



*WOOD BUFFALO*  
*ENVIRONMENTAL*  
*ASSOCIATION*

**OCTOBER 2014**  
**MONTHLY REPORT**



CONTINUOUS MONITORING  
INTEGRATED MONITORING  
November 28, 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

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November 27, 2014

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 October 2014  
Wood Buffalo Environmental Association**

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Enclosed is the October 2014 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 501 - Statoil Leismer  
AMS 502 - ConocoPhillips Surmont

WBEA commenced ambient air quality monitoring surveys at the Statoil Leismer and ConocoPhillips facilities on July 1, 2014. The survey at the Statoil Leismer facility was conducted from July 1 to October 14, 2014 to fulfill EPEA approval number 241311-00-02. The survey at the ConocoPhillips Surmont facility commenced on July 1, 2014 to fulfill EPEA approval number 48263-00-00.

These two stations are 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 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>.

Concentrations reported in near real-time were estimates, and 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.

## **2.0 Operational Status**

### **2.1 Continuous Monitoring**

In October 2014, there were no incidents resulting in a compliance monitoring instruments operating less than 90 % of the time.

### **2.2 Intermittent Monitoring**

The September and October results for passive and integrated monitoring of PAH, VOC, RSC, PM<sub>2.5</sub> and PM<sub>10</sub> are submitted with this report. Precipitation sample results were not available in time for submission with this report.

## **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***

Site preparation work conducted to upgrade the power lines at the site affected the normal operations of the NO<sub>2</sub> and NH<sub>3</sub> analyzers for 7 and 37 hours respectively.

Installation of new power lines to the station and the subsequent power interruption and analyzer stabilization periods on October 16 affected the normal operations of all air quality analyzers for 4 to 10 hours.

The NH<sub>3</sub> analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily span period. Additional time for stabilization after spanning 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 have been reported as invalid for a total of 30 hours this month.

Maintenance and investigation of O<sub>3</sub> analyzer responses at the station on September 14 interrupted normal operations of the analyzer for 6 hours.

A power spike at the station on October 19 affected the normal operations of NH<sub>3</sub> analyzer for 1 hour.

Maintenance to the sample inlet, flow audits and zero reference checks on October 21 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 1 hour.

The relative humidity sensor recorded intermittent periods of values exceeding the normal sensor operating range this reporting period. This resulted in 16 hours of invalid data.

Flat-line in the output signals of the wind sensor resulted in 32 hours of invalid data this reporting period.

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

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

Maintenance and cleaning of the sample manifold on October 20 affected the normal operations of air quality analyzers for 1 hour.

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

Flat-lines in the output signals of all meteorological sensors resulted in 15 to 20 hours of invalid data this reporting period.

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

Maintenance and cleaning of the sample manifold on October 20 affected the normal operations of air quality analyzers for 1 hour.

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

Maintenance and cleaning of the sample manifold on October 9 interrupted the normal operations of the H<sub>2</sub>S analyzer for 1 hour.

Flat-lines in the output signals of all meteorological sensors resulted in 12 to 18 hours of invalid data this reporting period.

#### ***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 period. Additional time for stabilization after spanning 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 span have been reported as invalid for a total of 31 hours this month.

There were two issues associated with operation of the PM<sub>2.5</sub> analyzer resulting in 31 hours of invalid data. Cleaning of the sample inlet, flow audits and zero reference checks on October 16 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 2 hour. The analyzer experienced seven episodes of unstable operations this reporting period, resulting in 29 hours of invalid data.

Maintenance and cleaning of the sample manifold on October 7 interrupted the normal operations of the TRS, O<sub>3</sub> and NH<sub>3</sub> analyzers for 2 hours.

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

Calibration of the wind speed and direction sensors at the station on October 8 interrupted the normal operations of these parameters for 1 hour.

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

Maintenance and cleaning of the sample manifold on October 15 interrupted the normal operations of the SO<sub>2</sub>, TRS, THC, and NO<sub>2</sub> analyzer for 1 to 2 hours.

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

Calibration of the wind speed and direction sensors at the station on October 9 interrupted the normal operations of these parameters for 1 hour.

Replacement of calibration gas, verification of gas-phase titration points for the NO<sub>2</sub> and O<sub>3</sub> calibration points at the station interrupted the normal operations of the O<sub>3</sub> and NO<sub>2</sub> analyzers for 2 and 4 hours, respectively.

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

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

Maintenance and audit of the tipping bucket precipitation collector on October 2 resulted in 1 hour of invalid data.

A power spike at the station on October 2 affected the normal operations of O<sub>3</sub> analyzer for 1 hour.

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

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

Maintenance and cleaning of the sample manifold on October 17 affected the normal operations of the H<sub>2</sub>S analyzer for 1 hour.

Maintenance on the zero air generator at the station on October 23 affected the normal operations of the THC analyzer for 2 hours.

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

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

Maintenance and cleaning of the sample manifold on October 20 affected the normal operations of air quality analyzers for 1 hour.

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

Maintenance to the sample inlet, flow audits and zero reference checks on October 23 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 3 hours.

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

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

The SO<sub>2</sub> and THC analyzers experienced multiple episodes of intermittent unstable operations due to baseline drift this reporting period. This resulted in 10 hours of invalid data for each analyzer.

Maintenance and cleaning of the sample manifold on October 22 affected the normal operations of the SO<sub>2</sub>, O<sub>3</sub> and NO<sub>2</sub> analyzer for 1 hour.

Maintenance to the sample inlet, flow audits and zero reference checks on October 22 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 8 hours of invalid data this reporting period.

Calibration of the wind speed and direction sensors at the station on October 22 interrupted the normal operations of these parameters for 1 hour.

Maintenance on the daily zero and span systems and the in-situ calibrator on October 23 interrupted the normal operations of the THC and O<sub>3</sub> analyzers for 1 and 2 hours, respectively.

A loose signal wire connection to the data logger failed to intermittently record relative humidity and temperature sensor data on October 21 to 23, resulting in 49 hours of invalid data for this reporting period. The sensor wiring and connections to the data logger were resolved on October 23, 2014.

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

Maintenance to the sample inlet, flow audits and zero reference checks on October 15 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 1 hour.

Flat-lines in the output signals of the wind sensor resulted in 34 hours of invalid data this reporting period.

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

The SO<sub>2</sub> analyzer experienced multiple episodes of intermittent unstable operations due to baseline drift this reporting period. This resulted in 8 hours of invalid data.

A flat line in the output signals of the wind sensor on October 2 resulted in 2 hours of invalid data.

An electrical interference on the NO<sub>x</sub> channel on the NO-NO<sub>2</sub>-NO<sub>x</sub> analyzer resulted in 10 hours of invalid data this reporting period.



There were two issues associated with operation of the PM<sub>2.5</sub> analyzer resulting in 3 hours of invalid data. A power line voltage variance on October 19 affected the normal operations of the analyzer for 2 hours. Maintenance to the sample inlet, flow audits and zero reference checks on October 21 interrupted the normal operations of the analyzer for 1 hour.

Maintenance and cleaning of the sample manifold on October 21 affected the normal operations of the TRS analyzer for 1 hour.

Maintenance and cleaning of the tipping bucket precipitation sampler on October 21 resulted in 1 hour of downtime.

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

Maintenance to the sample inlet, flow audits and zero reference checks on October 17 and 22 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 3 hours.

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

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

Station operator activities during the installation of the acoustic wind profiler at the site on October 1 affected the normal operation of all air quality analyzers for 3 to 6 hours.

An aborted calibration at the station on October 21 interrupted the normal operations of the SO<sub>2</sub>, NO<sub>2</sub> and THC analyzers for 1 hour.

Maintenance to the sample inlet, flow audits and zero reference checks on October 22 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 3 hours.

Flat-lines in the output signals of the wind sensor resulted in 47 hours of invalid data this reporting period.

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

The H<sub>2</sub>S analyzer experienced four episodes of intermittent unstable operations due to excessive baseline drift resulting in 5 hours of invalid data.

The THC analyzer experienced a single episode of unstable operations this reporting period, resulting in 6 hours of invalid data.

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

***Station 501, Statoil Leismer***

WBEA commissioned an ambient air quality survey at the Statoil Leismer facility from July 1 to October 14, 2014 to fulfill Alberta Environment's Environmental Protection and Enhancement Act facility approval number 241311-00-02. This station was 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 4 hours of invalid data.

The H<sub>2</sub>S analyzer experienced intermittent periods of unstable operations due to excessive baseline drift resulting in 2 hours of invalid data.

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

***Station 502, ConocoPhillips Surmont***

WBEA commissioned an ambient air quality survey at the ConocoPhillips facility to fulfill Alberta Environment's Environmental Protection and Enhancement Act (EPEA) facility approval number 48263-00-00. This station is equipped with ambient air quality analyzers for SO<sub>2</sub>, H<sub>2</sub>S, NO, NO<sub>2</sub>, NO<sub>x</sub> and meteorological sensors for ambient temperature, relative humidity, and wind speed and direction.

The data acquisition system failed to record data on October 9 resulting in the absence of data for 2 hours for all parameters.

The SO<sub>2</sub> analyzer experienced extended stabilization periods after the daily span checks this reporting month, resulting in 31 hours of invalid data.

The H<sub>2</sub>S analyzer experienced a single episode of unstable operations due to excessive baseline drift resulting in 2 hours of invalid data.

Maintenance and cleaning of the sample manifold on October 29 affected the normal operations of the SO<sub>2</sub> and NO<sub>2</sub> analyzers for 2 hours.

***Station 101, Portable***

Not in operation during 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)

OCTOBER 2014

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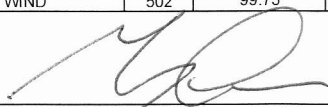
APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	10	2014					
254465-00-00							
149968-00-01							
48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
224816-00-03	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
189942-00-02	SO2(ppm)	1	98.66	0.029	0	0.004	0
206355-00-00	SO2(ppm)	2	99.87	0.058	0	0.018	0
46586-00-00	SO2(ppm)	4	99.87	0.031	0	0.004	0
216466-00-04	SO2(ppm)	5	100.00	0.067	0	0.008	0
137467-00-00	SO2(ppm)	6	100.00	0.023	0	0.005	0
20809-01-00	SO2(ppm)	7	99.87	0.019	0	0.004	0
241311-00-00	SO2(ppm)	8	100.00	0.007	0	0.002	0
094-02-00	SO2(ppm)	11	99.87	0.053	0	0.009	0
305529-00-00	SO2(ppm)	12	100.00	0.023	0	0.005	0
026-02-00	SO2(ppm)	13	98.52	0.034	0	0.005	0
228044-00-00	SO2(ppm)	14	100.00	0.006	0	0.001	0
73203-01-00	SO2(ppm)	15	98.92	0.023	0	0.005	0
	SO2(ppm)	16	100.00	0.026	0	0.005	0
	SO2(ppm)	17	99.46	0.026	0	0.003	0
	SO2(ppm)	19	100.00	0.020	0	0.004	0
	SO2(ppm)	501	98.77	0.006	0	0.003	0
	SO2(ppm)	502	95.43	0.007	0	0.002	0
	H2S(ppm)	2	99.87	0.004	0	0.001	0
	H2S(ppm)	4	99.87	0.002	0	0.000	0
	H2S(ppm)	5	99.87	0.005	0	0.001	0
	H2S(ppm)	11	99.87	0.006	0	0.001	0
	H2S(ppm)	17	99.60	0.002	0	0.001	0
	H2S(ppm)	19	98.92	0.003	0	0.001	0
	H2S(ppm)	501	99.39	0.003	0	0.001	0
	H2S(ppm)	502	99.46	0.002	0	0.000	0
	TRS(ppm)	1	99.33	0.002	0	0.001	0
	TRS(ppm)	6	99.73	0.001	0	0.001	0
	TRS(ppm)	7	99.87	0.004	0	0.001	0
	TRS(ppm)	9	99.87	0.001	0	0.000	0
	TRS(ppm)	12	100.00	0.002	0	0.001	0
	TRS(ppm)	13	100.00	0.002	0	0.000	0
	TRS(ppm)	14	100.00	0.003	0	0.001	0
	TRS(ppm)	15	99.87	0.001	0	0.000	0
	THC(ppm)	1	99.19	2.9	-	2.1	-
	THC(ppm)	2	99.87	5.2	-	3.0	-
	THC(ppm)	4	99.87	3.5	-	2.6	-
	THC(ppm)	5	100.00	4.2	-	2.6	-
	THC(ppm)	6	100.00	2.3	-	2.1	-
	THC(ppm)	7	99.73	2.6	-	2.1	-
	THC(ppm)	9	99.73	3.3	-	2.4	-
	THC(ppm)	11	99.87	4.3	-	2.6	-
	THC(ppm)	12	100.00	4.6	-	3.0	-
	THC(ppm)	13	98.52	4.3	-	2.4	-
	THC(ppm)	14	100.00	4.2	-	2.2	-
	THC(ppm)	15	100.00	11.9	-	3.7	-
	THC(ppm)	16	100.00	5.6	-	3.0	-
	THC(ppm)	17	99.33	2.7	-	2.2	-
	THC(ppm)	19	99.19	2.5	-	2.3	-
	O3(ppm)	1	99.46	0.044	0	0.034	-
	O3(ppm)	6	99.73	0.041	0	0.031	-

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

OCTOBER 2014

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APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	10	2014					
254465-00-00							
149968-00-01							
48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00							
224816-00-03				ONE-HOUR AVERAGE		24-HOUR AVERAGE	
189942-00-02	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
206355-00-00							
46586-00-00							
216466-00-04	O3(ppm)	7	99.73	0.039	0	0.026	-
137467-00-00	O3(ppm)	8	99.87	0.037	0	0.030	-
20809-01-00	O3(ppm)	13	99.46	0.040	0	0.026	-
241311-00-02	O3(ppm)	14	100.00	0.042	0	0.035	-
094-02-00	O3(ppm)	17	99.60	0.041	0	0.029	-
305529-00-00	NO2(ppm)	1	98.52	0.024	0	0.011	-
026-02-00	NO2(ppm)	6	100.00	0.023	0	0.008	-
228044-00-00	NO2(ppm)	7	99.33	0.041	0	0.015	-
73203-01-00	NO2(ppm)	8	100.00	0.016	0	0.005	-
	NO2(ppm)	12	100.00	0.030	0	0.018	-
	NO2(ppm)	13	99.87	0.029	0	0.009	-
	NO2(ppm)	14	100.00	0.011	0	0.003	-
	NO2(ppm)	15	98.66	0.033	0	0.014	-
	NO2(ppm)	16	100.00	0.045	0	0.016	-
	NO2(ppm)	17	99.33	0.024	0	0.009	-
	NO2(ppm)	19	100.00	0.038	0	0.012	-
	NO2(ppm)	501	100.00	0.026	0	0.006	-
	NO2(ppm)	502	99.60	0.035	0	0.013	-
	CO(ppm)	7	100.00	0.6	0	0.1	-
	NH3(ppm)	1	90.19	0	0	0	-
	NH3(ppm)	6	95.56	0	0	0	-
	PM2.5(ug/m <sup>3</sup> )	1	99.33	31.4	-	9.7	0
	PM2.5(ug/m <sup>3</sup> )	6	95.83	35.5	-	8.9	0
	PM2.5(ug/m <sup>3</sup> )	7	99.46	45.8	-	10.9	0
	PM2.5(ug/m <sup>3</sup> )	8	99.73	17.7	-	6	0
	PM2.5(ug/m <sup>3</sup> )	12	99.60	28.9	-	7.9	0
	PM2.5(ug/m <sup>3</sup> )	13	99.73	19.1	-	7.1	0
	PM2.5(ug/m <sup>3</sup> )	14	99.87	74.5	-	5.8	0
	PM2.5(ug/m <sup>3</sup> )	15	99.60	23.3	-	9.7	0
	PM2.5(ug/m <sup>3</sup> )	16	99.60	55.3	-	14.9	0
	PM2.5(ug/m <sup>3</sup> )	17	98.79	32.1	-	7	0
	WIND	1	95.70	-	-	-	-
	WIND	2	100.00	-	-	-	-
	WIND	4	100.00	-	-	-	-
	WIND	5	97.58	-	-	-	-
	WIND	6	99.73	-	-	-	-
	WIND	7	99.87	-	-	-	-
	WIND	8	99.87	-	-	-	-
	WIND	9	98.92	-	-	-	-
	WIND	11	100.00	-	-	-	-
	WIND	12	99.46	-	-	-	-
	WIND	13	98.79	-	-	-	-
	WIND	14	95.43	-	-	-	-
	WIND	15	99.73	-	-	-	-
	WIND	16	99.06	-	-	-	-
	WIND	17	93.68	-	-	-	-
	WIND	19	94.35	-	-	-	-
	WIND	501	96.62	-	-	-	-
	WIND	502	99.73	-	-	-	-
							
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**  
**OCTOBER 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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY - BERTHA GANTER (AMS 1)  
OCTOBER 2014

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	694	40	50	98.66	29	0	4	0
TRS(ppb) Average	703	36	41	99.33	2	0	1	0
THC(ppm) Average	703	35	41	99.19	2.9	-	2.1	-
NMHC(ppm) Average	703	35	41	99.19	0.161	-	0.014	-
CH4(ppm) Average	703	35	41	99.19	2.9	-	2.1	-
O3 (ppb) Average	704	36	40	99.46	44	0	34	-
NO2 (ppb) Average	697	36	47	98.52	24	0	11	-
NO (ppb) Average	697	36	47	98.52	69	-	11	-
NOX (ppb) Average	697	36	47	98.52	87	-	21	-
NH3 (ppb) Average	631	40	113	90.19	0	0	0	-
PM2.5 (ug/m3) Average	739	0	5	99.33	31.4	-	9.7	0
Wind Speed 10 m (km/h) Average	712	0	32	95.70	22	-	-	-
Wind Direction 10 m (deg) Average	712	0	32	95.70	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	22.5	-	14.9	-
Temperature 10 m (C) Average	744	0	0	100.00	21.7	-	15.3	-
Relative Humidity (%) Average	728	0	16	97.85	100	-	-	-
Precipitation (mm) Total	744	0	0	100.00	1.8	-	-	-
Surface Wetness (% of range) Average	744	0	0	100.00	96	-	-	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	256	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT MCKAY (AMS 1)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	694	1.4	2	-	0	0	1	1	1	3	29
TRS (ppb) Average	703	0.4	0	-	0	0	0	0	0	1	2
THC (ppm) Average	703	1.89	0.1	-	1.7	1.8	1.8	1.8	1.9	2.1	2.9
NMHC(ppm) Average	703	0.001	0.01	-	0	0	0	0	0	0	0.161
CH4(ppm) Average	703	1.89	0.1	-	1.7	1.8	1.8	1.8	1.9	2.1	2.9
O3 (ppb) Average	704	14.8	9	-	3	4	8	13	19	27	44
NO2 (ppb) Average	697	5.6	5	-	0	0	1	5	9	12	24
NO (ppb) Average	697	3.4	8	-	0	0	0	0	3	10	69
NOX (ppb) Average	697	9.1	11	-	0	0	1	6	11	21	87
NH3 (ppb) Average	631	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	739	4.49	3.7	-	0	1.1	2	3.5	5.8	9.3	31.4
Wind Speed 10 m (km/h) Average	712	5.7	4	-	0	2	3	5	8	10	22
Wind Direction 10 m (deg) Average	712	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	6.99	4.7	-	-1.4	2	3.2	6.3	9.8	13.8	22.5
Temperature 10 m (C) Average	744	7.52	4.4	-	0	2.5	3.6	7.2	10.3	14	21.7
Relative Humidity (%) Average	728	80.5	15	-	41	57	71	84	93	97	100
Precipitation (mm) Total	744	-	-	31.75	0	0	0	0	0	0	1.8
Surface Wetness (% of range) Average	744	4.5	13	-	0	0	0	0	0	13	96
Global Solar Radiation (W/m2) Average	744	34.3	59	-	0	0	0	0	45	130	256

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER Fort McKAY (AMS 1)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	16 Oct 2014 11:00	16 Oct 2014 20:00	10	Station power interruption - power upgrade, stabilization
TRS	16 Oct 2014 11:00	16 Oct 2014 15:00	5	Station power interruption - power upgrade, stabilization
NMHC, CH4, THC	16 Oct 2014 10:00	16 Oct 2014 15:00	6	Station power interruption - power upgrade, stabilization
O3	16 Oct 2014 11:00	16 Oct 2014 14:00	4	Station power interruption - power upgrade, stabilization
NO2, NO, NOX	08 Oct 2014 15:00	08 Oct 2014 21:00	7	Maintenance mode - excavation on site
NO2, NO, NOX	16 Oct 2014 11:00	16 Oct 2014 14:00	4	Station power interruption - power upgrade, stabilization
NH3	01 Oct 2014 03:00	31 Oct 2014 03:00	30	Stabilization after daily span
NH3	07 Oct 2014 14:00	07 Oct 2014 18:00	5	Unstable operation as a result of excavation on site
NH3	08 Oct 2014 15:00	09 Oct 2014 20:00	30	Unstable operation as a result of excavation on site
NH3	10 Oct 2014 16:00	10 Oct 2014 17:00	2	Unstable operation as a result of excavation on site
NH3	16 Oct 2014 11:00	16 Oct 2014 15:00	5	Station power interruption - power upgrade, stabilization
NH3	19 Oct 2014 08:00	19 Oct 2014 08:00	1	Power spike
PM2.5	16 Oct 2014 11:00	16 Oct 2014 14:00	4	Station power interruption - power upgrade, stabilization
PM2.5	21 Oct 2014 17:00	21 Oct 2014 17:00	1	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	02 Oct 2014 01:00	02 Oct 2014 02:00	2	Flat line in sensor output signal
Wind Speed, Wind Direction	02 Oct 2014 06:00	02 Oct 2014 09:00	4	Flat line in sensor output signal
Wind Speed, Wind Direction	07 Oct 2014 21:00	07 Oct 2014 21:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	07 Oct 2014 23:00	07 Oct 2014 23:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	16 Oct 2014 08:00	16 Oct 2014 08:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	29 Oct 2014 17:00	30 Oct 2014 15:00	23	Flat line in sensor output signal
Relative Humidity	02 Oct 2014 00:00	02 Oct 2014 03:00	4	Intermittent unstable operation - exceed upper range
Relative Humidity	04 Oct 2014 07:00	04 Oct 2014 08:00	2	Intermittent unstable operation - exceed upper range
Relative Humidity	06 Oct 2014 07:00	06 Oct 2014 09:00	3	Intermittent unstable operation - exceed upper range
Relative Humidity	08 Oct 2014 03:00	08 Oct 2014 03:00	1	Intermittent unstable operation - exceed upper range
Relative Humidity	19 Oct 2014 07:00	19 Oct 2014 11:00	5	Intermittent unstable operation - exceed upper range
Relative Humidity	24 Oct 2014 06:00	24 Oct 2014 06:00	1	Intermittent unstable operation - exceed upper range

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Summary of Hour Averages

Fort McKay - Bertha Ganter - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 29 ppb on Oct 3 12:00	Maximum Daily Average: 3.9 ppb on Oct 10		Hours of Data:	694
Minimum Value: 0 ppb on Oct 15 23:00	Minimum Daily Average: 0.3 ppb on Oct 15		Hours of Missing Data:	50
Maximum Diurnal Average: 3.3 ppb at hour 12	Minimum Diurnal Average: 0.7 ppb at hour 4		Hours of Calibration:	40
Monthly Average: 1.4 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> = 15		Percent Operational Time:	98.7

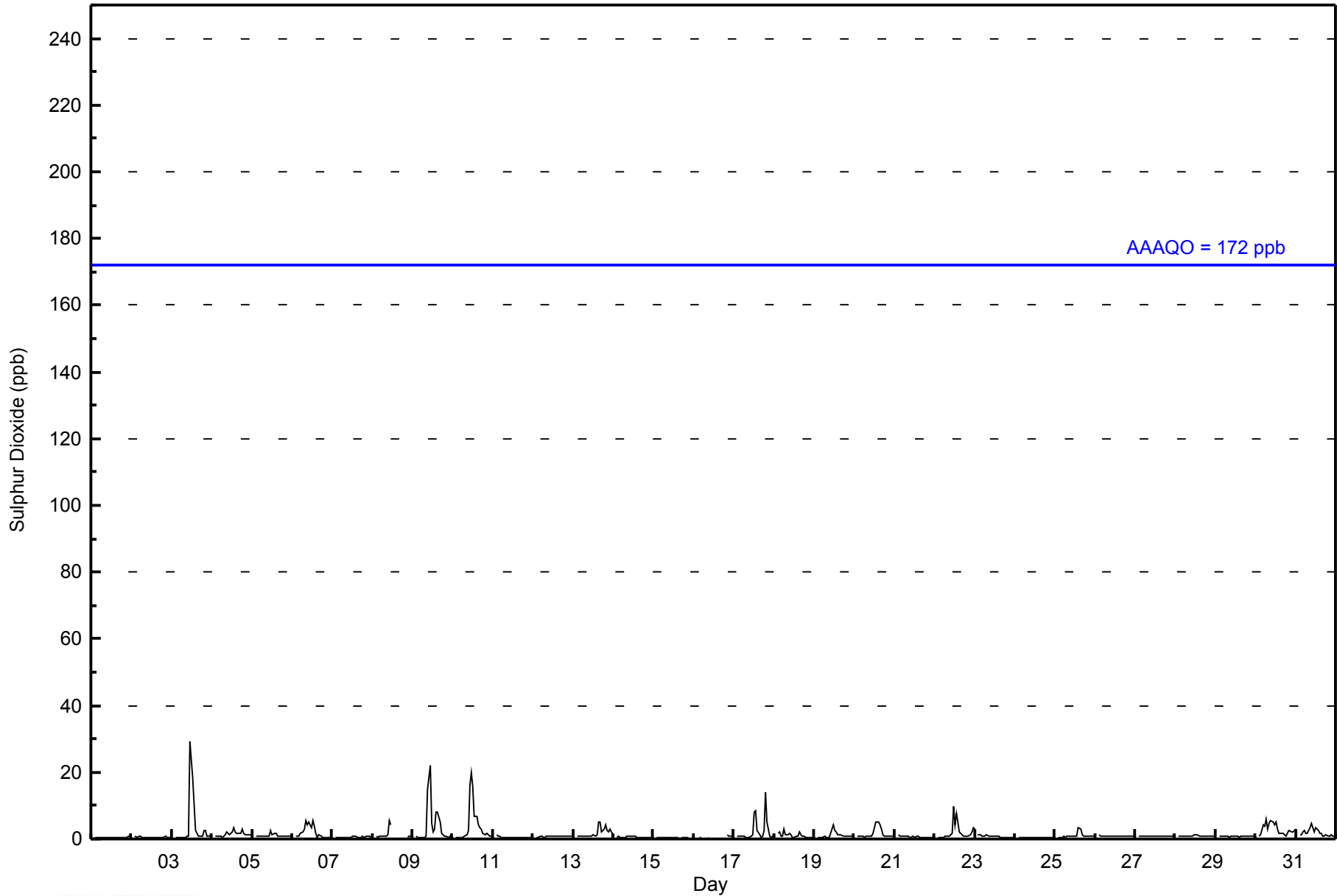
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1																								
2-Oct	0	Z	1	1	1	1	1	0	1	1	1	1	0	0	0	0	1	0	1	1	1	0	1	0	0.5	1																							
3-Oct	0	Z	1	1	0	1	1	0	1	1	1	29	18	10	3	2	1	1	1	2	3	1	1	1	3.4	29																							
4-Oct	1	Z	1	1	1	1	0	1	1	2	1	2	2	3	2	2	2	2	3	2	1	1	1	1	1.4	3																							
5-Oct	1	Z	1	1	1	1	1	1	1	1	1	2	1	2	2	1	1	1	1	1	1	1	1	1	1.0	2																							
6-Oct	1	Z	1	1	1	2	2	3	6	4	5	4	5	4	2	1	1	1	1	1	0	0	0	0	2.0	6																							
7-Oct	0	Z	0	0	1	1	0	1	0	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	0.6	1																							
8-Oct	1	Z	1	1	1	1	1	1	1	1	6	4	C	C	C	C	C	C	C	C	C	1	1	1	--	6																							
9-Oct	1	Z	1	0	1	1	1	0	1	15	22	5	2	3	8	8	5	2	1	1	1	1	1	1	3.4	22																							
10-Oct	1	Z	0	0	0	0	0	1	1	2	16	20	16	7	7	4	4	3	2	1	2	1	1	1	3.9	20																							
11-Oct	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	1	0.5	1																							
12-Oct	0	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																							
13-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5	2	3	4	3	2	3	2	1.8	5																							
14-Oct	1	Z	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	1	0	0	1	1	1	1	0.6	1																							
15-Oct	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
16-Oct	0	Z	0	0	0	0	0	0	0	0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	1	1	1	1	--	1																							
17-Oct	1	Z	1	1	1	1	1	1	1	1	1	8	8	3	1	0	1	3	14	5	1	1	1	1	2.3	14																							
18-Oct	1	Z	2	2	1	1	3	1	1	2	1	1	1	1	2	1	1	1	1	0	0	0	0	0	1.1	3																							
19-Oct	0	Z	0	0	1	1	1	1	0	1	2	4	3	2	1	1	1	1	1	1	1	1	1	1	1.1	4																							
20-Oct	1	Z	1	1	1	1	1	1	1	1	1	2	3	5	5	4	3	1	1	1	1	1	1	1	1.6	5																							
21-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	1	0	1	0.7	1																							
22-Oct	1	Z	1	0	0	1	1	1	1	1	2	10	4	8	5	2	1	1	1	1	1	1	2	3	2.0	10																							
23-Oct	3	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1	0	0	0.9	3																							
24-Oct	0	Z	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0.5	1																							
25-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	3	3	1	1	1	1	1	1	1	1	1.0	3																							
26-Oct	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																							
27-Oct	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																							
28-Oct	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																							
29-Oct	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																							
30-Oct	1	Z	1	1	4	4	6	3	5	5	5	4	5	3	2	2	2	1	1	2	3	2	2	3	2.9	6																							
31-Oct	3	Z	1	1	2	2	2	2	4	5	3	2	4	3	2	2	1	1	1	1	1	1	1	1	1.9	5																							
																								0.8	--	0.8	0.7	0.8	0.8	1.0	0.9	1.1	1.7	2.6	3.3	2.9	2.4	1.9	1.7	1.3	1.0	1.0	1.4	1.1	0.8	0.9	0.9	Diurnal Average	
																								3	--	2	2	4	4	6	3	6	15	22	29	18	10	8	8	5	3	3	14	5	2	3	3	Diurnal Maximum	

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - October 2014





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	686	98.85	98.85
11 - 20	6	0.86	99.71
21 - 60	2	0.29	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 694

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	88	40	20	11	8	10	24	61	77	39	32	32	43	58	71	42	656
11 - 20	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	6
21 - 60	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	88	40	20	11	8	10	24	62	84	39	32	32	43	58	71	42	664

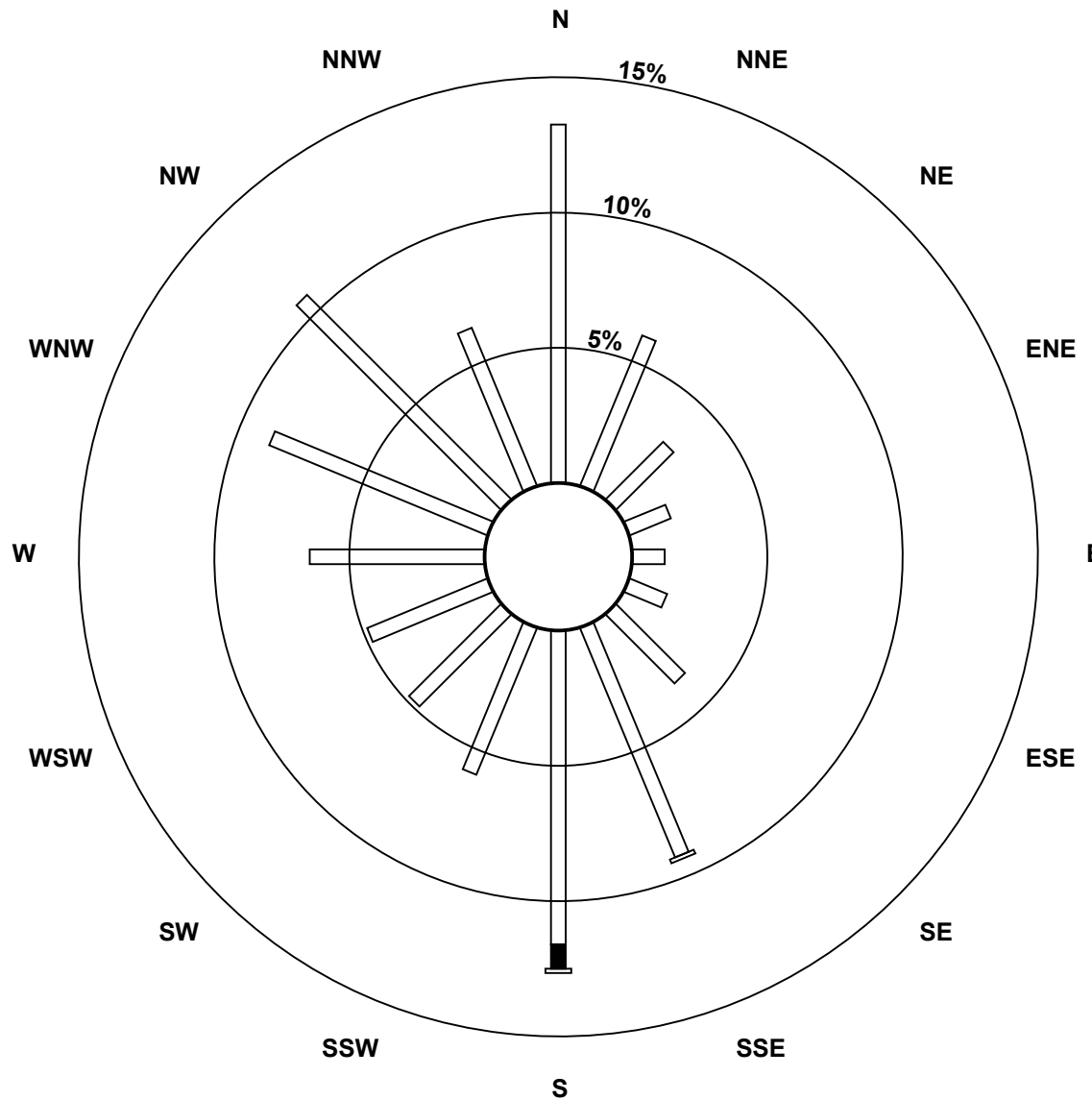
Total Number of Valid Hours: 664

Total Number of Hours: 744

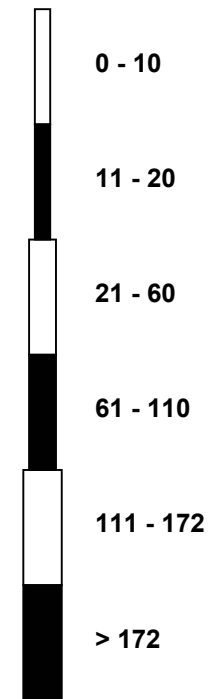


**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



Classes (ppb)

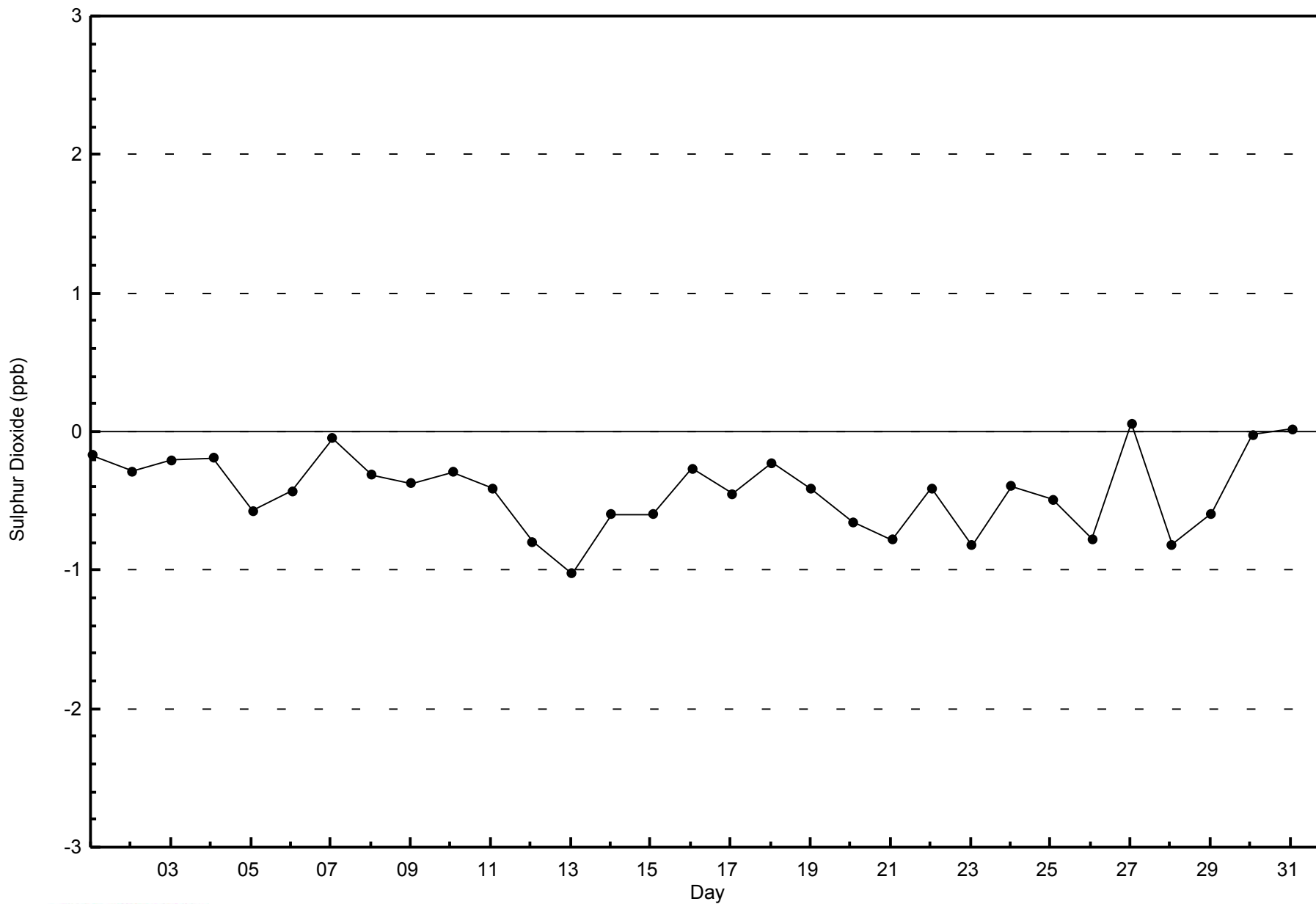


Total Number of Valid Hours: 664



WBEA  
Zero Responses

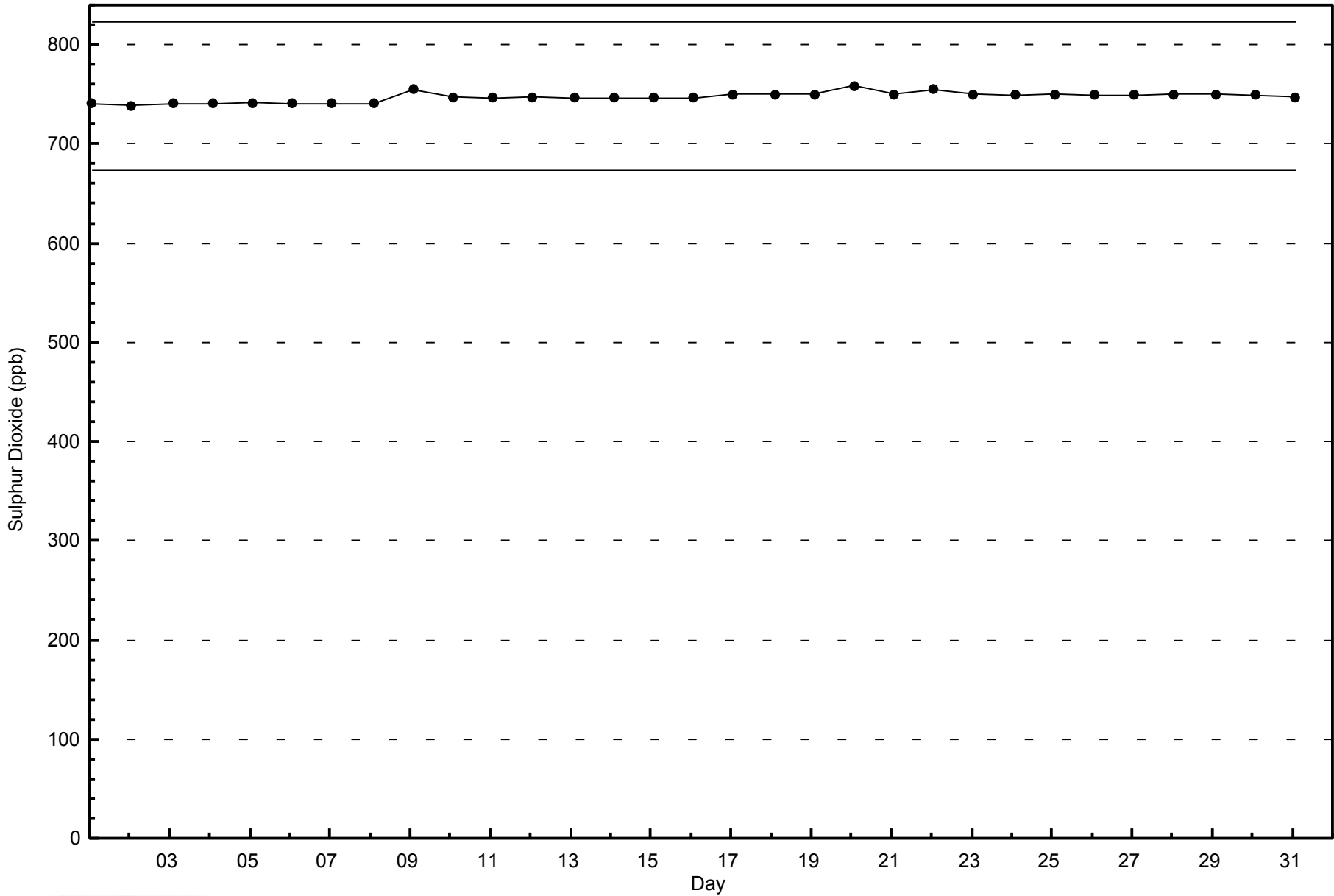
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - October 2014





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - October 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb  
Fort McKay - Bertha Ganter - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Oct 31 18:00	Maximum Daily Average: 0.8 ppb on Oct 10		Hours of Data:	703
Minimum Value: 0 ppb on Oct 8 04:00	Minimum Daily Average: 0.3 ppb on Oct 27		Hours of Missing Data:	41
Maximum Diurnal Average: 0.5 ppb at hour 11	Minimum Diurnal Average: 0.4 ppb at hour 6		Hours of Calibration:	36
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:	99.3

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

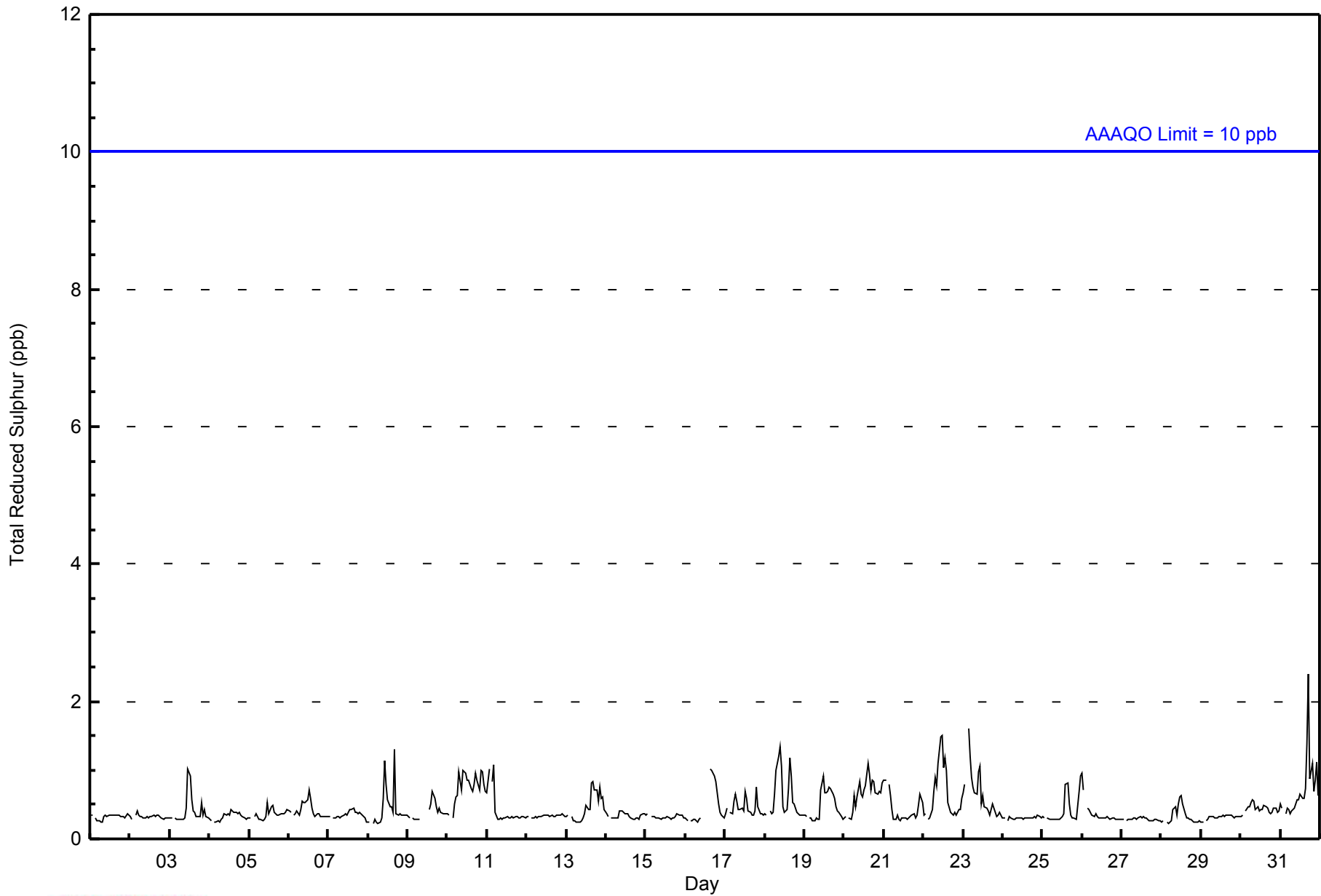
0.4	0.4	--	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	Diurnal Average
1	1	--	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	Diurnal Maximum

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



**WBEA**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	703	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: 703

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**

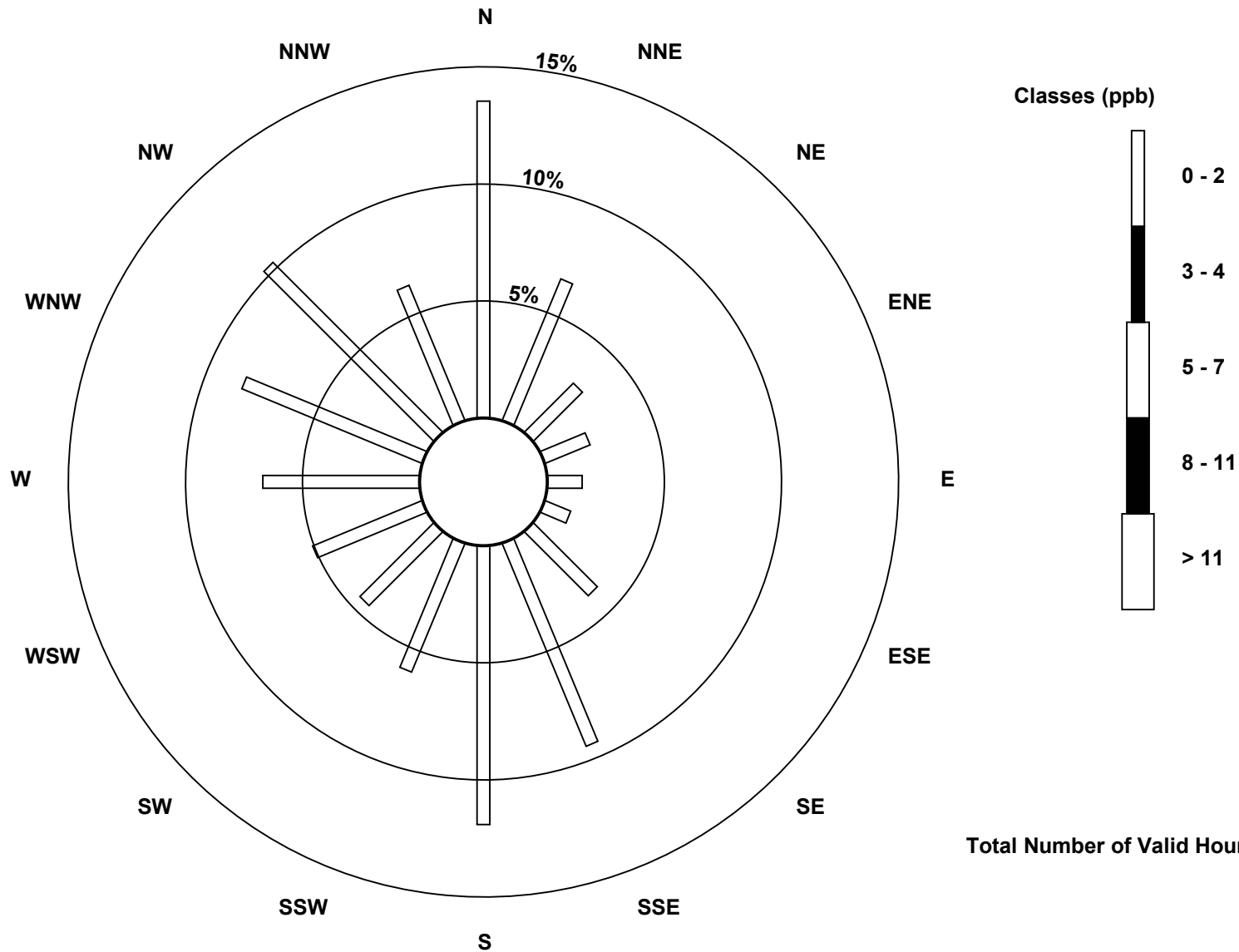
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	91	44	20	14	10	8	26	63	80	40	30	34	45	56	69	42	672
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	91	44	20	14	10	8	26	63	80	40	30	34	45	56	69	42	672

Total Number of Valid Hours: 672

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



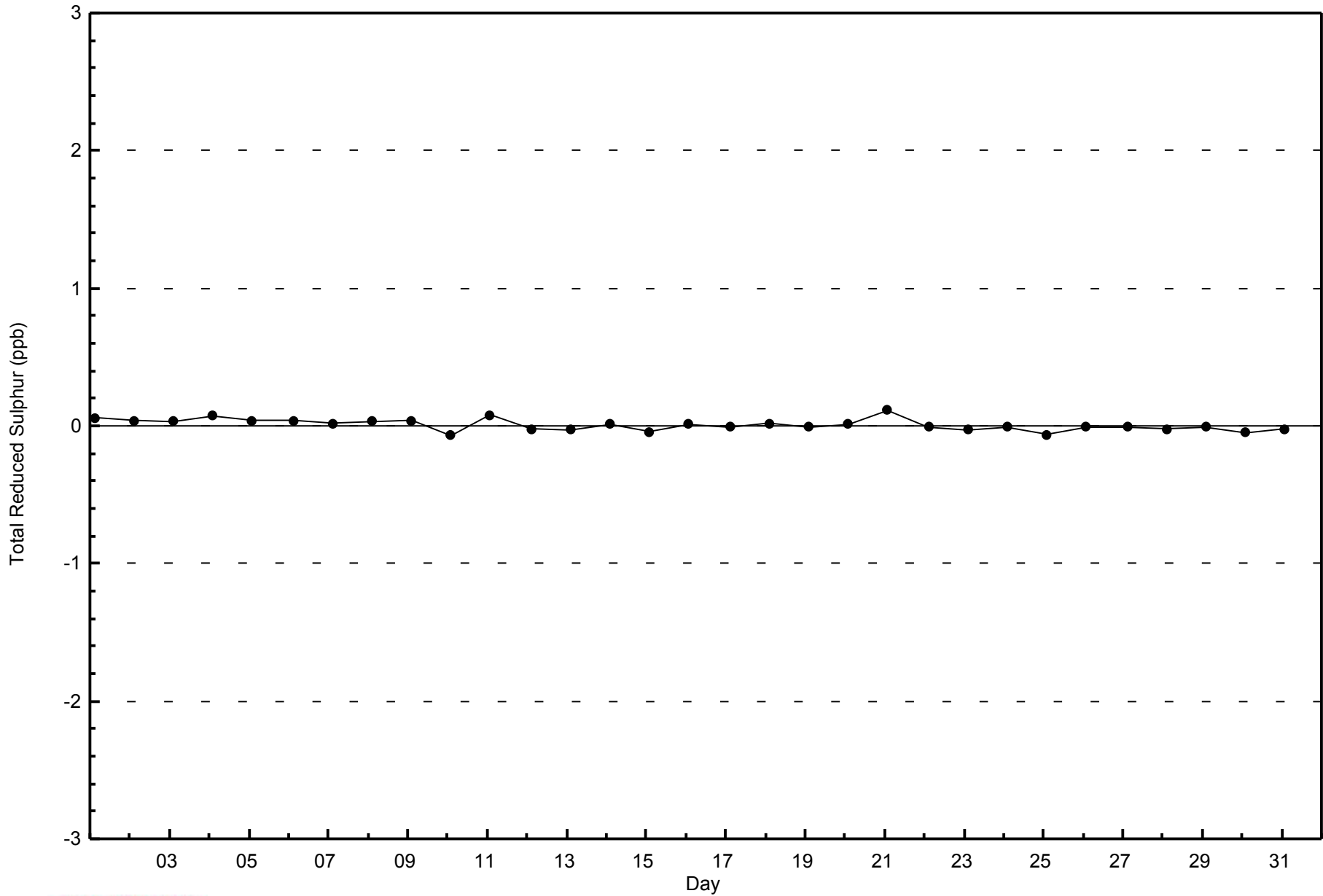
**Total Number of Valid Hours: 672**





WBEA  
Zero Responses

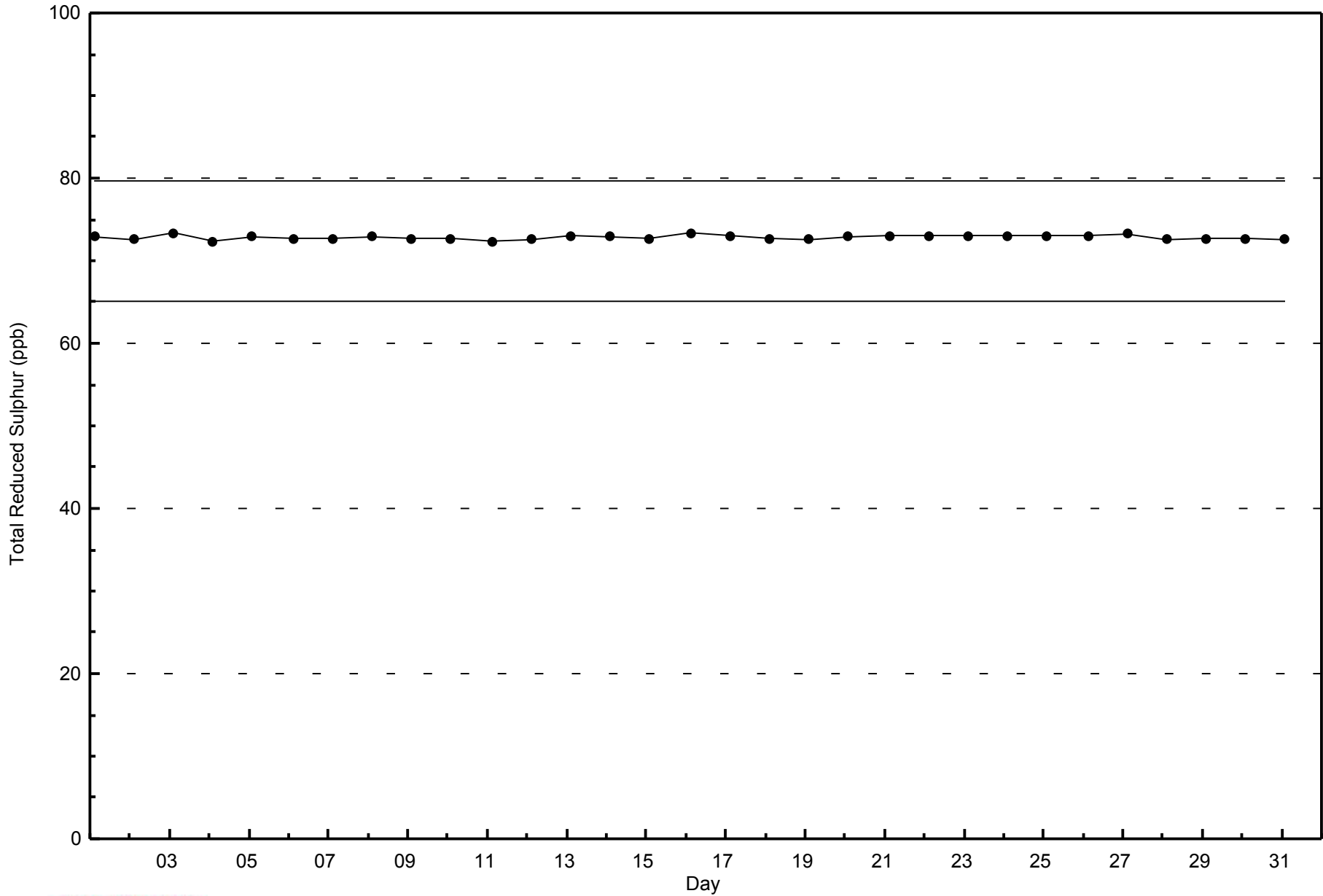
Total Reduced Sulphur (TRS) - ppb  
Fort McKay - Bertha Ganter - October 2014





**WBEA**  
**Span Responses**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**



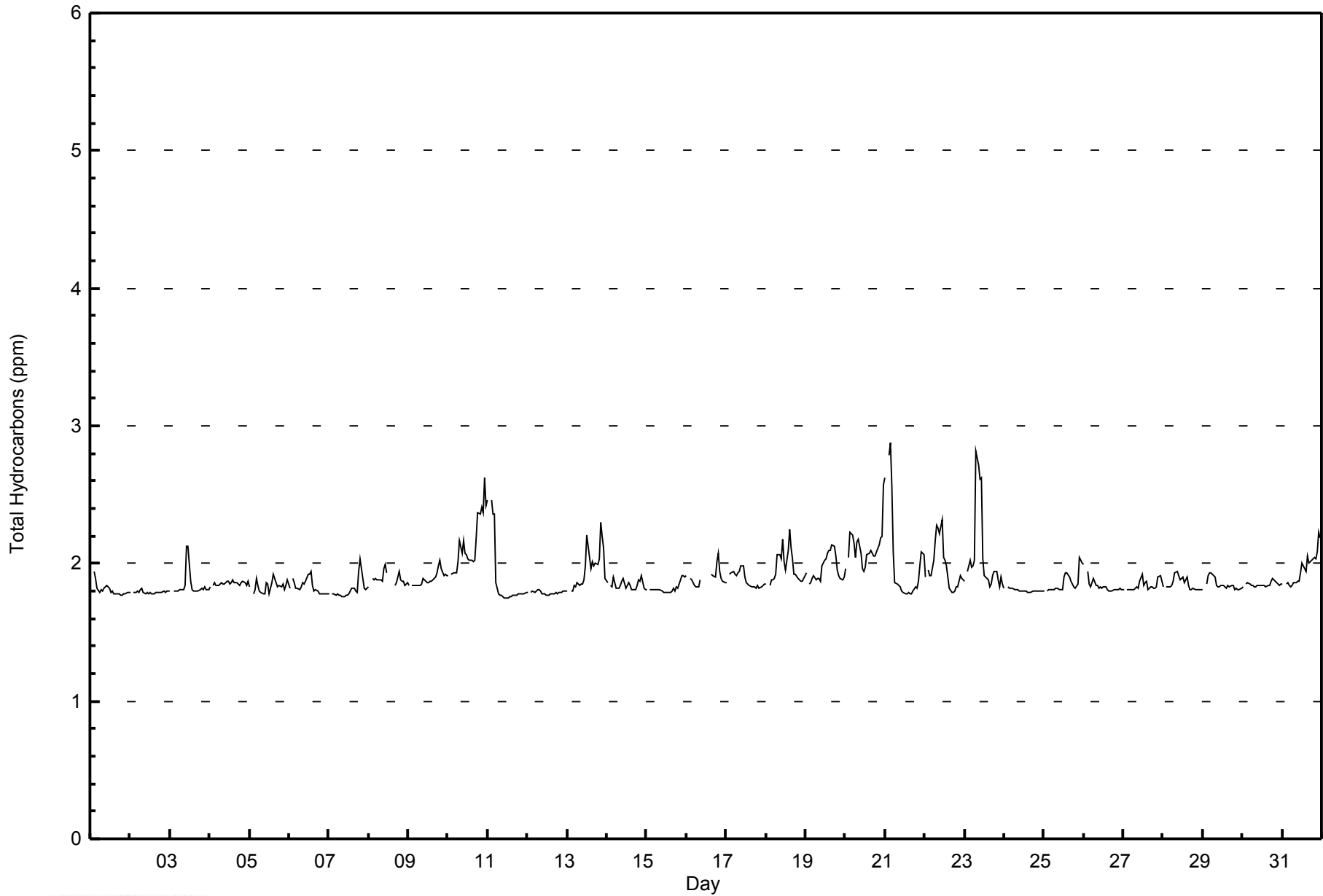


Maximum Value: 2.9 ppm on Oct 21 04:00															Maximum Daily Average: 2.1 ppm on Oct 10															Hours in Service: 744																						
Minimum Value: 1.7 ppm on Oct 11 11:00															Minimum Daily Average: 1.8 ppm on Oct 12															Hours of Data: 703																						
Maximum Diurnal Average: 1.9 ppm at hour 11															Minimum Diurnal Average: 1.9 ppm at hour 17															Hours of Missing Data: 41																						
Monthly Average: 1.89 ppm															Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.8 Q <sub>1</sub> = 1.8 Median = 1.8 Q <sub>3</sub> = 1.9 P <sub>90</sub> = 2.1 P <sub>99</sub> = 2.6															Hours of Calibration: 35																						
																														Percent Operational Time: 99.2																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																												
1-Oct	1.8	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8																									
2-Oct	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	1.8	1.8	1.8	1.8	1.8																								
3-Oct	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.1	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8																								
4-Oct	1.8	Z	1.8	1.9	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.8	1.9	1.9	1.8	1.9	1.9	1.9																								
5-Oct	1.8	Z	1.8	1.8	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	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8																								
6-Oct	1.8	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8																								
7-Oct	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	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8																								
8-Oct	1.8	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	C	C	C	C	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9																								
9-Oct	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9																								
10-Oct	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.2	2.1	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.2	2.4	2.4	2.4	2.4	2.6	2.4	2.1	2.6	2.1	2.6																								
11-Oct	2.5	Z	2.5	2.4	2.4	1.9	1.8	1.8	1.8	1.8	1.7	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8																								
12-Oct	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	1.8	1.8	1.8	1.8	1.8																								
13-Oct	1.8	Z	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.9	2.0	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.2	2.1	1.9	2.0	2.3	2.0	2.3																								
14-Oct	1.9	Z	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8																								
15-Oct	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.9																								
16-Oct	1.9	Z	1.9	1.9	1.9	1.8	1.8	1.8	1.9	PF	PF	PF	PF	PF	PF	1.9	1.9	1.9	2.0	2.1	1.9	1.9	1.9	1.9	--	2.1	--	2.1																								
17-Oct	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	1.8	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																								
18-Oct	1.9	Z	1.8	1.9	1.9	1.9	1.9	2.1	2.1	2.0	2.2	2.0	2.0	2.1	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.0	2.2																								
19-Oct	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	2.1	2.1	2.1	2.1	2.0	1.9	1.9	1.9	2.0	2.1	2.0	2.1																								
20-Oct	2.0	Z	2.0	2.2	2.2	2.1	2.0	2.2	2.2	2.1	2.0	1.9	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.6	2.1	2.6	2.1	2.6																								
21-Oct	2.6	Z	2.8	2.9	2.6	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.1	2.1	2.0	2.9	2.0	2.9																								
22-Oct	1.9	Z	1.9	1.9	1.9	2.0	2.2	2.3	2.3	2.2	2.3	2.0	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.3	2.0	2.3																								
23-Oct	1.9	Z	1.9	2.0	2.0	2.0	2.0	2.8	2.7	2.6	2.6	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.8	1.9	1.9	2.1	2.8	2.1	2.8																								
24-Oct	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	1.8	1.8	1.8	1.8	1.8																								
25-Oct	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	2.0	2.0	2.0	1.9	2.0	1.9	2.0																								
26-Oct	2.0	Z	1.9	1.9	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8																								
27-Oct	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8																								
28-Oct	1.8	Z	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	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8																								
29-Oct	1.8	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8																								
30-Oct	1.8	Z	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8																								
31-Oct	1.8	Z	1.8	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.0	2.2	2.0	2.2																								
																								1.9	--	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	Diurnal Average	
																								2.6	--	2.8	2.9	2.6	2.1	2.2	2.8	2.7	2.6	2.6	2.1	2.2	2.1	2.2	2.1	2.1	2.2	2.4	2.4	2.4	2.4	2.6	2.6	2.1	2.6	2.1	2.6	Diurnal Maximum
Z - zerospan																								C - Calibration				PF - Power Failure																								



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay - Bertha Ganter - October 2014**





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

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	631	89.76	89.76
2.1 - 3.0	72	10.24	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay - Bertha Ganter - October 2014**

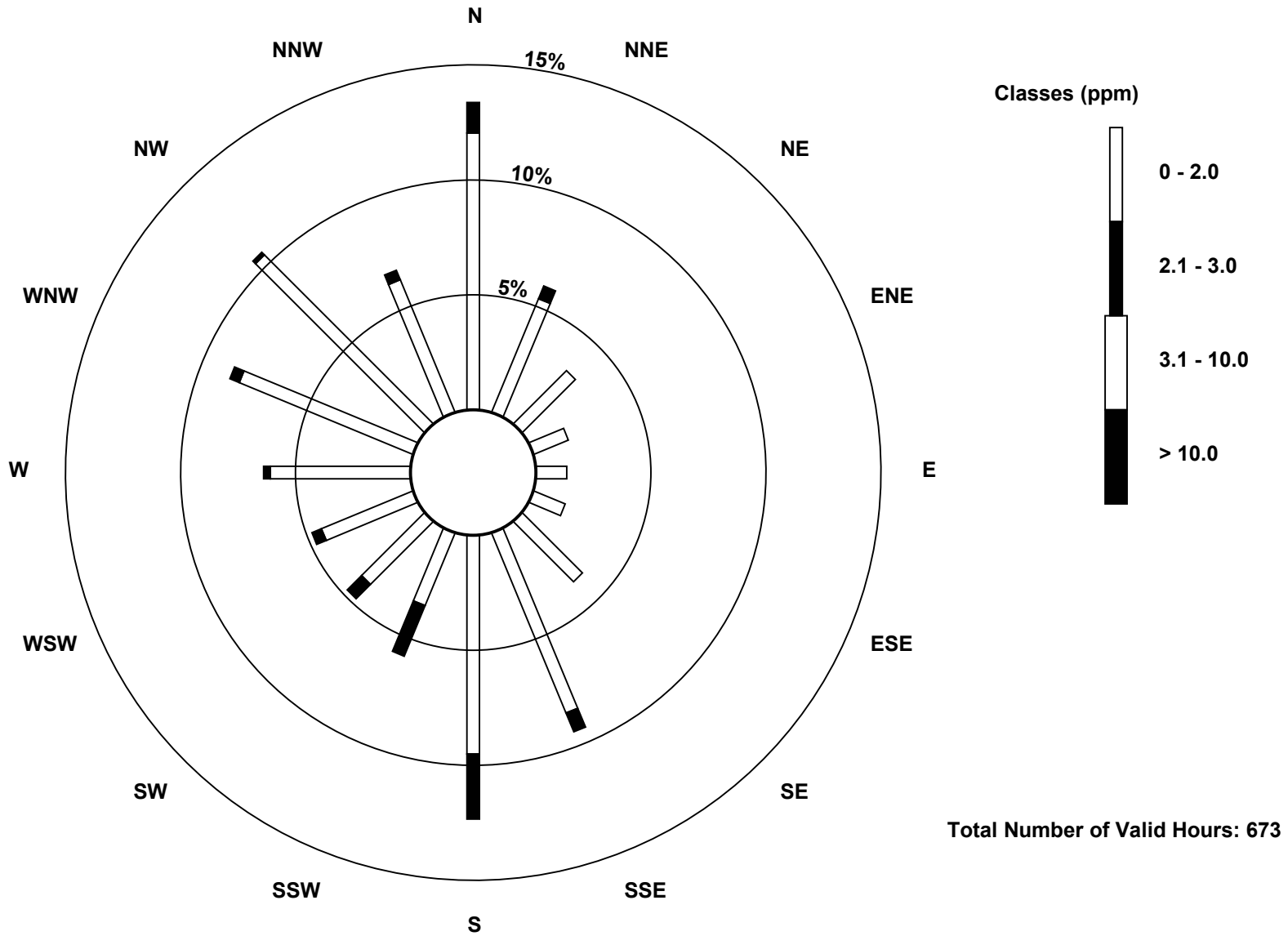
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	81	36	22	11	9	10	25	57	64	23	26	29	41	55	70	42	601
2.1 - 3.0	9	4	0	0	0	0	0	6	19	16	6	3	2	3	1	3	72
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	90	40	22	11	9	10	25	63	83	39	32	32	43	58	71	45	673

Total Number of Valid Hours: 673

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

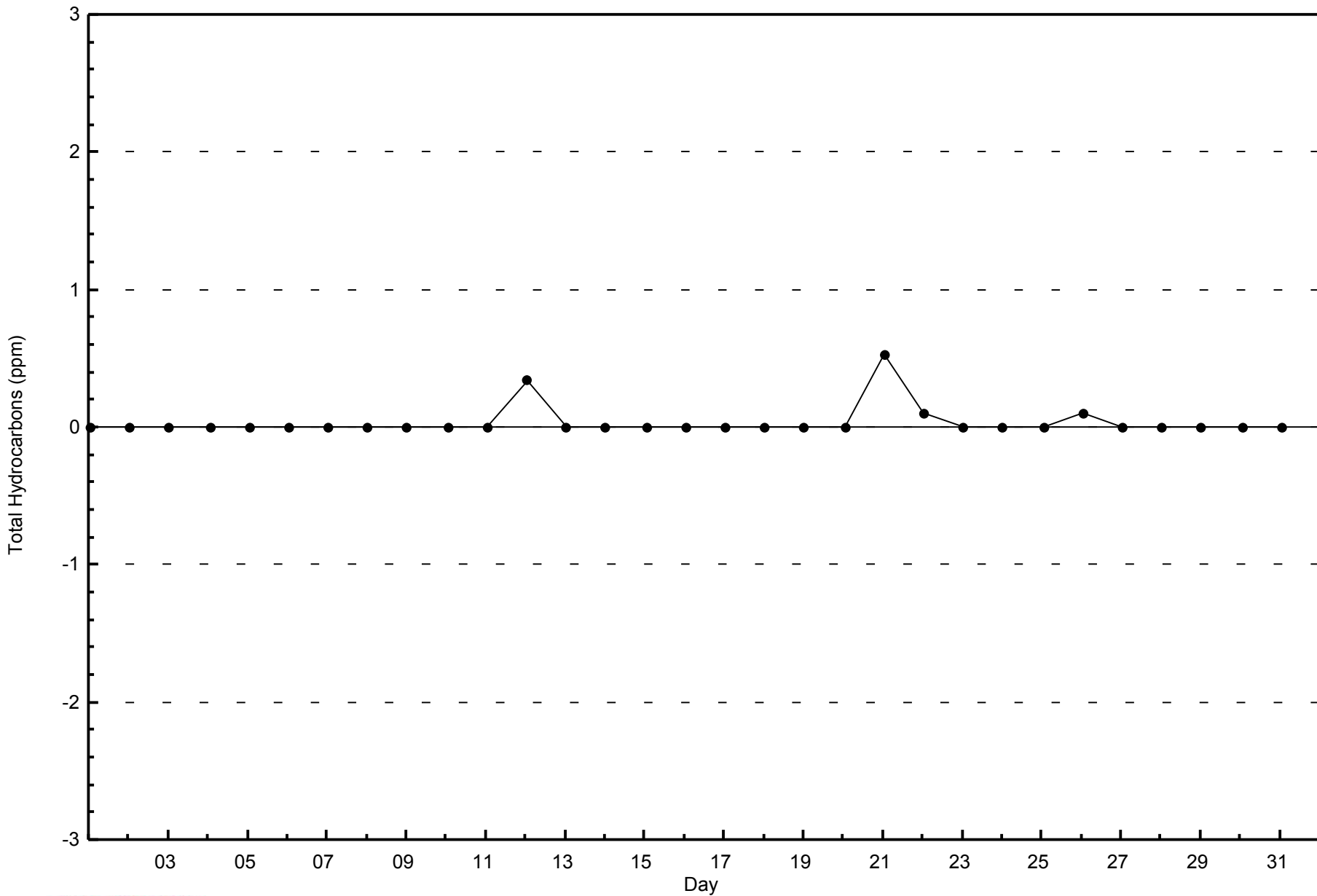
Total Hydrocarbons (THC) - ppm  
Fort McKay - Bertha Ganter (AMS 1)





WBEA  
Zero Responses

Total Hydrocarbons (THC) - ppm  
Fort McKay - Bertha Ganter - October 2014

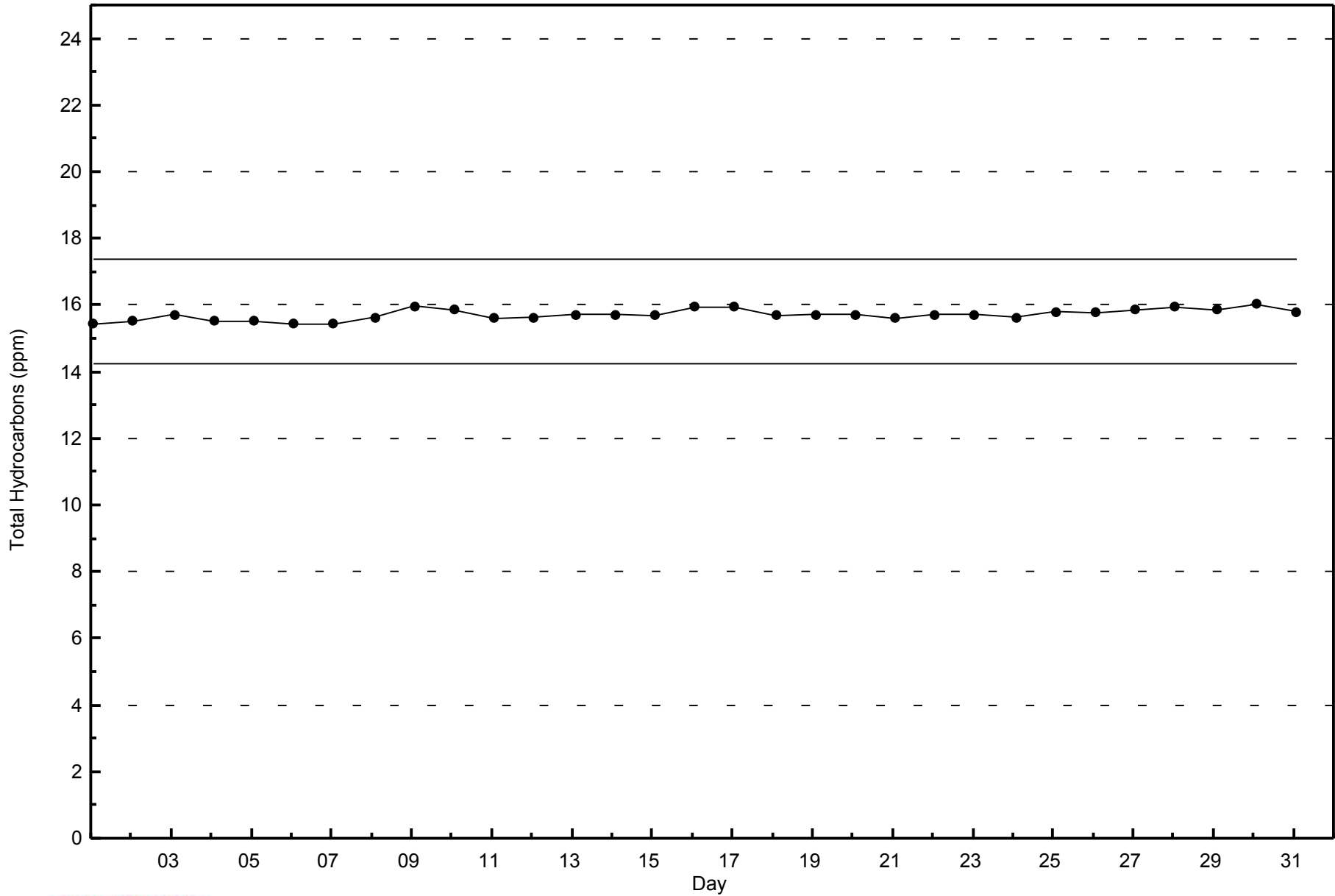






WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Fort McKay - Bertha Ganter - October 2014





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

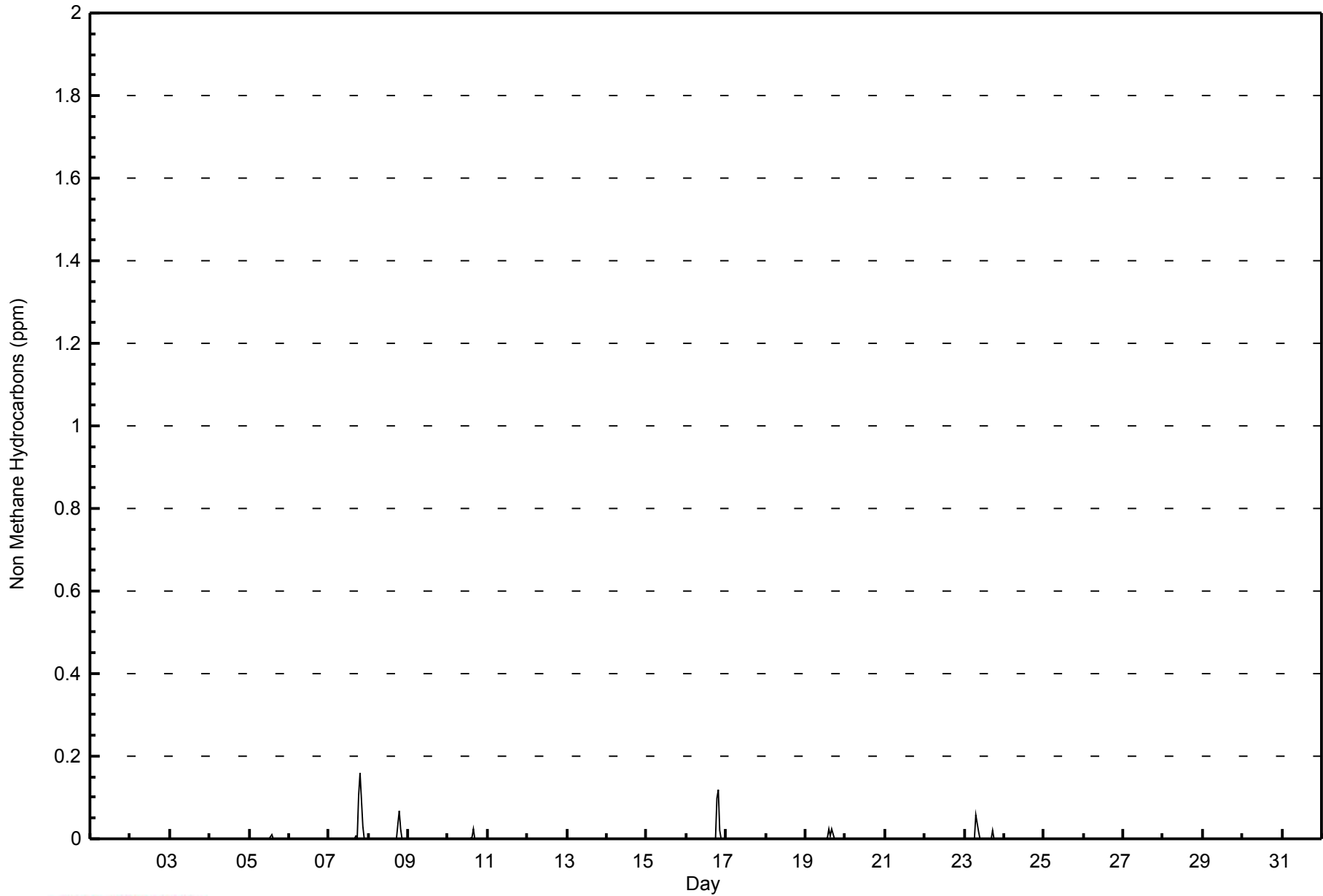
**Non Methane Hydrocarbons (NMHC) - ppm**  
**Fort McKay - Bertha Ganter - October 2014**

Maximum Value: 0.161 ppm on Oct 7 20:00		Maximum Daily Average: 0.014 ppm on Oct 7		Hours in Service: 744																							
Minimum Value: 0.000 ppm on Oct 1 01:00		Minimum Daily Average: 0.000 ppm on Oct 1		Hours of Data: 703																							
Maximum Diurnal Average: 0.010 ppm at hour 20		Minimum Diurnal Average: 0.000 ppm at hour 1		Hours of Missing Data: 41																							
Monthly Average: 0.001 ppm		Percentiles: $P_1 = 0.0$ $P_{10} = 0.0$ $Q_1 = 0.0$ Median = 0.0 $Q_3 = 0.0$ $P_{90} = 0.0$ $P_{99} = 0.0$		Hours of Calibration: 35																							
				Percent Operational Time: 99.2																							
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-Oct	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
2-Oct	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
3-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4-Oct	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
5-Oct	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	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011
6-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7-Oct	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	0.001	0.000	0.007	0.004	0.106	0.161	0.032	0.000	0.000	0.000	0.000	0.014	0.161
8-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	0.000	0.000	0.068	0.024	0.000	0.000	0.000	0.000	0.005	0.068	
9-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001
10-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.023	0.023
11-Oct	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
12-Oct	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
13-Oct	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
14-Oct	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
15-Oct	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
16-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	PF	PF	PF	PF	PF	PF	0.000	0.000	0.000	0.099	0.119	0.021	0.000	0.000	0.000	--	0.119	
17-Oct	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
18-Oct	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
19-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.025	0.007	0.025	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.025	0.025
20-Oct	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
21-Oct	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
22-Oct	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
23-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.057	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.021	0.000	0.000	0.000	0.000	0.000	0.004	0.057	0.057	
24-Oct	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
25-Oct	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
26-Oct	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
27-Oct	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-Oct	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
29-Oct	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
30-Oct	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
31-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	--	0.000	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.009	0.010	0.002	0.000	0.000	0.000	Diurnal Average		
		0.000	--	0.000	0.000	0.000	0.000	0.057	0.017	0.000	0.000	0.000	0.011	0.025	0.023	0.025	0.021	0.106	0.161	0.032	0.000	0.000	0.000	Diurnal Maximum			
Z - zerospan		C - Calibration					PF - Power Failure																				



**WBEA**  
**Hourly Averages**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Fort McKay - Bertha Ganter - October 2014**





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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	686	97.58	97.58
0.006 - 0.05	11	1.56	99.15
0.06 - 0.1	5	0.71	99.86
> 0.1	1	0.14	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Fort McKay - Bertha Ganter - October 2014**

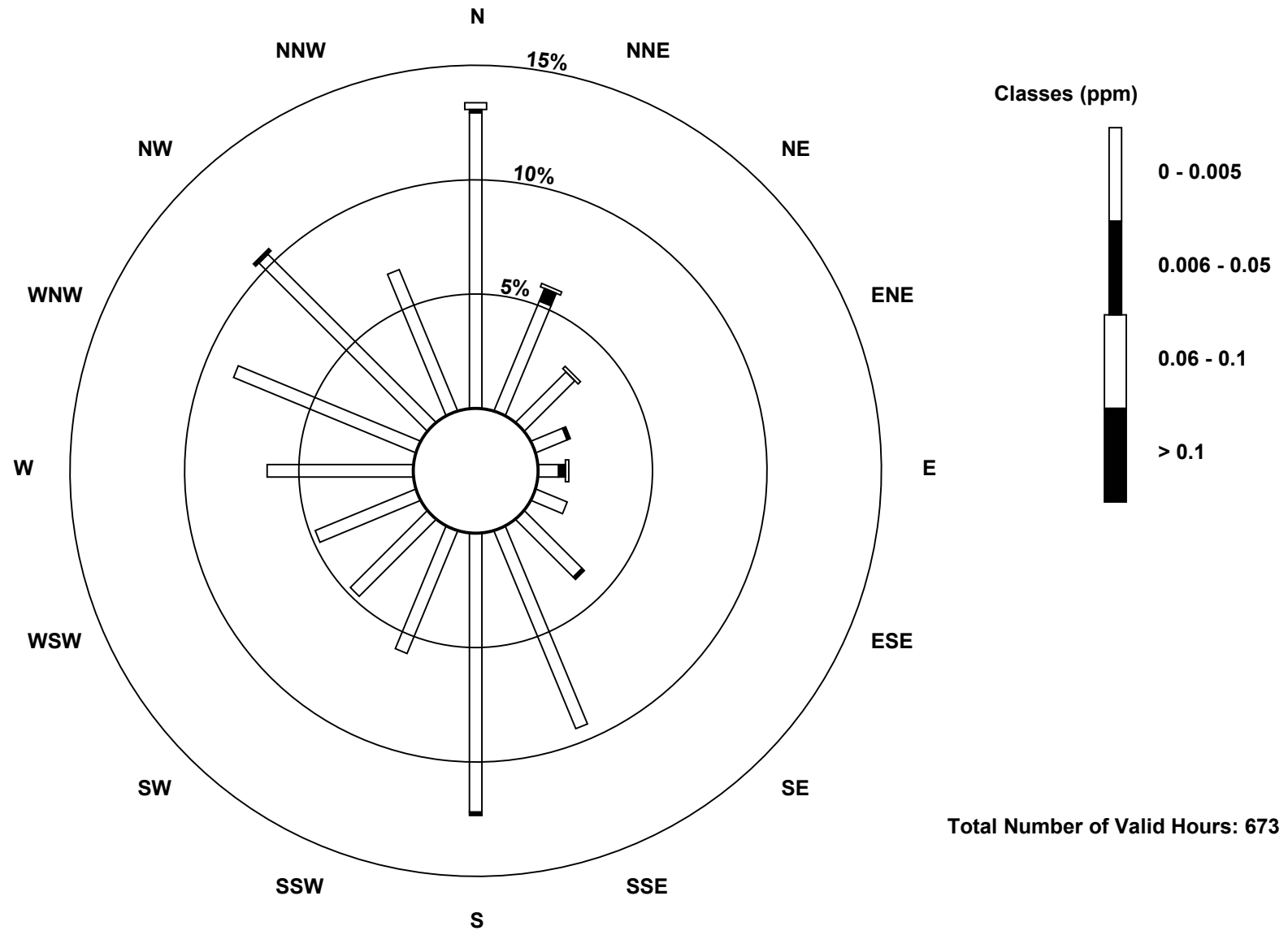
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	87	35	21	10	6	10	24	63	82	39	32	32	43	58	70	45	657
0.006 - 0.05	1	4	0	1	2	0	1	0	1	0	0	0	0	0	0	0	10
0.06 - 0.1	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	5
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
<b>Totals</b>	90	40	22	11	9	10	25	63	83	39	32	32	43	58	71	45	673

Total Number of Valid Hours: 673

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

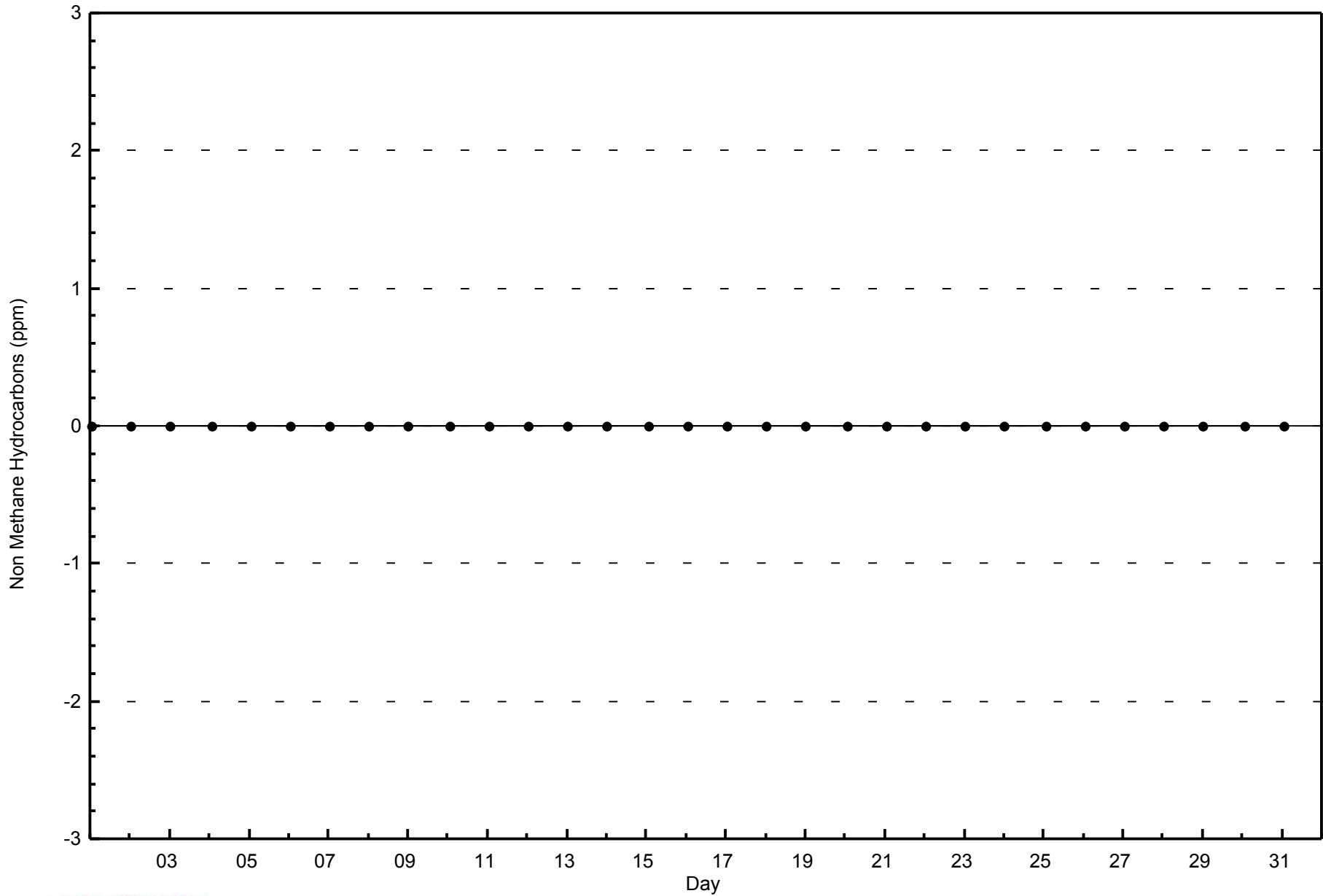
Non Methane Hydrocarbons (NMHC) - ppm  
Fort McKay - Bertha Ganter (AMS 1)





WBEA  
Zero Responses

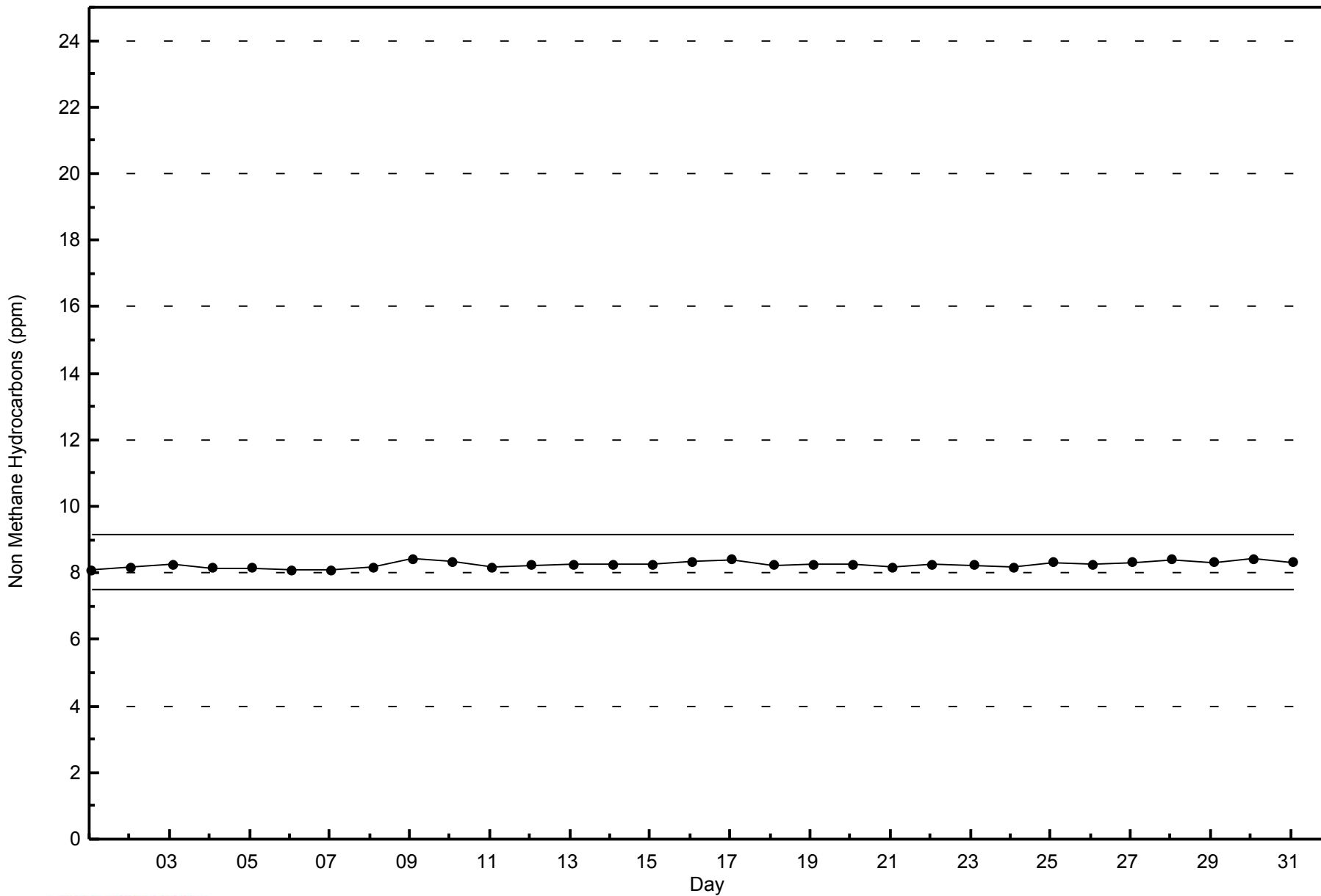
Non Methane Hydrocarbons (NMHC) - ppm  
Fort McKay - Bertha Ganter - October 2014





WBEA  
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm  
Fort McKay - Bertha Ganter - October 2014







Summary of Hour Averages

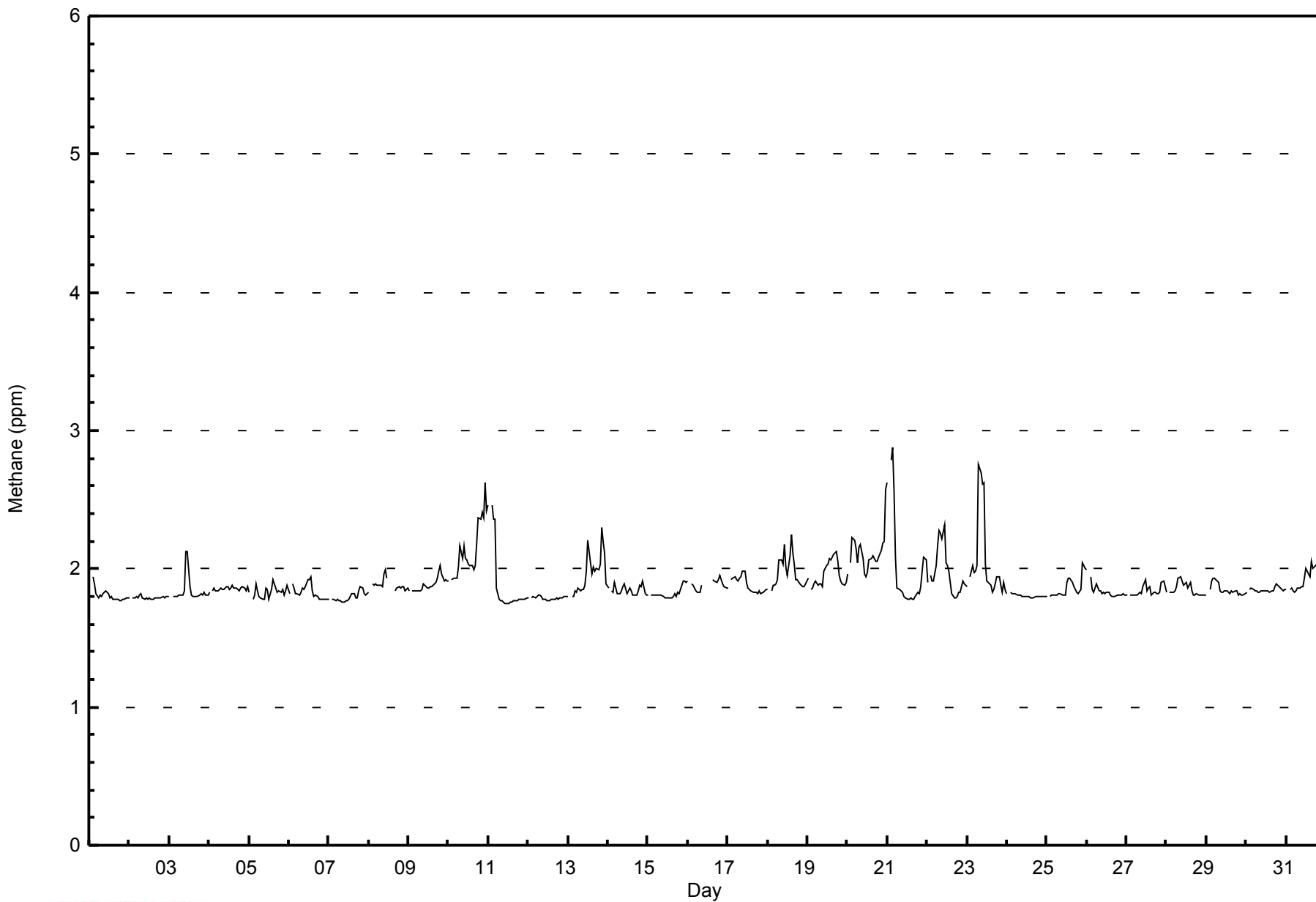
Fort McKay - Bertha Ganter - October 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744																																		
Maximum Value: 2.9 ppm on Oct 21 04:00	Maximum Daily Average: 2.1 ppm on Oct 10																																		
Minimum Value: 1.7 ppm on Oct 11 11:00	Hours of Data: 703																																		
Maximum Diurnal Average: 1.9 ppm at hour 11	Hours of Missing Data: 41																																		
Minimum Daily Average: 1.8 ppm on Oct 12	Hours of Calibration: 35																																		
Minimum Diurnal Average: 1.9 ppm at hour 17	Percent Operational Time: 99.2																																		
Monthly Average: 1.89 ppm	Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.8 Q <sub>1</sub> = 1.8 Median = 1.8 Q <sub>3</sub> = 1.9 P <sub>90</sub> = 2.1 P <sub>99</sub> = 2.6																																		
Hourly Period Ending At (MST)																									Daily Average	Daily Maximum									
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Oct	1.8	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9								
2-Oct	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	1.8	1.8	1.8	1.8								
3-Oct	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.1	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.1								
4-Oct	1.8	Z	1.8	1.9	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.8	1.9	1.8	1.9	1.9	1.9								
5-Oct	1.8	Z	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9								
6-Oct	1.8	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9								
7-Oct	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.9								
8-Oct	1.8	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	C	C	C	C	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	2.0								
9-Oct	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0								
10-Oct	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.2	2.1	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.2	2.4	2.4	2.4	2.4	2.6	2.4	2.1	2.6									
11-Oct	2.5	Z	2.5	2.4	2.4	1.9	1.8	1.8	1.8	1.8	1.7	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.5								
12-Oct	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	1.8	1.8	1.8	1.8								
13-Oct	1.8	Z	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.9	2.0	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.2	2.1	1.9	2.0	2.3									
14-Oct	1.9	Z	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.9								
15-Oct	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.8	1.9								
16-Oct	1.9	Z	1.9	1.9	1.9	1.8	1.8	1.8	1.9	PF	PF	PF	PF	PF	PF	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0								
17-Oct	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	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0								
18-Oct	1.9	Z	1.8	1.9	1.9	1.9	1.9	2.1	2.1	2.0	2.2	2.0	2.0	2.1	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2								
19-Oct	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	2.1								
20-Oct	2.0	Z	2.0	2.2	2.2	2.1	2.0	2.2	2.2	2.1	2.0	1.9	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.6	2.1	2.6									
21-Oct	2.6	Z	2.8	2.9	2.6	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.1	2.1	2.0	2.9									
22-Oct	1.9	Z	1.9	1.9	1.9	2.0	2.2	2.3	2.3	2.2	2.3	2.0	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.3									
23-Oct	1.9	Z	1.9	2.0	2.0	2.0	2.0	2.8	2.7	2.6	2.6	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.8	1.9	1.9	1.9	2.8									
24-Oct	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	1.8	1.8	1.8	1.8								
25-Oct	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	2.0	2.0	2.0	1.9	2.0									
26-Oct	2.0	Z	1.9	1.9	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0								
27-Oct	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9								
28-Oct	1.8	Z	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	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9								
29-Oct	1.8	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9								
30-Oct	1.8	Z	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9								
31-Oct	1.8	Z	1.8	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.0	2.2	2.2								
1.9	--	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	Diurnal Average								
2.6	--	2.8	2.9	2.6	2.1	2.2	2.8	2.7	2.6	2.6	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.2	2.4	2.4	2.4	2.4	2.6	2.6	2.1	2.6	Diurnal Maximum								
Z - zerospan		C - Calibration			PF - Power Failure																														



**WBEA**  
**Hourly Averages**

**Methane (CH<sub>4</sub>) - ppm**  
**Fort McKay - Bertha Ganter - October 2014**





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

**Methane (CH<sub>4</sub>) - ppm**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	632	89.90	89.90
2.1 - 3.0	71	10.10	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Fort McKay - Bertha Ganter - October 2014**

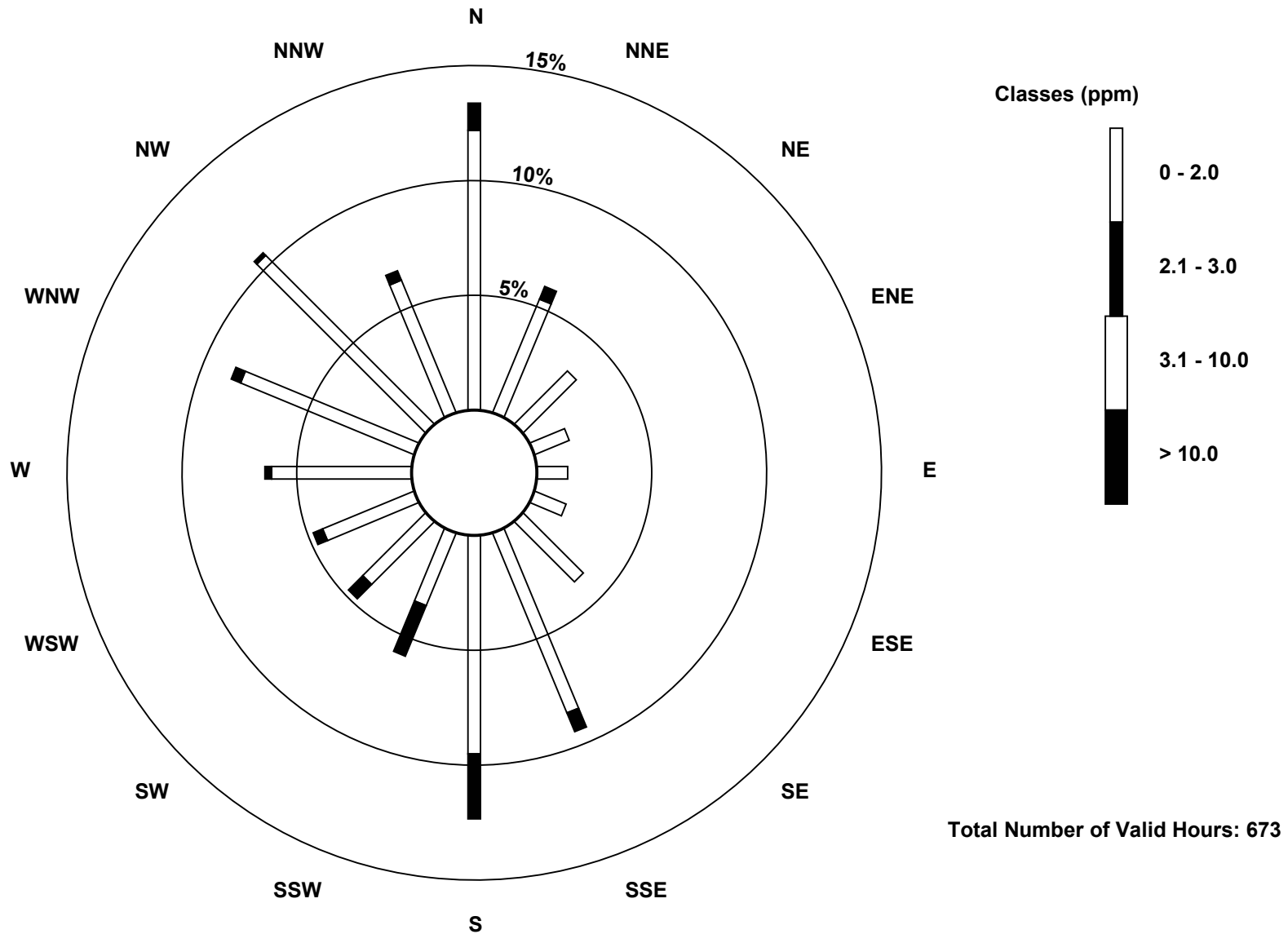
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	82	36	22	11	9	10	25	57	64	23	26	29	41	55	70	42	602
2.1 - 3.0	8	4	0	0	0	0	0	6	19	16	6	3	2	3	1	3	71
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	90	40	22	11	9	10	25	63	83	39	32	32	43	58	71	45	673

Total Number of Valid Hours: 673

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

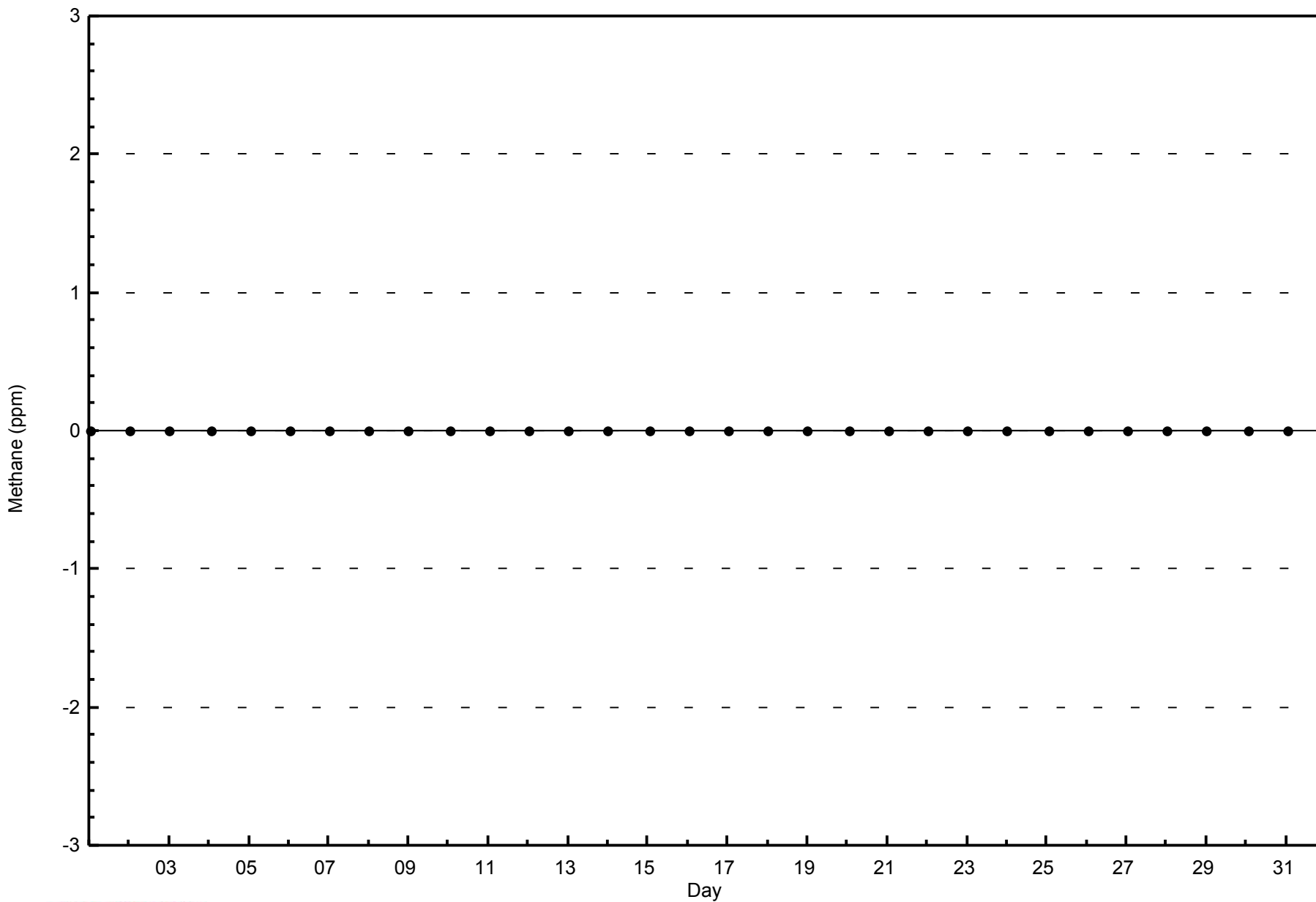
Methane (CH<sub>4</sub>) - ppm  
Fort McKay - Bertha Ganter (AMS 1)





WBEA  
Zero Responses

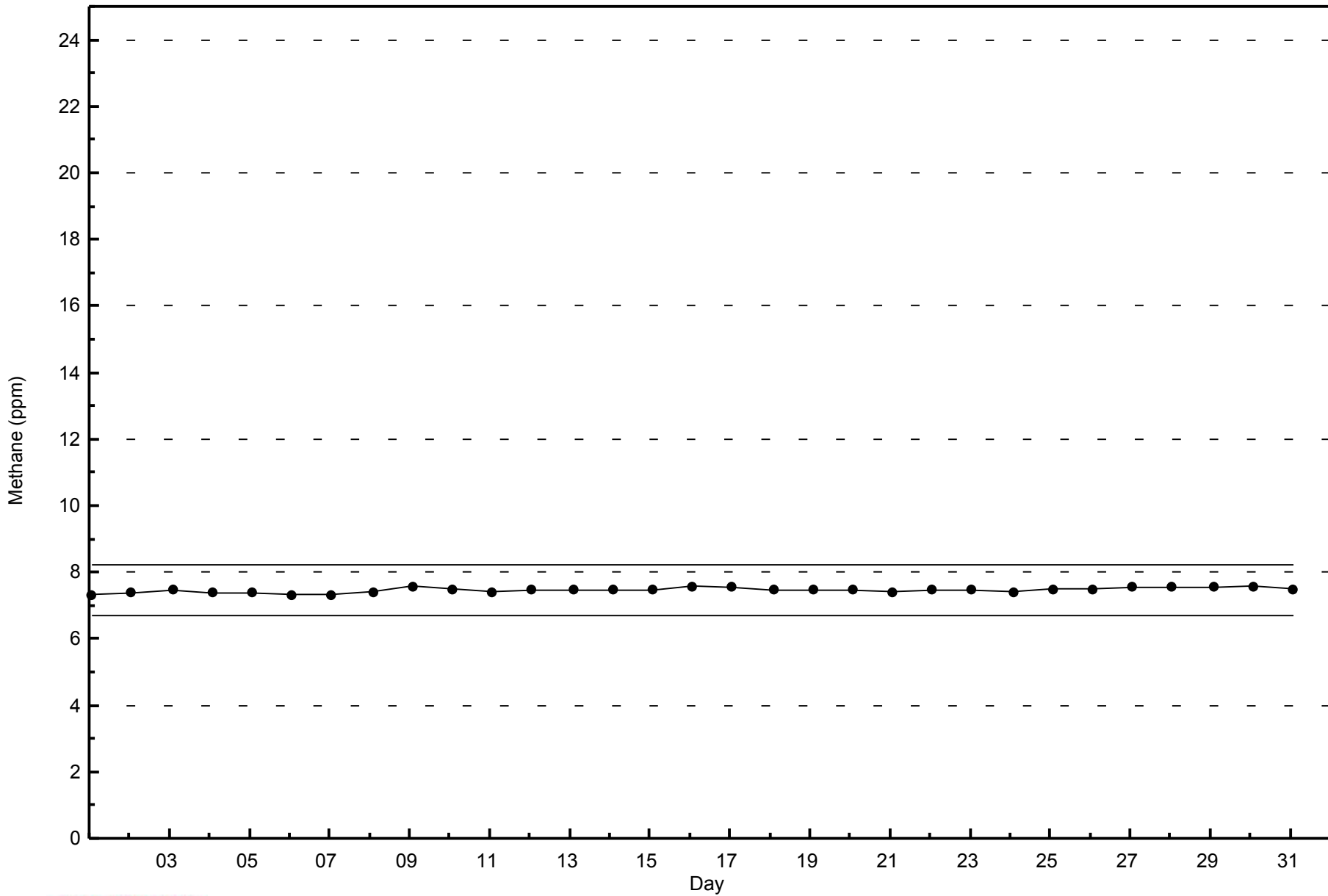
Methane (CH<sub>4</sub>) - ppm  
Fort McKay - Bertha Ganter - October 2014





WBEA  
Span Responses

Methane (CH<sub>4</sub>) - ppm  
Fort McKay - Bertha Ganter - October 2014





Summary of Hour Averages

Fort McKay - Bertha Ganter - October 2014

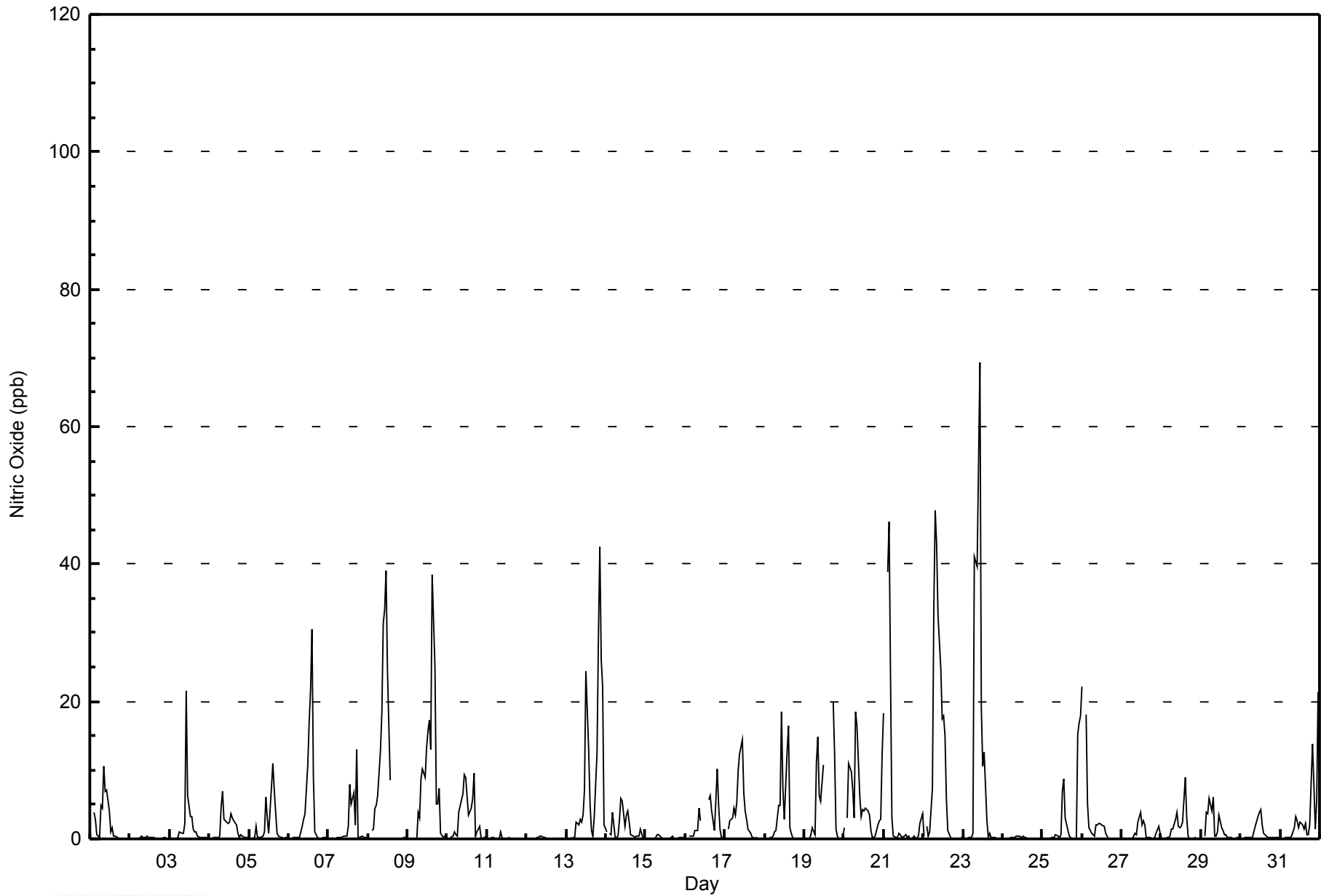
Maximum Value: 69 ppb on Oct 23 11:00														Maximum Daily Average: 11.0 ppb on Oct 23														Hours in Service: 744																				
Minimum Value: 0 ppb on Oct 18 21:00														Minimum Daily Average: 0.1 ppb on Oct 12														Hours of Data: 697																				
Maximum Diurnal Average: 8.4 ppb at hour 11														Minimum Diurnal Average: 1.3 ppb at hour 6														Hours of Missing Data: 47																				
Monthly Average: 3.4 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> = 40														Hours of Calibration: 36																				
																												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-Oct	0	Z	4	3	1	0	5	5	11	7	7	4	1	2	0	0	0	0	0	0	0	0	0	0	2.2	11																						
2-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
3-Oct	0	Z	0	0	0	0	1	1	1	2	22	6	3	3	1	1	1	1	0	0	0	0	0	1.9	22																							
4-Oct	0	Z	0	0	0	0	0	5	7	3	2	2	2	4	3	3	2	1	0	1	0	0	0	1.6	7																							
5-Oct	0	Z	0	0	2	0	0	0	0	1	6	3	1	8	11	7	4	1	0	0	0	0	0	2.0	11																							
6-Oct	0	Z	0	0	0	0	0	1	2	3	4	11	17	22	31	9	1	0	0	0	0	0	0	4.4	31																							
7-Oct	0	Z	0	0	0	0	0	0	0	0	0	2	8	5	7	2	13	0	0	0	0	0	0	1.7	13																							
8-Oct	0	Z	1	1	4	5	6	13	18	31	33	39	25	9	M	M	M	M	M	M	M	0	0	--	39																							
9-Oct	0	Z	0	0	0	0	4	3	9	10	9	13	16	17	13	38	25	5	5	7	1	0	0	7.7	38																							
10-Oct	0	Z	0	0	1	1	0	4	6	6	9	9	6	3	4	6	10	0	1	2	0	0	0	3.1	10																							
11-Oct	1	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
12-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
13-Oct	0	Z	0	0	0	0	2	2	3	2	3	7	24	13	5	1	0	3	13	30	42	26	22	2	8.8	42																						
14-Oct	1	Z	1	1	4	0	0	0	3	6	5	2	4	4	2	1	0	0	0	0	0	1	0	1.6	6																							
15-Oct	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
16-Oct	0	Z	0	0	0	0	1	1	4	3	PF	PF	PF	PF	6	6	4	1	6	10	5	1	0	2.7	10																							
17-Oct	0	Z	1	3	3	4	3	5	10	12	14	7	4	3	1	1	0	0	0	0	0	0	0	3.2	14																							
18-Oct	0	Z	0	0	0	0	1	1	5	5	18	7	3	13	17	2	1	0	0	0	0	0	0	3.2	18																							
19-Oct	0	Z	0	0	1	2	1	11	15	6	5	11	C	C	C	C	C	20	12	1	0	0	0	4.8	20																							
20-Oct	2	Z	3	11	10	7	3	19	16	6	3	4	4	5	4	3	1	0	0	0	2	3	3	12	5.3	19																						
21-Oct	18	Z	39	46	24	3	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	2	4	6.2	46																						
22-Oct	0	Z	2	0	1	7	34	48	43	33	25	18	18	15	6	1	0	0	0	0	0	0	0	10.9	48																							
23-Oct	0	Z	0	0	0	0	1	41	40	55	69	19	11	13	3	0	1	0	0	0	0	0	0	11.0	69																							
24-Oct	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-Oct	0	Z	0	0	0	0	0	0	1	0	0	1	7	9	3	1	1	0	0	0	0	15	17	18	3.2	18																						
26-Oct	22	Z	18	5	2	1	1	0	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	2.8	22																							
27-Oct	0	Z	0	0	0	0	0	0	1	1	3	4	2	3	2	0	0	0	0	0	0	1	2	1	0.8	4																						
28-Oct	0	Z	0	0	0	0	1	1	3	4	2	2	2	2	9	3	0	0	0	0	0	0	0	1.3	9																							
29-Oct	0	Z	0	4	4	6	4	6	0	0	1	4	2	1	1	1	0	0	0	0	0	0	0	1.5	6																							
30-Oct	0	Z	0	0	0	0	0	0	1	2	3	4	4	2	1	0	0	0	0	0	0	0	0	0.9	4																							
31-Oct	0	Z	0	0	0	0	0	0	2	3	3	2	2	2	2	2	1	1	2	14	8	2	6	21	3.1	21																						
																								1.5	--	2.3	2.5	1.9	1.3	2.3	5.5	6.6	6.7	8.4	6.0	5.6	5.6	4.5	3.3	1.9	1.6	1.4	2.3	2.1	1.7	1.8	2.0	Diurnal Average
																								22	--	39	46	24	7	34	48	43	55	69	39	25	22	31	38	25	20	13	30	42	26	22	21	Diurnal Maximum
Z - zerospan																								C - Calibration				M - Maintenance				PF - Power Failure																





WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
Fort McKay - Bertha Ganter - October 2014





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

**Nitric Oxide (NO) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	669	95.98	95.98
21 - 40	21	3.01	99.00
41 - 80	7	1.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 697  
Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**

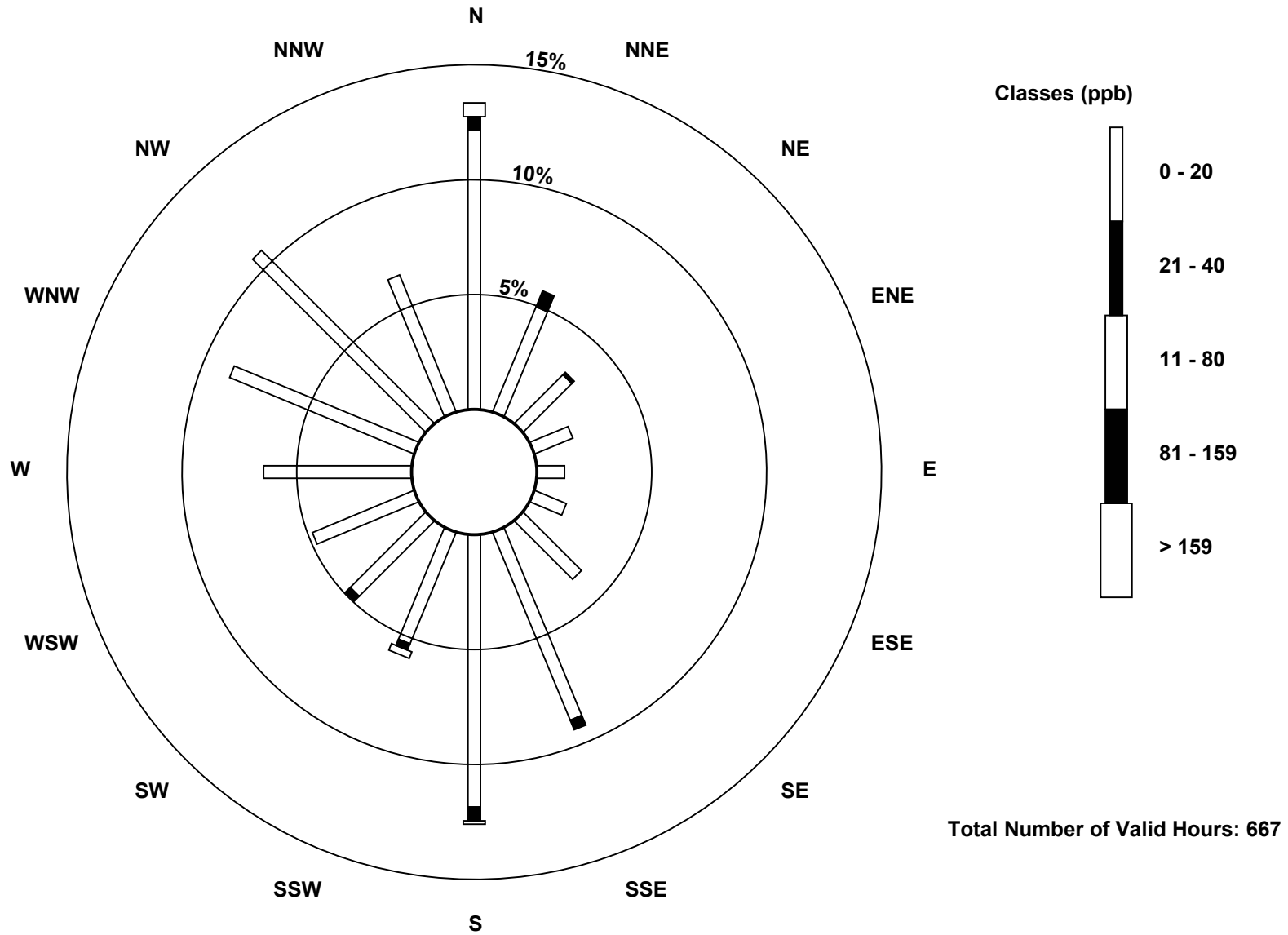
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	81	33	20	12	8	10	24	59	79	35	31	32	43	58	71	43	639
21 - 40	4	5	1	0	0	0	0	3	4	2	2	0	0	0	0	0	21
11 - 80	4	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	7
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	89	38	21	12	8	10	24	62	84	39	33	32	43	58	71	43	667

Total Number of Valid Hours: 667

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

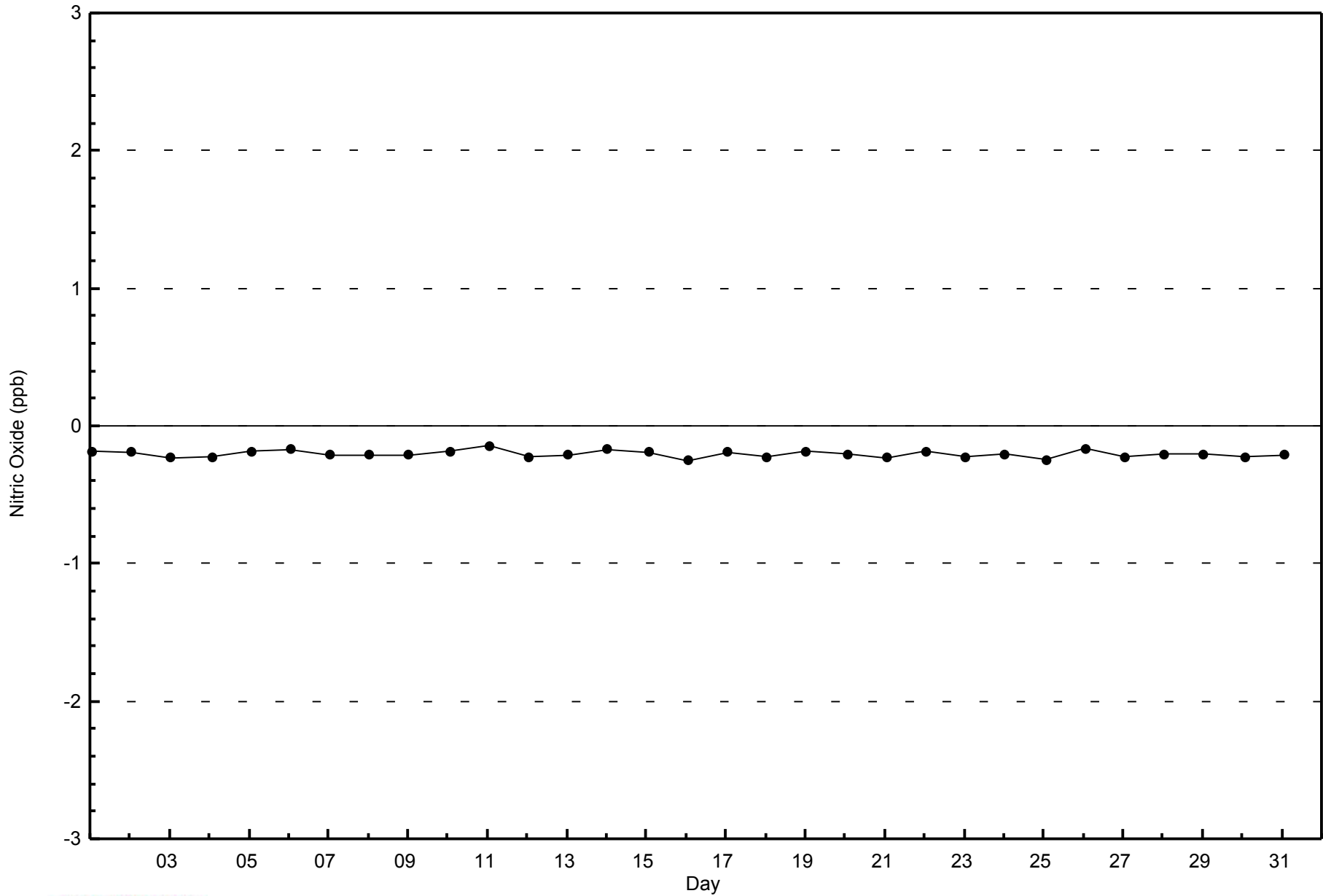
Nitric Oxide (NO) - ppb  
Fort McKay - Bertha Ganter (AMS 1)





WBEA  
Zero Responses

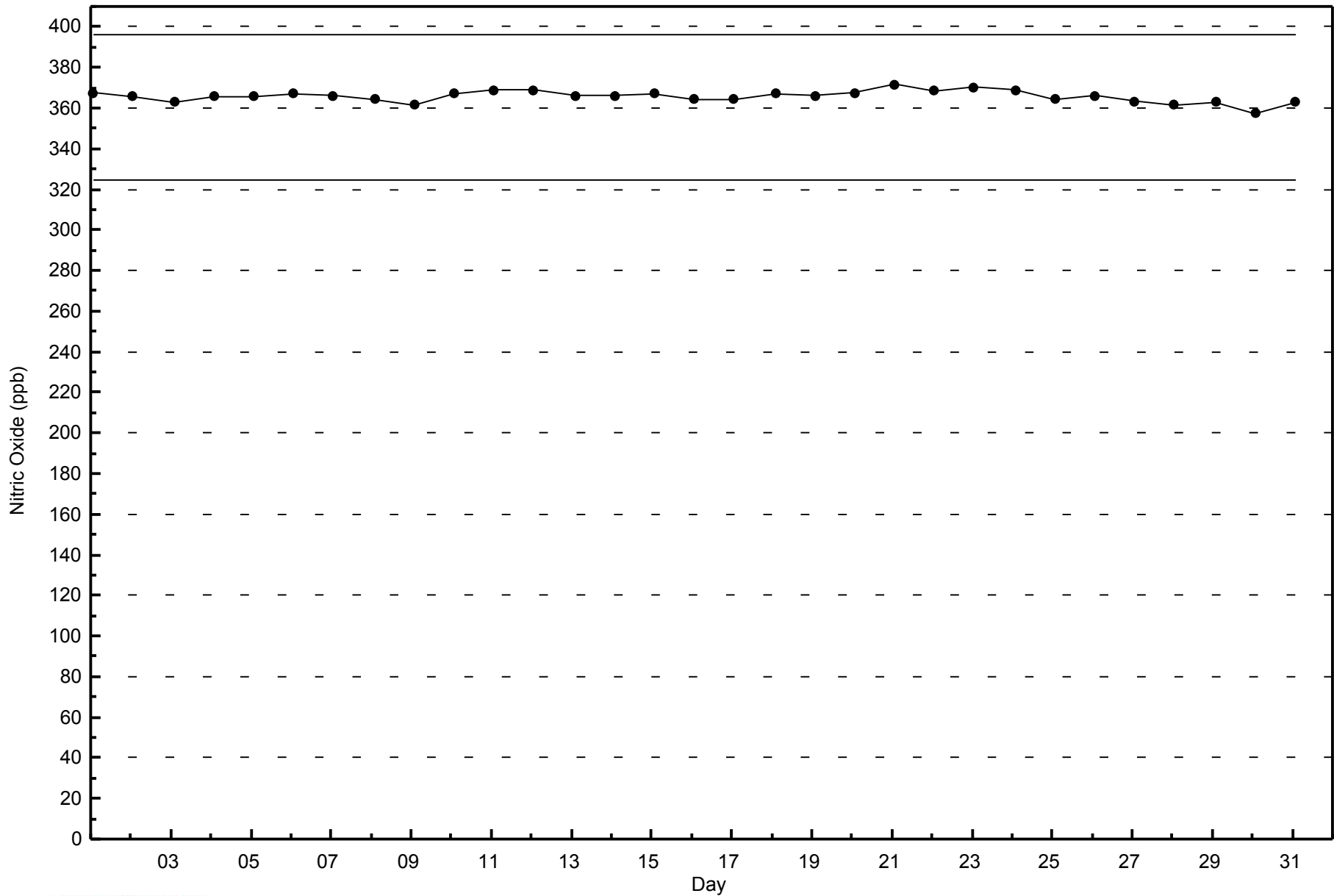
Nitric Oxide (NO) - ppb  
Fort McKay - Bertha Ganter - October 2014





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Fort McKay - Bertha Ganter - October 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 24 ppb on Oct 10 19:00	Maximum Daily Average: 10.6 ppb on Oct 10		Hours of Data:	697
Minimum Value: 0 ppb on Oct 2 17:00	Minimum Daily Average: 0.3 ppb on Oct 24		Hours of Missing Data:	47
Maximum Diurnal Average: 7.0 ppb at hour 19	Minimum Diurnal Average: 4.4 ppb at hour 4		Hours of Calibration:	36
Monthly Average: 5.6 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 5 Q <sub>3</sub> = 9 P <sub>90</sub> = 12 P <sub>99</sub> = 21		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-Oct	7	Z	8	7	2	1	3	2	6	7	8	6	3	5	3	2	1	1	1	1	0	0	1	1	3.3	8
2-Oct	1	Z	1	1	3	2	2	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.7	3
3-Oct	0	Z	0	0	0	1	3	2	1	2	12	8	7	6	4	5	7	8	10	4	4	2	7	4	4.2	12
4-Oct	6	Z	5	3	3	4	4	6	7	5	4	4	7	10	12	13	10	7	8	7	6	4	5	6.1	13	
5-Oct	2	Z	1	3	12	5	3	0	0	1	3	2	1	6	9	8	8	7	6	3	5	4	7	10	4.5	12
6-Oct	5	Z	8	8	6	7	4	5	6	6	6	9	12	11	9	5	3	2	0	0	0	1	1	1	5.0	12
7-Oct	0	Z	0	0	0	0	0	0	1	1	1	3	9	6	10	6	10	4	9	10	8	4	3	3.7	10	
8-Oct	3	Z	4	3	6	5	5	5	8	13	17	16	14	11	M	M	M	M	M	M	M	7	4	6	--	17
9-Oct	3	Z	1	2	3	3	7	5	8	9	8	11	8	13	12	23	18	19	18	20	15	9	14	12	10.5	23
10-Oct	11	Z	5	6	10	8	5	7	8	10	12	12	10	7	10	10	14	12	24	22	12	8	11	12	10.6	24
11-Oct	13	Z	11	9	10	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2.2	13
12-Oct	0	Z	0	0	0	1	2	1	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0.3	2
13-Oct	1	Z	1	0	3	2	4	3	3	2	4	9	17	11	9	7	8	14	20	23	22	21	21	13	9.4	23
14-Oct	10	Z	10	7	11	5	5	6	10	11	11	6	6	8	6	4	3	2	6	5	5	6	1	0	6.2	11
15-Oct	0	Z	0	0	1	0	1	1	1	0	0	0	0	0	0	1	2	1	1	1	6	8	6	5	1.5	8
16-Oct	4	Z	6	5	4	4	6	5	7	8	PF	PF	PF	PF	10	15	16	16	20	18	15	11	8	7	9.6	20
17-Oct	7	Z	7	6	6	7	8	8	5	6	8	7	8	7	4	4	3	4	4	8	4	5	3	5	5.7	8
18-Oct	5	Z	4	8	8	13	14	14	13	11	15	8	5	14	18	12	9	5	7	4	1	1	1	2	8.3	18
19-Oct	3	Z	0	0	1	2	1	4	5	3	4	6	C	C	C	C	C	15	16	15	10	7	6	4	5.7	16
20-Oct	5	Z	6	5	4	5	11	7	9	11	9	9	9	9	10	11	10	9	9	10	10	9	10	11	8.6	11
21-Oct	10	Z	13	12	10	5	2	2	2	2	2	1	1	1	1	2	1	5	14	5	8	10	14	13	5.9	14
22-Oct	7	Z	11	5	8	11	11	12	9	11	14	16	16	18	17	10	5	2	2	10	7	11	13	14	10.4	18
23-Oct	12	Z	9	11	10	7	9	17	14	16	18	12	15	17	12	3	9	6	11	9	4	1	4	1	9.8	18
24-Oct	0	Z	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	1
25-Oct	0	Z	0	0	1	2	1	1	1	0	0	0	5	9	6	4	4	6	4	5	6	12	11	11	3.9	12
26-Oct	11	Z	10	9	9	10	8	7	8	7	6	5	5	5	4	3	1	1	1	1	1	2	4	3	5.2	11
27-Oct	3	Z	1	1	3	1	2	5	5	3	6	7	4	5	6	1	2	2	2	3	6	10	11	6	4.1	11
28-Oct	3	Z	2	3	3	5	6	9	9	10	5	4	4	5	10	8	4	3	2	2	2	1	1	1	4.3	10
29-Oct	1	Z	3	9	11	11	12	13	3	2	4	8	5	4	3	5	3	7	7	1	1	1	1	1	5.0	13
30-Oct	4	Z	6	8	9	7	7	7	7	8	8	6	7	6	5	5	5	8	6	6	5	5	4	5	6.1	9
31-Oct	6	Z	5	5	7	5	8	7	8	11	8	6	7	7	7	9	7	7	9	10	9	8	8	6	7.2	11

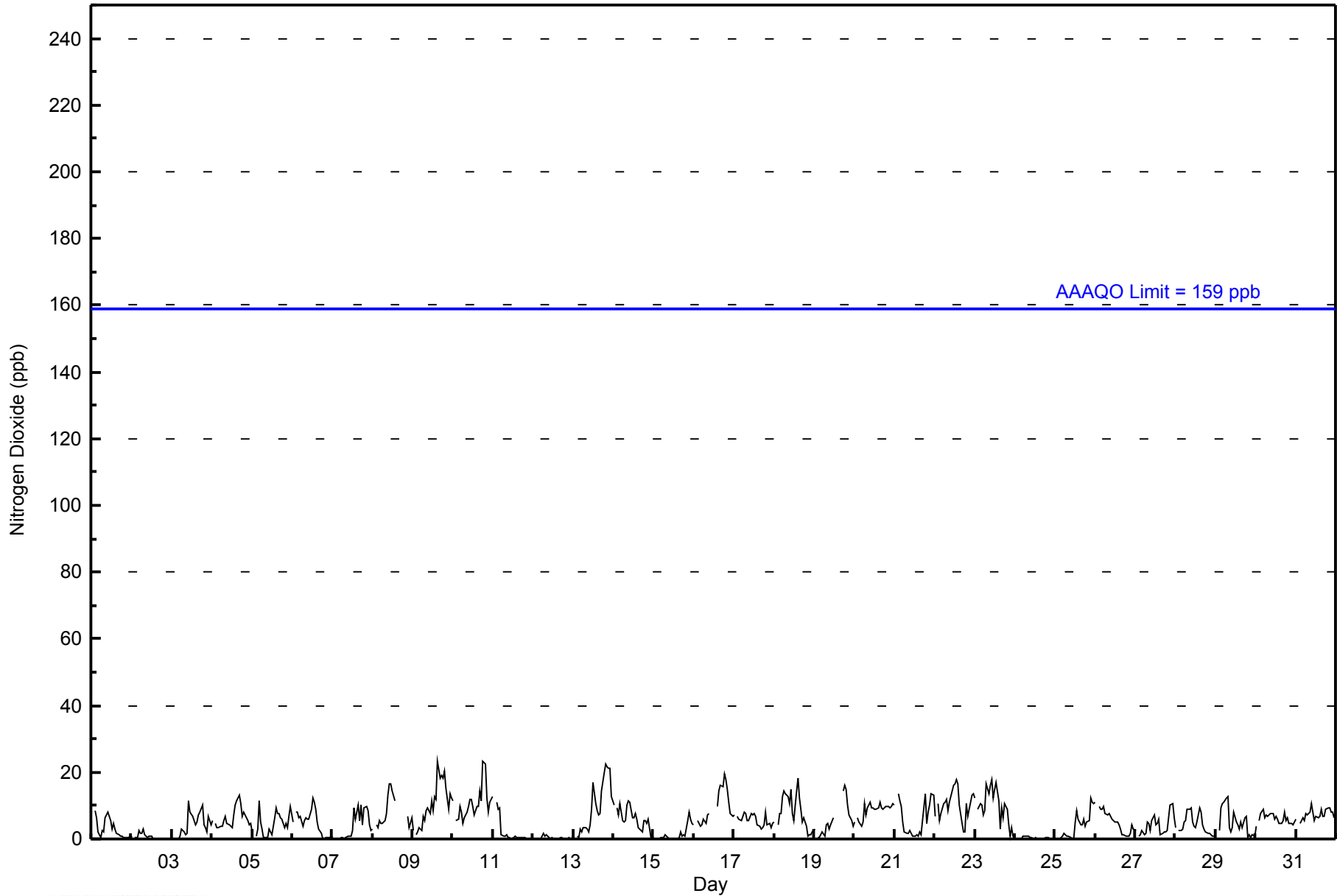
4.6	--	4.4	4.4	5.2	4.5	4.9	5.3	5.4	5.7	6.5	6.1	6.1	6.9	6.5	6.1	5.6	6.0	7.0	6.8	5.8	5.6	5.7	5.2	Diurnal Average	
13	--	13	12	12	13	14	17	14	16	18	16	17	18	18	23	18	19	24	23	22	21	21	14	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**







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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	690	99.00	99.00
21 - 40	7	1.00	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: 697

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	86	37	21	12	8	10	24	62	83	37	33	32	43	58	71	43	660
21 - 40	3	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	7
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>89</b>	<b>38</b>	<b>21</b>	<b>12</b>	<b>8</b>	<b>10</b>	<b>24</b>	<b>62</b>	<b>84</b>	<b>39</b>	<b>33</b>	<b>32</b>	<b>43</b>	<b>58</b>	<b>71</b>	<b>43</b>	<b>667</b>

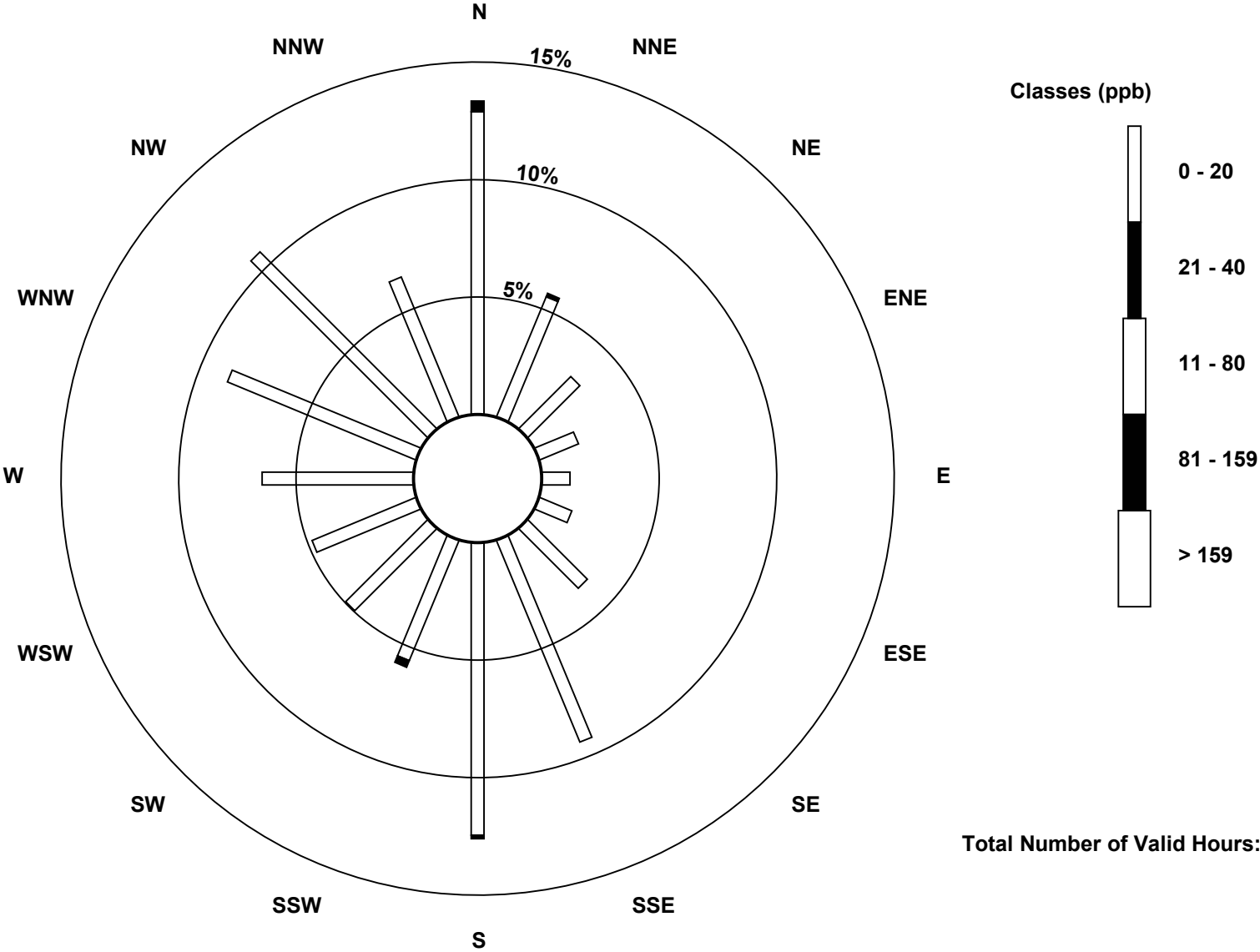
Total Number of Valid Hours: 667

Total Number of Hours: 744

**Wood Buffalo Environmental Association**

**Wind Rose Oct 2014**

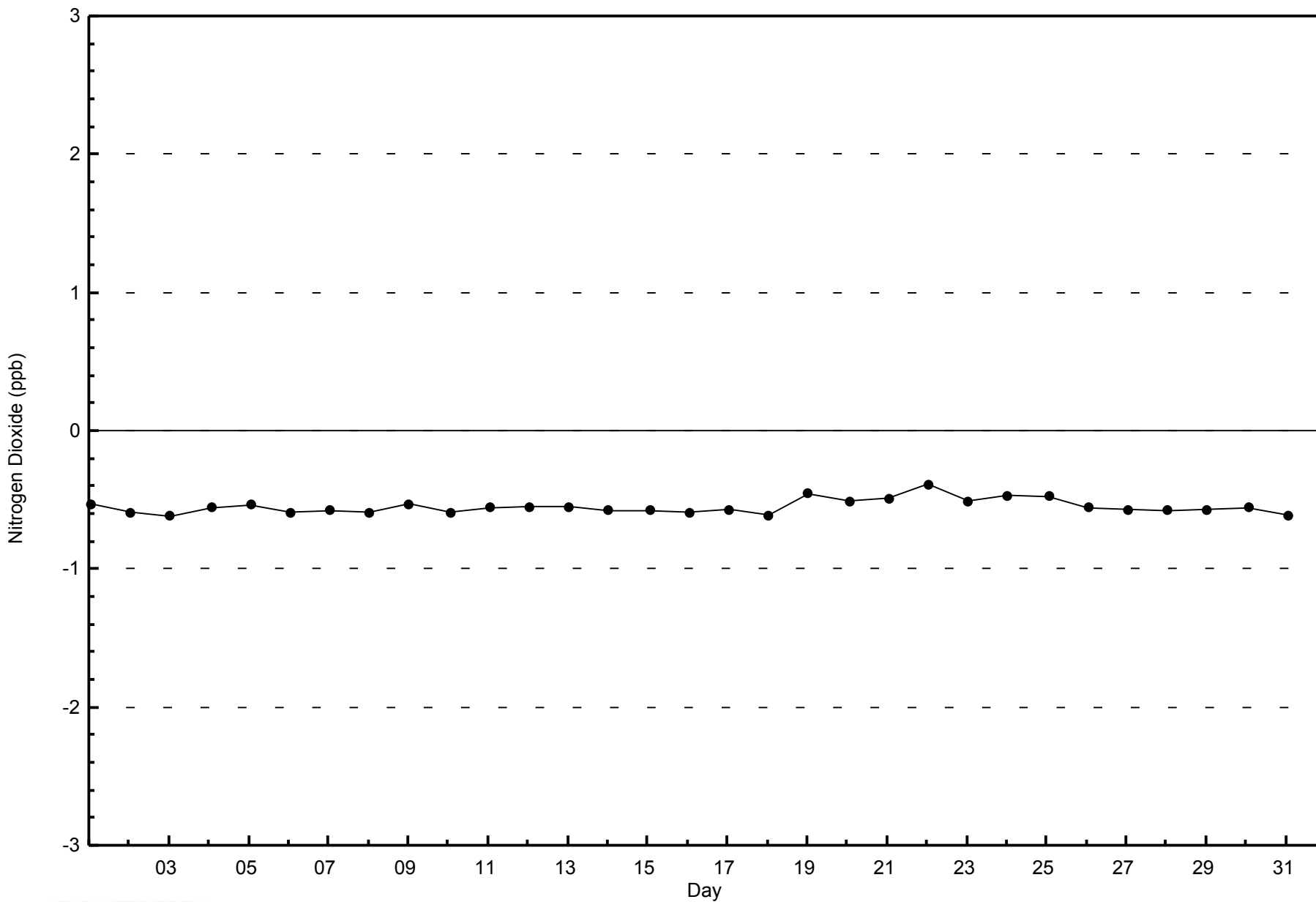
**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter (AMS 1)**





WBEA  
Zero Responses

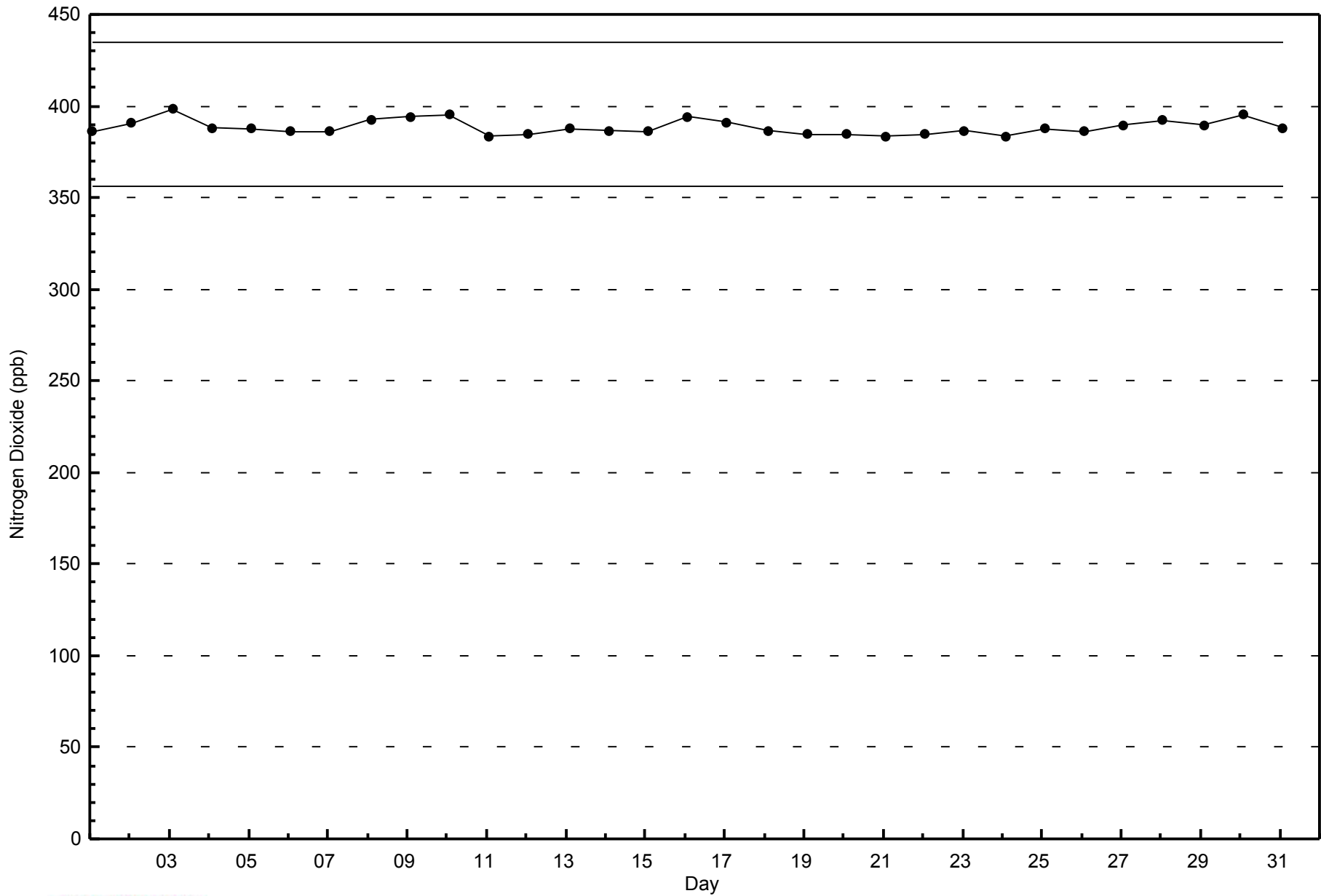
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - October 2014





**WBEA**  
**Span Responses**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**



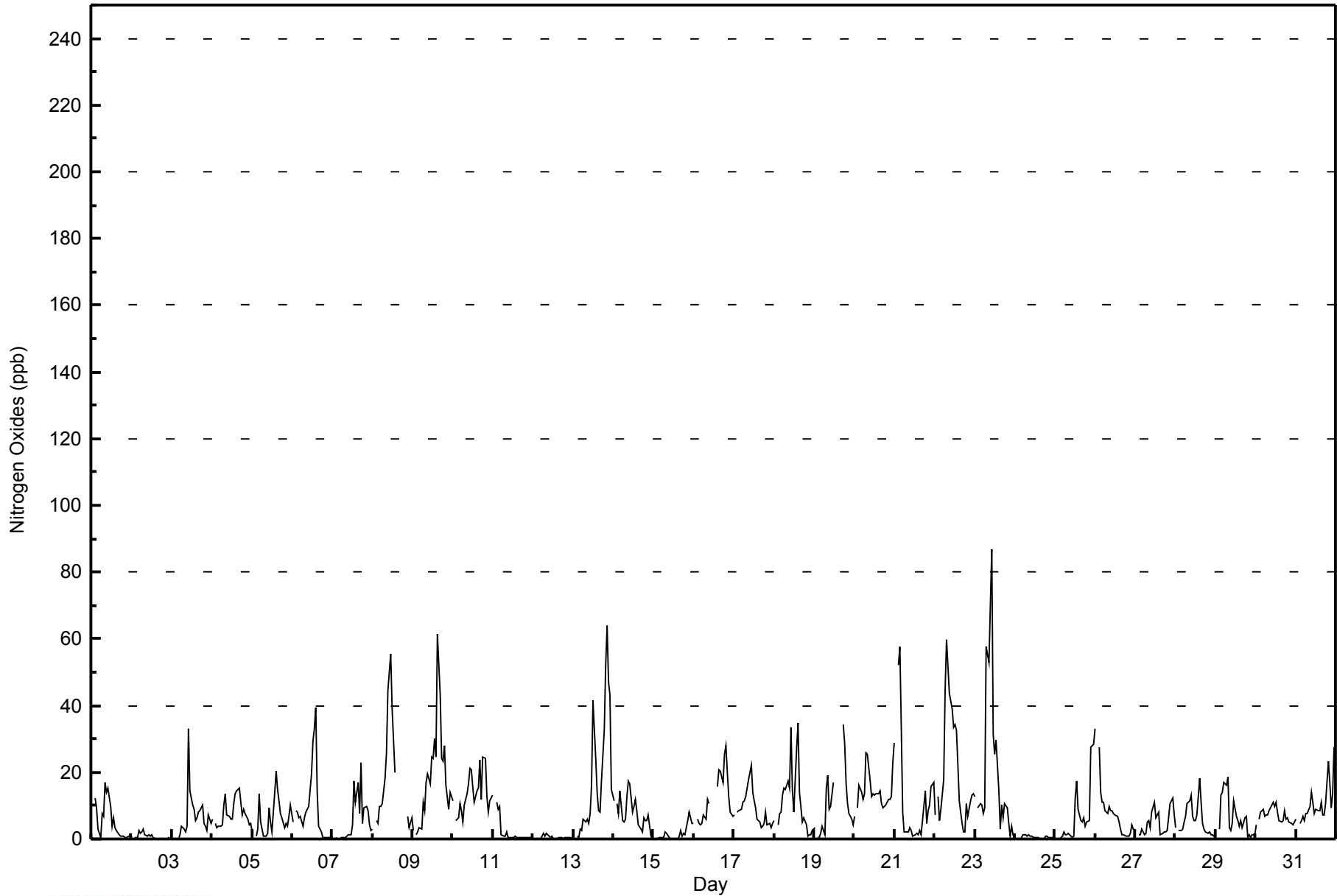


Maximum Value: 87 ppb on Oct 23 11:00														Maximum Daily Average: 21.3 ppb on Oct 22														Hours in Service: 744			
Minimum Value: 0 ppb on Oct 24 17:00														Minimum Daily Average: 0.5 ppb on Oct 24														Hours of Data: 697			
Maximum Diurnal Average: 14.9 ppb at hour 11														Minimum Diurnal Average: 5.8 ppb at hour 6														Hours of Missing Data: 47			
Monthly Average: 9.1 ppb														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 6 Q <sub>3</sub> = 11 P <sub>90</sub> = 21 P <sub>99</sub> = 58														Hours of Calibration: 36			
																												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-Oct	7	Z	12	9	3	1	8	7	17	14	15	10	4	6	3	2	1	1	1	1	0	0	1	1	5.4	17					
2-Oct	1	Z	1	1	3	2	2	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.8	3					
3-Oct	0	Z	0	0	0	1	4	3	2	4	33	14	10	9	6	6	8	8	10	5	4	2	7	5	6.2	33					
4-Oct	6	Z	5	3	4	4	4	10	14	7	7	6	6	11	13	14	15	11	7	9	8	6	4	5	7.8	15					
5-Oct	2	Z	1	3	13	5	3	1	1	2	9	5	2	14	20	15	11	7	6	4	5	4	7	10	6.5	20					
6-Oct	5	Z	8	8	6	7	4	6	8	9	10	20	29	33	39	14	4	2	0	0	0	1	1	1	9.4	39					
7-Oct	1	Z	0	0	0	0	1	0	0	1	1	1	4	17	11	17	7	23	4	9	10	9	4	3	5.5	23					
8-Oct	3	Z	5	5	10	10	11	18	26	44	50	55	39	20	M	M	M	M	M	M	M	7	4	6	--	55					
9-Oct	3	Z	1	2	3	3	11	9	17	20	17	25	24	30	25	62	43	24	23	28	16	9	14	13	18.3	62					
10-Oct	12	Z	6	6	11	9	5	10	14	16	21	21	16	11	14	15	24	12	25	24	13	8	11	12	13.7	25					
11-Oct	13	Z	11	9	10	1	1	1	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2.4	13					
12-Oct	0	Z	0	0	0	1	2	1	2	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0.5	2					
13-Oct	1	Z	1	1	3	2	6	5	6	4	8	16	41	24	14	9	8	18	32	52	64	47	43	15	18.3	64					
14-Oct	11	Z	10	8	14	6	5	6	13	17	17	8	10	12	8	4	3	2	6	6	5	7	1	0	7.8	17					
15-Oct	0	Z	0	0	1	0	1	2	2	0	0	0	0	0	0	1	2	1	2	1	6	8	6	5	1.7	8					
16-Oct	5	Z	6	5	4	5	7	6	12	10	PF	PF	PF	PF	15	21	20	17	25	28	20	13	8	7	12.3	28					
17-Oct	7	Z	8	8	9	11	11	13	15	18	22	14	12	9	6	5	3	4	4	8	4	5	3	5	8.9	22					
18-Oct	5	Z	4	8	8	13	15	15	17	15	33	15	8	27	35	14	10	5	7	4	1	1	1	2	11.5	35					
19-Oct	3	Z	0	0	2	4	1	15	19	9	10	17	C	C	C	C	C	34	29	16	10	7	6	4	10.5	34					
20-Oct	7	Z	9	16	14	12	14	26	26	17	13	14	13	13	14	14	11	9	10	10	12	12	13	23	13.9	26					
21-Oct	29	Z	52	58	34	8	2	2	2	3	3	1	1	2	1	3	1	5	14	5	8	10	16	17	12.0	58					
22-Oct	7	Z	13	6	9	18	45	60	52	44	39	33	34	33	22	11	5	2	2	10	7	11	13	14	21.3	60					
23-Oct	13	Z	9	11	10	7	9	58	53	71	87	31	25	30	14	3	10	6	11	9	4	1	4	1	20.8	87					
24-Oct	0	Z	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0.5	1					
25-Oct	0	Z	0	0	1	2	1	1	2	1	0	1	12	17	9	6	5	6	4	5	6	27	28	29	7.1	29					
26-Oct	33	Z	28	14	11	11	8	8	10	9	8	8	7	7	5	3	1	1	1	1	1	2	4	3	8.0	33					
27-Oct	3	Z	1	1	3	1	2	5	6	3	8	11	6	7	8	1	2	2	2	3	7	11	12	7	4.9	12					
28-Oct	3	Z	3	3	3	5	7	11	11	13	7	6	5	7	18	11	5	3	2	2	2	1	1	1	5.7	18					
29-Oct	1	Z	3	13	14	17	16	19	4	2	5	12	7	6	4	6	3	7	7	1	1	1	1	1	6.4	19					
30-Oct	4	Z	6	8	9	7	7	7	8	9	11	10	11	8	5	5	6	8	6	6	5	5	4	5	7.0	11					
31-Oct	6	Z	5	5	7	6	8	8	10	14	11	7	9	8	8	11	7	7	11	23	17	9	13	28	10.4	28					
		6.2	--	6.8	6.8	7.0	5.8	7.2	10.8	12.0	12.3	14.9	12.1	11.7	12.5	11.0	9.5	7.5	7.6	8.4	9.0	7.9	7.3	7.5	7.2	Diurnal Average					
		33	--	52	58	34	18	45	60	53	71	87	55	41	33	39	62	43	34	32	52	64	47	43	29	Diurnal Maximum					
Z - zerospan			C - Calibration				M - Maintenance				PF - Power Failure																				



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	627	89.96	89.96
21 - 40	50	7.17	97.13
41 - 80	19	2.73	99.86
81 - 159	1	0.14	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 697  
Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	77	25	20	11	7	9	23	54	67	30	31	32	43	57	71	40	597
21 - 40	5	11	0	1	1	1	1	6	14	6	0	0	0	1	0	3	50
41 - 80	6	2	1	0	0	0	0	2	3	3	2	0	0	0	0	0	19
81 - 159	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	89	38	21	12	8	10	24	62	84	39	33	32	43	58	71	43	667

Total Number of Valid Hours: 667

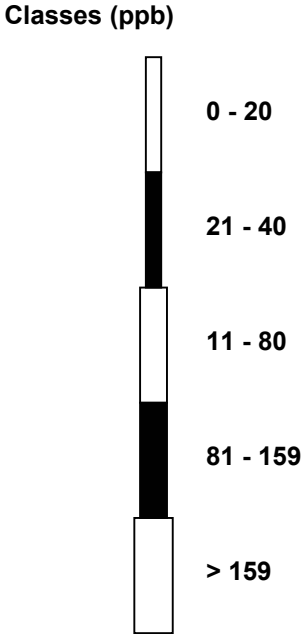
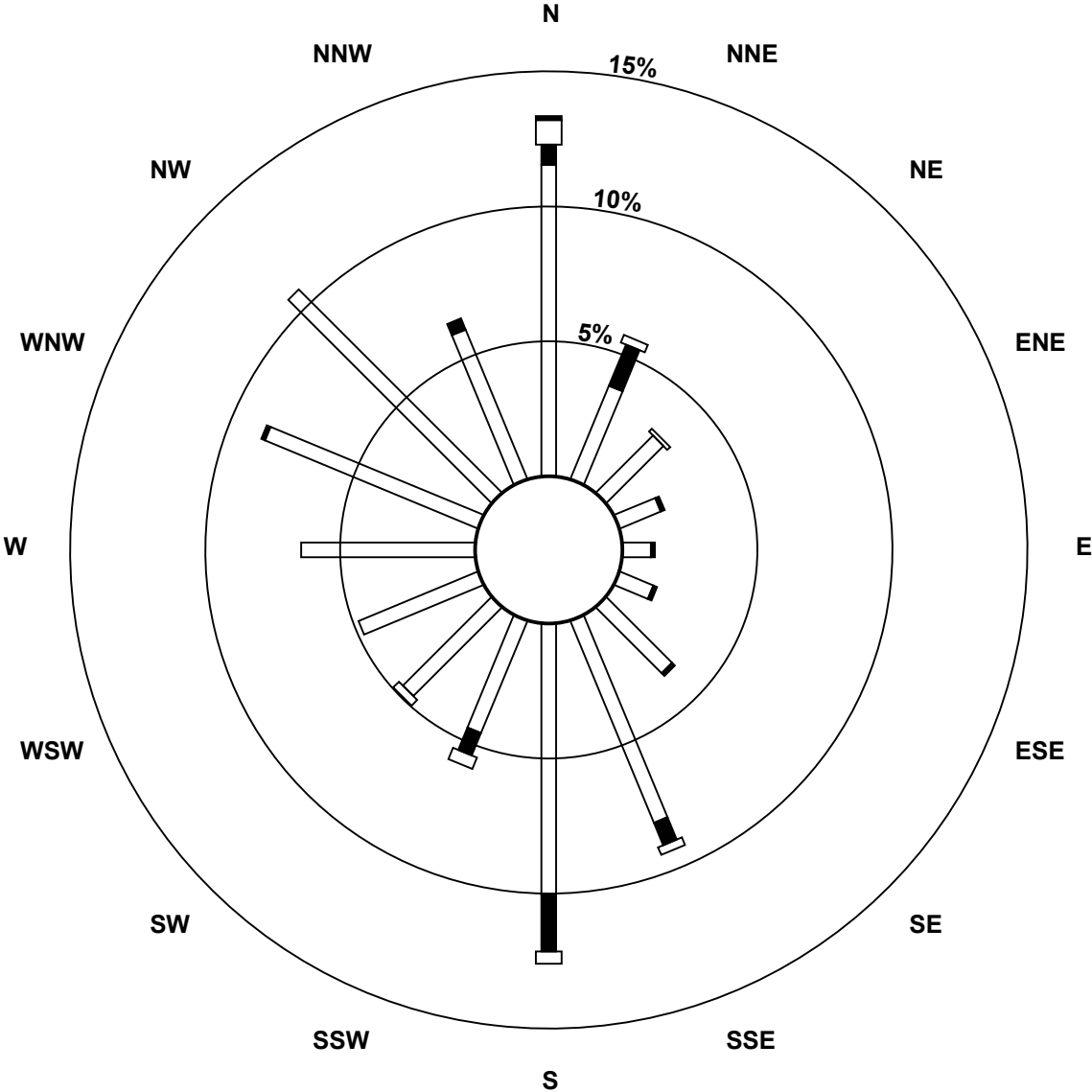
Total Number of Hours: 744

Wood Buffalo Environmental Association

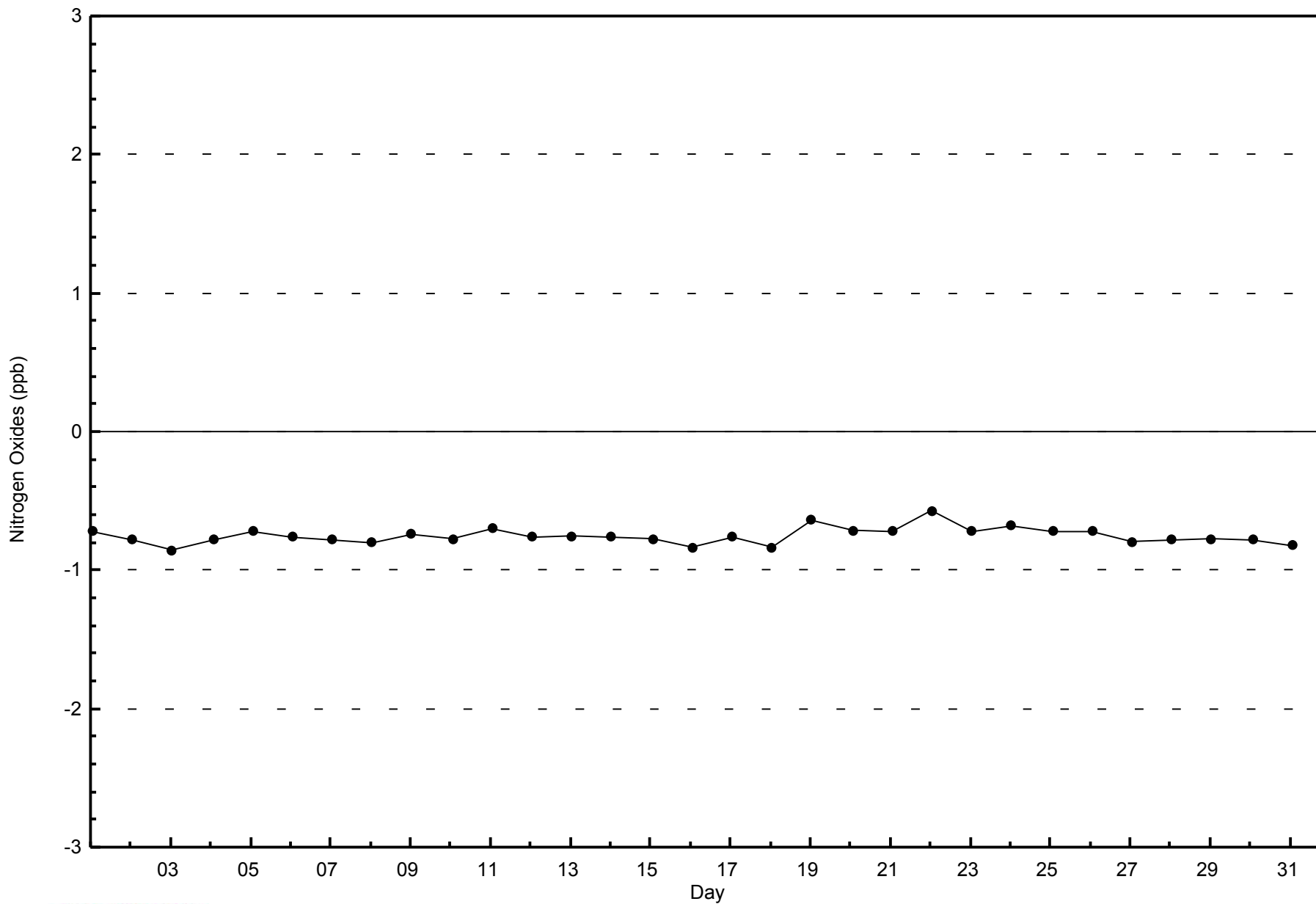
Wind Rose Oct 2014

Nitrogen Oxides (NO<sub>x</sub>) - ppb

Fort McKay - Bertha Ganter (AMS 1)



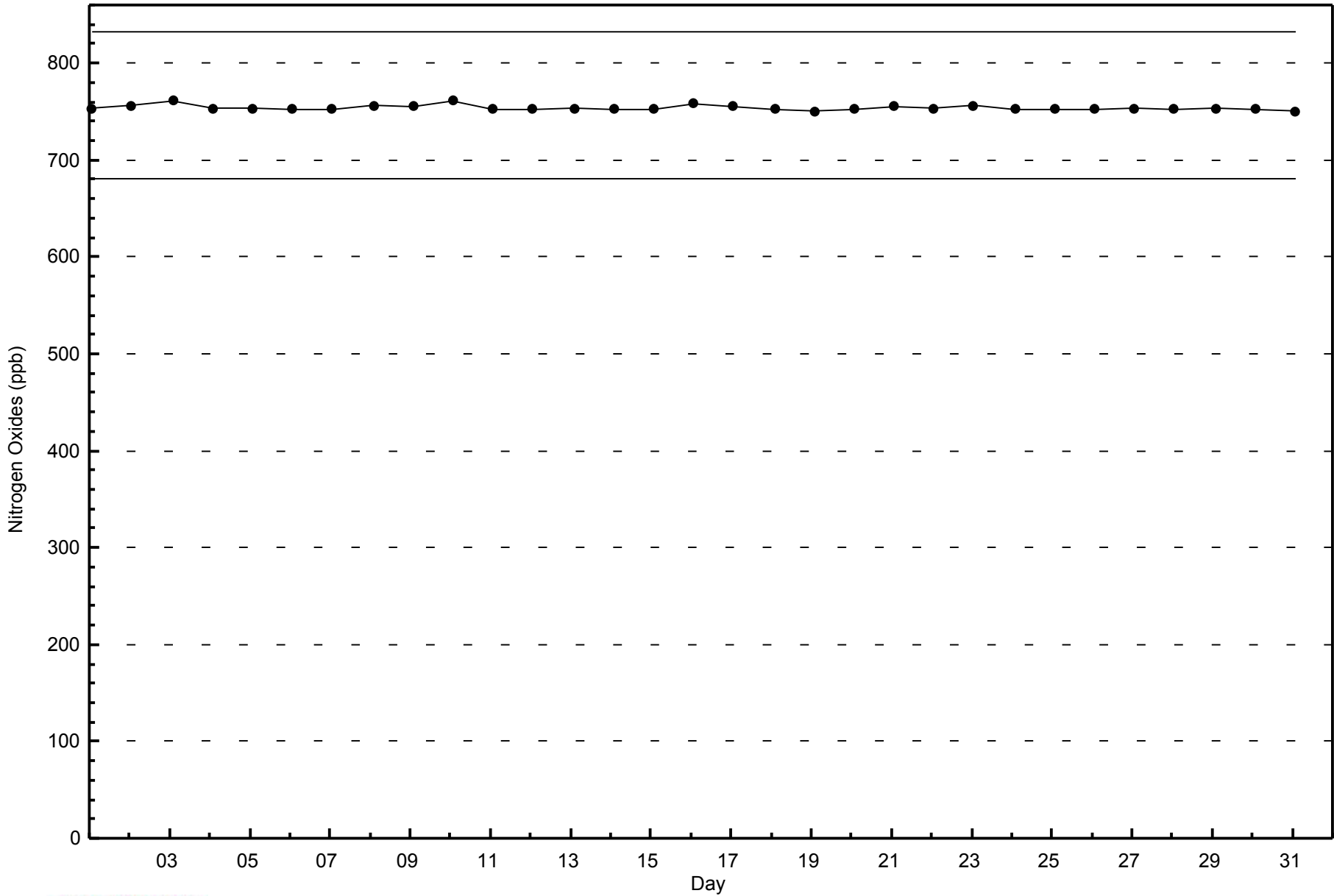
Total Number of Valid Hours: 667





**WBEA**  
**Span Responses**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**





Summary of Hour Averages

Fort McKay - Bertha Ganter - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 44 ppb on Oct 11 15:00	Maximum Daily Average: 33.6 ppb on Oct 11		Hours of Data:	704
Minimum Value: 3 ppb on Oct 17 05:00	Minimum Daily Average: 7.4 ppb on Oct 19		Hours of Missing Data:	40
Maximum Diurnal Average: 20.5 ppb at hour 16	Minimum Diurnal Average: 10.6 ppb at hour 8		Hours of Calibration:	36
Monthly Average: 14.8 ppb	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 4 Q <sub>1</sub> = 8 Median = 13 Q <sub>3</sub> = 19 P <sub>90</sub> = 27 P <sub>99</sub> = 40		Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	7	6	Z	4	6	7	5	5	6	8	8	11	13	11	14	17	17	18	19	20	19	19	21	17	12.1	21
2-Oct	19	13	Z	21	16	21	24	25	25	26	28	28	28	29	28	28	28	27	25	24	20	19	15	20	23.3	29
3-Oct	21	21	Z	21	19	17	13	14	16	17	13	23	24	23	25	24	22	21	17	23	23	22	16	18	19.7	25
4-Oct	16	13	Z	7	8	6	5	6	7	13	14	15	16	14	14	13	10	10	15	9	6	8	8	8	10.4	16
5-Oct	13	18	Z	20	10	14	12	13	13	12	11	15	20	20	13	13	13	12	12	13	12	14	10	8	13.5	20
6-Oct	13	8	Z	7	10	9	9	8	9	9	10	8	8	8	8	12	12	17	24	23	23	22	22	23	13.0	24
7-Oct	21	22	Z	24	26	27	25	25	28	32	34	36	35	28	27	24	27	24	22	13	9	10	11	8	23.3	36
8-Oct	6	5	Z	4	4	4	4	5	7	8	8	8	9	13	19	21	13	12	9	10	12	15	19	14	9.9	21
9-Oct	17	15	Z	13	12	14	9	7	9	13	16	16	19	23	23	23	18	8	4	4	9	14	7	8	13.0	23
10-Oct	9	7	Z	5	4	5	5	6	12	19	19	21	24	28	31	31	28	24	11	11	20	24	15	13	16.1	31
11-Oct	11	16	Z	14	14	30	34	34	34	36	38	40	42	41	44	42	42	42	40	38	37	36	35	34	33.6	44
12-Oct	34	33	Z	31	30	26	20	24	25	28	30	36	39	39	38	34	32	30	34	33	33	33	33	27	31.4	39
13-Oct	25	19	Z	20	12	9	5	6	8	15	16	14	10	15	21	27	21	10	4	4	4	4	4	7	12.2	27
14-Oct	7	5	Z	7	4	10	11	12	8	7	9	13	12	11	13	16	15	11	7	6	7	8	18	19	10.4	19
15-Oct	18	18	Z	19	19	19	18	17	17	20	22	23	23	23	24	25	25	24	24	23	16	12	11	12	19.7	25
16-Oct	8	7	Z	6	8	8	7	6	6	15	PF	PF	PF	PF	14	12	8	6	4	3	4	5	9	7	7.6	15
17-Oct	6	4	Z	3	3	3	3	4	4	5	7	14	20	23	26	30	30	28	26	21	25	24	24	22	15.4	30
18-Oct	21	21	Z	15	11	8	7	7	7	11	8	14	15	8	7	12	15	18	16	19	19	17	15	11	13.1	21
19-Oct	7	9	Z	9	7	3	4	3	4	6	10	10	9	10	9	6	4	3	5	6	13	17	10	5	7.4	17
20-Oct	4	4	Z	3	3	3	4	4	5	12	17	18	19	21	23	21	19	15	9	7	4	4	4	4	9.9	23
21-Oct	4	4	Z	4	5	14	23	C	C	C	C	C	29	30	33	33	32	26	16	20	14	10	6	4	16.9	33
22-Oct	7	5	Z	8	6	4	3	4	4	6	10	14	13	15	22	30	36	37	37	27	29	23	22	20	16.7	37
23-Oct	20	16	Z	8	9	7	4	4	4	4	4	8	8	7	11	17	10	11	7	7	11	16	14	14	9.7	20
24-Oct	11	10	Z	9	9	9	10	10	11	12	12	15	16	19	21	22	24	24	19	18	18	18	16	16	15.3	24
25-Oct	16	17	Z	17	12	10	12	12	13	14	16	16	14	14	17	18	11	9	10	8	8	4	4	3	12.0	18
26-Oct	4	4	Z	4	4	5	7	8	7	10	11	12	13	14	15	17	19	20	20	18	17	15	13	14	11.7	20
27-Oct	15	14	Z	15	14	16	14	10	13	16	14	12	15	16	16	19	14	13	12	13	9	5	4	5	12.8	19
28-Oct	7	7	Z	7	6	5	4	5	6	7	11	11	12	11	6	8	14	17	14	11	11	10	11	11	9.2	17
29-Oct	12	11	Z	4	3	3	4	5	15	16	17	15	19	20	19	17	18	15	14	19	18	18	19	20	13.9	20
30-Oct	17	15	Z	14	15	18	16	15	13	12	12	13	13	15	19	19	16	11	13	13	15	15	17	17	15.0	19
31-Oct	17	18	Z	19	18	18	15	14	13	10	12	13	12	12	11	8	9	8	5	4	4	4	4	4	10.9	19

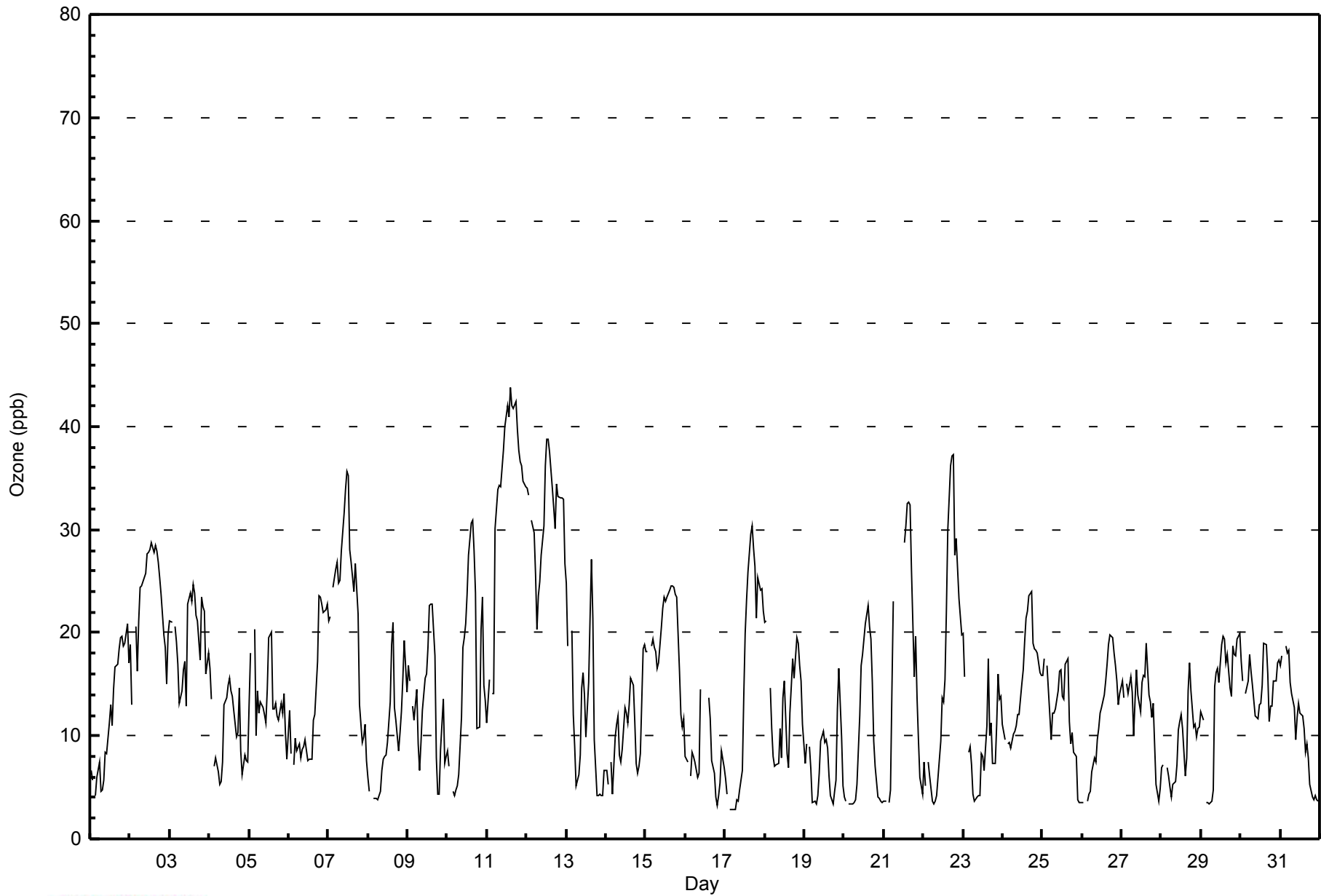
13.3	12.4	--	11.6	10.6	11.4	10.9	10.6	11.7	13.9	15.0	17.0	18.3	18.7	19.6	20.5	19.4	17.9	16.0	15.2	15.2	15.0	14.1	13.3	Diurnal Average		
34	33	--	31	30	30	34	34	34	36	38	40	42	41	44	42	42	42	42	40	38	37	36	35	34	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**





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

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	547	77.70	77.70
21 - 50	157	22.30	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**

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	42	18	12	9	9	22	53	51	36	28	28	25	30	38	29	520
21 - 50	1	2	2	2	1	0	4	10	33	4	3	4	18	25	31	13	153
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>	91	44	20	14	10	9	26	63	84	40	31	32	43	55	69	42	673

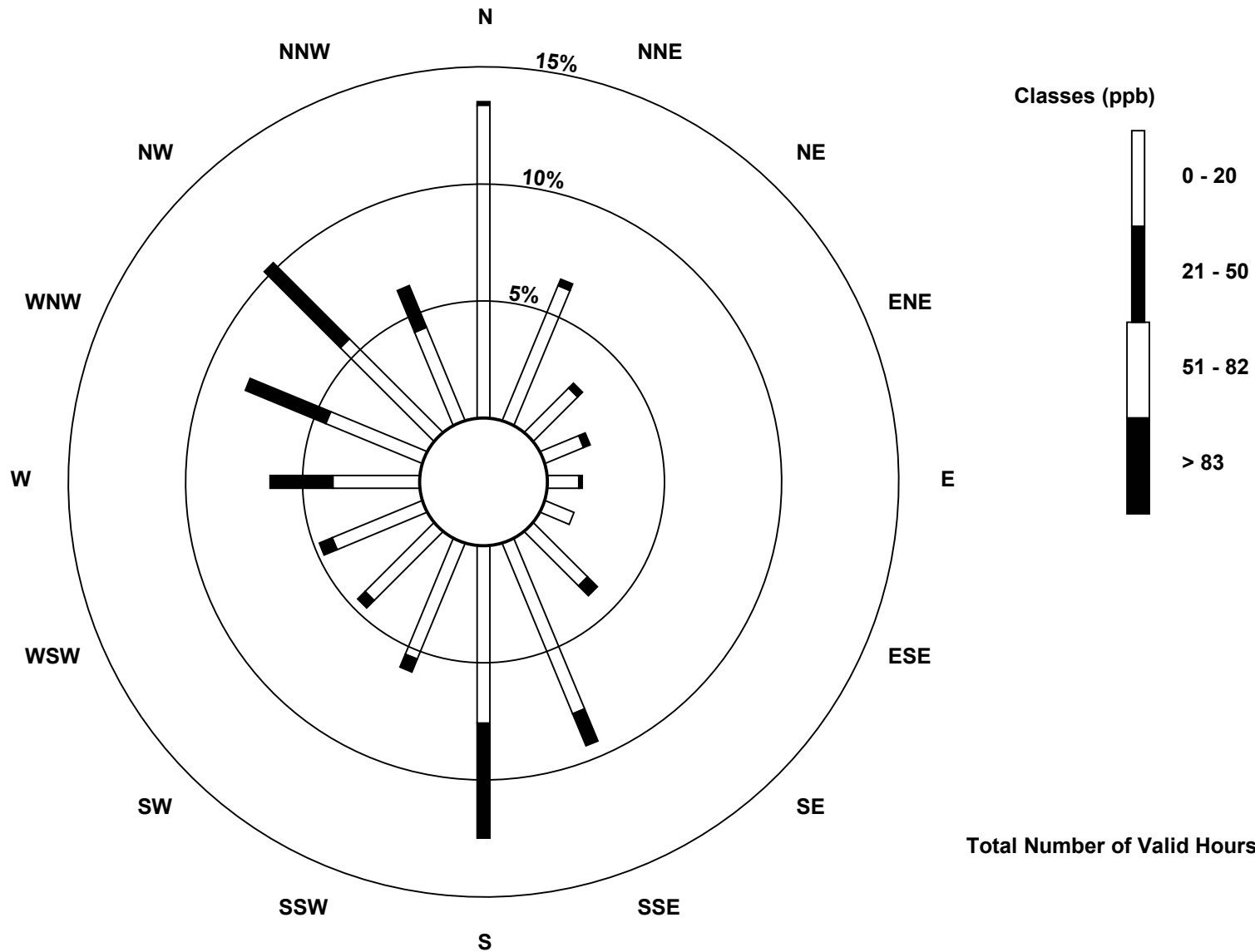
Total Number of Valid Hours: 673

Total Number of Hours: 744



Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

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

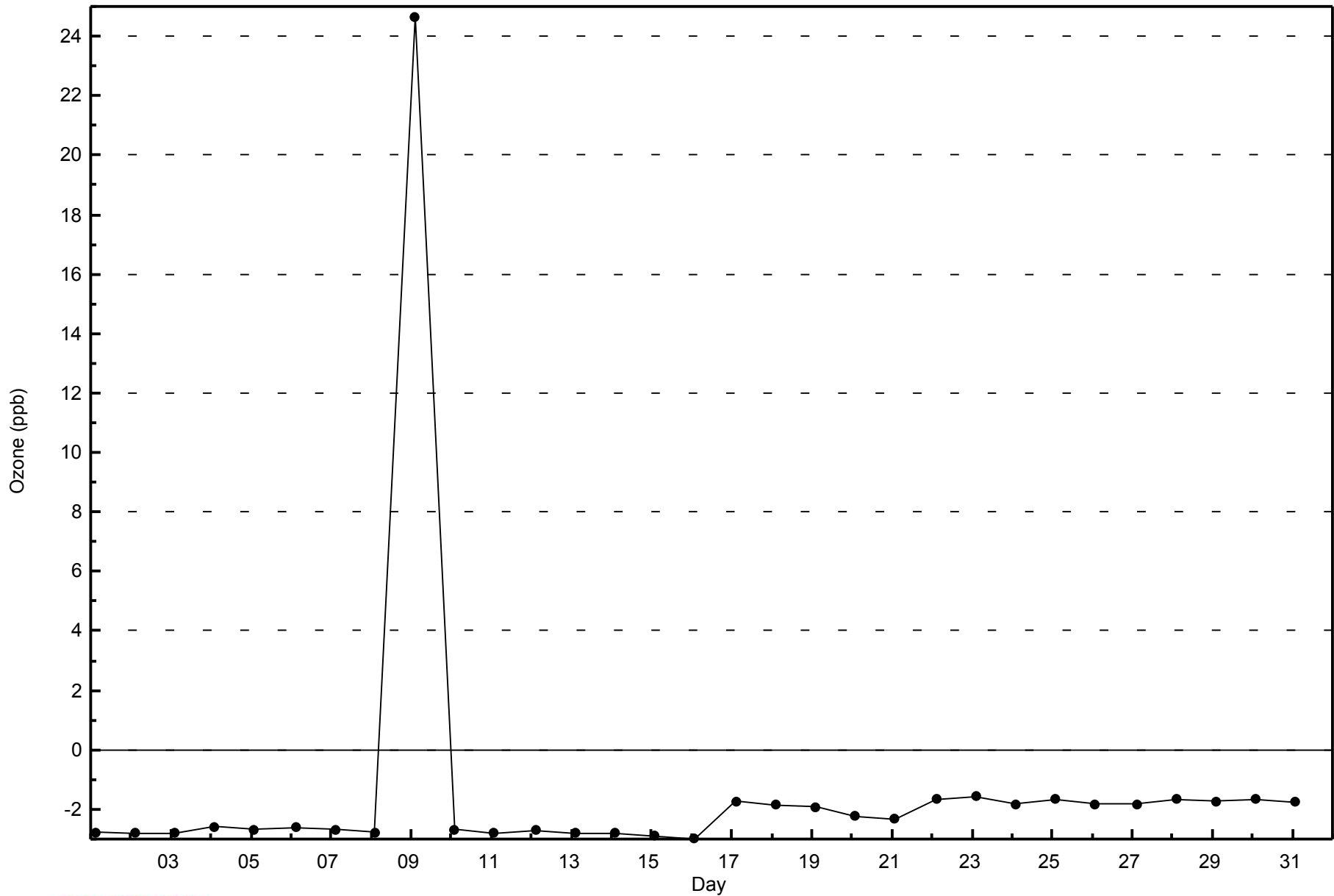


Total Number of Valid Hours: 673



WBEA  
Zero Responses

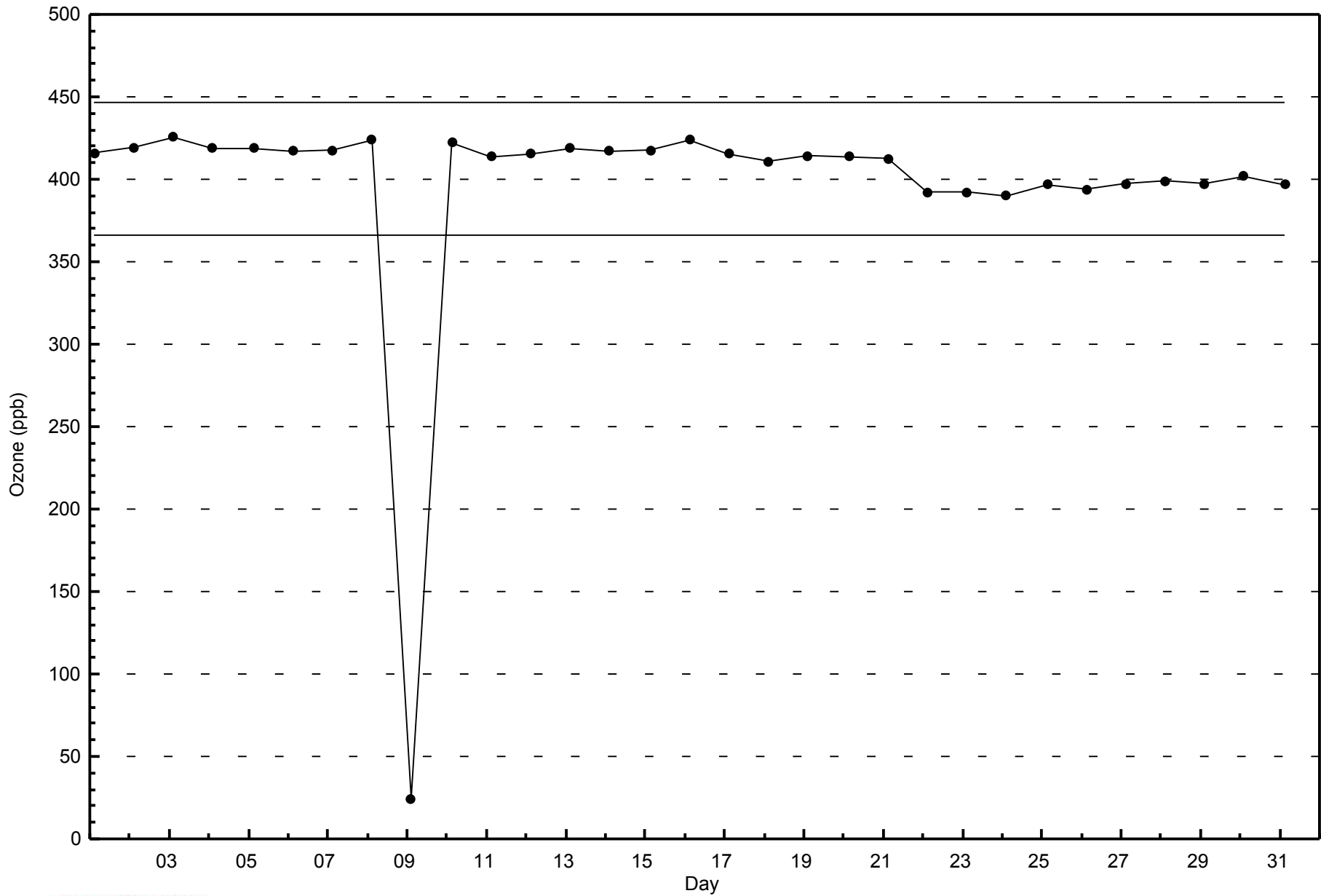
Ozone (O<sub>3</sub>) - ppb  
Fort McKay - Bertha Ganter - October 2014





WBEA  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Fort McKay - Bertha Ganter - October 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

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

Fort McKay - Bertha Ganter - October 2014

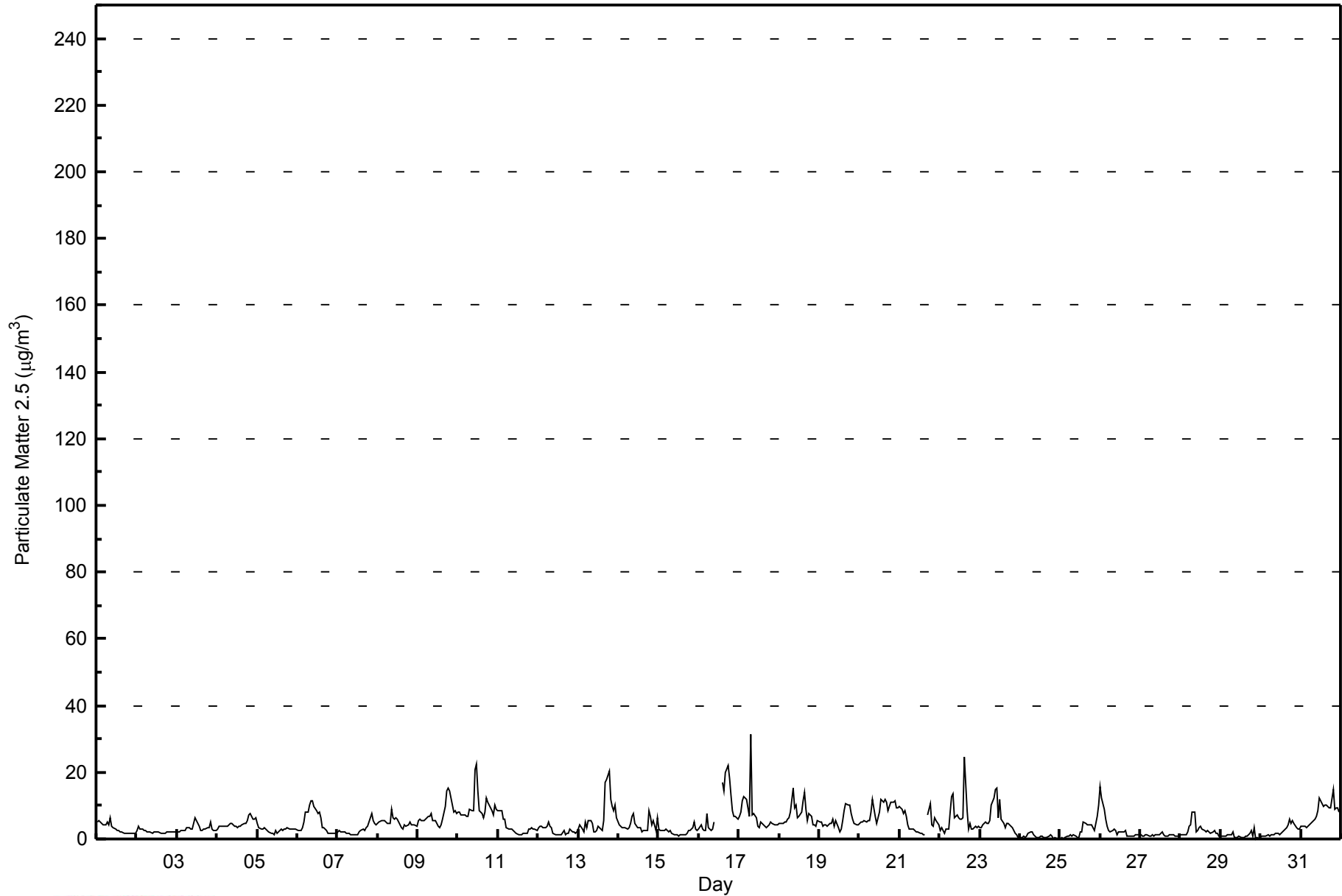
Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 744																								
Maximum Value: 31.4 µg/m <sup>3</sup> on Oct 17 08:00		Maximum Daily Average: 9.7 µg/m <sup>3</sup> on Oct 10																								
Minimum Value: 0.0 µg/m <sup>3</sup> on Oct 30 00:00		Hours of Data: 739																								
Maximum Diurnal Average: 5.9 µg/m <sup>3</sup> at hour 19		Hours of Missing Data: 5																								
Monthly Average: 4.49 µg/m <sup>3</sup>		Hours of Calibration: 0																								
Minimum Daily Average: 0.7 µg/m <sup>3</sup> on Oct 24		Percent Operational Time: 99.3																								
Minimum Diurnal Average: 3.8 µg/m <sup>3</sup> at hour 4																										
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 1.1 Q <sub>1</sub> = 2.0 Median = 3.5 Q <sub>3</sub> = 5.8 P <sub>90</sub> = 9.3 P <sub>99</sub> = 19.3																										
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-Oct	4.9	5.7	5.2	4.8	4.4	4.1	4.9	4.1	6.3	3.9	3.3	2.9	2.4	2.4	2.2	1.9	1.6	1.7	1.6	1.6	1.6	1.7	1.7	1.6	3.2	6.3
2-Oct	2.4	3.6	3.1	2.8	2.7	2.5	2.1	2.2	1.9	1.7	2.0	2.3	2.2	2.0	1.9	1.8	1.7	1.7	1.9	2.1	2.1	2.1	2.1	2.0	2.2	3.6
3-Oct	2.0	2.3	2.4	2.4	2.5	2.7	3.5	3.5	3.1	2.8	4.7	6.6	4.9	3.9	2.4	2.6	2.9	3.2	3.4	3.6	5.0	2.8	2.7	2.7	3.3	6.6
4-Oct	3.0	3.6	3.9	4.0	4.0	4.0	4.0	4.4	4.6	4.5	3.6	3.7	3.2	4.0	3.9	4.3	4.6	4.8	5.6	7.3	7.5	6.1	5.9	6.2	4.6	7.5
5-Oct	4.6	3.3	2.9	3.1	3.6	3.0	2.7	2.0	1.9	1.6	1.4	2.4	1.6	2.6	3.1	2.6	2.8	3.2	3.2	3.1	3.0	2.8	2.8	3.0	2.8	4.6
6-Oct	2.7	2.6	2.5	3.5	5.1	8.2	7.9	10.1	11.3	11.6	9.8	8.4	7.5	8.1	6.5	3.5	3.3	2.7	1.6	1.6	1.7	1.7	1.7	1.8	5.2	11.6
7-Oct	2.1	2.5	2.2	2.1	1.9	1.7	1.9	1.7	1.3	1.2	1.2	1.3	1.4	2.1	2.4	2.9	2.7	3.3	3.9	5.2	7.5	5.4	4.5	4.2	2.8	7.5
8-Oct	4.7	5.1	5.3	5.4	5.5	5.0	4.5	4.8	8.7	6.3	6.1	6.4	6.0	4.2	3.4	3.0	4.1	3.7	4.3	5.3	4.4	4.4	4.2	4.0	5.0	8.7
9-Oct	5.3	5.9	5.7	5.5	5.7	6.2	7.0	6.7	7.5	5.5	5.4	4.7	3.7	3.6	4.0	5.7	9.6	14.3	15.1	14.5	12.2	8.1	8.5	7.8	7.4	15.1
10-Oct	8.1	8.2	7.0	7.1	7.2	6.6	6.8	8.8	8.3	8.6	20.6	22.3	14.2	8.6	7.6	6.2	7.9	12.2	11.2	9.3	8.3	7.4	10.2	9.0	9.7	22.3
11-Oct	8.3	8.4	8.4	6.1	5.7	3.4	3.1	3.0	2.8	2.3	2.2	1.8	1.3	1.5	1.4	1.5	1.5	1.7	2.8	3.1	3.3	2.8	2.8	2.7	3.4	8.4
12-Oct	3.3	4.0	3.9	3.6	3.4	4.0	5.2	3.9	3.5	1.6	1.5	1.4	1.3	1.2	1.3	2.6	1.5	1.6	1.7	2.8	2.1	2.1	1.9	2.0	2.5	5.2
13-Oct	2.9	4.1	3.2	2.3	4.9	3.3	5.7	5.4	4.8	2.2	2.0	2.6	3.6	3.0	2.5	5.4	17.0	17.6	20.4	12.1	9.7	8.6	10.1	6.5	6.7	20.4
14-Oct	4.2	3.7	3.3	3.3	3.3	2.9	3.6	4.5	6.8	7.4	4.5	3.3	3.5	3.3	2.3	2.3	2.4	2.3	8.3	6.7	4.3	5.4	2.3	6.4	4.2	8.3
15-Oct	2.8	2.4	2.3	2.5	3.0	2.4	2.1	2.5	1.7	1.1	1.2	1.1	1.1	1.1	1.1	1.2	1.5	1.8	2.6	2.7	3.2	5.0	3.0	2.6	2.2	5.0
16-Oct	3.0	4.4	3.1	2.7	2.7	7.5	3.3	2.6	3.1	5.2	PF	PF	PF	PF	17.1	14.3	19.9	22.2	18.1	13.2	8.5	6.7	6.8	6.1	8.5	22.2
17-Oct	6.9	8.0	11.3	12.5	11.9	9.4	6.9	31.4	7.1	7.5	6.5	4.0	3.6	5.0	4.6	3.8	3.6	3.7	4.2	5.0	4.5	4.2	4.1	4.2	7.2	31.4
18-Oct	4.5	4.6	4.7	5.2	5.3	6.0	6.5	8.1	15.1	9.3	10.2	6.2	6.6	8.2	11.5	13.8	8.9	5.4	7.6	6.7	4.1	4.0	3.8	5.6	7.2	15.1
19-Oct	5.1	4.9	3.8	4.0	4.1	4.0	4.6	4.7	6.1	3.9	5.4	3.4	2.3	2.9	5.3	8.6	10.7	10.2	10.0	7.8	5.8	4.6	4.1	4.3	5.4	10.7
20-Oct	4.5	4.9	5.1	5.3	5.2	5.5	5.6	8.2	11.9	6.8	4.5	6.3	7.8	12.0	10.9	11.9	11.1	8.4	9.8	10.9	11.2	11.3	9.5	9.4	8.3	12.0
21-Oct	9.7	8.9	7.6	8.3	6.8	4.4	3.2	3.0	2.8	2.6	2.3	2.1	1.7	1.5	1.1	1.4	M	7.0	10.7	4.4	4.0	6.3	5.4	4.4	4.8	10.7
22-Oct	2.4	3.4	2.6	1.8	3.0	2.8	8.2	12.8	13.5	6.3	7.4	6.2	5.9	5.9	6.5	24.6	8.4	3.1	4.5	3.1	3.1	4.0	3.6	3.8	6.1	24.6
23-Oct	3.2	3.4	4.4	4.9	4.6	4.6	5.4	10.2	12.2	14.9	15.4	6.3	11.7	5.8	4.5	3.4	4.5	4.5	4.1	3.3	2.6	1.5	1.3	0.5	5.7	15.4
24-Oct	0.2	0.6	0.6	0.5	0.7	1.5	2.1	2.0	1.4	0.8	0.5	0.6	0.7	0.7	0.6	0.2	0.3	0.7	1.2	0.8	0.1	0.3	0.1	0.1	0.7	2.1
25-Oct	0.2	0.3	0.2	0.3	0.8	1.0	1.2	1.0	1.3	1.0	0.3	0.4	1.9	2.1	5.0	4.8	4.1	4.3	4.3	4.3	2.4	4.7	7.0	10.4	2.6	10.4
26-Oct	15.9	12.4	9.1	5.7	3.9	2.7	2.3	2.4	3.2	2.6	1.4	2.0	2.1	1.9	2.2	2.7	0.8	0.7	0.7	1.0	1.0	1.1	1.4	1.5	3.4	15.9
27-Oct	1.4	1.0	0.9	1.1	1.1	0.9	1.0	1.1	1.0	1.2	1.2	1.4	1.5	2.1	1.3	1.0	1.0	1.2	1.3	1.3	1.3	0.7	0.8	0.7	1.2	2.1
28-Oct	1.1	1.4	1.2	1.5	2.1	3.8	4.3	8.2	7.9	2.2	2.4	3.5	3.6	3.0	2.7	2.2	2.3	1.9	1.5	2.0	2.3	1.6	1.7	1.0	2.7	8.2
29-Oct	0.8	0.7	0.8	0.9	1.2	1.1	1.4	1.9	0.5	0.5	0.6	0.7	0.4	0.2	0.3	1.0	0.8	1.6	2.4	0.7	3.2	0.1	0.2	0.0	0.9	3.2
30-Oct	0.7	0.8	0.8	1.0	1.1	1.0	1.1	1.3	1.5	1.5	1.6	1.4	1.6	2.0	2.5	3.3	4.0	5.8	4.7	5.4	4.8	3.2	2.8	3.0	2.4	5.8
31-Oct	3.6	4.0	3.7	3.4	3.6	4.0	4.5	5.2	6.0	6.9	8.5	12.1	11.5	9.8	10.2	10.1	9.9	9.2	9.5	14.8	9.1	9.4	9.4	8.0	7.8	14.8
																								Diurnal Average		
																								Diurnal Maximum		
																								4.0 15.9		
																								4.2 12.4		
																								3.9 11.3		
																								3.8 12.5		
																								3.9 11.9		
																								3.9 9.4		
																								4.1 8.2		
																								5.5 31.4		
																								5.5 15.1		
																								4.4 14.9		
																								4.6 20.6		
																								4.3 22.3		
																								4.0 14.2		
																								3.8 12.0		
																								4.3 17.1		
																								5.0 24.6		
																								5.2 19.9		
																								5.3 22.2		
																								5.9 20.4		
																								5.3 14.8		
																								4.6 12.2		
																								4.2 11.3		
																								4.1 10.2		
																								4.0 10.4		

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>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay - Bertha Ganter - October 2014**





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	478	64.68	64.68
6 - 15	187	25.30	89.99
16 - 25	11	1.49	91.48
26 - 80	1	0.14	91.61
> 81.0	0	0.00	91.61

Total Number of Valid Hours: 739

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay - Bertha Ganter - October 2014**

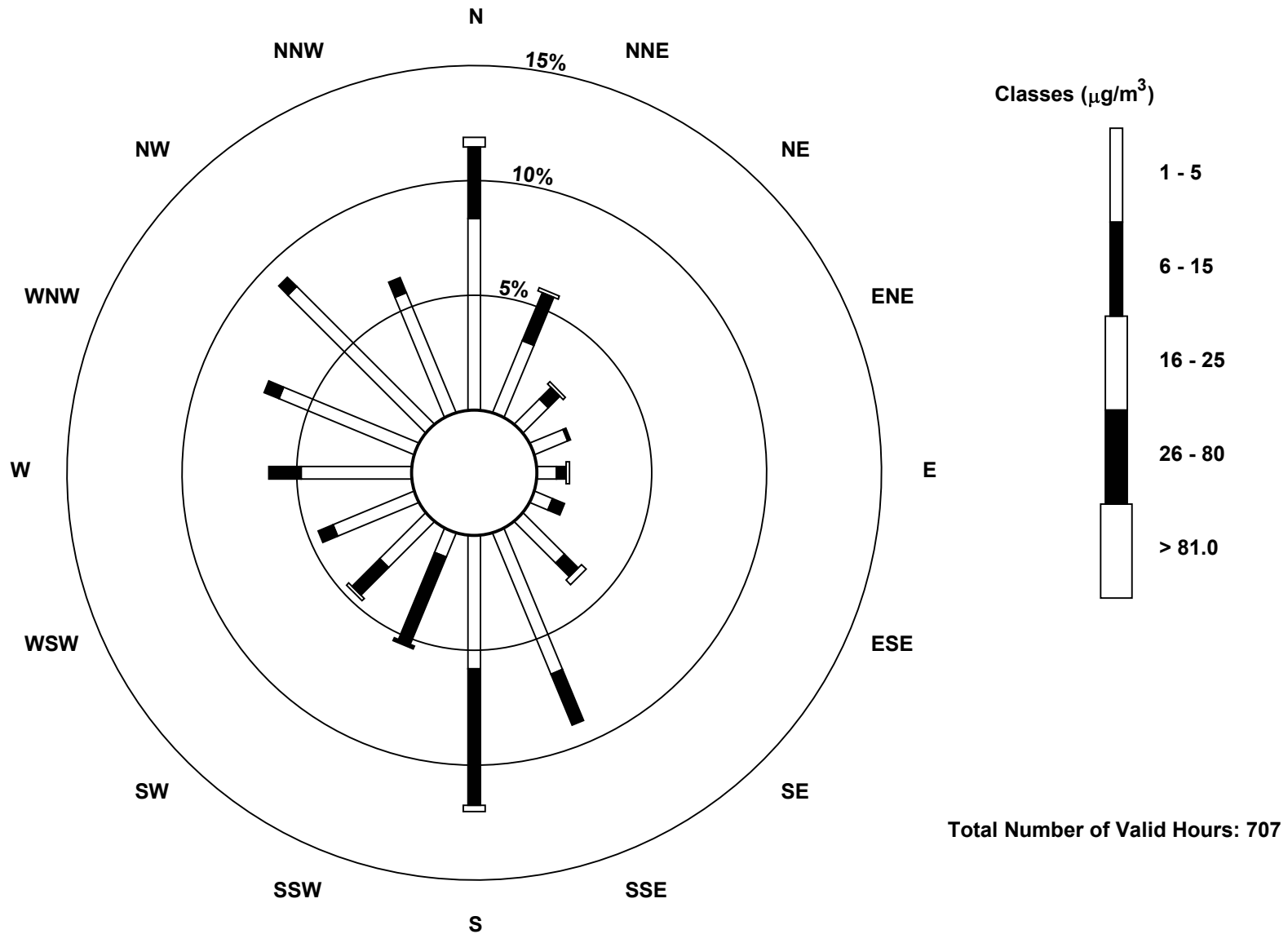
Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	59	24	11	11	6	6	18	47	41	8	20	27	34	45	60	40	457
6 - 15	22	16	5	1	3	4	6	17	42	29	12	5	10	5	4	5	186
16 - 25	3	1	1	0	1	0	2	0	2	0	1	0	0	0	0	0	11
26 - 80	0	0	0	0	0	0	0	0	0	1	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>	84	41	17	12	10	10	26	64	85	38	33	32	44	50	64	45	655

Total Number of Valid Hours: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

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







Summary of Hour Averages

Fort McKay - Bertha Ganter - October 2014

Number of Exceedences (AAAQO): 1-hr: 0	Hours in Service: 744
Maximum Value: 0 ppb on Oct 1 01:00	Maximum Daily Average: 0.0 ppb on Oct 1
Minimum Value: 0 ppb on Oct 1 01:00	Hours of Data: 631
Maximum Diurnal Average: 0.0 ppb at hour 1	Hours of Missing Data: 113
Monthly Average: 0.0 ppb	Hours of Calibration: 40
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: 90.2

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-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
5-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
6-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
7-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	UO	UO	UO	UO	UO	0	0	0	0	0	0	--	0
8-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	0
9-Oct	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	0
10-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	UO	UO	0	0	0	0	0	0	0	0.0	0
11-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
14-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
16-Oct	0	Z	RE	0	0	0	0	0	0	0	PF	PF	PF	PF	PF	0	0	0	0	0	0	0	0	0	--	0
17-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
18-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
19-Oct	0	Z	RE	0	0	0	0	PF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
20-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Oct	0	Z	RE	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	0	0	0	--	0
22-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
25-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
26-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
28-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
31-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0

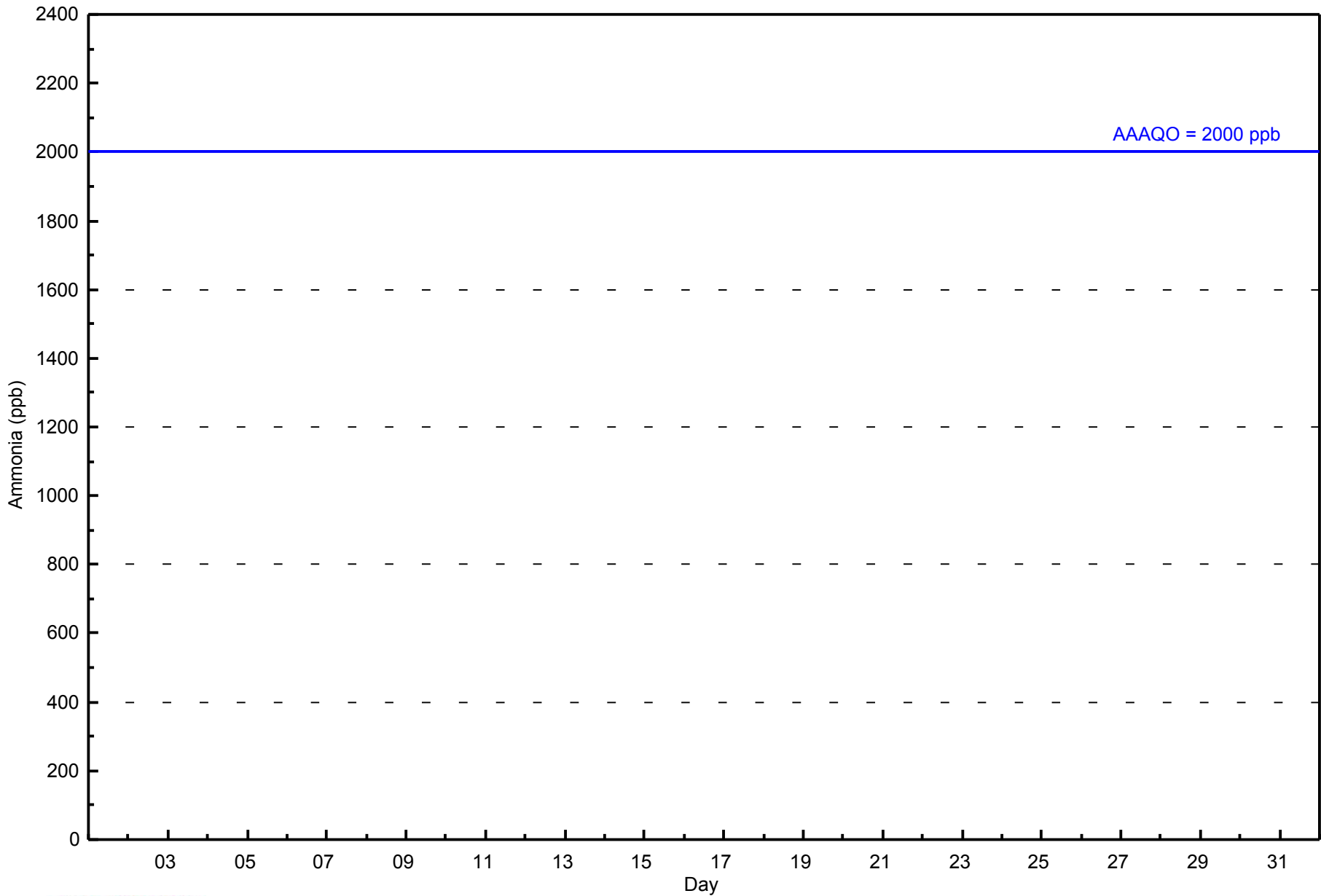
0.0	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
0	--	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

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



**WBEA**  
**Hourly Averages**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**





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

**Ammonia (NH<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	631	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: 631

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2014**

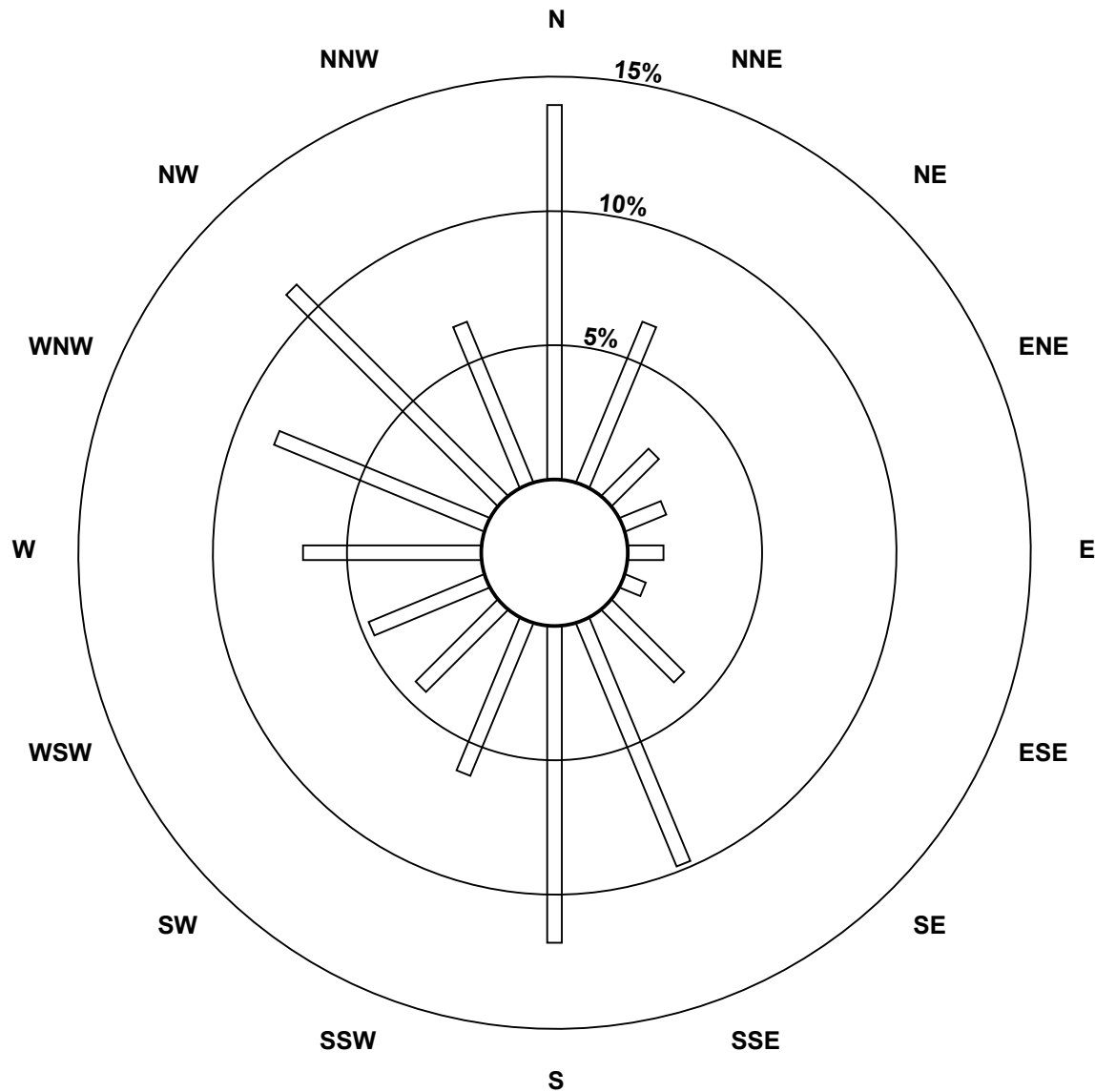
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	84	39	15	10	8	5	23	59	71	37	26	28	40	51	67	39	602
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 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>	84	39	15	10	8	5	23	59	71	37	26	28	40	51	67	39	602

Total Number of Valid Hours: 602

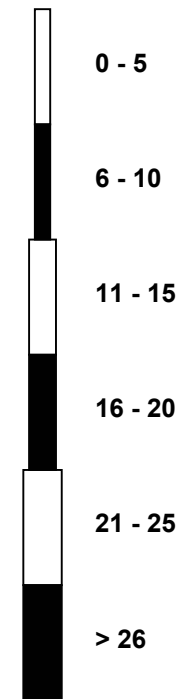
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



Classes (ppb)

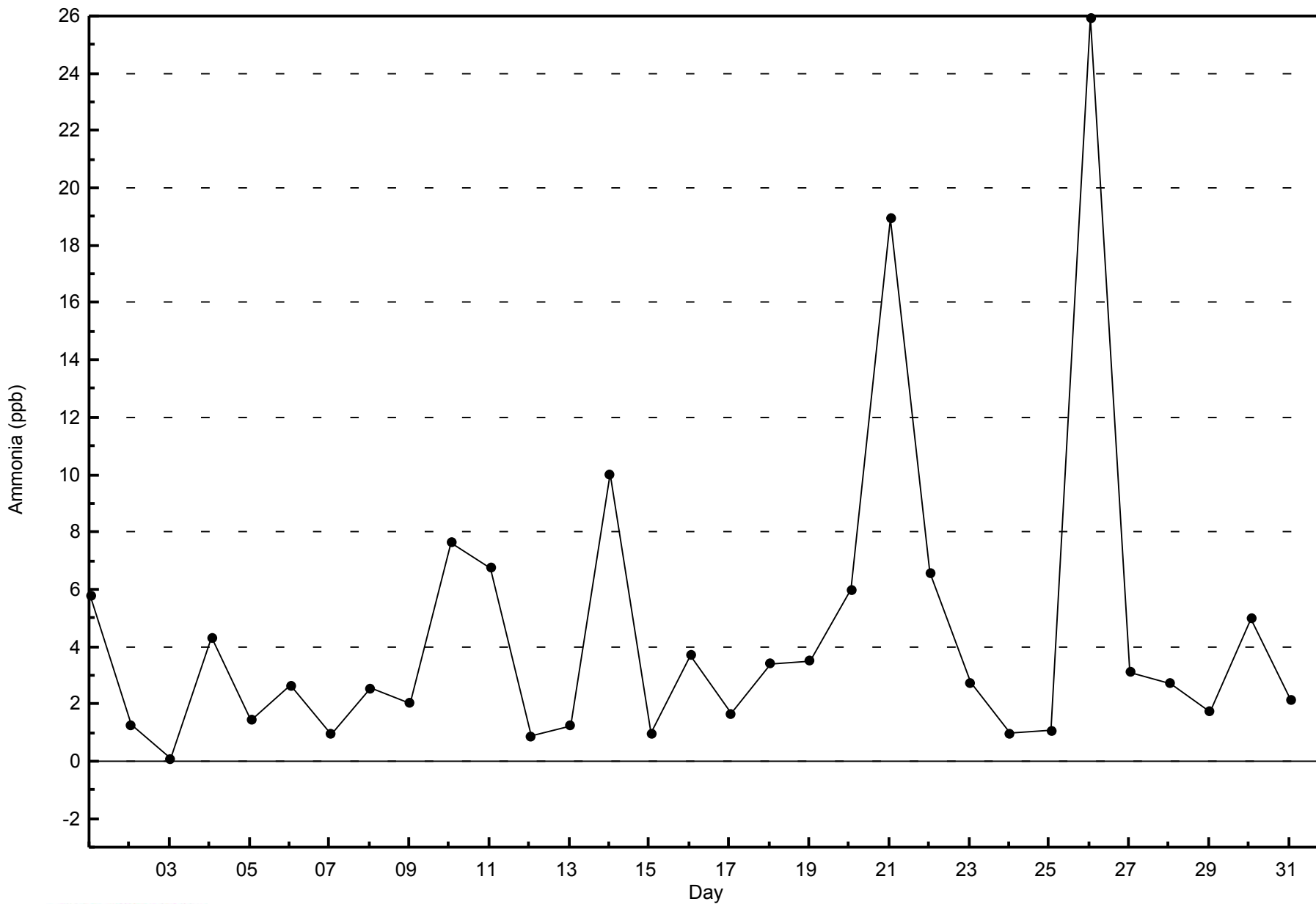


Total Number of Valid Hours: 602



WBEA  
Zero Responses

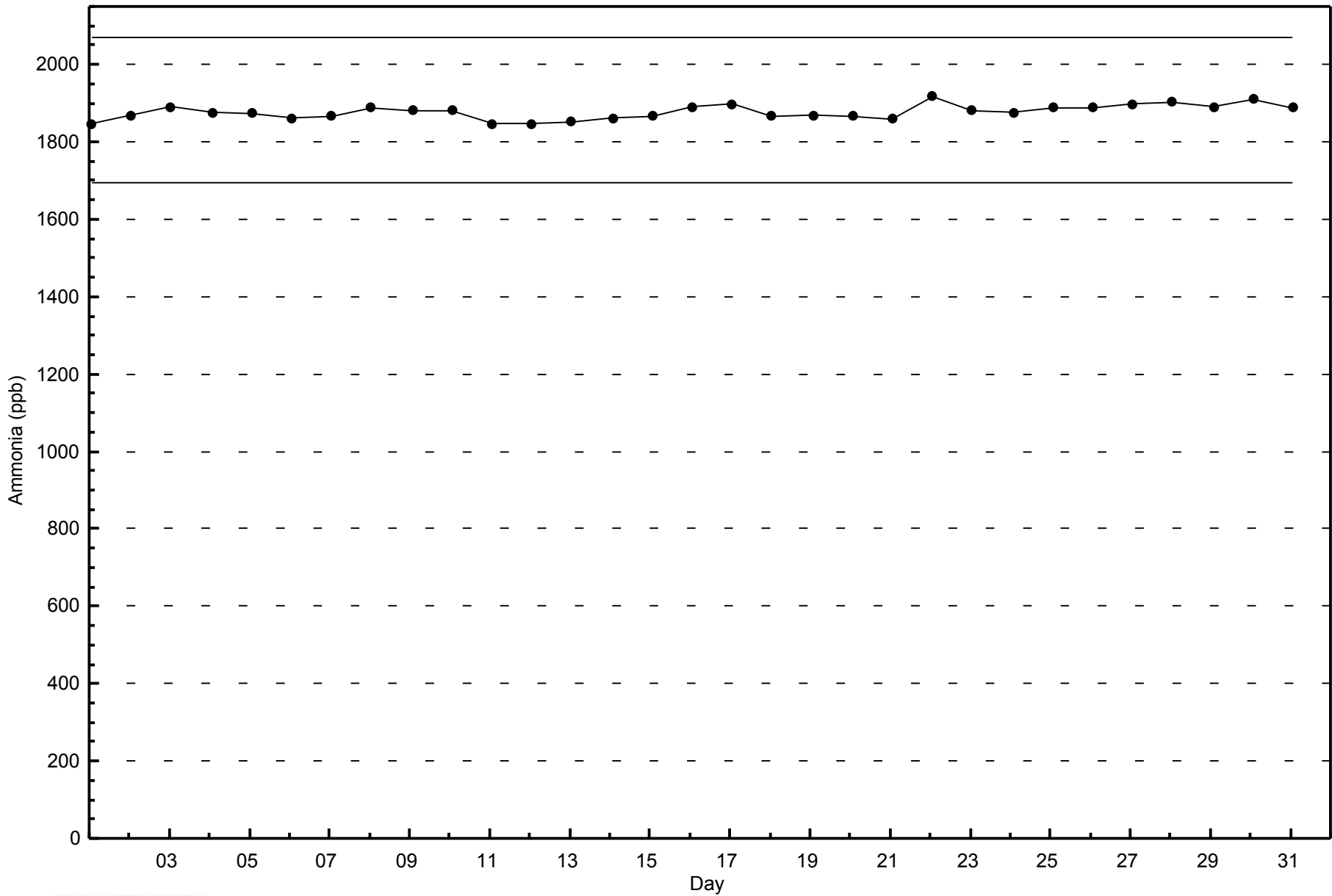
Ammonia (NH<sub>3</sub>) - ppb  
Fort McKay - Bertha Ganter - October 2014





WBEA  
Span Responses

Ammonia (NH<sub>3</sub>) - ppb  
Fort McKay - Bertha Ganter - October 2014





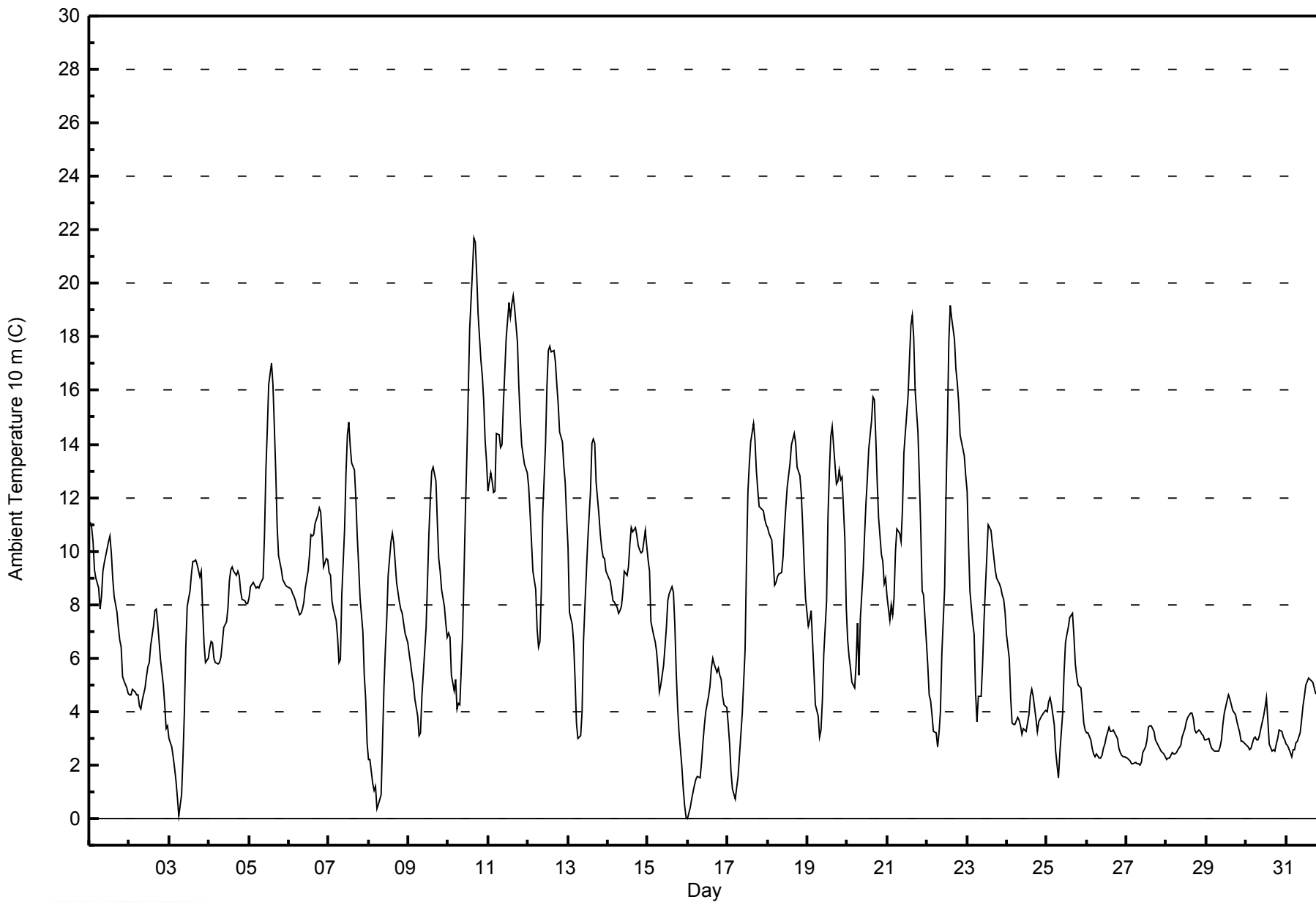
Maximum Value: 21.7 C on Oct 10 16:00		Maximum Daily Average: 15.3 C on Oct 11		Hours in Service: 744																																												
Minimum Value: 0.0 C on Oct 16 01:00		Minimum Daily Average: 2.5 C on Oct 27		Hours of Data: 744																																												
Maximum Diurnal Average: 10.9 C at hour 16		Minimum Diurnal Average: 4.7 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 7.52 C		Percentiles: P <sub>1</sub> = 0.7 P <sub>10</sub> = 2.5 Q <sub>1</sub> = 3.6 Median = 7.2 Q <sub>3</sub> = 10.3 P <sub>90</sub> = 14.0 P <sub>99</sub> = 19.2		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-Oct	11.1	10.9	10.3	9.3	9.0	8.6	7.8	8.3	9.2	9.5	9.8	10.4	10.6	10.0	9.0	8.3	7.7	7.2	6.6	6.4	5.3	5.2	4.9	4.7	8.3	11.1																						
2-Oct	4.6	4.6	4.8	4.7	4.6	4.6	4.2	4.1	4.4	4.9	5.3	5.7	5.8	6.5	7.2	7.8	7.8	7.3	6.6	5.9	5.0	4.3	3.3	3.5	5.3	7.8																						
3-Oct	3.0	2.7	2.3	1.9	1.4	0.8	0.1	0.9	2.3	4.0	6.4	7.9	8.5	9.1	9.6	9.6	9.7	9.5	9.0	9.2	7.8	6.5	5.8	6.0	5.6	9.7																						
4-Oct	6.4	6.6	6.5	6.0	5.8	5.8	5.8	6.0	6.6	7.2	7.4	7.9	8.9	9.3	9.4	9.2	9.1	9.2	9.1	8.5	8.2	8.2	8.0	8.0	7.6	9.4																						
5-Oct	8.3	8.7	8.8	8.7	8.6	8.7	8.6	8.8	9.0	10.6	13.0	14.5	16.2	17.0	16.2	14.7	13.0	10.9	9.8	9.3	8.9	8.8	8.7	8.7	10.8	17.0																						
6-Oct	8.6	8.6	8.4	8.3	8.2	7.9	7.6	7.6	7.8	8.1	8.6	9.3	9.8	10.6	10.6	10.6	11.0	11.3	11.6	11.5	10.4	9.4	9.7	9.7	9.4	11.6																						
7-Oct	9.2	9.1	8.2	7.8	7.4	6.8	5.8	5.9	8.4	10.8	12.9	14.4	14.8	13.9	13.3	13.0	12.0	10.5	9.4	8.2	7.0	5.3	4.5	2.8	9.2	14.8																						
8-Oct	2.2	2.2	1.3	1.0	1.2	0.4	0.5	0.9	2.9	4.9	6.3	7.4	9.1	10.4	10.7	10.3	9.6	8.8	8.1	7.8	7.6	7.3	7.0	6.6	5.6	10.7																						
9-Oct	6.1	5.8	5.4	5.1	4.4	3.8	3.1	3.2	4.6	5.4	7.1	8.9	10.7	11.9	13.0	13.1	12.6	11.1	9.7	9.3	8.6	8.0	7.3	6.8	7.7	13.1																						
10-Oct	6.9	6.8	5.4	4.8	5.2	4.1	4.3	4.3	6.9	9.2	11.6	13.5	15.9	18.3	20.5	21.7	21.5	20.3	18.9	17.1	16.5	15.6	14.2	13.4	12.4	21.7																						
11-Oct	12.2	12.9	12.6	12.2	12.2	14.4	14.3	13.9	14.0	15.5	16.7	18.0	19.3	18.8	19.3	19.5	19.1	17.8	16.1	15.0	14.0	13.6	13.3	12.9	15.3	19.5																						
12-Oct	12.4	11.4	10.3	9.3	8.6	7.1	6.4	6.6	8.6	11.4	14.0	16.2	17.5	17.6	17.5	17.5	17.1	16.2	15.5	14.4	14.1	13.2	12.5	11.2	12.8	17.6																						
13-Oct	10.1	7.7	7.2	6.6	5.2	3.6	3.0	3.1	4.0	6.6	8.0	9.1	10.3	12.2	14.0	14.2	14.0	12.6	11.3	10.6	10.1	9.8	9.7	9.2	8.8	14.2																						
14-Oct	9.0	8.9	8.5	8.1	8.1	7.9	7.6	7.8	7.9	8.4	9.2	9.1	9.4	10.2	10.9	10.7	10.9	10.6	10.2	10.0	9.9	10.0	10.8	10.2	9.4	10.9																						
15-Oct	9.7	9.2	7.4	6.8	6.6	6.2	5.6	4.7	5.0	5.7	6.4	7.2	8.1	8.4	8.7	8.5	7.2	5.5	4.2	3.2	2.0	1.1	0.5	0.0	5.8	9.7																						
16-Oct	0.0	0.4	0.7	1.0	1.2	1.4	1.6	1.5	2.1	2.8	3.5	4.0	4.6	5.0	5.6	6.0	5.8	5.5	5.6	5.4	5.2	4.6	4.2	4.1	3.4	6.0																						
17-Oct	3.5	2.8	1.7	1.1	0.7	1.1	1.6	2.4	3.1	4.0	6.3	9.6	12.2	13.2	14.1	14.8	14.2	13.1	12.3	11.7	11.6	11.5	11.2	11.0	7.9	14.8																						
18-Oct	10.9	10.7	10.4	9.6	8.7	8.8	9.0	9.2	9.2	9.8	10.8	11.7	12.4	13.3	14.0	14.2	14.4	14.0	13.2	12.8	12.1	10.9	9.5	8.3	11.2	14.4																						
19-Oct	7.2	7.4	7.8	6.6	5.5	4.3	3.8	3.0	3.3	4.4	6.1	8.1	11.3	13.0	14.3	14.7	13.9	12.5	12.6	13.0	12.7	12.7	10.4	7.9	9.0	14.7																						
20-Oct	6.7	6.1	5.6	5.1	4.9	5.8	7.3	5.3	7.4	9.3	10.5	11.8	12.7	13.8	14.9	15.7	15.7	14.2	12.6	11.3	9.9	9.6	8.8	9.0	9.7	15.7																						
21-Oct	8.3	7.4	8.0	7.6	8.2	10.0	10.8	10.6	10.4	11.6	13.6	14.4	15.8	17.2	18.4	18.8	18.0	16.0	14.4	12.7	10.8	8.5	8.3	6.6	11.9	18.8																						
22-Oct	5.7	4.6	4.4	3.9	3.2	3.2	2.7	3.2	4.0	6.2	8.6	12.1	14.8	17.9	19.2	18.7	17.9	16.8	16.3	15.5	14.4	13.8	13.5	12.8	10.6	19.2																						
23-Oct	12.2	10.2	8.5	7.3	6.9	4.7	3.6	4.6	4.6	5.8	7.3	8.6	9.8	11.0	10.7	10.2	9.8	9.3	9.0	8.8	8.6	8.4	8.2	7.7	8.2	12.2																						
24-Oct	6.9	6.0	4.5	3.6	3.5	3.5	3.8	3.7	3.5	3.1	3.4	3.3	3.6	3.9	4.6	4.8	4.6	3.7	3.2	3.6	3.8	3.8	4.0	4.1	4.0	6.9																						
25-Oct	4.0	4.4	4.5	4.3	3.5	2.5	2.0	1.5	2.5	4.0	5.5	6.5	6.9	7.2	7.5	7.7	6.8	5.8	5.3	5.0	4.9	4.2	3.6	3.3	4.7	7.7																						
26-Oct	3.2	3.2	3.0	2.6	2.4	2.3	2.4	2.3	2.2	2.4	2.6	2.8	3.0	3.4	3.2	3.2	3.3	3.2	3.0	2.6	2.5	2.3	2.3	2.3	2.7	3.4																						
27-Oct	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.5	2.7	3.0	3.4	3.5	3.5	3.3	3.0	2.8	2.7	2.6	2.5	2.4	2.3	2.5	3.5																						
28-Oct	2.2	2.2	2.2	2.5	2.4	2.4	2.5	2.6	2.7	3.1	3.2	3.4	3.6	3.8	4.0	3.9	3.7	3.3	3.2	3.3	3.3	3.1	3.1	2.9	3.0	4.0																						
29-Oct	3.0	3.0	2.8	2.6	2.6	2.5	2.5	2.5	2.7	2.9	3.5	3.9	4.4	4.6	4.5	4.2	4.0	3.9	3.6	3.4	3.2	2.9	2.9	2.8	3.3	4.6																						
30-Oct	2.7	2.7	2.6	2.6	3.0	3.1	3.0	2.9	3.1	3.4	3.9	4.2	4.5	3.7	2.8	2.5	2.6	2.5	2.8	3.0	3.3	3.3	3.0	2.9	3.1	4.5																						
31-Oct	2.8	2.7	2.5	2.3	2.6	2.6	2.8	2.9	3.2	3.7	4.2	4.5	5.0	5.2	5.2	5.2	5.1	4.9	4.7	4.6	4.3	4.2	4.0	3.8	3.9	5.2																						
																								6.5	6.2	5.8	5.3	5.1	4.9	4.7	4.7	5.4	6.5	7.7	8.7	9.8	10.4	10.8	10.9	10.5	9.7	9.1	8.6	8.0	7.5	7.1	6.6	Diurnal Average
																								12.4	12.9	12.6	12.2	12.2	14.4	14.3	13.9	14.0	15.5	16.7	18.0	19.3	18.8	20.5	21.7	21.5	20.3	18.9	17.1	16.5	15.6	14.2	13.4	Diurnal Maximum





**WBEA**  
**Hourly Averages**

**Ambient Temperature 10 m (AT 10m) - C**  
**Fort McKay - Bertha Ganter - October 2014**





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

**Ambient Temperature 10 m (AT 10m) - C**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	1	0.13	0.13
0 - 10	546	73.39	73.52
10 - 20	193	25.94	99.46
> 20	4	0.54	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

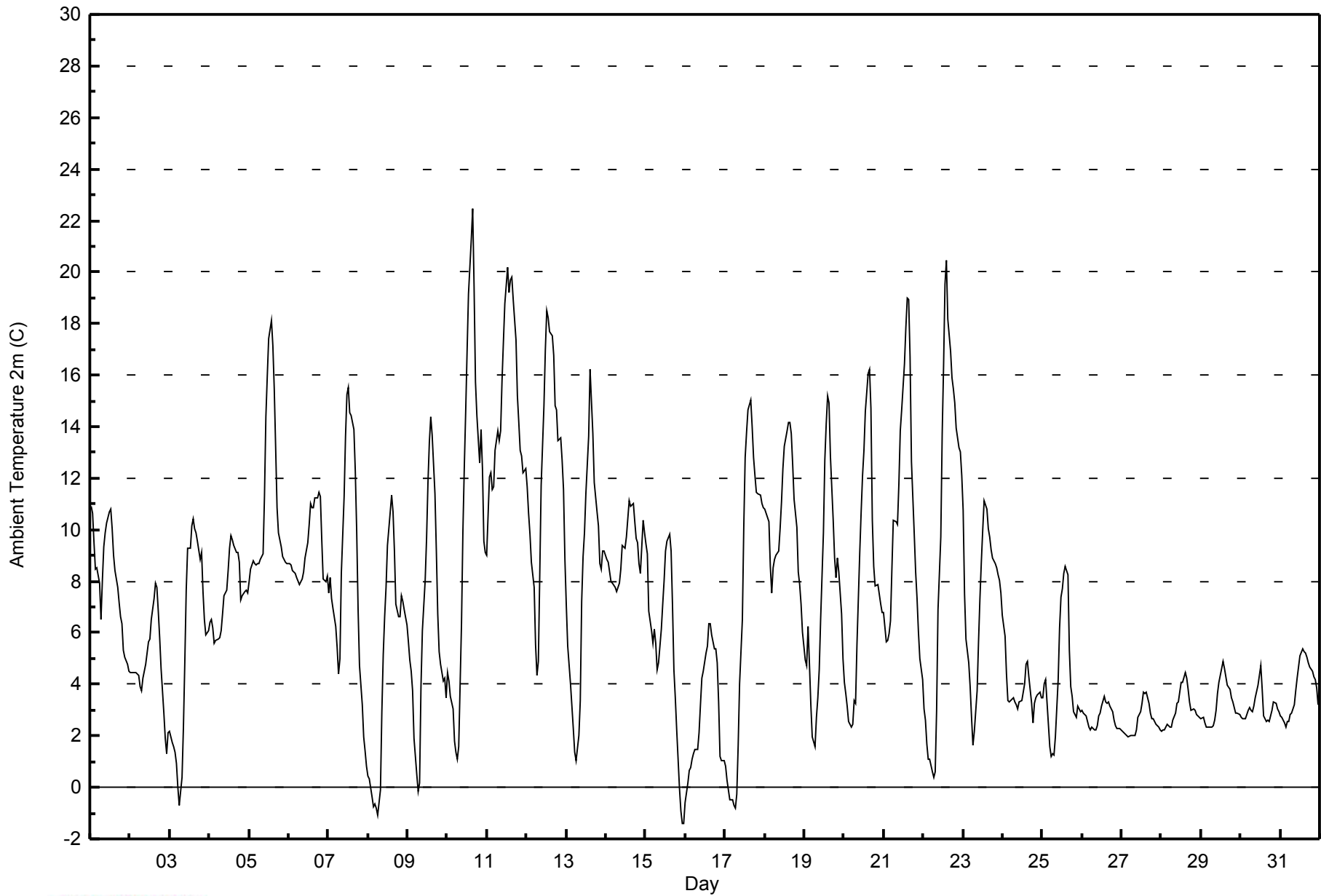


Maximum Value: 22.5 C on Oct 10 16:00		Maximum Daily Average: 14.9 C on Oct 11		Hours in Service: 744																																												
Minimum Value: -1.4 C on Oct 15 23:00		Minimum Daily Average: 2.6 C on Oct 27		Hours of Data: 744																																												
Maximum Diurnal Average: 11.4 C at hour 15		Minimum Diurnal Average: 3.7 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 6.99 C		Percentiles: P <sub>1</sub> = -0.7 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 3.2 Median = 6.3 Q <sub>3</sub> = 9.8 P <sub>90</sub> = 13.8 P <sub>99</sub> = 19.4		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	10.9	10.6	9.5	8.5	8.5	7.9	6.5	8.0	9.3	9.9	10.2	10.7	10.8	10.0	9.0	8.4	7.8	7.2	6.6	6.3	5.3	5.1	4.8	4.5	8.2	10.9																						
2-Oct	4.5	4.4	4.5	4.5	4.4	4.4	3.9	3.8	4.2	4.8	5.2	5.7	5.7	6.5	7.3	7.9	7.8	6.8	5.8	4.6	2.9	1.9	1.3	2.1	4.8	7.9																						
3-Oct	2.2	1.7	1.6	1.4	0.9	0.0	-0.7	0.4	2.4	4.9	7.7	9.3	9.3	10.1	10.4	10.0	9.9	9.5	8.8	9.1	7.6	6.5	5.9	6.1	5.6	10.4																						
4-Oct	6.4	6.5	6.2	5.6	5.7	5.8	5.8	6.1	6.7	7.5	7.6	8.4	9.3	9.8	9.6	9.4	9.1	9.1	8.7	7.3	7.5	7.6	7.7	7.6	7.5	9.8																						
5-Oct	8.0	8.5	8.8	8.7	8.6	8.7	8.7	8.8	9.1	11.3	14.4	16.0	17.4	18.1	17.1	15.5	13.2	10.9	9.9	9.3	9.0	8.9	8.7	8.7	11.1	18.1																						
6-Oct	8.7	8.6	8.4	8.3	8.3	8.2	7.9	8.0	8.1	8.4	8.9	9.5	10.2	11.0	10.9	10.9	11.2	11.3	11.5	11.3	9.6	8.1	8.0	8.2	9.3	11.5																						
7-Oct	7.5	8.1	7.3	7.0	6.3	5.4	4.4	5.0	8.3	11.3	13.6	15.2	15.5	14.6	14.5	13.9	12.3	9.9	6.9	4.7	3.2	2.0	1.4	0.8	8.3	15.5																						
8-Oct	0.4	0.4	-0.4	-0.7	-0.6	-0.8	-1.1	-0.1	2.9	5.1	6.6	7.8	9.4	10.7	11.3	10.7	9.2	7.1	6.6	6.6	7.4	7.2	6.9	6.3	5.0	11.3																						
9-Oct	5.6	5.0	4.5	3.7	1.9	0.5	-0.2	0.2	3.9	6.1	8.0	9.6	11.9	13.4	14.4	13.7	11.4	9.2	6.7	5.3	4.8	4.1	4.2	3.5	6.3	14.4																						
10-Oct	4.5	4.2	3.5	3.1	1.8	1.4	1.1	1.6	6.3	10.0	12.4	14.6	16.9	19.1	21.3	22.5	19.4	15.7	14.4	12.6	13.9	12.3	9.6	9.1	10.5	22.5																						
11-Oct	9.0	12.1	12.2	11.6	11.7	13.1	13.8	13.5	13.8	15.8	17.3	18.8	20.2	19.2	19.7	19.8	18.9	17.4	15.2	14.2	13.1	12.9	12.2	12.4	14.9	20.2																						
12-Oct	11.7	10.6	9.8	8.7	7.8	5.5	4.4	4.9	8.3	11.7	14.8	17.0	18.5	18.2	17.7	17.5	16.8	14.8	14.7	13.5	13.6	12.7	11.6	8.9	12.2	18.5																						
13-Oct	7.0	5.5	4.0	3.2	2.3	1.4	1.1	2.0	3.4	7.2	9.0	9.9	11.4	13.6	16.2	15.0	13.7	11.8	10.7	10.2	8.7	8.4	9.2	9.2	8.1	16.2																						
14-Oct	8.8	8.7	8.4	8.0	7.9	7.8	7.6	7.7	7.9	8.5	9.4	9.3	9.7	10.4	11.1	10.9	11.0	10.3	9.7	9.5	8.7	8.3	10.4	9.9	9.2	11.1																						
15-Oct	9.4	9.1	6.8	6.1	5.6	6.1	5.6	4.5	4.8	6.1	7.1	8.0	9.2	9.6	9.8	9.2	7.0	4.6	3.5	2.2	-0.1	-0.9	-1.4	-1.4	5.4	9.8																						
16-Oct	-0.6	0.2	0.6	0.8	1.1	1.3	1.5	1.5	2.1	3.2	4.2	4.5	5.2	5.5	6.3	6.4	5.9	5.4	5.4	4.8	3.3	1.2	1.0	1.0	3.0	6.4																						
17-Oct	0.8	0.3	-0.1	-0.5	-0.5	-0.7	-0.8	-0.3	1.6	4.0	6.5	10.1	12.8	13.8	14.6	15.0	14.0	12.8	12.1	11.5	11.4	11.4	11.0	10.9	7.2	15.0																						
18-Oct	10.8	10.6	10.3	8.6	7.5	8.5	8.8	9.0	9.2	10.1	11.1	12.4	13.3	13.9	14.2	14.2	13.7	12.6	11.2	10.1	8.4	7.9	7.1	6.0	10.4	14.2																						
19-Oct	4.9	4.7	6.3	4.8	3.2	2.0	1.6	2.7	3.5	4.6	6.5	9.9	12.7	14.1	15.2	14.9	12.9	10.3	8.9	8.1	8.9	8.4	6.8	5.0	7.5	15.2																						
20-Oct	4.1	3.6	3.2	2.5	2.4	2.4	3.4	3.2	5.5	9.1	10.7	12.1	13.1	14.6	16.0	16.3	14.7	10.4	8.6	7.8	7.9	7.5	7.1	6.8	8.0	16.3																						
21-Oct	6.8	5.6	5.7	6.0	6.5	8.5	10.4	10.3	10.2	11.8	13.8	14.6	16.4	17.9	19.0	18.9	16.7	12.7	9.8	8.4	7.3	6.0	5.0	4.2	10.5	19.0																						
22-Oct	3.1	2.6	1.7	1.1	1.1	0.6	0.4	0.6	3.0	6.9	9.7	13.7	16.4	19.5	20.5	18.2	16.9	15.9	15.5	14.9	13.9	13.2	13.0	12.1	9.8	20.5																						
23-Oct	10.7	7.5	5.7	4.8	3.9	2.7	1.6	2.2	3.8	5.7	7.3	8.8	10.0	11.1	10.8	10.0	9.7	9.3	8.9	8.7	8.5	8.3	8.0	7.6	7.3	11.1																						
24-Oct	6.7	5.9	4.4	3.4	3.3	3.4	3.5	3.3	3.2	3.1	3.3	3.3	3.7	4.0	4.8	4.9	4.3	3.2	2.5	3.2	3.5	3.6	3.7	3.5	3.8	6.7																						
25-Oct	3.5	4.0	4.2	3.3	1.6	1.2	1.3	1.2	2.0	4.2	6.2	7.4	7.7	8.3	8.6	8.2	5.3	3.9	3.5	3.0	2.7	3.2	3.1	3.0	4.2	8.6																						
26-Oct	3.0	2.9	2.8	2.5	2.3	2.3	2.4	2.2	2.2	2.4	2.8	2.9	3.2	3.5	3.3	3.3	3.3	3.2	3.0	2.6	2.4	2.3	2.3	2.3	2.7	3.5																						
27-Oct	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.7	2.9	3.2	3.7	3.6	3.7	3.3	2.9	2.7	2.6	2.5	2.4	2.3	2.2	2.6	3.7																						
28-Oct	2.2	2.3	2.3	2.5	2.4	2.4	2.3	2.6	2.9	3.3	3.3	3.7	4.1	4.1	4.4	4.2	3.8	3.3	3.0	3.0	3.0	2.8	2.8	2.7	3.1	4.4																						
29-Oct	2.7	2.7	2.5	2.3	2.3	2.3	2.4	2.4	2.6	3.0	3.6	4.1	4.6	4.9	4.6	4.3	4.0	3.8	3.5	3.3	3.1	2.9	2.9	2.8	3.2	4.9																						
30-Oct	2.7	2.7	2.6	2.7	3.0	3.1	3.0	2.9	3.1	3.5	4.0	4.3	4.7	3.8	2.8	2.5	2.6	2.5	2.8	3.0	3.3	3.3	3.0	2.9	3.1	4.7																						
31-Oct	2.8	2.7	2.5	2.3	2.6	2.6	2.8	2.9	3.2	3.7	4.2	4.7	5.1	5.4	5.3	5.2	5.1	4.8	4.6	4.5	4.3	4.2	3.9	3.2	3.9	5.4																						
																								5.5	5.3	4.9	4.4	4.1	3.9	3.7	4.0	5.2	6.7	8.1	9.3	10.4	11.1	11.4	11.1	10.2	8.8	7.9	7.3	6.8	6.2	5.9	5.5	Diurnal Average
																								11.7	12.1	12.2	11.6	11.7	13.1	13.8	13.5	13.8	15.8	17.3	18.8	20.2	19.5	21.3	22.5	19.4	17.4	15.5	14.9	13.9	13.2	13.0	12.4	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature 2m (AT 2m) - C**  
**Fort McKay - Bertha Ganter - October 2014**





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

**Ambient Temperature 2m (AT 2m) - C**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	20	2.69	2.69
0 - 10	547	73.52	76.21
10 - 20	173	23.25	99.46
> 20	4	0.54	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

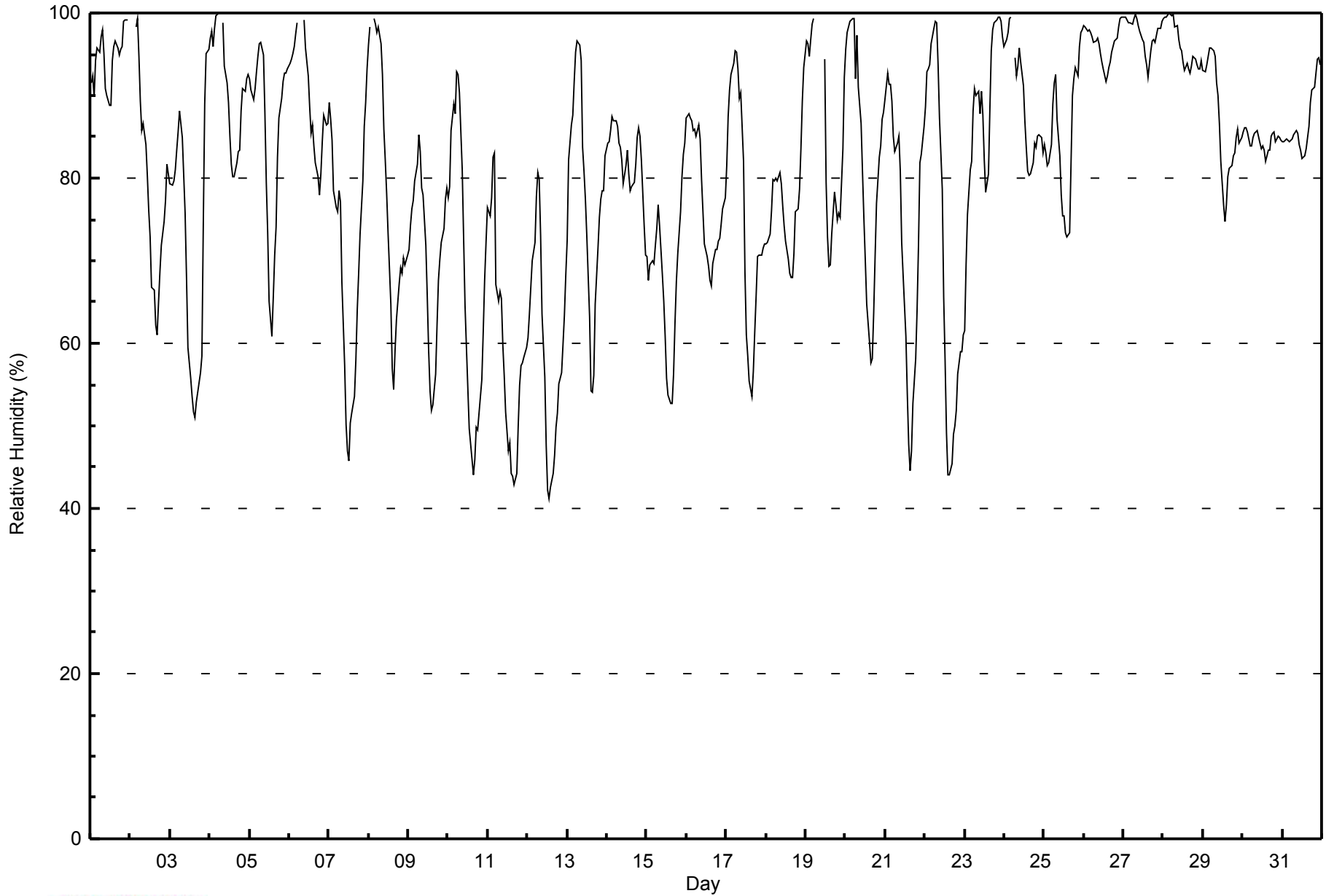


Maximum Value: 100 % on Oct 4 06:00																		Maximum Daily Average: 97.6 % on Oct 27																		Hours in Service: 744	
Minimum Value: 41 % on Oct 12 14:00																		Minimum Daily Average: 59.7 % on Oct 12																		Hours of Data: 728	
Maximum Diurnal Average: 89.9 % at hour 6																		Minimum Diurnal Average: 67.6 % at hour 15																		Hours of Missing Data: 16	
Monthly Average: 80.5 %																		Percentiles: P <sub>1</sub> = 44 P <sub>10</sub> = 57 Q <sub>1</sub> = 71 Median = 84 Q <sub>3</sub> = 93 P <sub>90</sub> = 97 P <sub>99</sub> = 100																		Hours of Calibration: 0	
																																				Percent Operational Time: 97.9	
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-Oct	92	92	90	94	96	95	97	98	95	91	90	89	89	94	96	97	96	95	96	96	99	99	99	99	UO	94.5	99										
2-Oct	UO	UO	UO	98	99	95	89	86	87	84	80	76	73	67	66	62	61	65	69	72	75	77	82	81	81	78.3	99										
3-Oct	79	79	80	81	83	86	88	85	80	76	68	60	56	54	52	51	53	54	56	58	75	89	95	96	96	72.2	96										
4-Oct	97	98	96	98	100	100	UO	UO	99	94	92	89	85	82	80	80	82	83	83	88	91	91	92	93	93	90.5	100										
5-Oct	92	91	90	91	93	95	96	96	95	88	79	73	65	61	66	71	74	83	87	90	92	93	93	93	93	85.2	96										
6-Oct	94	94	95	96	97	99	UO	UO	UO	99	96	92	89	86	86	84	82	80	78	81	84	88	86	87	87	89.2	99										
7-Oct	89	87	85	78	76	76	78	77	67	57	50	47	46	50	52	54	58	64	68	73	80	86	89	93	93	70.1	93										
8-Oct	96	98	UO	99	99	98	98	96	93	86	82	78	73	65	57	54	59	63	67	69	69	70	70	71	71	78.7	99										
9-Oct	71	74	76	77	80	82	85	83	79	78	72	66	59	54	52	53	56	62	68	70	72	74	77	79	79	70.8	85										
10-Oct	78	79	86	89	88	93	93	90	81	73	65	59	54	50	46	44	46	50	50	54	56	61	68	72	72	67.6	93										
11-Oct	77	75	78	83	83	67	65	66	65	60	56	52	47	48	44	44	43	44	50	55	57	58	58	60	60	59.8	83										
12-Oct	61	64	67	70	72	78	81	80	73	64	56	48	42	41	43	44	47	50	52	55	56	60	63	68	68	59.7	81										
13-Oct	73	82	86	88	92	95	97	96	94	84	81	78	73	63	54	54	56	65	72	75	77	78	79	83	83	78.1	97										
14-Oct	84	84	86	88	87	87	86	84	84	82	79	81	83	81	79	79	82	85	86	85	82	74	71	71	71	82.4	88										
15-Oct	70	68	70	70	70	72	74	77	74	68	65	61	56	54	53	53	56	62	67	71	76	80	83	84	84	68.1	84										
16-Oct	87	88	87	87	86	86	85	86	85	80	76	72	70	69	68	67	70	71	71	72	73	74	76	78	78	77.7	88										
17-Oct	82	88	91	92	94	96	95	93	90	90	82	69	61	58	55	54	57	61	66	71	71	71	72	72	72	76.2	96										
18-Oct	72	72	73	76	80	80	80	80	81	79	77	74	72	70	69	68	68	71	76	76	79	84	89	93	93	76.6	93										
19-Oct	97	96	95	97	99	99	UO	UO	UO	UO	UO	94	80	73	69	70	73	78	77	75	76	75	84	92	92	84.1	99										
20-Oct	96	98	98	99	99	99	92	97	91	87	81	75	70	65	60	58	58	64	71	77	83	84	87	88	88	82.3	99										
21-Oct	90	93	91	91	89	85	83	84	85	81	72	68	61	54	48	45	47	53	58	64	72	82	83	86	86	73.5	93										
22-Oct	89	93	93	94	96	98	99	99	94	87	79	66	58	49	44	44	45	49	50	52	56	59	59	61	61	71.4	99										
23-Oct	62	70	76	81	82	88	91	90	91	88	90	88	82	78	80	88	95	98	99	99	100	99	99	97	97	88.0	100										
24-Oct	96	97	98	99	100	UO	95	92	93	96	94	91	87	84	81	80	80	82	84	84	85	85	85	83	83	89.2	100										
25-Oct	84	83	81	82	84	89	92	93	87	83	78	75	75	73	73	73	82	90	92	93	92	96	98	98	98	85.3	98										
26-Oct	98	98	98	98	98	97	96	97	97	96	95	94	93	92	92	93	94	95	97	97	97	98	99	99	99	96.2	99										
27-Oct	100	100	99	99	99	99	99	100	99	99	98	97	96	95	94	92	95	97	97	96	97	98	98	99	99	97.6	100										
28-Oct	99	100	100	100	100	100	100	98	99	97	96	95	94	93	94	93	93	94	95	94	94	93	93	94	94	96.1	100										
29-Oct	93	93	94	95	96	96	95	95	92	90	87	82	77	75	77	80	81	82	83	83	85	86	84	85	85	86.8	96										
30-Oct	86	86	86	86	84	84	85	86	86	86	84	84	84	83	82	83	83	85	85	86	84	85	85	84	84	84.7	86										
31-Oct	84	84	85	85	84	85	85	85	86	85	84	83	82	83	83	85	86	89	91	91	93	94	95	94	94	86.7	95										
																								Diurnal Average													
																								Diurnal Maximum													
85.5 86.8 87.2 89.0 89.8 89.9 89.3 88.9 86.9 83.5 79.4 76.0 72.1 69.1 67.6 67.6 69.6 72.9 75.4 77.5 80.0 82.3 83.7 84.4																																					
100 100 100 100 100 100 100 100 99 99 98 97 96 95 96 97 96 98 99 99 100 99 99																																					
UO - Unstable Operation																																					



**WBEA**  
**Hourly Averages**

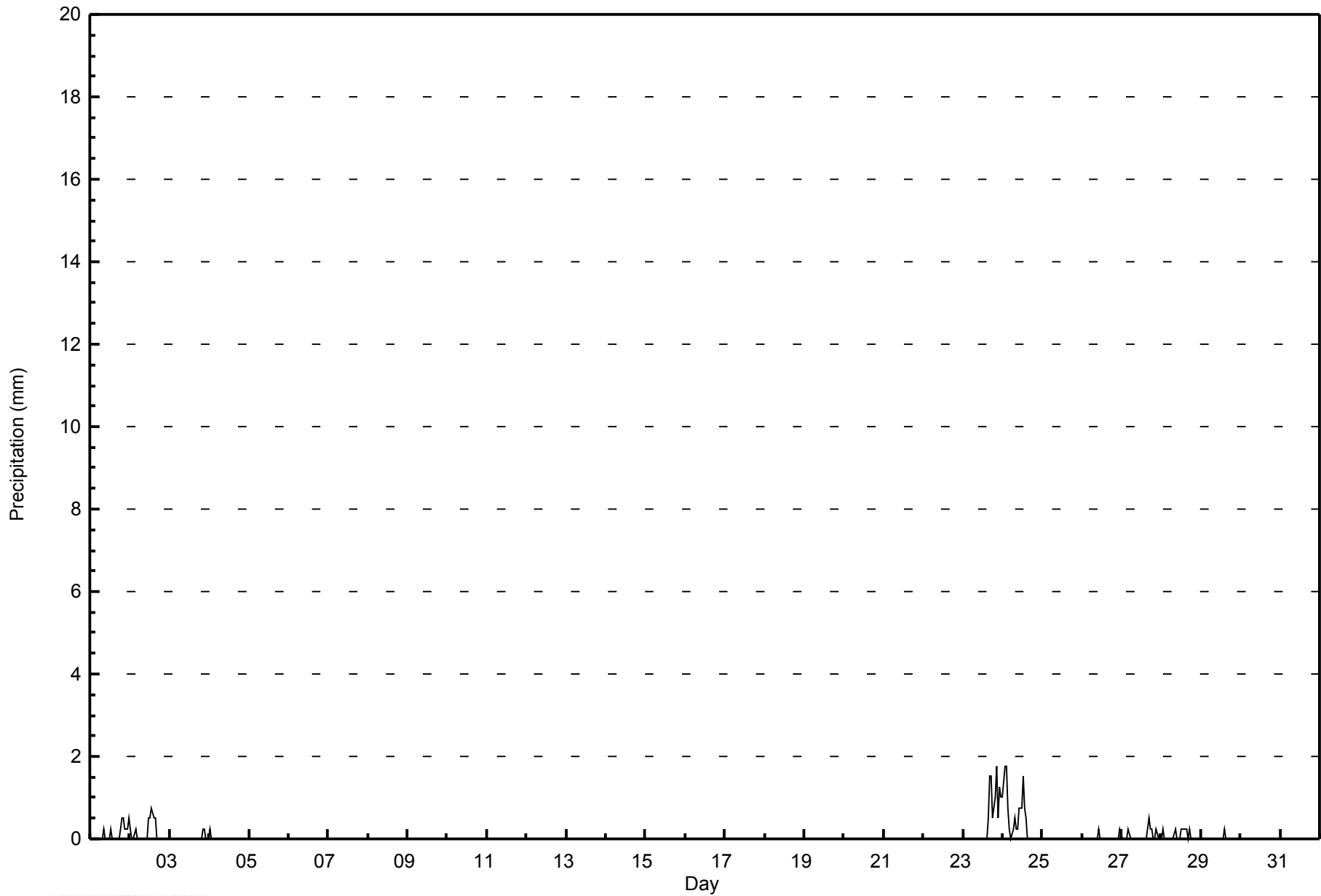
**Relative Humidity (RH) - %**  
**Fort McKay - Bertha Ganter - October 2014**





Maximum Value: 1.8 mm on Oct 23 21:00																				Maximum Daily Total: 11.2 mm on Oct 24					Hours in Service: 744																								
Minimum Value: 0.0 mm on Oct 1 01:00																				Minimum Daily Total: 0.0 mm on Oct 5					Hours of Data: 744																								
Maximum Diurnal Total: 2.5 mm at hour 21																				Minimum Diurnal Total: 0.0 mm at hour 6					Hours of Missing Data: 0																								
Monthly Total: 31.75 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> = 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-Oct	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	0.0	0.0	0.0	0.0	0.3	0.5	0.5	0.3	0.3	0.5	2.8	0.5																							
2-Oct	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.8	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.8																							
3-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.5	0.3																							
4-Oct	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3																							
5-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.5	1.5	1.5	0.5	1.0	1.8	0.5	1.3	1.0	9.7	1.8																						
24-Oct	1.0	1.8	1.8	0.8	0.3	0.0	0.3	0.5	0.3	0.3	0.8	0.8	1.5	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2	1.8																						
25-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.3																						
27-Oct	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	0.5	0.3	0.3	0.0	0.0	0.3	0.0	0.0	0.0	1.5	0.5																							
28-Oct	0.0	0.3	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	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.3																							
29-Oct	0.0	0.0	0.0	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	0.3	0.3																							
30-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
31-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
																								1.5	2.0	1.8	1.0	0.5	0.0	0.3	0.5	0.8	0.3	1.0	1.3	2.5	1.8	1.5	1.3	2.0	2.0	1.0	1.5	2.5	1.3	1.5	1.8	Diurnal Average	
																								1.0	1.8	1.8	0.8	0.3	0.0	0.3	0.5	0.3	0.3	0.8	0.8	1.5	0.8	0.5	0.5	1.5	1.5	0.5	1.0	1.8	0.5	1.3	1.0	Diurnal Maximum	







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

**Precipitation (PC) - mm**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (mm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	716	96.24	96.24
0.4 - 0.5	13	1.75	97.98
0.6 - 0.7	0	0.00	97.98
0.8 - 1.4	9	1.21	99.19
1.5 - 10	6	0.81	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

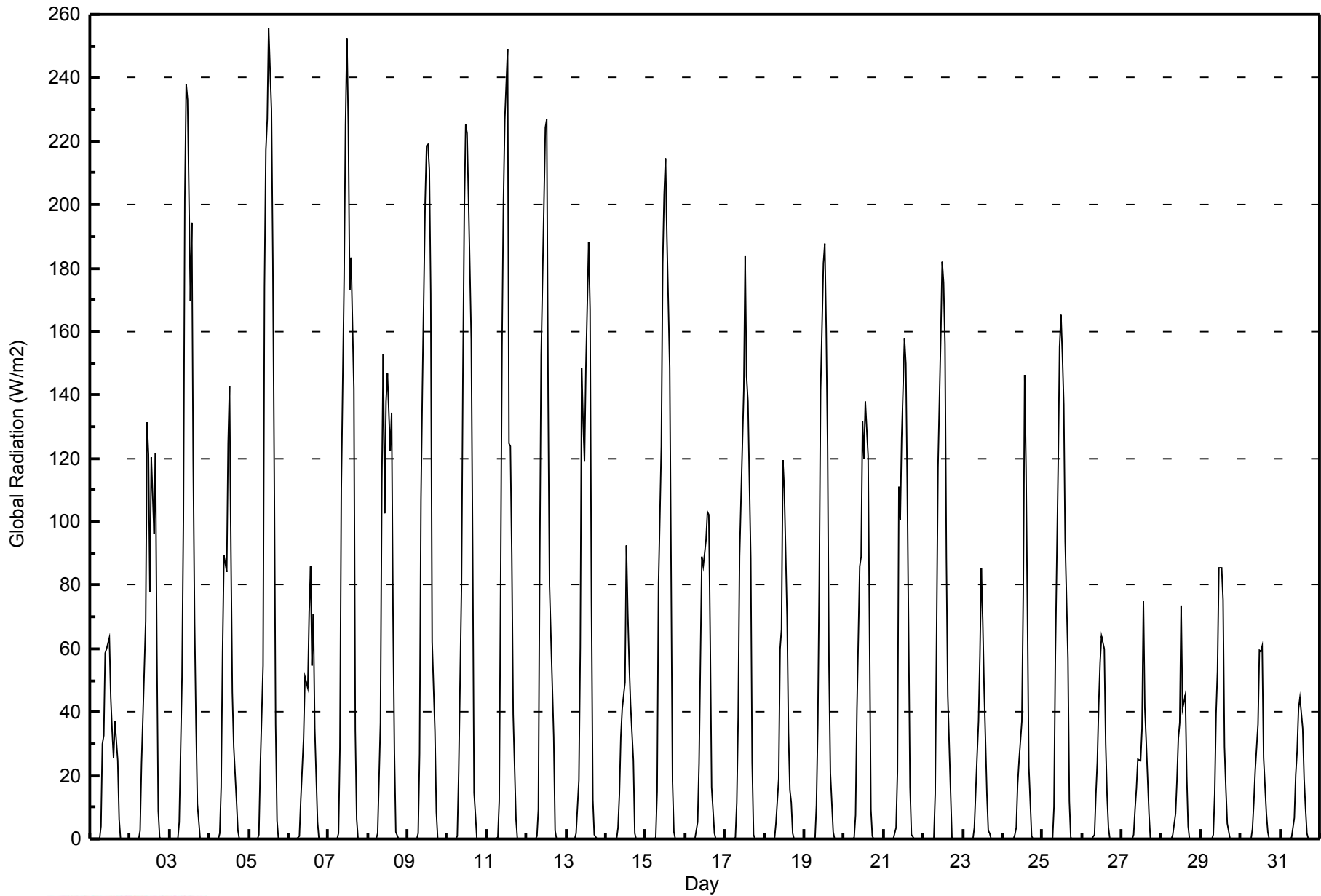


Maximum Value: 256 W/m2 on Oct 5 13:00																			Maximum Daily Average: 65.0 W/m2 on Oct 7						Hours in Service: 744	
Minimum Value: 0 W/m2 on Oct 22 19:00																			Minimum Daily Average: 8.6 W/m2 on Oct 31						Hours of Data: 744	
Maximum Diurnal Average: 135.4 W/m2 at hour 13																			Minimum Diurnal Average: 0.0 W/m2 at hour 20						Hours of Missing Data: 0	
Monthly Average: 34.3 W/m2																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 45 P <sub>90</sub> = 130 P <sub>99</sub> = 224						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-Oct	0	0	0	0	0	0	4	30	33	58	60	64	44	34	26	37	25	6	0	0	0	0	0	0	17.5	64
2-Oct	0	0	0	0	0	0	2	24	38	69	131	121	78	121	96	122	59	9	0	0	0	0	0	0	36.3	131
3-Oct	0	0	0	0	0	0	5	51	101	202	238	233	170	194	119	68	37	11	0	0	0	0	0	0	59.5	238
4-Oct	0	0	0	0	0	0	2	16	59	90	84	125	143	91	46	29	12	3	0	0	0	0	0	0	29.1	143
5-Oct	0	0	0	0	0	0	1	23	54	174	217	227	256	230	183	115	36	6	0	0	0	0	0	0	63.4	256
6-Oct	0	0	0	0	0	0	1	12	22	32	51	48	71	86	55	71	35	5	0	0	0	0	0	0	20.3	86
7-Oct	0	0	0	0	0	0	2	28	111	177	225	253	225	173	184	142	34	6	0	0	0	0	0	0	65.0	253
8-Oct	0	0	0	0	0	0	2	37	112	153	103	138	147	122	135	72	27	2	0	0	0	0	0	0	43.7	153
9-Oct	0	0	0	0	0	0	2	27	107	142	201	219	219	211	172	62	34	8	0	0	0	0	0	0	58.5	219
10-Oct	0	0	0	0	0	0	1	21	79	146	198	225	223	202	157	91	14	8	0	0	0	0	0	0	56.9	225
11-Oct	0	0	0	0	0	0	1	12	80	155	201	227	249	125	124	90	39	6	0	0	0	0	0	0	54.5	249
12-Oct	0	0	0	0	0	0	1	9	88	152	201	224	227	140	80	48	32	3	0	0	0	0	0	0	50.2	227
13-Oct	0	0	0	0	0	0	2	19	60	148	132	119	148	188	167	75	12	1	0	0	0	0	0	0	44.7	188
14-Oct	0	0	0	0	0	0	0	4	14	32	41	49	93	71	55	42	25	2	0	0	0	0	0	0	17.9	93
15-Oct	0	0	0	0	0	0	0	15	81	124	181	203	215	190	149	85	18	2	0	0	0	0	0	0	52.7	215
16-Oct	0	0	0	0	0	0	0	5	24	57	89	86	94	103	102	63	16	2	0	0	0	0	0	0	26.7	103
17-Oct	0	0	0	0	0	0	1	11	38	89	124	141	184	146	138	88	24	1	0	0	0	0	0	0	41.1	184
18-Oct	0	0	0	0	0	0	0	5	19	60	66	119	110	70	33	16	11	2	0	0	0	0	0	0	21.3	119
19-Oct	0	0	0	0	0	0	0	11	36	80	142	182	188	161	124	55	21	2	0	0	0	0	0	0	41.7	188
20-Oct	0	0	0	0	0	0	0	7	41	86	89	132	120	138	121	66	9	1	0	0	0	0	0	0	33.8	138
21-Oct	0	0	0	0	0	0	0	3	21	111	101	127	158	150	111	64	17	2	0	0	0	0	0	0	36.0	158
22-Oct	0	0	0	0	0	0	0	14	65	117	159	182	175	156	88	45	15	0	0	0	0	0	0	0	42.4	182
23-Oct	0	0	0	0	0	0	0	4	26	37	58	85	69	48	14	3	2	0	0	0	0	0	0	0	14.4	85
24-Oct	0	0	0	0	0	0	0	1	4	17	25	37	77	146	117	72	23	1	0	0	0	0	0	0	21.6	146
25-Oct	0	0	0	0	0	0	0	10	58	118	155	165	153	137	94	57	12	0	0	0	0	0	0	0	40.0	165
26-Oct	0	0	0	0	0	0	0	1	14	24	42	56	64	60	30	14	4	0	0	0	0	0	0	0	12.9	64
27-Oct	0	0	0	0	0	0	0	1	9	16	25	25	35	75	42	31	8	0	0	0	0	0	0	0	11.1	75
28-Oct	0	0	0	0	0	0	0	1	8	18	32	37	74	41	45	20	4	0	0	0	0	0	0	0	11.7	74
29-Oct	0	0	0	0	0	0	0	1	14	40	53	86	85	76	29	16	5	0	0	0	0	0	0	0	16.9	86
30-Oct	0	0	0	0	0	0	0	3	11	22	36	59	59	61	26	8	2	0	0	0	0	0	0	0	12.0	61
31-Oct	0	0	0	0	0	0	0	1	7	20	28	41	44	35	19	10	2	0	0	0	0	0	0	0	8.6	44
																			0.0 0.0 0.0 0.0 0.0 0.0 0.9 13.2 46.3 89.2 112.5 130.1 135.4 121.9 92.9 57.3 19.8 2.9 0.0 0.0 0.0 0.0 0.0 0.0						Diurnal Average	
																			0 0 0 0 0 0 5 51 112 202 238 253 256 230 184 142 59 11 0 0 0 0 0 0 0						Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Global Radiation (GR) - W/m<sup>2</sup>**  
**Fort McKay - Bertha Ganter - October 2014**





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

**Global Radiation (GR) - W/m2**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Concentration Ranges (W/m2)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	496	66.67	66.67
21 - 100	141	18.95	85.62
101 - 300	107	14.38	100.00
301 - 600	0	0.00	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 22 km/h on Oct 17 16:00	Maximum Daily Speed Average: 10.4 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 9 08:00	Minimum Daily Speed Average: 0.2 km/h on Oct 8	Hours of Data: 712
Maximum Diurnal Speed Average: 2.4 km/h at hour 3	Minimum Diurnal Speed Average: 0.1 km/h at hour 17	Hours of Missing Data: 32
Monthly Average Velocity: 1.0 km/h 266.6 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> = 16	Percent Operational Time: 95.7

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-Oct	NNE5	NNE3	N4	N5	NW4	NW2	WNW3	NNE0	SE3	E6	SE4	E5	ENE3	N6	N9	NNE10	N11	N12	N12	N11	NNW8	NNW8	NNW8	NW3	N4.7	N12
2-Oct	AF	AF	NW6	NNW9	NNW5	AF	AF	AF	AF	NNW11	NNW17	NNW16	NNW15	NW14	NW12	NW16	NW15	NW13	NW10	NW8	NW7	NNW3	WNW6	NNW10	NW10.4	NNW17
3-Oct	NW10	WNW9	NNW10	NNW10	NW6	W2	SW2	WSW3	WSW3	SSE7	SSE8	SSE10	S9	SSE10	SSE11	SE12	SSE11	SSE7	SSE6	S13	SSW10	SSE9	SSE8	SSE9	S4.6	S13
4-Oct	S5	SE3	ESE3	NNW3	NNW4	NNW2	NW3	WNW2	W2	WNW3	NW3	ENE2	NNW2	ENE3	NNE4	NE3	NNW2	NW4	SW2	WSW3	SW1	WNW1	SSE1	SW2	NW0.7	S5
5-Oct	WSW3	WSW3	SW6	SSW10	SSW9	S8	SSW8	SW8	SW7	S8	SSE8	SSE7	ESE5	ENE7	NE8	NE8	NNE7	NE7	NNE7	NNE7	NNE5	NE4	N4	N4	SE1.1	SSW10
6-Oct	SE2	ENE1	NNW1	WSW2	S3	ESE4	SE5	SSE3	SW2	SE2	NE3	N4	NNW5	N6	NNE6	N5	NW2	NW7	NW9	NW6	WNW5	WNW6	WNW7	W6	NW2.0	NW9
7-Oct	WNW7	WNW10	WNW11	NW12	NW11	WNW8	NW6	NW7	NNW5	NW8	NW8	NNW8	N8	NE6	ENE9	NE8	E7	ENE4	NNE3	NW1	AF	N1	AF	WNW2	NNW4.6	WNW12
8-Oct	NNW3	NW2	WNW2	N1	W3	W2	W2	W2	SSE2	S3	SSW2	N4	NNE4	ENE3	ENE2	NNE2	NNW3	NNW4	NE3	SE2	SSE6	SSE7	SSE8	SE4	SSE0.2	SSE8
9-Oct	ESE4	E3	NE2	NE2	ESE3	S2	S2	N0	ESE2	S7	S7	S5	S6	S7	S8	S7	NE2	NNE5	NNE2	ESE2	SE3	SSE3	SSE4	SSE3	SSE2.5	S8
10-Oct	SSW2	W1	NNW3	NW2	WSW0	N3	W3	SSW2	S6	SSE7	S11	S11	S11	S12	S12	S9	S4	SSW4	SSW4	SSW5	S7	SW4	SSW2	SW4	S4.4	S12
11-Oct	SW5	SSW7	SSW6	S7	SSW6	W6	W9	W9	W9	NNW10	NNW10	WNW9	W10	WSW9	NNW10	W11	W10	W8	W5	W5	W5	W5	WNW6	WNW7	W6.6	W11
12-Oct	WNW8	WNW9	WNW9	NNW10	WNW6	SSW2	WSW2	WNW4	SW3	SW6	W5	NW11	NW9	NW10	WNW6	NW2	NNW4	NW6	NW8	WNW5	W6	W5	NW6	NW4	WNW5.5	NW11
13-Oct	WNW1	WSW2	NE1	NNW1	W3	WSW2	W2	SSW2	S2	SSE4	SSE5	SSE5	SSE6	SSE5	SSE6	S5	SE2	N6	N6	NNE6	N4	N5	N6	N7	E0.3	N7
14-Oct	N6	N6	N5	N6	N7	N8	N9	N8	N8	N7	N7	N7	N7	N6	NNW4	NNW4	NW2	NW1	S2	W2	WNW3	W3	NW9	NNW10	N5.0	NW10
15-Oct	WNW7	NW11	NW7	W4	SW4	SW7	WNW6	W5	W6	WNW9	NNW10	NNW10	WNW7	NW8	NW9	NNW9	NNW9	NNW7	NNW9	NW4	NW1	NW2	WNW3	NW3	NW5.8	NW11
16-Oct	WSW1	SW1	SW1	WSW1	W3	SW1	WSW2	AF	WSW1	S4	SE5	S4	S5	S5	SW3	NNW1	N3	NE3	E4	N1	E3	NE3	NE2	NW2	S0.7	S5
17-Oct	NNE2	N4	WNW3	W3	W2	ENE1	NNE2	SSW0	N2	NNE5	NNE4	SSE6	SSE16	S18	S18	S22	SSE21	S20	S20	S15	S15	S13	SSE13	S14	S8.0	S22
18-Oct	S14	S13	S9	SSE2	SE2	S5	SSW4	SSW4	S3	S6	SSW5	SSE6	SSE7	SSE8	S5	SSW5	SSW3	SW1	SW4	W3	NW6	NW5	NW3	WSW2	S4.0	S14
19-Oct	S2	W4	WNW6	N4	NNW3	WSW1	NW2	W2	S2	NW2	NNW3	E4	E4	NNE5	NNE6	N4	NNE2	NNW3	S2	E2	SSE5	SE4	NNE5	N4	N1.2	WNW6
20-Oct	N4	N3	NNW3	NNW2	N3	WNW1	WSW2	SSW3	S6	S7	S9	S10	S10	S9	S10	S8	S5	NNW1	NW2	WNW2	WSW2	W2	W1	WNW3	SSW2.6	S10
21-Oct	S1	SSW4	SW5	SSW4	SSW4	WSW5	W6	WNW7	W5	WSW5	WSW5	W6	W6	WSW7	WSW7	WSW6	SSW5	S3	SW3	WSW3	SW4	SSW4	SW3	WSW3	WSW4.1	WNW7
22-Oct	SW3	SW3	SW3	SW2	SSW3	SW3	SW3	SSW3	S3	SSE4	S4	SSE4	SE3	SSE3	S5	SE6	SE10	SSE9	S8	S8	S7	S7	S9	S7	S4.5	SE10
23-Oct	SSW6	N3	NNW3	WSW1	N3	NNW3	N4	N4	NNE3	N4	N3	NNE5	N5	NNE3	SE3	E5	ENE4	NNE5	NNE6	N6	NNW6	NNW9	NW9	NW9	N3.2	NW9
24-Oct	NNW10	NNW10	NW9	NW9	WNW5	W4	WNW6	NW7	WNW6	WNW4	NW5	WNW8	NNW11	NNW13	NNW10	NW9	NW8	NW8	WSW3	SW3	SW4	WSW4	W3	WNW4	WNW6.3	WNW13
25-Oct	WNW5	WNW7	WNW7	NW4	WNW2	WSW3	WSW5	WSW5	SW4	WSW5	SSW6	SSW5	S9	S8	SSE7	SSE5	SE4	SE4	SE1	NNE2	NE3	NNE4	NNE5	NNE6	SW1.5	S9
26-Oct	NNE6	N5	N7	N7	N8	N7	N7	N7	N8	N7	N8	NNE9	NNE9	NNE9	N11	N10	N10	N11	N11	N11	N11	N10	N9	N8	N8.6	N11
27-Oct	N8	N7	N7	N7	N7	N7	N7	N6	N7	N6	NNE6	N6	N6	N5	NNE4	N2	NW3	NW4	NNW3	N4	N4	N3	NNW2	NW3	N5.0	N8
28-Oct	NW2	NNW1	NW2	WNW2	SW1	S1	SSE2	S4	SSE5	S6	S6	SSE7	SSE7	SSE6	SE5	SE5	SE6	SE4	ESE3	ESE3	SE3	SE2	ESE2	ENE3	SSE2.8	SSE7
29-Oct	ENE3	NNE3	N3	N3	N3	N4	NNE5	NNE5	NE6	NE6	NE6	NNE6	NNE6	NE6	ENE4	NE4	AF	AF	AF	AF	AF	AF	AF	AF	---	NNE6
30-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	S13	S11	SSE9	SSE12	SSE10	SSE12	SSE13	SSE15	SSE15	---	SSE15
31-Oct	SSE14	SSE15	SSE14	SSE12	SSE14	SSE13	SSE11	SSE12	S11	S12	S13	SSW9	SSW10	S10	S8	S7	SSW10	SSW9	SSW6	SSW5	S6	SSW6	SSW5	S1	S9.6	SSE15

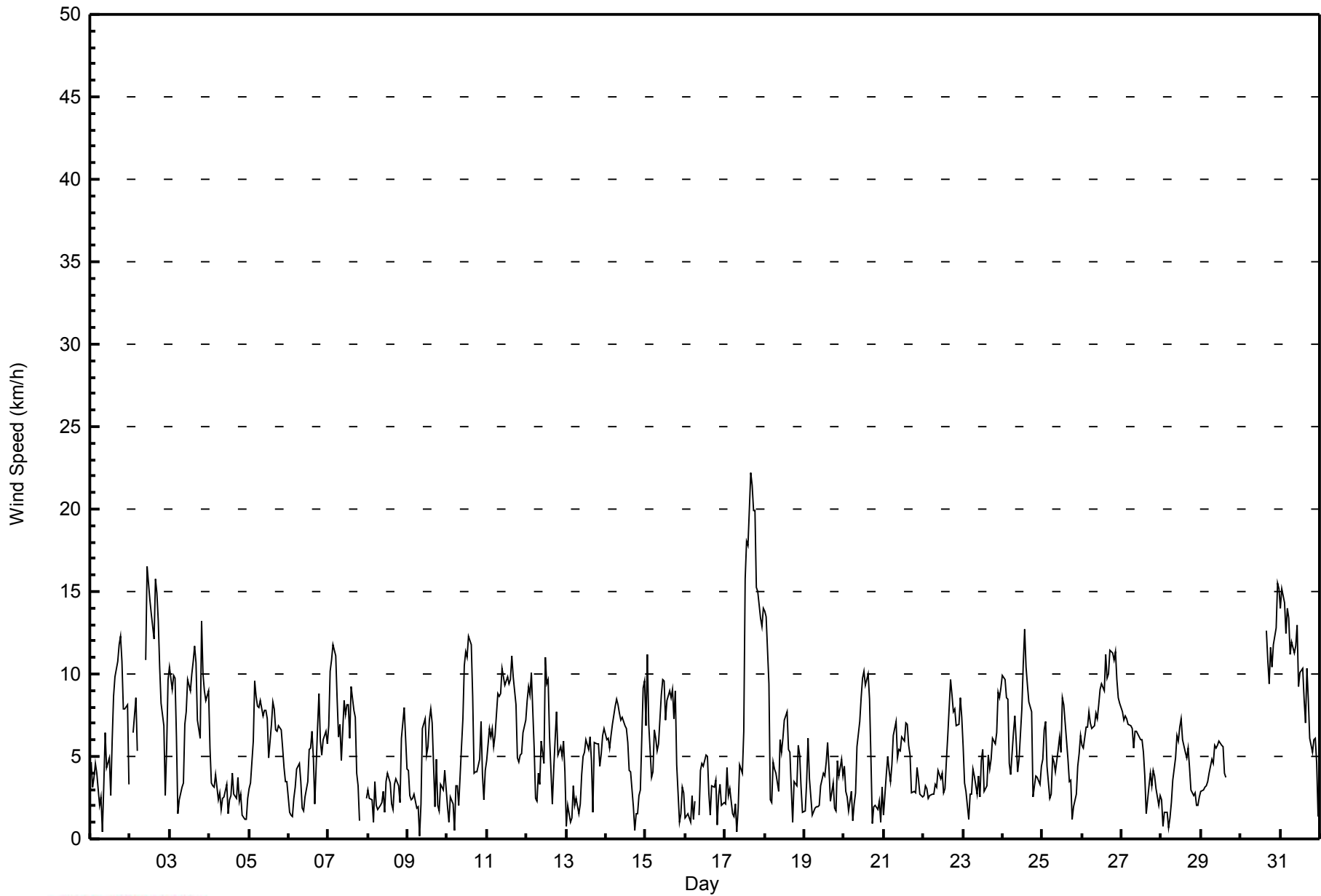
W1.3	NNW1.9	NNW2.4	NNW1.7	W1.1	W1.8	W1.9	WSW1.3	SW1.2	WSW1.3	WSW0.6	SW0.8	SSW0.9	SSE0.6	S0.7	SSE0.1	NNW1.0	NNW0.7	W0.8	SW1.3	SW0.9	W1.0	W1.7	Diurnal Average		
SSW14	SSE15	SSE14	SSE12	SSE14	SSE13	SSE11	SSE12	S11	S12	S13	SSW9	SSW10	S10	S8	S7	SSW10	SSW9	SSW6	SSW5	S6	SSW6	SSW5	S1	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Fort McKay - Bertha Ganter - October 2014**





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

**Wind Speed (WS) - km/h**  
**Fort McKay - Bertha Ganter - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	382	53.65	53.65
6 - 11	285	40.03	93.68
12 - 19	41	5.76	99.44
20 - 28	4	0.56	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 712

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort McKay - Bertha Ganter - October 2014**

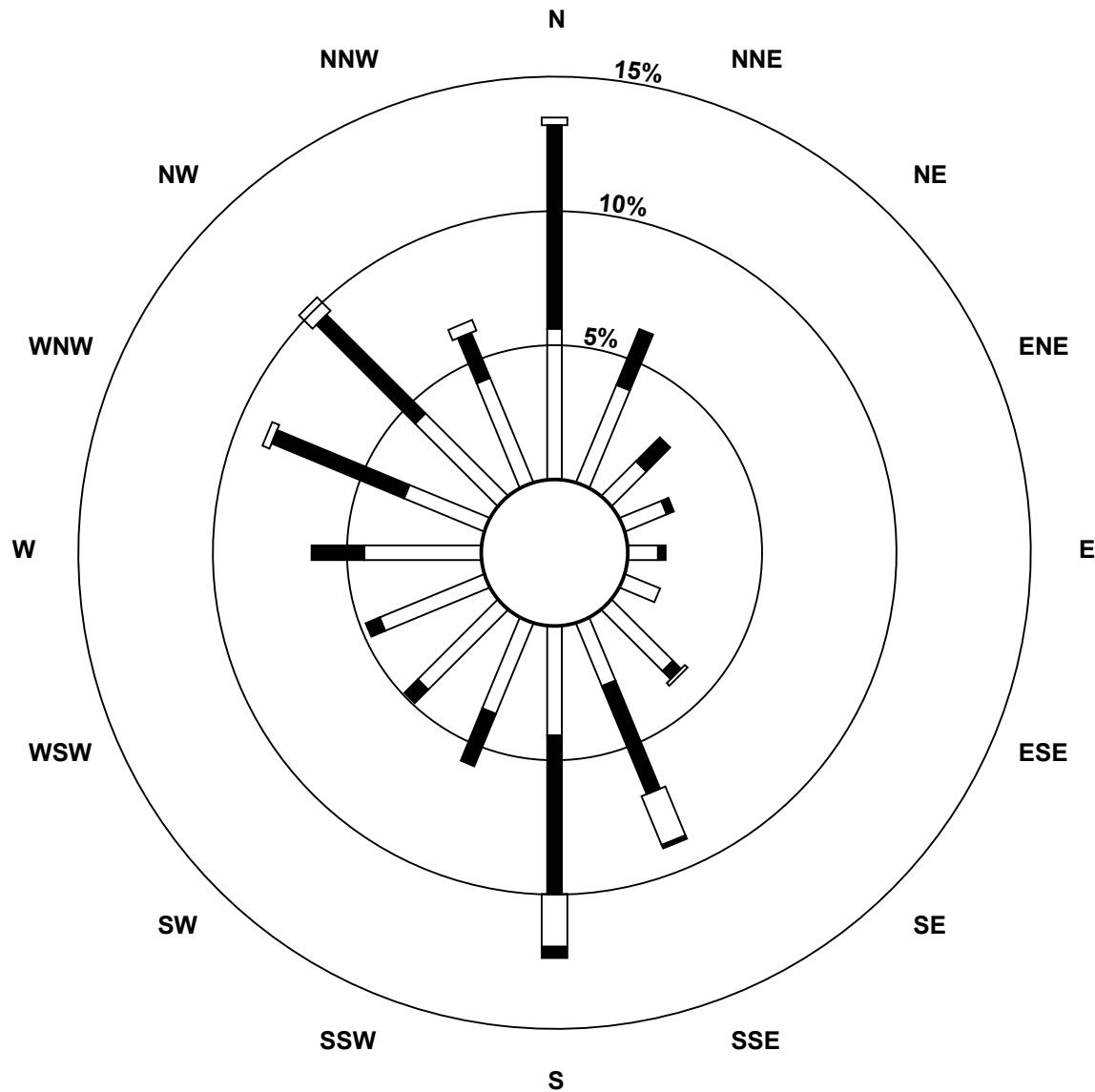
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	40	28	13	12	8	10	23	18	29	26	30	30	31	23	31	30	382
6 - 11	54	16	9	2	2	0	3	31	42	15	5	4	14	38	37	13	285
12 - 19	2	0	0	0	0	0	1	14	14	0	0	0	0	2	5	3	41
20 - 28	0	0	0	0	0	0	0	1	3	0	0	0	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>	96	44	22	14	10	10	27	64	88	41	35	34	45	63	73	46	712

Total Number of Valid Hours: 712

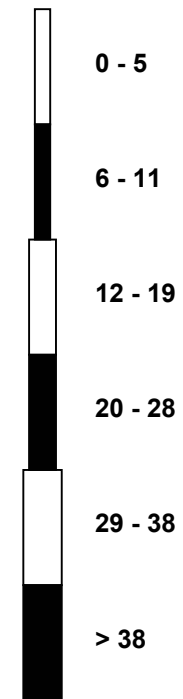
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



**Classes (km/h)**



**Total Number of Valid Hours: 712**



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 6 km/h on Oct 2 11:00			Hours of Data:	712
Minimum Value: 0 km/h on Oct 16 22:00			Hours of Missing Data:	32
			Hours of Calibration:	0
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			Percent Operational Time:	95.7

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

AF - Analyzer Failure



Direction of Maximum Speed: 170 deg on Oct 17 16:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 323.3 deg on Oct 2		Hours of Data:	712
Direction of Minimum Speed: 353 deg on Oct 9 08:00		Hours of Missing Data:	32
Direction of Minimum Daily Speed Average: 0.2 deg on Oct 8		Percent Operational Time:	95.7
Monthly Average Direction: 272.5 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-Oct	22	21	9	1	325	323	291	30	134	96	140	90	57	7	6	13	10	8	5	1	344	339	338	314	7.3
2-Oct	AF	AF	307	346	330	AF	AF	AF	AF	327	337	333	331	325	324	323	320	315	314	317	310	330	300	303	323.3
3-Oct	304	302	300	302	307	259	215	247	237	159	161	160	170	161	152	146	147	159	162	187	194	159	147	163	182.7
4-Oct	171	127	120	328	338	342	314	298	266	284	306	59	347	66	33	34	332	312	224	239	229	295	162	218	313.9
5-Oct	255	239	222	201	199	189	204	221	225	175	157	159	110	64	49	48	32	42	32	17	19	36	1	358	145.2
6-Oct	143	69	328	253	189	122	130	164	215	142	37	6	329	355	21	349	318	319	315	311	293	289	289	279	317.9
7-Oct	297	303	302	304	307	299	316	319	330	321	311	339	8	52	77	54	80	75	27	315	AF	8	AF	287	333.7
8-Oct	328	312	290	353	273	270	275	275	163	174	205	8	25	64	65	18	327	345	37	137	163	157	165	144	153.9
9-Oct	122	83	37	42	105	176	188	353	112	172	180	183	188	181	180	191	35	15	15	123	140	155	167	152	158.0
10-Oct	203	264	343	322	238	11	278	200	178	163	173	172	176	180	179	178	187	202	205	195	190	215	210	223	187.3
11-Oct	214	194	192	190	193	260	274	275	272	283	287	288	274	253	282	268	267	278	260	259	262	260	293	289	263.5
12-Oct	296	296	300	296	303	199	237	282	215	233	261	322	304	304	298	322	327	304	306	294	261	270	311	307	293.6
13-Oct	287	243	52	302	269	247	260	201	191	160	158	160	150	162	155	174	130	11	4	12	1	8	7	7	87.3
14-Oct	3	4	359	9	5	3	0	2	8	5	349	357	353	4	347	343	322	316	178	272	292	280	310	314	349.5
15-Oct	303	307	314	277	236	234	287	263	262	294	312	309	303	318	325	329	336	332	331	326	312	307	287	307	305.6
16-Oct	246	234	216	254	271	217	238	AF	249	172	139	177	169	179	218	327	7	44	92	2	82	40	51	308	172.2
17-Oct	18	359	294	277	272	74	16	209	359	20	13	153	167	169	170	160	169	175	179	173	171	166	179	169.3	
18-Oct	173	173	178	157	130	183	194	201	190	184	201	165	158	167	181	192	212	219	216	264	306	305	318	240	188.5
19-Oct	185	271	299	360	338	241	318	278	179	307	328	100	87	25	16	10	22	344	176	83	163	145	15	349	0.2
20-Oct	0	352	346	335	355	303	245	211	189	187	191	185	180	177	172	178	186	341	318	284	254	267	274	283	199.2
21-Oct	189	209	218	198	198	248	273	283	276	243	243	262	263	239	252	249	213	187	229	242	225	199	226	253	240.3
22-Oct	225	215	221	230	195	222	214	207	178	159	173	160	140	164	176	135	138	159	188	173	187	181	191	189	178.1
23-Oct	192	9	337	247	357	340	352	358	15	11	1	18	9	21	131	97	69	23	20	3	344	333	318	314	358.3
24-Oct	307	298	304	304	289	262	297	307	301	292	306	295	300	301	314	319	319	248	236	235	237	263	288	296.9	
25-Oct	293	295	300	321	285	257	247	255	235	249	204	193	182	172	166	158	127	136	129	22	40	17	16	15	233.8
26-Oct	14	9	1	5	1	10	8	11	360	11	7	12	13	16	11	5	4	7	3	6	7	9	7	6	7.5
27-Oct	6	0	0	10	6	6	2	6	8	8	12	5	359	7	19	355	317	307	340	7	350	349	340	315	359.9
28-Oct	322	345	325	295	222	180	163	183	166	171	187	156	158	168	142	137	140	124	121	117	143	132	117	60	152.8
29-Oct	77	27	0	356	356	11	15	15	35	49	49	28	33	45	66	55	AF	AF	AF	AF	AF	AF	AF	AF	--
30-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	177	171	162	166	161	162	164	164	168	--
31-Oct	166	165	160	164	168	165	166	168	172	174	187	193	194	181	187	186	200	195	193	202	188	193	200	172	177.6

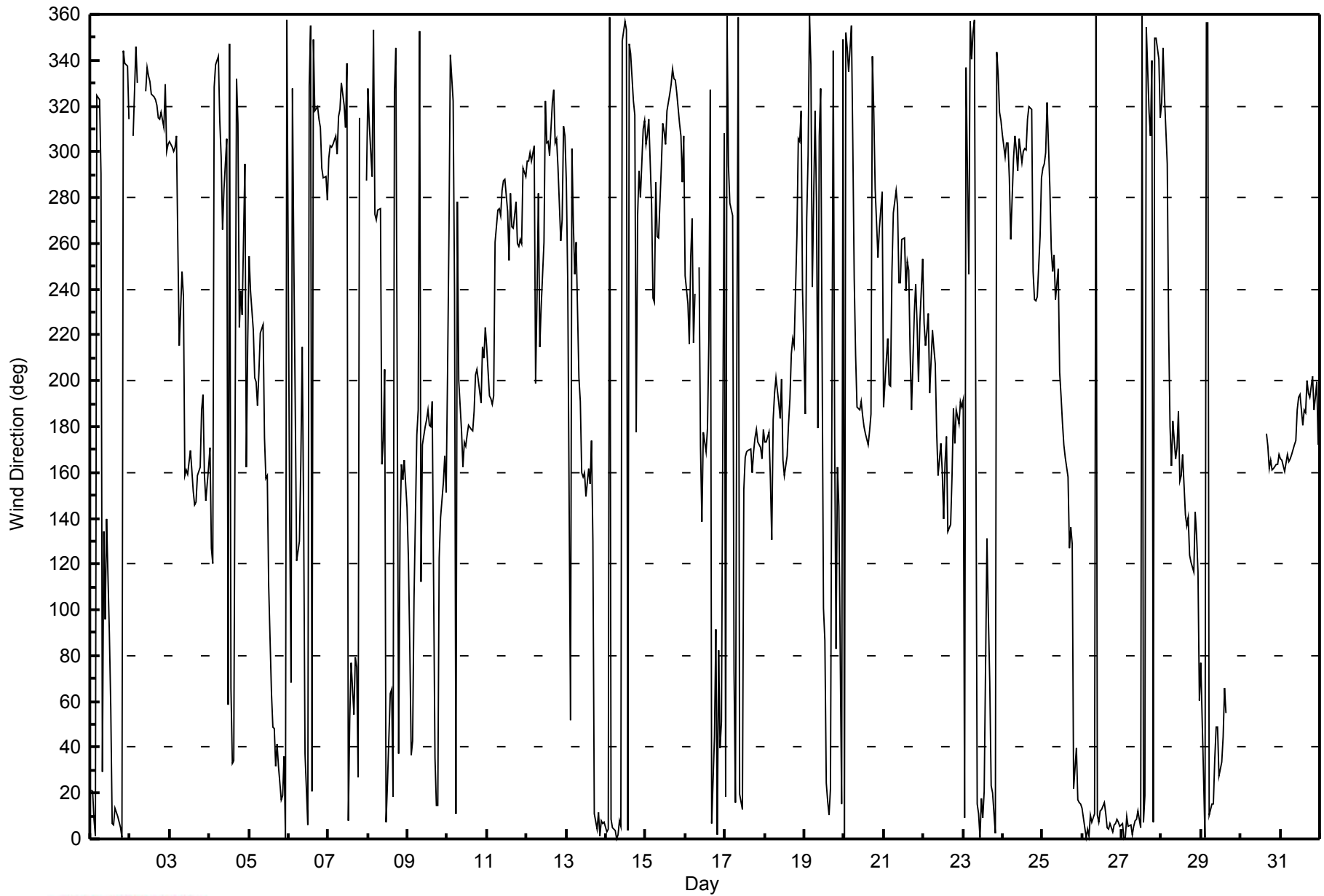
279.1 292.2 297.9 304.6 292.3 260.5 279.3 272.8 240.4 222.5 240.1 246.0 223.9 194.0 165.9 171.4 162.8 334.9 299.3 265.3 225.4 228.3 270.7 275.4  
Diurnal Average

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



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Fort McKay - Bertha Ganter - October 2014**





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0															Hours in Service: 744										
Maximum Value: 99 deg on Oct 17 08:00															Hours of Data: 712										
Minimum Value: 11 deg on Oct 17 02:00															Hours of Missing Data: 32										
Percentiles: P <sub>1</sub> = 13 P <sub>10</sub> = 15 Q <sub>1</sub> = 19 Median = 28 Q <sub>3</sub> = 42 P <sub>90</sub> = 59 P <sub>99</sub> = 85															Hours of Calibration: 0										
															Percent Operational Time: 95.7										
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-Oct	38	42	36	21	20	48	53	88	29	27	36	33	53	33	28	32	31	28	27	28	24	22	23	25	88
2-Oct	AF	AF	15	31	25	AF	AF	AF	AF	20	22	22	22	24	25	22	21	20	16	16	14	42	12	13	42
3-Oct	13	14	15	16	24	61	53	37	52	23	21	17	16	21	17	15	14	15	25	19	16	29	18	15	61
4-Oct	21	30	46	23	19	27	19	22	33	49	36	86	64	72	51	54	41	23	48	26	72	84	88	34	88
5-Oct	33	28	31	17	15	15	16	24	25	30	19	21	46	46	54	49	48	51	45	36	41	49	32	28	54
6-Oct	54	70	43	47	33	28	17	31	51	64	62	42	31	40	38	37	77	66	18	26	23	29	22	28	77
7-Oct	18	17	17	16	15	16	36	31	27	26	35	42	37	63	36	43	34	40	26	63	AF	22	AF	17	63
8-Oct	23	28	26	63	31	21	24	54	41	40	81	51	44	52	76	63	19	19	49	75	16	17	19	29	81
9-Oct	16	32	44	39	45	23	36	81	61	26	25	44	44	29	26	18	65	19	75	61	33	43	16	22	81
10-Oct	48	67	39	42	93	46	31	72	20	20	18	16	16	15	15	16	21	18	26	15	13	40	44	27	93
11-Oct	31	14	31	26	25	43	44	40	39	38	34	36	45	42	35	39	41	39	40	46	44	43	27	32	46
12-Oct	22	18	22	21	59	39	60	71	51	28	55	33	31	30	32	57	23	18	19	31	40	38	31	21	71
13-Oct	80	60	72	71	26	37	33	51	60	27	21	28	15	39	24	20	55	22	15	21	16	16	21	26	80
14-Oct	23	25	27	25	20	24	24	25	28	28	24	26	28	27	36	29	34	73	22	54	32	50	23	21	73
15-Oct	30	22	24	44	40	29	33	42	48	39	33	33	43	34	25	25	20	15	17	74	74	68	15	48	74
16-Oct	53	64	51	69	35	48	28	AF	30	28	29	40	30	31	62	81	25	45	70	91	30	19	35	28	91
17-Oct	32	11	27	19	33	69	34	99	73	17	24	66	16	16	17	17	14	15	16	15	16	17	15	15	99
18-Oct	15	15	18	77	58	25	20	27	40	19	20	28	12	12	15	18	23	72	13	31	14	25	52	54	77
19-Oct	68	58	22	39	47	73	59	51	75	59	48	49	64	46	32	25	51	56	92	60	19	28	33	22	92
20-Oct	22	29	28	61	43	72	71	34	13	17	16	17	15	15	13	16	16	75	33	50	41	44	53	17	75
21-Oct	75	32	21	30	46	50	45	42	48	45	40	47	47	40	41	39	16	52	36	33	24	25	52	42	75
22-Oct	55	36	25	39	24	44	12	15	25	19	39	26	65	54	22	19	16	24	15	14	26	17	15	17	65
23-Oct	14	73	32	54	33	28	15	18	48	66	71	33	31	53	48	21	34	36	33	24	24	20	15	16	73
24-Oct	17	23	20	18	38	44	33	20	26	40	27	30	24	22	24	23	18	19	35	26	28	28	42	25	44
25-Oct	26	27	27	18	36	39	32	40	40	40	25	43	22	22	16	16	21	23	64	25	22	15	14	17	64
26-Oct	18	22	21	29	26	31	22	30	27	31	28	29	27	36	27	27	27	26	26	25	26	28	29	26	36
27-Oct	28	25	26	26	25	24	24	30	31	32	31	29	25	29	41	52	23	14	18	25	22	25	33	17	52
28-Oct	15	55	19	40	86	63	42	20	18	16	16	14	15	15	18	16	16	18	20	33	41	42	48	25	86
29-Oct	28	25	21	18	18	20	19	36	48	45	47	39	52	49	48	38	AF	AF	AF	AF	AF	AF	AF	AF	52
30-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	21	17	15	15	15	16	15	15	16	21
31-Oct	15	15	14	15	15	15	16	14	14	15	18	22	16	16	15	17	15	16	15	16	14	14	16	64	64
															Diurnal Maximum										
															80 73 72 77 93 73 71 99 75 66 81 86 65 72 76 81 77 75 92 91 74 84 88 64										
AF - Analyzer Failure																									



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 8, 2014	Previous Calibration	September 10, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	12:25	End Time (MST)	9:21
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
Cal Gas Concentration	51 ppm	Cal Gas Expiry Date	May 29th 2014
Gas Cert Reference	LL107923		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2403
DACS voltage range		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	730
Calculated slope	1.001254	0.993844	Chamber temp.	42.0	42.0
Calculated intercept	0.697760	1.099212	Pressure (mmHg)	716.0	716.0
Analyzer Background	38.2	38.8	Flow (lpm)	0.496	0.496
Analyzer Coefficient	0.753	0.759	Intensity	359xx	359xx

Analyzer make	Thermo 43C	Analyzer serial #	50911
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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	5500	0.0	0.0	-0.7	NA
as found span	5500	81.5	755.7	751.2	1.006
calibrator zero	5500	0.0	0.0	-0.3	NA
high point	5500	81.5	755.7	759.8	0.995
second point	5500	45.7	423.8	424.8	0.998
third point	5500	22.8	211.4	210.8	1.003
as left zero	5500	0.0	0.0	-0.2	NA
as left span	5500	81.5	755.7	759.8	0.995
Average Correction Factor					0.998

Corrected As found	751.9	Previous response	754.1	% change	0.3%
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#### Notes:

Inlet filter changed after As Finds. Zero slightly elevated after the filter changed, zero adjusted.

Calibration Performed By: Zack Eastman



# Wood Buffalo Environmental Association

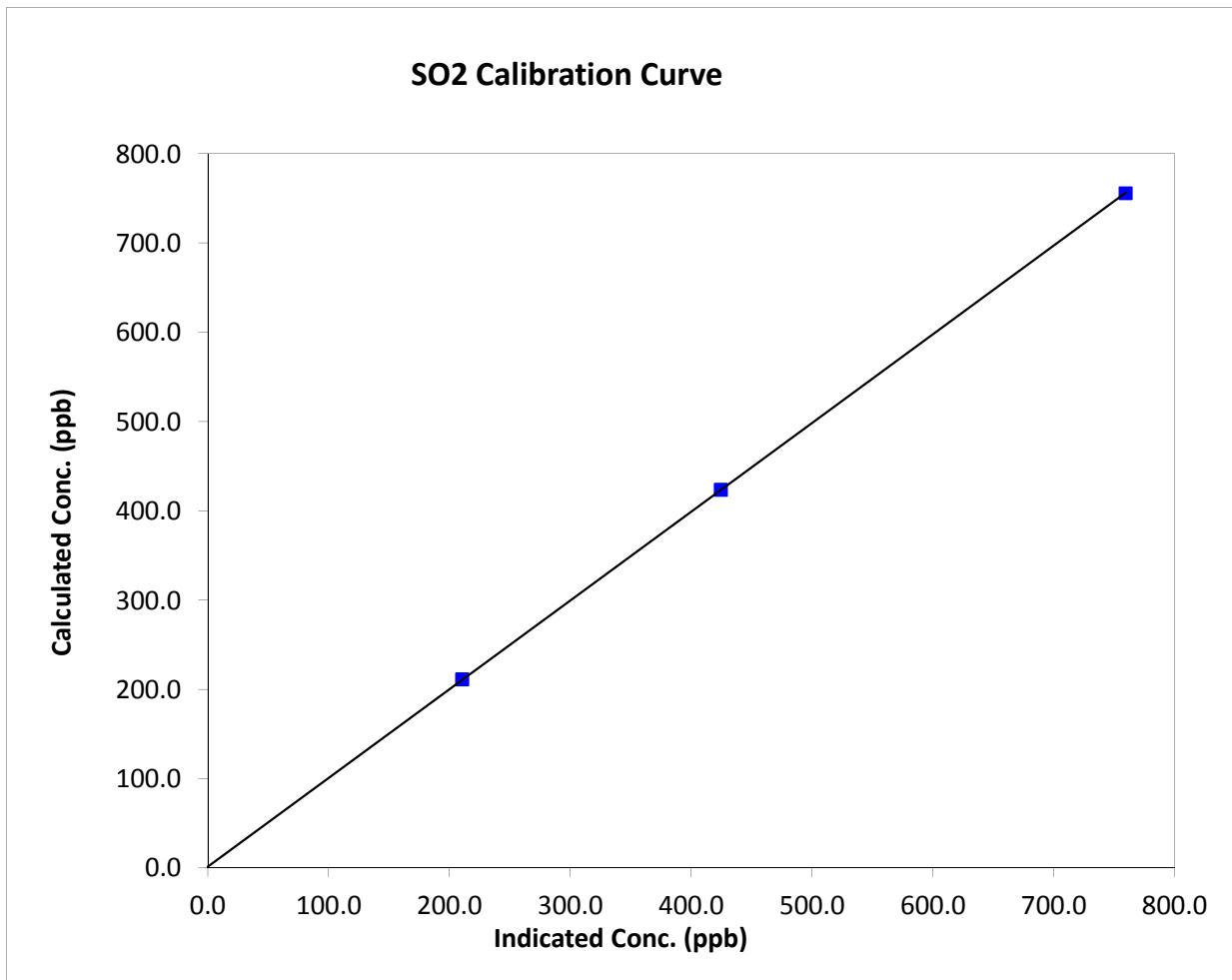
## SO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	October 8, 2014	Previous Calibration	September 10, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:25	End Time (MST)	9:21
Analyzer make	Thermo 43C	Analyzer serial #	50911

### Calibration Data

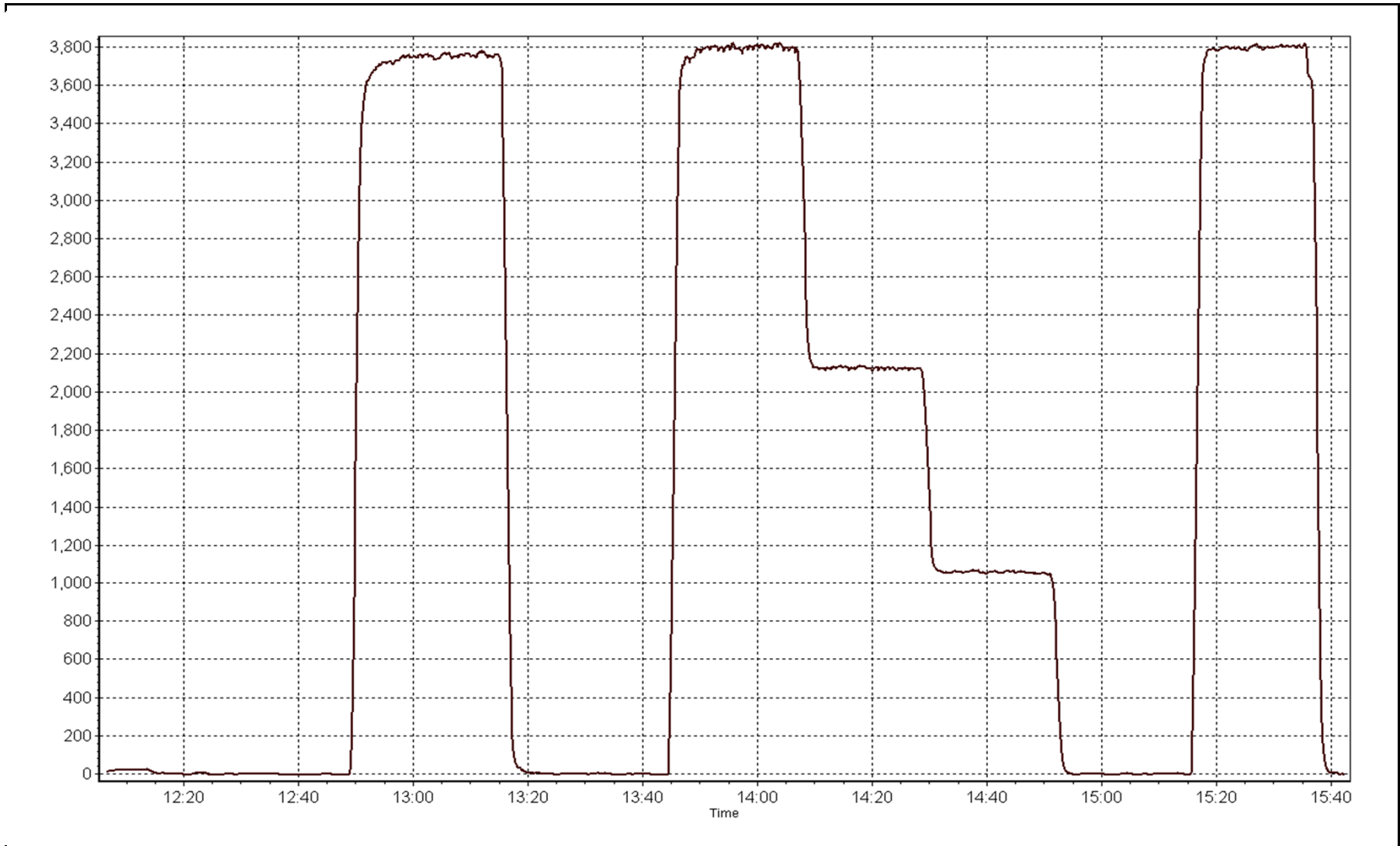
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999994
755.7	759.8	0.9946		
423.8	424.8	0.9976	Slope	0.993844
211.4	210.8	1.0029		
			Intercept	1.099212





SO2 Calibration Plot

Date: October 8, 2014





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	October 9, 2014	Previous Calibration	September 10, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	8:15	End Time (MST)	12:07
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.	51.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2403
DACS voltage range	5000	DACS channel #	2

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-859	-859
Analyzer Range (input)	5000	5000	Lamp voltage	1137	1137
Calculated slope	1.005123	1.000716	Chamber temp.	45	45
Calculated intercept	-0.038756	0.055056	Pressure	678.0	678.0
Analyzer Background	1.53	1.63	Flow	0.425	0.425
Analyzer Coefficient	0.969	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	0.05	NA
as found span	6500	46.0	75.0	74.3	1.010
SO2 scrubber check	5500	22.8	211.4	0.42	NA
calibrator zero	6500	0.0	0.00	0.03	NA
high point	6500	46.0	75.0	75.0	1.000
second point	6500	24.6	40.1	39.9	1.005
third point	6500	12.3	20.1	19.9	1.006
as left zero	6500	0.0	0.0	0.05	NA
as left span	6500	46.0	75.0	75.5	0.994
Average Correction Factor					1.004

Corrected As found	74.2	Previous response	74.7	% change	0.6%
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#### Notes:

Inlet filter changed after as founds. Zero adjusted slightly after filter change, span adjusted slightly also. No issues detected during this calibration.

Calibration Performed By:

Zack Eastman



# Wood Buffalo Environmental Association

## TRS Calibration Summary

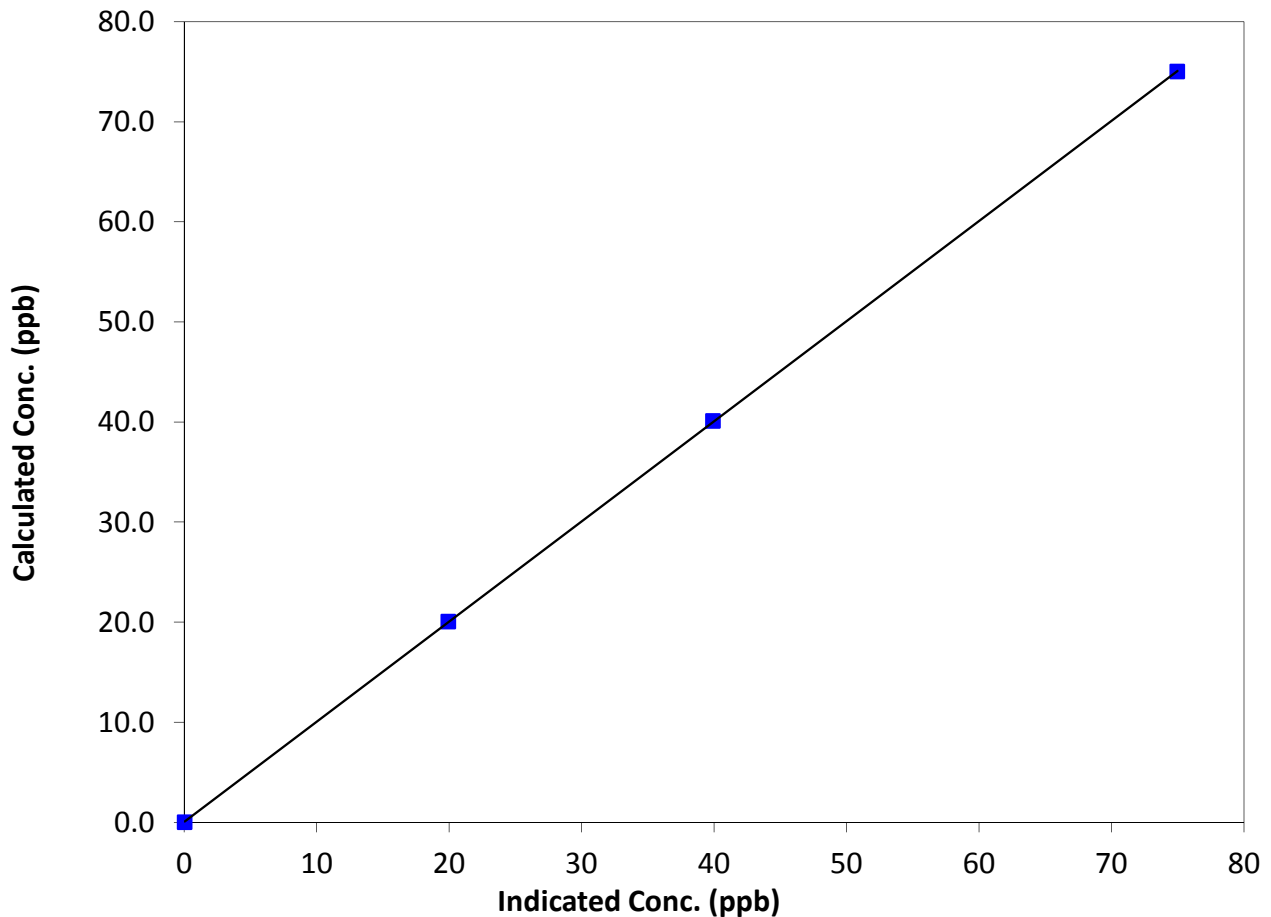
### Station Information

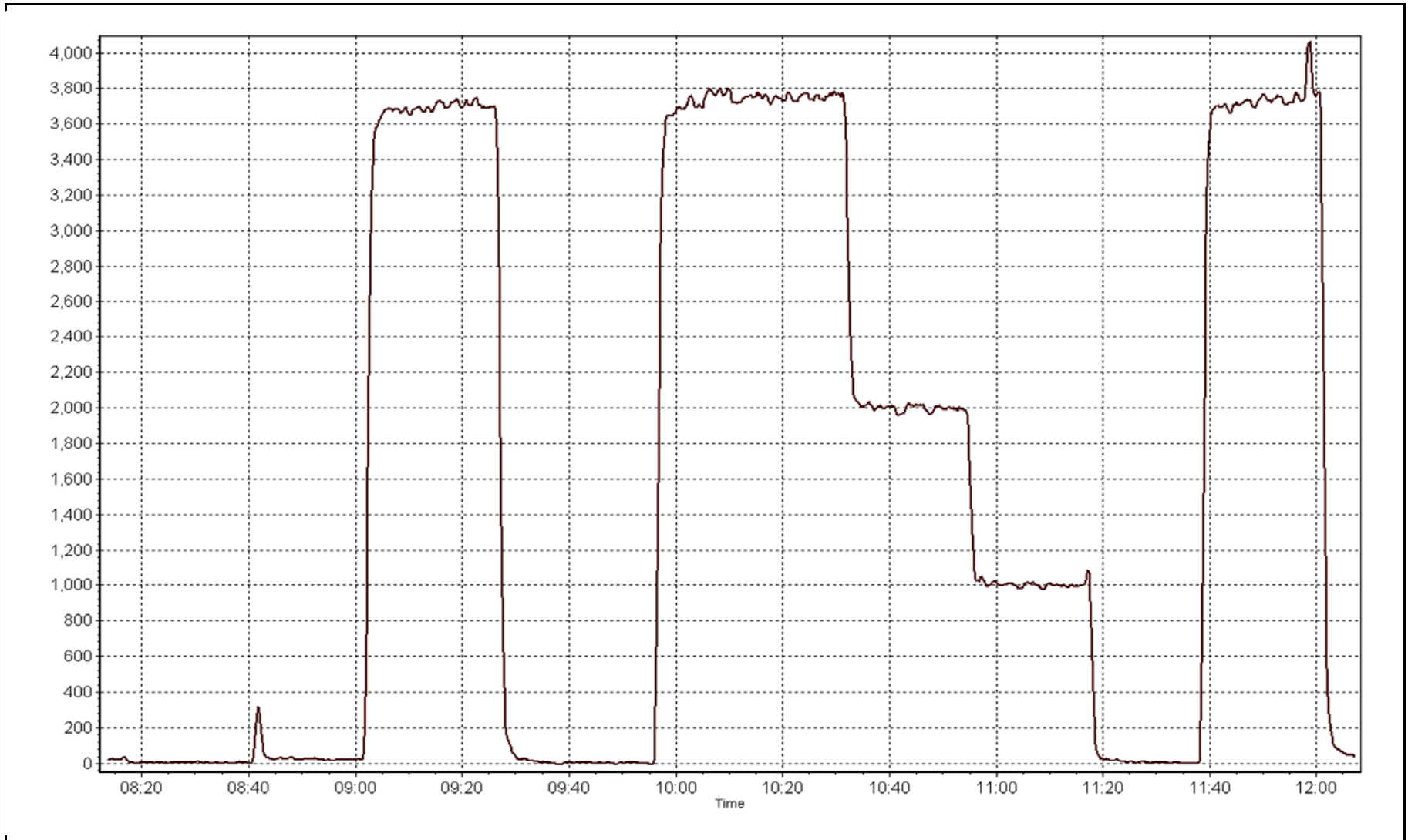
Calibration Date	October 9, 2014	Previous Calibration	September 10, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:15	End Time (MST)	12:07
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999991
75.0	75.0	1.0005		
40.1	39.9	1.0049	Slope	1.000716
20.1	19.9	1.0059		
			Intercept	0.055056

TRS Calibration Curve







# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

### Station Information

Calibration Date	Wednesday, October 08, 2014	Prev Calibration	Wednesday, September 10, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	12:25	End Time (MST)	15:39
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
Gas Cert Reference	LL107923	Cal Gas Expiry Date	May 29th 2014
CH4 Cal Gas Conc.	510.0 ppm	CH4 Equiv Conc.	1076.5 ppm
C3H8 Cal Gas Conc.	206.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2403

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	32.0	32.0
THC Range (input)	50	50	Flame Temp	406.0	406.0
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	1.002564	0.997246	Air Pressure	32.0	32.0
THC Calc intercept	0.021052	0.032452	Det Temp	175.0	175.0
NMHC Calc slope	1.002363	0.997998	Filter Temp	175.0	175.0
NMHC Calc intercept	0.000895	0.007734	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	15.67	1.018
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	81.5	15.95	15.99	0.998
second point	5500	45.7	8.94	8.90	1.005
third point	5500	22.8	4.46	4.42	1.010
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	81.5	15.95	15.96	0.999
Average Correction Factor					1.004

Corrected As found 15.67 Previous response 15.89 % change 1.4%

**Notes:**

Inlet filter changed after as founds, span adjuste slightly also after As Founds. No issues noted.

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	8.23	1.020
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	81.5	8.39	8.41	0.998
second point	5500	45.7	4.71	4.70	1.002
third point	5500	22.8	2.35	2.34	1.004
calibrator zero					
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	81.5	8.39	8.39	1.001
Average Correction Factor					1.001

Corrected As found      8.23      Previous response      8.37      % change      1.7%

### 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	5500	0	0.00	0.00	N/A
as found span	5500	81.5	7.56	7.44	1.016
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	81.5	7.56	7.58	0.997
second point	5500	45.7	4.24	4.20	1.009
third point	5500	22.8	2.11	2.08	1.016
calibrator zero					
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	81.5	7.56	7.57	0.998
Average Correction Factor					

Corrected As found      7.44      Previous response      7.52      % change      1.0%



# Wood Buffalo Environmental Association

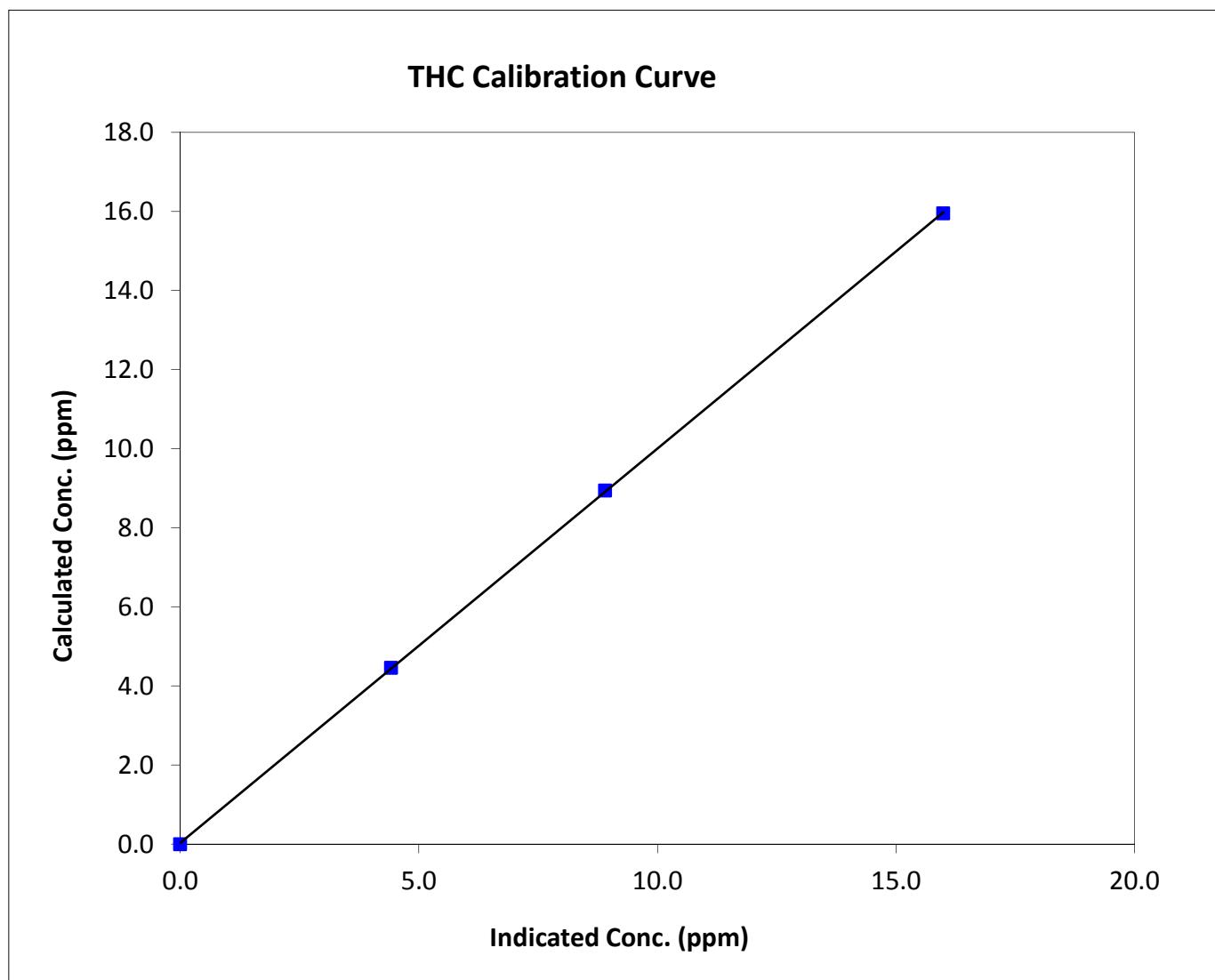
## THC Calibration Summary

### Station Information

Calibration Date	October 8, 2014	Previous Calibration	September 10, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:25	End Time (MST)	15:39
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	0.999974
15.95	15.99	0.9976		
8.94	8.90	1.0050	Slope	0.997246
4.46	4.42	1.0096		
			Intercept	0.032452





# Wood Buffalo Environmental Association

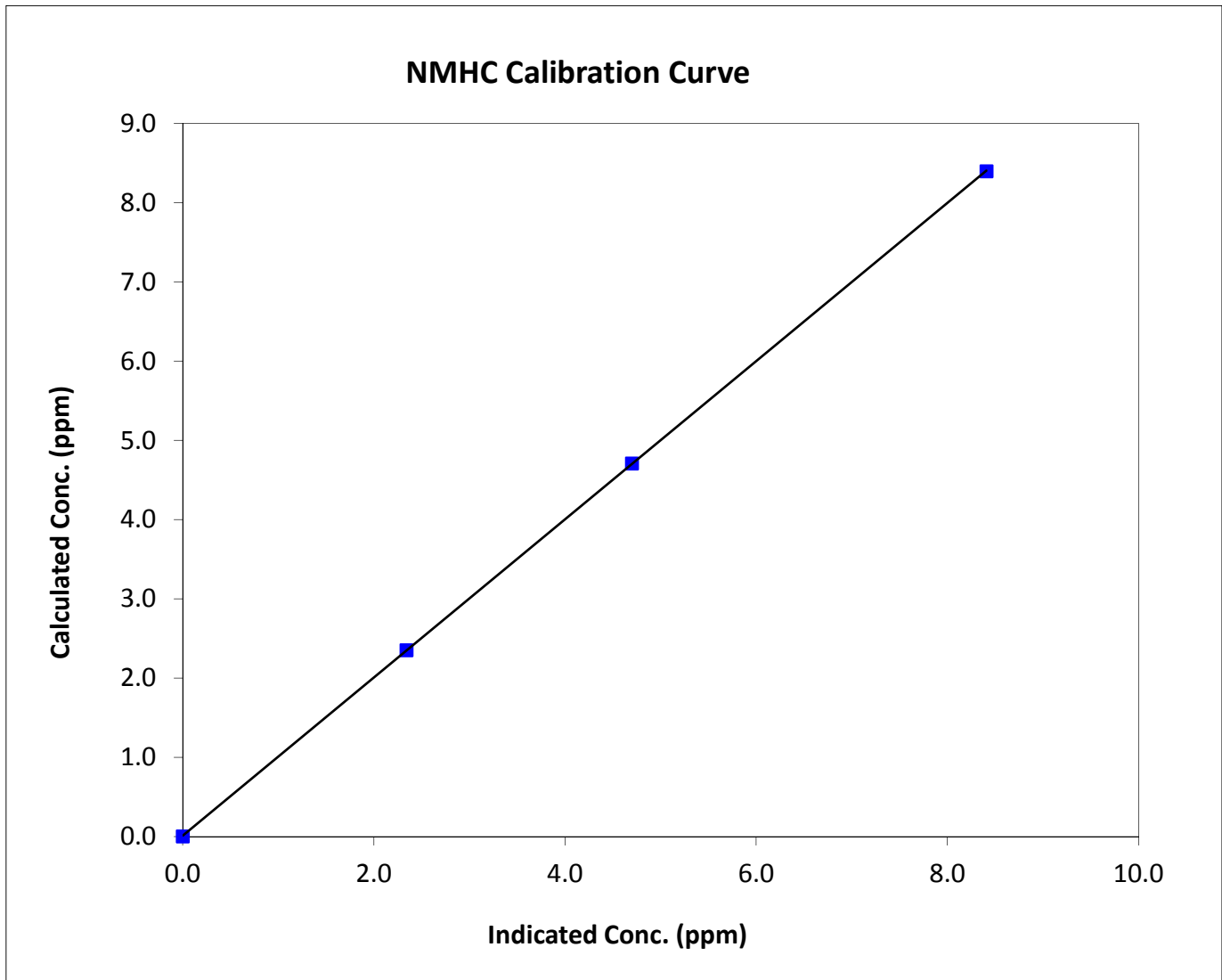
## NMHC Calibration Summary

### Station Information

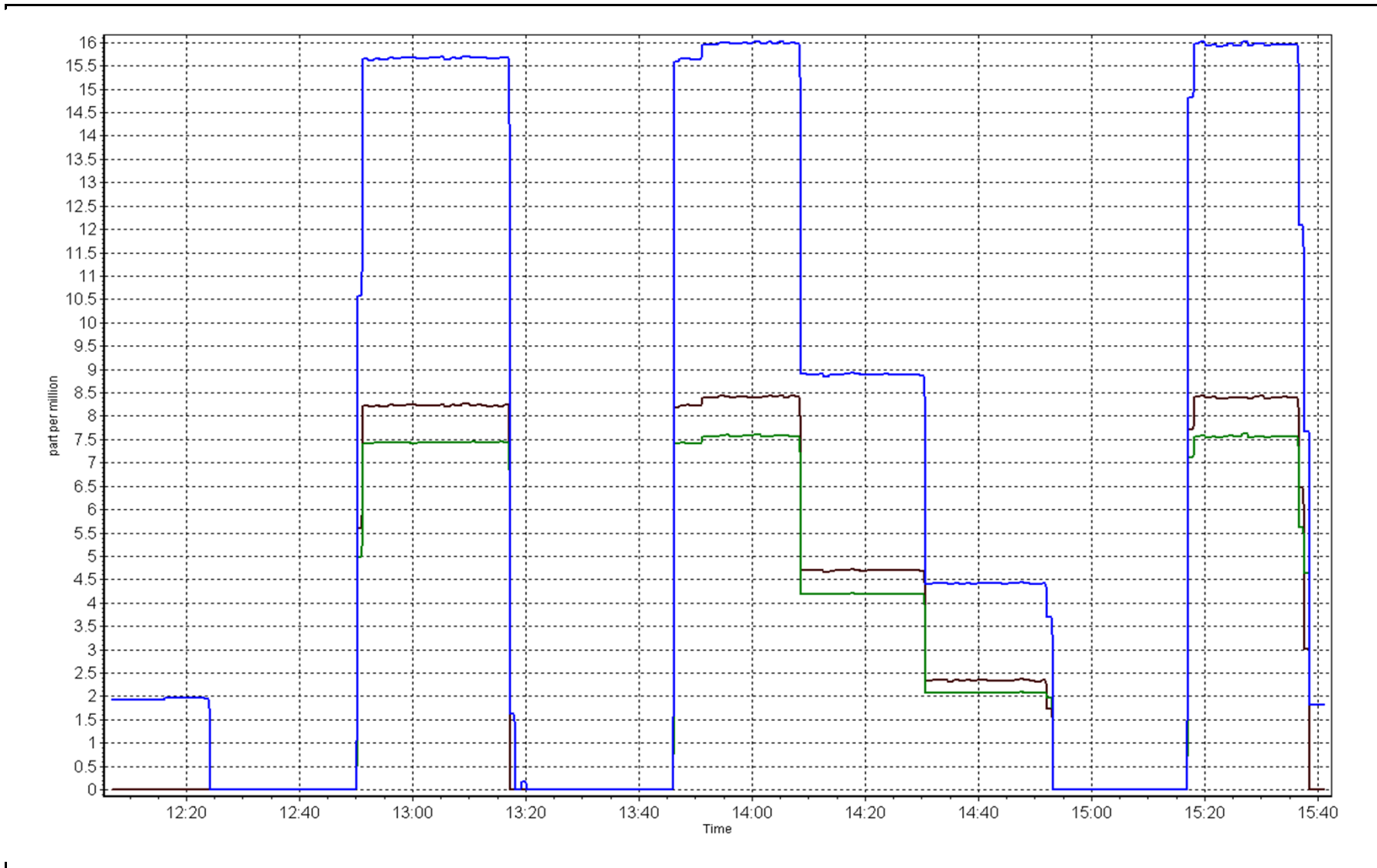
Calibration Date	October 8, 2014	Previous Calibration	September 10, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:25	End Time (MST)	15:39
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999995
8.39	8.41	0.9982		
4.71	4.70	1.0015	Slope	0.997998
2.35	2.34	1.0036		
			Intercept	0.007734









# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 21, 2014	Previous Calibration	September 11, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	7:50	End Time (MST)	11:23
Barometric Pressure	N/A mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
NO2 calibration used	Sunday, October 19, 2014	Transfer Standard	na
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2403
DACS voltage range	5000	DACS channel #	Diff 7

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	25.0	25.0
Analyzer Range (input)	5000	5000	Lamp temp.	53.0	53.0
Calculated slope	0.998659	0.996165	Pressure	669.0	669.0
Calculated intercept	-1.354428	-0.544643	Flow cell A	0.727	0.727
Analyzer Background	-0.8	-1.4	Flow cell B	0.725	0.725
Analyzer Coefficient	1.089	1.024	Cell A Intensity	81xxx	81xxx
			Cell B Intensity	83xxx	83xxx

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	-0.5	N/A
as found span	5000	1.10	389.0	412.3	0.943
calibrator zero	5500	0.00	0.0	0.3	N/A
high point	5000	1.10	389.0	390.5	0.996
second point	5000	0.60	202.0	204.6	0.987
third point	5000	0.35	106.0	106.5	0.995
calibrator zero	5500	0.00	0.0		NA
as left zero	N/A	0.00	0.0	0.8	NA
as left span	N/A	1.10	389.0	399.4	0.974
Average Correction Factor					0.993

Corrected As found 412.8 Previous response 390.9 % change -5.3%  
Average Correction

#### Notes:

zero and span adjusted after inlet filter changed.

Calibration Performed By:

Zack Eastman



# Wood Buffalo Environmental Association

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

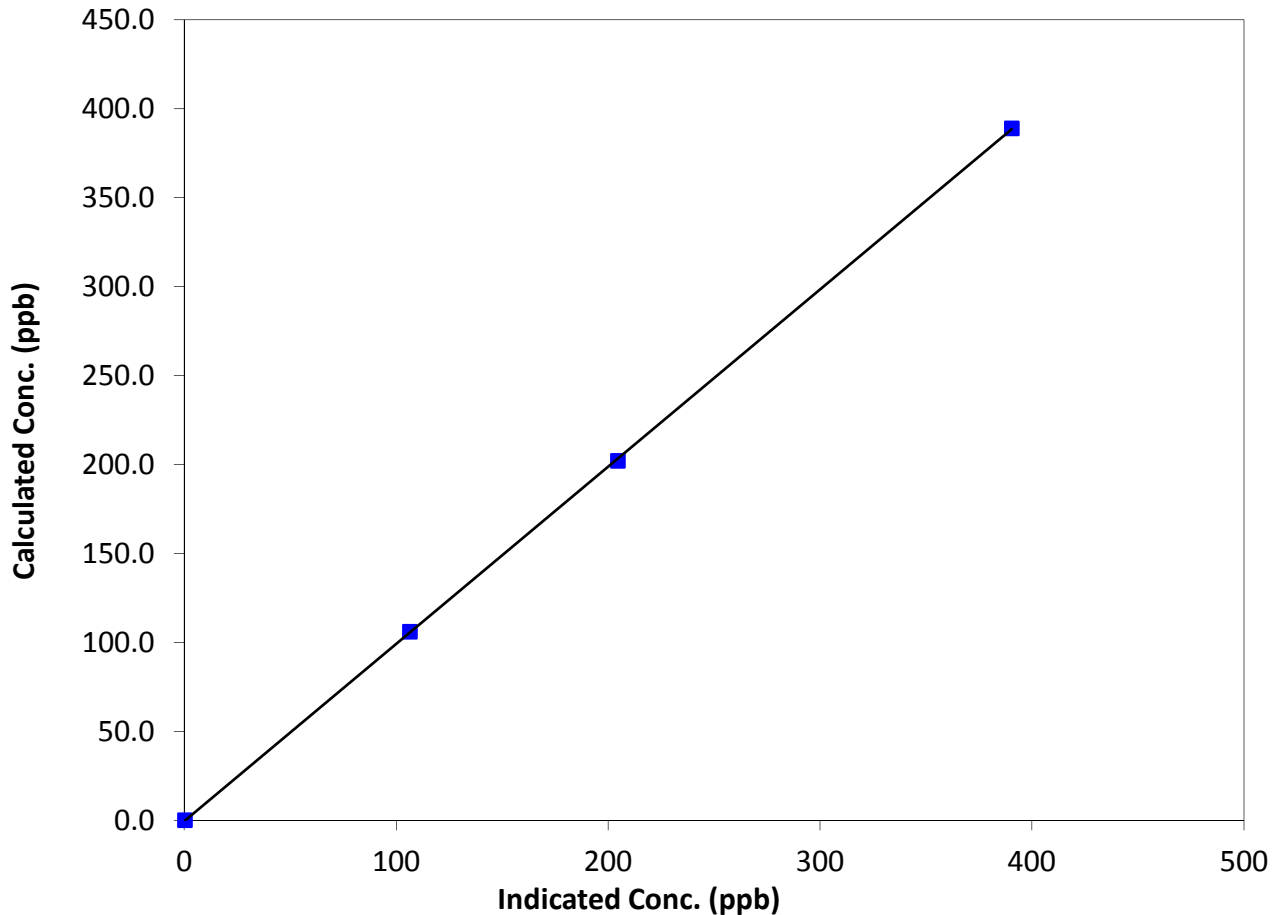
### Station Information

Calibration Date	Tuesday, October 21, 2014	Previous Calibration	September 11, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	7:50	End Time (MST)	11:23
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

### Calibration Data

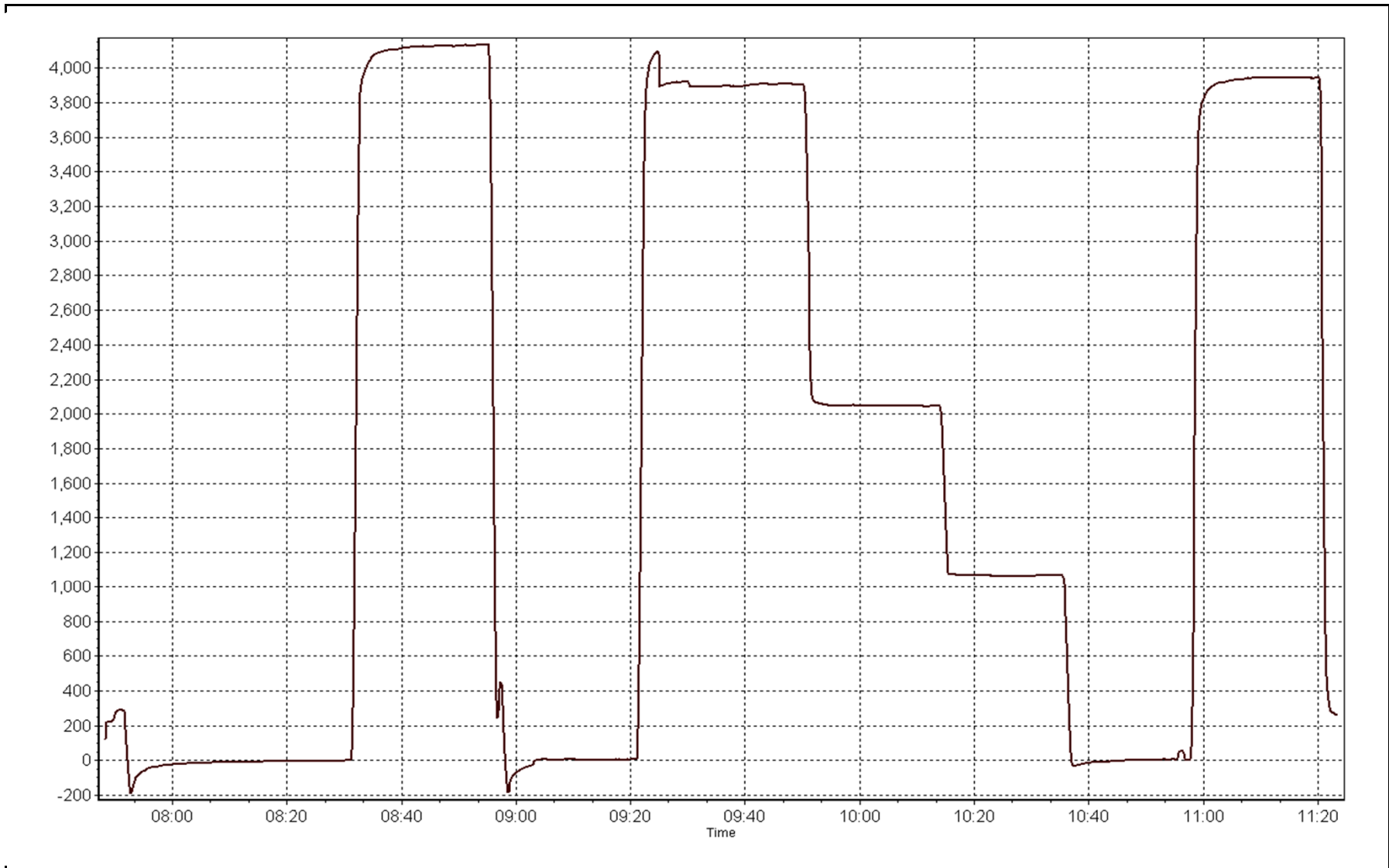
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999973
389.0	390.5	0.9962		
202.0	204.6	0.9873	Slope	0.996165
106.0	106.5	0.9953		
			Intercept	-0.544643

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



O3 Calibration Plot

Date: October 21, 2014





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 19, 2014	Previous Calibration	September 10, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	12:20	End Time (MST)	16:27
Barometric Pressure	n/a mmHg	Station Temperature	21.0 Deg C
Calibrator	SABIO 4010	Serial Number	1730512
NO Cal Gas Conc	50.6 ppm	Cal Gas Expiry Date	May 29th 2014
NOx Cal Gas Conc	50.6 ppm	Cal Gas Serial #	LL107923

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2403
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	5000	5000	5000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.998306	0.996797	1.004492
	Data Offset	1.086600	0.525246	-0.371570
After	Data Slope	1.001519	1.000736	1.003191
	Data Offset	1.053233	0.571677	1.074197
Channel #				
Voltage Range		0-5000mv	0-5000mv	0-5000mv

### Analyzer Information

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

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.872	ppb	0.872	ppb
NOx coefficient	0.997	ppb	0.997	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	6.2		6.2	
NOx bkgrnd	6.9		6.9	
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
O3 flow	ok	ccm	ok	ccm
R Cell Press	206.0	mmHg	206.0	mmHg
Sample Flow	503.0	ccm	503.0	ccm

**Notes:**

no adjustments required.



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

October 19, 2014

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	-0.8	-0.3	-0.5	N/A	N/A
as found span	5500	81.5	749.8	749.8	0.0	748.0	749.0	-0.7	1.002	1.001
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.8	-0.3	-0.5	N/A	N/A
high point	5500	81.5	749.8	749.8	0.0	748.0	749.0	-0.7	1.002	1.001
second point	5500	45.7	420.4	420.4	0.0	418.0	419.0	-1.0	1.006	1.003
third point	5500	22.8	209.8	209.8	0.0	208.5	209.0	-0.5	1.006	1.004
calibrator zero										
as left zero	5500	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3	N/A	N/A
as left span	5500	81.5	749.8	360.0	389.8	752.0	363.0	388.0	0.997	0.992
Average Correction Factor									1.005	1.003

Corrected As found NO<sub>x</sub>= 748.8 NO= 749.3 Percent Change NO<sub>x</sub>= 0.2% NO= 0.3%  
 Previous Response NO<sub>x</sub>= 750.0 NO= 751.7

### GPT Calibration Data

Dilution Flow 5500 ccm Source Gas Flow 81.50 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			-0.5			N/A	
1st NO <sub>2</sub> (300)	N/A	360.0	389.0	747.0	360.0	387.0	0.989	1.000	1.005	99.5%
2nd NO <sub>2</sub> (200)	N/A	547.0	202.0	747.0	547.0	200.0	0.989	1.000	1.010	99.0%
3rd NO <sub>2</sub> (100)	N/A	643.0	106.0	747.0	643.0	104.0	0.989	1.000	1.019	98.1%
4th NO <sub>2</sub> (0)	749.0	N/A	-2.0	747.0	749.0	-2.0	0.989	1.000	N/A	N/A
Average Correction Factor							0.989	1.000	1.011	98.9%

Calibration Performed By: Zack Eastman



# Wood Buffalo Environmental Association

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

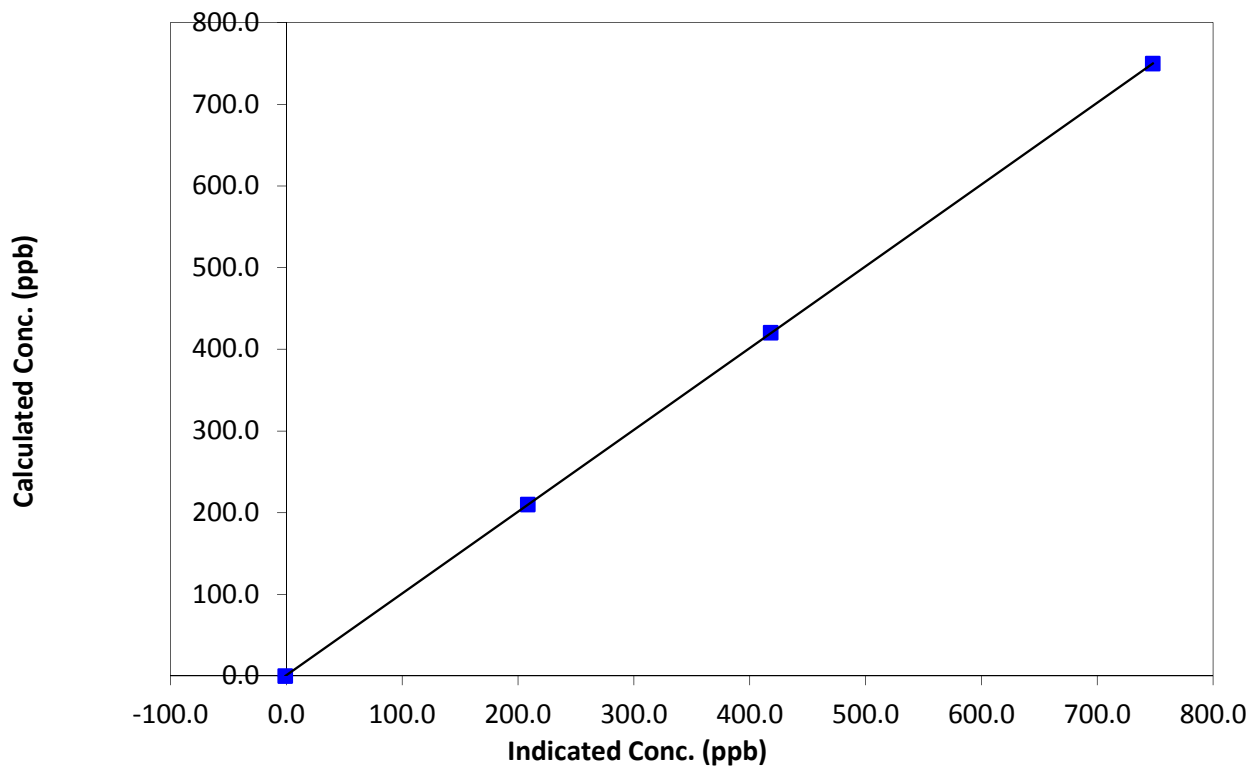
### Station Information

Calibration Date	October 19, 2014	Previous Calibration	September 10, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:20	End Time (MST)	16:27
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	-0.8	N/A	Correlation Coefficient	0.999997
749.8	748.0	1.0024		
420.4	418.0	1.0058	Slope	1.001519
209.8	208.5	1.0060		
			Intercept	1.053233

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

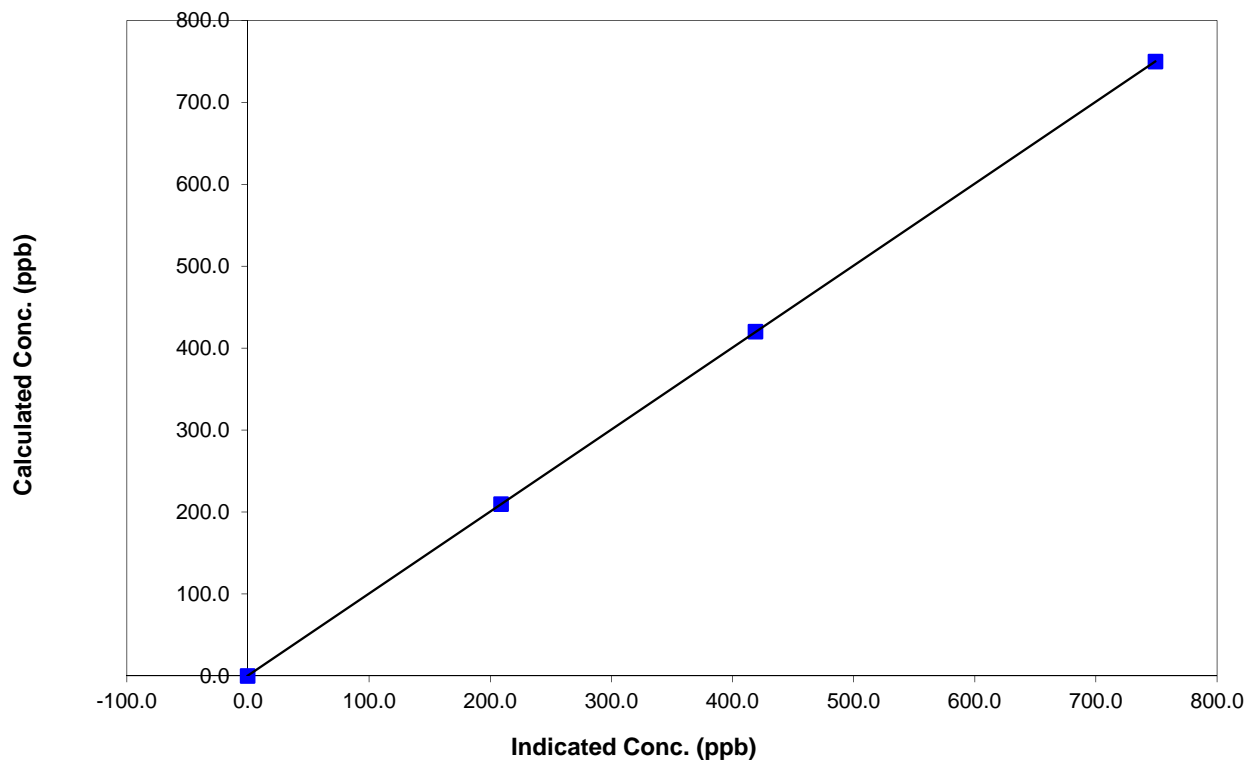
### Station Information

Calibration Date	October 19, 2014	Previous Calibration	September 10, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:20	End Time (MST)	16:27
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	-0.3	N/A	Correlation Coefficient	0.999998
749.8	749.0	1.0011		
420.4	419.0	1.0034	Slope	1.000736
209.8	209.0	1.0036		
			Intercept	0.571677

### NO Calibration Curve







# Wood Buffalo Environmental Association

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

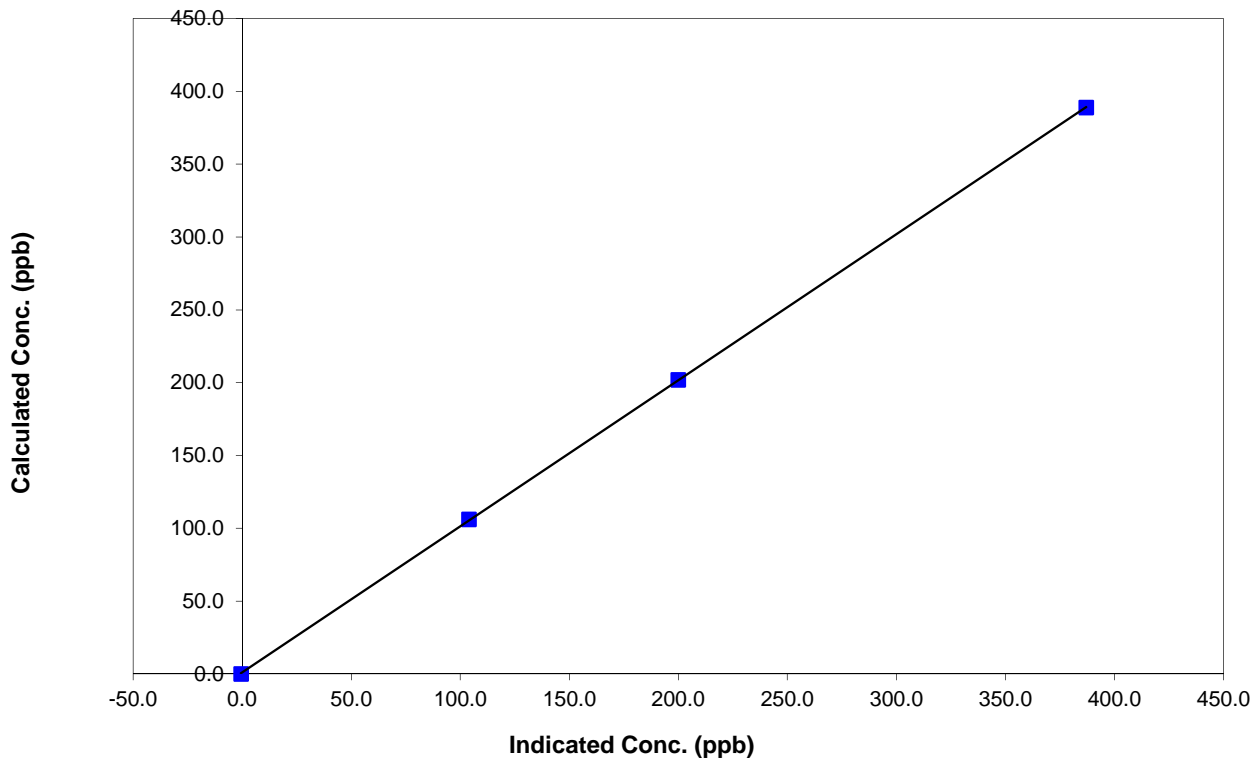
### Station Information

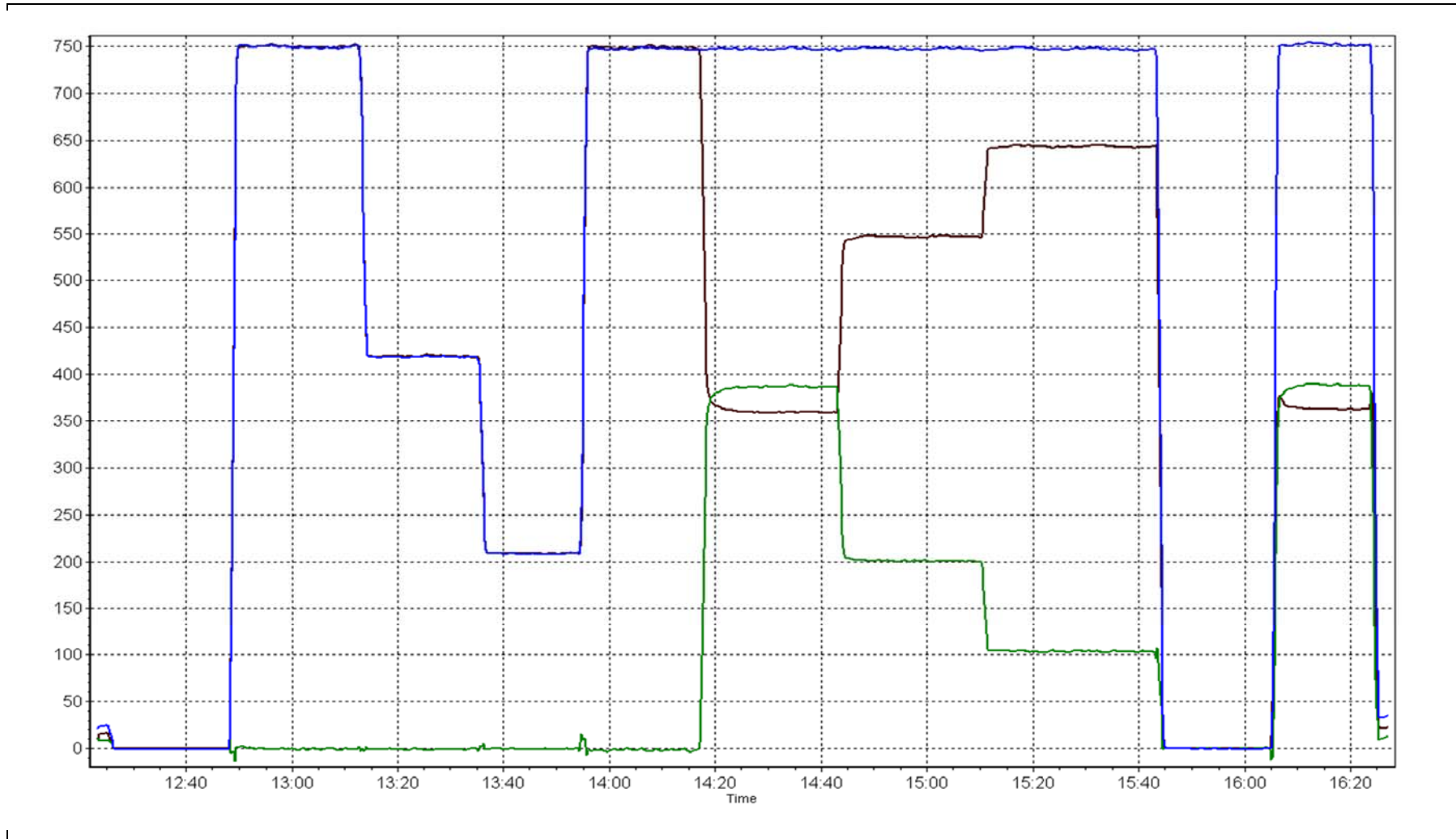
Calibration Date	October 19, 2014	Previous Calibration	September 10, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:20	End Time (MST)	16:27
Analyzer make	Thermo 42i NO/NO <sub>2</sub> /NO <sub>x</sub> Analyzer	Analyzer serial #	1218153357

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	N/A	Correlation Coefficient	0.999990
389.0	387.0	1.0052		
202.0	200.0	1.0100	Slope	1.003191
106.0	104.0	1.0192		
			Intercept	1.074197

### 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	October 21, 2014	Previous Calibration	September 11, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	11:25	End Time (MST)	17:21
Barometric Pressure	N/A mmHg	Station Temperature	21.0 Deg C
Calibrator	Sabio 4010	Serial Number	1730512
NH3 Cal Gas Conc	192 ppm	Cal Gas Expiry Date	March 3rd 2012
NOx Cal Gas Conc	50.6 ppm	Cal Gas Serial #	LL156612

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2403
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Parameter		Nt	NOx	NH3
MV conversion	Analyzer Range (ppb)	2500	1000	2500
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.989181	1.001750	1.001509
	Data Offset	-4.215264	0.487692	-3.069688
After	Data Slope	0.983892	1.001732	0.998004
	Data Offset	-8.236354	0.202515	-6.908791
Channel #		NA	6	7
Voltage Range		NA	0-5000mv	0-5000mv

### Analyzer Information

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

Test Point	before		after	
Concentration range	0-2500	ppb	0-2500	ppb
Nt Slope	1.198		1.179	
NOX Slope	1.183		1.151	
NH3 Conv coeff	0.960		0.974	
NO slope	1.150		1.101	
No bkgrnd	0.0	mV	0.0	mV
Nt bkgrnd	0.1	mV	0.1	mV
NOX bkgrnd	0.0	mV	0.0	
NhH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.0	Deg C	314.0	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	85.0	ccm	85.0	ccm
R Cell Press	5.6	mmHg	5.6	mmHg
PMT Voltage	614.0	v	614.0	v
Sample Flow 1 NO	513.0	ccm	513.0	ccm
Sample Flow 2 Nox	514.0	ccm	514.0	ccm

Notes:

NO adjusted on both zero and span after as founds, NH3 also adjusted.



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

October 21, 2014

Station Number:

AMS 1

### 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	5500	0.0	0.0	0.0	0.0	-0.1	-0.2	0.2	NA	NA
as found NO	5500	81.5	749.8	749.8	NA	746.7	747.2	-1.2	1.004	NA
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.4	-0.2	-0.5	NA	NA
high NO point	5500	81.5	749.8	749.8	NA	748.4	749.2	-2.0	1.002	NA
NO/O <sub>3</sub> point	5500	81.5	749.8	749.8	NA	747.3	747.4	-0.4	1.003	NA
as found NH <sub>3</sub>	6500	67.7	1999.8	NA	1999.8	1998.0	11.0	1970.5	1.001	1.015
first NH <sub>3</sub>	6500	67.7	1999.8	NA	1999.8	2038.0	11.6	2009.0	0.981	0.995
second NH <sub>3</sub>	6500	33.9	1001.4	NA	1001.4	1025.5	7.2	1007.5	0.976	0.994
third NH <sub>3</sub>	6500	16.9	499.2	NA	499.2	528.0	3.6	519.0	0.945	0.962
as left zero						0.0				
as left span						0.0				
Average Correction Factor									1.0026	0.9837

Corrected As found

Nt = 746.8 ppb

NH<sub>3</sub> = 1970.3 ppb

Previous response

Nt = 762.2 ppb

NH<sub>3</sub> = 1999.8 ppb

Nt percent change 2.1%

NH<sub>3</sub> percent change 1.5%

Converter efficiency 97.4%

Calibration Performed By:

Zach Eastman



# Wood Buffalo Environmental Association

## NH3 Calibration Summary

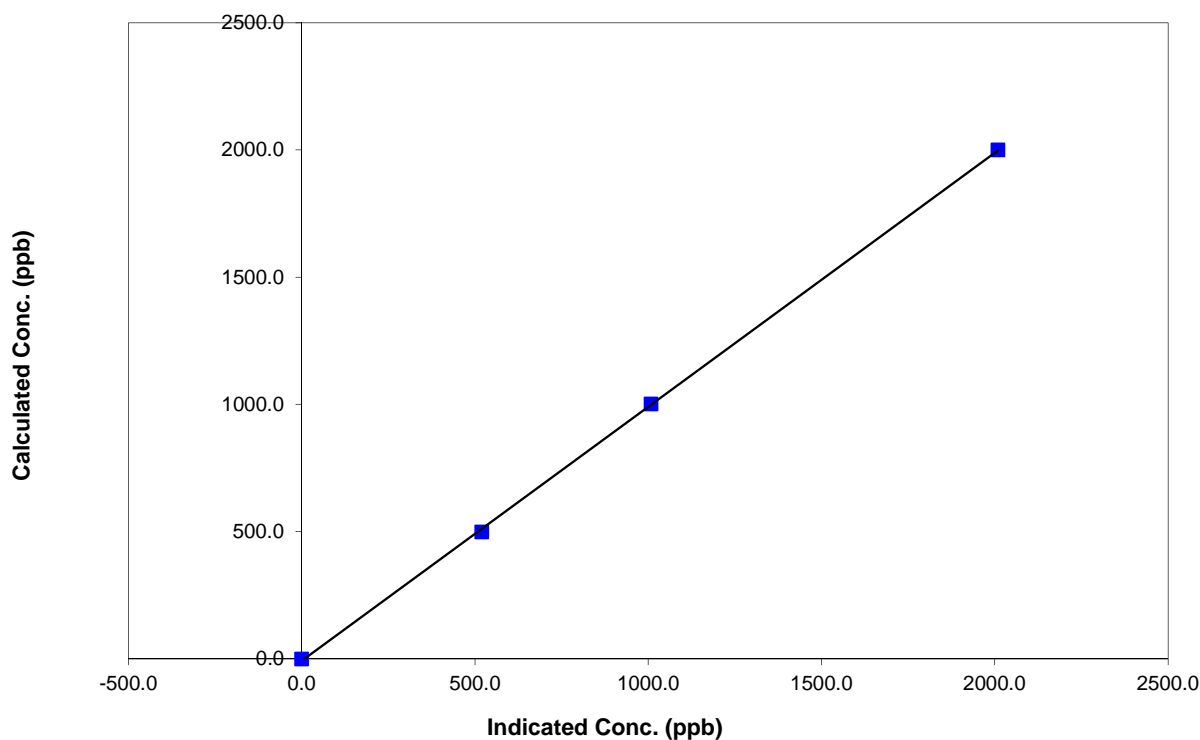
### Station Information

Calibration Date	October 21, 2014	Previous Calibration	September 11, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	11:25	End Time (MST)	17:21
Analyzer make	API T201	Analyzer serial #	152

### NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		
0.0	-0.5	N/A	Correlation Coefficient	0.999906	
1999.8	2009.0	0.9954		Slope	0.998004
1001.4	1007.5	0.9939			
499.2	519.0	0.9618	Intercept	-6.908791	

### NH3 Calibration Curve





# Wood Buffalo Environmental Association

## Nt Calibration Summary

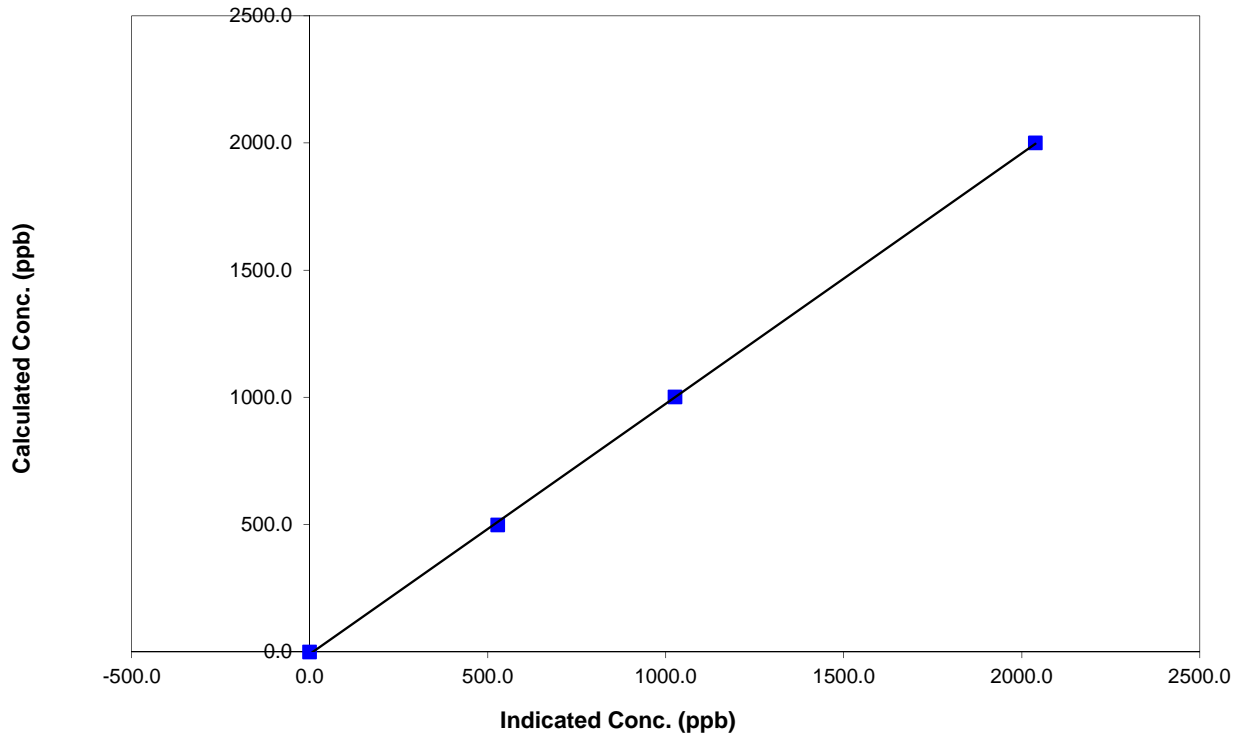
### Station Information

Calibration Date	October 21, 2014	Previous Calibration	September 11, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	11:25	End Time (MST)	17:21
Analyzer make	API T201	Analyzer serial #	152

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

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999896
1999.8	2038.0	0.9812		
1001.4	1025.5	0.9765	Slope	0.983892
499.2	528.0	0.9455		
	0.0		Intercept	-8.236354

### Nt Calibration Curve





# Wood Buffalo Environmental Association

## NOx Calibration Summary

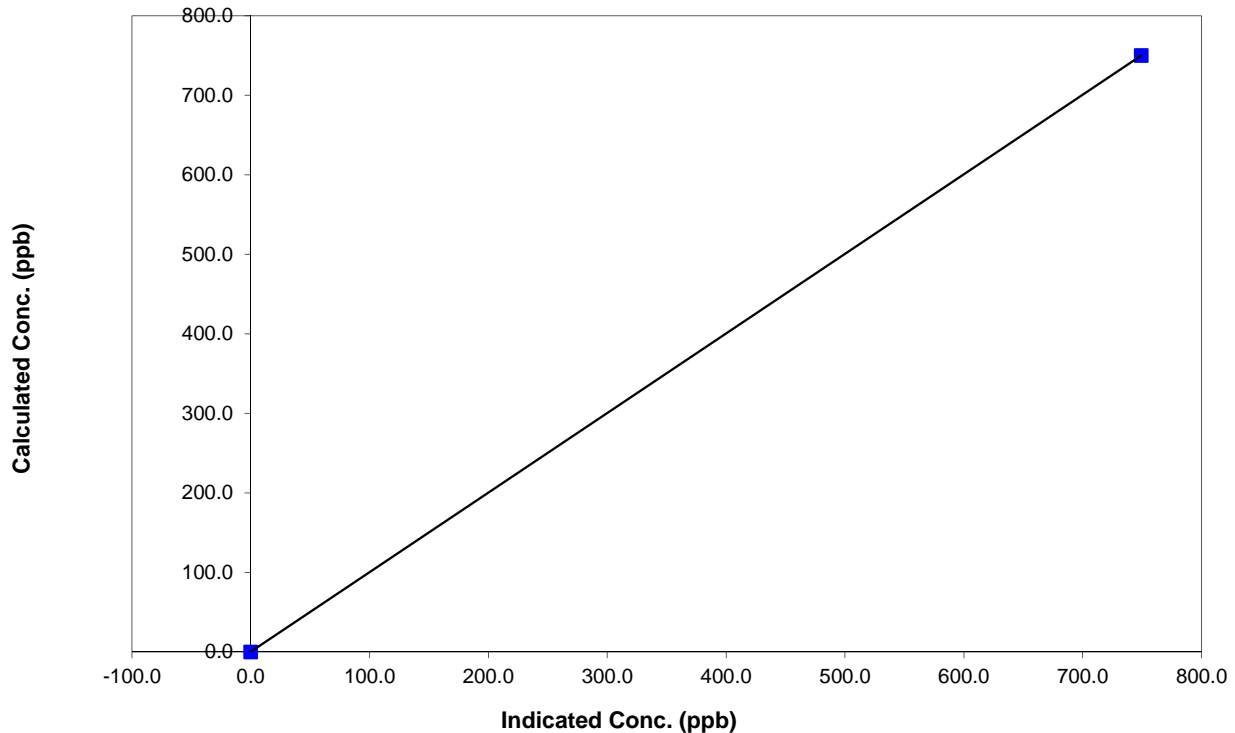
### Station Information

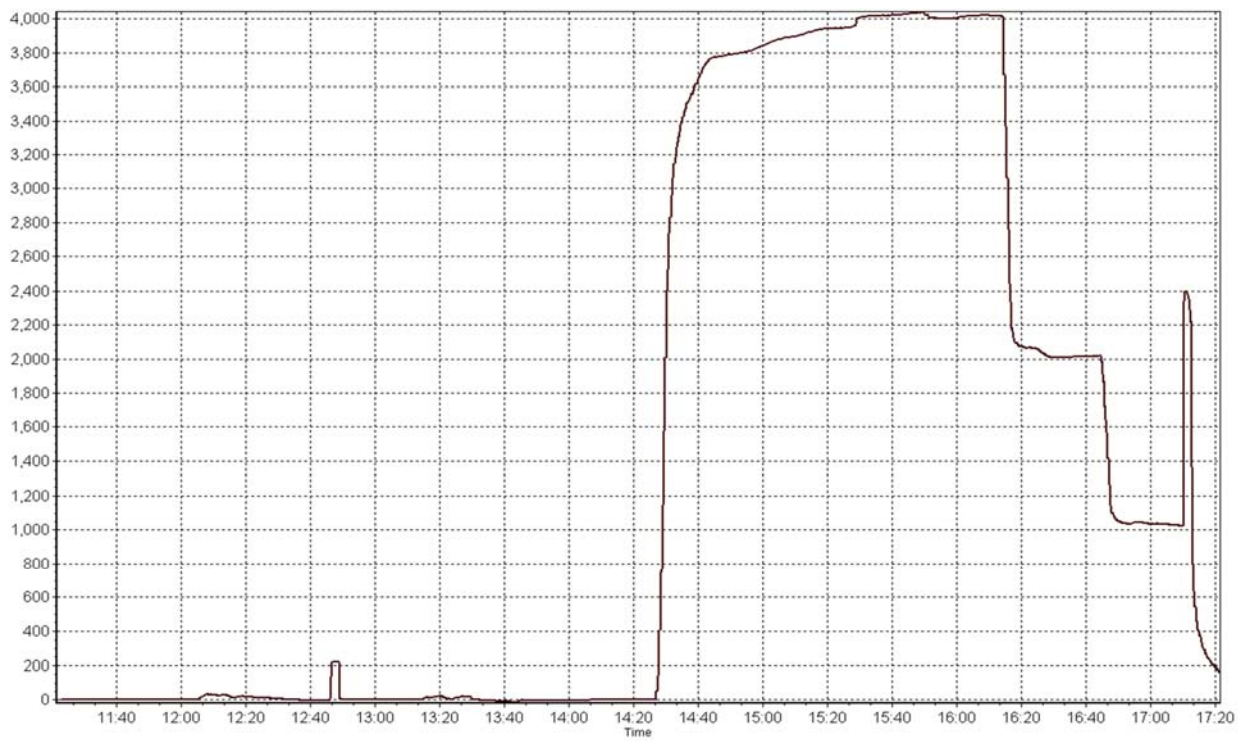
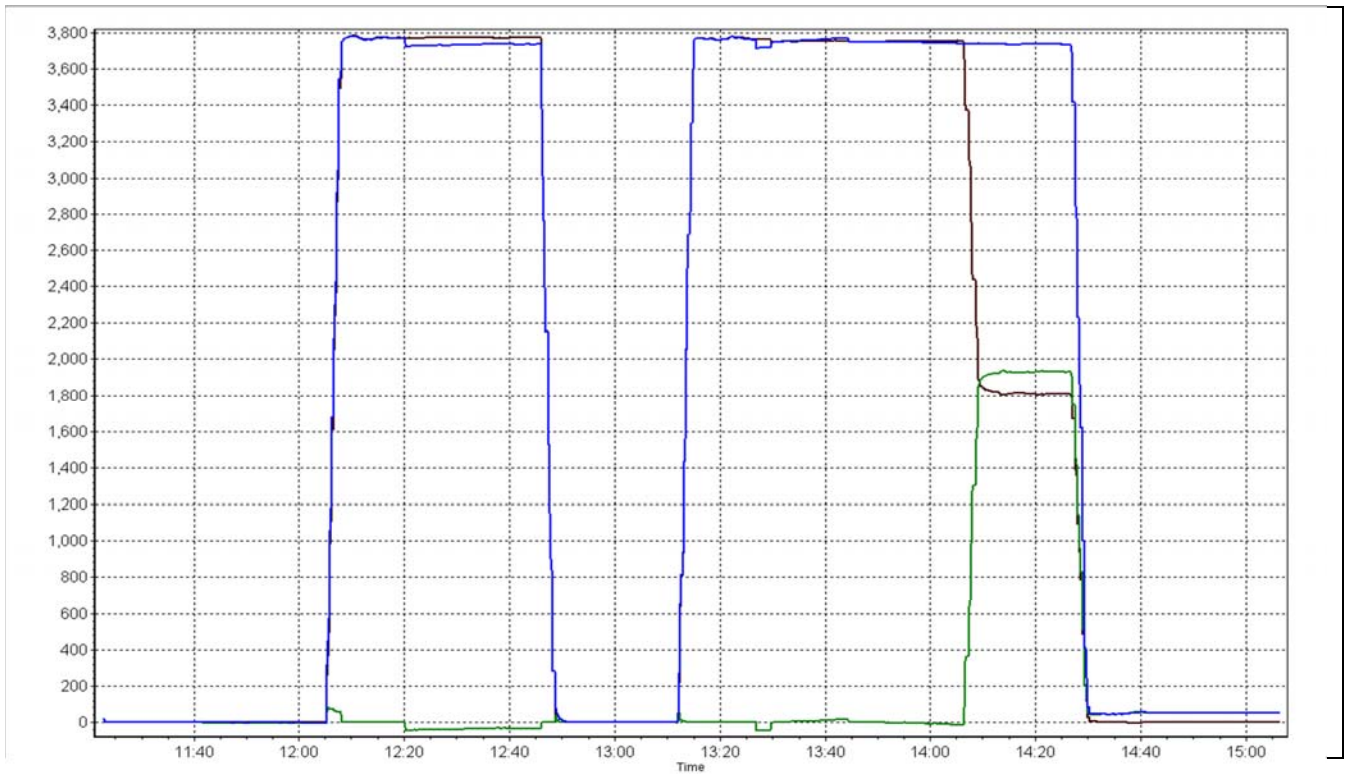
Calibration Date	October 21, 2014	Previous Calibration	September 11, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	11:25	End Time (MST)	17:21
Analyzer make	API T201	Analyzer serial #	152

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

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999996
749.8	749.2	1.0008		
749.8	747.4	1.0032	Slope	1.001732
			Intercept	0.202515

### NOx Calibration Curve







# **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

### **AMS 2 MILDRED LAKE OCTOBER 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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)  
OCTOBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	35	36	99.87	58	0	18	0
H2S (ppb) Average	708	35	36	99.87	4	0	1	0
THC (ppm) Average	708	35	36	99.87	5.2	-	3	-
Temperature (C) Average	744	0	0	100.00	20.3	-	13.2	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	26	-	-	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	2.6	5	-	0	0	1	1	2	6	58
H2S (ppb) Average	708	0.5	1	-	0	0	0	0	1	1	4
THC (ppm) Average	708	2.42	0.4	-	2	2.1	2.2	2.3	2.4	2.9	5.2
Temperature 2 m (C) Average	744	5.19	4.7	-	-3.2	-0.2	1.2	4.7	8.1	12.1	20.3
Wind Speed 10 m (km/h) Average	744	10	5	-	1	4	6	9	13	17	26
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, H2S, THC	20 Oct 2014 13:00	20 Oct 2014 13:00	1	Maintenance - manifold cleaning

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Wood Buffalo Environmental Association

Summary of Hour Averages

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

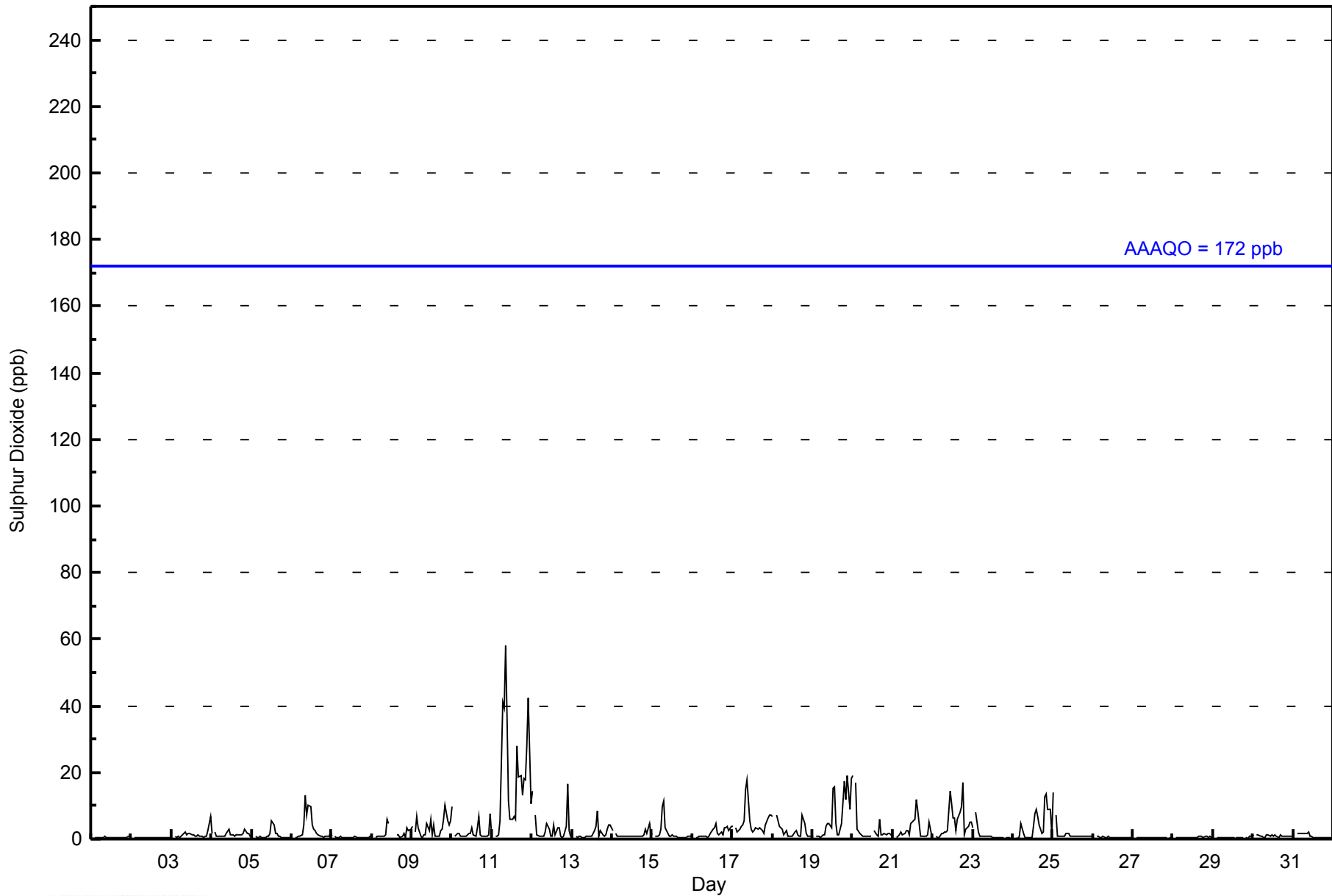
Mildred Lake - October 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 58 ppb on Oct 11 09:00										Maximum Daily Average: 18.2 ppb on Oct 11										Hours of Data: 708						
Minimum Value: 0 ppb on Oct 29 20:00										Minimum Daily Average: 0.3 ppb on Oct 29										Hours of Missing Data: 36						
Maximum Diurnal Average: 3.9 ppb at hour 9										Minimum Diurnal Average: 1.1 ppb at hour 5										Hours of Calibration: 35						
Monthly Average: 2.6 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 6 P <sub>99</sub> = 28										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-Oct	0	Z	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1
2-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
3-Oct	0	Z	1	1	1	1	1	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	3	7	1.4	7
4-Oct	2	Z	2	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	2	3	2	2	1	1.4	3
5-Oct	1	Z	1	1	1	1	1	1	1	1	1	2	6	4	2	2	1	1	1	1	1	0	0	0	1.2	6
6-Oct	0	Z	0	0	1	1	1	4	13	7	10	10	4	3	3	2	1	1	1	1	1	1	2	3.0	13	
7-Oct	1	Z	1	1	1	1	1	1	1	1	0	1	1	0	1	1	0	1	0	0	0	0	1	0.6	1	
8-Oct	0	Z	1	1	1	1	1	1	1	6	5	C	C	C	C	1	1	1	1	2	0	4	2	3	1.6	6
9-Oct	4	Z	2	7	3	1	1	1	1	4	2	6	1	4	1	1	1	3	3	6	10	5	4	5	3.4	10
10-Oct	10	Z	1	1	2	1	1	1	1	1	2	2	3	1	1	3	7	1	1	1	1	1	7	2.2	10	
11-Oct	2	Z	1	1	1	5	41	40	58	36	11	6	6	7	6	28	19	19	13	18	18	28	42	11	18.2	58
12-Oct	14	Z	7	1	1	1	1	1	2	4	3	1	1	4	1	3	4	1	1	1	4	16	3	1	3.3	16
13-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	1	3	4	9	1	2	1	1	1	3	4	4	1.8	9
14-Oct	2	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	5	1	1.3	5
15-Oct	2	Z	1	1	1	3	10	11	3	2	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1.9	11
16-Oct	1	Z	1	1	1	1	1	1	1	1	1	2	3	3	5	2	1	2	1	4	3	4	3	4	1.9	5
17-Oct	4	Z	3	2	3	4	4	6	15	18	6	3	2	3	3	3	3	3	3	2	4	6	7	7	4.9	18
18-Oct	7	Z	7	5	4	3	3	1	2	1	1	1	1	2	3	1	1	1	7	5	2	1	1	1	2.7	7
19-Oct	1	Z	1	1	1	1	1	1	4	5	5	3	15	16	4	1	1	5	11	18	12	19	9	18	6.6	19
20-Oct	19	Z	17	3	2	1	1	1	1	1	1	1	M	3	1	1	6	1	1	2	1	2	2	1	3.1	19
21-Oct	1	Z	1	1	1	2	1	1	2	2	1	5	5	6	12	9	5	1	1	1	1	1	5	1	2.8	12
22-Oct	1	Z	1	0	1	2	2	2	2	2	14	11	6	7	3	6	8	10	17	1	3	4	5	5	4.9	17
23-Oct	3	Z	8	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.0	8
24-Oct	0	Z	0	0	1	5	2	1	0	0	0	0	4	8	9	7	4	2	2	13	14	9	9	1	3.9	14
25-Oct	14	Z	7	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.8	14
26-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0	1	1	0	0	0	0.6	1
27-Oct	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	0.5	1
29-Oct	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
30-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0.9	1
31-Oct	1	Z	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0.9	2
3.1 -- 2.3 1.2 1.1 1.3 2.6 2.7 3.9 3.4 2.5 2.1 2.4 2.8 2.2 2.8 2.4 2.0 2.4 2.7 2.8 3.7 3.7 2.8																								Diurnal Average		
19 -- 17 7 4 5 41 40 58 36 14 11 15 16 12 28 19 19 17 18 18 28 42 18																								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  
Mildred Lake - October 2014







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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mildred Lake - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	672	94.92	94.92
11 - 20	29	4.10	99.01
21 - 60	7	0.99	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mildred Lake - October 2014**

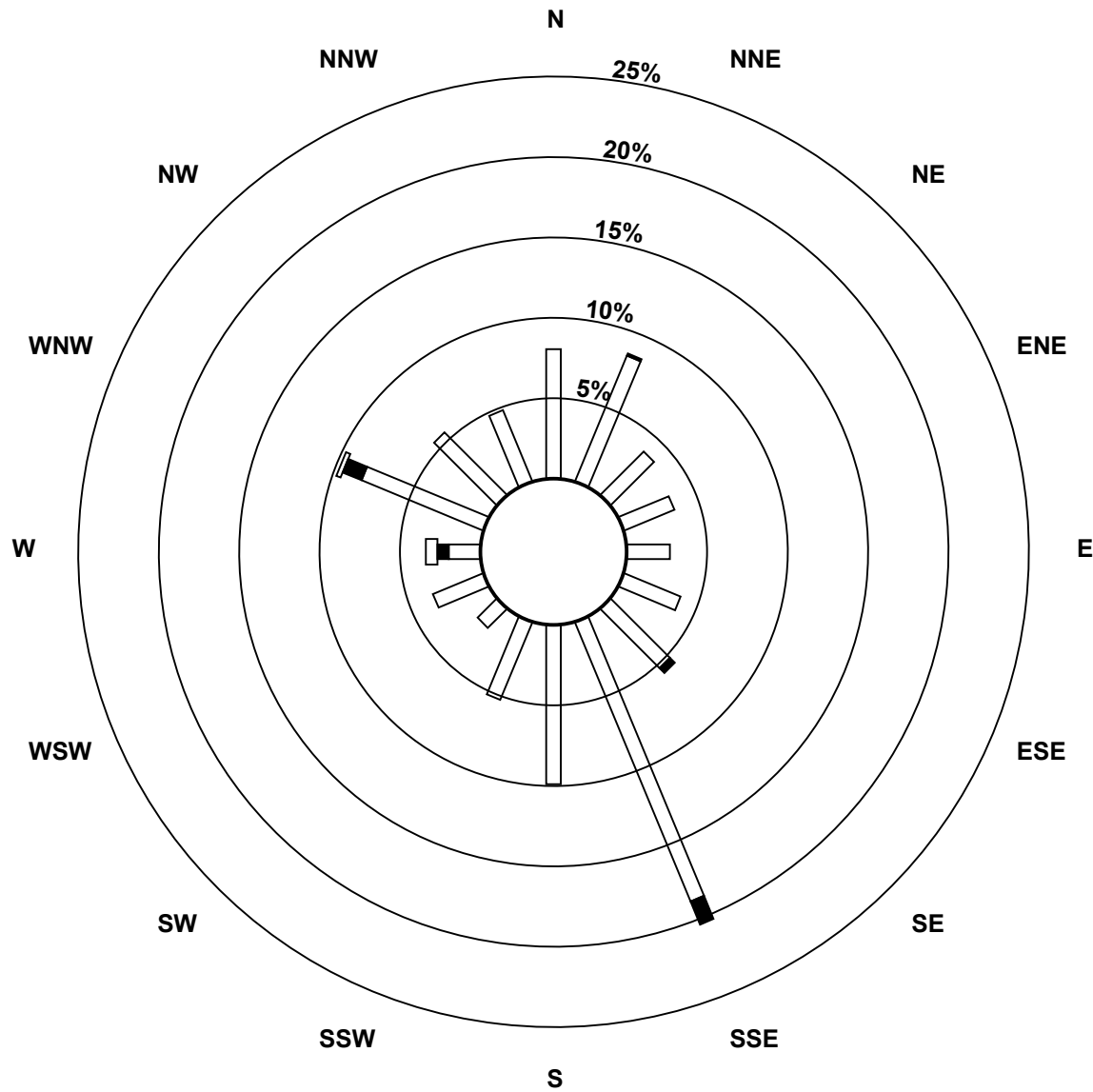
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	57	60	27	24	19	27	37	133	70	37	12	24	14	58	39	34	672
11 - 20	0	1	0	0	0	0	3	11	0	0	0	0	5	9	0	0	29
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	5	2	0	0	7
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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>	57	61	27	24	19	27	40	144	70	37	12	24	24	69	39	34	708

Total Number of Valid Hours: 708

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



**Classes (ppb)**

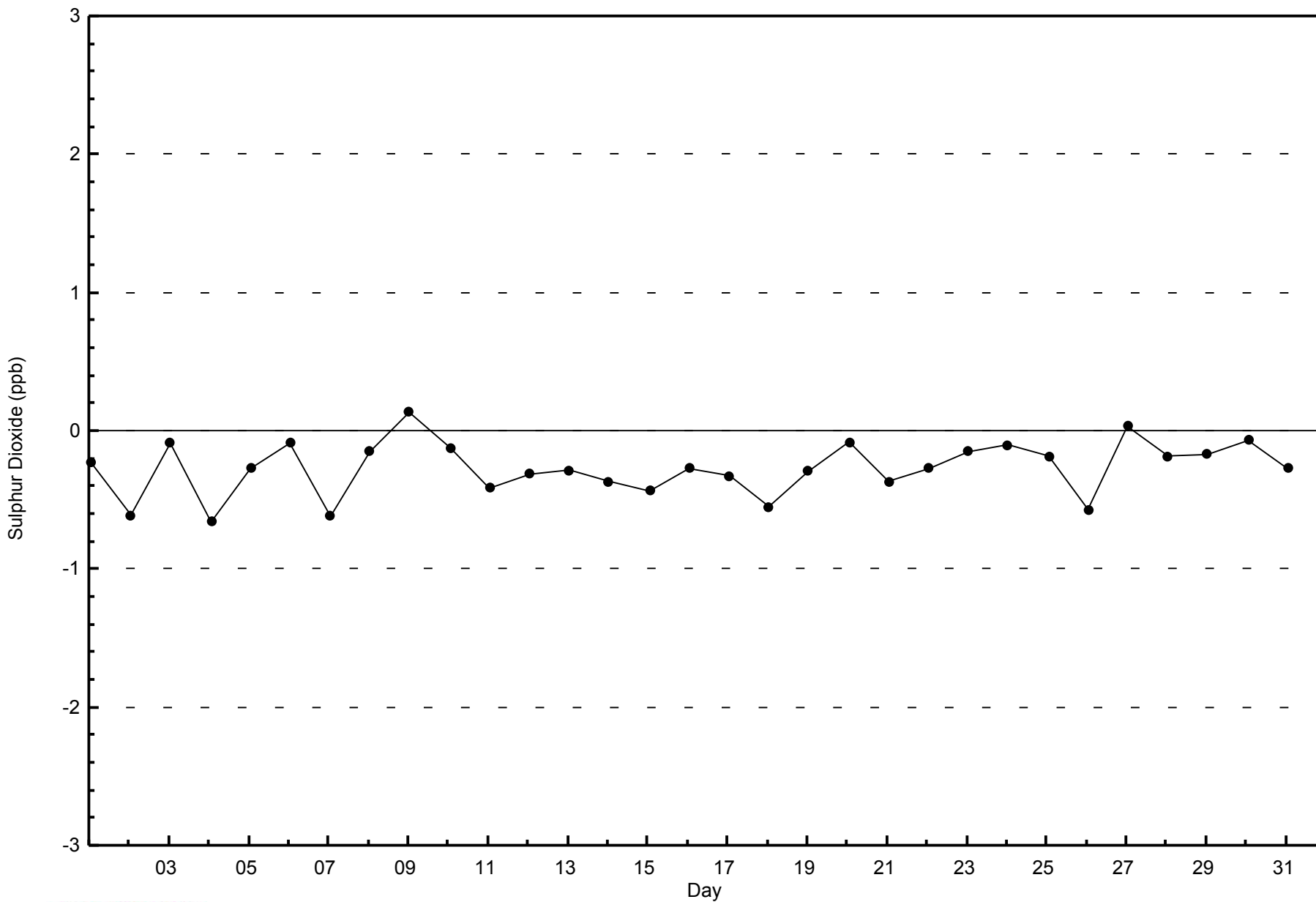


**Total Number of Valid Hours: 708**



WBEA  
Zero Responses

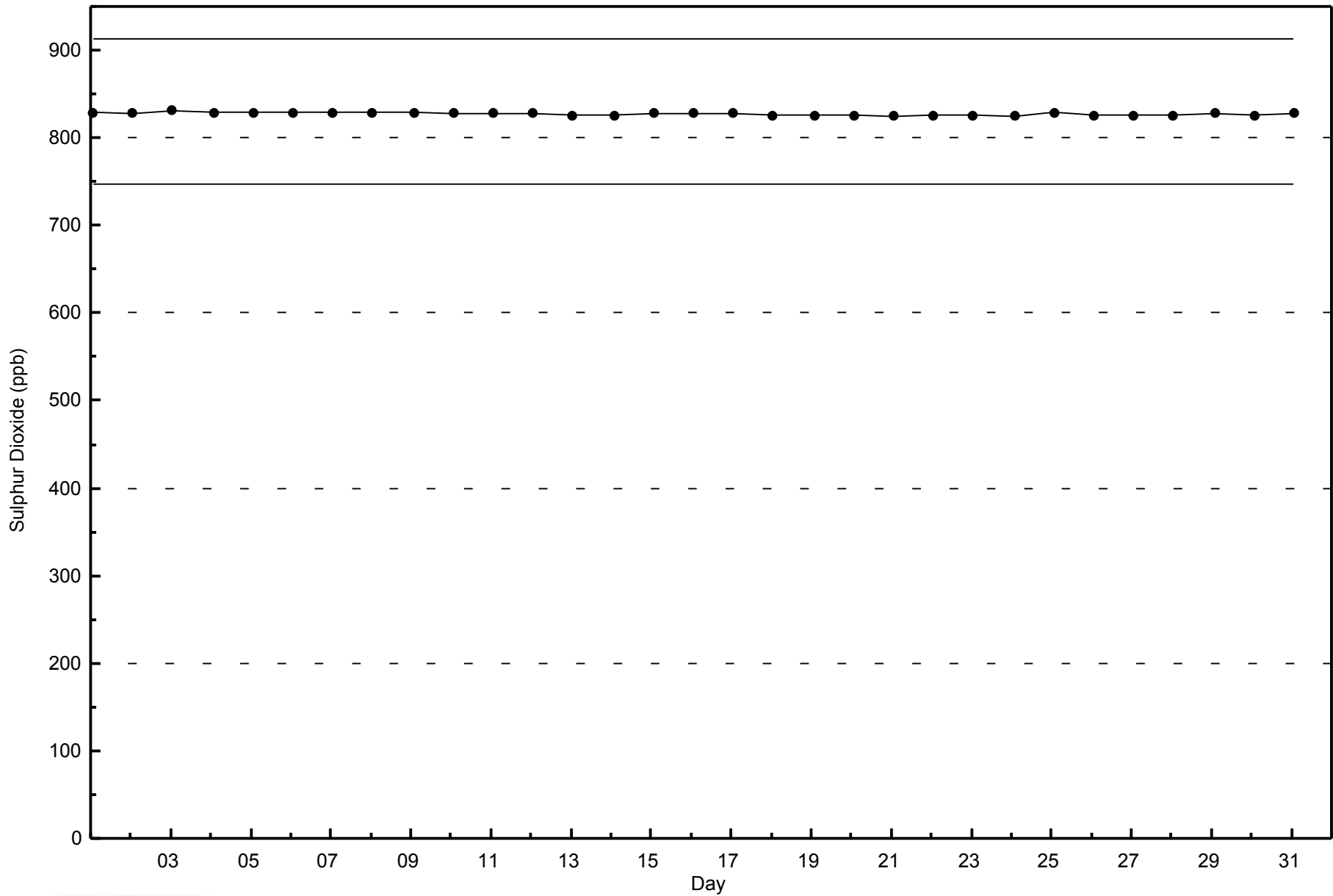
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mildred Lake - October 2014





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mildred Lake - October 2014



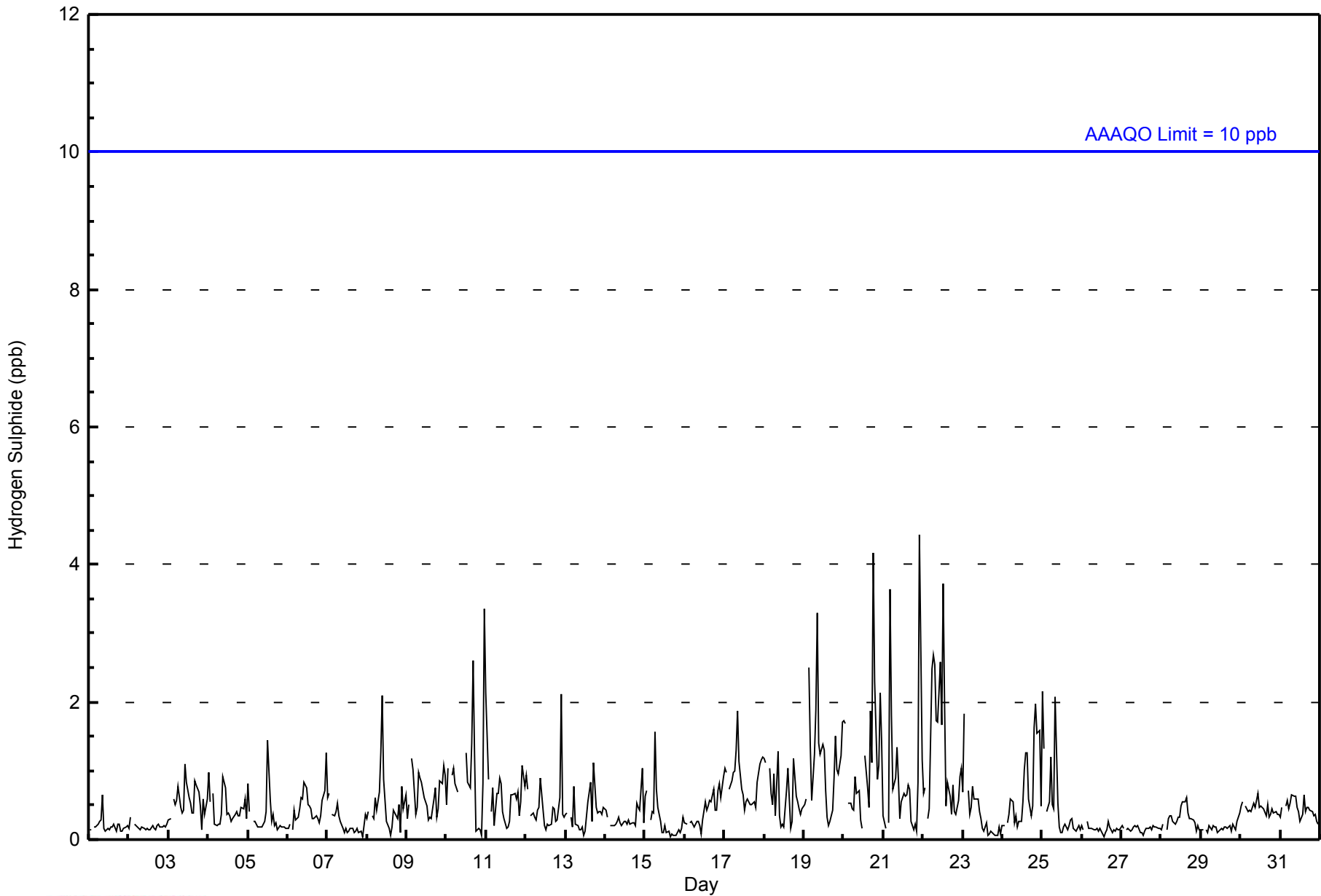


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 4 ppb on Oct 21 23:00										Maximum Daily Average: 1.3 ppb on Oct 22										Hours of Data: 708																												
Minimum Value: 0 ppb on Oct 15 16:00										Minimum Daily Average: 0.2 ppb on Oct 26										Hours of Missing Data: 36																												
Maximum Diurnal Average: 0.7 ppb at hour 9										Minimum Diurnal Average: 0.4 ppb at hour 12										Hours of Calibration: 35																												
Monthly Average: 0.5 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 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-Oct	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																						
2-Oct	0	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-Oct	0	0	Z	1	1	1	1	0	0	0	1	1	1	1	0	0	1	1	1	0	0	1	0	1	0.6	1																						
4-Oct	1	1	Z	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1																						
5-Oct	1	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1																						
6-Oct	0	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0.5	1																						
7-Oct	1	1	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
8-Oct	0	0	Z	0	0	1	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	1	0	1	0.5	2																						
9-Oct	0	1	Z	1	1	0	0	1	1	1	1	1	0	0	0	0	1	1	0	0	1	1	1	1	0.6	1																						
10-Oct	1	1	Z	1	1	1	1	1	C	C	C	C	1	1	1	1	3	1	0	0	0	0	1	3	1.0	3																						
11-Oct	2	1	Z	0	1	0	1	1	1	1	0	0	0	0	0	1	1	1	1	1	0	1	1	1	0.6	2																						
12-Oct	1	1	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0.5	2																						
13-Oct	0	0	Z	0	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0.4	1																						
14-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0.3	1																						
15-Oct	1	1	Z	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																						
16-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0	0	1	1	1	1	0.4	1																						
17-Oct	1	1	Z	1	1	1	1	1	2	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	0.9	2																						
18-Oct	1	1	Z	1	1	1	1	0	1	0	0	0	0	1	1	1	0	0	1	1	1	0	0	0	0.6	1																						
19-Oct	1	1	Z	2	1	1	1	2	3	1	1	1	1	1	0	0	0	0	1	2	1	1	1	2	1.2	3																						
20-Oct	2	2	Z	1	1	0	0	1	1	1	0	0	M	1	1	0	2	1	4	2	1	1	2	1	1.2	4																						
21-Oct	0	0	Z	0	4	2	1	1	1	1	0	1	1	1	1	1	1	0	0	0	0	1	4	1	0.9	4																						
22-Oct	1	1	Z	0	0	2	3	3	2	2	3	2	4	2	0	1	1	0	1	0	0	1	1	1	1.3	4																						
23-Oct	1	2	Z	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																						
24-Oct	0	0	Z	0	0	1	1	0	0	0	0	0	1	1	1	1	0	0	2	2	2	2	0	0	0.7	2																						
25-Oct	2	1	Z	0	1	1	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2																						
26-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
28-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.3	1																						
29-Oct	0	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																						
30-Oct	0	1	Z	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1																						
31-Oct	0	0	Z	0	1	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	1																						
																								0.6	0.6	--	0.5	0.6	0.5	0.6	0.6	0.7	0.6	0.5	0.4	0.5	0.5	0.4	0.4	0.5	0.4	0.5	0.5	0.4	0.5	0.7	0.7	Diurnal Average
																								2	2	--	2	4	2	3	3	3	2	3	2	4	2	1	1	3	1	4	2	2	2	4	3	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  
Mildred Lake - October 2014





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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Mildred Lake - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	698	98.59	98.59
3 - 4	10	1.41	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Mildred Lake - October 2014**

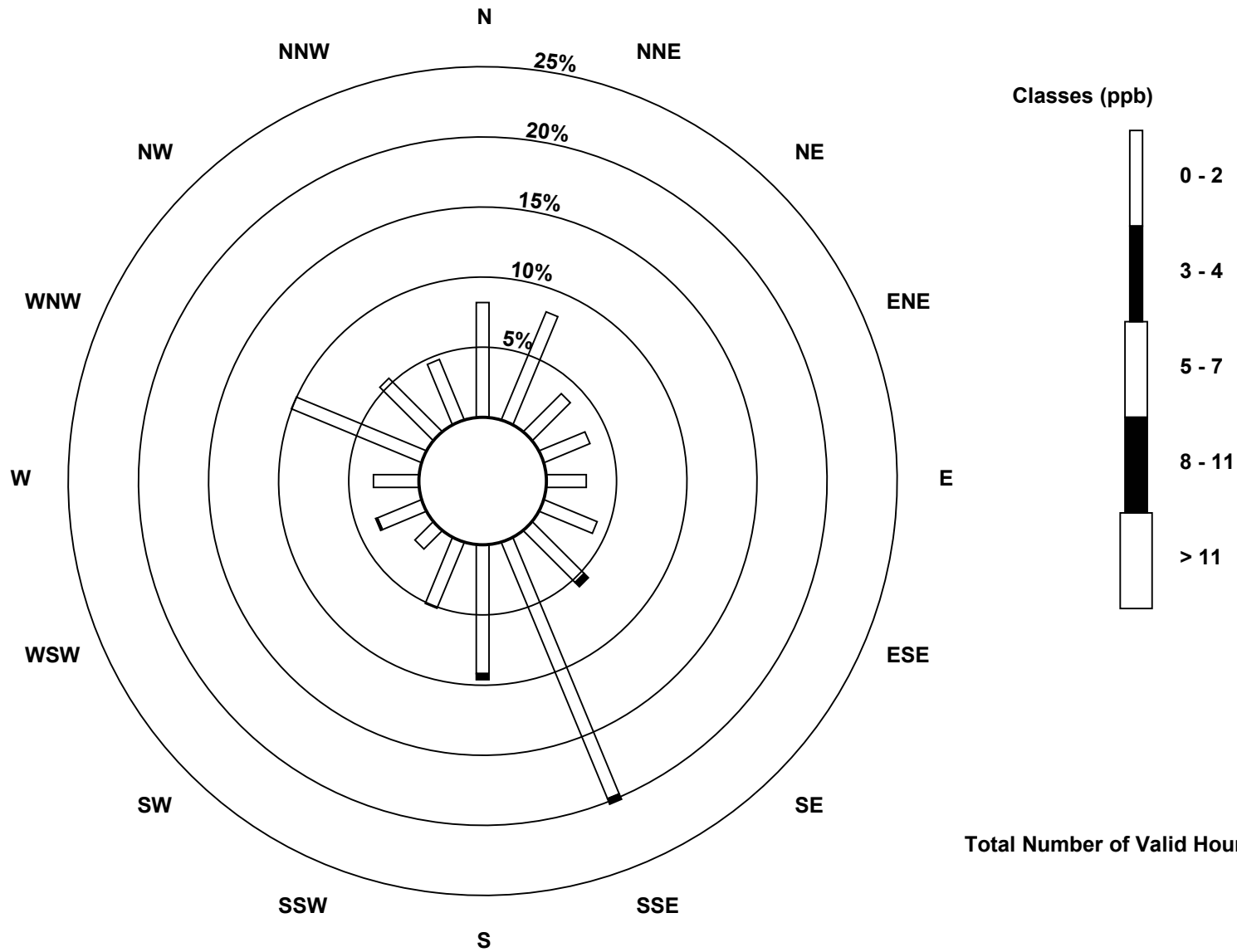
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	58	59	27	25	20	29	37	140	65	36	13	24	23	71	38	33	698
3 - 4	0	0	0	0	0	0	3	3	3	0	0	1	0	0	0	0	10
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	58	59	27	25	20	29	40	143	68	36	13	25	23	71	38	33	708

Total Number of Valid Hours: 708

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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

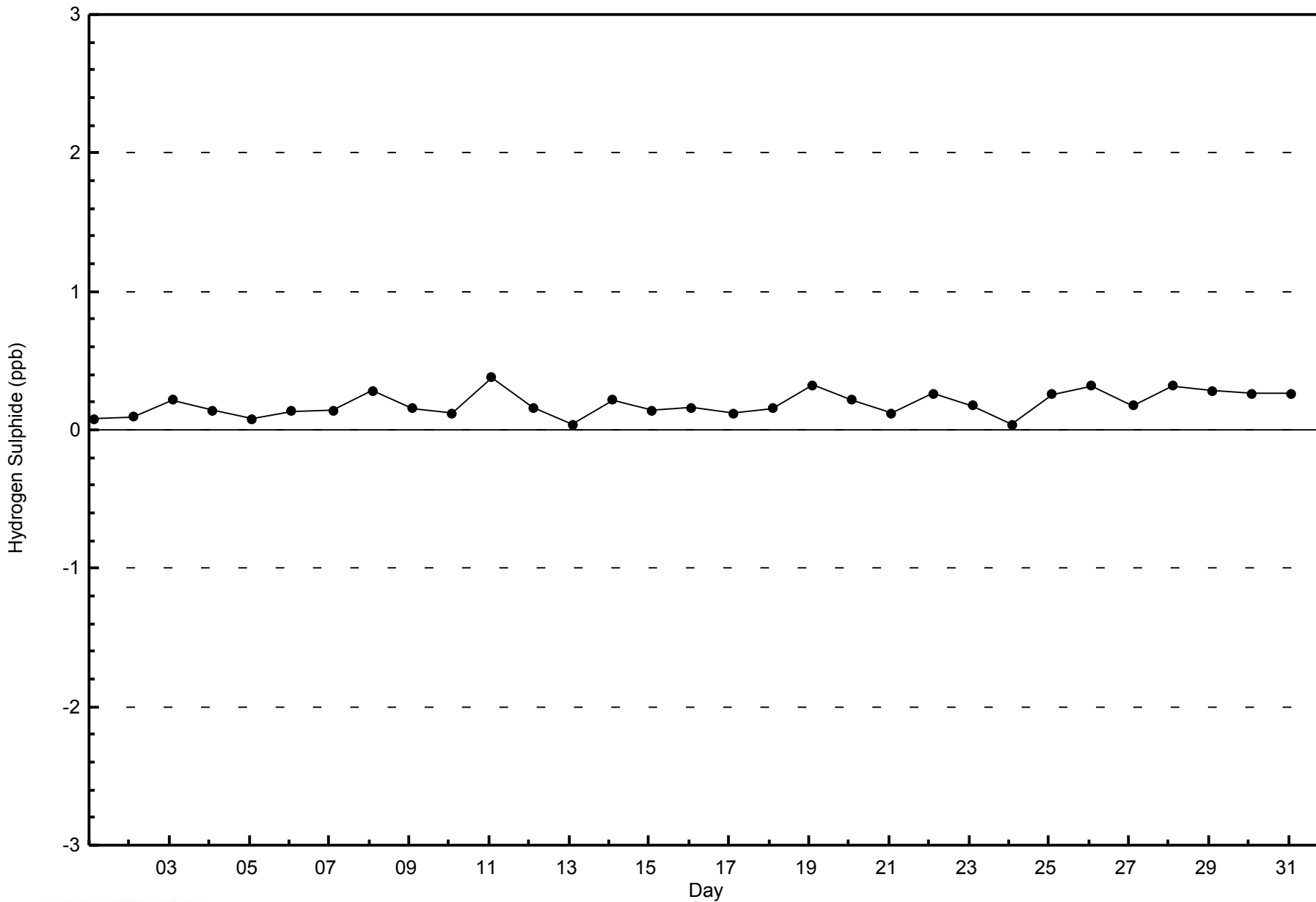


**Total Number of Valid Hours: 708**



WBEA  
Zero Responses

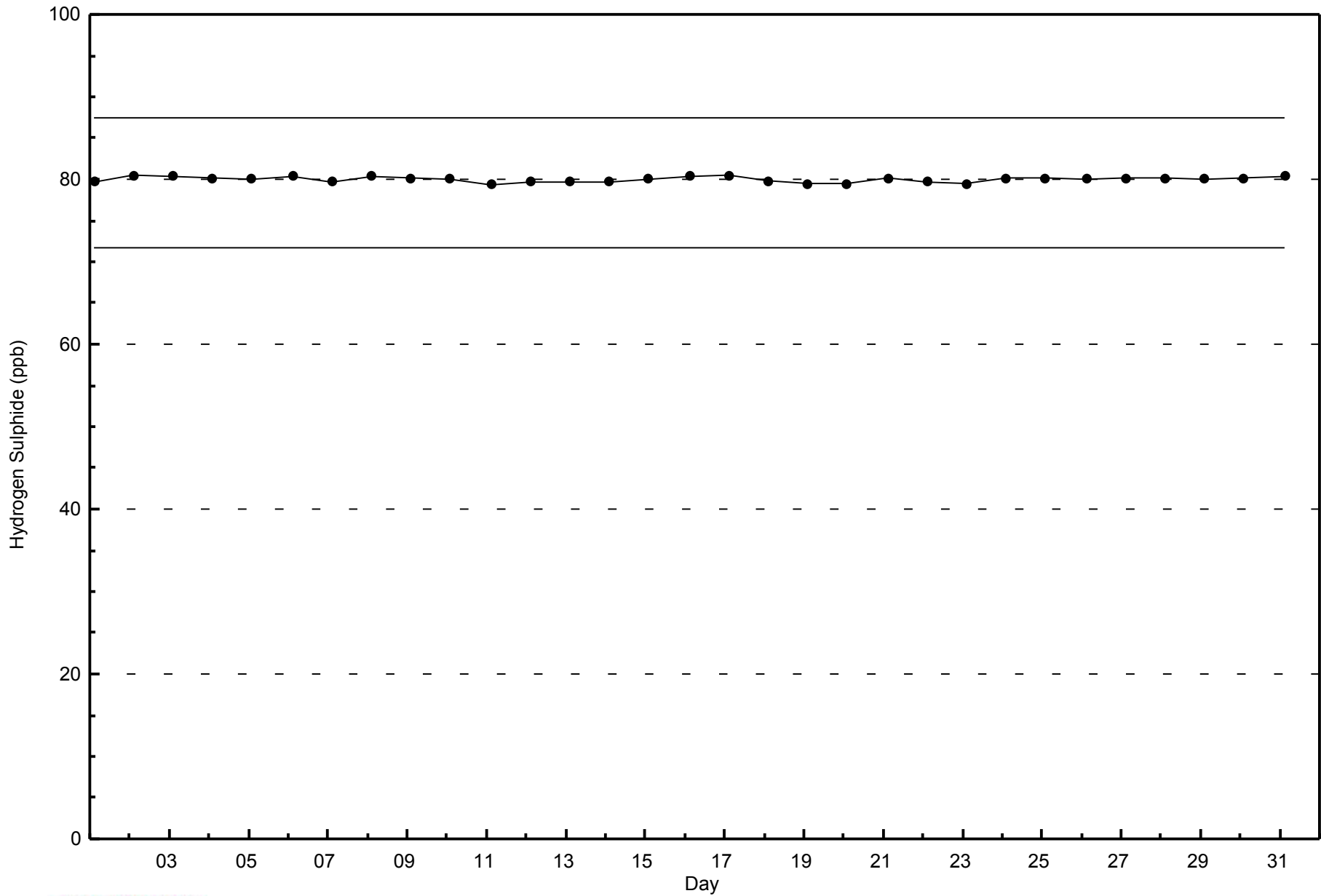
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mildred Lake - October 2014





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mildred Lake - October 2014





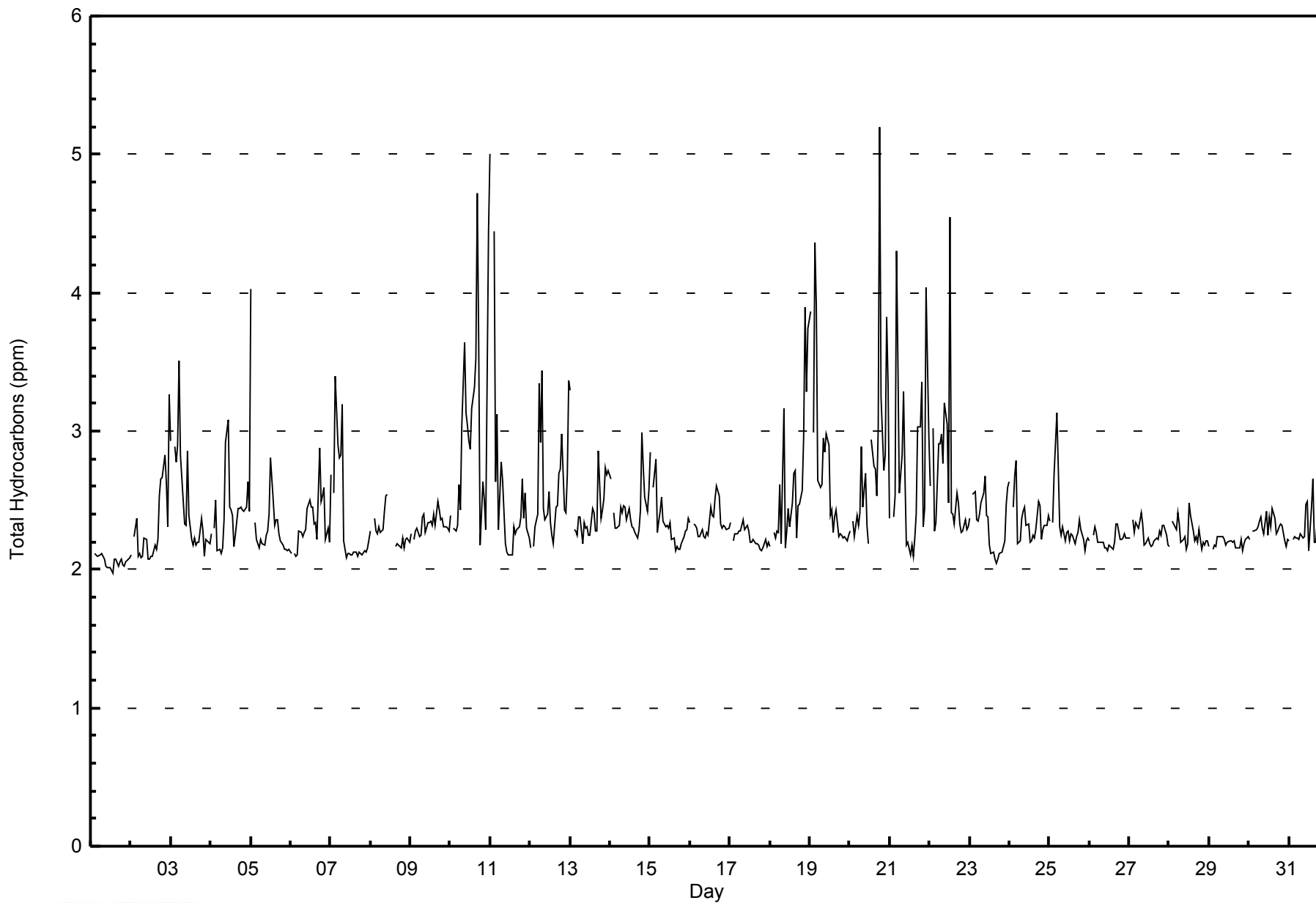
Maximum Value: 5.2 ppm on Oct 20 19:00													Maximum Daily Average: 3.0 ppm on Oct 10													Hours in Service: 744				
Minimum Value: 2.0 ppm on Oct 1 14:00													Minimum Daily Average: 2.1 ppm on Oct 1													Hours of Data: 708				
Maximum Diurnal Average: 2.6 ppm at hour 1													Minimum Diurnal Average: 2.3 ppm at hour 16													Hours of Missing Data: 36				
Monthly Average: 2.42 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> = 2.4 P <sub>90</sub> = 2.9 P <sub>99</sub> = 4.3													Hours of Calibration: 35				
		Percent Operational Time: 99.9																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24						
1-Oct	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	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.1	
2-Oct	2.1	Z	2.2	2.4	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.5	2.7	2.7	2.8	2.6	2.3	3.3	2.3	2.3	3.3	3.3	2.3	
3-Oct	2.9	Z	2.9	2.8	2.9	3.5	2.8	2.5	2.3	2.3	2.9	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.1	2.2	2.2	2.2	2.5	2.5	3.5	2.5	2.5	
4-Oct	2.3	Z	2.3	2.5	2.1	2.1	2.1	2.2	2.4	2.9	3.1	2.4	2.4	2.4	2.2	2.2	2.4	2.4	2.5	2.4	2.4	2.5	2.6	2.4	2.4	2.4	3.1	2.4	2.4	
5-Oct	4.0	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.8	2.5	2.3	2.4	2.4	2.3	2.2	2.2	2.1	2.2	2.1	2.1	2.3	2.3	4.0	2.3	4.0	
6-Oct	2.1	Z	2.1	2.1	2.1	2.3	2.3	2.2	2.3	2.3	2.4	2.5	2.5	2.4	2.3	2.3	2.2	2.9	2.5	2.5	2.6	2.2	2.3	2.2	2.3	2.3	2.9	2.3	2.9	
7-Oct	2.7	Z	2.5	3.4	2.9	2.8	2.8	3.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4	2.4	3.4	2.4	3.4	
8-Oct	2.3	Z	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.5	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.5	2.3	2.5	
9-Oct	2.3	Z	2.2	2.3	2.3	2.2	2.2	2.4	2.4	2.3	2.3	2.3	2.4	2.3	2.4	2.3	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.3	2.5	
10-Oct	2.4	Z	2.3	2.3	2.3	2.6	2.4	3.0	3.6	3.1	3.0	2.9	2.9	3.2	3.3	3.5	4.7	3.7	2.2	2.6	2.5	2.3	3.4	4.4	3.0	4.4	3.0	4.7	3.0	
11-Oct	5.0	Z	4.4	2.6	3.1	2.3	2.8	2.6	2.4	2.2	2.1	2.1	2.1	2.1	2.3	2.3	2.3	2.3	2.4	2.7	2.4	2.6	2.3	2.2	2.6	5.0	2.6	5.0	2.6	
12-Oct	2.2	Z	2.2	2.3	2.4	3.3	2.9	3.4	2.4	2.4	2.4	2.6	2.3	2.2	2.2	2.5	2.5	2.7	2.7	3.0	2.4	2.4	2.7	3.4	2.6	3.4	2.6	3.4	2.6	
13-Oct	3.3	Z	2.3	2.3	2.2	2.4	2.4	2.2	2.3	2.3	2.2	2.2	2.2	2.4	2.4	2.3	2.3	2.9	2.4	2.4	2.5	2.7	2.7	2.7	2.4	3.3	2.4	3.3	2.4	
14-Oct	2.7	Z	2.4	2.3	2.3	2.3	2.5	2.4	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.3	2.4	3.0	2.7	2.5	2.4	2.6	2.4	3.0	2.4	3.0	2.4	
15-Oct	2.9	Z	2.6	2.8	2.3	2.3	2.4	2.5	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.3	2.9	2.3	2.9	2.3	
16-Oct	2.3	Z	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.5	2.6	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.6	2.3	2.6	2.3
17-Oct	2.3	Z	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.2	2.4	2.2
18-Oct	2.2	Z	2.3	2.2	2.3	2.3	2.6	2.2	3.2	2.2	2.3	2.4	2.3	2.5	2.7	2.7	2.2	2.5	2.5	2.6	3.0	3.9	3.3	3.7	2.6	3.9	2.6	3.9	2.6	
19-Oct	3.9	Z	3.0	4.4	3.9	2.6	2.6	2.6	2.9	2.8	3.0	2.9	2.4	2.4	2.3	2.4	2.4	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.7	4.4	2.7	4.4	2.7	
20-Oct	2.3	Z	2.4	2.2	2.4	2.3	2.4	2.9	2.5	2.7	2.3	2.2	M	2.9	2.7	2.7	2.5	3.0	5.2	3.2	2.7	2.8	3.8	3.3	2.8	5.2	2.8	5.2	2.8	
21-Oct	2.4	Z	2.4	2.5	4.3	3.5	2.6	2.8	3.3	2.7	2.2	2.2	2.1	2.2	2.1	2.2	2.4	3.0	3.0	3.4	2.3	2.4	4.0	3.0	2.7	4.3	2.7	4.3	2.7	
22-Oct	2.6	Z	3.0	2.3	2.3	2.9	2.9	3.0	2.8	3.2	3.1	2.5	4.5	2.4	2.4	2.3	2.6	2.5	2.3	2.3	2.3	2.4	2.3	2.3	2.7	4.5	2.7	4.5	2.7	
23-Oct	2.4	Z	2.5	2.6	2.4	2.3	2.4	2.5	2.6	2.7	2.4	2.4	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.2	2.5	2.6	2.3	2.7	2.3	2.7	2.3	
24-Oct	2.6	Z	2.5	2.7	2.8	2.2	2.2	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.5	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.8	2.4	2.8	2.4	
25-Oct	2.4	Z	2.3	2.7	3.1	2.7	2.3	2.2	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.1	2.2	2.3	3.1	2.3	3.1	2.3	
26-Oct	2.2	Z	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2
27-Oct	2.2	Z	2.4	2.3	2.3	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	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.4	2.3
28-Oct	2.2	Z	2.4	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.1	2.2	2.2	2.2	2.3	2.5	2.3	2.5	2.3	2.5
29-Oct	2.2	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
30-Oct	2.2	Z	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.4	2.2	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.4	2.3	2.4	2.2	2.4
31-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.5	2.5	2.1	2.5	2.7	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.7	2.3	2.7	2.3
	2.6	--	2.4	2.5	2.5	2.5	2.4	2.5	2.5	2.4	2.4	2.3	2.4	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.3	2.4	2.5	2.5	Diurnal Average					
	5.0	--	4.4	4.4	4.3	3.5	2.9	3.4	3.6	3.2	3.1	2.9	4.5	3.2	3.3	3.5	4.7	3.7	5.2	3.4	3.0	3.9	4.0	4.4	Diurnal Maximum					

Z - zerospan      C - Calibration      M - Maintenance



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Mildred Lake - October 2014**





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

**Total Hydrocarbons (THC) - ppm**  
**Mildred Lake - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	10	1.41	1.41
2.1 - 3.0	656	92.66	94.07
3.1 - 10.0	42	5.93	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Mildred Lake - October 2014**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	4	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	10
2.1 - 3.0	53	59	25	23	17	26	38	137	63	33	11	21	21	67	33	29	656
3.1 - 10.0	0	0	0	1	0	1	2	7	7	4	1	3	3	2	6	5	42
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	57	61	27	24	19	27	40	144	70	37	12	24	24	69	39	34	708

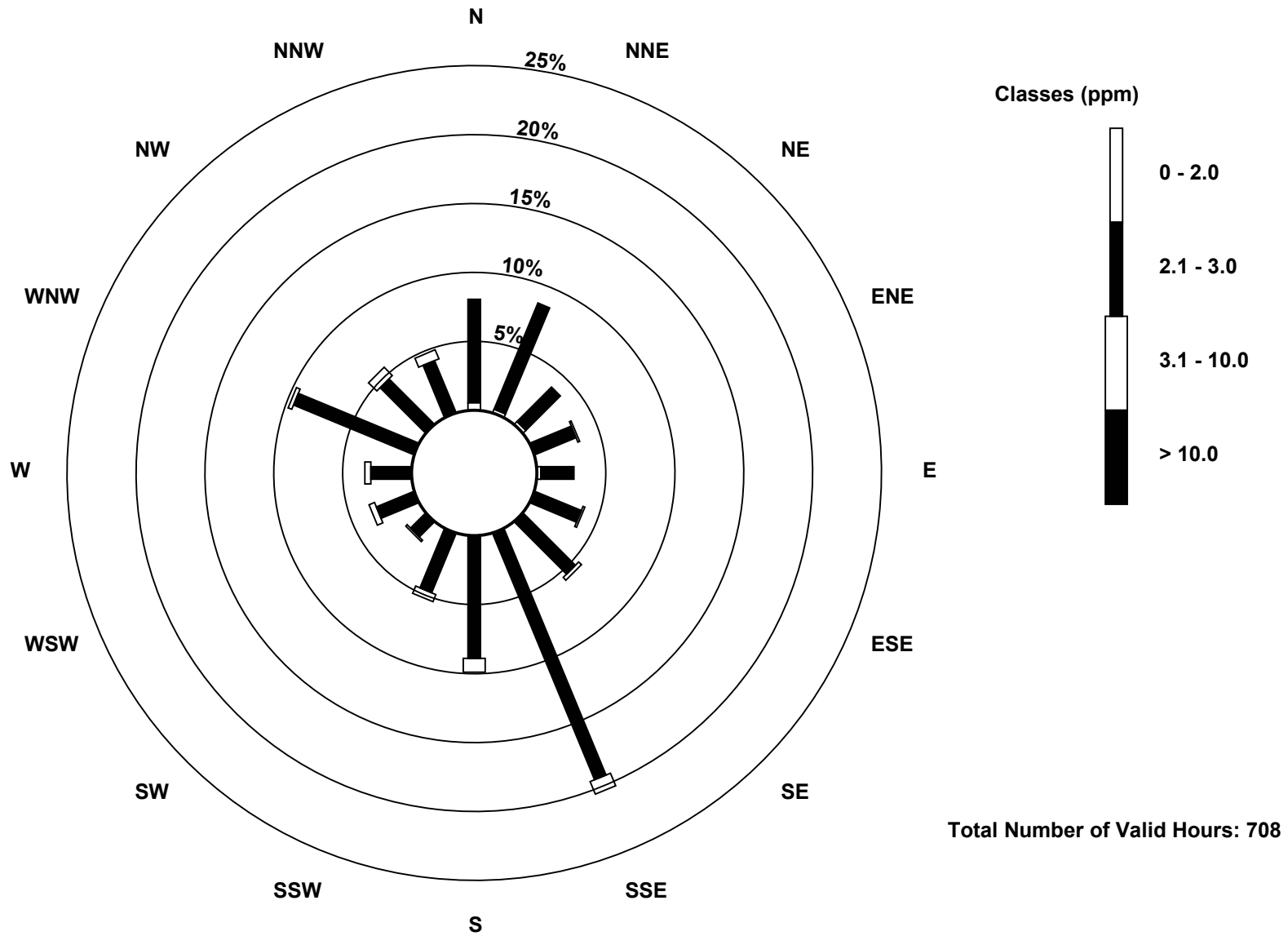
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2014

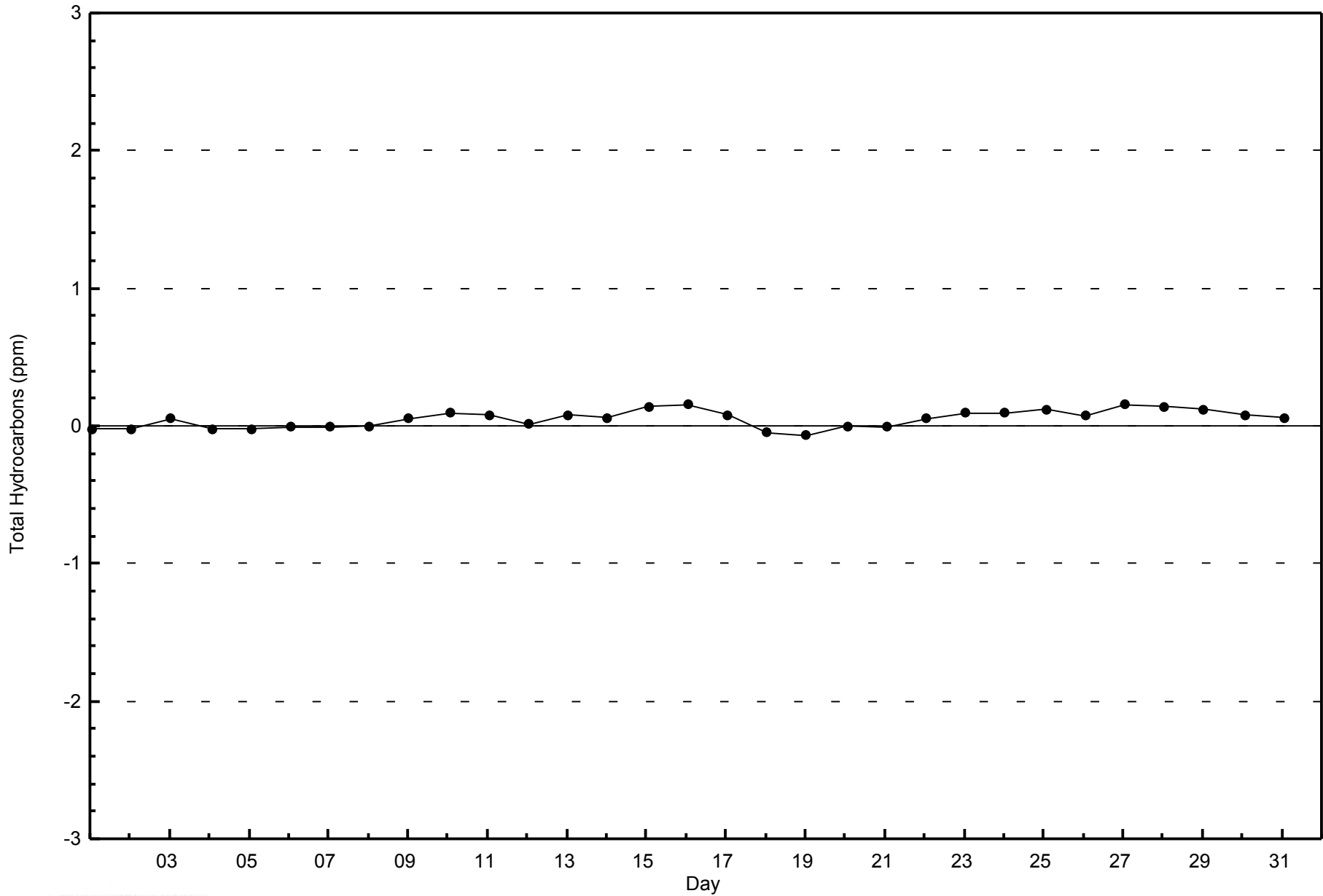
Total Hydrocarbons (THC) - ppm  
Mildred Lake (AMS 2)





WBEA  
Zero Responses

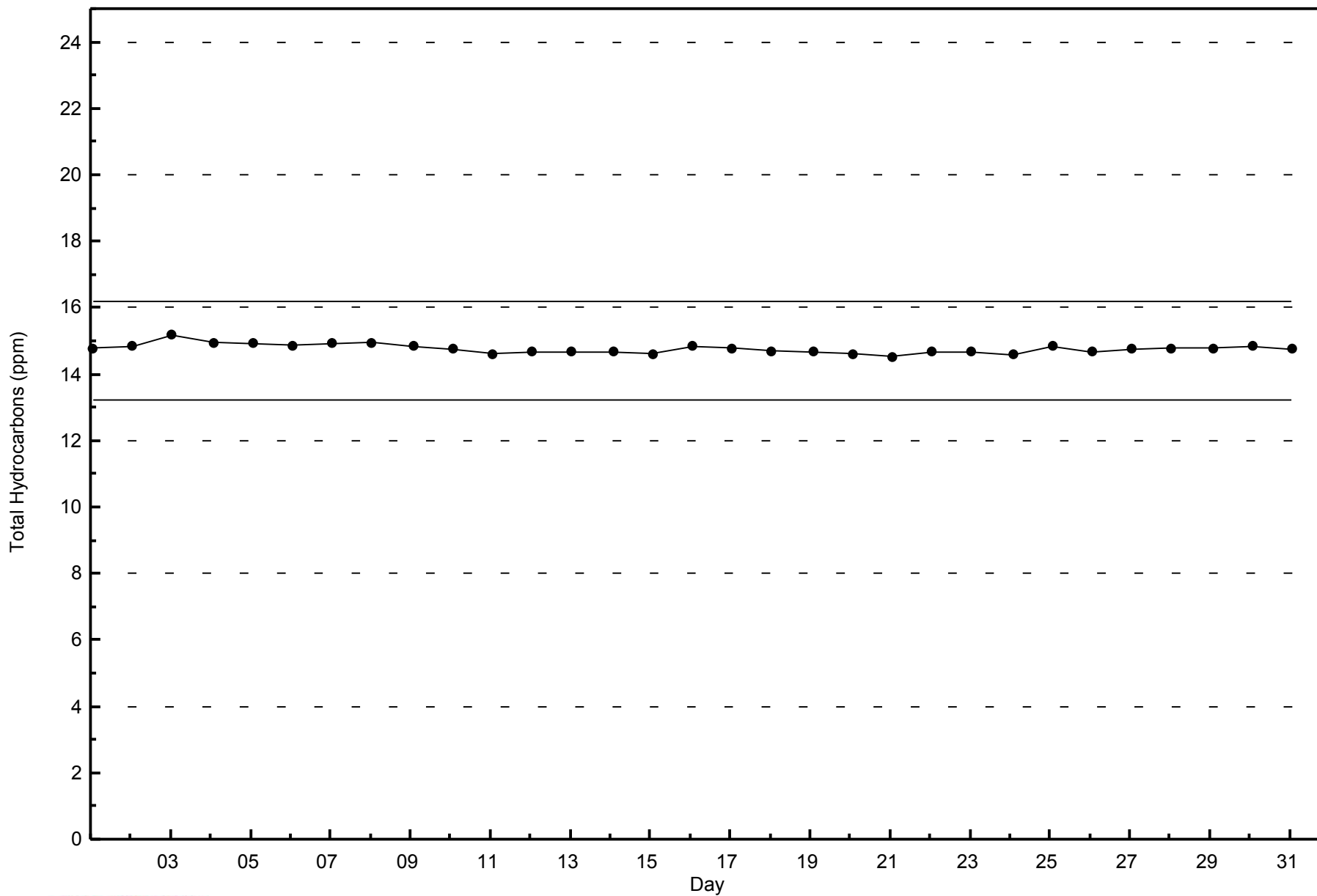
Total Hydrocarbons (THC) - ppm  
Mildred Lake - October 2014





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Mildred Lake - October 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

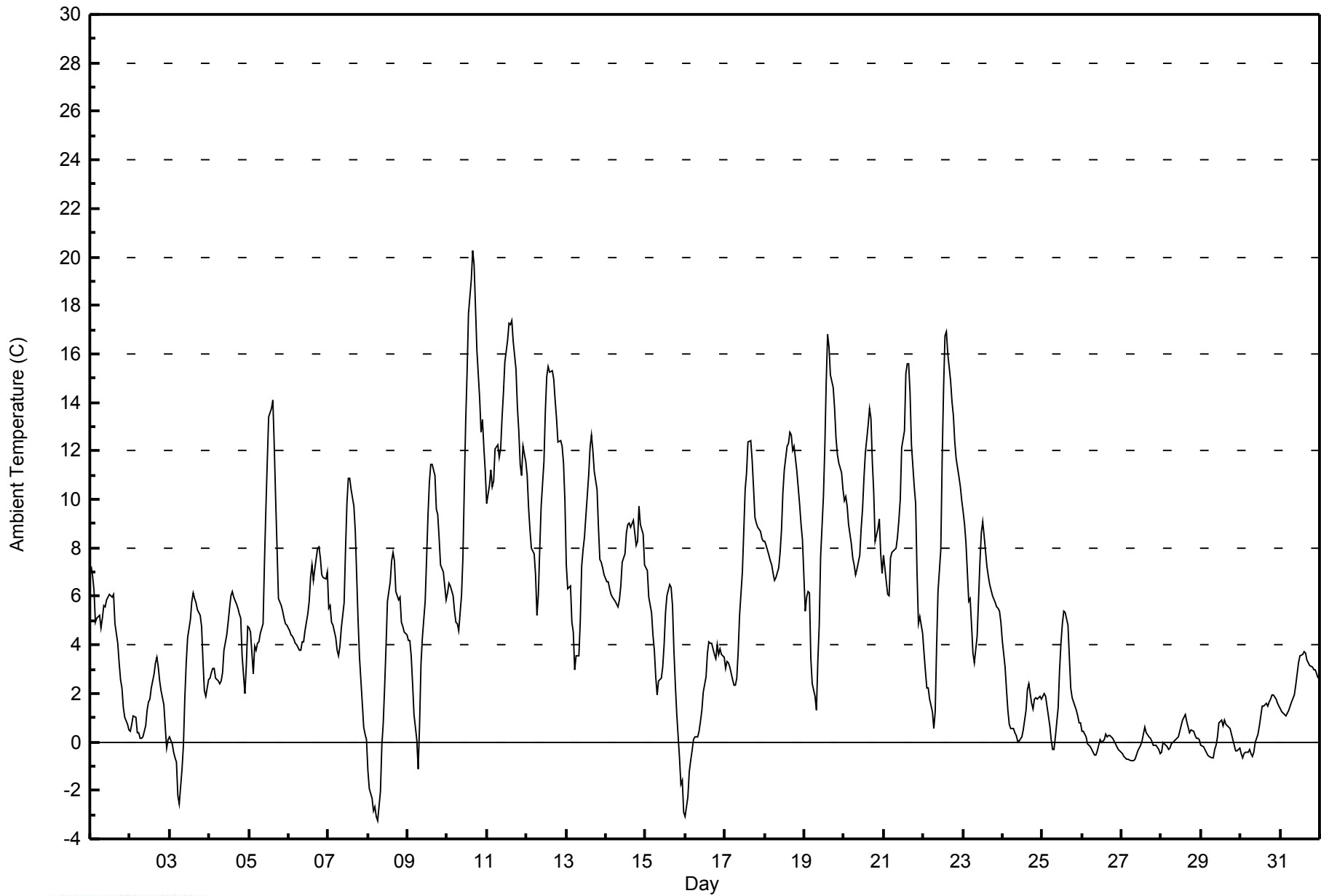
Mildred Lake - October 2014

Maximum Value: 20.3 C on Oct 10 16:00		Maximum Daily Average: 13.2 C on Oct 11		Hours in Service: 744																																												
Minimum Value: -3.2 C on Oct 8 07:00		Minimum Daily Average: -0.3 C on Oct 27		Hours of Data: 744																																												
Maximum Diurnal Average: 8.5 C at hour 15		Minimum Diurnal Average: 2.5 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 5.19 C		Percentiles: P <sub>1</sub> = -2.3 P <sub>10</sub> = -0.2 Q <sub>1</sub> = 1.2 Median = 4.7 Q <sub>3</sub> = 8.1 P <sub>90</sub> = 12.1 P <sub>99</sub> = 17.2		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-Oct	7.2	6.8	6.3	4.9	5.1	5.2	4.7	5.1	5.6	5.6	5.9	6.1	6.0	6.0	6.1	4.9	4.1	3.3	2.6	2.2	1.4	1.0	0.7	0.5	4.5	7.2																						
2-Oct	0.4	0.7	1.1	1.0	0.4	0.4	0.1	0.1	0.2	0.7	1.3	1.6	1.7	2.2	2.8	3.3	3.5	3.1	2.5	2.1	1.5	0.6	-0.3	0.1	1.3	3.5																						
3-Oct	0.2	-0.1	-0.4	-0.7	-0.8	-2.2	-2.5	-1.1	-0.2	1.8	3.2	4.3	5.0	5.8	6.1	5.9	5.7	5.4	5.2	4.8	3.3	2.1	1.9	2.5	2.3	6.1																						
4-Oct	2.6	2.9	3.0	3.0	2.6	2.5	2.4	2.5	2.9	3.8	4.4	5.0	5.5	6.0	6.2	6.0	5.7	5.5	5.3	5.1	3.5	2.0	3.2	4.8	4.0	6.2																						
5-Oct	4.7	4.5	2.8	4.0	3.8	4.1	4.1	4.5	4.9	7.4	9.6	11.6	13.4	13.8	14.1	12.2	10.0	8.0	5.9	5.6	5.4	5.1	4.9	4.8	7.0	14.1																						
6-Oct	4.6	4.4	4.3	4.3	4.1	4.0	3.8	3.8	4.1	4.2	4.6	5.3	5.8	6.8	7.3	6.6	7.1	8.0	8.1	7.6	6.9	6.8	6.7	7.0	5.7	8.1																						
7-Oct	5.5	5.6	4.9	4.8	4.3	3.8	3.6	4.0	4.7	5.7	7.9	9.8	10.9	10.9	10.4	9.7	8.7	6.8	5.0	3.5	1.6	0.6	0.3	0.1	5.5	10.9																						
8-Oct	-1.2	-1.9	-2.3	-2.8	-2.7	-3.1	-3.2	-2.1	-0.2	0.8	2.3	4.0	5.8	6.6	7.5	7.8	7.5	6.2	5.9	6.0	4.9	4.8	4.5	4.4	2.5	7.8																						
9-Oct	4.2	4.2	3.6	2.4	1.1	0.1	-1.1	0.7	3.2	4.3	5.8	7.5	9.3	10.7	11.5	11.4	11.0	9.6	9.4	8.4	7.3	7.0	6.4	5.8	6.0	11.5																						
10-Oct	6.1	6.6	6.4	6.1	5.4	4.9	4.9	4.6	6.0	7.6	10.5	13.2	15.3	17.7	19.1	20.3	19.7	17.9	16.2	14.2	12.8	13.3	12.1	11.2	11.3	20.3																						
11-Oct	9.8	10.6	11.2	10.5	10.8	12.1	12.2	11.8	12.1	13.3	14.4	15.7	16.6	17.3	17.2	17.4	16.5	15.3	13.8	12.9	11.4	11.0	12.2	11.5	13.2	17.4																						
12-Oct	11.0	9.6	8.8	8.0	7.8	6.9	5.2	6.1	8.0	9.7	11.5	13.6	15.1	15.5	15.2	15.3	15.0	14.1	13.4	12.3	12.4	12.2	11.5	10.0	11.2	15.5																						
13-Oct	7.3	6.3	6.4	4.9	4.5	3.0	3.6	3.6	5.0	7.2	7.9	8.4	9.3	11.0	12.2	12.7	12.0	11.2	10.4	8.9	7.5	7.4	7.2	6.9	7.7	12.7																						
14-Oct	6.6	6.6	6.3	6.1	6.0	5.8	5.7	5.6	5.8	6.4	7.4	7.7	8.6	8.9	9.1	8.9	9.1	8.6	8.1	8.2	9.7	9.0	8.6	7.3	7.5	9.7																						
15-Oct	7.2	7.1	6.0	5.4	4.4	3.8	2.7	1.9	2.5	2.6	3.1	4.0	5.3	6.0	6.5	6.4	5.6	3.8	2.4	1.2	-0.6	-1.8	-1.6	-2.9	3.4	7.2																						
16-Oct	-3.1	-2.3	-1.2	-0.8	-0.4	0.1	0.2	0.2	0.4	0.8	1.3	2.1	2.7	3.7	4.1	4.1	4.0	3.6	3.4	4.0	3.6	3.9	3.6	3.5	1.7	4.1																						
17-Oct	3.0	3.3	3.2	3.1	2.6	2.3	2.3	2.6	3.8	5.2	7.0	8.7	10.4	11.1	12.3	12.4	11.6	10.4	9.3	9.0	8.8	8.7	8.4	8.3	7.0	12.4																						
18-Oct	8.3	8.1	7.7	7.5	7.3	7.0	6.6	6.8	7.2	7.8	8.7	10.3	11.2	12.2	12.3	12.8	12.7	12.0	12.2	11.2	10.4	9.8	9.0	8.3	9.5	12.8																						
19-Oct	5.4	6.0	6.2	6.1	3.4	2.4	1.9	1.3	3.3	4.8	7.7	10.1	12.1	14.8	16.8	16.3	15.1	14.6	13.8	12.5	11.9	11.5	11.1	10.4	9.2	16.8																						
20-Oct	9.9	10.1	9.7	9.0	8.2	7.6	7.3	6.9	7.1	7.7	8.8	9.6	10.8	11.9	13.1	13.7	13.3	11.6	10.3	8.3	8.8	9.2	7.8	7.0	9.5	13.7																						
21-Oct	7.7	6.6	6.1	6.0	7.6	7.8	7.9	8.0	8.4	9.1	10.0	12.1	12.8	15.2	15.6	15.6	14.4	12.2	10.5	9.8	6.9	4.9	5.1	4.5	9.4	15.6																						
22-Oct	3.7	2.9	2.2	2.2	1.8	1.2	0.5	1.2	4.0	6.2	7.9	11.7	14.6	16.7	16.9	16.0	14.9	14.1	13.4	12.3	11.7	10.9	10.5	9.9	8.7	16.9																						
23-Oct	9.5	9.0	8.2	5.8	5.9	4.8	3.6	3.3	4.3	5.8	7.4	8.6	9.1	8.5	7.2	6.8	6.5	6.3	6.0	5.8	5.6	5.5	5.4	4.9	6.4	9.5																						
24-Oct	4.2	3.1	2.2	1.3	0.7	0.6	0.5	0.4	0.2	0.0	0.0	0.2	0.5	0.9	1.3	2.2	2.4	1.6	1.4	1.8	1.8	1.8	1.9	1.8	1.4	4.2																						
25-Oct	1.9	2.0	1.9	1.5	0.6	0.1	-0.3	-0.3	0.2	1.4	2.9	4.1	4.9	5.4	5.3	4.8	3.5	2.2	1.8	1.7	1.3	1.1	0.8	0.8	2.1	5.4																						
26-Oct	0.5	0.5	0.2	-0.1	-0.1	-0.2	-0.3	-0.5	-0.5	-0.4	-0.1	0.1	0.0	0.1	0.3	0.2	0.3	0.3	0.2	0.1	-0.1	-0.2	-0.3	-0.4	0.0	0.5																						
27-Oct	-0.5	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7	-0.8	-0.7	-0.6	-0.4	-0.1	0.0	0.3	0.6	0.4	0.2	0.2	0.0	-0.1	-0.1	-0.2	-0.3	-0.5	-0.3	0.6																						
28-Oct	-0.4	0.0	-0.1	-0.2	-0.3	-0.3	-0.1	0.0	0.1	0.1	0.2	0.5	0.7	0.9	1.1	0.8	0.6	0.4	0.5	0.5	0.3	0.1	0.1	0.1	0.2	1.1																						
29-Oct	-0.1	-0.2	-0.3	-0.4	-0.5	-0.6	-0.6	-0.6	-0.3	-0.1	0.2	0.8	0.9	0.6	0.9	0.7	0.7	0.6	0.3	0.1	-0.1	-0.4	-0.4	-0.2	0.0	0.9																						
30-Oct	-0.5	-0.7	-0.5	-0.4	-0.4	-0.3	-0.5	-0.6	-0.4	0.0	0.3	0.7	1.1	1.5	1.5	1.6	1.5	1.6	1.7	2.0	1.9	1.8	1.6	1.5	0.7	2.0																						
31-Oct	1.3	1.2	1.1	1.1	1.2	1.3	1.5	1.7	2.0	2.4	2.8	3.2	3.5	3.6	3.7	3.7	3.4	3.3	3.2	3.1	3.0	3.0	2.8	2.6	2.5	3.7																						
																								4.1	4.0	3.7	3.3	3.0	2.7	2.5	2.6	3.3	4.2	5.3	6.5	7.4	8.1	8.5	8.4	7.9	7.2	6.5	6.0	5.3	4.9	4.7	4.4	Diurnal Average
																								11.0	10.6	11.2	10.5	10.8	12.1	12.2	11.8	12.1	13.3	14.4	15.7	16.6	17.7	19.1	20.3	19.7	17.9	16.2	14.2	12.8	13.3	12.2	11.5	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Mildred Lake - October 2014**





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

**Ambient Temperature (AT) - C**  
**Mildred Lake - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	92	12.37	12.37
0 - 10	524	70.43	82.80
10 - 20	127	17.07	99.87
> 20	1	0.13	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



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

**Wind Speed (WS) - km/h**  
**Mildred Lake - October 2014**

Maximum Speed: 26 km/h on Oct 2 11:00	Maximum Daily Speed Average: 19.1 km/h on Oct 17	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 28 01:00	Minimum Daily Speed Average: 0.5 km/h on Oct 5	Hours of Data: 744
Maximum Diurnal Speed Average: 2.2 km/h at hour 2	Minimum Diurnal Speed Average: 0.7 km/h at hour 21	Hours of Missing Data: 0
Monthly Average Velocity: 1.0 km/h 188.8 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 9 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-Oct	NE7	NNE5	NE5	NNE4	NNE6	NE5	NNE4	E4	E7	E8	E6	NE6	N5	NNE8	NNE13	NNE16	NNE15	NNE18	NNE18	N21	N20	N16	NNW15	NNW11	NNE9.0	N21
2-Oct	NNW11	NW11	NNW16	NNW13	NNW12	NNW14	NNW20	NNW17	NW17	NW21	NNW26	NNW26	NNW23	NNW23	NW19	NW21	NW21	NW18	NW15	NW16	NNW14	N11	NNW9	NW13	NNW16.6	NNW26
3-Oct	NW12	NW12	NW10	NNW11	NW10	NNW3	WSW3	WSW5	SW5	S6	S8	SSE10	SSE10	SSE13	SSE13	SSE14	SSE15	SSE14	SSE16	S17	S12	SSE12	SE13	SSE16	S5.8	S17
4-Oct	SSE14	SSE15	SSE13	S10	SW5	SW4	SSW4	ESE3	SSE4	SSW2	NNW2	NE4	SSW1	N2	NNE6	N7	NNE8	N6	N6	N5	W1	NNW2	WSW3	WSW4	SSE1.1	SSE15
5-Oct	W1	SW4	SSW4	SW9	SSW10	SSW10	SSW12	WSW10	WSW12	SW11	S8	SSW6	NW2	ENE8	NNE15	NE14	NE13	NNE10	NNE10	NNE8	NNE8	NE7	NE6	NE4	N0.5	NNE15
6-Oct	ESE4	E5	E5	SE3	SE5	E7	ESE6	E6	NNE3	E6	ENE3	NNW9	NNW9	NNW10	NNE9	NNE11	N9	NW14	NW14	NNW13	NW11	NNW14	NNW12	NNW11	NNW4.3	NW14
7-Oct	NNW12	NNW15	NNW16	NW16	NNW16	NNW14	NNW14	NNW10	N9	N10	NNW13	NW12	NNW13	NNW11	NE13	ENE13	NE12	NE8	ENE5	ENE5	E6	E7	SE5	SSW5	NNW6.7	NW16
8-Oct	SSE3	ENE4	NE4	NNE4	NNE3	ENE3	ENE4	ESE2	SE3	ESE4	ESE4	E6	ESE9	E10	SE7	S3	ENE1	NNE4	SE6	SSE9	SSE5	SE9	SSE9	SSE10	ESE4.0	E10
9-Oct	SE8	SSE8	SE8	SSE7	SE5	E3	E2	S6	S11	SSE9	SSE10	S9	S11	S10	S10	SSE8	SSE8	SE8	SE9	SSE10	SSE10	SSE16	SE15	SSE11	SSE8.5	SSE16
10-Oct	SSE10	SSE13	SSE14	SSE16	SSE11	S12	S14	S9	S12	S12	S12	SSE13	SSE14	SSE16	SSE14	SSE11	SSE8	SSW9	SSW8	S8	S7	S9	SE7	SSE8	SSE11.0	SSE16
11-Oct	S4	S6	SSE6	SSE6	SSW8	WSW11	W13	W14	W18	NNW17	NNW19	NNW15	NNW16	NNW16	NNW14	W18	W16	NNW12	W10	W10	W11	W11	NNW16	NNW17	W11.0	NNW19
12-Oct	NNW17	NNW15	NNW17	NNW15	NNW12	NW9	W3	WNW6	WNW8	NNW10	WNW8	NNW10	NNW12	NNW10	NNW12	WNW8	NW10	NNW13	NNW13	NW12	NNW14	NNW15	NNW12	NNW6	NNW11.0	NNW17
13-Oct	WSW1	WSW5	WSW6	WSW5	WSW5	SW3	WSW5	SW4	WSW4	SW6	SSW7	SSW7	S8	SSE8	SSE9	SSE8	SSE9	SE7	ESE6	NE5	N9	N10	N10	N11	SSW1.7	N11
14-Oct	N10	N10	N11	N9	N10	N13	N13	N14	N12	N11	N10	N9	N8	N6	NNE6	N7	NNW4	N4	ESE1	SSW3	NNW12	NNW10	NNW13	NNW10	N7.8	N14
15-Oct	NNW11	NNW16	NW14	NW9	W8	WSW11	NNW10	W9	NNW12	NW12	NW10	NW8	NNW8	NNW13	NNW13	NNW14	N13	N11	N11	N9	N5	N5	NNW6	N5	NW8.9	NNW16
16-Oct	NNE4	NE3	NNE3	N2	SSE2	SE4	SE3	E4	SE3	SE6	ESE7	SSE4	SSE7	SSW6	SSW7	S6	ESE2	ENE5	ESE7	SSE12	SSE14	SSE17	SSE20	SSE19	SSE5.5	SSE20
17-Oct	SSE12	SSE17	SSE18	SSE18	SSE19	SSE19	SSE20	SSE15	SSE13	SSE12	SSE18	SSE18	SSE19	SSE20	SSE24	SSE24	SSE25	SSE24	SSE23	SSE22	SSE19	SSE20	SSE21	SSE19	SSE19.1	SSE25
18-Oct	SSE20	SSE24	SSE19	SSE17	SSE12	SSE12	S8	S7	S7	S8	SSW6	SSW5	S5	S8	SSE7	W1	WSW7	NNW4	W7	NNW8	NW9	NNW10	NNW11	NNW7	S5.4	SSE24
19-Oct	W2	WSW6	W6	NNW4	ENE4	ENE3	SSW2	S4	SE4	ESE7	S4	S5	SE8	SSE9	SE13	SE10	ESE12	SE15	SE14	SSE11	SSE14	SSE16	SSE16	SSE13	SSE6.9	SSE16
20-Oct	SSE13	SSE13	SSE15	SSE15	SSE12	SSE15	S11	S12	SSE11	S7	S10	S10	S11	SSE9	S10	SSE10	SSE9	SSE8	SSE6	ESE4	ESE6	SE5	S4	SSW4	SSE9.1	SSE15
21-Oct	SSW7	SSW9	SSW7	SW4	WSW6	WSW5	WSW7	W9	W7	WSW5	WSW7	W9	W7	WSW7	NNW8	NNW7	WSW5	W4	SW4	SW5	S4	ESE6	S5	SSW5	WSW5.0	W9
22-Oct	S4	SSW3	SSW4	SW6	S5	S4	SE4	S5	S5	SSW7	SE7	SSE7	S8	SSE10	SE13	SE12	SE15	SE17	SSE16	SSE18	SSE17	SSE15	SSE14	SSE12	SSE8.9	SSE18
23-Oct	SSE11	SSE9	SSE5	ENE3	SE5	ESE1	NNE5	N10	NNE9	NE7	ENE4	E5	ESE13	ESE14	E9	ENE9	NE6	NE7	NNE8	NNE8	N10	NNW12	NW14	NW15	NE4.0	NW15
24-Oct	NW17	NW19	NW17	NW14	NW11	NNW15	NNW15	NNW12	NNW11	NNW13	NNW14	NNW15	NNW17	NNW19	NNW13	NNW18	NW15	NW13	NNW16	NNW13	NNW15	NNW15	NNW13	NNW13	NNW14.7	NNW19
25-Oct	NNW15	NNW18	NNW16	NW11	NNW8	NNW7	WSW6	W8	W5	SW7	SW7	SW8	S8	S9	S8	SSW7	SE5	ESE6	E4	ENE5	ENE4	ENE4	ENE4	NE5	W3.0	NNW18
26-Oct	NNE7	N8	NNE8	N9	N12	NNE11	NNE12	NNE11	NNE11	NNE12	NNE11	NNE12	NNE14	NNE14	NNE15	NNE15	NNE15	NNE14	NNE14	NNE14	NNE16	NNE14	NNE14	NNE13	NNE12.2	NNE16
27-Oct	NNE12	N12	N13	N12	N12	N11	N11	N10	N10	NNE10	NE8	NNE8	NNE9	NNE8	NNE8	N7	N8	N6	N6	NNE5	NNE5	ENE5	E4	ENE3	NNE8.2	N13
28-Oct	ENE1	S6	S6	SSW8	S7	S6	S8	S6	S10	S12	SSW11	S10	SSE9	SSE8	SSE7	SE7	SE9	ESE9	ESE7	SE7	SE6	SE7	ESE6	ESE6	SSE6.6	S12
29-Oct	E6	E8	E6	NNE5	NNE7	N7	N8	NE4	NE5	NE6	NE7	NE8	ENE8	NE8	NE5	NE6	ENE6	ENE6	ESE8	SE8	SE9	SE8	SE9	SSE12	ENE5.2	SSE12
30-Oct	SSE12	SSE13	SSE15	SSE17	SSE20	SSE19	SSE20	SSE17	SSE15	SSE18	SSE17	SSE18	SSE18	SSE18	SSE19	S16	SSE16	SSE17	SSE17	SSE20	SSE20	SSE19	SSE21	SSE19	SSE17.5	SSE21
31-Oct	SSE19	SSE17	SSE17	SSE18	SSE18	SSE18	SSE16	SSE16	SSE16	SSE16	S15	S13	S12	S11	S10	S10	SSW10	S9	SSW9	SSW7	S6	S6	SSW6	SSW4	S12.0	SSE19
SSW1.3SSW2.2 SW1.6 SW1.7SSW1.6SSW1.5 SW1.7WSW1.5 SW1.5SSW1.5SSW1.6 SW1.3 S1.3 SSE1.4 SE1.1 E1.0 E1.1 ENE1.1 SE1.1 SSE1.2 SSE0.7 SSE1.3 SSE1.3 S1.2																								Diurnal Average		
SSE20 SSE24 SSE19 SSE18 SSE20 SSE19 SSE20NNW17 W18 NNW21NNW26NNW26NNW23NNW23 SSE24 SSE24 SSE25 SSE24 SSE23 SSE22 N20 SSE20 SSE21 SSE19																								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 - October 2014**

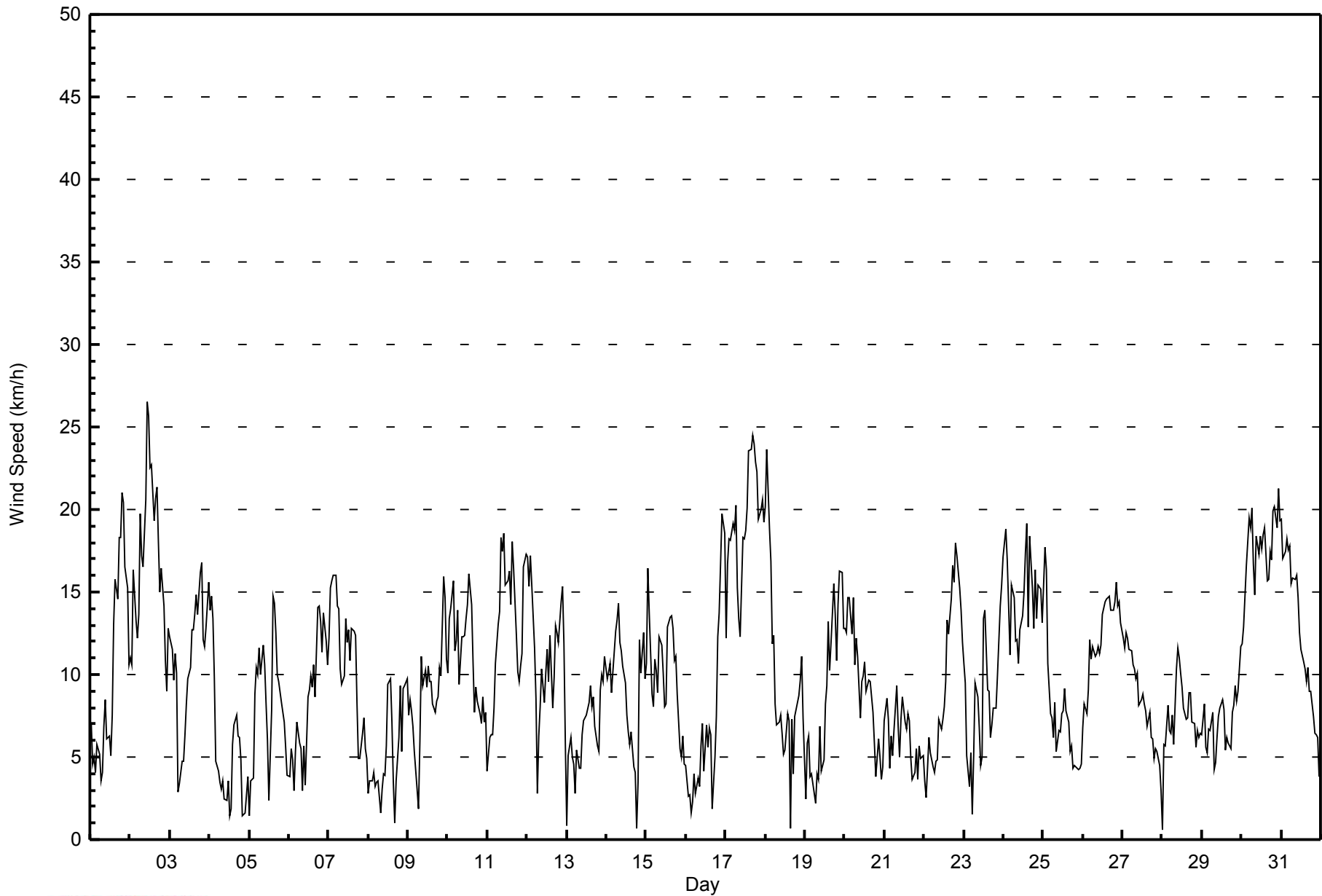
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on Oct 2 12:00																	Hours in Service: 744								
Minimum Value: 1 km/h on Oct 8 03:00																	Hours of Data: 744								
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 P <sub>99</sub> = 6																	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-Oct	3	1	1	1	2	2	1	1	2	3	2	2	1	2	4	4	4	4	4	5	5	3	3	3	5
2-Oct	3	3	4	4	2	5	4	4	4	5	6	6	6	5	5	6	5	5	4	4	3	3	3	3	6
3-Oct	3	3	3	3	3	2	1	2	2	2	2	3	3	3	3	3	3	3	4	4	3	3	3	4	4
4-Oct	3	3	2	3	2	1	2	1	2	1	2	2	1	2	2	2	2	1	1	1	1	1	1	2	3
5-Oct	2	1	1	2	2	2	2	3	3	3	2	2	2	3	4	4	4	3	3	3	2	2	2	1	4
6-Oct	1	2	1	1	1	2	1	1	1	2	2	2	2	2	2	3	2	5	4	4	3	4	3	4	5
7-Oct	4	4	4	4	4	4	4	3	3	3	3	3	4	3	3	3	3	3	2	1	1	1	1	1	4
8-Oct	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	3	2	2	2	2	2	3
9-Oct	2	3	3	2	1	1	1	4	2	2	3	2	2	2	2	2	2	2	2	2	2	4	3	4	4
10-Oct	3	3	3	3	2	3	2	2	2	2	2	3	3	3	3	2	1	2	2	2	2	2	1	2	3
11-Oct	2	1	2	3	2	4	4	5	5	6	5	5	5	5	5	6	5	4	3	3	3	4	5	4	6
12-Oct	4	4	5	4	4	2	2	2	2	3	3	3	3	3	3	3	3	4	3	3	4	5	4	3	5
13-Oct	2	2	2	2	2	2	2	1	1	2	2	2	1	2	2	2	2	1	1	1	1	1	1	1	2
14-Oct	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	4	4	4	2	4
15-Oct	4	4	3	3	4	4	4	3	3	3	3	3	3	4	3	3	2	2	2	3	1	1	1	1	4
16-Oct	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	2	2	4	3	3	4	4	4
17-Oct	3	3	3	3	3	3	4	4	3	3	4	4	4	5	5	5	5	5	5	4	5	5	5	4	5
18-Oct	4	4	5	4	2	3	3	2	2	2	2	1	2	1	1	2	2	2	2	3	3	2	2	3	5
19-Oct	1	1	2	3	1	1	1	1	1	1	2	2	2	2	3	2	2	5	4	3	4	5	5	3	5
20-Oct	3	3	3	3	2	3	5	3	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	3	5
21-Oct	2	2	2	2	2	3	2	2	3	2	2	3	2	3	3	3	2	1	1	1	2	1	1	2	3
22-Oct	1	1	2	1	1	1	1	1	1	1	1	2	2	2	3	3	4	4	4	3	3	3	3	2	4
23-Oct	2	2	3	1	2	2	1	1	2	2	2	2	3	3	2	2	1	1	2	2	2	2	3	4	4
24-Oct	4	5	5	4	3	4	4	3	3	3	3	5	4	5	3	6	4	4	5	5	4	4	3	6	
25-Oct	4	4	5	3	2	2	2	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	5
26-Oct	1	1	2	1	2	2	2	2	2	2	2	3	3	4	4	3	3	3	3	3	3	3	3	3	4
27-Oct	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	3
28-Oct	1	1	1	1	1	2	2	2	3	2	2	2	2	2	1	2	2	1	1	1	1	1	1	1	3
29-Oct	1	1	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	2	3	3
30-Oct	3	3	3	3	4	3	4	3	4	4	4	4	4	4	4	3	4	4	4	4	4	4	5	4	5
31-Oct	4	4	4	4	3	4	3	3	3	3	3	2	2	2	2	2	2	2	2	2	1	2	2	2	4
Diurnal Maximum																									





**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Mildred Lake - October 2014**





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

**Wind Speed (WS) - km/h**  
**Mildred Lake - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	151	20.30	20.30
6 - 11	320	43.01	63.31
12 - 19	245	32.93	96.24
20 - 28	28	3.76	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Mildred Lake - October 2014**

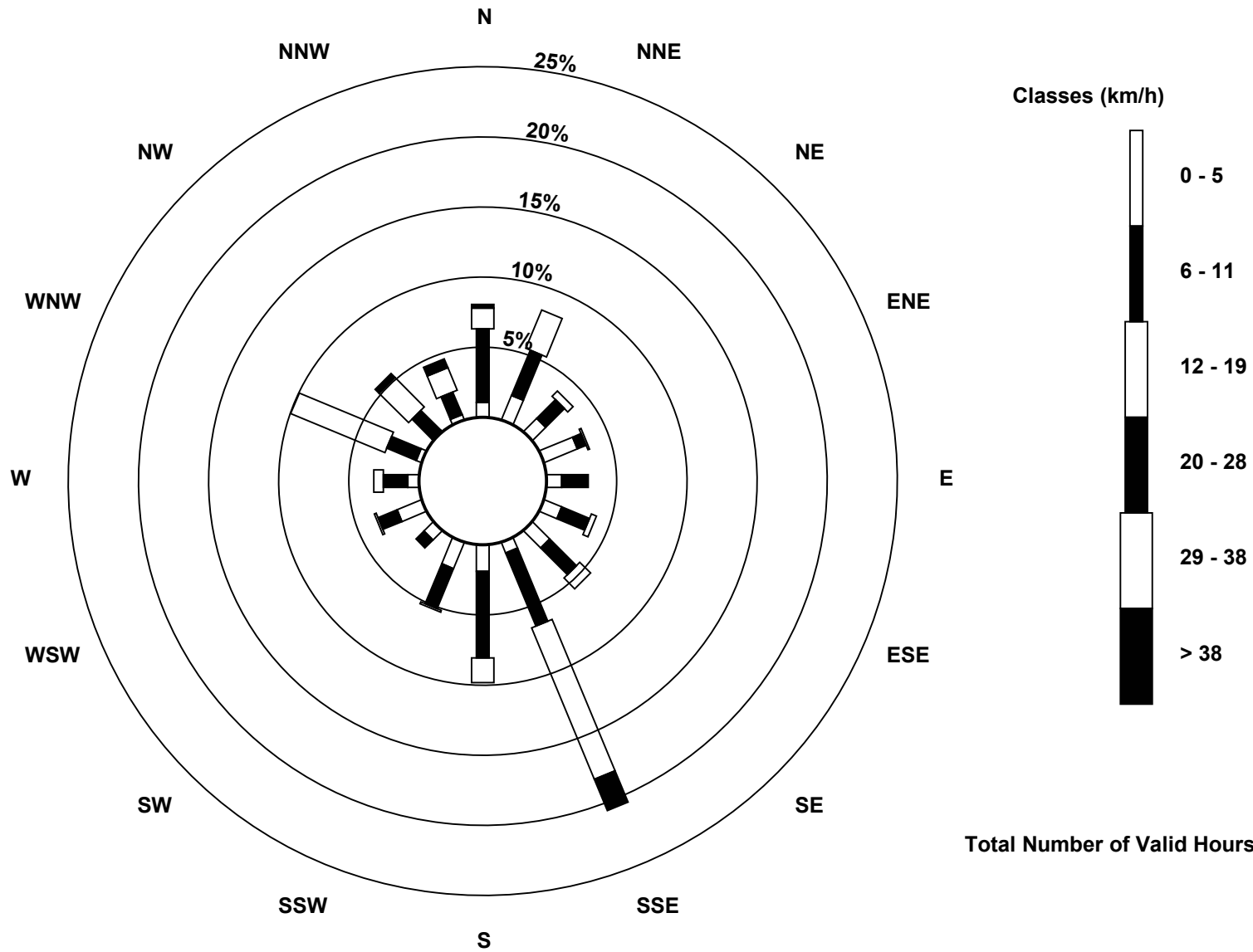
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	14	10	19	8	10	13	6	14	15	7	14	6	3	1	3	151
6 - 11	39	26	14	5	14	16	20	42	46	23	6	11	13	17	15	13	320
12 - 19	11	22	4	1	0	3	8	87	13	1	0	1	5	54	22	13	245
20 - 28	2	0	0	0	0	0	0	18	0	0	0	0	0	0	3	5	28
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>	60	62	28	25	22	29	41	153	73	39	13	26	24	74	41	34	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



**Total Number of Valid Hours: 744**



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

**Wind Direction (WD) - deg**  
**Mildred Lake - October 2014**

Direction of Maximum Speed: 338 deg on Oct 2 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 159.1 deg on Oct 17	Hours of Data: 744
Direction of Minimum Speed: 78 deg on Oct 28 01:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.5 deg on Oct 5	Percent Operational Time: 100.0
Monthly Average Direction: 242.5 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-Oct	43	29	39	18	29	35	26	81	96	95	83	45	8	21	12	18	30	12	12	9	5	354	346	344	19.2
2-Oct	340	319	328	339	346	344	341	332	323	325	338	332	331	332	323	324	321	313	309	312	327	349	341	311	328.8
3-Oct	308	316	317	302	312	333	244	243	232	189	176	147	147	155	161	162	160	162	166	174	187	151	128	156	177.5
4-Oct	153	155	159	181	216	214	196	122	155	213	328	39	209	358	14	5	18	3	6	358	273	303	252	247	157.3
5-Oct	277	235	204	220	199	192	204	244	251	224	189	196	314	57	12	43	45	22	30	24	20	39	44	44	0.7
6-Oct	118	101	96	128	127	99	103	81	31	82	66	344	333	329	13	14	352	322	313	298	309	300	299	300	342.8
7-Oct	299	302	299	307	303	301	301	341	351	354	341	326	336	342	35	57	48	51	58	77	96	98	129	196	340.5
8-Oct	168	72	34	33	18	72	77	122	144	117	121	88	105	97	129	176	70	33	129	162	159	139	149	149	118.8
9-Oct	145	154	146	147	125	95	95	171	170	164	168	171	177	172	175	161	160	135	134	147	153	153	146	149	155.1
10-Oct	159	163	166	165	163	170	172	189	170	170	173	166	155	162	163	160	157	197	196	175	178	187	140	155	168.1
11-Oct	170	177	166	168	207	248	263	268	279	286	293	297	296	295	288	273	276	283	268	265	260	263	286	294	273.7
12-Oct	293	296	297	300	303	321	268	290	284	291	286	302	301	302	302	301	304	298	299	304	299	294	298	336	298.8
13-Oct	241	257	254	241	244	235	244	220	237	217	204	199	172	161	147	149	166	146	118	43	5	9	6	6	195.1
14-Oct	5	5	10	9	4	8	3	4	8	7	1	6	5	0	12	355	348	353	110	208	298	290	294	328	352.5
15-Oct	301	297	312	315	264	258	283	280	301	310	311	318	331	342	333	335	350	1	351	353	358	358	347	8	320.3
16-Oct	13	41	24	6	168	125	137	97	137	126	108	154	168	202	192	177	120	73	123	156	152	154	156	161	146.7
17-Oct	163	166	164	165	168	167	163	159	151	149	161	163	159	156	156	157	157	160	161	163	156	151	152	153	159.1
18-Oct	157	161	158	155	153	164	169	189	182	190	209	213	189	180	167	276	237	282	272	286	309	326	307	335	187.9
19-Oct	278	241	275	286	69	71	209	169	143	121	169	188	131	154	129	141	121	146	140	147	154	156	154	151	149.3
20-Oct	155	158	160	166	164	165	172	173	163	186	180	187	169	157	177	162	153	160	160	104	122	144	170	204	164.6
21-Oct	194	208	196	214	249	245	255	267	265	256	239	268	264	255	285	288	257	259	221	214	174	123	178	210	239.0
22-Oct	191	194	196	214	186	178	127	190	182	194	142	166	169	167	137	131	133	133	158	166	158	153	155	150	157.8
23-Oct	161	152	152	66	131	117	18	4	24	46	62	82	111	121	84	69	49	34	28	15	1	333	325	320	47.7
24-Oct	313	304	304	307	305	296	294	296	297	301	294	295	299	298	297	299	295	308	305	296	285	296	297	296	299.2
25-Oct	293	295	300	309	305	292	252	270	270	231	220	216	188	177	190	203	139	103	81	61	72	58	61	37	265.3
26-Oct	17	10	17	10	8	21	16	24	20	16	23	25	17	31	24	18	15	20	19	15	14	18	15	17	18.1
27-Oct	19	10	7	10	11	8	10	10	9	19	35	24	23	24	25	10	6	3	7	22	21	63	80	64	17.4
28-Oct	78	182	175	195	187	171	189	189	175	178	192	189	167	162	156	131	142	120	113	130	136	134	123	106	160.6
29-Oct	97	100	80	24	14	11	8	36	34	45	37	51	59	50	43	42	59	74	105	124	128	124	129	152	72.9
30-Oct	151	155	160	161	162	164	165	161	155	160	163	159	165	164	168	173	157	152	157	161	162	162	161	164	161.3
31-Oct	163	160	155	157	162	159	159	161	162	164	172	178	185	175	187	189	195	189	198	196	178	187	203	212	171.4

198.9 211.0 218.0 220.3 208.6 200.4 224.4 239.8 227.7 201.8 205.7 220.3 177.0 155.5 128.7 96.9 92.6 75.2 125.6 168.2 166.1 148.4 168.6 183.9  
 Diurnal Average

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

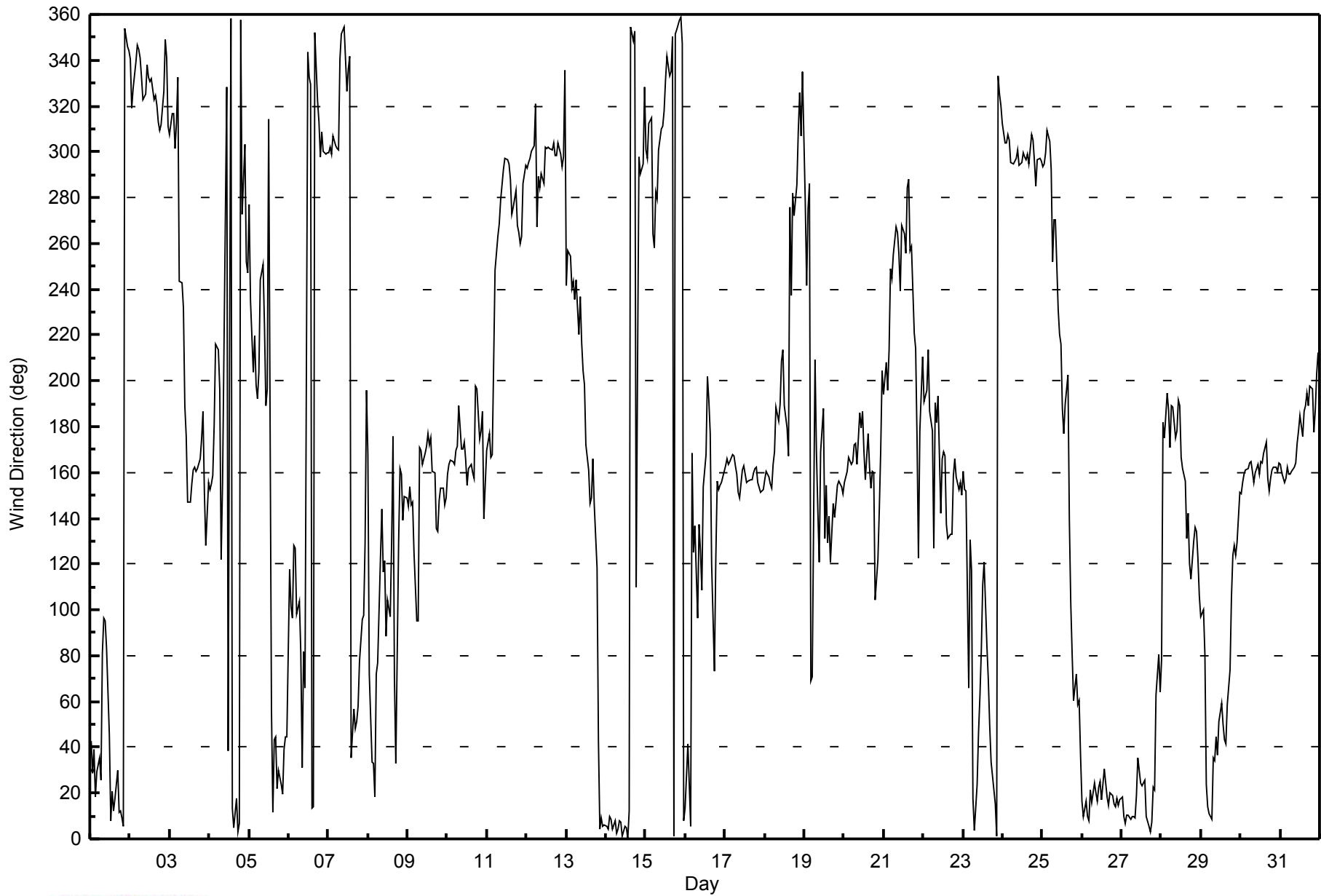
Mildred Lake - October 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744											
Maximum Value: 99 deg on Oct 14 19:00														Hours of Data: 744											
Minimum Value: 7 deg on Oct 13 23:00														Hours of Missing Data: 0											
Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 12 Q <sub>1</sub> = 14 Median = 17 Q <sub>3</sub> = 22 P <sub>90</sub> = 32 P <sub>99</sub> = 79														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-Oct	22	24	26	27	23	26	27	27	16	19	38	20	21	17	17	17	17	13	13	13	12	14	11	11	38
2-Oct	12	15	14	27	11	13	10	13	15	16	11	13	13	14	15	16	15	16	16	17	17	21	21	17	27
3-Oct	16	17	23	17	27	72	49	27	27	31	21	25	22	20	18	15	14	13	13	15	15	19	15	18	72
4-Oct	16	15	14	18	25	26	39	17	46	61	82	56	89	94	30	19	16	11	10	12	51	62	30	24	94
5-Oct	81	40	31	21	15	14	13	28	22	21	24	35	86	35	19	20	15	18	19	21	19	22	24	28	86
6-Oct	28	23	18	27	17	16	18	18	29	22	52	16	17	18	27	23	12	15	19	18	17	17	18	25	52
7-Oct	17	16	15	16	16	16	19	23	23	23	18	24	21	23	24	20	17	18	18	15	9	9	22	14	24
8-Oct	28	19	19	24	32	27	14	64	36	14	33	18	18	15	25	33	78	22	23	15	28	16	21	17	78
9-Oct	18	17	24	18	13	37	55	62	14	22	20	28	21	27	21	18	18	15	18	14	13	15	15	28	62
10-Oct	17	13	13	11	11	12	12	15	14	10	14	15	16	14	13	14	12	14	18	10	18	21	12	16	21
11-Oct	34	13	22	36	31	25	24	21	19	19	18	20	19	19	31	20	20	20	21	22	20	21	18	16	36
12-Oct	16	16	17	16	25	20	52	24	19	22	29	25	22	23	17	28	19	15	17	16	16	18	17	38	52
13-Oct	84	25	19	27	23	55	26	28	31	25	22	19	21	23	22	21	12	14	13	35	7	7	7	8	84
14-Oct	7	8	11	14	10	8	9	8	9	9	10	9	14	13	11	13	14	12	99	55	18	20	19	17	99
15-Oct	21	16	18	17	30	27	22	22	18	19	21	24	29	15	18	15	11	10	10	10	8	9	8	15	30
16-Oct	11	16	25	40	49	28	33	21	29	19	25	46	30	43	29	26	48	34	21	18	16	15	14	13	49
17-Oct	13	12	12	11	10	12	12	14	15	17	15	16	15	17	16	15	15	13	13	13	15	16	16	16	17
18-Oct	15	13	14	15	16	14	24	26	28	17	20	22	33	15	12	94	23	38	21	29	23	19	14	33	94
19-Oct	54	19	22	79	35	39	51	20	26	15	47	44	26	28	17	18	12	21	19	17	19	17	18	15	79
20-Oct	13	13	13	13	11	12	21	18	13	26	17	20	15	17	17	18	16	12	18	23	13	20	61	64	64
21-Oct	21	13	23	35	21	48	26	18	65	37	27	21	22	36	23	24	34	40	21	20	46	10	25	20	65
22-Oct	39	53	14	18	21	19	22	14	20	18	24	25	19	16	19	15	15	15	16	14	14	15	14	15	53
23-Oct	14	14	65	30	14	67	11	7	13	35	37	26	15	16	16	14	15	15	14	13	12	12	14	14	67
24-Oct	16	16	16	16	17	16	16	16	17	17	17	17	17	17	17	17	16	18	16	17	21	16	16	16	21
25-Oct	17	17	17	18	15	13	32	21	22	23	30	20	22	25	27	17	19	11	14	24	18	21	25	26	32
26-Oct	12	10	17	10	9	14	12	14	12	12	14	15	13	15	15	13	11	14	13	12	12	13	12	13	17
27-Oct	14	10	9	10	9	9	11	11	10	15	19	17	17	18	20	13	9	10	10	16	15	19	19	23	23
28-Oct	77	15	16	11	15	20	22	20	17	16	14	16	15	15	17	15	17	11	14	20	18	15	20	12	77
29-Oct	13	11	30	15	12	10	9	33	26	22	18	22	21	20	26	19	17	13	18	13	12	10	15	17	33
30-Oct	16	15	14	14	13	12	11	13	15	14	13	14	12	13	13	15	15	16	15	14	13	14	14	12	16
31-Oct	13	14	15	14	13	15	14	14	13	13	14	16	17	13	16	13	13	17	15	14	12	18	28	34	34
														Diurnal Maximum											



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Mildred Lake - October 2014**



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# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 8, 2014	Previous Calibration	September 3, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	11:05	End Time (MST)	14:15
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.	2589
DACS voltage range	0-5v	DACS channel #	SE1

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-616	-616
Analyzer Range (mv)	5000	5000	Lamp voltage	901	904
Calculated slope	1.001103	0.993684	Chamber temp.	44.7	44.6
Calculated intercept	1.189961	1.446227	Pressure (mmHg)	700.1	707.0
Analyzer Background	27.9	27.6	Flow (lpm)	0.518	0.520
Analyzer Coefficient	0.902	0.899	Intensity	29000	29000

Analyzer make TEI 43c Analyzer serial # 43c-77879-387

### 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	69.9	830.4	835.9	0.993
calibrator zero	5000	0.0	0.0	-0.2	NA
high point	5000	69.9	830.4	835.2	0.994
second point	5000	35.4	420.6	420.2	1.001
third point	5000	17.7	210.3	209.5	1.004
calibrator zero	5000	0.0	0.0	-0.2	NA
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	69.9	830.4	835.4	0.994
Average Correction Factor					1.000

Corrected As found 836.1 Previous response 828.3 % change -0.9%

#### Notes:

Changed filter after as founds. Slight adjustment was made to the span.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

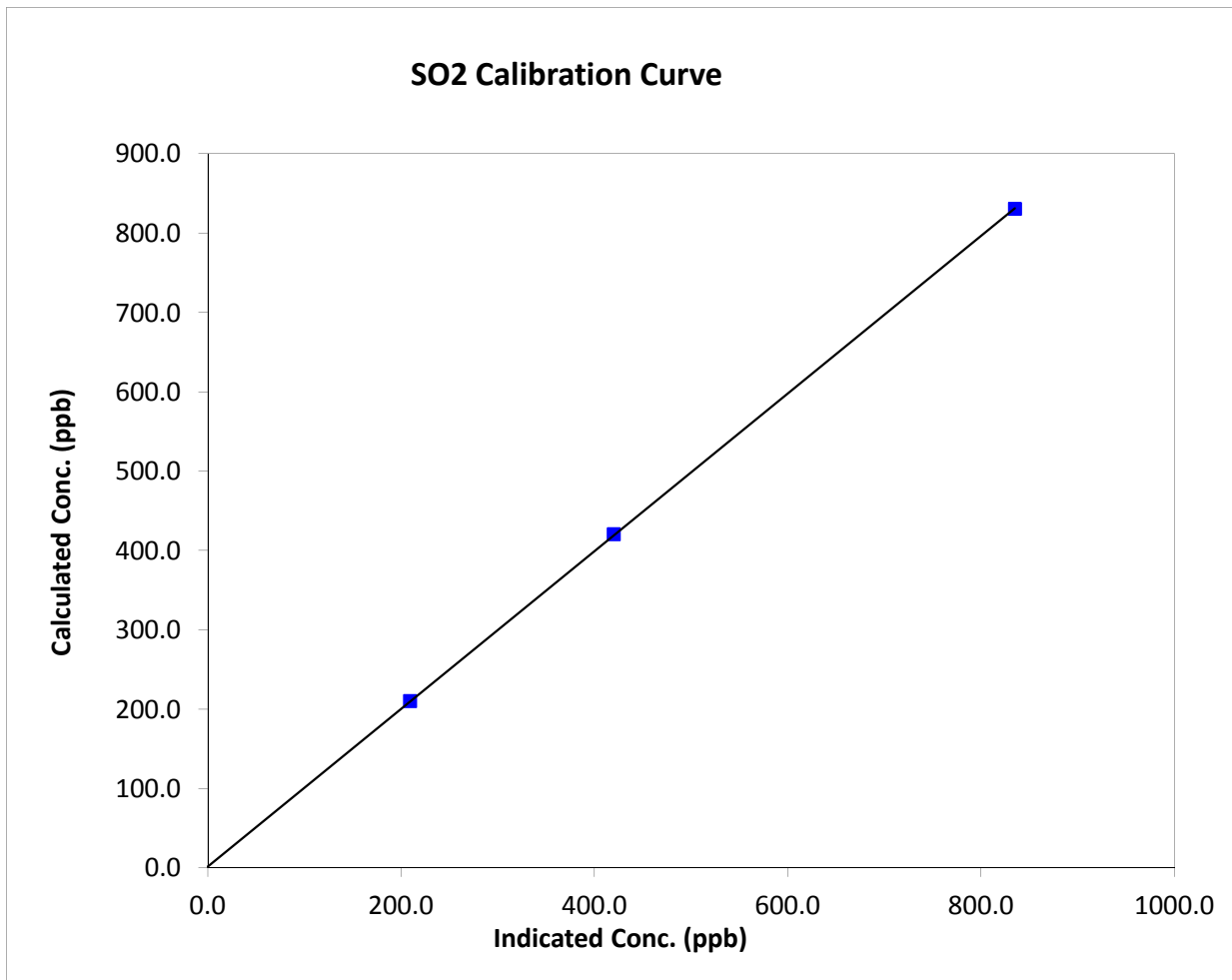
## SO<sub>2</sub> Calibration Summary

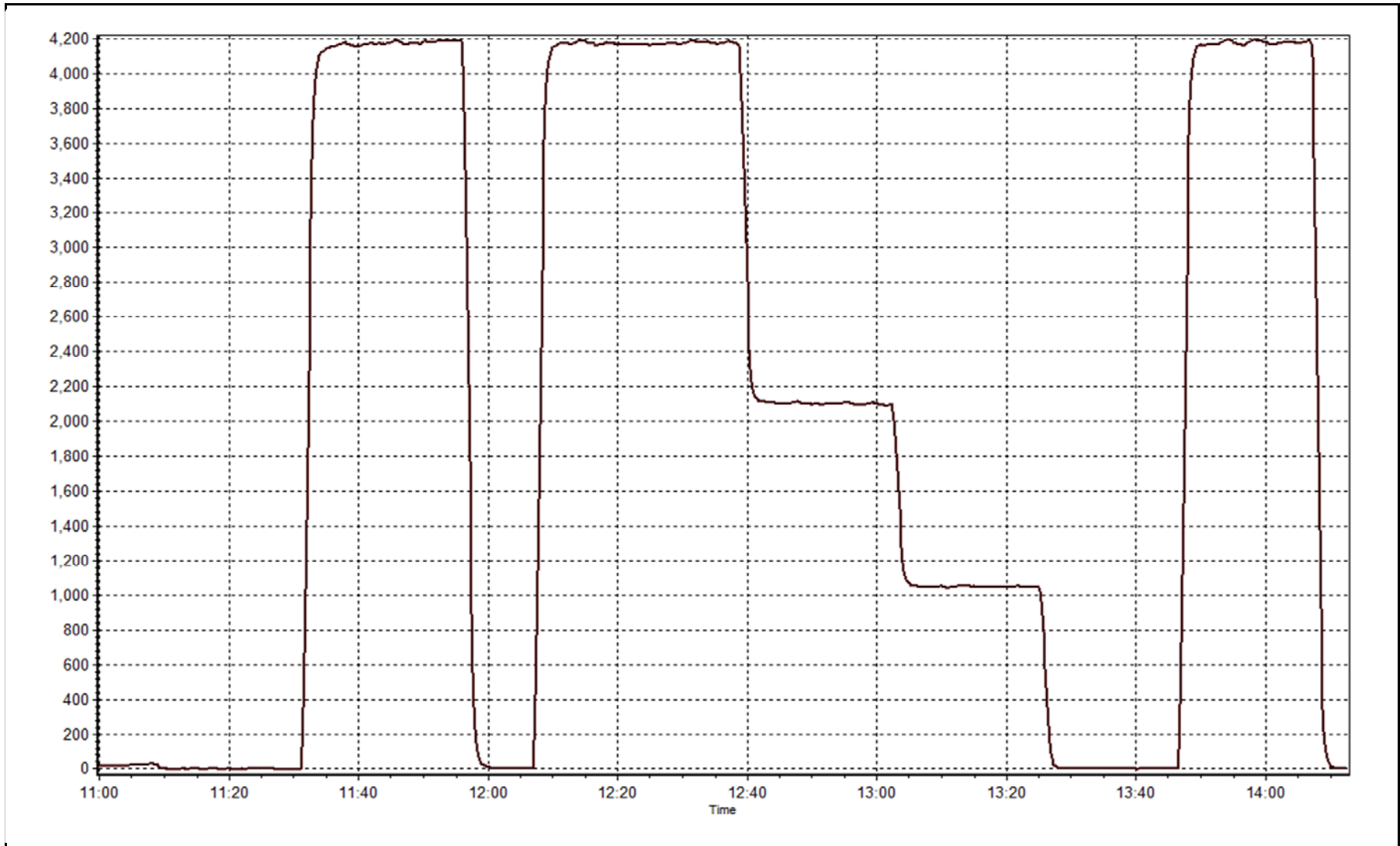
### Station Information

Calibration Date	October 8, 2014	Previous Calibration	September 3, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	11:05	End Time (MST)	14:15
Analyzer make	TEI 43c	Analyzer serial #	43c-77879-387

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999986
830.4	835.2	0.9943		
420.6	420.2	1.0009	Slope	0.993684
210.3	209.5	1.0038		
			Intercept	1.446227







# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	October 10, 2014	Previous Calibration	September 3, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	8:30	End Time (MST)	11:20
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11541008
Cal Gas Concentration	5.59 ppm H2S	Cal Gas Expiry Date	3/11/2009
Gas Cert Reference	cc243460	SO2 gas conc.	59.4 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2589
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)	5000	5000	Lamp voltage	773	774
Calculated slope	1.000387	0.993549	Chamber temp.	45	45
Calculated intercept	-0.142500	-0.229840	Pressure	545.7	542.3
Analyzer Background	12.9	12.9	Flow	1.010	1.004
Analyzer Coefficient	0.886	0.886	Intensity	87	87
			Converter temp.	325	323

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

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	4000	0.0	0.0	0.4	NA
as found span	4000	57.3	80.1	80.9	0.990
SO2 scrubber check	5000	17.7	210.3	0.3	NA
calibrator zero	4000	0.0	0.0	0.4	NA
high point	4000	57.2	79.9	80.9	0.988
second point	4000	28.7	40.1	40.3	0.996
third point	4000	14.3	20.0	20.3	0.985
calibrator zero	5000	0.0	0.0	0.4	NA
as left zero	5000	0.0	0.0	0.3	NA
as left span	4000	57.3	80.1	80.5	0.995
Average Correction Factor					0.990

Corrected As found	80.4	Previous response	80.2	% change	-0.3%
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#### Notes:

Filter changed and Scrubber checked completed after as founds. No adjustments.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## H2S Calibration Summary

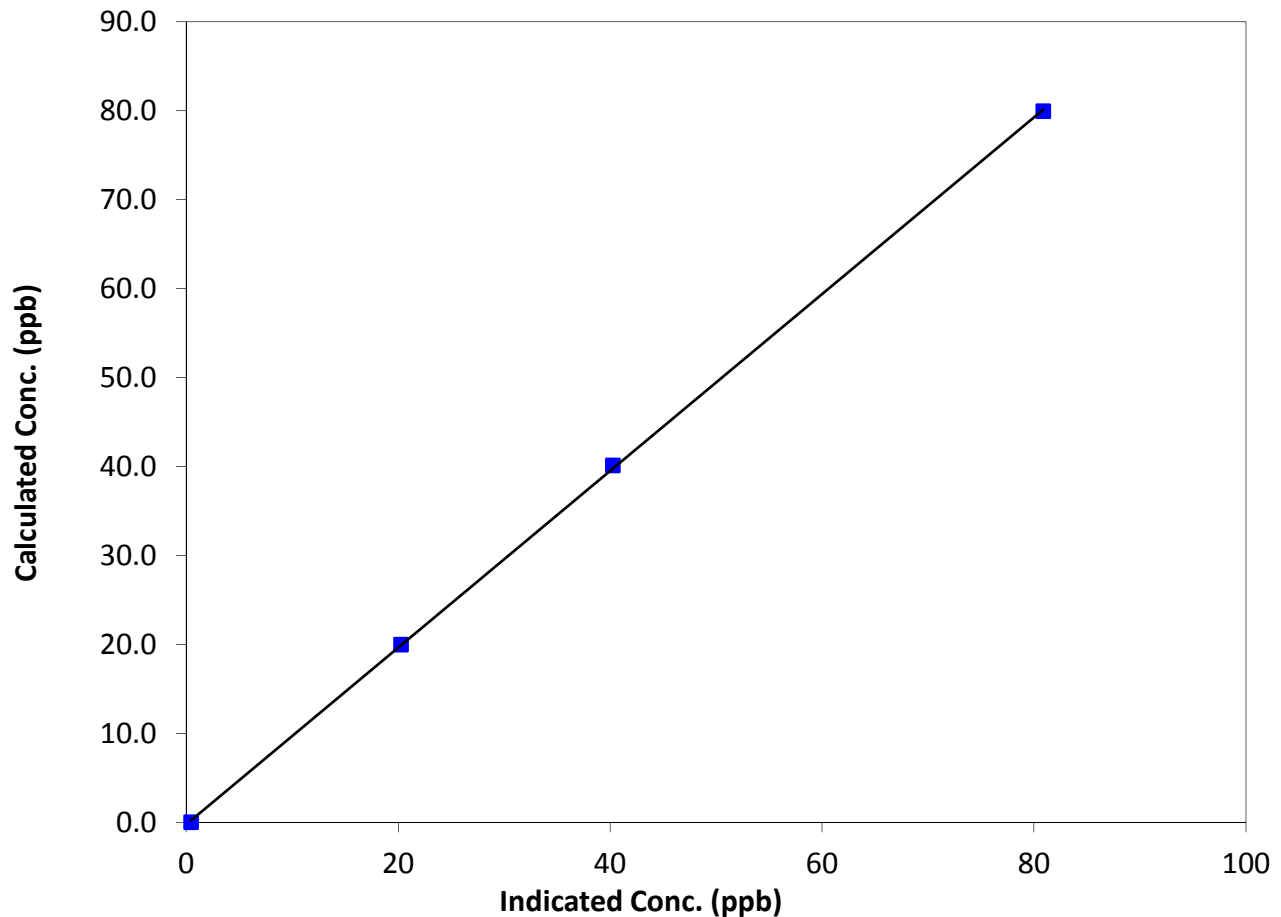
### Station Information

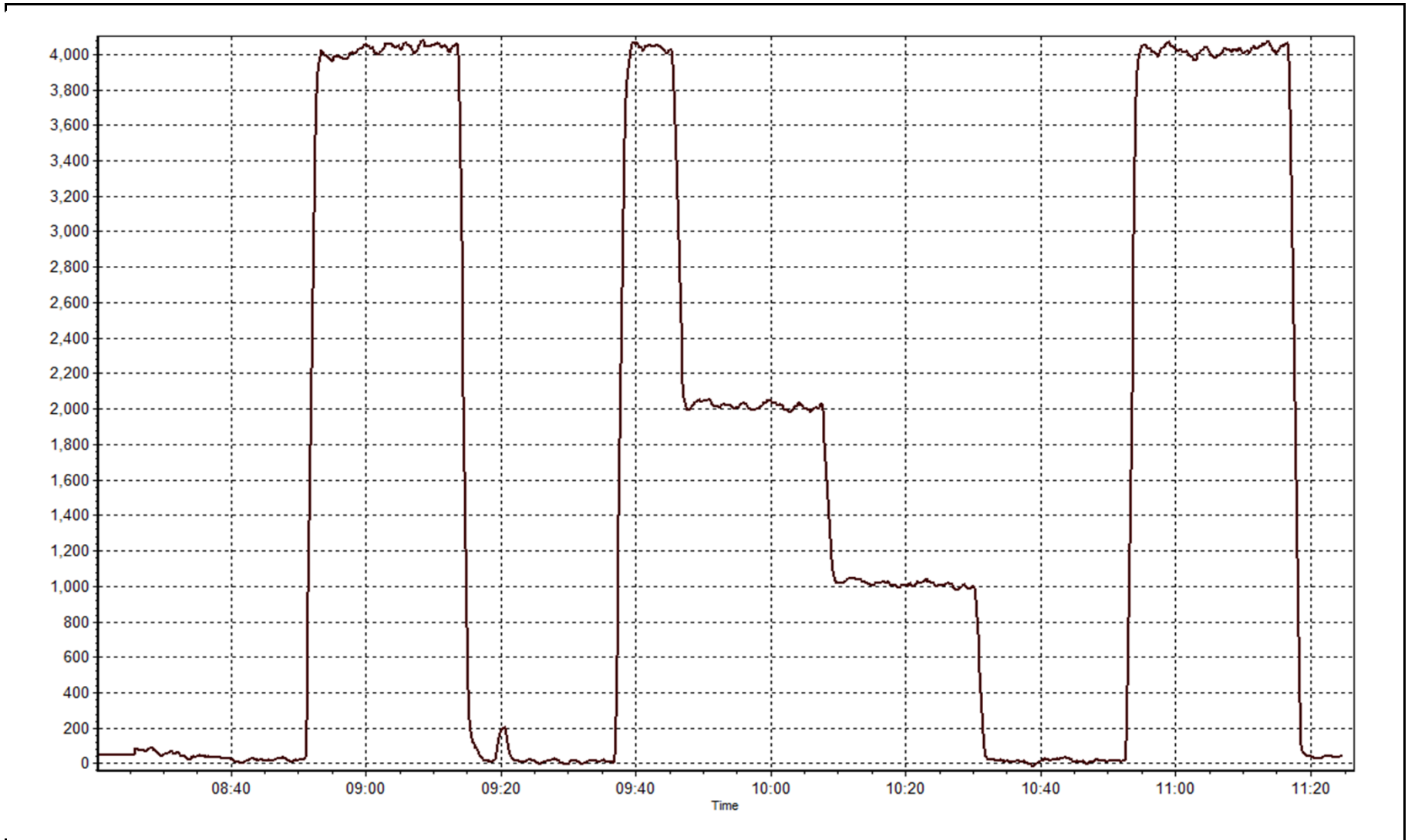
Calibration Date	October 10, 2014	Previous Calibration	September 3, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	8:30	End Time (MST)	11:20
Analyzer make	TEI 450i	Analyzer serial #	815129107

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999944
79.9	80.9	0.9885		
40.1	40.3	0.9962	Slope	0.993549
20.0	20.3	0.9853		
			Intercept	-0.229840

**H2S Calibration Curve**







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	October 8, 2014	Previous Calibration	September 23, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	11:05	End Time (MST)	14:15
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.	2589
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)	5000	5000	Air or Bypass press	39.8	39.8
Calculated slope	1.006781	0.999101	Fuel Pressure	25.7	25.7
Calculated intercept	0.024477	-0.009885			
BKG	2.49	2.45			
COEF	5.044	4.965			

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	0.01	N/A
as found span	5000	69.9	14.83	15.03	0.986
calibrator zero	5000	0.0	0.00	0.01	N/A
high point	5000	69.9	14.83	14.85	0.999
second point	5000	35.4	7.51	7.53	0.997
third point	5000	17.7	3.75	3.76	0.998
calibrator zero	5000	0.0	0.00	0.01	N/A
as left zero	5000	0.0	0.00	0.05	N/A
as left span	5000	69.9	14.83	14.80	1.001
Average Correction Factor					0.998

Corrected As found 15.02 Previous response 14.70 % change -2.1%

#### Notes:

Changed filter after as founds. Adjusted span.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## THC Calibration Summary

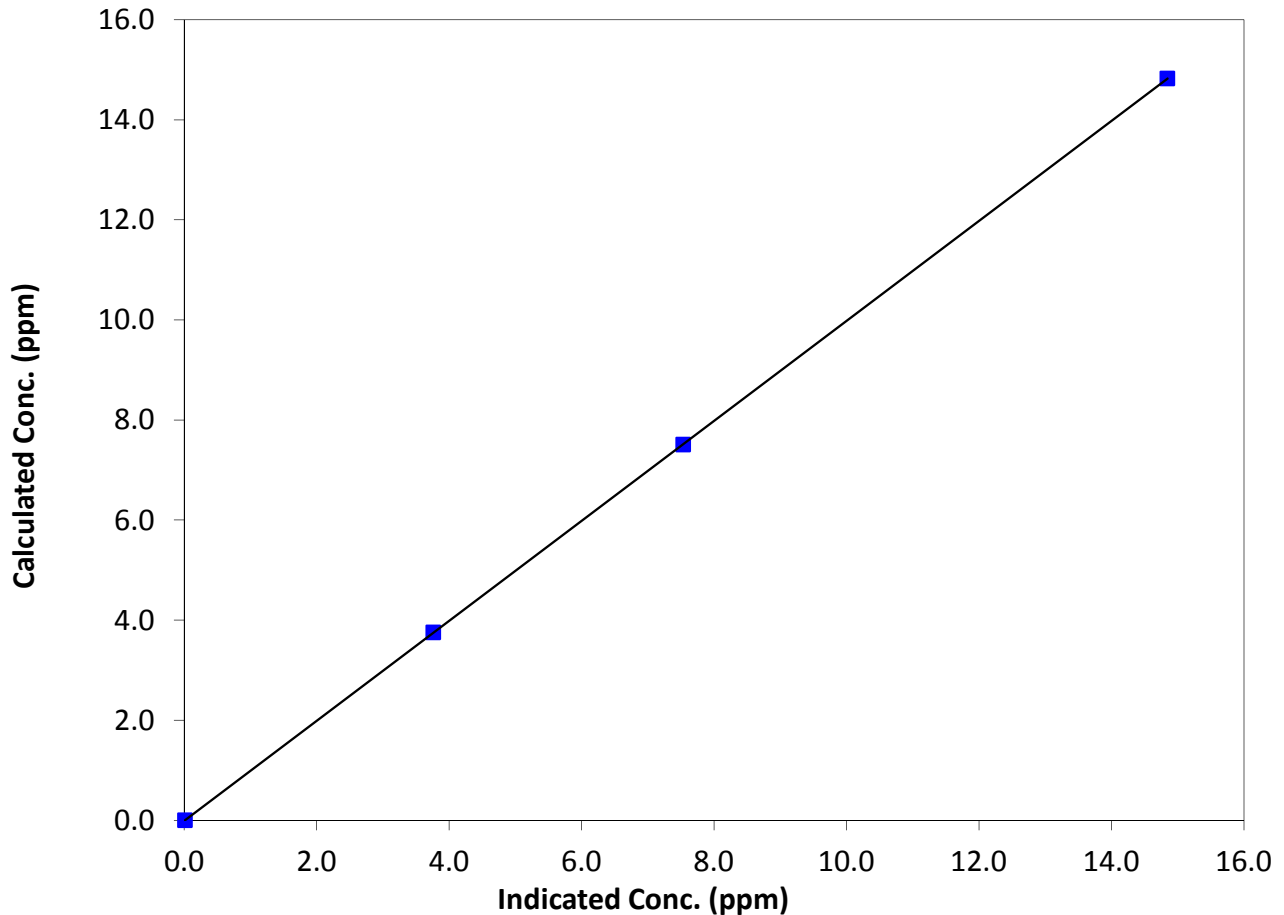
### Station Information

Calibration Date	October 8, 2014	Previous Calibration	September 23, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	11:05	End Time (MST)	14:15
Analyzer make	51i-LT	Analyzer serial #	1300156231

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	N/A	Correlation Coefficient	0.999999
14.83	14.85	0.9987		
7.51	7.53	0.9965	Slope	0.999101
3.75	3.76	0.9978		
			Intercept	-0.009885

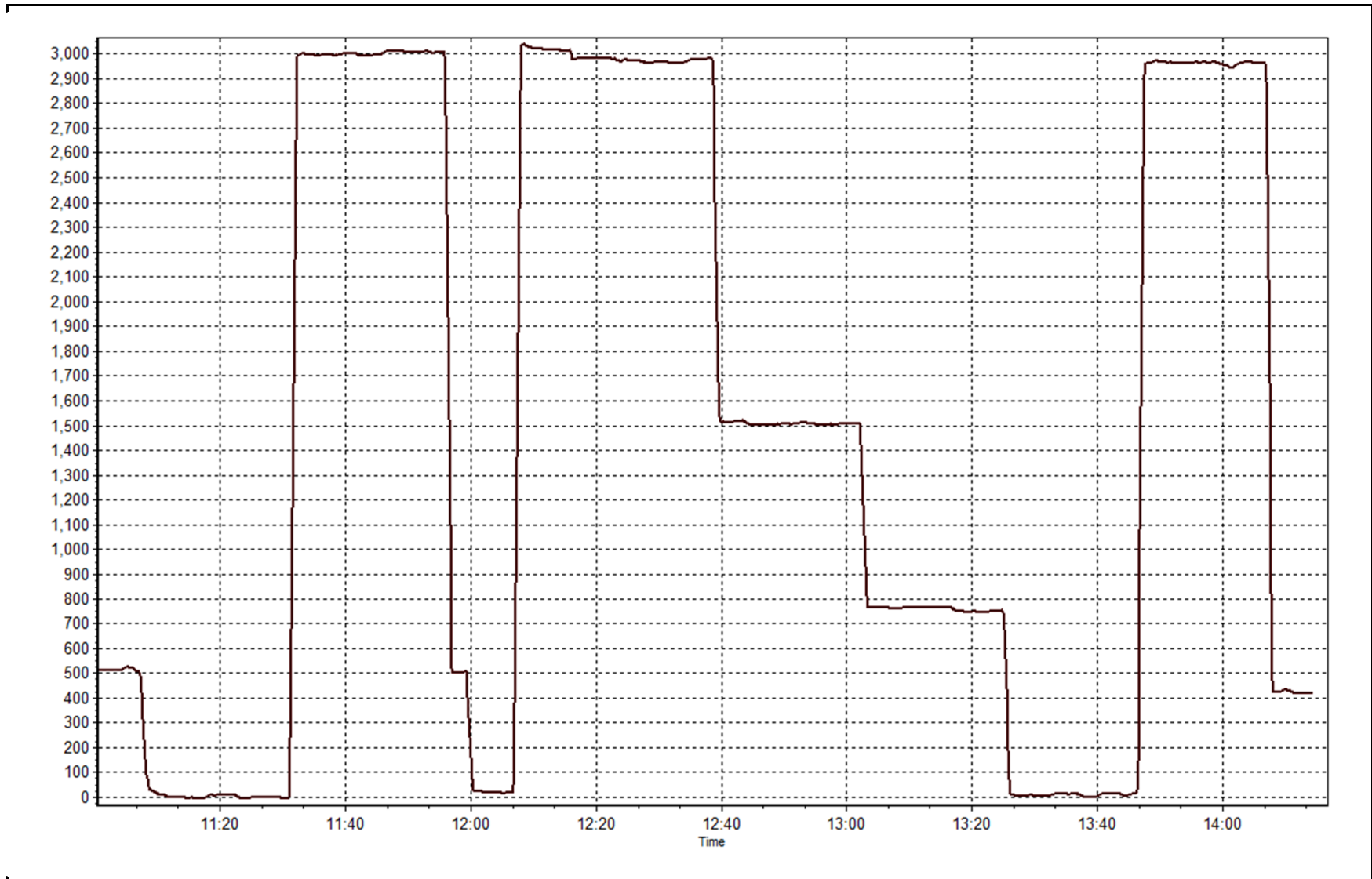
**THC Calibration Curve**





THC Calibration Plot

Date: October 8, 2014



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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 3  
LOWER CAMP METEOROLOGY  
OCTOBER 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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)  
OCTOBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
Temperature 20 m (C) Average	744	0	0	100.00	20.5	-	13.1	-
Temperature 45 m (C) Average	744	0	0	100.00	21.1	-	13.2	-
Temperature 100 m (C) Average	744	0	0	100.00	21.8	-	13.7	-
Temperature 167 m (C) Average	744	0	0	100.00	21.4	-	13.6	-
Relative Humidity 20 m (%) Average	744	0	0	100.00	99	-	-	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	98	-	-	-
Relative Humidity 100 m (%) Average	744	0	0	100.00	99	-	-	-
Relative Humidity 167 m (%) Average	744	0	0	100.00	99	-	-	-
Wind Speed 20 m (km/h) Average	729	0	15	97.98	26	-	-	-
Wind Speed 45 m (km/h) Average	724	0	20	97.31	35	-	-	-
Wind Speed 100 m (km/h) Average	728	0	16	97.85	46	-	-	-
Wind Speed 167 m (km/h) Average	726	0	18	97.58	50	-	-	-
Wind Direction 20 m (deg) Average	729	0	15	97.98	-	-	-	-
Wind Direction 45 m (deg) Average	724	0	20	97.31	-	-	-	-
Wind Direction 100 m (deg) Average	728	0	16	97.85	-	-	-	-
Wind Direction 167 m (deg) Average	726	0	18	97.58	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	729	0	15	97.98	0.6	-	-	-
Vertical Wind Speed 45 m (km/h) Average	724	0	20	97.31	1.6	-	-	-
Vertical Wind Speed 100 m (km/h) Average	728	0	16	97.85	4.2	-	-	-
Vertical Wind Speed 167 m (km/h) Average	726	0	18	97.58	4.9	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
Temperature 20 m (C) Average	744	5.45	4.6	-	-2.8	0.2	1.5	4.7	8.4	11.9	20.5
Temperature 45 m (C) Average	744	5.48	4.6	-	-2.5	0.2	1.5	4.8	8.4	12.1	21.1
Temperature 100 m (C) Average	744	5.39	4.8	-	-1.5	-0.2	1.3	4.6	8.4	12.3	21.8
Temperature 167 m (C) Average	744	5.2	4.9	-	-1.8	-0.6	0.9	4.4	8.8	12.2	21.4
Relative Humidity 20 m (%) Average	744	75.6	15	-	36	54	65	78	88	93	99
Relative Humidity 45 m (%) Average	744	74.2	15	-	33	52	64	76	86	92	98
Relative Humidity 100 m (%) Average	744	73.6	15	-	30	51	63	75	86	93	99
Relative Humidity 167 m (%) Average	744	73.4	16	-	30	52	62	74	87	95	99
Wind Speed 20 m (km/h) Average	729	8.6	6	-	0	2	4	8	13	17	26
Wind Speed 45 m (km/h) Average	724	11.3	7	-	0	3	5	10	17	21	35
Wind Speed 100 m (km/h) Average	728	16.9	10	-	1	5	8	15	25	32	46
Wind Speed 167 m (km/h) Average	726	19.9	11	-	1	7	11	17	29	37	50
Wind Direction 20 m (deg) Average	729	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	724	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	728	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	726	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	729	-0.09	0.2	-	-0.7	-0.4	-0.2	-0.1	0	0.1	0.6
Vertical Wind Speed 45 m (km/h) Average	724	0.12	0.6	-	-1.7	-0.7	-0.2	0.1	0.6	1	1.6
Vertical Wind Speed 100 m (km/h) Average	728	0.51	1	-	-1.6	-0.4	-0.1	0.2	0.9	2	4.2
Vertical Wind Speed 167 m (km/h) Average	726	0.83	1.1	-	-1.5	-0.2	0.2	0.5	1.3	2.4	4.9

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	02 Oct 2014 01:00	02 Oct 2014 02:00	2	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	24 Oct 2014 06:00	24 Oct 2014 06:00	1	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	27 Oct 2014 00:00	27 Oct 2014 11:00	12	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	02 Oct 2014 01:00	02 Oct 2014 02:00	2	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	24 Oct 2014 06:00	24 Oct 2014 11:00	6	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	26 Oct 2014 22:00	27 Oct 2014 09:00	12	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	01 Oct 2014 23:00	02 Oct 2014 03:00	5	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	24 Oct 2014 06:00	24 Oct 2014 16:00	11	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	01 Oct 2014 22:00	02 Oct 2014 07:00	10	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	24 Oct 2014 05:00	24 Oct 2014 12:00	8	Flat line in sensor output signal

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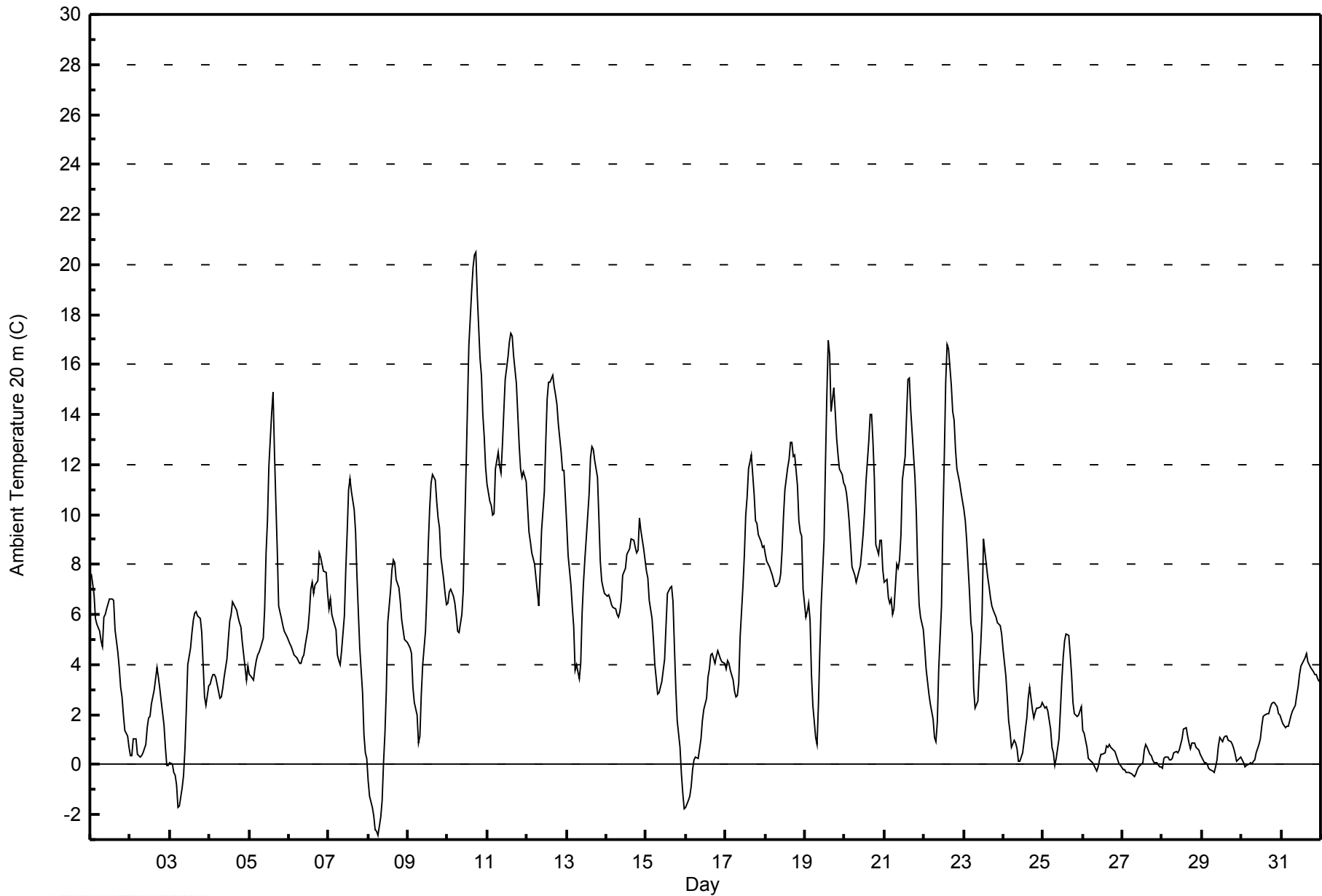


Maximum Value: 20.5 C on Oct 10 18:00		Maximum Daily Average: 13.1 C on Oct 11		Hours in Service: 744																																												
Minimum Value: -2.8 C on Oct 8 07:00		Minimum Daily Average: 0.0 C on Oct 27		Hours of Data: 744																																												
Maximum Diurnal Average: 8.7 C at hour 16		Minimum Diurnal Average: 2.8 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 5.45 C		Percentiles: P <sub>1</sub> = -1.7 P <sub>10</sub> = 0.2 Q <sub>1</sub> = 1.5 Median = 4.7 Q <sub>3</sub> = 8.4 P <sub>90</sub> = 11.9 P <sub>99</sub> = 17.1		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-Oct	7.6	7.2	6.8	5.8	5.6	5.3	5.0	4.7	5.9	6.0	6.2	6.6	6.6	6.6	6.6	5.4	4.5	3.9	3.1	2.7	2.0	1.4	1.1	0.7	4.9	7.6																						
2-Oct	0.4	0.4	1.0	1.0	0.4	0.4	0.3	0.3	0.4	0.8	1.5	1.9	1.9	2.4	3.0	3.4	3.9	3.5	3.1	2.6	1.6	0.7	0.0	0.0	1.4	3.9																						
3-Oct	0.1	0.0	-0.3	-0.4	-0.8	-1.7	-1.7	-0.9	-0.4	0.6	2.2	4.0	4.7	5.3	5.8	6.0	6.1	6.0	5.9	5.3	4.0	2.7	2.4	3.2	2.4	6.1																						
4-Oct	3.2	3.4	3.6	3.6	3.5	2.9	2.6	2.7	3.0	3.5	4.2	5.0	5.7	6.0	6.5	6.4	6.2	5.9	5.7	5.5	4.9	3.9	3.4	3.9	4.4	6.5																						
5-Oct	3.6	3.5	3.4	3.8	4.2	4.4	4.5	4.6	5.0	6.2	8.5	9.7	11.9	14.0	14.9	12.5	10.5	8.6	6.4	5.8	5.6	5.3	5.2	5.1	7.0	14.9																						
6-Oct	4.8	4.7	4.6	4.4	4.3	4.3	4.0	4.0	4.3	4.4	4.8	5.4	6.1	7.0	7.3	6.9	7.2	7.4	8.5	8.3	8.0	7.7	7.7	6.9	6.0	8.5																						
7-Oct	6.2	6.6	6.0	5.8	5.4	4.4	4.1	4.0	4.5	6.0	7.8	9.3	11.0	11.4	10.9	10.2	9.3	7.5	6.0	4.7	2.9	1.2	0.5	0.3	6.1	11.4																						
8-Oct	-0.6	-1.3	-1.7	-2.1	-2.6	-2.6	-2.8	-2.1	-1.4	0.1	1.2	3.0	5.7	7.0	7.8	8.2	8.1	7.4	7.1	6.5	5.8	5.4	5.0	4.9	2.7	8.2																						
9-Oct	4.7	4.6	4.4	3.1	2.5	2.0	0.8	1.1	2.8	4.0	5.3	6.9	8.8	10.2	11.3	11.6	11.4	10.5	9.9	9.4	8.3	7.4	6.9	6.4	6.4	11.6																						
10-Oct	6.5	6.9	7.0	6.7	6.4	5.9	5.3	5.3	6.0	6.9	9.4	11.7	14.3	16.7	18.9	19.9	20.4	20.5	18.8	16.2	15.6	14.0	13.1	11.9	11.9	20.5																						
11-Oct	11.2	10.6	10.4	10.0	10.0	11.8	12.5	11.9	11.7	12.8	14.1	15.4	16.3	16.9	17.3	17.2	16.4	15.2	14.0	12.8	11.8	11.5	11.7	11.3	13.1	17.3																						
12-Oct	10.3	9.3	8.9	8.5	8.0	7.5	6.9	6.3	7.7	9.4	10.9	12.9	14.6	15.3	15.3	15.5	15.1	14.8	14.4	13.6	12.5	11.7	11.8	10.7	11.3	15.5																						
13-Oct	9.6	8.4	7.2	6.3	5.5	3.8	4.0	3.4	4.1	6.1	7.3	8.3	9.1	10.8	12.2	12.7	12.6	12.1	11.5	9.9	8.1	7.3	7.0	6.9	8.1	12.7																						
14-Oct	6.7	6.8	6.6	6.4	6.3	6.2	6.0	5.9	6.1	6.6	7.6	7.9	8.4	8.5	8.6	9.0	9.0	8.7	8.5	8.6	9.8	9.4	8.6	8.2	7.7	9.8																						
15-Oct	7.7	7.5	6.5	5.8	5.0	4.0	3.4	2.8	2.9	3.3	3.8	4.2	5.6	6.9	7.1	7.1	6.5	4.7	3.0	1.7	0.7	-0.4	-1.2	-1.8	4.0	7.7																						
16-Oct	-1.7	-1.4	-1.2	-0.9	-0.2	0.2	0.3	0.2	0.6	1.0	1.8	2.2	2.6	3.5	3.8	4.4	4.5	4.0	4.3	4.6	4.4	4.2	4.1	4.1	2.1	4.6																						
17-Oct	3.9	4.1	4.1	3.8	3.4	2.9	2.7	2.7	3.3	5.1	7.1	8.4	10.0	10.7	11.8	12.4	11.6	10.8	9.8	9.7	9.2	8.9	8.7	8.7	7.2	12.4																						
18-Oct	8.4	8.2	7.9	7.8	7.5	7.3	7.1	7.1	7.3	7.7	8.6	9.9	11.0	11.9	12.2	12.9	12.9	12.3	12.4	11.2	9.7	9.3	9.2	7.0	9.4	12.9																						
19-Oct	5.9	6.1	6.4	5.8	3.6	2.3	1.1	0.8	2.4	4.6	6.5	9.0	12.0	14.8	17.0	16.4	14.1	15.1	14.1	13.0	12.4	11.8	11.6	11.3	9.1	17.0																						
20-Oct	11.1	10.8	10.4	9.7	7.9	7.7	7.6	7.3	7.5	8.0	8.6	9.3	10.1	11.3	13.0	14.0	14.0	12.9	11.4	8.8	8.4	9.0	9.0	7.8	9.8	14.0																						
21-Oct	7.3	7.4	6.7	6.5	6.6	6.0	6.2	8.0	7.9	8.2	9.2	11.4	12.3	13.9	15.4	15.5	14.2	13.3	11.5	10.0	7.8	6.4	5.9	5.4	9.3	15.5																						
22-Oct	4.7	3.9	3.3	2.8	2.4	1.8	1.1	0.9	1.7	3.8	6.3	9.8	12.3	15.3	16.8	16.6	15.2	14.1	13.8	12.6	11.8	11.2	10.9	10.5	8.5	16.8																						
23-Oct	10.2	9.7	9.0	6.9	5.7	5.2	3.0	2.3	2.6	3.8	4.7	6.0	9.0	8.5	7.5	7.1	6.7	6.3	6.1	5.9	5.7	5.6	5.5	5.2	6.2	10.2																						
24-Oct	4.6	3.5	2.7	1.8	1.3	0.7	1.0	0.9	0.6	0.1	0.1	0.5	0.9	1.4	1.8	2.6	3.1	2.2	1.9	2.1	2.3	2.3	2.3	2.5	1.8	4.6																						
25-Oct	2.3	2.2	2.3	2.2	1.4	0.7	0.5	0.0	0.3	1.0	2.1	3.3	4.3	5.0	5.2	5.2	4.4	3.6	2.5	2.0	1.9	2.0	2.1	2.3	2.4	5.2																						
26-Oct	1.4	1.3	0.7	0.3	0.2	0.1	0.1	-0.1	-0.3	-0.1	0.2	0.4	0.4	0.5	0.8	0.7	0.8	0.7	0.6	0.5	0.3	0.2	0.0	-0.1	0.4	1.4																						
27-Oct	-0.2	-0.2	-0.3	-0.3	-0.3	-0.4	-0.4	-0.5	-0.4	-0.2	-0.1	0.0	0.1	0.6	0.8	0.7	0.4	0.4	0.2	0.1	0.1	0.1	-0.1	-0.1	0.0	0.8																						
28-Oct	-0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.5	0.5	0.5	0.6	0.8	1.0	1.4	1.5	1.2	0.9	0.7	0.8	0.9	0.7	0.6	0.6	0.4	0.6	1.5																						
29-Oct	0.3	0.1	0.1	0.0	-0.1	-0.2	-0.3	-0.3	-0.1	0.2	0.7	1.1	0.9	1.1	1.1	1.2	0.9	0.9	0.8	0.7	0.4	0.1	0.2	0.3	0.4	1.2																						
30-Oct	0.2	0.1	-0.1	0.0	0.0	0.1	0.0	0.2	0.2	0.4	0.8	1.0	1.5	1.9	2.0	2.0	2.1	2.2	2.4	2.5	2.5	2.3	2.1	2.0	1.2	2.5																						
31-Oct	1.8	1.6	1.5	1.5	1.6	1.7	2.0	2.1	2.4	2.8	3.1	3.6	3.9	4.1	4.2	4.4	4.1	4.0	3.9	3.7	3.6	3.6	3.4	3.3	3.0	4.4																						
																								4.6	4.4	4.1	3.8	3.4	3.1	2.8	2.8	3.2	4.0	5.0	6.1	7.2	8.1	8.7	8.7	8.3	7.7	7.2	6.5	5.9	5.4	5.1	4.8	Diurnal Average
																								11.2	10.8	10.4	10.0	10.0	11.8	12.5	11.9	11.7	12.8	14.1	15.4	16.3	16.9	18.9	19.9	20.4	20.5	18.8	16.2	15.6	14.0	13.1	11.9	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature 20 m (AT20m) - C**  
**Lower Camp Met Tower - October 2014**





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

**Ambient Temperature 20 m (AT20m) - C**  
**Lower Camp Met Tower - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	53	7.12	7.12
0 - 10	563	75.67	82.80
10 - 20	126	16.94	99.73
> 20	2	0.27	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

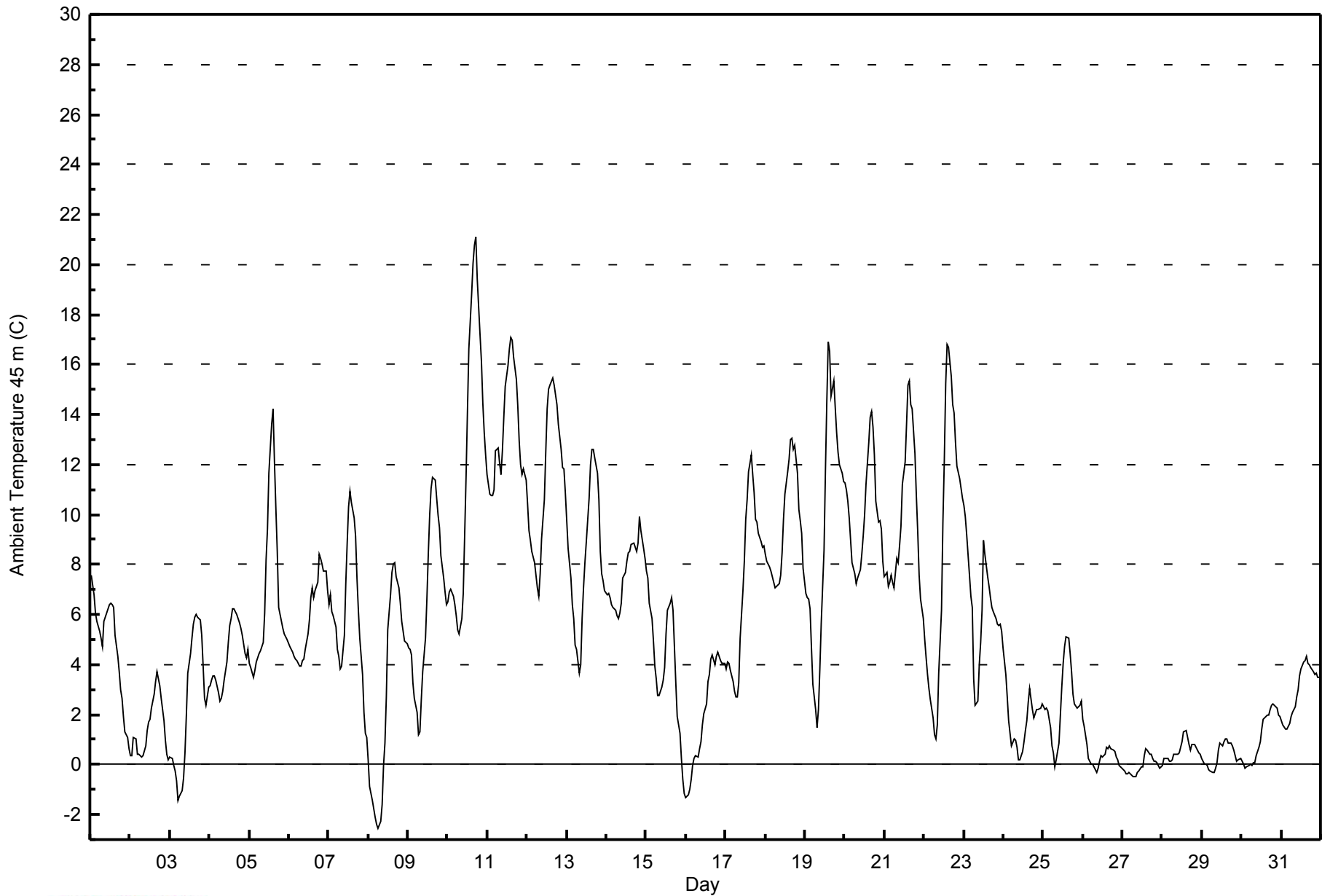


Maximum Value: 21.1 C on Oct 10 18:00		Maximum Daily Average: 13.2 C on Oct 11		Hours in Service: 744																																												
Minimum Value: -2.5 C on Oct 8 07:00		Minimum Daily Average: -0.1 C on Oct 27		Hours of Data: 744																																												
Maximum Diurnal Average: 8.6 C at hour 16		Minimum Diurnal Average: 2.8 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 5.48 C		Percentiles: P <sub>1</sub> = -1.4 P <sub>10</sub> = 0.2 Q <sub>1</sub> = 1.5 Median = 4.8 Q <sub>3</sub> = 8.4 P <sub>90</sub> = 12.1 P <sub>99</sub> = 16.9		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-Oct	7.6	7.2	6.8	6.0	5.7	5.3	5.1	4.7	5.7	5.9	6.1	6.4	6.5	6.4	6.3	5.2	4.4	3.7	3.0	2.6	1.9	1.3	1.1	0.7	4.8	7.6																						
2-Oct	0.4	0.4	1.1	1.0	0.4	0.4	0.3	0.3	0.4	0.8	1.3	1.7	1.8	2.2	2.8	3.3	3.7	3.4	3.1	2.6	1.7	1.0	0.4	0.2	1.5	3.7																						
3-Oct	0.3	0.2	-0.1	-0.2	-0.6	-1.4	-1.2	-1.0	-0.5	0.4	2.0	3.7	4.4	5.1	5.6	5.9	6.0	5.9	5.8	5.2	3.9	2.7	2.3	3.1	2.4	6.0																						
4-Oct	3.2	3.4	3.5	3.5	3.4	2.9	2.6	2.6	2.9	3.4	4.1	4.9	5.5	5.8	6.2	6.2	6.0	5.8	5.6	5.5	5.2	4.4	4.3	4.6	4.4	6.2																						
5-Oct	4.0	3.9	3.5	3.8	4.1	4.3	4.4	4.5	4.9	6.1	8.2	9.4	11.6	13.6	14.2	12.1	10.3	8.5	6.3	5.7	5.5	5.2	5.1	5.0	6.8	14.2																						
6-Oct	4.7	4.6	4.5	4.3	4.2	4.1	3.9	3.9	4.1	4.2	4.6	5.2	5.8	6.7	7.0	6.7	7.0	7.3	8.4	8.2	8.0	7.8	7.7	7.0	5.8	8.4																						
7-Oct	6.4	6.8	6.1	5.9	5.5	4.6	4.3	3.8	3.9	5.2	7.2	8.9	10.3	11.0	10.5	9.9	9.1	7.5	6.2	5.1	3.6	2.1	1.2	1.1	6.1	11.0																						
8-Oct	0.2	-0.9	-1.5	-1.8	-2.1	-2.4	-2.5	-2.3	-1.6	0.0	0.9	2.7	5.4	6.8	7.7	8.0	8.1	7.5	7.1	6.5	5.7	5.3	5.0	4.8	2.8	8.1																						
9-Oct	4.7	4.6	4.4	3.3	2.7	2.1	1.2	1.3	2.6	3.7	5.0	6.6	8.4	10.0	11.0	11.5	11.4	10.7	10.0	9.5	8.3	7.5	6.9	6.4	6.4	11.5																						
10-Oct	6.5	6.9	7.0	6.7	6.4	5.9	5.4	5.2	5.9	6.9	9.1	11.5	14.1	16.6	18.8	20.0	20.8	21.1	19.4	17.2	16.1	14.4	13.3	12.4	12.0	21.1																						
11-Oct	11.6	10.8	10.8	10.8	11.0	12.6	12.7	12.0	11.6	12.5	13.9	15.1	15.9	16.6	17.1	17.0	16.3	15.4	14.3	12.9	12.0	11.6	11.8	11.4	13.2	17.1																						
12-Oct	10.4	9.3	8.9	8.5	8.1	7.6	7.0	6.7	7.6	9.0	10.6	12.5	14.2	15.0	15.2	15.5	15.2	14.8	14.4	13.6	12.6	11.9	11.8	10.9	11.3	15.5																						
13-Oct	9.8	8.6	7.4	6.4	5.9	4.8	4.6	3.7	4.0	5.8	7.1	8.1	8.9	10.6	12.0	12.6	12.6	12.2	11.6	10.6	8.5	7.6	7.3	7.0	8.2	12.6																						
14-Oct	6.8	6.9	6.7	6.4	6.3	6.2	6.0	5.8	6.1	6.5	7.4	7.7	8.1	8.5	8.5	8.8	8.9	8.7	8.5	8.9	9.9	9.4	8.6	8.3	7.7	9.9																						
15-Oct	7.7	7.5	6.5	5.8	4.9	3.9	3.4	2.8	2.7	3.1	3.4	3.9	5.2	6.2	6.5	6.7	6.2	4.7	3.3	1.9	1.2	0.2	-0.6	-1.1	4.0	7.7																						
16-Oct	-1.3	-1.2	-1.0	-0.6	0.0	0.2	0.4	0.3	0.6	0.9	1.6	2.0	2.4	3.3	3.6	4.2	4.4	4.0	4.3	4.5	4.3	4.1	4.1	4.0	2.1	4.5																						
17-Oct	3.8	4.1	4.0	3.8	3.3	2.9	2.7	2.7	3.3	5.1	7.0	8.2	9.8	10.6	11.7	12.4	11.6	10.9	9.8	9.7	9.2	8.9	8.7	8.7	7.2	12.4																						
18-Oct	8.4	8.1	7.9	7.7	7.5	7.3	7.1	7.1	7.2	7.6	8.5	9.8	10.8	11.7	12.2	13.0	13.1	12.6	12.8	11.7	10.2	9.7	9.2	7.9	9.5	13.1																						
19-Oct	6.8	6.7	6.6	6.2	4.6	3.2	2.2	1.5	2.2	3.8	5.6	8.6	11.8	14.6	16.9	16.5	14.7	15.3	14.3	13.3	12.5	12.0	11.7	11.3	9.3	16.9																						
20-Oct	11.3	11.0	10.5	9.8	8.1	7.9	7.6	7.3	7.5	7.8	8.4	9.1	10.0	11.2	12.9	13.9	14.1	13.5	12.4	10.5	9.7	9.7	9.4	8.1	10.1	14.1																						
21-Oct	7.5	7.7	7.1	7.3	7.6	7.3	7.1	8.2	8.1	8.7	9.5	11.2	12.1	13.6	15.2	15.4	14.4	14.2	12.4	10.8	9.3	7.5	6.6	5.8	9.8	15.4																						
22-Oct	5.0	4.3	3.6	3.1	2.6	1.9	1.2	1.0	1.6	3.6	6.2	9.7	12.2	15.2	16.8	16.7	15.5	14.4	14.0	12.9	11.9	11.4	11.0	10.6	8.6	16.8																						
23-Oct	10.3	9.9	9.2	7.6	6.7	6.3	3.5	2.4	2.6	4.0	4.9	6.2	9.0	8.4	7.5	7.1	6.7	6.3	6.1	5.8	5.6	5.6	5.6	5.3	6.4	10.3																						
24-Oct	4.7	3.6	2.7	1.8	1.3	0.7	1.0	1.0	0.7	0.2	0.2	0.5	0.9	1.4	1.7	2.5	3.0	2.2	1.9	2.0	2.2	2.2	2.3	2.4	1.8	4.7																						
25-Oct	2.3	2.2	2.2	2.1	1.5	0.8	0.5	-0.1	0.2	0.9	2.0	3.1	4.0	4.7	5.1	5.1	4.4	3.7	2.8	2.4	2.3	2.3	2.4	2.6	2.5	5.1																						
26-Oct	1.8	1.5	0.8	0.3	0.1	0.0	0.0	-0.2	-0.3	-0.1	0.1	0.3	0.3	0.4	0.7	0.6	0.8	0.6	0.6	0.5	0.3	0.2	0.0	-0.1	0.4	1.8																						
27-Oct	-0.2	-0.3	-0.4	-0.4	-0.3	-0.4	-0.5	-0.5	-0.5	-0.3	-0.2	-0.1	-0.1	0.3	0.6	0.6	0.4	0.4	0.2	0.1	0.1	0.1	-0.2	-0.1	-0.1	0.6																						
28-Oct	0.0	0.2	0.3	0.3	0.1	0.1	0.2	0.4	0.4	0.4	0.5	0.7	0.9	1.3	1.4	1.1	0.8	0.6	0.8	0.8	0.7	0.6	0.5	0.4	0.6	1.4																						
29-Oct	0.2	0.0	0.0	0.0	-0.2	-0.2	-0.3	-0.3	-0.2	0.0	0.6	0.9	0.7	0.9	1.0	1.1	0.9	0.9	0.7	0.6	0.3	0.1	0.2	0.2	0.3	1.1																						
30-Oct	0.1	0.0	-0.1	-0.1	0.0	0.0	-0.1	0.1	0.1	0.4	0.7	0.9	1.4	1.8	1.9	2.0	2.0	2.2	2.3	2.4	2.4	2.3	2.0	1.9	1.1	2.4																						
31-Oct	1.7	1.6	1.4	1.4	1.5	1.7	1.9	2.1	2.3	2.7	3.0	3.5	3.9	4.1	4.2	4.3	4.0	4.0	3.9	3.7	3.6	3.7	3.5	3.5	3.0	4.3																						
																								4.7	4.5	4.2	3.9	3.6	3.2	3.0	2.8	3.1	3.8	4.8	5.9	7.0	7.9	8.5	8.6	8.3	7.8	7.3	6.7	6.1	5.6	5.3	5.0	Diurnal Average
																								11.6	11.0	10.8	10.8	11.0	12.6	12.7	12.0	11.6	12.5	13.9	15.1	15.9	16.6	18.8	20.0	20.8	21.1	19.4	17.2	16.1	14.4	13.3	12.4	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature 45 m (AT45m) - C**  
**Lower Camp Met Tower - October 2014**





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

**Ambient Temperature 45 m (AT45m) - C**  
**Lower Camp Met Tower - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	55	7.39	7.39
0 - 10	559	75.13	82.53
10 - 20	127	17.07	99.60
> 20	3	0.40	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

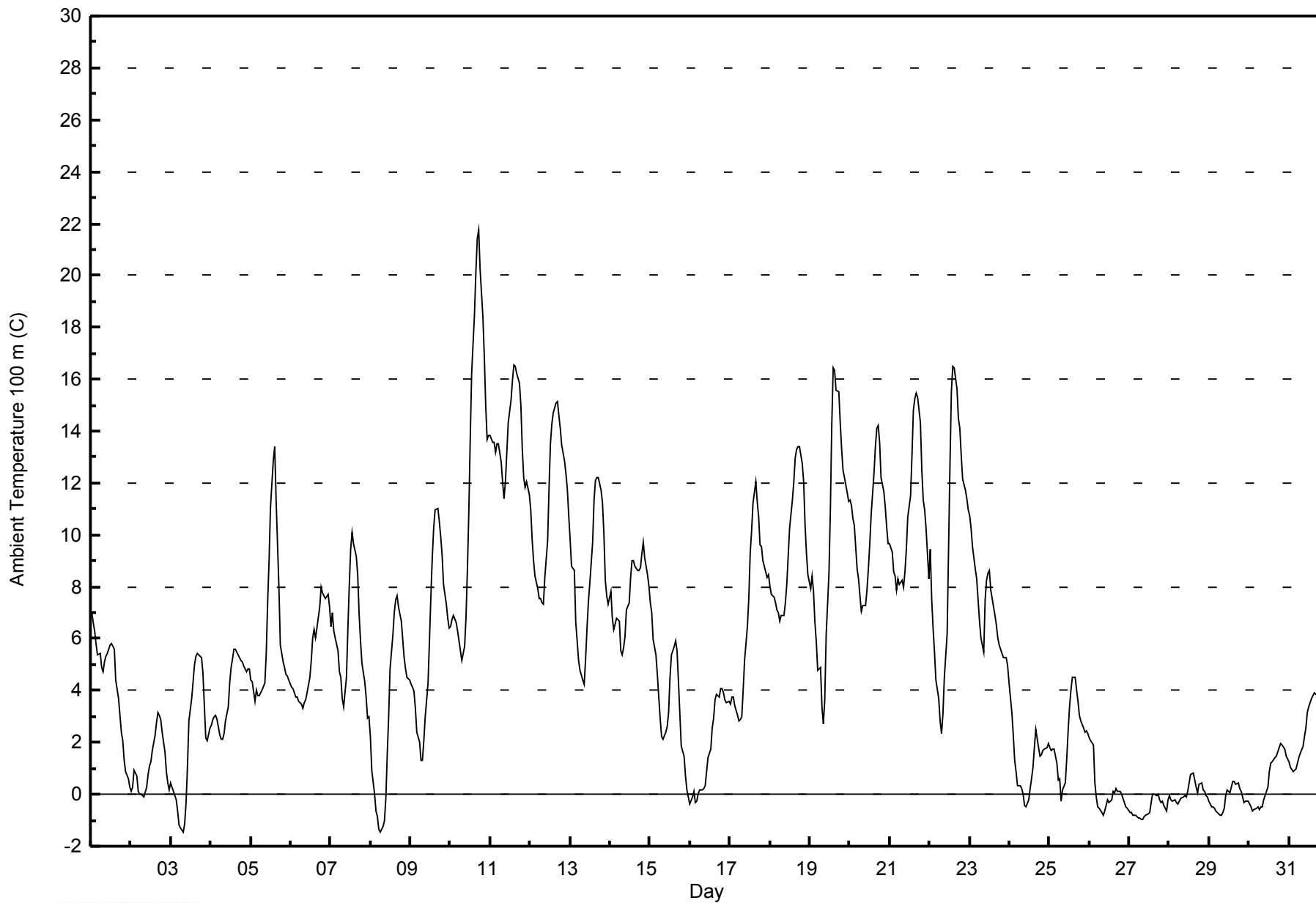


Maximum Value: 21.8 C on Oct 10 18:00      Maximum Daily Average: 13.7 C on Oct 11																								Hours in Service: 744 Hours of Data: 744																								
Minimum Value: -1.5 C on Oct 3 08:00      Minimum Daily Average: -0.5 C on Oct 27 Maximum Diurnal Average: 8.1 C at hour 16      Minimum Diurnal Average: 2.9 C at hour 8 Monthly Average: 5.39 C      Percentiles: $P_1 = -1.1$ $P_{10} = -0.2$ $Q_1 = 1.3$ Median = 4.6 $Q_3 = 8.4$ $P_{90} = 12.3$ $P_{99} = 15.4$																								Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	7.0	6.6	6.3	5.8	5.4	5.4	4.9	4.7	5.1	5.3	5.4	5.8	5.8	5.7	5.6	4.4	3.7	3.0	2.4	2.0	1.3	0.9	0.6	0.3	4.3	7.0																						
2-Oct	0.1	0.3	0.9	0.7	0.1	0.0	0.0	0.0	-0.1	0.3	0.8	1.1	1.3	1.7	2.3	2.8	3.1	3.1	2.9	2.4	1.6	0.9	0.4	0.1	1.1	3.1																						
3-Oct	0.5	0.1	0.0	-0.2	-0.6	-1.2	-1.3	-1.5	-1.1	-0.3	1.1	2.8	3.7	4.4	5.0	5.3	5.4	5.4	5.2	4.7	3.4	2.2	2.1	2.6	2.0	5.4																						
4-Oct	2.7	2.9	3.0	3.0	2.9	2.3	2.1	2.1	2.4	2.8	3.4	4.3	4.9	5.2	5.6	5.6	5.4	5.3	5.2	5.1	4.9	4.7	4.8	4.8	4.0	5.6																						
5-Oct	4.4	4.4	3.6	4.0	3.8	3.8	3.9	4.0	4.3	5.4	7.4	9.0	11.1	12.9	13.4	11.4	9.7	8.0	5.7	5.1	4.9	4.6	4.6	4.4	6.4	13.4																						
6-Oct	4.1	4.1	3.9	3.7	3.7	3.6	3.5	3.3	3.5	3.6	3.9	4.5	5.1	6.0	6.3	6.0	6.4	7.2	8.0	7.8	7.7	7.6	7.7	7.2	5.4	8.0																						
7-Oct	6.5	7.0	6.3	6.1	5.5	4.7	4.5	3.7	3.4	4.5	6.4	8.0	9.5	10.1	9.7	9.2	8.5	6.9	5.9	5.0	4.4	3.7	2.9	3.0	6.1	10.1																						
8-Oct	2.2	0.9	0.0	-0.6	-0.8	-1.3	-1.4	-1.2	-1.1	-0.2	1.5	3.0	4.8	6.2	7.0	7.5	7.7	7.2	6.7	6.0	5.3	4.8	4.5	4.4	3.0	7.7																						
9-Oct	4.2	4.2	4.0	3.3	2.4	2.0	1.3	1.3	2.0	3.0	4.3	5.9	7.6	9.1	10.3	11.0	11.0	10.5	9.9	9.2	8.1	7.3	6.8	6.4	6.1	11.0																						
10-Oct	6.4	6.8	6.9	6.6	6.3	5.9	5.5	5.2	5.7	6.8	8.7	10.9	13.7	16.2	18.5	20.1	21.4	21.8	20.3	18.4	16.9	15.0	13.7	13.8	12.1	21.8																						
11-Oct	13.8	13.6	13.6	13.2	13.5	13.5	12.8	12.1	11.4	12.1	13.2	14.3	15.2	15.9	16.5	16.5	16.2	15.9	15.0	13.3	12.2	11.8	12.1	11.6	13.7	16.5																						
12-Oct	10.9	9.8	9.0	8.4	7.9	7.6	7.5	7.4	7.3	8.4	9.8	11.8	13.5	14.3	14.7	15.1	15.1	14.6	14.1	13.4	12.9	12.4	11.8	10.8	11.2	15.1																						
13-Oct	9.8	8.8	8.6	6.6	5.9	5.1	4.8	4.4	4.2	5.2	6.4	7.4	8.2	9.7	11.3	12.1	12.2	12.2	11.7	11.2	10.1	8.3	7.6	7.3	8.3	12.2																						
14-Oct	7.8	6.8	6.4	6.6	6.8	6.7	5.6	5.4	5.6	6.1	7.1	7.4	8.3	9.0	9.0	8.8	8.6	8.6	8.7	9.3	9.7	9.1	8.5	8.0	7.7	9.7																						
15-Oct	7.4	7.0	6.0	5.4	4.6	3.7	2.9	2.2	2.1	2.4	2.6	3.2	4.5	5.4	5.7	5.9	5.6	4.3	3.1	1.8	1.5	0.7	0.2	-0.1	3.7	7.4																						
16-Oct	-0.4	-0.1	0.1	-0.3	-0.3	0.0	0.2	0.2	0.2	0.3	0.9	1.4	1.7	2.6	2.9	3.6	3.9	3.7	4.1	4.1	3.9	3.6	3.5	3.6	1.8	4.1																						
17-Oct	3.5	3.8	3.8	3.4	3.0	2.8	2.9	3.0	4.0	5.1	6.5	7.5	9.3	10.1	11.2	12.1	11.3	10.7	9.6	9.5	9.0	8.6	8.4	8.5	7.0	12.1																						
18-Oct	8.1	7.7	7.6	7.4	7.1	7.0	6.7	6.9	6.9	7.4	8.1	9.1	10.3	11.3	12.1	13.0	13.3	13.4	13.4	12.7	12.0	10.4	9.3	8.5	9.6	13.4																						
19-Oct	8.0	8.4	7.8	6.6	5.9	4.8	4.9	3.4	2.7	3.7	6.1	8.5	11.0	14.3	16.4	16.3	15.6	15.5	14.3	13.3	12.5	12.2	11.6	11.3	9.8	16.4																						
20-Oct	11.4	11.1	10.6	10.4	8.7	8.3	7.7	7.0	7.3	7.3	7.9	8.7	9.6	10.8	12.4	13.4	14.1	14.2	13.6	12.2	11.7	11.1	10.3	9.6	10.4	14.2																						
21-Oct	9.6	9.4	8.6	8.4	7.9	8.3	8.1	8.3	8.0	8.6	9.5	10.7	11.5	13.1	14.8	15.2	15.5	15.3	14.3	12.5	11.4	11.0	10.3	8.3	10.8	15.5																						
22-Oct	9.4	7.5	6.4	5.5	4.4	3.7	2.8	2.4	3.1	4.5	6.2	9.4	12.7	15.5	16.5	16.4	15.6	14.5	14.1	13.1	12.2	11.7	11.4	11.0	9.6	16.5																						
23-Oct	10.8	10.2	9.5	8.7	8.3	7.5	6.7	6.0	5.5	7.5	8.3	8.5	8.6	7.9	7.2	6.9	6.5	6.0	5.7	5.5	5.2	5.3	5.3	4.9	7.2	10.8																						
24-Oct	4.3	3.2	2.3	1.3	0.9	0.4	0.3	0.2	0.0	-0.5	-0.5	-0.2	0.2	0.6	1.0	1.8	2.5	1.8	1.5	1.5	1.7	1.7	1.8	2.0	1.2	4.3																						
25-Oct	1.8	1.7	1.8	1.7	1.2	0.6	0.6	-0.2	0.2	0.4	1.4	2.5	3.4	4.0	4.5	4.5	4.0	3.6	3.0	2.8	2.6	2.4	2.5	2.3	2.2	4.5																						
26-Oct	2.2	2.1	1.9	0.4	-0.1	-0.5	-0.5	-0.7	-0.8	-0.6	-0.4	-0.2	-0.3	-0.2	0.1	0.1	0.2	0.1	0.1	0.0	-0.2	-0.3	-0.5	-0.5	0.1	2.2																						
27-Oct	-0.7	-0.7	-0.8	-0.8	-0.8	-0.9	-0.9	-1.0	-1.0	-0.8	-0.8	-0.7	-0.7	-0.3	0.0	0.0	0.0	0.0	-0.2	-0.3	-0.3	-0.4	-0.6	-0.2	-0.5	0.0																						
28-Oct	0.0	-0.2	-0.3	-0.2	-0.3	-0.4	-0.3	-0.2	-0.1	-0.1	-0.1	0.1	0.4	0.8	0.8	0.6	0.3	0.1	0.4	0.4	0.2	0.1	0.0	-0.1	0.1	0.8																						
29-Oct	-0.2	-0.5	-0.5	-0.5	-0.7	-0.7	-0.8	-0.8	-0.7	-0.6	0.0	0.2	0.1	0.3	0.5	0.5	0.4	0.4	0.2	0.1	-0.1	-0.3	-0.3	-0.3	-0.2	0.5																						
30-Oct	-0.4	-0.5	-0.6	-0.6	-0.5	-0.5	-0.6	-0.5	-0.5	-0.2	0.1	0.3	0.9	1.2	1.3	1.4	1.5	1.6	1.8	1.9	1.9	1.8	1.5	1.3	0.6	1.9																						
31-Oct	1.2	1.0	0.9	0.9	1.0	1.2	1.4	1.6	1.8	2.3	2.6	3.1	3.3	3.7	3.8	3.9	3.8	3.9	4.2	3.6	3.4	3.5	3.5	3.2	2.6	4.2																						
																								5.0	4.7	4.4	4.0	3.7	3.3	3.1	2.9	3.0	3.5	4.4	5.4	6.4	7.3	8.0	8.1	8.0	7.7	7.3	6.7	6.2	5.7	5.4	5.1	Diurnal Average
																								13.8	13.6	13.6	13.2	13.5	13.5	12.8	12.1	11.4	12.1	13.2	14.3	15.2	16.2	18.5	20.1	21.4	21.8	20.3	18.4	16.9	15.0	13.7	13.8	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature 100 m (AT100m) - C**  
**Lower Camp Met Tower - October 2014**







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

**Ambient Temperature 100 m (AT100m) - C**  
**Lower Camp Met Tower - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	102	13.71	13.71
0 - 10	508	68.28	81.99
10 - 20	130	17.47	99.46
> 20	4	0.54	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

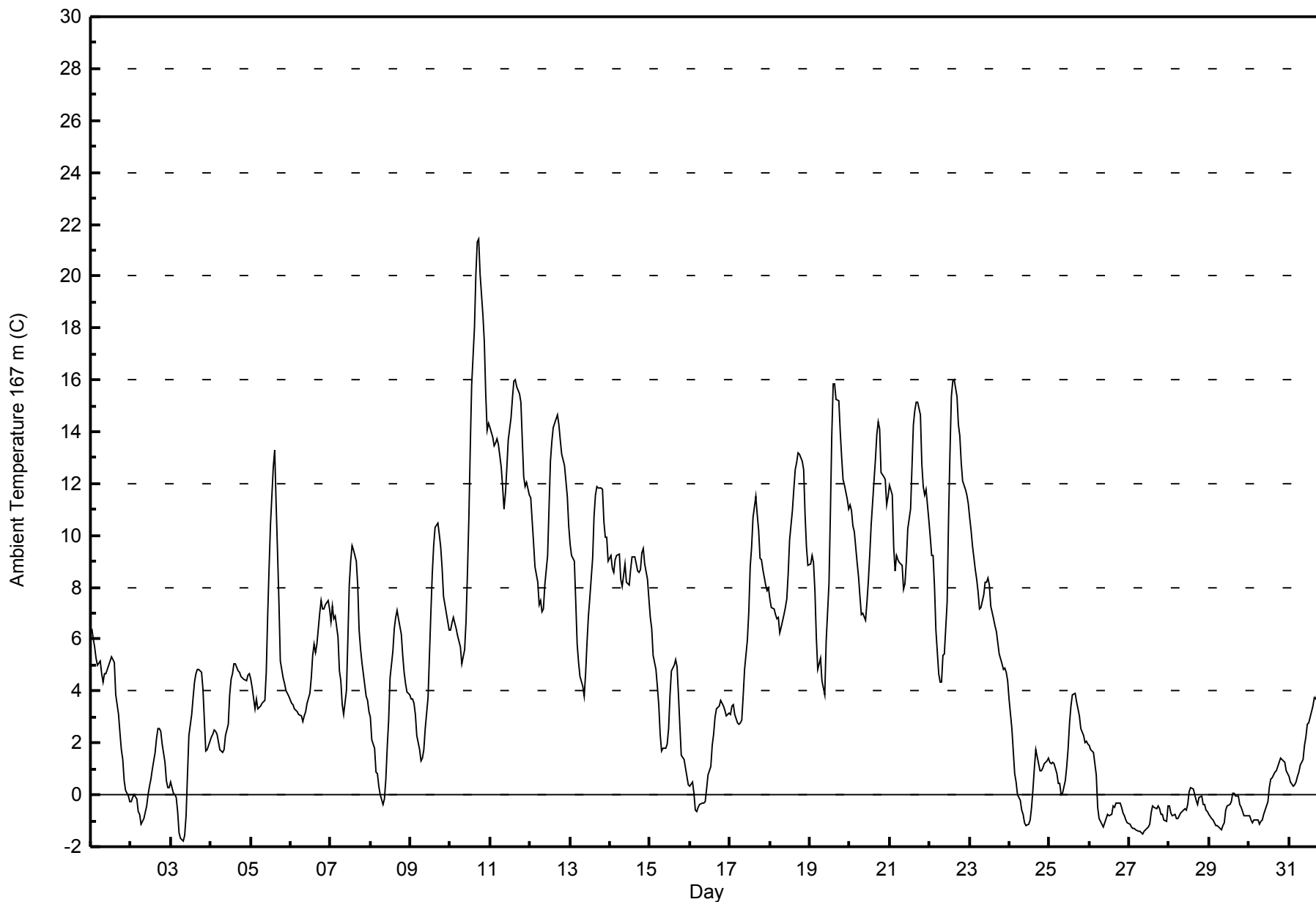


Maximum Value: 21.4 C on Oct 10 18:00																				Maximum Daily Average: 13.6 C on Oct 11					Hours in Service: 744																							
Minimum Value: -1.8 C on Oct 3 08:00																				Minimum Daily Average: -1.0 C on Oct 27					Hours of Data: 744																							
Maximum Diurnal Average: 7.6 C at hour 16																				Minimum Diurnal Average: 2.8 C at hour 8					Hours of Missing Data: 0																							
Monthly Average: 5.20 C																				Percentiles: P <sub>1</sub> = -1.4 P <sub>10</sub> = -0.6 Q <sub>1</sub> = 0.9 Median = 4.4 Q <sub>3</sub> = 8.8 P <sub>90</sub> = 12.2 P <sub>99</sub> = 17.0					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-Oct	6.4	6.0	5.7	5.3	5.0	5.2	4.7	4.4	4.7	4.7	4.8	5.2	5.3	5.2	5.1	3.9	3.1	2.4	1.7	1.4	0.6	0.2	0.0	-0.3	3.8	6.4																						
2-Oct	-0.3	-0.1	0.0	-0.2	-0.6	-0.8	-1.1	-1.0	-0.9	-0.4	0.0	0.3	0.6	1.0	1.6	2.2	2.6	2.6	2.5	2.0	1.3	0.5	0.3	0.3	0.5	2.6																						
3-Oct	0.5	0.1	0.0	-0.1	-0.6	-1.5	-1.7	-1.8	-1.6	-0.8	0.8	2.3	3.1	3.8	4.4	4.7	4.8	4.8	4.7	4.1	2.9	1.7	1.7	2.0	1.6	4.8																						
4-Oct	2.3	2.3	2.5	2.5	2.3	1.8	1.7	1.7	1.8	2.3	2.7	3.9	4.5	4.7	5.1	5.0	4.8	4.7	4.6	4.5	4.5	4.4	4.6	4.7	3.5	5.1																						
5-Oct	4.5	4.1	3.3	3.7	3.3	3.4	3.4	3.6	3.6	4.7	6.9	8.7	10.4	12.7	13.3	11.2	9.4	7.4	5.1	4.5	4.3	4.0	3.9	3.8	6.0	13.3																						
6-Oct	3.5	3.5	3.3	3.3	3.2	3.1	3.0	2.8	3.0	3.2	3.6	3.9	4.5	5.4	5.8	5.5	5.8	7.0	7.5	7.2	7.2	7.3	7.5	7.2	4.9	7.5																						
7-Oct	6.7	7.3	6.8	6.9	6.1	4.8	4.4	3.5	3.1	4.0	6.0	8.1	9.0	9.6	9.5	9.0	8.1	6.4	5.6	5.1	4.2	3.8	3.6	3.2	6.0	9.6																						
8-Oct	3.0	2.1	1.8	0.9	0.8	0.3	0.0	-0.4	-0.1	0.6	1.8	2.9	4.5	5.5	6.4	6.9	7.1	6.8	6.2	5.4	4.7	4.3	4.0	3.9	3.3	7.1																						
9-Oct	3.7	3.7	3.5	3.1	2.3	1.7	1.3	1.4	1.7	2.5	3.8	5.4	7.0	8.5	9.6	10.3	10.5	10.1	9.5	8.8	7.7	7.0	6.7	6.4	5.7	10.5																						
10-Oct	6.4	6.6	6.8	6.4	6.1	5.9	5.7	5.1	5.6	6.7	8.5	10.6	13.4	15.8	18.0	20.1	21.3	21.4	20.1	18.5	17.5	15.5	14.1	14.3	12.1	21.4																						
11-Oct	14.2	13.8	13.5	13.6	13.7	13.5	12.7	11.9	11.0	11.6	12.6	13.7	14.5	15.3	15.9	16.0	15.7	15.5	15.1	13.7	12.3	11.9	12.1	11.5	13.6	16.0																						
12-Oct	11.4	10.6	9.7	8.8	8.2	7.3	7.5	7.0	7.1	8.1	9.2	11.1	12.9	13.6	14.2	14.5	14.7	14.3	13.7	13.1	12.7	12.1	11.5	10.4	11.0	14.7																						
13-Oct	9.6	9.2	9.0	7.4	5.8	5.1	4.6	4.2	3.8	4.6	5.9	6.9	7.6	9.1	10.7	11.5	11.9	11.9	11.8	11.8	10.5	9.9	9.9	9.0	8.4	11.9																						
14-Oct	9.3	8.7	8.6	9.1	9.2	9.3	8.3	8.0	8.4	8.9	8.2	8.1	8.7	9.2	9.2	9.1	8.6	8.6	8.7	9.3	9.5	8.9	8.3	7.6	8.7	9.5																						
15-Oct	6.9	6.4	5.4	4.8	4.2	3.5	2.3	1.7	1.8	1.8	2.0	2.6	3.8	4.8	5.0	5.2	5.0	3.8	2.7	1.5	1.4	1.0	0.7	0.4	3.3	6.9																						
16-Oct	0.3	0.5	0.1	-0.6	-0.6	-0.5	-0.4	-0.3	-0.3	-0.3	0.2	0.8	1.1	1.9	2.3	3.0	3.3	3.4	3.7	3.5	3.4	3.3	3.1	3.1	1.4	3.7																						
17-Oct	3.1	3.4	3.5	3.1	2.8	2.7	2.8	2.9	3.8	4.8	6.0	7.0	8.8	9.6	10.7	11.5	10.8	10.2	9.1	9.1	8.7	8.1	7.9	8.0	6.6	11.5																						
18-Oct	7.6	7.2	7.2	7.0	6.8	6.8	6.3	6.5	7.0	7.2	7.5	8.5	9.8	11.0	11.8	12.5	12.8	13.2	13.1	12.9	12.5	10.8	9.5	8.9	9.3	13.2																						
19-Oct	8.9	9.2	9.0	7.8	6.1	4.8	5.3	4.4	4.1	3.9	5.9	8.1	10.8	13.9	15.8	15.8	15.2	15.2	14.0	13.0	12.2	11.9	11.4	11.0	9.9	15.8																						
20-Oct	11.2	10.9	10.4	10.1	8.9	8.4	7.7	6.9	7.0	6.7	7.4	8.2	9.3	10.4	12.1	12.9	13.9	14.4	14.1	12.4	12.3	12.2	11.2	11.5	10.4	14.4																						
21-Oct	11.9	11.6	9.5	8.6	9.2	9.1	8.9	8.8	7.9	8.1	9.0	10.2	11.0	12.6	14.3	14.8	15.1	15.1	14.6	12.8	11.9	11.6	11.8	10.6	11.2	15.1																						
22-Oct	10.0	9.2	9.2	8.0	6.3	4.7	4.4	4.4	5.4	5.4	7.5	10.7	13.2	15.4	16.0	16.0	15.3	14.3	13.8	12.8	12.1	11.8	11.6	11.2	10.4	16.0																						
23-Oct	10.7	10.2	9.6	8.7	8.3	7.8	7.2	7.2	7.7	8.2	8.2	8.3	8.1	7.3	6.8	6.5	6.3	5.8	5.4	5.1	4.9	4.9	4.7	4.4	7.2	10.7																						
24-Oct	3.7	2.6	1.7	0.8	0.5	0.0	-0.2	-0.6	-0.8	-1.1	-1.2	-1.1	-0.9	-0.5	0.2	1.0	1.7	1.2	0.9	1.0	1.0	1.2	1.3	1.4	0.6	3.7																						
25-Oct	1.3	1.2	1.3	1.2	0.8	0.4	0.4	0.0	0.1	0.5	1.1	1.8	2.8	3.4	3.9	3.9	3.6	3.3	3.1	2.5	2.3	2.0	2.1	1.9	1.9	3.9																						
26-Oct	1.9	1.8	1.6	1.2	0.8	-0.5	-0.9	-1.1	-1.2	-1.1	-0.9	-0.7	-0.8	-0.7	-0.4	-0.5	-0.3	-0.3	-0.3	-0.5	-0.7	-0.8	-1.0	-1.1	-0.3	1.9																						
27-Oct	-1.1	-1.2	-1.3	-1.3	-1.3	-1.4	-1.4	-1.5	-1.5	-1.4	-1.3	-1.2	-1.2	-0.7	-0.4	-0.5	-0.6	-0.5	-0.5	-0.7	-0.7	-1.0	-1.0	-0.4	-1.0	-0.4																						
28-Oct	-0.5	-0.7	-0.8	-0.7	-0.9	-0.9	-0.8	-0.7	-0.6	-0.5	-0.6	-0.4	0.1	0.3	0.2	0.0	-0.2	-0.4	-0.1	0.0	-0.4	-0.4	-0.6	-0.6	-0.4	0.3																						
29-Oct	-0.7	-0.9	-1.0	-1.1	-1.2	-1.2	-1.3	-1.4	-1.2	-1.1	-0.6	-0.4	-0.4	-0.2	0.0	0.0	0.0	-0.1	-0.4	-0.5	-0.6	-0.8	-0.8	-0.8	-0.7	0.0																						
30-Oct	-0.8	-1.0	-1.1	-0.9	-1.0	-1.0	-1.1	-1.0	-1.0	-0.7	-0.4	-0.2	0.3	0.6	0.7	0.9	0.9	1.1	1.3	1.4	1.4	1.2	1.0	0.8	0.0	1.4																						
31-Oct	0.7	0.5	0.3	0.4	0.5	0.7	0.9	1.1	1.4	1.9	2.3	2.7	2.8	3.2	3.4	3.8	3.7	3.9	4.1	3.7	3.2	3.1	3.3	2.9	2.3	4.1																						
																								5.0	4.8	4.5	4.1	3.7	3.3	3.0	2.8	2.9	3.3	4.1	5.0	6.0	6.8	7.5	7.6	7.6	7.3	6.9	6.4	5.9	5.5	5.3	5.1	Diurnal Average
																								14.2	13.8	13.5	13.6	13.7	13.5	12.7	11.9	11.0	11.6	12.6	13.7	14.5	15.8	18.0	20.1	21.3	21.4	20.1	18.5	17.5	15.5	14.1	14.3	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature 167 m (AT167m) - C**  
**Lower Camp Met Tower - October 2014**





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

**Ambient Temperature 167 m (AT167m) - C**  
**Lower Camp Met Tower - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	135	18.15	18.15
0 - 10	473	63.58	81.72
10 - 20	132	17.74	99.46
> 20	4	0.54	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

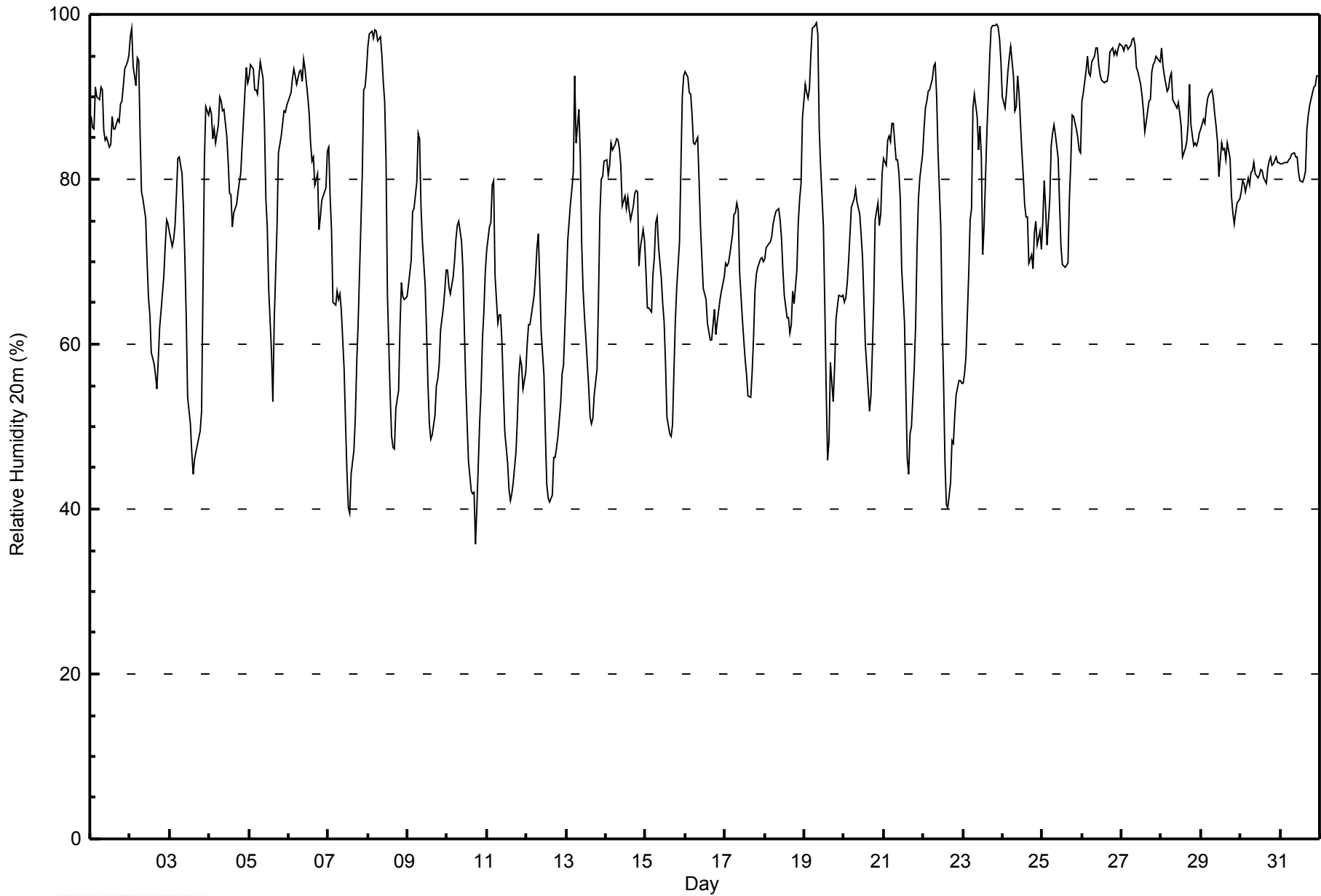


Maximum Value: 99 % on Oct 19 08:00										Maximum Daily Average: 93.8 % on Oct 26										Hours in Service: 744						
Minimum Value: 36 % on Oct 10 18:00										Minimum Daily Average: 56.1 % on Oct 12										Hours of Data: 744						
Maximum Diurnal Average: 84.9 % at hour 7										Minimum Diurnal Average: 62.6 % at hour 15										Hours of Missing Data: 0						
Monthly Average: 75.6 %										Percentiles: P <sub>1</sub> = 41 P <sub>10</sub> = 54 Q <sub>1</sub> = 65 Median = 78 Q <sub>3</sub> = 88 P <sub>90</sub> = 93 P <sub>99</sub> = 98										Hours of Calibration: 0						
																				Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	88	86	86	91	90	90	91	91	86	85	85	84	84	88	86	86	87	87	89	89	91	93	94	95	88.5	95
2-Oct	97	98	94	91	95	94	85	78	78	75	70	66	64	59	58	56	55	58	62	64	68	72	75	75	74.5	98
3-Oct	73	72	73	74	78	83	83	81	76	71	63	54	50	47	44	46	47	48	49	52	67	82	89	88	66.2	89
4-Oct	89	88	85	86	84	87	90	89	88	88	85	82	78	78	74	76	77	78	80	81	84	90	94	92	84.4	94
5-Oct	92	94	93	91	91	90	92	94	92	87	78	74	67	59	53	63	69	74	83	85	87	88	88	89	82.3	94
6-Oct	90	91	92	93	93	92	93	93	92	95	93	90	88	84	82	83	79	81	74	75	77	78	79	83	86.3	95
7-Oct	84	78	74	65	65	66	65	66	64	57	50	45	40	39	44	47	51	58	62	68	81	91	91	93	64.4	93
8-Oct	96	98	98	97	98	98	97	97	95	92	89	82	66	54	49	47	47	52	54	62	67	66	65	66	76.4	98
9-Oct	67	69	70	76	76	80	86	85	77	73	67	61	55	50	48	49	51	55	56	57	62	64	66	69	65.5	86
10-Oct	69	67	66	68	70	73	74	75	72	69	62	55	51	46	42	42	42	36	40	50	54	61	64	69	59.1	75
11-Oct	71	74	75	79	80	68	63	64	64	60	54	49	46	42	41	42	43	47	51	56	58	57	55	57	58.2	80
12-Oct	60	62	62	64	66	69	72	73	68	61	56	49	43	41	41	42	46	46	47	49	53	56	58	62	56.1	73
13-Oct	67	73	77	79	81	93	84	89	83	72	67	63	61	55	51	50	51	54	57	65	76	80	80	82	70.4	93
14-Oct	82	81	82	84	84	84	85	85	84	82	77	78	76	78	76	75	77	78	79	79	70	72	74	72	78.8	85
15-Oct	69	64	64	64	69	70	75	75	72	68	65	63	58	51	49	49	50	57	63	67	72	81	90	93	66.6	93
16-Oct	93	92	91	90	88	84	84	85	80	74	70	67	65	63	62	60	61	64	61	63	64	65	66	68	73.4	93
17-Oct	70	70	70	71	73	76	76	77	76	69	63	61	58	56	54	54	57	61	66	69	69	70	71	70	66.9	77
18-Oct	70	72	72	72	73	75	75	76	76	75	73	69	66	63	63	61	62	66	65	69	75	78	79	88	71.4	88
19-Oct	92	90	90	91	95	98	99	99	98	86	81	74	65	54	46	48	58	53	57	63	65	66	66	66	75.0	99
20-Oct	65	66	67	70	77	77	78	79	77	76	73	70	65	60	55	52	54	59	65	75	77	74	76	81	69.5	81
21-Oct	83	82	85	85	85	87	87	82	82	81	78	69	63	54	46	44	49	50	57	62	72	78	80	83	71.8	87
22-Oct	86	89	89	91	91	92	94	94	90	83	74	63	55	46	40	40	43	48	48	51	54	56	55	55	67.9	94
23-Oct	55	56	58	69	75	76	89	90	88	84	87	83	71	74	86	90	95	98	99	99	99	99	97	94	83.8	99
24-Oct	90	89	90	93	95	96	93	88	89	92	90	83	81	77	75	75	70	71	69	74	75	72	74	72	82.2	96
25-Oct	75	80	77	72	78	84	86	87	85	83	77	72	70	69	69	70	77	82	88	88	86	85	84	83	79.4	88
26-Oct	90	90	93	95	93	93	94	95	96	96	94	93	92	92	92	92	93	95	96	95	96	95	96	96	93.8	96
27-Oct	96	96	96	96	96	96	97	97	96	94	93	92	90	88	86	87	89	90	93	94	94	95	94	94	93.3	97
28-Oct	96	94	93	91	91	92	93	90	89	89	89	88	87	83	84	85	87	91	87	84	84	84	85	86	88.3	96
29-Oct	86	87	87	89	90	90	91	90	88	87	85	80	84	84	84	82	84	83	78	76	75	76	77	78	83.7	91
30-Oct	78	80	79	78	80	79	81	81	82	81	80	81	81	81	80	79	81	82	83	82	82	83	82	82	80.8	83
31-Oct	82	82	82	82	82	82	83	83	83	83	83	81	80	80	80	81	86	88	89	90	91	91	93	93	84.5	93
	80.7	80.9	81.0	81.9	83.2	84.4	84.9	84.8	82.8	79.5	75.9	71.7	67.7	64.4	62.6	63.1	65.1	67.4	69.3	72.1	75.0	77.4	78.6	79.8	Diurnal Average	
	97	98	98	97	98	98	99	99	98	96	94	93	92	92	92	92	95	98	99	99	99	99	97	96	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity 20m (RH20m) - %**  
**Lower Camp Met Tower - October 2014**





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

**Relative Humidity 20m (RH20m) - %**  
**Lower Camp Met Tower - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	2	0.27	0.27
40 - 60	123	16.53	16.80
60 - 80	277	37.23	54.03
80 - 100	342	45.97	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



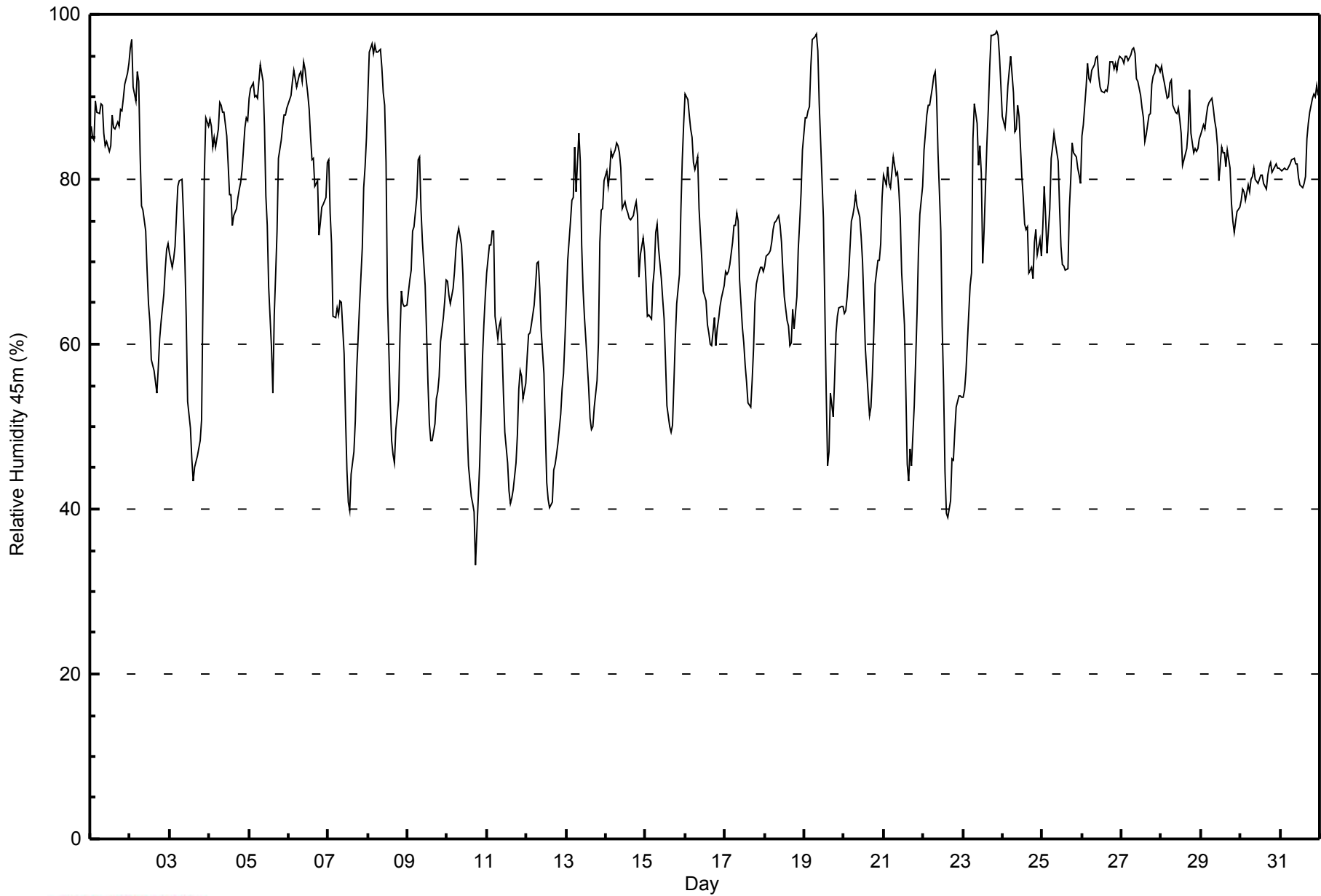
Maximum Value: 98 % on Oct 23 21:00														Maximum Daily Average: 92.3 % on Oct 26														Hours in Service: 744	
Minimum Value: 33 % on Oct 10 18:00														Minimum Daily Average: 55.1 % on Oct 12														Hours of Data: 744	
Maximum Diurnal Average: 83.5 % at hour 8														Minimum Diurnal Average: 62.1 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 74.2 %														Percentiles: P <sub>1</sub> = 41 P <sub>10</sub> = 52 Q <sub>1</sub> = 64 Median = 76 Q <sub>3</sub> = 86 P <sub>90</sub> = 92 P <sub>99</sub> = 97														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Oct	86	85	85	89	88	88	89	89	86	84	85	83	84	88	86	86	87	86	88	88	90	92	93	94	87.5	94			
2-Oct	96	97	91	89	93	92	83	77	76	74	69	65	63	58	57	55	54	57	61	63	66	69	72	72	72.9	97			
3-Oct	71	69	70	72	76	79	80	80	76	70	63	53	50	46	43	45	46	46	48	51	66	81	87	86	64.8	87			
4-Oct	87	87	84	85	84	86	89	88	88	88	85	82	78	78	74	76	76	78	79	80	81	86	87	87	83.1	89			
5-Oct	90	91	92	90	90	90	92	94	92	87	78	74	67	60	54	63	69	74	83	85	86	88	88	89	81.8	94			
6-Oct	90	90	92	93	92	91	93	93	92	94	93	90	88	85	82	83	79	80	73	75	77	77	78	82	86.0	94			
7-Oct	82	76	72	63	63	64	64	65	65	59	51	45	41	40	44	47	51	57	61	65	72	79	82	85	62.2	85			
8-Oct	90	95	97	95	96	95	95	96	94	91	89	82	66	53	48	47	46	50	53	61	66	65	64	65	75.0	97			
9-Oct	66	68	69	74	74	78	82	83	76	73	67	61	55	50	48	48	50	53	54	56	60	63	65	68	64.4	83			
10-Oct	68	66	65	67	69	71	73	74	72	68	62	55	50	45	42	41	40	33	37	45	52	58	62	66	57.6	74			
11-Oct	69	72	72	74	74	63	61	62	63	60	54	49	46	42	41	41	42	46	49	55	57	56	53	55	56.5	74			
12-Oct	59	61	61	62	65	67	70	70	67	62	56	50	43	41	40	41	45	45	47	48	51	55	56	61	55.1	70			
13-Oct	65	70	75	77	78	84	79	86	82	72	67	63	61	55	51	50	50	52	56	60	72	76	76	80	68.2	86			
14-Oct	81	79	81	83	83	84	84	84	83	81	76	77	76	76	75	75	76	77	77	76	68	71	73	71	77.8	84			
15-Oct	68	63	64	63	67	69	74	75	72	68	65	63	58	52	50	49	50	55	61	65	68	76	82	87	65.2	87			
16-Oct	90	90	88	86	85	82	81	83	76	73	70	66	65	62	61	60	60	63	60	62	63	65	66	67	71.9	90			
17-Oct	69	69	69	70	72	74	74	76	75	68	62	60	57	55	53	52	56	59	65	67	68	69	69	69	65.8	76			
18-Oct	70	71	71	71	72	74	75	75	76	74	72	69	66	63	62	60	60	64	62	66	72	75	78	84	70.0	84			
19-Oct	88	87	88	89	94	97	97	98	96	89	85	75	65	54	45	47	54	51	56	61	63	64	65	65	73.9	98			
20-Oct	64	64	66	68	75	76	77	78	77	75	73	70	65	59	54	51	52	56	61	67	70	70	72	78	67.5	78			
21-Oct	80	79	82	79	79	81	83	81	81	79	75	69	62	54	45	43	47	45	53	58	64	71	76	79	68.6	83			
22-Oct	84	86	88	89	89	91	93	93	90	83	74	62	55	45	40	39	41	46	46	49	52	54	54	54	66.5	93			
23-Oct	54	54	57	64	67	69	85	89	87	82	84	81	70	74	84	89	93	97	98	98	98	98	95	91	81.5	98			
24-Oct	88	86	88	91	93	95	91	86	86	89	88	80	78	75	74	74	69	69	68	72	74	71	73	71	80.3	95			
25-Oct	74	79	76	71	76	83	84	86	84	82	77	72	70	69	69	69	76	80	84	83	83	81	81	79	77.9	86			
26-Oct	85	87	91	94	92	92	93	94	95	95	93	91	91	91	91	91	92	94	94	93	94	93	94	95	92.3	95			
27-Oct	95	94	95	95	94	95	96	96	95	92	92	90	89	87	84	85	88	88	91	93	93	94	94	93	92.0	96			
28-Oct	94	93	92	90	90	92	92	89	88	88	89	87	86	82	83	84	86	91	86	83	84	83	84	85	87.4	94			
29-Oct	85	87	86	88	89	89	90	89	87	86	84	80	84	83	83	82	84	81	77	75	73	75	76	77	82.9	90			
30-Oct	77	79	78	77	79	78	80	80	81	80	79	80	81	80	80	79	81	81	82	81	81	82	81	81	80.0	82			
31-Oct	81	81	81	81	81	82	82	82	82	82	82	80	79	79	79	80	85	87	88	90	90	90	91	90	83.7	91			
														78.9 79.2 79.5 80.1 81.3 82.3 83.2 83.5 81.9 79.0 75.5 71.2 67.3 64.0 62.1 62.4 64.0 66.0 67.6 70.0 72.8 75.1 76.4 77.6														Diurnal Average	
														96 97 97 95 96 97 97 98 96 95 93 91 91 91 91 91 93 97 98 98 98 98 95 95														Diurnal Maximum	





**WBEA**  
**Hourly Averages**

**Relative Humidity 45m (RH45m) - %**  
**Lower Camp Met Tower - October 2014**





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

**Relative Humidity 45m (RH45m) - %**  
**Lower Camp Met Tower - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	6	0.81	0.81
40 - 60	127	17.07	17.88
60 - 80	299	40.19	58.06
80 - 100	312	41.94	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity 100m (RH100m) - %**

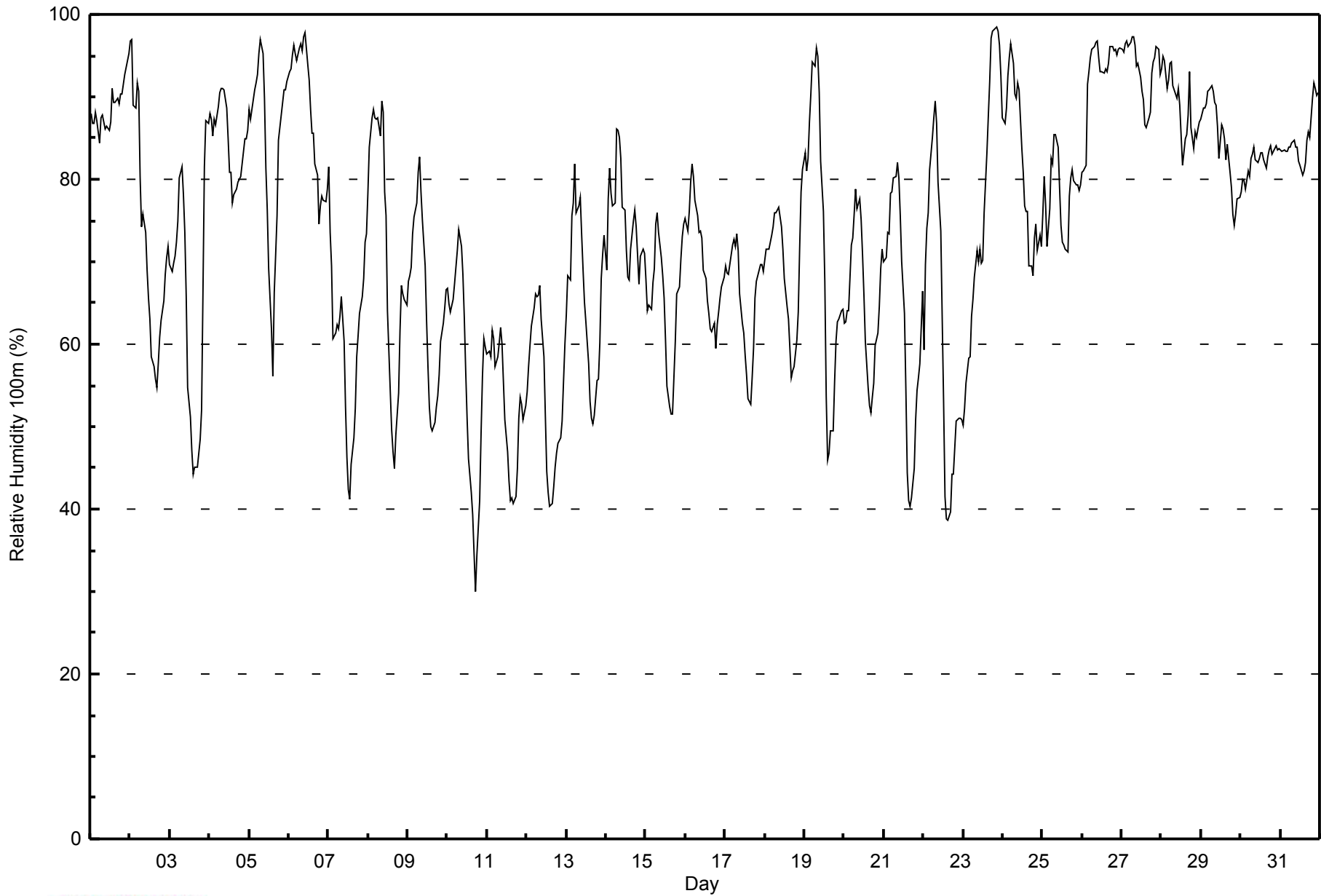
**Lower Camp Met Tower - October 2014**

Maximum Value: 99 % on Oct 23 21:00														Maximum Daily Average: 93.5 % on Oct 27														Hours in Service: 744	
Minimum Value: 30 % on Oct 10 18:00														Minimum Daily Average: 52.7 % on Oct 11														Hours of Data: 744	
Maximum Diurnal Average: 82.4 % at hour 8														Minimum Diurnal Average: 63.2 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 73.6 %														Percentiles: P <sub>1</sub> = 40 P <sub>10</sub> = 51 Q <sub>1</sub> = 63 Median = 75 Q <sub>3</sub> = 86 P <sub>90</sub> = 93 P <sub>99</sub> = 97														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Oct	88	87	87	88	87	84	87	88	87	86	86	86	87	91	89	89	90	89	90	90	92	93	94	95	88.8	95			
2-Oct	97	97	89	89	92	91	80	74	76	74	69	66	63	58	57	56	55	58	61	63	65	69	70	72	72.5	97			
3-Oct	70	69	70	71	72	75	80	82	78	74	66	55	51	47	44	45	45	45	48	52	67	82	87	87	65.0	87			
4-Oct	88	87	85	87	87	89	91	91	91	91	89	85	81	81	77	78	79	80	80	80	82	85	85	86	84.7	91			
5-Oct	88	87	90	91	92	93	95	97	95	90	81	76	69	62	56	66	71	76	85	88	89	91	91	92	83.8	97			
6-Oct	93	93	95	96	95	94	96	96	96	97	98	94	92	89	86	86	82	81	75	77	78	77	77	79	88.4	98			
7-Oct	82	74	70	61	61	62	62	63	66	60	52	46	42	41	46	49	52	58	61	64	66	68	72	73	60.5	82			
8-Oct	78	84	88	89	88	87	87	85	90	88	79	76	64	54	50	47	45	49	54	62	67	66	65	65	71.1	90			
9-Oct	68	68	69	73	76	77	81	83	78	75	69	63	57	52	50	49	50	52	54	56	60	62	64	67	64.9	83			
10-Oct	67	65	64	65	67	69	71	74	72	68	63	57	51	46	42	39	35	30	34	41	49	56	61	60	56.1	74			
11-Oct	59	59	59	62	61	57	58	60	62	60	55	51	47	43	41	41	41	41	45	51	54	53	51	53	52.7	62			
12-Oct	54	57	60	62	64	66	66	66	67	63	58	51	45	42	40	41	43	45	47	48	49	51	55	60	54.2	67			
13-Oct	64	68	68	76	77	82	76	77	78	73	69	65	63	58	53	51	50	51	56	56	60	68	71	73	65.9	82			
14-Oct	69	78	81	78	77	77	86	86	85	83	77	76	71	68	68	72	75	76	74	71	67	71	72	71	75.4	86			
15-Oct	68	64	65	64	67	69	75	76	73	71	68	66	60	55	52	51	51	56	60	66	67	70	73	75	65.2	76			
16-Oct	75	74	76	80	82	80	77	76	74	74	73	69	68	65	64	62	61	63	59	62	64	66	67	68	69.9	82			
17-Oct	70	69	69	70	72	73	72	73	71	66	63	61	59	56	53	53	56	60	66	68	68	70	70	69	65.6	73			
18-Oct	70	71	71	72	73	74	76	76	77	75	74	72	68	65	63	59	56	57	57	61	64	72	79	81	69.3	81			
19-Oct	83	81	83	87	90	94	94	96	95	90	82	76	68	54	46	47	50	49	55	60	63	63	64	64	72.3	96			
20-Oct	63	63	64	64	72	73	76	79	76	78	75	71	66	60	55	53	52	54	55	60	61	65	69	71	65.6	79			
21-Oct	70	70	74	73	78	78	80	80	82	80	76	70	64	55	44	41	40	41	45	51	54	56	58	66	63.7	82			
22-Oct	59	70	74	76	81	85	87	90	87	80	74	63	53	42	39	39	40	44	44	48	51	51	51	51	61.5	90			
23-Oct	50	52	55	58	59	63	65	68	71	70	72	70	70	76	83	88	92	97	98	98	99	98	96	92	76.7	99			
24-Oct	87	87	89	93	95	96	94	90	90	92	91	84	81	77	76	76	69	70	68	73	75	71	73	72	82.0	96			
25-Oct	76	80	77	72	77	83	82	85	85	84	79	74	72	72	72	71	78	80	81	80	79	79	79	79	78.2	85			
26-Oct	81	81	82	91	93	95	96	96	97	97	95	93	93	93	93	93	94	96	96	96	96	95	96	96	93.0	97			
27-Oct	96	96	96	97	96	97	97	97	96	94	94	92	91	90	87	86	87	88	93	94	95	96	96	93	93.5	97			
28-Oct	93	95	94	91	92	94	94	91	90	90	91	89	85	82	85	85	88	93	86	84	86	85	86	87	89.1	95			
29-Oct	87	89	89	89	91	91	91	91	89	89	86	82	87	86	85	82	84	81	79	76	74	76	78	78	84.6	91			
30-Oct	79	80	80	79	81	80	82	83	84	82	82	83	83	83	82	81	83	84	84	83	83	84	83	84	82.2	84			
31-Oct	84	83	83	83	83	84	84	84	85	84	84	82	82	81	81	82	85	86	85	90	92	91	90	90	84.9	92			
	75.9	76.7	77.2	78.3	79.9	81.1	82.0	82.4	82.0	79.9	76.5	72.4	68.8	65.3	63.2	63.2	63.8	65.5	67.0	69.3	71.5	73.5	75.0	75.8	Diurnal Average				
	97	97	96	97	96	97	97	97	97	97	98	94	93	93	93	93	94	97	98	98	99	98	96	96	Diurnal Maximum				



**WBEA**  
**Hourly Averages**

**Relative Humidity 100m (RH100m) - %**  
**Lower Camp Met Tower - October 2014**





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

**Relative Humidity 100m (RH100m) - %**  
**Lower Camp Met Tower - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	7	0.94	0.94
40 - 60	142	19.09	20.03
60 - 80	297	39.92	59.95
80 - 100	298	40.05	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity 167m (RH167m) - %**

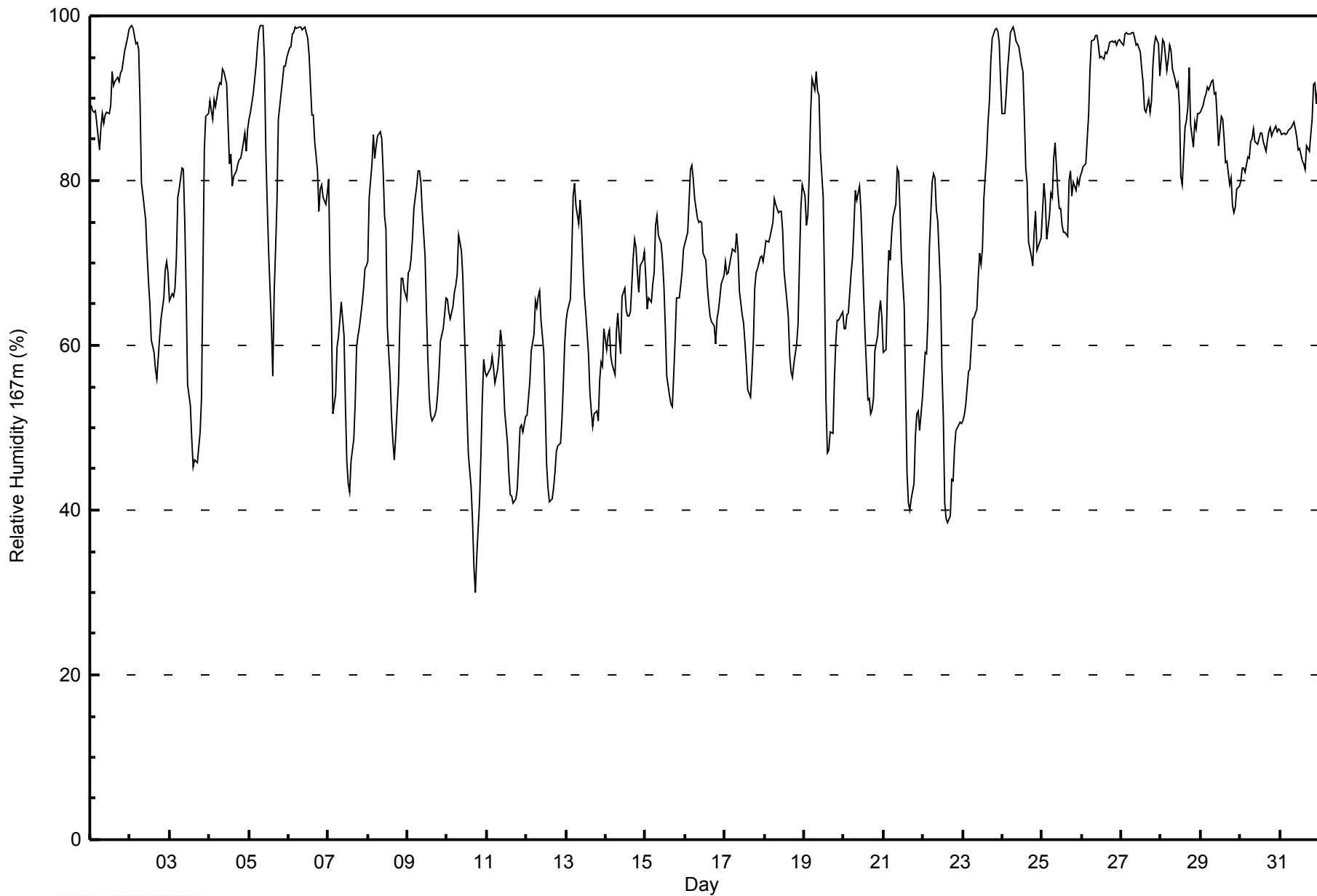
**Lower Camp Met Tower - October 2014**

Maximum Value: 99 % on Oct 5 09:00											Maximum Daily Average: 94.7 % on Oct 27											Hours in Service: 744				
Minimum Value: 30 % on Oct 10 18:00											Minimum Daily Average: 51.5 % on Oct 11											Hours of Data: 744				
Maximum Diurnal Average: 81.7 % at hour 8											Minimum Diurnal Average: 64.0 % at hour 16											Hours of Missing Data: 0				
Monthly Average: 73.4 %											Percentiles: P <sub>1</sub> = 40 P <sub>10</sub> = 52 Q <sub>1</sub> = 62 Median = 74 Q <sub>3</sub> = 87 P <sub>90</sub> = 95 P <sub>99</sub> = 99											Hours of Calibration: 0				
																						Percent Operational Time: 100.0				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	89	88	88	88	87	84	86	88	87	88	88	88	89	93	91	92	93	92	93	93	95	96	97	98	90.6	98
2-Oct	99	99	98	97	97	96	89	80	78	75	71	68	65	61	59	57	56	59	61	63	66	69	70	69	75.1	99
3-Oct	65	66	66	67	71	78	79	82	81	75	66	55	53	49	45	46	46	46	49	54	69	84	88	88	65.3	88
4-Oct	90	88	87	90	89	91	92	92	94	93	92	87	82	83	79	81	81	82	82	83	84	86	84	86	86.5	94
5-Oct	87	88	91	92	94	96	98	99	99	95	84	77	72	63	56	67	72	78	87	91	92	94	94	95	85.8	99
6-Oct	96	96	98	98	99	98	99	99	98	99	99	97	95	92	88	88	85	81	76	79	79	78	77	78	90.5	99
7-Oct	80	69	63	52	54	60	61	63	65	61	53	46	43	42	46	49	53	60	61	62	65	67	69	70	58.9	80
8-Oct	70	78	82	86	83	84	85	86	85	81	76	74	62	56	51	48	46	49	56	63	68	68	67	66	69.6	86
9-Oct	69	69	70	73	77	79	81	81	80	76	71	64	58	54	51	51	52	52	54	57	61	62	64	66	65.5	81
10-Oct	66	64	63	65	66	67	69	73	72	68	63	58	52	47	43	39	33	30	34	41	47	54	58	57	55.3	73
11-Oct	56	57	57	59	57	55	57	59	62	60	56	52	48	44	42	42	41	41	43	46	50	50	49	51	51.5	62
12-Oct	52	53	56	59	61	65	65	66	67	63	59	53	46	43	41	41	43	45	47	48	48	51	55	60	53.6	67
13-Oct	63	64	66	71	78	80	77	75	78	75	70	66	64	59	54	52	50	52	52	51	56	58	57	62	63.7	80
14-Oct	60	61	62	59	58	56	62	64	61	59	66	67	64	64	64	64	71	73	72	69	66	70	70	71	64.6	73
15-Oct	68	64	66	65	67	69	75	76	73	72	70	67	62	56	54	53	53	56	61	66	66	67	69	72	65.3	76
16-Oct	72	74	77	81	82	80	78	75	75	75	75	71	70	67	65	64	63	62	60	63	64	66	68	69	70.7	82
17-Oct	70	69	69	70	72	71	71	74	71	67	64	63	60	58	55	54	57	61	67	69	69	71	71	70	66.3	74
18-Oct	71	73	73	73	74	75	78	77	76	76	76	74	69	66	64	59	57	56	58	60	63	70	77	79	69.7	79
19-Oct	78	75	76	81	88	92	91	93	91	90	84	78	67	53	47	47	49	49	56	60	63	63	64	64	70.8	93
20-Oct	62	62	64	64	69	71	74	79	78	79	76	72	66	61	53	54	52	52	54	59	61	64	65	63	64.8	79
21-Oct	59	59	67	72	70	74	76	77	82	81	76	71	65	54	45	41	40	41	43	49	52	52	50	54	60.3	82
22-Oct	56	59	59	63	72	80	81	80	76	75	67	57	51	41	39	38	39	44	44	47	50	50	51	50	57.1	81
23-Oct	51	52	53	57	57	60	63	63	64	68	71	70	72	78	83	87	90	94	97	98	98	98	97	92	75.6	98
24-Oct	88	88	90	94	96	98	99	98	97	97	96	94	93	88	82	80	73	71	70	74	76	71	73	73	85.7	99
25-Oct	76	80	78	73	76	79	78	83	85	79	77	77	75	74	74	73	80	81	78	80	79	80	79	80	78.0	85
26-Oct	81	82	82	85	88	94	97	97	98	98	97	95	95	95	96	95	96	97	97	97	97	96	97	97	93.6	98
27-Oct	97	97	98	98	98	98	98	98	97	96	97	96	94	92	89	88	90	88	90	94	96	97	97	93	94.7	98
28-Oct	95	97	97	93	95	97	96	94	92	91	92	89	81	79	86	87	89	94	87	84	87	86	88	88	90.2	97
29-Oct	88	89	90	90	91	91	92	92	91	91	88	84	88	87	85	82	82	80	80	77	76	77	79	79	85.5	92
30-Oct	80	81	82	81	83	83	85	85	86	85	84	85	86	86	85	84	85	86	87	85	86	87	86	86	84.5	87
31-Oct	86	86	86	86	86	86	86	86	87	86	85	84	84	82	82	81	84	84	84	87	92	92	89	91	86.0	92
											74.9 75.1 75.9 76.8 78.5 80.2 81.2 81.7 81.5 79.9 77.1 73.5 70.0 66.6 64.3 64.0 64.5 65.7 67.1 69.4 71.6 73.3 74.2 74.8											Diurnal Average				
											99 99 98 98 99 98 99 99 99 99 99 99 97 95 95 96 95 96 97 97 98 98 98 97 98											Diurnal Maximum				



**WBEA**  
**Hourly Averages**

**Relative Humidity 167m (RH167m) - %**  
**Lower Camp Met Tower - October 2014**





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

**Relative Humidity 167m (RH167m) - %**  
**Lower Camp Met Tower - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	7	0.94	0.94
40 - 60	158	21.24	22.18
60 - 80	291	39.11	61.29
80 - 100	288	38.71	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744





Maximum Speed: 26 km/h on Oct 17 19:00	Maximum Daily Speed Average: 19.1 km/h on Oct 17	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 13 06:00	Minimum Daily Speed Average: 0.6 km/h on Oct 5	Hours of Data: 729
Maximum Diurnal Speed Average: 2.9 km/h at hour 1	Minimum Diurnal Speed Average: 1.0 km/h at hour 17	Hours of Missing Data: 15
Monthly Average Velocity: 1.8 km/h 180.7 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 8 Q <sub>3</sub> = 13 P <sub>90</sub> = 17 P <sub>99</sub> = 22	Percent Operational Time: 98.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	N3	N3	N2	NW3	NW2	NNE3	NE2	NE2	E2	E6	ENE4	NE4	N4	N5	N9	N12	N12	N15	N14	N14	N16	NNW12	NNW11	NNW11	N6.4	N16	
2-Oct	AF	AF	NW12	NNW11	NNW10	NNW9	NW15	NW15	NW13	NW17	NNW16	NW17	NW18	NW19	NW17	NW18	NW16	NW16	NW15	NW13	NNW7	N7	NNW6	N6	NW13.1	NW19	
3-Oct	N6	N6	N6	N6	NNE3	NNW2	NW2	SSW2	S5	SSE7	SSE7	SSE8	SSE10	SSE14	SSE13	SSE11	SSE13	SSE14	SSE17	S17	S12	SSE12	SE10	SSE18	SSE6.5	SSE18	
4-Oct	SSE18	SE15	SE15	S3	SSW3	WSW3	WSW3	SW1	S2	SW3	WSW2	SE1	NW0	WSW2	NNW3	N5	N5	NNW2	NNW4	NNW4	NNW2	N2	NNW0	SSE2	SSE1.3	SSE18	
5-Oct	N2	SE3	SSW3	SW12	SSW8	SSE11	S8	SSW7	SW9	SSW5	SSE6	SE7	SE5	NNW1	N11	NNE10	NNE9	N10	N9	NNE8	N8	NNE6	NNE4	NE3	E0.6	SW12	
6-Oct	E3	NE3	ENE2	SE3	SE3	E6	E4	E3	E1	ENE2	NE2	NNW5	NNW7	NNW7	N7	N8	NNW6	NNW5	NW14	WNW21	WNW17	WNW16	WNW15	W12	NW4.5	WNW21	
7-Oct	WNW10	WNW13	WNW14	NNW11	NW13	NNW8	NNW3	NNW5	N6	N7	N5	NE6	N7	NNW6	NNE9	NNE9	NE9	NE4	N3	ENE2	NNE1	N2	N2	N1	NNW5.2	WNW14	
8-Oct	N1	N1	N1	N1	NW4	N1	N1	NNW1	NNE1	W1	N2	N4	ESE1	E6	SE5	SSE3	ESE3	NW2	SSE5	SSE11	SSE8	SE8	SE10	SE10	SE2.1	SSE11	
9-Oct	SE8	SE7	SSE7	NNE2	NE1	SE1	N1	NNE1	SSE8	SSE10	SSE11	SSE12	SSE9	SSE8	SSE9	SSE10	SSE9	SE7	SE6	SE11	SE14	SE14	SE16	SE10	SE7.6	SE16	
10-Oct	SE8	SE10	SE12	SSE13	SSE13	SSE11	SE7	SSE8	SSE11	SSE12	SSE9	SSE13	SSE15	SSE14	SSE15	SSE12	SSE11	SSW11	S11	SSE12	SSE16	SSE7	SE5	SSE9	SSE10.8	SSE16	
11-Oct	SSE12	SE12	SE15	SSE16	SSE14	S4	W11	W14	W13	W16	W18	W14	W16	W17	W16	W19	W19	W13	WSW11	W8	W10	W14	W18	W20	W9.8	W20	
12-Oct	W22	W19	W16	WNW10	WNW7	WNW7	WNW4	W2	W4	W8	W6	W9	WNW11	W9	W9	W8	W9	WNW15	WNW15	WNW15	W12	W12	W10	NW2	W9.8	W22	
13-Oct	WSW2	W2	W5	WSW3	SW0	S0	SSE4	SE6	SE6	S3	S3	SSE4	SE5	SE5	SSE7	SSE9	SSE9	SSE6	ENE2	N4	N5	N3	NNW2	N4	SSE1.8	SSE9	
14-Oct	NNW4	NNW3	NNW4	NNW6	NNW5	NNW7	NNW6	NNW6	NNW5	NNW4	NNW4	N5	N6	N7	N6	N4	N5	NNW3	W1	SSW2	W13	W13	W16	NW10	NW4.7	W16	
15-Oct	WNW11	W16	NW13	NW9	WSW13	WSW13	W14	W15	W14	WNW11	NW9	NW9	W6	NNW8	NNW10	NNW9	NNW9	NNW9	NNW7	NNW6	NNW3	NNW1	N2	NNW2	WNW7.8	W16	
16-Oct	NNW2	ENE1	NNW3	NNW3	SSW1	E2	NE1	NNE1	E2	E3	ESE3	SE3	SSE2	S4	SSE8	S5	NNW1	ENE2	SE9	SE12	SE17	SE18	SE17	SE15	SE4.4	SE18	
17-Oct	SE12	SE13	SE14	SE13	SE14	SE15	SE18	SSE12	SE12	SE18	SSE20	SE18	SSE21	SSE23	SSE26	SSE25	SSE23	SSE25	SSE26	SSE26	SSE20	SSE21	SSE25	SSE21	SSE19.1	SSE26	
18-Oct	SE17	SE17	SE17	SE15	SSE9	SSE6	SSE9	SSE8	SSE8	SSE8	S5	SSE3	SSE5	SSE8	SSE8	SSE3	W6	NE1	WSW6	W9	W6	W3	W4	NW2	SSE5.4	SE17	
19-Oct	SSE2	WSW4	WNW5	NW4	NNW2	S1	NNE1	W1	N1	NNW2	N3	NNE2	S2	SSE8	SE12	SE8	ENE2	SSE14	SE15	SSE18	SE16	SE17	SE17	SE16	SE5.2	SSE18	
20-Oct	SE12	SE14	SSE10	SE10	NE1	SE4	SSE4	SSE4	SSE8	SSE8	SSE7	SSE7	SSE12	SSE10	S9	SSE9	SSE8	SE6	E2	NNW1	S1	SE4	SSE7	SSE7	SSE6.7	SE14	
21-Oct	SSE10	SE8	SSE10	SE11	SE7	SE11	SSE7	S2	SSE4	S5	S4	WSW11	WSW9	WSW9	W9	W7	WSW3	WSW7	WSW4	SSE5	SSE6	SSE5	SSE7	SSE5	S4.5	SE11	
22-Oct	SSE7	SE4	SE6	SE4	SE5	SE5	SE5	SE4	SE5	SSE4	S3	SSE3	SSE4	SSE8	SE13	SE14	SSE13	SSE15	SSE17	SSE16	SE16	SE17	SSE15	SSE14	SSE8.9	SSE17	
23-Oct	SE12	SE7	ESE4	N5	SE0	N4	N4	NNW3	NW3	NW3	NNW6	N4	ESE8	SE12	E6	ENE7	NNE3	NW3	NNW4	NNW4	NNW5	NW9	NNW12	NW13	N2.1	NW13	
24-Oct	NW15	WNW21	WNW19	WNW15	WNW13	AF	WNW16	WNW19	WNW16	NW14	WNW16	WNW15	WNW16	WNW17	W19	W15	W18	WNW14	NW12	W15	W16	W16	W13	WNW16	WNW15.6	WNW21	
25-Oct	WNW12	W13	WNW11	NW12	WNW8	WNW3	WSW11	SW6	WSW8	SW9	SW6	SSW4	S5	S7	S7	SSW4	SE3	E3	N2	NNE3	ENE4	ENE3	SE4	NE3	WSW3.0	W13	
26-Oct	N4	NNE6	N7	N6	N10	N8	N7	N9	N9	N9	N8	NNE8	N10	NNE9	N11	N12	N11	N8	N11	N12	N11	N11	N9	AF	N9.0	N12	
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N7	N8	N8	NNE5	NNW5	NNW5	NNW4	NNW3	WNW3	NW2	NNW1	NE1	N2	---	N8
28-Oct	NW3	WSW2	S2	SW5	SSW3	ESE3	S3	S10	S12	S14	S10	S9	SSE9	SSE7	SE5	ESE7	SE9	S1	SE3	SE4	SE1	SE3	NNE1	E1	SSE4.4	S14	
29-Oct	E3	ENE2	E1	N3	NNW3	NNW3	NNW3	NW3	NNW3	N3	NNE5	ENE7	NE5	NNE6	NNW3	NE4	ENE2	NNE1	SE3	SE6	ESE9	ESE8	SE9	SE12	ENE2.3	SE12	
30-Oct	SE15	SSE13	SSE15	SSE19	SSE15	SSE17	SSE15	SSE18	SSE16	SE16	SSE16	SE15	SSE16	SSE16	S20	S17	SSE16	SSE17	SSE19	SSE19	SSE18	SSE18	SSE19	SSE16	SSE16.5	S20	
31-Oct	SSE17	SE17	SE19	SSE20	SSE19	SSE19	SSE18	SSE16	SSE16	SSE18	SSE18	SSE17	S12	SSE14	S13	SSE13	S13	SSE15	S12	SSE8	SSE9	SSE10	SSE6	SE4	SSE14.1	SSE20	

SSE2.9	S2.5	S1.8	S1.2	SSW1.5	SSE2.1	SSW1.7	SW1.7	SSW2.2	S2.3	S1.7	S1.2	S1.9	S2.3	S2.2	SSE1.3	S1.0	S1.1	SSW1.4	S2.0	S2.0	SSE2.3	S2.5	S2.7	Diurnal Average	
W22	WNW21	SE19	SSE20	SSE19	SSE19	SSE18	WNW19	WNW16	SE18	SSE20	SE18	SSE21	SSE23	SSE26	SSE25	SSE23	SSE25	SSE26	SSE26	SSE20	SSE21	SSE25	SSE21	Diurnal Maximum	

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



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

**Wind Speed 20 m (WS20m) - km/h**  
**Lower Camp Met Tower - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 8 km/h on Oct 17 16:00	Hours of Data: 729
Minimum Value: 1 km/h on Oct 16 00:00	Hours of Missing Data: 15
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 7	Hours of Calibration: 0
	Percent Operational Time: 98.0

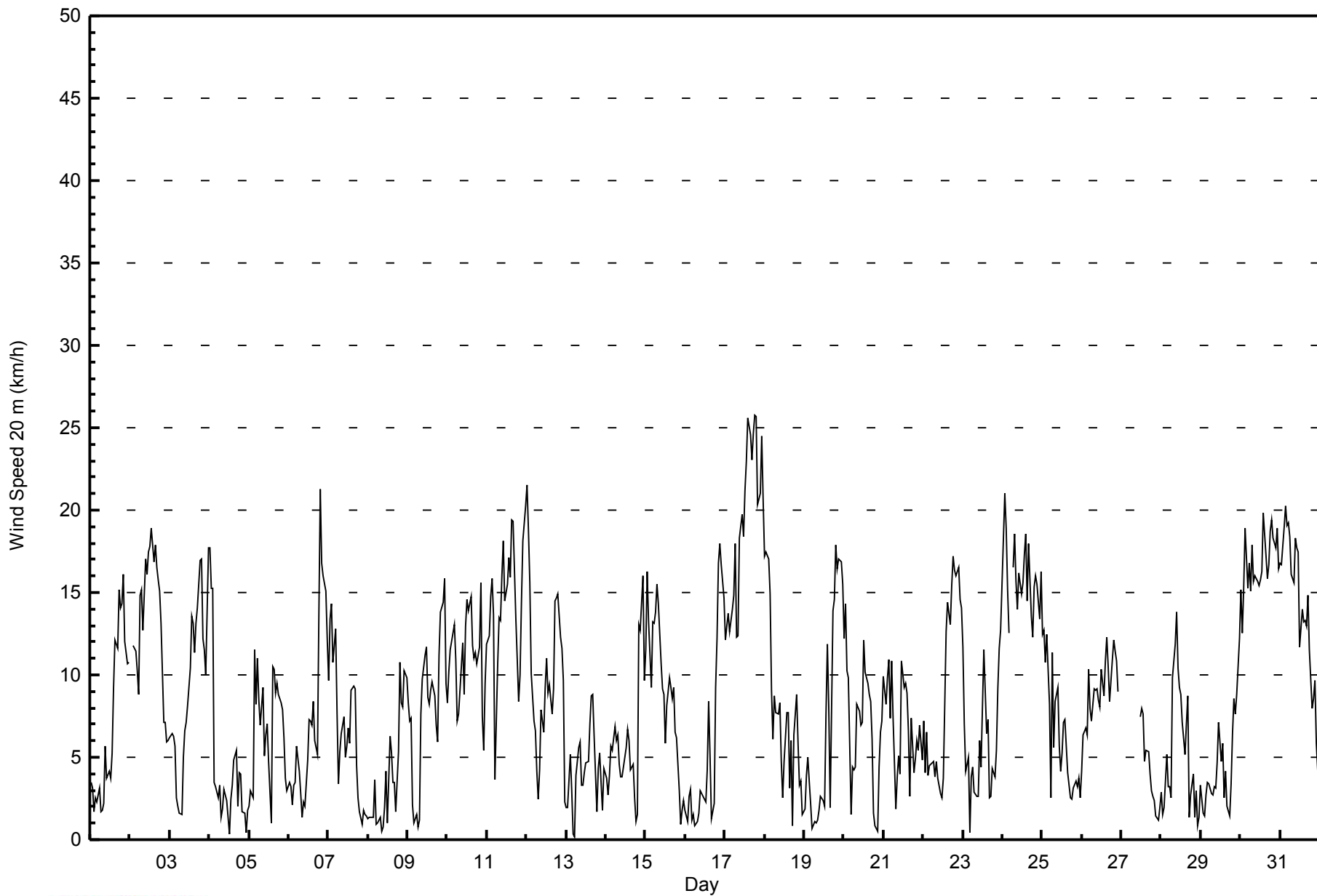
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	2	2	1	1	2	2	1	1	1	3	2	2	2	3	3	5	4	6	5	6	6	4	4	3	6
2-Oct	AF	AF	5	5	4	4	5	5	5	6	6	7	6	6	6	6	6	5	5	5	3	2	2	2	7
3-Oct	2	2	2	2	2	1	1	1	2	2	2	3	3	4	4	3	4	4	5	4	3	4	4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

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Speed 20 m (WS20m) - km/h**  
**Lower Camp Met Tower - October 2014**





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

**Wind Speed 20 m (WS20m) - km/h**  
**Lower Camp Met Tower - October 2014**

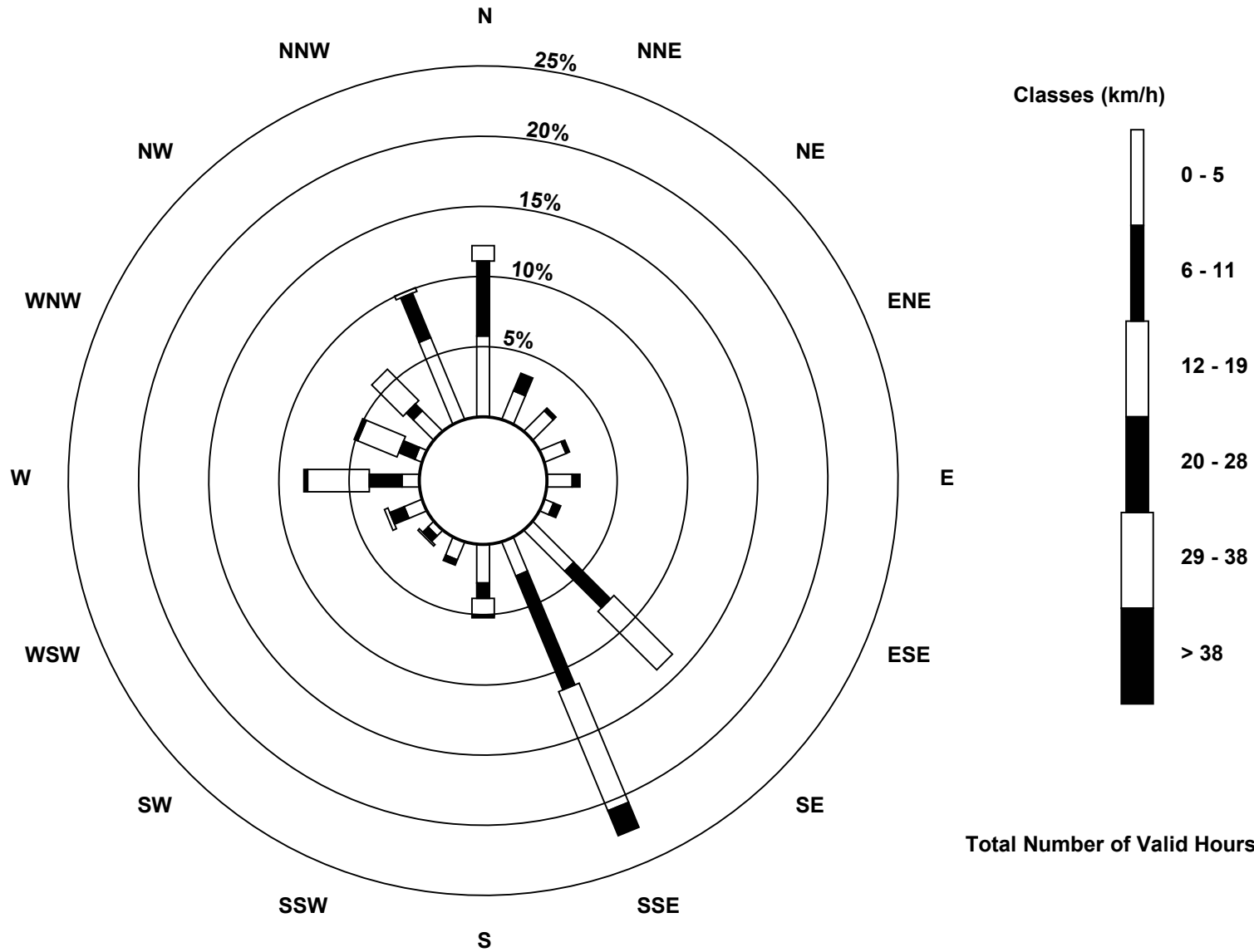
<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	270	37.04	37.04
6 - 11	231	31.69	68.72
12 - 19	209	28.67	97.39
20 - 28	19	2.61	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 729

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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





Maximum Speed: 35 km/h on Oct 17 15:00	Maximum Daily Speed Average: 26.4 km/h on Oct 17	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 18 18:00	Minimum Daily Speed Average: 1.4 km/h on Oct 5	Hours of Data: 724
Maximum Diurnal Speed Average: 4.0 km/h at hour 1	Minimum Diurnal Speed Average: 0.8 km/h at hour 17	Hours of Missing Data: 20
Monthly Average Velocity: 2.3 km/h 177.4 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 10 Q <sub>3</sub> = 17 P <sub>90</sub> = 21 P <sub>99</sub> = 31	Percent Operational Time: 97.3

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-Oct	N5	N4	N3	NW3	NW3	NNE6	NE2	NE3	E2	E8	ENE6	NE6	N5	N7	N13	N17	N16	N21	N19	N20	N23	NNW18	NNW14	NNW14	N9.0	N23			
2-Oct	AF	AF	NW15	NNW16	NNW12	NNW12	NW19	NW19	NW16	NW21	NNW20	NW21	NW22	NW23	NW20	NW22	NW20	NW20	NW19	NW17	NNW10	N11	NNW9	N9	NW16.7	NW23			
3-Oct	N9	N9	N9	N8	NNE4	NNW3	NW3	SSW2	S5	SSE7	SSE8	SSE9	SSE13	SSE16	SSE15	SSE13	SSE16	SSE17	SSE19	S19	S14	SSE15	SE14	SSE23	SSE7.4	SSE23			
4-Oct	SSE24	SE21	SE21	S5	SSW4	WSW3	WSW4	SW2	S2	SW3	WSW3	SE1	NW1	WSW3	NNW4	N6	N8	NNW3	NNW6	NNW6	NNW3	N1	NNW2	SSE3	SSE1.7	SSE24			
5-Oct	N2	SE4	SSW3	SW15	SSW11	SSE12	S9	SSW8	SW11	SSW5	SSE7	SSE8	SE5	NNW2	N14	NNE15	NNE14	N14	NN13	NNE13	N12	NNE9	NNE5	NE5	NE1.4	SW15			
6-Oct	E5	NE4	ENE3	SE4	SE4	E8	E6	E4	E2	ENE3	NE3	NNW6	NNW9	NNW9	N10	N11	NNW8	NNW7	NW17	WNW28	WNW23	WNW22	WNW21	W17	NW6.0	WNW28			
7-Oct	WNW14	WNW19	WNW20	NNW15	NW18	NNW11	NNW6	NNW8	N9	N9	N6	NE7	N9	NNW7	NNE13	NNE13	NE14	NE7	N4	ENE3	NNE2	N2	N1	N1	NNW7.2	WNW20			
8-Oct	N2	N3	N2	N3	NW4	N2	N1	NNW2	NNE1	W1	N2	N5	ESE2	E8	SE6	SSE4	ESE6	NW1	SSE7	SSE13	SSE10	SE11	SE14	SE13	SE2.8	SE14			
9-Oct	SE11	SE10	SSE11	NNE2	NE2	SE3	N2	NNE1	SSE10	SSE12	SSE14	SSE14	SSE11	SSE9	SSE11	SSE11	SSE11	SE11	SE9	SE15	SE19	SE20	SE22	SE14	SE10.1	SE22			
10-Oct	SE13	SE15	SE16	SSE19	SSE18	SSE15	SE11	SSE10	SSE13	SSE14	SSE10	SSE16	SSE19	SSE17	SSE17	SSE15	SSE14	SSW14	S12	SSE14	SSE17	SSE9	SE8	SSE14	SSE13.8	SSE19			
11-Oct	SSE15	SE15	SE18	SSE18	SSE15	S6	W15	W19	W18	W21	W24	W19	W21	W22	W21	W26	W26	W19	WSW16	W12	W14	W20	W25	W27	W13.4	W27			
12-Oct	W29	W26	W22	WNW14	WNW10	WNW9	WNW6	W5	W7	W10	W8	W11	WNW14	W12	W13	W11	W13	WNW19	WNW19	WNW20	W17	W16	W14	NW4	W13.4	W29			
13-Oct	WSW3	W3	W9	WSW5	SW2	S1	SSE4	SE7	SE7	S4	S4	SSE5	SE5	SE5	SSE8	SSE10	SSE10	SSE9	ENE3	N3	N8	N5	NNW4	N7	SSE1.9	SSE10			
14-Oct	NNW6	NNW5	NNW6	NNW8	NNW8	NNW10	NNW8	NNW9	NNW7	NNW5	NNW5	N7	N8	N9	N8	N6	N7	NNW4	W1	SSW3	W17	W17	W21	NW12	NNW6.7	W21			
15-Oct	WNW15	W22	NW16	NW12	WSW17	WSW16	W19	W21	W19	WNW13	NW11	NW11	W7	NNW10	NNW12	NNW12	NNW12	NNW14	NNW10	NNW9	NNW6	NNW1	N1	NNW3	WNW10.2	W22			
16-Oct	NNW2	ENE0	NNW3	NNW4	SSW2	E1	NE1	NNE2	E3	E4	ESE3	SE3	SSE3	S5	SSE10	S6	NNW2	ENE4	SE13	SE16	SE22	SE23	SE21	SE19	SE5.7	SE23			
17-Oct	SE16	SE17	SE19	SE17	SE19	SE21	SE25	SSE18	SE18	SE24	SSE28	SE26	SSE29	SSE31	SSE35	SSE34	SSE32	SSE35	SSE35	SSE33	SSE29	SSE30	SSE34	SSE30	SSE26.4	SSE35			
18-Oct	SE25	SE26	SE25	SE21	SSE12	SSE9	SSE11	SSE9	SSE10	SSE11	S5	SSE3	SSE5	SSE9	SSE10	SSE4	W9	NE0	WSW10	W14	W10	W4	W5	NW2	SSE7.3	SE26			
19-Oct	SSE2	WSW6	WNW8	NW5	NNW2	S2	NNE1	W1	N2	NNW2	N3	NNE2	S2	SSE10	SE16	SE12	ENE6	SSE20	SE20	SSE26	SE23	SE24	SE22	SE21	SE7.3	SSE26			
20-Oct	SE18	SE21	SSE17	SE16	NE3	SE8	SSE7	SSE6	SSE11	SSE10	SSE9	SSE9	SSE16	SSE13	S11	SSE10	SSE12	SE9	E4	NNW1	S2	SE7	SSE8	SSE8	SSE9.4	SE21			
21-Oct	SSE12	SE11	SSE11	SE11	SE6	SE10	SSE7	S4	SSE3	S5	S5	WSW15	WSW13	WSW13	W12	W10	WSW5	WSW11	WSW8	SSE7	SSE10	SSE9	SSE11	SSE8	S5.8	WSW15			
22-Oct	SSE11	SE7	SE10	SE6	SE7	SE6	SE6	SE5	SE6	SSE4	S3	SSE3	SSE4	SSE10	SE17	SE19	SSE18	SSE21	SSE24	SSE22	SE22	SE23	SSE20	SSE20	SSE12.2	SSE24			
23-Oct	SE17	SE12	ESE8	N6	SE4	N3	N6	NNW5	NW4	NW3	NNW8	N5	ESE12	SE16	E10	ENE11	NNE5	NW4	NNW6	NNW6	NNW8	NW12	NW15	NW16	NNE2.7	SE17			
24-Oct	NW20	WNW27	WNW25	WNW20	WNW17	AF	NW4	AF	NW4	AF	NW4	AF	NW4	AF	NW19	NNW21	WNW23	W25	W20	W23	WNW17	NW15	W20	W21	W20	W18	WNW21	WNW20.3	WNW27
25-Oct	WNW16	W17	WNW14	NW16	WNW11	WNW4	WSW16	SW7	WSW13	SW11	SW7	SSW5	S6	W8	S8	SSW5	SE5	E4	N2	NNE4	ENE5	ENE6	SE6	NE4	WSW3.8	W17			
26-Oct	N5	NNE8	N9	N9	N14	N11	N10	N13	N13	N13	N12	NNE13	N15	NNE13	N16	N18	N15	N13	N15	N17	N16	NAF	NAF	AF	N12.7	N18			
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF11	AF9	N11	N11	N10	NNE7	NNW7	NNW8	NNW6	NNW5	WNW3	NW4	NNW2	NE2	N2	---	N11		
28-Oct	NW3	WSW2	S3	SW6	SSW4	ESE4	S4	S11	S13	S14	S11	S10	SSE10	SSE8	SE6	ESE9	SE11	S2	SE5	SE6	SE2	SE4	NNE1	E2	SSE5.2	S14			
29-Oct	E5	ENE3	E2	N4	NNW5	NNW5	NNW5	NW4	NNW4	N4	NNE6	ENE10	NE7	NNE9	NNW3	NE6	ENE3	NNE3	SE4	SE8	ESE12	ESE11	SE12	SE16	ENE3.3	SE16			
30-Oct	SE20	SSE16	SSE19	SSE25	SSE19	SSE22	SSE18	SSE20	SSE20	SE21	SSE20	SE20	SSE18	SSE19	S22	S19	SSE20	SSE22	SSE23	SSE25	SSE24	SSE24	SSE25	SSE20	SSE20.7	SSE25			
31-Oct	SSE21	SE23	SE25	SSE27	SSE26	SSE26	SSE25	SSE22	SSE21	SSE24	SSE22	SSE20	S12	SSE16	S14	SSE14	S13	SSE16	S12	SSE10	SSE10	SSE11	SSE7	SE4	SSE17.4	SSE27			

SSE4.0	S3.5	S2.4	S1.5	SSW1.9	SSE2.6	SSW2.1	SSW2.1	S2.9	S3.0	S2.3	S1.3	SSW2.1	S2.4	S2.2	SSE1.2	SSE0.8	S1.3	SSW1.6	S2.4	S2.2	SSE3.7	S3.9	SSE3.7	Diurnal Average
W29	WNW27	SE25	SSE27	SSE26	SSE26	SSE25	SSE22	SSE21	SE24	SSE28	SE26	SSE29	SSE31	SSE35	SSE34	SSE32	SSE35	SSE35	SSE33	SSE29	SSE30	SSE34	SSE30	Diurnal Maximum

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



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

**Wind Speed 45 m (WS45m) - km/h**  
**Lower Camp Met Tower - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 8 km/h on Oct 17 17:00	Hours of Data: 724
Minimum Value: 1 km/h on Oct 8 01:00	Hours of Missing Data: 20
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 5 P <sub>90</sub> = 6 P <sub>99</sub> = 7	Hours of Calibration: 0
	Percent Operational Time: 97.3

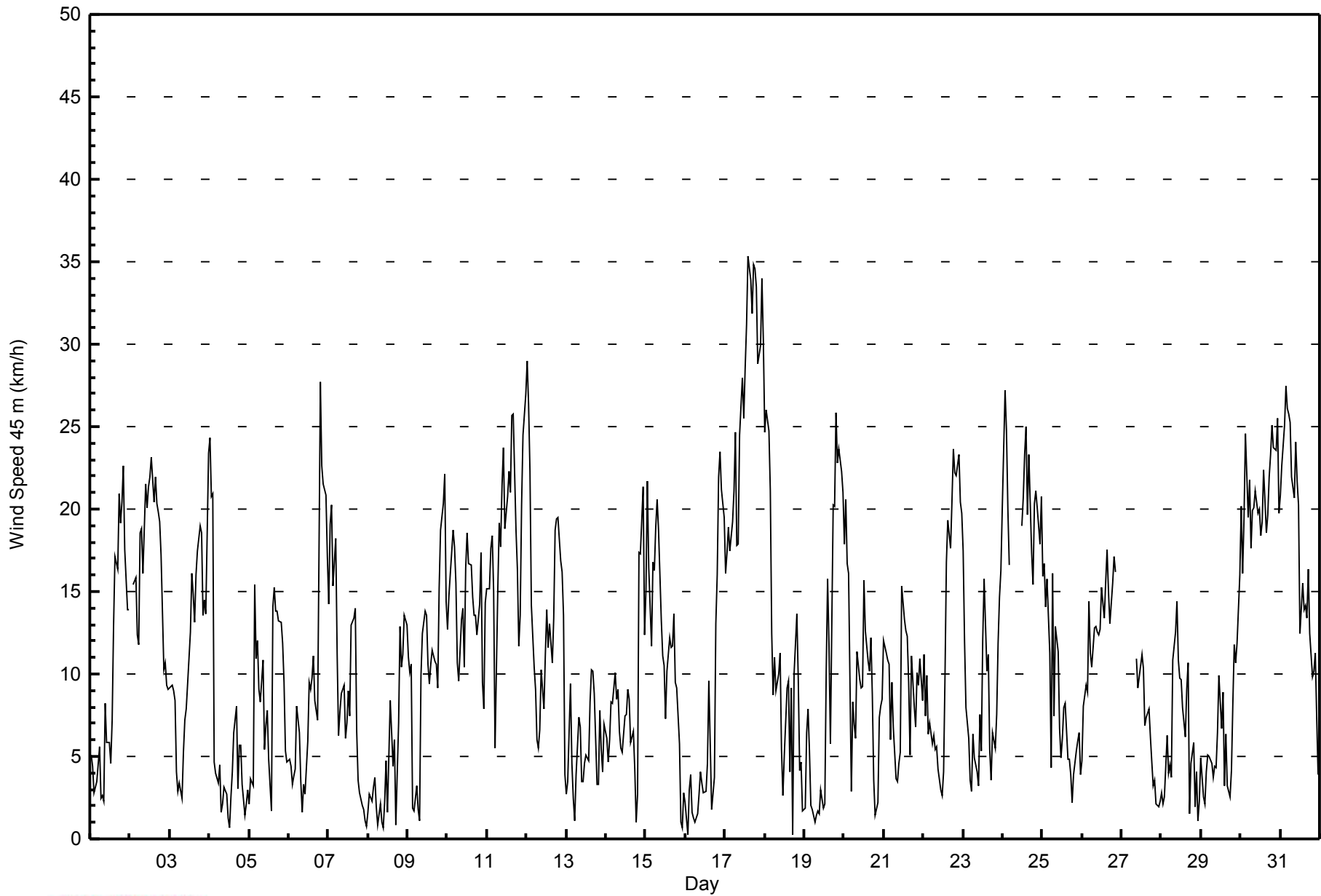
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	2	2	1	2	2	2	1	1	2	3	3	2	2	3	4	5	5	7	5	7	7	5	4	4	7
2-Oct	AF	AF	5	6	5	5	5	5	5	5	6	7	6	6	5	6	6	5	5	5	3	2	2	2	7
3-Oct	2	2	2	2	3	2	2	2	1	2	2	3	3	4	4	4	5	5	5	5	3	4	4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

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Speed 45 m (WS45m) - km/h**  
**Lower Camp Met Tower - October 2014**







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

**Wind Speed 45 m (WS45m) - km/h**  
**Lower Camp Met Tower - October 2014**

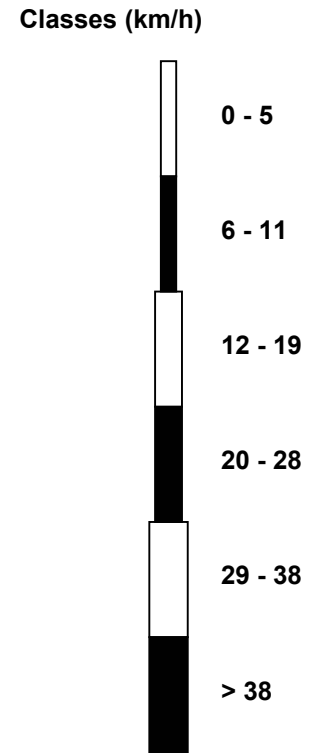
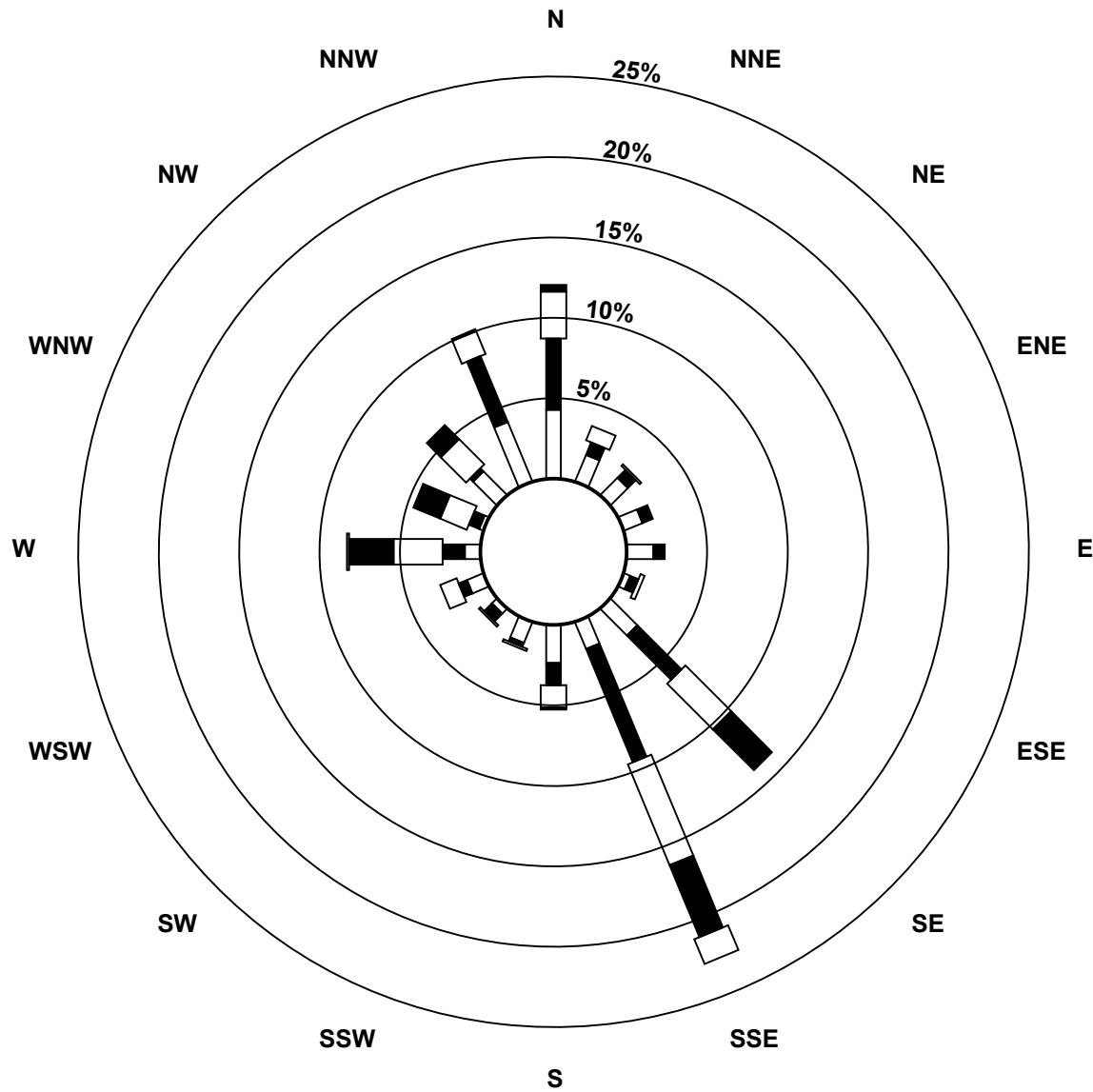
<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	200	27.62	27.62
6 - 11	212	29.28	56.91
12 - 19	191	26.38	83.29
20 - 28	108	14.92	98.20
29 - 38	13	1.80	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 724

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



**Total Number of Valid Hours: 722**



Maximum Speed: 46 km/h on Oct 17 23:00	Maximum Daily Speed Average: 38.7 km/h on Oct 17	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 8 06:00	Minimum Daily Speed Average: 2.1 km/h on Oct 5	Hours of Data: 728
Maximum Diurnal Speed Average: 6.8 km/h at hour 23	Minimum Diurnal Speed Average: 2.4 km/h at hour 18	Hours of Missing Data: 16
Monthly Average Velocity: 4.0 km/h 167.1 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 8 Median = 15 Q <sub>3</sub> = 25 P <sub>90</sub> = 32 P <sub>99</sub> = 44	Percent Operational Time: 97.9

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-Oct	NNE9	N7	NNE4	N7	N7	NNE12	NE4	NE5	E6	E12	ENE8	NE8	N6	N9	N17	N23	N22	N29	N27	N28	N32	NNW27	AF	AF	N12.7	N32
2-Oct	AF	AF	AF	NNW23	NNW23	NNW19	NW29	NW29	NW23	NW31	NW30	NW30	NW32	NW34	NW29	NW31	NW29	NNW29	NNW30	NNW28	NW19	NNW16	NW16	NW16	NW25.5	NW34
3-Oct	WNW19	NW16	NW17	NW14	NW8	WNW6	WSW8	WSW5	SSW5	SE8	SE9	SE11	SE15	SE19	SSE18	SE18	SE25	SE27	SSE26	SSE24	S17	SE23	SE23	SE34	SSE9.3	SE34
4-Oct	SE35	SE32	SE31	SE10	SSE5	SW5	SSW4	SW2	SSE3	SW2	WSW3	NE2	NNW2	WNW2	NNW5	NNW8	N11	N5	NNW9	NNW8	WNW5	WSW6	W7	SW10	SSE2.7	SE35
5-Oct	SW10	SSW6	SW7	SW21	SW15	S11	SSW10	SW13	SW12	SSW5	SE7	SE8	SSE3	N4	N19	NNE21	NNE18	N19	N20	NNE18	N16	NNE13	NNE8	NE7	N2.1	SW21
6-Oct	ENE6	NE5	ENE4	ESE5	SE6	E12	E12	E5	ENE2	ENE4	NE3	NW8	NW13	NNW12	N13	N13	NNW11	NW14	WNW26	WNW37	WNW33	WNW31	WNW30	W25	NW8.2	WNW37
7-Oct	WNW23	WNW32	WNW33	WNW33	WNW35	WNW25	WNW16	NW14	NNW12	NNW11	NNW9	NNE8	NNW13	NNW10	NNE17	NNE16	NE17	NE11	NE7	E7	ESE11	SE13	SE10	SSE7	NW9.3	WNW35
8-Oct	SE7	ESE5	ESE3	NE3	SE2	NW1	ESE5	SE3	SE4	SE6	ESE3	NE3	SE6	E11	ESE9	SE7	ESE11	SE6	SE13	SSE19	SE17	SE18	SE20	SE21	SE8.0	SE21
9-Oct	SE18	SE18	SE20	SE9	ESE6	ESE12	SE9	SE9	SE18	SE17	SE17	SE17	SE15	SE13	SE14	SE15	SE15	SE20	SE19	SE24	SE28	SE32	SE36	SE28	SE17.8	SE36
10-Oct	SE25	SE27	SE27	SE29	SE31	SE29	SE24	SSE19	SSE23	SSE16	SSE15	SE21	SSE23	SSE23	SSE21	SSE17	SSE17	SSW15	SSW18	S26	S28	S15	SSE12	SSE20	SSE20.9	SE31
11-Oct	S11	S8	SSW9	SSW8	SW11	WSW18	WSW27	WSW31	WSW28	W31	W32	W26	W28	W30	W28	W35	W37	W31	WSW26	WSW22	WSW23	WSW31	W39	W39	WSW24.1	W39
12-Oct	W39	W40	W37	W24	W19	W14	WNW12	W13	WSW11	W15	W10	W13	WNW17	WSW13	W17	W14	WSW20	W26	WNW29	WNW29	W29	W28	W21	NW8	W20.4	W40
13-Oct	W7	WSW13	WSW18	WSW12	WSW9	WSW4	SW10	SSW6	SSW3	SSW4	S4	SSE4	SE6	SE6	SE9	SE10	SSE14	SSE14	SE10	SE6	NE4	N9	N9	NNW11	SSW3.2	WSW18
14-Oct	NNE9	N10	N11	N9	N10	N14	N15	N16	N13	N10	NNW9	NNW9	NNE4	NNW4	N4	NNW6	NW5	NW6	NW4	SW6	W28	W25	W31	NW19	NW8.4	W31
15-Oct	W23	W30	NW23	WNW17	WSW20	WSW21	WSW26	W27	W25	WNW18	WNW13	WNW13	W8	NW12	NW15	NW15	NNW18	NNW22	NNW19	NNW16	NNW11	NNW6	NNW2	NNW3	WNW14.0	W30
16-Oct	NNW5	NE2	ENE4	N3	E2	SE3	SE4	ESE6	SE6	ESE7	ESE5	E3	SE5	SSE5	SSE11	SSE7	NNE2	ENE8	SE22	SE25	SE33	SE35	SE32	SE31	SE9.8	SE35
17-Oct	SE28	SE30	SE32	SE30	SE32	SE34	SE38	SE33	SE33	SE39	SE38	SE36	SE38	SE42	SE46	SE45	SE45	SE46	SSE45	SSE43	SE43	SE44	SE46	SE44	SE38.7	SE46
18-Oct	SE38	SE37	SE37	SE32	SE25	SE22	SSE19	SSE10	SSE13	SSE11	SSW6	S3	SE5	SSE9	SSE9	SSW5	WSW14	SW10	WSW20	W24	W22	NW10	WNW9	NNW6	SSE9.7	SE38
19-Oct	WNW3	WSW18	W20	W11	NNE4	ESE4	SSE8	SSE11	SE12	ESE8	SE5	SE6	SE7	SE19	SE21	SE20	SE19	SE32	SE32	SE37	SE36	SE37	SE35	SE32	SE14.5	SE37
20-Oct	SE29	SE32	SE28	SE32	SE19	SE24	SE18	SE15	SE26	SSE15	SE15	SSE13	SSE15	SE14	S13	SSE12	SE18	SSE16	SE13	SE7	SE12	SE17	SE16	SSE9	SE17.7	SE32
21-Oct	S11	S11	S9	SW8	WSW9	SW11	WSW13	WSW15	SW10	SW11	SW12	WSW17	WSW15	WSW15	WSW17	WSW15	WSW14	WSW16	WSW16	SSW6	S5	SSE9	SSE11	SSE5	SW10.2	WSW17
22-Oct	S6	SSE7	SSE11	S7	SSE12	SSE12	SSE10	SSE12	SSE13	SSE8	ESE9	SSE5	SE8	SE16	SE26	SE29	SE29	SE29	SE34	SE34	SE36	SE38	SE33	SE33	SE18.8	SE38
23-Oct	SE35	SE24	SE20	SE11	SE16	SE11	E4	NNE7	NNE9	E8	ESE6	SE12	ESE19	ESE21	E17	E20	ENE13	NNE9	NNE10	N8	NNW12	NW19	NW22	NW24	E6.4	SE35
24-Oct	WNW29	WNW37	WNW35	WNW29	WNW24	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	WNW37
25-Oct	W22	W25	WNW20	WNW24	WNW16	W12	WSW18	WSW16	WSW17	WSW14	SW7	S5	S6	SSE9	SSE9	SSW6	ESE9	SE8	SE9	SE7	SE15	SE14	SE14	ESE8	SW5.9	W25
26-Oct	ESE8	E7	E10	N12	N18	N15	N15	N16	N16	N17	NNE17	NNE19	N22	NNE20	N21	N24	N21	N20	N22	N24	N24	N23	N19	N19	N16.7	N24
27-Oct	N18	N18	N16	N16	N15	N15	N14	N14	N15	N15	NNE13	NNE15	N15	N13	NNE10	NNW11	NNW13	N10	N8	N5	N6	NNE5	E4	ESE5	N11.4	N18
28-Oct	SSW3	SSW4	SSE4	SSW8	S5	SE5	SSE7	SSE13	SSE16	SSE18	S13	S12	SSE12	SSE10	SE8	SE12	SE16	SE5	SE12	SE13	ESE6	SE10	ESE4	ESE8	SSE8.5	SSE18
29-Oct	ESE11	E8	E5	NNE6	N7	N7	N8	N4	N6	N6	NE9	ENE12	NE9	NNE12	NNE4	NE10	ENE7	ENE6	ESE7	SE13	ESE18	ESE18	SE18	SE25	E6.6	SE25
30-Oct	SE30	SE25	SE28	SE35	SE30	SE31	SSE25	SSE25	SE29	SE32	SE29	SE29	SSE25	SSE27	SSE26	SSE23	SE28	SE30	SE32	SE36	SE35	SE35	SE37	SSE28	SE29.5	SE37
31-Oct	SE31	SE33	SE36	SE38	SE36	SE37	SE35	SE33	SE29	SE33	SSE27	SSE24	SSE15	SSE19	SSE16	SSE16	S19	S18	S20	S13	SSE9	SSE9	SSW6	SSW6	SSE22.5	SE38

SSE6.3	S5.9	S5.3	SSW3.1	S3.2	SSE4.2	S4.2	SSW3.7	S4.5	SSE3.9	SSE3.3	SE3.0	SSE3.0	SE4.1	SE3.4	SE2.8	SSE2.8	SSE2.4	S3.3	S4.9	S4.9	SSE5.8	SSE6.8	SSE6.3	Diurnal Average	
W39	W40	SE37	SE38	SE36	SE37	SE38	SE33	SE33	SE39	SE38	SE36	SE38	SE42	SE46	SE45	SE45	SE46	SSE45	SSE43	SE43	SE44	SE46	SE44	Diurnal Maximum	

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



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

**Wind Speed 100 m (WS100m) - km/h**  
**Lower Camp Met Tower - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 20 07:00	Hours in Service: 744 Hours of Data: 728 Hours of Missing Data: 16 Hours of Calibration: 0 Percent Operational Time: 97.9
Minimum Value: 1 km/h on Oct 15 23:00	
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> = 8	

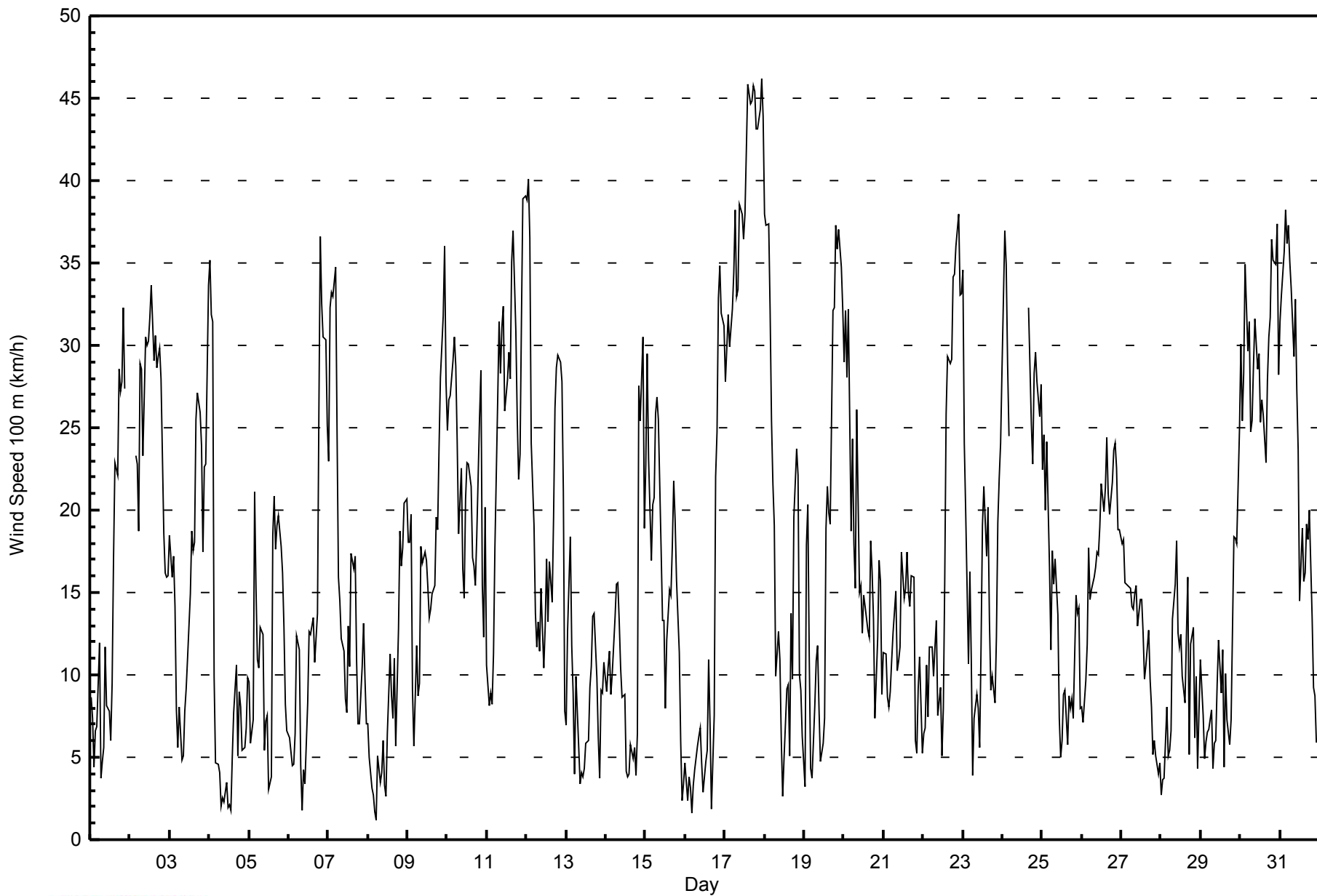
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	3	2	2	1	2	5	2	2	3	3	4	2	2	2	3	3	3	5	4	7	6	5	AF	AF	7
2-Oct	AF	AF	AF	6	6	6	4	4	5	5	5	8	5	5	5	6	6	5	4	5	3	2	2	4	8
3-Oct	5	3	3	4	3	3	2	2	2	2	2	3	3	3	4	4	4	5	5	4	5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

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Speed 100 m (WS100m) - km/h**  
**Lower Camp Met Tower - October 2014**





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

**Wind Speed 100 m (WS100m) - km/h**  
**Lower Camp Met Tower - October 2014**

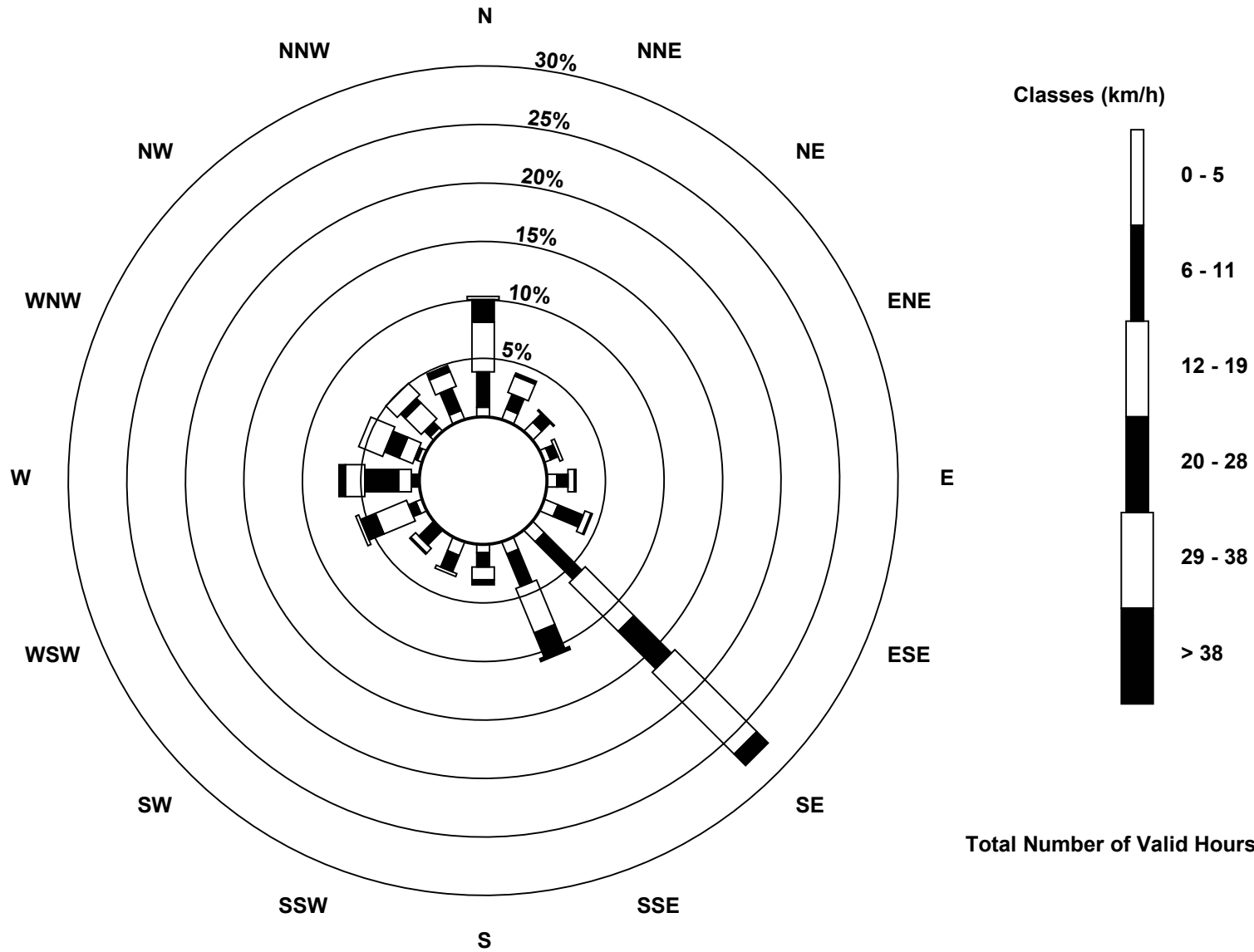
<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	89	12.23	12.23
6 - 11	187	25.69	37.91
12 - 19	202	27.75	65.66
20 - 28	120	16.48	82.14
29 - 38	114	15.66	97.80
> 38	16	2.20	100.00

Total Number of Valid Hours: 728

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



**Total Number of Valid Hours: 728**



Maximum Speed: 50 km/h on Oct 17 23:00	Maximum Daily Speed Average: 41.4 km/h on Oct 17	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 6 09:00	Minimum Daily Speed Average: 1.9 km/h on Oct 14	Hours of Data: 726
Maximum Diurnal Speed Average: 7.5 km/h at hour 23	Minimum Diurnal Speed Average: 2.8 km/h at hour 18	Hours of Missing Data: 18
Monthly Average Velocity: 4.9 km/h 180.9 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 7 Q <sub>1</sub> = 11 Median = 17 Q <sub>3</sub> = 29 P <sub>90</sub> = 37 P <sub>99</sub> = 46	Percent Operational Time: 97.6

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-Oct	NNE12	NNE10	NNE6	NNE10	NNE11	NNE16	NE8	NE7	E7	E13	ENE9	NE8	N6	N9	N17	N23	N22	N30	N30	N31	N36	AF	AF	AF	NNE14.0	N36		
2-Oct	AF	AF	AF	AF	AF	AF	AF	NW35	NW29	NW36	NW35	NW35	NW36	NW37	NW33	NW35	NW34	WNW36	WNW37	WNW36	NW25	NW21	NW23	NW28	---	WNW37		
3-Oct	NW29	NW25	WNW27	WNW24	WNW16	W8	W13	W10	SW6	SSE7	SSE8	SE10	SE14	SSE18	SSE17	SSE19	SE28	SSE29	SSE27	SSE28	S21	SSE24	SE27	SE37	S8.9	SE37		
4-Oct	SE36	SE35	SE33	SSE12	SSE6	SW4	S4	S2	S3	W2	W4	NNE2	NNW3	NW3	N6	NNW8	N11	NNE6	N9	N8	W6	W8	W10	WSW11	SSE2.8	SE36		
5-Oct	W14	SW7	SW13	WSW21	SW16	SSW11	SSW14	SW16	SW13	SW8	S6	S6	SW4	NNE5	N19	NNE21	NNE18	NNE20	NNE21	NNE19	NNE16	NNE14	NNE9	NE7	NW3.2	WSW21		
6-Oct	ENE6	NE6	NE4	ESE2	SSE6	ESE11	ESE11	E5	NNE1	NE4	NNE4	NW9	NW14	NW14	N13	N15	NNW12	NW21	WNW32	WNW40	WNW38	WNW36	WNW35	WNW26	NW10.4	WNW40		
7-Oct	WNW31	WNW41	WNW42	NW45	WNW46	WNW37	WNW23	WNW23	NW15	NW15	NW12	N8	NNW14	NNW11	NNE17	NNE17	NE18	NE16	NE14	E16	ESE17	SE17	SSE14	S13	NW12.1	WNW46		
8-Oct	S11	SSE8	SSE9	SE7	SE9	SSW3	SE10	SSE5	SSE9	SE12	SE11	ESE8	ESE10	E12	ESE9	SE8	SE12	SE11	SE17	SSE18	SE19	SE19	SE22	SE24	SE11.4	SE24		
9-Oct	SE22	SE22	SE22	SE18	SE11	SE12	SE14	SE19	SSE19	SE18	SE18	SE17	SE17	SE15	SE14	SSE15	SSE16	SE24	SE24	SE28	SE32	SE37	SSE41	SE33	SE21.1	SSE41		
10-Oct	SE31	SE32	SSE29	SE34	SSE34	SSE33	SSE29	SSE19	SSE22	SSE16	SSE16	SSE18	SSE21	SSE23	S25	S23	S21	SSW24	SSW28	SSW27	SSW33	SSW23	S18	S20	SSE23.3	SSE34		
11-Oct	SW13	SW11	SW13	SW16	WSW21	WSW30	WSW38	W42	W37	W36	W35	W29	W31	W32	W31	W39	W41	W36	W37	W35	WSW35	W41	W46	W42	W31.2	W46		
12-Oct	W42	W42	W44	WNW34	W28	WNW15	WNW16	WNW18	W16	WNW18	W13	WNW15	WNW18	W15	W19	W17	W24	W32	WNW35	WNW36	W35	W34	WNW25	NW13	W24.9	W44		
13-Oct	W7	W17	W14	WSW15	W14	W11	WSW12	SW12	SW8	SW6	S4	S4	SE6	SSE6	SE9	SSE9	S16	SSE13	SE16	SE15	SE9	E9	ESE9	E4	SSW5.5	W17		
14-Oct	E10	E8	E8	ESE11	ESE8	E11	NE10	NE9	ENE15	E14	NNE4	NNE3	SE8	SE5	SSE4	SSW1	W5	WNW7	W6	WSW13	W34	W30	W33	NW22	NW1.9	W34		
15-Oct	W27	W34	WNW26	WNW20	WSW24	W29	W32	W31	W27	WNW19	WNW14	NW15	W9	NW13	NW17	NW16	NNW19	NNW25	NNW25	NNW20	N15	N12	N8	NNE7	WNW16.7	W34		
16-Oct	NE3	E4	ENE9	NE7	ENE7	ESE6	ESE6	ESE8	ESE7	ESE8	E5	E3	SE5	SSE5	SE11	SSE8	NE2	E9	SE25	SE29	SE37	SE40	SE39	SE38	SE12.1	SE40		
17-Oct	SE33	SE36	SE34	SE33	SE36	SE40	SE41	SE35	SE35	SE39	SE40	SE38	SSE37	SSE43	SE48	SSE46	SE49	SSE47	SSE47	SSE45	SSE46	SE49	SE50	SE47	SE41.4	SE50		
18-Oct	SE42	SE41	SE42	SE37	SE31	SE26	SSE19	S11	S11	SSW8	SW8	SSW4	S4	S7	S8	SW8	WSW17	WSW17	W25	W29	WNW28	NW19	WNW20	NW14	S9.6	SE42		
19-Oct	WNW13	W18	WNW20	WNW14	NNW6	ENE5	SSE5	SSE10	SSE11	SE13	SE10	SE9	SE16	SE23	SE22	SE23	SE26	SE37	SE38	SE43	SE42	SE43	SE42	SE38	SE16.2	SE43		
20-Oct	SE34	SE37	SE32	SSE35	SE30	SE31	SE24	SSE22	SSE26	SSE13	SSE14	SSE12	SSE12	SSE13	S15	SSE13	SSE18	SSE16	SSE17	SE6	SE9	SSE13	SSE12	SSE15	SSE19.2	SE37		
21-Oct	S22	SSW15	SW16	WSW17	W23	WSW25	WSW30	W27	WSW22	WSW19	WSW19	WSW21	WSW16	WSW19	W21	W18	WSW18	WSW22	W24	WSW14	WSW12	SW7	SSW7	WSW9	WSW17.3	WSW30		
22-Oct	WSW11	SW7	SSW6	S12	S12	SSE11	SSE11	SSE15	SSE15	SSE10	SE16	SE17	SSE14	SSE19	SE29	SE35	SE38	SE37	SE39	SSE39	SSE42	SSE39	SSE32	SSE33	SSE21.3	SSE42		
23-Oct	SSE33	SE28	SE27	SE19	SE24	SE20	SE15	ESE10	E13	ESE15	SE12	ESE16	ESE21	ESE23	ESE20	E24	E18	ENE15	NNE14	NNE11	N12	NNW22	NW26	NW29	ESE10.3	SSE33		
24-Oct	WNW33	WNW40	WNW39	WNW35	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	W33	W37	W34	W29	W36	WNW31	WNW28	W33	W34	W33	W31	WNW31	---	WNW40
25-Oct	W28	W31	WNW26	WNW30	WNW19	WNW14	W16	WSW19	W20	WSW15	WSW7	SSW6	S7	S8	S9	SSW6	SE9	SE10	SE16	SE11	SE18	SE18	SE17	SE11	SW6.8	W31		
26-Oct	SE11	ESE11	ESE13	ENE11	NE12	NNE17	NNE18	NNE19	NNE18	N19	NNE20	NNE22	NNE24	NNE24	NNE24	N27	N25	NNE25	NNE25	NNE26	N27	NNE25	NNE22	NNE22	NNE18.2	N27		
27-Oct	NNE22	N21	N18	N19	N19	N18	N17	NNE18	NNE17	NNE14	NNE15	N15	N13	NNE10	N11	N13	N11	N11	NNE10	N8	NE8	E7	SE7	NNE13.2	NNE22			
28-Oct	S5	SSW6	S4	SSW9	S7	SSE5	S10	S15	SSE18	SSE20	S15	S13	SSE12	SSE10	SE10	SE14	SE19	SE10	SE17	SE17	ESE12	SE15	ESE8	ESE13	SSE10.7	SSE20		
29-Oct	ESE15	ESE15	ESE9	ENE8	NE7	NE8	NE9	NE6	NE8	NNE7	NE13	ENE13	NE10	NE13	NE7	NE12	E12	E10	ESE10	SE14	SE19	SE22	SE21	SE28	E9.6	SE28		
30-Oct	SE32	SE30	SSE31	SSE34	SSE32	SSE34	SSE27	SSE26	SSE30	SE36	SE31	SE33	SSE27	SSE27	SSE27	SSE26	SSE30	SE33	SE35	SE39	SSE38	SSE36	SE39	SSE29	SSE31.6	SSE39		
31-Oct	SSE32	SE36	SE38	SE41	SE38	SE39	SE37	SE37	SSE31	SSE32	SSE26	SSE23	S16	S18	S17	S19	SSW19	SSW18	SSW21	SSW17	SSW9	SSW10	SW12	WSW10	SSE22.6	SE41		

S6.9	S6.5	S5.9	SSW5.1	S5.8	S6.0	S6.5	SSW5.3	S5.2	S4.3	SSE4.0	SSE3.3	S3.2	S3.5	S3.2	SSE2.8	S3.7	S2.8	S3.9	S5.4	S5.8	S7.3	S7.5	S6.9	Diurnal Average
SE42	W42	W44	NW45	WNW46	SE40	SE41	W42	W37	SE39	SE40	SE38	SSE37	SSE43	SSE48	SSE46	SE49	SSE47	SSE47	SSE45	SSE46	SE49	SE50	SE47	Diurnal Maximum

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





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

**Wind Speed 167 m (WS167m) - km/h**  
**Lower Camp Met Tower - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 11 km/h on Oct 7 07:00	Hours of Data: 726
Minimum Value: 1 km/h on Oct 27 17:00	Hours of Missing Data: 18
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: 97.6

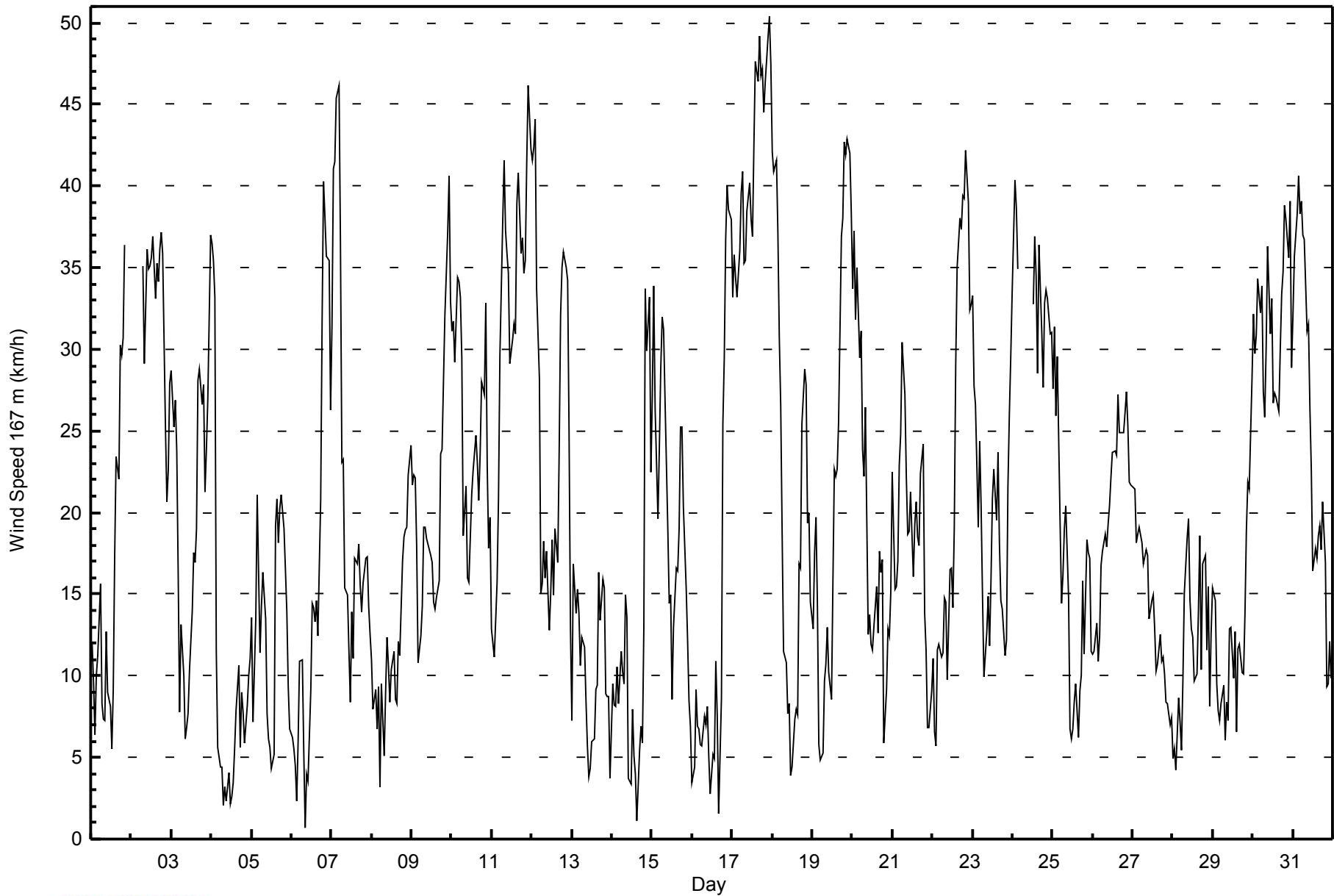
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	3	3	3	2	3	4	2	1	3	3	4	2	2	2	3	3	4	5	5	8	6	AF	AF	AF	8
2-Oct	AF	AF	AF	AF	AF	AF	AF	4	5	5	4	7	5	5	5	6	5	5	4	5	5	3	3	3	7
3-Oct	5	3	3	3	6	4	2	3	2	2	2	2	3	3	3	4	3	4	6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

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Speed 167 m (WS167m) - km/h**  
**Lower Camp Met Tower - October 2014**





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

**Wind Speed 167 m (WS167m) - km/h**  
**Lower Camp Met Tower - October 2014**

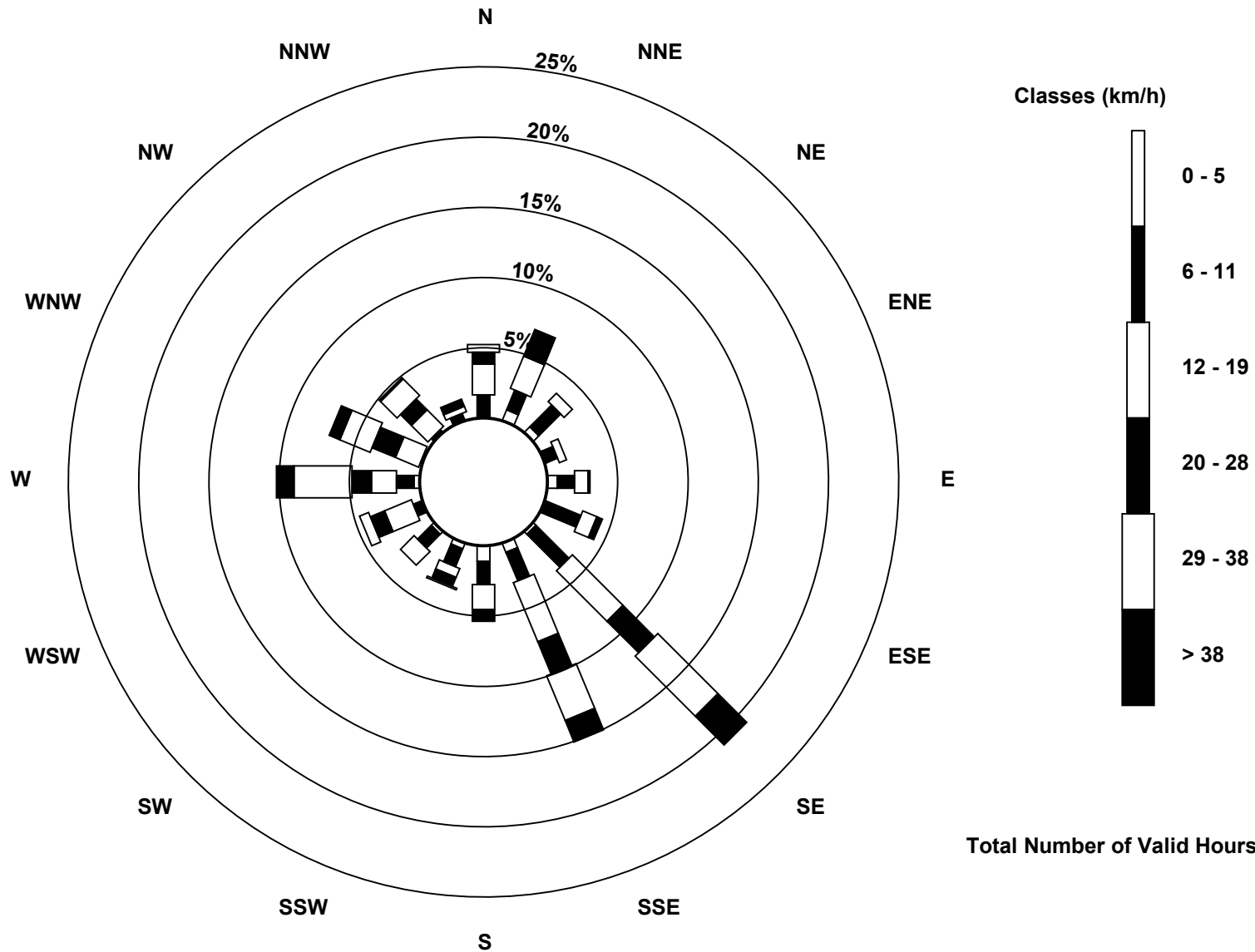
<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	42	5.79	5.79
6 - 11	164	22.59	28.37
12 - 19	213	29.34	57.71
20 - 28	120	16.53	74.24
29 - 38	138	19.01	93.25
> 38	49	6.75	100.00

Total Number of Valid Hours: 726

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg

Lower Camp Met Tower - October 2014

Direction of Maximum Speed: 154 deg on Oct 17 19:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 148.6 deg on Oct 17		Hours of Data: 729
Direction of Minimum Speed: 180 deg on Oct 13 06:00	Direction of Minimum Daily Speed Average: 0.6 deg on Oct 5	Hours of Missing Data: 15
Monthly Average Direction: 285.7 deg		Percent Operational Time: 98.0

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-Oct	359	1	0	314	325	17	34	45	92	91	62	41	350	4	6	3	6	4	3	357	353	343	332	327	0.3
2-Oct	AF	AF	321	340	334	333	323	320	312	314	327	322	322	324	321	317	317	314	312	318	344	350	336	1	323.2
3-Oct	1	350	3	357	15	340	307	196	184	158	152	151	147	154	163	162	160	158	168	177	181	153	131	153	157.4
4-Oct	147	143	146	178	203	254	242	221	169	232	250	139	308	258	346	352	359	333	334	329	335	6	346	158	166.2
5-Oct	355	133	193	222	209	164	180	199	232	193	150	152	135	338	358	27	29	11	5	29	10	28	22	55	79.4
6-Oct	81	51	68	124	134	89	89	79	86	63	39	327	330	338	6	356	347	341	315	302	300	289	286	277	322.7
7-Oct	285	294	296	330	319	337	346	346	0	351	10	38	3	342	23	32	39	41	5	58	27	357	349	358	344.7
8-Oct	357	357	360	352	316	8	353	340	28	265	354	350	114	99	129	164	120	308	151	164	156	139	141	142	134.7
9-Oct	136	135	151	19	53	132	352	23	147	149	155	157	155	150	155	162	160	140	140	144	139	134	140	131	144.6
10-Oct	138	141	146	152	157	155	140	168	158	163	155	155	156	158	165	155	155	192	182	161	163	150	137	153	157.5
11-Oct	150	146	144	147	149	190	272	275	270	271	276	281	281	279	275	275	270	269	253	278	277	276	276	268	259.1
12-Oct	266	272	281	295	291	286	283	268	261	274	266	280	286	261	276	279	266	290	300	298	274	263	281	315	279.3
13-Oct	247	280	266	237	218	180	157	130	134	176	178	152	143	141	153	158	163	150	70	358	356	349	345	355	155.6
14-Oct	344	338	345	341	341	347	333	346	342	342	340	10	7	7	4	353	7	341	271	202	279	274	270	313	325.1
15-Oct	293	279	321	322	246	243	269	273	278	302	315	308	265	331	330	334	337	345	335	333	332	345	8	345	299.8
16-Oct	344	70	332	334	196	98	41	16	90	100	116	127	152	170	164	175	348	59	124	145	137	135	136	138	135.2
17-Oct	144	140	138	141	142	144	145	147	145	137	149	145	154	153	151	152	148	153	154	156	147	151	153	152	148.6
18-Oct	144	146	143	141	147	155	162	155	158	150	177	163	151	154	152	159	259	55	255	267	274	277	272	315	163.3
19-Oct	166	244	300	314	331	188	25	278	9	348	5	20	191	149	143	129	61	150	146	149	145	144	135	140	144.1
20-Oct	141	145	148	142	36	142	147	166	157	164	149	148	154	154	183	159	148	142	98	337	191	146	152	154	151.1
21-Oct	149	144	148	145	136	144	148	190	150	172	187	252	252	255	260	261	238	246	252	166	150	148	150	158	182.8
22-Oct	148	142	146	138	141	141	128	133	127	147	175	156	156	158	143	140	150	156	156	151	146	144	153	154	148.1
23-Oct	146	139	103	353	130	350	352	332	319	320	343	4	115	126	82	68	31	324	343	342	331	322	319	315	11.1
24-Oct	304	298	300	302	297	AF	285	295	297	305	296	299	282	283	275	272	279	303	306	276	277	278	281	296	290.5
25-Oct	290	279	297	315	295	297	249	225	242	231	218	196	180	170	173	209	129	95	9	24	68	77	128	48	253.5
26-Oct	358	14	7	352	357	2	355	359	1	356	7	17	9	15	5	4	1	6	2	2	2	4	354	AF	3.0
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	9	7	3	17	336	338	341	339	299	320	339	50	4	--
28-Oct	322	249	186	223	204	115	170	171	178	177	175	180	168	165	136	122	135	180	140	129	135	142	27	83	165.2
29-Oct	82	72	90	355	334	343	338	324	346	349	21	69	42	24	331	53	58	22	126	137	118	110	127	144	74.1
30-Oct	144	150	151	152	152	150	164	167	150	142	151	146	162	163	169	174	155	153	159	154	150	155	148	164	155.4
31-Oct	158	146	146	149	148	147	149	147	151	152	156	164	175	165	169	168	169	165	174	160	150	157	151	146	156.1

167.4	177.8	174.7	179.8	193.3	152.2	208.9	221.6	198.4	189.4	189.1	178.1	187.9	177.0	174.7	167.6	175.0	186.9	193.4	186.1	174.4	167.4	172.7	169.6
Diurnal Average																							

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



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

**Wind Direction 20 m (WD20m) - deg**  
**Lower Camp Met Tower - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 105 deg on Oct 13 05:00	Hours of Data: 729
Minimum Value: 7 deg on Oct 31 18:00	Hours of Missing Data: 15
Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 13 Q <sub>1</sub> = 16 Median = 20 Q <sub>3</sub> = 33 P <sub>90</sub> = 58 P <sub>99</sub> = 93	Hours of Calibration: 0
	Percent Operational Time: 98.0

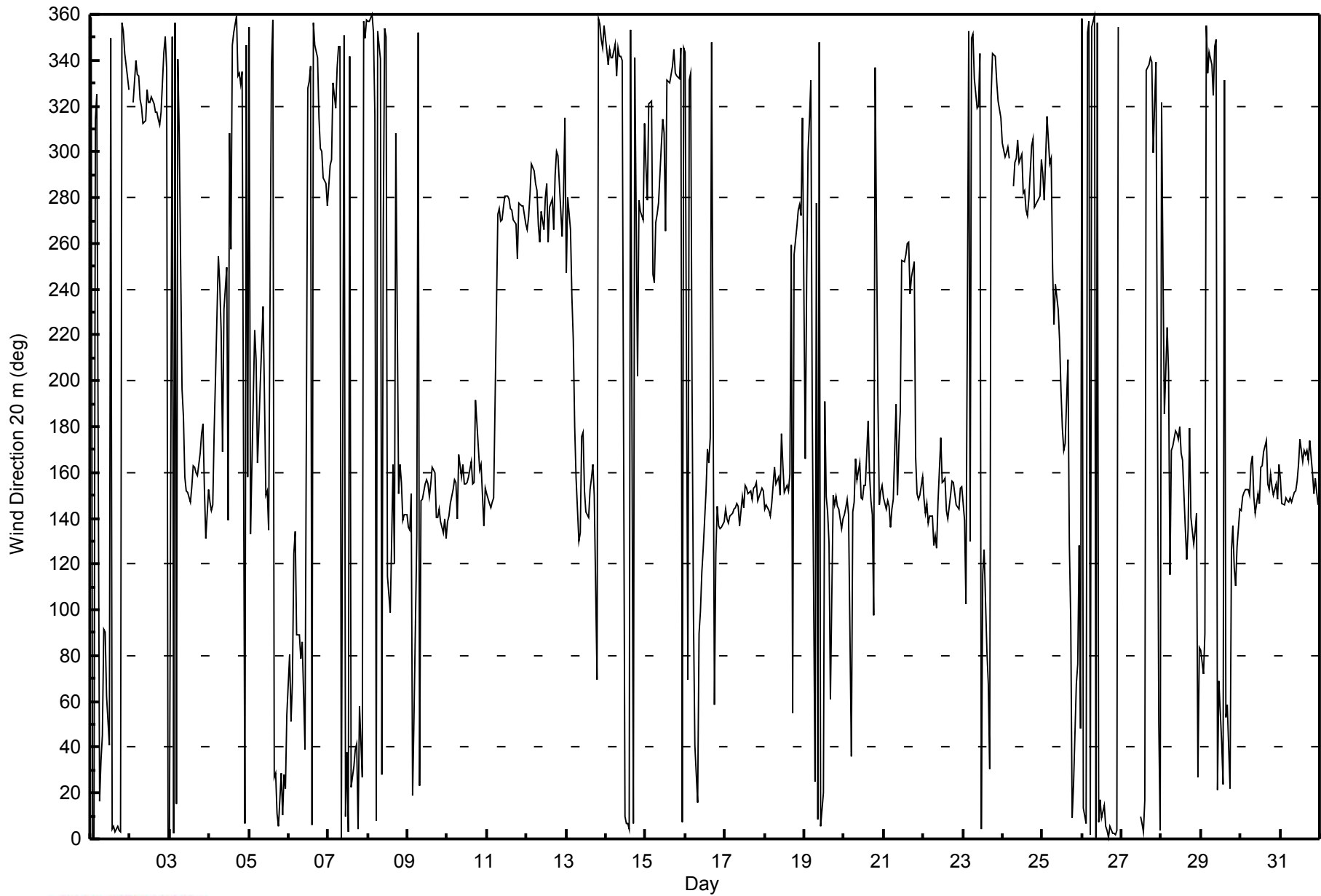
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	47	40	65	35	54	52	48	59	55	31	42	34	42	26	23	22	20	20	20	20	19	18	16	14	65
2-Oct	AF	AF	16	24	19	19	15	15	17	17	16	17	15	15	15	15	15	16	17	18	14	16	17	24	
3-Oct	18	17	17	25	56	77	64	68	20	20	18	19	18	15	13	15	15	13	12	13	23	19	16	77	
4-Oct	17	18	17	73	63	31	32	43	43	30	52	89	89	51	48	27	24	50	19	16	67	52	93	46	
5-Oct	64	38	39	11	18	7	16	16	16	26	21	16	35	89	21	27	27	20	22	27	28	39	40	89	
6-Oct	27	40	50	27	25	27	36	35	76	49	64	28	23	21	26	23	19	33	17	16	16	18	17	76	
7-Oct	22	21	22	26	26	27	77	30	24	23	33	25	34	44	29	25	23	32	42	67	69	47	73	78	
8-Oct	42	37	56	71	38	69	80	54	82	69	44	21	93	29	28	29	43	58	33	16	16	21	17	93	
9-Oct	16	23	22	51	77	81	87	69	22	17	16	15	20	21	19	12	15	21	21	14	15	15	17	87	
10-Oct	21	18	16	16	16	20	27	18	15	10	17	14	14	15	12	10	8	9	18	10	9	58	37	58	
11-Oct	13	8	8	9	12	31	23	17	16	17	17	19	19	17	21	17	14	13	11	16	14	15	15	31	
12-Oct	11	16	20	25	25	17	29	65	37	29	30	27	26	27	26	30	20	16	18	19	14	12	20	65	
13-Oct	49	56	40	56	105	94	27	12	13	48	47	35	24	25	16	12	18	25	42	26	42	26	37	105	
14-Oct	31	26	24	30	26	17	21	21	31	34	31	25	32	15	17	26	21	25	54	25	18	17	15	54	
15-Oct	23	18	19	18	20	12	15	15	17	25	22	22	50	33	23	20	15	16	16	16	33	52	28	52	
16-Oct	43	51	29	49	59	61	63	74	26	31	40	47	58	46	17	22	76	59	25	17	16	17	17	76	
17-Oct	18	19	19	18	17	15	13	18	17	15	15	16	14	14	13	13	14	13	12	12	14	15	13	19	
18-Oct	16	16	16	17	28	32	27	15	18	16	38	37	18	13	15	51	19	68	22	13	42	76	32	84	
19-Oct	65	43	50	46	55	77	73	59	52	28	26	38	74	20	17	41	69	13	13	13	13	12	13	77	
20-Oct	14	14	17	23	80	59	46	34	32	19	24	22	12	13	25	15	21	12	74	69	83	25	14	83	
21-Oct	34	20	11	12	16	13	20	95	54	30	55	16	17	17	18	28	41	11	42	19	11	19	10	95	
22-Oct	20	22	16	38	20	18	13	23	19	24	35	33	21	15	17	14	12	9	11	12	12	13	13	38	
23-Oct	20	33	35	24	96	39	20	38	45	69	29	31	55	25	21	20	58	35	16	22	15	13	13	96	
24-Oct	16	16	16	17	18	AF	16	14	16	17	17	17	18	19	16	18	19	24	21	16	17	16	17	24	
25-Oct	20	19	23	17	19	75	14	37	20	15	26	23	30	20	20	27	21	46	32	24	40	49	59	75	
26-Oct	33	18	16	16	15	18	18	16	16	14	18	22	20	22	18	16	17	18	15	15	16	18	17	AF	33
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	23	22	19	30	18	15	20	23	28	24	56	58	39	58
28-Oct	27	71	62	15	35	32	81	15	11	10	12	13	13	16	26	22	26	100	53	35	93	47	78	100	
29-Oct	35	65	66	24	18	19	30	38	29	35	30	25	40	33	43	26	50	64	59	16	19	20	18	66	
30-Oct	16	17	15	15	15	16	16	11	19	17	15	16	15	16	13	13	14	15	13	15	16	16	14	19	
31-Oct	14	15	15	14	15	15	14	15	14	12	11	11	13	9	9	8	8	7	11	21	13	8	14	21	
	65	71	66	73	105	94	87	95	82	69	64	89	93	89	48	51	76	100	74	69	93	76	93	84	
	Diurnal Maximum																								

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction 20 m (WD20m) - deg**  
**Lower Camp Met Tower - October 2014**





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg

Lower Camp Met Tower - October 2014

Direction of Maximum Speed: 141 deg on Oct 17 15:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 138.9 deg on Oct 17	Hours of Data: 724
Direction of Minimum Speed: 219 deg on Oct 18 18:00	Direction of Minimum Daily Speed Average: 1.5 deg on Oct 5
Direction of Minimum Speed: 219 deg on Oct 18 18:00	Hours of Missing Data: 20
Monthly Average Direction: 291.7 deg	Percent Operational Time: 97.3

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-Oct	1	359	354	327	326	19	30	41	88	82	58	37	345	1	1	360	1	360	0	352	348	338	326	322	357.1
2-Oct	AF	AF	311	335	327	328	316	311	303	305	320	315	313	315	313	308	308	304	301	307	333	343	332	346	315.1
3-Oct	346	337	344	342	351	326	275	211	177	145	141	141	139	143	151	150	144	144	156	167	171	143	125	142	146.3
4-Oct	137	133	135	159	191	247	233	216	162	228	249	111	328	256	340	345	354	340	334	326	315	329	256	197	154.2
5-Oct	297	151	184	216	202	157	173	191	225	185	140	138	128	349	352	22	21	7	2	22	8	23	17	47	38.3
6-Oct	71	43	58	114	123	83	84	69	70	59	31	321	324	331	1	353	341	336	306	291	291	279	277	266	314.6
7-Oct	275	283	284	313	305	322	329	335	355	343	4	26	356	343	17	25	32	38	4	61	82	74	348	84	335.6
8-Oct	5	7	355	357	322	2	341	356	50	212	341	341	107	91	121	150	114	262	137	150	144	130	132	134	119.8
9-Oct	130	129	139	55	81	115	121	138	135	138	143	144	144	139	144	150	147	130	131	136	132	128	133	127	135.1
10-Oct	133	135	138	140	144	142	133	153	146	151	143	142	142	149	158	147	146	182	178	160	161	145	125	137	147.3
11-Oct	142	136	137	139	145	227	259	263	260	262	267	272	271	269	266	266	261	259	244	264	264	265	266	260	251.2
12-Oct	257	262	271	282	278	273	274	269	252	266	260	273	278	252	267	268	255	280	290	289	267	255	269	322	269.9
13-Oct	252	269	253	236	236	183	185	132	131	178	169	143	131	136	141	146	156	142	101	21	354	337	338	350	156.4
14-Oct	346	336	343	339	336	343	332	339	341	339	338	360	360	356	355	347	356	340	313	208	268	264	261	304	320.4
15-Oct	284	268	311	312	238	236	259	264	268	292	305	302	258	323	321	326	331	340	335	332	335	292	322	345	291.5
16-Oct	339	9	343	330	213	103	82	46	99	94	108	105	143	161	153	165	346	52	116	136	130	129	128	131	126.2
17-Oct	133	132	132	135	135	136	136	135	135	130	140	136	141	142	141	141	138	142	143	144	139	141	142	141	138.9
18-Oct	137	138	136	133	134	140	150	149	146	140	169	156	140	142	141	153	250	219	244	257	265	273	268	355	155.1
19-Oct	168	235	281	286	318	155	121	154	79	351	335	11	167	139	132	123	98	141	137	140	137	137	129	133	137.9
20-Oct	135	137	139	137	104	124	133	148	144	150	139	141	143	143	171	149	139	134	132	317	146	141	137	138	140.3
21-Oct	141	139	142	140	141	143	148	222	159	199	210	244	242	247	253	249	228	228	240	157	145	139	141	147	185.9
22-Oct	140	141	142	137	138	139	131	135	123	133	152	148	140	147	132	131	136	143	146	142	137	136	137	138	138.4
23-Oct	137	131	109	357	104	1	343	344	332	331	338	1	107	118	78	66	37	335	342	337	327	316	309	306	24.4
24-Oct	295	289	291	293	289	AF	AF	AF	AF	AF	AF	286	272	273	265	263	270	292	294	266	266	268	270	287	279.0
25-Oct	278	269	285	304	286	282	240	223	235	225	211	184	171	159	163	199	122	105	46	47	91	99	122	66	237.9
26-Oct	15	15	5	351	352	357	353	355	356	352	6	15	6	11	2	360	356	2	357	359	360	AF	AF	AF	0.5
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	5	7	6	3	357	9	334	334	340	340	314	329	355	58	14	--
28-Oct	304	239	170	215	194	104	153	163	169	168	166	171	160	156	124	113	127	157	127	121	112	128	31	81	153.1
29-Oct	86	77	87	353	334	338	336	326	342	348	20	60	33	22	330	45	55	31	116	127	111	105	121	135	65.6
30-Oct	135	138	139	140	139	138	151	156	138	134	141	136	149	150	158	164	143	142	146	142	140	142	139	149	143.4
31-Oct	143	137	137	139	138	138	139	137	139	141	145	153	165	156	161	161	163	158	167	152	142	150	147	157	146.1

156.6 169.1 167.1 168.6 183.5 140.2 182.9 193.1 174.3 164.8 154.8 157.8 173.8 162.5 157.6 139.9 141.1 156.1 173.7 171.5 162.2 158.5 163.0 154.5

Diurnal Average

AF - Analyzer Failure

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





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 45 m (WD45m) - deg

Lower Camp Met Tower - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 107 deg on Oct 16 02:00			Hours of Data:	724
Minimum Value: 4 deg on Oct 11 02:00			Hours of Missing Data:	20
			Hours of Calibration:	0
			Percent Operational Time:	97.3
Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 9 Q <sub>1</sub> = 12 Median = 15 Q <sub>3</sub> = 27 P <sub>90</sub> = 47 P <sub>99</sub> = 87				

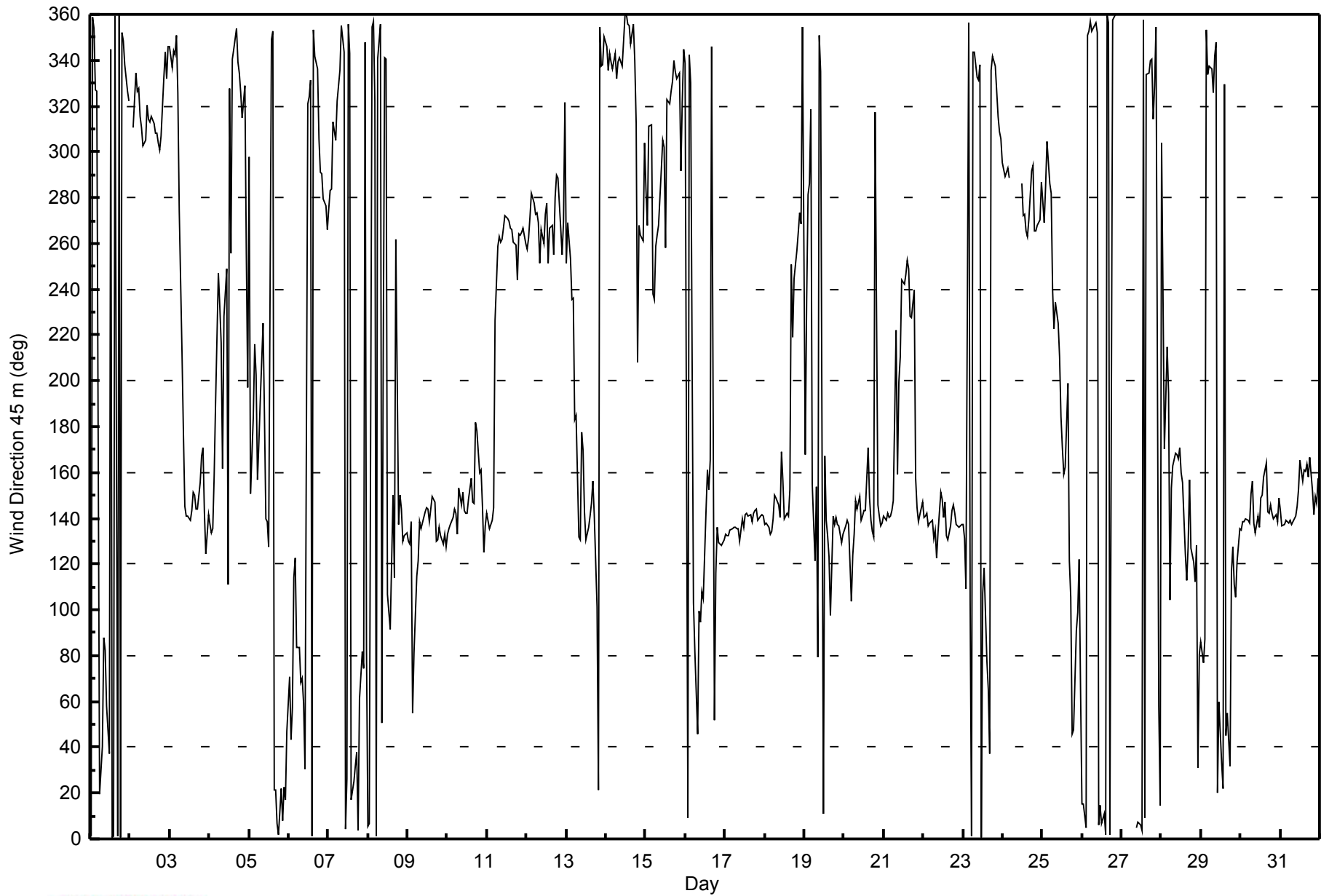
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	29	32	51	37	43	46	40	33	60	23	32	27	39	20	16	17	17	14	15	14	15	14	12	11	60		
2-Oct	AF	AF	13	24	18	17	13	12	13	15	14	16	13	13	13	13	13	13	12	15	15	10	10	13	24		
3-Oct	16	13	15	21	47	56	28	52	19	18	13	15	14	11	13	13	13	12	13	9	9	19	13	11	56		
4-Oct	12	12	12	77	41	29	28	41	43	26	44	95	83	51	43	21	19	40	15	13	33	47	41	28	95		
5-Oct	54	37	36	9	17	7	13	14	14	28	20	12	38	88	15	20	18	15	17	17	20	20	32	28	88		
6-Oct	19	37	34	20	24	18	22	27	73	39	54	27	18	17	22	19	13	26	14	11	11	13	13	11	73		
7-Oct	17	14	15	20	22	22	50	21	21	20	27	20	27	44	24	18	17	23	36	68	55	33	71	83	83		
8-Oct	20	17	33	38	41	43	79	34	72	71	40	15	89	22	24	25	26	84	31	16	13	15	12	13	89		
9-Oct	12	16	16	62	64	47	77	106	18	13	11	12	16	18	16	9	12	13	13	9	9	9	11	16	106		
10-Oct	14	12	10	10	11	14	19	15	13	7	13	10	11	14	10	7	9	7	15	9	9	52	26	10	52		
11-Oct	8	4	5	7	24	22	17	12	10	12	11	13	13	12	16	12	9	10	6	12	10	10	10	7	24		
12-Oct	6	9	12	19	19	13	22	18	28	21	23	22	20	22	21	27	17	11	14	15	11	8	14	44	44		
13-Oct	29	38	23	46	44	83	22	10	10	47	46	22	22	24	12	9	15	15	24	47	19	11	14	15	83		
14-Oct	19	17	17	26	16	12	16	16	23	23	29	15	18	10	11	20	15	16	86	31	14	13	11	18	86		
15-Oct	20	12	16	16	15	10	10	10	11	23	18	19	43	30	19	16	12	12	13	11	13	52	80	20	80		
16-Oct	32	107	24	30	58	65	48	84	20	22	30	46	53	45	14	22	80	43	21	13	12	13	12	12	107		
17-Oct	13	13	13	13	12	9	8	12	11	10	9	10	11	10	8	8	10	8	8	8	9	9	8	9	13		
18-Oct	11	9	10	10	22	24	18	14	13	10	39	35	15	8	10	46	16	84	13	9	28	60	29	77	84		
19-Oct	64	36	30	35	61	47	75	50	54	40	28	56	79	14	12	27	40	9	8	8	9	7	9	9	79		
20-Oct	8	8	9	14	71	33	33	28	24	16	17	17	7	8	22	14	11	8	73	57	87	9	13	10	87		
21-Oct	18	13	12	18	24	16	28	89	70	30	45	9	8	10	14	22	26	10	20	24	6	7	5	8	89		
22-Oct	8	10	9	16	11	13	10	15	14	20	33	27	18	12	11	9	8	7	8	8	7	7	9	10	33		
23-Oct	12	17	19	22	60	78	12	26	31	73	26	49	29	18	15	12	48	34	13	17	12	12	11	12	78		
24-Oct	12	11	11	12	14	AF	AF	AF	AF	AF	AF	13	14	14	11	13	13	21	19	10	11	11	13	13	21		
25-Oct	16	14	20	13	16	71	8	30	11	11	24	25	29	18	16	28	18	32	38	24	38	38	33	47	71		
26-Oct	33	15	13	12	10	12	15	11	11	11	13	16	14	15	13	12	12	13	11	11	14	AF	AF	AF	33		
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	15	18	16	15	14	22	17	11	14	17	28	17	39	39	43	43		
28-Oct	27	63	46	13	30	23	57	11	8	7	9	9	12	15	23	18	21	94	33	28	81	38	72	70	94		
29-Oct	21	48	58	17	13	14	18	19	21	26	26	20	31	24	35	20	39	45	57	12	13	15	12	13	58		
30-Oct	11	13	12	10	12	12	15	11	14	13	12	12	14	14	11	10	13	9	10	11	12	12	11	12	15		
31-Oct	12	10	10	9	10	10	9	10	10	8	9	10	9	9	8	7	7	6	8	18	10	6	11	20	20		
	64	107	58	77	71	83	79	106	73	73	54	95	89	88	43	46	80	94	86	68	87	60	80	83			
Diurnal Maximum																											

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction 45 m (WD45m) - deg**  
**Lower Camp Met Tower - October 2014**





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

**Wind Direction 100 m (WD100m) - deg**  
**Lower Camp Met Tower - October 2014**

Direction of Maximum Speed: 143 deg on Oct 17 23:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 141.9 deg on Oct 17	Hours of Data: 728
Direction of Minimum Speed: 326 deg on Oct 8 06:00	Direction of Minimum Daily Speed Average: 2.1 deg on Oct 5
Direction of Minimum Speed: 326 deg on Oct 8 06:00	Hours of Missing Data: 16
Monthly Average Direction: 236.4 deg	Percent Operational Time: 97.9

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-Oct	18	8	12	360	356	24	34	40	95	88	68	43	353	4	2	4	4	2	2	355	351	344	AF	AF	7.0	
2-Oct	AF	AF	AF	335	330	331	319	313	304	306	319	315	312	315	310	309	307	300	296	299	316	331	322	308	312.9	
3-Oct	302	307	304	304	306	288	256	251	198	141	137	137	137	144	151	146	142	144	153	164	169	144	133	141	158.4	
4-Oct	141	137	138	145	163	233	211	214	162	236	256	42	333	282	346	343	357	7	346	342	292	243	263	233	155.5	
5-Oct	232	198	219	233	215	172	192	214	225	193	141	135	161	9	355	25	22	11	8	22	11	23	22	50	357.1	
6-Oct	66	53	57	116	132	94	101	80	74	60	39	317	320	327	2	356	340	314	302	289	289	283	283	273	311.0	
7-Oct	284	287	287	299	296	299	302	310	341	328	336	14	348	344	19	28	35	45	42	92	119	134	137	162	321.8	
8-Oct	143	123	118	47	134	326	121	136	135	126	115	52	125	99	116	144	122	130	132	147	141	135	137	137	130.2	
9-Oct	139	137	140	142	119	119	132	145	138	138	138	139	139	135	140	145	143	133	138	139	140	139	141	140	138.3	
10-Oct	139	141	142	143	146	146	145	151	149	155	150	144	148	153	162	161	166	196	193	179	178	169	150	155	155.2	
11-Oct	177	183	192	198	221	246	252	257	258	261	266	271	270	269	266	264	260	261	253	254	254	257	264	266	257.0	
12-Oct	266	267	272	278	269	270	282	279	258	271	265	277	283	258	269	265	258	277	288	286	270	267	274	325	272.9	
13-Oct	264	258	251	246	246	248	220	206	198	198	174	151	124	137	135	144	164	147	132	128	38	6	356	348	197.0	
14-Oct	18	354	355	5	359	5	350	351	356	358	338	347	25	343	358	343	319	320	326	225	267	264	265	305	322.7	
15-Oct	279	267	304	303	243	246	256	259	269	291	302	303	265	324	319	322	331	344	341	342	344	342	336	337	294.6	
16-Oct	344	35	73	9	84	138	127	106	125	111	107	101	135	154	148	159	13	74	126	140	135	136	135	137	129.4	
17-Oct	138	138	139	140	141	142	141	138	137	138	141	139	144	144	143	143	141	145	147	148	143	143	143	142	141.9	
18-Oct	140	140	140	137	136	138	147	163	149	154	205	181	140	147	155	195	246	236	255	265	273	307	286	338	166.1	
19-Oct	298	250	265	273	16	103	150	149	139	119	141	133	126	134	131	130	129	143	140	143	142	142	139	139	144.5	
20-Oct	140	141	142	145	140	139	141	143	143	147	141	149	150	146	176	152	146	149	141	128	131	140	144	168	144.2	
21-Oct	170	173	189	223	237	234	242	247	236	236	234	245	242	244	255	251	241	242	240	197	173	160	160	167	226.9	
22-Oct	180	157	157	172	152	154	155	151	148	148	120	148	145	145	132	134	132	137	143	145	143	142	143	143	143.3	
23-Oct	143	138	135	126	130	130	86	17	25	97	114	126	113	122	96	84	68	32	13	3	343	321	311	306	94.0	
24-Oct	296	289	289	291	291	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	268	289	288	264	262	268	269	287	--
25-Oct	273	267	283	297	287	273	250	238	249	241	225	190	171	162	164	200	123	124	124	125	124	127	132	115	229.1	
26-Oct	111	96	87	11	1	6	6	6	3	359	12	18	9	15	6	3	0	6	4	3	4	6	3	3	9.3	
27-Oct	10	1	354	359	359	356	357	359	1	10	14	12	6	3	13	345	346	353	353	1	356	27	83	109	3.1	
28-Oct	206	213	150	208	181	129	165	165	167	165	171	172	158	154	136	127	137	124	128	132	121	126	106	109	150.7	
29-Oct	104	99	99	25	4	7	7	6	10	8	40	62	39	31	14	51	74	70	117	131	122	120	132	138	82.3	
30-Oct	137	140	141	143	142	141	149	153	141	137	142	138	147	147	156	161	144	142	144	143	143	143	141	148	143.8	
31-Oct	144	140	139	141	141	141	141	140	142	143	149	154	165	159	166	168	176	173	180	173	160	167	203	212	151.1	

166.5 182.8 181.0 199.7 188.8 155.0 182.7 196.0 171.4 161.1 154.5 142.9 152.0 145.9 139.0 128.7 155.8 158.8 170.5 175.1 173.2 162.2 168.6 163.6  
 Diurnal Average

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



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

**Wind Direction 100 m (WD100m) - deg**  
**Lower Camp Met Tower - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 91 deg on Oct 5 14:00	Hours of Data: 728
Minimum Value: 2 deg on Oct 17 07:00	Hours of Missing Data: 16
Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 16 P <sub>90</sub> = 27 P <sub>99</sub> = 62	Hours of Calibration: 0
	Percent Operational Time: 97.9

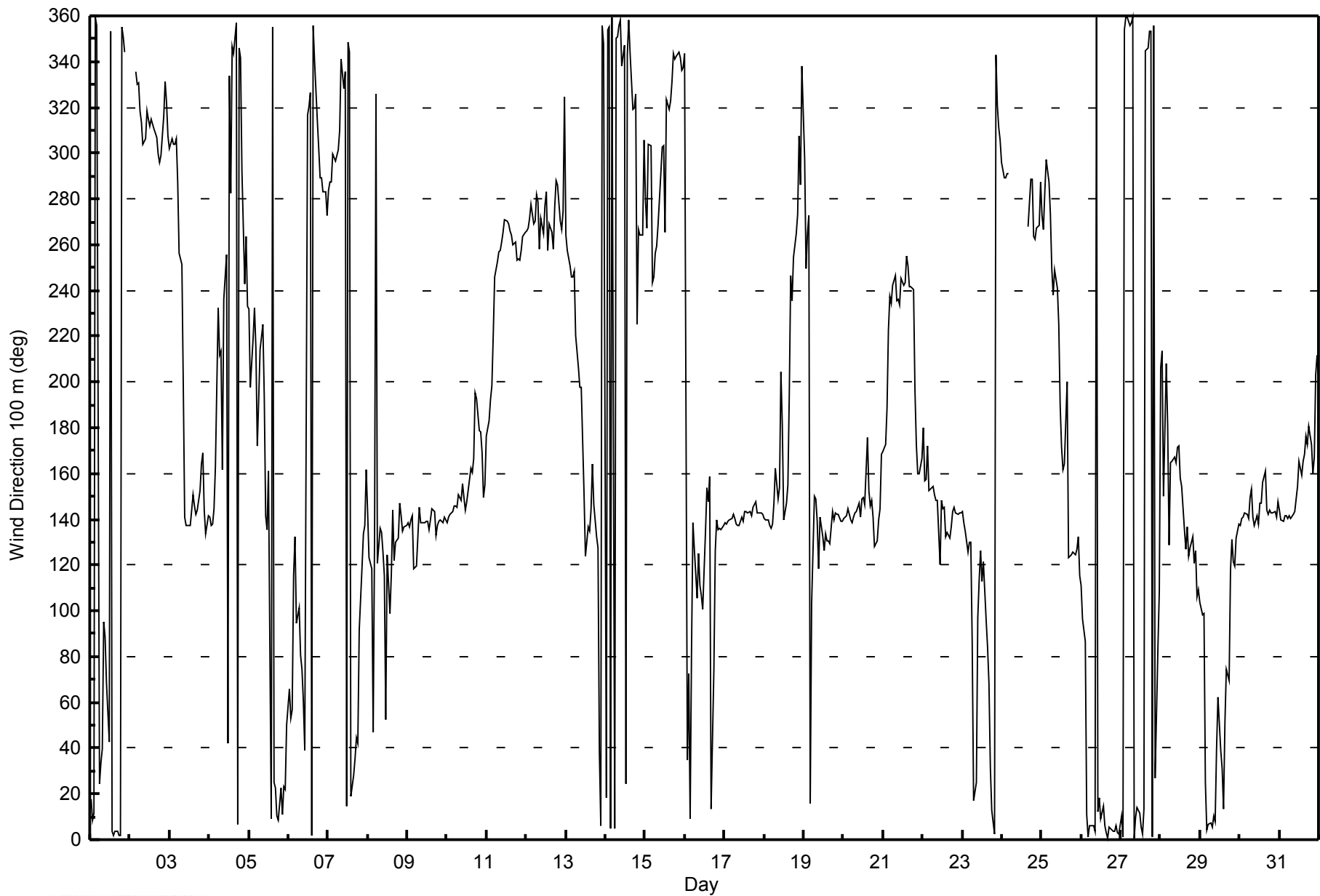
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	18	20	31	15	21	24	33	8	36	14	24	20	27	10	8	10	9	7	7	8	10	8	AF	AF	36
2-Oct	AF	AF	AF	23	14	13	9	8	11	11	8	11	8	8	9	9	10	9	7	9	10	8	11	11	23
3-Oct	13	10	10	14	22	32	12	32	22	20	7	8	8	8	11	9	5	5	9	8	7	13	7	3	32
4-Oct	4	4	4	30	42	17	25	38	33	35	32	66	60	72	40	17	15	28	8	12	24	13	17	7	72
5-Oct	6	31	21	7	15	9	14	10	8	26	22	13	61	91	10	12	10	8	11	10	13	14	18	20	91
6-Oct	14	30	29	14	15	8	7	25	51	30	40	19	12	13	16	16	9	13	10	7	6	9	9	7	51
7-Oct	11	8	8	7	10	13	22	14	17	16	26	23	19	36	18	12	11	17	28	21	7	4	13	13	36
8-Oct	9	6	27	34	76	63	12	16	23	14	11	44	44	14	15	12	13	26	16	13	6	7	6	6	76
9-Oct	6	6	5	19	31	5	13	13	5	5	5	6	8	8	9	6	11	5	6	5	3	3	3	3	31
10-Oct	3	2	3	2	3	3	5	7	5	6	8	6	8	10	7	8	11	9	11	3	4	23	16	6	23
11-Oct	13	12	18	20	21	8	8	6	5	7	5	8	8	6	16	7	4	4	5	5	5	4	3	2	21
12-Oct	2	3	5	12	12	11	12	13	15	11	15	18	14	23	21	26	10	9	10	10	6	4	16	25	26
13-Oct	30	9	4	10	10	29	12	18	20	33	35	25	12	11	7	10	9	7	6	27	62	10	8	7	62
14-Oct	11	10	8	20	17	10	7	7	8	10	18	16	48	50	45	20	10	5	48	27	9	11	8	14	50
15-Oct	17	8	12	14	9	8	5	5	7	20	17	12	41	22	11	12	6	6	8	8	4	11	24	17	41
16-Oct	13	37	18	35	68	25	12	12	6	13	25	44	26	39	11	19	68	30	9	6	5	5	6	5	68
17-Oct	6	5	3	4	2	2	2	3	3	3	3	4	5	4	4	4	4	4	4	5	3	3	3	3	6
18-Oct	3	3	3	4	5	5	9	11	11	10	26	28	14	10	10	29	7	5	4	9	14	21	12	30	30
19-Oct	49	10	8	27	24	53	16	9	8	6	19	14	25	6	7	7	8	4	4	3	3	3	4	4	53
20-Oct	3	2	3	2	11	5	7	13	8	8	6	14	7	6	14	11	6	4	16	13	3	3	5	15	16
21-Oct	8	11	22	19	22	16	27	22	24	13	17	6	5	8	9	8	8	5	6	27	18	11	8	24	27
22-Oct	14	18	5	14	9	6	9	8	6	12	8	15	13	8	5	4	6	5	3	3	2	2	3	3	18
23-Oct	3	5	4	12	5	9	29	34	26	41	39	12	9	12	8	4	17	11	11	14	12	7	7	7	41
24-Oct	8	6	6	7	10	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	10	18	17	5	5	7	8	9	18
25-Oct	13	9	17	8	9	12	6	7	6	9	22	25	22	16	15	29	10	12	9	20	8	5	11	22	29
26-Oct	17	19	17	10	7	7	8	6	5	5	6	7	6	8	7	5	6	6	5	4	5	6	8	7	19
27-Oct	6	7	8	7	7	8	8	8	6	8	10	7	8	7	15	11	4	8	8	15	12	25	25	23	25
28-Oct	58	36	34	12	19	29	42	8	7	5	8	9	7	11	16	14	10	43	10	9	22	16	41	18	58
29-Oct	9	17	34	19	15	16	14	26	18	18	19	15	23	15	20	14	22	24	18	8	6	8	7	6	34
30-Oct	4	6	5	5	7	6	11	9	7	6	6	5	10	10	10	9	8	4	5	4	5	6	4	8	11
31-Oct	6	4	4	4	4	4	3	3	4	3	6	7	8	6	8	6	4	6	4	12	11	10	22	15	22
58 37 34 35 76 63 42 38 51 41 40 66 61 91 45 29 68 43 48 27 62 25 41 30																									
Diurnal Maximum																									

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction 100 m (WD100m) - deg**  
**Lower Camp Met Tower - October 2014**





Maximum Value: 0.6 km/h on Oct 10 21:00      Maximum Daily Average: 0.1 km/h on Oct 28																								Hours in Service: 744 Hours of Data: 729		
Minimum Value: -0.7 km/h on Oct 11 14:00      Minimum Daily Average: -0.4 km/h on Oct 24 Maximum Diurnal Average: 0.0 km/h at hour 6      Minimum Diurnal Average: -0.2 km/h at hour 23 Monthly Average: -0.09 km/h      Percentiles: P <sub>1</sub> = -0.6 P <sub>10</sub> = -0.4 Q <sub>1</sub> = -0.2 Median = -0.1 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.1 P <sub>99</sub> = 0.3																								Hours of Missing Data: 15 Hours of Calibration: 0 Percent Operational Time: 98.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	-0.1	-0.1	0.0	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	-0.5	-0.5	-0.4	-0.5	0.2	-0.1	-0.3	-0.2	0.2
2-Oct	AF	AF	-0.2	-0.2	-0.1	-0.2	-0.5	-0.6	-0.3	-0.5	-0.3	-0.3	-0.4	-0.7	-0.6	-0.5	-0.5	-0.4	-0.3	-0.1	0.0	-0.1	-0.1	-0.1	-0.3	0.0
3-Oct	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	0.1	0.0	0.1	0.1	0.3	0.2	0.0	-0.2	0.1	0.1	0.2	0.1	0.3	0.2	0.1	0.2	-0.2	0.1	0.1	0.3
4-Oct	-0.1	-0.2	0.0	0.2	0.1	-0.1	-0.1	0.1	-0.1	-0.2	0.1	0.2	0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2
5-Oct	0.0	0.0	0.0	-0.2	-0.1	0.2	0.2	-0.2	-0.1	-0.1	0.0	-0.1	0.2	-0.2	-0.4	0.0	-0.1	-0.3	0.0	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	0.2
6-Oct	-0.1	0.0	-0.1	0.0	0.0	-0.3	-0.1	0.0	0.0	0.1	0.0	-0.1	0.1	0.0	-0.1	-0.4	-0.1	-0.1	-0.3	-0.6	-0.4	-0.5	-0.5	-0.3	-0.2	0.1
7-Oct	-0.2	-0.2	-0.2	0.0	0.0	0.0	-0.1	-0.2	-0.3	-0.4	-0.1	-0.1	0.1	0.0	-0.1	-0.3	-0.3	-0.2	-0.2	0.0	0.0	0.1	0.0	0.0	-0.1	0.1
8-Oct	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	-0.1	0.0	-0.1	-0.3	-0.1	-0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.2	-0.1	-0.1	0.0	0.0	0.2
9-Oct	-0.1	0.0	0.1	-0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1	-0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	-0.2	-0.4	-0.4	-0.1	-0.2	0.0	0.2
10-Oct	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	-0.1	-0.1	-0.2	0.1	-0.2	-0.2	-0.1	0.2	0.0	0.1	0.0	0.0	0.6	0.6	0.4	-0.1	-0.1	0.0	0.6
11-Oct	-0.1	0.0	0.0	0.2	0.3	0.1	-0.3	-0.5	-0.4	-0.6	-0.6	-0.5	-0.4	-0.7	-0.6	-0.6	-0.7	-0.4	-0.1	-0.4	-0.5	-0.5	-0.6	-0.6	-0.4	0.3
12-Oct	-0.6	-0.4	-0.2	-0.2	-0.1	-0.4	-0.2	0.0	-0.1	-0.3	-0.1	-0.4	-0.3	-0.1	-0.1	-0.1	-0.2	-0.6	-0.2	-0.3	-0.4	-0.2	-0.4	-0.1	-0.2	0.0
13-Oct	0.0	-0.1	0.0	-0.1	0.1	0.1	0.2	0.2	0.1	0.1	-0.1	0.1	0.1	0.2	-0.1	0.1	0.2	0.0	0.0	-0.1	-0.1	-0.1	0.0	-0.1	0.0	0.2
14-Oct	-0.1	-0.1	0.0	-0.2	-0.1	-0.2	-0.1	0.1	0.0	-0.1	-0.1	-0.2	-0.3	-0.3	-0.2	-0.1	-0.1	0.0	0.0	-0.4	-0.3	-0.5	-0.5	-0.3	-0.1	0.1
15-Oct	-0.5	-0.7	-0.4	-0.2	-0.1	-0.1	-0.4	-0.5	-0.5	-0.3	-0.3	-0.3	-0.2	-0.2	-0.3	-0.3	0.0	0.1	0.0	0.0	-0.1	0.0	0.0	0.0	-0.2	0.1
16-Oct	0.0	0.0	-0.1	-0.2	0.1	0.0	0.1	-0.1	0.0	0.0	0.1	0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	-0.2	-0.3	-0.3	-0.4	-0.6	-0.3	-0.1	0.1
17-Oct	-0.1	-0.2	-0.3	-0.2	0.0	-0.1	-0.5	0.0	-0.2	-0.3	-0.3	0.0	0.0	-0.2	-0.4	-0.2	-0.1	-0.2	-0.3	-0.3	0.0	0.1	-0.4	0.0	-0.2	0.1
18-Oct	0.2	0.0	0.0	-0.2	-0.1	0.0	-0.2	0.1	-0.1	-0.1	0.0	0.2	0.2	0.1	-0.1	0.1	-0.1	0.1	0.0	-0.2	-0.2	-0.1	-0.2	0.0	0.0	0.2
19-Oct	0.1	-0.1	-0.4	-0.2	0.0	0.0	0.0	0.1	0.1	0.0	-0.1	0.3	0.1	0.2	-0.2	-0.2	0.1	-0.1	-0.2	-0.3	-0.3	-0.3	-0.4	-0.3	-0.1	0.3
20-Oct	-0.3	-0.3	-0.1	0.1	0.0	0.1	-0.1	0.1	0.0	0.0	0.0	-0.1	-0.2	-0.1	0.0	0.0	-0.2	0.3	0.1	0.0	0.0	0.1	0.1	0.2	0.0	0.3
21-Oct	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.0	0.2	0.1	-0.1	-0.1	-0.3	-0.2	-0.1	0.0	-0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.2
22-Oct	0.2	0.1	0.0	0.0	0.2	0.1	0.1	0.1	-0.2	0.2	0.0	-0.1	0.0	0.0	0.0	-0.2	0.0	-0.2	-0.3	-0.4	-0.3	-0.1	0.1	0.3	0.0	0.3
23-Oct	0.1	0.0	0.0	-0.3	0.1	0.0	-0.1	0.0	0.0	-0.1	-0.3	-0.1	0.0	-0.2	0.0	-0.1	0.1	0.0	-0.1	0.0	0.1	-0.1	-0.4	-0.2	-0.1	0.1
24-Oct	-0.3	-0.5	-0.4	-0.1	-0.4	AF	0.0	-0.6	-0.2	-0.2	-0.6	-0.6	-0.5	-0.3	-0.5	-0.3	-0.5	-0.3	-0.3	-0.5	-0.5	-0.5	-0.5	-0.6	-0.4	0.0
25-Oct	-0.4	-0.3	-0.2	-0.2	0.0	0.1	0.2	0.2	0.0	-0.2	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	-0.1	-0.1	-0.1	0.0	0.2
26-Oct	-0.2	-0.5	-0.5	-0.3	-0.4	-0.1	-0.1	-0.2	-0.3	-0.3	0.0	0.1	-0.1	0.0	-0.3	-0.3	-0.4	0.0	-0.3	-0.2	-0.2	-0.2	-0.1	AF	-0.2	0.1
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.0	-0.3	-0.4	0.0	0.1	0.1	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	--	0.1
28-Oct	-0.1	-0.1	0.2	0.0	0.0	0.0	0.1	0.4	0.4	0.3	0.3	0.3	0.3	0.2	-0.1	-0.2	-0.2	-0.1	0.1	-0.1	0.1	0.0	0.1	0.0	0.1	0.4
29-Oct	0.0	0.1	0.0	0.0	0.1	0.2	0.1	0.0	0.1	-0.1	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.3	0.0	-0.3	0.2	0.0	0.2
30-Oct	-0.1	0.0	0.0	-0.2	0.1	0.2	0.1	0.0	-0.2	-0.1	0.0	0.1	0.1	0.0	0.0	0.2	-0.2	-0.1	-0.1	-0.1	-0.1	0.1	0.1	0.0	0.0	0.2
31-Oct	-0.1	0.0	-0.2	-0.1	-0.2	0.0	-0.1	0.2	0.0	-0.3	-0.2	0.0	0.1	0.2	0.3	0.2	0.2	0.2	0.3	0.1	-0.2	0.0	0.3	0.1	0.0	0.3
																								Diurnal Average		
																								Diurnal Maximum		
AF - Analyzer Failure																										



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 1	Hours in Service: 744
Maximum Value: 4.8 km/h on Oct 17 15:00	Hours of Data: 729
Minimum Value: 0.1 km/h on Oct 15 23:00	Hours of Missing Data: 15
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.8 Median = 1.5 Q <sub>3</sub> = 2.3 P <sub>90</sub> = 3.0 P <sub>99</sub> = 4.1	Hours of Calibration: 0
	Percent Operational Time: 98.0

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	1.0	0.9	0.6	0.3	0.5	1.0	0.3	0.4	1.0	1.5	1.1	1.3	1.0	1.4	2.3	2.8	2.7	3.3	3.1	3.0	3.4	2.7	2.1	1.8	3.4
2-Oct	AF	AF	2.3	2.5	2.0	1.7	2.6	2.6	2.4	3.2	3.1	3.3	3.2	3.3	3.0	3.2	3.1	2.7	2.7	2.5	1.3	1.1	0.7	1.1	3.3
3-Oct	1.2	1.1	1.2	1.2	0.9	0.4	0.4	0.6	0.9	1.4	1.8	1.9	2.0	2.2	2.0	1.9	2.5	2.6	2.4	2.2	1.6	2.2	2.1	3.3	3.3
4-Oct	3.5	3.2	3.4	1.3	0.8	0.6	0.7	0.5	0.6	0.8	1.0	1.0	1.2	1.1	1.1	1.3	0.6	0.7	0.6	0.3	0.2	0.2	0.4	3.5	3.5
5-Oct	0.4	0.4	0.6	1.3	1.2	1.0	1.2	1.2	1.2	1.0	1.6	1.5	1.5	1.4	2.3	2.9	2.3	2.2	2.1	2.2	2.0	1.7	1.1	0.8	2.9
6-Oct	0.8	0.8	0.7	0.7	0.7	1.4	1.2	0.8	0.7	0.9	1.0	1.2	1.6	1.6	1.8	1.8	1.3	1.3	2.5	3.7	3.1	2.9	2.7	2.0	3.7
7-Oct	1.8	2.7	3.0	2.7	3.0	2.0	1.6	1.1	1.5	1.7	1.6	1.7	2.0	1.8	2.4	2.5	2.3	1.2	0.6	0.5	0.2	0.2	0.2	0.2	3.0
8-Oct	0.1	0.1	0.2	0.2	0.4	0.2	0.1	0.2	0.3	0.5	0.7	0.8	1.1	1.6	1.4	0.8	0.8	0.5	1.2	1.8	1.5	1.8	2.0	1.9	2.0
9-Oct	1.6	1.7	1.7	0.6	0.4	0.6	0.5	0.8	1.9	2.2	2.1	2.1	2.1	1.8	1.8	1.3	1.3	1.3	1.3	1.9	2.4	2.7	3.4	2.4	3.4
10-Oct	1.9	2.2	2.3	2.5	2.6	2.4	1.8	1.5	2.1	1.6	1.8	2.4	2.7	2.3	2.0	1.5	1.0	1.0	1.2	1.3	1.7	1.3	0.7	1.5	2.7
11-Oct	1.4	1.2	1.6	1.7	1.7	0.7	2.0	2.5	2.3	2.9	3.4	2.9	2.9	3.2	2.9	3.4	3.1	1.9	1.3	1.4	1.5	2.3	2.9	2.7	3.4
12-Oct	2.9	3.2	3.2	2.2	1.7	1.0	0.6	0.6	1.1	1.8	1.7	2.0	2.3	1.7	1.8	1.5	1.5	2.4	2.8	2.8	1.9	1.5	1.9	0.6	3.2
13-Oct	0.4	0.7	1.3	0.8	0.4	0.3	0.7	0.6	0.8	1.2	1.4	1.2	1.3	1.6	1.5	1.2	1.2	0.8	0.4	0.4	0.9	0.5	0.3	0.8	1.6
14-Oct	0.7	0.6	0.7	1.0	1.1	1.4	1.3	1.3	1.2	1.0	0.9	1.2	1.3	1.2	1.1	1.0	1.0	0.4	0.2	0.2	2.3	2.2	2.5	1.5	2.5
15-Oct	2.2	2.8	2.5	1.6	1.6	1.4	2.3	2.6	2.7	2.2	2.0	1.7	1.8	2.0	2.0	1.9	1.6	1.9	1.2	1.0	0.3	0.2	0.1	0.1	2.8
16-Oct	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.4	0.3	0.8	1.1	1.2	1.2	1.4	1.5	1.1	0.4	0.6	1.9	2.3	3.3	3.4	3.2	3.0	3.4
17-Oct	2.6	2.7	2.9	2.6	3.0	2.7	3.1	2.6	2.3	3.2	3.8	3.8	3.9	4.1	4.8	4.2	4.2	4.2	4.1	3.9	3.8	4.1	4.0	4.0	4.8
18-Oct	3.6	3.7	3.4	2.9	2.4	1.8	1.7	1.0	1.3	1.5	1.1	1.0	1.2	1.3	0.9	0.4	0.8	0.2	0.7	1.0	1.0	0.6	0.7	0.4	3.7
19-Oct	0.4	0.9	1.4	0.8	0.3	0.2	0.2	0.2	0.3	0.5	0.8	0.9	1.0	1.7	2.3	1.8	1.0	2.3	2.5	3.0	2.7	2.7	2.8	2.5	3.0
20-Oct	2.2	2.5	2.1	2.5	1.0	1.6	1.5	1.4	2.4	1.6	1.7	1.6	1.9	1.6	1.3	1.2	1.7	0.6	0.4	0.2	0.2	0.4	0.4	0.7	2.5
21-Oct	1.1	0.9	1.0	1.1	1.1	1.4	1.5	1.4	1.2	0.9	1.0	1.8	1.6	1.6	1.6	1.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	1.8
22-Oct	0.9	0.5	0.7	0.6	0.5	0.7	0.6	0.6	0.9	1.1	0.8	1.0	0.9	1.2	2.4	2.4	1.9	2.0	2.5	2.3	2.5	2.7	2.5	2.5	2.7
23-Oct	2.4	1.5	1.0	0.7	0.4	0.5	0.6	0.7	0.6	0.8	0.9	1.1	2.2	2.4	1.5	1.7	0.9	0.5	0.8	0.8	1.0	1.5	1.9	2.1	2.4
24-Oct	2.8	3.6	3.3	2.9	2.3	AF	3.0	3.0	2.8	2.6	3.2	2.7	2.9	3.3	3.2	2.6	3.3	2.7	2.3	2.6	2.8	2.7	2.4	2.8	3.6
25-Oct	2.4	2.4	2.3	2.3	1.3	0.9	1.5	0.9	1.4	1.3	1.1	1.1	1.3	1.5	1.2	0.6	0.6	0.5	0.3	0.5	0.7	0.7	1.0	0.9	2.4
26-Oct	0.7	1.1	1.2	1.1	1.9	1.7	1.5	1.7	1.9	1.6	1.8	2.1	2.3	2.3	2.2	2.4	2.1	1.8	2.2	2.4	2.3	2.3	1.9	AF	2.4
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.8	1.8	1.6	1.2	1.1	1.0	0.8	0.6	0.4	0.4	0.4	0.4	0.4	1.8
28-Oct	0.4	0.5	0.6	0.6	0.6	0.9	0.9	1.3	1.4	1.4	1.3	1.2	1.2	1.2	1.1	1.3	1.7	0.8	1.0	1.1	0.7	1.0	0.7	0.7	1.7
29-Oct	0.8	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.7	0.9	1.3	1.8	1.6	1.7	0.7	1.1	0.6	0.6	0.8	1.1	1.8	1.7	1.7	2.5	2.5
30-Oct	2.9	2.5	2.8	3.3	3.0	3.3	2.5	2.4	3.0	3.3	2.9	2.9	2.6	2.7	2.6	2.2	2.6	2.9	2.9	3.6	3.6	3.3	3.8	2.6	3.8
31-Oct	2.9	3.3	3.6	3.6	3.5	3.6	3.4	3.2	2.8	3.0	2.6	2.2	1.4	1.5	1.4	1.4	1.4	1.5	1.3	1.4	1.0	0.9	0.8	0.6	3.6
	3.6	3.7	3.6	3.6	3.5	3.6	3.4	3.2	3.0	3.3	3.8	3.8	3.9	4.1	4.8	4.2	4.2	4.2	4.1	3.9	3.8	4.1	4.0	4.0	
	Diurnal Maximum																								

AF - Analyzer Failure



Maximum Value: 1.6 km/h on Oct 17 15:00																				Maximum Daily Average: 1.2 km/h on Oct 17					Hours in Service: 744		
Minimum Value: -1.7 km/h on Oct 6 20:00																				Minimum Daily Average: -1.0 km/h on Oct 24					Hours of Data: 724		
Maximum Diurnal Average: 0.2 km/h at hour 1																				Minimum Diurnal Average: 0.1 km/h at hour 10					Hours of Missing Data: 20		
Monthly Average: 0.12 km/h																				Percentiles: P <sub>1</sub> = -1.3 P <sub>10</sub> = -0.7 Q <sub>1</sub> = -0.2 Median = 0.1 Q <sub>3</sub> = 0.6 P <sub>90</sub> = 1.0 P <sub>99</sub> = 1.4					Hours of Calibration: 0		
																									Percent Operational Time: 97.3		
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-Oct	-0.1	-0.1	0.1	-0.2	-0.1	0.0	-0.1	0.0	0.1	0.1	0.0	0.1	-0.1	0.0	-0.4	-0.3	-0.3	-0.6	-0.5	-0.7	-0.7	-0.3	-0.7	-0.9	-0.2	0.1	
2-Oct	AF	AF	-1.0	-0.8	-0.5	-0.5	-1.1	-1.3	-0.9	-1.3	-1.1	-1.1	-1.4	-1.5	-1.2	-1.4	-1.2	-1.1	-0.9	-0.7	-0.3	-0.4	-0.5	-0.3	-0.9	-0.3	
3-Oct	-0.2	-0.5	-0.4	-0.4	-0.2	-0.2	0.1	0.2	0.2	0.5	0.6	0.7	0.6	0.7	0.7	0.7	1.1	0.9	1.0	0.3	0.2	0.8	0.5	1.2	0.4	1.2	
4-Oct	1.1	1.0	1.1	0.4	0.2	-0.1	0.0	0.1	-0.1	-0.2	0.2	0.7	0.3	-0.2	-0.3	-0.1	-0.2	0.1	-0.1	-0.2	-0.1	0.0	-0.1	-0.1	0.1	1.1	
5-Oct	-0.1	0.2	0.2	0.1	-0.1	0.6	0.2	-0.1	0.1	0.0	0.4	0.2	0.6	0.0	-0.3	0.3	-0.1	-0.3	-0.2	-0.1	-0.3	-0.1	-0.1	0.3	0.1	0.6	
6-Oct	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.2	0.2	-0.2	-0.3	-0.2	-0.2	-0.4	-0.3	-0.2	-0.9	-1.7	-1.1	-1.1	-1.1	-0.6	-0.3	0.2	
7-Oct	-0.5	-0.7	-0.5	-0.3	-0.5	-0.1	0.1	-0.4	-0.5	-0.6	0.0	0.0	0.1	0.2	-0.1	0.0	0.0	-0.1	-0.2	0.1	0.2	0.1	0.1	0.1	-0.1	0.2	
8-Oct	0.1	0.1	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.1	-0.2	-0.3	0.1	0.2	0.4	0.3	0.3	0.0	0.4	0.7	0.6	0.5	0.6	0.6	0.2	0.7	
9-Oct	0.6	0.4	0.6	0.1	0.0	0.2	0.2	0.1	0.5	0.6	0.6	0.7	0.6	0.6	0.7	0.5	0.5	0.5	0.4	0.5	0.8	0.6	1.1	0.5	0.5	1.1	
10-Oct	0.6	0.6	0.6	0.7	0.6	0.5	0.2	0.1	0.4	0.2	0.5	0.6	0.7	0.7	0.6	1.0	1.0	-0.2	0.4	1.2	1.3	1.0	0.3	0.8	0.6	1.3	
11-Oct	0.9	1.0	1.3	1.4	1.4	-0.2	-0.4	-0.8	-0.7	-1.0	-1.3	-1.2	-0.9	-1.6	-1.0	-1.1	-1.0	-0.8	-0.2	-0.6	-0.8	-1.2	-1.2	-1.1	-0.5	1.4	
12-Oct	-0.9	-0.7	-0.9	-0.5	-0.2	-0.6	-0.3	-0.2	-0.1	-0.3	-0.2	-0.6	-0.6	0.0	-0.6	-0.2	-0.2	-1.2	-0.9	-1.2	-0.9	-0.5	-0.8	-0.1	-0.5	0.0	
13-Oct	-0.1	-0.4	0.1	-0.1	-0.2	0.1	0.1	0.8	0.6	0.2	0.1	0.3	0.4	0.5	0.4	0.6	0.5	0.5	0.2	-0.1	-0.1	-0.2	-0.1	-0.1	0.2	0.8	
14-Oct	-0.1	-0.2	0.0	-0.5	-0.3	-0.5	-0.3	-0.1	-0.2	-0.2	-0.2	-0.2	-0.4	-0.4	-0.4	-0.2	-0.2	-0.1	0.0	-0.9	-0.9	-0.7	-1.0	-0.7	-0.3	0.0	
15-Oct	-0.8	-1.2	-1.1	-0.6	0.1	0.0	-0.6	-1.0	-1.1	-0.7	-0.7	-0.7	-0.1	-0.2	-0.6	-0.5	-0.5	-0.3	0.0	-0.3	-0.2	0.1	0.1	0.0	-0.5	0.1	
16-Oct	0.0	0.1	-0.1	-0.4	0.0	0.1	0.1	-0.1	0.1	0.2	0.3	0.2	-0.2	0.1	0.3	0.2	0.0	0.1	0.5	0.7	0.8	0.8	0.4	0.8	0.2	0.8	
17-Oct	0.7	0.7	0.8	0.8	1.0	1.0	0.9	0.9	0.8	0.9	1.2	1.2	1.5	1.4	1.6	1.3	1.3	1.6	1.5	1.4	1.2	1.2	1.4	1.4	1.2	1.6	
18-Oct	1.2	1.2	1.2	0.9	0.6	0.5	0.1	0.5	0.2	0.5	0.2	0.4	0.5	0.6	0.4	0.2	-0.2	0.1	-0.1	-0.3	-0.2	-0.1	-0.5	0.0	0.3	1.2	
19-Oct	0.2	-0.2	-0.8	-0.5	0.0	0.1	0.1	0.1	0.1	0.0	-0.1	0.2	0.4	0.6	0.6	0.5	0.3	0.8	0.9	1.0	0.9	1.0	0.7	0.9	0.3	1.0	
20-Oct	0.7	0.9	0.7	0.9	0.3	0.6	0.1	0.1	0.7	0.4	0.4	0.4	0.7	0.5	0.0	0.4	0.4	0.8	0.3	0.0	0.2	0.6	0.6	0.9	0.5	0.9	
21-Oct	0.8	1.0	0.7	0.9	0.6	0.7	0.5	0.3	0.2	0.0	0.0	-0.2	-0.1	-0.4	-0.4	-0.1	0.0	0.0	-0.1	0.4	0.7	0.7	0.9	0.5	0.3	1.0	
22-Oct	1.0	0.5	0.6	0.4	0.5	0.4	0.6	0.4	0.3	0.4	0.2	0.0	0.1	0.4	0.9	0.9	0.9	1.0	1.0	0.9	0.9	1.2	1.1	1.2	0.6	1.2	
23-Oct	1.1	0.7	0.5	-0.4	0.4	0.0	-0.2	-0.1	-0.1	-0.1	-0.7	-0.2	0.8	0.6	0.3	0.4	0.3	0.1	-0.1	0.0	0.0	-0.7	-1.1	-1.0	0.0	1.1	
24-Oct	-1.0	-1.5	-1.2	-1.0	-1.0	AF	AF	AF	AF	AF	AF	AF	-1.0	-1.1	-1.2	-1.2	-0.6	-0.9	-0.8	-0.9	-1.0	-1.0	-1.1	-0.8	-1.2	-1.0	-0.6
25-Oct	-0.8	-0.6	-0.5	-0.9	-0.6	-0.1	0.3	0.4	0.5	0.3	-0.1	0.0	0.2	0.1	0.2	0.1	0.2	0.3	0.1	0.0	0.2	0.2	0.4	0.0	0.0	0.5	
26-Oct	-0.2	-0.6	-0.9	-0.5	-0.5	-0.3	0.0	-0.3	-0.4	-0.4	-0.1	0.3	0.0	0.0	-0.3	-0.4	-0.4	-0.1	-0.4	-0.5	-0.4	AF	AF	AF	-0.3	0.3	
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.4	-0.1	-0.2	-0.4	-0.5	0.1	-0.1	-0.2	-0.1	0.0	-0.1	-0.1	0.0	0.0	0.0	--	0.1
28-Oct	-0.1	-0.1	0.2	0.0	0.1	0.1	0.2	0.7	0.6	0.4	0.6	0.2	0.7	0.7	0.2	0.4	0.4	-0.1	0.3	0.4	0.2	0.2	0.2	0.2	0.3	0.7	
29-Oct	0.3	0.2	0.0	0.0	-0.1	0.0	0.1	-0.1	-0.1	-0.2	0.1	0.3	0.1	0.1	0.0	0.2	0.2	0.1	0.1	0.3	0.5	0.5	0.4	1.0	0.2	1.0	
30-Oct	1.0	1.0	1.1	1.0	1.1	1.5	1.0	1.0	1.1	1.0	1.2	1.1	1.1	1.1	0.9	0.6	1.0	1.0	1.1	1.1	1.3	1.4	1.4	1.3	1.1	1.5	
31-Oct	1.3	1.2	1.3	1.3	1.1	1.1	1.1	1.3	1.1	1.2	1.1	1.0	0.3	0.9	0.7	0.6	0.6	0.8	0.7	0.6	0.3	0.6	0.8	0.2	0.9	1.3	
																								Diurnal Average			
																								Diurnal Maximum			
AF - Analyzer Failure																											





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 3.9 km/h on Oct 2 14:00	Hours of Data: 724
Minimum Value: 0.1 km/h on Oct 15 23:00	Hours of Missing Data: 20
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 0.9 Median = 1.5 Q <sub>3</sub> = 2.4 P <sub>90</sub> = 3.1 P <sub>99</sub> = 3.7	Hours of Calibration: 0
	Percent Operational Time: 97.3

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-Oct	1.2	1.1	0.8	0.4	0.7	1.1	0.4	0.4	1.0	1.5	1.1	1.3	1.1	1.4	2.2	2.9	2.7	3.4	3.2	3.0	3.6	3.2	2.5	2.1	3.6	
2-Oct	AF	AF	2.5	2.7	2.4	2.1	3.1	2.9	2.6	3.4	3.7	3.9	3.6	3.9	3.3	3.5	3.4	3.1	3.0	2.9	1.5	1.1	0.9	1.3	3.9	
3-Oct	1.5	1.4	1.4	1.5	1.1	0.5	0.7	0.8	1.1	1.6	1.7	1.8	1.9	2.1	2.1	2.0	2.6	2.6	2.6	2.4	1.6	2.4	2.0	3.2	3.2	
4-Oct	3.3	2.9	3.1	1.6	0.9	0.7	0.7	0.5	0.7	0.9	1.2	1.1	1.4	1.2	1.3	1.2	1.3	0.7	0.8	0.6	0.3	0.3	0.3	0.6	3.3	
5-Oct	0.6	0.5	0.8	1.5	1.3	1.0	1.3	1.3	1.3	1.2	1.7	1.3	1.6	1.5	2.4	2.8	2.3	2.3	2.4	2.2	1.9	1.7	1.2	0.9	2.8	
6-Oct	0.9	0.8	0.8	0.7	0.8	1.3	1.2	0.8	0.9	0.9	1.1	1.3	1.7	1.8	1.8	1.7	1.3	1.6	2.7	3.5	3.3	3.0	2.8	2.0	3.5	
7-Oct	2.1	3.0	3.4	3.4	3.5	2.5	2.0	1.4	1.6	1.8	1.8	1.6	2.2	2.1	2.3	2.3	2.2	1.5	0.7	0.6	0.3	0.3	0.2	0.3	3.5	
8-Oct	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.5	0.7	0.9	1.1	1.5	1.5	0.9	0.9	0.6	1.4	1.8	1.5	1.7	1.8	1.7	1.8	
9-Oct	1.5	1.7	1.9	0.9	0.6	0.7	0.6	0.9	1.9	2.0	2.0	1.9	1.9	1.8	1.8	1.1	1.3	1.2	1.3	1.7	2.0	2.3	3.0	2.3	3.0	
10-Oct	2.0	2.1	2.0	2.4	2.6	2.5	2.0	1.7	2.1	1.4	1.6	2.2	2.5	2.3	2.2	1.3	0.9	1.2	1.5	1.4	1.9	1.6	0.8	1.3	2.6	
11-Oct	1.4	0.8	1.2	1.3	1.6	1.0	2.3	2.7	2.6	3.2	3.5	3.1	3.2	3.4	3.0	3.6	3.1	2.1	1.1	1.6	1.6	2.4	3.1	2.5	3.6	
12-Oct	2.4	3.2	3.5	2.7	2.1	1.2	0.7	0.8	1.2	2.0	1.8	2.1	2.5	1.7	2.0	1.7	1.5	2.6	3.1	3.0	2.2	1.5	2.0	0.8	3.5	
13-Oct	0.6	1.1	1.5	0.9	0.6	0.4	0.9	0.7	0.8	1.2	1.4	1.2	1.4	1.7	1.3	1.1	1.2	0.8	0.6	0.6	0.9	0.5	0.5	0.7	1.7	
14-Oct	0.8	0.8	0.9	0.9	1.2	1.6	1.6	1.5	1.3	1.1	1.1	1.1	1.2	0.9	0.9	1.0	0.8	0.4	0.2	0.4	2.7	2.4	2.5	1.7	2.7	
15-Oct	2.4	3.0	2.8	1.8	1.5	1.4	2.5	2.6	2.8	2.4	2.1	2.0	2.0	2.3	2.3	2.2	1.8	2.1	1.6	1.2	0.3	0.3	0.1	0.1	3.0	
16-Oct	0.2	0.2	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.9	1.2	1.3	1.2	1.5	1.4	1.2	0.5	0.7	1.8	2.2	3.1	3.4	3.1	2.9	3.4	
17-Oct	2.7	2.8	2.8	2.7	2.9	2.4	2.5	2.6	2.1	2.9	3.3	3.3	3.7	3.7	3.8	3.4	3.8	3.4	3.4	3.5	3.5	3.5	3.3	3.5	3.8	
18-Oct	3.3	3.0	3.1	2.7	2.4	2.0	1.8	1.0	1.2	1.2	1.0	1.1	1.2	1.1	0.6	0.5	0.8	0.3	0.7	0.9	0.9	0.8	0.8	0.6	3.3	
19-Oct	0.5	1.1	1.8	1.1	0.3	0.3	0.2	0.3	0.4	0.5	0.7	0.8	1.1	1.5	2.0	1.7	1.3	2.0	2.2	2.5	2.5	2.2	2.4	2.3	2.5	
20-Oct	1.8	2.0	2.0	2.6	1.3	1.9	1.6	1.7	2.8	1.7	1.7	1.6	1.6	1.2	1.6	1.2	1.6	0.7	0.5	0.3	0.4	0.5	0.5	0.7	2.8	
21-Oct	1.0	1.1	1.0	1.1	1.3	1.4	1.8	1.8	1.5	1.1	1.3	1.5	1.3	1.4	1.6	1.0	0.7	0.5	0.7	0.8	0.7	0.8	0.6	0.5	1.8	
22-Oct	0.9	0.5	0.7	0.6	0.7	0.7	0.7	0.7	0.9	1.0	0.9	1.0	1.0	1.1	2.2	2.2	1.8	1.7	2.1	2.0	2.2	2.3	2.6	2.6	2.6	
23-Oct	2.5	1.6	1.2	0.9	0.7	0.7	0.6	0.8	0.7	0.8	0.9	1.0	2.3	2.3	1.4	1.5	1.0	0.7	1.0	0.9	1.4	1.8	2.2	2.4	2.5	
24-Oct	2.9	3.7	3.6	3.1	2.5	AF	AF	AF	AF	AF	AF	AF	2.8	3.4	3.8	3.5	2.9	3.7	3.0	2.7	2.8	3.1	3.0	2.7	3.0	3.8
25-Oct	2.9	2.8	2.7	2.7	1.5	1.1	1.2	1.1	1.4	1.4	1.2	1.3	1.4	1.5	1.3	0.8	0.6	0.6	0.4	0.6	0.9	0.8	1.2	1.2	2.9	
26-Oct	0.7	1.2	1.2	1.1	1.7	1.6	1.6	1.7	1.8	1.6	1.8	2.3	2.4	2.3	2.2	2.5	2.1	1.9	2.1	2.5	2.4	AF	AF	AF	2.5	
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.8	1.7	1.9	1.7	1.6	1.4	1.3	1.2	0.9	0.7	0.5	0.5	0.6	0.5	0.4	1.9	
28-Oct	0.5	0.7	0.7	0.7	0.7	1.0	1.2	1.4	1.4	1.5	1.5	1.3	1.3	1.3	1.3	1.3	1.9	0.9	1.2	1.2	0.8	1.2	0.8	0.8	1.9	
29-Oct	1.0	0.8	0.8	0.7	0.8	0.8	0.8	0.6	0.8	1.1	1.4	1.7	1.6	1.6	0.7	1.1	0.7	0.7	0.9	1.1	1.7	1.8	1.6	2.4	2.4	
30-Oct	2.7	2.5	2.7	3.1	2.9	3.3	2.7	2.6	3.0	3.1	2.9	3.0	2.8	3.0	2.9	2.5	2.6	2.5	2.6	3.4	3.4	3.3	3.4	2.9	3.4	
31-Oct	3.1	3.1	3.1	3.3	3.1	3.3	2.9	3.0	2.7	2.5	2.3	2.1	1.5	1.5	1.4	1.5	1.4	1.4	1.4	1.5	1.0	1.0	0.8	0.8	3.3	
Diurnal Maximum																										

AF - Analyzer Failure



Maximum Value: 4.2 km/h on Oct 31 00:00																				Maximum Daily Average: 2.8 km/h on Oct 30					Hours in Service: 744		
Minimum Value: -1.6 km/h on Oct 2 14:00																				Minimum Daily Average: -0.8 km/h on Oct 2					Hours of Data: 728		
Maximum Diurnal Average: 0.7 km/h at hour 1																				Minimum Diurnal Average: 0.3 km/h at hour 12					Hours of Missing Data: 16		
Monthly Average: 0.51 km/h																				Percentiles: P <sub>1</sub> = -1.2 P <sub>10</sub> = -0.4 Q <sub>1</sub> = -0.1 Median = 0.2 Q <sub>3</sub> = 0.9 P <sub>90</sub> = 2.0 P <sub>99</sub> = 3.3					Hours of Calibration: 0		
																									Percent Operational Time: 97.9		
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-Oct	-0.1	-0.1	0.4	-0.1	0.0	0.7	-0.2	0.0	0.2	0.1	0.0	-0.1	0.2	0.4	0.0	0.2	0.1	0.2	0.3	0.0	0.0	-0.3	AF	AF	0.1	0.7	
2-Oct	AF	AF	AF	-0.6	-0.7	-0.3	-0.8	-0.8	-0.6	-1.0	-0.9	-0.8	-1.6	-1.6	-1.0	-1.1	-0.6	-0.7	-1.2	-1.0	-0.6	-0.6	-0.8	-0.7	-0.8	-0.3	
3-Oct	0.6	-1.2	-1.2	-1.2	-0.4	0.1	0.1	0.3	0.3	0.6	0.4	0.6	0.4	0.9	1.1	2.1	3.2	2.6	2.9	0.4	-0.1	1.5	1.4	1.7	0.7	3.2	
4-Oct	2.2	1.9	2.2	1.5	0.6	0.1	0.3	0.3	0.0	0.2	1.4	0.6	0.0	-0.3	-0.1	0.1	0.4	0.0	-0.1	0.0	0.0	-0.1	0.0	0.0	0.5	2.2	
5-Oct	0.4	0.1	0.5	1.0	0.4	-0.1	0.0	0.0	0.5	0.1	0.4	-0.2	0.6	0.3	-0.3	1.0	0.2	0.1	0.2	-0.3	0.1	-0.1	0.3	0.2	0.2	1.0	
6-Oct	0.1	-0.2	0.0	0.1	0.4	0.4	0.4	0.1	0.1	0.5	0.0	-0.5	-0.1	-0.3	0.2	0.2	-0.2	-0.5	-0.7	-1.5	-1.1	-0.8	-0.7	-0.2	-0.2	0.5	
7-Oct	0.0	0.1	0.5	1.1	0.3	0.7	1.4	-0.4	-0.3	0.3	-0.4	-0.4	0.2	0.8	0.2	0.5	0.5	-0.2	0.0	0.0	0.4	0.7	0.5	0.1	0.3	1.4	
8-Oct	0.4	0.2	0.1	0.1	0.1	0.0	0.2	0.1	0.2	0.5	0.1	-0.1	0.6	0.5	0.5	0.5	0.5	0.5	1.1	2.0	1.5	1.5	1.3	1.1	0.6	2.0	
9-Oct	1.4	1.5	2.2	1.1	0.0	0.8	0.3	0.2	1.5	0.9	0.8	0.9	1.3	0.7	1.1	1.2	1.6	1.0	0.9	1.1	1.3	1.4	2.7	2.3	1.2	2.7	
10-Oct	1.5	1.7	1.0	1.3	1.8	2.1	1.1	0.9	1.1	0.5	0.3	1.1	1.5	1.3	0.5	1.1	0.8	0.7	0.0	-0.3	-0.1	0.9	0.2	1.0	0.9	2.1	
11-Oct	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	0.4	0.2	-0.2	-0.3	-0.8	-1.1	-0.9	-1.2	-0.3	-0.3	-0.2	-0.2	0.0	-0.2	-0.6	-0.7	-0.5	-0.4	-0.3	0.4	
12-Oct	0.0	0.5	0.1	0.5	0.6	-0.2	-0.4	-0.2	0.4	0.3	0.1	-0.1	-0.5	0.2	-0.4	0.3	0.1	-0.6	-0.6	-1.1	-0.8	-0.4	-0.3	0.0	-0.1	0.6	
13-Oct	-0.2	-1.0	1.3	0.2	0.0	0.0	0.5	-0.1	0.0	0.4	0.1	0.3	0.3	0.2	0.5	0.4	0.8	0.7	0.3	0.0	0.0	0.0	0.1	0.2	1.3		
14-Oct	0.2	-0.1	0.1	-0.2	-0.1	-0.5	-0.3	0.1	-0.2	-0.1	-0.2	-0.3	-0.4	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	-0.3	-0.1	-0.3	-0.7	-0.7	-0.2	0.2	
15-Oct	-0.7	-0.7	-0.9	-0.7	0.7	0.2	0.2	-0.2	-0.5	-0.2	-0.3	-0.8	0.6	0.6	-0.6	-0.5	-0.6	-0.3	-0.1	-0.1	-0.2	0.0	-0.1	0.0	-0.2	0.7	
16-Oct	0.0	0.1	0.2	-0.1	0.1	0.0	0.2	0.2	0.3	0.1	0.4	0.0	-0.5	-0.1	0.4	0.3	-0.1	0.6	0.8	1.2	1.7	2.2	1.9	2.0	0.5	2.2	
17-Oct	2.0	2.5	2.9	2.6	2.4	1.9	1.8	2.7	2.8	2.0	1.8	1.9	3.2	3.2	2.1	2.3	2.3	2.2	2.7	3.5	2.0	2.4	2.3	2.7	2.4	3.5	
18-Oct	2.4	2.0	2.1	2.0	2.8	2.9	1.3	0.1	0.6	0.6	0.4	0.1	0.2	0.3	0.0	0.1	0.4	0.2	0.2	-0.1	0.2	-0.2	-0.6	-0.1	0.7	2.9	
19-Oct	-0.1	0.2	-0.8	-0.8	0.1	0.2	0.5	0.7	0.6	0.3	0.1	0.1	0.8	1.1	1.0	1.1	1.2	1.7	1.3	1.6	1.6	1.3	1.5	1.7	0.7	1.7	
20-Oct	1.5	1.7	1.4	2.5	3.0	3.3	1.6	1.2	3.7	1.4	1.2	1.0	0.7	0.7	-0.2	0.2	1.5	1.3	0.9	0.3	0.7	1.2	1.0	0.3	1.3	3.7	
21-Oct	0.1	0.2	-0.3	-0.2	-0.4	0.1	1.3	1.9	1.0	-0.2	-0.1	0.3	0.4	0.4	0.4	0.5	1.1	0.5	0.5	0.1	0.1	0.5	0.5	0.2	0.4	1.9	
22-Oct	0.0	0.4	0.5	-0.1	0.6	0.6	0.7	0.6	0.9	1.2	0.6	0.4	0.5	0.6	1.3	1.4	1.4	1.3	1.8	0.9	1.4	1.8	2.7	3.0	1.0	3.0	
23-Oct	3.0	2.0	1.2	0.7	1.0	0.6	0.0	0.1	0.1	0.2	0.1	0.9	1.3	0.8	0.5	0.3	0.9	1.3	0.1	0.4	0.0	-0.6	-0.5	-0.8	0.6	3.0	
24-Oct	-0.9	-1.2	-1.1	-0.6	-0.7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.4	-0.6	-0.9	-0.4	-0.4	-0.3	-0.6	-0.8	-	-0.3
25-Oct	-0.2	-0.1	-0.2	-1.0	-0.6	0.0	0.9	2.2	1.1	1.0	0.5	0.0	0.4	0.2	0.2	0.2	0.2	0.1	0.4	0.1	0.2	0.5	0.3	-0.3	0.2	2.2	
26-Oct	0.3	-0.3	0.0	-0.4	-0.3	0.2	0.5	-0.1	-0.1	0.1	0.4	0.5	0.3	0.4	0.1	0.0	0.3	0.2	0.1	0.2	0.2	0.2	0.2	0.0	0.1	0.5	
27-Oct	0.2	0.1	0.2	0.3	0.3	0.1	0.2	0.2	0.1	0.3	0.7	0.4	-0.2	0.0	0.5	-0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.0	0.4	0.2	0.7	
28-Oct	0.0	-0.2	0.3	0.1	0.2	0.2	0.7	0.7	0.3	-0.2	0.1	0.0	1.3	1.3	0.7	0.5	0.4	0.3	1.6	1.3	0.8	1.3	0.4	0.6	0.5	1.6	
29-Oct	0.5	0.4	-0.1	0.2	-0.1	0.0	0.3	0.1	0.0	0.1	0.2	0.4	0.2	0.2	0.0	0.2	0.2	0.1	0.1	0.3	0.3	0.8	1.0	2.1	0.3	2.1	
30-Oct	2.3	2.4	2.8	3.0	3.1	2.9	2.7	3.3	3.1	2.5	2.5	2.5	3.4	3.7	2.7	0.6	2.0	1.7	2.7	2.7	2.8	3.9	2.9	4.2	2.8	4.2	
31-Oct	3.7	2.3	1.5	1.6	2.1	1.8	1.8	2.2	2.2	1.9	2.0	2.0	0.1	0.5	0.5	0.0	-0.2	0.2	-0.5	0.4	-0.2	-0.2	0.2	-0.1	1.1	3.7	
																								Diurnal Average			
																								Diurnal Maximum			
0.7 0.5 0.6 0.5 0.6 0.6 0.6 0.6 0.6 0.4 0.4 0.3 0.5 0.5 0.4 0.4 0.5 0.5 0.5 0.4 0.4 0.6 0.6 0.6 0.6 0.6																											
3.7 2.5 2.9 3.0 3.1 3.3 2.7 3.3 3.7 2.5 2.5 2.5 3.4 3.7 2.7 2.3 3.2 2.6 2.9 3.5 2.8 3.9 2.9 4.2 4.2 4.2																											
AF - Analyzer Failure																											



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 4.2 km/h on Oct 2 12:00	Hours of Data: 728
Minimum Value: 0.2 km/h on Oct 8 06:00	Hours of Missing Data: 16
Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 0.7 Q <sub>1</sub> = 1.0 Median = 1.4 Q <sub>3</sub> = 2.0 P <sub>90</sub> = 2.7 P <sub>99</sub> = 3.3	Hours of Calibration: 0
	Percent Operational Time: 97.9

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-Oct	1.6	1.6	1.3	0.9	1.2	1.1	0.6	0.4	1.0	1.3	1.0	1.4	1.2	1.3	1.9	2.4	2.6	2.6	3.0	3.0	3.7	3.1	AF	AF	3.7	
2-Oct	AF	AF	AF	2.5	2.5	2.1	2.8	2.6	2.8	3.3	3.1	4.2	3.4	3.1	3.1	3.4	3.7	3.3	2.7	2.8	1.9	1.1	1.0	1.9	4.2	
3-Oct	2.5	1.8	1.9	1.7	1.5	0.9	1.3	1.0	1.0	1.5	1.1	1.6	2.0	2.5	2.2	2.1	2.0	3.1	2.6	1.5	2.0	1.9	2.1	3.1	3.1	
4-Oct	2.2	2.0	1.9	1.7	1.1	1.1	0.8	0.6	0.6	1.0	1.5	1.5	1.7	1.3	1.7	1.3	0.9	0.9	0.5	0.4	0.4	0.7	0.5	0.8	2.2	
5-Oct	1.1	0.7	1.5	0.6	1.0	1.0	1.3	1.5	1.7	1.5	1.3	0.9	1.6	1.5	1.7	3.1	2.4	2.0	2.1	2.5	1.8	1.8	1.6	1.1	3.1	
6-Oct	0.9	0.9	0.7	0.6	0.7	1.0	0.7	0.9	0.8	1.1	1.2	1.3	2.0	2.1	1.7	1.7	1.2	1.9	2.7	3.0	2.6	2.5	2.2	1.4	3.0	
7-Oct	2.2	2.5	2.4	2.5	2.9	3.0	3.1	2.3	1.8	2.4	2.3	1.6	2.8	2.2	2.5	2.7	2.3	2.0	1.7	1.1	0.7	0.5	0.6	0.8	3.1	
8-Oct	0.4	0.4	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.6	0.2	0.6	1.2	1.9	1.8	1.1	0.7	1.1	1.6	1.7	1.3	1.3	1.4	1.4	1.9	
9-Oct	1.4	1.2	1.4	1.3	0.9	1.0	1.2	1.6	1.6	1.4	1.5	1.6	1.6	1.7	1.8	1.3	1.3	1.1	1.4	1.6	1.5	1.4	1.9	1.4	1.9	
10-Oct	1.0	1.0	1.1	1.1	1.8	1.6	1.9	1.8	1.7	1.2	1.6	1.7	2.1	2.3	2.2	1.9	1.5	1.4	1.5	1.2	1.7	2.0	1.4	1.5	2.3	
11-Oct	1.4	0.8	0.9	1.2	1.1	1.5	2.2	2.2	2.0	2.3	2.4	2.8	2.8	2.3	2.4	2.6	1.8	1.0	1.0	1.4	1.6	1.4	1.6	1.2	2.8	
12-Oct	1.0	1.6	2.6	3.1	2.7	1.5	1.2	1.5	1.6	1.7	1.9	2.5	2.7	2.0	1.9	1.6	1.7	2.7	3.2	2.5	2.0	1.4	1.8	1.1	3.2	
13-Oct	1.0	1.3	1.5	1.4	1.0	0.6	1.4	1.1	0.7	1.0	1.2	1.0	1.2	1.3	1.0	1.0	1.1	1.1	0.6	0.7	1.0	0.6	0.4	0.6	1.5	
14-Oct	0.6	0.8	0.7	0.6	0.8	1.2	1.1	1.2	1.2	0.9	1.0	0.7	1.1	1.1	0.9	0.5	0.4	0.2	0.3	0.7	2.1	2.0	1.9	1.6	2.1	
15-Oct	2.1	2.7	3.0	1.9	1.4	1.5	2.1	1.7	2.0	2.2	2.5	1.8	2.6	3.4	2.5	2.4	1.4	1.4	1.3	0.9	0.3	0.2	0.3	0.3	3.4	
16-Oct	0.4	0.4	0.7	0.5	0.7	0.6	0.6	0.5	0.4	0.8	1.4	1.7	1.4	1.9	1.6	1.3	0.5	0.8	1.6	1.9	2.5	3.1	3.0	2.4	3.1	
17-Oct	2.4	2.1	1.5	1.5	1.3	1.3	1.2	1.1	1.3	1.5	1.9	2.3	3.1	3.0	2.8	2.9	2.9	3.3	3.6	3.8	2.3	2.3	2.4	2.3	3.8	
18-Oct	2.1	2.0	1.8	1.9	1.9	1.6	1.9	1.2	1.1	1.0	1.3	0.8	0.7	0.9	0.8	0.8	0.6	0.7	0.7	0.9	0.8	1.4	1.1	1.1	2.1	
19-Oct	0.8	1.2	2.0	1.4	0.4	0.4	0.5	0.6	0.7	0.5	0.5	0.9	1.5	1.2	2.2	1.7	1.7	1.4	1.8	2.1	2.0	1.5	1.9	1.7	2.2	
20-Oct	1.2	1.1	0.9	1.8	2.0	1.7	2.0	2.1	1.9	1.9	1.4	1.4	1.2	1.1	1.6	1.3	1.5	0.9	0.9	0.4	0.4	0.6	0.8	0.9	2.1	
21-Oct	1.2	1.4	1.2	1.2	1.9	1.9	2.7	2.6	2.5	1.8	1.7	1.3	1.1	1.2	1.1	0.8	0.6	0.6	0.5	1.0	0.8	1.2	0.7	0.6	2.7	
22-Oct	0.7	0.5	0.7	0.7	0.9	1.1	0.9	0.9	1.3	1.1	0.6	0.6	0.8	1.4	2.0	2.0	2.3	2.2	1.7	1.7	1.5	1.5	1.9	2.0	2.3	
23-Oct	1.8	1.3	1.0	1.2	0.8	1.2	0.8	0.8	0.7	1.1	0.9	1.2	2.3	2.2	1.1	1.2	1.1	1.2	1.2	1.2	0.9	1.3	1.7	2.1	2.3	
24-Oct	2.7	3.0	2.8	2.5	2.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3.2	3.0	2.7	1.8	2.0	2.7	2.4	2.7	3.2
25-Oct	2.9	2.8	3.1	2.7	1.0	1.5	0.8	1.3	0.8	1.0	1.4	1.2	1.5	1.6	1.5	0.9	0.6	1.1	0.9	0.9	1.1	1.0	1.6	1.6	3.1	
26-Oct	1.2	1.1	1.1	0.8	0.8	1.0	1.1	1.1	0.8	1.1	1.7	1.8	1.9	2.2	1.7	1.7	1.7	1.5	1.4	1.4	1.7	1.7	1.7	1.6	2.2	
27-Oct	1.4	1.2	1.4	1.3	1.3	1.2	1.2	1.2	1.1	1.8	1.7	1.6	1.2	1.2	1.7	1.0	0.5	0.4	0.6	0.7	0.6	1.0	0.8	1.0	1.8	
28-Oct	0.8	0.8	0.8	0.7	0.9	1.2	1.5	1.3	1.3	1.3	1.2	1.1	1.4	1.4	1.7	1.6	2.6	1.6	1.4	1.4	1.3	1.6	1.2	1.2	2.6	
29-Oct	1.2	1.3	1.1	1.1	1.0	1.0	1.1	1.0	1.1	1.3	1.6	1.8	1.6	1.4	0.9	1.1	0.8	1.0	1.4	1.1	1.2	1.7	1.8	2.1	2.1	
30-Oct	1.9	2.2	2.1	2.5	2.7	2.8	2.9	3.3	2.9	2.9	2.6	2.6	3.0	3.2	3.7	2.9	2.5	2.3	2.6	3.0	3.1	2.9	2.7	2.8	3.7	
31-Oct	2.8	2.4	2.4	2.5	2.4	2.4	2.1	1.8	2.0	1.9	2.2	2.5	1.7	1.6	1.4	1.3	1.1	1.0	1.1	1.2	1.2	1.2	0.9	0.9	2.8	
Diurnal Maximum																										
2.9 3.0 3.1 3.1 2.9 3.0 3.1 3.3 2.9 3.3 3.1 4.2 3.4 3.4 3.7 3.4 3.7 3.3 3.6 3.8 3.7 3.1 3.0 2.8																										

AF - Analyzer Failure



Maximum Value: 4.9 km/h on Oct 31 00:00																				Maximum Daily Average: 3.3 km/h on Oct 30					Hours in Service: 744	
Minimum Value: -1.5 km/h on Oct 2 14:00																				Minimum Daily Average: -0.1 km/h on Oct 6					Hours of Data: 726	
Maximum Diurnal Average: 1.1 km/h at hour 7																				Minimum Diurnal Average: 0.5 km/h at hour 15					Hours of Missing Data: 18	
Monthly Average: 0.83 km/h																				Percentiles: P <sub>1</sub> = -1.1 P <sub>10</sub> = -0.2 Q <sub>1</sub> = 0.2 Median = 0.5 Q <sub>3</sub> = 1.3 P <sub>90</sub> = 2.4 P <sub>99</sub> = 4.1					Hours of Calibration: 0	
																									Percent Operational Time: 97.6	
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-Oct	0.0	0.0	0.4	0.0	0.1	1.0	0.0	0.2	0.5	0.4	0.2	0.0	0.3	0.3	0.0	0.1	0.4	0.3	0.1	0.1	0.2	AF	AF	AF	0.2	1.0
2-Oct	AF	AF	AF	AF	AF	AF	AF	-1.3	-0.9	-0.9	-1.0	-0.7	-1.3	-1.5	-0.8	-1.2	-0.5	-0.7	-1.1	-0.6	-0.4	-0.6	-1.0	-0.7	--	-0.4
3-Oct	1.5	-1.3	-1.0	-1.2	-0.9	0.4	0.3	0.5	0.5	0.4	0.5	0.2	0.1	0.8	0.9	2.7	4.4	3.0	2.9	0.4	0.0	1.5	2.2	1.5	0.8	4.4
4-Oct	2.4	2.6	2.7	2.6	0.8	0.3	0.4	0.4	0.2	0.0	0.2	1.4	0.1	0.4	-0.4	0.0	0.1	0.5	0.1	0.0	0.4	0.1	0.0	0.4	0.7	2.7
5-Oct	0.7	0.6	1.3	1.5	1.1	0.9	1.1	0.9	0.9	0.5	0.4	0.1	0.7	0.5	-0.3	1.2	0.3	0.1	0.1	-0.3	-0.1	-0.2	0.2	0.3	0.5	1.5
6-Oct	0.1	-0.4	0.0	0.1	0.4	0.8	0.7	0.3	0.1	0.3	-0.1	-0.5	-0.3	-0.5	0.5	0.1	-0.4	-0.6	-0.4	-0.8	-0.9	-0.4	-0.4	0.0	-0.1	0.8
7-Oct	0.6	0.9	1.6	2.3	1.3	2.2	2.5	-0.5	-0.2	0.2	-0.4	-0.7	0.3	1.5	0.5	0.4	0.6	0.0	-0.1	0.5	1.0	0.8	0.7	0.2	0.7	2.5
8-Oct	0.3	0.6	0.6	0.4	0.7	0.3	0.6	0.3	0.6	1.1	0.6	0.2	1.0	0.8	0.9	0.4	0.8	2.0	1.8	2.2	2.1	2.0	1.5	1.3	1.0	2.2
9-Oct	1.6	2.1	3.0	2.4	1.0	1.1	0.8	0.8	1.6	0.9	0.8	0.7	1.4	0.6	1.0	1.3	2.0	1.5	1.1	1.3	1.5	1.8	3.1	3.1	1.5	3.1
10-Oct	1.8	1.8	0.6	1.1	2.0	2.2	1.0	0.4	0.5	0.1	-0.1	0.8	0.9	1.2	0.6	0.9	0.7	2.3	2.6	2.7	3.2	2.2	0.0	0.1	1.2	3.2
11-Oct	0.7	0.7	0.8	0.3	0.4	0.7	1.5	1.4	0.6	0.4	-0.1	-0.3	-0.1	-0.4	0.3	0.6	0.6	0.3	0.5	0.7	0.0	0.1	-0.4	0.0	0.4	1.5
12-Oct	0.0	1.0	0.9	1.4	1.7	0.1	-0.2	-0.1	0.7	0.7	0.7	0.2	-0.1	0.6	0.2	0.8	0.7	0.6	-0.3	-0.8	-0.4	-0.1	0.2	0.3	0.4	1.7
13-Oct	0.1	-0.7	0.6	0.5	0.4	0.4	1.3	0.5	0.3	0.6	0.4	0.3	0.1	0.2	0.3	0.5	0.4	0.5	1.6	1.1	0.4	0.7	0.6	0.3	0.5	1.6
14-Oct	0.4	0.6	0.5	0.7	0.5	0.4	-0.1	0.3	0.0	0.6	0.2	0.2	0.4	0.3	0.3	0.2	0.0	-0.1	-0.1	0.4	0.3	0.4	0.0	-0.4	0.3	0.7
15-Oct	-0.1	0.0	-0.6	-0.5	1.2	0.6	1.2	0.7	0.3	0.4	0.5	-0.7	0.9	0.8	-0.8	-0.6	-0.5	-0.1	0.3	0.1	0.0	0.2	0.0	0.3	0.1	1.2
16-Oct	0.1	0.1	0.2	0.2	0.1	0.3	0.4	0.4	0.5	0.3	0.8	-0.1	-0.4	-0.1	0.2	0.4	0.0	1.1	1.4	0.9	2.6	3.1	2.9	2.9	0.8	3.1
17-Oct	3.1	3.5	3.6	3.1	2.8	2.4	2.0	3.1	3.2	2.0	1.8	1.8	3.3	3.3	2.0	2.1	2.4	1.8	2.3	3.0	2.0	2.5	2.5	2.8	2.6	3.6
18-Oct	2.6	2.0	2.1	2.6	4.2	3.8	1.8	0.0	0.5	0.6	0.9	0.4	0.3	0.2	0.1	0.4	0.7	0.7	0.5	0.2	0.5	0.0	-0.6	-0.5	1.0	4.2
19-Oct	-0.3	0.2	-0.3	-0.2	0.1	0.2	0.3	0.4	0.5	0.8	0.9	0.2	1.6	1.4	0.8	1.3	1.9	2.2	1.9	1.9	1.7	1.3	2.0	2.0	1.0	2.2
20-Oct	1.8	1.9	1.8	2.4	4.5	4.2	2.3	1.9	3.8	1.2	1.2	0.9	0.5	0.6	0.1	0.1	1.6	0.8	1.1	0.4	0.7	0.6	0.3	0.6	1.5	4.5
21-Oct	0.5	1.7	0.4	0.2	0.0	0.7	4.0	4.2	3.0	0.1	0.7	0.8	0.9	1.0	0.8	0.9	1.4	0.9	1.1	1.4	0.6	0.3	0.6	0.4	1.1	4.2
22-Oct	0.4	0.4	0.4	0.1	0.5	0.6	0.6	0.7	0.6	0.6	1.7	1.8	1.0	0.9	1.6	2.1	2.9	2.3	2.2	0.8	1.4	1.6	2.1	2.6	1.2	2.9
23-Oct	3.1	2.3	1.9	1.5	1.3	1.4	1.0	0.3	0.6	0.6	0.4	1.1	1.8	1.2	1.0	1.2	2.0	2.4	0.4	0.6	0.3	-0.5	-0.4	-0.8	1.0	3.1
24-Oct	-0.6	-0.7	-0.5	-0.9	AF	AF	AF	AF	AF	AF	AF	AF	0.9	-0.4	0.1	1.0	0.4	-0.2	-0.3	0.1	0.3	0.2	0.0	-0.3	--	1.0
25-Oct	0.8	0.4	1.1	-1.0	-0.4	0.4	0.7	3.0	1.3	1.0	0.8	0.6	0.5	0.3	0.1	0.7	0.5	0.5	1.1	0.5	0.4	1.0	0.1	-0.2	0.6	3.0
26-Oct	0.7	-0.2	0.6	0.1	-0.2	0.3	0.9	0.0	0.1	0.1	0.5	0.6	0.4	0.4	0.1	0.0	0.3	0.1	0.2	0.0	0.0	0.4	0.5	0.3	0.3	0.9
27-Oct	0.5	0.2	0.4	0.4	0.5	0.3	0.4	0.2	0.2	0.4	0.8	0.5	-0.4	0.0	0.5	-0.1	0.1	0.2	0.1	0.6	0.2	0.1	0.3	0.6	0.3	0.8
28-Oct	0.3	0.3	0.5	1.1	0.5	0.3	1.3	0.7	0.7	0.5	0.2	0.4	1.3	1.1	1.2	0.5	0.6	1.2	3.1	2.2	2.2	2.8	1.1	1.5	1.1	3.1
29-Oct	1.3	1.3	0.2	0.1	-0.2	0.0	0.3	0.1	0.0	0.2	0.5	0.6	0.3	0.6	0.1	0.6	0.7	0.7	0.5	0.3	0.5	1.4	1.4	2.4	0.6	2.4
30-Oct	2.6	3.2	3.3	3.1	3.8	3.8	3.2	3.2	3.9	3.3	3.6	3.4	4.1	4.7	2.6	0.4	2.6	1.8	2.9	3.0	3.3	4.3	3.2	4.9	3.3	4.9
31-Oct	4.3	2.7	1.7	1.5	2.2	1.8	2.0	2.2	2.6	1.8	2.0	1.2	0.3	0.2	0.2	0.2	1.2	1.3	2.2	2.1	0.4	0.4	1.0	0.5	1.5	4.3
																								Diurnal Average		
																								Diurnal Maximum		
1.1 0.9 1.0 0.9 1.0 1.1 1.1 0.8 0.9 0.6 0.7 0.5 0.7 0.7 0.5 0.6 0.9 0.9 1.0 0.8 0.8 0.9 0.8 0.9																								Diurnal Average		
4.3 3.5 3.6 3.1 4.5 4.2 4.0 4.2 3.9 3.3 3.6 3.4 4.1 4.7 2.6 2.7 4.4 3.0 3.1 3.0 3.3 4.3 3.2 4.9																								Diurnal Maximum		
AF - Analyzer Failure																										



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 4.6 km/h on Oct 17 20:00	Hours of Data: 726
Minimum Value: 0.2 km/h on Oct 15 23:00	Hours of Missing Data: 18
Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 0.7 Q <sub>1</sub> = 0.9 Median = 1.4 Q <sub>3</sub> = 2.0 P <sub>90</sub> = 2.7 P <sub>99</sub> = 3.6	Hours of Calibration: 0
	Percent Operational Time: 97.6

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-Oct	1.8	1.6	1.7	1.1	1.4	1.4	0.6	0.4	1.0	1.1	0.9	1.2	1.2	1.4	1.9	2.6	2.9	2.9	3.3	3.3	3.6	AF	AF	AF	3.6
2-Oct	AF	AF	AF	AF	AF	AF	AF	2.8	2.8	3.3	3.1	4.1	3.2	3.2	3.1	3.4	3.5	3.3	2.3	2.9	2.3	1.6	0.9	2.2	4.1
3-Oct	2.5	1.9	1.7	1.9	2.0	1.0	1.2	1.2	0.8	1.0	0.9	1.7	2.1	2.5	2.4	2.3	1.9	2.3	3.4	2.2	1.1	1.9	2.0	1.9	3.4
4-Oct	2.2	1.7	1.6	1.9	1.3	1.1	0.8	0.3	0.5	0.8	1.3	1.6	1.5	1.3	1.9	1.1	0.8	0.9	0.5	0.4	0.5	0.7	0.5	0.4	2.2
5-Oct	0.9	0.8	1.7	0.5	1.0	0.9	1.5	1.3	1.5	1.3	1.0	0.9	1.5	1.5	1.9	3.3	2.2	1.8	2.2	2.5	1.9	1.7	1.8	1.2	3.3
6-Oct	1.0	1.0	0.7	0.5	0.6	0.7	0.4	0.7	0.7	1.0	1.0	1.2	1.6	2.0	1.8	1.7	1.1	2.1	2.5	2.9	2.7	2.3	1.9	1.7	2.9
7-Oct	2.6	2.3	2.0	2.0	2.6	3.3	4.1	2.6	2.0	2.7	2.5	2.1	3.2	2.7	2.9	2.6	2.2	1.7	1.6	1.0	0.7	0.5	0.8	0.6	4.1
8-Oct	0.6	0.5	0.7	0.4	0.5	0.3	0.4	0.4	0.6	0.8	0.4	0.8	1.2	2.1	2.0	1.4	0.8	1.1	1.8	1.6	1.2	1.3	1.4	1.3	2.1
9-Oct	1.3	1.2	1.2	1.4	1.2	0.7	0.9	1.5	1.4	1.3	1.6	1.9	1.8	2.1	2.2	1.5	1.4	1.0	1.7	1.7	1.7	1.2	2.1	1.2	2.2
10-Oct	1.2	1.1	1.4	1.4	1.6	1.4	1.7	1.7	1.5	1.1	1.4	1.6	1.9	1.8	1.3	1.0	1.0	1.1	0.9	0.9	1.0	1.4	1.1	1.0	1.9
11-Oct	1.5	1.0	1.1	1.4	1.6	1.3	1.7	1.6	1.4	1.9	2.0	2.3	2.6	2.1	2.4	2.0	1.3	1.1	0.8	0.8	1.1	1.0	1.1	1.1	2.6
12-Oct	0.9	1.1	1.1	2.3	2.6	2.2	1.9	1.9	1.7	1.7	1.6	2.7	2.9	2.0	2.0	1.9	1.4	2.3	2.8	2.4	1.5	1.6	1.9	1.6	2.9
13-Oct	0.9	1.0	0.8	0.8	0.5	0.9	1.1	1.2	0.7	1.2	0.9	0.9	1.0	0.9	1.0	0.9	0.6	1.2	0.9	0.8	0.9	0.5	0.5	0.5	1.2
14-Oct	0.5	0.6	0.8	0.8	0.8	0.7	0.9	1.4	1.1	0.8	0.9	1.3	1.4	1.4	0.8	0.4	0.3	0.2	0.5	1.1	1.7	1.7	1.9	1.7	1.9
15-Oct	2.1	2.3	3.2	2.0	1.3	1.5	1.7	1.4	1.3	2.3	2.9	1.6	2.8	3.3	2.7	2.2	1.1	0.9	1.0	0.7	0.6	0.3	0.2	0.3	3.3
16-Oct	0.4	0.6	0.9	0.8	1.1	0.9	0.9	0.7	0.6	0.8	1.4	1.8	1.5	2.0	1.7	1.4	0.7	0.9	1.3	1.8	1.9	2.4	2.5	2.0	2.5
17-Oct	2.2	1.8	1.6	1.5	1.4	1.4	1.6	1.6	1.4	1.4	1.9	2.3	4.0	3.6	3.0	3.1	2.9	4.1	4.1	4.6	2.6	2.0	2.2	2.3	4.6
18-Oct	2.2	2.0	1.8	1.8	1.6	1.8	2.0	0.9	0.8	0.7	1.1	0.7	0.5	0.6	0.6	1.0	0.6	1.1	0.6	0.6	0.9	1.8	1.5	1.2	2.2
19-Oct	1.0	0.8	1.1	0.8	0.6	0.4	0.4	0.5	0.5	0.7	0.9	0.9	1.4	1.2	2.3	1.7	1.7	1.5	2.0	2.3	1.9	1.7	1.8	1.8	2.3
20-Oct	1.5	1.3	1.1	1.9	1.6	1.9	1.9	2.1	2.3	1.9	1.6	1.3	0.9	1.1	1.0	1.1	1.5	1.0	1.1	0.4	0.4	0.5	0.6	0.8	2.3
21-Oct	1.3	1.5	1.1	0.9	1.8	1.4	2.1	2.3	2.1	1.5	1.5	0.9	0.7	0.8	1.0	0.7	0.4	0.4	0.5	1.0	0.8	1.3	0.5	0.7	2.3
22-Oct	0.9	0.5	0.5	0.6	0.6	0.6	0.6	0.8	0.8	0.5	0.9	1.0	1.1	1.7	1.6	1.4	1.9	2.3	1.8	1.9	1.7	2.5	2.9	2.7	2.9
23-Oct	2.4	1.8	1.0	1.0	0.9	1.1	0.9	0.8	0.9	1.3	1.2	1.6	2.2	2.2	0.8	0.7	1.2	1.0	1.2	1.4	0.7	0.9	1.5	1.8	2.4
24-Oct	2.4	2.8	2.6	2.2	AF	AF	AF	AF	AF	AF	AF	AF	2.5	2.7	2.4	2.2	3.0	3.3	2.6	1.5	1.8	2.3	2.2	3.1	3.3
25-Oct	2.6	2.1	3.2	2.1	1.0	1.3	0.7	1.4	0.7	0.9	1.4	1.1	1.2	1.4	1.2	0.9	0.7	1.2	1.0	1.2	1.1	1.2	1.6	1.7	3.2
26-Oct	1.4	1.5	1.2	1.0	0.8	0.9	1.1	1.1	0.7	0.9	1.4	1.5	1.7	2.0	1.8	1.6	1.7	1.7	1.6	1.4	1.6	1.8	2.2	1.9	2.2
27-Oct	1.7	1.4	1.7	1.6	1.6	1.4	1.6	1.3	1.3	1.9	1.7	1.5	1.1	1.2	1.8	0.9	0.5	0.4	0.7	0.7	0.7	1.0	0.8	1.2	1.9
28-Oct	0.9	0.8	0.8	0.7	0.6	1.4	1.4	0.9	1.3	1.2	0.7	0.7	1.1	1.1	1.9	1.8	2.6	2.1	1.3	1.3	1.2	1.5	1.5	1.2	2.6
29-Oct	0.8	1.2	1.2	1.4	1.3	1.4	1.3	1.2	1.2	1.3	1.5	1.6	1.5	1.3	0.9	1.0	0.9	1.0	1.6	1.3	1.1	1.4	1.7	2.2	2.2
30-Oct	2.3	2.3	2.5	3.2	3.1	2.8	3.0	3.3	2.9	2.8	2.7	2.5	3.3	3.5	3.8	2.8	2.5	2.4	3.3	3.5	3.5	3.7	3.3	3.2	3.8
31-Oct	3.2	2.8	2.7	2.8	2.8	2.9	2.5	2.1	2.2	2.6	2.3	2.2	1.3	1.1	0.9	0.7	0.8	0.8	0.8	1.0	0.9	0.9	0.9	0.8	3.2
	3.2	2.8	3.2	3.2	3.1	3.3	4.1	3.3	2.9	3.3	3.1	4.1	4.0	3.6	3.8	3.4	3.5	4.1	4.1	4.6	3.6	3.7	3.3	3.2	

Diurnal Maximum

AF - Analyzer Failure

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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 4  
BUFFALO VIEWPOINT  
OCTOBER 2014**

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

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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)  
OCTOBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	36	37	99.87	31	0	4	0
H2S (ppb) Average	708	35	36	99.87	2	0	0	0
THC (ppm) Average	705	38	39	99.87	3.5	-	2.6	-
Temperature (C) Average	744	0	0	100.00	21	-	13	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	34	-	-	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2 (ppb) Average	707	0.7	2	-	0	0	0	0	0	0	1	31
H2S (ppb) Average	708	0.1	0	-	0	0	0	0	0	0	0	2
THC (ppm) Average	705	2.22	0.2	-	2.1	2.1	2.1	2.2	2.2	2.4	2.4	3.5
Temperature 2 m (C) Average	744	4.94	4.7	-	-2.9	-0.3	0.9	4.4	7.9	12	12	21
Wind Speed 10 m (km/h) Average	744	11.1	6	-	1	5	7	10	15	19	19	34
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, H2S, THC	20 Oct 2014 10:00	20 Oct 2014 10:00	1	Maintenance - manifold cleaning

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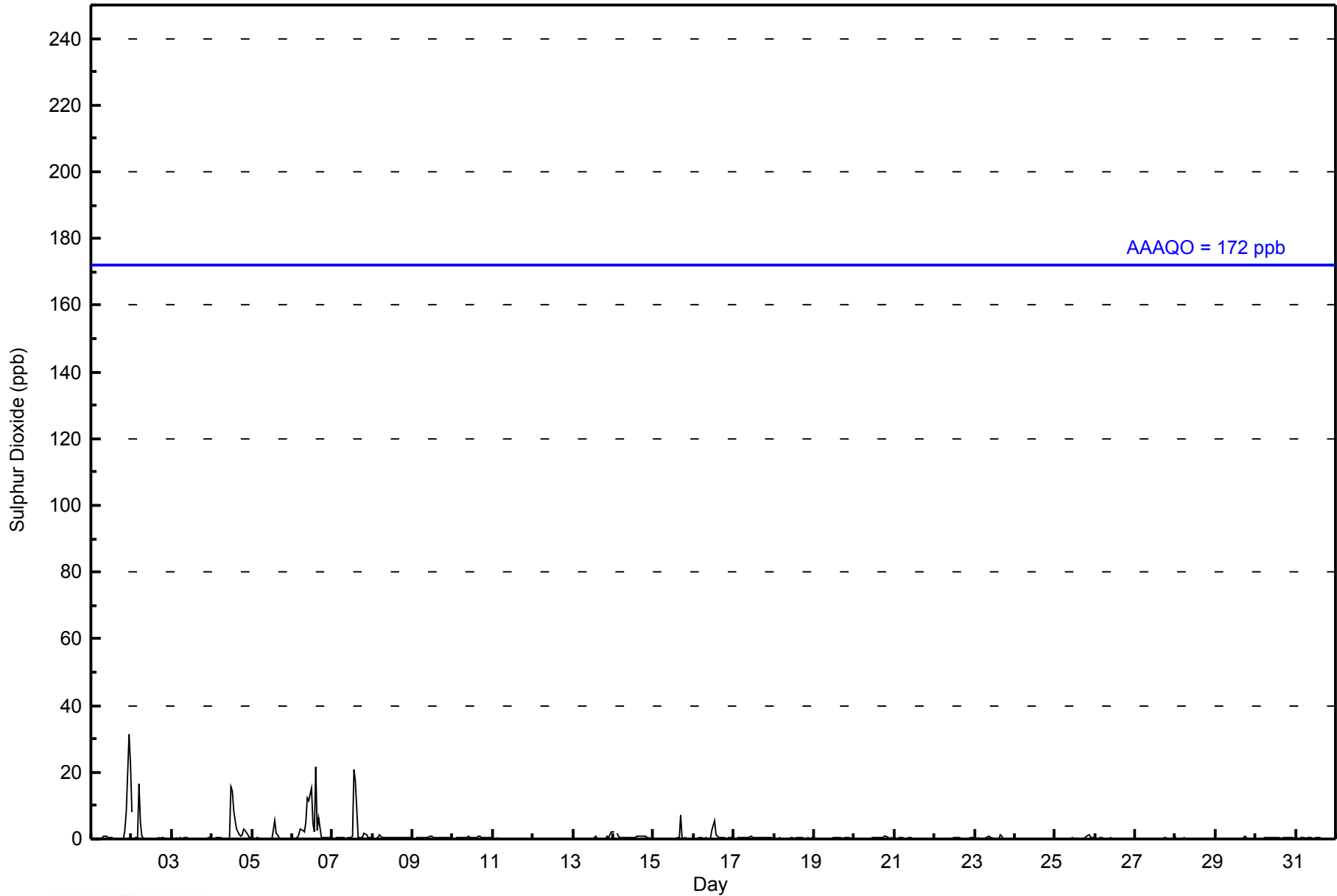


Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																																									
Maximum Value: 31 ppb on Oct 1 23:00		Maximum Daily Average: 4.1 ppb on Oct 6				Hours of Data:		707																																									
Minimum Value: 0 ppb on Oct 12 13:00		Minimum Daily Average: 0.1 ppb on Oct 12				Hours of Missing Data:		37																																									
Maximum Diurnal Average: 1.7 ppb at hour 15		Minimum Diurnal Average: 0.2 ppb at hour 4				Hours of Calibration:		36																																									
Monthly Average: 0.7 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 15				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-Oct	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	2	8	31	23	3.0	31																							
2-Oct	8	Z	0	0	16	5	1	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	1.8	16																							
3-Oct	0	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																							
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	16	14	8	5	3	1	1	1	3	3	1	1	0	2.6	16																							
5-Oct	1	Z	1	0	0	0	0	0	0	0	0	0	0	6	2	1	0	0	0	0	0	0	0	0	0.5	6																							
6-Oct	1	Z	0	1	1	3	3	2	5	12	12	15	5	2	22	2	7	1	0	0	0	0	0	0	4.1	22																							
7-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	1	21	17	1	0	0	0	2	1	0	0	0	2.1	21																							
8-Oct	0	Z	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
9-Oct	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1																							
10-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1																							
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
12-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
13-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	2	0.4	2																							
14-Oct	2	Z	2	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0.6	2																							
15-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0.5	7																							
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	2	6	1	1	1	0	0	0	0	0	0	0	0	0.7	6																							
17-Oct	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1																							
18-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
19-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1																							
20-Oct	0	Z	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.3	1																							
21-Oct	0	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																							
22-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1																							
23-Oct	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.3	1																							
24-Oct	0	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-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1																							
26-Oct	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
27-Oct	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																							
28-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.1	1																							
30-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
31-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
																								0.6	--	0.3	0.2	0.8	0.5	0.3	0.3	0.4	0.7	0.6	1.3	1.1	1.4	1.7	0.5	0.7	0.3	0.3	0.4	0.4	0.5	1.3	1.0	Diurnal Average	
																								8	--	2	1	16	5	3	2	5	12	12	16	14	21	22	3	7	1	1	3	3	8	31	23	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  
Buffalo Viewpoint - October 2014





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Buffalo Viewpoint - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	696	98.44	98.44
11 - 20	7	0.99	99.43
21 - 60	4	0.57	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Buffalo Viewpoint - October 2014**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	47	50	23	9	13	30	137	147	26	16	14	47	58	38	27	14	696
11 - 20	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7
21 - 60	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4
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>	51	52	23	9	13	30	137	147	26	16	14	47	58	38	28	18	707

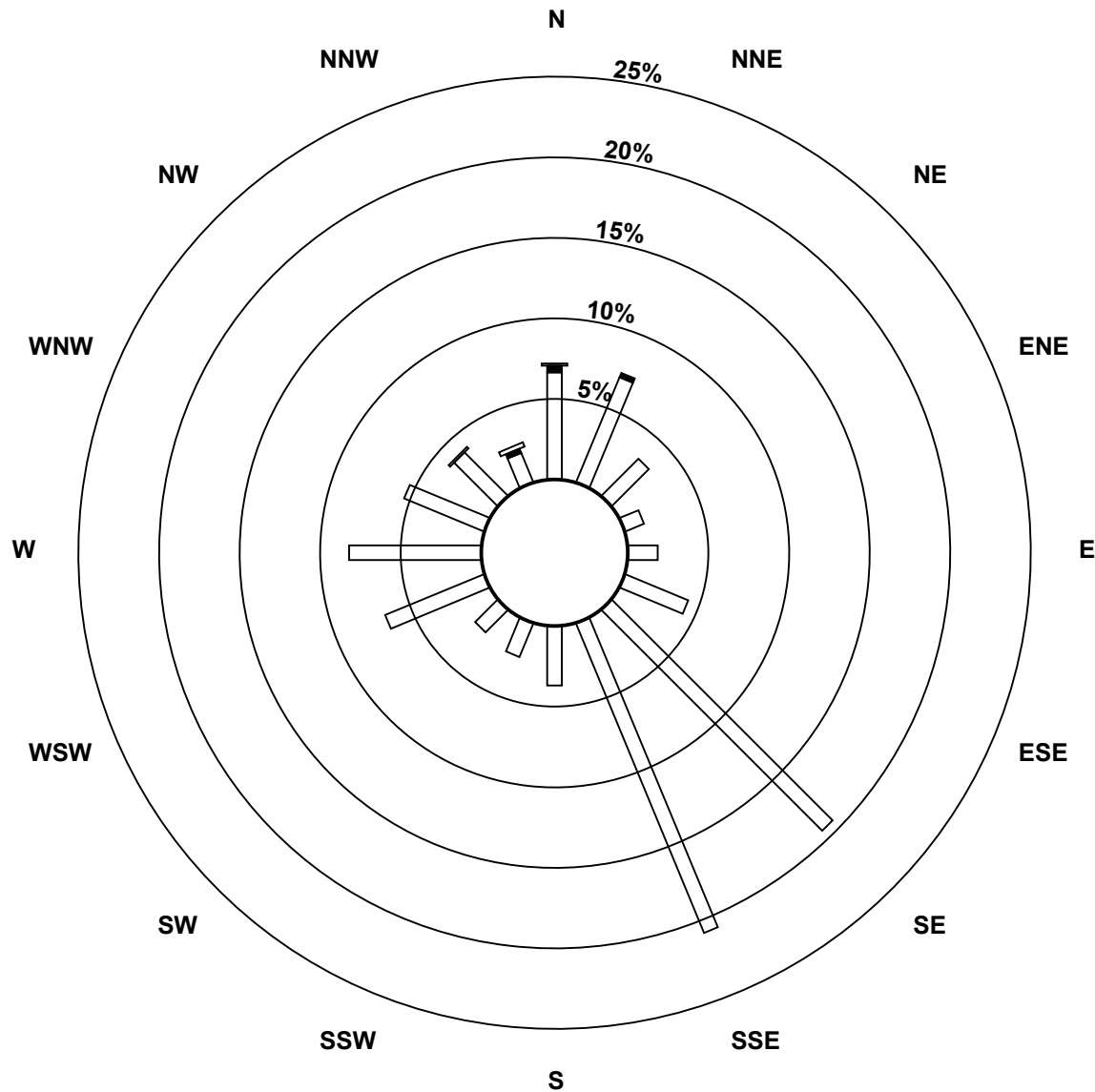
Total Number of Valid Hours: 707

Total Number of Hours: 744

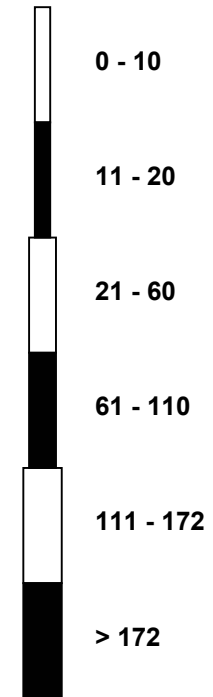


**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



Classes (ppb)

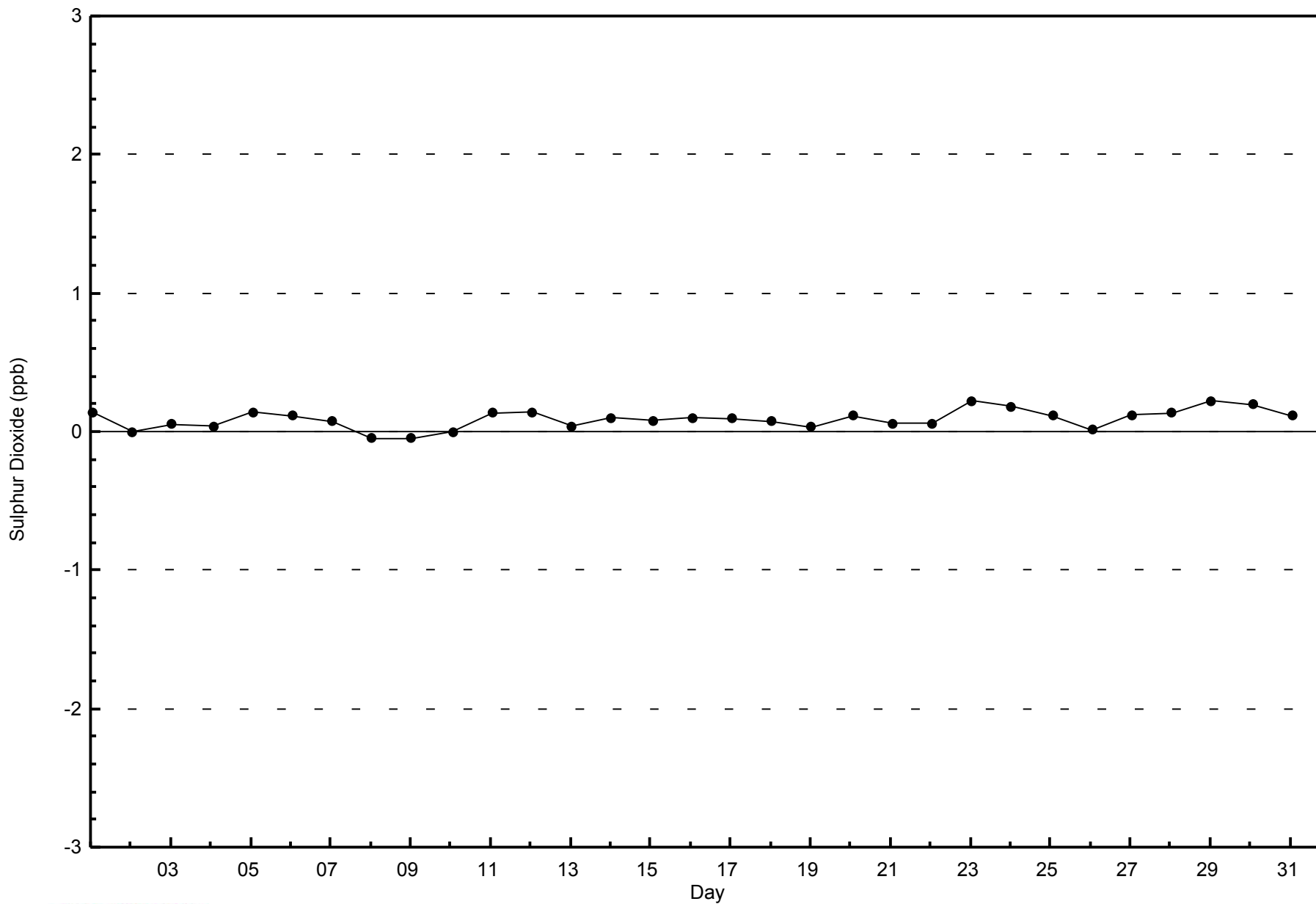


**Total Number of Valid Hours: 707**



WBEA  
Zero Responses

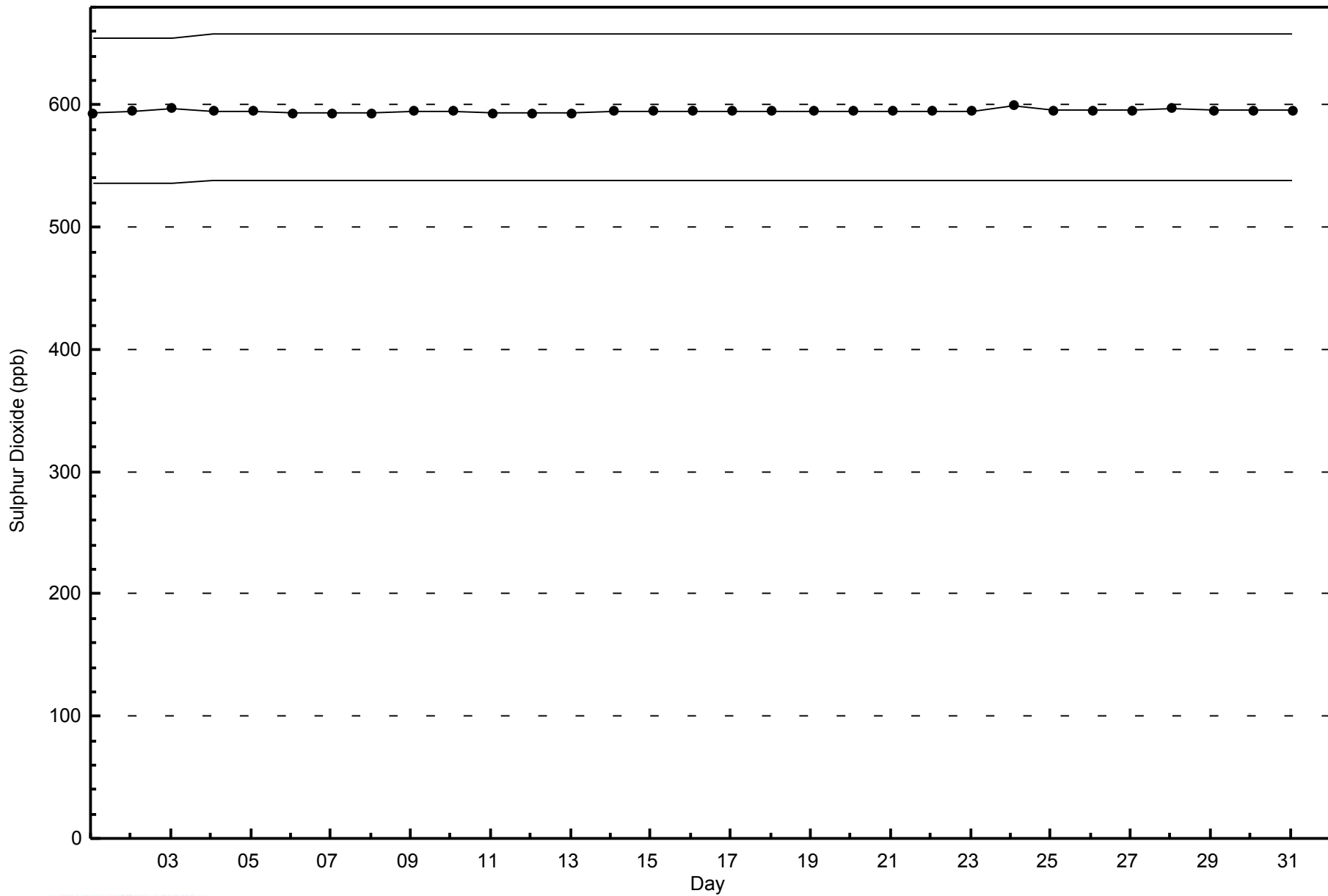
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Buffalo Viewpoint - October 2014





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Buffalo Viewpoint - October 2014



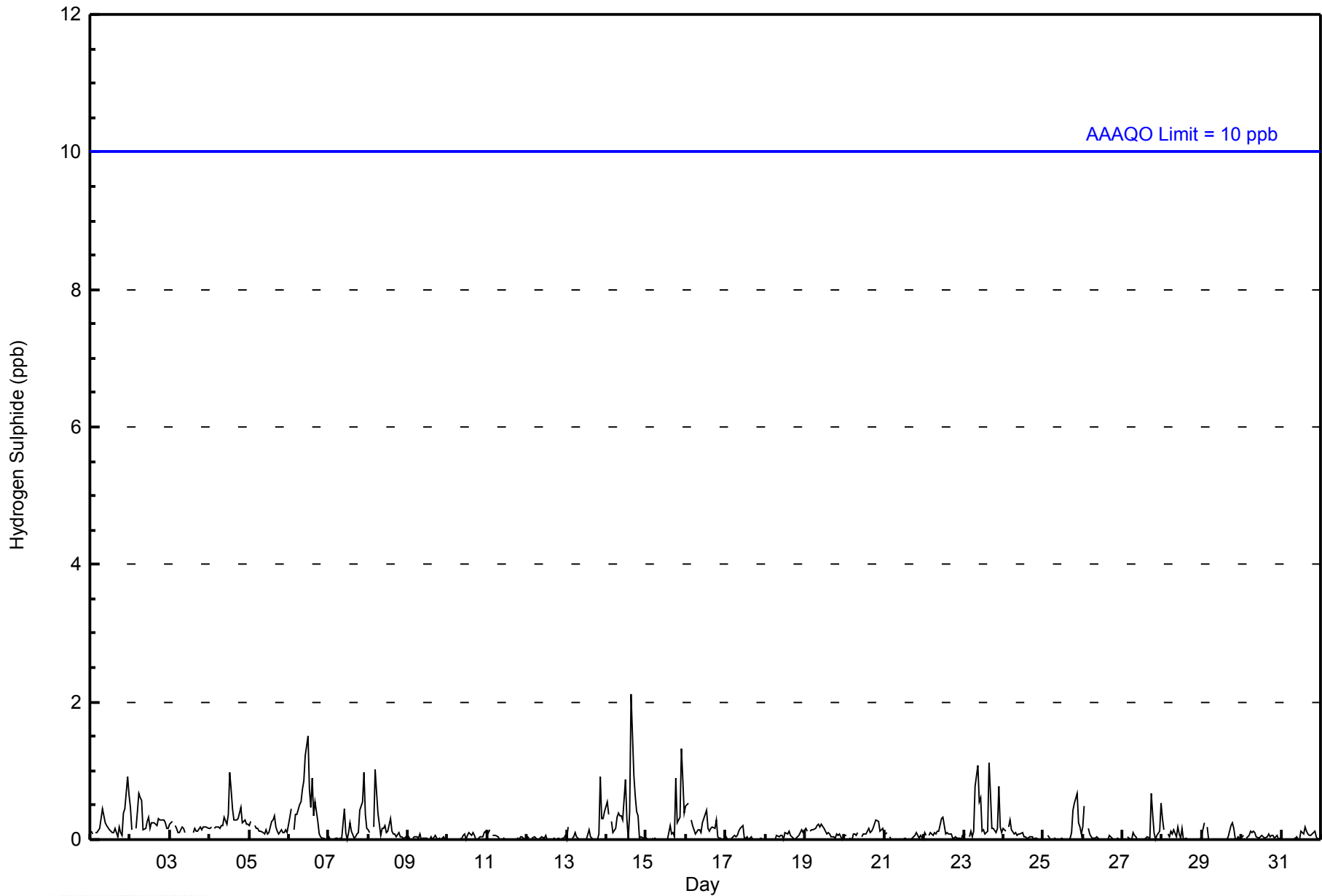


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																		
Maximum Value: 2 ppb on Oct 14 16:00										Maximum Daily Average: 0.5 ppb on Oct 6										Hours of Data: 708								
Minimum Value: 0 ppb on Oct 7 02:00										Minimum Daily Average: 0.0 ppb on Oct 12										Hours of Missing Data: 36								
Maximum Diurnal Average: 0.2 ppb at hour 16										Minimum Diurnal Average: 0.1 ppb at hour 4										Hours of Calibration: 35								
Monthly Average: 0.1 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1										Percent Operational Time: 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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1		
2-Oct	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1		
3-Oct	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0		
4-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1		
5-Oct	0	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		
6-Oct	0	0	Z	0	0	0	0	1	1	1	1	2	1	0	1	0	1	0	0	0	0	0	0	0	0.5	2		
7-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.2	1		
8-Oct	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1		
9-Oct	0	0	Z	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-Oct	0	0	Z	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-Oct	0	0	Z	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-Oct	0	0	Z	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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1		
14-Oct	1	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	2	1	1	0	0	0	0	0	0	0.4	2		
15-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0.2	1		
16-Oct	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1		
17-Oct	0	0	Z	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-Oct	0	0	Z	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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0		
20-Oct	0	0	Z	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0		
21-Oct	0	0	Z	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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0		
23-Oct	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	1	0	0	0.3	1		
24-Oct	0	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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.1	1		
26-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0		
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.1	1		
28-Oct	0	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		
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0		
30-Oct	0	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		
31-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0		
	0.1		0.1		--		0.1		0.1		0.1		0.1		0.1		0.1		0.1		0.1		0.1		0.1		Diurnal Average	
	1		1		--		0		1		1		1		1		2		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**  
**Buffalo Viewpoint - October 2014**





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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Buffalo Viewpoint - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	708	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Buffalo Viewpoint - October 2014**

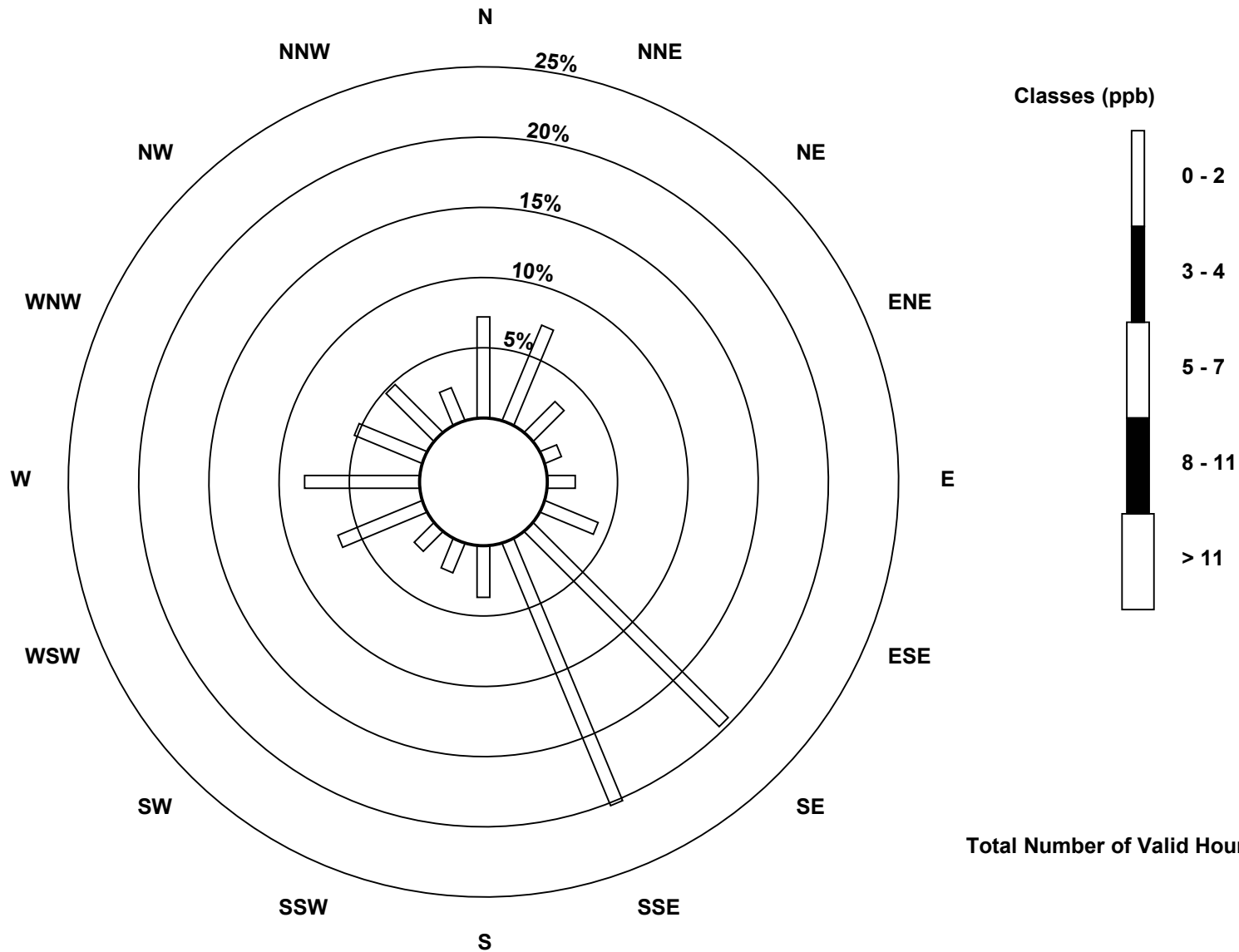
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	51	52	22	9	14	29	139	143	26	16	14	46	58	37	34	18	708
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	51	52	22	9	14	29	139	143	26	16	14	46	58	37	34	18	708

Total Number of Valid Hours: 708

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



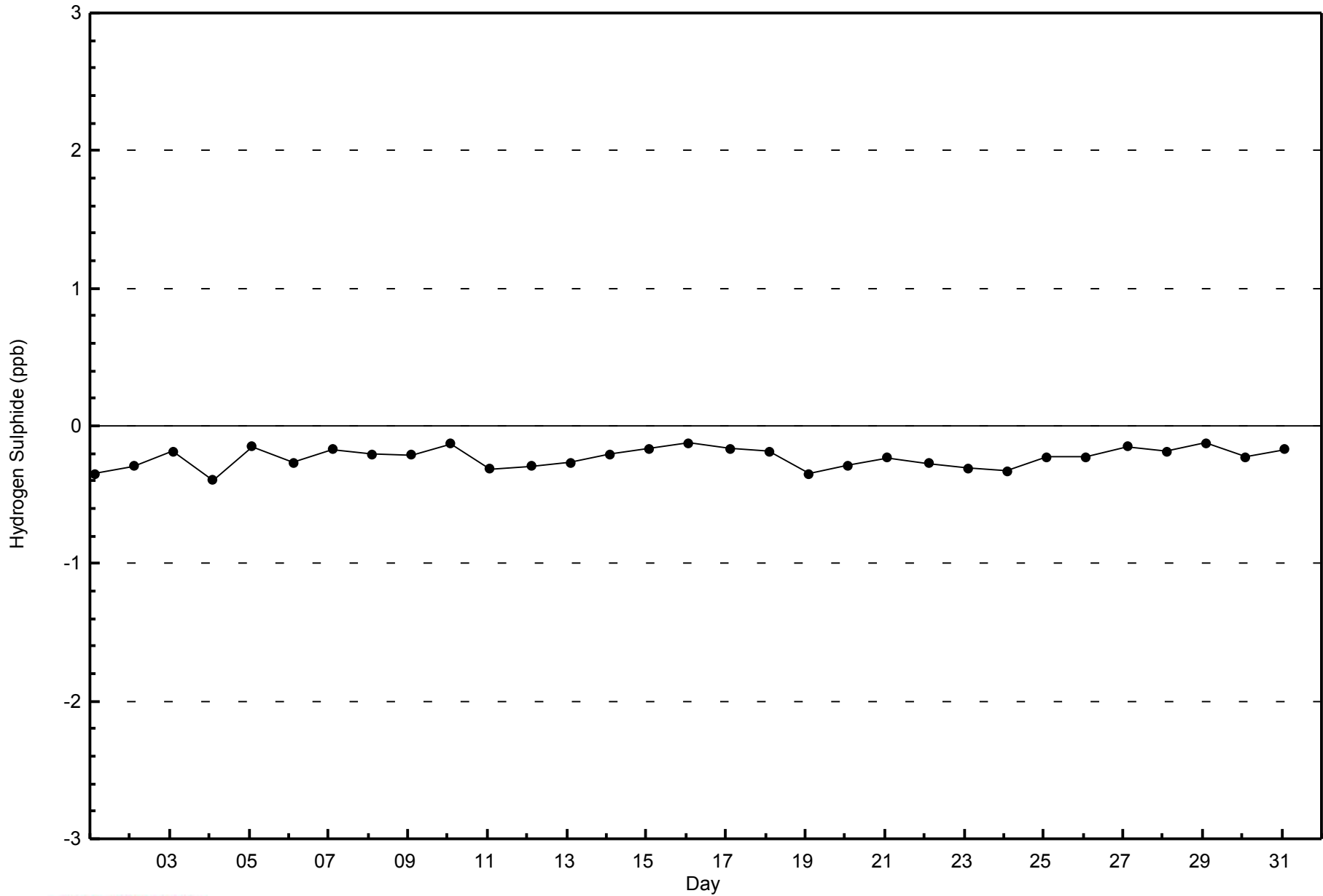
**Total Number of Valid Hours: 708**





WBEA  
Zero Responses

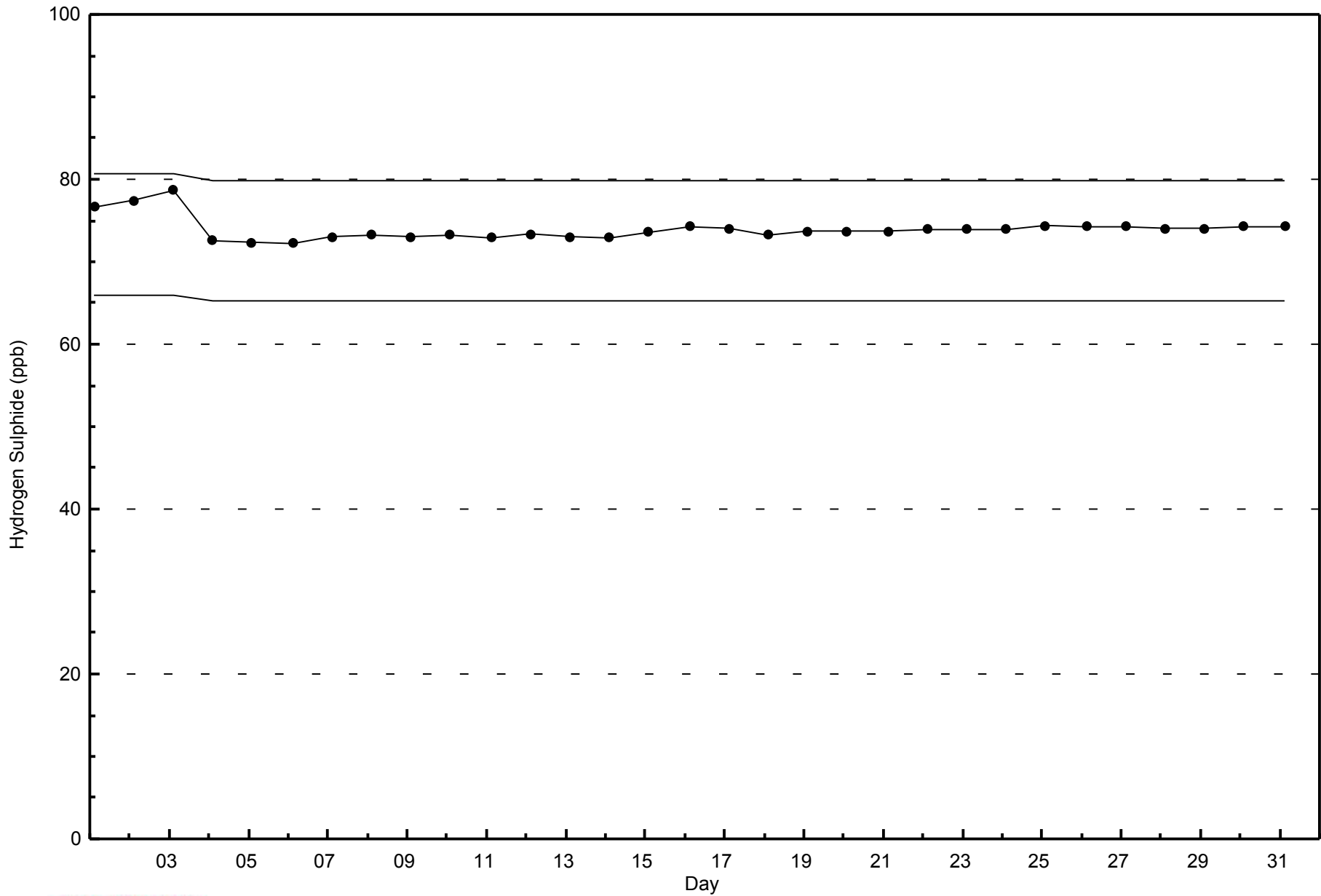
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Buffalo Viewpoint - October 2014





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Buffalo Viewpoint - October 2014





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

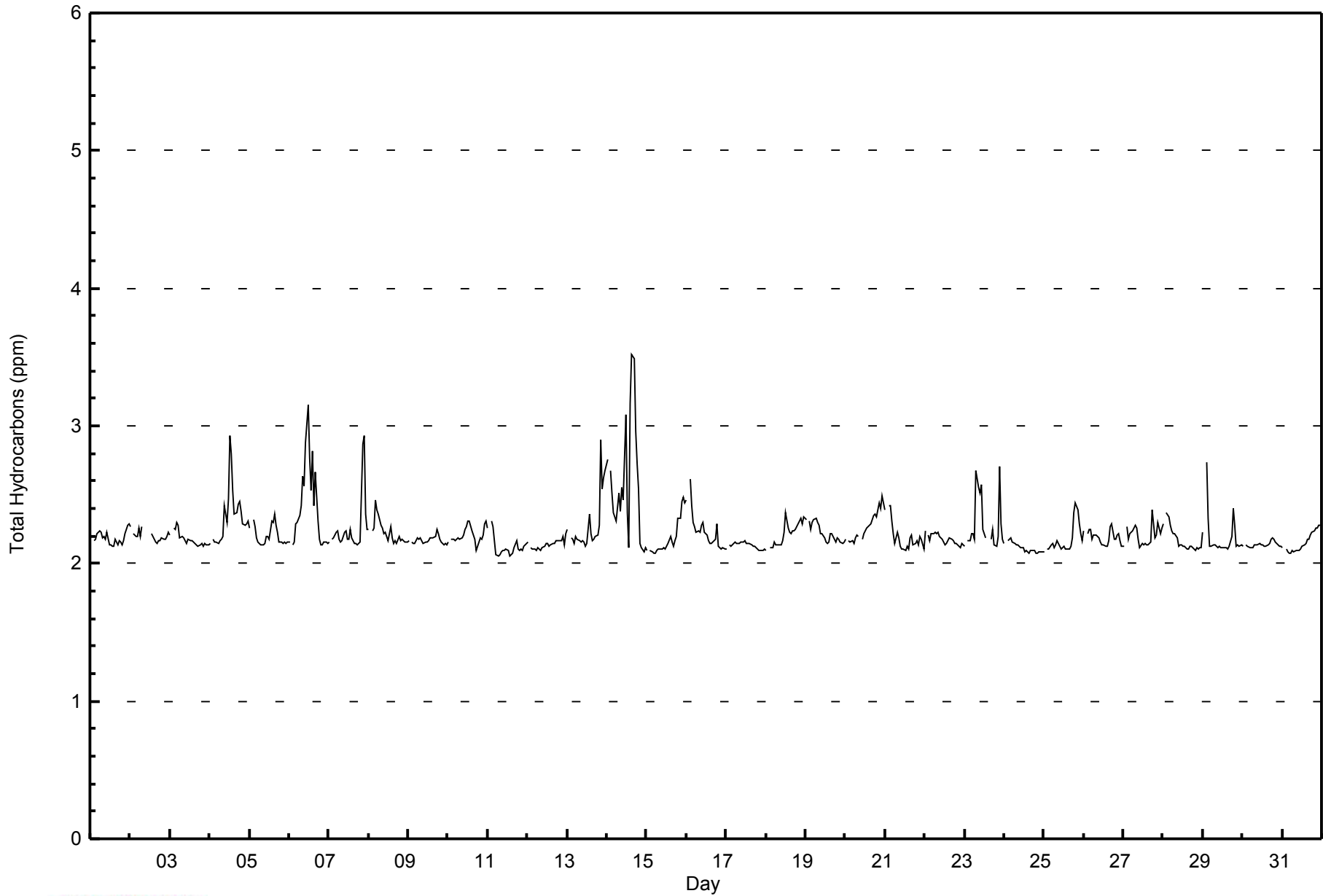
**Total Hydrocarbons (THC) - ppm**  
**Buffalo Viewpoint - October 2014**

Maximum Value: 3.5 ppm on Oct 14 16:00		Maximum Daily Average: 2.6 ppm on Oct 14		Hours in Service: 744																							
Minimum Value: 2.1 ppm on Oct 11 14:00		Minimum Daily Average: 2.1 ppm on Oct 24		Hours of Data: 705																							
Maximum Diurnal Average: 2.2 ppm at hour 3		Minimum Diurnal Average: 2.2 ppm at hour 7		Hours of Missing Data: 39																							
Monthly Average: 2.22 ppm		Percentiles: P <sub>1</sub> = 2.1 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.1 Median = 2.2 Q <sub>3</sub> = 2.2 P <sub>90</sub> = 2.4 P <sub>99</sub> = 2.9		Hours of Calibration: 38																							
				Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	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	2.1	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.3	2.3	2.2	2.3	
2-Oct	2.3	Z	2.2	2.2	2.2	2.3	2.2	2.3	C	C	C	C	C	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	
3-Oct	2.2	Z	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	
4-Oct	2.1	Z	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.4	2.3	2.5	2.9	2.8	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.9	
5-Oct	2.3	Z	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.4	
6-Oct	2.2	Z	2.1	2.2	2.3	2.3	2.4	2.4	2.6	2.6	2.9	3.1	2.8	2.5	2.8	2.4	2.7	2.3	2.2	2.1	2.1	2.2	2.2	2.1	2.4	3.1	
7-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.9	2.9	2.4	2.3	2.3	2.3	2.9	
8-Oct	2.2	Z	2.2	2.3	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	
9-Oct	2.2	Z	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	
10-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.2	2.3	
11-Oct	2.3	Z	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
12-Oct	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	
13-Oct	2.2	Z	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.4	2.2	2.2	2.2	2.2	2.2	2.3	2.9	2.5	2.6	2.7	2.3	2.9	
14-Oct	2.8	Z	2.7	2.5	2.4	2.3	2.4	2.5	2.4	2.6	2.5	3.1	2.4	2.1	3.2	3.5	3.5	3.0	2.7	2.5	2.1	2.1	2.1	2.1	2.1	3.5	
15-Oct	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.3	2.3	2.5	2.5	2.4	2.2	2.5	
16-Oct	2.5	Z	2.6	2.4	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.2	2.6	
17-Oct	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
18-Oct	2.1	Z	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.4	
19-Oct	2.3	Z	2.3	2.2	2.3	2.3	2.3	2.3	2.3	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	2.3	
20-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	M	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.5	2.4	2.3	2.5	
21-Oct	2.4	Z	2.4	2.4	2.3	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.2	2.4	
22-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	
23-Oct	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.7	2.6	2.5	2.6	2.2	2.2	2.2	C	C	2.2	2.3	2.1	2.1	2.2	2.7	2.3	2.2	2.3	2.7	
24-Oct	2.1	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
25-Oct	2.1	Z	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	2.2	2.4	2.4	2.4	2.3	2.2	2.2	2.4	
26-Oct	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	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.3	
27-Oct	2.1	Z	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.3	2.2	2.2	2.3	2.2	2.3	2.2	2.4	
28-Oct	2.3	Z	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	
29-Oct	2.2	Z	2.7	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.3	2.1	2.1	2.1	2.1	2.2	2.7	
30-Oct	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	
31-Oct	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	
		2.2	--	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	Diurnal Average
		2.8	--	2.7	2.5	2.5	2.4	2.4	2.7	2.6	2.6	2.9	3.1	2.9	2.8	3.2	3.5	3.5	3.0	2.7	2.5	2.9	2.9	2.6	2.7	2.2	Diurnal Maximum
Z - zerospan		C - Calibration				M - Maintenance																					



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Buffalo Viewpoint - October 2014**





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

**Total Hydrocarbons (THC) - ppm**  
**Buffalo Viewpoint - October 2014**

<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	700	99.29	99.29
3.1 - 10.0	5	0.71	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Buffalo Viewpoint - October 2014**

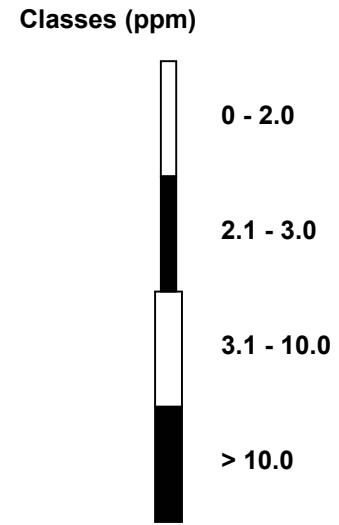
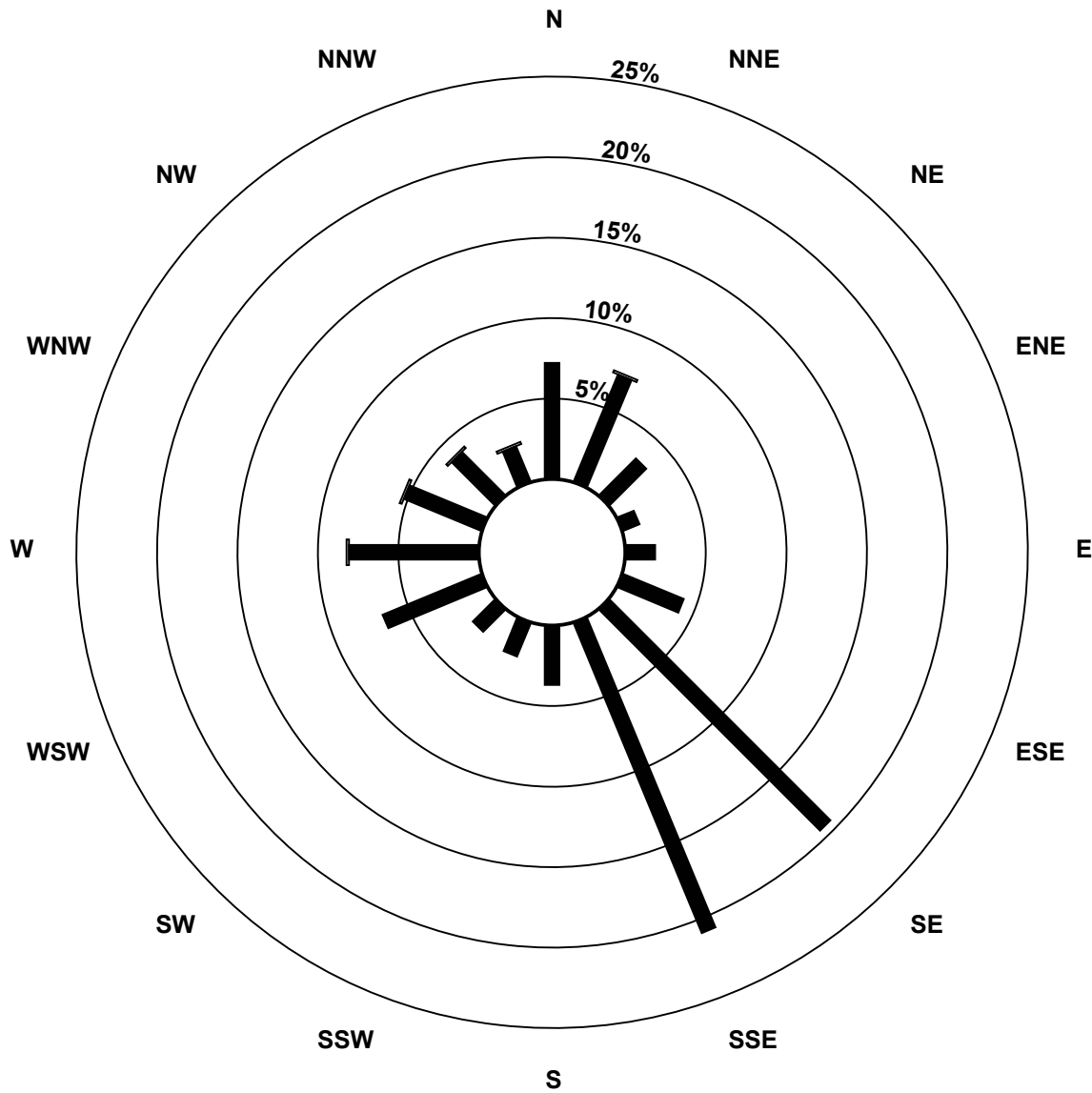
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	51	51	23	8	13	29	137	147	26	16	14	47	57	37	27	17	700
3.1 - 10.0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	5
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	51	52	23	8	13	29	137	147	26	16	14	47	58	38	28	18	705

Total Number of Valid Hours: 705

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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

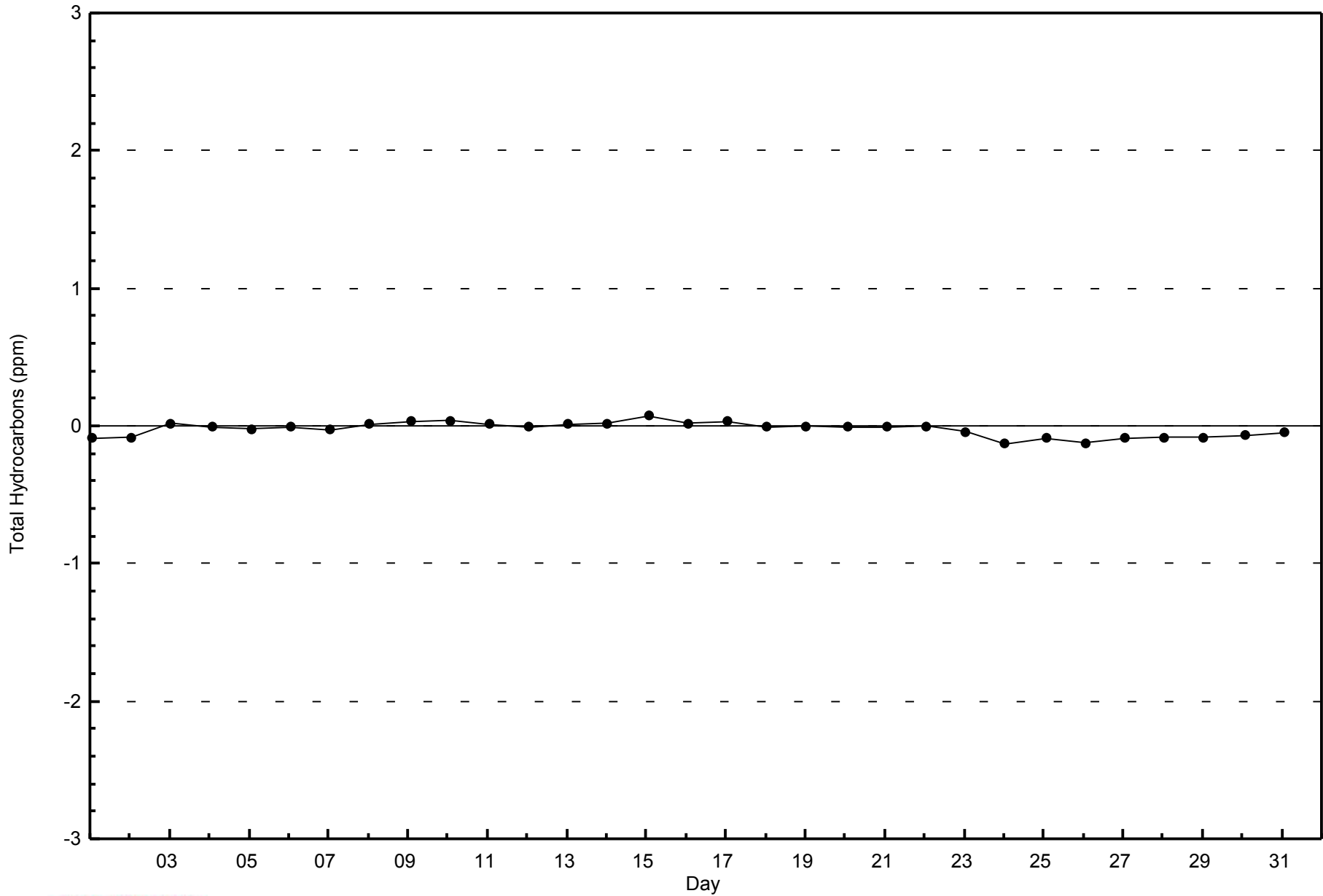


**Total Number of Valid Hours: 705**



WBEA  
Zero Responses

Total Hydrocarbons (THC) - ppm  
Buffalo Viewpoint - October 2014

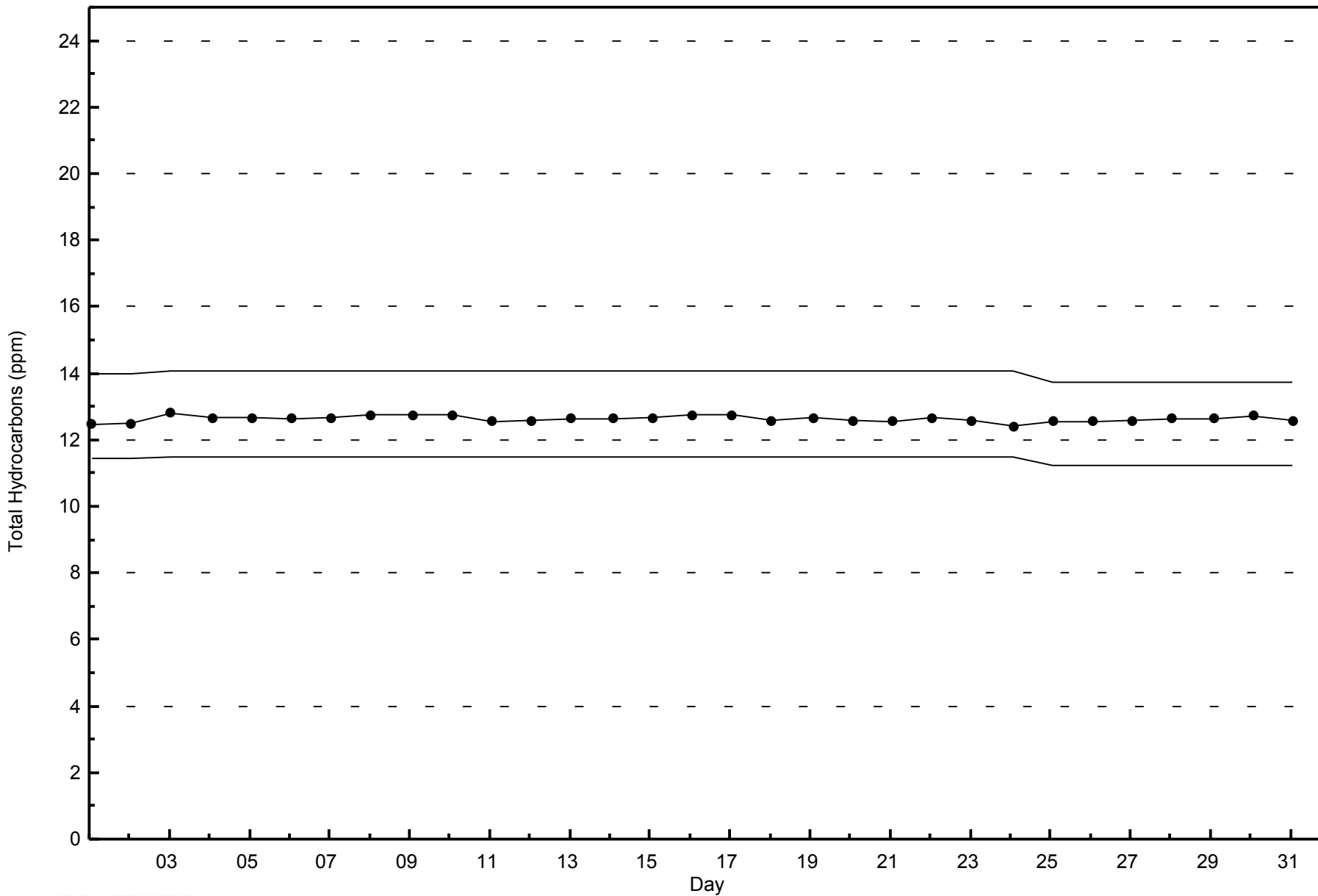






**WBEA**  
**Span Responses**

**Total Hydrocarbons (THC) - ppm**  
**Buffalo Viewpoint - October 2014**



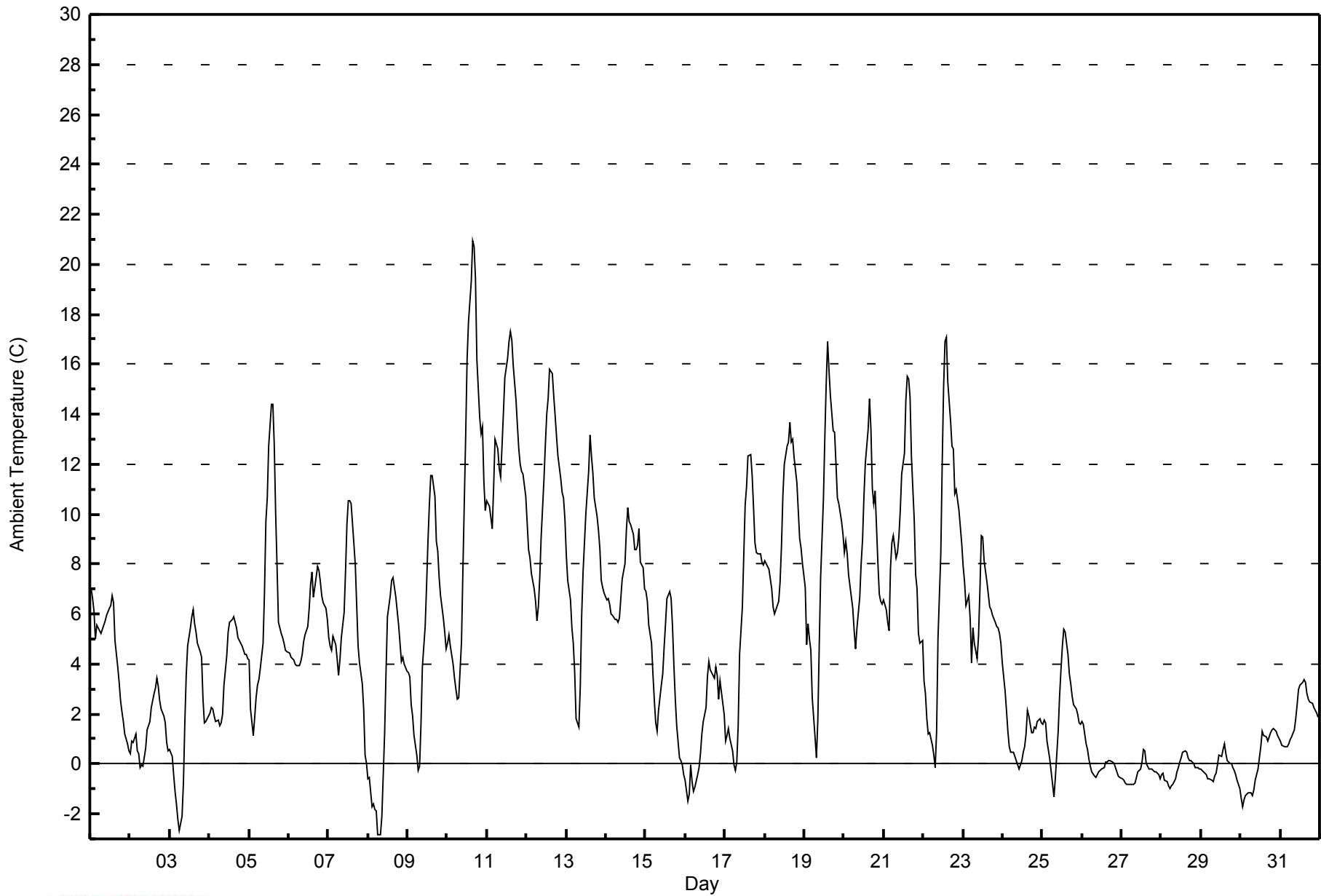


Maximum Value: 21.0 C on Oct 10 16:00		Maximum Daily Average: 13.0 C on Oct 11		Hours in Service: 744																																												
Minimum Value: -2.9 C on Oct 8 08:00		Minimum Daily Average: -0.4 C on Oct 27		Hours of Data: 744																																												
Maximum Diurnal Average: 8.6 C at hour 15		Minimum Diurnal Average: 2.0 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 4.94 C		Percentiles: P <sub>1</sub> = -1.9 P <sub>10</sub> = -0.3 Q <sub>1</sub> = 0.9 Median = 4.4 Q <sub>3</sub> = 7.9 P <sub>90</sub> = 12.0 P <sub>99</sub> = 16.9		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-Oct	7.0	6.6	6.1	5.0	5.6	5.3	5.2	5.4	5.6	5.8	5.9	6.2	6.3	6.7	6.4	5.0	3.9	3.3	2.5	2.1	1.7	1.2	0.8	0.5	4.6	7.0																						
2-Oct	0.4	0.9	0.9	1.2	0.5	0.4	-0.1	0.0	-0.1	0.7	1.4	1.5	1.7	2.2	2.8	3.1	3.5	3.1	2.5	2.2	1.9	1.6	0.9	0.5	1.4	3.5																						
3-Oct	0.6	0.3	-0.4	-1.1	-1.6	-2.2	-2.7	-2.1	-0.7	1.6	3.6	4.7	5.4	5.9	6.2	5.6	5.3	4.9	4.5	4.2	2.6	1.7	1.7	1.9	2.1	6.2																						
4-Oct	2.0	2.2	2.2	1.9	1.7	1.7	1.5	1.6	2.0	3.2	4.3	5.3	5.7	5.7	5.8	5.9	5.5	5.1	4.9	4.8	4.7	4.4	4.4	4.2	3.8	5.9																						
5-Oct	4.2	2.2	1.1	1.8	2.6	3.1	3.4	3.8	4.8	6.9	9.7	10.6	12.7	14.4	14.4	12.8	10.0	7.9	5.7	5.2	5.1	4.8	4.6	4.5	6.5	14.4																						
6-Oct	4.4	4.3	4.2	4.2	4.0	3.9	3.9	4.1	4.4	4.9	5.2	5.5	6.2	7.2	7.7	6.7	7.0	7.9	7.8	7.3	6.7	6.4	6.2	5.8	5.7	7.9																						
7-Oct	5.0	4.7	4.6	5.1	4.8	4.2	3.5	4.2	5.1	6.1	7.7	9.6	10.5	10.5	10.4	8.8	8.0	6.3	4.7	4.1	3.2	2.2	0.3	0.0	5.6	10.5																						
8-Oct	-0.6	-0.5	-1.7	-1.6	-1.8	-1.9	-2.8	-2.9	-2.1	-0.5	1.3	3.7	5.9	6.7	7.3	7.5	7.1	6.7	5.6	4.8	4.1	4.3	4.0	3.7	2.3	7.5																						
9-Oct	3.7	3.5	2.4	1.9	1.2	0.4	-0.3	-0.1	1.6	3.9	5.5	7.1	8.9	10.3	11.5	11.5	10.7	8.9	8.5	7.5	6.7	5.8	5.3	4.6	5.5	11.5																						
10-Oct	4.8	5.1	4.7	4.0	3.4	3.0	2.6	2.7	4.9	7.8	10.5	13.2	16.2	17.7	19.3	21.0	20.7	19.4	16.2	13.9	13.2	13.5	11.3	10.1	10.8	21.0																						
11-Oct	10.5	10.3	9.8	9.4	11.1	13.0	12.6	11.8	11.5	12.7	14.1	15.5	16.3	16.9	17.3	17.0	16.0	14.6	13.6	12.6	12.0	11.7	11.6	10.7	13.0	17.3																						
12-Oct	9.6	8.6	8.2	7.6	7.0	6.5	5.7	6.3	7.5	9.1	11.4	12.8	14.0	14.6	15.8	15.6	14.7	13.9	13.1	12.3	11.4	10.9	10.6	9.8	10.7	15.8																						
13-Oct	8.3	7.4	6.6	5.4	4.8	3.6	1.8	1.5	3.1	5.9	7.7	8.9	10.0	11.7	13.2	12.3	11.7	10.6	9.9	9.3	8.6	7.4	7.0	6.9	7.7	13.2																						
14-Oct	6.6	6.6	6.4	6.0	6.0	5.8	5.8	5.7	5.8	6.6	7.4	8.0	9.4	10.3	9.7	9.6	9.2	8.6	8.6	8.8	9.4	8.1	7.9	7.0	7.6	10.3																						
15-Oct	6.9	6.5	5.6	4.8	3.6	2.5	1.7	1.3	2.2	3.1	3.6	4.7	5.6	6.6	6.9	6.6	5.5	3.9	2.6	1.6	0.2	0.1	0.0	-0.4	3.6	6.9																						
16-Oct	-0.7	-1.5	-1.2	0.0	-0.7	-1.1	-0.9	-0.5	-0.2	0.4	1.2	1.7	2.3	3.5	4.1	3.8	3.6	3.4	3.9	3.5	2.6	3.3	2.9	2.0	1.5	4.1																						
17-Oct	0.9	1.1	1.4	1.0	0.5	0.0	-0.2	0.1	1.6	4.4	6.3	8.4	10.3	11.1	12.4	12.4	11.5	10.2	8.9	8.5	8.4	8.4	8.1	7.9	6.0	12.4																						
18-Oct	8.1	8.0	7.8	7.4	7.0	6.3	6.0	6.2	6.5	7.3	8.7	10.7	12.0	12.7	12.9	13.6	12.9	13.0	12.3	11.2	10.1	9.0	8.6	8.0	9.4	13.6																						
19-Oct	7.1	4.8	5.6	5.0	4.5	2.6	1.1	0.2	1.8	4.7	7.4	10.6	13.0	15.2	16.9	15.7	14.8	13.3	13.3	12.0	10.7	10.4	9.7	9.2	8.7	16.9																						
20-Oct	8.5	8.9	8.4	7.6	6.7	6.2	5.3	4.6	5.4	6.7	8.0	8.9	10.7	12.1	13.4	14.6	13.4	11.0	10.4	10.9	8.0	6.8	6.5	6.4	8.7	14.6																						
21-Oct	6.6	6.2	5.7	5.3	7.9	8.8	9.2	8.3	8.5	9.1	10.2	11.6	12.4	14.6	15.5	15.4	14.7	12.3	9.8	7.5	7.0	5.2	4.8	4.9	9.2	15.5																						
22-Oct	3.3	2.8	1.8	1.2	1.3	0.7	0.4	-0.2	1.3	5.1	8.4	12.0	15.1	16.9	17.1	15.3	13.7	12.7	12.6	10.8	11.0	10.2	9.5	8.8	8.0	17.1																						
23-Oct	7.9	7.3	6.4	6.8	5.8	4.0	5.5	4.8	4.2	5.1	7.0	9.2	9.1	8.1	7.3	6.8	6.3	6.2	6.0	5.7	5.5	5.5	5.2	4.8	6.3	9.2																						
24-Oct	4.0	2.9	2.1	1.3	0.7	0.5	0.5	0.3	0.1	0.0	-0.2	0.2	0.5	0.7	1.2	2.2	1.9	1.3	1.2	1.4	1.4	1.7	1.8	1.7	1.2	4.0																						
25-Oct	1.6	1.7	1.7	0.9	0.2	-0.3	-0.8	-1.3	-0.5	1.3	2.7	3.8	4.7	5.4	5.3	4.4	3.6	3.2	2.7	2.4	2.2	2.0	1.6	1.6	2.1	5.4																						
26-Oct	1.7	1.6	0.8	0.6	0.2	-0.1	-0.3	-0.5	-0.6	-0.4	-0.3	-0.2	-0.2	-0.1	0.1	0.1	0.1	0.1	0.1	0.0	-0.1	-0.3	-0.5	-0.5	0.0	1.7																						
27-Oct	-0.6	-0.7	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.6	-0.3	-0.2	0.1	0.6	0.5	0.0	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.4	-0.6	-0.4	0.6																						
28-Oct	-0.4	-0.4	-0.6	-0.7	-0.9	-1.0	-0.9	-0.8	-0.6	-0.3	-0.1	0.1	0.2	0.5	0.5	0.5	0.2	0.1	0.1	0.0	-0.1	-0.1	-0.2	-0.2	-0.2	0.5																						
29-Oct	-0.2	-0.3	-0.4	-0.4	-0.6	-0.6	-0.7	-0.7	-0.5	-0.3	-0.1	0.3	0.3	0.6	0.8	0.4	0.2	0.0	0.0	-0.1	-0.2	-0.4	-0.6	-1.0	-0.2	0.8																						
30-Oct	-1.4	-1.7	-1.4	-1.3	-1.2	-1.1	-1.2	-1.3	-1.0	-0.6	-0.2	0.3	0.7	1.3	1.2	1.1	0.9	1.1	1.2	1.4	1.4	1.3	1.1	1.0	0.1	1.4																						
31-Oct	0.9	0.7	0.7	0.7	0.7	0.8	0.9	1.1	1.4	1.8	2.3	3.0	3.1	3.3	3.3	3.3	2.8	2.6	2.5	2.4	2.2	2.2	2.0	1.9	1.9	3.3																						
																								3.9	3.6	3.2	2.9	2.7	2.4	2.1	2.0	2.6	3.9	5.2	6.4	7.4	8.2	8.6	8.3	7.7	7.0	6.3	5.8	5.2	4.8	4.4	4.1	Diurnal Average
																								10.5	10.3	9.8	9.4	11.1	13.0	12.6	11.8	11.5	12.7	14.1	15.5	16.3	17.7	19.3	21.0	20.7	19.4	16.2	13.9	13.2	13.5	11.6	10.7	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Buffalo Viewpoint - October 2014**





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

**Ambient Temperature (AT) - C**  
**Buffalo Viewpoint - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	117	15.73	15.73
0 - 10	504	67.74	83.47
10 - 20	121	16.26	99.73
> 20	2	0.27	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 34 km/h on Oct 2 11:00	Maximum Daily Speed Average: 23.0 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 6 09:00	Minimum Daily Speed Average: 0.8 km/h on Oct 4	Hours of Data: 744
Maximum Diurnal Speed Average: 2.7 km/h at hour 7	Minimum Diurnal Speed Average: 0.3 km/h at hour 13	Hours of Missing Data: 0
Monthly Average Velocity: 1.2 km/h 209.0 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 10 Q <sub>3</sub> = 15 P <sub>90</sub> = 19 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-Oct	NNE10	NNE9	NNE7	N8	NNE7	NE5	ENE3	NE7	E6	E6	E5	NE7	NNE6	N10	N16	N24	NNE22	N29	N28	N32	N32	NNW30	NNW23	NW18	N12.9	N32		
2-Oct	NW16	WNW19	NW23	NW21	NNW21	NW19	NW22	NW22	NW20	NW24	NW34	NW28	NW28	NW29	WNW27	NW26	NW28	WNW26	WNW22	WNW22	WNW23	NW22	NW19	NW20	NW23.0	NW34		
3-Oct	NW17	NW16	WNW13	W12	W13	W9	SW7	SW7	SW7	SSE7	SE7	ESE9	SE11	SE11	SSE11	SSE13	SE12	SE11	SSE13	SSE14	SSE11	SE10	SE14	SE15	S5.4	NW17		
4-Oct	SSE13	SSE12	SSE11	SSE8	S5	SSW5	S4	SSE4	SSE4	WSW4	WNW5	N5	N5	NNW3	NNW2	N8	N8	N9	NNW9	WSW2	SW6	SW5	S5	S0.8	SSE13			
5-Oct	SSW4	SE8	S7	S7	SSE7	SE7	S6	SW8	SW9	SSW7	WSW8	WSW10	W10	NE10	N18	NNE18	NNE13	NNE17	N18	NNE15	N14	NNE9	ENE6	NNE7	NNE2.9	N18		
6-Oct	E4	ENE5	NE4	SE2	SE4	SE3	E3	NE3	SSW1	NNE3	NNE4	NNW8	NW12	NW12	N11	N14	NW9	WNW20	WNW21	WNW20	WNW20	W15	W16	WSW16	NW6.2	WNW21		
7-Oct	WNW15	WNW19	WNW20	WNW21	WNW22	WNW20	WNW21	WNW22	NW18	NNW19	NW14	NW14	NW16	NNW15	N15	NE15	NNE12	NE11	NE7	ENE5	ESE7	ESE9	SSE9	SSE9	NW9.6	WNW22		
8-Oct	SSE7	SE3	SSE3	E3	NNW3	S3	SSE5	S5	SE6	SSE6	SE5	SE4	ESE9	ESE10	SE8	SE7	SE5	SE3	SE6	S6	ESE5	ESE8	SE9	SE8	SE5.1	ESE10		
9-Oct	SE8	SE9	SE7	SSE4	SE4	SE6	SSE6	SSE8	SSE9	SSE10	SE9	ESE9	ESE9	ESE8	SE9	SSE8	SE8	SE8	SE10	SE12	SE13	SSE13	SSE13	SE11	SE8.6	SE13		
10-Oct	SE10	SSE10	SSE7	SSE8	SSE9	SSE11	SSE10	SSE9	SSE11	SSE12	SSE13	SSE13	SSE15	SSE16	SSE15	SSE11	SSE9	S11	SSE9	SSE12	SSE14	SSE13	SE10	SE11	SSE11.0	SSE16		
11-Oct	SE8	SE9	SE10	SSE9	SSW10	WSW15	WSW19	WSW21	WSW21	WSW22	W19	W18	W19	WNW19	W19	WSW22	W21	WSW13	WSW12	WSW14	WSW19	WSW19	WSW21	W18	WSW14.1	WSW22		
12-Oct	WSW18	WSW22	W22	W15	W14	WSW12	SW7	W10	WSW7	WSW9	W10	WNW12	WNW12	W12	W12	WSW14	WSW13	W17	W15	W14	W11	W7	W10	W11	W12.4	WSW22		
13-Oct	WNW4	NW6	WSW8	SSW8	SSW6	SSW6	S8	SE7	SE6	S3	SW3	S2	NNE4	NE7	ESE5	SE8	SSE9	SE8	SE7	SE4	NNE6	NNE9	NNE8	NNE8	SE1.8	NNE9		
14-Oct	NNE8	NNE9	NNE10	NNE8	NNE9	N10	N10	NNE10	NNE11	NNE8	NNW6	NNE7	ENE6	SE7	W3	WNW6	NW6	NW5	S2	SW8	WSW18	WSW16	W15	WNW13	NNW4.2	WSW18		
15-Oct	W14	W17	WNW14	W10	SW10	SW10	WSW13	WSW15	W15	W14	W12	WNW10	WNW6	NNW9	NNW13	NW16	NNW16	NW18	NW19	NNW17	N10	NNW5	N4	N3	WNW9.5	NW19		
16-Oct	W1	SE3	SSW4	E2	S5	SSE4	S3	ESE2	S3	SE4	SE7	S6	SSE8	SSE7	SE7	ESE5	ENE3	ESE5	SE10	SE10	SE11	SSE13	SE14	SSE11	SE5.7	SE14		
17-Oct	SSE11	SSE11	SSE13	SSE12	SSE12	SSE13	SSE13	SSE11	SE10	SE13	SE15	SSE16	SSE17	SE21	SE25	SE25	SE22	SE21	SE21	SSE19	SE20	SE20	SE20	SE18	SSE16.5	SE25		
18-Oct	SE17	SE17	SSE15	SSE12	SSE6	SE7	S8	SSE8	SSE8	SSE6	SSW4	S4	N4	SSE3	S5	WSW7	WSW7	SW7	WSW10	WSW10	W8	W10	W10	W10	S5.3	SE17		
19-Oct	WSW5	SSW7	W6	W7	WSW4	ESE5	SSE6	SSE9	SSE8	SE8	SSE3	SE7	SE12	ESE11	SE13	SE11	SE11	SE12	SE17	SE17	SE12	SE14	SE11	SE7	SE7.4	SE17		
20-Oct	SE9	SE11	SE11	SE10	SSE11	SSE10	SSE7	SSE8	S9	SSE11	SSE11	SSE10	SSE10	SE9	SSE10	SE8	SE10	SE8	SE2	SE3	SE6	SSE8	SSE10	SSE11	SSE8.8	SSE11		
21-Oct	SSE9	SSE9	SSE9	SSW6	W10	WSW12	W13	W13	WSW18	WSW15	WSW12	WSW15	WSW12	WSW10	WSW12	WSW10	WSW12	WSW10	SW6	S7	SSE9	SE10	SSE9	SE10	SSE10	SSE7	SW7.1	WSW18
22-Oct	SE8	SSE7	SSE9	SSE11	SE12	SSE9	SSE6	SSE8	SSE10	SSE9	SE7	SE8	SE10	SE13	SE13	SE13	SE15	SE14	SE14	SSE10	SE13	SE12	SSE12	SSE12	SE10.4	SE15		
23-Oct	SSE10	SE5	SSE3	ESE2	SE6	SSE5	E4	NNE7	NE9	NE6	ENE2	ESE12	ESE13	ESE14	ESE10	ENE8	NE7	NE8	NNE9	N9	NNW8	NW13	WNW18	NW21	NE2.7	NW21		
24-Oct	WNW22	WNW23	WNW20	WNW17	WNW13	W15	W16	WNW16	WNW16	WNW17	WNW17	WNW16	W19	W20	W20	W17	W13	W16	WSW16	W16	W16	W15	W15	W17.0	WNW23			
25-Oct	W16	W18	W17	W14	W10	WSW8	SSW9	S6	SSW5	SSW6	SSW5	SSW7	SSE7	S8	S8	S5	ESE5	ESE5	ESE5	E4	E3	ESE6	ESE5	ESE4	SW4.1	W18		
26-Oct	E6	NE6	NE8	NE8	N13	NNE13	NNE15	NNE13	NNE13	N15	NNE13	NNE16	N19	NNE19	N20	N23	N22	N20	N20	N21	N23	N21	NNE20	N19	NNE15.8	N23		
27-Oct	N18	N17	N17	N17	N15	N16	N16	N14	N13	NNE14	NNE12	NNE12	NNE12	NNE10	N9	N9	NNW7	NNW4	N7	N7	NNE5	NE5	SE2	N11.1	N18			
28-Oct	SSW3	S4	SSE4	SSE4	SSE5	SSE6	SSE7	SSE7	SSE8	SSE10	SSE8	SSE8	SE9	SE7	SE7	SE7	SE8	SE9	SE8	SE8	SE7	SE8	SE7	ESE2	SSE6.5	SSE10		
29-Oct	E6	E5	ENE4	NE7	NE8	NE8	NNE9	NNE9	NNE8	NNE10	NE9	NE8	NE10	NNE10	NNE9	NNE8	NE7	ENE6	E7	ESE8	SE10	SE9	SE11	SSE10	ENE5.9	SE11		
30-Oct	SE11	SSE12	SSE13	SSE15	SSE16	SSE15	SSE15	SSE14	SE14	SSE14	SSE13	SE14	SSE15	SSE16	SSE16	SSE14	SE13	SE13	SE15	SE17	SE17	SE17	SE17	SSE16	SSE14.5	SE17		
31-Oct	SE14	SE14	SE15	SE14	SE14	SE15	SE12	SE11	SE11	SSE12	SSE12	SSE10	SSE9	SSE9	SSE8	SSE8	S7	SSE8	SSE7	SSE9	SSE8	SSE6	SSE6	SSE6	SSE10.1	SE15		

SSW1.9	SSW2.1	SW2.2	SW1.9	SW1.9	SSW2.4	SW2.7	SW2.0	SSW2.2	SSW1.7	SSW1.2	SW0.7	S0.3	ESE0.9	ESE0.5	NNE0.5	NNE0.6	N0.9	E0.4	SSW0.6	SSW1.1	S1.7	SSW2.6	SSW2.3	Diurnal Average	
WNW22	WNW23	NW23	WNW21	WNW22	WNW20	NW22	NW22	WSW21	NW24	NW34	NW28	NW28	NW29	WNW27	NW26	NW28	N29	N28	N32	N32	NNW30	NNW23	NW21	Diurnal Maximum	

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

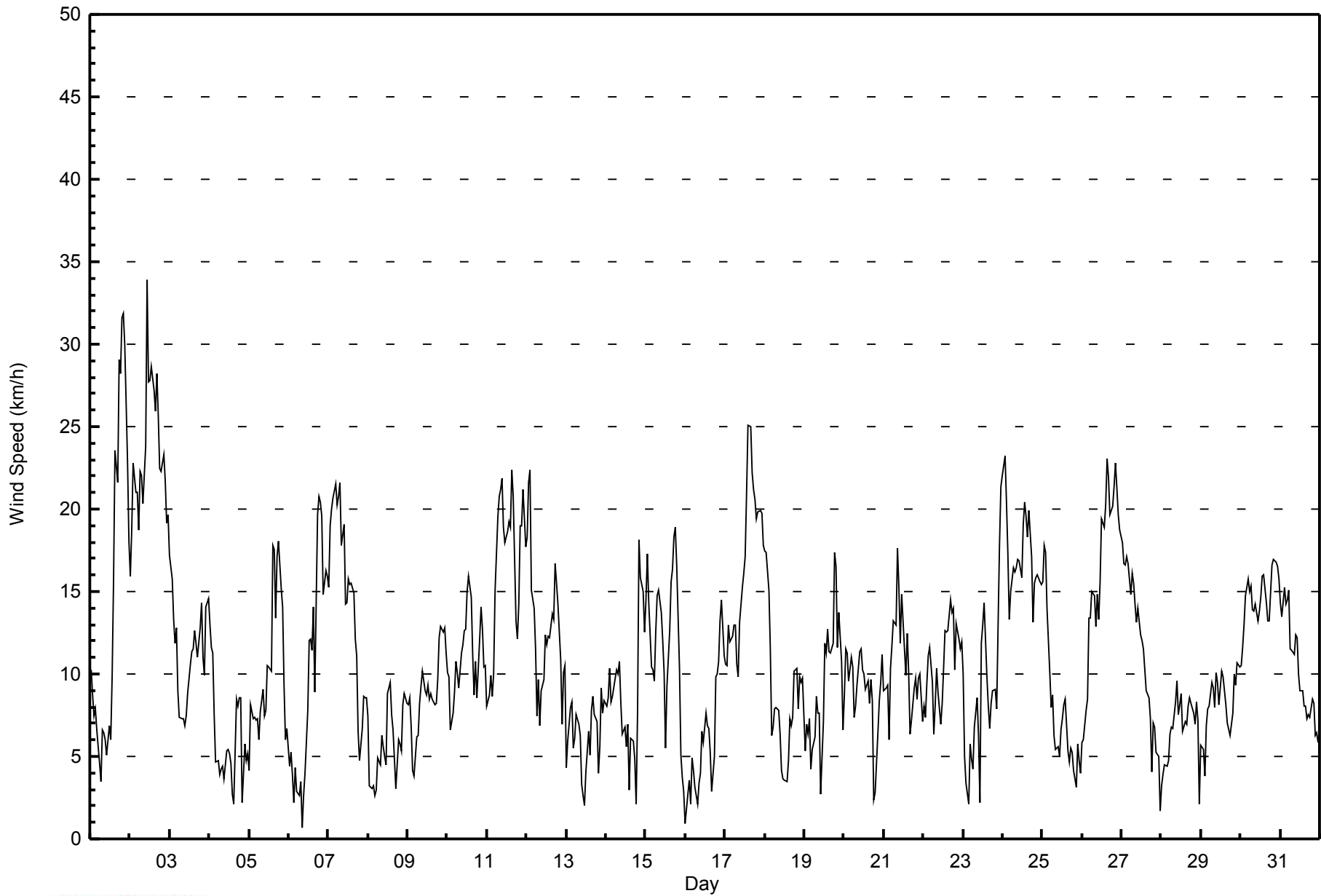
Buffalo Viewpoint - October 2014

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



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Buffalo Viewpoint - October 2014**





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

**Wind Speed (WS) - km/h**  
**Buffalo Viewpoint - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	110	14.78	14.78
6 - 11	335	45.03	59.81
12 - 19	228	30.65	90.46
20 - 28	65	8.74	99.19
29 - 38	6	0.81	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Buffalo Viewpoint - October 2014**

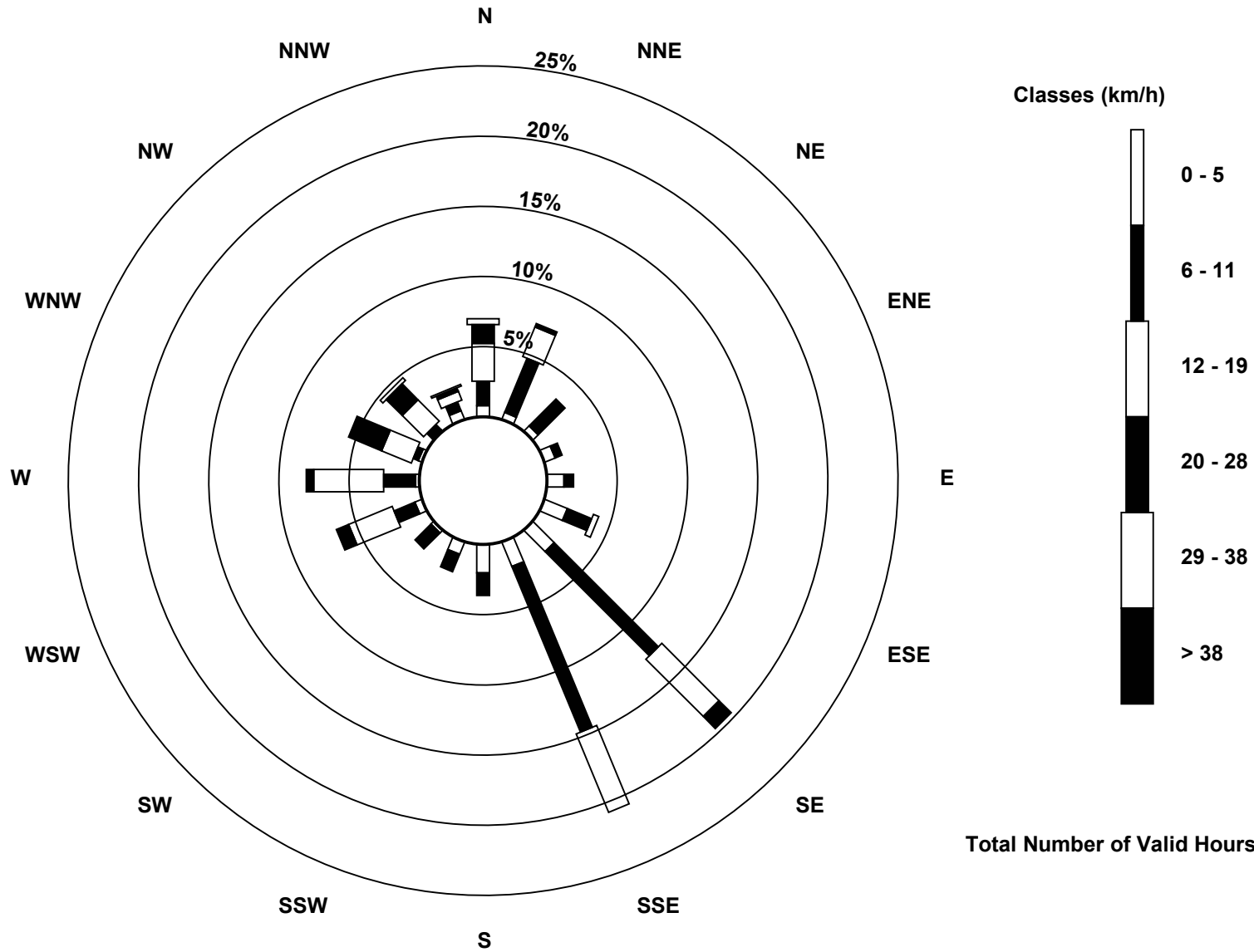
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	4	4	6	9	13	16	14	15	7	2	4	2	2	1	5	110
6 - 11	13	31	20	4	5	14	78	95	12	10	12	12	17	3	4	5	335
12 - 19	20	17	0	0	0	3	43	45	0	0	0	25	37	17	16	5	228
20 - 28	10	2	0	0	0	0	9	0	0	0	0	7	4	19	12	2	65
29 - 38	3	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	6
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	52	54	24	10	14	30	146	154	27	17	14	48	60	41	35	18	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



**Total Number of Valid Hours: 744**



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

**Wind Direction (WD) - deg**  
**Buffalo Viewpoint - October 2014**

Direction of Maximum Speed: 321 deg on Oct 2 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 310.4 deg on Oct 2	Hours of Data: 744
Direction of Minimum Speed: 212 deg on Oct 6 09:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.8 deg on Oct 4	Percent Operational Time: 100.0
Monthly Average Direction: 218.2 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-Oct	24	23	29	9	18	43	72	53	85	95	90	40	22	6	5	6	12	1	356	357	354	344	327	318	3.8
2-Oct	316	302	310	304	329	326	325	319	309	313	321	318	313	315	300	306	305	301	296	300	296	308	309	307	310.4
3-Oct	307	308	290	265	266	259	229	225	215	147	138	117	129	137	156	149	146	146	150	163	164	132	133	141	175.4
4-Oct	149	149	156	167	191	202	171	155	156	247	289	353	0	2	345	338	8	4	5	343	248	232	219	184	179.8
5-Oct	195	136	174	175	154	147	175	224	228	208	251	248	275	34	8	15	30	14	6	16	8	25	58	33	12.6
6-Oct	85	67	55	145	138	134	99	42	212	28	22	340	310	318	353	10	309	303	293	288	284	272	268	257	305.7
7-Oct	286	286	291	302	298	294	290	293	314	331	316	312	320	333	3	34	26	39	41	61	102	122	162	149	317.7
8-Oct	150	126	168	88	339	172	155	180	141	155	139	132	117	110	124	130	136	136	136	182	120	114	143	140	136.1
9-Oct	137	140	137	153	128	144	150	158	159	149	128	122	114	121	137	155	143	126	129	141	146	149	149	145	140.4
10-Oct	145	152	156	158	164	159	163	161	158	157	155	149	151	149	149	153	155	175	162	156	153	156	135	131	153.9
11-Oct	130	146	142	147	211	241	246	250	252	258	269	273	273	284	264	256	259	255	237	243	247	245	254	261	250.1
12-Oct	258	256	259	265	262	245	220	264	244	258	280	292	282	261	277	248	258	275	281	272	264	278	273	263	264.4
13-Oct	297	307	239	207	199	206	175	145	145	189	223	172	23	37	114	144	150	134	130	141	16	27	24	30	140.6
14-Oct	22	23	31	24	19	7	11	20	16	16	348	23	64	132	270	302	304	309	182	229	258	253	259	285	335.9
15-Oct	262	273	300	265	228	222	240	247	264	274	280	299	301	312	329	322	334	326	323	340	4	333	353	8	295.8
16-Oct	264	143	194	92	169	148	182	123	170	142	136	169	158	153	125	109	78	111	124	141	143	148	146	158	144.2
17-Oct	163	160	158	158	157	157	155	156	144	143	141	147	150	138	142	143	143	143	146	148	143	142	142	145	147.0
18-Oct	145	146	147	150	154	146	174	153	159	163	200	188	1	147	185	241	237	224	240	253	266	272	263	266	190.8
19-Oct	257	212	264	272	252	120	167	148	160	131	147	133	124	123	127	124	127	132	136	135	139	142	141	138	143.2
20-Oct	140	141	139	146	148	153	168	161	169	163	160	154	149	130	149	142	138	137	135	134	145	163	155	157	149.8
21-Oct	160	162	161	197	270	253	259	268	255	247	241	255	258	252	255	256	216	188	149	144	147	136	147	158	221.7
22-Oct	129	147	157	154	145	154	164	167	162	155	134	139	135	144	128	126	128	131	146	149	143	143	148	154	144.0
23-Oct	161	143	168	113	143	159	99	31	36	46	69	112	117	122	114	64	43	38	16	9	336	310	303	305	53.5
24-Oct	297	285	287	290	284	274	276	286	284	289	294	284	273	270	270	264	271	277	277	261	256	268	271	277	278.0
25-Oct	262	266	271	278	270	258	213	190	154	200	203	199	168	187	186	190	121	108	115	82	87	115	120	113	217.1
26-Oct	89	53	41	35	10	15	13	16	17	7	17	15	8	15	10	3	359	5	5	2	4	8	12	10	11.6
27-Oct	10	4	2	6	7	5	1	359	5	10	16	18	12	15	13	1	355	334	337	7	9	27	40	133	7.0
28-Oct	200	189	159	167	156	156	166	157	151	155	162	152	141	142	134	134	136	130	139	139	145	145	144	116	148.7
29-Oct	91	83	71	45	34	35	23	31	26	27	35	51	39	18	28	24	48	63	88	117	132	142	146	147	60.2
30-Oct	144	149	148	149	150	152	153	149	146	148	148	143	148	151	155	155	139	140	142	144	145	145	145	147	147.4
31-Oct	144	138	139	142	143	139	142	142	144	149	158	164	168	155	163	165	170	156	163	153	149	156	165	156	150.4

199.3 211.5 222.6 223.0 226.3 205.9 216.6 228.9 212.0 212.7 245.9 229.2 184.2 106.5 112.6 28.1 24.2 5.1 97.2 198.7 201.7 183.2 191.6 202.0  
 Diurnal Average

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



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

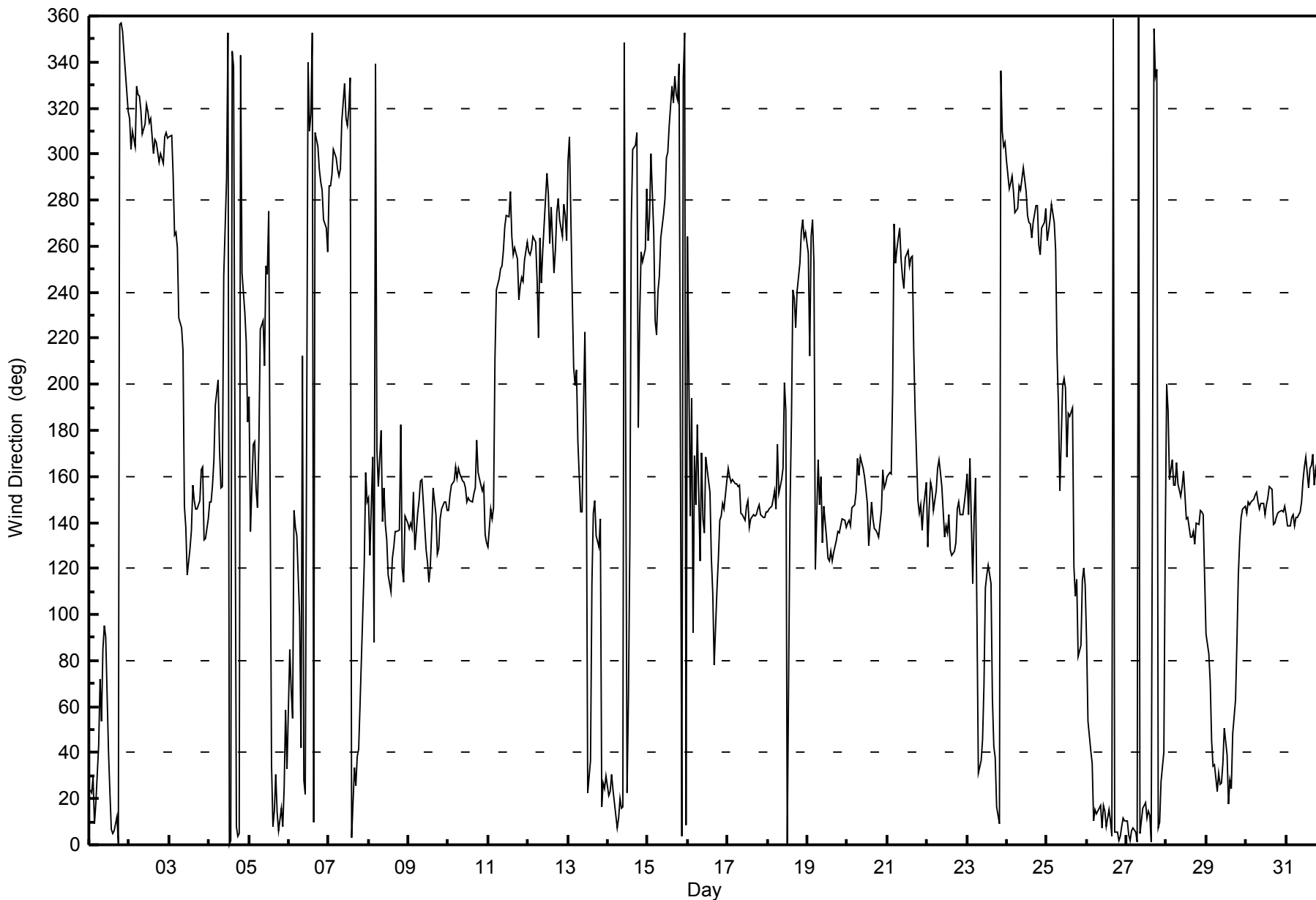
**Wind Direction (WD) - deg**  
**Buffalo Viewpoint - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744											
Maximum Value: 86 deg on Oct 19 11:00														Hours of Data: 744											
Minimum Value: 6 deg on Oct 21 20:00														Hours of Missing Data: 0											
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 11 Q <sub>1</sub> = 14 Median = 16 Q <sub>3</sub> = 20 P <sub>90</sub> = 30 P <sub>99</sub> = 73														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-Oct	16	16	20	13	15	35	32	17	26	32	48	20	23	15	12	14	13	11	12	11	11	14	13	15	48
2-Oct	16	14	13	12	13	15	11	13	13	15	13	15	14	14	15	13	13	13	13	14	12	13	11	11	16
3-Oct	12	12	13	11	11	25	16	15	28	25	29	21	24	24	25	18	17	17	17	19	16	17	17	20	29
4-Oct	17	17	16	17	22	18	25	19	13	52	29	30	28	19	33	70	14	11	12	18	57	16	34	26	70
5-Oct	46	7	18	17	19	13	24	35	20	25	31	25	25	22	18	17	16	14	11	15	11	20	21	25	46
6-Oct	19	19	32	41	32	40	49	58	84	80	44	21	15	17	18	14	26	16	14	15	15	17	17	12	84
7-Oct	16	14	15	12	12	13	14	14	16	14	18	16	18	16	25	14	15	14	28	41	18	16	16	7	41
8-Oct	10	34	30	66	53	53	23	17	13	17	20	39	24	23	24	18	17	17	12	23	9	16	20	16	66
9-Oct	15	16	11	18	27	10	15	13	17	21	27	22	23	28	28	19	19	12	14	14	15	15	15	15	28
10-Oct	17	17	15	12	15	15	14	17	17	18	19	20	19	18	18	18	14	15	16	11	11	14	10	10	20
11-Oct	25	17	10	31	37	14	13	12	12	15	17	18	18	17	18	14	13	13	13	13	12	13	12	16	37
12-Oct	12	12	13	17	12	20	24	15	20	18	28	16	20	19	25	16	13	15	15	16	14	23	14	15	28
13-Oct	60	33	18	10	29	19	23	10	13	58	69	74	53	22	44	19	15	10	10	68	12	7	8	9	74
14-Oct	12	10	10	10	10	12	12	13	10	12	15	15	44	19	57	15	13	24	46	42	14	11	15	15	57
15-Oct	17	16	15	22	13	17	14	12	15	19	23	22	50	33	19	14	11	9	10	18	11	27	23	44	50
16-Oct	84	57	30	72	19	15	26	45	20	18	22	29	31	39	32	24	20	35	18	20	15	17	16	16	84
17-Oct	14	16	15	16	15	13	13	15	16	17	18	19	21	18	18	18	17	18	17	16	17	16	16	17	21
18-Oct	16	16	17	17	15	14	15	20	16	20	30	46	62	61	41	21	18	20	13	17	27	14	10	8	62
19-Oct	36	25	21	16	49	29	18	12	14	18	86	31	18	18	17	16	15	13	16	16	14	15	16	19	86
20-Oct	17	17	15	15	16	15	26	13	17	16	19	18	20	17	20	18	14	9	62	39	13	15	8	7	62
21-Oct	13	10	14	40	18	20	20	13	10	13	18	14	14	23	17	13	27	21	8	6	10	6	16	21	40
22-Oct	22	18	16	7	6	18	9	13	13	19	25	22	19	19	18	14	13	16	17	13	14	14	12	14	25
23-Oct	15	18	47	82	15	41	22	19	12	19	75	17	18	18	18	21	15	14	12	11	22	16	11	12	82
24-Oct	14	15	16	14	16	15	16	16	16	15	15	18	16	16	16	16	15	15	16	15	15	15	15	15	18
25-Oct	14	15	15	15	13	15	14	32	22	24	40	29	27	26	22	22	8	9	11	25	27	22	23	22	40
26-Oct	22	16	11	13	12	12	10	11	13	10	12	11	11	12	12	10	10	11	10	11	11	11	11	10	22
27-Oct	11	10	10	10	11	10	10	10	10	10	11	11	11	12	13	15	12	13	25	15	11	22	14	45	45
28-Oct	26	22	20	16	18	17	16	16	14	16	18	18	15	18	16	14	16	15	15	17	14	16	18	61	61
29-Oct	15	18	19	19	13	14	12	11	15	13	13	21	19	14	15	14	17	18	19	17	17	16	16	15	21
30-Oct	16	17	16	17	17	16	17	16	17	18	18	18	17	17	18	18	17	17	17	18	17	18	18	17	18
31-Oct	17	17	16	17	18	17	16	17	17	17	19	22	21	18	21	17	18	15	17	14	13	15	20	14	22
														84 57 47 82 53 53 49 58 84 80 86 74 62 61 57 70 27 35 62 68 57 27 34 61											
														Diurnal Maximum											



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Buffalo Viewpoint - October 2014**



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# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 2, 2014	Previous Calibration	September 4, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	12:05
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.	2586
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)	5000	5000	Lamp voltage	822	827
Calculated slope	0.999312	0.994665	Chamber temp.	45.2	45.1
Calculated intercept	-0.220233	-0.518743	Pressure (mmHg)	690.1	694.0
Analyzer Background	9.6	9.5	Flow (lpm)	0.495	0.498
Analyzer Coefficient	0.896	0.896	Intensity	85	84

Analyzer make TEI 43i Analyzer serial # JC1327300932

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	NA
as found span	5000	58.8	599.8	600.6	0.999
calibrator zero	5000	0.0	0.0	0.4	NA
high point	5000	58.8	599.8	603.1	0.995
second point	5000	29.4	299.9	303.2	0.989
third point	5000	14.7	149.9	150.7	0.995
calibrator zero	5000	0.0	0.0	0.4	NA
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	58.8	599.8	603.3	0.994
Average Correction Factor					0.993

Corrected As found 600.6 Previous response 600.4 % change 0.0%

#### Notes:

No adjustments made.

Calibration Performed By:

Devin Russell



## Wood Buffalo Environmental Association

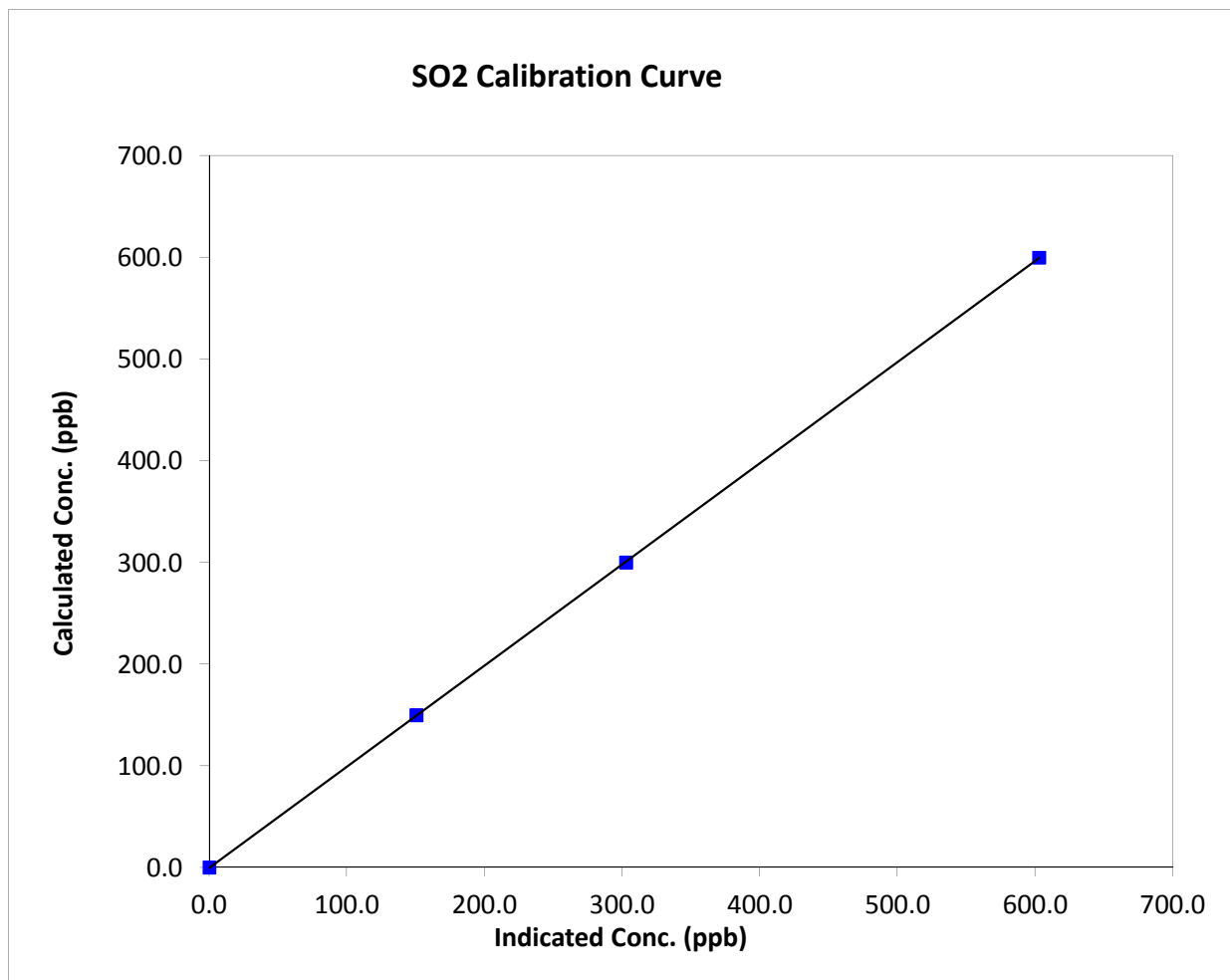
### SO<sub>2</sub> Calibration Summary

#### Station Information

Calibration Date	October 2, 2014	Previous Calibration	September 4, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	8:40	End Time (MST)	12:05
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

#### Calibration Data

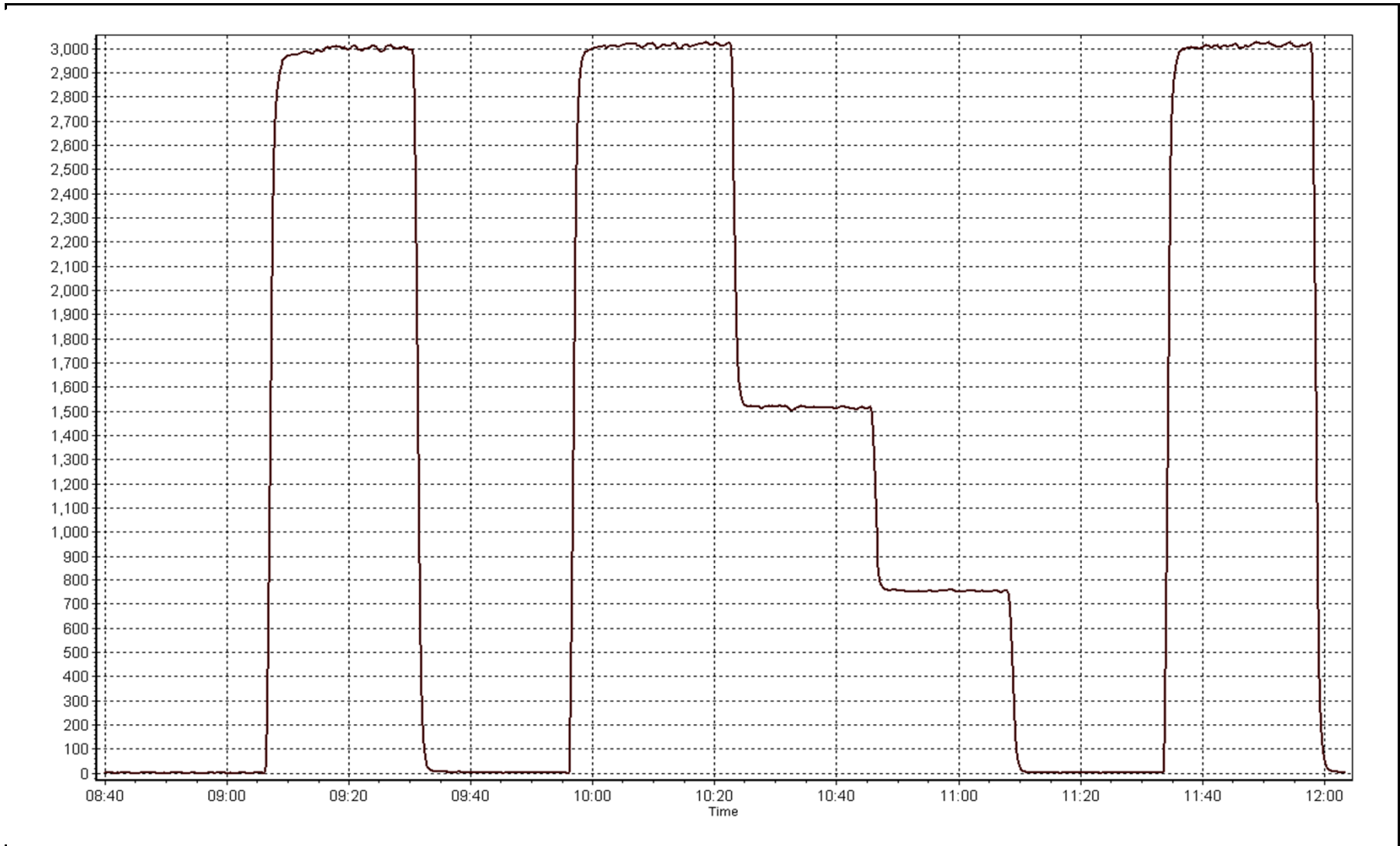
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999991
599.8	603.1	0.9945		
299.9	303.2	0.9892	Slope	0.994665
149.9	150.7	0.9952		
			Intercept	-0.518743





SO2 Calibration Plot

Date: October 2, 2014





# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	October 3, 2014	Previous Calibration	September 4, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	1:40
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.	2586
DACS voltage range	0-5V	DACS channel #	dig

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-616	-616
Analyzer Range (mv)	5000	5000	Lamp voltage	867	868
Calculated slope	0.975240	0.992220	Chamber temp.	45	45
Calculated intercept	-0.055091	0.115595	Pressure	535.8	538.2
Analyzer Background	15.9	14.6	Flow	1.028	1.032
Analyzer Coefficient	0.960	0.896	Intensity	94	94
			Converter temp.	328	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	46.2	75.1	78.8	0.953
SO2 scrubber check	5000	29.4	299.9	2.8	NA
calibrator zero	6000	0.0	0.0	-0.2	NA
high point	6000	46.2	75.1	75.4	0.995
second point	6000	25.9	42.1	42.5	0.990
third point	6000	15.4	25.0	25.2	0.995
calibrator zero	6000	0.0	0.0	-0.2	NA
as left zero	5000	0.0	0.0	-0.3	NA
as left span	6000	46.2	75.1	76.3	0.984
Average Correction Factor					0.994

Corrected As found	79.0	Previous response	77.0	% change	-2.5%
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#### Notes:

Adjusted span.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## H2S Calibration Summary

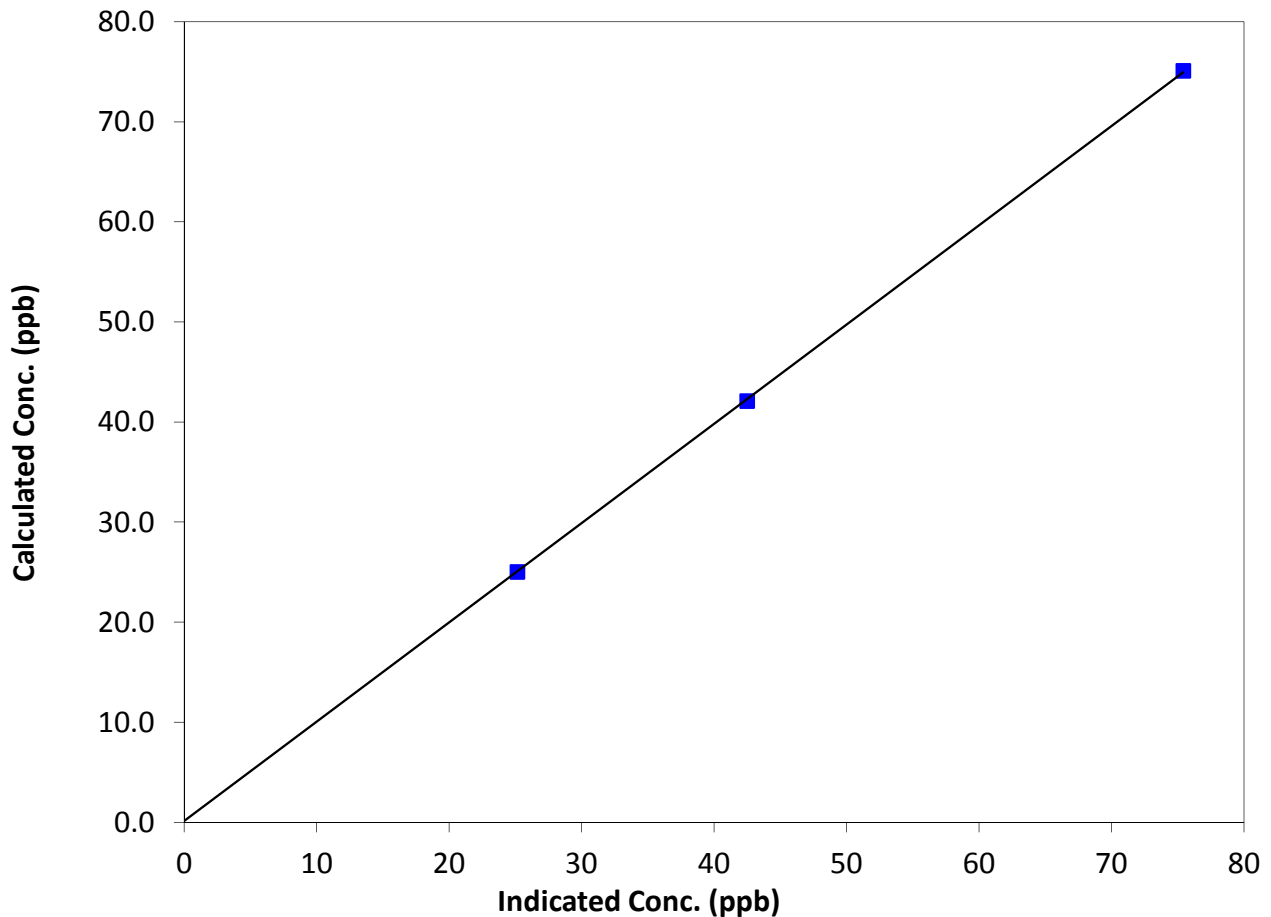
### Station Information

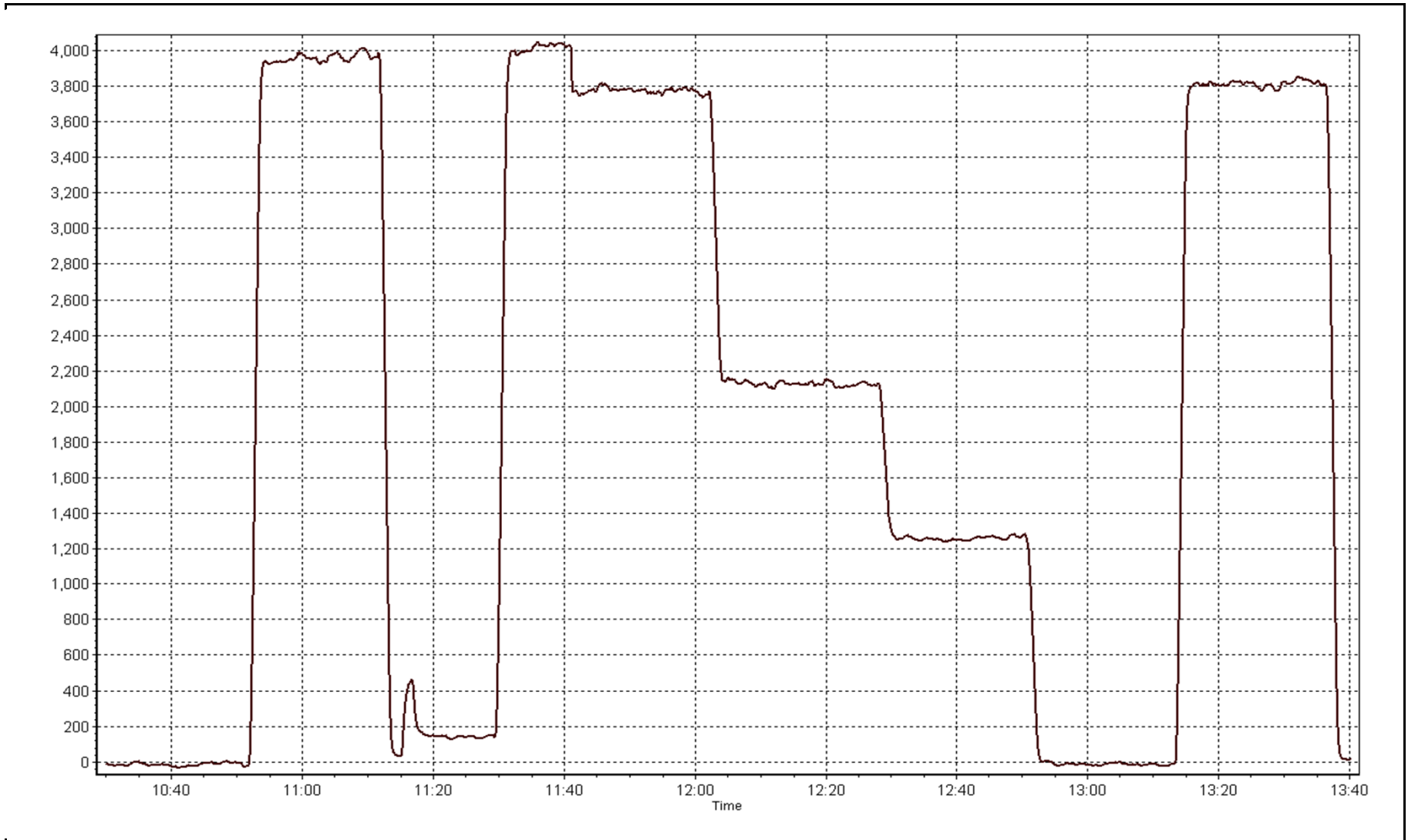
Calibration Date	October 3, 2014	Previous Calibration	September 4, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:30	End Time (MST)	1:40
Analyzer make	TEI 450i	Analyzer serial #	1336160094

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999976
75.1	75.4	0.9954		
42.1	42.5	0.9903	Slope	0.992220
25.0	25.2	0.9949		
			Intercept	0.115595

**H2S Calibration Curve**







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Thursday, October 02, 2014	Previous Calibration	Thursday, September 04, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	12:05
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.	2586
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)	5000	5000	Air or Bypass press	30.4	30.4
Calculated slope	1.000886	0.998761	Fuel Pressure	17.2	18.2
Calculated intercept	-0.048313	-0.045865			
BKG	1.4	1.4			
COEF	4.109	4.145			

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	-0.09	N/A
as found span	5000	58.8	12.56	12.34	1.018
calibrator zero	5000	0.0	0.00	0.02	N/A
high point	5000	58.8	12.56	12.59	0.997
second point	5000	29.4	6.28	6.38	0.984
third point	5005	14.7	3.14	3.19	0.983
calibrator zero	5000	0.0	0.00	0.02	N/A
as left zero	5000	0.0	0.00	0.01	N/A
as left span	5000	58.8	12.56	12.73	0.987
Average Correction Factor					0.988

Corrected As found 12.43 Previous response 12.59 % change 1.4%

#### Notes:

Zero and span adjusted.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## THC Calibration Summary

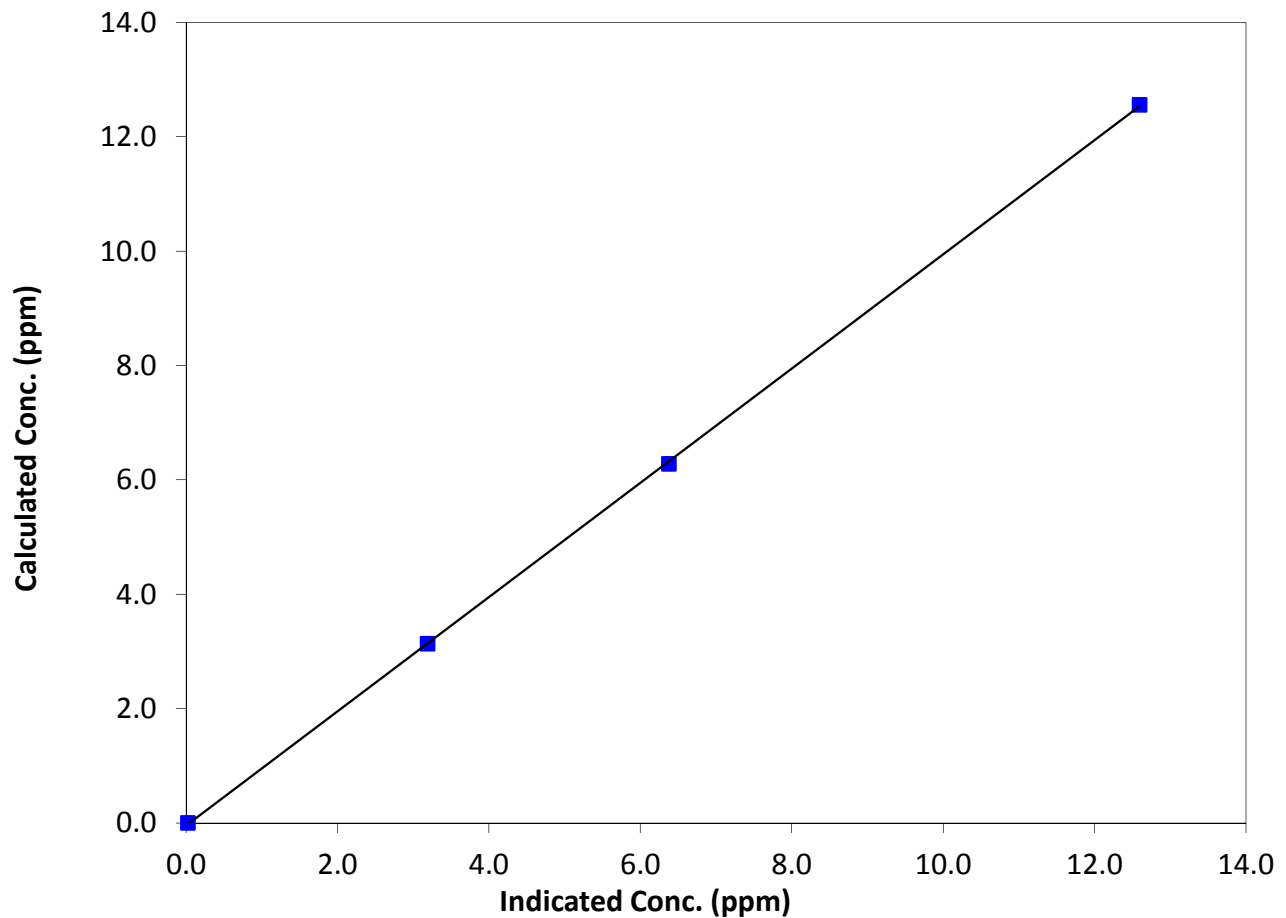
### Station Information

Calibration Date	October 2, 2014	Previous Calibration	September 4, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	8:40	End Time (MST)	12:05
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

### Calibration Data

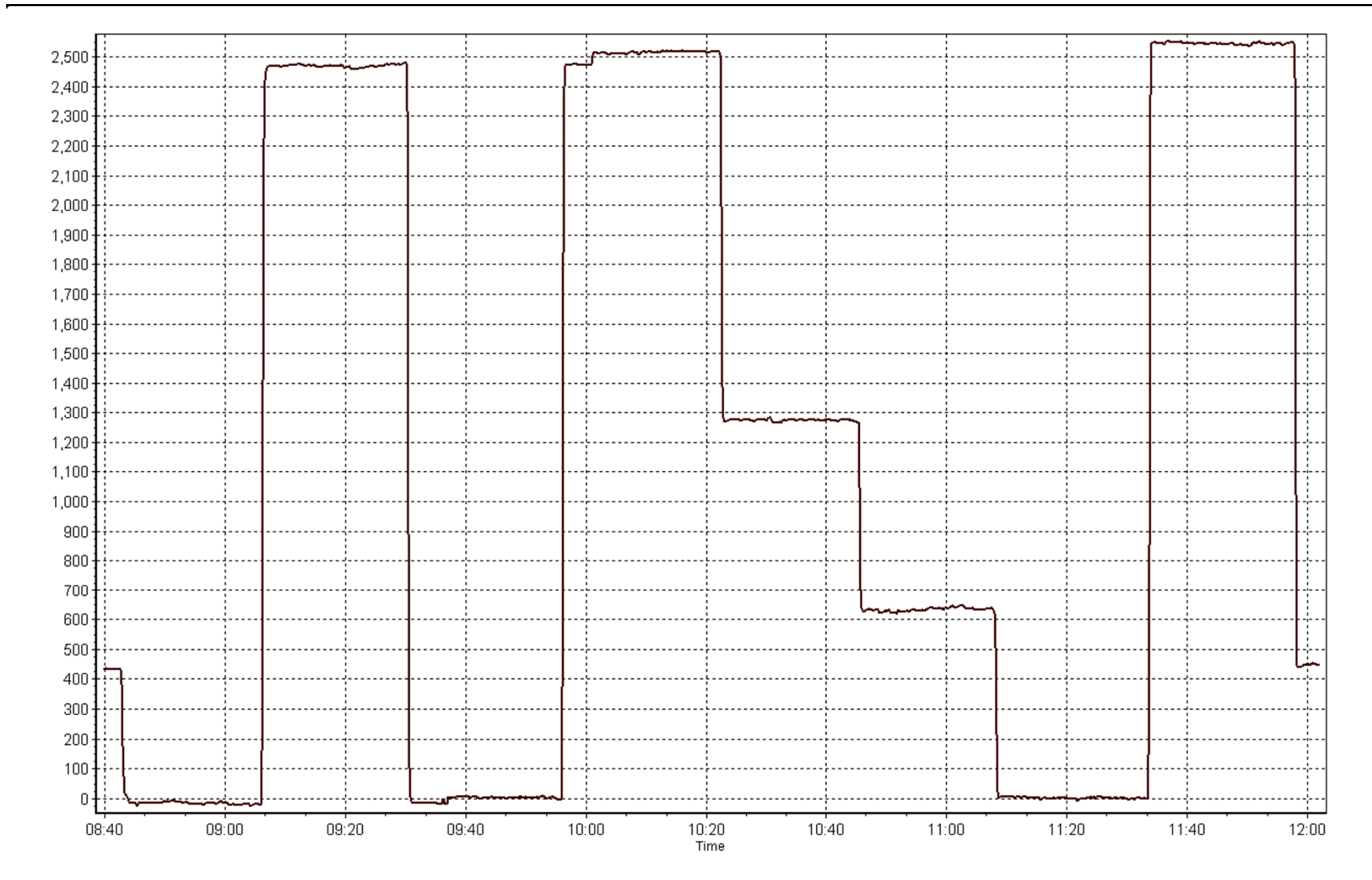
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	N/A	Correlation Coefficient	0.999961
12.56	12.59	0.9970		
6.28	6.38	0.9843	Slope	0.998761
3.14	3.19	0.9833		
			Intercept	-0.045865

### THC Calibration Curve



THC Calibration Plot

Date: October 2, 2014



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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 5  
MANNIX  
OCTOBER 2014**

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

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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)  
OCTOBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	36	36	100.00	67	0	8	0
H2S (ppb) Average	708	35	36	99.87	5	0	1	0
THC (ppm) Average	708	36	36	100.00	4.2	-	2.6	-
Temperature 2 m (C) Average	744	0	0	100.00	20.2	-	12.6	-
Temperature 20 m (C) Average	732	0	12	98.39	21.1	-	13.1	-
Temperature 45 m (C) Average	728	0	16	97.85	21.2	-	13.4	-
Temperature 75 m (C) Average	732	0	12	98.39	21.3	-	13.6	-
Temperature 90 m (C) Average	732	0	12	98.39	21.2	-	13.5	-
Relative Humidity 2 m (%) Average	744	0	0	100.00	97	-	-	-
Relative Humidity 20 m (%) Average	732	0	12	98.39	98	-	-	-
Relative Humidity 45 m (%) Average	728	0	16	97.85	98	-	-	-
Relative Humidity 75 m (%) Average	732	0	12	98.39	98	-	-	-
Relative Humidity 90 m (%) Average	732	0	12	98.39	99	-	-	-
Wind Speed 20 m (km/h) Average	726	0	18	97.58	30	-	-	-
Wind Speed 45 m (km/h) Average	728	0	16	97.85	40	-	-	-
Wind Speed 75 m (km/h) Average	732	0	12	98.39	42	-	-	-
Wind Speed 90 m (km/h) Average	731	0	13	98.25	43	-	-	-
Wind Direction 20 m (deg) Average	726	0	18	97.58	-	-	-	-
Wind Direction 45 m (deg) Average	728	0	16	97.85	-	-	-	-
Wind Direction 75 m (deg) Average	732	0	12	98.39	-	-	-	-
Wind Direction 90 m (deg) Average	731	0	13	98.25	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	726	0	18	97.58	0.7	-	-	-
Vertical Wind Speed 45 m (km/h) Average	728	0	16	97.85	1.3	-	-	-
Vertical Wind Speed 75 m (km/h) Average	732	0	12	98.39	1.1	-	-	-
Vertical Wind Speed 90 m (km/h) Average	731	0	13	98.25	4.4	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2 (ppb) Average	708	1.3	5	-	0	0	0	0	0	0	2	67
H2S (ppb) Average	708	0.4	0	-	0	0	0	0	0	0	1	5
THC (ppm) Average	708	2.25	0.2	-	2	2.1	2.1	2.2	2.3	2.4	4.2	4.2
Temperature 2 m (C) Average	744	5.08	4.7	-	-3.4	-0.2	1	4.4	8.5	11.5	20.2	20.2
Temperature 20 m (C) Average	732	5.32	4.8	-	-3.1	-0.2	1.3	4.6	8.7	12.1	21.1	21.1
Temperature 45 m (C) Average	728	5.29	4.8	-	-2.9	-0.4	1.2	4.5	8.9	12.1	21.2	21.2
Temperature 75 m (C) Average	732	5.16	4.9	-	-2.8	-0.6	0.9	4.4	9	12	21.3	21.3
Temperature 90 m (C) Average	732	5.12	4.9	-	-2.8	-0.7	0.8	4.3	9	12.2	21.2	21.2
Relative Humidity 2 m (%) Average	744	76	15	-	40	54	65	79	88	95	97	97
Relative Humidity 20 m (%) Average	732	74.3	15	-	35	52	63	77	87	94	98	98
Relative Humidity 45 m (%) Average	728	73.5	15	-	33	51	61	75	87	94	98	98
Relative Humidity 75 m (%) Average	732	73.7	16	-	33	52	61	75	88	95	98	98
Relative Humidity 90 m (%) Average	732	74.2	16	-	33	52	61	75	89	95	99	99
Wind Speed 20 m (km/h) Average	726	11.3	6	-	0	5	7	10	15	19	30	30
Wind Speed 45 m (km/h) Average	728	15.3	7	-	1	6	9	14	20	26	40	40
Wind Speed 75 m (km/h) Average	732	16.9	9	-	1	6	9	16	24	29	42	42
Wind Speed 90 m (km/h) Average	731	18.5	9	-	2	7	11	18	26	30	43	43
Wind Direction 20 m (deg) Average	726	-	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	728	-	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	732	-	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	731	-	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	726	0.05	0.3	-	-1.2	-0.4	-0.2	0.1	0.3	0.4	0.7	0.7
Vertical Wind Speed 45 m (km/h) Average	728	0.19	0.5	-	-1.3	-0.5	-0.2	0.3	0.5	0.7	1.3	1.3
Vertical Wind Speed 75 m (km/h) Average	732	0.01	0.3	-	-1.1	-0.4	-0.2	0	0.2	0.4	1.1	1.1
Vertical Wind Speed 90 m (km/h) Average	731	0.59	1.2	-	-1.7	-0.6	-0.2	0.3	1.1	2.5	4.4	4.4

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	09 Oct 2014 13:00	09 Oct 2014 13:00	1	Maintenance - manifold cleaning
Temperature, Relative Humidity 20 m	24 Oct 2014 04:00	24 Oct 2014 15:00	12	Flat line in sensor output signal
Temperature, Relative Humidity 45 m	02 Oct 2014 00:00	02 Oct 2014 03:00	4	Flat line in sensor output signal
Temperature, Relative Humidity 45 m	24 Oct 2014 04:00	24 Oct 2014 15:00	12	Flat line in sensor output signal
Temperature, Relative Humidity 75 m	24 Oct 2014 04:00	24 Oct 2014 15:00	12	Flat line in sensor output signal
Temperature, Relative Humidity 90 m	24 Oct 2014 04:00	24 Oct 2014 15:00	12	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	02 Oct 2014 01:00	02 Oct 2014 03:00	3	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	24 Oct 2014 04:00	24 Oct 2014 15:00	12	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	26 Oct 2014 20:00	26 Oct 2014 22:00	3	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	02 Oct 2014 00:00	02 Oct 2014 03:00	4	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	24 Oct 2014 04:00	24 Oct 2014 15:00	12	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 75 m	24 Oct 2014 04:00	24 Oct 2014 15:00	12	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 90 m	24 Oct 2014 04:00	24 Oct 2014 16:00	13	Flat line in sensor output signal

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Summary of Hour Averages

Mannix - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 67 ppb on Oct 4 13:00	Maximum Daily Average: 7.5 ppb on Oct 26		Hours of Data:	708
Minimum Value: 0 ppb on Oct 11 12:00	Minimum Daily Average: 0.0 ppb on Oct 29		Hours of Missing Data:	36
Maximum Diurnal Average: 3.9 ppb at hour 13	Minimum Diurnal Average: 0.5 ppb at hour 20		Hours of Calibration:	36
Monthly Average: 1.3 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> = 2 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-Oct	0	Z	0	0	1	0	0	0	0	0	0	0	0	1	1	1	2	8	1	0	1	0	0	0.7	8	
2-Oct	3	Z	3	5	0	1	0	17	35	6	23	10	28	18	1	2	0	0	0	0	0	1	3	6.8	35	
3-Oct	4	Z	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4	
4-Oct	0	Z	0	0	0	0	0	0	0	0	14	67	47	11	4	2	1	2	4	3	3	1	1	7.1	67	
5-Oct	1	Z	1	1	0	0	0	0	0	0	0	0	8	8	3	1	1	6	1	1	0	0	0	1.5	8	
6-Oct	0	Z	0	0	0	3	3	1	2	2	13	18	12	4	7	3	4	1	0	0	0	0	0	3.2	18	
7-Oct	0	Z	0	0	0	0	0	0	7	38	20	2	7	1	1	0	0	0	0	0	0	0	0	3.4	38	
8-Oct	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-Oct	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.2	0	
10-Oct	0	Z	0	0	0	0	0	0	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1	
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
12-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
13-Oct	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-Oct	0	Z	3	0	0	0	1	4	8	2	0	0	0	0	0	0	1	1	1	0	0	0	0	1.0	8	
15-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	1	18	19	1	2	2	0	2	13	5	2	2.9	19	
16-Oct	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	
17-Oct	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
18-Oct	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	
19-Oct	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0.3	1	
20-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	0	0	0	0.4	1	
21-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
22-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0.3	1	
23-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
24-Oct	0	Z	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-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
26-Oct	0	Z	0	0	0	0	0	1	1	2	0	1	0	3	18	48	14	4	4	5	3	10	57	7.5	57	
27-Oct	6	Z	10	16	16	10	16	3	1	0	0	0	1	0	0	1	1	1	1	1	0	0	0	3.7	16	
28-Oct	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	
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
30-Oct	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	
31-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	

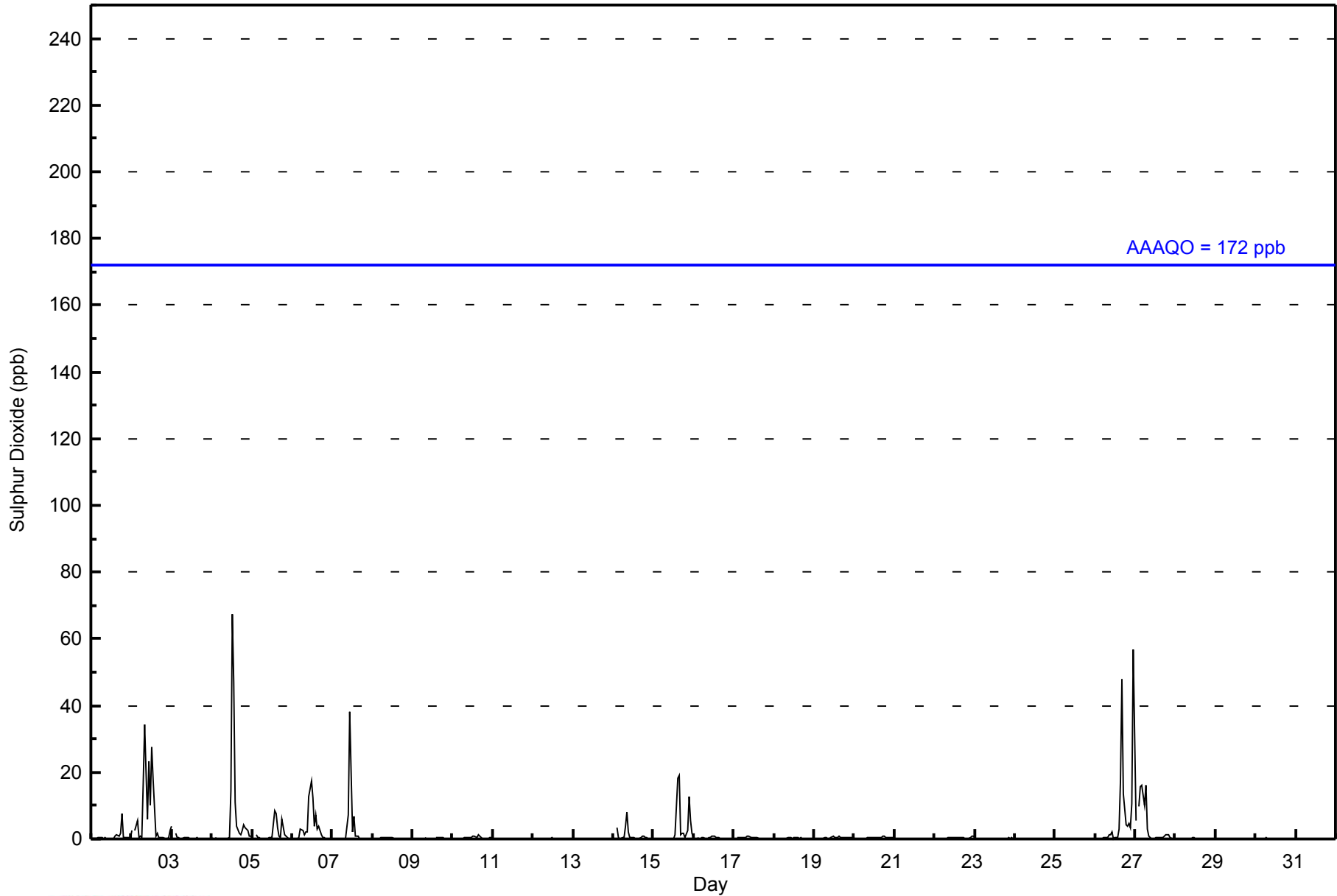
0.5	--	0.7	0.8	0.7	0.6	0.8	0.9	1.6	0.8	2.7	2.3	3.9	3.0	1.8	1.8	2.0	0.8	0.9	0.5	0.5	0.8	0.7	2.1	Diurnal Average
6	--	10	16	16	10	16	17	35	7	38	20	67	47	18	19	48	14	8	4	5	13	10	57	Diurnal Maximum

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 - October 2014



AAAQO = 172 ppb





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mannix - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	684	96.61	96.61
11 - 20	16	2.26	98.87
21 - 60	7	0.99	99.86
61 - 110	1	0.14	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mannix - October 2014**

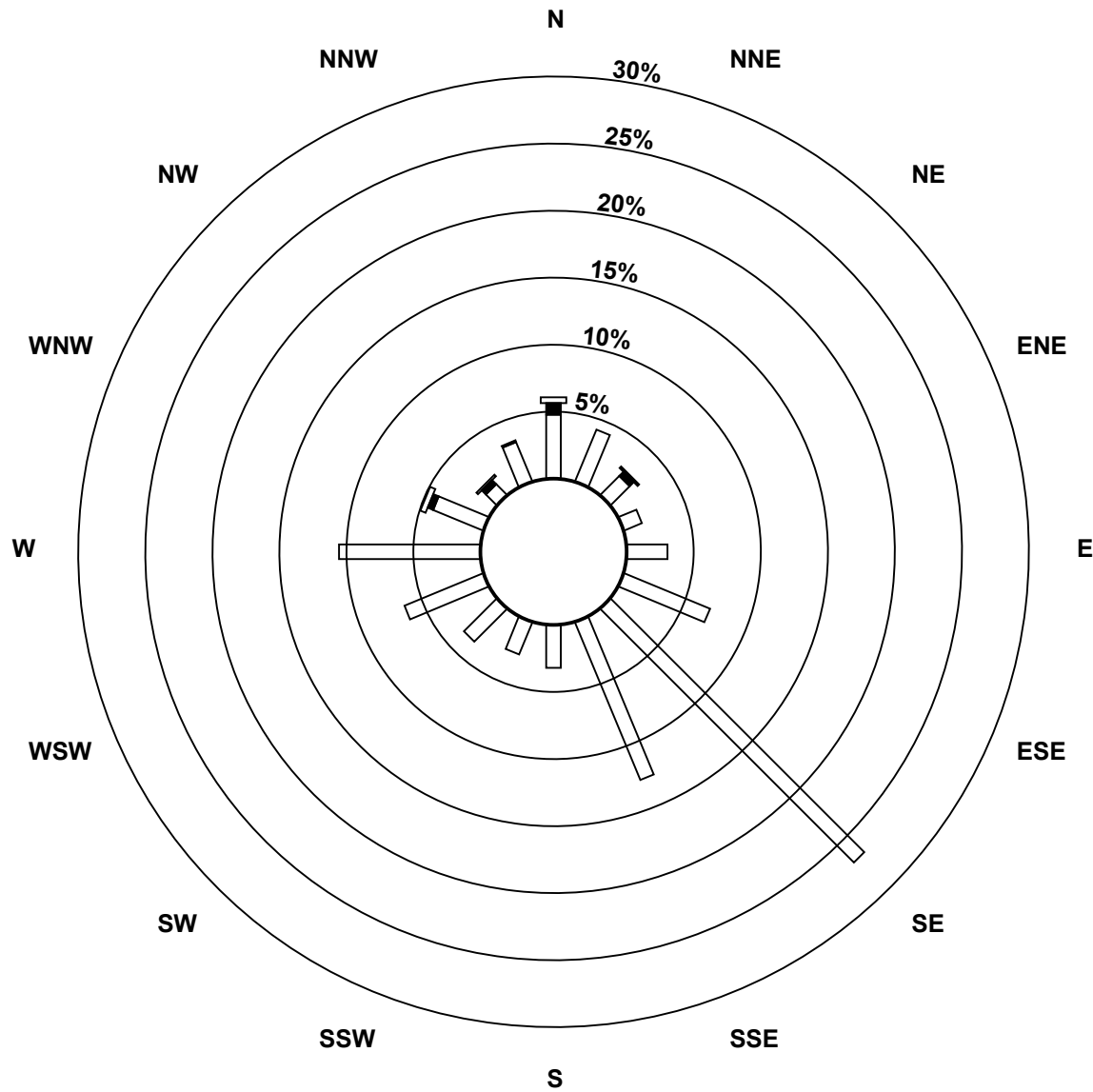
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	33	29	14	10	21	48	185	88	22	18	24	44	73	28	8	22	667
11 - 20	6	0	3	0	0	0	0	0	0	0	0	0	0	3	3	1	16
21 - 60	3	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	7
61 - 110	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	42	29	18	10	21	48	185	88	22	18	24	44	73	34	12	23	691

Total Number of Valid Hours: 691

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



**Classes (ppb)**

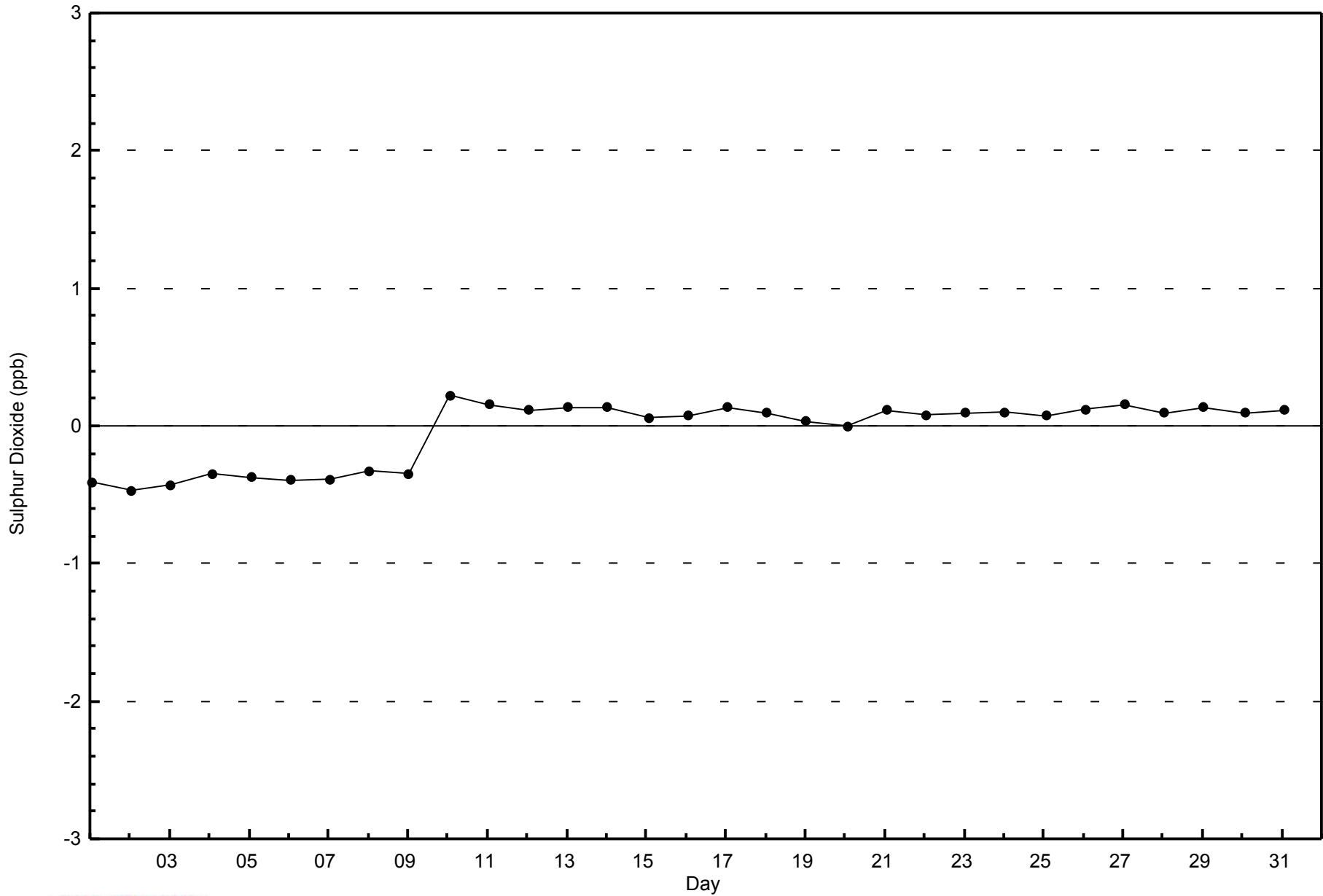


**Total Number of Valid Hours: 691**



WBEA  
Zero Responses

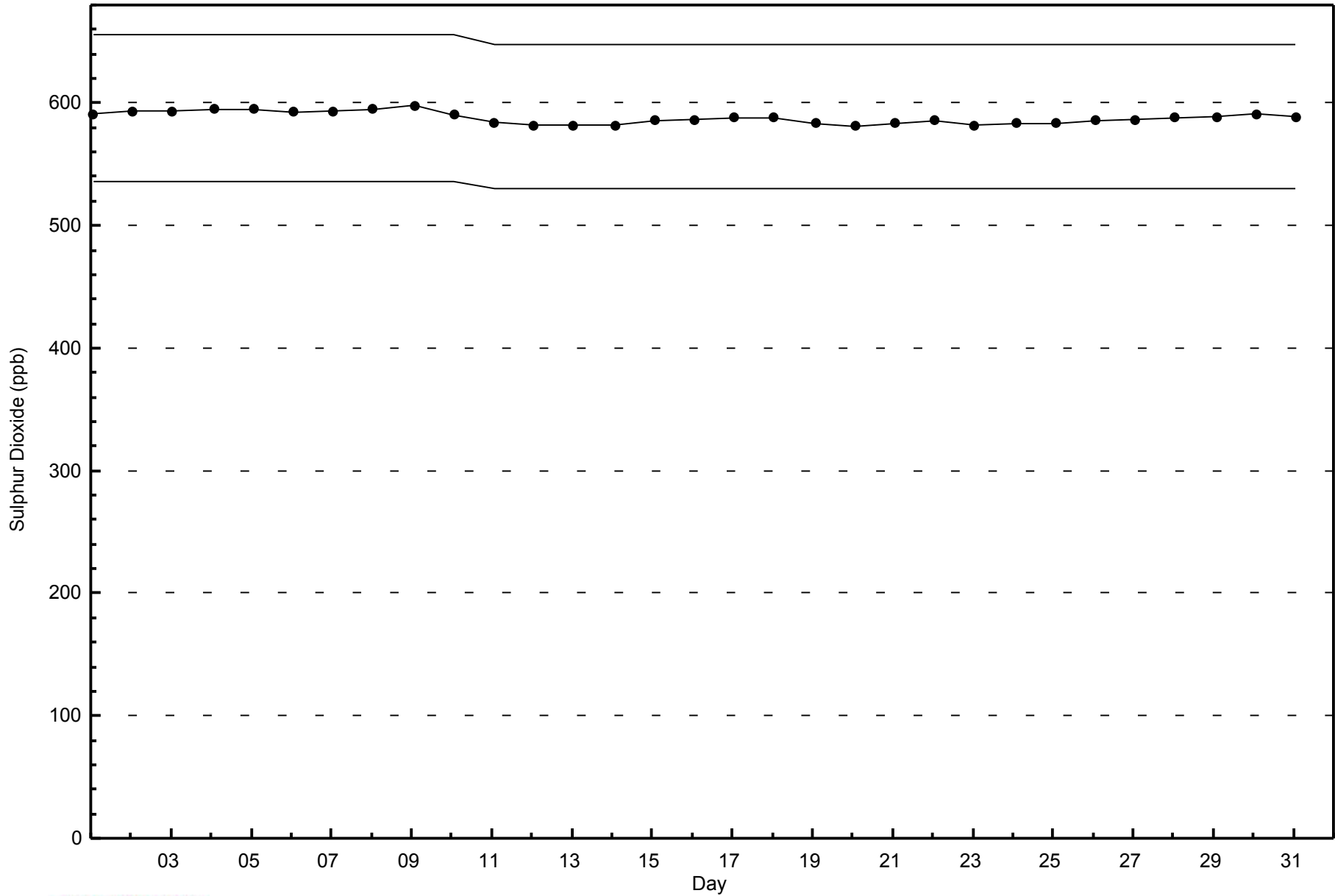
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mannix - October 2014





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mannix - October 2014





Summary of Hour Averages

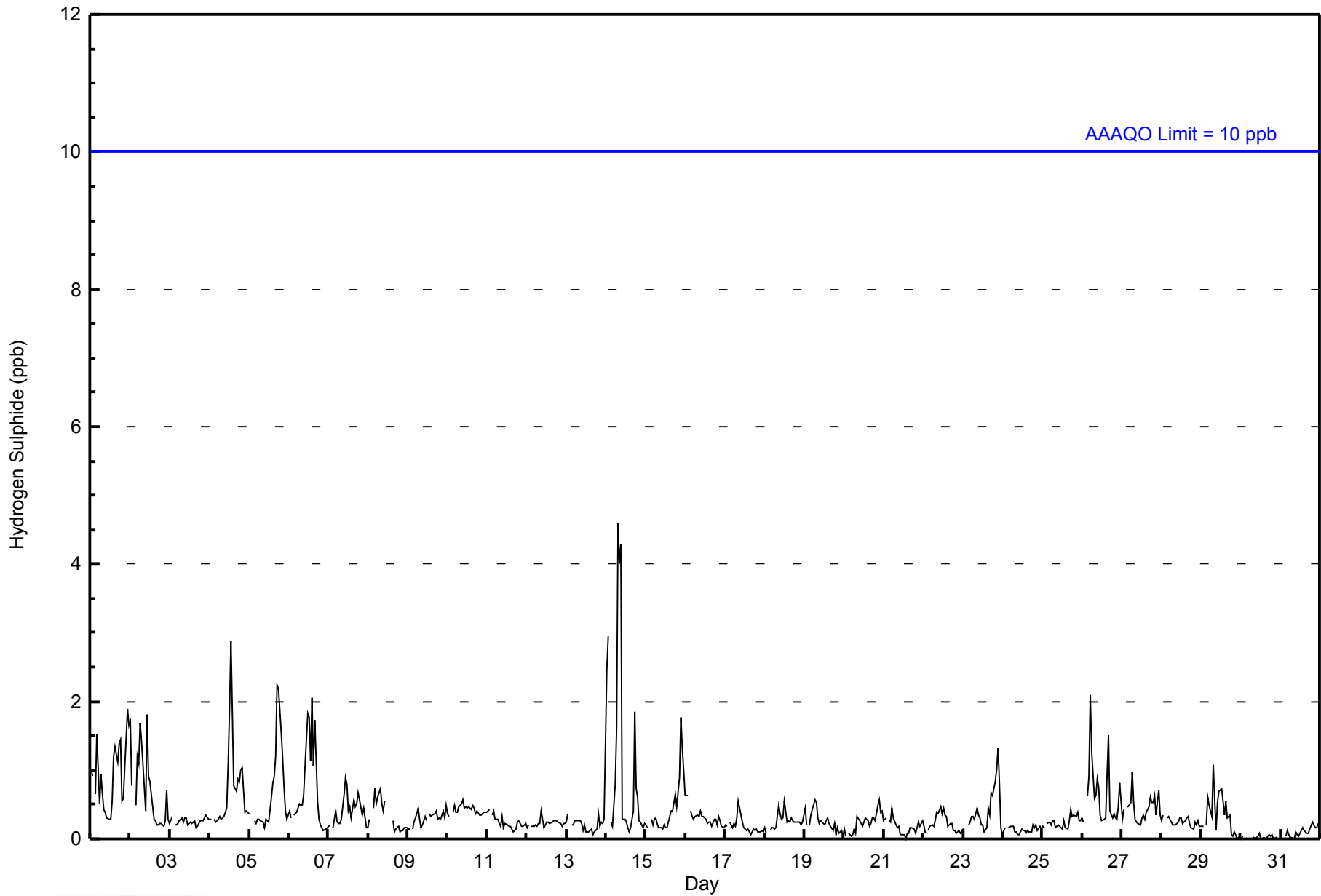
Mannix - October 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 5 ppb on Oct 14 08:00										Maximum Daily Average: 1.2 ppb on Oct 14										Hours of Data: 708																												
Minimum Value: 0 ppb on Oct 21 14:00										Minimum Daily Average: 0.0 ppb on Oct 30										Hours of Missing Data: 36																												
Maximum Diurnal Average: 0.5 ppb at hour 8										Minimum Diurnal Average: 0.3 ppb at hour 4										Hours of Calibration: 35																												
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-Oct	1	1	Z	1	2	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	0.9	2																							
2-Oct	2	1	Z	0	1	1	2	1	1	0	2	1	1	1	0	0	0	0	0	0	0	1	0	0.7	2																							
3-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
4-Oct	0	0	Z	0	0	0	0	0	0	0	1	2	3	2	1	1	1	1	1	1	0	0	0	0.7	3																							
5-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	2	1	1	0	0.7	2																							
6-Oct	0	0	Z	0	0	0	1	0	0	1	1	2	2	1	2	1	2	1	0	0	0	0	0	0.7	2																							
7-Oct	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	1	0	1	1	1	1	0	0	0	0.4	1																							
8-Oct	0	0	Z	0	1	1	1	1	1	0	1	C	C	C	C	0	0	0	0	0	0	0	0	0.3	1																							
9-Oct	0	0	Z	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
10-Oct	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
12-Oct	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																							
13-Oct	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-Oct	2	3	Z	0	0	1	2	5	4	4	0	0	0	0	0	0	0	2	1	1	0	0	0	1.2	5																							
15-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	1	0.5	2																							
16-Oct	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
17-Oct	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
19-Oct	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
20-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1																							
21-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
22-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
23-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0.4	1																							
24-Oct	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																							
25-Oct	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																							
26-Oct	0	0	Z	1	1	2	1	1	1	1	1	0	0	0	1	2	0	0	0	0	0	0	1	0.6	2																							
27-Oct	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0.4	1																							
28-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
29-Oct	0	0	Z	0	1	0	0	1	1	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0.4	1																							
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
31-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
																								0.4	0.4	--	0.3	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.3	Diurnal Average	
																								2	3	--	1	2	2	2	5	4	4	2	2	2	3	2	1	2	2	2	2	1	2	2	2	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																



WBEA  
Hourly Averages

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mannix - October 2014





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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Mannix - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	703	99.29	99.29
3 - 4	4	0.56	99.86
5 - 7	1	0.14	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Mannix - October 2014**

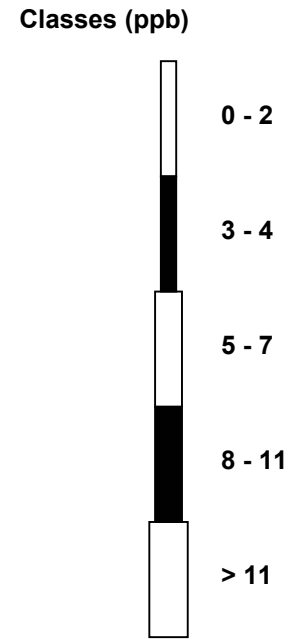
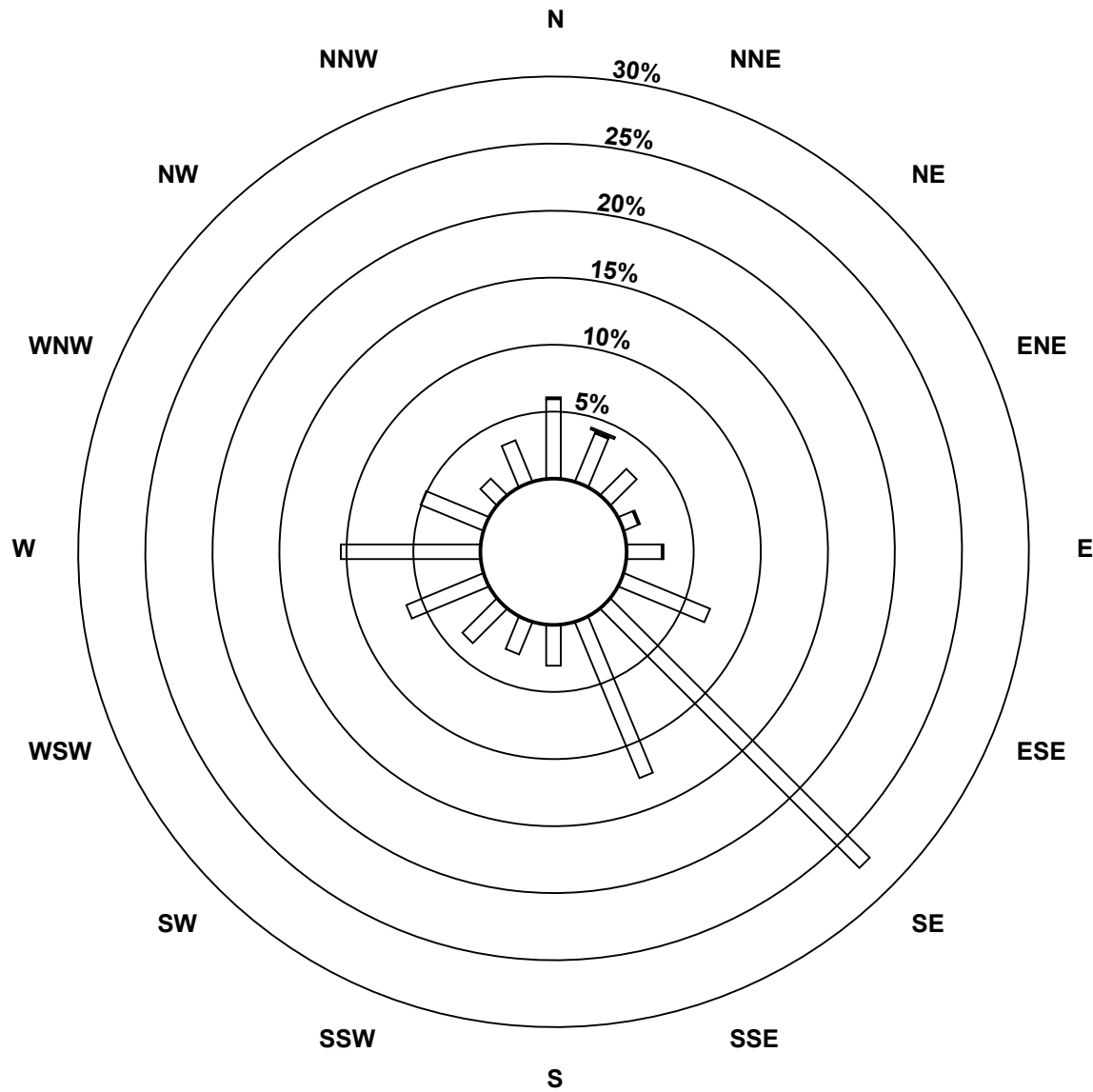
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	41	27	19	8	18	48	189	87	21	18	25	43	72	35	12	23	686
3 - 4	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	4
5 - 7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	42	29	19	9	19	48	189	87	21	18	25	43	72	35	12	23	691

Total Number of Valid Hours: 691

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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

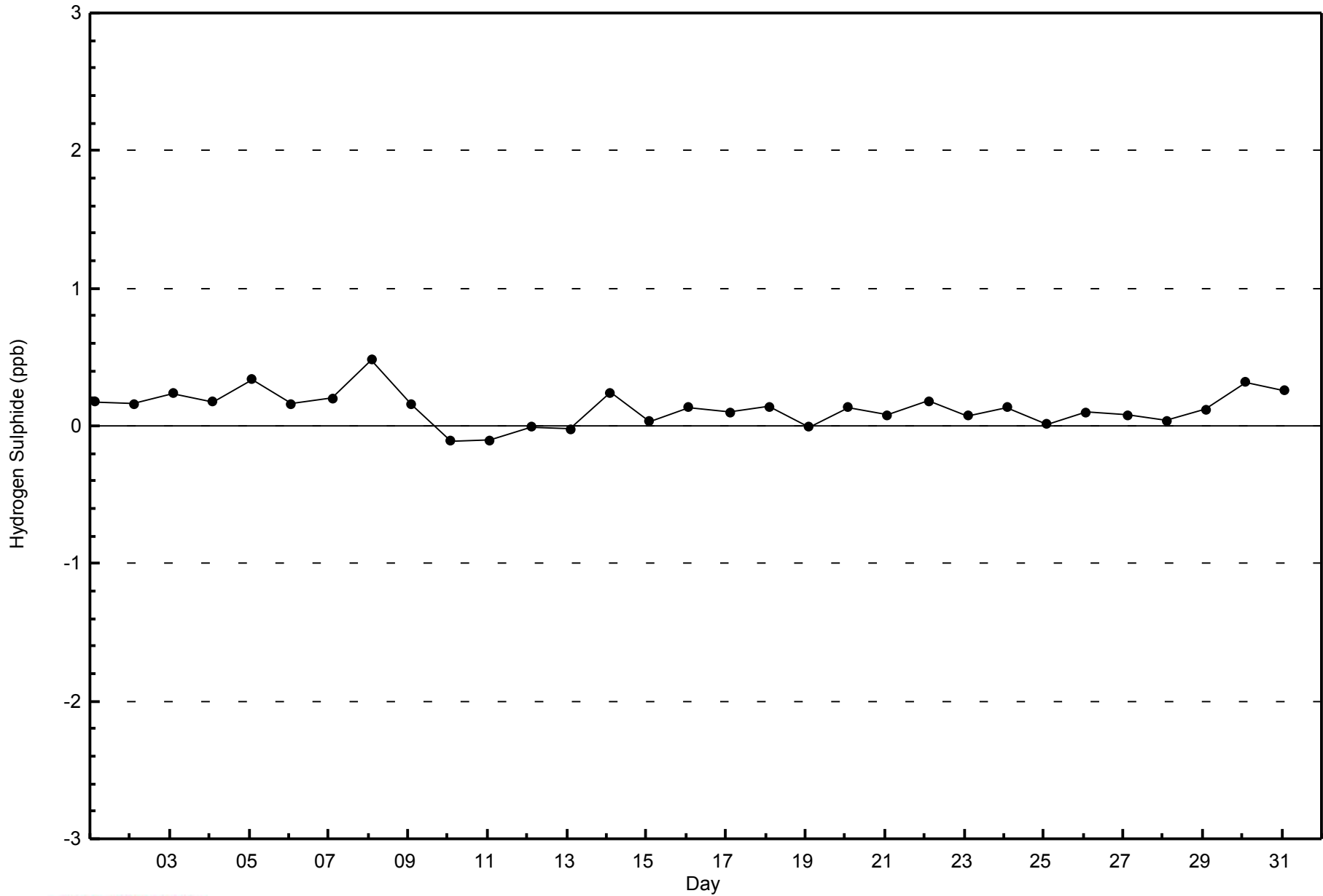


**Total Number of Valid Hours: 691**



WBEA  
Zero Responses

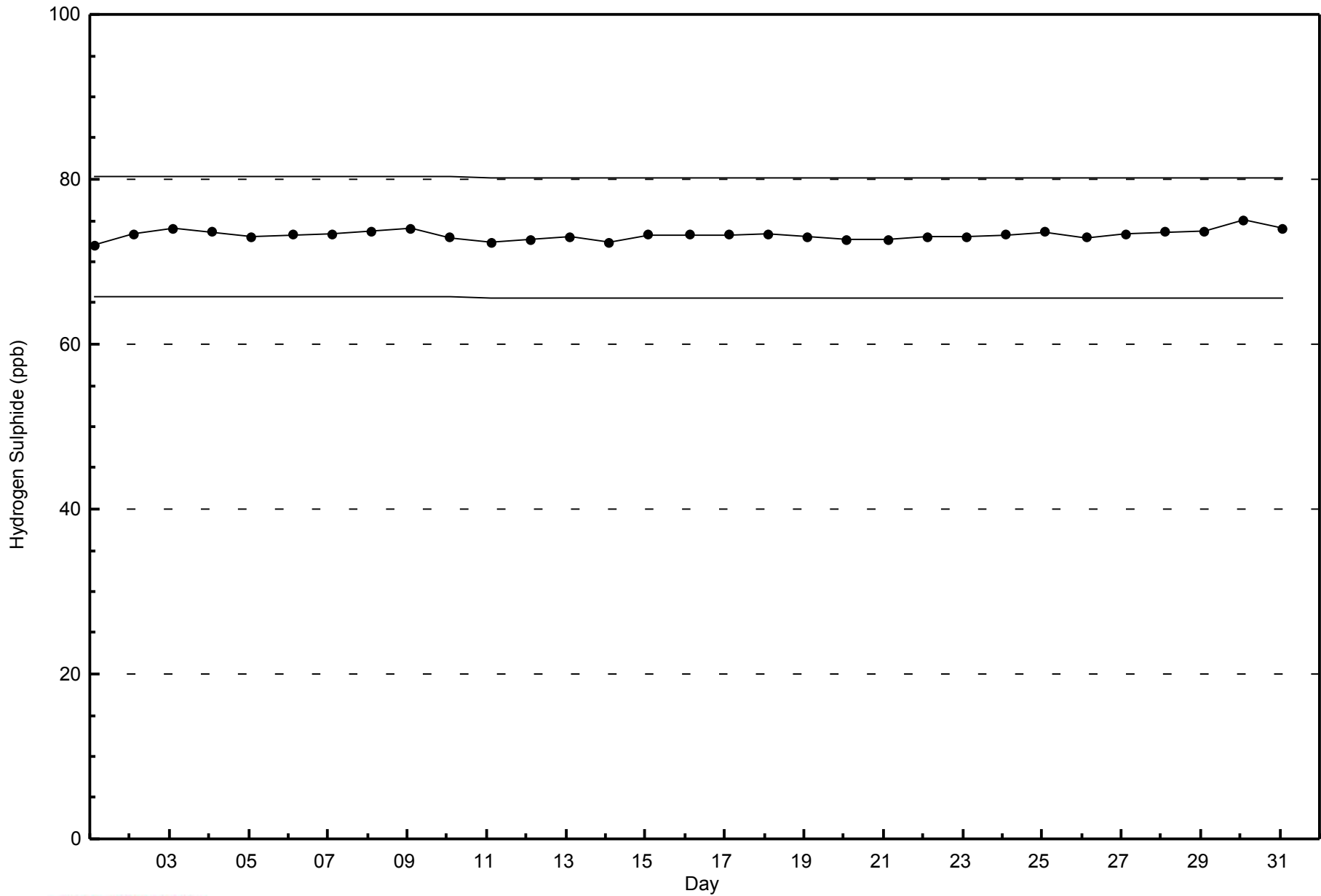
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mannix - October 2014





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mannix - October 2014



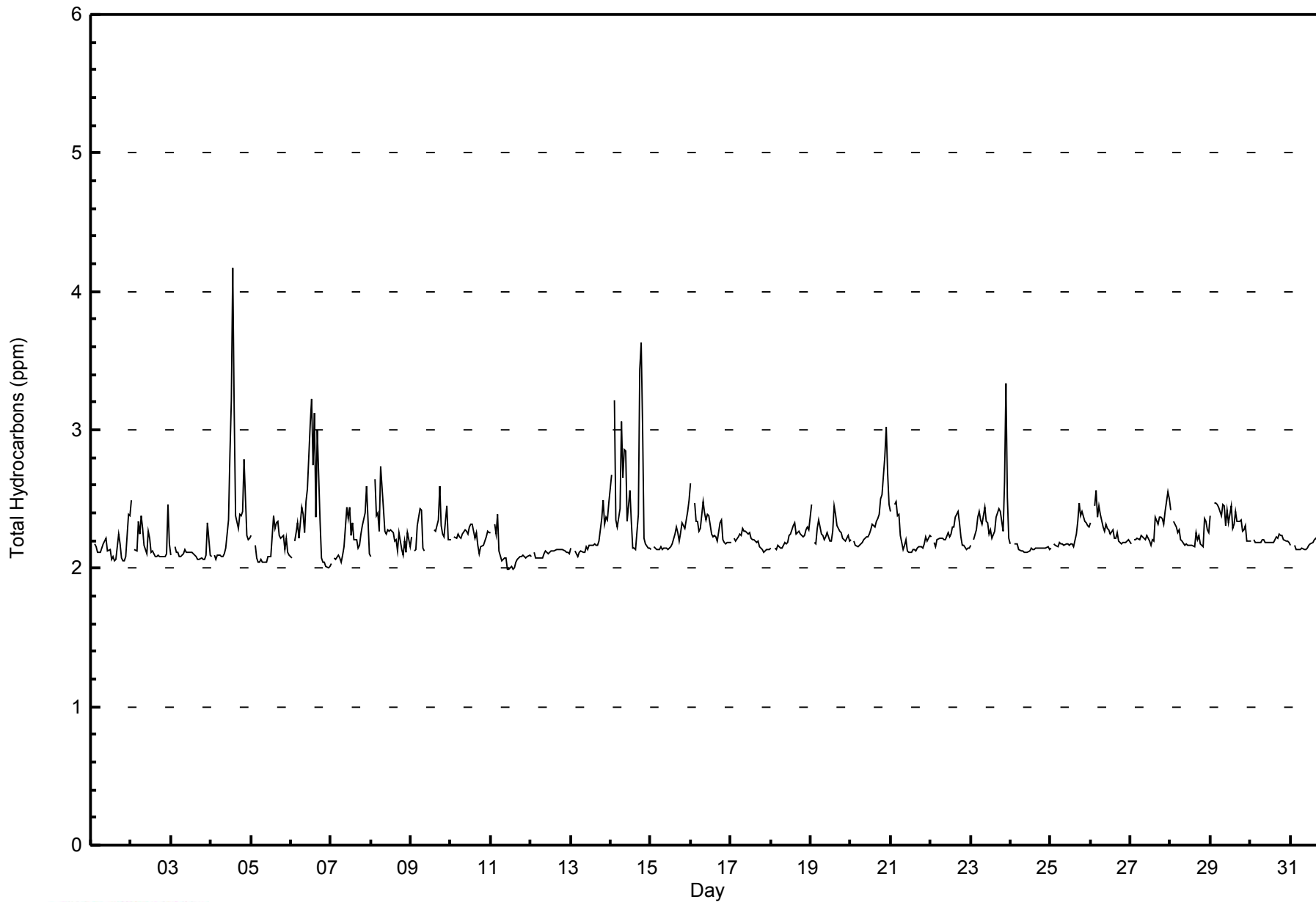


Maximum Value: 4.2 ppm on Oct 4 14:00		Maximum Daily Average: 2.6 ppm on Oct 14		Hours in Service: 744																							
Minimum Value: 2.0 ppm on Oct 11 12:00		Minimum Daily Average: 2.1 ppm on Oct 11		Hours of Data: 708																							
Maximum Diurnal Average: 2.3 ppm at hour 18		Minimum Diurnal Average: 2.2 ppm at hour 4		Hours of Missing Data: 36																							
Monthly Average: 2.25 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> = 2.4 P <sub>99</sub> = 3.2		Hours of Calibration: 36																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.1	2.1	2.1	2.1	2.4	2.4	2.2	2.4	
2-Oct	2.5	Z	2.1	2.1	2.3	2.3	2.4	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	2.5	2.2	2.2	2.5	
3-Oct	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.1	2.1	2.3	
4-Oct	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.8	3.2	4.2	3.1	2.4	2.3	2.4	2.4	2.4	2.8	2.2	2.2	2.2	2.4	4.2	
5-Oct	2.2	Z	2.2	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.4	
6-Oct	2.1	Z	2.2	2.3	2.3	2.2	2.4	2.4	2.3	2.5	2.6	3.0	3.2	2.7	3.1	2.4	3.0	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.4	3.2	
7-Oct	2.0	Z	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.4	2.4	2.4	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.6	2.4	2.1	2.2	2.6	
8-Oct	2.1	Z	2.6	2.4	2.4	2.3	2.7	2.4	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.3	2.1	2.1	2.2	2.1	2.3	2.2	2.3	2.7	
9-Oct	2.2	Z	2.1	2.1	2.3	2.4	2.4	2.1	2.1	C	C	C	C	C	2.3	2.3	2.4	2.6	2.3	2.2	2.2	2.5	2.2	2.2	2.3	2.6	
10-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	
11-Oct	2.3	Z	2.3	2.2	2.4	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	
12-Oct	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	
13-Oct	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.5	2.3	2.4	2.3	2.5	2.2	2.5	
14-Oct	2.7	Z	3.2	2.4	2.3	2.4	3.1	2.7	2.9	2.8	2.3	2.6	2.3	2.1	2.1	2.1	2.4	3.4	3.6	3.0	2.2	2.2	2.1	2.1	2.6	3.6	
15-Oct	2.1	Z	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.3	2.4	2.4	2.5	2.2	2.5	
16-Oct	2.6	Z	2.5	2.3	2.3	2.3	2.3	2.5	2.4	2.3	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.3	2.6	
17-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	
18-Oct	2.1	Z	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.3	
19-Oct	2.5	Z	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.5	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.5	
20-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.5	2.8	3.0	2.7	2.5	2.4	3.0	
21-Oct	2.4	Z	2.5	2.5	2.4	2.4	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	
22-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.4	
23-Oct	2.2	Z	2.2	2.3	2.4	2.4	2.4	2.3	2.4	2.3	2.3	2.2	2.3	2.2	2.3	2.4	2.4	2.4	2.4	2.3	2.6	3.3	2.5	2.2	2.4	3.3	
24-Oct	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	
25-Oct	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.4	2.4	2.3	2.3	2.3	2.2	2.5	
26-Oct	2.3	Z	2.5	2.6	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.6	
27-Oct	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	2.4	2.3	2.4	2.4	2.4	2.3	2.4	2.5	2.5	2.3	2.5	
28-Oct	2.4	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	2.3	2.2	2.2	2.2	2.2	2.4	2.3	2.3	2.3	2.2	2.4	
29-Oct	2.4	Z	2.5	2.5	2.5	2.4	2.4	2.5	2.5	2.3	2.4	2.3	2.4	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.4	2.5	
30-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
31-Oct	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.3	
		2.2	--	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	Diurnal Average		
		2.7	--	3.2	2.6	2.5	2.4	3.1	2.7	2.9	2.8	2.6	3.0	3.2	4.2	3.1	2.4	3.0	3.4	3.6	3.0	2.8	3.3	2.7	2.5	Diurnal Maximum	
Z - zerospan		C - Calibration																									



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Mannix - October 2014**





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

**Total Hydrocarbons (THC) - ppm**  
**Mannix - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	18	2.54	2.54
2.1 - 3.0	680	96.05	98.59
3.1 - 10.0	10	1.41	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Mannix - October 2014**

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	1	1	2	1	1	12	0	0	0	18
2.1 - 3.0	41	29	16	10	20	47	185	87	21	16	23	43	60	31	12	22	663
3.1 - 10.0	1	0	2	0	1	1	0	0	0	0	0	0	1	3	0	1	10
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	42	29	18	10	21	48	185	88	22	18	24	44	73	34	12	23	691

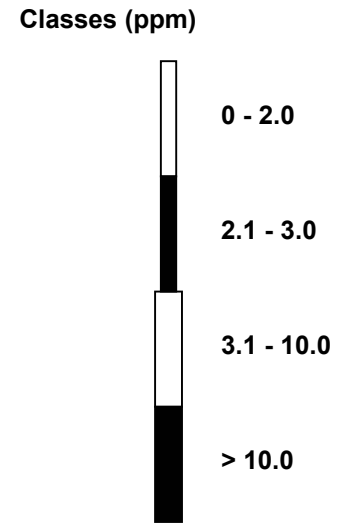
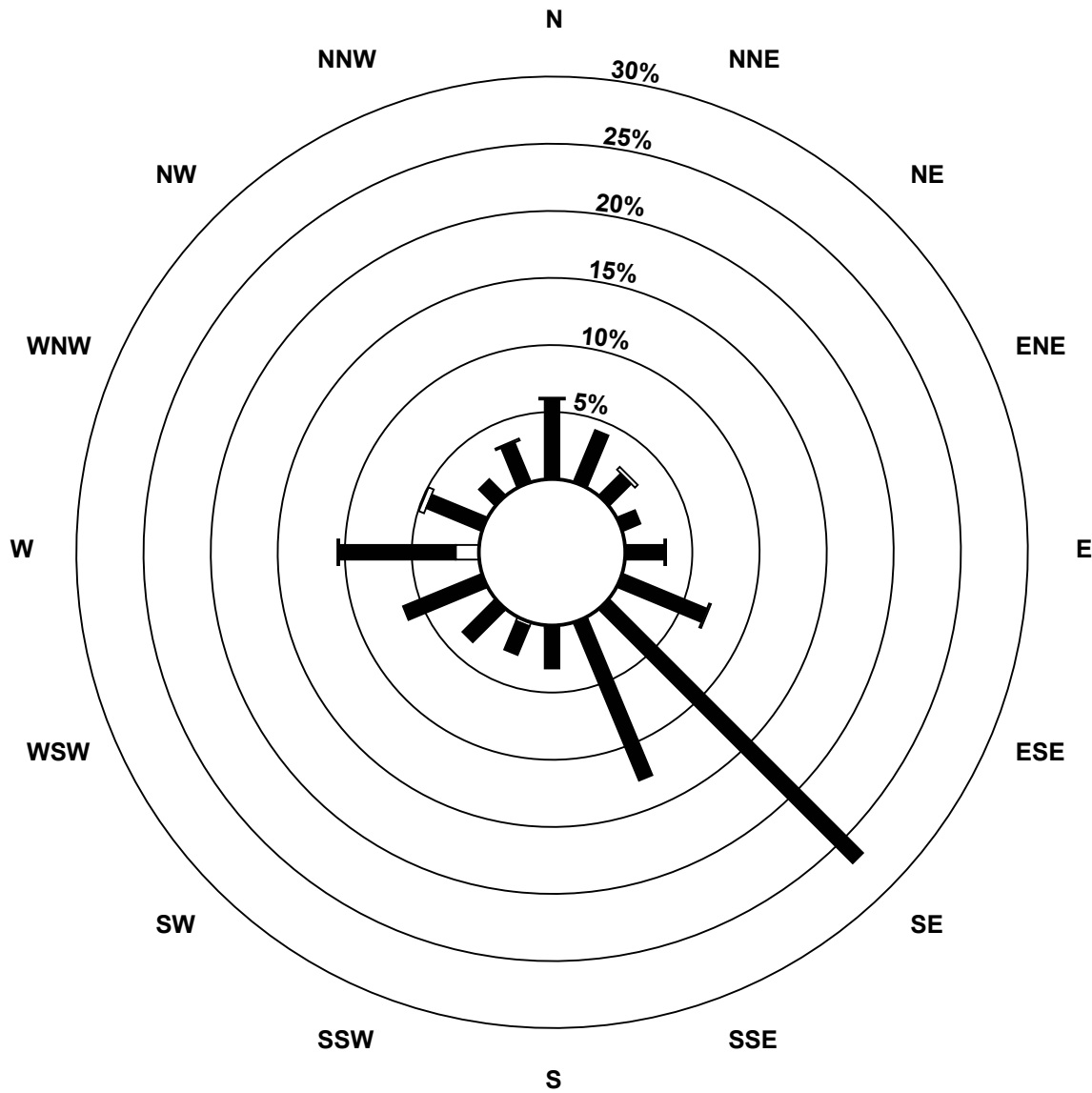
Total Number of Valid Hours: 691

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2014

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

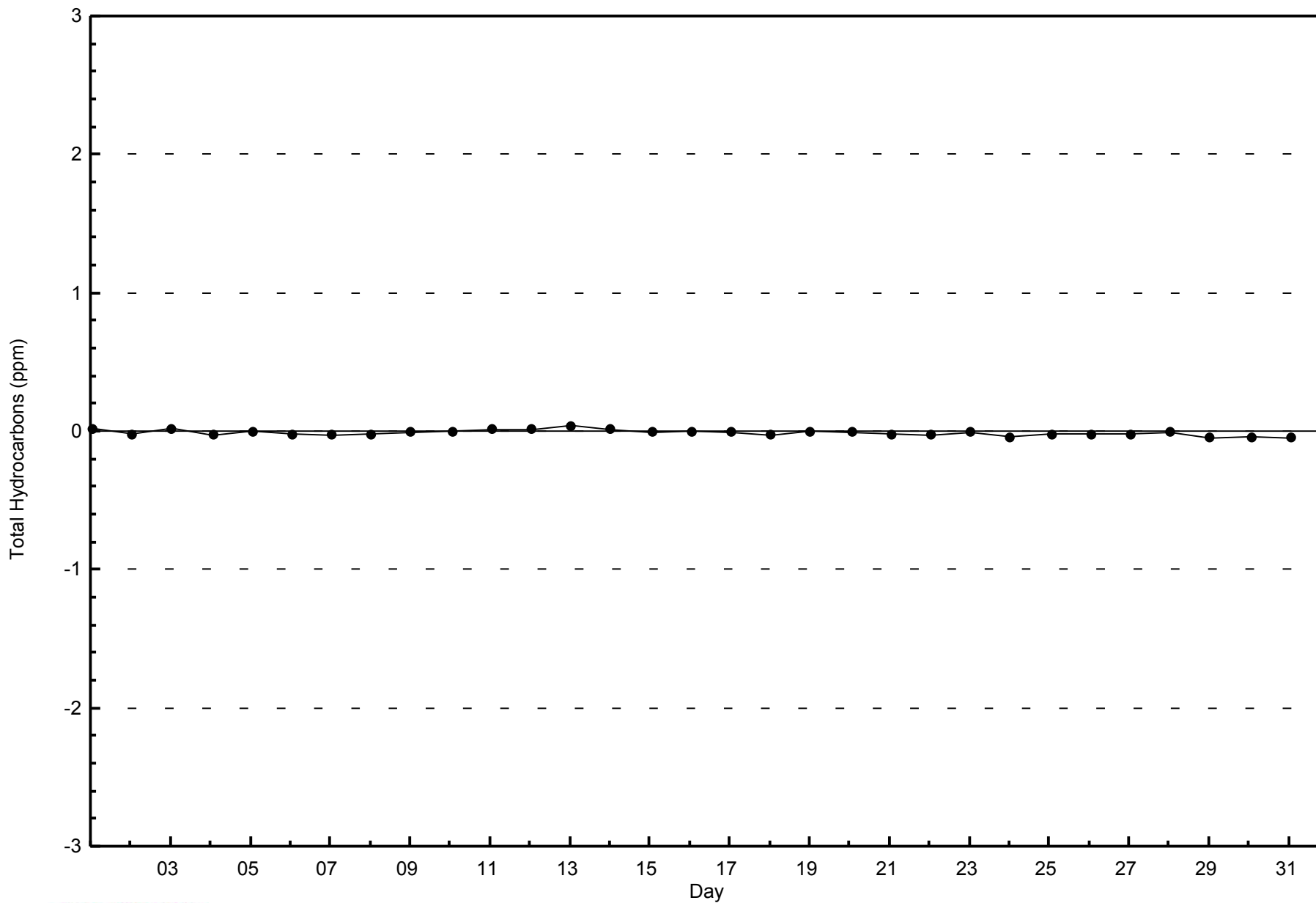


Total Number of Valid Hours: 691



WBEA  
Zero Responses

Total Hydrocarbons (THC) - ppm  
Mannix - October 2014

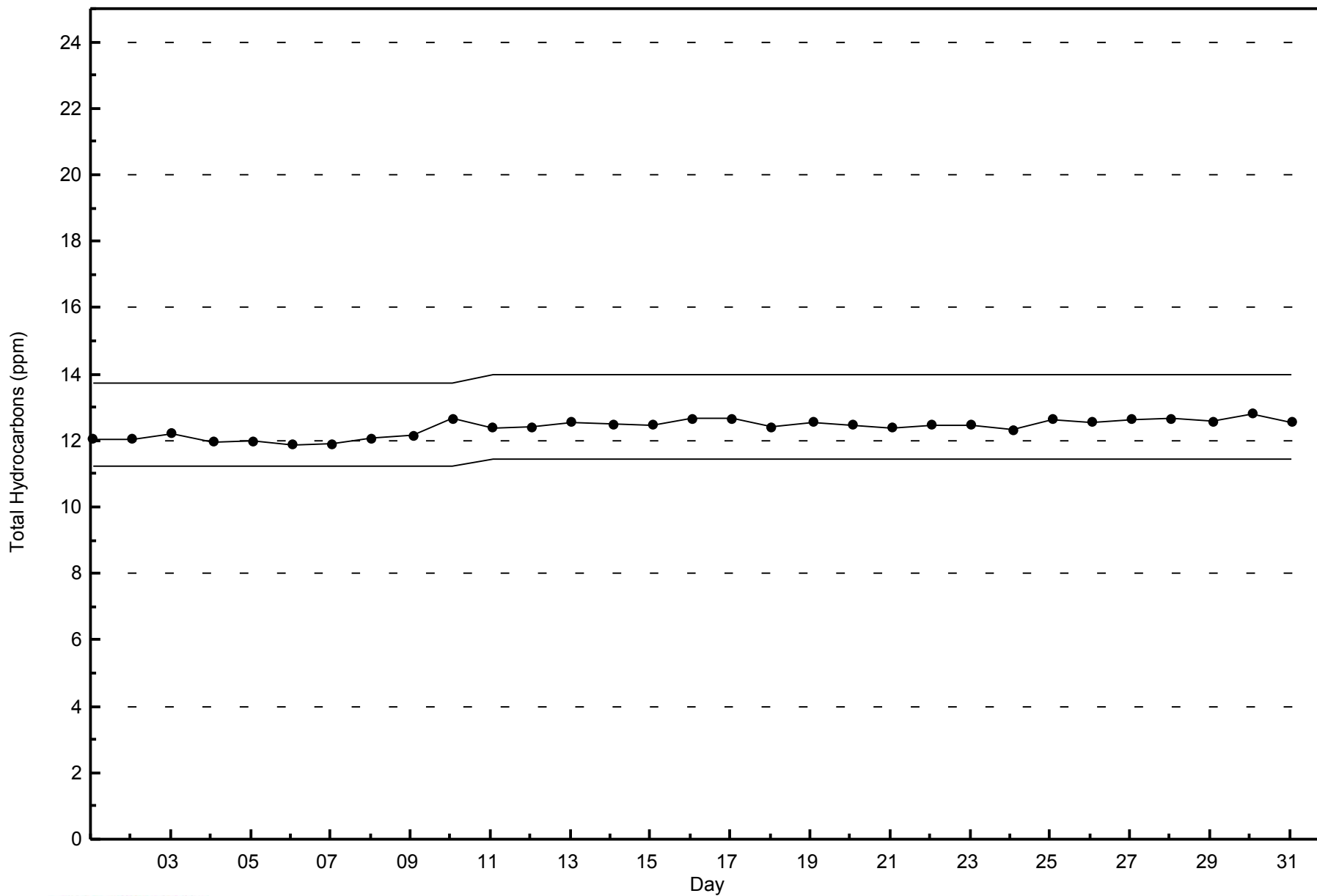




WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm

Mannix - October 2014





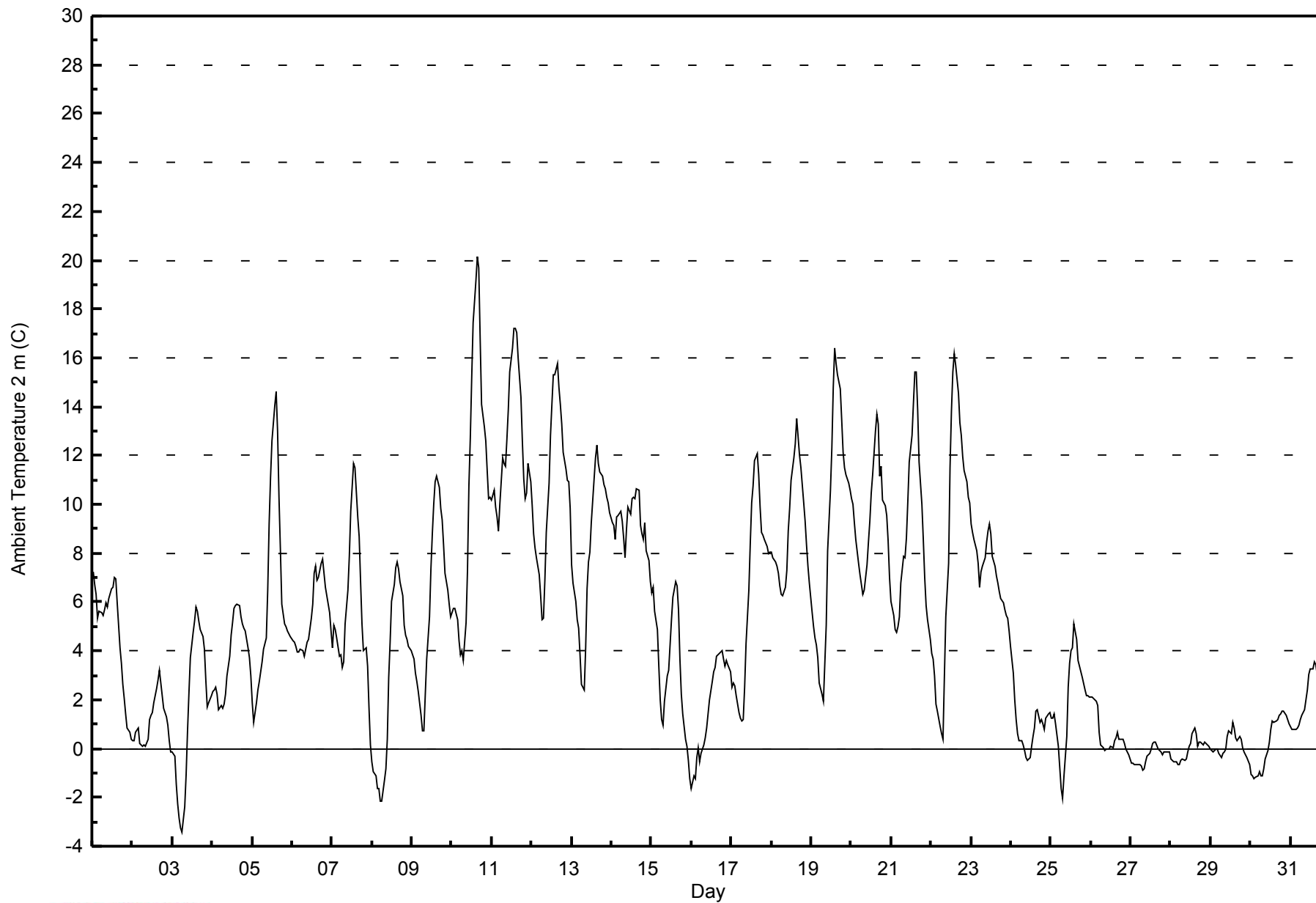
Maximum Value: 20.2 C on Oct 10 16:00      Maximum Daily Average: 12.6 C on Oct 11																								Hours in Service: 744 Hours of Data: 744																									
Minimum Value: -3.4 C on Oct 3 07:00      Minimum Daily Average: -0.3 C on Oct 27																								Hours of Missing Data: 0 Hours of Calibration: 0																									
Maximum Diurnal Average: 8.5 C at hour 15      Minimum Diurnal Average: 2.4 C at hour 7																								Percent Operational Time: 100.0																									
Monthly Average: 5.08 C      Percentiles: P <sub>1</sub> = -2.0 P <sub>10</sub> = -0.2 Q <sub>1</sub> = 1.0 Median = 4.4 Q <sub>3</sub> = 8.5 P <sub>90</sub> = 11.5 P <sub>99</sub> = 16.8																																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	7.3	6.7	6.3	5.3	5.7	5.6	5.4	5.7	5.9	5.8	6.1	6.5	6.6	7.0	7.0	6.0	4.1	3.5	2.6	2.0	1.4	0.9	0.6	0.4	4.8	7.3																							
2-Oct	0.3	0.3	0.6	0.8	0.2	0.2	0.1	0.1	0.1	0.4	1.2	1.4	1.5	1.9	2.5	2.8	3.2	2.7	2.2	1.6	1.3	1.0	0.3	-0.1	1.1	3.2																							
3-Oct	-0.1	-0.3	-1.4	-2.3	-2.8	-3.2	-3.4	-2.4	-1.0	0.7	2.3	3.7	4.7	5.2	5.8	5.6	5.2	4.9	4.6	4.1	2.8	1.7	1.9	2.1	1.6	5.8																							
4-Oct	2.3	2.4	2.5	2.2	1.6	1.7	1.6	1.8	2.2	3.0	3.8	4.6	5.2	5.8	5.9	5.9	5.8	5.4	5.1	4.9	4.8	4.1	3.7	3.0	3.7	5.9																							
5-Oct	1.9	1.1	1.9	2.4	2.7	3.2	3.6	4.1	4.5	6.5	9.2	11.1	12.6	14.0	14.6	13.0	10.3	8.2	5.9	5.1	5.0	4.8	4.7	4.6	6.5	14.6																							
6-Oct	4.4	4.4	4.2	3.9	4.0	4.0	4.0	3.8	4.1	4.4	4.5	5.3	5.9	7.2	7.5	6.9	7.0	7.6	7.7	7.2	6.6	6.2	5.5	4.8	5.5	7.7																							
7-Oct	4.1	5.0	4.8	4.5	3.8	3.8	3.3	3.5	5.1	6.5	7.9	9.7	10.7	11.7	11.5	9.5	8.7	6.8	5.1	4.0	4.1	3.4	1.6	0.2	5.8	11.7																							
8-Oct	-0.5	-1.0	-1.1	-1.6	-1.6	-2.2	-2.1	-1.3	-0.8	0.4	2.9	4.4	6.0	6.7	7.4	7.6	7.4	6.9	6.3	5.0	4.6	4.5	4.2	4.0	2.8	7.6																							
9-Oct	3.9	3.7	3.1	2.7	2.3	1.4	0.7	0.7	2.2	3.7	5.4	7.3	8.8	10.0	10.9	11.2	10.7	9.9	9.3	8.3	7.2	6.5	5.9	5.4	5.9	11.2																							
10-Oct	5.5	5.7	5.8	5.3	4.4	3.8	4.0	3.6	5.2	7.3	10.7	12.7	15.2	17.4	19.2	20.2	19.7	16.8	14.1	13.1	12.6	11.4	10.2	10.3	10.6	20.2																							
11-Oct	10.2	10.6	9.9	9.5	8.9	10.0	11.9	11.7	11.6	12.6	13.9	15.4	16.4	17.2	17.2	17.0	16.0	14.4	12.6	11.0	10.2	10.5	11.7	10.9	12.6	17.2																							
12-Oct	9.9	8.8	8.2	7.8	7.1	6.2	5.3	5.3	6.9	8.9	10.9	12.8	14.1	15.3	15.3	15.8	14.8	14.1	13.3	12.1	11.4	11.0	10.9	9.9	10.7	15.8																							
13-Oct	7.5	6.8	6.0	5.3	4.9	3.9	2.6	2.4	4.1	6.5	7.7	8.0	9.3	11.1	11.9	12.4	11.6	11.3	11.2	10.8	10.6	10.3	10.1	9.6	8.2	12.4																							
14-Oct	9.3	9.1	8.6	9.5	9.6	9.7	9.3	8.6	7.8	9.0	9.9	9.6	10.2	10.3	10.3	10.7	10.6	9.1	8.8	8.6	9.2	8.1	7.7	6.9	9.2	10.7																							
15-Oct	6.4	6.6	5.6	4.9	3.4	2.0	1.2	0.9	1.9	3.0	3.2	4.2	5.3	6.2	6.8	6.7	5.7	3.7	2.2	1.4	0.4	0.1	-0.5	-1.2	3.3	6.8																							
16-Oct	-1.6	-1.1	-1.2	-0.4	0.1	-0.5	-0.2	0.1	0.4	0.8	1.4	2.0	2.7	3.2	3.3	3.8	3.9	4.0	4.0	3.6	3.4	3.6	3.4	3.1	1.7	4.0																							
17-Oct	2.5	2.7	2.6	2.2	1.5	1.2	1.2	1.2	2.5	4.3	6.5	8.4	10.1	10.8	11.8	12.1	11.2	9.9	8.8	8.7	8.5	8.3	8.0	8.0	6.4	12.1																							
18-Oct	8.0	7.8	7.6	7.5	7.2	6.6	6.3	6.3	6.6	7.3	8.9	9.9	11.0	11.9	12.5	13.5	12.8	12.0	11.5	10.1	9.3	8.3	7.4	6.8	9.0	13.5																							
19-Oct	5.6	5.0	4.5	4.2	3.7	2.7	2.2	1.9	3.5	5.0	8.1	10.6	12.3	14.8	16.4	15.7	15.3	14.7	13.5	12.1	11.5	11.2	10.8	10.6	9.0	16.4																							
20-Oct	10.2	10.0	9.3	8.6	7.6	7.1	6.7	6.3	6.5	7.5	8.5	9.3	10.4	11.2	13.0	13.7	13.3	11.1	11.6	10.2	9.9	9.6	8.5	7.0	9.5	13.7																							
21-Oct	6.0	5.5	4.9	4.8	5.0	5.4	6.8	7.9	7.8	8.6	10.1	11.8	12.8	14.2	15.4	15.4	13.9	11.7	10.0	8.5	7.0	5.9	5.3	4.5	8.7	15.4																							
22-Oct	3.9	3.7	3.0	1.8	1.6	0.9	0.6	0.4	3.0	5.4	7.6	11.5	13.8	15.4	16.1	15.7	14.5	13.3	12.8	12.0	11.4	10.9	10.3	10.1	8.3	16.1																							
23-Oct	9.2	8.9	8.5	8.1	7.6	6.6	7.2	7.5	7.8	8.4	8.9	9.2	8.8	7.9	7.5	7.0	6.8	6.4	6.2	6.0	5.7	5.4	5.3	4.8	7.3	9.2																							
24-Oct	4.2	3.1	2.0	1.2	0.6	0.3	0.3	0.2	-0.1	-0.4	-0.5	-0.4	0.1	0.5	0.8	1.5	1.6	1.1	1.2	1.0	0.8	1.3	1.4	1.5	1.0	4.2																							
25-Oct	1.2	1.3	1.4	1.0	0.1	-0.8	-1.6	-2.0	-1.1	0.5	2.5	3.5	4.0	4.1	5.1	4.5	3.6	3.4	3.2	2.9	2.4	2.2	2.2	2.1	1.9	5.1																							
26-Oct	2.1	2.1	2.0	2.0	1.8	0.7	0.1	0.0	-0.1	0.0	0.0	-0.1	0.1	0.1	0.3	0.5	0.7	0.4	0.4	0.4	0.2	0.0	-0.2	-0.3	0.5	2.1																							
27-Oct	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7	-0.9	-0.8	-0.6	-0.3	-0.2	0.0	0.2	0.3	0.2	0.0	-0.1	-0.1	-0.3	-0.2	-0.1	-0.1	-0.1	-0.3	0.3																							
28-Oct	-0.4	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	-0.4	-0.5	-0.4	-0.2	0.1	0.2	0.6	0.8	0.6	0.1	0.3	0.3	0.2	0.2	0.2	0.1	0.1	-0.1	0.8																							
29-Oct	0.0	-0.1	-0.1	0.0	0.0	-0.2	-0.4	-0.2	-0.2	0.0	0.5	0.7	0.6	1.1	0.8	0.4	0.3	0.5	0.4	0.0	-0.1	-0.2	-0.4	-0.6	0.1	1.1																							
30-Oct	-1.1	-1.1	-1.2	-1.2	-1.1	-0.9	-1.1	-1.1	-0.8	-0.4	-0.1	0.3	0.8	1.2	1.1	1.1	1.2	1.3	1.4	1.5	1.5	1.4	1.2	1.0	0.2	1.5																							
31-Oct	0.9	0.8	0.8	0.8	0.8	1.0	1.2	1.4	1.6	2.0	2.4	3.0	3.3	3.2	3.5	3.4	3.1	2.8	2.7	2.6	2.5	2.3	2.3	2.2	2.1	3.5																							
																								4.0	3.8	3.5	3.2	2.9	2.5	2.4	2.5	3.1	4.1	5.3	6.3	7.2	8.0	8.5	8.4	7.8	7.0	6.4	5.8	5.4	5.0	4.7	4.2	Diurnal Average	
																								10.2	10.6	9.9	9.5	9.6	10.0	11.9	11.7	11.6	12.6	13.9	15.4	16.4	17.4	19.2	20.2	19.7	16.8	14.1	13.1	12.6	11.4	11.7	10.9	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Ambient Temperature 2 m (AT2m) - C**

**Mannix - October 2014**





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

**Ambient Temperature 2 m (AT2m) - C**  
**Mannix - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	97	13.04	13.04
0 - 10	515	69.22	82.26
10 - 20	131	17.61	99.87
> 20	1	0.13	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

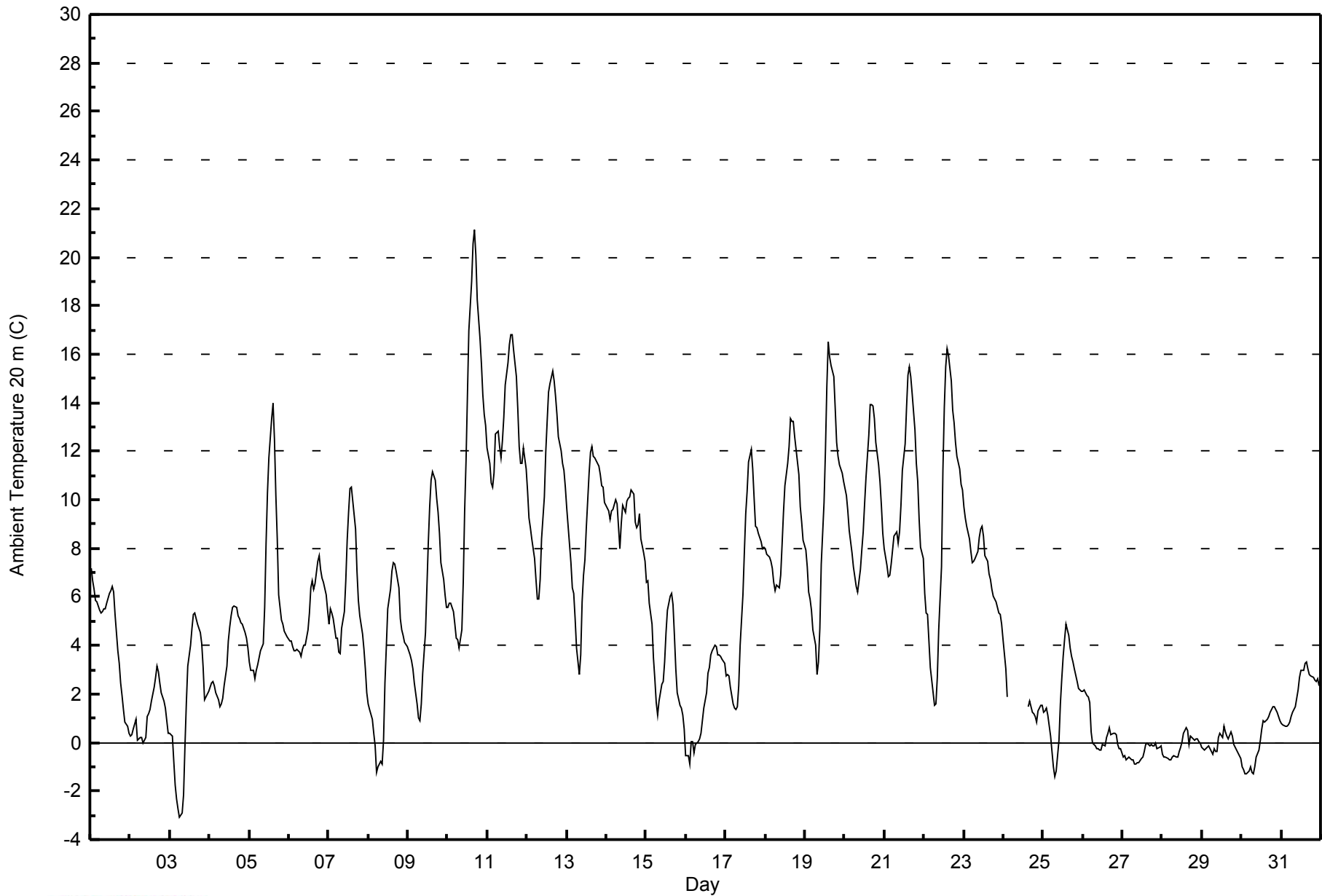
Mannix - October 2014

Maximum Value: 21.1 C on Oct 10 17:00      Maximum Daily Average: 13.1 C on Oct 11																								Hours in Service:	744		
Minimum Value: -3.1 C on Oct 3 07:00      Minimum Daily Average: -0.5 C on Oct 27																								Hours of Data:	732		
Maximum Diurnal Average: 8.4 C at hour 15      Minimum Diurnal Average: 2.7 C at hour 8																								Hours of Missing Data:	12		
Monthly Average: 5.32 C      Percentiles: P <sub>1</sub> = -1.3 P <sub>10</sub> = -0.2 Q <sub>1</sub> = 1.3 Median = 4.6 Q <sub>3</sub> = 8.7 P <sub>90</sub> = 12.1 P <sub>99</sub> = 16.7																								Hours of Calibration:	0		
																								Percent Operational Time:	98.4		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	7.2	6.7	6.3	5.8	5.8	5.5	5.3	5.4	5.5	5.5	5.8	6.1	6.3	6.5	6.2	5.3	3.8	3.3	2.4	2.0	1.3	0.8	0.7	0.4	4.6	7.2	
2-Oct	0.3	0.3	0.6	0.9	0.1	0.2	0.2	0.2	0.0	0.2	1.1	1.2	1.3	1.7	2.3	2.7	3.1	2.9	2.5	2.0	1.7	1.4	0.9	0.4	1.2	3.1	
3-Oct	0.4	0.3	-0.8	-1.7	-2.4	-2.7	-3.1	-2.9	-2.2	-0.1	1.7	3.1	4.0	4.7	5.3	5.3	5.1	4.9	4.5	4.1	3.1	1.8	1.9	2.1	1.5	5.3	
4-Oct	2.3	2.4	2.5	2.4	2.1	1.8	1.5	1.6	1.8	2.4	3.2	4.2	4.8	5.2	5.6	5.6	5.6	5.2	5.1	4.9	4.9	4.5	4.3	3.9	3.7	5.6	
5-Oct	3.3	3.0	3.0	2.6	3.0	3.2	3.5	3.8	4.0	5.6	8.2	10.3	11.7	13.4	14.0	12.5	10.2	8.4	6.1	5.1	4.8	4.6	4.5	4.4	6.4	14.0	
6-Oct	4.2	4.2	4.0	3.8	3.8	3.8	3.7	3.5	3.8	4.0	4.0	4.7	5.3	6.4	6.7	6.3	6.5	7.5	7.7	7.1	6.8	6.6	6.1	5.4	5.2	7.7	
7-Oct	4.9	5.5	5.3	5.1	4.3	4.3	3.7	3.7	4.7	5.4	6.7	8.4	9.5	10.5	10.5	9.4	8.8	7.0	5.8	5.2	4.4	3.9	3.0	2.0	5.9	10.5	
8-Oct	1.6	1.4	1.0	0.4	-0.2	-1.2	-1.0	-0.8	-0.9	0.1	2.5	3.9	5.5	6.3	7.1	7.4	7.4	7.0	6.4	5.1	4.7	4.4	4.1	3.9	3.2	7.4	
9-Oct	3.8	3.6	3.4	3.0	2.4	1.6	1.0	0.9	1.6	2.9	4.5	6.4	8.2	9.7	10.8	11.2	10.8	10.1	9.5	8.6	7.4	6.7	6.1	5.6	5.8	11.2	
10-Oct	5.6	5.7	5.8	5.4	4.9	4.3	4.3	3.9	4.6	6.6	9.5	11.6	14.3	16.9	19.0	20.5	21.1	20.1	18.2	16.6	15.6	14.3	13.5	13.0	11.5	21.1	
11-Oct	12.2	11.5	10.7	10.5	11.1	12.7	12.8	12.2	11.7	12.4	13.4	14.7	15.6	16.4	16.8	16.8	16.2	15.1	13.7	12.2	11.5	11.5	12.1	11.3	13.1	16.8	
12-Oct	10.3	9.2	8.9	8.4	7.6	6.7	5.9	5.9	6.7	8.4	10.1	12.0	13.2	14.4	14.8	15.3	14.9	14.3	13.5	12.6	12.0	11.5	11.2	10.5	10.8	15.3	
13-Oct	9.7	8.9	7.4	6.4	6.2	5.1	3.9	2.8	3.6	5.8	6.9	7.5	8.9	11.1	12.0	12.2	11.8	11.7	11.5	11.4	11.1	10.6	10.5	9.9	8.6	12.2	
14-Oct	9.6	9.6	9.2	9.6	9.6	10.0	9.8	8.9	8.0	9.0	9.7	9.5	9.9	10.1	10.1	10.4	10.2	9.1	8.8	9.0	9.5	8.4	7.8	7.5	9.3	10.4	
15-Oct	6.6	6.7	5.7	4.8	3.5	2.6	1.6	1.1	1.7	2.4	2.5	3.3	4.5	5.5	6.0	6.1	5.7	4.4	3.0	2.0	1.5	1.4	1.1	0.5	3.5	6.7	
16-Oct	-0.6	-0.5	-0.9	0.0	0.0	-0.4	-0.1	0.1	0.2	0.4	0.9	1.4	2.0	2.9	3.1	3.6	3.8	4.0	3.9	3.6	3.6	3.6	3.4	3.3	1.7	4.0	
17-Oct	2.7	2.8	2.7	2.3	1.6	1.4	1.4	1.5	2.3	4.0	6.1	7.8	9.4	10.4	11.6	12.1	11.3	10.0	8.9	8.9	8.6	8.3	8.0	8.0	6.3	12.1	
18-Oct	8.0	7.7	7.6	7.5	7.2	6.6	6.2	6.5	6.4	6.9	8.2	9.5	10.6	11.5	12.2	13.4	13.2	13.2	12.6	11.5	11.1	9.7	9.1	8.4	9.4	13.4	
19-Oct	7.9	7.2	6.2	5.9	5.5	4.7	4.0	2.8	3.3	4.7	7.4	9.9	12.0	14.7	16.5	15.9	15.5	15.1	13.7	12.3	11.8	11.4	11.1	10.8	9.6	16.5	
20-Oct	10.5	10.2	9.5	8.7	7.8	7.2	6.8	6.4	6.2	7.1	7.9	8.7	9.8	10.9	12.7	13.9	13.9	13.9	13.3	12.4	11.5	10.7	9.8	8.6	9.9	13.9	
21-Oct	8.0	7.3	6.9	6.9	7.4	7.9	8.5	8.7	8.2	8.7	9.8	11.2	12.3	13.8	15.2	15.5	15.1	14.4	12.9	11.5	10.7	9.2	8.0	7.6	10.2	15.5	
22-Oct	6.1	5.3	5.3	4.2	3.1	2.1	1.5	1.6	2.7	4.7	7.3	11.2	13.8	15.5	16.2	15.9	14.9	13.7	13.2	12.4	11.8	11.3	10.7	10.4	8.9	16.2	
23-Oct	9.7	9.3	8.9	8.4	7.9	7.4	7.5	7.6	7.9	8.5	8.8	8.9	8.5	7.7	7.4	6.9	6.7	6.3	6.0	5.8	5.5	5.4	5.3	4.9	7.4	9.7	
24-Oct	4.2	3.0	1.9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.4	1.7	1.2	1.2	1.1	0.8	1.3	1.5	1.5	-	4.2	
25-Oct	1.3	1.3	1.4	1.1	0.3	-0.4	-1.0	-1.4	-1.2	0.1	1.6	2.6	3.6	4.2	4.8	4.4	3.9	3.6	3.3	3.0	2.5	2.2	2.2	2.1	1.9	4.8	
26-Oct	2.1	2.1	1.9	1.9	1.6	0.5	0.0	-0.1	-0.3	-0.3	-0.3	-0.3	-0.1	-0.1	0.2	0.4	0.6	0.3	0.4	0.4	0.3	-0.1	-0.2	-0.3	0.4	2.1	
27-Oct	-0.6	-0.6	-0.7	-0.6	-0.6	-0.7	-0.7	-0.9	-0.9	-0.9	-0.9	-0.8	-0.7	-0.6	-0.4	-0.1	0.0	-0.1	-0.1	-0.2	-0.1	0.0	-0.3	-0.2	-0.1	-0.5	0.0
28-Oct	-0.5	-0.6	-0.6	-0.7	-0.7	-0.7	-0.6	-0.5	-0.6	-0.6	-0.4	-0.2	0.0	0.4	0.6	0.5	-0.1	0.3	0.2	0.1	0.2	0.1	0.0	0.0	-0.2	0.6	
29-Oct	-0.2	-0.3	-0.3	-0.2	-0.1	-0.3	-0.5	-0.3	-0.4	-0.4	0.2	0.4	0.2	0.7	0.4	0.2	0.1	0.4	0.3	-0.1	-0.2	-0.3	-0.5	-0.7	-0.1	0.7	
30-Oct	-1.0	-1.1	-1.3	-1.3	-1.2	-1.0	-1.2	-1.3	-1.0	-0.6	-0.3	0.1	0.5	0.9	0.9	1.0	1.1	1.3	1.3	1.5	1.5	1.3	1.1	0.9	0.1	1.5	
31-Oct	0.8	0.7	0.7	0.7	0.7	0.8	1.1	1.3	1.5	1.8	2.2	2.7	3.0	3.0	3.3	3.3	3.0	2.8	2.7	2.7	2.6	2.5	2.6	2.4	2.0	3.3	
																								Diurnal Average			
																								Diurnal Maximum			
AF - Analyzer Failure																											



**WBEA**  
**Hourly Averages**

**Ambient Temperature 20 m (AT20m) - C**  
**Mannix - October 2014**







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

**Ambient Temperature 20 m (AT20m) - C**  
**Mannix - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	98	13.39	13.39
0 - 10	495	67.62	81.01
10 - 20	136	18.58	99.59
> 20	3	0.41	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



Summary of Hour Averages

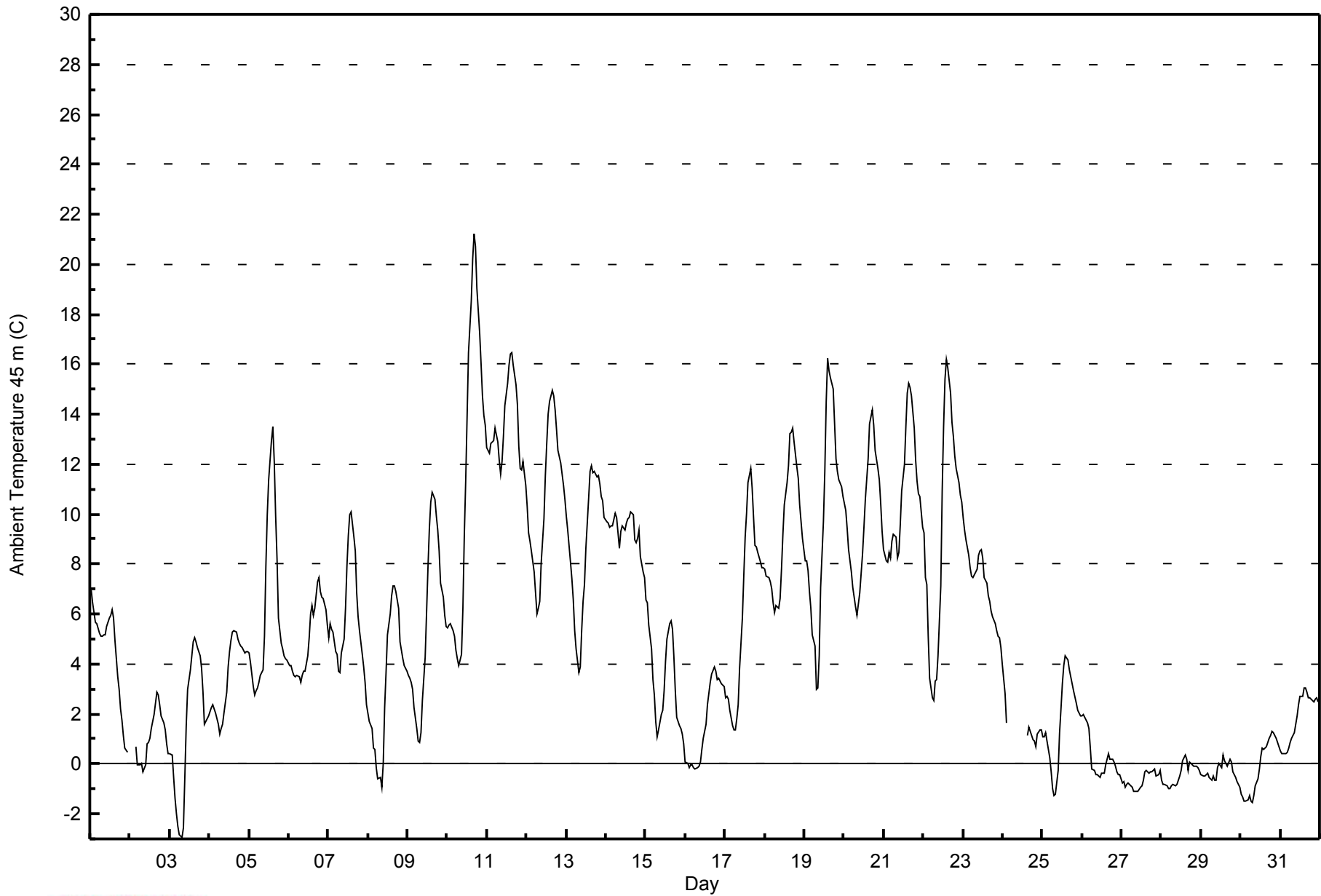
Mannix - October 2014

Maximum Value: 21.2 C on Oct 10 17:00																								Hours in Service: 744		
Maximum Daily Average: 13.4 C on Oct 11																								Hours of Data: 728		
Minimum Value: -2.9 C on Oct 3 08:00																								Hours of Missing Data: 16		
Minimum Daily Average: -0.7 C on Oct 27																								Hours of Calibration: 0		
Maximum Diurnal Average: 8.1 C at hour 15																								Percent Operational Time: 97.9		
Minimum Diurnal Average: 2.8 C at hour 8																										
Monthly Average: 5.29 C																										
Percentiles: P <sub>1</sub> = -1.5 P <sub>10</sub> = -0.4 Q <sub>1</sub> = 1.2 Median = 4.5 Q <sub>3</sub> = 8.9 P <sub>90</sub> = 12.1 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-Oct	6.9	6.4	6.1	5.7	5.6	5.2	5.1	5.1	5.2	5.2	5.5	5.8	6.0	6.2	5.9	5.0	3.5	3.0	2.2	1.7	1.1	0.6	0.5	AF	4.5	6.9
2-Oct	AF	AF	AF	0.7	0.0	0.0	0.0	0.0	-0.3	0.0	0.8	0.9	1.1	1.4	2.0	2.4	2.9	2.7	2.4	1.9	1.7	1.4	0.8	0.4	1.1	2.9
3-Oct	0.4	0.4	-0.6	-1.4	-2.0	-2.5	-2.8	-2.9	-2.6	-0.5	1.5	3.0	3.8	4.3	4.9	5.1	4.9	4.7	4.3	3.9	2.9	1.6	1.7	1.9	1.4	5.1
4-Oct	2.1	2.3	2.4	2.2	2.0	1.6	1.2	1.4	1.6	2.0	2.9	3.9	4.5	4.9	5.3	5.3	5.0	4.9	4.7	4.7	4.5	4.5	4.5	4.5	3.5	5.3
5-Oct	4.4	4.0	3.1	2.7	2.9	3.1	3.3	3.6	3.7	5.1	7.9	10.0	11.4	12.9	13.5	12.1	9.9	8.2	5.9	4.8	4.6	4.3	4.2	4.1	6.2	13.5
6-Oct	3.9	3.9	3.7	3.5	3.5	3.6	3.5	3.2	3.5	3.7	3.7	4.3	5.0	6.0	6.4	6.0	6.2	7.3	7.5	6.9	6.7	6.6	6.2	5.6	5.0	7.5
7-Oct	5.1	5.6	5.4	5.3	4.5	4.4	3.7	3.6	4.4	5.0	6.2	7.9	9.1	10.0	10.1	9.1	8.5	6.9	5.9	5.3	4.4	3.9	3.3	2.4	5.8	10.1
8-Oct	2.0	1.7	1.4	0.6	0.6	-0.2	-0.6	-0.5	-1.0	0.0	2.2	3.6	5.2	6.0	6.8	7.1	7.1	6.9	6.2	4.9	4.5	4.2	3.9	3.7	3.2	7.1
9-Oct	3.5	3.4	3.3	3.0	2.3	1.4	0.9	0.8	1.3	2.5	4.3	6.1	7.9	9.4	10.5	10.8	10.6	9.9	9.3	8.5	7.3	6.7	6.0	5.5	5.6	10.8
10-Oct	5.5	5.6	5.6	5.3	5.1	4.5	4.2	3.9	4.4	6.2	9.1	11.3	13.9	16.5	18.5	20.2	21.2	20.7	19.0	17.2	16.0	14.7	14.0	13.6	11.5	21.2
11-Oct	12.7	12.4	12.8	12.9	13.0	13.4	12.9	12.1	11.6	12.1	13.1	14.4	15.2	16.0	16.4	16.5	16.0	15.2	14.4	12.7	11.8	11.8	12.1	11.2	13.4	16.5
12-Oct	10.3	9.3	8.9	8.5	7.7	6.8	6.0	6.2	6.5	8.0	9.8	11.6	12.8	14.0	14.5	15.0	14.7	14.2	13.4	12.6	12.1	11.6	11.1	10.6	10.7	15.0
13-Oct	9.9	9.3	8.1	7.4	6.6	5.3	4.6	3.6	3.9	5.4	6.5	7.2	8.6	10.7	11.7	11.9	11.6	11.7	11.5	11.6	11.2	10.7	10.5	9.8	8.7	11.9
14-Oct	9.7	9.7	9.5	9.5	9.5	10.0	9.9	9.3	8.7	9.3	9.6	9.3	9.7	9.8	9.8	10.1	10.0	8.9	8.9	9.0	9.3	8.3	7.7	7.5	9.3	10.1
15-Oct	6.6	6.5	5.5	4.6	3.4	2.8	1.7	1.1	1.4	2.0	2.1	3.0	4.1	5.0	5.6	5.7	5.4	4.3	2.9	1.9	1.5	1.4	1.2	0.8	3.3	6.6
16-Oct	0.1	0.0	-0.1	0.0	-0.1	-0.1	-0.2	-0.2	-0.1	0.1	0.6	1.1	1.6	2.3	2.8	3.3	3.6	3.9	3.7	3.4	3.4	3.3	3.2	3.1	1.6	3.9
17-Oct	2.7	2.7	2.6	2.1	1.5	1.3	1.4	1.8	2.4	3.8	5.8	7.5	9.1	10.0	11.3	11.8	11.1	9.9	8.8	8.7	8.5	8.1	7.8	7.9	6.2	11.8
18-Oct	7.8	7.5	7.4	7.3	7.0	6.4	6.1	6.3	6.2	6.6	7.8	9.2	10.4	11.2	11.9	13.2	13.3	13.4	12.9	11.9	11.5	10.4	9.7	9.0	9.4	13.4
19-Oct	8.1	8.1	7.7	6.9	6.2	5.1	4.7	3.0	3.0	4.3	7.1	9.7	11.7	14.5	16.2	15.7	15.4	15.0	13.6	12.2	11.7	11.4	11.1	10.7	9.7	16.2
20-Oct	10.4	10.1	9.4	8.6	7.7	7.1	6.7	6.3	6.0	6.8	7.6	8.4	9.5	10.6	12.2	13.6	13.9	14.2	13.6	12.5	11.8	11.4	10.4	9.3	9.9	14.2
21-Oct	8.6	8.2	8.1	8.5	8.2	8.9	9.2	9.1	8.2	8.5	9.6	10.9	12.0	13.5	14.9	15.2	15.1	14.7	13.4	12.2	11.3	10.8	10.7	9.5	10.8	15.2
22-Oct	9.2	7.5	7.2	5.1	3.4	2.7	2.5	3.3	3.4	4.3	7.1	10.9	13.5	15.4	16.2	15.9	14.9	13.7	13.1	12.3	11.8	11.3	10.7	10.5	9.4	16.2
23-Oct	9.9	9.4	9.0	8.4	7.8	7.5	7.5	7.6	7.8	8.3	8.5	8.6	8.2	7.4	7.2	6.7	6.5	6.1	5.9	5.6	5.3	5.1	5.0	4.7	7.3	9.9
24-Oct	4.0	2.8	1.6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.2	1.5	1.1	1.0	0.9	0.7	1.2	1.4	1.3	-	4.0
25-Oct	1.1	1.1	1.2	0.9	0.2	-0.3	-1.0	-1.3	-1.2	-0.3	1.3	2.2	3.2	3.9	4.3	4.2	3.7	3.5	3.2	2.9	2.4	2.1	2.0	1.9	1.7	4.3
26-Oct	1.9	2.0	1.7	1.6	1.4	0.6	-0.2	-0.3	-0.4	-0.4	-0.5	-0.5	-0.3	-0.4	0.0	0.2	0.4	0.2	0.2	0.1	-0.1	-0.3	-0.4	-0.4	0.3	2.0
27-Oct	-0.8	-0.7	-0.9	-0.8	-0.8	-0.9	-0.9	-1.1	-1.1	-1.1	-1.1	-1.0	-0.9	-0.6	-0.3	-0.3	-0.3	-0.3	-0.3	-0.2	-0.2	-0.5	-0.4	-0.2	-0.7	-0.2
28-Oct	-0.6	-0.8	-0.8	-0.9	-1.0	-1.0	-0.9	-0.8	-0.9	-0.8	-0.7	-0.5	-0.3	0.1	0.4	0.2	-0.3	0.1	0.0	-0.1	-0.1	-0.1	-0.2	-0.3	-0.4	0.4
29-Oct	-0.5	-0.5	-0.5	-0.4	-0.4	-0.5	-0.7	-0.5	-0.7	-0.6	-0.1	0.0	-0.1	0.4	0.2	0.0	-0.1	0.2	0.1	-0.3	-0.4	-0.6	-0.7	-0.9	-0.3	0.4
30-Oct	-1.2	-1.3	-1.5	-1.5	-1.4	-1.3	-1.5	-1.5	-1.2	-0.8	-0.6	-0.2	0.3	0.6	0.6	0.7	0.8	1.0	1.1	1.3	1.2	1.0	0.9	0.7	-0.2	1.3
31-Oct	0.5	0.4	0.4	0.4	0.5	0.6	0.8	1.0	1.2	1.6	1.9	2.4	2.7	2.7	3.0	3.1	2.9	2.6	2.6	2.5	2.5	2.6	2.7	2.5	1.8	3.1
4.8 4.6 4.3 3.9 3.5 3.2 2.9 2.8 2.8 3.5 4.7 5.7 6.6 7.5 8.1 8.0 7.7 7.4 6.8 6.2 5.8 5.5 5.2 5.0																								Diurnal Average		
12.7 12.4 12.8 12.9 13.0 13.4 12.9 12.1 11.6 12.1 13.1 14.4 15.2 16.5 18.5 20.2 21.2 20.7 19.0 17.2 16.0 14.7 14.0 13.6																								Diurnal Maximum		
AF - Analyzer Failure																										



**WBEA**  
**Hourly Averages**

**Ambient Temperature 45 m (AT45m) - C**  
**Mannix - October 2014**





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

**Ambient Temperature 45 m (AT45m) - C**  
**Mannix - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	117	16.07	16.07
0 - 10	477	65.52	81.59
10 - 20	131	17.99	99.59
> 20	3	0.41	100.00

Total Number of Valid Hours: 728

Total Number of Hours: 744



Summary of Hour Averages

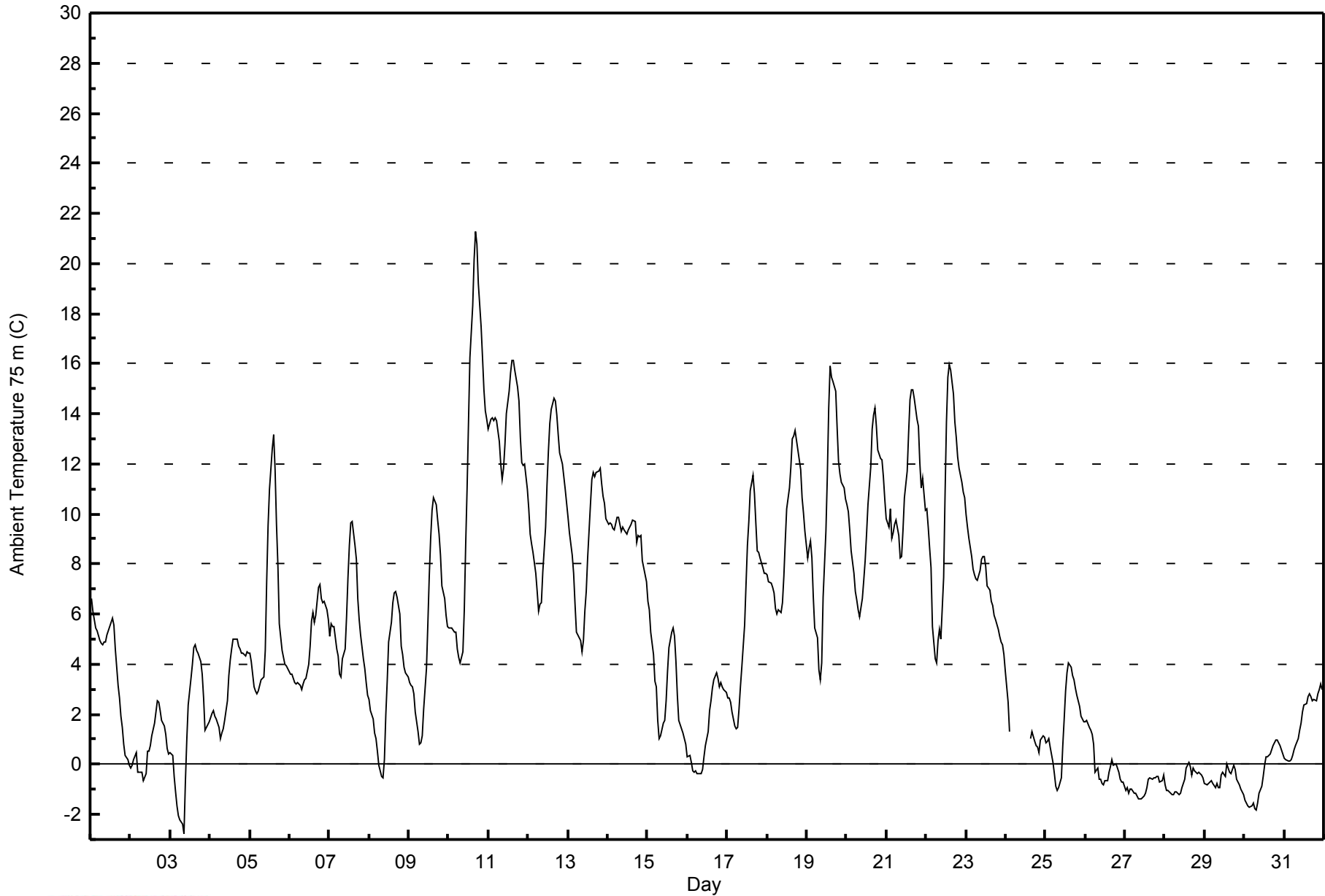
Mannix - October 2014

Maximum Value: 21.3 C on Oct 10 17:00      Maximum Daily Average: 13.6 C on Oct 11																							Hours in Service:	744																							
Minimum Value: -2.8 C on Oct 3 09:00      Minimum Daily Average: -0.9 C on Oct 27																							Hours of Data:	732																							
Maximum Diurnal Average: 7.8 C at hour 15      Minimum Diurnal Average: 2.8 C at hour 8																							Hours of Missing Data:	12																							
Monthly Average: 5.16 C      Percentiles: P <sub>1</sub> = -1.7 P <sub>10</sub> = -0.6 Q <sub>1</sub> = 0.9 Median = 4.4 Q <sub>3</sub> = 9.0 P <sub>90</sub> = 12.0 P <sub>99</sub> = 15.2																							Hours of Calibration:	0																							
																							Percent Operational Time:	98.4																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Oct	6.6	6.1	5.8	5.4	5.3	4.9	4.8	4.8	4.9	4.9	5.2	5.5	5.7	5.8	5.5	4.6	3.2	2.7	1.9	1.5	0.8	0.4	0.2	0.0	4.0	6.6																					
2-Oct	-0.1	0.0	0.2	0.5	-0.3	-0.3	-0.3	-0.3	-0.6	-0.3	0.5	0.5	0.7	1.1	1.7	2.1	2.5	2.5	2.2	1.8	1.5	1.2	0.6	0.4	0.7	2.5																					
3-Oct	0.4	0.4	-0.5	-1.1	-1.7	-2.0	-2.2	-2.4	-2.8	-0.7	1.0	2.4	3.5	4.0	4.6	4.8	4.6	4.5	4.1	3.6	2.7	1.4	1.5	1.7	1.3	4.8																					
4-Oct	1.9	2.0	2.1	1.9	1.8	1.5	1.0	1.2	1.4	1.7	2.6	3.5	4.2	4.6	5.0	5.0	5.0	4.7	4.6	4.4	4.4	4.3	4.5	4.4	3.3	5.0																					
5-Oct	4.4	4.1	3.1	2.9	2.8	2.9	3.2	3.4	3.5	4.6	7.3	9.5	11.0	12.6	13.2	11.7	9.6	7.9	5.6	4.5	4.3	4.0	3.9	3.8	6.0	13.2																					
6-Oct	3.6	3.6	3.4	3.3	3.2	3.3	3.2	3.0	3.2	3.4	3.5	4.0	4.7	5.7	6.0	5.7	6.0	7.1	7.2	6.6	6.4	6.5	6.2	5.8	4.8	7.2																					
7-Oct	5.1	5.6	5.5	5.5	4.6	4.3	3.6	3.5	4.2	4.6	5.9	7.5	8.8	9.6	9.7	8.8	8.2	6.6	5.8	5.2	4.2	3.8	3.2	2.8	5.7	9.7																					
8-Oct	2.6	2.1	1.8	1.3	1.0	0.5	0.0	-0.5	-0.5	0.2	2.0	3.3	4.9	5.7	6.4	6.8	6.9	6.7	6.0	4.7	4.4	3.9	3.7	3.5	3.2	6.9																					
9-Oct	3.3	3.1	3.1	2.8	2.1	1.3	0.8	0.9	1.1	2.2	3.8	5.6	7.5	9.0	10.2	10.6	10.3	9.8	9.2	8.3	7.1	6.6	5.9	5.5	5.4	10.6																					
10-Oct	5.5	5.5	5.5	5.3	5.3	4.6	4.3	4.0	4.5	6.2	8.8	11.0	13.7	16.2	18.3	20.1	21.3	20.8	19.2	17.5	16.2	14.9	14.1	13.8	11.5	21.3																					
11-Oct	13.4	13.8	13.8	13.7	13.8	13.7	12.9	12.0	11.4	11.8	12.8	14.0	14.9	15.6	16.1	16.1	15.7	15.1	14.5	13.1	12.1	11.9	12.0	11.0	13.6	16.1																					
12-Oct	10.2	9.2	8.8	8.5	7.6	6.9	6.1	6.4	6.4	7.7	9.5	11.2	12.5	13.6	14.2	14.6	14.5	13.9	13.2	12.4	12.0	11.5	11.0	10.5	10.5	14.6																					
13-Oct	9.9	9.3	8.4	7.6	6.4	5.3	5.2	4.9	4.5	4.9	6.1	6.9	8.2	10.4	11.4	11.6	11.5	11.7	11.7	11.8	11.2	10.7	10.4	9.8	8.7	11.8																					
14-Oct	9.6	9.6	9.6	9.4	9.4	9.9	9.9	9.6	9.3	9.5	9.3	9.2	9.4	9.5	9.6	9.8	9.7	8.9	9.1	9.1	9.2	8.1	7.6	7.3	9.2	9.9																					
15-Oct	6.5	6.2	5.3	4.4	3.3	3.1	1.8	1.0	1.1	1.6	1.7	2.6	3.7	4.7	5.3	5.4	5.1	4.1	2.8	1.8	1.4	1.3	1.0	0.8	3.2	6.5																					
16-Oct	0.3	0.4	0.1	-0.3	-0.3	-0.3	-0.3	-0.4	-0.3	-0.2	0.3	0.8	1.3	2.1	2.5	3.0	3.3	3.7	3.4	3.1	3.2	3.1	3.0	2.9	1.4	3.7																					
17-Oct	2.7	2.7	2.5	2.1	1.5	1.4	1.5	2.2	3.1	3.9	5.5	7.2	8.8	9.7	11.0	11.5	10.8	9.6	8.5	8.5	8.3	7.9	7.6	7.6	6.1	11.5																					
18-Oct	7.6	7.3	7.2	7.1	6.8	6.2	6.0	6.2	6.1	6.4	7.5	8.9	10.2	11.0	11.9	13.0	13.1	13.4	12.9	12.2	11.7	10.7	10.0	9.3	9.3	13.4																					
19-Oct	8.2	8.6	8.9	8.2	6.7	5.5	5.1	3.8	3.4	4.1	6.7	9.3	11.5	14.2	15.9	15.5	15.3	14.9	13.5	12.1	11.6	11.3	11.0	10.6	9.8	15.9																					
20-Oct	10.4	10.1	9.3	8.5	7.6	6.9	6.6	6.2	5.9	6.6	7.4	8.1	9.2	10.3	11.9	13.4	13.9	14.2	13.5	12.6	12.2	12.1	11.5	10.6	10.0	14.2																					
21-Oct	9.8	9.4	10.2	9.0	9.3	9.6	9.8	9.1	8.2	8.3	9.4	10.6	11.7	13.2	14.6	15.0	14.9	14.6	13.8	13.5	12.1	11.1	11.5	10.1	11.2	15.0																					
22-Oct	10.2	9.5	8.6	7.8	5.5	4.2	4.0	5.0	5.4	5.0	7.5	10.7	13.7	15.4	16.0	15.7	14.8	13.7	13.0	12.3	11.8	11.2	10.9	10.6	10.1	16.0																					
23-Oct	10.0	9.5	9.0	8.3	7.8	7.6	7.4	7.4	7.7	8.2	8.3	8.3	7.9	7.1	7.0	6.5	6.3	6.0	5.8	5.4	5.1	4.9	4.8	4.4	7.1	10.0																					
24-Oct	3.7	2.5	1.3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.0	1.3	0.9	0.7	0.7	0.5	1.0	1.1	1.1	-	3.7																					
25-Oct	0.8	0.9	1.0	0.7	0.1	-0.4	-0.9	-1.0	-0.9	-0.5	0.8	1.8	2.9	3.7	4.1	3.9	3.5	3.4	3.0	2.7	2.3	1.9	1.8	1.7	1.5	4.1																					
26-Oct	1.7	1.7	1.5	1.3	1.2	0.8	-0.3	-0.2	-0.6	-0.6	-0.8	-0.8	-0.8	-0.7	-0.3	-0.1	0.2	0.0	0.0	-0.1	-0.3	-0.6	-0.7	-0.7	0.0	1.7																					
27-Oct	-1.1	-1.0	-1.1	-1.0	-1.0	-1.1	-1.2	-1.3	-1.4	-1.4	-1.4	-1.4	-1.3	-1.2	-0.9	-0.6	-0.6	-0.6	-0.6	-0.5	-0.5	-0.7	-0.6	-0.4	-0.9	-0.4																					
28-Oct	-0.8	-1.0	-1.1	-1.1	-1.2	-1.2	-1.1	-1.1	-1.2	-1.1	-1.0	-0.8	-0.6	-0.1	0.1	-0.1	-0.4	-0.2	-0.3	-0.4	-0.3	-0.4	-0.4	-0.5	-0.7	0.1																					
29-Oct	-0.7	-0.8	-0.8	-0.7	-0.7	-0.8	-0.9	-0.8	-0.9	-0.9	-0.9	-0.4	-0.3	-0.5	0.0	-0.1	-0.3	-0.4	0.0	-0.2	-0.6	-0.7	-0.8	-1.0	-1.2	-0.6	0.0																				
30-Oct	-1.4	-1.6	-1.7	-1.7	-1.7	-1.5	-1.8	-1.8	-1.5	-1.1	-0.9	-0.5	0.0	0.3	0.3	0.4	0.6	0.8	0.9	1.0	1.0	0.7	0.6	0.4	-0.4	1.0																					
31-Oct	0.2	0.2	0.1	0.1	0.2	0.3	0.6	0.8	1.0	1.3	1.6	2.1	2.4	2.4	2.7	2.8	2.7	2.5	2.6	2.5	2.8	3.0	3.2	3.0	1.7	3.2																					
																							4.7	4.5	4.2	4.0	3.6	3.2	2.9	2.8	2.9	3.3	4.3	5.4	6.3	7.2	7.8	7.7	7.5	7.2	6.7	6.2	5.8	5.4	5.2	4.9	Diurnal Average
																							13.4	13.8	13.8	13.7	13.8	13.7	12.9	12.0	11.4	11.8	12.8	14.0	14.9	16.2	18.3	20.1	21.3	20.8	19.2	17.5	16.2	14.9	14.1	13.8	Diurnal Maximum
AF - Analyzer Failure																																															



**WBEA**  
**Hourly Averages**

**Ambient Temperature 75 m (AT75m) - C**  
**Mannix - October 2014**





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

**Ambient Temperature 75 m (AT75m) - C**  
**Mannix - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	132	18.03	18.03
0 - 10	465	63.52	81.56
10 - 20	132	18.03	99.59
> 20	3	0.41	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



Summary of Hour Averages

Mannix - October 2014

Maximum Value: 21.2 C on Oct 10 17:00      Maximum Daily Average: 13.5 C on Oct 11																								Hours in Service:	744		
Minimum Value: -2.8 C on Oct 3 09:00      Minimum Daily Average: -1.0 C on Oct 27																								Hours of Data:	732		
Maximum Diurnal Average: 7.7 C at hour 15      Minimum Diurnal Average: 2.8 C at hour 9																								Hours of Missing Data:	12		
Monthly Average: 5.12 C      Percentiles: P <sub>1</sub> = -1.7 P <sub>10</sub> = -0.7 Q <sub>1</sub> = 0.8 Median = 4.3 Q <sub>3</sub> = 9.0 P <sub>90</sub> = 12.2 P <sub>99</sub> = 15.2																								Hours of Calibration:	0		
																								Percent Operational Time:	98.4		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	6.5	6.0	5.6	5.3	5.2	4.8	4.7	4.6	4.8	4.8	5.0	5.4	5.5	5.7	5.4	4.5	3.0	2.5	1.8	1.4	0.7	0.2	0.1	-0.1	3.9	6.5	
2-Oct	-0.2	-0.1	0.3	0.4	-0.4	-0.4	-0.5	-0.4	-0.7	-0.5	0.4	0.4	0.6	1.0	1.5	2.0	2.4	2.4	2.1	1.7	1.4	1.1	0.6	0.4	0.6	2.4	
3-Oct	0.5	0.3	-0.5	-1.0	-1.6	-1.8	-1.5	-1.8	-2.8	-1.0	0.9	2.5	3.4	3.9	4.5	4.6	4.5	4.3	4.0	3.5	2.5	1.2	1.4	1.6	1.3	4.6	
4-Oct	1.8	1.9	2.0	1.8	1.7	1.4	1.0	1.1	1.3	1.6	2.4	3.4	4.1	4.5	4.9	4.9	4.6	4.5	4.3	4.3	4.3	4.2	4.4	4.3	3.1	4.9	
5-Oct	4.3	4.1	3.1	2.9	2.7	2.9	3.1	3.3	3.4	4.4	7.0	9.4	10.9	12.5	13.0	11.6	9.4	7.8	5.5	4.4	4.2	3.9	3.8	3.7	5.9	13.0	
6-Oct	3.5	3.5	3.3	3.1	3.2	3.2	3.0	2.9	3.1	3.3	3.4	3.9	4.6	5.6	5.9	5.5	5.8	7.0	7.1	6.5	6.3	6.5	6.2	5.9	4.7	7.1	
7-Oct	5.1	5.6	5.6	5.6	4.6	4.3	3.6	3.4	4.1	4.5	5.7	7.4	8.6	9.5	9.6	8.6	8.1	6.5	5.7	5.1	4.2	3.8	3.2	2.9	5.6	9.6	
8-Oct	2.7	2.1	1.8	1.4	1.2	0.7	0.2	-0.2	-0.3	0.4	1.9	3.3	4.8	5.6	6.4	6.7	6.8	6.5	5.9	4.7	4.3	3.8	3.5	3.4	3.2	6.8	
9-Oct	3.2	3.0	3.0	2.7	2.0	1.2	0.7	0.8	1.0	2.1	3.8	5.7	7.5	9.0	10.1	10.5	10.2	9.7	9.1	8.2	7.0	6.6	6.0	5.5	5.4	10.5	
10-Oct	5.5	5.5	5.4	5.2	5.2	4.5	4.3	4.0	4.6	6.2	8.7	10.9	13.4	16.0	18.1	20.0	21.2	20.7	19.3	17.6	16.3	15.0	14.2	13.8	11.5	21.2	
11-Oct	13.7	14.0	13.9	13.8	14.0	13.7	12.8	11.9	11.3	11.7	12.6	13.9	14.8	15.5	16.0	16.0	15.6	15.0	14.5	13.1	12.1	12.0	11.9	10.9	13.5	16.0	
12-Oct	10.1	9.2	8.8	8.5	7.7	7.0	6.2	6.4	6.5	7.5	9.3	11.1	12.3	13.5	14.1	14.5	14.4	13.8	13.1	12.3	11.9	11.5	10.9	10.4	10.5	14.5	
13-Oct	9.8	9.2	8.4	7.6	6.4	5.3	5.2	4.9	4.3	4.7	6.0	6.8	8.2	10.2	11.4	11.5	11.4	11.6	11.8	11.9	11.2	10.7	10.4	9.8	8.7	11.9	
14-Oct	9.5	9.6	9.6	9.3	9.3	9.8	9.8	9.6	9.4	9.5	9.2	9.1	9.2	9.4	9.4	9.6	9.6	8.9	9.3	9.1	9.1	8.0	7.5	7.2	9.2	9.8	
15-Oct	6.5	6.1	5.2	4.3	3.3	3.1	1.8	1.0	1.0	1.5	1.6	2.4	3.6	4.5	5.1	5.3	5.0	4.0	2.7	1.7	1.4	1.2	0.9	0.7	3.1	6.5	
16-Oct	0.3	0.3	0.0	-0.4	-0.4	-0.4	-0.4	-0.5	-0.5	-0.3	0.1	0.6	1.1	2.0	2.5	2.9	3.3	3.6	3.3	3.0	3.1	3.0	2.9	2.8	1.3	3.6	
17-Oct	2.6	2.7	2.4	2.1	1.5	1.4	1.5	2.3	3.2	4.0	5.4	7.1	8.7	9.6	10.9	11.4	10.7	9.5	8.4	8.4	8.1	7.8	7.5	7.5	6.0	11.4	
18-Oct	7.4	7.2	7.1	7.0	6.7	6.1	6.0	6.1	6.1	6.3	7.4	8.8	10.1	10.9	11.8	12.9	13.0	13.3	12.9	12.2	11.8	10.7	10.1	9.4	9.2	13.3	
19-Oct	8.3	8.7	9.0	8.4	6.8	5.5	5.1	4.4	4.0	4.0	6.7	9.3	11.6	14.2	15.8	15.3	15.2	14.8	13.4	12.0	11.5	11.2	11.0	10.5	9.9	15.8	
20-Oct	10.3	10.0	9.3	8.5	7.6	6.8	6.5	6.1	5.9	6.5	7.2	8.0	9.0	10.3	11.7	13.3	13.9	14.1	13.5	12.6	12.3	12.3	11.8	11.5	10.0	14.1	
21-Oct	11.1	10.8	10.6	9.4	9.7	9.8	9.9	9.1	8.2	8.2	9.3	10.5	11.6	13.1	14.4	14.8	14.8	14.6	14.0	13.9	12.5	11.2	11.6	10.5	11.4	14.8	
22-Oct	10.5	9.7	9.0	8.7	7.3	5.1	4.9	5.6	6.0	5.7	8.1	11.1	13.9	15.6	15.9	15.6	14.8	13.6	13.0	12.2	11.8	11.2	10.9	10.7	10.5	15.9	
23-Oct	10.0	9.5	9.0	8.3	7.8	7.6	7.4	7.3	7.7	8.1	8.2	8.1	7.7	7.0	6.9	6.4	6.2	5.9	5.7	5.3	5.1	4.8	4.7	4.3	7.0	10.0	
24-Oct	3.6	2.4	1.2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.8	1.1	0.8	0.6	0.6	0.4	0.8	1.0	0.9	-	3.6	
25-Oct	0.7	0.8	0.9	0.5	0.0	-0.4	-0.8	-0.8	-0.8	-0.6	0.7	1.7	2.8	3.6	3.9	3.8	3.4	3.3	3.0	2.7	2.2	1.8	1.7	1.6	1.5	3.9	
26-Oct	1.6	1.6	1.4	1.2	1.1	0.8	-0.1	-0.1	-0.6	-0.6	-0.9	-0.9	-0.7	-0.8	-0.4	-0.2	0.1	-0.1	-0.1	-0.3	-0.4	-0.7	-0.8	-0.8	0.0	1.6	
27-Oct	-1.2	-1.1	-1.2	-1.1	-1.1	-1.2	-1.3	-1.4	-1.5	-1.5	-1.5	-1.4	-1.3	-1.1	-0.7	-0.7	-0.7	-0.7	-0.7	-0.6	-0.6	-0.8	-0.8	-0.5	-1.0	-0.5	
28-Oct	-0.9	-1.1	-1.2	-1.3	-1.3	-1.3	-1.2	-1.2	-1.3	-1.3	-1.1	-1.0	-0.7	-0.3	-0.1	-0.2	-0.5	-0.3	-0.4	-0.5	-0.5	-0.5	-0.5	-0.7	-0.8	-0.1	
29-Oct	-0.9	-0.9	-0.9	-0.8	-0.8	-0.9	-1.1	-0.9	-1.1	-1.1	-1.1	-0.6	-0.4	-0.6	-0.1	-0.3	-0.5	-0.5	-0.2	-0.4	-0.7	-0.8	-1.0	-1.1	-1.3	-0.7	-0.1
30-Oct	-1.5	-1.7	-1.7	-1.8	-1.7	-1.7	-1.9	-2.0	-1.7	-1.3	-1.0	-0.6	-0.1	0.2	0.2	0.3	0.4	0.7	0.8	0.9	0.8	0.6	0.4	0.3	-0.5	0.9	
31-Oct	0.1	0.0	0.0	0.0	0.1	0.2	0.4	0.7	0.9	1.2	1.5	2.0	2.3	2.3	2.6	2.7	2.7	2.6	2.7	2.8	3.0	3.1	3.2	3.0	1.7	3.2	
																								Diurnal Average			
																								Diurnal Maximum			
AF - Analyzer Failure																											

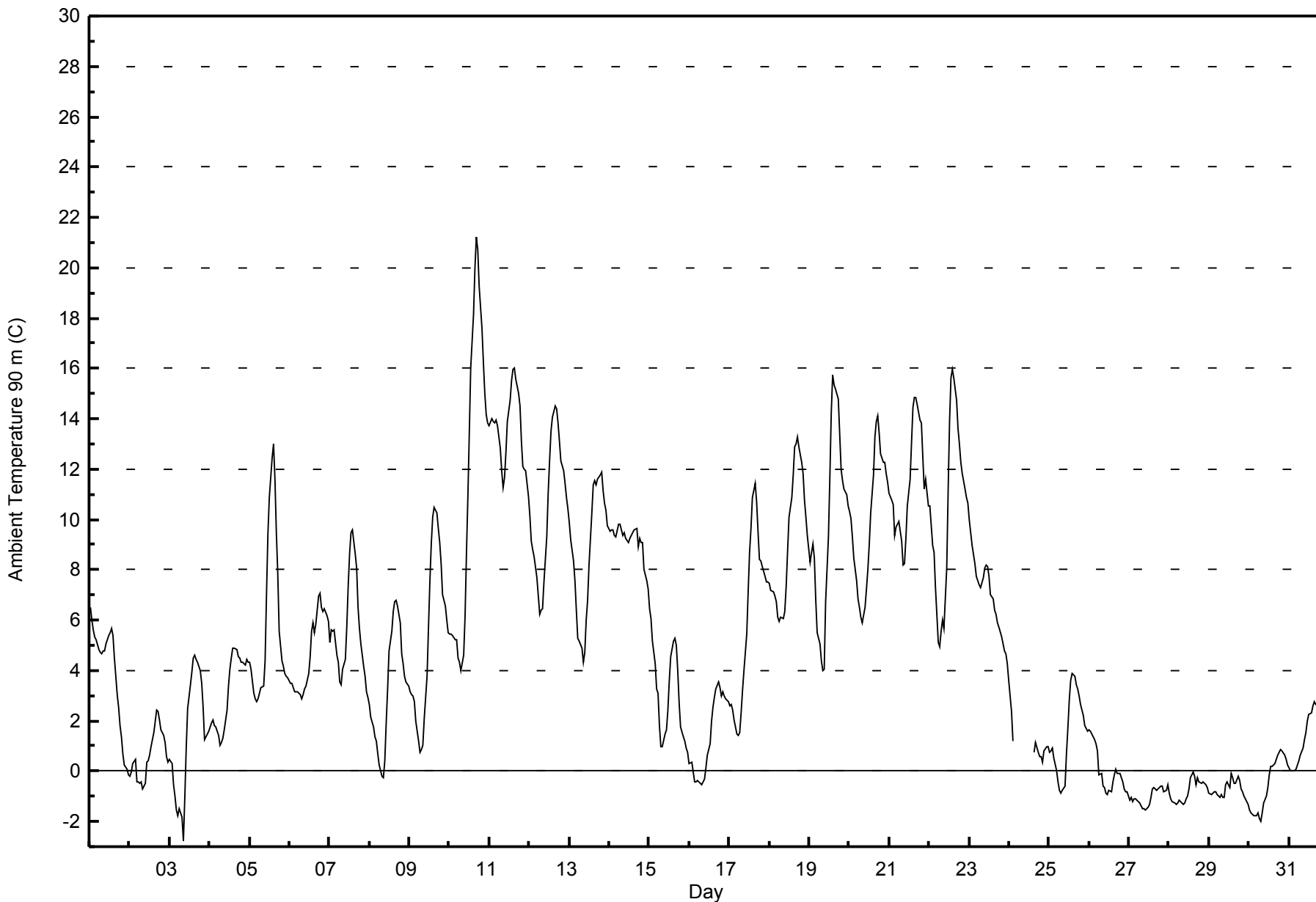




**WBEA**  
**Hourly Averages**

**Ambient Temperature 90 m (AT90m) - C**

**Mannix - October 2014**





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

**Ambient Temperature 90 m (AT90m) - C**  
**Mannix - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	134	18.31	18.31
0 - 10	461	62.98	81.28
10 - 20	135	18.44	99.73
> 20	2	0.27	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744

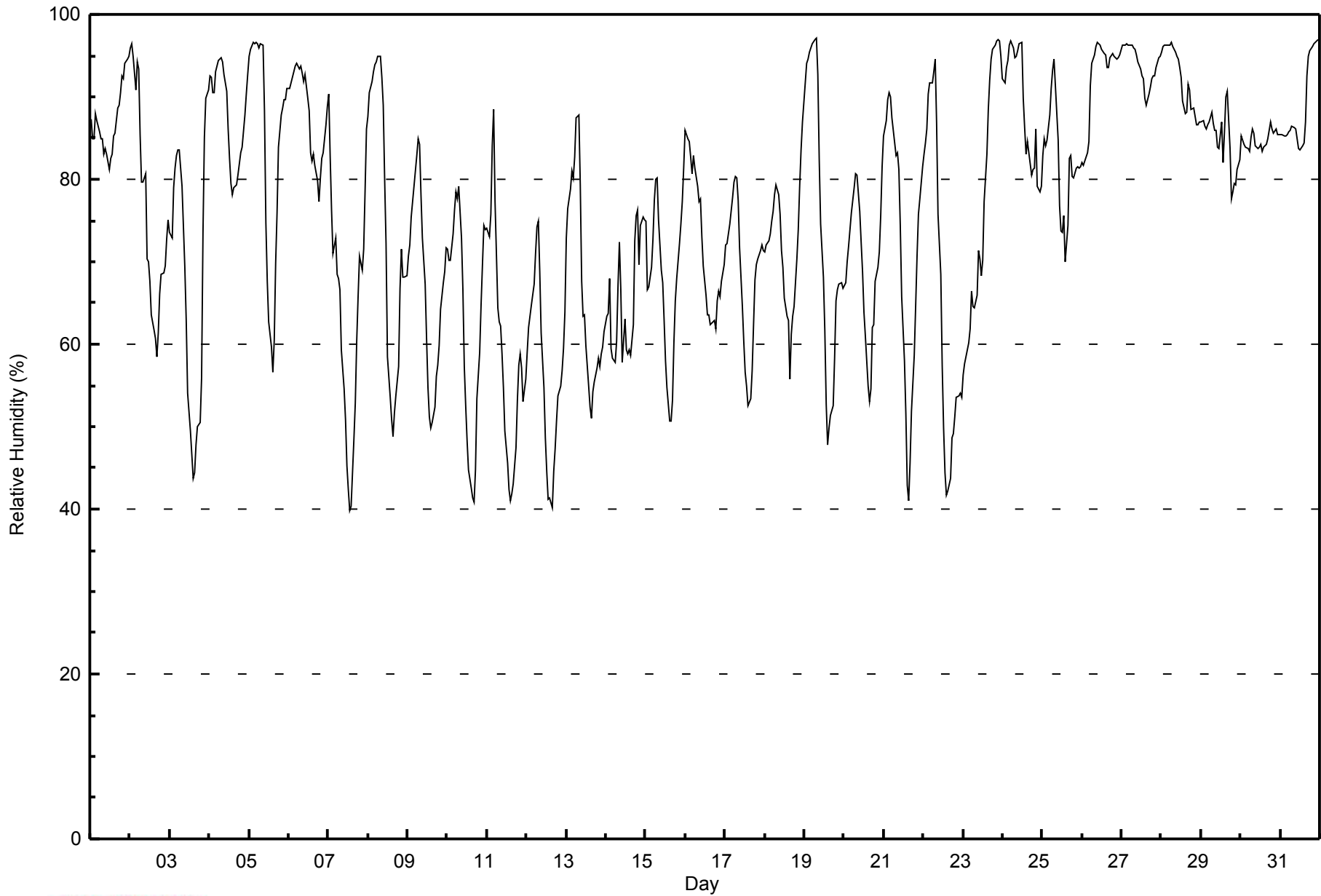


Maximum Value: 97 % on Oct 19 08:00														Maximum Daily Average: 93.9 % on Oct 27														Hours in Service: 744	
Minimum Value: 40 % on Oct 7 14:00														Minimum Daily Average: 57.0 % on Oct 12														Hours of Data: 744	
Maximum Diurnal Average: 84.6 % at hour 7														Minimum Diurnal Average: 63.4 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 76.0 %														Percentiles: P <sub>1</sub> = 41 P <sub>10</sub> = 54 Q <sub>1</sub> = 65 Median = 79 Q <sub>3</sub> = 88 P <sub>90</sub> = 95 P <sub>99</sub> = 97														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Oct	87	85	85	88	87	86	85	85	83	84	83	81	83	83	85	86	89	89	91	92	92	94	95	95	87.2	95			
2-Oct	96	96	95	91	94	93	86	80	80	81	70	70	68	64	62	61	58	61	66	69	69	70	73	75	76.1	96			
3-Oct	74	73	79	81	83	84	84	79	74	69	63	54	49	47	44	44	48	50	50	56	74	85	90	91	67.7	91			
4-Oct	93	92	91	91	93	94	95	95	94	93	91	86	83	79	78	79	79	80	82	83	84	88	90	93	87.7	95			
5-Oct	95	96	97	96	97	96	96	96	96	88	75	68	63	60	57	61	70	76	84	88	89	90	90	91	83.8	97			
6-Oct	91	92	92	93	94	94	93	94	93	92	93	90	88	83	82	83	82	80	77	80	82	83	87	89	87.8	94			
7-Oct	90	83	76	71	73	68	68	67	59	55	51	45	42	40	40	49	53	60	66	71	69	71	79	86	63.9	90			
8-Oct	88	90	92	93	94	94	95	95	92	89	80	72	58	54	51	49	52	54	57	67	71	68	68	68	74.6	95			
9-Oct	71	72	75	77	79	83	85	84	78	73	67	61	55	51	50	51	52	56	57	60	64	68	69	72	67.1	85			
10-Oct	72	70	70	73	76	79	78	79	73	67	57	53	48	45	43	41	41	45	53	59	65	70	74	74	62.7	79			
11-Oct	74	73	76	84	89	77	64	63	62	59	55	49	46	42	41	42	43	47	53	57	59	57	53	56	59.2	89			
12-Oct	59	62	63	65	67	71	74	75	69	61	55	49	45	41	41	40	45	47	51	54	55	57	59	64	57.0	75			
13-Oct	73	76	79	81	80	83	87	88	79	68	63	63	60	55	52	51	54	55	57	58	57	59	60	62	66.7	88			
14-Oct	63	64	68	60	58	58	60	67	72	67	58	63	59	59	59	59	62	73	76	76	70	74	75	75	65.6	76			
15-Oct	75	67	67	69	73	77	80	80	75	69	68	63	58	55	51	51	53	60	65	68	72	75	77	81	67.8	81			
16-Oct	86	85	85	83	81	83	81	79	77	78	73	70	66	64	64	62	62	63	62	65	66	66	68	70	72.4	86			
17-Oct	72	72	73	75	78	80	80	80	78	72	65	60	57	55	53	53	57	62	68	70	70	71	72	71	68.5	80			
18-Oct	71	72	72	73	75	76	78	79	78	76	71	69	66	63	63	56	61	63	65	70	74	79	84	87	71.8	87			
19-Oct	92	94	95	95	96	96	97	97	93	82	75	68	62	53	48	50	51	53	58	65	67	67	67	67	74.5	97			
20-Oct	67	67	70	72	76	77	79	81	80	76	72	69	64	61	55	53	55	62	62	68	69	71	76	82	69.3	82			
21-Oct	85	87	90	90	90	87	86	83	83	81	74	66	58	51	43	41	46	52	59	65	71	76	78	82	71.8	90			
22-Oct	83	84	86	90	92	92	93	95	87	76	69	58	50	44	42	42	44	49	49	51	54	54	54	54	66.2	95			
23-Oct	56	58	58	60	62	66	65	64	66	71	70	68	70	77	83	89	92	95	96	96	97	97	97	95	77.0	97			
24-Oct	92	92	94	94	96	97	96	95	95	96	96	97	90	86	83	85	83	81	81	81	86	79	78	79	88.8	97			
25-Oct	83	85	84	85	88	91	93	95	91	85	77	74	74	76	70	74	83	83	80	80	81	81	81	82	82.3	95			
26-Oct	82	82	83	83	85	91	94	95	96	97	97	96	96	95	95	94	93	95	95	95	95	95	95	95	92.4	97			
27-Oct	96	96	96	96	96	96	96	96	96	95	94	93	93	92	90	89	90	91	92	93	93	94	95	95	93.9	96			
28-Oct	95	96	96	96	96	96	97	96	95	95	95	94	92	89	88	88	91	91	88	89	88	87	87	87	92.2	97			
29-Oct	87	87	86	86	87	87	88	87	86	86	84	84	87	82	86	90	91	84	78	78	80	79	81	82	84.7	91			
30-Oct	85	85	84	84	84	83	85	86	86	84	84	84	84	83	84	84	85	86	87	86	86	86	85	85	84.8	87			
31-Oct	85	85	85	85	85	86	86	86	86	86	85	84	84	84	84	87	93	95	96	96	96	97	97	97	88.8	97			
	81.2	81.3	82.1	82.7	83.9	84.6	84.6	84.5	82.4	79.0	74.5	71.0	67.6	65.0	63.4	63.9	66.4	68.9	71.0	73.8	75.6	77.0	78.5	80.0	Diurnal Average				
	96	96	97	96	97	97	97	97	96	97	97	97	96	95	95	94	93	95	96	96	97	97	97	97	Diurnal Maximum				



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Mannix - October 2014**





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

**Relative Humidity (RH) - %**  
**Mannix - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	1	0.13	0.13
40 - 60	136	18.28	18.41
60 - 80	252	33.87	52.29
80 - 100	355	47.72	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 20m (RH20m) - %

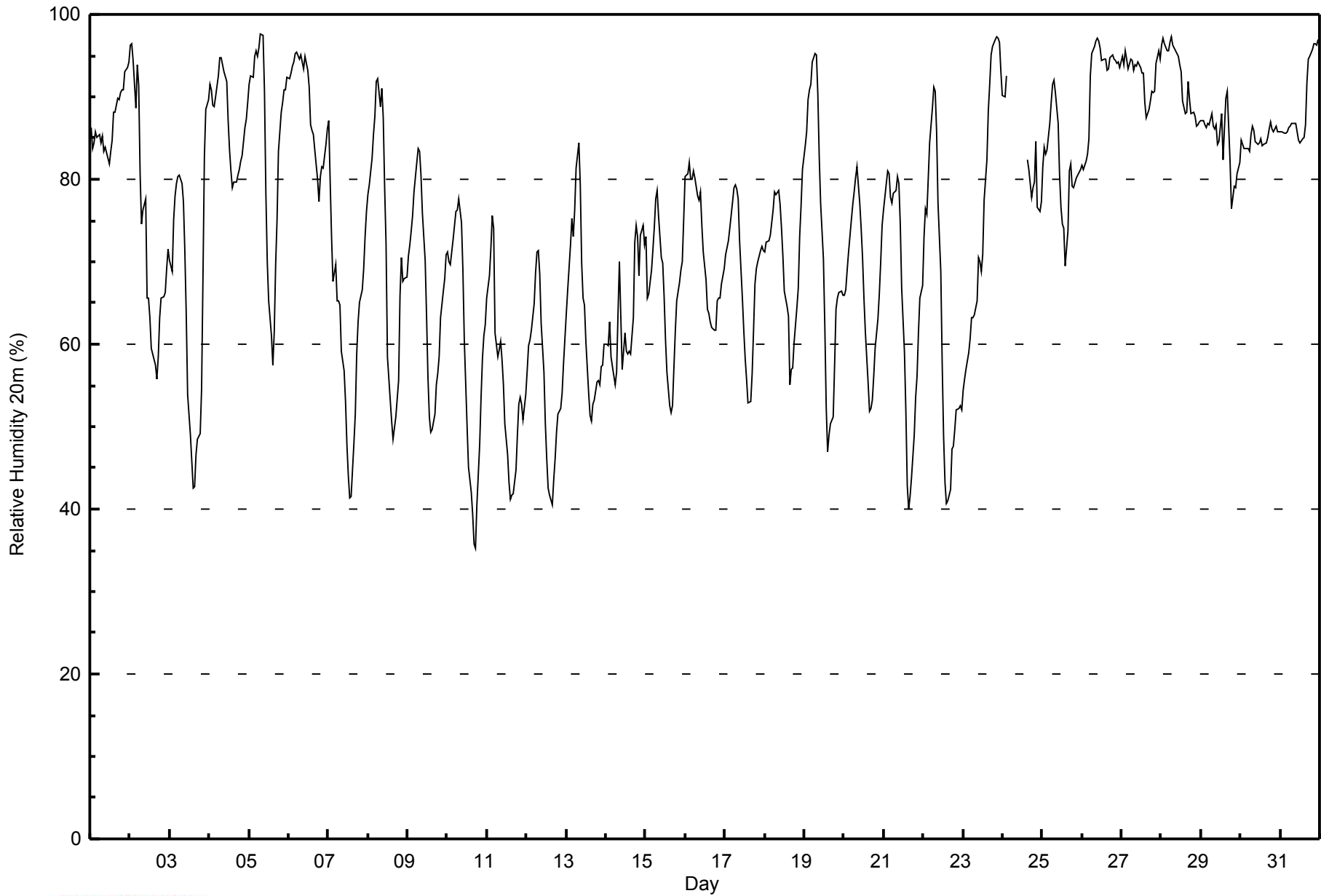
Mannix - October 2014

Maximum Value: 98 % on Oct 5 08:00																			Maximum Daily Average: 92.8 % on Oct 27						Hours in Service: 744																									
Minimum Value: 35 % on Oct 10 18:00																			Minimum Daily Average: 55.4 % on Oct 11						Hours of Data: 732																									
Maximum Diurnal Average: 82.6 % at hour 8																			Minimum Diurnal Average: 62.8 % at hour 15						Hours of Missing Data: 12																									
Monthly Average: 74.3 %																			Percentiles: P <sub>1</sub> = 41 P <sub>10</sub> = 52 Q <sub>1</sub> = 63 Median = 77 Q <sub>3</sub> = 87 P <sub>90</sub> = 94 P <sub>99</sub> = 97						Hours of Calibration: 0																									
																									Percent Operational Time: 98.4																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Oct	86	84	84	86	85	85	84	85	83	84	83	82	83	85	88	88	90	90	91	91	91	93	94	94	87.1	94																								
2-Oct	96	96	94	89	94	91	81	75	76	78	66	66	63	59	58	58	56	58	63	66	66	66	69	72	73.1	96																								
3-Oct	70	69	75	78	79	80	81	79	77	71	64	54	49	46	43	43	47	48	49	55	68	83	88	90	66.1	90																								
4-Oct	91	91	89	89	90	93	95	95	94	93	92	87	84	81	79	80	80	81	81	82	83	86	87	89	87.1	95																								
5-Oct	92	93	92	95	96	95	96	98	98	91	78	70	65	61	58	62	70	75	83	88	89	91	91	92	84.0	98																								
6-Oct	92	93	94	94	95	95	95	95	94	93	95	93	91	87	86	86	84	80	77	80	82	81	84	86	88.9	95																								
7-Oct	87	80	73	68	70	65	65	65	59	57	53	48	44	41	42	48	52	59	63	65	67	69	73	76	62.0	87																								
8-Oct	78	79	83	85	88	92	92	89	91	87	79	72	58	53	51	48	50	51	56	66	71	68	68	68	71.8	92																								
9-Oct	71	72	74	76	79	82	84	83	81	76	70	63	56	51	49	50	52	55	56	58	63	66	68	71	66.9	84																								
10-Oct	71	70	70	73	74	76	76	78	75	69	60	55	50	45	42	39	36	35	41	48	54	58	61	62	59.1	78																								
11-Oct	66	68	72	76	74	61	58	59	60	58	55	50	47	43	41	42	42	45	49	53	54	53	51	54	55.4	76																								
12-Oct	57	60	61	62	65	69	71	71	69	63	57	50	46	43	42	41	44	46	49	52	52	54	58	61	55.8	71																								
13-Oct	64	67	72	75	73	76	81	84	79	70	66	65	60	54	51	51	53	53	55	56	55	57	57	60	64.0	84																								
14-Oct	60	60	63	58	57	55	57	64	70	63	57	61	59	59	59	63	72	74	73	68	73	74	72	72	63.8	74																								
15-Oct	73	66	66	69	72	74	78	79	76	71	70	66	60	57	52	52	53	57	62	65	67	69	70	75	66.5	79																								
16-Oct	80	81	82	80	80	81	80	78	77	78	74	71	68	64	64	63	62	62	62	65	66	66	67	69	71.7	82																								
17-Oct	71	72	73	74	77	79	79	79	78	72	66	62	58	56	53	53	56	62	67	69	70	71	72	71	68.3	79																								
18-Oct	71	72	72	73	75	76	78	78	79	77	74	71	66	65	63	55	57	57	60	64	67	73	77	81	70.1	81																								
19-Oct	84	86	90	91	92	94	95	95	90	83	77	70	62	52	47	49	50	51	57	64	66	66	66	66	72.7	95																								
20-Oct	66	67	69	71	75	77	78	80	81	77	74	70	66	62	55	52	52	53	56	60	63	66	70	74	67.3	81																								
21-Oct	76	79	81	81	78	77	78	79	80	79	75	67	59	52	43	40	42	44	49	54	56	61	66	67	65.1	81																								
22-Oct	73	76	76	80	84	89	91	91	86	77	69	58	49	43	41	41	42	47	48	50	52	52	53	52	63.3	91																								
23-Oct	54	56	57	59	61	63	63	64	65	70	70	69	71	77	82	88	92	95	96	97	97	97	97	93	76.4	97																								
24-Oct	90	90	93	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	82	81	78	79	80	85	77	76	77	--	93																								
25-Oct	82	84	83	84	87	89	91	92	91	87	81	77	75	74	69	74	81	82	79	79	80	81	81	81	81.7	92																								
26-Oct	82	81	82	83	85	93	95	96	97	97	97	96	94	95	94	93	93	95	95	95	94	94	94	93	92.3	97																								
27-Oct	95	94	96	95	93	95	94	93	94	94	94	94	93	93	89	87	89	90	91	91	91	94	96	95	92.8	96																								
28-Oct	96	97	97	96	96	97	97	96	96	95	95	94	93	89	88	88	92	90	88	88	88	86	87	87	92.3	97																								
29-Oct	87	87	87	86	87	87	88	86	86	87	84	85	88	82	86	90	91	82	76	78	79	79	81	82	84.6	91																								
30-Oct	85	84	84	84	84	83	85	87	86	85	84	84	85	84	84	84	85	86	87	86	86	86	86	86	85.0	87																								
31-Oct	86	86	86	86	86	86	86	87	87	87	86	85	84	85	85	87	92	95	95	96	96	96	96	97	89.0	97																								
																								78.5	78.7	79.6	79.8	81.0	81.9	82.5	82.6	81.8	79.0	74.8	71.1	67.6	64.6	62.8	63.6	65.3	66.9	68.9	71.3	73.0	74.7	76.0	77.3	Diurnal Average		
																								96	97	97	96	96	97	97	98	98	97	97	96	94	95	94	93	93	95	96	97	97	97	97	97	97	Diurnal Maximum	
AF - Analyzer Failure																																																		



**WBEA**  
**Hourly Averages**

**Relative Humidity 20m (RH20m) - %**  
**Mannix - October 2014**





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

**Relative Humidity 20m (RH20m) - %**  
**Mannix - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	3	0.41	0.41
40 - 60	153	20.90	21.31
60 - 80	265	36.20	57.51
80 - 100	311	42.49	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



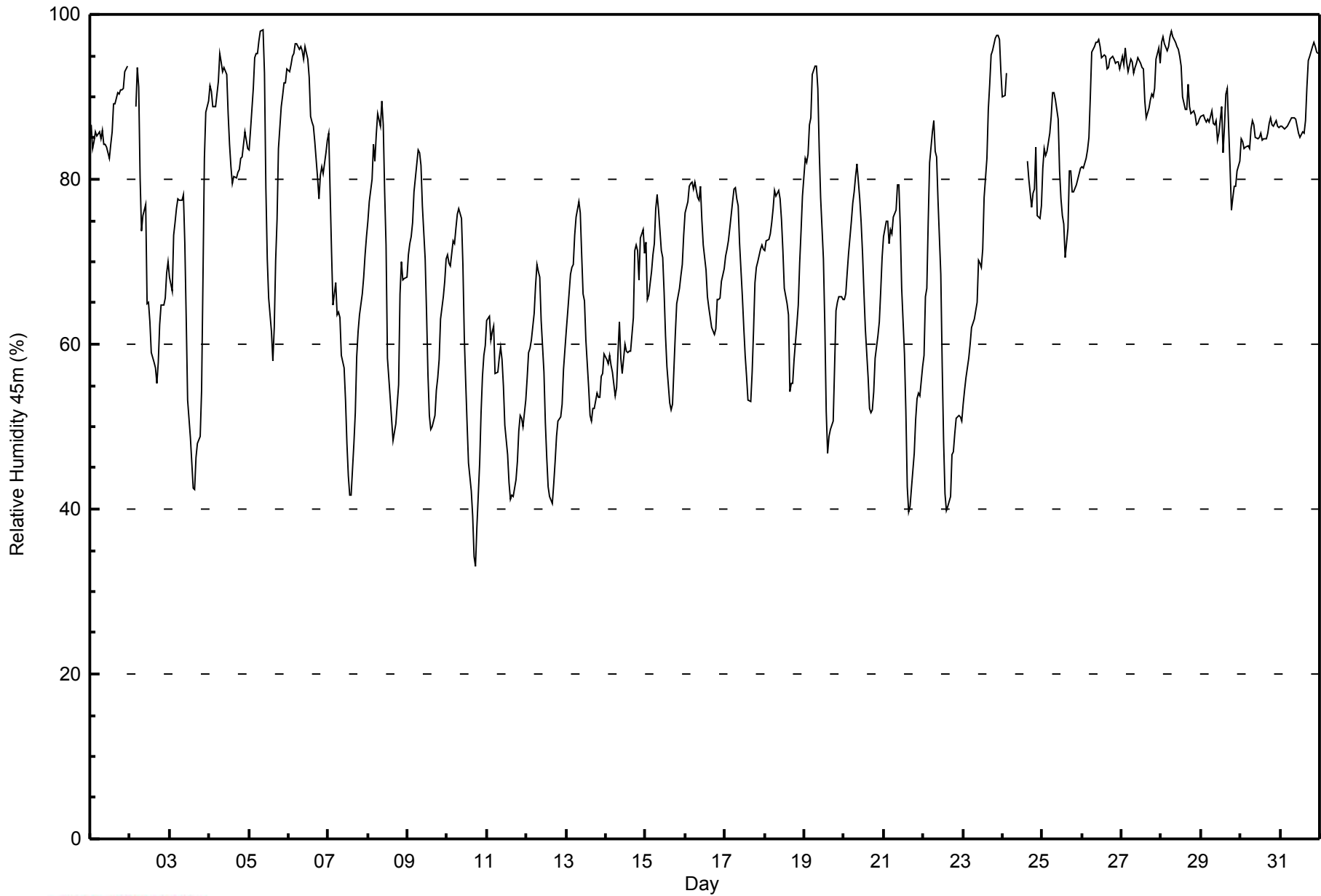


Maximum Value: 98 % on Oct 5 09:00																			Maximum Daily Average: 92.8 % on Oct 27						Hours in Service: 744	
Minimum Value: 33 % on Oct 10 18:00																			Minimum Daily Average: 52.6 % on Oct 11						Hours of Data: 728	
Maximum Diurnal Average: 81.6 % at hour 7																			Minimum Diurnal Average: 63.1 % at hour 15						Hours of Missing Data: 16	
Monthly Average: 73.5 %																			Percentiles: P <sub>1</sub> = 40 P <sub>10</sub> = 51 Q <sub>1</sub> = 61 Median = 75 Q <sub>3</sub> = 87 P <sub>90</sub> = 94 P <sub>99</sub> = 97						Hours of Calibration: 0	
																									Percent Operational Time: 97.9	
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-Oct	87	84	85	86	85	86	85	86	84	84	84	83	84	86	89	89	91	90	91	91	91	93	94	AF	87.2	94
2-Oct	AF	AF	AF	89	94	91	80	74	76	77	65	65	63	59	58	57	55	58	62	65	65	66	69	70	69.3	94
3-Oct	68	66	73	75	76	78	77	78	78	72	63	53	49	46	42	42	46	48	49	54	68	83	88	90	65.1	90
4-Oct	91	91	89	89	89	92	95	94	93	94	93	88	84	82	80	80	80	81	81	83	83	86	85	84	86.9	95
5-Oct	84	86	91	95	95	95	97	98	98	93	79	70	66	61	58	62	70	75	84	89	90	92	92	93	83.9	98
6-Oct	93	94	95	95	97	97	96	96	96	95	96	95	92	88	87	86	84	80	78	81	82	81	83	85	89.6	97
7-Oct	86	78	71	65	68	64	64	63	59	57	53	48	44	42	42	48	52	59	61	64	66	68	71	73	61.0	86
8-Oct	75	77	80	84	82	85	88	86	89	87	79	72	58	53	51	48	49	50	55	66	70	68	68	68	70.4	89
9-Oct	71	72	73	75	78	82	84	83	82	77	70	64	56	51	50	50	51	54	56	58	63	66	68	70	66.8	84
10-Oct	71	70	70	73	72	74	76	77	75	70	61	55	50	46	42	39	34	33	38	46	52	56	59	60	58.2	77
11-Oct	63	63	61	62	62	56	57	58	60	58	55	50	47	43	41	42	42	44	46	50	51	51	50	53	52.6	63
12-Oct	56	59	59	61	64	67	70	69	68	63	57	50	46	43	42	41	43	46	49	51	51	53	57	59	55.1	70
13-Oct	62	64	69	69	70	73	75	77	76	71	66	65	61	55	51	51	52	52	54	54	54	56	57	59	62.2	77
14-Oct	58	58	59	57	57	54	55	59	63	58	56	60	59	59	59	59	63	71	72	71	68	73	74	71	62.2	74
15-Oct	72	65	66	69	71	72	76	78	76	71	71	66	61	57	53	52	53	57	61	65	67	68	70	73	66.3	78
16-Oct	76	77	79	80	80	79	80	78	77	79	75	72	69	66	64	63	62	61	62	65	65	66	68	69	71.3	80
17-Oct	71	72	73	74	77	79	79	78	77	72	66	62	59	56	53	53	57	62	68	69	70	72	72	72	68.3	79
18-Oct	71	73	73	73	75	76	79	78	79	78	75	71	67	65	63	54	55	55	58	62	65	70	74	78	69.5	79
19-Oct	83	82	83	87	87	93	94	94	91	83	78	70	62	52	47	49	50	51	57	64	65	66	66	65	71.6	94
20-Oct	65	66	69	71	75	77	79	80	82	78	75	71	66	62	56	52	52	52	54	58	61	63	66	70	66.7	82
21-Oct	73	75	75	72	74	73	75	76	79	79	74	67	59	52	43	40	40	42	47	51	53	54	54	57	61.9	79
22-Oct	59	66	67	75	82	86	87	83	83	77	69	58	48	42	40	40	42	47	47	49	51	51	51	51	60.4	87
23-Oct	53	54	56	58	60	62	63	63	65	70	70	69	71	78	83	89	92	95	96	97	98	97	97	93	76.2	98
24-Oct	90	90	93	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	82	80	77	78	79	84	76	75	77	-	93
25-Oct	81	84	83	83	86	88	91	90	90	87	81	78	76	75	71	74	81	81	78	78	79	80	81	81	81.5	91
26-Oct	82	81	83	84	85	90	95	96	97	97	97	96	95	95	93	94	95	95	95	95	94	94	94	93	92.2	97
27-Oct	95	94	96	94	93	95	94	93	94	94	95	94	93	93	89	87	89	90	90	90	91	95	96	94	92.8	96
28-Oct	97	97	96	96	96	97	98	97	97	96	96	95	94	90	88	88	91	89	88	88	88	87	87	87	92.6	98
29-Oct	88	88	87	87	87	87	88	87	87	87	85	86	89	83	87	90	91	82	76	78	79	79	81	82	85.0	91
30-Oct	85	85	84	84	84	84	86	87	87	85	85	85	86	85	85	85	86	87	87	87	86	87	86	86	85.5	87
31-Oct	86	86	86	86	86	87	87	87	87	87	86	86	85	86	86	87	91	94	95	96	97	96	95	95	89.3	97
																								Diurnal Average		
																								Diurnal Maximum		
76.3 76.6 77.4 78.2 79.6 80.6 81.6 81.5 81.4 79.2 75.1 71.5 68.0 65.0 63.1 63.7 65.1 66.4 68.2 70.7 72.4 73.9 75.0 75.4																										
97 97 96 96 97 97 98 98 98 97 97 96 95 95 95 93 94 95 96 97 98 97 97 95																										
AF - Analyzer Failure																										



**WBEA**  
**Hourly Averages**

**Relative Humidity 45m (RH45m) - %**  
**Mannix - October 2014**





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

**Relative Humidity 45m (RH45m) - %**  
**Mannix - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	6	0.82	0.82
40 - 60	166	22.80	23.63
60 - 80	263	36.13	59.75
80 - 100	293	40.25	100.00

Total Number of Valid Hours: 728

Total Number of Hours: 744

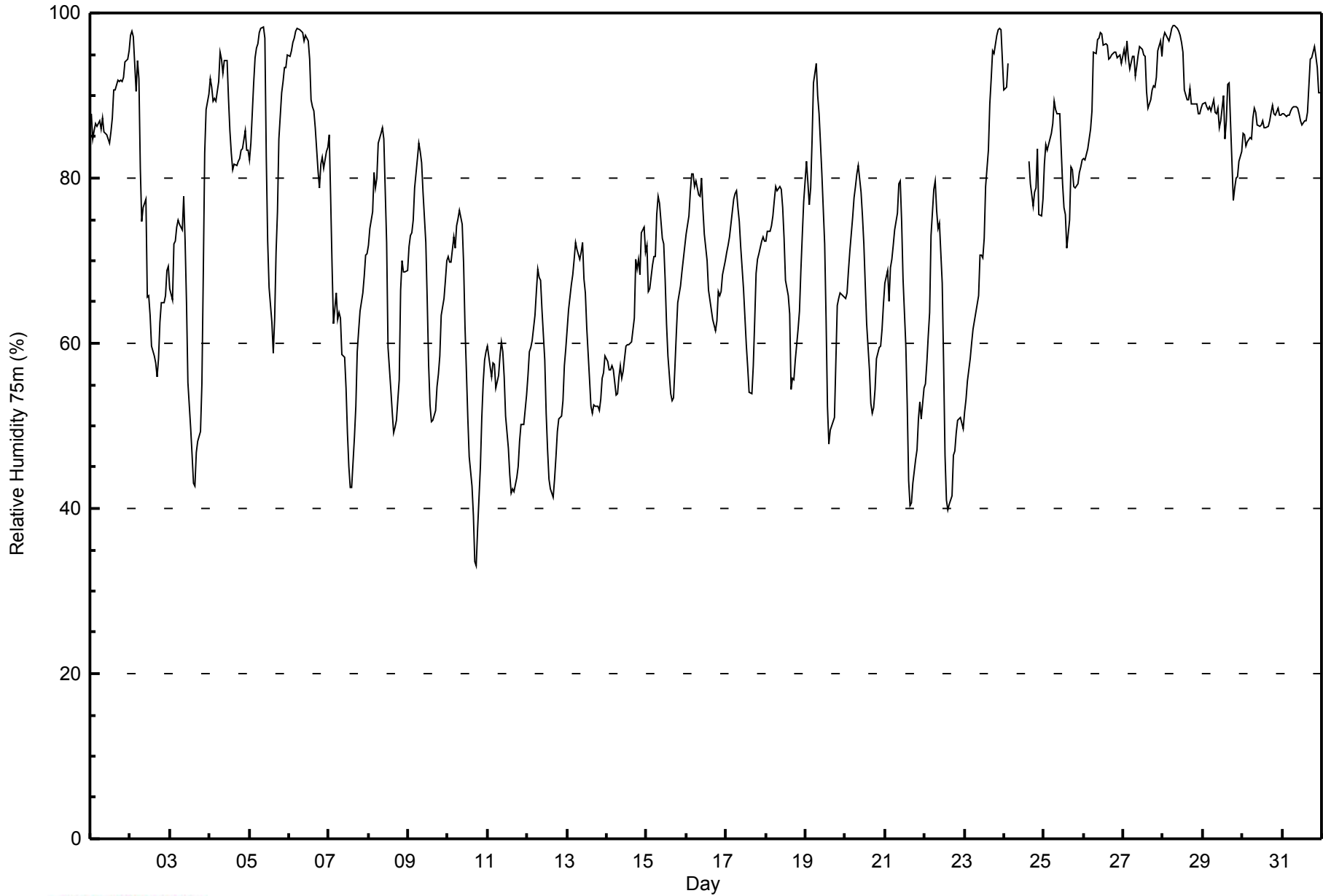


Maximum Value: 98 % on Oct 28 07:00																			Maximum Daily Average: 93.6 % on Oct 27						Hours in Service: 744																			
Minimum Value: 33 % on Oct 10 18:00																			Minimum Daily Average: 51.7 % on Oct 11						Hours of Data: 732																			
Maximum Diurnal Average: 81.1 % at hour 7																			Minimum Diurnal Average: 64.0 % at hour 15						Hours of Missing Data: 12																			
Monthly Average: 73.7 %																			Percentiles: P <sub>1</sub> = 41 P <sub>10</sub> = 52 Q <sub>1</sub> = 61 Median = 75 Q <sub>3</sub> = 88 P <sub>90</sub> = 95 P <sub>99</sub> = 98						Hours of Calibration: 0																			
																									Percent Operational Time: 98.4																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Oct	88	85	86	87	86	87	86	87	86	86	85	84	86	87	91	91	92	92	92	92	92	94	94	95	88.7	95																		
2-Oct	97	98	97	90	94	92	81	75	76	77	66	66	63	60	59	58	56	58	63	65	65	66	69	69	73.3	98																		
3-Oct	67	65	72	72	74	75	74	74	78	72	65	55	50	46	43	43	47	48	49	55	68	83	88	90	64.8	90																		
4-Oct	92	91	89	90	89	92	95	94	93	94	94	90	86	83	81	82	82	82	82	83	83	86	83	83	87.5	95																		
5-Oct	82	84	91	95	96	96	98	98	98	97	83	72	67	63	59	63	71	76	85	90	92	93	93	95	84.9	98																		
6-Oct	95	95	96	97	98	98	98	98	98	97	97	97	94	89	89	88	86	81	79	82	83	81	83	84	90.9	98																		
7-Oct	85	78	70	62	66	63	64	63	59	58	55	49	45	43	43	49	52	59	61	64	66	68	71	71	60.9	85																		
8-Oct	72	74	76	81	79	80	84	85	86	85	79	72	59	54	52	49	50	51	56	66	70	69	69	69	69.4	86																		
9-Oct	72	73	73	75	79	82	84	83	82	78	72	65	57	53	51	51	52	55	56	59	63	65	68	70	67.4	84																		
10-Oct	71	70	70	73	72	74	75	76	74	70	62	57	51	46	43	39	34	33	37	45	51	55	58	59	58.1	76																		
11-Oct	60	57	56	58	58	55	56	58	60	59	56	51	47	44	42	42	42	44	45	48	50	50	50	54	51.7	60																		
12-Oct	56	59	59	60	63	66	69	68	68	64	58	52	47	44	42	41	44	46	49	51	51	53	57	59	55.3	69																		
13-Oct	62	64	67	68	70	72	71	70	71	72	68	66	62	56	52	52	53	52	52	52	53	56	57	58	61.5	72																		
14-Oct	58	57	57	57	54	54	56	57	56	57	60	60	60	60	60	63	70	69	70	68	73	74	71	71	61.6	74																		
15-Oct	72	66	67	70	70	70	76	78	77	73	72	68	62	58	54	53	53	57	61	65	67	69	70	72	66.7	78																		
16-Oct	73	75	78	81	80	79	80	78	78	80	76	73	70	66	65	64	63	62	63	66	66	66	68	70	71.7	81																		
17-Oct	71	72	73	74	78	78	79	76	75	72	67	63	60	57	54	54	57	63	68	70	71	72	73	72	68.7	79																		
18-Oct	72	74	74	74	75	77	79	78	79	79	77	73	68	66	64	54	56	56	58	62	64	69	73	77	69.8	79																		
19-Oct	82	80	77	79	85	92	94	90	88	84	80	72	63	52	48	49	50	51	58	65	65	66	66	66	70.9	94																		
20-Oct	65	66	69	71	75	78	79	80	82	78	75	72	67	62	57	53	52	52	54	58	60	60	62	65	66.3	82																		
21-Oct	67	69	65	69	70	72	74	76	79	80	75	68	60	53	43	40	41	43	46	47	51	53	51	55	60.2	80																		
22-Oct	55	58	61	64	73	79	80	76	74	75	67	57	47	41	40	40	41	46	47	49	51	51	50	50	57.1	80																		
23-Oct	52	53	55	58	60	62	63	64	66	71	71	70	73	79	83	89	92	95	95	97	98	98	98	94	76.5	98																		
24-Oct	91	91	94	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	82	79	77	78	79	84	76	75	77	--	94																		
25-Oct	82	84	83	84	85	87	89	88	88	88	84	79	76	76	72	75	81	81	79	79	79	81	81	82	81.8	89																		
26-Oct	82	82	84	85	86	88	95	95	97	97	98	97	96	96	96	94	95	95	95	95	95	95	95	94	92.8	98																		
27-Oct	96	94	97	95	93	95	95	92	94	95	96	96	95	95	91	88	89	91	91	91	92	95	97	95	93.6	97																		
28-Oct	97	98	97	97	97	98	98	98	98	98	97	96	95	91	89	90	91	89	89	89	89	88	88	88	93.6	98																		
29-Oct	89	89	89	88	89	88	89	88	88	88	86	87	90	85	87	91	92	82	77	79	80	80	82	83	86.1	92																		
30-Oct	85	85	84	84	85	85	87	88	88	86	86	86	87	86	86	86	87	88	89	88	88	88	88	88	86.7	89																		
31-Oct	88	88	88	88	88	88	88	89	89	89	88	87	86	87	87	88	91	94	95	96	95	93	90	90	89.5	96																		
																			76.6	76.6	77.2	77.5	79.0	80.1	81.1	80.7	80.8	79.9	76.3	72.7	69.0	65.9	64.0	64.5	65.6	66.7	68.4	70.9	72.6	74.0	74.9	75.7	Diurnal Average	
																			97	98	97	97	98	98	98	98	98	98	98	97	96	96	96	94	95	95	95	95	97	98	98	95	Diurnal Maximum	
AF - Analyzer Failure																																												



**WBEA**  
**Hourly Averages**

**Relative Humidity 75m (RH75m) - %**  
**Mannix - October 2014**





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

**Relative Humidity 75m (RH75m) - %**  
**Mannix - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	5	0.68	0.68
40 - 60	173	23.63	24.32
60 - 80	262	35.79	60.11
80 - 100	292	39.89	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744

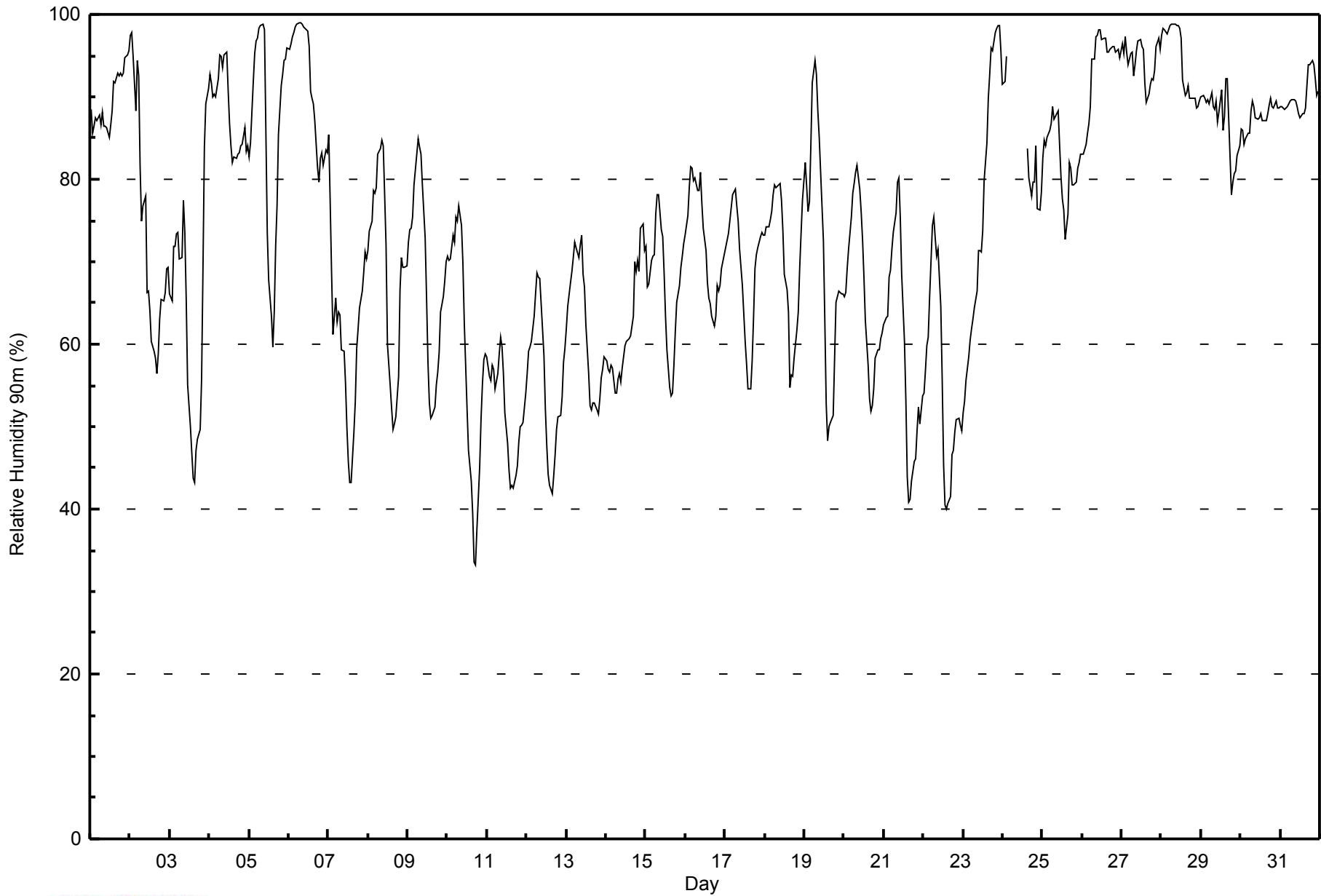


Maximum Value: 99 % on Oct 6 07:00																		Maximum Daily Average: 94.5 % on Oct 28																		Hours in Service: 744													
Minimum Value: 33 % on Oct 10 18:00																		Minimum Daily Average: 51.9 % on Oct 11																		Hours of Data: 732													
Maximum Diurnal Average: 81.1 % at hour 7																		Minimum Diurnal Average: 64.7 % at hour 15																		Hours of Missing Data: 12													
Monthly Average: 74.2 %																		Percentiles: P <sub>1</sub> = 41 P <sub>10</sub> = 52 Q <sub>1</sub> = 61 Median = 75 Q <sub>3</sub> = 89 P <sub>90</sub> = 95 P <sub>99</sub> = 99																		Hours of Calibration: 0													
																																				Percent Operational Time: 98.4													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	89	86	87	87	87	88	87	88	86	86	86	85	87	88	92	92	93	93	93	93	93	95	95	96	89.6	96																							
2-Oct	97	98	95	88	94	93	82	75	77	78	66	67	64	60	59	58	57	59	63	65	65	66	69	69	73.5	98																							
3-Oct	66	65	72	72	73	74	70	71	78	74	65	55	50	47	44	43	47	49	50	56	69	84	89	91	64.7	91																							
4-Oct	93	92	90	90	90	92	95	95	94	95	95	91	87	84	82	83	83	83	83	84	84	86	83	84	88.3	95																							
5-Oct	83	84	92	95	97	97	98	99	99	98	86	74	68	63	60	64	72	77	85	91	93	94	95	96	85.8	99																							
6-Oct	96	96	97	98	98	99	99	99	99	99	98	98	96	91	90	89	87	81	80	83	83	82	84	83	91.8	99																							
7-Oct	86	77	69	61	66	63	64	64	59	59	55	50	46	43	43	49	53	60	62	64	66	69	71	70	61.2	86																							
8-Oct	71	74	75	79	78	79	83	84	85	84	78	72	60	55	52	50	50	51	56	67	71	69	69	70	69.2	85																							
9-Oct	72	74	74	75	79	83	85	84	83	79	73	66	58	53	51	51	52	55	57	59	64	66	68	70	67.9	85																							
10-Oct	71	70	70	73	72	75	75	77	74	70	63	57	52	47	43	40	34	33	38	45	51	55	58	59	58.5	77																							
11-Oct	58	56	56	57	57	55	56	59	61	60	57	52	48	45	42	43	43	44	45	48	50	50	50	54	51.9	61																							
12-Oct	56	59	60	60	63	66	69	68	68	65	59	52	48	44	43	42	44	47	50	51	51	53	58	60	55.7	69																							
13-Oct	62	65	67	69	71	72	72	71	72	73	68	67	62	56	53	52	53	53	52	51	53	56	57	59	61.9	73																							
14-Oct	58	57	57	58	57	54	54	56	56	55	57	60	60	61	61	63	70	69	70	69	74	75	71	71	61.8	75																							
15-Oct	72	67	67	70	71	71	76	78	78	74	73	69	63	59	55	54	54	58	62	65	67	69	71	72	67.3	78																							
16-Oct	73	76	79	81	81	80	80	79	79	81	77	74	71	67	66	65	63	62	63	67	66	67	69	71	72.4	81																							
17-Oct	72	72	73	75	78	78	79	77	75	71	67	64	60	58	55	54	58	63	69	71	72	73	74	73	69.2	79																							
18-Oct	73	74	74	75	76	78	79	79	79	80	77	74	69	67	64	55	56	56	58	62	64	69	73	77	70.4	80																							
19-Oct	82	79	76	77	84	92	94	93	88	85	81	73	63	53	48	50	50	51	58	65	66	67	66	66	71.2	94																							
20-Oct	66	66	69	71	75	78	79	81	82	79	76	73	68	63	58	53	52	53	55	58	59	59	61	61	66.5	82																							
21-Oct	62	63	63	68	69	72	73	76	80	80	75	68	60	53	44	41	41	43	46	46	50	52	50	54	59.6	80																							
22-Oct	54	57	60	61	66	74	75	73	71	71	65	56	45	40	40	41	42	47	47	49	51	51	50	49	55.6	75																							
23-Oct	52	53	56	58	60	62	63	64	66	71	71	71	74	80	84	90	93	96	96	98	98	99	99	96	77.1	99																							
24-Oct	92	92	95	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	84	80	78	80	80	84	76	76	78	--	95																							
25-Oct	83	85	84	85	86	87	89	87	88	88	84	80	78	76	73	76	82	81	79	79	80	81	82	83	82.3	89																							
26-Oct	83	83	84	86	87	89	95	95	97	97	98	98	97	97	95	95	96	96	96	96	95	96	96	95	93.5	98																							
27-Oct	96	95	97	95	94	95	95	93	94	96	97	97	96	96	92	89	90	92	92	92	93	96	97	96	94.4	97																							
28-Oct	97	98	98	98	98	99	99	99	99	99	99	98	97	92	90	90	91	90	90	90	90	89	89	89	94.5	99																							
29-Oct	90	90	90	89	90	89	90	89	88	89	87	88	91	86	88	92	92	83	78	80	81	81	83	84	87.0	92																							
30-Oct	86	86	84	85	86	86	88	90	89	87	87	87	88	87	87	87	88	89	90	89	89	89	89	89	87.6	90																							
31-Oct	89	89	89	89	89	89	89	90	90	89	89	88	88	88	88	89	91	94	94	94	94	92	90	91	90.0	94																							
																								76.8	76.7	77.4	77.6	79.1	80.3	81.1	80.9	81.1	80.5	77.0	73.4	69.8	66.7	64.7	65.2	66.2	67.3	68.9	71.3	73.0	74.4	75.3	76.0	Diurnal Average	
																								97	98	98	98	98	99	99	99	99	99	99	98	97	97	97	95	95	96	96	98	98	99	99	96	Diurnal Maximum	
AF - Analyzer Failure																																																	



**WBEA**  
**Hourly Averages**

**Relative Humidity 90m (RH90m) - %**  
**Mannix - October 2014**







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

**Relative Humidity 90m (RH90m) - %**  
**Mannix - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	5	0.68	0.68
40 - 60	168	22.95	23.63
60 - 80	262	35.79	59.43
80 - 100	297	40.57	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



Maximum Speed: 30 km/h on Oct 2 11:00	Maximum Daily Speed Average: 21.5 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 16 05:00	Minimum Daily Speed Average: 1.1 km/h on Oct 14	Hours of Data: 726
Maximum Diurnal Speed Average: 3.8 km/h at hour 3	Minimum Diurnal Speed Average: 0.8 km/h at hour 18	Hours of Missing Data: 18
Monthly Average Velocity: 2.4 km/h 178.0 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 10 Q <sub>3</sub> = 15 P <sub>90</sub> = 19 P <sub>99</sub> = 26	Percent Operational Time: 97.6

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-Oct	NNE9	NNE11	NNE7	NNE5	NNE3	NE7	NE7	NE6	E8	ESE8	ESE5	ESE4	ENE2	NNE5	N10	N15	NNE20	N21	N19	NNW23	NNW25	NNW20	NNW18	NNW17	N9.5	NNW25	
2-Oct	AF	AF	AF	WNW18	NNW15	NNW12	NW23	NW22	WNW22	WNW23	NW30	NW28	WNW29	WNW26	WNW25	WNW26	WNW26	WNW25	WNW22	WNW21	WNW19	WNW18	NW14	WNW15	WNW21.5	NW30	
3-Oct	WNW16	WNW14	W12	WSW12	WSW12	WSW10	WSW10	WSW7	SSW5	SE6	SE6	SE8	SE11	SE12	SSE12	SSE13	SE15	SE12	SE17	SSE17	SSE14	SE12	SE12	SE15	S6.7	SSE17	
4-Oct	SE14	SE12	SE12	SSE8	S5	WSW5	WSW3	SW3	SW4	SW5	W5	NE2	NE2	NE1	W4	NNW4	N5	NNW6	NNW6	WNW6	WSW7	WSW7	SW8	SSW1.8	SE14		
5-Oct	SW9	SSW9	SSW10	SSW9	S7	SSE7	S7	SSW7	SW9	SSW6	SSE4	WSW4	W10	N6	N11	N16	NNE14	N12	NNE18	NNE12	N9	NNE11	NNE6	NE6	NNW1.8	NNE18	
6-Oct	NNE4	NE5	E4	SE3	SSE4	ESE4	E8	E5	SSE1	E5	NE3	NW5	WNW9	NW12	NNW10	N10	NW9	WNW17	WNW20	W26	W24	W23	W19	W15	WNW6.1	W26	
7-Oct	W15	W22	W25	W18	W19	W21	W23	WNW18	WNW19	NW14	WNW13	NW10	NNW11	NW13	NNW13	NNE12	NE11	NE10	NE8	ENE7	E9	ESE6	SSE5	SSE5	WNW8.4	W25	
8-Oct	SE4	ESE3	SE4	E3	ESE2	SW2	ESE4	SSE2	SSE2	SSE2	SE4	ESE5	ESE8	E12	SE8	SE7	SSE7	SE7	SE9	SSE7	SE7	SE11	SE12	SE11	SE5.5	SE12	
9-Oct	SE10	SE8	SE7	SE8	SE6	SE6	ESE6	SE10	SE10	SE11	SE9	SE9	SE9	SE9	SE8	SSE8	SE9	SE10	SE13	SE15	SE15	SE10	SE15	SE14	SE9.7	SE15	
10-Oct	SE14	SE14	SE14	SE12	SE11	SE13	SE14	SSE11	SE11	SSE10	SSE11	SE13	SSE16	SSE16	SSE16	SSE9	SSE11	S9	S10	S13	SSE15	SSE13	SSE13	SSE13	SSE12.2	SSE16	
11-Oct	SSE10	SSE9	SSE9	SSE8	SSW9	SW11	WSW20	WSW21	WSW21	W25	W26	W23	W24	W24	W24	WSW25	W26	WSW15	WSW14	WSW12	WSW9	WSW13	W25	W24	WSW15.6	W26	
12-Oct	W22	W23	W19	W19	W21	W15	W12	W14	W15	WSW10	W11	W15	W18	W15	WSW13	WSW16	WSW14	W19	W22	W16	W17	W15	W17	W11	W16.2	W23	
13-Oct	WNW4	W9	WSW11	SW12	WSW10	SW6	S7	S3	SSE4	S3	S4	SE5	SE5	SE5	SE7	SSE9	SSE8	SE6	ESE5	ESE6	SE6	ESE6	ESE5	E6	S3.7	SW12	
14-Oct	E8	E5	E7	ESE9	E13	E11	ESE2	NNE3	N5	ENE5	SE6	ESE6	ESE10	SE9	SE4	S3	WSW4	WNW7	W4	SW5	W19	WSW16	W17	W15	S1.1	W19	
15-Oct	W13	W23	W17	WSW10	SW11	SW11	WSW14	WSW12	W16	W19	WNW16	W13	W8	WNW10	WNW13	NNW12	NNW12	NNW13	NNW13	NNW14	N9	N7	N6	NNE4	WNW9.5	W23	
16-Oct	SW1	SW1	WSW3	NE5	E0	SSW3	SSW2	E4	SE3	SSE4	SE6	SSE5	SSE7	SSE5	SE6	S4	SSW1	ESE5	ESE12	SE15	SE13	SE15	SE16	SE16	SE5.6	SE16	
17-Oct	SE15	SE14	SE16	SE17	SE15	SE14	SE12	SE12	SE9	SE12	SE18	SE21	SE18	SE22	SE24	SE24	SE26	SE24	SE24	SE23	SE22	SE20	SE19	SE17	SE18.2	SE26	
18-Oct	SE19	SE19	SE17	SE14	SE9	SE12	SE9	SSE5	SSE7	SSE6	SSW6	SE3	ESE5	SE7	SSE6	SW7	WSW5	SW5	WSW8	W9	W11	W10	W11	W11	S4.8	SE19	
19-Oct	WNW2	WSW12	W12	W11	WNW4	SSE2	S6	SSE9	SE8	SE6	SSE5	SE7	SE9	SE10	ESE12	SE14	SE13	SE17	SE21	SE19	SE16	SE17	SE13	SE16	SE8.1	SE21	
20-Oct	SE14	SE15	SE14	SE19	SE15	SE16	SE14	SE11	SE9	SSE8	SSE11	SSE10	SSE8	SE8	S11	SE8	SE10	SE9	SE7	ESE4	ESE5	SE5	SSE8	S9	SE10.1	SE19	
21-Oct	SSE7	SSE8	S7	S5	SW7	SSW5	WSW8	W11	SW8	SW5	WSW9	WSW9	W11	WSW11	WSW18	W14	WSW8	SW9	SSW8	SSW8	S4	SE7	SSE9	SSE6	SW6.6	WSW18	
22-Oct	SSE9	SE7	SSE9	SSE9	SSE8	SSE7	SSE10	SSE10	SSE9	SSE10	SE5	SSE4	SE5	SE9	SE12	SE14	SE15	SE17	SE19	SE18	SE15	SE16	SE11	SE12	SE10.8	SE19	
23-Oct	SE10	SE11	SE10	ESE8	ESE8	ESE5	ESE9	ESE9	E10	ESE13	ESE12	ESE12	ESE13	ESE15	ESE10	ENE10	E6	NNE6	NNE7	N6	WNW6	WNW12	WNW17	WNW20	ESE4.5	WNW20	
24-Oct	WNW23	W28	W28	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	WSW16	WSW19	W19	W17	WSW16	WSW14	W18	W18	W21	---	W28
25-Oct	W16	W16	W17	W14	W11	WSW7	SW8	SW8	SW7	SSW4	SSW6	SSE6	SE7	SSW6	SSE4	SE6	ESE5	SE6	ESE6	ESE7	ESE12	ESE11	ESE8	SSW4.2	W17		
26-Oct	ESE9	ESE6	ENE9	ENE11	NNE9	N9	N11	NNE12	N12	N9	N10	NNE14	NNE18	NNE18	N20	N22	N19	N22	N22	AF	AF	AF	N18	N22	NNE13.2	N22	
27-Oct	N20	N18	N14	N17	N19	N15	N14	N19	N16	N13	N12	N11	N9	NNW7	N7	NNW8	NNW7	NNW5	NW5	NNW3	N4	NNE5	ENE4	SE5	N10.0	N20	
28-Oct	SSW5	S4	S5	SSW5	SSE7	SSE9	SSE9	SE7	SSE9	SSE12	SSE11	SSE11	SE9	SSE8	SE6	SE6	SE8	SE6	SE7	SE6	ESE6	SE6	ESE7	ESE8	SSE6.9	SSE12	
29-Oct	E9	E11	E9	E9	ENE5	NNE5	NNE3	NE6	NNE8	NNE6	NE7	NE10	NE11	NE10	NNE9	NE8	ENE8	E10	E10	ESE8	SE8	SE9	SE11	SE11	ENE6.6	SE11	
30-Oct	SE11	SE12	SE14	SE16	SE19	SE20	SE17	SE15	SE17	SE20	SE18	SE18	SE16	SE18	SSE19	SE16	SE17	SE15	SSE15	SSE17	SE21	SE20	SE20	SE19	SE17.1	SE21	
31-Oct	SE19	SE17	SE19	SE19	SE19	SE18	SE17	SE15	SE16	SE15	SE15	SSE12	SSE11	SSE11	SSE11	SSE10	SSE10	SSE10	SSE10	SSE8	SSE9	S7	S7	S5	SSE12.6	SE19	

S3.3	SSW3.2	SSW3.8	S3.4	S3.2	S3.1	S3.1	S2.1	SSW2.4	S2.7	S2.3	SSE2.1	S1.8	SSE2.0	SSE1.9	S1.0	SSE1.4	SSE0.8	SSE1.6	S2.8	S2.8	S2.9	S2.9	S2.8	Diurnal Average	
WNW23	W28	W28	SE19	W21	W21	NW23	NW22	WNW22	W25	NW30	NW28	WNW29	WNW26	WNW25	WNW26	SE26	WNW25	SE24	W26	NNW25	W23	W25	W24	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:	744
Maximum Value: 9 km/h on Oct 2 11:00			Hours of Data:	726
Minimum Value: 1 km/h on Oct 8 08:00			Hours of Missing Data:	18
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:	97.6

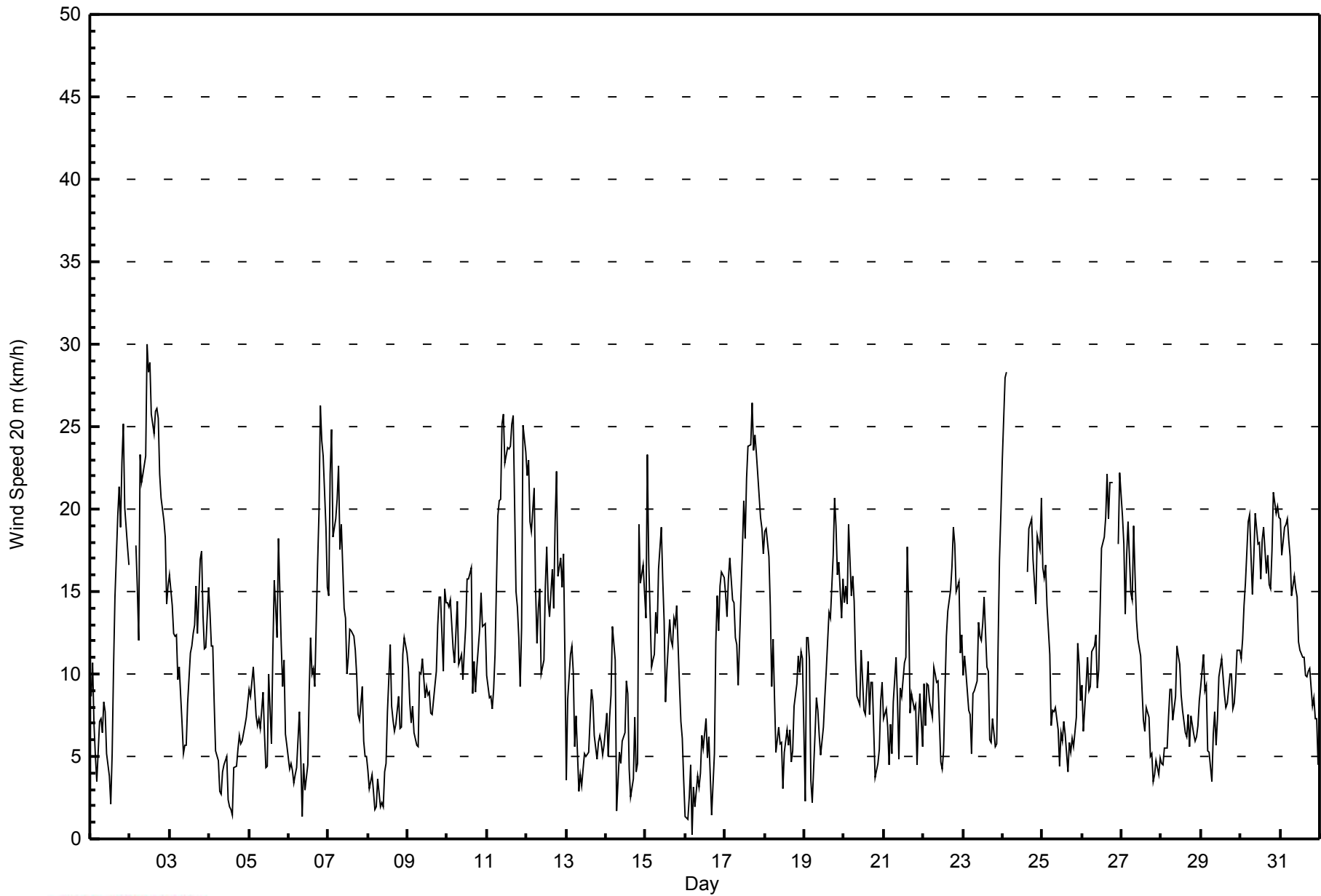
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	3	4	3	3	2	3	2	2	3	3	3	3	2	3	4	5	5	6	6	7	8	6	6	5	8
2-Oct	AF	AF	AF	5	6	6	8	6	6	9	8	7	7	7	7	6	6	5	5	5	5	4	3	9	
3-Oct	3	3	2	2	2	2	1	3	2	2	2	3	4	4	4	5	4	5	5	5	4	5	5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

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Speed 20 m (WS20m) - km/h**  
**Mannix - October 2014**





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

**Wind Speed 20 m (WS20m) - km/h**  
**Mannix - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	122	16.80	16.80
6 - 11	299	41.18	57.99
12 - 19	233	32.09	90.08
20 - 28	70	9.64	99.72
29 - 38	2	0.28	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 726

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h**  
**Mannix - October 2014**

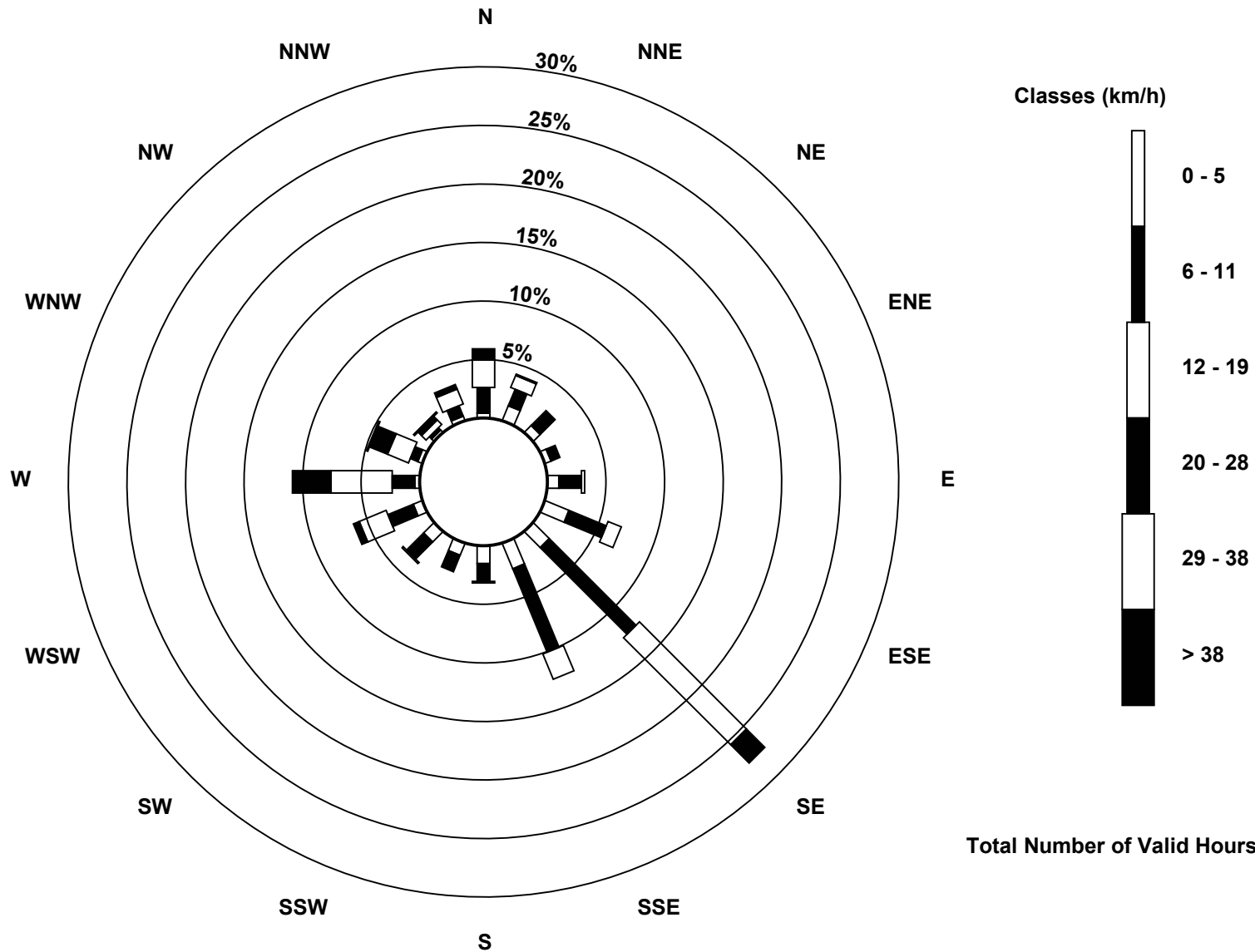
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	10	6	4	7	16	14	17	11	8	9	6	3	3	2	3	122
6 - 11	16	11	13	6	14	25	76	56	11	11	15	17	14	5	2	7	299
12 - 19	17	8	0	0	2	9	94	17	1	0	1	18	38	14	4	10	233
20 - 28	7	1	0	0	0	0	16	0	0	0	0	4	24	12	3	3	70
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	43	30	19	10	23	50	200	90	23	19	25	45	79	35	12	23	726

Total Number of Valid Hours: 726

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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





Maximum Speed: 40 km/h on Oct 2 11:00	Maximum Daily Speed Average: 28.8 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 19 06:00	Minimum Daily Speed Average: 2.1 km/h on Oct 5	Hours of Data: 728
Maximum Diurnal Speed Average: 5.3 km/h at hour 3	Minimum Diurnal Speed Average: 1.3 km/h at hour 18	Hours of Missing Data: 16
Monthly Average Velocity: 3.2 km/h 173.4 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 6 Q <sub>1</sub> = 9 Median = 14 Q <sub>3</sub> = 20 P <sub>90</sub> = 26 P <sub>99</sub> = 33	Percent Operational Time: 97.9

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-Oct	NNE11	NNE14	NE9	NNE7	NNE5	NNE9	NE9	NE7	E9	ESE9	ESE6	ESE5	E2	NNE6	N13	N20	NNE26	N28	N26	NNW31	NNW34	NNW27	NNW25	AF	N12.5	NNW34	
2-Oct	AF	AF	AF	WNW25	NNW21	NNW18	NW33	NW29	WNW29	WNW30	NW40	NW37	WNW38	WNW34	WNW32	WNW33	WNW34	WNW33	WNW28	WNW27	WNW26	WNW26	NW21	WNW23	WNW28.8	NW40	
3-Oct	WNW23	WNW21	W17	W18	WSW18	W15	W16	WSW11	SSW7	SE6	SE6	SE10	SE13	SE16	SSE16	SSE17	SE20	SE16	SE22	SSE23	SSE18	SE16	SE16	SE20	S7.7	WNW23	
4-Oct	SE19	SE16	SE16	SSE11	S9	SW6	WSW3	SW4	SSW5	SW6	W5	NE3	NE2	N1	NNE2	W5	N6	N7	N9	NNW8	WNW8	WSW10	WSW12	SW12	SSW2.3	SE19	
5-Oct	WSW14	SW13	SW17	SW16	SSW13	SSE10	S12	SSW11	SW12	SSW9	SSE5	WSW5	WNW11	N7	N14	N20	NNE18	N18	NNE24	NNE16	N12	NNE14	NNE8	NE6	NW2.1	NNE24	
6-Oct	NNE5	NE5	E5	SE4	SSE6	ESE5	E9	E5	SSW2	E5	NE4	NW6	NW11	NW16	NNW13	N14	NW13	WNW21	WNW24	W31	W28	W28	W23	W20	WNW7.7	W31	
7-Oct	W20	WNW28	W30	WNW26	W25	W25	W28	WNW23	WNW25	NW18	WNW17	NW13	NNW14	NW16	NNW16	NNE15	NE15	NE14	NE12	ENE11	E12	ESE8	SSE10	SSE11	NW10.7	W30	
8-Oct	SSE8	ESE6	SE8	ESE5	ESE5	ESE3	ESE7	SE3	SSE5	SE3	SE5	ESE6	ESE9	E14	SE10	SE9	SE8	SE10	SE12	SSE9	SE10	SE15	SE15	SE16	SE8.0	SE16	
9-Oct	SE14	SE11	SE11	SE13	SE10	SE9	ESE8	SE15	SE13	SE13	SE10	SE11	SE11	SE11	SE9	SSE9	SE13	SE14	SE18	SE19	SE21	SE15	SE22	SE22	SE13.4	SE22	
10-Oct	SE21	SE21	SE21	SE17	SE17	SE19	SE21	SE16	SE15	SSE13	SSE15	SSE16	SSE19	SSE19	SSE21	SSE13	S18	S20	S21	S23	S24	S21	SSE20	SSE22	SSE18.0	S24	
11-Oct	SSE17	SSE14	S12	SSW14	SW16	WSW20	WSW27	WSW28	WSW26	W28	W29	W26	W26	W26	W28	WSW31	W30	W20	WSW23	WSW21	WSW16	WSW20	W30	W27	WSW20.8	WSW31	
12-Oct	W26	W28	W23	W23	W26	W20	W17	W18	W17	WSW11	W12	W17	W19	W17	WSW16	WSW19	WSW18	W23	W26	W20	W21	W20	W21	W15	W19.6	W28	
13-Oct	WNW8	W13	WSW18	WSW20	WSW14	WSW10	S12	SSW8	S4	S4	S5	SE6	SE6	SE6	SE8	SSE11	SSE12	SE11	SE8	ESE9	SE10	ESE9	ESE8	E9	S5.2	WSW20	
14-Oct	E11	ESE9	E11	ESE12	ESE16	E15	ESE5	ENE5	NE7	E8	SE8	ESE9	ESE12	SE11	SE5	S4	WSW4	WNW9	W6	WSW8	W24	W20	W21	W19	SSE2.3	W24	
15-Oct	W18	W27	WNW20	WSW13	SW16	SW19	WSW21	WSW19	W19	W21	WNW18	W14	W9	WNW12	WNW16	NNW15	NNW15	NNW20	NNW19	NNW20	N13	N10	N8	NNE7	WNW12.2	W27	
16-Oct	NE4	ENE3	NE2	NE7	E2	SSE3	S2	E5	ESE5	SSE4	SE7	SSE7	S9	SSE6	SE7	SSE5	S2	ESE8	ESE16	SE20	SE18	SE21	SE22	SE22	SE7.6	SE22	
17-Oct	SE20	SE20	SE22	SE22	SE21	SE20	SE19	SE18	SE15	SE18	SE24	SE27	SE23	SE29	SE31	SE31	SE35	SE30	SE31	SE30	SE30	SE27	SE27	SE24	SE24.7	SE35	
18-Oct	SE25	SE25	SE23	SE20	SE13	SE17	SE13	SSE9	SSE10	SSE7	SSW8	SSE4	SE6	SE8	SSE8	SW9	WSW8	SW10	WSW15	W15	W17	W16	W18	W17	S6.4	SE25	
19-Oct	NW5	WSW17	W20	W18	NW6	S1	S9	SSE14	SE11	SE8	SSE6	SE8	SE11	SE12	ESE16	ESE18	SE19	SE24	SE28	SE26	SE24	SE24	SE20	SE22	SE10.5	SE28	
20-Oct	SE20	SE22	SE20	SE25	SE20	SE21	SE20	SE17	SE13	SSE11	SSE14	SSE12	SSE9	SSE9	S14	SSE10	SE15	SE14	SE11	SE6	ESE7	SE9	SSE14	SSE15	SE14.2	SE25	
21-Oct	SSE15	S15	SSW14	WSW8	WSW13	WSW10	W16	W18	WSW14	SW8	WSW12	WSW11	W12	WSW13	WSW21	W16	WSW11	WSW13	SW14	SW15	SSW10	SSE9	SSE11	SSW8	SW10.7	WSW21	
22-Oct	S10	SSE13	SSE16	SSE19	SSE15	SSE14	SE16	SE19	SSE16	SSE12	SE7	SSE6	SSE8	SE14	SE17	SE19	SE21	SE22	SE25	SE25	SE24	SE25	SE19	SE19	SE16.4	SE25	
23-Oct	SE17	SE18	SE16	ESE11	ESE11	ESE8	ESE12	ESE13	E12	ESE17	ESE17	ESE16	ESE17	ESE19	ESE14	ENE12	E8	NNE8	NNE9	N7	NW7	WNW15	WNW21	WNW25	ESE6.9	WNW25	
24-Oct	WNW28	W31	W31	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	WSW19	WSW23	W23	W19	W20	WSW19	W22	W20	W24	---	W31
25-Oct	W21	W20	W19	W17	W15	W10	SW13	SW12	WSW12	SW9	SSW6	S9	SSE8	SE9	SSW9	SSE6	SE9	ESE8	SE9	ESE8	ESE10	ESE15	ESE14	ESE11	SSW5.5	W21	
26-Oct	ESE12	ESE9	ENE11	ENE13	NNE12	NNE12	N16	NNE16	N17	N12	N14	NNE18	NNE23	NNE24	N26	N30	N26	N30	N30	N31	N32	N30	N27	N30	NNE19.3	N32	
27-Oct	N26	N25	N19	N25	N26	N21	N20	N26	N22	N18	NNE15	N14	N11	N9	N8	NNW10	NNW10	NNW7	NNW7	N5	N5	NE5	E5	SE8	N13.5	N26	
28-Oct	SSW7	S8	S9	S9	SSE10	SSE11	SSE12	SE9	SSE11	SSE15	SSE14	SSE13	SE11	SSE10	SE8	SE8	SE11	SE8	SE10	SE9	ESE8	SE8	ESE9	ESE11	SSE9.2	SSE15	
29-Oct	E11	E13	E11	E10	ENE6	NNE6	NNE5	NE8	NNE9	NNE7	NE9	NE11	NE13	NE11	NNE11	NE10	ENE9	E12	E11	ESE10	SE10	SE12	SE14	SE15	ENE8.1	SE15	
30-Oct	SE15	SE17	SE19	SE20	SE25	SE24	SE22	SE19	SE22	SE26	SE22	SE23	SE19	SE23	SSE23	SE20	SE22	SE20	SSE19	SSE22	SE26	SE25	SE26	SE24	SE21.8	SE26	
31-Oct	SE25	SE23	SE25	SE25	SE26	SE24	SE23	SE21	SE21	SE21	SE19	SSE15	SSE14	SSE14	SSE14	SSE14	SSE14	SSE14	SSE14	SSE12	SSE13	S13	S14	SSW8	SSE17.1	SE26	
SSE4.6 S4.5 S5.3 S4.5 S4.1 S3.8 S4.1 S3.2 S3.1 S3.6 S2.8 SSE2.7 SSE2.2 SE2.7 SSE2.4 SSE1.3 SSE2.2 SSE1.3 SSE2.2 S2.8 S2.9 SSE3.1 S3.9 S4.8																								Diurnal Average			
WNW28 W31 W31WNW26 N26 W25 NW33 NW29WNW29WNW30 NW40 NW37WNW38WNW34WNW32WNW33 SE35WNW33 SE31NNW31NNW34 N30 W30 N30																								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: 744
Maximum Value: 8 km/h on Oct 2 11:00	Hours of Data: 728
Minimum Value: 1 km/h on Oct 4 08:00	Hours of Missing Data: 16
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: 97.9

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

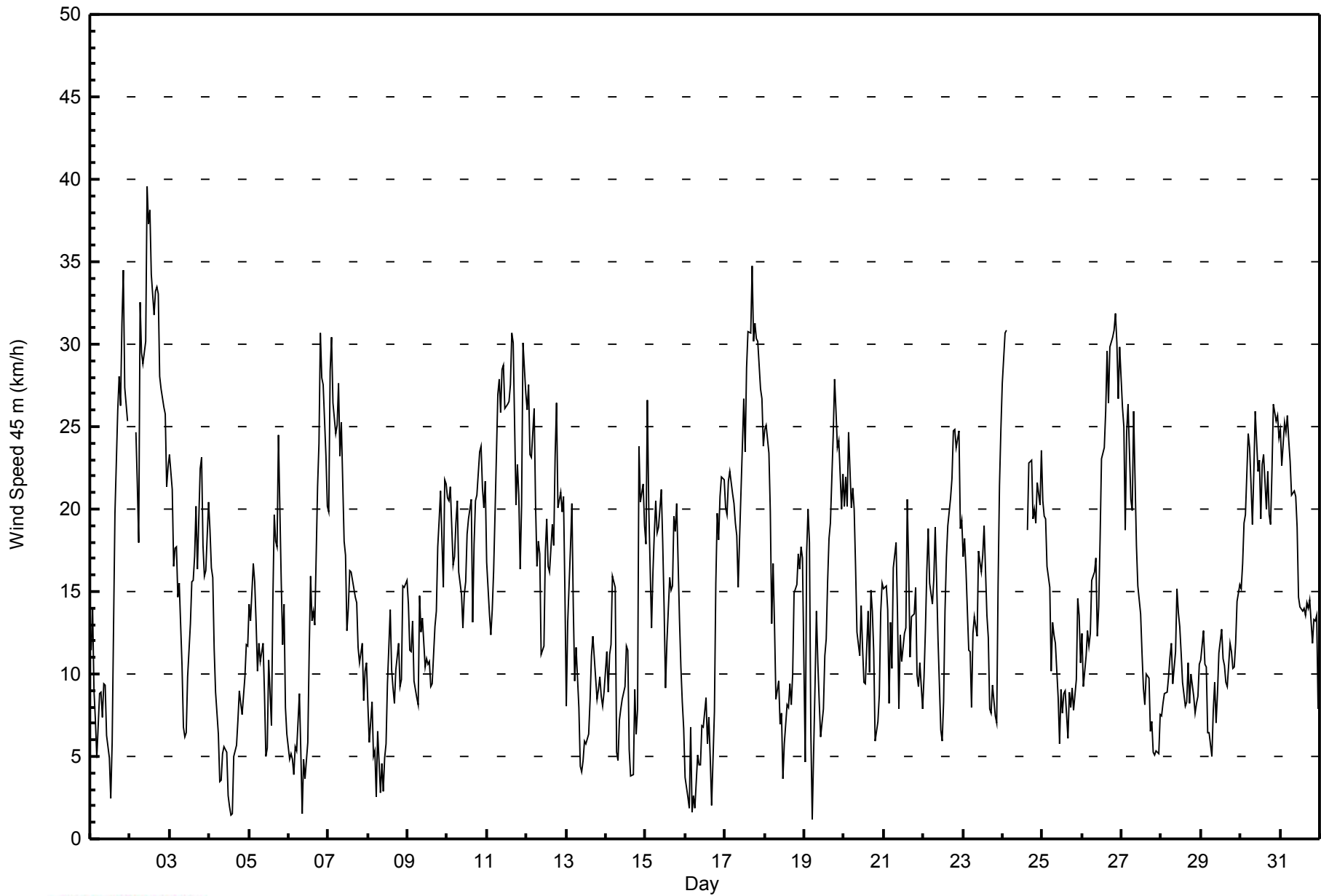
Diurnal Maximum

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Speed 45 m (WS45m) - km/h**  
**Mannix - October 2014**





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

**Wind Speed 45 m (WS45m) - km/h**  
**Mannix - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	57	7.83	7.83
6 - 11	209	28.71	36.54
12 - 19	244	33.52	70.06
20 - 28	181	24.86	94.92
29 - 38	36	4.95	99.86
> 38	1	0.14	100.00

Total Number of Valid Hours: 728

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed 45 m (WS45m) - km/h**  
**Mannix - October 2014**

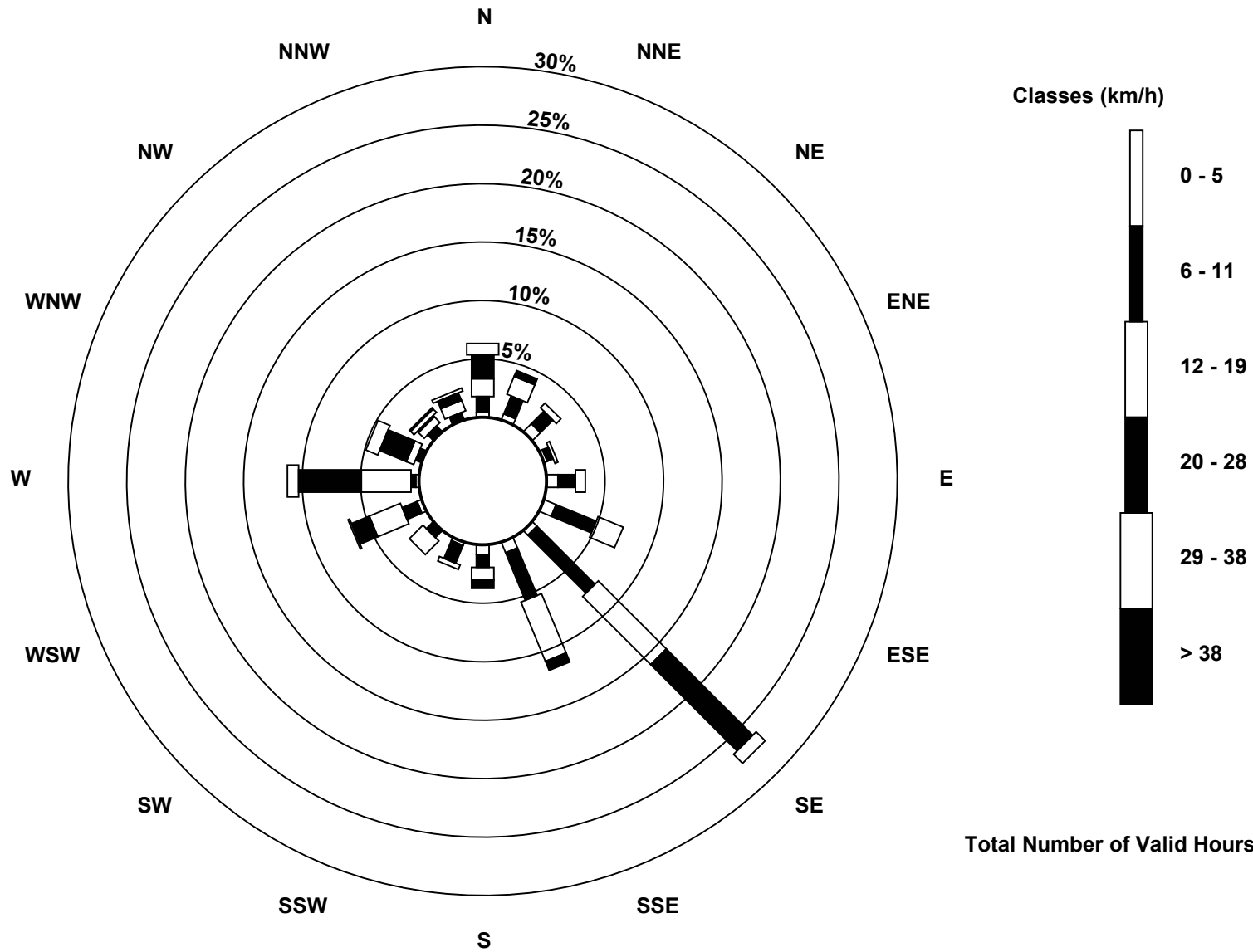
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	4	7	2	7	8	4	7	6	2	1	3	2	0	1	0	57
6 - 11	10	12	11	4	11	27	51	32	8	12	5	10	3	4	4	5	209
12 - 19	11	12	4	2	6	17	60	40	8	3	12	21	31	5	5	7	244
20 - 28	15	4	0	0	0	0	76	6	5	0	0	12	39	18	1	5	181
29 - 38	7	0	0	0	0	0	8	0	0	0	0	1	7	8	3	2	36
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
<b>Totals</b>	46	32	22	8	24	52	199	85	27	17	18	47	82	35	15	19	728

Total Number of Valid Hours: 728

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



**Total Number of Valid Hours: 728**



Maximum Speed: 42 km/h on Oct 2 11:00	Maximum Daily Speed Average: 30.6 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 4 14:00	Minimum Daily Speed Average: 2.4 km/h on Oct 4	Hours of Data: 732
Maximum Diurnal Speed Average: 4.8 km/h at hour 3	Minimum Diurnal Speed Average: 1.1 km/h at hour 18	Hours of Missing Data: 12
Monthly Average Velocity: 3.3 km/h 186.6 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 6 Q <sub>1</sub> = 9 Median = 16 Q <sub>3</sub> = 24 P <sub>90</sub> = 29 P <sub>99</sub> = 36	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-Oct	NNE13	NNE16	NE11	NNE9	NNE6	NNE10	NE10	ENE8	E9	ESE8	ESE7	ESE5	ESE3	NNE6	N13	N22	NNE30	NNE32	N30	N36	NNW39	NNW32	NNW29	NNW26	N14.6	NNW39		
2-Oct	NW21	WNW22	WNW30	WNW27	NNW24	NNW21	NW36	NW32	WNW31	WNW33	NW42	NW40	WNW41	WNW36	WNW34	WNW35	WNW36	WNW36	WNW31	WNW30	WNW30	WNW29	NW25	WNW27	WNW30.6	NW42		
3-Oct	WNW28	WNW25	WNW20	W22	W20	W18	W18	W14	SW8	SSE6	SE7	SE8	SE12	SE16	SSE17	SSE19	SE22	SE19	SE26	SSE27	SSE21	SE16	SE14	SE19	S7.2	WNW28		
4-Oct	SE21	SE17	SE20	SSE14	SSE11	SSW7	SW4	SSW3	SSW5	SW5	W6	NE3	NE2	N1	NNE2	W5	N6	N8	N9	NNW9	WNW7	W12	WSW12	WSW11	SSW2.4	SE21		
5-Oct	SW13	SW12	SW20	SW19	SSW15	S12	SSW14	SW13	SW13	SSW9	S5	WSW6	WNW11	N7	N16	N22	NNE20	NNE21	NNE27	NNE18	N13	NNE16	NNE9	NE7	NW2.6	NNE27		
6-Oct	NE5	NE5	E4	SE3	SSE6	ESE5	E8	E4	SSW2	E4	ENE3	NW6	WNW12	NW16	NNW14	N15	NW14	WNW24	WNW26	W33	W30	W31	W27	W24	WNW8.9	W33		
7-Oct	W25	WNW33	WNW36	WNW33	WNW29	W28	W32	WNW26	WNW28	NW19	WNW17	NW13	NNW15	NNW17	NNW17	NNE17	NE17	NE17	NE14	ENE12	E13	ESE6	SSE12	SSE16	NW12.1	WNW36		
8-Oct	SSE14	SE9	SE13	SE7	SE5	SE5	SE7	SE6	SE8	ESE4	SE5	SE6	ESE8	E12	SE9	SE9	SE9	SE11	SE13	SSE10	SE9	SE14	SE14	SE12	SE8.8	SSE14		
9-Oct	SE14	SE10	SE12	SE13	SE9	SE9	SE7	SE17	SE13	SE12	SE9	SE10	SE10	SE9	SE9	SSE10	SE13	SE11	SE17	SE19	SE20	SE16	SE23	SE22	SE13.0	SE23		
10-Oct	SE18	SE23	SE22	SE16	SE17	SE19	SE24	SE20	SE19	SSE17	SSE18	SSE17	SSE20	SSE21	SSE22	SSE16	S22	S25	S26	S30	S31	S28	S23	S26	SSE20.8	S31		
11-Oct	S18	SSW8	SW10	SW14	SW22	WSW26	WSW32	WSW33	WSW29	W31	W30	W27	W28	W28	W29	WSW34	W33	W24	WSW28	WSW27	WSW23	WSW27	W34	W30	WSW24.8	W34		
12-Oct	W30	W32	W27	W27	W30	W24	W21	W21	W19	WSW12	W12	W18	W20	W17	WSW18	WSW21	WSW20	W26	W29	W23	W25	W23	W23	W18	W22.2	W32		
13-Oct	W12	W14	WSW21	WSW22	WSW15	WSW13	SSW11	SW11	SW5	SSW5	S5	SE6	SE6	SE6	SE8	SSE11	SSE15	SE13	SE9	ESE8	SE8	ESE7	ESE7	ESE8	SSW5.6	WSW22		
14-Oct	ESE10	ESE9	ESE10	ESE10	ESE13	E15	SE7	ESE7	E7	ESE9	SE9	ESE8	ESE10	SE12	SE6	S5	SW4	WNW8	WSW8	WSW11	W28	W24	W26	W22	S3.0	W22		
15-Oct	W23	W28	WNW22	W14	WSW20	WSW25	WSW27	WSW25	W21	W22	WNW18	W14	W9	WNW12	NW16	NNW16	NNW17	NNW24	NNW24	NNW25	N16	N12	N9	NNE8	WNW14.0	W28		
16-Oct	NE5	NE6	NE6	NE8	E3	SE3	ESE2	E6	ESE5	SE4	SE6	SSE7	SSE9	SSE6	SE7	SSE6	SSE3	ESE6	ESE12	SE20	SE21	SE23	SE21	SE23	SE7.9	SE23		
17-Oct	SE25	SE24	SE25	SE25	SE23	SE24	SE21	SE23	SE22	SE23	SE25	SE28	SE24	SE28	SE32	SE32	SE36	SE34	SE35	SE34	SE32	SE27	SE28	SE23	SE27.1	SE36		
18-Oct	SE23	SE23	SE25	SE20	SE13	SE16	SE16	SSE12	SSE13	SSE8	SSW8	S4	SSE6	SSE9	S10	SW11	WSW11	SW13	WSW20	W22	W23	W21	WNW22	WNW20	SSW7.3	SE25		
19-Oct	WNW8	W18	W22	WNW23	NW9	ENE3	SSE8	SSE18	SE14	SE10	SE8	SSE8	SE12	SE10	ESE11	SE14	SE17	SE26	SE24	SE24	SE23	SE25	SE21	SE20	SE9.5	SE26		
20-Oct	SE19	SE20	SE20	SE28	SE23	SE24	SE23	SE19	SE16	SSE14	SSE17	SSE13	SSE10	SSE11	S15	SSE11	SSE19	SE16	SE13	SE7	ESE4	SE8	SSE15	SSE19	SE15.7	SE28		
21-Oct	SSE24	S24	SW14	W15	W22	WSW18	W24	W23	WSW18	WSW11	WSW14	WSW12	W13	WSW14	WSW22	WSW17	WSW13	WSW16	SW18	SW20	SW16	S6	SSW6	SW10	WSW14.2	W24		
22-Oct	SW6	SSW6	SSE9	SSE18	SSE24	SSE23	SSE21	SSE27	SE20	SE15	SE9	SSE9	SE12	SE16	SE15	SE17	SE18	SE18	SE27	SE29	SE29	SE30	SE24	SE25	SE18.1	SE30		
23-Oct	SE20	SE20	SE14	ESE9	ESE9	SE7	ESE9	ESE11	ESE11	ESE14	ESE13	ESE14	ESE14	ESE11	E14	E8	NE7	NNE9	N8	NW7	NW17	WNW24	WNW27	ESE5.5	WNW27			
24-Oct	WNW30	W32	W32	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	WSW21	W26	W26	W22	W23	WSW24	W25	W23	W26	---	W32
25-Oct	W24	W23	W22	W18	W18	W13	SW18	WSW18	WSW18	SW11	SSW6	S10	SSE8	SE9	S9	SSE6	SE9	ESE7	ESE6	ESE7	ESE6	ESE11	ESE10	ESE9	SW6.5	W24		
26-Oct	ESE10	ESE9	E12	ENE14	NE13	NE11	NNE18	NNE17	NNE18	N13	N16	NNE21	NNE26	NNE26	NNE29	N33	N31	N34	N34	N35	N36	NNE34	NNE30	N33	NNE21.5	N36		
27-Oct	N29	N28	N21	N29	NNE30	N24	N23	NNE31	NNE25	N21	NNE17	NNE15	N12	N10	N23	NNW11	NNW11	NNW8	NNW8	N6	NNE6	NE6	E5	SE8	N15.3	NNE31		
28-Oct	S9	S10	S10	S10	SSE11	SSE14	SSE13	SSE11	SSE14	SSE18	SSE15	SSE14	SE13	SE11	SE9	SE8	SE12	SE8	SE10	SE9	ESE7	SE7	ESE7	ESE8	SSE10.2	SSE18		
29-Oct	E10	E12	E10	E11	ENE7	NE7	NE6	ENE9	NE11	NNE8	NE9	NE12	NE14	NE12	NE11	NE11	ENE10	E12	E11	ESE9	SE9	SE11	SE13	SE17	ENE8.5	SE17		
30-Oct	SE18	SE19	SE24	SE24	SE28	SE26	SE24	SE22	SE24	SE28	SE24	SE25	SE22	SE25	SSE26	SE22	SE24	SE22	SSE21	SE25	SE29	SE28	SE29	SE27	SE24.5	SE29		
31-Oct	SE27	SE24	SE26	SE26	SE28	SE26	SE25	SE22	SE24	SE23	SE21	SSE16	SSE16	SSE16	SSE16	SSE16	SSE18	SSE19	SSE19	SSE16	S17	S18	SSW13	SW8	SSE19.1	SE28		

S4.2SSW4.3SSW4.8SSW4.3SSW4.3	S4.2SSW4.7	S4.3	S4.0	S4.0	S3.0	S2.8	S2.3	SSE2.7	SSE2.4	S1.3	SSE2.4	SSE1.1	S2.1	S3.1	SSW3.5SSW3.3SSW4.0SSW4.1	Diurnal Average	
WNW30WNW33WNW36WNW33	W30	W28	NW36	WSW33WNW31WNW33	NW42	NW40	WNW41	WNW36WNW34WNW35	SE36WNW36	SE35	N36	NNW39	NNE34	W34	N33	Diurnal Maximum	

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



Summary of Hour Standard Deviations

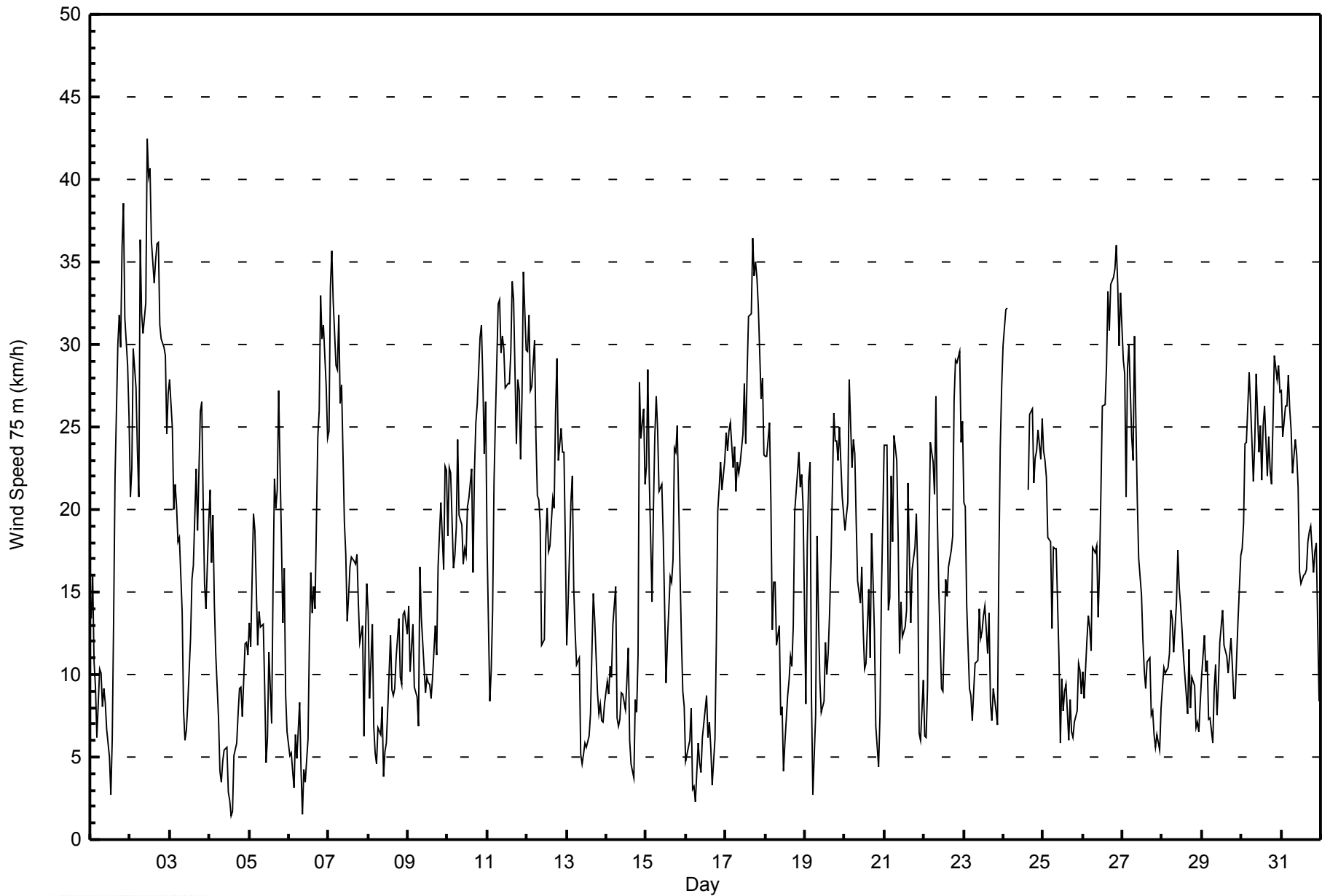
Mannix - October 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Oct 17 15:00 Minimum Value: 1 km/h on Oct 4 08:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 8																	Hours in Service: 744 Hours of Data: 732 Hours of Missing Data: 12 Hours of Calibration: 0 Percent Operational Time: 98.4								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	3	4	4	4	2	4	3	2	3	3	3	2	2	3	4	4	4	5	6	6	7	6	5	5	7
2-Oct	4	6	5	4	4	7	6	5	4	5	8	6	5	6	6	6	5	5	4	6	4	5	3	2	8
3-Oct	3	2	2	2	1	2	2	5	2	2	2	3	4	4	4	4	5	4	5	5	5	6	6	6	
4-Oct	5	5	4	4	2	2	1	1	1	3	2	2	2	2	2	2	2	1	1	1	2	2	1	2	5
5-Oct	2	2	2	1	2	2	2	3	3	3	2	3	2	3	4	4	3	3	3	5	3	3	4	2	5
6-Oct	3	3	1	1	2	2	3	2	1	2	3	2	3	3	3	3	3	8	4	5	3	4	3	3	8
7-Oct	5	4	4	6	3	3	3	4	5	6	4	3	5	3	4	3	3	2	1	3	3	2	3	2	6
8-Oct	1	2	2	2	2	2	3	2	3	1	3	3	3	4	3	3	2	5	4	2	3	5	5	4	5
9-Oct	6	4	4	3	4	4	3	3	5	4	3	4	3	3	3	3	4	5	6	7	6	6	5	7	7
10-Oct	6	6	6	4	2	3	4	2	2	3	4	3	3	4	4	3	4	2	2	3	3	3	2	2	6
11-Oct	4	2	4	2	5	4	5	5	5	5	6	4	5	5	6	6	5	2	2	3	2	4	4	4	6
12-Oct	3	3	4	3	2	3	2	2	3	2	2	3	3	4	3	3	5	4	3	4	3	3	3	3	5
13-Oct	2	2	4	3	2	1	2	1	3	2	2	2	3	3	3	3	1	1	3	2	3	3	3	3	4
14-Oct	3	3	4	4	5	4	4	3	2	3	3	3	4	4	2	1	2	2	8	4	4	3	3	3	8
15-Oct	5	5	6	3	2	2	2	2	3	2	2	4	4	4	3	3	4	4	3	3	3	2	1	2	6
16-Oct	1	1	2	3	3	1	1	2	2	2	2	3	3	2	2	2	2	3	5	6	4	5	7	5	7
17-Oct	3	3	4	2	3	3	4	4	3	6	8	8	7	8	9	9	9	7	7	7	7	8	8	8	9
18-Oct	8	8	6	6	5	6	3	2	2	2	2	2	2	2	1	2	2	3	2	2	3	2	1	2	8
19-Oct	3	4	1	1	5	2	3	3	5	3	3	3	3	4	3	5	7	7	9	9	8	8	7	8	9
20-Oct	8	7	6	4	4	5	4	4	3	2	3	3	3	4	3	3	3	2	4	2	2	3	3	3	8
21-Oct	3	2	3	3	3	3	3	5	4	2	3	3	3	5	3	3	1	1	1	1	4	2	2	3	5
22-Oct	1	1	4	3	1	2	2	2	4	3	3	2	3	3	5	6	6	7	6	5	4	5	3	3	7
23-Oct	3	3	5	4	3	3	3	3	4	5	3	4	5	5	4	4	5	2	1	2	3	3	4	3	5
24-Oct	3	4	3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	5	4	3	3	2	3	3	3	5
25-Oct	3	3	3	3	2	2	2	2	1	3	1	3	3	3	3	2	3	3	2	3	3	3	3	4	4
26-Oct	3	4	2	3	3	2	2	2	2	2	3	3	3	3	5	4	4	2	2	3	3	3	4	3	5
27-Oct	3	6	3	6	2	5	5	2	2	3	3	3	2	2	2	2	2	2	2	2	2	1	2	2	6
28-Oct	1	1	2	1	1	2	2	3	3	2	4	2	2	2	2	3	4	3	3	3	3	3	2	3	4
29-Oct	3	2	3	3	3	2	1	2	2	2	4	3	2	3	2	2	2	2	3	3	3	4	5	4	5
30-Oct	4	4	4	4	5	5	5	5	6	6	6	5	5	6	5	5	5	5	4	5	6	7	6	5	7
31-Oct	6	6	7	7	6	6	6	6	5	5	4	4	3	2	3	2	2	2	2	2	2	2	2	2	7
Diurnal Maximum																									
AF - Analyzer Failure																									



**WBEA**  
**Hourly Averages**

**Wind Speed 75 m (WS75m) - km/h**  
**Mannix - October 2014**







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

**Wind Speed 75 m (WS75m) - km/h**  
**Mannix - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	41	5.60	5.60
6 - 11	204	27.87	33.47
12 - 19	202	27.60	61.07
20 - 28	208	28.42	89.48
29 - 38	73	9.97	99.45
> 38	4	0.55	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed 75 m (WS75m) - km/h**  
**Mannix - October 2014**

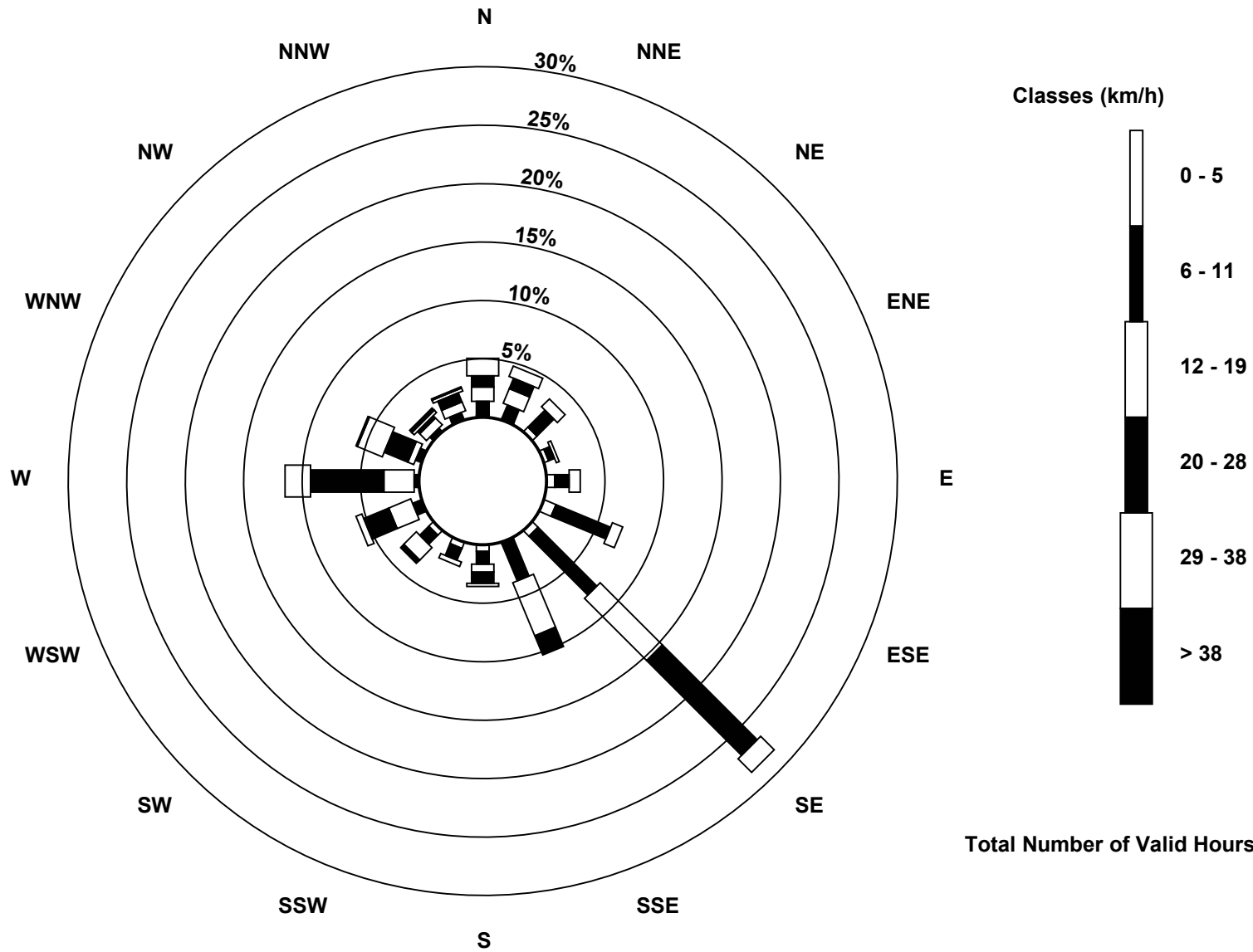
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	1	4	3	5	8	5	1	4	4	4	0	1	0	0	0	41
6 - 11	9	9	15	4	9	37	52	25	8	8	8	6	2	4	3	5	204
12 - 19	9	10	7	2	7	7	55	36	5	3	11	15	19	4	6	6	202
20 - 28	7	7	0	0	0	0	84	13	7	0	3	17	46	16	2	6	208
29 - 38	11	7	0	0	0	0	12	0	2	0	0	4	16	17	2	2	73
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	4
<b>Totals</b>	<b>37</b>	<b>34</b>	<b>26</b>	<b>9</b>	<b>21</b>	<b>52</b>	<b>208</b>	<b>75</b>	<b>26</b>	<b>15</b>	<b>26</b>	<b>42</b>	<b>84</b>	<b>42</b>	<b>15</b>	<b>20</b>	<b>732</b>

Total Number of Valid Hours: 732

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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





Maximum Speed: 43 km/h on Oct 2 11:00	Maximum Daily Speed Average: 31.2 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 2 km/h on Oct 4 14:00	Minimum Daily Speed Average: 2.6 km/h on Oct 4	Hours of Data: 731
Maximum Diurnal Speed Average: 4.8 km/h at hour 10	Minimum Diurnal Speed Average: 1.9 km/h at hour 18	Hours of Missing Data: 13
Monthly Average Velocity: 3.7 km/h 168.6 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 7 Q <sub>1</sub> = 11 Median = 18 Q <sub>3</sub> = 26 P <sub>90</sub> = 30 P <sub>99</sub> = 37	Percent Operational Time: 98.3

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Oct	NNE14	NNE17	NNE12	NNE10	N7	NNE11	NNE11	NE8	ENE10	E10	E7	E6	E3	NNE6	N14	N23	NNE31	N33	N31	NNW38	NNW40	NNW34	NW30	NNW27	N15.4	NNW40		
2-Oct	NW22	WNW23	WNW31	WNW28	NNW26	NW22	NW38	NW33	WNW31	WNW33	NW43	NW40	WNW41	WNW36	WNW34	WNW35	WNW36	WNW37	W32	WNW31	WNW31	WNW30	NNW26	NNW28	WNW31.2	NW43		
3-Oct	WNW29	WNW26	W21	W23	W21	W19	W18	W14	SW9	SSE6	SE7	SE10	SE13	SE17	SE17	SE21	SE25	SE21	SE28	SSE29	SSE22	SE19	ESE19	SE23	S7.4	WNW29		
4-Oct	SE24	SE19	SE22	SE16	SSE13	SSW8	SSW4	S3	S4	SW5	W6	NNE3	NE2	NNW2	N2	W5	NNW6	N8	N9	NNW9	WNW7	WSW12	WSW12	WSW11	S2.6	SE24		
5-Oct	SW13	SW12	SW20	SW19	SSW16	S12	SSW15	SW14	SW14	SSW9	S5	SW7	W11	NNW7	N16	N22	NNE21	N22	N27	NNE19	N14	NNE17	NNE9	NE6	NW3.2	N27		
6-Oct	NNE5	NE5	E5	SE4	SSE7	ESE6	E9	E5	SSW2	ENE4	ENE3	NW6	WNW12	WNW16	NNW14	N16	NW15	WNW25	W26	W33	W31	W32	W29	W26	WNW9.2	W33		
7-Oct	W27	W35	W38	WNW35	W30	W30	W33	WNW27	WNW28	NW20	WNW17	NW14	NNW15	NW17	NNW17	NNE18	NNE17	NNE18	NE16	ENE13	E16	ESE11	SSE12	SSE17	WNW12.4	W38		
8-Oct	SSE16	SE11	SE15	SE10	SE9	SE7	ESE10	SE9	SE11	ESE8	ESE7	ESE7	ESE10	E15	ESE11	ESE11	SE10	SE13	SE15	SSE10	SE10	ESE16	ESE18	ESE17	SE11.1	ESE18		
9-Oct	SE17	ESE13	SE14	SE14	ESE11	ESE11	ESE10	SE18	SE16	SE13	SE10	SE11	SE11	SE11	SE10	SE10	SE14	ESE16	SE20	SE22	SE23	SE21	SE25	SE25	SE15.2	SE25		
10-Oct	ESE22	SE25	SE24	SE19	SE18	SE19	SE27	SE21	SE22	SE19	SSE19	SSE19	SSE21	SSE22	SSE24	SSE18	SSE24	S28	S29	S34	S35	S31	SSE26	S29	SSE22.5	S35		
11-Oct	S17	SW8	SW11	SW15	SW24	WSW28	WSW34	WSW34	WSW30	WSW30	W29	W27	W27	W27	WSW30	WSW34	WSW33	WSW25	WSW29	WSW29	WSW26	WSW29	W35	W30	WSW26.0	WSW35		
12-Oct	W31	W33	W29	W29	W32	W25	W22	W21	W20	WSW12	W12	W18	W20	W18	WSW18	WSW21	WSW21	W26	W30	W24	W26	W25	W24	W19	W22.9	WSW33		
13-Oct	W13	W15	WSW21	WSW22	WSW16	WSW14	SSW11	SW11	SW6	SSW5	S5	SE6	SE6	SE7	SE9	SSE12	SSE16	SE14	ESE12	ESE13	ESE13	ESE11	ESE10	ESE13	S6.0	WSW22		
14-Oct	ESE15	ESE15	ESE17	ESE16	E20	E21	ESE10	ESE10	E9	E14	ESE12	ESE14	ESE14	SE13	SE7	S5	SSW4	W8	WSW8	WSW13	WSW29	WSW25	WSW27	W22	SSE4.6	WSW29		
15-Oct	W24	W28	W22	WSW15	WSW22	WSW26	WSW29	WSW27	WSW27	W21	W18	W14	W9	WNW12	WNW16	NW16	NNW18	NNW25	NNW26	NNW27	N18	N13	N10	N9	WNW14.9	WSW29		
16-Oct	NE5	NE6	NNE7	NNE9	ENE4	ESE4	ESE3	E7	ESE6	SE4	SE7	SE7	SSE9	SE7	SE8	SSE6	SE4	ESE11	ESE19	SE22	SE24	SE26	SE24	SE26	ESE9.1	SE26		
17-Oct	SE28	SE26	SE27	SE28	SE24	SE26	SE23	SE26	SE26	SE27	SE28	SE30	SE26	SE31	SE35	SE35	SE40	SE38	SE39	SE37	SE36	SE31	SE31	SE27	SE30.1	SE40		
18-Oct	SE27	SE27	SE28	SE23	SE16	SE19	SE17	SSE14	SSE15	SSE8	SSW8	S4	SSE6	SSE9	S11	SW12	WSW11	SW14	WSW21	WSW25	W26	W22	WNW23	WNW21	S7.8	SE28		
19-Oct	WNW10	W17	W20	WNW22	NW10	E5	SSE7	SE16	SE14	SE11	SE9	SE9	SE13	ESE13	ESE20	ESE22	ESE22	SE29	ESE29	ESE29	ESE28	SE29	SE27	ESE26	SE11.9	SE29		
20-Oct	ESE25	ESE26	SE23	SE30	SE24	SE27	SE25	SE22	SE18	SSE16	SSE18	SSE14	SSE11	SE12	SSE16	SSE12	SE20	SE18	SE15	SE9	ESE8	SE9	SE17	SE24	SE17.8	SE30		
21-Oct	SSE28	S26	SW14	W18	W24	WSW21	WSW27	WSW25	WSW20	WSW13	WSW15	WSW13	WSW13	WSW14	WSW21	WSW17	WSW14	WSW18	WSW20	WSW21	SW18	SSW7	SW7	SW12	WSW15.6	SSE28		
22-Oct	SW8	SW5	SSE6	SSE13	SSE20	SSE20	SSE20	SSE26	SE22	SE18	ESE12	SE12	SE16	SE17	ESE18	ESE20	ESE23	ESE26	SE30	SE32	SE33	SE33	SE28	SE29	SE19.4	SE33		
23-Oct	SE24	SE23	ESE18	ESE15	ESE14	ESE11	ESE17	ESE19	E17	ESE24	ESE23	ESE22	ESE24	ESE22	ESE17	ENE15	E10	NE7	NNE9	N8	NW7	WNW17	WNW24	WNW28	ESE9.8	WNW28		
24-Oct	WNW30	W32	W32	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	WSW27	W27	W22	WSW24	WSW25	W26	W24	W26	---	W32
25-Oct	WSW24	WSW24	W23	W19	W19	W14	SW20	WSW20	WSW20	SW12	SSW6	S10	SSE8	SE10	S9	SSE6	SE9	ESE9	ESE11	ESE11	ESE13	ESE19	ESE17	ESE13	SSW6.2	WSW24		
26-Oct	ESE16	ESE12	E14	ENE15	NE13	NE11	N18	NNE17	NNE17	N14	N17	NNE22	N27	N28	N30	N34	N33	N34	N35	N35	N37	N35	N31	N34	NNE22.0	N37		
27-Oct	N30	N29	N22	N30	N31	N26	N24	N32	N26	N22	N18	N15	N12	N11	N10	NNW11	NNW11	NNW8	NNW8	N7	N6	NE7	E7	SE9	N16.0	N32		
28-Oct	SSE10	S11	S11	S11	SSE12	SE15	SSE14	SE13	SE16	SSE19	SSE16	SSE15	SE14	SE12	SE10	ESE9	SE13	ESE10	SE11	SE11	ESE9	ESE10	ESE10	ESE12	SE11.6	SSE19		
29-Oct	E12	E14	E12	ENE12	ENE8	NE8	NE6	NE10	NNE11	NNE8	NE10	NE12	NNE14	NE12	NNE12	NE12	ENE11	E14	E13	ESE11	ESE12	ESE14	SE15	SE19	ENE9.6	SE19		
30-Oct	SE20	SE22	SE27	SE27	SE32	SE29	SE26	SE24	SE26	SE31	SE26	SE28	SE24	SE27	SE28	SE24	SE26	SE24	SE23	SE27	SE32	SE31	SE31	SE29	SE26.9	SE32		
31-Oct	SE29	SE27	SE29	SE29	SE31	SE29	SE27	SE25	SE27	SE26	SE24	SE18	SSE16	SE17	SSE17	SSE18	SSE20	SSE21	SSE22	SSE18	S18	S17	SSW12	WSW9	SE20.4	SE31		

SSE4.7	S4.3	SSW4.5	S4.2	S4.2	S4.4	S4.8	S4.5	S4.5	SSE4.8	SSE3.7	SSE3.5	SSE3.1	SE3.5	SSE3.1	SE2.0	SE3.0	SE1.9	SSE2.7	S3.5	S3.9	S3.8	S4.3	S4.5	Diurnal Average
W31	W35	W38	WNW35	W32	W30	NW38	WSW34	WNW31	WNW33	NW43	WNW40	WNW41	WNW36	SE35	SE35	SE40	SE38	SE39	NNW38	NNW40	N35	WSW35	N34	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: 744
Maximum Value: 8 km/h on Oct 2 11:00	Hours of Data: 731
Minimum Value: 1 km/h on Oct 4 08:00	Hours of Missing Data: 13
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: 98.3

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

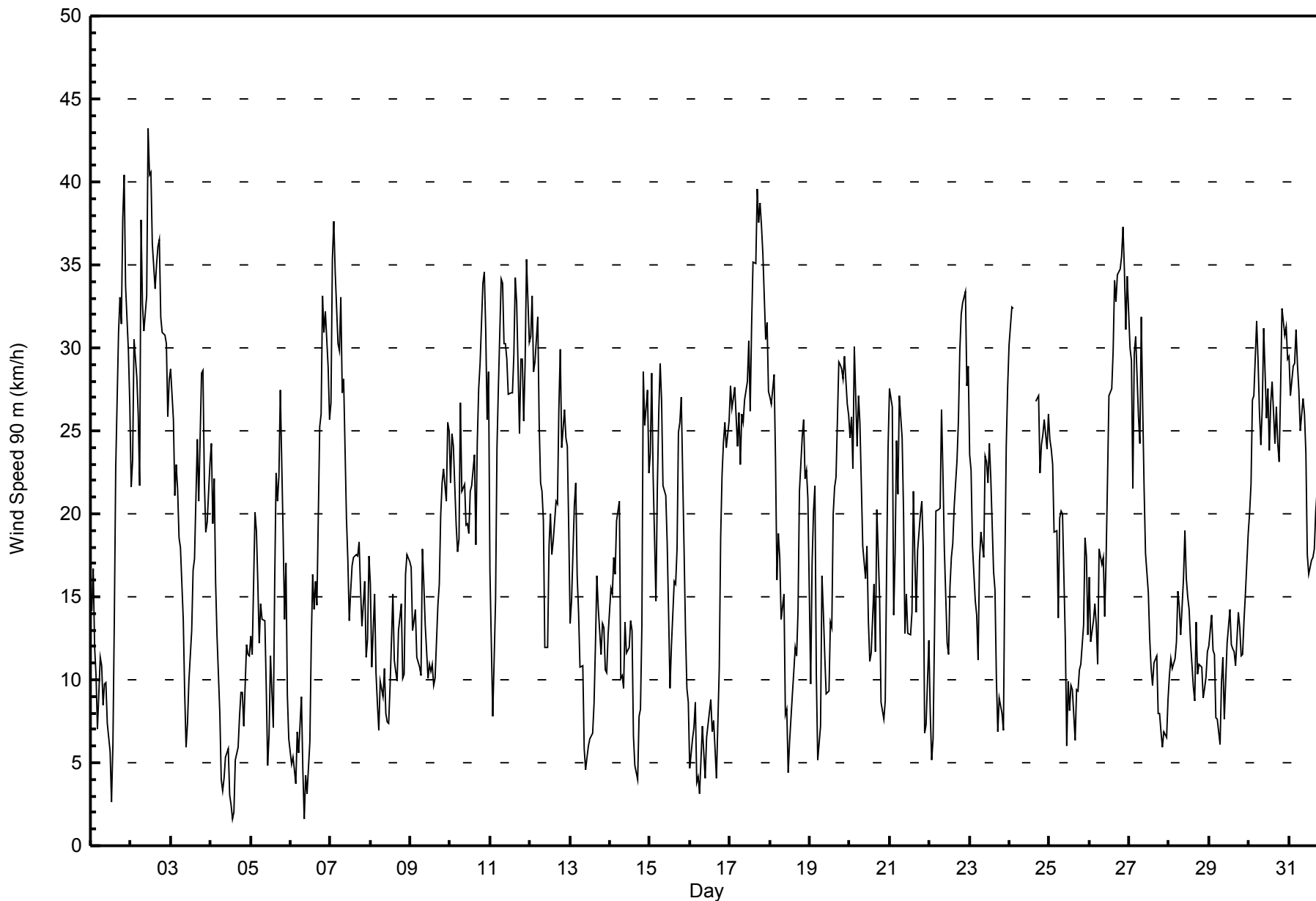
AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

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

**Mannix - October 2014**





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

**Wind Speed 90 m (WS90m) - km/h**  
**Mannix - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	32	4.38	4.38
6 - 11	160	21.89	26.27
12 - 19	217	29.69	55.95
20 - 28	209	28.59	84.54
29 - 38	107	14.64	99.18
> 38	6	0.82	100.00

Total Number of Valid Hours: 731

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed 90 m (WS90m) - km/h**  
**Mannix - October 2014**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	2	3	3	4	2	3	0	6	4	2	0	1	0	0	1	32
6 - 11	10	10	10	3	8	30	35	14	6	6	8	4	4	2	3	7	160
12 - 19	11	13	5	5	9	36	47	26	4	3	12	16	16	6	4	4	217
20 - 28	11	2	0	0	2	18	73	14	2	0	3	29	34	13	3	5	209
29 - 38	17	1	0	0	0	2	29	1	5	0	0	14	19	14	3	2	107
> 38	0	0	0	0	0	0	2	0	0	0	0	0	0	2	1	1	6
<b>Totals</b>	50	28	18	11	23	88	189	55	23	13	25	63	74	37	14	20	731

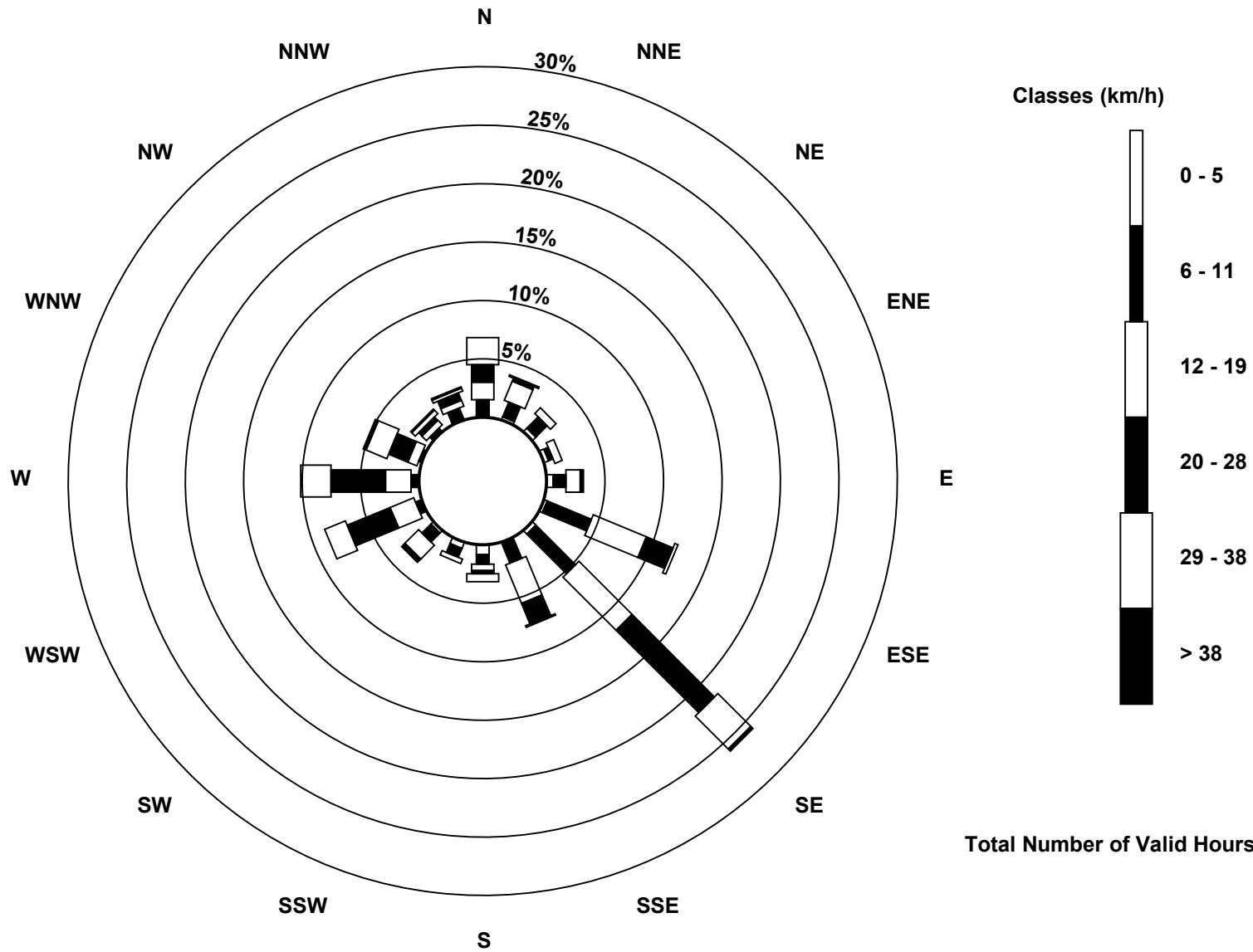
Total Number of Valid Hours: 731

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



**Total Number of Valid Hours: 731**



Direction of Maximum Speed: 310 deg on Oct 2 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 300.0 deg on Oct 2	Hours of Data: 726
Direction of Minimum Speed: 80 deg on Oct 16 05:00	Direction of Minimum Daily Speed Average: 1.1 deg on Oct 14
Direction of Minimum Speed: 80 deg on Oct 16 05:00	Hours of Missing Data: 18
Monthly Average Direction: 211.1 deg	Percent Operational Time: 97.6

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	26	18	32	23	18	35	37	52	86	106	103	109	71	25	1	356	22	11	353	345	345	338	327	330	6.5
2-Oct	AF	AF	AF	299	333	330	318	310	297	293	310	307	299	300	295	294	292	290	283	287	291	298	307	289	300.0
3-Oct	287	288	263	246	244	253	253	241	196	145	126	131	138	140	149	148	140	144	144	155	156	134	127	133	172.5
4-Oct	139	136	144	153	178	237	242	230	216	220	261	55	52	1	41	273	348	360	343	338	285	250	241	227	208.5
5-Oct	225	205	213	213	189	153	175	203	219	197	148	241	280	358	4	5	18	9	15	24	3	25	29	37	346.1
6-Oct	30	47	98	131	154	116	90	93	168	87	46	323	302	307	337	354	311	291	282	278	275	273	266	262	291.8
7-Oct	268	281	279	280	270	271	270	286	294	312	301	312	340	324	339	24	43	41	40	67	80	104	160	161	301.5
8-Oct	139	119	130	91	111	221	108	153	163	150	138	118	113	93	130	129	150	139	145	157	137	133	130	127	130.1
9-Oct	134	132	133	133	132	128	118	146	144	139	132	140	139	131	141	150	139	128	136	138	133	126	130	133	135.1
10-Oct	134	136	135	133	141	142	142	149	145	147	158	144	155	156	159	147	164	182	173	174	168	166	160	157	152.4
11-Oct	154	153	159	163	192	234	244	251	256	262	264	266	267	272	260	248	260	257	238	238	252	248	265	270	251.0
12-Oct	263	262	262	266	264	267	264	267	263	258	274	277	274	274	252	249	256	264	273	277	268	265	265	272	265.7
13-Oct	301	264	247	236	239	227	176	172	157	182	175	139	124	140	130	156	158	136	118	116	125	104	113	92	169.1
14-Oct	88	90	79	112	101	88	112	33	11	71	134	110	121	143	137	186	252	292	273	233	261	257	260	276	172.3
15-Oct	261	267	280	251	226	224	238	248	261	278	285	268	271	300	300	327	339	343	337	335	358	360	357	29	287.5
16-Oct	215	226	237	34	80	197	206	89	129	160	139	158	167	163	141	170	208	105	118	137	138	138	134	137	140.5
17-Oct	142	139	139	141	138	140	136	143	145	137	134	137	137	137	138	138	137	143	141	140	136	132	133	131	137.9
18-Oct	131	131	136	135	128	131	137	166	152	148	193	143	123	134	158	236	250	218	247	268	272	275	280	273	170.7
19-Oct	294	243	261	269	287	159	169	149	141	134	152	145	141	137	113	124	127	135	133	132	129	131	125	127	142.3
20-Oct	130	129	136	141	142	140	141	137	141	153	157	159	147	146	173	145	140	141	126	122	109	127	147	169	142.5
21-Oct	159	165	191	175	220	200	250	259	235	216	247	254	267	254	258	260	238	228	208	211	174	144	157	155	224.5
22-Oct	159	139	148	167	151	149	152	152	157	160	139	152	142	136	133	134	135	136	142	139	135	136	137	139	143.0
23-Oct	134	134	132	123	118	123	120	106	88	112	112	109	117	121	111	73	80	22	16	3	303	298	288	289	104.4
24-Oct	285	276	275	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	255	257	265	272	258	252	264	266	272	--
25-Oct	259	259	268	276	268	243	214	224	233	217	193	194	166	140	192	153	136	116	124	107	123	109	114	122	205.1
26-Oct	106	103	74	68	31	8	2	14	10	358	1	13	12	15	10	9	8	10	8	AF	AF	AF	11	10	16.9
27-Oct	8	3	351	6	10	3	3	11	7	5	9	8	350	340	351	327	335	339	318	342	4	24	77	138	2.1
28-Oct	206	189	174	192	168	153	158	146	147	156	165	159	142	151	143	130	135	127	139	138	121	127	106	103	148.0
29-Oct	91	89	95	84	58	15	17	47	29	12	38	49	35	42	29	36	74	79	91	119	129	130	136	141	74.3
30-Oct	141	139	146	145	141	143	145	141	138	138	139	141	143	145	151	145	139	144	152	149	145	141	142	142	143.2
31-Oct	140	137	136	138	137	136	137	135	139	138	144	149	157	148	157	151	163	154	165	161	164	171	189	176	146.4

170.2 191.8 191.8 174.8 175.1 169.2 185.0 188.4 194.6 178.1 181.7 167.8 171.6 149.4 166.9 185.0 154.2 158.5 165.6 179.9 184.6 176.5 187.0 183.2  
Diurnal Average

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



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 95 deg on Oct 16 05:00			Hours of Data:	726
Minimum Value: 5 deg on Oct 18 23:00			Hours of Missing Data:	18
			Hours of Calibration:	0
Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 9 Q <sub>1</sub> = 10 Median = 13 Q <sub>3</sub> = 19 P <sub>90</sub> = 28 P <sub>99</sub> = 75			Percent Operational Time:	97.6

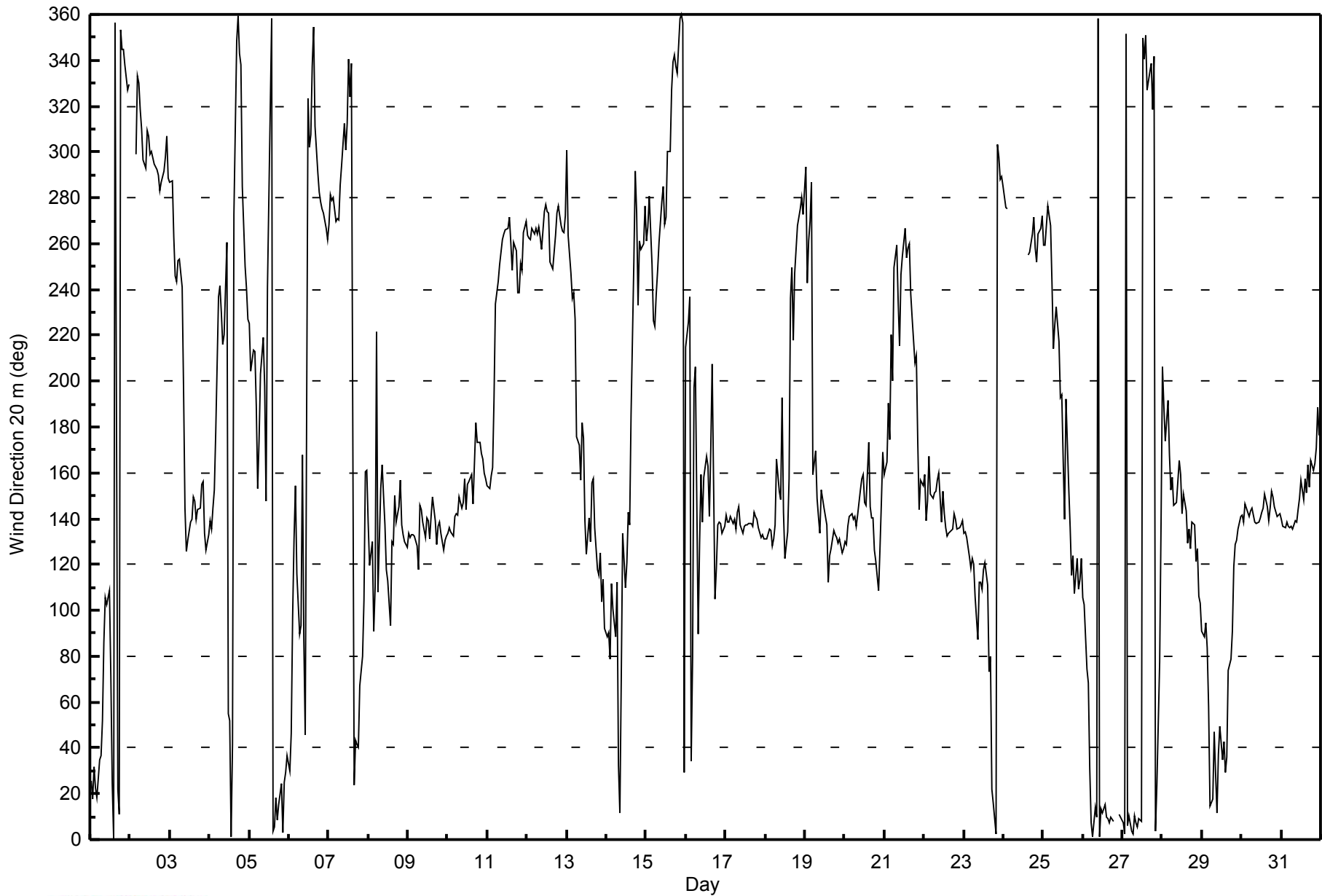
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	15	14	18	49	65	26	19	21	18	27	45	49	68	36	17	16	12	15	16	13	14	13	14	14	68
2-Oct	AF	AF	AF	24	16	18	13	15	10	12	14	17	10	11	12	10	10	9	9	9	10	11	13	9	24
3-Oct	9	8	8	9	8	8	8	26	22	21	19	14	16	15	16	12	11	12	11	12	11	13	14	12	26
4-Oct	11	12	11	11	22	17	16	22	12	37	20	79	66	74	88	37	19	12	12	19	12	12	11	88	
5-Oct	10	13	12	16	17	15	13	19	16	29	28	80	16	46	28	20	13	14	10	17	19	17	17	18	80
6-Oct	25	24	20	26	27	29	15	18	76	39	76	32	18	18	17	22	19	11	10	7	7	6	6	8	76
7-Oct	12	7	7	14	8	7	8	13	11	19	15	24	26	18	24	15	14	13	9	24	12	17	27	20	27
8-Oct	9	10	16	34	70	59	18	39	43	59	24	31	23	15	19	19	12	22	13	13	15	13	18	13	70
9-Oct	15	14	12	12	12	13	16	12	12	12	20	21	20	17	20	16	16	14	11	11	11	13	11	11	21
10-Oct	11	11	11	10	8	9	9	9	10	11	15	13	12	13	10	13	16	11	11	10	8	9	6	8	16
11-Oct	9	10	14	21	31	11	11	11	11	10	10	12	12	14	16	12	9	10	8	8	9	9	9	8	31
12-Oct	6	6	7	7	6	7	7	7	6	17	12	12	13	17	21	14	12	9	8	10	5	6	6	14	21
13-Oct	36	27	7	9	8	18	11	68	26	46	35	21	25	35	17	20	10	12	13	12	22	19	26	25	68
14-Oct	21	51	28	20	20	21	92	49	22	39	27	23	20	15	16	40	46	13	27	75	11	9	11	9	92
15-Oct	9	9	12	16	12	11	9	10	10	10	12	14	27	23	17	21	15	12	12	11	13	9	8	57	57
16-Oct	78	61	64	28	95	28	48	34	49	32	22	30	25	42	14	38	61	27	18	12	10	10	10	10	95
17-Oct	8	9	9	8	9	8	9	9	11	11	11	11	13	11	12	12	10	10	10	11	10	11	11	11	13
18-Oct	11	11	11	11	13	11	13	24	21	19	27	46	21	11	20	21	22	20	12	14	15	12	5	6	46
19-Oct	54	8	8	24	37	51	22	11	13	15	26	19	14	13	15	16	13	10	11	11	12	13	13	13	54
20-Oct	14	13	10	9	10	10	11	11	16	12	11	18	17	18	15	19	10	5	13	12	14	13	9	10	19
21-Oct	14	12	23	32	23	27	24	21	16	23	16	16	14	13	11	10	18	6	9	8	26	14	10	24	32
22-Oct	14	16	9	10	15	16	10	8	8	12	25	22	16	11	12	10	10	10	10	10	10	10	9	10	25
23-Oct	9	10	12	15	15	11	14	14	17	19	15	16	17	18	19	19	32	18	12	20	19	11	9	9	32
24-Oct	10	8	7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	11	12	8	8	12	11	8	8	7	12
25-Oct	11	9	9	9	11	14	14	16	10	15	28	23	35	19	28	36	13	17	15	16	14	13	15	17	36
26-Oct	17	27	13	13	28	11	11	10	9	14	12	14	10	10	10	10	12	9	10	AF	AF	AF	12	10	28
27-Oct	10	13	11	14	10	13	14	10	11	12	13	13	19	20	21	11	13	18	21	22	27	13	30	16	30
28-Oct	22	15	15	11	13	10	11	14	12	10	11	12	12	13	13	18	13	20	11	12	17	16	18	19	22
29-Oct	13	11	12	11	31	19	25	19	14	14	29	19	13	15	17	15	19	19	11	21	14	15	12	11	31
30-Oct	10	11	11	10	9	9	10	11	11	10	10	10	11	12	11	11	10	12	10	11	11	11	11	10	12
31-Oct	10	11	11	11	10	11	10	12	11	11	11	12	12	11	14	10	9	10	9	10	8	12	15	28	28
Diurnal Maximum																									
78 61 64 49 95 59 92 68 76 59 76 80 68 74 88 40 61 27 27 75 27 19 30 57																									

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction 20 m (WD20m) - deg**  
**Mannix - October 2014**





Direction of Maximum Speed: 313 deg on Oct 2 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 302.3 deg on Oct 2	Hours of Data: 728
Direction of Minimum Speed: 169 deg on Oct 19 06:00	Hours of Missing Data: 16
Direction of Minimum Daily Speed Average: 2.1 deg on Oct 5	Percent Operational Time: 97.9
Monthly Average Direction: 213.0 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	26	18	34	24	16	33	35	53	85	108	104	107	86	17	2	359	22	11	357	348	347	340	330	AF	8.9
2-Oct	AF	AF	AF	302	334	332	321	313	299	295	313	309	302	301	296	295	294	291	286	288	293	299	309	293	302.3
3-Oct	292	295	276	260	255	263	262	248	202	146	131	131	137	140	149	148	138	143	144	155	156	133	126	131	176.5
4-Oct	138	133	143	150	171	231	245	222	210	214	262	46	53	5	23	273	350	3	350	341	294	257	247	235	204.6
5-Oct	237	219	220	220	196	162	181	208	218	199	153	237	282	356	3	7	19	11	14	23	6	26	30	38	323.2
6-Oct	33	49	95	129	156	117	88	95	194	82	50	325	304	310	340	356	315	293	284	279	277	275	270	265	294.8
7-Oct	276	282	281	285	277	275	273	289	297	316	301	313	339	326	340	24	39	39	44	71	83	110	161	160	304.6
8-Oct	167	123	133	108	112	116	109	124	152	124	134	122	115	95	126	125	145	137	145	160	135	131	129	127	129.3
9-Oct	132	129	131	131	131	129	120	140	140	136	130	136	136	130	139	151	136	126	133	135	132	126	130	131	132.7
10-Oct	131	135	133	130	140	139	137	146	145	150	159	147	155	157	160	152	170	184	178	176	173	171	165	165	154.8
11-Oct	164	164	178	193	216	242	246	253	256	260	265	266	267	272	261	249	260	259	244	242	249	250	265	270	249.8
12-Oct	265	263	264	269	267	269	266	274	265	257	273	278	276	274	251	250	257	265	275	277	269	268	268	274	267.3
13-Oct	287	267	254	238	247	250	188	201	186	185	177	139	128	139	130	155	157	140	124	117	125	107	115	99	179.6
14-Oct	100	105	99	113	104	93	123	77	37	91	131	114	119	141	140	186	240	298	280	244	262	259	261	279	158.3
15-Oct	262	268	284	256	234	232	242	250	261	279	286	268	275	302	303	329	340	344	339	338	357	4	359	18	290.7
16-Oct	54	68	39	41	84	152	173	92	120	157	133	153	170	157	137	167	178	110	118	135	136	136	132	134	131.2
17-Oct	140	137	136	138	134	135	132	138	142	136	133	134	137	136	137	138	136	142	141	140	136	131	132	131	136.5
18-Oct	130	130	133	133	127	130	138	167	153	153	198	160	134	139	165	235	250	228	251	263	273	277	281	280	179.3
19-Oct	306	251	267	275	307	169	172	148	140	137	152	146	138	130	114	123	126	134	131	131	129	130	127	126	141.9
20-Oct	128	127	133	138	139	138	139	134	139	156	158	161	150	147	174	147	144	140	131	128	110	130	149	163	141.5
21-Oct	164	173	192	238	257	246	261	263	247	229	247	255	265	254	258	259	243	239	220	219	207	158	166	201	231.9
22-Oct	170	153	153	166	154	151	142	146	149	156	139	158	147	136	130	131	130	130	140	139	136	137	138	139	142.8
23-Oct	133	133	129	120	118	122	117	107	96	112	113	109	118	120	112	75	87	29	21	5	312	303	290	291	106.2
24-Oct	287	278	277	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	256	258	268	274	260	254	266	269	274	--
25-Oct	261	261	269	278	273	260	223	229	237	221	193	191	164	139	193	152	132	119	125	108	120	113	116	122	205.8
26-Oct	109	106	78	72	32	15	5	16	11	1	3	16	12	16	10	9	7	9	8	8	9	11	10	9	15.7
27-Oct	8	4	356	8	10	6	6	11	9	7	12	10	352	349	356	332	338	342	329	360	9	36	84	134	5.3
28-Oct	192	185	177	190	167	149	159	146	147	157	165	160	142	147	142	128	134	124	135	134	120	126	110	106	148.0
29-Oct	91	88	93	83	63	27	29	51	32	16	40	49	35	43	30	39	72	81	94	117	127	128	134	140	75.9
30-Oct	139	137	146	144	141	143	145	143	138	137	138	139	143	144	150	146	139	142	150	147	144	141	142	142	142.5
31-Oct	140	137	136	137	136	135	136	134	138	137	144	148	157	148	157	152	165	156	166	162	166	175	187	194	147.5

168.0 182.1 184.3 181.8 178.4 171.1 185.0 184.2 187.6 170.9 174.8 162.6 165.3 142.9 159.7 167.2 147.2 146.4 161.9 175.1 177.5 168.5 181.1 175.2

Diurnal Average

AF - Analyzer Failure

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



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 91 deg on Oct 16 03:00			Hours of Data:	728
Minimum Value: 3 deg on Oct 19 00:00			Hours of Missing Data:	16
Percentiles: P <sub>1</sub> = 4 P <sub>10</sub> = 6 Q <sub>1</sub> = 7 Median = 10 Q <sub>3</sub> = 14 P <sub>90</sub> = 22 P <sub>99</sub> = 65			Hours of Calibration:	0
			Percent Operational Time:	97.9

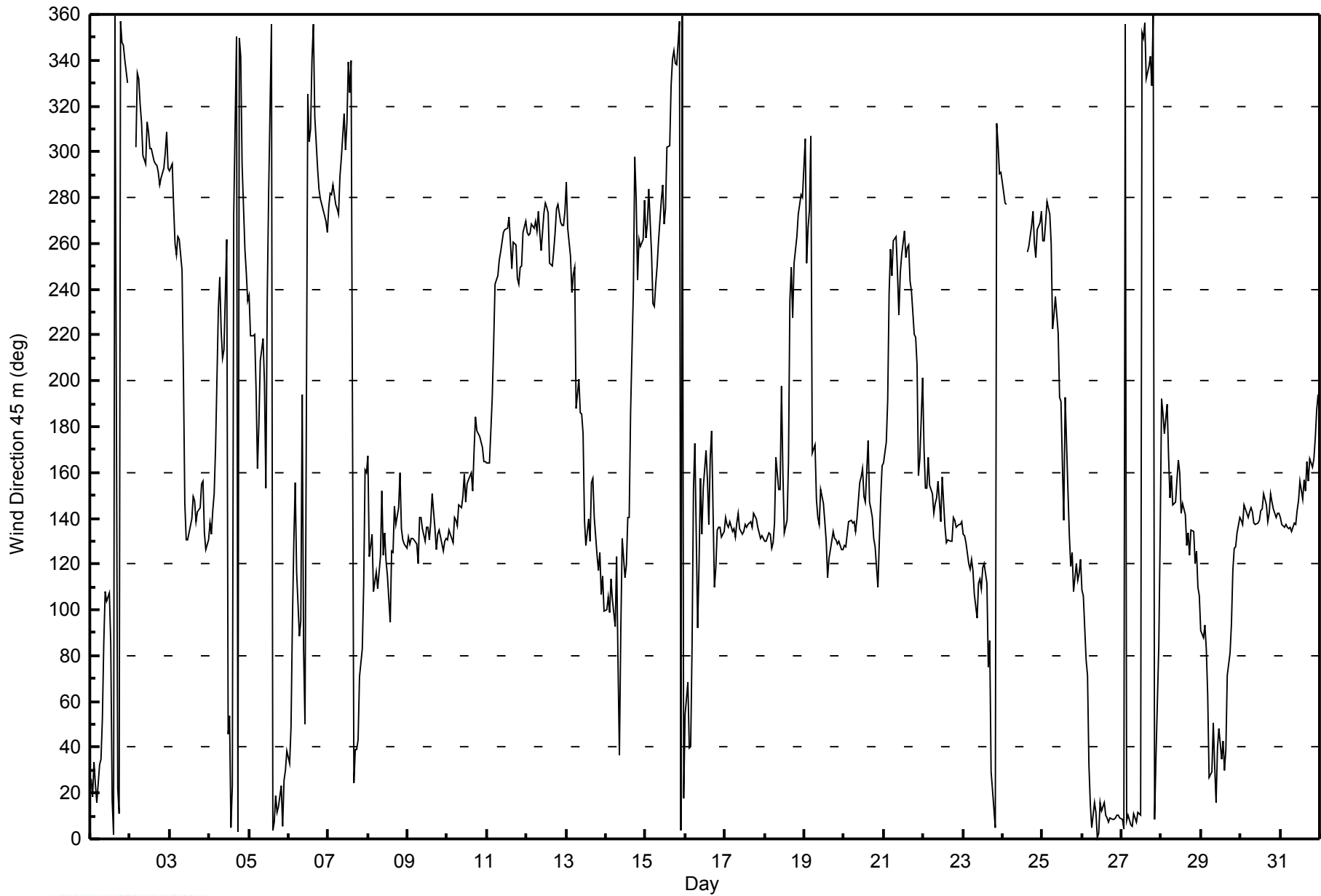
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	12	10	17	29	26	20	14	18	15	25	40	39	57	29	12	12	7	13	12	9	10	10	10	AF	57
2-Oct	AF	AF	AF	21	13	12	10	12	7	10	11	15	7	8	9	8	8	7	7	7	7	9	8	6	21
3-Oct	6	5	6	6	5	4	4	19	21	19	13	10	14	11	13	10	8	8	9	10	8	11	10	8	21
4-Oct	8	8	9	9	18	19	14	18	7	33	21	77	64	85	79	32	34	14	8	7	16	9	8	8	85
5-Oct	3	12	9	13	14	12	10	14	13	21	24	64	16	45	25	17	9	9	6	12	16	12	12	17	64
6-Oct	20	26	16	20	22	25	12	15	68	48	56	28	15	15	13	19	17	9	9	6	6	6	6	6	68
7-Oct	8	6	7	11	7	5	6	10	7	17	12	22	22	16	20	11	10	8	9	14	9	10	21	9	22
8-Oct	11	9	9	19	56	39	12	17	26	26	28	24	20	12	15	16	11	19	11	11	15	9	13	8	56
9-Oct	11	9	6	5	8	10	12	7	10	9	15	18	16	14	17	14	12	9	7	9	6	8	5	6	18
10-Oct	6	6	6	5	4	5	6	4	7	9	11	12	9	10	7	10	11	3	7	5	5	6	3	4	12
11-Oct	7	7	17	13	25	7	8	8	9	9	8	10	12	12	15	10	8	6	6	5	5	6	8	6	25
12-Oct	5	5	6	6	5	5	5	6	5	14	11	10	11	16	18	11	9	8	7	8	5	5	5	8	18
13-Oct	18	18	4	8	6	13	12	13	25	35	30	17	19	27	14	18	7	8	9	9	14	14	17	15	35
14-Oct	10	18	16	14	15	12	59	53	26	23	21	16	15	11	13	30	47	7	15	36	9	7	8	7	59
15-Oct	8	8	11	14	9	6	6	7	8	9	10	13	24	20	15	19	12	8	10	8	11	7	7	12	24
16-Oct	15	46	91	17	72	35	61	20	42	22	18	22	19	36	12	33	50	15	13	9	6	7	6	6	91
17-Oct	5	6	5	4	5	5	4	6	7	7	7	7	11	8	9	9	7	8	8	8	7	7	7	7	11
18-Oct	7	6	6	8	8	7	12	18	18	16	22	37	18	10	18	16	15	14	7	10	14	9	3	3	37
19-Oct	31	5	4	10	28	83	18	8	9	11	19	15	11	11	10	10	8	7	7	7	8	8	7	8	83
20-Oct	9	7	6	6	7	7	8	5	13	10	8	17	15	15	10	15	6	4	8	9	9	10	7	8	17
21-Oct	9	9	23	15	7	9	8	10	9	13	12	11	10	12	9	10	14	4	8	4	13	9	10	29	29
22-Oct	17	13	4	4	7	6	8	5	7	8	19	20	10	6	8	6	7	8	8	6	5	6	5	6	20
23-Oct	4	3	6	11	10	9	9	8	12	14	10	11	12	12	14	17	26	12	10	15	22	9	8	7	26
24-Oct	8	7	6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	9	10	6	8	10	9	7	7	6	10
25-Oct	8	8	8	8	7	8	10	11	7	11	17	13	27	14	22	30	8	13	10	14	11	9	11	13	30
26-Oct	12	16	13	12	24	8	6	6	5	10	8	10	6	6	6	6	8	5	5	5	5	5	7	7	24
27-Oct	5	9	7	8	5	8	9	5	6	8	9	9	14	16	18	8	13	19	22	17	20	14	21	9	22
28-Oct	20	9	10	6	12	9	9	11	9	8	8	10	9	9	10	14	10	15	7	8	13	13	13	15	20
29-Oct	12	9	10	10	22	17	16	13	11	11	24	17	10	11	13	11	16	17	11	16	11	13	8	8	24
30-Oct	7	8	8	8	7	8	9	10	8	7	7	8	10	10	9	9	7	10	8	9	9	9	8	9	10
31-Oct	8	8	8	8	7	8	7	6	8	7	9	10	10	9	11	7	6	7	5	7	4	7	10	12	12
Diurnal Maximum																									
31 46 91 29 72 83 61 53 68 48 56 77 64 85 79 33 50 19 22 36 22 14 21 29																									

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction 45 m (WD45m) - deg**  
**Mannix - October 2014**





Direction of Maximum Speed: 314 deg on Oct 2 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 303.4 deg on Oct 2	Hours of Data: 732
Direction of Minimum Speed: 2 deg on Oct 4 14:00	Direction of Minimum Daily Speed Average: 2.4 deg on Oct 4
Direction of Minimum Speed: 2 deg on Oct 4 14:00	Hours of Missing Data: 12
Monthly Average Direction: 216.4 deg	Percent Operational Time: 98.4

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	27	20	36	25	17	33	36	58	83	106	104	106	102	19	4	2	23	12	358	351	348	343	331	333	7.5	
2-Oct	322	297	299	303	332	333	323	314	301	296	314	310	303	302	296	296	295	291	286	289	293	300	309	297	303.4	
3-Oct	297	300	284	272	268	273	272	264	216	150	138	132	138	141	150	148	140	142	145	154	156	136	129	133	185.2	
4-Oct	139	135	142	151	163	208	227	204	196	214	266	40	56	2	17	274	354	5	356	346	298	260	256	240	192.7	
5-Oct	233	220	227	227	202	172	192	215	218	201	173	241	283	352	4	8	21	14	16	24	8	27	33	42	321.3	
6-Oct	36	55	90	134	161	119	88	99	203	83	64	322	303	311	341	357	316	294	284	280	278	276	272	269	294.3	
7-Oct	280	282	284	290	284	280	275	290	298	318	300	314	337	328	342	26	38	40	50	76	87	116	157	163	305.5	
8-Oct	166	135	141	129	129	133	126	141	140	118	132	129	116	97	127	125	143	139	145	166	139	132	131	129	134.9	
9-Oct	134	132	135	134	132	131	125	137	138	135	132	135	136	132	138	152	135	126	133	134	134	132	135	134	134.3	
10-Oct	132	136	135	134	136	136	137	142	142	151	160	153	157	156	160	157	173	184	181	177	178	176	171	172	158.0	
11-Oct	178	197	216	219	234	245	247	253	256	260	264	266	266	270	260	249	260	260	249	246	250	252	264	269	252.5	
12-Oct	265	263	265	270	269	272	267	281	269	257	271	277	275	273	250	250	257	266	276	276	269	268	270	274	268.1	
13-Oct	281	266	257	238	255	255	208	220	229	192	180	146	133	145	134	156	157	143	131	121	125	117	120	106	194.3	
14-Oct	106	110	106	115	105	96	124	105	81	102	132	118	120	139	145	187	220	292	256	244	262	260	263	281	180.8	
15-Oct	264	268	284	260	239	241	247	253	262	279	285	269	277	301	304	328	340	346	341	342	358	6	2	13	291.6	
16-Oct	56	55	38	42	80	124	121	93	115	144	132	152	167	154	136	160	153	113	120	136	138	138	134	136	127.9	
17-Oct	139	138	137	137	136	136	135	138	137	137	135	136	139	138	139	139	138	143	142	142	138	134	135	134	137.9	
18-Oct	133	133	136	136	132	133	145	166	155	160	201	176	148	151	177	234	247	235	254	262	275	280	287	288	194.5	
19-Oct	302	264	280	286	317	78	159	150	144	141	146	150	138	128	116	125	130	136	132	133	132	134	132	130	144.6	
20-Oct	131	130	135	138	137	139	139	137	142	157	158	163	156	150	172	150	147	140	136	134	120	140	148	149	143.2	
21-Oct	161	174	220	261	264	254	263	262	254	238	247	253	261	251	257	258	246	245	235	234	223	186	198	228	239.6	
22-Oct	216	193	155	160	164	161	152	153	146	140	133	151	145	138	131	131	130	129	138	140	139	140	140	141	145.2	
23-Oct	137	136	131	123	123	126	118	106	102	112	115	110	118	123	113	79	93	41	27	11	319	308	293	293	106.3	
24-Oct	288	279	278	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	257	260	270	275	261	255	267	270	275	--
25-Oct	262	262	270	280	275	269	234	239	245	229	195	188	165	143	191	154	133	123	119	108	112	114	118	120	224.1	
26-Oct	110	108	83	77	43	35	12	22	17	7	6	19	14	18	12	9	9	10	10	10	10	12	12	10	17.9	
27-Oct	11	7	1	10	12	9	9	12	12	10	14	13	356	359	4	336	341	348	341	10	13	49	89	136	8.7	
28-Oct	175	181	178	186	164	149	158	149	149	158	164	158	142	144	140	131	135	128	135	134	122	127	115	111	149.9	
29-Oct	90	88	89	82	67	39	41	57	38	23	46	50	36	45	36	43	74	83	96	118	127	129	134	140	75.5	
30-Oct	138	138	145	144	142	143	146	145	140	139	139	140	145	144	150	146	139	141	149	145	143	142	143	144	143.0	
31-Oct	142	138	138	138	138	137	138	136	140	139	144	149	157	149	156	154	165	158	167	166	175	184	207	235	150.7	

185.2 202.7 206.9 195.7 193.1 181.1 196.8 189.9 184.6 171.9 177.4 168.9 171.6 148.2 166.2 176.7 153.3 164.1 180.9 190.3 198.6 194.7 201.4 194.8

Diurnal Average

AF - Analyzer Failure

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





Summary of Hour Standard Deviations

Mannix - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 79 deg on Oct 19 06:00			Hours of Data:	732
Minimum Value: 2 deg on Oct 26 18:00			Hours of Missing Data:	12
			Hours of Calibration:	0
			Percent Operational Time:	98.4
Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 5 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 13 P <sub>90</sub> = 18 P <sub>99</sub> = 53				

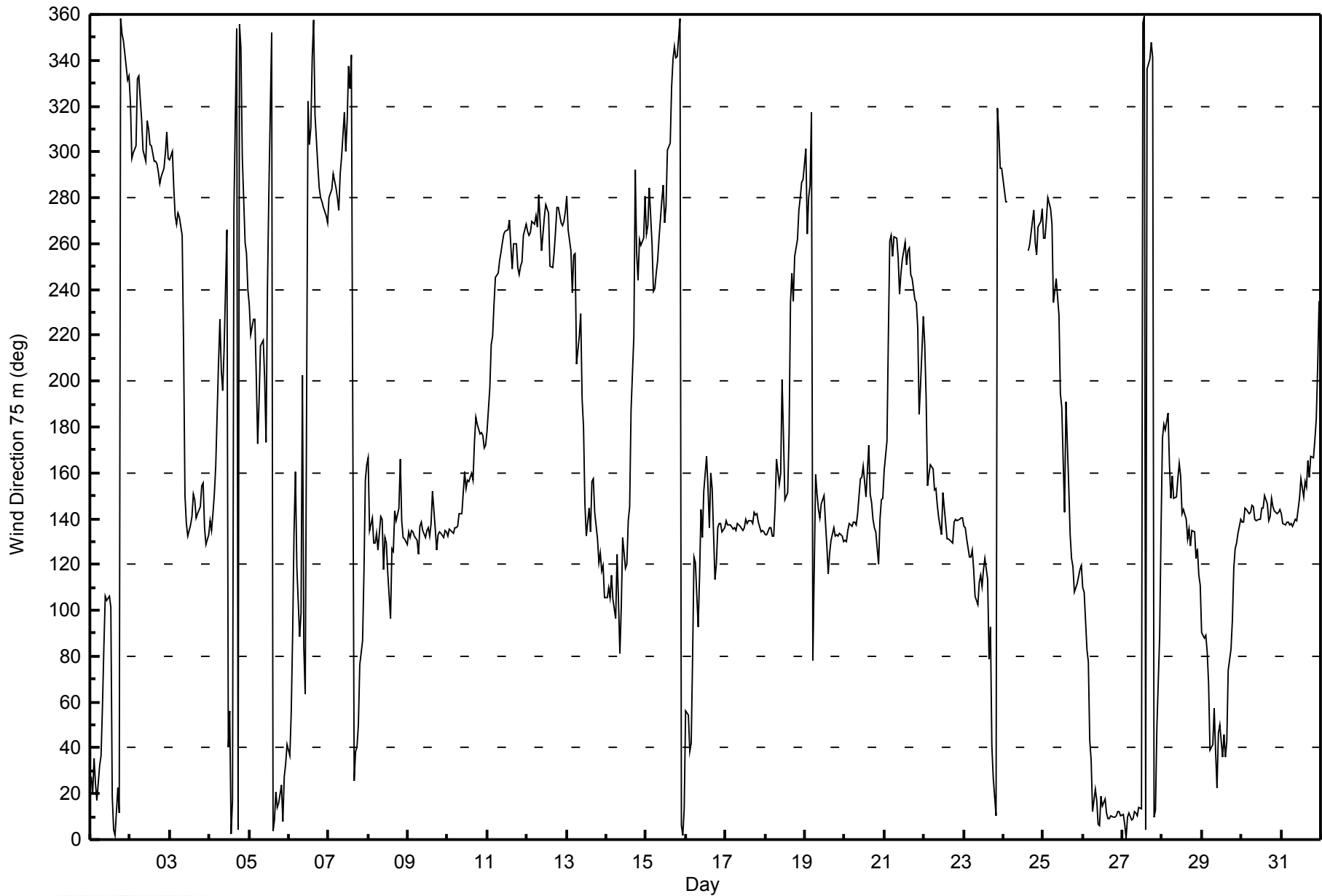
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	10	9	14	19	20	15	12	18	15	24	36	34	49	26	10	10	5	11	10	7	8	9	9	9	49
2-Oct	12	12	7	20	11	11	8	11	7	9	10	14	7	8	8	7	7	7	6	7	6	8	6	5	20
3-Oct	5	4	6	6	4	7	3	17	24	16	13	10	12	8	11	8	6	7	7	8	7	11	10	8	24
4-Oct	6	7	7	7	10	19	13	15	7	34	17	74	53	71	79	31	33	11	7	8	15	7	6	4	79
5-Oct	4	9	9	10	12	12	12	12	12	18	30	48	16	45	23	16	7	6	5	8	13	9	10	15	48
6-Oct	16	22	18	20	22	23	12	19	65	58	64	26	13	13	14	16	16	8	9	6	6	6	6	65	
7-Oct	6	5	7	9	6	6	5	8	7	16	12	20	21	16	19	10	9	7	9	11	10	13	15	9	21
8-Oct	11	7	6	14	18	11	15	10	13	15	15	19	19	13	15	16	10	17	11	11	15	9	12	9	19
9-Oct	10	9	6	5	9	11	13	5	9	9	14	16	15	13	16	13	11	11	8	9	6	8	4	5	16
10-Oct	6	5	5	5	3	3	4	3	5	7	9	11	7	8	6	9	10	3	6	4	4	5	3	3	11
11-Oct	6	18	18	15	16	6	7	6	8	8	8	9	12	12	15	9	7	5	4	4	3	5	7	6	18
12-Oct	4	4	6	6	5	5	6	5	5	12	11	9	11	15	16	10	8	8	7	8	5	6	5	7	16
13-Oct	13	14	3	8	9	9	15	10	18	30	23	17	17	26	14	16	6	7	8	13	13	15	15	14	30
14-Oct	12	14	14	14	15	10	27	20	20	15	18	15	15	9	12	26	44	11	10	18	9	5	8	6	44
15-Oct	7	7	10	13	6	4	4	4	8	8	8	13	22	17	15	17	10	5	7	7	10	5	7	9	22
16-Oct	10	13	12	15	52	24	31	15	33	23	16	19	19	28	12	27	43	14	14	7	5	5	6	5	52
17-Oct	3	3	3	3	3	3	3	3	3	5	6	5	9	7	7	8	6	6	6	6	5	6	6	7	9
18-Oct	6	6	5	7	8	8	11	12	13	13	18	30	15	10	21	13	13	12	5	7	13	9	4	4	30
19-Oct	17	9	6	7	44	79	22	5	9	9	14	15	9	13	12	10	8	6	7	7	7	7	7	8	79
20-Oct	9	7	6	4	5	5	5	4	9	7	7	14	13	12	9	13	5	4	6	7	13	11	7	11	14
21-Oct	4	7	21	7	4	5	5	6	7	10	10	10	9	12	8	9	13	4	3	4	7	25	16	10	25
22-Oct	22	24	12	6	5	5	7	3	7	6	11	17	10	6	8	8	8	9	7	4	4	4	4	4	24
23-Oct	3	3	8	11	11	12	12	12	13	15	12	13	12	13	15	17	24	12	11	12	25	7	7	6	25
24-Oct	7	7	7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	9	9	6	8	9	7	6	7	6	9
25-Oct	7	7	8	8	5	7	6	7	3	12	16	12	24	12	20	26	9	14	13	15	14	12	13	15	26
26-Oct	14	16	11	12	22	12	6	7	7	12	6	7	4	5	5	4	6	2	3	3	3	4	5	5	22
27-Oct	4	6	8	5	3	6	7	3	4	6	7	8	12	13	17	8	13	20	20	14	16	14	18	9	20
28-Oct	15	6	8	6	11	6	7	8	7	6	6	9	7	7	7	12	9	13	8	9	14	13	14	16	16
29-Oct	14	8	12	10	18	17	14	10	9	11	21	15	10	10	11	10	13	15	11	16	12	12	9	7	21
30-Oct	6	6	6	7	6	6	7	8	6	6	6	7	8	7	8	8	5	7	7	7	7	8	7	7	8
31-Oct	7	6	6	6	5	6	6	5	5	6	7	9	9	7	11	5	5	5	4	4	3	7	12	13	13
Diurnal Maximum																									
22 24 21 20 52 79 31 20 65 58 64 74 53 71 79 31 44 20 20 18 25 25 18 16																									

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction 75 m (WD75m) - deg**  
**Mannix - October 2014**





Summary of Hour Standard Deviations

Mannix - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 78 deg on Oct 4 15:00			Hours of Data:	731
Minimum Value: 2 deg on Oct 27 08:00			Hours of Missing Data:	13
Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 8 Q <sub>3</sub> = 12 P <sub>90</sub> = 18 P <sub>99</sub> = 59			Hours of Calibration:	0
			Percent Operational Time:	98.3

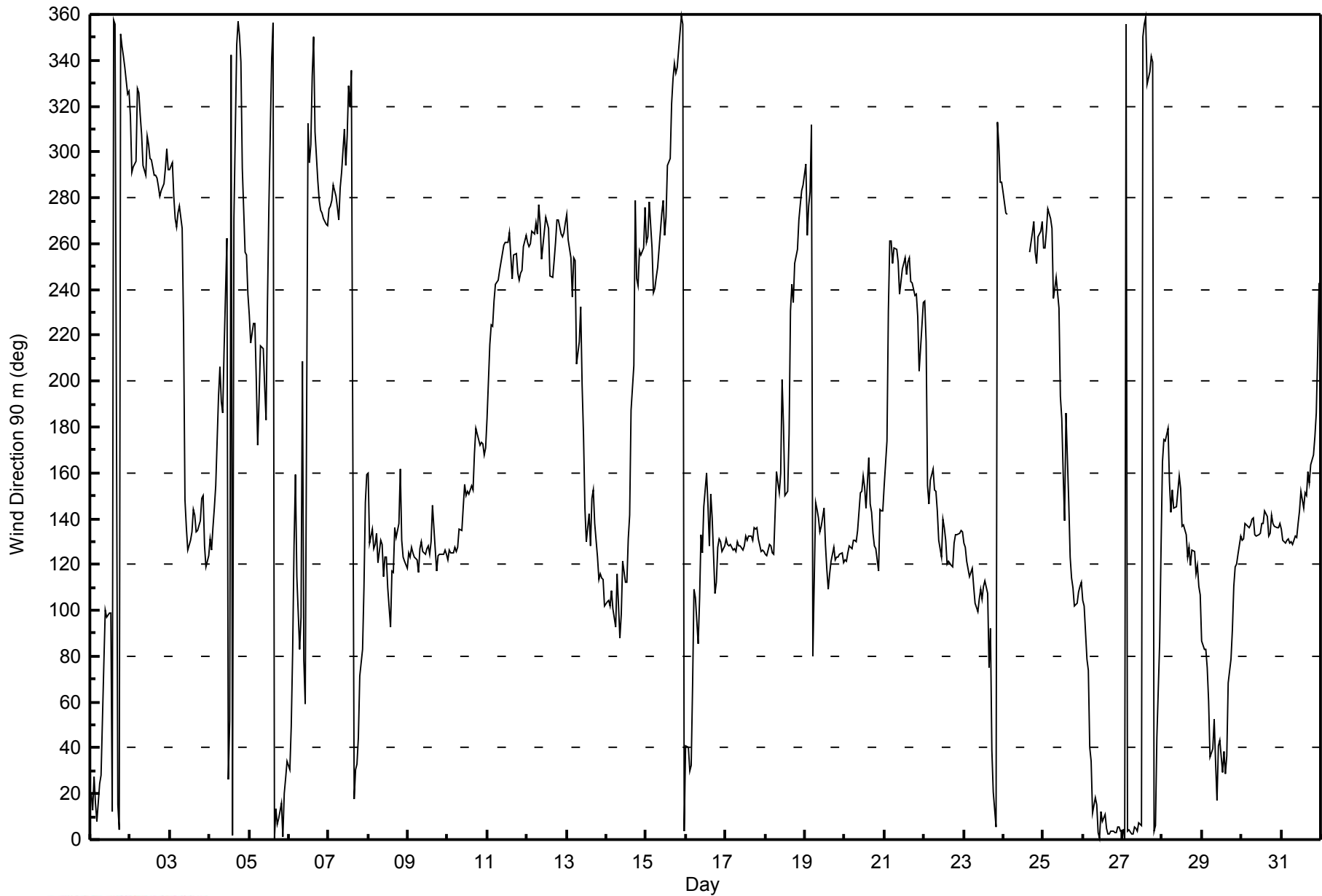
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	9	8	13	20	17	14	13	18	15	24	35	36	52	26	9	9	4	10	9	6	8	8	9	8	52
2-Oct	11	11	6	20	12	11	7	10	7	9	9	13	6	7	8	7	6	6	5	6	5	8	6	4	20
3-Oct	4	4	5	5	3	6	4	15	25	18	14	9	12	9	11	8	6	7	7	8	6	10	7	7	25
4-Oct	6	6	6	6	9	17	15	14	10	32	15	69	55	72	78	29	33	10	8	9	14	6	6	4	78
5-Oct	6	7	8	10	11	11	12	12	12	18	36	44	14	43	22	15	7	5	5	7	13	9	10	14	44
6-Oct	19	22	17	22	23	25	11	21	60	64	75	24	12	12	15	15	15	8	8	5	5	5	5	6	75
7-Oct	5	4	6	7	5	5	5	8	6	15	11	19	19	15	19	10	8	7	9	11	11	8	14	9	19
8-Oct	7	6	6	9	18	10	8	9	9	9	10	17	21	13	14	15	11	16	13	10	17	7	10	6	21
9-Oct	9	8	5	4	7	8	11	4	7	8	16	16	15	14	18	14	12	9	6	8	5	5	3	4	18
10-Oct	4	4	4	4	3	3	3	3	5	6	9	10	6	8	6	8	9	3	6	3	4	5	3	4	10
11-Oct	8	20	15	15	13	6	7	6	7	7	7	9	11	11	13	8	6	5	4	3	3	4	6	5	20
12-Oct	4	4	6	5	4	5	7	4	5	11	12	8	10	13	15	9	7	7	6	7	4	5	5	6	15
13-Oct	10	11	3	8	9	7	15	12	16	31	22	20	16	28	14	16	6	7	4	7	11	14	12	10	31
14-Oct	8	9	9	10	11	9	22	16	14	11	16	12	15	10	12	27	37	14	7	13	8	5	7	6	37
15-Oct	7	7	10	12	5	4	3	3	7	7	7	12	21	15	14	17	10	5	6	7	9	5	6	7	21
16-Oct	11	12	10	13	52	23	29	12	31	27	22	21	20	27	14	27	37	11	11	6	4	5	5	5	52
17-Oct	3	3	3	2	3	2	2	3	3	4	5	5	9	7	8	8	6	6	6	7	6	5	5	5	9
18-Oct	5	5	5	6	7	6	11	10	11	15	17	30	15	11	22	12	13	12	4	6	12	8	4	3	30
19-Oct	13	8	5	7	27	62	23	5	12	9	14	15	9	12	9	7	6	5	6	6	5	5	5	6	62
20-Oct	7	5	5	3	4	4	5	3	9	5	6	13	12	11	9	13	4	3	4	5	9	12	8	9	13
21-Oct	4	10	17	6	4	4	4	4	6	9	8	9	9	12	7	8	12	4	3	6	6	25	14	7	25
22-Oct	12	21	23	5	3	4	5	4	7	4	5	15	9	6	6	6	5	6	7	5	3	4	4	4	23
23-Oct	3	3	5	7	7	8	7	7	10	10	7	8	9	9	14	17	23	15	13	12	25	7	6	6	25
24-Oct	7	6	6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	7	6	7	8	6	6	6	5	8
25-Oct	7	6	7	8	5	6	6	5	3	12	17	12	23	12	21	26	7	10	9	11	9	8	9	12	26
26-Oct	11	16	10	12	22	14	6	7	8	13	5	6	4	5	5	3	5	2	2	3	3	3	5	4	22
27-Oct	4	5	7	4	2	5	6	2	3	5	7	7	11	12	16	8	12	21	19	12	14	14	17	9	21
28-Oct	13	6	7	6	10	5	7	8	6	5	6	8	6	6	6	13	8	11	6	7	13	11	11	13	13
29-Oct	13	8	12	10	18	18	12	10	9	12	21	15	9	8	10	11	12	14	10	14	9	11	8	6	21
30-Oct	5	6	6	7	6	6	7	8	6	6	7	6	8	8	8	7	6	8	8	8	7	7	7	7	8
31-Oct	6	6	6	6	6	6	6	5	6	5	7	9	8	7	10	5	4	4	4	3	4	8	13	11	13
Diurnal Maximum																									
19 22 23 22 52 62 29 21 60 64 75 69 55 72 78 29 37 21 19 14 25 25 17 14																									

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction 90 m (WD90m) - deg**  
**Mannix - October 2014**





Maximum Value: 0.7 km/h on Oct 30 20:00																				Maximum Daily Average: 0.4 km/h on Oct 17					Hours in Service: 744		
Minimum Value: -1.2 km/h on Oct 2 11:00																				Minimum Daily Average: -0.6 km/h on Oct 2					Hours of Data: 726		
Maximum Diurnal Average: 0.1 km/h at hour 12																				Minimum Diurnal Average: 0.0 km/h at hour 18					Hours of Missing Data: 18		
Monthly Average: 0.05 km/h																				Percentiles: P <sub>1</sub> = -0.8 P <sub>10</sub> = -0.4 Q <sub>1</sub> = -0.2 Median = 0.1 Q <sub>3</sub> = 0.3 P <sub>90</sub> = 0.4 P <sub>99</sub> = 0.6					Hours of Calibration: 0		
																									Percent Operational Time: 97.6		
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-Oct	0.0	-0.1	0.3	-0.1	0.0	0.1	0.0	0.2	0.2	0.2	0.2	0.2	0.1	0.1	-0.3	-0.3	0.0	-0.6	-0.6	-0.8	-1.0	-0.9	-0.6	0.1	-0.2	0.3	
2-Oct	AF	AF	AF	-0.5	-0.6	-0.5	-1.0	-0.9	-0.7	-0.4	-1.2	-1.1	-0.8	-0.6	-0.6	-0.6	-0.6	-0.6	-0.2	-0.3	-0.5	-0.6	-0.5	-0.3	-0.6	-0.2	
3-Oct	-0.3	-0.2	-0.2	-0.6	-0.6	-0.4	-0.3	0.0	0.0	0.1	0.2	0.0	0.0	0.3	0.2	0.4	0.5	0.2	0.3	0.5	0.4	0.2	0.2	0.1	0.0	0.5	
4-Oct	0.3	0.2	0.4	0.2	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.3	-0.1	0.1	0.0	0.1	-0.1	0.0	-0.2	-0.2	-0.2	0.1	-0.2	-0.2	-0.1	0.0	0.4	
5-Oct	-0.2	-0.1	-0.3	-0.3	0.0	0.3	0.2	-0.1	-0.1	0.2	0.6	0.1	-0.2	0.1	0.0	-0.3	-0.2	-0.4	-0.3	-0.1	-0.3	0.0	0.1	0.1	-0.1	0.6	
6-Oct	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.0	0.5	0.1	0.2	-0.1	-0.2	-0.3	-0.1	-0.2	-0.4	-0.3	-0.2	-0.1	-0.1	-0.2	-0.2	0.0	0.5	
7-Oct	-0.2	-0.3	-0.3	-0.3	-0.2	-0.3	-0.1	-0.3	-0.4	-0.4	-0.2	0.0	-0.3	-0.3	-0.3	0.0	0.2	0.0	-0.1	0.2	0.3	0.2	0.1	0.1	-0.1	0.3	
8-Oct	0.2	0.2	0.2	0.1	-0.1	-0.1	0.1	0.0	0.1	0.1	0.1	0.4	0.6	0.4	0.2	0.1	0.2	0.3	0.3	0.3	0.3	0.1	0.3	0.1	0.2	0.6	
9-Oct	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.4	0.3	0.2	0.2	0.0	0.2	0.4	0.2	0.4	0.4	0.3	0.2	0.1	0.3	0.2	0.4	
10-Oct	0.1	0.4	0.4	0.2	0.3	0.3	0.4	0.2	0.3	0.3	0.4	0.2	0.5	0.6	0.4	0.4	0.4	0.1	0.2	0.2	0.5	0.4	0.5	0.7	0.3	0.7	
11-Oct	0.4	0.2	0.1	0.0	-0.1	-0.2	-0.5	-0.5	-0.4	-0.3	-0.4	-0.1	-0.1	-0.2	-0.5	-0.6	-0.6	-0.4	-0.5	-0.4	-0.2	-0.4	-0.2	-0.3	-0.3	0.4	
12-Oct	-0.3	-0.3	-0.4	-0.2	-0.3	-0.3	-0.2	-0.2	-0.3	0.1	-0.3	-0.1	-0.4	-0.1	-0.1	-0.3	-0.3	-0.3	-0.2	-0.2	-0.1	-0.1	0.0	-0.1	-0.2	0.1	
13-Oct	-0.1	-0.2	-0.4	-0.4	-0.3	-0.2	-0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.0	0.1	0.2	0.4	0.2	0.2	0.1	0.3	0.2	0.3	0.3	0.1	0.4	
14-Oct	0.4	0.3	0.3	0.3	0.5	0.4	0.1	0.1	-0.1	0.2	0.3	0.5	0.5	0.3	0.1	0.2	0.0	-0.1	0.0	-0.1	-0.2	-0.4	-0.3	-0.1	0.1	0.5	
15-Oct	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4	-0.5	-0.4	-0.4	-0.2	-0.2	-0.3	-0.2	-0.2	-0.3	-0.2	-0.2	-0.5	-0.4	-0.6	-0.4	-0.3	-0.2	0.0	-0.3	0.0	
16-Oct	0.0	0.0	-0.1	0.2	-0.1	-0.2	-0.1	0.3	0.1	0.1	0.4	0.2	0.3	0.1	-0.1	-0.1	0.0	0.2	0.2	0.2	0.5	0.4	0.3	0.4	0.1	0.5	
17-Oct	0.2	0.3	0.4	0.3	0.3	0.3	0.4	0.2	0.2	0.3	0.4	0.5	0.4	0.6	0.6	0.6	0.5	0.4	0.5	0.6	0.5	0.3	0.6	0.2	0.4	0.6	
18-Oct	0.2	0.2	0.5	0.4	0.2	0.2	0.3	0.1	0.2	0.3	0.0	0.1	0.3	0.1	0.2	-0.1	0.0	0.0	-0.2	-0.1	-0.2	-0.2	-0.1	-0.2	0.1	0.5	
19-Oct	-0.1	-0.3	-0.3	-0.2	-0.2	0.0	0.0	0.4	0.1	0.3	0.2	0.2	0.2	0.4	0.4	0.4	0.1	0.5	0.2	0.2	0.4	0.4	0.0	0.0	0.1	0.5	
20-Oct	0.3	0.1	0.3	0.5	0.4	0.3	0.2	0.4	0.2	0.3	0.4	0.2	0.4	0.4	0.1	0.3	0.4	0.3	0.2	0.2	0.2	0.2	0.4	0.3	0.3	0.5	
21-Oct	0.2	0.0	0.0	0.0	-0.3	-0.1	-0.3	-0.2	-0.1	-0.1	-0.2	-0.2	-0.1	-0.1	-0.4	-0.3	-0.2	-0.2	-0.2	-0.2	0.0	0.3	0.2	0.1	-0.1	0.3	
22-Oct	0.0	0.2	0.3	0.2	0.3	0.2	0.4	0.4	0.3	0.4	0.4	0.3	0.2	0.1	0.1	0.0	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	
23-Oct	0.2	0.3	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.1	0.0	-0.2	-0.1	-0.1	-0.1	-0.4	0.2	0.4	
24-Oct	-0.3	-0.1	-0.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.4	-0.4	-0.2	-0.1	-0.3	-0.3	-0.2	-0.2	-0.1	-	-0.1
25-Oct	-0.4	-0.3	-0.1	0.0	-0.3	-0.3	-0.3	-0.4	-0.3	-0.3	0.3	0.2	0.1	0.3	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.6	0.6	0.3	0.0	0.6	
26-Oct	0.3	0.4	0.4	0.4	-0.1	-0.2	-0.4	-0.2	-0.2	-0.3	-0.1	-0.3	-0.6	-0.4	-0.6	-0.8	-0.4	-0.6	-0.5	AF	AF	AF	0.0	-0.7	-0.2	0.4	
27-Oct	-0.6	-0.5	-0.4	-0.3	-0.5	-0.3	-0.3	-0.4	-0.4	-0.3	-0.3	-0.4	-0.1	0.0	-0.1	-0.2	-0.3	-0.2	-0.1	-0.1	0.0	0.0	0.2	0.2	-0.2	0.2	
28-Oct	0.0	0.0	0.1	0.0	0.2	0.2	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.1	0.2	0.3	0.2	0.3	0.3	0.1	0.2	0.3	0.4	0.3	0.2	0.4
29-Oct	0.4	0.3	0.0	0.2	0.2	0.0	0.0	0.2	0.1	-0.1	0.2	0.2	0.4	0.1	0.1	0.1	0.3	0.2	0.2	0.5	0.2	0.4	0.2	0.3	0.2	0.5	
30-Oct	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.5	0.3	0.6	0.3	0.5	0.3	0.4	0.6	0.4	0.4	0.2	0.3	0.7	0.4	0.4	0.6	0.2	0.4	0.7	
31-Oct	0.3	0.4	0.4	0.6	0.5	0.5	0.4	0.5	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.2	-0.1	0.0	0.3	0.6	
																								Diurnal Average			
																								Diurnal Maximum			
AF - Analyzer Failure																											



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 3.9 km/h on Oct 1 21:00	Hours of Data: 726
Minimum Value: 0.2 km/h on Oct 16 02:00	Hours of Missing Data: 18
Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 0.9 Median = 1.4 Q <sub>3</sub> = 1.9 P <sub>90</sub> = 2.5 P <sub>99</sub> = 3.2	Hours of Calibration: 0
	Percent Operational Time: 97.6

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-Oct	1.4	1.6	1.3	0.8	0.8	1.3	1.1	1.2	1.1	1.2	1.0	1.0	0.9	1.2	1.7	2.2	2.8	3.0	2.9	3.4	3.9	3.0	2.6	2.8	3.9
2-Oct	AF	AF	AF	2.1	2.5	2.1	3.2	2.9	2.5	2.6	3.7	3.3	3.0	3.0	2.9	2.8	2.9	2.8	2.1	2.2	2.2	2.2	1.9	1.6	3.7
3-Oct	1.7	1.5	1.0	1.0	1.0	0.8	0.8	0.9	1.1	1.2	1.4	1.6	1.8	1.8	1.8	1.8	2.1	1.7	2.4	2.3	1.6	1.8	2.2	2.3	2.4
4-Oct	1.9	1.8	1.6	1.1	0.6	0.6	0.5	0.5	0.6	1.0	1.1	1.1	1.1	0.9	0.9	0.7	0.8	0.8	0.9	0.7	0.6	0.6	0.4	0.6	1.9
5-Oct	0.7	0.7	1.2	1.1	1.0	0.9	1.0	1.1	1.3	1.4	1.3	1.5	1.6	1.7	2.1	2.3	1.8	1.8	2.3	1.9	1.4	1.6	1.1	0.8	2.3
6-Oct	0.8	0.8	0.7	0.6	0.7	0.9	1.0	0.9	0.7	1.1	1.1	1.1	1.4	1.7	1.6	1.8	1.5	2.0	1.9	2.1	1.7	1.5	1.1	1.0	2.1
7-Oct	1.3	1.7	1.9	1.9	1.4	1.5	1.8	1.6	2.2	2.1	2.0	2.1	2.2	2.0	2.1	1.8	1.7	1.4	0.8	0.8	1.0	0.9	0.5	0.5	2.2
8-Oct	0.3	0.4	0.4	0.3	0.5	0.3	0.4	0.3	0.6	0.6	0.9	1.2	1.6	1.6	1.4	1.2	0.8	1.1	1.0	0.7	1.0	1.8	1.8	2.1	2.1
9-Oct	1.6	1.4	1.1	1.3	1.0	1.0	1.0	1.2	1.5	1.7	1.7	1.8	1.8	1.7	1.5	1.1	1.4	1.8	1.8	2.0	2.2	2.0	2.3	2.2	2.3
10-Oct	2.2	2.1	2.2	1.7	1.1	1.3	1.8	1.1	1.4	1.4	1.8	1.8	1.8	2.0	1.9	1.4	1.3	1.2	1.1	1.4	1.4	1.2	0.9	1.2	2.2
11-Oct	0.9	0.8	0.7	0.7	1.2	1.4	2.4	2.6	2.5	2.5	2.3	2.2	2.3	2.3	2.7	3.0	2.5	1.4	1.1	1.1	1.0	1.4	2.2	1.7	3.0
12-Oct	1.6	1.7	1.5	1.4	1.4	1.0	0.8	0.6	1.0	1.3	1.2	1.7	1.8	1.8	1.7	2.0	1.5	1.7	1.7	1.3	1.1	1.1	1.3	0.7	2.0
13-Oct	0.4	0.5	0.8	0.9	0.6	0.5	0.6	0.4	0.6	1.1	1.3	1.2	1.3	1.5	1.3	1.2	0.9	0.7	0.8	0.9	1.2	1.0	1.1	0.9	1.5
14-Oct	1.2	1.1	1.1	1.5	1.6	1.7	0.9	0.9	0.6	0.8	1.2	1.4	1.8	1.3	0.7	0.8	0.7	0.6	0.3	0.9	2.1	1.8	1.8	1.2	2.1
15-Oct	1.4	1.9	1.5	1.2	1.2	1.2	1.4	1.6	1.7	1.8	1.8	1.6	1.5	1.7	1.8	1.8	1.7	1.9	1.8	2.0	1.0	0.7	0.3	0.3	2.0
16-Oct	0.3	0.2	0.4	0.9	0.8	0.4	0.5	0.7	0.7	0.9	1.3	1.3	1.4	1.5	1.3	0.9	0.5	1.0	2.1	2.1	1.7	2.0	2.4	2.2	2.4
17-Oct	1.6	1.7	2.0	1.7	1.8	1.7	1.7	1.3	1.2	1.9	2.8	2.9	2.7	3.1	3.3	3.2	3.5	3.0	3.1	3.0	3.1	3.1	3.0	2.6	3.5
18-Oct	2.9	3.0	2.5	2.1	1.7	2.0	1.3	0.7	0.9	0.9	1.2	1.0	1.2	1.1	0.8	0.8	0.5	0.7	0.8	0.7	0.6	0.5	0.4	0.3	3.0
19-Oct	0.3	0.5	0.4	0.4	0.5	0.3	0.5	0.9	1.1	1.2	1.3	1.4	1.5	1.8	2.3	2.6	2.3	2.5	3.1	2.8	2.7	2.7	2.5	2.8	3.1
20-Oct	2.6	2.7	2.0	2.3	1.8	2.0	2.0	1.6	1.3	1.1	1.4	1.2	1.4	1.3	1.6	1.2	1.1	0.5	0.7	0.4	0.5	0.6	0.7	0.7	2.7
21-Oct	0.7	0.6	0.5	0.4	0.6	0.5	0.8	1.1	1.1	0.9	1.1	1.3	1.2	1.6	1.8	1.3	0.6	0.5	0.6	0.5	0.5	0.6	0.5	0.4	1.8
22-Oct	0.6	0.6	0.7	0.6	0.9	0.8	0.9	0.8	0.9	1.2	1.2	1.2	1.1	1.3	2.0	2.0	2.2	2.4	2.1	2.3	2.1	2.3	1.4	1.5	2.4
23-Oct	1.3	1.4	1.7	1.6	1.6	0.7	1.7	1.5	1.3	2.1	2.5	2.3	2.8	2.6	1.9	1.4	1.0	0.7	0.8	0.7	0.6	1.2	1.8	2.0	2.8
24-Oct	2.1	2.1	2.0	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.9	2.1	1.6	1.2	1.6	1.8	1.6	1.4	1.6	2.1
25-Oct	1.7	1.8	1.5	1.3	0.9	0.7	0.9	0.7	0.8	1.0	1.3	1.4	1.3	1.4	1.3	0.8	0.8	1.0	1.2	0.8	1.2	1.8	1.8	1.5	1.8
26-Oct	1.7	1.5	1.1	1.3	1.3	1.0	1.4	1.4	1.5	1.1	1.5	1.8	2.2	2.3	2.5	2.8	2.9	2.6	2.7	AF	AF	AF	2.8	2.8	2.9
27-Oct	2.5	2.5	1.8	2.5	2.4	2.1	2.0	2.3	2.1	1.9	1.7	1.4	1.4	1.1	1.0	0.9	0.9	0.8	0.7	0.5	0.4	0.5	0.7	0.7	2.5
28-Oct	0.5	0.7	0.7	0.7	0.8	1.0	1.0	1.2	1.3	1.4	1.1	1.1	1.3	1.0	0.9	1.1	1.2	1.1	1.1	1.0	1.1	1.2	1.2	1.3	1.4
29-Oct	1.1	1.1	1.2	1.1	0.9	0.7	0.7	0.9	1.0	0.9	1.2	1.6	1.7	1.4	1.4	1.2	1.0	1.1	1.0	1.4	1.6	1.6	1.6	1.5	1.7
30-Oct	1.5	1.7	1.8	2.0	2.4	2.3	2.2	2.1	2.3	2.7	2.2	2.3	2.2	2.5	2.3	2.0	2.2	2.0	1.9	2.3	2.7	2.6	2.7	2.5	2.7
31-Oct	2.5	2.4	2.6	2.6	2.6	2.7	2.3	2.3	2.1	2.1	2.0	1.6	1.4	1.4	1.3	1.2	1.0	1.1	0.9	0.8	0.7	0.8	0.8	0.5	2.7
2.9 3.0 2.6 2.6 2.6 2.7 3.2 2.9 2.5 2.7 3.7 3.3 3.0 3.1 3.3 3.2 3.5 3.0 3.1 3.4 3.9 3.1 3.0 2.8																									
Diurnal Maximum																									

AF - Analyzer Failure



Summary of Hour Averages

Mannix - October 2014

Maximum Value: 1.3 km/h on Oct 14 13:00		Maximum Daily Average: 0.7 km/h on Oct 17		Hours in Service: 744																						
Minimum Value: -1.3 km/h on Oct 1 21:00		Minimum Daily Average: -0.7 km/h on Oct 2		Hours of Data: 728																						
Maximum Diurnal Average: 0.3 km/h at hour 14		Minimum Diurnal Average: 0.1 km/h at hour 20		Hours of Missing Data: 16																						
Monthly Average: 0.19 km/h		Percentiles: P <sub>1</sub> = -0.9 P <sub>10</sub> = -0.5 Q <sub>1</sub> = -0.2 Median = 0.3 Q <sub>3</sub> = 0.5 P <sub>90</sub> = 0.7 P <sub>99</sub> = 0.9		Hours of Calibration: 0																						
				Percent Operational Time: 97.9																						
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-Oct	0.2	0.0	0.4	-0.1	0.2	0.3	0.2	0.4	0.5	0.5	0.3	0.4	0.2	0.4	-0.1	0.0	0.1	-0.2	-0.2	-1.2	-1.3	-1.1	-0.9	AF	0.0	0.5
2-Oct	AF	AF	AF	-0.5	-0.7	-0.4	-1.0	-0.7	-0.6	-0.5	-1.3	-0.9	-0.8	-0.5	-0.5	-0.7	-0.8	-0.8	-0.3	-0.7	-0.6	-0.4	-0.3	-0.5	-0.7	-0.3
3-Oct	-0.6	-0.4	-0.3	-0.5	-0.5	-0.4	-0.3	0.2	0.1	0.2	0.1	-0.1	0.3	0.6	0.6	0.8	0.7	0.4	0.8	0.9	0.6	0.4	0.8	0.1	0.2	0.9
4-Oct	0.8	0.6	0.6	0.4	0.2	0.0	0.0	0.0	0.0	0.0	-0.2	0.1	0.4	0.3	0.4	0.1	0.2	0.0	-0.1	-0.2	0.1	-0.2	-0.2	0.0	0.1	0.8
5-Oct	-0.1	0.0	-0.5	-0.4	0.0	0.4	0.2	0.0	0.0	0.4	0.8	0.7	-0.1	0.3	0.1	-0.2	0.0	-0.1	-0.4	0.0	-0.1	0.2	0.1	0.2	0.1	0.8
6-Oct	0.3	0.4	0.3	0.4	0.4	0.7	0.4	0.5	0.1	0.6	0.3	0.3	0.1	-0.1	-0.2	0.1	-0.2	-0.4	-0.4	-0.4	-0.3	-0.4	-0.3	-0.4	0.1	0.7
7-Oct	-0.5	-0.7	-0.6	-0.6	-0.5	-0.4	-0.4	-0.7	-0.5	-0.3	0.2	0.1	-0.2	-0.2	-0.3	0.2	0.4	0.1	0.0	0.4	0.4	0.5	0.2	0.4	-0.1	0.5
8-Oct	0.3	0.3	0.5	0.3	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.5	1.1	0.6	0.4	0.3	0.5	0.7	0.6	0.5	0.7	0.4	0.7	0.6	0.4	1.1
9-Oct	0.6	0.4	0.5	0.4	0.5	0.7	0.7	0.6	0.3	0.3	0.6	0.7	0.5	0.4	0.3	0.4	0.9	0.6	0.5	0.7	0.6	0.4	0.4	0.6	0.5	0.9
10-Oct	0.7	0.8	0.5	0.4	0.7	0.8	0.8	0.5	0.4	0.3	0.8	0.7	0.8	0.9	0.4	0.7	0.5	0.2	0.4	0.5	0.5	0.6	0.5	0.8	0.6	0.9
11-Oct	0.5	0.2	0.2	0.0	-0.3	-0.5	-0.7	-0.8	-0.5	-0.3	-0.6	-0.2	-0.1	-0.1	-0.7	-0.7	-0.6	-0.5	-0.7	-0.6	-0.4	-0.6	-0.5	-0.5	-0.4	0.5
12-Oct	-0.5	-0.6	-0.5	-0.3	-0.4	-0.4	-0.4	-0.3	-0.5	0.0	-0.3	-0.2	-0.6	-0.1	0.0	-0.2	-0.3	-0.5	-0.4	-0.3	-0.3	-0.3	-0.2	-0.1	-0.3	0.0
13-Oct	-0.1	-0.2	-0.5	-0.4	-0.3	-0.1	0.0	0.0	0.1	0.4	0.3	0.3	0.3	0.5	0.4	0.3	0.5	0.5	0.5	0.3	0.6	0.7	0.5	0.6	0.2	0.7
14-Oct	0.8	0.8	0.7	0.7	0.7	0.5	0.4	0.5	0.2	0.4	0.5	0.9	1.3	0.4	0.1	0.4	0.2	0.0	0.0	-0.1	-0.5	-0.5	-0.3	-0.2	0.3	1.3
15-Oct	-0.2	-0.2	-0.3	-0.1	-0.5	-0.6	-0.7	-0.4	-0.3	-0.3	-0.3	-0.3	-0.1	0.0	-0.4	-0.3	-0.2	-0.7	-0.7	-0.8	-0.3	-0.2	-0.1	0.1	-0.3	0.1
16-Oct	0.3	0.2	0.1	0.4	0.3	0.1	0.3	0.5	0.4	0.4	1.0	0.5	0.9	0.3	-0.2	0.0	0.1	0.5	0.3	0.6	0.7	0.7	0.5	0.7	0.4	1.0
17-Oct	0.5	0.6	0.7	0.5	0.5	0.5	0.6	0.7	0.6	0.6	0.6	0.8	0.8	0.9	0.4	0.9	0.6	0.6	0.8	0.8	0.9	0.6	0.8	0.7	0.7	0.9
18-Oct	0.4	0.5	0.8	0.5	0.4	0.4	0.6	0.3	0.5	0.5	0.2	0.4	0.4	0.3	0.4	-0.1	0.0	-0.1	-0.3	-0.3	-0.4	-0.3	-0.3	-0.3	0.2	0.8
19-Oct	-0.1	-0.4	-0.5	-0.4	-0.1	0.1	0.2	0.8	0.4	0.4	0.2	0.4	0.1	0.7	0.9	0.8	0.4	0.7	0.5	0.3	0.7	0.6	0.3	0.5	0.3	0.9
20-Oct	0.8	0.5	0.7	0.9	0.8	0.6	0.6	0.7	0.5	0.4	0.6	0.4	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.4	0.8	0.4	0.6	0.9
21-Oct	0.4	0.1	0.1	-0.1	-0.4	-0.2	-0.3	-0.3	-0.2	0.0	-0.3	-0.1	-0.1	0.0	-0.6	-0.3	-0.2	-0.4	-0.2	-0.2	-0.1	0.5	0.3	0.0	-0.1	0.5
22-Oct	0.2	0.5	0.8	0.5	0.7	0.4	0.8	1.0	0.7	0.6	0.6	0.4	0.4	0.4	0.2	0.2	0.3	0.3	0.6	0.7	0.9	0.9	0.8	0.8	0.6	1.0
23-Oct	0.6	0.7	0.6	0.8	1.0	0.4	0.7	0.4	0.5	0.6	0.7	0.7	0.9	0.6	0.9	0.6	0.7	0.4	0.3	-0.1	0.0	-0.1	-0.2	-0.4	0.5	1.0
24-Oct	-0.4	0.1	0.0	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.2	-0.4	-0.3	-0.3	-0.5	-0.4	-0.2	-0.3	-	0.1
25-Oct	-0.5	-0.3	-0.1	0.0	-0.2	-0.3	-0.4	-0.4	-0.4	-0.1	0.4	0.2	0.2	0.7	0.4	0.2	0.5	0.7	0.9	0.5	0.5	1.0	0.9	0.6	0.2	1.0
26-Oct	0.7	0.8	0.6	0.6	0.1	0.1	-0.2	0.0	-0.1	-0.1	0.2	-0.1	-0.3	-0.3	-0.5	-0.5	-0.2	-0.9	-0.9	-0.9	-0.8	-0.8	-0.5	-0.7	-0.2	0.8
27-Oct	-0.6	-0.5	-0.2	0.0	-0.4	0.0	0.0	-0.5	-0.4	-0.1	-0.2	-0.3	0.0	0.4	0.2	-0.2	-0.3	-0.2	0.0	0.1	0.1	0.2	0.4	0.5	-0.1	0.5
28-Oct	0.1	0.2	0.3	0.0	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.3	0.4	0.3	0.3	0.9	0.5	0.7	0.3	0.3	1.0	0.7	0.8	0.7	0.5	1.0
29-Oct	0.6	0.3	0.0	0.4	0.7	0.2	0.2	0.2	0.3	0.0	0.5	0.4	0.5	0.4	0.2	0.2	0.3	0.2	0.2	0.9	0.7	1.0	0.3	0.5	0.4	1.0
30-Oct	0.6	0.6	0.7	0.7	0.5	0.5	0.4	0.7	0.5	0.9	0.6	0.7	0.7	0.5	0.9	0.6	0.5	0.5	0.5	0.8	0.7	0.7	0.8	0.4	0.6	0.9
31-Oct	0.4	0.7	0.7	0.7	0.8	0.7	0.8	0.7	0.7	0.7	0.6	0.5	0.7	0.4	0.6	0.6	0.5	0.6	0.5	0.6	0.5	0.3	0.0	0.0	0.6	0.8
																								Diurnal Average		
																								Diurnal Maximum		
0.2 0.2 0.2 0.2 0.2 0.2 0.1 0.2 0.1 0.2 0.2 0.3 0.3 0.3 0.2 0.2 0.2 0.1 0.1 0.1 0.2 0.2 0.2 0.2																										
0.8 0.8 0.8 0.9 1.0 0.8 0.8 1.0 0.7 0.9 1.0 0.9 1.3 0.9 0.9 0.9 0.9 0.7 0.9 0.9 1.0 1.0 0.9 0.8																										
AF - Analyzer Failure																										



Summary of Hour Standard Deviations

Mannix - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 4.2 km/h on Oct 1 21:00			Hours of Data:	728
Minimum Value: 0.2 km/h on Oct 4 23:00			Hours of Missing Data:	16
Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.9 Median = 1.4 Q <sub>3</sub> = 2.0 P <sub>90</sub> = 2.5 P <sub>99</sub> = 3.4			Hours of Calibration:	0
			Percent Operational Time:	97.9

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-Oct	1.6	1.8	1.6	1.0	1.1	1.5	1.2	1.4	1.3	1.5	1.3	1.3	1.2	1.6	1.8	2.4	2.6	3.0	3.1	3.5	4.2	3.4	3.1	AF	4.2																						
2-Oct	AF	AF	AF	2.2	2.6	2.3	3.4	3.0	2.5	2.8	3.8	3.4	3.2	3.1	2.9	2.8	2.8	2.9	2.3	2.2	2.1	2.2	1.8	1.4	3.8																						
3-Oct	1.5	1.2	0.8	0.7	0.6	0.4	0.4	0.8	1.1	1.2	1.4	1.6	2.0	1.9	2.1	2.1	2.3	1.9	2.8	2.5	1.8	1.8	2.3	2.3	2.8																						
4-Oct	2.0	1.6	1.8	1.3	0.5	0.4	0.4	0.4	0.4	1.0	1.2	1.4	1.3	1.2	1.2	0.9	0.9	0.6	0.7	0.7	0.5	0.4	0.2	0.2	2.0																						
5-Oct	0.3	0.2	0.9	0.8	0.7	0.7	1.0	1.2	1.5	1.6	1.6	1.9	1.8	1.9	2.3	2.4	1.8	1.8	1.9	2.0	1.5	1.7	1.3	0.9	2.4																						
6-Oct	0.9	1.0	0.8	0.8	0.9	1.1	1.1	0.9	0.8	1.3	1.3	1.2	1.5	1.9	1.8	2.0	1.5	1.9	2.0	2.2	1.8	1.7	1.2	0.9	2.2																						
7-Oct	1.4	1.9	2.0	1.8	1.4	1.4	1.9	1.7	2.2	2.4	2.3	2.5	2.5	2.6	2.5	1.8	1.6	1.3	0.7	1.0	1.1	1.0	0.5	0.3	2.6																						
8-Oct	0.3	0.5	0.5	0.5	0.5	0.3	0.6	0.4	0.6	0.6	1.0	1.3	1.9	1.8	1.6	1.3	1.0	1.2	1.0	0.6	1.2	1.6	1.7	2.0	2.0																						
9-Oct	1.7	1.4	0.9	0.8	0.9	1.1	1.1	1.2	1.8	1.9	1.9	2.1	2.2	1.9	1.7	1.3	1.6	1.9	1.9	2.1	1.8	1.9	1.8	1.8	2.2																						
10-Oct	1.6	1.9	1.9	1.2	0.9	1.0	1.7	0.9	1.4	1.5	2.1	1.9	2.1	2.4	2.1	1.7	1.2	0.8	0.7	1.2	1.5	1.2	0.6	1.0	2.4																						
11-Oct	0.8	0.7	0.9	0.7	1.3	1.5	2.4	2.7	2.9	2.8	2.5	2.5	2.6	2.7	2.9	3.1	2.5	1.2	0.8	0.8	1.0	1.6	2.4	1.8	3.1																						
12-Oct	1.6	1.7	1.6	1.5	1.3	0.7	0.7	0.4	0.8	1.5	1.5	1.8	2.0	1.9	2.1	2.1	1.6	1.8	1.9	1.5	1.4	1.2	1.4	0.7	2.1																						
13-Oct	0.5	0.3	0.5	0.5	0.4	0.4	0.4	0.4	0.5	1.5	1.5	1.3	1.4	1.8	1.4	1.3	0.8	0.5	0.9	1.0	1.3	1.3	1.3	1.1	1.8																						
14-Oct	1.4	1.4	1.3	1.7	1.8	2.1	1.3	1.2	0.6	1.0	1.3	1.6	2.1	1.5	0.7	1.0	0.7	0.5	0.2	1.0	2.1	1.7	1.7	1.4	2.1																						
15-Oct	1.5	2.0	1.6	1.1	1.1	0.9	1.2	1.6	1.7	1.9	1.8	2.0	1.9	2.3	2.3	2.1	2.1	2.0	2.0	2.1	1.2	0.8	0.4	0.4	2.3																						
16-Oct	0.4	0.3	0.5	1.4	1.0	0.4	0.7	0.9	0.8	1.1	1.6	1.6	1.8	1.8	1.7	1.2	0.7	1.0	1.9	2.1	1.7	2.0	2.0	1.9	2.1																						
17-Oct	1.5	1.4	1.7	1.4	1.3	1.4	1.2	1.3	1.2	1.8	2.5	2.6	2.8	3.1	3.6	3.5	3.6	3.4	3.4	3.3	3.0	2.6	2.7	2.4	3.6																						
18-Oct	2.4	2.3	2.4	2.0	1.5	1.7	1.0	0.8	1.0	1.0	1.3	1.2	1.2	1.1	0.8	0.8	0.5	0.7	0.8	0.7	0.7	0.4	0.4	0.3	2.4																						
19-Oct	0.6	0.3	0.3	0.3	0.5	0.2	0.3	0.9	1.1	1.1	1.3	1.6	1.6	1.8	2.4	2.6	2.1	2.2	2.7	2.6	2.5	2.5	2.1	2.7	2.7																						
20-Oct	2.4	2.4	1.7	2.1	1.9	2.2	1.8	1.3	1.1	1.3	1.4	1.3	1.6	1.2	1.7	1.3	1.0	0.3	0.5	0.4	0.5	0.5	0.4	0.4	2.4																						
21-Oct	0.8	0.7	0.5	0.6	0.6	0.5	0.8	1.0	1.1	1.1	1.0	1.5	1.1	1.9	1.8	1.3	0.5	0.4	0.3	0.3	0.8	0.6	0.4	0.4	1.9																						
22-Oct	0.4	0.5	0.4	0.4	0.8	0.8	0.7	0.6	0.9	1.3	1.2	1.3	0.9	1.1	1.9	1.8	2.1	2.5	2.2	2.1	1.8	2.0	1.3	1.5	2.5																						
23-Oct	0.9	0.9	1.3	1.7	1.7	1.0	1.8	1.5	1.4	2.4	2.3	2.3	3.0	2.5	2.2	1.5	1.2	0.7	0.7	0.6	0.6	1.2	1.8	2.0	3.0																						
24-Oct	2.1	2.5	2.2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.2	2.3	1.8	1.4	1.5	1.7	1.8	1.6	1.7	2.5																						
25-Oct	1.6	1.8	1.7	1.5	0.7	0.4	0.8	0.5	0.6	1.2	1.5	1.6	1.4	1.6	1.5	0.8	0.8	1.1	1.3	1.1	1.3	2.0	1.9	1.8	2.0																						
26-Oct	1.8	1.6	1.4	1.5	1.3	0.8	1.1	1.1	1.1	1.0	1.5	1.8	1.9	2.0	2.1	2.4	2.9	1.9	2.0	2.2	2.3	2.2	2.2	2.5	2.9																						
27-Oct	2.0	2.2	1.8	2.1	1.8	2.1	2.0	2.0	1.7	1.8	1.6	1.4	1.4	1.4	1.2	0.9	1.0	0.8	0.8	0.7	0.5	0.7	0.8	0.6	2.2																						
28-Oct	0.4	0.5	0.6	0.6	0.7	1.1	1.2	1.4	1.5	1.6	1.2	1.2	1.4	1.2	1.2	1.2	1.1	1.2	0.9	1.1	1.3	1.3	1.2	1.5	1.6																						
29-Oct	1.3	1.1	1.5	1.3	1.1	0.9	0.8	1.1	1.0	0.9	1.4	1.8	1.7	1.6	1.3	1.3	1.2	1.0	1.1	1.6	1.7	1.8	1.6	1.6	1.8																						
30-Oct	1.5	1.7	2.1	2.1	2.5	2.6	2.5	2.4	2.5	2.9	2.4	2.5	2.5	3.0	2.8	2.3	2.3	2.2	2.2	2.9	3.3	3.0	2.9	2.8	3.3																						
31-Oct	2.7	2.5	2.5	2.6	2.7	2.6	2.2	2.0	2.1	2.1	2.3	1.9	1.5	1.6	1.4	1.2	0.9	1.2	0.8	0.8	0.6	0.6	0.5	0.6	2.7																						
Diurnal Maximum																								2.7	2.5	2.5	2.6	2.7	2.6	3.4	3.0	2.9	2.9	3.8	3.4	3.2	3.1	3.6	3.5	3.6	3.4	3.4	3.5	4.2	3.4	3.1	2.8

AF - Analyzer Failure





Summary of Hour Averages

Mannix - October 2014

Maximum Value: 1.1 km/h on Oct 14 13:00		Maximum Daily Average: 0.3 km/h on Oct 28		Hours in Service: 744																						
Minimum Value: -1.1 km/h on Oct 1 21:00		Minimum Daily Average: -0.4 km/h on Oct 17		Hours of Data: 732																						
Maximum Diurnal Average: 0.2 km/h at hour 13		Minimum Diurnal Average: -0.1 km/h at hour 24		Hours of Missing Data: 12																						
Monthly Average: 0.01 km/h		Percentiles: P <sub>1</sub> = -0.7 P <sub>10</sub> = -0.4 Q <sub>1</sub> = -0.2 Median = 0.0 Q <sub>3</sub> = 0.2 P <sub>90</sub> = 0.4 P <sub>99</sub> = 0.8		Hours of Calibration: 0																						
				Percent Operational Time: 98.4																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0.2	0.0	0.3	-0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.1	0.4	0.3	0.4	0.4	0.5	0.4	-0.7	-1.1	-0.6	-0.3	-0.3	0.1	0.5
2-Oct	0.1	0.2	0.0	-0.1	-0.3	-0.2	-0.5	-0.1	0.1	0.0	-0.3	-0.1	0.0	0.2	0.5	0.0	0.2	-0.2	0.1	-0.1	0.0	0.2	0.2	0.1	0.0	0.5
3-Oct	0.1	0.2	-0.1	-0.3	-0.3	-0.2	-0.1	0.3	-0.1	0.2	-0.2	-0.7	-0.1	-0.2	0.3	0.0	-0.3	-0.1	0.0	0.6	0.2	-0.3	-0.1	-0.8	-0.1	0.6
4-Oct	-0.2	-0.2	-0.1	0.2	0.2	0.0	0.0	-0.1	-0.1	-0.1	-0.4	0.1	0.6	0.4	0.5	0.3	0.4	0.1	-0.1	-0.1	0.2	-0.1	-0.2	-0.1	0.1	0.6
5-Oct	-0.1	-0.1	-0.6	-0.5	-0.2	0.1	0.0	-0.3	0.0	0.2	0.8	0.8	-0.2	0.5	0.2	0.2	0.3	0.4	-0.1	-0.1	0.2	0.2	0.1	0.3	0.1	0.8
6-Oct	0.2	0.5	0.1	0.2	0.1	0.6	0.2	0.4	0.1	0.4	0.3	0.5	0.4	0.3	0.1	0.3	0.1	0.0	-0.1	0.2	0.2	-0.3	-0.1	-0.3	0.2	0.6
7-Oct	-0.2	-0.2	-0.2	-0.1	0.0	0.0	-0.1	-0.3	0.0	0.1	0.8	0.4	0.2	0.0	-0.2	0.3	0.6	0.4	0.2	0.4	0.2	0.3	0.1	0.2	0.1	0.8
8-Oct	0.3	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.2	0.2	0.1	0.3	0.9	0.1	-0.1	0.0	0.3	0.3	0.2	0.3	0.4	-0.4	-0.1	-0.3	0.1	0.9
9-Oct	-0.1	-0.2	-0.3	-0.4	0.0	0.3	0.5	-0.2	-0.1	-0.4	0.2	0.1	0.3	-0.1	0.0	0.2	0.3	0.1	-0.3	-0.2	-0.4	-0.5	-0.6	-0.5	-0.1	0.5
10-Oct	-0.4	-0.2	-0.6	-0.5	0.1	0.0	-0.3	-0.1	-0.3	0.0	0.5	0.5	0.4	0.6	0.1	0.5	0.4	-0.1	0.1	0.4	0.5	0.4	0.2	0.5	0.1	0.6
11-Oct	0.2	0.0	-0.1	-0.2	-0.5	-0.4	-0.5	-0.7	-0.4	0.2	-0.2	-0.1	0.3	0.4	-0.7	-0.4	-0.5	-0.3	-0.6	-0.5	-0.4	-0.4	-0.2	-0.3	-0.3	0.4
12-Oct	-0.6	-0.7	-0.5	-0.2	-0.2	-0.2	-0.2	-0.2	-0.4	0.1	-0.2	0.0	-0.5	-0.1	0.1	-0.1	-0.2	-0.1	0.0	0.0	-0.2	-0.2	-0.1	0.0	-0.2	0.1
13-Oct	0.0	-0.1	-0.3	-0.4	-0.2	0.0	-0.1	-0.2	-0.1	0.3	0.2	0.1	0.0	0.5	0.0	-0.1	0.3	0.1	0.0	0.0	0.2	0.6	0.4	0.4	0.1	0.6
14-Oct	0.8	0.9	0.6	0.4	0.2	0.1	0.3	0.4	0.1	0.2	0.3	0.7	1.1	-0.2	-0.2	0.3	0.1	0.2	0.0	-0.2	-0.3	-0.3	-0.3	0.0	0.2	1.1
15-Oct	-0.1	0.1	0.0	0.2	-0.6	-0.7	-0.7	-0.4	-0.2	-0.2	-0.3	-0.3	-0.2	0.2	-0.2	0.3	0.1	-0.5	-0.4	-0.4	-0.1	-0.1	0.0	0.1	-0.2	0.3
16-Oct	0.2	0.2	0.2	0.3	0.3	0.0	0.3	0.5	0.2	0.6	0.8	0.3	0.8	0.1	-0.6	-0.3	-0.1	0.5	-0.1	-0.2	-0.3	-0.1	-0.5	-0.5	0.1	0.8
17-Oct	-0.5	-0.4	-0.4	-0.5	-0.5	-0.5	-0.5	-0.2	-0.1	-0.1	-0.4	-0.4	0.2	-0.3	-0.5	-0.3	-0.7	-0.5	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	0.2
18-Oct	-0.6	-0.6	-0.3	-0.3	-0.2	-0.5	0.0	0.2	0.3	0.2	0.0	0.1	0.2	0.2	0.0	-0.3	-0.1	-0.2	-0.1	-0.2	-0.3	-0.1	0.0	-0.2	-0.1	0.3
19-Oct	0.0	-0.3	-0.2	-0.1	0.2	0.1	0.2	0.6	0.1	0.1	0.1	0.1	-0.3	0.2	0.6	0.3	-0.4	-0.3	-0.7	-0.8	-0.4	-0.4	-0.5	-0.6	-0.1	0.6
20-Oct	-0.2	-0.6	-0.2	0.0	0.1	-0.4	-0.3	-0.2	0.0	0.2	0.3	0.3	0.5	0.1	0.4	0.3	-0.1	-0.2	-0.1	0.0	0.3	0.0	0.3	0.2	0.0	0.5
21-Oct	0.5	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	0.0	-0.1	-0.3	-0.1	0.0	0.1	-0.4	-0.2	-0.3	-0.5	-0.4	-0.3	-0.3	0.1	-0.1	-0.2	-0.2	0.5
22-Oct	-0.1	0.1	0.3	0.6	0.8	0.4	0.4	0.6	0.2	0.1	0.2	0.1	0.2	-0.1	-0.5	-0.8	-0.8	-0.6	-0.6	-0.4	-0.3	-0.3	-0.1	-0.1	0.0	0.8
23-Oct	-0.3	-0.2	-0.3	0.4	0.6	0.1	0.4	0.1	0.3	0.2	0.3	0.5	0.3	-0.2	0.7	0.8	0.6	0.5	0.5	0.0	0.1	0.2	0.2	0.1	0.3	0.8
24-Oct	0.2	0.6	0.6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.1	-0.1	-0.1	0.0	-0.3	-0.2	0.0	0.1	0.0	-	0.6
25-Oct	-0.2	-0.1	0.2	0.2	-0.1	-0.2	-0.5	-0.6	-0.6	-0.3	0.0	-0.2	0.0	0.5	0.2	-0.1	-0.1	0.6	0.5	0.5	0.1	0.7	0.2	0.2	0.0	0.7
26-Oct	0.5	0.7	0.4	0.4	0.3	0.2	0.0	0.3	0.0	0.0	0.2	0.3	0.1	0.1	-0.2	0.0	0.4	-0.5	-0.5	-0.5	-0.4	-0.3	-0.1	-0.4	0.1	0.7
27-Oct	-0.2	-0.2	0.4	0.7	0.1	0.6	0.7	-0.3	-0.1	0.2	0.0	-0.1	0.1	0.6	0.3	-0.1	-0.2	0.0	0.1	0.2	0.2	0.3	0.4	0.1	0.2	0.7
28-Oct	0.2	0.3	0.3	0.0	0.2	0.2	0.3	0.2	0.2	0.5	0.5	0.2	-0.1	0.0	0.0	0.7	-0.1	0.4	-0.1	-0.3	1.0	0.5	0.6	0.7	0.3	1.0
29-Oct	0.3	-0.1	-0.3	0.1	0.9	0.2	0.1	0.2	0.3	0.0	0.6	0.4	0.5	0.3	0.2	0.2	0.2	-0.1	-0.3	0.6	0.3	0.6	-0.4	-0.2	0.2	0.9
30-Oct	-0.1	-0.2	-0.2	0.0	-0.4	-0.1	-0.1	0.2	-0.3	-0.4	-0.3	-0.5	0.0	-0.2	0.2	0.1	-0.5	-0.4	-0.1	0.0	-0.2	-0.3	-0.1	-0.4	-0.2	0.2
31-Oct	-0.6	-0.5	-0.6	-0.4	-0.5	-0.5	-0.4	-0.4	-0.1	-0.2	0.0	0.3	0.4	0.1	0.2	0.3	0.4	0.5	0.4	0.4	0.4	0.1	-0.4	-0.1	-0.1	0.5
																								Diurnal Average		
																								Diurnal Maximum		
0.0 0.0 -0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.2 0.1 0.0 0.1 0.0 0.0 -0.1 -0.1 0.0 0.0 0.0 -0.1																										
0.8 0.9 0.6 0.7 0.9 0.6 0.7 0.6 0.3 0.6 0.8 0.8 1.1 0.6 0.7 0.8 0.6 0.6 0.5 0.6 1.0 0.7 0.6 0.7																										
AF - Analyzer Failure																										



Summary of Hour Standard Deviations

Mannix - October 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.9 km/h on Oct 1 21:00 Minimum Value: 0.2 km/h on Oct 5 01:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 1.0 Median = 1.5 Q <sub>3</sub> = 2.0 P <sub>90</sub> = 2.5 P <sub>99</sub> = 3.3																								Hours in Service: 744 Hours of Data: 732 Hours of Missing Data: 12 Hours of Calibration: 0 Percent Operational Time: 98.4	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	1.7	1.9	1.6	0.9	1.3	1.5	1.1	1.5	1.6	2.0	1.6	1.6	1.4	1.5	2.0	2.3	2.1	2.7	3.1	3.2	3.9	3.5	2.8	2.7	3.9
2-Oct	1.7	1.6	2.1	2.1	2.3	2.2	3.2	3.1	2.5	2.7	3.7	3.2	3.2	3.2	3.2	2.9	3.0	2.9	2.4	2.2	2.3	2.3	1.8	1.3	3.7
3-Oct	1.3	1.3	1.0	0.6	0.5	0.4	0.4	0.8	0.9	1.2	1.4	1.4	2.4	2.1	2.2	1.8	2.2	1.9	2.7	2.3	1.7	1.7	2.3	2.0	2.7
4-Oct	2.0	1.6	1.6	1.3	0.5	0.3	0.3	0.3	0.2	0.9	1.2	1.6	1.5	1.4	1.5	1.2	1.0	0.6	0.7	0.5	0.4	0.3	0.2	0.2	2.0
5-Oct	0.2	0.2	0.5	0.3	0.5	0.6	1.0	1.1	1.6	1.7	1.5	2.1	1.8	2.0	2.4	2.2	1.6	1.5	1.6	2.0	1.4	1.6	1.4	1.1	2.4
6-Oct	0.8	1.0	1.0	0.9	0.7	1.3	1.2	1.1	1.0	1.3	1.3	1.4	1.6	2.2	1.8	1.8	1.4	2.0	2.1	2.4	1.9	1.8	1.2	0.9	2.4
7-Oct	1.5	1.8	2.0	1.7	1.7	1.6	2.0	1.8	2.1	2.6	2.5	2.7	2.8	2.9	2.4	1.8	1.5	1.0	0.6	1.3	1.4	1.6	0.5	0.4	2.9
8-Oct	0.2	0.7	0.5	1.0	1.1	0.5	1.0	0.5	0.8	1.0	1.1	1.5	2.2	2.3	1.9	1.8	1.1	1.4	1.0	0.6	1.4	1.7	2.0	1.9	2.3
9-Oct	1.8	1.5	1.2	0.9	1.2	1.3	1.5	1.1	1.7	1.7	2.2	2.3	2.4	2.1	2.0	1.5	1.9	2.1	2.0	2.3	1.8	1.8	1.5	1.6	2.4
10-Oct	1.6	1.8	1.7	1.3	0.8	0.9	1.5	0.5	1.0	1.2	2.0	1.8	2.0	2.4	1.9	1.7	1.2	0.9	0.8	1.2	1.6	1.1	0.8	0.9	2.4
11-Oct	0.8	1.0	1.2	1.2	1.5	1.8	2.5	2.6	3.0	3.1	2.7	2.7	2.8	3.2	3.0	3.1	2.5	1.2	0.8	0.7	1.0	1.6	2.6	2.2	3.2
12-Oct	1.7	1.8	2.0	1.8	1.4	0.6	0.7	0.5	0.7	1.4	1.6	1.9	2.3	2.1	2.2	2.0	1.6	2.0	2.1	1.6	1.5	1.5	1.5	0.8	2.3
13-Oct	0.6	0.4	0.3	0.4	0.6	0.4	0.3	0.3	0.5	1.5	1.6	1.2	1.3	2.0	1.6	1.3	0.8	0.4	1.0	1.7	1.7	1.9	1.8	1.8	2.0
14-Oct	2.2	2.2	2.1	2.5	2.7	3.0	1.7	1.8	1.1	1.7	1.7	2.0	2.5	1.5	0.7	1.0	0.6	0.5	0.2	1.1	2.1	1.5	1.6	1.4	3.0
15-Oct	1.5	2.2	1.6	1.1	0.9	0.7	1.0	1.2	1.6	2.2	1.8	2.3	2.2	2.8	2.5	2.4	2.1	1.3	1.5	1.7	1.3	0.8	0.6	0.4	2.8
16-Oct	0.3	0.4	0.7	1.6	1.1	0.7	0.7	1.0	1.0	1.1	1.8	1.8	2.1	2.2	1.8	1.4	0.7	1.8	2.5	2.1	1.6	1.9	2.1	1.9	2.5
17-Oct	1.2	1.2	1.5	1.0	1.2	1.2	1.1	1.2	1.2	1.8	2.4	2.4	2.9	3.0	3.4	3.5	3.6	3.4	3.3	3.2	2.9	2.5	2.5	2.3	3.6
18-Oct	2.4	2.3	2.1	1.9	1.5	1.6	0.9	0.8	0.9	0.9	1.3	1.3	1.2	1.1	0.8	0.9	0.6	1.0	0.8	0.7	0.7	0.4	0.3	0.3	2.4
19-Oct	0.6	0.2	0.2	0.3	0.5	0.5	0.4	0.5	0.8	1.0	1.5	1.7	1.4	1.9	3.0	2.8	2.1	2.4	2.6	2.7	2.3	2.5	1.9	2.4	3.0
20-Oct	2.5	2.2	1.7	1.7	1.6	1.9	1.5	1.2	1.0	1.0	1.2	1.3	1.6	1.0	1.8	1.3	0.7	0.4	0.8	0.7	1.0	0.6	0.3	0.5	2.5
21-Oct	0.6	1.0	0.7	0.7	0.4	0.6	0.8	0.9	1.2	1.0	0.9	1.5	1.1	1.9	1.9	1.5	0.6	0.5	0.3	0.3	0.7	0.8	0.3	0.3	1.9
22-Oct	0.4	0.3	0.3	0.4	0.5	0.5	0.6	0.4	0.7	0.9	1.2	1.1	0.8	1.1	1.8	1.8	2.1	2.6	2.2	2.0	1.6	1.9	1.4	1.1	2.6
23-Oct	1.1	1.0	1.6	2.1	2.1	1.4	2.3	2.5	2.3	3.1	3.0	3.0	3.4	2.8	2.9	1.7	1.6	0.7	0.5	0.6	0.6	1.1	1.7	1.9	3.4
24-Oct	2.2	2.6	2.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.2	2.4	1.8	1.4	1.4	1.5	1.9	1.8	1.8	2.6
25-Oct	1.4	1.7	2.0	1.5	0.7	0.5	0.6	0.4	0.3	0.9	1.3	1.7	1.5	1.7	1.6	0.9	1.1	1.5	1.7	1.7	2.0	2.9	2.5	2.4	2.9
26-Oct	2.6	2.2	1.6	1.6	1.4	0.9	0.8	0.8	1.2	1.1	1.2	1.3	1.4	1.8	1.8	1.8	2.6	1.2	1.3	1.7	1.7	1.9	2.1	2.1	2.6
27-Oct	1.8	1.7	1.9	1.9	1.2	2.0	2.0	1.1	1.2	1.5	1.4	1.2	1.4	1.3	1.3	0.9	1.0	0.9	1.0	0.8	0.6	0.7	0.8	0.8	2.0
28-Oct	0.6	0.5	0.5	0.6	0.7	1.0	1.1	1.3	1.4	1.3	1.2	1.0	1.3	1.0	1.1	1.5	1.1	1.5	1.1	1.2	1.7	1.6	1.8	2.0	2.0
29-Oct	1.5	1.6	1.8	1.6	1.2	0.9	1.0	1.0	0.9	0.9	1.5	1.7	1.5	1.5	1.2	1.0	1.4	1.4	1.7	2.1	1.8	2.0	1.7	1.7	2.1
30-Oct	1.4	1.7	1.8	2.0	2.4	2.6	2.5	2.4	2.4	2.7	2.3	2.4	2.7	2.9	2.8	2.3	2.2	2.4	2.2	2.8	3.1	3.1	2.7	2.7	3.1
31-Oct	2.8	2.4	2.6	2.7	2.5	2.5	2.3	1.9	1.9	1.8	2.1	1.8	1.4	1.3	1.2	1.0	0.8	0.9	0.6	0.6	0.5	0.6	0.4	0.7	2.8
Diurnal Maximum																									
2.8 2.6 2.6 2.7 2.7 3.0 3.2 3.1 3.0 3.1 3.7 3.2 3.4 3.2 3.4 3.5 3.6 3.4 3.3 3.2 3.9 3.5 2.8 2.7																									
AF - Analyzer Failure																									



Maximum Value: 4.4 km/h on Oct 2 13:00		Maximum Daily Average: 3.2 km/h on Oct 2		Hours in Service:	744																					
Minimum Value: -1.7 km/h on Oct 19 19:00		Minimum Daily Average: -0.6 km/h on Oct 17		Hours of Data:	731																					
Maximum Diurnal Average: 0.7 km/h at hour 21		Minimum Diurnal Average: 0.5 km/h at hour 15		Hours of Missing Data:	13																					
Monthly Average: 0.59 km/h		Percentiles: P <sub>1</sub> = -1.4 P <sub>10</sub> = -0.6 Q <sub>1</sub> = -0.2 Median = 0.3 Q <sub>3</sub> = 1.1 P <sub>90</sub> = 2.5 P <sub>99</sub> = 3.9		Hours of Calibration:	0																					
				Percent Operational Time:	98.3																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0.0	-0.2	0.0	-0.4	0.1	-0.1	-0.2	-0.2	-0.3	-0.2	-0.1	-0.1	0.0	0.3	0.6	1.2	0.1	1.0	1.8	0.9	0.8	1.1	1.8	1.3	0.4	1.8
2-Oct	1.8	2.4	3.1	2.7	1.3	1.4	2.9	3.1	3.4	3.3	4.1	4.0	4.4	4.0	3.9	3.8	4.0	3.7	3.6	3.3	3.2	3.5	3.1	3.1	3.2	4.4
3-Oct	3.3	3.0	2.2	2.1	1.8	1.8	1.9	2.0	0.4	0.2	-0.3	-0.9	-0.4	-0.2	0.4	0.4	-0.3	0.0	0.4	1.3	0.7	-0.7	-1.0	-1.5	0.7	3.3
4-Oct	-0.3	-0.6	0.2	0.4	0.5	0.3	0.1	0.0	0.0	0.2	0.0	-0.1	0.4	0.5	0.5	0.8	0.6	0.2	0.2	0.3	1.0	1.1	0.9	0.6	0.3	1.1
5-Oct	0.6	0.4	0.6	0.5	0.4	0.5	0.5	0.4	0.7	0.5	1.0	1.3	0.9	0.8	0.6	0.5	0.3	0.5	-0.1	-0.3	0.4	0.0	-0.2	0.1	0.4	1.3
6-Oct	0.0	0.4	-0.1	0.0	0.2	0.3	-0.2	0.0	0.1	0.2	0.0	0.9	1.6	1.8	0.9	0.8	1.4	2.7	2.7	3.7	3.3	3.1	2.9	2.4	1.2	3.7
7-Oct	2.6	3.5	3.9	3.8	3.1	3.1	3.3	2.6	2.9	1.9	2.5	1.5	1.2	1.2	0.8	0.1	0.2	0.0	-0.3	-0.2	-0.4	-0.1	0.4	0.8	1.6	3.9
8-Oct	0.8	-0.1	0.2	-0.1	-0.1	0.0	-0.3	-0.1	-0.1	-0.2	-0.2	0.1	0.3	-0.5	-0.6	-0.4	0.3	0.2	0.3	0.6	0.2	-0.9	-0.6	-1.1	-0.1	0.8
9-Oct	-0.5	-0.6	-0.6	-0.9	-0.5	-0.1	0.1	-0.6	-0.2	-0.9	-0.3	-0.3	0.0	-0.7	-0.3	0.3	-0.1	-0.7	-0.9	-0.8	-1.0	-0.9	-1.1	-1.2	-0.5	0.3
10-Oct	-1.1	-0.8	-1.4	-1.1	-0.4	-0.7	-0.7	0.3	0.0	0.5	1.0	0.9	0.8	1.0	0.6	0.9	1.3	1.3	1.4	1.5	1.8	1.6	1.0	1.4	0.5	1.8
11-Oct	0.6	0.3	0.4	0.6	1.4	2.1	2.6	2.6	2.6	3.1	2.9	2.6	3.2	3.3	2.2	2.7	2.8	2.2	2.0	2.1	2.0	2.4	3.4	2.9	2.2	3.4
12-Oct	2.5	2.5	2.2	2.8	3.1	2.6	2.1	2.1	1.6	1.2	1.0	1.9	1.5	1.5	1.7	1.8	1.7	2.6	3.1	2.4	2.6	2.3	2.4	2.0	2.1	3.1
13-Oct	1.5	1.4	1.6	1.2	1.3	1.3	0.3	0.3	0.2	0.3	0.3	0.0	-0.2	0.4	-0.3	0.0	0.7	0.2	-0.3	-0.5	-0.2	0.0	0.0	-0.1	0.4	1.6
14-Oct	-0.1	0.1	-0.1	-0.2	-0.6	-0.8	-0.1	-0.2	-0.3	-0.4	-0.2	0.1	0.3	-0.4	-0.2	0.4	0.3	0.9	0.5	0.9	2.6	2.2	2.6	2.3	0.4	2.6
15-Oct	2.4	3.1	2.5	1.6	1.1	1.5	1.9	2.2	1.9	2.0	1.6	1.0	0.7	1.3	1.3	1.6	1.2	0.8	1.1	1.2	0.5	0.1	0.2	0.0	1.4	3.1
16-Oct	0.0	-0.1	-0.1	-0.1	0.1	-0.1	0.2	0.2	0.0	0.4	0.4	0.2	1.0	0.0	-0.9	-0.3	-0.2	-0.1	-1.0	-0.6	-0.3	-0.2	-0.9	-0.8	-0.1	1.0
17-Oct	-0.4	-0.6	-0.8	-0.8	-1.1	-1.0	-1.1	-0.3	-0.4	-0.4	-0.7	-0.6	0.3	-0.4	-0.4	-0.4	-0.7	-0.3	-0.1	-0.1	-0.3	-1.1	-1.0	-1.0	-0.6	0.3
18-Oct	-1.3	-1.4	-0.6	-0.6	-0.6	-1.1	0.3	0.6	0.8	0.3	0.3	0.1	0.1	0.4	0.4	0.4	0.7	0.9	2.0	2.2	2.6	2.5	2.7	2.3	0.6	2.7
19-Oct	1.0	1.5	2.1	2.4	1.2	-0.1	0.2	0.8	0.4	0.1	0.0	0.2	-0.6	-0.3	-0.3	-0.6	-1.3	-0.7	-1.7	-1.7	-1.3	-1.1	-1.0	-1.5	-0.1	2.4
20-Oct	-0.8	-1.4	-0.9	-0.3	-0.3	-0.4	-0.5	-0.2	0.0	0.6	0.7	0.6	0.7	0.3	0.8	0.5	0.4	0.1	-0.3	-0.3	-0.2	0.1	0.7	0.9	0.0	0.9
21-Oct	1.3	0.7	0.8	1.7	2.4	1.8	2.6	2.3	2.0	0.9	0.9	1.0	1.1	1.3	1.6	1.6	0.7	0.9	1.0	1.2	0.9	0.3	0.2	0.6	1.2	2.6
22-Oct	0.4	0.3	0.3	0.5	1.4	1.2	1.0	1.5	0.9	0.0	-0.3	0.2	0.3	-0.3	-1.3	-1.6	-1.6	-1.4	-0.8	-0.2	0.0	0.0	0.3	0.4	0.1	1.5
23-Oct	-0.4	-0.5	-1.0	-0.2	0.0	-0.2	-0.3	-0.8	-0.4	-0.7	-0.5	-0.4	-0.5	-1.0	-0.3	0.2	0.2	0.3	0.4	0.1	0.7	2.0	2.9	3.4	0.1	3.4
24-Oct	3.6	4.1	4.0	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.5	2.6	2.2	2.1	2.1	2.6	2.5	2.6	-	4.1
25-Oct	2.2	2.3	2.5	2.1	1.9	1.1	0.9	0.7	0.9	0.5	0.0	0.1	0.1	0.5	0.6	-0.1	-0.4	0.0	-0.1	0.0	-0.5	-0.3	-0.6	-0.6	0.6	2.5
26-Oct	-0.3	0.1	-0.2	-0.3	0.0	-0.1	0.1	0.1	-0.1	0.2	0.5	0.5	0.2	0.0	0.0	0.2	0.7	-0.2	-0.2	-0.2	-0.1	-0.1	0.1	0.0	0.0	0.7
27-Oct	0.0	0.3	1.2	1.1	0.3	0.9	1.0	-0.2	0.1	0.4	0.1	-0.1	0.5	1.0	0.4	0.5	0.4	0.3	0.4	0.2	0.2	0.0	0.1	-0.2	0.4	1.2
28-Oct	0.5	0.7	0.6	0.4	0.5	0.3	0.5	0.4	0.5	0.9	0.9	0.5	0.0	0.1	-0.1	0.2	-0.2	-0.1	-0.4	-0.6	0.4	0.1	0.0	0.0	0.3	0.9
29-Oct	-0.2	-0.5	-0.7	-0.4	0.6	0.0	-0.1	-0.1	-0.1	-0.1	0.2	0.0	0.2	-0.1	-0.1	-0.2	-0.2	-0.6	-0.9	-0.1	-0.3	0.0	-0.9	-0.3	-0.2	0.6
30-Oct	-0.1	-0.2	0.2	0.3	-0.2	0.3	0.2	0.4	-0.3	-0.4	-0.3	-0.5	0.2	0.2	0.6	0.6	-0.6	-0.5	0.2	0.4	0.2	-0.2	0.2	-0.1	0.0	0.6
31-Oct	-0.3	-0.6	-0.9	-0.6	-0.6	-0.7	-0.5	-0.5	0.0	-0.1	0.3	0.5	0.7	0.4	0.6	0.7	1.0	1.1	1.2	1.0	0.9	0.8	0.2	0.6	0.2	1.2
																								Diurnal Average		
																								Diurnal Maximum		
																								0.6		
																								3.6		

AF - Analyzer Failure



Summary of Hour Standard Deviations

Mannix - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 3.9 km/h on Oct 1 21:00			Hours of Data:	731
Minimum Value: 0.2 km/h on Oct 4 09:00			Hours of Missing Data:	13
Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 0.9 Median = 1.4 Q <sub>3</sub> = 2.0 P <sub>90</sub> = 2.5 P <sub>99</sub> = 3.5			Hours of Calibration:	0
			Percent Operational Time:	98.3

Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1.7	1.9	1.8	0.9	1.4	1.5	1.1	1.5	1.5	1.6	1.5	1.5	1.3	1.5	2.1	2.2	2.0	2.9	3.1	3.1	3.9	3.4	3.2	2.6	3.9	
2-Oct	1.8	1.6	2.1	2.2	2.5	2.4	3.1	3.2	2.4	2.7	3.6	3.1	3.2	3.2	3.0	2.8	2.9	2.7	2.3	2.2	2.1	2.2	1.7	1.3	3.6	
3-Oct	1.2	1.2	1.0	0.7	0.6	0.4	0.4	1.0	0.9	1.3	1.3	1.3	2.2	2.3	2.3	1.8	2.1	1.9	2.6	2.3	1.7	1.8	2.2	2.0	2.6	
4-Oct	1.8	1.5	1.4	1.3	0.5	0.4	0.4	0.3	0.2	0.8	1.2	1.5	1.4	1.5	1.5	1.3	1.1	0.6	0.7	0.6	0.5	0.4	0.3	0.2	1.8	
5-Oct	0.2	0.2	0.4	0.4	0.5	0.6	1.1	1.2	1.6	1.7	1.5	2.1	2.0	2.0	2.3	2.2	1.5	1.4	1.7	2.1	1.5	1.7	1.5	1.1	2.3	
6-Oct	0.7	1.1	0.8	0.7	0.7	1.1	1.0	0.8	0.9	1.2	1.2	1.4	1.6	2.0	1.7	1.8	1.4	1.8	2.0	2.4	1.9	1.9	1.4	1.1	2.4	
7-Oct	1.6	1.8	2.0	1.7	1.8	1.7	2.0	1.9	1.9	2.6	2.4	2.8	2.8	2.9	2.7	1.9	1.5	1.0	0.6	1.2	1.1	1.3	0.6	0.4	2.9	
8-Oct	0.3	0.6	0.4	0.7	0.8	0.3	0.7	0.5	0.8	0.9	1.0	1.2	1.8	1.8	1.7	1.5	1.1	1.2	0.9	0.7	1.3	1.7	1.7	1.8	1.8	
9-Oct	1.7	1.4	1.1	0.8	1.2	1.3	1.4	1.0	1.7	1.8	2.1	2.2	2.4	2.1	2.0	1.6	1.6	1.9	2.2	2.3	1.8	1.7	1.1	1.3	2.4	
10-Oct	1.6	1.5	1.5	1.1	0.6	0.8	1.2	0.5	0.8	1.1	1.9	1.8	1.9	2.4	1.8	1.7	1.3	0.9	0.9	1.3	1.6	1.2	1.0	1.1	2.4	
11-Oct	0.9	1.0	1.3	1.5	1.9	2.1	2.9	3.0	3.2	3.3	3.0	2.8	2.9	3.4	3.2	3.3	2.7	1.3	1.0	1.0	1.1	1.8	2.8	2.3	3.4	
12-Oct	1.7	1.9	2.1	1.9	1.5	0.8	0.8	0.6	0.8	1.4	1.7	2.0	2.4	2.4	2.3	2.2	1.8	2.1	2.2	1.7	1.6	1.6	1.6	1.0	2.4	
13-Oct	0.7	0.5	0.6	0.7	0.9	0.6	0.4	0.4	0.5	1.4	1.7	1.1	1.2	1.8	1.4	1.5	0.8	0.4	0.8	1.4	1.5	1.7	1.5	1.4	1.8	
14-Oct	1.4	1.4	1.4	2.0	2.0	2.2	1.7	1.5	1.0	1.3	1.5	1.6	2.0	1.4	0.7	1.0	0.7	0.6	0.4	1.5	2.2	1.6	1.7	1.4	2.2	
15-Oct	1.7	2.3	1.6	1.2	0.9	0.8	1.0	1.2	1.7	2.2	1.8	2.2	2.4	2.8	2.5	2.5	2.0	1.0	1.4	1.4	1.6	0.9	0.7	0.6	2.8	
16-Oct	0.3	0.4	0.8	1.8	1.2	0.6	0.7	0.8	0.9	1.1	1.6	1.9	2.1	2.2	1.6	1.4	0.7	1.3	1.9	2.1	1.4	1.8	2.0	1.8	2.2	
17-Oct	0.9	0.8	1.2	0.7	0.9	0.9	0.9	1.0	0.9	1.4	2.4	2.3	3.0	3.0	3.5	3.5	3.6	3.6	3.3	3.5	3.0	2.5	2.5	2.4	3.6	
18-Oct	2.3	2.3	1.9	1.9	1.3	1.6	0.9	0.9	0.9	0.9	1.4	1.3	1.2	1.0	0.8	1.0	0.8	1.2	1.0	0.8	0.9	0.5	0.4	0.5	2.3	
19-Oct	0.9	0.4	0.2	0.3	1.0	0.4	0.4	0.4	0.8	1.0	1.5	1.7	1.4	1.7	2.1	2.6	2.1	2.3	2.9	2.9	2.4	2.4	1.8	2.5	2.9	
20-Oct	2.6	2.3	1.7	1.5	1.5	1.7	1.4	1.0	0.9	0.9	1.2	1.2	1.5	1.0	1.7	1.4	0.6	0.5	0.6	0.5	0.7	0.4	0.3	0.6	2.6	
21-Oct	0.5	1.2	0.8	0.9	0.5	0.8	0.9	1.2	1.4	1.1	1.1	1.5	1.3	1.8	2.1	1.6	0.7	0.5	0.3	0.3	0.7	0.9	0.3	0.5	2.1	
22-Oct	0.5	0.4	0.4	0.4	0.4	0.7	0.6	0.3	0.7	0.7	0.9	1.0	0.8	1.1	1.8	1.8	2.2	2.7	2.3	2.0	1.4	1.8	1.3	0.9	2.7	
23-Oct	0.8	0.7	1.6	1.8	1.8	1.4	1.8	1.5	1.6	2.4	2.2	2.0	2.6	2.2	2.3	1.3	1.2	0.8	0.6	0.6	0.8	1.2	1.5	1.8	2.6	
24-Oct	2.1	2.5	2.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.6	1.8	1.5	1.6	1.6	2.0	1.9	1.9	2.6
25-Oct	1.5	1.9	2.0	1.7	0.8	0.6	0.6	0.4	0.4	0.8	1.2	1.7	1.6	1.8	1.6	0.8	1.1	1.3	1.5	1.2	1.6	2.1	2.1	2.1	2.1	
26-Oct	1.9	1.8	1.4	1.4	1.4	1.0	0.8	0.8	1.3	1.3	1.2	1.3	1.3	1.8	1.8	1.8	2.5	1.1	1.3	1.6	1.6	1.9	2.3	2.2	2.5	
27-Oct	1.9	1.8	2.0	1.9	1.0	2.0	2.0	0.8	1.2	1.5	1.4	1.3	1.5	1.4	1.4	1.0	1.0	1.0	1.1	0.9	0.7	0.6	0.7	0.9	2.0	
28-Oct	0.6	0.5	0.5	0.6	0.7	0.8	1.2	1.3	1.3	1.3	1.2	1.0	1.2	0.9	1.0	1.2	0.9	1.3	1.1	1.2	1.4	1.5	1.3	1.5	1.5	
29-Oct	1.2	1.3	1.6	1.4	1.2	0.9	1.0	0.9	0.8	1.0	1.5	1.7	1.5	1.7	1.2	1.0	1.2	1.1	1.3	1.7	1.6	1.7	1.7	1.7	1.7	
30-Oct	1.3	1.7	1.7	2.0	2.3	2.5	2.6	2.4	2.3	2.7	2.2	2.4	2.7	3.1	2.9	2.3	2.2	2.4	2.2	2.9	3.2	3.2	2.8	2.7	3.2	
31-Oct	2.7	2.4	2.4	2.7	2.5	2.5	2.2	1.8	1.7	1.6	2.0	1.8	1.4	1.2	1.1	0.9	0.7	0.8	0.6	0.5	0.6	0.7	0.5	0.9	2.7	
Diurnal Maximum																								2.7		

AF - Analyzer Failure



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 9, 2014	Previous Calibration	September 16, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	13:17
Barometric Pressure	730 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Cal Gas Concentration	51 ppm	Cal Gas Expiry Date	29-May-14
Gas Cert Reference	LL107934		
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	-635	-634
Analyzer Range (mv)	5000	5000	Lamp voltage	866	865
Calculated slope	0.991708	0.998184	Chamber temp.	45.1	45.2
Calculated intercept	1.019064	0.264929	Pressure (mmHg)	701.0	700.1
Analyzer Background	7.5	6.9	Flow (lpm)	0.478	0.480
Analyzer Coefficient	1.001	0.992	Intensity	91	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	-0.4	NA
as found span	5000	58.8	599.8	609.1	0.985
calibrator zero	5000	0.0	0.0	-0.2	0.000
high point	5000	58.8	599.8	600.0	1.000
second point	5000	29.4	299.9	302.0	0.993
third point	5000	14.7	149.9	148.6	1.009
calibrator zero					
as left zero	5000	0.0	0.0	0.3	0.000
as left span	5000	58.8	599.8	599.6	1.000
Average Correction Factor					1.001

Corrected As found 609.5 Previous response 603.8 % change -0.9%

#### Notes:

Small adjustments to zero and span. Filter changed after As Finds.

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

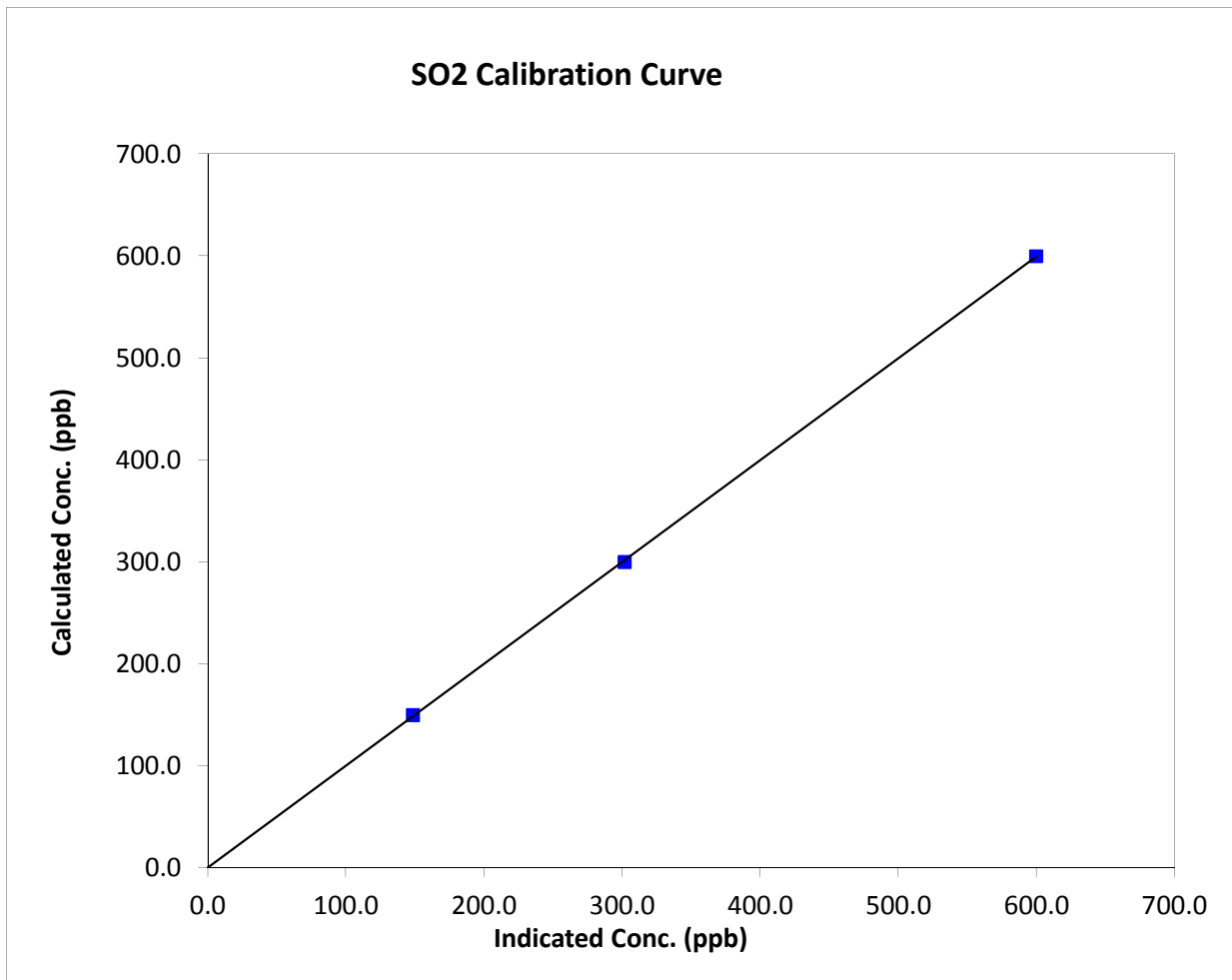
## SO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	October 9, 2014	Previous Calibration	September 16, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:45	End Time (MST)	13:17
Analyzer make	TEI 43i	Analyzer serial #	1008841399

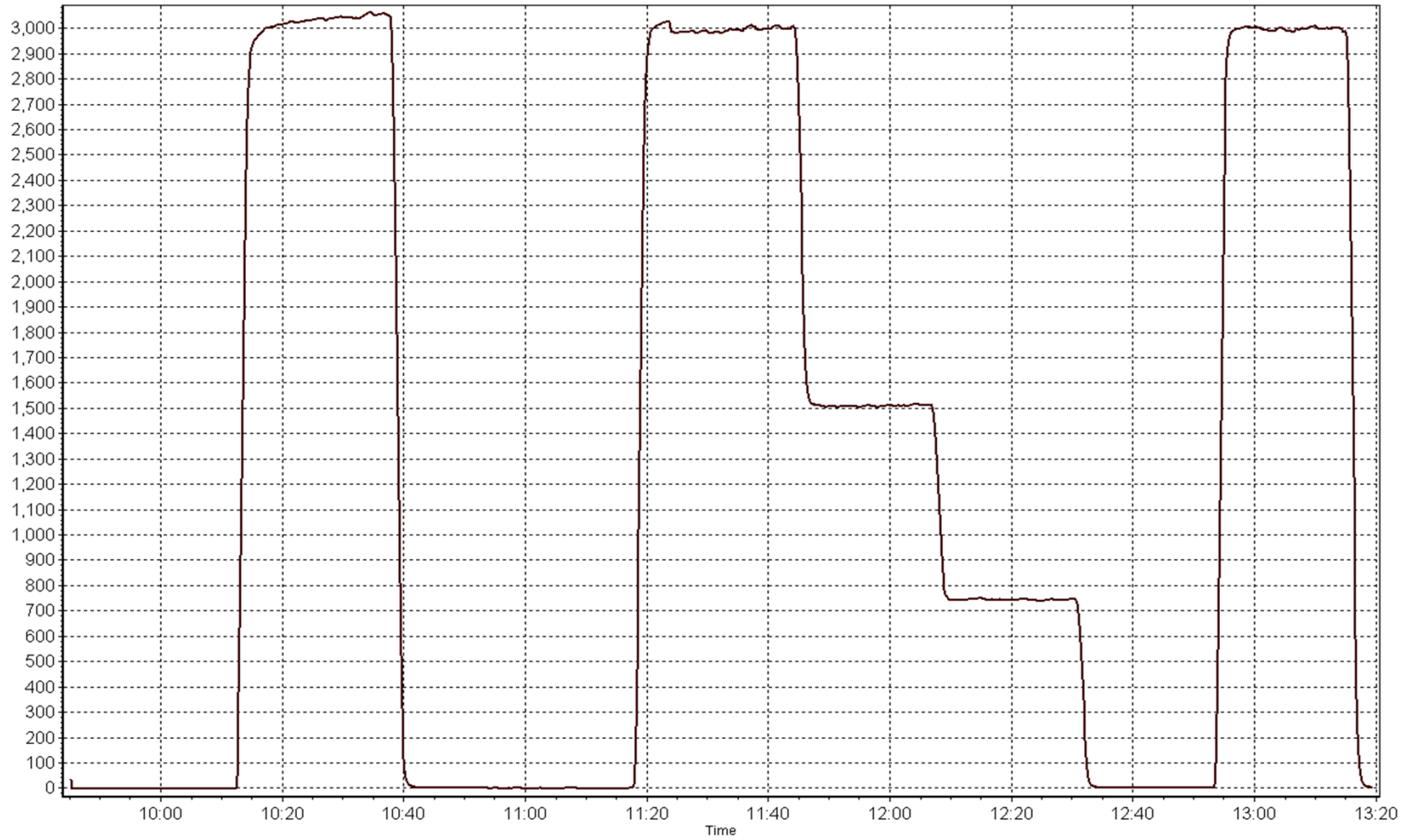
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999972
599.8	600.0	0.9996		
299.9	302.0	0.9930	Slope	0.998184
149.9	148.6	1.0090		
			Intercept	0.264929



SO2 Calibration Plot

Date: October 9, 2014





# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	October 8, 2014	Previous Calibration	September 17, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	14:10
Barometric Pressure	725 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11061107
Cal Gas Concentration	10.2 ppm H2S	Cal Gas Expiry Date	30-May-13
Gas Cert Reference	LL155272	SO2 gas conc.	51.0 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 (mv)	5000	5000	Lamp voltage	880	880
Calculated slope	1.006095	1.004700	Chamber temp.	45	45
Calculated intercept	-0.044564	-0.031345	Pressure	515.6	517.1
Analyzer Background	14.3	14.4	Flow	1.063	1.063
Analyzer Coefficient	1.117	1.12	Intensity (%)	115	115
			Converter temp.	325	325

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	0.46	NA
as found span	5000	36.8	75.1	75.3	0.997
SO2 scrubber check	5000	29.4	299.9	1.8	NA
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	36.8	75.1	74.7	1.005
second point	5000	20.6	42.0	41.9	1.003
third point	5000	12.3	25.1	25.0	1.002
calibrator zero					
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	36.8	75.1	74.4	1.009
Average Correction Factor					1.003

Corrected As found	74.8	Previous response	74.7	% change	-0.2%
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#### Notes:

Small adjustment to zero and span. Filter changed after As Finds, Scrubber Check after third point

Calibration Performed By:

Ryan Power





# Wood Buffalo Environmental Association

## H2S Calibration Summary

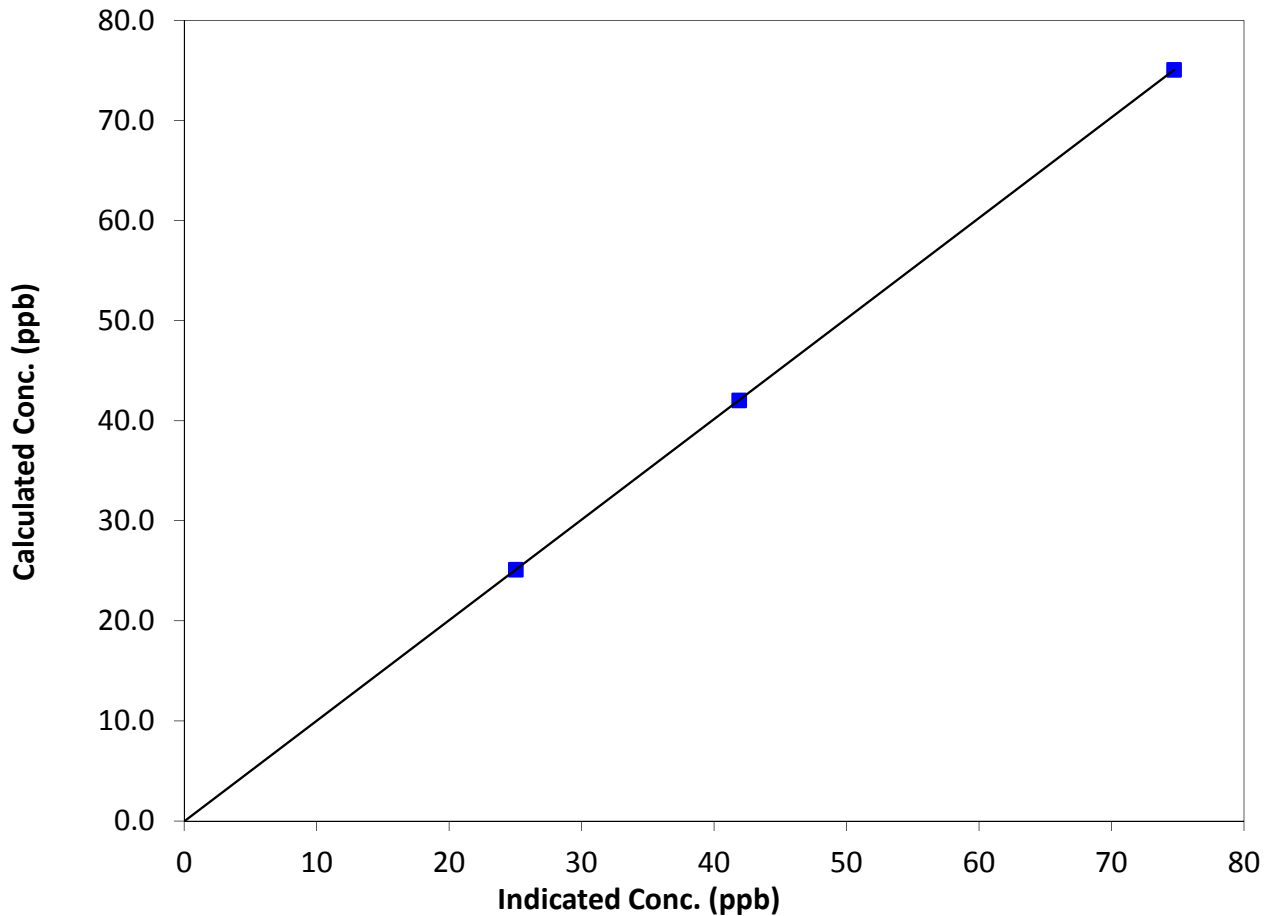
### Station Information

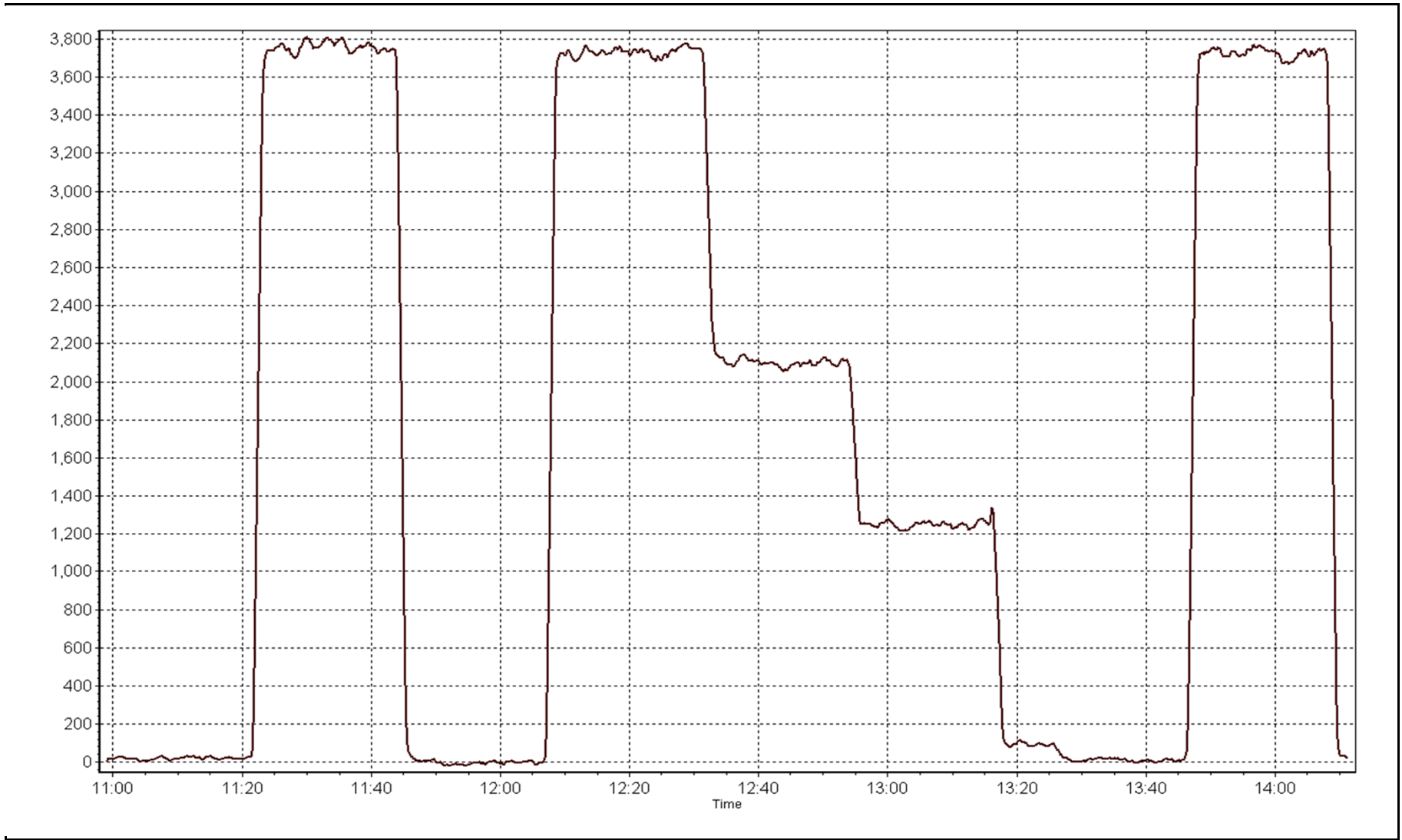
Calibration Date	October 8, 2014	Previous Calibration	September 17, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:00	End Time (MST)	14:10
Analyzer make	TEI 450i	Analyzer serial #	815129108

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999998
75.1	74.7	1.0047		
42.0	41.9	1.0030	Slope	1.004700
25.1	25.0	1.0024		
			Intercept	-0.031345

### H2S Calibration Curve







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Thursday, October 09, 2014	Previous Calibration	Friday, September 26, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	13:15
Barometric Pressure	740 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Gas Cert Reference	LL107934	Cal Gas Expiry Date	29-May-14
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1081.5 ppm
C3H8 Cal Gas Conc.	206 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	11.6
Analyzer Range (mv)	5000	5000	Air	42.3	42.3
Calculated slope	1.001750	1.000778	Fuel Pressure	20.2	20.2
Calculated intercept	-0.013533	-0.014870	Detector Temp	125.0	125.1
Bkg	1.95	2.04	Flame Temp	165.2	165.5
Slope	1.705	1.792			

Analyzer make TEI 51i-LT Analyzer serial # 1317958295

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.05	N/A
as found span	5000	58.8	12.72	12.07	1.054
calibrator zero	5000	0.0	0.00	0.02	N/A
high point	5000	58.8	12.72	12.73	0.999
2nd point	5000	29.4	6.36	6.37	0.998
3rd point	5000	14.7	3.18	3.18	1.001
calibrator zero					
as left zero	5000	0.0	0.00	0.03	N/A
as left span	5000	58.8	12.72	12.80	0.994
Average Correction Factor					0.999

Corrected As found 12.12 Previous response 12.71 % change 4.9%

#### Notes:

Small adjustments to zero and span. Filter changed after As Finds.

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

## THC Calibration Summary

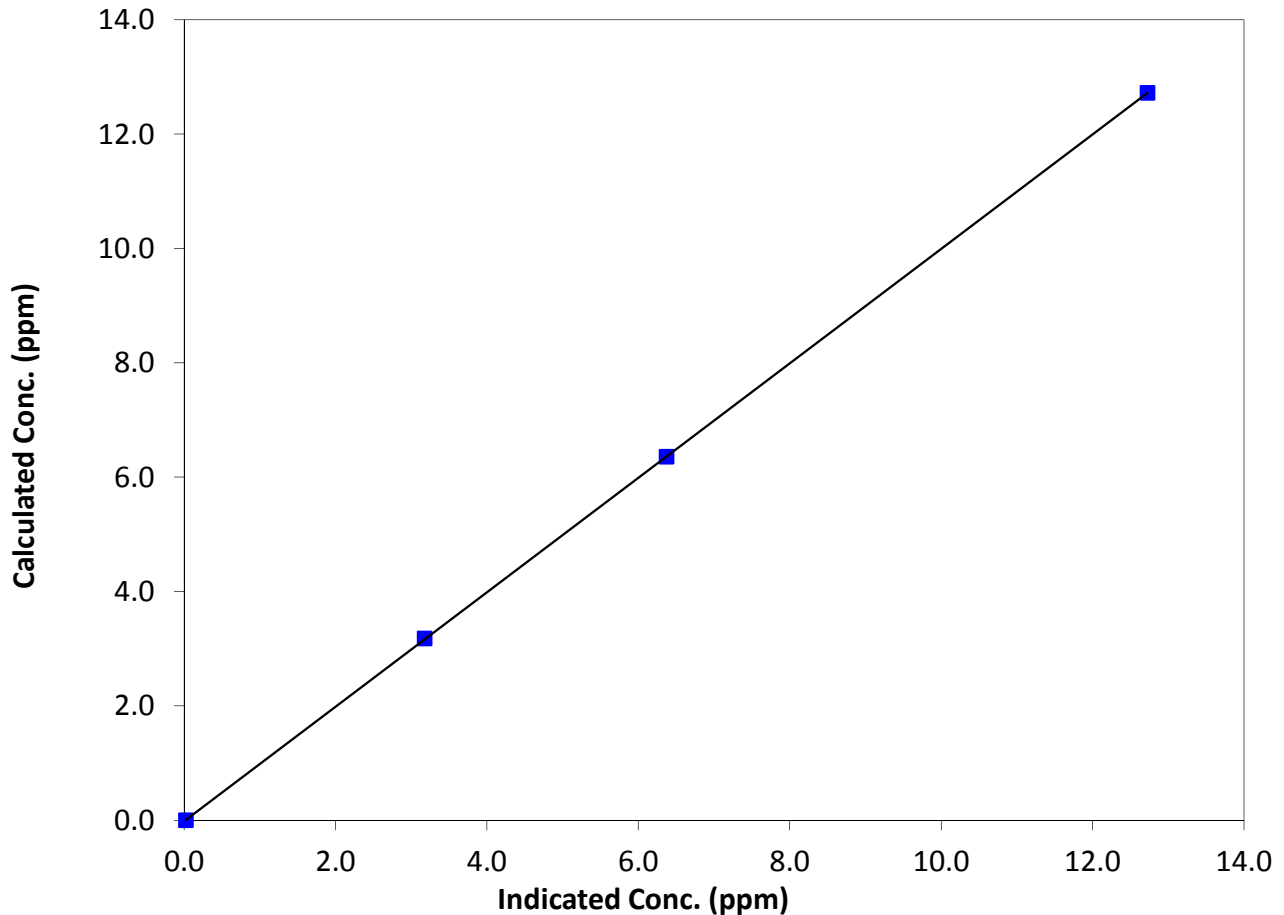
### Station Information

Calibration Date	October 9, 2014	Previous Calibration	September 26, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:45	End Time (MST)	13:15
Analyzer make	TEI 51i-LT	Analyzer serial #	1317958295

### Calibration Data

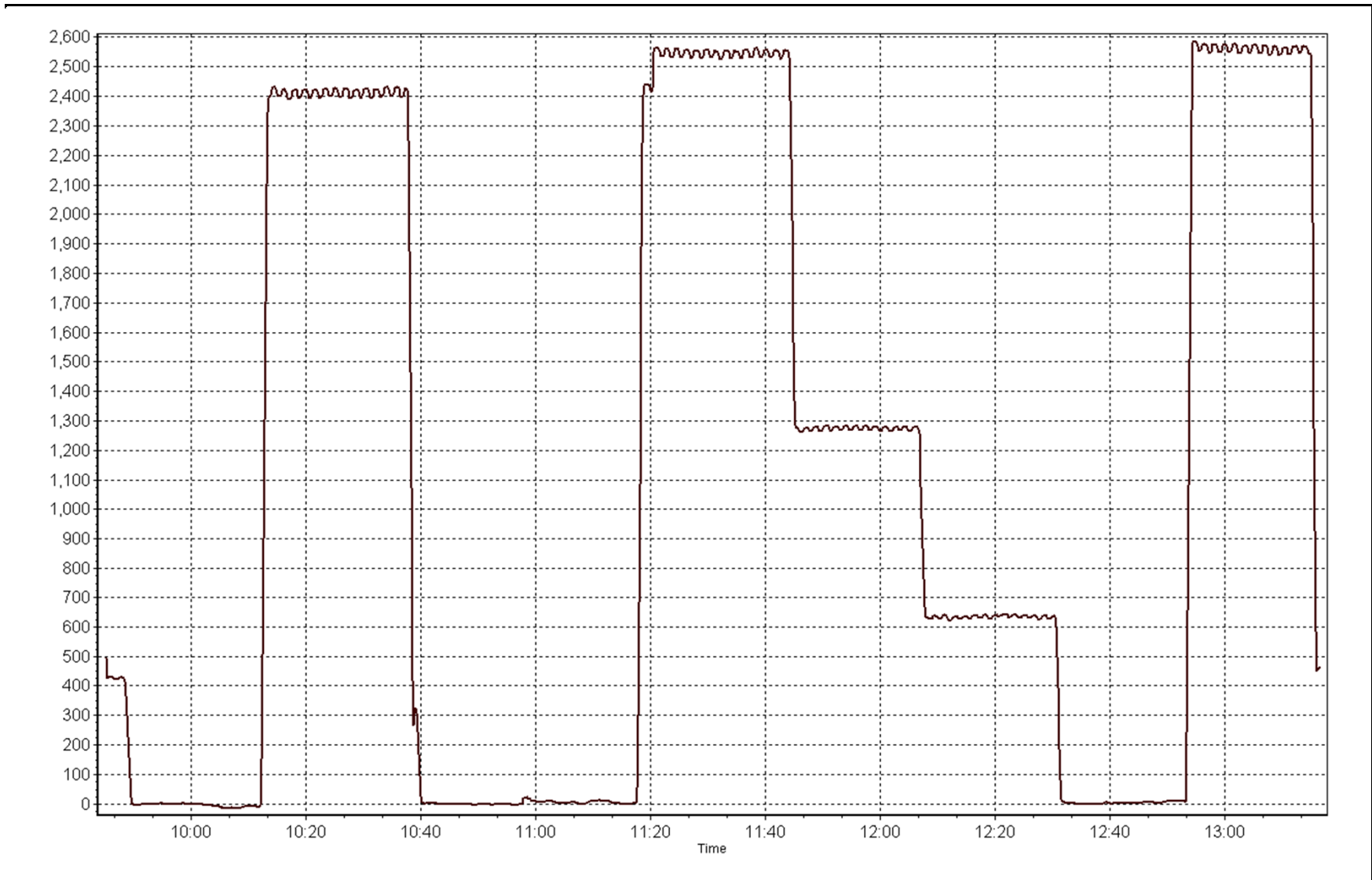
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	N/A	Correlation Coefficient	0.999996
12.72	12.73	0.9995		
6.36	6.37	0.9978	Slope	1.000778
3.18	3.18	1.0009		
			Intercept	-0.014870

THC Calibration Curve



THC Calibration Plot

Date: October 9, 2014



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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 6**  
**PATRICIA MCINNES**  
**OCTOBER 2014**

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

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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)  
OCTOBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	36	36	100.00	23	0	5	0
TRS (ppb) Average	706	36	38	99.73	1	0	1	0
THC (ppm) Average	708	36	36	100.00	2.3	-	2.1	-
NMHC(ppm) Average	708	36	36	100.00	0.071	-	0.005	-
CH4(ppm) Average	708	36	36	100.00	2.3	-	2.1	-
O3 (ppb) Average	707	35	37	99.73	41	0	31	-
NO2 (ppb) Average	708	36	36	100.00	23	0	8	-
NO (ppb) Average	708	36	36	100.00	32	-	6	-
NOX (ppb) Average	708	36	36	100.00	47	-	14	-
NH3 (ppb) Average	672	39	72	95.56	0	0	0	-
PM2.5 (ug/m3) Average	713	0	31	95.83	35.5	-	8.9	0
Temperature 2 m (C) Average	744	0	0	100.00	22.5	-	12.1	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	-	-
Wind Speed 10 m (km/h) Average	742	0	2	99.73	26	-	-	-
Wind Direction 10 m (deg) Average	742	0	2	99.73	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.5	2	-	0	0	0	0	0	1	23
TRS (ppb) Average	706	0.4	0	-	0	0	0	0	0	1	1
THC (ppm) Average	708	1.96	0.1	-	1.9	1.9	1.9	1.9	2	2	2.3
NMHC(ppm) Average	708	0.001	0.005	-	0	0	0	0	0	0	0.071
CH4(ppm) Average	708	1.96	0.1	-	1.9	1.9	1.9	1.9	2	2	2.3
O3 (ppb) Average	707	16.8	8	-	2	7	11	16	22	29	41
NO2 (ppb) Average	708	4.5	4	-	0	0	1	3	6	10	23
NO (ppb) Average	708	1.7	3	-	0	0	0	1	2	4	32
NOX (ppb) Average	708	6.2	7	-	0	1	2	4	8	14	47
NH3 (ppb) Average	672	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	713	3.58	4.1	-	0.1	0.5	1.2	2.4	4.4	7.5	35.5
Temperature 2 m (C) Average	744	4.89	4.9	-	-4.5	-0.6	0.6	4.4	7.9	11.6	22.5
Relative Humidity (%) Average	744	76.2	16	-	32	52	65	80	89	94	97
Wind Speed 10 m (km/h) Average	742	10.1	5	-	0	4	6	10	13	17	26
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	07 Oct 2014 12:00	07 Oct 2014 13:00	2	Maintenance - sample manifold cleaned, replace glass
O3	07 Oct 2014 12:00	07 Oct 2014 13:00	2	Maintenance - sample manifold cleaned, replace glass
NH3	01 Oct 2014 10:00	31 Oct 2014 10:00	31	Stabilization after daily span
NH3	07 Oct 2014 12:00	07 Oct 2014 13:00	2	Maintenance - sample manifold cleaned, replace glass
PM2.5	02 Oct 2014 01:00	02 Oct 2014 04:00	4	Intermittent unstable operation - excessive baseline drift
PM2.5	02 Oct 2014 10:00	02 Oct 2014 12:00	3	Intermittent unstable operation - excessive baseline drift
PM2.5	02 Oct 2014 15:00	02 Oct 2014 15:00	1	Intermittent unstable operation - excessive baseline drift
PM2.5	02 Oct 2014 23:00	02 Oct 2014 23:00	1	Intermittent unstable operation - excessive baseline drift
PM2.5	12 Oct 2014 12:00	12 Oct 2014 14:00	3	Intermittent unstable operation - excessive baseline drift
PM2.5	12 Oct 2014 21:00	12 Oct 2014 23:00	3	Intermittent unstable operation - excessive baseline drift
PM2.5	15 Oct 2014 03:00	15 Oct 2014 16:00	14	Intermittent unstable operation - excessive baseline drift
PM2.5	16 Oct 2014 10:00	16 Oct 2014 11:00	2	Flow and zero reference checks, sample head cleaning
Wind Speed, Wind Direction	02 Oct 2014 09:00	02 Oct 2014 09:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	08 Oct 2014 13:00	08 Oct 2014 13:00	1	Maintenance - sensor calibration and alignment check

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 23 ppb on Oct 5 00:00	Maximum Daily Average: 5.0 ppb on Oct 4		Hours of Data:	708
Minimum Value: 0 ppb on Oct 26 21:00	Minimum Daily Average: 0.1 ppb on Oct 26		Hours of Missing Data:	36
Maximum Diurnal Average: 1.1 ppb at hour 17	Minimum Diurnal Average: 0.2 ppb at hour 6		Hours of Calibration:	36
Monthly Average: 0.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 8		Percent Operational Time:	100.0

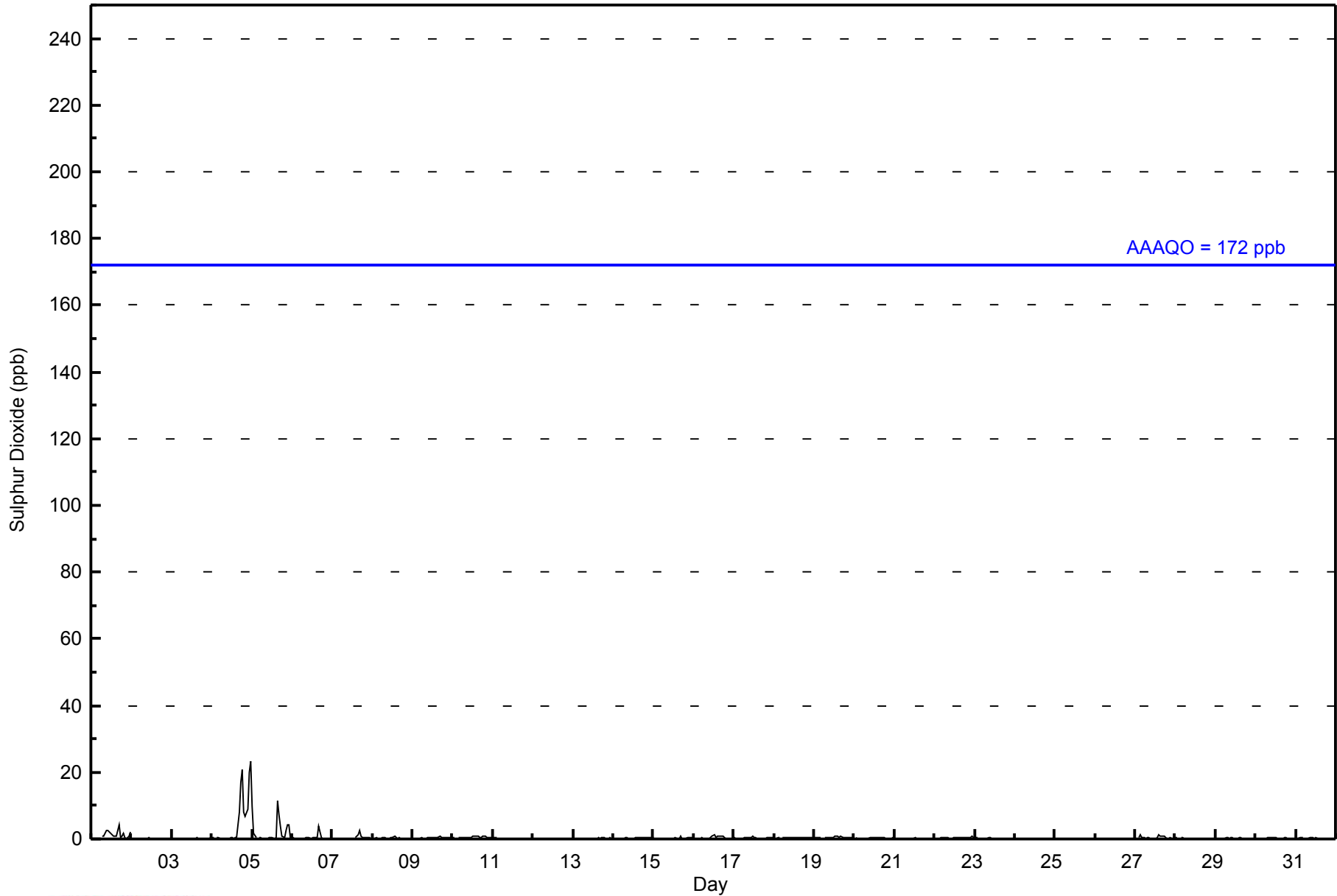
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	0	Z	1	1	2	2	2	2	1	1	1	1	4	0	1	2	0	0	1	2	1.1	4	
2-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
3-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
4-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	8	17	21	8	7	9	20	23	5.0	23	
5-Oct	10	2	0	Z	0	0	0	0	0	0	0	0	0	0	0	11	7	4	1	0	2	4	4	1	2.2	11	
6-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0.4	4	
7-Oct	0	0	0	0	0	Z	0	0	0	C	C	C	C	C	0	1	2	1	0	0	0	0	0	0	0.4	2	
8-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1	
9-Oct	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0.4	1	
10-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	1	0	0	1	0	0.5	1	
11-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
12-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
13-Oct	0	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	
14-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1	
15-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1	
16-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1	
17-Oct	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
18-Oct	0	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	
19-Oct	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1	
20-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1	
21-Oct	0	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	
22-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
23-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
24-Oct	0	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	
25-Oct	0	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	
26-Oct	Z	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	
27-Oct	0	Z	1	1	1	0	0	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0.4	1	
28-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
29-Oct	0	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	
30-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
31-Oct	0	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	
	0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.7	1.1	1.0	0.9	0.5	0.5	0.6	1.0	1.0	Diurnal Average	
	10	2	1	1	1	0	1	1	2	2	2	2	2	1	1	1	11	8	17	21	8	7	9	20	23	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  
Patricia McInnes - October 2014





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Patricia McInnes - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	703	99.29	99.29
11 - 20	3	0.42	99.72
21 - 60	2	0.28	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Patricia McInnes - October 2014**

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	20	12	16	41	145	79	33	28	23	47	60	65	44	19	24	701
11 - 20	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
21 - 60	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	21	12	16	41	145	79	33	28	23	47	61	66	44	19	24	706

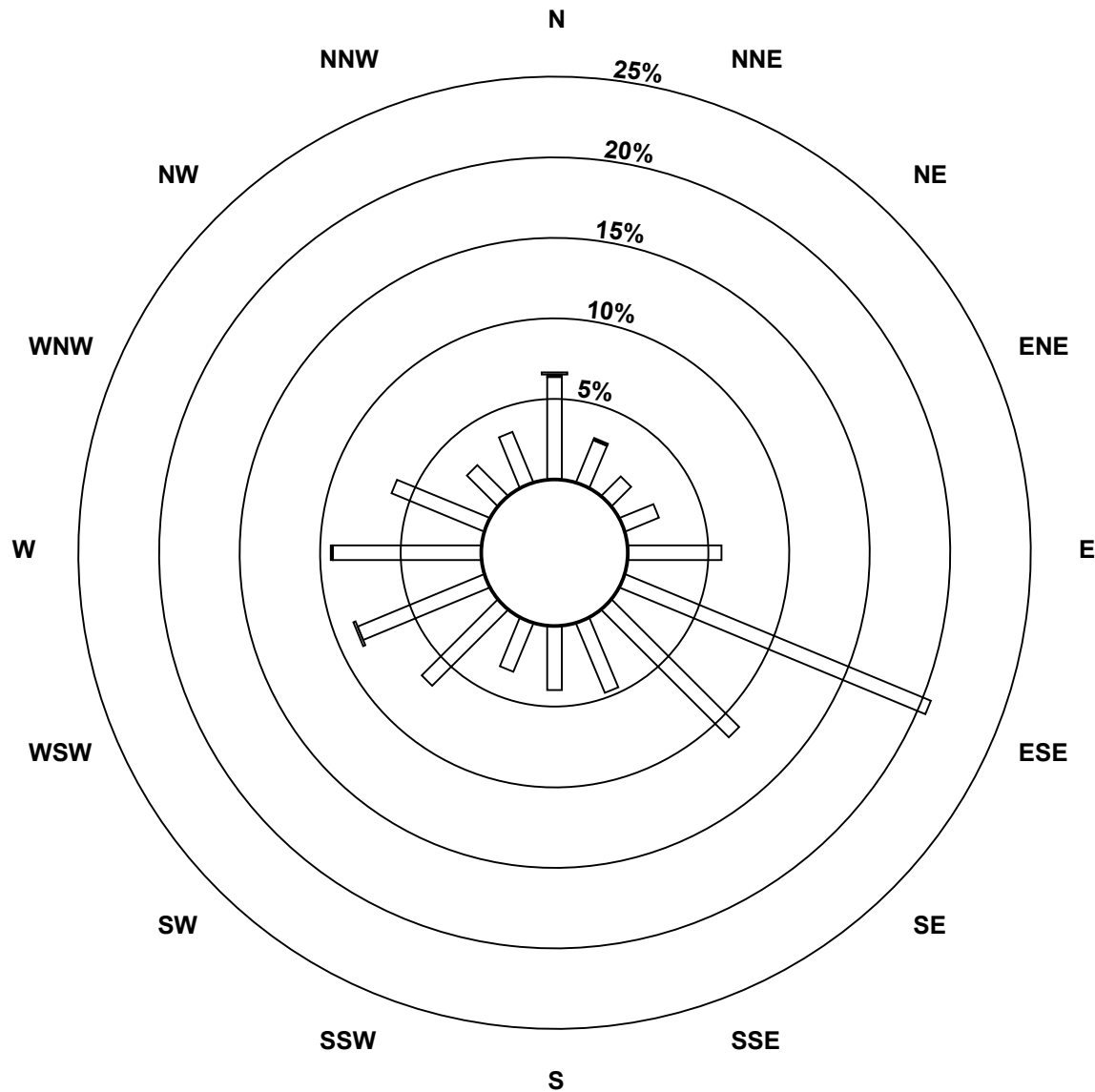
Total Number of Valid Hours: 706

Total Number of Hours: 744

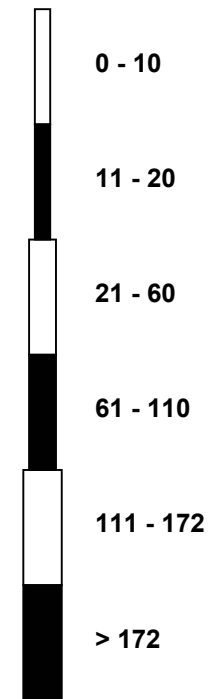


**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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



**Classes (ppb)**

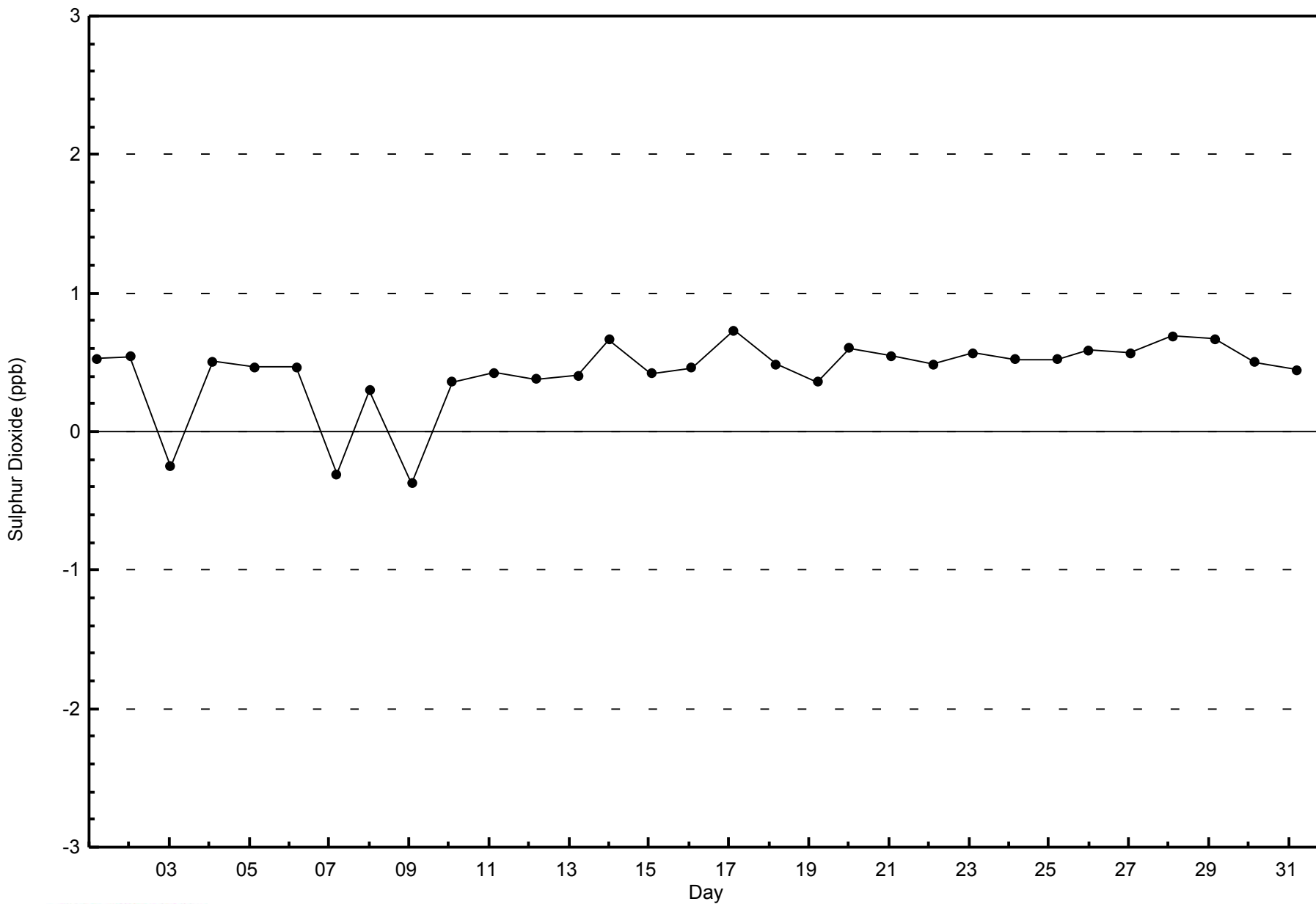


**Total Number of Valid Hours: 706**



WBEA  
Zero Responses

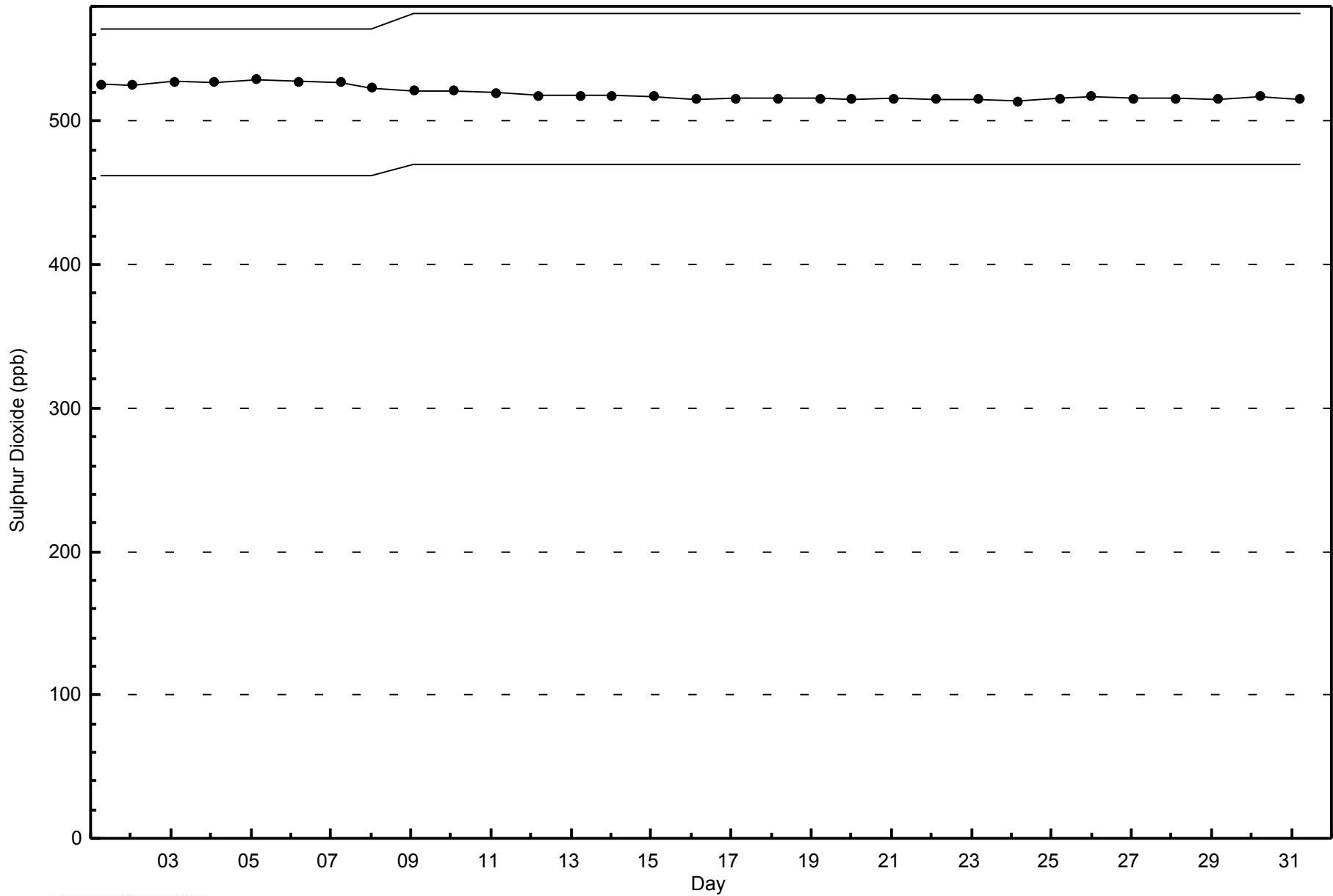
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Patricia McInnes - October 2014





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Patricia McInnes - October 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 1 ppb on Oct 1 17:00	Maximum Daily Average: 0.5 ppb on Oct 22		Hours of Data:	706
Minimum Value: 0 ppb on Oct 30 03:00	Minimum Daily Average: 0.4 ppb on Oct 30		Hours of Missing Data:	38
Maximum Diurnal Average: 0.5 ppb at hour 17	Minimum Diurnal Average: 0.4 ppb at hour 3		Hours of Calibration:	36
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:	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-Oct	0	0	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	1	0	1	1	1	1	0	1	0.5	1	
2-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	0
3-Oct	0	0	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
4-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0.5	1
5-Oct	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0.5	1	
6-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0.4	0	
7-Oct	0	0	0	0	0	0	Z	0	0	0	0	M	M	0	0	1	0	1	1	1	0	0	0	0	0.4	1	
8-Oct	0	Z	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
9-Oct	0	0	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
10-Oct	0	0	0	Z	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0.5	1	
11-Oct	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.5	1
12-Oct	0	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
13-Oct	1	0	1	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.5	1
14-Oct	0	Z	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.5	1
15-Oct	0	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0.5	1	
16-Oct	0	0	0	Z	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
17-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
18-Oct	0	0	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
19-Oct	0	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
20-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.4	1
21-Oct	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0.5	1	
22-Oct	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	1	0.5	1	
23-Oct	0	1	0	0	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0.5	1	
24-Oct	0	0	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
25-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1	
26-Oct	0	Z	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0.4	1
27-Oct	0	0	Z	1	1	1	0	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0.5	1
28-Oct	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
29-Oct	0	0	0	0	Z	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
30-Oct	0	0	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
31-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0.5	1

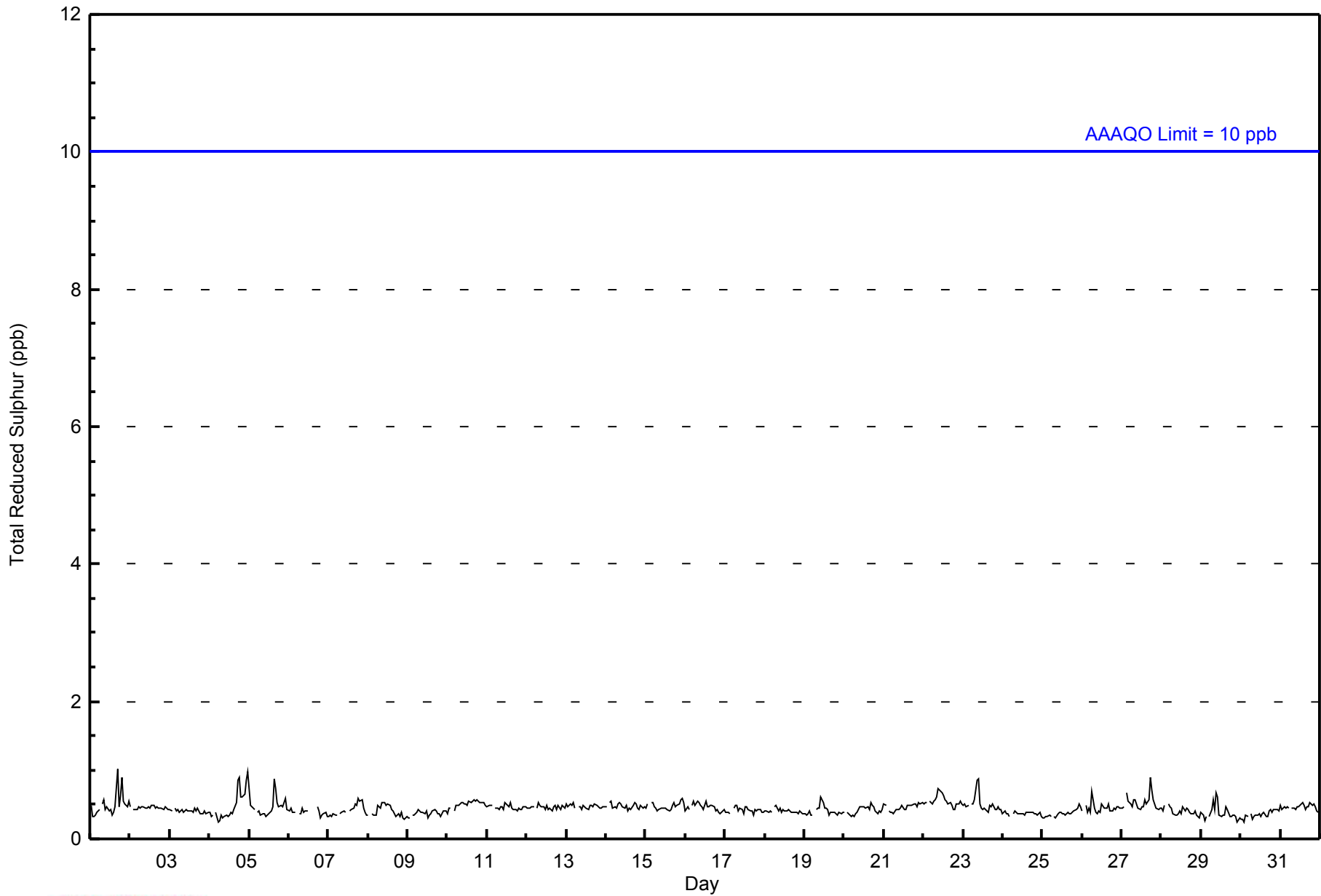
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	Diurnal Average		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum	

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**  
**Patricia McInnes - October 2014**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Patricia McInnes - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	706	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: 706

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Patricia McInnes - October 2014**

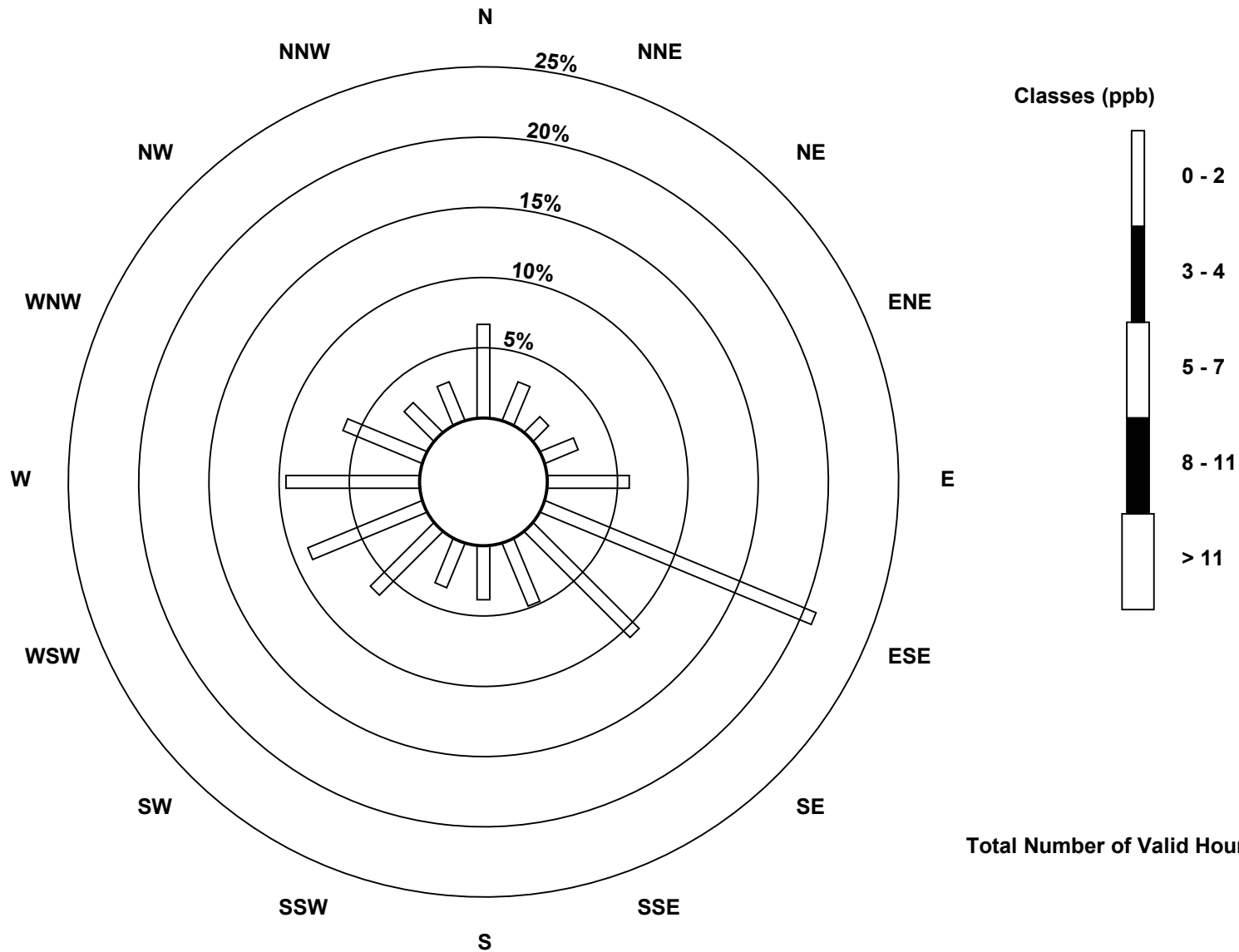
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	47	21	11	18	41	147	75	34	27	24	45	62	67	43	21	21	704
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	21	11	18	41	147	75	34	27	24	45	62	67	43	21	21	704

Total Number of Valid Hours: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

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



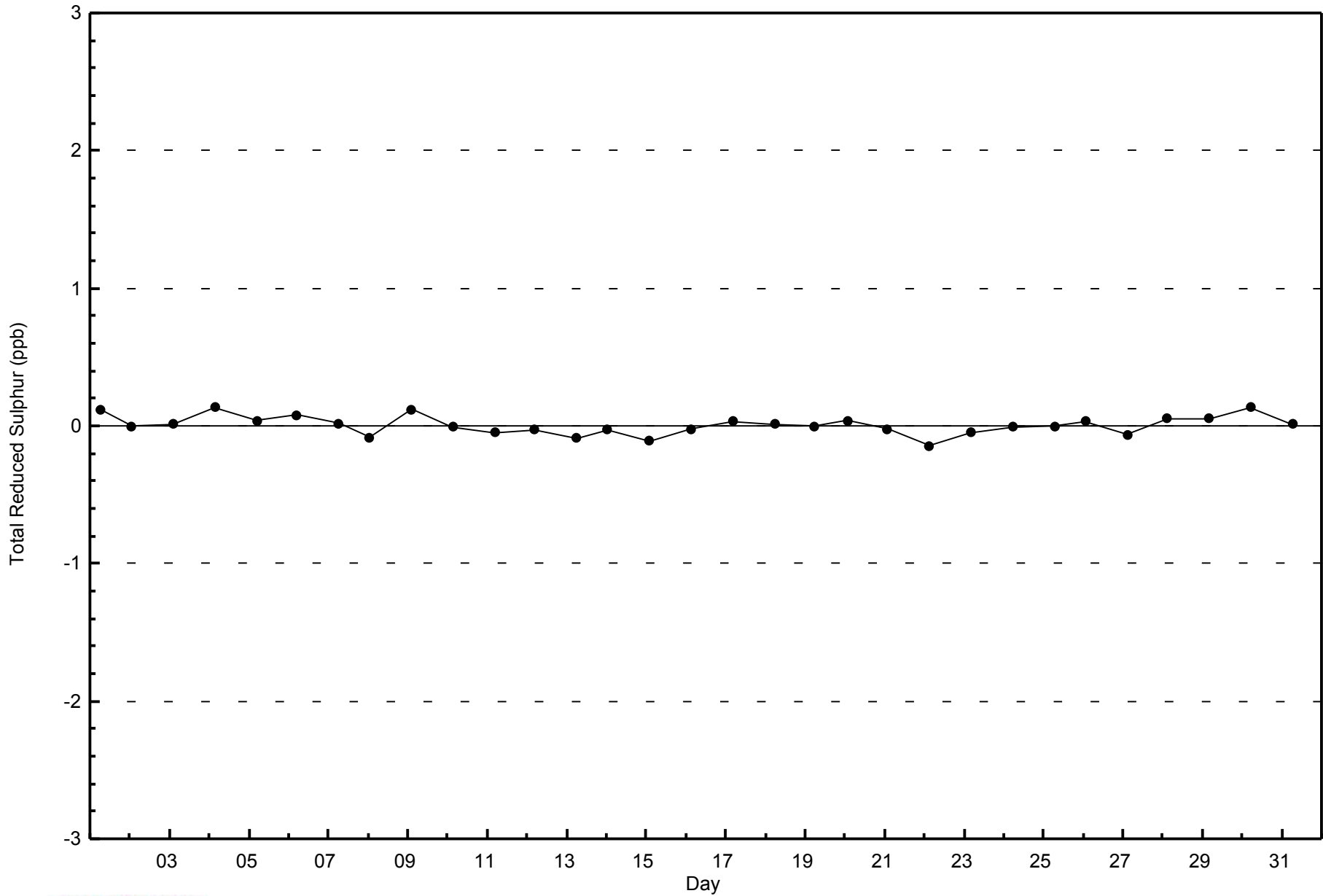
Total Number of Valid Hours: 704





WBEA  
Zero Responses

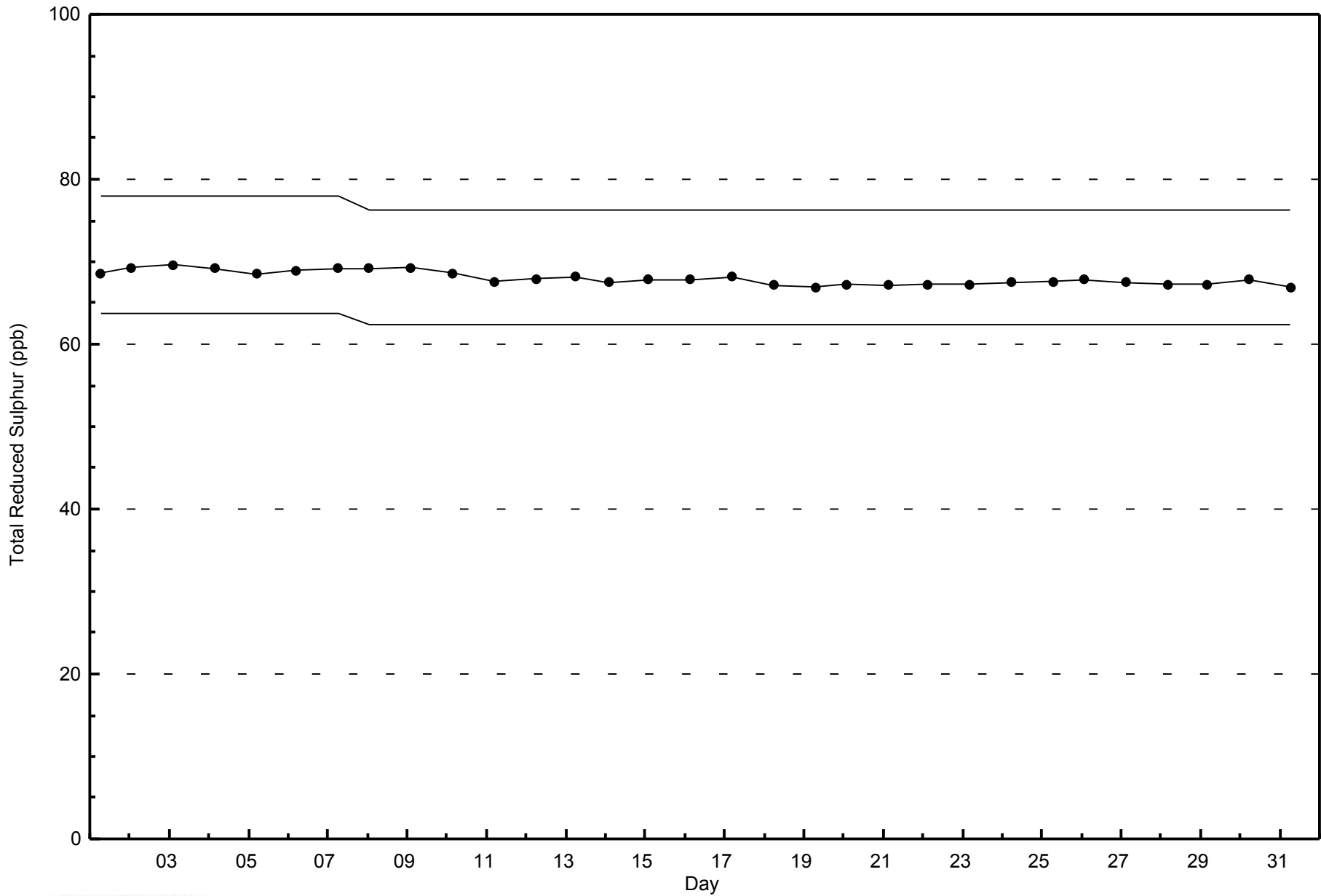
Total Reduced Sulphur (TRS) - ppb  
Patricia McInnes - October 2014





WBEA  
Span Responses

Total Reduced Sulphur (TRS) - ppb  
Patricia McInnes - October 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

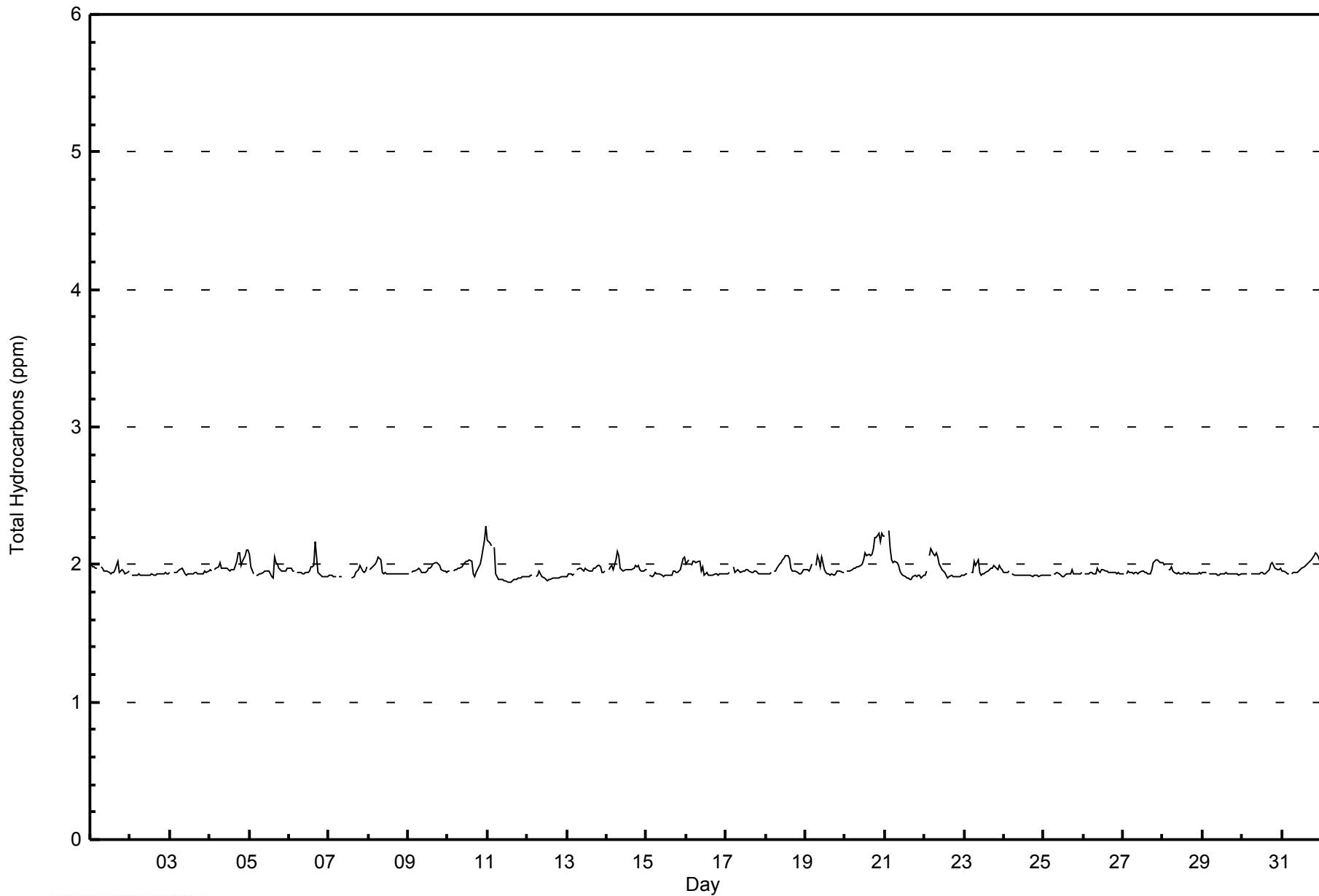
Patricia McInnes - October 2014

Maximum Value: 2.3 ppm on Oct 11 00:00																				Maximum Daily Average: 2.1 ppm on Oct 20					Hours in Service: 744		
Minimum Value: 1.9 ppm on Oct 11 14:00																				Minimum Daily Average: 1.9 ppm on Oct 12					Hours of Data: 708		
Maximum Diurnal Average: 2.0 ppm at hour 24																				Minimum Diurnal Average: 1.9 ppm at hour 15					Hours of Missing Data: 36		
Monthly Average: 1.96 ppm																				Percentiles: P <sub>1</sub> = 1.9 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> = 2.0 P <sub>99</sub> = 2.2					Hours of Calibration: 36		
																									Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	
2-Oct	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
3-Oct	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	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
4-Oct	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1
5-Oct	2.1	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.1	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.1
6-Oct	2.0	2.0	1.9	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.2	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
7-Oct	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	C	C	C	C	C	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0	1.9	2.0	2.0
8-Oct	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.0	1.9	1.9	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
9-Oct	1.9	Z	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0
10-Oct	1.9	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	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.3	2.0	2.3	2.0
11-Oct	2.2	2.2	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	1.9	1.9	1.9
12-Oct	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	1.9	1.9	1.9
13-Oct	1.9	1.9	1.9	1.9	1.9	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	1.9	1.9	1.9	1.9	1.9	2.0
14-Oct	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
15-Oct	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	1.9	1.9	2.0	2.0	2.0	2.1	1.9	2.1
16-Oct	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
17-Oct	1.9	1.9	1.9	Z	2.0	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
18-Oct	1.9	1.9	1.9	1.9	Z	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1
19-Oct	2.0	2.0	1.9	2.0	2.0	Z	2.0	2.1	2.0	2.0	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
20-Oct	Z	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1
21-Oct	2.2	Z	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
22-Oct	1.9	2.0	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
23-Oct	1.9	1.9	1.9	Z	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
24-Oct	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
25-Oct	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
26-Oct	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
27-Oct	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	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
28-Oct	2.0	2.0	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
29-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
30-Oct	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
31-Oct	2.0	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerspan C - Calibration																											



WBEA  
Hourly Averages

Total Hydrocarbons (THC) - ppm  
Patricia McInnes - October 2014





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

**Total Hydrocarbons (THC) - ppm**  
**Patricia McInnes - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	661	93.36	93.36
2.1 - 3.0	47	6.64	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Patricia McInnes - October 2014**

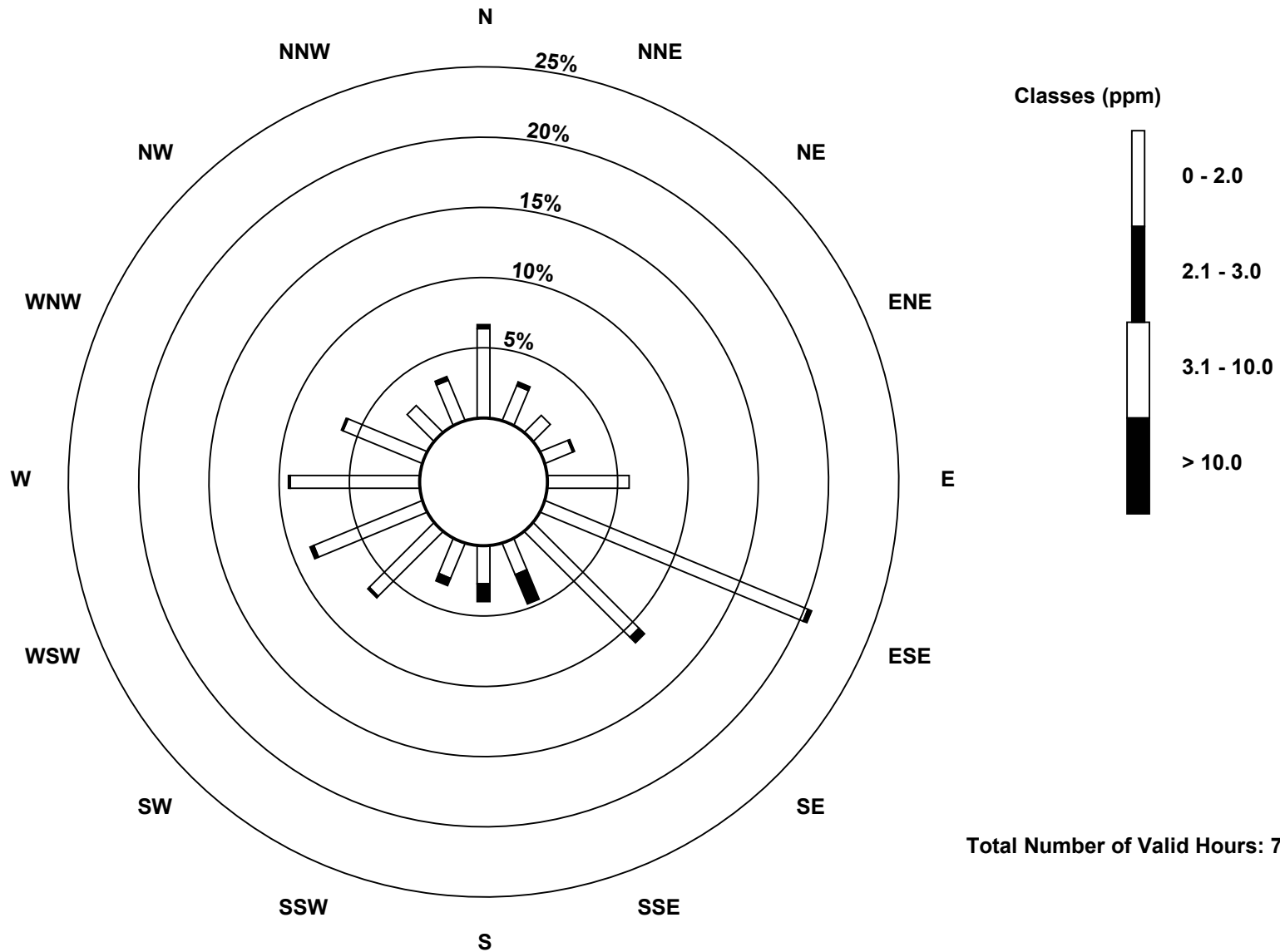
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	45	19	12	15	41	143	75	17	19	19	46	59	65	43	19	22	659
2.1 - 3.0	2	2	0	1	0	2	4	16	9	4	1	2	1	1	0	2	47
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	21	12	16	41	145	79	33	28	23	47	61	66	44	19	24	706

Total Number of Valid Hours: 706

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

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

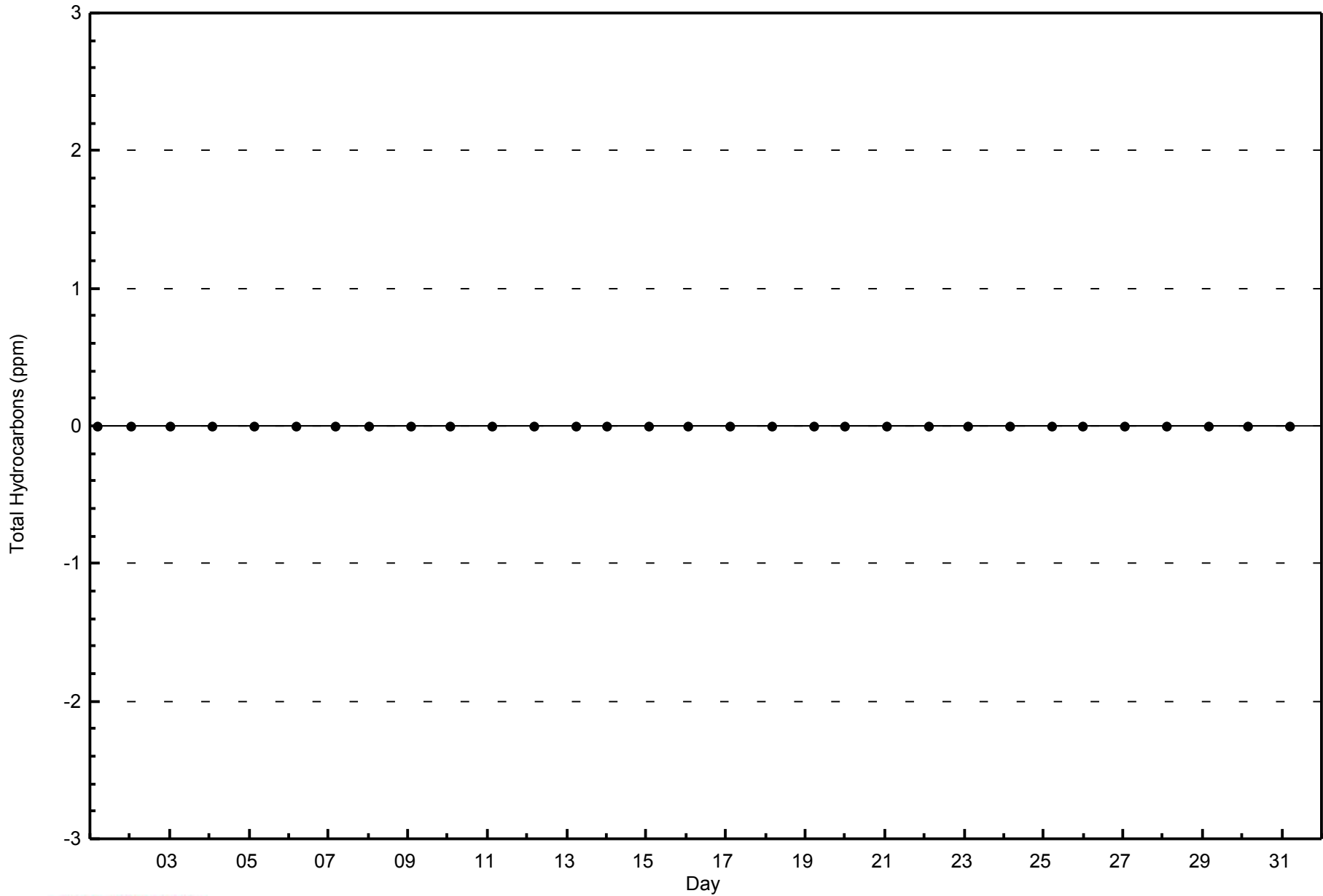


**Total Number of Valid Hours: 706**



**WBEA**  
**Zero Responses**

**Total Hydrocarbons (THC) - ppm**  
**Patricia McInnes - October 2014**

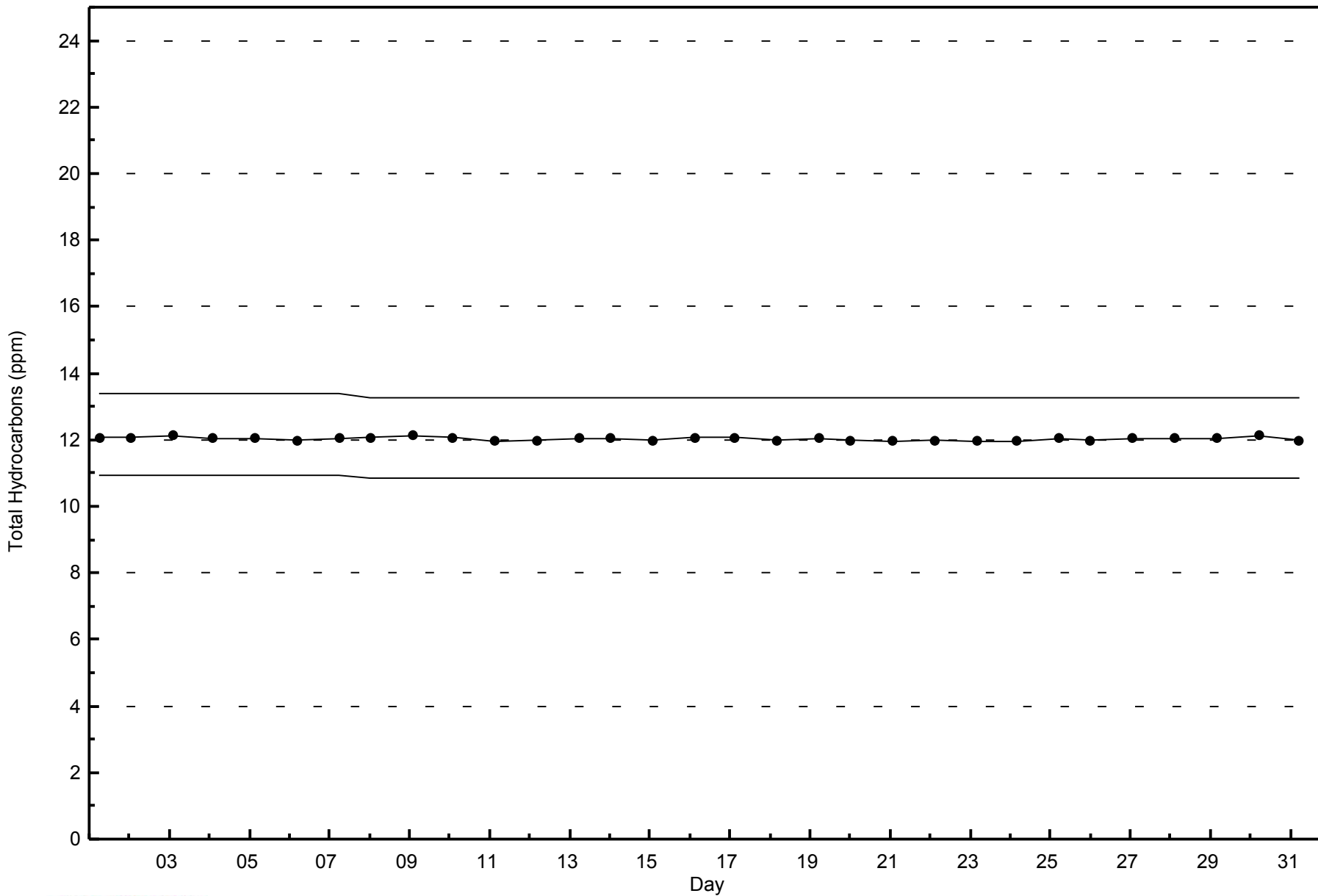






WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Patricia McInnes - October 2014





Summary of Hour Averages

Patricia McInnes - October 2014

Maximum Value: 0.071 ppm on Oct 17 05:00	Maximum Daily Average: 0.005 ppm on Oct 17	Hours in Service: 744
Minimum Value: 0.000 ppm on Oct 1 01:00	Minimum Daily Average: 0.000 ppm on Oct 1	Hours of Data: 708
Maximum Diurnal Average: 0.004 ppm at hour 11	Minimum Diurnal Average: 0.000 ppm at hour 3	Hours of Missing Data: 36
Monthly Average: 0.001 ppm	Percentiles: $P_1 = 0.0$ $P_{10} = 0.0$ $Q_1 = 0.0$ Median = 0.0 $Q_3 = 0.0$ $P_{90} = 0.0$ $P_{99} = 0.0$	Hours of Calibration: 36
		Percent Operational Time: 100.0

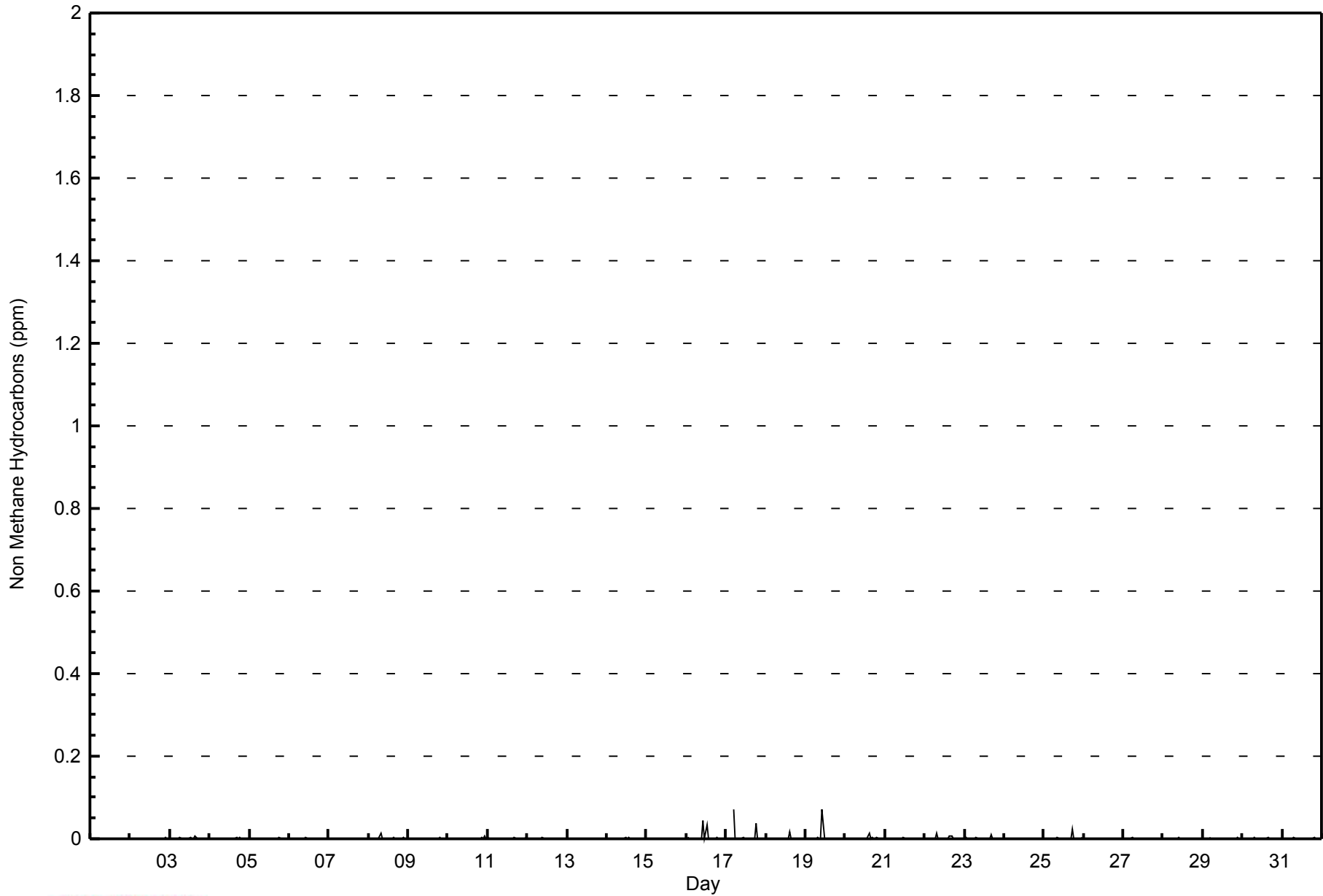
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																												
1-Oct	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
2-Oct	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	0.003	0.000	0.000	0.000	0.000	0.000	0.000																								
3-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.005	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.005	0.000																								
4-Oct	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.003	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
5-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
6-Oct	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	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-Oct	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	C	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
8-Oct	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.001	0.012	0.000																								
9-Oct	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	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
10-Oct	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.005	0.000	0.000	0.000	0.000	0.000																								
11-Oct	0.003	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000																								
12-Oct	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
13-Oct	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																								
14-Oct	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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	0.000	0.000	0.000	0.000	0.000	0.000																								
15-Oct	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																								
16-Oct	0.000	0.002	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.043	0.000	0.033	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000																								
17-Oct	0.000	0.000	0.000	Z	0.071	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.038	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
18-Oct	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	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
19-Oct	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.004	0.000	0.000	0.070	0.000	0.000	0.000	0.000	0.000	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-Oct	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	0.015	0.000	0.003	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
21-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
22-Oct	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.014	0.000																								
23-Oct	0.000	0.003	0.000	Z	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.010	0.000	0.000																								
24-Oct	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																								
25-Oct	0.000	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	0.025	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.025	0.000	0.000																								
26-Oct	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																								
27-Oct	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																								
28-Oct	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
29-Oct	0.000	0.000	0.000	Z	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000																								
30-Oct	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.004	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																								
31-Oct	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
																								0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.001	0.000	0.004	0.000	0.001	0.000	0.001	0.001	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Diurnal Average	
																								0.003	0.003	0.000	0.000	0.071	0.003	0.003	0.014	0.003	0.003	0.070	0.003	0.033	0.003	0.018	0.007	0.010	0.025	0.038	0.004	0.004	0.003	0.005	0.004	0.000	0.000	0.000	0.000	Diurnal Maximum

Z - zerospan C - Calibration



WBEA  
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm  
Patricia McInnes - October 2014





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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Patricia McInnes - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	695	98.16	98.16
0.006 - 0.05	11	1.55	99.72
0.06 - 0.1	2	0.28	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Patricia McInnes - October 2014**

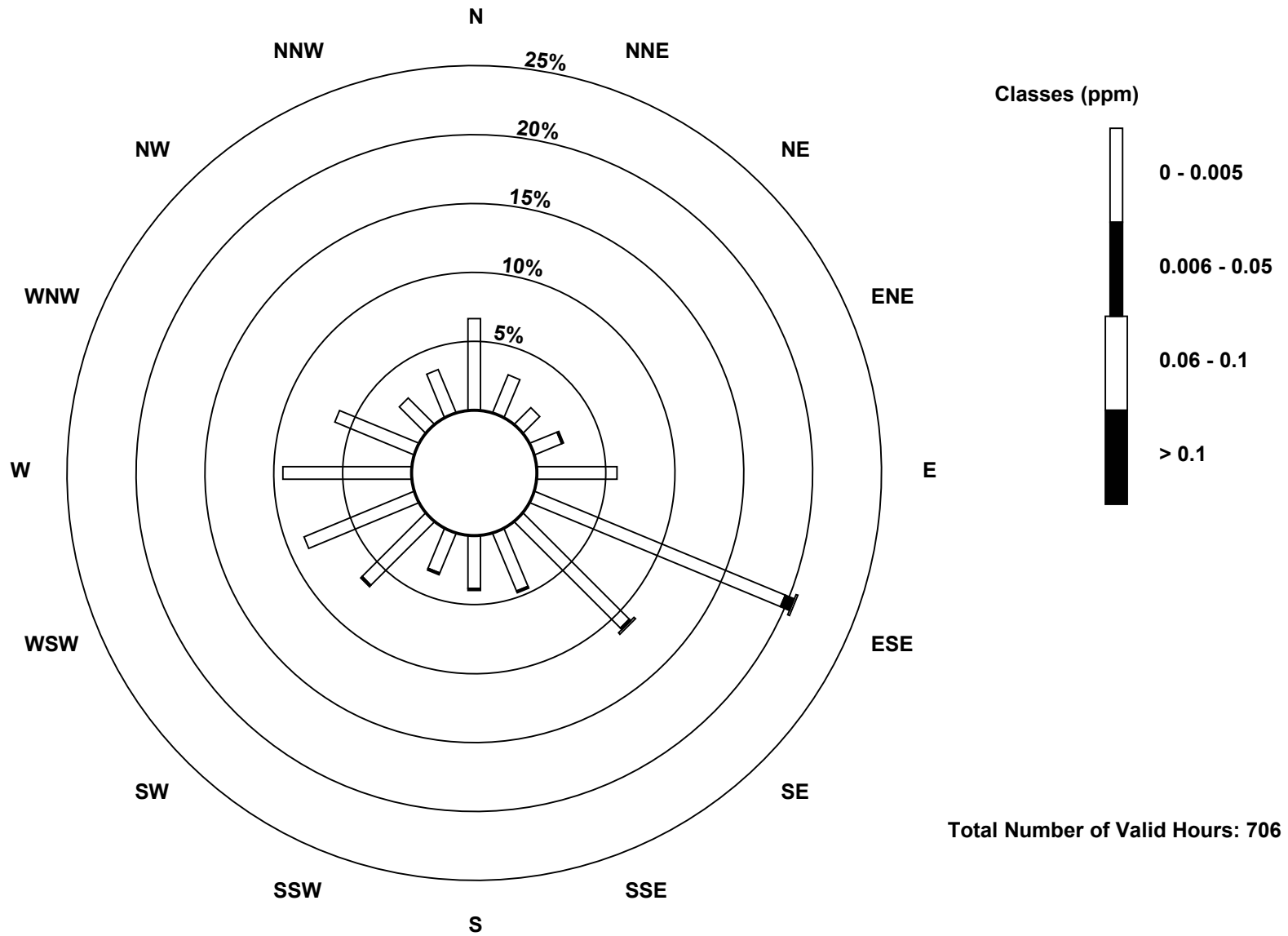
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	47	21	12	15	41	139	77	32	27	22	46	61	66	44	19	24	693
0.006 - 0.05	0	0	0	1	0	5	1	1	1	1	1	0	0	0	0	0	11
0.06 - 0.1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	21	12	16	41	145	79	33	28	23	47	61	66	44	19	24	706

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

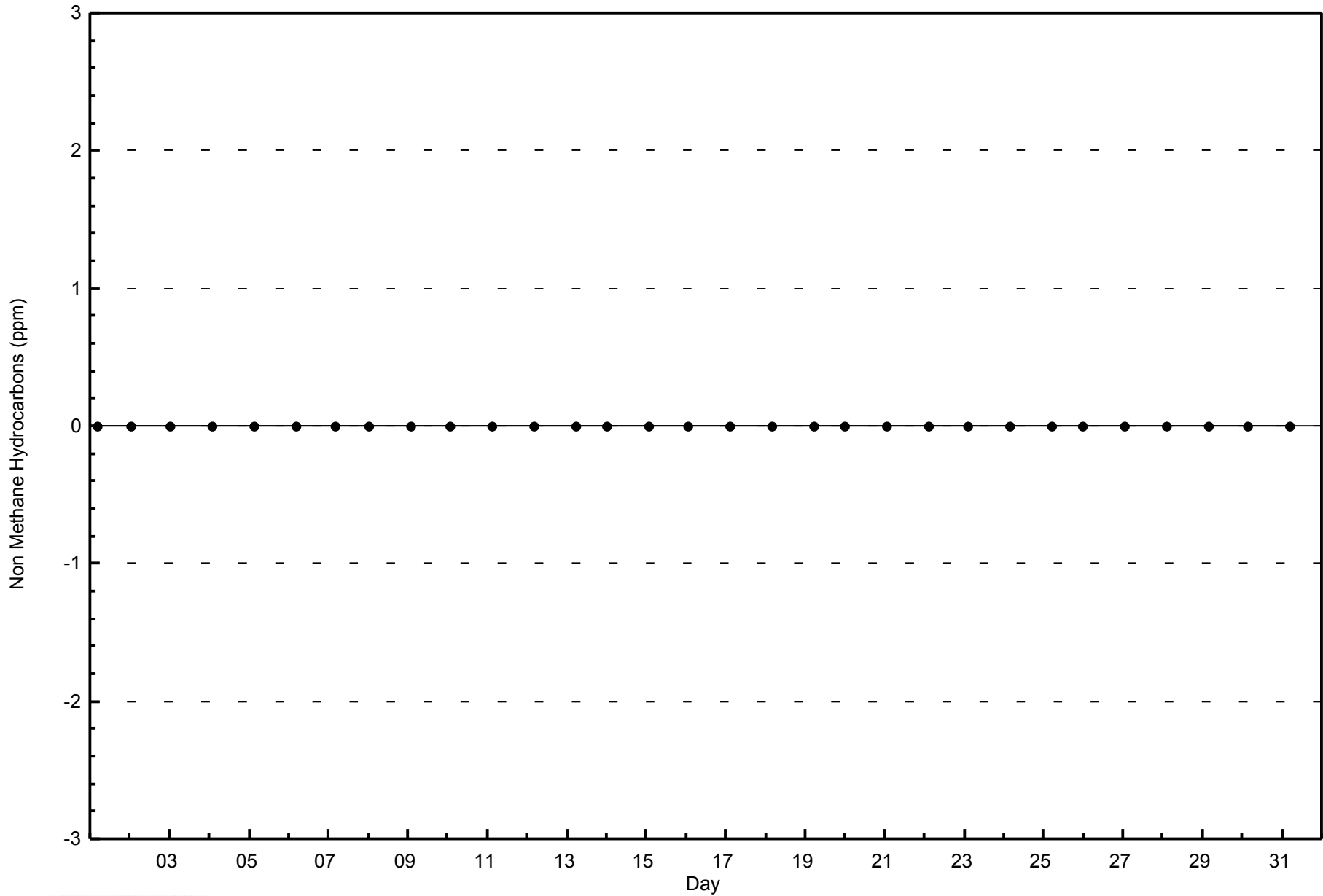
Non Methane Hydrocarbons (NMHC) - ppm  
Patricia McInnes (AMS 6)





WBEA  
Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm  
Patricia McInnes - October 2014

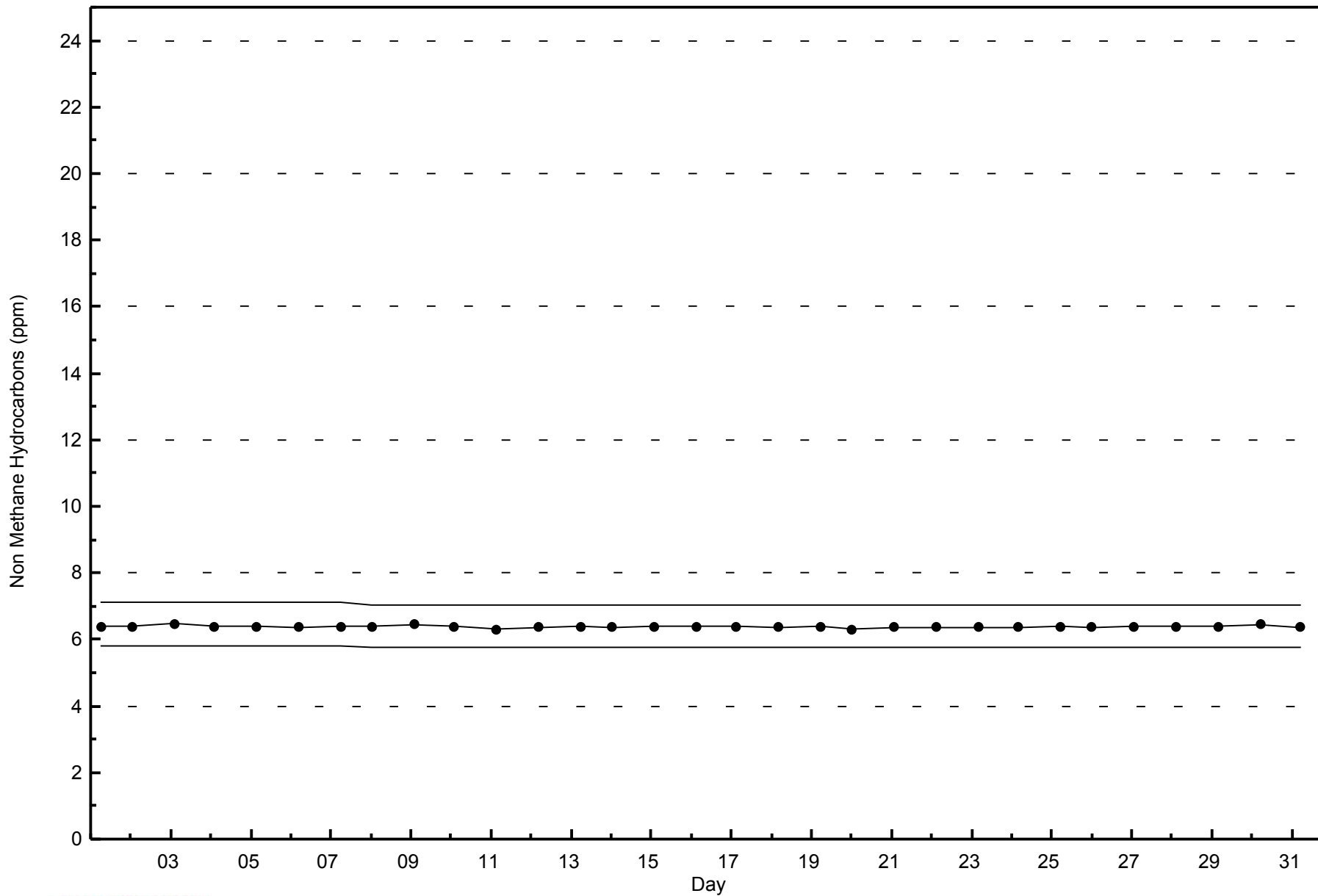




WBEA  
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - October 2014







Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2.3 ppm on Oct 11 00:00	Maximum Daily Average: 2.1 ppm on Oct 20		Hours of Data:	708
Minimum Value: 1.9 ppm on Oct 11 14:00	Minimum Daily Average: 1.9 ppm on Oct 12		Hours of Missing Data:	36
Maximum Diurnal Average: 2.0 ppm at hour 24	Minimum Diurnal Average: 1.9 ppm at hour 15		Hours of Calibration:	36
Monthly Average: 1.96 ppm	Percentiles: P <sub>1</sub> = 1.9 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> = 2.0 P <sub>99</sub> = 2.2		Percent Operational Time:	100.0

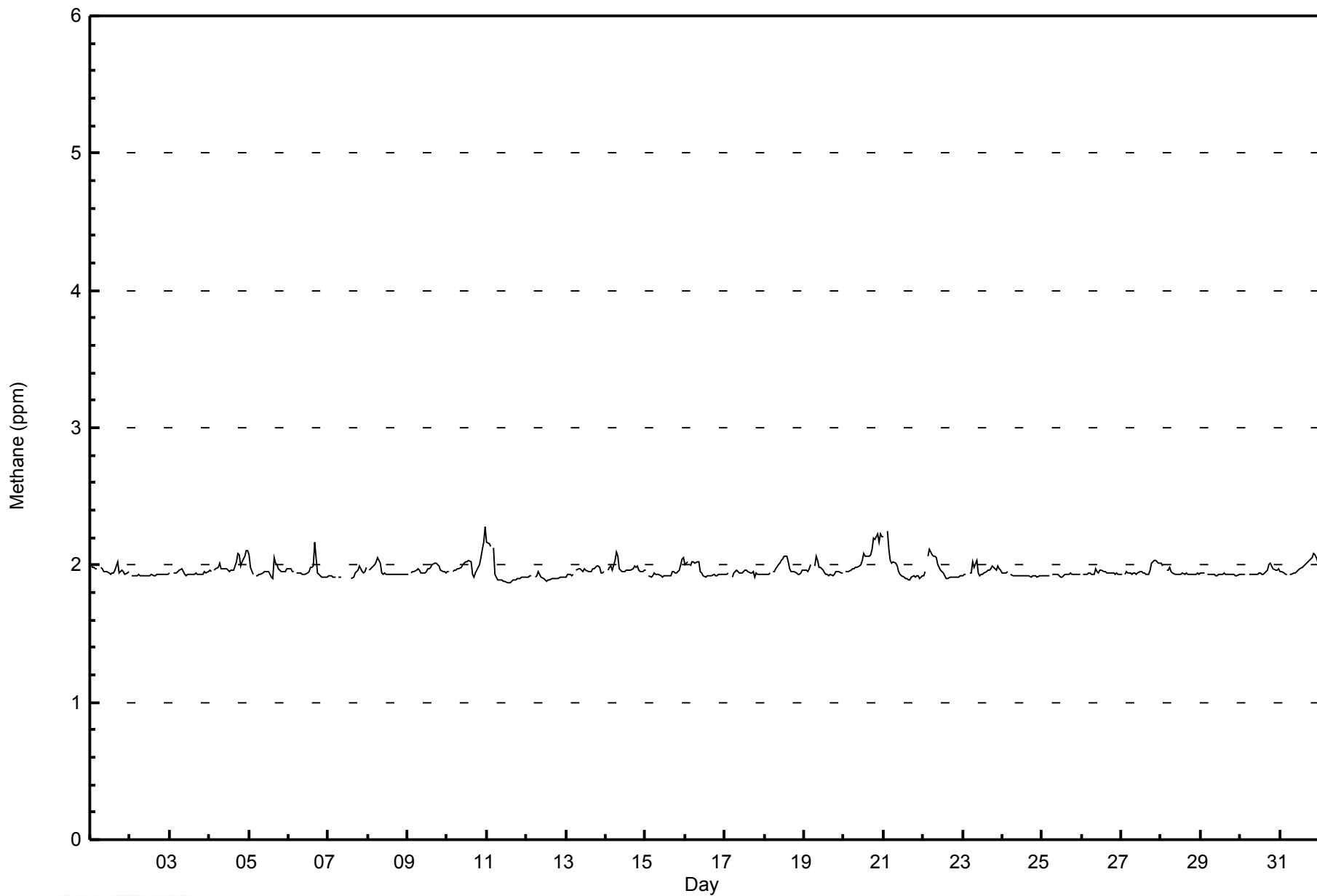
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0
2-Oct	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9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

Z - zerospan C - Calibration



WBEA  
Hourly Averages

Methane (CH<sub>4</sub>) - ppm  
Patricia McInnes - October 2014





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

**Methane (CH<sub>4</sub>) - ppm**  
**Patricia McInnes - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	662	93.50	93.50
2.1 - 3.0	46	6.50	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Patricia McInnes - October 2014**

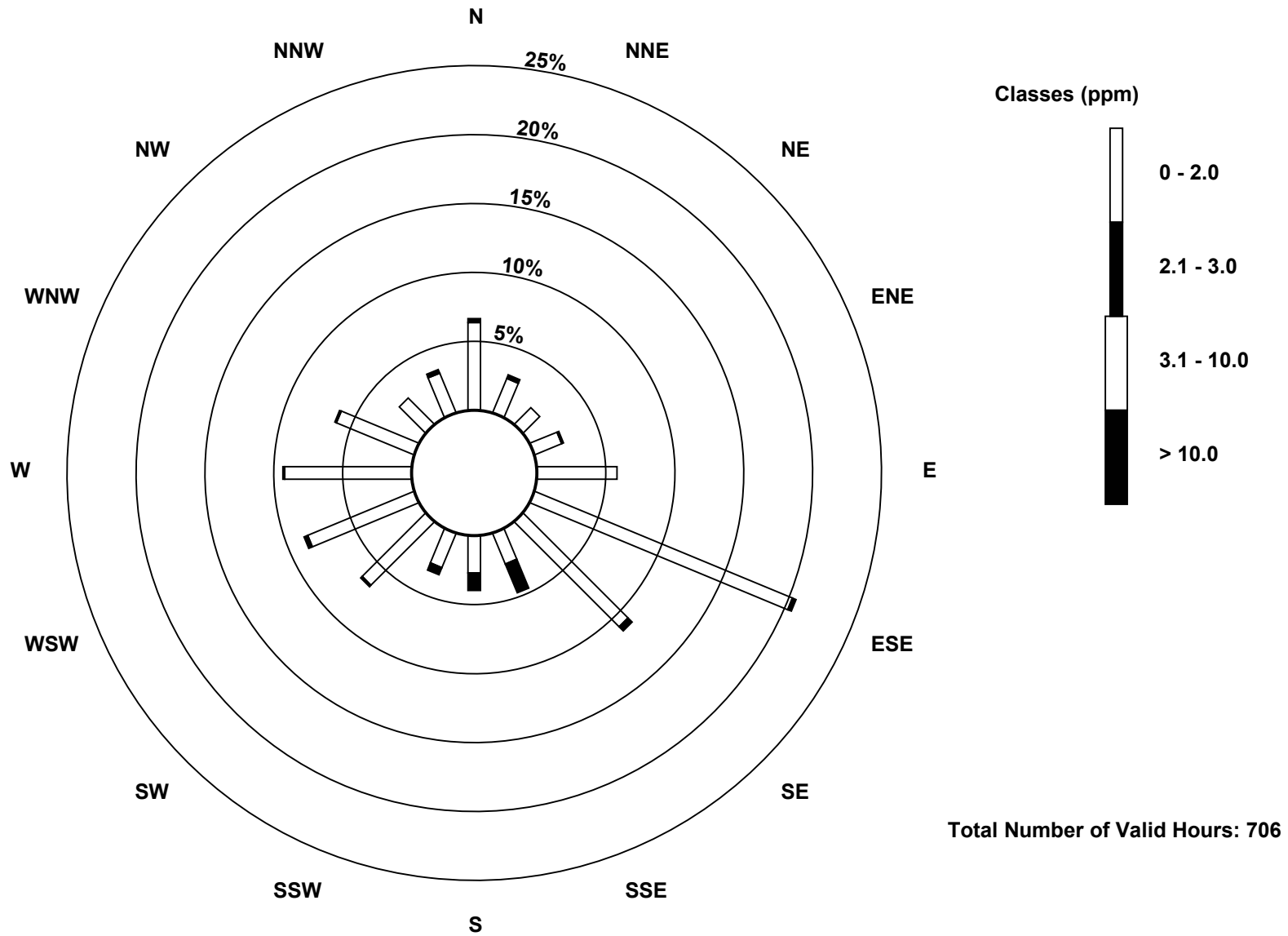
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	45	19	12	15	41	143	76	17	19	19	46	59	65	43	19	22	660
2.1 - 3.0	2	2	0	1	0	2	3	16	9	4	1	2	1	1	0	2	46
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	21	12	16	41	145	79	33	28	23	47	61	66	44	19	24	706

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

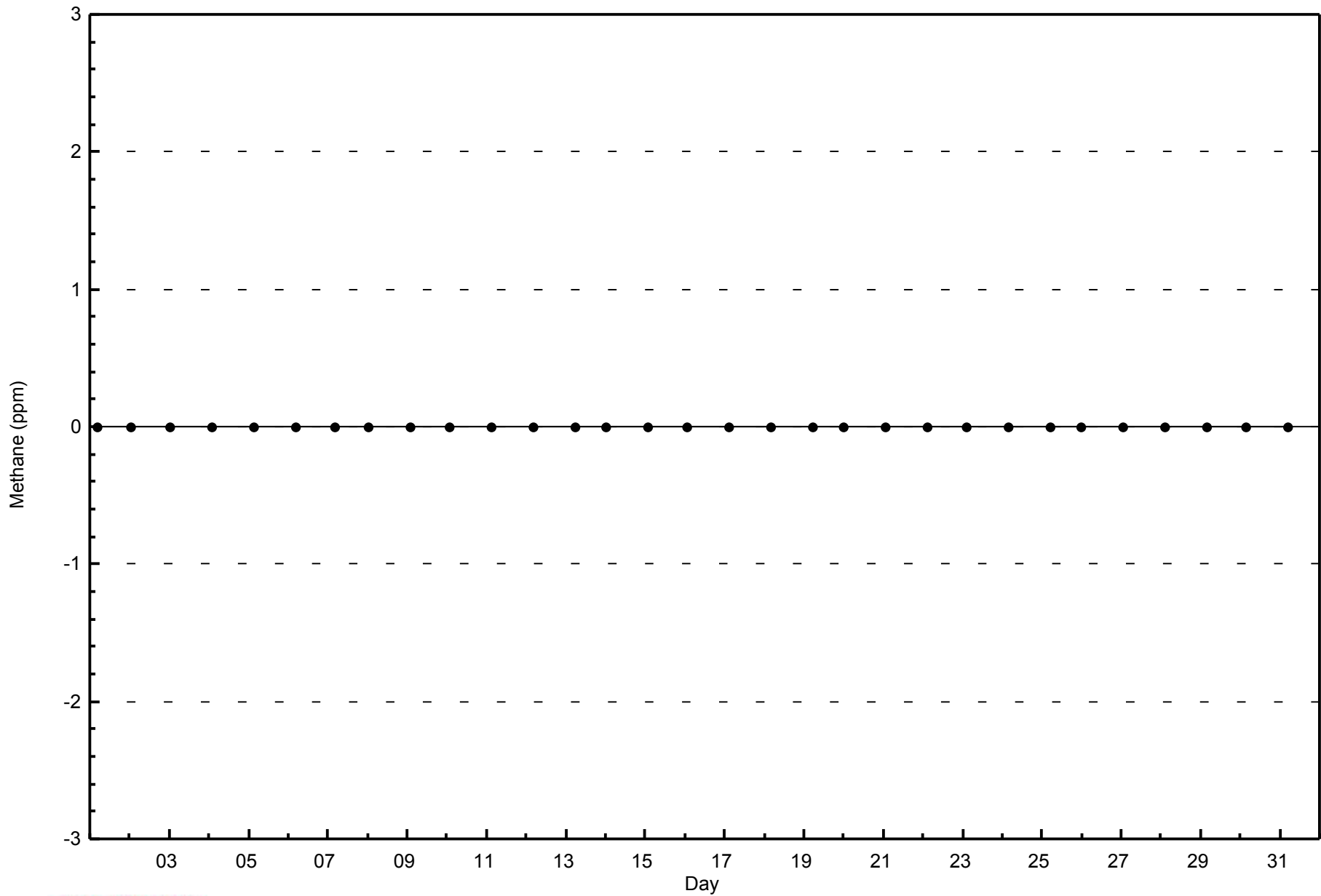
Methane (CH<sub>4</sub>) - ppm  
 Patricia McInnes (AMS 6)





WBEA  
Zero Responses

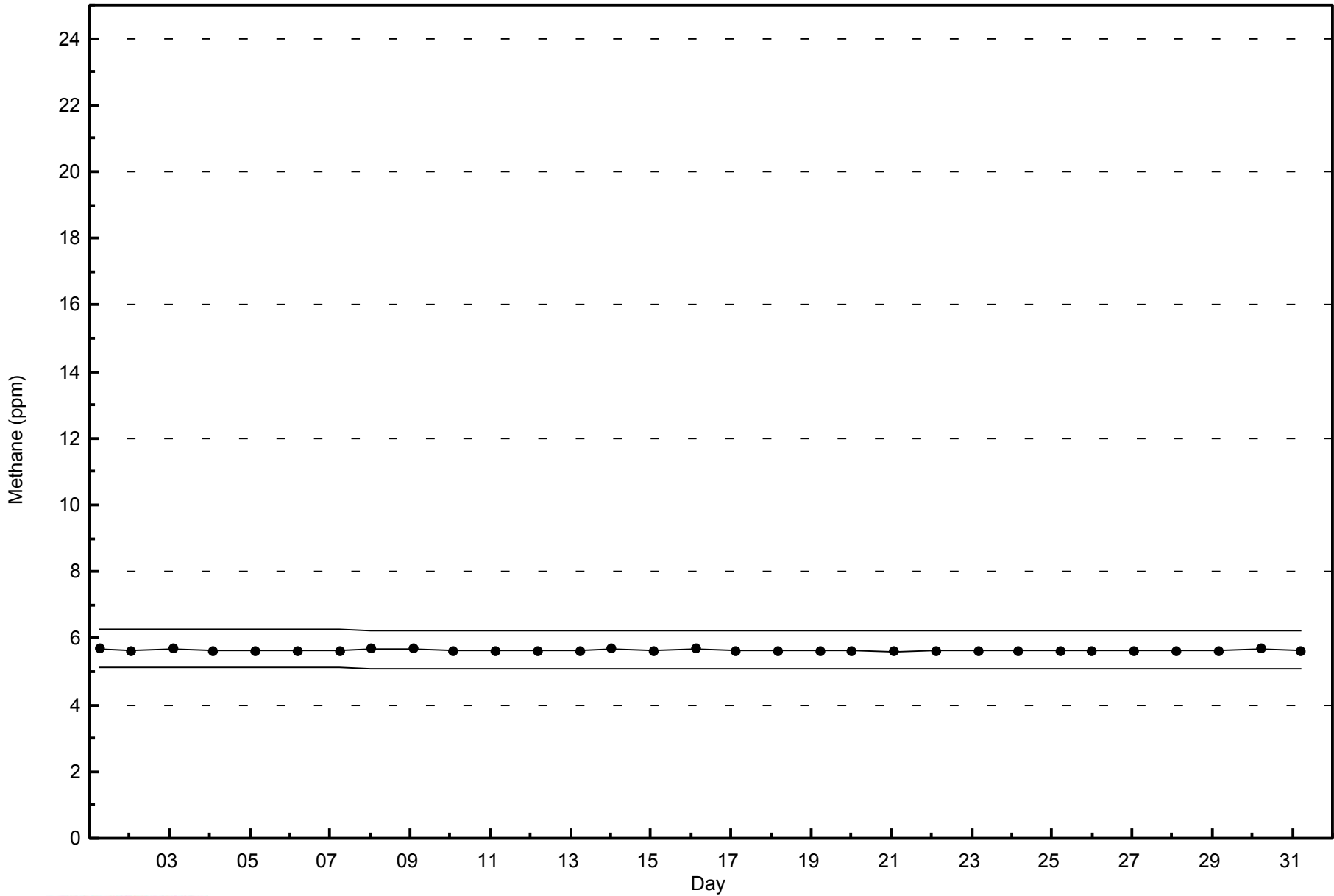
Methane (CH<sub>4</sub>) - ppm  
Patricia McInnes - October 2014





WBEA  
Span Responses

Methane (CH<sub>4</sub>) - ppm  
Patricia McInnes - October 2014





Summary of Hour Averages

Patricia McInnes - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 41 ppb on Oct 11 14:00	Maximum Daily Average: 31.1 ppb on Oct 11		Hours of Data:	707
Minimum Value: 2 ppb on Oct 4 23:00	Minimum Daily Average: 9.1 ppb on Oct 4		Hours of Missing Data:	37
Maximum Diurnal Average: 21.7 ppb at hour 15	Minimum Diurnal Average: 11.0 ppb at hour 8		Hours of Calibration:	35
Monthly Average: 16.8 ppb	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 7 Q <sub>1</sub> = 11 Median = 16 Q <sub>3</sub> = 22 P <sub>90</sub> = 29 P <sub>99</sub> = 37		Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	5	5	7	7	6	4	3	Z	7	8	8	11	13	13	14	14	10	14	13	14	16	18	16	16	10.5	18	
2-Oct	17	16	Z	17	18	18	19	21	22	21	22	22	23	23	23	23	23	23	22	22	21	21	20	19	20.7	23	
3-Oct	19	19	19	Z	17	16	10	9	12	14	17	20	23	24	25	24	20	18	19	20	18	16	17	17	17.9	25	
4-Oct	16	16	15	12	Z	4	6	8	8	9	10	11	11	10	12	14	9	5	4	12	9	4	2	2	9.1	16	
5-Oct	6	13	16	15	13	Z	10	9	9	9	8	13	16	25	27	13	10	7	9	11	9	8	7	5	11.7	27	
6-Oct	5	6	4	5	6	7	Z	8	8	9	8	7	7	8	8	9	5	14	18	22	24	23	21	18	11.0	24	
7-Oct	16	21	22	26	27	28	28	Z	29	29	29	M	M	32	33	32	22	16	12	6	12	19	12	8	21.9	33	
8-Oct	8	7	Z	5	4	4	2	2	8	12	12	C	C	C	C	21	21	24	27	23	19	20	20	20	13.8	27	
9-Oct	20	19	18	Z	13	7	3	8	15	16	17	18	21	23	25	23	22	24	24	24	22	21	21	21	18.4	25	
10-Oct	21	21	22	21	Z	14	17	17	17	15	16	19	23	23	28	35	37	33	31	25	16	16	13	14	21.5	37	
11-Oct	19	16	16	11	15	Z	29	30	32	35	37	39	40	41	40	38	38	37	35	34	34	33	32	33	31.1	41	
12-Oct	32	31	30	29	29	29	Z	13	23	28	29	32	32	33	32	33	31	31	31	31	30	30	31	31	29.7	33	
13-Oct	29	25	24	25	23	17	18	Z	17	20	22	22	23	24	22	20	15	10	7	8	17	24	25	24	20.0	29	
14-Oct	20	23	Z	17	19	9	10	7	17	22	25	25	24	24	21	20	20	14	18	22	21	19	18	15	18.7	25	
15-Oct	13	14	17	Z	13	9	12	12	13	15	16	17	18	19	20	19	16	16	16	16	18	13	8	5	14.6	20	
16-Oct	8	7	8	10	Z	3	4	4	4	14	14	20	21	20	21	20	15	14	16	18	18	17	16	16	13.5	21	
17-Oct	15	15	15	14	13	Z	10	9	12	14	15	17	20	24	28	31	30	28	25	24	24	24	23	23	19.7	31	
18-Oct	23	23	22	21	19	18	Z	8	7	11	18	21	21	22	24	28	30	29	29	29	28	26	24	19	21.8	30	
19-Oct	17	14	19	13	6	7	5	Z	6	15	15	16	20	24	28	31	31	30	28	24	24	25	25	27	19.6	31	
20-Oct	28	28	Z	26	24	23	21	18	20	18	15	18	22	22	22	20	11	5	5	6	6	6	4	8	16.4	28	
21-Oct	9	8	6	Z	17	17	14	14	17	21	23	26	26	30	34	36	34	22	22	26	26	26	29	26	22.2	36	
22-Oct	27	24	16	6	Z	3	3	2	5	11	16	19	21	25	31	33	34	31	36	31	33	33	31	31	21.8	36	
23-Oct	31	30	29	23	23	Z	5	8	6	19	23	22	20	20	19	17	12	8	8	10	10	13	16	13	16.7	31	
24-Oct	12	8	7	7	8	10	Z	12	11	11	12	12	13	14	16	17	17	18	17	17	19	19	17	15	13.6	19	
25-Oct	14	13	14	14	12	8	9	Z	11	13	14	16	18	20	21	17	13	8	11	13	13	13	12	13	13.5	21	
26-Oct	13	14	Z	13	9	12	12	13	10	11	14	12	10	11	11	11	11	11	11	11	13	15	15	16	16	12.3	16
27-Oct	15	16	15	Z	13	13	13	13	14	14	13	13	15	17	17	17	16	11	7	8	5	5	8	6	12.4	17	
28-Oct	6	8	11	10	Z	5	8	7	6	7	7	7	7	9	15	11	9	10	12	13	12	12	13	13	9.5	15	
29-Oct	12	12	11	10	9	Z	9	10	12	12	13	14	14	14	13	13	11	10	14	13	16	17	16	16	12.8	17	
30-Oct	15	15	16	16	16	13	Z	12	12	13	11	11	12	16	16	13	11	10	11	13	14	15	16	16	13.6	16	
31-Oct	17	18	18	19	18	16	15	Z	12	11	10	9	8	7	7	5	3	3	2	2	2	2	4	4	9.2	19	
	16.5	16.3	16.0	15.1	15.2	12.1	11.4	11.0	13.0	15.4	16.5	17.6	18.7	20.6	21.7	21.2	19.0	17.2	17.5	17.7	17.9	17.8	17.2	16.5	Diurnal Average		
	32	31	30	29	29	29	29	30	32	35	37	39	40	41	40	38	38	37	36	34	34	33	32	33	Diurnal Maximum		

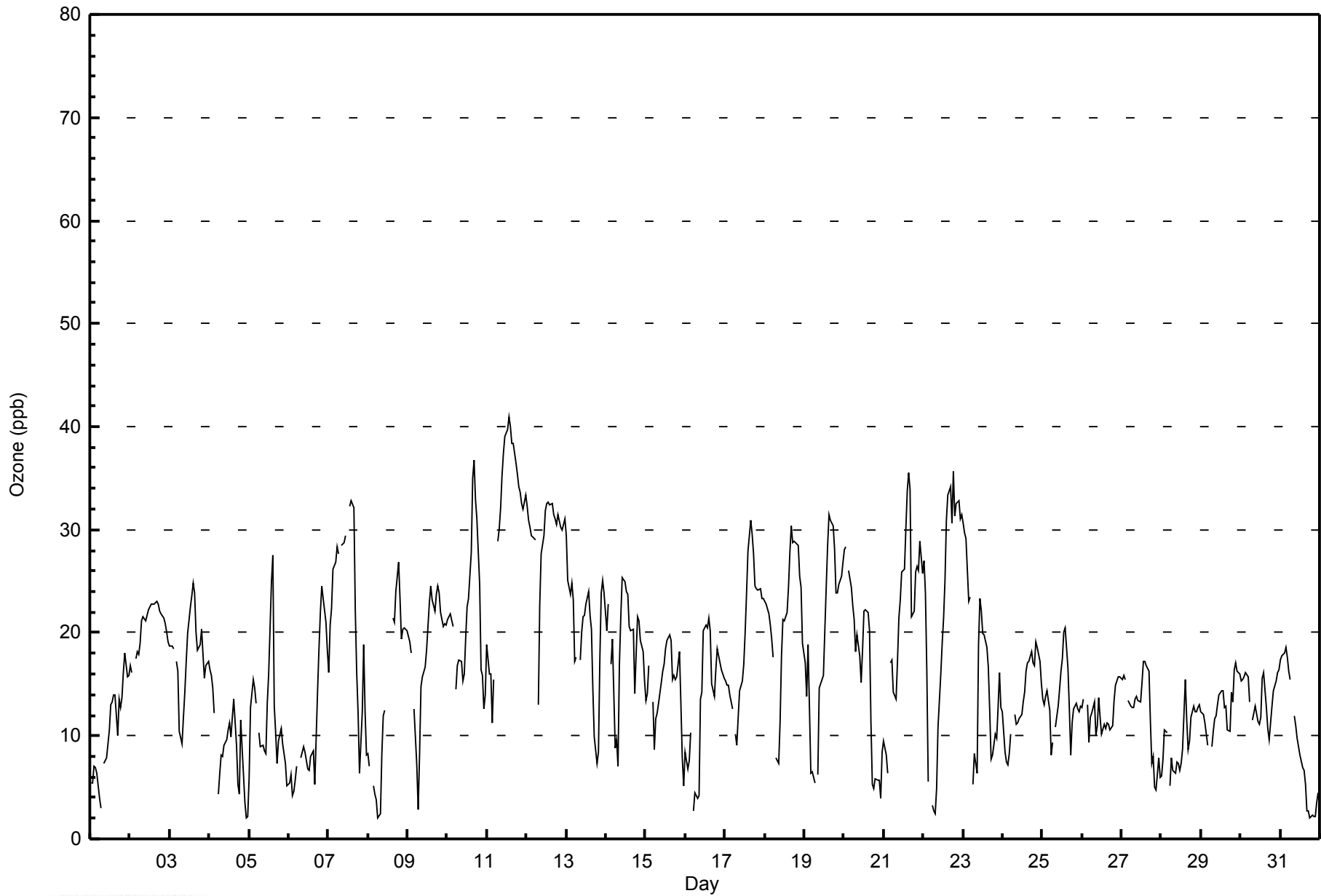
Z - zerospan      C - Calibration      M - Maintenance  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb





**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2014**





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

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	492	69.59	69.59
21 - 50	215	30.41	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2014**

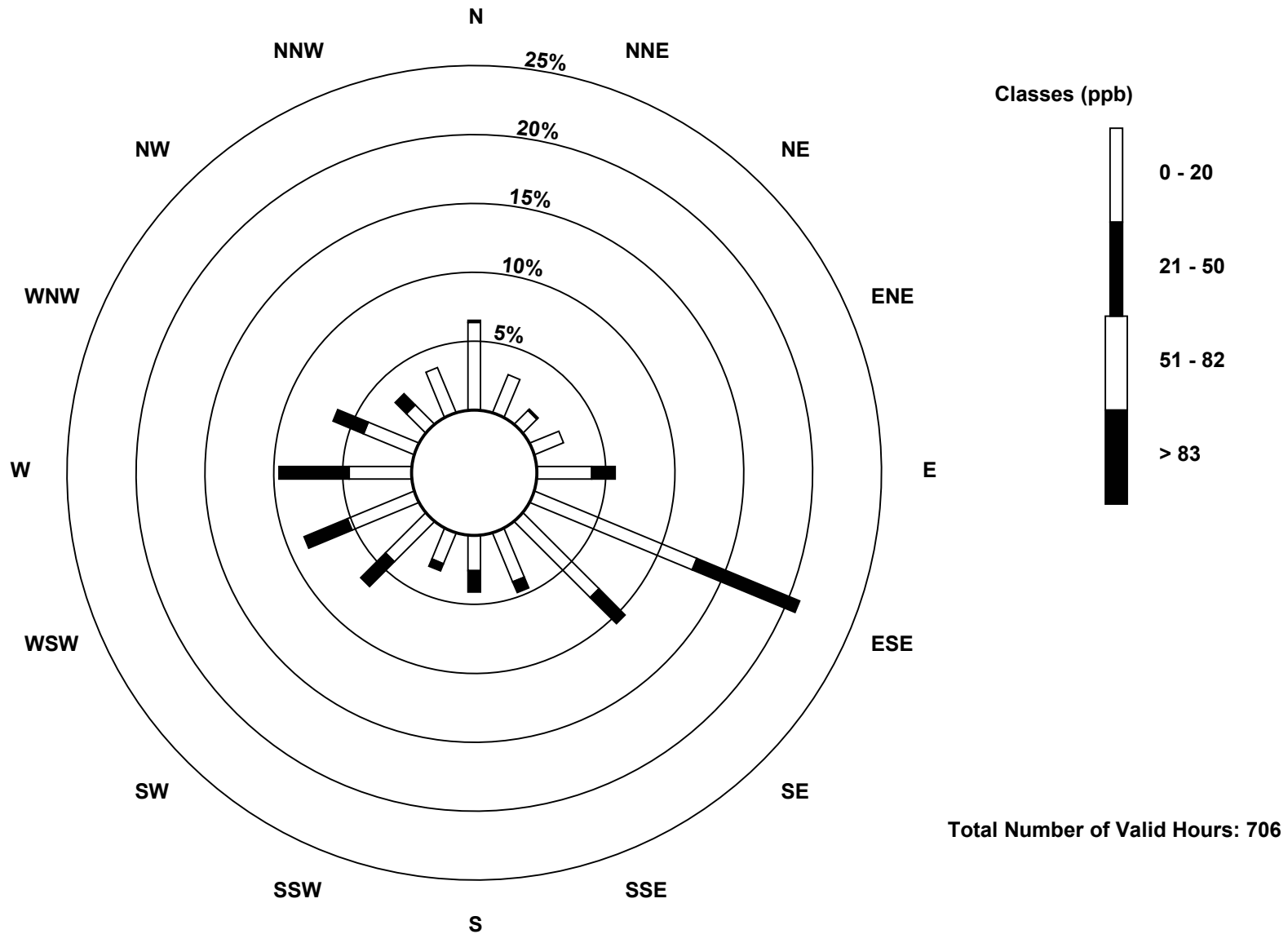
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	45	21	10	16	28	90	55	27	18	17	29	37	32	28	14	25	492
21 - 50	1	0	1	0	12	57	19	6	11	4	18	24	36	17	8	0	214
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	46	21	11	16	40	147	74	33	29	21	47	61	68	45	22	25	706

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

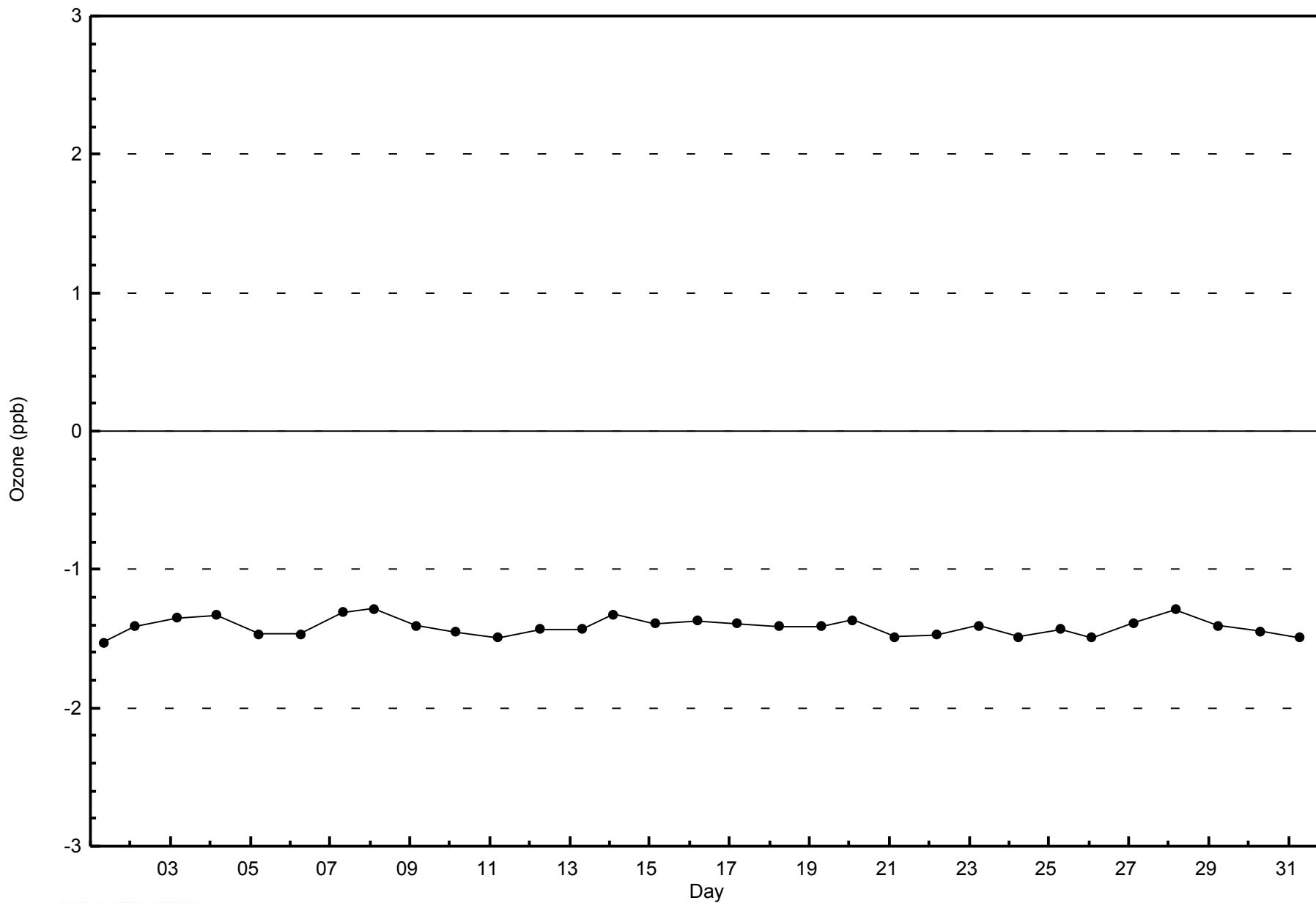
Ozone (O<sub>3</sub>) - ppb  
Patricia McInnes (AMS 6)





**WBEA**  
**Zero Responses**

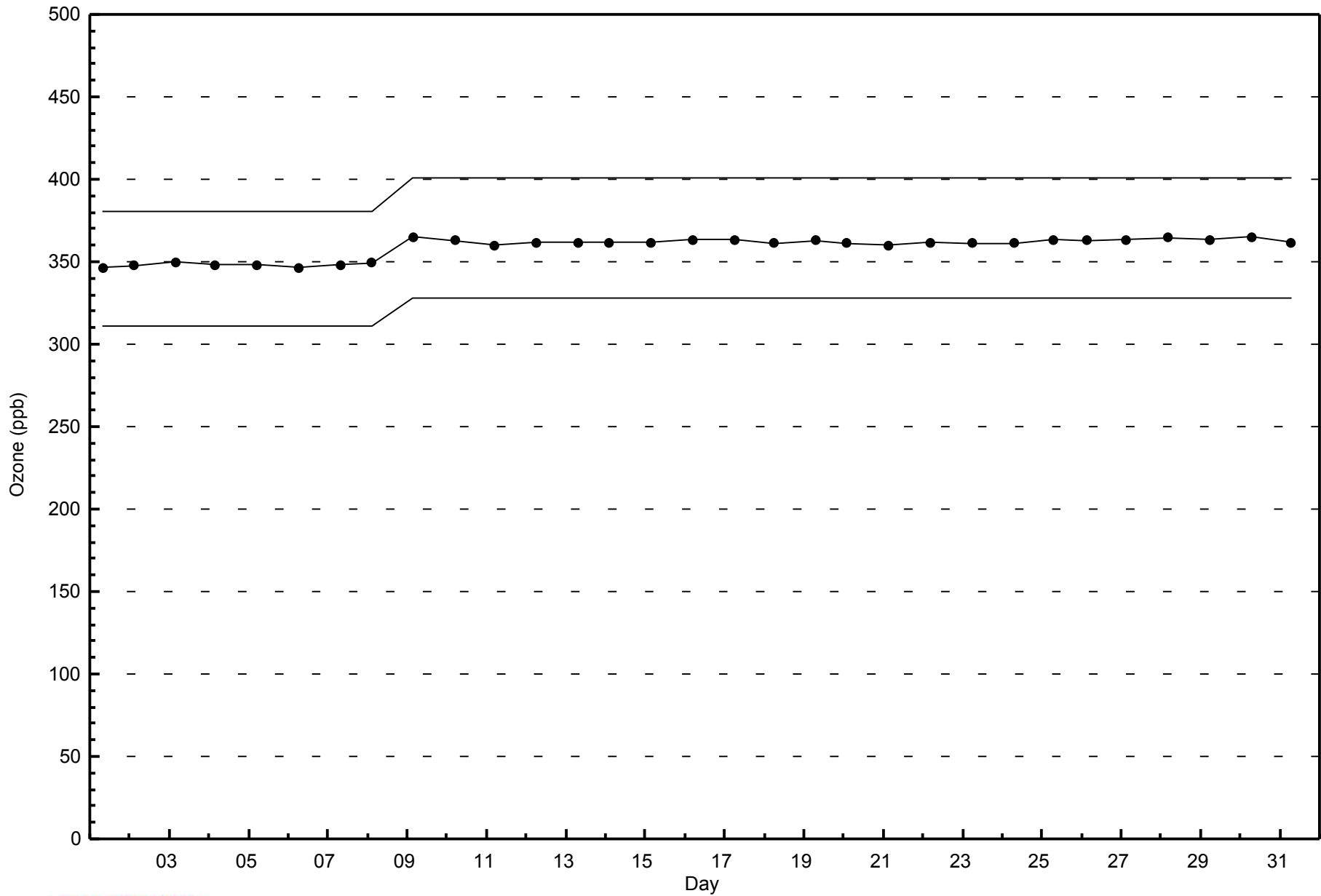
**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2014**





**WBEA**  
**Span Responses**

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2014**





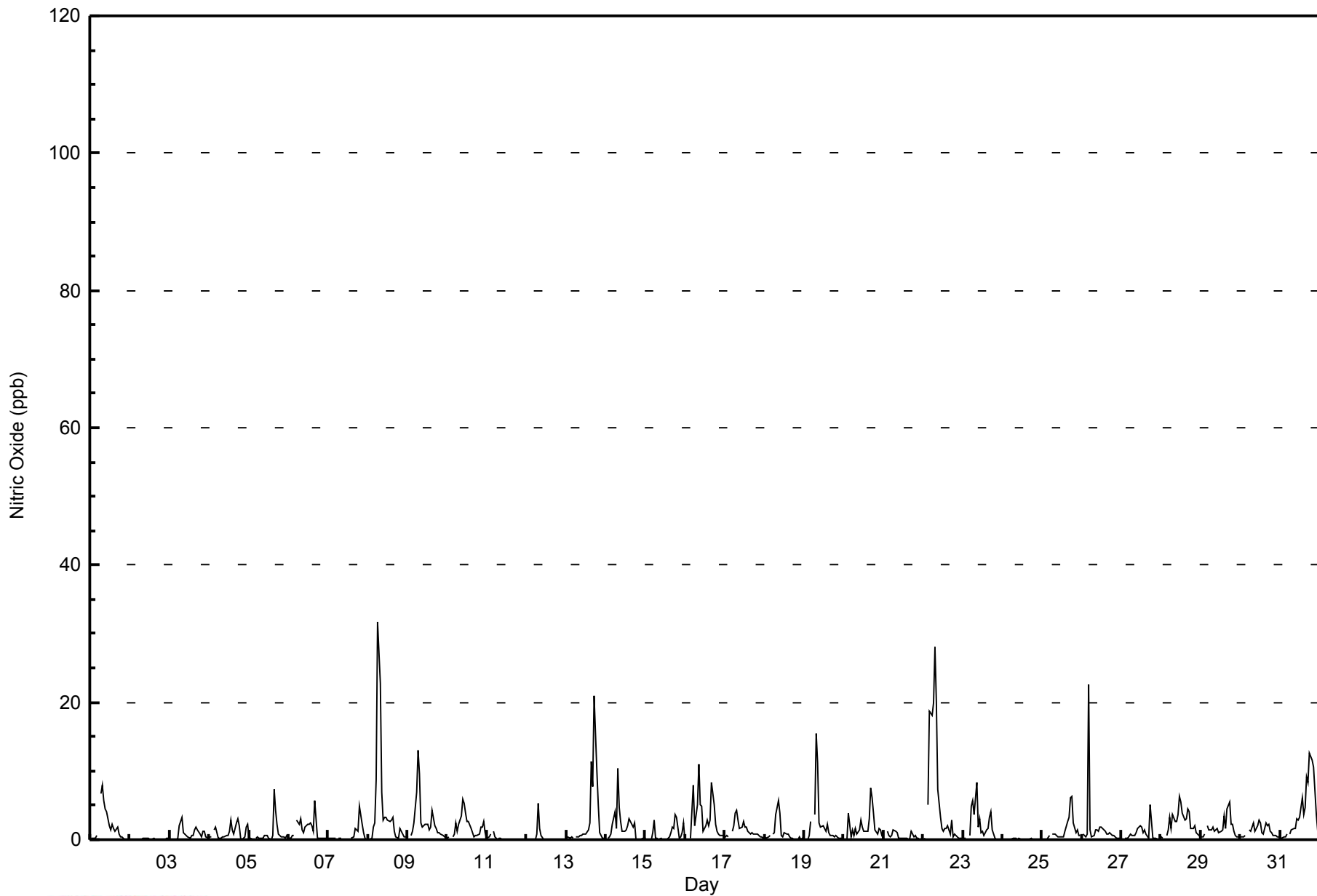
Maximum Value: 32 ppb on Oct 8 07:00																	Maximum Daily Average: 5.9 ppb on Oct 22																	Hours in Service: 744	
Minimum Value: 0 ppb on Oct 11 18:00																	Minimum Daily Average: 0.1 ppb on Oct 24																	Hours of Data: 708	
Maximum Diurnal Average: 4.5 ppb at hour 8																	Minimum Diurnal Average: 0.2 ppb at hour 1																	Hours of Missing Data: 36	
Monthly Average: 1.7 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> = 4 P <sub>99</sub> = 20																	Hours of Calibration: 36	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Oct	0	0	0	0	1	Z	7	8	6	5	4	2	1	2	2	1	2	1	0	0	0	0	0	0	1.9	8									
2-Oct	Z	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									
3-Oct	0	Z	0	0	0	0	2	3	1	1	1	0	0	1	1	1	2	1	1	0	1	1	0	0	0.8	3									
4-Oct	0	0	Z	1	2	0	0	0	0	0	1	1	1	3	1	1	2	3	2	0	0	0	2	2	1.1	3									
5-Oct	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	1	7	4	2	1	0	0	0	0	1	0.9	7									
6-Oct	0	0	1	1	Z	3	2	3	1	1	2	2	2	2	2	1	6	0	0	0	0	0	0	0	1.3	6									
7-Oct	0	0	0	0	0	Z	0	0	0	C	C	C	C	C	0	0	2	1	1	5	2	1	0	0	0.8	5									
8-Oct	Z	0	0	2	2	9	32	23	7	3	3	3	3	3	3	3	3	1	0	0	2	1	1	0	0	4.4	32								
9-Oct	0	Z	1	1	2	7	13	9	2	2	2	2	2	1	2	4	2	2	1	1	1	1	0	0	2.6	13									
10-Oct	0	0	Z	0	1	2	1	2	3	6	5	4	3	3	2	1	0	1	1	1	2	2	3	1	1.9	6									
11-Oct	0	0	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
12-Oct	0	0	0	0	Z	0	1	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	5									
13-Oct	0	0	0	0	0	Z	0	0	1	1	1	1	1	2	2	11	8	21	10	5	1	1	0	0	2.9	21									
14-Oct	Z	0	0	1	2	4	2	10	5	3	1	1	1	2	3	3	2	2	0	0	0	0	0	0	1.9	10									
15-Oct	0	Z	0	0	1	3	0	0	0	0	0	0	0	0	0	1	2	2	4	3	0	0	1	2	0.9	4									
16-Oct	0	0	Z	0	4	8	2	5	11	5	5	1	2	3	2	3	8	5	2	1	1	1	1	1	3.1	11									
17-Oct	0	1	1	Z	1	2	4	4	3	2	2	3	2	2	1	1	1	1	1	1	1	0	0	0	1.4	4									
18-Oct	0	0	0	1	Z	1	1	4	6	4	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0.9	6									
19-Oct	0	0	0	1	3	Z	4	15	11	2	2	2	2	1	2	1	1	1	0	1	0	0	0	0	2.1	15									
20-Oct	Z	0	0	4	0	1	1	2	1	1	3	2	1	1	1	3	8	6	4	1	1	2	1	1	2.0	8									
21-Oct	1	Z	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0.5	1									
22-Oct	0	0	Z	5	19	18	20	28	20	7	3	2	1	2	2	2	1	3	0	1	1	0	0	0	5.9	28									
23-Oct	0	0	0	Z	1	5	6	4	8	2	3	1	1	1	2	3	4	1	0	0	0	0	0	0	1.9	8									
24-Oct	0	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									
25-Oct	0	0	0	0	1	Z	1	1	1	0	0	0	1	0	0	1	3	3	6	6	2	1	1	1	1	1.3	6								
26-Oct	Z	1	0	1	23	1	0	1	1	1	1	2	2	1	1	1	1	1	1	1	0	0	0	0	1.8	23									
27-Oct	0	Z	0	0	0	1	1	1	1	1	2	2	2	1	2	1	0	5	3	0	0	0	0	0	1.0	5									
28-Oct	0	0	Z	1	1	3	2	4	3	3	4	6	5	4	3	3	4	4	2	2	2	1	1	1	2.5	6									
29-Oct	1	0	1	Z	2	1	1	2	1	1	2	1	1	1	3	2	4	6	2	2	1	1	0	0	1.7	6									
30-Oct	0	0	0	1	Z	1	1	2	2	1	2	3	3	1	1	3	2	2	1	1	1	1	0	0	1.3	3									
31-Oct	0	0	0	0	1	Z	1	2	2	2	3	3	3	6	4	5	9	8	13	12	11	7	4	1	4.2	13									
																	Diurnal Average		Diurnal Maximum																
																	0.2		1																
																	0.2		1																
																	0.3		1																
																	0.8		5																
																	2.6		23																
																	2.9		18																
																	3.4		32																
																	4.5		28																
																	3.3		20																
																	1.9		7																
																	1.8		5																
																	1.5		6																
																	1.4		5																
																	1.5		6																
																	1.4		4																
																	2.1		11																
																	2.6		9																
																	2.9		21																
																	1.9		13																
																	1.4		12																
																	0.9		11																
																	0.7		7																
																	0.5		4																
																	0.4		2																

Z - zerospan C - Calibration



**WBEA**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - October 2014**







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

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	703	99.29	99.29
21 - 40	5	0.71	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - October 2014**

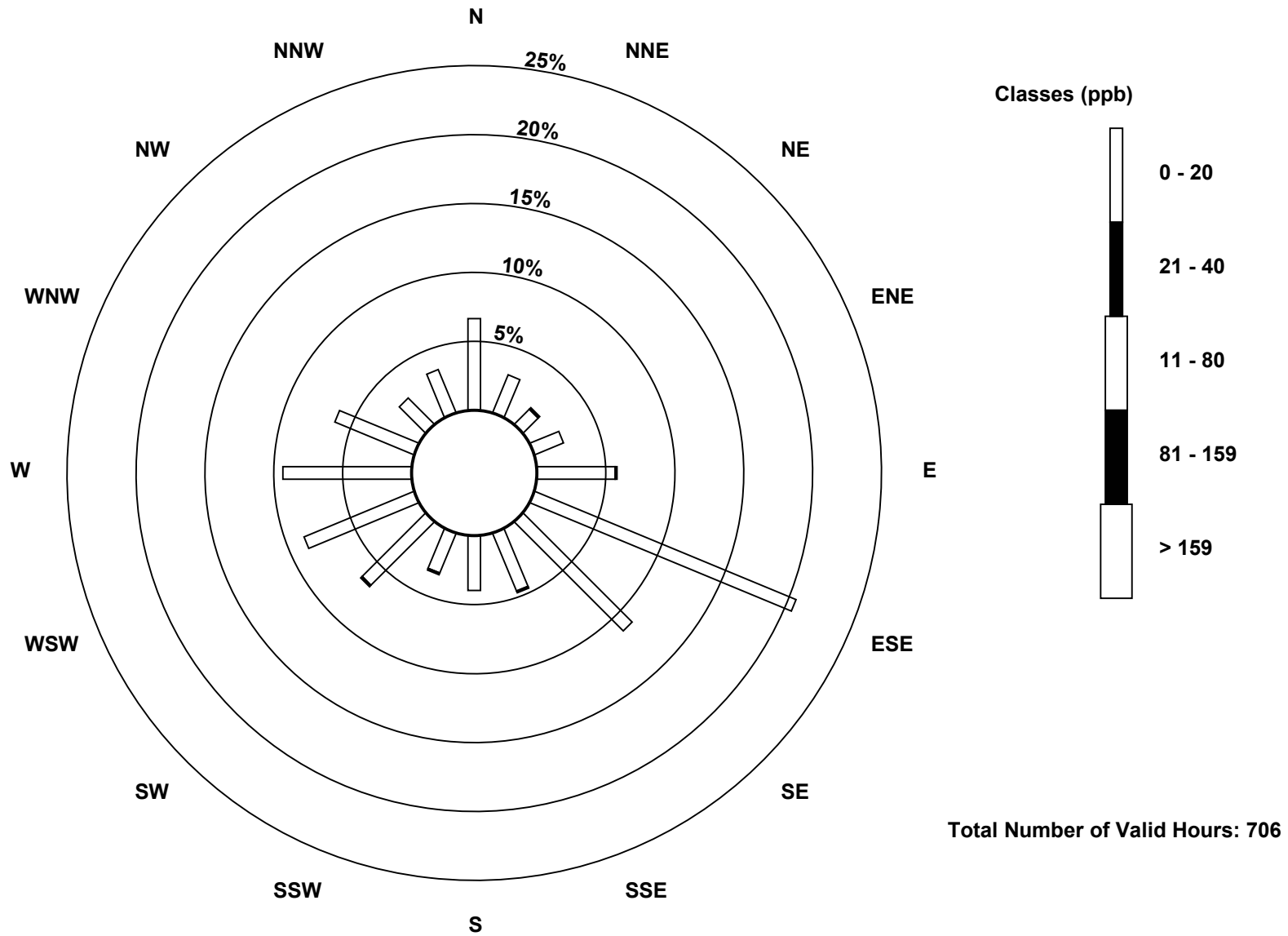
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	47	21	11	16	40	145	79	32	28	22	46	61	66	44	19	24	701
21 - 40	0	0	1	0	1	0	0	1	0	1	1	0	0	0	0	0	5
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	21	12	16	41	145	79	33	28	23	47	61	66	44	19	24	706

Total Number of Valid Hours: 706

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

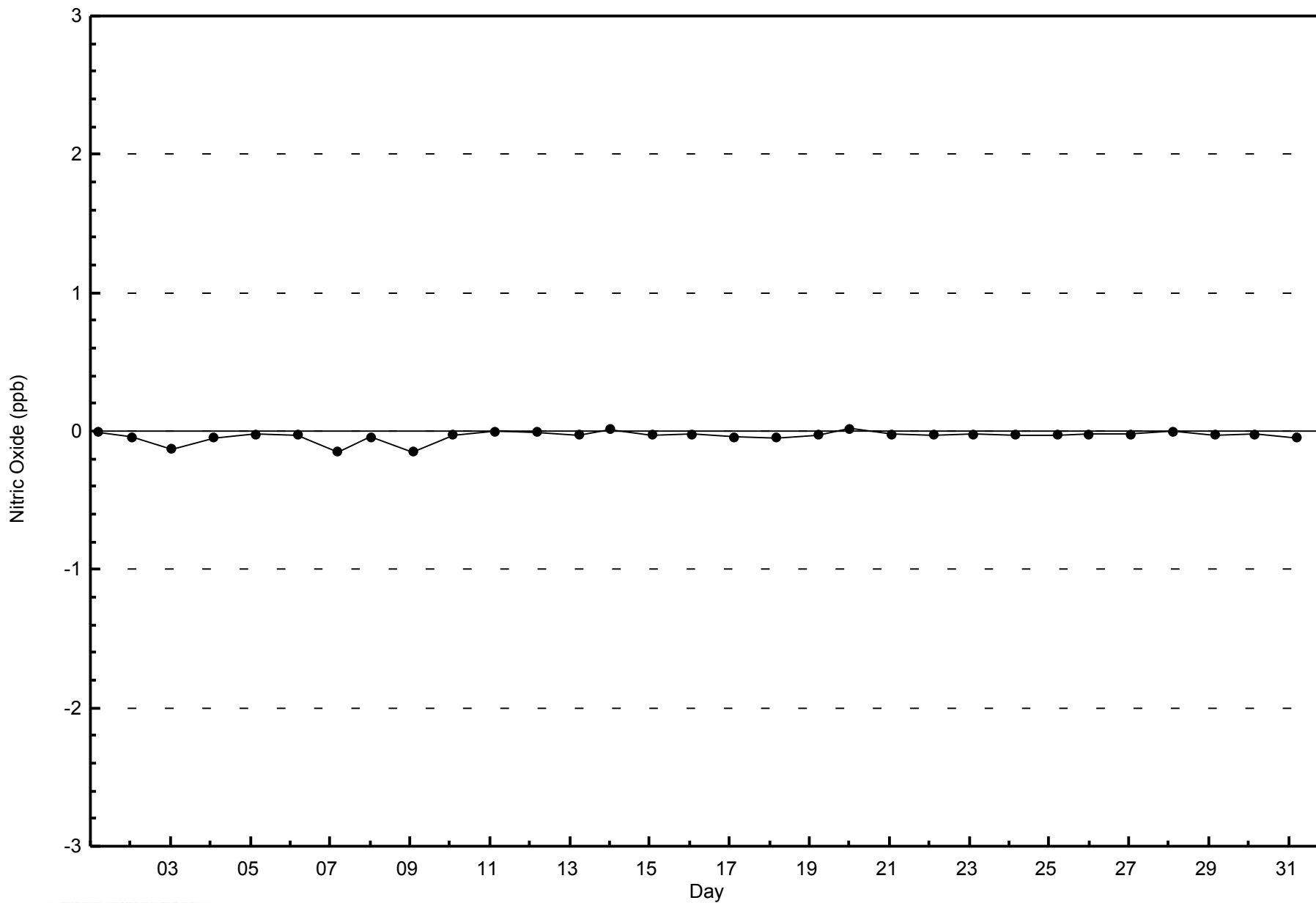
**Nitric Oxide (NO) - ppb  
Patricia McInnes (AMS 6)**





WBEA  
Zero Responses

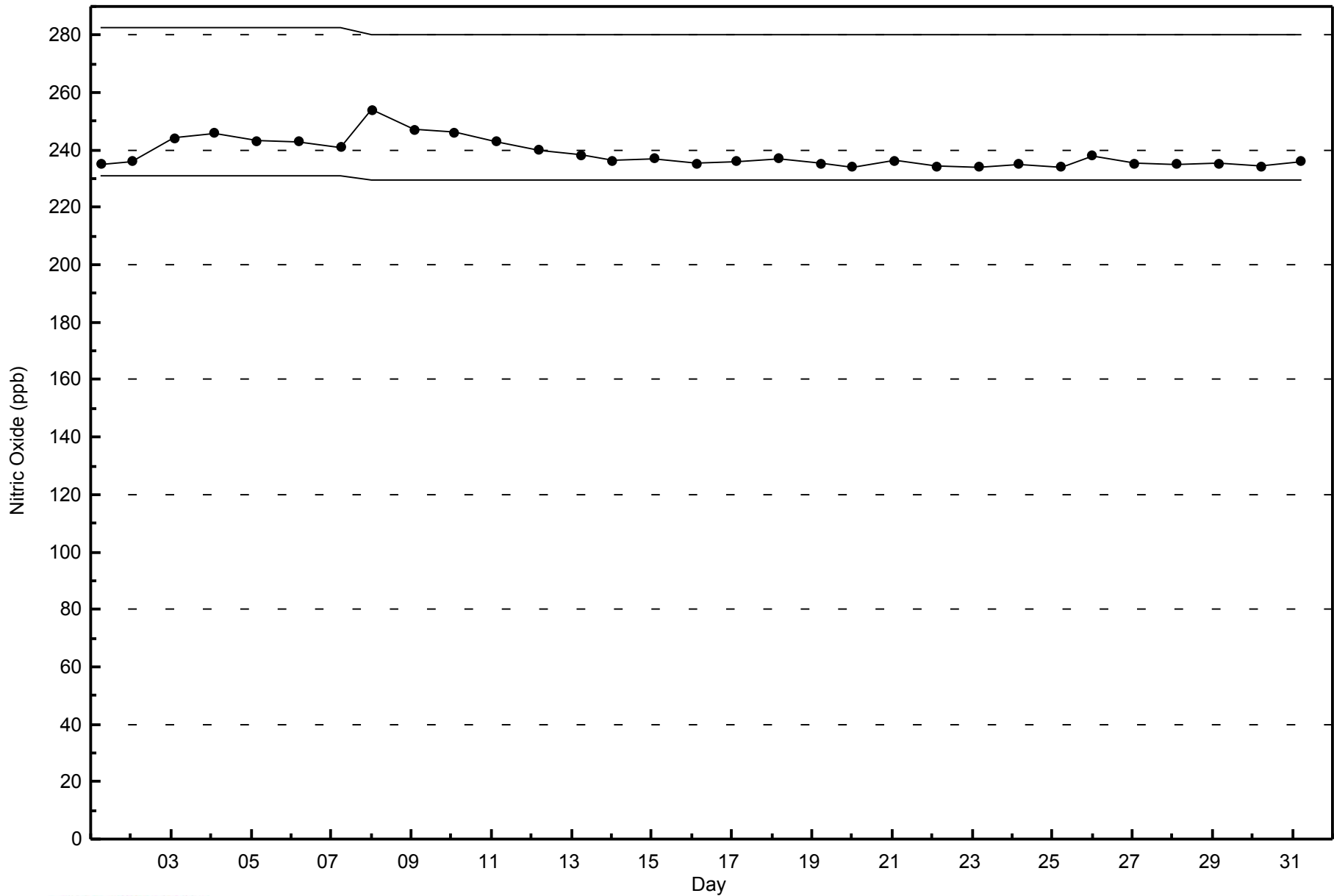
Nitric Oxide (NO) - ppb  
Patricia McInnes - October 2014





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Patricia McInnes - October 2014





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 23 ppb on Oct 23 07:00	Maximum Daily Average: 7.8 ppb on Oct 22
Minimum Value: 0 ppb on Oct 15 10:00	Hours of Data: 708
Maximum Diurnal Average: 7.7 ppb at hour 18	Hours of Missing Data: 36
Monthly Average: 4.5 ppb	Hours of Calibration: 36
Minimum Daily Average: 0.3 ppb on Oct 24	Percent Operational Time: 100.0
Minimum Diurnal Average: 2.5 ppb at hour 3	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 3 Q <sub>3</sub> = 6 P <sub>90</sub> = 10 P <sub>99</sub> = 19	

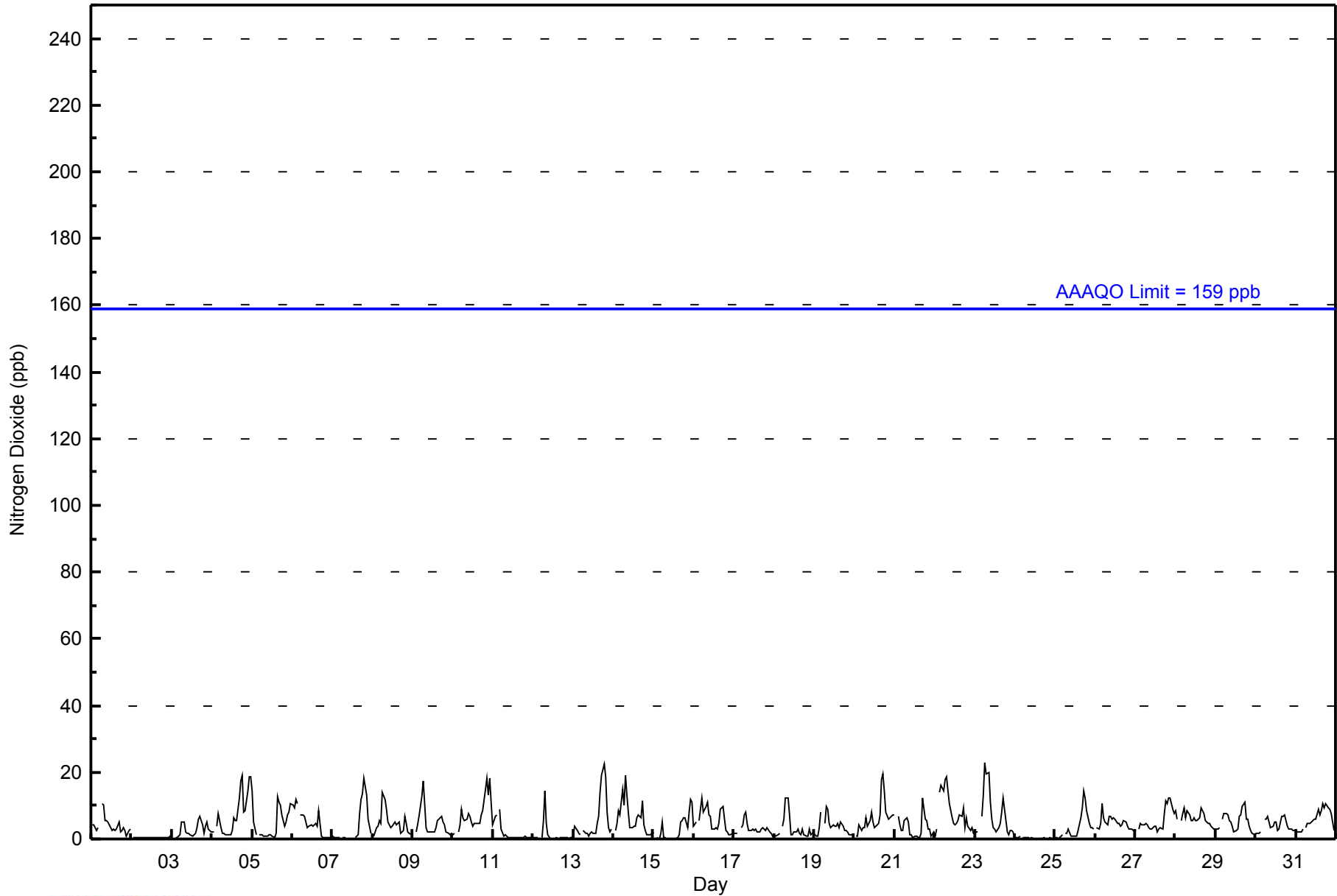
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	4	4	3	3	3	Z	11	10	5	5	5	3	2	3	3	3	5	2	2	3	2	1	3	3	3.9	11
2-Oct	Z	0	0	0	0	0	1	0	1	0	1	1	0	0	1	0	0	0	0	0	1	1	1	1	0.4	1
3-Oct	1	Z	1	1	1	1	5	5	2	2	2	1	1	1	2	4	6	7	4	2	4	5	3	2	2.6	7
4-Oct	2	2	Z	4	8	3	2	2	1	1	1	1	3	7	6	5	12	18	19	8	8	14	19	19	7.2	19
5-Oct	15	5	1	Z	1	1	1	1	1	1	1	1	1	1	2	13	11	10	7	4	5	7	8	10	4.7	15
6-Oct	10	9	12	11	Z	7	7	7	5	3	4	4	4	4	5	4	8	1	1	1	1	0	1	1	4.7	12
7-Oct	1	1	1	1	1	Z	1	1	1	C	C	C	C	C	0	1	8	12	14	18	13	6	4	2	4.6	18
8-Oct	Z	1	4	4	6	5	14	12	9	5	4	4	4	5	4	5	5	2	2	7	5	2	2	1	4.7	14
9-Oct	1	Z	2	4	7	13	17	10	3	2	2	2	2	2	3	6	7	7	5	4	2	2	1	2	4.6	17
10-Oct	1	2	Z	2	4	9	6	6	6	8	7	5	4	5	5	5	5	7	8	15	18	13	18	11	7.3	18
11-Oct	4	7	7	Z	9	3	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1.7	9
12-Oct	1	1	0	1	Z	1	6	14	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	14
13-Oct	1	4	3	2	1	Z	2	2	2	1	2	2	2	2	5	7	14	19	22	19	8	3	2	3	5.5	22
14-Oct	Z	3	5	8	7	15	10	19	13	8	4	3	4	4	6	7	7	12	4	3	1	1	1	2	6.4	19
15-Oct	2	Z	0	0	2	5	1	0	0	0	0	0	0	0	0	1	5	6	7	6	3	8	12	11	3.0	12
16-Oct	4	5	Z	5	9	12	8	10	11	7	7	3	3	3	3	5	9	10	6	3	2	1	1	2	5.6	12
17-Oct	2	2	2	Z	4	4	7	8	5	3	2	3	2	3	2	2	3	4	3	3	3	2	2	1	3.0	8
18-Oct	1	1	1	2	Z	4	6	12	12	7	1	1	2	2	3	2	1	3	1	1	1	3	1	2	3.1	12
19-Oct	1	1	1	4	8	Z	5	10	9	5	4	4	4	4	5	4	5	4	3	3	2	1	1	1	3.7	10
20-Oct	Z	1	1	4	2	3	3	6	4	5	8	5	4	4	5	7	18	20	15	8	6	6	7	7	6.4	20
21-Oct	7	Z	7	4	3	3	5	7	5	1	1	1	1	1	0	0	2	12	6	5	3	3	1	2	3.5	12
22-Oct	1	3	Z	14	16	15	18	19	15	11	6	5	4	5	5	7	7	9	4	6	4	3	3	2	7.8	19
23-Oct	2	2	2	Z	7	13	23	19	20	11	6	3	3	2	3	5	8	12	9	2	1	3	2	2	7.0	23
24-Oct	1	1	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
25-Oct	0	0	0	0	1	Z	2	2	3	1	1	1	1	1	2	7	9	14	12	9	5	4	4	3	3.5	14
26-Oct	Z	3	3	5	11	6	5	4	7	7	6	6	6	5	5	4	4	5	5	4	3	3	3	2	4.8	11
27-Oct	3	Z	3	5	4	4	5	4	3	3	3	4	4	2	3	3	3	8	12	10	12	12	9	8	5.5	12
28-Oct	8	6	Z	5	8	9	7	8	7	6	6	6	5	6	6	9	9	8	6	5	5	4	3	3	6.3	9
29-Oct	3	3	3	Z	6	8	8	7	5	5	4	2	3	3	7	7	10	11	6	6	4	2	2	1	5.1	11
30-Oct	2	2	2	2	Z	6	6	7	5	4	4	5	5	3	3	7	7	7	5	4	3	3	2	3	4.1	7
31-Oct	2	2	2	2	3	Z	4	5	5	5	6	6	6	9	7	8	11	9	11	10	9	8	5	3	5.9	11
																								Diurnal Average		
																								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 - October 2014**





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Patricia McInnes - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	706	99.72	99.72
21 - 40	2	0.28	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Patricia McInnes - October 2014**

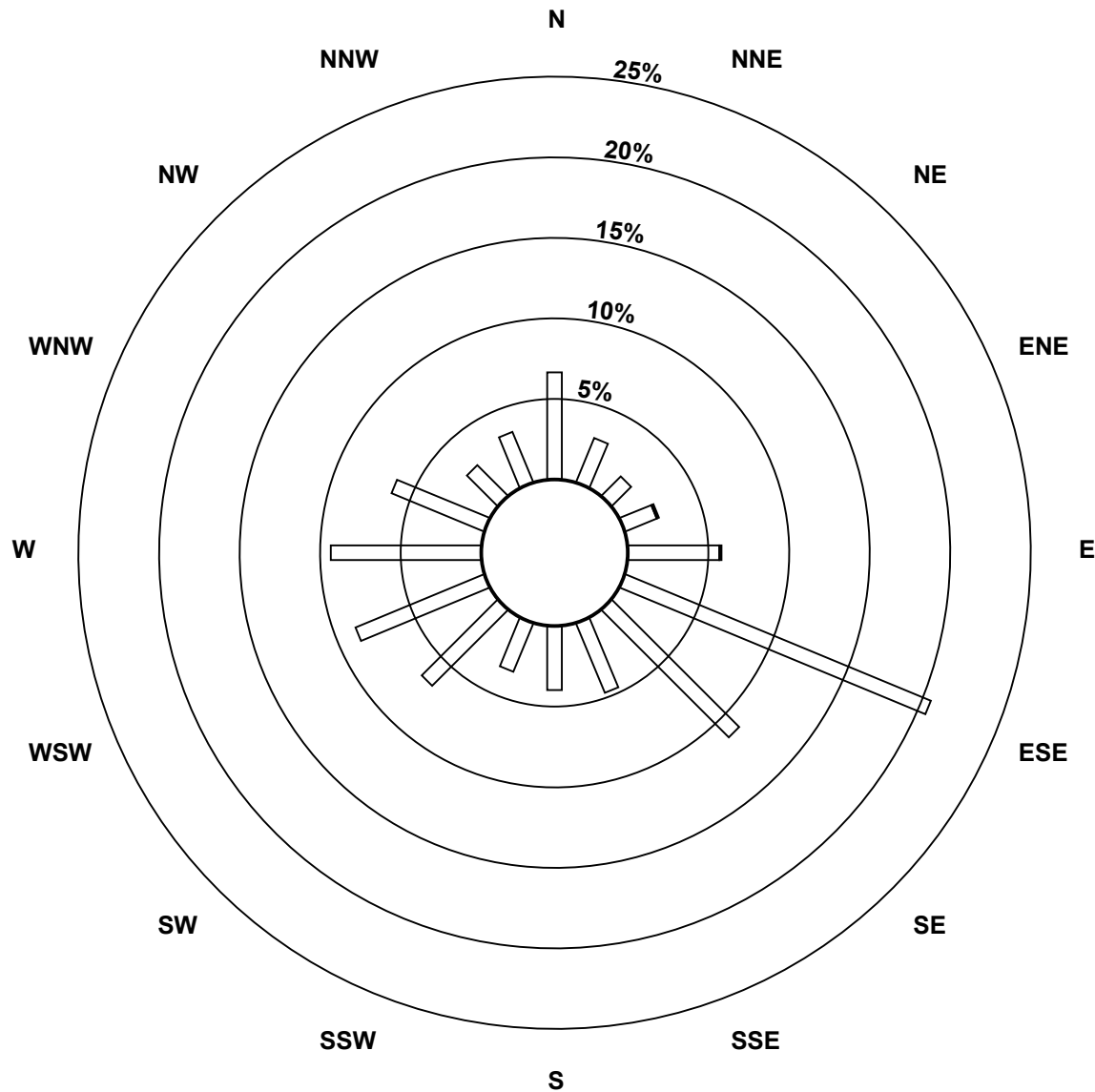
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	47	21	12	15	40	145	79	33	28	23	47	61	66	44	19	24	704
21 - 40	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	21	12	16	41	145	79	33	28	23	47	61	66	44	19	24	706

Total Number of Valid Hours: 706

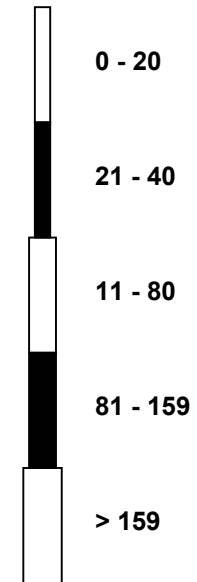
Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Patricia McInnes (AMS 6)



Classes (ppb)

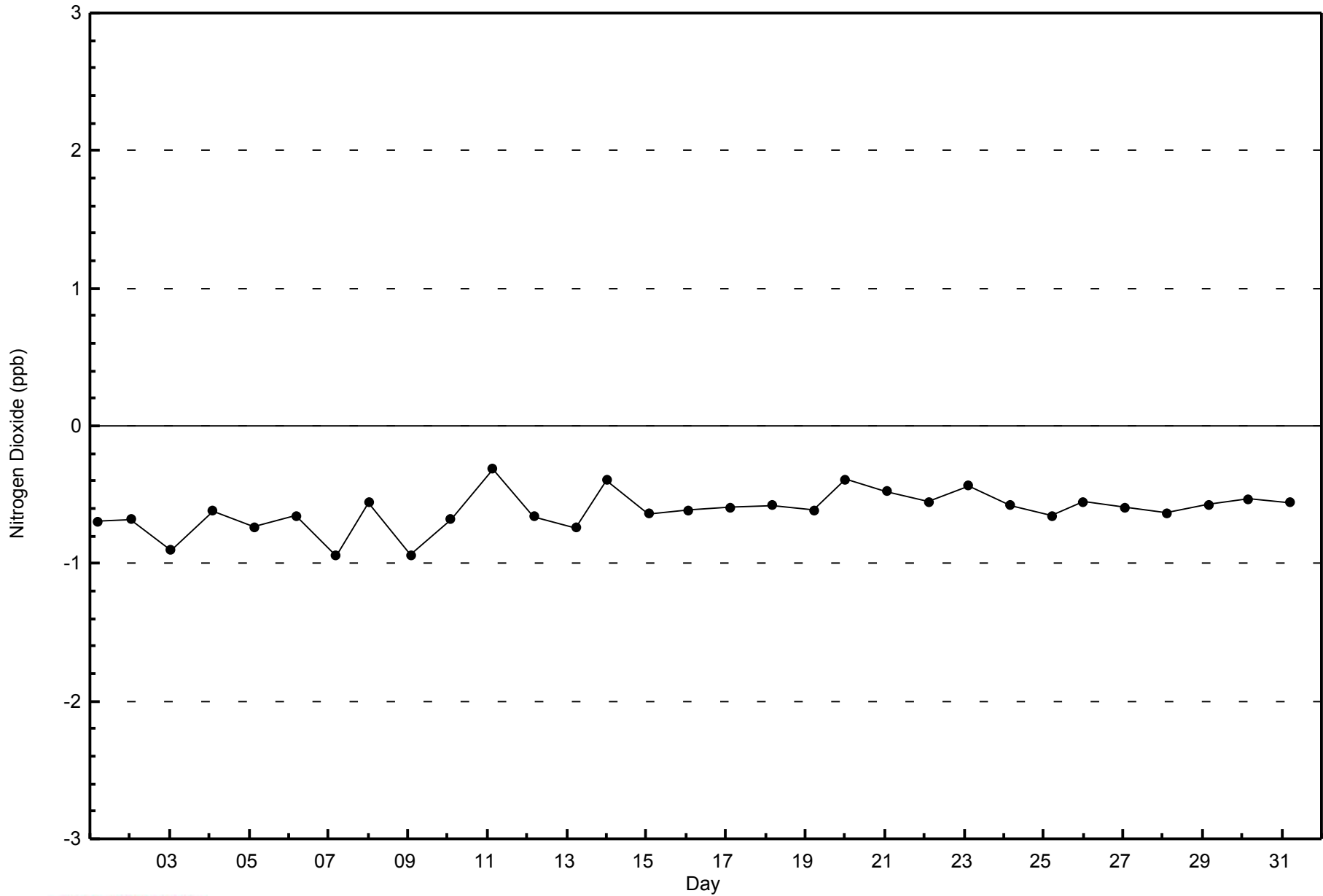


Total Number of Valid Hours: 706



**WBEA**  
**Zero Responses**

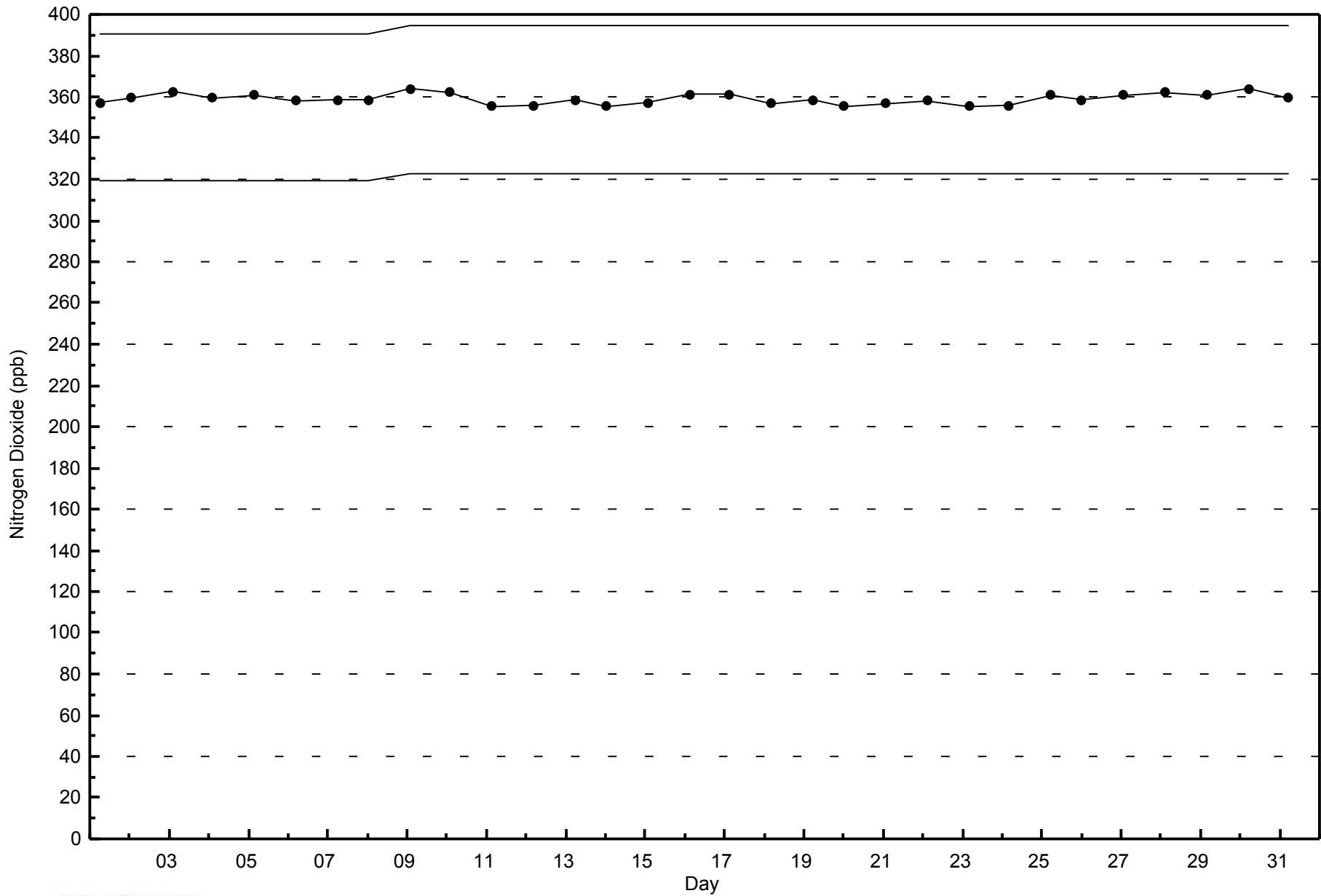
**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Patricia McInnes - October 2014**





**WBEA**  
**Span Responses**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Patricia McInnes - October 2014**



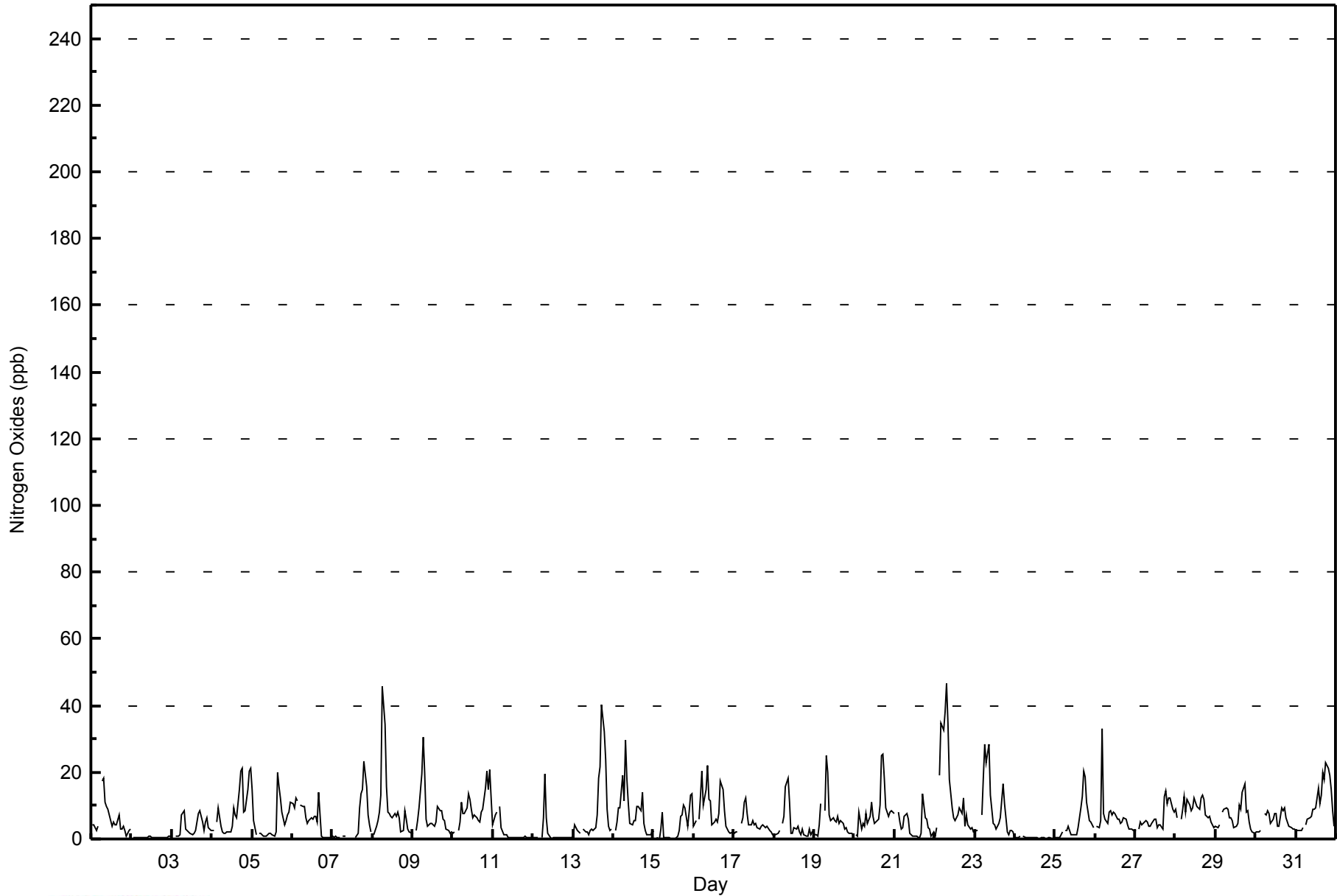


Maximum Value: 47 ppb on Oct 22 08:00																		Maximum Daily Average: 13.7 ppb on Oct 22						Hours in Service: 744			
Minimum Value: 0 ppb on Oct 15 12:00																		Minimum Daily Average: 0.4 ppb on Oct 24						Hours of Data: 708			
Maximum Diurnal Average: 11.5 ppb at hour 8																		Minimum Diurnal Average: 2.8 ppb at hour 3						Hours of Missing Data: 36			
Monthly Average: 6.2 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 4 Q <sub>3</sub> = 8 P <sub>90</sub> = 14 P <sub>99</sub> = 34						Hours of Calibration: 36			
																		Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	4	4	4	3	4	Z	17	18	11	10	9	5	4	5	4	4	7	3	3	4	3	1	3	3	5.8	18	
2-Oct	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0	0	1	1	0	1	1	1	1	0.5	1	
3-Oct	1	Z	1	1	1	1	7	8	3	2	2	2	1	2	2	5	8	8	5	2	5	6	4	2	3.5	8	
4-Oct	2	2	Z	5	9	4	2	2	2	2	2	4	9	7	6	15	21	21	8	8	15	20	21	8.3	21		
5-Oct	15	5	1	Z	2	2	1	1	1	1	2	2	1	1	2	20	16	12	8	4	5	7	8	11	5.6	20	
6-Oct	11	9	12	11	Z	10	10	10	7	5	5	6	6	7	7	5	14	1	1	1	1	1	1	1	6.0	14	
7-Oct	1	1	1	1	1	Z	1	1	1	C	C	C	C	C	1	2	9	13	15	23	15	7	4	2	5.4	23	
8-Oct	Z	1	4	6	8	13	46	35	16	8	8	7	7	8	7	8	6	2	3	9	6	3	2	2	9.2	46	
9-Oct	2	Z	3	5	9	20	30	20	6	4	5	4	4	4	5	10	9	8	6	5	3	3	2	2	7.3	30	
10-Oct	2	2	Z	3	5	11	8	8	9	14	12	9	6	7	6	6	5	8	9	15	20	15	21	12	9.3	21	
11-Oct	4	7	8	Z	10	4	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	1.9	10	
12-Oct	1	1	0	1	Z	1	6	20	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.8	20	
13-Oct	1	4	3	2	2	Z	3	2	2	1	2	3	2	3	7	18	22	40	32	24	9	4	2	3	8.4	40	
14-Oct	Z	3	5	9	9	19	12	30	18	11	5	4	5	6	10	10	8	14	4	2	1	1	1	2	8.3	30	
15-Oct	2	Z	0	0	3	8	1	1	0	0	0	0	0	0	1	2	7	7	10	9	4	8	13	14	3.9	14	
16-Oct	4	5	Z	6	13	20	10	15	22	12	12	4	5	6	5	7	17	15	8	4	3	2	2	2	8.7	22	
17-Oct	2	2	2	Z	5	6	11	12	8	4	4	5	4	5	4	3	4	4	4	4	4	2	2	1	4.5	12	
18-Oct	1	1	2	2	Z	5	7	16	18	11	2	2	3	3	4	2	1	3	1	1	1	3	1	2	4.0	18	
19-Oct	1	1	1	4	11	Z	8	25	20	7	5	6	6	5	7	5	6	5	3	3	2	2	2	1	5.9	25	
20-Oct	Z	1	1	8	3	5	4	8	5	7	11	7	5	5	6	10	25	26	18	9	7	8	8	8	8.4	26	
21-Oct	8	Z	8	5	3	3	7	8	6	2	1	1	1	1	1	0	2	14	6	6	3	3	1	2	4.0	14	
22-Oct	1	3	Z	19	35	33	38	47	35	18	9	6	5	6	7	9	8	12	4	7	4	3	4	2	13.7	47	
23-Oct	2	2	2	Z	7	18	29	23	28	13	9	4	4	3	5	6	11	16	10	2	1	3	2	2	8.9	29	
24-Oct	1	0	0	1	Z	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1
25-Oct	0	0	0	0	2	Z	3	2	4	1	1	1	1	1	1	4	9	13	20	18	11	5	5	4	3	4.9	20
26-Oct	Z	4	3	6	33	8	6	5	8	8	7	8	8	6	6	5	5	6	6	4	3	3	3	3	6.7	33	
27-Oct	3	Z	3	5	4	5	5	5	4	4	5	6	6	3	4	4	3	13	14	11	12	12	9	8	6.5	14	
28-Oct	9	6	Z	6	9	13	8	12	10	8	9	12	11	10	9	12	13	12	7	6	7	5	4	3	8.8	13	
29-Oct	4	3	4	Z	8	9	9	9	6	6	6	3	4	5	10	9	14	17	8	8	5	3	2	2	6.7	17	
30-Oct	2	2	2	3	Z	7	7	9	7	5	6	8	7	4	4	9	9	9	7	5	4	3	3	3	5.4	9	
31-Oct	2	2	3	3	4	Z	4	6	6	7	9	9	9	15	11	13	20	18	23	21	19	15	9	4	10.0	23	
																		3.3 2.9 2.8 4.4 7.6 9.0 9.7 11.5 8.8 5.8 5.0 4.3 4.1 4.4 4.7 6.5 8.9 10.6 8.3 6.9 5.3 4.6 4.5 4.0						Diurnal Average			
																		15 9 12 19 35 33 46 47 35 18 12 12 11 15 11 20 25 40 32 24 20 15 21 21						Diurnal Maximum			
Z - zerospan																		C - Calibration									



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Patricia McInnes - October 2014





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	680	96.05	96.05
21 - 40	26	3.67	99.72
41 - 80	2	0.28	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - October 2014**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	46	19	11	12	37	142	77	26	27	22	46	60	66	44	19	24	678
21 - 40	1	2	1	4	4	3	2	6	1	0	1	1	0	0	0	0	26
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>	47	21	12	16	41	145	79	33	28	23	47	61	66	44	19	24	706

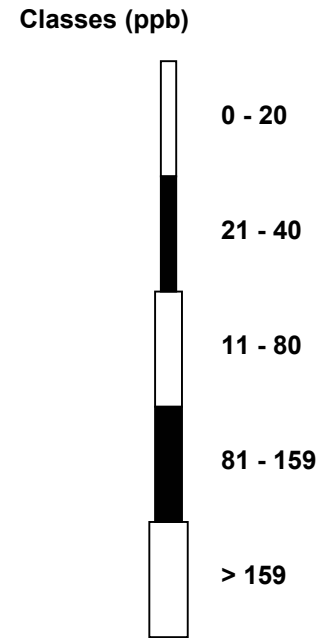
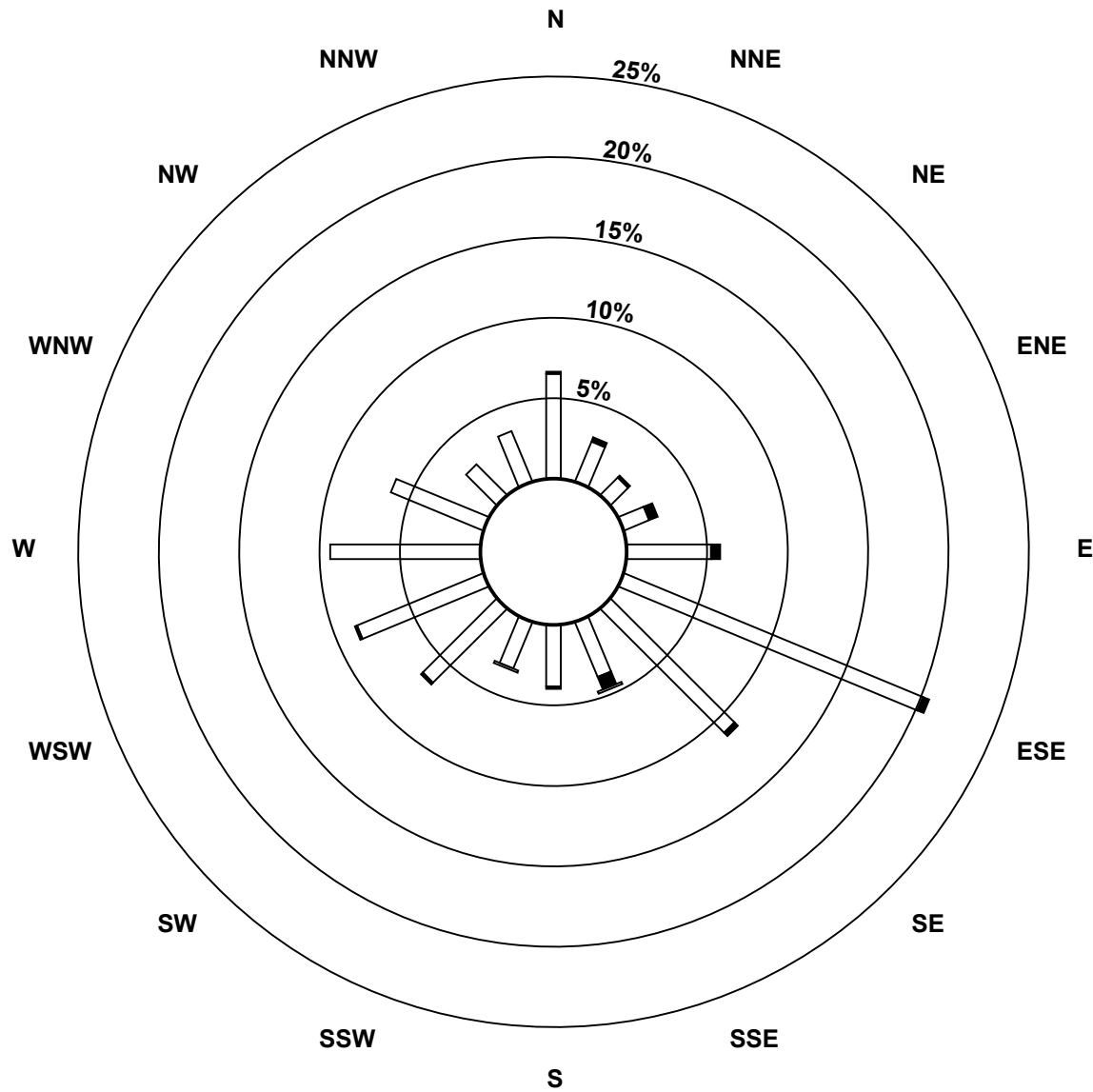
Total Number of Valid Hours: 706

Total Number of Hours: 744

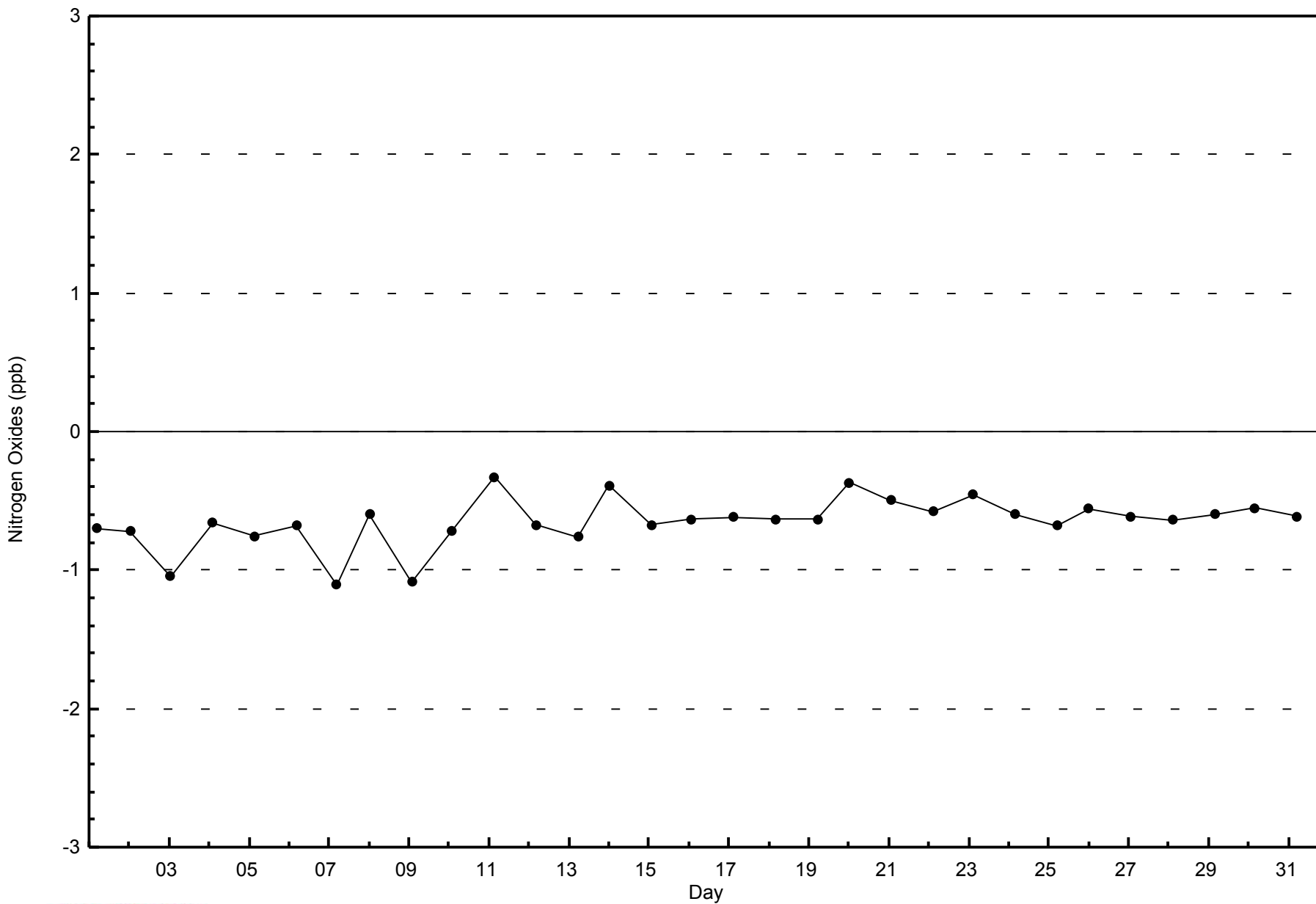


**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Patricia McInnes (AMS 6)**



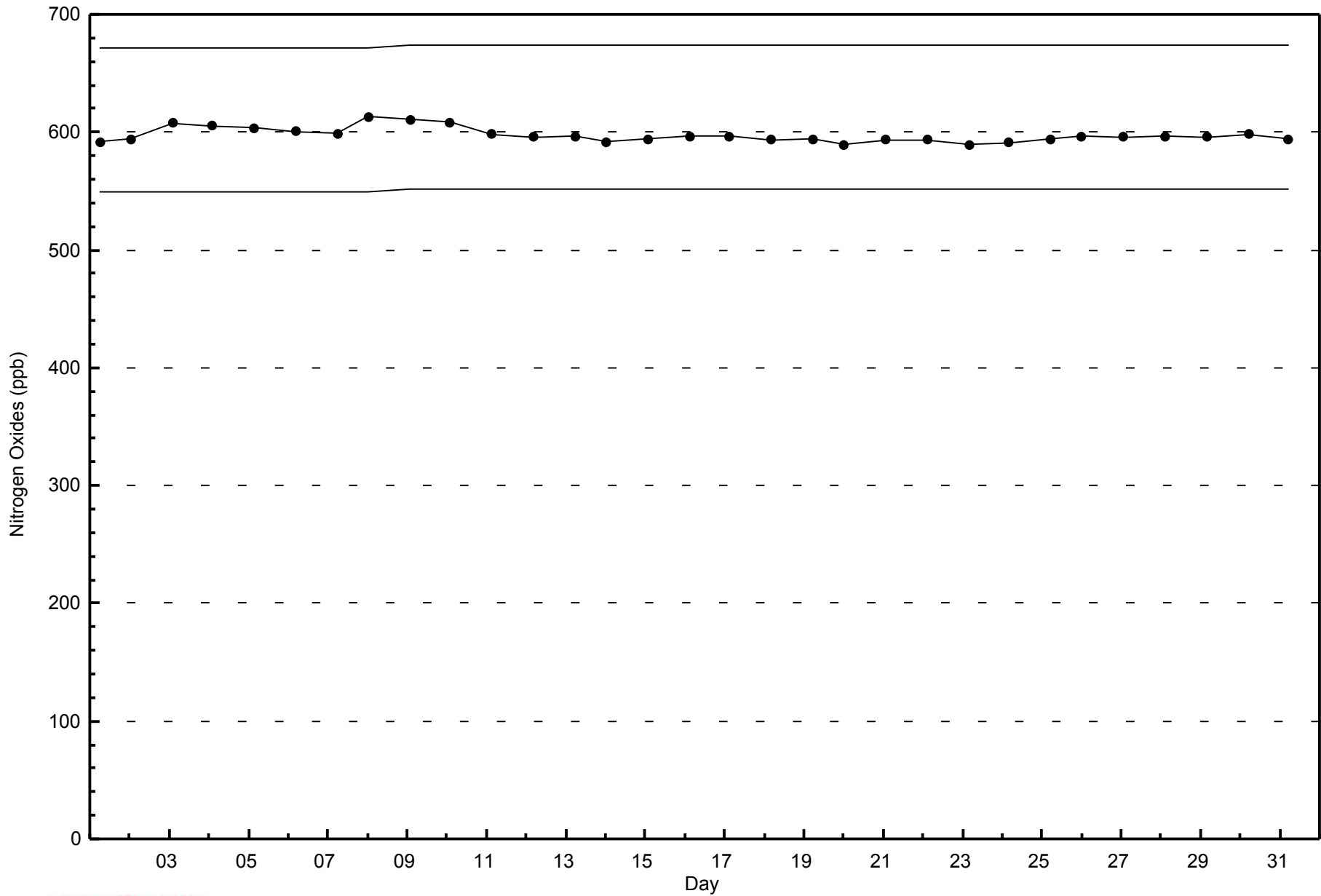
**Total Number of Valid Hours: 706**





**WBEA**  
**Span Responses**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - October 2014**





Number of Exceedences (AAAQO): 1-hr: 0	Hours in Service: 744
Maximum Value: 0 ppb on Oct 1 01:00	Maximum Daily Average: 0.0 ppb on Oct 1
Minimum Value: 0 ppb on Oct 1 01:00	Hours of Data: 672
Maximum Diurnal Average: 0.0 ppb at hour 1	Hours of Missing Data: 72
Monthly Average: 0.0 ppb	Hours of Calibration: 39
Minimum Daily Average: 0.0 ppb on Oct 1	Percent Operational Time: 95.6
Minimum Diurnal Average: 0.0 ppb at hour 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

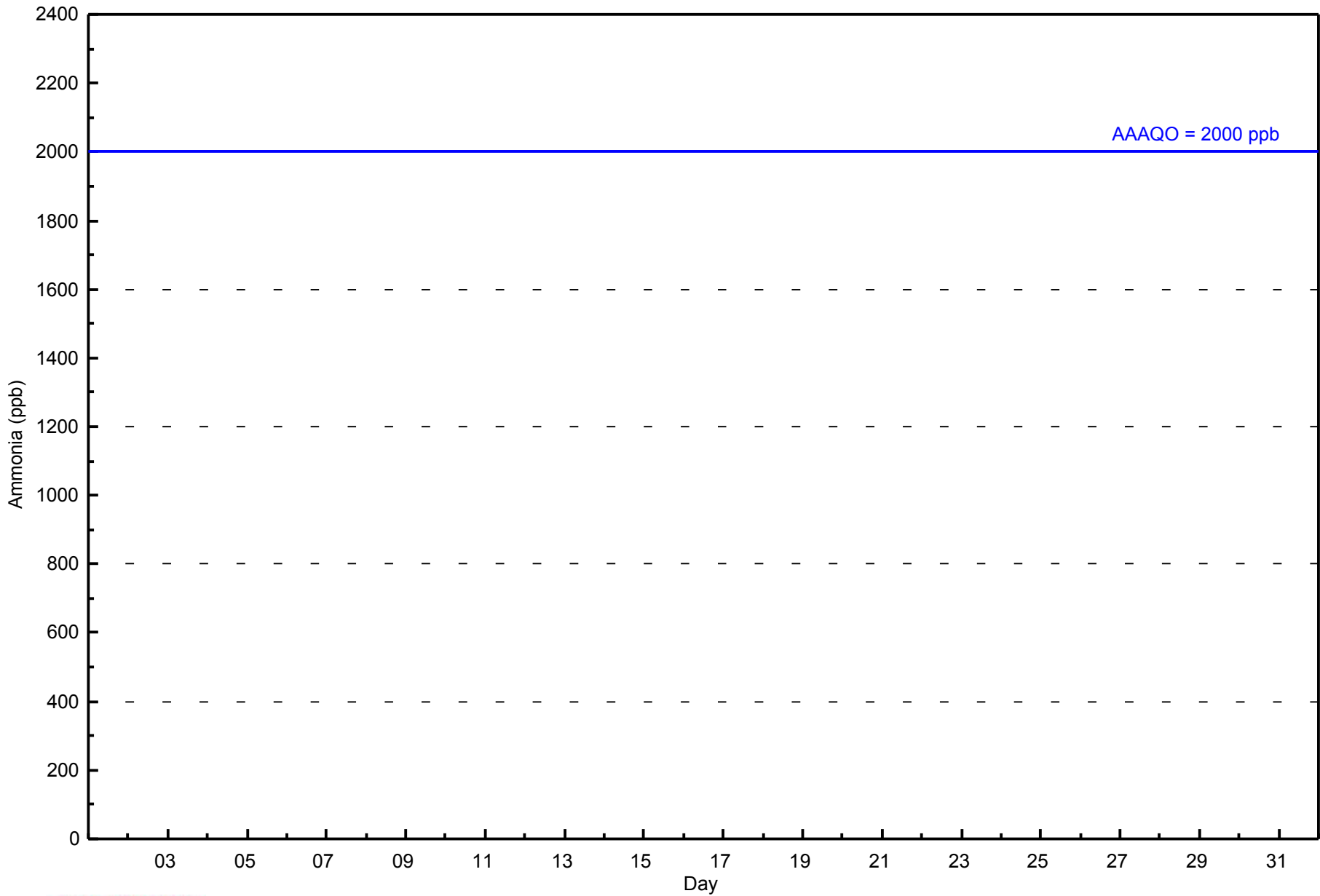
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Oct	0	0	0	Z	RE	0	0	0	0	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0
3-Oct	0	0	0	0	Z	RE	0	0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

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



**WBEA**  
**Hourly Averages**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2014**





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

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	672	100.00	100.00
6 - 10	0	0.00	100.00
11 - 15	0	0.00	100.00
16 - 20	0	0.00	100.00
21 - 25	0	0.00	100.00
> 26	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2014**

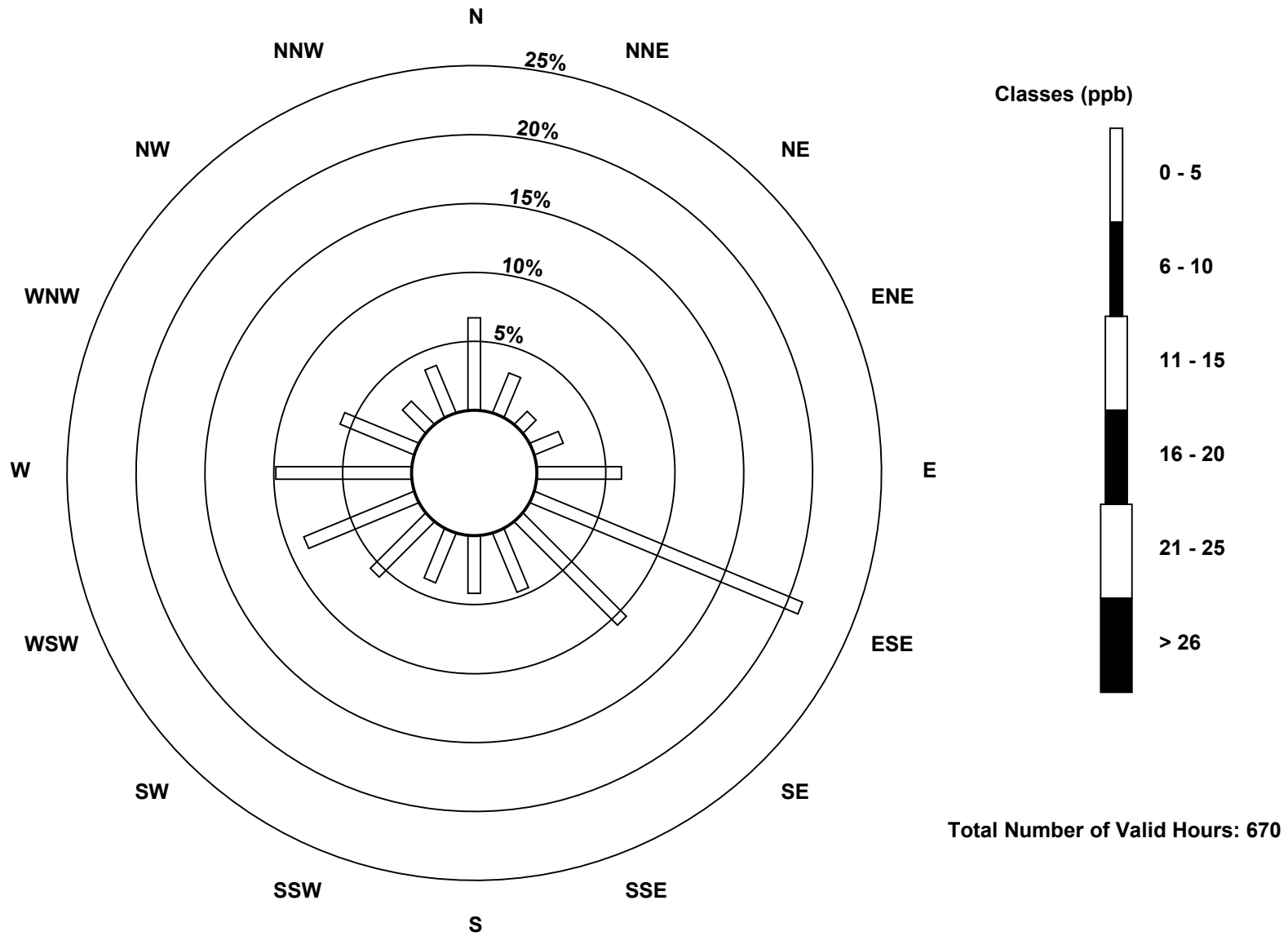
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	45	21	9	15	41	141	71	31	28	26	38	58	66	39	16	25	670
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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>	45	21	9	15	41	141	71	31	28	26	38	58	66	39	16	25	670

Total Number of Valid Hours: 670

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Ammonia (NH<sub>3</sub>) - ppb  
Patricia McInnes (AMS 6)

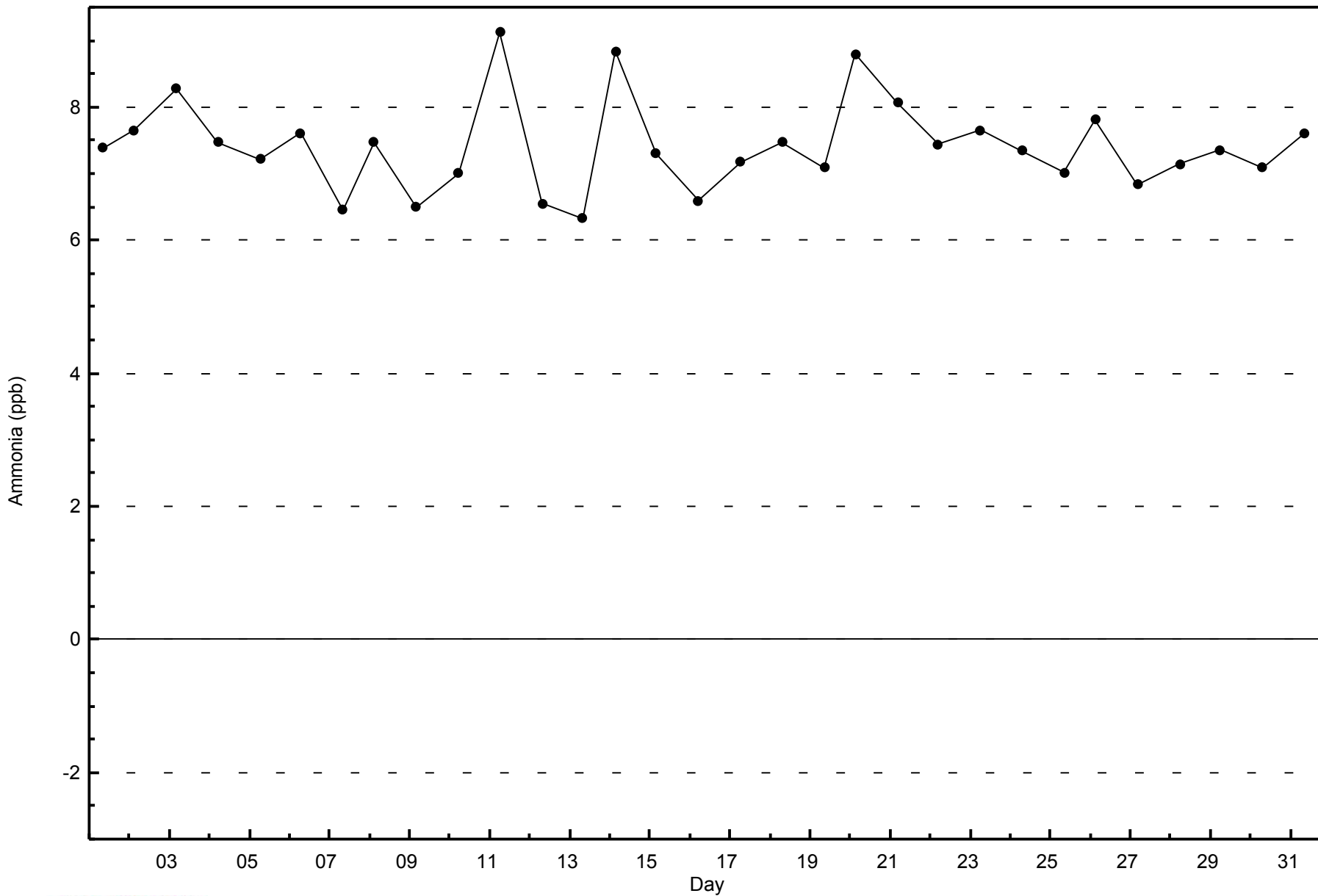






WBEA  
Zero Responses

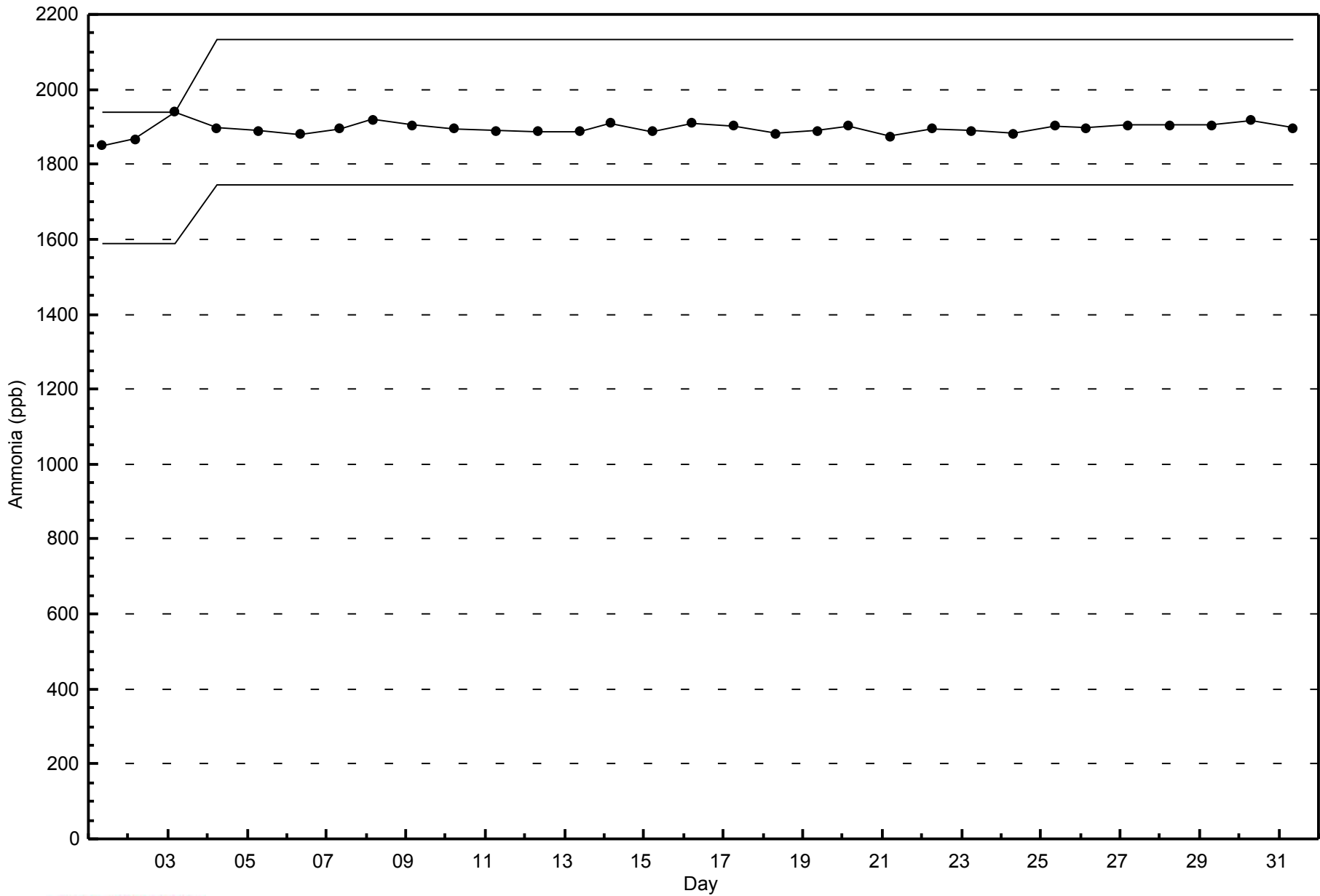
Ammonia (NH<sub>3</sub>) - ppb  
Patricia McInnes - October 2014





WBEA  
Span Responses

Ammonia (NH<sub>3</sub>) - ppb  
Patricia McInnes - October 2014





Summary of Hour Averages

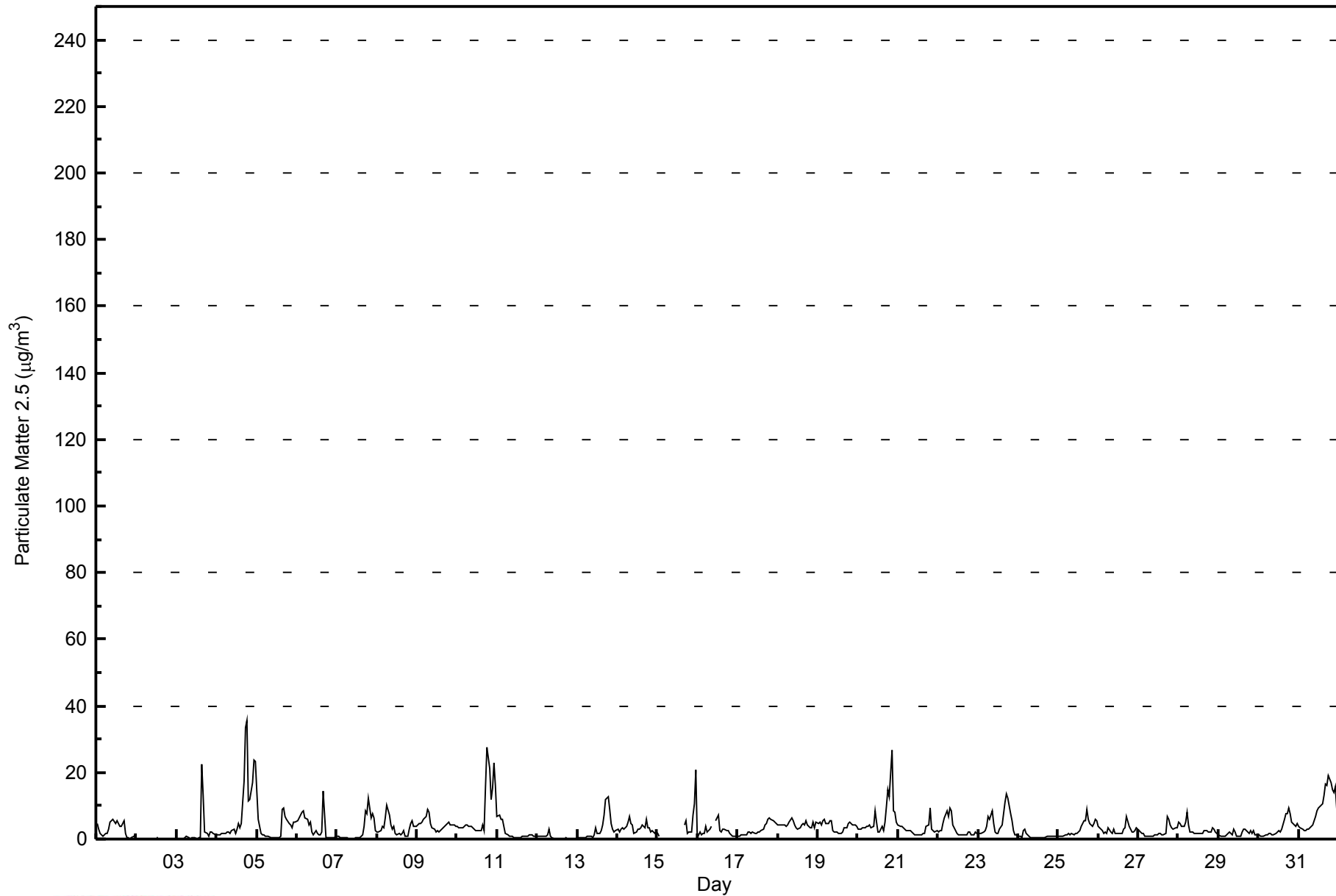
Patricia McInnes - October 2014

Number of Exceedences (AAAQO): 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 35.5 µg/m <sup>3</sup> on Oct 4 19:00										Maximum Daily Average: 8.9 µg/m <sup>3</sup> on Oct 31										Hours of Data: 713																												
Minimum Value: 0.1 µg/m <sup>3</sup> on Oct 3 01:00										Minimum Daily Average: 0.7 µg/m <sup>3</sup> on Oct 12										Hours of Missing Data: 31																												
Maximum Diurnal Average: 6.6 µg/m <sup>3</sup> at hour 19										Minimum Diurnal Average: 2.1 µg/m <sup>3</sup> at hour 14										Hours of Calibration: 0																												
Monthly Average: 3.58 µg/m <sup>3</sup>										Percentiles: P <sub>1</sub> = 0.1 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 1.2 Median = 2.4 Q <sub>3</sub> = 4.4 P <sub>90</sub> = 7.5 P <sub>99</sub> = 22.5										Percent Operational Time: 95.8																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	4.8	2.8	1.7	1.2	1.0	1.6	1.8	2.8	5.1	5.7	5.7	4.8	5.5	4.5	3.9	3.9	5.5	1.7	0.5	0.4	0.2	0.2	0.8	1.4	2.8	5.7																						
2-Oct	UO	UO	UO	UO	0.1	0.1	0.1	0.1	0.1	UO	UO	UO	0.3	0.2	UO	0.2	0.2	0.2	0.2	0.1	0.1	0.1	UO	0.1	--	0.3																						
3-Oct	0.1	0.1	0.2	0.2	0.2	0.3	0.8	0.6	0.2	0.2	0.2	0.2	0.1	0.3	0.3	22.3	13.0	2.1	1.5	0.9	1.9	2.2	1.5	1.4	2.1	22.3																						
4-Oct	1.5	1.4	1.3	1.8	1.6	1.5	2.2	2.2	1.8	2.5	3.2	1.8	2.8	4.5	3.4	4.7	17.5	33.3	35.5	11.5	11.8	16.9	23.6	23.4	8.8	35.5																						
5-Oct	14.3	5.8	1.6	1.1	1.1	0.8	1.0	0.9	0.3	0.3	0.3	0.3	0.3	0.4	0.7	9.0	9.3	6.6	5.8	4.8	4.1	3.4	5.1	5.0	3.4	14.3																						
6-Oct	5.6	6.5	7.1	7.9	8.6	6.2	6.1	4.3	5.2	2.1	1.3	2.7	1.9	1.2	1.4	2.3	14.5	0.4	0.2	0.2	0.4	0.4	0.5	0.7	3.7	14.5																						
7-Oct	0.8	0.7	0.5	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.2	1.2	3.7	8.4	7.7	12.1	6.2	7.6	6.5	2.4	2.5	12.1																						
8-Oct	2.1	2.0	2.6	3.7	3.6	6.3	10.3	7.2	4.1	2.9	3.7	1.8	1.2	1.6	1.4	1.7	2.4	0.8	1.1	2.8	4.5	5.3	4.0	3.9	3.4	10.3																						
9-Oct	4.2	4.6	4.7	5.0	5.9	6.9	8.8	7.9	4.8	3.5	2.8	2.0	2.4	2.1	2.5	3.1	3.7	4.2	4.7	4.9	4.4	4.4	4.1	3.9	4.4	8.8																						
10-Oct	3.9	3.6	3.5	3.5	3.8	4.1	4.2	4.0	3.6	3.5	3.1	2.6	2.4	2.5	2.7	4.2	2.7	15.7	27.7	21.2	11.7	15.1	22.9	16.3	7.8	27.7																						
11-Oct	6.7	7.2	5.8	5.7	3.8	1.8	1.2	0.9	0.7	0.7	0.5	0.3	0.3	0.5	0.6	0.8	0.8	0.9	0.9	1.2	1.2	1.1	1.0	1.0	1.9	7.2																						
12-Oct	0.9	0.9	1.0	1.0	1.0	0.8	1.2	2.8	1.0	0.3	0.2	UO	UO	UO	0.2	0.1	0.2	0.2	0.1	0.1	UO	UO	UO	0.1	0.7	2.8																						
13-Oct	0.2	0.4	0.4	0.3	0.4	0.6	0.8	0.8	0.9	0.6	1.2	3.3	1.9	1.6	2.7	4.0	7.0	11.7	12.6	9.1	4.8	3.0	2.2	2.6	3.0	12.6																						
14-Oct	3.1	2.1	2.9	3.2	3.0	4.0	4.9	6.7	4.5	4.1	1.5	2.0	3.2	3.0	3.5	4.1	3.5	6.1	3.5	3.2	2.2	2.7	1.8	1.9	3.4	6.7																						
15-Oct	1.5	0.8	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	4.4	5.4	1.6	2.1	2.1	7.1	10.8	20.7	--	20.7																						
16-Oct	0.6	1.9	1.1	1.6	1.7	3.6	2.1	2.9	3.7	M	M	5.3	7.2	2.7	1.9	2.8	2.9	2.7	2.5	1.7	1.2	0.7	0.7	0.7	2.4	7.2																						
17-Oct	0.8	0.8	1.1	1.1	1.1	1.2	2.1	2.2	1.7	2.0	1.8	1.9	2.3	2.3	2.5	3.0	4.3	4.8	5.9	6.3	5.7	5.3	4.9	4.6	2.9	6.3																						
18-Oct	4.4	4.1	4.2	4.2	4.1	4.0	4.3	5.3	6.3	5.3	4.1	3.6	3.1	3.3	4.2	4.6	4.3	5.4	4.4	3.5	3.4	5.0	3.5	5.1	4.3	6.3																						
19-Oct	4.6	5.0	4.1	5.3	5.8	4.6	4.5	5.6	5.4	2.6	2.2	2.1	1.8	1.6	1.6	1.9	3.3	3.4	4.8	5.2	4.7	4.2	4.1	3.8	3.8	5.8																						
20-Oct	3.1	2.9	3.0	3.2	3.4	3.7	3.8	4.1	3.5	3.8	8.3	5.0	2.1	2.3	3.9	2.6	5.2	9.7	14.9	12.8	26.8	8.4	8.2	5.1	6.2	26.8																						
21-Oct	4.1	3.7	3.8	3.5	2.9	2.6	2.6	2.7	2.3	1.5	1.2	1.1	1.2	1.2	1.3	1.9	1.8	4.0	4.2	9.2	2.9	2.7	2.2	2.6	2.8	9.2																						
22-Oct	2.1	2.5	2.7	4.7	6.3	8.4	6.7	9.5	8.3	4.3	2.5	1.6	1.4	1.4	1.5	1.4	1.4	1.3	2.0	2.0	1.3	1.3	2.0	1.5	3.3	9.5																						
23-Oct	1.8	1.9	1.7	2.3	2.5	3.6	6.9	5.7	8.5	4.7	2.1	1.6	1.9	2.8	4.1	7.6	11.0	13.7	12.3	7.7	5.4	2.7	1.5	1.4	4.8	13.7																						
24-Oct	0.8	0.8	0.5	2.4	3.0	1.5	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.8	0.8	0.8	0.7	0.8	0.8	0.8	0.9	3.0																						
25-Oct	0.9	0.9	1.0	1.1	1.2	1.4	1.6	1.5	1.5	1.4	1.5	1.6	2.2	2.3	3.7	5.4	5.3	8.8	5.9	4.8	4.0	4.6	5.9	5.4	3.1	8.8																						
26-Oct	4.0	3.2	2.3	1.7	2.1	1.9	3.4	2.0	1.7	3.0	1.9	1.6	1.8	1.7	1.6	2.9	3.3	6.7	3.9	2.9	2.2	2.1	2.4	3.5	2.7	6.7																						
27-Oct	2.5	1.9	1.5	1.7	1.1	1.0	1.0	1.0	0.9	0.9	1.1	1.4	1.6	1.5	1.4	1.2	1.8	7.0	6.1	4.3	3.3	3.0	3.6	3.3	2.2	7.0																						
28-Oct	5.3	4.5	4.0	3.8	5.0	7.9	4.3	2.3	2.0	1.6	1.6	1.9	1.8	1.8	1.9	2.5	2.6	2.5	2.1	2.1	3.5	2.8	2.1	1.7	3.0	7.9																						
29-Oct	1.2	0.9	0.8	0.8	0.8	1.3	2.0	1.9	1.3	2.8	2.1	0.7	1.0	0.8	2.0	3.0	2.8	2.2	1.5	2.4	1.8	2.4	1.2	1.2	1.6	3.0																						
30-Oct	1.1	0.8	0.8	0.8	1.1	1.3	1.5	1.8	1.4	1.2	1.6	2.2	2.4	2.2	3.2	5.8	7.6	7.8	9.3	7.8	5.0	4.2	3.8	4.5	3.3	9.3																						
31-Oct	4.0	3.3	2.8	2.3	2.6	2.8	2.9	3.4	4.2	5.6	6.6	8.4	9.4	10.0	10.4	13.0	16.4	16.0	18.9	17.0	14.9	14.0	15.5	9.0	8.9	18.9																						
3.0																								2.6	2.4	2.6	2.6	2.9	3.1	3.1	2.9	2.4	2.3	2.2	2.2	2.1	2.4	4.1	5.3	6.3	6.6	5.3	4.8	4.5	5.1	4.5	Diurnal Average	
14.3																								7.2	7.1	7.9	8.6	8.4	10.3	9.5	8.5	5.7	8.3	8.4	9.4	10.0	10.4	22.3	17.5	33.3	35.5	21.2	26.8	16.9	23.6	23.4	Diurnal Maximum	
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>) -  $\mu\text{g}/\text{m}^3$**   
**Patricia McInnes - October 2014**





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Patricia McInnes - October 2014**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	451	63.25	63.25
6 - 15	95	13.32	76.58
16 - 25	15	2.10	78.68
26 - 80	4	0.56	79.24
> 81.0	0	0.00	79.24

Total Number of Valid Hours: 713

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Patricia McInnes - October 2014**

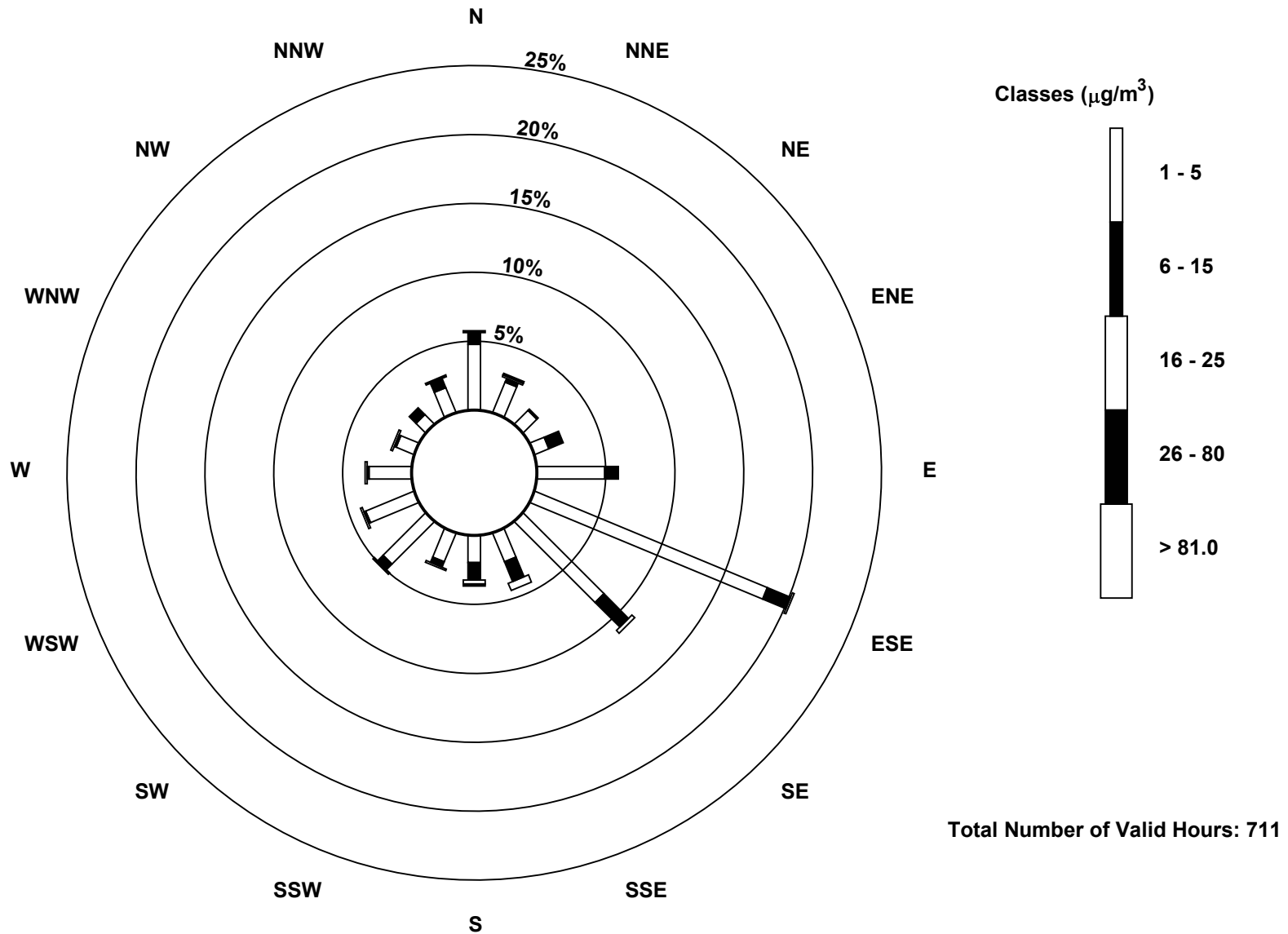
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	34	17	10	8	35	130	59	16	14	16	31	27	22	10	7	14	450
6 - 15	6	2	1	8	7	13	18	11	9	3	4	1	1	1	5	5	95
16 - 25	0	1	0	0	0	1	2	4	2	1	1	1	1	1	0	0	15
26 - 80	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	4
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	41	21	11	16	42	144	79	31	26	20	36	29	24	12	12	20	564

Total Number of Valid Hours: 711

Total Number of Hours: 744

Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
 Patricia McInnes (AMS 6)





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

**Patricia McInnes - October 2014**

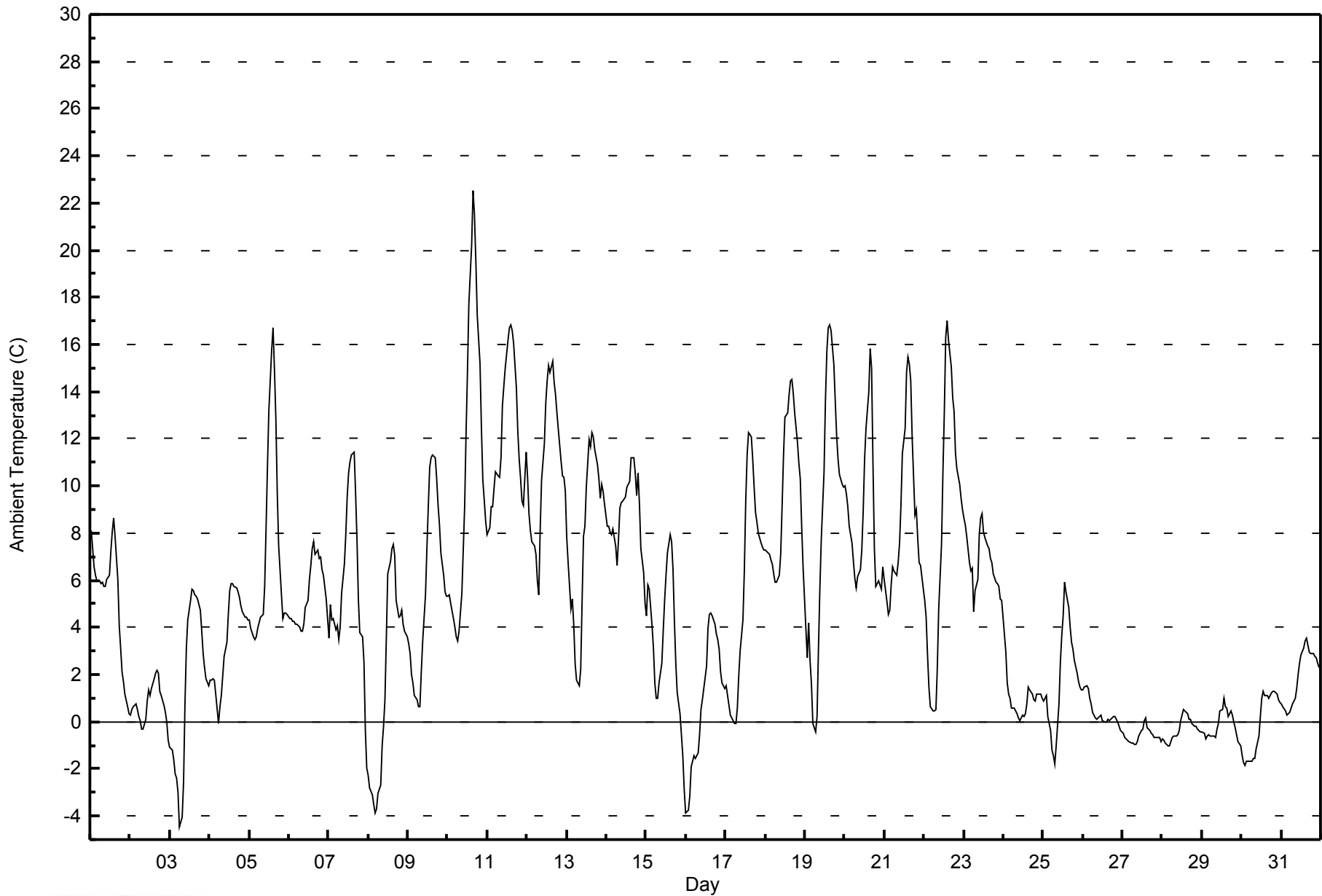
Maximum Value: 22.5 C on Oct 10 16:00		Maximum Daily Average: 12.1 C on Oct 11		Hours in Service: 744																																												
Minimum Value: -4.5 C on Oct 3 07:00		Minimum Daily Average: -0.6 C on Oct 27		Hours of Data: 744																																												
Maximum Diurnal Average: 8.8 C at hour 16		Minimum Diurnal Average: 1.9 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 4.89 C		Percentiles: P <sub>1</sub> = -3.1 P <sub>10</sub> = -0.6 Q <sub>1</sub> = 0.6 Median = 4.4 Q <sub>3</sub> = 7.9 P <sub>90</sub> = 11.6 P <sub>99</sub> = 16.8		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-Oct	8.1	7.3	6.6	6.2	6.0	6.0	5.8	5.9	5.7	5.7	6.0	6.2	7.2	8.1	8.7	7.9	6.0	4.1	3.1	2.1	1.7	1.2	0.6	0.3	5.3	8.7																						
2-Oct	0.3	0.5	0.7	0.7	0.5	0.2	0.1	-0.3	-0.3	0.1	0.8	1.4	1.1	1.4	1.8	2.0	2.2	2.1	1.3	1.1	0.7	0.4	0.0	-0.8	0.7	2.2																						
3-Oct	-1.1	-1.2	-1.6	-2.2	-2.4	-3.0	-4.5	-4.1	-2.6	0.8	3.2	4.3	5.2	5.6	5.6	5.4	5.3	5.2	4.7	3.8	2.9	2.3	1.8	1.5	1.5	5.6																						
4-Oct	1.7	1.7	1.8	1.7	1.2	-0.1	0.6	1.1	1.9	2.7	3.4	4.6	5.6	5.9	5.8	5.7	5.7	5.5	5.3	4.9	4.7	4.4	4.5	4.3	3.5	5.9																						
5-Oct	4.3	3.9	3.6	3.5	3.6	4.0	4.2	4.4	4.6	5.7	8.2	10.8	13.2	15.8	16.7	15.0	12.9	9.7	7.4	5.4	4.4	4.6	4.6	4.6	7.3	16.7																						
6-Oct	4.4	4.4	4.2	4.3	4.2	4.1	4.0	3.8	3.8	4.2	4.9	5.1	6.0	6.6	7.3	7.6	7.1	7.3	6.9	7.0	6.5	6.2	5.2	4.4	5.4	7.6																						
7-Oct	3.5	5.0	4.3	4.4	3.9	4.1	3.5	4.0	5.5	6.7	7.9	9.5	10.6	11.0	11.3	11.4	9.7	7.7	5.2	3.8	3.6	2.5	-0.4	-2.0	5.7	11.4																						
8-Oct	-2.3	-2.8	-3.1	-3.5	-3.9	-3.7	-3.0	-2.7	-1.0	-0.2	0.9	3.5	6.2	6.8	7.3	7.5	7.0	5.1	4.5	4.5	4.7	4.2	3.9	3.6	1.8	7.5																						
9-Oct	3.3	2.9	2.0	1.6	1.1	1.0	0.6	0.7	2.1	3.4	5.4	7.3	9.1	10.8	11.2	11.3	11.2	10.3	9.2	8.3	7.2	6.2	5.5	5.3	5.7	11.3																						
10-Oct	5.3	5.4	5.0	4.4	4.0	3.6	3.4	3.9	5.4	7.3	9.1	12.2	14.8	17.7	20.2	22.5	21.5	19.6	17.3	15.2	12.4	10.2	9.4	8.5	10.8	22.5																						
11-Oct	8.0	8.2	9.1	9.1	9.9	10.6	10.4	10.3	11.2	13.4	14.2	15.0	16.2	16.7	16.8	16.6	16.1	14.2	12.3	11.1	10.3	9.4	9.2	11.4	12.1	16.8																						
12-Oct	10.4	8.8	8.1	7.6	7.4	7.1	6.0	5.4	8.1	10.3	11.8	13.5	14.5	15.1	14.8	15.3	14.4	13.9	13.1	12.4	11.0	10.4	10.4	9.7	10.8	15.3																						
13-Oct	7.8	6.7	4.8	5.2	4.1	2.5	1.8	1.5	2.2	5.1	7.9	8.3	10.0	11.7	12.3	12.1	11.6	10.9	10.3	9.5	10.1	9.8	9.2	7.8	7.8	12.3																						
14-Oct	8.3	8.3	8.1	7.9	8.2	7.5	6.6	7.7	9.0	9.3	9.3	9.5	9.9	10.1	10.2	11.2	10.5	9.6	10.5	9.2	7.3	6.3	5.0	8.8	8.8	11.2																						
15-Oct	4.5	5.8	5.6	4.0	3.1	1.6	1.0	1.0	1.6	2.5	3.8	5.1	6.2	7.2	7.9	7.6	6.4	4.2	2.5	1.2	0.3	-0.5	-1.4	-2.8	3.3	7.9																						
16-Oct	-3.9	-3.8	-3.1	-1.9	-1.7	-1.5	-1.6	-1.3	-0.5	0.5	1.0	1.4	2.4	3.9	4.5	4.6	4.5	4.2	3.7	3.5	3.1	2.1	1.6	1.4	1.0	4.6																						
17-Oct	1.5	1.1	0.7	0.3	0.0	-0.1	-0.1	0.6	1.9	3.0	4.3	6.4	9.3	11.3	12.3	12.1	11.1	10.0	8.9	8.5	8.0	7.6	7.4	7.3	5.6	12.3																						
18-Oct	7.3	7.2	7.1	6.8	6.7	6.3	5.9	5.9	6.2	7.1	9.1	11.3	12.9	13.1	13.8	14.5	14.5	13.9	13.1	11.9	11.0	10.3	8.3	6.6	9.6	14.5																						
19-Oct	3.9	2.7	4.2	2.6	1.6	-0.1	-0.5	0.2	3.1	5.6	7.7	10.6	13.6	15.7	16.7	16.8	16.6	15.2	13.6	12.2	11.1	10.5	10.1	10.0	8.5	16.8																						
20-Oct	10.0	9.7	9.1	8.3	7.6	6.8	6.1	5.7	6.2	6.5	7.3	9.0	11.2	12.4	14.0	15.8	15.0	10.9	7.3	5.7	6.0	5.8	5.6	6.6	8.7	15.8																						
21-Oct	6.0	5.1	4.6	4.7	5.8	6.5	6.4	6.2	6.7	7.6	9.2	11.4	12.4	14.8	15.5	15.2	14.4	12.1	8.8	9.0	7.7	6.7	6.6	5.6	8.7	15.5																						
22-Oct	5.2	4.4	2.8	1.5	0.6	0.5	0.4	0.5	2.3	4.8	7.5	10.5	13.1	16.3	17.0	16.2	15.0	13.8	13.1	11.4	10.7	10.1	9.5	9.0	8.2	17.0																						
23-Oct	8.6	8.4	7.9	6.7	6.4	6.5	4.7	5.6	6.0	7.9	8.6	8.8	8.1	7.8	7.4	7.3	6.9	6.7	6.3	5.9	5.8	5.7	5.2	5.1	6.9	8.8																						
24-Oct	4.4	2.9	1.7	1.2	1.0	0.6	0.6	0.5	0.3	0.2	0.0	0.3	0.2	0.3	0.7	1.5	1.4	1.2	0.9	0.9	1.2	1.2	1.2	1.0	1.1	4.4																						
25-Oct	0.9	1.0	1.1	0.2	-0.4	-1.2	-1.5	-1.8	-1.0	0.8	2.5	3.7	4.5	5.9	5.5	4.9	4.0	3.4	3.1	2.6	2.0	1.7	1.5	1.3	1.9	5.9																						
26-Oct	1.4	1.4	1.5	1.4	1.0	0.7	0.4	0.2	0.1	0.2	0.2	0.3	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.0	-0.2	-0.4	0.4	1.5																						
27-Oct	-0.5	-0.6	-0.7	-0.8	-0.9	-0.9	-0.9	-1.0	-1.0	-0.8	-0.6	-0.4	-0.3	0.1	0.1	-0.3	-0.4	-0.5	-0.6	-0.7	-0.7	-0.7	-0.7	-0.8	-0.6	0.1																						
28-Oct	-0.7	-0.8	-0.9	-1.0	-1.0	-0.8	-0.7	-0.6	-0.6	-0.6	-0.3	0.1	0.3	0.5	0.4	0.3	0.1	0.1	-0.1	-0.2	-0.2	-0.3	-0.4	-0.4	-0.3	0.5																						
29-Oct	-0.4	-0.5	-0.7	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.3	-0.1	0.5	0.5	1.0	0.7	0.6	0.2	0.4	0.3	0.0	-0.3	-0.6	-0.8	-1.0	-0.2	1.0																						
30-Oct	-1.5	-1.7	-1.9	-1.7	-1.6	-1.7	-1.7	-1.6	-1.6	-1.2	-0.6	0.2	1.0	1.3	1.1	1.1	1.0	1.1	1.3	1.3	1.3	1.2	0.9	0.8	-0.1	1.3																						
31-Oct	0.8	0.6	0.5	0.3	0.3	0.4	0.6	0.7	1.0	1.4	2.0	2.5	2.8	3.1	3.4	3.5	3.3	3.0	2.9	2.9	2.7	2.7	2.5	2.3	1.9	3.5																						
																								3.5	3.3	3.0	2.7	2.4	2.2	1.9	2.0	2.8	3.9	5.0	6.2	7.4	8.3	8.7	8.8	8.3	7.3	6.3	5.7	5.1	4.6	4.1	3.8	Diurnal Average
																								10.4	9.7	9.1	9.1	9.9	10.6	10.4	10.3	11.2	13.4	14.2	15.0	16.2	17.7	20.2	22.5	21.5	19.6	17.3	15.2	12.4	10.5	10.4	11.4	Diurnal Maximum





**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Patricia McInnes - October 2014**





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

**Ambient Temperature (AT) - C**  
**Patricia McInnes - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	115	15.46	15.46
0 - 10	506	68.01	83.47
10 - 20	120	16.13	99.60
> 20	3	0.40	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

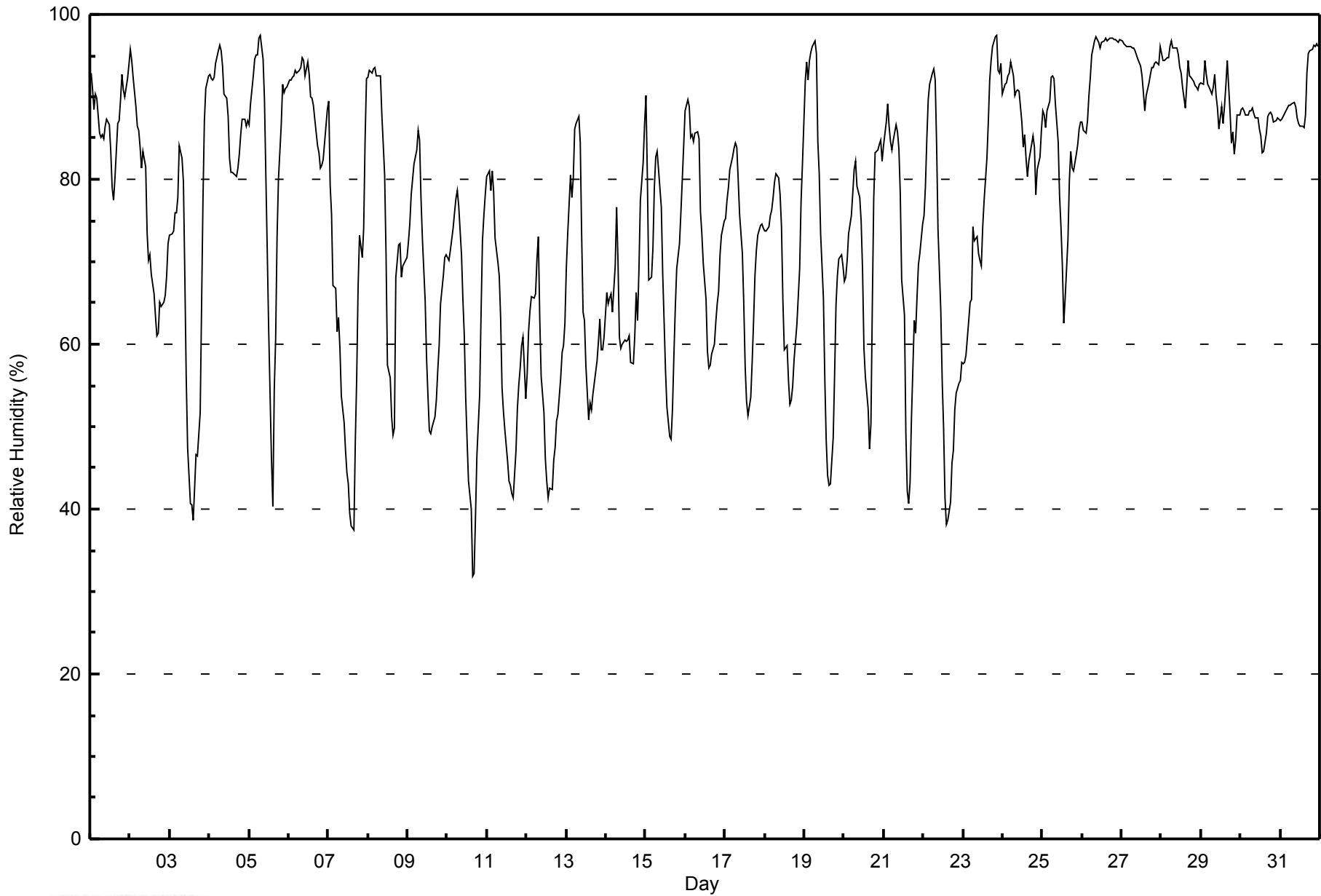


Maximum Value: 97 % on Oct 5 08:00														Maximum Daily Average: 94.6 % on Oct 26														Hours in Service: 744	
Minimum Value: 32 % on Oct 10 16:00														Minimum Daily Average: 55.9 % on Oct 12														Hours of Data: 744	
Maximum Diurnal Average: 86.0 % at hour 7														Minimum Diurnal Average: 62.0 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 76.2 %														Percentiles: P <sub>1</sub> = 39 P <sub>10</sub> = 52 Q <sub>1</sub> = 65 Median = 80 Q <sub>3</sub> = 89 P <sub>90</sub> = 94 P <sub>99</sub> = 97														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Oct	93	91	89	90	90	86	85	85	85	86	87	87	83	79	78	80	87	87	90	93	91	90	92	94	87.4	94			
2-Oct	96	94	92	89	87	86	84	81	83	81	74	70	71	68	66	63	61	61	65	65	65	66	68	72	75.4	96			
3-Oct	73	73	74	76	76	78	84	83	80	68	56	47	41	41	39	43	47	46	52	65	78	87	91	93	66.2	93			
4-Oct	93	92	92	92	94	96	96	96	94	90	90	88	83	81	81	81	80	81	83	85	87	87	86	87	88.1	96			
5-Oct	87	89	93	95	95	95	97	97	95	90	80	71	62	46	40	54	61	73	80	87	91	91	91	91	81.3	97			
6-Oct	92	92	92	92	93	93	93	94	95	94	93	94	93	90	90	89	87	84	83	81	82	82	86	88	89.8	95			
7-Oct	89	79	76	67	67	61	63	59	54	51	47	44	43	39	38	37	48	56	67	73	70	74	85	92	61.7	92			
8-Oct	92	93	93	93	94	93	93	93	88	84	80	71	57	56	51	49	50	68	72	72	68	69	70	70	75.8	94			
9-Oct	72	75	78	80	82	84	86	85	78	73	65	58	54	50	49	50	51	53	57	60	65	68	71	71	67.2	86			
10-Oct	71	70	71	74	76	78	79	77	71	65	61	53	48	43	40	32	32	39	46	54	64	73	76	78	61.3	79			
11-Oct	80	81	79	81	79	73	70	68	63	55	52	50	46	43	43	42	41	47	52	55	57	60	61	53	59.6	81			
12-Oct	56	62	64	66	66	66	70	73	63	56	52	46	43	41	42	42	46	47	51	52	56	59	60	63	55.9	73			
13-Oct	69	73	81	78	80	86	87	88	84	73	64	63	57	51	53	52	54	55	58	60	63	59	59	61	67.0	88			
14-Oct	66	65	66	66	64	69	77	70	61	60	60	61	60	60	61	58	58	61	66	63	69	77	82	87	66.1	87			
15-Oct	90	80	68	68	72	79	83	83	81	77	68	63	57	52	49	49	52	59	64	69	72	76	80	84	69.8	90			
16-Oct	88	90	89	85	85	85	86	86	85	76	73	70	65	59	57	57	59	60	63	65	66	71	73	75	73.7	90			
17-Oct	75	77	79	81	83	84	84	84	80	76	71	65	57	53	51	54	58	63	68	71	73	74	75	74	71.3	84			
18-Oct	74	74	74	76	76	78	80	81	80	78	74	65	59	60	56	53	53	55	58	62	66	69	77	82	69.2	82			
19-Oct	92	94	92	94	95	96	97	95	85	81	73	66	56	48	44	43	43	49	56	65	68	70	71	69	72.6	97			
20-Oct	68	68	70	73	76	78	81	82	79	78	75	69	60	56	52	47	50	65	78	83	84	84	85	82	71.8	85			
21-Oct	84	87	89	86	85	84	85	87	86	84	78	68	64	49	42	41	43	51	63	61	66	70	71	75	70.7	89			
22-Oct	76	79	85	90	92	93	93	92	84	74	64	56	50	41	38	39	41	46	47	52	54	55	56	58	64.7	93			
23-Oct	58	58	59	63	65	65	74	73	73	71	70	69	74	77	83	87	92	94	96	97	97	93	93	94	78.2	97			
24-Oct	90	91	92	92	93	94	93	90	91	91	87	84	85	83	80	82	84	85	85	84	78	81	83	86	87.1	94			
25-Oct	88	88	86	88	89	92	93	92	89	85	78	74	70	63	66	73	80	83	81	81	83	84	86	87	82.5	93			
26-Oct	87	86	86	87	90	92	95	97	97	97	97	96	97	97	97	97	97	97	97	97	97	97	97	97	94.6	97			
27-Oct	97	96	96	96	96	96	96	96	96	95	95	94	93	90	88	90	92	93	93	94	94	94	94	96	94.2	97			
28-Oct	95	94	94	95	95	96	97	96	96	96	95	94	93	91	89	91	94	93	92	92	91	91	91	92	93.5	97			
29-Oct	92	92	94	93	92	91	90	91	93	90	89	86	89	87	89	91	94	88	84	86	83	85	88	88	89.3	94			
30-Oct	88	89	88	88	88	88	88	89	88	87	87	86	85	83	83	86	88	88	88	88	87	87	87	87	87.2	89			
31-Oct	87	87	88	88	89	89	89	89	89	89	87	87	86	86	86	88	93	95	96	96	96	96	96	96	90.4	96			
	82.5	82.6	82.8	83.3	83.9	84.6	86.0	85.5	82.7	79.1	75.0	70.9	67.1	63.5	62.0	62.5	65.0	68.5	72.0	74.4	76.2	78.1	80.0	81.4	Diurnal Average				
	97	96	96	96	96	96	97	97	97	97	97	96	97	97	97	97	97	97	97	97	97	97	97	97	Diurnal Maximum				



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Patricia McInnes - October 2014**





Maximum Speed: 26 km/h on Oct 1 21:00	Maximum Daily Speed Average: 17.6 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 4 13:00	Minimum Daily Speed Average: 0.7 km/h on Oct 4	Hours of Data: 742
Maximum Diurnal Speed Average: 2.1 km/h at hour 24	Minimum Diurnal Speed Average: 0.2 km/h at hour 16	Hours of Missing Data: 2
Monthly Average Velocity: 1.2 km/h 183.9 deg	Percentiles: P <sub>1</sub> = 1 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> = 24	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	N6	N10	N9	NW5	N6	NNE8	NE5	NE4	E8	ESE8	ESE8	SE6	SSW0	N6	N8	NNW18	N19	N19	N21	N22	NNW26	NNW25	NNW20	NNW15	N9.7	NNW26
2-Oct	NW9	NW14	NW15	NW15	NW17	NW16	NW17	NW16	AF	NW18	NW21	NW25	NW23	NW25	NW21	NW24	NW21	NW19	W17	W18	W17	W18	NW14	NW10	WNW17.6	NW25
3-Oct	WNW11	WNW13	W11	W11	W12	W11	SW6	SSW7	SW9	S7	S9	SSE9	S10	SSE11	SSE12	SSE13	SE11	SE13	SE14	SSE17	SSE7	E8	ESE14	ESE15	S6.0	SSE17
4-Oct	ESE15	ESE14	ESE10	ESE7	SE4	WNW2	NW4	W3	W2	NNW4	SW5	SW4	WNW0	NNE5	NNE6	N5	NNE7	NNE6	N5	NW6	NW4	WNW6	W6	WSW7	NNE0.7	ESE15
5-Oct	WSW7	SW8	WSW7	WSW7	SW7	SSW8	SW8	WSW9	WSW13	SW14	SSW13	WSW10	WSW14	NW19	N16	N11	N13	N14	N12	NNE10	N7	NE6			WNW5.2	NW19
6-Oct	NNW1	NE3	NW1	SW1	SE2	SE5	E5	E6	ESE1	W3	WSW2	WNW6	WNW10	WNW13	NNW8	NNW10	NNW10	NNW15	W18	W22	W19	WNW17	W12	W12	WNW6.1	W22
7-Oct	W11	WNW20	WNW12	WNW12	W12	W15	W15	WNW20	NW18	NW17	NW17	NW15	WNW16	WNW17	WNW16	NW13	N13	N8	NNW8	NNE5	ENE6	ESE6	SSW2	WNW3	WNW10.1	WNW20
8-Oct	W3	SE1	SE1	ENE1	W3	NNE2	SSW1	SW1	ESE6	SE7	ESE6	ESE6	M	ESE4	E8	E8	SE10	SW9	SW4	NE3	ESE11	ESE14	ESE11	ESE13	ESE4.1	ESE14
9-Oct	ESE10	ESE10	SE8	ESE7	ESE6	ESE6	E5	ESE7	ESE10	ESE10	ESE9	E8	ESE10	ESE9	E11	E11	ESE11	ESE12	ESE12	ESE13	ESE13	ESE11	ESE11	ESE12	ESE9.4	ESE13
10-Oct	ESE13	ESE11	SE13	SE11	SE10	SE8	SE9	SE10	SE9	SE7	SE7	SE8	SE9	ESE7	SE7	S12	S14	S10	S8	S6	S5	S6	SSE6	SSE7	SE8.0	S14
11-Oct	SSW6	S5	SE5	SSE6	SSW7	SSW9	SW13	SW13	SW15	W22	W22	W21	W21	W23	WSW24	W24	W19	WSW12	WSW12	WSW13	WSW15	WSW16	WSW15	W17	WSW13.6	W24
12-Oct	W16	WSW17	WSW19	WSW17	W14	W14	SSW2	SSE3	WSW3	W8	W10	WNW14	WNW17	W16	W13	W15	W12	W16	W15	W14	WSW13	WSW11	WSW13	WSW12	W12.2	WSW19
13-Oct	WSW7	SE2	SSW7	SW13	SW11	SSW7	SSW8	SW8	SW8	SW10	SSW8	S9	S7	E6	E9	SE7	ESE4	E5	E5	E5	ESE8	ESE10	ESE11	E7	SSE4.4	SW13
14-Oct	ENE3	E7	ENE6	ESE5	ESE6	NE1	NNE1	ENE4	E8	ESE9	ESE12	E11	ESE9	SE8	E5	ESE2	SSE4	S3	WSW5	W13	W16	WSW12	WSW8	WSW5	SE2.2	W16
15-Oct	SW7	W9	WNW15	W15	WSW8	SW7	WSW10	W10	NW9	WNW13	NW13	WNW11	WNW9	WNW10	NW9	N9	NNE11	NNW11	NNW11	NNW12	NNW13	NNW7	WNW3	SW3	WNW7.9	WNW15
16-Oct	W3	W3	WNW6	NW1	SSW2	SSE3	W2	WSW2	S1	E6	ESE9	SSE4	SE6	E6	E7	ESE7	E9	ENE10	ESE12	ESE16	ESE14	ESE15	ESE14	ESE13	ESE5.3	ESE16
17-Oct	ESE13	ESE13	ESE13	ESE13	ESE12	ESE12	ESE10	SE12	ESE13	ESE17	ESE17	ESE17	ESE16	ESE20	ESE22	SE23	SE23	SE17	SE18	SE18	ESE15	ESE15	ESE14	ESE17	ESE15.8	SE23
18-Oct	ESE17	ESE17	ESE13	ESE11	ESE10	SE9	SE7	SE4	S3	S4	SW8	SW7	SSE6	S9	SSW8	SW11	WSW12	WSW6	W11	WSW10	W10	WSW8	WNW8	W5	S4.4	ESE17
19-Oct	SW7	WSW9	WSW10	SW4	S4	S3	SW4	SE2	SE4	SE7	SE9	SE8	ESE10	E14	ESE15	ESE16	ESE17	ESE15	ESE18	ESE18	ESE18	ESE16	ESE15	ESE16	SE8.6	ESE18
20-Oct	ESE14	ESE15	SE16	SE15	SE15	SE13	SE13	ESE9	ESE9	SE8	SSE7	SSE6	SSE7	SSE8	S6	SSE4	ESE5	SSE4	SE2	S2	NNW3	S2	SSE4	SSW5	SE7.3	SE16
21-Oct	S6	SSW4	S5	SSW7	SW12	SW11	SSW7	S7	SSW8	SW11	SW12	WSW13	SW11	WSW11	W16	W13	WSW8	SW6	SW8	SW9	SW9	SW8	WSW11	SW9	SW8.6	W16
22-Oct	SW13	S6	SSE6	SSE6	SSE7	SSE7	SSE8	SSE5	SSE4	SSE6	SE8	SE7	SE7	SE9	ESE13	ESE12	ESE15	ESE13	SE14	ESE10	ESE12	ESE13	ESE8	ESE9	SE7.9	ESE15
23-Oct	SE9	ESE8	ESE9	E6	ESE8	E6	ENE3	ENE2	ENE4	E12	E16	ESE17	ESE16	ESE16	E13	E11	ESE6	ENE4	NNW5	W4	W5	W12	W12	W11	ESE4.9	ESE17
24-Oct	WNW20	W20	W21	W16	W13	W14	W15	W16	W15	W11	WSW10	WSW16	WSW20	WSW18	WSW17	WSW16	WSW13	WSW13	WSW16	WSW15	W14	WSW14	W14	WSW12	W15.2	W21
25-Oct	WSW12	WSW14	WSW15	WSW14	W5	SW9	SW10	WSW9	SW8	SW9	SW7	SW8	SSW6	SSE6	ESE6	E7	ENE6	ENE6	E8	E7	E8	E10	E7		SSW2.9	WSW15
26-Oct	E7	E7	ENE9	NE10	NE9	NE9	NNE8	NNE9	N10	NNE9	NNE10	N12	N13	N14	N14	N15	N15	N14	N15	N15	N14	N14	N14	N13	N10.6	N15
27-Oct	N13	N13	NNW13	N13	N13	N13	N12	N12	NNW12	N12	N11	N11	NNW11	NNW11	NNW11	NW10	NW7	NW8	NW6	NW5	WNW5	WSW2	WNW2	SW4	NNW8.9	N13
28-Oct	SW5	SSW5	SSW5	S4	SSE4	SE5	SE7	ESE6	ESE6	ESE7	ESE6	E5	ESE8	E8	ESE7	ESE6	ESE7	ESE9	ESE10	ESE10	ESE11	ESE10	ESE9	E7	ESE6.1	ESE11
29-Oct	ENE6	ENE7	NE6	ENE7	NNE6	NNE7	NNE9	NE8	NNE7	NNE8	NNE8	N8	N7	NNW5	NE7	NNE5	NNE6	E8	E8	E6	E9	ESE11	ESE11	SE12	NE5.7	SE12
30-Oct	ESE10	ESE11	ESE9	SE11	ESE11	SE15	SE14	SE13	ESE13	ESE15	ESE10	SE11	SE11	SE17	SSE16	SE12	ESE13	ESE14	SE15	SE17	SE17	SE16	SE15	SE14	SE13.2	SE17
31-Oct	SE14	ESE13	ESE14	ESE14	SE13	SE14	ESE13	ESE14	ESE11	ESE11	SE12	SE10	SE8	SE7	SE7	SE7	SSE5	SE6	SE5	ESE5	SSE4	SSE4	SSW4	S5	SE8.8	ESE14

S2.0	S1.5	SSW1.5	SSW1.9	SSW2.1	S2.0	SSW1.7	SSW1.4	S1.6	S1.6	S1.9	SSW1.6	SW1.7	SW0.8	S0.3	NE0.2	E1.1	E0.6	SSW0.3	SW0.7	S0.5	SSE1.4	SSE1.7	SSE2.1	Diurnal Average	
WNW20	W20	W21	WSW17	WNW17	WNW16	WNW17	WNW20	NW18	W22	W22	NW25	WNW23	WNW25	WSW24	W24	SE23	N19	N21	W22	NNW26	NNW25	NNW20	W17	Diurnal Maximum	

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



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

**Wind Speed (WS) - km/h**  
**Patricia McInnes - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 9 km/h on Oct 2 10:00	Hours of Data: 742
Minimum Value: 1 km/h on Oct 16 01:00	Hours of Missing Data: 2
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	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-Oct	2	2	2	1	2	2	1	3	2	2	2	2	1	2	4	4	4	4	5	5	6	6	5	3	6
2-Oct	3	3	3	3	3	3	5	3	AF	9	5	6	5	5	5	5	4	4	3	4	3	3	3	2	9
3-Oct	2	2	2	2	1	1	2	1	2	2	2	2	3	3	3	3	3	3	4	4	3	2	4	3	4
4-Oct	3	3	3	2	1	1	1	1	1	1	2	2	1	2	2	1	1	1	1	1	1	2	1	1	3
5-Oct	2	2	2	2	2	2	2	3	1	2	3	3	3	4	4	6	4	3	3	3	3	3	2	2	6
6-Oct	2	2	1	2	2	2	2	1	2	1	2	2	2	3	2	2	3	3	4	5	4	4	2	2	5
7-Oct	3	4	2	3	2	3	3	4	4	4	4	3	5	5	4	4	2	2	1	1	1	2	1	1	5
8-Oct	1	1	2	1	1	2	1	1	1	2	1	2	M	2	2	2	2	2	2	2	3	3	2	3	3
9-Oct	3	3	2	1	2	1	1	2	2	2	2	2	3	3	2	2	3	3	2	3	4	3	2	3	4
10-Oct	3	3	3	3	2	2	2	2	2	1	2	2	3	2	2	4	4	2	2	1	1	1	1	2	4
11-Oct	2	1	1	2	2	2	3	2	3	6	5	4	5	5	5	5	5	2	1	2	2	2	3	3	6
12-Oct	3	3	3	3	3	3	2	1	1	3	3	4	4	4	5	4	4	4	3	3	2	2	2	2	5
13-Oct	2	2	4	2	2	2	2	1	2	2	2	2	2	2	1	1	1	2	1	1	3	2	2	2	4
14-Oct	2	4	3	2	2	1	1	2	2	2	3	3	2	3	1	1	1	1	1	5	3	3	1	1	5
15-Oct	1	2	4	3	4	2	1	2	3	3	3	3	4	3	3	2	2	2	1	3	2	2	2	1	4
16-Oct	1	1	1	1	1	1	1	1	1	2	2	2	3	3	3	2	2	2	3	4	3	3	3	3	4
17-Oct	3	2	3	3	2	2	2	3	4	4	4	4	4	5	5	5	5	4	4	4	3	3	3	3	5
18-Oct	3	3	3	3	2	2	2	1	1	1	2	2	2	2	2	3	3	2	3	2	1	2	1	2	3
19-Oct	2	1	2	2	2	1	1	1	2	2	2	2	3	3	3	4	3	3	4	4	4	4	4	4	4
20-Oct	4	3	4	4	3	3	4	2	2	2	1	1	2	2	2	1	1	1	2	1	1	1	1	1	4
21-Oct	2	2	1	2	2	2	2	2	3	2	2	3	2	5	3	3	2	1	2	2	1	1	2	2	5
22-Oct	2	2	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	4	2	2	3	2	2	4
23-Oct	2	2	2	1	3	2	2	2	2	3	4	4	4	4	3	3	2	1	1	1	2	3	2	3	4
24-Oct	5	4	4	3	3	3	3	4	3	4	5	4	4	4	4	3	3	3	3	3	3	2	3	2	5
25-Oct	2	2	3	3	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	1	3
26-Oct	1	2	2	2	2	2	1	1	1	1	1	2	2	2	2	3	3	3	3	3	3	3	3	3	3
27-Oct	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	3
28-Oct	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	2	2	2	2	2	2	1	2
29-Oct	1	2	1	2	1	1	1	2	2	1	2	1	2	2	2	1	2	2	2	2	3	2	2	3	3
30-Oct	2	2	2	3	3	4	3	3	3	3	2	2	3	5	4	3	3	3	3	4	4	4	3	3	5
31-Oct	4	3	3	3	3	3	3	3	2	2	3	2	2	1	2	2	1	1	1	1	1	1	1	1	4
	5	4	4	4	4	4	5	4	4	9	5	6	5	5	6	5	5	4	5	5	6	6	5	4	

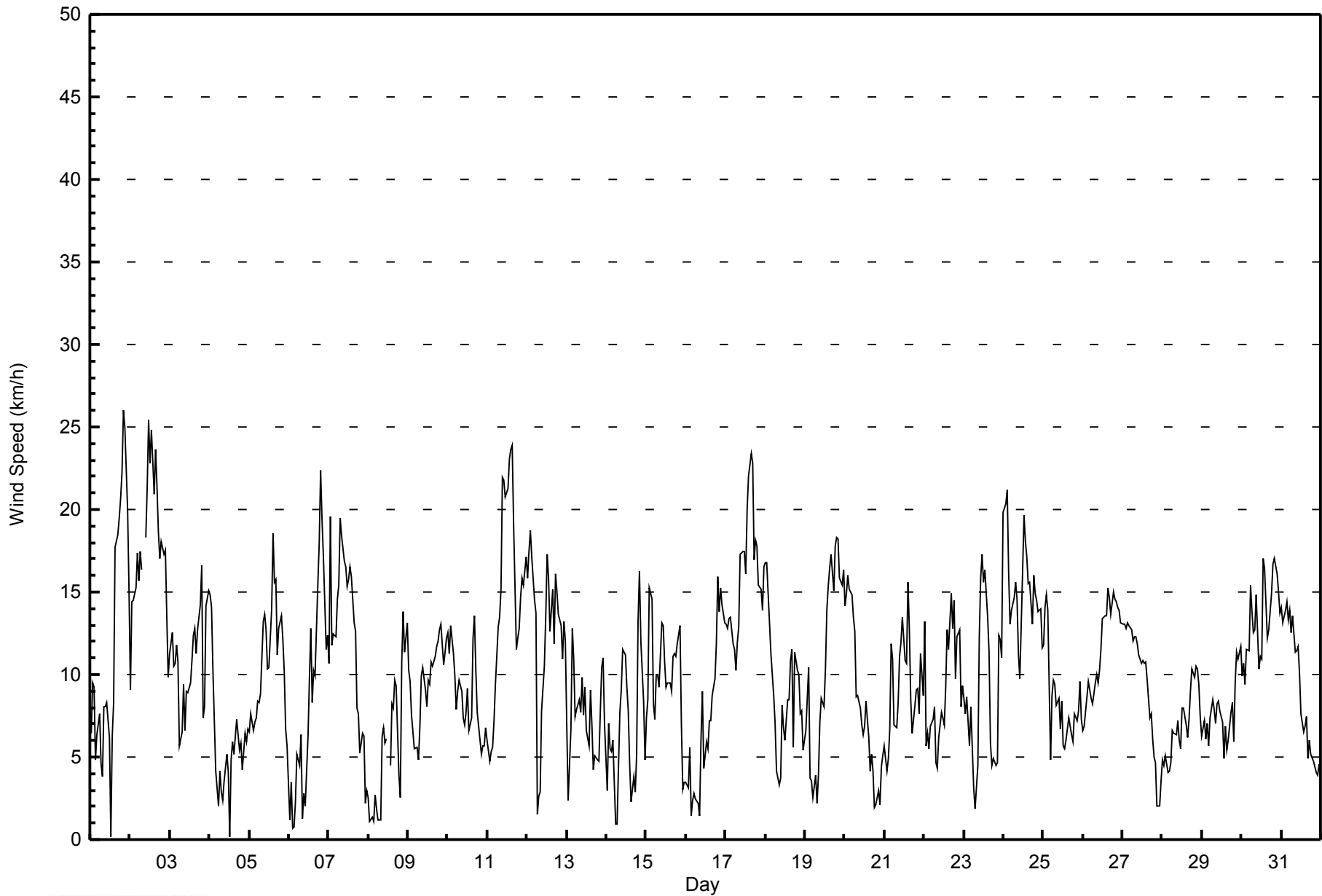
Diurnal Maximum

M - Maintenance AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Patricia McInnes - October 2014**





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

**Wind Speed (WS) - km/h**  
**Patricia McInnes - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	127	17.12	17.12
6 - 11	335	45.15	62.26
12 - 19	250	33.69	95.96
20 - 28	30	4.04	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Patricia McInnes - October 2014**

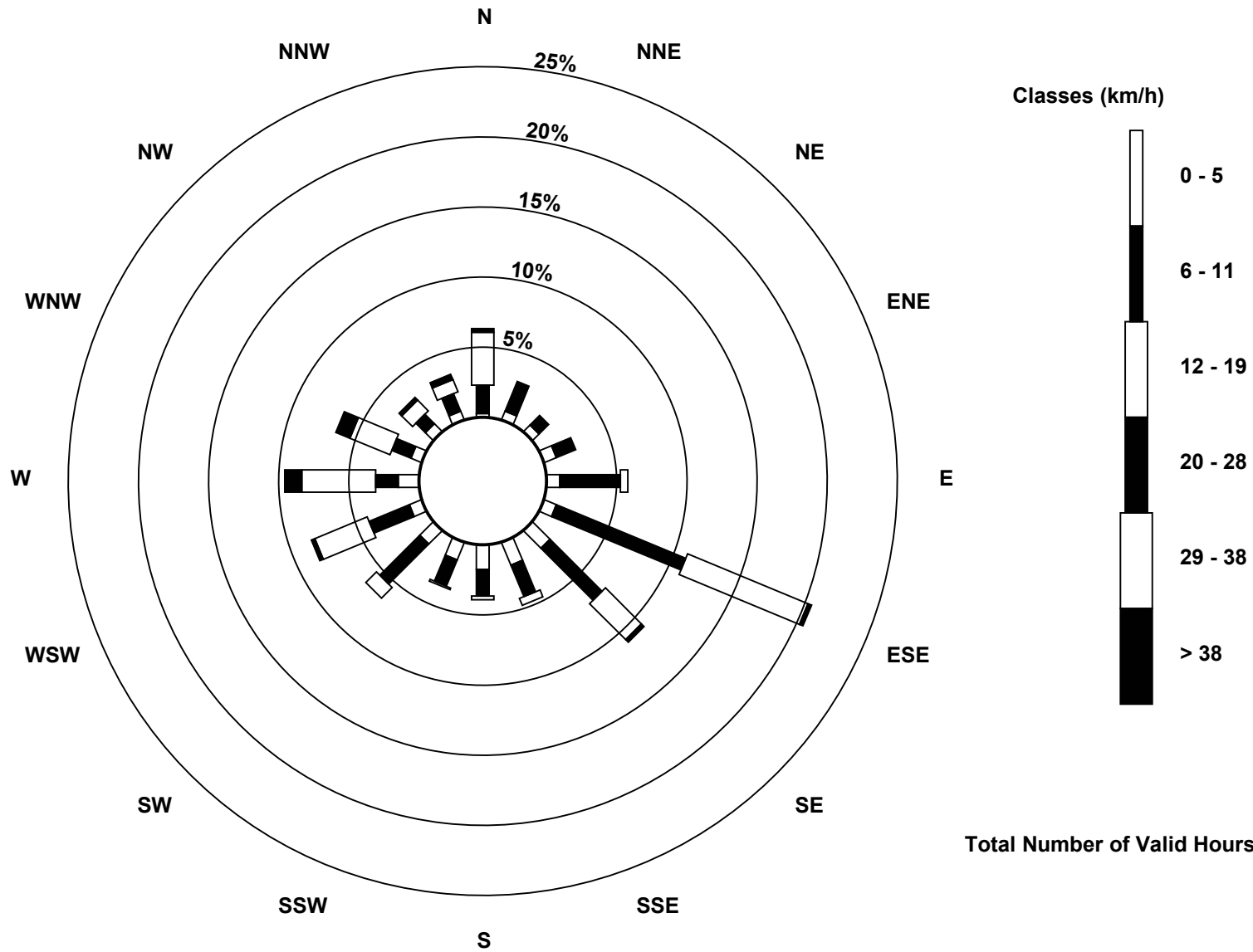
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	5	5	7	7	7	13	13	13	10	10	7	11	6	6	5	127
6 - 11	15	17	7	11	32	74	39	18	14	15	30	23	12	11	7	10	335
12 - 19	28	0	0	0	4	69	27	4	2	1	8	30	39	23	8	7	250
20 - 28	2	0	0	0	0	2	2	0	0	0	0	2	9	8	2	3	30
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	22	12	18	43	152	81	35	29	26	48	62	71	48	23	25	742

Total Number of Valid Hours: 742

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

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





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

**Wind Direction (WD) - deg**  
**Patricia McInnes - October 2014**

Direction of Maximum Speed: 346 deg on Oct 1 21:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 292.7 deg on Oct 2	Hours of Data: 742
Direction of Minimum Speed: 295 deg on Oct 4 13:00	Direction of Minimum Daily Speed Average: 0.7 deg on Oct 4
Direction of Minimum Speed: 295 deg on Oct 4 13:00	Hours of Missing Data: 2
Monthly Average Direction: 252.7 deg	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	350	354	353	321	352	26	40	53	80	111	112	127	210	1	350	345	353	357	351	354	346	345	334	329	356.5
2-Oct	308	297	299	287	291	296	301	300	AF	305	305	306	298	299	289	286	286	283	277	279	276	279	291	295	292.7
3-Oct	283	283	279	271	272	264	222	193	215	177	171	164	176	156	166	148	134	133	142	162	163	101	115	117	176.1
4-Oct	117	120	123	122	126	292	316	274	276	329	229	217	295	21	15	2	29	22	360	313	307	289	260	251	32.9
5-Oct	251	220	239	248	216	199	227	243	240	228	208	243	254	299	306	358	1	356	352	350	1	15	10	36	292.2
6-Oct	341	48	312	221	125	125	95	83	120	264	239	288	296	300	330	340	338	287	280	280	280	284	262	264	290.9
7-Oct	259	283	283	283	279	281	274	285	304	313	310	317	301	294	295	320	10	357	348	18	67	110	204	284	301.5
8-Oct	275	137	135	68	272	33	201	220	123	125	122	108	M	116	81	101	142	230	234	56	109	109	110	111	119.5
9-Oct	118	118	125	123	112	103	83	104	110	116	104	93	115	110	101	100	116	116	120	121	120	117	116	117	112.8
10-Oct	115	117	124	124	131	132	129	136	134	139	138	139	140	123	139	181	184	182	184	184	184	185	157	152	145.9
11-Oct	193	172	144	162	197	213	232	229	236	261	264	262	259	260	255	260	262	257	251	241	242	239	249	267	247.7
12-Oct	260	255	252	257	260	268	202	149	255	265	273	287	289	276	279	264	263	271	267	267	255	254	251	253	264.2
13-Oct	242	138	210	215	218	204	211	222	220	215	203	185	173	99	81	130	120	87	90	88	117	111	110	95	167.0
14-Oct	68	95	72	107	104	55	32	68	89	108	121	101	103	125	101	118	154	171	257	265	261	251	239	240	137.2
15-Oct	229	281	286	273	257	225	253	268	304	296	305	283	285	287	318	358	12	339	335	337	367	339	299	218	299.4
16-Oct	267	275	300	311	208	159	259	239	189	93	121	151	124	79	100	105	89	77	107	121	118	113	113	113	113.1
17-Oct	117	114	116	120	118	120	121	129	122	120	115	115	123	113	123	124	131	134	127	130	123	121	116	115	121.5
18-Oct	118	116	119	119	121	128	128	133	175	170	228	218	160	191	197	226	243	247	266	258	262	243	285	260	185.6
19-Oct	234	244	251	233	182	186	217	145	137	136	136	128	111	101	105	115	120	119	119	117	114	119	118	122	127.3
20-Oct	117	119	124	124	127	124	126	123	121	138	151	165	163	153	170	151	112	148	140	184	348	185	147	203	134.1
21-Oct	181	196	183	210	232	229	201	186	199	226	230	253	235	250	260	265	248	228	222	224	222	219	238	214	229.1
22-Oct	231	191	152	160	166	168	149	150	147	148	125	133	132	126	105	117	113	104	125	117	112	117	115	111	131.6
23-Oct	127	120	112	99	116	97	74	76	71	96	97	103	102	110	100	100	107	68	344	279	273	261	267	275	105.1
24-Oct	292	275	275	277	268	266	268	274	273	269	258	256	258	255	257	252	250	250	257	255	263	254	261	258	264.1
25-Oct	247	251	255	257	269	222	220	240	224	234	224	218	194	166	115	80	79	77	70	79	86	89	93	85	205.0
26-Oct	87	79	69	47	51	35	28	19	11	13	13	5	359	6	359	355	356	359	357	357	356	358	354	353	10.7
27-Oct	354	349	348	353	350	350	352	349	347	355	359	352	345	330	330	323	312	319	310	318	298	254	283	234	340.7
28-Oct	219	211	196	171	167	136	128	118	115	120	114	101	103	101	116	103	107	110	115	107	104	109	105	86	117.9
29-Oct	60	57	56	68	26	22	23	36	27	19	23	351	6	348	49	14	30	87	98	98	101	111	116	125	56.0
30-Oct	116	119	122	124	123	131	134	126	122	121	121	125	130	140	149	131	121	119	125	126	127	131	131	137	127.8
31-Oct	130	121	117	122	126	124	122	119	118	123	129	131	135	127	144	132	147	130	144	123	147	163	197	186	129.3

185.8	184.5	199.4	198.0	194.1	189.8	194.1	196.3	168.8	179.0	175.7	210.1	218.4	216.6	172.2	49.5	86.8	80.0	204.9	222.9	185.2	156.1	166.1	161.3
Diurnal Average																							

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

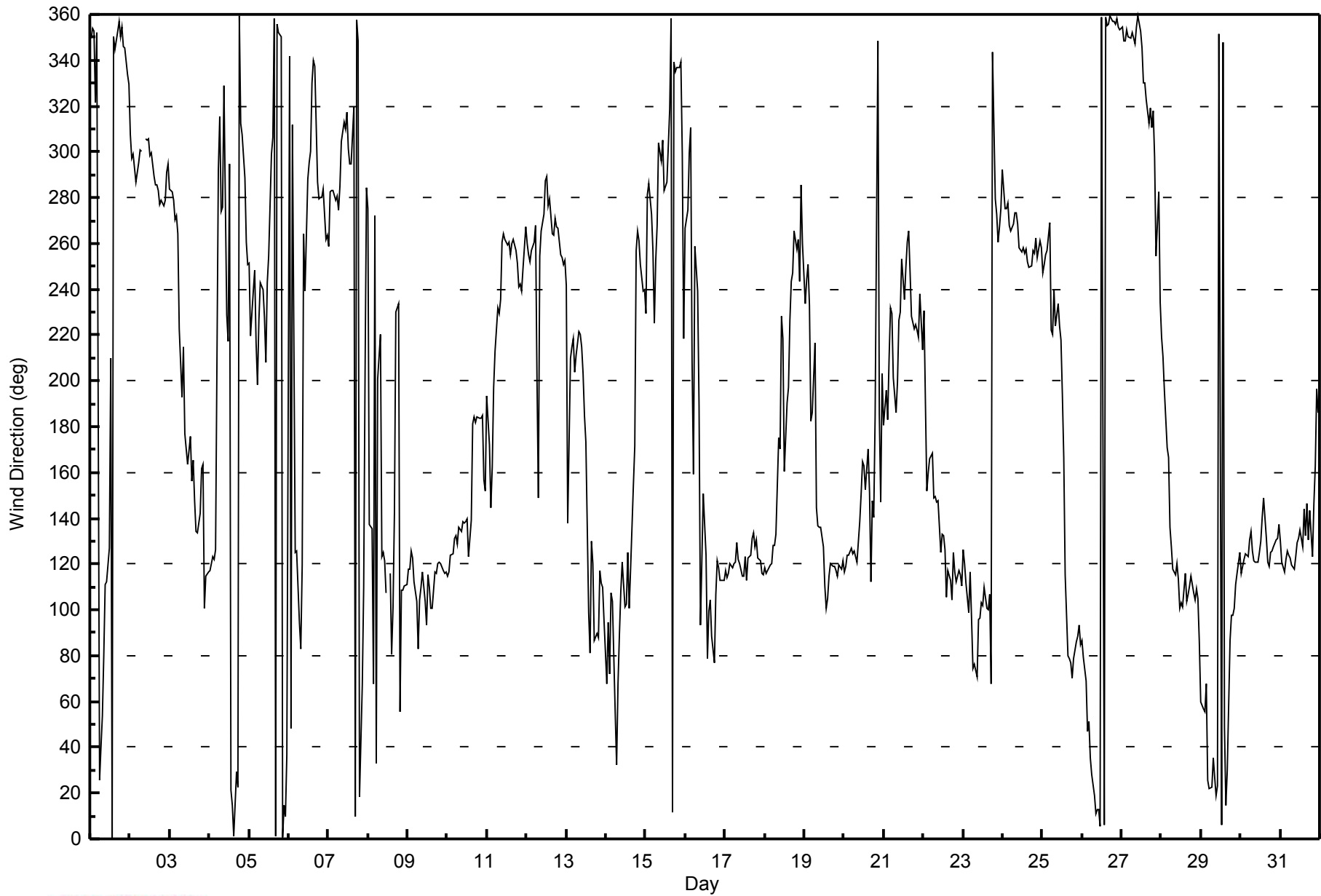
Wind Direction (WD) - deg  
Patricia McInnes - October 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0															Hours in Service: 744										
Maximum Value: 103 deg on Oct 4 13:00															Hours of Data: 742										
Minimum Value: 6 deg on Oct 21 23:00															Hours of Missing Data: 2										
Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 11 Q <sub>1</sub> = 12 Median = 14 Q <sub>3</sub> = 19 P <sub>90</sub> = 34 P <sub>99</sub> = 81															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-Oct	16	13	14	18	17	15	17	57	22	19	19	37	99	36	21	13	15	15	16	16	14	14	12	10	99
2-Oct	15	11	11	11	11	10	13	10	AF	13	12	13	11	11	13	12	12	12	11	12	11	11	11	12	15
3-Oct	10	11	13	8	7	11	31	24	14	24	20	25	27	21	20	18	15	14	15	14	22	14	13	14	31
4-Oct	13	13	14	27	31	49	24	22	44	25	27	54	103	36	26	25	15	14	27	24	16	18	11	13	103
5-Oct	26	13	21	23	19	19	15	17	13	16	17	31	29	18	30	18	13	14	13	14	16	16	23	22	31
6-Oct	71	64	82	83	83	27	35	17	83	34	71	42	14	15	18	14	31	12	12	12	11	10	15	11	83
7-Oct	14	10	11	10	10	11	11	10	17	17	15	17	20	18	18	37	13	13	11	26	16	12	52	14	52
8-Oct	11	62	75	86	54	35	72	79	15	19	19	24	M	51	17	19	24	16	41	50	14	13	14	12	86
9-Oct	14	16	15	15	16	17	14	16	15	16	21	23	25	24	17	14	15	13	12	13	15	15	13	12	25
10-Oct	13	14	13	13	14	12	13	13	13	19	15	20	20	27	18	15	16	12	14	9	14	17	17	11	27
11-Oct	14	23	27	18	16	12	11	10	12	14	13	15	16	17	15	14	13	10	9	8	8	8	14	11	27
12-Oct	9	9	8	9	11	13	81	54	66	34	23	23	20	25	16	16	12	11	11	11	9	9	11	11	81
13-Oct	66	60	29	8	10	13	11	11	11	15	18	15	29	38	15	22	24	15	10	20	11	12	12	13	66
14-Oct	56	50	31	39	20	80	80	22	14	15	15	14	16	19	24	49	25	35	12	13	11	9	12	22	80
15-Oct	11	27	15	13	19	8	10	10	17	20	22	29	37	33	29	34	17	11	8	11	9	14	54	22	54
16-Oct	16	17	9	55	26	26	25	50	62	19	20	58	50	68	33	17	15	11	17	13	14	11	12	13	68
17-Oct	12	11	12	12	12	13	13	13	14	14	13	13	15	14	14	15	14	13	13	13	12	12	13	12	15
18-Oct	12	12	13	13	14	15	14	14	29	38	20	21	28	19	19	14	14	17	12	11	8	13	20	25	38
19-Oct	7	12	13	37	41	56	22	46	17	23	19	19	19	14	12	12	12	11	12	12	12	14	13	13	56
20-Oct	14	13	13	14	13	13	14	14	17	15	18	20	21	20	26	34	17	20	75	36	36	65	12	21	75
21-Oct	25	26	20	17	9	10	23	18	19	17	14	13	15	26	13	13	10	10	7	8	9	11	6	11	26
22-Oct	8	29	15	15	9	10	9	13	24	19	18	20	17	17	12	13	12	11	14	12	10	11	17	14	29
23-Oct	14	13	13	9	15	23	42	82	37	12	14	15	15	16	14	14	16	26	25	22	22	10	10	13	82
24-Oct	11	12	11	12	13	12	12	11	13	12	11	11	11	11	13	12	12	15	11	11	13	10	11	11	15
25-Oct	9	11	9	13	36	9	12	8	13	15	29	24	41	39	32	12	10	13	13	11	16	14	11	13	41
26-Oct	14	19	13	15	16	16	10	10	10	10	11	13	13	12	15	12	13	13	12	13	14	14	13	14	19
27-Oct	13	12	13	12	12	12	13	13	12	12	14	14	13	9	11	10	12	10	14	15	11	40	37	21	40
28-Oct	18	22	20	31	15	23	15	15	14	15	13	14	12	10	11	15	17	14	13	11	11	12	11	14	31
29-Oct	16	15	19	13	17	12	10	14	13	12	15	14	18	34	36	20	16	23	15	19	14	12	12	13	36
30-Oct	12	13	15	15	14	13	12	16	12	12	13	13	13	14	11	13	12	13	13	14	14	14	15	13	16
31-Oct	14	14	14	14	13	14	13	12	13	13	13	14	15	14	18	13	16	15	12	16	17	11	19	16	19
															71 64 82 86 83 80 81 82 83 38 71 58 103 68 36 49 31 35 75 50 36 65 54 25										
															Diurnal Maximum										
M - Maintenance															AF - Analyzer Failure										



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Patricia McInnes - October 2014**



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# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 7, 2014	Previous Calibration	September 5, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	13:40
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	771	771
Calculated slope	0.997776	0.997410	Chamber temp.	44.9	45.3
Calculated intercept	-0.675989	0.452610	Pressure (mmHg)	697.0	692.2
Analyzer Background	5.6	5.6	Flow (lpm)	0.438	0.443
Analyzer Coefficient	1.039	1.022	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	-0.3	NA
as found span	5000	55.3	519.8	530.7	0.979
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	55.3	519.8	520.9	0.998
second point	5000	27.7	260.4	260.7	0.999
third point	5000	13.9	130.7	129.7	1.007
calibrator zero	5000	0.0	0.0	0.1	NA
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	55.3	519.8	525.0	0.990
Average Correction Factor					1.001

Corrected As found 531.0 Previous response 521.7 % change -1.8%

#### Notes:

changed pump for preventative maintenance. Adjusted span

Calibration Performed By:

Michael Martineau



## Wood Buffalo Environmental Association

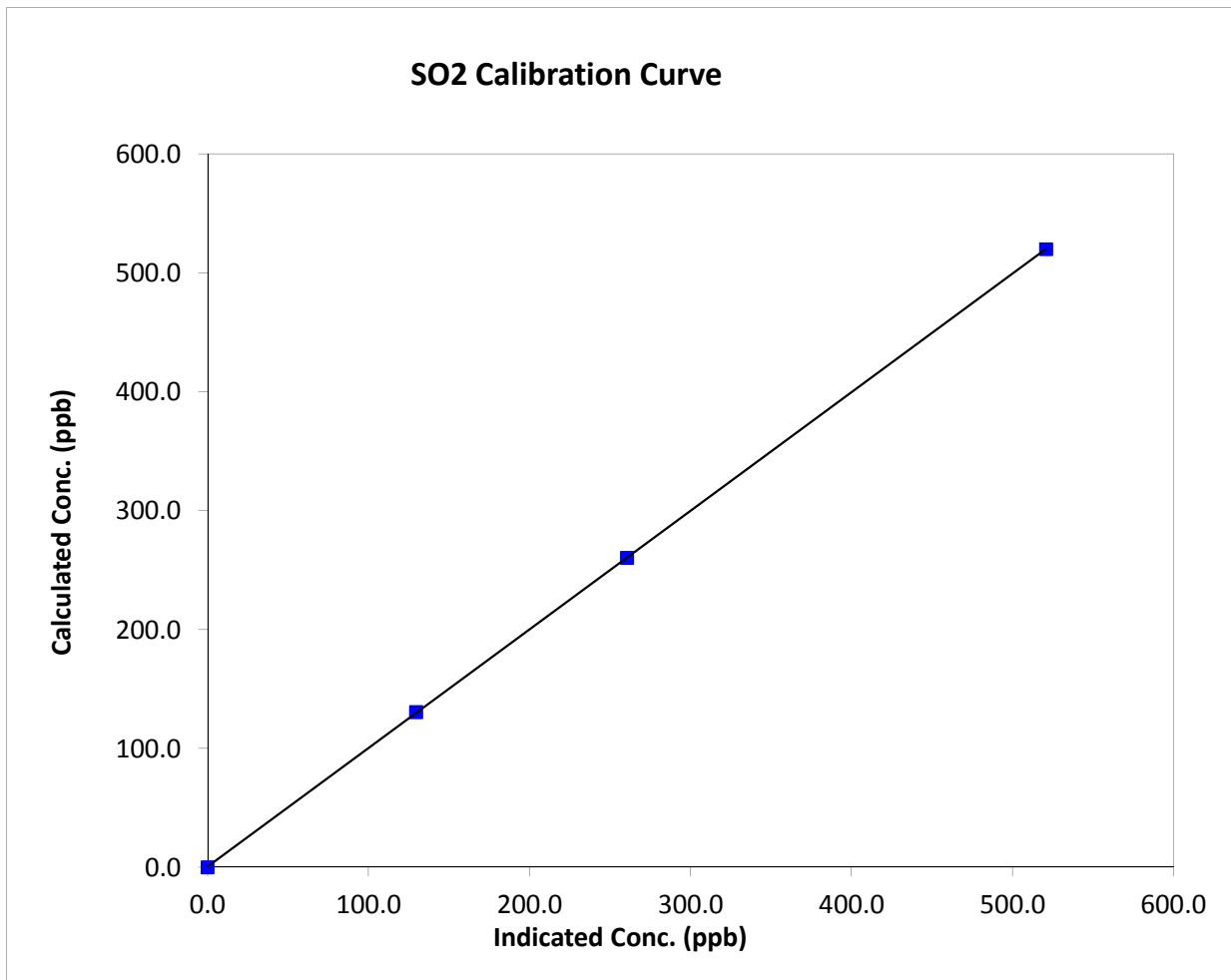
### SO<sub>2</sub> Calibration Summary

#### Station Information

Calibration Date	October 7, 2014	Previous Calibration	September 5, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	13:40
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

#### Calibration Data

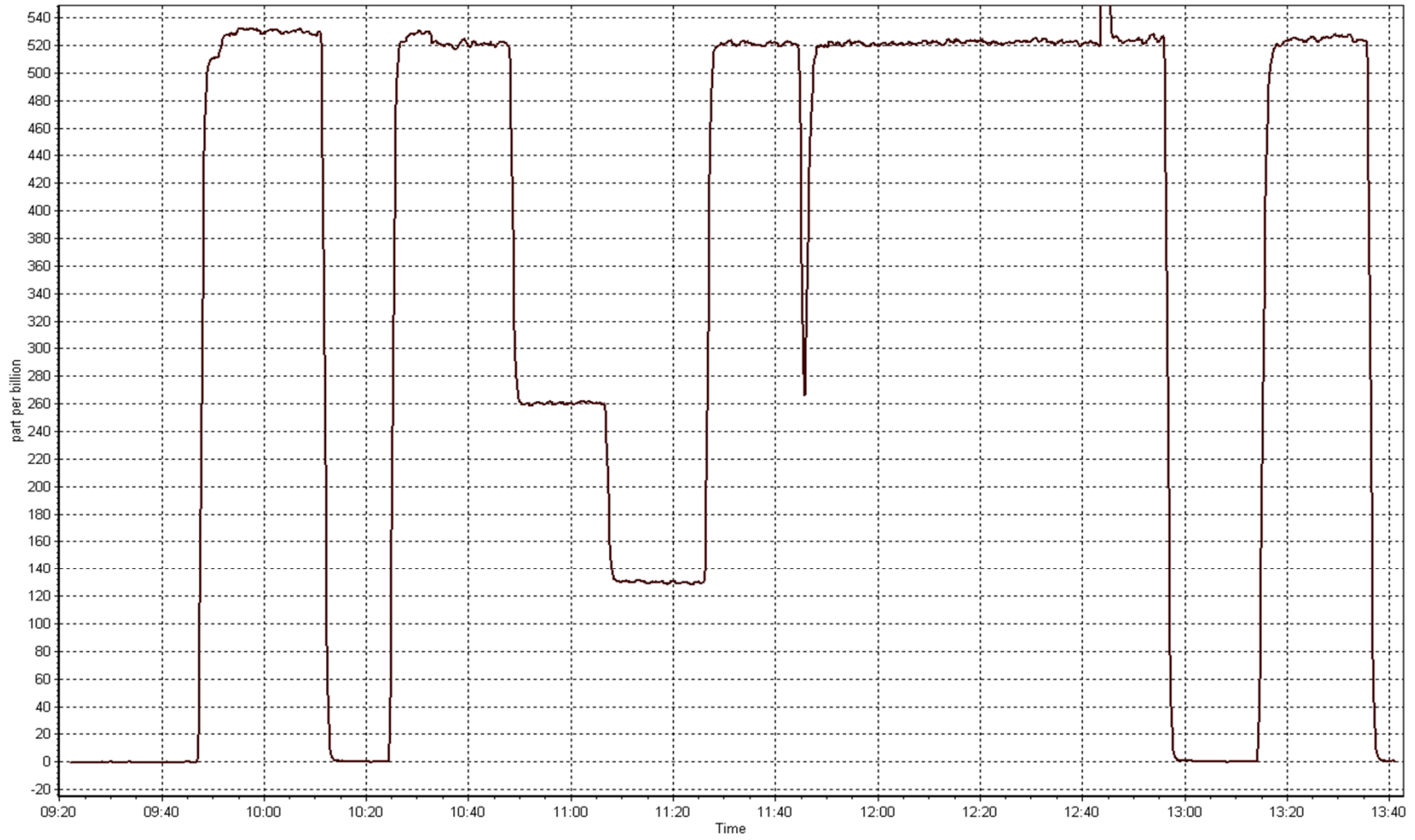
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999993
519.8	520.9	0.9979		
260.4	260.7	0.9989	Slope	0.997410
130.7	129.7	1.0073		
			Intercept	0.452610





SO2 Calibration Plot

Date: October 7, 2014





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	October 6, 2014	Previous Calibration	September 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	11:50	End Time (MST)	15:35
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	1220
Cal Gas Concentration	4.84 ppm H2S	Cal Gas Expiry Date	June 10 2014
Gas Cert Reference	ALM009562	SO2 gas conc.	47.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	0-5000mV	DACS channel #	SE 2

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-657	-675
Analyzer Range (input)	100	100	Lamp voltage	844	800
Calculated slope	0.997551	0.987370	Chamber temp.	45	45
Calculated intercept	-0.289569	0.087047	Pressure	702.0	692.1
Analyzer Background	14.4	13.8	Flow	0.488	0.462
Analyzer Coefficient	1.259	1.198	Intensity	116	90
			Converter temp.	850	850

Analyzer make/model	TEI 43i	Analyzer serial #	1008841398
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	70.4	0.995
SO2 scrubber check	5000	21.3	200.2	0.3	NA
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	72.3	70.0	70.8	0.989
second point	5000	36.3	35.1	35.5	0.989
third point	5000	18.7	18.1	18.2	0.996
calibrator zero	5000	0.0	0.0	-0.1	NA
as left zero	5000	0.0	0.0	0.0	NA
as left span	5000	72.3	70.0	71.1	0.984
Average Correction Factor					0.991

Corrected As found	70.2	Previous response	70.4	% change	0.3%
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#### Notes:

replaced pump (1 yr old); adjusted flash lamp and PMT voltage to address lamp intensity alarm. Adjusted zero and span.

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

## TRS Calibration Summary

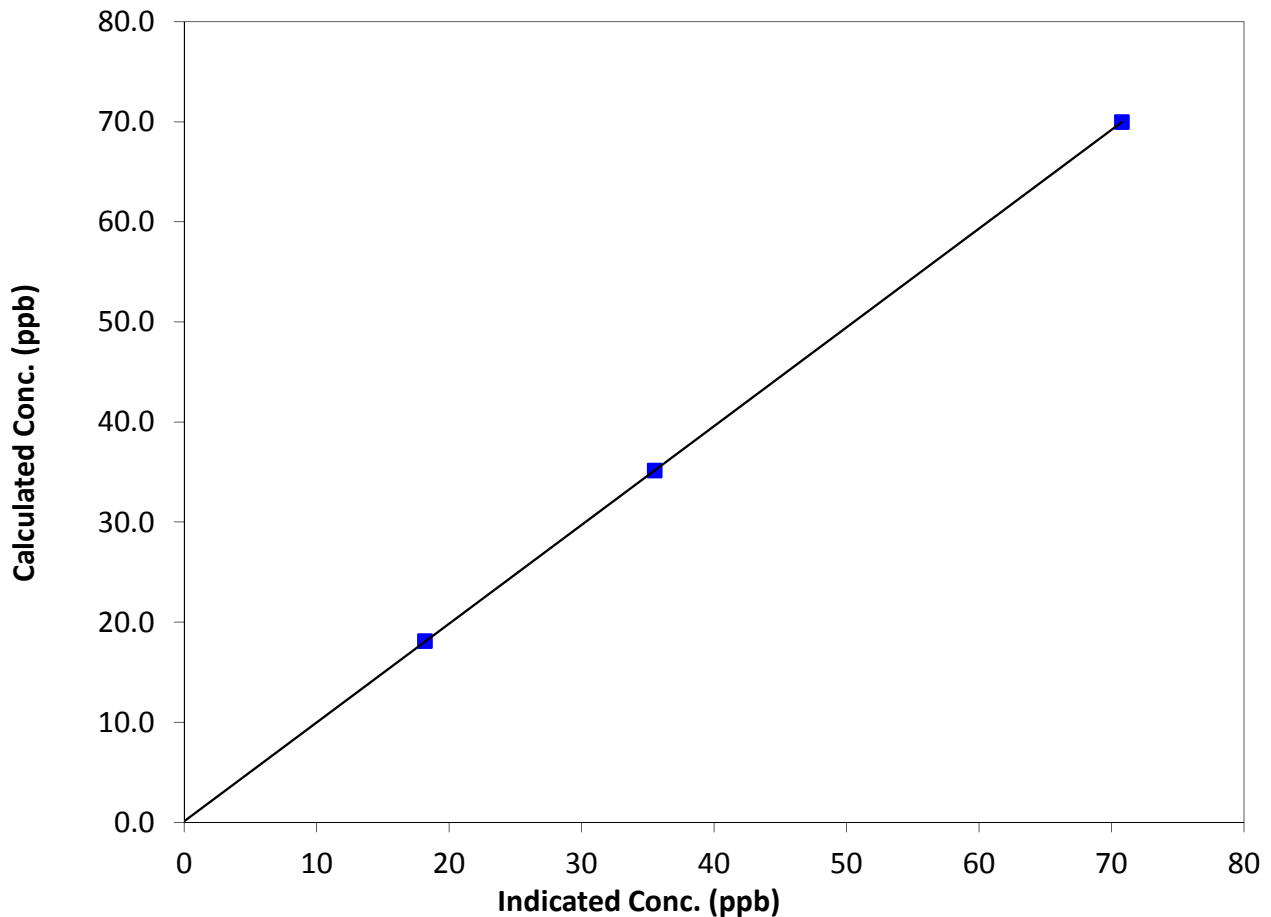
### Station Information

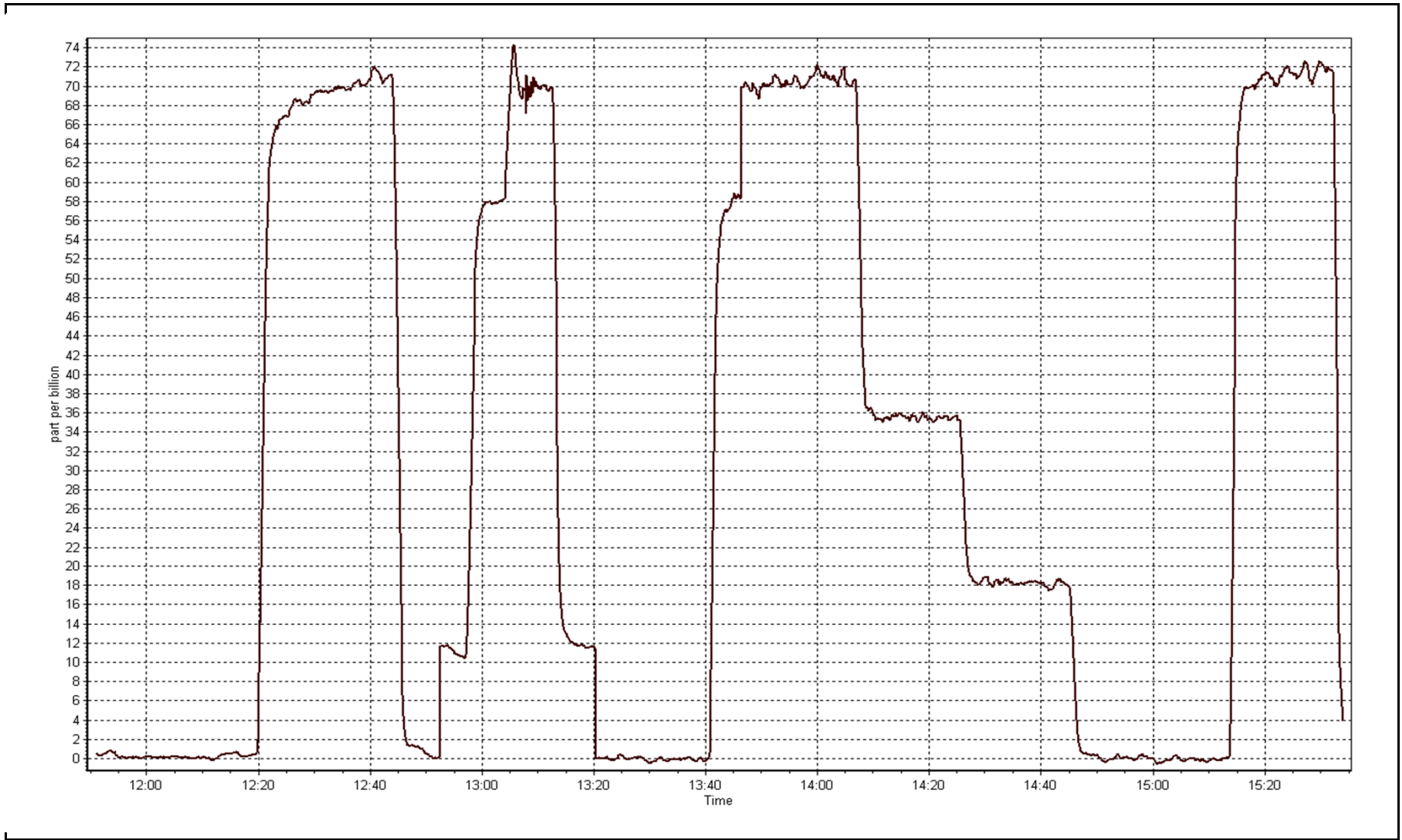
Calibration Date	October 6, 2014	Previous Calibration	September 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	11:50	End Time (MST)	15:35
Analyzer make	TEI 43i	Analyzer serial #	1008841398

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999998
70.0	70.8	0.9885		
35.1	35.5	0.9893	Slope	0.987370
18.1	18.2	0.9957		
			Intercept	0.087047

**TRS Calibration Curve**







# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

### Station Information

Calibration Date	Tuesday, October 07, 2014	Prev Calibration	Friday, September 05, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	13:40
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	36.7	34.4
CH4 Range (input)	50	50	Flame Temp	405.8	403.2
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	1.008162	1.008262	Air Pressure	32.4	32.4
THC Calc intercept	-0.034085	-0.032092	Detector Temp	175.0	175.0
NMHC Calc slope	1.010697	1.005402	Filter Temp	175.0	175.0
NMHC Calc intercept	-0.024067	-0.031850			

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	12.01	1.006
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	12.08	12.00	1.007
second point	5000	27.7	6.05	6.04	1.002
third point	5000	13.8	3.01	3.06	0.985
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	55.3	12.08	12.00	1.007
Average Correction Factor					0.998

Corrected As found 12.01 Previous response 12.02 % change 0.1%

**Notes:**

No adjustments made.

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	6.39	1.004
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	6.42	6.40	1.003
second point	5000	27.7	3.21	3.24	0.992
third point	5000	13.8	1.60	1.66	0.965
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	55.3	6.42	6.40	1.003
Average Correction Factor					0.987

Corrected As found      6.39      Previous response      6.37      % change      -0.3%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	55.3	5.66	5.62	1.008
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	5.66	5.60	1.011
second point	5000	27.7	2.84	2.80	1.013
third point	5000	13.8	1.41	1.40	1.009
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	55.3	5.66	5.60	1.011
Average Correction Factor					

Corrected As found      5.62      Previous response      5.64      % change      0.4%



# Wood Buffalo Environmental Association

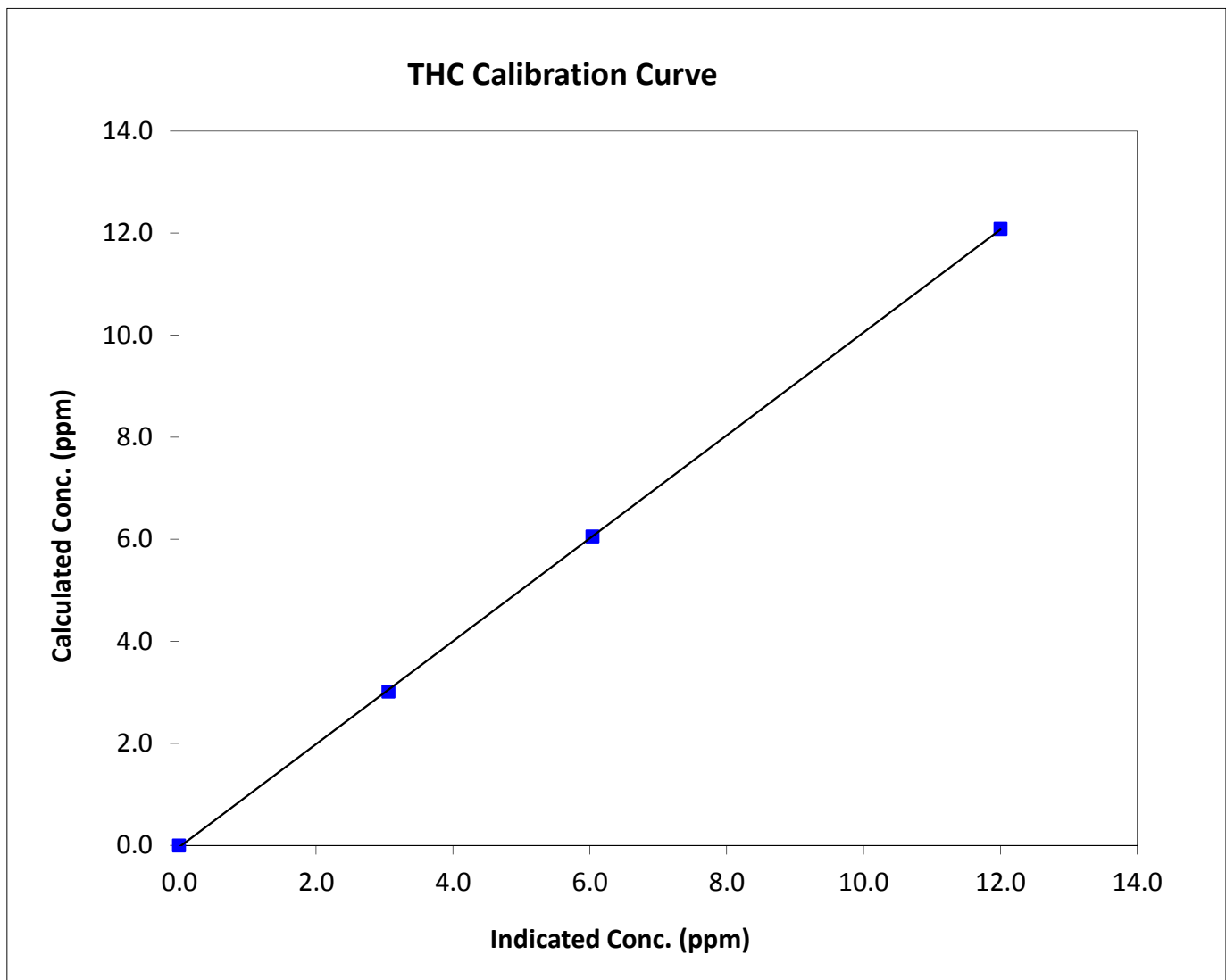
## THC Calibration Summary

### Station Information

Calibration Date	October 7, 2014	Previous Calibration	September 5, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	13:40
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	0.999966
12.08	12.00	1.0067		
6.05	6.04	1.0018	Slope	1.008262
3.01	3.06	0.9852		
			Intercept	-0.032092





# Wood Buffalo Environmental Association

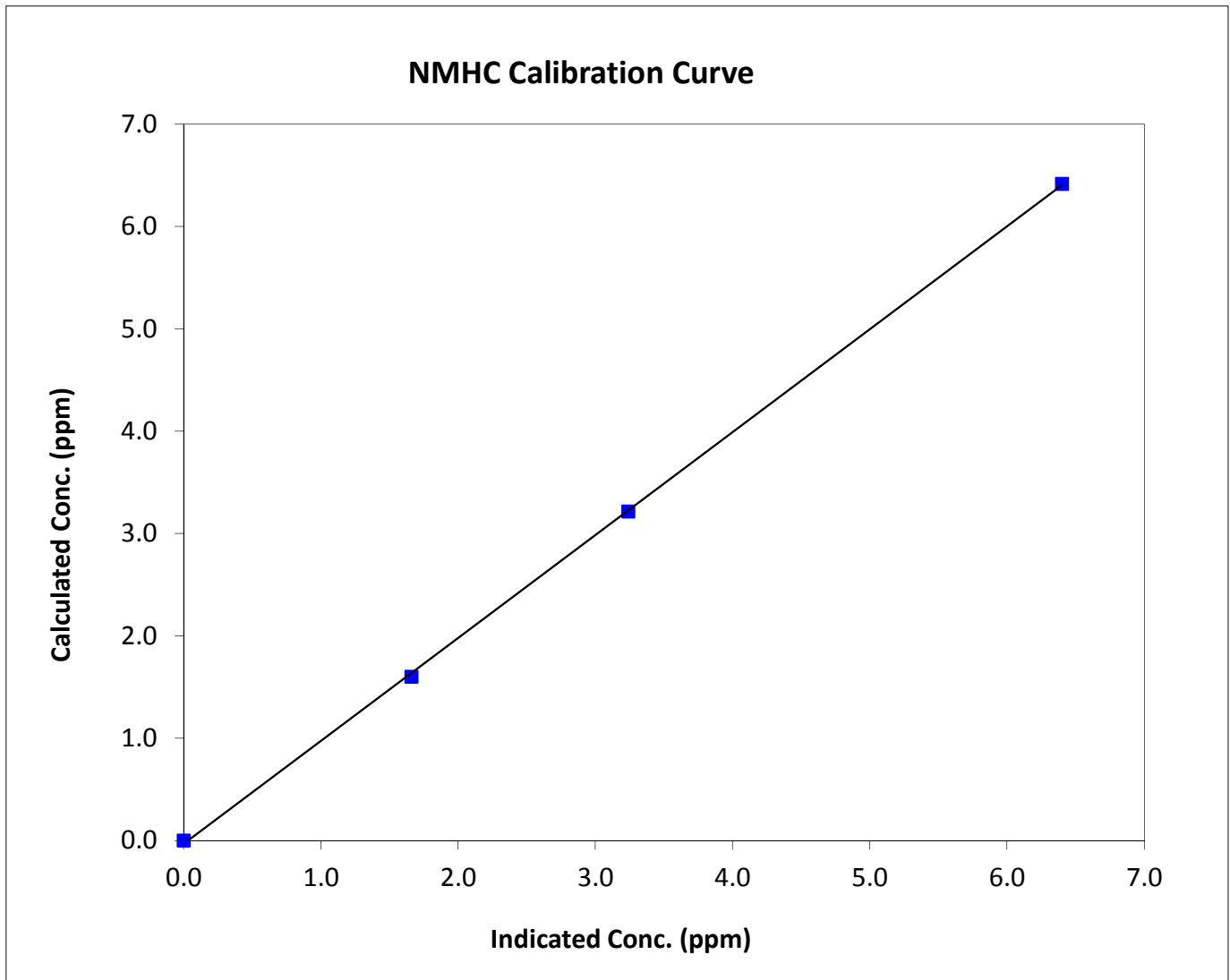
## NMHC Calibration Summary

### Station Information

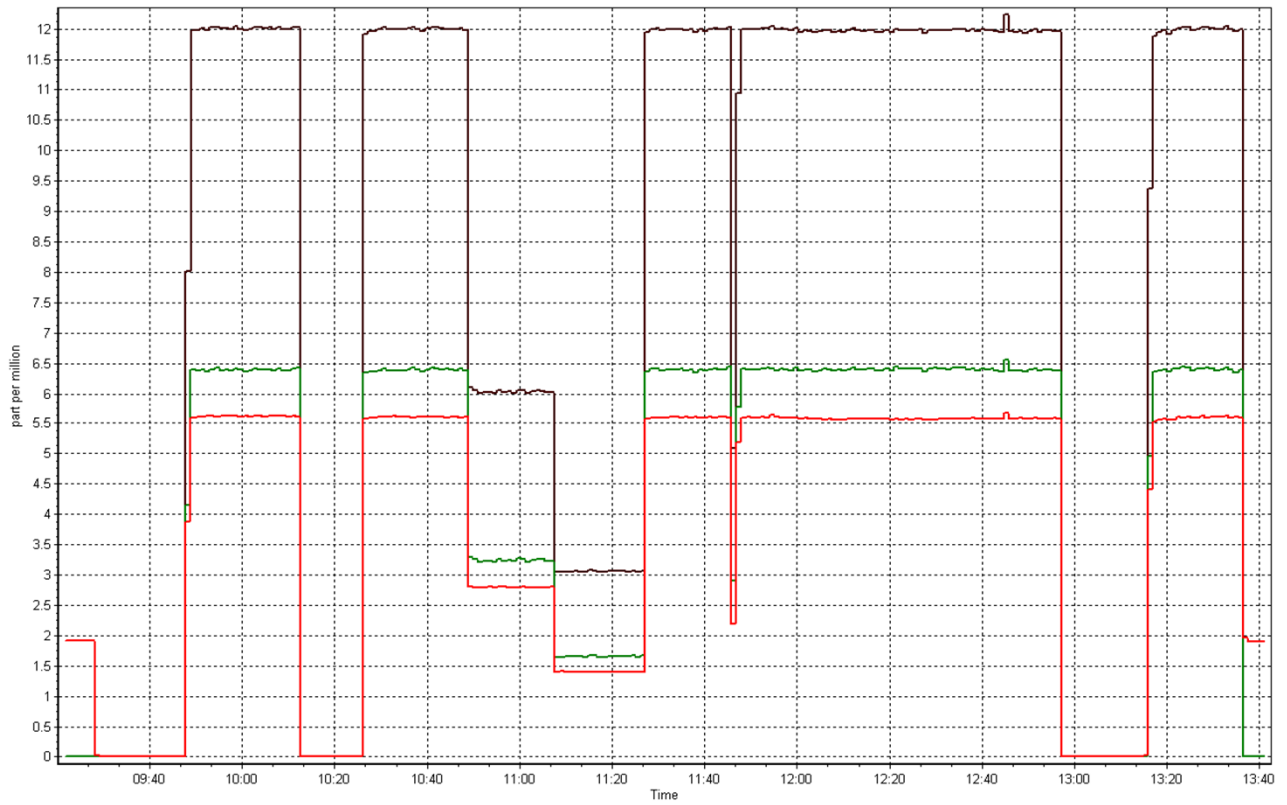
Calibration Date	October 7, 2014	Previous Calibration	September 5, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	13:40
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999883
6.42	6.40	1.0027		
3.21	3.24	0.9922	Slope	1.005402
1.60	1.66	0.9648		
			Intercept	-0.031850









# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 8, 2014	Previous Calibration	September 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	11:15	End Time (MST)	14:00
Barometric Pressure	737 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	API T700	Serial Number	1220
NO2 calibration used	Saturday, September 06, 2014	Transfer Standard	SA130110A
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	0-5000mV	DACS channel #	SE4

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	32.0	32.7
Analyzer Range (input)	500	500	Lamp temp.	53.0	53.6
Calculated slope	0.997503	0.995891	Pressure	681.0	679.5
Calculated intercept	-0.812792	0.383636	Flow cell A	0.610	0.605
Analyzer Background	0.0	0.0	Flow cell B	0.640	0.633
Analyzer Coefficient	0.962	1.001	Cell A Intensity	n/a	88000
			Cell B Intensity	n/a	81900

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	-0.7	N/A
as found span	5000	1060 / 615	362.0	347.9	1.041
calibrator zero	5000	0.000	0.0	-0.7	N/A
high point	5000	1060 / 615	362.0	363.0	0.997
second point	5000	964 / 430	247.5	248.1	0.997
third point	5000	838 / 220	125.1	125.7	0.996
calibrator zero					
as left zero	5000	0.000	0.0	-0.4	N/A
as left span	5000	1060 / 615	362.0	363.9	0.995
Average Correction Factor					0.997

Corrected As found 348.6 Previous response 363.7 % change 4.4%

#### Notes:

span adjusted slightly. No issues noted with instruments performance. Noise during second point due to internal station temp fluctuations.

Calibration Performed By:

Michael Martineau



## Wood Buffalo Environmental Association

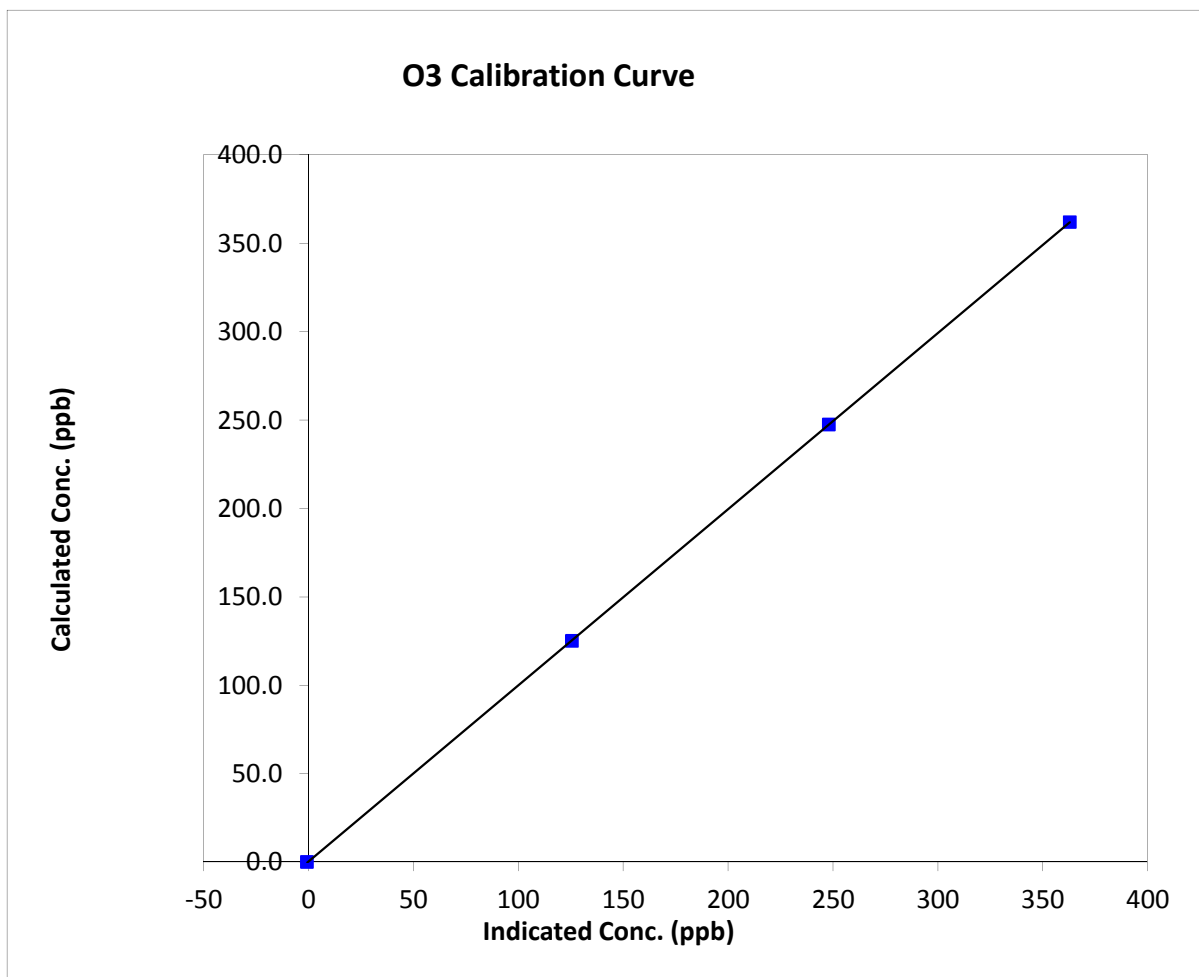
### O<sub>3</sub> Calibration Summary

#### Station Information

Calibration Date	Wednesday, October 08, 2014	Previous Calibration	September 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	11:15	End Time (MST)	14:00
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

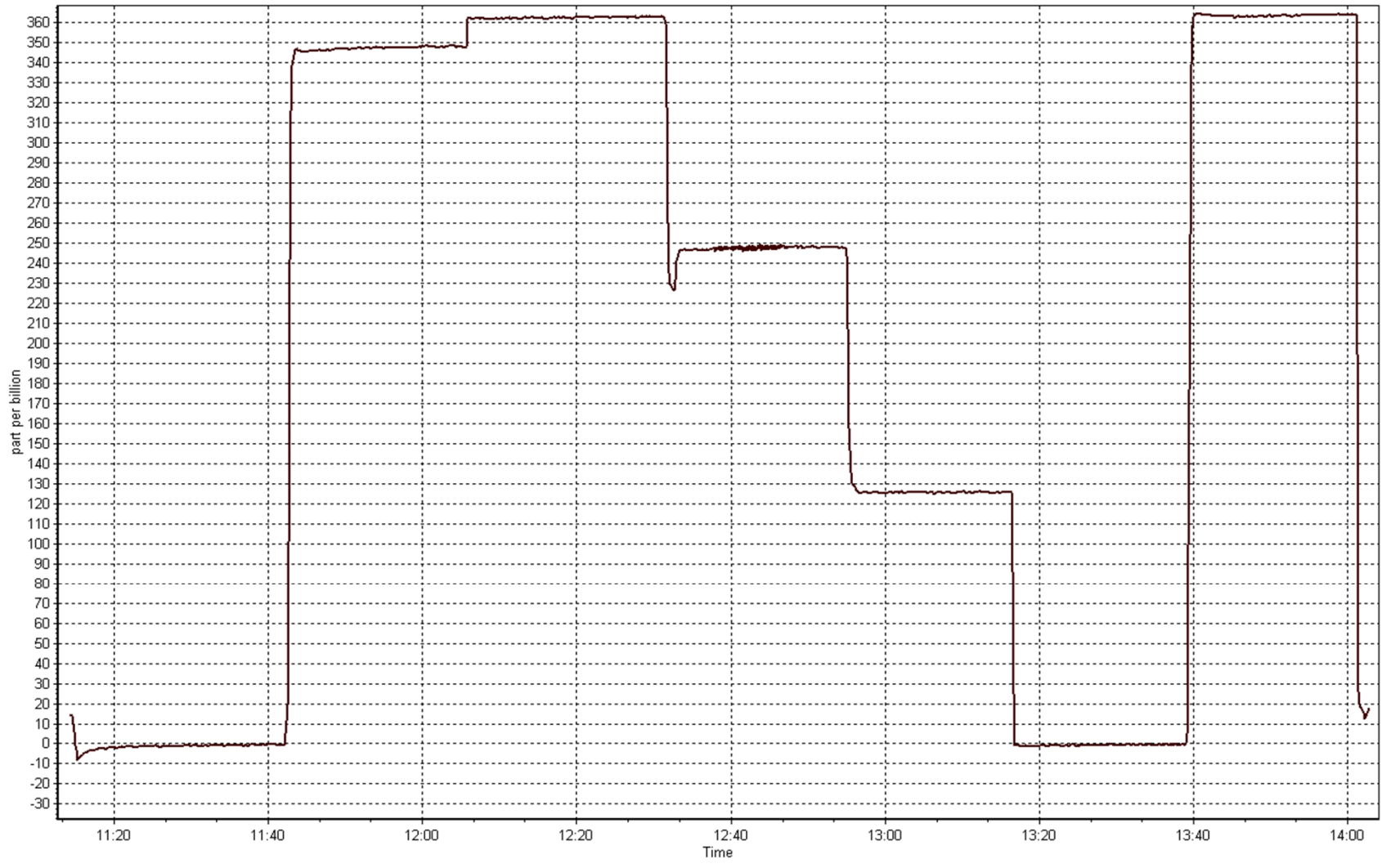
#### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.7	N/A	Correlation Coefficient	0.999996
362.0	363.0	0.9974		
247.5	248.1	0.9974	Slope	0.995891
125.1	125.7	0.9956		
			Intercept	0.383636



O3 Calibration Plot

Date: October 8, 2014





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 7, 2014	Previous Calibration	September 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	13:40
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	0.997337	0.998287	0.987332
	Data Offset	0.027288	-0.235368	-1.221607
After	Data Slope	0.994168	0.995284	1.014854
	Data Offset	0.673382	0.158789	0.745619
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	1.065		1.065	
NOx coefficient	0.997		0.997	
NO2 coefficient	1.000		1.000	
NO bkgnd	2.8		2.8	
NOx bkgnd	4.1		4.1	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	328	Deg C	326	Deg C
PMT voltage	-760	V	-761	V
PMT Temp	-2.8	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	180.6	mmHg	175	mmHg
R Cell Press Nox	180.9	mmHg	174.7	mmHg
NO sample flow	0.822	ccm	0.788	ccm
Nox sample Flow	0.826	ccm	0.787	ccm

**Notes:**

No adjustments required. 2nd high NO point used as GPT reference (after GPT).



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

October 7, 2014

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	-1.3	-0.1	-1.2	N/A	N/A
as found span	5000	55.3	601.7	601.7	0.0	598.6	598.1	0.5	1.0052	1.0060
calibrator zero	5000	0.0	0.0	0.0	0.0	-1.3	-0.1	-1.2	N/A	N/A
high point	5000	55.3	601.7	601.7	0.0	603.8	604.3	-0.6	0.9965	0.9956
second point	5000	27.7	301.4	301.4	0.0	303.6	302.9	0.7	0.9928	0.9951
third point	5000	13.9	151.2	151.2	0.0	152.3	151.4	0.9	0.9929	0.9986
calibrator zero	5000	0.0	0.0	0.0	0.0	-1.3	-0.1	-1.2	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	-0.5	0.0	-0.5	N/A	N/A
as left span	5000	55.3	601.7	253.9	347.8	618.0	262.0	356.0	0.9736	0.9691
Average Correction Factor									0.9941	0.9964

Corrected As found NO<sub>x</sub>= 599.8 NO= 598.1 Percent Change NO<sub>x</sub>= 0.6% NO= 0.8%  
 Previous Response NO<sub>x</sub>= 603.2 NO= 602.9

### 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			-1.2			N/A	
1st NO <sub>2</sub> (300)	N/A	253.9	362.0	609.9	253.9	355.9	0.9758	1.0000	1.0171	98.3%
2nd NO <sub>2</sub> (200)	N/A	368.4	247.5	611.2	368.4	242.8	0.9737	1.0000	1.0195	98.1%
3rd NO <sub>2</sub> (100)	N/A	490.8	125.1	614.2	490.8	123.4	0.9689	1.0000	1.0138	98.6%
4th NO <sub>2</sub> (0)	615.9	N/A	-1.3	614.6	615.9	-1.3	0.9683	1.0000	N/A	N/A
Average Correction Factor							0.9717	1.0000	1.0168	98.4%

Calibration Performed By: Michael Martineau



# Wood Buffalo Environmental Association

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

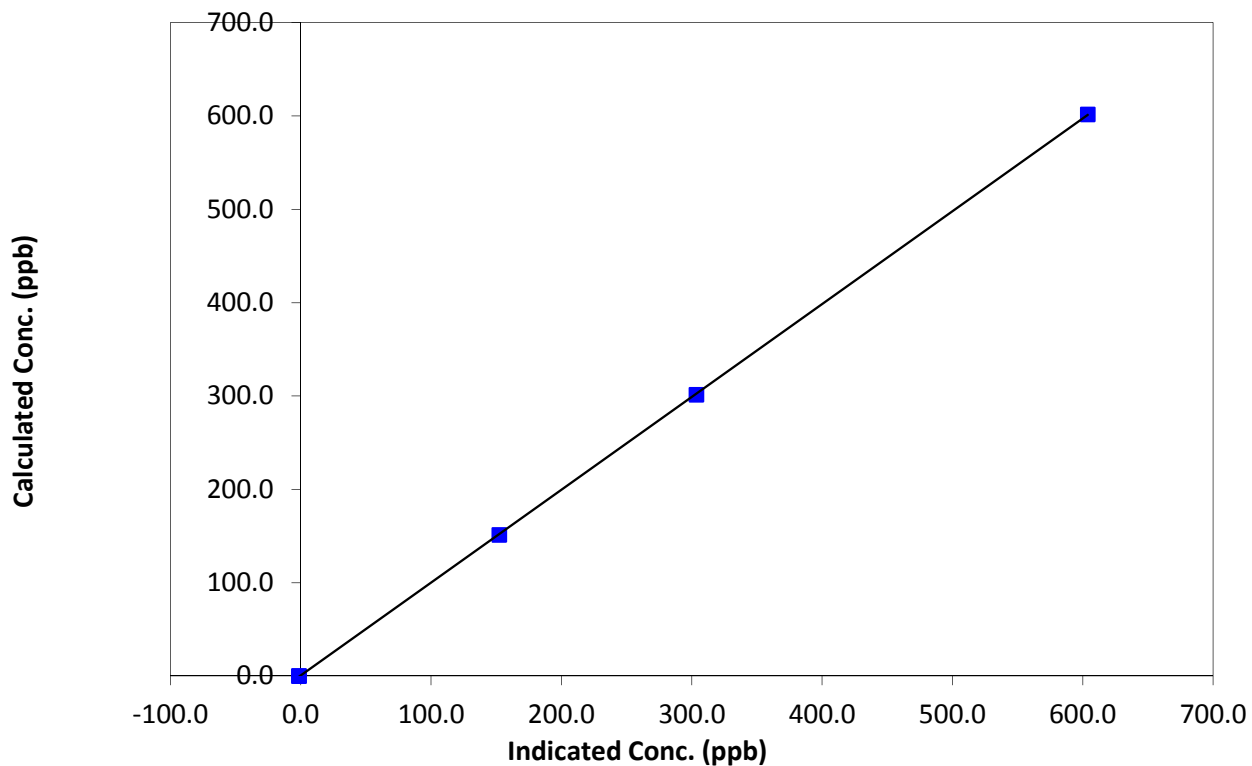
### Station Information

Calibration Date	October 7, 2014	Previous Calibration	September 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	13:40
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	-1.3	N/A	Correlation Coefficient	0.999987
601.7	603.8	0.9965		
301.4	303.6	0.9928	Slope	0.994168
151.2	152.3	0.9929		
0.0	-1.3	0.0000	Intercept	0.673382

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

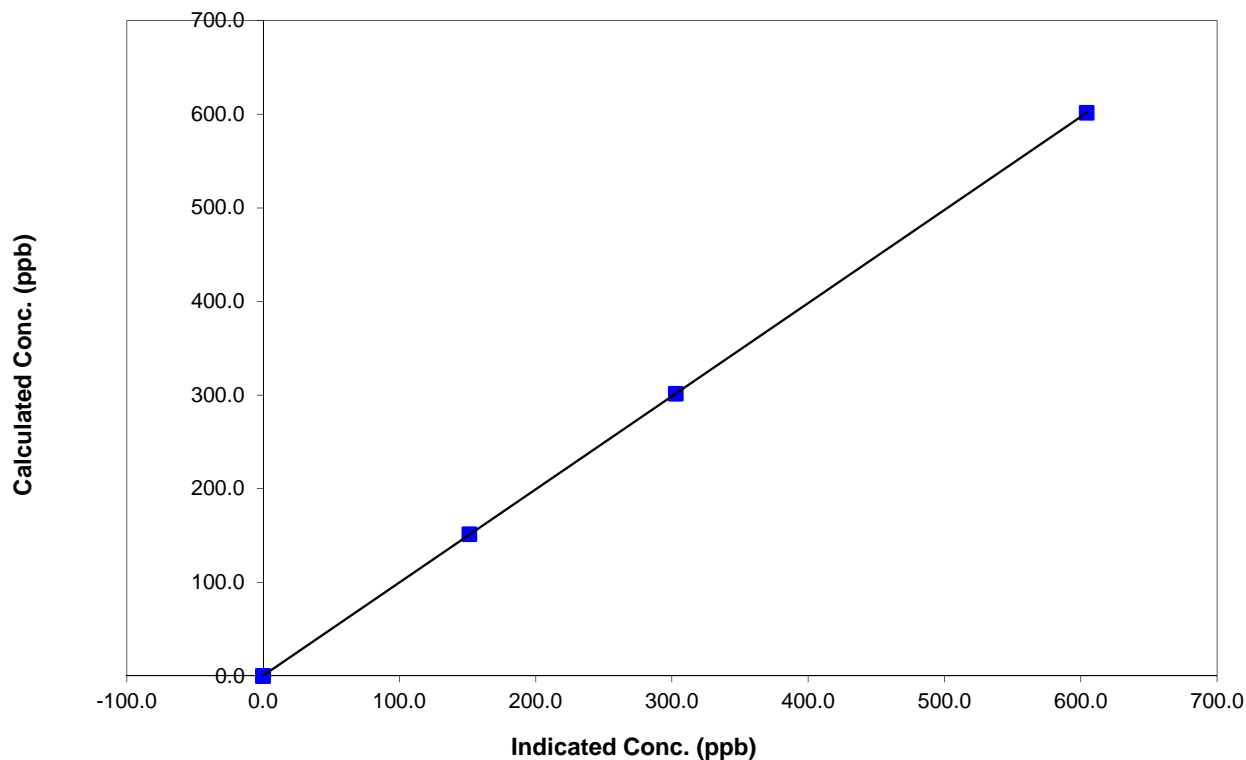
### Station Information

Calibration Date	October 7, 2014	Previous Calibration	September 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	13:40
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	0.999999
601.7	604.3	0.9956		
301.4	302.9	0.9951	Slope	0.995284
151.2	151.4	0.9986		
0.0	-0.1	0.0000	Intercept	0.158789

### NO Calibration Curve







# Wood Buffalo Environmental Association

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

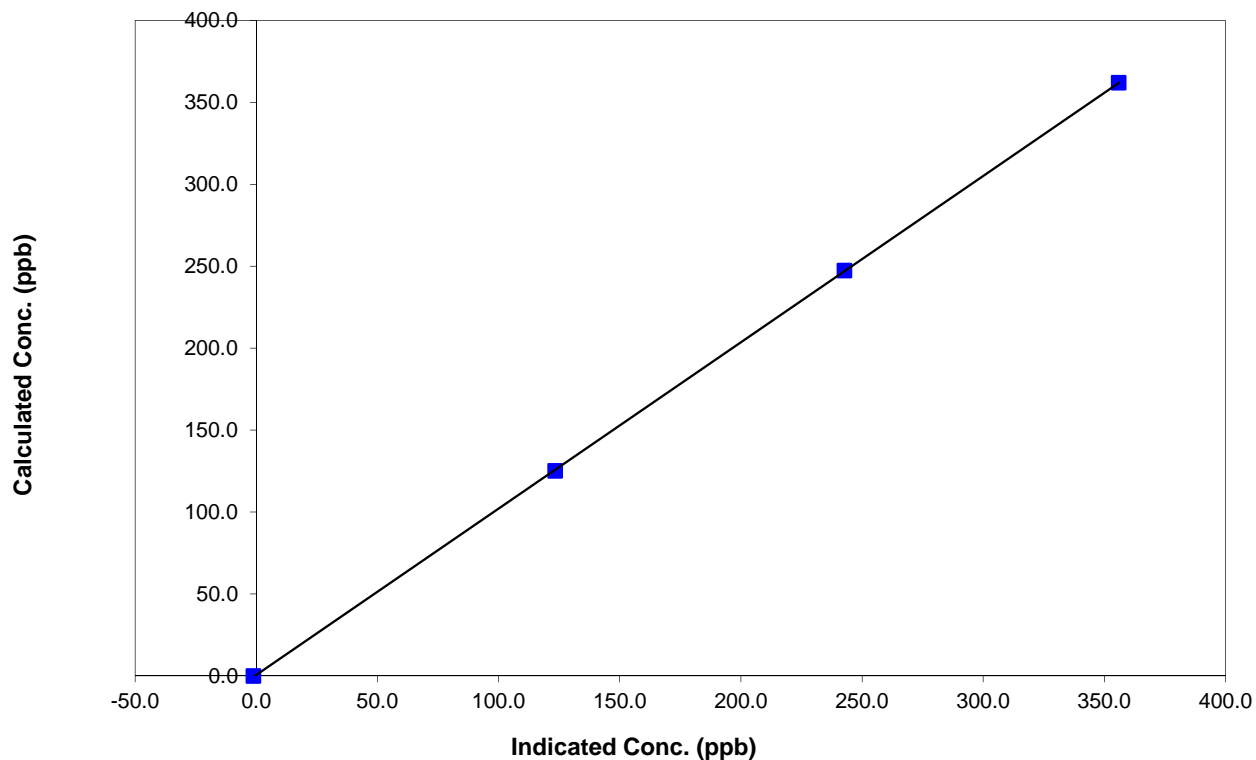
### Station Information

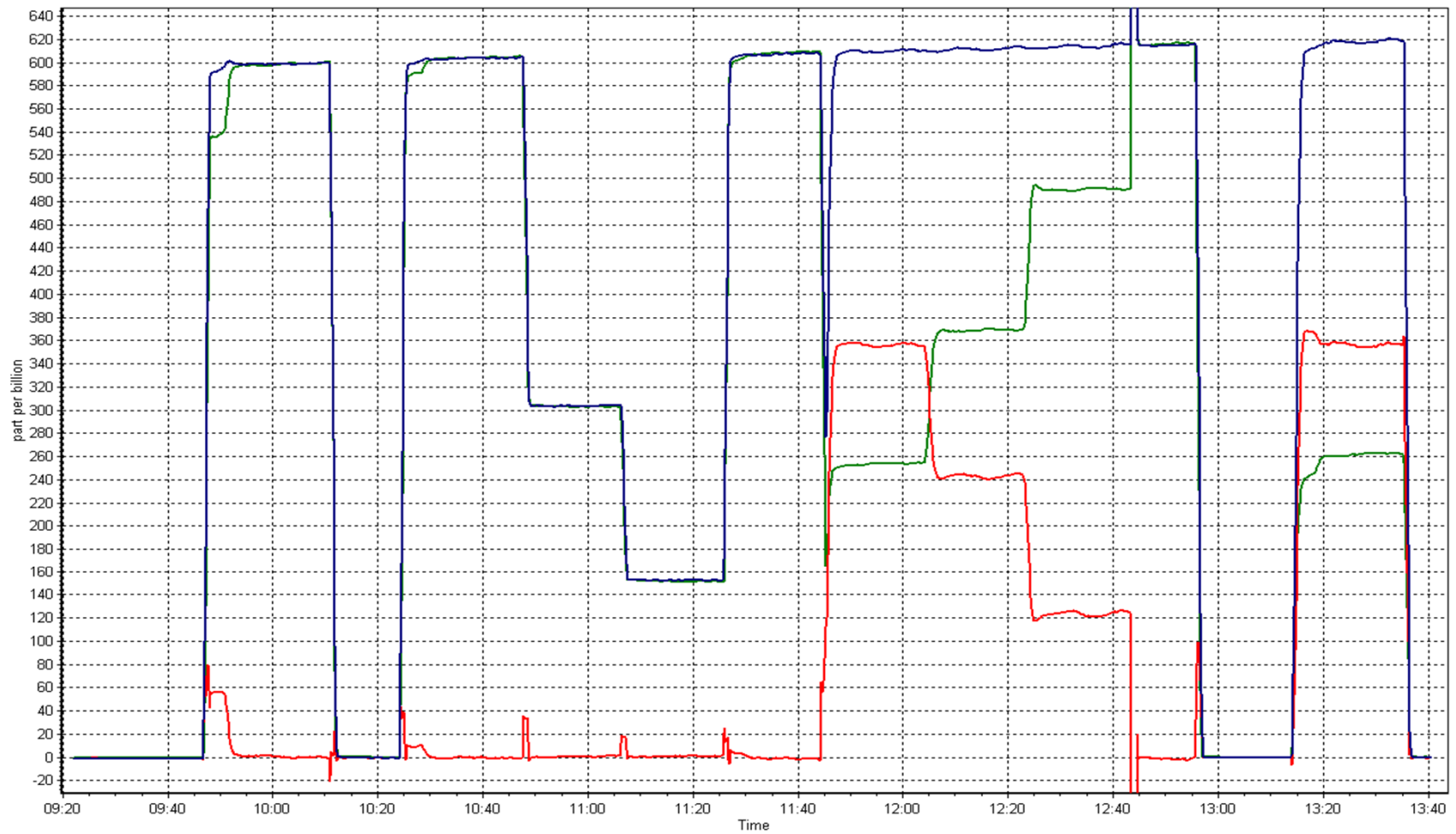
Calibration Date	October 7, 2014	Previous Calibration	September 6, 2014
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	13:40
Analyzer make	Thermo Scientific 42i	Analyzer serial #	1218153460

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.2	N/A	Correlation Coefficient	0.999985
362.0	355.9	1.0171		
247.5	242.8	1.0195	Slope	1.014854
125.1	123.4	1.0138		
			Intercept	0.745619

### 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	October 2, 2014	Previous Calibration	September 7, 2014
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	13:10
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	0.999665	0.990706	1.000778
	Data Offset	-2.242181	0.065064	-2.634638
After	Data Slope	1.006931	0.994324	1.007387
	Data Offset	1.843292	-0.004389	1.726329
Channel #		NA	NA	NA
Voltage Range		0-5	0-5	0-5

### Analyzer Information

Analyzer make/model	Thermo 17c	Analyzer serial #	622817829
		Converter serial #	617817369

Test Point	before		after	
Concentration range	0-2500	ppb	0-2500	ppb
Nt coefficient	0.889	ppb	0.891	ppb
NOX coefficient	0.905	ppb	0.904	ppb
NH3 coefficient	0.933		0.933	
NO coefficient	0.895		0.904	
NO2 coefficient	1.000	ppb	1.000	ppb
No bkgrnd	5.8		5.8	
Nt bkgrnd	5.9		5.9	
NOX bkgrnd	5.1		5.1	
NH3 conv temp	771	DegC	771	Deg C
Chamber Temp	49.7	Deg C	49.7	Deg C
Moly Temp	322.0	Deg C	322.0	Deg C
PMT Temp	-8.7	Deg C	-8.6	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	120.0	mmHg	120.1	mmHg
PMT Voltage	-838.0	v	-838.0	v
Sample Flow 1 NO	502.0	ccm	496.0	ccm
Sample Flow 2 Nox	454.0	ccm	449.0	ccm
Sample Flow 3 Nt	507.0	ccm	501.0	ccm

Notes:



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

October 2, 2014

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	0.1	0.0	0.1	NA	NA
as found NO	5000	55.3	601.7	601.7	NA	594.6	596.8	-2.2	1.012	NA
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	NA	NA
high NO point	5000	55.3	601.7	601.7	NA	603.5	603.8	-0.3	0.997	NA
NO/O <sub>3</sub> point	5000	55.3	601.7	601.7	NA	607.3	606.4	0.9	0.991	NA
as found NH <sub>3</sub>	5000	52.8	2006.4	NA	2006.4	1991.0	1.0	1990.0	1.008	1.008
first NH <sub>3</sub>	5000	52.8	2006.4	NA	2006.4	1991.0	1.0	1990.0	1.008	1.008
second NH <sub>3</sub>	5000	26.3	999.4	NA	999.4	992.0	0.0	992.0	1.007	1.007
third NH <sub>3</sub>	5000	13.3	505.4	NA	505.4	496.6	0.0	496.6	1.018	1.018
as left zero										
as left span										
Average Correction Factor									0.9938	1.0111

Corrected As found

Nt = 594.5 ppb

NH<sub>3</sub> = 1989.9 ppb

Previous response

Nt = 604.1 ppb

NH<sub>3</sub> = 2007.5 ppb

Nt percent change

1.6%

NH<sub>3</sub> percent change

0.9%

Converter efficiency

93.3%

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

## NH3 Calibration Summary

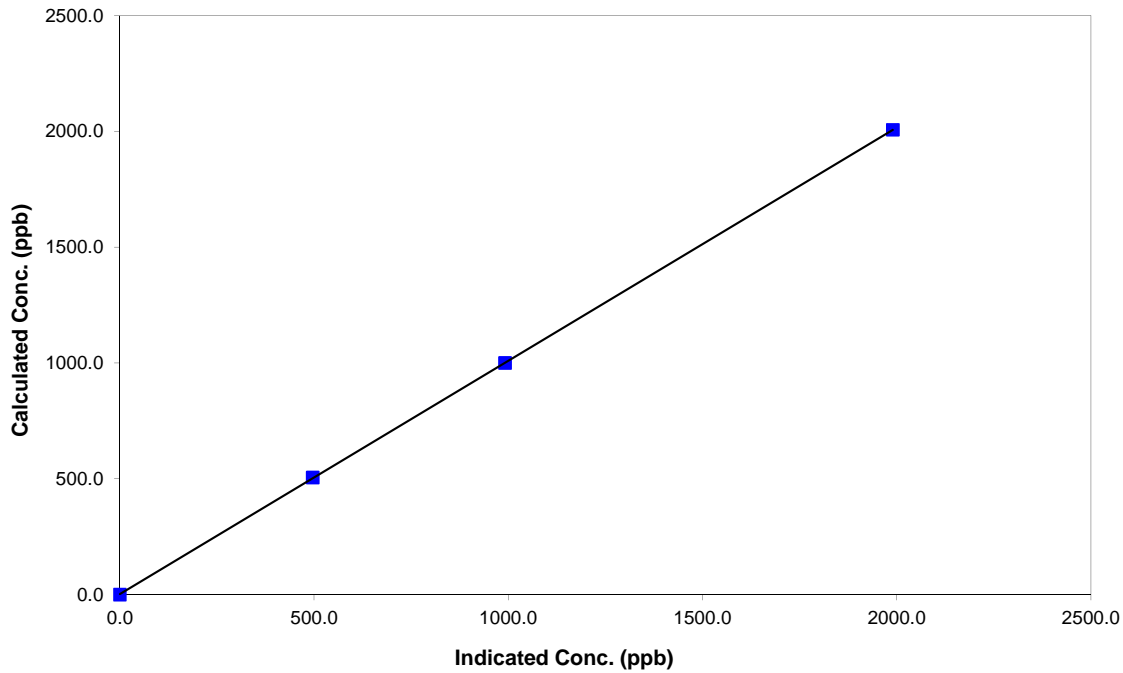
### Station Information

Calibration Date	October 2, 2014	Previous Calibration	September 7, 2014
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:20	End Time (MST)	13:10
Analyzer make	Thermo 17c	Analyzer serial #	622817829

### 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	0.999992
2006.4	1990.0	1.0082		
999.4	992.0	1.0075	Slope	1.007387
505.4	496.6	1.0177		
			Intercept	1.726329

### NH3 Calibration Curve





# Wood Buffalo Environmental Association

## Nt Calibration Summary

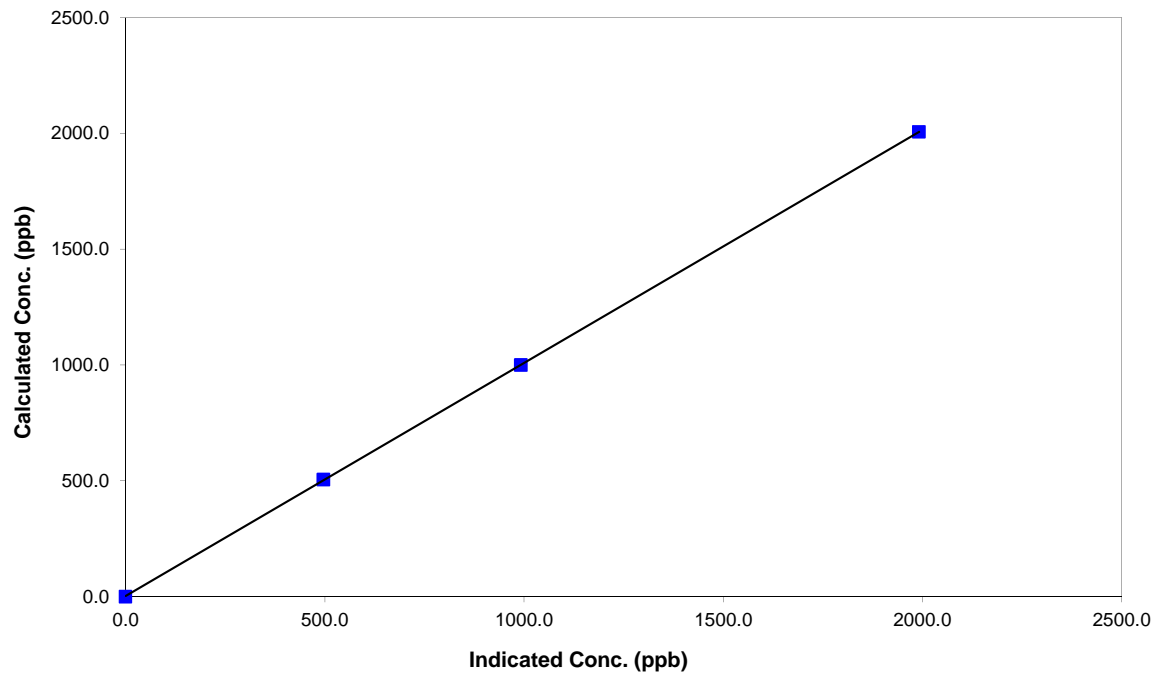
### Station Information

Calibration Date	October 2, 2014	Previous Calibration	September 7, 2014
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:20	End Time (MST)	13:10
Analyzer make	Thermo 17c	Analyzer serial #	622817829

### Nt (NH<sub>3</sub>) 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
2006.4	1991.0	1.0077		
999.4	992.0	1.0074	Slope	1.006931
505.4	496.6	1.0177		
			Intercept	1.843292

### Nt Calibration Curve





## Wood Buffalo Environmental Association

### NOx Calibration Summary

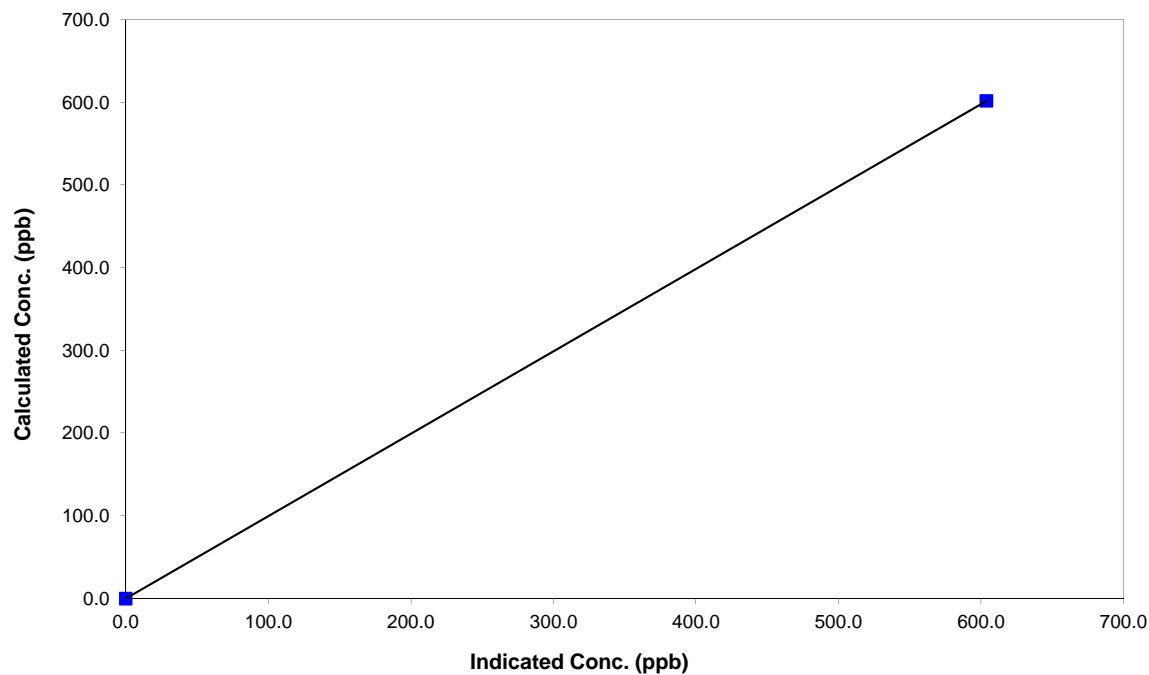
#### Station Information

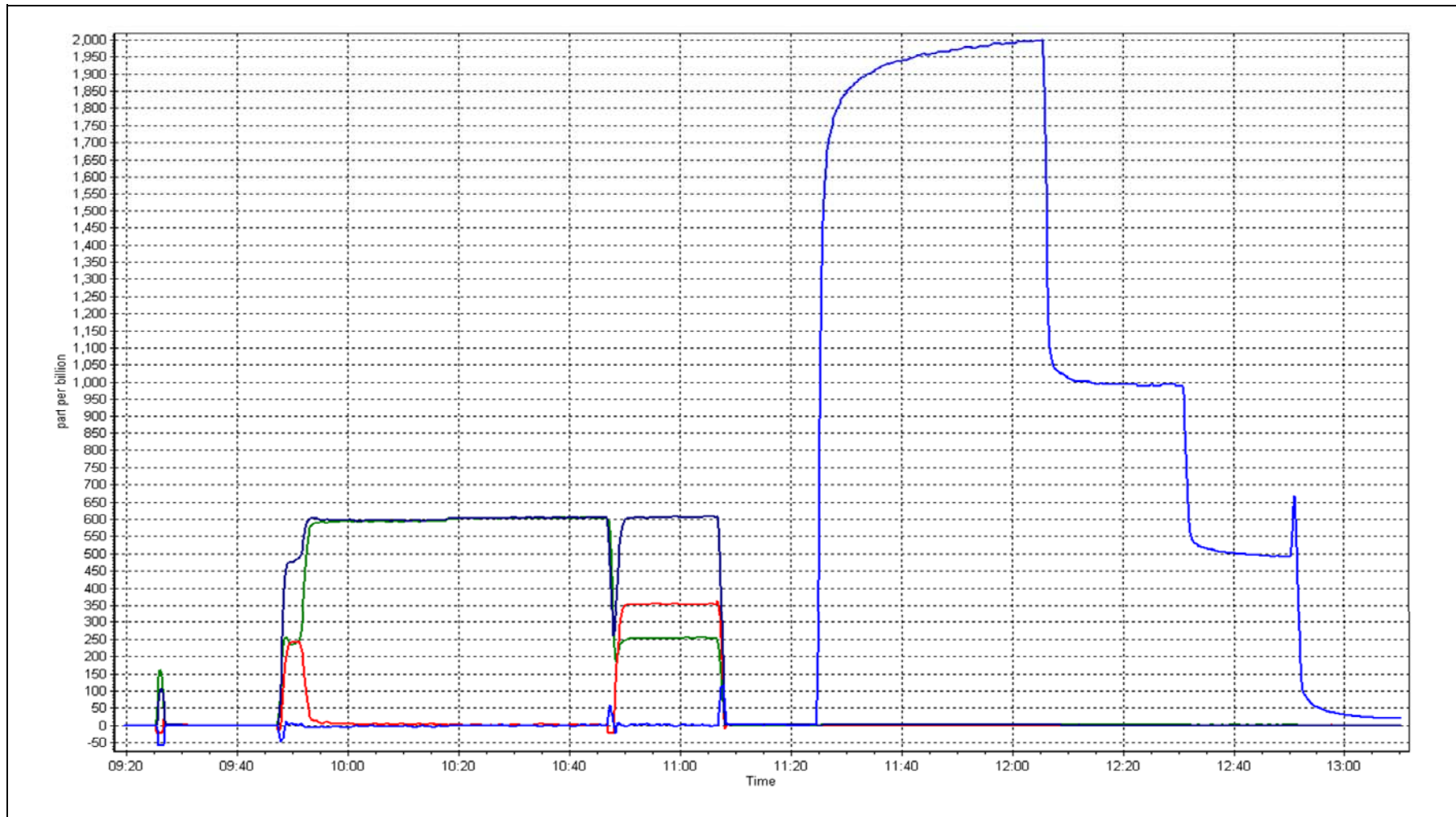
Calibration Date	October 2, 2014	Previous Calibration	September 7, 2014
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:20	End Time (MST)	13:10
Analyzer make	Thermo 17c	Analyzer serial #	622817829

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

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999986
601.7	603.8	0.9965		
601.7	606.4	0.9922		
			Slope	0.994324
			Intercept	-0.004389

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







# **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 7**  
**ATHABASCA VALLEY**  
**OCTOBER 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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
OCTOBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	705	38	39	99.87	19	0	4	0
TRS (ppb) Average	707	36	37	99.87	4	0	1	0
THC (ppm) Average	704	38	40	99.73	2.6	-	2.1	-
NMHC (ppm) Average	704	38	40	99.73	0.439	-	0.043	-
CH4(ppm) Average	704	38	40	99.73	2.5	-	2.1	-
O3 (ppb) Average	707	35	37	99.73	39	0	26	-
NO2 (ppb) Average	701	38	43	99.33	41	0	15	-
NO (ppb) Average	701	38	43	99.33	84	-	11	-
NOX (ppb) Average	701	38	43	99.33	116	-	25	-
PM2.5 (ug/m3) Average	740	0	4	99.46	45.8	-	10.9	0
CO(ppm) Average	705	39	39	100.00	0.6	-	0.1	-
Temperature 2 m (C) Average	744	0	0	100.00	23.3	-	12.2	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.4	-	-	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	-	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	29	-	-	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	705	0.8	1	-	0	0	0	1	1	1	19
TRS (ppb) Average	707	0.2	0	-	0	0	0	0	0	0	4
THC (ppm) Average	704	1.93	0.1	-	1.8	1.9	1.9	1.9	1.9	2	2.6
NMHC (ppm) Average	704	0.009	0.037	-	0	0	0	0	0	0	0.439
CH4(ppm) Average	704	1.92	0.1	-	1.8	1.9	1.9	1.9	1.9	2	2.5
O3 (ppb) Average	707	12.7	8	-	0	3	7	12	17	23	39
NO2 (ppb) Average	701	6.5	5	-	0	1	3	5	9	13	41
NO (ppb) Average	701	3.9	7	-	0	0	0	1	4	10	84
NOX (ppb) Average	701	10.5	11	-	0	1	3	7	14	22	116
PM2.5 (ug/m3) Average	740	5.11	3.7	-	1.1	2.1	3	4.2	5.9	8.9	45.8
CO(ppm) Average	705	0.06	0.1	-	0	0	0	0	0.1	0.1	0.6
Temperature 2 m (C) Average	744	5.7	4.6	-	-2.3	0.5	1.9	5.1	8.4	12.3	23.3
Barometric Pressure (inHg) Average	744	28.86	0.2	-	28.4	28.5	28.7	28.8	29	29.2	29.4
Relative Humidity (%) Average	744	75.7	15	-	33	52	66	80	88	92	99
Wind Speed 10 m (km/h) Average	743	8.6	6	-	0	2	4	7	12	15	29
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	15 Oct 2014 10:00	15 Oct 2014 10:00	1	Maintenance - sample manifold cleaned
TRS	15 Oct 2014 10:00	15 Oct 2014 10:00	1	Maintenance - sample manifold cleaned
NMHC, CH4, THC	15 Oct 2014 09:00	15 Oct 2014 10:00	2	Maintenance - sample manifold cleaned
O3	16 Oct 2014 09:00	16 Oct 2014 09:00	1	Maintenance - confirmed calibration points for Ozone
O3	22 Oct 2014 14:00	22 Oct 2014 14:00	1	Maintenance - confirmed calibration points for Ozone
NO2, NO, NOX	15 Oct 2014 10:00	15 Oct 2014 10:00	1	Maintenance - sample manifold cleaned
NO2, NO, NOX	16 Oct 2014 09:00	16 Oct 2014 09:00	1	Maintenance - confirmed calibration points for Ozone
NO2, NO, NOX	22 Oct 2014 15:00	22 Oct 2014 15:00	1	Maintenance - confirmed calibration points for Ozone
NO2, NO, NOX	23 Oct 2014 11:00	23 Oct 2014 12:00	2	Maintenance - confirmed calibration points for Ozone
PM2.5	15 Oct 2014 13:00	15 Oct 2014 16:00	4	Flow and zero reference checks, sample head cleaning
Wind Speed, Wind Direction	09 Oct 2014 14:00	09 Oct 2014 14:00	1	Maintenance - sensor calibration and alignment check

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 19 ppb on Oct 5 01:00	Maximum Daily Average: 4.3 ppb on Oct 4		Hours of Data:	705
Minimum Value: 0 ppb on Oct 23 22:00	Minimum Daily Average: 0.3 ppb on Oct 24		Hours of Missing Data:	39
Maximum Diurnal Average: 1.2 ppb at hour 19	Minimum Diurnal Average: 0.5 ppb at hour 5		Hours of Calibration:	38
Monthly Average: 0.8 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> = 5		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	1	1	1	2	2	1	1	1	1	1	2	1	1	1	1	2	2	3	1.2	3
2-Oct	3	1	1	Z	1	1	1	1	1	0	1	1	1	1	0	1	1	0	1	1	0	1	0	0	0.7	3
3-Oct	0	0	1	Z	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
4-Oct	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	4	13	18	15	12	6	5	14	4.3	18
5-Oct	19	6	1	Z	1	0	0	0	0	0	0	0	0	0	1	8	6	2	1	0	0	0	0	0	2.1	19
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	3	2	1	0	0	0	0	0	0.6	3
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	3	2	1	0	0	0	0	0	0	0.5	3
8-Oct	0	0	0	Z	0	0	0	1	0	0	1	1	1	1	0	1	1	0	1	1	1	1	1	1	0.5	1
9-Oct	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
10-Oct	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
11-Oct	1	0	0	Z	1	1	1	1	1	1	1	1	0	1	0	1	1	1	0	0	0	0	1	0	0.5	1
12-Oct	1	0	1	Z	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
13-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	0	1	0.4	1
14-Oct	0	1	1	Z	1	1	1	1	1	C	C	C	C	C	C	C	1	1	1	1	1	1	1	1	-	1
15-Oct	1	1	1	Z	1	1	1	1	1	M	1	1	1	1	1	1	1	1	4	2	1	2	1	1	1.0	4
16-Oct	1	1	1	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
17-Oct	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
18-Oct	1	0	1	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.5	1
19-Oct	0	0	0	Z	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	0	0.5	1
20-Oct	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
21-Oct	0	0	0	Z	0	0	0	1	1	1	1	0	0	1	0	0	0	1	1	1	1	1	1	1	0.5	1
22-Oct	0	0	0	Z	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
23-Oct	1	1	1	Z	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
24-Oct	0	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
25-Oct	0	0	0	Z	1	1	1	1	1	0	0	0	1	0	0	1	1	1	0	1	1	1	1	0	0.5	1
26-Oct	0	0	1	Z	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.5	1
27-Oct	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	1
28-Oct	1	1	1	Z	1	1	1	0	1	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0.5	1
29-Oct	0	0	0	Z	0	0	0	1	0	1	0	0	1	0	1	1	1	1	1	1	1	1	1	1	0.5	1
30-Oct	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	1
31-Oct	1	0	1	Z	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.5	1

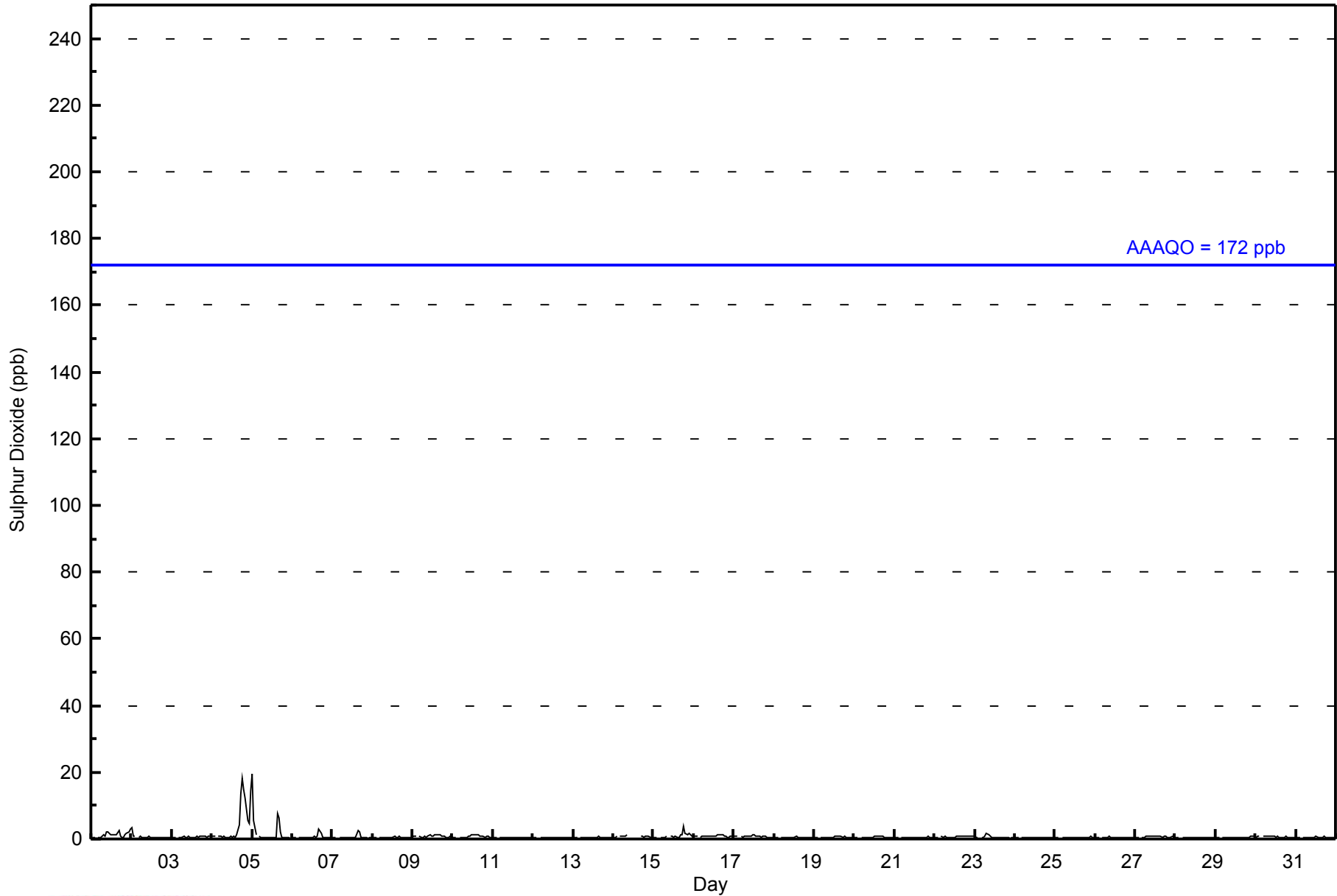
1.2	0.7	0.5	--	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	1.0	1.1	1.1	1.2	1.0	0.9	0.8	0.7	1.0	Diurnal Average		
19	6	1	--	1	1	1	1	1	1	2	2	1	1	1	1	8	6	13	18	15	12	6	5	14	Diurnal Maximum	

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  
Athabasca Valley - October 2014







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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Athabasca Valley - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	699	99.15	99.15
11 - 20	6	0.85	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Athabasca Valley - October 2014**

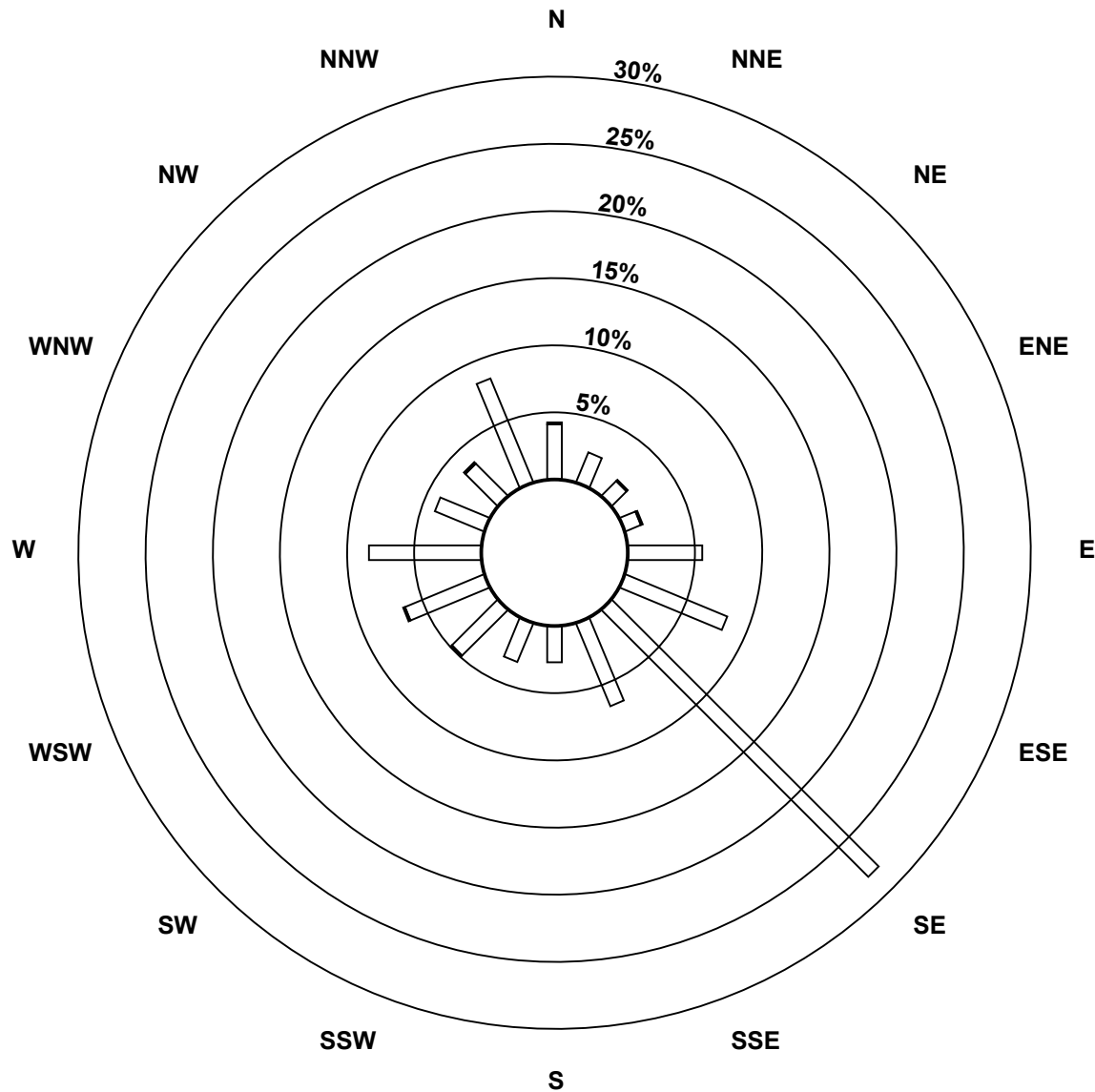
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	29	17	11	9	39	58	198	47	19	22	34	45	59	28	24	59	698
11 - 20	1	0	1	1	0	0	0	0	0	0	1	1	0	0	1	0	6
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	30	17	12	10	39	58	198	47	19	22	35	46	59	28	25	59	704

Total Number of Valid Hours: 704

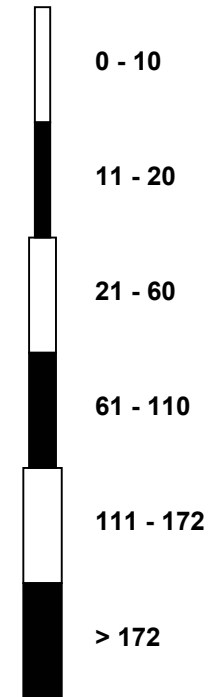
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley (AMS 7)**



Classes (ppb)

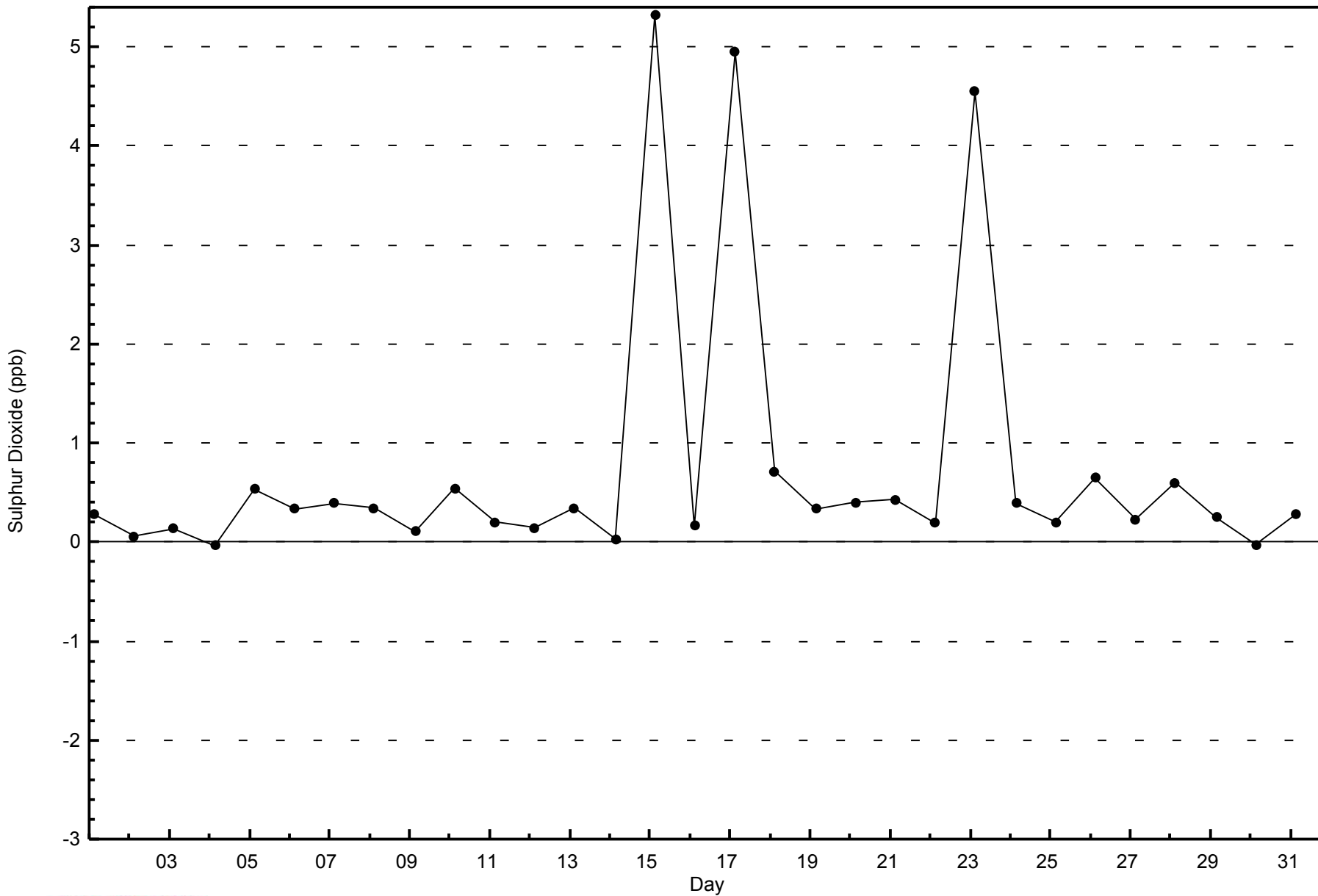


**Total Number of Valid Hours: 704**



WBEA  
Zero Responses

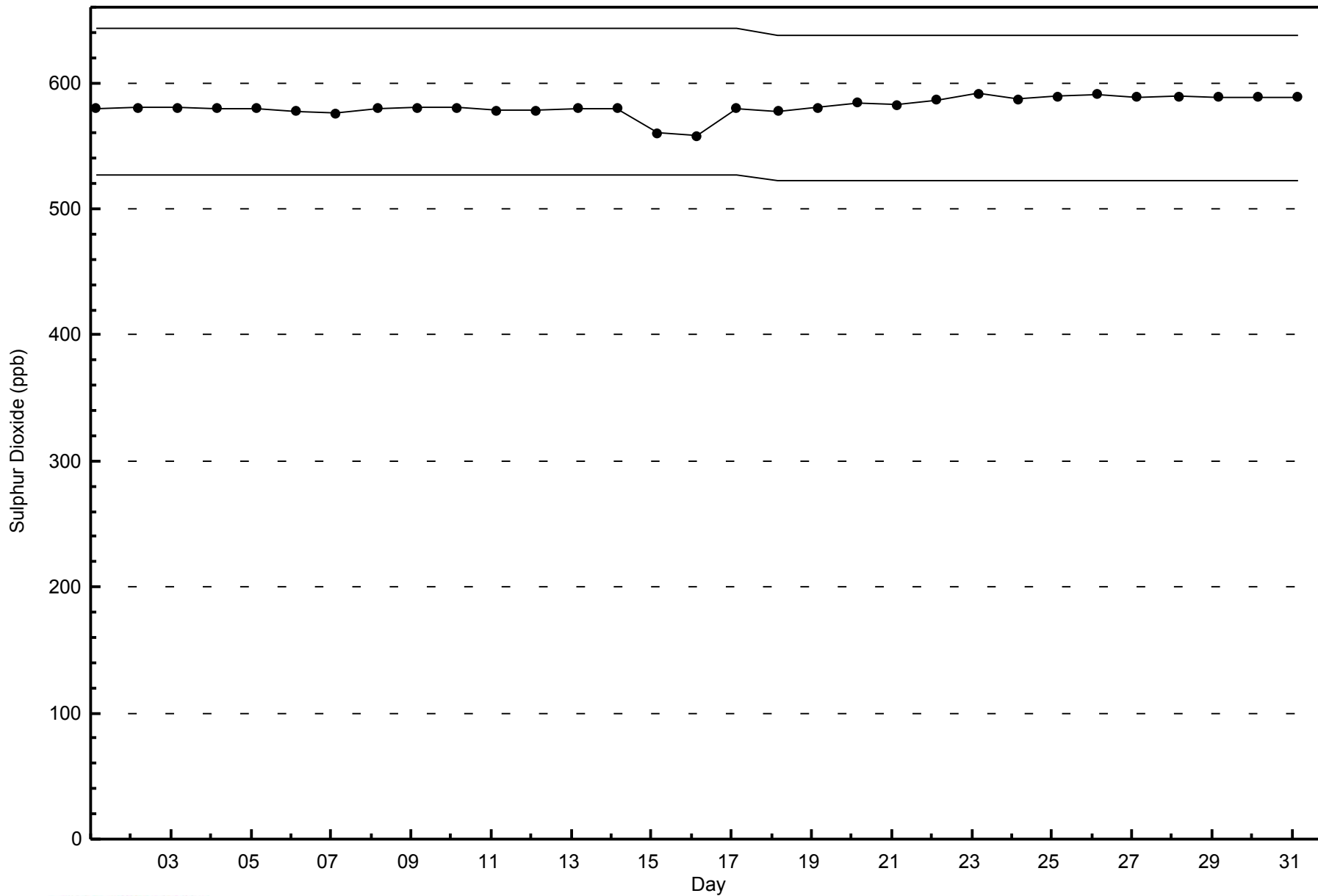
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley - October 2014





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley - October 2014



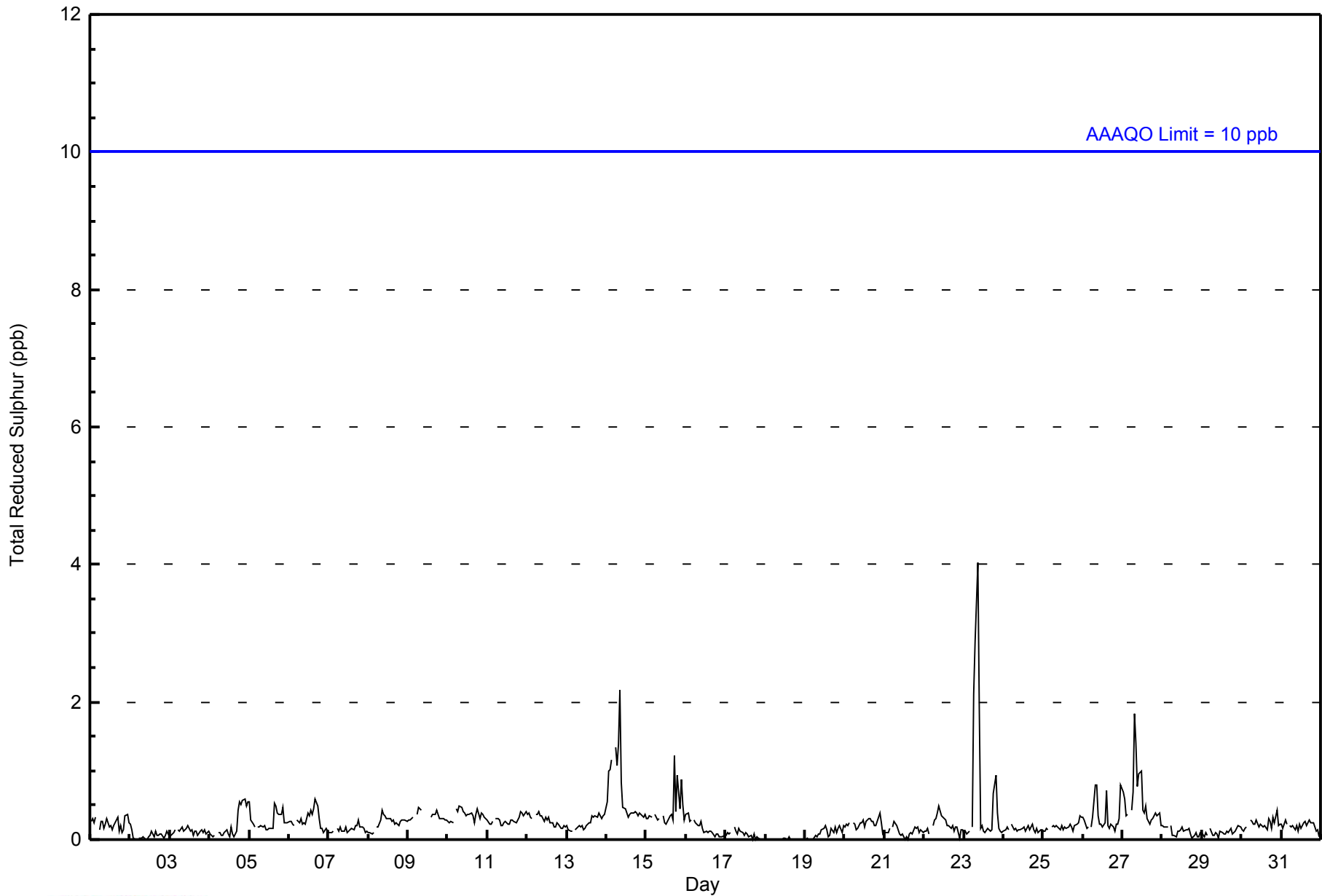


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 4 ppb on Oct 23 09:00										Maximum Daily Average: 0.7 ppb on Oct 14										Hours of Data: 707						
Minimum Value: 0 ppb on Oct 2 10:00										Minimum Daily Average: 0.0 ppb on Oct 18										Hours of Missing Data: 37						
Maximum Diurnal Average: 0.4 ppb at hour 9										Minimum Diurnal Average: 0.2 ppb at hour 13										Hours of Calibration: 36						
Monthly Average: 0.2 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1										Percent Operational Time: 99.9						
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-Oct	0	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
2-Oct	0	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-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0.2	1
5-Oct	1	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
6-Oct	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
7-Oct	0	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
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Oct	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	0
10-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
11-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
12-Oct	0	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
13-Oct	0	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
14-Oct	1	1	1	1	Z	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2
15-Oct	0	0	0	0	Z	0	0	0	0	M	0	0	0	0	0	0	0	1	0	1	0	1	1	0	0.4	1
16-Oct	0	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-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
19-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Oct	0	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-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-Oct	0	0	0	0	Z	0	2	3	4	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.7	4
24-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Oct	0	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
26-Oct	0	0	0	0	Z	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0.3	1
27-Oct	1	1	0	0	Z	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
28-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-Oct	0	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
0.2 0.2 0.2 0.2 -- 0.2 0.3 0.4 0.4 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.2 0.2 0.2 0.2																								Diurnal Average		
1 1 1 1 -- 1 2 3 4 2 1 1 0 0 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**

**Total Reduced Sulphur (TRS) - ppb**  
**Athabasca Valley - October 2014**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Athabasca Valley - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	705	99.72	99.72
3 - 4	2	0.28	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Athabasca Valley - October 2014**

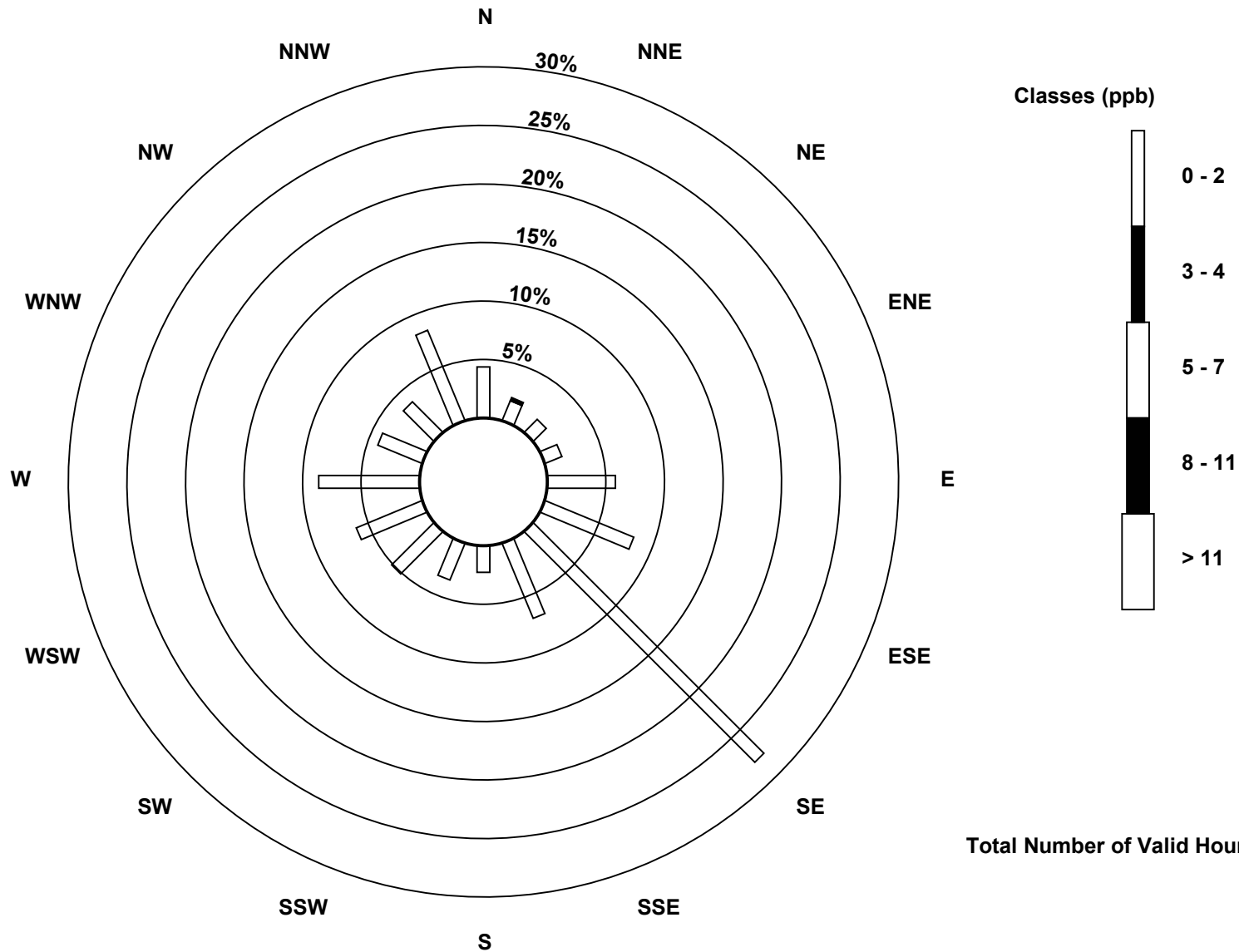
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	31	13	11	11	41	58	197	49	16	24	36	43	61	29	26	59	705
3 - 4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	31	15	11	11	41	58	197	49	16	24	36	43	61	29	26	59	707

Total Number of Valid Hours: 707

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Total Reduced Sulphur (TRS) - ppb  
Athabasca Valley (AMS 7)**

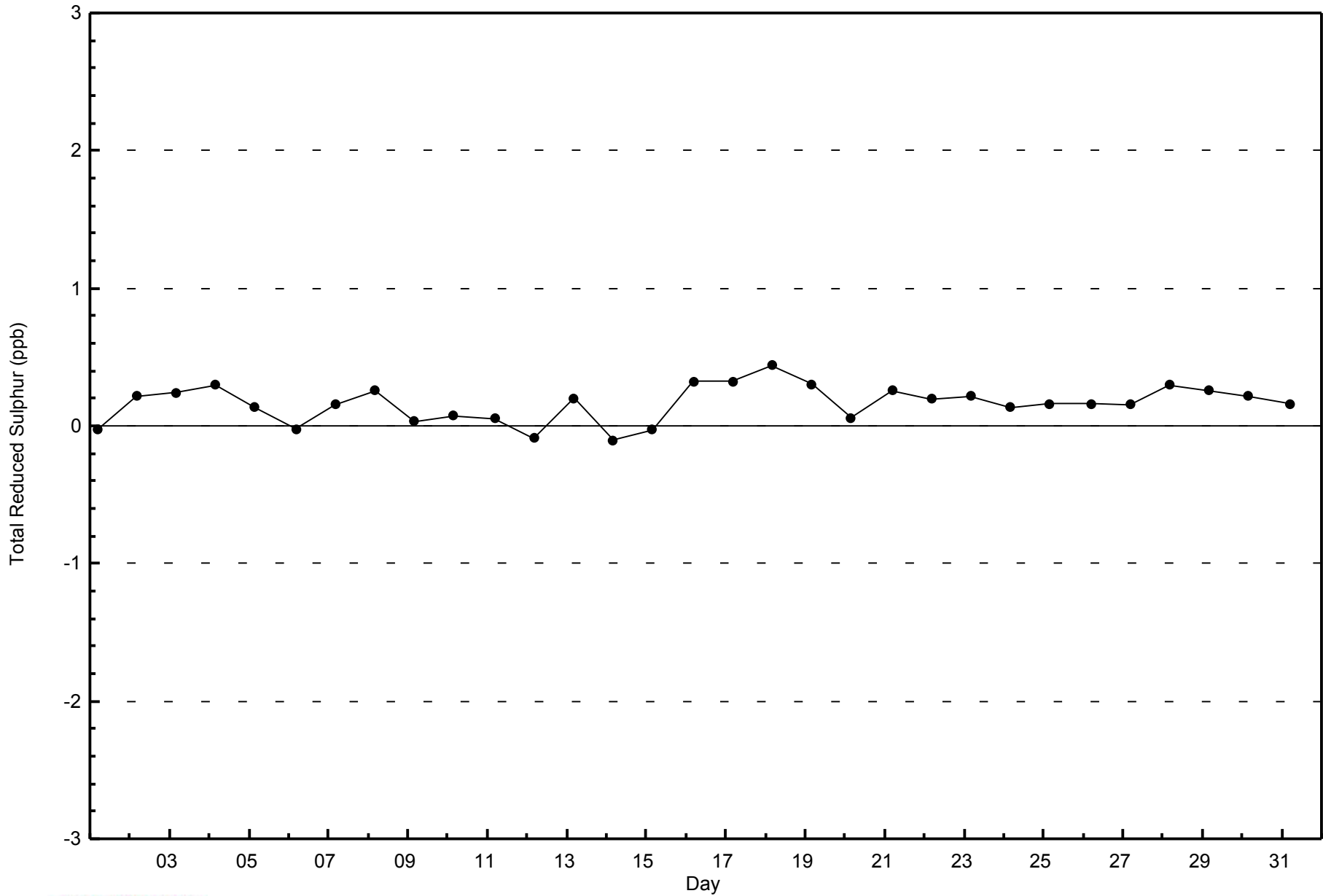


**Total Number of Valid Hours: 707**



WBEA  
Zero Responses

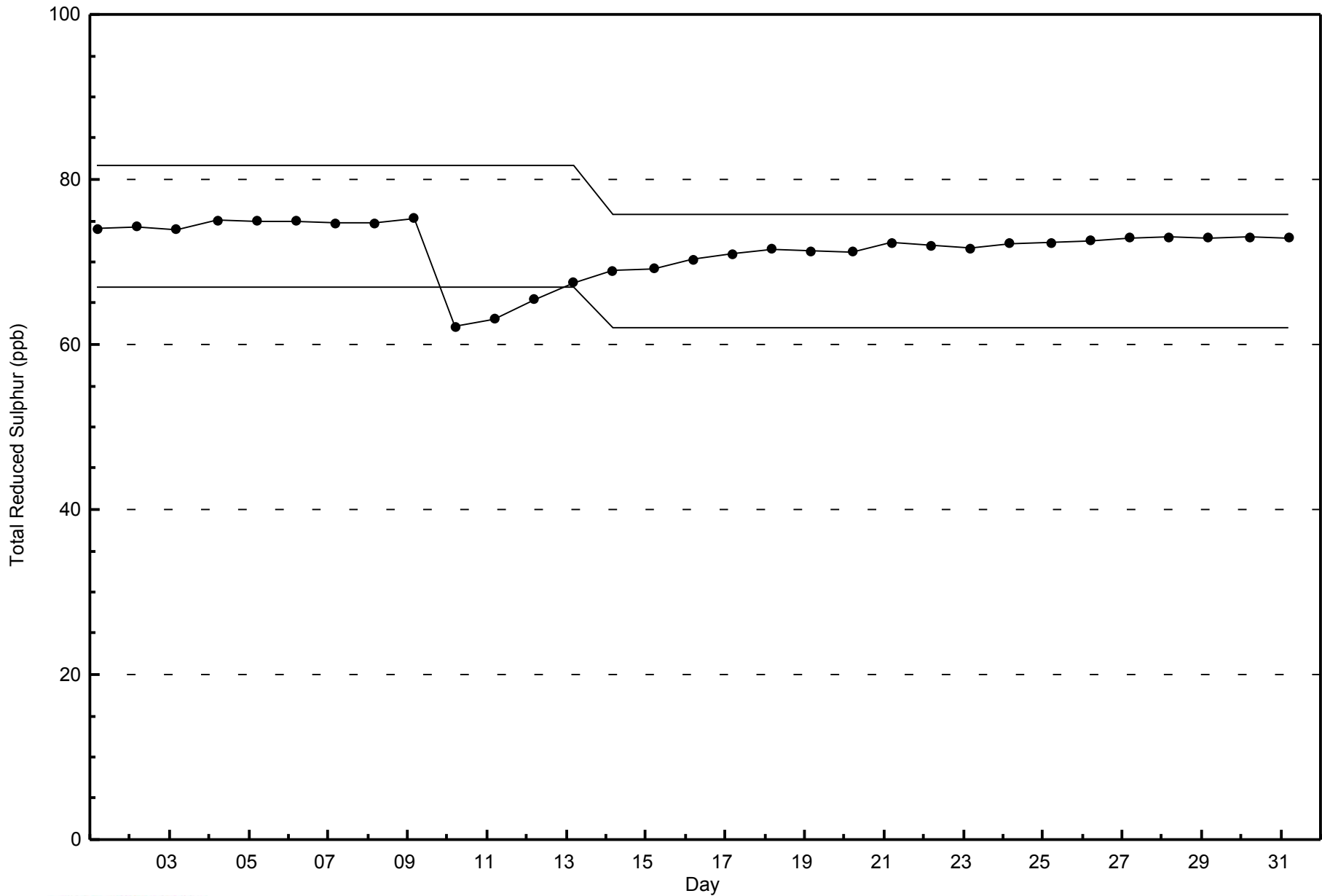
Total Reduced Sulphur (TRS) - ppb  
Athabasca Valley - October 2014





WBEA  
Span Responses

Total Reduced Sulphur (TRS) - ppb  
Athabasca Valley - October 2014





# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Total Hydrocarbons (THC) - ppm

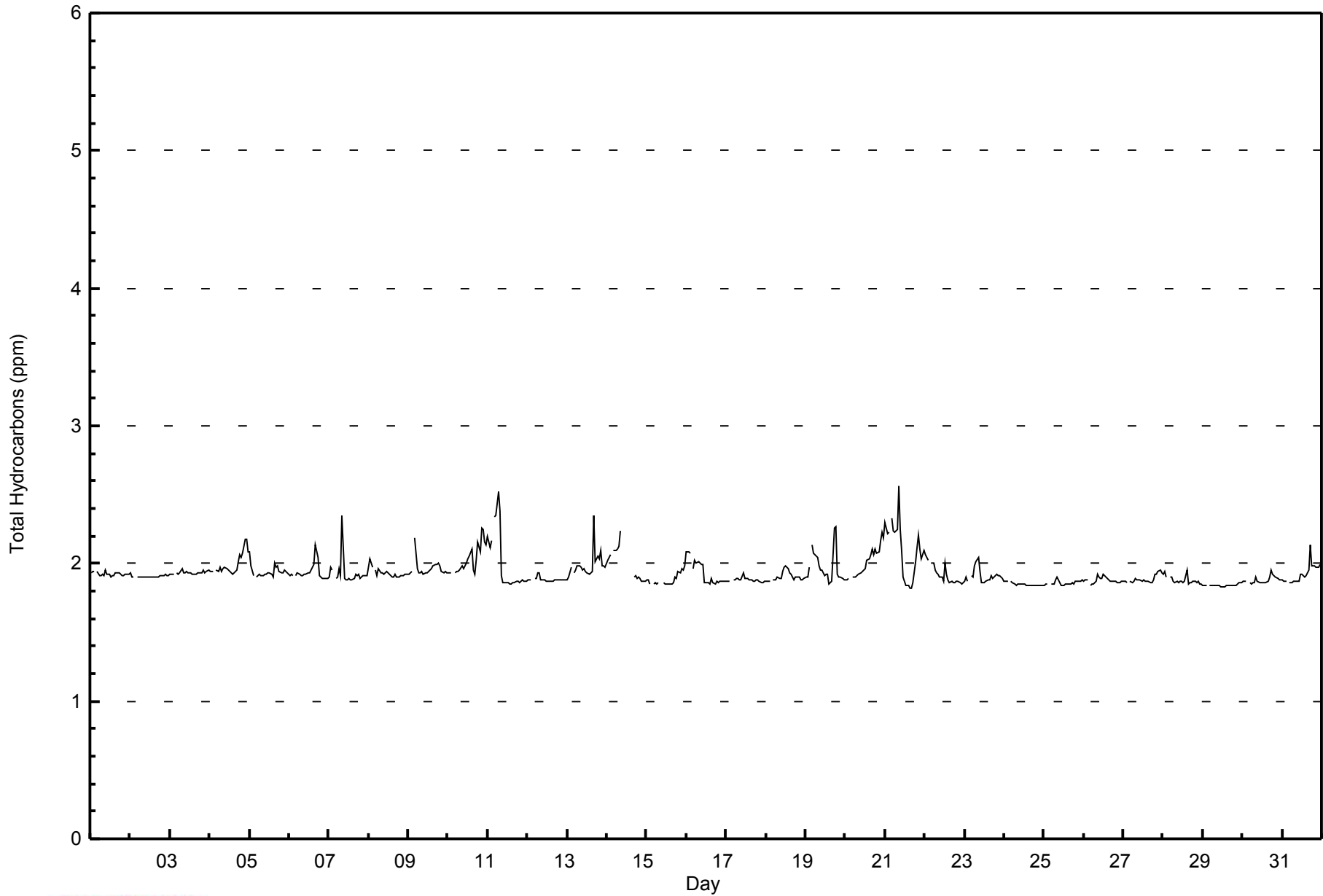
## Athabasca Valley - October 2014

Maximum Value: 2.6 ppm on Oct 21 09:00		Maximum Daily Average: 2.1 ppm on Oct 21		Hours in Service: 744																															
Minimum Value: 1.8 ppm on Oct 21 16:00		Minimum Daily Average: 1.8 ppm on Oct 29		Hours of Data: 704																															
Maximum Diurnal Average: 2.0 ppm at hour 9		Minimum Diurnal Average: 1.9 ppm at hour 12		Hours of Missing Data: 40																															
Monthly Average: 1.93 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> = 1.9 P <sub>90</sub> = 2.0 P <sub>99</sub> = 2.3		Hours of Calibration: 38																															
				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-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
2-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
3-Oct	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	2.0	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	
4-Oct	1.9	1.9	1.9	Z	2.0	1.9	2.0	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.0	2.1	2.2	2.2	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
5-Oct	2.1	2.0	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	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	1.9	1.9	
6-Oct	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	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
7-Oct	1.9	2.0	2.0	Z	1.9	1.9	2.0	1.9	2.4	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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-Oct	2.0	2.0	2.0	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
9-Oct	1.9	1.9	1.9	Z	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	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-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	1.9	2.0	2.2	2.1	2.3	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
11-Oct	2.2	2.1	2.2	Z	2.3	2.3	2.5	2.4	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
12-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
13-Oct	1.9	1.9	2.0	Z	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.3	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
14-Oct	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.2	C	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
15-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	M	M	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9		
16-Oct	2.1	2.1	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
18-Oct	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
19-Oct	1.9	1.9	2.0	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.3	2.3	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
20-Oct	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
21-Oct	2.3	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.6	2.2	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.1	2.2	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1		
22-Oct	2.1	2.0	2.0	Z	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
23-Oct	1.9	1.9	1.9	Z	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
24-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	
25-Oct	1.8	1.8	1.8	Z	1.8	1.9	1.8	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
26-Oct	1.9	1.9	1.9	Z	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
27-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
28-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
29-Oct	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	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	
30-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
31-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	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	
	1.9	1.9	1.9	--	2.0	1.9	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	Diurnal Average
	2.3	2.2	2.2	--	2.3	2.3	2.5	2.4	2.6	2.2	2.1	2.0	2.0	2.1	2.1	2.1	2.3	2.3	2.3	2.1	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	Diurnal Maximum
Z - zerospan		C - Calibration				M - Maintenance																													



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - October 2014**





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

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	638	90.63	90.63
2.1 - 3.0	66	9.38	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - October 2014**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	28	14	10	8	37	53	183	35	10	19	30	45	59	26	23	57	637
2.1 - 3.0	2	3	2	2	2	5	15	12	9	3	5	1	0	2	2	1	66
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>	30	17	12	10	39	58	198	47	19	22	35	46	59	28	25	58	703

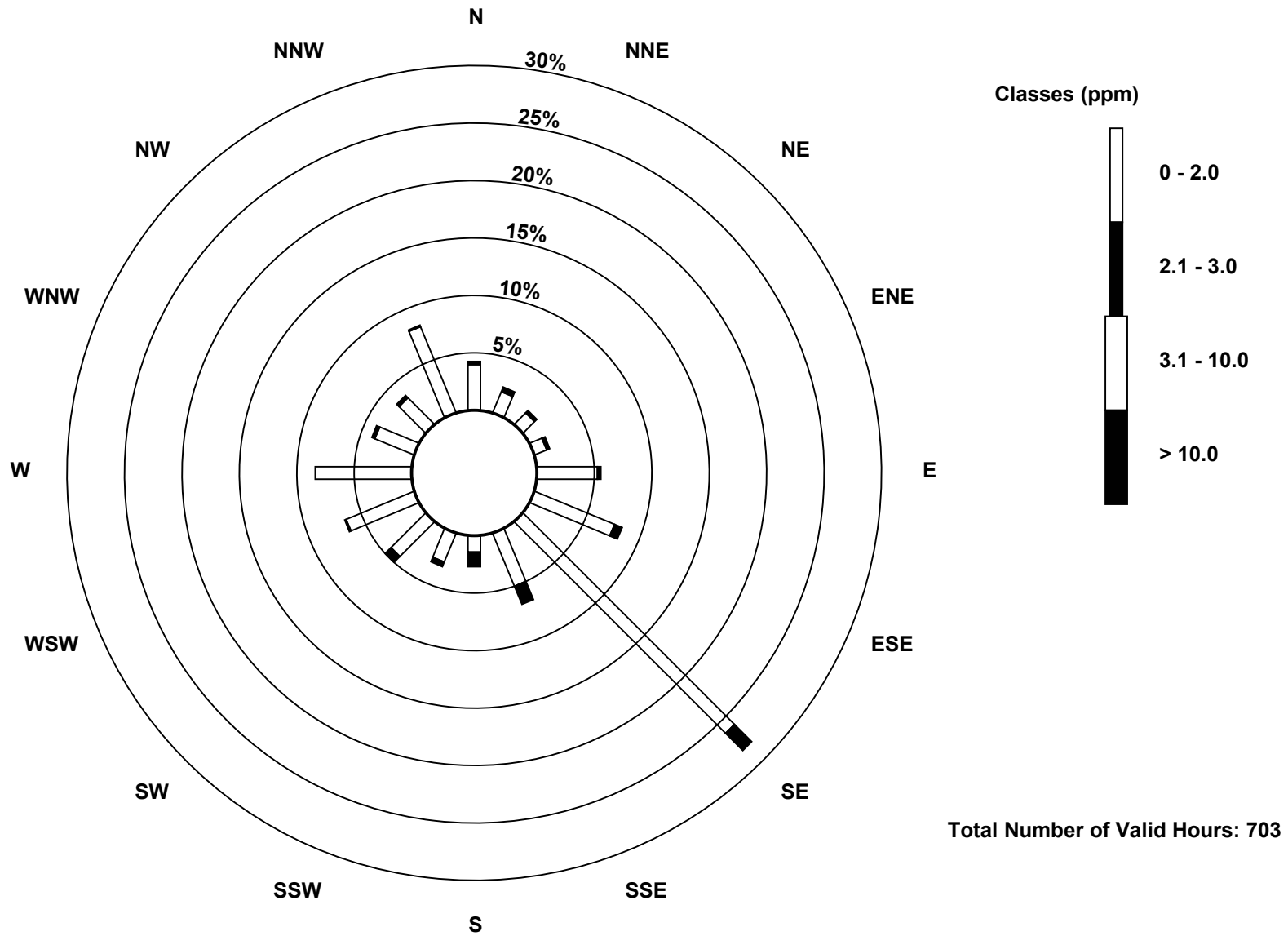
Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

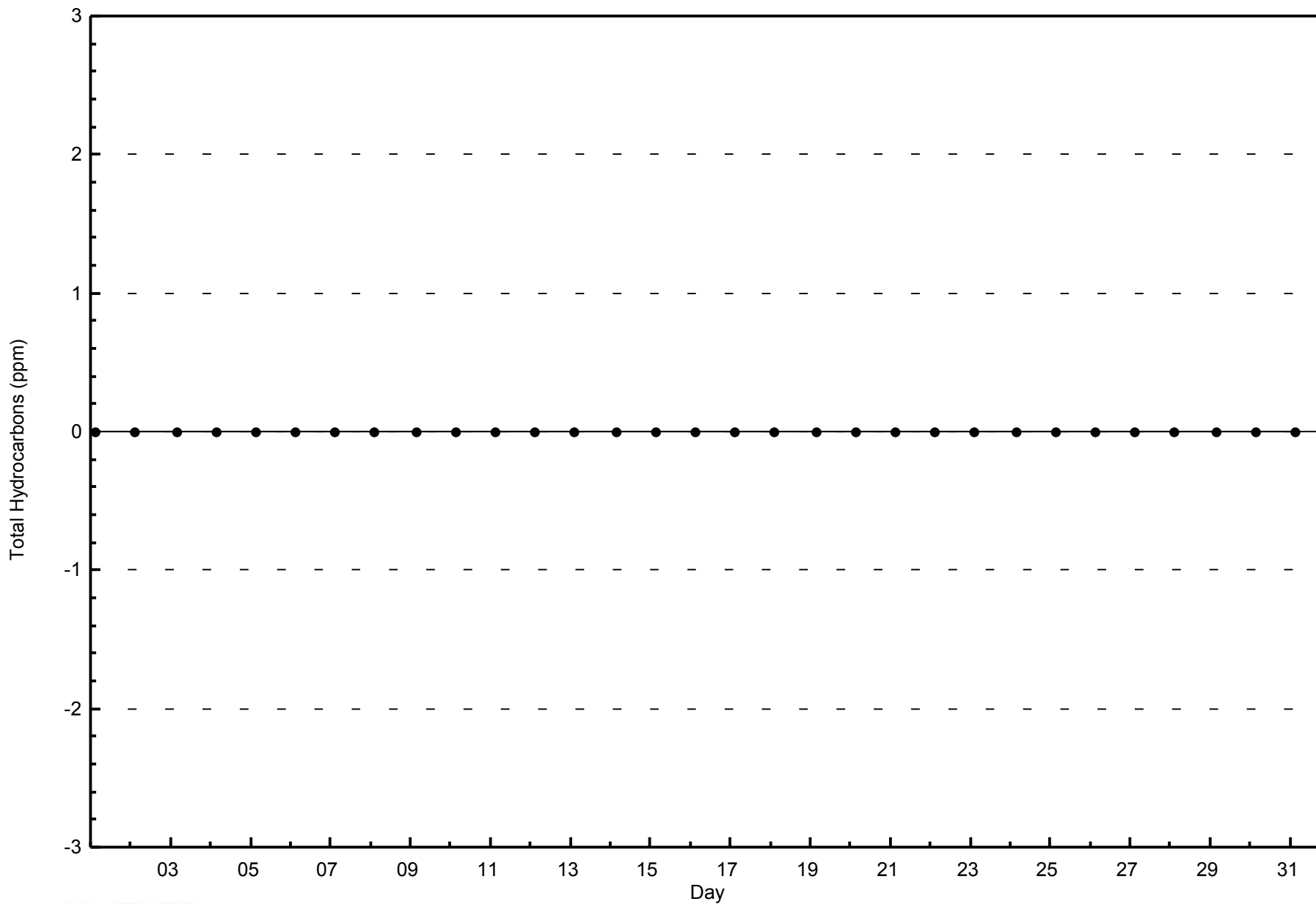
**Total Hydrocarbons (THC) - ppm  
Athabasca Valley (AMS 7)**





**WBEA**  
**Zero Responses**

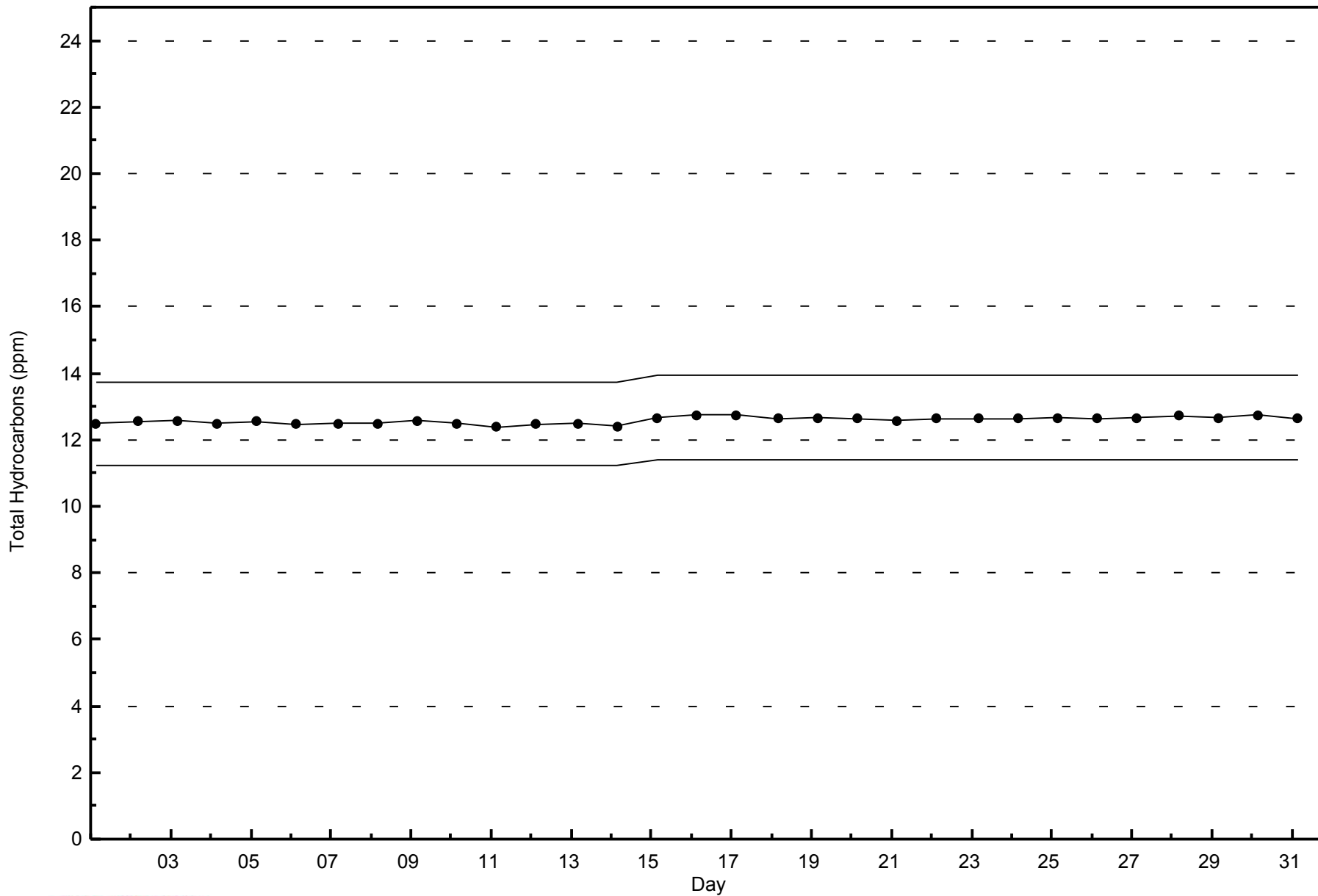
**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - October 2014**





**WBEA**  
**Span Responses**

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - October 2014**





Summary of Hour Averages

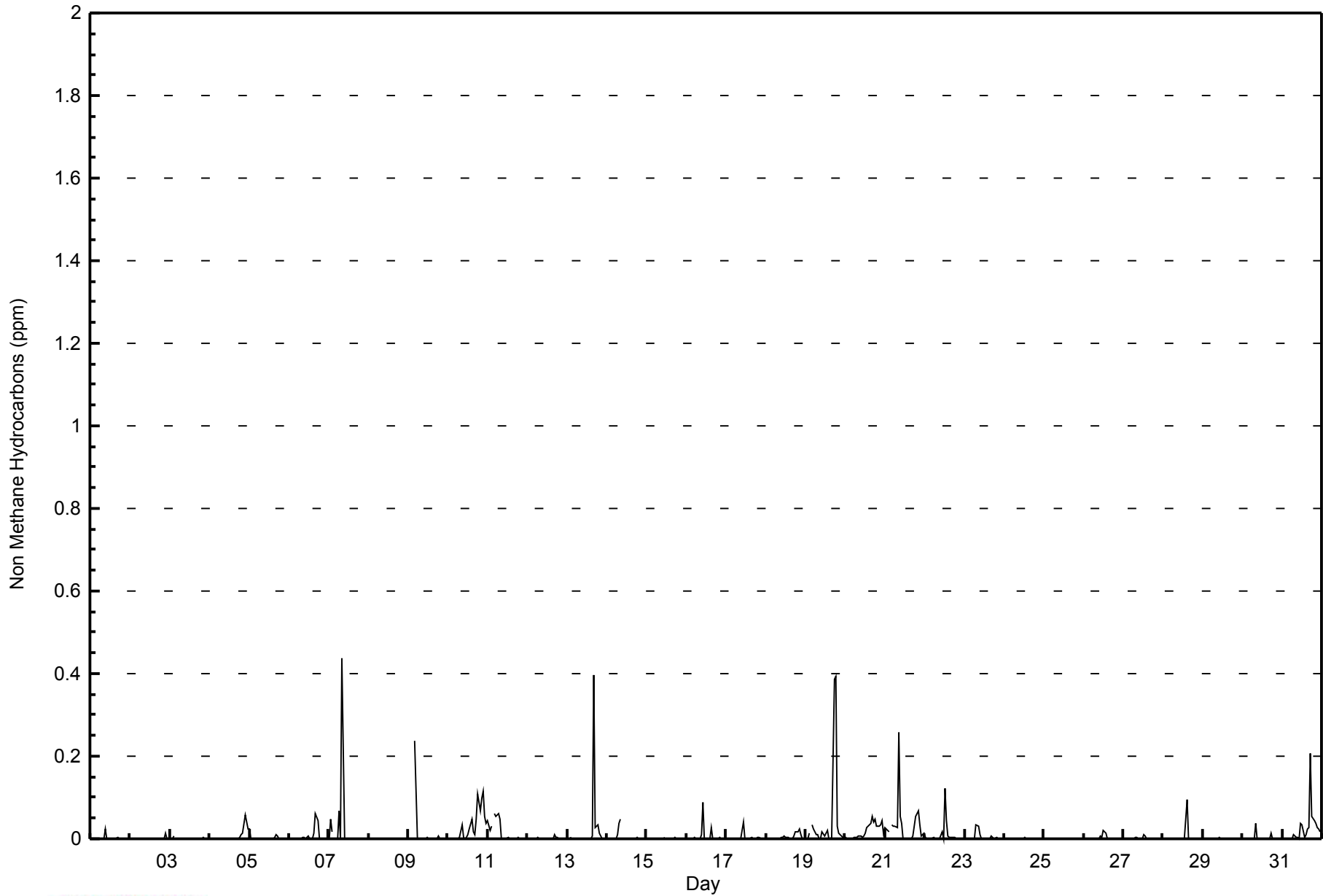
Athabasca Valley - October 2014

Maximum Value: 0.439 ppm on Oct 7 09:00		Maximum Daily Average: 0.043 ppm on Oct 19		Hours in Service:	744																						
Minimum Value: 0.000 ppm on Oct 1 03:00		Minimum Daily Average: 0.000 ppm on Oct 8		Hours of Data:	704																						
Maximum Diurnal Average: 0.029 ppm at hour 9		Minimum Diurnal Average: 0.003 ppm at hour 12		Hours of Missing Data:	40																						
Monthly Average: 0.009 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:	38																						
				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-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.001	0.000	0.001	0.000	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.023	
2-Oct	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	0.013	0.000	0.000	0.001	0.013	
3-Oct	0.000	0.000	0.007	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.003	0.000	0.000	0.000	0.001	0.007	
4-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.004	0.010	0.012	0.057	0.042	0.024	0.007	0.057	
5-Oct	0.025	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.010	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.025	
6-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.002	0.004	0.000	0.008	0.000	0.001	0.002	0.012	0.062	0.042	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.062	
7-Oct	0.000	0.047	0.018	Z	0.000	0.000	0.069	0.000	0.439	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025	0.439	
8-Oct	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	
9-Oct	0.000	0.000	0.000	Z	0.238	0.000	0.000	0.000	0.000	0.001	0.001	0.003	0.000	0.000	0.000	0.000	0.001	0.001	0.006	0.001	0.000	0.000	0.000	0.000	0.011	0.238	
10-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.002	0.035	0.003	0.002	0.002	0.011	0.023	0.047	0.019	0.012	0.048	0.109	0.069	0.099	0.114	0.055	0.037	0.030	0.114	
11-Oct	0.043	0.019	0.030	Z	0.061	0.054	0.062	0.047	0.000	0.000	0.002	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.014	0.062	
12-Oct	0.000	0.000	0.000	Z	0.000	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.009	0.003	0.002	0.000	0.000	0.000	0.000	0.000	0.001	0.009	
13-Oct	0.000	0.000	0.004	Z	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.396	0.028	0.034	0.015	0.006	0.002	0.001	0.000	0.021	0.396		
14-Oct	0.000	0.000	0.001	Z	0.000	0.000	0.010	0.037	0.048	C	C	C	C	C	C	C	0.000	0.001	0.002	0.000	0.001	0.000	0.000	0.000	--	0.048	
15-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	M	M	0.002	0.000	0.000	0.000	0.000	0.001	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	
16-Oct	0.000	0.000	0.000	Z	0.000	0.004	0.002	0.000	0.001	0.011	0.087	0.000	0.001	0.000	0.000	0.026	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.006	0.087	
17-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.040	0.000	0.000	0.000	0.000	0.004	0.000	0.001	0.001	0.004	0.002	0.000	0.000	0.000	0.002	0.040	
18-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.001	0.001	0.001	0.002	0.003	0.007	0.004	0.003	0.001	0.002	0.000	0.006	0.017	0.016	0.024	0.010	0.001	0.001	0.004	0.024	
19-Oct	0.001	0.001	0.013	Z	0.036	0.024	0.011	0.009	0.001	0.000	0.016	0.006	0.015	0.020	0.000	0.001	0.004	0.387	0.392	0.032	0.015	0.010	0.002	0.002	0.043	0.392	
20-Oct	0.002	0.000	0.000	Z	0.001	0.002	0.002	0.003	0.006	0.006	0.004	0.008	0.013	0.026	0.035	0.037	0.055	0.041	0.047	0.032	0.030	0.033	0.044	0.014	0.019	0.055	
21-Oct	0.027	0.020	0.016	Z	0.036	0.030	0.032	0.028	0.258	0.056	0.037	0.001	0.000	0.000	0.000	0.001	0.007	0.054	0.060	0.069	0.034	0.006	0.014	0.034	0.258		
22-Oct	0.002	0.000	0.000	Z	0.000	0.002	0.000	0.000	0.000	0.001	0.016	0.001	0.122	0.044	0.006	0.003	0.005	0.002	0.003	0.000	0.000	0.000	0.000	0.000	0.009	0.122	
23-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.032	0.031	0.010	0.000	0.000	0.000	0.001	0.001	0.006	0.002	0.000	0.002	0.001	0.000	0.000	0.002	0.004	0.004	0.032	
24-Oct	0.000	0.000	0.000	Z	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
25-Oct	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	
26-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.005	0.019	0.014	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.019	
27-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.004	0.003	0.000	0.000	0.000	0.011	0.008	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.011	
28-Oct	0.000	0.000	0.000	Z	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.095	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.095	
29-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
30-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.038	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.001	0.000	0.000	0.000	0.002	0.038	
31-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.009	0.003	0.002	0.000	0.037	0.035	0.004	0.010	0.023	0.027	0.207	0.054	0.045	0.037	0.026	0.022	0.016	0.024	0.207	
		0.003	0.003	0.003	--	0.012	0.004	0.006	0.006	0.029	0.004	0.007	0.003	0.008	0.005	0.007	0.005	0.019	0.026	0.023	0.009	0.010	0.010	0.006	0.004	Diurnal Average	
		0.043	0.047	0.030	--	0.238	0.054	0.069	0.047	0.439	0.056	0.087	0.037	0.122	0.044	0.095	0.037	0.396	0.387	0.392	0.069	0.099	0.114	0.055	0.037	Diurnal Maximum	
Z - zerospan		C - Calibration			M - Maintenance																						



**WBEA**  
**Hourly Averages**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Athabasca Valley - October 2014**





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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Athabasca Valley - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	568	80.68	80.68
0.006 - 0.05	112	15.91	96.59
0.06 - 0.1	17	2.41	99.01
> 0.1	7	0.99	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Athabasca Valley - October 2014**

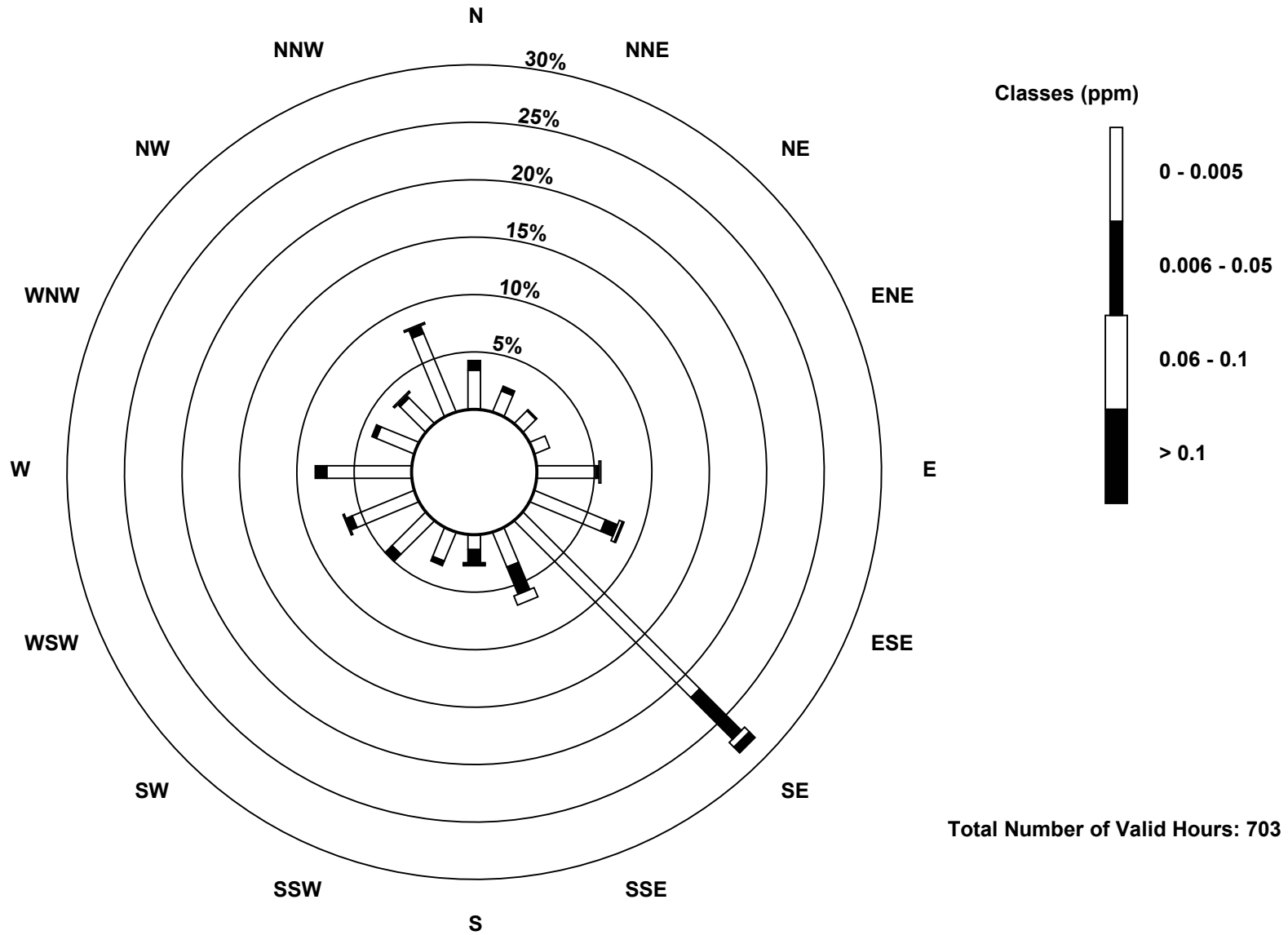
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	24	14	11	10	36	47	153	23	9	19	29	41	52	25	22	52	567
0.006 - 0.05	6	3	1	0	2	8	36	18	8	3	6	4	7	3	2	5	112
0.06 - 0.1	0	0	0	0	1	2	4	6	1	0	0	1	0	0	1	1	17
> 0.1	0	0	0	0	0	1	5	0	1	0	0	0	0	0	0	0	7
<b>Totals</b>	30	17	12	10	39	58	198	47	19	22	35	46	59	28	25	58	703

Total Number of Valid Hours: 703

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley (AMS 7)

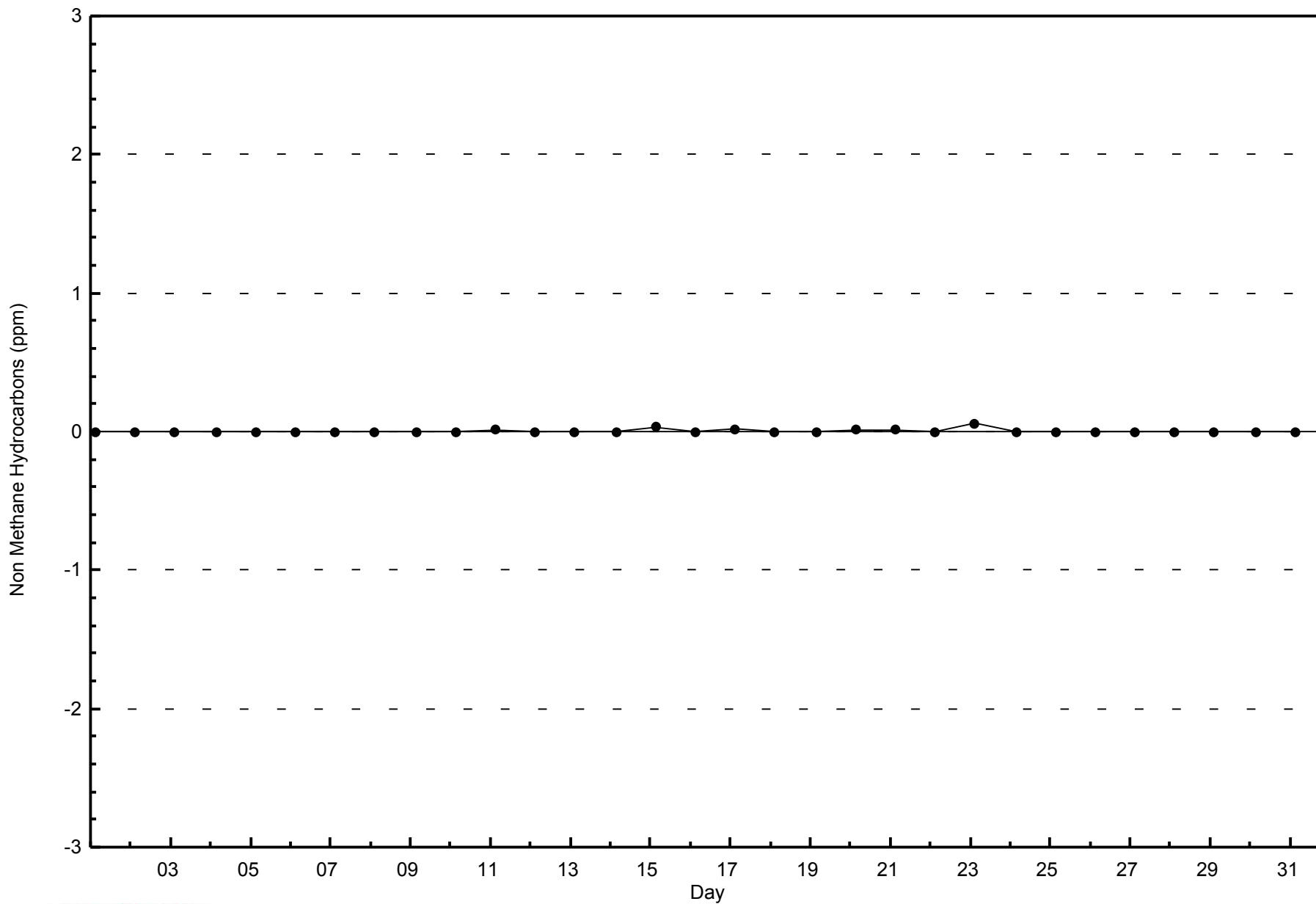






WBEA  
Zero Responses

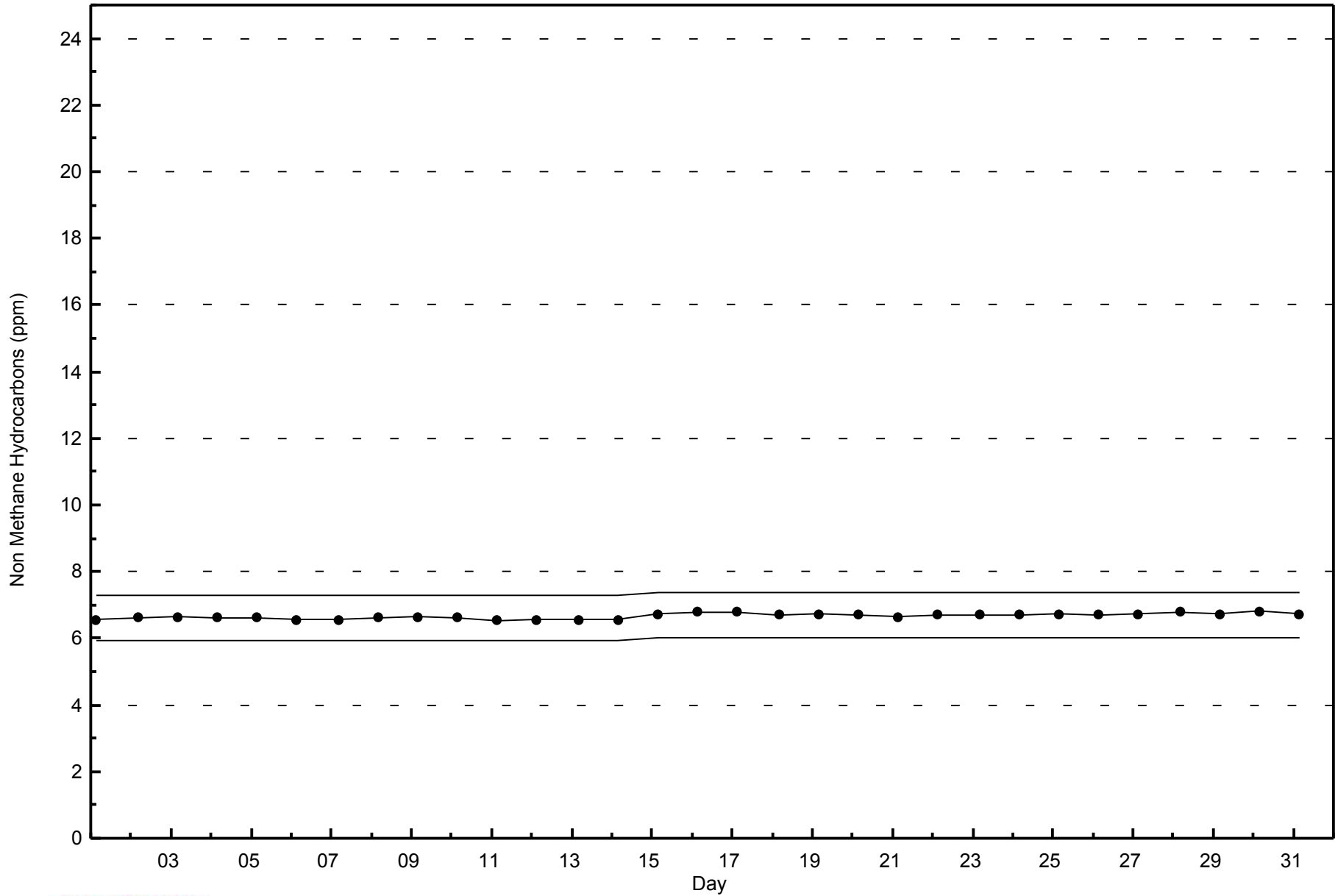
Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley - October 2014





WBEA  
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley - October 2014

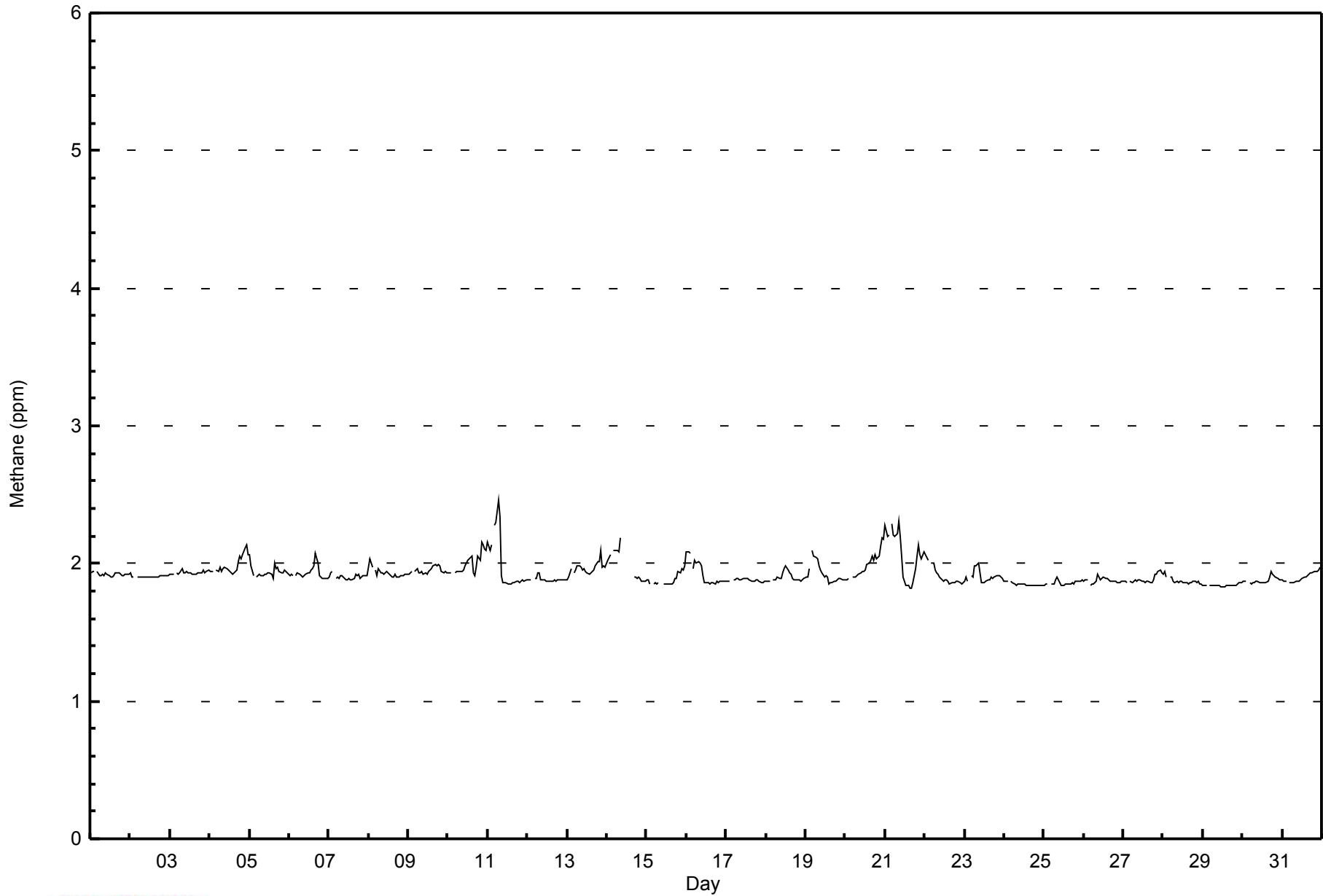






WBEA  
Hourly Averages

Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley - October 2014





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

**Methane (CH<sub>4</sub>) - ppm**  
**Athabasca Valley - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	653	92.76	92.76
2.1 - 3.0	51	7.24	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Athabasca Valley - October 2014**

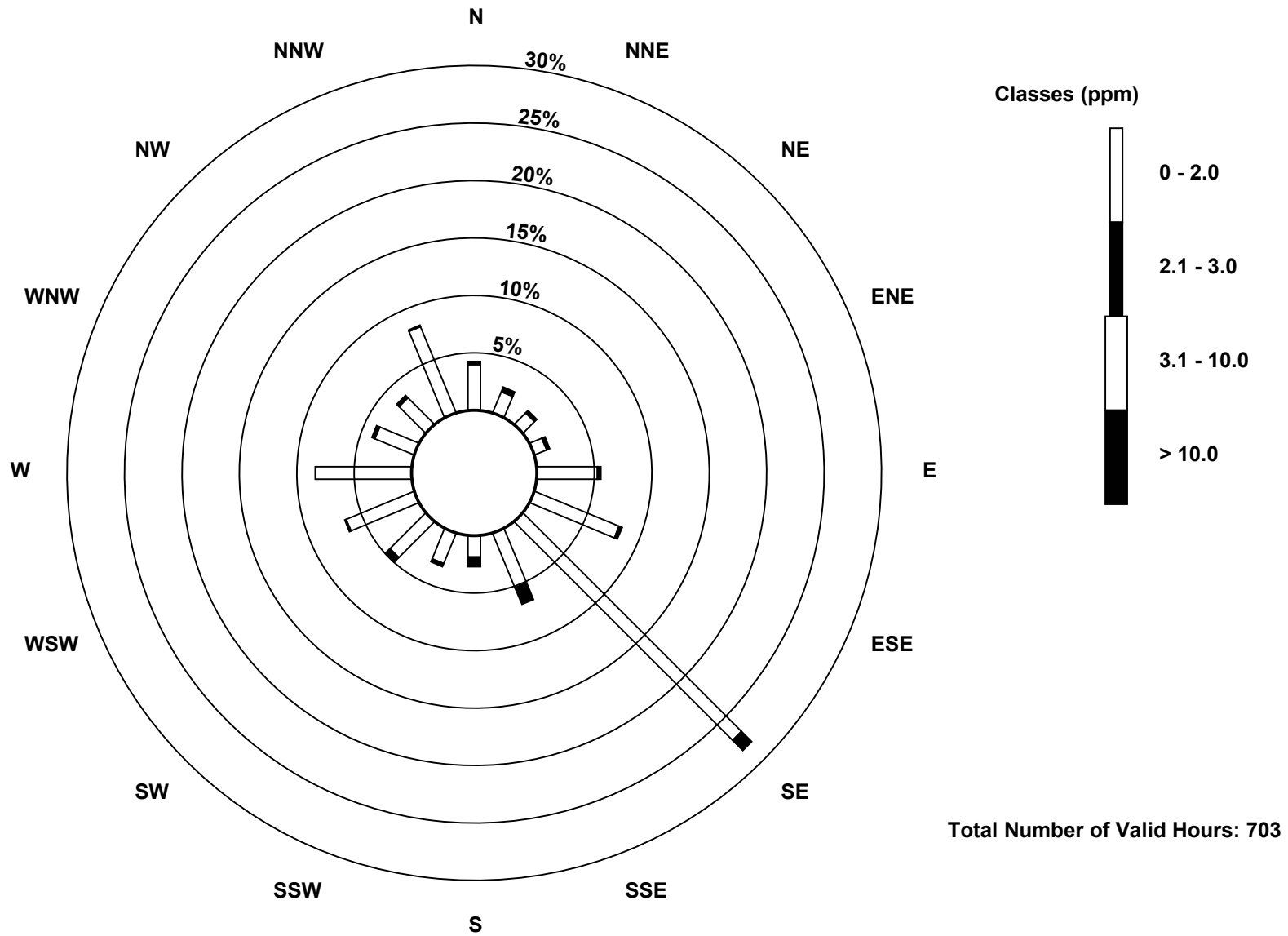
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	28	14	10	8	37	56	189	36	13	20	31	45	59	26	23	57	652
2.1 - 3.0	2	3	2	2	2	2	9	11	6	2	4	1	0	2	2	1	51
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	30	17	12	10	39	58	198	47	19	22	35	46	59	28	25	58	703

Total Number of Valid Hours: 703

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

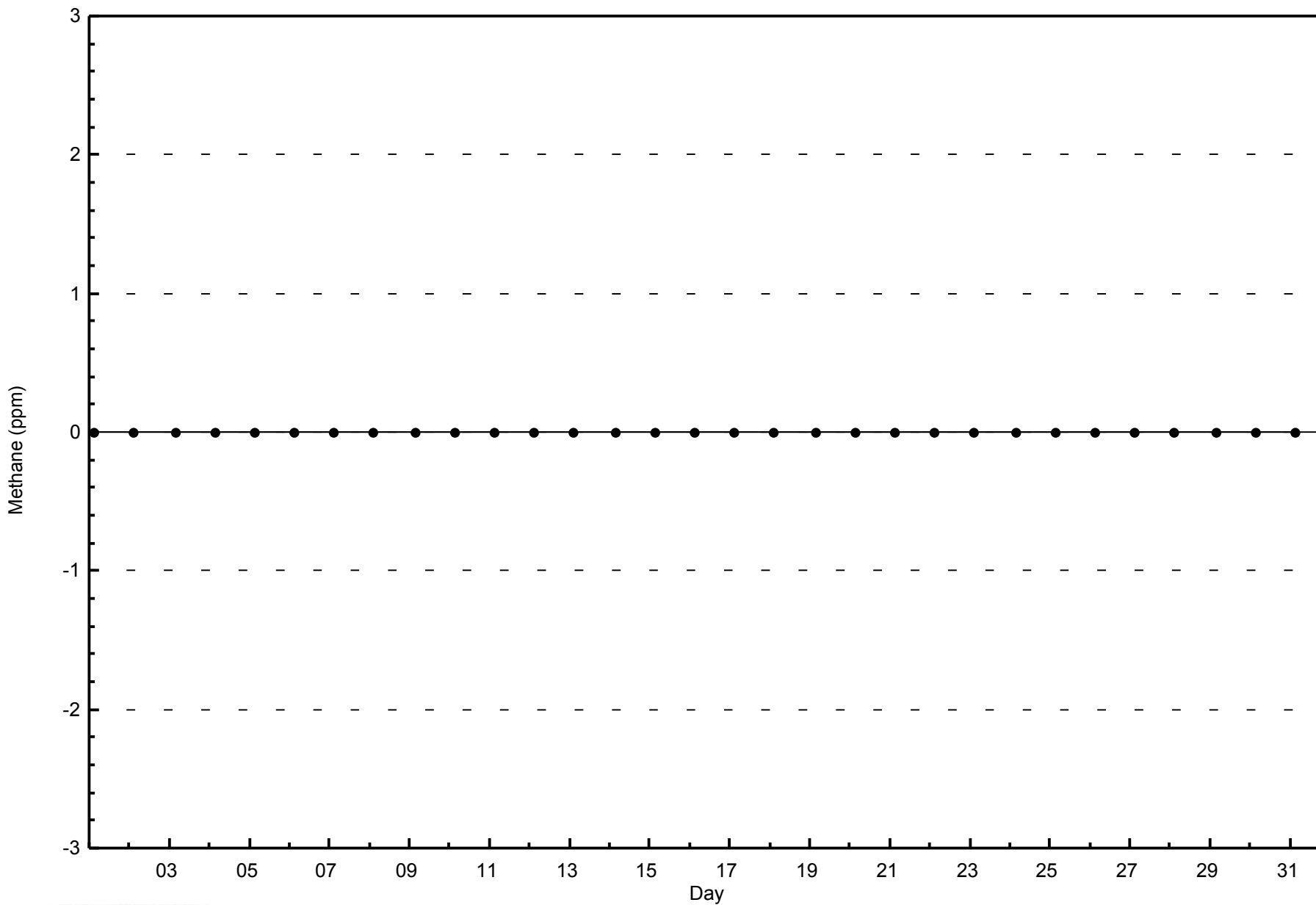
Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley (AMS 7)





WBEA  
Zero Responses

Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley - October 2014

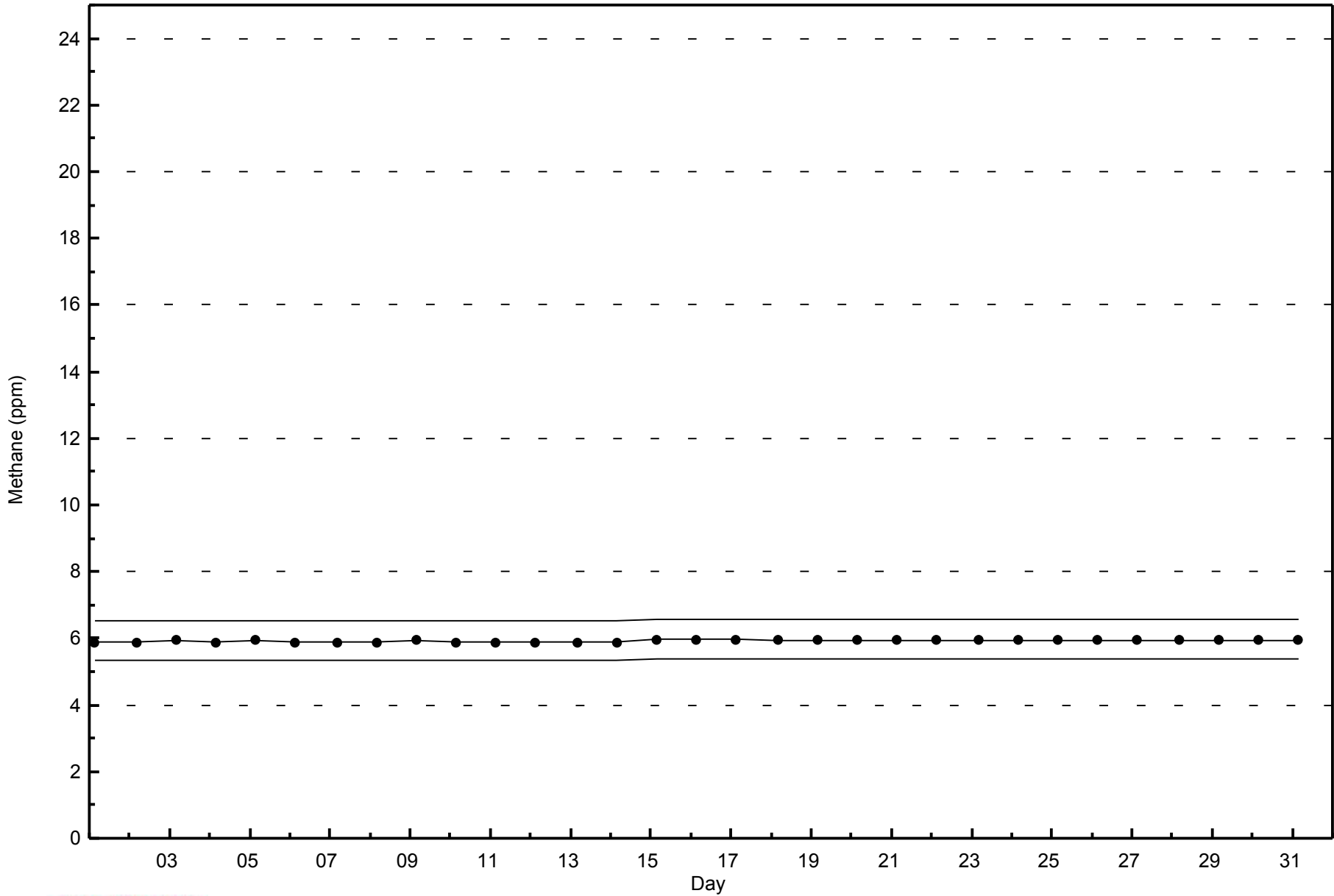






WBEA  
Span Responses

Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley - October 2014





Summary of Hour Averages

Athabasca Valley - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 39 ppb on Oct 11 14:00	Maximum Daily Average: 26.2 ppb on Oct 12		Hours of Data:	707
Minimum Value: 0 ppb on Oct 14 06:00	Minimum Daily Average: 7.2 ppb on Oct 4		Hours of Missing Data:	37
Maximum Diurnal Average: 18.5 ppb at hour 15	Minimum Diurnal Average: 6.7 ppb at hour 8		Hours of Calibration:	35
Monthly Average: 12.7 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 3 Q <sub>1</sub> = 7 Median = 12 Q <sub>3</sub> = 17 P <sub>90</sub> = 23 P <sub>99</sub> = 35		Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	4	5	4	Z	3	7	7	6	8	6	8	9	11	13	13	11	7	9	11	15	16	17	16	17	9.7	17
2-Oct	13	17	16	Z	18	16	19	20	21	22	23	24	24	24	24	24	24	23	21	21	21	21	20	18	20.6	24
3-Oct	18	17	16	Z	14	12	11	5	10	10	11	16	21	23	23	20	18	16	14	15	11	16	15	16	15.1	23
4-Oct	16	16	15	Z	5	4	4	3	3	4	5	8	9	14	17	15	11	5	1	4	2	1	0	1	7.2	17
5-Oct	2	10	16	Z	13	10	8	9	9	8	9	10	11	14	17	14	11	6	7	8	6	6	6	9	10.0	27
6-Oct	12	11	12	Z	9	8	9	10	8	7	7	4	4	7	6	6	2	7	16	20	24	23	21	17	10.9	24
7-Oct	14	10	14	Z	22	18	20	12	18	27	29	30	30	33	33	32	19	19	5	19	17	20	16	12	20.3	33
8-Oct	6	2	6	Z	4	6	2	2	5	6	7	8	10	16	22	20	11	24	25	21	19	19	18	18	12.0	25
9-Oct	17	17	13	Z	6	7	7	4	7	12	11	14	18	22	23	21	18	19	14	14	16	17	17	17	14.4	23
10-Oct	18	18	19	Z	14	9	8	8	12	13	12	16	18	16	11	25	27	12	2	4	2	2	4	8	12.1	27
11-Oct	7	10	8	Z	1	2	0	8	29	33	36	37	38	39	39	37	35	31	32	34	33	33	32	30	25.5	39
12-Oct	30	30	29	Z	23	18	10	13	23	25	28	30	32	31	30	30	28	28	27	27	27	27	28	30	26.2	32
13-Oct	29	22	16	Z	15	11	11	11	15	18	16	19	20	22	22	15	16	7	3	5	5	7	11	11	14.3	29
14-Oct	6	3	1	Z	0	0	0	0	0	5	15	21	22	18	17	18	14	6	6	15	19	18	17	15	10.3	22
15-Oct	13	12	15	Z	12	5	8	6	C	C	C	C	15	15	15	16	14	5	8	7	9	3	4	2	9.6	16
16-Oct	0	0	1	Z	2	0	0	1	M	3	8	16	17	17	16	13	17	15	14	13	13	12	13	13	9.3	17
17-Oct	12	12	11	Z	7	6	5	5	8	9	9	13	17	20	23	25	24	19	16	16	18	19	19	19	14.6	25
18-Oct	18	18	18	Z	13	11	8	7	7	7	6	9	12	18	20	21	23	18	16	17	14	19	19	18	14.6	23
19-Oct	15	12	9	Z	1	1	0	1	4	5	6	10	10	16	29	27	25	19	21	19	19	20	21	22	13.5	29
20-Oct	22	22	21	Z	17	14	12	11	13	12	13	12	11	14	9	5	3	1	1	3	2	1	2	7	10.0	22
21-Oct	6	8	5	Z	1	1	1	1	1	4	8	18	22	23	26	28	18	15	3	1	2	2	3	3	8.8	28
22-Oct	4	5	5	Z	2	1	1	1	3	5	7	9	10	M	18	23	21	23	24	23	23	25	27	27	13.0	27
23-Oct	25	22	18	Z	9	8	0	1	1	5	22	20	18	17	17	15	10	11	9	1	2	10	16	12	11.7	25
24-Oct	11	7	6	Z	5	6	7	9	8	8	9	9	11	12	14	15	14	15	14	14	16	16	15	13	11.0	16
25-Oct	12	11	11	Z	9	7	7	4	3	9	12	14	15	16	18	16	15	15	15	11	10	9	8	9	11.2	18
26-Oct	9	9	9	Z	14	14	11	6	2	5	7	7	5	6	5	7	7	6	7	8	11	12	11	11	8.1	14
27-Oct	11	11	12	Z	7	6	6	4	5	8	7	8	11	13	13	12	11	10	9	6	7	4	3	3	8.2	13
28-Oct	5	4	7	Z	5	5	7	6	5	5	5	5	8	11	10	11	9	10	10	11	11	11	12	11	8.0	12
29-Oct	11	11	11	Z	12	11	12	12	8	12	13	14	14	15	15	12	15	14	14	15	15	14	14	13	12.9	15
30-Oct	12	11	11	Z	12	11	11	11	9	8	9	10	11	14	12	10	8	8	8	10	12	13	15	15	10.9	15
31-Oct	15	16	17	Z	16	14	13	11	9	9	10	8	8	6	5	4	1	2	2	2	2	3	2	1	7.7	17

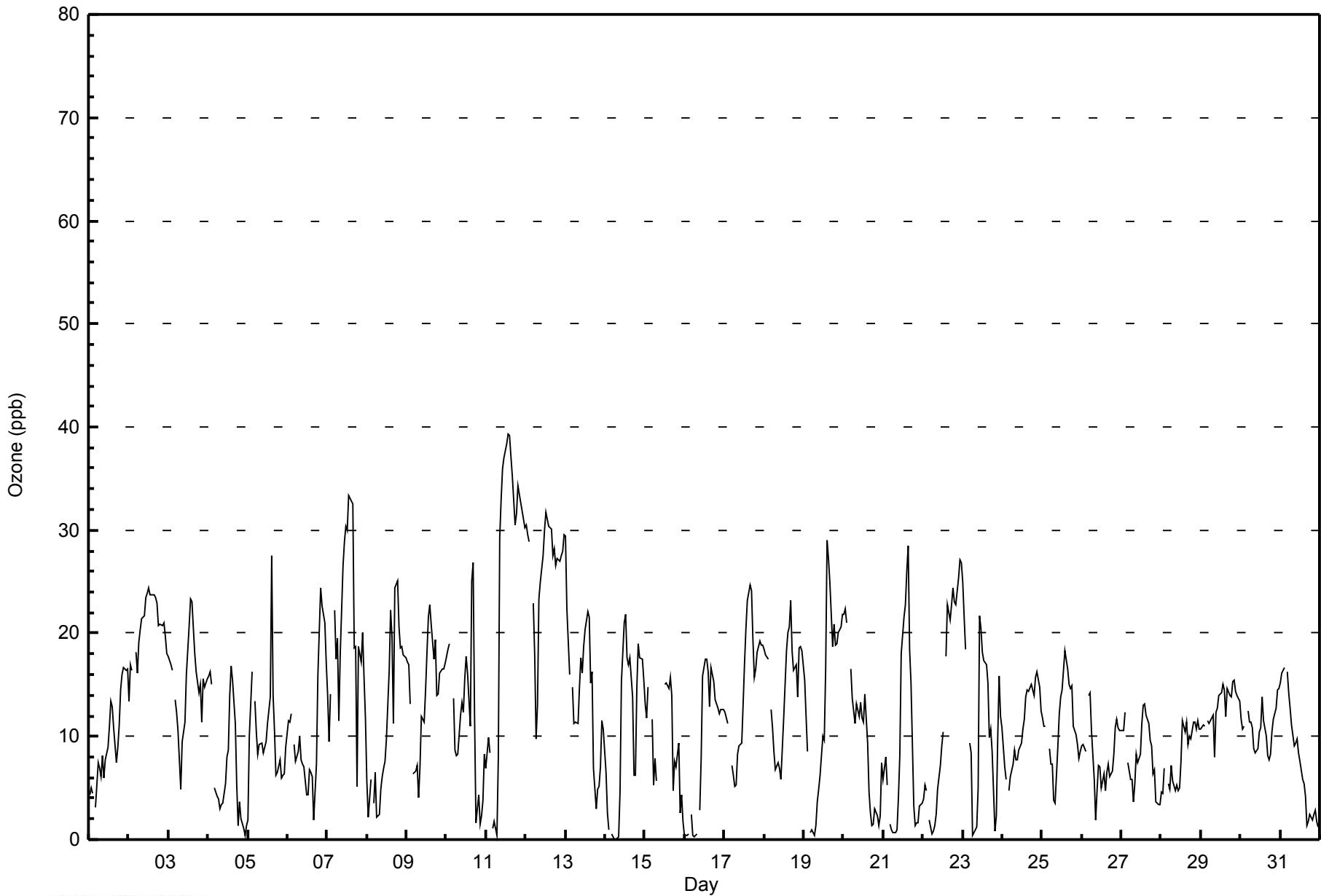
12.7	12.2	12.0	--	9.4	8.1	7.3	6.7	8.8	10.3	12.3	14.3	15.6	17.6	18.5	17.7	15.4	13.5	12.1	12.9	13.1	13.5	13.7	13.4	Diurnal Average
30	30	29	--	23	18	20	20	29	33	36	37	38	39	39	37	35	31	32	34	33	33	32	30	Diurnal Maximum

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  
Athabasca Valley - October 2014





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

**Ozone (O<sub>3</sub>) - ppb**  
**Athabasca Valley - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	597	84.44	84.44
21 - 50	110	15.56	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Athabasca Valley - October 2014**

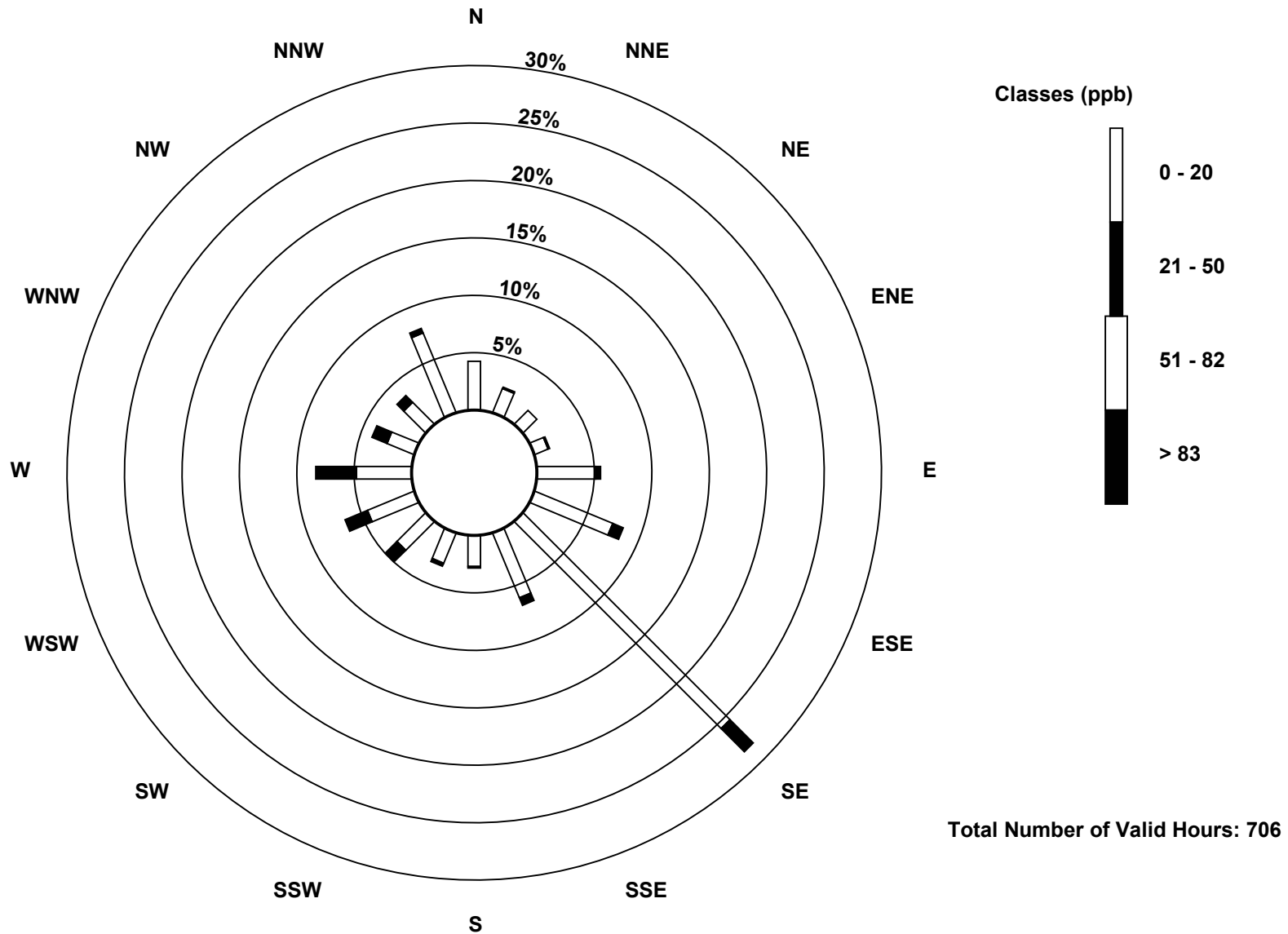
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	30	16	12	9	36	52	180	43	19	20	25	31	34	18	19	53	597
21 - 50	0	1	0	1	3	7	20	5	1	2	10	15	25	10	6	3	109
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	30	17	12	10	39	59	200	48	20	22	35	46	59	28	25	56	706

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

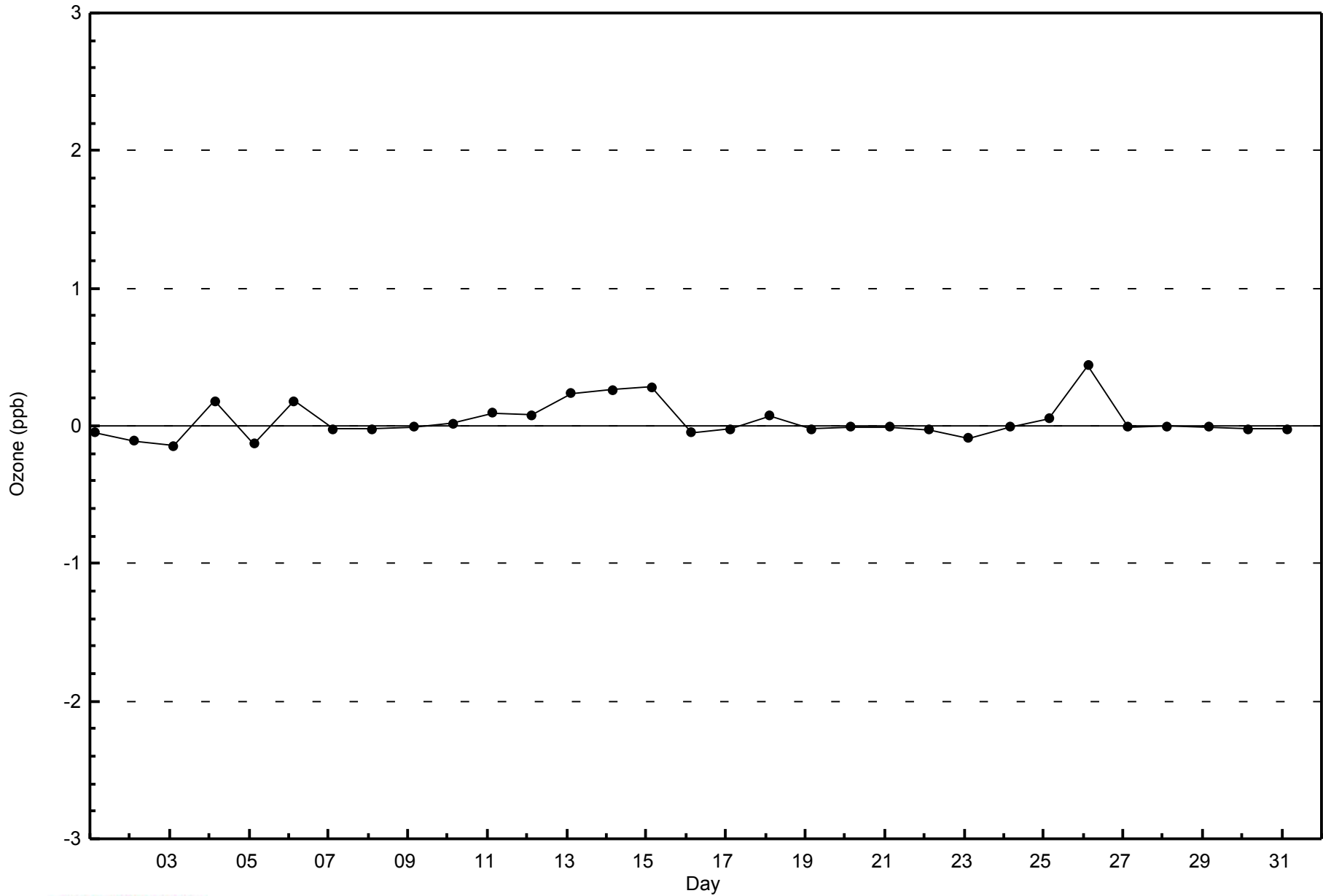
Ozone (O<sub>3</sub>) - ppb  
Athabasca Valley (AMS 7)





WBEA  
Zero Responses

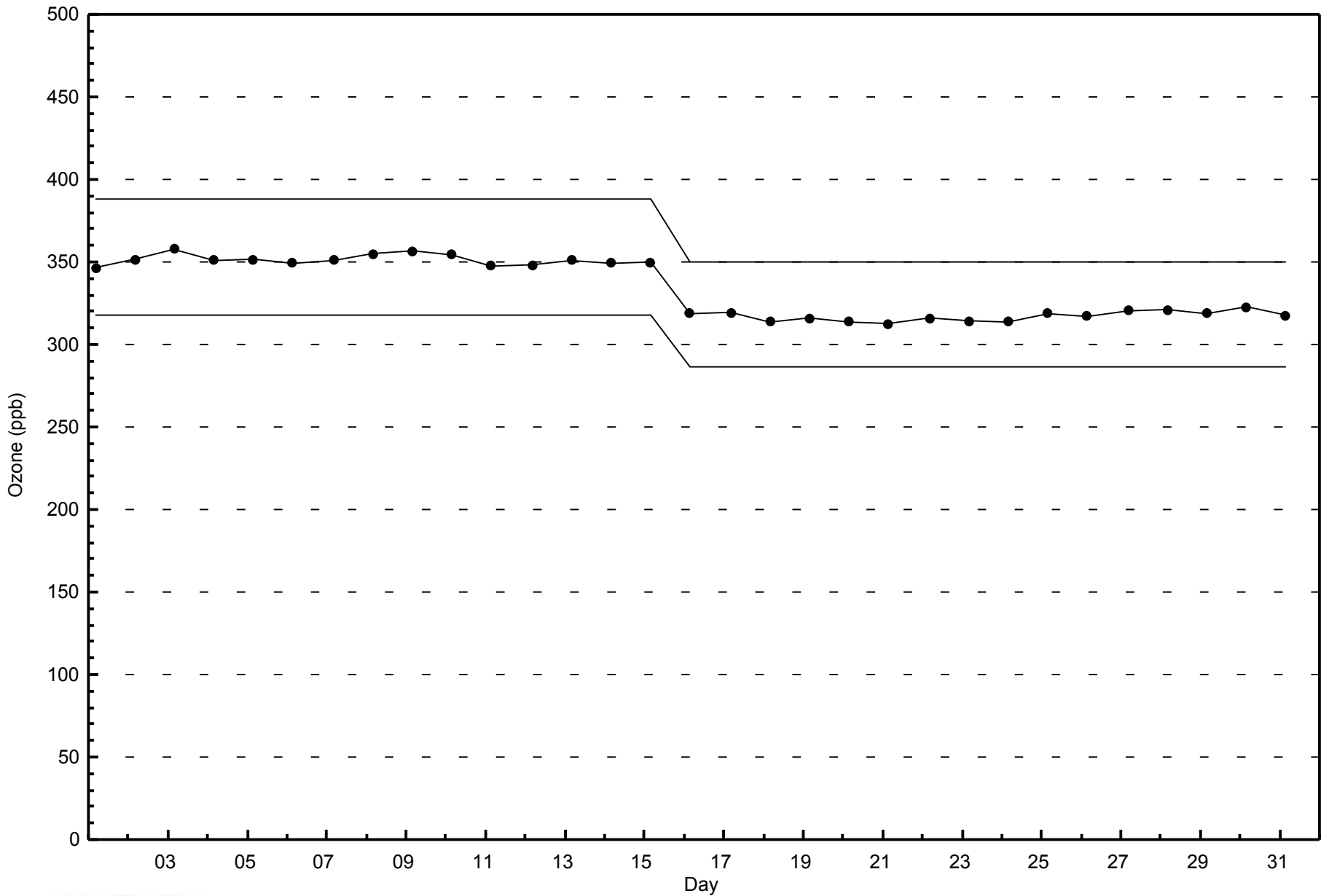
Ozone (O<sub>3</sub>) - ppb  
Athabasca Valley - October 2014





**WBEA**  
**Span Responses**

**Ozone (O<sub>3</sub>) - ppb**  
**Athabasca Valley - October 2014**





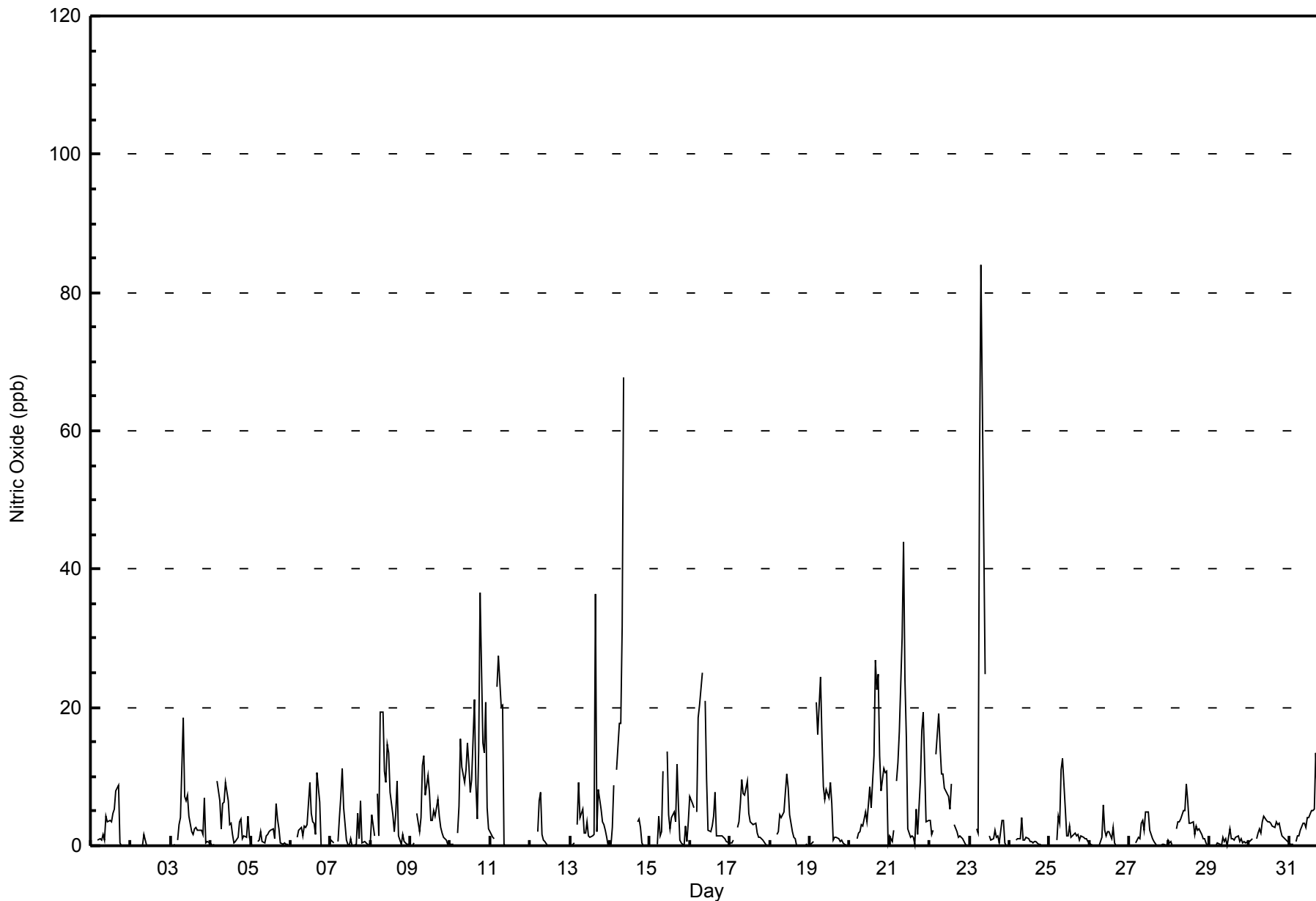


Maximum Value: 84 ppb on Oct 23 08:00										Maximum Daily Average: 10.9 ppb on Oct 23										Hours in Service: 744						
Minimum Value: 0 ppb on Oct 1 02:00										Minimum Daily Average: 0.1 ppb on Oct 2										Hours of Data: 701						
Maximum Diurnal Average: 11.4 ppb at hour 8										Minimum Diurnal Average: 0.6 ppb at hour 1										Hours of Missing Data: 43						
Monthly Average: 3.9 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 4 P <sub>90</sub> = 10 P <sub>99</sub> = 36										Hours of Calibration: 38						
																				Percent Operational Time: 99.3						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	1	1	1	2	1	4	3	4	3	5	5	8	9	0	0	0	0	0	0	0	2.1	9
2-Oct	0	0	0	Z	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2
3-Oct	0	0	0	Z	1	3	4	18	7	7	7	4	2	2	3	3	2	2	2	2	7	0	1	0	3.4	18
4-Oct	0	0	0	Z	9	6	3	6	6	9	7	3	3	2	0	1	1	3	4	1	1	1	4	1	3.2	9
5-Oct	1	0	0	Z	1	1	2	1	1	1	2	2	2	2	1	6	4	2	0	0	0	0	0	0	1.3	6
6-Oct	0	0	0	Z	1	2	3	1	3	3	3	9	5	3	3	2	11	6	0	0	0	0	0	0	2.4	11
7-Oct	1	1	0	Z	1	4	7	11	5	1	0	0	1	0	0	0	5	1	6	0	1	0	0	0	2.0	11
8-Oct	1	4	1	Z	7	1	19	19	11	9	15	13	8	5	2	4	9	1	0	2	1	0	0	0	5.8	19
9-Oct	0	0	0	Z	5	2	4	12	13	7	10	8	4	4	5	4	7	4	3	2	1	1	0	0	4.2	13
10-Oct	0	0	0	Z	2	6	15	11	9	11	15	12	8	10	21	9	4	14	37	15	13	21	6	2	10.4	37
11-Oct	2	1	1	Z	23	28	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.2	28
12-Oct	0	0	0	Z	2	7	8	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	8
13-Oct	0	0	0	Z	3	9	4	5	2	2	3	1	1	1	2	36	2	8	5	4	3	2	1	0	4.2	36
14-Oct	0	3	9	Z	11	18	18	32	68	C	C	C	C	C	C	C	3	4	3	0	0	0	0	0	-	68
15-Oct	0	0	0	Z	0	4	1	2	11	M	14	4	2	4	5	3	12	6	1	0	0	3	1	4	3.5	14
16-Oct	7	6	6	Z	5	18	20	25	M	21	10	2	2	3	4	8	1	1	2	1	1	1	1	0	6.6	25
17-Oct	0	0	1	Z	3	4	6	10	8	7	9	5	4	3	3	3	2	1	1	1	1	0	0	0	3.1	10
18-Oct	0	0	0	Z	2	2	5	4	5	8	10	8	4	2	1	1	0	0	0	0	0	0	0	0	2.3	10
19-Oct	0	0	1	Z	21	16	24	16	8	7	8	7	9	6	1	1	1	1	1	1	0	0	0	0	5.6	24
20-Oct	0	0	0	Z	1	2	2	3	3	5	3	6	9	5	13	27	23	25	13	8	11	11	11	0	7.8	27
21-Oct	1	1	2	Z	9	12	16	30	44	24	16	2	1	1	1	0	5	2	10	17	19	12	3	4	10.1	44
22-Oct	4	2	2	Z	13	19	14	10	10	8	8	7	5	9	M	3	2	1	1	1	1	0	0	0	5.6	19
23-Oct	0	0	0	Z	2	2	54	84	45	25	M	M	1	1	1	2	1	1	0	4	4	0	0	0	10.9	84
24-Oct	0	0	0	Z	1	1	1	4	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0.6	4
25-Oct	0	0	0	Z	1	4	3	11	13	5	1	1	3	1	1	2	2	2	1	1	1	1	1	1	2.5	13
26-Oct	0	0	0	Z	0	0	0	1	6	2	1	2	2	1	3	0	0	0	0	0	0	0	0	0	0.8	6
27-Oct	0	0	0	Z	0	1	1	3	4	2	5	5	2	2	1	1	0	0	0	0	0	0	0	1	1.2	5
28-Oct	0	1	0	Z	3	4	3	4	5	5	9	6	3	3	3	2	3	2	2	2	1	1	0	0	2.7	9
29-Oct	0	0	0	Z	0	0	0	0	1	1	1	0	3	1	1	1	1	1	1	1	0	1	0	1	0.7	3
30-Oct	1	1	1	Z	1	2	2	2	4	4	4	3	4	3	3	3	3	3	3	2	1	1	1	1	2.3	4
31-Oct	0	0	0	Z	1	1	1	2	3	3	3	4	4	5	5	5	13	8	6	6	5	4	5	4	4.0	13
																				Diurnal Average						
																				Diurnal Maximum						
Z - zerospan										C - Calibration										M - Maintenance						



WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
Athabasca Valley - October 2014





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

**Nitric Oxide (NO) - ppb**  
**Athabasca Valley - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	679	96.86	96.86
21 - 40	17	2.43	99.29
41 - 80	4	0.57	99.86
81 - 159	1	0.14	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Athabasca Valley - October 2014**

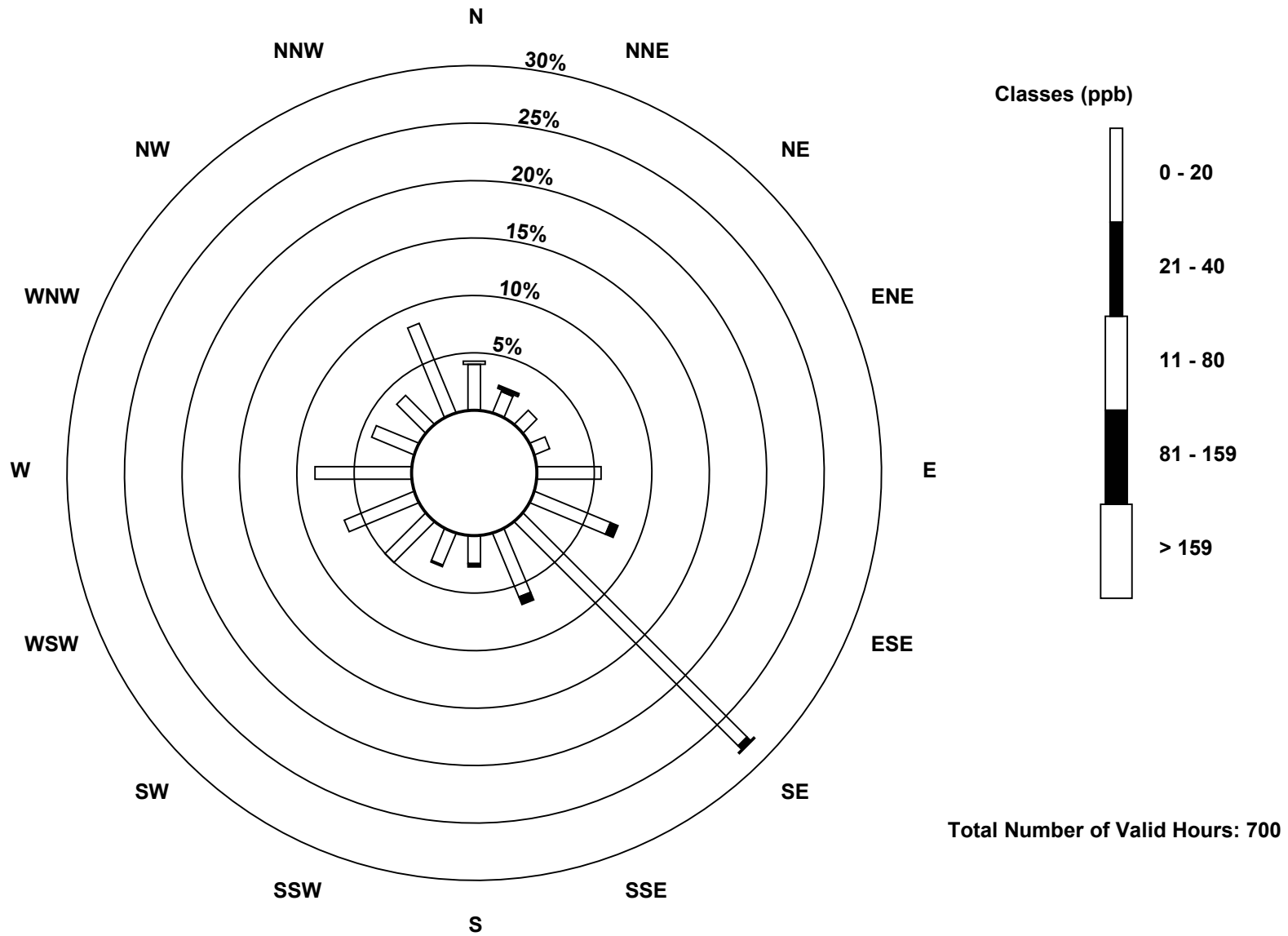
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	14	12	10	39	50	193	42	17	21	35	46	59	28	25	59	678
21 - 40	0	1	0	0	0	5	3	5	2	1	0	0	0	0	0	0	17
41 - 80	2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4
81 - 159	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>30</b>	<b>17</b>	<b>12</b>	<b>10</b>	<b>39</b>	<b>55</b>	<b>197</b>	<b>47</b>	<b>19</b>	<b>22</b>	<b>35</b>	<b>46</b>	<b>59</b>	<b>28</b>	<b>25</b>	<b>59</b>	<b>700</b>

Total Number of Valid Hours: 700

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

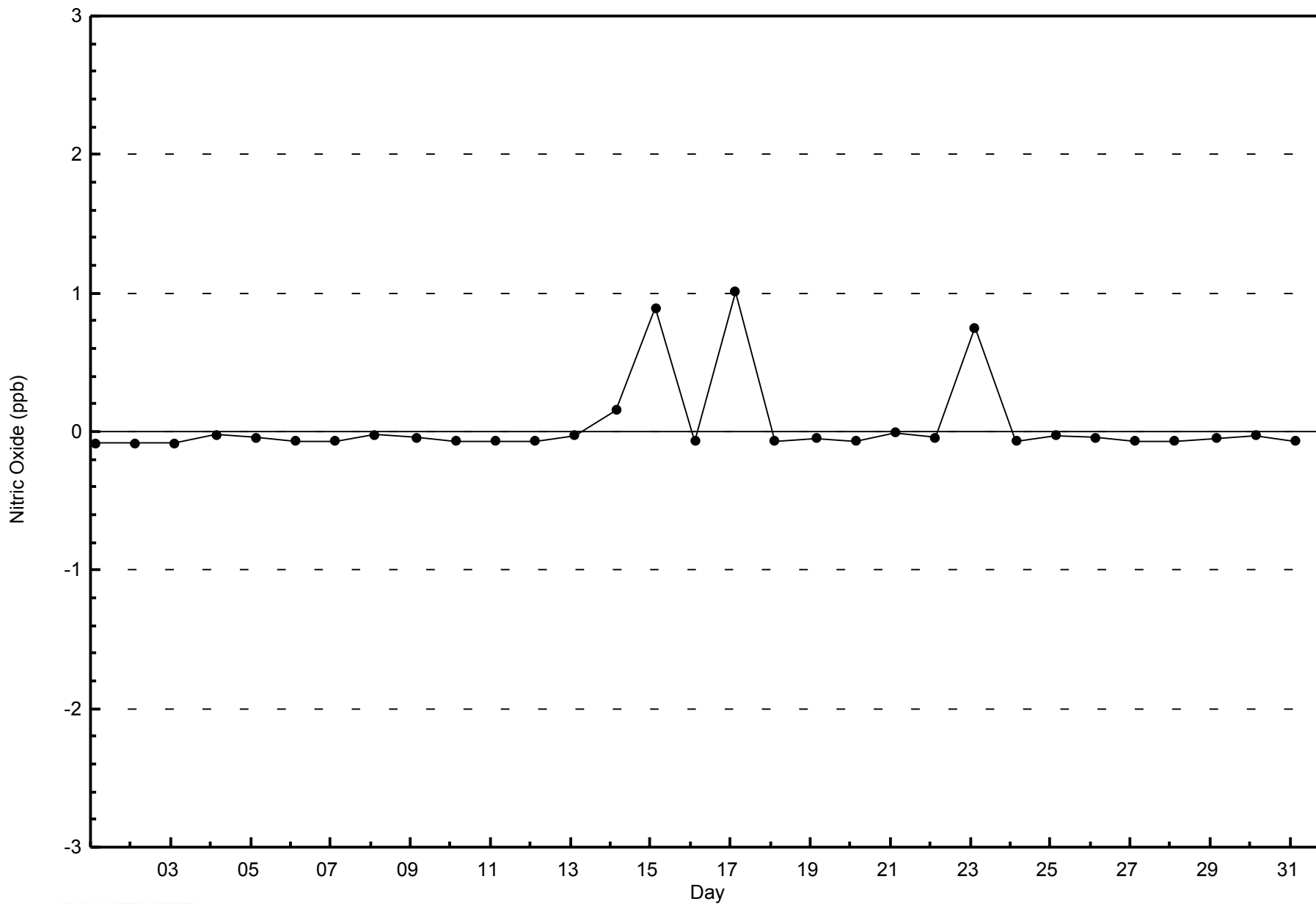
**Nitric Oxide (NO) - ppb  
Athabasca Valley (AMS 7)**





WBEA  
Zero Responses

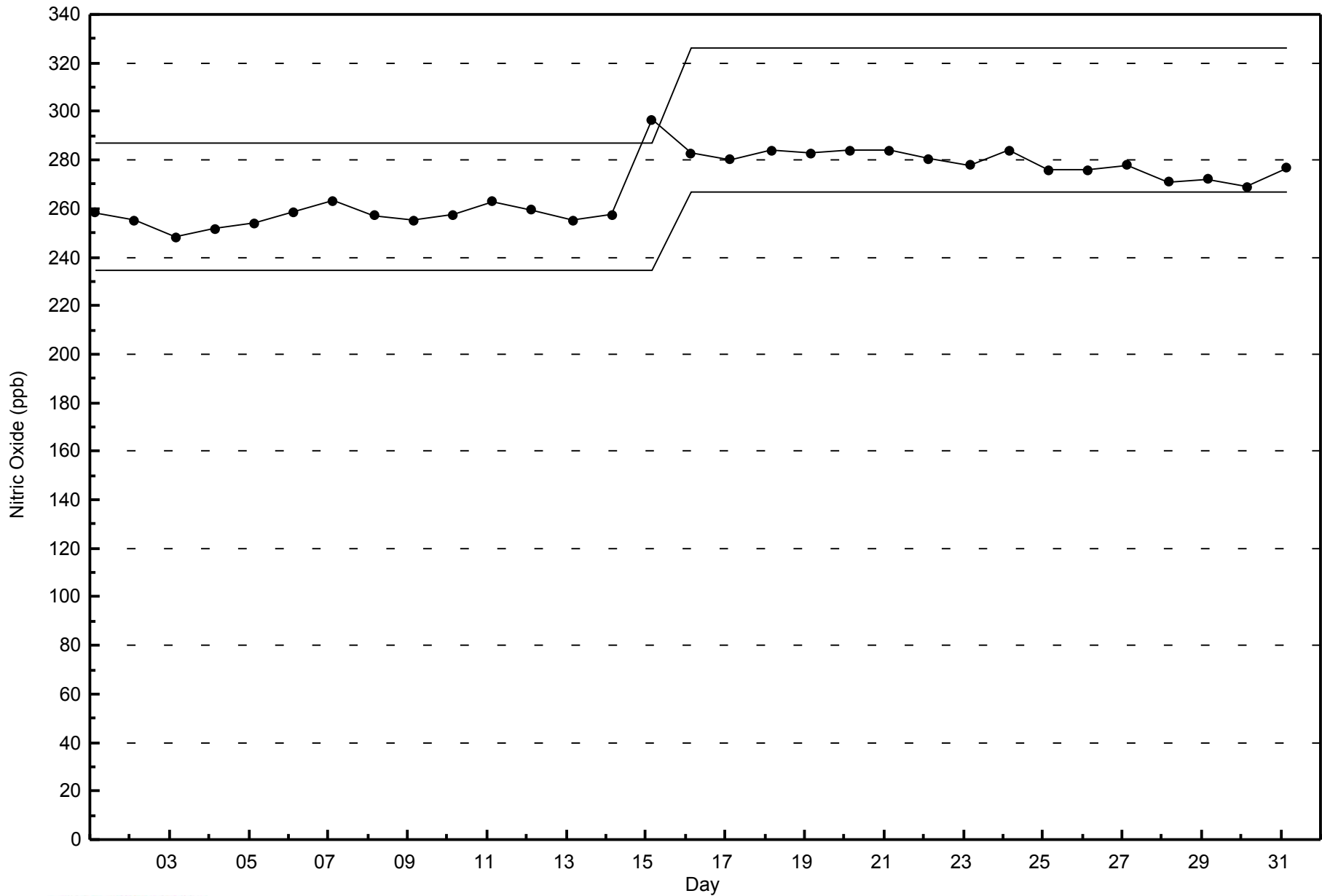
Nitric Oxide (NO) - ppb  
Athabasca Valley - October 2014





**WBEA**  
**Span Responses**

**Nitric Oxide (NO) - ppb**  
**Athabasca Valley - October 2014**





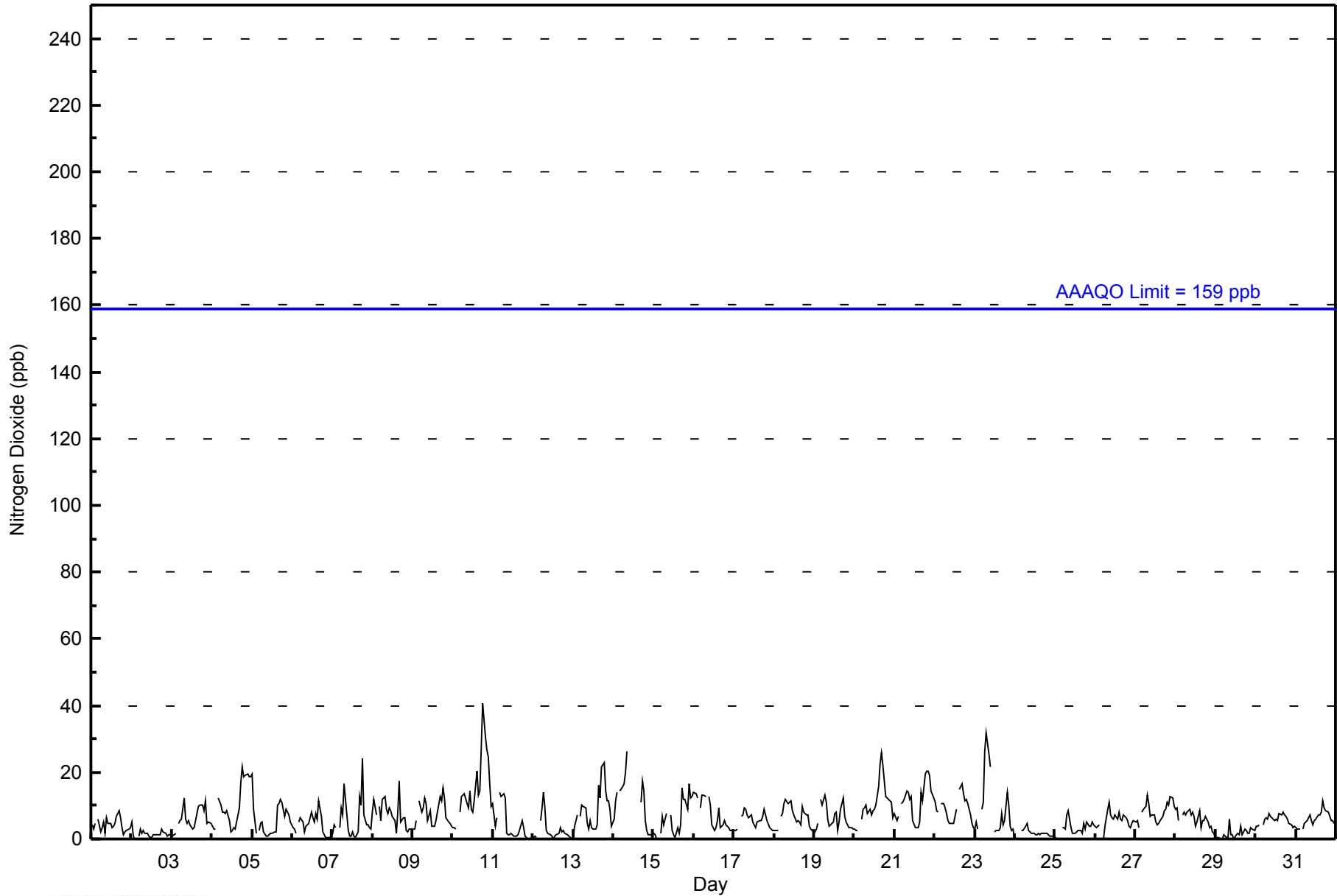
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 41 ppb on Oct 10 19:00										Maximum Daily Average: 15.0 ppb on Oct 10										Hours of Data: 701						
Minimum Value: 0 ppb on Oct 2 03:00										Minimum Daily Average: 1.6 ppb on Oct 2										Hours of Missing Data: 43						
Maximum Diurnal Average: 10.3 ppb at hour 19										Minimum Diurnal Average: 4.0 ppb at hour 13										Hours of Calibration: 38						
Monthly Average: 6.5 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 3 Median = 5 Q <sub>3</sub> = 9 P <sub>90</sub> = 13 P <sub>99</sub> = 26										Percent Operational Time: 99.3						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	4	3	5	Z	6	2	4	5	2	6	5	5	3	4	5	7	9	6	3	1	2	3	3	4	4.1	9
2-Oct	5	1	0	Z	1	3	2	3	2	2	1	1	0	1	1	1	1	1	3	2	2	1	1	1	1.6	5
3-Oct	1	1	2	Z	5	5	6	12	6	5	6	4	3	4	6	8	10	10	9	12	5	5	5	5	5.9	12
4-Oct	4	3	3	Z	12	10	8	8	8	9	6	2	3	4	3	5	9	17	21	19	19	19	19	19	10.0	21
5-Oct	20	9	2	Z	3	5	5	2	1	1	1	2	2	2	2	10	11	12	11	7	9	8	7	5	5.8	20
6-Oct	3	3	2	Z	5	6	5	2	4	4	5	8	6	5	8	6	12	7	2	1	1	1	0	1	4.2	12
7-Oct	2	4	4	Z	3	9	7	17	12	3	1	1	2	1	1	2	13	10	24	7	4	4	3	3	6.0	24
8-Oct	8	12	7	Z	10	5	12	13	9	8	9	8	7	6	2	8	17	5	7	6	2	2	3	3	7.3	17
9-Oct	3	3	6	Z	12	8	9	12	11	6	8	4	4	4	6	8	13	12	15	12	6	5	5	4	7.6	15
10-Oct	4	3	3	Z	8	13	13	14	11	9	14	9	8	12	21	13	14	27	41	31	27	25	17	10	15.0	41
11-Oct	11	4	6	Z	14	13	14	12	2	1	1	2	1	1	1	1	3	6	3	1	1	0	0	0	4.2	14
12-Oct	1	1	1	Z	6	9	14	9	2	2	1	1	0	1	1	2	4	2	3	2	1	1	0	0	2.7	14
13-Oct	0	4	7	Z	7	10	10	9	5	3	6	4	3	3	4	16	12	21	23	15	12	12	9	4	8.6	23
14-Oct	6	11	14	Z	14	16	16	20	26	C	C	C	C	C	C	C	11	17	14	6	2	1	1	1	--	26
15-Oct	2	1	0	Z	2	7	4	6	8	M	7	3	1	0	4	2	4	15	12	12	9	16	12	13	6.3	16
16-Oct	14	14	12	Z	9	13	13	13	M	13	10	4	3	4	6	9	3	4	5	4	4	4	3	2	7.5	14
17-Oct	2	3	3	Z	7	7	9	9	7	6	7	5	4	3	5	6	6	7	9	7	6	4	3	3	5.5	9
18-Oct	3	3	3	Z	7	8	10	12	11	11	12	8	7	5	5	5	4	10	8	7	7	4	3	2	6.8	12
19-Oct	2	3	5	Z	12	10	13	11	6	4	4	5	8	8	3	5	9	12	7	5	4	3	3	3	6.3	13
20-Oct	3	3	3	Z	6	9	9	10	8	9	7	9	9	10	16	22	26	22	17	13	12	12	11	6	10.9	26
21-Oct	8	5	7	Z	11	11	12	15	14	12	13	5	4	3	3	5	14	12	20	20	20	19	14	12	11.2	20
22-Oct	11	9	8	Z	11	11	9	8	6	5	5	5	7	9	M	15	17	14	12	12	11	7	5	3	8.9	17
23-Oct	3	5	3	Z	9	11	26	32	26	21	M	M	2	3	3	3	8	4	6	14	10	4	3	3	9.4	32
24-Oct	1	0	0	Z	2	3	4	5	2	2	2	2	1	1	2	1	2	2	2	2	1	1	1	1	1.6	5
25-Oct	0	0	0	Z	3	3	3	7	9	4	2	2	2	2	3	2	2	5	3	5	4	4	5	4	3.2	9
26-Oct	4	3	4	Z	0	0	4	9	11	7	6	6	7	6	8	6	5	7	6	6	4	4	5	6	5.4	11
27-Oct	5	5	4	Z	8	10	10	13	10	7	7	7	5	4	5	6	7	8	9	11	10	13	12	10	8.0	13
28-Oct	9	9	6	Z	7	8	7	8	9	7	8	7	4	5	9	3	5	6	7	5	3	4	2	2	6.0	9
29-Oct	0	1	0	Z	0	1	0	1	6	1	1	0	1	2	1	4	1	3	3	2	2	3	3	3	1.7	6
30-Oct	4	4	4	Z	4	6	6	6	8	7	6	6	6	6	8	7	8	7	7	6	5	4	4	4	5.7	8
31-Oct	4	3	3	Z	3	5	5	5	7	6	4	6	6	7	7	8	11	10	8	8	7	5	5	5	6.0	11
4.7 4.3 4.0 -- 6.6 7.6 8.7 9.9 8.2 6.2 5.7 4.4 4.0 4.1 5.0 6.6 8.7 9.7 10.3 8.2 7.0 6.3 5.4 4.5																								Diurnal Average		
20 14 14 -- 14 16 26 32 26 21 14 9 9 12 21 22 26 27 41 31 27 25 19 19																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										





WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley - October 2014





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Athabasca Valley - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	683	97.43	97.43
21 - 40	17	2.43	99.86
41 - 80	1	0.14	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Athabasca Valley - October 2014**

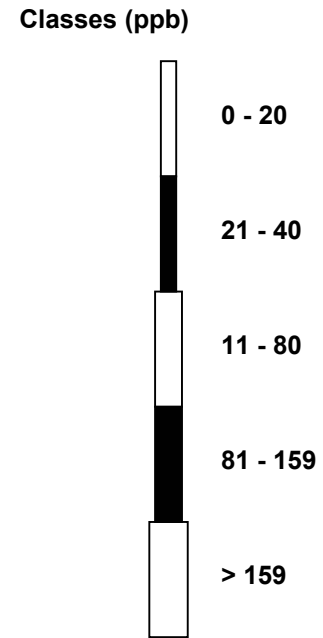
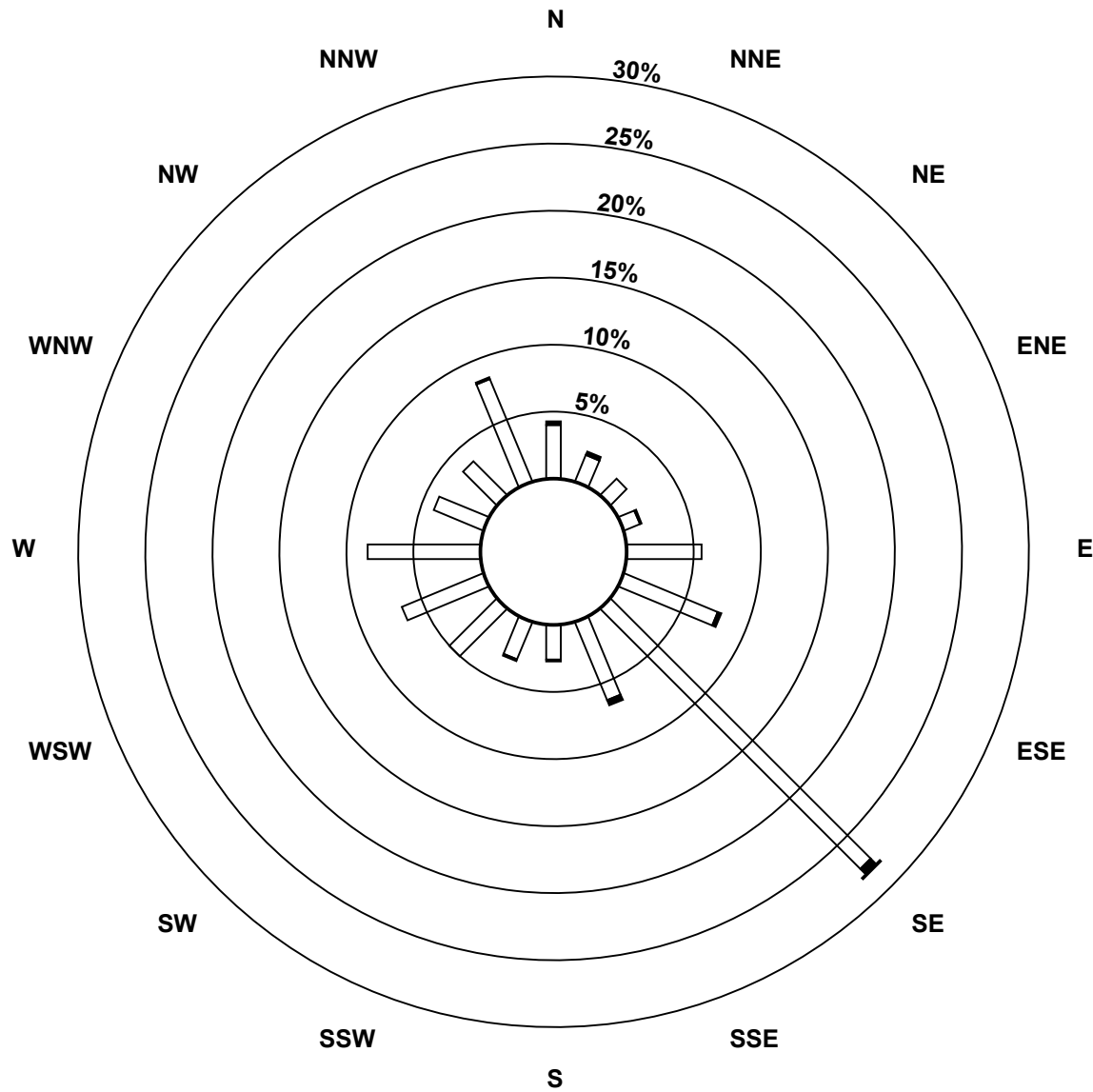
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	15	12	9	39	53	192	44	18	21	35	46	59	28	25	58	682
21 - 40	2	2	0	1	0	2	4	3	1	1	0	0	0	0	0	1	17
11 - 80	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	30	17	12	10	39	55	197	47	19	22	35	46	59	28	25	59	700

Total Number of Valid Hours: 700

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley (AMS 7)**

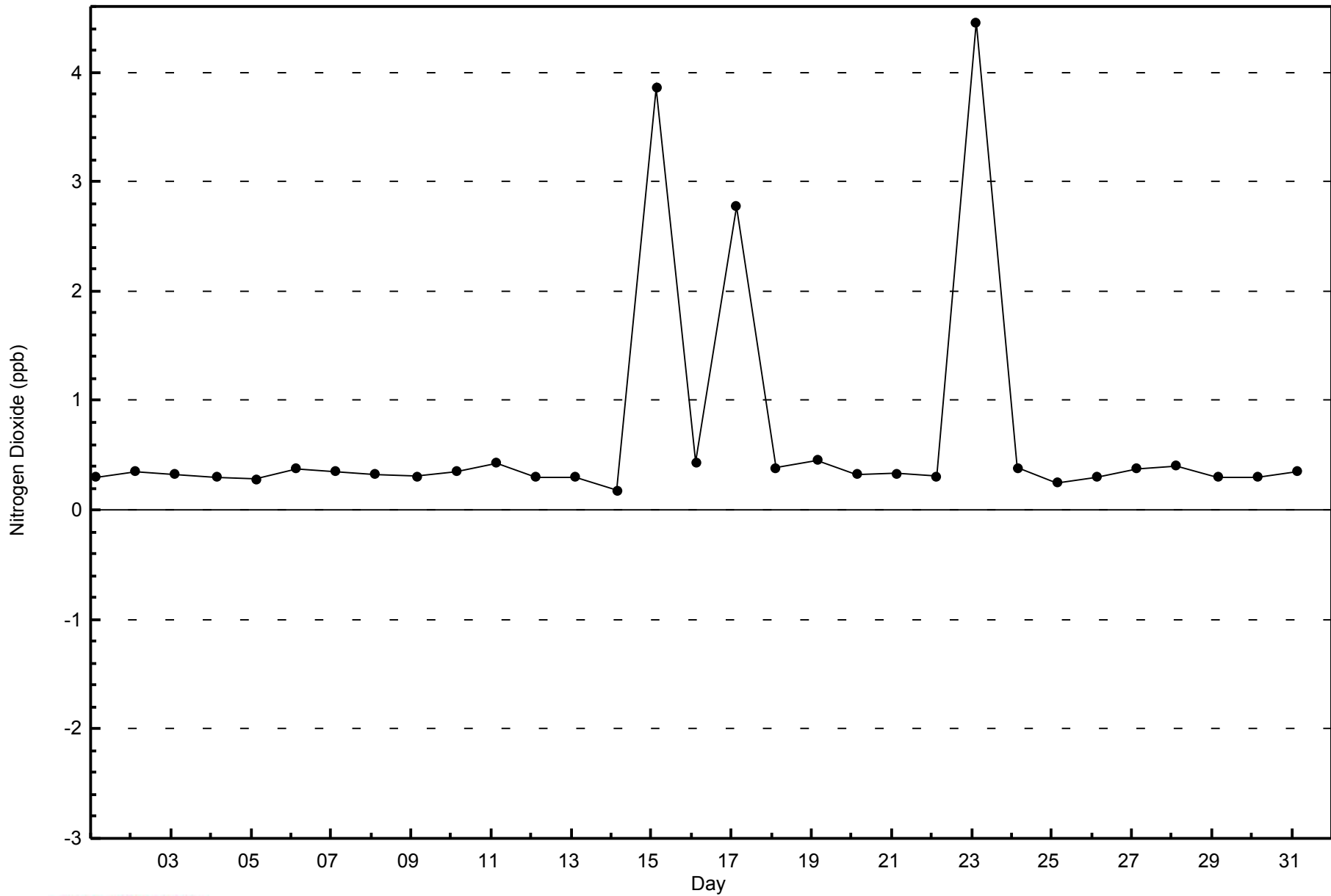


**Total Number of Valid Hours: 700**



WBEA  
Zero Responses

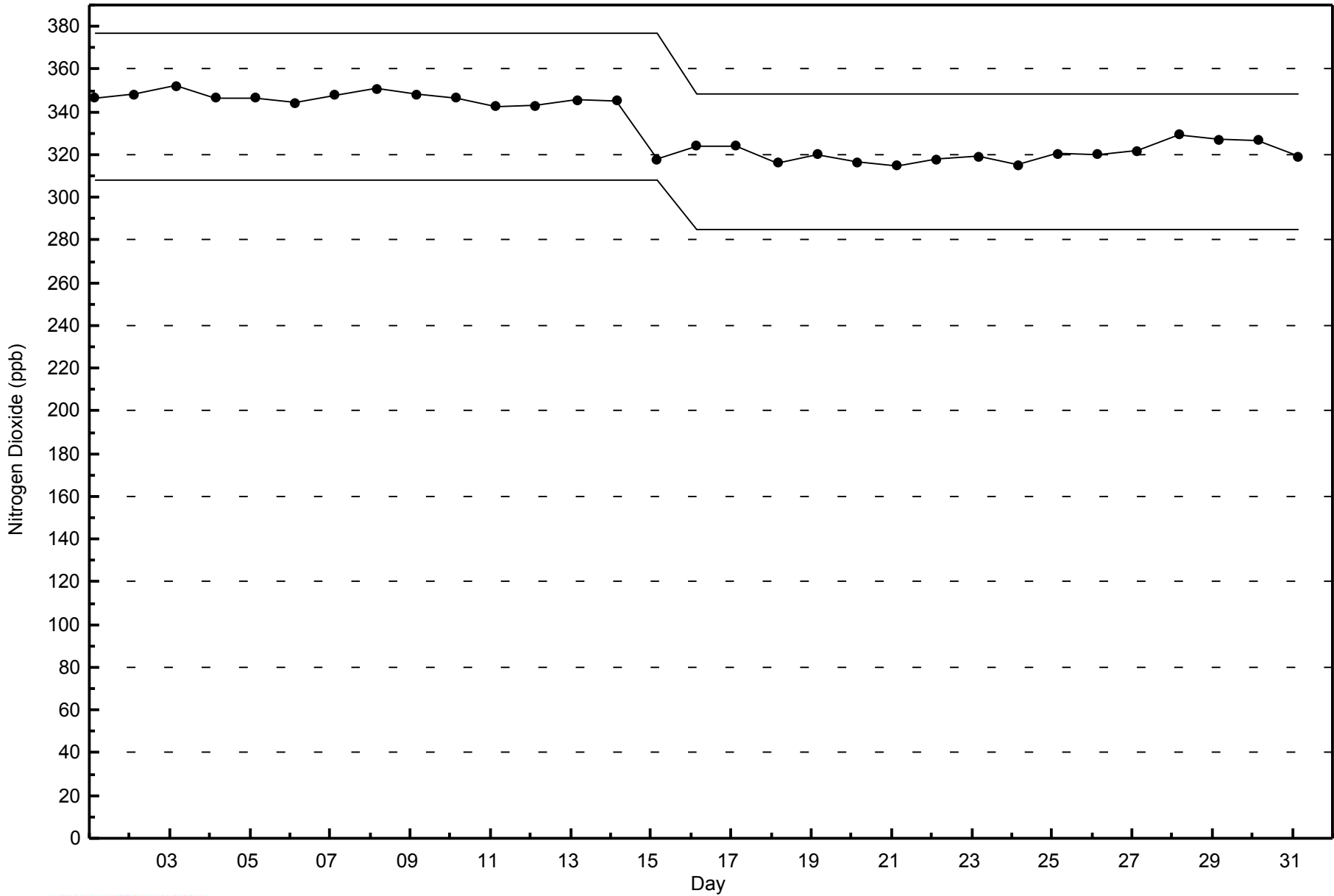
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley - October 2014





**WBEA**  
**Span Responses**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Athabasca Valley - October 2014**



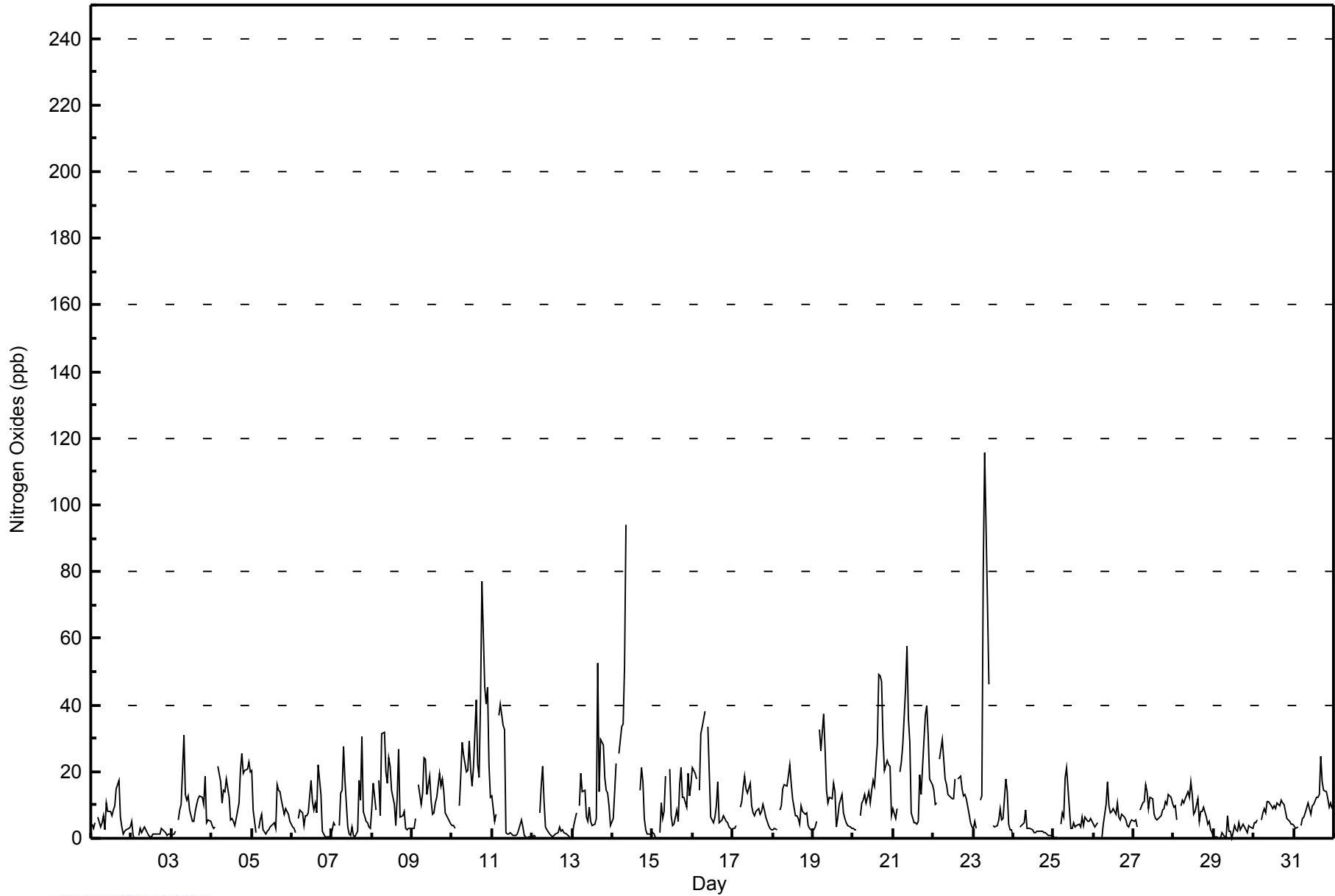


Maximum Value: 116 ppb on Oct 23 08:00																		Maximum Daily Average: 25.4 ppb on Oct 10																		Hours in Service: 744																																																																																	
Minimum Value: 0 ppb on Oct 2 03:00																		Minimum Daily Average: 1.6 ppb on Oct 2																		Hours of Data: 701																																																																																	
Maximum Diurnal Average: 21.2 ppb at hour 8																		Minimum Diurnal Average: 4.8 ppb at hour 3																		Hours of Missing Data: 43																																																																																	
Monthly Average: 10.5 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 3 Median = 7 Q <sub>3</sub> = 14 P <sub>90</sub> = 22 P <sub>99</sub> = 50																		Hours of Calibration: 38																																																																																	
																																				Percent Operational Time: 99.3																																																																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																																																																																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																																																																													
1-Oct	4	3	5	Z	7	3	5	7	3	11	8	8	7	9	10	15	17	7	3	1	2	3	3	4	6.2	17																																																																																											
2-Oct	5	1	0	Z	1	3	2	2	3	2	1	1	0	1	1	1	1	1	3	2	2	1	1	1	1.6	5																																																																																											
3-Oct	1	1	2	Z	5	8	10	31	13	11	13	8	5	5	8	10	12	13	12	10	18	5	5	5	9.3	31																																																																																											
4-Oct	4	3	3	Z	22	17	11	14	14	18	12	5	6	5	4	6	11	20	25	19	21	21	23	20	13.2	25																																																																																											
5-Oct	20	9	2	Z	3	5	7	3	1	2	3	4	4	5	3	16	14	14	11	7	9	8	7	5	7.1	20																																																																																											
6-Oct	3	3	2	Z	6	9	8	4	7	7	8	17	11	8	11	8	22	13	2	1	1	1	0	1	6.6	22																																																																																											
7-Oct	3	5	4	Z	4	14	14	28	17	4	1	1	3	1	1	2	17	11	30	8	5	5	3	3	8.0	30																																																																																											
8-Oct	9	16	8	Z	17	7	31	32	20	17	24	22	14	10	4	12	27	6	7	8	3	3	3	3	13.2	32																																																																																											
9-Oct	3	3	6	Z	16	10	13	24	24	13	18	11	7	8	11	12	19	16	18	14	7	6	5	4	11.7	24																																																																																											
10-Oct	4	4	3	Z	10	19	29	25	20	20	29	21	16	21	42	22	18	41	77	46	40	45	22	12	25.4	77																																																																																											
11-Oct	13	5	7	Z	37	40	34	33	2	1	1	2	1	1	1	1	3	6	3	1	1	0	0	0	8.4	40																																																																																											
12-Oct	1	1	1	Z	8	16	21	11	3	3	1	1	0	1	1	2	4	2	3	2	1	1	0	0	3.6	21																																																																																											
13-Oct	0	4	8	Z	10	19	14	14	7	5	9	5	4	4	6	52	14	30	28	18	15	14	10	4	12.7	52																																																																																											
14-Oct	6	14	23	Z	25	33	34	52	94	C	C	C	C	C	C	C	15	21	17	6	2	1	1	1	--	94																																																																																											
15-Oct	1	1	0	Z	2	11	6	8	19	M	21	7	4	4	8	5	16	21	12	12	9	19	13	16	9.8	21																																																																																											
16-Oct	21	20	18	Z	14	31	33	38	M	33	20	6	5	6	10	17	5	6	7	6	5	5	3	3	14.2	38																																																																																											
17-Oct	3	3	4	Z	9	11	15	18	15	13	17	10	8	7	8	9	7	8	10	8	6	4	3	2	8.7	18																																																																																											
18-Oct	3	3	3	Z	8	10	15	16	16	19	22	17	12	7	7	6	4	10	8	7	7	4	3	2	9.0	22																																																																																											
19-Oct	2	3	5	Z	33	26	37	27	15	10	12	12	17	14	4	7	10	13	7	6	5	4	3	3	12.0	37																																																																																											
20-Oct	3	3	3	Z	7	11	11	13	10	14	11	14	17	16	28	49	49	47	30	20	23	22	22	7	18.7	49																																																																																											
21-Oct	9	6	9	Z	20	23	28	45	58	36	29	8	5	5	4	5	19	13	29	37	40	31	18	16	21.4	58																																																																																											
22-Oct	15	10	10	Z	24	30	24	18	16	13	12	12	12	18	M	18	19	15	13	13	12	7	4	3	14.4	30																																																																																											
23-Oct	3	5	3	Z	11	13	81	116	70	46	M	M	4	3	4	6	9	6	6	18	14	4	2	3	20.3	116																																																																																											
24-Oct	0	0	0	Z	3	4	5	9	3	3	3	3	2	2	2	2	2	2	2	2	1	1	1	1	2.3	9																																																																																											
25-Oct	0	0	0	Z	4	8	6	18	21	9	3	3	5	3	4	4	3	6	4	6	5	5	6	5	5.7	21																																																																																											
26-Oct	4	4	5	Z	0	0	4	10	17	10	8	8	9	7	11	6	5	7	6	5	4	4	5	5	6.2	17																																																																																											
27-Oct	5	5	3	Z	9	11	11	16	14	9	12	12	7	6	6	6	7	8	9	11	10	13	12	11	9.3	16																																																																																											
28-Oct	9	10	6	Z	10	11	10	12	14	12	17	13	7	8	12	5	8	8	9	6	4	5	2	2	8.8	17																																																																																											
29-Oct	0	1	0	Z	0	2	1	1	7	2	2	0	4	3	2	5	3	4	3	2	2	4	3	3	2.3	7																																																																																											
30-Oct	5	5	5	Z	5	7	9	8	11	11	10	9	10	9	10	10	11	11	10	8	6	5	4	4	8.0	11																																																																																											
31-Oct	4	3	3	Z	4	6	6	8	10	9	7	10	10	12	12	13	25	17	15	14	12	9	11	9	10.0	25																																																																																											
																		5.3				4.9				4.8				--				10.8				13.4				17.3				21.2				18.1				12.5				11.5				8.6				7.1				7.0				8.1				11.1				12.8				13.0				13.6				10.5				9.4				8.3				6.5				5.1				Diurnal Average			
																		21				20				23				--				37				40				81				116				94				46				29				22				17				21				42				52				49				47				77				46				40				45				23				20				Diurnal Maximum			
Z - zerospan																		C - Calibration																		M - Maintenance																																																																																	



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Athabasca Valley - October 2014**







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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Athabasca Valley - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	618	88.16	88.16
21 - 40	66	9.42	97.57
41 - 80	14	2.00	99.57
81 - 159	2	0.29	99.86
> 159	0	0.00	99.86

Total Number of Valid Hours: 701

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Athabasca Valley - October 2014**

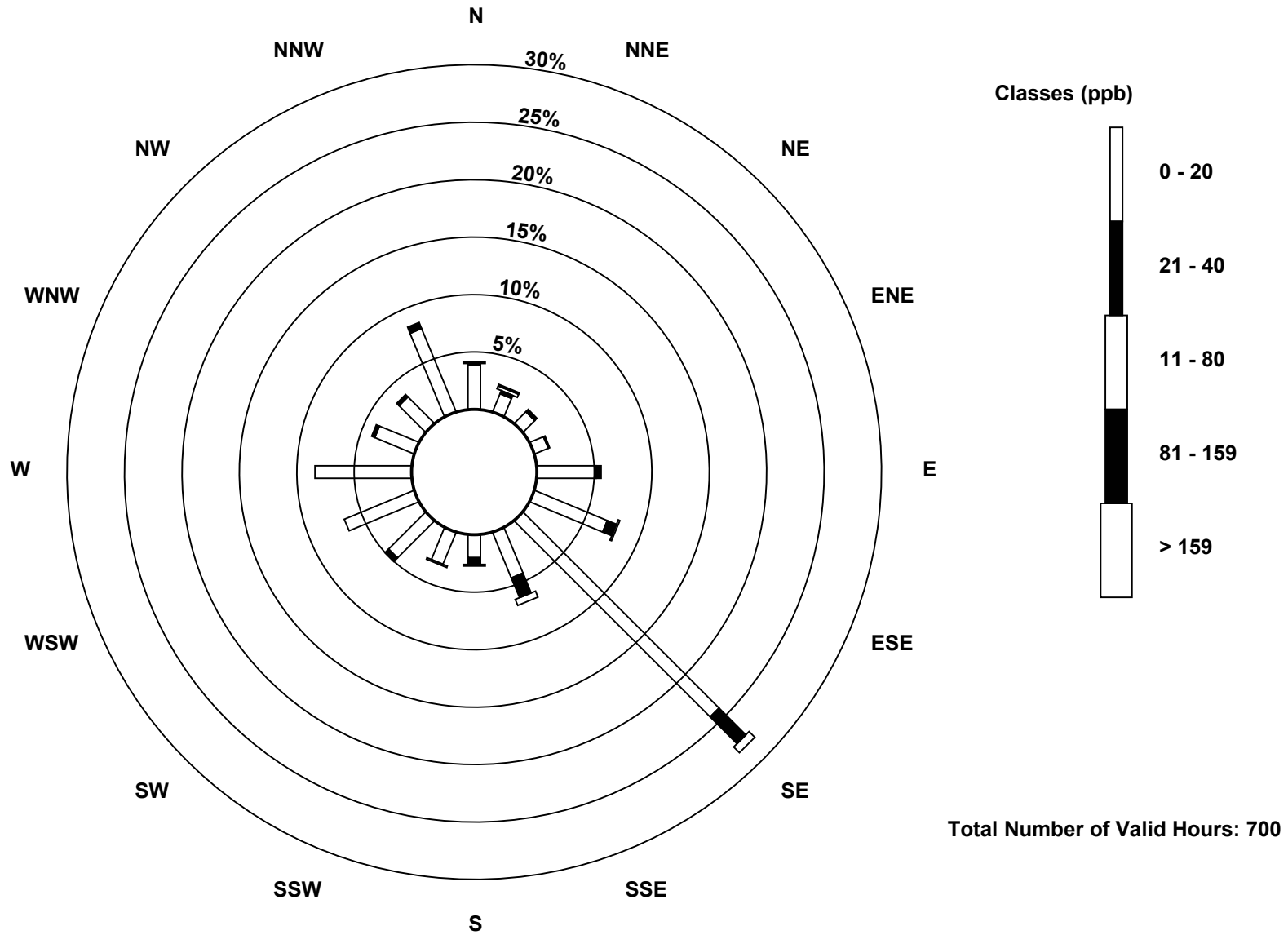
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	12	10	9	36	48	169	30	14	21	32	46	59	26	23	55	617
21 - 40	1	2	2	1	3	6	23	13	4	0	3	0	0	2	2	4	66
41 - 80	0	2	0	0	0	1	5	4	1	1	0	0	0	0	0	0	14
81 - 159	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	29	17	12	10	39	55	197	47	19	22	35	46	59	28	25	59	699

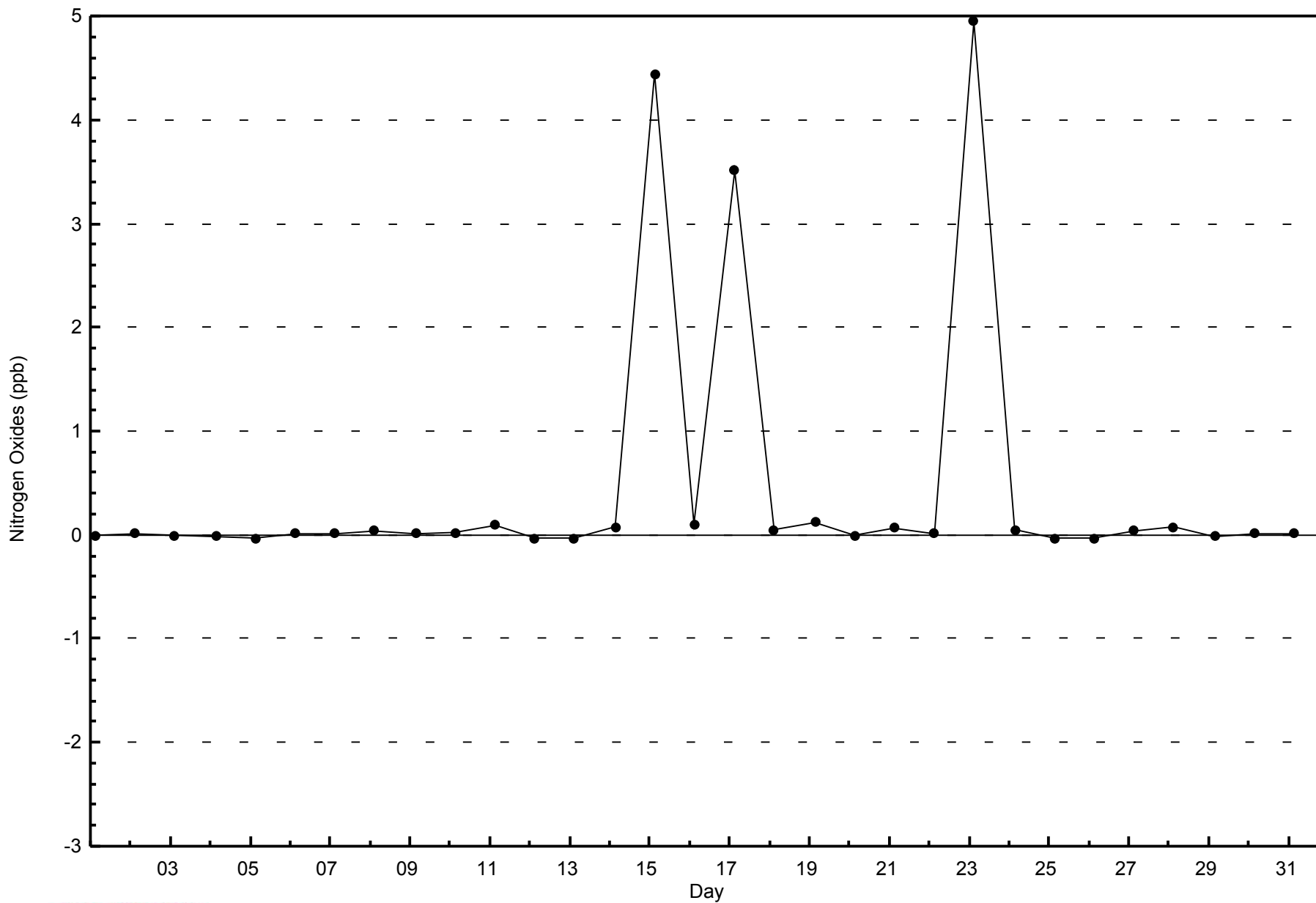
Total Number of Valid Hours: 700

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Athabasca Valley (AMS 7)**

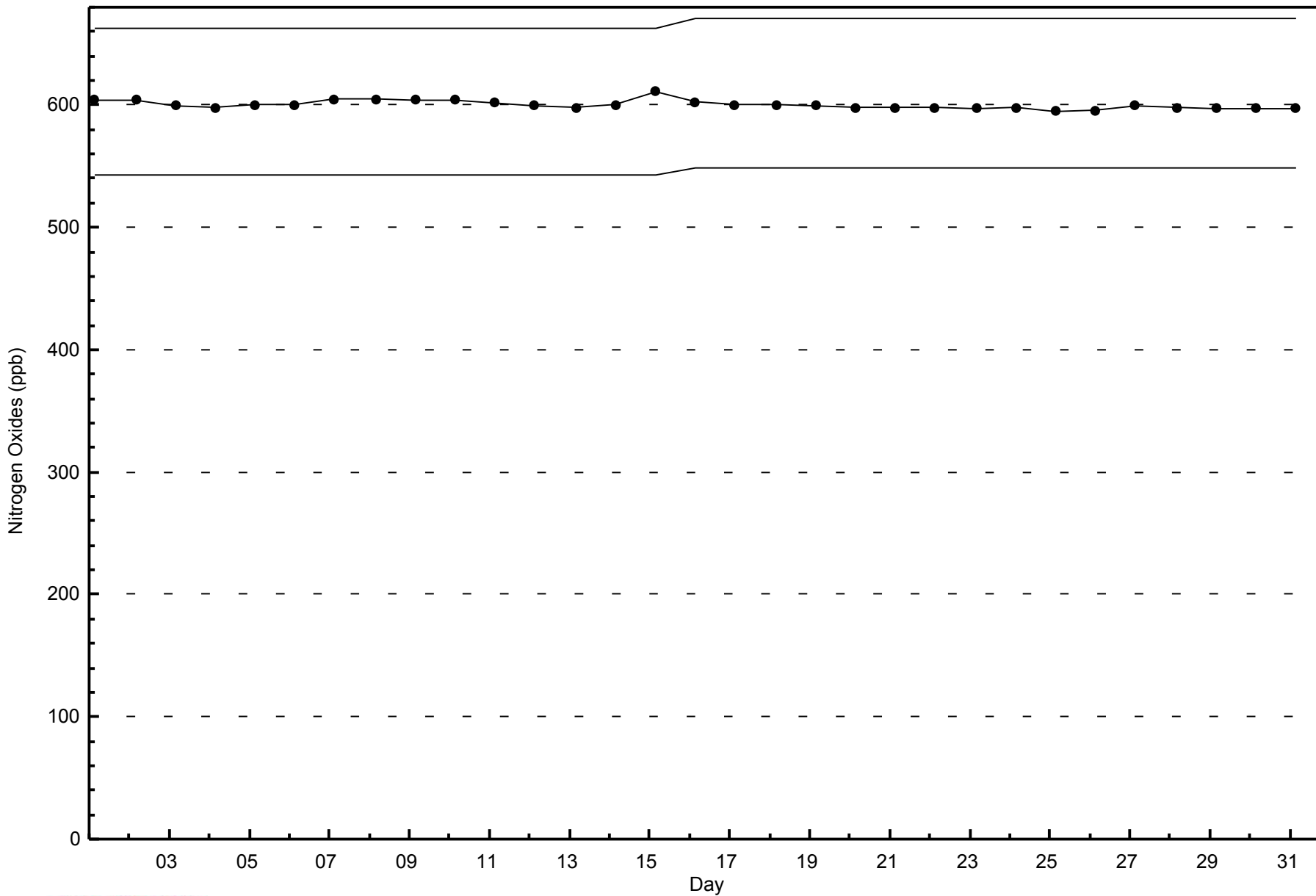






WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Athabasca Valley - October 2014



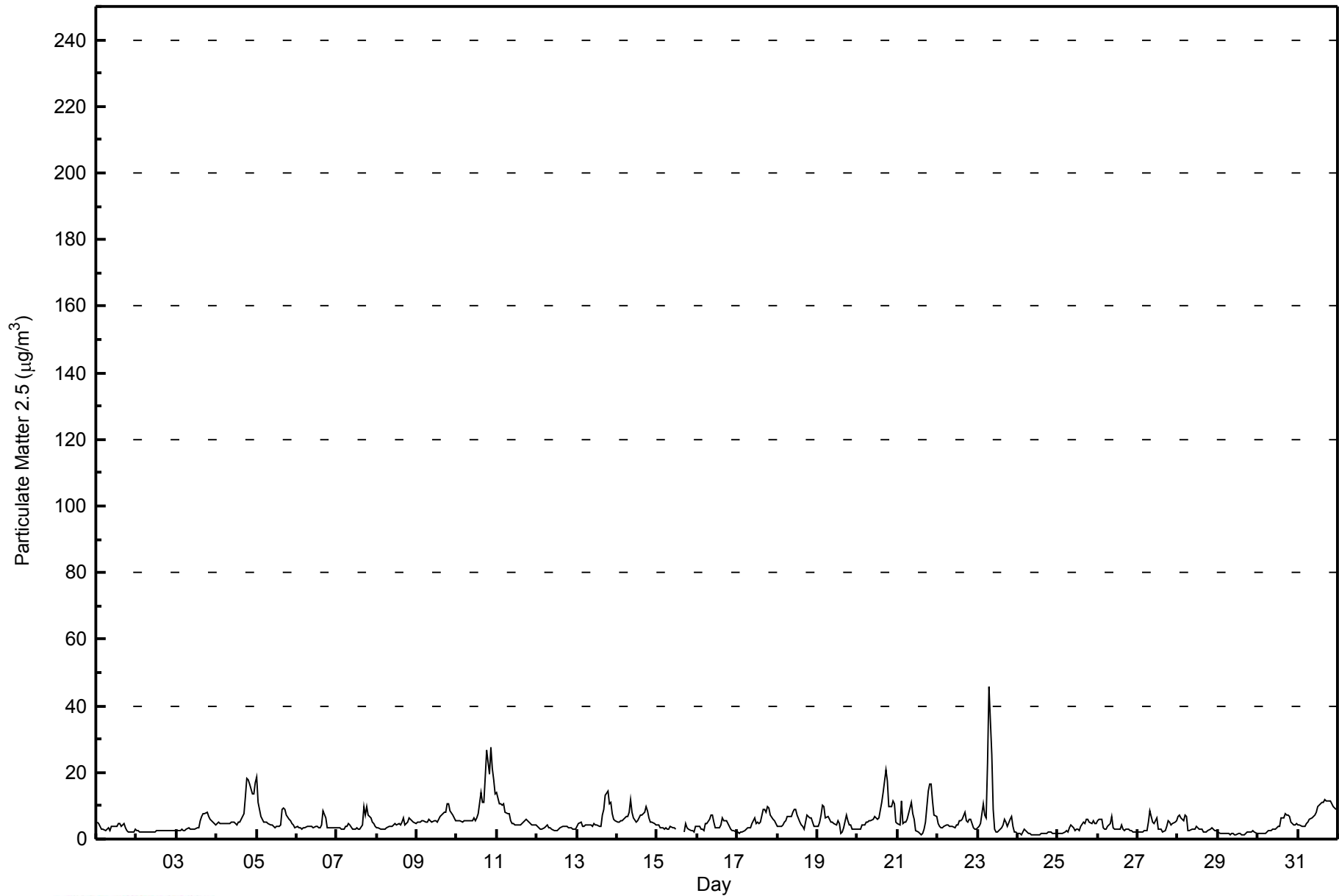


Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 744																																														
Maximum Value: 45.8 µg/m <sup>3</sup> on Oct 23 08:00		Maximum Daily Average: 10.9 µg/m <sup>3</sup> on Oct 10																																														
Minimum Value: 1.1 µg/m <sup>3</sup> on Oct 24 13:00		Hours of Data: 740																																														
Maximum Diurnal Average: 7.6 µg/m <sup>3</sup> at hour 19		Hours of Missing Data: 4																																														
Monthly Average: 5.11 µg/m <sup>3</sup>		Hours of Calibration: 0																																														
Minimum Daily Average: 1.7 µg/m <sup>3</sup> on Oct 29		Percent Operational Time: 99.5																																														
Minimum Diurnal Average: 4.0 µg/m <sup>3</sup> at hour 13																																																
Percentiles: P <sub>1</sub> = 1.4 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 3.0 Median = 4.2 Q <sub>3</sub> = 5.9 P <sub>90</sub> = 8.9 P <sub>99</sub> = 20.2																																																
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-Oct	5.0	4.6	3.7	3.0	2.9	2.7	2.9	3.3	2.7	4.0	3.8	3.7	3.9	4.5	4.8	4.0	4.6	3.4	2.6	2.1	2.0	2.0	2.2	2.8	3.4	5.0																						
2-Oct	2.7	2.4	2.0	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.3	2.5	2.5	2.6	2.7	2.6	2.6	2.5	2.4	2.4	2.4	2.7																						
3-Oct	2.3	2.5	2.5	2.9	2.6	2.7	2.8	3.6	3.0	3.0	3.1	3.1	3.2	3.6	5.4	6.7	7.8	7.8	7.9	7.0	6.1	5.7	5.0	4.4	4.4	7.9																						
4-Oct	4.8	4.9	4.7	4.6	4.8	4.8	4.7	4.8	4.9	5.3	5.2	4.6	4.4	5.1	4.9	5.9	7.7	12.7	18.2	17.9	16.4	13.4	13.6	17.2	8.1	18.2																						
5-Oct	18.8	11.2	6.7	5.8	5.1	5.1	5.1	4.8	4.3	4.0	3.8	3.4	3.6	3.8	4.2	9.0	9.5	8.8	7.3	6.0	5.6	4.7	4.2	3.5	6.2	18.8																						
6-Oct	3.7	3.6	3.3	3.1	3.2	3.6	3.8	3.9	3.9	3.9	3.4	3.9	4.0	3.4	3.6	4.4	8.6	6.4	3.4	3.4	3.4	3.4	3.3	3.5	3.9	8.6																						
7-Oct	3.4	3.4	3.3	3.0	3.0	3.6	3.6	4.6	4.0	2.9	2.9	2.8	3.6	3.1	3.2	4.4	9.7	7.4	9.9	7.4	6.5	5.1	4.5	3.8	4.5	9.9																						
8-Oct	3.2	3.3	3.1	3.0	3.1	3.0	3.4	3.7	3.8	3.6	4.4	4.9	4.1	4.5	4.3	5.0	6.2	4.4	5.2	6.2	5.9	5.5	5.2	4.8	4.3	6.2																						
9-Oct	4.9	5.1	5.2	5.5	5.6	5.3	5.3	5.9	5.6	5.0	5.6	5.4	5.1	6.0	6.7	7.3	8.0	8.2	10.4	10.6	8.5	7.0	6.2	5.6	6.4	10.6																						
10-Oct	5.6	5.4	5.3	5.1	5.4	5.6	5.7	5.7	5.3	5.4	6.3	5.7	6.4	7.8	13.8	11.0	11.1	18.5	26.7	19.7	27.7	21.3	17.8	13.6	10.9	27.7																						
11-Oct	13.8	10.6	10.5	10.4	10.6	8.0	7.7	7.8	5.3	4.5	4.5	4.4	4.1	4.1	4.4	4.7	4.9	6.0	5.5	4.9	4.6	4.2	4.1	4.2	6.4	13.8																						
12-Oct	3.6	3.2	3.1	3.1	3.6	3.8	4.1	3.6	3.2	3.0	2.6	2.5	2.4	2.8	3.5	3.7	3.8	3.6	4.0	3.6	3.4	3.2	3.1	2.9	3.3	4.1																						
13-Oct	4.0	4.6	5.0	3.8	4.0	4.2	4.3	4.3	4.1	4.0	4.6	4.2	4.2	4.0	3.8	7.3	8.9	13.1	14.3	10.6	11.2	7.5	6.1	5.6	6.1	14.3																						
14-Oct	5.1	5.2	5.4	5.6	5.7	6.7	6.7	8.1	11.7	8.2	6.4	5.2	5.4	6.3	7.3	7.2	8.2	9.6	8.3	6.2	5.3	4.9	4.5	4.4	6.6	11.7																						
15-Oct	4.4	4.1	3.5	3.2	3.1	3.3	2.8	2.9	3.7	3.3	3.2	3.0	M	M	M	M	1.9	4.6	3.3	2.8	2.5	2.7	2.3	4.0	3.2	4.6																						
16-Oct	4.0	3.6	3.0	3.1	2.4	4.5	4.8	5.8	7.3	7.1	5.2	3.4	3.3	3.6	4.1	6.4	5.3	5.7	4.5	3.6	3.1	2.4	2.4	2.1	4.2	7.3																						
17-Oct	2.0	1.9	1.9	1.9	2.4	2.9	3.2	3.5	3.6	4.5	6.2	4.8	5.0	4.7	5.2	8.8	8.9	8.0	9.6	9.1	7.1	5.9	5.5	4.7	5.0	9.6																						
18-Oct	4.0	3.8	3.6	4.1	5.1	5.3	6.6	6.7	6.8	8.2	8.7	8.8	7.2	4.9	4.2	4.0	3.2	4.9	7.1	6.3	6.5	5.3	3.9	3.9	5.6	8.8																						
19-Oct	3.8	5.1	7.1	10.0	9.8	6.5	6.8	5.9	5.0	5.2	4.8	4.3	5.4	4.6	1.5	2.3	3.5	7.2	5.6	4.2	4.2	3.1	2.9	2.9	5.1	10.0																						
20-Oct	3.1	3.0	3.1	4.1	4.3	5.0	4.9	5.3	5.4	5.8	6.9	6.5	6.0	6.4	11.2	14.0	17.5	20.7	17.6	9.9	9.9	11.3	10.7	5.2	8.2	20.7																						
21-Oct	4.6	4.1	11.5	4.7	5.0	5.3	6.0	9.4	10.9	7.6	6.1	2.5	2.1	1.6	1.3	1.5	3.2	5.2	14.4	16.6	16.6	11.4	7.3	6.7	6.9	16.6																						
22-Oct	4.5	3.9	3.5	3.4	4.0	4.4	4.1	4.0	4.0	3.6	3.6	4.4	4.3	5.7	5.5	5.8	8.1	5.6	5.2	6.1	5.7	3.2	2.8	2.8	4.5	8.1																						
23-Oct	3.5	3.8	4.8	10.4	7.1	6.4	22.8	45.8	25.3	9.0	2.8	2.1	2.3	2.6	3.5	4.2	6.0	4.9	3.9	6.0	6.6	3.7	2.1	2.1	8.0	45.8																						
24-Oct	1.7	1.6	1.4	2.1	3.1	2.3	1.6	1.5	1.3	1.4	1.2	1.3	1.1	1.2	1.5	1.9	1.8	1.8	2.0	1.9	1.9	1.8	1.7	1.6	1.7	3.1																						
25-Oct	1.6	1.6	1.7	1.8	1.9	2.5	2.3	3.2	4.4	3.5	2.7	2.9	3.1	2.6	3.7	5.2	4.8	6.0	6.0	5.2	4.5	5.5	4.8	4.6	3.6	6.0																						
26-Oct	5.6	5.9	5.7	3.2	2.9	3.0	3.8	4.6	6.6	3.3	3.0	3.0	2.9	2.9	4.3	2.8	2.7	3.0	2.8	2.7	2.5	2.3	2.3	2.2	3.5	6.6																						
27-Oct	2.1	2.1	1.9	2.2	2.4	2.5	5.0	8.4	6.7	5.3	4.7	6.2	3.2	3.0	3.2	2.3	2.4	3.8	5.3	5.0	4.4	4.9	5.2	5.4	4.1	8.4																						
28-Oct	6.7	7.4	6.3	5.4	7.1	6.8	2.4	2.6	3.2	2.8	3.1	3.9	3.4	2.9	2.9	1.9	2.2	2.1	2.6	3.1	3.2	2.8	2.7	2.4	3.7	7.4																						
29-Oct	1.9	1.6	1.5	1.5	1.5	1.6	1.7	1.4	1.7	1.5	1.5	1.5	1.6	1.6	1.4	1.4	1.4	2.2	2.0	2.0	2.0	2.6	1.9	1.6	1.7	2.6																						
30-Oct	1.8	1.8	1.7	1.7	1.8	2.1	2.4	2.4	2.7	2.9	2.9	3.2	3.8	3.9	6.2	6.6	7.6	7.2	7.1	6.7	5.0	4.2	4.4	4.5	3.9	7.6																						
31-Oct	4.4	4.2	4.0	3.7	3.8	4.5	5.1	5.7	6.5	6.9	7.3	8.3	9.9	10.7	11.0	11.2	11.8	11.4	11.5	11.5	10.8	9.8	9.5	9.0	8.0	11.8																						
																								4.5	4.2	4.2	4.1	4.2	4.2	4.8	6.0	5.5	4.5	4.3	4.1	4.0	4.1	4.8	5.4	6.3	7.0	7.6	6.8	6.6	5.6	5.0	4.7	Diurnal Average
																								18.8	11.2	11.5	10.4	10.6	8.0	22.8	45.8	25.3	9.0	8.7	8.8	9.9	10.7	13.8	14.0	17.5	20.7	26.7	19.7	27.7	21.3	17.8	17.2	Diurnal Maximum
M - Maintenance																																																
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																																																



**WBEA**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Athabasca Valley - October 2014**





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Athabasca Valley - October 2014**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	526	71.08	71.08
6 - 15	195	26.35	97.43
16 - 25	16	2.16	99.59
26 - 80	3	0.41	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 740

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Athabasca Valley - October 2014**

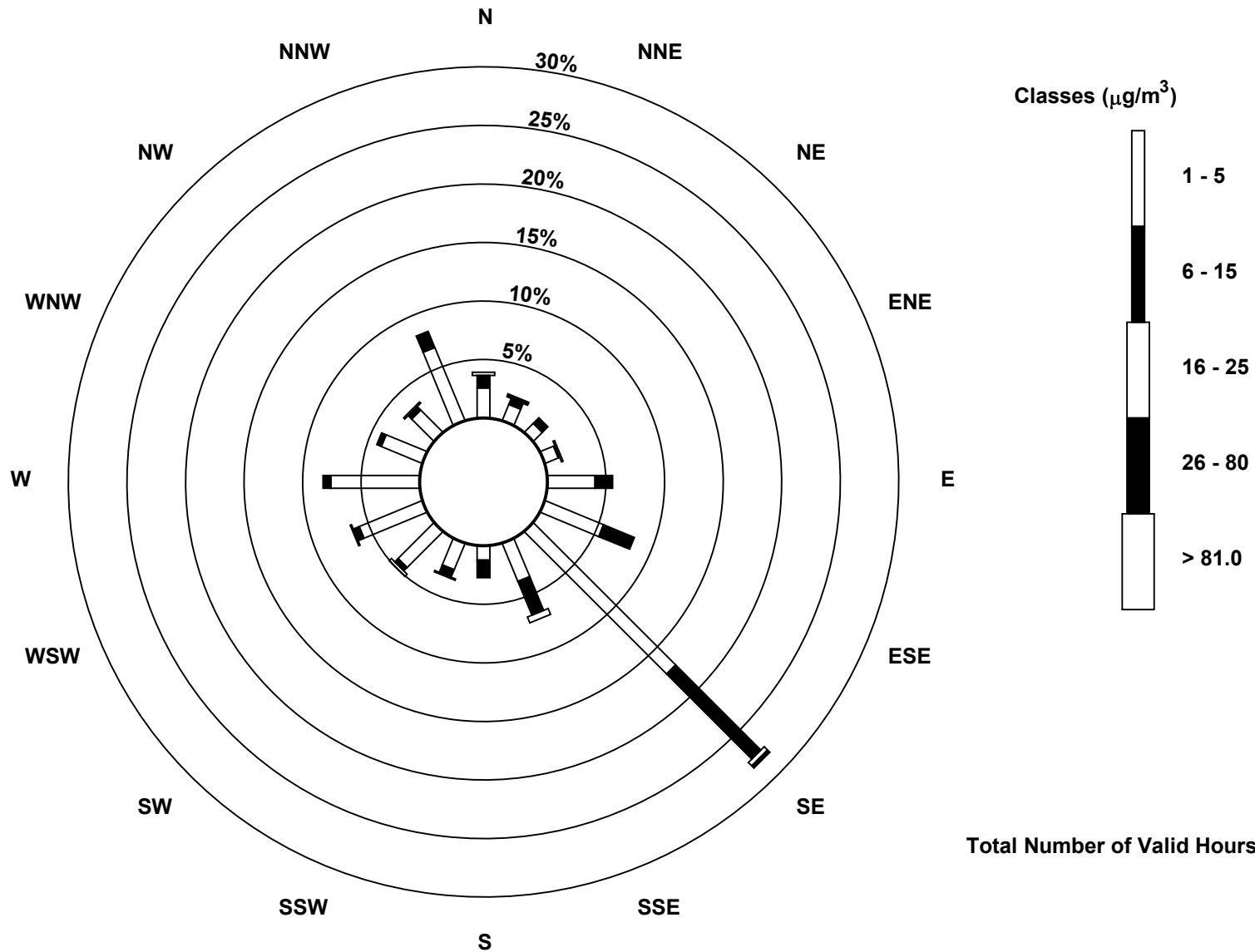
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	19	11	8	9	30	40	127	26	9	18	32	43	56	28	20	50	526
6 - 15	8	4	5	1	11	21	76	23	11	5	3	4	5	3	3	11	194
16 - 25	2	1	0	1	0	0	3	4	0	1	2	1	0	0	1	0	16
26 - 80	0	1	0	0	0	0	2	0	0	0	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>	29	17	13	11	41	61	208	53	20	24	37	48	61	31	24	61	739

Total Number of Valid Hours: 739

Total Number of Hours: 744

Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
 Athabasca Valley (AMS 7)



Total Number of Valid Hours: 739



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 0.6 ppm on Oct 23 09:00	Maximum Daily Average: 0.1 ppm on Oct 10		Hours of Data:	705
Minimum Value: 0.0 ppm on Oct 2 23:00	Minimum Daily Average: 0.0 ppm on Oct 5		Hours of Missing Data:	39
Maximum Diurnal Average: 0.1 ppm at hour 9	Minimum Diurnal Average: 0.0 ppm at hour 24		Hours of Calibration:	39
Monthly Average: 0.06 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> = 0.1 P <sub>90</sub> = 0.1 P <sub>99</sub> = 0.3		Percent Operational Time:	100.0

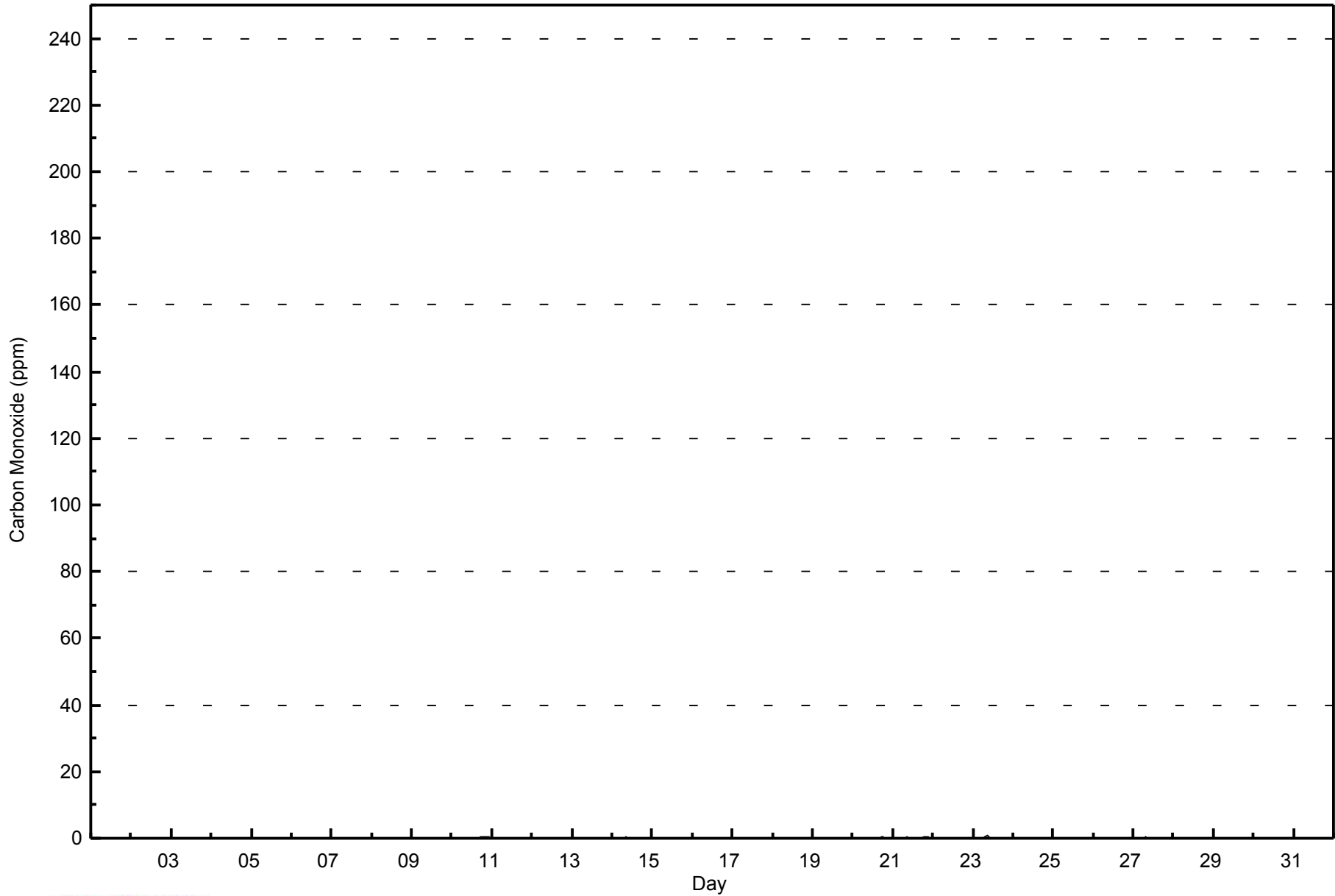
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	0.1	0.1	0.0	0.1	0.0	Z	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1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

Z - zerospan C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 13 ppm



**WBEA**  
**Hourly Averages**

**Carbon Monoxide (CO) - ppm**  
**Athabasca Valley - October 2014**





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

**Carbon Monoxide (CO) - ppm**  
**Athabasca Valley - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	699	99.15	99.15
0.4 - 0.5	5	0.71	99.86
0.6 - 0.7	1	0.14	100.00
0.8 - 1.4	0	0.00	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Carbon Monoxide (CO) - ppm**  
**Athabasca Valley - October 2014**

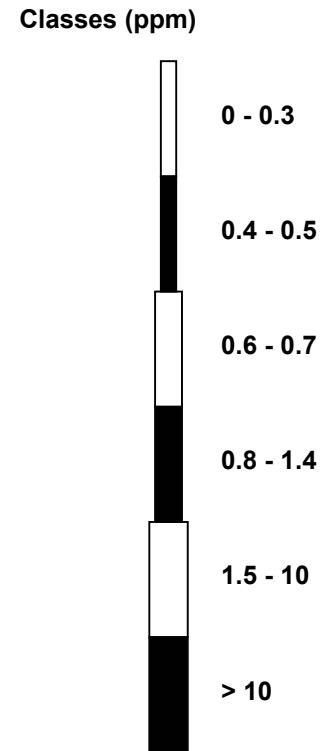
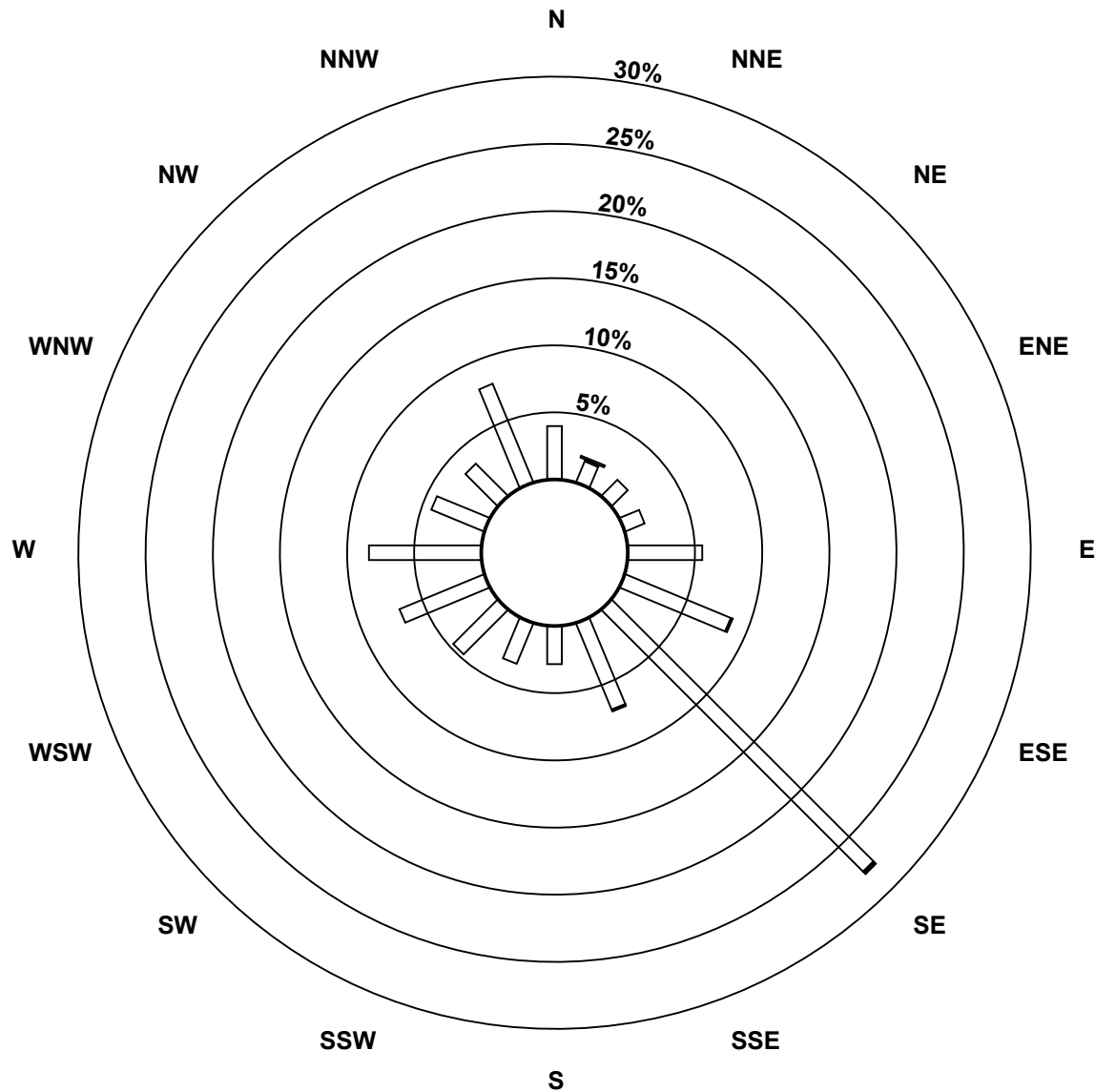
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	28	12	12	11	39	60	194	49	20	23	33	48	59	30	24	56	698
0.4 - 0.5	0	1	0	0	0	1	2	1	0	0	0	0	0	0	0	0	5
0.6 - 0.7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0.8 - 1.4	0	0	0	0	0	0	0	0	0	0	0	0	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>	28	14	12	11	39	61	196	50	20	23	33	48	59	30	24	56	704

Total Number of Valid Hours: 704

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Carbon Monoxide (CO) - ppm  
Athabasca Valley (AMS 7)**

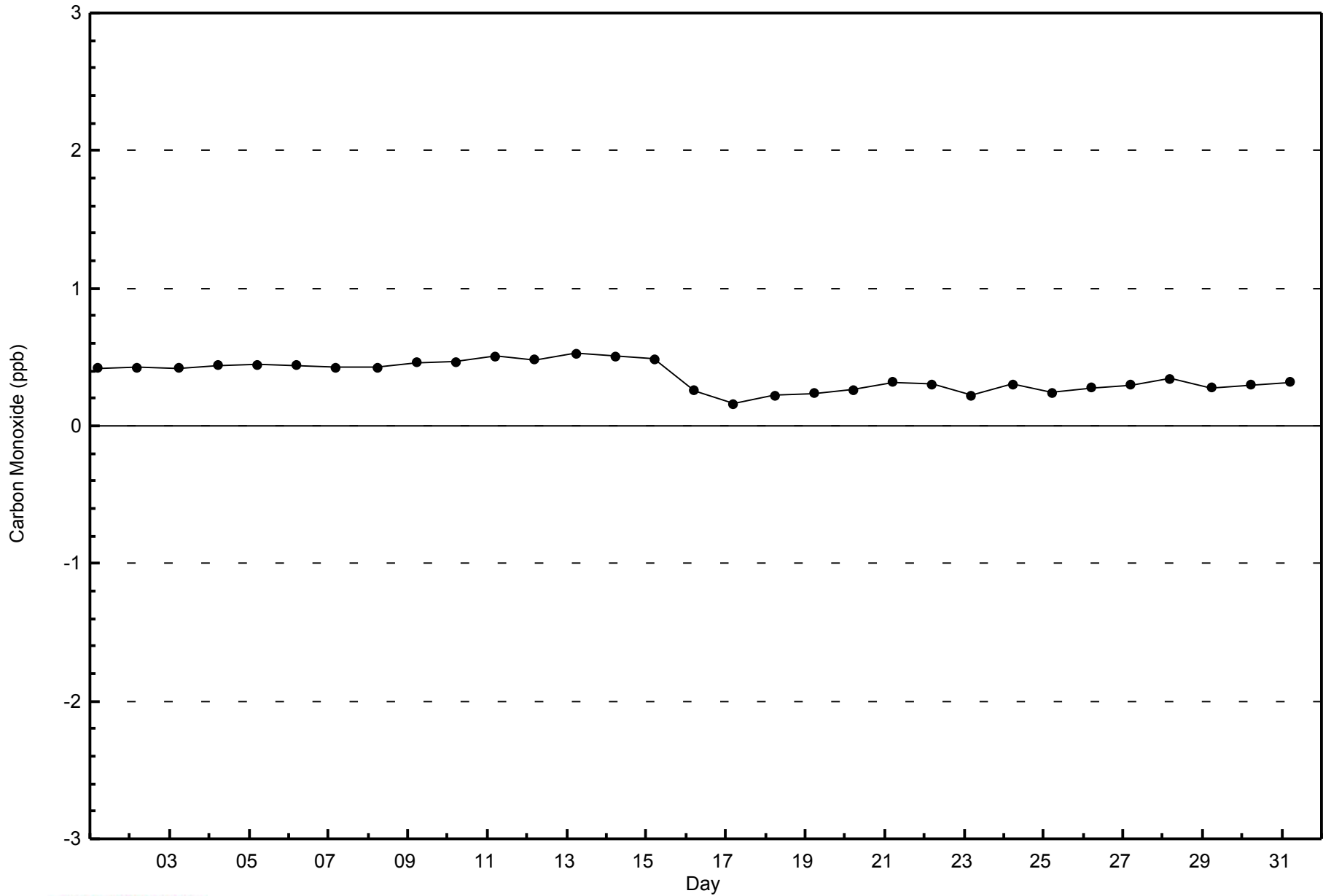


**Total Number of Valid Hours: 704**



WBEA  
Zero Responses

Carbon Monoxide (CO) - ppb  
Athabasca Valley - October 2014

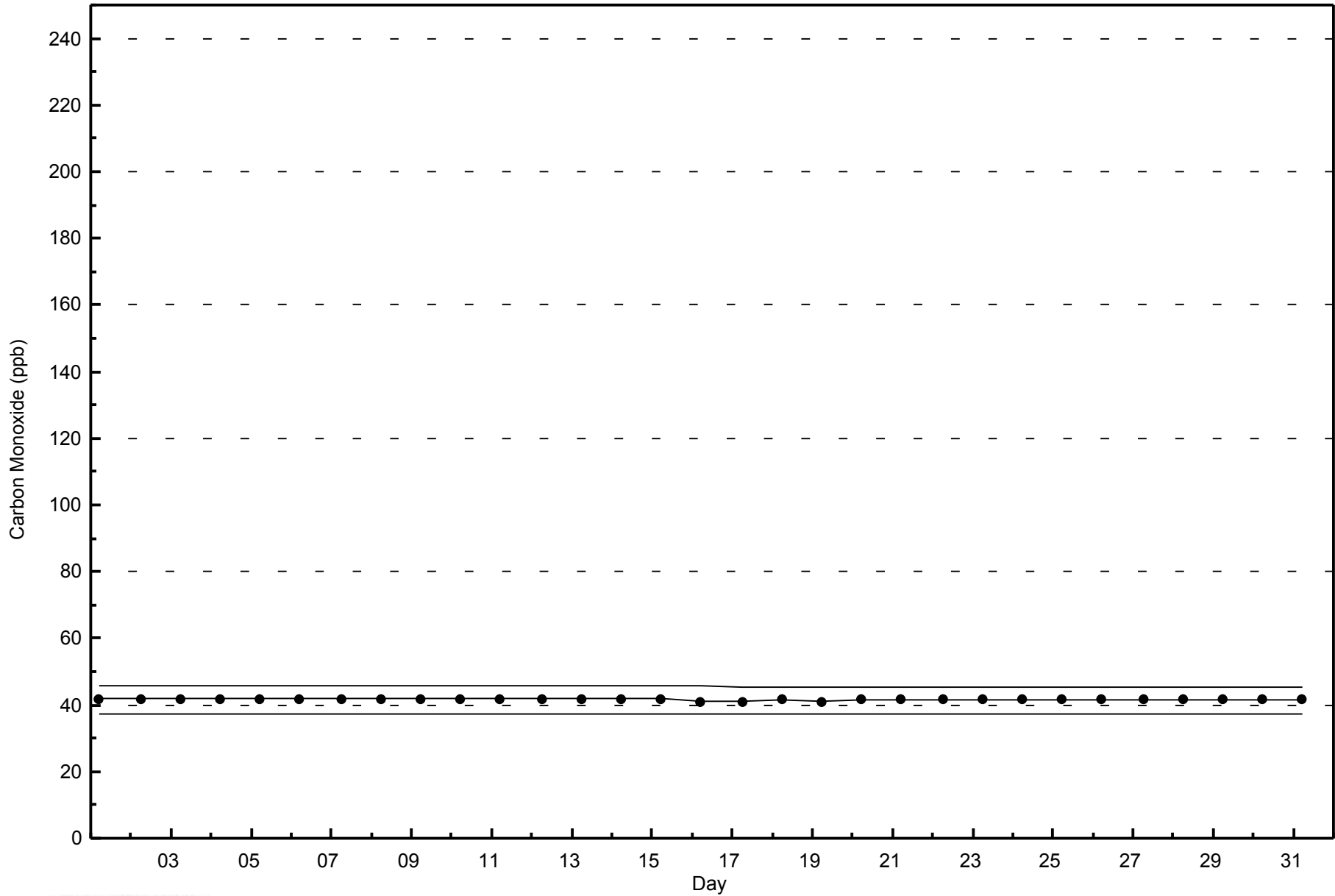






**WBEA**  
**Span Responses**

**Carbon Monoxide (CO) - ppb**  
**Athabasca Valley - October 2014**





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

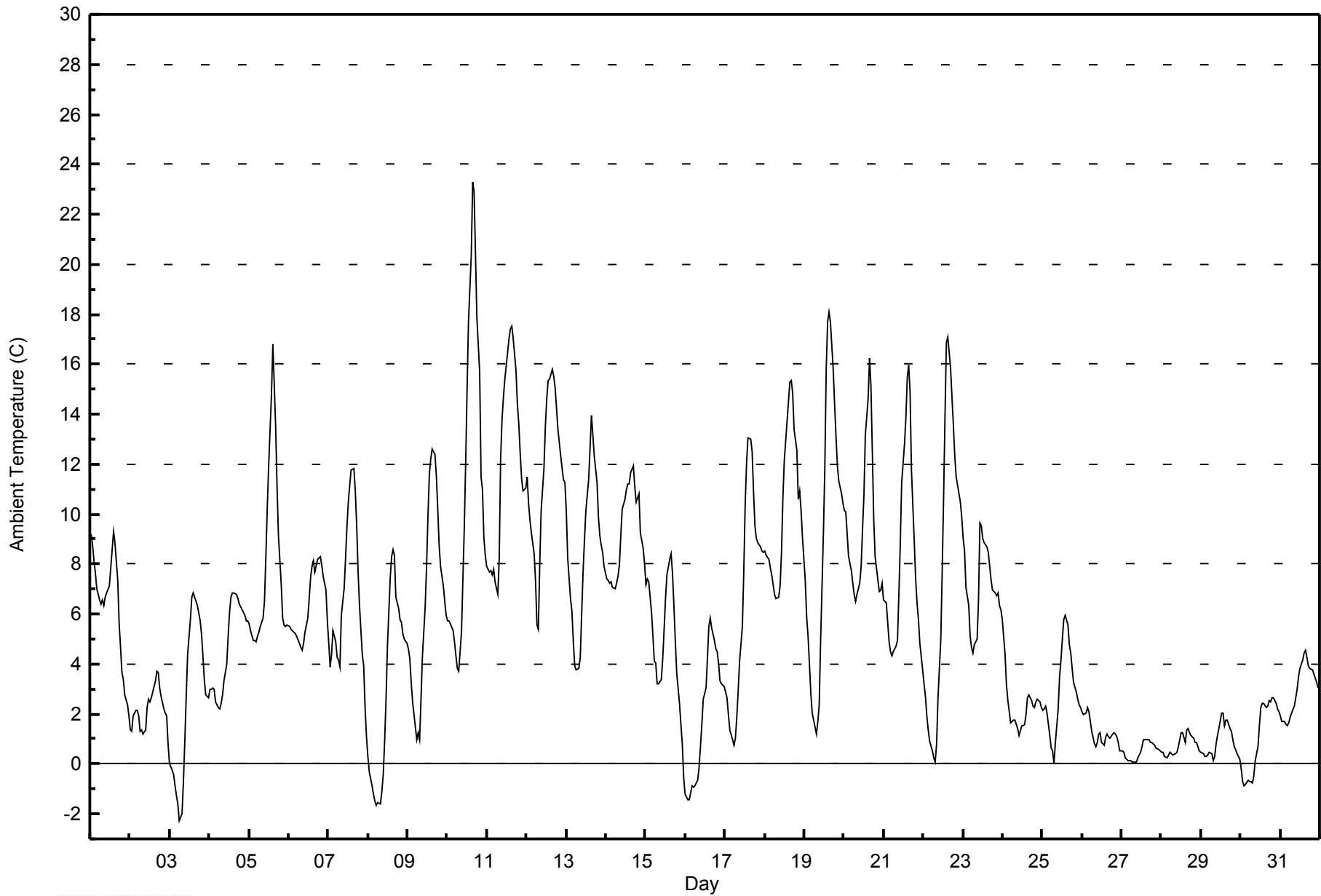
**Ambient Temperature (AT) - C**  
**Athabasca Valley - October 2014**

Maximum Value: 23.3 C on Oct 10 16:00		Maximum Daily Average: 12.2 C on Oct 11		Hours in Service: 744																																												
Minimum Value: -2.3 C on Oct 3 07:00		Minimum Daily Average: 0.5 C on Oct 27		Hours of Data: 744																																												
Maximum Diurnal Average: 9.8 C at hour 16		Minimum Diurnal Average: 2.7 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 5.70 C		Percentiles: P <sub>1</sub> = -1.4 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 1.9 Median = 5.1 Q <sub>3</sub> = 8.4 P <sub>90</sub> = 12.3 P <sub>99</sub> = 17.5		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-Oct	9.2	8.7	8.1	7.6	7.0	6.6	6.4	6.6	6.3	6.7	6.9	7.1	7.9	8.6	9.3	8.8	7.3	5.6	4.7	3.6	3.4	2.8	2.4	1.9	6.4	9.3																						
2-Oct	1.4	1.3	1.9	2.1	2.1	1.9	1.3	1.4	1.2	1.3	2.3	2.6	2.5	2.6	3.1	3.3	3.7	3.7	3.0	2.7	2.2	2.1	1.9	0.8	2.2	3.7																						
3-Oct	0.0	-0.2	-0.4	-0.9	-1.3	-1.6	-2.3	-2.0	-0.7	0.9	2.7	4.4	5.8	6.7	6.8	6.7	6.5	6.4	5.8	5.2	4.3	3.3	2.7	2.6	2.6	6.8																						
4-Oct	3.0	3.0	3.0	3.0	2.5	2.2	2.2	2.4	2.7	3.3	4.0	5.1	6.1	6.6	6.8	6.8	6.8	6.6	6.4	6.3	6.2	6.0	5.7	5.7	4.7	6.8																						
5-Oct	5.6	5.3	5.0	4.9	4.9	5.1	5.3	5.5	5.8	6.5	8.3	10.3	12.0	14.8	16.8	15.2	13.5	11.1	9.2	7.2	5.8	5.6	5.5	5.6	8.1	16.8																						
6-Oct	5.5	5.4	5.4	5.3	5.2	5.1	4.8	4.7	4.6	4.9	5.3	5.8	6.6	7.4	7.9	8.1	7.7	8.2	8.3	8.3	8.0	7.5	7.0	5.7	6.4	8.3																						
7-Oct	4.8	3.9	4.4	5.3	4.9	4.3	4.2	3.9	6.0	7.0	8.2	9.5	10.5	11.2	11.8	11.8	10.9	9.5	7.7	6.4	4.4	3.9	2.2	1.1	6.6	11.8																						
8-Oct	0.3	-0.3	-0.9	-1.2	-1.5	-1.6	-1.6	-1.6	-1.1	-0.4	0.9	2.6	4.7	7.4	8.3	8.6	8.4	6.7	6.2	5.8	5.7	5.2	5.0	4.8	2.9	8.6																						
9-Oct	4.6	4.2	3.2	2.5	2.0	1.0	1.2	1.0	2.5	4.3	6.3	7.9	9.9	11.6	12.2	12.6	12.4	11.6	10.2	8.7	7.9	7.1	6.5	5.9	6.6	12.6																						
10-Oct	5.7	5.7	5.6	5.4	4.9	4.3	3.8	3.7	5.3	7.4	9.4	12.1	15.0	17.7	20.4	23.3	22.9	20.4	17.9	15.7	11.5	11.0	9.1	8.4	11.1	23.3																						
11-Oct	7.9	7.7	7.7	7.6	7.8	7.3	6.8	8.3	12.2	13.8	14.7	15.4	16.4	17.0	17.4	17.5	17.0	15.8	14.4	13.6	12.4	11.4	10.9	11.1	12.2	17.5																						
12-Oct	11.5	10.4	9.8	9.2	8.4	7.3	5.6	5.4	8.0	10.1	11.8	13.5	14.6	15.3	15.4	15.8	15.5	15.0	14.2	13.4	12.3	11.8	11.4	11.2	11.5	15.8																						
13-Oct	10.1	8.2	6.6	6.1	4.9	3.9	3.8	3.8	4.3	6.0	7.7	9.0	10.1	11.4	12.7	13.9	13.2	12.3	11.2	9.9	9.1	8.8	8.5	7.9	8.5	13.9																						
14-Oct	7.4	7.3	7.3	7.3	7.1	7.0	7.2	7.5	8.0	9.1	10.2	10.6	11.0	11.2	11.2	11.7	11.9	11.1	10.5	10.7	10.8	9.2	8.6	8.0	9.2	11.9																						
15-Oct	7.2	7.4	7.3	6.1	5.1	4.1	4.1	3.2	3.2	3.4	4.2	5.4	6.6	7.6	8.2	8.4	7.6	6.3	4.9	3.7	2.4	1.6	0.8	-0.5	4.9	8.4																						
16-Oct	-1.2	-1.4	-1.4	-1.1	-0.9	-0.9	-0.9	-0.6	-0.1	0.7	1.6	2.6	3.0	4.2	5.5	5.8	5.4	4.9	4.6	4.5	4.0	3.3	3.2	3.1	2.0	5.8																						
17-Oct	2.9	2.6	2.0	1.3	1.0	0.8	1.0	1.9	2.9	4.1	5.5	7.7	10.4	12.0	13.1	13.0	12.5	10.9	9.5	9.0	8.8	8.7	8.5	8.5	6.6	13.1																						
18-Oct	8.5	8.3	8.2	7.8	7.6	7.2	6.8	6.6	6.7	7.1	8.5	10.6	12.2	13.7	14.5	15.3	15.4	14.8	13.4	12.5	10.6	10.9	10.1	9.1	10.3	15.4																						
19-Oct	7.3	5.9	5.1	4.0	2.8	2.1	1.5	1.2	1.7	2.4	4.9	9.3	11.8	15.8	17.7	18.1	17.7	15.8	14.4	13.1	11.9	11.3	10.8	10.4	9.0	18.1																						
20-Oct	10.2	10.1	9.2	8.3	7.7	7.3	6.8	6.5	6.8	7.2	7.9	9.4	10.8	13.2	14.6	16.2	15.1	12.5	9.8	8.3	7.3	6.9	6.9	7.2	9.4	16.2																						
21-Oct	6.6	6.4	5.7	4.9	4.5	4.3	4.5	4.7	4.9	6.8	8.8	11.2	12.8	13.8	15.4	16.0	14.9	11.8	8.9	7.4	6.5	5.8	4.9	3.7	8.1	16.0																						
22-Oct	3.2	2.7	1.9	1.4	0.9	0.5	0.2	0.1	0.8	2.7	5.0	7.7	10.7	13.9	16.9	17.1	15.8	14.7	13.6	12.4	11.5	10.8	10.5	9.8	7.7	17.1																						
23-Oct	9.0	8.5	7.1	6.3	5.1	4.7	4.4	4.8	5.0	6.6	9.6	9.5	9.1	8.9	8.7	8.5	7.9	7.3	6.9	6.8	6.7	6.8	6.4	6.2	7.1	9.6																						
24-Oct	5.8	4.4	3.1	2.5	2.1	1.7	1.7	1.8	1.6	1.4	1.1	1.5	1.5	1.6	2.0	2.6	2.7	2.5	2.3	2.3	2.5	2.6	2.5	2.2	2.3	5.8																						
25-Oct	2.2	2.2	2.3	2.0	1.1	0.6	0.5	0.0	0.8	2.2	3.5	4.1	5.0	5.8	6.0	5.5	4.8	4.4	3.8	3.3	2.9	2.6	2.4	2.3	2.9	6.0																						
26-Oct	2.1	2.0	2.0	2.3	2.1	1.7	1.3	0.8	0.7	0.9	1.2	1.3	0.9	0.8	1.1	1.2	1.1	1.0	1.2	1.3	1.2	1.1	0.9	0.5	1.3	2.3																						
27-Oct	0.5	0.5	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.5	0.7	0.9	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.6	0.6	0.5	0.5	1.0																						
28-Oct	0.5	0.5	0.3	0.2	0.3	0.5	0.4	0.4	0.4	0.5	0.7	1.0	1.3	1.2	0.9	1.4	1.4	1.2	1.1	1.0	0.9	0.8	0.7	0.5	0.8	1.4																						
29-Oct	0.5	0.4	0.3	0.3	0.4	0.4	0.4	0.1	0.3	0.8	1.1	1.4	2.0	2.0	1.5	1.7	1.7	1.4	1.3	1.0	0.7	0.6	0.4	0.2	0.9	2.0																						
30-Oct	-0.2	-0.7	-0.9	-0.8	-0.7	-0.7	-0.7	-0.8	-0.5	0.1	0.7	1.5	2.2	2.4	2.4	2.2	2.3	2.5	2.5	2.7	2.7	2.4	2.2	2.1	1.0	2.7																						
31-Oct	1.9	1.7	1.7	1.6	1.5	1.6	1.8	2.0	2.3	2.6	3.0	3.5	3.8	4.2	4.4	4.6	4.3	4.0	3.8	3.7	3.6	3.4	3.3	3.0	3.0	4.6																						
																								4.6	4.3	3.9	3.6	3.2	2.9	2.7	2.7	3.3	4.2	5.4	6.6	7.7	8.8	9.5	9.8	9.3	8.4	7.5	6.8	6.1	5.7	5.2	4.8	Diurnal Average
																								11.5	10.4	9.8	9.2	8.4	7.3	7.2	8.3	12.2	13.8	14.7	15.4	16.4	17.7	20.4	23.3	22.9	20.4	17.9	15.7	12.4	11.8	11.4	11.2	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Athabasca Valley - October 2014**





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

**Ambient Temperature (AT) - C**  
**Athabasca Valley - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	37	4.97	4.97
0 - 10	570	76.61	81.59
10 - 20	133	17.88	99.46
> 20	4	0.54	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

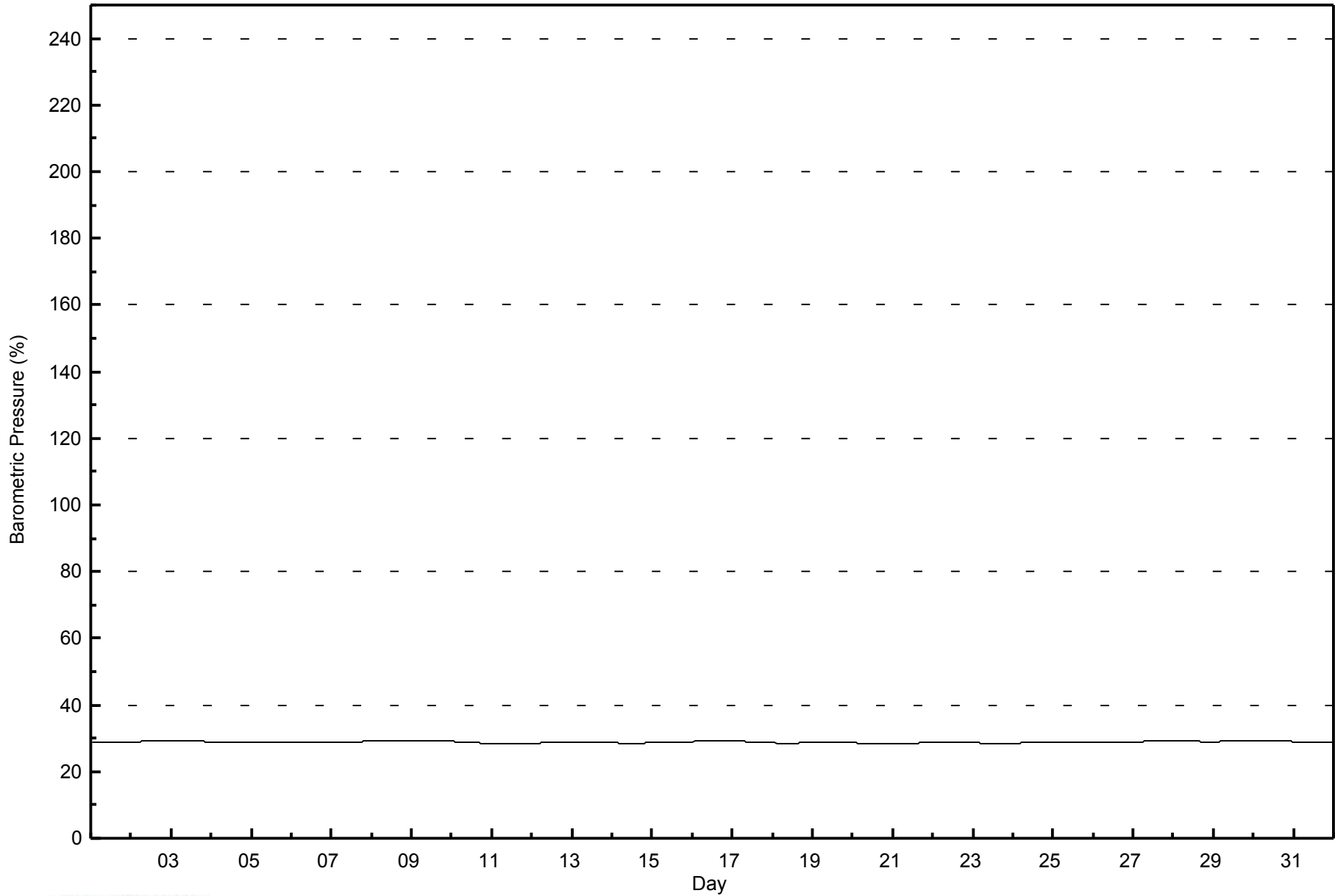


Maximum Value: 29.4 % on Oct 30 03:00																				Maximum Daily Average: 29.3 % on Oct 30					Hours in Service: 744																											
Minimum Value: 28.4 % on Oct 23 21:00																				Minimum Daily Average: 28.5 % on Oct 11					Hours of Data: 744																											
Maximum Diurnal Average: 28.9 % at hour 9																				Minimum Diurnal Average: 28.8 % at hour 16					Hours of Missing Data: 0																											
Monthly Average: 28.86 %																				Percentiles: P <sub>1</sub> = 28.4 P <sub>10</sub> = 28.5 Q <sub>1</sub> = 28.7 Median = 28.8 Q <sub>3</sub> = 29.0 P <sub>90</sub> = 29.2 P <sub>99</sub> = 29.3					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-Oct	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.8	28.8																									
2-Oct	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	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.1	29.3																							
3-Oct	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.0	29.0	29.0	28.9	28.9	28.9	29.2	29.3																							
4-Oct	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9																							
5-Oct	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.9	28.9																						
6-Oct	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.7	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.8																							
7-Oct	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	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	28.9	29.1																							
8-Oct	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2																							
9-Oct	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2																							
10-Oct	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.8	29.0																							
11-Oct	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5																							
12-Oct	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.8																							
13-Oct	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8																							
14-Oct	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7																							
15-Oct	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	29.0																							
16-Oct	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2																							
17-Oct	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.9	29.1																							
18-Oct	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.7																							
19-Oct	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.9																							
20-Oct	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6																							
21-Oct	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.7																							
22-Oct	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.7	28.8																							
23-Oct	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.5	28.6																							
24-Oct	28.4	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.7	28.9																							
25-Oct	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	29.0																							
26-Oct	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.9																							
27-Oct	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1																							
28-Oct	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.2																							
29-Oct	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	29.2	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																							
30-Oct	29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.0	29.0	29.3	29.4	29.4																							
31-Oct	29.0	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	29.0																							
																								28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	Diurnal Average	
																								29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Barometric Pressure (BP) - %**  
**Athabasca Valley - October 2014**



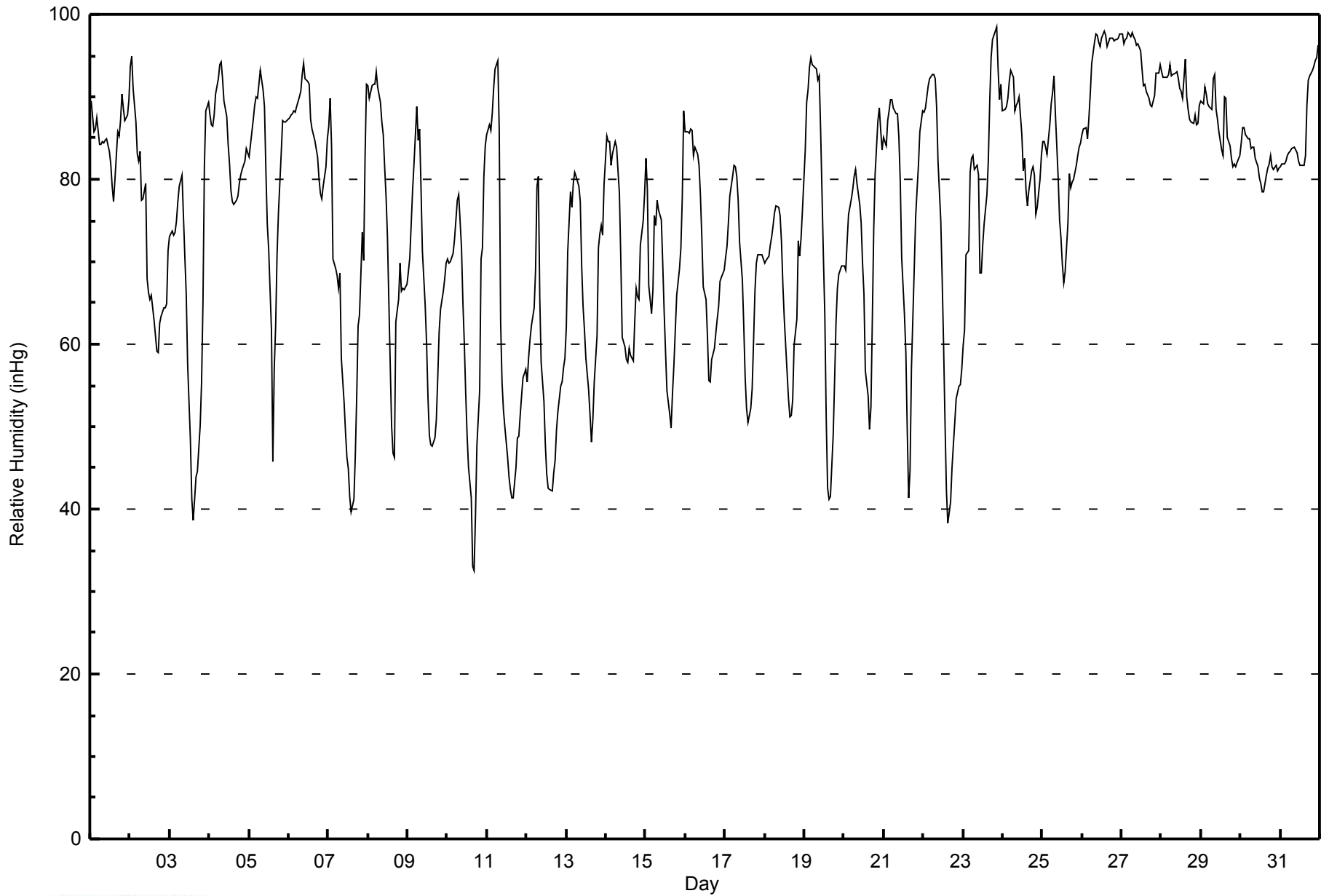


Maximum Value: 99 inHg on Oct 23 21:00																			Maximum Daily Average: 94.3 inHg on Oct 26						Hours in Service: 744																				
Minimum Value: 33 inHg on Oct 10 17:00																			Minimum Daily Average: 55.9 inHg on Oct 12						Hours of Data: 744																				
Maximum Diurnal Average: 85.7 inHg at hour 7																			Minimum Diurnal Average: 61.4 inHg at hour 16						Hours of Missing Data: 0																				
Monthly Average: 75.7 inHg																			Percentiles: P <sub>1</sub> = 41 P <sub>10</sub> = 52 Q <sub>1</sub> = 66 Median = 80 Q <sub>3</sub> = 88 P <sub>90</sub> = 92 P <sub>99</sub> = 98						Hours of Calibration: 0																				
																									Percent Operational Time: 100.0																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																					
1-Oct	90	88	86	86	88	84	84	85	84	85	85	83	82	79	77	80	86	85	87	90	89	87	88	90	85.3	90																			
2-Oct	94	95	91	87	83	82	83	77	78	79	68	66	65	66	63	61	59	59	63	63	64	64	65	71	72.9	95																			
3-Oct	73	74	73	74	75	77	79	80	76	71	66	58	48	41	39	41	44	45	50	55	65	81	88	89	65.1	89																			
4-Oct	88	87	86	88	90	92	94	94	92	90	88	84	82	79	77	77	78	80	80	81	82	84	83	83	84.7	94																			
5-Oct	83	84	87	89	90	90	91	93	91	89	81	75	71	62	46	57	62	71	76	83	87	87	87	87	80.0	93																			
6-Oct	87	88	88	88	88	89	90	91	93	94	92	92	91	87	86	85	85	83	80	78	78	79	82	85	86.7	94																			
7-Oct	86	90	84	70	69	68	67	69	58	53	49	46	45	42	40	41	47	54	62	64	74	70	83	92	63.4	92																			
8-Oct	91	90	91	92	92	93	91	89	87	85	82	78	73	57	50	47	46	63	65	70	67	67	67	67	75.0	93																			
9-Oct	69	70	75	79	82	89	85	86	79	71	65	60	54	49	48	48	49	51	56	62	64	66	68	70	66.4	89																			
10-Oct	70	70	70	71	73	75	77	78	72	65	60	54	49	45	41	33	33	39	48	54	70	72	80	84	61.8	84																			
11-Oct	85	87	86	88	91	93	94	86	63	55	52	50	46	44	42	41	41	45	49	49	51	54	56	57	62.8	94																			
12-Oct	55	58	60	62	64	69	79	80	66	58	53	48	44	42	42	42	44	46	50	52	55	55	57	58	55.9	80																			
13-Oct	62	71	78	77	79	81	80	79	77	70	65	62	58	54	51	48	51	55	61	72	73	74	73	79	68.0	81																			
14-Oct	85	85	85	82	83	85	84	81	78	70	61	60	58	58	59	59	58	63	67	66	65	72	75	78	71.5	85																			
15-Oct	83	79	67	64	67	76	74	77	76	75	70	64	59	54	52	50	54	57	62	66	69	72	78	88	68.0	88																			
16-Oct	86	86	86	86	86	83	84	83	82	78	73	67	65	61	56	55	58	60	61	63	65	68	68	69	72.0	86																			
17-Oct	70	72	75	78	80	82	82	80	77	72	68	62	56	52	51	52	55	60	66	70	71	71	71	70	68.5	82																			
18-Oct	70	70	71	72	73	74	76	77	77	76	72	67	63	57	53	51	51	53	60	63	73	71	73	76	67.4	77																			
19-Oct	84	89	91	94	95	94	94	93	92	92	86	70	64	51	43	41	42	49	56	62	67	69	69	70	73.1	95																			
20-Oct	69	69	73	76	78	79	80	81	80	77	75	70	66	57	54	50	52	63	74	81	87	89	86	84	72.8	89																			
21-Oct	85	84	87	88	90	90	89	88	88	85	80	70	64	59	49	41	45	57	69	75	79	82	86	88	75.7	90																			
22-Oct	88	89	90	91	92	93	93	92	89	82	75	68	60	51	42	38	41	45	48	51	53	55	55	57	68.2	93																			
23-Oct	60	62	71	71	81	83	83	81	82	81	69	69	72	75	78	82	89	95	97	98	99	93	90	92	81.2	99																			
24-Oct	88	89	89	90	92	93	92	88	89	89	90	85	81	83	79	77	79	81	82	80	76	77	80	83	84.6	93																			
25-Oct	85	85	84	83	87	89	91	93	88	80	75	73	70	68	69	75	81	79	80	80	82	83	84	84	81.0	93																			
26-Oct	85	86	86	85	87	90	94	97	98	98	97	96	97	98	97	96	97	97	97	97	97	97	97	98	94.3	98																			
27-Oct	98	96	97	97	98	97	98	97	97	96	97	96	93	91	92	91	90	89	89	90	90	93	93	94	94.1	98																			
28-Oct	93	92	92	92	93	94	93	93	93	93	92	91	91	90	95	90	88	87	87	87	88	87	87	89	90.7	95																			
29-Oct	90	89	91	90	89	89	88	92	93	89	87	86	84	83	90	90	85	84	83	82	82	81	82	83	86.7	93																			
30-Oct	84	86	86	85	85	85	84	84	84	82	82	80	80	78	78	81	81	82	83	82	81	82	81	81	82.4	86																			
31-Oct	82	82	82	82	83	83	83	84	84	83	83	82	82	82	82	83	89	92	93	93	94	94	95	96	86.1	96																			
																			81.2	81.9	82.5	82.5	83.9	85.2	85.7	85.5	82.6	79.5	75.3	71.4	68.2	64.3	62.0	61.4	63.2	66.6	70.2	72.8	75.3	76.6	78.3	80.4	Diurnal Average		
																			98	96	97	97	98	97	98	97	98	98	97	96	97	98	97	96	97	97	97	97	98	99	97	97	98	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - inHg**  
**Athabasca Valley - October 2014**







Maximum Speed: 29 km/h on Oct 2 13:00	Maximum Daily Speed Average: 19.3 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 29 03:00	Minimum Daily Speed Average: 1.1 km/h on Oct 4	Hours of Data: 743
Maximum Diurnal Speed Average: 2.8 km/h at hour 24	Minimum Diurnal Speed Average: 0.3 km/h at hour 17	Hours of Missing Data: 1
Monthly Average Velocity: 1.4 km/h 200.3 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 7 Q <sub>3</sub> = 12 P <sub>90</sub> = 15 P <sub>99</sub> = 25	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-Oct	N6	N8	NNW8	NW6	NNE5	NE3	ENE2	E5	E9	ESE7	SE6	SSE6	NNE2	NNE5	N6	NNW15	NNW17	N17	NNW20	N20	NNW25	NNW26	NNW23	NNW19	N8.7	NNW26
2-Oct	NW10	NW10	NNW16	NNW18	NNW21	NNW16	NW22	NNW21	NNW18	NNW19	NW27	NW28	NW29	NNW24	NNW23	NNW29	NNW24	NNW22	W20	W20	W23	W23	WNW7	WSW9	WNW19.3	NW29
3-Oct	WSW9	WSW7	WSW7	SW4	WSW7	SW8	SW6	SSE3	S4	ESE5	E6	E7	E7	SE7	SSE10	SSE10	SE11	SE11	SE13	SE11	SSE6	ESE5	SE8	SE9	SSE4.8	SE13
4-Oct	SE11	SE14	SE12	SE9	SSE3	SW2	SSW0	WSW3	SW4	NW0	SW4	SW5	WNW2	NNE5	N6	N5	NE3	NE4	ENE3	N3	NW3	NW4	WNW1	WSW4	SE1.1	SE14
5-Oct	SW7	WSW7	WSW5	W6	WSW5	SSE4	SSE3	WSW5	WSW12	SW11	SSW9	SSW7	SW12	SW3	NW14	NNW14	N13	NNW13	NNW13	NNW14	NNW11	E5	ESE3	ENE5	WNW3.8	NNW14
6-Oct	ENE1	ENE3	NE2	E2	SE4	SE5	ESE5	E5	E2	SSW2	W3	W6	NW6	NW12	NNW11	N7	NNW10	NNW13	W21	NNW19	W18	W17	WSW16	WSW10	WNW5.1	W21
7-Oct	SSW7	SSE3	WSW5	WSW15	WSW14	SW7	WSW8	SSE2	S1	NNW8	NW11	NNW11	NNE8	NW16	NNW18	NNW12	NNE7	N7	NNW6	N3	ESE5	ESE5	ESE2	ESE2	NW3.7	WNW18
8-Oct	E2	SE3	SE4	ESE5	SE4	E4	SE5	SE6	SE6	SE7	SE5	NE1	NNW4	E5	E7	ESE8	SE8	SW11	SSW3	E4	ESE7	ESE9	ESE8	SE9	SE4.4	SW11
9-Oct	SE8	SE8	SE4	SE2	ESE3	E3	E4	E3	E3	SE7	SSE6	S6	SSE9	M	ESE9	ESE9	SE10	SE9	SE8	ESE7	SE8	SE9	SE7	SE9	SE6.4	SE10
10-Oct	SE12	SE12	SE15	SE14	SE12	SE8	SE9	SE9	SE9	SE9	SE7	SSE8	SSE10	S3	SSE6	S7	SSE10	SE7	SE5	SSE5	SE3	SSE5	SSE2	SSW2	SSE7.7	SE15
11-Oct	S3	SSW3	S3	SSW2	S2	SSE1	ESE2	SW2	WSW12	W20	W26	W21	W23	W24	W25	W23	W21	W11	W10	WSW17	WSW21	WSW25	WSW21	WSW19	W13.1	W26
12-Oct	WSW18	WSW22	WSW22	W18	SW7	SSW5	SE1	SSW2	SW8	SSW7	W12	NNW11	NNW15	W15	W14	W13	W12	W18	W13	W12	WSW9	SW6	SW11	WSW12	W10.9	WSW22
13-Oct	SW7	SW1	S2	SSW6	S3	SSE5	S3	SSW5	SSW5	SSW5	E4	SW4	ESE2	ENE6	ESE4	SSE5	SE5	SE3	ESE2	ESE2	NE2	NE2	E4	ENE3	SSE2.2	SW7
14-Oct	NE3	NNE2	NNE3	N2	NE2	NNE1	N2	NNE2	N2	S1	SSE5	ESE7	SE7	SE7	ESE4	SE4	SE4	SE1	WSW3	WSW7	W17	WSW12	WSW11	W10	SW1.3	W17
15-Oct	W9	NNW8	NNW15	NNW14	NNW12	W6	W11	NNW10	NNW11	NNW16	NNW13	NNW8	NNW10	NW6	N9	N10	NNW13	NNW12	NNW11	NNW13	NNW12	NNW5	WSW3	E2	NW8.6	NNW16
16-Oct	E2	E2	ENE2	SSE1	SE1	SE5	SE5	ESE4	ESE4	ESE3	SSE8	SSE5	ESE6	SE5	S8	SE5	E8	E4	ESE8	SE13	SE12	SE10	SE11	SE12	SE5.6	SE13
17-Oct	SE13	SE10	SE9	SSE9	SE8	SE10	SE12	SE14	SE18	SE14	SE11	SE15	SE19	SE21	SE21	SE22	SE25	SE16	SE12	SE11	SE13	SE14	SE13	SE12	SE14.2	SE25
18-Oct	SE12	SE13	SE12	SE11	SE10	SE11	SE10	SE6	SE8	SE7	SE4	E4	E5	SW6	SW6	SW6	WSW6	W3	W6	W7	W5	WSW8	W4	SW6	SSE4.3	SE13
19-Oct	SW6	SSW5	SSE2	SSE2	ESE3	SE3	ESE3	SE4	SE7	ESE6	E5	SE5	ESE1	SE7	ESE12	SE12	SE12	SE8	SE11	SE13	SE12	SE13	SE14	SE14	SE7.1	SE14
20-Oct	SE9	SE11	SSE12	SE10	SE12	SE11	SE14	SSE10	SSE10	SSE10	SSE10	SSE3	NW1	SE5	SSE5	S4	SE5	SSW1	SW0	SW2	WNW2	SW1	SSE3	S2	SSE5.9	SE14
21-Oct	SSE5	SSE6	S4	SSE6	SE7	SE9	SE9	SE7	SE4	SSE3	S2	SSW4	SW7	SW10	WSW10	W10	WSW4	SW4	SSE0	SE1	SSE1	SSE4	SE3	SSE3	S3.5	W10
22-Oct	SE4	SSE6	SSE5	SSE5	SSE6	SE4	SE6	SE8	SE5	SE6	SE8	ESE6	ESE5	SE5	SE7	SE9	SE9	SE10	SSE11	SSE8	SE8	SE10	SE12	SE9	SE7.1	SE12
23-Oct	ESE4	SE5	S1	E2	ESE1	NNE3	N2	N2	NNE2	ESE3	ESE11	ESE13	ESE13	SE13	ESE10	ESE8	SE3	N4	N5	NNW2	NW1	W12	W13	W11	ESE2.0	ESE13
24-Oct	WNW20	W24	W24	W14	WSW10	W12	W13	W18	NNW15	NNW13	W13	W15	W17	W15	W20	W15	WSW13	WSW12	W16	W14	W14	W15	W14	WSW13	W15.2	W24
25-Oct	WSW14	WSW15	WSW9	WNW6	WSW8	SW9	SW10	SSW3	SE3	SSW5	SSW3	SW6	W2	WNW2	E6	E5	E5	ESE5	E5	ESE5	ESE5	ESE5	SE5	SE5	SSW2.6	WSW15
26-Oct	ESE3	E3	E0	NE4	NE3	N3	N5	N7	N8	N8	N7	N8	NNW12	NNW11	NNW14	NNW15	NNW14	NNW13	NNW13	NNW13	NNW14	NNW13	NNW14	NNW15	N8.7	NNW15
27-Oct	NNW14	NNW15	NNW15	NNW14	NNW13	NNW14	NNW12	NNW13	NNW13	NNW13	NNW12	NNW13	NNW13	NNW12	NNW10	NW8	NW8	NW7	NW6	NW5	NW4	W3	NW2	SW4	NNW9.7	NNW15
28-Oct	SSW4	S4	SSW5	SW5	S2	SE5	SE8	SE6	SE7	SE9	SSE6	SE6	ESE7	SE7	E5	E6	ESE6	ESE7	SE11	ESE8	ESE7	ESE8	ESE6	E6	SE5.6	SE11
29-Oct	NE2	ENE2	W0	ENE2	NNE3	NNE4	N5	NNW3	NNW3	N5	N3	NNW5	NE5	NE5	N4	NNE2	E7	E4	ESE6	E7	E6	ESE8	ESE9	SE10	ENE2.9	SE10
30-Oct	SE6	SE7	SE8	SE11	SE12	SE15	SE15	SE13	SE10	SE12	SE12	SE12	SE13	SE16	SE13	SE12	SE13	SE12	SE12	SE14	SE15	SE15	SE15	SE13	SE12.3	SE16
31-Oct	SE14	SE14	SE13	SE14	SE14	SE14	SE13	SE13	SE13	SE15	SE14	SE13	SE13	SE10	SE11	SE9	SE6	SE8	SSE7	SE7	SE8	SE8	SE6	SE4	SE10.9	SE15

SSW2.5	S2.4	SSW2.4	SSW2.2	S2.2	SSE2.6	SSE2.1	SSE1.7	S1.8	S1.8	SSW1.4	SSW1.2	W0.6	WSW1.0	W1.0	W0.6	ESE0.3	W0.9	WSW1.0	WSW1.1	WSW1.5	SSW2.3	SSW2.4	S2.8	Diurnal Average	
WNW20	W24	W24	WNW18	WNW21	WNW16	NW22	WNW21	SE18	W20	NW27	NW28	NW29	WNW24	W25	WNW29	SE25	WNW22	W21	W20	NNW25	NNW26	NNW23	NNW19	Diurnal Maximum	

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



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

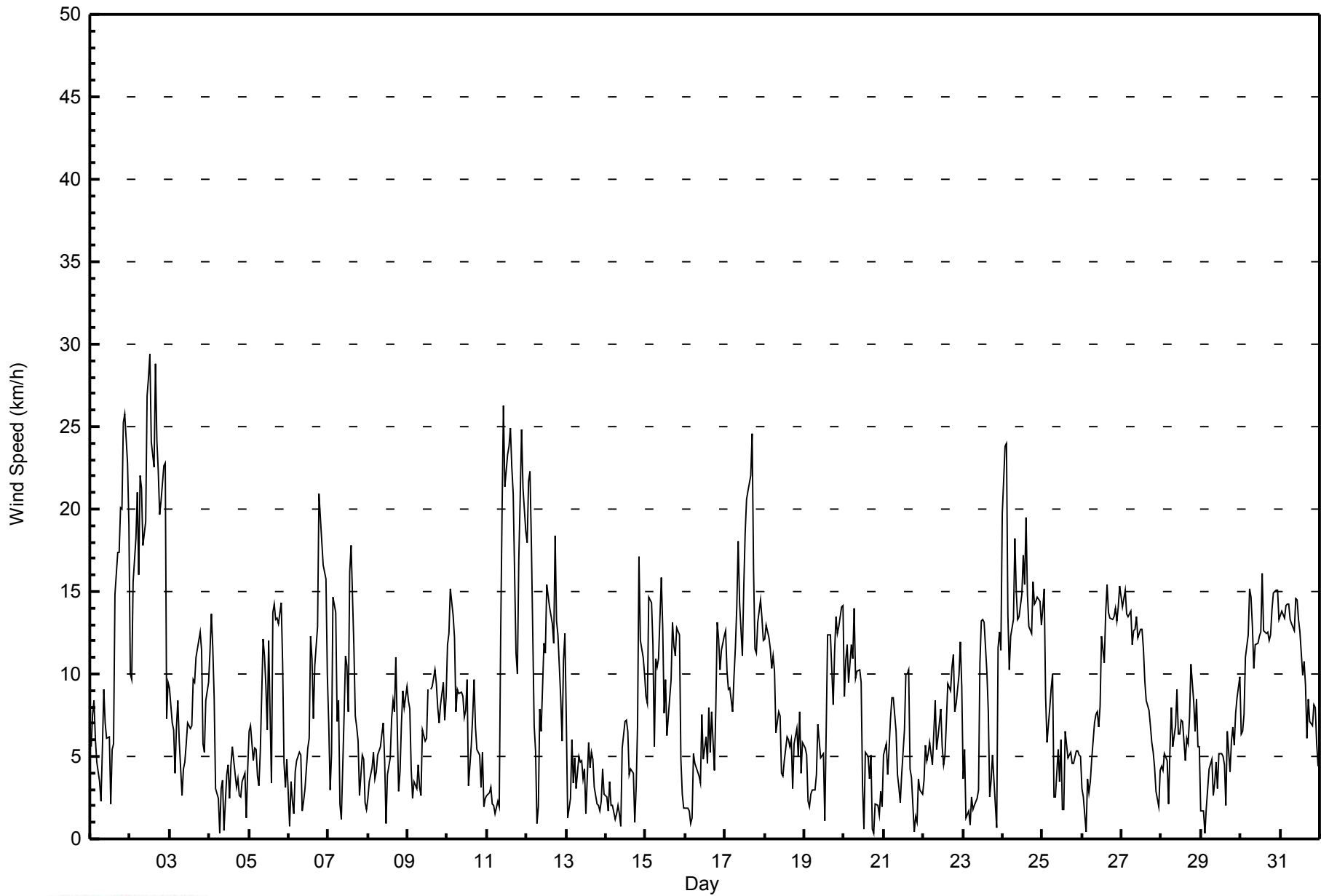
**Wind Speed (WS) - km/h**  
**Athabasca Valley - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744											
Maximum Value: 11 km/h on Oct 5 15:00														Hours of Data: 743											
Minimum Value: 1 km/h on Oct 21 19:00														Hours of Missing Data: 1											
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														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-Oct	2	2	2	2	2	2	1	2	2	2	2	2	2	2	5	5	5	6	5	7	6	5	4	7	
2-Oct	4	2	4	4	4	3	8	4	4	5	5	5	6	5	5	5	4	3	3	4	3	4	4	2	8
3-Oct	2	2	2	2	3	2	2	1	2	2	2	3	3	3	3	3	3	3	3	2	2	2	3	3	
4-Oct	3	3	3	3	1	1	1	1	1	1	2	2	2	1	2	2	1	1	1	2	2	1	2	1	3
5-Oct	2	2	2	3	2	2	1	4	3	3	2	3	3	4	11	3	4	3	3	3	3	2	1	2	11
6-Oct	2	2	1	2	2	1	2	2	2	1	1	2	1	3	3	3	4	7	4	4	6	4	3	5	7
7-Oct	3	2	4	4	3	3	3	2	2	3	4	4	2	4	4	3	3	2	1	1	2	2	1	1	4
8-Oct	1	2	2	2	2	1	2	1	2	2	2	1	1	3	2	2	2	3	2	2	2	2	2	2	3
9-Oct	3	3	1	1	1	1	1	1	2	2	2	2	3	M	3	3	3	3	3	2	2	3	2	2	3
10-Oct	2	3	3	3	3	2	2	2	2	2	2	2	2	2	2	4	3	2	1	2	1	2	1	2	4
11-Oct	2	2	2	2	1	1	2	3	2	7	4	5	5	5	6	5	6	2	3	3	4	3	4	3	7
12-Oct	3	4	4	6	3	2	1	3	3	2	4	4	4	4	4	5	4	4	3	2	2	2	4	4	6
13-Oct	3	2	3	4	3	2	2	3	2	2	1	2	2	2	2	2	2	1	2	2	1	1	2	1	4
14-Oct	1	1	2	2	1	1	1	1	1	2	3	2	3	2	1	2	1	1	2	2	4	2	2	2	4
15-Oct	2	2	5	3	5	2	2	2	4	3	3	3	4	4	2	3	2	2	3	2	3	2	1	1	5
16-Oct	1	1	1	1	1	1	1	1	1	1	2	2	3	2	2	2	2	2	3	3	3	3	3	3	3
17-Oct	3	3	2	2	2	3	3	3	3	3	3	4	5	5	5	6	6	4	3	3	3	3	3	3	6
18-Oct	3	3	3	2	2	2	2	2	2	2	2	2	1	2	2	2	2	1	2	1	1	2	2	2	3
19-Oct	4	3	2	1	2	1	2	2	2	2	1	2	1	3	3	3	4	2	3	3	3	3	3	3	4
20-Oct	2	4	4	2	3	2	3	3	3	3	2	3	1	3	2	1	1	1	2	1	1	1	1	1	4
21-Oct	3	2	2	2	2	2	2	4	2	2	2	2	2	2	3	4	1	2	1	1	1	2	1	1	4
22-Oct	2	1	2	1	2	1	2	3	2	2	3	2	1	2	3	2	2	2	3	2	2	2	2	4	4
23-Oct	2	2	2	2	1	2	1	1	2	3	4	5	5	4	3	3	3	1	1	1	2	3	2	2	5
24-Oct	6	4	4	5	2	2	4	3	3	2	3	4	5	4	5	4	3	2	3	3	3	3	3	2	6
25-Oct	2	3	3	2	2	3	5	2	1	2	2	2	1	1	1	1	1	2	2	2	2	2	2	2	5
26-Oct	2	2	1	1	2	1	1	2	2	2	2	3	3	3	3	3	3	2	3	3	3	3	2	2	3
27-Oct	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	1	1	1	1	1	1	1	1	3
28-Oct	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	2	2	3	2	2	2	1	1	3
29-Oct	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	2	3
30-Oct	2	2	2	3	4	3	4	3	2	3	3	3	3	4	3	3	3	3	3	3	4	4	4	3	4
31-Oct	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	2	2	2	2	2	2	1	3
Diurnal Maximum																									
6 4 5 6 5 3 8 4 4 7 5 5 6 5 11 6 6 7 6 5 7 6 5 5																									
M - Maintenance																									



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Athabasca Valley - October 2014**





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

**Wind Speed (WS) - km/h**  
**Athabasca Valley - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	268	36.07	36.07
6 - 11	257	34.59	70.66
12 - 19	176	23.69	94.35
20 - 28	40	5.38	99.73
29 - 38	2	0.27	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Athabasca Valley - October 2014**

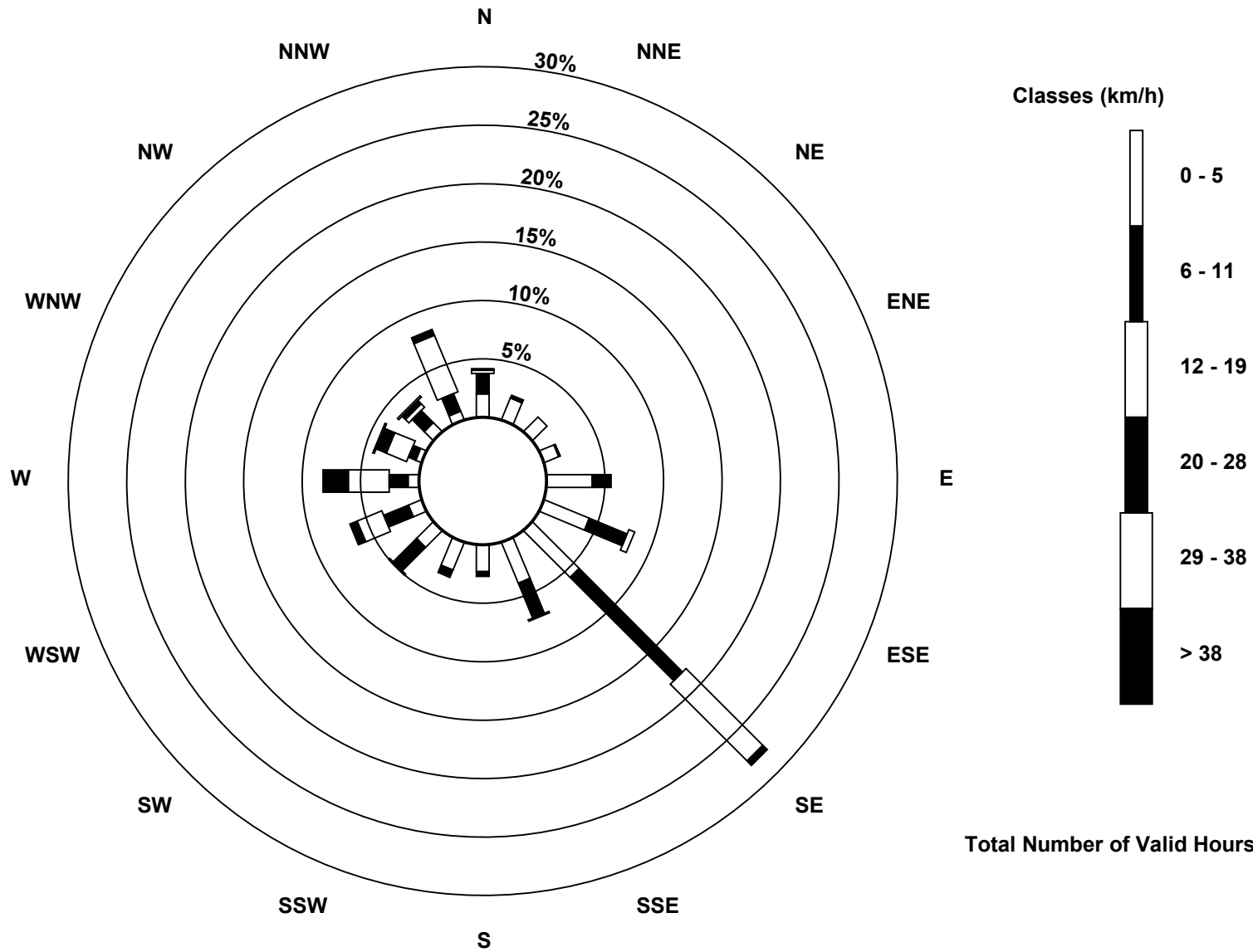
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	15	13	10	29	31	42	28	17	19	15	9	7	4	8	6	268
6 - 11	13	2	0	1	12	26	93	24	3	5	21	17	12	5	11	12	257
12 - 19	2	0	0	0	0	4	69	1	0	0	1	17	26	14	3	39	176
20 - 28	1	0	0	0	0	0	4	0	0	0	0	5	16	7	3	4	40
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	31	17	13	11	41	61	208	53	20	24	37	48	61	31	26	61	743

Total Number of Valid Hours: 743

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Wind Speed (WS) - km/h  
Athabasca Valley (AMS 7)**



**Total Number of Valid Hours: 743**



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

**Wind Direction (WD) - deg**  
**Athabasca Valley - October 2014**

Direction of Maximum Speed: 307 deg on Oct 2 13:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 292.3 deg on Oct 2	Hours of Data: 743
Direction of Minimum Speed: 279 deg on Oct 29 03:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 1.1 deg on Oct 4	Percent Operational Time: 99.9
Monthly Average Direction: 239.0 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	8	353	347	326	20	36	57	83	89	119	130	157	25	16	359	348	347	351	345	352	344	342	336	329	354.1
2-Oct	316	319	294	287	289	297	313	298	293	298	307	306	307	302	298	286	287	284	274	272	265	271	297	246	292.3
3-Oct	244	257	247	217	246	233	220	152	190	114	81	81	90	146	164	156	132	139	141	141	153	103	131	131	156.6
4-Oct	129	135	139	141	160	215	199	238	231	313	223	225	286	13	5	8	39	47	72	359	323	313	292	237	140.0
5-Oct	233	247	254	278	244	159	165	249	253	226	213	208	218	217	317	347	350	339	342	336	345	80	103	65	290.5
6-Oct	59	75	34	90	131	136	106	95	93	209	261	273	324	305	333	358	342	287	278	283	280	273	251	237	287.4
7-Oct	207	164	242	255	252	225	243	160	187	345	321	341	14	321	295	346	17	359	346	0	105	114	108	117	305.0
8-Oct	100	128	139	122	132	93	129	133	138	140	135	40	329	90	84	119	142	223	213	83	106	117	121	128	126.1
9-Oct	139	140	145	134	115	90	94	100	96	141	165	171	158	M	123	122	131	131	132	120	127	138	144	142	134.0
10-Oct	143	140	139	139	139	140	134	144	140	145	143	156	157	174	152	179	162	143	140	147	140	147	164	206	146.8
11-Oct	186	206	173	200	188	166	109	234	244	269	274	272	271	275	274	267	275	273	260	250	249	245	250	242	260.0
12-Oct	252	257	256	259	223	203	135	209	216	208	266	284	300	280	279	275	273	280	266	259	248	234	235	247	260.0
13-Oct	233	228	183	202	170	159	169	197	210	211	96	222	109	75	102	161	129	127	117	102	50	41	81	65	156.3
14-Oct	36	29	33	6	37	29	352	20	0	179	149	113	127	145	117	138	128	140	240	247	270	251	254	260	224.1
15-Oct	261	287	300	290	285	264	279	290	336	327	338	332	312	314	353	352	342	333	342	338	339	337	253	84	317.4
16-Oct	81	82	74	151	140	130	124	107	105	121	150	157	103	134	175	144	86	83	120	135	137	136	135	130	128.4
17-Oct	135	139	144	148	145	143	142	142	141	134	137	131	132	126	130	135	141	140	139	142	141	142	140	137	137.6
18-Oct	133	136	144	143	141	140	141	141	137	135	135	93	83	217	220	225	249	264	271	274	273	252	264	235	166.5
19-Oct	227	204	148	166	121	144	117	143	134	115	97	145	116	136	120	131	137	132	131	137	138	140	138	133	136.5
20-Oct	143	144	148	139	145	145	142	151	147	160	149	154	306	133	153	171	145	197	220	229	298	217	161	180	149.9
21-Oct	152	150	170	162	139	134	142	140	139	168	189	209	226	220	254	269	241	231	149	136	154	149	139	148	181.3
22-Oct	139	150	155	148	149	145	142	141	124	138	134	105	105	130	136	138	135	138	149	150	146	145	143	133	139.2
23-Oct	117	142	173	97	114	23	359	11	33	115	116	116	117	124	112	112	125	7	351	342	304	259	261	270	122.3
24-Oct	292	277	276	278	258	261	275	281	285	282	264	265	270	264	270	263	253	250	262	265	270	264	265	256	269.8
25-Oct	246	247	250	297	251	227	236	192	139	206	213	217	270	285	91	79	82	113	97	119	118	120	130	128	204.1
26-Oct	122	95	83	35	35	4	351	353	359	1	6	2	348	348	343	343	344	343	345	346	345	345	339	336	349.6
27-Oct	335	336	339	340	339	338	337	336	336	339	336	337	342	344	338	326	319	323	314	316	323	263	319	218	333.4
28-Oct	197	171	195	214	169	138	134	144	138	135	147	142	120	132	81	93	113	120	128	115	108	122	107	91	130.9
29-Oct	41	63	279	67	16	15	7	336	346	11	11	341	46	43	9	25	80	91	102	93	93	123	121	135	64.2
30-Oct	133	138	143	141	140	135	137	135	131	133	136	133	135	139	146	134	132	136	137	138	137	136	139	137	136.6
31-Oct	132	131	131	135	136	136	138	138	137	141	134	134	134	138	136	131	135	132	147	131	141	142	145	141	136.1

194.4 190.9 212.2 210.3 189.2 163.7 158.5 164.3 169.0 178.2 198.2 212.9 269.7 248.3 272.3 265.4 120.7 271.1 256.1 248.8 251.0 207.3 193.3 188.4  
 Diurnal Average

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



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

**Wind Direction (WD) - deg**  
**Athabasca Valley - October 2014**

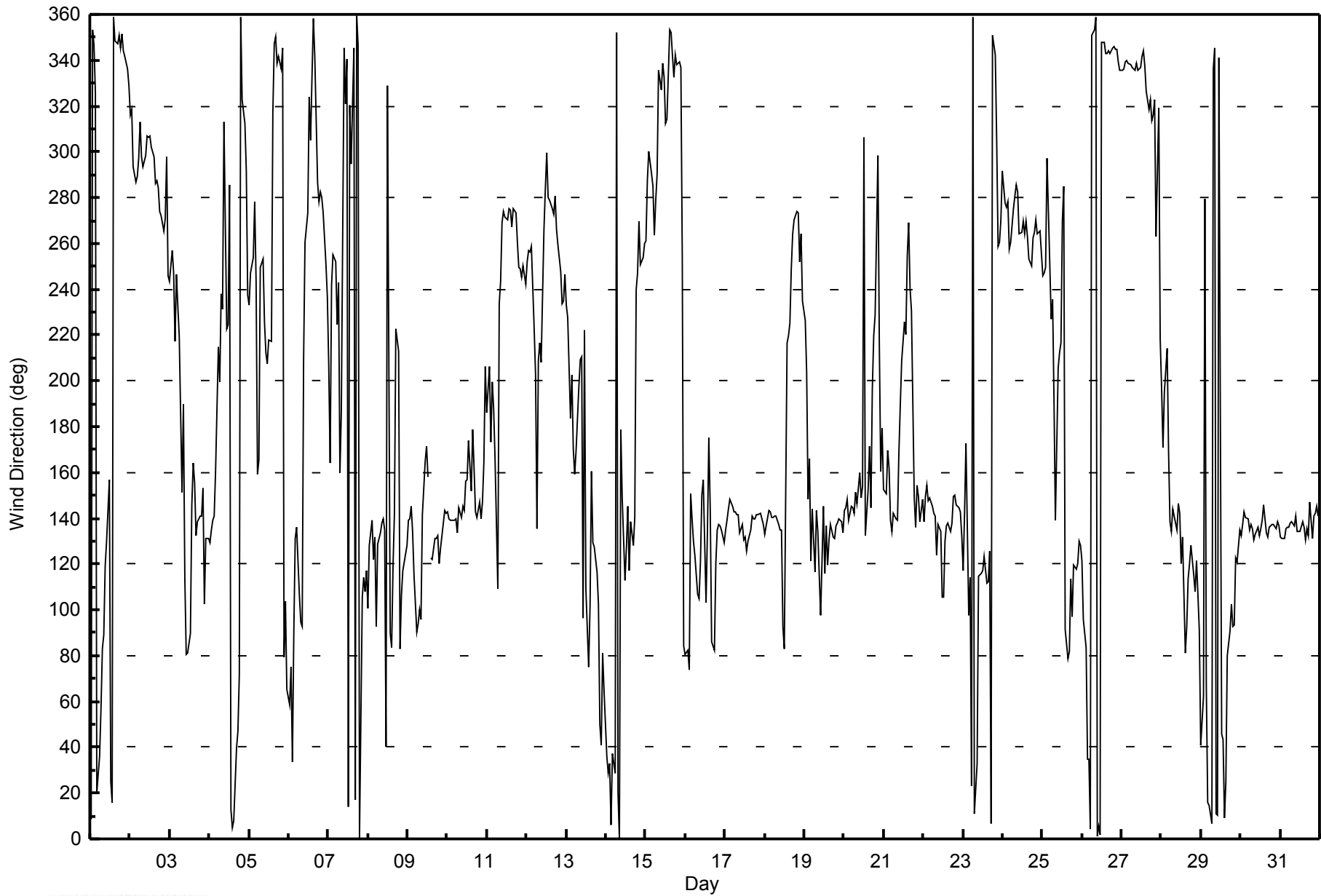
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on Oct 14 10:00		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9																							
Minimum Value: 7 deg on Oct 27 00:00																									
Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 12 Q <sub>1</sub> = 14 Median = 18 Q <sub>3</sub> = 30 P <sub>90</sub> = 51 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-Oct	15	19	20	18	21	36	44	14	13	26	29	29	62	32	26	16	17	19	18	20	16	14	12	11	62
2-Oct	19	22	15	12	14	17	20	11	13	14	13	12	11	12	15	11	11	10	10	10	9	11	35	11	35
3-Oct	18	22	22	44	29	12	20	42	37	48	30	22	33	51	26	22	15	15	15	16	26	20	19	20	51
4-Oct	16	14	15	21	32	25	87	16	9	90	42	23	40	34	22	27	36	21	30	39	34	25	74	16	90
5-Oct	15	18	32	24	24	37	26	40	15	15	13	34	16	82	68	16	17	14	12	11	22	25	16	25	82
6-Oct	87	32	30	70	39	31	23	17	75	57	39	32	18	14	12	18	12	21	9	12	12	12	12	32	87
7-Oct	18	52	80	12	12	26	44	66	78	24	26	17	22	22	18	25	17	19	13	47	22	26	56	46	80
8-Oct	40	21	34	24	34	7	18	15	16	15	25	78	17	55	17	23	18	17	43	19	20	20	20	16	78
9-Oct	19	25	24	44	32	25	20	29	40	21	27	30	22	M	23	20	18	19	19	19	19	16	17	15	44
10-Oct	11	12	12	11	12	15	14	15	15	17	20	18	16	80	25	34	16	14	11	13	20	26	37	43	80
11-Oct	47	41	43	66	60	67	41	92	14	14	12	13	13	14	13	13	12	10	13	10	10	9	10	9	92
12-Oct	10	10	10	13	36	47	77	90	36	13	20	30	21	19	16	15	12	11	11	10	11	20	12	11	90
13-Oct	33	91	63	54	73	25	46	43	33	34	42	70	83	14	25	27	21	30	73	64	35	38	23	34	91
14-Oct	30	55	47	73	52	61	39	42	47	105	45	21	19	20	28	33	23	77	19	30	12	10	15	17	105
15-Oct	12	15	13	15	18	19	17	14	14	18	18	35	28	63	25	20	8	9	13	12	10	18	60	39	63
16-Oct	58	19	40	64	74	12	14	19	27	32	20	46	37	50	20	43	15	18	23	15	16	17	16	16	74
17-Oct	14	15	15	15	19	17	14	13	11	14	15	15	15	14	15	16	14	13	14	13	13	14	14	15	19
18-Oct	14	13	12	13	13	11	14	19	16	14	33	40	12	41	16	19	20	19	13	12	21	21	36	23	41
19-Oct	42	50	72	48	49	43	46	38	15	25	34	32	94	28	18	17	16	14	14	14	14	14	12	14	94
20-Oct	19	18	19	16	13	15	12	17	15	15	16	66	83	56	26	37	16	79	88	34	44	66	43	68	88
21-Oct	28	29	33	34	21	16	16	27	42	60	74	56	19	12	28	16	15	62	83	62	87	26	25	22	87
22-Oct	23	17	23	18	17	22	15	15	24	17	21	29	25	26	23	15	15	15	18	17	15	15	13	20	29
23-Oct	31	22	99	48	91	55	62	61	84	84	20	21	19	20	21	21	69	17	12	33	95	14	11	11	99
24-Oct	15	11	10	14	15	13	11	9	10	11	13	14	16	17	13	13	13	12	13	12	15	13	14	11	17
25-Oct	9	10	17	29	15	24	13	46	52	26	23	15	69	71	13	13	10	22	20	26	23	25	18	31	71
26-Oct	40	37	89	30	48	28	15	14	16	16	18	19	17	14	11	11	13	11	14	13	14	13	9	7	89
27-Oct	7	8	8	10	9	7	7	7	8	8	7	9	11	13	16	16	11	13	12	14	26	24	47	12	47
28-Oct	20	12	20	13	52	18	14	20	15	14	25	21	20	22	10	15	23	22	14	18	18	15	18	13	52
29-Oct	39	42	94	36	21	15	15	26	25	18	30	13	38	28	30	63	12	26	22	15	19	20	19	16	94
30-Oct	17	19	17	14	14	13	14	14	13	13	14	14	16	15	17	14	14	14	15	15	15	16	15	15	19
31-Oct	14	14	14	14	15	14	15	14	13	13	14	13	14	14	14	13	27	17	19	15	14	15	27	25	27
Diurnal Maximum																									
M - Maintenance																									





**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Athabasca Valley - October 2014**



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# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 3, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	15:05
Barometric Pressure	725 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.	2575
DACS voltage range	0-5V	DACS channel #	1

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-681	-681
Analyzer Range (mv)	5000	5000	Lamp voltage	802	801
Calculated slope	0.994981	0.999449	Chamber temp.	43.6	43.8
Calculated intercept	1.842012	1.314380	Pressure (mmHg)	704.5	701.2
Analyzer Background	10.2	10.7	Flow (lpm)	0.550	0.549
Analyzer Coefficient	0.797	0.829	Intensity	49000	49000

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	0.1	NA
as found span	5000	58.8	597.4	590.8	1.011
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	60.7	607.0	607.0	1.000
second point	5000	30.4	304.0	301.3	1.009
third point	5000	15.2	152.0	150.0	1.013
calibrator zero					
as left zero	6000	0.0	0.0	0.7	NA
as left span	5000	60.7	607.0	604.8	1.004
Average Correction Factor					1.007

Corrected As found 590.7 Previous response 598.6 % change 1.3%

#### Notes:

Changed cal gas cylinder and inlet filter; adjusted span.

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

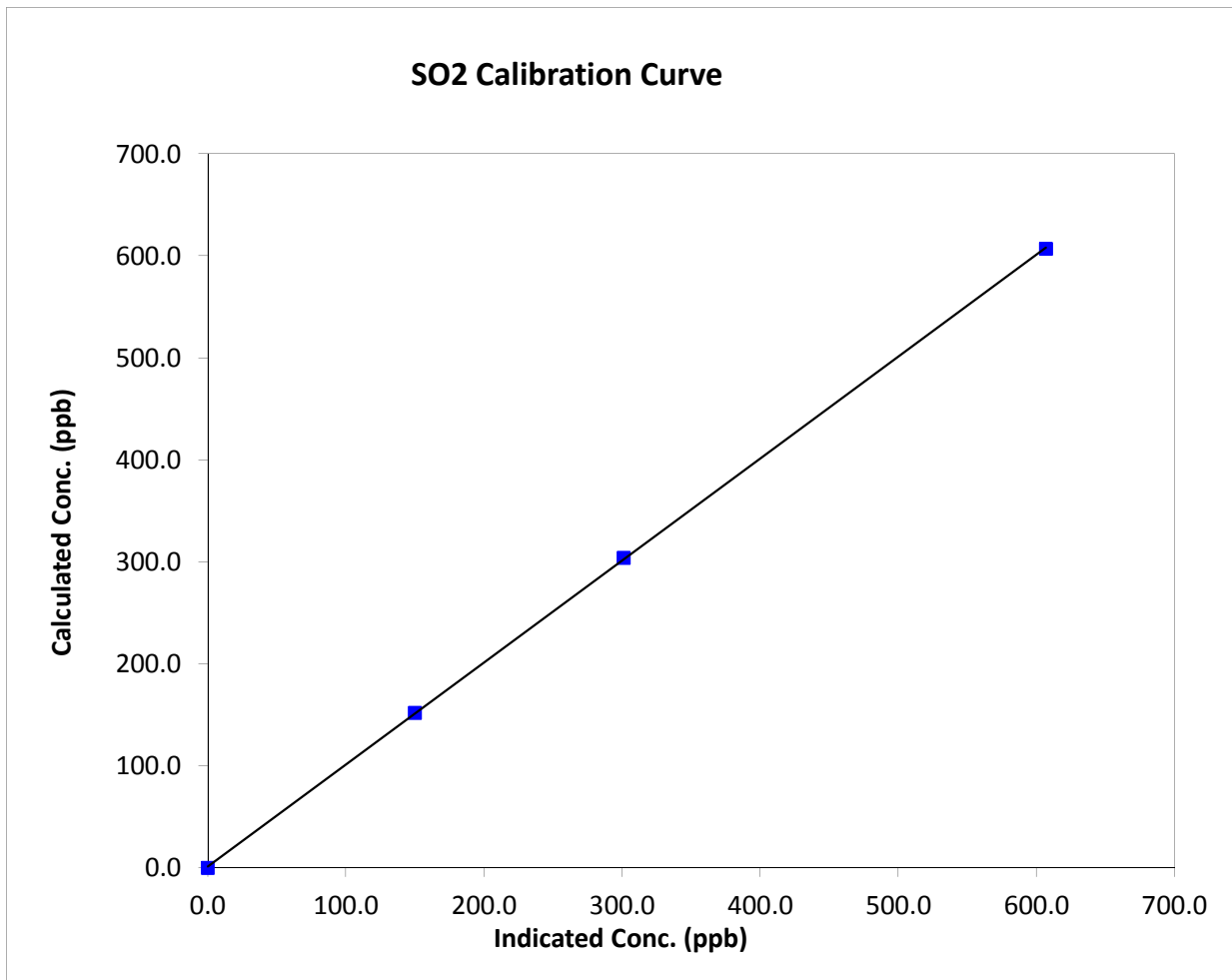
## SO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 3, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	15:05
Analyzer make	Thermo 43c	Analyzer serial #	607415781

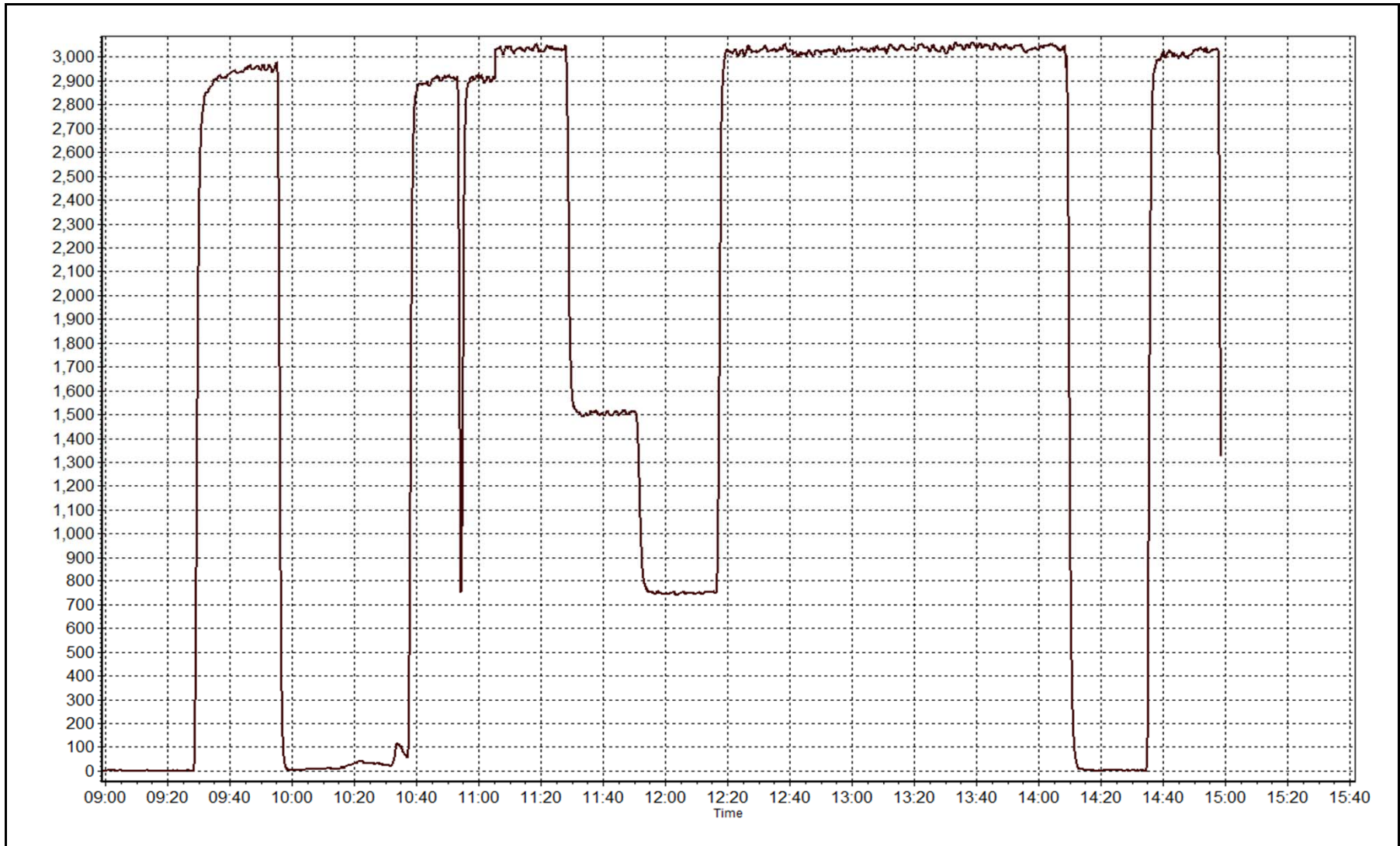
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999970
607.0	607.0	1.0000		
304.0	301.3	1.0091	Slope	0.999449
152.0	150.0	1.0133		
			Intercept	1.314380



SO2 Calibration Plot

Date: October 14, 2014





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	October 9, 2014	Previous Calibration	September 4, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:10
Barometric Pressure	742 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)	5000	5000	Lamp voltage	808	805
Calculated slope	1.007150	1.014514	Chamber temp.	44	44
Calculated intercept	-0.026464	-0.063121	Pressure	680.0	690.4
Analyzer Background	16.7	17.4	Flow	0.473	0.478
Analyzer Coefficient	1.011	1.061	Intensity	43500	43500
			Converter temp.	800	800

Analyzer make/model	TEI 45C	Analyzer serial #	630718530
Converter make/model	Model 26 Thermal Oxidizer	Converter serial #	20101-14

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.2	NA
as found span	6000	79.8	75.0	75.3	0.996
SO2 scrubber check	5000	14.7	149.4	0.4	NA
calibrator zero	6000	0.0	0.0	0.2	NA
high point	6000	89.6	75.0	74.0	1.013
second point	6000	50.2	42.0	41.5	1.012
third point	6000	29.9	25.0	24.5	1.020
calibrator zero					
as left zero	5000	0.0	0.0	0.3	NA
as left span	6000	89.6	75.0	73.6	1.018
Average Correction Factor					1.015

Corrected As found	75.1	Previous response	74.5	% change	-0.8%
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#### Notes:

Changed sample pump (annual maintenance), changed out cal gas cylinder because it was almost empty. Adjusted span.

Calibration Performed By:

Mike Martineau



# Wood Buffalo Environmental Association

## TRS Calibration Summary

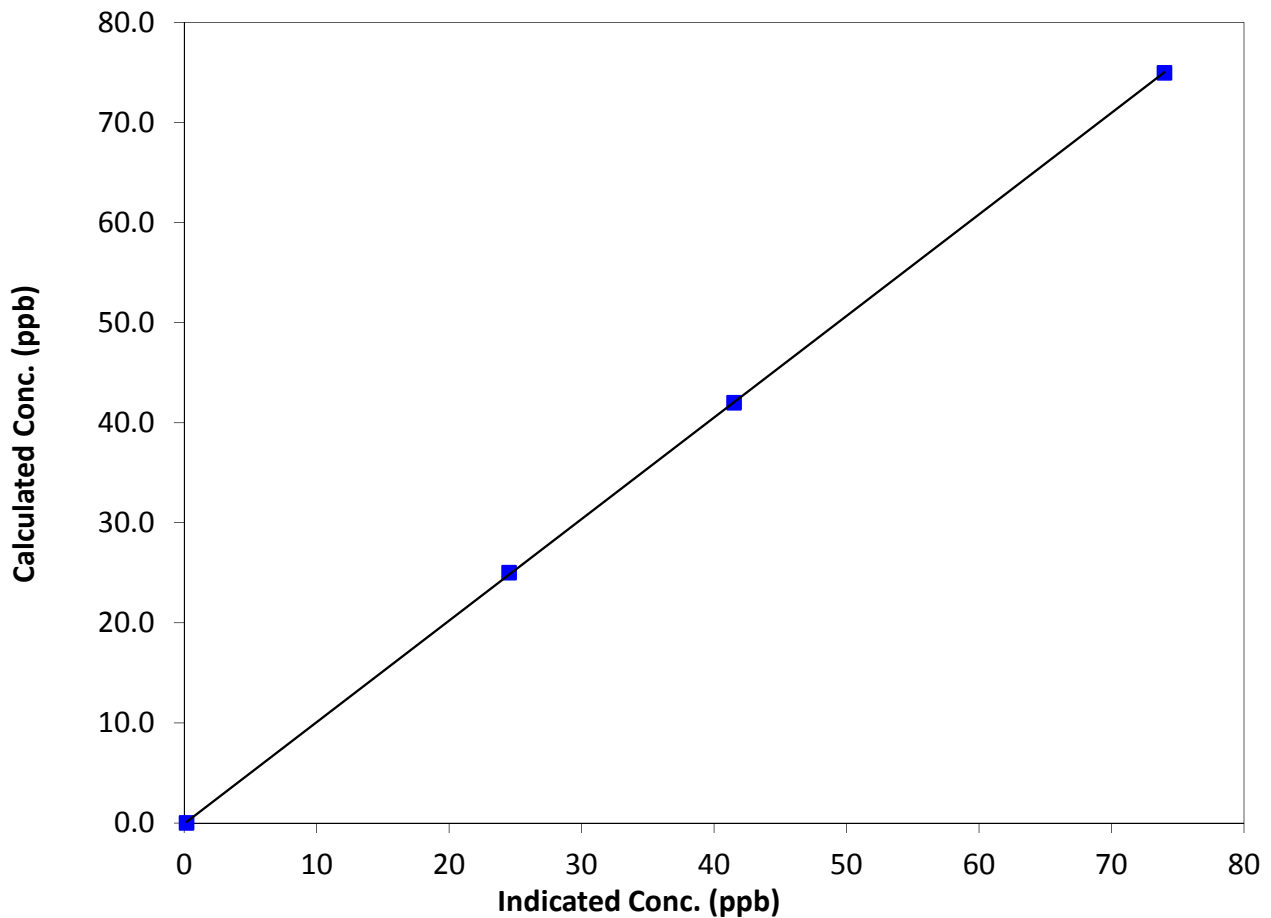
### Station Information

Calibration Date	October 9, 2014	Previous Calibration	September 4, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	13:10
Analyzer make	TEI 45C	Analyzer serial #	630718530

### Calibration Data

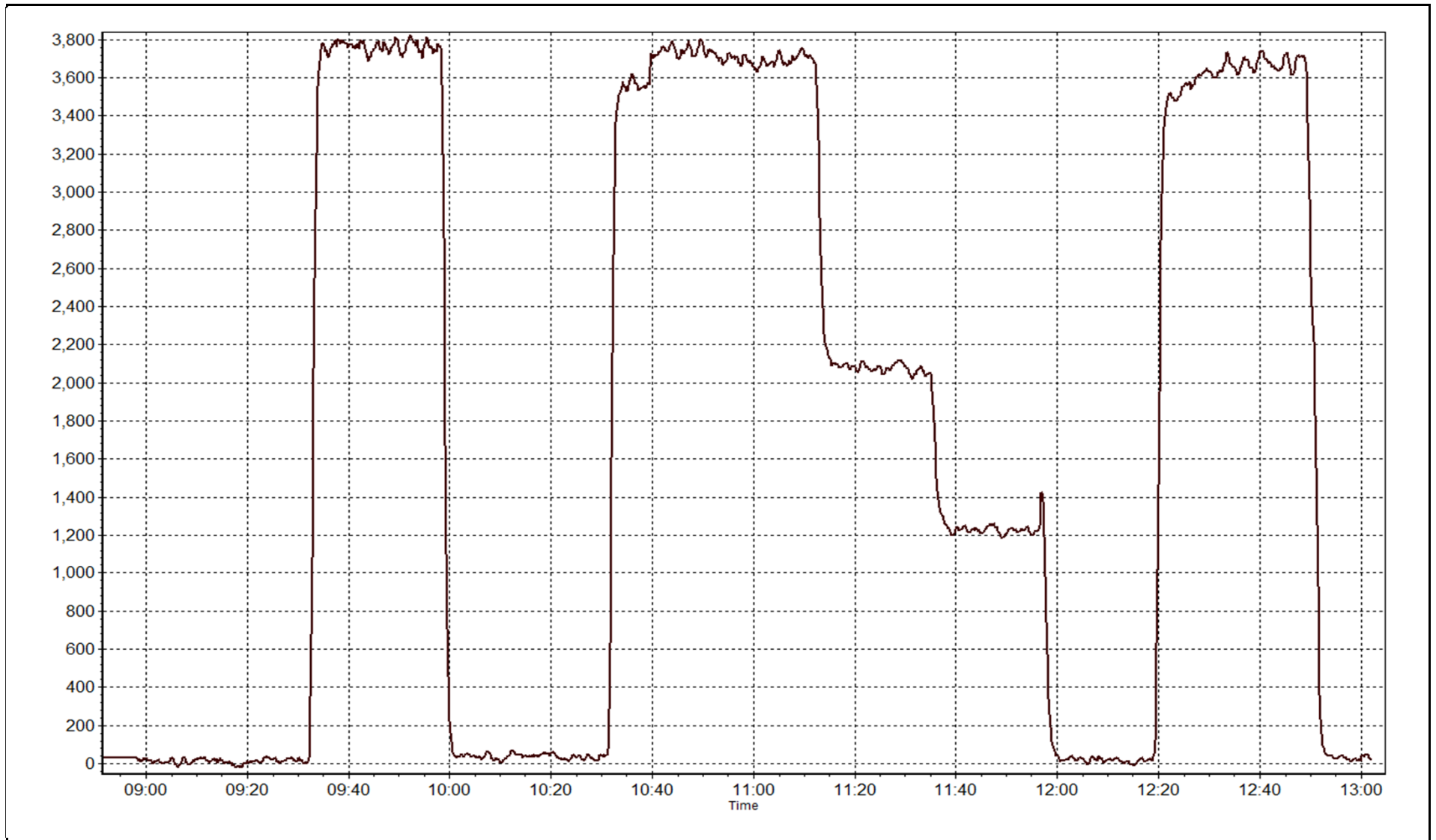
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999980
75.0	74.0	1.0130		
42.0	41.5	1.0121	Slope	1.014514
25.0	24.5	1.0202		
			Intercept	-0.063121

**TRS Calibration Curve**



TRS Calibration Plot

Date: October 9, 2014







# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

### Station Information

Calibration Date	Tuesday, October 14, 2014	Prev Calibration	Wednesday, September 03, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	15:05
Barometric Pressure	725 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.	5563

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	32.0	33.5
THC Range (input)	50	50	Flame Temp	385.0	384.2
NMHC Range (ppm)	50	50	Carrier Pressure	32.1	32.1
NMHC Range (input)	50	50	Fuel Pressure	41.4	41.4
THC Calc slope	0.999650	0.999245	Air Pressure	32.5	32.5
THC Calc intercept	0.016043	0.024258			
NMHC Calc slope	0.998892	0.998959			
NMHC Calc intercept	0.012034	0.016279			

Analyzer make Thermo Scientific 55i Analyzer serial # 1218153354

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	N/A
as found span	5000	58.8	12.50	12.42	1.006
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	60.7	12.63	12.63	1.000
second point	5000	30.4	6.32	6.27	1.008
third point	5000	15.2	3.16	3.13	1.010
calibrator zero					
as left zero	6000	0.0	0.00	0.00	N/A
as left span	5000	60.7	12.63	12.61	1.001
Average Correction Factor					1.006

Corrected As found 12.42 Previous response 12.49 % change 0.6%

**Notes:**

Changed cal gas cylinder; changed inlet filter; 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	58.8	6.60	6.53	1.011
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	3.31	1.010
third point	5000	15.2	1.67	1.65	1.013
calibrator zero					
as left zero	6000	0.0	0.00	0.00	N/A
as left span	5000	60.7	6.68	6.67	1.001
Average Correction Factor					1.008

Corrected As found      6.53      Previous response      6.60      % change      1.0%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	58.8	5.90	5.89	1.002
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	2.96	1.006
third point	5000	15.2	1.49	1.48	1.006
calibrator zero					
as left zero	6000	0.0	0.00	0.00	N/A
as left span	5000	60.7	5.95	5.94	1.001
Average Correction Factor					

Corrected As found      5.89      Previous response      5.89      % change      0.1%



# Wood Buffalo Environmental Association

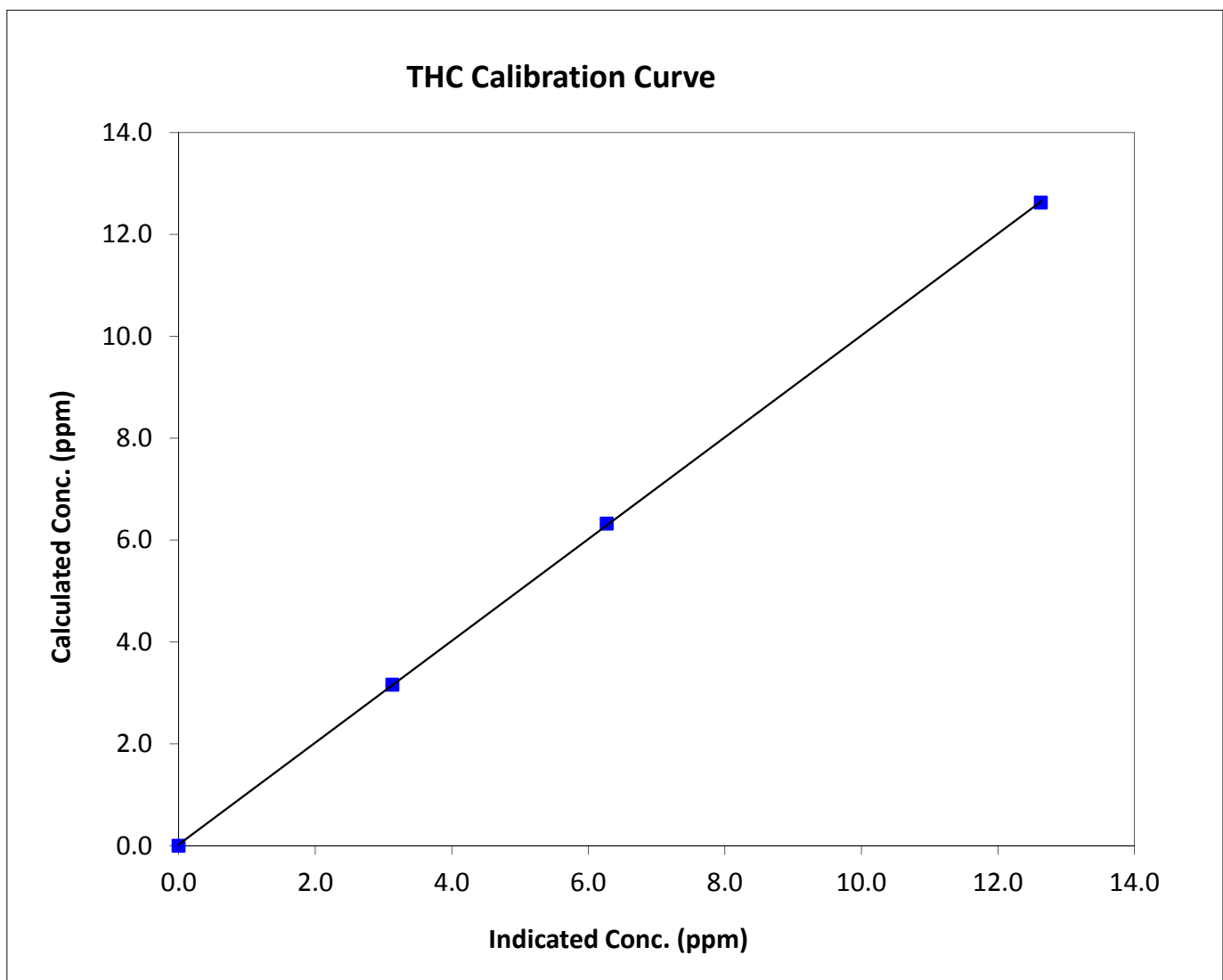
## THC Calibration Summary

### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 3, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	15:05
Analyzer make	Thermo Scientific 55i	Analyzer serial #	1218153354

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999975
12.63	12.63	0.9997		
6.32	6.27	1.0085	Slope	0.999245
3.16	3.13	1.0101		
			Intercept	0.024258





# Wood Buffalo Environmental Association

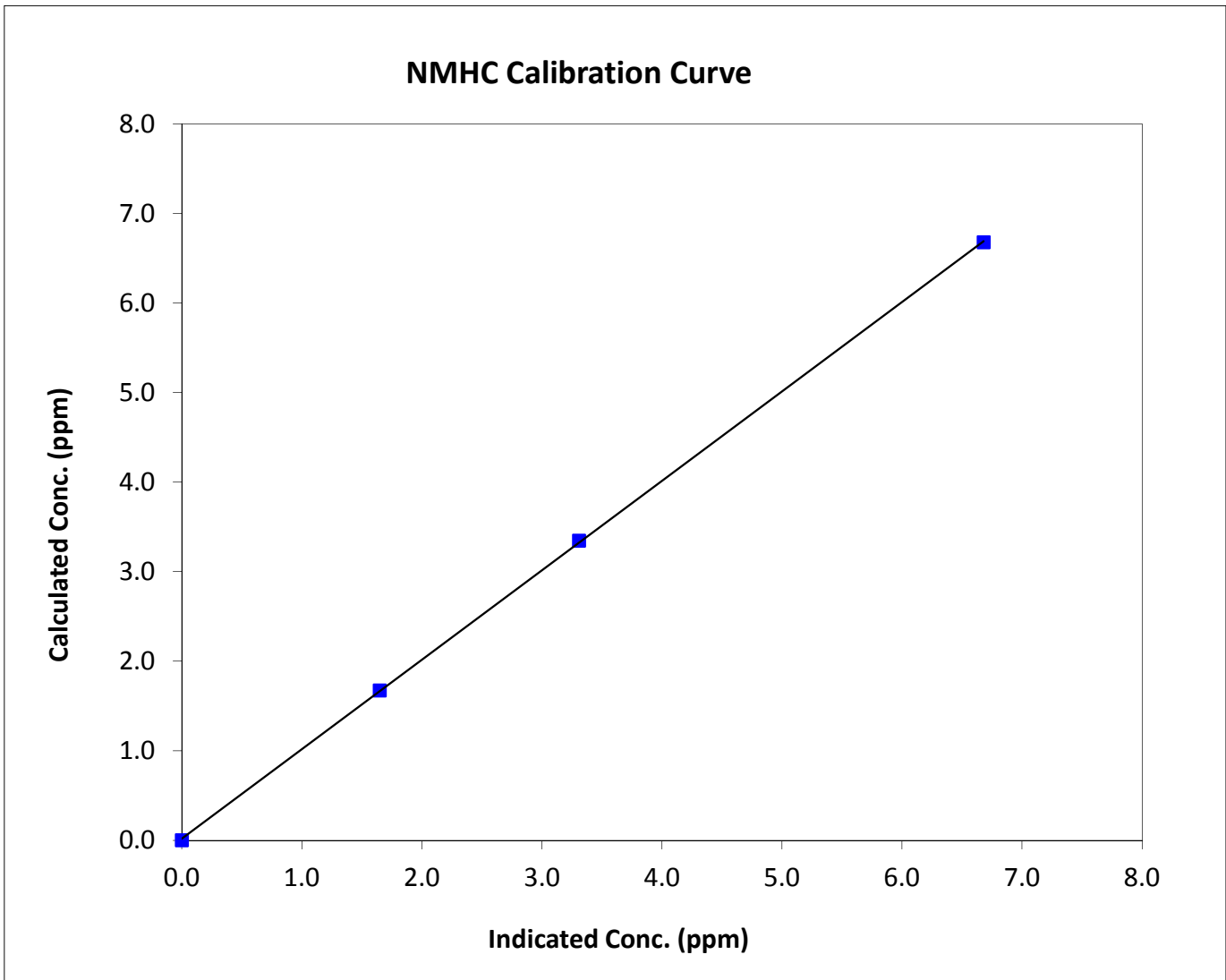
## NMHC Calibration Summary

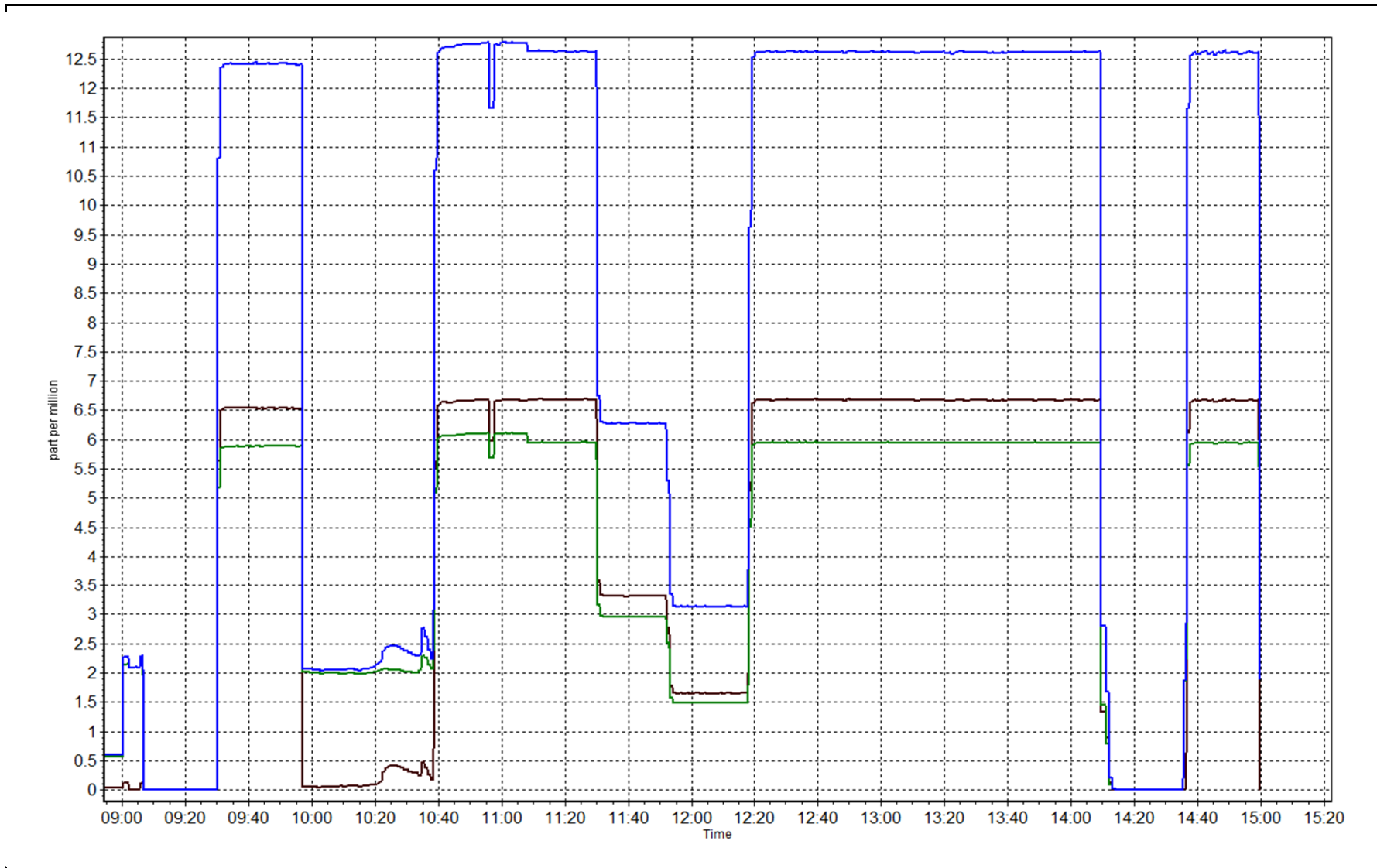
### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 3, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	15:05
Analyzer make	Thermo Scientific 55i	Analyzer serial #	1218153354

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999962
6.68	6.68	0.9996		
3.34	3.31	1.0103	Slope	0.998959
1.67	1.65	1.0133		
			Intercept	0.016279







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 15, 2014	Previous Calibration	September 4, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:20	End Time (MST)	12:00
Barometric Pressure	733 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
NO2 calibration used	Wednesday, August 13, 2014	Transfer Standard	N/A
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5563
DACS voltage range	0-5V	DACS channel #	5

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	28.7	27.2
Analyzer Range (input)	5000	5000	Lamp temp.	70.8	70.8
Calculated slope	0.991320	1.000124	Pressure	732.4	727.5
Calculated intercept	0.924244	0.515477	Flow cell A	0.685	0.683
Analyzer Background	-0.2	-0.2	Flow cell B	0.751	0.749
Analyzer Coefficient	1.072	0.972	Cell A Intensity	10600	10400
			Cell B Intensity	89000	87500

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	316.2	355.1	0.890
calibrator zero	5000	0.00	0.0	0.0	N/A
high point	5000	N/A	316.2	316.1	1.000
second point	5000	N/A	160.6	159.2	1.009
third point	5000	N/A	81.9	81.3	1.007
calibrator zero					
as left zero	5000	0.00	0.0	0.0	N/A
as left span	5000	N/A	316.2	320.4	0.987
Average Correction Factor					1.005

Corrected As found 355.1 Previous response 318.0 % change -10.4%

#### Notes:

Changed inlet filter after as founds; adjusted span. Diagnostics OK.

Calibration Performed By:

Michael Martineau



## Wood Buffalo Environmental Association

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

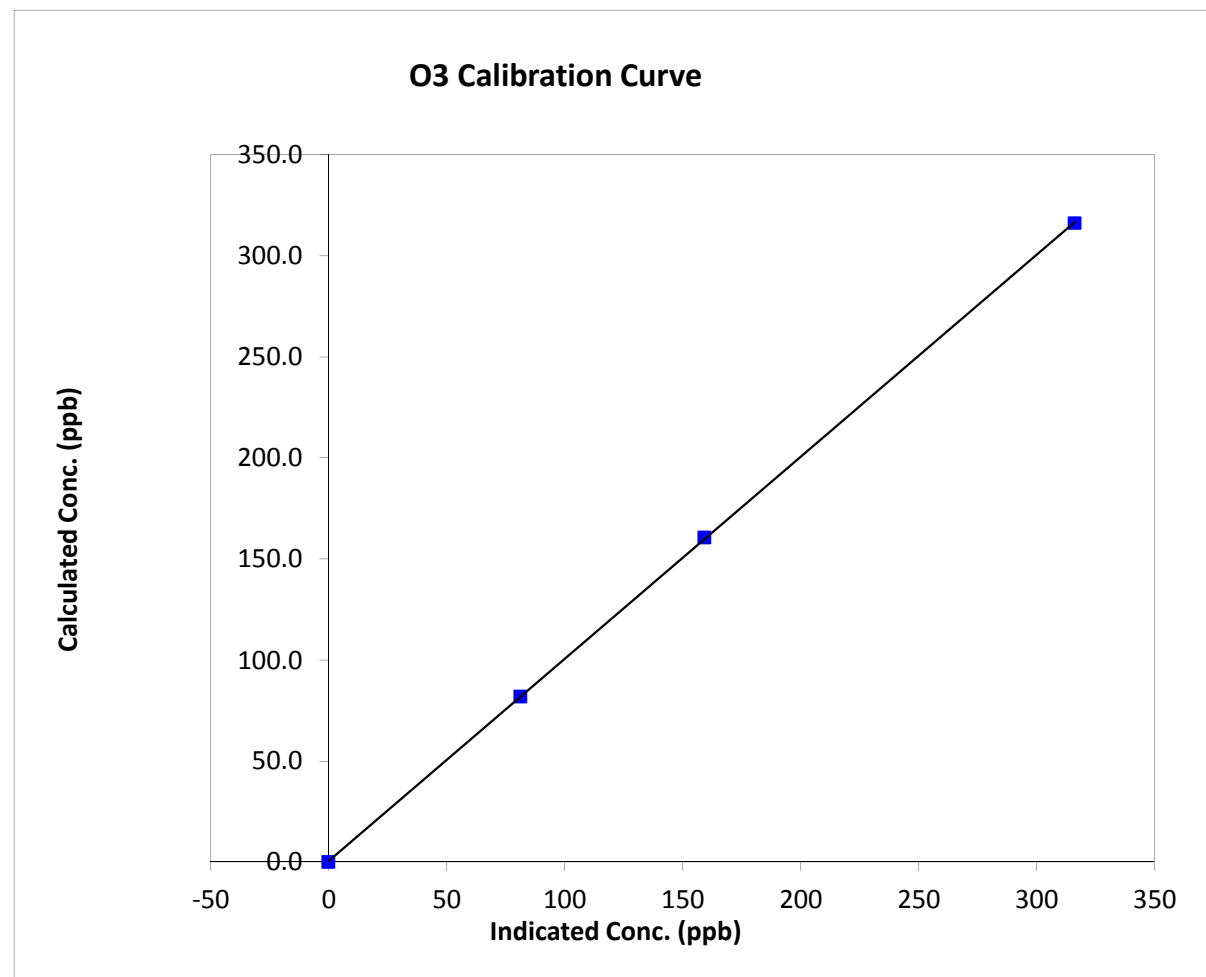
#### Station Information

Calibration Date	Wednesday, October 15, 2014	Previous Calibration	September 4, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:20	End Time (MST)	12:00
Analyzer make	TEI 49C	Analyzer serial #	607415760

#### Calibration Data

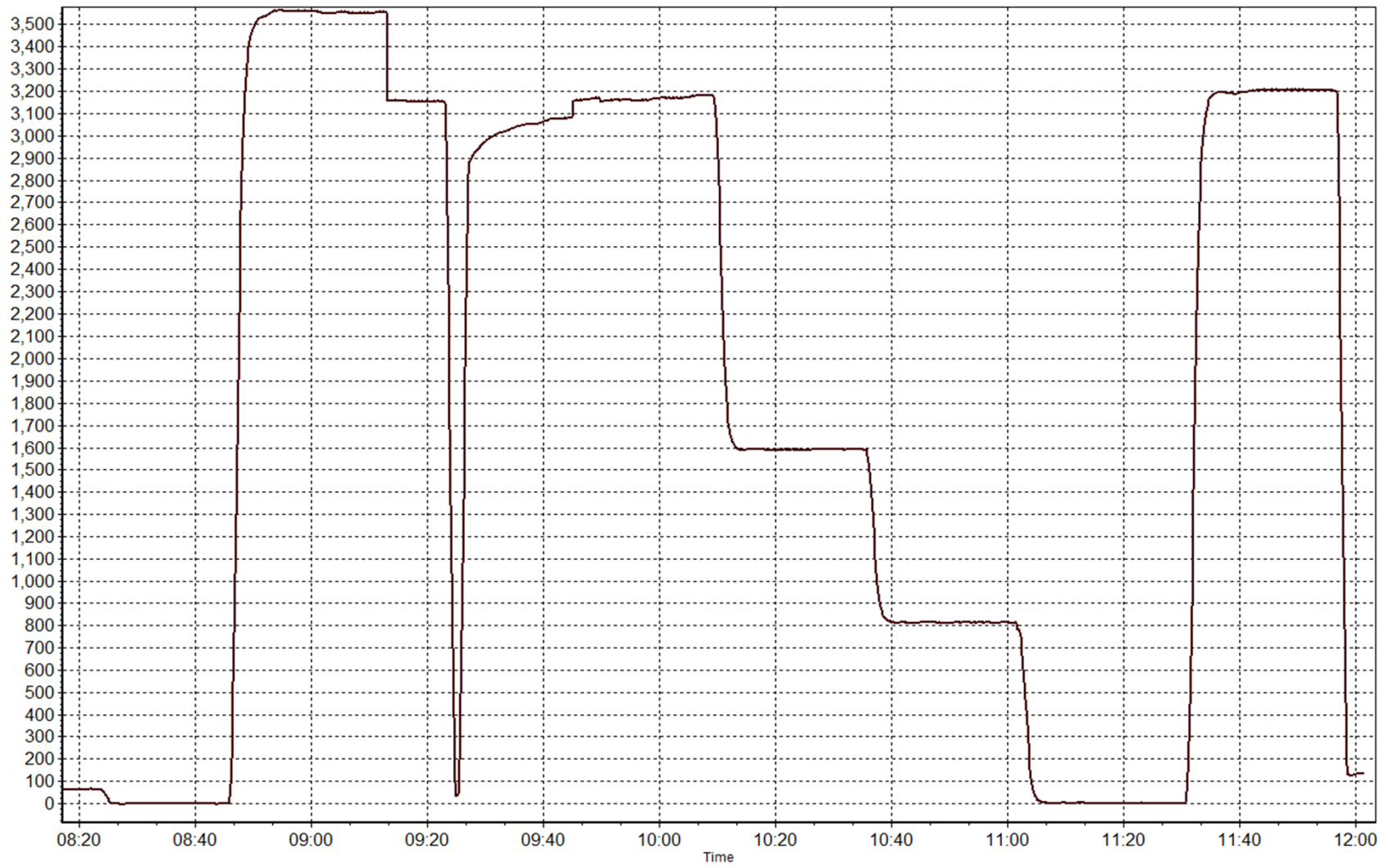
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999978
316.2	316.1	1.0003		
160.6	159.2	1.0088	Slope	1.000124
81.9	81.3	1.0074		
			Intercept	0.515477

**O<sub>3</sub> Calibration Curve**



O3 Calibration Plot

Date: October 15, 2014







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 3, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	9:00	End Time (MST)	15:05
Barometric Pressure	725 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

Parameter		NO <sub>x</sub>	NO	NO <sub>2</sub>
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.996199	0.991581	1.005399
	Data Offset	1.304677	1.338870	0.574073
After	Data Slope	0.998120	1.001567	0.998091
	Data Offset	2.167949	2.153502	-0.612132
Channel #		4	5	6
Voltage Range		0 - 5V	0 - 5V	0 - 5V

### Analyzer Information

Analyzer make/model Thermo 42c      Analyzer serial # 601114773

Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.854	ppb	0.774	ppb
NO <sub>x</sub> coefficient	0.998	ppb	1.003	ppb
NO <sub>2</sub> coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	3.6		3.3	
NO <sub>x</sub> bkgrnd	3.9		3.5	
Nt coefficient	n/a		n/a	
Chamber Temp	49.6	Deg C	49.6	Deg C
Moly Temp	323.0	Deg C	323.0	Deg C
PMT Temp	-3.6	Deg C	-3.5	Deg C
O <sub>3</sub> flow	ok	ccm	ok	ccm
R Cell Press	167.8	mmHg	166.2	mmHg
Sample Flow	0.783	ccm	0.784	ccm

**Notes:**

changed out cal gas cylinder. Changed inlet filter. Adjusted span.



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

October 14, 2014

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	0.3	N/A	N/A
as found span	5000	58.8	602.1	599.8	2.3	607.5	607.6	0.2	0.9911	0.9871
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.3	N/A	N/A
high point	5000	60.7	599.7	599.7	0.0	600.0	597.8	2.4	0.9995	1.0032
second point	5000	30.4	300.4	300.4	0.0	296.8	296.2	1.0	1.0120	1.0140
third point	5000	15.2	150.2	150.2	0.0	146.8	146.1	0.8	1.0230	1.0279
calibrator zero										
as left zero	6000	0.0	0.0	0.0	0.0	0.0	-0.1	0.3	N/A	N/A
as left span	5000	60.7	599.7	279.8	319.9	589.8	282.0	307.8	1.0168	0.9922
Average Correction Factor									1.0115	1.0150

Corrected As found  
Previous Response

NO<sub>x</sub>= 607.6  
NO<sub>x</sub>= 603.1

NO= 607.7  
NO= 603.6

Percent Change

NO<sub>x</sub>= -0.7%

NO= -0.7%

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

60.70

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			0.3			N/A	
1st NO <sub>2</sub> (300)	N/A	279.8	316.2	596.8	279.8	317.2	0.9928	1.0000	0.9968	100.3%
2nd NO <sub>2</sub> (200)	N/A	435.4	160.6	596.9	435.4	161.8	0.9927	1.0000	0.9926	100.7%
3rd NO <sub>2</sub> (100)	N/A	514.1	81.9	596.6	514.1	83.0	0.9931	1.0000	0.9872	101.3%
4th NO <sub>2</sub> (0)	596.0	N/A	2.4	598.4	596.0	2.5	0.9902	1.0000	N/A	N/A
Average Correction Factor							0.9922	1.0000	0.9922	100.8%

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

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

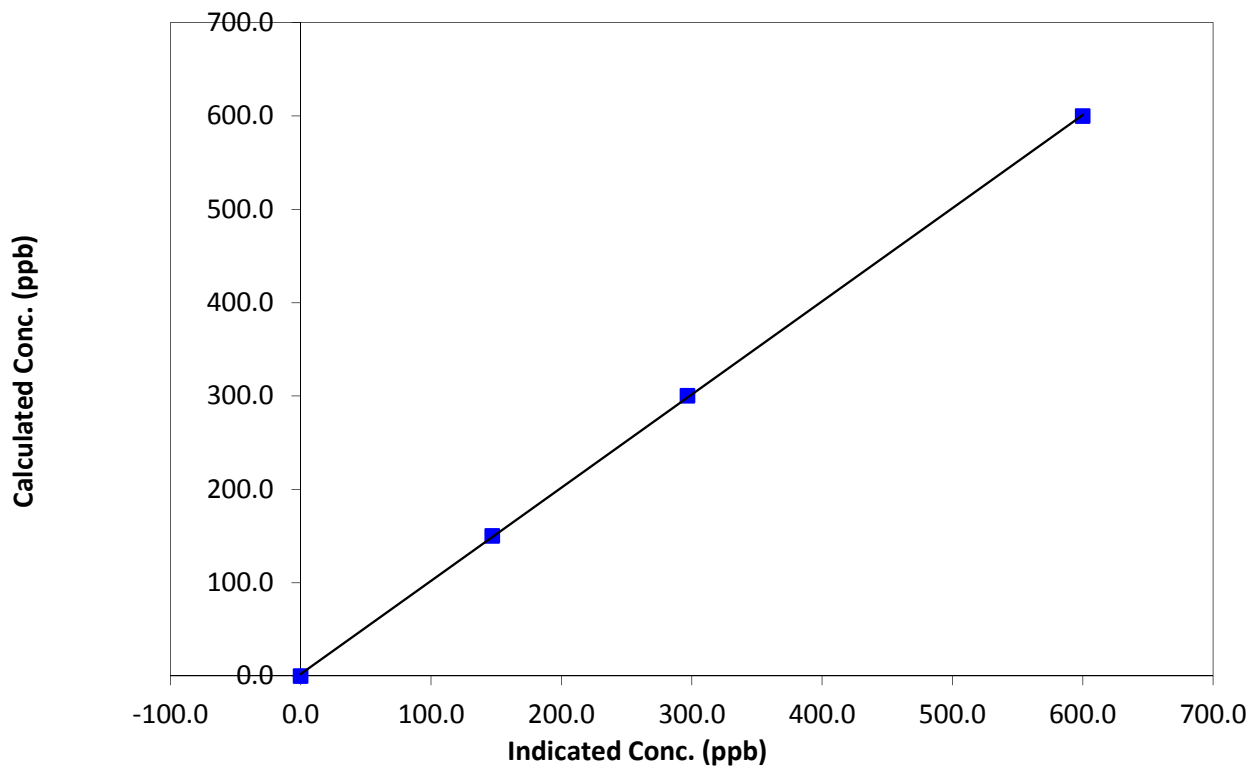
### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 3, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	15:05
Analyzer make	Thermo 42c	Analyzer serial #	601114773

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999938
599.7	600.0	0.9995		
300.4	296.8	1.0120	Slope	0.998120
150.2	146.8	1.0230		
			Intercept	2.167949

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

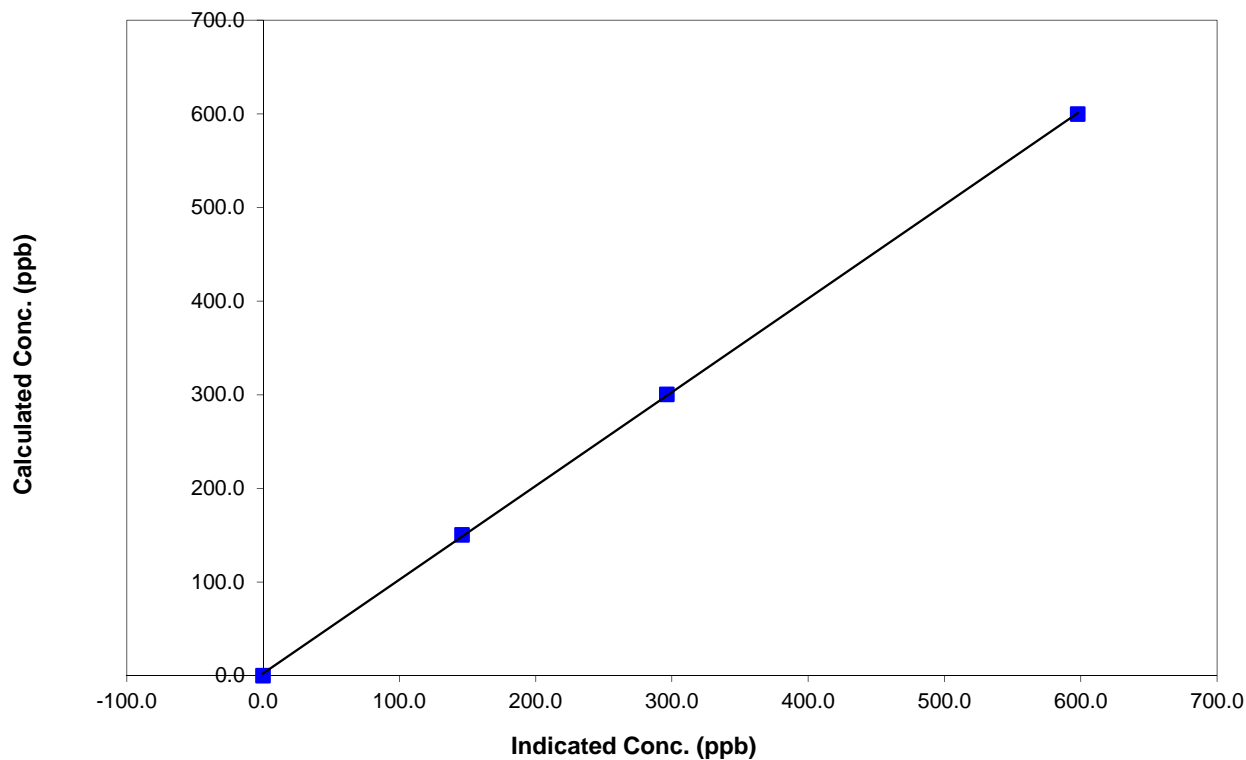
### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 3, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	15:05
Analyzer make	Thermo 42c	Analyzer serial #	601114773

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999945
599.7	597.8	1.0032		
300.4	296.2	1.0140	Slope	1.001567
150.2	146.1	1.0279		
			Intercept	2.153502

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

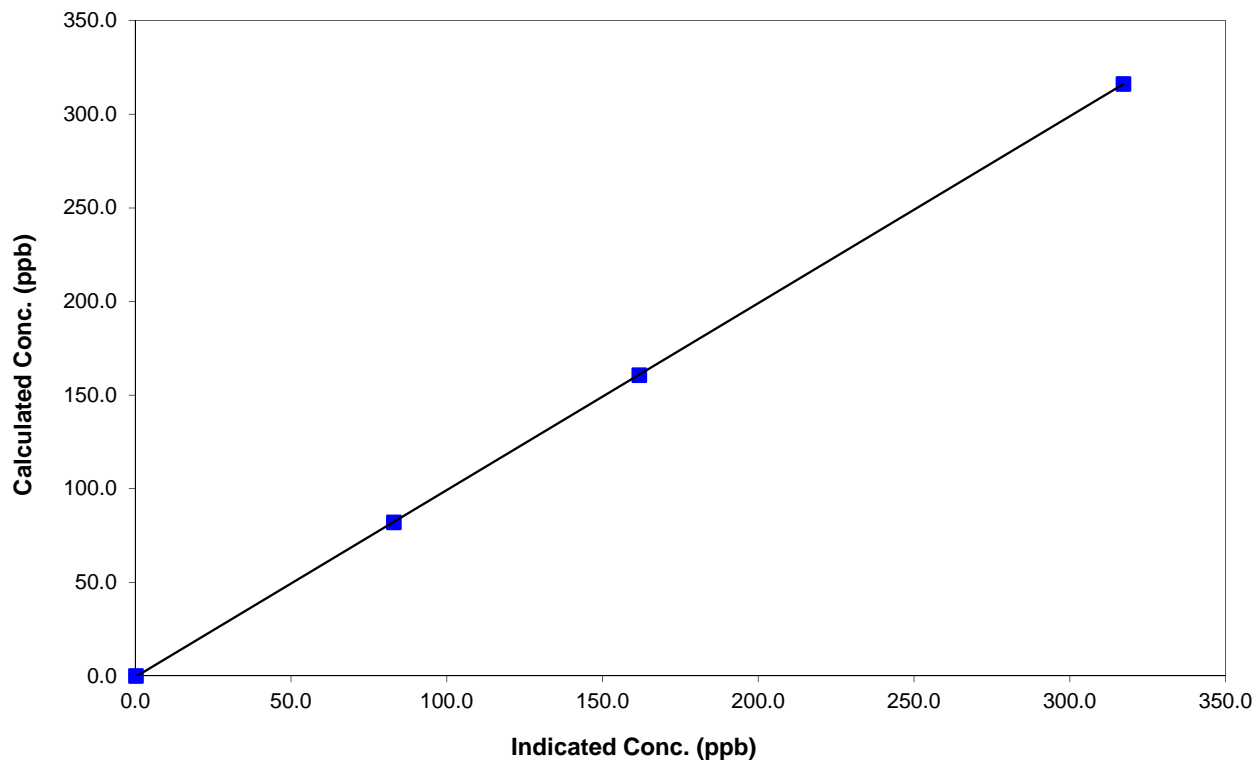
### Station Information

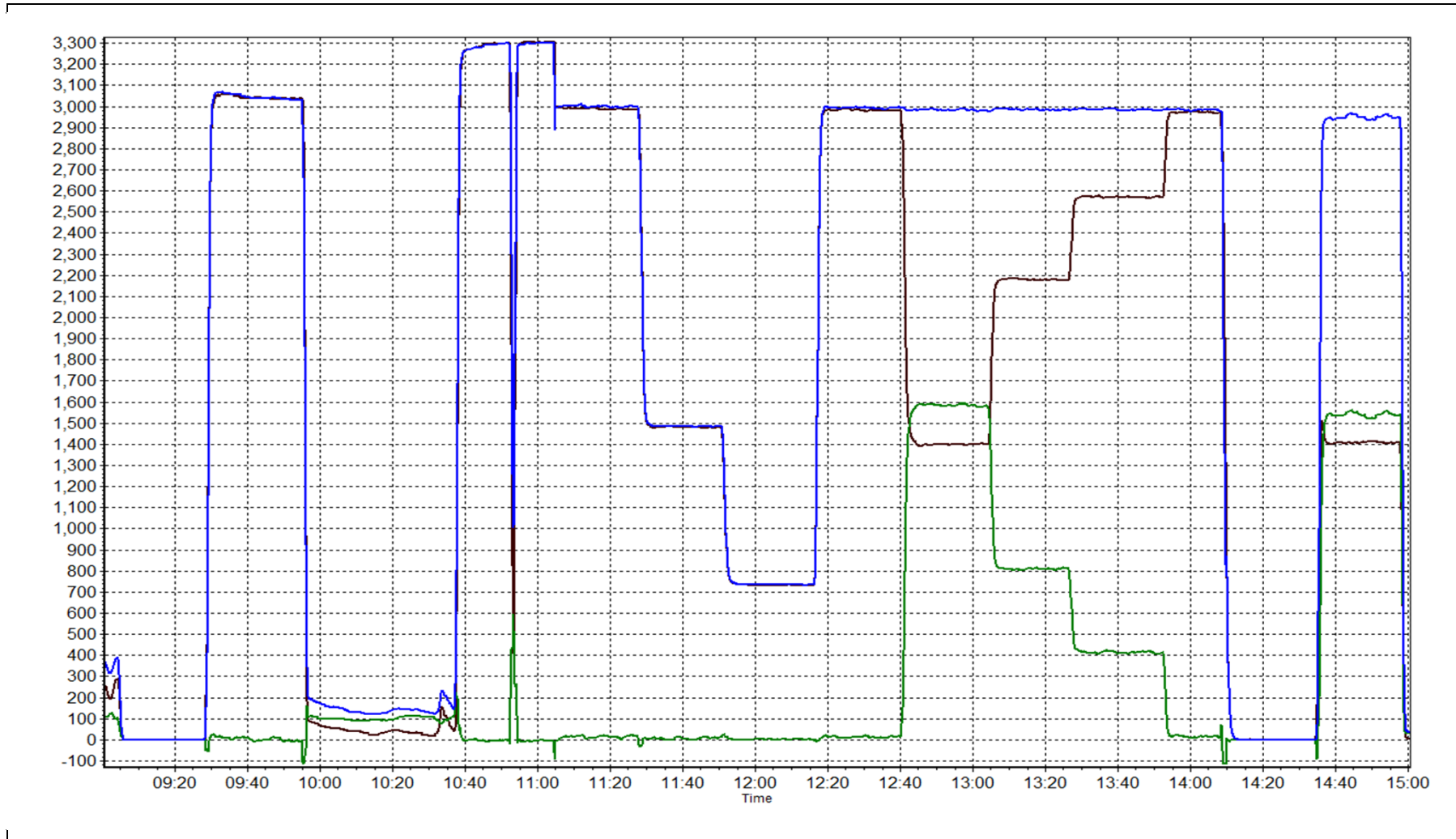
Calibration Date	October 14, 2014	Previous Calibration	September 3, 2014
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	15:05
Analyzer make	Thermo 42c	Analyzer serial #	601114773

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999994
316.2	317.2	0.9968		
160.6	161.8	0.9926	Slope	0.998091
81.9	83.0	0.9872		
			Intercept	-0.612132

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







# Wood Buffalo Environmental Association

## CO Calibration Report

### Station Information

Calibration Date	October 15, 2014	Previous Calibration	September 5, 2014
Station Name	Athabasca Valley	Station Number	7
Reason:	Routine	Install	Removal
		Other:	
Start Time (MST)	12:00	End Time (MST)	15:10
Barometric Pressure	733 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.	5563
DACS voltage range	0-5V	DACS channel #	11

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	50	50	Chamber temp.	48.0	48.0
Analyzer Range (mv)	5000	5000	Pressure	719.0	714.2
Calculated slope	0.998684	0.999975	Flow	1.275	1.251
Calculated intercept	0.139602	0.154992	Intensity	200200	200200
Analyzer Background	1.817	2.123	S/R ratio	1.165580	1.165580
Analyzer Coefficient	1.024	1.024			

Analyzer make TEI 48C Analyzer serial # 508011060

### 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	67.60	41.4	42.3	0.979
calibrator zero	5000	0.00	0.0	0.0	N/A
high point	5000	67.60	41.4	41.3	1.001
second point	5000	34.20	20.9	20.6	1.017
third point	5000	14.70	9.0	8.8	1.026
calibrator zero					
as left zero	6000	0.00	0.0	0.0	N/A
as left span	5000	67.60	41.4	41.2	1.004
<b>Average Correction Factor</b>					<b>1.015</b>

Corrected As found 42.0 Previous response 41.2 % change -1.9%

**Notes:**

changed inlet filter and holder. Adjusted zero.

Calibration Performed By: Michael Martineau



# Wood Buffalo Environmental Association

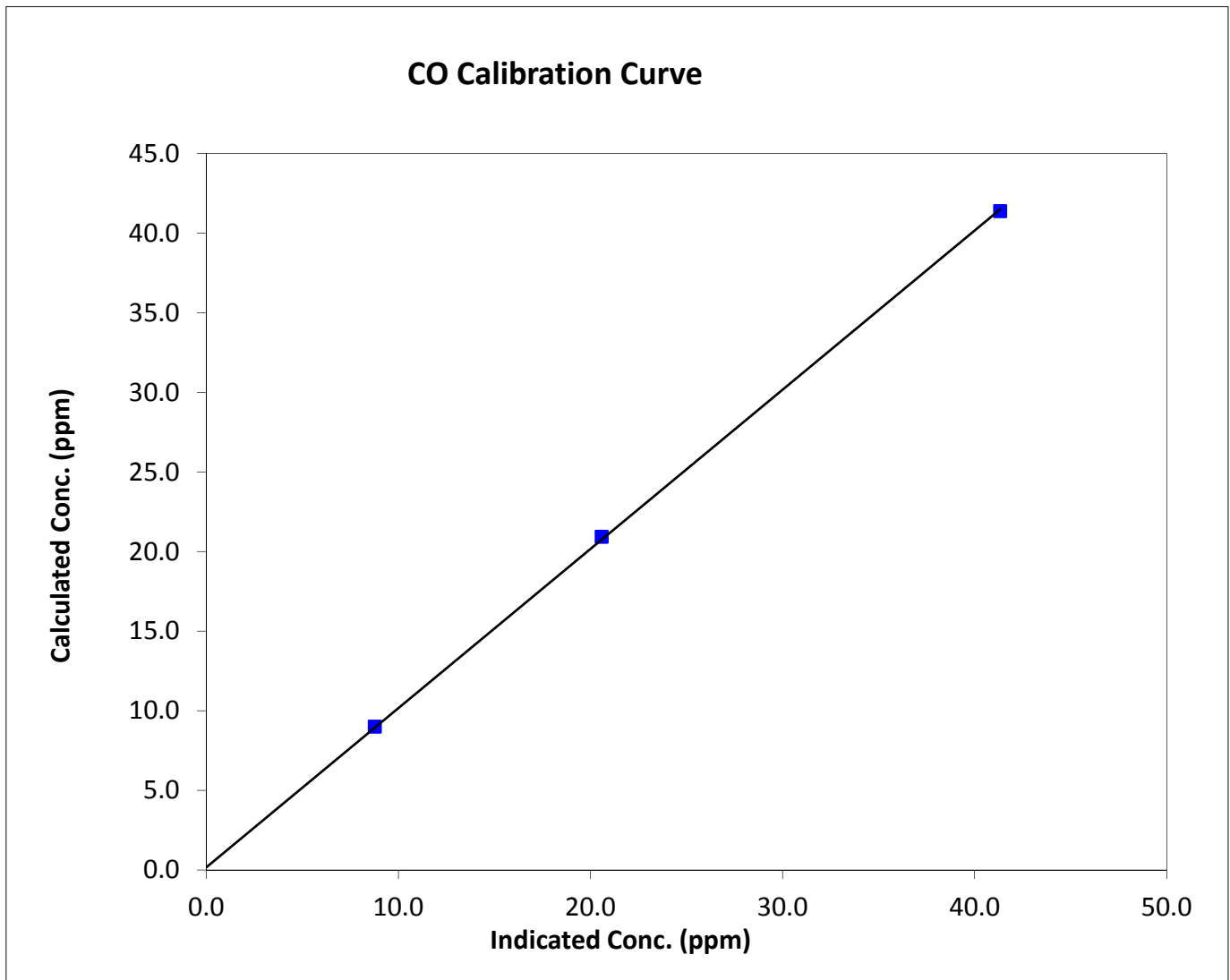
## CO Calibration Summary

### Station Information

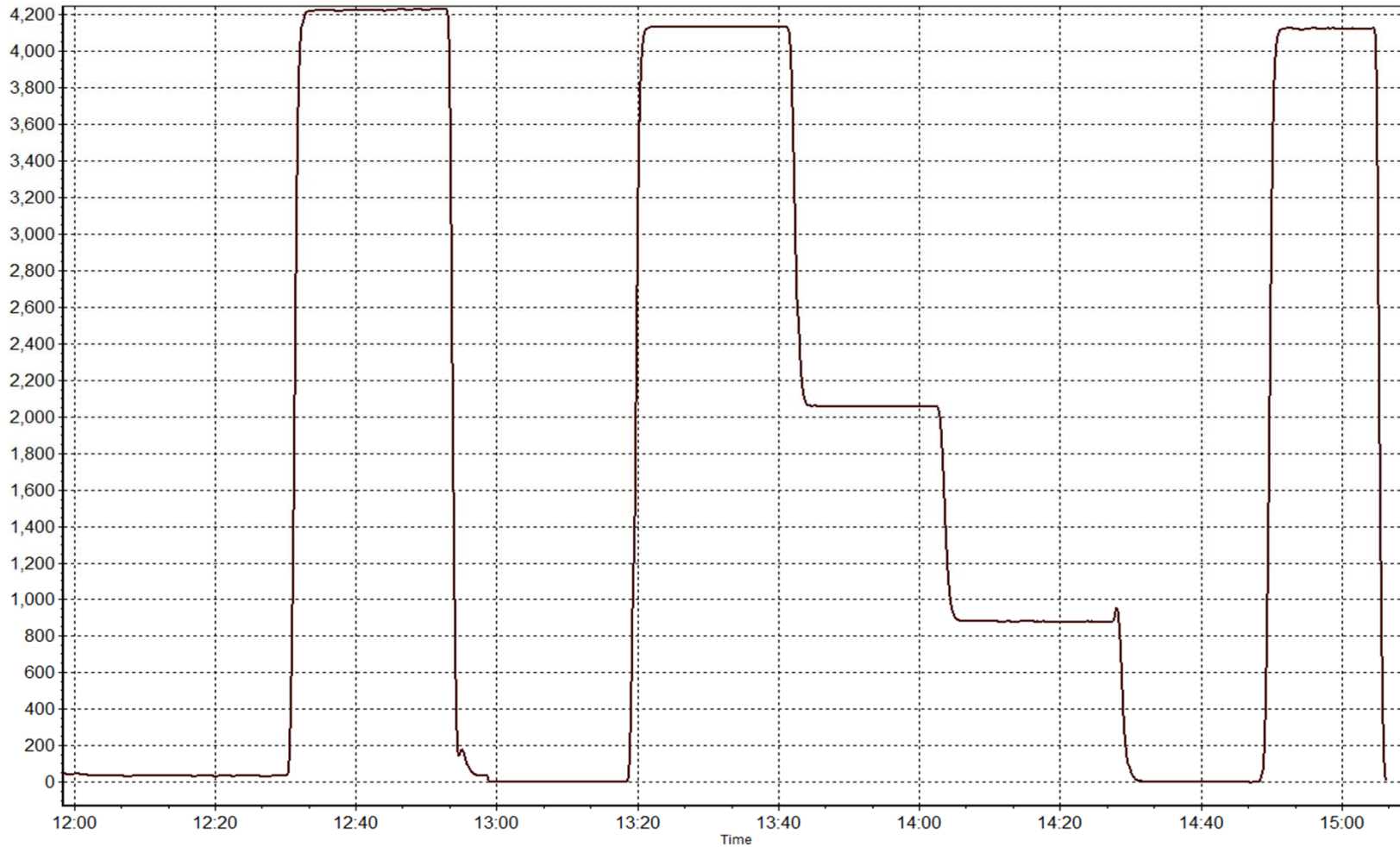
Calibration Date	October 15, 2014	Previous Calibration	September 5, 2014
Station Name	Athabasca Valley	Station Number	7
Start Time (MST)	12:00	End Time (MST)	15:10
Analyzer make	TEI 48C	Analyzer serial #	508011060

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999916
41.4	41.3	1.0010		
20.9	20.6	1.0170	Slope	0.999975
9.0	8.8	1.0258		
			Intercept	0.154992







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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 8  
FORT CHIPEWYAN  
OCTOBER 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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
OCTOBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	705	39	39	100.00	7	0	2	0
O3(ppb) Average	709	34	35	99.87	37	0	30	-
NO2(ppb) Average	702	42	42	100.00	16	0	5	-
NO(ppb) Average	702	42	42	100.00	9	-	2	-
NOX(ppb) Average	702	42	42	100.00	19	-	5	-
PM2.5(ug/m3) Average	742	0	2	99.73	17.7	-	6.0	0
Wind Speed 10 m (km/h) Average	743	0	1	99.87	35	-	-	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	16.9	-	11.9	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	-	-
Precipitation (mm) Total	743	0	1	99.87	3.6	-	-	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	472	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2(ppb) Average	705	0.2	1	-	0	0	0	0	0	0	0	7
O3(ppb) Average	709	20.2	6	-	5	13	16	20	24	28	37	37
NO2(ppb) Average	702	0.9	2	-	0	0	0	0	1	2	16	16
NO(ppb) Average	702	0.2	1	-	0	0	0	0	0	0	9	9
NOX(ppb) Average	702	1	2	-	0	0	0	0	1	2	19	19
PM2.5(ug/m3) Average	742	2.78	2.4	-	0.1	0.5	1.1	2.1	3.7	5.7	17.7	17.7
Wind Speed 10 m (km/h) Average	743	13.4	7	-	0	5	7	12	19	24	35	35
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	3.44	3.9	-	-4.5	-1.2	0.5	2.9	5.7	8.6	16.9	16.9
Relative Humidity (%) Average	744	81.7	12	-	42	66	74	84	91	95	99	99
Precipitation (mm) Total	743	-	-	26.42	0	0	0	0	0	0	3.6	3.6
Global Solar Radiation (W/m2) Average	744	55.6	97	-	0	0	0	0	74	206	472	472

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
O3	02 Oct 2014 14:00	02 Oct 2014 14:00	1	Power spike
PM2.5	02 Oct 2014 18:00	02 Oct 2014 19:00	2	Flow and zero reference checks, sample head cleaning
Wind Speed, Wind Direction	28 Oct 2014 03:00	28 Oct 2014 03:00	1	Flat line in sensor output signal
Precipitation Collector	02 Oct 2014 10:00	02 Oct 2014 10:00	1	Maintenance - tipping bucket cleaned

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 7 ppb on Oct 10 23:00	Maximum Daily Average: 2.0 ppb on Oct 10		Hours of Data:	705
Minimum Value: 0 ppb on Oct 3 10:00	Minimum Daily Average: 0.0 ppb on Oct 24		Hours of Missing Data:	39
Maximum Diurnal Average: 0.4 ppb at hour 23	Minimum Diurnal Average: 0.1 ppb at hour 6		Hours of Calibration:	39
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 3		Percent Operational Time:	100.0

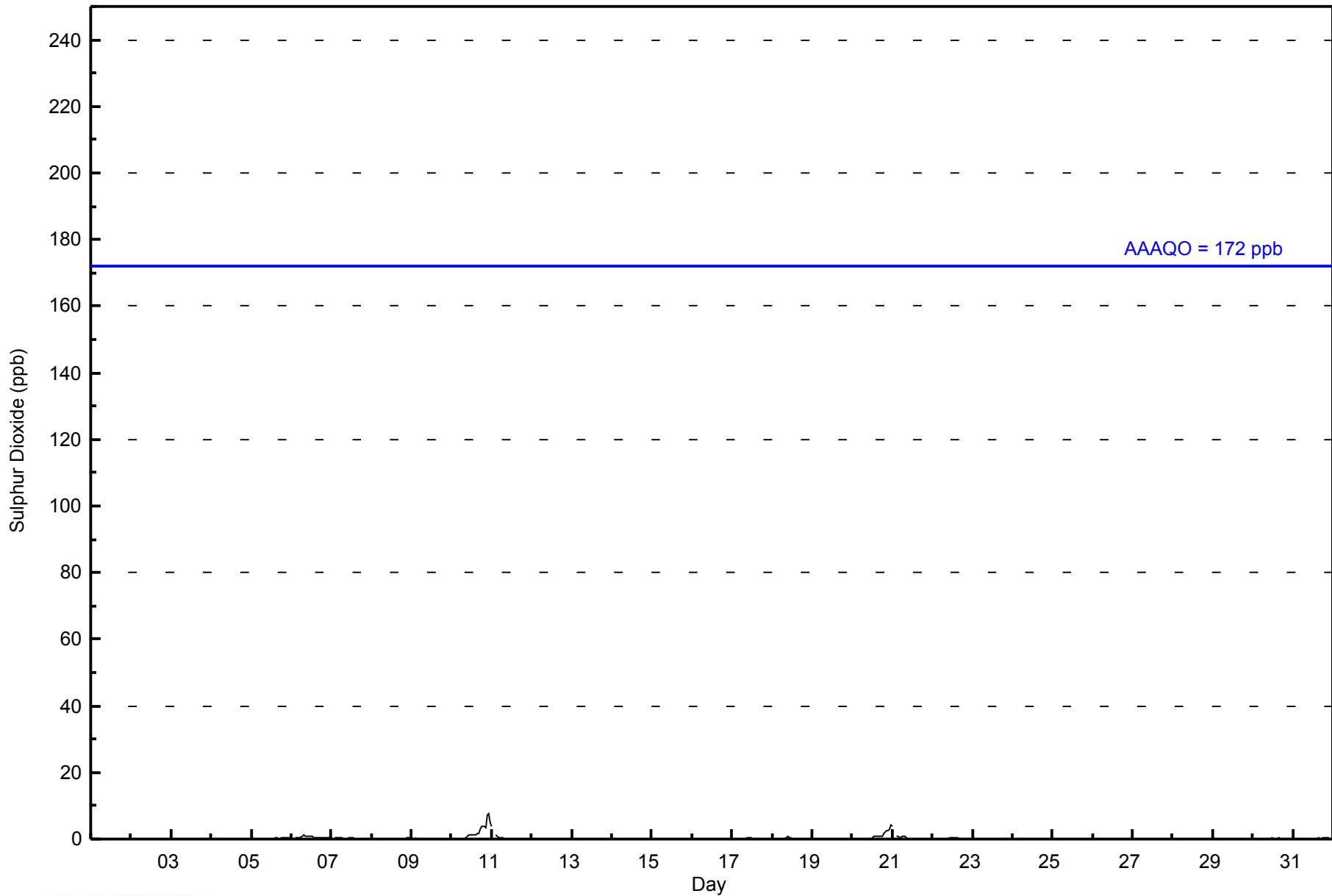
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
2-Oct	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	--	0																						
3-Oct	0	Z	0	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-Oct	0	Z	0	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-Oct	0	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-Oct	0	Z	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1																						
7-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
8-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
9-Oct	0	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																						
10-Oct	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	2	3	4	4	3	7	7	5	2.0	7																						
11-Oct	4	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4																						
12-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
13-Oct	0	Z	0	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-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
15-Oct	0	Z	0	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-Oct	0	Z	0	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-Oct	0	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																						
18-Oct	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																						
19-Oct	0	Z	0	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-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	2	3	3	3	4	0.9	4																						
21-Oct	4	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4																						
22-Oct	0	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																						
23-Oct	0	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-Oct	0	Z	0	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-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
26-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
27-Oct	0	Z	0	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-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																						
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
30-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
31-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
																								0.3	--	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	Diurnal Average
																								4	--	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	4	4	3	7	7	5	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 - October 2014





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Chipeywan - October 2014**

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

Total Number of Valid Hours: 705

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Chipeywan - October 2014**

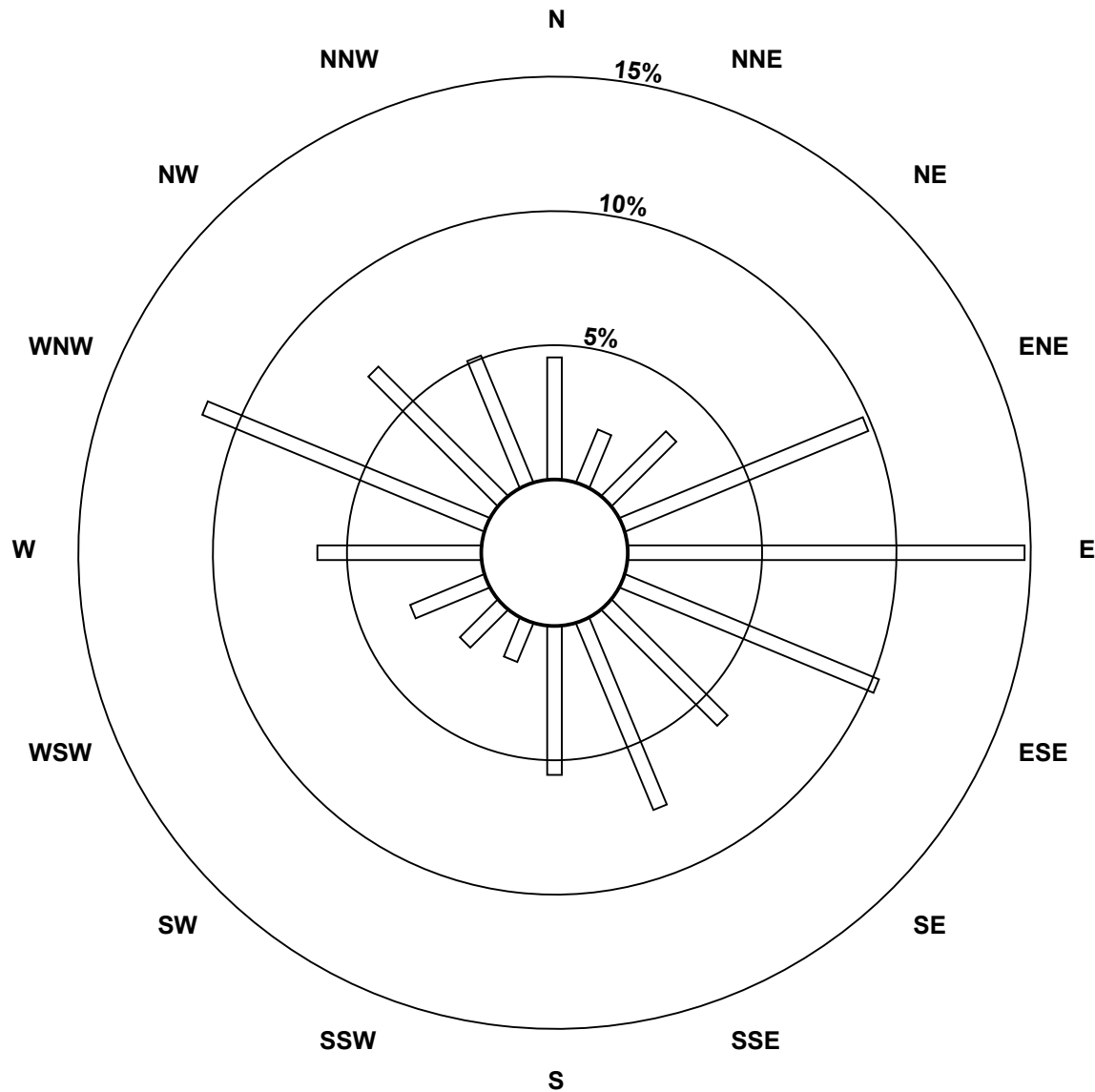
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	32	15	24	69	104	72	43	53	39	11	14	21	43	80	48	36	704
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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>	32	15	24	69	104	72	43	53	39	11	14	21	43	80	48	36	704

Total Number of Valid Hours: 704

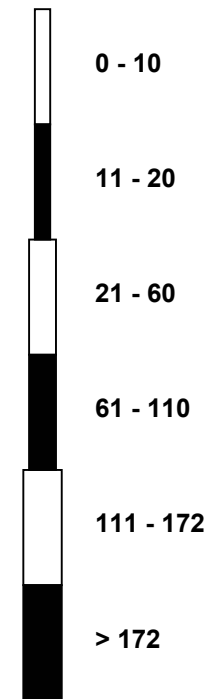
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Chipeywan (AMS 8)**



Classes (ppb)

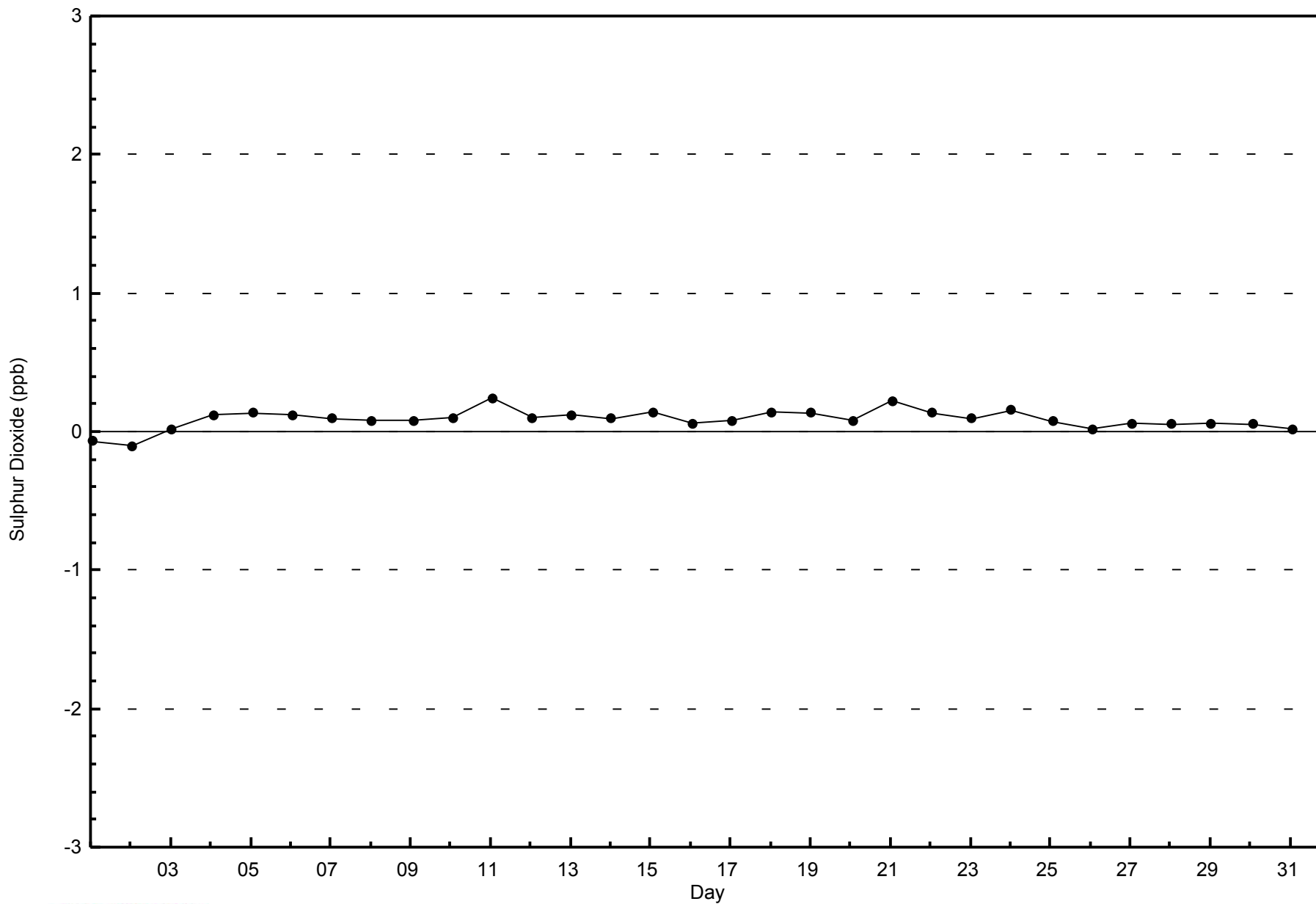


Total Number of Valid Hours: 704



WBEA  
Zero Responses

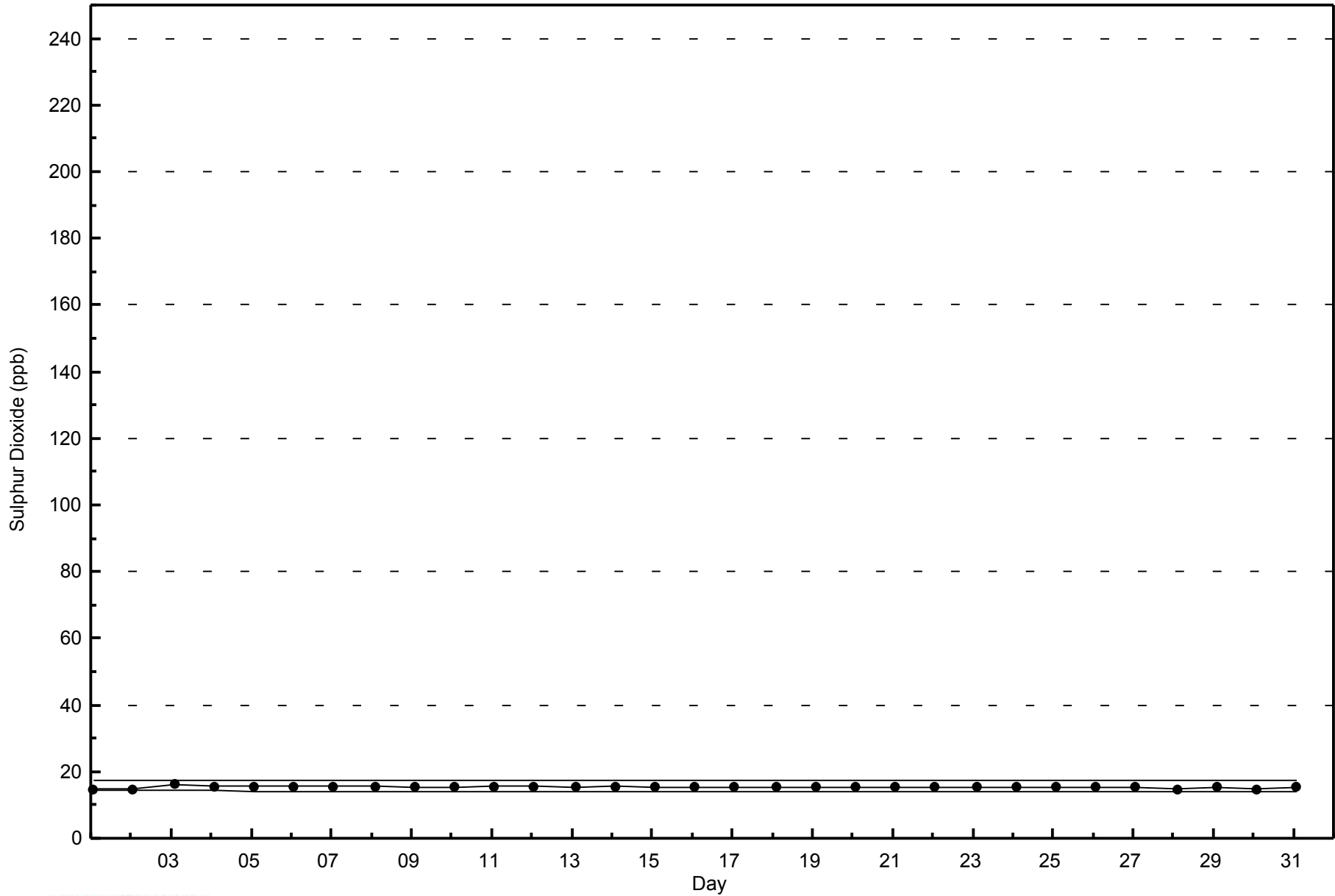
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Chipeywan - October 2014





**WBEA**  
**Span Responses**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Chipeywan - October 2014**





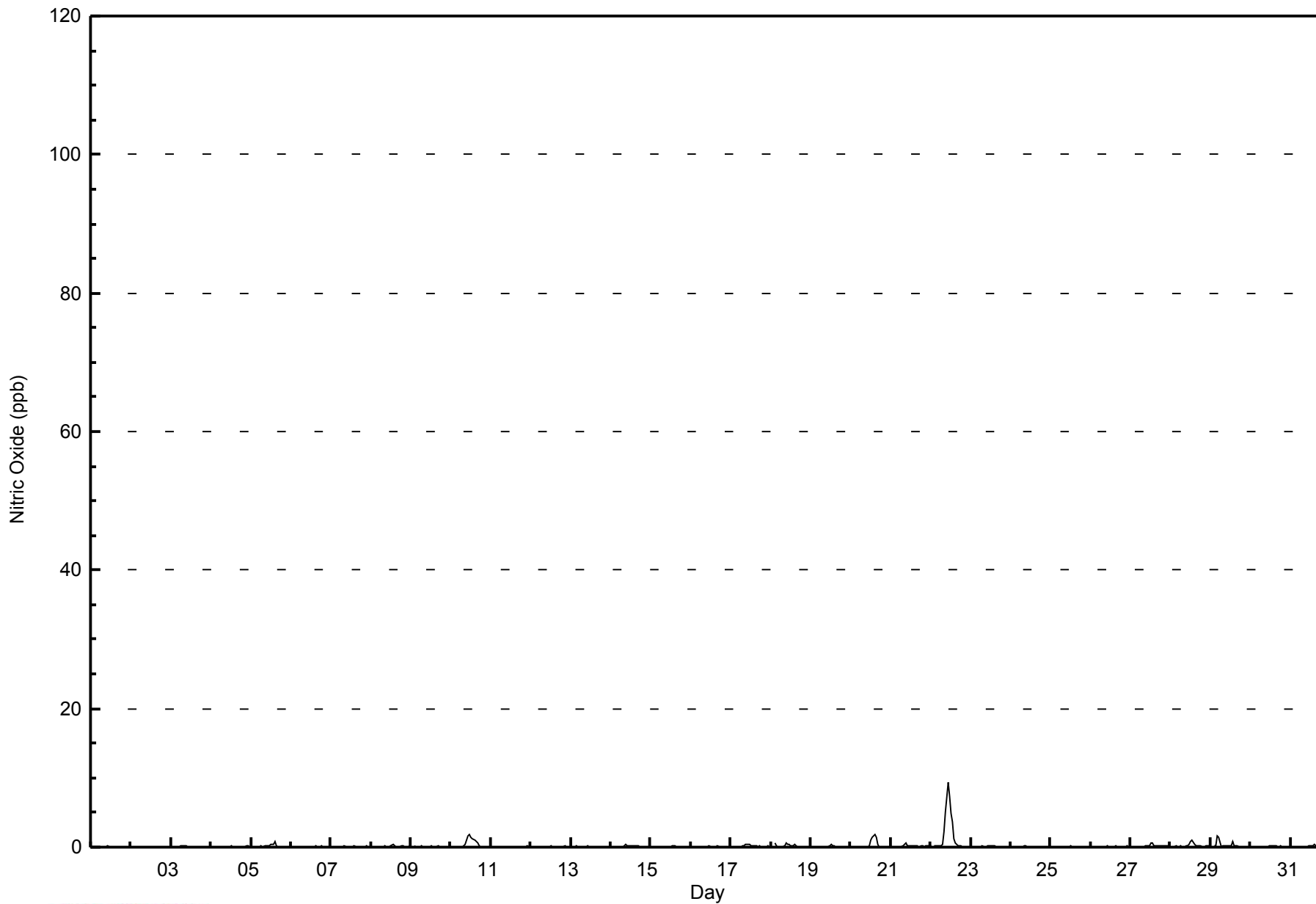
Maximum Value: 9 ppb on Oct 22 11:00														Maximum Daily Average: 1.6 ppb on Oct 22														Hours in Service: 744																				
Minimum Value: 0 ppb on Oct 1 04:00														Minimum Daily Average: 0.0 ppb on Oct 1														Hours of Data: 702																				
Maximum Diurnal Average: 0.5 ppb at hour 11														Minimum Diurnal Average: 0.1 ppb at hour 1														Hours of Missing Data: 42																				
Monthly Average: 0.2 ppb														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 2														Hours of Calibration: 42																				
																												Percent Operational Time: 100.0																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0	Z	0	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-Oct	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	0	0	0	0	--	0																						
3-Oct	0	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																						
4-Oct	0	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																						
5-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	1																						
6-Oct	0	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-Oct	0	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-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
9-Oct	0	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																						
10-Oct	0	Z	0	0	0	0	0	0	0	1	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0.5	2																						
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
12-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
13-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
14-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
15-Oct	0	Z	0	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-Oct	0	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																						
17-Oct	0	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																						
18-Oct	0	Z	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
19-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
20-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	1	2	2	0	0	0	0	0	0	0	0	0	0.3	2																						
21-Oct	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																						
22-Oct	0	Z	0	0	0	0	0	0	2	5	9	7	5	4	1	1	0	0	0	0	0	0	0	0	1.6	9																						
23-Oct	0	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-Oct	0	Z	0	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-Oct	0	Z	0	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-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
27-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
29-Oct	0	Z	0	0	2	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	2																						
30-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
31-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
																								0.1	--	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.5	0.4	0.4	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average
																								0	--	1	0	2	1	0	0	2	5	9	7	5	4	2	2	1	0	0	0	0	0	0	0	Diurnal Maximum
Z - zerospan C - Calibration																																																





WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
Fort Chipewyan - October 2014





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

**Nitric Oxide (NO) - ppb**  
**Fort Chipeywan - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	702	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: 702

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort Chipeywan - October 2014**

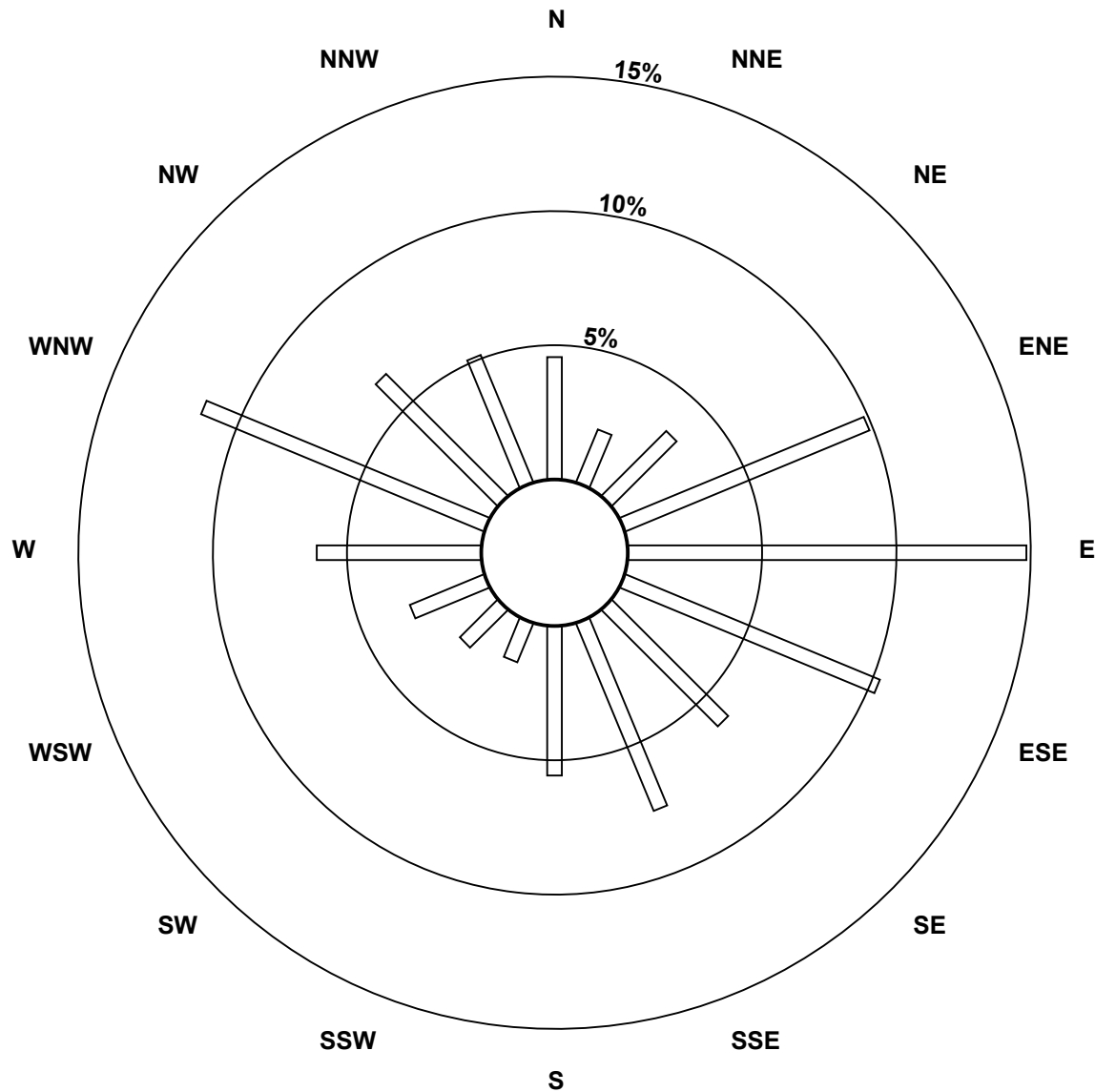
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	32	15	24	69	104	72	43	53	39	11	14	21	43	80	45	36	701
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	32	15	24	69	104	72	43	53	39	11	14	21	43	80	45	36	701

Total Number of Valid Hours: 701

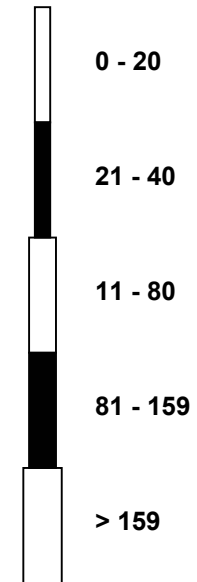
Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Nitric Oxide (NO) - ppb  
Fort Chipeywan (AMS 8)



Classes (ppb)

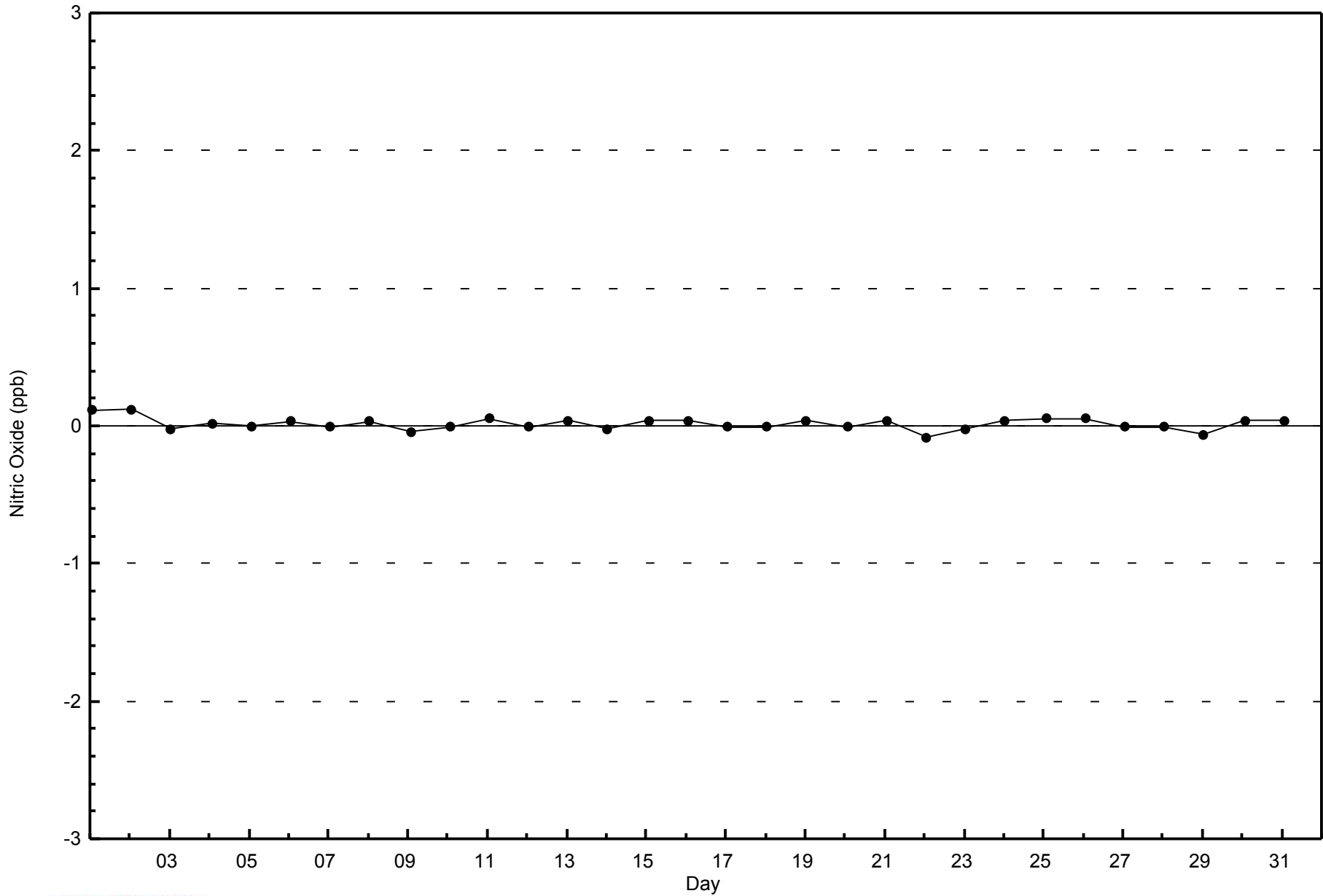


Total Number of Valid Hours: 701



WBEA  
Zero Responses

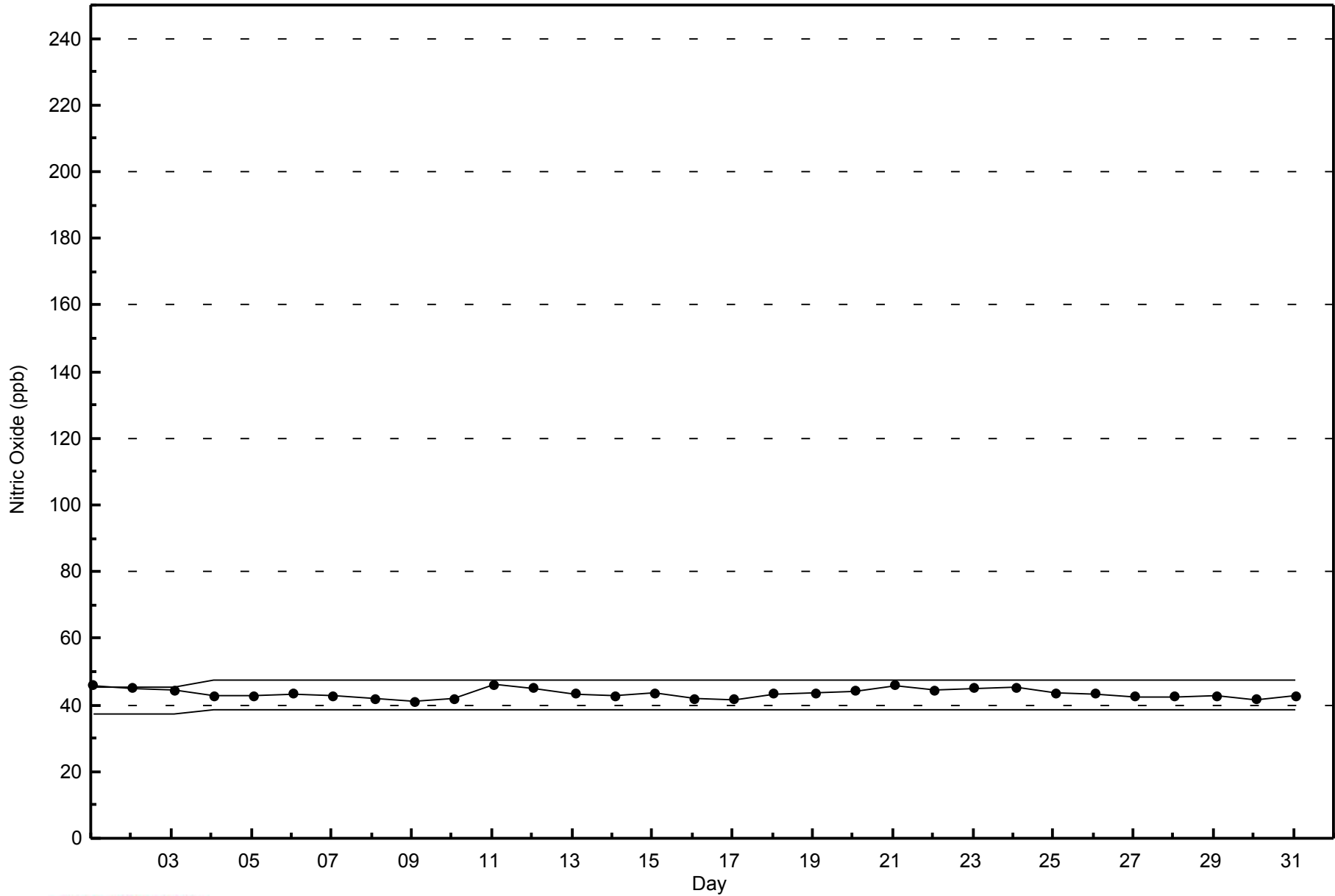
Nitric Oxide (NO) - ppb  
Fort Chipeywan - October 2014





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Fort Chipecywan - October 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 16 ppb on Oct 20 21:00	Maximum Daily Average: 4.6 ppb on Oct 20		Hours of Data:	702
Minimum Value: 0 ppb on Oct 1 01:00	Minimum Daily Average: 0.1 ppb on Oct 9		Hours of Missing Data:	42
Maximum Diurnal Average: 1.3 ppb at hour 23	Minimum Diurnal Average: 0.6 ppb at hour 3		Hours of Calibration:	42
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> = 11		Percent Operational Time:	100.0

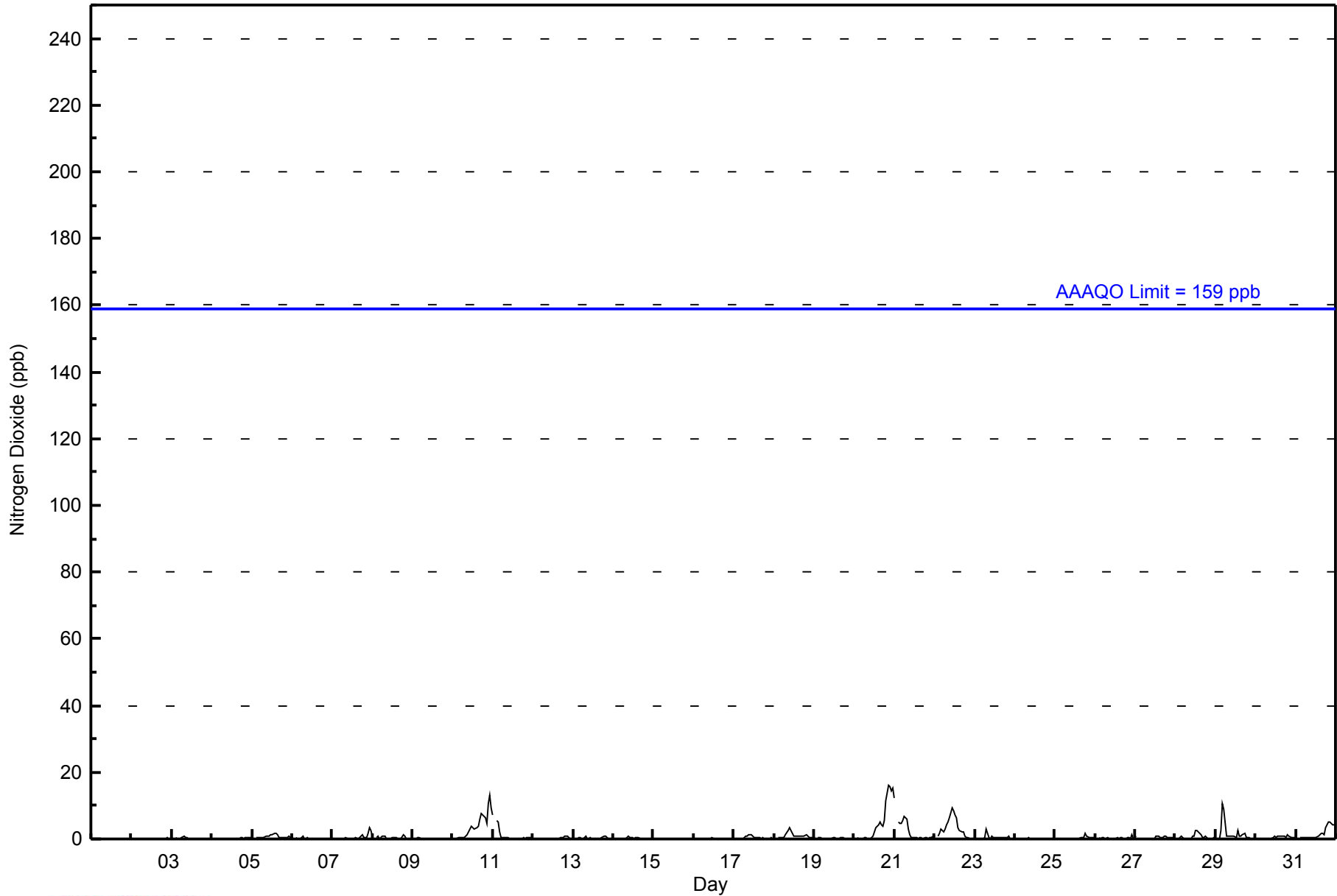
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Oct	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	0	0	0	0	--	0
3-Oct	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-Oct	0	Z	0	0	0	0	0	1	1	1	1	1	1	2	2	1	1	0	0	0	0	0	1	1	0.7	2
6-Oct	0	Z	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
7-Oct	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0	2	3	3	0.6	3
8-Oct	1	Z	0	1	0	0	1	1	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0.4	1
9-Oct	0	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
10-Oct	0	Z	0	0	0	0	1	1	1	2	3	4	4	3	3	4	6	8	7	6	5	11	13	9	4.0	13
11-Oct	7	Z	6	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	7
12-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.2	1
13-Oct	1	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0.3	1
14-Oct	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
15-Oct	0	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
16-Oct	0	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
17-Oct	0	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
18-Oct	0	Z	1	0	0	0	1	1	3	3	3	2	1	1	1	1	1	1	1	1	1	0	0	0	1.0	3
19-Oct	0	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-Oct	0	Z	0	0	0	0	0	0	0	0	1	2	3	4	5	4	4	6	11	16	16	15	15	4.6	16	
21-Oct	12	Z	5	5	5	5	7	6	3	1	0	0	0	0	0	0	0	0	1	0	0	0	1	2.3	12	
22-Oct	1	Z	1	2	3	2	3	4	5	6	9	9	7	7	3	3	2	2	1	1	0	0	0	3.1	9	
23-Oct	0	Z	0	0	0	0	0	3	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0.5	3	
24-Oct	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-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0.3	2	
26-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0.3	1	
27-Oct	1	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0.4	1	
28-Oct	0	Z	0	1	0	0	0	0	0	0	1	1	3	3	2	1	1	0	1	0	0	0	0	0.6	3	
29-Oct	1	Z	0	2	11	9	1	1	1	1	1	1	3	1	1	1	2	1	1	0	0	0	0	1.6	11	
30-Oct	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0.5	1	
31-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2	1	3	5	5	5	4	4	1.7	5
	0.9	--	0.6	0.7	0.8	0.7	0.6	0.7	0.6	0.7	0.8	0.8	0.8	0.9	0.8	0.7	0.8	0.8	1.0	1.2	1.1	1.2	1.3	1.2	Diurnal Average	
	12	--	6	5	11	9	7	6	5	6	9	9	7	7	4	5	6	8	7	11	16	16	15	15	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 - October 2014







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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort Chipeywan - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	702	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: 702

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort Chipeywan - October 2014**

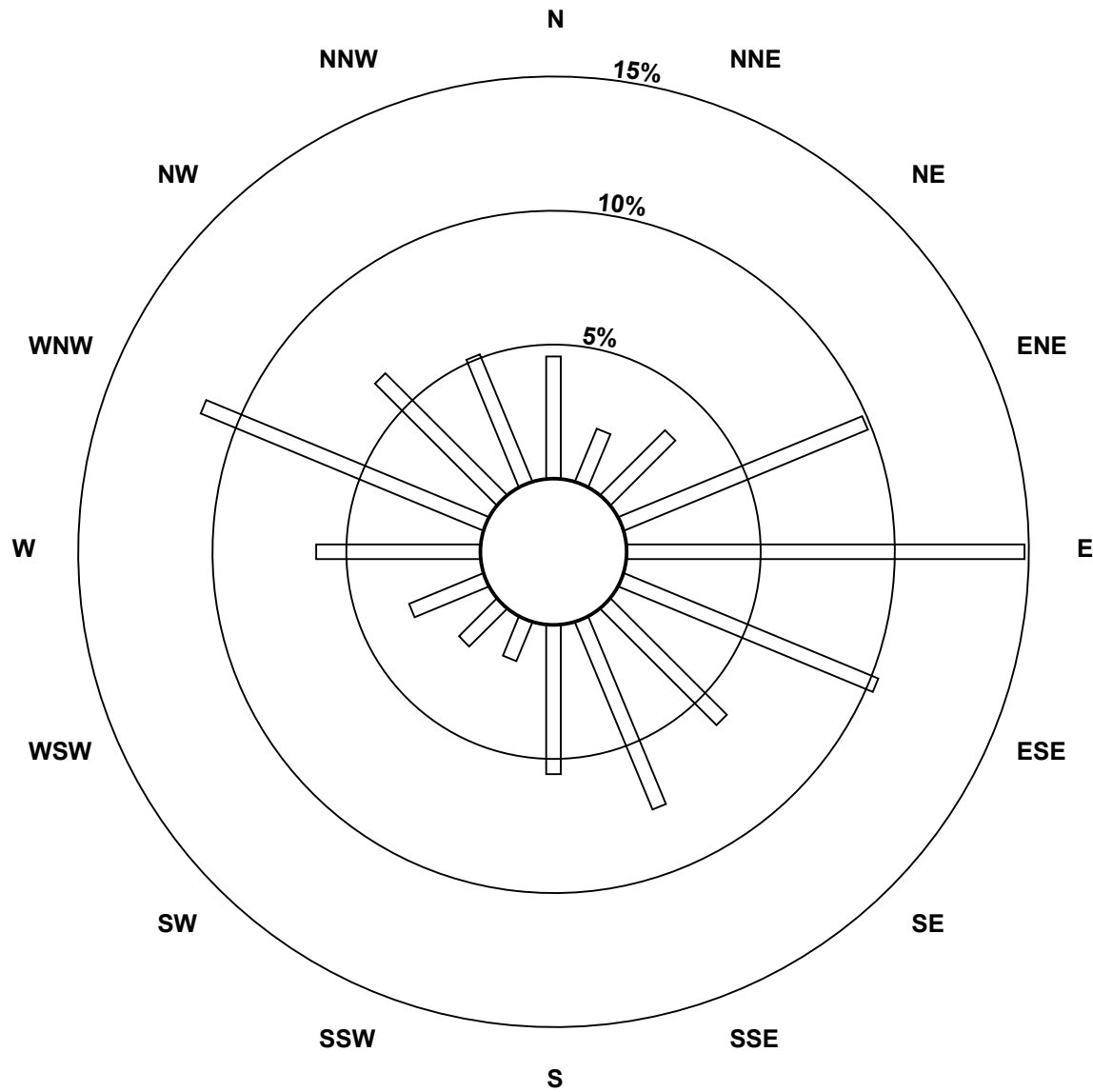
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	32	15	24	69	104	72	43	53	39	11	14	21	43	80	45	36	701
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	32	15	24	69	104	72	43	53	39	11	14	21	43	80	45	36	701

Total Number of Valid Hours: 701

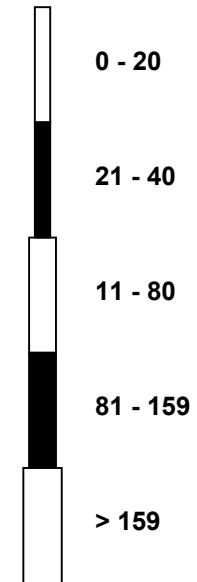
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipeywan (AMS 8)**



Classes (ppb)

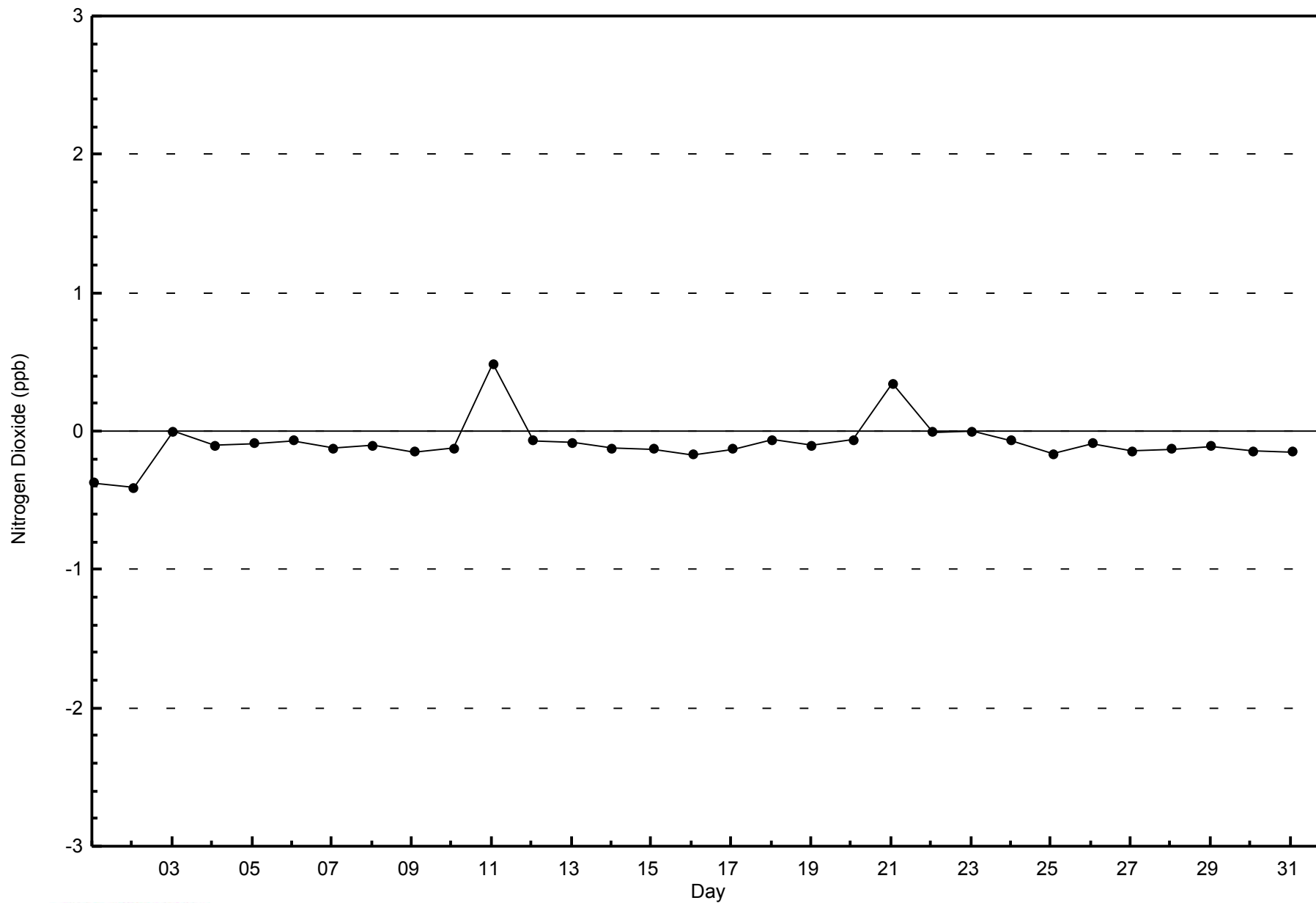


Total Number of Valid Hours: 701



WBEA  
Zero Responses

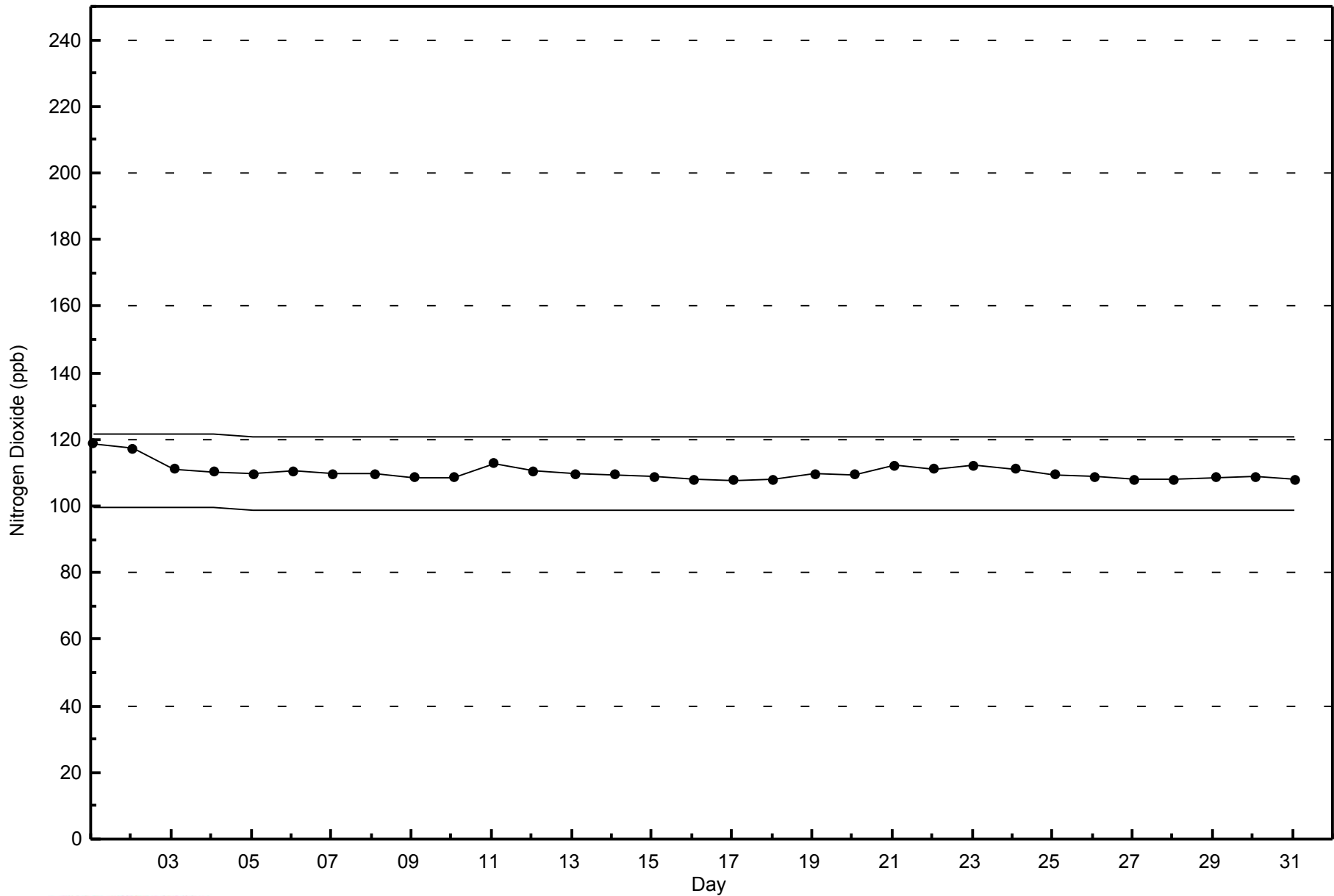
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipecywan - October 2014





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipecywan - October 2014



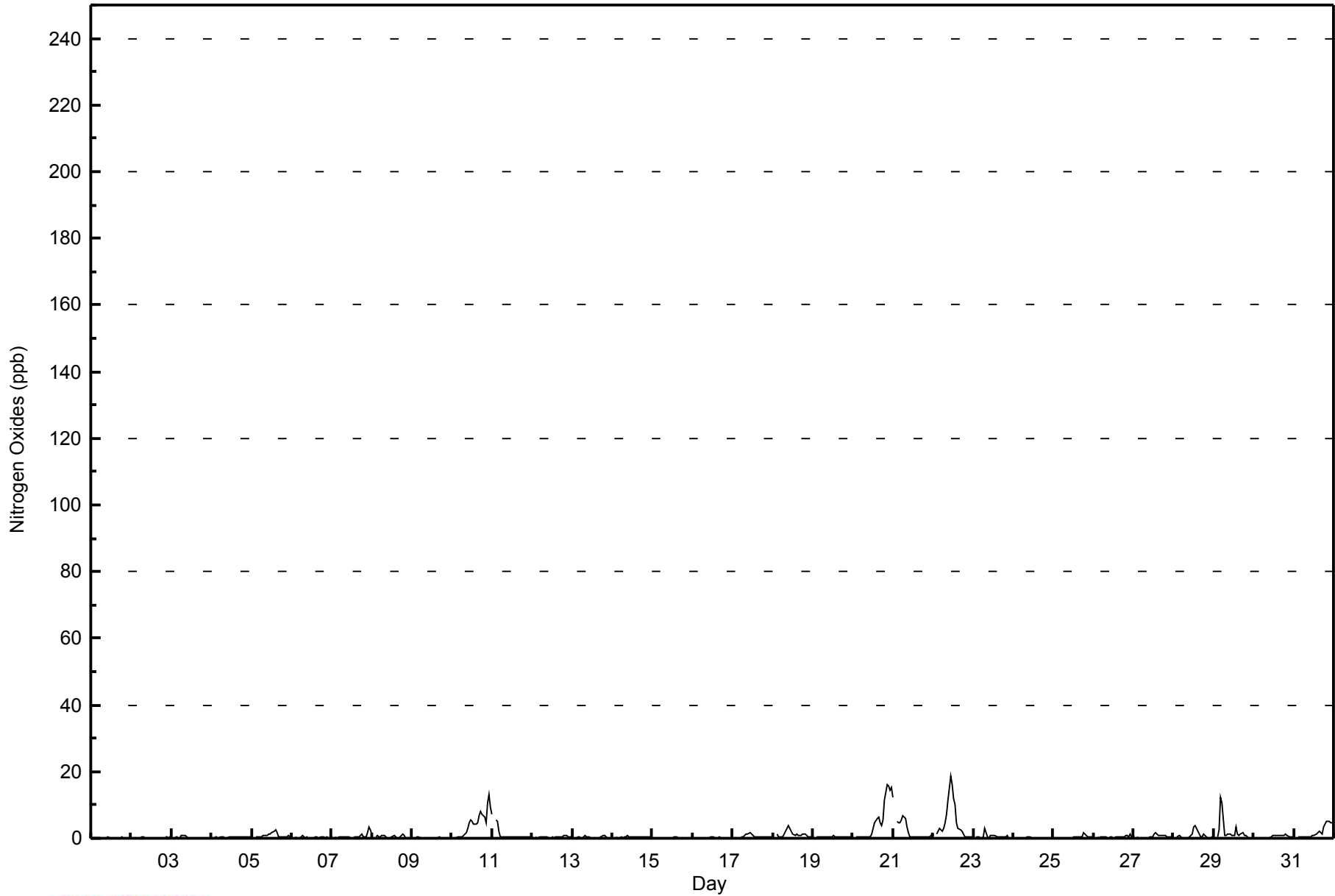


Maximum Value: 19 ppb on Oct 22 11:00														Maximum Daily Average: 4.9 ppb on Oct 20														Hours in Service: 744																				
Minimum Value: 0 ppb on Oct 1 01:00														Minimum Daily Average: 0.1 ppb on Oct 16														Hours of Data: 702																				
Maximum Diurnal Average: 1.4 ppb at hour 23														Minimum Diurnal Average: 0.6 ppb at hour 3														Hours of Missing Data: 42																				
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> = 12														Hours of Calibration: 42																				
																												Percent Operational Time: 100.0																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
2-Oct	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	0	0	0	0	--	0																						
3-Oct	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	1																						
5-Oct	0	Z	0	0	0	0	1	1	1	1	1	2	2	3	2	1	0	0	0	0	0	0	1	0	0.8	3																						
6-Oct	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
7-Oct	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0	2	3	3	0.7	3																						
8-Oct	1	Z	0	1	0	0	1	1	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0.5	1																						
9-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
10-Oct	0	Z	0	0	0	0	0	1	2	3	5	6	5	4	4	5	7	8	7	6	5	11	13	9	4.4	13																						
11-Oct	7	Z	6	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	7																						
12-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1																						
13-Oct	0	Z	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0.3	1																						
14-Oct	0	Z	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1																						
15-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																						
17-Oct	0	Z	0	0	0	0	0	1	1	1	2	1	1	1	0	0	0	0	0	0	0	0	1	0	0.5	2																						
18-Oct	0	Z	1	1	0	0	1	1	3	4	3	2	1	1	1	1	1	1	1	1	1	0	0	0	1.2	4																						
19-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
20-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	3	5	6	7	5	4	6	12	16	16	15	15	4.9	16																						
21-Oct	12	Z	5	5	5	6	7	6	3	2	0	0	0	0	0	0	0	0	0	1	0	0	1	1	2.5	12																						
22-Oct	1	Z	1	2	3	2	3	5	7	12	19	16	12	10	5	3	2	2	1	1	0	0	0	0	4.7	19																						
23-Oct	0	Z	0	0	0	0	0	3	0	0	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0.5	3																						
24-Oct	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
25-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0.3	2																						
26-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0.4	1																						
27-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	1	1	1	0	0	0	0	0.6	2																						
28-Oct	0	Z	0	1	0	0	0	0	0	0	1	1	3	4	2	1	1	0	1	0	0	0	0	0	0.8	4																						
29-Oct	1	Z	0	3	12	10	1	1	1	1	1	1	3	1	1	1	2	1	1	1	0	0	0	0	1.9	12																						
30-Oct	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.5	1																						
31-Oct	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	2	2	2	1	3	5	5	5	5	5	1.8	5																						
																								0.9	--	0.6	0.7	0.9	0.8	0.6	0.8	0.8	1.0	1.3	1.2	1.2	1.3	1.1	0.9	0.9	0.9	1.0	1.2	1.2	1.3	1.4	1.3	Diurnal Average
																								12	--	6	5	12	10	7	6	7	12	19	16	12	10	6	7	7	8	7	12	16	16	15	15	Diurnal Maximum
Z - zerospan C - Calibration																																																



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Chipecywan - October 2014**





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Chipeywan - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	702	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: 702

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Chipeywan - October 2014**

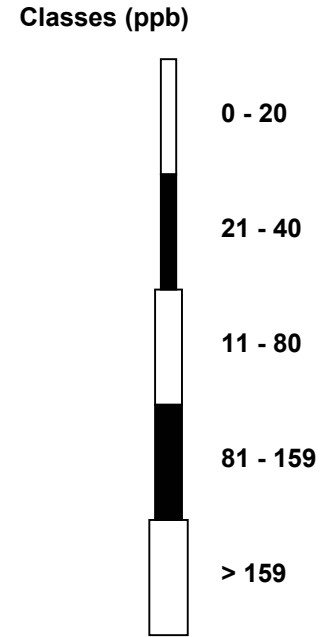
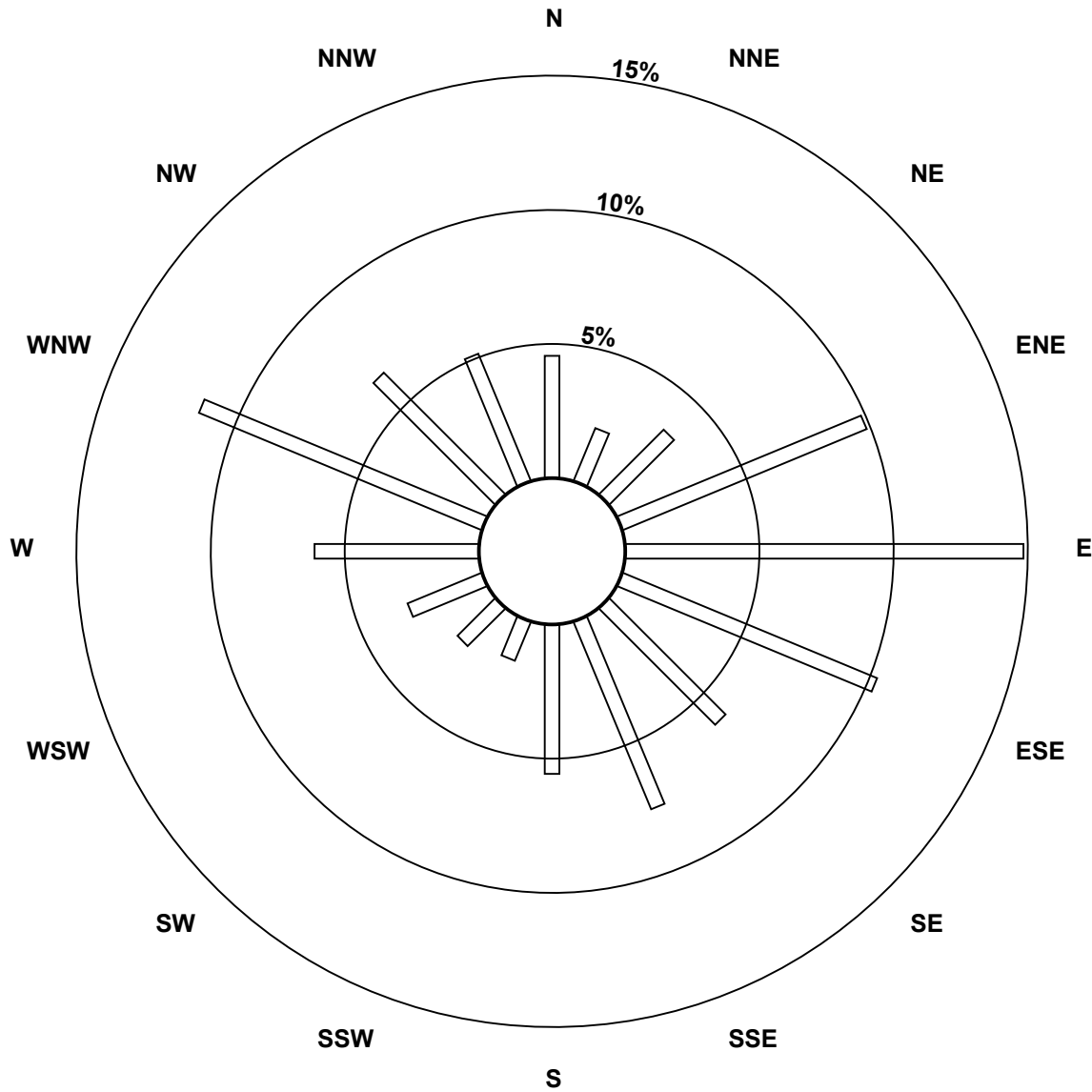
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	32	15	24	69	104	72	43	53	39	11	14	21	43	80	45	36	701
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	32	15	24	69	104	72	43	53	39	11	14	21	43	80	45	36	701

Total Number of Valid Hours: 701

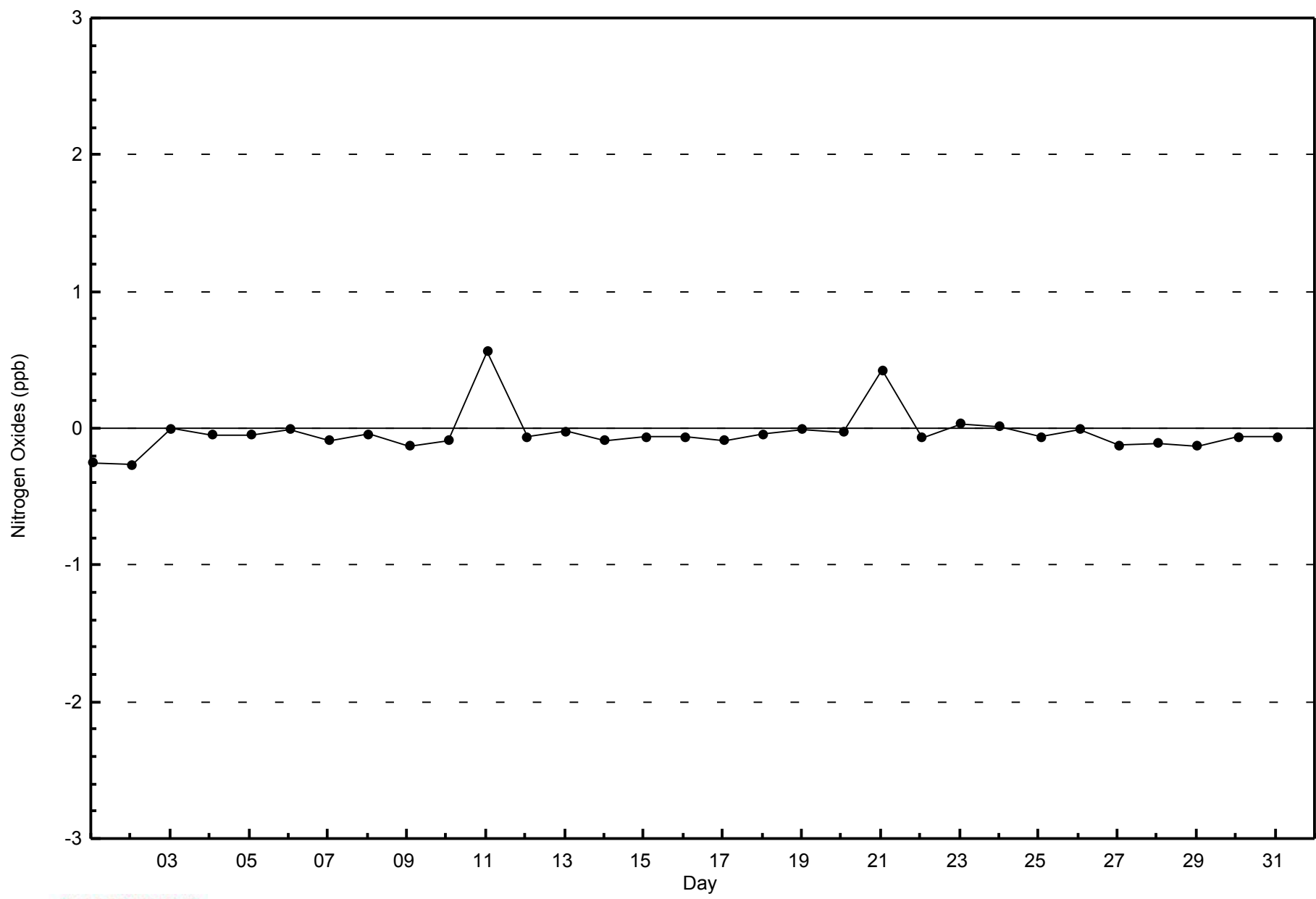
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Chipeywan (AMS 8)**



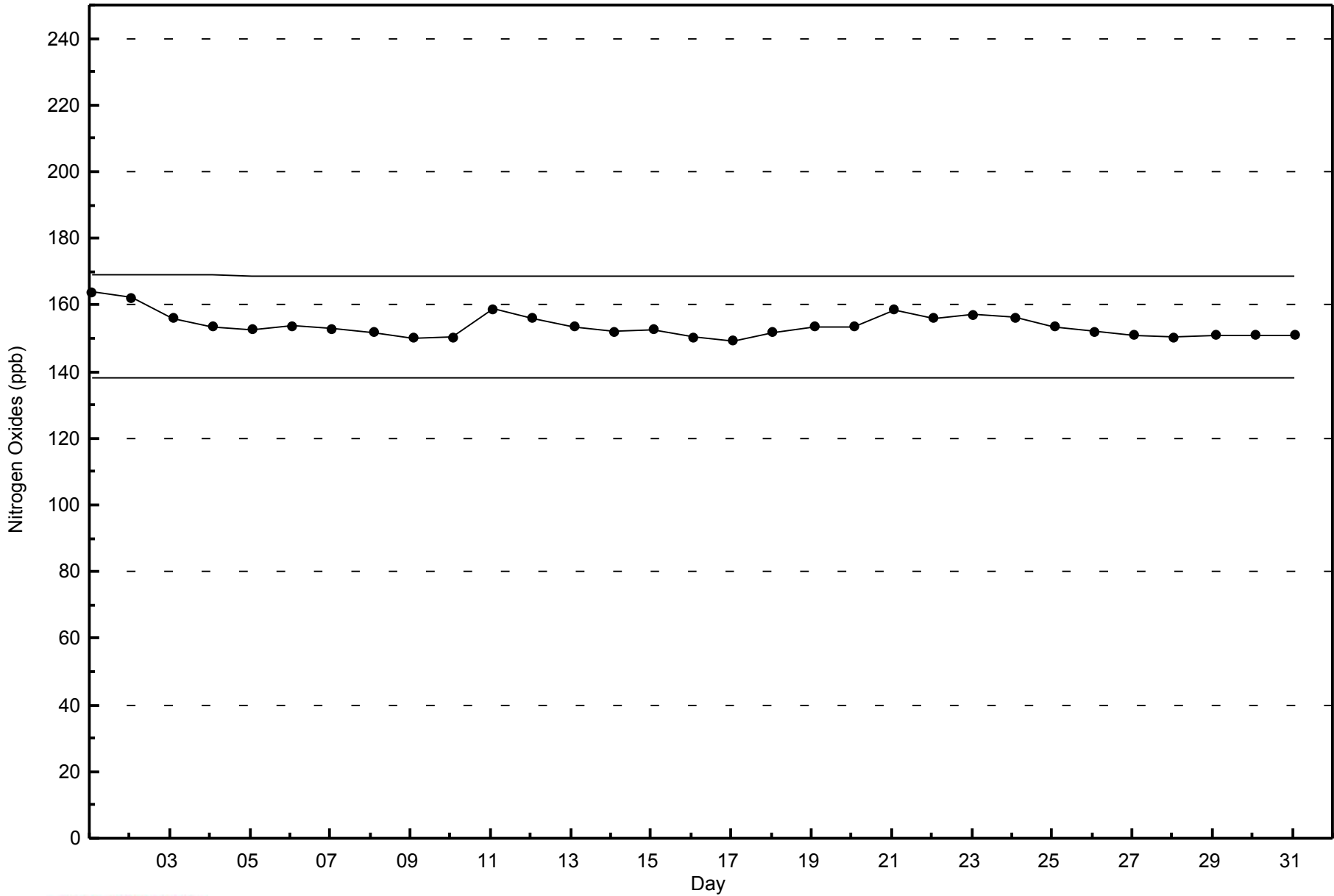
**Total Number of Valid Hours: 701**





WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Chipecywan - October 2014





Summary of Hour Averages

Fort Chipeywan - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 37 ppb on Oct 11 15:00	Maximum Daily Average: 29.8 ppb on Oct 11		Hours of Data:	709
Minimum Value: 5 ppb on Nov 1 00:00	Minimum Daily Average: 14.4 ppb on Oct 18		Hours of Missing Data:	35
Maximum Diurnal Average: 21.8 ppb at hour 18	Minimum Diurnal Average: 18.5 ppb at hour 8		Hours of Calibration:	34
Monthly Average: 20.2 ppb	Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 13 Q <sub>1</sub> = 16 Median = 20 Q <sub>3</sub> = 24 P <sub>90</sub> = 28 P <sub>99</sub> = 34		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-Oct	15	14	Z	14	13	13	13	16	18	19	18	18	19	21	22	24	23	21	22	23	24	25	25	25	19.3	25
2-Oct	25	25	Z	25	25	25	25	24	24	24	25	25	24	PF	23	24	C	C	C	24	24	25	25	24	24.5	25
3-Oct	24	23	Z	20	17	16	15	14	17	17	20	24	24	24	25	25	25	24	23	23	23	22	22	21	21.3	25
4-Oct	21	21	Z	22	21	20	19	19	19	18	18	18	18	19	19	20	20	20	20	19	17	16	15	14	18.8	22
5-Oct	14	13	Z	11	11	11	11	11	10	10	12	15	15	16	16	18	23	28	30	31	33	33	34	35	19.1	35
6-Oct	33	32	Z	33	32	33	31	31	30	30	30	30	31	27	26	28	29	28	27	27	28	28	26	26	29.4	33
7-Oct	26	25	Z	25	26	26	26	25	23	25	28	28	27	26	25	22	21	23	23	22	21	16	14	12	23.1	28
8-Oct	15	15	Z	19	19	17	15	19	22	21	21	20	22	22	23	24	24	23	21	22	25	25	25	25	21.0	25
9-Oct	26	26	Z	21	21	21	19	17	17	18	17	17	18	21	23	24	25	27	27	25	24	23	22	21	21.8	27
10-Oct	21	21	Z	23	23	24	23	22	22	23	23	24	25	28	29	29	26	25	25	26	27	18	15	18	23.3	29
11-Oct	19	19	Z	20	27	31	31	31	28	24	27	29	33	37	37	36	34	34	34	33	32	31	29	27	29.8	37
12-Oct	27	25	Z	17	15	15	14	15	16	16	17	17	18	20	21	20	21	21	21	19	16	17	14	13	18.1	27
13-Oct	13	12	Z	12	11	11	12	13	18	22	23	24	24	24	25	25	25	22	22	25	27	28	27	27	20.4	28
14-Oct	27	26	Z	24	22	21	21	20	19	19	19	20	20	18	18	18	17	17	17	16	15	15	12	12	19.0	27
15-Oct	12	12	Z	12	13	13	12	13	13	13	14	13	15	19	20	19	19	18	18	18	18	19	22	22	15.9	22
16-Oct	21	22	Z	21	21	21	20	19	18	18	21	22	25	25	25	24	24	23	22	21	21	19	18	16	21.2	25
17-Oct	15	15	Z	15	15	15	15	17	17	19	20	22	24	27	28	28	26	25	24	24	23	24	24	24	21.1	28
18-Oct	23	23	Z	22	21	20	19	18	15	14	15	15	16	17	16	13	10	9	7	8	8	8	8	8	14.4	23
19-Oct	8	9	Z	10	10	10	11	12	14	13	12	14	14	16	16	18	18	17	16	17	18	19	20	21	14.5	21
20-Oct	23	25	Z	25	25	23	22	23	22	21	20	22	22	21	20	21	22	22	19	13	9	9	8	7	19.4	25
21-Oct	9	13	Z	14	12	9	9	16	20	27	27	28	28	29	30	30	30	29	29	29	30	31	28	24	23.1	31
22-Oct	22	21	Z	15	14	19	17	14	12	13	13	17	19	21	22	24	25	25	28	29	31	31	32	31	21.5	32
23-Oct	30	29	Z	30	30	30	28	24	27	27	25	24	23	21	20	20	19	17	19	19	17	15	14	13	22.6	30
24-Oct	12	12	Z	9	10	11	13	14	15	17	19	20	21	23	25	25	25	25	24	25	24	24	23	23	19.1	25
25-Oct	24	24	Z	23	22	22	20	20	19	18	18	19	17	17	16	15	15	15	13	13	14	15	16	17	18.0	24
26-Oct	19	20	Z	22	23	24	25	20	15	17	19	26	25	24	23	16	22	26	25	22	20	18	18	16	21.0	26
27-Oct	15	14	Z	13	12	13	13	13	14	14	14	14	14	17	19	20	19	17	15	14	15	14	14	13	14.8	20
28-Oct	14	16	Z	13	15	15	15	16	13	12	11	11	11	12	14	17	18	19	18	22	22	22	23	20	16.0	23
29-Oct	19	19	Z	13	6	7	12	12	11	10	10	11	13	14	18	18	17	18	23	25	27	25	25	23	16.4	27
30-Oct	24	25	Z	26	26	26	25	24	25	24	20	18	17	16	16	18	20	22	23	19	19	19	19	20	21.5	26
31-Oct	21	22	Z	24	24	24	24	23	22	21	19	18	17	15	15	13	12	12	10	7	6	6	5	5	15.9	24

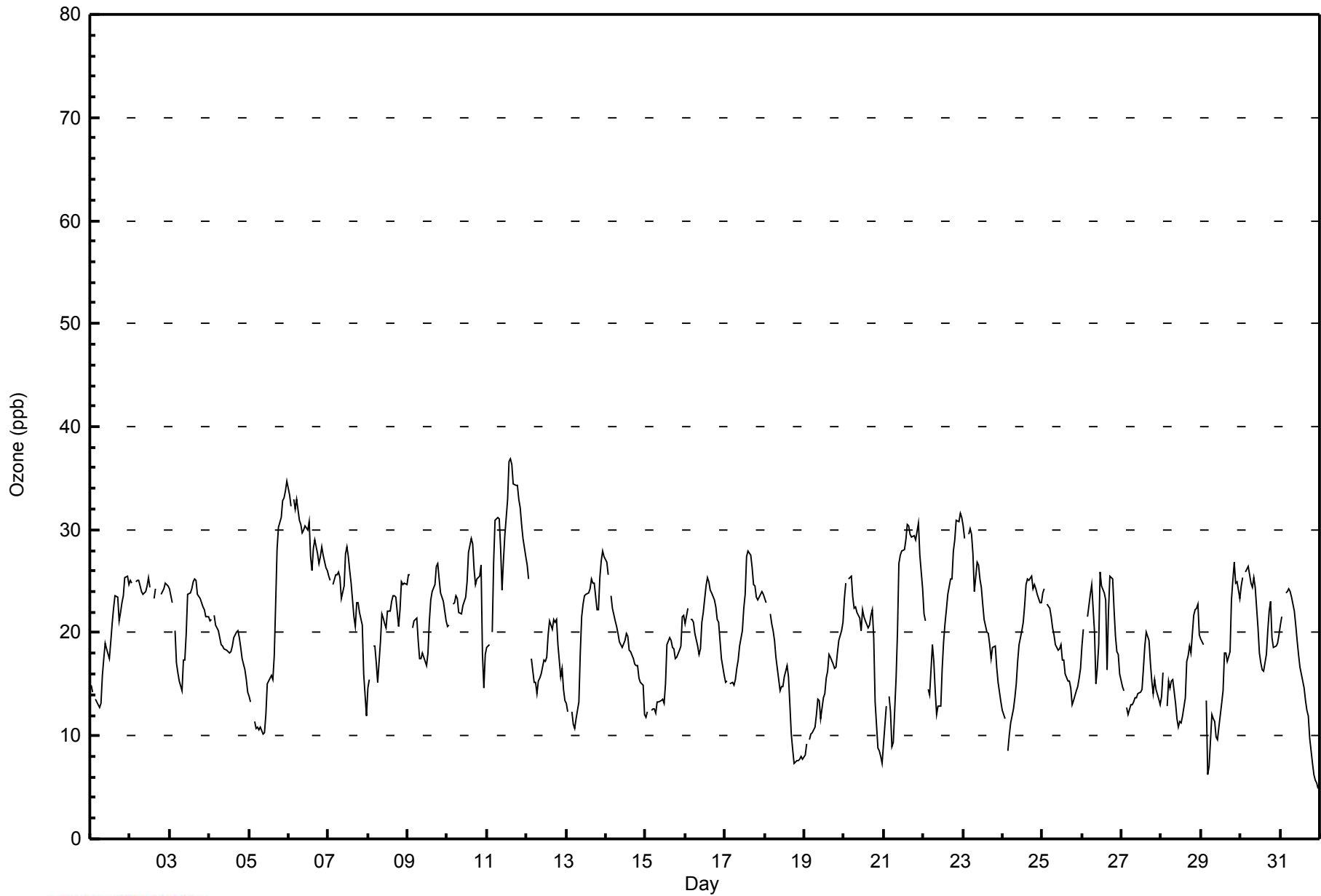
19.9	20.0	--	19.0	18.8	18.8	18.6	18.5	18.6	18.9	19.2	20.1	20.6	21.3	21.8	21.8	21.8	21.8	21.6	21.2	21.2	20.5	20.1	19.5	Diurnal Average		
33	32	--	33	32	33	31	31	30	30	30	30	33	37	37	36	34	34	34	34	33	33	33	34	35	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipewyan - October 2014**





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

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipeywan - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	360	50.78	50.78
21 - 50	349	49.22	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipeywan - October 2014**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	26	12	13	36	42	20	25	27	20	5	11	13	24	45	19	22	360
21 - 50	6	2	10	34	61	53	19	27	18	5	4	8	19	34	32	17	349
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>32</b>	<b>14</b>	<b>23</b>	<b>70</b>	<b>103</b>	<b>73</b>	<b>44</b>	<b>54</b>	<b>38</b>	<b>10</b>	<b>15</b>	<b>21</b>	<b>43</b>	<b>79</b>	<b>51</b>	<b>39</b>	<b>709</b>

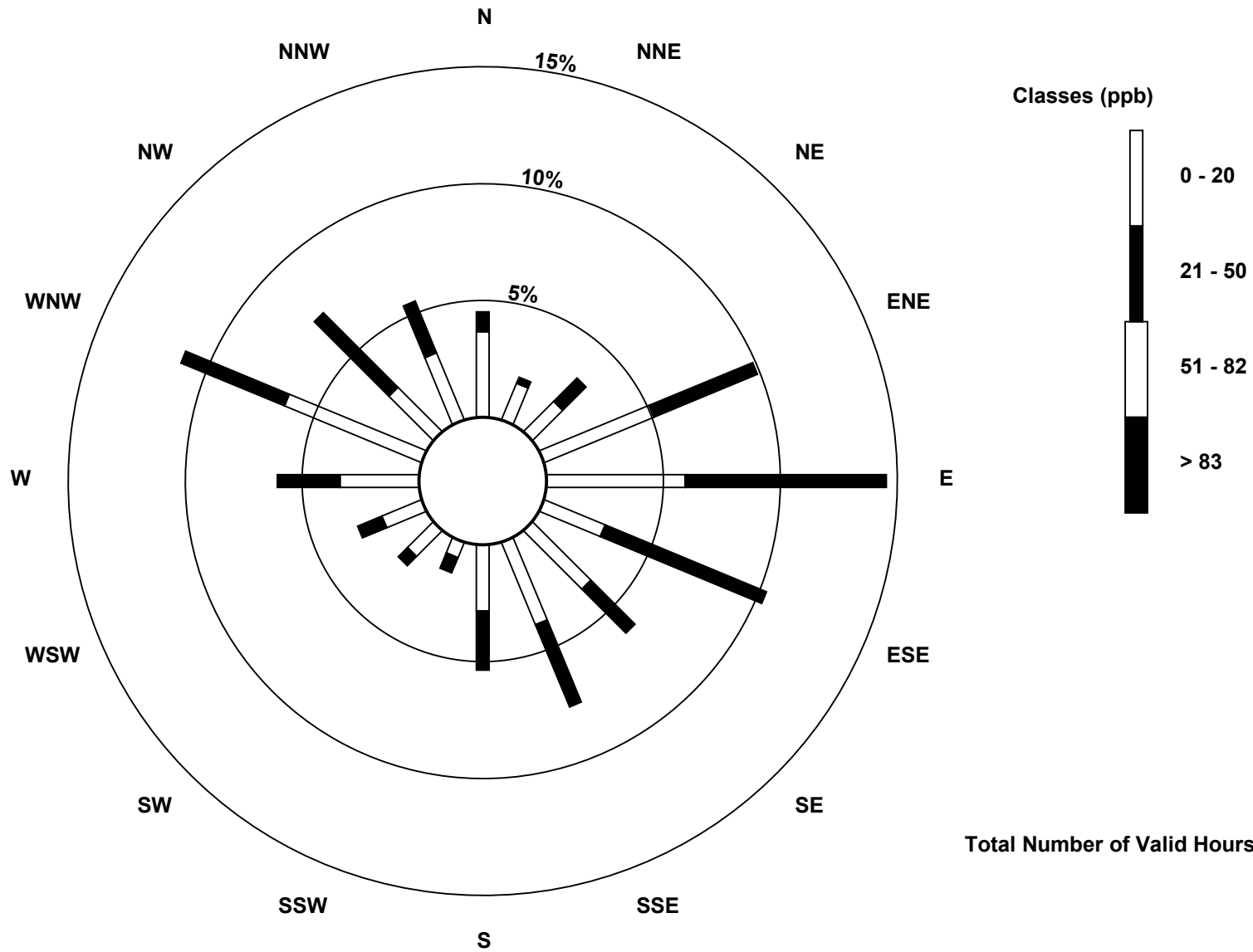
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

Ozone (O<sub>3</sub>) - ppb  
 Fort Chipeywan (AMS 8)

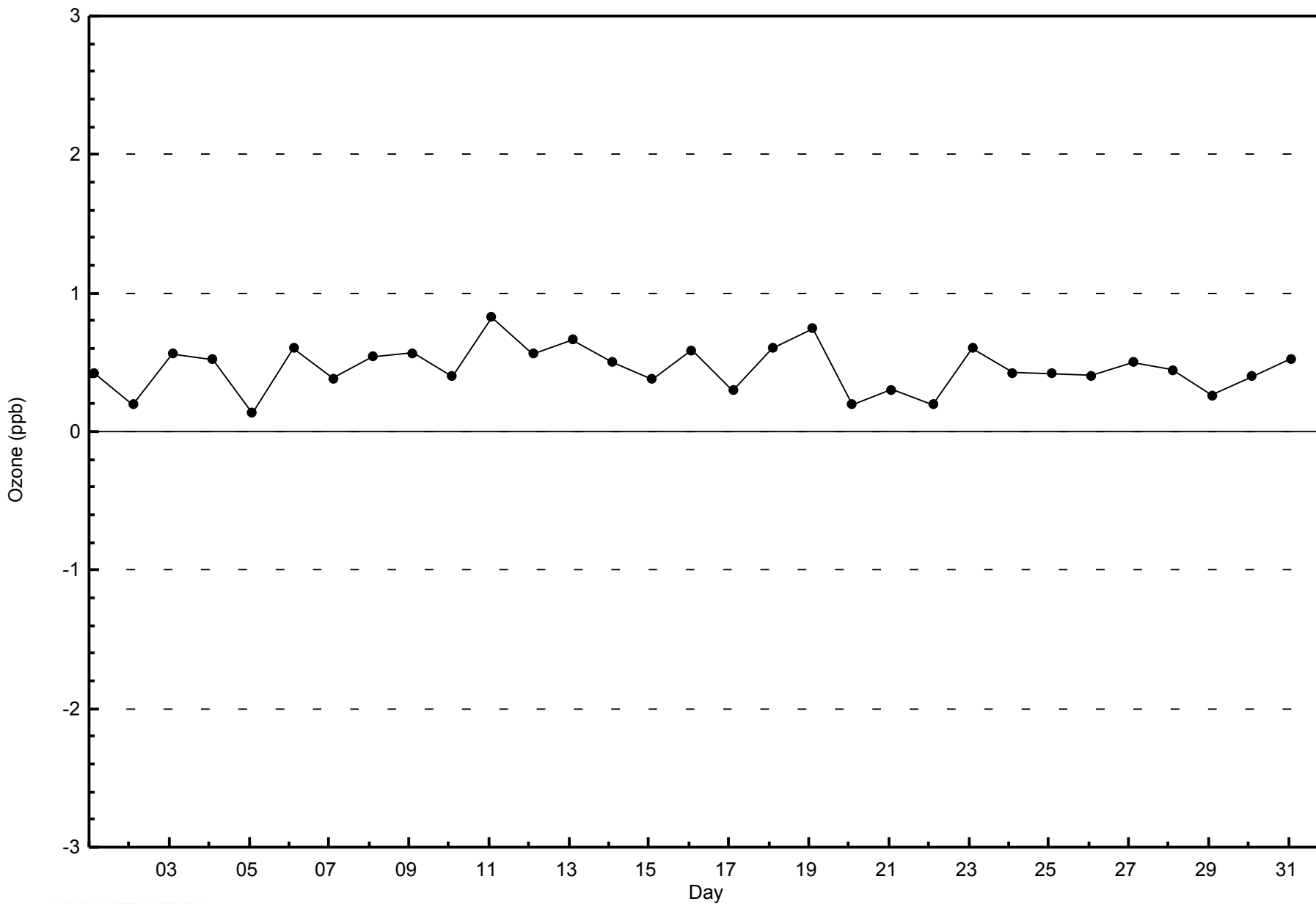


Total Number of Valid Hours: 709



WBEA  
Zero Responses

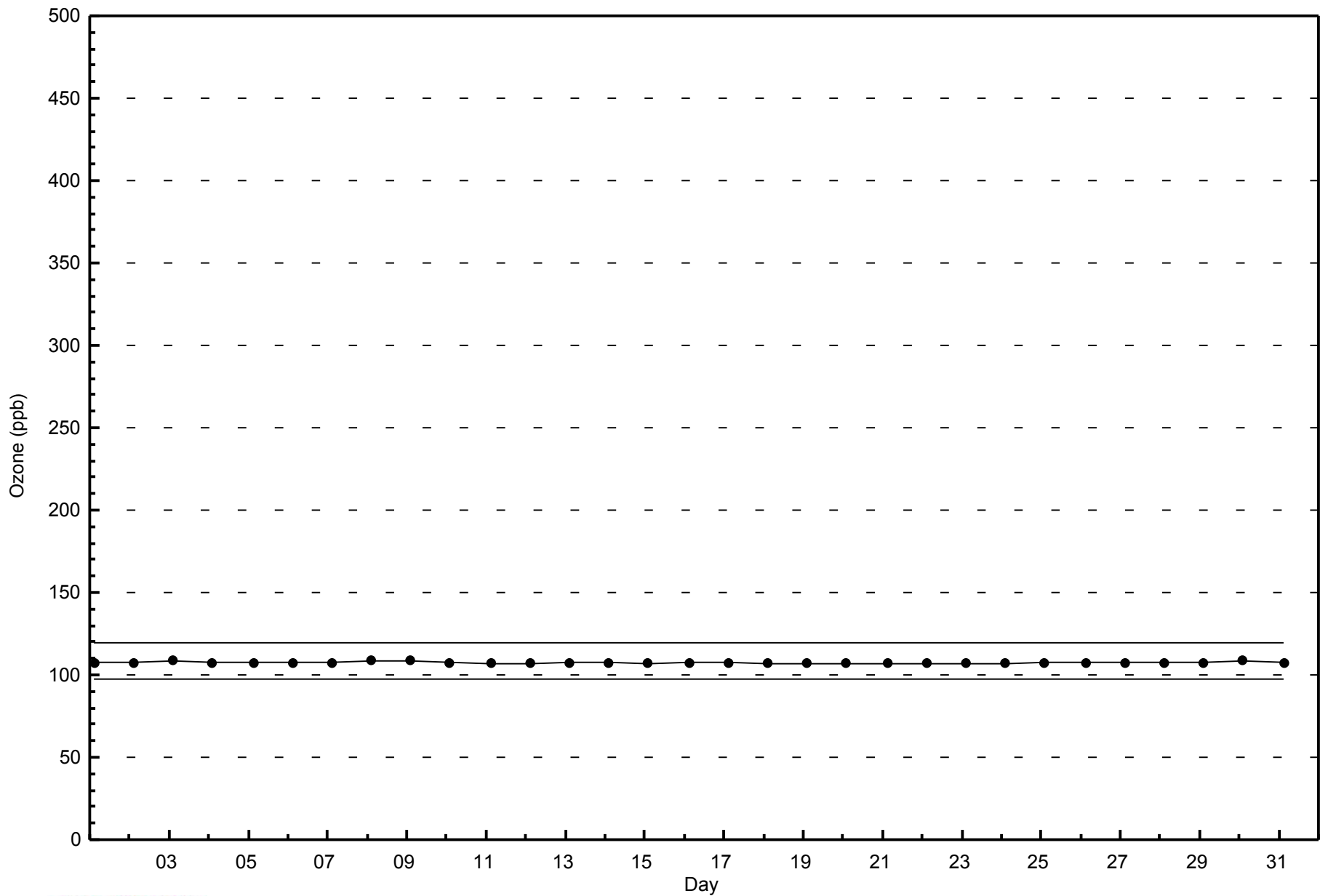
Ozone (O<sub>3</sub>) - ppb  
Fort Chipewyan - October 2014





WBEA  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Fort Chipewyan - October 2014





Summary of Hour Averages

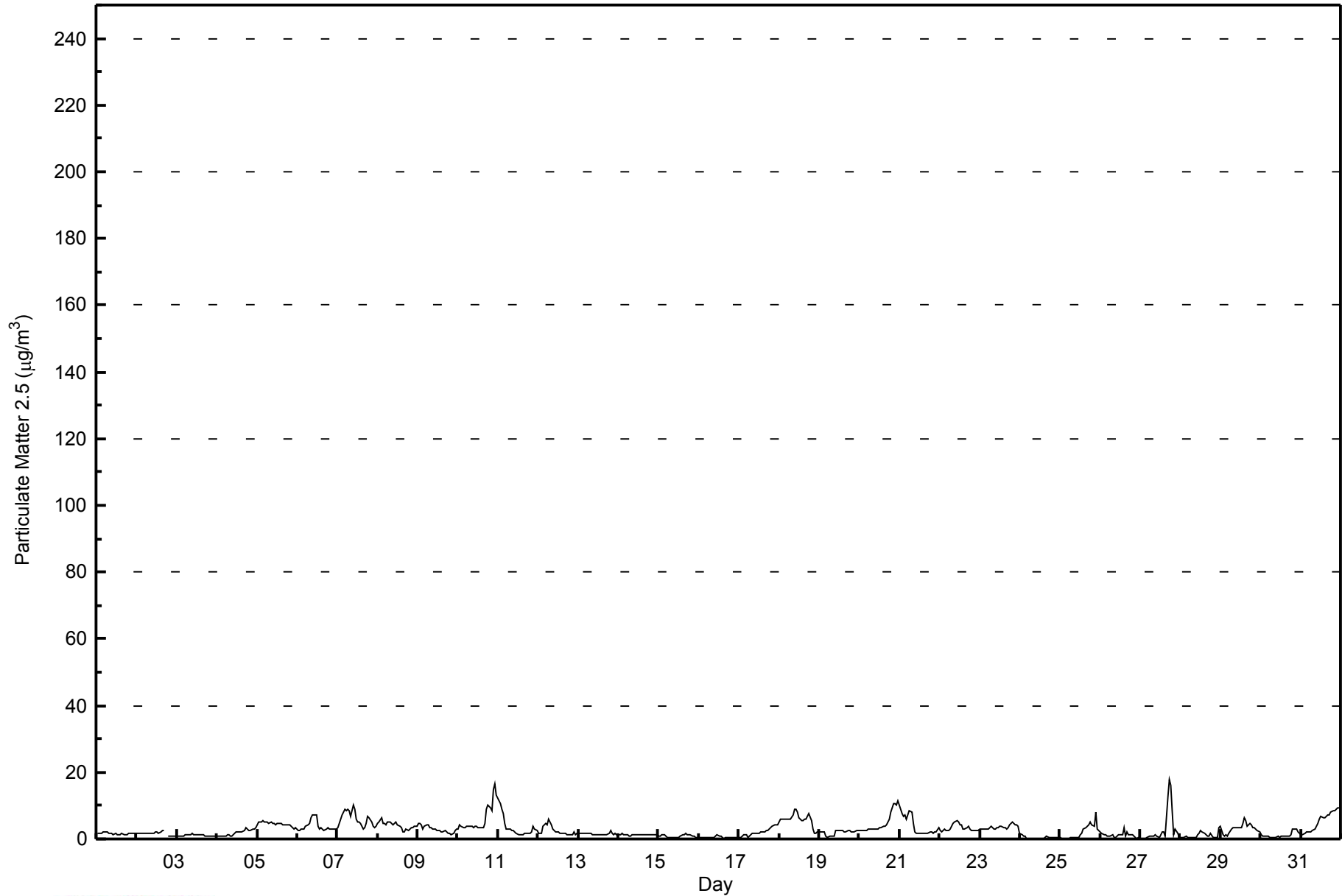
Fort Chipeyan - October 2014

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 17.7 µg/m <sup>3</sup> on Oct 27 18:00 Minimum Value: 0.1 µg/m <sup>3</sup> on Oct 24 05:00 Maximum Diurnal Average: 3.6 µg/m <sup>3</sup> at hour 19 Monthly Average: 2.78 µg/m <sup>3</sup>		Maximum Daily Average: 6.0 µg/m <sup>3</sup> on Oct 10 Minimum Daily Average: 0.4 µg/m <sup>3</sup> on Oct 24 Minimum Diurnal Average: 2.4 µg/m <sup>3</sup> at hour 6 Percentiles: P <sub>1</sub> = 0.1 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 1.1 Median = 2.1 Q <sub>3</sub> = 3.7 P <sub>90</sub> = 5.7 P <sub>99</sub> = 11.7		Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1.6	1.6	1.7	1.8	2.0	2.1	2.0	1.8	1.7	1.5	1.4	1.5	1.4	1.4	1.5	1.5	1.5	1.4	1.5	1.5	1.6	1.6	1.6	1.6	1.6	2.1
2-Oct	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.6	1.6	1.8	2.1	2.2	1.8	2.3	2.7	2.5	M	M	0.9	0.8	0.8	0.8	0.8	0.8	2.7
3-Oct	0.8	0.7	0.7	0.8	0.9	1.1	1.1	1.2	1.3	1.6	1.5	1.3	1.3	1.4	1.4	1.3	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1.6	
4-Oct	0.8	0.9	1.0	1.0	1.0	1.0	1.1	1.1	1.0	1.0	1.5	2.0	2.0	2.2	2.1	2.3	2.5	3.3	3.0	2.7	2.7	3.0	3.2	3.3	3.3	
5-Oct	4.2	5.0	5.2	5.5	4.9	5.0	4.9	4.5	4.9	4.7	4.5	4.4	4.6	4.6	4.8	4.2	4.2	4.3	4.3	4.2	3.8	3.5	3.0	3.4	5.5	
6-Oct	2.7	2.7	3.0	3.0	3.1	3.7	4.2	4.8	6.5	7.2	7.4	7.3	4.0	3.0	3.4	3.0	2.6	3.0	3.2	3.1	3.0	3.0	3.2	2.9	7.4	
7-Oct	3.6	4.8	6.0	7.1	8.9	8.6	9.1	8.3	6.9	10.0	8.7	6.0	5.2	5.1	4.7	2.8	3.4	4.6	6.9	6.3	5.1	4.0	3.5	3.7	10.0	
8-Oct	4.6	4.9	6.5	4.8	4.5	4.4	5.2	5.1	4.7	4.4	4.8	4.9	4.3	4.0	3.2	2.3	2.0	2.9	2.6	2.8	3.3	3.4	3.7	3.9	6.5	
9-Oct	4.5	4.7	4.2	3.1	3.9	4.0	4.0	3.5	3.3	3.0	2.9	2.5	2.4	2.3	2.3	2.3	2.5	2.0	1.8	1.5	1.5	1.7	2.4	4.7		
10-Oct	3.2	4.0	3.8	3.6	3.5	3.6	3.6	3.6	3.7	3.6	3.8	3.8	3.4	3.5	3.4	3.6	4.8	8.7	10.2	9.5	8.6	15.0	16.6	13.0	16.6	
11-Oct	12.2	10.6	8.8	7.5	4.5	2.8	2.9	3.0	2.7	2.5	2.1	1.7	1.4	1.3	1.2	1.3	1.6	1.7	1.7	1.8	2.3	3.7	2.8	2.4	12.2	
12-Oct	1.8	1.6	1.7	3.9	4.7	4.4	5.9	4.9	4.1	3.1	2.2	2.1	2.3	1.8	1.7	1.7	1.5	1.5	1.4	1.4	1.4	2.1	1.4	1.5	5.9	
13-Oct	1.6	1.6	1.5	1.5	1.6	1.6	1.7	1.5	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.2	1.4	1.8	2.4	1.7	1.5	1.5	1.4	2.4	
14-Oct	1.4	1.5	1.5	1.5	1.5	1.4	1.0	0.8	1.1	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.5	1.5	1.4	1.3	1.4	1.3	1.5	1.2	1.5	
15-Oct	0.9	1.0	1.2	1.1	1.0	0.3	0.2	0.3	0.4	0.3	0.3	0.3	0.4	1.1	1.2	1.4	1.6	1.1	1.2	1.2	1.0	0.7	0.4	0.4	1.6	
16-Oct	0.6	0.6	0.6	0.6	0.6	0.4	0.5	0.6	0.6	0.5	0.7	1.1	1.0	0.9	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	1.1	
17-Oct	0.3	0.4	1.0	1.2	1.1	0.5	0.7	1.3	1.6	1.7	1.8	1.9	1.9	2.1	2.1	2.3	2.3	2.5	2.9	3.3	3.6	4.0	4.3	4.1	4.3	
18-Oct	5.2	6.0	6.0	5.8	5.7	5.8	5.8	6.0	7.2	8.7	8.8	7.9	6.3	5.6	5.5	5.9	6.1	6.7	7.8	5.5	3.0	1.8	1.8	2.1	8.8	
19-Oct	2.1	2.1	1.9	1.9	1.1	0.6	0.7	0.8	1.0	1.0	2.6	2.7	2.5	2.5	2.3	2.2	2.3	2.5	2.5	2.3	2.2	2.3	2.4	2.5	2.7	
20-Oct	2.6	2.7	2.6	2.5	2.5	2.8	2.8	2.9	2.8	3.0	3.0	3.0	3.3	3.5	3.8	4.0	4.2	5.0	6.0	8.2	10.5	10.8	10.3	11.4	11.4	
21-Oct	10.2	7.7	6.8	7.2	6.1	7.0	8.3	8.0	4.8	1.9	1.7	1.7	1.7	1.9	1.8	1.8	1.7	1.8	2.0	2.0	1.9	2.2	2.2	3.5	10.2	
22-Oct	2.7	2.2	2.6	2.9	2.7	2.4	2.9	3.6	4.5	4.9	5.3	5.0	4.4	4.0	3.0	3.1	3.3	3.8	3.0	2.4	2.5	2.6	2.5	2.6	5.3	
23-Oct	2.8	3.1	3.2	3.1	3.1	3.0	3.2	3.7	3.1	3.1	3.4	3.5	3.8	3.9	3.4	3.3	3.0	3.2	4.1	4.9	4.6	4.3	4.3	3.7	4.9	
24-Oct	1.8	1.2	1.1	0.9	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.5	0.8	0.5	0.3	0.4	0.4	0.4	0.3	0.3	1.8	
25-Oct	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.3	0.3	1.2	1.6	3.2	3.6	3.9	4.3	5.3	4.4	3.7	8.0	2.8	2.3	8.0	
26-Oct	2.2	1.5	1.5	1.1	0.8	1.0	0.8	1.1	0.4	0.3	0.7	1.1	1.4	1.3	3.3	1.0	2.2	1.4	1.4	1.4	0.9	0.5	0.2	0.4	3.3	
27-Oct	0.2	0.1	0.1	0.1	0.2	0.8	0.8	0.8	1.0	1.1	0.8	0.5	1.4	2.3	2.1	1.0	12.7	17.7	16.1	8.6	1.4	2.9	1.9	0.6	17.7	
28-Oct	0.4	0.3	0.4	0.8	0.3	0.3	0.3	0.5	0.5	0.6	1.1	1.7	2.6	2.1	1.8	1.1	0.7	0.7	1.7	0.6	0.5	0.5	0.5	3.5	3.5	
29-Oct	4.0	1.1	0.8	1.5	1.0	1.8	3.1	3.4	3.4	3.5	3.4	3.5	3.5	4.5	6.4	5.6	3.7	4.5	4.1	3.5	3.3	2.9	2.7	2.0	6.4	
30-Oct	1.2	0.8	0.7	0.8	0.7	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.7	1.1	1.0	0.9	0.8	1.0	1.2	2.8	3.1	2.9	2.3	1.7	3.1	
31-Oct	1.5	1.4	1.7	2.0	2.0	2.1	2.2	2.6	3.0	3.7	4.6	5.7	6.6	6.5	6.5	7.0	7.3	7.1	8.0	8.6	8.5	8.8	9.2	9.3	9.3	
																								Diurnal Average		
																								Diurnal Maximum		
2.7 2.5 2.6 2.6 2.4 2.4 2.6 2.7 2.6 2.7 2.7 2.7 2.6 2.6 2.7 2.5 2.9 3.4 3.6 3.2 2.9 3.3 3.0 3.0 12.2 10.6 8.8 7.5 8.9 8.6 9.1 8.3 7.2 10.0 8.8 7.9 6.6 6.5 6.5 7.0 12.7 17.7 16.1 9.5 10.5 15.0 16.6 13.0																										
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 - October 2014**





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort Chipeywan - October 2014**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	504	67.92	67.92
6 - 15	80	10.78	78.71
16 - 25	3	0.40	79.11
26 - 80	0	0.00	79.11
> 81.0	0	0.00	79.11

Total Number of Valid Hours: 742

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Fort Chipeywan - October 2014**

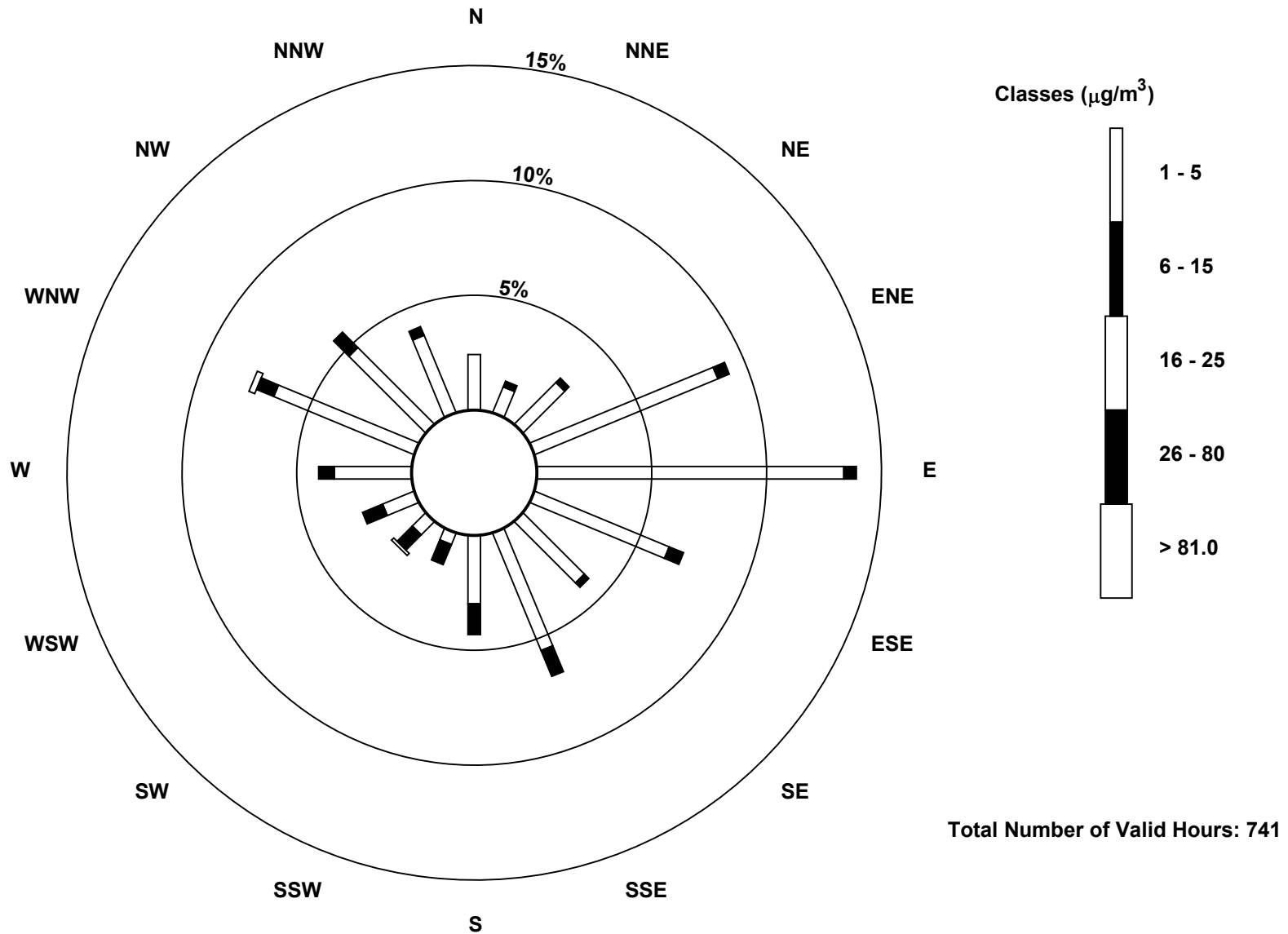
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	18	9	19	64	99	47	28	41	22	4	6	11	25	49	35	27	504
6 - 15	0	2	2	4	4	5	2	9	10	7	7	7	5	6	7	3	80
16 - 25	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	3
26 - 80	0	0	0	0	0	0	0	0	0	0	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>	18	11	21	68	103	52	30	50	32	11	14	18	30	57	42	30	587

Total Number of Valid Hours: 741

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Fort Chipeywan (AMS 8)





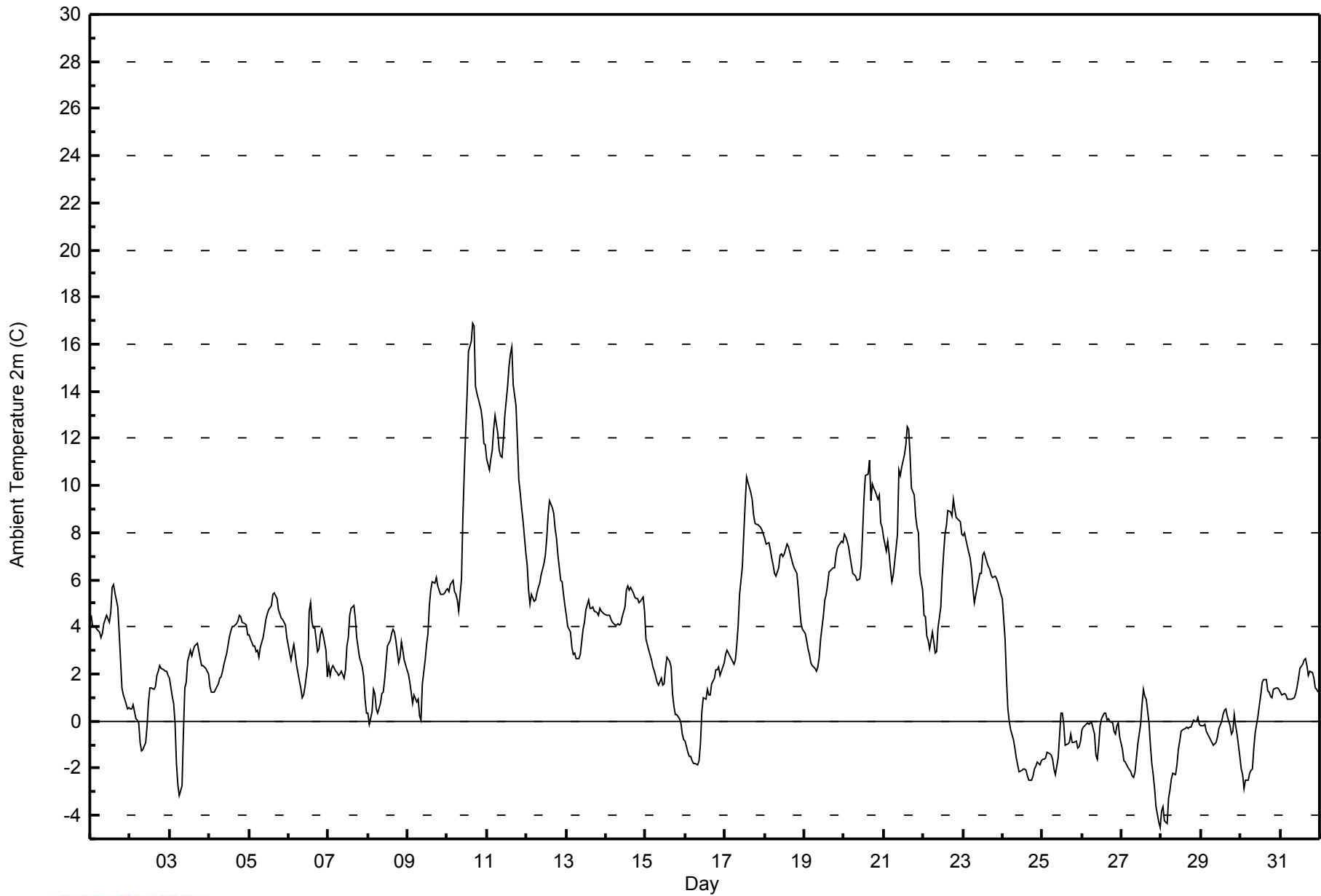


Maximum Value: 16.9 C on Oct 10 16:00		Maximum Daily Average: 11.9 C on Oct 11		Hours in Service: 744																																												
Minimum Value: -4.5 C on Oct 28 00:00		Minimum Daily Average: -1.5 C on Oct 27		Hours of Data: 744																																												
Maximum Diurnal Average: 5.1 C at hour 16		Minimum Diurnal Average: 1.9 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 3.44 C		Percentiles: P <sub>1</sub> = -3.3 P <sub>10</sub> = -1.2 Q <sub>1</sub> = 0.5 Median = 2.9 Q <sub>3</sub> = 5.7 P <sub>90</sub> = 8.6 P <sub>99</sub> = 14.5		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-Oct	4.5	4.0	4.0	4.0	3.9	3.8	3.5	3.7	4.1	4.3	4.5	4.2	4.6	5.7	5.8	5.4	4.8	3.8	2.6	1.4	1.1	0.9	0.5	0.6	3.6	5.8																						
2-Oct	0.5	0.5	0.7	0.1	0.0	0.0	-0.9	-1.2	-1.2	-0.9	-0.2	0.8	1.4	1.4	1.4	1.4	1.9	2.1	2.3	2.2	2.2	2.1	2.1	2.0	0.9	2.3																						
3-Oct	1.8	1.0	0.8	-0.1	-1.8	-2.7	-3.2	-2.7	-0.5	1.4	1.7	2.5	3.0	2.8	3.0	3.2	3.3	3.3	2.7	2.4	2.3	2.3	2.3	2.0	1.3	3.3																						
4-Oct	1.5	1.2	1.2	1.3	1.4	1.6	1.8	1.9	2.1	2.4	2.9	3.3	3.6	3.8	4.0	4.0	4.1	4.2	4.5	4.4	4.2	4.2	4.1	3.6	3.0	4.5																						
5-Oct	3.6	3.5	3.2	3.2	2.9	3.0	2.7	3.2	3.6	3.9	4.3	4.6	4.7	4.9	5.4	5.5	5.4	5.2	4.8	4.4	4.3	4.2	4.1	3.5	4.1	5.5																						
6-Oct	2.9	2.6	2.9	3.3	2.8	2.3	1.7	1.4	1.0	1.1	1.5	2.4	4.7	5.0	4.2	4.0	4.0	3.0	3.0	3.7	3.9	3.7	3.0	1.9	2.9	5.0																						
7-Oct	2.4	2.0	2.2	2.4	2.1	2.0	2.0	2.0	2.1	1.8	2.2	3.2	3.6	4.5	4.8	4.9	4.4	3.5	3.1	2.7	2.3	1.9	0.9	0.3	2.6	4.9																						
8-Oct	0.3	-0.1	0.4	1.3	1.1	0.5	0.3	0.7	1.2	1.2	1.7	2.5	3.2	3.4	3.7	3.9	3.8	3.4	2.4	2.7	3.4	3.0	2.6	2.2	2.0	3.9																						
9-Oct	2.0	1.7	1.2	0.8	1.1	0.8	1.0	0.2	0.1	1.6	2.6	3.3	3.7	4.9	5.6	5.9	5.9	6.1	5.7	5.6	5.4	5.4	5.5	5.5	3.4	6.1																						
10-Oct	5.6	5.5	5.8	6.0	5.5	5.4	5.1	4.7	6.0	8.7	10.6	12.3	13.9	15.7	16.1	16.9	16.7	14.2	13.9	13.5	13.2	12.8	11.8	11.7	10.5	16.9																						
11-Oct	11.1	10.7	11.1	11.5	12.4	13.0	12.2	11.5	11.3	11.2	11.9	13.0	14.2	15.0	15.6	15.9	14.3	13.4	11.9	10.2	9.7	9.1	8.5	7.2	11.9	15.9																						
12-Oct	6.6	5.5	5.0	5.4	5.1	5.1	5.5	5.7	5.9	6.2	6.7	7.0	7.7	8.8	9.4	9.1	8.8	8.2	7.8	7.0	6.0	5.9	5.4	4.9	6.6	9.4																						
13-Oct	4.5	4.0	3.8	3.1	2.8	2.9	2.6	2.6	2.8	3.4	3.9	4.2	4.7	5.2	4.8	4.8	4.9	4.6	4.6	4.5	4.8	4.7	4.6	4.5	4.1	5.2																						
14-Oct	4.5	4.5	4.5	4.3	4.2	4.1	4.1	4.1	4.1	4.2	4.4	4.8	5.6	5.7	5.6	5.7	5.4	5.2	5.2	5.2	5.0	5.1	5.3	4.6	4.8	5.7																						
15-Oct	3.5	3.2	3.0	2.6	2.3	2.1	1.9	1.7	1.5	1.8	1.6	1.6	2.2	2.7	2.6	2.3	1.2	0.6	0.3	0.3	0.1	-0.1	-0.6	-0.8	1.6	3.5																						
16-Oct	-0.8	-1.3	-1.5	-1.5	-1.7	-1.8	-1.8	-1.9	-1.6	-1.0	0.4	1.0	1.0	1.4	1.1	1.1	1.6	1.8	2.2	2.2	2.3	1.9	2.1	2.5	0.3	2.5																						
17-Oct	2.8	3.0	2.9	2.7	2.6	2.4	2.6	3.2	4.1	5.4	6.6	7.9	9.2	10.4	10.2	9.7	9.4	8.7	8.4	8.3	8.4	8.2	8.1	8.0	6.4	10.4																						
18-Oct	7.7	7.5	7.5	7.3	6.9	6.6	6.3	6.2	6.5	7.0	7.1	7.0	7.1	7.5	7.4	7.2	6.9	6.7	6.5	6.3	5.6	4.8	4.1	3.9	6.6	7.7																						
19-Oct	3.7	3.4	3.1	2.8	2.5	2.4	2.3	2.1	2.3	2.7	3.5	4.5	5.1	5.4	5.8	6.3	6.4	6.5	6.5	7.0	7.4	7.5	7.6	7.6	4.8	7.6																						
20-Oct	7.9	7.8	7.6	7.4	6.6	6.3	6.2	6.1	6.0	6.0	6.6	7.9	9.4	10.4	10.5	11.1	9.4	10.1	9.9	9.8	9.4	9.6	8.4	8.2	8.3	11.1																						
21-Oct	7.8	7.2	7.6	7.1	6.5	5.9	6.2	7.4	7.9	10.7	10.4	10.8	11.3	11.7	12.5	12.4	11.3	9.9	9.6	8.7	8.2	8.0	6.3	5.6	8.8	12.5																						
22-Oct	4.5	4.4	3.6	3.4	3.1	3.8	3.4	2.9	2.9	4.0	4.8	6.1	7.1	8.0	8.3	8.9	8.9	8.7	9.4	9.0	8.7	8.5	8.4	7.9	6.2	9.4																						
23-Oct	7.9	8.0	7.7	7.2	6.9	6.5	5.6	5.0	5.7	6.0	6.3	6.3	7.0	7.2	6.7	6.6	6.4	6.2	6.1	6.1	6.0	5.9	5.6	5.4	6.4	8.0																						
24-Oct	5.2	3.5	1.8	0.5	0.0	-0.4	-0.8	-1.2	-1.5	-1.8	-2.2	-2.1	-2.0	-2.1	-2.3	-2.5	-2.5	-2.5	-2.3	-2.0	-1.9	-1.7	-1.8	-1.7	-1.0	5.2																						
25-Oct	-1.6	-1.6	-1.6	-1.3	-1.4	-1.4	-1.6	-2.0	-2.3	-1.6	-0.6	0.4	0.3	-0.1	-1.0	-1.0	-0.9	-0.6	-0.9	-0.9	-0.9	-1.1	-1.1	-0.9	-1.1	0.4																						
26-Oct	-0.4	-0.2	-0.1	-0.1	-0.2	-0.1	-0.1	-0.5	-1.4	-1.6	-1.0	-0.2	0.1	0.3	0.3	0.0	0.1	0.0	-0.1	-0.4	-0.5	-0.2	-0.1	-0.6	-0.3	0.3																						
27-Oct	-1.2	-1.7	-1.7	-1.8	-2.0	-2.1	-2.4	-2.4	-2.1	-1.6	-1.0	-0.2	0.7	1.4	1.1	0.9	-0.1	-1.0	-1.8	-2.3	-2.9	-3.6	-4.3	-4.5	-1.5	1.4																						
28-Oct	-3.8	-3.7	-4.2	-4.4	-3.3	-2.9	-2.4	-2.2	-2.3	-1.9	-1.2	-0.8	-0.5	-0.4	-0.3	-0.3	-0.3	-0.2	-0.3	0.0	0.0	0.0	0.1	-0.1	-1.5	0.1																						
29-Oct	-0.2	-0.2	-0.1	-0.4	-0.5	-0.7	-0.9	-1.0	-1.0	-0.9	-0.7	-0.3	0.0	0.3	0.5	0.5	0.2	-0.2	-0.5	-0.4	0.3	-0.2	-0.5	-1.5	-0.4	0.5																						
30-Oct	-2.0	-2.3	-2.9	-2.5	-2.5	-2.2	-2.1	-2.0	-1.1	-0.5	0.2	0.7	1.1	1.7	1.8	1.7	1.3	1.3	1.0	1.0	1.3	1.4	1.4	1.3	-0.1	1.8																						
31-Oct	1.2	1.1	1.2	1.1	1.0	0.9	1.0	1.0	1.0	1.2	1.4	1.8	2.2	2.4	2.6	2.7	2.3	1.9	2.1	2.1	1.8	1.4	1.3	1.2	1.6	2.7																						
																								3.0	2.7	2.6	2.5	2.3	2.2	2.0	1.9	2.2	2.7	3.3	3.9	4.5	5.0	5.1	5.1	4.8	4.5	4.2	4.0	3.9	3.7	3.4	3.1	Diurnal Average
																								11.1	10.7	11.1	11.5	12.4	13.0	12.2	11.5	11.3	11.2	11.9	13.0	14.2	15.7	16.1	16.9	16.7	14.2	13.9	13.5	13.2	12.8	11.8	11.7	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature 2m (AT 2m) - C**  
**Fort Chipecywan - October 2014**





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

**Ambient Temperature 2m (AT 2m) - C**  
**Fort Chipeywan - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	156	20.97	20.97
0 - 10	540	72.58	93.55
10 - 20	48	6.45	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

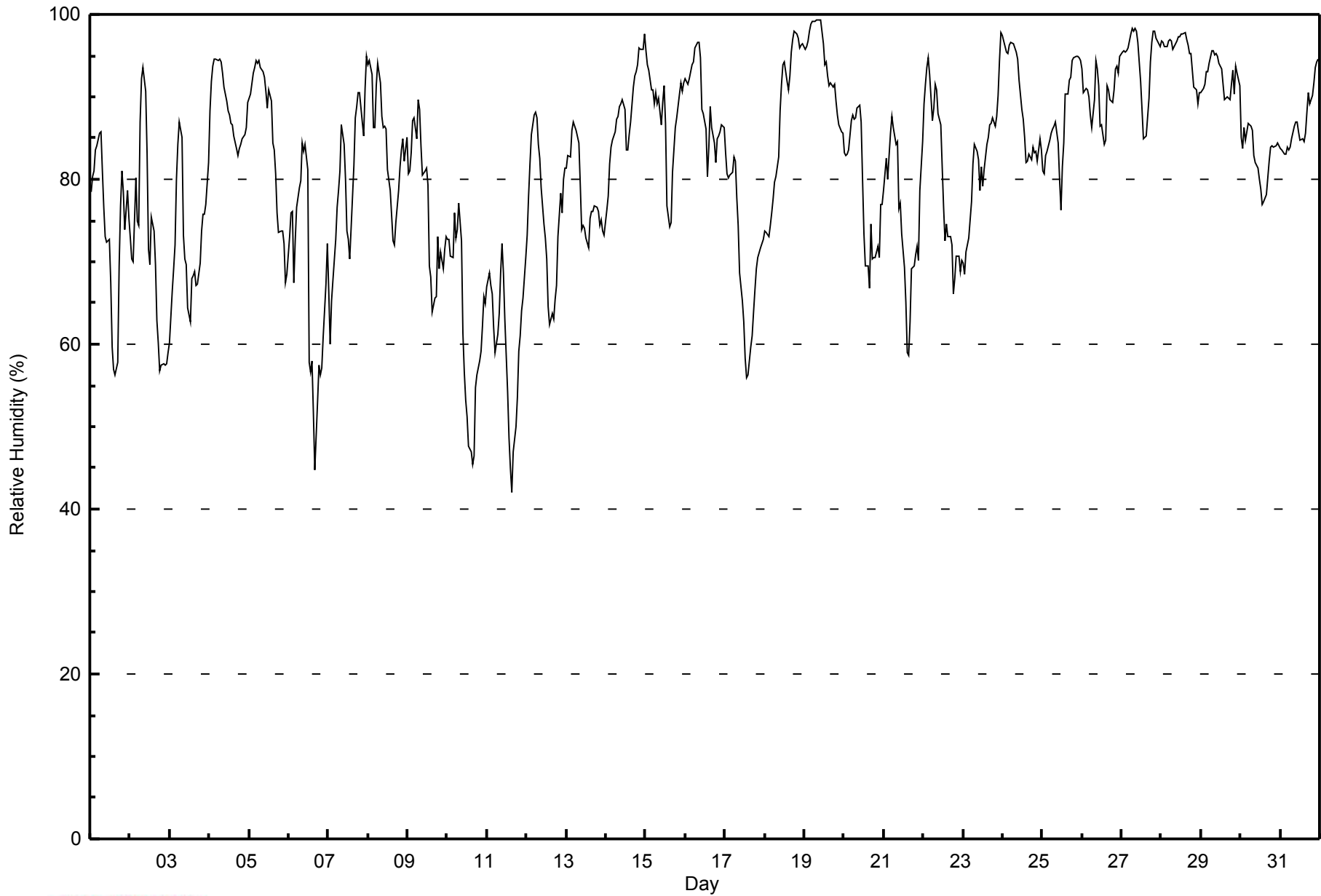


Maximum Value: 99 % on Oct 19 09:00														Maximum Daily Average: 95.4 % on Oct 28														Hours in Service: 744																				
Minimum Value: 42 % on Oct 11 16:00														Minimum Daily Average: 60.3 % on Oct 11														Hours of Data: 744																				
Maximum Diurnal Average: 87.3 % at hour 8														Minimum Diurnal Average: 75.4 % at hour 15														Hours of Missing Data: 0																				
Monthly Average: 81.7 %														Percentiles: P <sub>1</sub> = 48 P <sub>10</sub> = 66 Q <sub>1</sub> = 74 Median = 84 Q <sub>3</sub> = 91 P <sub>90</sub> = 95 P <sub>99</sub> = 99														Hours of Calibration: 0																				
																												Percent Operational Time: 100.0																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	78	80	81	84	84	86	86	81	77	73	72	73	67	60	57	56	58	69	77	81	78	74	79	75	74.4	86																						
2-Oct	73	70	70	80	75	74	87	92	93	91	83	72	70	75	74	70	63	60	57	57	58	57	58	59	71.6	93																						
3-Oct	60	67	69	72	80	84	87	85	73	70	70	64	63	68	68	69	67	67	70	74	76	76	77	82	72.4	87																						
4-Oct	88	92	94	95	95	94	95	94	93	91	90	88	88	87	87	85	84	83	84	84	85	85	86	89	89.0	95																						
5-Oct	90	90	93	94	94	94	94	93	93	92	91	89	91	90	84	84	81	76	74	74	74	72	67	69	85.1	94																						
6-Oct	73	76	76	68	73	77	79	80	84	83	84	81	58	57	58	52	45	53	58	56	57	61	67	72	67.8	84																						
7-Oct	66	60	65	68	73	77	79	81	87	84	80	74	73	70	74	82	88	89	91	90	87	85	91	95	79.5	95																						
8-Oct	94	94	93	86	86	91	94	92	88	86	86	86	81	79	76	73	72	75	79	82	83	85	82	85	84.5	94																						
9-Oct	81	81	83	87	87	85	90	89	84	81	81	81	79	69	68	64	66	66	73	69	71	69	72	73	77.0	90																						
10-Oct	73	73	71	71	76	73	74	77	72	61	57	53	51	48	47	45	46	55	56	58	59	62	66	65	62.0	77																						
11-Oct	67	69	67	66	62	59	61	64	69	72	69	63	54	49	45	42	47	50	54	59	61	64	66	71	60.3	72																						
12-Oct	73	78	82	85	88	88	87	84	83	79	75	73	70	65	62	64	63	65	67	73	78	76	80	81	75.8	88																						
13-Oct	81	83	83	86	87	86	86	84	79	74	74	74	73	72	75	76	76	77	77	76	74	75	74	73	78.2	87																						
14-Oct	76	78	82	84	85	86	87	88	89	89	90	88	84	84	85	87	91	93	93	94	96	96	96	98	88.2	98																						
15-Oct	96	94	93	91	91	89	91	89	90	87	89	91	87	77	74	75	81	84	86	87	90	92	91	92	87.7	96																						
16-Oct	92	92	92	93	94	94	96	97	97	95	88	88	86	80	84	89	86	84	82	85	85	86	87	86	89.1	97																						
17-Oct	83	81	80	81	81	83	82	78	74	69	65	63	58	56	60	61	64	67	69	71	72	72	73	70.7	83																							
18-Oct	74	73	73	74	76	78	80	80	83	88	92	94	94	92	91	93	95	97	98	98	97	96	96	96	87.8	98																						
19-Oct	96	96	97	98	99	99	99	99	99	99	99	96	94	94	93	91	92	91	92	90	88	87	86	86	94.1	99																						
20-Oct	83	83	83	84	87	88	87	87	89	89	87	80	73	69	69	67	74	70	71	71	72	71	77	77	78.7	89																						
21-Oct	79	83	80	83	86	88	86	84	85	76	77	73	69	65	59	59	63	69	70	71	72	70	79	85	75.4	88																						
22-Oct	89	91	93	95	93	87	89	91	91	88	87	81	77	73	75	73	73	72	66	68	71	71	69	70	80.5	95																						
23-Oct	70	69	71	73	75	77	82	84	83	82	79	82	79	81	84	85	87	87	88	87	88	90	94	98	82.3	98																						
24-Oct	98	96	96	95	96	97	96	96	95	95	92	88	87	85	82	82	83	82	84	83	83	82	85	84	89.3	98																						
25-Oct	81	81	83	83	85	86	86	86	87	84	80	76	81	84	90	90	92	92	94	95	95	95	94	94	87.4	95																						
26-Oct	93	91	91	91	90	88	86	90	94	93	91	86	87	84	85	91	91	90	89	91	93	94	93	95	90.3	95																						
27-Oct	96	96	95	96	96	98	98	98	98	98	97	92	88	85	85	85	90	94	97	98	98	97	97	96	94.4	98																						
28-Oct	97	97	96	96	97	97	97	96	96	97	97	97	97	98	98	98	97	96	95	91	91	91	89	90	95.4	98																						
29-Oct	91	91	91	93	93	94	96	96	95	95	95	94	93	92	90	90	90	90	92	93	90	94	93	91	92.5	96																						
30-Oct	85	84	86	85	87	87	86	86	83	82	81	80	79	77	77	78	80	82	84	84	84	84	84	84	82.9	87																						
31-Oct	84	84	83	83	84	84	84	85	87	87	87	86	85	85	85	86	88	91	89	90	92	94	94	95	87.0	95																						
																								82.6	82.9	83.6	84.4	85.6	86.0	87.3	87.3	86.8	84.9	83.4	80.9	78.0	75.7	75.4	75.4	76.4	77.8	79.0	79.9	80.6	80.7	81.9	83.2	Diurnal Average
																								98	97	97	98	99	99	99	99	99	99	99	99	97	98	98	98	97	96	97	98	98	97	97	98	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Fort Chipewyan - October 2014**





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

**Relative Humidity (RH) - %**  
**Fort Chipeywan - October 2014**

<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	6.18	6.18
60 - 80	226	30.38	36.56
80 - 100	472	63.44	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

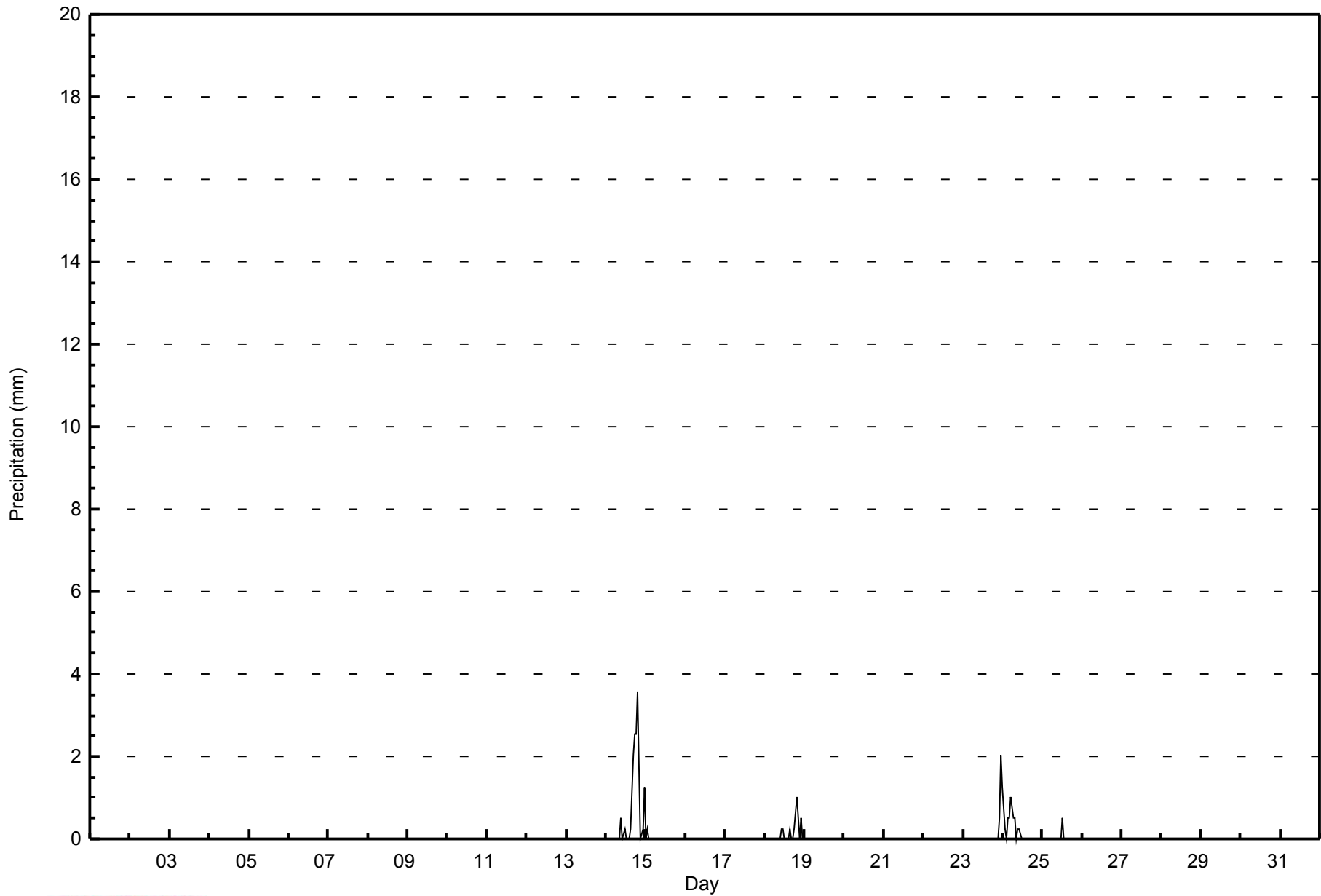


Maximum Value: 3.6 mm on Oct 14 20:00      Maximum Daily Total: 15.0 mm on Oct 14																								Hours in Service: 744 Hours of Data: 743																									
Minimum Value: 0.0 mm on Oct 1 01:00      Minimum Daily Total: 0.0 mm on Oct 1 Maximum Diurnal Total: 4.6 mm at hour 20      Minimum Diurnal Total: 0.0 mm at hour 3 Monthly Total: 26.42 mm      Percentiles: $P_1 = 0.0$ $P_{10} = 0.0$ $Q_1 = 0.0$ Median = 0.0 $Q_3 = 0.0$ $P_{90} = 0.0$ $P_{99} = 0.8$																								Hours of 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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																
3-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.3	0.0	0.0	0.3	2.0	2.5	2.5	3.6	1.8	0.0	0.3	1.3	15.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0																
15-Oct	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3																
16-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.3	1.0	0.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.0															
19-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.0	2.5	2.0															
24-Oct	1.3	0.3	0.0	0.5	0.5	1.0	0.5	0.5	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	1.3																
25-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5																
26-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																
29-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																
30-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																
31-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																
																								1.3	0.5	0.0	0.5	0.5	1.0	0.5	0.5	0.0	0.8	0.5	0.5	0.5	0.0	0.5	2.0	2.5	2.8	4.6	2.3	0.0	1.3	3.3	Diurnal Average		
																								1.3	0.3	0.0	0.5	0.5	1.0	0.5	0.5	0.0	0.5	0.3	0.3	0.5	0.0	0.0	0.3	2.0	2.5	2.5	3.6	1.8	0.0	0.5	2.0	Diurnal Maximum	
M - Maintenance																																																	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Precipitation (PC) - mm**  
**Fort Chipewyan - October 2014**







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

**Precipitation (PC) - mm**  
**Fort Chipeywan - October 2014**

<b>Concentration Ranges (mm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	724	97.44	97.44
0.4 - 0.5	9	1.21	98.65
0.6 - 0.7	0	0.00	98.65
0.8 - 1.4	4	0.54	99.19
1.5 - 10	6	0.81	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744

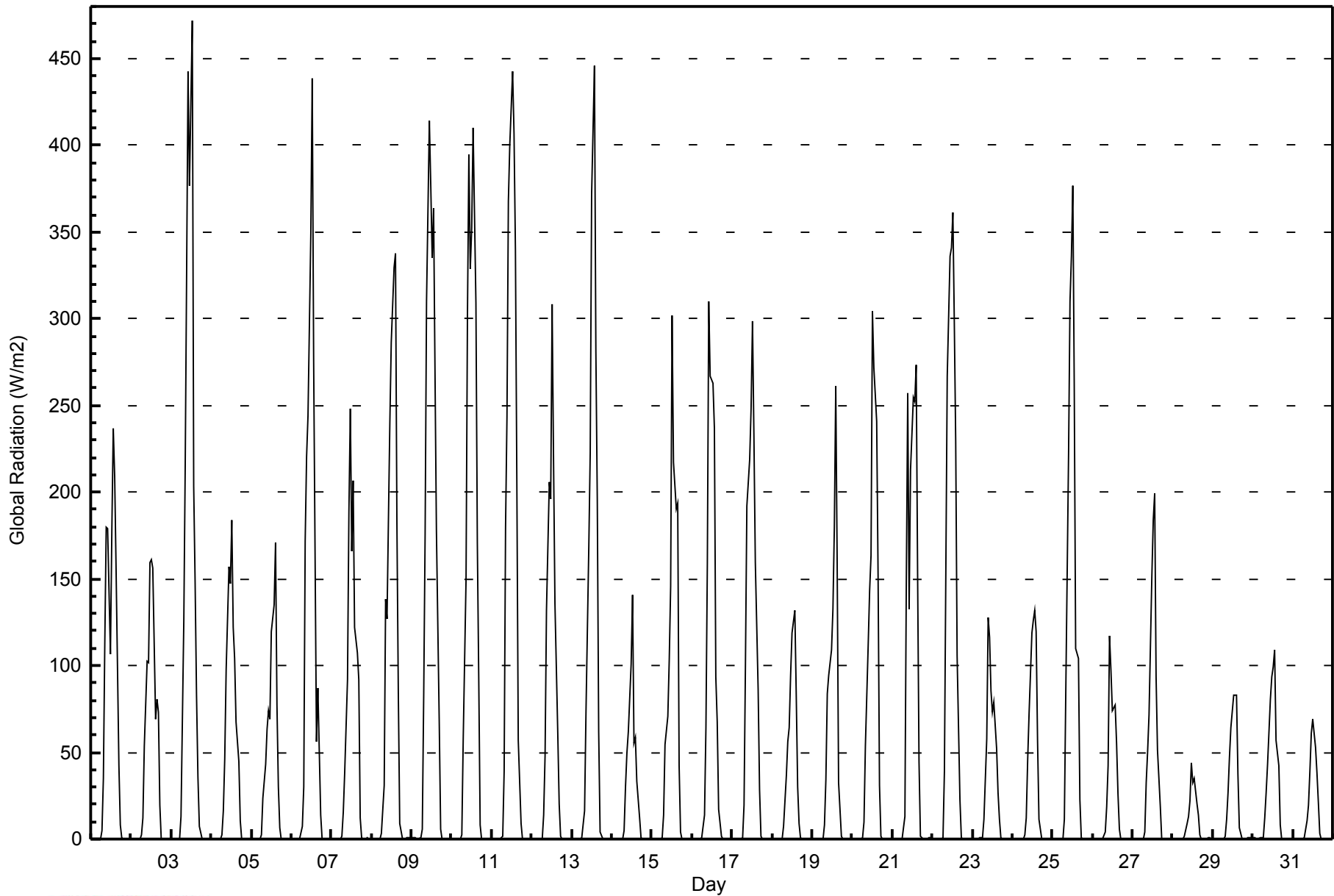


Maximum Value: 472 W/m2 on Oct 3 13:00														Maximum Daily Average: 112.2 W/m2 on Oct 11														Hours in Service: 744	
Minimum Value: 0 W/m2 on Oct 1 02:00														Minimum Daily Average: 8.2 W/m2 on Oct 28														Hours of Data: 744	
Maximum Diurnal Average: 229.3 W/m2 at hour 13														Minimum Diurnal Average: 0.1 W/m2 at hour 3														Hours of Missing Data: 0	
Monthly Average: 55.6 W/m2														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 74 P <sub>90</sub> = 206 P <sub>99</sub> = 407														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-Oct	0	0	0	0	0	0	5	35	113	180	179	107	178	236	209	155	43	8	1	0	0	0	0	0	60.4	236			
2-Oct	0	0	0	0	0	0	3	12	54	103	101	160	161	156	70	81	74	19	0	0	0	0	0	0	41.4	161			
3-Oct	0	0	0	0	0	0	13	126	216	328	443	376	472	203	148	83	35	7	0	0	0	0	0	0	102.2	472			
4-Oct	0	0	0	0	0	0	2	16	47	98	157	147	184	122	104	67	45	10	0	0	0	0	0	0	41.7	184			
5-Oct	0	0	0	0	0	0	3	23	43	63	74	69	120	135	171	77	30	6	0	0	0	0	0	0	34.1	171			
6-Oct	0	0	0	0	0	0	7	30	172	220	244	349	439	277	165	56	87	14	0	0	0	0	0	0	85.9	439			
7-Oct	0	0	0	0	0	0	1	15	39	92	189	248	166	207	122	107	92	12	0	0	0	0	0	0	53.8	248			
8-Oct	0	0	0	0	0	0	3	31	138	127	184	240	286	330	337	183	85	9	0	0	0	0	0	0	81.5	337			
9-Oct	1	0	1	0	0	1	6	83	176	310	414	377	335	363	269	179	68	6	0	0	0	0	0	0	107.9	414			
10-Oct	0	0	0	0	0	0	2	58	149	302	395	329	352	410	309	171	93	8	0	0	0	0	0	0	107.6	410			
11-Oct	0	0	0	0	0	0	1	39	180	243	368	400	443	407	339	206	57	9	0	0	0	0	0	0	112.2	443			
12-Oct	0	0	0	0	0	0	0	14	48	132	206	196	309	219	136	61	20	2	0	0	0	0	0	0	55.9	309			
13-Oct	0	0	0	0	0	0	1	16	73	122	168	223	372	445	281	196	62	4	0	0	0	0	0	0	81.9	445			
14-Oct	0	0	0	0	0	0	0	5	30	50	62	101	141	55	59	33	13	1	0	0	0	0	0	0	23.0	141			
15-Oct	0	0	0	0	0	0	1	14	55	71	104	146	302	217	190	194	42	4	0	0	0	0	0	0	55.9	302			
16-Oct	0	0	0	0	0	0	1	14	64	158	310	267	263	237	93	67	17	2	0	0	0	0	0	0	62.3	310			
17-Oct	0	0	0	0	0	0	1	20	101	192	218	248	298	233	159	86	28	2	0	0	0	0	0	0	66.2	298			
18-Oct	0	0	0	0	0	0	0	7	37	56	64	94	118	132	83	30	9	1	0	0	0	0	0	0	26.4	132			
19-Oct	0	0	0	0	0	0	0	8	34	84	94	109	132	180	261	159	33	2	0	0	0	0	0	0	45.7	261			
20-Oct	0	0	0	0	0	0	1	10	54	112	143	163	304	272	241	151	31	1	0	0	0	0	0	0	61.9	304			
21-Oct	0	0	0	0	0	0	0	13	148	257	132	213	255	252	273	153	45	2	0	0	0	0	0	0	72.7	273			
22-Oct	0	0	0	0	0	0	0	39	153	267	336	341	361	299	230	105	23	1	0	0	0	0	0	0	89.9	361			
23-Oct	0	0	0	0	0	1	1	11	58	128	116	86	73	79	52	27	11	0	0	0	0	0	0	0	26.8	128			
24-Oct	0	0	0	0	0	0	0	2	13	45	72	119	126	132	119	57	12	0	0	0	0	0	0	0	29.2	132			
25-Oct	0	0	0	0	0	0	0	11	84	223	310	336	376	262	110	104	22	1	0	0	0	0	0	0	76.7	376			
26-Oct	0	0	0	0	0	0	0	4	19	42	117	98	74	78	56	26	6	0	0	0	0	0	0	0	21.7	117			
27-Oct	0	0	0	0	0	0	0	4	33	50	72	151	184	199	94	51	18	0	0	0	0	0	0	0	35.7	199			
28-Oct	0	0	0	0	0	0	0	2	9	13	22	44	33	35	20	14	2	0	0	0	0	0	1	0	8.2	44			
29-Oct	0	0	0	0	0	0	0	2	11	27	47	64	83	83	83	37	6	0	0	0	0	1	0	1	18.6	83			
30-Oct	1	0	0	0	0	0	0	12	27	43	81	94	100	109	57	42	8	0	0	0	0	0	0	0	24.0	109			
31-Oct	0	0	0	0	0	0	0	1	11	20	39	61	69	53	38	21	3	0	0	0	0	0	0	0	13.2	69			
														0.2 0.1 0.1 0.1 0.2 0.2 1.8 21.8 77.0 134.1 176.2 192.1 229.3 207.0 157.4 96.2 36.1 4.3 0.2 0.2 0.1 0.2 0.2 0.2														Diurnal Average	
														1 0 1 0 0 1 13 126 216 328 443 400 472 445 339 206 93 19 1 0 0 1 1 1														Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Global Radiation (GR) - W/m<sup>2</sup>**  
**Fort Chipeywan - October 2014**





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

**Global Radiation (GR) - W/m2**  
**Fort Chipeywan - October 2014**

<b>Concentration Ranges (W/m2)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	477	64.11	64.11
21 - 100	112	15.05	79.17
101 - 300	119	15.99	95.16
301 - 600	36	4.84	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 35 km/h on Oct 19 17:00	Maximum Daily Speed Average: 23.4 km/h on Oct 14	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 22 02:00	Minimum Daily Speed Average: 2.9 km/h on Oct 6	Hours of Data: 743
Maximum Diurnal Speed Average: 5.8 km/h at hour 18	Minimum Diurnal Speed Average: 0.8 km/h at hour 10	Hours of Missing Data: 1
Monthly Average Velocity: 3.2 km/h 103.9 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 12 Q <sub>3</sub> = 19 P <sub>90</sub> = 24 P <sub>99</sub> = 30	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-Oct	NW8	WNW5	WNW6	WNW8	WNW7	WNW9	WNW6	NNW7	NNW9	NNW11	NNW9	NNW10	NNW10	NNW11	NNW14	NNW17	NNW13	NNW16	NW15	NW17	NW16	NW15	NW16	NW16	NW10.9	NW17	
2-Oct	NW17	NW16	NW19	NW21	NW21	NW22	WNW19	WNW19	WNW18	WNW20	NW19	NW22	NW23	WNW25	NW24	NW22	NW23	NW19	NW18	NW18	NW15	NW13	NW15	NW12	NW19.1	WNW25	
3-Oct	NW10	NNW6	WNW4	W6	WNW8	WNW9	WNW8	NW8	NW2	S3	ESE7	E9	E13	E17	E17	ESE21	ESE29	ESE28	ESE25	ESE26	ESE26	ESE24	ESE24	SE23	ESE9.5	ESE29	
4-Oct	SE21	SE20	SE21	SE20	SE18	SE15	SE16	SE15	SE14	SE12	SE11	ESE10	E11	E12	E13	E13	E14	ENE11	ESE12	SE14	SE13	SSE11	SSE11	S6	ESE13.0	SE21	
5-Oct	SSE8	SSE13	S8	SSE9	SSE10	SSE12	SSE10	SE6	ESE2	E2	ENE1	E3	E8	E7	E11	E10	E9	ENE11	ENE8	NE6	NE9	ENE7	ENE2	NE2	ESE5.5	SSE13	
6-Oct	NE5	ENE9	E9	ESE19	ESE21	E17	ENE12	E19	E18	ENE12	ESE8	ESE7	NW10	WNW14	WNW13	WNW13	WNW12	WNW11	WNW13	WNW12	WNW11	WNW9	NW4	NW4	NE2.9	ESE21	
7-Oct	N4	NNW4	NW7	NNW7	NW8	NW8	NW8	NW7	NW7	NNW10	NNW9	NW9	NNW7	NNW3	S6	WSW2	ENE6	E8	E5	ENE8	NE7	NE6	NNW1	ENE2	NNW3.6	NNW10	
8-Oct	NNE7	NNE11	NNE10	NE9	NE9	ENE5	E4	SE11	ESE8	ESE3	ESE5	E4	E12	E14	E14	E16	E18	E15	ENE11	E15	E22	ESE19	ESE21	ESE22	E10.6	ESE22	
9-Oct	ESE18	ESE17	ESE13	E11	ESE14	ESE15	E20	ESE17	ESE15	ESE14	E15	E19	E22	E26	E26	E26	E23	E24	E21	E20	E18	ESE18	ESE17	ESE18	E18.2	E26	
10-Oct	ESE18	ESE17	SE14	ESE14	E17	ESE16	ESE13	ESE13	SE13	SSE15	S18	S18	SSE16	S18	SSE13	S16	S21	S21	SSW20	SSW11	SSW11	SW13	SW12	S6	SSE12.4	S21	
11-Oct	SE4	SSE4	SSW6	SW5	WSW10	WSW15	WSW15	WSW17	W23	W24	W25	W22	W22	W24	W24	W22	W23	W18	W17	WNW12	WNW10	W12	WNW12	W11	W14.9	W25	
12-Oct	WNW9	W11	W9	WNW10	WNW14	WNW15	WNW14	WNW12	WNW12	WNW13	WNW13	WNW12	WNW11	WNW9	W6	NW3	N2	N1	N3	N5	NNW4	NNW5	NNW6	NNW5	WNW8.0	WNW15	
13-Oct	NW3	NNW4	N5	N7	NNW5	N5	NNE6	NE8	ENE9	ENE10	E12	E11	ESE10	ESE12	E16	E16	E16	E13	ENE11	ENE13	ENE19	ENE21	ENE23	ENE29	ENE10.1	ENE29	
14-Oct	ENE29	ENE26	ENE24	ENE28	ENE27	ENE26	ENE27	ENE28	ENE24	ENE29	ENE29	ENE29	ENE29	ENE30	ENE29	ENE29	ENE29	ENE28	ENE28	ENE25	ENE25	ENE21	ENE7	ENE2	W15	ENE23.4	ENE30
15-Oct	W20	W23	W21	W20	W19	W21	W20	W20	W23	W23	W21	W17	WNW19	WNW19	WNW18	NW16	WNW13	WNW10	WNW8	WNW8	NW9	NW7	NNW7	NNW6	W15.3	W23	
16-Oct	N7	N7	N6	NNW7	NNW7	NNW7	NNW8	NNW9	NNW7	N5	ENE2	SE5	E8	E12	E14	E21	ESE18	ESE18	ESE21	ESE27	ESE30	ESE22	ESE20	ESE18	E8.5	ESE30	
17-Oct	ESE17	ESE19	ESE18	SE16	SE16	SE15	SE17	SSE21	S22	S27	S29	S33	S24	S26	SSE26	SSE31	SSE29	SSE27	SSE32	S31	S25	S24	S21	SSE15	SSE22.1	S33	
18-Oct	SSE15	SSE16	SSE15	SSE14	S13	S7	S6	SSW5	SW7	WSW10	WSW10	WSW10	W8	W8	WSW7	W6	WSW6	W6	WNW7	NW10	NW10	NW12	NW10	NNW10	SW5.2	SSE16	
19-Oct	NW8	WNW9	WNW7	WNW8	WNW6	NW3	W3	WSW5	WSW3	SE9	SE14	SE17	E19	E24	E29	E33	E35	E33	E32	E30	E27	E27	E29	E27	E13.8	E35	
20-Oct	E26	E22	E24	E26	E22	ESE20	E18	E18	E18	ESE17	ESE11	SSE11	SSE10	SSE10	SSE10	SSE9	SE8	SE6	SSE6	SSE6	SSW6	S4	ESE7	ESE7	ESE11.6	E26	
21-Oct	E10	E7	ENE3	ENE2	WNW4	W2	SW6	WSW6	WSW7	W14	W12	WSW15	W16	WSW14	W15	WSW12	SW8	SSW3	SSW5	SW8	SW9	W6	SW1	ESE1	WSW5.5	W16	
22-Oct	ESE3	SE0	E4	E6	E5	SE1	E3	E5	E8	E11	E16	E19	E21	E21	E20	E21	E21	ENE19	E25	E25	ESE19	ESE17	ESE14	E17	E13.2	E25	
23-Oct	E19	E16	E16	E15	E11	ESE9	E9	E10	E14	E14	E12	ENE15	ENE19	ENE21	ENE27	ENE21	ENE19	ENE22	E21	ENE14	NNE9	N7	N7	NNW9	ENE13.4	ENE27	
24-Oct	NNW11	NNW18	NNW19	NNW19	NW18	NW21	NW19	WNW19	WNW20	WNW22	WNW24	WNW25	WNW25	WNW24	WNW25	WNW18	WNW18	WNW15	WNW16	WNW18	WNW14	WNW14	WNW14	WNW16	WNW18.2	WNW25	
25-Oct	WNW17	NW15	WNW12	WNW13	WNW12	WNW9	W9	W11	WNW13	WNW10	W10	W8	SW12	SW10	WSW6	NNW1	ESE5	E10	ENE9	ENE10	NE10	NE10	NE10	ENE11	WNW4.2	WNW17	
26-Oct	ENE12	ENE16	ENE14	E17	ENE14	ENE16	ENE18	ENE9	N8	N9	NE9	ENE15	NE10	NE13	NNE9	N6	NE9	NE12	NE10	NNE6	NNE8	NNE8	NNE8	NNE7	NE10.0	ENE18	
27-Oct	N8	N8	NNE6	N6	N7	N7	N6	N4	N5	N5	N5	N2	NW1	SSW4	SSW3	WSW3	WNW5	WNW7	WNW6	WNW6	WNW5	NW2	NW5	W4	NNW3.8	N8	
28-Oct	WSW4	SW3	AF	NE1	ESE7	ESE7	ESE5	SE4	S2	SE4	SSE5	SSE5	S7	SSE6	SE4	SSE8	SSE7	SE5	E6	ESE7	ESE8	SE7	ESE8	ENE5	SE4.4	ESE8	
29-Oct	ENE4	ENE6	NE5	NNE3	NNE6	N6	N7	N6	N7	N5	N5	NNW4	NNE4	NE6	NNE5	NE5	NE4	NE6	ENE9	ENE9	ESE11	SSE12	SSE16	SSE16	ENE3.8	SSE16	
30-Oct	S16	SSE14	SSE14	SE21	SSE19	SE22	SE24	SE22	SSE18	SSE18	S23	S25	S20	SSE18	S23	S22	SSE20	S24	S24	SSE22	SSE25	SSE25	SSE25	SE26	SSE20.6	SE26	
31-Oct	SE26	SE25	SSE26	SE28	SE22	SSE20	SE20	SE20	SE20	SSE19	SSE16	S18	S19	S12	SSE13	SSE9	SE8	ESE7	S12	SSW8	SW9	SW8	SW8	SW9	SSE14.4	SE28	

E3.9	E3.4	E3.0	E3.5	E2.7	ESE1.9	E2.2	ESE1.9	SE0.9	SSE0.8	SSE1.6	SSE2.4	SE1.8	ESE2.7	E3.6	E4.6	E5.6	E5.8	E5.2	E4.9	ESE4.5	ESE3.7	ESE4.0	ESE3.6	Diurnal Average	
ENE29	ENE26	SSE26	ENE28	ENE27	ENE26	ENE27	ENE28	ENE24	ENE29	S29	S33	ENE29	ENE30	E29	E33	E35	E33	E32	S31	ESE30	E27	E29	ENE29	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**

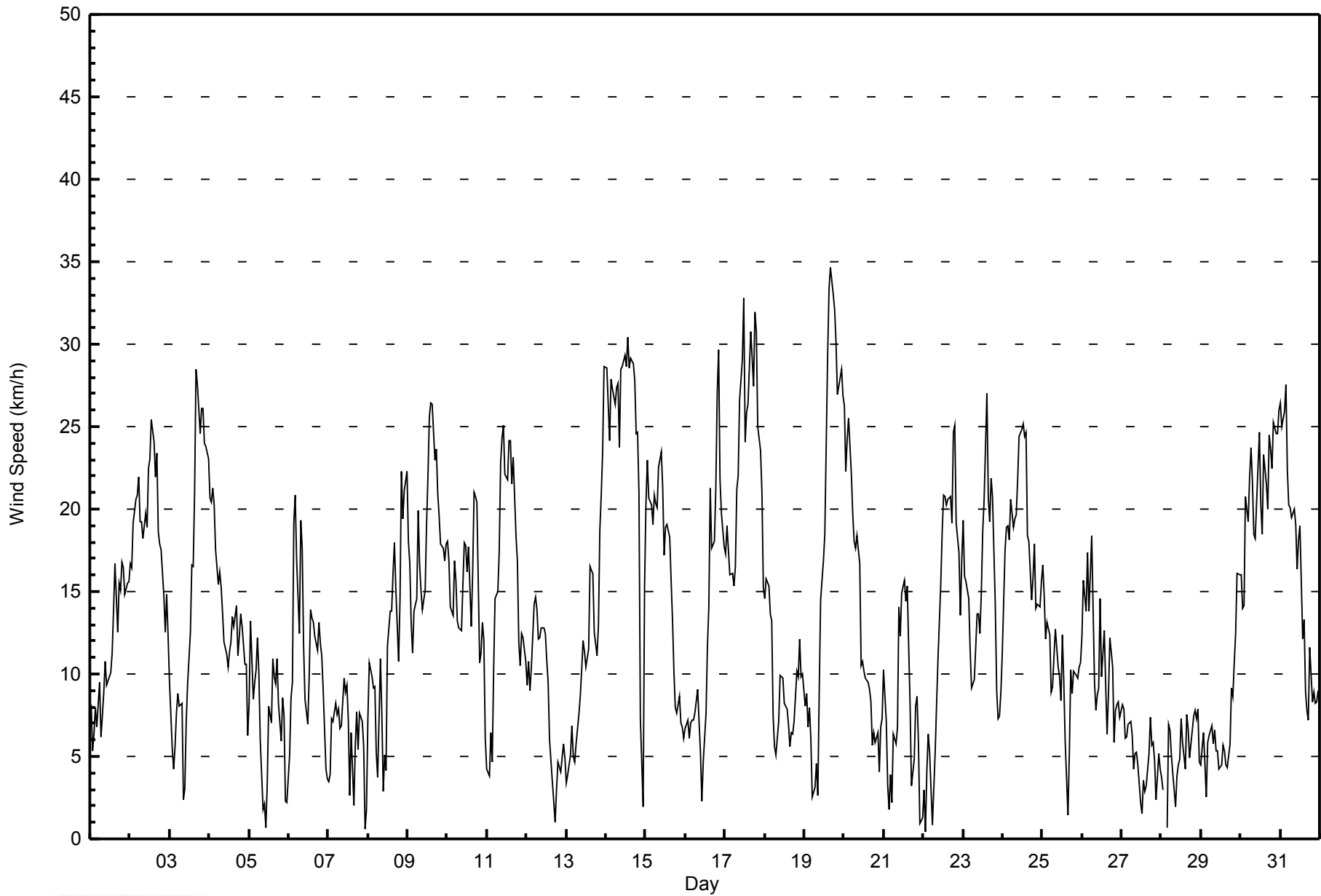
**Wind Speed (WS) - km/h**  
**Fort Chipeywan - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																	Hours in Service: 744								
Maximum Value: 9 km/h on Oct 23 14:00																	Hours of Data: 743								
Minimum Value: 1 km/h on Oct 28 10:00																	Hours of Missing Data: 1								
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: 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-Oct	3	1	2	2	2	2	2	3	4	4	3	4	4	4	6	6	5	6	5	6	6	5	6	5	6
2-Oct	5	5	6	7	6	6	5	5	5	6	6	7	7	8	8	8	8	6	6	6	5	4	5	3	8
3-Oct	4	2	2	1	1	1	1	2	2	2	2	1	2	1	1	3	2	2	3	3	3	2	2	2	4
4-Oct	2	2	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2	3	2	2	1	2	1	3
5-Oct	2	3	3	1	2	1	2	1	1	1	1	2	2	3	2	1	2	2	2	1	1	2	2	1	3
6-Oct	2	1	7	2	2	3	2	3	3	3	2	1	5	4	4	3	3	2	3	3	3	2	2	1	7
7-Oct	2	1	2	3	2	2	2	2	3	4	3	4	3	2	2	2	2	2	2	1	2	2	1	1	4
8-Oct	3	1	2	1	1	1	1	5	3	1	1	1	4	1	1	2	2	3	1	4	2	2	2	1	5
9-Oct	2	2	1	1	3	1	2	2	2	1	3	1	3	2	2	3	3	2	2	2	2	2	1	1	3
10-Oct	2	1	2	2	2	2	1	1	2	5	4	3	3	3	3	3	3	2	3	4	2	2	2	3	5
11-Oct	2	2	2	1	4	4	3	4	6	5	7	6	6	7	7	5	6	5	5	2	2	2	2	2	7
12-Oct	2	2	2	3	3	3	3	3	3	4	3	4	3	3	3	2	1	1	1	1	1	1	1	2	4
13-Oct	1	1	1	1	3	2	2	2	2	2	2	3	1	1	1	1	1	2	2	2	3	3	4	4	4
14-Oct	4	4	4	4	5	5	5	4	5	4	5	5	5	6	5	5	5	4	5	3	4	6	2	7	7
15-Oct	5	6	5	5	5	5	5	6	5	6	5	5	5	6	5	4	4	4	2	2	2	2	2	2	6
16-Oct	2	2	2	3	2	3	2	2	3	2	2	2	2	2	3	2	2	2	2	4	5	2	3	1	5
17-Oct	1	1	1	2	1	1	2	5	4	5	5	5	7	5	4	5	5	4	5	5	4	3	4	3	7
18-Oct	3	3	3	3	2	2	2	1	1	2	2	2	2	2	2	2	2	1	2	3	3	3	3	3	3
19-Oct	3	2	2	2	2	2	2	2	2	3	3	2	2	3	3	3	3	3	3	3	2	2	2	2	3
20-Oct	2	1	2	2	2	2	3	2	2	2	2	2	2	2	3	2	3	1	1	2	2	2	1	2	3
21-Oct	1	4	2	2	2	2	2	3	4	3	3	4	4	4	4	3	2	2	1	3	2	2	1	1	4
22-Oct	2	1	4	1	2	1	2	2	1	2	2	3	2	2	2	2	3	4	3	2	3	2	2	1	4
23-Oct	2	2	2	2	2	1	1	2	2	2	4	2	4	9	5	4	3	3	3	2	2	2	3	9	
24-Oct	5	6	7	6	5	6	5	6	5	6	6	6	6	7	6	5	5	4	4	5	3	4	4	4	7
25-Oct	4	4	3	3	3	2	2	3	3	3	3	2	3	2	3	2	3	2	1	1	1	2	2	2	4
26-Oct	3	3	4	3	3	3	4	8	2	2	5	4	2	3	2	2	3	3	2	2	2	2	3	2	8
27-Oct	2	2	2	2	2	2	3	2	2	2	2	1	1	1	1	2	1	1	2	2	1	2	1	1	3
28-Oct	1	1	AF	1	2	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2
29-Oct	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	2	1	1	3	2	2	2	3
30-Oct	2	2	2	2	3	2	2	3	3	3	3	4	3	4	3	4	3	5	6	5	5	4	4	3	6
31-Oct	3	3	3	3	3	2	2	3	2	3	3	2	2	2	2	2	1	1	3	2	1	2	3	2	3
Diurnal Maximum																									
5 6 7 7 6 6 5 8 6 6 7 7 7 9 8 8 8 8 6 6 6 6 6 6 7																									
AF - Analyzer Failure																									



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Fort Chipewyan - October 2014**





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

**Wind Speed (WS) - km/h**  
**Fort Chipeywan - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	104	14.00	14.00
6 - 11	246	33.11	47.11
12 - 19	226	30.42	77.52
20 - 28	142	19.11	96.64
29 - 38	25	3.36	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort Chipeywan - October 2014**

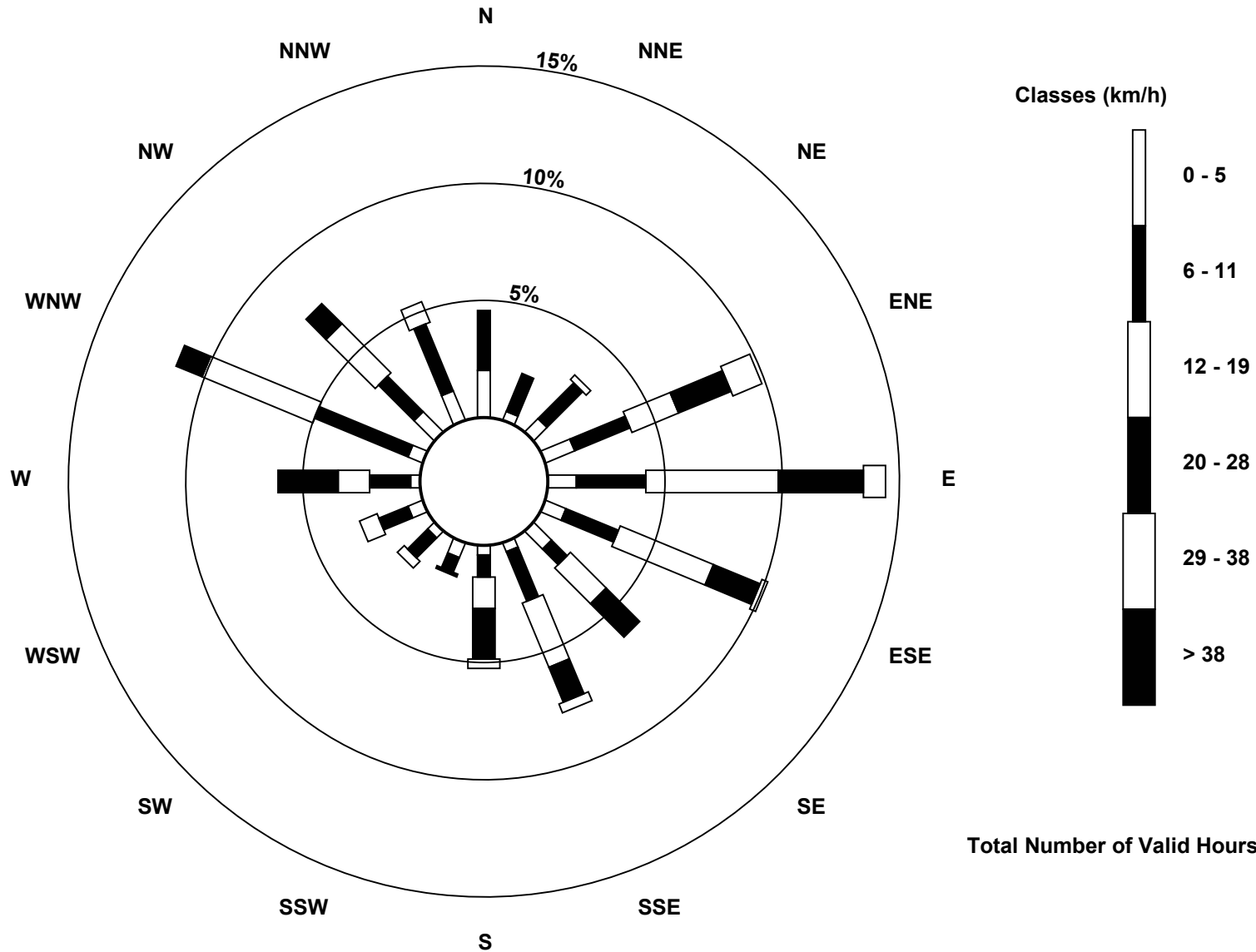
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	3	6	10	9	7	8	3	3	5	3	5	3	5	9	10	104
6 - 11	19	13	16	19	22	18	7	17	7	5	9	10	13	32	16	23	246
12 - 19	0	0	2	16	42	32	16	22	10	0	3	6	10	38	22	7	226
20 - 28	0	0	0	18	27	16	15	12	16	1	0	0	19	9	9	0	142
29 - 38	0	0	0	10	7	2	0	3	3	0	0	0	0	0	0	0	25
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>34</b>	<b>16</b>	<b>24</b>	<b>73</b>	<b>107</b>	<b>75</b>	<b>46</b>	<b>57</b>	<b>39</b>	<b>11</b>	<b>15</b>	<b>21</b>	<b>45</b>	<b>84</b>	<b>56</b>	<b>40</b>	<b>743</b>

Total Number of Valid Hours: 743

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Wind Speed (WS) - km/h  
Fort Chipeywan (AMS 8)**





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

**Wind Direction (WD) - deg**  
**Fort Chipeywan - October 2014**

Direction of Maximum Speed: 83 deg on Oct 19 17:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 67.7 deg on Oct 14	Hours of Data: 743
Direction of Minimum Speed: 125 deg on Oct 22 02:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 2.9 deg on Oct 6	Percent Operational Time: 99.9
Monthly Average Direction: 295.3 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-Oct	324	293	294	295	291	288	297	327	335	335	328	334	338	344	339	338	343	327	323	321	321	322	322	316	323.6
2-Oct	312	304	307	307	307	305	299	297	301	302	304	309	306	299	308	313	317	317	317	315	307	306	311	311	307.4
3-Oct	326	337	297	274	282	291	295	305	312	191	120	99	95	97	97	105	108	113	116	112	109	111	121	129	108.8
4-Oct	125	129	126	137	138	130	124	129	129	126	126	114	96	95	89	87	90	78	106	127	143	163	162	178	122.5
5-Oct	153	161	183	165	153	154	154	139	122	96	66	95	99	98	91	98	85	69	57	53	56	59	74	53	113.7
6-Oct	55	64	93	104	105	94	72	81	86	77	111	122	320	297	296	295	299	285	293	292	295	296	311	321	34.6
7-Oct	356	339	312	333	319	310	309	307	305	333	330	321	330	343	176	243	62	85	100	59	53	46	328	71	344.3
8-Oct	18	12	32	48	50	77	94	124	121	112	114	93	88	89	94	97	93	88	70	81	101	104	107	104	88.3
9-Oct	107	112	116	90	105	112	97	117	110	106	94	88	88	86	86	84	81	87	92	99	97	109	113	109	97.7
10-Oct	116	114	131	113	101	109	115	113	133	164	174	175	168	169	164	170	174	184	194	198	212	217	221	189	158.3
11-Oct	136	150	209	221	244	251	255	257	264	268	268	263	264	268	266	267	266	267	271	285	288	281	282	281	264.5
12-Oct	282	280	279	296	282	284	289	302	293	301	294	285	283	290	276	304	0	357	355	350	342	328	342	339	296.0
13-Oct	324	332	353	352	342	351	13	49	62	68	83	98	111	107	97	96	89	83	65	60	70	78	77	78	73.2
14-Oct	75	69	70	72	73	70	72	72	66	68	65	66	59	66	62	67	64	67	64	78	66	72	64	263	67.7
15-Oct	269	269	267	265	266	266	265	266	268	268	269	280	290	290	291	306	303	300	285	303	313	323	338	348	279.8
16-Oct	351	360	0	348	345	338	338	344	344	351	64	124	99	101	94	93	106	116	114	109	111	114	115	120	91.6
17-Oct	120	122	121	127	125	127	135	167	172	174	174	177	170	173	161	164	163	162	165	173	175	173	170	167	160.5
18-Oct	152	158	166	164	174	183	190	210	229	242	247	240	262	263	254	261	254	274	283	304	323	320	312	301	233.4
19-Oct	306	293	298	287	298	317	262	243	250	125	125	125	97	88	85	85	83	82	86	88	92	90	90	90	88.7
20-Oct	91	94	88	89	94	102	99	94	94	103	114	151	161	163	165	162	136	138	160	162	206	190	112	105	111.4
21-Oct	92	98	70	64	286	280	231	246	258	278	275	258	260	256	259	246	227	209	202	224	232	272	226	105	250.3
22-Oct	102	125	93	83	96	145	93	92	91	94	93	89	88	88	88	85	81	77	86	93	104	118	102	94	91.4
23-Oct	97	89	95	91	99	106	98	88	95	101	88	69	69	73	75	69	70	74	79	64	17	2	351	347	76.5
24-Oct	339	334	332	329	318	311	305	302	297	291	291	292	288	292	293	300	301	295	293	291	285	293	294	291	301.3
25-Oct	291	304	283	287	290	287	274	269	282	287	275	267	226	220	258	327	105	98	74	68	53	45	54	57	297.4
26-Oct	65	68	71	94	75	69	76	71	9	5	37	69	44	54	33	6	50	45	54	26	12	14	23	18	52.7
27-Oct	10	3	13	4	353	357	351	350	0	2	351	356	304	203	209	252	292	297	298	297	295	324	310	262	332.2
28-Oct	242	220	AF	56	116	119	110	131	173	134	159	153	182	163	139	154	162	135	81	122	122	124	117	61	135.7
29-Oct	66	59	46	33	21	5	7	4	358	356	353	346	15	34	33	46	40	38	74	68	117	148	147	158	62.2
30-Oct	177	165	154	142	148	138	127	138	157	161	173	172	170	163	171	170	167	174	172	168	165	150	147	143	158.6
31-Oct	142	146	149	143	143	147	146	146	143	152	165	170	184	180	164	154	134	118	187	205	222	224	222	236	159.1

92.6 92.7 99.7 97.0 100.0 102.7 100.4 114.6 125.1 156.1 164.5 150.9 125.6 109.6 100.1 96.5 94.1 93.6 101.2 97.4 101.8 108.7 108.8 106.3  
 Diurnal Average

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



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

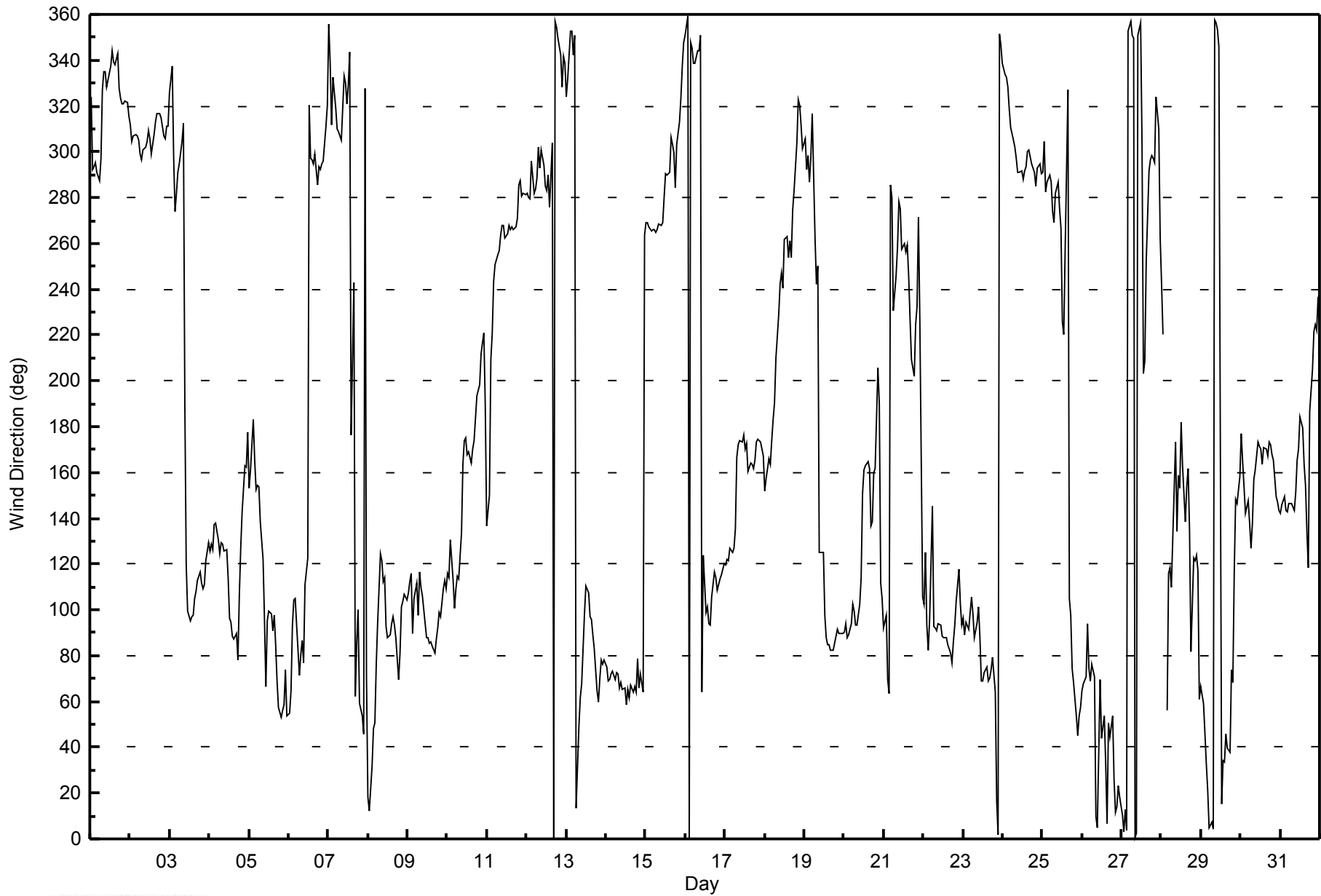
**Wind Direction (WD) - deg**  
**Fort Chipeywan - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 83 deg on Oct 22 02:00														Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9											
Minimum Value: 4 deg on Oct 9 12:00																									
Percentiles: P <sub>1</sub> = 4 P <sub>10</sub> = 6 Q <sub>1</sub> = 8 Median = 13 Q <sub>3</sub> = 17 P <sub>90</sub> = 27 P <sub>99</sub> = 77																									
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-Oct	21	14	18	14	15	15	15	23	27	26	27	26	26	28	27	24	26	24	21	21	21	21	22	18	28
2-Oct	18	16	17	17	16	15	16	16	15	15	16	16	17	16	16	18	19	19	20	17	17	17	16	16	20
3-Oct	29	28	28	13	11	10	5	11	57	54	20	9	7	6	6	8	4	6	6	5	5	6	6	5	57
4-Oct	6	6	7	7	7	9	9	6	6	6	8	13	6	7	6	6	5	8	18	9	7	10	11	15	18
5-Oct	14	8	16	10	7	6	7	13	40	35	63	23	10	8	18	7	9	9	12	12	7	7	29	51	63
6-Oct	13	7	10	8	8	8	10	8	9	13	20	16	56	18	16	15	14	12	14	14	15	14	20	13	56
7-Oct	23	29	15	22	16	15	15	16	28	23	25	31	33	71	23	82	30	11	26	8	6	36	70	43	82
8-Oct	22	9	15	7	6	14	21	10	23	25	13	22	7	6	7	6	5	10	8	12	7	5	5	4	25
9-Oct	10	11	5	9	15	7	6	9	8	6	6	4	4	4	4	6	6	5	5	5	6	7	4	5	15
10-Oct	4	4	17	17	7	8	8	6	15	16	12	10	10	11	12	9	7	6	6	14	9	8	8	31	31
11-Oct	39	41	15	14	19	12	13	13	14	14	15	15	16	16	15	14	14	14	14	13	13	12	11	10	41
12-Oct	12	11	12	16	12	12	13	15	15	18	16	18	19	19	36	40	19	43	10	12	15	13	15	17	43
13-Oct	15	13	12	14	28	33	27	20	12	12	14	7	8	7	5	5	6	6	12	8	10	8	7	7	33
14-Oct	7	8	9	8	8	9	9	9	11	8	9	9	9	10	8	8	8	8	12	8	9	73	79	17	79
15-Oct	13	14	14	14	15	14	14	15	14	14	14	15	16	16	17	16	15	14	23	15	18	20	20	23	23
16-Oct	22	22	26	21	24	24	20	18	23	28	62	23	12	8	9	9	9	6	5	4	6	6	11	5	62
17-Oct	5	4	5	7	7	6	12	12	10	10	10	8	12	11	8	9	9	9	10	9	8	9	10	13	13
18-Oct	10	10	11	11	10	9	11	19	9	13	12	12	16	20	18	18	13	14	12	17	18	16	16	15	20
19-Oct	18	17	17	21	26	49	25	25	43	11	10	9	7	5	5	5	5	5	5	4	4	4	4	4	49
20-Oct	4	4	5	4	4	6	6	7	5	9	8	20	11	16	26	19	15	15	14	26	15	35	9	12	35
21-Oct	6	53	30	78	29	52	12	25	27	14	14	15	15	16	16	15	16	15	13	17	9	18	61	70	78
22-Oct	65	83	80	9	18	79	28	11	8	6	5	5	5	5	5	5	6	7	6	4	12	6	11	6	83
23-Oct	5	7	7	7	8	10	6	7	10	10	12	10	10	25	8	11	13	8	6	14	20	19	19	20	25
24-Oct	21	22	22	20	17	15	15	14	14	13	13	14	14	15	15	15	15	14	14	14	14	14	14	14	22
25-Oct	13	16	13	14	14	14	13	14	13	14	16	21	13	11	29	64	19	12	8	6	11	9	7	6	64
26-Oct	8	9	12	11	10	9	10	55	21	20	29	12	15	12	17	24	19	13	16	29	15	17	21	16	55
27-Oct	17	15	22	24	25	24	35	51	29	22	21	35	56	24	30	39	13	8	14	13	16	31	15	18	56
28-Oct	22	20	AF	81	9	11	13	18	27	16	17	19	10	12	15	13	10	17	20	14	8	8	14	15	81
29-Oct	10	6	10	22	12	18	16	20	19	29	28	30	31	15	16	16	16	14	11	9	28	8	6	7	31
30-Oct	7	9	17	6	8	7	5	10	10	11	8	8	10	12	9	10	10	10	10	12	11	10	8	8	17
31-Oct	7	8	8	7	7	9	8	9	8	8	9	9	9	12	11	9	19	21	13	10	11	10	13	11	21
65 83 80 81 29 79 35 55 57 54 63 35 56 71 36 82 30 43 26 29 28 73 79 70																									
Diurnal Maximum																									
AF - Analyzer Failure																									



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Fort Chipeywan - October 2014**



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# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 2, 2014	Previous Calibration	September 4, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	16:06
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)	7	7
Analyzer Range (mv)	5000	5000	HV power supply (V)	529	529
Calculated slope	0.988966	0.983140	Chamber temp.	50.0	50.0
Calculated intercept	0.010473	-0.082890	Pressure (in Hg)	26.7	26.8
Analyzer Background	6.9	6.5	Flow (cc/m)	630	634
Analyzer Coefficient	1.051	1.083	UV Lamp (mV)	4405	4406

Analyzer make	T100u	Analyzer serial #	138
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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	-0.15	NA
as found span	5000	37.1	18.18	17.62	1.032
calibrator zero	5000	0.0	0.0	0.04	NA
high point	5000	37.1	18.18	18.56	0.979
second point	5000	19.8	9.70	9.95	0.975
third point	5000	9.9	4.85	5.08	0.955
calibrator zero	5000	0.0	0.0		NA
as left zero	5000	0.0	0.0	-0.2	NA
as left span	5000	37.1	18.2	16.5	NA
Average Correction Factor					0.970

Corrected As found	17.8	Previous response	18.4	% change	3.4%
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#### Notes:

Zero and span with small adjustments. Filter changed after As Finds

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

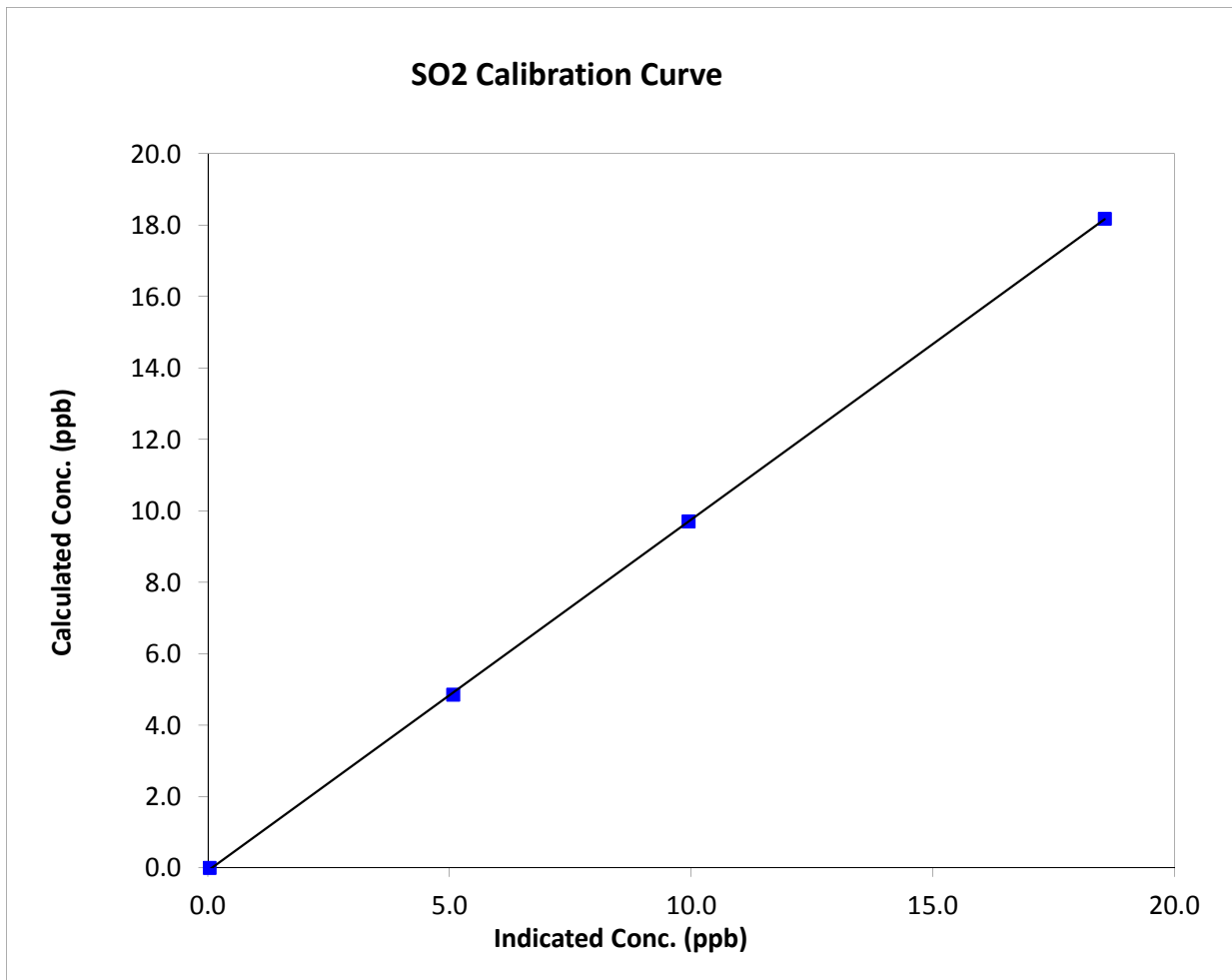
## SO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	October 2, 2014	Previous Calibration	September 4, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	9:25	End Time (MST)	16:06
Analyzer make	T100u	Analyzer serial #	138

### Calibration Data

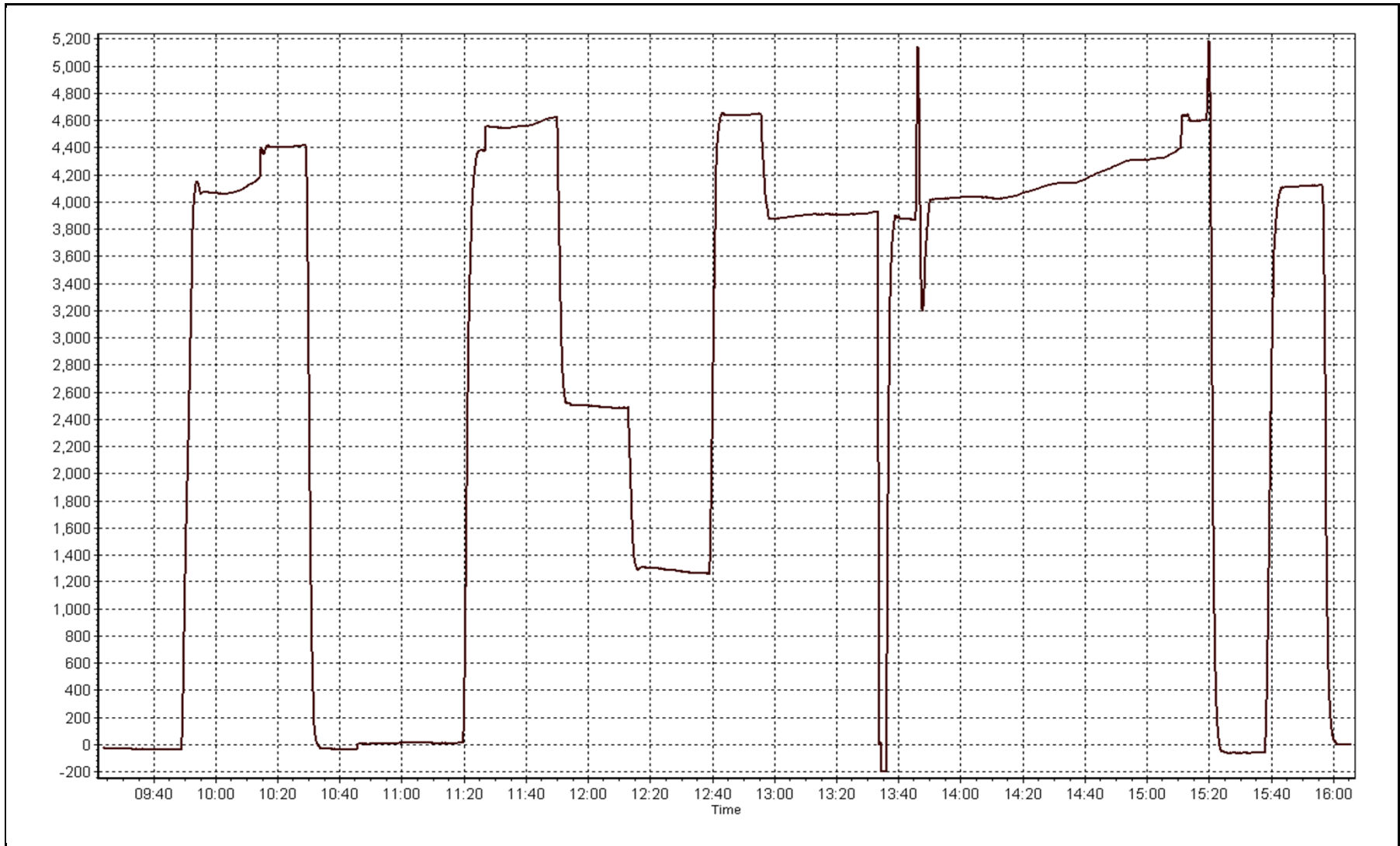
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999968
18.2	18.6	0.9795		
9.7	9.9	0.9751	Slope	0.983140
4.9	5.1	0.9549		
			Intercept	-0.082890





SO2 Calibration Plot

Date: October 2, 2014





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 2, 2014	Previous Calibration	September 4, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	16:42	End Time (MST)	18:10
Barometric Pressure	740 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	API T700	Serial Number	735
NO2 calibration used	Thursday, October 02, 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)	26.1	26.8
Analyzer Range (input)	5000	5000	Lamp temp. (Deg C)	58.0	58.0
Calculated slope	0.993142	0.998864	Pressure (in Hg)	27.1	27.3
Calculated intercept	0.105263	-0.518084	Flow cell (LPM)	0.740	0.744
Analyzer Background	-0.50	-0.5	Cell A Intensity	NA	NA
Analyzer Coefficient	1.017	1.017	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	0.4	N/A
as found span	5000	197.5 -- 810.1	107.0	107.4	0.996
calibrator zero	5000	0.00	0.0	0.4	N/A
high point	5000	197.5 -- 810.1	107.0	107.4	0.996
second point	5000	148 -- 772	81.2	82.0	0.991
third point	5000	93 -- 715	53.5	54.3	0.985
calibrator zero					
as left zero	5000	0.00	0.0	0.3	N/A
as left span	5000	197.5 -- 810.1	107.0	108.4	N/A
Average Correction Factor					0.991

Corrected As found 107.0 Previous response 107.6 % change 0.5%

#### Notes:

As Finds used as calibrator zero and high point. No adjustments, filter changed after third point

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

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

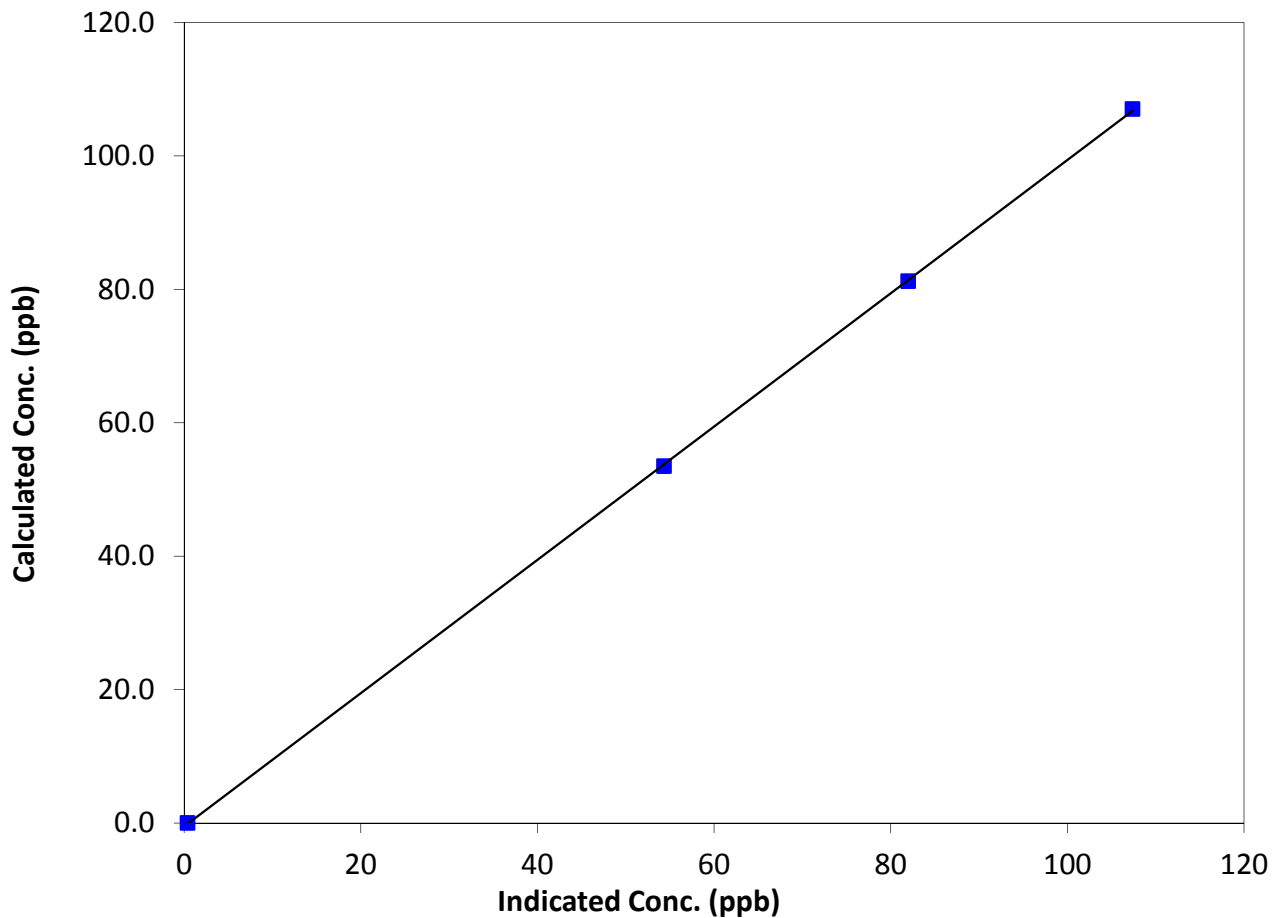
### Station Information

Calibration Date	Thursday, October 02, 2014	Previous Calibration	September 4, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	16:42	End Time (MST)	18:10
Analyzer make	API T400	Analyzer serial #	1020

### Calibration Data

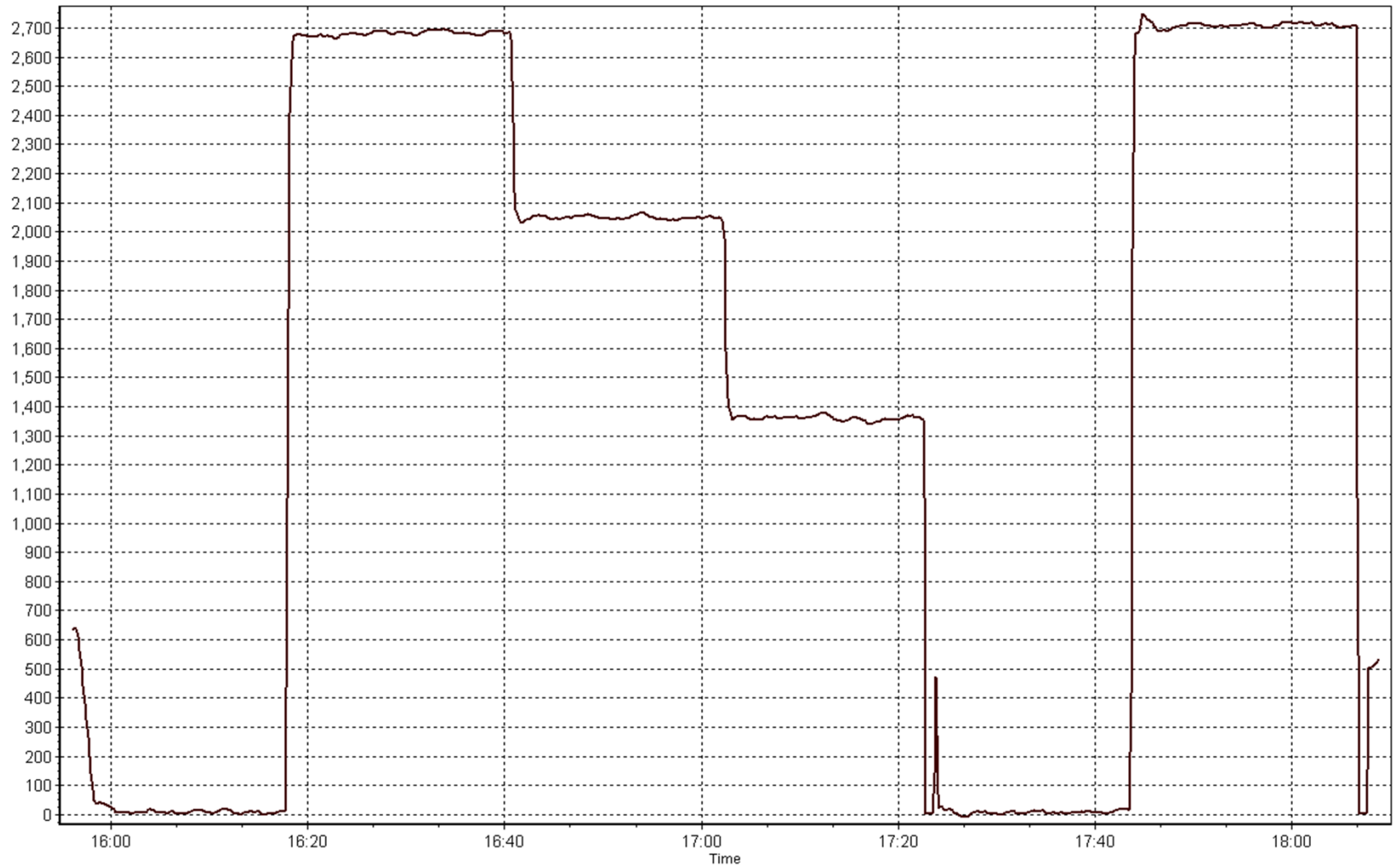
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999974
107.0	107.4	0.9963		
81.2	82.0	0.9907	Slope	0.998864
53.5	54.3	0.9848		
			Intercept	-0.518084

**O<sub>3</sub> Calibration Curve**



O3 Calibration Plot

Date: October 2, 2014





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 2, 2014	Previous Calibration	September 4, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	16:06
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. 172

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	200	200	200
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	1.001044	0.999021	0.997925
	Data Offset	0.239080	0.503239	0.197156
After	Data Slope	1.001044	0.999021	0.997925
	Data Offset	0.239080	0.503239	0.197156
Channel #		DIFF 3	DIFF 1	DIFF 2
Voltage Range		0 - 5V	0 - 5V	0 - 5V

### Analyzer Information

Analyzer make/model Thermo 42C      Analyzer serial # 2185

Test Point	before		after	
Concentration range	200	ppb	0-1000	ppb
NO coefficient	1.350	ppb	1.271	ppb
NOX coefficient	1.365	ppb	1.274	ppb
NO bkgrnd	-0.2		-0.1	
NOX bkgrnd	0.8		0.1	
PMT Voltage	0.0		0.0	
Chamber Temp	40.0	Deg C	40.0	Deg C
Moly Temp	314.2	Deg C	316.0	Deg C
PMT Temp	5.1	Deg C	5.1	Deg C
O3 flow	88.0	ccm	89.0	ccm
R Cell Press	2.8	"Hg	2.7	"Hg
Sample Flow	1157	ccm	1134	ccm

**Notes:**

Air dryer replaced after As Founds. Percent change of -7.9% and -7.7% more than likely to this issues. Diagnostics seem normal. Filter changed after As Founds. 2nd High Reference point used for GPT



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date: October 2, 2014 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	-0.4	0.0	-0.5	N/A	N/A
as found span	5000	37.1	150.6	149.9	0.7	162.7	162.0	0.6	0.9258	0.9251
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	N/A	N/A
high point	5000	37.1	150.6	149.9	0.7	150.6	150.3	0.2	1.0003	0.9972
second point	5000	19.8	80.4	80.0	0.4	79.9	79.7	0.2	1.0064	1.0035
third point	5000	9.9	40.2	40.0	0.2	40.2	40.1	0.1	0.9990	0.9981
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	0.4	0.2	0.2	N/A	N/A
as left span	5000	37.1	150.6	44.7	105.9	153.4	45.5	107.8	0.9820	0.9828
Average Correction Factor									1.0019	0.9996

Corrected As found NO<sub>x</sub>= 163.1 NO= 162.0 Percent Change NO<sub>x</sub>= -7.9% NO= -7.7%  
 Previous Response NO<sub>x</sub>= 150.2 NO= 149.5

### 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			-0.1			N/A	
1st NO <sub>2</sub> (100)	N/A	44.7	107.0	152.6	44.7	107.8	0.9795	1.0000	0.9928	100.7%
2nd NO <sub>2</sub> (75)	N/A	70.5	81.2	152.9	70.5	82.3	0.9778	1.0000	0.9865	101.4%
3rd NO <sub>2</sub> (50)	N/A	98.2	53.5	152.6	98.2	54.3	0.9798	1.0000	0.9858	101.4%
4th NO <sub>2</sub> (0)	151.8	N/A	0.6	152.4	151.8	0.5	0.9812	1.0000	N/A	N/A
Average Correction Factor							0.9796	1.0000	0.9884	101.2%

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

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

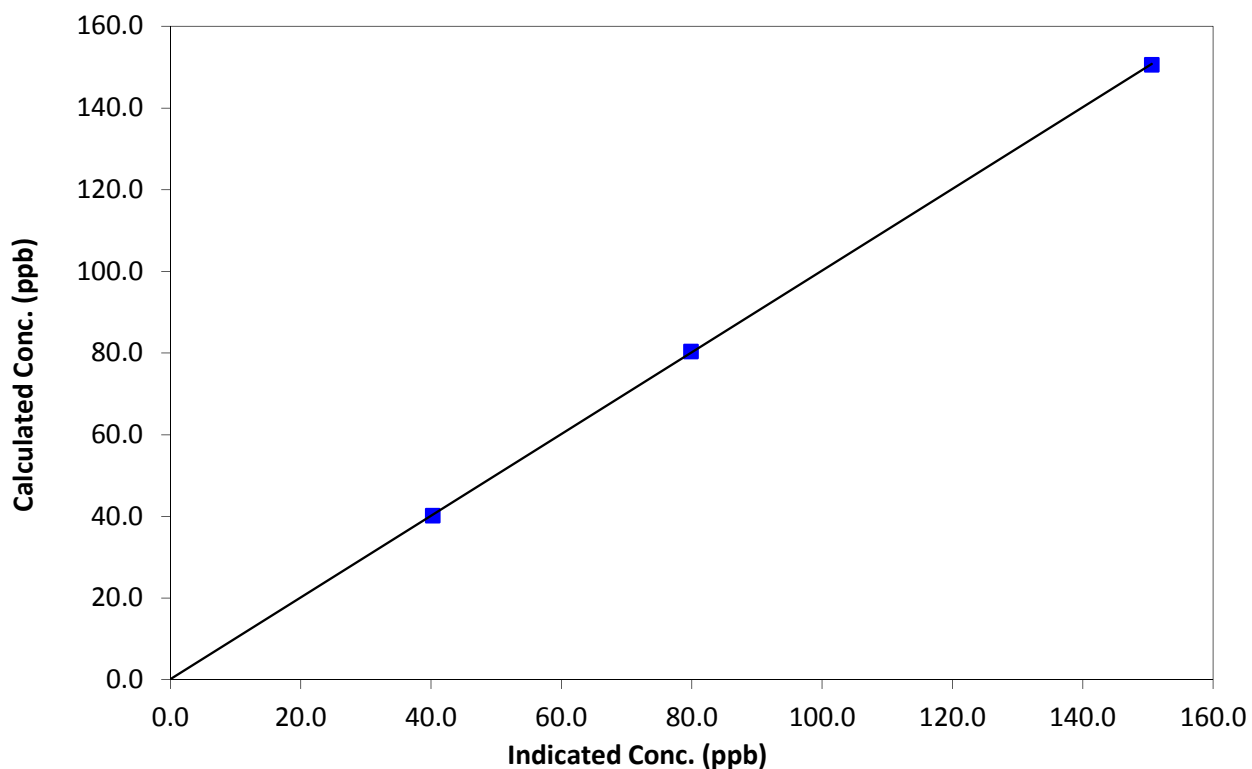
### Station Information

Calibration Date	October 2, 2014	Previous Calibration	September 4, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	9:25	End Time (MST)	16:06
Analyzer make	Thermo 42C	Analyzer serial #	2185

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999986
150.6	150.6	1.0003		
80.4	79.9	1.0064	Slope	1.000294
40.2	40.2	0.9990		
			Intercept	0.140212

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

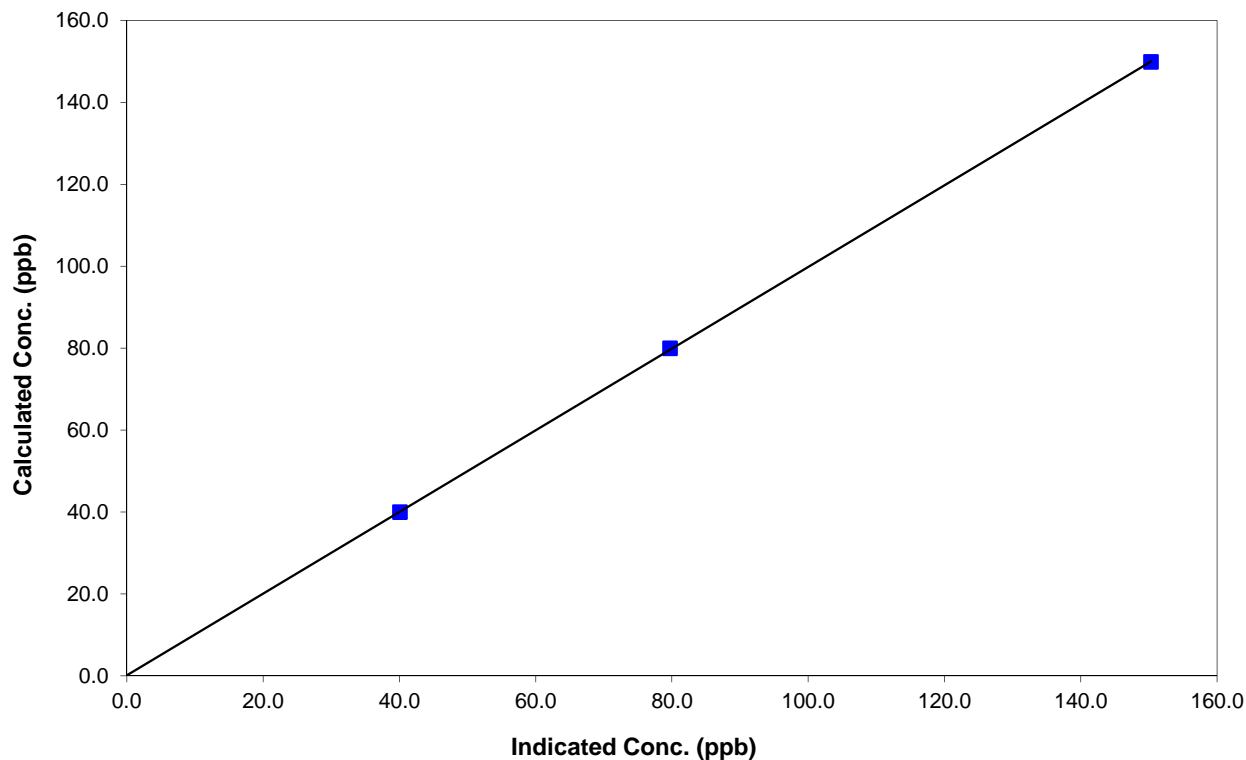
### Station Information

Calibration Date	October 2, 2014	Previous Calibration	September 4, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	9:25	End Time (MST)	16:06
Analyzer make	Thermo 42C	Analyzer serial #	2185

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999986
149.9	150.3	0.9972		
80.0	79.7	1.0035	Slope	0.997442
40.0	40.1	0.9981		
			Intercept	0.126817

### NO Calibration Curve







# Wood Buffalo Environmental Association

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

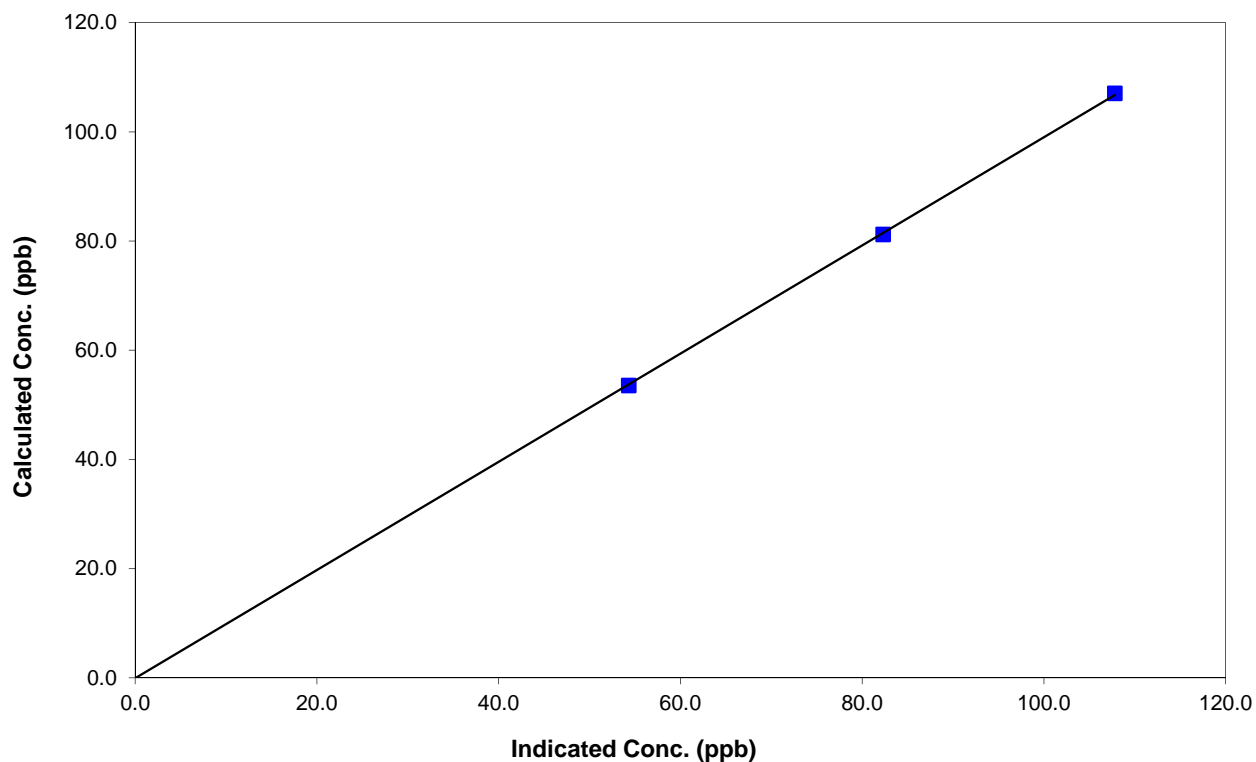
### Station Information

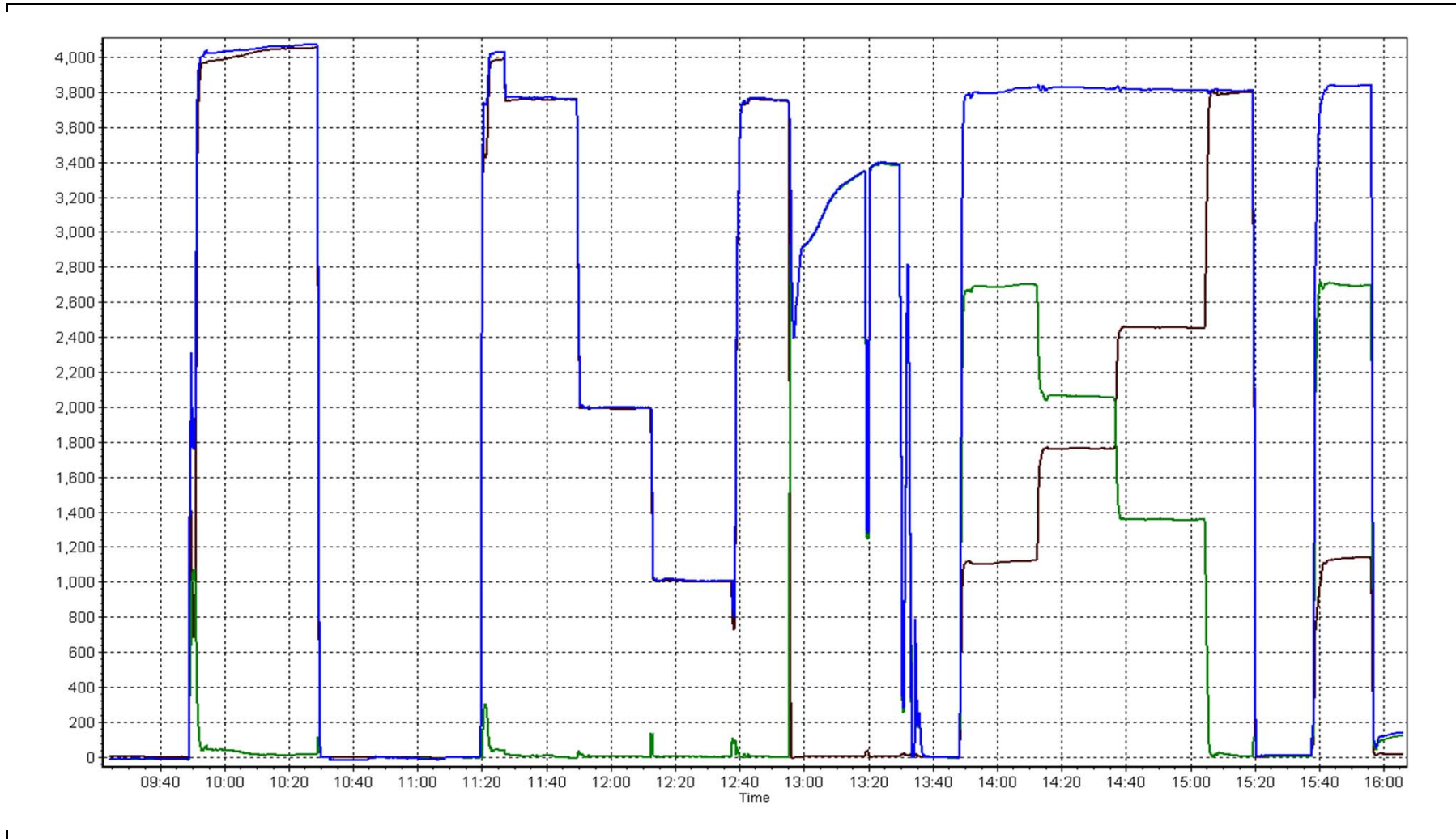
Calibration Date	October 2, 2014	Previous Calibration	September 4, 2014
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	9:25	End Time (MST)	16:06
Analyzer make	Thermo 42C	Analyzer serial #	2185

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999962
107.0	107.8	0.9928		
81.2	82.3	0.9865	Slope	0.990343
53.5	54.3	0.9858		
			Intercept	-0.044623

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





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 9  
BARGE LANDING  
OCTOBER 2014**

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

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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
OCTOBER 2014

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	707	36	37	99.87	1	0	0	0
THC(ppm) Average	705	37	39	99.73	3.3	-	2.4	-
Temperature (C) Average	744	0	0	100.00	21.5	-	14.6	-
Wind Speed 10 m (km/h) Average	736	0	8	98.92	19	-	-	-
Wind Direction 10 m (deg) Average	736	0	8	98.92	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
 OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
TRS(ppb) Average	707	0.2	0	-	0	0	0	0	0	0	0	1
THC(ppm) Average	705	2.13	0.2	-	1.8	1.9	2	2.1	2.2	2.4	2.4	3.3
Temperature (C) Average	744	5.97	4.7	-	-2.9	0.9	2	5.4	8.6	12.8	12.8	21.5
Wind Speed 10 m (km/h) Average	736	5.8	3	-	1	2	3	5	8	10	10	19
Wind Direction 10 m (deg) Average	736	-	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	17 Oct 2014 14:00	17 Oct 2014 14:00	1	Maintenance - sample manifold cleaned
THC	23 Oct 2014 12:00	23 Oct 2014 13:00	2	Maintenance - zero air pressure adjusted
Wind Speed, Wind Direction	02 Oct 2014 05:00	02 Oct 2014 08:00	4	Flat line in sensor output signal
Wind Speed, Wind Direction	08 Oct 2014 00:00	08 Oct 2014 00:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	24 Oct 2014 09:00	24 Oct 2014 10:00	2	Flat line in sensor output signal
Wind Speed, Wind Direction	28 Oct 2014 03:00	28 Oct 2014 03:00	1	Flat line in sensor output signal

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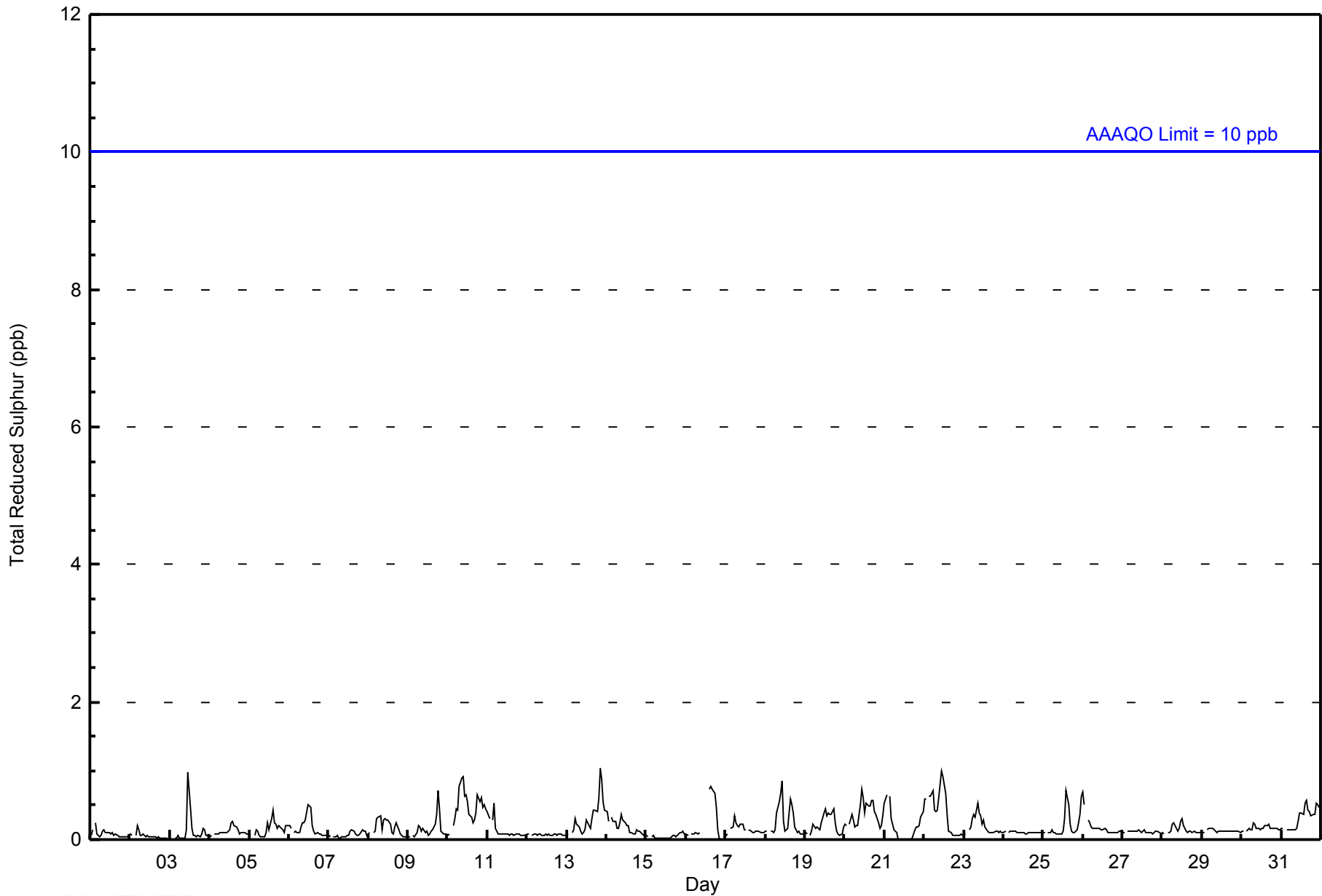


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 1 ppb on Oct 13 21:00										Maximum Daily Average: 0.5 ppb on Oct 10										Hours of Data: 707																												
Minimum Value: 0 ppb on Oct 3 01:00										Minimum Daily Average: 0.0 ppb on Oct 15										Hours of Missing Data: 37																												
Maximum Diurnal Average: 0.3 ppb at hour 12										Minimum Diurnal Average: 0.1 ppb at hour 2										Hours of Calibration: 36																												
Monthly Average: 0.2 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1										Percent Operational Time: 99.9																												
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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
2-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
3-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																						
4-Oct	0	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																						
5-Oct	0	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																						
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
7-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
8-Oct	0	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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1																						
10-Oct	0	0	Z	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	1	1	0	1	0	0.5	1																						
11-Oct	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																						
12-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
13-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.3	1																						
14-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
15-Oct	0	0	Z	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-Oct	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	1	1	1	1	0	0	0	0	0	0	0.2	1																						
17-Oct	0	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																						
18-Oct	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	1																						
19-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
20-Oct	0	0	Z	0	0	0	0	0	0	1	1	1	0	1	0	0	1	1	0	0	0	0	0	0	0.4	1																						
21-Oct	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
22-Oct	1	1	Z	1	1	1	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1																						
23-Oct	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																						
24-Oct	0	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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0.2	1																						
26-Oct	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
28-Oct	0	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																						
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
31-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0.3	1																						
																								0.2	0.1	--	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average
																								1	1	--	1	1	1	0	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**

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - October 2014**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	707	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - October 2014**

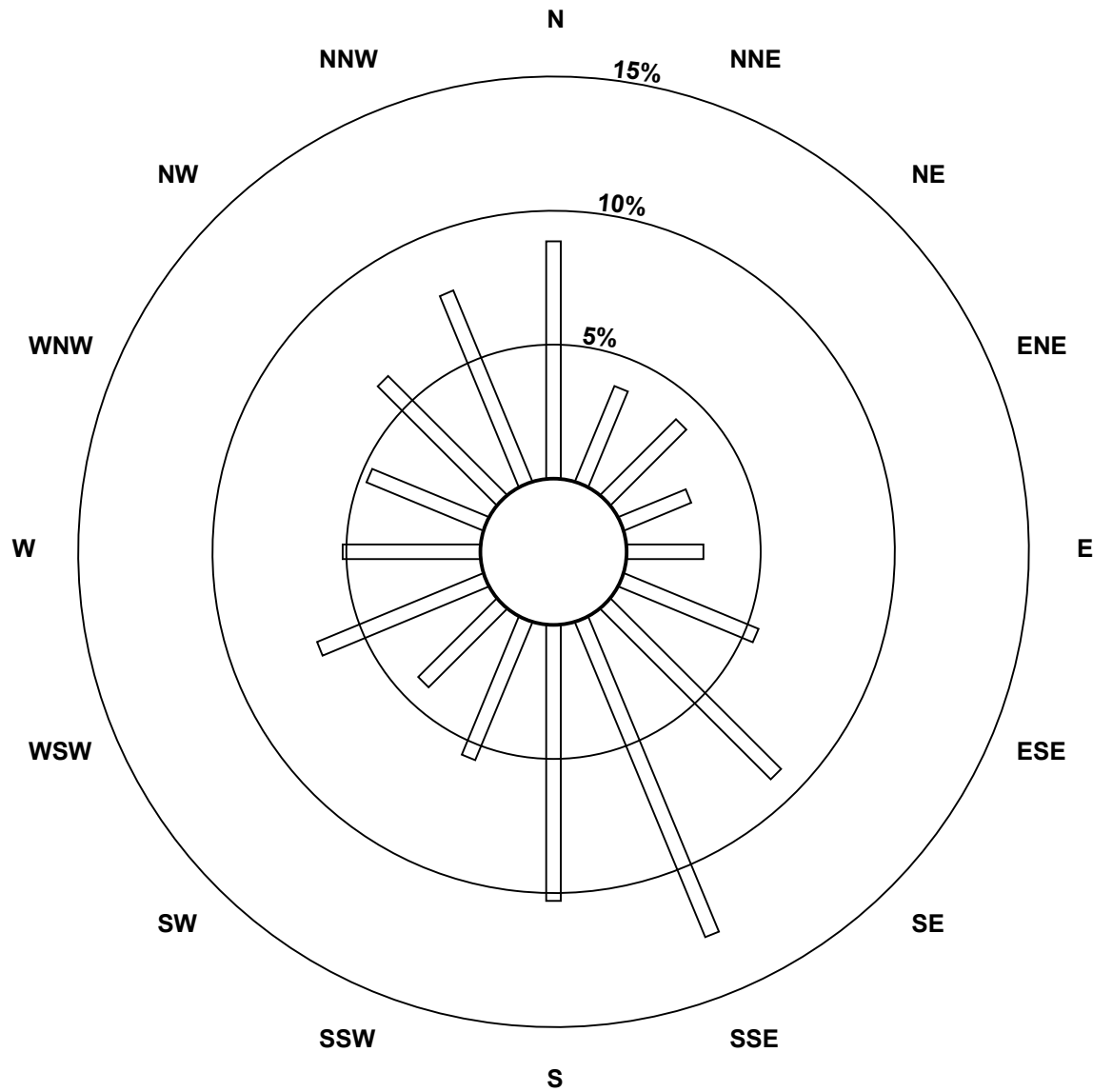
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	62	27	28	19	20	38	63	89	72	39	29	47	36	33	44	54	700
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	62	27	28	19	20	38	63	89	72	39	29	47	36	33	44	54	700

Total Number of Valid Hours: 700

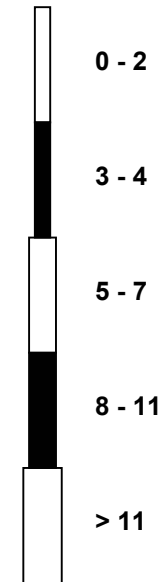
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Total Reduced Sulphur (TRS) - ppb  
Barge Landing (AMS 9)**



Classes (ppb)

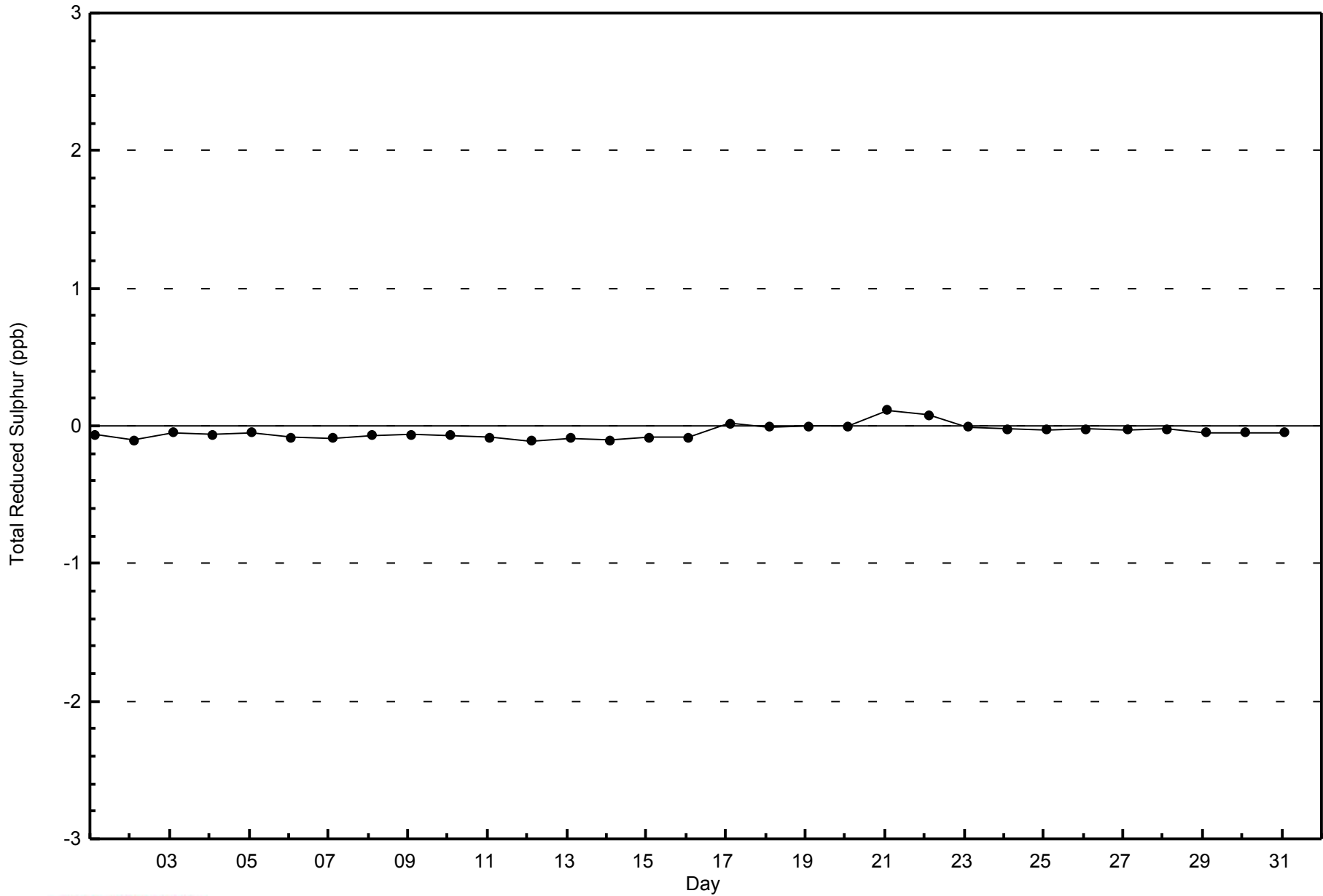


Total Number of Valid Hours: 700



**WBEA**  
**Zero Responses**

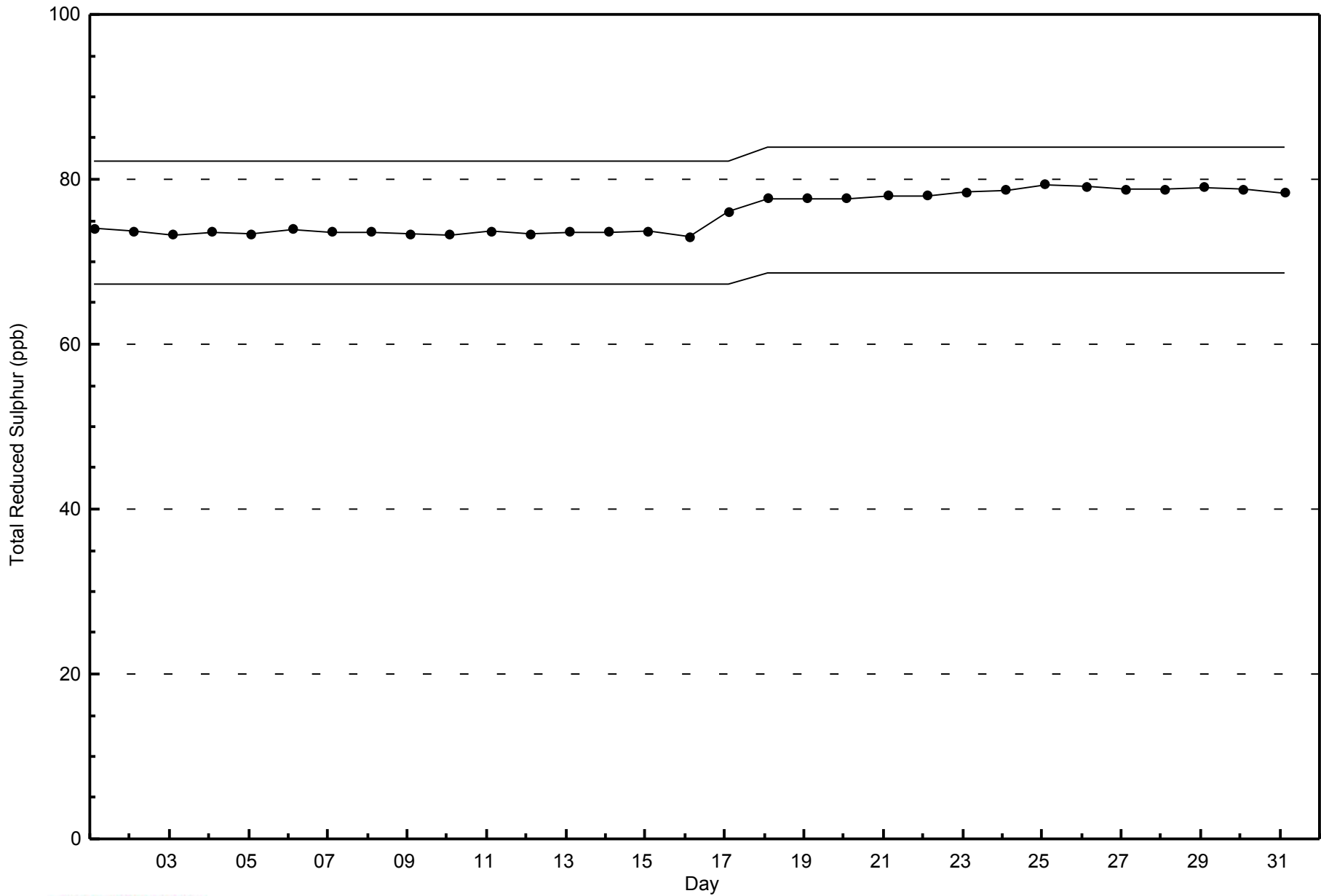
**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - October 2014**





**WBEA**  
**Span Responses**

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - October 2014**





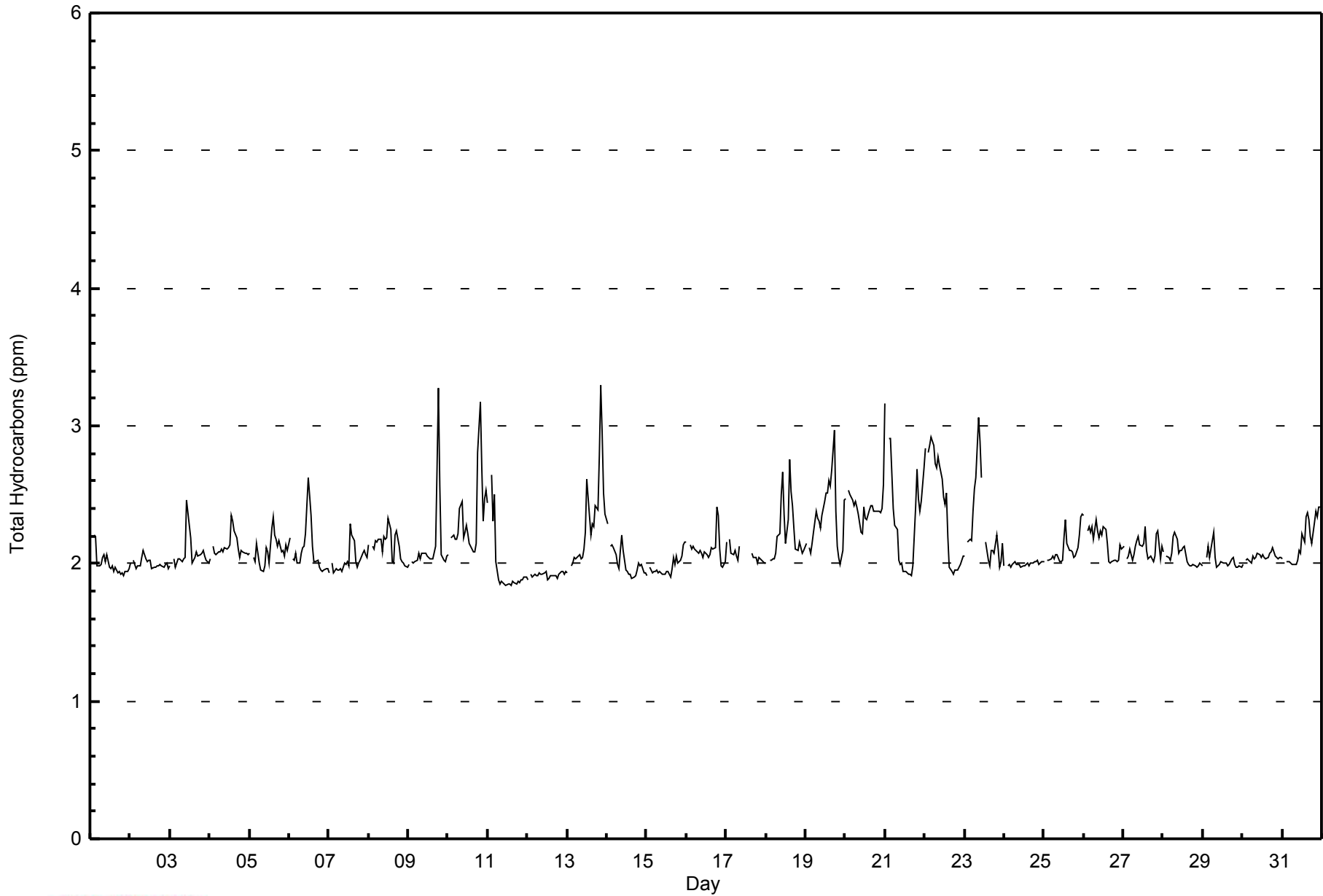
Maximum Value: 3.3 ppm on Oct 13 21:00		Maximum Daily Average: 2.4 ppm on Oct 22		Hours in Service: 744																							
Minimum Value: 1.8 ppm on Oct 11 15:00		Minimum Daily Average: 1.9 ppm on Oct 12		Hours of Data: 705																							
Maximum Diurnal Average: 2.2 ppm at hour 20		Minimum Diurnal Average: 2.1 ppm at hour 16		Hours of Missing Data: 39																							
Monthly Average: 2.13 ppm		Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 1.9 Q <sub>1</sub> = 2.0 Median = 2.1 Q <sub>3</sub> = 2.2 P <sub>90</sub> = 2.4 P <sub>99</sub> = 2.9		Hours of Calibration: 37																							
				Percent Operational Time: 99.7																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	2.0	Z	2.2	2.2	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.2	
2-Oct	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
3-Oct	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.4	2.2	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.5	
4-Oct	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.3	2.2	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
5-Oct	2.1	Z	2.0	2.0	2.1	2.1	2.0	2.0	1.9	2.0	2.1	2.1	2.0	2.3	2.3	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
6-Oct	2.2	Z	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.2	2.6	2.5	2.4	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.1	2.6	
7-Oct	1.9	Z	2.0	1.9	2.0	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.3	2.2	2.2	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.3	
8-Oct	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.0	2.0	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.3	
9-Oct	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.7	3.3	2.6	2.1	2.0	2.0	2.1	2.1	3.3	
10-Oct	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.4	2.5	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.8	3.2	2.7	2.3	2.5	2.5	2.1	3.2	
11-Oct	2.4	Z	2.6	2.3	2.5	2.0	1.9	1.8	1.9	1.9	1.8	1.8	1.9	1.9	1.8	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.6	
12-Oct	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	
13-Oct	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.2	2.6	2.3	2.2	2.3	2.3	2.4	2.4	2.8	3.3	2.9	2.5	2.4	2.1	3.3	
14-Oct	2.3	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.3	
15-Oct	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.0	2.2	
16-Oct	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	2.0	2.1	2.1	2.1	2.1	2.4	2.3	2.1	2.0	2.0	2.0	2.0	2.4	
17-Oct	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.0	2.1	C	C	C	C	C	C	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	
18-Oct	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.5	2.7	2.4	2.1	2.3	2.8	2.5	2.4	2.3	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.8	
19-Oct	2.1	Z	2.1	2.1	2.1	2.2	2.4	2.3	2.3	2.3	2.4	2.4	2.5	2.5	2.6	2.6	2.7	3.0	2.4	2.1	2.0	2.0	2.1	2.5	2.1	3.0	
20-Oct	2.5	Z	2.5	2.5	2.5	2.4	2.5	2.4	2.4	2.2	2.2	2.4	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.6	2.1	2.6	
21-Oct	3.2	Z	2.9	2.9	2.7	2.4	2.3	2.2	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.4	2.7	2.5	2.4	2.4	2.7	2.1	3.2	
22-Oct	2.8	Z	2.8	2.9	2.9	2.9	2.7	2.7	2.8	2.7	2.6	2.5	2.4	2.5	2.2	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.9	
23-Oct	2.1	Z	2.2	2.2	2.2	2.4	2.5	2.6	3.1	2.9	2.6	M	M	2.2	2.0	2.0	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.1	2.1	3.1	
24-Oct	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
25-Oct	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.2	2.3	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.3	2.4	2.1	2.4	
26-Oct	2.4	Z	2.2	2.3	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.4	
27-Oct	2.1	Z	2.0	2.1	2.1	2.0	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.3	2.1	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.0	2.1	2.1	2.3	
28-Oct	2.1	Z	2.1	2.0	2.0	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	
29-Oct	2.0	Z	2.0	2.1	2.0	2.1	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	
30-Oct	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	
31-Oct	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.4	2.3	2.2	2.1	2.3	2.4	2.3	2.4	2.4	2.1	2.4	
		2.1	--	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Average
		3.2	--	2.9	2.9	2.9	2.9	2.7	2.7	3.1	2.9	2.7	2.6	2.6	2.5	2.8	2.6	2.7	3.0	3.3	3.2	3.3	2.9	2.5	2.7	2.1	Diurnal Maximum
Z - zerospan		C - Calibration			M - Maintenance																						





**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - October 2014**





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

**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	344	48.79	48.79
2.1 - 3.0	356	50.50	99.29
3.1 - 10.0	5	0.71	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - October 2014**

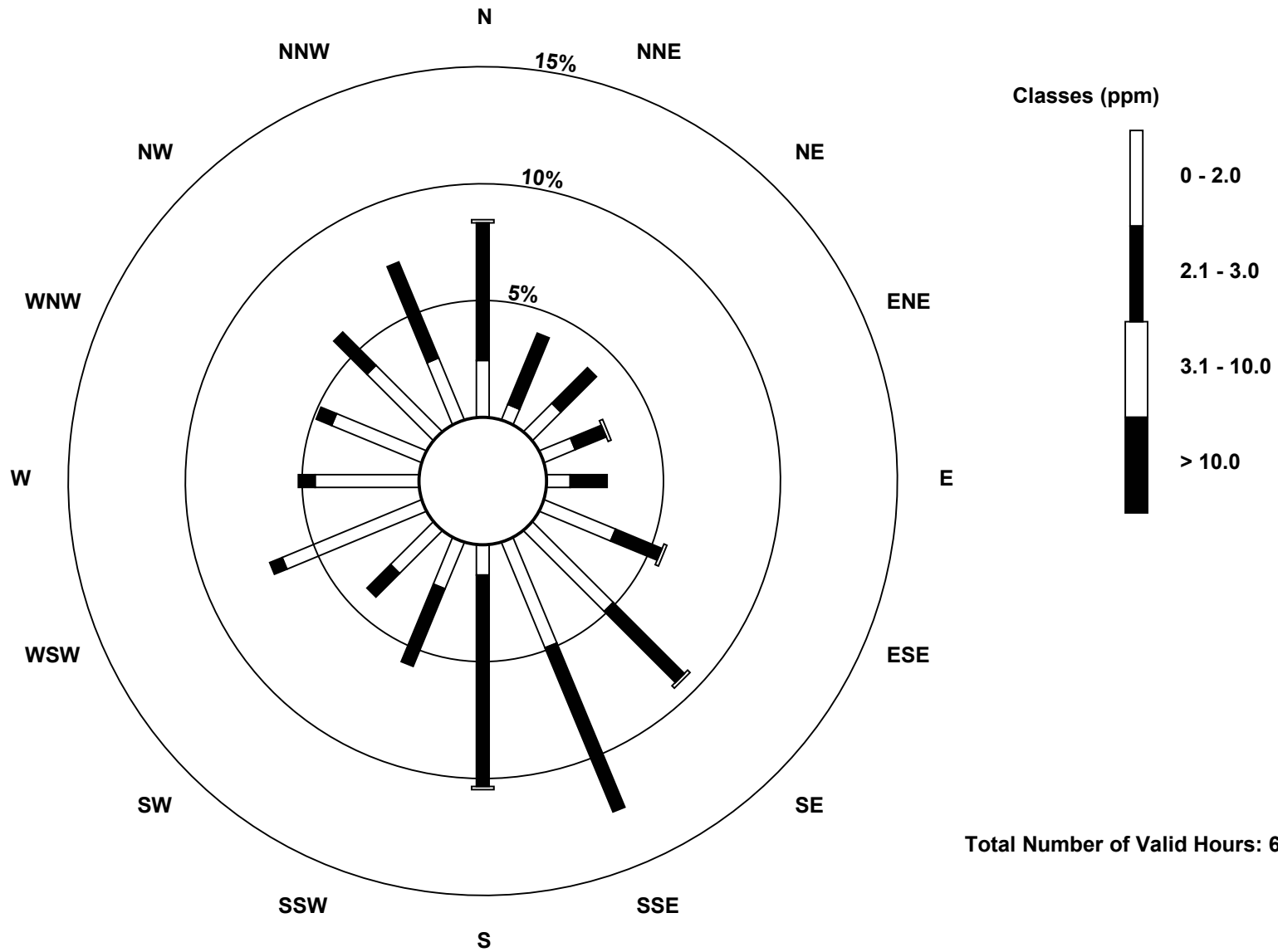
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	17	5	12	10	7	23	34	34	9	15	18	45	31	29	28	20	337
2.1 - 3.0	41	23	15	10	11	15	30	53	63	25	10	4	5	5	14	31	355
3.1 - 10.0	1	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	5
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	59	28	27	21	18	39	65	87	73	40	28	49	36	34	42	51	697

Total Number of Valid Hours: 697

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

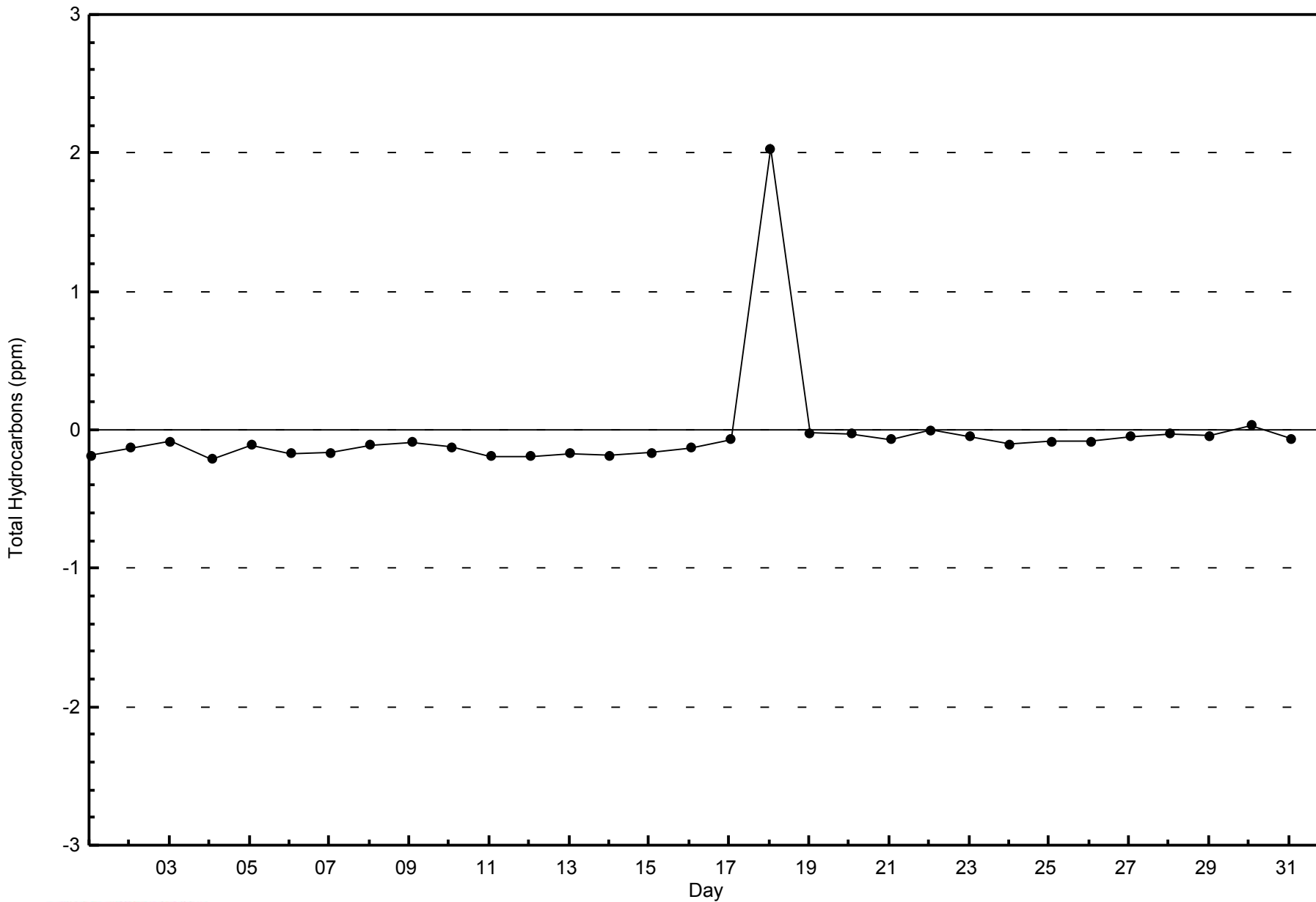
**Total Hydrocarbons (THC) - ppm  
Barge Landing (AMS 9)**





WBEA  
Zero Responses

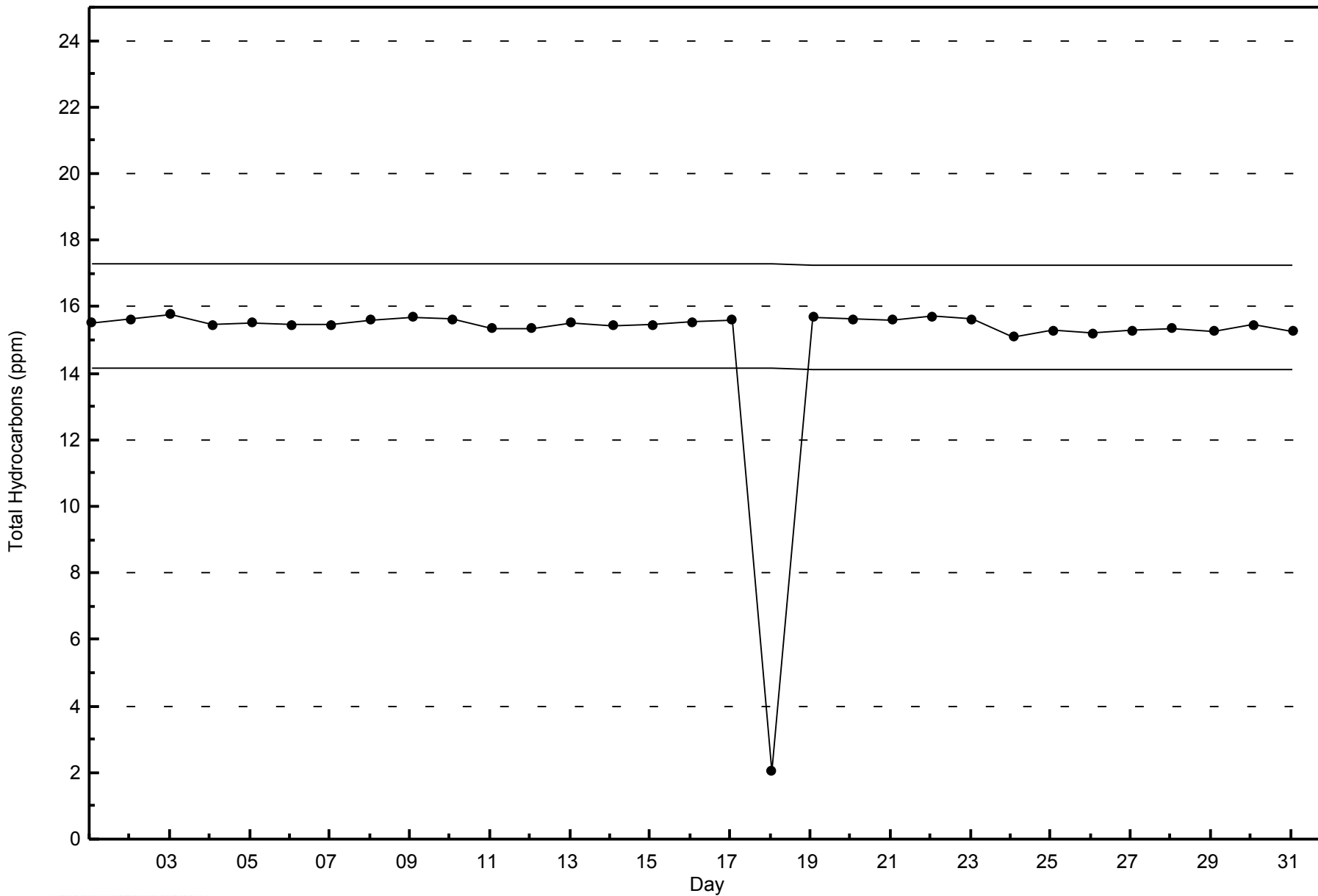
Total Hydrocarbons (THC) - ppm  
Barge Landing - October 2014





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Barge Landing - October 2014





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

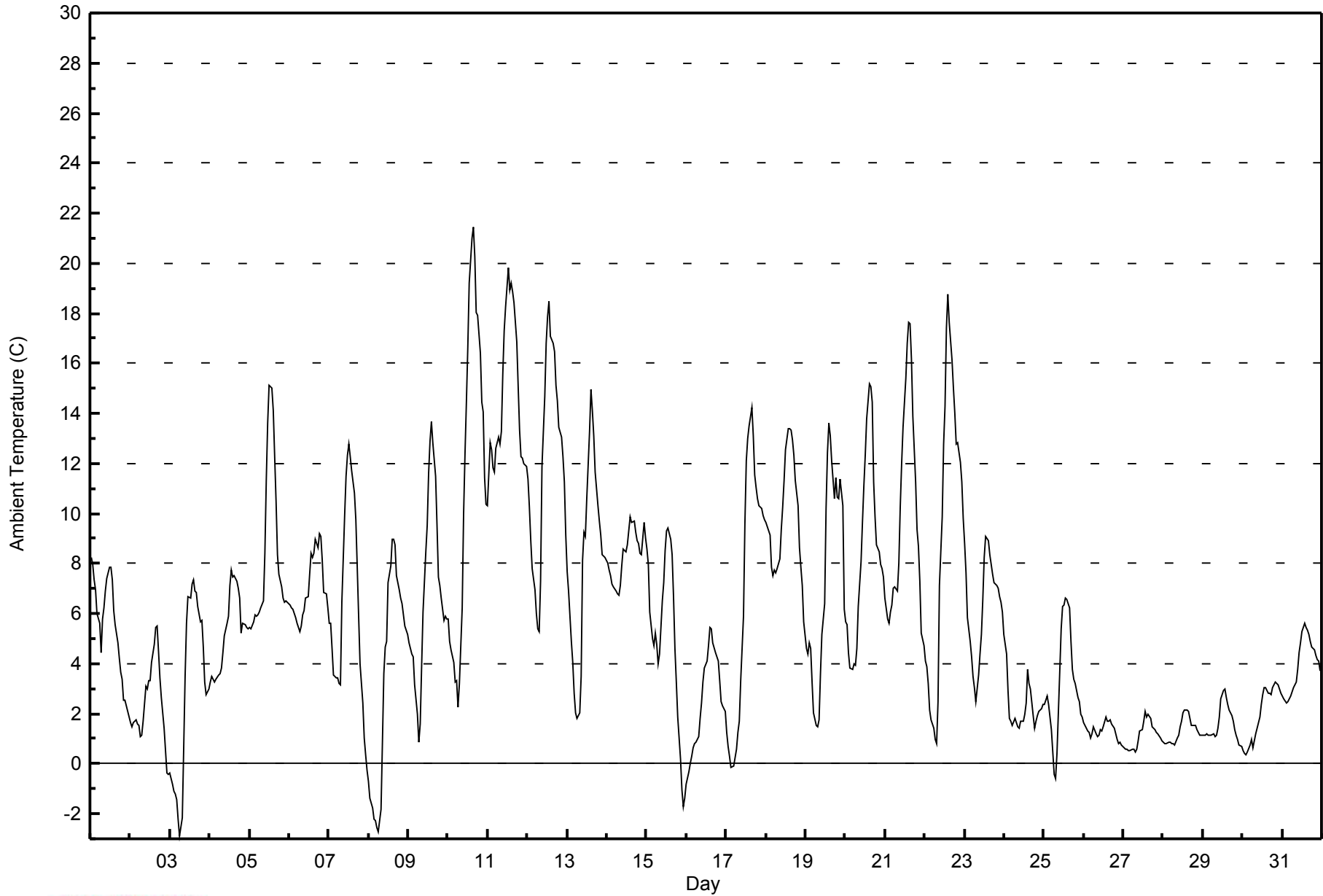
**Ambient Temperature (AT) - C**  
**Barge Landing - October 2014**

Maximum Value: 21.5 C on Oct 10 16:00		Maximum Daily Average: 14.6 C on Oct 11		Hours in Service: 744																																												
Minimum Value: -2.9 C on Oct 3 07:00		Minimum Daily Average: 1.1 C on Oct 27		Hours of Data: 744																																												
Maximum Diurnal Average: 9.9 C at hour 15		Minimum Diurnal Average: 2.8 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 5.97 C		Percentiles: P <sub>1</sub> = -1.8 P <sub>10</sub> = 0.9 Q <sub>1</sub> = 2.0 Median = 5.4 Q <sub>3</sub> = 8.6 P <sub>90</sub> = 12.8 P <sub>99</sub> = 18.7		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-Oct	8.3	8.0	7.4	7.0	6.0	5.6	4.5	5.8	6.3	6.9	7.4	7.9	7.8	7.3	6.1	5.5	4.8	4.2	3.7	3.4	2.5	2.5	2.1	1.9	5.5	8.3																						
2-Oct	1.6	1.5	1.7	1.7	1.6	1.5	1.1	1.1	1.7	3.1	3.0	3.3	3.3	4.1	4.8	5.4	5.5	4.5	3.4	2.6	1.4	0.5	-0.4	-0.4	2.4	5.5																						
3-Oct	-0.4	-0.8	-1.1	-1.2	-1.4	-2.2	-2.9	-2.2	0.6	3.5	5.6	6.7	6.6	7.2	7.3	6.9	6.8	6.3	5.7	5.7	4.7	3.3	2.7	3.0	2.9	7.3																						
4-Oct	3.3	3.5	3.4	3.3	3.4	3.6	3.6	3.8	4.4	5.1	5.6	5.9	7.1	7.7	7.5	7.5	7.3	7.0	6.6	5.2	5.6	5.6	5.5	5.4	5.3	7.7																						
5-Oct	5.4	5.4	5.7	5.9	5.9	5.9	6.1	6.2	6.5	8.4	11.3	13.6	15.1	15.0	14.1	12.2	10.5	8.4	7.6	7.1	6.6	6.4	6.5	6.5	8.4	15.1																						
6-Oct	6.3	6.2	6.2	6.0	5.9	5.6	5.3	5.5	6.0	6.1	6.6	6.7	7.6	8.4	8.2	8.4	9.0	8.6	9.2	9.1	8.1	6.9	6.8	6.2	7.0	9.2																						
7-Oct	5.6	5.6	4.6	3.5	3.4	3.4	3.2	3.2	6.4	9.9	11.5	12.3	12.8	12.2	11.7	10.8	9.8	7.8	5.9	4.0	2.4	1.0	0.4	-0.3	6.3	12.8																						
8-Oct	-0.7	-1.4	-1.8	-2.2	-2.3	-2.6	-2.7	-1.8	0.8	3.6	4.6	4.9	7.2	7.9	8.9	8.9	8.7	7.5	7.0	6.6	6.4	5.9	5.5	5.2	3.5	8.9																						
9-Oct	4.8	4.6	4.4	4.3	3.2	2.0	0.9	1.6	3.9	6.0	8.5	9.5	11.6	12.9	13.7	12.8	11.5	9.5	7.4	7.1	6.6	5.7	5.9	5.8	6.8	13.7																						
10-Oct	5.8	4.9	4.6	4.0	3.2	3.3	2.3	3.2	6.2	10.0	12.4	14.5	16.6	19.2	21.0	21.5	20.2	18.0	17.9	16.4	14.4	14.0	11.4	10.4	11.5	21.5																						
11-Oct	10.3	12.8	12.5	11.8	11.6	12.6	13.0	12.8	13.2	15.6	17.3	18.3	19.8	18.9	19.2	18.9	18.4	16.9	15.1	13.4	12.3	12.2	12.0	11.9	14.6	19.8																						
12-Oct	11.4	10.2	8.9	7.8	6.9	6.0	5.4	5.3	7.3	11.9	14.7	16.8	17.8	18.5	17.1	16.8	16.4	15.1	14.5	13.4	13.0	12.3	11.3	9.2	12.0	18.5																						
13-Oct	7.7	6.9	4.9	4.1	2.8	2.0	1.8	2.0	3.5	8.1	9.2	9.1	10.6	13.3	14.9	14.1	13.1	11.7	10.3	9.7	9.1	8.4	8.3	8.2	8.1	14.9																						
14-Oct	8.0	7.7	7.5	7.2	7.0	6.9	6.8	6.7	7.1	7.9	8.6	8.5	8.7	9.3	9.8	9.6	9.7	9.2	8.9	8.8	8.4	8.4	9.6	9.0	8.3	9.8																						
15-Oct	8.6	8.0	6.0	5.0	4.7	5.2	4.8	4.0	4.4	6.5	7.3	8.5	9.3	9.4	9.0	8.4	6.7	4.6	3.2	1.9	0.2	-1.0	-1.7	-1.4	5.1	9.4																						
16-Oct	-0.8	-0.3	0.0	0.3	0.7	0.8	0.9	1.1	1.8	2.4	3.3	3.8	4.1	4.7	5.5	5.4	4.8	4.4	4.3	4.1	3.3	2.5	2.3	2.1	2.6	5.5																						
17-Oct	1.2	0.7	0.3	-0.2	-0.1	0.2	0.6	1.2	1.7	3.3	5.9	9.6	12.1	13.0	13.5	14.2	13.1	11.6	11.0	10.6	10.3	10.2	9.9	9.8	6.8	14.2																						
18-Oct	9.6	9.5	9.1	7.9	7.5	7.7	7.6	7.8	8.2	9.4	10.3	11.3	12.5	13.4	13.4	13.3	13.0	12.3	11.3	10.3	8.6	7.9	7.1	5.7	9.8	13.4																						
19-Oct	4.6	4.4	4.8	4.6	3.2	2.1	1.5	1.5	1.8	3.6	5.2	6.4	10.2	12.4	13.6	13.1	12.1	10.6	11.4	10.6	10.6	11.4	10.3	6.2	7.3	13.6																						
20-Oct	5.7	5.5	4.4	3.8	3.8	4.0	4.0	4.6	6.3	8.0	9.6	11.1	12.3	13.8	15.2	15.0	14.4	11.3	9.8	8.8	8.5	7.9	7.8	7.4	8.5	15.2																						
21-Oct	6.6	5.8	5.6	6.1	6.3	7.0	7.1	6.9	8.0	10.2	12.0	13.4	15.4	16.8	17.6	17.6	16.2	13.9	11.2	9.4	8.7	7.3	5.2	4.7	10.0	17.6																						
22-Oct	4.1	3.9	3.2	2.2	1.7	1.4	1.0	0.8	2.5	7.1	9.8	12.8	14.3	17.4	18.7	17.6	16.1	15.0	14.0	12.8	12.8	12.0	11.2	9.8	9.3	18.7																						
23-Oct	8.8	7.6	5.8	4.9	4.2	3.5	3.0	2.5	3.6	4.4	5.1	6.5	8.3	9.1	8.9	8.4	8.0	7.6	7.3	7.1	7.0	6.7	6.4	6.0	6.3	9.1																						
24-Oct	5.2	4.4	3.0	1.8	1.7	1.5	1.8	1.6	1.5	1.4	1.7	1.7	2.0	2.4	3.8	3.2	3.0	1.9	1.4	1.7	1.9	2.1	2.2	2.4	2.3	5.2																						
25-Oct	2.4	2.6	2.7	2.4	1.4	0.5	-0.4	-0.6	0.4	3.7	5.4	6.3	6.3	6.6	6.6	6.2	4.9	3.8	3.4	3.2	2.6	2.5	2.0	1.9	3.2	6.6																						
26-Oct	1.6	1.5	1.3	1.3	1.0	1.2	1.5	1.2	1.1	1.1	1.4	1.3	1.5	1.9	1.7	1.7	1.7	1.6	1.4	1.2	1.0	0.8	0.8	0.8	1.3	1.9																						
27-Oct	0.7	0.6	0.6	0.5	0.5	0.6	0.6	0.5	0.6	0.9	1.3	1.4	1.7	2.1	1.9	2.0	1.8	1.5	1.4	1.4	1.3	1.2	1.1	0.9	1.1	2.1																						
28-Oct	0.9	0.8	0.8	0.9	0.9	0.8	0.8	0.8	1.0	1.2	1.5	1.7	2.0	2.2	2.1	2.1	1.8	1.6	1.6	1.5	1.4	1.3	1.2	1.1	1.3	2.2																						
29-Oct	1.2	1.1	1.2	1.1	1.1	1.1	1.2	1.1	1.1	1.4	1.8	2.6	3.0	3.0	2.7	2.4	2.1	1.9	1.7	1.4	1.1	1.0	0.7	0.7	1.6	3.0																						
30-Oct	0.5	0.4	0.4	0.4	0.8	1.0	0.6	0.9	1.2	1.4	1.9	2.4	2.7	3.0	3.0	2.8	2.8	2.8	3.0	3.2	3.3	3.2	3.0	2.8	2.0	3.3																						
31-Oct	2.7	2.6	2.4	2.5	2.6	2.7	2.9	3.0	3.3	3.8	4.4	4.8	5.3	5.6	5.5	5.3	5.2	4.9	4.7	4.5	4.3	4.2	4.1	3.7	4.0	5.6																						
																								4.5	4.3	3.9	3.5	3.2	3.1	2.8	3.0	3.9	5.7	6.9	7.9	8.9	9.6	9.9	9.6	9.0	7.9	7.3	6.7	6.1	5.6	5.2	4.7	Diurnal Average
																								11.4	12.8	12.5	11.8	11.6	12.6	13.0	12.8	13.2	15.6	17.3	18.3	19.8	19.2	21.0	21.5	20.2	18.0	17.9	16.4	14.4	14.0	12.0	11.9	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Barge Landing - October 2014**







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

**Ambient Temperature (AT) - C**  
**Barge Landing - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	28	3.76	3.76
0 - 10	577	77.55	81.32
10 - 20	136	18.28	99.60
> 20	3	0.40	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 19 km/h on Oct 17 17:00	Maximum Daily Speed Average: 10.5 km/h on Oct 30	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 28 00:00	Minimum Daily Speed Average: 0.2 km/h on Oct 19	Hours of Data: 736
Maximum Diurnal Speed Average: 1.8 km/h at hour 6	Minimum Diurnal Speed Average: 0.3 km/h at hour 15	Hours of Missing Data: 8
Monthly Average Velocity: 1.0 km/h 197.9 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> = 15	Percent Operational Time: 98.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	NE5	NNE4	NNE5	N6	NNW4	NNW2	WSW1	SE2	ESE3	E5	ESE3	E6	E5	NNE4	N9	N8	N11	N11	N12	N14	N10	NNW9	NW7	WNW3	N4.8	N14	
2-Oct	W3	SW1	WNW3	NNW8	AF	AF	AF	AF	NW9	NW10	NW15	NW14	NW15	NW13	NW13	NW14	NW14	WNW12	WNW9	NW7	NW4	NW4	W3	WNW3	NW8.5	NW15	
3-Oct	NNW3	NW4	W2	NW4	WNW5	W4	WSW3	SW5	SW4	S6	S7	S7	SSE7	SE9	SE9	SE10	SE10	SE7	SE7	SSE10	SSE9	SE8	SE9	SE8	SSE4.3	SE10	
4-Oct	SSE4	SE2	SE3	E1	NW2	NNW2	NNW1	S2	SSW3	WSW2	NW3	ENE3	NNE3	NNE4	NNE5	NW4	NNW3	NW3	SW3	SSW3	SSW4	W3	SE2	SSW3	W0.5	NNE5	
5-Oct	S3	SSW3	SSW5	SSW8	S7	S7	SSW7	SW8	SW9	S6	SE7	S4	NE2	NNE7	NE9	NNE9	NE8	NE9	NNE8	NNE7	N6	N5	NNE4	NE2	E0.9	SW9	
6-Oct	NNE1	E2	S2	SSW3	S2	ESE5	SE5	SE1	WNW2	ESE1	NNE3	NNE4	NNW5	N6	N6	NNW6	NNW3	NW2	WNW8	W7	W7	WSW8	WSW9	WSW5	WNW1.7	WSW9	
7-Oct	W4	W5	WSW3	ESE2	NNE2	SSW1	W6	NW4	WNW6	NW7	NW10	NNW7	N7	NE9	NE8	NE7	ENE8	ENE6	NE4	ESE3	ESE4	E3	E1	AF	N2.3	NW10	
8-Oct	NNE1	E2	E2	E3	SE1	SE2	E1	ESE1	SE4	SE3	NW4	NNW4	NNW4	NE3	NE4	NNE3	NW1	N2	ENE4	ESE6	SE8	SE7	SE7	SE5	E1.9	SE8	
9-Oct	ESE3	E4	ENE3	E4	ESE5	ESE4	ESE3	ESE3	ESE4	SSE4	S3	WNW2	S5	WSW4	WNW3	S4	NE1	ENE3	ESE3	SE5	SE5	SE6	SSE7	SSE6	SE2.6	SSE7	
10-Oct	S3	W2	W1	SSE1	S3	SE3	SW2	S4	S5	S7	S9	S9	SSE10	S10	S10	S9	SSE5	S4	SSW7	S7	SSE8	S5	S3	SSW4	S5.2	S10	
11-Oct	SSW5	SSW6	SSW6	S6	SSW5	WSW9	WSW12	WSW14	WSW14	WSW15	W12	WSW13	WSW13	WSW14	WSW14	WSW15	WSW15	WSW13	WSW9	WSW7	WSW8	WSW10	WSW11	WSW10	WSW10.2	WSW15	
12-Oct	WSW10	W6	WSW4	WSW6	WNW6	SW6	SW6	SSW4	SW5	SW7	SW6	NNW10	NW10	WNW8	WNW7	WNW3	WNW3	W6	W8	W8	WSW10	WSW10	WNW5	NW2	W5.8	WSW10	
13-Oct	WSW4	SW3	SW2	W2	SW3	S2	S2	SSW3	SSW3	SSW4	S4	SSW6	SSW5	SW5	SSE5	SSE5	ESE2	N3	NNW4	NNE3	N4	N3	NNW5	N5	SW1.1	SSW6	
14-Oct	NNW4	NNW4	NNW5	N4	NNW5	N6	NNW6	NNW6	NNW4	N5	NNW7	NNW6	NNW7	NNW6	NW5	NNW4	NW3	WNW1	SE2	SE1	W3	W4	WNW9	WNW8	NNW4.3	WNW9	
15-Oct	W7	WNW10	WNW7	W5	WSW6	SW8	WSW9	WSW9	WSW10	W10	WNW8	W9	W7	NW7	NW8	NW7	NNW9	NW6	NNW6	NNW3	W1	WSW1	SW2	S1	WNW5.5	WNW10	
16-Oct	S1	S1	SSW2	SSW2	SW3	S2	SSW3	SSE1	SSW2	SSE3	ESE4	SE3	SSE4	SSW4	SW4	WNW2	N3	NE3	E4	E2	ESE4	ESE3	ESE3	N1	SSE1.3	SSE4	
17-Oct	N2	N2	SE1	SSE2	SSE3	SSE3	SSE4	SE2	NNW2	NNW5	NNW4	SSE9	SSE12	SSE16	SSE17	SSE18	SE19	SE16	SSE18	SSE14	SSE13	SE13	SSE14	SSE12	SSE8.0	SE19	
18-Oct	SSE13	SSE12	SSE8	SE5	SE6	SSE6	SSE5	S4	SSE3	S6	SSW6	SSW5	SSW5	S6	S5	S5	S4	S2	SW5	SW4	W2	NW3	WNW3	SW2	S4.3	SSE13	
19-Oct	SSE3	SSW3	W4	NNW4	ENE2	ESE3	E2	SSE3	SSE2	WNW1	NW4	NNW3	NNW4	NNW6	NNW6	NNW5	NNE3	NNE2	SE6	SSE3	SSE6	SSE6	SE5	NNE2	E0.2	SE6	
20-Oct	N4	N3	ENE1	SSE1	ESE1	S4	WSW3	SSE5	S6	S6	S7	S7	S9	S8	S8	SSE8	SSE4	ESE2	E2	ESE3	ESE4	SSW2	SSW2	WSW3	S3.3	S9	
21-Oct	SE2	SSE5	S4	S4	S4	S4	SSE4	SSE3	SW5	SW6	S4	WSW10	WSW9	WSW9	SW10	SW9	SSW6	S5	SSE4	SSW4	SSE5	SE5	SSW2	S4	SSW4.4	SW10	
22-Oct	S4	SSE6	SSE5	S4	SSE5	SSE5	SE4	S2	SE3	SW4	SSW4	W3	N3	NNW3	SSE4	SE8	ESE11	SE12	SSE8	SSE8	SSE10	SSE9	SSE8	SE6	SSE4.7	SE12	
23-Oct	SSE5	NNW1	N2	E4	N3	NNW5	NNW5	NNW4	ENE3	NW3	NNW6	NNW6	NNW5	NW3	ESE4	E5	ENE6	NE7	NE8	N4	NW6	NNW8	NW6	NW7	N2.9	NNW8	
24-Oct	WNW8	W9	W9	W8	W6	SW6	WSW9	W7	AF	AF	W6	W7	W8	W10	WNW8	WNW10	NW11	WNW10	W5	WSW6	WSW7	WSW8	WSW8	WSW7	W7.4	NW11	
25-Oct	W6	W8	W7	NW4	WNW4	S3	SSW4	S5	SW5	SW6	SSW6	SSW6	S7	S6	SSE6	SSE5	ESE5	E4	E4	ENE4	ENE2	NE3	N3	NNW4	SSW1.9	W8	
26-Oct	NNW3	N4	NNW4	N5	NNW5	NNE6	NNE7	NNE7	N7	NNE6	N8	N8	N8	N9	N11	N10	N11	N11	N11	N11	N11	N9	N8	N8	N7.8	N11	
27-Oct	N8	N8	NNW7	N7	N6	N7	N6	N7	N6	N6	NNE6	N6	N5	N6	ENE4	NNE3	NW3	WNW3	NNW4	N5	N3	NE1	ENE3	NNE1	N4.7	N8	
28-Oct	NW2	NW1	AF	WNW1	SSW2	SSE3	SSE4	SE4	SSE6	SE6	SSE4	SE6	SE6	SE5	SE5	ESE6	ESE6	ESE6	ESE5	ESE6	SE4	ESE3	E2	ENE3	SE3.7	SE6	
29-Oct	ENE3	NE3	NNE3	N2	NE4	NNW2	NE4	NE7	NE8	NE7	NE7	NE7	NE7	NE7	ENE7	ENE7	NE7	ENE7	ENE7	ESE5	ESE5	ESE5	ESE5	SE5	SE7	ENE4.6	NE8
30-Oct	SE8	SE10	SE9	SSE8	SSE9	SSE9	SSE9	SSE9	SSE8	SSE9	SSE10	SSE11	SSE12	SSE11	SSE12	SSE12	SSE10	SE12	SE12	SE12	SE11	SE12	SE13	SSE13	SSE14	SSE10.5	SSE14
31-Oct	SE13	SE14	SE15	SE14	SSE13	SE14	SE12	SSE11	SSE10	SSE11	SSE10	S9	S8	SSE8	S8	S7	S7	S7	S6	S5	SSE6	SSE6	S5	S3	SSE8.8	SE15	

SSW0.9 SW1.0SSW1.1SSW0.6SSW1.1 S1.8SSW1.7SSW1.8SSW1.8SSW1.8WSW1.5WSW1.5WSW1.3WSW0.7 S0.3 SSE0.5ENE0.6ENE0.7 SE0.7 SSE1.1 SSE1.8 S1.5 S1.3SSW1.3 SSE13 SE14 SE15 SE14 SSE13 SE14WSW12WSW14WSW14WSW15 NW15 NW14 NW15 SSE16 SSE17 SSE18 SE19 SE16 SSE18 SSE14 SSE13 SSE13 SSE14 SSE14	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**

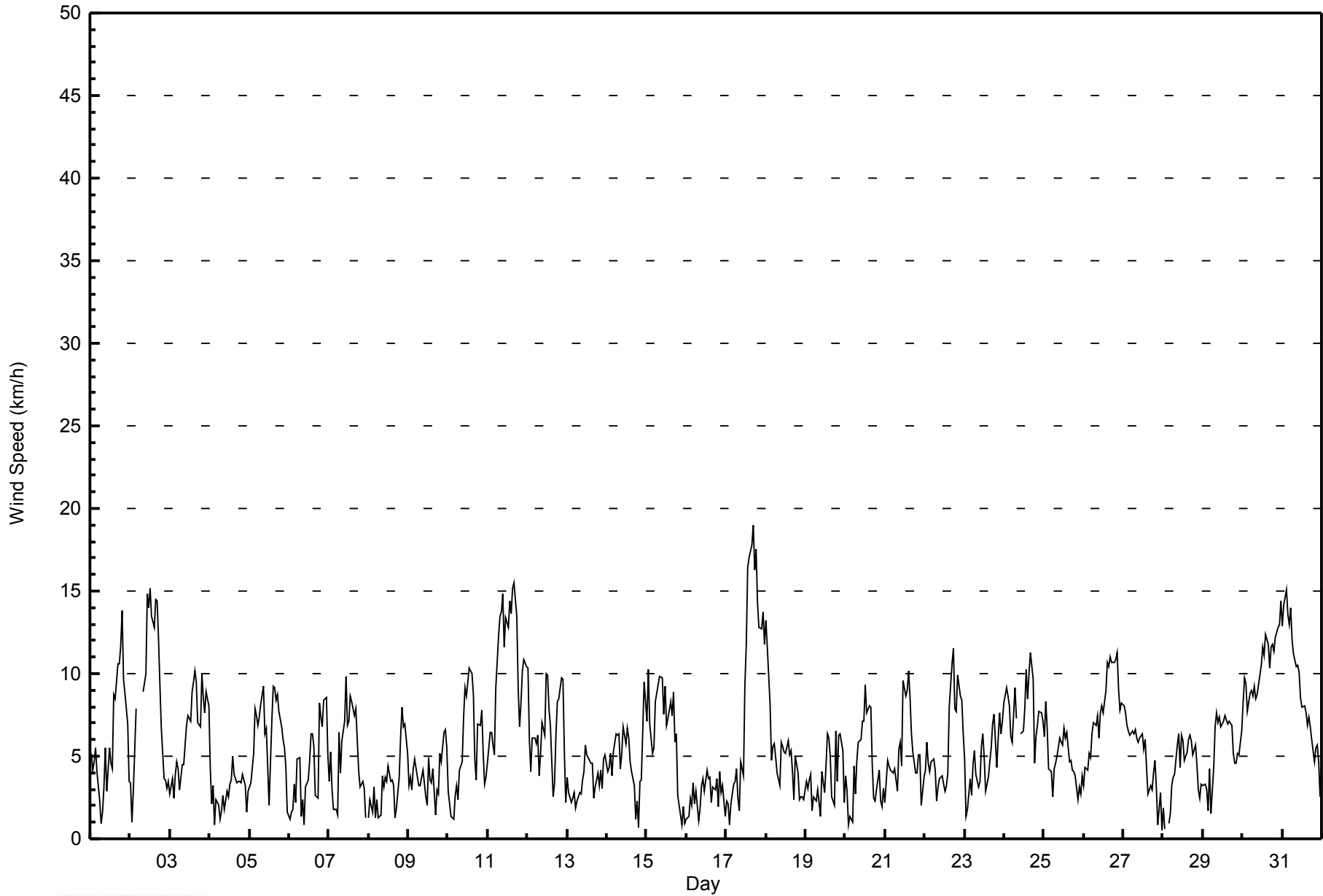
**Wind Speed (WS) - km/h**  
**Barge Landing - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744											
Maximum Value: 6 km/h on Oct 17 16:00														Hours of Data: 736											
Minimum Value: 0 km/h on Oct 14 19:00														Hours of Missing Data: 8											
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														Hours of Calibration: 0											
														Percent Operational Time: 98.9											
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-Oct	2	1	2	1	1	1	1	2	1	2	1	2	2	2	3	3	3	4	4	5	4	3	2	1	5
2-Oct	2	1	1	4	AF	AF	AF	AF	3	5	5	5	5	5	5	5	5	5	3	2	2	1	1	2	5
3-Oct	1	2	1	2	2	2	2	1	1	2	2	2	2	3	3	3	2	2	5	3	2	3	2	5	
4-Oct	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	2	1	2
5-Oct	1	1	2	2	3	2	2	3	3	2	2	2	2	3	3	3	2	3	2	2	2	1	1	3	
6-Oct	1	1	1	1	1	1	2	1	1	1	2	1	1	2	2	2	2	4	3	3	2	2	3	2	4
7-Oct	2	2	2	1	1	2	3	2	3	3	3	2	2	3	3	2	3	2	1	1	1	1	1	AF	3
8-Oct	1	1	1	2	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	2	2	2	2	2
9-Oct	1	1	1	1	1	2	1	1	1	2	1	1	2	2	2	2	1	1	1	1	1	2	1	2	2
10-Oct	1	1	1	1	1	1	1	1	2	2	3	3	3	3	4	3	2	1	2	1	2	3	2	2	4
11-Oct	2	2	2	2	1	2	3	4	3	4	4	4	5	4	4	4	5	4	3	2	2	2	3	2	5
12-Oct	3	3	3	2	2	1	1	2	1	1	2	4	4	3	3	2	2	3	3	2	3	2	3	1	4
13-Oct	2	2	2	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	2	1	2
14-Oct	1	1	1	2	2	2	2	2	1	2	2	2	2	2	1	1	1	1	0	1	1	1	4	3	4
15-Oct	3	5	3	1	1	3	3	2	3	3	3	3	3	2	3	3	2	1	2	2	1	1	1	1	5
16-Oct	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	1	1	2
17-Oct	1	1	1	2	1	1	1	1	2	1	1	5	5	6	6	6	6	5	5	5	4	4	5	4	6
18-Oct	4	4	3	1	2	2	1	1	1	2	2	1	2	2	2	2	1	1	1	2	2	1	1	1	4
19-Oct	1	1	2	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	2	1	3	2	2	1	3
20-Oct	1	1	1	1	1	1	1	1	2	2	2	3	3	2	2	3	1	1	2	1	1	1	1	1	3
21-Oct	2	2	1	2	1	2	1	1	1	1	2	2	3	2	3	2	2	1	1	1	1	1	1	1	3
22-Oct	2	1	1	1	1	1	1	1	1	1	2	1	1	1	4	2	2	3	2	2	3	3	2	1	4
23-Oct	1	1	1	1	1	1	1	1	1	1	2	1	1	1	3	1	2	2	3	2	1	2	2	3	3
24-Oct	3	3	3	2	2	2	3	2	AF	AF	3	2	3	4	4	4	4	4	2	1	1	2	2	2	4
25-Oct	2	3	2	2	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	3
26-Oct	1	1	1	1	2	2	2	2	2	2	2	3	2	3	3	3	3	3	3	3	3	3	2	2	3
27-Oct	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2
28-Oct	1	1	AF	1	1	1	1	1	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	2
29-Oct	1	1	1	1	2	1	2	2	2	2	2	2	3	3	3	2	2	2	2	1	1	1	1	2	3
30-Oct	2	3	3	2	3	3	3	3	3	3	3	4	4	4	4	4	3	3	4	3	3	4	4	5	5
31-Oct	4	4	4	4	4	4	4	4	3	3	3	3	3	3	2	2	2	2	2	1	1	2	2	2	4
Diurnal Maximum																									
4 5 4 4 4 4 4 4 4 3 5 5 5 5 6 6 6 6 5 5 5 4 4 5 5																									
AF - Analyzer Failure																									



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Barge Landing - October 2014**





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

**Wind Speed (WS) - km/h**  
**Barge Landing - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	391	53.13	53.13
6 - 11	292	39.67	92.80
12 - 19	53	7.20	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: 736

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Barge Landing - October 2014**

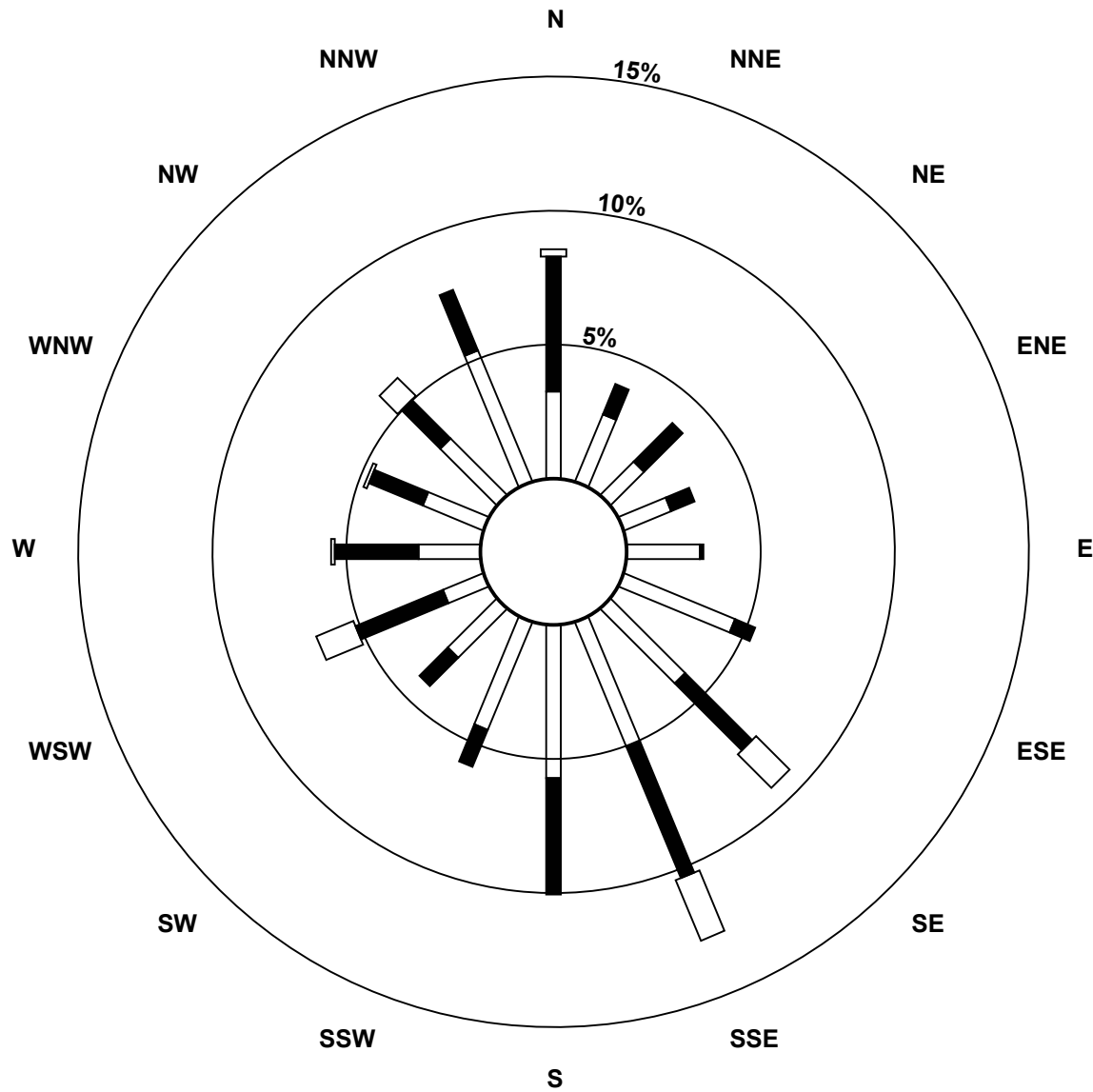
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	24	20	13	14	20	33	29	37	42	32	19	12	17	18	22	39	391
6 - 11	37	9	15	7	1	6	26	39	32	11	11	26	23	16	15	18	292
12 - 19	2	0	0	0	0	0	13	18	0	0	0	11	1	1	7	0	53
20 - 28	0	0	0	0	0	0	0	0	0	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	29	28	21	21	39	68	94	74	43	30	49	41	35	44	57	736

Total Number of Valid Hours: 736

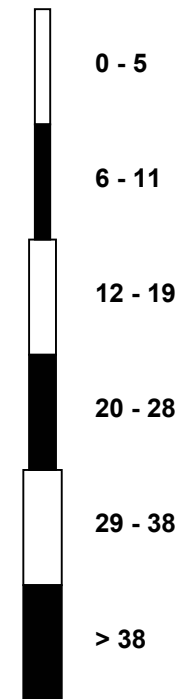
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Wind Speed (WS) - km/h  
Barge Landing (AMS 9)**



Classes (km/h)



Total Number of Valid Hours: 736



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg  
Barge Landing - October 2014**

Direction of Maximum Speed: 146 deg on Oct 17 17:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 149.9 deg on Oct 30		Hours of Data: 736
Direction of Minimum Speed: 13 deg on Oct 28 00:00	Direction of Minimum Daily Speed Average: 0.2 deg on Oct 19	Hours of Missing Data: 8
Monthly Average Direction: 261.3 deg		Percent Operational Time: 98.9

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-Oct	36	19	22	356	333	346	253	131	121	80	109	82	81	20	1	3	2	359	1	355	349	342	324	296	6.8
2-Oct	274	229	295	331	AF	AF	AF	AF	319	318	322	322	318	314	309	312	307	299	298	311	322	316	280	295	311.6
3-Oct	328	314	281	306	289	276	239	233	221	176	175	171	167	138	138	129	136	144	142	168	167	135	124	143	161.3
4-Oct	152	145	132	96	323	329	334	177	211	243	316	72	17	17	323	333	308	228	209	204	265	136	198	278.6	
5-Oct	186	192	208	194	189	183	204	216	214	178	138	178	53	33	34	33	36	39	33	20	3	9	21	45	100.2
6-Oct	26	97	178	195	173	117	133	129	295	118	14	31	330	353	10	345	335	325	296	279	262	255	255	242	295.7
7-Oct	271	270	258	115	18	196	274	312	302	309	309	347	359	38	48	51	67	62	55	110	103	93	100	AF	5.2
8-Oct	29	94	84	93	143	127	80	120	129	139	305	337	329	50	34	23	319	359	72	115	132	128	141	143	99.1
9-Oct	104	93	73	86	109	106	108	119	115	156	191	297	185	251	299	188	37	78	103	131	146	135	153	149	131.8
10-Oct	170	262	264	164	178	138	216	173	181	185	175	174	167	171	171	170	163	179	194	181	156	174	173	193	175.5
11-Oct	196	204	198	186	201	238	248	248	248	254	259	258	257	242	254	248	248	256	249	242	240	243	253	246	244.5
12-Oct	258	260	246	257	282	228	228	193	224	224	227	293	306	290	293	286	300	280	280	262	250	251	283	310	263.9
13-Oct	249	232	235	280	231	179	181	199	196	210	188	200	236	158	153	113	349	344	20	354	359	339	355	230.8	
14-Oct	343	347	348	357	339	351	343	337	330	350	329	331	331	328	326	329	318	299	134	136	261	270	297	298	327.6
15-Oct	276	291	292	259	238	234	253	248	248	281	290	280	276	321	325	312	330	325	329	335	273	254	221	189	283.3
16-Oct	170	181	199	200	221	172	201	156	198	149	102	140	161	198	233	296	354	39	79	89	112	104	105	349	151.7
17-Oct	360	3	146	148	158	163	156	136	335	339	335	150	155	149	149	150	146	145	151	154	153	145	147	151	148.6
18-Oct	153	150	157	130	131	152	163	187	159	175	206	197	195	183	173	176	186	190	224	236	263	313	284	217	175.5
19-Oct	147	199	260	329	71	122	94	150	151	296	311	348	332	330	338	328	12	22	142	162	153	153	134	19	91.9
20-Oct	356	349	70	159	106	174	238	168	178	180	186	178	178	174	185	164	167	104	90	103	123	196	192	238	171.7
21-Oct	135	162	177	170	171	189	152	161	232	221	191	239	238	237	235	232	213	179	168	196	157	137	196	181	201.4
22-Oct	176	160	157	170	159	160	142	177	136	222	208	267	2	339	151	125	120	130	154	156	150	152	151	143	150.9
23-Oct	166	342	358	100	355	341	342	345	63	308	329	337	329	305	113	88	64	48	51	2	326	327	315	306	356.7
24-Oct	288	271	272	267	263	232	256	259	AF	AF	280	265	269	272	282	286	307	300	259	240	237	242	248	258	268.5
25-Oct	260	262	266	304	284	178	204	183	216	214	201	207	179	171	150	148	110	93	81	68	70	47	349	344	199.8
26-Oct	347	349	340	1	348	23	15	16	0	12	359	5	5	9	5	358	357	0	360	357	355	358	358	359	1.3
27-Oct	4	356	347	358	352	356	356	1	3	7	14	6	359	7	60	20	320	303	334	6	8	48	57	13	1.4
28-Oct	315	322	AF	294	201	147	154	146	151	145	165	144	135	131	125	121	123	118	112	117	126	123	95	76	131.4
29-Oct	74	40	22	2	43	345	49	50	49	55	51	49	56	61	63	56	62	78	103	117	122	118	134	136	68.3
30-Oct	137	143	142	157	157	158	157	161	150	154	159	153	154	154	154	158	148	138	141	141	144	146	148	150	149.9
31-Oct	146	143	140	143	147	143	146	151	153	152	160	184	181	167	182	180	184	174	183	185	157	165	178	179	158.2

201.3 215.5 213.0 205.3 198.9 177.4 205.4 196.6 208.6 212.0 244.7 243.8 241.3 244.8 169.7 163.0 70.2 64.2 125.2 157.2 166.2 172.5 187.3 198.1  
Diurnal Average

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





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

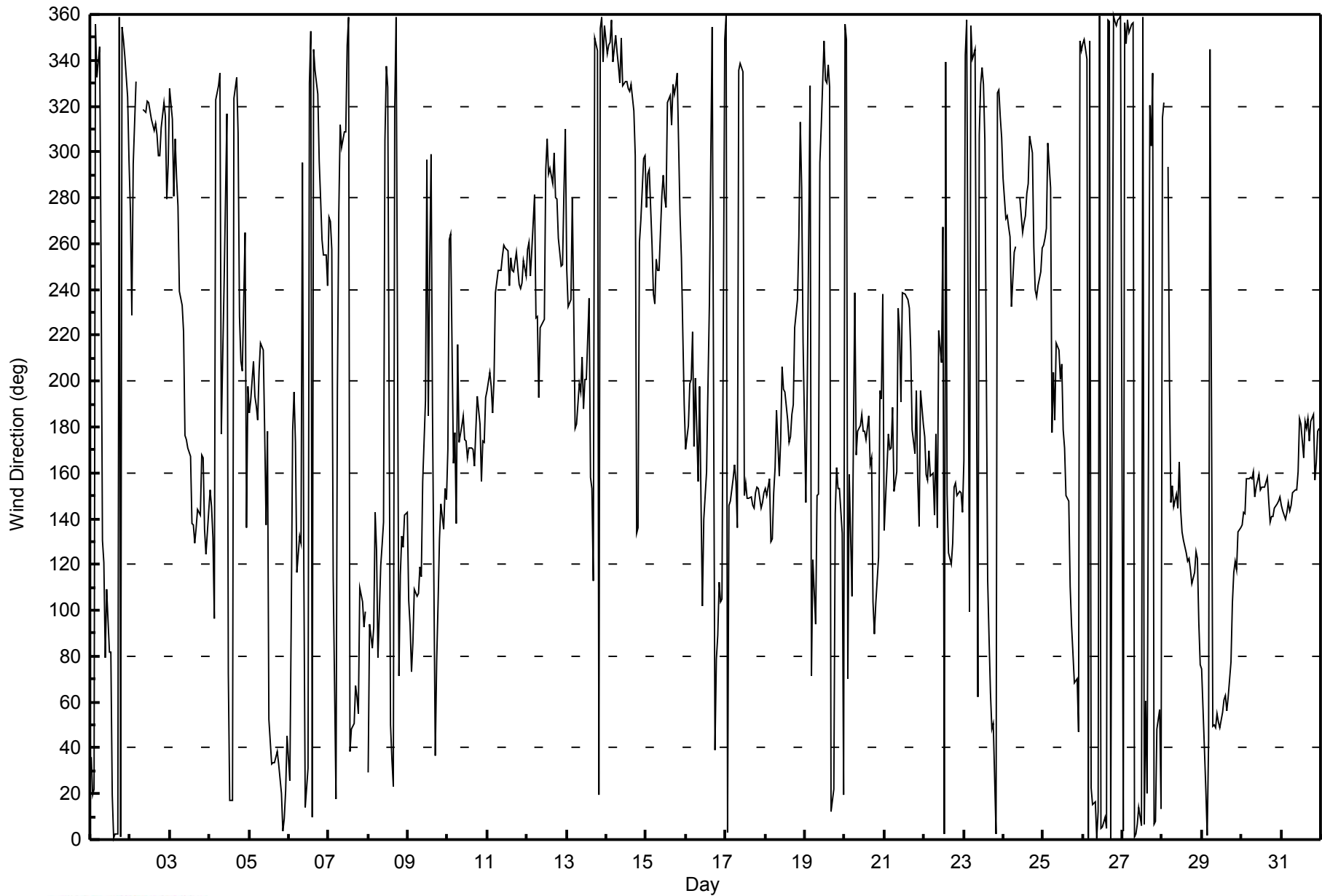
Wind Direction (WD) - deg  
Barge Landing - October 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 91 deg on Oct 7 06:00 Minimum Value: 9 deg on Oct 23 07:00 Percentiles: P <sub>1</sub> = 12 P <sub>10</sub> = 16 Q <sub>1</sub> = 20 Median = 24 Q <sub>3</sub> = 35 P <sub>90</sub> = 52 P <sub>99</sub> = 89																		Hours in Service: 744 Hours of Data: 736 Hours of Missing Data: 8 Hours of Calibration: 0 Percent Operational Time: 98.9									
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	33	29	33	19	19	48	90	45	36	21	52	27	22	43	23	24	24	22	23	22	22	24	21	38	90		
2-Oct	35	86	47	23	AF	AF	AF	AF	21	24	22	22	22	25	27	23	25	26	28	26	29	32	27	45	86		
3-Oct	59	32	58	61	36	37	33	14	28	31	31	32	32	28	20	15	15	16	16	27	24	19	14	18	61		
4-Oct	25	41	17	60	47	16	30	30	39	79	52	56	49	39	32	32	32	31	16	18	22	41	72	28	79		
5-Oct	24	27	26	24	24	24	23	22	22	32	31	54	89	26	21	19	19	19	21	25	26	26	26	70	89		
6-Oct	61	54	57	18	59	22	16	62	43	83	58	29	28	26	26	26	60	76	26	24	25	20	19	28	83		
7-Oct	53	45	77	79	86	91	41	42	28	33	26	35	31	30	22	25	21	21	24	34	16	13	26	AF	91		
8-Oct	45	19	49	9	68	38	34	52	26	44	25	29	22	43	43	31	40	25	40	23	12	14	16	21	68		
9-Oct	45	15	14	16	15	16	21	18	25	44	80	76	61	68	70	30	62	16	19	11	16	18	14	14	80		
10-Oct	25	33	49	89	24	27	43	29	26	25	28	28	28	27	27	27	20	23	17	17	14	44	48	41	89		
11-Oct	27	25	31	28	39	16	19	18	17	21	27	24	24	19	22	19	20	20	16	16	15	14	18	16	39		
12-Oct	23	61	72	30	27	19	12	45	15	17	26	36	28	38	30	60	30	28	29	21	18	16	49	39	72		
13-Oct	44	66	63	27	31	47	22	27	36	38	46	34	40	37	49	27	25	40	17	25	19	25	23	23	66		
14-Oct	27	24	22	31	24	24	21	24	31	29	19	25	20	24	21	20	16	47	36	90	30	37	28	29	90		
15-Oct	32	31	27	22	18	19	20	17	17	31	36	35	40	30	29	29	20	17	18	38	81	64	47	64	81		
16-Oct	87	76	39	52	24	26	33	59	38	29	35	66	42	65	53	54	23	42	60	67	16	15	20	51	87		
17-Oct	17	34	74	48	19	15	13	36	74	16	23	51	26	21	23	21	19	18	20	21	21	19	19	20	74		
18-Oct	21	20	25	22	13	23	19	25	40	26	26	30	32	28	22	21	17	24	13	43	54	43	37	50	54		
19-Oct	38	51	27	24	47	43	29	32	49	60	27	47	30	21	29	18	36	40	23	30	17	19	21	53	60		
20-Oct	20	66	61	70	89	21	40	25	20	24	25	33	24	26	30	26	18	41	37	19	23	42	55	35	89		
21-Oct	82	31	42	35	33	45	28	59	17	21	40	15	21	21	18	18	21	16	24	28	15	52	44	38	82		
22-Oct	25	18	18	31	11	17	12	30	34	27	48	50	52	36	91	16	13	15	18	17	18	20	17	14	91		
23-Oct	15	78	65	11	44	13	9	16	36	55	23	18	19	41	60	26	19	19	22	35	15	17	19	24	78		
24-Oct	28	25	24	22	24	17	21	21	AF	AF	32	28	28	31	35	30	23	26	32	15	14	13	17	22	35		
25-Oct	23	25	26	27	28	41	24	22	22	22	30	32	35	31	27	27	13	19	12	22	28	16	29	21	41		
26-Oct	21	22	24	21	23	22	19	20	20	26	23	22	21	21	21	21	21	21	22	22	21	22	20	20	26		
27-Oct	21	20	19	22	21	20	20	20	21	20	21	20	21	19	29	36	14	23	16	18	22	71	24	47	71		
28-Oct	23	73	AF	61	50	14	17	17	17	16	25	18	17	18	13	12	12	14	15	14	15	20	21	15	73		
29-Oct	19	20	24	32	28	59	34	18	19	19	20	21	21	21	20	22	19	18	20	19	16	15	16	15	59		
30-Oct	14	16	16	22	24	24	24	25	20	22	22	21	21	21	22	24	19	15	15	17	19	19	19	19	25		
31-Oct	18	17	16	17	18	17	19	19	20	20	22	30	26	22	24	22	22	20	24	24	18	20	24	44	44		
																		87 86 77 89 89 91 90 62 74 83 80 76 89 68 91 60 62 76 60 90 81 71 72 70									
																		Diurnal Maximum									
AF - Analyzer Failure																											



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Barge Landing - October 2014**





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	October 16, 2014	Previous Calibration	September 5, 2014
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	1:45
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.	2638
DACS voltage range		DACS channel #	

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-689	-689
Analyzer Range (input)	5000	5000	Lamp voltage	996	1000
Calculated slope	1.001602	0.989299	Chamber temp.	45	45
Calculated intercept	0.171776	-0.172599	Pressure	578.0	690.0
Analyzer Background	2.25	2.03	Flow	0.372	0.436
Analyzer Coefficient	0.963	0.956	Intensity	91	91
			Converter temp.	850	800

Analyzer make/model	Thermo 45C	Analyzer serial #	328702540
Converter make/model	CDN-101	Converter serial #	376

### 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	5000	83.7	79.8	79.4	1.006
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	83.7	79.8	80.9	0.987
second point	5000	41.9	40.0	40.5	0.987
third point	5000	20.8	19.8	20.3	0.976
calibrator zero	6000	0.0	0.0	-0.1	NA
as left zero	6000	0.0	0.0	0.2	NA
as left span	5000	83.7	79.8	81.0	0.986
Average Correction Factor					0.983

Corrected As found	79.4	Previous response	79.6	% change	0.2%
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#### Notes:

Replaced converter and pump after as founds. Filter was changed after as founds. Zero and span were adjusted.

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

## TRS Calibration Summary

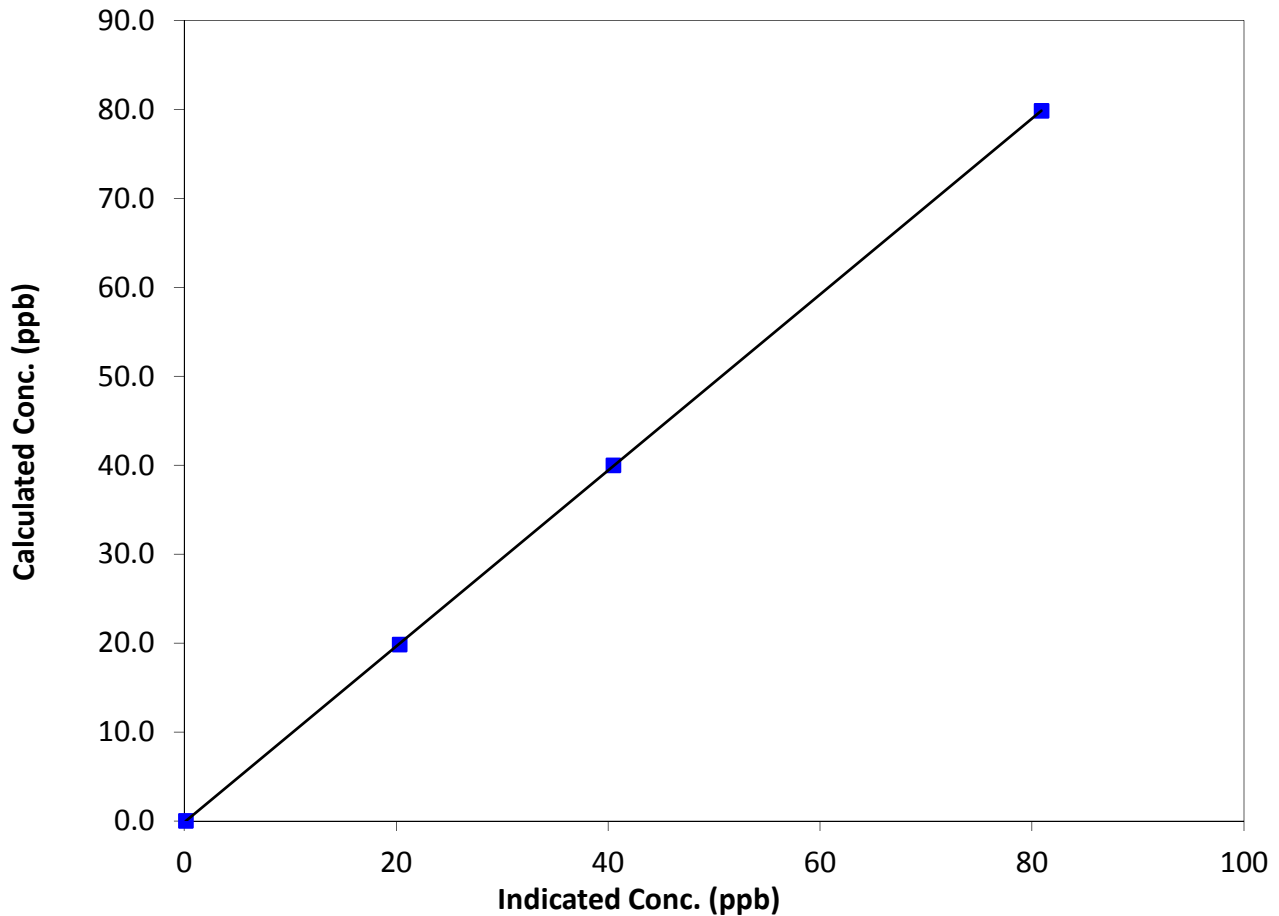
### Station Information

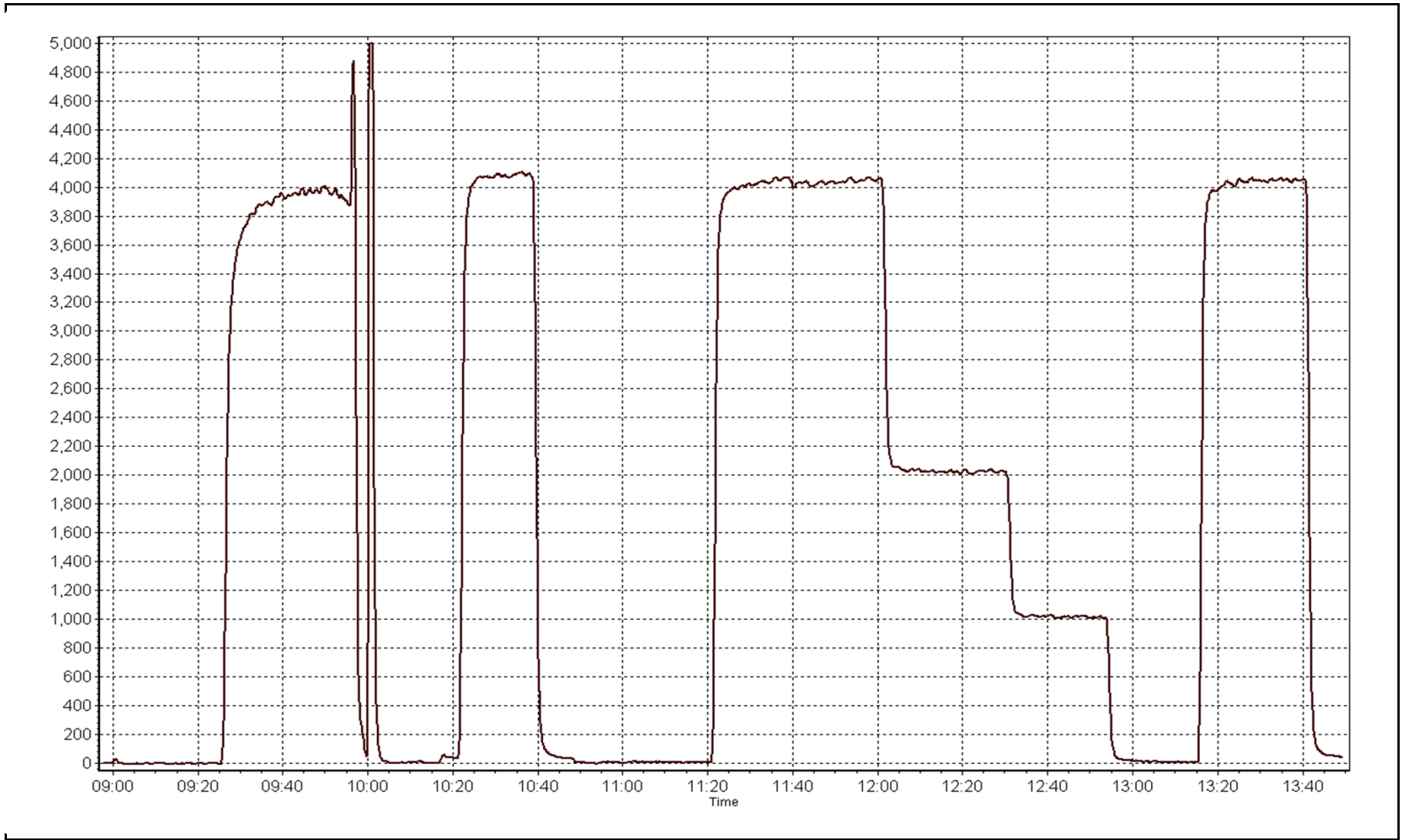
Calibration Date	October 16, 2014	Previous Calibration	September 5, 2014
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	9:00	End Time (MST)	1:45
Analyzer make	Thermo 45C	Analyzer serial #	328702540

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999995
79.8	80.9	0.9869		
40.0	40.5	0.9872	Slope	0.989299
19.8	20.3	0.9760		
			Intercept	-0.172599

TRS Calibration Curve







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Friday, October 17, 2014	Previous Calibration	Friday, September 05, 2014
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	2:45
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.	2638
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)	5000	5000	Air or Bypass press	34.7	34.7
Calculated slope	0.997957	0.999725	Fuel Pressure	24.1	24.1
Calculated intercept	0.022923	0.018663	BKG	5.79	5.68
			COEF	4.210	4.236

Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296
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### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.00	-0.16	N/A
as found span	6000	89.7	15.69	15.28	1.027
calibrator zero	6000	0.0	0.00	-0.01	N/A
high point	6000	89.7	15.69	15.69	1.000
second point	6000	48.0	8.40	8.35	1.005
third point	6000	18.0	3.15	3.13	1.006
calibrator zero	6000	0.0	0.00	-0.01	N/A
as left zero	6000	0.5	0.09	0.00	N/A
as left span	6000	89.7	15.69	15.70	1.000
Average Correction Factor					1.004

Corrected As found	15.44	Previous response	15.70	% change	1.7%
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#### Notes:

Filter changed after as founds. Zero and span adjusted.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

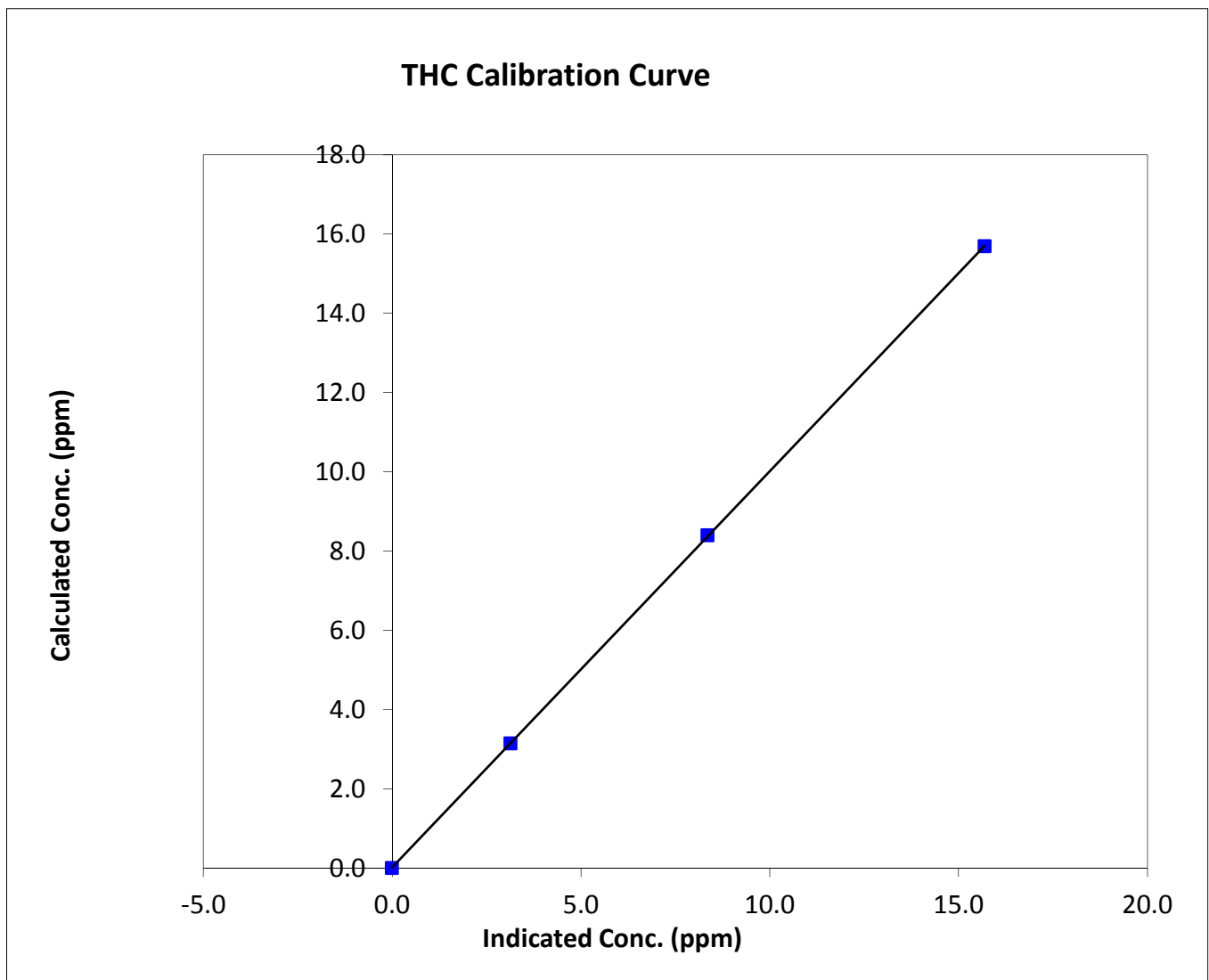
## THC Calibration Summary

### Station Information

Calibration Date	October 17, 2014	Previous Calibration	September 5, 2014
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	9:30	End Time (MST)	2:45
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

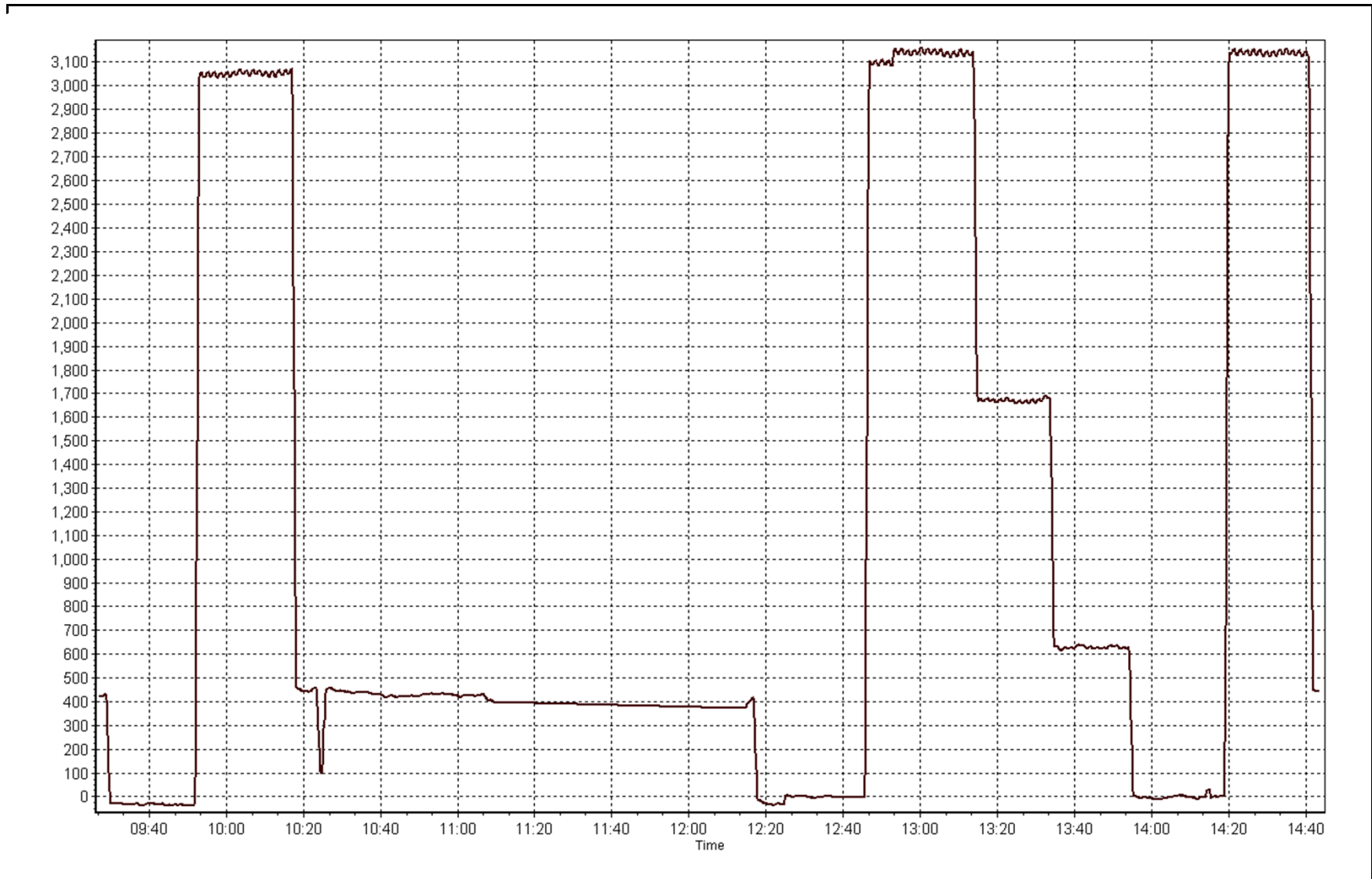
### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	N/A	Correlation Coefficient	0.999991
15.69	15.69	0.9999		
8.40	8.35	1.0054	Slope	0.999725
3.15	3.13	1.0055		
			Intercept	0.018663



THC Calibration Plot

Date: October 17, 2014





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 11  
LOWER CAMP  
OCTOBER 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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
OCTOBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	35	36	99.87	53	0	9	0
H2S (ppb) Average	707	36	37	99.87	6	0	1	0
THC (ppm) Average	708	35	36	99.87	4.3	-	2.6	-
Temperature (C) Average	744	0	0	100.00	20.6	-	13.1	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	28	-	-	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
 OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	2.1	4	-	0	0	1	1	2	4	53
H2S (ppb) Average	707	0.5	1	-	0	0	0	0	1	1	6
THC (ppm) Average	708	2.24	0.2	-	1.9	2	2.1	2.2	2.3	2.6	4.3
Temperature 2 m (C) Average	744	5.6	4.4	-	-2.8	0.5	1.9	5.1	8.1	12.2	20.6
Wind Speed 10 m (km/h) Average	744	10.1	6	-	0	3	5	9	15	20	28
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, H2S, THC	20 Oct 2014 11:00	20 Oct 2014 11:00	1	Maintenance - manifold cleaning

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 53 ppb on Oct 17 20:00	Maximum Daily Average: 8.6 ppb on Oct 17		Hours of Data:	708
Minimum Value: 0 ppb on Oct 3 07:00	Minimum Daily Average: 0.4 ppb on Oct 29		Hours of Missing Data:	36
Maximum Diurnal Average: 3.9 ppb at hour 20	Minimum Diurnal Average: 1.1 ppb at hour 23		Hours of Calibration:	35
Monthly Average: 2.1 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 4 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-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0.4	1
2-Oct	0	Z	0	0	1	1	0	0	0	0	0	1	1	0	0	1	0	3	2	1	0	1	0	0.7	3	
3-Oct	0	Z	0	0	0	0	0	4	1	1	1	1	1	1	1	2	2	12	3	1	1	1	1	1.6	12	
4-Oct	2	Z	1	1	1	1	2	4	2	3	5	6	3	2	1	1	1	1	2	1	1	1	1	2.0	6	
5-Oct	1	Z	1	1	1	1	1	1	5	2	2	2	5	2	2	1	1	1	1	1	1	0	1	1.5	5	
6-Oct	1	Z	1	0	1	1	1	2	4	4	6	7	4	3	2	2	1	1	3	18	14	5	2	3.6	18	
7-Oct	3	Z	4	3	5	4	8	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.9	8	
8-Oct	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	
9-Oct	1	Z	1	1	1	1	1	0	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	0.9	2	
10-Oct	1	Z	1	1	1	1	1	2	2	1	1	1	1	1	2	1	1	2	1	1	1	1	1	1.2	2	
11-Oct	1	Z	1	1	1	1	1	1	2	1	1	1	3	1	10	1	1	1	1	1	2	1	1	1.5	10	
12-Oct	2	Z	1	1	1	2	1	1	10	10	4	17	22	9	5	16	2	2	11	16	3	3	2	6.1	22	
13-Oct	1	Z	1	1	1	1	1	1	1	2	3	1	2	4	4	1	1	1	1	1	1	1	1	1.4	4	
14-Oct	1	Z	1	1	1	1	1	1	1	C	C	C	C	1	1	1	1	1	1	1	1	2	7	1.2	7	
15-Oct	9	Z	5	11	24	37	1	1	1	8	9	1	12	4	1	1	1	1	0	1	1	4	2	5.9	37	
16-Oct	2	Z	1	1	1	1	1	1	1	0	1	1	6	5	2	2	2	1	1	1	1	0	1	1.3	6	
17-Oct	1	Z	1	1	1	1	1	1	1	1	2	1	23	19	7	16	2	25	29	53	2	2	3	8.6	53	
18-Oct	1	Z	1	1	1	1	3	1	1	1	2	2	3	1	1	2	3	3	2	4	6	1	1	1.9	6	
19-Oct	1	Z	1	1	1	1	1	1	1	1	1	4	4	1	1	1	1	1	1	2	1	1	1	1.1	4	
20-Oct	1	Z	1	1	1	1	1	1	7	7	M	1	1	1	2	1	1	1	1	2	1	1	1	1.7	7	
21-Oct	1	Z	1	1	1	1	2	3	4	2	2	2	2	2	2	3	2	2	1	1	1	1	1	1.7	4	
22-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	1	1	1	1	0.8	2	
23-Oct	1	Z	0	1	1	1	0	0	1	0	1	0	0	0	0	1	1	0	1	0	0	1	0	0.5	1	
24-Oct	1	Z	8	2	2	0	1	4	6	7	6	12	1	1	1	1	1	2	1	1	0	0	3	2.7	12	
25-Oct	2	Z	2	5	2	3	28	16	24	31	3	2	1	1	1	4	1	1	1	1	1	1	1	5.8	31	
26-Oct	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
27-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	1	1	1	1	0.5	1	
28-Oct	1	Z	1	10	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1.3	10	
29-Oct	0	Z	0	1	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	1	0.4	1	
30-Oct	0	Z	0	1	2	1	4	7	6	1	2	1	8	10	16	3	4	2	3	2	7	15	4	4.8	16	
31-Oct	10	Z	1	2	2	1	1	1	1	1	2	2	1	1	1	1	1	1	0	0	0	1	1	1.4	10	

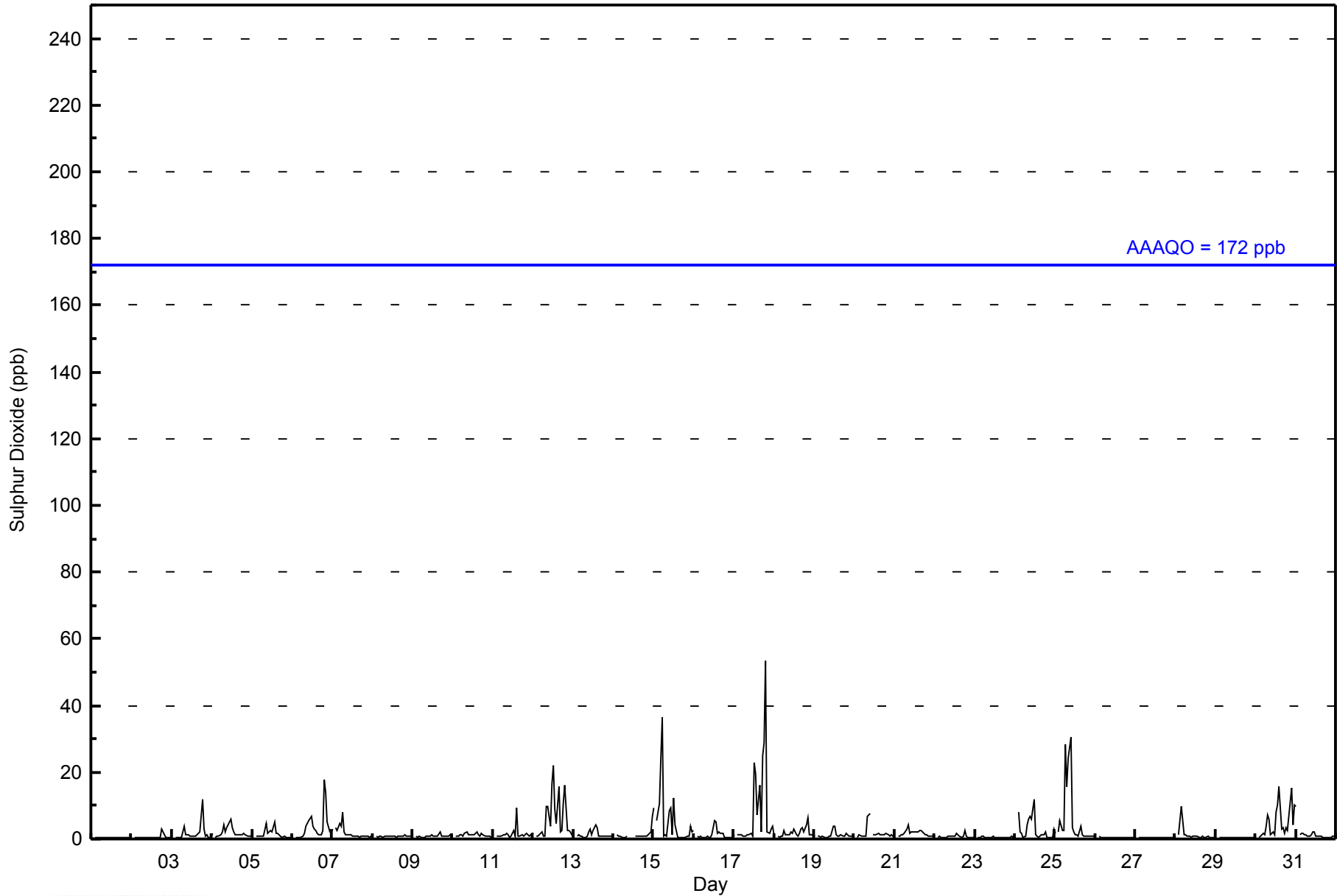
1.6	--	1.3	1.6	2.0	2.1	2.1	1.9	2.8	3.1	2.1	2.5	3.6	2.6	2.1	2.1	1.2	1.9	2.7	3.9	1.7	1.4	1.1	1.5	Diurnal Average
10	--	8	11	24	37	28	16	24	31	9	17	23	19	16	16	4	25	29	53	14	15	4	10	Diurnal Maximum

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  
Lower Camp - October 2014







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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Lower Camp - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	683	96.47	96.47
11 - 20	15	2.12	98.59
21 - 60	10	1.41	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Lower Camp - October 2014**

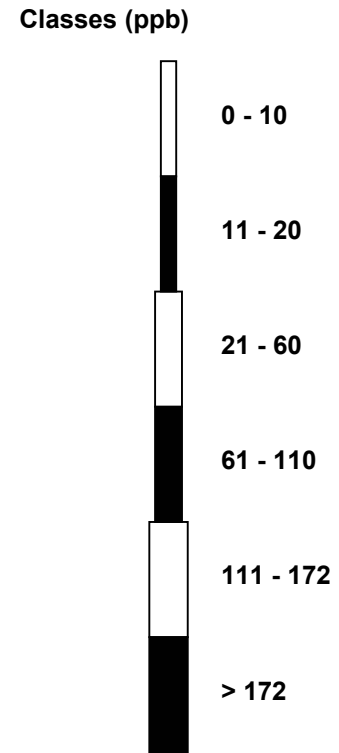
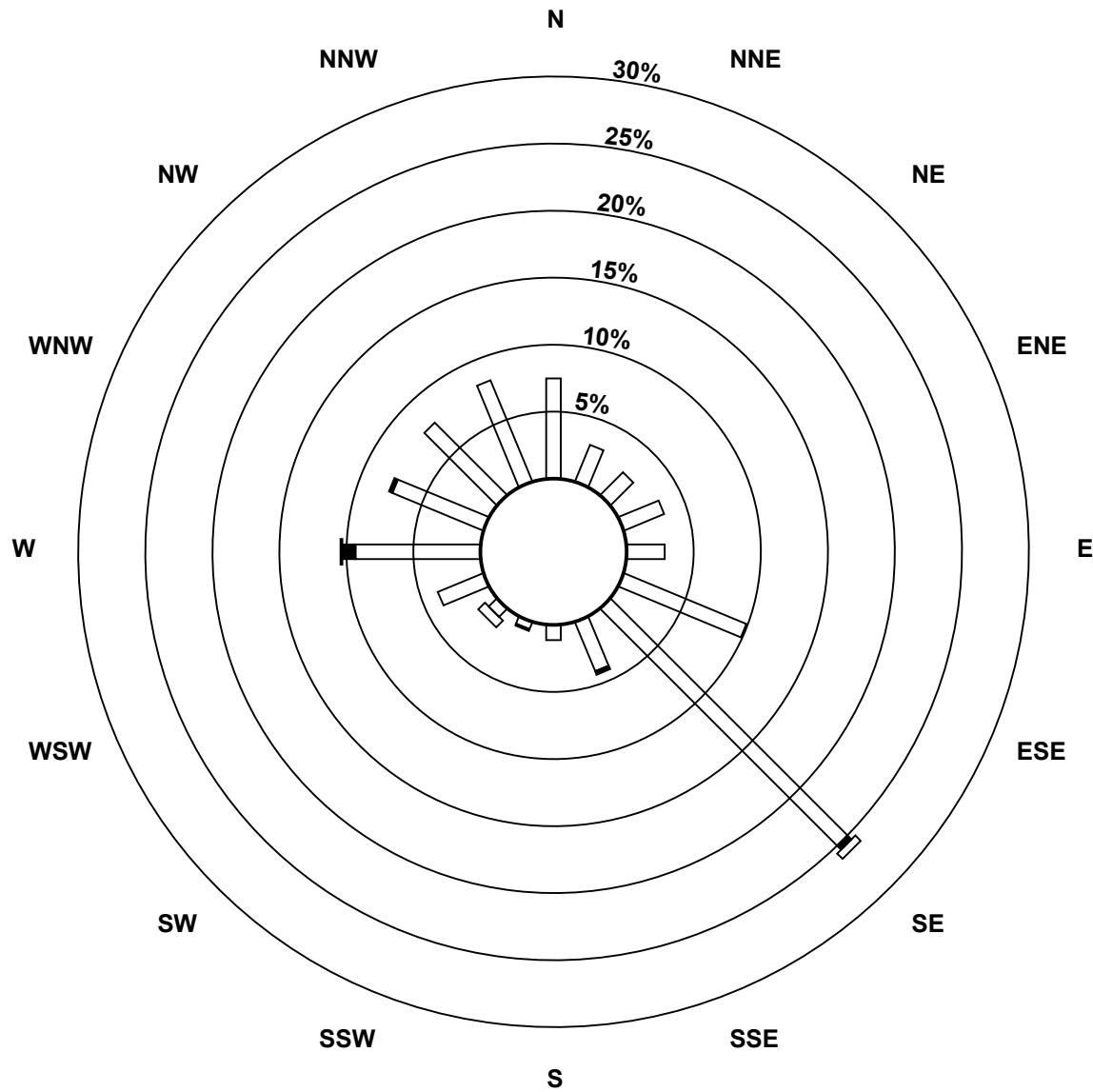
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	53	21	17	23	20	70	177	28	8	4	6	26	66	52	54	58	683
11 - 20	0	0	0	0	0	0	3	2	0	1	0	0	7	2	0	0	15
21 - 60	0	0	0	0	0	0	4	0	0	0	5	0	1	0	0	0	10
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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>	53	21	17	23	20	70	184	30	8	5	11	26	74	54	54	58	708

Total Number of Valid Hours: 708

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp (AMS 11)**

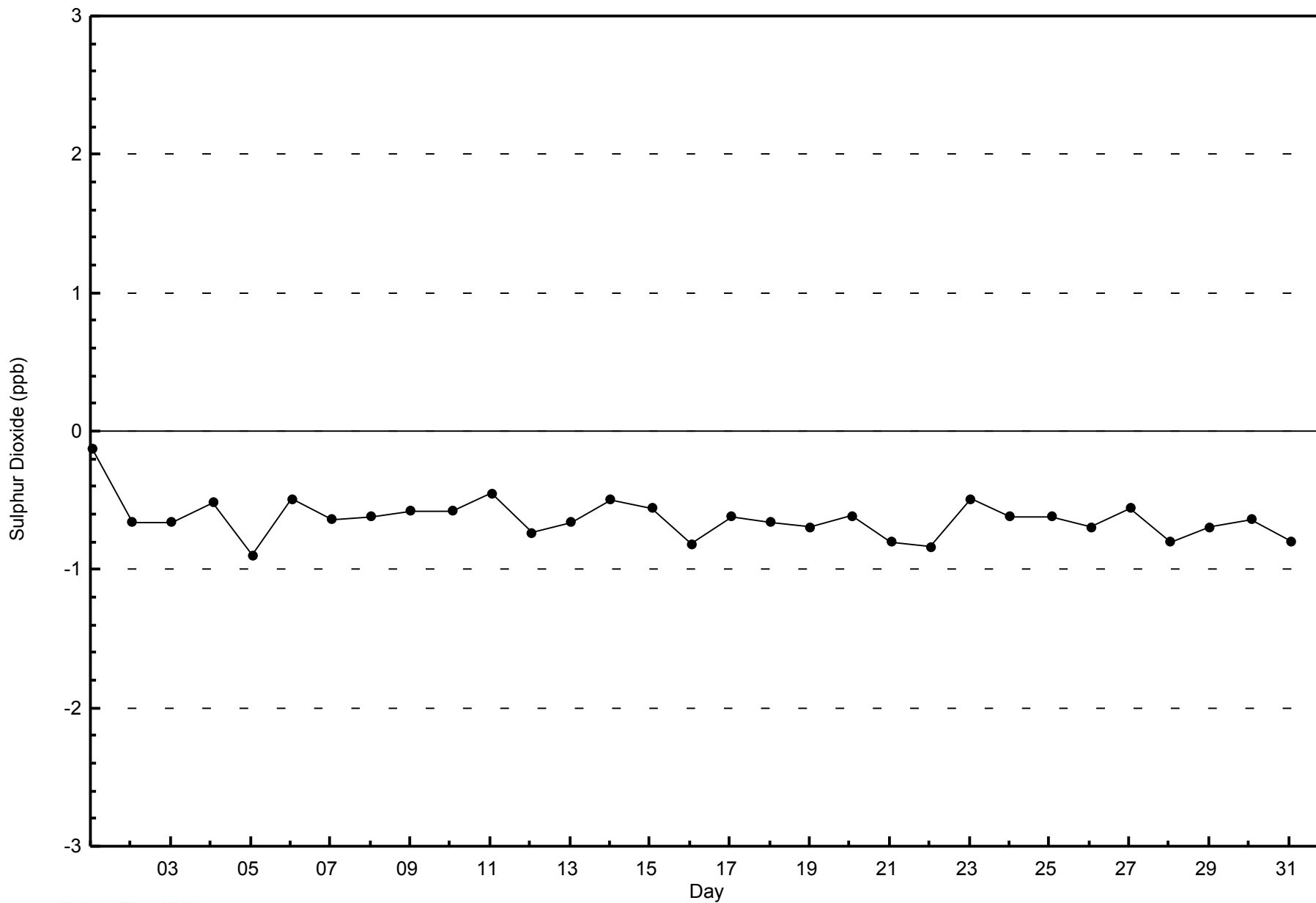


**Total Number of Valid Hours: 708**



WBEA  
Zero Responses

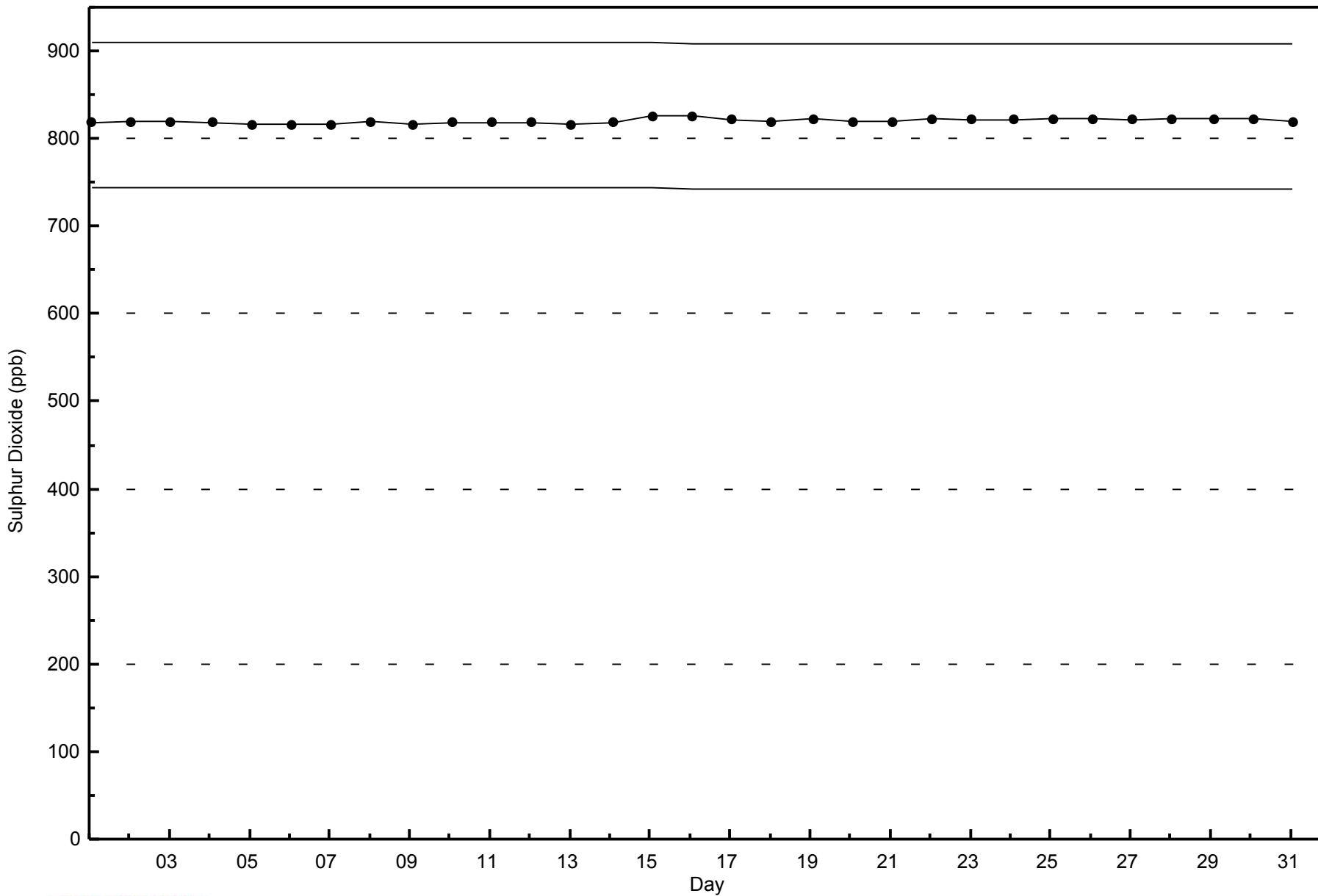
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp - October 2014





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp - October 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 6 ppb on Oct 15 06:00	Maximum Daily Average: 1.3 ppb on Oct 25		Hours of Data:	707
Minimum Value: 0 ppb on Oct 27 23:00	Minimum Daily Average: 0.2 ppb on Oct 1		Hours of Missing Data:	37
Maximum Diurnal Average: 0.7 ppb at hour 20	Minimum Diurnal Average: 0.3 ppb at hour 15		Hours of Calibration:	36
Monthly Average: 0.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 3		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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1
2-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0.4	2
3-Oct	0	0	Z	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.4	1
4-Oct	0	0	Z	1	1	1	1	2	1	2	1	1	1	1	0	0	0	0	0	1	0	1	0	0	0.6	2
5-Oct	1	0	Z	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
6-Oct	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	0	0	1	0.4	1
7-Oct	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1
8-Oct	2	1	Z	0	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	2
9-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Oct	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	2	1	1	0	0	0	0.5	2
11-Oct	0	0	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.4	1
12-Oct	0	0	Z	0	0	1	0	1	1	1	0	1	0	0	0	1	1	0	1	1	0	1	0	0	0.5	1
13-Oct	2	2	Z	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	2	1	1	0	1	0.7	2
14-Oct	1	1	Z	1	0	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0.4	1
15-Oct	0	0	Z	1	4	6	1	1	0	C	C	C	C	C	0	0	1	1	0	0	0	0	3	2	1.1	6
16-Oct	4	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4
17-Oct	0	0	Z	0	0	0	0	0	1	1	0	0	1	1	0	1	0	1	1	2	0	0	0	1	0.5	2
18-Oct	0	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	1	2	2	2	1	1	2	1	1	0.8	2
19-Oct	2	1	Z	1	1	1	1	2	4	2	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0.9	4
20-Oct	0	0	Z	1	0	0	0	1	1	0	M	0	0	0	1	0	1	0	2	3	2	1	1	1	0.7	3
21-Oct	1	1	Z	1	1	1	2	1	1	1	1	0	0	0	0	1	2	1	1	1	1	1	1	1	0.9	2
22-Oct	1	1	Z	1	1	0	0	0	0	0	1	1	1	1	1	0	0	0	1	1	0	0	0	0	0.6	1
23-Oct	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0.6	1
24-Oct	0	1	Z	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0.5	1
25-Oct	1	0	Z	2	1	1	5	3	4	5	1	1	1	0	0	1	0	0	1	1	0	0	1	0	1.3	5
26-Oct	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0.2	1
28-Oct	0	1	Z	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
29-Oct	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
30-Oct	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	1	1	1	0	0	0	1	1	0	1	0.5	1
31-Oct	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	1	0.4	1

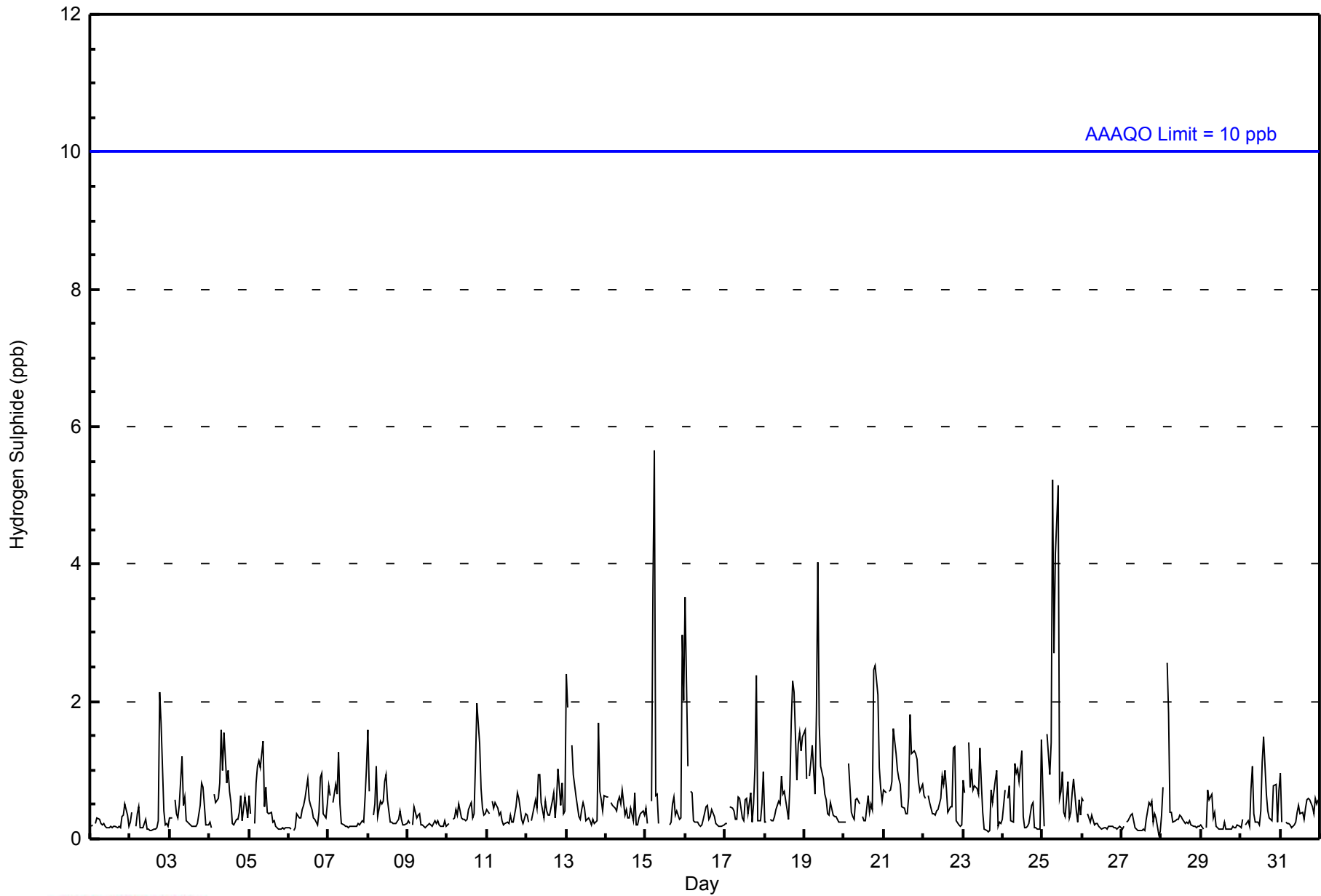
0.7	0.5	--	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.4	0.5	0.7	0.7	0.5	0.4	0.4	0.5	Diurnal Average	
4	2	--	3	4	6	5	3	4	5	1	1	1	1	1	1	1	2	2	2	3	2	2	3	2	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Lower Camp - October 2014**





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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Lower Camp - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	696	98.44	98.44
3 - 4	8	1.13	99.58
5 - 7	3	0.42	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Lower Camp - October 2014**

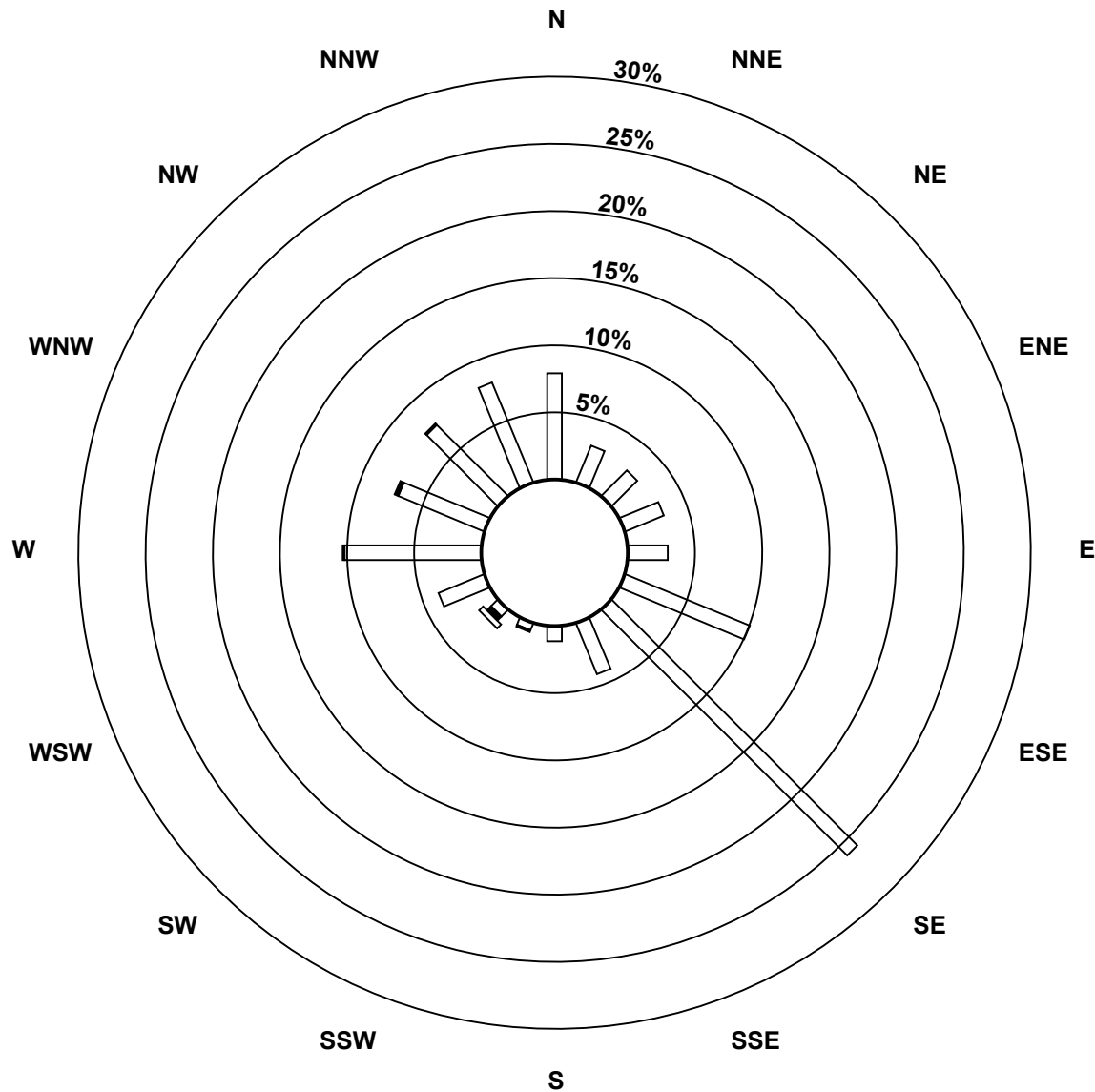
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	56	21	19	22	21	71	183	29	8	4	5	26	72	49	53	57	696
3 - 4	0	0	0	0	0	0	0	0	0	1	3	0	1	2	1	0	8
5 - 7	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	56	21	19	22	21	71	183	29	8	5	11	26	73	51	54	57	707

Total Number of Valid Hours: 707

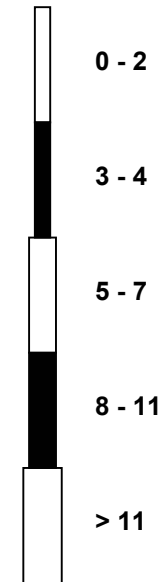
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Lower Camp (AMS 11)**



**Classes (ppb)**

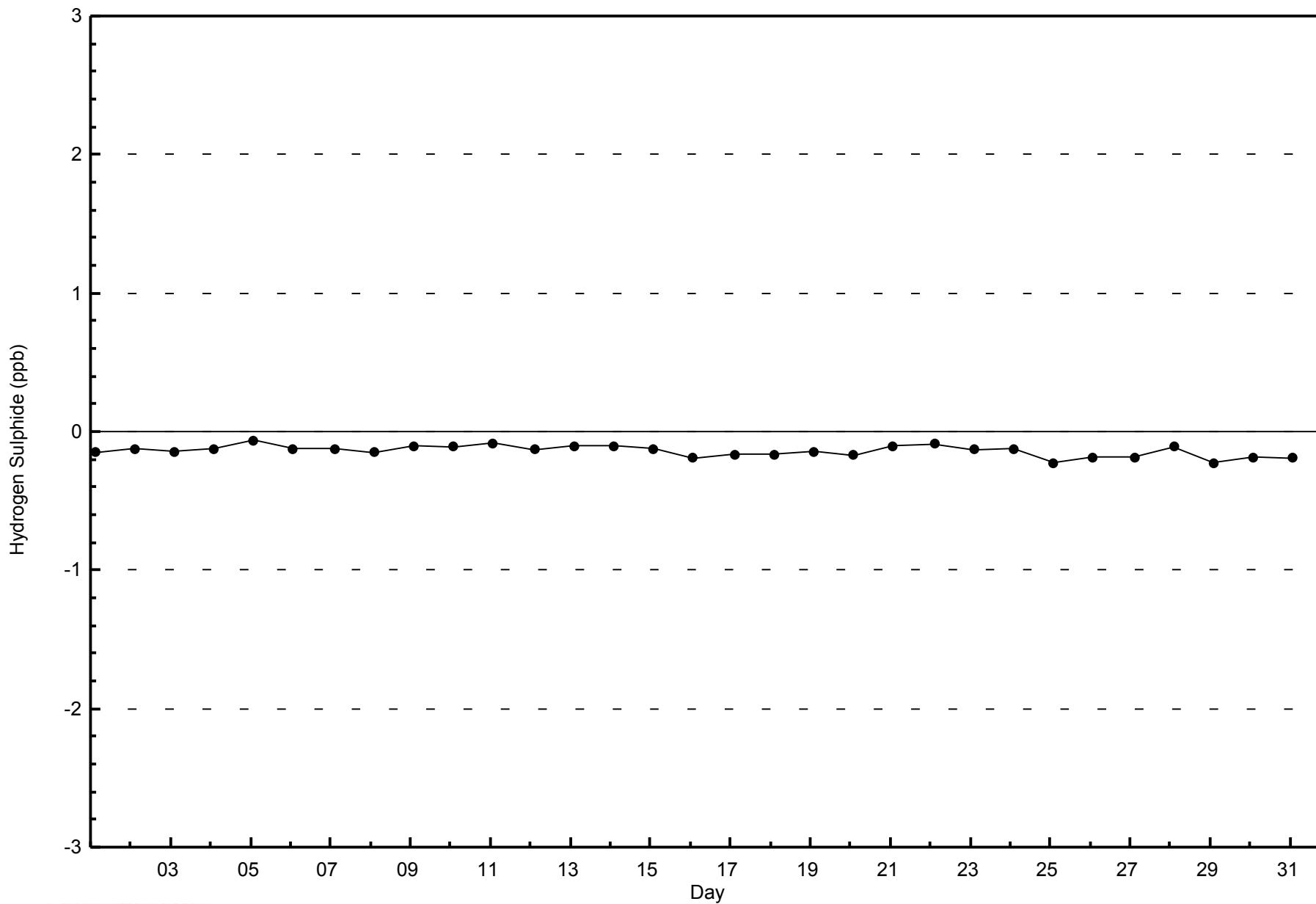


**Total Number of Valid Hours: 707**



WBEA  
Zero Responses

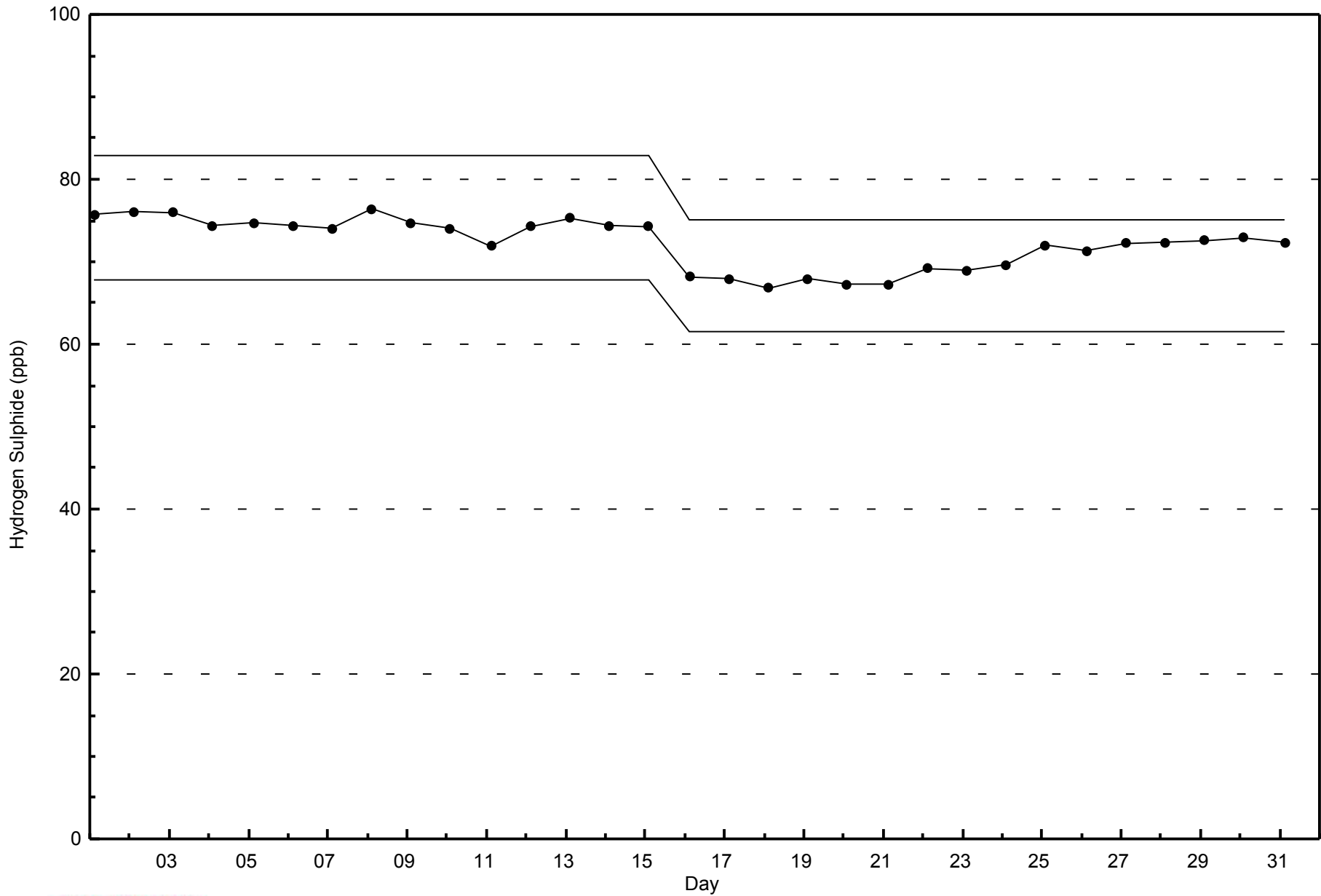
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Lower Camp - October 2014





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Lower Camp - October 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

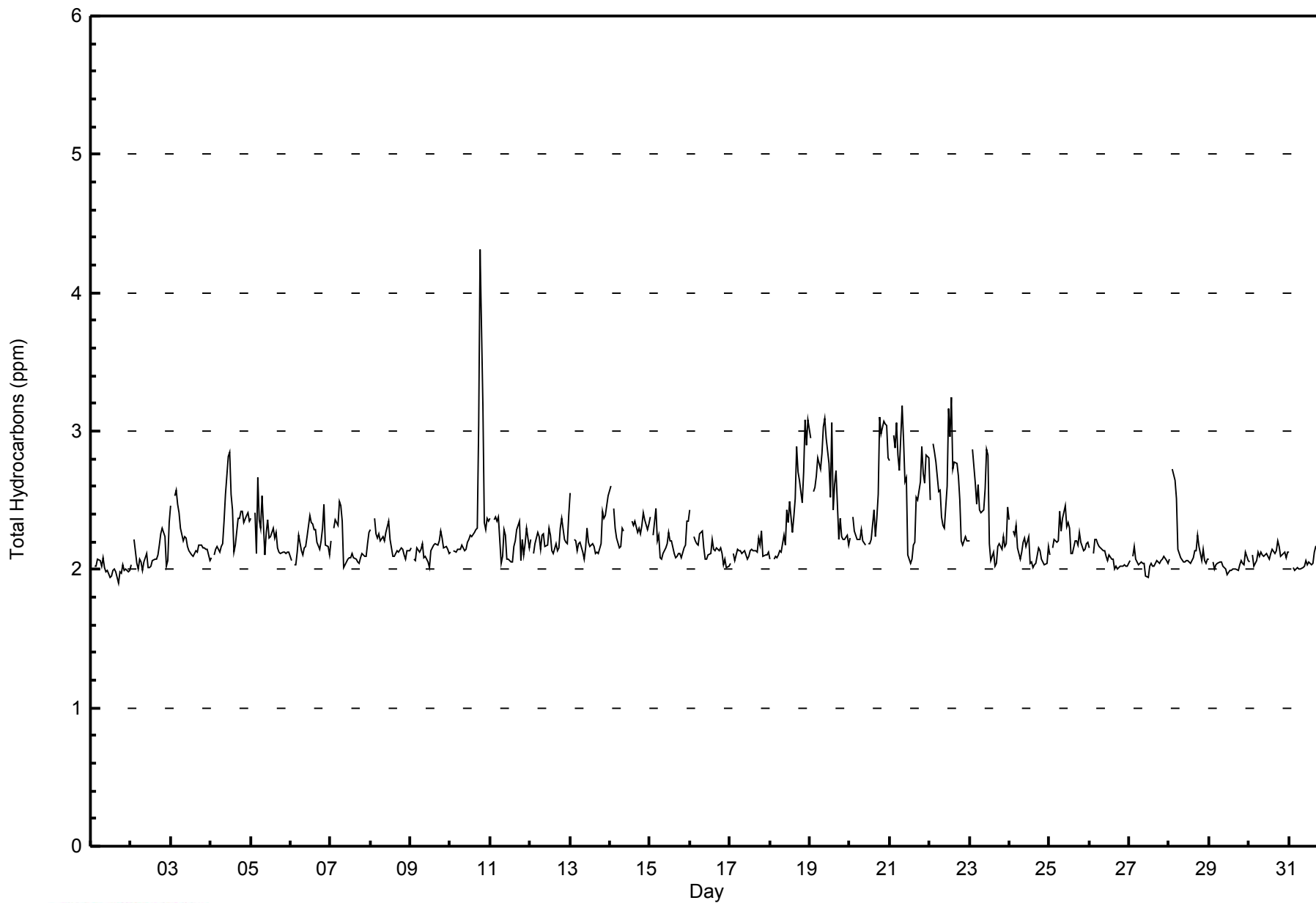
Lower Camp - October 2014

Table with 26 columns (Day, 1-24, Daily Average, Daily Maximum) and 31 rows (Oct 1-31). Includes summary statistics like Maximum Value: 4.3 ppm on Oct 10 19:00 and Minimum Value: 1.9 ppm on Oct 1 17:00. Legend: Z - zerospan, C - Calibration, M - Maintenance.



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - October 2014**





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

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	99	13.98	13.98
2.1 - 3.0	596	84.18	98.16
3.1 - 10.0	13	1.84	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - October 2014**

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	24	5	9	3	4	5	11	3	0	0	0	1	8	1	10	15	99
2.1 - 3.0	29	16	8	19	15	64	168	26	8	5	11	25	66	51	44	41	596
3.1 - 10.0	0	0	0	1	1	1	5	1	0	0	0	0	0	2	0	2	13
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	53	21	17	23	20	70	184	30	8	5	11	26	74	54	54	58	708

Total Number of Valid Hours: 708

Total Number of Hours: 744

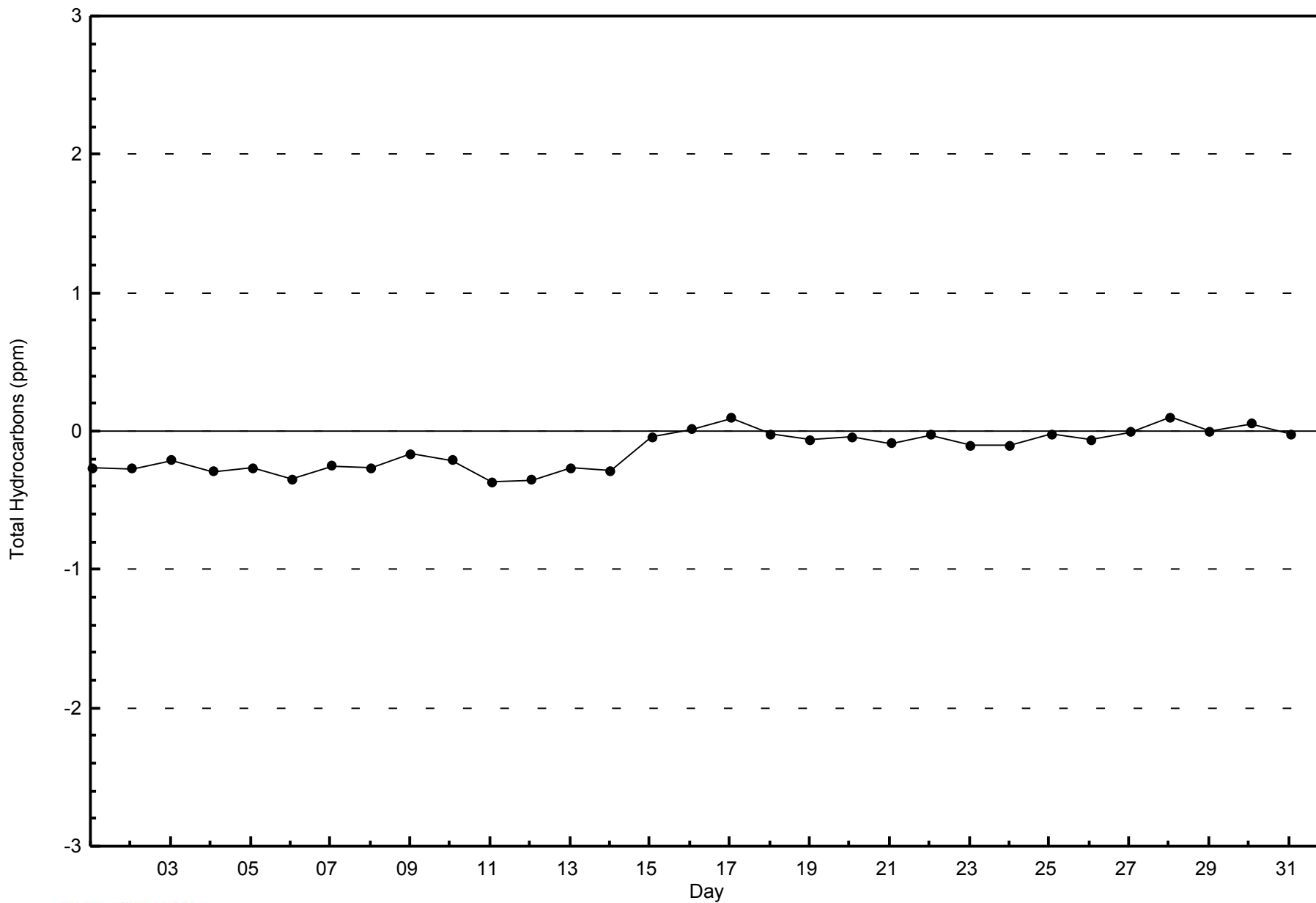






WBEA  
Zero Responses

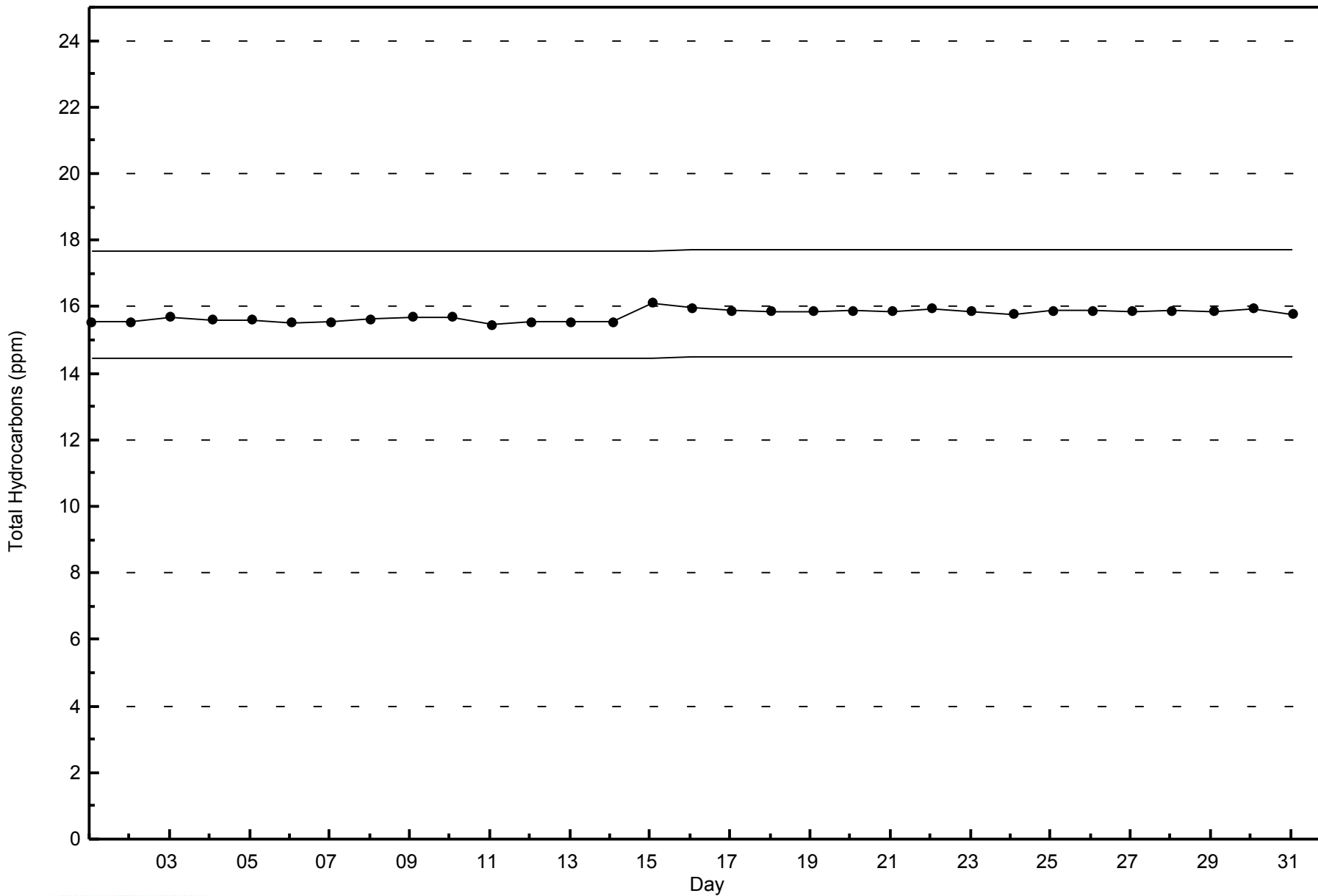
Total Hydrocarbons (THC) - ppm  
Lower Camp - October 2014





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Lower Camp - October 2014



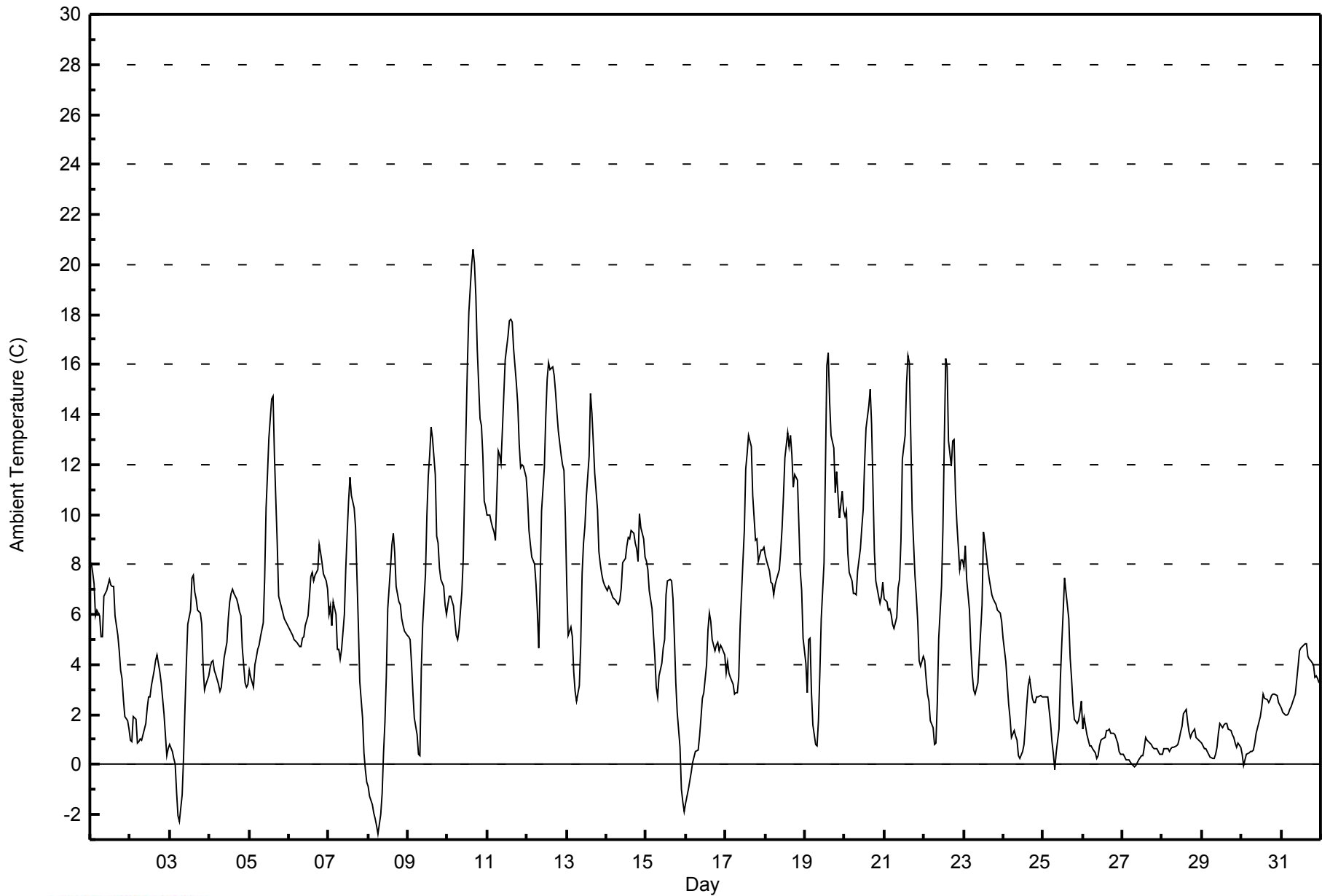


Maximum Value: 20.6 C on Oct 10 16:00		Maximum Daily Average: 13.1 C on Oct 11		Hours in Service: 744																																												
Minimum Value: -2.8 C on Oct 8 07:00		Minimum Daily Average: 0.4 C on Oct 27		Hours of Data: 744																																												
Maximum Diurnal Average: 9.4 C at hour 15		Minimum Diurnal Average: 2.8 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 5.60 C		Percentiles: P <sub>1</sub> = -1.9 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 1.9 Median = 5.1 Q <sub>3</sub> = 8.1 P <sub>90</sub> = 12.2 P <sub>99</sub> = 17.7		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-Oct	8.1	7.7	7.2	6.0	6.2	6.0	5.1	5.1	6.8	6.8	6.9	7.4	7.2	7.1	7.1	5.9	5.1	4.6	3.8	3.4	2.6	1.9	1.8	1.4	5.5	8.1																						
2-Oct	1.0	0.9	1.9	1.8	0.9	0.9	1.0	1.0	1.2	1.6	2.3	2.7	2.7	3.2	3.7	4.1	4.4	4.1	3.7	3.3	2.0	1.2	0.3	0.6	2.1	4.4																						
3-Oct	0.8	0.5	0.3	0.0	-1.1	-2.0	-2.3	-1.2	0.3	2.3	4.0	5.6	6.2	7.5	7.6	6.9	6.6	6.2	6.0	5.6	3.9	3.0	3.2	3.5	3.1	7.6																						
4-Oct	3.9	4.1	4.1	3.8	3.6	3.2	2.9	3.1	3.7	4.3	4.9	5.9	6.5	6.8	7.0	6.8	6.6	6.4	6.1	5.9	4.6	3.3	3.1	3.2	4.7	7.0																						
5-Oct	3.8	3.5	3.1	4.0	4.3	4.6	4.8	5.1	5.7	7.5	10.3	11.6	13.0	14.6	14.7	12.3	10.6	8.8	6.7	6.3	6.1	5.8	5.7	5.6	7.4	14.7																						
6-Oct	5.4	5.3	5.2	5.0	5.0	4.9	4.7	4.7	5.0	5.1	5.5	5.9	6.7	7.5	7.7	7.4	7.6	7.8	8.8	8.5	8.1	7.6	7.4	7.0	6.4	8.8																						
7-Oct	6.0	6.3	5.6	6.5	6.0	4.6	4.6	4.2	4.6	6.0	7.9	9.2	10.6	11.5	10.8	10.3	9.5	7.5	5.6	3.3	1.9	0.5	-0.2	-0.7	5.9	11.5																						
8-Oct	-0.9	-1.3	-1.6	-1.9	-2.2	-2.4	-2.8	-2.0	-1.2	0.5	1.7	3.5	6.2	7.9	8.8	9.2	8.4	7.1	6.5	6.4	5.8	5.6	5.3	5.2	3.0	9.2																						
9-Oct	5.1	5.0	4.0	2.9	1.9	1.2	0.4	0.3	3.8	5.6	7.6	10.0	11.5	12.4	13.5	13.0	11.6	9.1	8.9	7.8	7.4	7.1	6.4	6.0	6.8	13.5																						
10-Oct	6.4	6.8	6.7	6.3	5.7	5.2	5.0	5.4	6.9	8.2	11.0	13.5	16.1	18.1	20.0	20.6	20.1	18.7	16.6	13.8	13.6	12.4	10.6	10.3	11.6	20.6																						
11-Oct	10.0	10.0	9.7	9.5	9.3	8.9	12.6	12.4	12.0	13.4	14.8	16.2	17.1	17.8	17.8	17.7	16.6	15.3	14.4	12.8	11.9	12.0	11.9	11.5	13.1	17.8																						
12-Oct	10.6	9.3	8.8	8.3	8.0	7.3	6.1	4.6	7.3	10.1	11.9	13.9	15.4	16.1	15.8	15.9	15.6	14.9	14.1	13.3	12.4	12.0	11.8	9.9	11.4	16.1																						
13-Oct	7.2	5.2	5.5	5.1	3.7	2.9	2.5	3.2	4.8	7.6	8.8	9.5	10.7	12.4	14.8	14.1	12.9	11.6	10.2	8.5	8.0	7.6	7.4	7.2	8.0	14.8																						
14-Oct	6.9	7.1	7.0	6.8	6.7	6.6	6.4	6.4	6.6	7.1	8.0	8.2	8.8	9.1	9.1	9.4	9.3	8.9	8.6	8.1	10.0	9.5	9.0	8.3	8.0	10.0																						
15-Oct	8.1	7.8	6.9	6.2	5.2	4.3	3.1	2.7	3.5	4.1	4.7	5.0	6.8	7.3	7.4	7.3	6.6	5.0	3.3	2.1	0.7	-1.0	-1.5	-1.9	4.3	8.1																						
16-Oct	-1.6	-1.0	-0.7	-0.3	0.1	0.3	0.5	0.6	1.1	1.9	2.7	2.9	4.0	5.4	6.0	5.7	5.0	4.5	4.8	4.9	4.6	4.8	4.7	4.4	2.7	6.0																						
17-Oct	3.7	4.1	3.7	3.5	3.2	2.8	2.9	2.9	3.5	5.6	8.1	9.4	11.8	12.4	13.2	12.7	10.8	9.9	9.0	9.0	8.1	8.6	8.6	8.7	7.3	13.2																						
18-Oct	8.4	8.1	7.7	7.3	7.3	6.8	7.2	7.4	7.8	8.5	9.5	10.8	12.3	13.2	12.7	13.2	12.4	11.1	11.6	11.4	9.6	7.7	6.9	5.0	9.3	13.2																						
19-Oct	4.0	2.9	5.0	5.1	2.9	1.6	0.8	0.7	1.7	3.7	5.8	8.1	11.9	16.0	16.5	14.5	13.2	12.7	10.9	11.7	10.7	9.9	10.9	10.2	8.0	16.5																						
20-Oct	9.9	10.1	8.4	7.7	7.4	6.9	6.8	6.8	7.7	8.6	9.5	10.2	12.1	13.4	14.4	15.0	13.6	11.1	8.5	7.4	6.7	6.5	6.7	7.3	9.3	15.0																						
21-Oct	6.6	6.5	6.2	6.2	6.0	5.6	5.4	5.9	7.1	7.4	9.0	12.2	13.2	15.2	16.4	16.1	13.2	10.2	7.6	6.8	5.7	4.2	3.9	4.3	8.4	16.4																						
22-Oct	4.1	3.4	2.8	2.5	1.8	1.5	0.8	0.9	2.5	5.0	7.1	9.4	12.9	16.3	15.9	13.0	11.9	13.0	13.0	10.8	9.7	7.8	8.2	8.2	7.6	16.3																						
23-Oct	7.9	8.8	7.4	6.2	4.7	3.6	3.0	2.8	3.2	4.3	5.4	6.4	9.3	8.9	7.9	7.5	7.1	6.8	6.6	6.4	6.2	6.1	6.1	5.7	6.2	9.3																						
24-Oct	5.0	4.1	3.3	2.4	1.8	1.1	1.4	1.1	1.0	0.4	0.3	0.5	0.8	1.6	2.4	3.1	3.4	2.7	2.5	2.5	2.7	2.7	2.8	2.7	2.2	5.0																						
25-Oct	2.7	2.7	2.7	2.7	1.7	0.9	0.4	-0.2	0.5	1.4	3.4	4.9	6.1	7.4	6.9	5.9	4.3	3.4	2.4	1.8	1.7	1.7	2.1	2.5	2.9	7.4																						
26-Oct	1.4	1.9	1.2	1.0	0.8	0.7	0.6	0.5	0.3	0.4	0.7	1.0	1.0	1.1	1.4	1.4	1.4	1.3	1.3	1.2	1.0	0.9	0.5	0.4	1.0	1.9																						
27-Oct	0.4	0.3	0.2	0.2	0.2	0.0	-0.1	-0.1	0.0	0.1	0.2	0.4	0.4	0.7	1.1	1.0	0.9	0.8	0.7	0.6	0.6	0.6	0.4	0.4	0.4	1.1																						
28-Oct	0.4	0.6	0.7	0.6	0.5	0.6	0.7	0.7	0.7	0.8	1.0	1.3	1.5	2.0	2.2	1.7	1.3	1.1	1.3	1.4	1.1	1.0	1.0	0.9	1.1	2.2																						
29-Oct	0.9	0.6	0.6	0.5	0.4	0.3	0.2	0.2	0.4	0.7	1.3	1.6	1.5	1.6	1.6	1.6	1.4	1.4	1.2	1.1	0.9	0.7	0.9	0.7	0.9	1.6																						
30-Oct	0.4	0.0	0.2	0.4	0.5	0.5	0.5	0.6	0.8	1.2	1.7	1.9	2.3	2.8	2.6	2.6	2.5	2.6	2.7	2.8	2.8	2.7	2.5	2.4	1.7	2.8																						
31-Oct	2.3	2.1	2.0	2.0	2.0	2.2	2.3	2.5	2.8	3.4	3.9	4.6	4.7	4.8	4.8	4.8	4.3	4.2	4.1	4.0	3.5	3.5	3.4	3.2	3.4	4.8																						
																								4.5	4.3	4.1	3.8	3.4	3.0	2.8	2.8	3.6	4.6	5.8	6.9	8.1	9.1	9.4	9.1	8.3	7.5	6.8	6.2	5.6	5.1	4.9	4.7	Diurnal Average
																								10.6	10.1	9.7	9.5	9.3	8.9	12.6	12.4	12.0	13.4	14.8	16.2	17.1	18.1	20.0	20.6	20.1	18.7	16.6	13.8	13.6	12.4	11.9	11.5	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Lower Camp - October 2014**





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

**Ambient Temperature (AT) - C**  
**Lower Camp - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	27	3.63	3.63
0 - 10	598	80.38	84.01
10 - 20	117	15.73	99.73
> 20	2	0.27	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 28 km/h on Oct 17 23:00	Maximum Daily Speed Average: 22.1 km/h on Oct 17	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 13 02:00	Minimum Daily Speed Average: 1.1 km/h on Oct 4	Hours of Data: 744
Maximum Diurnal Speed Average: 2.9 km/h at hour 24	Minimum Diurnal Speed Average: 0.2 km/h at hour 19	Hours of Missing Data: 0
Monthly Average Velocity: 1.3 km/h 148.3 deg	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> = 20 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-Oct	N5	N5	N4	NW3	NW4	NNE5	NE2	NE4	ENE4	ENE9	NE7	NE7	NNW5	N8	N12	N17	N16	N19	N18	N17	NNW20	NNW16	NW15	NW13	N8.5	NNW20
2-Oct	NW10	NNW8	NW16	NNW16	NW14	NW11	NW19	NNW20	NNW19	NNW21	NW22	NW23	NW22	NW22	NW20	NNW23	NNW23	NNW24	NNW22	NNW20	NNW10	NNW9	NW7	NNW9	NW16.7	NNW24
3-Oct	NNW9	NNW9	NNW8	NNW7	NNE2	NNW3	ENE2	SW4	SSE4	SE9	SE9	SE11	SE12	SE12	SE11	SE10	SE13	SE12	SSE12	SSE13	S9	SE12	ESE15	SE20	SE6.0	SE20
4-Oct	SE19	SE20	SE19	SE6	SSE2	W4	WSW4	WSW2	SE2	W3	W4	E2	NNW3	W4	N4	NNW6	N9	N4	NW5	NW5	NW0	N1	NW0	ESE2	ESE1.1	SE20
5-Oct	NNW3	SE3	SSE3	SSW10	SSW6	SSE7	SSE6	S6	SW9	SSE4	SE8	SE10	E5	NE3	NNW13	NNE18	NNE13	N13	N11	NNE14	N11	NNE9	NNE6	NE6	NE2.6	NNE18
6-Oct	ENE5	NE6	NE4	E5	E5	ENE8	ENE6	ENE5	E3	ENE5	NNE2	NW6	NW10	NNW11	N11	N11	NNW8	NW6	NNW17	NNW23	W19	W20	W17	WSW14	NW4.8	NNW23
7-Oct	W13	W19	W19	NW18	NNW18	NW9	NW10	NNW8	N8	NNW8	NNW7	NNE7	N10	NNW9	NNE15	NNE14	NNE15	NE7	N2	NE1	ENE1	NNE1	NNW1	NW1	NNW6.7	W19
8-Oct	NNW2	W2	NNW2	W3	W5	NW1	NW1	NW2	NE1	SW1	NNW3	NNW5	ENE2	E9	ESE7	SE5	ESE5	NNW2	ESE5	SE9	SE8	ESE10	ESE12	ESE12	ESE2.4	ESE12
9-Oct	SE11	ESE11	SE10	ENE2	NNW2	N1	NNW3	NNW2	ESE11	ESE12	SE11	SE10	SE10	SE10	SE10	SE8	SE7	ESE7	ESE5	ESE11	ESE16	ESE19	SE19	ESE17	ESE8.6	SE19
10-Oct	ESE12	SE13	ESE13	SE15	SE12	SE11	SE12	ESE7	SE10	SE8	SE10	SE12	SE13	SE12	SE11	SE10	SE7	S7	SSE8	SE10	SE13	SE12	SE4	SE11	SE10.4	SE15
11-Oct	SE7	SE11	SE11	SE12	SE11	SE7	W14	W18	W14	W18	W21	W18	W19	W18	W17	W21	W21	WSW15	WSW14	W9	W9	W16	W20	WSW21	WSW11.2	W21
12-Oct	WSW23	WSW21	W18	W11	W12	W8	W4	NNE1	WSW6	WSW10	W8	W10	W12	WSW11	W12	W10	WSW12	W18	W16	W15	WSW13	WSW13	W11	NNW4	W11.4	WSW23
13-Oct	S1	NW0	WSW5	ESE1	E1	E1	E3	ESE5	SE6	SE6	ESE5	SE6	SE6	SE10	SE8	SSE7	SE6	N2	W3	NNW4	W4	W4	NW4	SE2.4	SE10	
14-Oct	W4	NNW4	NW5	NW6	NW6	NW7	NNW8	NW7	NW6	NNW6	NW5	N6	N7	NNW7	NNW7	NW5	N7	NW4	W2	ESE1	W16	WSW15	WSW17	NNW11	NNW5.9	WSW17
15-Oct	W13	W19	NNW15	NNW11	SW12	SW13	WSW14	WSW15	W17	W14	NNW12	NNW9	W7	NW8	NW13	NW12	NNW12	NNW8	NW8	NNW3	NE1	NNW1	W4	NNW9.2	W19	
16-Oct	NW1	NE1	NNW3	NNW4	SSW1	ENE2	E1	ENE2	ENE4	E5	ESE5	NNE3	ESE5	SE6	SE8	SE5	NNE3	NE5	ESE14	SE17	ESE24	ESE27	ESE27	ESE23	ESE6.8	ESE27
17-Oct	ESE17	SE20	SE20	SE18	SE19	SE20	ESE21	ESE17	ESE15	ESE22	SE24	SE25	SE20	SE24	SE27	SE26	SE26	SE23	SE23	SE22	SE23	SE25	SE28	SE27	SE22.1	SE28
18-Oct	SE25	SE24	SE24	SE20	SE16	SE11	SE10	SE6	SE9	SE9	SE5	SE5	SE8	SE10	SE8	SSE4	SW2	N0	WSW7	WSW9	W5	NNW5	N1	NNW2	SE7.3	SE25
19-Oct	ESE3	NE2	NNW4	NNW3	NNW1	E1	ENE1	NW2	NNW3	NNW4	NNW6	N5	ESE3	SE10	SE18	ESE14	NNW2	SE14	SE16	SE21	SE19	ESE19	ESE21	ESE20	ESE6.5	SE21
20-Oct	ESE17	ESE20	ESE15	SE14	ESE9	ESE12	ESE8	SE5	SE14	SE10	SE11	SE11	SE13	SE11	SSE9	SE9	SE10	SE6	ENE0	W1	NNW0	E1	SE3	SE7	SE8.8	ESE20
21-Oct	SE8	SE9	SE8	SE10	SE9	SE11	SE9	ESE5	SE9	SE9	SSE4	WSW12	WSW10	WSW10	WSW10	WSW8	WSW0	N1	ENE3	SE5	ESE5	ENE2	ESE4	ESE3	SSE4.0	WSW12
22-Oct	SE9	ESE5	SE7	ESE4	SE5	SE5	ESE5	ESE5	ESE8	SE9	SE6	SE5	SE8	SE8	SE16	SE16	SE13	SE15	SE19	SE15	SE16	SE15	SE11	SE13	SE9.8	SE19
23-Oct	SE12	ESE9	ESE5	NNW4	SW0	NNW4	NNW4	NNW5	NNW4	W4	NW6	NNW6	ESE12	ESE16	ENE9	ENE8	NNE3	NNW4	NW5	NW5	NNW7	NNW10	NNW14	NNW16	NNW1.6	ESE16
24-Oct	NNW20	NNW26	NNW25	NNW20	NNW17	W18	W22	W20	W19	NNW16	W17	W20	W23	W22	W23	W19	W23	NNW20	NNW16	W19	W20	W20	W19	W17	W19.7	NNW26
25-Oct	W16	W18	W16	NNW16	W11	W7	SW12	SSW5	SW10	SW9	SSW4	SE4	SE7	SE7	SSE6	S4	ESE2	N1	NNW3	NW2	ENE4	ENE5	E3	N4	WSW3.7	W18
26-Oct	NNW5	N7	NNW5	NNW7	NNW12	N9	NNW9	N11	N8	NNW10	N12	N14	N15	N14	N15	N16	N13	N13	N13	N16	N16	N14	NNW9	NNW9	N11.1	N16
27-Oct	N11	NNW9	NNW8	NNW9	NNW8	NNW8	NNW7	NNW7	NNW7	N10	NNE10	N10	N10	N9	N9	NW8	NW7	NNW6	NW4	NNW3	NNW4	NNW3	NE4	N2	NNW6.6	N11
28-Oct	NNW4	NW2	SE2	SW4	S3	E5	SSE6	SSE8	S10	S11	SSE8	SSE7	SSE6	SSE6	ESE8	E8	ESE9	ESE5	ESE9	ESE10	E5	ESE7	NE3	E5	SE4.8	S11
29-Oct	E7	E4	ENE3	N5	NNW5	NNW5	NW5	NW3	NNW5	NNW5	NNE6	NE11	NE4	NNE9	NNW4	NE8	E5	NNE3	E5	ESE9	E11	E12	ESE14	SE17	ENE4.2	SE17
30-Oct	SE18	SE14	SE16	SE18	SE17	SE18	SE15	SSE14	SE18	SE22	SE17	SE19	SE15	SE17	SSE15	SSE12	SE16	SE18	SE18	SE20	SE21	SE19	SE21	SE17	SE17.3	SE22
31-Oct	SE16	SE20	SE24	SE24	SE21	SE22	SE20	SE18	SE15	SE17	SE15	SE13	SSE9	SSE10	SSE9	SSE9	SSE8	SSE10	SSE8	SE8	SE7	SE7	SE5	SE4	SE13.2	SE24

SSE2.4 SSE2.2 SSE1.8 SSE0.7 S1.3 SE1.6 SSW1.5 SW1.1 S1.9 SSE1.9 SE1.0 ESE0.9 SSE1.2 SE1.6 ESE1.4 ENE1.0 NE0.7 N0.5 SSW0.2 SSE1.3 SE1.7 SE2.3 SSE2.5 SE2.9	Diurnal Average
SE25 NNW26 NNW25 SE24 SE21 SE22 W22 W20 W19 SE22 SE24 SE25 W23 SE24 SE27 SE26 SE26 NNW24 SE23 NNW23 ESE24 ESE27 SE28 SE27	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 - October 2014**

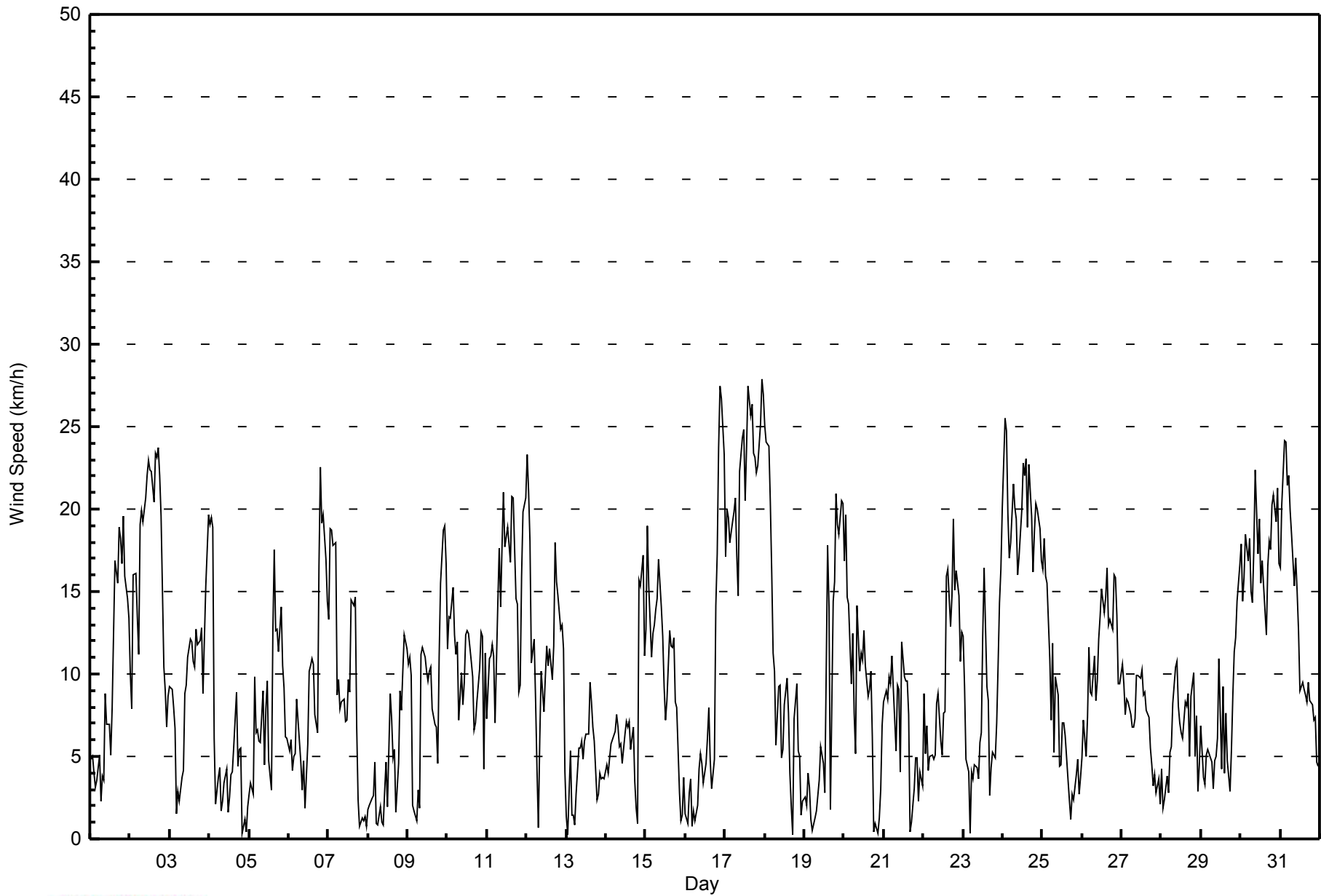
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Oct 20 07:00 Minimum Value: 1 km/h on Oct 4 19:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 6																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	1	2	1	1	2	2	2	1	1	2	4	2	2	2	3	4	4	5	5	5	5	3	3	3	5
2-Oct	2	2	5	4	4	4	4	4	4	4	5	5	4	5	4	5	4	5	4	4	3	2	1	2	5
3-Oct	2	2	2	2	1	1	1	2	1	2	2	2	3	3	3	3	4	4	4	4	3	4	4	5	5
4-Oct	5	5	5	3	2	2	1	2	1	1	1	1	1	2	2	2	2	1	1	1	2	1	1	1	5
5-Oct	1	1	1	3	2	2	2	2	3	2	2	1	2	2	4	4	3	4	3	3	3	2	2	2	4
6-Oct	2	2	2	1	2	2	2	2	1	1	2	3	2	2	2	3	2	4	4	4	4	4	4	4	4
7-Oct	2	4	4	5	5	4	3	3	2	3	2	2	3	3	4	3	3	3	2	1	1	1	1	1	5
8-Oct	1	1	1	2	1	1	1	1	2	1	1	1	2	2	3	1	1	1	4	4	3	3	3	3	4
9-Oct	2	3	3	2	1	1	2	2	3	3	3	2	3	2	2	2	2	2	2	3	3	3	5	4	5
10-Oct	3	3	3	4	4	3	4	3	3	2	2	3	3	3	3	2	2	2	3	2	3	3	2	3	4
11-Oct	3	2	3	4	2	2	4	4	4	4	4	4	4	4	5	4	4	3	2	4	3	3	4	3	5
12-Oct	4	5	4	3	4	2	2	2	4	2	2	2	2	3	3	3	3	4	3	4	3	3	4	2	5
13-Oct	1	1	6	2	1	1	1	2	1	2	1	1	1	1	2	2	2	1	1	2	1	1	1	1	6
14-Oct	1	1	1	2	1	2	2	2	2	2	2	2	2	2	3	1	1	1	2	1	4	3	4	2	4
15-Oct	4	4	4	3	3	3	2	3	4	4	3	2	3	5	3	3	2	3	2	2	2	1	1	1	5
16-Oct	2	2	1	2	1	2	2	2	1	1	1	2	3	3	2	3	2	2	4	4	4	5	5	5	5
17-Oct	4	5	4	4	4	4	3	5	5	3	5	5	5	6	5	5	6	5	5	5	5	5	5	5	6
18-Oct	5	4	4	4	5	3	3	2	2	2	3	2	1	2	2	2	2	1	3	3	3	2	2	2	5
19-Oct	1	1	2	2	1	1	2	1	1	1	1	1	2	2	2	3	3	4	4	4	4	4	3	3	4
20-Oct	2	2	3	4	3	4	7	5	6	3	3	3	2	2	3	2	3	1	2	2	1	1	2	3	7
21-Oct	2	3	2	2	2	2	3	3	3	2	3	3	3	2	2	2	1	1	1	2	2	1	2	2	3
22-Oct	2	2	3	3	2	2	2	2	2	2	2	1	1	1	3	2	2	3	4	4	3	3	2	3	4
23-Oct	3	2	4	1	1	1	1	2	2	2	1	2	4	5	2	2	2	1	1	1	2	2	3	3	5
24-Oct	4	5	5	4	4	5	4	3	4	3	4	4	5	4	5	4	6	4	4	3	4	4	4	3	6
25-Oct	3	3	4	4	2	3	2	3	2	3	2	1	2	2	2	2	1	1	1	1	2	2	2	1	4
26-Oct	1	3	3	2	3	2	3	3	2	2	2	2	2	3	3	3	3	2	3	2	3	3	2	2	3
27-Oct	2	2	2	2	2	2	1	2	1	2	3	2	2	2	2	1	1	1	1	1	1	1	1	1	3
28-Oct	1	1	1	1	1	2	3	3	3	3	3	2	2	2	3	2	4	3	3	4	2	3	1	2	4
29-Oct	2	1	1	1	1	1	1	2	1	1	2	3	3	2	2	2	1	2	2	3	2	2	3	4	4
30-Oct	4	4	4	5	5	5	5	4	5	5	5	5	4	5	5	4	5	4	4	5	5	5	6	5	6
31-Oct	5	5	5	5	5	5	5	4	3	4	4	3	3	3	2	2	2	2	2	3	3	2	2	1	5
Diurnal Maximum																									





**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Lower Camp - October 2014**





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

**Wind Speed (WS) - km/h**  
**Lower Camp - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	226	30.38	30.38
6 - 11	249	33.47	63.84
12 - 19	190	25.54	89.38
20 - 28	79	10.62	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Lower Camp - October 2014**

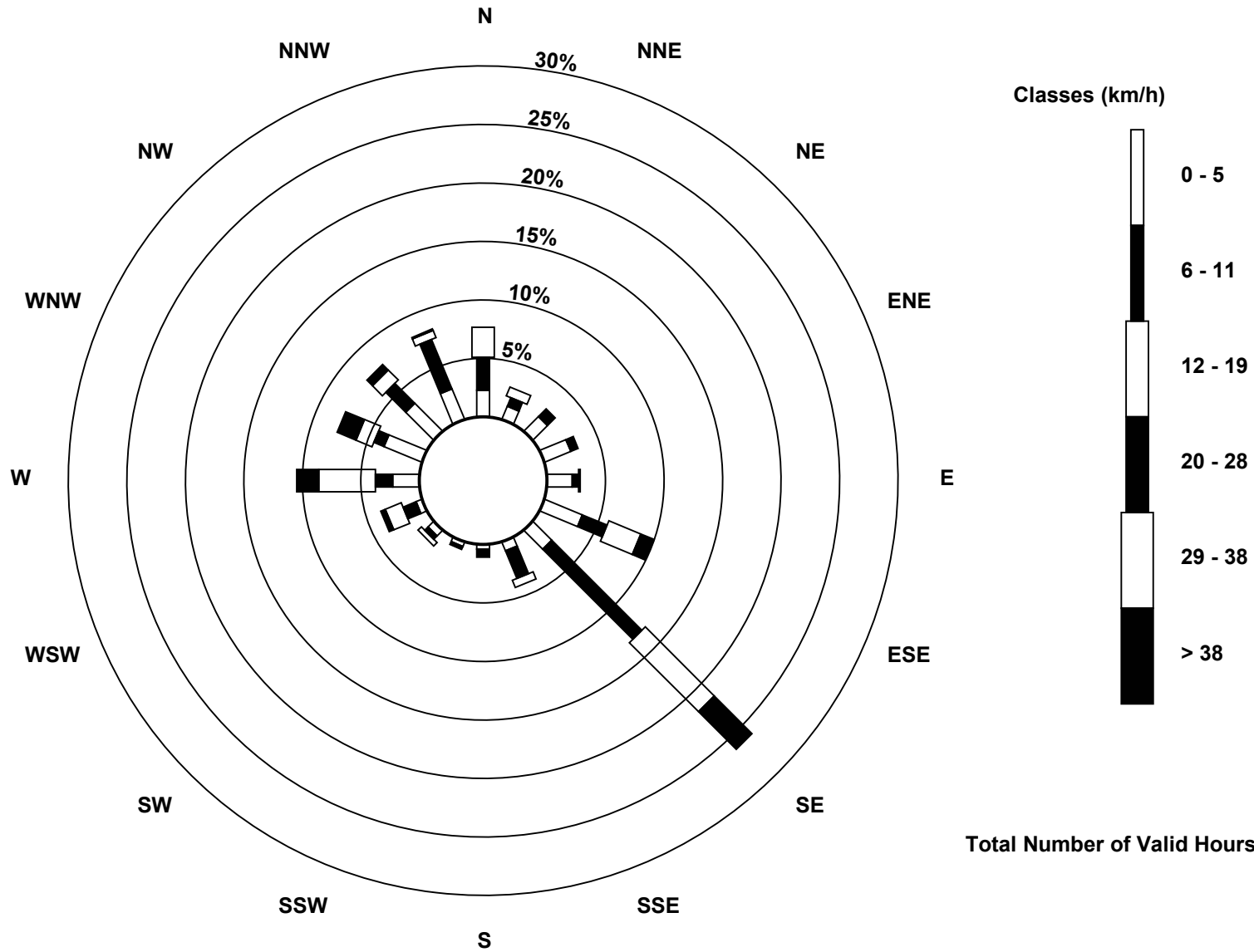
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	17	9	13	18	16	26	17	6	3	3	5	4	17	26	25	21	226
6 - 11	21	6	7	5	4	17	81	19	5	2	3	9	11	7	18	34	249
12 - 19	19	6	0	0	1	22	62	5	0	0	3	11	36	11	9	5	190
20 - 28	0	0	0	0	0	9	34	0	0	0	0	3	14	13	5	1	79
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	21	20	23	21	74	194	30	8	5	11	27	78	57	57	61	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Wind Speed (WS) - km/h  
Lower Camp (AMS 11)**



**Total Number of Valid Hours: 744**



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

**Wind Direction (WD) - deg**  
**Lower Camp - October 2014**

Direction of Maximum Speed: 134 deg on Oct 17 23:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 129.0 deg on Oct 17	Hours of Data: 744
Direction of Minimum Speed: 310 deg on Oct 13 02:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.1 deg on Oct 4	Percent Operational Time: 100.0
Monthly Average Direction: 303.9 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-Oct	349	356	353	304	322	24	44	54	71	74	47	39	337	9	359	360	4	359	359	353	344	328	319	313	356.1
2-Oct	313	333	307	331	320	320	306	300	296	299	312	308	304	311	305	302	303	295	294	300	330	336	314	344	308.0
3-Oct	341	337	338	333	15	331	62	229	165	130	129	125	126	134	141	139	133	135	150	164	171	135	119	136	133.2
4-Oct	129	127	125	146	160	269	237	241	130	259	259	84	302	265	350	345	359	359	324	314	318	349	318	105	122.3
5-Oct	339	130	148	206	199	154	158	185	227	163	130	138	101	35	347	19	21	6	356	15	2	19	24	56	36.1
6-Oct	74	48	51	101	101	77	73	65	84	60	21	319	316	337	360	356	336	326	297	283	281	271	267	258	316.2
7-Oct	267	274	275	308	301	320	309	329	353	345	348	17	359	336	16	25	33	42	6	47	62	26	289	309	329.9
8-Oct	288	278	291	273	273	316	325	318	34	232	343	331	77	101	108	133	103	293	106	140	133	121	122	123	117.7
9-Oct	129	121	129	70	338	352	296	336	118	123	132	134	132	127	133	141	140	116	115	122	120	110	127	119	123.6
10-Oct	123	127	123	129	131	129	126	123	128	133	131	134	136	143	145	141	146	172	156	145	146	140	144	138	135.8
11-Oct	138	137	135	139	138	140	262	264	260	261	266	269	271	271	265	262	259	256	246	265	271	266	264	256	252.6
12-Oct	254	256	264	275	269	274	280	19	250	256	265	265	266	255	265	266	252	269	278	280	258	250	265	286	264.2
13-Oct	178	310	243	113	85	94	101	123	134	132	116	126	131	126	130	138	149	138	10	274	285	280	278	319	139.2
14-Oct	275	298	312	310	304	305	302	312	312	303	312	351	349	344	348	326	349	311	262	109	265	258	257	297	300.3
15-Oct	278	265	298	298	235	235	244	251	264	279	282	297	259	311	323	321	322	329	301	308	301	47	304	278	283.0
16-Oct	311	41	303	300	195	75	82	66	76	97	105	22	115	135	133	144	14	50	107	127	121	122	123	123	115.2
17-Oct	123	126	128	128	129	129	120	120	117	117	132	129	133	133	130	131	129	132	133	133	130	132	134	133	129.0
18-Oct	130	130	129	126	125	127	141	137	138	134	140	128	136	134	140	154	233	11	254	256	263	289	352	294	138.8
19-Oct	114	46	327	328	338	94	58	323	298	327	347	354	119	127	124	117	346	129	125	131	126	121	113	120	116.4
20-Oct	114	117	121	125	123	120	120	124	132	135	128	133	132	134	166	137	137	132	68	280	346	96	137	141	128.2
21-Oct	133	132	139	141	135	140	137	119	141	139	163	251	246	251	255	249	255	356	59	133	120	75	106	116	158.2
22-Oct	138	121	134	123	127	139	116	117	120	133	139	131	135	137	128	125	131	136	136	128	125	124	133	134	130.1
23-Oct	126	122	120	294	220	294	283	287	290	277	310	348	108	115	69	62	22	292	319	320	311	302	301	298	337.4
24-Oct	291	287	288	291	283	267	269	274	279	282	276	277	267	270	264	262	266	287	292	266	264	266	268	277	275.5
25-Oct	268	267	274	299	272	267	233	205	228	216	199	141	131	145	153	184	115	355	330	325	73	69	84	3	247.4
26-Oct	302	349	337	347	347	354	347	357	353	348	5	10	3	8	359	360	357	0	356	357	357	356	343	345	355.3
27-Oct	360	347	336	345	343	338	333	338	344	3	20	11	354	351	7	324	320	327	312	300	300	345	56	349	347.1
28-Oct	295	312	144	221	189	86	163	166	170	169	161	168	157	147	112	86	117	113	116	115	101	112	55	82	135.7
29-Oct	89	81	76	354	329	330	323	322	336	347	16	56	52	21	332	43	80	12	96	110	95	97	114	129	63.3
30-Oct	126	130	131	132	131	130	143	149	131	127	132	127	137	139	147	159	133	133	136	132	131	134	130	140	134.4
31-Oct	135	129	128	131	129	129	131	130	132	133	138	146	158	156	155	152	156	155	162	144	130	137	128	133	136.9

149.5 149.7 161.4 159.5 175.9 138.5 200.3 218.8 178.5 155.0 143.5 107.5 157.0 134.9 109.4 69.2 42.8 4.1 195.8 159.3 140.4 136.6 148.8 142.4  
 Diurnal Average

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



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

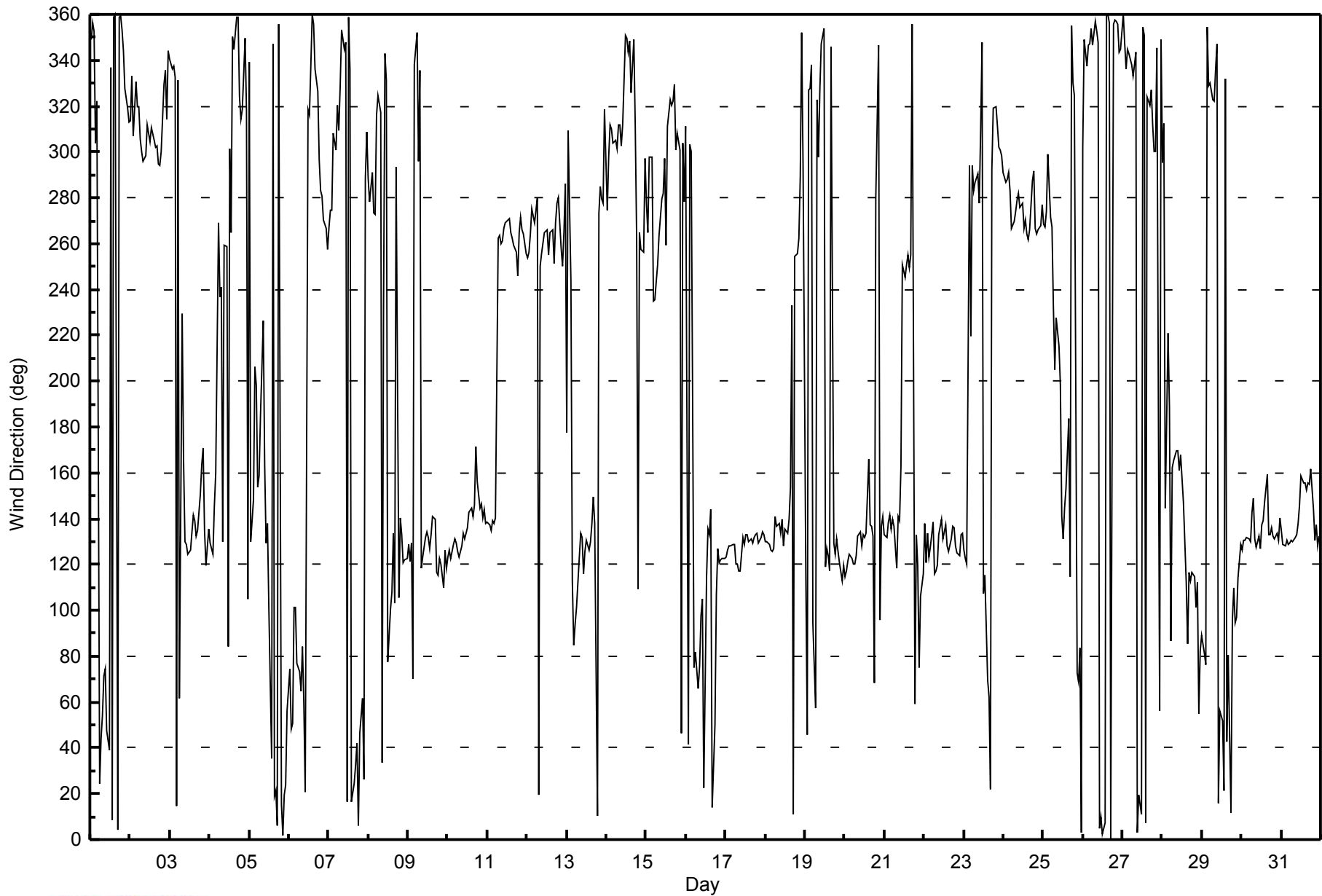
**Wind Direction (WD) - deg**  
**Lower Camp - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on Oct 13 02:00		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 6 deg on Oct 20 02:00																									
Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 11 Q <sub>1</sub> = 14 Median = 19 Q <sub>3</sub> = 30 P <sub>90</sub> = 59 P <sub>99</sub> = 92																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	28	28	41	43	40	47	64	16	36	20	24	25	32	21	18	19	19	19	18	18	21	14	14	12	64
2-Oct	14	16	15	27	20	19	14	12	12	13	12	14	12	12	13	12	13	11	11	13	16	14	20	17	27
3-Oct	21	16	14	23	74	55	50	58	40	20	17	17	17	21	26	25	24	25	25	25	26	18	15	74	
4-Oct	16	14	14	40	81	32	33	79	53	34	30	79	61	39	38	23	15	31	16	15	83	73	92	60	92
5-Oct	60	52	62	21	30	20	20	28	22	50	19	12	30	53	19	16	17	17	20	20	21	22	28	23	62
6-Oct	22	28	34	16	21	18	23	27	34	32	69	23	17	19	18	21	18	28	12	11	11	12	12	14	69
7-Oct	17	12	13	20	23	34	31	27	25	26	25	18	20	31	21	20	15	22	64	90	67	59	78	69	90
8-Oct	52	32	43	32	16	77	68	55	75	85	51	26	77	17	23	18	38	42	48	29	24	20	17	17	85
9-Oct	18	20	23	67	68	90	61	70	18	18	19	19	18	14	13	17	22	23	27	15	16	9	13	10	90
10-Oct	17	13	12	15	25	24	27	56	23	24	17	16	18	20	20	11	14	14	21	11	13	12	45	10	56
11-Oct	52	12	13	22	11	35	16	12	12	12	12	12	13	13	15	12	11	12	11	19	16	12	12	11	52
12-Oct	10	12	12	17	21	21	31	87	63	15	19	21	16	20	18	20	15	11	12	11	12	10	19	41	87
13-Oct	66	104	76	69	71	86	50	18	19	20	25	19	17	13	10	13	24	23	35	36	28	27	15	24	104
14-Oct	18	31	30	31	26	25	22	25	26	27	28	24	23	23	20	29	15	34	66	57	13	13	12	20	66
15-Oct	18	11	19	22	15	13	11	11	12	22	23	16	36	36	16	17	13	13	19	17	65	43	47	15	65
16-Oct	53	99	43	42	55	73	90	77	30	22	38	41	36	48	18	41	70	36	15	13	11	10	11	11	99
17-Oct	15	13	14	15	13	13	9	12	15	10	12	11	16	14	11	12	11	14	15	15	12	12	12	12	16
18-Oct	11	10	10	9	14	19	24	42	13	15	42	24	8	8	12	54	68	92	30	13	46	51	75	73	92
19-Oct	69	76	45	55	75	101	64	55	25	30	20	24	54	9	9	14	80	13	10	12	10	10	8	8	101
20-Oct	8	6	9	17	27	24	74	78	28	21	15	14	10	8	32	17	20	19	93	63	81	77	42	14	93
21-Oct	22	16	18	12	13	10	15	47	15	9	62	18	16	16	15	30	88	89	37	22	29	52	31	25	89
22-Oct	15	41	22	46	40	21	25	24	19	14	18	10	7	19	10	7	11	13	13	14	10	8	16	16	46
23-Oct	20	23	81	38	95	25	27	28	27	50	25	25	45	18	14	12	59	24	20	20	12	11	10	10	95
24-Oct	11	11	11	11	17	11	10	10	10	12	11	12	11	12	11	12	11	23	20	10	11	10	10	11	23
25-Oct	12	10	13	13	12	32	12	48	16	18	64	39	29	31	29	37	39	80	50	56	65	49	65	68	80
26-Oct	23	29	39	20	18	17	21	16	18	18	13	10	13	12	15	13	17	12	15	14	14	16	18	19	39
27-Oct	14	18	17	19	18	17	15	17	17	16	16	16	17	18	18	14	15	16	17	36	20	40	32	52	52
28-Oct	26	66	51	22	44	28	46	25	22	22	21	23	25	24	26	27	37	47	24	19	25	23	48	39	66
29-Oct	17	38	45	20	14	16	21	56	21	24	28	17	74	24	46	12	35	59	24	16	12	12	14	16	74
30-Oct	14	19	17	16	19	18	23	22	18	13	17	15	20	20	22	26	17	13	16	15	16	18	15	20	26
31-Oct	20	14	11	11	13	12	13	13	15	13	15	21	22	20	20	18	17	17	19	23	30	23	38	19	38
Diurnal Maximum																									



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Lower Camp - October 2014**



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# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 8, 2014
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Install		
Start Time (MST)	9:20	End Time (MST)	12:50
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.	2634
DACS voltage range	0-5v	DACS channel #	SE1

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-626	-626
Analyzer Range (mv)	5000	5000	Lamp voltage	856	854
Calculated slope	0.997942	0.995721	Chamber temp.	43.5	43.3
Calculated intercept	1.401783	1.765339	Pressure (mmHg)	727.5	716.4
Analyzer Background	27.7	28.1	Flow (lpm)	0.465	0.469
Analyzer Coefficient	1.003	1.007	Intensity	35xxx	35xxx

Analyzer make TEI 43C Analyzer serial # 613516794

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.8	NA
as found span	5000	80.9	830.0	821.9	1.010
calibrator zero	5000	0.0	0.0	-0.8	NA
high point	5000	80.9	830.0	832.7	0.997
second point	5000	40.9	419.6	418.1	1.004
third point	5002	20.4	209.2	208.0	1.006
calibrator zero	5000	0.0	0.0	-0.8	NA
as left zero	5000	0.0	0.0	-0.3	NA
as left span	5000	80.9	830.0	834.0	0.995
Average Correction Factor					1.002

Corrected As found 822.7 Previous response 830.3 % change 0.9%

#### Notes:

Filter changed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

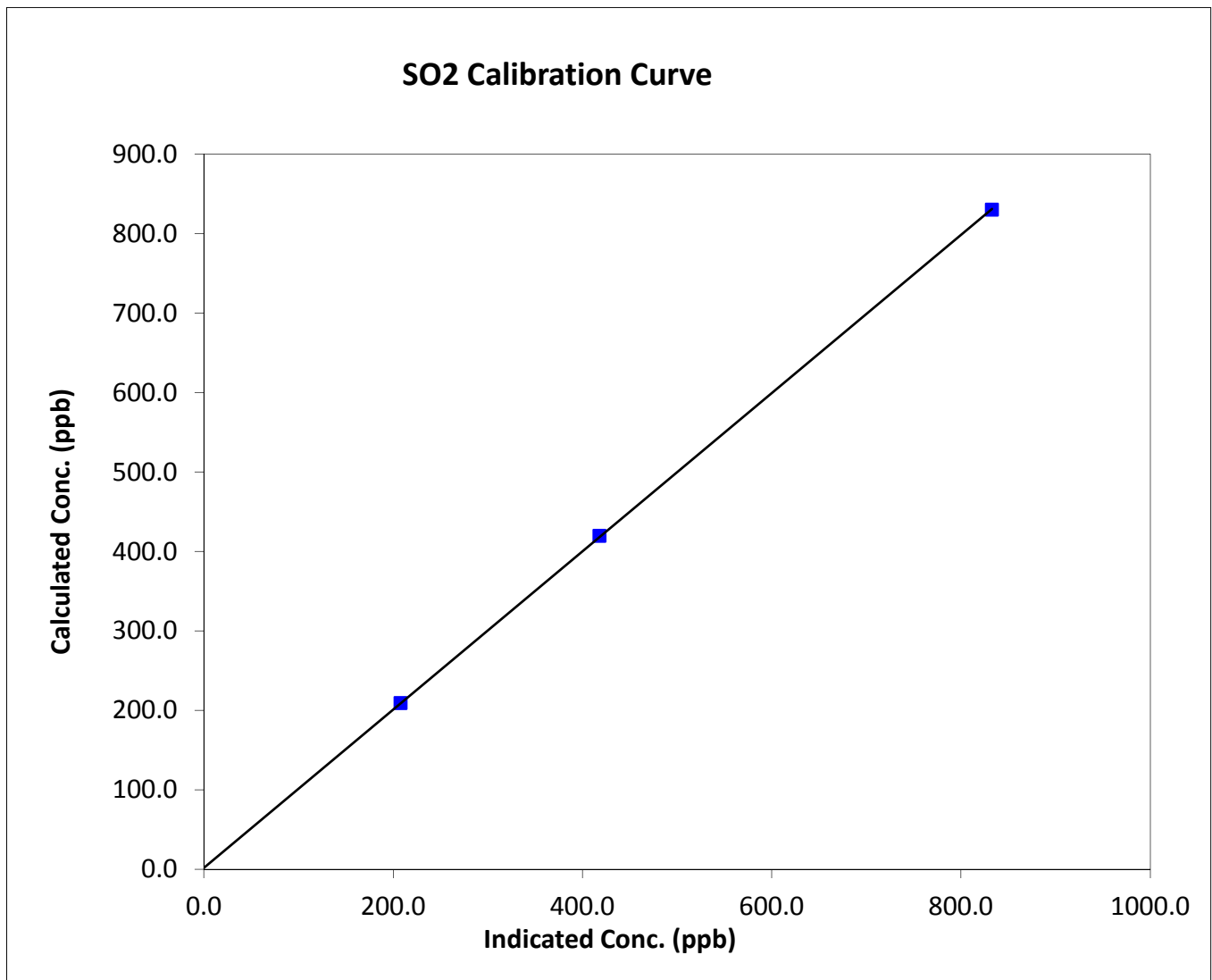
## SO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 8, 2014
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:20	End Time (MST)	12:50
Analyzer make	TEI 43C	Analyzer serial #	613516794

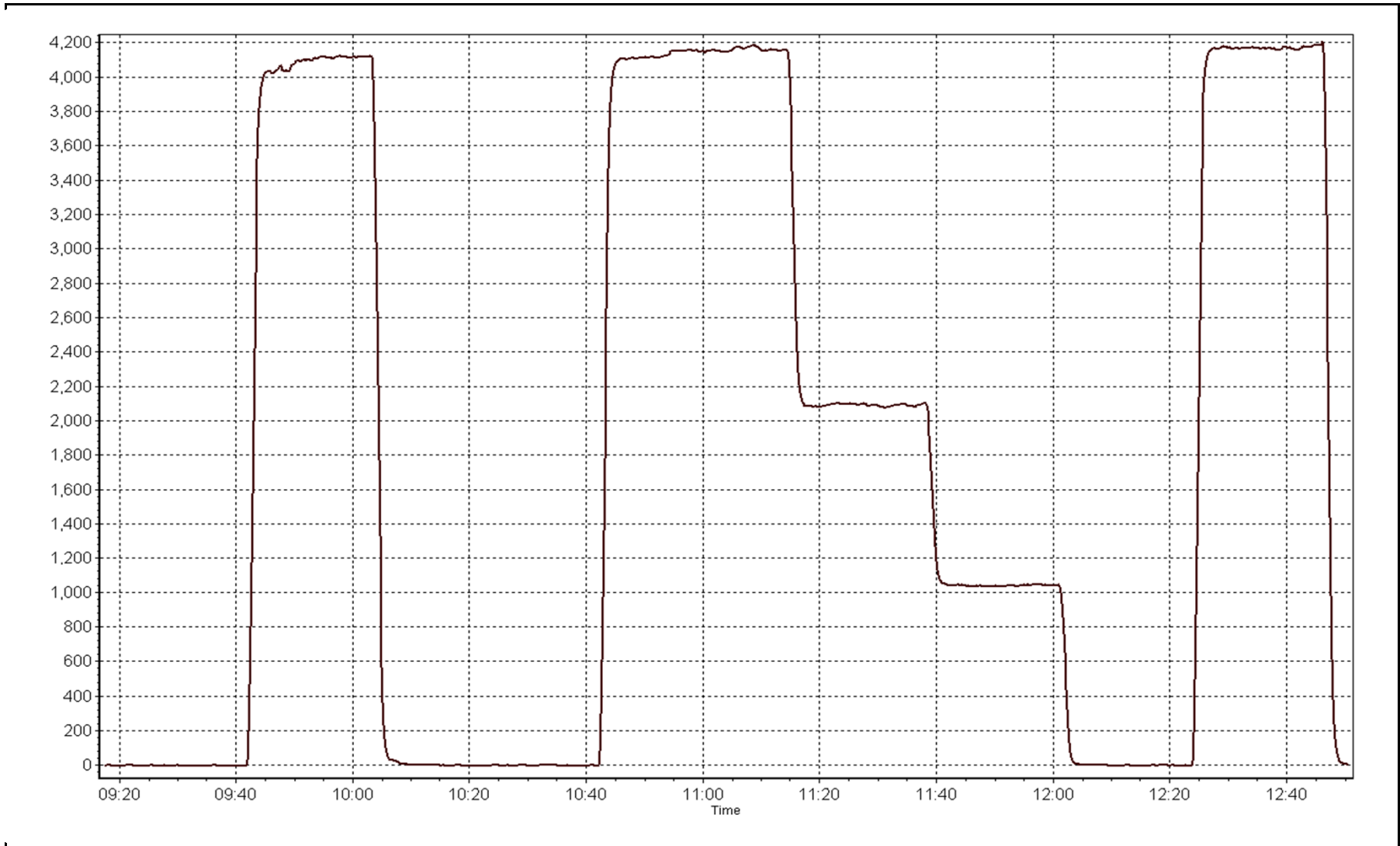
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.8	N/A	Correlation Coefficient	0.999989
830.0	832.7	0.9968		
419.6	418.1	1.0036	Slope	0.995721
209.2	208.0	1.0059		
			Intercept	1.765339



SO2 Calibration Plot

Date: October 14, 2014





# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	October 15, 2014	Previous Calibration	September 9, 2014
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	1:45
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)	-681	-680
Analyzer Range (mv)	5000	5000	Lamp voltage (v)	972	973
Calculated slope	0.995069	0.997283	Chamber temp. (deg C)	45	45
Calculated intercept	0.134607	0.287768	Pressure (mmHg)	540.7	503.6
Analyzer Background	1.71	1.85	Flow(LPM)	0.374	0.347
Analyzer Coefficient	0.884	0.924	Intensity(%)	91	91
			Converter temp.(deg C)	370	370

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	36.4	75.0	75.8	0.990
SO2 scrubber check	5000	20.5	210.3	1.6	NA
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5001	72.9	75.1	75.1	1.000
second point	5002	38.8	39.9	39.6	1.008
third point	5002	19.4	20.0	19.6	1.020
calibrator zero	5000	0.0	0.0	-0.1	NA
as left zero	5000	0.0	0.0	-0.2	NA
as left span	4999	72.9	75.1	75.3	0.997
Average Correction Factor					1.009

Corrected As found	75.9	Previous response	75.2	% change	-1.0%
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**Notes:**

Changed cylinder after as founds. Adjusted span. Scrubber check completed after third point.

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

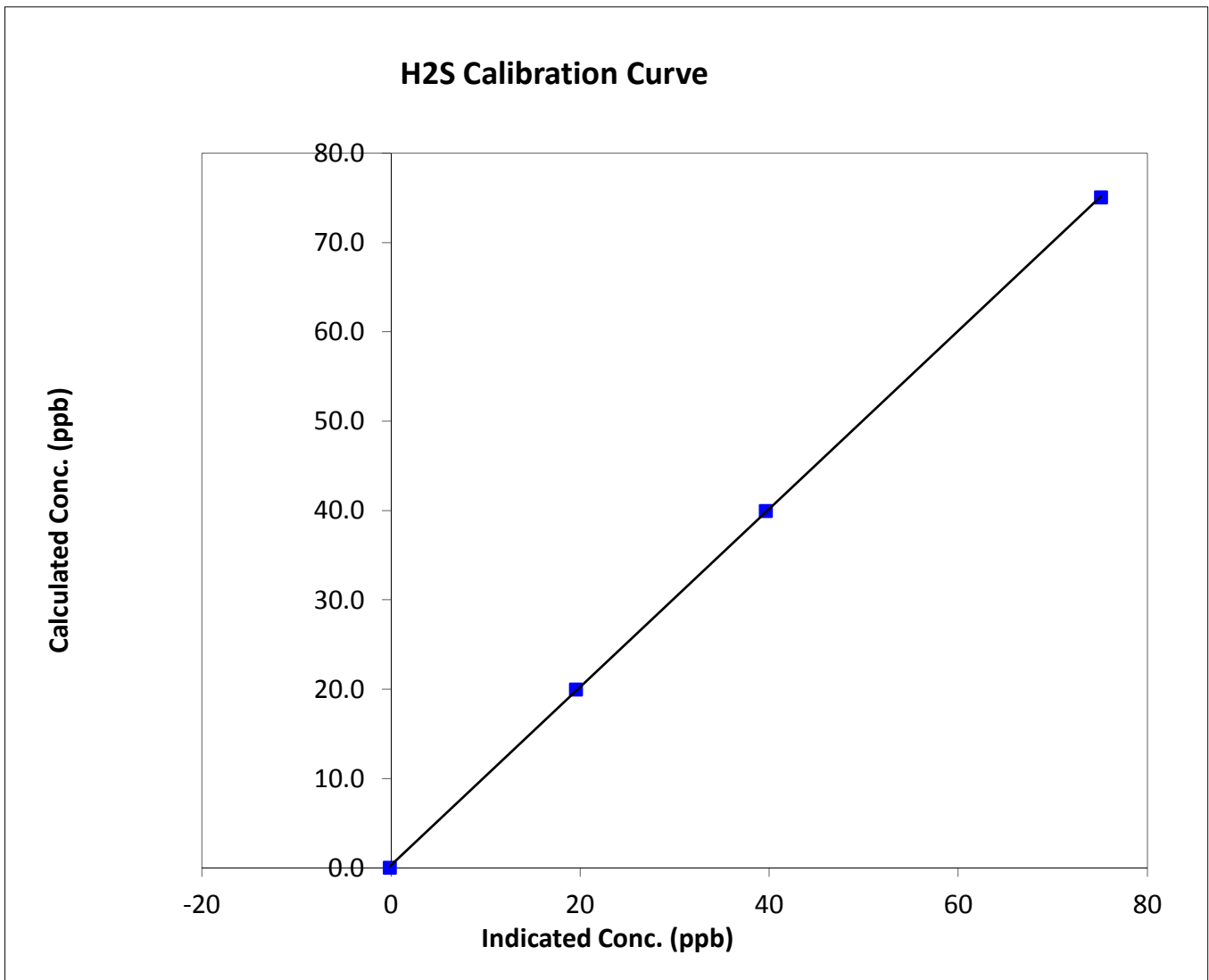
## H2S Calibration Summary

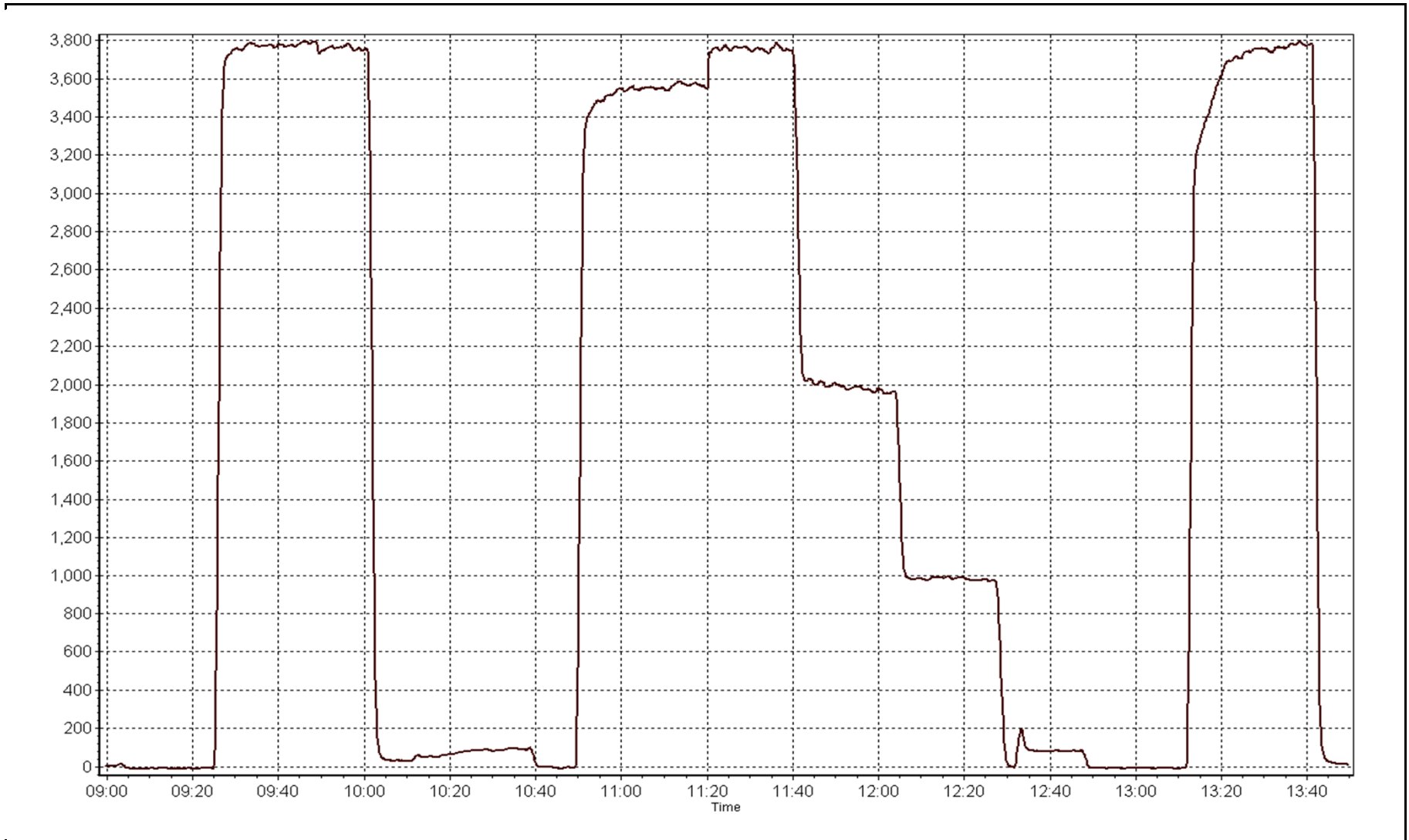
### Station Information

Calibration Date	October 15, 2014	Previous Calibration	September 9, 2014
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:00	End Time (MST)	1:45
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	-0.1	N/A	Correlation Coefficient	0.999973
75.1	75.1	0.9997		
39.9	39.6	1.0077	Slope	0.997283
20.0	19.6	1.0200		
			Intercept	0.287768







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Tuesday, October 14, 2014	Previous Calibration	Friday, September 19, 2014
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	12:50
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	8.2	8.2
Analyzer Range (mv)	5000	5000	Air or Bypass press	37.8	37.8
Calculated slope	1.002069	0.998216	Fuel Pressure	24.2	24.2
Calculated intercept	0.010743	0.030446			

Analyzer make	51i-LT	Analyzer serial #	1218153580
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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	-0.43	N/A
as found span	5001	80.9	17.37	16.92	1.027
calibrator zero	5000	0.0	0.00	-0.02	N/A
high point	5001	80.9	17.37	17.38	0.999
second point	5000	40.9	8.78	8.75	1.004
third point	5002	20.4	4.38	4.35	1.006
calibrator zero	5000	0.0	0.00	-0.02	N/A
as left zero	5000	0.0	0.00	-0.02	N/A
as left span	5000	80.9	17.37	17.76	0.978
Average Correction Factor					1.003

Corrected As found	17.35	Previous response	17.32	% change	-0.1%
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#### Notes:

Filter changed after as founds. Zero and span adjusted.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## THC Calibration Summary

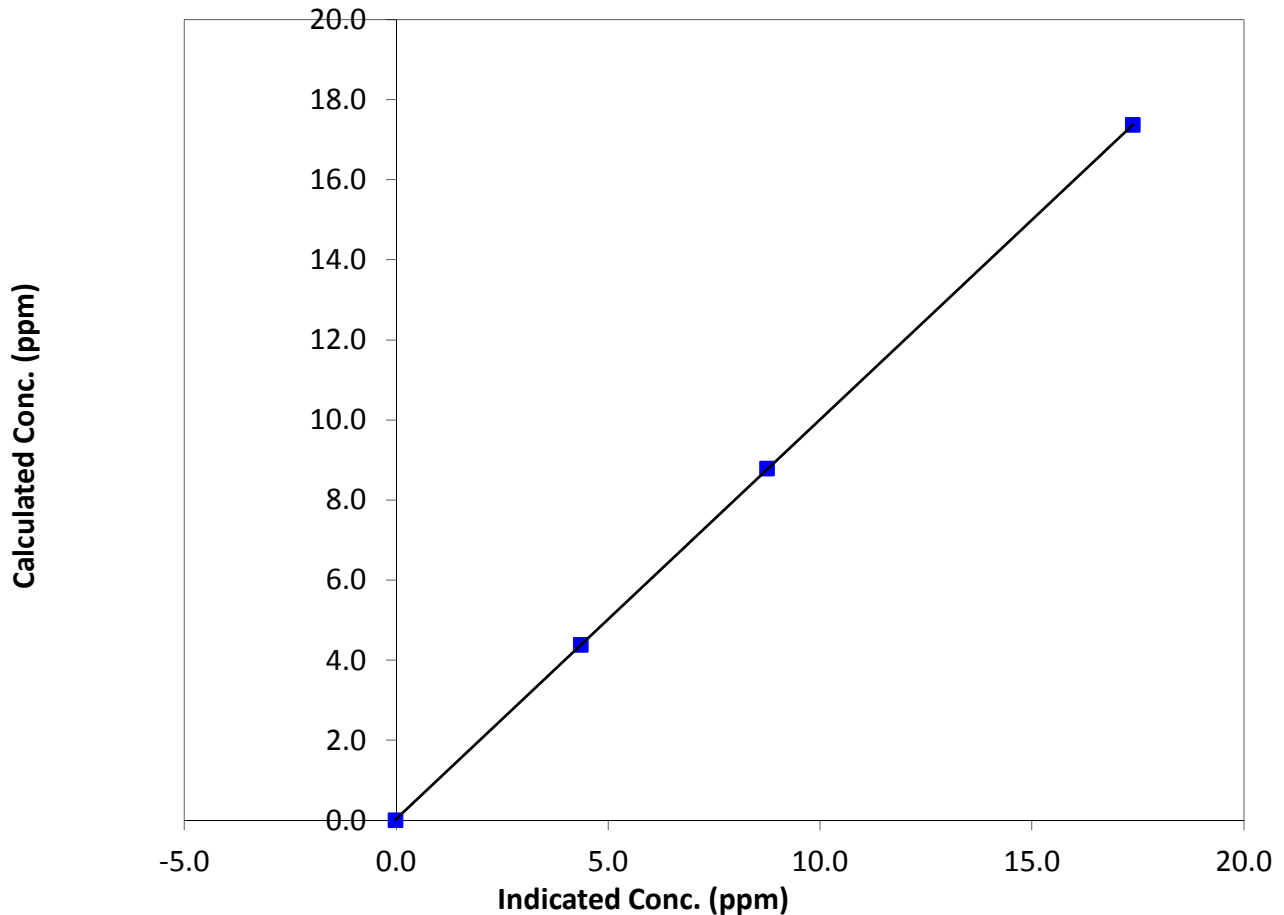
### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 19, 2014
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:20	End Time (MST)	12:50
Analyzer make	51i-LT	Analyzer serial #	1218153580

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.02	N/A	Correlation Coefficient	0.999996
17.37	17.38	0.9993		
8.78	8.75	1.0040	Slope	0.998216
4.38	4.35	1.0060		
			Intercept	0.030446

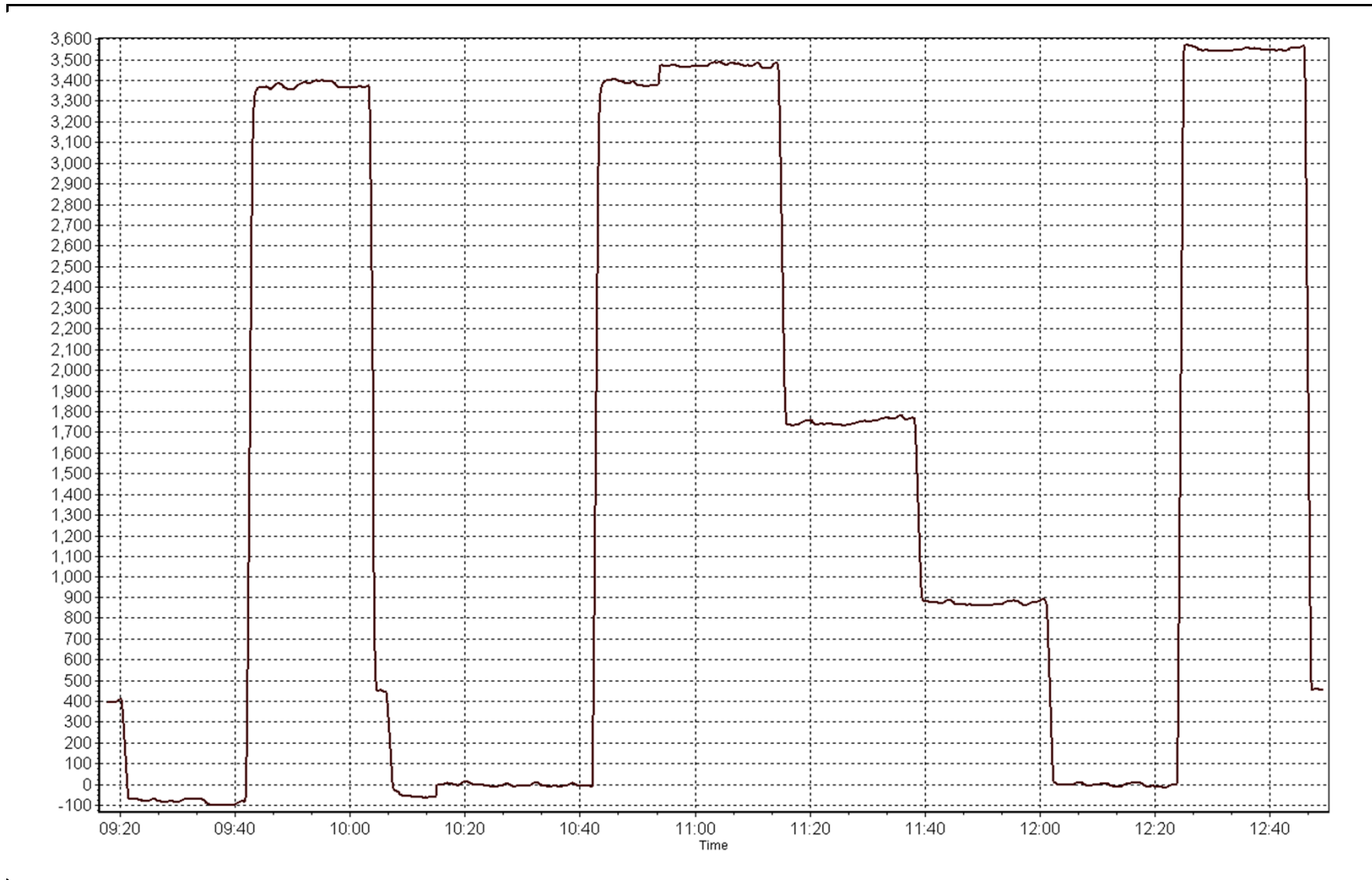
**THC Calibration Curve**





THC Calibration Plot

Date: October 14, 2014



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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 12  
MILLENNIUM MINE  
OCTOBER 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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)  
OCTOBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	707	37	37	100.00	23	0	5	0
TRS(ppb) Average	705	39	39	100.00	2	0	1	0
THC(ppm) Average	708	36	36	100.00	4.6	-	3	-
NO2(ppb) Average	707	37	37	100.00	30	0	18	-
NO(ppb) Average	707	37	37	100.00	134	-	34	-
NOX(ppb) Average	707	37	37	100.00	157	-	48	-
PM2.5(ug/m3) Average	741	0	3	99.60	28.9	-	7.9	0
Temperature 2 m (C) Average	744	0	0	100.00	20.3	-	12.8	-
Wind Speed 10 m (km/h) Average	740	0	4	99.46	23	-	-	-
Wind Direction 10 m (deg) Average	740	0	4	99.46	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	707	1	3	-	0	0	0	0	0	1	23
TRS(ppb) Average	705	0.4	0	-	0	0	0	0	1	1	2
THC(ppm) Average	708	2.32	0.3	-	2	2.1	2.1	2.2	2.4	2.6	4.6
NO2(ppb) Average	707	8.9	6	-	0	2	4	8	13	18	30
NO(ppb) Average	707	7.6	16	-	0	0	1	2	7	18	134
NOX(ppb) Average	707	16.5	20	-	1	2	5	11	19	33	157
PM2.5(ug/m3) Average	741	4.51	3	-	0.6	1.4	2.4	3.9	6	8.2	28.9
Temperature 2 m (C) Average	744	5.11	4.7	-	-3.2	-0.3	0.9	4.4	8.5	11.7	20.3
Wind Speed 10 m (km/h) Average	740	8.6	4	-	0	4	5	8	12	15	23
Wind Direction 10 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -MILLENNIUM MINE (AMS 12)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	23 Oct 2014 09:00	23 Oct 2014 11:00	3	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	02 Oct 2014 05:00	02 Oct 2014 05:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	04 Oct 2014 19:00	04 Oct 2014 19:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	08 Oct 2014 06:00	08 Oct 2014 06:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	20 Oct 2014 20:00	20 Oct 2014 20:00	1	Flat line in sensor output signal

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 23 ppb on Oct 7 04:00	Maximum Daily Average: 4.8 ppb on Oct 2		Hours of Data:	707
Minimum Value: 0 ppb on Oct 1 20:00	Minimum Daily Average: 0.2 ppb on Oct 1		Hours of Missing Data:	37
Maximum Diurnal Average: 2.6 ppb at hour 13	Minimum Diurnal Average: 0.4 ppb at hour 7		Hours of Calibration:	37
Monthly Average: 1.0 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 16		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Oct	0	Z	3	1	0	0	0	1	2	15	2	2	5	2	7	8	13	8	3	3	13	7	2	12	4.8	15
3-Oct	15	Z	9	2	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.5	15
4-Oct	0	Z	0	0	0	0	0	0	0	0	4	11	17	12	7	4	2	2	1	1	2	1	1	1	3.0	17
5-Oct	1	Z	1	1	0	0	0	0	0	0	0	0	1	15	5	2	0	0	0	0	0	0	0	0	1.3	15
6-Oct	0	Z	0	0	0	1	1	1	2	4	12	11	11	9	3	2	1	3	4	1	1	1	1	0	2.9	12
7-Oct	0	Z	1	23	12	11	1	1	6	2	5	4	3	2	1	0	0	0	0	0	0	0	0	0	3.3	23
8-Oct	1	Z	1	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
9-Oct	0	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
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1
11-Oct	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Oct	0	Z	0	1	0	0	0	0	1	10	3	20	16	1	1	0	0	0	0	0	0	0	0	0	2.5	20
13-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.4	1
14-Oct	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0.4	1
15-Oct	0	Z	1	1	0	0	0	0	0	0	7	16	16	21	21	3	1	1	0	0	0	0	0	0	4.0	21
16-Oct	0	Z	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
17-Oct	0	Z	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
18-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
19-Oct	0	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
20-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	1	1	1	1	0.5	1
21-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.4	1
22-Oct	1	Z	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
23-Oct	0	Z	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	2	--	2
24-Oct	3	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
25-Oct	0	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
26-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Oct	0	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
28-Oct	0	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
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
31-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0

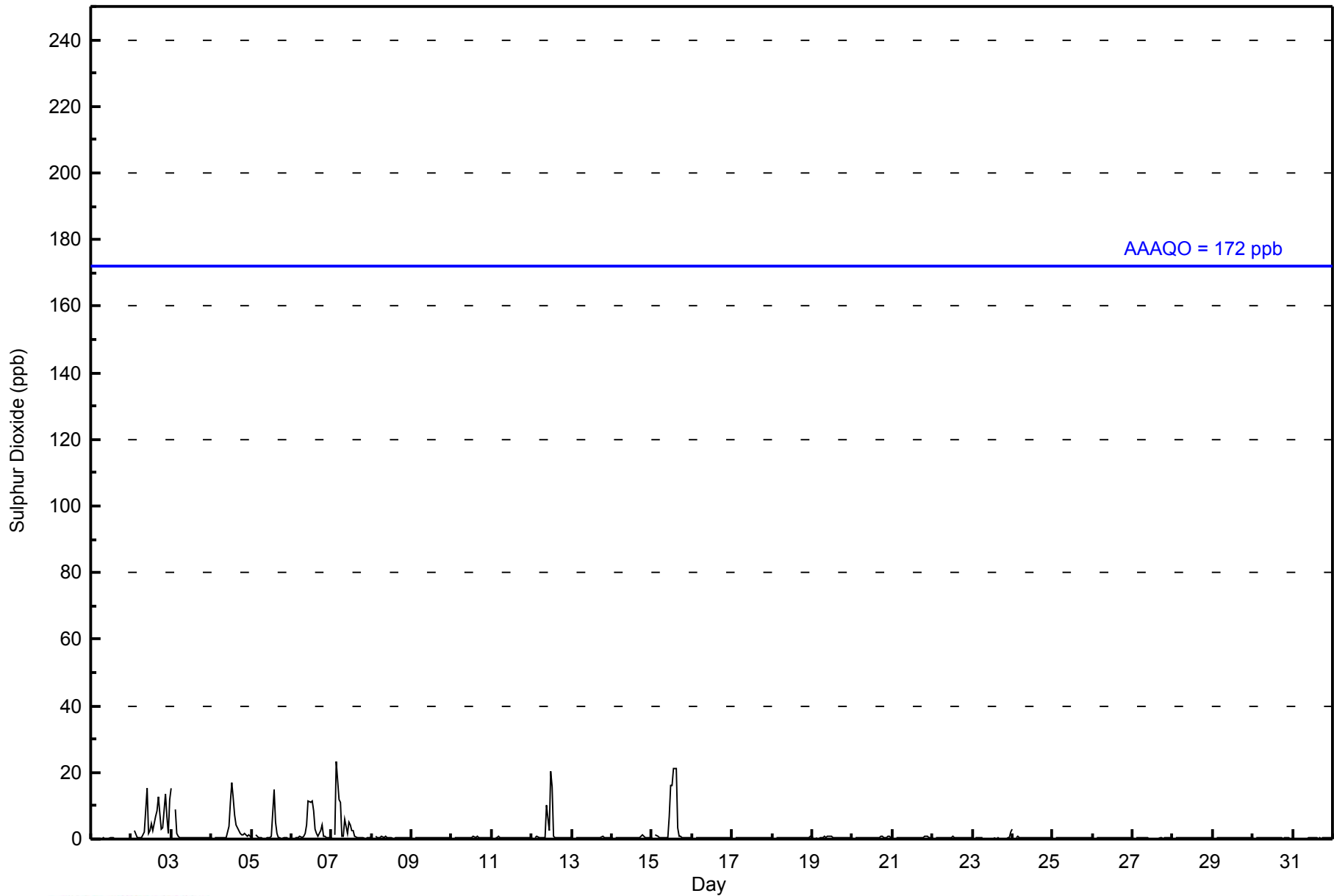
0.9	--	0.8	1.2	0.7	0.7	0.4	0.4	0.7	1.4	1.4	2.5	2.6	2.3	1.7	0.9	0.8	0.7	0.6	0.5	0.8	0.6	0.4	0.8	Diurnal Average	
15	--	9	23	12	11	1	1	6	15	12	20	17	21	21	8	13	8	4	3	13	7	2	12	Diurnal Maximum	

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Millennium - October 2014





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Millennium - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	686	97.03	97.03
11 - 20	18	2.55	99.58
21 - 60	3	0.42	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Millennium - October 2014**

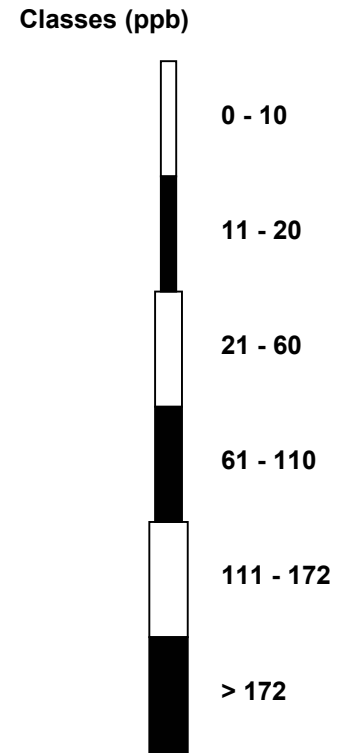
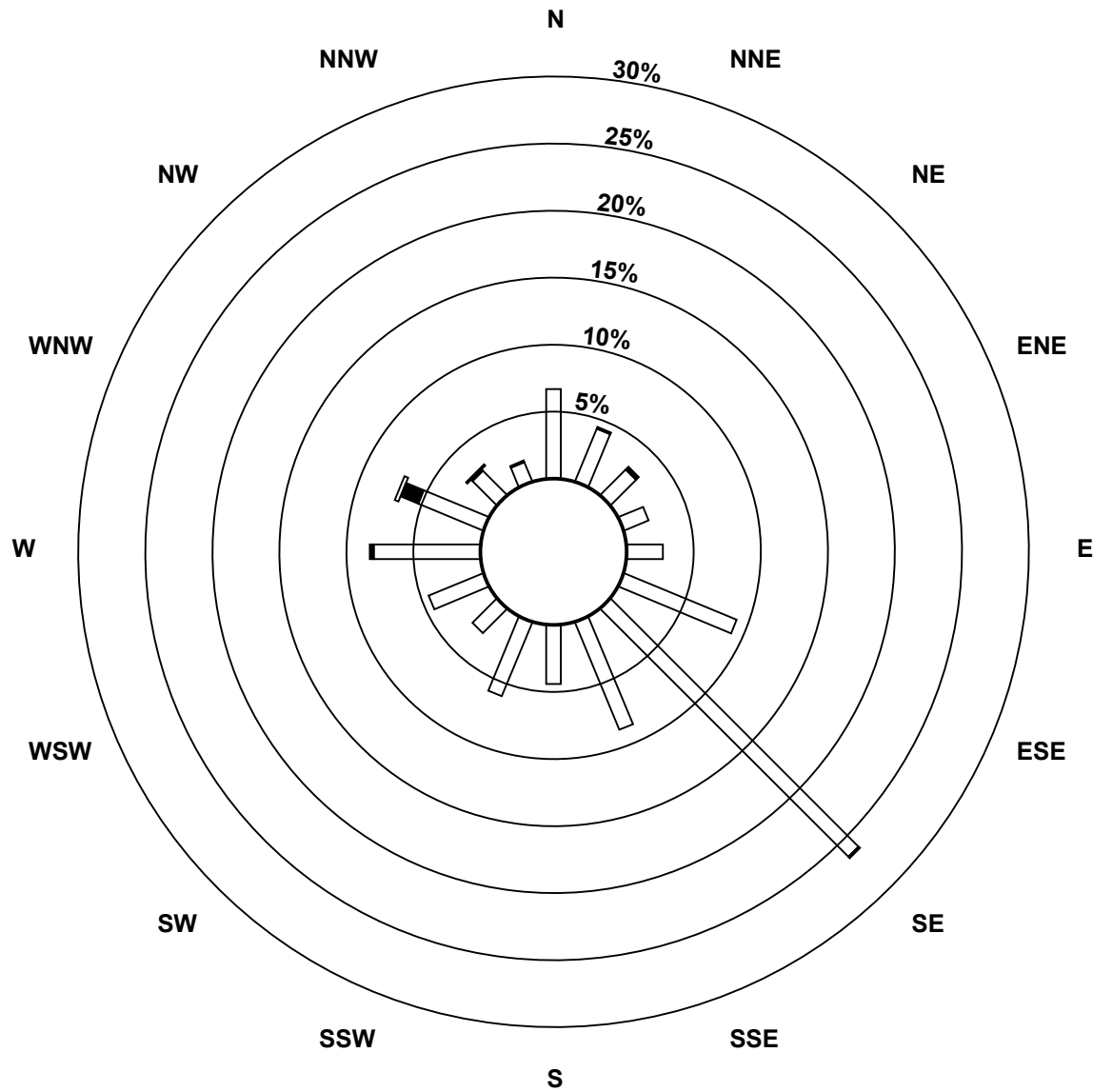
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	47	30	19	14	19	64	184	61	31	42	18	31	56	37	18	11	682
11 - 20	0	1	2	0	0	0	1	0	0	0	0	0	2	10	1	1	18
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	31	21	14	19	64	185	61	31	42	18	31	58	49	20	12	703

Total Number of Valid Hours: 703

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Millennium (AMS 12)**

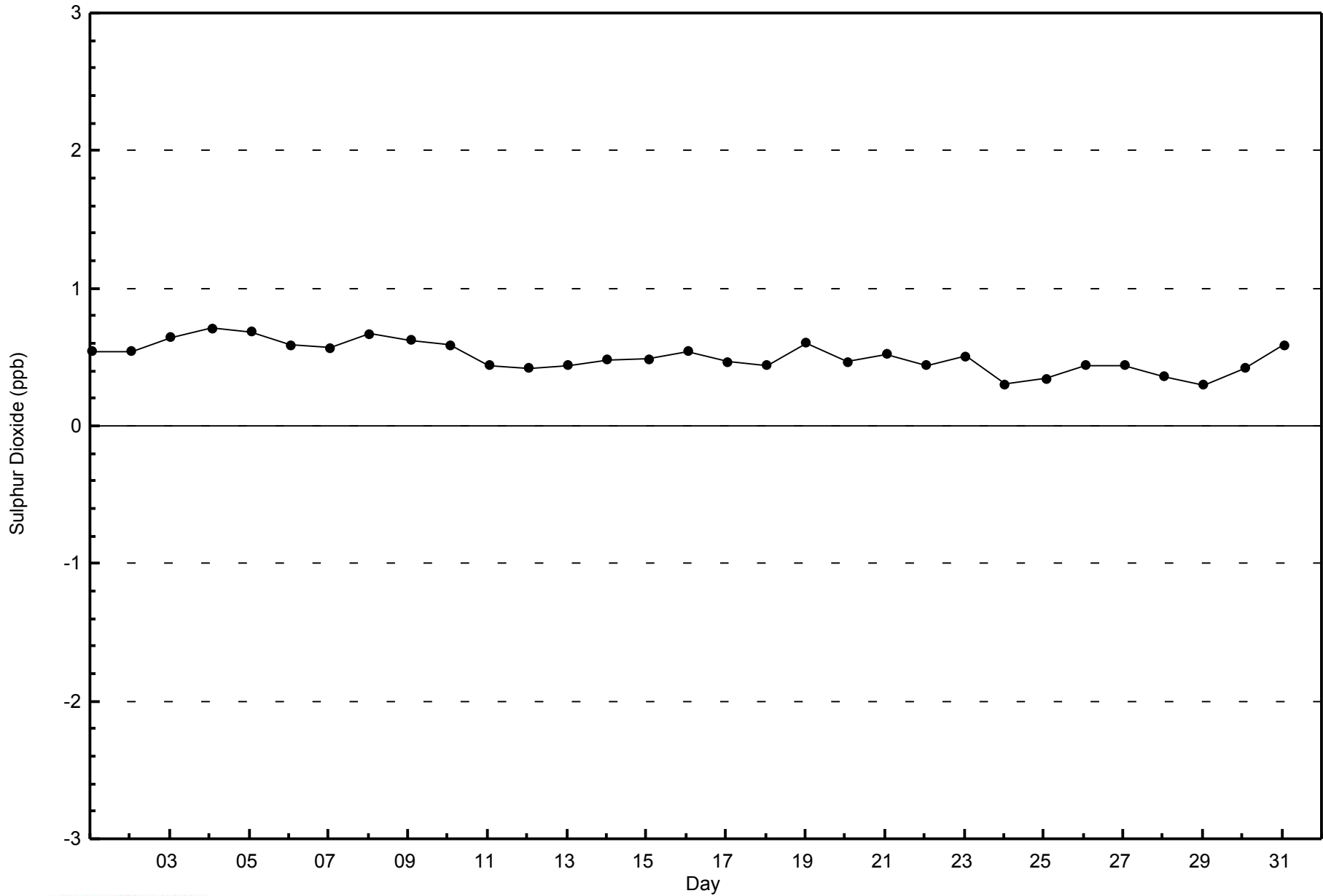


**Total Number of Valid Hours: 703**



WBEA  
Zero Responses

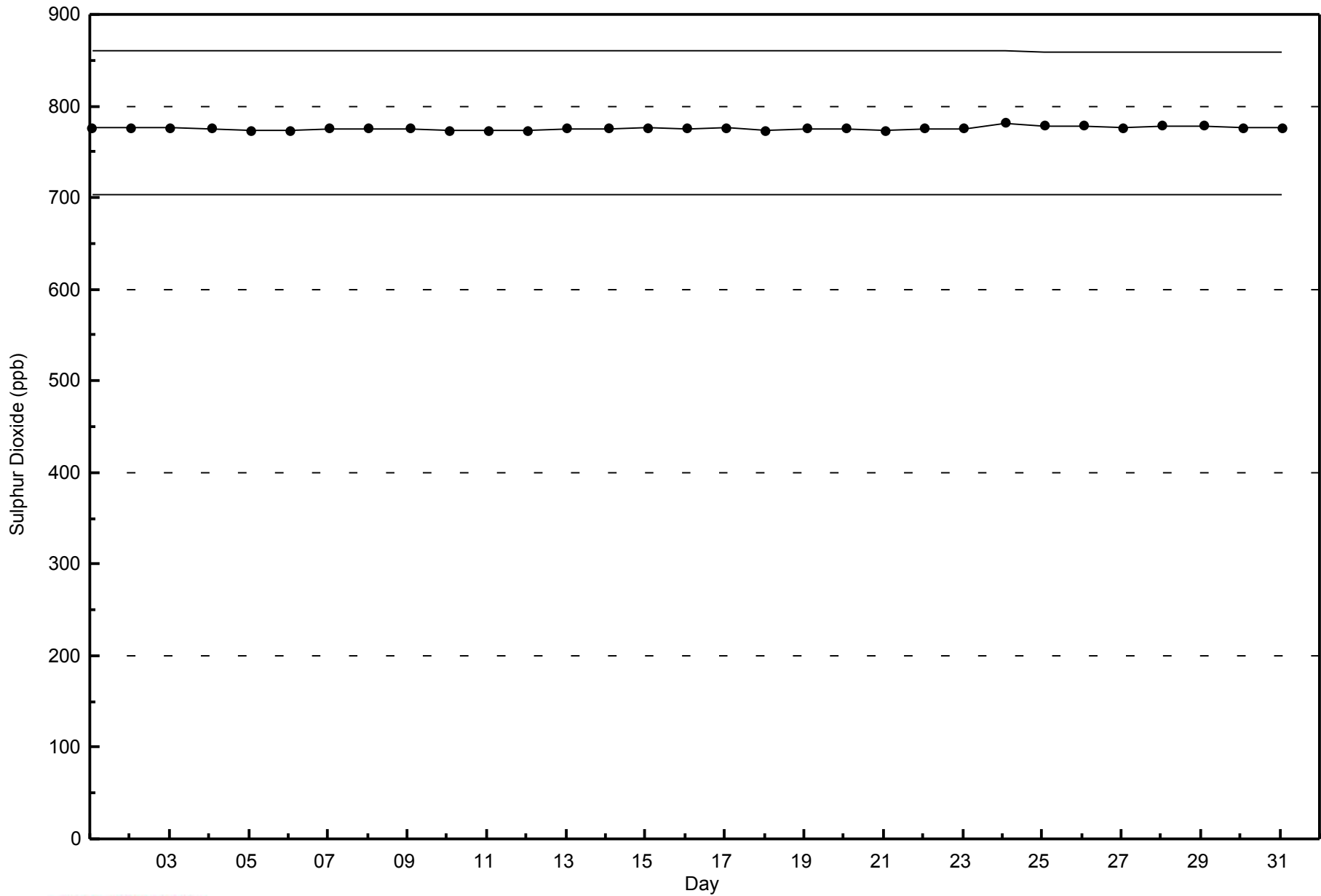
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Millennium - October 2014





**WBEA**  
**Span Responses**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Millennium - October 2014**





Summary of Hour Averages

Millennium - October 2014

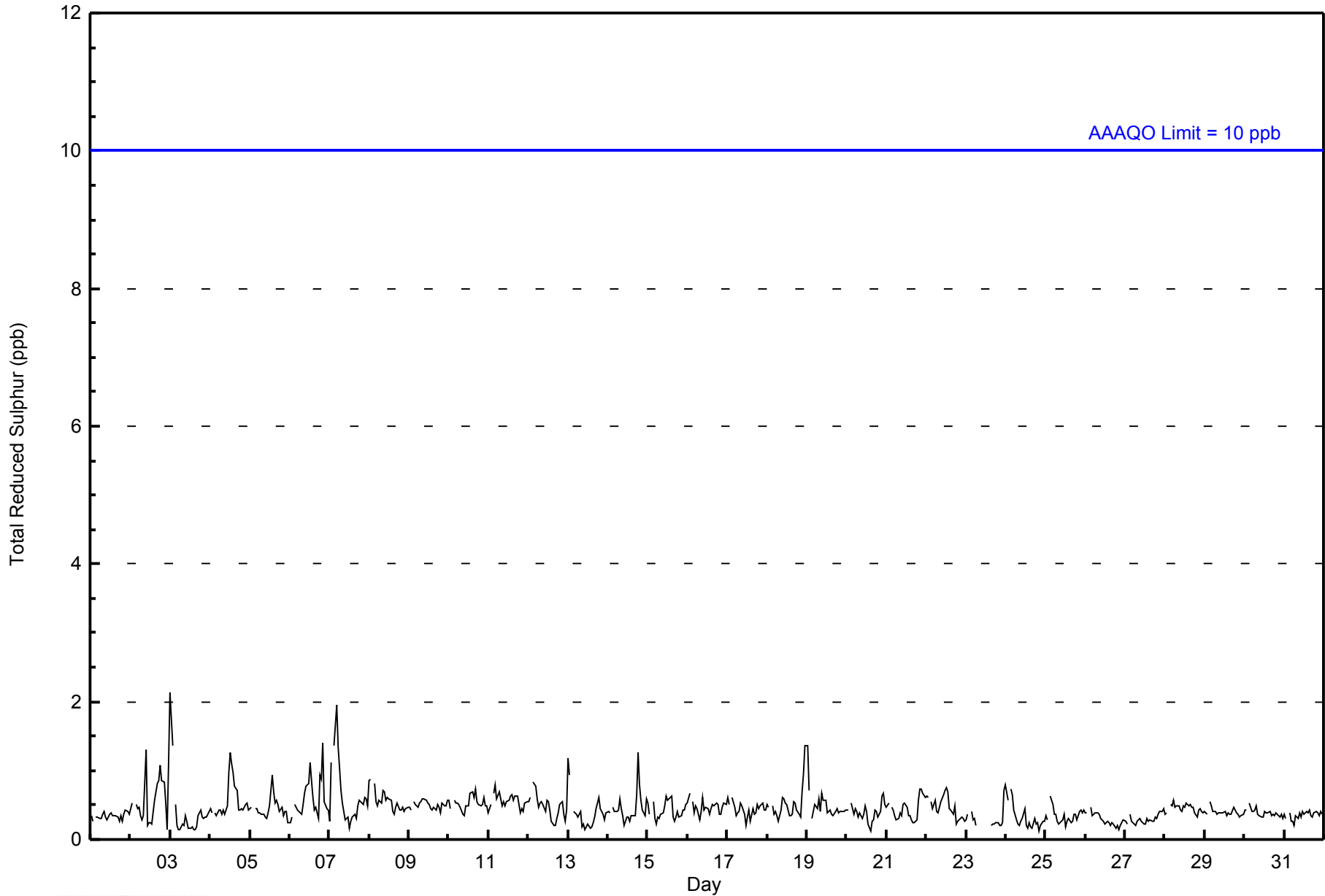
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 2 ppb on Oct 3 01:00										Maximum Daily Average: 0.6 ppb on Oct 7										Hours of Data: 705						
Minimum Value: 0 ppb on Oct 24 21:00										Minimum Daily Average: 0.3 ppb on Oct 26										Hours of Missing Data: 39						
Maximum Diurnal Average: 0.6 ppb at hour 1										Minimum Diurnal Average: 0.4 ppb at hour 16										Hours of Calibration: 39						
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: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	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-Oct	0	1	Z	1	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	0	1	0.6	1
3-Oct	2	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	2
4-Oct	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	1	1	0	0.6	1
5-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1
6-Oct	0	0	Z	1	0	0	0	0	0	1	1	1	1	1	1	0	0	0	1	1	1	1	0	0	0.6	1
7-Oct	0	1	Z	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0.6	2
8-Oct	1	1	Z	1	1	0	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0.6	1
9-Oct	0	0	Z	1	1	0	1	1	1	1	1	1	0	0	0	0	1	0	0	1	0	0	1	0.5	1	
10-Oct	1	0	Z	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	0	1	1	0	0	0.5	1
11-Oct	0	1	Z	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	0	0	0	1	1	0.6	1
12-Oct	1	1	Z	1	1	1	0	1	1	1	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0.5	1
13-Oct	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	1
14-Oct	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	0.5	1
15-Oct	1	0	Z	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0.4	1
16-Oct	1	1	Z	1	0	0	0	0	0	1	0	0	0	0	1	0	1	1	0	0	0	1	1	0	0.5	1
17-Oct	1	1	Z	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1
18-Oct	1	0	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	1	1	0	0	0	1	1	1	0.5	1
19-Oct	1	1	Z	0	0	1	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
20-Oct	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
21-Oct	0	1	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0.4	1
22-Oct	1	1	Z	1	0	1	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
23-Oct	0	0	Z	0	0	0	0	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	1	--	1	
24-Oct	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
25-Oct	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
26-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
28-Oct	0	0	Z	1	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0.5	1
29-Oct	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
30-Oct	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
31-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
0.6 0.5 -- 0.5 0.5 0.4 0.4 0.4 0.4 0.5 0.4 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.4 0.4 0.4 0.4 0.5																								Diurnal Average		
2 1 -- 1 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**

**Total Reduced Sulphur (TRS) - ppb**  
**Millennium - October 2014**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Millennium - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	705	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Millennium - October 2014**

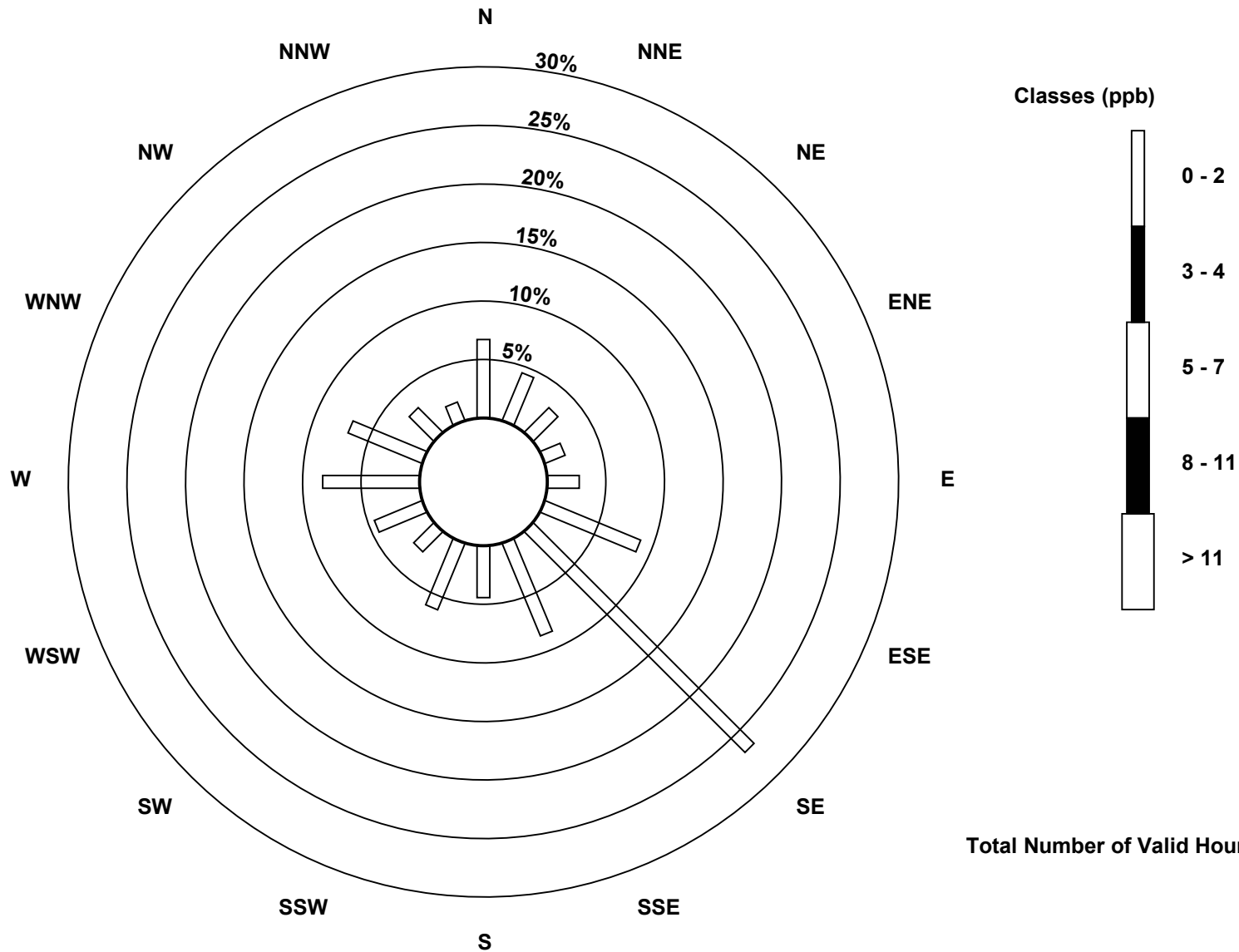
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	47	31	21	13	19	62	187	60	31	43	17	31	58	48	21	12	701
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	31	21	13	19	62	187	60	31	43	17	31	58	48	21	12	701

Total Number of Valid Hours: 701

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Total Reduced Sulphur (TRS) - ppb  
Millennium (AMS 12)**

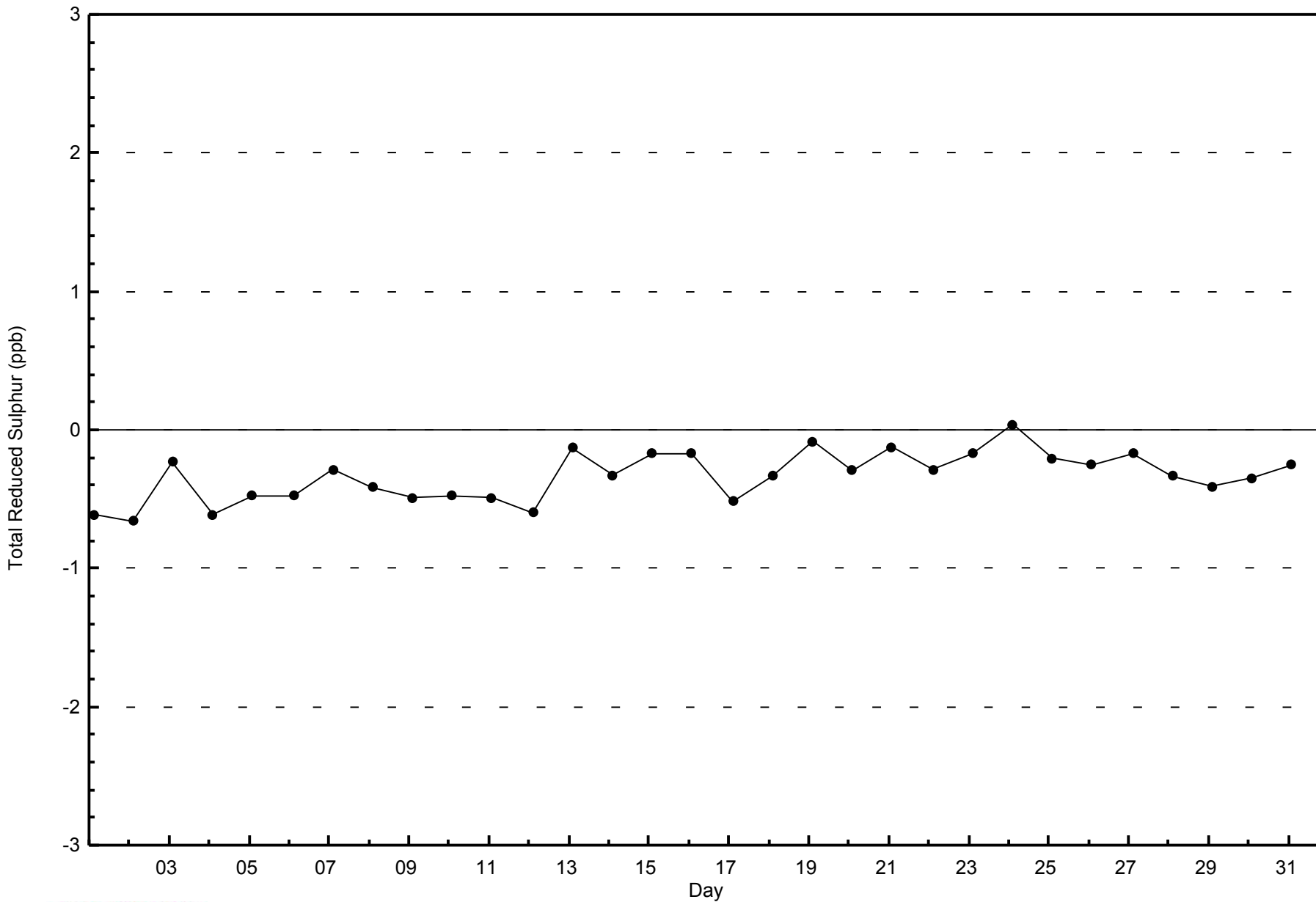


**Total Number of Valid Hours: 701**



WBEA  
Zero Responses

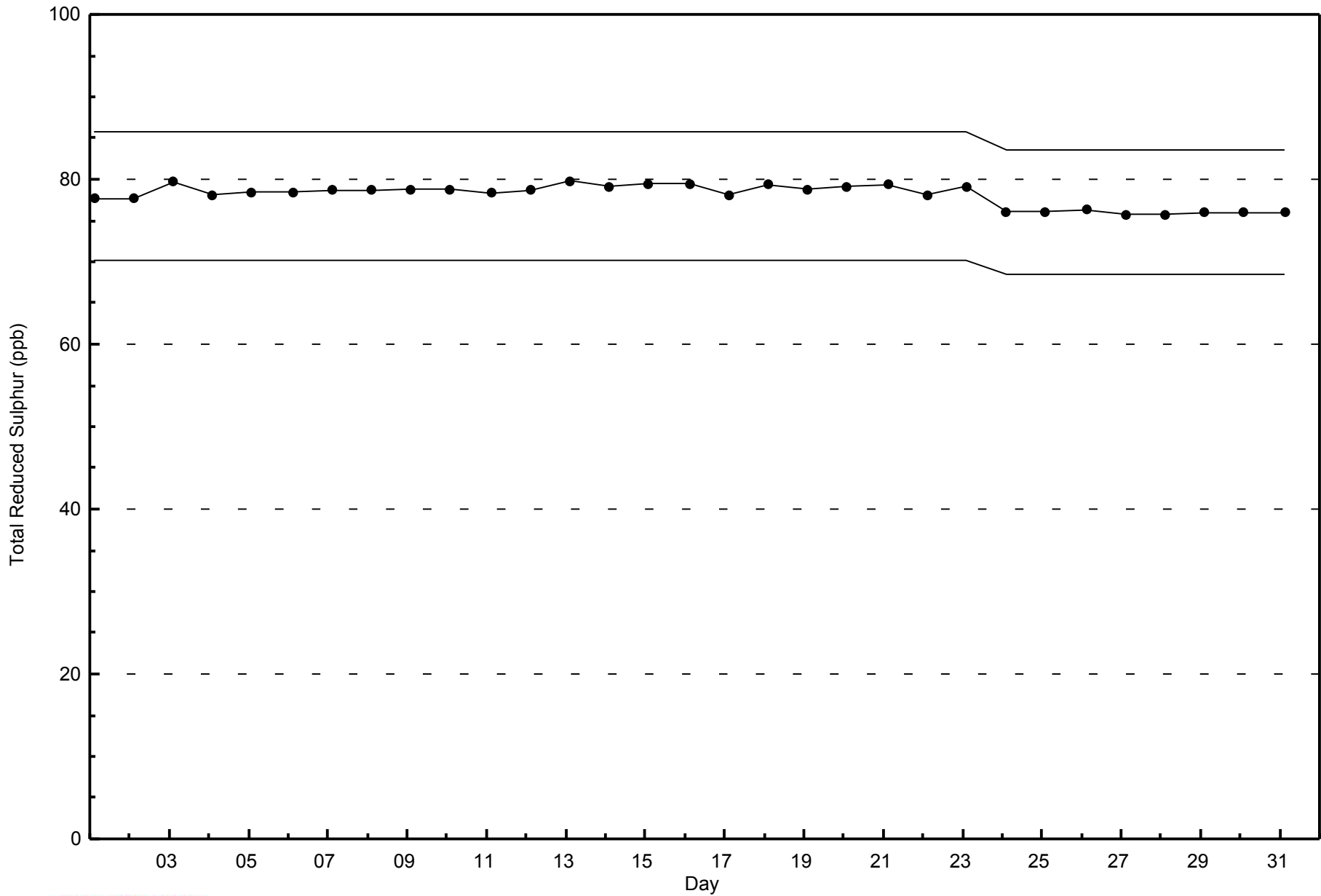
Total Reduced Sulphur (TRS) - ppb  
Millennium - October 2014





WBEA  
Span Responses

Total Reduced Sulphur (TRS) - ppb  
Millennium - October 2014



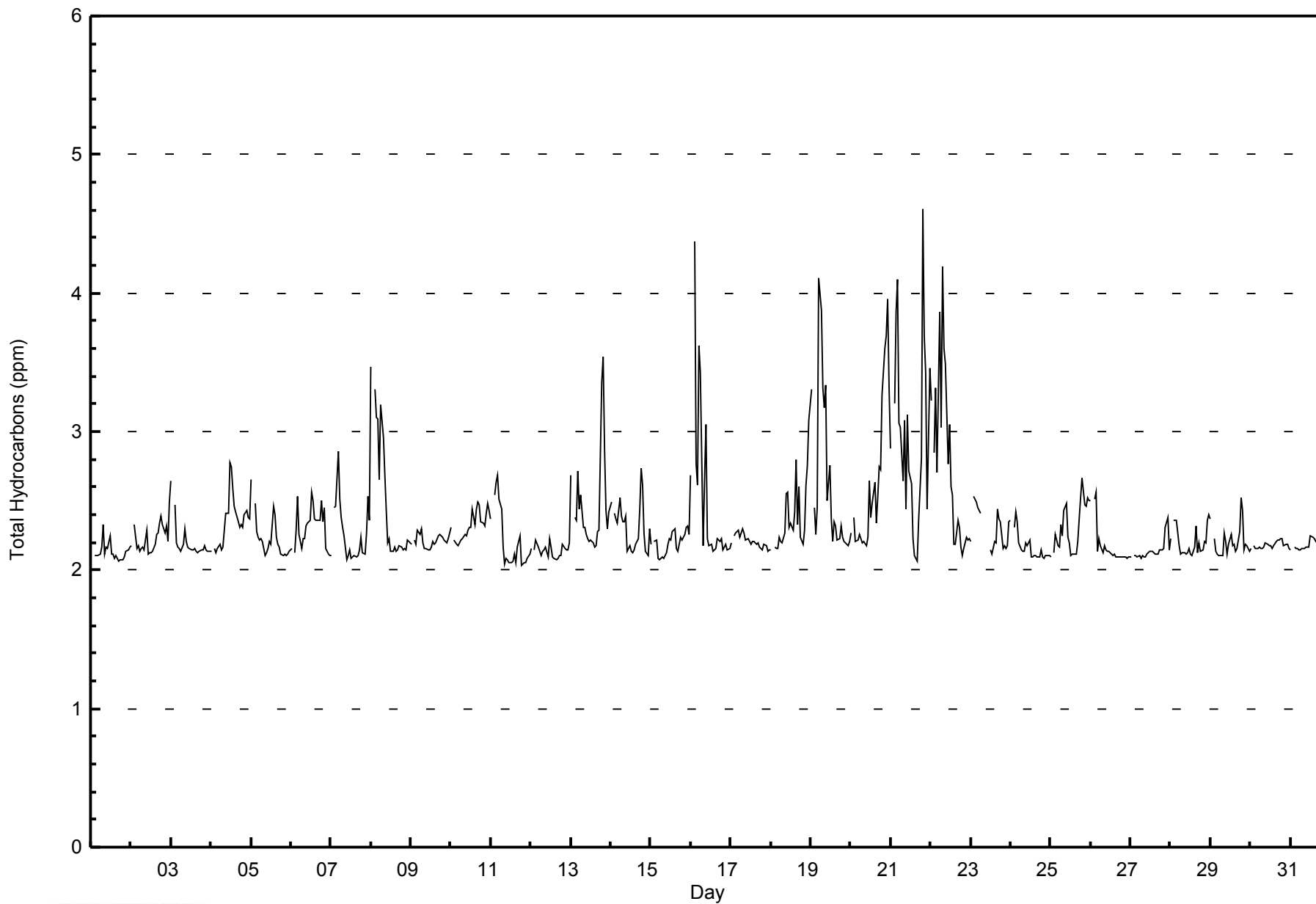


Maximum Value: 4.6 ppm on Oct 21 20:00																				Maximum Daily Average: 3.0 ppm on Oct 21					Hours in Service: 744																							
Minimum Value: 2.0 ppm on Oct 11 19:00																				Minimum Daily Average: 2.1 ppm on Oct 1					Hours of Data: 708																							
Maximum Diurnal Average: 2.4 ppm at hour 3																				Minimum Diurnal Average: 2.2 ppm at hour 16					Hours of Missing Data: 36																							
Monthly Average: 2.32 ppm																				Percentiles: P <sub>1</sub> = 2.1 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> = 3.8					Hours of Calibration: 36																							
																									Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.3	2.1	2.2	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.3																						
2-Oct	2.2	Z	2.3	2.2	2.2	2.1	2.2	2.2	2.1	2.3	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.2	2.5	2.2	2.5																						
3-Oct	2.6	Z	2.5	2.2	2.2	2.2	2.1	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.6																						
4-Oct	2.1	Z	2.2	2.1	2.2	2.2	2.1	2.2	2.3	2.4	2.4	2.8	2.7	2.6	2.5	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.3	2.8																						
5-Oct	2.7	Z	2.5	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.5	2.4	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.7																						
6-Oct	2.2	Z	2.1	2.3	2.5	2.3	2.2	2.2	2.2	2.3	2.3	2.4	2.6	2.5	2.4	2.4	2.4	2.4	2.5	2.3	2.5	2.2	2.1	2.1	2.3	2.6																						
7-Oct	2.1	Z	2.4	2.5	2.9	2.5	2.4	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.3	2.5	2.4	2.3	2.9																						
8-Oct	3.5	Z	3.3	3.1	3.1	2.7	3.2	3.0	2.7	2.4	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.2	3.5																						
9-Oct	2.2	Z	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.3																						
10-Oct	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.4	2.3	2.4	2.5	2.5	2.4	2.3	2.3	2.4	2.5	2.4	2.3	2.5																						
11-Oct	2.4	Z	2.5	2.6	2.7	2.5	2.4	2.2	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.7																						
12-Oct	2.2	Z	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.1	2.2																						
13-Oct	2.7	Z	2.4	2.4	2.7	2.4	2.5	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	3.4	3.5	2.9	2.4	2.3	2.4	2.5	3.5																						
14-Oct	2.5	Z	2.4	2.4	2.3	2.5	2.4	2.4	2.3	2.4	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.4	2.7	2.6	2.3	2.1	2.1	2.3	2.3	2.7																						
15-Oct	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3																						
16-Oct	2.7	Z	4.4	2.8	2.6	3.6	3.4	2.2	2.7	3.0	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.5	4.4																						
17-Oct	2.2	Z	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.3																						
18-Oct	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.6	2.3	2.3	2.3	2.4	2.8	2.3	2.6	2.2	2.2	2.3	2.6	2.8	3.1	2.4	3.1																						
19-Oct	3.3	Z	2.5	2.3	2.5	4.1	3.9	3.3	3.2	3.3	2.5	2.8	2.4	2.2	2.4	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.6	4.1																						
20-Oct	2.3	Z	2.4	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.6	2.4	2.5	2.6	2.3	2.5	2.7	2.7	3.3	3.6	3.7	4.0	3.3	2.6	4.0																						
21-Oct	2.9	Z	3.2	3.9	4.1	3.1	3.0	2.6	3.1	2.4	3.1	2.7	2.6	2.2	2.1	2.1	2.1	2.4	2.8	4.6	3.7	3.4	2.4	3.5	3.0	4.6																						
22-Oct	3.2	Z	2.8	3.3	2.7	3.9	3.0	4.2	3.6	3.5	2.8	3.1	2.6	2.5	2.2	2.2	2.4	2.3	2.2	2.1	2.2	2.2	2.2	2.2	2.8	4.2																						
23-Oct	2.2	Z	2.5	2.5	2.5	2.4	2.4	C	C	C	C	C	2.1	2.1	2.2	2.2	2.4	2.4	2.4	2.2	2.2	2.2	2.4	2.3	2.5	2.5																						
24-Oct	2.4	Z	2.3	2.4	2.3	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4																						
25-Oct	2.1	Z	2.1	2.3	2.2	2.2	2.3	2.2	2.4	2.5	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.5	2.7	2.5	2.5	2.5	2.3	2.7																						
26-Oct	2.5	Z	2.5	2.6	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.6																						
27-Oct	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	2.3	2.4	2.1	2.1	2.4																						
28-Oct	2.2	Z	2.4	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.3	2.1	2.2	2.1	2.1	2.2	2.2	2.4	2.4	2.2	2.4																						
29-Oct	2.4	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.1	2.2	2.3	2.2	2.2	2.1	2.2	2.3	2.5	2.4	2.1	2.2	2.2	2.1	2.2	2.5																						
30-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2																						
31-Oct	2.1	Z	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	2.3	2.2	2.2	2.2	2.4	2.7	2.5	2.2	2.7																						
																								2.4	--	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.4	Diurnal Average
																								3.5	--	4.4	3.9	4.1	4.1	3.9	4.2	3.6	3.5	3.1	3.1	2.7	2.6	2.6	2.8	2.5	2.7	3.4	4.6	3.7	3.7	4.0	3.5	Diurnal Maximum
Z - zerospan      C - Calibration																																																



WBEA  
Hourly Averages

Total Hydrocarbons (THC) - ppm  
Millennium - October 2014







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

**Total Hydrocarbons (THC) - ppm**  
**Millennium - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	3	0.42	0.42
2.1 - 3.0	666	94.07	94.49
3.1 - 10.0	39	5.51	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Millennium - October 2014**

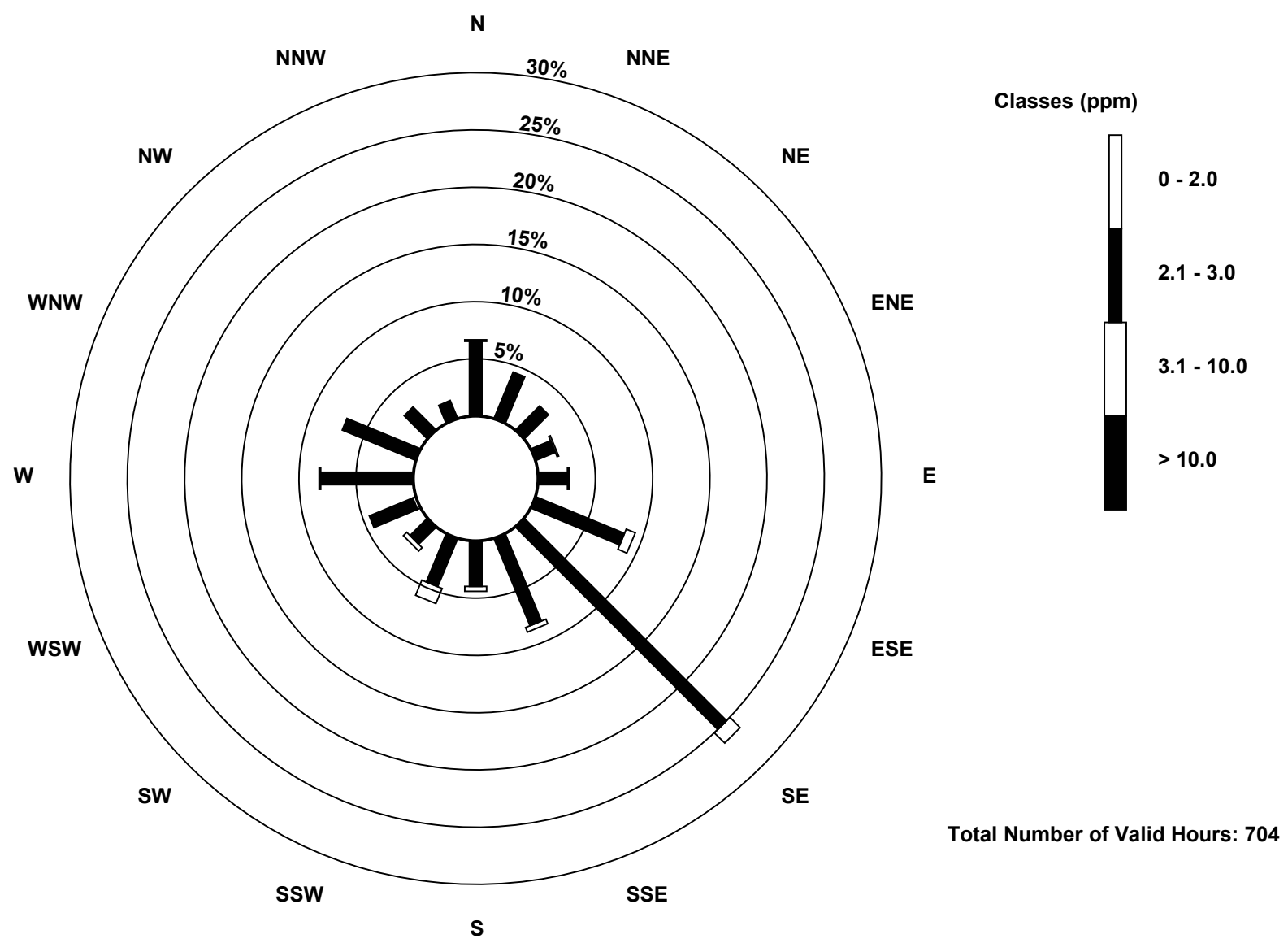
Concentration Ranges (ppm)	Wind Direction																Totals	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	3
2.1 - 3.0	46	31	21	13	18	59	176	58	28	32	14	29	57	49	20	12	663	
3.1 - 10.0	1	0	0	1	1	6	9	3	3	10	3	0	1	0	0	0	38	
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Totals</b>	47	31	21	14	19	65	185	61	31	42	18	31	58	49	20	12	704	

Total Number of Valid Hours: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

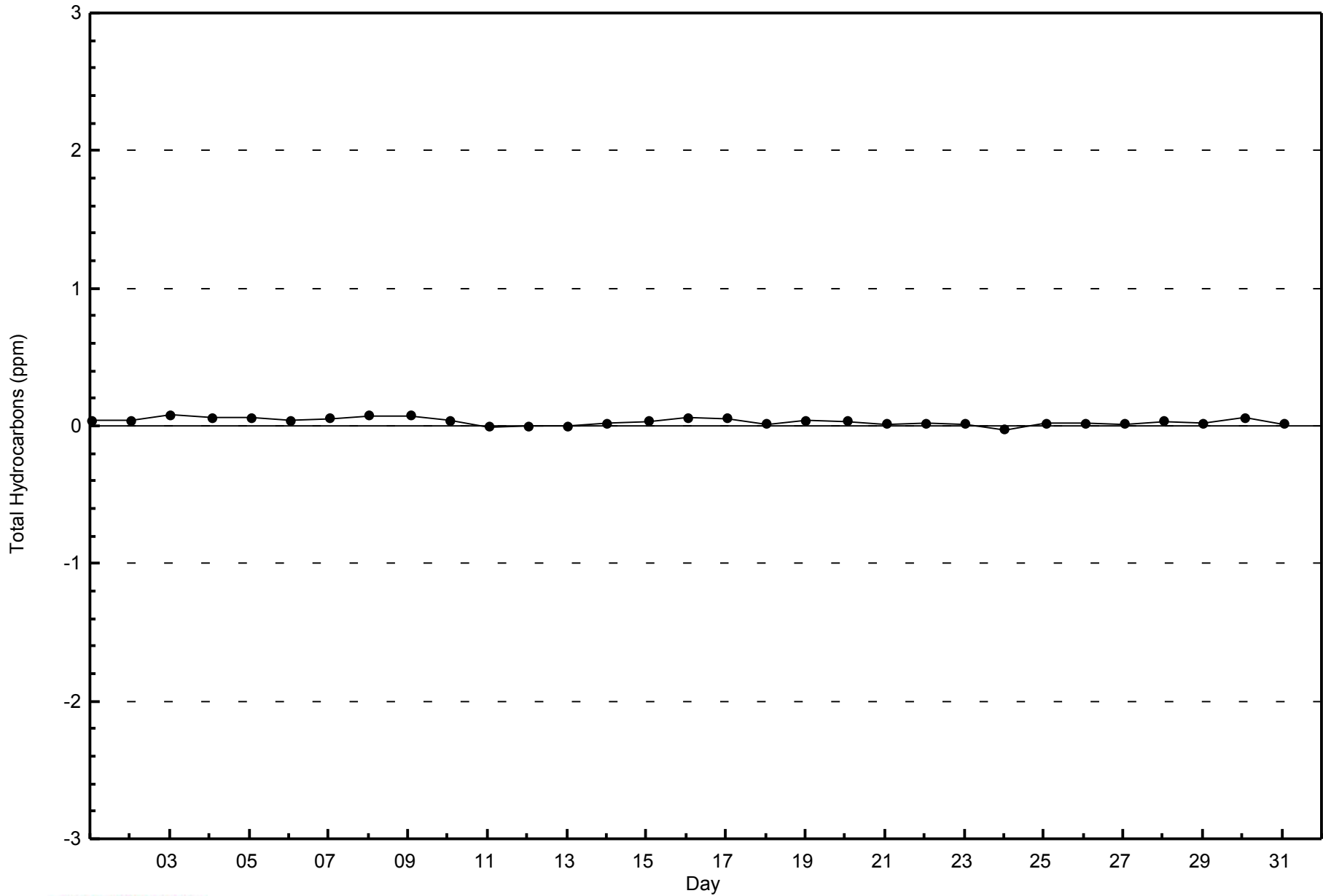
Total Hydrocarbons (THC) - ppm  
Millennium (AMS 12)





WBEA  
Zero Responses

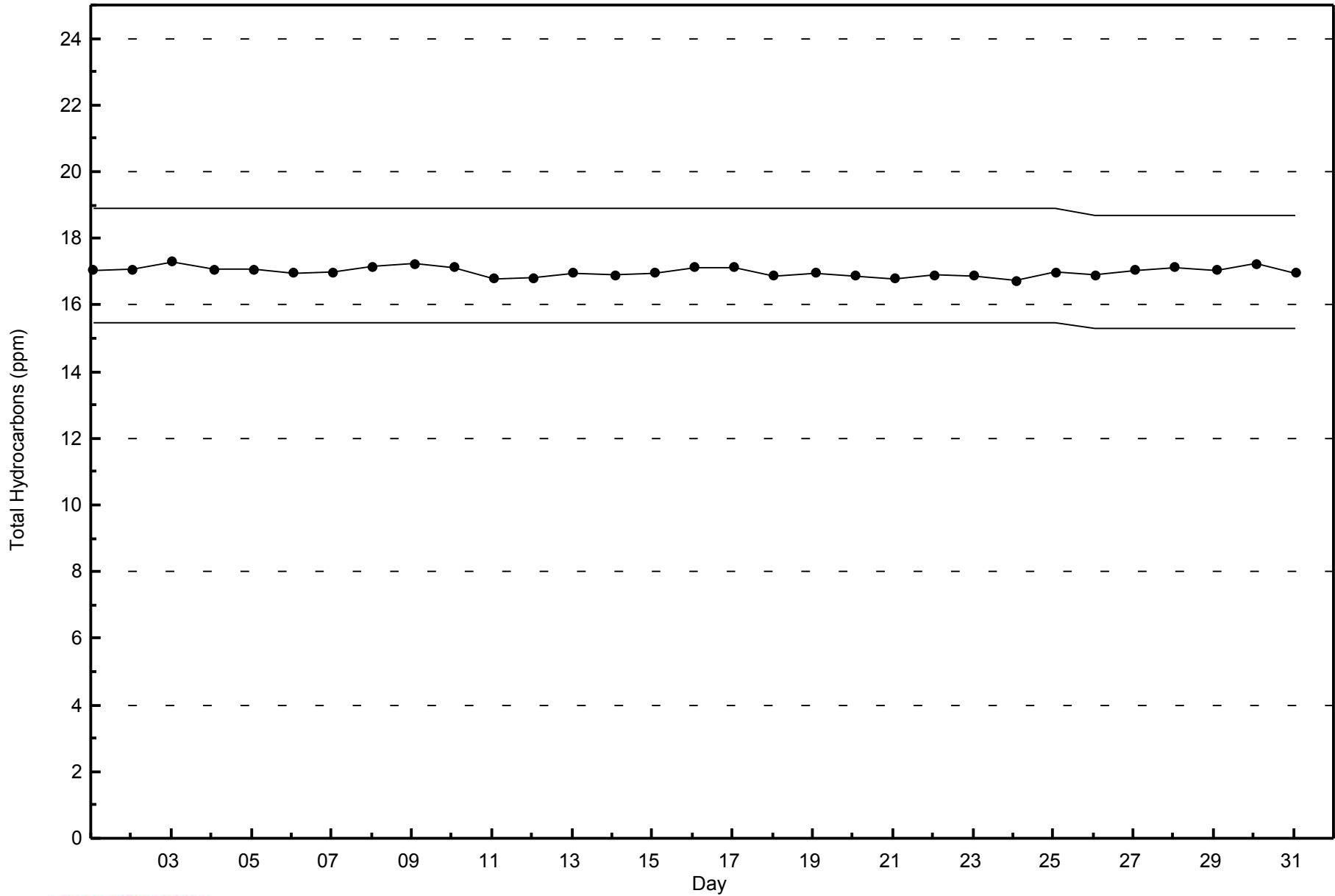
Total Hydrocarbons (THC) - ppm  
Millennium - October 2014





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Millennium - October 2014



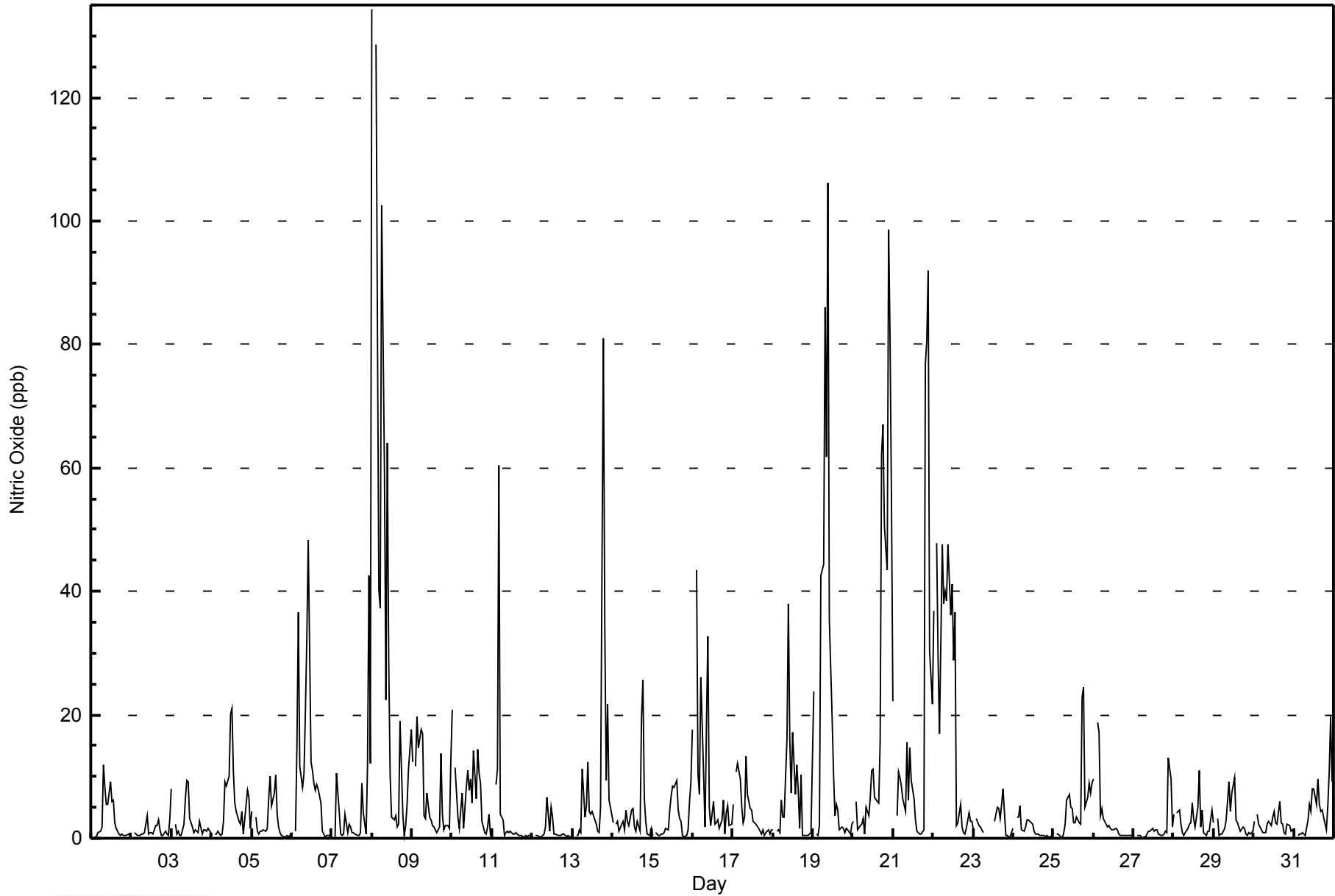


Maximum Value: 134 ppb on Oct 8 01:00														Maximum Daily Average: 34.1 ppb on Oct 8														Hours in Service: 744			
Minimum Value: 0 ppb on Oct 7 00:00														Minimum Daily Average: 1.1 ppb on Oct 12														Hours of Data: 707			
Maximum Diurnal Average: 14.8 ppb at hour 10														Minimum Diurnal Average: 2.7 ppb at hour 17														Hours of Missing Data: 37			
Monthly Average: 7.6 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> = 18 P <sub>99</sub> = 82														Hours of Calibration: 37			
																												Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Oct	0	Z	0	0	1	1	2	12	8	5	5	9	6	6	3	2	1	1	1	0	0	0	1	1	2.8	12					
2-Oct	1	Z	1	1	1	0	1	1	1	4	1	1	1	1	2	2	3	1	0	1	1	1	0	3	1.2	4					
3-Oct	8	Z	2	1	1	0	1	2	6	9	9	3	2	1	1	1	3	1	1	1	1	1	2	1	2.6	9					
4-Oct	1	Z	1	1	1	0	1	3	9	8	10	20	21	11	6	4	3	2	4	1	3	8	7	2	5.4	21					
5-Oct	4	Z	3	1	1	1	1	1	1	2	6	10	5	7	10	4	2	1	0	0	0	0	0	1	2.8	10					
6-Oct	1	Z	1	15	37	12	8	11	21	32	48	12	11	9	8	9	8	6	1	1	0	0	0	0	10.9	48					
7-Oct	0	Z	0	10	4	1	0	1	4	1	2	2	1	1	1	0	1	9	4	1	12	43	12	4.8	43						
8-Oct	134	Z	129	83	40	37	103	59	22	64	29	10	3	3	4	2	2	19	4	0	2	6	11	18	34.1	134					
9-Oct	12	Z	12	20	15	18	17	4	3	7	3	3	2	2	1	1	2	14	4	1	2	2	2	13	6.9	20					
10-Oct	21	Z	11	3	2	5	7	2	9	11	8	10	6	14	6	14	11	9	3	1	1	2	4	1	6.9	21					
11-Oct	1	Z	9	11	61	4	3	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	4.3	61					
12-Oct	0	Z	0	0	0	0	0	1	2	7	1	5	3	1	1	0	0	0	1	1	0	0	0	0	1.1	7					
13-Oct	0	Z	1	0	1	1	11	3	5	12	4	4	4	3	2	1	1	5	81	34	9	22	6	5	9.5	81					
14-Oct	2	Z	2	3	1	2	3	1	5	3	2	5	5	2	1	3	1	19	26	6	3	1	1	2	4.2	26					
15-Oct	0	Z	1	1	0	1	1	1	2	1	5	7	8	8	9	4	3	3	0	0	0	1	6	9	3.2	9					
16-Oct	18	Z	44	10	7	26	18	2	18	33	5	2	6	2	3	3	2	3	6	1	4	5	2	2	9.7	44					
17-Oct	6	Z	11	12	10	5	2	4	13	7	5	4	3	2	2	2	1	1	1	1	1	1	1	1	4.2	13					
18-Oct	1	Z	1	1	1	6	3	4	16	38	16	7	17	7	12	8	2	10	0	0	0	0	1	1	6.7	38					
19-Oct	24	Z	1	0	2	43	44	86	62	106	36	19	10	4	5	5	1	2	2	1	2	1	1	2	19.9	106					
20-Oct	3	Z	6	1	2	2	3	1	5	4	7	11	11	7	6	6	16	62	67	50	44	99	81	55	23.8	99					
21-Oct	22	Z	4	11	10	9	6	4	15	6	15	9	6	3	1	1	1	1	1	77	81	92	30	22	18.6	92					
22-Oct	37	Z	48	29	17	48	38	40	39	48	36	41	29	37	2	3	5	2	1	1	2	4	3	3	22.2	48					
23-Oct	1	Z	3	2	2	1	1	C	C	C	C	C	C	3	5	5	3	5	8	0	0	0	0	1	--	8					
24-Oct	2	Z	4	3	5	1	1	2	3	3	3	2	1	1	1	0	0	1	0	0	0	0	0	1	1.6	5					
25-Oct	1	Z	1	1	0	0	1	2	6	7	5	5	3	3	3	3	2	23	24	5	7	9	7	9	5.5	24					
26-Oct	10	Z	19	17	4	5	3	2	2	2	2	1	1	2	1	1	0	0	0	0	0	0	0	0	3.2	19					
27-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	13	10	2	1.7	13					
28-Oct	4	Z	4	5	2	1	1	1	2	2	3	6	3	2	5	11	2	5	1	1	1	1	3	5	3.0	11					
29-Oct	2	Z	3	1	1	1	2	3	6	9	4	7	10	3	2	2	1	2	2	1	1	1	1	1	2.8	10					
30-Oct	3	Z	4	2	1	1	1	1	2	3	2	3	4	2	2	6	2	2	1	1	2	2	1	1	2.2	6					
31-Oct	1	Z	1	1	1	1	1	1	3	5	4	8	8	6	10	6	4	5	3	1	5	11	20	9	4.9	20					
														10.4														Diurnal Average			
														134														Diurnal Maximum			
Z - zerospan														C - Calibration																	



WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
Millennium - October 2014





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

**Nitric Oxide (NO) - ppb**  
**Millennium - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	647	91.51	91.51
21 - 40	30	4.24	95.76
41 - 80	19	2.69	98.44
81 - 159	8	1.13	99.58
> 159	0	0.00	99.58

Total Number of Valid Hours: 707

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Millennium - October 2014**

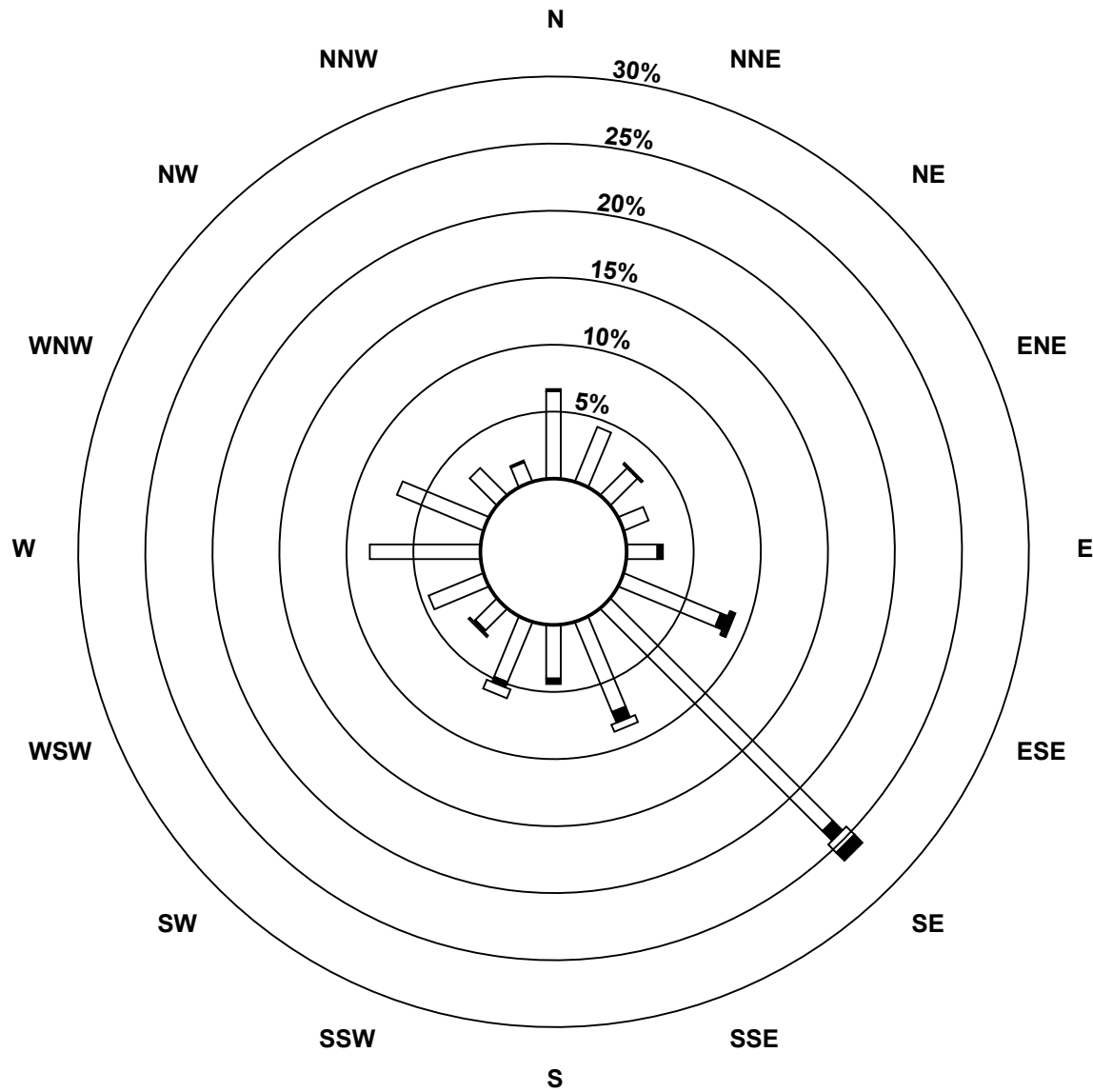
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	46	31	20	14	16	55	165	51	28	34	16	31	58	49	20	11	645
21 - 40	1	0	0	0	3	4	7	6	3	3	1	0	0	0	0	1	29
41 - 80	0	0	1	0	0	1	6	4	0	5	1	0	0	0	0	0	18
81 - 159	0	0	0	0	0	2	6	0	0	0	0	0	0	0	0	0	8
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	31	21	14	19	62	184	61	31	42	18	31	58	49	20	12	700

Total Number of Valid Hours: 703

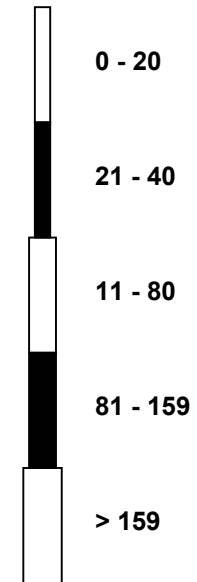
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitric Oxide (NO) - ppb  
Millennium (AMS 12)**



Classes (ppb)

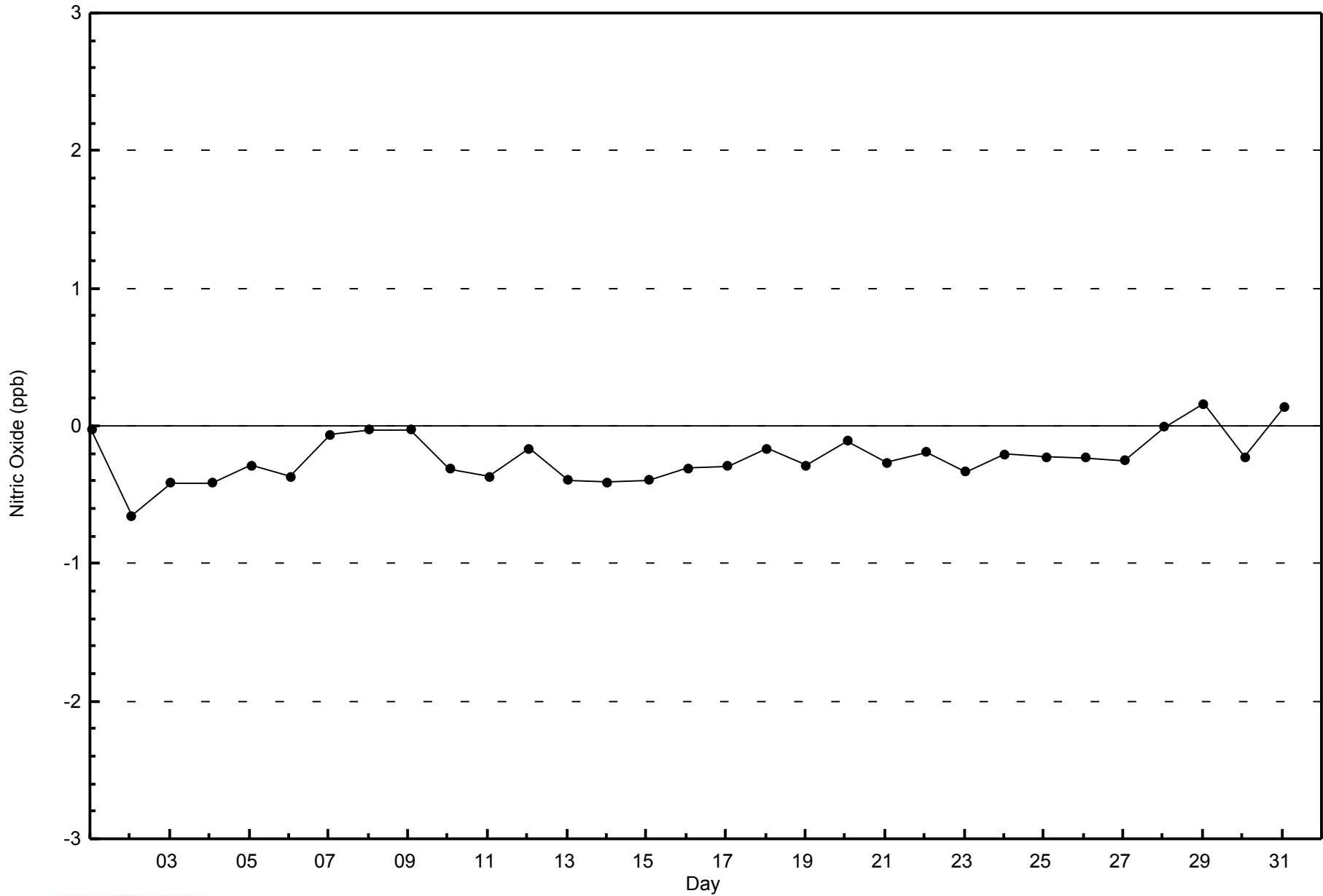


**Total Number of Valid Hours: 703**



WBEA  
Zero Responses

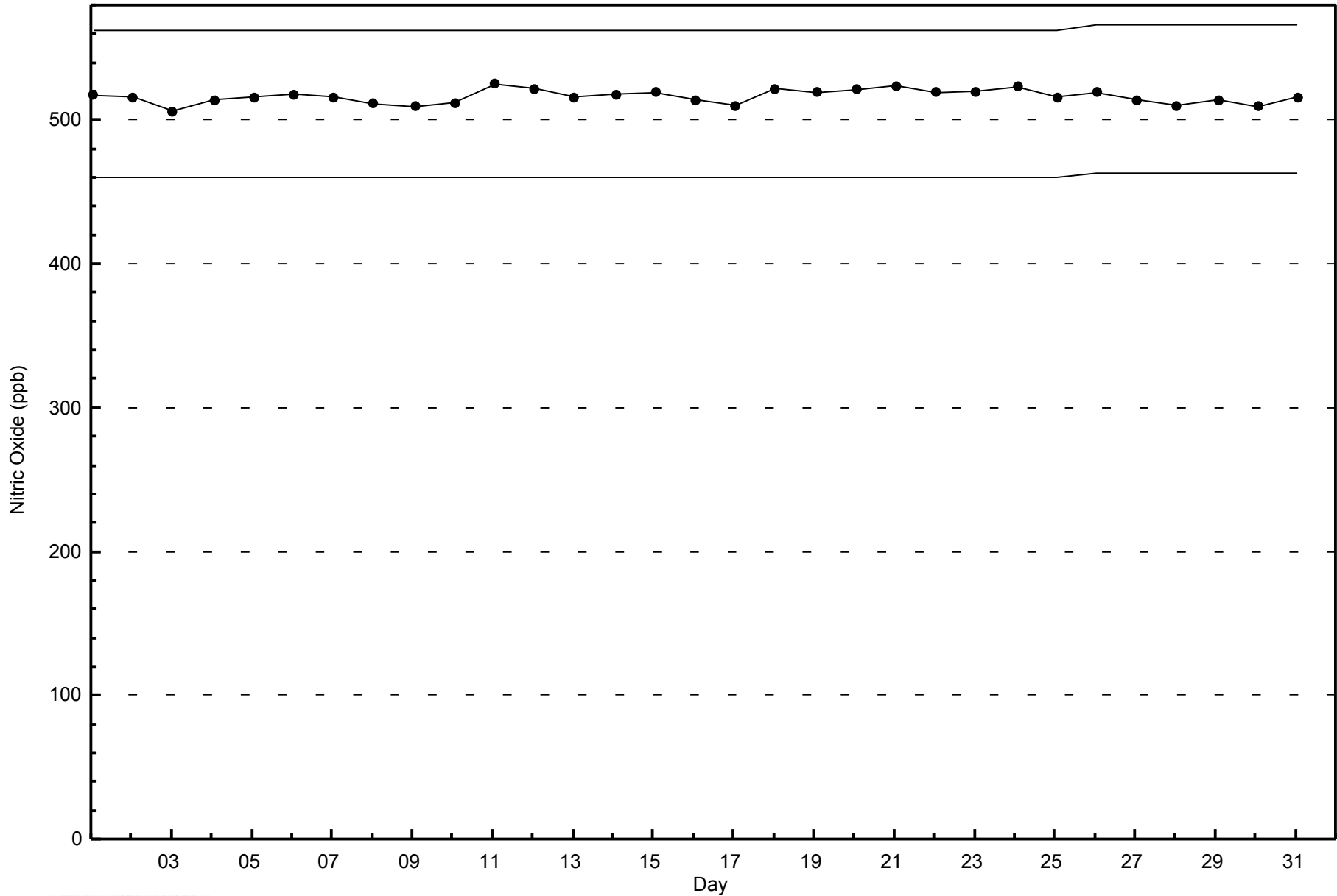
Nitric Oxide (NO) - ppb  
Millennium - October 2014





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Millennium - October 2014





Number of Exceedences (AAAO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 30 ppb on Oct 21 22:00	Maximum Daily Average: 17.7 ppb on Oct 22		Hours of Data:	707
Minimum Value: 0 ppb on Oct 1 20:00	Minimum Daily Average: 2.5 ppb on Oct 24		Hours of Missing Data:	37
Maximum Diurnal Average: 11.6 ppb at hour 1	Minimum Diurnal Average: 5.9 ppb at hour 14		Hours of Calibration:	37
Monthly Average: 8.9 ppb	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 8 Q <sub>3</sub> = 13 P <sub>90</sub> = 18 P <sub>99</sub> = 25		Percent Operational Time:	100.0

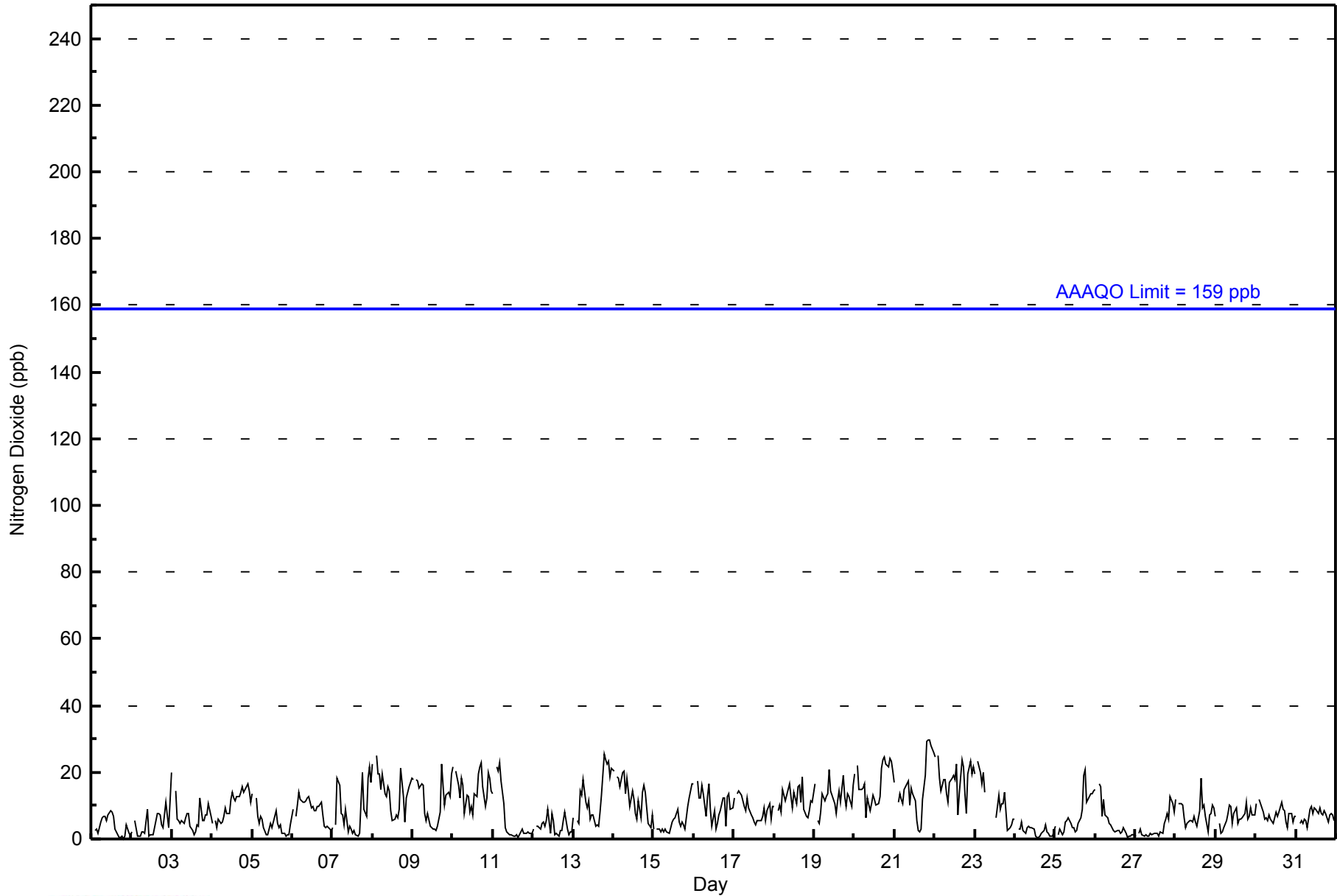
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	2	Z	3	3	2	5	6	7	7	5	7	9	8	7	3	2	0	0	1	0	1	4	2	1	3.7	9																						
2-Oct	2	Z	6	1	1	1	2	2	2	9	1	1	1	1	6	8	8	7	4	3	11	7	3	11	4.3	11																						
3-Oct	20	Z	14	6	6	5	6	5	6	8	8	4	3	1	2	4	4	12	6	5	7	7	11	7	6.7	20																						
4-Oct	5	Z	6	3	6	5	5	7	9	8	8	12	14	12	12	13	13	14	16	14	15	17	15	11	10.3	17																						
5-Oct	13	Z	12	7	5	7	6	3	1	1	3	5	3	7	8	5	4	4	2	2	1	1	1	4	4.5	13																						
6-Oct	9	Z	7	10	14	12	11	11	12	12	13	9	10	8	9	10	10	11	7	4	3	4	3	2	8.7	14																						
7-Oct	3	Z	4	18	16	8	7	4	9	2	4	3	2	2	1	1	2	11	20	9	7	18	22	17	8.3	22																						
8-Oct	22	Z	25	20	20	15	20	13	13	16	14	8	6	6	7	6	9	21	13	5	12	14	16	18	13.8	25																						
9-Oct	18	Z	18	17	15	17	16	8	5	8	4	4	3	3	3	4	8	22	16	10	13	14	13	19	11.2	22																						
10-Oct	22	Z	21	16	12	18	16	8	13	13	8	10	7	14	13	20	22	23	16	10	12	20	18	14	15.0	23																						
11-Oct	14	Z	22	21	23	18	11	3	2	2	1	1	1	1	1	1	1	3	2	2	2	2	2	2	5.9	23																						
12-Oct	3	Z	4	4	3	5	5	4	6	9	2	8	6	1	2	1	3	3	5	8	3	1	2	2	3.8	9																						
13-Oct	6	Z	6	5	14	13	18	11	9	12	6	7	7	4	4	4	8	13	25	24	23	24	19	21	12.3	25																						
14-Oct	20	Z	19	18	16	20	21	14	18	15	10	14	12	8	6	11	7	14	16	14	9	5	3	7	12.8	21																						
15-Oct	3	Z	3	3	2	3	2	3	2	2	4	5	6	7	9	5	4	5	4	3	10	12	14	16	5.5	16																						
16-Oct	17	Z	17	12	12	16	14	7	13	17	9	4	8	3	5	7	8	12	12	4	13	13	9	9	10.5	17																						
17-Oct	12	Z	14	14	13	11	10	8	12	10	7	6	5	4	5	5	6	7	9	6	9	11	6	10	8.7	14																						
18-Oct	10	Z	9	10	8	15	13	12	15	16	13	10	14	11	16	16	11	19	9	7	6	9	12	11	11.7	19																						
19-Oct	16	Z	6	5	8	13	11	13	14	21	14	12	11	8	12	14	11	19	13	10	13	13	10	16	12.2	21																						
20-Oct	19	Z	22	15	15	15	16	6	12	8	11	13	12	10	11	13	21	24	24	22	22	24	23	20	16.5	24																						
21-Oct	17	Z	11	14	12	11	15	16	17	10	15	14	12	5	2	2	3	12	19	29	30	30	28	26	15.2	30																						
22-Oct	25	Z	25	18	15	18	18	13	11	17	18	19	18	22	7	14	24	22	14	8	20	23	20	21	17.7	25																						
23-Oct	19	Z	24	20	17	20	14	C	C	C	C	C	C	6	13	9	11	10	14	2	3	3	4	6	--	24																						
24-Oct	6	Z	3	3	5	3	2	3	4	4	4	3	1	1	0	1	2	3	4	2	2	1	1	3	2.5	6																						
25-Oct	4	Z	1	3	1	2	5	6	6	5	3	4	2	3	5	7	9	19	21	11	13	13	13	15	7.4	21																						
26-Oct	15	Z	17	16	7	12	7	6	5	4	3	2	2	3	3	2	2	4	2	1	1	1	1	1	5.0	17																						
27-Oct	1	Z	2	3	1	1	1	1	1	2	1	2	2	2	1	2	2	5	6	8	6	13	11	8	3.4	13																						
28-Oct	12	Z	10	11	10	6	4	5	5	5	5	7	5	4	9	18	10	10	7	2	7	8	10	10	7.8	18																						
29-Oct	7	Z	5	2	2	3	6	8	10	10	5	8	10	5	6	6	7	8	11	6	7	9	7	7	6.6	11																						
30-Oct	11	Z	12	10	8	6	6	6	7	6	5	6	8	7	8	11	9	9	5	4	8	8	5	7	7.4	12																						
31-Oct	7	Z	5	6	5	6	5	3	9	10	8	9	9	8	9	8	7	8	8	5	7	8	7	6	7.0	10																						
																								11.6	--	11.2	10.1	9.4	9.9	9.6	7.2	8.5	8.8	7.1	7.2	6.9	5.9	6.3	7.3	7.8	11.4	10.6	7.7	9.5	10.8	10.0	10.7	Diurnal Average
																								25	--	25	21	23	20	21	16	18	21	18	19	18	22	16	20	24	24	25	29	30	30	28	26	Diurnal Maximum

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



**WBEA**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Millennium - October 2014**





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Millennium - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	666	94.20	94.20
21 - 40	41	5.80	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Millennium - October 2014**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	47	31	21	14	18	53	167	53	29	42	18	31	58	49	20	12	663
21 - 40	0	0	0	0	1	11	18	8	2	0	0	0	0	0	0	0	40
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>	47	31	21	14	19	64	185	61	31	42	18	31	58	49	20	12	703

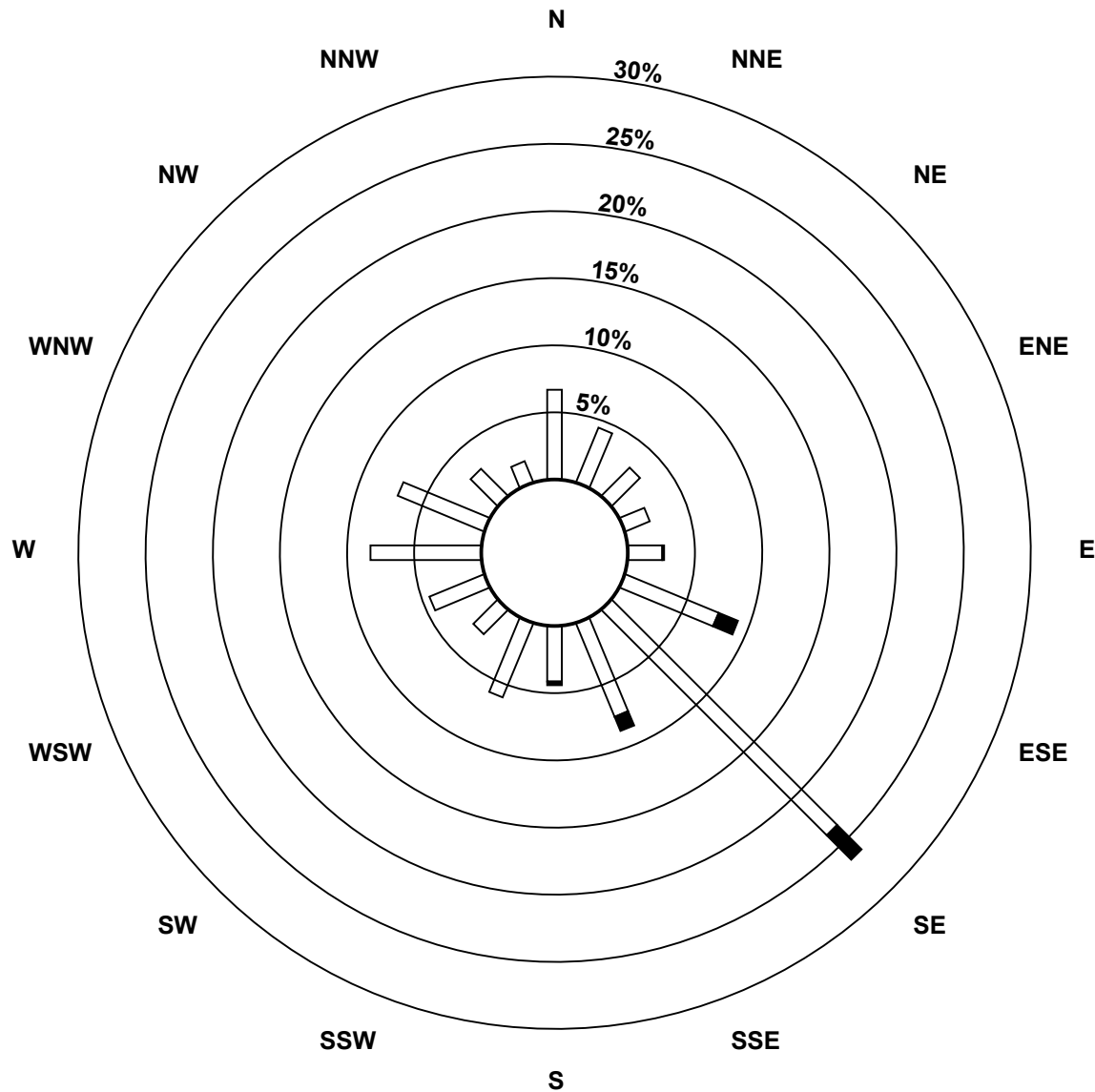
Total Number of Valid Hours: 703

Total Number of Hours: 744

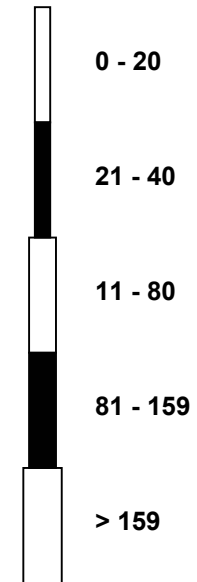


Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Millennium (AMS 12)



Classes (ppb)

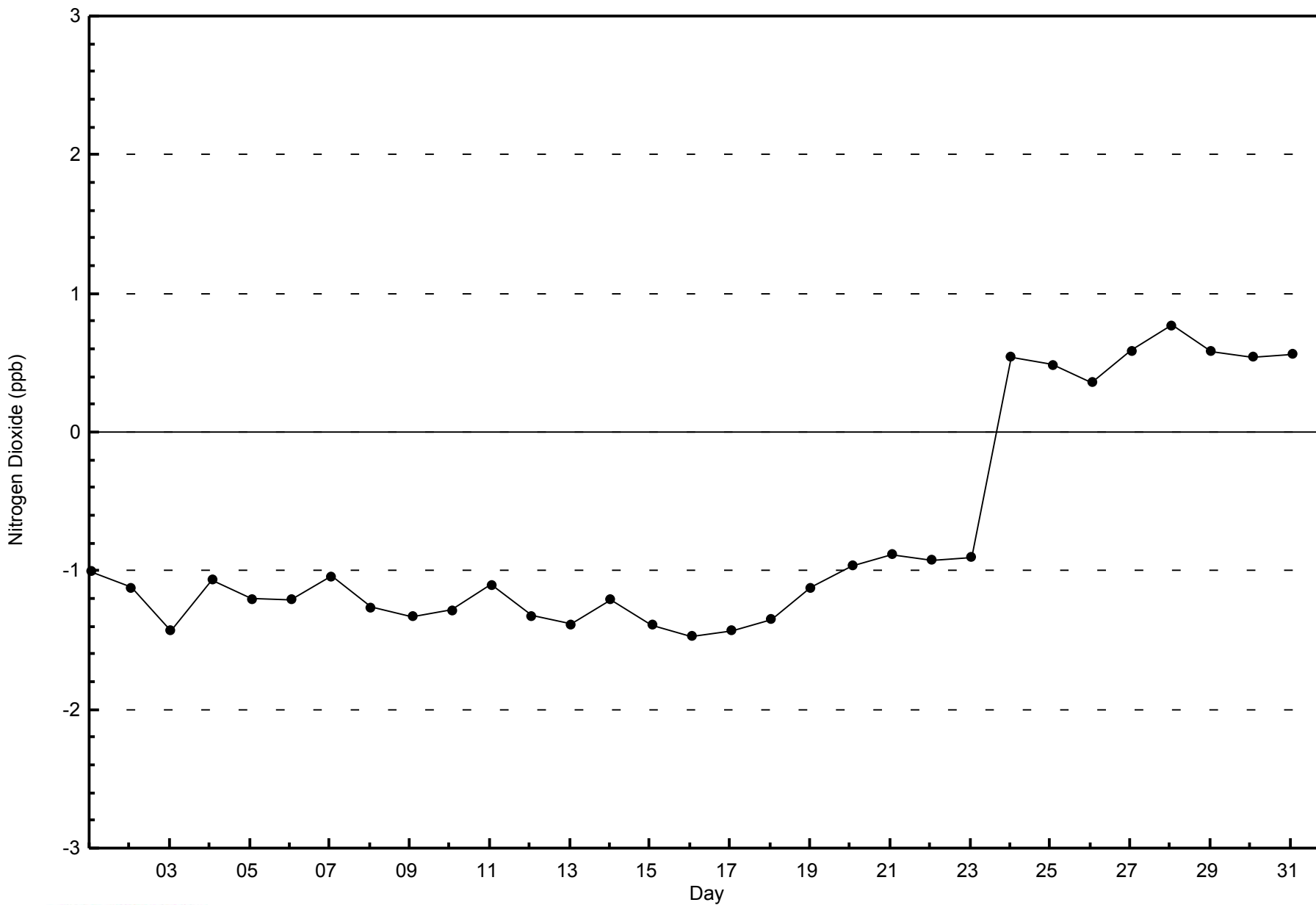


Total Number of Valid Hours: 703



WBEA  
Zero Responses

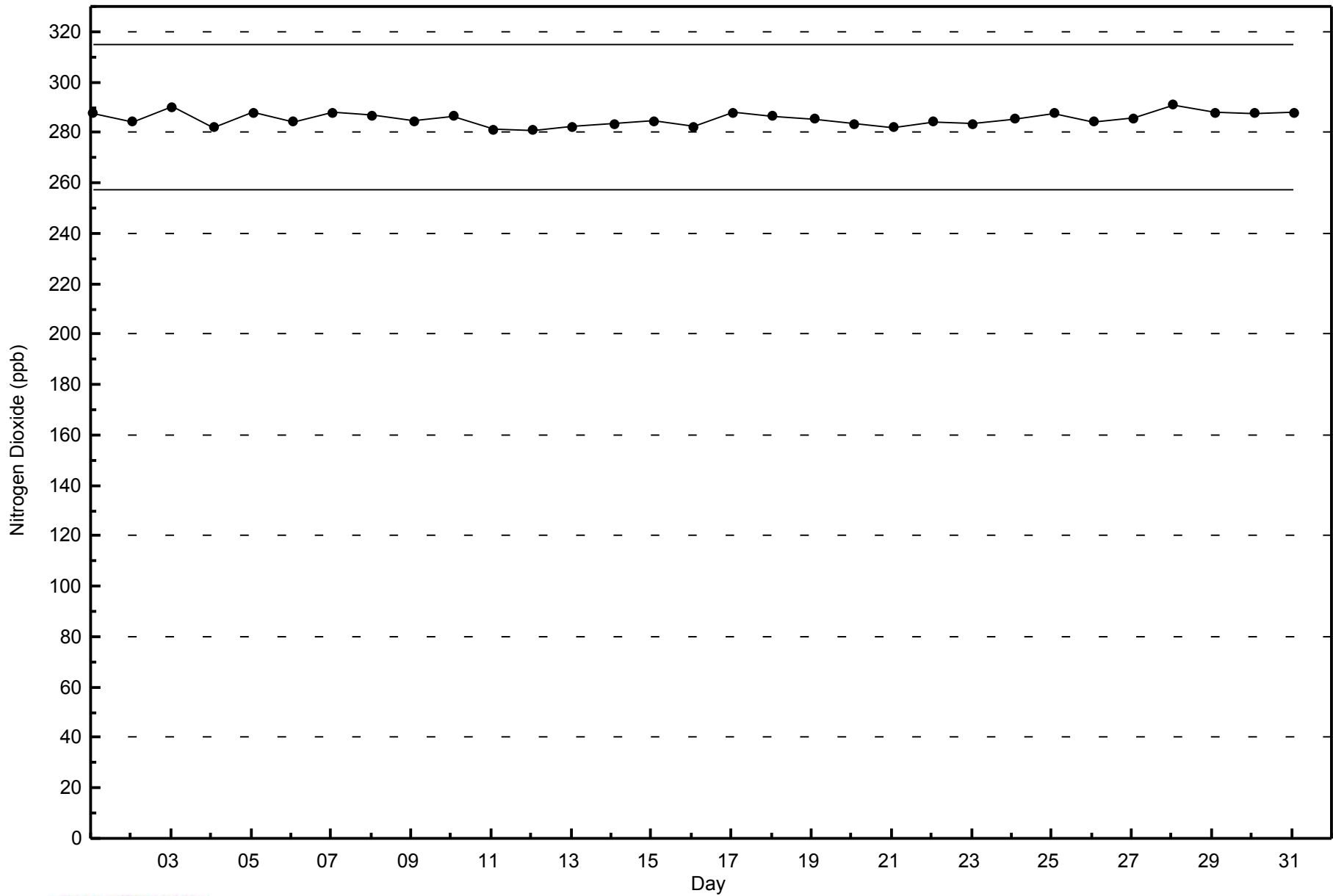
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Millennium - October 2014





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Millennium - October 2014



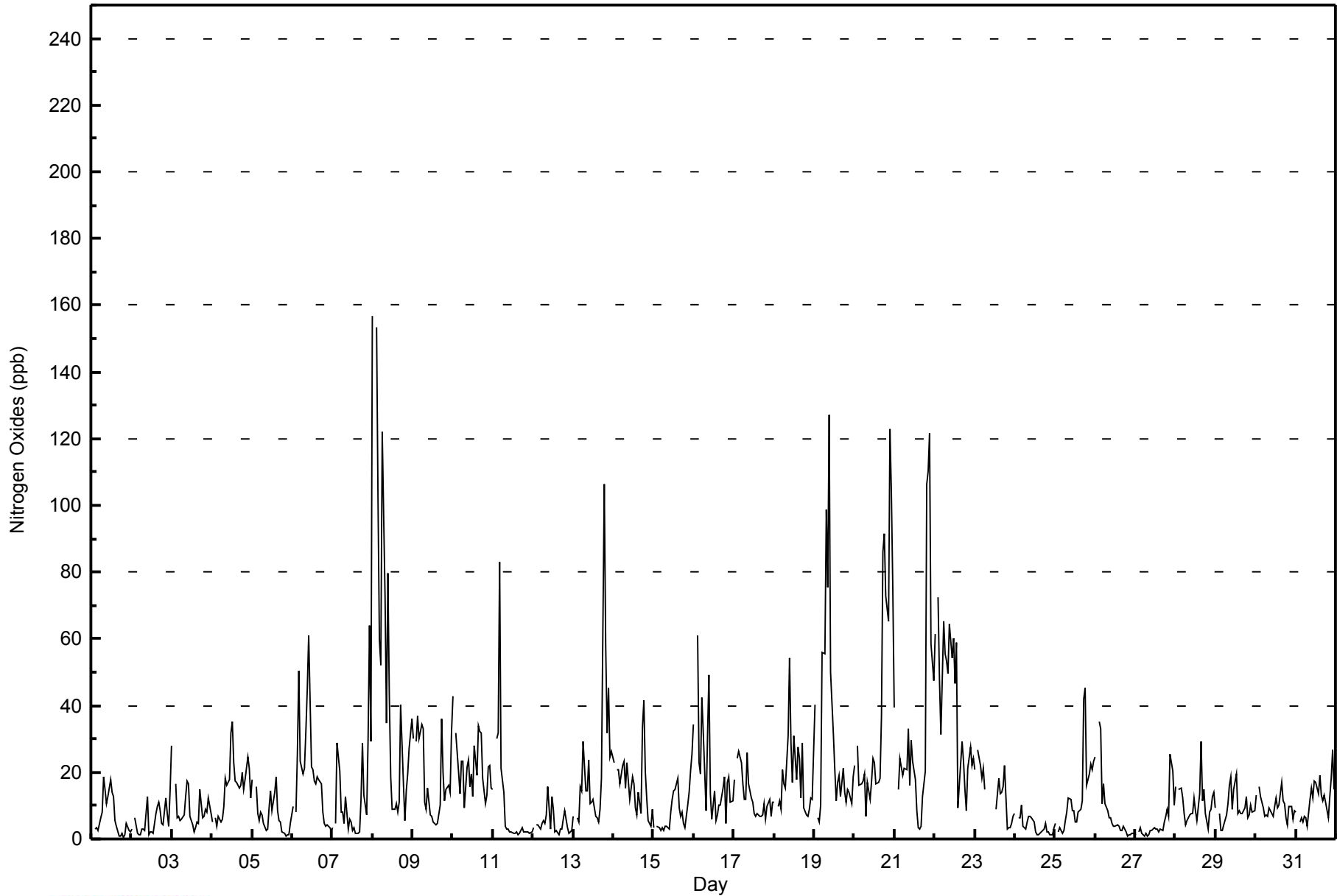


Maximum Value: 157 ppb on Oct 8 01:00																		Maximum Daily Average: 47.9 ppb on Oct 8																		Hours in Service: 744			
Minimum Value: 1 ppb on Oct 1 20:00																		Minimum Daily Average: 4.1 ppb on Oct 24																		Hours of Data: 707			
Maximum Diurnal Average: 23.5 ppb at hour 10																		Minimum Diurnal Average: 10.2 ppb at hour 15																		Hours of Missing Data: 37			
Monthly Average: 16.5 ppb																		Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 5 Median = 11 Q <sub>3</sub> = 19 P <sub>90</sub> = 33 P <sub>99</sub> = 104																		Hours of Calibration: 37			
																																				Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24															
1-Oct	3	Z	3	3	3	6	8	19	15	11	13	18	14	13	5	4	1	1	1	1	1	5	2	2	6.5	19													
2-Oct	3	Z	6	2	1	1	3	3	3	13	1	2	2	2	8	10	11	9	5	4	12	8	4	14	5.5	14													
3-Oct	28	Z	17	6	7	5	6	7	13	17	17	7	4	2	4	5	5	15	6	7	9	8	12	7	9.3	28													
4-Oct	5	Z	6	4	7	5	6	10	18	16	18	32	35	23	17	15	16	20	15	18	24	21	12	15.7	35														
5-Oct	18	Z	16	8	5	8	7	5	3	3	9	15	9	14	19	9	5	5	2	2	1	1	5	7.3	19														
6-Oct	10	Z	8	25	50	23	20	21	32	45	61	22	21	17	16	19	18	17	8	4	4	4	3	2	19.6	61													
7-Oct	3	Z	5	29	20	8	8	5	13	3	6	5	3	3	2	2	2	12	29	13	7	30	64	29	13.0	64													
8-Oct	157	Z	153	103	60	52	122	73	35	80	43	18	9	9	11	8	11	40	17	6	14	20	27	36	47.9	157													
9-Oct	30	Z	29	37	30	34	33	11	9	15	7	7	5	5	4	5	10	36	20	12	15	16	14	32	18.1	37													
10-Oct	43	Z	32	20	14	23	23	9	22	24	16	19	13	28	19	34	32	32	18	11	13	22	22	15	21.8	43													
11-Oct	15	Z	30	32	83	21	14	4	3	3	2	2	2	2	2	1	2	4	2	2	2	2	2	2	10.1	83													
12-Oct	3	Z	4	4	3	5	6	5	7	16	3	13	9	2	3	1	3	3	6	9	3	2	2	3	5.0	16													
13-Oct	7	Z	6	5	16	14	29	14	15	24	10	11	12	7	6	5	9	18	106	58	32	45	25	26	21.8	106													
14-Oct	23	Z	21	21	17	22	23	15	23	17	12	19	17	9	7	14	8	33	42	20	12	5	4	9	17.1	42													
15-Oct	4	Z	4	4	3	4	3	4	4	3	8	12	14	15	18	9	7	8	4	3	10	14	20	26	8.7	26													
16-Oct	34	Z	61	23	19	42	32	9	31	49	14	6	14	5	7	10	10	15	18	5	17	19	11	12	20.1	61													
17-Oct	18	Z	24	26	23	16	12	12	26	17	12	11	8	7	8	7	7	7	11	6	10	12	7	11	12.9	26													
18-Oct	11	Z	10	12	9	21	17	15	31	54	29	17	31	18	27	24	12	29	9	7	7	9	12	12	18.4	54													
19-Oct	40	Z	6	5	10	56	56	99	75	127	50	31	21	11	17	19	13	21	14	11	15	14	11	18	32.2	127													
20-Oct	22	Z	28	16	17	17	20	7	17	12	17	24	23	17	17	18	37	86	91	73	65	123	104	76	40.3	123													
21-Oct	39	Z	15	24	22	19	21	21	33	16	30	23	18	8	3	3	4	13	21	106	110	122	58	47	33.8	122													
22-Oct	62	Z	73	48	31	65	56	54	50	65	54	60	47	59	9	16	29	23	15	8	21	27	22	24	39.9	73													
23-Oct	21	Z	27	22	18	21	15	C	C	C	C	C	C	9	18	14	14	16	22	3	3	4	5	7	--	27													
24-Oct	8	Z	6	6	10	4	3	5	7	7	6	5	2	1	1	1	2	3	5	2	2	1	1	3	4.1	10													
25-Oct	5	Z	2	3	1	2	6	8	12	12	8	8	5	5	8	9	11	42	45	16	20	22	21	23	12.9	45													
26-Oct	25	Z	35	33	10	17	10	9	6	6	5	4	4	4	4	2	2	4	2	1	1	1	2	2	8.3	35													
27-Oct	1	Z	2	3	2	1	2	1	1	3	2	3	3	3	2	3	2	5	7	9	7	26	20	10	5.2	26													
28-Oct	16	Z	15	15	12	7	4	6	7	8	8	12	8	6	14	29	11	15	8	3	8	9	13	14	10.8	29													
29-Oct	9	Z	8	2	3	4	7	11	16	19	9	15	19	8	8	8	8	10	13	6	7	10	8	8	9.4	19													
30-Oct	13	Z	16	13	9	7	7	7	9	9	7	10	12	9	10	17	11	11	6	4	10	10	6	8	9.6	17													
31-Oct	8	Z	5	6	5	7	6	4	12	15	12	17	17	13	19	13	11	13	11	6	13	18	27	15	12.0	27													
																								Diurnal Average															
																								Diurnal Maximum															
22.0 -- 21.7 18.1 16.8 17.4 18.8 15.6 18.2 23.5 16.3 14.9 13.3 10.8 10.2 10.9 10.4 18.1 18.8 14.0 15.2 20.4 17.8 16.5																																							
157 -- 153 103 83 65 122 99 75 127 61 60 47 59 27 34 37 86 106 106 110 123 104 76																																							
Z - zerospan C - Calibration																																							



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Millennium - October 2014**





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Millennium - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	543	76.80	76.80
21 - 40	109	15.42	92.22
41 - 80	40	5.66	97.88
81 - 159	15	2.12	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Millennium - October 2014**

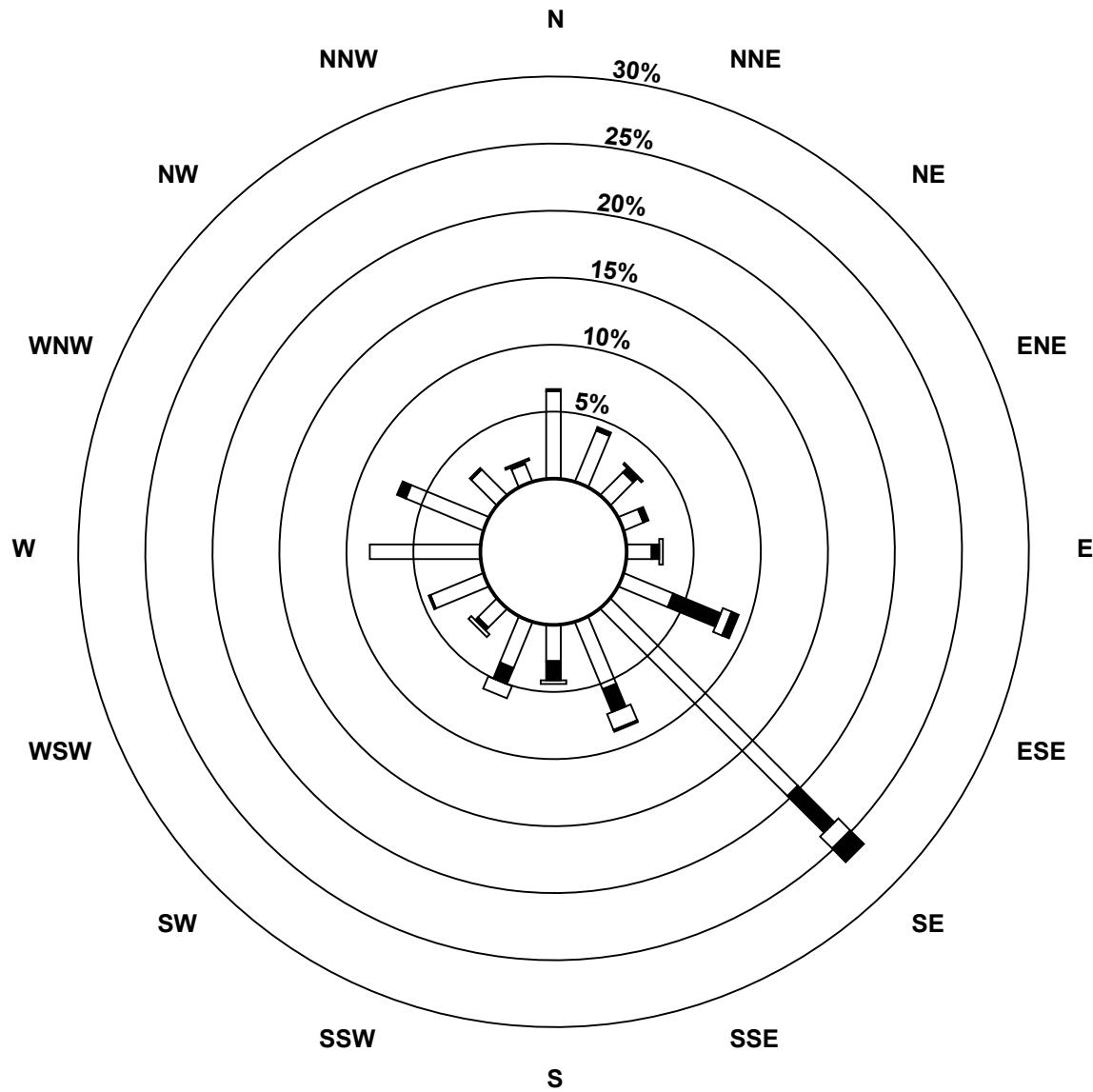
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	46	29	17	11	13	28	139	38	19	26	14	30	58	44	19	10	541
21 - 40	1	2	3	3	4	27	27	13	10	9	2	1	0	5	1	1	109
11 - 80	0	0	1	0	2	5	9	9	2	7	2	0	0	0	0	1	38
81 - 159	0	0	0	0	0	4	10	1	0	0	0	0	0	0	0	0	15
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	31	21	14	19	64	185	61	31	42	18	31	58	49	20	12	703

Total Number of Valid Hours: 703

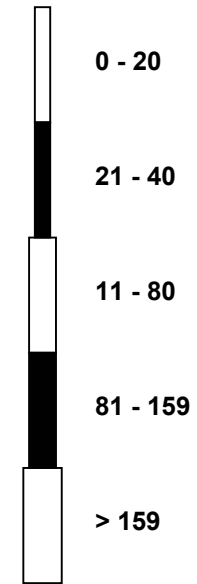
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Millennium (AMS 12)**

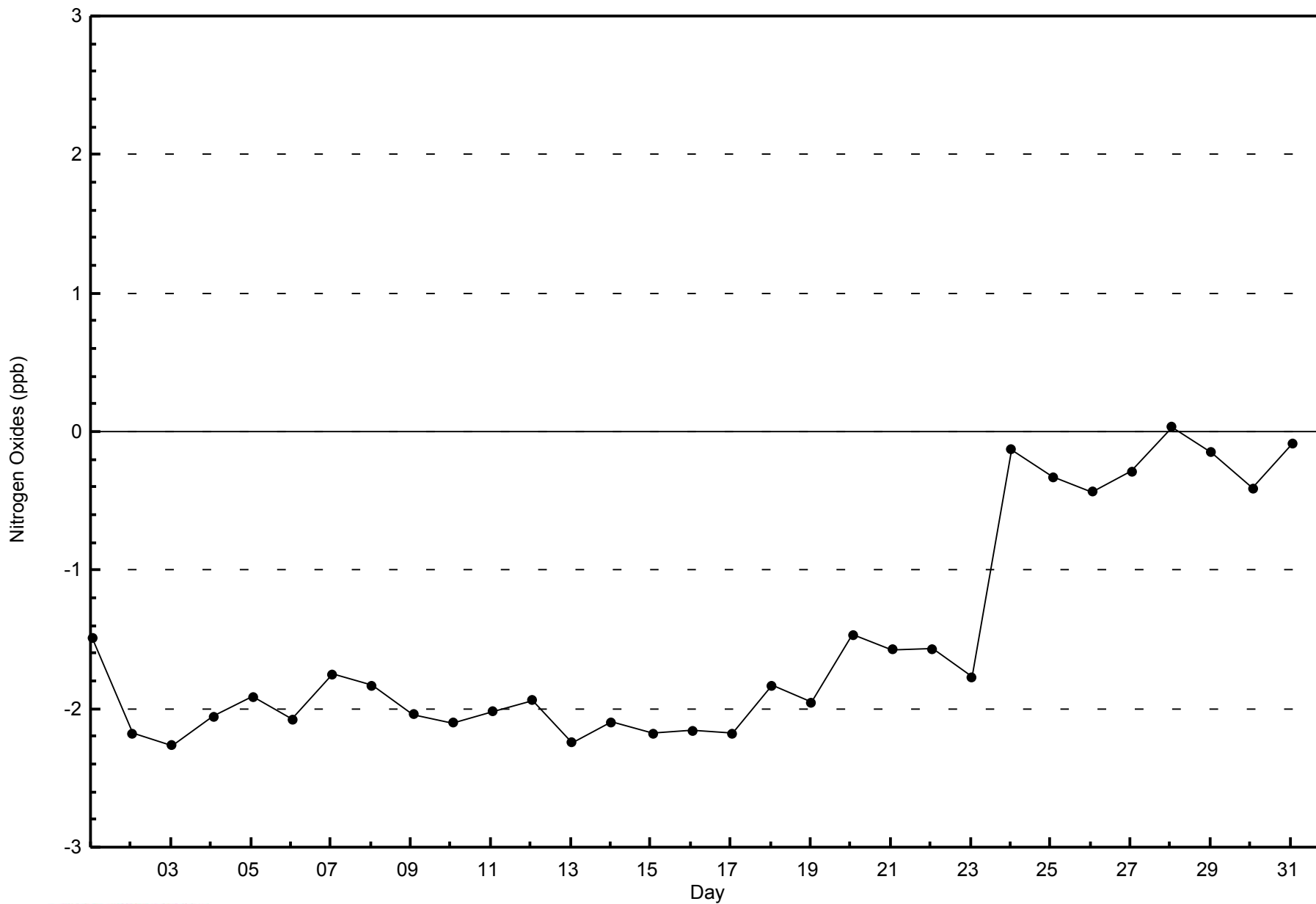


Classes (ppb)



Total Number of Valid Hours: 703

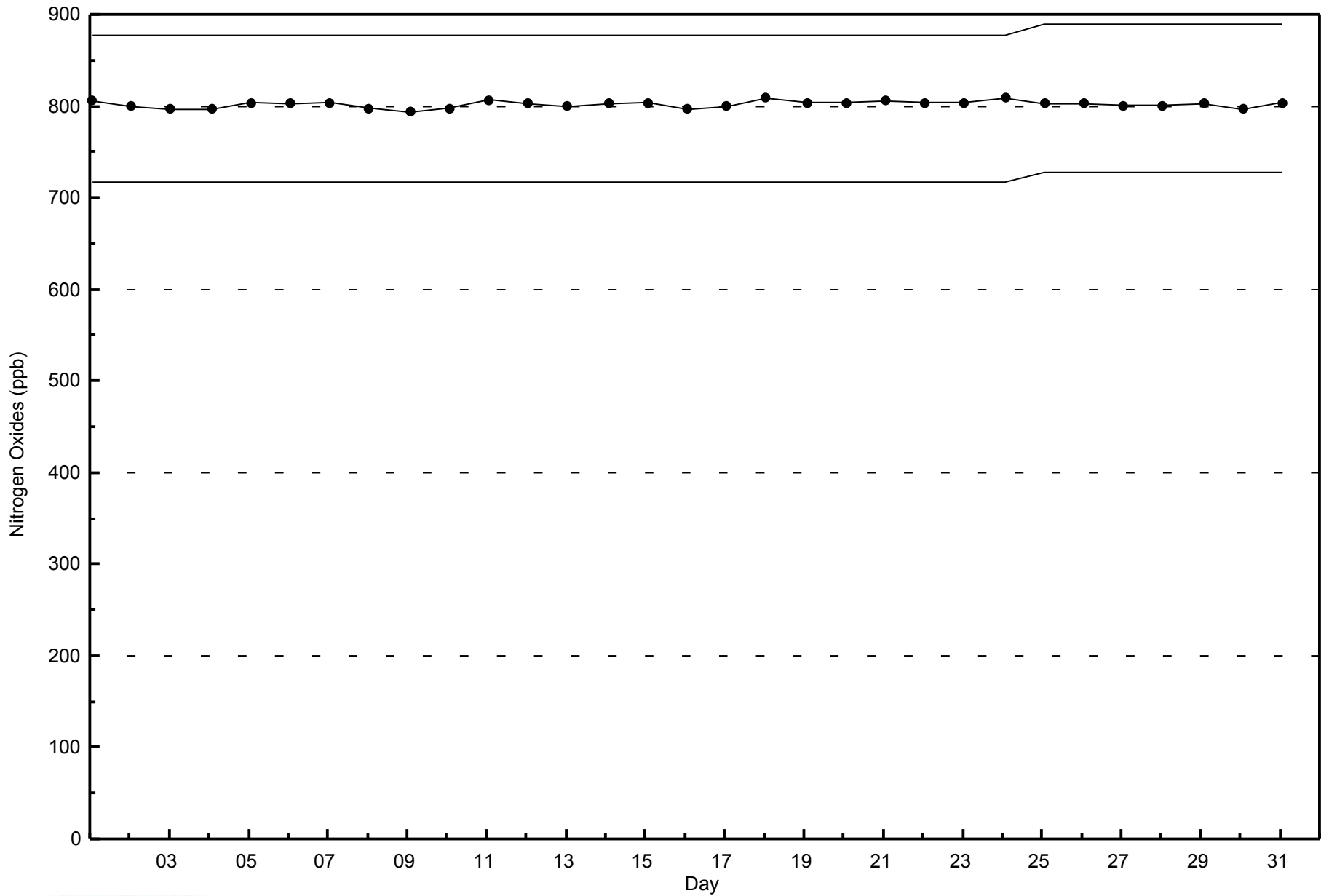






**WBEA**  
**Span Responses**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Millennium - October 2014**





Summary of Hour Averages

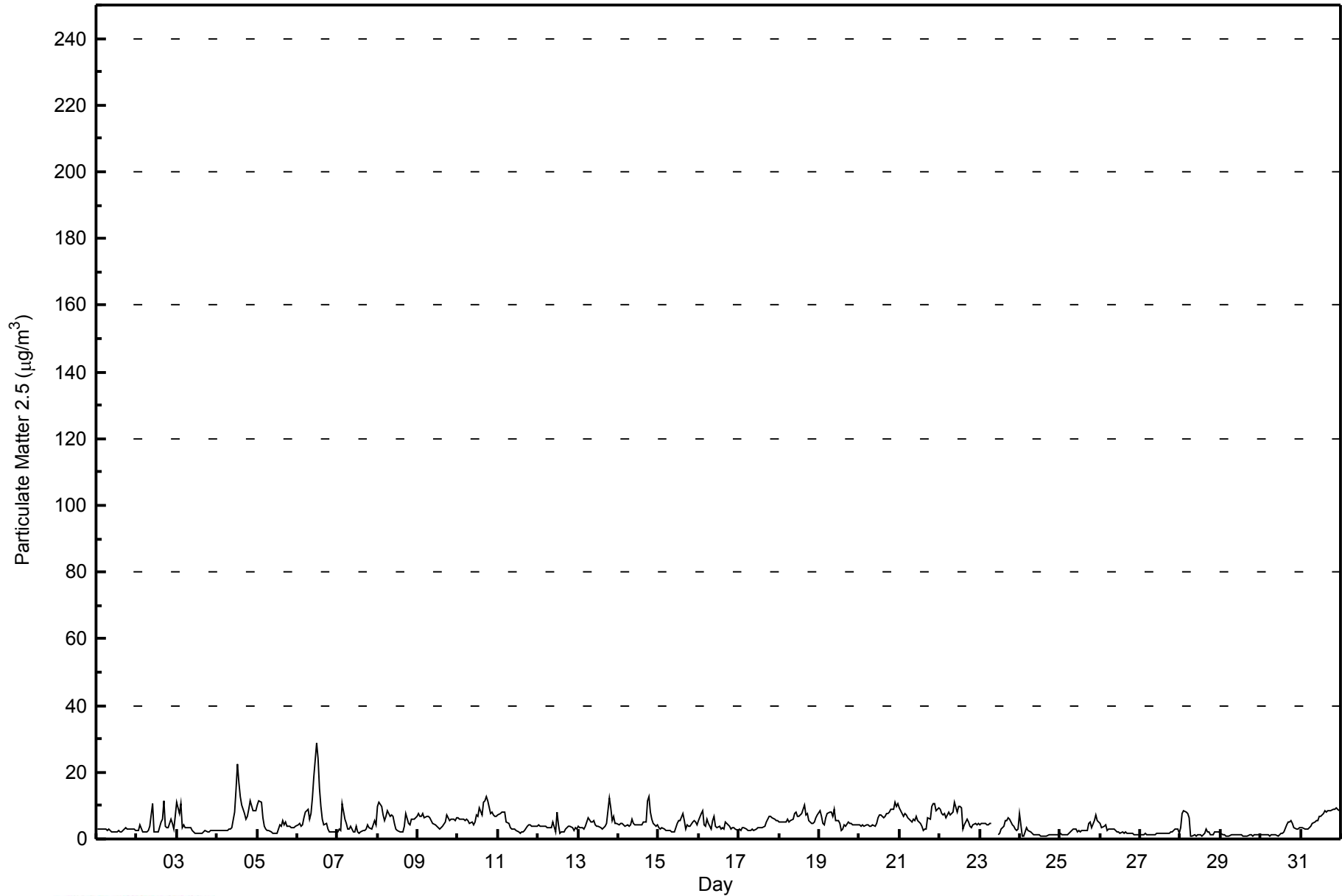
Millennium - October 2014

Number of Exceedences (AAAQO): 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 28.9 µg/m <sup>3</sup> on Oct 6 12:00										Maximum Daily Average: 7.9 µg/m <sup>3</sup> on Oct 6										Hours of Data: 741																													
Minimum Value: 0.6 µg/m <sup>3</sup> on Oct 24 02:00										Minimum Daily Average: 1.2 µg/m <sup>3</sup> on Oct 29										Hours of Missing Data: 3																													
Maximum Diurnal Average: 5.1 µg/m <sup>3</sup> at hour 18										Minimum Diurnal Average: 3.8 µg/m <sup>3</sup> at hour 8										Hours of Calibration: 0																													
Monthly Average: 4.51 µg/m <sup>3</sup>										Percentiles: P <sub>1</sub> = 1.0 P <sub>10</sub> = 1.4 Q <sub>1</sub> = 2.4 Median = 3.9 Q <sub>3</sub> = 6.0 P <sub>90</sub> = 8.2 P <sub>99</sub> = 14.7										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-Oct	3.1	3.0	2.9	3.0	3.1	2.8	2.6	3.1	2.4	2.1	2.3	2.3	2.2	2.3	2.2	2.2	2.9	3.3	3.2	2.9	2.9	3.2	2.8	2.6	2.7	3.3																							
2-Oct	2.7	2.6	4.4	2.2	2.1	2.1	2.1	2.4	3.8	10.6	2.1	2.3	2.3	2.2	5.2	5.9	11.4	4.0	3.2	3.5	6.1	4.6	2.9	7.0	4.1	11.4																							
3-Oct	10.9	7.8	10.4	3.5	4.3	3.3	3.3	3.3	3.3	2.5	2.2	1.7	1.7	1.7	1.8	1.8	2.1	2.5	2.3	2.3	2.4	2.4	2.5	2.4	3.4	10.9																							
4-Oct	2.6	2.5	2.6	2.4	2.5	2.6	2.5	2.8	3.1	3.2	8.0	14.9	22.7	17.1	12.8	10.3	7.6	6.1	6.9	8.7	11.5	8.6	8.3	8.6	7.4	22.7																							
5-Oct	10.1	11.3	11.2	6.4	3.8	2.9	2.6	2.5	2.2	1.9	1.8	1.8	1.5	4.4	3.9	5.4	4.2	4.9	3.6	3.6	3.5	3.5	3.5	3.8	4.3	11.3																							
6-Oct	4.1	4.5	3.8	4.3	6.5	8.2	8.9	6.1	7.5	12.1	18.5	28.9	24.2	15.1	9.8	5.9	4.4	4.6	2.8	1.9	2.0	2.0	2.0	2.2	7.9	28.9																							
7-Oct	2.2	2.9	2.7	10.4	5.9	4.8	3.0	2.8	3.6	2.1	2.3	3.7	1.9	1.8	2.0	2.4	2.5	3.0	4.2	3.4	3.1	4.1	5.3	4.3	3.5	10.4																							
8-Oct	9.7	11.1	9.8	7.3	5.4	6.7	8.3	6.7	7.2	6.9	4.7	3.0	2.4	2.1	2.3	2.3	3.6	7.8	4.7	4.2	6.0	6.1	5.8	6.9	5.9	11.1																							
9-Oct	7.5	7.0	6.7	7.6	6.5	6.9	7.0	6.4	5.6	4.9	4.3	3.9	3.4	3.1	3.4	3.6	5.1	7.2	6.6	5.5	6.0	5.8	5.4	6.2	5.6	7.6																							
10-Oct	6.3	5.7	6.0	6.0	5.6	6.0	5.6	4.6	4.9	4.4	5.2	7.1	6.9	9.2	7.1	10.8	11.4	12.6	11.6	7.5	7.9	7.2	6.8	6.7	7.2	12.6																							
11-Oct	7.1	7.6	8.0	7.9	8.1	5.1	4.5	3.2	2.9	2.8	2.9	2.7	2.3	1.9	2.0	2.2	2.5	3.9	4.3	4.1	3.9	3.9	4.0	3.8	4.2	8.1																							
12-Oct	4.0	4.0	3.8	3.9	3.8	3.5	3.5	3.5	3.4	4.9	2.1	8.2	4.2	1.8	2.0	2.1	3.0	3.4	3.9	3.8	3.4	2.7	3.3	2.9	3.5	8.2																							
13-Oct	3.8	3.2	3.5	3.2	4.0	4.9	6.5	5.2	5.0	5.5	4.2	3.9	3.9	3.5	3.2	3.6	3.6	4.7	12.3	9.2	5.7	6.7	4.7	4.8	4.9	12.3																							
14-Oct	4.4	4.7	4.7	4.4	3.9	4.2	4.0	4.2	5.8	4.8	4.3	4.4	4.3	4.3	4.4	5.2	5.3	11.2	12.7	8.2	6.1	4.7	3.8	4.1	5.3	12.7																							
15-Oct	3.3	3.1	3.3	3.0	2.6	2.6	2.5	2.3	2.2	2.1	3.5	4.6	5.4	5.5	7.6	5.6	2.9	4.2	3.9	3.8	5.1	5.5	5.2	4.2	3.9	7.6																							
16-Oct	5.7	7.5	8.3	4.0	4.0	6.0	4.6	3.0	5.4	6.6	3.9	3.2	4.0	2.9	3.3	3.1	4.9	4.2	3.7	2.8	3.3	3.3	3.0	2.7	4.3	8.3																							
17-Oct	3.0	2.7	3.4	3.5	2.9	2.7	2.4	2.7	2.8	2.7	2.9	3.2	3.3	3.5	3.6	3.8	4.9	6.1	6.8	6.9	6.2	5.9	5.7	5.7	4.0	6.9																							
18-Oct	5.3	5.3	5.2	5.1	5.0	6.0	5.0	5.5	6.0	7.6	7.9	6.9	6.8	7.4	9.0	10.1	7.1	7.7	5.4	4.7	4.8	5.1	6.3	7.3	6.4	10.1																							
19-Oct	8.5	6.9	4.6	4.4	6.2	7.8	8.1	8.2	7.0	9.1	5.6	5.6	4.6	2.5	3.1	4.4	3.9	5.0	4.7	4.5	4.2	4.3	4.0	4.2	5.5	9.1																							
20-Oct	4.1	4.0	4.4	3.9	4.1	4.4	4.0	3.6	4.1	3.7	4.6	6.3	7.4	7.3	6.6	6.9	7.8	7.8	8.0	9.1	9.0	11.2	9.6	10.7	6.4	11.2																							
21-Oct	9.5	7.8	7.0	7.8	7.2	6.5	5.9	5.2	6.0	5.4	6.7	5.7	4.8	3.8	2.6	2.8	3.1	6.2	6.1	9.6	10.5	10.6	8.3	9.4	6.6	10.6																							
22-Oct	8.8	7.7	7.3	7.8	6.4	8.0	7.0	7.8	8.0	11.0	8.2	9.8	9.9	9.3	3.2	4.2	6.1	5.0	3.7	3.3	4.4	4.9	4.3	4.5	6.7	11.0																							
23-Oct	4.2	4.8	4.7	4.5	4.3	4.3	4.5	4.7	M	M	M	1.3	1.5	2.8	3.7	5.4	5.7	6.3	6.0	4.3	3.7	2.8	2.6	3.0	4.1	6.3																							
24-Oct	7.5	0.6	0.8	2.2	3.3	2.6	2.0	1.6	1.3	1.2	1.4	1.2	1.0	1.0	0.9	0.9	1.0	1.2	1.4	1.2	1.1	1.1	1.1	1.4	1.6	7.5																							
25-Oct	1.5	1.3	1.2	1.4	1.4	1.7	2.1	2.6	3.1	3.2	2.2	2.6	2.1	2.6	2.6	2.4	2.5	4.8	5.2	3.4	5.4	7.2	5.6	5.2	3.0	7.2																							
26-Oct	4.6	3.5	4.0	4.0	2.3	2.9	3.1	3.1	2.9	2.4	2.2	2.0	1.9	2.0	1.8	2.0	1.8	1.8	1.6	1.5	1.4	1.3	1.3	1.2	2.4	4.6																							
27-Oct	1.2	1.2	1.4	1.5	1.3	1.4	1.3	1.3	1.3	1.4	1.8	1.9	1.9	1.8	1.6	1.7	1.5	1.8	1.9	2.3	2.4	2.8	3.1	1.8	1.7	3.1																							
28-Oct	3.2	7.8	8.4	8.0	7.6	6.4	0.8	0.9	1.1	1.1	1.3	1.3	1.2	1.0	1.7	2.9	2.2	1.9	1.4	1.4	2.0	2.1	2.3	2.0	2.9	8.4																							
29-Oct	1.5	1.2	1.3	1.0	1.0	1.0	1.2	1.2	1.4	1.4	1.2	1.3	1.5	0.9	1.0	1.0	1.0	1.1	1.3	1.0	1.1	1.2	1.1	1.2	1.2	1.5																							
30-Oct	1.3	1.2	1.4	1.3	1.1	1.0	1.1	1.2	1.3	1.2	1.0	1.3	1.7	1.9	2.1	4.1	5.1	4.9	5.3	4.8	3.4	3.0	2.9	3.4	2.4	5.3																							
31-Oct	3.4	3.2	3.1	2.9	3.1	3.5	3.9	4.5	5.3	5.4	5.6	6.9	7.0	7.7	8.4	7.9	8.3	8.5	8.6	8.7	9.0	9.5	8.8	8.5	6.3	9.5																							
																								5.0	4.8	4.8	4.5	4.2	4.3	4.0	3.8	4.0	4.5	4.2	5.0	4.8	4.3	4.0	4.3	4.5	5.1	5.1	4.6	4.8	4.8	4.4	4.6	Diurnal Average	
																								10.9	11.3	11.2	10.4	8.1	8.2	8.9	8.2	8.0	12.1	18.5	28.9	24.2	17.1	12.8	10.8	11.4	12.6	12.7	9.6	11.5	11.2	9.6	10.7	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 - October 2014**





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Millennium - October 2014**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	514	69.37	69.37
6 - 15	210	28.34	97.71
16 - 25	4	0.54	98.25
26 - 80	1	0.13	98.38
> 81.0	0	0.00	98.38

Total Number of Valid Hours: 741

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Millennium - October 2014**

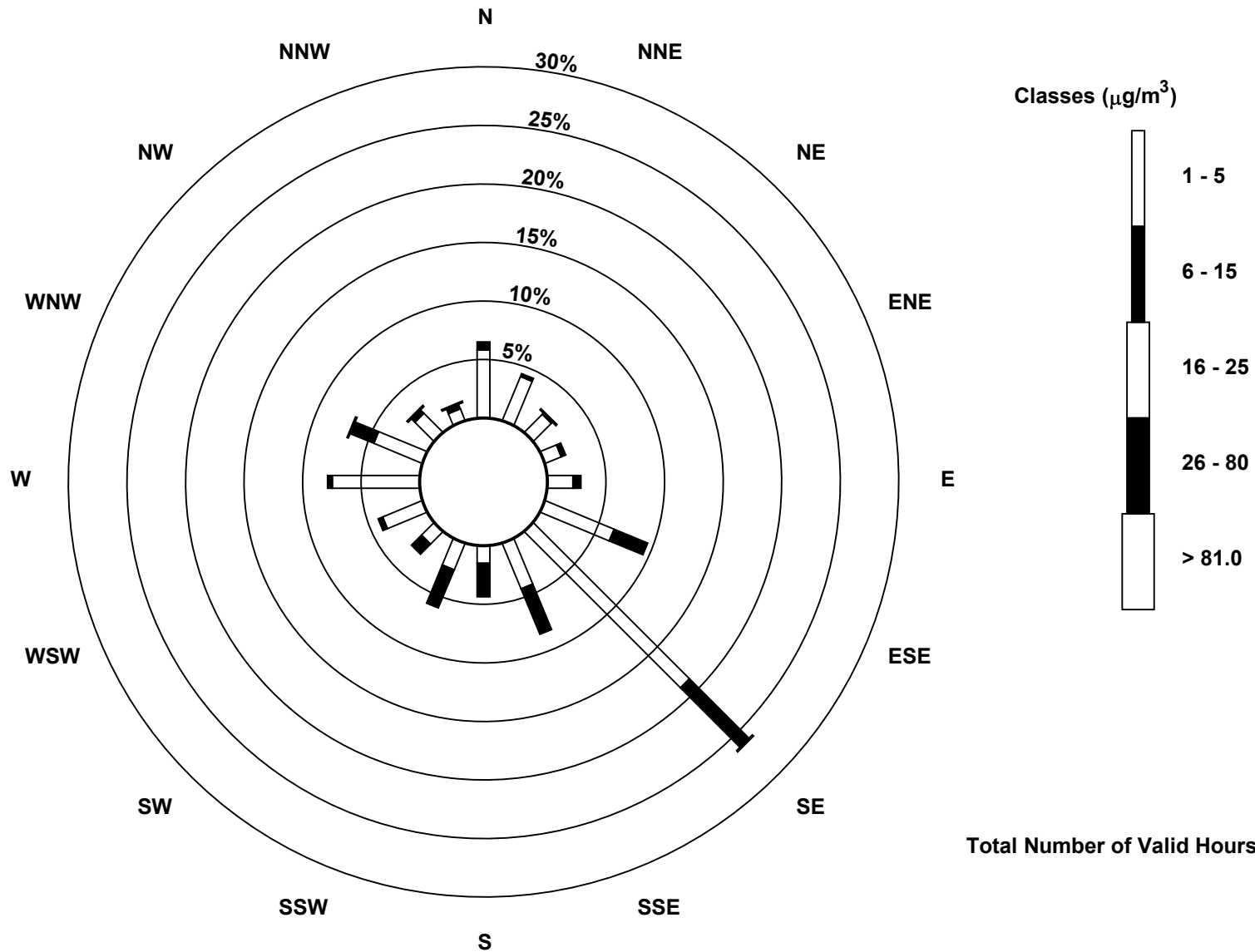
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	43	30	16	11	16	47	139	31	11	18	11	27	55	33	17	8	513
6 - 15	5	2	1	3	5	23	53	31	21	26	9	3	3	16	3	3	207
16 - 25	0	0	1	0	0	0	1	0	0	0	0	0	0	1	1	0	4
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>48</b>	<b>32</b>	<b>18</b>	<b>14</b>	<b>21</b>	<b>70</b>	<b>193</b>	<b>62</b>	<b>32</b>	<b>44</b>	<b>20</b>	<b>30</b>	<b>58</b>	<b>50</b>	<b>21</b>	<b>12</b>	<b>725</b>

Total Number of Valid Hours: 737

Total Number of Hours: 744

Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
 Millennium (AMS 12)



Total Number of Valid Hours: 737



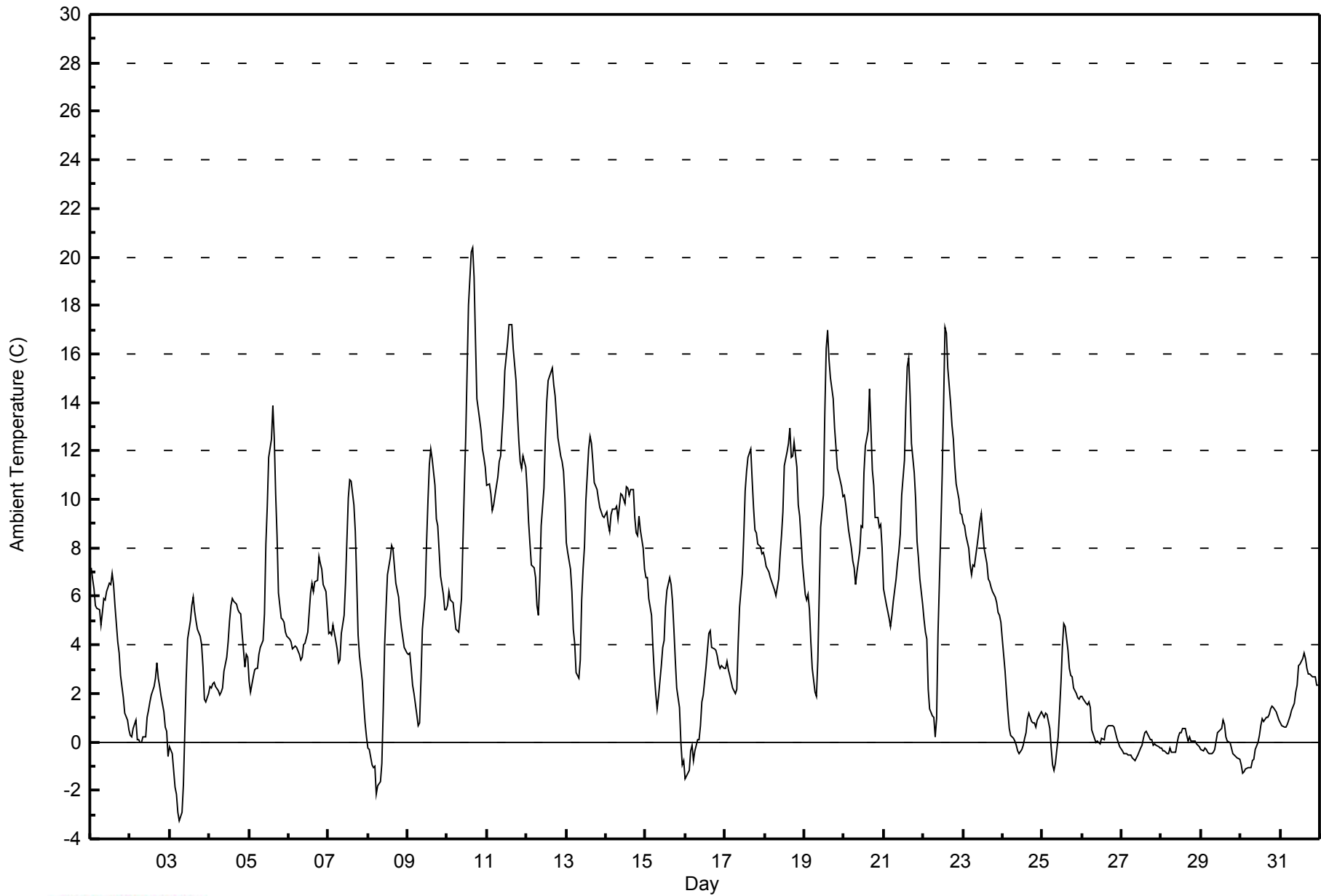
Maximum Value: 20.3 C on Oct 10 16:00		Maximum Daily Average: 12.8 C on Oct 11		Hours in Service: 744																																												
Minimum Value: -3.2 C on Oct 3 07:00		Minimum Daily Average: -0.3 C on Oct 27		Hours of Data: 744																																												
Maximum Diurnal Average: 8.5 C at hour 15		Minimum Diurnal Average: 2.5 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 5.11 C		Percentiles: P <sub>1</sub> = -1.7 P <sub>10</sub> = -0.3 Q <sub>1</sub> = 0.9 Median = 4.4 Q <sub>3</sub> = 8.5 P <sub>90</sub> = 11.7 P <sub>99</sub> = 17.2		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-Oct	7.2	6.7	6.3	5.6	5.5	5.4	4.8	5.3	5.9	5.9	6.2	6.5	6.5	6.9	6.5	5.6	4.1	3.6	2.7	2.3	1.8	1.2	0.9	0.5	4.8	7.2																						
2-Oct	0.3	0.2	0.5	0.9	0.1	0.1	0.0	0.0	0.2	0.2	1.0	1.3	1.6	1.9	2.3	2.6	3.3	2.6	2.3	1.9	1.3	0.6	0.5	-0.6	1.0	3.3																						
3-Oct	-0.2	-0.5	-1.2	-1.9	-2.2	-2.9	-3.2	-2.9	-1.7	0.4	2.6	4.2	5.0	5.6	6.0	5.4	5.0	4.6	4.3	4.0	3.1	1.7	1.7	2.0	1.6	6.0																						
4-Oct	2.3	2.2	2.4	2.4	2.3	2.1	1.9	2.0	2.2	2.9	3.5	4.1	5.0	5.6	5.9	5.8	5.7	5.5	5.3	5.3	4.5	3.1	3.6	3.5	3.7	5.9																						
5-Oct	2.5	2.0	2.7	2.9	3.0	3.1	3.6	3.9	4.2	5.3	8.2	9.7	11.8	12.5	13.9	12.5	10.2	8.5	6.1	5.1	5.0	4.9	4.5	4.4	6.3	13.9																						
6-Oct	4.3	4.1	3.9	3.9	3.9	3.9	3.6	3.4	3.5	4.0	4.1	4.5	5.3	6.2	6.5	6.2	6.6	6.7	7.6	7.4	7.1	6.5	6.2	5.4	5.2	7.6																						
7-Oct	4.5	4.6	4.4	4.8	4.2	3.9	3.3	3.4	4.4	5.2	6.5	8.4	10.1	10.8	10.7	9.8	8.7	6.7	4.4	3.6	2.5	1.6	0.8	0.2	5.3	10.8																						
8-Oct	-0.3	-0.3	-0.9	-1.0	-1.0	-2.2	-1.8	-1.7	-0.9	1.4	4.0	5.5	6.9	7.6	8.1	7.9	7.2	6.5	6.0	5.2	4.7	4.3	3.9	3.7	3.0	8.1																						
9-Oct	3.6	3.7	3.0	2.3	2.0	1.2	0.7	0.8	2.6	4.6	6.0	8.2	10.0	11.5	12.1	11.6	10.6	9.2	8.9	7.9	6.9	6.1	5.5	5.4	6.0	12.1																						
10-Oct	5.6	6.2	5.9	5.7	5.1	4.7	4.6	4.5	5.9	8.2	10.5	12.5	15.2	18.0	20.2	20.3	19.2	16.6	14.2	13.3	12.8	12.1	11.8	11.3	11.0	20.3																						
11-Oct	10.6	10.6	10.2	9.6	9.8	10.2	10.9	11.6	11.8	12.8	13.8	15.3	16.4	17.2	17.2	17.2	16.2	14.9	13.6	12.4	11.6	11.3	11.8	11.3	12.8	17.2																						
12-Oct	10.4	9.1	8.2	7.3	7.2	6.8	5.6	5.2	6.7	8.9	10.5	12.5	14.0	14.9	15.1	15.4	14.7	14.3	13.4	12.5	11.8	11.5	11.2	10.0	10.7	15.4																						
13-Oct	8.2	7.8	7.1	6.2	4.6	4.1	2.9	2.6	3.4	5.8	7.1	8.1	9.9	12.1	12.6	12.3	11.5	10.7	10.4	10.0	9.7	9.5	9.3	9.3	8.1	12.6																						
14-Oct	9.5	8.9	8.7	9.4	9.6	9.6	9.7	9.2	9.7	10.3	10.2	9.8	10.5	10.5	10.2	10.4	10.4	9.2	8.6	8.5	9.3	8.8	8.0	7.1	9.4	10.5																						
15-Oct	6.8	6.8	5.9	5.2	3.9	2.8	2.0	1.3	1.9	3.1	3.9	4.2	5.6	6.3	6.8	6.5	5.8	4.7	3.4	2.2	1.4	0.0	-0.9	-0.8	3.7	6.8																						
16-Oct	-1.5	-1.3	-1.2	-0.4	-0.1	-0.8	-0.3	0.1	0.1	0.7	1.6	1.9	3.1	3.8	4.4	4.6	3.9	3.9	3.8	3.5	3.2	3.0	3.1	3.0	1.8	4.6																						
17-Oct	3.0	3.3	3.0	2.7	2.2	2.1	2.0	2.2	4.1	5.6	7.0	8.5	10.3	11.1	11.7	12.1	10.8	9.7	8.8	8.6	8.1	8.0	7.8	7.8	6.7	12.1																						
18-Oct	7.6	7.2	7.0	6.8	6.6	6.4	6.3	6.0	6.7	7.7	8.5	9.5	11.4	12.0	12.3	12.9	11.7	11.8	12.4	11.3	9.8	9.3	8.4	7.4	9.0	12.9																						
19-Oct	6.1	5.8	6.1	5.4	4.1	3.0	2.0	1.9	3.4	6.1	8.9	10.2	13.6	16.3	17.0	15.8	15.0	14.1	12.9	12.1	11.3	11.1	10.5	10.1	9.3	17.0																						
20-Oct	10.2	9.8	9.2	8.7	8.0	7.4	7.2	6.5	7.0	7.8	8.9	8.9	11.1	12.2	12.8	14.5	12.9	11.2	10.6	9.3	9.3	8.8	9.0	8.0	9.6	14.5																						
21-Oct	6.3	5.7	5.4	5.1	4.7	5.2	5.8	6.7	7.3	7.9	8.6	10.2	11.6	13.8	15.5	15.8	14.3	12.3	11.1	10.0	8.3	7.6	6.7	5.7	8.8	15.8																						
22-Oct	5.1	4.5	4.2	2.1	1.4	1.1	1.0	0.2	0.9	4.5	8.7	11.0	13.9	17.1	16.8	15.4	14.0	13.1	12.5	11.4	10.7	10.0	9.4	9.4	8.3	17.1																						
23-Oct	9.0	8.9	8.5	8.0	7.3	6.9	7.3	7.2	8.1	8.5	9.1	9.4	8.7	8.0	7.3	6.7	6.6	6.4	6.2	6.0	5.8	5.3	5.2	4.9	7.3	9.4																						
24-Oct	4.2	2.9	2.0	1.2	0.6	0.3	0.2	0.0	-0.1	-0.4	-0.5	-0.3	-0.1	0.2	0.4	1.0	1.2	0.9	0.8	0.8	0.6	0.9	1.1	1.2	0.8	4.2																						
25-Oct	1.1	1.0	1.2	1.1	0.6	-0.3	-0.9	-1.2	-0.9	0.2	1.3	2.4	3.9	4.9	4.8	3.8	3.0	2.8	2.7	2.2	2.0	1.8	1.8	1.9	1.7	4.9																						
26-Oct	1.9	1.8	1.6	1.6	1.6	1.4	0.5	0.1	0.0	0.0	0.0	-0.1	0.1	0.1	0.5	0.6	0.7	0.7	0.7	0.6	0.4	0.2	0.0	-0.2	0.6	1.9																						
27-Oct	-0.4	-0.5	-0.5	-0.5	-0.5	-0.6	-0.7	-0.7	-0.8	-0.6	-0.5	-0.3	-0.1	0.1	0.4	0.4	0.2	0.1	0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.3	0.4																						
28-Oct	-0.2	-0.4	-0.4	-0.5	-0.5	-0.3	-0.4	-0.4	-0.4	-0.1	0.2	0.4	0.4	0.5	0.6	0.3	0.0	0.2	0.0	0.0	0.0	-0.1	-0.1	-0.2	-0.1	0.6																						
29-Oct	-0.3	-0.4	-0.3	-0.3	-0.4	-0.5	-0.5	-0.5	-0.3	0.0	0.4	0.4	0.5	0.9	0.7	0.2	0.0	0.0	-0.2	-0.5	-0.5	-0.6	-0.7	-0.7	-0.1	0.9																						
30-Oct	-0.9	-1.3	-1.2	-1.1	-1.1	-1.1	-1.0	-0.8	-0.7	-0.3	0.0	0.3	0.7	0.9	0.9	1.0	1.0	1.2	1.4	1.5	1.4	1.3	1.1	0.9	0.2	1.5																						
31-Oct	0.8	0.7	0.6	0.6	0.7	0.9	1.1	1.3	1.6	2.0	2.4	3.1	3.2	3.5	3.6	3.5	3.1	2.8	2.8	2.7	2.7	2.7	2.4	2.3	2.1	3.6																						
																								4.1	3.9	3.6	3.4	3.0	2.7	2.5	2.5	3.1	4.2	5.2	6.1	7.3	8.2	8.5	8.3	7.7	6.9	6.4	5.8	5.4	4.9	4.6	4.3	Diurnal Average
																								10.6	10.6	10.2	9.6	9.8	10.2	10.9	11.6	11.8	12.8	13.8	15.3	16.4	18.0	20.2	20.3	19.2	16.6	14.2	13.3	12.8	12.1	11.8	11.3	Diurnal Maximum





**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Millennium - October 2014**





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

**Ambient Temperature (AT) - C**  
**Millennium - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	102	13.71	13.71
0 - 10	511	68.68	82.39
10 - 20	129	17.34	99.73
> 20	2	0.27	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 23 km/h on Oct 1 21:00	Maximum Daily Speed Average: 16.4 km/h on Oct 17	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 16 05:00	Minimum Daily Speed Average: 1.6 km/h on Oct 4	Hours of Data: 740
Maximum Diurnal Speed Average: 3.0 km/h at hour 24	Minimum Diurnal Speed Average: 1.1 km/h at hour 16	Hours of Missing Data: 4
Monthly Average Velocity: 2.0 km/h 134.8 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 5 Median = 8 Q <sub>3</sub> = 12 P <sub>90</sub> = 15 P <sub>99</sub> = 20	Percent Operational Time: 99.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	NNE11	NNE8	NNE8	NNE7	NNW3	NNE7	NE5	E4	ENE5	E5	ESE3	ESE4	SSW1	NNE5	N12	N17	NNE20	N22	N21	N22	N23	N17	NNW13	NW11	N9.2	N23	
2-Oct	NW10	NW8	WNW10	NNW15	AF	NNW7	NW8	NW11	NW14	WNW16	NW17	NW17	NW18	NW17	WNW16	WNW15	WNW17	WNW16	WNW14	WNW15	WNW12	WNW9	WNW10	WNW9	NW12.7	NW18	
3-Oct	WNW10	WNW9	W7	WSW7	WSW7	WSW5	WSW4	SSW5	SSW6	SSE5	SSE6	SSE6	SE7	SSE8	SSE8	SE9	SE11	SE11	SE12	SSE9	S10	SE9	ESE12	SE14	SSE5.1	SE14	
4-Oct	SE13	SE12	SE10	SE9	SE6	SW3	WSW2	WSW2	SW4	SSW5	WSW2	NE3	SE1	NW2	NNW1	WSW3	NNW3	N3	AF	N5	WNW3	WNW4	WSW4	SW4	SSE1.6	SE13	
5-Oct	SSW4	S3	SW6	SSW6	SSW6	SSE3	SSW6	SSW7	SSW8	S6	SE6	SE6	WNW2	NNE8	N10	N17	NNE17	N14	N14	NNE13	N11	NNE9	NE8	ENE5	NNE2.6	N17	
6-Oct	E3	E4	ENE4	E3	SE3	E5	ENE6	ENE5	E3	E4	NE4	NNW5	WNW7	NW8	N10	N13	NW7	NW6	WNW13	WNW14	WNW11	WNW11	W10	W8	NW3.4	WNW14	
7-Oct	W9	W9	WNW11	WNW10	WNW12	WNW13	WNW11	WNW13	NW10	NW11	NNW6	NNW6	NNW8	NW6	N13	NNE14	NE13	NE9	ENE6	ENE5	E5	ESE6	SE4	SSE3	NNW5.1	NNE14	
8-Oct	SE5	ESE4	SE5	ESE3	ESE3	AF	ESE5	SSE2	SSW4	SE4	SE7	SE7	SE7	ESE5	ESE6	SE5	SE7	ESE7	SE10	SE8	SE10	ESE9	ESE9	ESE8	SE5.9	SE10	
9-Oct	ESE9	SE8	SE7	ESE9	ESE9	ESE8	ESE8	SE8	SE10	SE8	SSE8	SE8	SE8	SE7	SSE7	SSE6	SE8	ESE9	SE11	ESE12	SE11	SE12	SE11	ESE13	SE8.8	ESE13	
10-Oct	ESE13	SE13	SE13	SE13	SE12	SE10	SE11	SSE7	SE9	SE9	S6	S6	SSW8	S7	SSE6	SE7	SSE5	SSE5	SE7	SE7	SE8	SE8	SE9	SE8	SE8.2	SE13	
11-Oct	SSE5	SSE4	SSE5	SSE4	SSE5	SSW7	SW7	WSW8	WSW10	W12	W12	W11	W13	W13	W12	WSW15	W14	W9	SW7	WSW6	SW7	WSW7	W12	W11	WSW7.5	WSW15	
12-Oct	NW6	WNW6	W6	W7	W9	W10	WSW6	WSW5	WSW6	W8	W8	WNW8	W9	W8	W7	WSW8	WSW7	W11	W12	WNW10	W8	W8	WNW6	WNW5	W7.5	W12	
13-Oct	WNW4	W5	SW5	WSW6	SSW5	SSW4	SSW5	SSW5	S5	S5	S5	SSE4	SE5	SSE6	SE7	SSE6	SSE5	SE5	ESE5	E5	ESE4	SE3	SE4	ESE7	SSE3.4	ESE7	
14-Oct	ESE6	SE2	ESE3	SE7	E5	ESE6	S4	E1	ESE4	ESE5	SE6	SE7	SE9	SE7	SSE4	S3	SSW4	WNW3	NNW3	SW2	W10	W10	W10	W7	SSE2.1	W10	
15-Oct	W7	W11	WNW11	WNW9	SW7	SW7	WSW10	WSW9	W9	W11	WNW11	W8	WNW7	WNW7	NW7	NW8	NNW8	N14	N12	N12	N10	NE6	NNE5	NNE5	WNW6.1	N14	
16-Oct	SW1	SW4	SW3	NE1	ESE0	SW4	ENE1	ENE4	SSE2	SSE2	ENE4	NNE0	SSE6	S6	SSE5	S5	WSW2	ESE7	ESE12	SE14	SE14	SE13	SE16	SE17	SE4.9	SE17	
17-Oct	SE15	SE14	SE13	SE14	SE13	SE15	SE15	SE11	SE12	SE15	SE18	SE17	SE19	SE19	SE20	SE20	SE20	SE19	SE18	SE15	SE17	SE18	SE18	SE18	SE16.4	SE20	
18-Oct	SE18	SE17	SE15	SE14	SE12	SE11	SE8	SE5	SE6	SE5	S6	S5	SSE4	SSE5	SSE4	SSW4	SSW2	SSW4	WSW6	W5	WNW3	W6	WNW4	W3	SSE5.0	SE18	
19-Oct	N2	SW6	WSW6	WSW4	ENE2	SSW2	SSW4	SE6	SE5	SE5	SSE6	SSW5	SSE5	SE12	ESE12	ESE11	SE14	SE15	ESE16	SE18	SE16	SE17	SE16	ESE14	SE7.6	SE18	
20-Oct	ESE13	ESE13	ESE13	SE13	SE12	SE10	SE11	SE8	SE9	SSE8	SSE6	S6	SSE5	S6	SSW10	S6	SE6	SE7	SE6	AF	ESE5	SE6	SE6	SSW6	SE7.6	ESE13	
21-Oct	S5	SSW7	SSW7	S4	SSW6	S4	S4	S3	SW8	SSW6	SSW5	SSE3	S2	WSW4	W5	W7	SW5	SSW5	S5	SE4	ESE5	SE6	SSE4	S4	SSW3.9	SW8	
22-Oct	SSE4	SE5	SSE4	SSW7	SSE4	SSE4	SSE4	SSE4	SSW5	SSW4	SE4	SSW4	S3	SE7	SE14	SE13	SE13	SE14	SE14	SE14	SE12	SE12	SE8	SE11	SE7.3	SE14	
23-Oct	SE10	SE10	ESE10	ESE10	ESE9	SE8	ESE8	ESE5	SE7	ESE9	ESE10	ESE9	ESE15	ESE11	E6	ENE7	E4	NNE4	NNE6	N6	WNW4	WNW8	WNW11	NW11	ESE4.6	ESE15	
24-Oct	WNW13	WNW16	WNW14	WNW14	W10	W11	W13	W12	W11	W11	WNW10	W7	W11	W11	W13	WSW11	WSW10	W11	W9	W9	WSW8	W9	W9	W11	W10.8	WNW16	
25-Oct	W9	WSW9	W11	W9	W6	WSW3	SSW7	SW7	SW7	SSW7	SSW6	S7	SSE6	SE6	SE7	SE6	ESE6	ESE6	ESE6	ESE6	ESE8	ESE10	ESE8	ESE8	S3.1	W11	
26-Oct	ESE8	ESE9	ESE8	E8	NE6	N5	NNE9	NNE10	NNE8	NNE9	N12	NNE14	N16	NNE18	N18	N19	N17	N17	N18	N19	N21	NNE21	NNE17	N15	NNE11.8	N21	
27-Oct	NNE17	N16	N15	N16	N16	N14	N14	N14	N14	N14	N13	NNE14	N12	N11	N9	N9	N7	N8	N8	N6	NE4	NE1	NE2	ESE3	SE6	N9.7	NNE17
28-Oct	SSE5	SSW5	S5	SSW6	S5	SE5	SE9	SE7	SE8	SSE6	SSE5	SSE4	SE7	SE7	SE6	ESE6	SE3	ESE7	SE9	SE8	ESE7	ESE7	ESE7	ESE6	SE5.6	SE9	
29-Oct	E6	E6	E6	E5	ENE6	NE6	ENE8	NE9	NNE7	NNE5	NE12	NE12	NE12	NE9	NE7	NE9	NE5	E5	ESE6	ESE8	SE7	ESE8	SE10	SE12	ENE6.4	NE12	
30-Oct	SE11	SE11	SE11	SE11	SE12	SE15	SE13	SE11	SE14	SE16	SE15	SE16	SE15	SE15	SSE12	SSE11	SE14	SE16	SE18	SE18	SE16	SE16	SE19	SE17	SE14.3	SE19	
31-Oct	SE17	SE15	SE17	SE17	SE17	SE16	SE16	SE14	SE14	SE14	SE13	SE9	SSE7	SSE5	SSE7	SSE5	S6	SSE5	S5	SSE5	SSE4	S3	SSW5	SSW5	SE9.6	SE17	

SE2.9	SE2.5	SSE2.3	SE2.2	SE2.9	SE2.5	SSE2.6	SSE1.8	S2.3	SSE2.2	SSE1.9	SE1.5	SSE1.5	SE1.5	ESE1.3	E1.1	E1.5	E2.0	E2.3	E2.1	ESE2.2	ESE2.5	SE2.6	SE3.0	Diurnal Average	
SE18	SE17	SE17	SE17	SE17	SE16	SE16	SE14	SE14	SE16	SE18	SE17	SE19	SE19	SE20	SE20	SE20	N22	N21	N22	N23	NNE21	SE19	SE18	Diurnal Maximum	

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



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

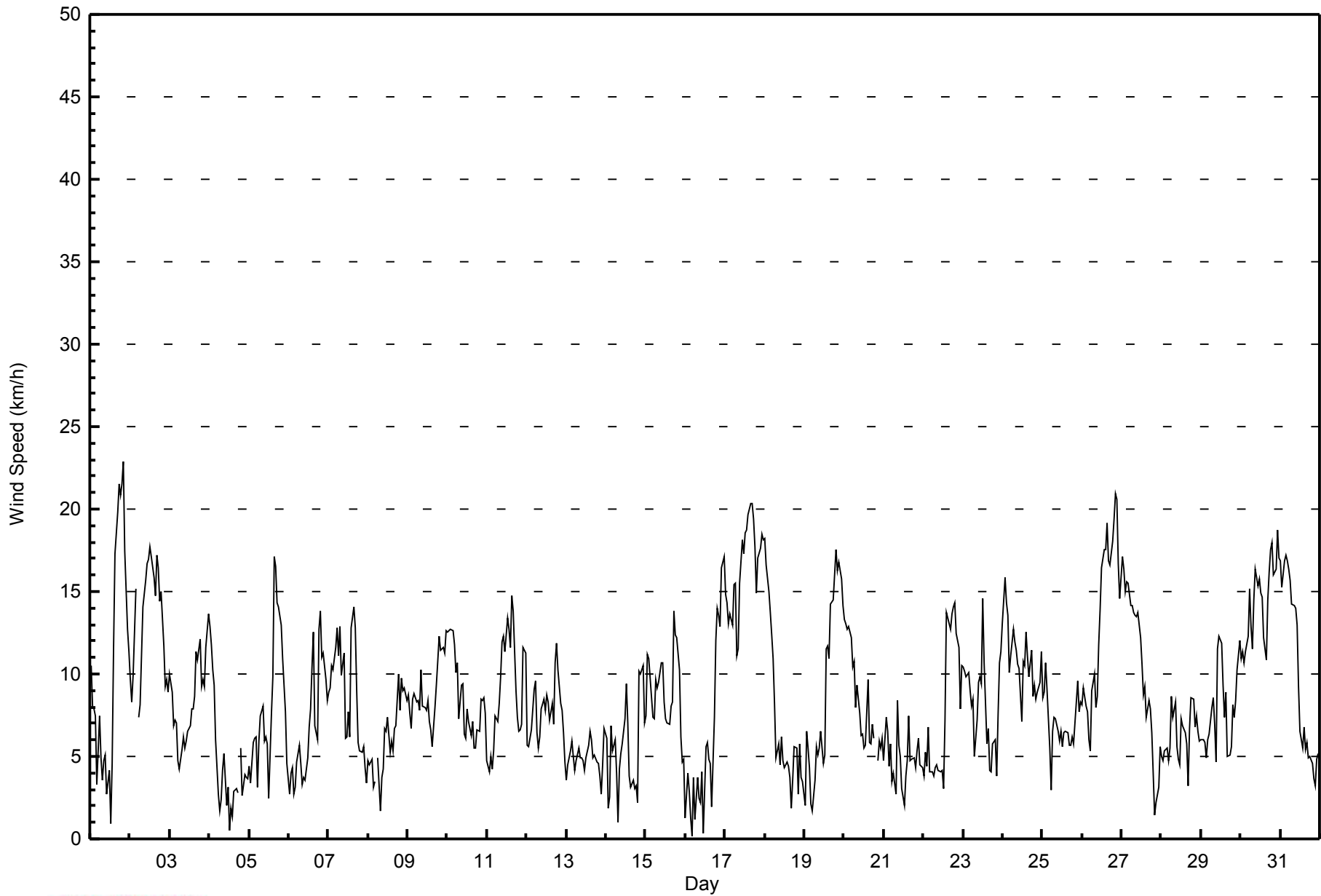
**Wind Speed (WS) - km/h**  
**Millennium - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Oct 2 08:00																	Hours in Service: 744									
Minimum Value: 1 km/h on Oct 31 21:00																	Hours of Data: 740									
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																	Hours of Missing Data: 4									
																	Hours of Calibration: 0									
																	Percent Operational Time: 99.5									
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-Oct	3	2	2	2	2	2	2	1	2	2	2	1	2	3	3	4	4	4	5	5	7	6	5	4	7	
2-Oct	3	3	4	6	AF	6	6	8	5	6	6	7	7	6	6	6	6	6	5	5	4	3	3	2	8	
3-Oct	3	3	2	2	2	1	1	2	1	2	2	2	3	3	3	3	3	4	3	3	3	3	4	4		
4-Oct	4	4	3	3	2	1	1	1	2	2	2	1	1	1	1	1	3	2	AF	2	2	1	1	1	4	
5-Oct	1	1	1	2	2	1	2	2	2	2	2	2	2	2	3	4	3	4	3	3	3	2	3	2	4	
6-Oct	1	1	2	1	2	2	2	2	2	2	1	2	3	3	4	3	2	3	4	5	4	4	3	3	5	
7-Oct	2	3	3	4	4	4	3	4	4	4	3	2	3	3	5	3	3	3	1	1	1	1	2	1	5	
8-Oct	1	1	1	1	2	AF	2	1	2	2	2	3	3	2	2	2	2	2	3	3	3	3	3	2	3	
9-Oct	2	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	3	3	3	3	3	3	3	
10-Oct	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	1	1	2	2	2	2	3	
11-Oct	1	1	1	2	2	1	2	4	4	4	5	4	5	5	5	5	5	3	2	3	2	2	4	4	5	
12-Oct	3	2	2	2	3	3	2	2	2	2	3	3	3	3	3	3	3	4	4	4	3	3	3	2	4	
13-Oct	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	
14-Oct	2	2	2	4	3	3	2	2	2	2	2	3	2	1	1	1	1	1	2	3	3	4	3	2	4	
15-Oct	3	4	4	4	2	2	3	3	3	3	4	3	3	3	3	3	3	4	4	4	2	2	1	2	4	
16-Oct	1	1	1	2	2	2	2	2	1	1	2	2	2	2	2	2	1	3	4	4	3	3	4	4	4	
17-Oct	4	4	4	4	3	4	4	3	4	4	5	5	5	6	6	6	5	5	6	5	5	4	5	5	6	
18-Oct	5	5	4	4	3	3	3	2	2	1	2	2	1	2	1	1	1	2	2	2	1	2	1	2	5	
19-Oct	2	2	1	2	1	3	2	1	1	1	3	1	3	3	4	3	4	4	5	5	5	5	4	4	5	
20-Oct	3	3	3	4	3	3	4	2	4	2	2	2	2	2	3	2	1	1	2	AF	1	2	2	2	4	
21-Oct	2	2	2	2	2	1	2	2	2	2	2	2	1	2	2	3	1	1	1	1	1	1	1	2	3	
22-Oct	1	1	1	1	1	1	1	1	1	1	2	1	1	4	4	3	3	4	3	4	3	3	3	2	4	
23-Oct	2	3	3	3	2	2	3	2	3	4	3	3	5	4	2	2	1	2	2	2	2	3	4	4	5	
24-Oct	5	5	5	5	3	3	4	4	4	3	4	3	3	4	4	3	4	4	3	3	3	3	3	4	5	
25-Oct	3	3	3	3	3	2	2	2	1	2	2	2	2	2	2	2	1	2	2	2	3	3	3	3	3	
26-Oct	3	3	3	3	2	2	2	2	1	2	2	2	3	3	3	3	3	3	3	3	4	4	4	4	4	
27-Oct	3	3	3	3	3	3	3	3	3	2	3	2	3	2	2	2	2	2	2	2	2	1	1	2	3	
28-Oct	2	2	1	2	1	2	2	2	2	2	1	1	3	2	2	2	2	3	2	3	2	2	3	2	3	
29-Oct	2	2	2	2	2	3	2	2	3	2	4	2	2	3	2	2	1	2	2	3	2	3	4	3	4	
30-Oct	3	3	4	4	4	4	4	4	4	5	4	5	4	5	4	3	4	4	5	5	5	5	5	5	5	
31-Oct	5	4	5	5	5	5	4	4	4	4	4	3	2	2	2	1	1	1	1	1	1	1	1	1	5	
																	Diurnal Maximum									
																	5 5 5 6 5 6 6 8 5 6 6 7 7 6 6 6 6 6 6 5 7 6 5 5									
AF - Analyzer Failure																										



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Millennium - October 2014**





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

**Wind Speed (WS) - km/h**  
**Millennium - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	204	27.57	27.57
6 - 11	350	47.30	74.86
12 - 19	176	23.78	98.65
20 - 28	10	1.35	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 740

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Millennium - October 2014**

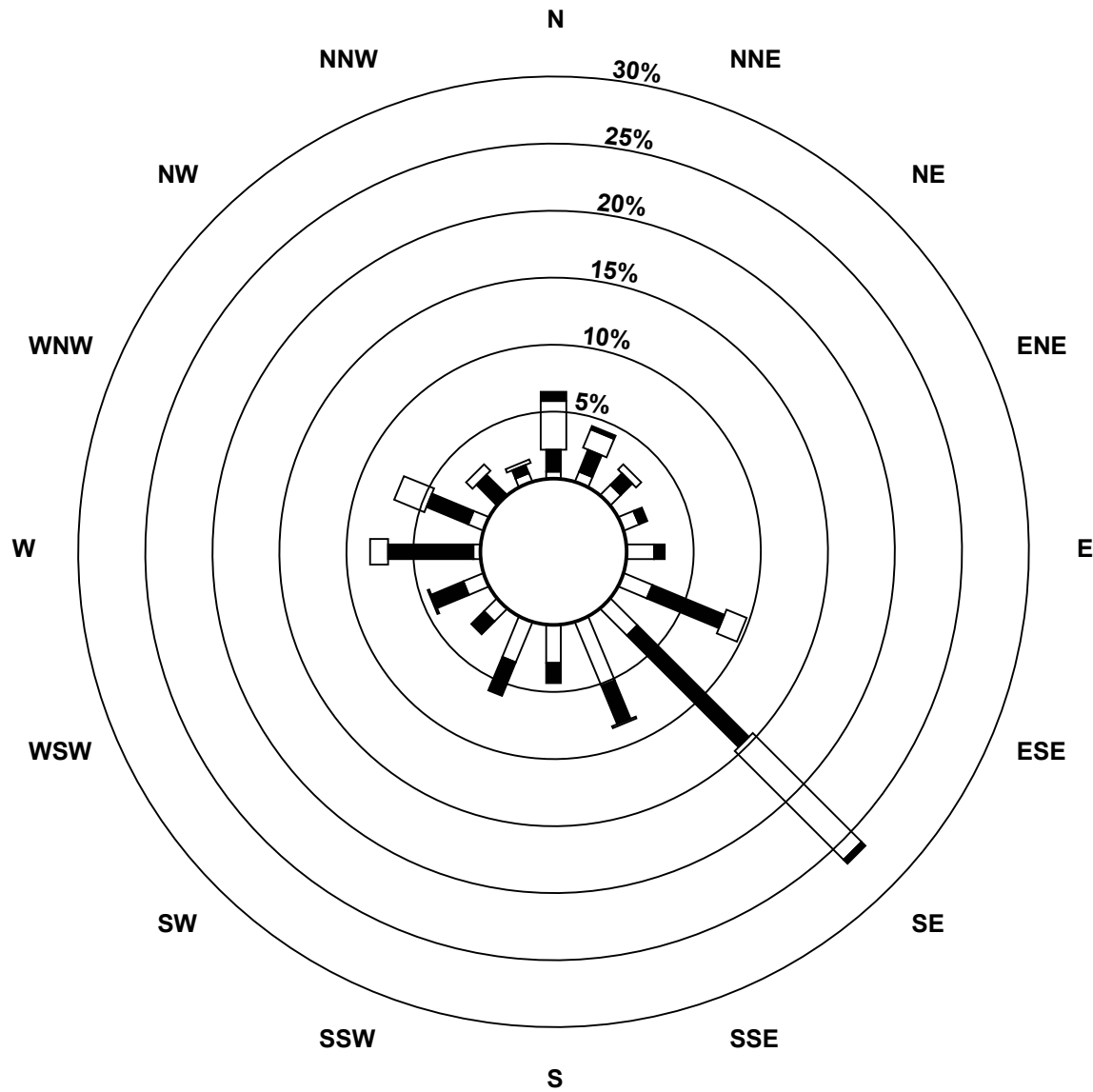
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	6	8	9	15	17	21	38	21	24	10	12	4	9	1	5	204
6 - 11	12	13	9	5	6	43	87	23	11	20	10	19	47	25	15	5	350
12 - 19	27	11	4	0	0	12	85	1	0	0	0	1	10	18	5	2	176
20 - 28	5	2	0	0	0	0	3	0	0	0	0	0	0	0	0	0	10
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>	48	32	21	14	21	72	196	62	32	44	20	32	61	52	21	12	740

Total Number of Valid Hours: 740

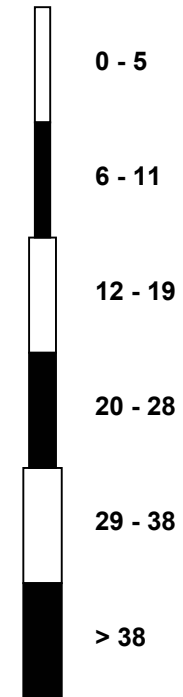
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Wind Speed (WS) - km/h  
Millennium (AMS 12)**



**Classes (km/h)**



**Total Number of Valid Hours: 740**





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

**Wind Direction (WD) - deg**  
**Millennium - October 2014**

Direction of Maximum Speed: 355 deg on Oct 1 21:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 131.6 deg on Oct 17	Hours of Data: 740
Direction of Minimum Speed: 107 deg on Oct 16 05:00	Direction of Minimum Daily Speed Average: 1.6 deg on Oct 4
Direction of Minimum Speed: 107 deg on Oct 16 05:00	Hours of Missing Data: 4
Monthly Average Direction: 210.3 deg	Percent Operational Time: 99.5

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	33	14	29	16	340	29	39	85	77	84	116	120	204	22	6	6	15	9	2	358	355	350	333	324	8.9
2-Oct	314	323	303	340	AF	340	318	319	316	300	320	320	316	316	299	301	299	295	297	300	299	299	298	284	309.0
3-Oct	292	287	269	251	254	249	245	205	198	168	152	148	145	148	147	144	136	138	142	156	172	137	123	129	166.5
4-Oct	135	130	136	136	140	225	244	238	215	202	256	41	141	316	328	254	340	8	AF	1	285	286	241	222	165.9
5-Oct	204	174	225	200	194	165	197	210	212	189	137	138	297	18	11	9	13	7	2	13	1	15	34	61	12.8
6-Oct	94	81	74	96	135	82	75	64	85	80	39	339	300	320	359	3	324	312	294	286	287	285	276	262	326.2
7-Oct	264	280	289	300	293	289	284	295	321	320	329	338	328	319	2	23	35	38	61	76	92	108	136	156	327.9
8-Oct	125	110	135	118	116	AF	120	164	207	126	135	142	134	116	117	126	125	123	132	145	130	121	119	118	128.3
9-Oct	121	126	137	123	120	121	120	143	133	146	152	143	136	146	154	151	136	123	125	123	128	127	129	123	131.3
10-Oct	123	125	124	128	129	132	132	152	144	141	170	172	194	172	155	146	147	165	143	143	139	127	133	139	141.0
11-Oct	152	153	150	165	163	204	221	238	250	269	274	280	281	276	264	252	266	260	236	241	235	238	269	276	251.5
12-Oct	305	300	276	279	274	266	250	252	256	264	266	290	268	275	267	255	254	264	279	283	279	272	293	285	272.6
13-Oct	286	275	232	238	209	207	194	194	188	186	178	163	139	154	143	159	158	128	106	91	112	143	128	115	167.5
14-Oct	122	141	116	128	97	108	183	89	104	109	143	131	127	141	161	191	212	297	332	235	263	260	263	279	167.3
15-Oct	265	270	287	287	224	230	242	249	259	271	289	280	291	302	317	321	340	357	353	350	6	35	25	24	302.1
16-Oct	229	215	219	40	107	216	67	67	167	165	78	21	166	179	147	169	254	120	123	129	131	133	128	128	137.6
17-Oct	132	133	132	131	124	126	128	126	138	133	126	129	136	139	133	135	130	137	141	139	128	127	127	127	131.6
18-Oct	126	125	131	130	130	128	142	145	141	142	191	170	147	158	165	204	212	203	243	264	287	274	289	273	150.9
19-Oct	352	221	255	258	59	200	206	140	129	129	148	195	157	127	121	123	127	127	123	125	128	128	125	123	133.9
20-Oct	121	123	121	129	128	128	130	145	143	148	161	189	164	176	201	171	142	139	128	AF	111	131	144	193	141.9
21-Oct	191	212	207	188	207	170	170	184	216	194	192	161	186	240	260	266	235	206	180	136	123	127	148	172	193.9
22-Oct	159	142	155	202	162	166	148	165	195	193	143	204	188	139	129	128	125	125	130	132	136	139	142	133	142.8
23-Oct	129	126	119	119	118	125	116	112	124	112	115	119	118	118	86	67	87	26	17	8	302	298	302	309	104.7
24-Oct	295	284	286	286	278	269	275	276	278	281	284	277	263	262	263	250	250	269	273	263	248	266	267	280	272.9
25-Oct	272	258	272	281	276	255	213	218	216	208	199	191	159	149	142	129	130	118	107	90	112	111	112	110	177.6
26-Oct	114	114	105	97	43	360	15	16	16	12	10	12	8	14	11	8	9	10	10	11	10	13	12	11	18.2
27-Oct	14	9	6	10	10	9	7	6	8	11	12	7	358	357	8	357	353	357	9	40	49	42	123	134	9.6
28-Oct	155	199	189	205	191	143	127	127	126	153	158	161	131	133	124	118	146	121	131	126	117	116	111	106	137.2
29-Oct	91	81	83	79	63	56	58	53	30	24	48	44	34	41	41	46	48	88	102	119	130	123	126	132	71.5
30-Oct	134	129	143	142	138	137	141	142	138	135	138	138	137	136	148	147	135	128	132	136	140	139	136	138	137.5
31-Oct	138	133	131	133	136	134	132	132	136	135	140	146	162	157	162	164	174	152	175	167	162	172	201	202	143.5

131.7 146.3 155.5 145.6 144.8 145.4 149.2 163.8 169.8 163.0 146.3 142.6 154.1 138.5 110.4 83.8 87.6 86.4 99.3 96.7 116.3 121.5 133.7 139.3  
 Diurnal Average

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



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

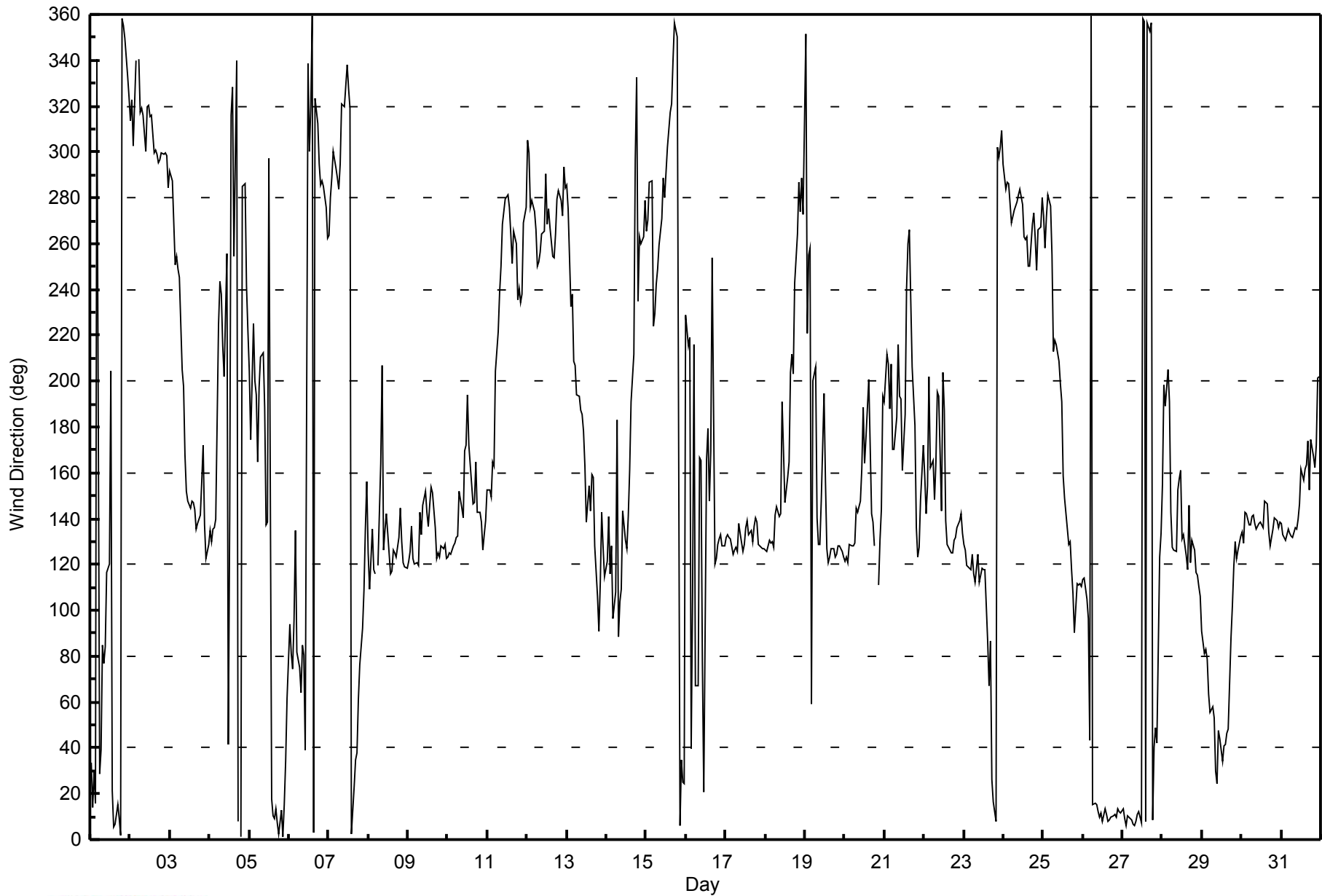
**Wind Direction (WD) - deg**  
**Millennium - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																	Hours in Service: 744										
Maximum Value: 107 deg on Oct 16 12:00																	Hours of Data: 740										
Minimum Value: 10 deg on Oct 8 01:00																	Hours of Missing Data: 4										
Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 15 Q <sub>1</sub> = 17 Median = 22 Q <sub>3</sub> = 28 P <sub>90</sub> = 37 P <sub>99</sub> = 92																	Hours of Calibration: 0										
																	Percent Operational Time: 99.5										
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-Oct	18	19	19	21	44	20	27	36	29	29	57	36	94	41	16	15	14	15	18	20	22	25	33	31	94		
2-Oct	30	39	28	33	AF	29	29	28	34	31	32	32	34	32	33	30	32	29	30	28	25	29	31	19	39		
3-Oct	22	20	27	19	20	24	25	22	21	24	26	26	23	25	24	21	19	17	17	22	18	24	17	18	27		
4-Oct	18	18	18	16	19	30	23	28	23	26	85	47	97	71	83	42	60	60	AF	23	25	13	21	15	97		
5-Oct	17	20	18	22	20	20	21	19	20	28	31	36	78	18	26	15	12	16	17	15	20	22	20	24	78		
6-Oct	33	27	30	30	28	30	28	30	41	50	43	43	34	31	31	21	31	30	30	26	30	26	25	23	50		
7-Oct	23	21	22	28	26	22	20	23	34	33	42	36	36	42	28	16	16	16	11	20	21	15	23	17	42		
8-Oct	10	16	13	46	57	AF	14	28	20	27	22	32	25	32	29	24	21	17	18	20	18	18	19	18	57		
9-Oct	19	21	18	16	16	17	14	15	18	23	23	28	27	31	28	22	21	15	16	16	17	17	15	15	31		
10-Oct	16	16	17	16	15	16	17	16	16	19	32	26	23	24	26	18	18	15	11	13	12	15	14	13	32		
11-Oct	13	15	28	29	32	11	26	34	31	32	33	33	32	33	37	29	27	28	26	28	26	28	30	28	37		
12-Oct	50	38	25	24	23	24	20	24	26	24	29	37	36	35	41	31	29	28	27	27	28	27	36	31	50		
13-Oct	22	20	16	16	13	14	16	17	19	23	36	35	29	30	27	21	20	14	14	20	40	40	25	19	40		
14-Oct	23	77	73	45	44	40	50	92	41	40	24	19	25	20	26	24	33	34	77	30	26	27	24	92			
15-Oct	27	29	31	35	24	23	25	24	26	27	35	40	41	44	37	33	31	20	23	26	16	15	14	14	44		
16-Oct	84	16	27	105	92	19	95	29	52	63	47	107	39	36	38	30	70	23	20	17	16	15	15	15	107		
17-Oct	16	16	17	17	17	15	15	15	17	18	17	18	18	18	17	18	17	17	17	18	16	16	16	16	18		
18-Oct	16	16	16	17	15	16	20	21	24	23	24	25	32	24	24	29	51	40	23	29	54	22	21	32	54		
19-Oct	57	20	19	19	66	78	67	13	19	21	29	29	36	18	19	20	17	16	18	17	18	17	16	17	78		
20-Oct	15	15	15	16	17	18	18	17	20	17	23	21	23	20	19	23	12	12	39	AF	21	20	17	23	39		
21-Oct	22	18	14	27	24	41	35	41	15	19	24	38	57	51	44	23	24	10	15	16	13	13	14	25	57		
22-Oct	25	16	21	11	25	32	18	17	17	19	31	23	45	28	16	16	16	17	17	16	16	17	19	14	45		
23-Oct	15	16	16	16	16	24	23	46	32	27	26	27	22	24	33	19	34	16	15	14	33	27	31	31	46		
24-Oct	30	27	27	27	24	26	25	26	25	26	27	32	26	26	26	23	27	26	27	27	27	29	26	28	32		
25-Oct	26	24	25	28	41	43	14	18	18	22	23	22	27	25	21	16	16	21	22	28	29	21	24	24	43		
26-Oct	22	22	27	36	33	30	13	11	12	14	11	12	15	12	12	14	13	12	13	13	13	13	12	13	36		
27-Oct	13	13	14	13	12	13	14	14	13	13	13	14	18	22	17	21	21	19	17	48	62	23	36	17	62		
28-Oct	31	26	18	16	19	23	16	17	18	23	21	25	19	19	20	26	25	23	19	19	24	20	27	26	31		
29-Oct	28	23	29	25	20	24	17	13	15	32	16	14	15	19	20	11	19	31	34	22	20	20	18	17	34		
30-Oct	17	16	18	19	18	17	18	17	17	16	17	17	16	18	19	18	17	16	17	16	16	16	17	16	19		
31-Oct	16	18	17	17	17	17	17	17	17	17	16	18	22	20	22	19	18	17	18	15	14	22	18	16	22		
																	84 77 73 105 92 78 95 92 52 63 85 107 97 71 83 42 70 60 39 77 62 40 36 32										
																	Diurnal Maximum										
AF - Analyzer Failure																											



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Millennium - October 2014**





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 23, 2014	Previous Calibration	September 24, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	7:15	End Time (MST)	11:53
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)	5000	5000	Lamp voltage	786	786
Calculated slope	1.004372	1.017695	Chamber temp.	45.1	45.1
Calculated intercept	-0.206764	-2.464779	Pressure (mmHg)	697.5	697.5
Analyzer Background	8.4	8.4	Flow (lpm)	0.421	0.421
	1.199	1.199	Intensity	92	92

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	0.4	NA
as found span	6000	94.1	801.4	788.4	1.017
calibrator zero	6000	0.0	0.0	0.4	NA
high point	6000	94.1	801.4	788.4	1.017
second point	6000	47.1	401.1	399.0	1.005
third point	6000	23.5	200.1	200.2	1.000
calibrator zero	6000	0.0	0.0	0.9	NA
as left zero	6000	0.0	0.0	0.9	NA
as left span	6000	94.1	801.4	793.6	1.010
Average Correction Factor					1.007

Corrected As found	788.0	Previous response	798.1	% change	1.3%
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#### Notes:

Filter changed No mainanence or adjustments made

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

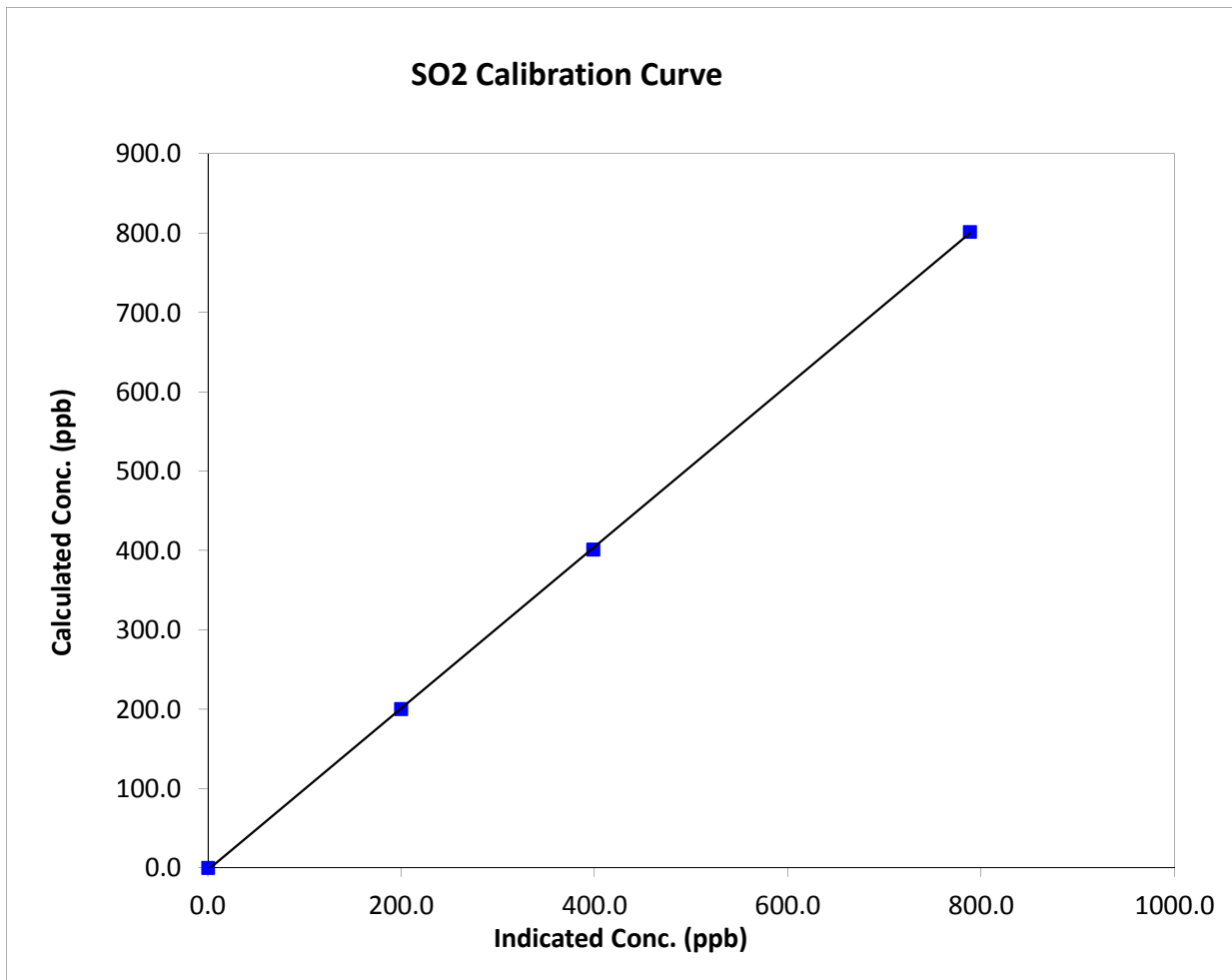
## SO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	October 23, 2014	Previous Calibration	September 24, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	7:15	End Time (MST)	11:53
Analyzer make	43i Thermo	Analyzer serial #	1118148499

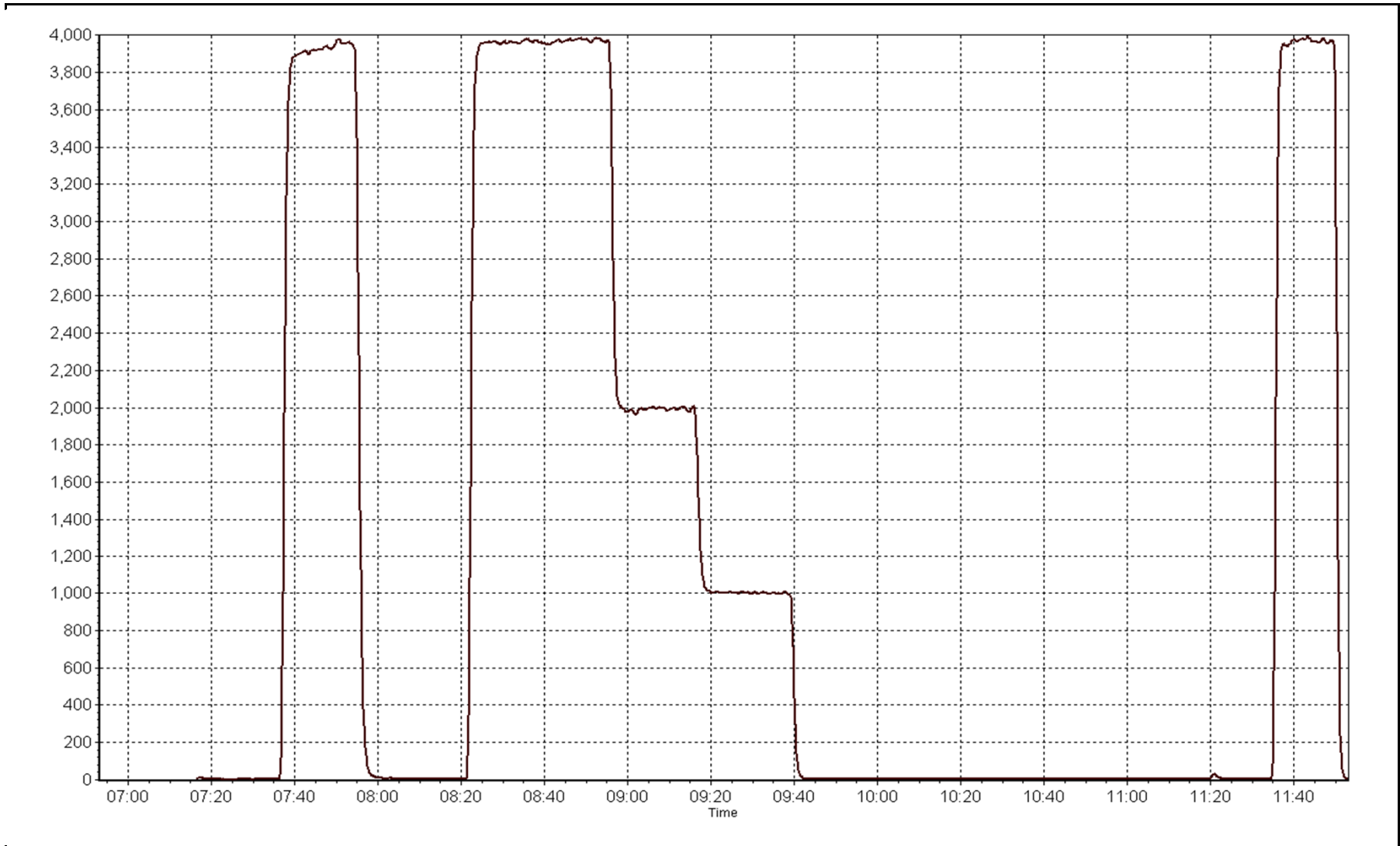
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999960
801.4	788.4	1.0165		
401.1	399.0	1.0054	Slope	1.017695
200.1	200.2	0.9997		
			Intercept	-2.464779



SO2 Calibration Plot

Date: October 23, 2014





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	October 23, 2014	Previous Calibration	September 24, 2014
Station Name	Millenium Mine	Station Number	Ams 12
Reason:	Routine		
Start Time (MST)	11:50	End Time (MST)	14:00
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)	5000	5000	Lamp voltage	878	878
Calculated slope	0.986965	1.000178	Chamber temp.	44	44
Calculated intercept	0.294306	0.117832	Pressure	672.6	672.6
Analyzer Background	19.4	18.9	Flow	0.597	0.597
Analyzer Coefficient	0.667	0.64	Intensity	47000	47000
			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	-0.1	NA
as found span	5000	38.5	80.1	82.4	0.971
SO2 scrubber check	6000	47.1	401.1	0.3	NA
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	38.5	80.1	80.0	1.002
second point	5000	19.2	39.9	39.8	1.004
third point	5000	9.6	20.0	19.9	1.003
calibrator zero	6000	0.0	0.0	0.2	NA
as left zero	6000	0.0	0.0	0.2	NA
as left span	5000	38.5	80.1	80.0	1.000
Average Correction Factor					1.003

Corrected As found	82.6	Previous response	80.8	% change	-2.1%
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#### Notes:

span adjusted, filter changed out, scrubber checked before as leftts

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## TRS Calibration Summary

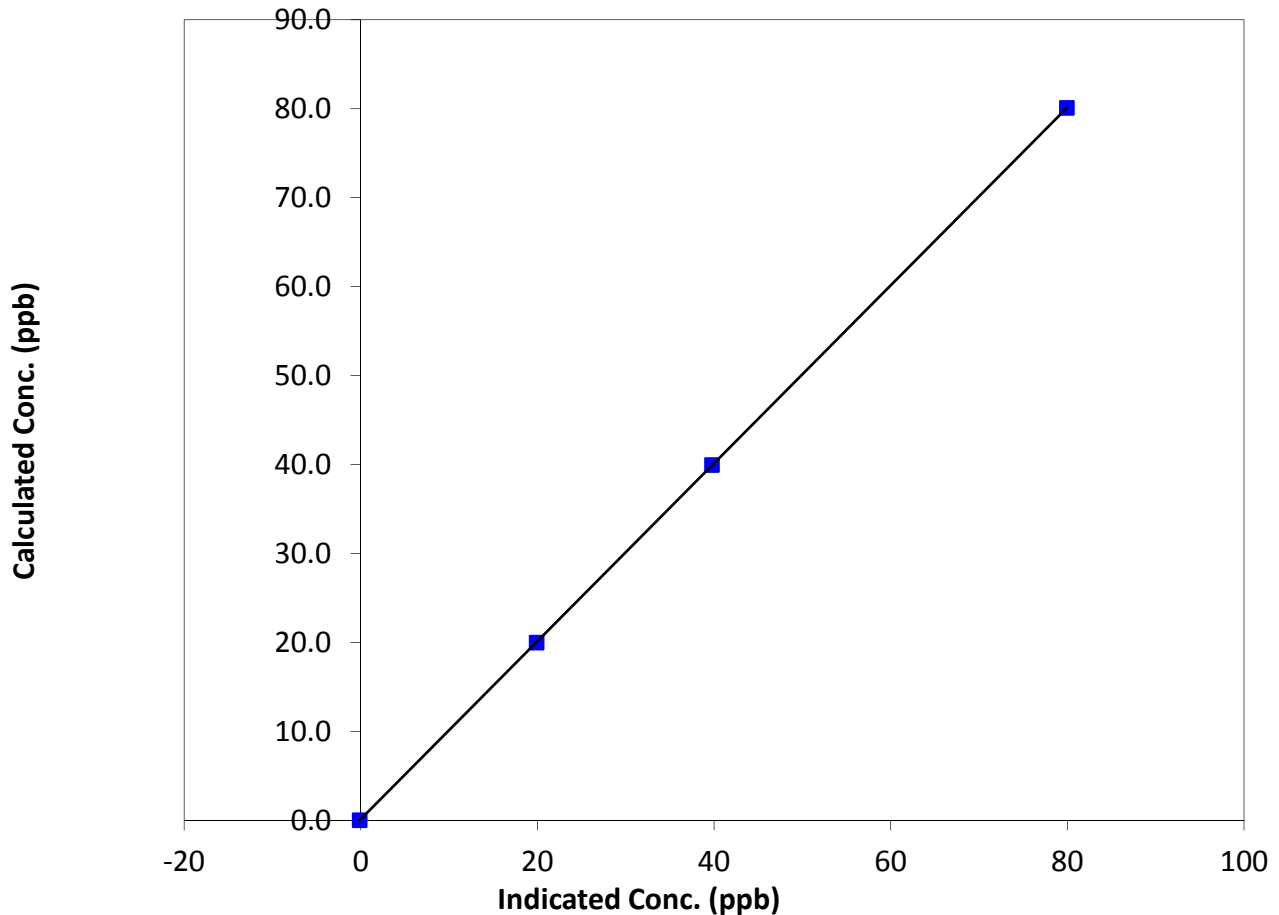
### Station Information

Calibration Date	October 23, 2014	Previous Calibration	September 24, 2014
Station Name	Millenium Mine	Station Number	Ams 12
Start Time (MST)	11:50	End Time (MST)	14:00
Analyzer make	TEI 43C	Analyzer serial #	0509110887

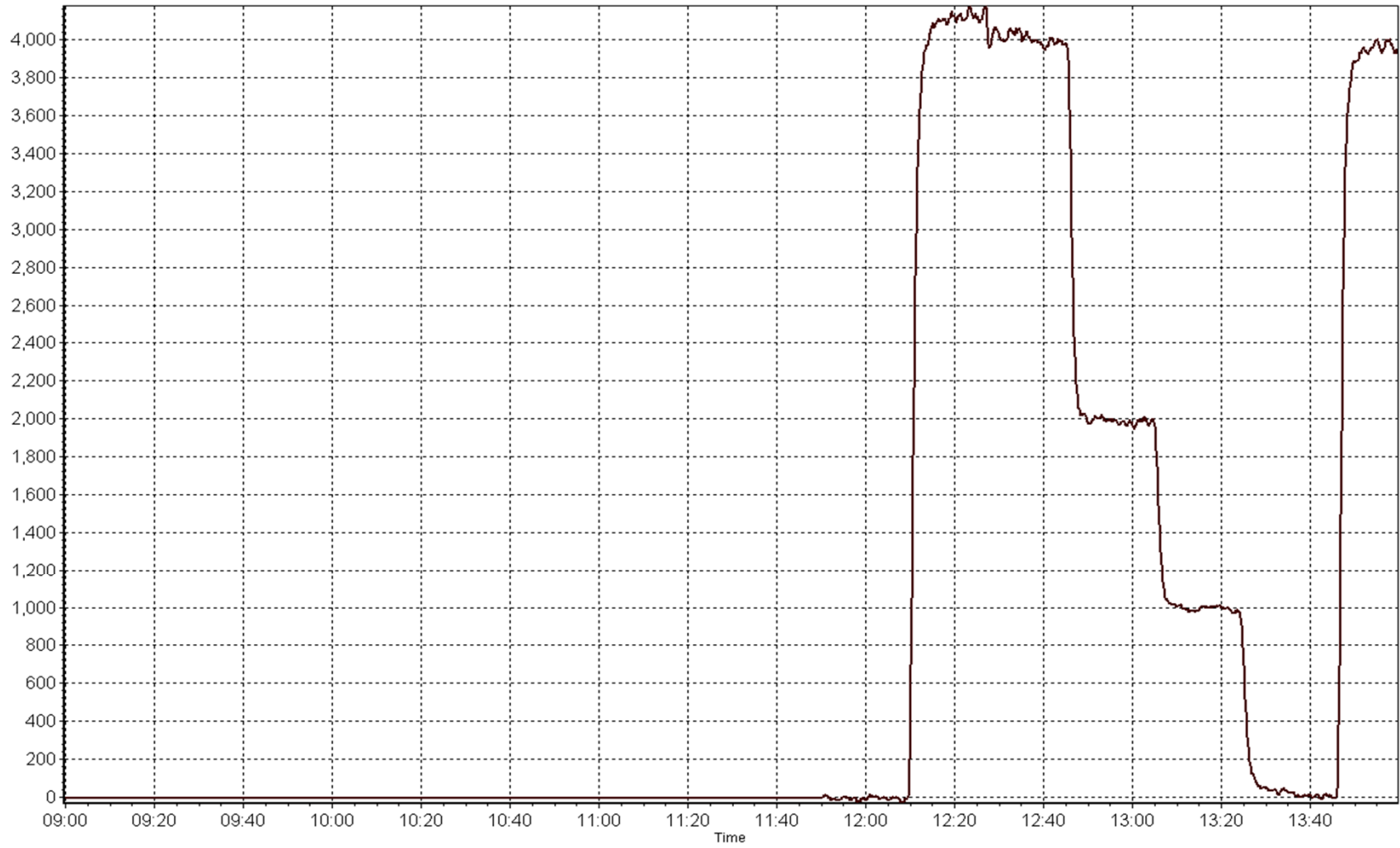
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999998
80.1	80.0	1.0015		
39.9	39.8	1.0044	Slope	1.000178
20.0	19.9	1.0034		
			Intercept	0.117832

TRS Calibration Curve









# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Thursday, October 23, 2014	Previous Calibration	Wednesday, September 24, 2014
Station Name	Millennium	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	7:15	End Time (MST)	11:50
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	11.8	11.8
Analyzer Range (mv)	5000	5000	Air or Bypass press	42.9	42.9
Calculated slope	1.010366	1.011568	Fuel Pressure	19.3	19.3
Calculated intercept	-0.154028	0.005004		3.87	3.87
				2.23	2.23

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	-0.02	N/A
as found span	6000	94.1	16.93	16.73	1.012
calibrator zero	6000	0.0	0.00	-0.02	N/A
high point	6000	94.1	16.93	16.73	1.012
second point	6000	47.1	8.47	8.36	1.013
third point	6000	23.5	4.23	4.21	1.005
calibrator zero	6000	0.0	0.00	-0.02	N/A
as left zero	6000	0.0	0.00	-0.02	N/A
as left span	6000	94.1	16.93	16.97	0.998
Average Correction Factor					1.010

Corrected As found	16.75	Previous response	16.91	% change	0.9%
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#### Notes:

Filter changed out, No adjustments made, NO maintenance done,

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## THC Calibration Summary

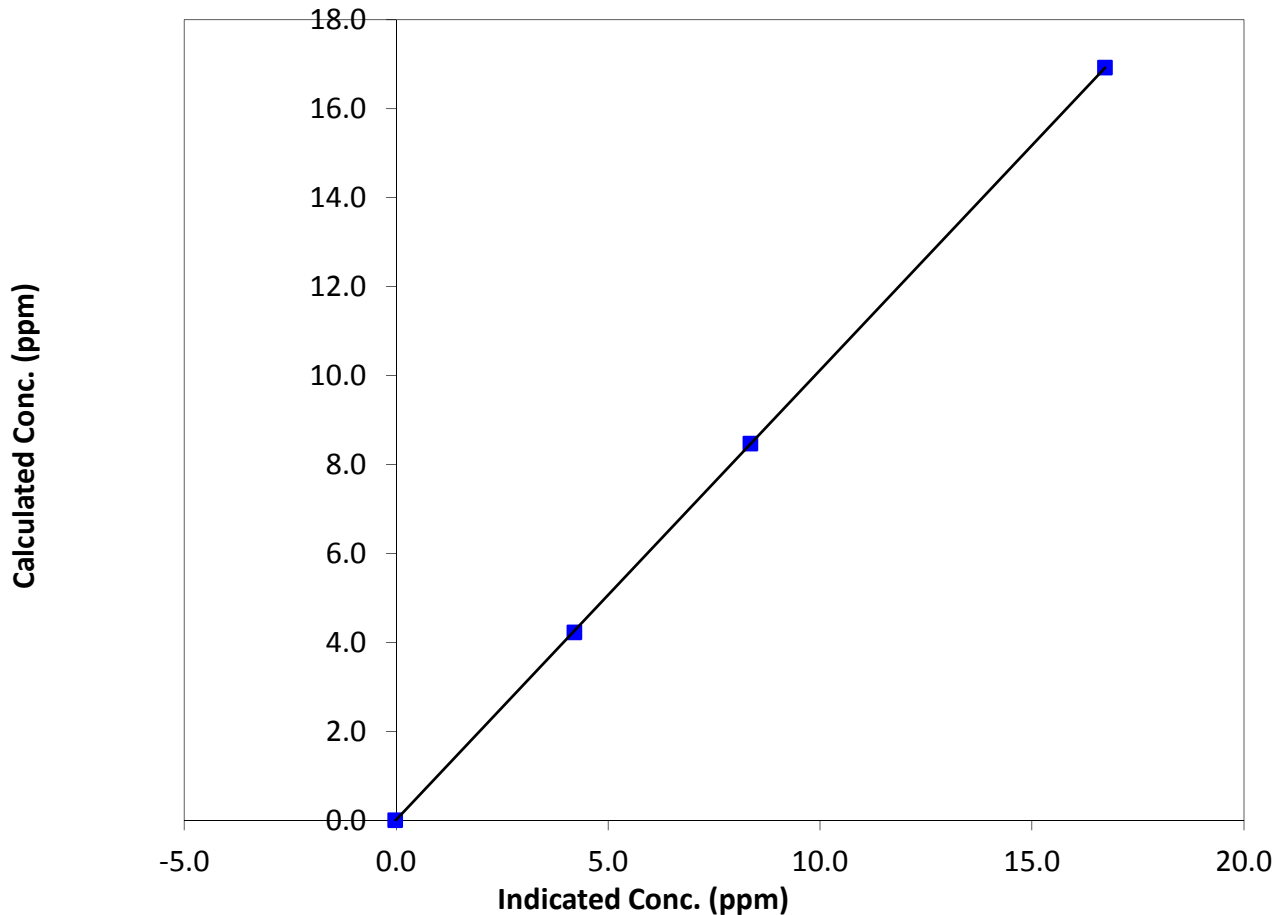
### Station Information

Calibration Date	October 23, 2014	Previous Calibration	September 24, 2014
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	7:15	End Time (MST)	11:50
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958296

### Calibration Data

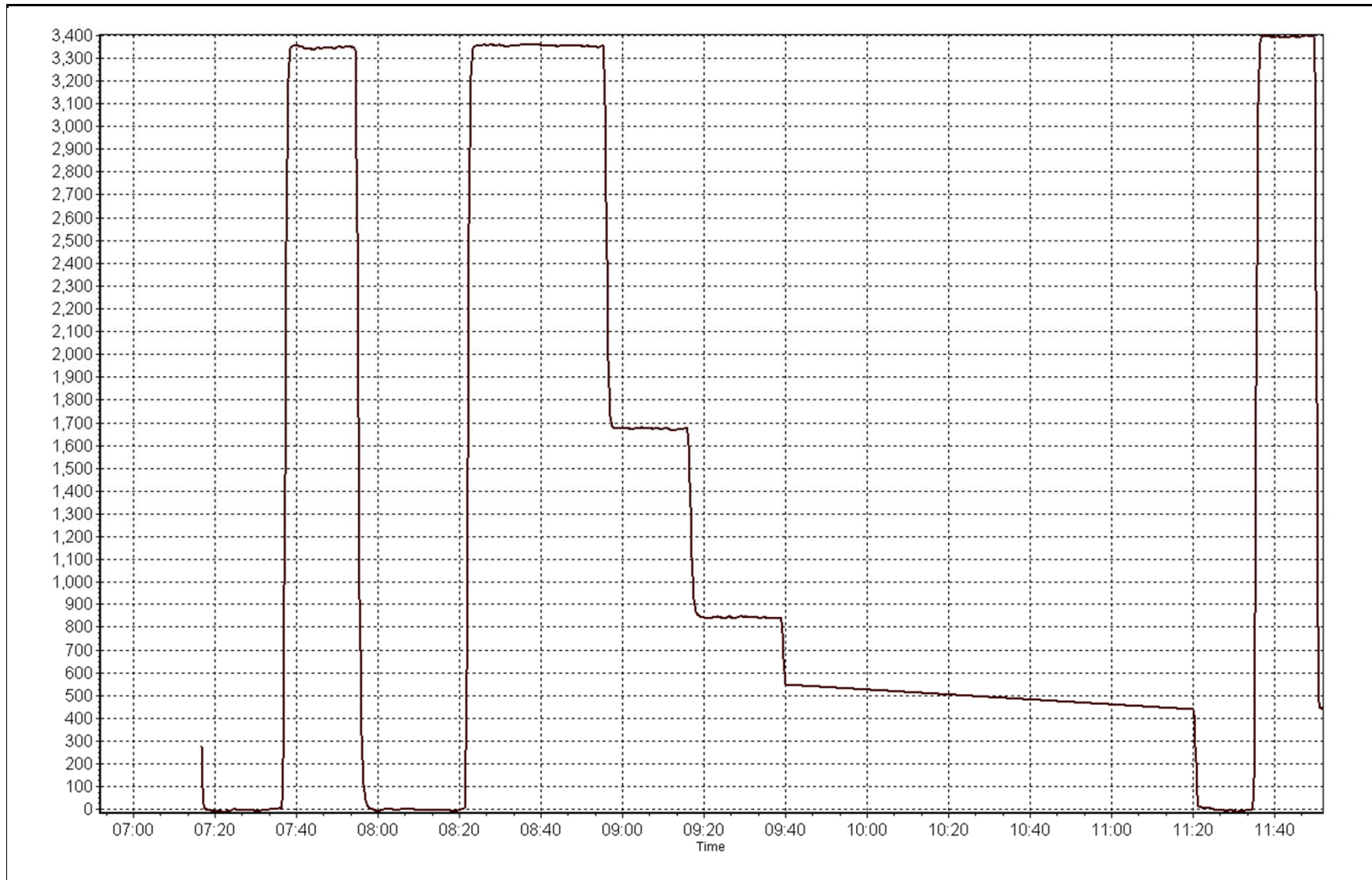
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.02	N/A	Correlation Coefficient	0.999991
16.93	16.73	1.0120		
8.47	8.36	1.0134	Slope	1.011568
4.23	4.21	1.0052		
			Intercept	0.005004

**THC Calibration Curve**



THC Calibration Plot

Date: October 23, 2014





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 23, 2014	Previous Calibration	September 25, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	7:15	End Time (MST)	11:52
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)	5000	5000	5000
Before	Data Slope	0.992287	0.993709	1.009969
	Data Offset	0.916160	-0.108265	-0.824399
After	Data Slope	0.989542	0.990127	1.013309
	Data Offset	-0.108311	-0.349928	-0.507519
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	1.141	ppb	1.148	ppb
NOX coefficient	1.147	ppb	1.141	ppb
NO2 coefficient		ppb		ppb
NO bkgrnd	0.3		0.5	
NOX bkgrnd	4.2		1.6	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.4	Deg C	314.4	Deg C
PMT Temp	6.8	Deg C	6.8	Deg C
O3 flow	87.0	ccm	87.0	ccm
R Cell Press	2.8	mmHg	2.9	mmHg
Sample Flow	498-493	ccm	498-493	ccm

**Notes:**

Filter changed, Pump changed out, Zero adjusted



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

October 23, 2014

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	-1.6	0.0	-1.1	N/A	N/A
as found span	6000	94.1	799.9	799.9	0.0	806.0	804.8	1.7	0.9924	0.9938
calibrator zero	6000	0.0	0.0	0.0	0.0	0.2	0.2	0.3	N/A	N/A
high point	6000	94.1	799.9	799.9	0.0	808.6	808.2	1.0	0.9892	0.9897
second point	6000	47.1	400.4	400.4	0.0	404.2	404.4	0.7	0.9905	0.9900
third point	6000	23.5	199.8	199.8	0.0	202.2	202.6	0.5	0.9879	0.9859
calibrator zero	6000	0.0	0.0	0.0	0.0	0.1	0.2	0.4	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	0.1	0.2	0.4	N/A	N/A
as left span	6000	94.1	799.9	502.0	297.9	800.4	506.8	293.6	0.9993	0.9905
Average Correction Factor									0.9892	0.9885

Corrected As found NO<sub>x</sub>= 807.6 NO= 804.8 Percent Change NO<sub>x</sub>= -0.3% NO= 0.0%  
 Previous Response NO<sub>x</sub>= 805.2 NO= 805.0

### GPT Calibration Data

Dilution Flow 6000 ccm Source Gas Flow 94.10 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			0.3			N/A	
1st NO <sub>2</sub> (300)	N/A	502.0	307.0	805.2	502.0	303.0	0.9780	1.0000	1.0132	98.7%
2nd NO <sub>2</sub> (200)	N/A	607.2	201.8	806.8	607.2	200.4	0.9761	1.0000	1.0070	99.3%
3rd NO <sub>2</sub> (100)	N/A	708.6	100.4	807.6	708.6	99.5	0.9751	1.0000	1.0090	99.1%
4th NO <sub>2</sub> (0)	809.0	N/A	0.4	809.4	809.0	0.9	0.9729	1.0000	N/A	N/A
Average Correction Factor							0.9755	1.0000	1.0097	99.0%

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

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

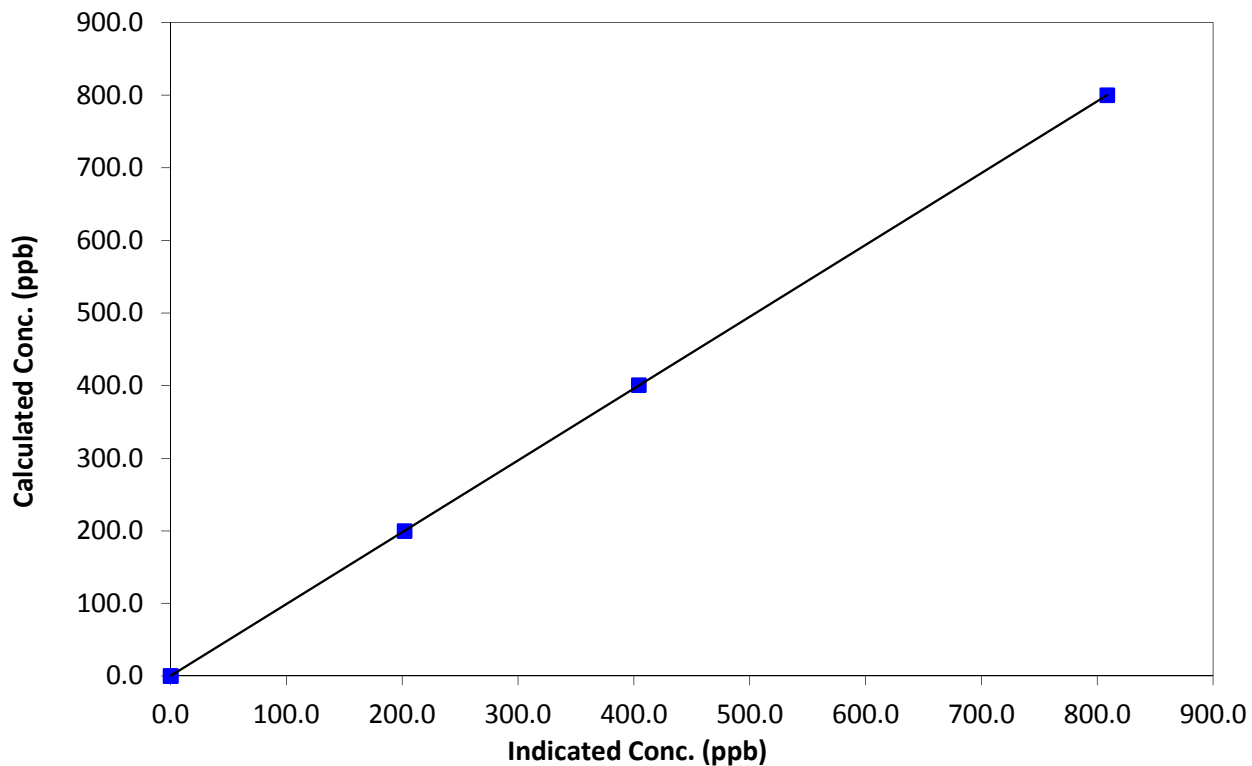
### Station Information

Calibration Date	October 23, 2014	Previous Calibration	September 25, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	7:15	End Time (MST)	11:52
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	808.6	0.9892		
400.4	404.2	0.9905	Slope	0.989542
199.8	202.2	0.9879		
0.0	0.1	0.0000	Intercept	-0.108311

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

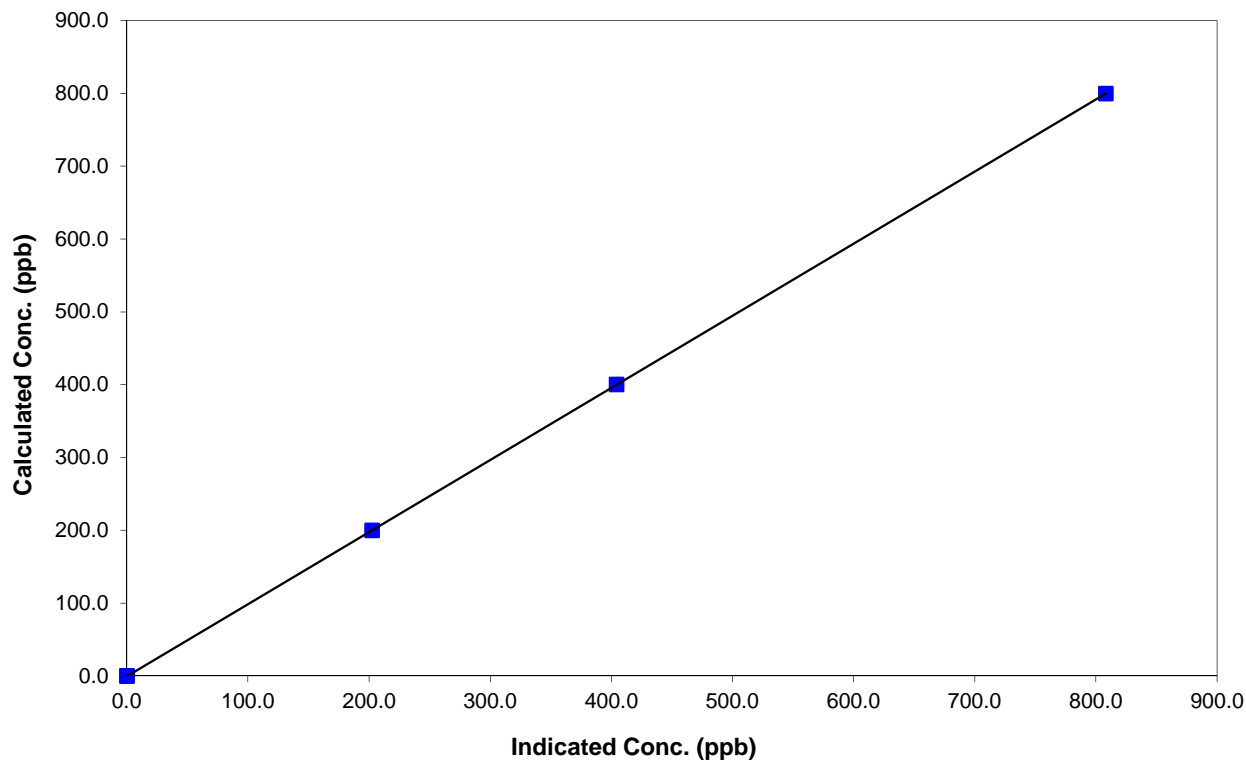
### Station Information

Calibration Date	October 23, 2014	Previous Calibration	September 25, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	7:15	End Time (MST)	11:52
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	808.2	0.9897		
400.4	404.4	0.9900	Slope	0.990127
199.8	202.6	0.9859		
0.0	0.2	0.0000	Intercept	-0.349928

### NO Calibration Curve







# Wood Buffalo Environmental Association

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

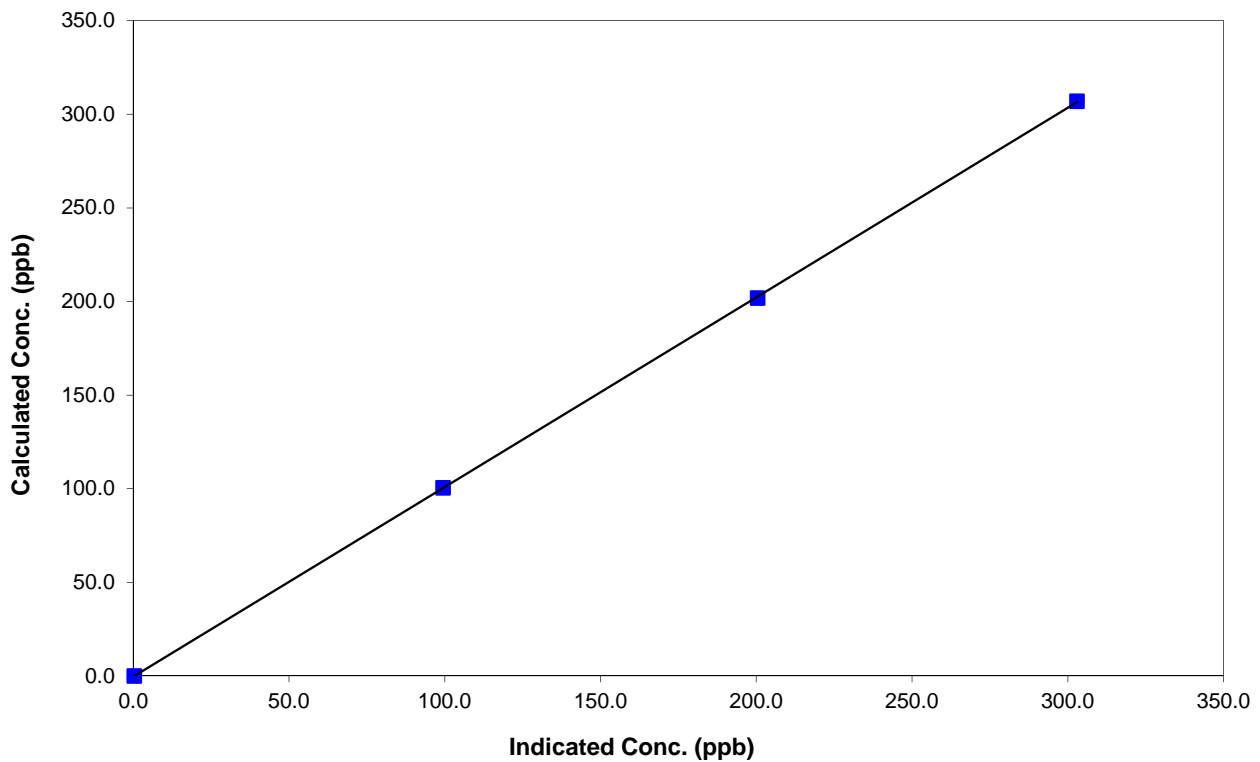
### Station Information

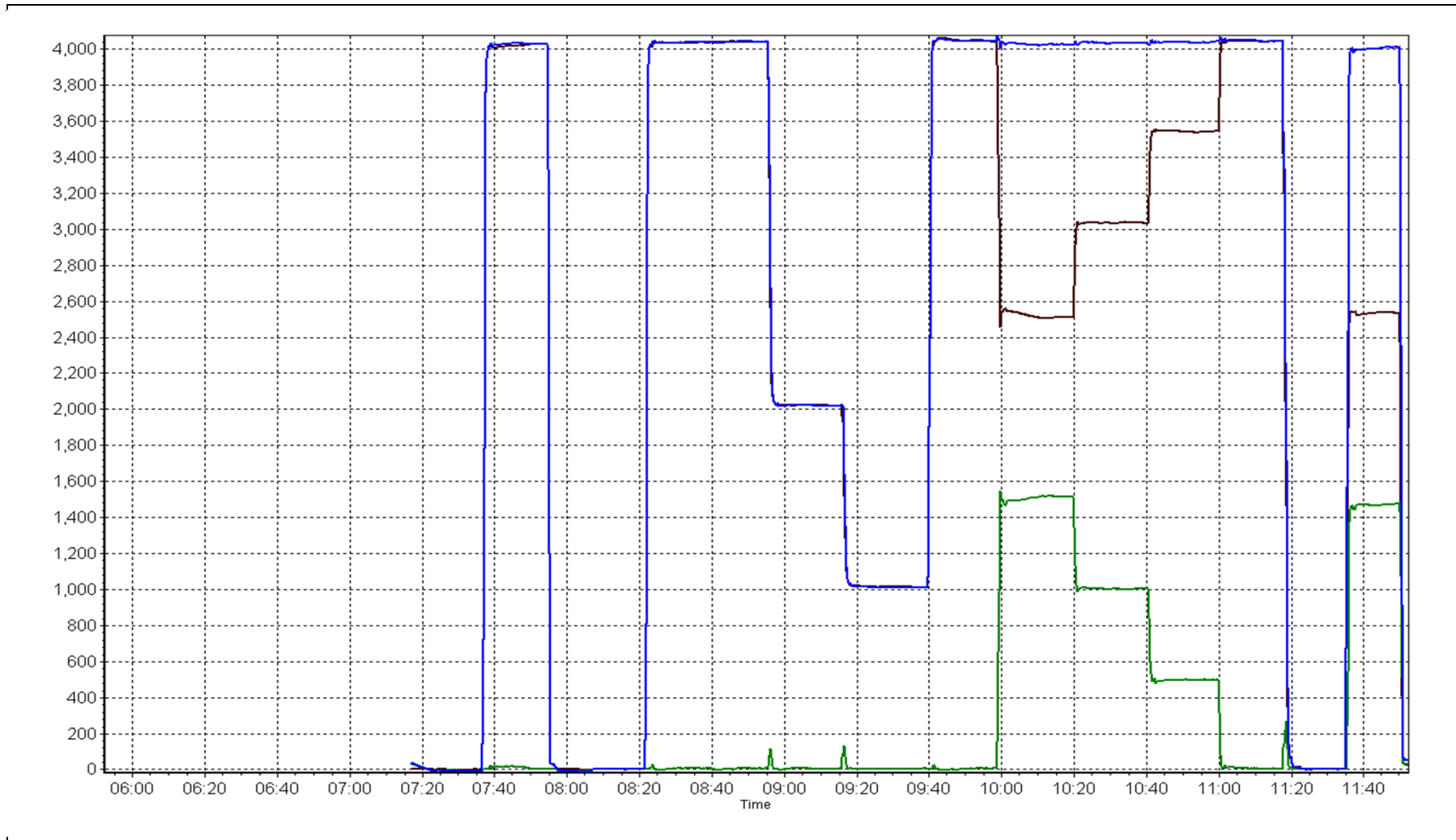
Calibration Date	October 23, 2014	Previous Calibration	September 25, 2014
Station Number	Millenium Mine	Station Number	AMS 12
Start Time (MST)	7:15	End Time (MST)	11:52
Analyzer make	API T200	Analyzer serial #	723

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999984
307.0	303.0	1.0132		
201.8	200.4	1.0070	Slope	1.013309
100.4	99.5	1.0090		
			Intercept	-0.507519

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





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 13  
FORT MCKAY SOUTH  
OCTOBER 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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)  
OCTOBER 2014

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	693	40	51	98.52	34	0	5	0
TRS(ppb) Average	708	36	36	100.00	2	0	0	0
THC(ppm) Average	695	38	49	98.52	4.3	-	2.4	-
O3(ppb) Average	702	38	42	99.46	40	0	26	-
NO2(ppb) Average	705	38	39	99.87	29	0	9	-
NO(ppb) Average	705	38	39	99.87	72	-	14	-
NOX(ppb) Average	705	38	39	99.87	76	-	22	-
PM2.5(ug/m3) Average	742	0	2	99.73	19.1	-	7.1	0
Temperature 2 m (C) Average	695	0	49	93.41	20.3	-	11.1	-
Relative Humidity (%) Average	695	0	49	93.41	100	-	-	-
Wind Speed 10 m (km/h) Average	735	0	9	98.79	12	-	-	-
Wind Direction 10 m (deg) Average	735	0	9	98.79	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	693	1.4	3	-	0	0	0	1	1	3	34
TRS(ppb) Average	708	0.2	0	-	0	0	0	0	0	0	2
THC(ppm) Average	695	2.12	0.3	-	1.8	1.9	1.9	2.1	2.2	2.4	4.3
O3(ppb) Average	702	9.5	8	-	0	0	2	8	14	22	40
NO2(ppb) Average	705	4.4	4	-	0	0	1	3	7	10	29
NO(ppb) Average	705	2.9	7	-	0	0	0	0	2	8	72
NOX(ppb) Average	705	7.2	10	-	0	0	1	4	9	18	76
PM2.5(ug/m3) Average	742	3.91	2.6	-	0.9	1.5	1.9	3.3	5	7.3	19.1
Temperature 2 m (C) Average	695	3.59	4.6	-	-6.4	-0.9	0.1	2.9	6.2	10.3	20.3
Relative Humidity (%) Average	695	83.8	14	-	40	61	77	88	95	97	100
Wind Speed 10 m (km/h) Average	735	4.6	3	-	0	1	2	4	6	9	12
Wind Direction 10 m (deg) Average	735	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	15 Oct 2014 00:00	15 Oct 2014 01:00	2	Unstable operation - excessive noise on output signal
SO2	15 Oct 2014 06:00	15 Oct 2014 06:00	1	Unstable operation - excessive noise on output signal
SO2	15 Oct 2014 14:00	15 Oct 2014 14:00	1	Unstable operation - excessive noise on output signal
SO2	21 Oct 2014 12:00	21 Oct 2014 12:00	1	Unstable operation - excessive noise on output signal
SO2	22 Oct 2014 13:00	22 Oct 2014 13:00	1	Maintenance - cleaned glass manifold
SO2	26 Oct 2014 01:00	26 Oct 2014 01:00	1	Unstable operation - excessive noise on output signal
SO2	28 Oct 2014 06:00	28 Oct 2014 06:00	1	Unstable operation - excessive noise on output signal
SO2	29 Oct 2014 04:00	29 Oct 2014 04:00	1	Unstable operation - excessive noise on output signal
SO2	30 Oct 2014 00:00	30 Oct 2014 00:00	1	Unstable operation - excessive noise on output signal
SO2	30 Oct 2014 09:00	30 Oct 2014 09:00	1	Unstable operation - excessive noise on output signal
THC	01 Oct 2014 19:00	01 Oct 2014 19:00	1	Intermittent unstable operation - excessive baseline drift
THC	11 Oct 2014 11:00	11 Oct 2014 19:00	9	Intermittent unstable operation - excessive baseline drift
THC	21 Oct 2014 15:00	21 Oct 2014 15:00	1	Maintenance - tested automated daily system check valves
O3	22 Oct 2014 12:00	22 Oct 2014 13:00	2	Maintenance - cleaned glass manifold
O3	23 Oct 2014 10:00	23 Oct 2014 11:00	2	Maintenance - test automated daily system check valves
NO2, NO, NOX	22 Oct 2014 13:00	22 Oct 2014 13:00	1	Maintenance - cleaned glass manifold
PM2.5	22 Oct 2014 14:00	22 Oct 2014 15:00	2	Flow and zero reference checks, sample head cleaning
Temperature/ Relative Humidity	21 Oct 2014 12:00	23 Oct 2014 12:00	49	Analyzer Failure - rewiring sensor setup
Wind Speed, Wind Direction	02 Oct 2014 07:00	02 Oct 2014 09:00	3	Flat line in sensor output signal
Wind Speed, Wind Direction	14 Oct 2014 19:00	14 Oct 2014 19:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	21 Oct 2014 12:00	21 Oct 2014 15:00	4	Flat line in sensor output signal
Wind Speed, Wind Direction	22 Oct 2014 14:00	22 Oct 2014 14:00	1	Maintenance - sensor calibration and alignment check

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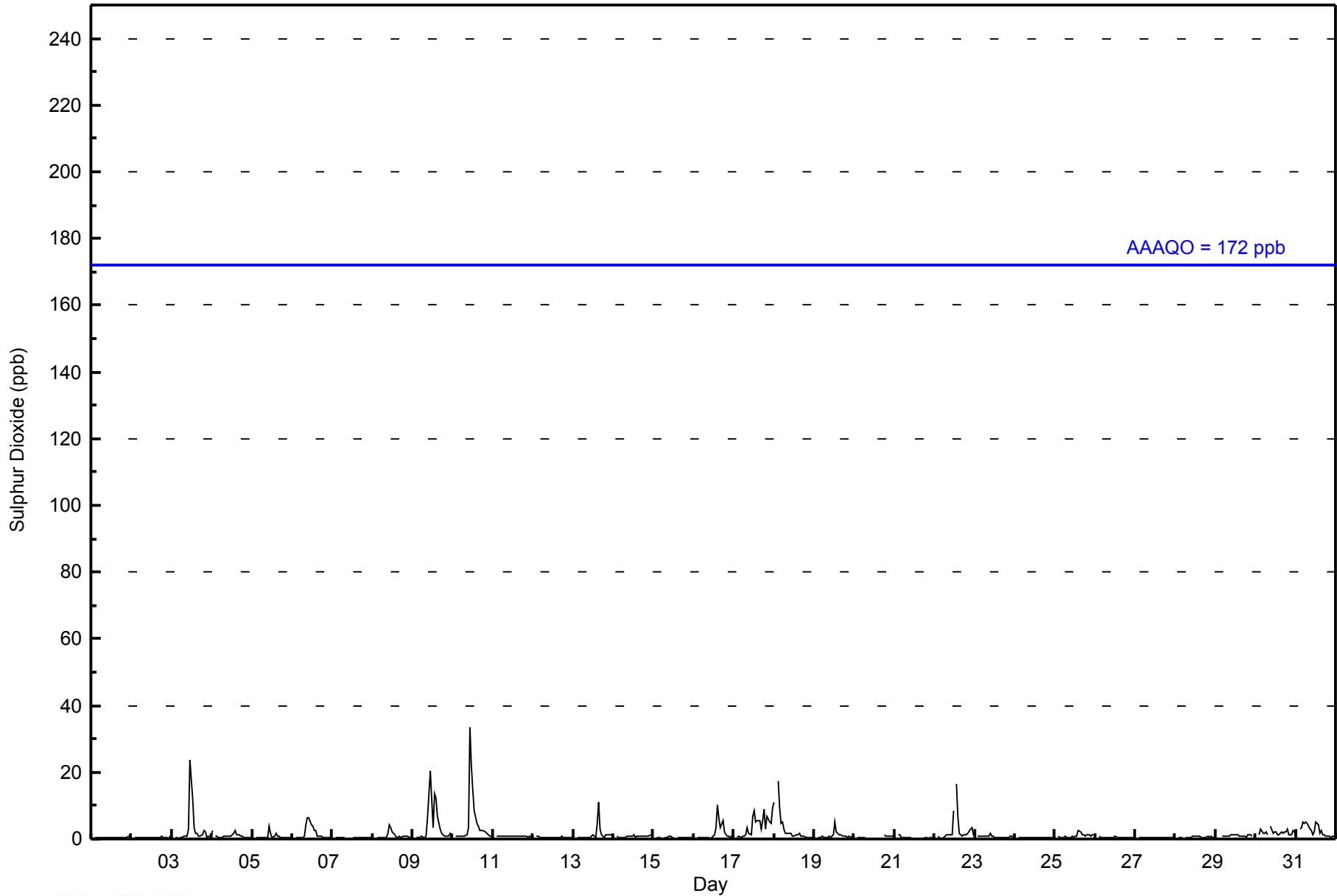


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 34 ppb on Oct 10 11:00										Maximum Daily Average: 4.9 ppb on Oct 10										Hours of Data: 693						
Minimum Value: 0 ppb on Oct 3 05:00										Minimum Daily Average: 0.3 ppb on Oct 7										Hours of Missing Data: 51						
Maximum Diurnal Average: 3.4 ppb at hour 12										Minimum Diurnal Average: 0.8 ppb at hour 8										Hours of Calibration: 40						
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> = 3 P <sub>99</sub> = 14										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-Oct	0	Z	0	0	0	0	0	0	1	0	1	1	1	0	1	0	1	1	0	1	0	1	1	1	0.5	1
2-Oct	1	Z	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	1	0.5	1
3-Oct	1	Z	1	0	0	0	1	1	1	1	3	24	12	3	2	2	1	1	1	3	2	1	1	2.7	24	
4-Oct	2	Z	1	1	1	1	1	1	1	1	1	1	1	2	3	1	1	1	1	1	0	1	1	1.0	3	
5-Oct	0	Z	1	1	1	0	0	0	0	0	4	2	0	1	2	1	1	0	0	0	0	0	0	0.7	4	
6-Oct	0	Z	0	0	0	0	0	1	4	6	6	4	4	3	3	1	1	1	1	0	0	0	0	1.6	6	
7-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1	
8-Oct	0	Z	0	0	0	0	0	0	1	2	4	3	2	1	1	0	1	0	1	1	1	1	1	0.9	4	
9-Oct	1	Z	1	1	0	1	1	1	1	6	20	12	3	13	12	7	3	2	1	1	1	1	2	3.9	20	
10-Oct	1	Z	1	1	1	1	1	1	1	3	34	22	15	8	5	4	3	2	2	2	2	1	1	4.9	34	
11-Oct	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	
12-Oct	1	Z	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0.6	1	
13-Oct	1	Z	1	0	0	0	1	0	0	0	1	1	1	1	5	11	3	1	1	1	1	1	1	1.5	11	
14-Oct	1	Z	1	0	1	0	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0.7	1	
15-Oct	UO	Z	1	1	1	UO	0	1	1	1	1	0	1	UO	1	0	0	1	1	1	1	0	1	0.5	1	
16-Oct	1	Z	1	1	1	1	0	0	0	0	0	1	1	3	10	7	3	6	2	1	1	1	1	1.8	10	
17-Oct	1	Z	1	1	1	1	1	1	3	2	1	7	9	5	6	5	3	5	9	3	7	5	5	3.9	9	
18-Oct	11	Z	18	9	5	5	3	2	2	2	2	1	1	1	2	1	1	1	0	0	1	0	0	3.0	18	
19-Oct	1	Z	0	1	1	1	1	0	0	1	0	1	5	2	2	1	1	1	1	1	1	1	1	1.0	5	
20-Oct	1	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	C	1	1	1	1	1	--	1	
21-Oct	1	Z	1	1	0	0	0	0	0	0	0	UO	0	0	0	0	0	0	0	1	0	0	1	0.4	1	
22-Oct	0	Z	1	0	0	0	1	1	1	1	1	8	M	16	7	2	1	1	1	1	2	3	4	2.5	16	
23-Oct	1	Z	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0	1	1	0	1	1	0.7	2	
24-Oct	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0.5	1	
25-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	3	2	1	1	1	1	1	1	1	1.0	3	
26-Oct	UO	Z	1	1	1	0	0	0	0	1	0	0	1	1	1	1	1	1	0	0	1	1	1	0.5	1	
27-Oct	1	Z	1	1	1	1	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0.4	1	
28-Oct	0	Z	0	0	0	UO	0	0	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0.6	1	
29-Oct	1	Z	1	UO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1.0	1	
30-Oct	1	Z	1	3	2	2	2	1	UO	4	2	2	2	1	1	2	2	2	2	3	1	1	3	2.0	4	
31-Oct	0	Z	3	4	5	4	5	5	3	3	1	2	5	4	2	3	1	1	1	1	1	1	1	2.5	5	
1.0 -- 1.2 1.0 0.8 0.9 0.8 0.8 0.8 0.9 1.4 3.0 3.4 2.5 2.6 2.3 1.9 1.1 1.1 1.1 1.1 1.0 1.0 0.9 1.0 1.0																								Diurnal Average		
11 -- 18 9 5 5 5 5 5 4 6 34 24 15 16 12 11 3 6 9 3 7 5 5 9																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South - October 2014





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	680	98.12	98.12
11 - 20	10	1.44	99.57
21 - 60	3	0.43	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: 693

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South - October 2014**

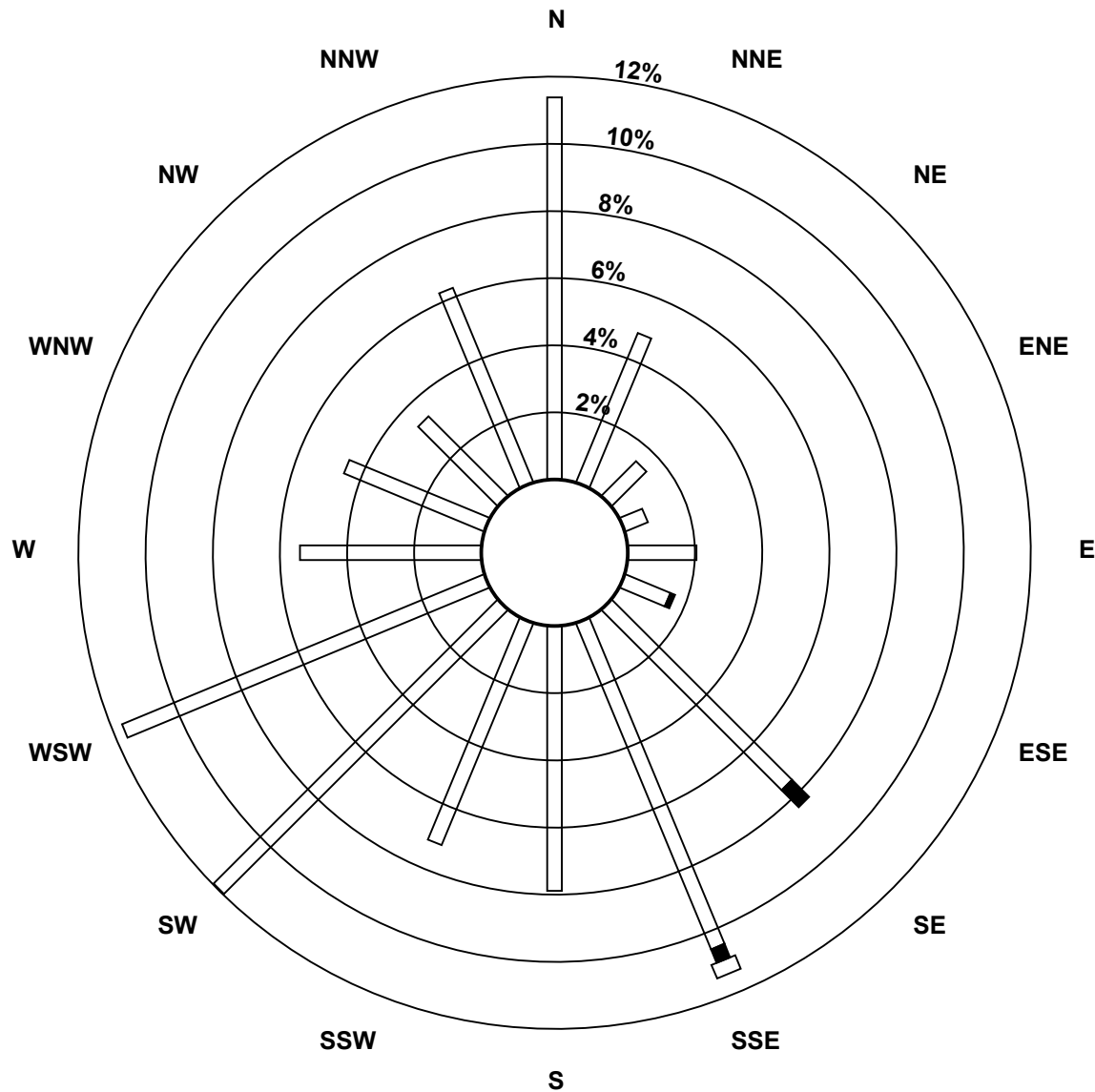
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	78	33	10	5	14	10	52	72	54	49	82	80	37	31	23	43	673
11 - 20	0	0	0	0	0	1	5	3	0	0	0	0	0	0	0	0	9
21 - 60	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	78	33	10	5	14	11	57	78	54	49	82	80	37	31	23	43	685

Total Number of Valid Hours: 685

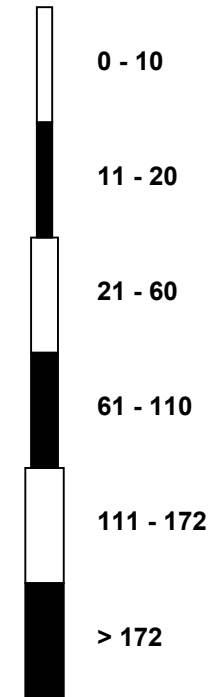
Total Number of Hours: 744

**Wood Buffalo Environmental Association**  
**Wind Rose Oct 2014**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South (AMS 13)**



**Classes (ppb)**

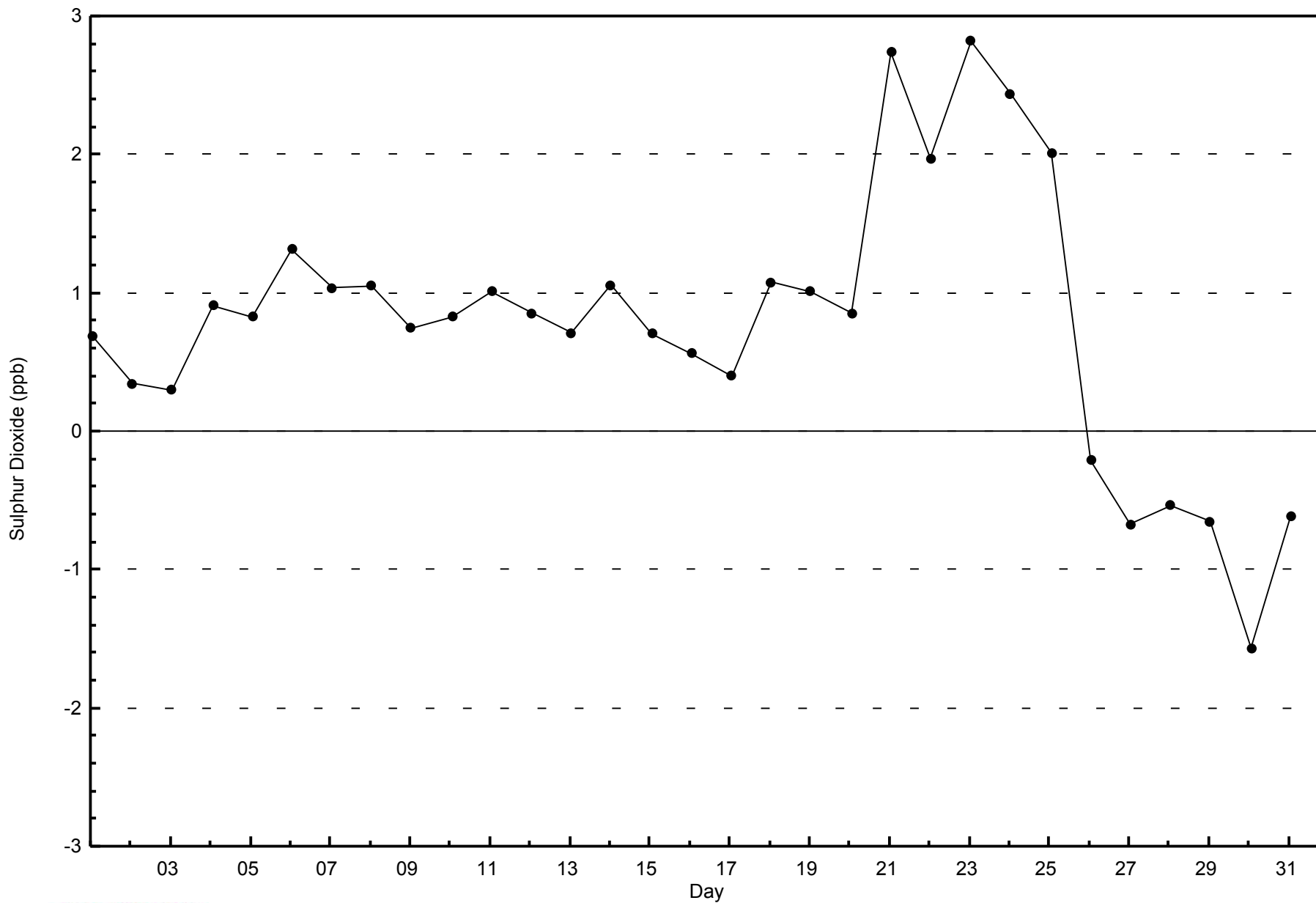


**Total Number of Valid Hours: 685**



WBEA  
Zero Responses

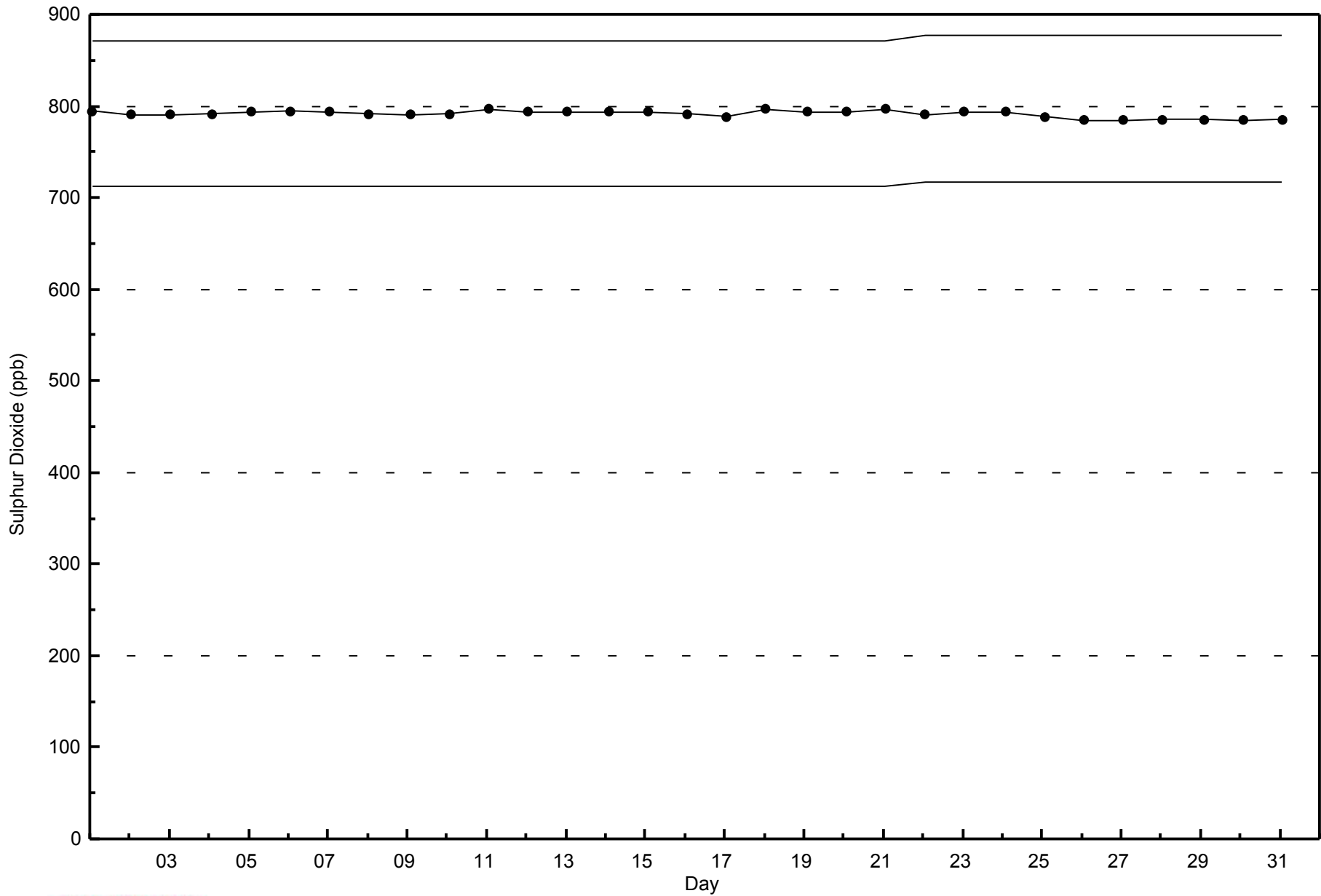
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South - October 2014





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South - October 2014





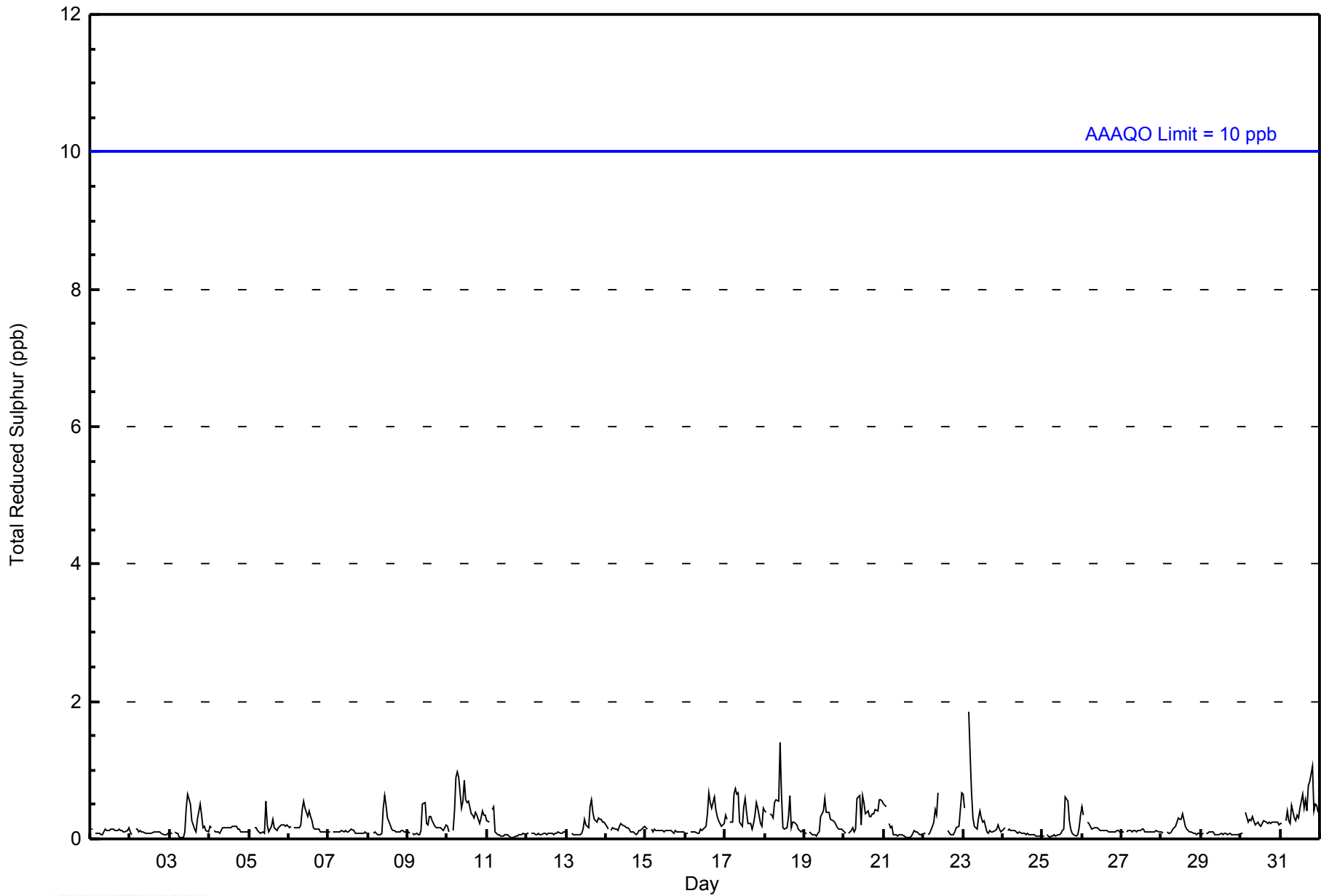
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 2 ppb on Oct 23 04:00										Maximum Daily Average: 0.5 ppb on Oct 10										Hours of Data: 708																												
Minimum Value: 0 ppb on Oct 3 08:00										Minimum Daily Average: 0.1 ppb on Oct 29										Hours of Missing Data: 36																												
Maximum Diurnal Average: 0.3 ppb at hour 11										Minimum Diurnal Average: 0.2 ppb at hour 2										Hours of Calibration: 36																												
Monthly Average: 0.2 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1										Percent Operational Time: 100.0																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
2-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
3-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0.2	1																						
4-Oct	0	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																						
5-Oct	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
6-Oct	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
7-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
8-Oct	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
9-Oct	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
10-Oct	0	0	Z	0	0	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1																						
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
12-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
13-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1																						
14-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
15-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
16-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0.2	1																						
17-Oct	0	0	Z	0	0	1	1	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0.4	1																						
18-Oct	0	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0.4	1																						
19-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
20-Oct	0	0	Z	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	1	1	1	0.4	1																						
21-Oct	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																						
22-Oct	0	0	Z	0	0	0	0	0	0	1	C	C	C	C	C	0	0	0	0	0	0	0	0	1	0.2	1																						
23-Oct	1	0	Z	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																						
24-Oct	0	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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.1	1																						
26-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
28-Oct	0	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																						
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
31-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	1	0	1	0	0	0.4	1																						
																								0.2	0.2	--	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average
																								1	0	--	2	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	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**  
**Fort McKay South - October 2014**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	708	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - October 2014**

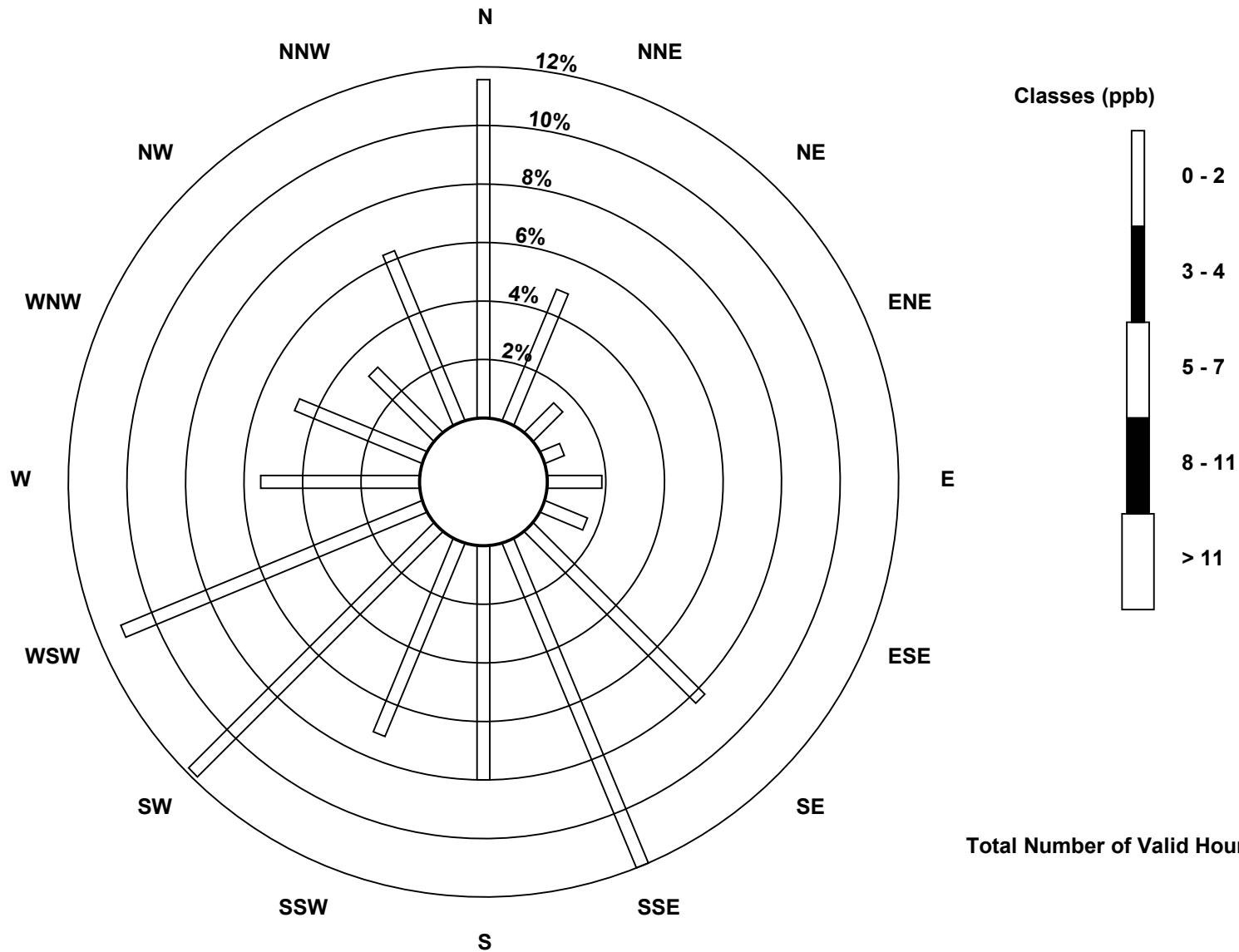
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	81	34	10	5	13	11	58	84	56	50	83	78	38	33	22	44	700
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	81	34	10	5	13	11	58	84	56	50	83	78	38	33	22	44	700

Total Number of Valid Hours: 700

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

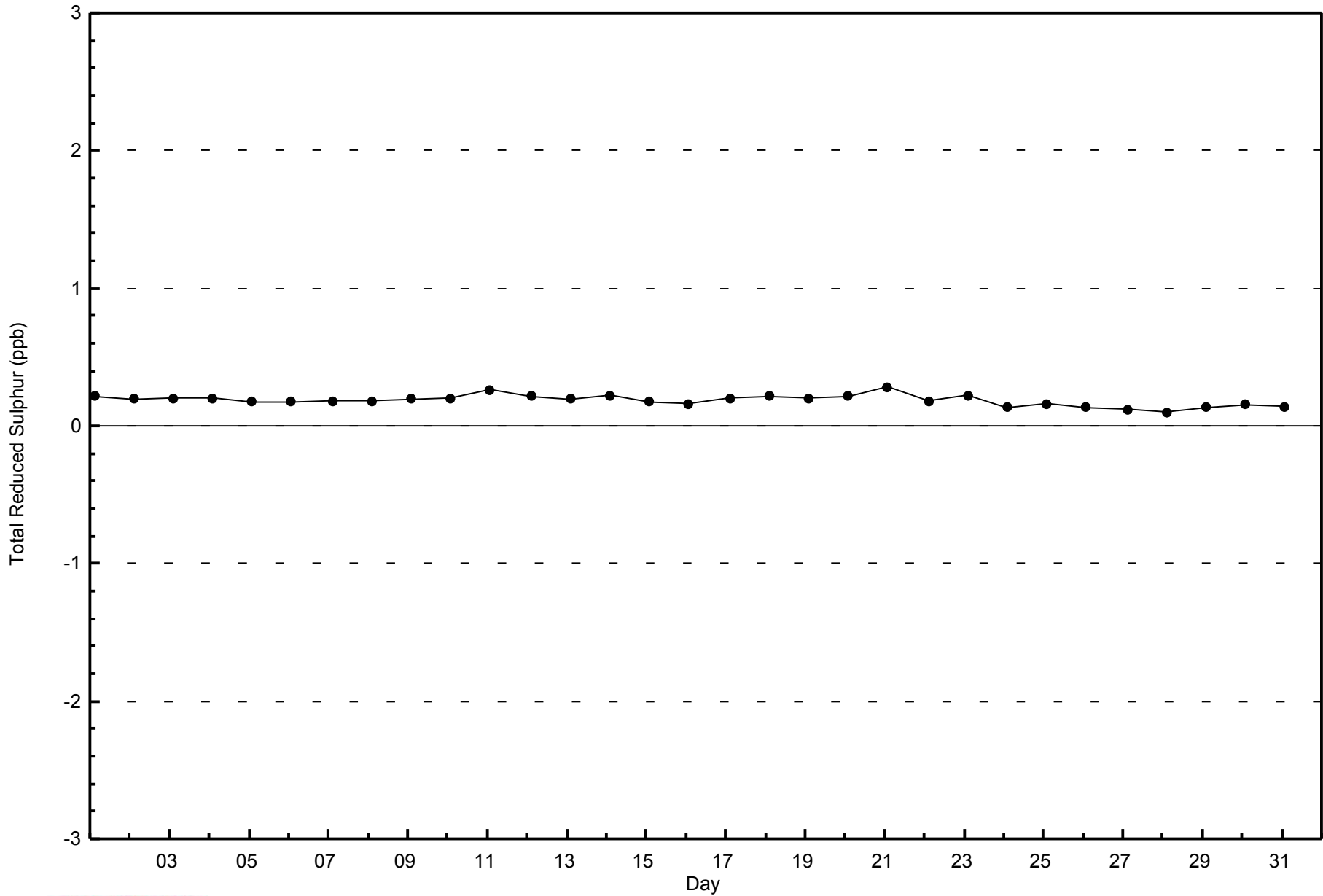
**Total Reduced Sulphur (TRS) - ppb  
Fort McKay South (AMS 13)**





WBEA  
Zero Responses

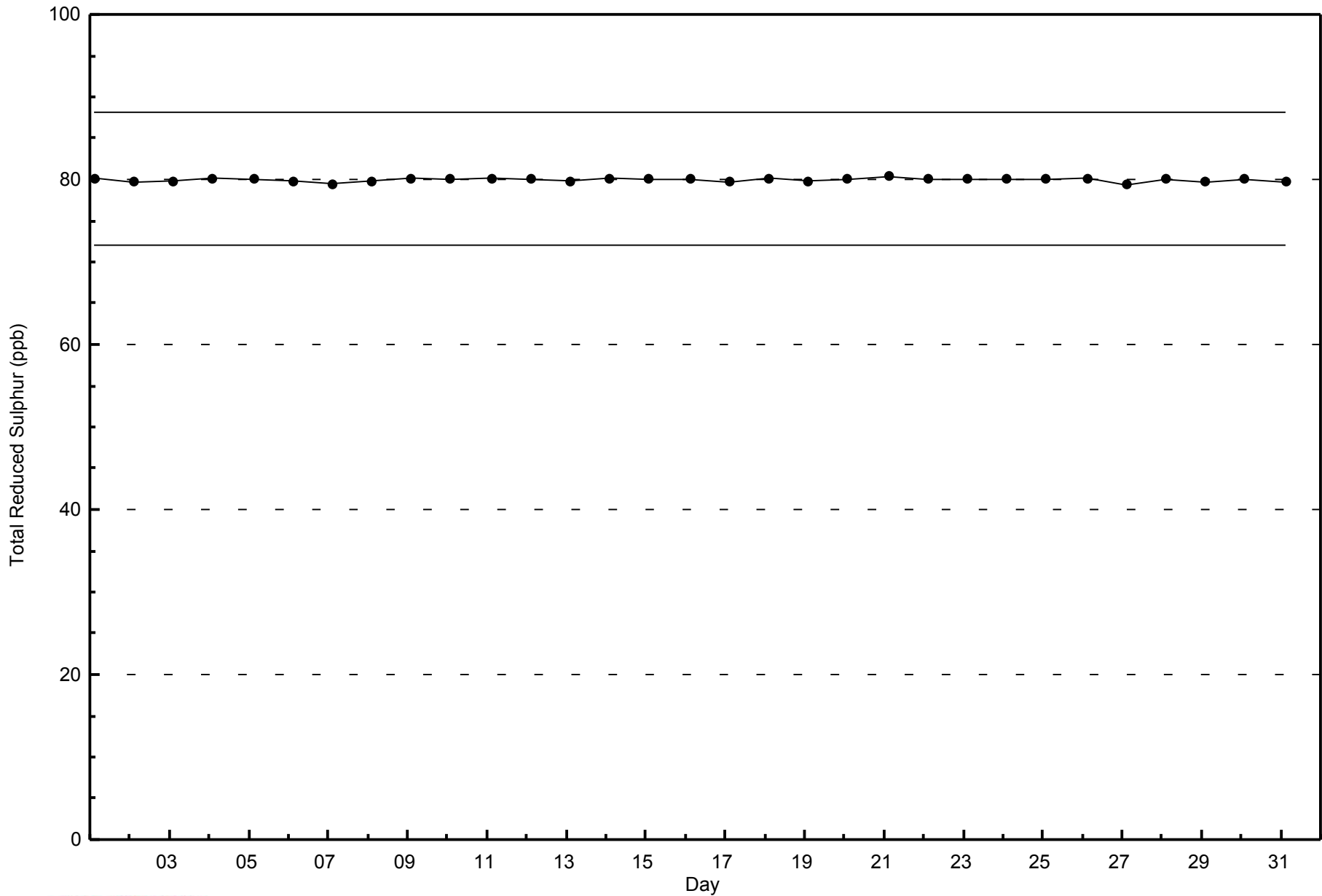
Total Reduced Sulphur (TRS) - ppb  
Fort McKay South - October 2014





**WBEA**  
**Span Responses**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - October 2014**

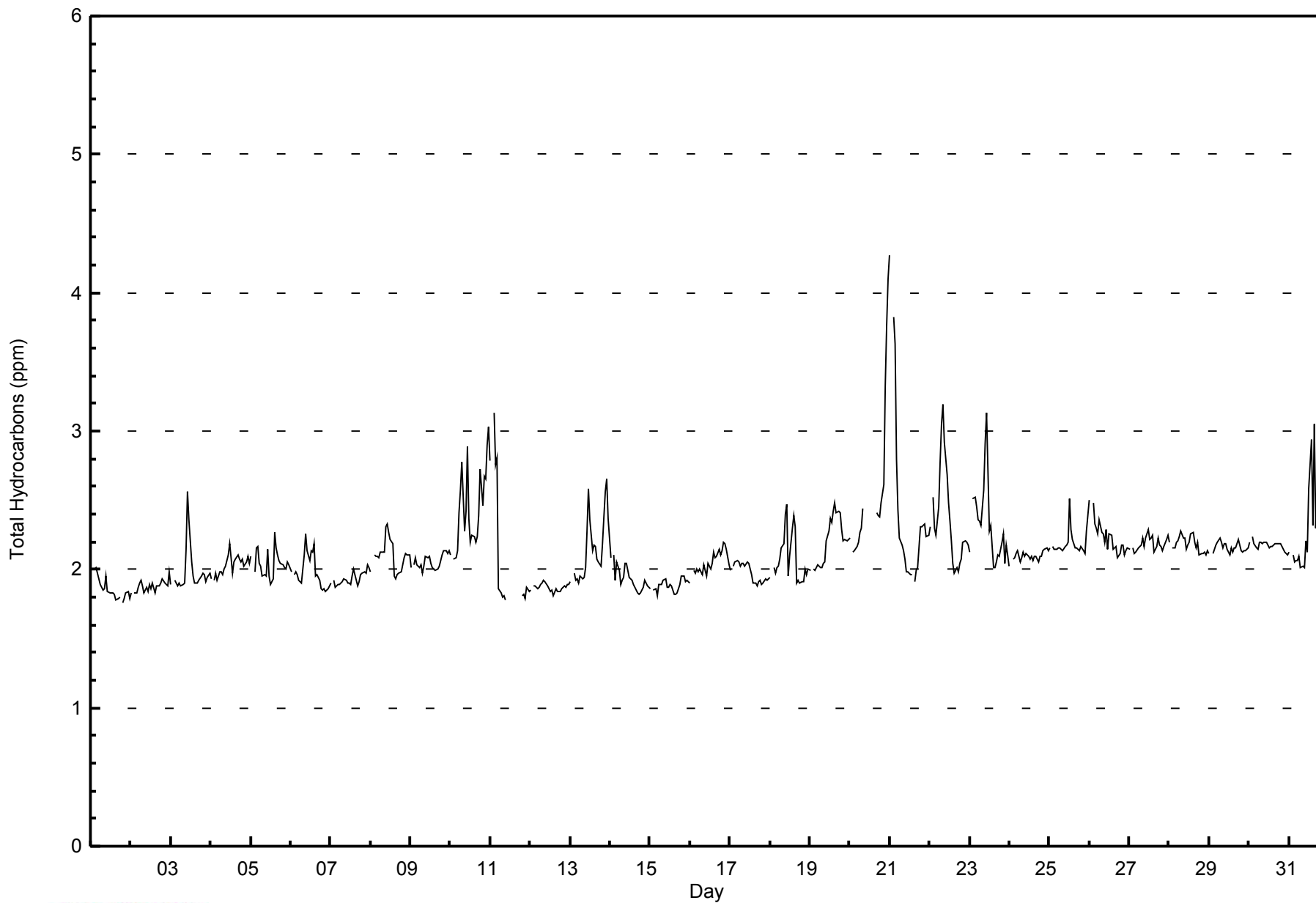






**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - October 2014**







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

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	310	44.60	44.60
2.1 - 3.0	375	53.96	98.56
3.1 - 10.0	10	1.44	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 695

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - October 2014**

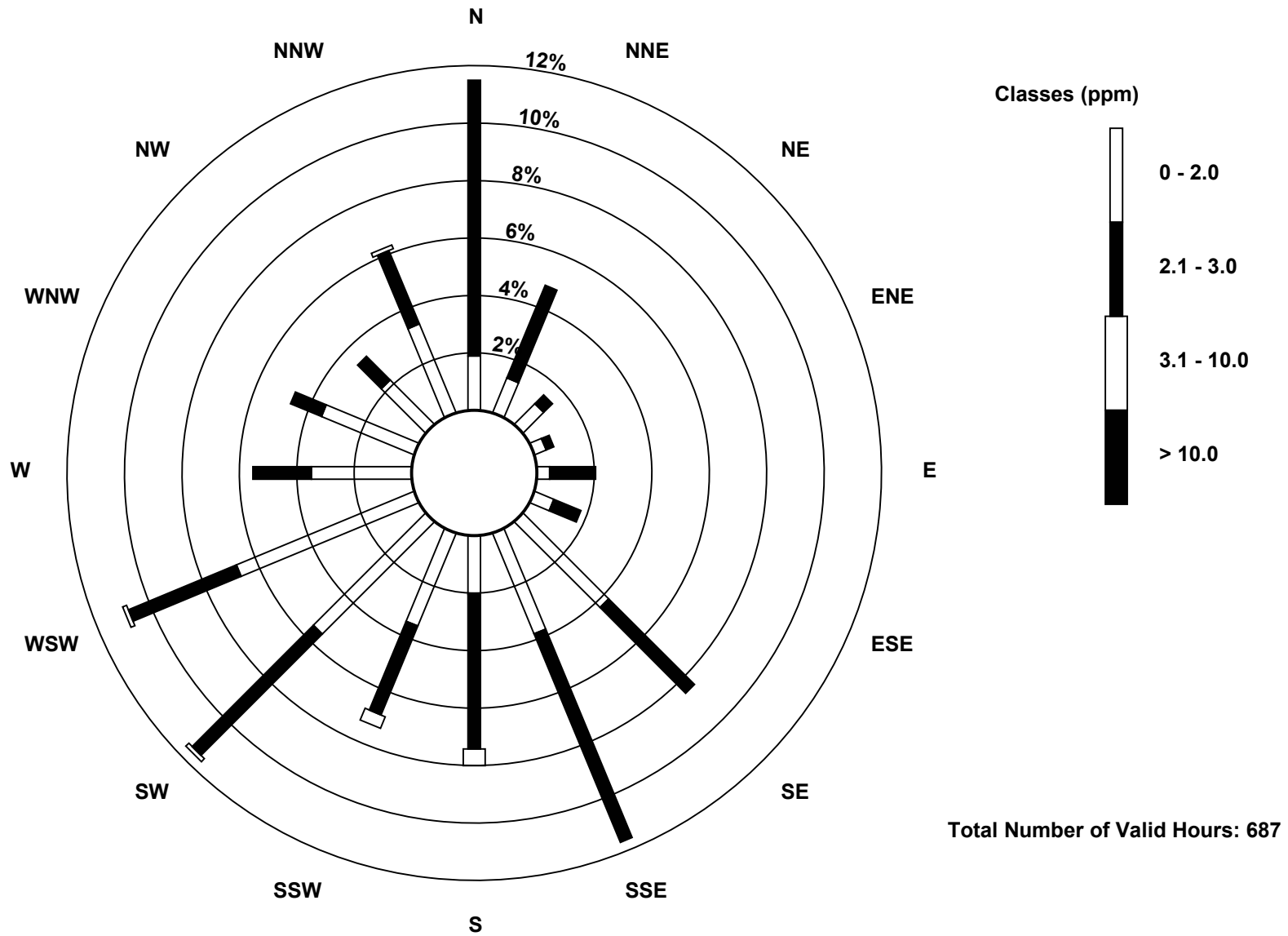
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	13	9	7	3	3	5	29	26	14	24	38	46	24	24	15	23	303
2.1 - 3.0	66	24	3	2	11	7	29	54	37	23	41	28	14	8	8	19	374
3.1 - 10.0	0	0	0	0	0	0	0	0	4	3	1	1	0	0	0	1	10
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	79	33	10	5	14	12	58	80	55	50	80	75	38	32	23	43	687

Total Number of Valid Hours: 687

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

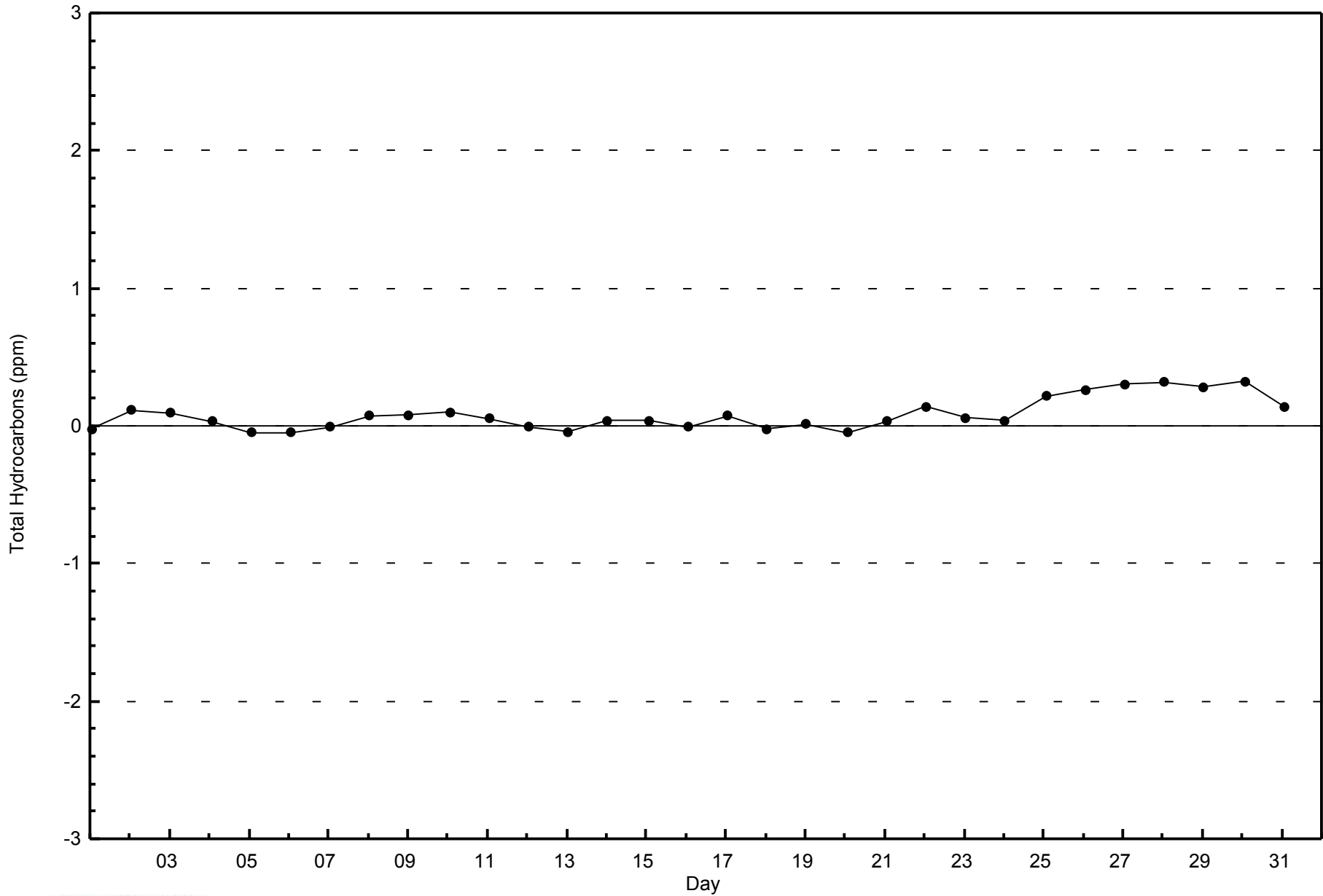
**Total Hydrocarbons (THC) - ppm  
Fort McKay South (AMS 13)**





WBEA  
Zero Responses

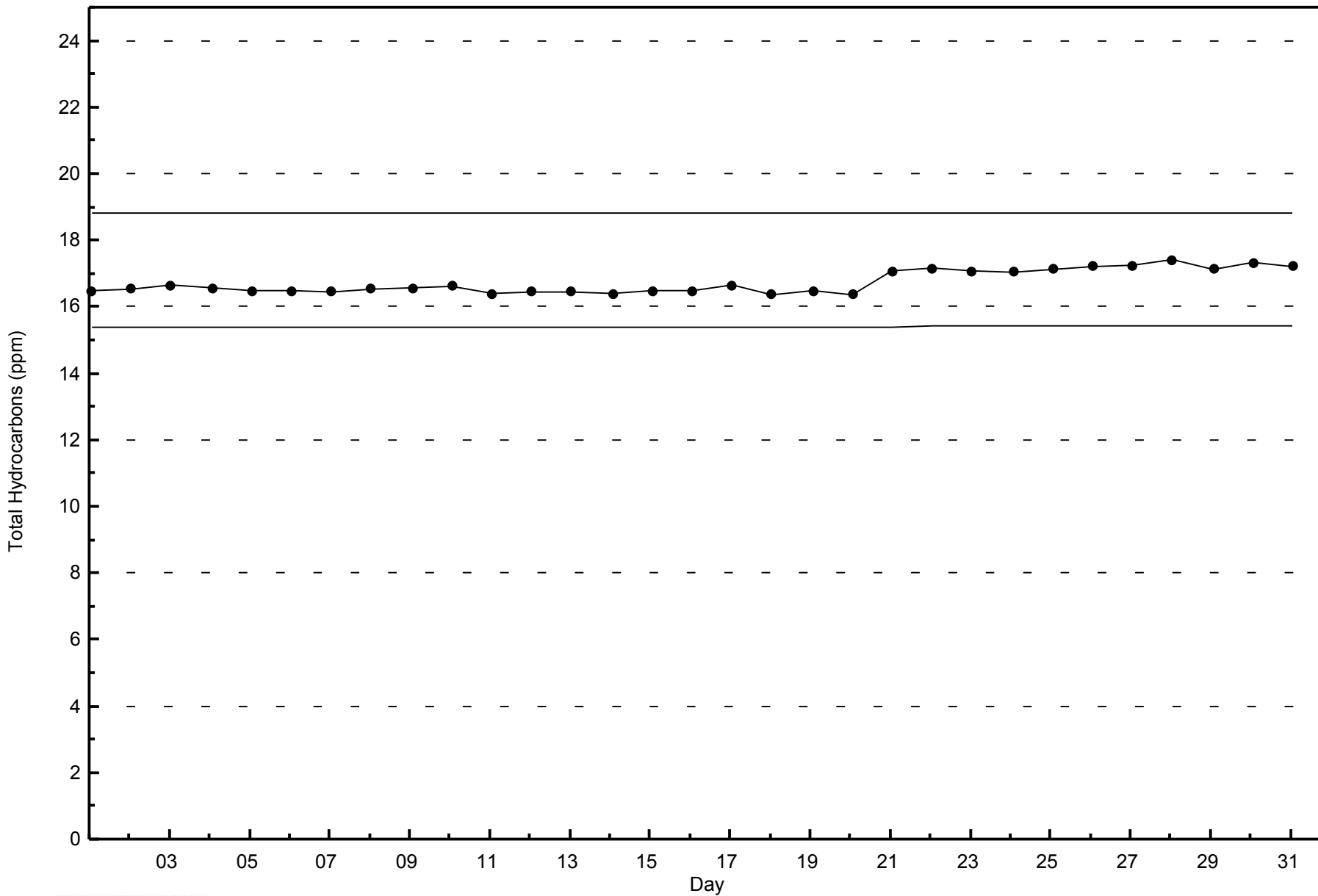
Total Hydrocarbons (THC) - ppm  
Fort McKay South - October 2014





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Fort McKay South - October 2014





Number of Exceedences (AAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 40 ppb on Oct 11 15:00	Maximum Daily Average: 26.3 ppb on Oct 12		Hours of Data:	702
Minimum Value: 0 ppb on Oct 10 02:00	Minimum Daily Average: 2.3 ppb on Oct 19		Hours of Missing Data:	42
Maximum Diurnal Average: 15.8 ppb at hour 16	Minimum Diurnal Average: 5.6 ppb at hour 5		Hours of Calibration:	38
Monthly Average: 9.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 2 Median = 8 Q <sub>3</sub> = 14 P <sub>90</sub> = 22 P <sub>99</sub> = 34		Percent Operational Time:	99.5

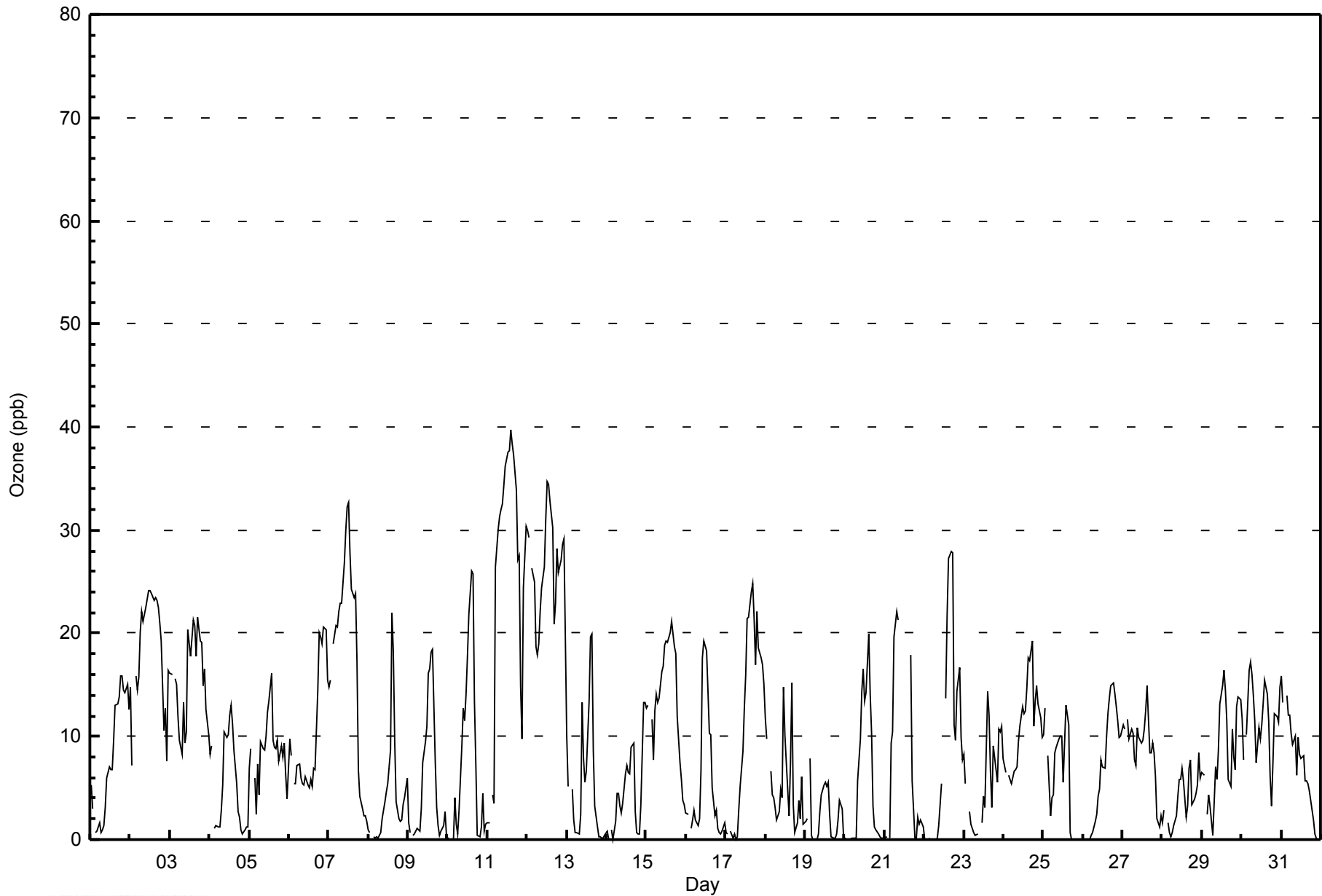
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	5	3	Z	1	1	2	1	1	1	3	6	7	7	7	10	13	13	14	16	16	14	14	15	13	7.9	16																						
2-Oct	15	7	Z	16	14	16	20	22	21	23	23	24	24	24	23	24	23	23	21	19	11	13	8	16	18.7	24																						
3-Oct	16	16	Z	16	15	12	10	8	13	9	10	20	18	19	21	21	18	22	19	19	15	17	13	10	15.5	22																						
4-Oct	8	9	Z	1	1	1	1	3	5	10	10	10	12	13	11	9	5	3	2	1	1	1	1	1	5.3	13																						
5-Oct	7	9	Z	6	2	7	4	9	9	9	10	12	13	16	10	9	9	10	8	9	8	9	6	4	8.5	16																						
6-Oct	10	8	Z	5	5	7	7	6	5	5	6	5	5	6	5	7	7	14	20	20	19	21	20	15	10.0	21																						
7-Oct	15	15	Z	19	21	21	22	23	23	27	30	32	33	28	24	23	24	17	7	4	3	2	2	2	18.1	33																						
8-Oct	1	1	Z	0	0	0	0	1	2	3	4	5	5	9	22	18	10	4	2	2	2	3	4	6	4.5	22																						
9-Oct	2	1	Z	0	1	1	1	1	3	7	9	11	16	17	18	18	8	3	1	0	1	1	3	0	5.4	18																						
10-Oct	0	0	Z	0	4	2	1	3	9	13	12	14	18	22	26	26	13	7	0	0	1	5	1	1	7.7	26																						
11-Oct	2	2	Z	4	4	26	30	31	32	33	34	36	38	38	40	38	37	34	27	28	15	10	24	30	25.8	40																						
12-Oct	30	29	Z	26	25	19	18	19	22	24	26	31	35	34	33	30	21	23	28	26	27	29	29	20	26.3	35																						
13-Oct	10	5	Z	5	2	1	1	1	2	13	8	6	7	13	20	20	9	3	1	0	0	0	0	0	5.5	20																						
14-Oct	1	0	Z	1	0	2	4	4	3	3	4	6	7	6	6	9	9	3	1	1	1	3	13	13	4.4	13																						
15-Oct	13	13	Z	12	8	12	14	13	14	16	17	19	19	20	21	20	19	18	12	7	6	4	3	3	13.9	21																						
16-Oct	3	2	Z	1	2	3	2	1	2	7	18	19	18	14	10	10	5	2	3	1	1	1	1	2	5.6	19																						
17-Oct	1	0	Z	1	0	1	0	0	3	5	8	13	16	21	22	24	25	21	17	22	19	18	17	15	11.7	25																						
18-Oct	12	10	Z	7	4	4	3	2	3	5	4	15	10	5	2	7	15	3	1	2	4	2	6	1	5.5	15																						
19-Oct	2	2	Z	8	0	0	0	0	1	3	4	5	6	5	6	2	0	0	0	1	2	4	3	0	2.3	8																						
20-Oct	0	0	Z	0	0	0	0	0	6	10	14	16	13	14	20	14	10	3	1	1	0	0	0	0	5.4	20																						
21-Oct	0	0	Z	0	9	10	20	22	21	C	C	C	C	C	C	C	18	6	0	0	2	1	2	1	--	22																						
22-Oct	0	0	Z	0	0	0	0	0	0	1	5	M	M	14	22	27	28	28	11	10	14	17	10	8	9.3	28																						
23-Oct	8	5	Z	3	2	1	1	0	1	M	M	2	4	3	14	12	7	3	9	7	6	11	10	11	5.7	14																						
24-Oct	8	7	Z	6	6	5	7	7	7	9	11	13	12	12	15	18	17	19	11	13	15	13	12	10	11.0	19																						
25-Oct	10	13	Z	8	2	4	4	8	9	10	10	10	6	9	13	11	1	0	0	0	0	0	0	0	5.6	13																						
26-Oct	0	0	Z	0	0	0	1	2	2	4	5	8	7	7	10	12	14	15	15	14	13	12	10	10	7.0	15																						
27-Oct	11	11	Z	12	10	11	10	8	7	11	10	9	10	11	12	15	8	8	9	8	6	2	1	2	8.8	15																						
28-Oct	2	3	Z	2	1	0	1	1	2	4	6	6	7	6	2	3	7	8	3	4	5	5	8	6	4.0	8																						
29-Oct	6	6	Z	2	4	3	0	4	7	6	9	13	15	16	14	11	6	5	11	8	7	13	14	14	8.5	16																						
30-Oct	12	8	Z	10	16	17	16	14	12	7	11	10	11	13	15	14	11	6	3	7	12	12	11	15	11.5	17																						
31-Oct	16	13	Z	14	12	12	10	9	10	6	10	8	8	8	6	6	5	5	4	2	1	0	0	0	7.2	16																						
																								7.2	6.4	--	6.0	5.6	6.5	6.7	7.2	8.3	9.9	11.5	13.3	13.8	14.4	15.8	15.8	13.0	10.7	8.7	8.3	7.4	7.9	8.0	7.5	Diurnal Average
																								30	29	--	26	25	26	30	31	32	33	34	36	38	38	40	38	37	34	28	28	27	29	29	30	Diurnal Maximum

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



**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - October 2014**





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

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	620	88.32	88.32
21 - 50	82	11.68	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - October 2014**

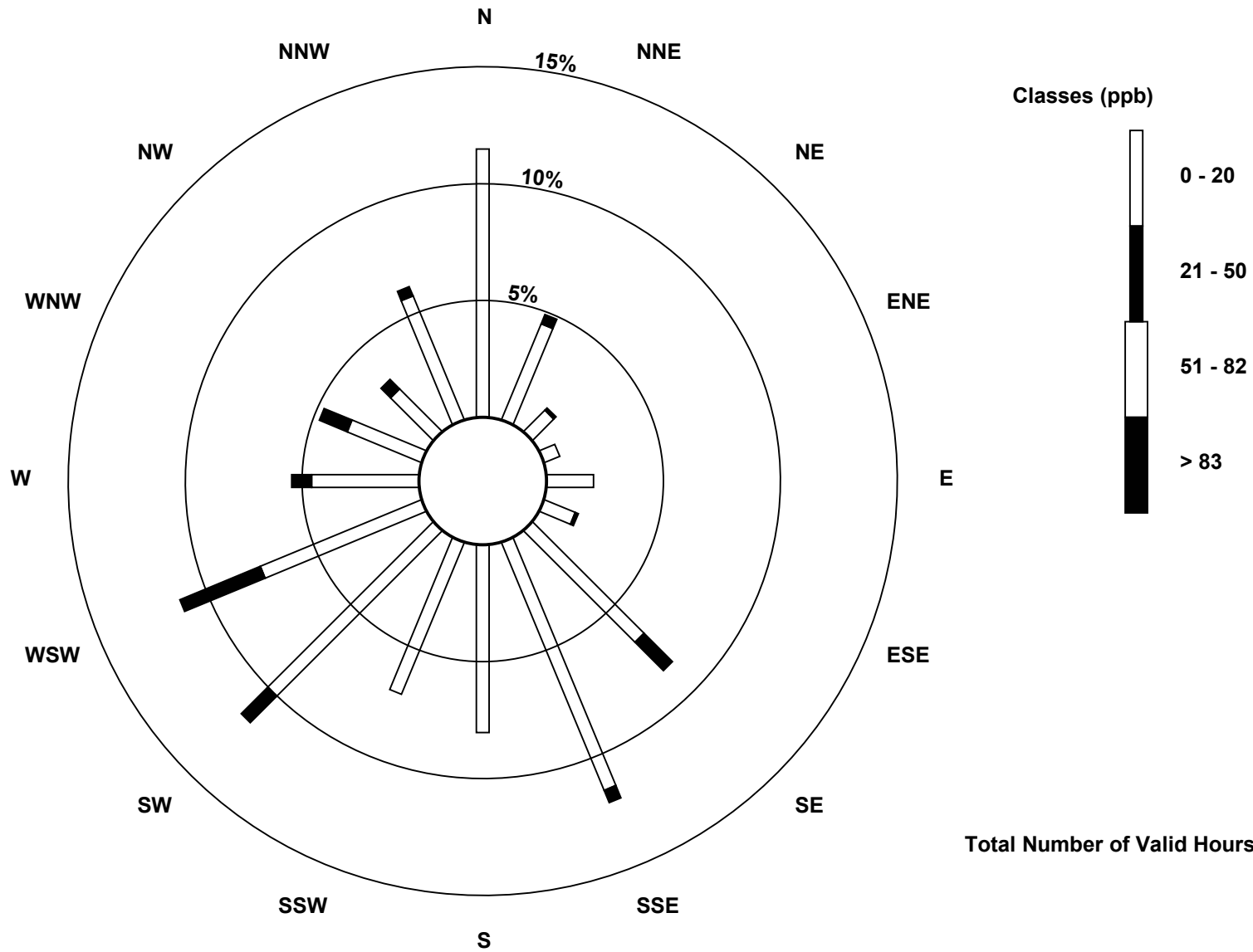
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	80	31	9	5	14	10	47	80	56	49	70	52	32	24	18	40	617
21 - 50	0	3	1	0	0	1	12	4	0	0	11	26	6	9	4	3	80
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	80	34	10	5	14	11	59	84	56	49	81	78	38	33	22	43	697

Total Number of Valid Hours: 697

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Ozone (O<sub>3</sub>) - ppb  
Fort McKay South (AMS 13)

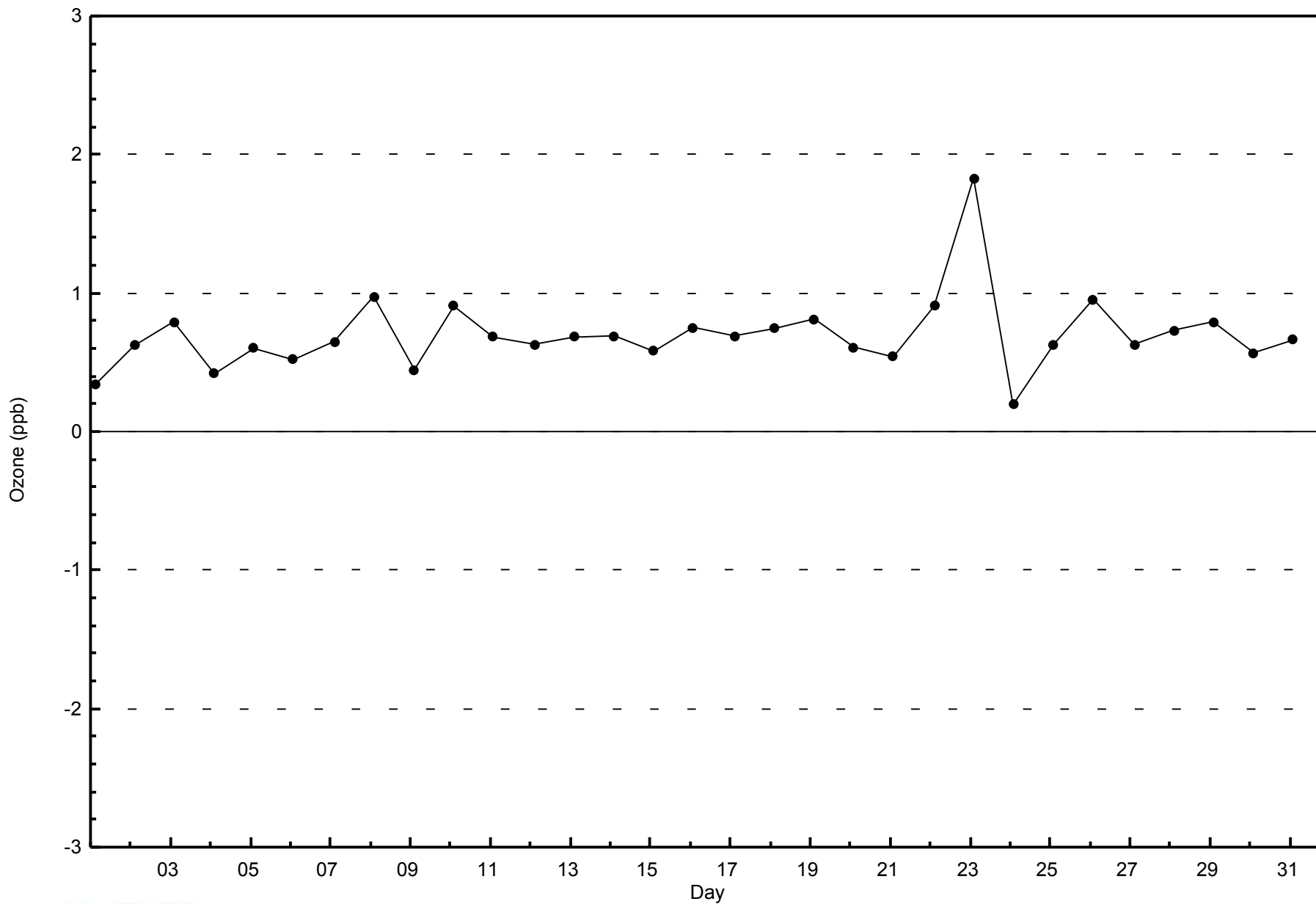


Total Number of Valid Hours: 697



WBEA  
Zero Responses

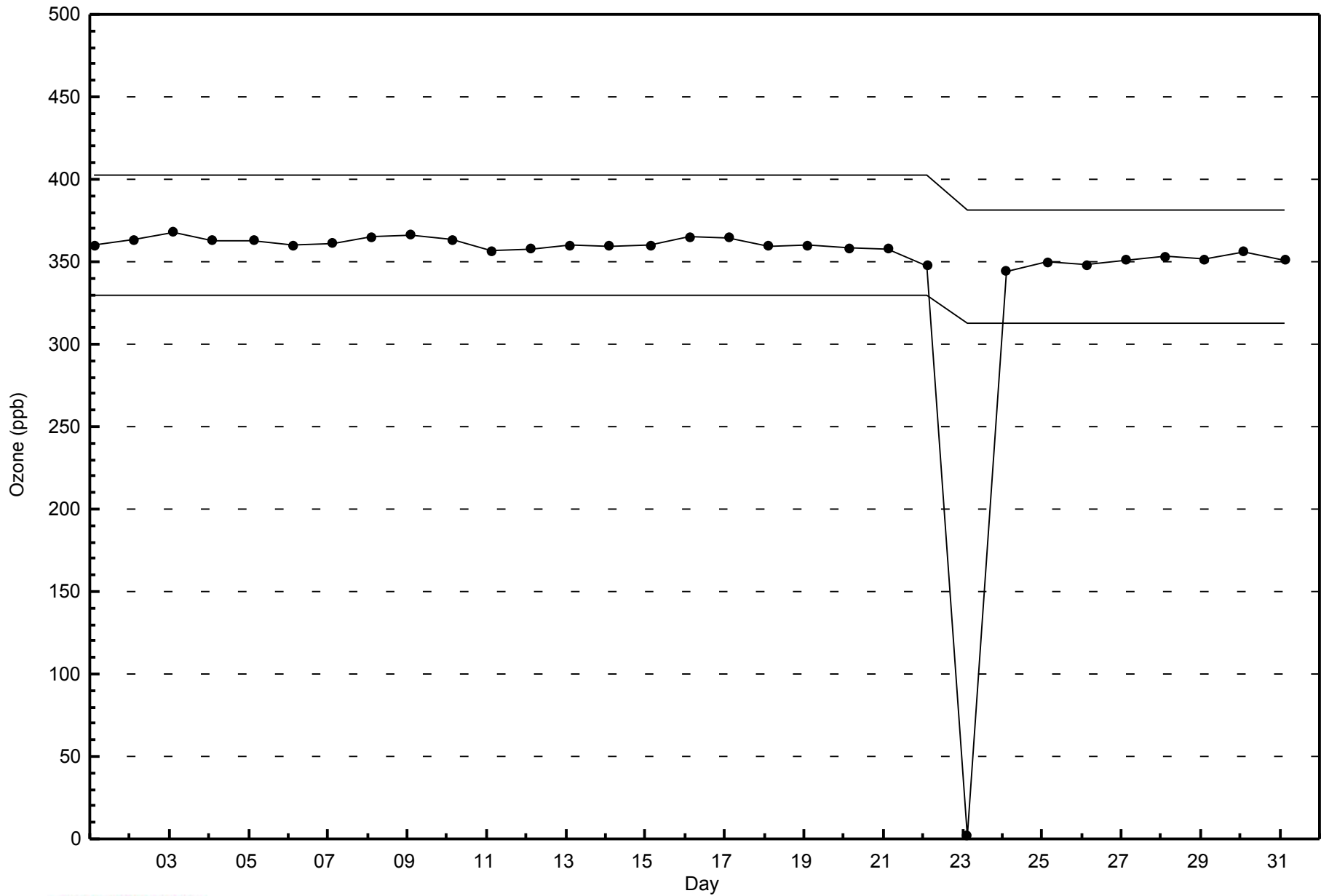
Ozone (O<sub>3</sub>) - ppb  
Fort McKay South - October 2014





WBEA  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Fort McKay South - October 2014



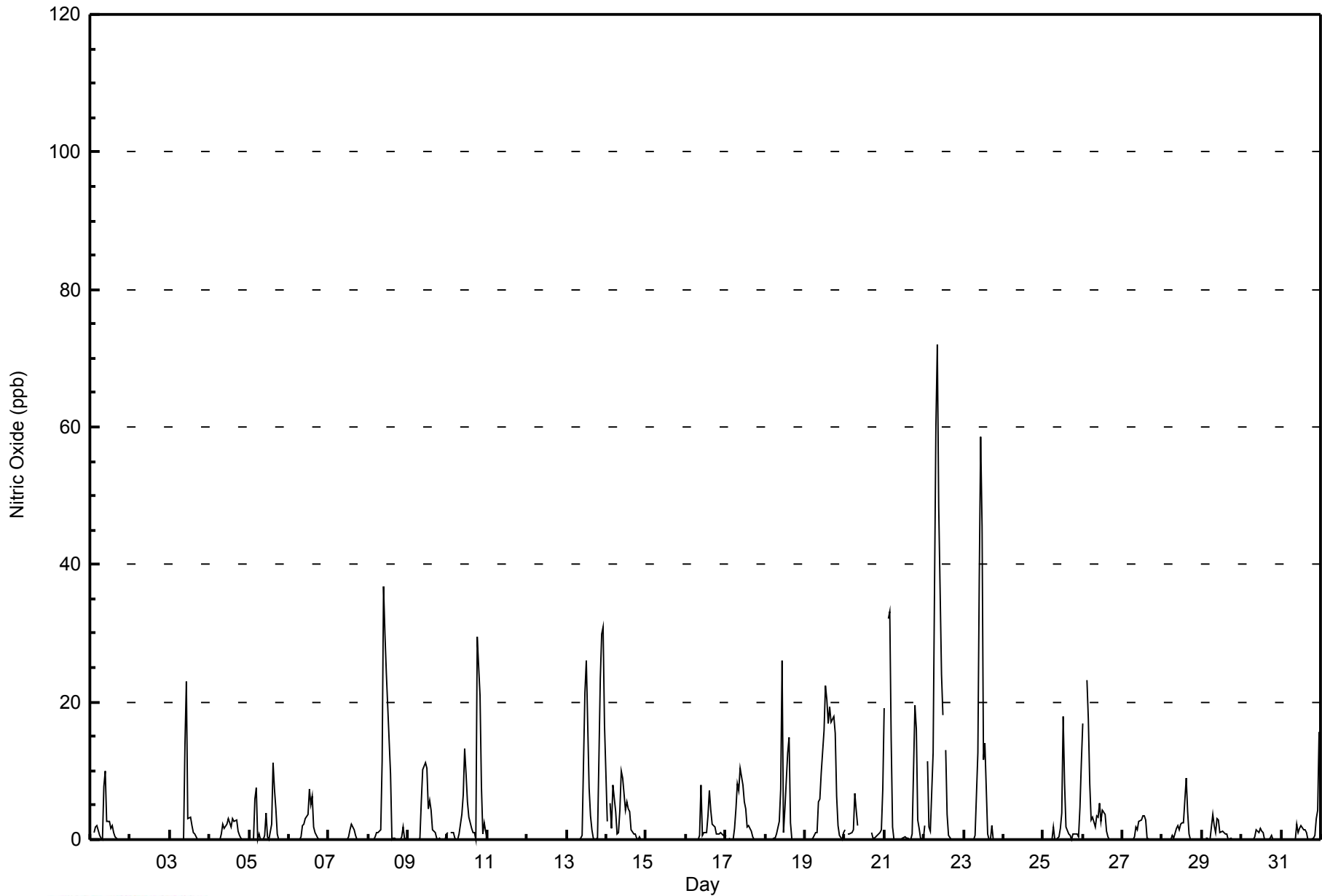


Maximum Value: 72 ppb on Oct 22 09:00																		Maximum Daily Average: 13.9 ppb on Oct 22																		Hours in Service: 744												
Minimum Value: 0 ppb on Oct 1 01:00																		Minimum Daily Average: 0.0 ppb on Oct 2																		Hours of Data: 705												
Maximum Diurnal Average: 8.4 ppb at hour 11																		Minimum Diurnal Average: 0.9 ppb at hour 18																		Hours of Missing Data: 39												
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> = 36																		Hours of Calibration: 38												
																																				Percent Operational Time: 99.9												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0	Z	1	2	2	1	0	0	8	10	3	3	2	2	1	0	0	0	0	0	0	0	0	0	1.5	10																						
2-Oct	0	Z	0	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-Oct	0	Z	0	0	0	0	0	0	0	14	23	3	3	2	1	1	0	0	0	0	0	0	0	2.1	23																							
4-Oct	0	Z	0	0	0	0	0	1	2	2	2	3	2	3	3	3	1	1	0	0	0	0	0	1.1	3																							
5-Oct	0	Z	0	6	7	0	1	0	0	1	4	0	2	2	11	7	4	1	0	0	0	0	0	2.0	11																							
6-Oct	0	Z	0	0	0	0	0	0	2	2	3	4	7	5	6	2	1	0	0	0	0	0	0	1.5	7																							
7-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0.3	2																							
8-Oct	0	Z	0	0	0	1	1	2	11	37	30	24	19	10	0	0	0	0	0	0	0	2	0	6.0	37																							
9-Oct	0	Z	0	0	0	0	0	0	6	10	11	10	5	6	4	1	1	0	0	0	0	0	0	2.4	11																							
10-Oct	1	Z	1	1	0	0	0	1	4	6	13	10	6	3	2	1	1	0	30	21	8	1	2	4.9	30																							
11-Oct	0	Z	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-Oct	0	Z	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-Oct	0	Z	0	0	0	0	0	0	0	1	11	21	26	8	4	1	0	0	0	12	23	30	31	8.0	31																							
14-Oct	3	Z	5	2	8	4	1	1	4	10	9	4	6	4	4	1	1	1	0	0	1	0	0	3.0	10																							
15-Oct	0	Z	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-Oct	0	Z	0	0	0	0	0	0	1	8	1	1	1	3	7	4	2	2	1	1	1	1	1	1.5	8																							
17-Oct	1	Z	0	0	0	2	5	8	7	10	8	5	4	2	2	1	0	0	0	0	0	0	0	2.4	10																							
18-Oct	0	Z	0	0	0	0	0	1	3	7	26	1	4	13	15	2	0	0	0	0	0	0	0	3.2	26																							
19-Oct	0	Z	0	0	0	0	1	1	5	6	10	16	22	20	17	19	17	18	16	6	2	1	0	7.8	22																							
20-Oct	1	Z	1	1	1	1	7	4	2	C	C	C	C	C	C	C	1	0	0	0	1	1	1	--	7																							
21-Oct	19	Z	32	33	15	2	0	0	0	0	0	0	0	0	0	0	0	1	19	16	3	2	0	6.2	33																							
22-Oct	2	Z	11	2	1	13	37	60	72	48	24	18	M	13	4	1	0	0	0	0	0	0	0	13.9	72																							
23-Oct	0	Z	0	0	0	0	0	1	13	38	59	46	12	14	1	0	0	2	0	0	0	0	0	8.0	59																							
24-Oct	0	Z	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-Oct	0	Z	0	0	0	0	2	0	0	0	2	4	18	8	2	1	1	0	1	1	1	0	5	2.4	18																							
26-Oct	17	Z	23	17	8	3	3	2	3	3	5	3	4	4	1	0	0	0	0	0	0	0	0	4.3	23																							
27-Oct	0	Z	0	0	0	0	0	0	2	1	3	3	4	3	3	0	0	0	0	0	0	0	0	0.8	4																							
28-Oct	0	Z	0	0	0	0	1	0	2	2	2	2	3	2	9	4	1	0	0	0	0	0	0	1.2	9																							
29-Oct	0	Z	0	0	0	0	4	2	1	3	3	1	1	1	1	1	0	0	0	0	0	0	0	0.8	4																							
30-Oct	0	Z	0	0	0	0	0	0	0	1	1	2	1	1	0	0	0	0	1	0	0	0	0	0.3	2																							
31-Oct	0	Z	0	0	0	0	0	0	0	2	1	2	2	1	2	1	0	0	0	0	1	3	4	1.5	16																							
1.4																								--	2.4	2.1	1.4	0.9	2.0	2.7	4.8	7.5	8.4	6.2	5.3	4.4	3.4	1.9	1.1	0.9	2.2	1.9	1.3	1.3	1.5	1.8	Diurnal Average	
19																								--	32	33	15	13	37	60	72	48	59	46	26	20	17	19	17	18	30	21	23	30	31	17	Diurnal Maximum	
Z - zerospan      C - Calibration      M - Maintenance																																																



WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
Fort McKay South - October 2014





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

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	681	96.60	96.60
21 - 40	19	2.70	99.29
41 - 80	5	0.71	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - October 2014**

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	31	10	5	12	11	56	79	49	48	82	80	38	32	23	38	672
21 - 40	1	2	0	0	1	0	2	1	5	2	1	0	0	0	0	4	19
11 - 80	1	0	0	0	1	0	0	0	1	0	0	1	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>	80	33	10	5	14	11	58	80	55	50	83	81	38	32	23	43	696

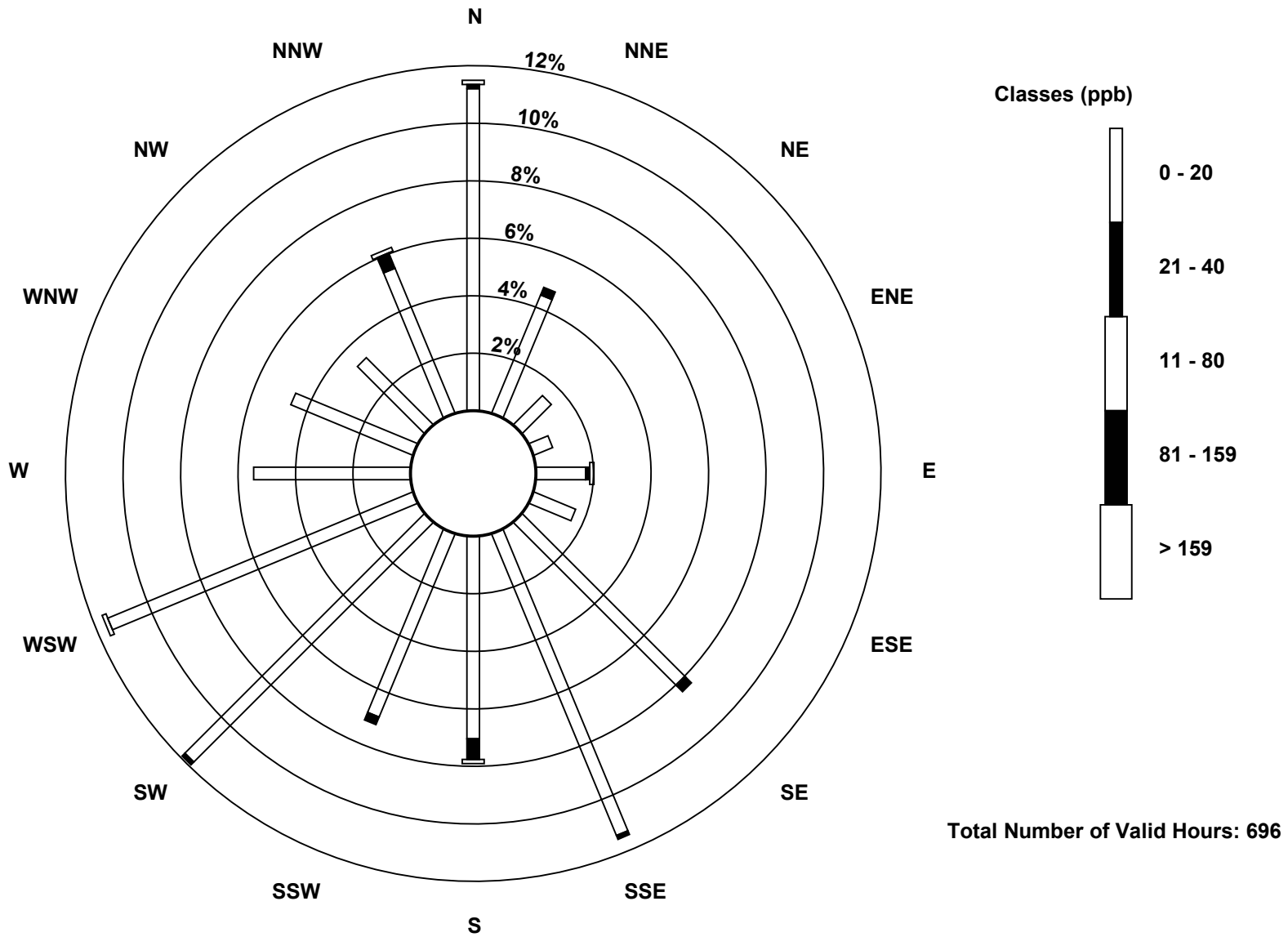
Total Number of Valid Hours: 696

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

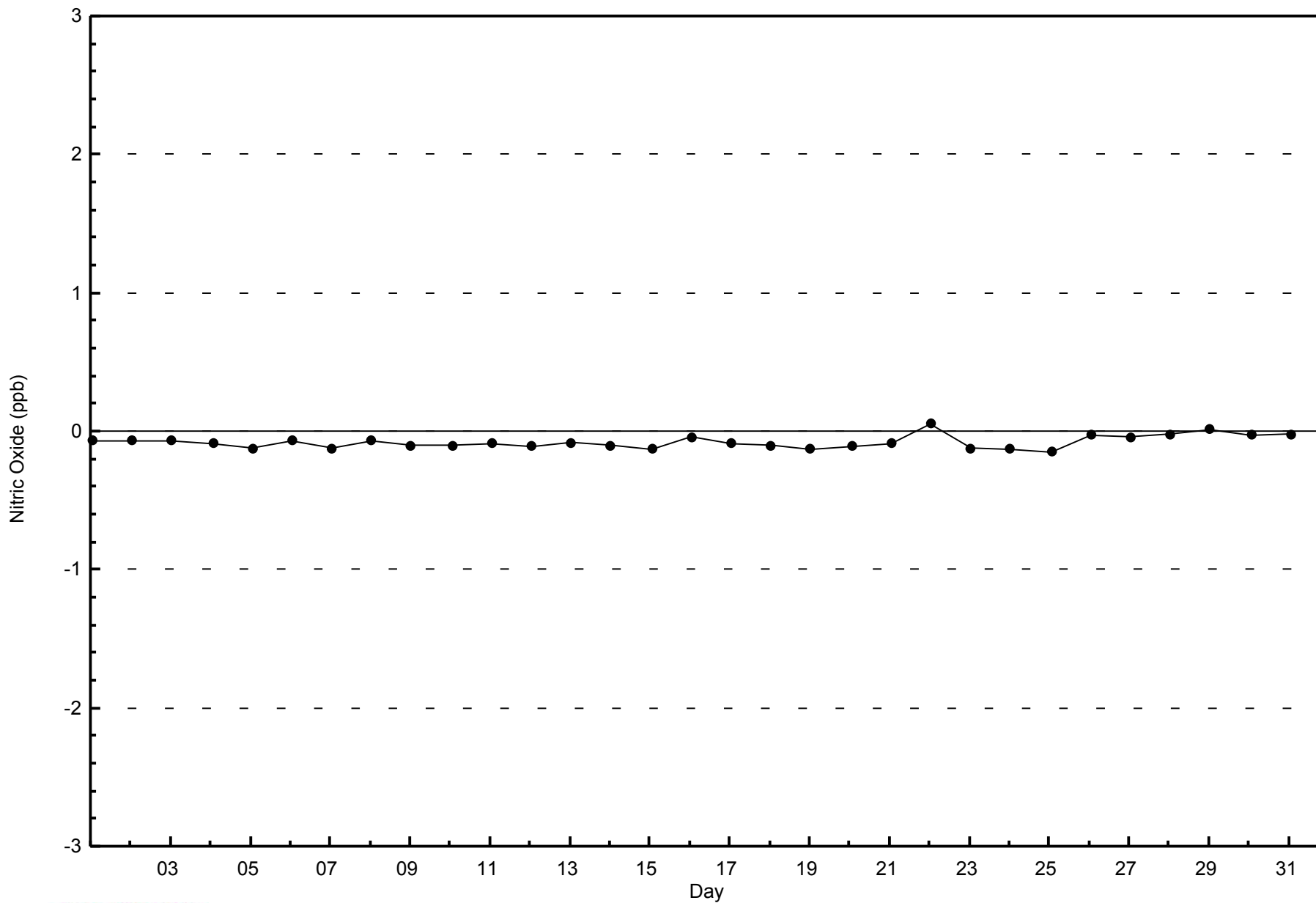
**Nitric Oxide (NO) - ppb  
Fort McKay South (AMS 13)**





WBEA  
Zero Responses

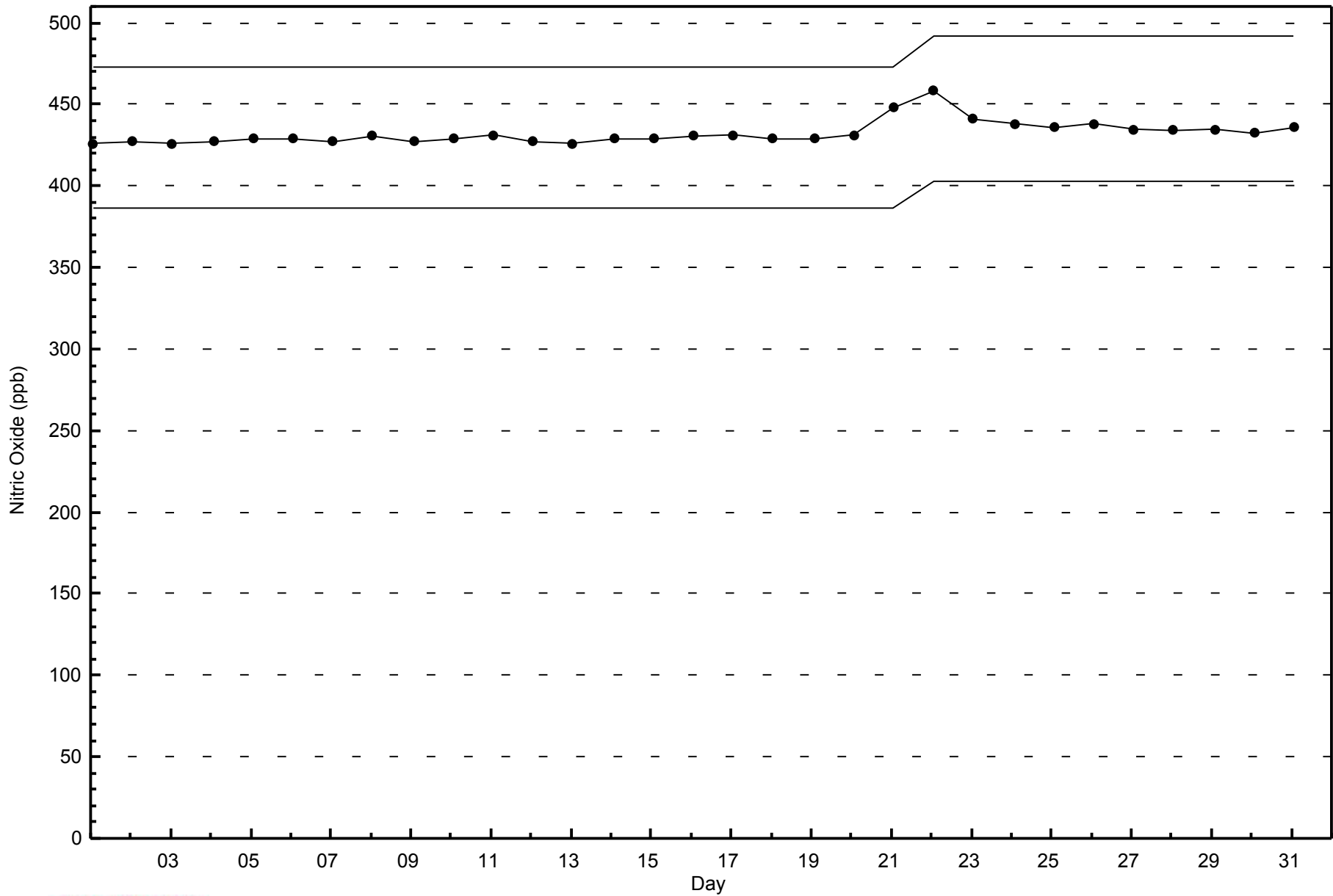
Nitric Oxide (NO) - ppb  
Fort McKay South - October 2014





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Fort McKay South - October 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb

Fort McKay South - October 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 29 ppb on Oct 10 19:00	Maximum Daily Average: 8.9 ppb on Oct 10
Minimum Value: 0 ppb on Oct 2 01:00	Hours of Data: 705
Maximum Diurnal Average: 6.6 ppb at hour 11	Hours of Missing Data: 39
Monthly Average: 4.4 ppb	Hours of Calibration: 38
Minimum Daily Average: 0.0 ppb on Oct 12	Percent Operational Time: 99.9
Minimum Diurnal Average: 2.7 ppb at hour 3	
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> = 10 P <sub>99</sub> = 17	

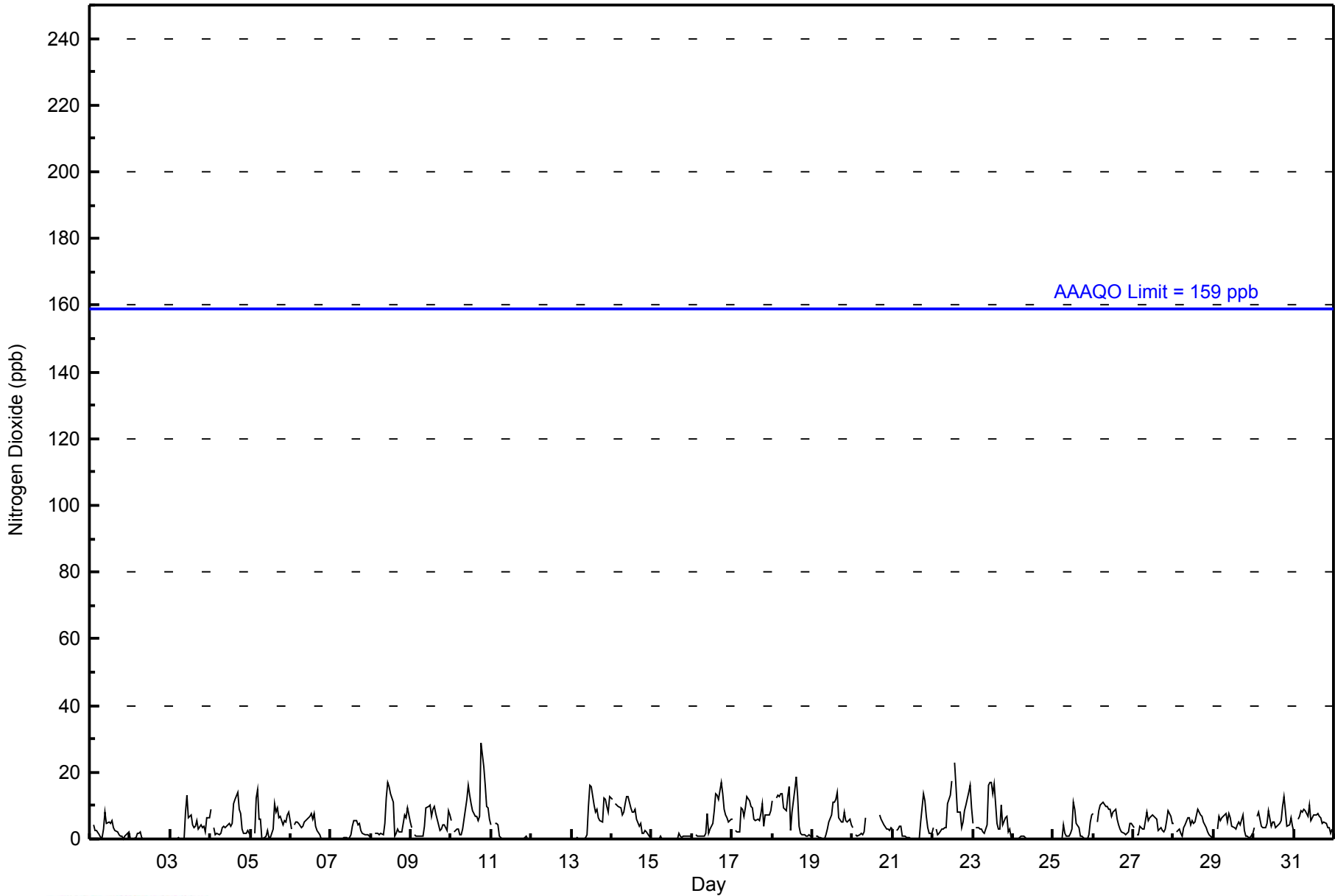
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	3	Z	4	3	3	1	1	0	3	8	5	5	5	5	4	2	2	1	1	1	0	1	2	2	2.7	8																						
2-Oct	0	Z	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																						
3-Oct	0	Z	0	0	0	0	0	0	0	8	13	6	7	4	4	4	6	3	4	4	4	2	6	7	3.6	13																						
4-Oct	9	Z	3	1	2	1	2	3	4	3	4	5	4	5	11	12	14	9	8	3	2	2	3	2	4.7	14																						
5-Oct	1	Z	2	12	15	6	6	0	1	1	3	1	0	3	10	8	10	6	7	4	6	5	7	8	5.3	15																						
6-Oct	3	Z	4	5	5	5	3	4	5	5	6	7	8	6	8	4	3	1	0	0	0	0	0	0	3.5	8																						
7-Oct	0	Z	0	0	0	0	0	0	0	1	0	1	1	4	5	5	4	5	3	2	1	1	1	1	1.5	5																						
8-Oct	1	Z	2	2	2	1	2	1	5	12	17	16	14	11	1	2	3	2	2	5	7	6	9	5	5.5	17																						
9-Oct	3	Z	1	1	1	1	1	1	4	9	10	10	7	9	10	8	4	3	3	4	4	2	9	7	4.9	10																						
10-Oct	5	Z	2	3	3	1	1	3	9	12	16	13	11	8	7	7	5	7	29	22	16	10	9	6	8.9	29																						
11-Oct	4	Z	5	5	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.8	5																						
12-Oct	0	Z	0	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-Oct	0	Z	0	1	0	0	0	0	0	1	10	16	16	10	8	9	6	6	5	12	12	10	8	13	6.2	16																						
14-Oct	12	Z	10	10	10	9	7	8	11	13	13	9	8	8	9	6	4	5	2	2	2	1	0	0	7.0	13																						
15-Oct	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	1	0	1	1	1	1	1	0.4	2																						
16-Oct	1	Z	1	1	1	1	1	1	2	8	2	3	5	9	13	13	12	17	14	9	7	6	5	6	5.9	17																						
17-Oct	6	Z	3	2	2	10	9	7	9	13	12	10	9	6	6	6	6	8	11	4	7	7	7	9	7.2	13																						
18-Oct	12	Z	12	13	13	14	13	9	8	13	16	3	8	15	19	13	4	2	1	1	1	1	1	1	8.3	19																						
19-Oct	1	Z	1	1	0	0	0	0	1	3	5	7	11	11	12	14	6	5	5	8	6	5	6	4	4.9	14																						
20-Oct	4	Z	1	1	1	2	1	2	6	C	C	C	C	C	C	C	7	6	5	4	3	3	3	3	--	7																						
21-Oct	3	Z	3	3	4	4	1	1	1	0	0	0	0	0	0	0	0	5	14	12	7	4	2	2	2.7	14																						
22-Oct	4	Z	3	1	2	3	3	3	4	11	13	18	M	23	16	8	8	3	5	9	10	14	16	9	8.4	23																						
23-Oct	5	Z	3	4	3	3	2	2	4	16	17	17	14	16	5	3	3	10	4	6	7	2	3	1	6.5	17																						
24-Oct	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																						
25-Oct	0	Z	0	0	0	0	4	2	1	1	2	3	11	9	5	3	1	1	1	0	0	1	5	7	2.4	11																						
26-Oct	8	Z	5	9	10	11	11	10	10	9	9	7	8	9	6	4	3	2	2	1	2	2	5	5	6.3	11																						
27-Oct	4	Z	1	1	4	3	3	5	8	5	6	7	7	6	6	3	3	3	2	3	5	8	7	5	4.6	8																						
28-Oct	5	Z	2	3	2	1	4	4	6	6	4	5	5	5	9	8	7	7	5	3	2	1	1	1	4.2	9																						
29-Oct	1	Z	3	7	5	6	7	8	5	8	7	4	4	3	4	5	4	7	3	1	1	0	1	2	4.1	8																						
30-Oct	4	Z	7	8	4	3	3	3	5	9	4	5	5	3	4	5	6	10	13	9	4	4	6	4	5.5	13																						
31-Oct	2	Z	6	7	9	8	9	9	7	10	6	6	7	7	8	7	6	5	5	5	4	3	2	3	6.0	10																						
																								3.2	--	2.7	3.3	3.4	3.2	3.2	2.8	3.8	6.1	6.6	6.1	6.0	6.5	6.2	5.3	4.5	4.5	4.9	4.3	3.9	3.4	4.0	3.6	Diurnal Average
																								12	--	12	13	15	14	13	10	11	16	17	18	16	23	19	14	14	17	29	22	16	14	16	13	Diurnal Maximum

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



WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - October 2014





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay South - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	702	99.57	99.57
21 - 40	3	0.43	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay South - October 2014**

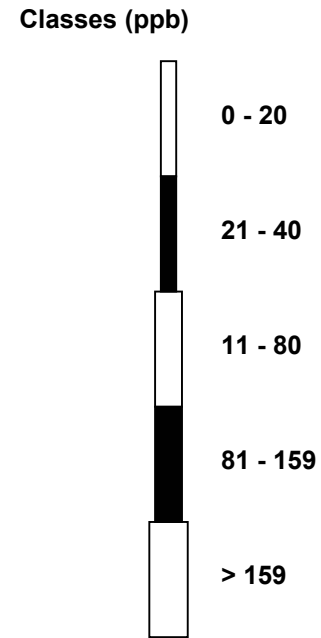
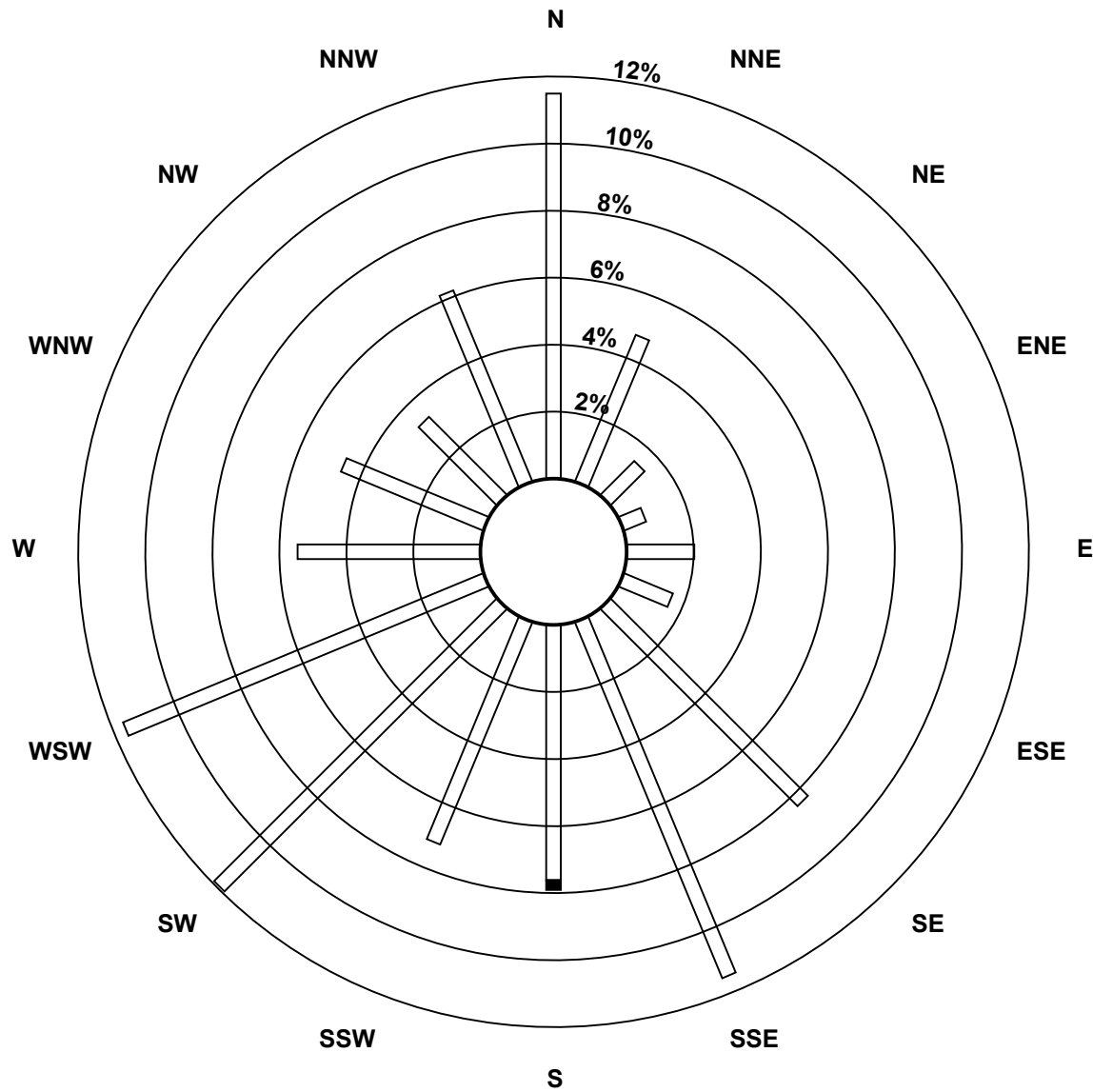
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	80	33	10	5	14	11	58	80	53	50	83	81	38	32	23	43	694
21 - 40	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	80	33	10	5	14	11	58	80	55	50	83	81	38	32	23	43	696

Total Number of Valid Hours: 696

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South (AMS 13)



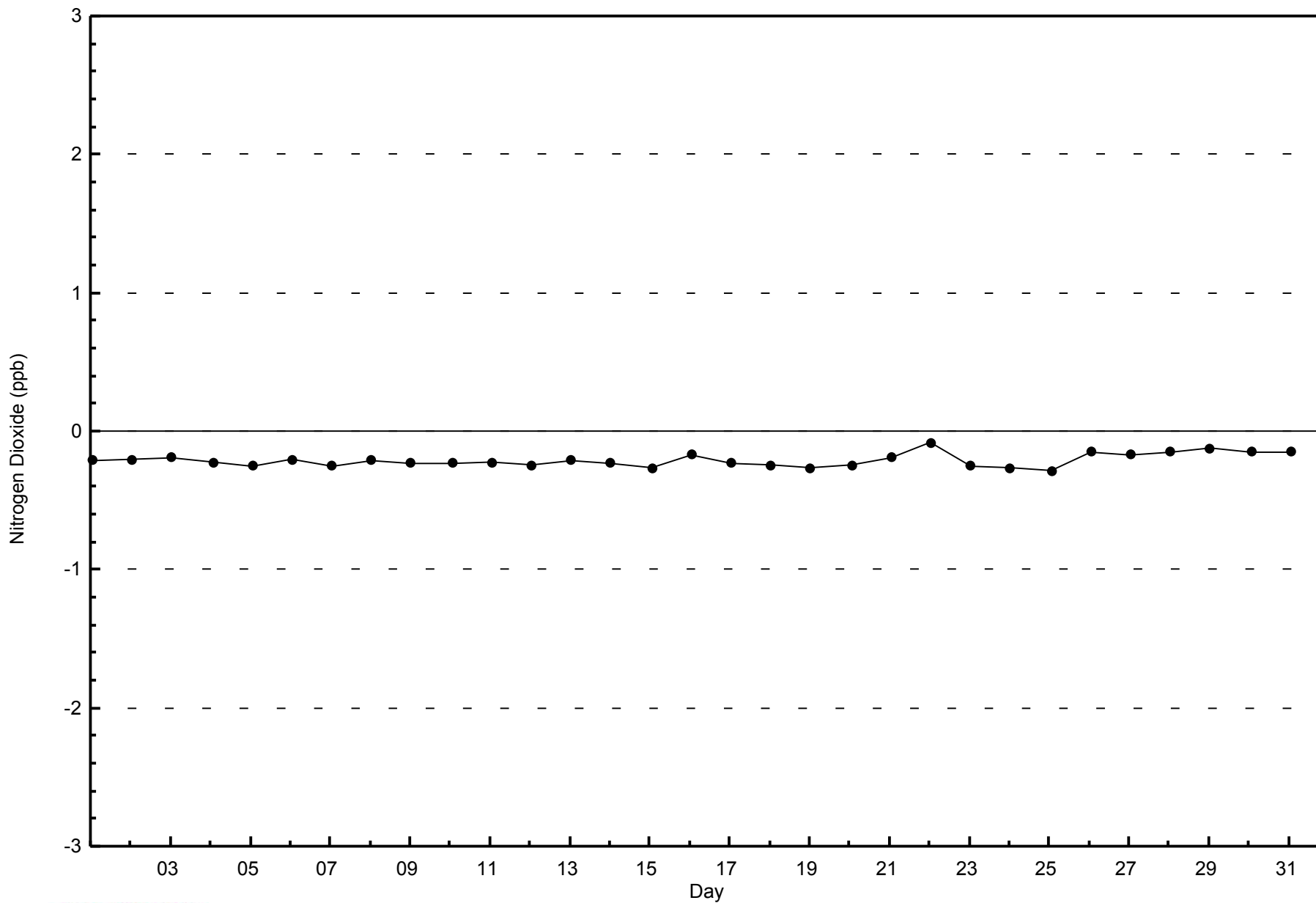
Total Number of Valid Hours: 696





WBEA  
Zero Responses

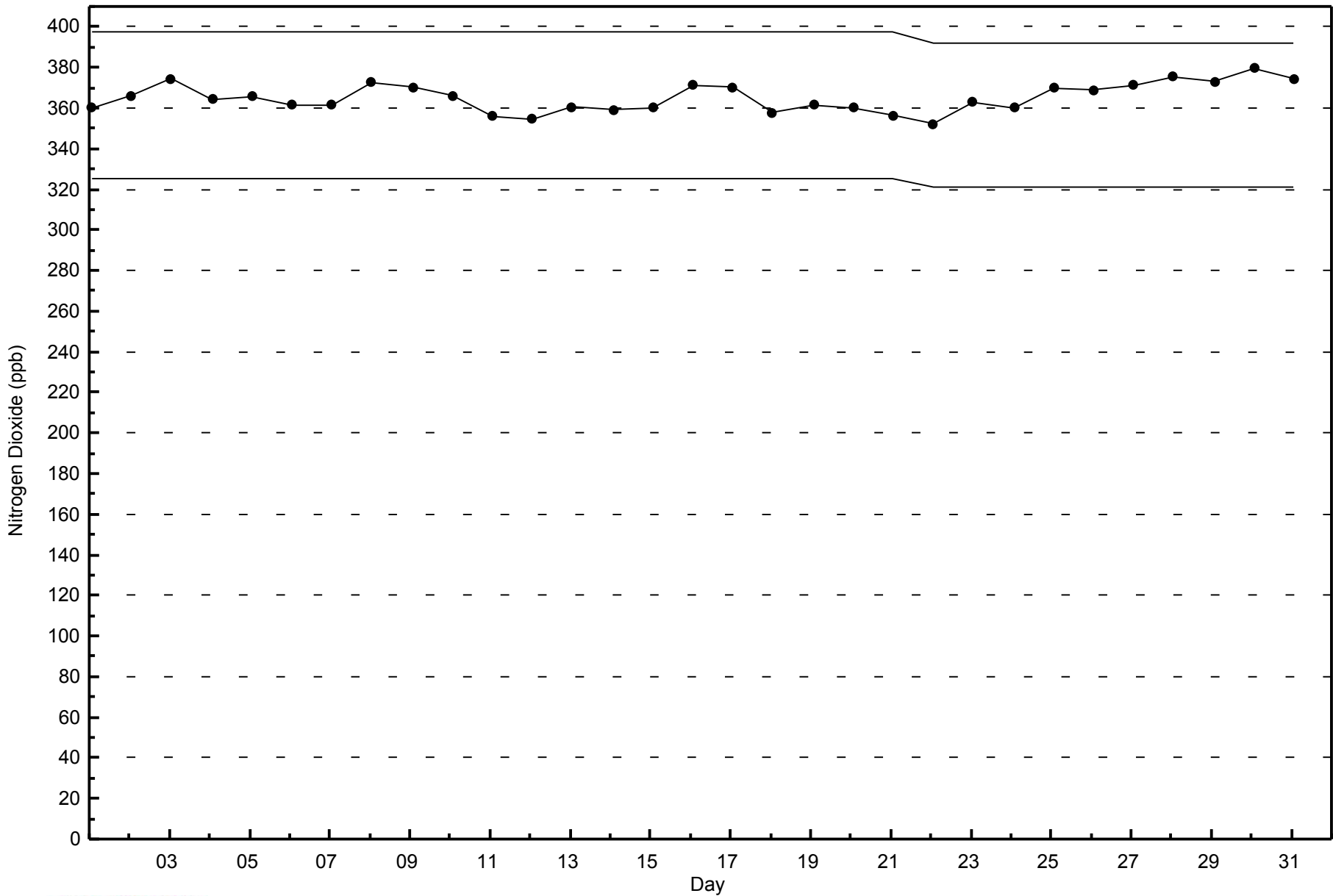
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - October 2014





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - October 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb

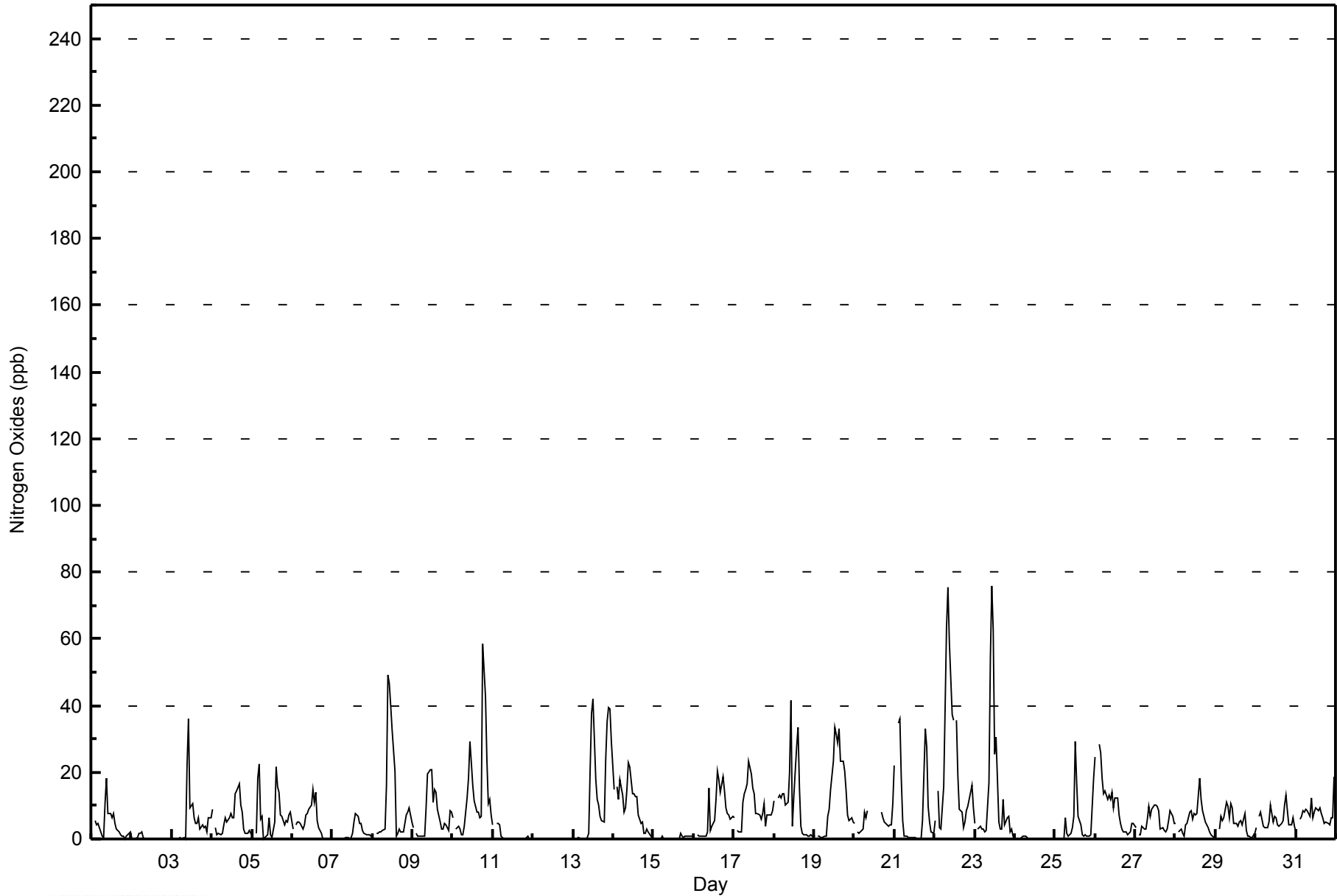
Fort McKay South - October 2014

Maximum Value: 76 ppb on Oct 23 11:00										Maximum Daily Average: 22.3 ppb on Oct 22										Hours in Service: 744						
Minimum Value: 0 ppb on Oct 2 10:00										Minimum Daily Average: 0.0 ppb on Oct 12										Hours of Data: 705						
Maximum Diurnal Average: 15.0 ppb at hour 11										Minimum Diurnal Average: 4.0 ppb at hour 6										Hours of Missing Data: 39						
Monthly Average: 7.2 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 4 Q <sub>3</sub> = 9 P <sub>90</sub> = 18 P <sub>99</sub> = 52										Hours of Calibration: 38						
																				Percent Operational Time: 99.9						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	2	Z	5	4	5	2	1	0	11	18	7	8	7	7	5	3	2	1	1	1	0	1	2	2	4.1	18
2-Oct	0	Z	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
3-Oct	0	Z	0	0	0	0	0	0	0	22	36	9	11	6	4	5	6	3	4	4	4	2	6	7	5.7	36
4-Oct	9	Z	3	1	2	1	2	4	6	5	6	8	7	6	14	15	17	10	8	3	2	2	3	2	5.8	17
5-Oct	1	Z	2	18	22	6	7	0	1	1	6	1	0	5	22	16	14	7	7	4	6	5	7	8	7.3	22
6-Oct	3	Z	4	5	5	5	3	4	7	8	9	10	15	11	14	6	4	2	0	0	0	0	0	0	5.0	15
7-Oct	0	Z	0	0	0	0	0	0	0	1	0	1	2	5	8	7	5	5	3	2	1	1	1	1	1.8	8
8-Oct	1	Z	2	2	2	2	3	3	16	49	47	40	33	21	1	2	3	2	2	4	7	8	9	5	11.5	49
9-Oct	3	Z	2	1	1	1	1	1	9	20	21	21	11	15	14	9	5	3	3	4	4	2	9	8	7.3	21
10-Oct	6	Z	3	4	3	1	1	4	12	18	29	23	16	12	8	8	6	7	58	43	24	11	12	7	13.8	58
11-Oct	4	Z	5	5	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.9	5
12-Oct	0	Z	0	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-Oct	0	Z	0	1	0	0	0	0	1	2	21	38	42	18	12	10	7	5	5	24	35	39	39	29	14.2	42
14-Oct	15	Z	16	12	18	13	8	9	15	23	22	14	13	13	13	7	5	5	2	2	3	2	1	0	10.0	23
15-Oct	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	1	0	1	1	1	1	1	0.4	2
16-Oct	1	Z	1	1	1	1	1	1	2	15	3	4	6	12	21	18	14	19	14	9	8	7	6	7	7.4	21
17-Oct	6	Z	3	2	2	11	14	15	16	23	19	15	14	8	8	7	6	8	11	4	7	7	7	9	9.7	23
18-Oct	11	Z	12	13	12	14	13	10	11	20	42	4	13	27	34	15	4	2	1	1	1	1	1	1	11.5	42
19-Oct	1	Z	1	1	0	1	1	1	7	9	15	23	33	31	29	33	23	23	20	15	7	6	6	5	12.7	33
20-Oct	5	Z	2	2	2	3	8	6	8	C	C	C	C	C	C	C	8	6	5	4	4	4	4	11	--	11
21-Oct	22	Z	35	36	18	6	1	1	1	0	0	0	0	0	0	0	0	6	33	27	10	5	2	2	8.9	36
22-Oct	6	Z	14	3	3	15	39	63	76	59	37	36	M	36	19	9	8	3	5	9	10	14	16	9	22.3	76
23-Oct	5	Z	3	4	3	3	2	2	17	54	76	63	25	30	5	3	3	12	4	6	7	2	3	1	14.5	76
24-Oct	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
25-Oct	0	Z	0	0	0	0	6	1	1	2	3	7	29	17	7	4	1	1	1	1	1	1	10	18	4.9	29
26-Oct	25	Z	28	26	18	14	14	12	13	12	14	9	12	12	7	5	3	2	2	1	2	2	5	5	10.6	28
27-Oct	4	Z	1	1	4	3	3	6	10	7	9	10	10	10	9	3	3	3	2	3	5	8	7	5	5.4	10
28-Oct	5	Z	2	3	2	1	4	5	8	8	6	7	7	7	18	12	8	7	5	3	2	1	1	0	5.4	18
29-Oct	1	Z	3	7	5	6	11	10	6	11	9	5	5	4	5	6	4	8	3	1	1	0	1	2	4.9	11
30-Oct	4	Z	7	8	4	3	3	3	5	10	5	7	6	4	4	5	5	10	13	9	4	4	6	4	5.8	13
31-Oct	2	Z	6	7	9	8	9	9	7	12	6	8	9	8	9	8	6	5	5	5	4	6	6	19	7.5	19
4.6 -- 5.2 5.4 4.8 4.0 5.1 5.5 8.6 13.6 15.0 12.3 11.2 10.9 9.6 7.1 5.6 5.3 7.1 6.1 5.2 4.7 5.5 5.4																								Diurnal Average		
25 -- 35 36 22 15 39 63 76 59 76 63 42 36 34 33 23 23 58 43 35 39 39 29																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance																										



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - October 2014**





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	646	91.63	91.63
21 - 40	47	6.67	98.30
41 - 80	12	1.70	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - October 2014**

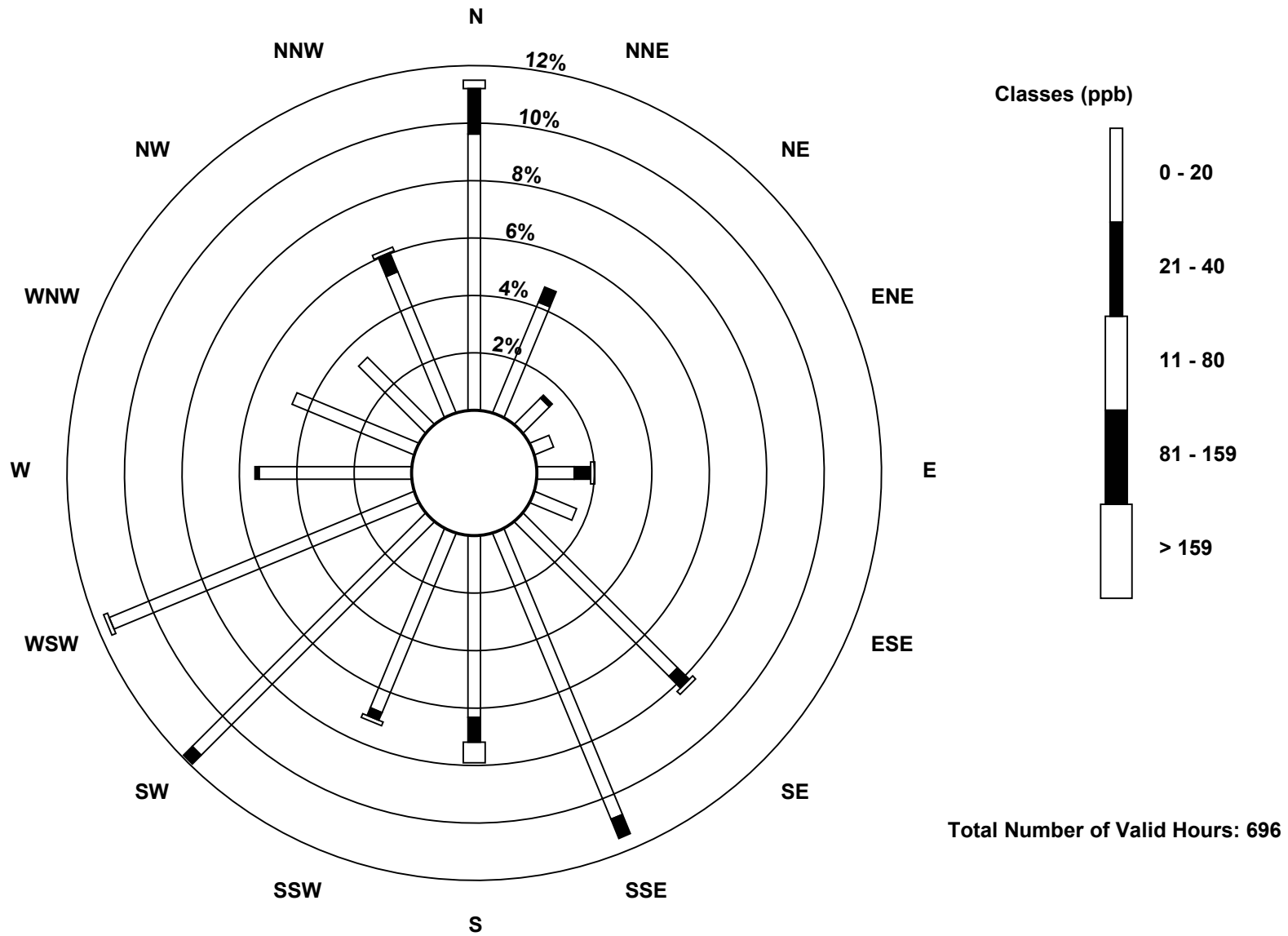
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	67	29	9	5	9	11	53	75	44	47	80	80	37	32	23	37	638
21 - 40	11	4	1	0	4	0	4	5	6	2	3	0	1	0	0	5	46
41 - 80	2	0	0	0	1	0	1	0	5	1	0	1	0	0	0	1	12
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	80	33	10	5	14	11	58	80	55	50	83	81	38	32	23	43	696

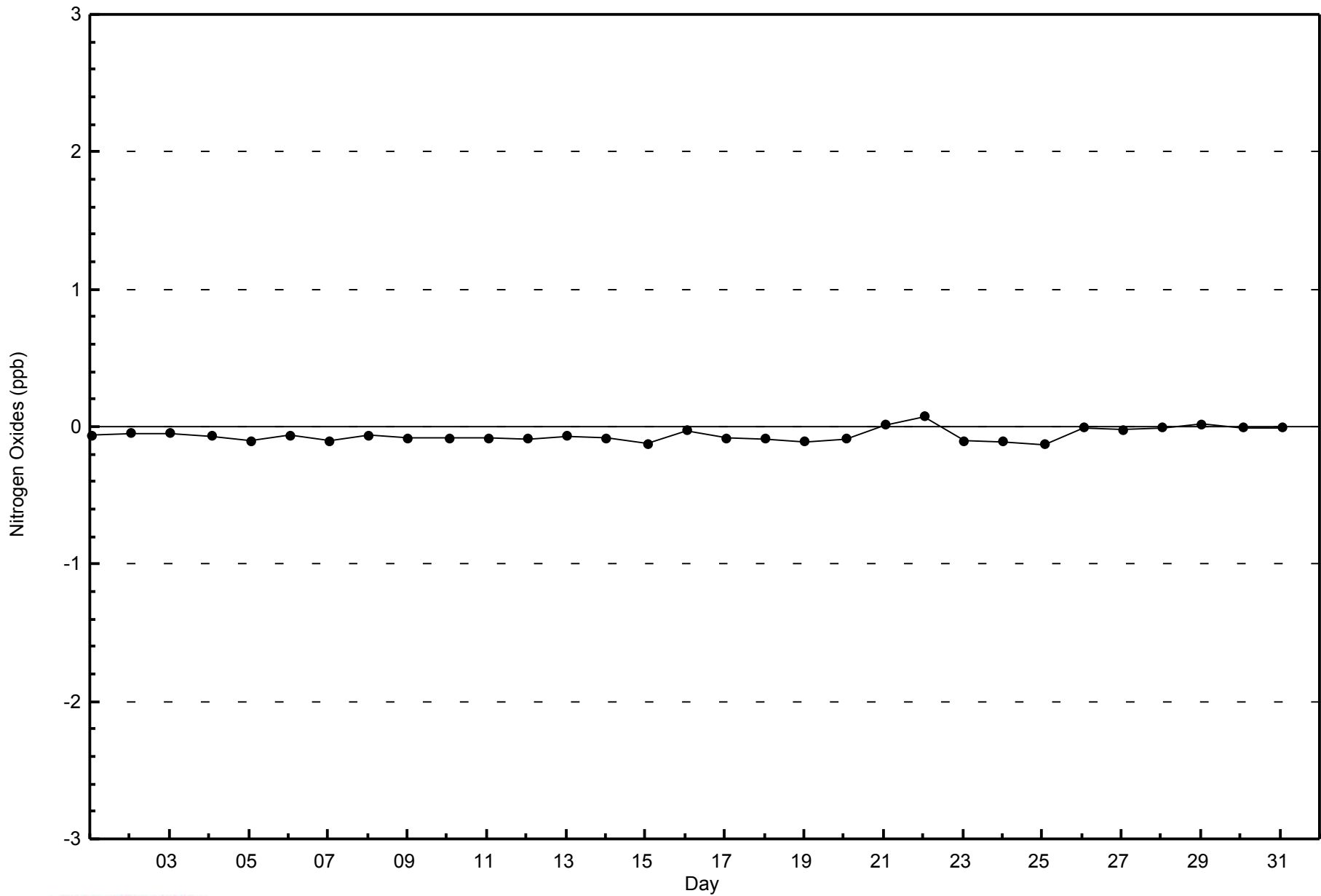
Total Number of Valid Hours: 696

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay South (AMS 13)**



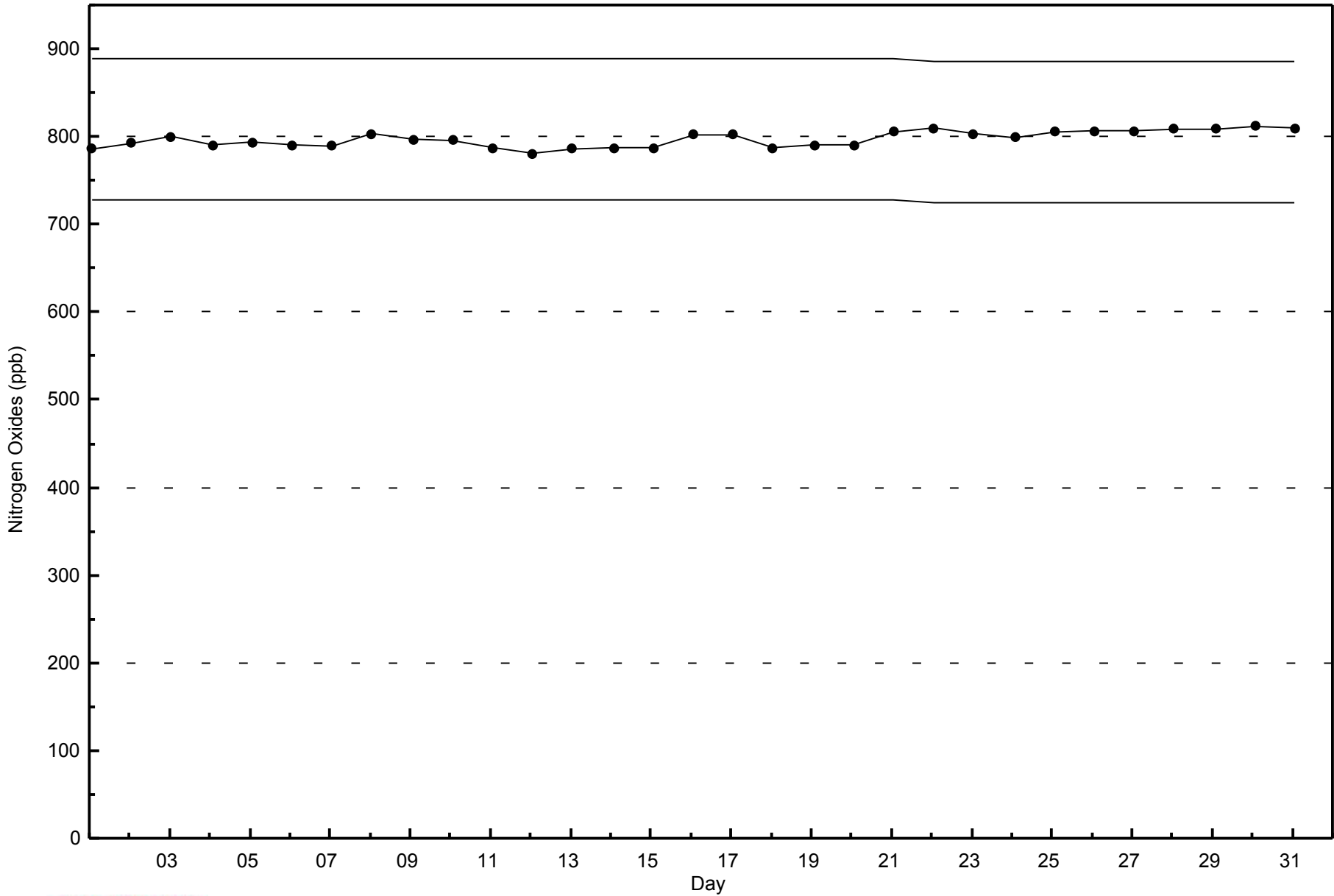






WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay South - October 2014





Summary of Hour Averages

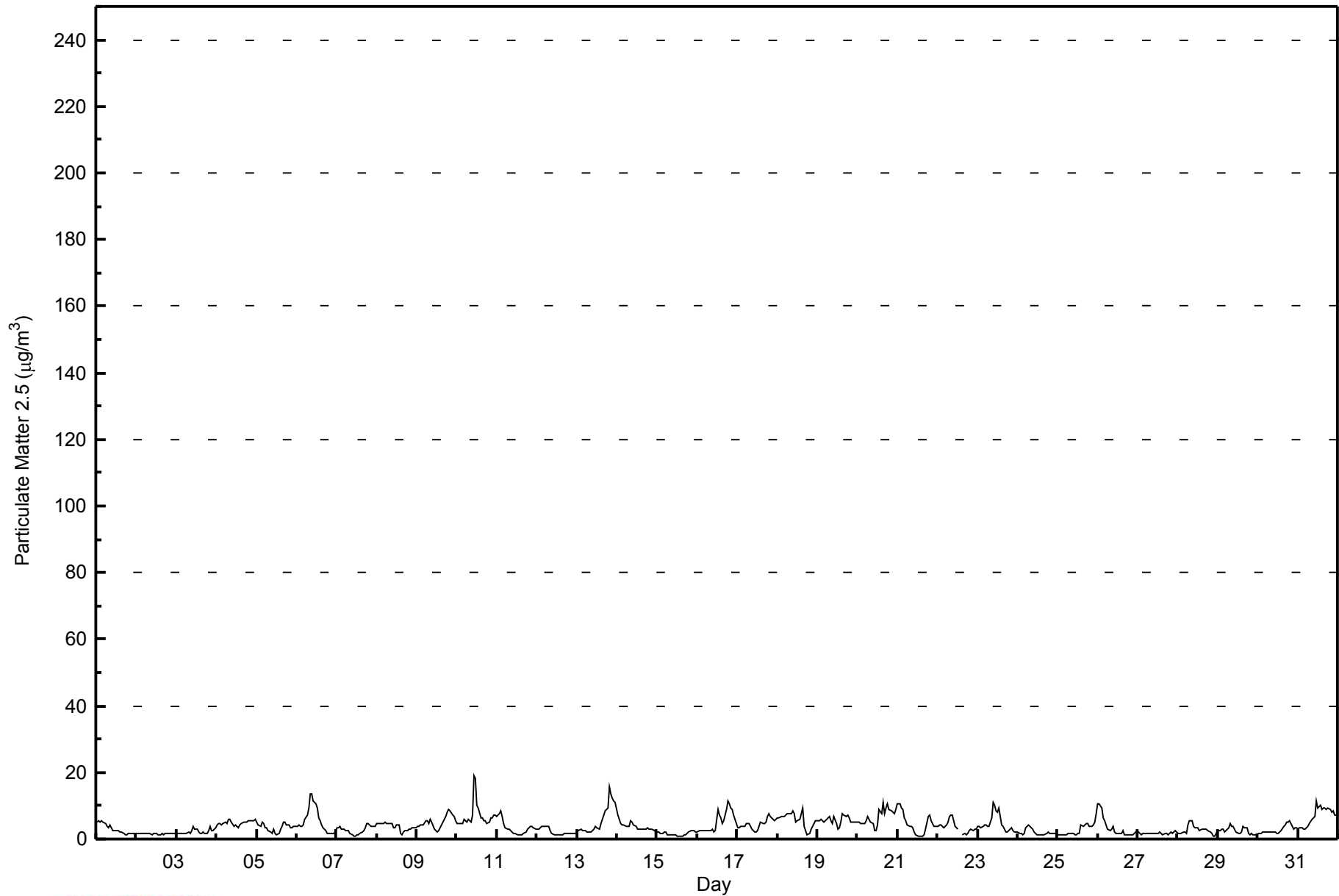
Fort McKay South - October 2014

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 744																																															
Maximum Value: 19.1 µg/m <sup>3</sup> on Oct 10 11:00		Maximum Daily Average: 7.1 µg/m <sup>3</sup> on Oct 10																																															
Minimum Value: 0.9 µg/m <sup>3</sup> on Oct 28 23:00		Hours of Data: 742																																															
Maximum Diurnal Average: 4.5 µg/m <sup>3</sup> at hour 20		Hours of Missing Data: 2																																															
Monthly Average: 3.91 µg/m <sup>3</sup>		Hours of Calibration: 0																																															
Minimum Daily Average: 1.5 µg/m <sup>3</sup> on Oct 2		Percent Operational Time: 99.7																																															
Minimum Diurnal Average: 3.5 µg/m <sup>3</sup> at hour 13																																																	
Percentiles: P <sub>1</sub> = 1.0 P <sub>10</sub> = 1.5 Q <sub>1</sub> = 1.9 Median = 3.3 Q <sub>3</sub> = 5.0 P <sub>90</sub> = 7.3 P <sub>99</sub> = 10.8																																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	5.2	5.3	5.1	5.4	4.9	4.5	3.8	3.6	4.2	3.2	2.5	2.5	2.7	2.5	2.1	2.1	1.7	1.4	1.3	1.5	1.5	1.5	1.6	1.6	3.0	5.4																							
2-Oct	1.5	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.5	1.6	1.6	1.6	1.5	1.5	1.6	1.3	1.5	1.5	1.5	1.5	1.6	1.6	1.7	1.5	1.7																							
3-Oct	1.6	1.6	1.7	1.6	1.6	1.7	1.6	1.9	1.8	2.4	3.7	2.8	3.1	2.0	1.6	1.7	2.0	1.7	1.9	2.7	3.6	2.6	2.7	3.4	2.2	3.7																							
4-Oct	4.2	4.8	4.6	4.3	4.5	4.9	4.7	5.9	6.0	5.0	4.0	4.4	3.8	3.4	4.1	4.8	5.1	5.2	5.3	5.5	5.7	5.6	5.8	4.9	6.0																								
5-Oct	5.0	4.4	4.0	5.0	4.8	3.6	3.2	2.4	2.1	1.8	3.1	1.5	1.1	1.8	3.0	3.8	5.0	4.9	4.4	4.0	3.6	3.6	3.7	4.0	3.5	5.0																							
6-Oct	3.6	4.1	3.7	3.9	4.3	6.0	7.4	9.5	13.6	13.5	11.6	10.7	9.4	6.2	5.6	4.2	3.4	2.6	1.9	1.9	1.8	1.8	1.7	2.5	5.6	13.6																							
7-Oct	3.4	3.6	3.6	3.1	3.0	2.7	2.7	2.4	1.9	1.3	1.0	1.1	1.1	1.4	1.8	1.9	2.8	3.5	4.9	4.7	4.0	3.8	3.9	4.0	2.8	4.9																							
8-Oct	4.7	4.8	4.8	4.6	4.8	5.1	4.6	4.5	4.6	4.7	3.5	3.5	4.3	4.3	1.6	1.4	2.3	2.5	2.5	3.1	3.1	3.3	3.2	3.4	3.7	5.1																							
9-Oct	3.6	3.7	4.1	4.0	4.4	5.3	5.3	4.9	5.8	4.9	3.0	2.4	2.2	2.5	3.3	4.4	5.9	6.9	7.9	9.1	8.7	7.3	6.8	5.5	5.1	9.1																							
10-Oct	4.8	4.6	4.6	4.9	5.8	5.6	5.1	5.8	5.1	7.4	19.1	18.2	10.3	9.3	6.2	6.2	5.4	5.5	4.6	5.0	6.2	6.3	7.4	7.1	7.1	19.1																							
11-Oct	6.9	7.5	8.3	6.6	4.6	3.2	3.0	2.8	2.7	2.3	1.9	1.5	1.2	1.4	1.4	1.3	1.5	2.2	3.0	3.5	3.7	3.8	3.4	2.9	3.4	8.3																							
12-Oct	2.8	3.1	3.5	4.0	3.9	3.7	3.9	3.7	2.6	1.7	1.5	1.2	1.1	1.1	1.1	1.5	1.7	1.7	1.5	1.7	1.8	1.7	1.7	1.7	2.2	4.0																							
13-Oct	2.1	2.4	2.8	2.4	2.4	2.7	2.0	2.1	2.2	2.5	3.0	3.8	3.5	3.0	4.9	6.1	7.2	8.3	9.5	15.8	13.7	12.1	11.4	11.2	5.7	15.8																							
14-Oct	7.2	6.1	4.8	4.4	4.3	3.9	3.6	3.7	5.3	5.3	4.2	3.7	3.1	2.8	2.8	2.8	2.8	3.1	3.3	3.0	3.1	3.0	2.5	2.2	3.8	7.2																							
15-Oct	2.3	2.1	1.8	1.8	1.9	1.9	1.3	1.3	1.5	1.3	1.3	1.2	1.0	1.0	1.0	1.0	1.3	1.3	1.8	2.3	2.6	2.4	2.4	2.3	1.7	2.6																							
16-Oct	2.3	2.4	2.4	2.4	2.4	2.5	2.4	2.5	2.5	2.9	2.2	2.5	8.8	7.1	6.6	4.8	5.4	9.1	11.5	10.6	9.5	8.8	7.3	4.6	5.1	11.5																							
17-Oct	3.6	3.5	3.6	3.7	3.7	4.5	4.9	4.6	3.6	3.0	2.0	1.9	2.5	3.8	5.3	4.6	4.6	5.2	6.7	7.7	7.0	5.9	5.6	5.9	4.5	7.7																							
18-Oct	6.3	6.3	6.7	6.8	7.0	7.2	7.6	7.5	7.7	8.5	7.7	5.2	5.5	6.1	7.7	9.2	3.9	2.5	1.2	1.6	2.8	3.8	4.6	5.5	5.8	9.2																							
19-Oct	5.7	5.4	5.8	5.5	5.2	5.5	6.4	6.8	5.6	4.5	6.8	4.6	3.0	3.5	5.1	7.4	7.3	6.7	7.3	6.2	5.3	5.0	5.0	5.0	5.6	7.4																							
20-Oct	5.0	4.9	4.9	4.8	4.8	5.4	6.7	6.0	5.1	4.5	2.7	2.5	4.3	8.7	7.6	11.1	7.5	9.4	10.4	9.0	8.5	8.0	7.5	9.0	6.6	11.1																							
21-Oct	10.5	10.6	9.3	8.8	6.2	5.5	4.4	4.0	3.7	3.2	2.1	1.1	1.0	0.9	0.9	0.9	1.3	3.0	6.8	7.2	5.6	4.6	3.9	3.7	4.5	10.6																							
22-Oct	3.9	4.4	4.3	3.6	3.3	4.1	5.2	6.8	7.2	7.1	3.7	3.2	3.1	M	M	1.1	1.5	1.2	1.7	2.4	2.9	2.6	2.8	3.0	3.6	7.2																							
23-Oct	4.0	3.8	3.3	3.8	4.2	4.1	4.0	3.8	6.3	11.1	10.1	8.3	7.9	9.3	4.2	3.7	3.0	2.0	2.1	2.9	3.3	2.5	2.2	2.1	4.7	11.1																							
24-Oct	2.0	1.8	1.5	1.4	1.8	3.3	4.3	4.0	3.3	2.8	2.2	1.2	1.1	1.1	1.2	1.1	1.1	1.6	1.9	1.6	1.6	1.6	1.6	1.1	1.9	4.3																							
25-Oct	1.1	1.2	1.4	1.1	1.4	1.4	1.7	1.6	1.7	1.6	1.3	1.4	1.8	1.6	4.2	3.6	4.3	4.6	4.7	3.6	3.6	4.2	5.1	7.7	2.7	7.7																							
26-Oct	10.6	10.4	9.2	6.5	5.3	4.1	3.1	2.7	2.9	3.9	2.0	1.8	1.8	1.6	1.5	2.4	1.4	1.4	1.4	1.2	1.1	1.1	1.8	2.0	3.4	10.6																							
27-Oct	2.2	1.8	1.5	1.5	1.9	1.7	1.6	1.8	1.7	1.7	1.8	1.9	1.8	2.0	1.6	1.4	1.6	1.6	1.4	1.9	1.9	1.8	2.3	2.2	1.8	2.3																							
28-Oct	1.7	1.7	1.7	2.1	1.9	1.9	4.0	5.6	5.7	3.9	3.5	3.4	3.2	2.5	3.1	2.8	2.8	2.9	2.6	2.1	1.6	1.0	0.9	1.7	2.7	5.7																							
29-Oct	2.4	2.7	3.1	2.8	2.2	2.6	3.4	4.6	4.0	3.8	2.8	2.1	1.9	1.7	2.3	3.6	3.2	3.2	1.6	1.1	1.6	1.2	1.1	1.3	2.5	4.6																							
30-Oct	1.7	1.8	1.7	1.9	2.1	2.1	2.0	2.0	2.1	2.2	2.1	1.8	1.9	2.1	2.5	3.9	4.3	4.9	5.1	5.4	4.6	3.1	3.6	3.2	2.8	5.4																							
31-Oct	3.2	3.4	3.2	3.1	3.1	3.5	3.8	4.7	6.1	6.2	7.0	11.4	9.2	10.2	8.9	9.4	9.2	9.1	9.4	8.9	8.1	8.3	7.1	7.1	6.8	11.4																							
																								4.0	4.1	4.0	3.8	3.7	3.7	3.9	4.0	4.2	4.2	4.0	3.7	3.5	3.5	3.5	3.7	3.6	3.9	4.2	4.5	4.3	4.0	3.9	4.0	Diurnal Average	
																								10.6	10.6	9.3	8.8	7.0	7.2	7.6	9.5	13.6	13.5	19.1	18.2	10.3	10.2	8.9	11.1	9.2	9.4	11.5	15.8	13.7	12.1	11.4	11.2	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 - October 2014**





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay South - October 2014**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	584	78.71	78.71
6 - 15	146	19.68	98.38
16 - 25	3	0.40	98.79
26 - 80	0	0.00	98.79
> 81.0	0	0.00	98.79

Total Number of Valid Hours: 742

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Fort McKay South - October 2014**

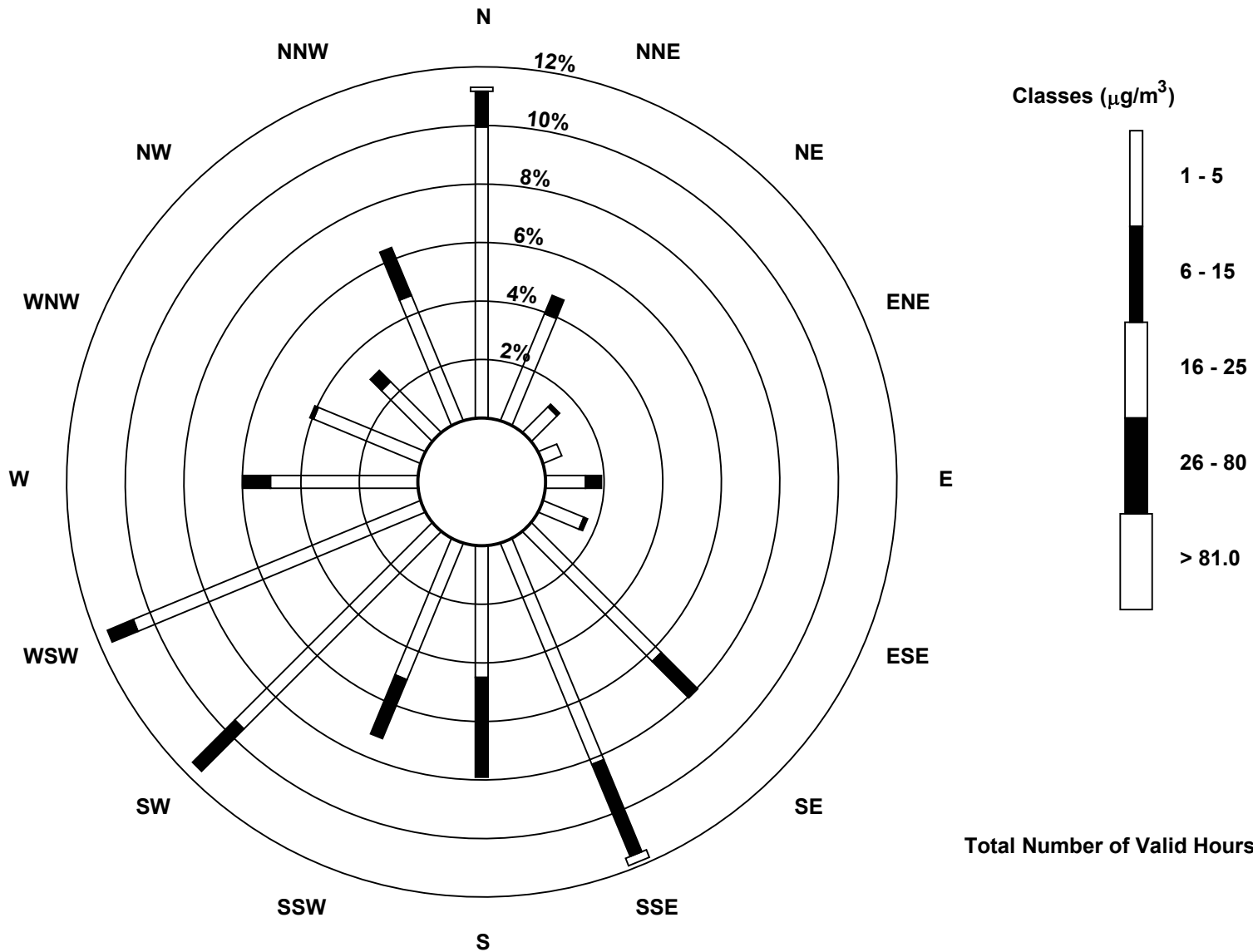
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	73	29	9	5	10	11	46	60	33	37	70	78	37	29	18	34	579
6 - 15	9	5	1	0	4	1	13	25	25	16	15	7	7	1	4	13	146
16 - 25	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	3
26 - 80	0	0	0	0	0	0	0	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>	<b>83</b>	<b>34</b>	<b>10</b>	<b>5</b>	<b>14</b>	<b>12</b>	<b>59</b>	<b>87</b>	<b>58</b>	<b>53</b>	<b>85</b>	<b>85</b>	<b>44</b>	<b>30</b>	<b>22</b>	<b>47</b>	<b>728</b>

Total Number of Valid Hours: 734

Total Number of Hours: 744

Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
 Fort McKay South (AMS 13)



Total Number of Valid Hours: 734

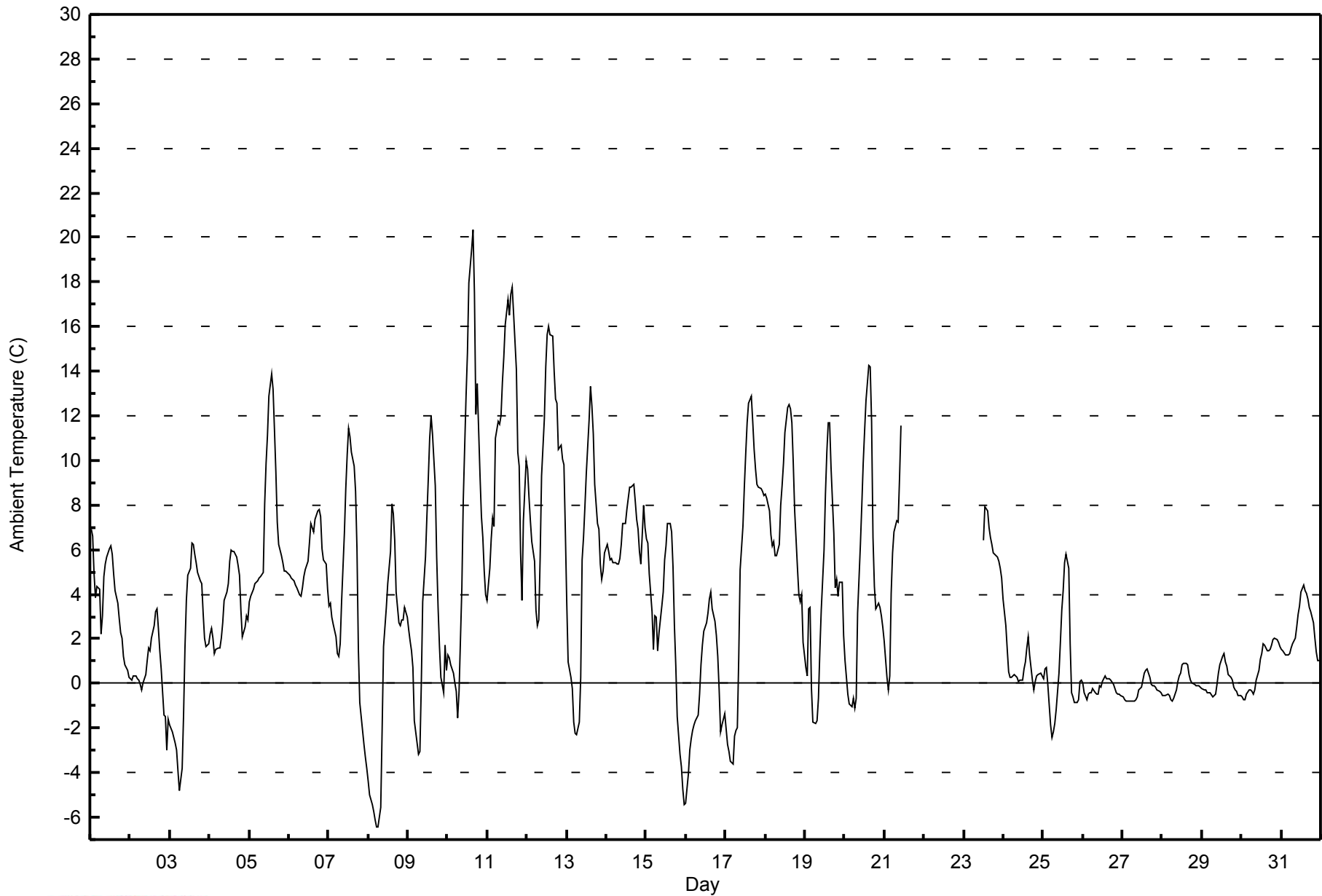


Maximum Value: 20.3 C on Oct 10 16:00																								Hours in Service: 744		
Maximum Daily Average: 11.1 C on Oct 11																								Hours of Data: 695		
Minimum Value: -6.4 C on Oct 8 07:00																								Hours of Missing Data: 49		
Maximum Diurnal Average: 8.0 C at hour 15																								Hours of Calibration: 0		
Minimum Daily Average: -0.3 C on Oct 27																								Percent Operational Time: 93.4		
Minimum Diurnal Average: 0.7 C at hour 7																										
Monthly Average: 3.59 C																										
Percentiles: P <sub>1</sub> = -5.5 P <sub>10</sub> = -0.9 Q <sub>1</sub> = 0.1 Median = 2.9 Q <sub>3</sub> = 6.2 P <sub>90</sub> = 10.3 P <sub>99</sub> = 17.1																										
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-Oct	6.9	6.6	4.9	3.8	4.4	4.2	2.2	3.0	4.8	5.3	5.7	6.0	6.2	5.8	4.9	4.2	3.6	2.9	2.3	2.0	1.2	0.8	0.6	0.3	3.9	6.9
2-Oct	0.2	0.2	0.3	0.4	0.2	0.1	-0.1	-0.3	0.0	0.4	1.1	1.6	1.5	2.0	2.6	3.2	3.3	2.4	1.5	0.7	-1.4	-1.5	-3.0	-1.6	0.6	3.3
3-Oct	-1.8	-2.2	-2.4	-2.6	-3.0	-3.9	-4.8	-3.8	-1.4	1.6	3.8	4.8	5.2	6.3	6.2	5.8	5.4	5.0	4.6	4.5	3.2	2.1	1.6	1.8	1.5	6.3
4-Oct	2.2	2.5	2.0	1.3	1.5	1.6	1.6	2.0	2.7	3.7	4.1	4.5	5.5	6.0	5.9	5.9	5.7	5.3	4.9	3.3	2.1	2.5	3.0	2.9	3.4	6.0
5-Oct	3.7	3.9	4.2	4.5	4.5	4.6	4.7	4.8	5.0	8.0	9.9	11.1	12.9	13.9	13.2	11.4	9.5	7.2	6.2	5.7	5.4	5.0	5.0	5.0	7.1	13.9
6-Oct	4.9	4.7	4.7	4.6	4.4	4.3	4.0	3.9	4.3	4.8	5.1	5.5	6.3	7.2	7.0	6.8	7.4	7.7	7.8	7.5	6.1	5.5	5.3	4.2	5.6	7.8
7-Oct	3.5	3.6	3.0	2.7	2.1	1.4	1.2	1.8	3.7	6.7	8.7	10.3	11.4	11.1	10.4	9.7	8.6	6.0	1.5	-0.8	-2.1	-2.7	-3.3	-3.8	3.9	11.4
8-Oct	-4.4	-5.0	-5.4	-5.8	-6.1	-6.4	-6.4	-5.6	-2.1	1.7	2.5	3.4	4.5	5.9	8.0	7.6	6.4	4.1	2.7	2.6	2.9	2.9	3.4	3.0	0.6	8.0
9-Oct	2.4	1.9	1.5	0.7	-1.7	-2.6	-3.1	-3.0	0.0	3.7	5.6	7.5	9.2	11.0	12.0	11.2	8.9	5.7	3.4	1.6	0.3	-0.4	1.7	0.6	3.2	12.0
10-Oct	1.3	1.2	0.9	0.5	0.0	-0.4	-1.5	-0.3	4.3	8.2	10.5	12.9	14.8	18.0	19.5	20.3	17.5	12.1	13.5	9.3	7.5	6.6	5.0	4.0	7.7	20.3
11-Oct	3.8	5.2	6.5	7.4	7.0	11.0	11.8	11.6	12.0	13.5	14.7	16.1	17.2	16.5	17.5	17.8	16.6	14.1	10.4	9.8	5.9	3.7	7.3	10.0	11.1	17.8
12-Oct	9.6	8.4	7.3	6.3	5.5	3.3	2.6	2.9	5.6	9.3	11.9	14.2	15.6	16.0	15.7	15.6	14.0	12.8	12.6	10.5	10.7	10.1	9.8	6.8	9.9	16.0
13-Oct	3.7	1.0	0.3	-0.3	-1.7	-2.2	-2.3	-1.7	0.2	5.5	6.5	7.9	9.4	11.8	13.3	12.4	11.2	8.9	7.2	6.9	5.4	4.7	5.0	5.9	5.0	13.3
14-Oct	6.2	5.9	5.5	5.6	5.4	5.4	5.3	5.4	5.6	6.2	7.2	7.2	7.8	8.3	8.8	8.8	8.9	8.1	7.3	6.9	5.9	5.4	8.0	7.0	6.8	8.9
15-Oct	6.5	6.3	4.9	3.2	1.5	3.1	3.0	1.5	2.3	3.5	4.1	5.6	6.2	7.2	7.2	6.8	5.2	2.6	0.8	-1.5	-3.2	-3.8	-4.7	-5.4	2.6	7.2
16-Oct	-5.3	-4.1	-3.0	-2.5	-2.1	-1.8	-1.7	-1.4	-0.5	0.8	1.7	2.3	2.7	3.1	3.8	4.1	3.3	2.8	2.1	1.2	-0.3	-2.2	-1.9	-1.3	0.0	4.1
17-Oct	-2.0	-2.7	-3.1	-3.5	-3.6	-2.4	-2.1	-2.0	1.2	5.1	7.0	8.8	10.3	11.7	12.6	12.9	11.8	10.5	9.6	8.9	8.8	8.8	8.6	8.4	5.1	12.9
18-Oct	8.5	8.3	7.8	6.7	6.2	6.3	5.7	5.7	6.3	8.0	8.9	9.9	11.2	12.3	12.5	12.3	11.7	9.9	7.7	5.2	4.0	3.7	4.0	1.8	7.7	12.5
19-Oct	0.7	0.3	3.4	3.4	-0.2	-1.8	-1.8	-1.7	-0.6	1.5	3.3	6.0	8.5	10.4	11.7	11.7	9.7	6.7	4.3	4.7	3.9	4.6	4.6	2.1	4.0	11.7
20-Oct	1.0	0.3	-0.5	-0.9	-1.0	-0.7	-1.1	-0.7	3.2	6.2	8.0	9.9	11.3	12.7	14.2	14.2	11.7	6.6	4.4	3.3	3.6	3.4	3.0	2.5	4.8	14.2
21-Oct	1.9	0.3	-0.3	0.3	4.0	5.9	6.8	7.3	7.2	9.3	11.5	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	11.5
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
23-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	6.4	7.9	7.7	7.0	6.5	6.2	5.9	5.7	5.7	5.5	5.2	4.7	--	7.9
24-Oct	3.8	2.6	1.5	0.5	0.3	0.3	0.4	0.3	0.2	0.1	0.2	0.1	0.7	1.0	1.6	2.1	1.3	0.1	-0.3	0.1	0.3	0.4	0.5	0.3	0.8	3.8
25-Oct	0.2	0.6	0.7	-0.1	-1.8	-2.4	-2.2	-1.8	-1.2	0.5	1.9	3.3	4.2	5.4	5.8	5.2	1.8	-0.4	-0.6	-0.8	-0.8	-0.8	0.1	0.1	0.7	5.8
26-Oct	0.0	-0.4	-0.7	-0.4	-0.4	-0.4	-0.2	-0.4	-0.5	-0.5	-0.1	-0.2	0.1	0.4	0.2	0.2	0.2	0.1	0.0	-0.3	-0.4	-0.5	-0.5	-0.5	-0.2	0.4
27-Oct	-0.6	-0.7	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.6	-0.3	-0.2	0.1	0.5	0.6	0.7	0.3	0.0	-0.1	-0.1	-0.2	-0.3	-0.4	-0.4	-0.3	0.7
28-Oct	-0.5	-0.5	-0.5	-0.5	-0.5	-0.7	-0.8	-0.7	-0.3	0.1	0.3	0.5	0.8	0.9	0.9	0.8	0.4	0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.1	0.0	0.9
29-Oct	-0.2	-0.3	-0.3	-0.4	-0.4	-0.4	-0.6	-0.5	-0.5	0.0	0.4	0.8	1.2	1.3	1.0	0.8	0.4	0.2	0.2	-0.1	-0.3	-0.3	-0.5	-0.5	0.0	1.3
30-Oct	-0.6	-0.7	-0.7	-0.5	-0.3	-0.3	-0.3	-0.5	-0.3	0.1	0.6	1.1	1.4	1.8	1.7	1.5	1.4	1.5	1.7	2.0	2.0	2.0	1.8	1.7	0.7	2.0
31-Oct	1.5	1.4	1.3	1.3	1.3	1.4	1.6	1.8	2.0	2.5	3.1	3.5	4.1	4.4	4.2	4.0	3.8	3.4	3.2	2.7	2.0	1.4	1.0	1.0	2.4	4.4
2.0 1.7 1.5 1.2 0.8 0.9 0.7 0.9 2.2 4.0 5.1 5.9 6.8 7.6 8.0 7.8 6.8 5.3 4.3 3.5 2.7 2.3 2.4 2.1																								Diurnal Average		
9.6 8.4 7.8 7.4 7.0 11.0 11.8 11.6 12.0 13.5 14.7 16.1 17.2 18.0 19.5 20.3 17.5 14.1 13.5 10.5 10.7 10.1 9.8 10.0																								Diurnal Maximum		
M - Maintenance AF - Analyzer Failure																										



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Fort McKay South - October 2014**







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

**Ambient Temperature (AT) - C**  
**Fort McKay South - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	168	24.17	24.17
0 - 10	455	65.47	89.64
10 - 20	71	10.22	99.86
> 20	1	0.14	100.00

Total Number of Valid Hours: 695

Total Number of Hours: 744

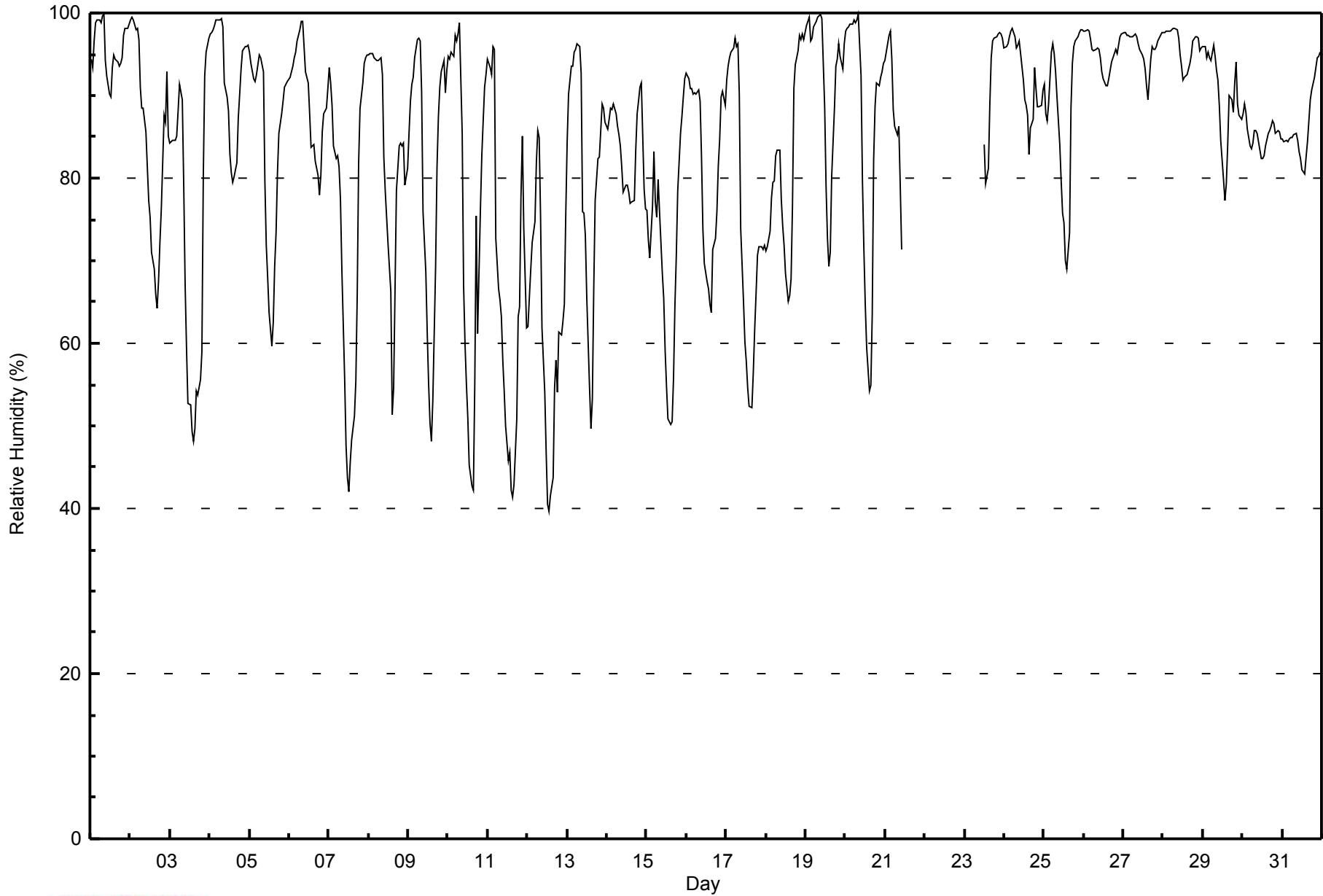


Maximum Value: 100 % on Oct 19 10:00																		Maximum Daily Average: 96.0 % on Oct 28						Hours in Service: 744																								
Minimum Value: 40 % on Oct 12 14:00																		Minimum Daily Average: 62.1 % on Oct 12						Hours of Data: 695																								
Maximum Diurnal Average: 92.4 % at hour 5																		Minimum Diurnal Average: 67.4 % at hour 15						Hours of Missing Data: 49																								
Monthly Average: 83.8 %																		Percentiles: P <sub>1</sub> = 43 P <sub>10</sub> = 61 Q <sub>1</sub> = 77 Median = 88 Q <sub>3</sub> = 95 P <sub>90</sub> = 97 P <sub>99</sub> = 99						Hours of Calibration: 0																								
																								Percent Operational Time: 93.4																								
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-Oct	94	93	97	99	99	99	99	100	100	94	92	90	90	93	95	94	94	94	94	95	97	98	98	99	95.7	100																						
2-Oct	99	99	99	98	98	97	91	88	88	86	81	77	75	71	69	66	64	67	72	76	88	87	93	85	84.0	99																						
3-Oct	84	85	85	85	85	88	91	90	79	67	59	53	53	49	48	50	54	54	56	59	80	92	95	97	72.4	97																						
4-Oct	98	98	98	98	99	99	99	99	98	92	90	88	83	81	79	80	82	87	90	93	96	96	96	96	92.3	99																						
5-Oct	95	94	92	92	93	94	95	95	93	80	72	68	64	60	63	69	73	81	85	88	89	91	91	92	83.6	95																						
6-Oct	92	93	94	95	95	97	98	99	99	96	93	92	88	84	84	84	82	80	78	80	86	88	89	91	89.8	99																						
7-Oct	93	92	89	84	82	83	81	77	69	56	48	44	42	46	48	51	55	66	82	88	92	94	95	95	73.0	95																						
8-Oct	95	95	95	95	94	94	94	95	92	83	79	75	72	66	51	55	66	79	84	84	84	84	79	81	82.1	95																						
9-Oct	85	89	91	92	95	97	97	97	91	76	69	61	55	50	48	53	69	81	87	91	93	94	90	93	81.1	97																						
10-Oct	95	94	95	95	97	97	97	99	85	67	60	55	51	45	43	42	55	75	61	76	83	87	91	93	76.6	99																						
11-Oct	94	93	93	96	96	73	67	65	63	58	54	50	46	47	42	41	43	51	63	64	78	85	74	62	66.6	96																						
12-Oct	62	66	69	72	75	82	86	85	75	62	54	47	40	40	41	44	55	58	54	61	61	63	65	76	62.1	86																						
13-Oct	84	90	94	94	95	96	96	96	93	76	76	73	66	55	50	53	67	77	82	83	86	89	89	87	81.0	96																						
14-Oct	86	87	88	88	89	88	86	85	84	81	78	79	79	78	77	77	83	88	88	89	91	92	79	76	83.7	92																						
15-Oct	76	73	70	77	83	77	75	80	76	68	65	59	55	51	50	50	56	65	71	78	85	87	90	92	71.3	92																						
16-Oct	93	92	91	91	90	90	90	91	89	83	74	70	67	67	65	64	71	73	76	82	85	90	91	89	81.7	93																						
17-Oct	92	94	95	95	96	97	96	96	90	74	65	60	58	55	52	52	56	62	66	71	72	72	71	72	75.3	97																						
18-Oct	71	72	74	78	80	80	83	83	83	78	74	72	68	65	66	68	77	91	94	95	97	97	98	97	80.8	98																						
19-Oct	98	99	99	97	97	98	99	99	100	100	99	89	79	73	69	71	80	88	94	94	96	95	93	96	91.8	100																						
20-Oct	98	98	98	99	99	99	99	99	100	92	80	71	65	60	54	55	64	82	89	92	91	92	93	94	85.9	100																						
21-Oct	94	96	97	98	94	88	86	85	86	79	71	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	98																						
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--																						
23-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	84	79	81	89	95	97	97	97	97	98	97	97	--	98																						
24-Oct	96	96	96	97	98	98	97	96	96	97	95	92	89	89	88	83	86	87	93	91	89	89	89	91	92.4	98																						
25-Oct	91	88	87	89	95	96	95	93	90	84	80	76	75	70	69	73	88	94	96	97	97	98	98	98	88.2	98																						
26-Oct	98	98	98	98	97	96	95	96	96	96	95	93	92	91	91	92	93	94	95	96	95	96	97	97	95.2	98																						
27-Oct	98	98	97	97	97	97	97	97	97	96	96	95	94	93	91	89	94	96	96	96	96	97	97	98	95.8	98																						
28-Oct	98	98	98	98	98	98	98	98	98	97	95	94	92	92	93	93	94	95	97	97	97	97	95	96	96.0	98																						
29-Oct	96	96	95	95	95	94	96	95	93	92	89	85	80	77	79	84	90	90	88	92	94	89	88	87	89.9	96																						
30-Oct	88	89	88	86	84	84	84	86	86	85	83	82	82	83	84	86	86	86	87	87	86	86	85	85	85.3	89																						
31-Oct	85	84	85	84	85	85	85	85	85	85	83	82	81	80	83	84	87	89	91	92	93	95	95	95	86.7	95																						
																								90.7	91.0	91.2	91.7	92.4	91.7	91.5	91.3	88.8	82.0	77.5	74.0	71.2	68.6	67.4	68.8	74.3	80.1	82.9	85.6	88.7	90.2	89.7	89.8	Diurnal Average
																								99	99	99	99	99	99	99	100	100	100	99	95	94	93	95	94	95	95	97	97	97	98	98	99	Diurnal Maximum
M - Maintenance AF - Analyzer Failure																																																



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Fort McKay South - October 2014**





Maximum Speed: 12 km/h on Oct 17 18:00	Maximum Daily Speed Average: 8.0 km/h on Oct 26	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 9 17:00	Minimum Daily Speed Average: 0.2 km/h on Oct 13	Hours of Data: 735
Maximum Diurnal Speed Average: 2.3 km/h at hour 3	Minimum Diurnal Speed Average: 0.1 km/h at hour 14	Hours of Missing Data: 9
Monthly Average Velocity: 1.1 km/h 235.1 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 4 Q <sub>3</sub> = 6 P <sub>90</sub> = 9 P <sub>99</sub> = 12	Percent Operational Time: 98.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	NNE4	N4	NNW1	NNW3	WNW2	NNW1	SW2	SSW1	SSW0	ENE4	NE2	NE2	NNE2	N5	N8	N10	N11	N11	N12	NNW10	NNW7	NW7	NW6	W3	N4.3	N12	
2-Oct	W3	W1	W5	NNW5	NW5	NW6	AF	AF	AF	WNW9	NW10	NW10	WNW9	NW9	WNW8	WNW10	WNW9	W9	W6	W5	WNW4	WNW2	WSW4	W6	WNW6.1	NW10	
3-Oct	WSW6	W7	W6	WSW8	WSW8	SW2	SE1	SE2	SSW4	SE4	SSE5	SE5	SE6	SE7	ESE6	SE5	SSE6	SSE6	SSE7	SSE4	SE5	ESE4	SSE4	S3.2	WSW8		
4-Oct	SSE4	SSE3	SE1	NW1	N2	WNW1	WNW2	W1	SW1	SW3	N2	N4	NE2	NNE5	NNE5	NNE4	NNE3	W2	SW1	SSW2	S2	SW1	SE1	SW1	NNW0.4	NNE5	
5-Oct	SW4	SW4	SSW5	S7	S6	S5	S6	SSW6	SSW7	S4	ESE3	SSW4	NE3	NNE7	N10	NNE11	NNE9	NNE8	SW7	N7	N6	N6	N2	NE1	N0.9	NNE11	
6-Oct	ESE2	E3	S1	S2	SSE2	E3	E3	NE2	SSE1	SE2	N3	NNW3	NW3	NW4	NNE8	NNW6	WNW2	WNW5	WNW6	W5	WSW6	WSW8	WSW8	WSW6	WNW1.5	NNE8	
7-Oct	WSW7	WSW9	WSW10	WSW8	W6	WSW7	W9	W6	NW5	NNW5	WNW7	NNW7	NNW7	NNE9	NNE9	NNE9	NE7	NNW4	WSW1	SW3	SW2	WSW2	SW2	SW2	WNW3.4	WSW10	
8-Oct	WSW1	SW2	SW2	WSW1	WSW2	SW2	SW2	SW1	S1	SE2	S3	NNE3	N5	NNE4	SE4	ENE1	NNW3	WNW2	W0	SE2	S2	ESE3	SE3	SE3	SSE0.5	N5	
9-Oct	ENE2	N1	NW1	NW2	WSW2	WSW2	SW2	WSW2	N2	ESE3	SE4	SE6	SE7	SE6	SSE6	SE3	NW0	W1	W1	SW3	S2	SSW2	SSE4	SSE2	SSE1.5	SE7	
10-Oct	SSW2	W1	W1	WSW1	S4	SW1	SSW2	S4	SSE6	SSE7	SSE7	SSE6	SE7	SE7	SE8	SE6	S3	SSW4	S6	S3	S4	SSW3	WSW3	SSW3	S3.5	SE8	
11-Oct	SW2	SSW2	S3	S4	SSW4	SW7	SW10	WSW10	WSW11	WSW12	WSW10	WSW10	WSW10	WSW10	WSW9	WSW12	SW12	SW6	SW6	SW5	S3	S3	WSW8	WSW10	SW7.0	WSW12	
12-Oct	WSW9	WSW11	WSW11	WSW10	W6	SW3	WSW4	WSW6	SW7	SW6	WSW5	WNW6	WNW8	WSW8	W4	WSW6	WSW2	WSW5	WSW5	SW5	SW6	SW7	WSW6	W3	WSW6.1	WSW11	
13-Oct	SSW2	SW3	WSW2	SW1	SW1	SW3	SSW1	S1	SE2	ESE2	E4	SE3	S4	S5	SE5	ESE3	SE2	NNW1	NNW3	N5	NNW3	NNW4	NNW4	N6	SSE0.2	N6	
14-Oct	NNW5	NNW4	NNW4	N6	NNW5	N6	NNW7	NNW7	N8	N7	NNW6	NNW7	NNW6	NNW4	NNW4	NNW3	N1	SSE1	AF	WSW1	WSW2	WSW3	WNW5	W4	NNW4.1	N8	
15-Oct	SW5	W6	W4	WSW3	SSW4	SW7	SW7	WSW7	WSW6	WSW7	WNW6	WNW7	WNW6	WNW6	NW8	NW7	NNW7	NW5	NW5	W2	SW2	SW2	SW3	SW3	SW1	W4.2	NW8
16-Oct	SW2	S2	SSW1	S2	SSW1	SSE2	SSW2	SW0	SW1	SE2	E3	SSE2	SE3	SSE3	S4	S2	N2	NNE3	NNE1	WNW1	WSW2	W2	SW2	S4	S1.1	S4	
17-Oct	SW1	NNW2	SW2	SW2	SSE1	S5	SE2	S2	SSE4	SE7	SE7	SSE8	SE10	SE11	SE12	SE12	SSE12	SSE11	SSE10	SE7	SE9	SSE10	SSE9	SSE6.7	SSE12		
18-Oct	SSE11	SSE10	SSE7	SE4	SE4	SSE4	S4	SSE1	S2	SSE4	SSW6	S5	S4	S5	SSE3	SSE3	SSW3	SSW1	SSW3	SW3	WSW5	W4	W4	SSW3	S3.5	SSE11	
19-Oct	SW4	WSW6	WSW8	W3	SSW1	SW2	W2	S1	SSW1	N3	NW3	NE4	NNE5	N6	N7	NNE4	N1	W2	SSW2	SSW1	SSE2	SE3	E3	NNW2	WNW0.8	WSW8	
20-Oct	NNW2	NNW1	SW1	W1	WSW1	SSW1	NNW1	S3	S5	SSE6	SSE7	S6	SSE7	SSE6	S7	SE5	SSE3	WSW2	WSW2	SW3	SSW2	SSW2	SW2	WSW2	S2.5	SSE7	
21-Oct	SSW2	S3	SSW3	S3	SW7	SW5	WSW10	WSW12	WSW9	SW7	SSW4	AF	AF	AF	AF	SW6	SSW4	SSW4	SW3	SW3	SW3	SSW2	SW3	SW3	SW4.6	WSW12	
22-Oct	SSW2	SSW3	SW3	SW2	SW3	SW3	SW3	WSW3	S2	E2	E2	E3	ESE4	M	SE5	SE5	SE6	SSE4	SW2	SSW2	SSE5	SSE6	SSE3	SW3	SSE2.3	SE6	
23-Oct	SSW4	W1	WSW2	SW2	WSW1	WSW1	W1	NW1	NNW3	N3	NNW3	N4	N4	E1	ESE4	NE3	NNW2	N5	N6	N5	NW5	NW6	WNW5	WNW5	NNW2.0	N6	
24-Oct	W7	W9	W7	W7	WSW3	SW5	WSW6	SW3	WSW4	WSW3	W5	WSW6	WSW5	W7	WSW5	WNW5	WNW5	WSW3	SSW4	SW5	SW5	SW5	SW4	SW4	WSW4.8	W9	
25-Oct	WSW5	WSW6	WSW6	W2	WSW2	SW4	SW6	SW7	SW6	SW8	SSW6	SSW4	S6	SSW6	SSE4	SSE3	SW1	W2	WSW2	NW2	N2	NNE4	N4	N4	SW2.7	SW8	
26-Oct	N4	NNW4	NNW3	N6	N7	N7	N6	N6	N8	N7	N8	N9	N10	N9	N10	N10	N10	N10	N10	N10	N10	N10	N8	N8	N8.0	N11	
27-Oct	N8	N6	N7	N7	N6	N6	N6	N6	N7	N7	N6	N7	N5	N5	NNE3	N3	WNW2	WNW2	NW2	N3	NNW3	NNW2	NNW1	NNW2	N4.5	N8	
28-Oct	W1	NNW1	W1	WSW1	SSE1	S1	S2	S2	SSE2	SE4	SSE3	SE4	SE4	SE3	ESE3	SE3	SE3	E3	ENE1	E1	SE2	ESE1	E2	NNE2	SE1.5	SE4	
29-Oct	NNE2	NNE3	N3	N2	N3	N3	N3	N5	N5	N5	NNE7	NNE6	NNE6	NNE5	NNE5	N4	NNW2	NE3	ENE2	SE1	E2	E3	SE3	SE3	NNE2.9	NNE7	
30-Oct	SE3	SE3	SE3	S4	SSE8	SSE9	SSE9	SSE8	SSE7	SSE7	SSE9	SSE7	SSE9	SSE9	SSE9	SSE8	SSE7	SE5	SSE6	SSE8	SSE9	SSE9	SSE8	SSE10	SSE7.2	SSE10	
31-Oct	SSE9	SSE8	SSE9	SSE9	SSE8	SSE8	SSE7	SSE7	SSE7	SSE8	SSE8	S6	S7	SSE6	S5	S6	S7	S5	S4	S3	S3	SSW2	SSW2	S1	SSE5.9	SSE9	

SW1.7	WSW1.9	WSW2.3	WSW1.7	SW1.7	SW1.7	SW2.2	SW2.0	SW1.8	SSW1.2	SW0.9	W0.3	SSW0.2	S0.1	ENE0.7	NNE0.3	NW0.3	NNW0.9	W1.0	WSW1.1	SW1.2	SW1.0	SW1.4	SW1.5	Diurnal Average	
SSE11	WSW11	WSW11	WSW10	SSE8	SSE9	SW10	WSW12	WSW11	WSW12	WSW10	NW10	N10	SE11	SE12	SE12	SE12	SSE12	N12	SSE10	N10	N10	SSE10	SSE10	Diurnal Maximum	

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



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

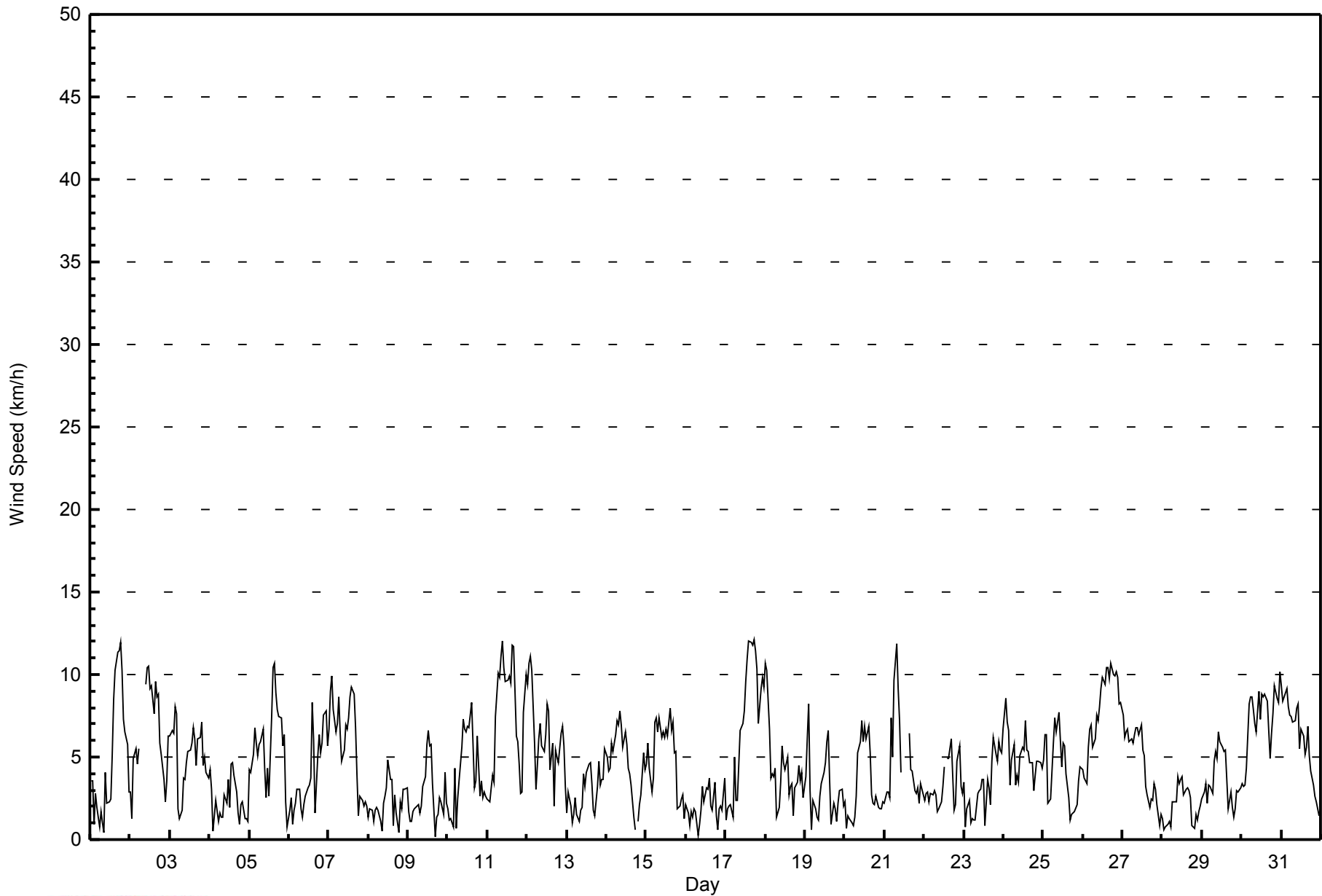
**Wind Speed (WS) - km/h**  
**Fort McKay South - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5 km/h on Oct 11 15:00 Minimum Value: 0 km/h on Oct 22 09:00 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																	Hours in Service: 744 Hours of Data: 735 Hours of Missing Data: 9 Hours of Calibration: 0 Percent Operational Time: 98.8								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	1	2	1	1	1	1	1	1	1	2	2	2	1	2	3	3	4	4	4	4	3	2	2	2	4
2-Oct	2	2	2	3	2	3	AF	AF	AF	4	5	5	4	5	3	4	4	4	2	2	1	2	2	2	5
3-Oct	2	2	2	3	3	2	1	1	2	1	2	2	2	2	2	2	2	2	2	3	2	2	2	3	
4-Oct	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	2
5-Oct	1	1	2	2	2	2	2	2	2	2	2	3	2	3	3	3	3	3	3	3	2	2	1	1	3
6-Oct	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	3	3	2	2	2	2	2	3
7-Oct	2	3	3	2	2	2	3	3	3	3	3	3	3	3	3	3	3	2	1	1	1	1	1	1	3
8-Oct	1	1	1	1	1	1	1	1	1	2	1	2	1	1	2	1	1	1	1	2	1	2	1	1	2
9-Oct	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	2	1	1	2
10-Oct	1	1	1	1	1	1	2	1	2	2	2	2	2	2	3	2	1	1	2	1	1	1	1	1	3
11-Oct	1	1	2	1	2	3	4	3	4	5	4	4	4	4	5	4	5	2	2	2	1	1	2	3	5
12-Oct	3	3	4	3	4	2	1	2	2	2	2	3	3	3	2	2	1	3	2	2	2	2	2	1	4
13-Oct	1	1	2	1	1	1	1	1	1	1	2	1	2	2	2	1	1	1	1	1	1	1	1	2	2
14-Oct	1	1	1	2	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	AF	1	1	2	3	3
15-Oct	2	3	3	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	1	1	1	1	1	1	3
16-Oct	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	2	1	1	1	1	1	2
17-Oct	1	1	1	1	1	1	1	1	2	2	3	3	4	4	5	5	5	4	4	4	3	4	4	3	5
18-Oct	4	4	3	2	2	1	1	1	1	1	2	2	2	2	1	1	2	1	1	1	1	1	2	1	4
19-Oct	3	2	2	3	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	2	1	1	3
20-Oct	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2
21-Oct	1	1	1	1	3	3	3	3	3	2	1	AF	AF	AF	AF	2	1	1	1	1	1	1	1	1	3
22-Oct	1	1	1	1	1	1	1	0	0	1	1	1	2	M	2	2	2	2	1	1	2	2	1	1	2
23-Oct	1	1	1	1	1	1	1	1	1	2	1	1	1	2	2	1	1	1	2	2	2	2	2	2	2
24-Oct	3	3	3	2	1	2	2	2	2	2	2	2	2	3	2	3	2	2	1	1	1	1	1	1	3
25-Oct	1	2	2	2	1	1	1	2	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2
26-Oct	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3	4	3	3	3	3	3	2	4
27-Oct	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2
28-Oct	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
29-Oct	1	1	1	1	1	1	1	2	2	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2
30-Oct	1	1	2	2	3	4	3	3	3	2	3	3	3	3	3	3	2	2	2	3	4	3	3	4	4
31-Oct	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1	1	3
																	Diurnal Maximum								
																	4 4 4 3 4 4 4 3 4 5 5 5 4 5 5 5 5 4 4 4 4 4 4 4 4								
M - Maintenance																	AF - Analyzer Failure								



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Fort McKay South - October 2014**





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

**Wind Speed (WS) - km/h**  
**Fort McKay South - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	474	64.49	64.49
6 - 11	252	34.29	98.78
12 - 19	9	1.22	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: 735

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort McKay South - October 2014**

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	34	22	9	5	15	11	41	34	47	47	68	42	30	19	15	35	474
6 - 11	48	12	1	0	0	1	16	52	11	6	17	40	14	14	8	12	252
12 - 19	1	0	0	0	0	0	3	1	0	0	1	3	0	0	0	0	9
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>	83	34	10	5	15	12	60	87	58	53	86	85	44	33	23	47	735

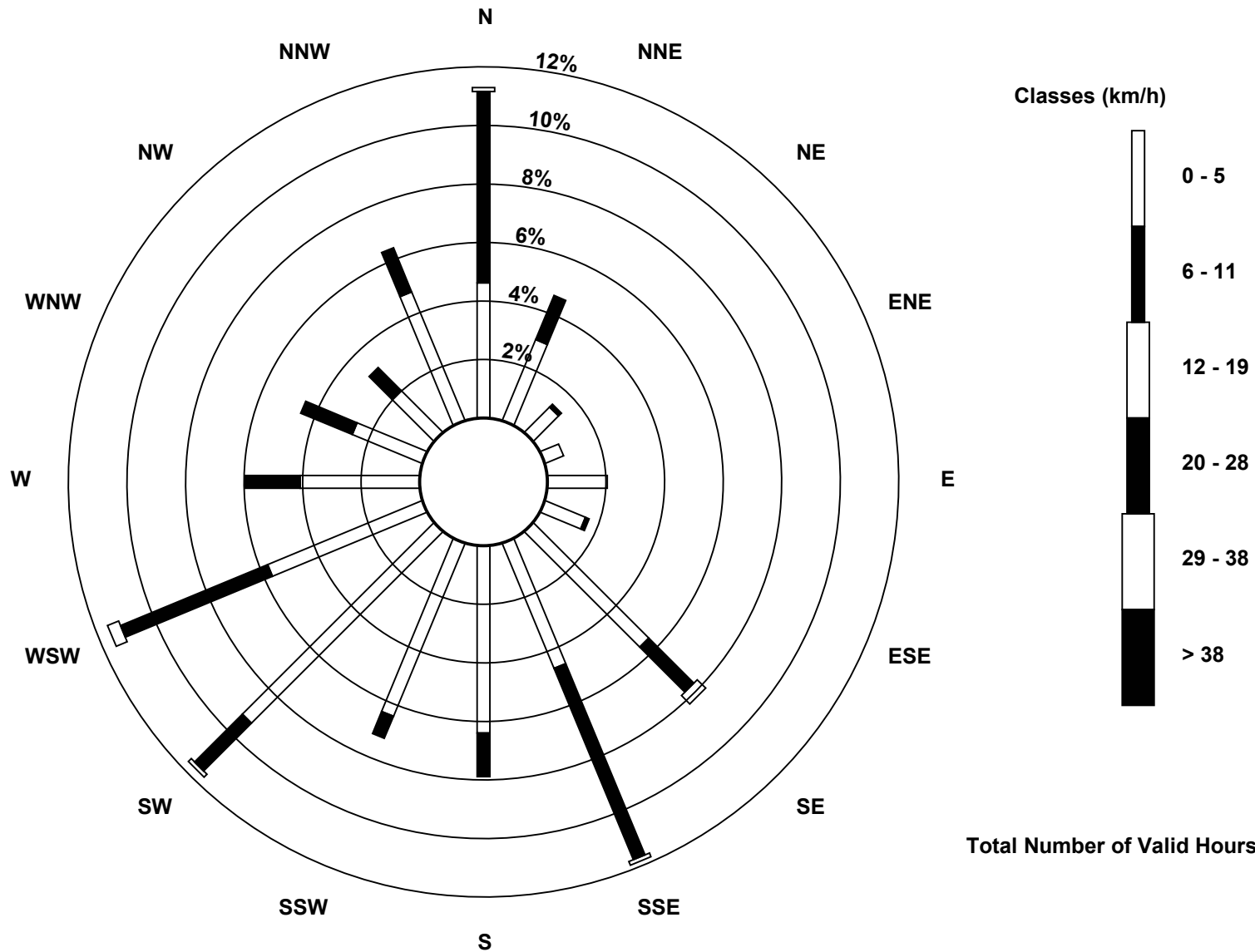
Total Number of Valid Hours: 735

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Wind Speed (WS) - km/h  
Fort McKay South (AMS 13)**



Total Number of Valid Hours: 735



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

**Wind Direction (WD) - deg**  
**Fort McKay South - October 2014**

Direction of Maximum Speed: 150 deg on Oct 17 18:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 357.4 deg on Oct 26	Hours of Data: 735
Direction of Minimum Speed: 304 deg on Oct 9 17:00	Direction of Minimum Daily Speed Average: 0.2 deg on Oct 13
Direction of Minimum Speed: 304 deg on Oct 9 17:00	Hours of Missing Data: 9
Monthly Average Direction: 254.1 deg	Percent Operational Time: 98.8

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	16	10	347	338	294	341	216	206	203	62	52	41	16	5	353	354	353	352	351	348	333	325	322	280	350.2
2-Oct	281	267	278	331	310	315	AF	AF	AF	298	312	307	301	304	291	297	290	280	273	278	287	287	253	262	294.1
3-Oct	254	262	263	255	257	218	142	143	211	146	156	151	129	133	128	122	129	157	158	166	164	140	119	147	172.3
4-Oct	159	153	144	320	354	290	290	260	214	215	352	10	40	12	18	20	29	273	233	212	186	230	136	221	347.4
5-Oct	234	227	209	176	179	171	182	210	209	190	113	199	48	14	3	18	21	19	18	4	0	2	352	46	7.5
6-Oct	122	84	177	186	166	87	98	44	159	134	11	341	321	314	14	343	286	295	283	261	251	251	247	242	287.2
7-Oct	244	248	250	257	259	254	259	272	318	327	288	338	327	20	12	20	37	22	250	223	235	240	230	229	293.9
8-Oct	245	231	229	241	240	215	230	218	174	138	178	20	360	24	137	62	327	301	267	145	177	119	141	132	164.4
9-Oct	62	350	319	319	243	238	232	237	11	113	146	139	142	132	151	142	304	277	270	234	173	208	162	165	161.4
10-Oct	193	271	281	241	179	229	194	182	165	157	163	155	133	145	139	143	170	196	189	187	186	195	238	207	169.3
11-Oct	227	201	187	178	193	223	235	238	242	246	254	258	248	237	245	248	233	229	227	223	177	188	240	245	235.7
12-Oct	247	245	249	252	262	223	237	243	236	224	246	283	283	257	276	237	252	254	258	236	235	235	255	281	250.1
13-Oct	201	219	244	229	224	214	198	172	146	106	91	142	180	177	133	102	134	340	345	352	340	339	344	349	149.8
14-Oct	344	345	348	353	342	349	346	348	349	349	334	347	340	334	348	344	349	150	AF	242	256	237	288	281	337.1
15-Oct	235	276	277	254	199	214	232	230	239	256	287	288	290	283	305	304	332	319	309	276	216	227	222	210	268.5
16-Oct	217	189	205	179	209	165	210	235	214	145	95	155	130	152	180	178	358	33	26	290	240	259	233	189	176.1
17-Oct	235	303	236	229	163	174	137	187	155	144	144	148	143	142	139	142	142	150	154	161	146	145	153	159	151.3
18-Oct	156	158	155	143	135	161	176	166	175	165	196	183	186	175	154	168	197	209	197	230	252	267	263	202	179.4
19-Oct	226	239	247	264	211	220	265	179	207	357	325	36	13	5	7	13	351	269	207	203	148	136	98	337	301.7
20-Oct	340	334	232	280	248	195	345	187	176	166	165	173	165	164	176	144	164	238	241	228	212	201	216	237	183.4
21-Oct	192	191	208	182	236	226	237	240	243	232	197	AF	AF	AF	AF	228	198	202	232	224	221	206	236	222	224.7
22-Oct	210	192	223	220	228	218	231	237	183	87	80	93	117	M	139	134	138	147	232	211	157	157	168	230	168.2
23-Oct	207	274	258	227	250	255	261	317	343	349	327	9	9	99	111	47	345	353	357	353	324	307	288	286	327.5
24-Oct	267	262	264	262	240	223	243	229	244	254	259	258	256	260	256	289	290	286	217	206	222	227	233	236	252.1
25-Oct	241	244	247	261	237	228	223	236	234	224	212	192	177	194	159	150	221	264	247	322	356	14	11	7	228.8
26-Oct	4	346	347	356	350	356	354	354	353	358	356	2	3	4	359	359	357	358	359	355	357	359	357	359	357.4
27-Oct	357	350	349	354	349	350	352	358	355	356	358	0	351	356	20	354	287	292	321	354	336	345	336	335	351.0
28-Oct	281	339	278	239	156	178	190	177	149	145	147	129	141	135	117	125	127	94	68	92	138	105	85	18	134.3
29-Oct	26	12	5	1	0	358	352	2	1	2	17	24	26	32	24	11	342	50	60	138	92	97	140	138	23.5
30-Oct	142	142	146	172	165	165	156	157	159	157	160	153	155	156	155	166	156	145	151	156	159	159	152	154	156.7
31-Oct	157	150	147	154	155	151	154	156	156	161	159	177	174	168	171	179	178	177	185	185	176	194	203	169	163.5

230.1 240.4 245.9 249.7 233.5 220.6 227.0 232.0 227.9 209.8 219.7 263.6 205.2 190.5 76.5 15.8 304.2 292.0 266.0 244.1 225.9 224.7 230.8 231.6  
 Diurnal Average

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Fort McKay South - October 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 96 deg on Oct 16 20:00	Hours of Data: 735
Minimum Value: 9 deg on Oct 21 18:00	Hours of Missing Data: 9
Percentiles: P <sub>1</sub> = 12 P <sub>10</sub> = 19 Q <sub>1</sub> = 25 Median = 31 Q <sub>3</sub> = 44 P <sub>90</sub> = 62 P <sub>99</sub> = 93	Hours of Calibration: 0
	Percent Operational Time: 98.8

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	24	43	66	29	31	73	65	70	94	56	67	74	68	26	27	26	28	27	27	29	29	28	31	37	94
2-Oct	40	81	32	43	32	32	AF	AF	AF	39	37	39	42	39	40	37	42	39	44	40	32	75	24	22	81
3-Oct	21	22	24	23	29	84	77	53	43	51	49	47	40	38	34	33	30	27	28	28	29	33	39	36	84
4-Oct	35	50	95	47	19	35	25	35	56	38	73	48	86	38	30	32	47	27	62	21	25	90	63	65	95
5-Oct	17	19	30	20	23	20	23	27	26	45	89	65	94	33	27	28	28	26	30	30	28	28	39	66	94
6-Oct	42	40	81	38	41	35	49	44	66	50	66	48	66	53	27	38	73	66	41	39	25	21	18	23	81
7-Oct	19	21	22	23	25	22	34	50	49	54	45	49	47	37	28	30	35	39	51	27	21	15	16	16	54
8-Oct	32	13	42	73	30	21	12	49	95	44	46	76	28	41	52	78	20	30	83	48	34	33	28	32	95
9-Oct	32	56	50	21	12	13	9	40	41	38	53	40	44	43	37	36	88	52	61	16	21	77	25	20	88
10-Oct	25	52	48	73	15	87	53	16	25	24	33	35	33	34	32	34	29	16	15	29	17	40	21	35	87
11-Oct	34	34	60	24	32	24	26	23	27	31	39	38	36	26	35	29	22	17	13	26	17	26	19	19	60
12-Oct	22	21	24	24	52	49	25	18	17	34	51	55	46	39	57	27	51	30	34	25	19	19	27	33	57
13-Oct	39	53	90	74	57	21	55	57	43	67	40	47	43	49	47	33	22	64	16	15	18	16	14	19	90
14-Oct	19	28	28	26	17	22	24	22	21	26	35	25	30	39	34	43	46	64	AF	57	51	46	48	41	64
15-Oct	31	44	53	53	22	22	19	17	30	44	45	55	55	52	42	42	26	24	26	66	41	14	17	74	74
16-Oct	31	45	41	31	52	20	14	94	62	45	50	76	51	65	48	69	35	34	80	96	33	34	56	26	96
17-Oct	59	34	51	25	66	17	26	60	30	28	31	33	33	31	33	30	32	30	29	29	34	30	33	30	66
18-Oct	26	28	31	32	27	25	16	25	54	33	27	40	44	29	35	30	23	53	12	13	20	24	57	34	57
19-Oct	49	16	16	84	96	49	42	39	69	32	48	36	33	24	28	30	74	43	56	74	52	38	42	44	96
20-Oct	39	90	67	60	91	91	63	41	15	21	25	26	29	30	27	38	41	48	33	15	41	36	31	18	91
21-Oct	48	36	30	48	33	54	18	18	27	28	44	AF	AF	AF	AF	22	14	9	24	27	20	23	10	27	54
22-Oct	34	21	18	35	10	21	15	11	38	48	61	50	46	M	53	28	29	42	53	29	31	33	33	20	61
23-Oct	18	72	45	38	40	42	31	67	27	68	42	24	29	71	55	30	39	22	22	28	30	33	36	38	72
24-Oct	36	31	33	30	34	22	26	50	33	45	36	37	45	32	31	38	41	34	23	17	20	20	18	17	50
25-Oct	16	20	27	68	32	20	18	16	16	19	30	40	28	37	45	51	33	43	19	23	28	14	19	25	68
26-Oct	16	18	19	23	24	24	22	20	22	23	24	23	23	22	25	24	25	25	25	24	26	23	25	25	26
27-Oct	24	27	27	24	25	25	26	24	25	25	27	26	28	26	39	28	38	34	30	23	26	20	59	22	59
28-Oct	30	71	64	62	39	24	35	23	34	28	31	28	30	30	30	32	34	43	39	74	58	44	45	27	74
29-Oct	26	22	21	29	21	24	20	24	26	25	27	28	31	36	26	26	60	30	69	40	32	40	30	31	69
30-Oct	28	32	40	46	33	34	31	30	30	27	29	34	26	30	30	29	27	34	32	30	30	35	30	30	46
31-Oct	29	30	31	32	31	32	29	32	29	29	28	34	27	28	27	23	22	19	20	14	15	19	33	63	63
	59	90	95	84	96	91	77	94	95	68	89	76	94	71	57	78	88	66	83	96	58	90	63	74	

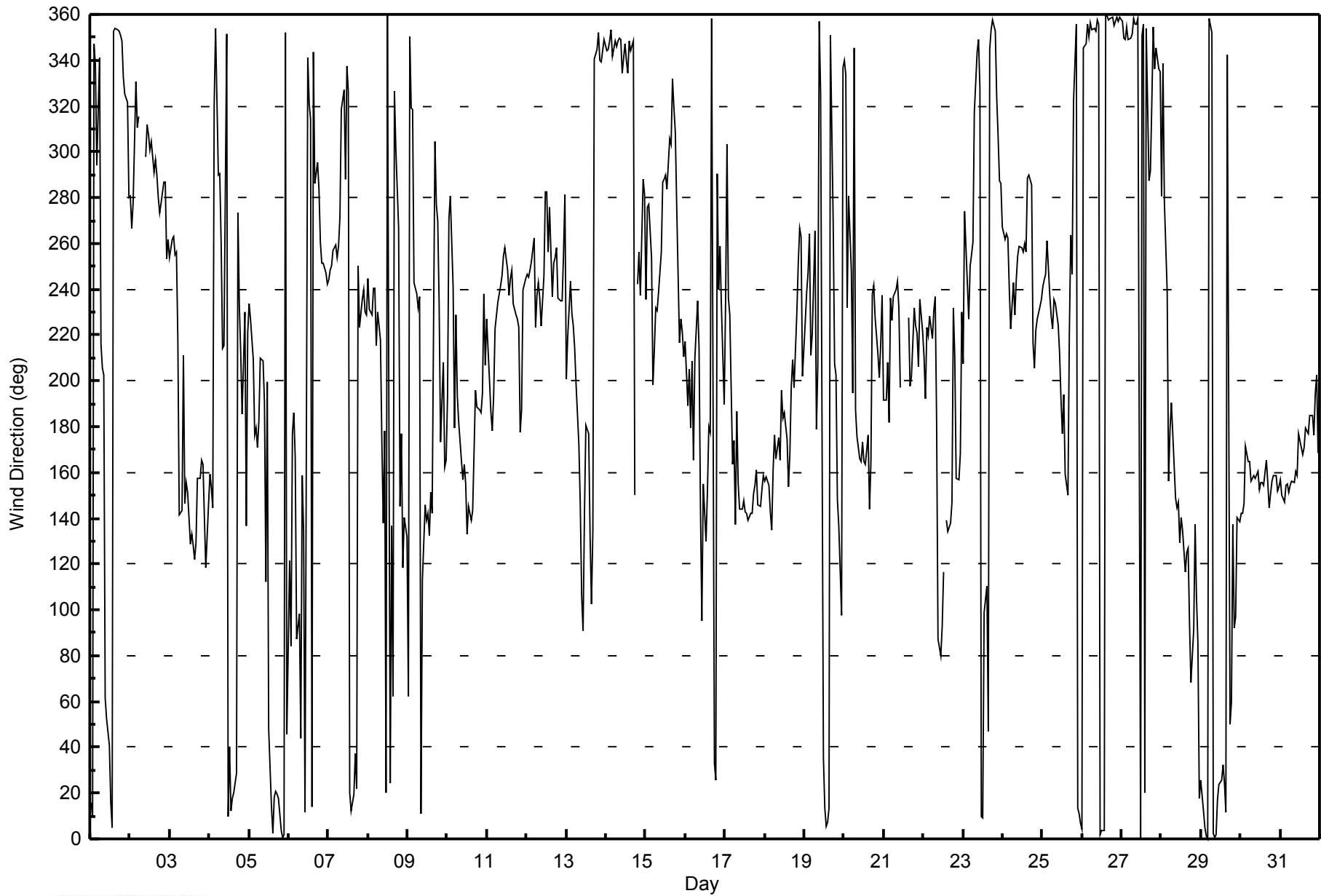
Diurnal Maximum

M - Maintenance AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Fort McKay South - October 2014**





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 20, 2014	Previous Calibration	September 10, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	15:00
Barometric Pressure	729 mmHg	Station temp.	24 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1377
Cal Gas Concentration	51.1 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL107		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492
DACS voltage range	0-5v	DACS channel #	

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	HVPS voltage	25	26
Analyzer Range (mv)	5000	5000	Lamp voltage	2152	2152
Calculated slope	0.997638	0.998822	Chamber temp.	50.0	50.0
Calculated intercept	1.457192	-0.100080	Pressure ("Hg)	25.7	25.4
Analyzer Background	26.3	24.8	Flow (ccm)	660	652
Analyzer Coefficient	1.640	1.633	Intensity	73	78

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	0.5	NA
as found span	5000	78.9	806.4	807.2	0.999
calibrator zero	5000	0.0	0.0	1.4	0.000
high point	5000	78.9	806.4	808.4	0.997
second point	5000	39.4	402.7	401.5	1.003
third point	5000	19.7	201.3	201.1	1.001
calibrator zero					
as left zero	5000	0.0	0.0	2.4	NA
as left span	5000	78.9	806.4	806.9	NA
Average Correction Factor					1.001

Corrected As found	806.7	Previous response	806.8	% change	0.0%
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#### Notes:

Slight adjustment to span and zero

Calibration Performed By: Ryan Power



## Wood Buffalo Environmental Association

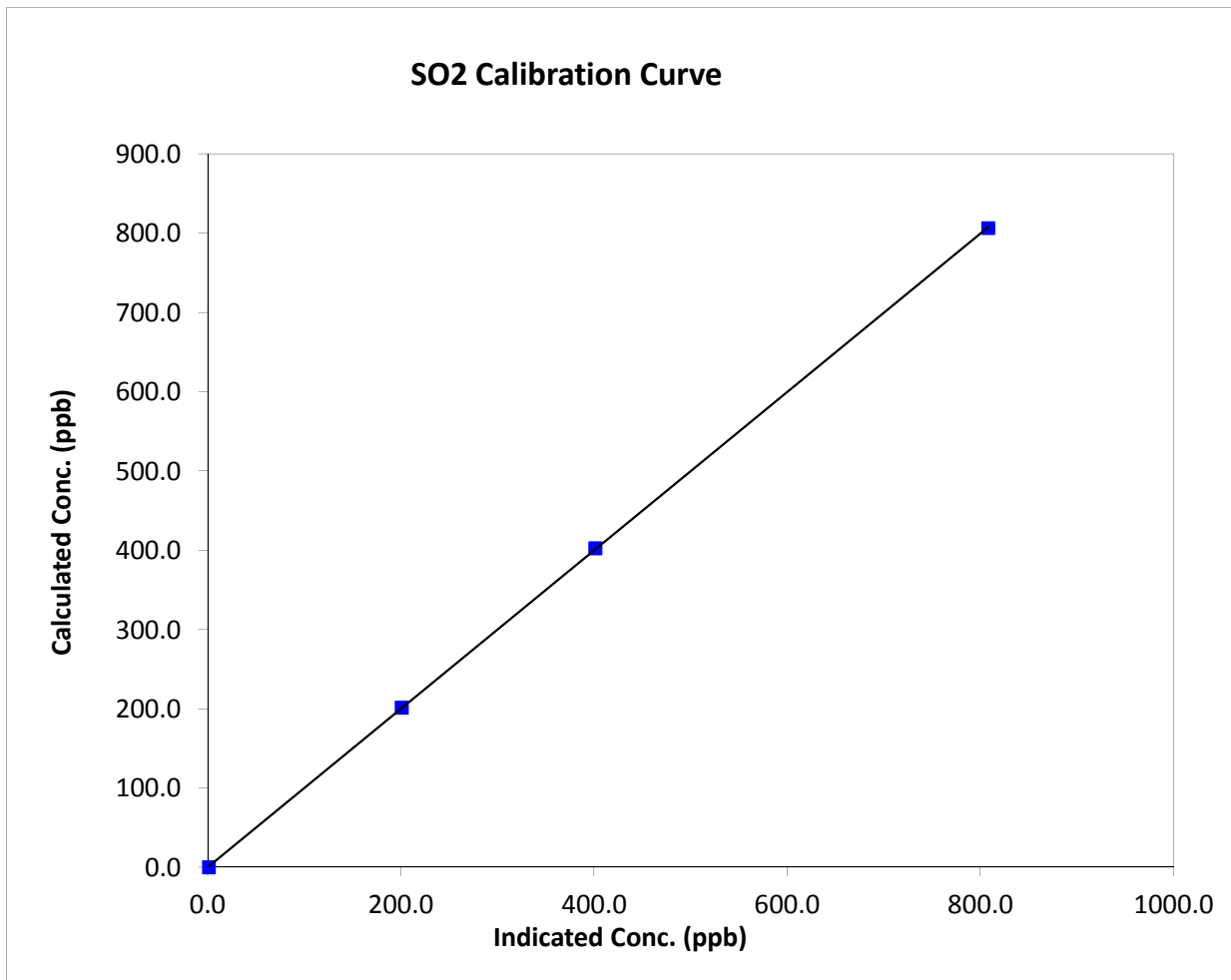
### SO<sub>2</sub> Calibration Summary

#### Station Information

Calibration Date	October 20, 2014	Previous Calibration	September 10, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:45	End Time (MST)	15:00
Analyzer make	API T100	Analyzer serial #	599

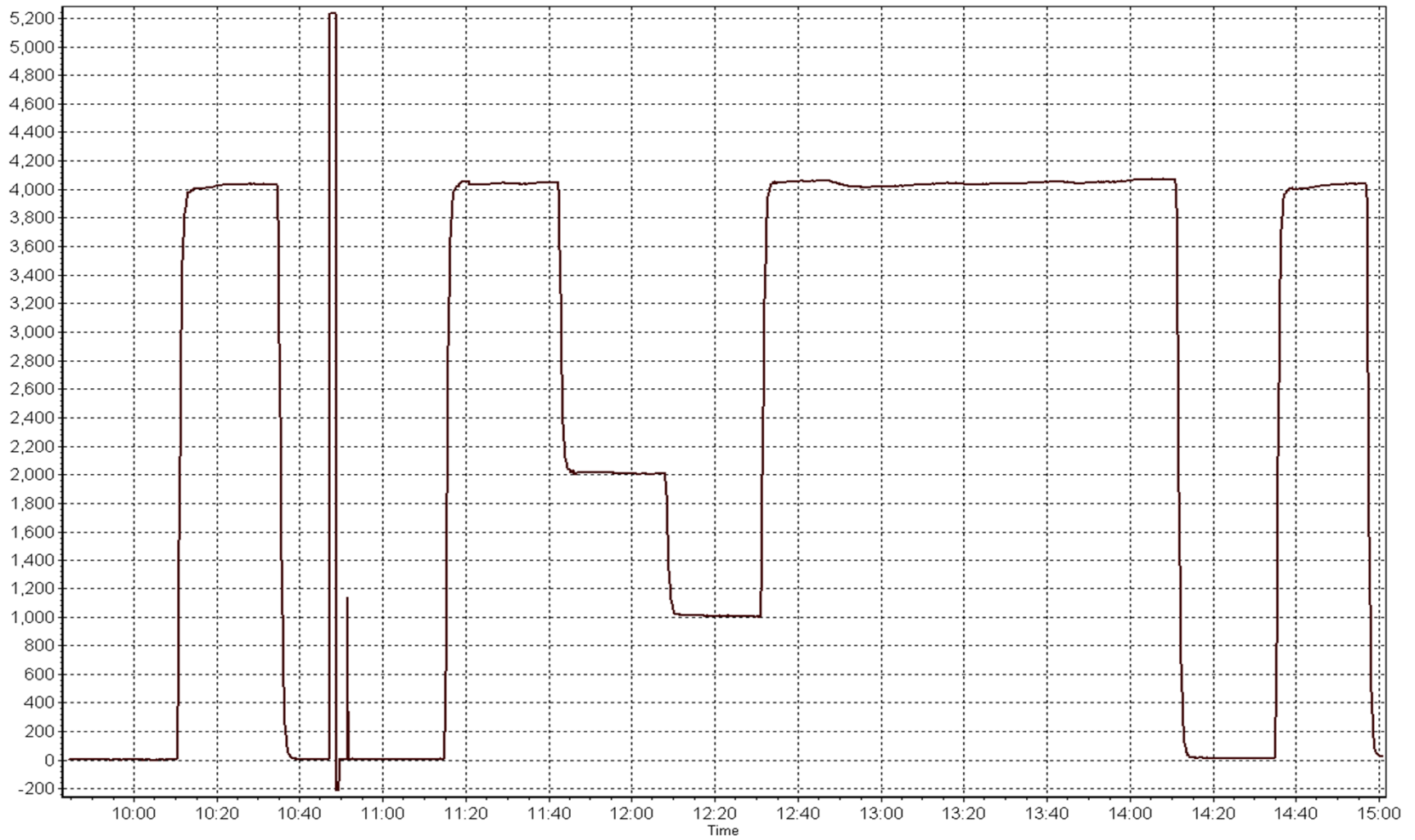
#### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.4	N/A	Correlation Coefficient	0.999983
806.4	808.4	0.9975		
402.7	401.5	1.0028	Slope	0.998822
201.3	201.1	1.0013		
			Intercept	-0.100080



SO2 Calibration Plot

Date: October 20, 2014





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	October 22, 2014	Previous Calibration	September 8, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:02	End Time (MST)	12:47
Barometric Pressure	743 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11041107
Cal Gas Concentration	10.4 ppm H2S	Cal Gas Expiry Date	5/30/2013
Gas Cert Reference	LL82750	SO2 gas conc.	51.1 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2581
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)	5000	5000	Lamp voltage	990	992
Calculated slope	0.999714	1.000566	Chamber temp.	45	45
Calculated intercept	-0.081923	-0.245577	Pressure	682.6	681.6
Analyzer Background	1.82	1.82	Flow	0.431	0.431
Analyzer Coefficient	1.027	1.027	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	0.2	NA
as found span	5000	38.5	80.1	80.2	0.999
SO2 scrubber check	5000	39.4	402.7	0.4	NA
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	38.5	80.1	80.2	0.999
second point	5000	19.2	39.9	40.4	0.988
third point	5000	9.6	20.0	20.1	0.995
calibrator zero					
as left zero	5000	0.0	0.0	0.3	NA
as left span	4000	30.8	80.1	80.5	0.995
Average Correction Factor					0.994

Corrected As found	80.0	Previous response	80.2	% change	0.3%
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#### Notes:

As founds used as high point and calibrator zero, scrubber check before As Found, filter changed after third point

Calibration Performed By:

Ryan Power





# Wood Buffalo Environmental Association

## TRS Calibration Summary

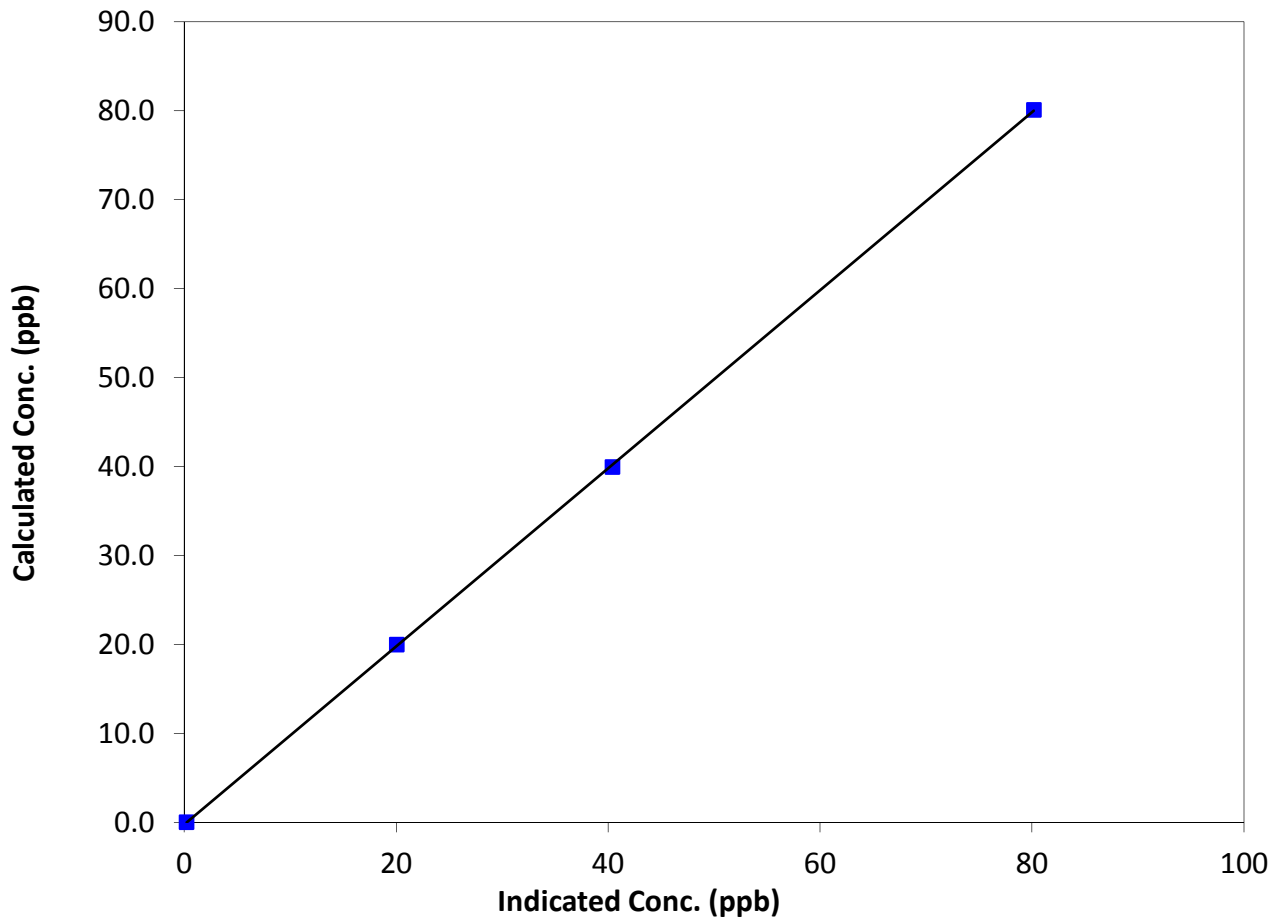
### Station Information

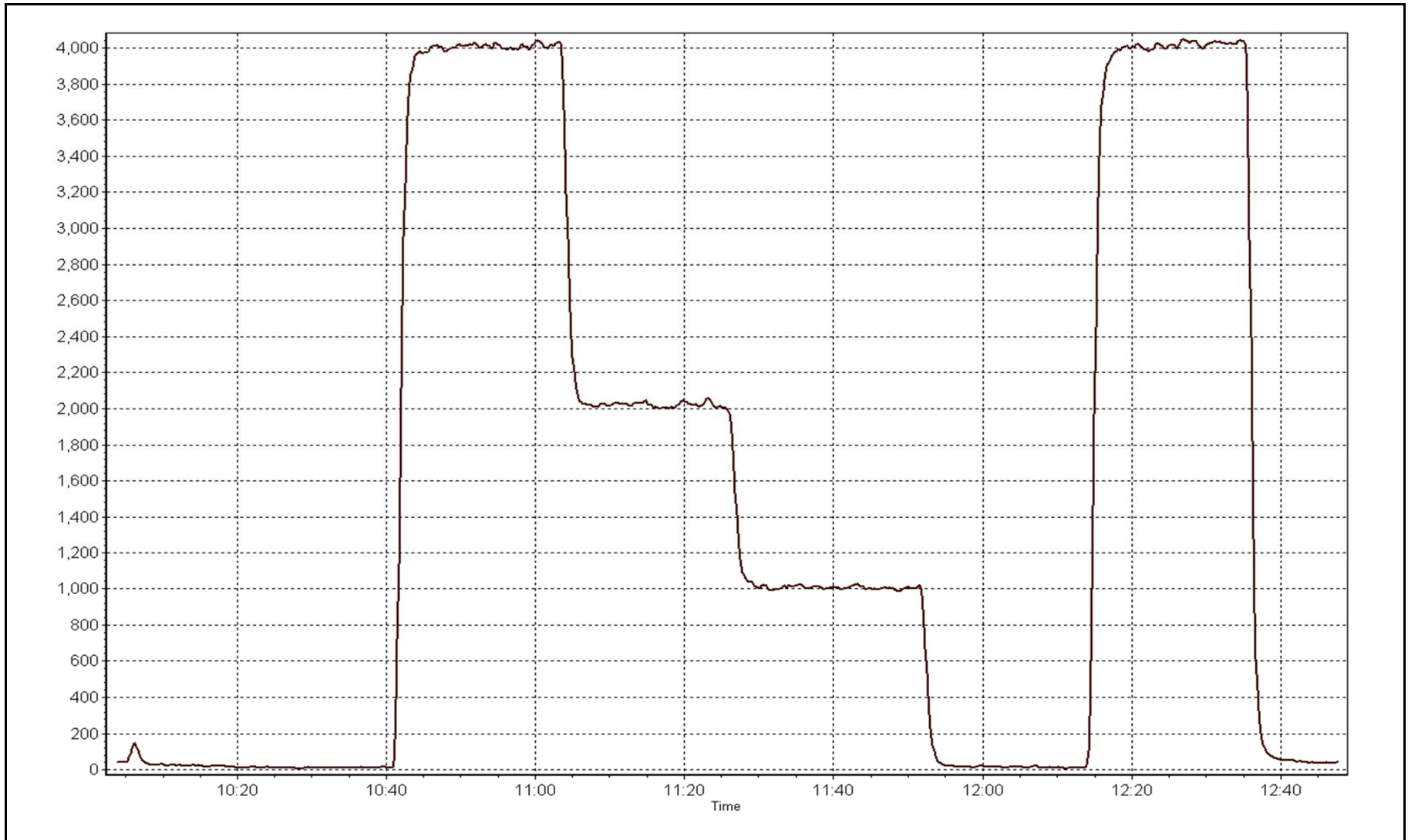
Calibration Date	October 22, 2014	Previous Calibration	September 8, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:02	End Time (MST)	12:47
Analyzer make	TEI 43i-TLE	Analyzer serial #	1218153359

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999972
80.1	80.2	0.9987		
39.9	40.4	0.9880	Slope	1.000566
20.0	20.1	0.9953		
			Intercept	-0.245577

**TRS Calibration Curve**







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Monday, October 20, 2014	Previous Calibration	Wednesday, September 10, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	14:59
Barometric Pressure	729 mmHg	Station temp.	24 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
Gas Cert Reference	LL107918	Cal Gas Expiry Date	5/29/2014
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1076.0 ppm
C3H8 Cal Gas Conc.	204 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492
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)	5000	5000	Air or Bypass press	42.4	42.4
Calculated slope	1.010647	1.002392	Fuel Pressure	22.6	22.6
Calculated intercept	0.029764	0.019480			
BKG	2.6	2.5			
COEF	4.708	4.842			

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	-0.18	N/A
as found span	5000	78.9	16.98	16.38	1.036
calibrator zero	5000	0.0	0.00	-0.03	N/A
high point	5000	78.9	16.98	16.92	1.004
second point	5000	39.4	8.48	8.43	1.006
third point	5000	19.7	4.24	4.23	1.001
calibrator zero					
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	78.9	16.98	16.91	1.004
Average Correction Factor					1.004

Corrected As found 16.56 Previous response 16.77 % change 1.2%

#### Notes:

Zero and span with small adjustments

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

## THC Calibration Summary

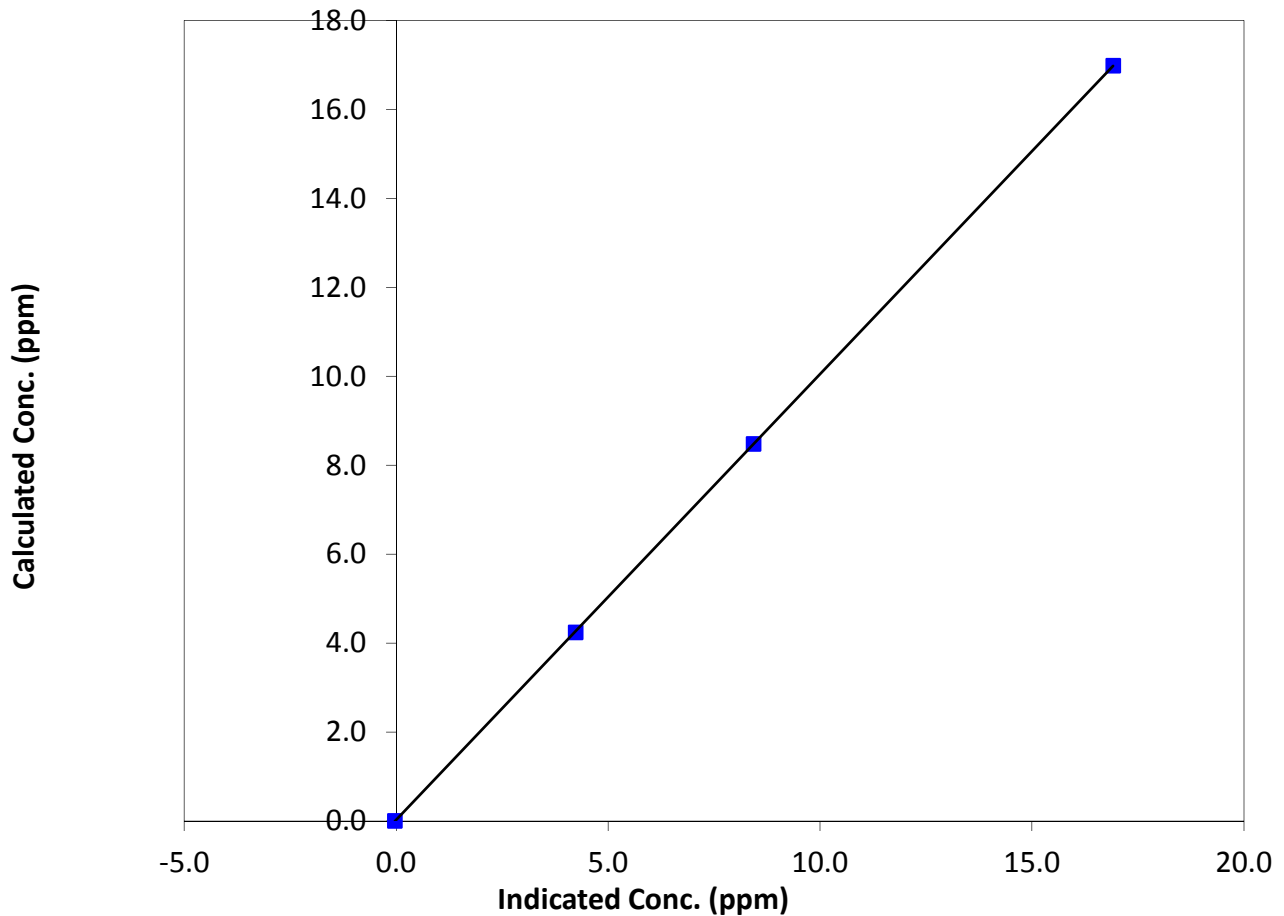
### Station Information

Calibration Date	October 20, 2014	Previous Calibration	September 10, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:45	End Time (MST)	14:59
Analyzer make	Thermo Model 51iLT	Analyzer serial #	1236656114

### Calibration Data

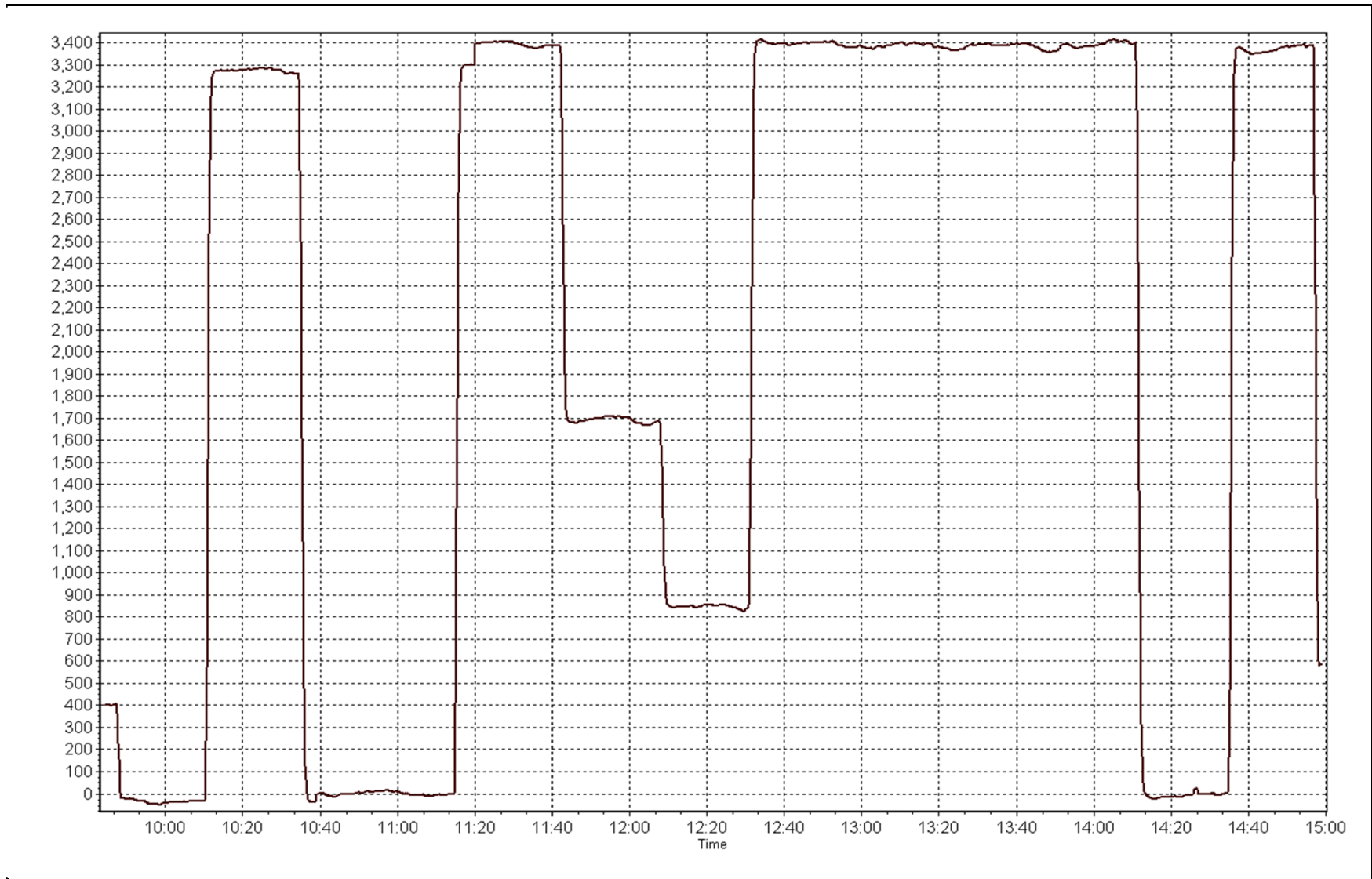
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	N/A	Correlation Coefficient	0.999995
16.98	16.92	1.0036		
8.48	8.43	1.0058	Slope	1.002392
4.24	4.23	1.0014		
			Intercept	0.019480

**THC Calibration Curve**



THC Calibration Plot

Date: October 20, 2014





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 21, 2014	Previous Calibration	September 11, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	15:20
Barometric Pressure	728 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
NO2 calibration used	Monday, October 20, 2014	Transfer Standard	??
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2681
DACS voltage range	0-5v	DACS channel #	

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	30.3	28.7
Analyzer Range (input)	5000	5000	Lamp temp.	58.0	58.0
Calculated slope	0.990177	1.002548	Pressure ("Hg)	26.1	26.1
Calculated intercept	-0.417627	-0.724725	Flow cell A	724	727
Analyzer Background	-1.1	-1.1			
Analyzer Coefficient	1.050	1.013			

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	0.5	N/A
as found span	5000	0.90	349.5	362.1	0.965
calibrator zero	5000	0.000	0.0	0.5	N/A
high point	5000	0.903	349.5	349.2	1.001
second point	5000	0.585	207.4	207.8	0.998
third point	5000	0.358	109.0	109.6	0.995
calibrator zero					
as left zero	5000	0.00	0.0	0.4	N/A
as left span	5000	0.903	349.5	345.0	N/A
Average Correction Factor					0.998

Corrected As found	361.6	Previous response	353.4	% change	-2.3%
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#### Notes:

Small change to span, filter changed after third point.

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

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

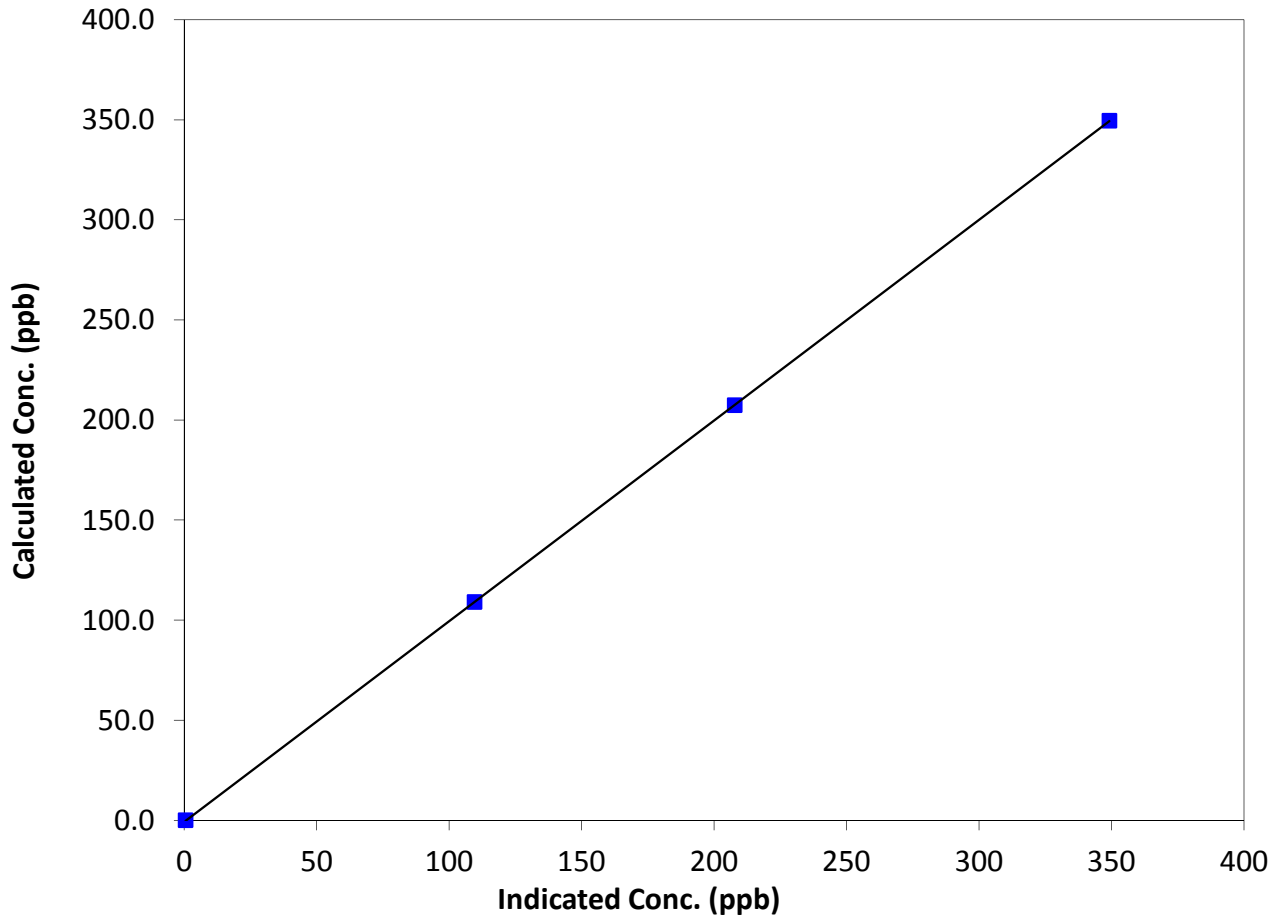
### Station Information

Calibration Date	Tuesday, October 21, 2014	Previous Calibration	September 11, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:15	End Time (MST)	15:20
Analyzer make	API T400	Analyzer serial #	825

### Calibration Data

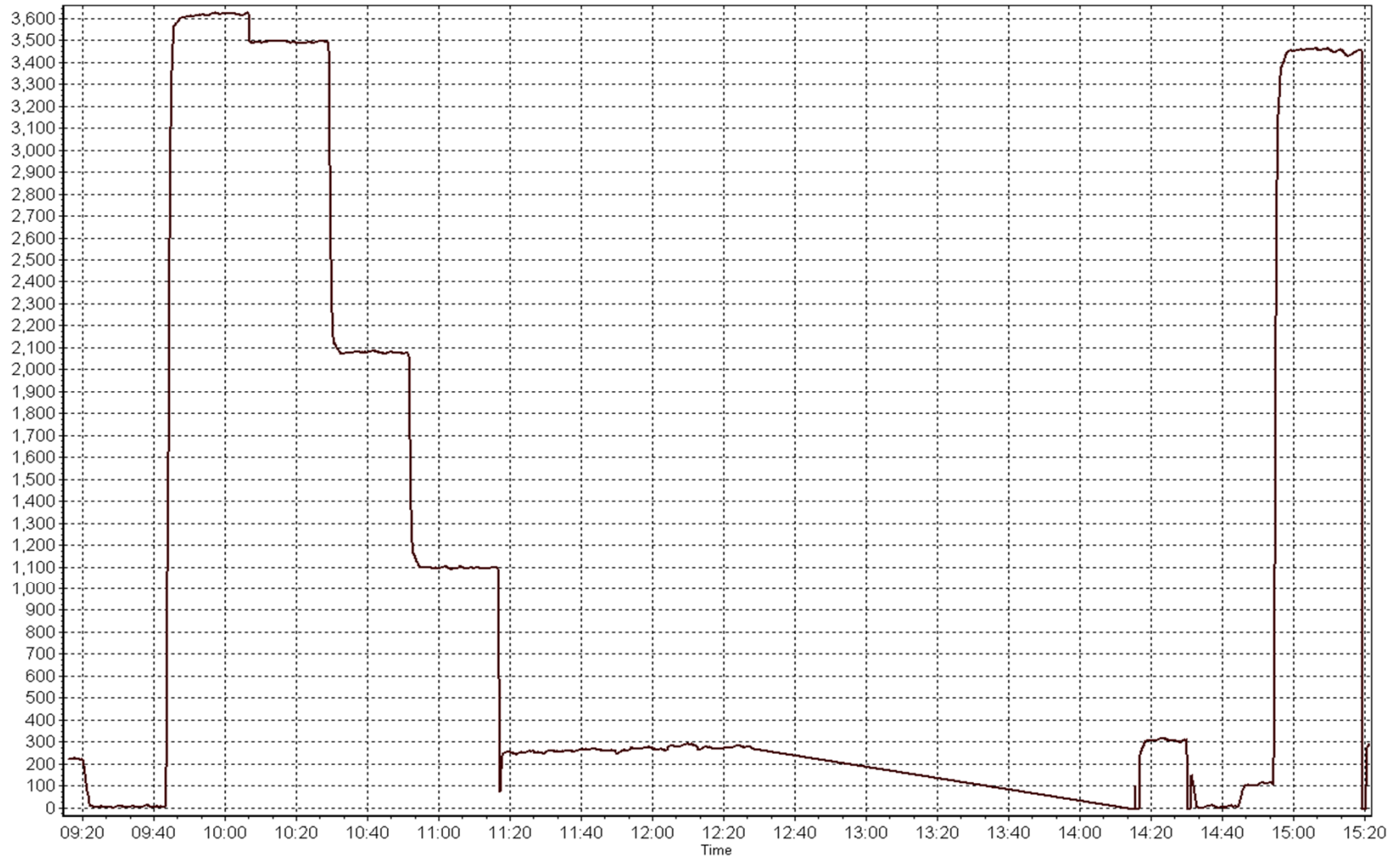
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	N/A	Correlation Coefficient	0.999998
349.5	349.2	1.0009		
207.4	207.8	0.9982	Slope	1.002548
109.0	109.6	0.9946		
			Intercept	-0.724725

**O<sub>3</sub> Calibration Curve**



O3 Calibration Plot

Date: October 21, 2014







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 20, 2014	Previous Calibration	September 10, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	15:00
Barometric Pressure	729 mmHg	Station Temperature	24.0 Deg C
Calibrator	Sabio 4010	Serial Number	11041107
NO Cal Gas Conc	50.7 ppm	Cal Gas Expiry Date	May 29, 2014
NOx Cal Gas Conc	50.8 ppm	Cal Gas Serial #	LL107918

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	3492
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.996069	0.995422	0.995798
	Data Offset	2.134899	2.156380	0.088540
After	Data Slope	0.999404	0.998756	0.997169
	Data Offset	2.053770	2.011817	-0.251679
Channel #		3	2	1
Voltage Range		0 - 5V	0 - 5V	0 - 5V

### Analyzer Information

Analyzer make/model	Thermo 42C	Analyzer serial #	2185
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.861	ppb	0.877	ppb
NOX coefficient	1.001	ppb	1.001	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	4.0		4.0	
NOX bkgrnd	4.1		4.1	
Nt coefficient	N/A		N/A	
Chamber Temp	49.5	Deg C	49.7	Deg C
Moly Temp	325.0	Deg C	325.0	Deg C
PMT Temp	-3.7	Deg C	-3.6	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	198.4	mmHg	197.2	mmHg
Sample Flow	0.805	ccm	0.804	ccm

**Notes:**

Filter and span with small adjustments



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

October 20, 2014

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	-0.2	N/A	N/A
as found span	5000	78.9	801.6	800.0	1.6	788.1	785.9	2.4	1.0172	1.0180
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.3	N/A	N/A
high point	5000	78.9	801.6	800.0	1.6	801.2	800.2	1.3	1.0005	0.9998
second point	5000	39.4	400.3	399.5	0.8	397.0	396.3	0.8	1.0084	1.0080
third point	5000	19.7	200.2	199.8	0.4	196.6	196.6	0.0	1.0178	1.0162
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	-0.4	N/A	N/A
as left span	5000	78.9	801.6	450.6	351.1	800.6	456.2	344.6	1.0013	0.9876
Average Correction Factor									1.0089	1.0080

Corrected As found

NO<sub>x</sub>= 788.2

NO= 786.0

Percent Change

NO<sub>x</sub>= 1.8%

NO= 2.0%

Previous Response

NO<sub>x</sub>= 802.7

NO= 801.6

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

78.90

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			-0.3			N/A	
1st NO <sub>2</sub> (350)	N/A	450.6	349.5	800.7	450.6	350.4	0.9856	1.0000	0.9974	100.3%
2nd NO <sub>2</sub> (200)	N/A	592.6	207.4	800.9	592.6	208.4	0.9854	1.0000	0.9949	100.5%
3rd NO <sub>2</sub> (100)	N/A	691.1	109.0	801.0	691.1	110.1	0.9852	1.0000	0.9894	101.1%
4th NO <sub>2</sub> (0)	800.0	N/A	0.7	800.7	800.0	1.0	0.9856	1.0000	N/A	N/A
Average Correction Factor							0.9855	1.0000	0.9939	100.6%

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

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

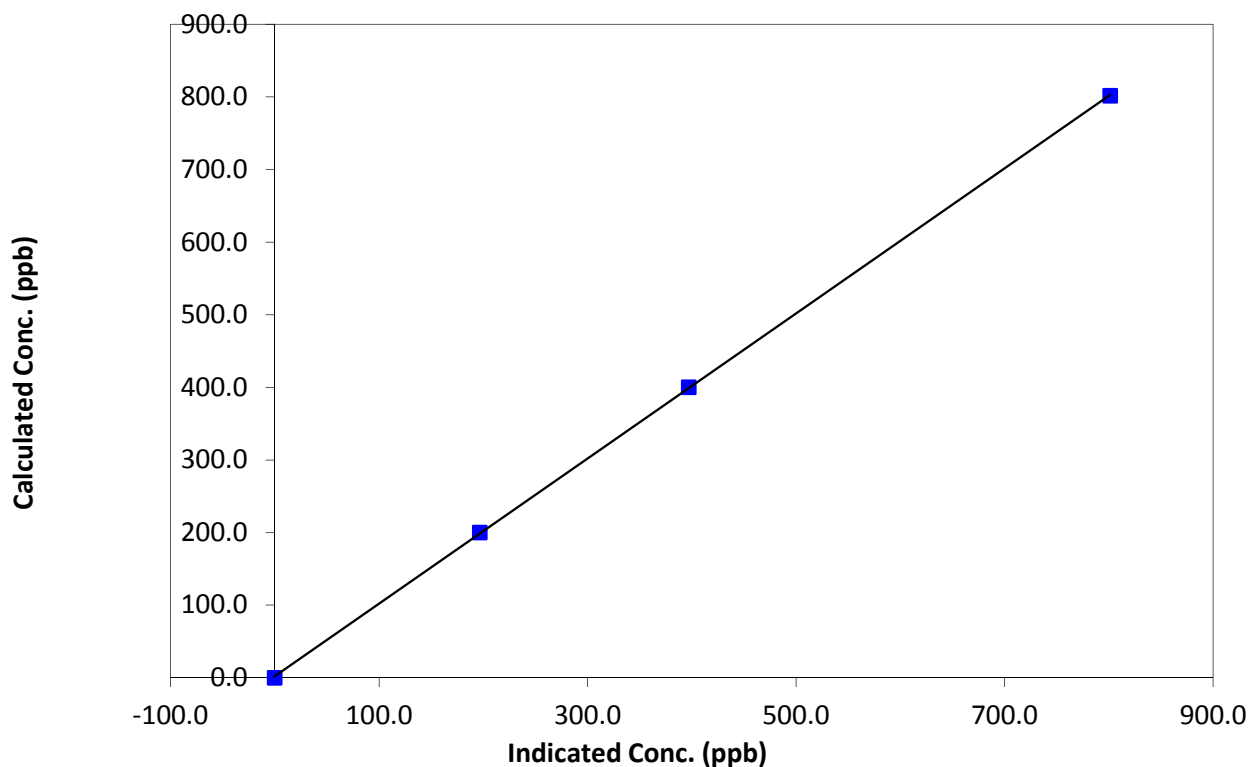
### Station Information

Calibration Date	October 20, 2014	Previous Calibration	September 10, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:45	End Time (MST)	15:00
Analyzer make	Thermo 42C	Analyzer serial #	2185

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999972
801.6	801.2	1.0005		
400.3	397.0	1.0084	Slope	0.999404
200.2	196.6	1.0178		
0.0			Intercept	2.053770

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

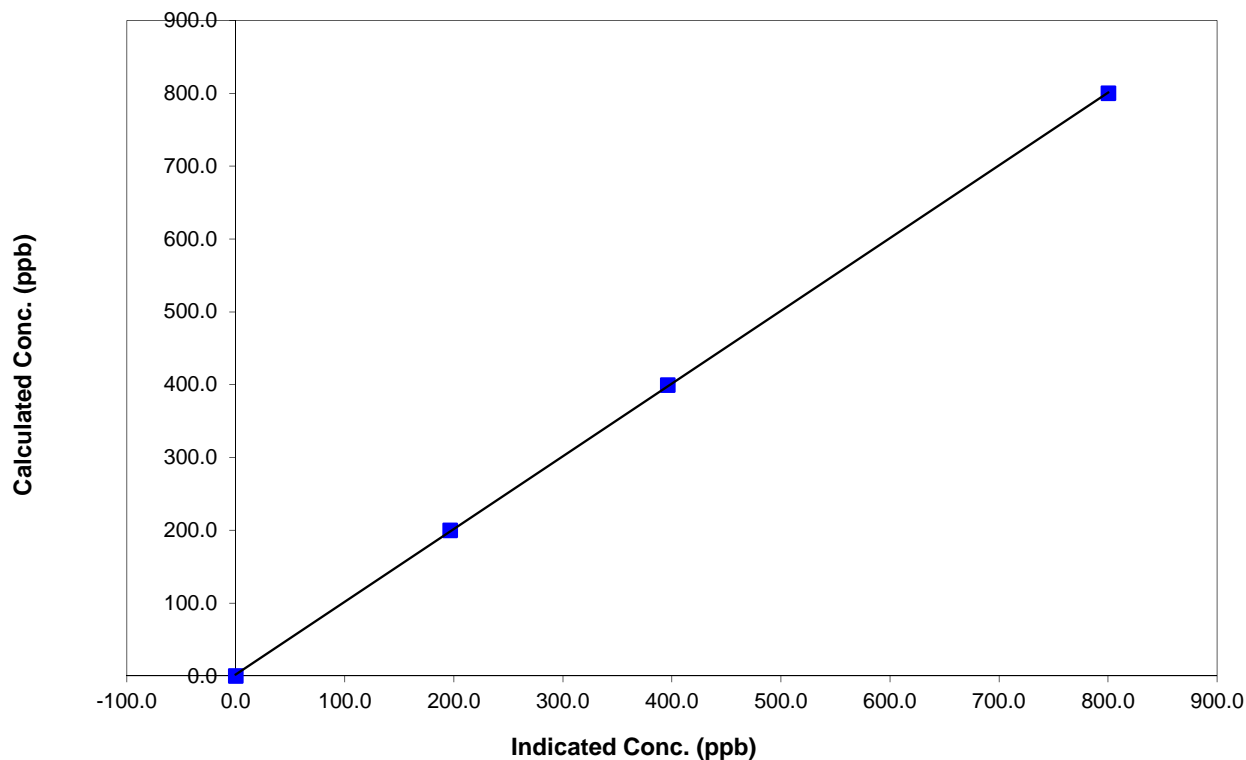
### Station Information

Calibration Date	October 20, 2014	Previous Calibration	September 10, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:45	End Time (MST)	15:00
Analyzer make	Thermo 42C	Analyzer serial #	2185

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999972
800.0	800.2	0.9998		
399.5	396.3	1.0080	Slope	0.998756
199.8	196.6	1.0162		
0.0			Intercept	2.011817

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

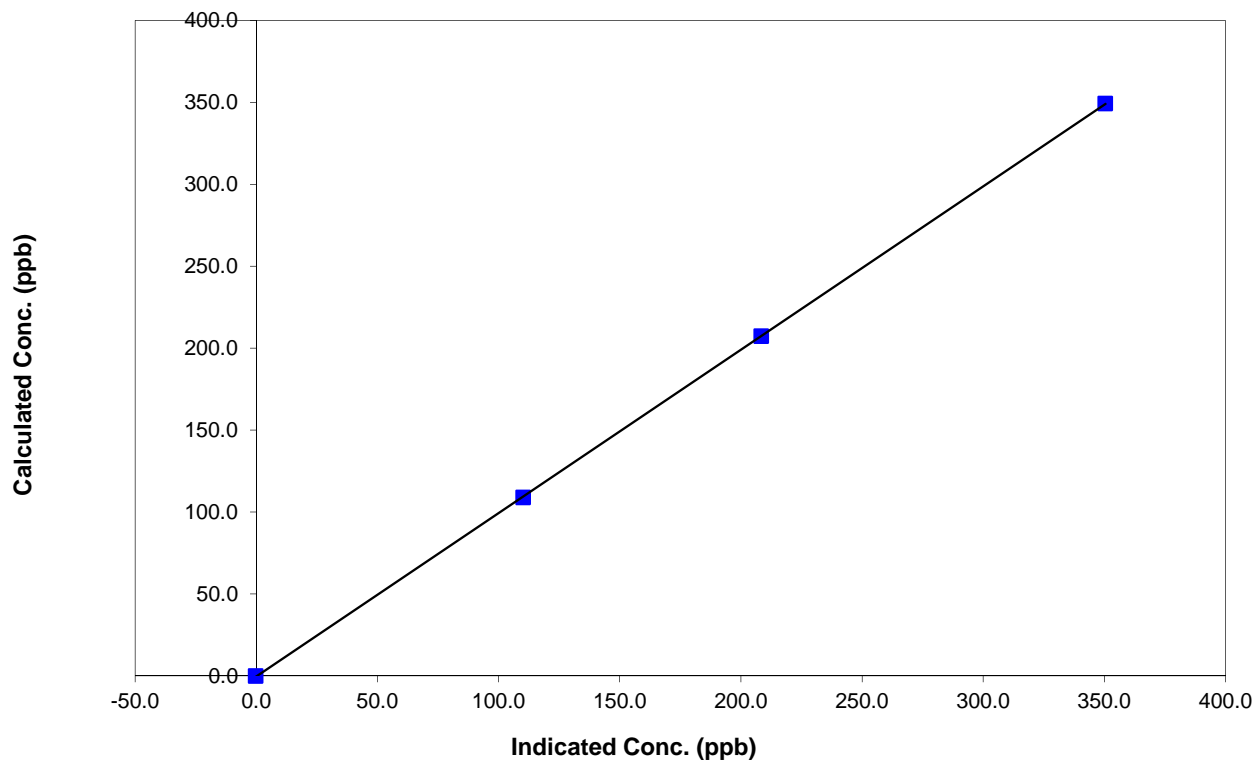
### Station Information

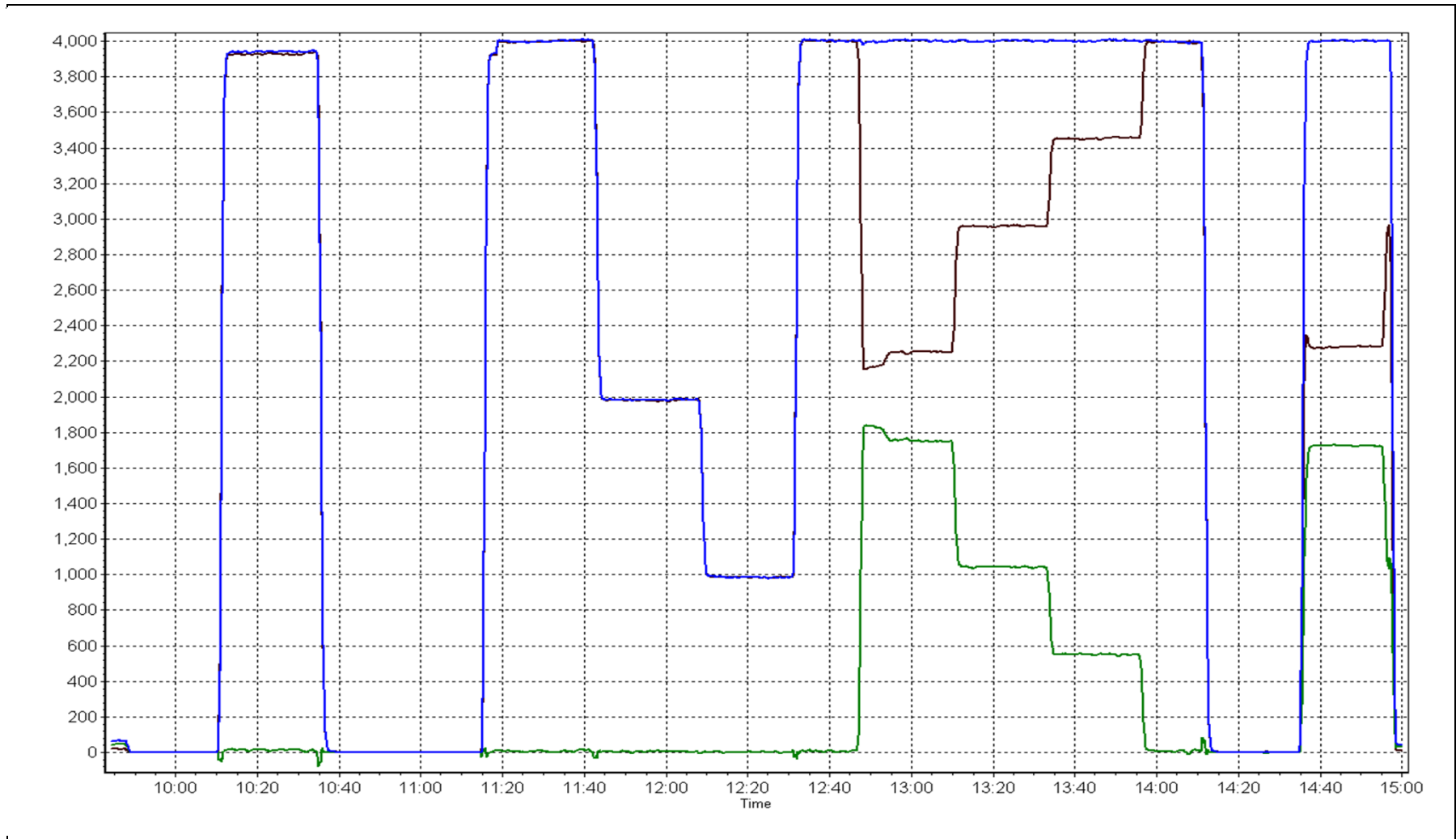
Calibration Date	October 20, 2014	Previous Calibration	September 10, 2014
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:45	End Time (MST)	15:00
Analyzer make	Thermo 42C	Analyzer serial #	2185

### 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
349.5	350.4	0.9974		
207.4	208.4	0.9949	Slope	0.997169
109.0	110.1	0.9894		
			Intercept	-0.251679

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





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 14  
ANZAC  
OCTOBER 2014**

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

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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
OCTOBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	707	37	37	100.00	6	0	1	0
TRS(ppb) Average	709	35	35	100.00	3	0	1	0
THC(ppm) Average	708	36	36	100.00	4.2	-	2.2	-
NMHC(ppm) Average	708	36	36	100.00	0.119	-	0.06	-
CH4(ppm) Average	708	36	36	100.00	4.3	-	2.2	-
NO2(ppb) Average	708	36	36	100.00	11	0	3	-
NO(ppb) Average	708	36	36	100.00	15	-	1	-
NOX(ppb) Average	708	36	36	100.00	22	-	4	-
O3(ppb) Average	710	34	34	100.00	42	0	35	-
PM2.5(ug/m3) Average	743	0	1	99.87	74.5	-	5.8	0
Temperature 2 m (C) Average	744	0	0	100.00	21.5	-	12.9	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	98	-
Surface Wetness (% of range) Average	744	0	0	100.00	81	-	36	-
Wind Speed 10 m (km/h) Average	710	0	34	95.43	22	-	16	-
Wind Direction 10 m (deg) Average	710	0	34	95.43	-	-	-	-
Precipitation (mm) Total	744	0	0	100.00	4.1	-	10.9	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	707	0.5	1	-	0	0	0	0	0	1	6
TRS(ppb) Average	709	0.2	0	-	0	0	0	0	0	0	3
THC(ppm) Average	708	1.88	0.2	-	1.7	1.8	1.8	1.8	1.9	2	4.2
NMHC (ppm) Average	708	0.011	0.02	-	0	0	0	0	0	0	0.119
CH4(ppm) Average	708	1.87	0.2	-	1.7	1.8	1.8	1.8	1.8	1.9	4.3
NO2(ppb) Average	708	1.5	2	-	0	0	1	1	2	3	11
NO(ppb) Average	708	0.4	1	-	0	0	0	0	0	1	15
NOX(ppb) Average	708	1.9	2	-	0	0	1	1	2	4	22
O3(ppb) Average	710	19.1	8	-	0	9	14	18	25	31	42
PM2.5(ug/m3) Average	743	3.1	4	-	0	0.6	1.3	2.3	3.8	6.1	74.5
Temperature 2 m (C) Average	744	4.43	5.1	-	-5.3	-1.2	0	3.6	7.8	12.1	21.5
Relative Humidity (%) Average	744	78.6	17	-	33	54	65	83	93	97	99
Surface Wetness (% of range) Average	744	5.8	13	-	0	0	0	0	5	21	81
Wind Speed 20 m (km/h) Average	710	8.6	4	-	1	4	6	8	11	14	22
Wind Direction 20 m (deg) Average	710	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	41.4	0	0	0	0	0	0	4.1

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	15 Oct 2014 14:00	15 Oct 2014 14:00	1	Flow and zero reference checks, sample head cleaning
Wind Speed, Wind Direction	01 Oct 2014 23:00	02 Oct 2014 11:00	13	Flat line in sensor output signal
Wind Speed, Wind Direction	02 Oct 2014 14:00	02 Oct 2014 14:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	26 Oct 2014 16:00	27 Oct 2014 11:00	20	Flat line in sensor output signal

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Summary of Hour Averages

Anzac - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 6 ppb on Oct 16 12:00	Maximum Daily Average: 1.5 ppb on Oct 16		Hours of Data:	707
Minimum Value: 0 ppb on Oct 2 07:00	Minimum Daily Average: 0.1 ppb on Oct 26		Hours of Missing Data:	37
Maximum Diurnal Average: 0.7 ppb at hour 13	Minimum Diurnal Average: 0.2 ppb at hour 7		Hours of Calibration:	37
Monthly Average: 0.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 4		Percent Operational Time:	100.0

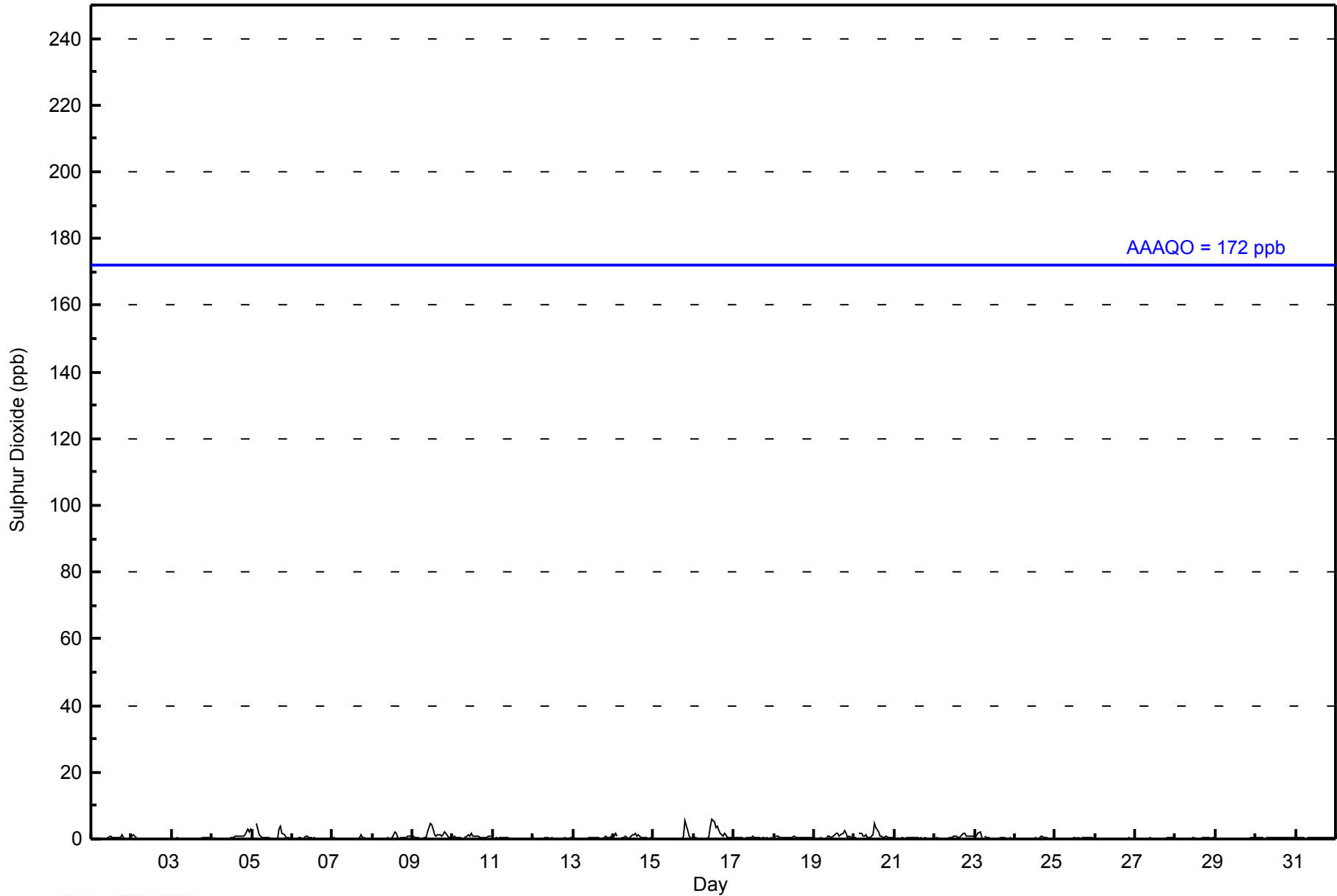
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0.3	1	
2-Oct	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
3-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.2	1	
4-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	3	2	3	0.7	3	
5-Oct	2	Z	5	3	1	1	0	0	0	0	0	0	0	0	0	0	3	4	1	1	1	0	0	0	1.1	5	
6-Oct	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.2	1	
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	2	2	0	0	0	0	1	0	0	1	1	1	0.4	2	
9-Oct	1	0	0	0	0	Z	0	0	1	2	5	4	3	1	1	1	1	1	1	2	2	0	0	1	1.3	5	
10-Oct	1	1	1	0	1	0	Z	0	1	1	1	2	1	1	1	1	0	0	0	0	1	1	1	1	0.7	2	
11-Oct	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
12-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
13-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0.3	1	
14-Oct	1	2	1	Z	0	1	0	1	0	0	0	1	1	1	1	0	0	0	0	0	1	0	0	0	0.6	2	
15-Oct	0	0	0	0	Z	0	C	C	C	C	C	C	0	0	0	0	0	0	1	5	3	1	0	0	--	5	
16-Oct	0	0	0	0	0	Z	0	0	0	1	4	6	5	3	4	2	2	1	2	1	0	0	0	0	1.5	6	
17-Oct	0	0	0	1	0	1	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1	
18-Oct	Z	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	1	0.4	1	
19-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	1	2	2	1	1	2	3	2	1	1	0	1	0.9	3	
20-Oct	0	0	Z	2	2	1	1	1	0	1	1	1	5	4	2	1	1	1	1	1	0	0	0	0	1.1	5	
21-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
22-Oct	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	1	2	2	1	1	1	1	1	0.6	2	
23-Oct	1	1	2	2	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2	
24-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1	
25-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
26-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
28-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1	
29-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
30-Oct	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	
31-Oct	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	
	0.4	0.4	0.5	0.4	0.3	0.3	0.2	0.3	0.3	0.4	0.6	0.7	0.7	0.7	0.6	0.4	0.5	0.6	0.6	0.7	0.5	0.4	0.4	0.4	Diurnal Average		
	2	2	5	3	2	1	1	1	1	2	5	6	5	4	4	2	3	4	4	3	5	3	3	2	3	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  
Anzac - October 2014





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Anzac - October 2014**

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

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Anzac - October 2014**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	28	2	12	20	23	46	114	130	21	24	13	11	34	122	50	25	675
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>	28	2	12	20	23	46	114	130	21	24	13	11	34	122	50	25	675

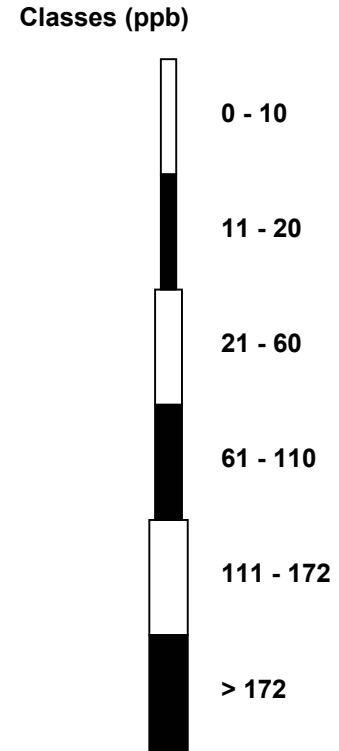
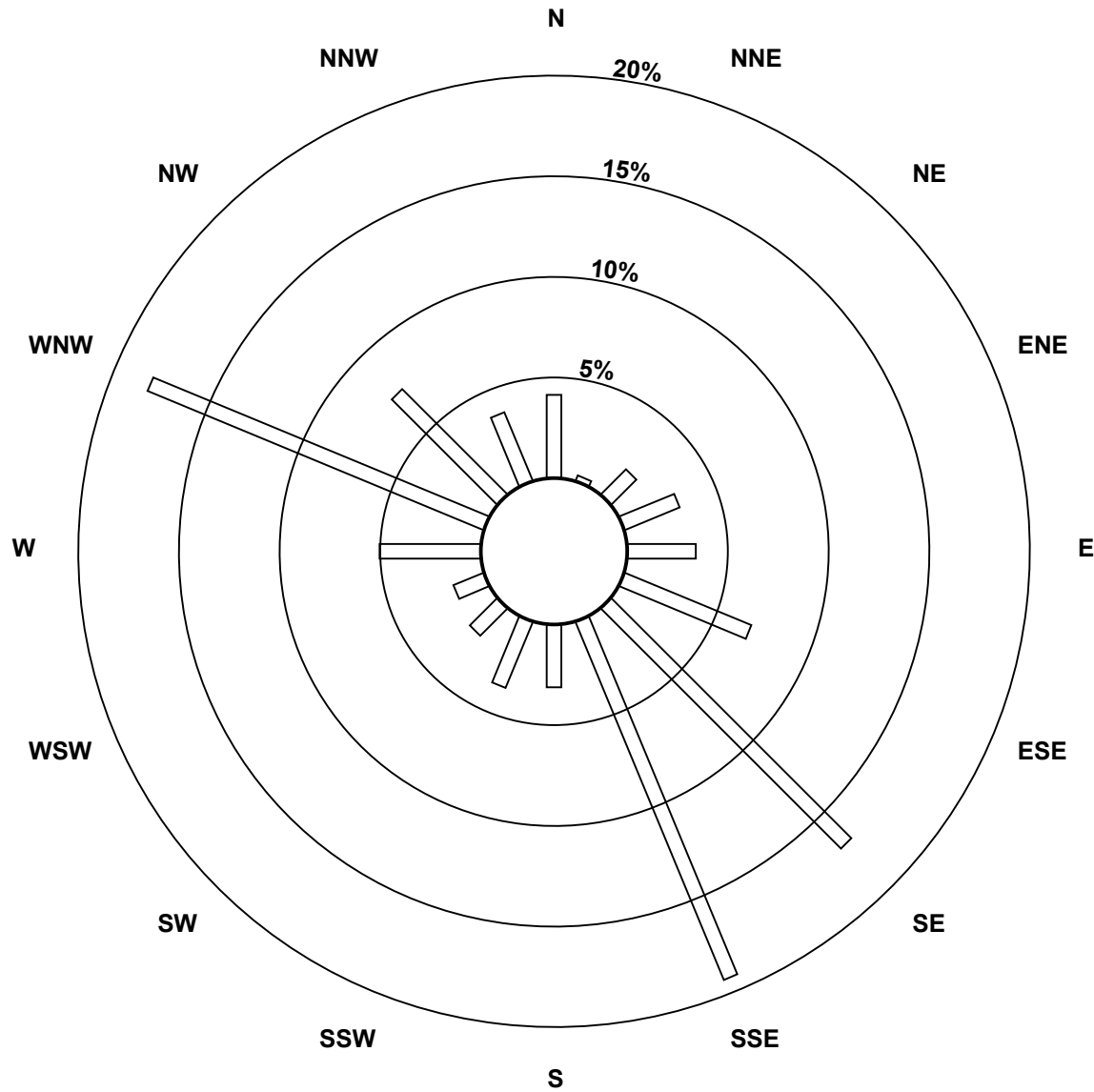
Total Number of Valid Hours: 675

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Anzac (AMS 14)**

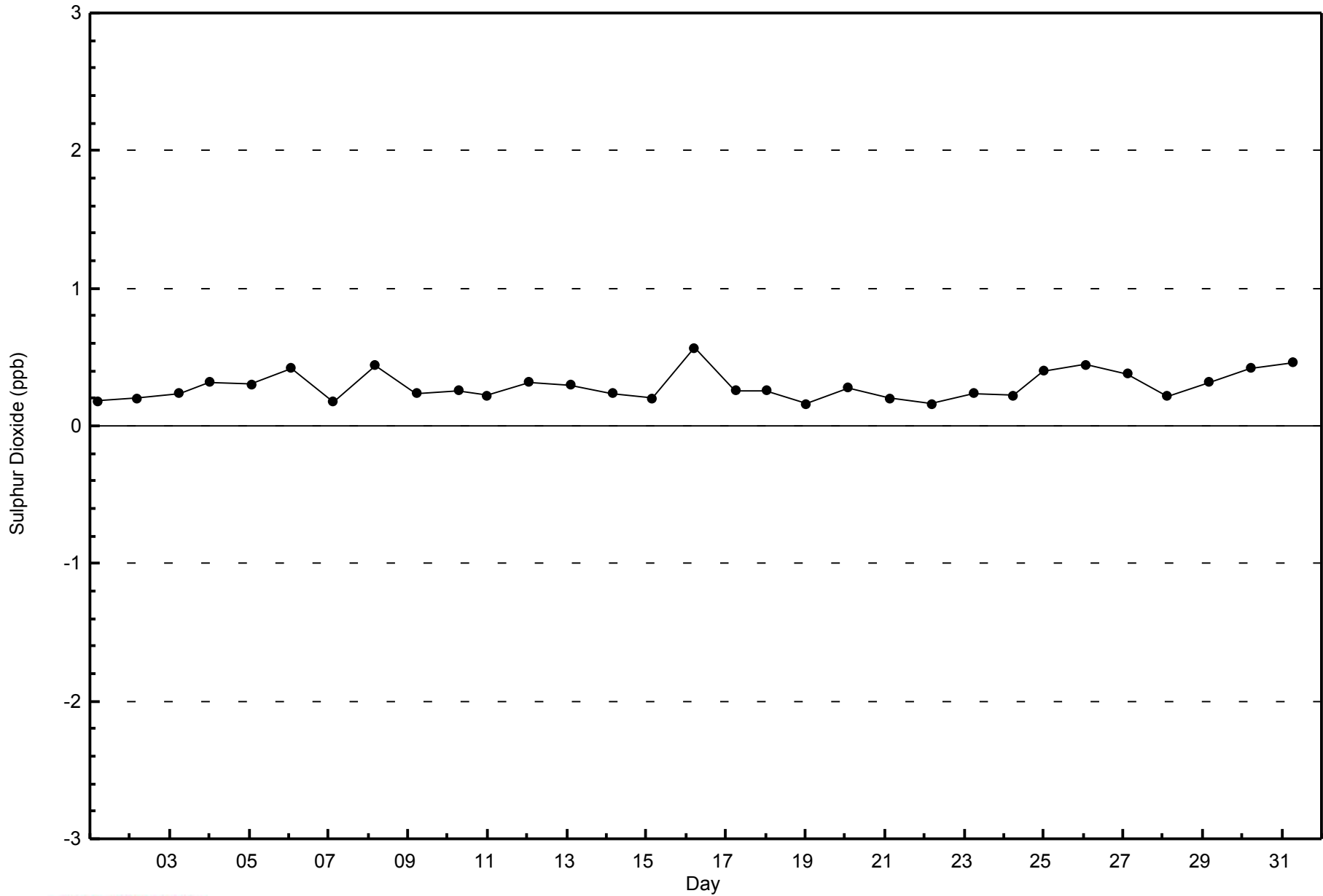


**Total Number of Valid Hours: 675**



WBEA  
Zero Responses

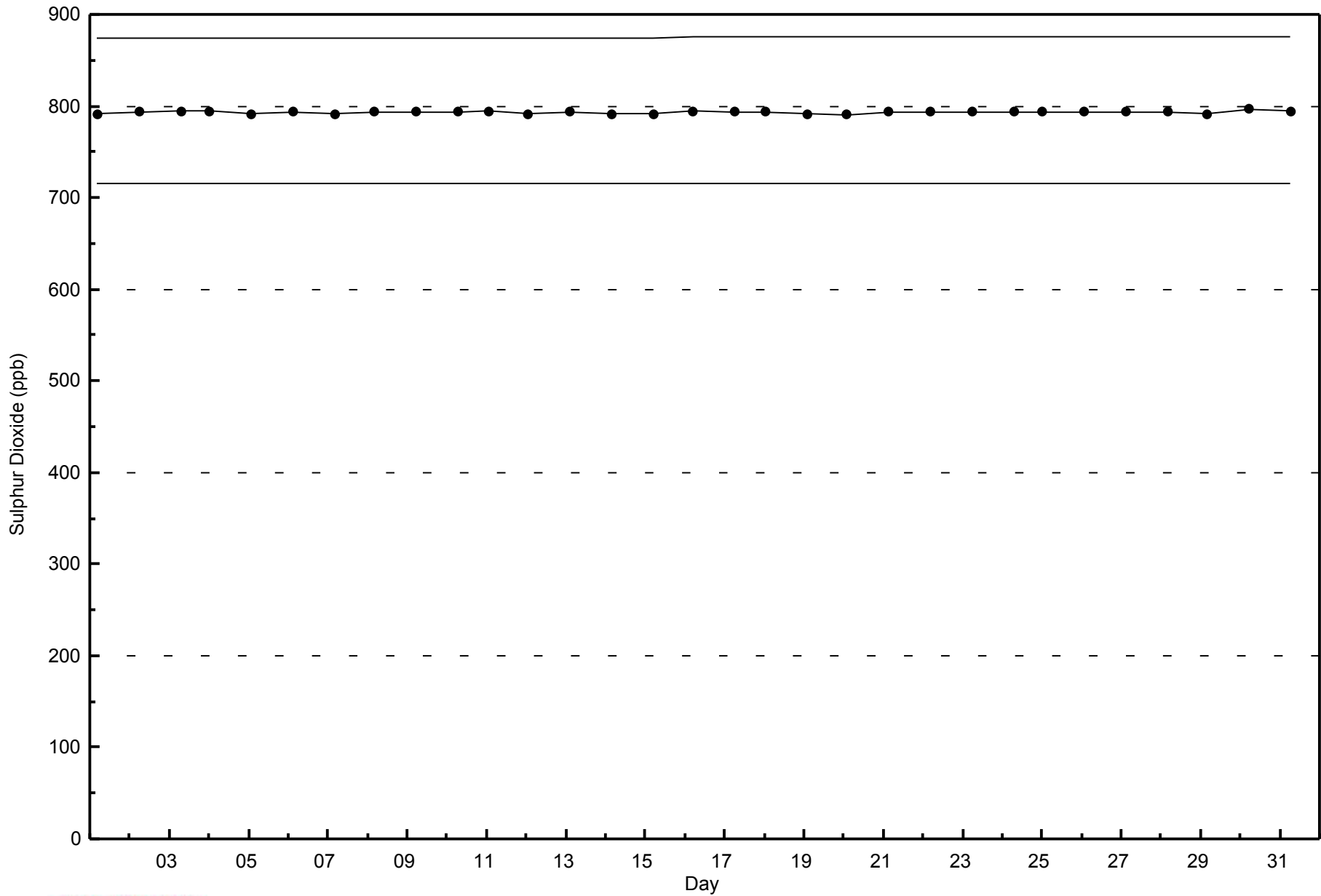
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Anzac - October 2014





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Anzac - October 2014





Summary of Hour Averages

Anzac - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 3 ppb on Oct 28 20:00	Maximum Daily Average: 0.5 ppb on Oct 9		Hours of Data:	709
Minimum Value: 0 ppb on Oct 4 06:00	Minimum Daily Average: 0.1 ppb on Oct 29		Hours of Missing Data:	35
Maximum Diurnal Average: 0.3 ppb at hour 20	Minimum Diurnal Average: 0.2 ppb at hour 5		Hours of Calibration:	35
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1		Percent Operational Time:	100.0

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

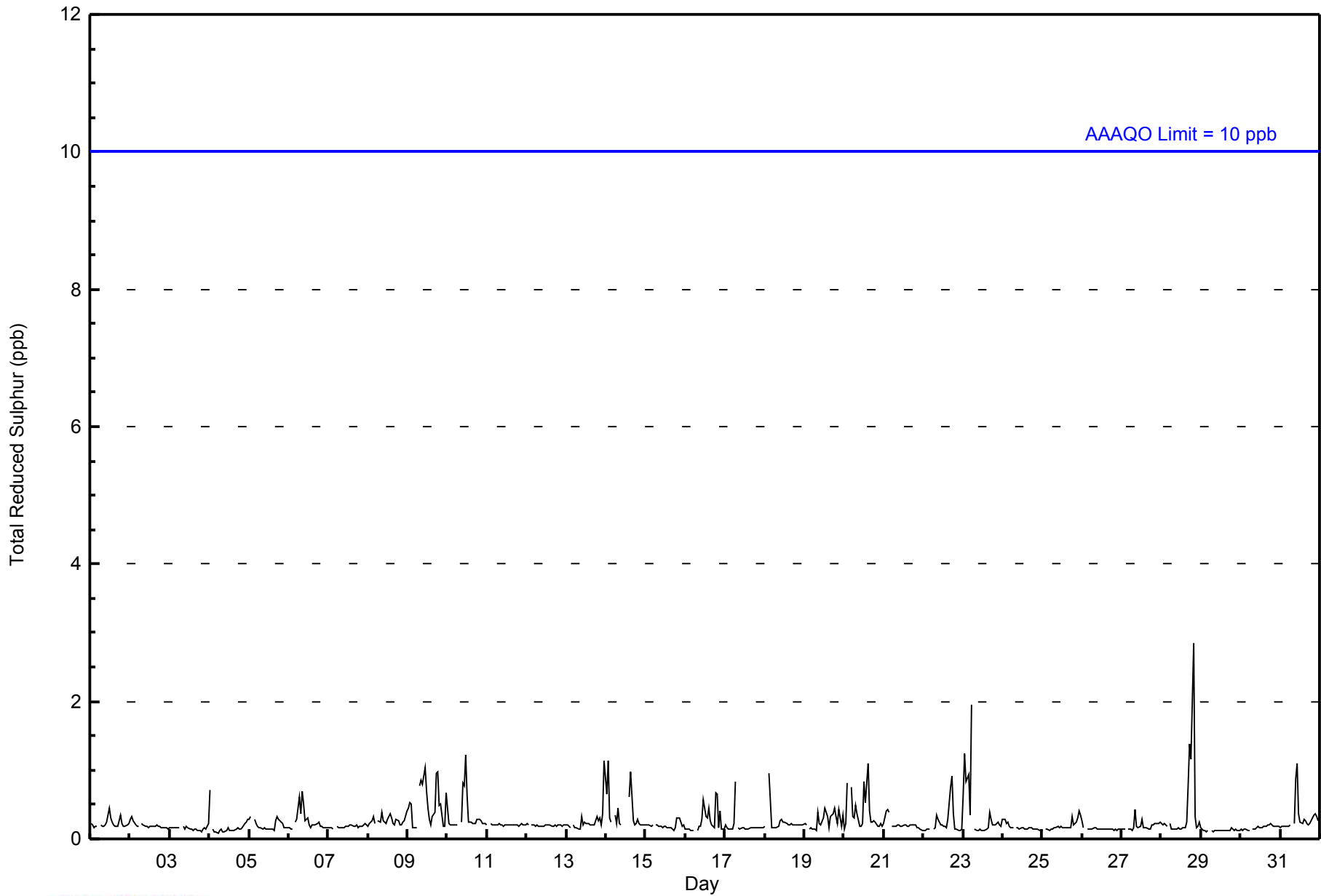
0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.3	Diurnal Average
1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	0	0	1	Diurnal Maximum

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



**WBEA**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - October 2014**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	708	99.86	99.86
3 - 4	1	0.14	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - October 2014**

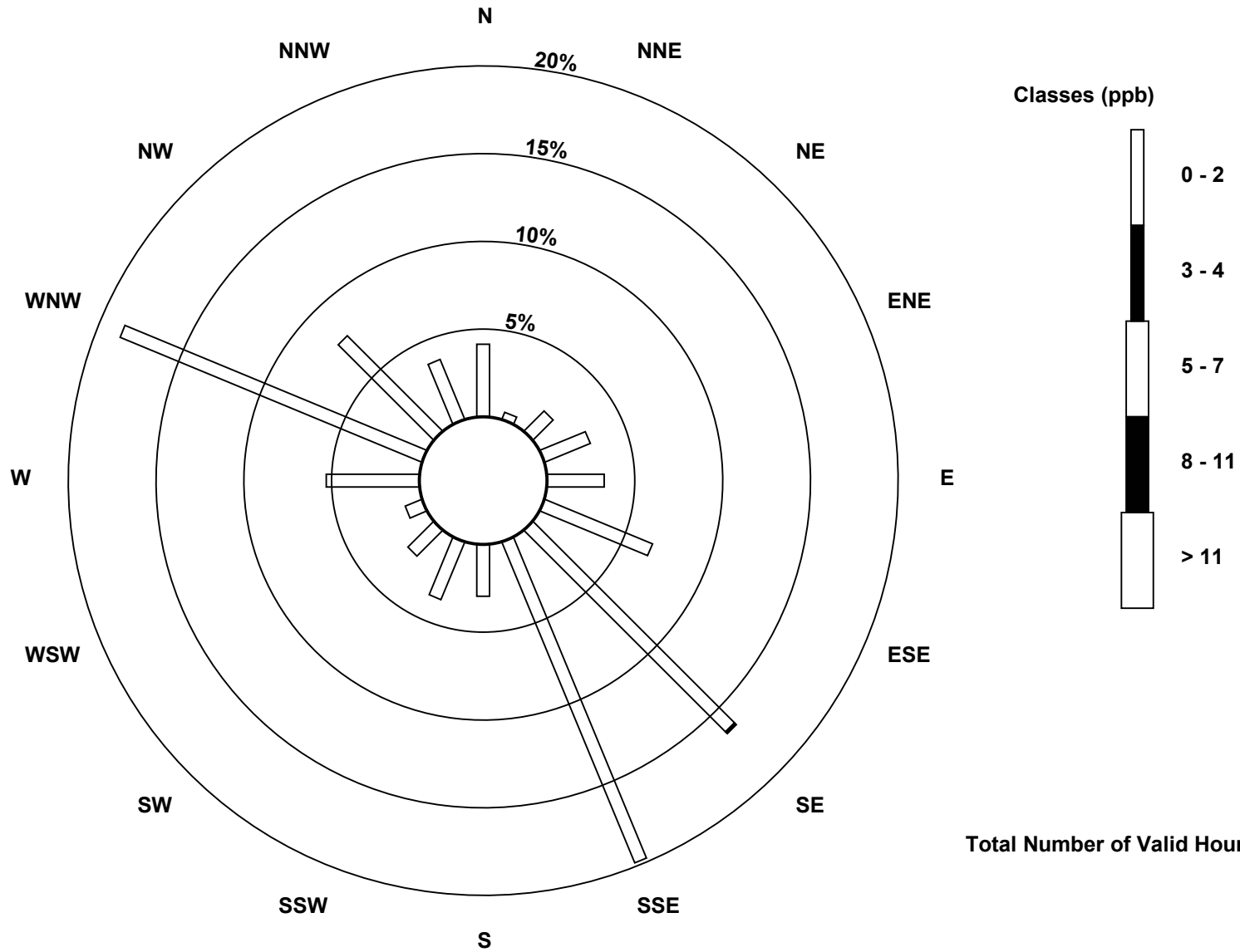
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	28	3	11	19	22	45	110	134	20	24	14	7	36	126	52	25	676
3 - 4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	28	3	11	19	22	45	111	134	20	24	14	7	36	126	52	25	677

Total Number of Valid Hours: 677

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Total Reduced Sulphur (TRS) - ppb  
Anzac (AMS 14)



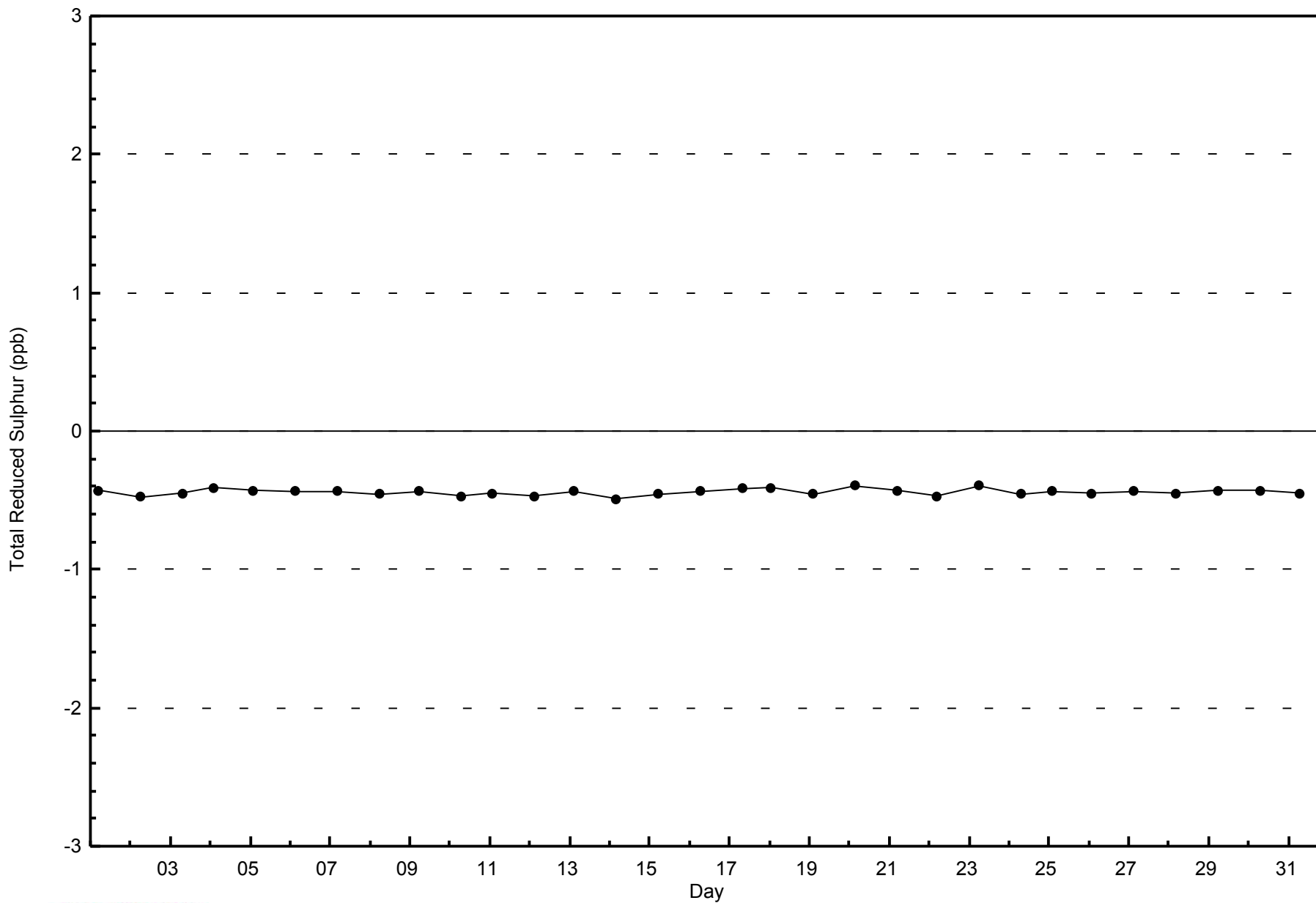
Total Number of Valid Hours: 677





**WBEA**  
**Zero Responses**

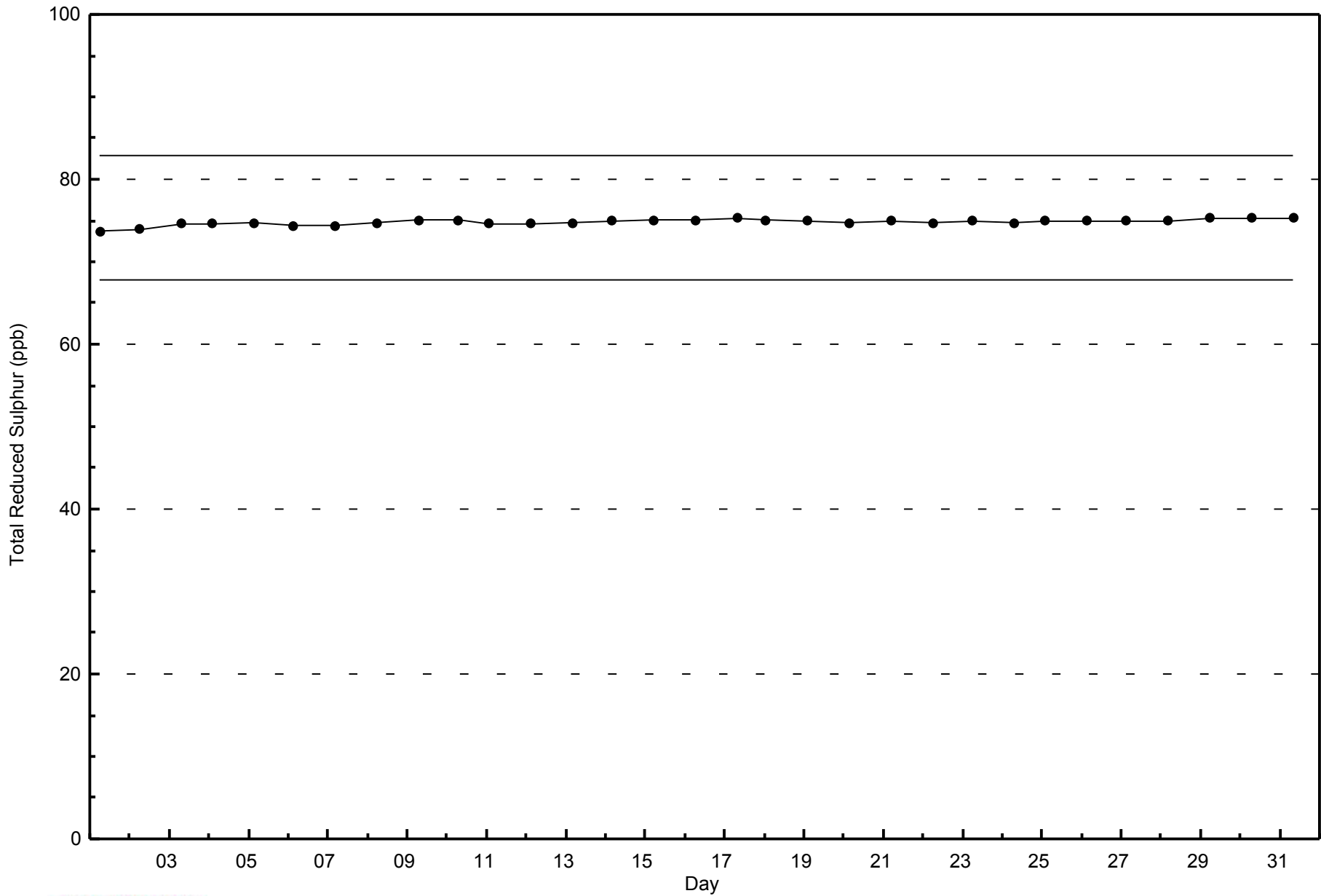
**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - October 2014**





**WBEA**  
**Span Responses**

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - October 2014**

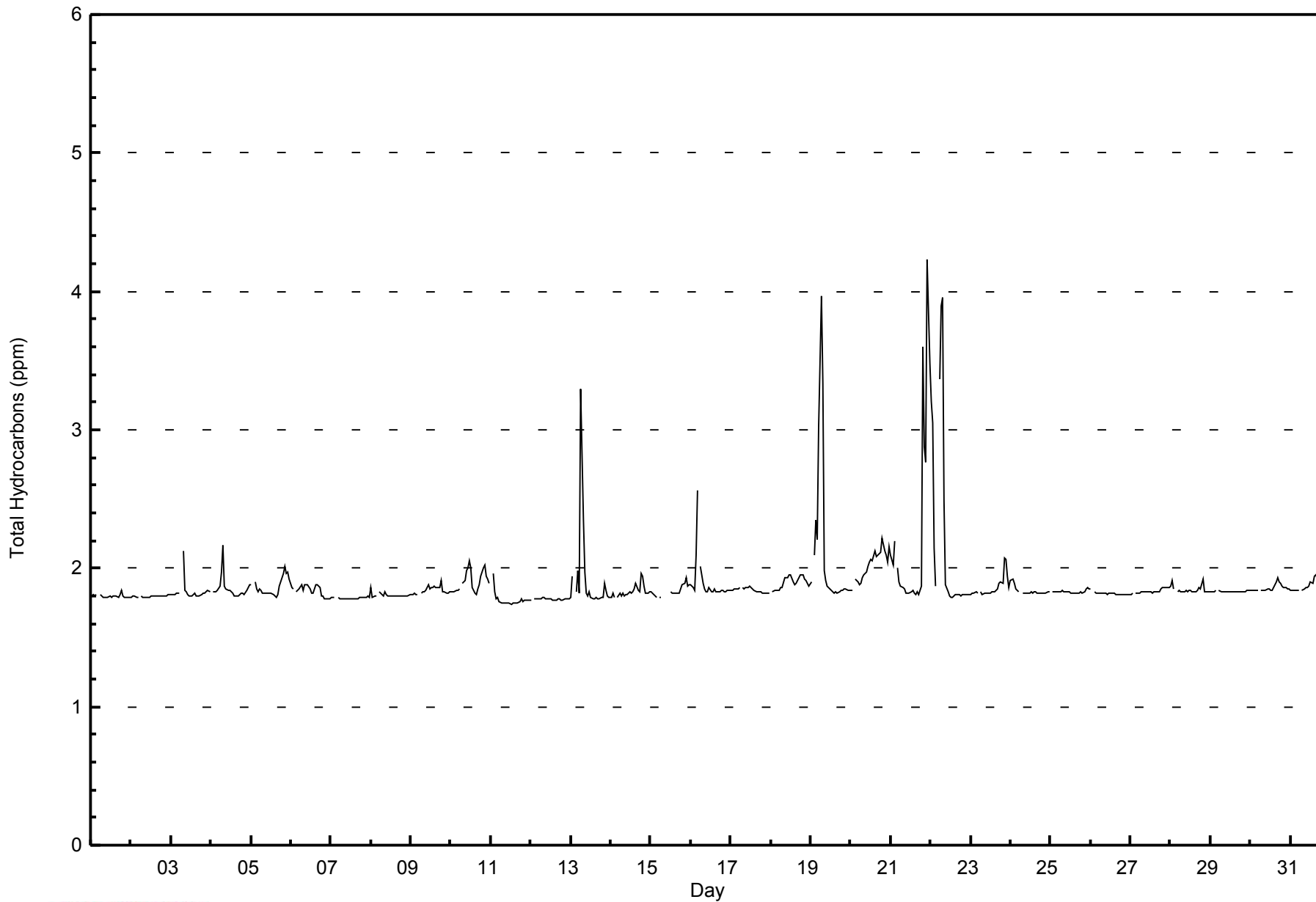






**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Anzac - October 2014**





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

**Total Hydrocarbons (THC) - ppm**  
**Anzac - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	665	93.93	93.93
2.1 - 3.0	32	4.52	98.45
3.1 - 10.0	11	1.55	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Anzac - October 2014**

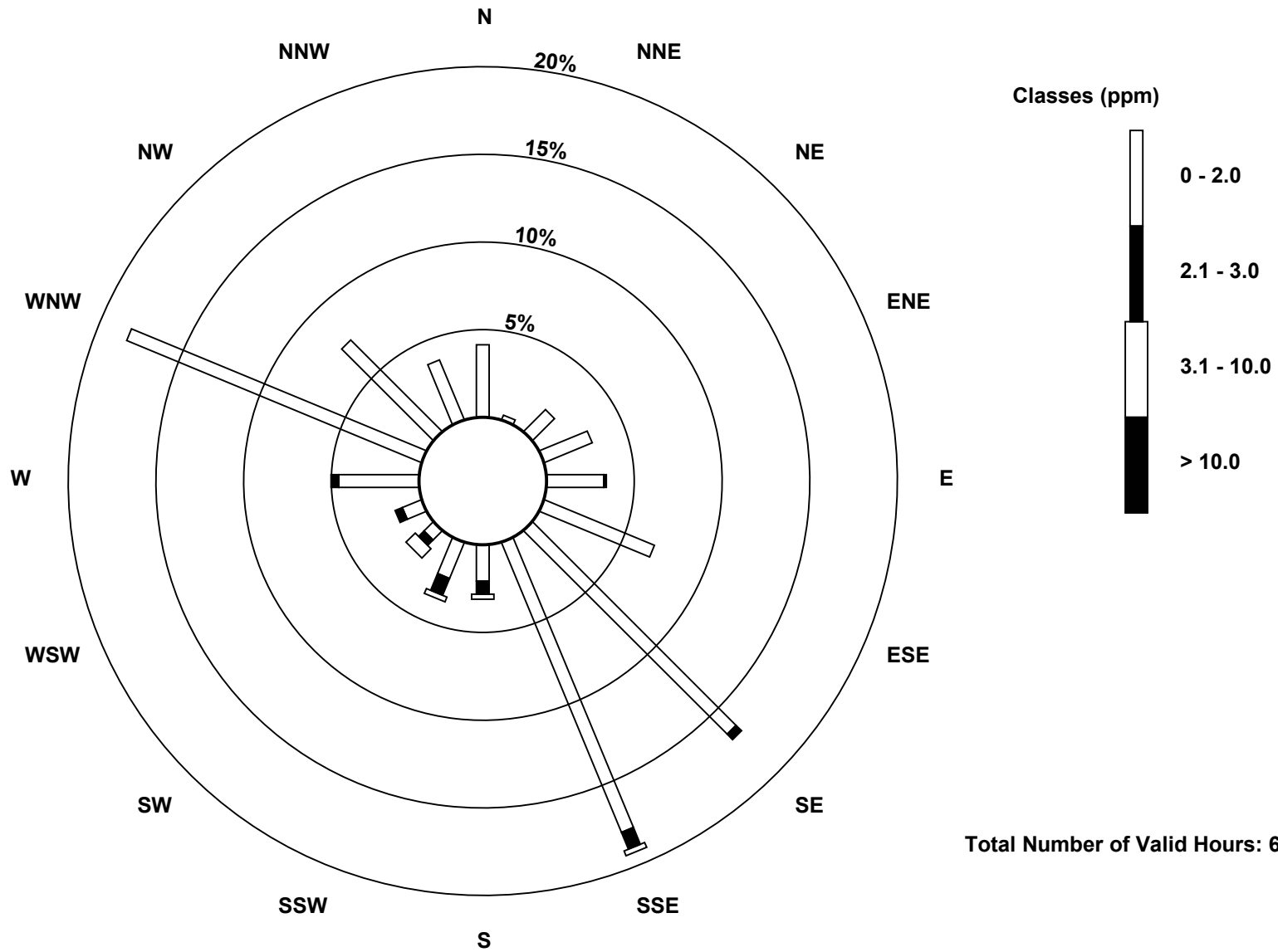
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	28	2	12	20	22	46	111	121	14	15	5	8	31	123	50	25	633
2.1 - 3.0	0	0	0	0	1	0	3	7	5	7	3	3	3	0	0	0	32
3.1 - 10.0	0	0	0	0	0	0	0	2	2	2	5	0	0	0	0	0	11
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	28	2	12	20	23	46	114	130	21	24	13	11	34	123	50	25	676

Total Number of Valid Hours: 676

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Total Hydrocarbons (THC) - ppm  
Anzac (AMS 14)

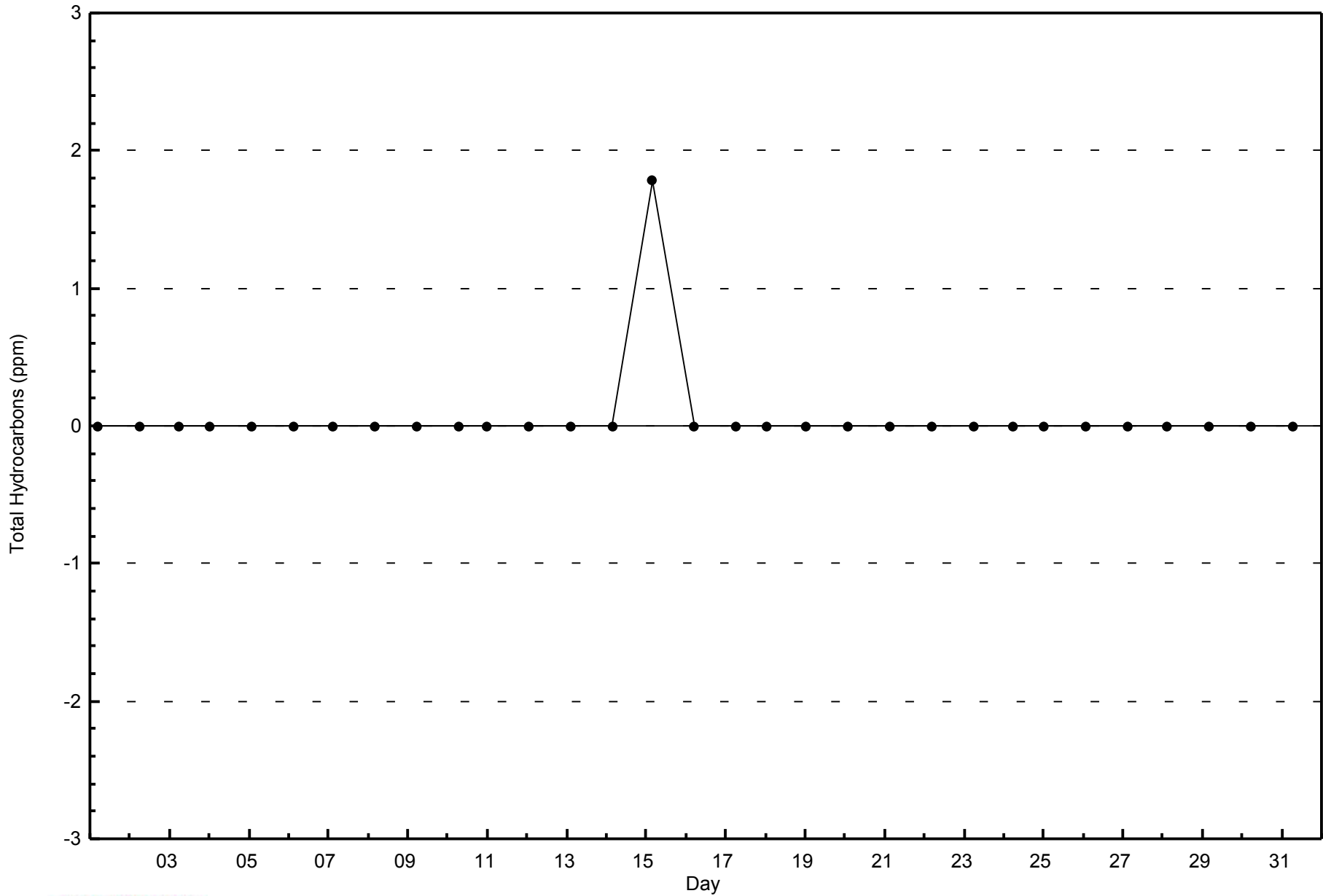


Total Number of Valid Hours: 676



WBEA  
Zero Responses

Total Hydrocarbons (THC) - ppm  
Anzac - October 2014

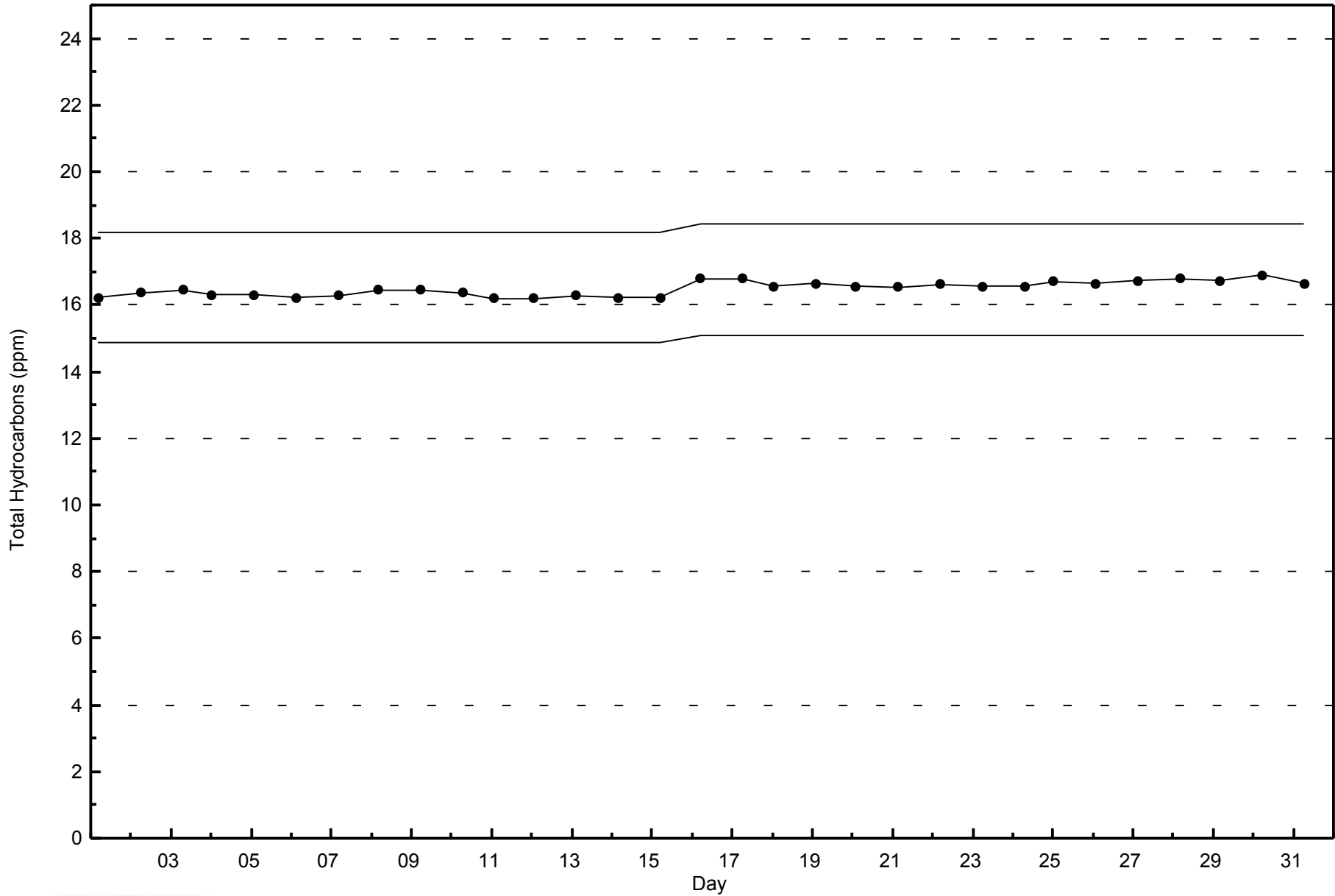






WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Anzac - October 2014





Summary of Hour Averages

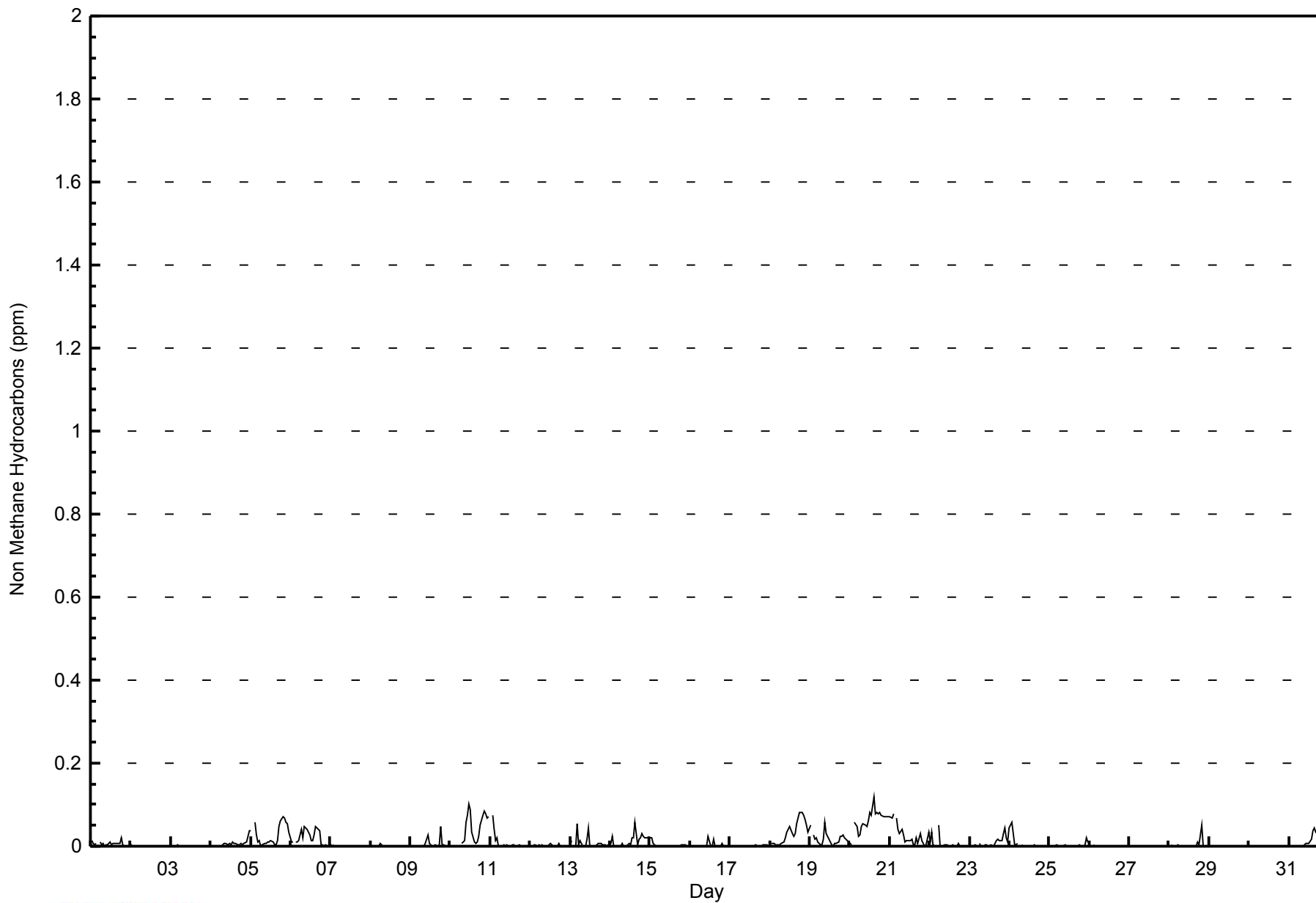
Anzac - October 2014

Maximum Value: 0.119 ppm on Oct 20 15:00      Maximum Daily Average: 0.060 ppm on Oct 20																						Hours in Service: 744 Hours of Data: 708					
Minimum Value: 0.000 ppm on Oct 1 21:00      Minimum Daily Average: 0.000 ppm on Oct 30 Maximum Diurnal Average: 0.017 ppm at hour 20      Minimum Diurnal Average: 0.005 ppm at hour 8 Monthly Average: 0.011 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 Missing Data: 36 Hours of Calibration: 36 Percent Operational Time: 100.0					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0.014	0.008	0.005	0.005	Z	0.009	0.005	0.005	0.001	0.003	0.002	0.011	0.004	0.008	0.007	0.008	0.005	0.007	0.021	0.003	0.000	0.000	0.000	0.000	0.006	0.021	
2-Oct	0.002	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	0.002
3-Oct	0.000	0.000	0.000	0.000	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	0.001	0.000	0.002	
4-Oct	Z	0.001	0.000	0.000	0.000	0.001	0.000	0.003	0.008	0.005	0.002	0.007	0.005	0.011	0.008	0.006	0.002	0.003	0.005	0.004	0.005	0.010	0.024	0.038	0.006	0.038	
5-Oct	0.036	Z	0.057	0.026	0.010	0.012	0.000	0.004	0.007	0.007	0.009	0.011	0.015	0.009	0.005	0.002	0.012	0.047	0.061	0.072	0.069	0.057	0.053	0.035	0.027	0.072	
6-Oct	0.012	0.012	Z	0.011	0.009	0.015	0.040	0.022	0.047	0.044	0.042	0.028	0.013	0.014	0.027	0.048	0.045	0.036	0.002	0.003	0.001	0.005	0.001	0.003	0.021	0.048	
7-Oct	0.002	0.001	0.003	Z	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
8-Oct	0.000	0.000	0.000	0.000	Z	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.008
9-Oct	0.001	0.000	0.000	0.000	0.000	Z	0.000	0.001	0.000	0.007	0.029	0.007	0.003	0.000	0.000	0.002	0.001	0.003	0.046	0.005	0.004	0.000	0.000	0.001	0.005	0.046	
10-Oct	0.000	0.000	0.000	0.001	0.001	0.002	Z	0.006	0.015	0.057	0.076	0.102	0.089	0.036	0.012	0.006	0.011	0.022	0.050	0.076	0.085	0.077	0.066	0.071	0.037	0.102	
11-Oct	Z	0.076	0.039	0.015	0.020	0.001	0.001	0.001	0.002	0.001	0.002	0.001	0.000	0.003	0.002	0.001	0.001	0.002	0.000	0.001	0.001	0.001	0.000	0.000	0.008	0.076	
12-Oct	0.000	Z	0.004	0.003	0.001	0.002	0.000	0.002	0.000	0.000	0.000	0.002	0.008	0.003	0.000	0.001	0.002	0.008	0.001	0.000	0.000	0.000	0.000	0.001	0.002	0.008	
13-Oct	0.000	0.015	Z	0.000	0.055	0.002	0.013	0.002	0.001	0.002	0.015	0.042	0.001	0.001	0.000	0.001	0.005	0.006	0.005	0.002	0.003	0.003	0.000	0.004	0.008	0.055	
14-Oct	0.005	0.025	0.000	Z	0.000	0.001	0.000	0.007	0.000	0.001	0.001	0.007	0.003	0.022	0.022	0.058	0.004	0.017	0.022	0.031	0.025	0.019	0.022	0.021	0.014	0.058	
15-Oct	0.019	0.019	0.006	0.001	Z	0.001	0.001	C	C	C	C	C	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.004	0.004	0.000	0.001	0.003	0.019	
16-Oct	0.001	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.000	0.018	0.000	0.000	0.000	0.001	0.006	0.000	0.000	0.000	0.002	0.023		
17-Oct	0.000	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.004	0.001	0.001	0.002	0.001	0.002	0.003	0.003	0.001	0.004	
18-Oct	Z	0.006	0.006	0.002	0.005	0.002	0.004	0.006	0.011	0.020	0.032	0.042	0.046	0.031	0.025	0.029	0.055	0.068	0.081	0.083	0.074	0.065	0.051	0.035	0.034	0.083	
19-Oct	0.050	Z	0.028	0.017	0.022	0.010	0.004	0.004	0.018	0.058	0.032	0.017	0.010	0.004	0.001	0.006	0.006	0.010	0.023	0.022	0.028	0.021	0.014	0.010	0.018	0.058	
20-Oct	0.008	0.005	Z	0.056	0.047	0.023	0.028	0.047	0.054	0.050	0.048	0.061	0.083	0.075	0.119	0.079	0.080	0.080	0.082	0.074	0.071	0.073	0.070	0.071	0.060	0.119	
21-Oct	0.073	0.068	0.077	Z	0.069	0.040	0.029	0.039	0.027	0.011	0.014	0.014	0.015	0.017	0.004	0.005	0.021	0.005	0.030	0.015	0.008	0.002	0.004	0.034	0.027	0.077	
22-Oct	0.010	0.033	0.000	0.002	Z	0.052	0.000	0.000	0.000	0.003	0.003	0.001	0.001	0.000	0.002	0.002	0.001	0.006	0.001	0.000	0.000	0.000	0.001	0.000	0.005	0.052	
23-Oct	0.000	0.000	0.000	0.002	0.000	Z	0.008	0.000	0.000	0.002	0.003	0.001	0.001	0.002	0.002	0.005	0.012	0.018	0.015	0.013	0.032	0.046	0.019	0.011	0.008	0.046	
24-Oct	0.044	0.058	0.032	0.004	0.005	0.006	Z	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.058	
25-Oct	Z	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.000	0.000	0.005	0.019	0.009	0.002	0.019	
26-Oct	0.010	Z	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.010	
27-Oct	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.001	
28-Oct	0.001	0.000	0.003	Z	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	0.010	0.005	0.051	0.000	0.000	0.000	0.000	0.003	0.051	
29-Oct	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
30-Oct	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	
31-Oct	0.000	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.005	0.006	0.006	0.008	0.016	0.037	0.044	0.035	0.038	0.047	0.057	0.056	0.049	0.060	0.067	0.023	0.067	
																						Diurnal Average					
																						Diurnal Maximum					
Z - zerospan      C - Calibration																											



WBEA  
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm  
Anzac - October 2014





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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Anzac - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	490	69.21	69.21
0.006 - 0.05	172	24.29	93.50
0.06 - 0.1	46	6.50	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Anzac - October 2014**

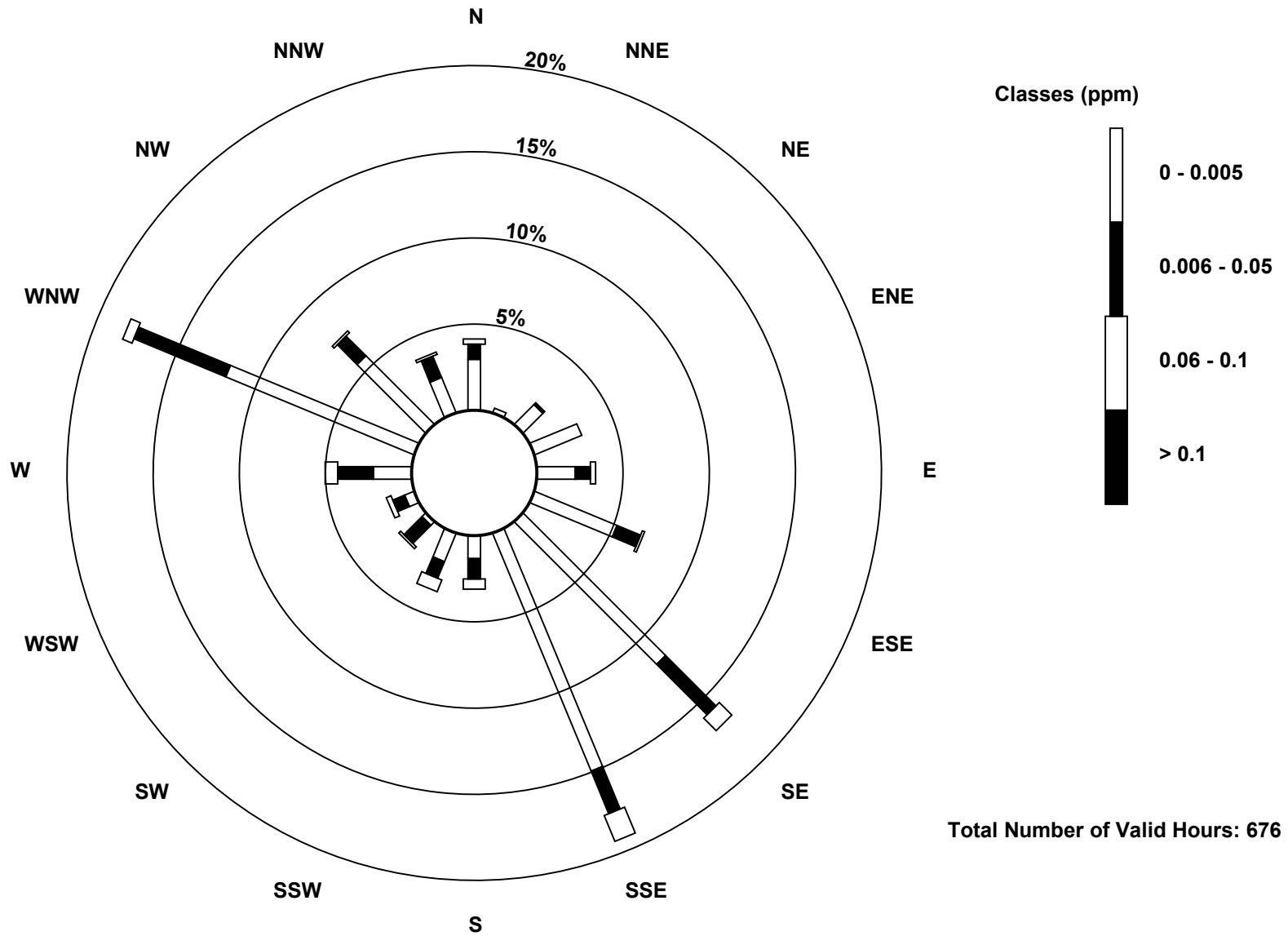
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	20	2	11	20	15	35	79	101	9	12	2	4	15	80	38	15	458
0.006 - 0.05	6	0	1	0	6	10	28	18	8	7	10	5	14	39	11	9	172
0.06 - 0.1	2	0	0	0	2	1	7	11	4	5	1	2	5	4	1	1	46
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	28	2	12	20	23	46	114	130	21	24	13	11	34	123	50	25	676

Total Number of Valid Hours: 676

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

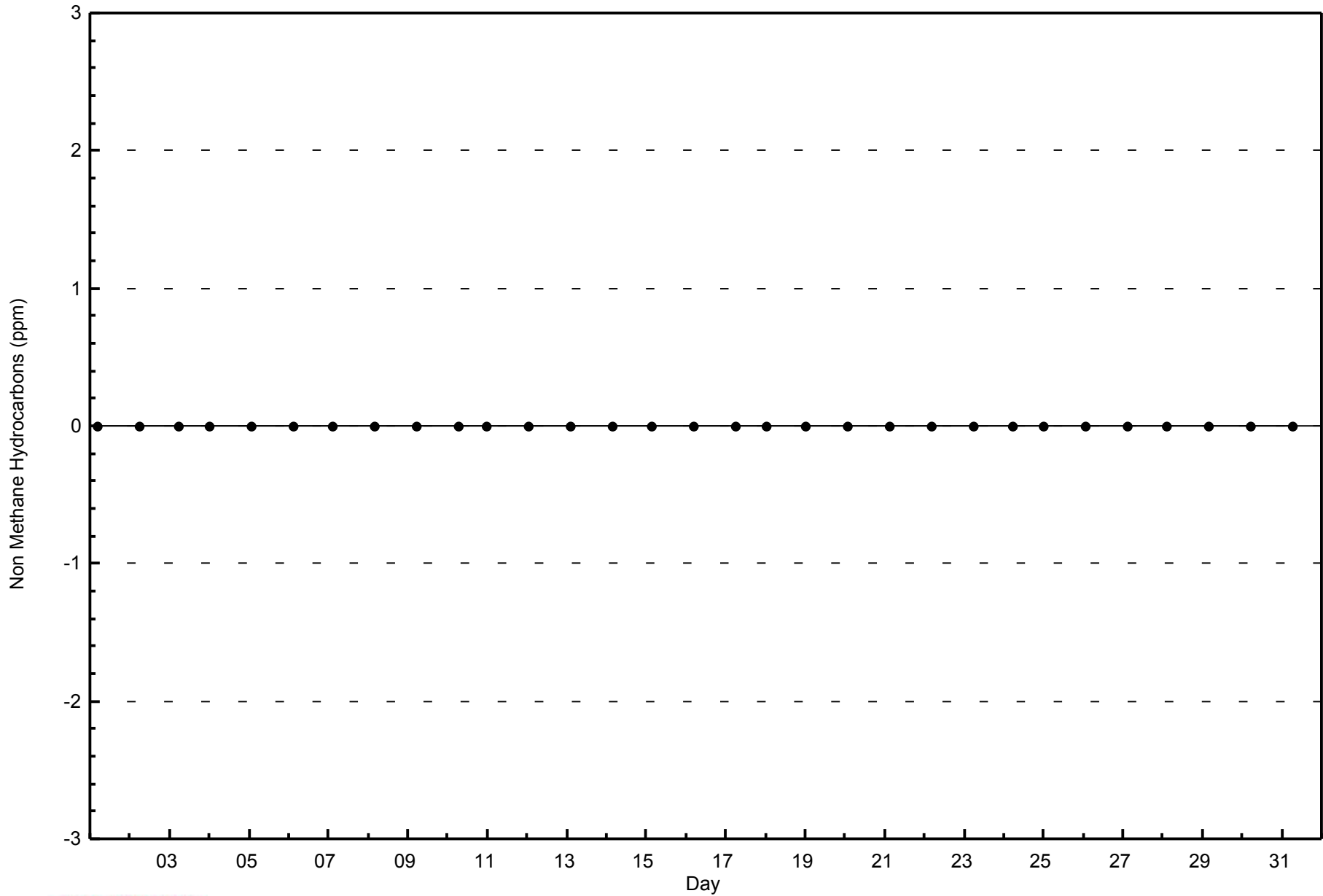
Non Methane Hydrocarbons (NMHC) - ppm  
Anzac (AMS 14)





WBEA  
Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm  
Anzac - October 2014

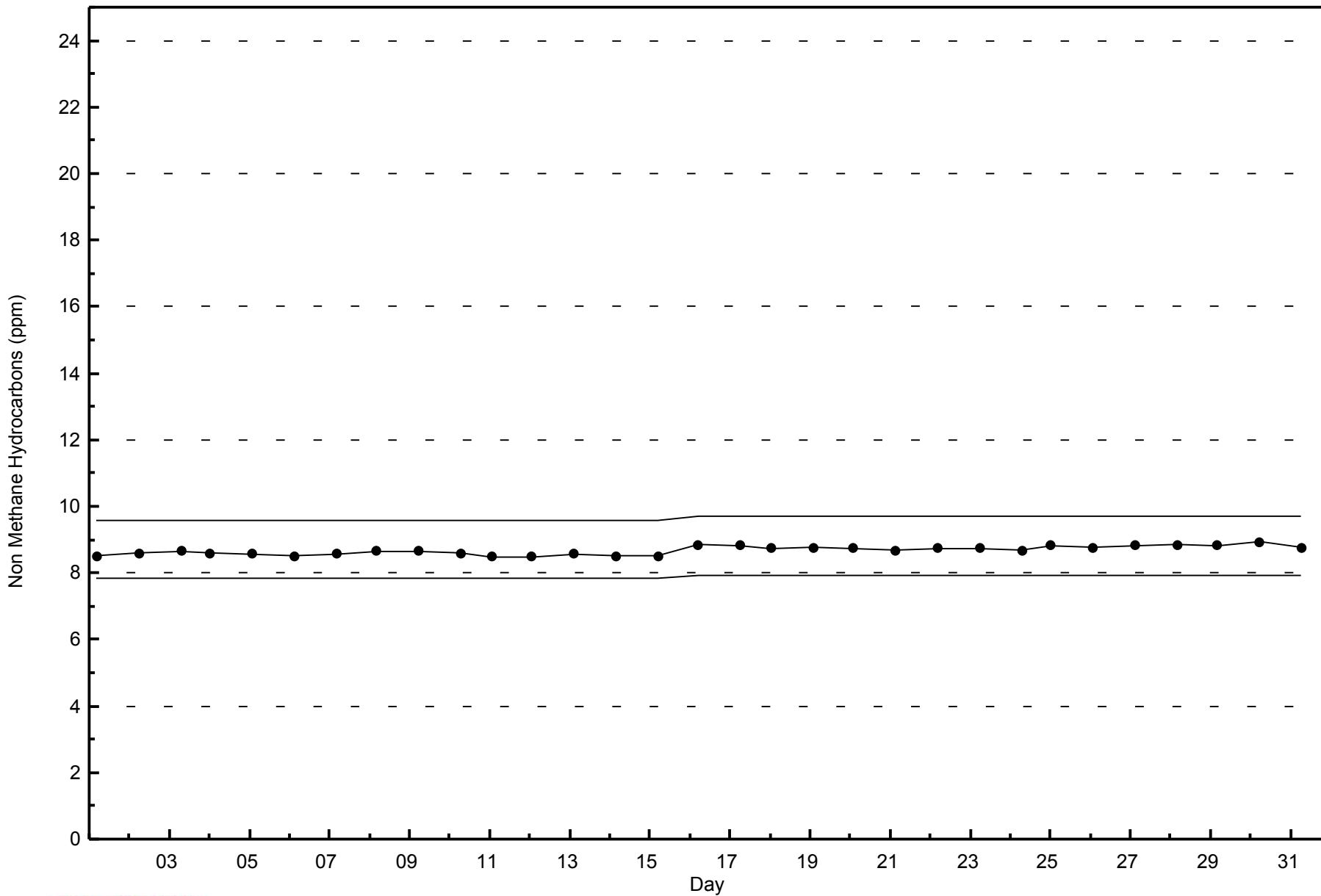




WBEA  
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm

Anzac - October 2014



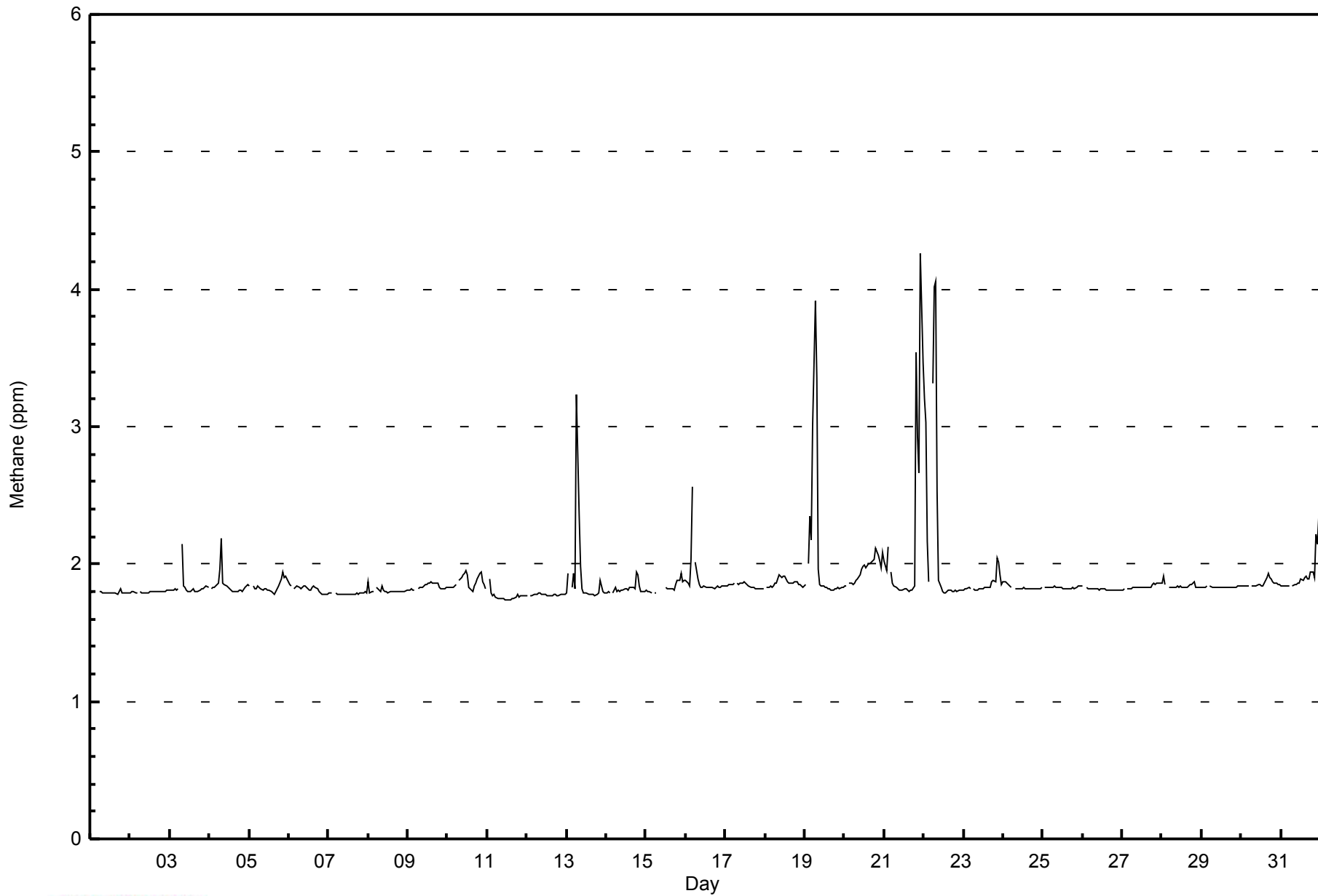






WBEA  
Hourly Averages

Methane (CH<sub>4</sub>) - ppm  
Anzac - October 2014





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

**Methane (CH<sub>4</sub>) - ppm**  
**Anzac - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	679	95.90	95.90
2.1 - 3.0	19	2.68	98.59
3.1 - 10.0	10	1.41	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Anzac - October 2014**

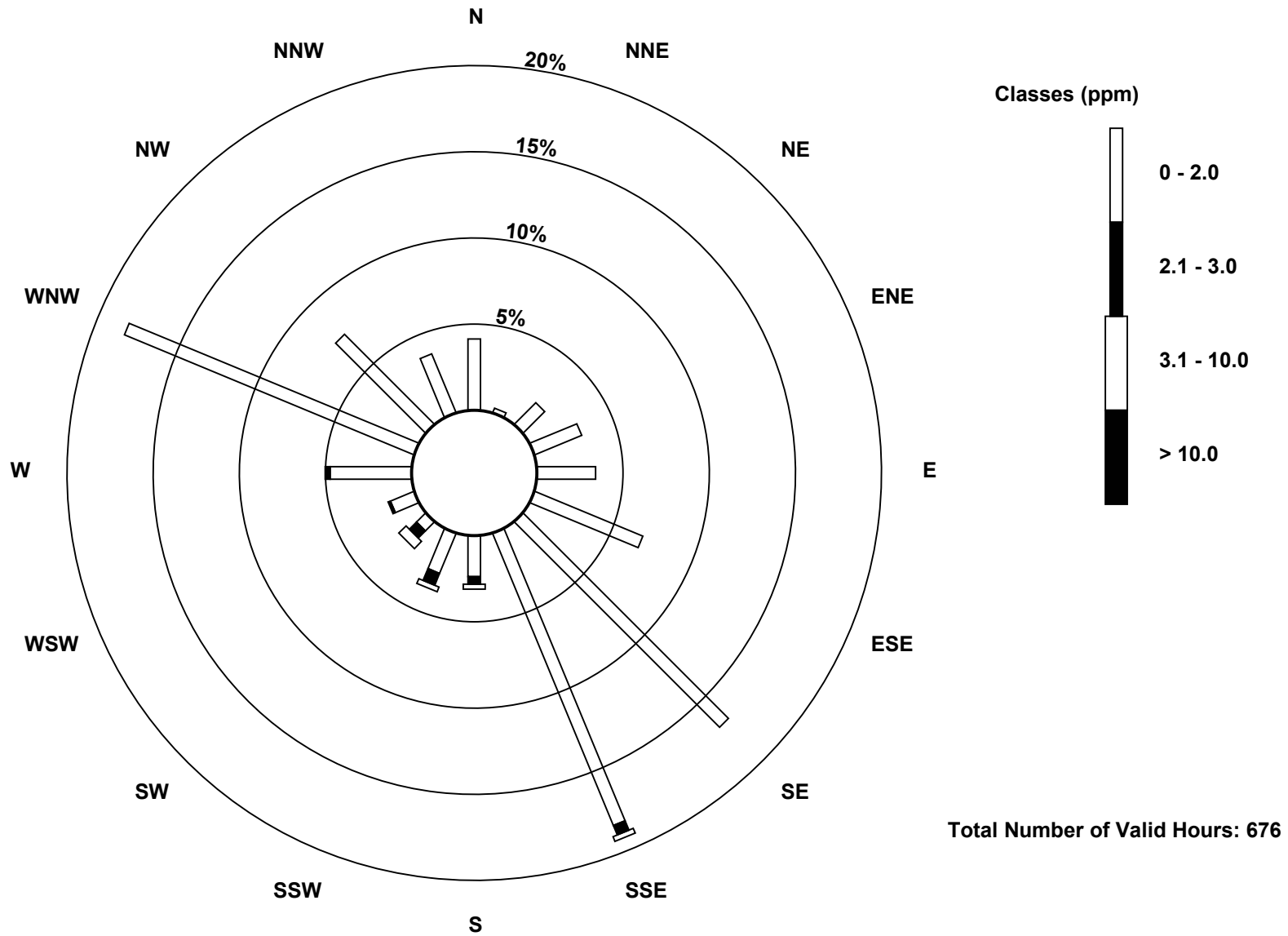
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	28	2	12	20	23	46	114	124	16	17	5	10	32	123	50	25	647
2.1 - 3.0	0	0	0	0	0	0	0	4	3	5	4	1	2	0	0	0	19
3.1 - 10.0	0	0	0	0	0	0	0	2	2	2	4	0	0	0	0	0	10
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	28	2	12	20	23	46	114	130	21	24	13	11	34	123	50	25	676

Total Number of Valid Hours: 676

Total Number of Hours: 744

Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

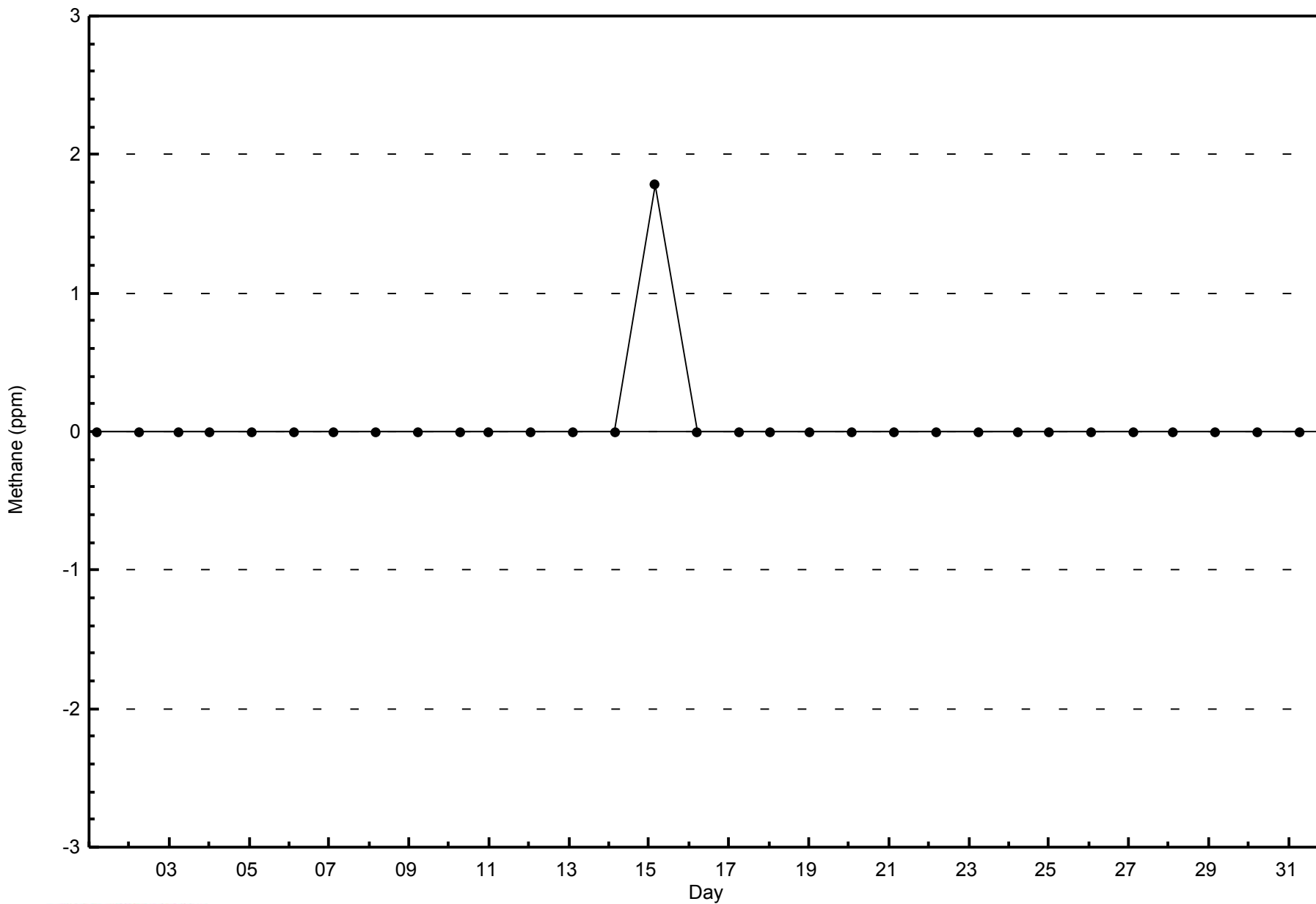
Methane (CH<sub>4</sub>) - ppm  
 Anzac (AMS 14)





WBEA  
Zero Responses

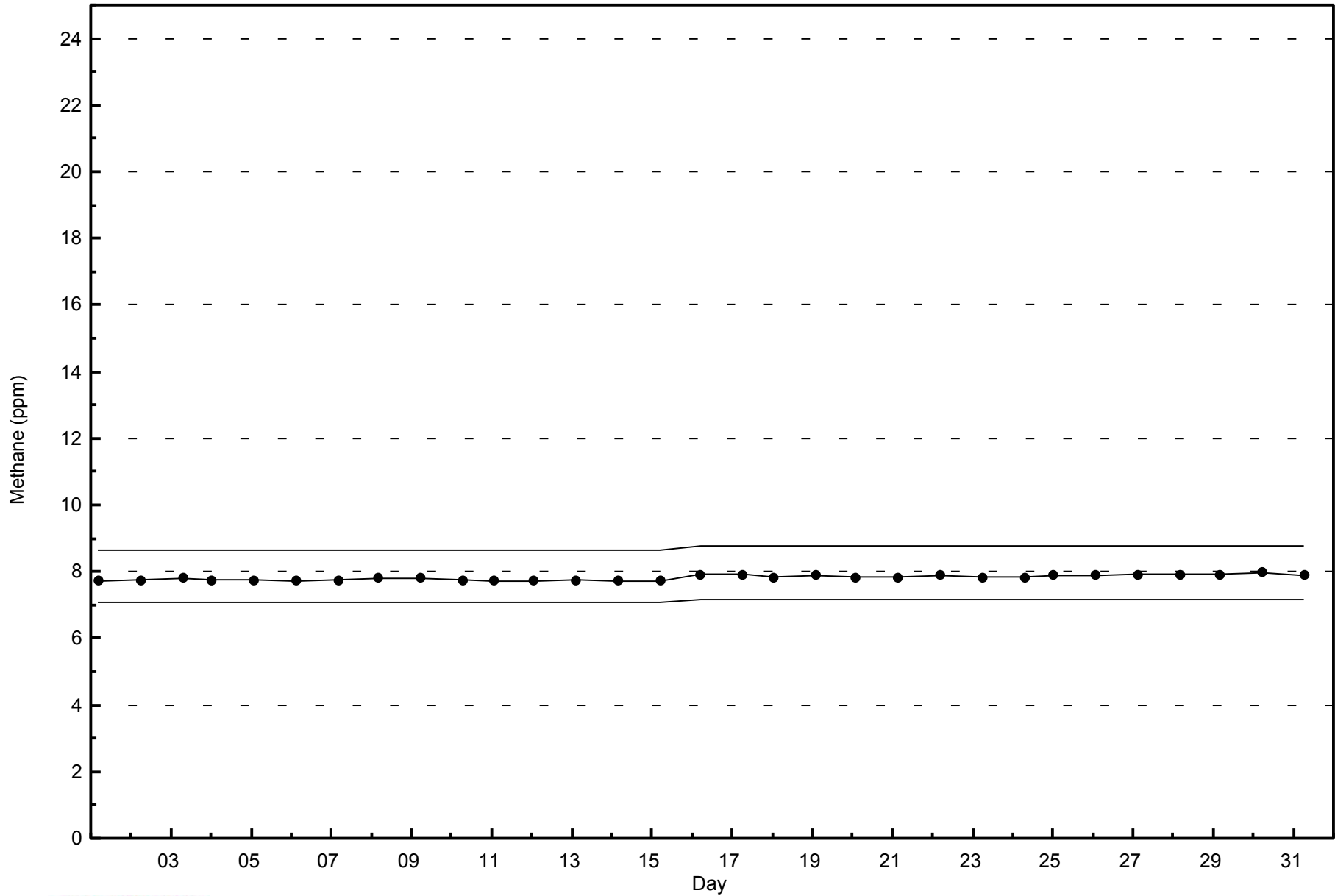
Methane (CH<sub>4</sub>) - ppm  
Anzac - October 2014





WBEA  
Span Responses

Methane (CH<sub>4</sub>) - ppm  
Anzac - October 2014





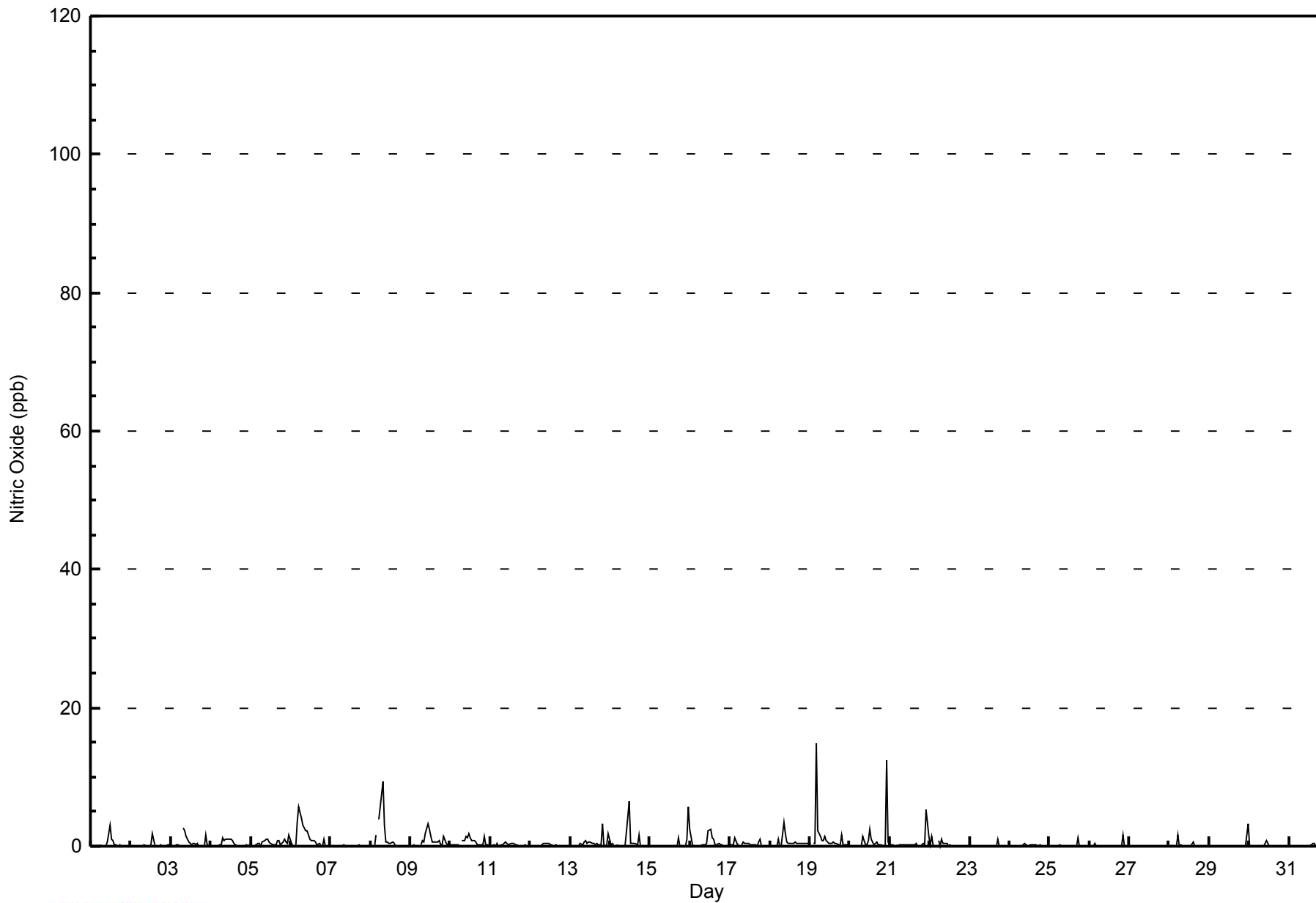
Maximum Value: 15 ppb on Oct 19 05:00																	Maximum Daily Average: 1.3 ppb on Oct 6																	Hours in Service: 744	
Minimum Value: 0 ppb on Oct 1 08:00																	Minimum Daily Average: 0.0 ppb on Oct 27																	Hours of Data: 708	
Maximum Diurnal Average: 0.8 ppb at hour 23																	Minimum Diurnal Average: 0.1 ppb at hour 3																	Hours of Missing Data: 36	
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> = 5																	Hours of Calibration: 36	
																	Percent Operational Time: 100.0																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Oct	0	0	0	0	Z	0	0	0	0	0	1	3	1	1	0	0	0	0	0	0	0	0	0	0	0.3	3									
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0.1	2									
3-Oct	0	0	0	0	0	0	Z	3	2	2	1	1	0	0	0	0	0	0	0	0	0	2	0	0	0.5	3									
4-Oct	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1									
5-Oct	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	1	1	0	1	1	1	0	2	0.5	2									
6-Oct	0	0	Z	0	3	6	4	3	3	2	2	1	1	1	1	0	0	0	0	1	0	0	0	1.3	6										
7-Oct	0	0	0	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-Oct	0	0	0	2	Z	4	6	9	3	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1.2	9									
9-Oct	0	0	0	0	0	Z	0	1	1	2	3	3	1	1	1	1	1	1	0	0	1	0	0	0.7	3										
10-Oct	0	0	0	0	0	0	Z	1	1	1	1	2	1	1	1	1	0	0	0	0	1	0	0	0.6	2										
11-Oct	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
12-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
13-Oct	0	0	Z	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0	3	0	0	0	2	0.5	3									
14-Oct	0	0	0	Z	0	0	0	0	0	0	2	6	0	0	0	0	0	2	0	0	0	0	0	0	0.6	6									
15-Oct	0	0	0	0	Z	0	0	C	C	C	C	C	0	0	0	0	0	1	0	0	0	0	1	6	0.4	6									
16-Oct	3	0	0	0	0	Z	0	0	0	0	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0.5	3									
17-Oct	0	0	0	1	0	0	Z	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1									
18-Oct	Z	0	0	0	0	1	0	0	4	2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0.6	4									
19-Oct	0	Z	0	0	15	2	1	1	1	1	1	0	0	0	1	0	0	0	0	2	0	0	0	0	1.3	15									
20-Oct	0	0	Z	0	0	0	0	0	1	0	0	1	2	1	0	0	1	0	0	0	0	0	12	1	0.9	12									
21-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0.5	5									
22-Oct	0	1	0	0	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
23-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1	1									
24-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
25-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1	1									
26-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.1	2									
27-Oct	0	0	Z	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-Oct	0	0	0	Z	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	2									
29-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.1	3									
30-Oct	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
31-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	4	1	1.0	8									
																								Diurnal Average											
																								Diurnal Maximum											
0.2 0.1 0.1 0.2 0.8 0.6 0.5 0.7 0.7 0.5 0.6 0.8 0.5 0.4 0.3 0.2 0.2 0.3 0.1 0.2 0.5 0.4 0.8 0.6																																			
3 1 0 2 15 6 6 9 4 2 3 6 2 2 1 1 1 2 1 3 8 8 12 6																																			
Z - zerospan C - Calibration																																			





WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
Anzac - October 2014





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

**Nitric Oxide (NO) - ppb**  
**Anzac - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	708	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Anzac - October 2014**

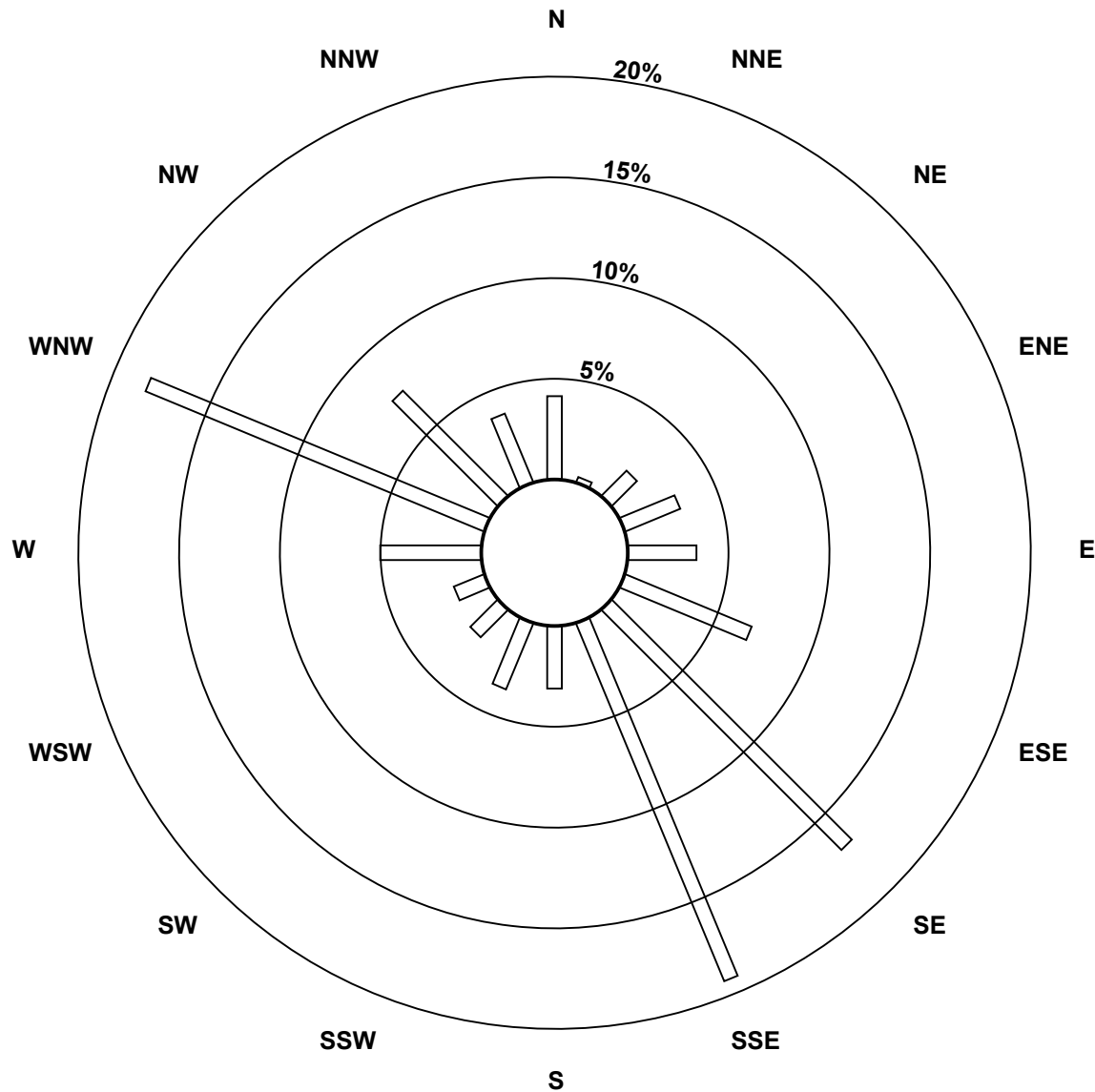
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	2	12	20	23	46	114	130	21	24	13	11	34	123	50	25	676
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	28	2	12	20	23	46	114	130	21	24	13	11	34	123	50	25	676

Total Number of Valid Hours: 676

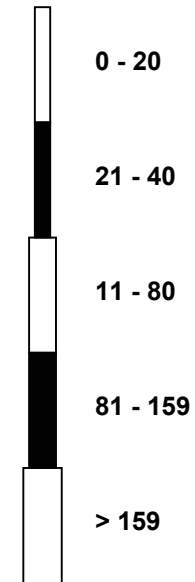
Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Nitric Oxide (NO) - ppb  
Anzac (AMS 14)



Classes (ppb)

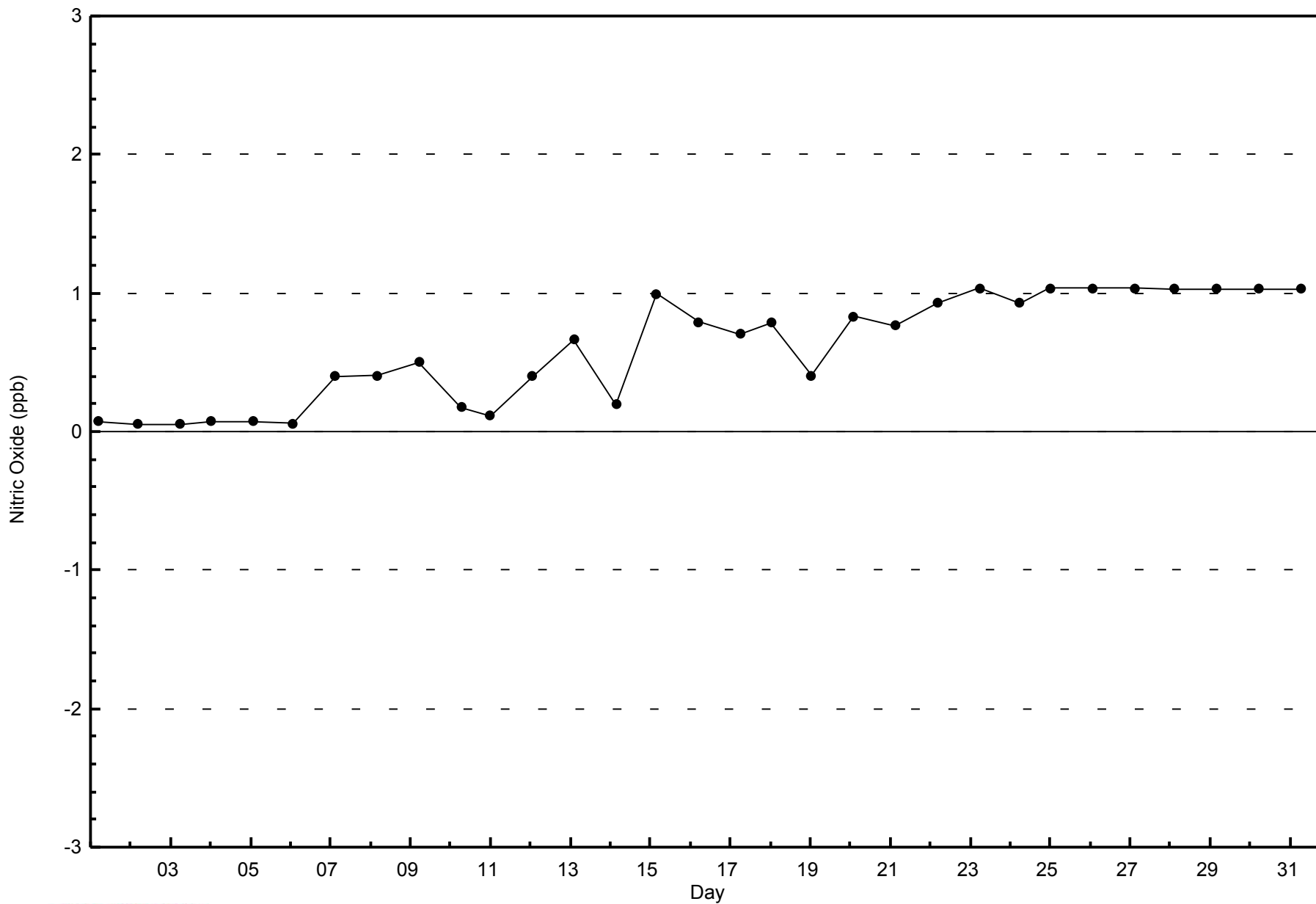


Total Number of Valid Hours: 676



WBEA  
Zero Responses

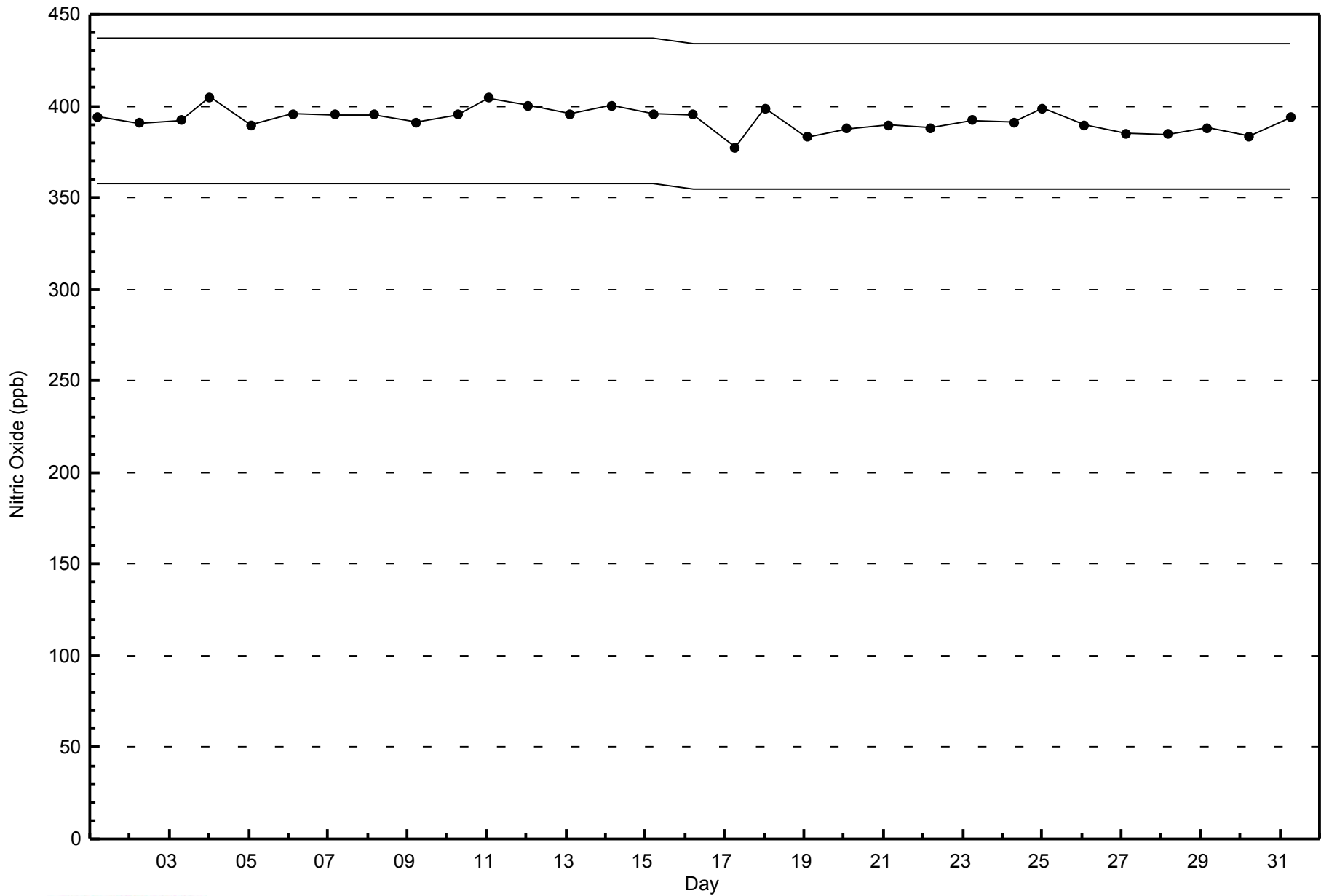
Nitric Oxide (NO) - ppb  
Anzac - October 2014





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Anzac - October 2014





Summary of Hour Averages

Anzac - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 11 ppb on Oct 5 20:00	Maximum Daily Average: 3.5 ppb on Oct 5		Hours of Data:	708
Minimum Value: 0 ppb on Oct 15 04:00	Minimum Daily Average: 0.1 ppb on Oct 29		Hours of Missing Data:	36
Maximum Diurnal Average: 2.3 ppb at hour 19	Minimum Diurnal Average: 1.0 ppb at hour 16		Hours of Calibration:	36
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> = 2 P <sub>90</sub> = 3 P <sub>99</sub> = 8		Percent Operational Time:	100.0

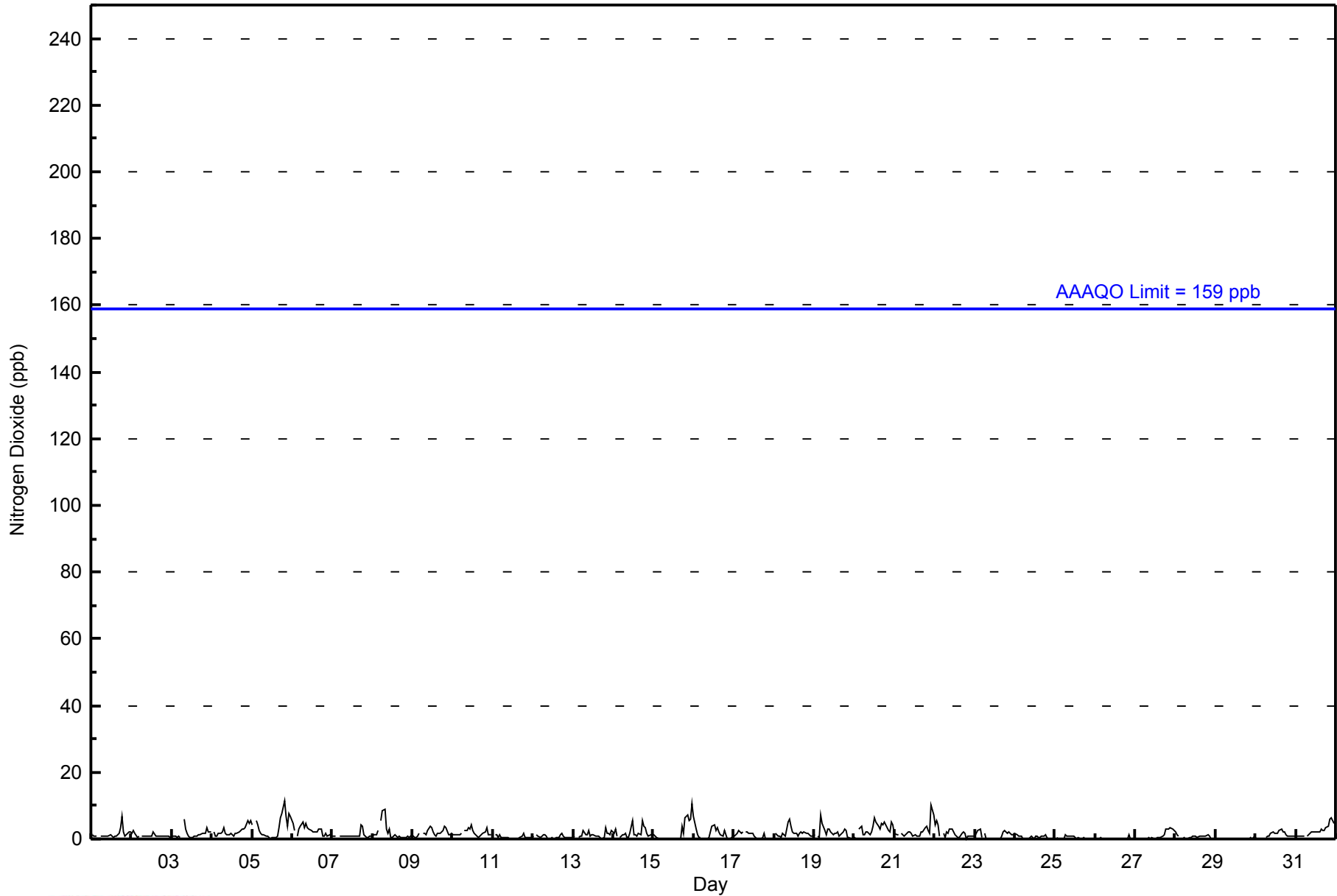
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	4	7	2	1	1	2	2	1.5	7	
2-Oct	2	2	2	1	1	Z	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1.0	2	
3-Oct	1	1	1	1	1	1	Z	6	3	2	1	1	1	1	1	1	1	2	2	2	3	2	2	1.5	6	
4-Oct	Z	2	1	1	2	2	2	3	2	1	1	2	1	1	2	2	2	3	3	3	3	6	5	2.3	6	
5-Oct	4	Z	6	4	3	2	1	1	1	1	0	1	1	1	1	4	7	8	11	7	4	8	7	3.5	11	
6-Oct	5	3	Z	1	3	4	5	3	5	3	3	2	2	2	2	3	3	1	1	2	1	1	1	2.5	5	
7-Oct	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	4	4	1	1	1	1	1	1.1	4	
8-Oct	1	1	1	3	Z	5	9	9	3	2	3	1	0	1	1	1	1	1	1	1	1	1	1	2.0	9	
9-Oct	1	1	1	1	2	Z	2	2	1	2	4	4	2	1	1	2	2	2	3	4	3	1	1	1.9	4	
10-Oct	1	1	1	1	1	2	Z	3	2	3	3	4	3	2	1	1	1	1	2	2	4	1	1	1.9	4	
11-Oct	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	1	0	0.5	2	
12-Oct	1	Z	1	1	1	1	1	1	1	0	0	1	0	0	0	0	1	2	1	0	0	0	0	0.6	2	
13-Oct	1	1	Z	0	1	1	3	1	1	2	1	1	1	1	1	1	0	0	3	2	2	1	3	1.2	3	
14-Oct	2	3	1	Z	0	1	1	2	0	0	2	6	1	1	1	2	1	6	4	3	2	1	1	1.8	6	
15-Oct	1	1	0	0	Z	0	0	C	C	C	C	C	0	0	0	0	4	2	6	7	6	6	11	2.5	11	
16-Oct	7	3	1	1	1	Z	0	0	0	1	2	4	3	3	2	1	1	3	1	0	0	0	1	1.6	7	
17-Oct	1	1	2	3	2	2	Z	2	2	2	2	2	1	1	0	0	0	0	2	0	0	0	0	1.0	3	
18-Oct	Z	2	1	1	1	2	1	1	5	6	4	2	2	2	1	2	2	2	2	2	2	1	1	1.9	6	
19-Oct	1	Z	1	1	7	5	3	1	3	3	2	1	2	2	2	1	1	2	3	3	0	1	0	1.9	7	
20-Oct	0	0	Z	3	4	1	1	2	2	1	2	4	6	5	4	3	5	4	5	4	2	2	5	3.1	6	
21-Oct	2	1	1	Z	2	1	1	2	2	2	2	1	1	1	1	2	2	3	4	3	2	10	7	2.3	10	
22-Oct	4	6	4	1	Z	2	1	2	2	3	3	2	1	1	0	2	2	2	0	1	1	1	1	1.8	6	
23-Oct	1	2	2	3	1	Z	2	0	0	0	0	0	0	0	0	1	2	3	2	2	2	1	1	1.1	3	
24-Oct	2	1	1	1	1	0	Z	0	0	0	1	0	1	1	0	0	1	1	1	0	0	0	0	0.6	2	
25-Oct	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0.4	1	
26-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	1	
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	3	3	3	3	3	3	1.0	3	
28-Oct	2	1	1	Z	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.7	2	
29-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	1	
30-Oct	0	0	0	0	0	Z	0	1	1	2	2	2	2	2	3	3	2	2	1	1	1	1	1	1.2	3	
31-Oct	1	1	1	1	1	1	Z	1	2	2	2	2	2	2	2	3	3	2	3	4	6	6	6	5	2.5	6
	1.5	1.4	1.2	1.1	1.3	1.3	1.4	1.6	1.4	1.5	1.5	1.5	1.3	1.1	1.0	1.0	1.3	2.0	2.3	2.1	1.8	1.5	1.9	2.0	Diurnal Average	
	7	6	6	4	7	5	9	9	5	6	4	6	6	5	4	3	5	7	8	11	7	6	10	11	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 - October 2014







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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Anzac - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	708	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Anzac - October 2014**

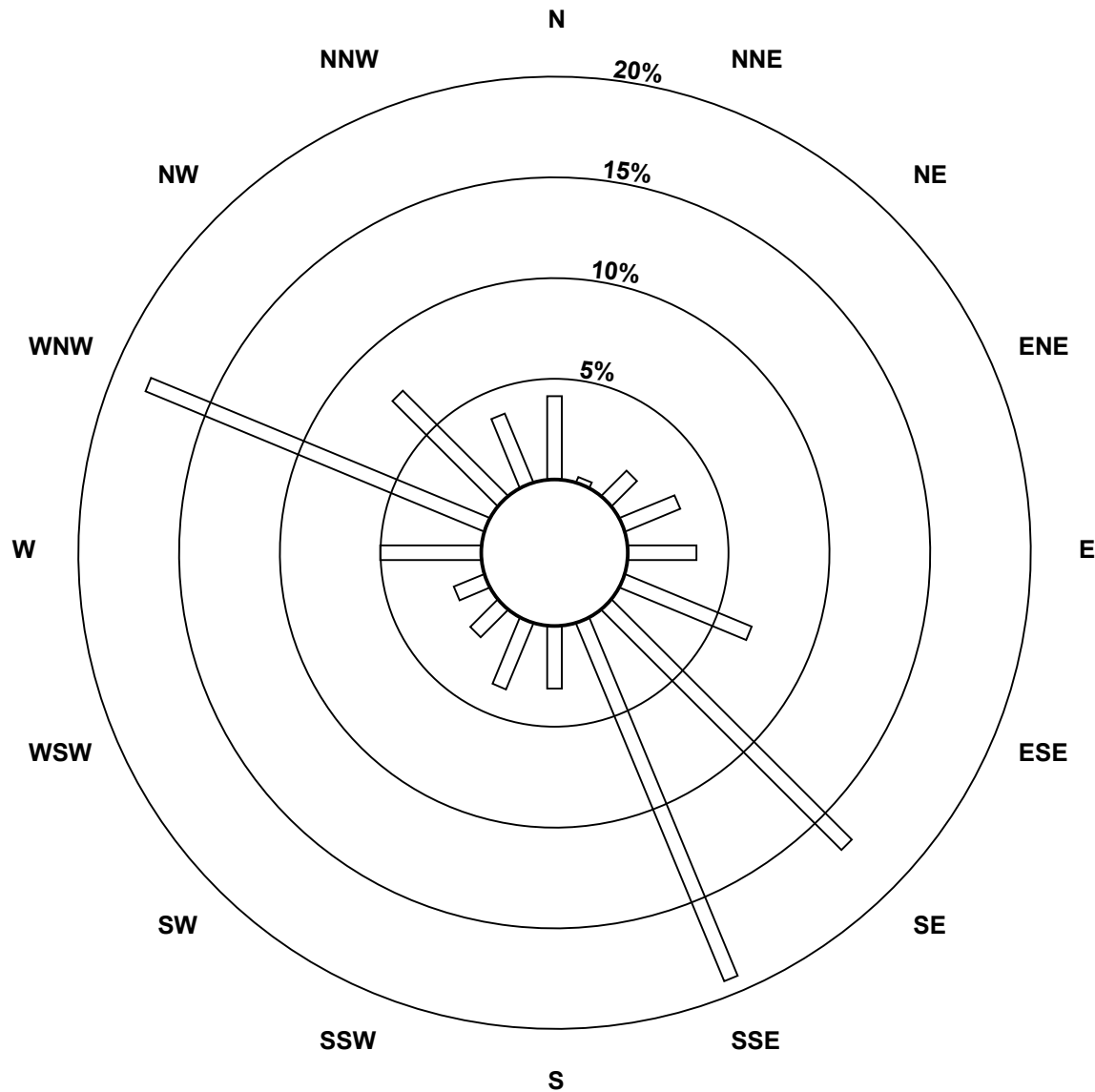
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	2	12	20	23	46	114	130	21	24	13	11	34	123	50	25	676
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	28	2	12	20	23	46	114	130	21	24	13	11	34	123	50	25	676

Total Number of Valid Hours: 676

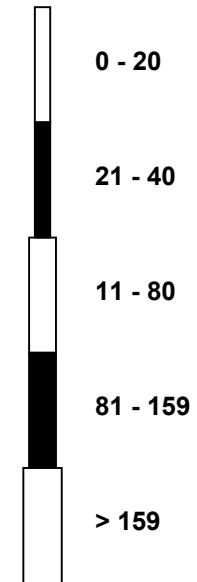
Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac (AMS 14)



Classes (ppb)

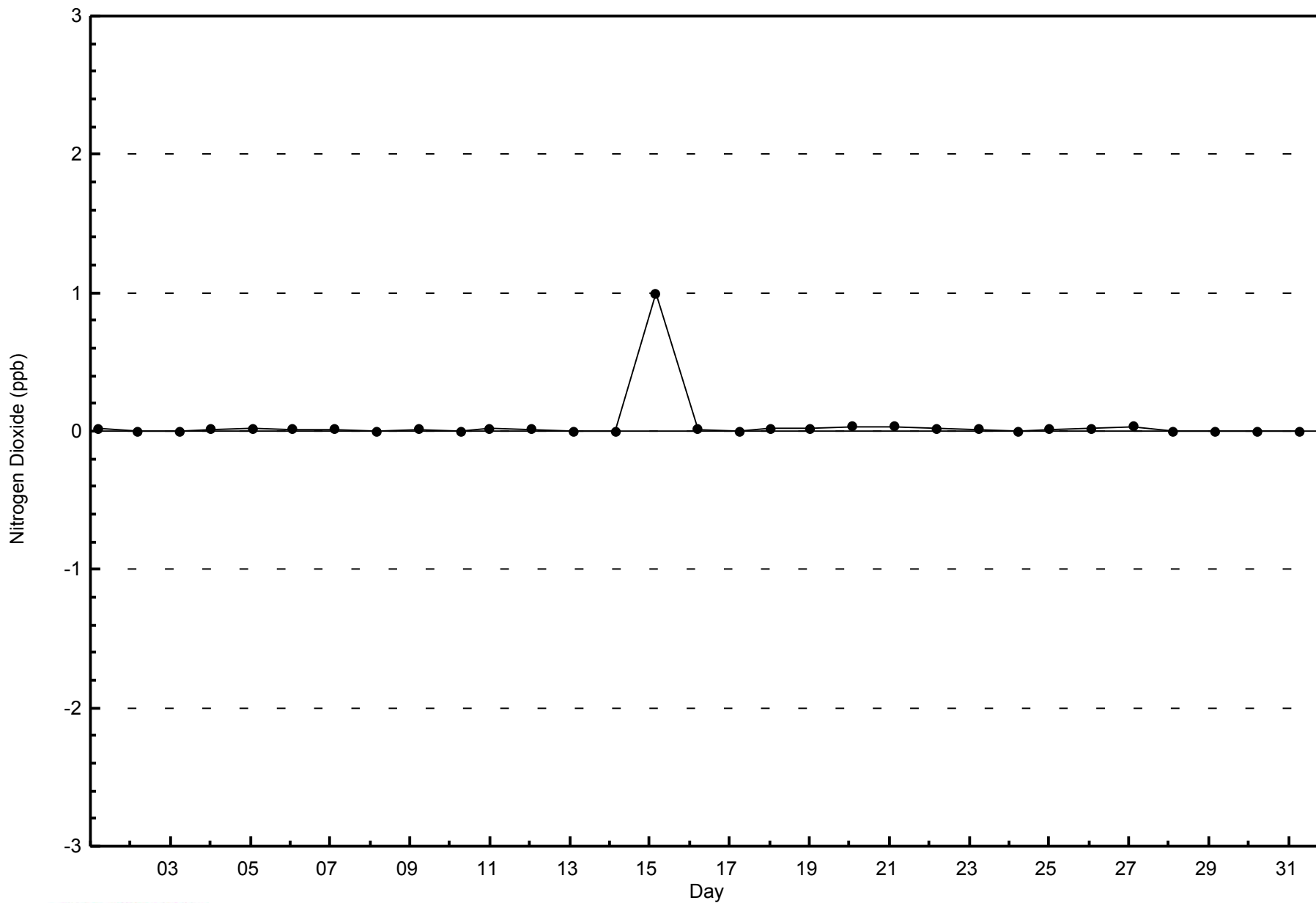


Total Number of Valid Hours: 676



WBEA  
Zero Responses

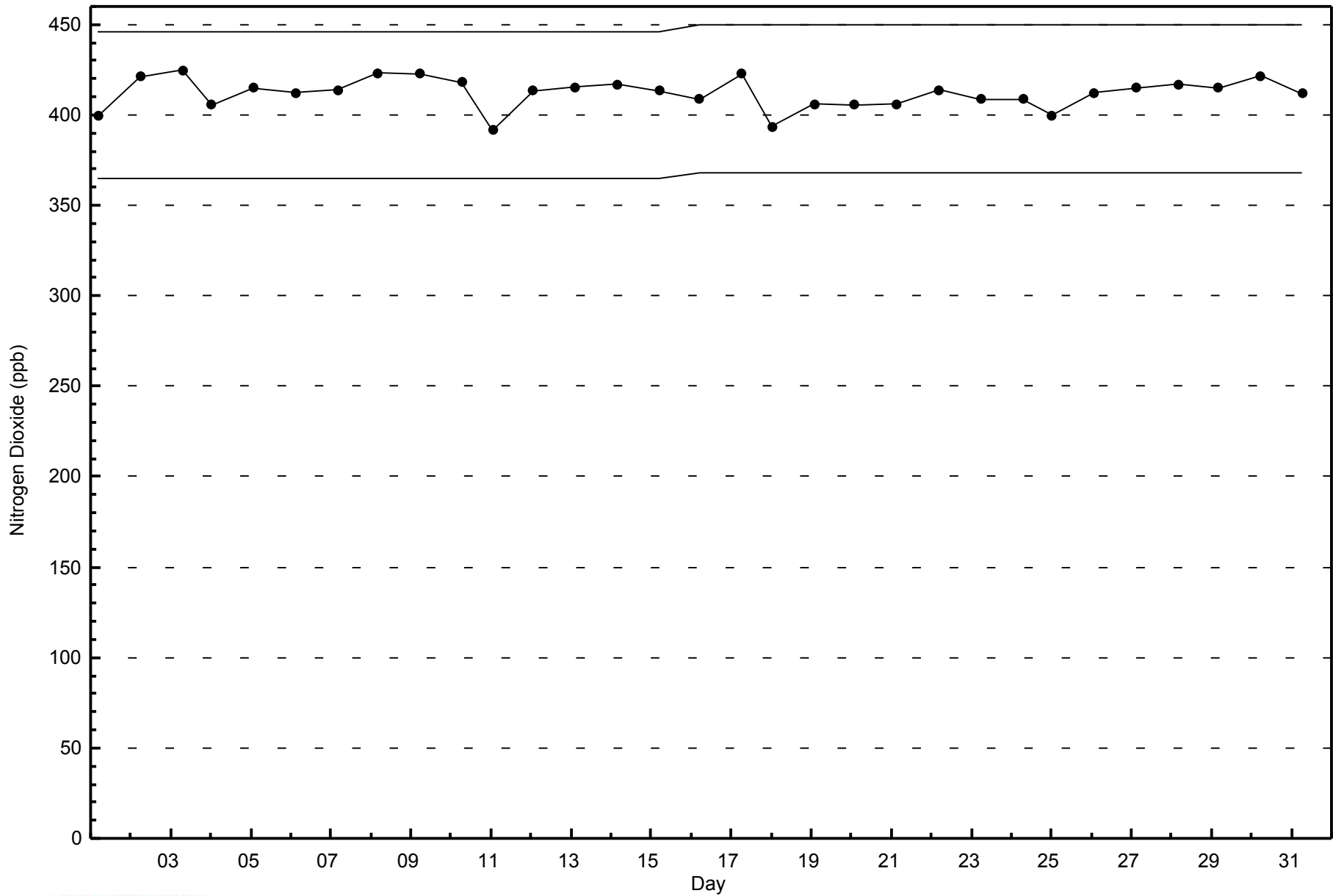
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac - October 2014





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac - October 2014



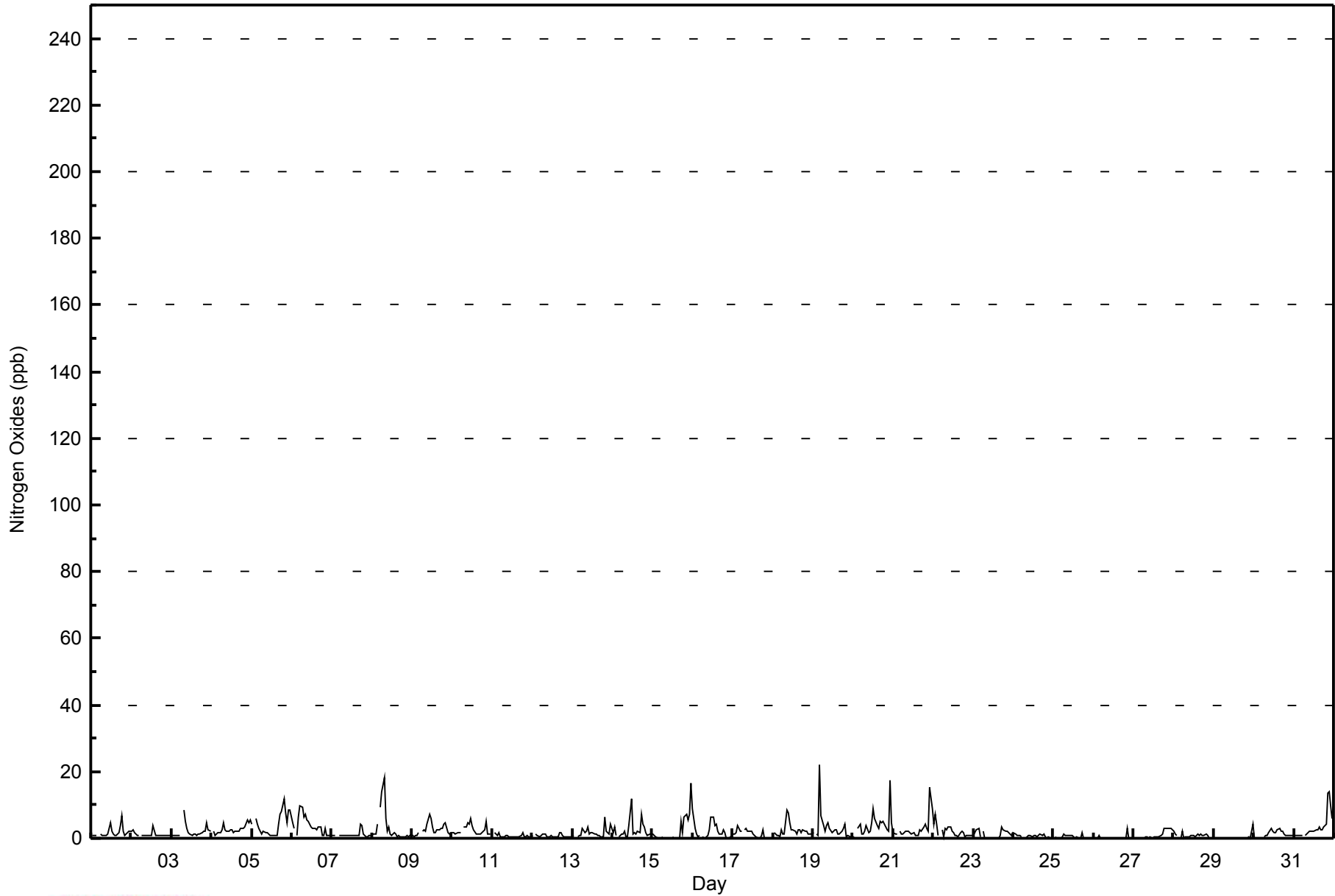


Maximum Value: 22 ppb on Oct 19 05:00														Maximum Daily Average: 4.0 ppb on Oct 5														Hours in Service: 744			
Minimum Value: 0 ppb on Oct 15 04:00														Minimum Daily Average: 0.2 ppb on Oct 26														Hours of Data: 708			
Maximum Diurnal Average: 2.7 ppb at hour 23														Minimum Diurnal Average: 1.2 ppb at hour 16														Hours of Missing Data: 36			
Monthly Average: 1.9 ppb														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 4 P <sub>99</sub> = 14														Hours of Calibration: 36			
																												Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Oct	1	1	1	1	Z	1	1	1	1	1	1	5	2	1	1	1	2	4	7	2	1	1	2	2	1.7	7					
2-Oct	2	2	2	1	1	Z	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1.1	4					
3-Oct	1	1	1	1	1	1	Z	9	5	3	2	1	1	1	1	1	1	2	2	2	5	2	2	2.0	9						
4-Oct	Z	2	1	1	2	2	2	5	2	2	2	3	2	2	2	2	2	3	3	3	6	5	6	2.7	6						
5-Oct	4	Z	6	4	3	2	1	2	2	2	1	1	1	1	1	4	7	8	12	8	5	8	9	4.0	12						
6-Oct	5	3	Z	1	6	10	9	6	7	6	5	3	3	3	3	3	3	3	1	1	3	1	1	1	3.8	10					
7-Oct	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	4	4	1	1	1	1	1	1	1.1	4					
8-Oct	1	1	1	4	Z	9	14	18	6	2	3	1	1	2	1	0	1	1	0	1	1	1	1	1	3.1	18					
9-Oct	1	1	1	1	2	Z	2	3	2	4	7	6	4	2	2	2	2	3	3	4	5	2	1	2	2.6	7					
10-Oct	1	1	1	2	2	2	Z	3	3	5	4	6	4	3	1	1	1	1	2	2	5	1	1	1	2.4	6					
11-Oct	Z	2	1	1	2	0	0	0	1	1	0	0	0	0	0	0	0	1	2	0	0	1	0	0	0.7	2					
12-Oct	1	Z	1	1	1	1	1	1	1	1	0	1	0	0	0	1	2	2	1	0	0	0	0	0	0.8	2					
13-Oct	0	1	Z	0	1	1	3	2	2	3	1	2	2	1	1	1	0	0	7	2	2	1	4	1	1.7	7					
14-Oct	2	3	1	Z	0	1	1	2	0	0	4	12	1	1	1	2	2	7	4	3	2	1	1	1	2.4	12					
15-Oct	1	1	0	0	Z	0	0	C	C	C	C	C	0	0	0	0	5	2	6	7	6	7	16	16	2.9	16					
16-Oct	9	3	1	1	1	Z	0	0	0	1	3	6	4	4	2	1	1	3	2	0	0	0	1	1	2.2	9					
17-Oct	1	1	2	4	2	2	Z	2	3	2	2	2	1	1	0	0	0	1	3	0	0	0	0	0	1.3	4					
18-Oct	Z	2	1	1	1	3	1	1	9	8	5	2	2	2	1	2	2	2	3	2	2	1	1	1	2.4	9					
19-Oct	2	Z	1	1	22	7	4	2	4	4	3	2	2	2	3	1	1	2	3	4	1	1	0	1	3.2	22					
20-Oct	0	0	Z	3	4	1	1	2	4	2	2	4	9	6	4	3	5	5	5	4	3	2	18	5	4.0	18					
21-Oct	2	1	1	Z	2	1	1	2	2	2	2	1	2	1	1	1	3	2	4	4	3	2	15	9	2.8	15					
22-Oct	4	7	4	1	Z	3	0	3	2	3	3	2	2	1	1	0	2	2	2	0	1	1	1	1	2.0	7					
23-Oct	1	2	2	3	1	Z	2	0	0	0	0	0	0	0	0	1	3	3	2	2	2	1	1	1	1.1	3					
24-Oct	2	1	1	1	1	0	Z	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0.7	2					
25-Oct	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	2	0	0	0	0	0	0	0.4	2					
26-Oct	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0.2	3					
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	3	3	3	3	3	3	1.0	3					
28-Oct	2	1	1	Z	0	2	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.8	2					
29-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0.2	4					
30-Oct	0	0	0	0	0	Z	0	1	1	2	3	2	2	2	3	3	2	2	1	1	1	1	1	1	1.3	3					
31-Oct	1	1	1	1	1	1	Z	1	2	2	2	2	2	2	3	3	2	2	3	4	13	14	10	6	3.5	14					
																												Diurnal Average			
1.7														1.5														9			
1.3														1.2														6			
2.1														2.0														14			
2.0														1.9														18			
2.4														2.1														9			
2.0														2.0														8			
2.1														2.3														12			
1.7														1.5														6			
1.3														1.2														3			
1.5														2.3														7			
2.3														2.3														8			
2.4														2.4														12			
1.9														2.7														14			
2.6														16														16			
Diurnal Maximum																															
Z - zerospan														C - Calibration																	



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Anzac - October 2014





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Anzac - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	707	99.86	99.86
21 - 40	1	0.14	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Anzac - October 2014**

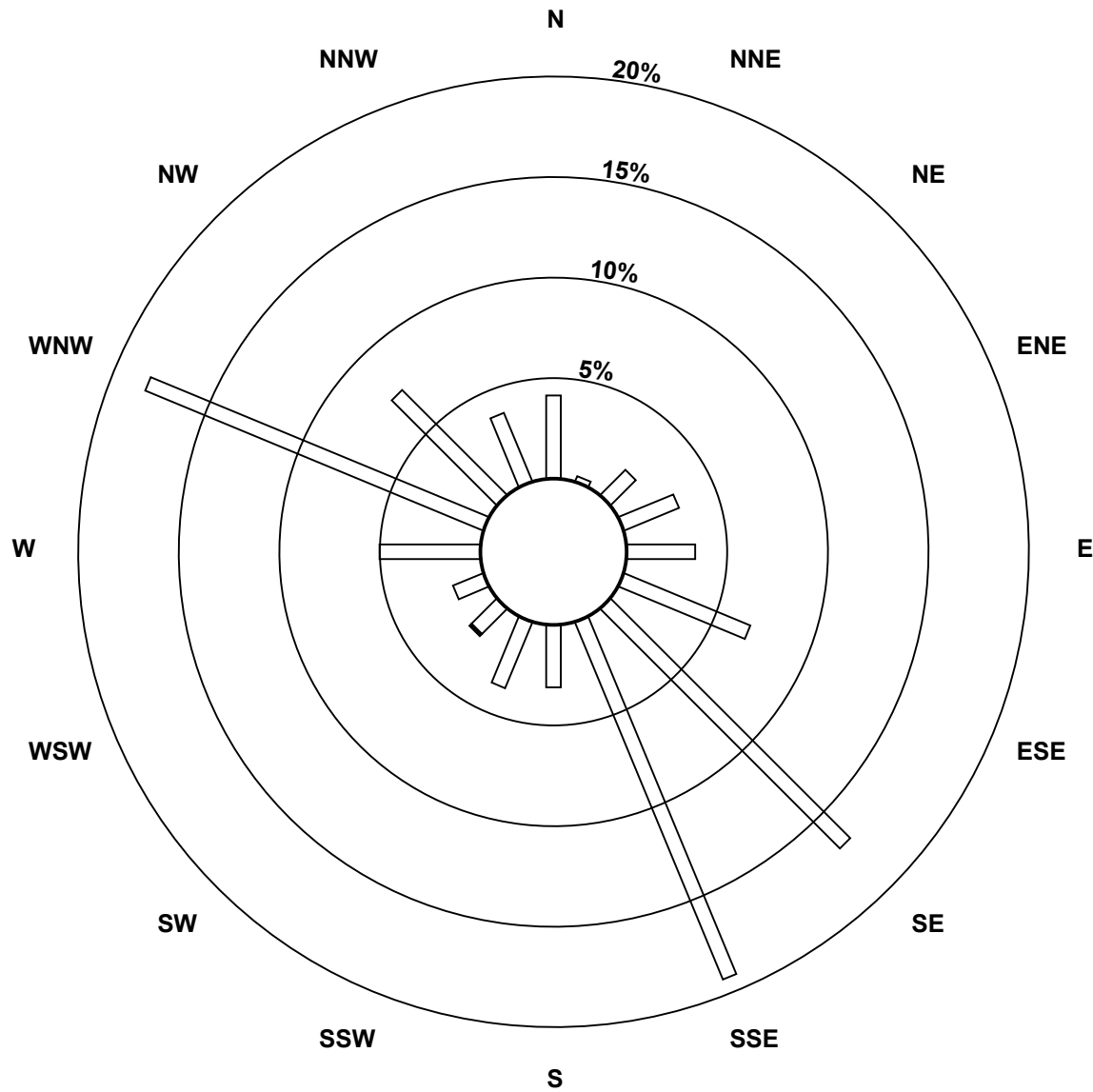
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	2	12	20	23	46	114	130	21	24	12	11	34	123	50	25	675
21 - 40	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	28	2	12	20	23	46	114	130	21	24	13	11	34	123	50	25	676

Total Number of Valid Hours: 676

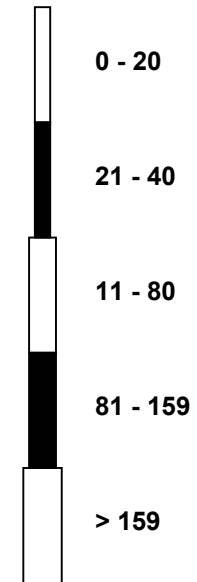
Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

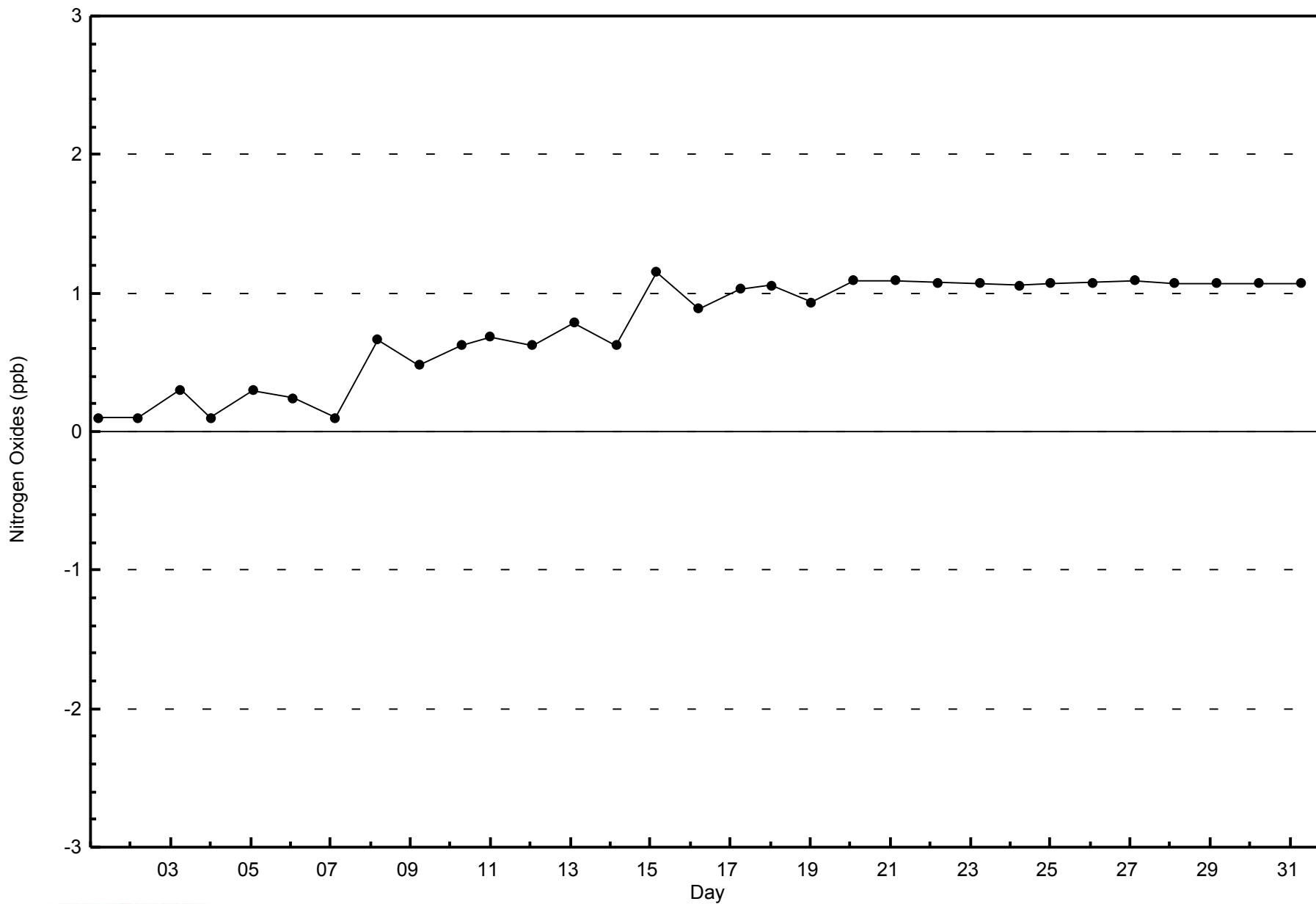
Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Anzac (AMS 14)



Classes (ppb)



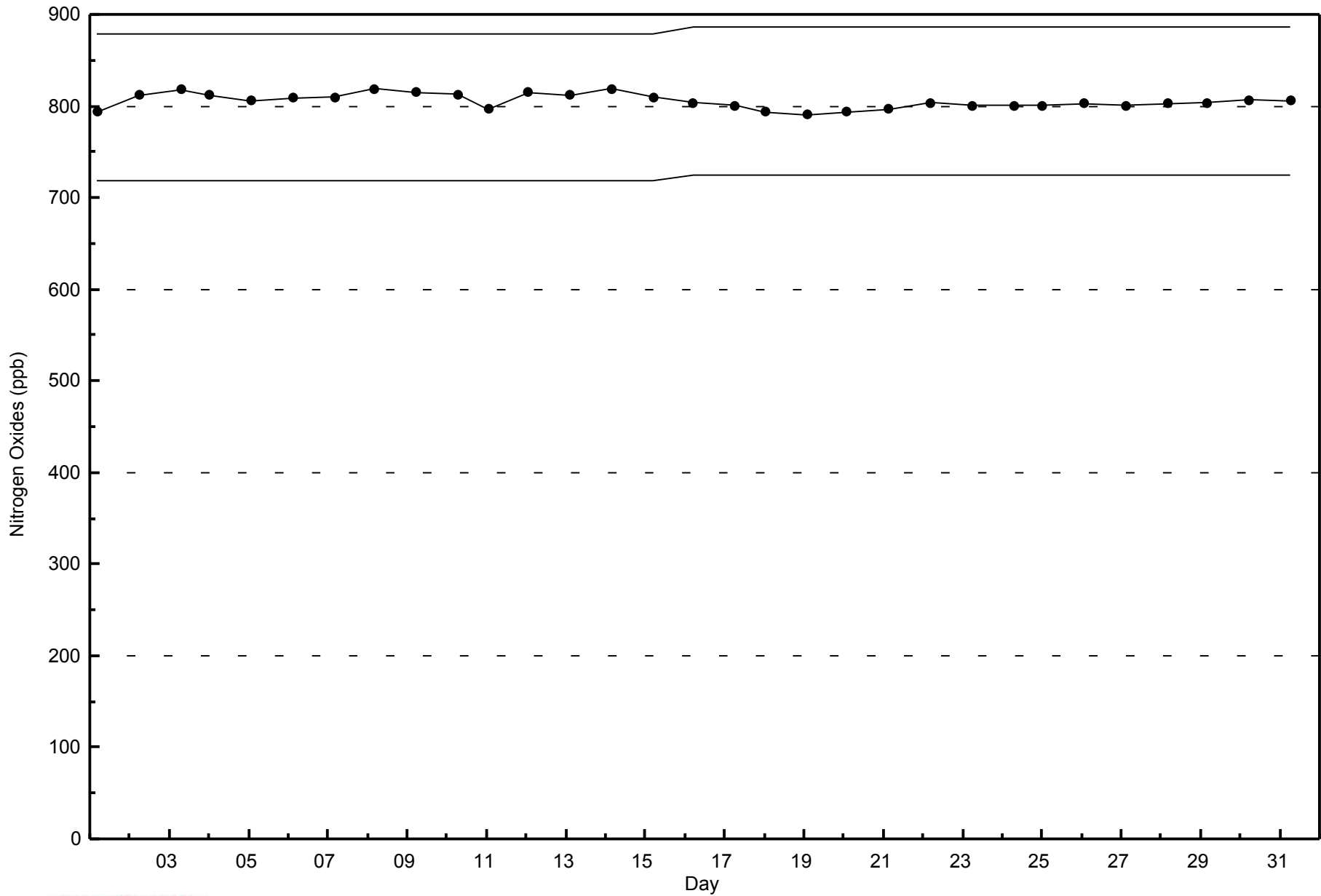
Total Number of Valid Hours: 676





WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Anzac - October 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

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

Anzac - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 42 ppb on Oct 22 15:00	Maximum Daily Average: 34.9 ppb on Oct 11		Hours of Data:	710
Minimum Value: 0 ppb on Oct 31 22:00	Minimum Daily Average: 10.3 ppb on Oct 6		Hours of Missing Data:	34
Maximum Diurnal Average: 24.7 ppb at hour 15	Minimum Diurnal Average: 15.2 ppb at hour 7		Hours of Calibration:	34
Monthly Average: 19.1 ppb	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 9 Q <sub>1</sub> = 14 Median = 18 Q <sub>3</sub> = 25 P <sub>90</sub> = 31 P <sub>99</sub> = 38		Percent Operational Time:	100.0

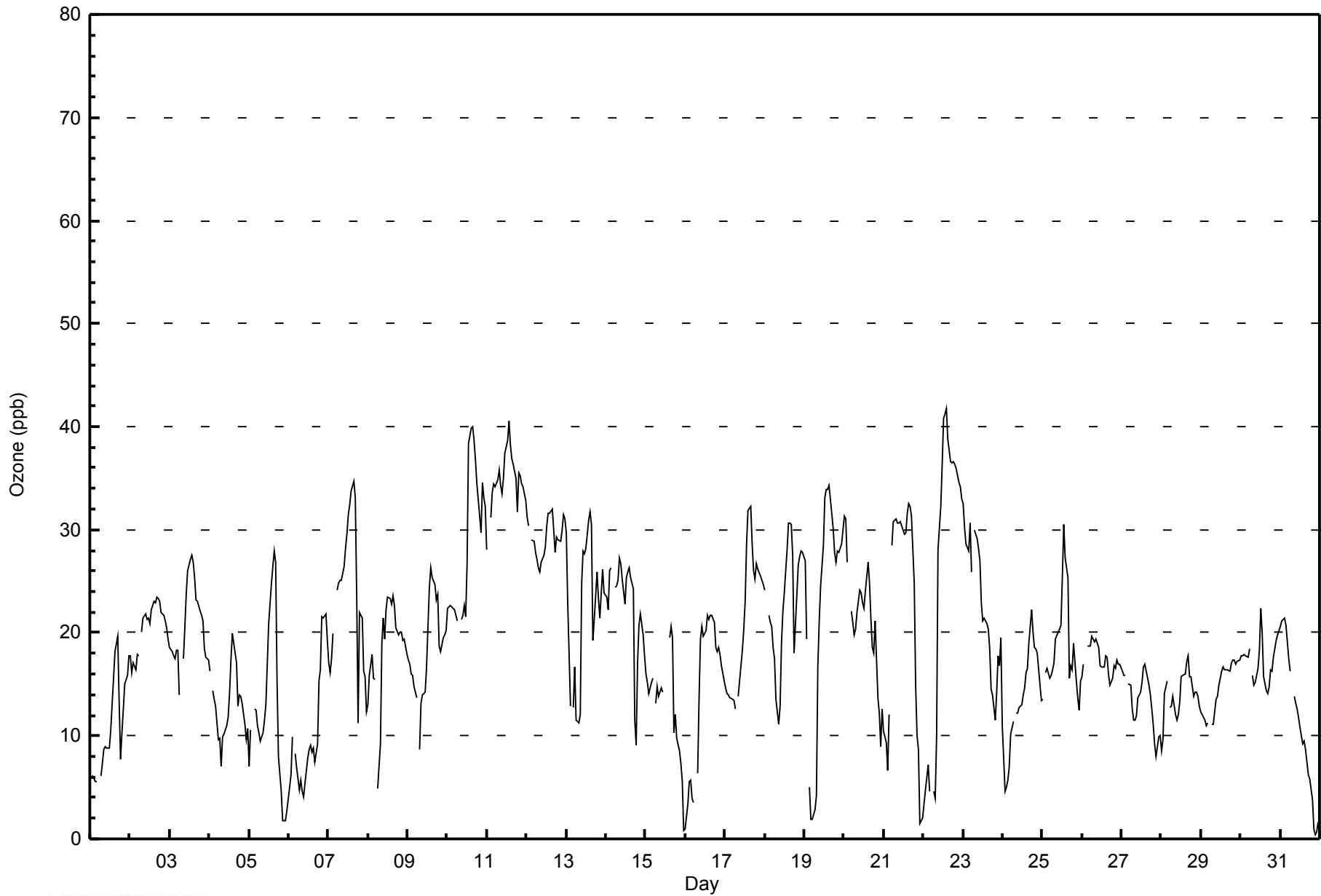
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	6	6	6	6	6	Z	6	7	9	9	9	9	11	13	16	18	20	13	8	10	13	15	16	18	10.8	20																							
2-Oct	18	16	17	16	18	18	Z	20	21	22	21	21	21	22	23	23	23	23	23	22	22	21	20	19	20.5	23																							
3-Oct	19	18	18	17	18	18	14	Z	17	21	24	26	27	28	27	25	23	23	22	22	21	18	18	17	20.9	28																							
4-Oct	16	Z	14	14	13	10	10	7	10	10	11	12	14	17	20	19	17	13	14	14	13	11	10	11	13.0	20																							
5-Oct	7	11	Z	13	12	11	10	10	10	11	13	17	21	25	26	28	27	15	8	5	2	2	2	3	12.5	28																							
6-Oct	5	6	10	Z	8	7	5	6	5	4	5	8	9	9	8	9	7	9	15	16	22	21	22	19	10.3	22																							
7-Oct	17	16	17	20	Z	24	25	25	25	26	28	30	31	32	34	35	33	24	11	22	21	16	16	12	23.6	35																							
8-Oct	13	16	18	16	15	Z	5	9	19	21	19	22	23	23	23	24	23	21	20	20	20	19	19	18	18.5	24																							
9-Oct	17	17	16	16	15	14	Z	9	13	14	14	17	21	24	26	25	25	23	24	19	18	19	20	20	18.5	26																							
10-Oct	22	23	23	22	22	22	21	Z	21	22	23	22	27	38	40	40	39	37	34	31	30	35	33	32	28.6	40																							
11-Oct	28	Z	31	34	34	34	35	36	34	33	35	37	39	41	38	37	36	35	32	36	35	34	34	33	34.9	41																							
12-Oct	31	30	Z	29	29	28	27	26	26	27	28	28	30	32	32	32	30	28	29	29	29	30	32	31	29.2	32																							
13-Oct	30	23	13	Z	13	17	11	11	12	25	28	28	28	31	32	31	19	21	26	23	21	24	26	24	22.5	32																							
14-Oct	23	22	26	26	Z	24	25	25	27	27	25	23	25	26	26	25	24	11	9	17	21	22	20	18	22.6	27																							
15-Oct	16	15	14	15	16	Z	13	15	14	15	14	C	C	C	20	21	19	10	12	10	9	7	6	1	13.0	21																							
16-Oct	1	3	6	6	4	4	Z	6	14	19	21	20	20	22	21	22	22	21	19	18	19	18	17	15	14.6	22																							
17-Oct	15	14	14	14	14	13	13	Z	14	15	18	20	23	29	32	32	29	26	25	27	26	25	25	25	21.2	32																							
18-Oct	24	Z	22	21	21	19	18	14	11	13	19	22	24	28	31	31	30	28	18	24	27	27	28	28	22.8	31																							
19-Oct	27	19	Z	5	2	2	3	4	17	21	24	28	33	34	34	34	33	30	28	27	28	28	29	30	22.6	34																							
20-Oct	31	31	27	Z	22	21	20	20	22	24	24	23	22	24	27	25	21	19	18	21	14	12	9	13	21.3	31																							
21-Oct	10	9	7	12	Z	29	31	31	31	31	31	30	30	30	32	33	32	31	25	15	10	9	1	2	21.8	33																							
22-Oct	3	5	6	7	5	Z	5	4	10	28	32	36	41	41	42	39	37	36	37	36	36	35	34	33	25.5	42																							
23-Oct	32	30	29	28	31	26	Z	30	29	28	27	23	21	21	21	20	18	15	14	11	14	18	17	19	22.8	32																							
24-Oct	11	5	5	6	7	10	11	Z	12	12	13	13	14	15	16	17	19	22	20	19	18	18	15	13	13.5	22																							
25-Oct	14	Z	16	17	16	16	16	17	19	20	20	21	26	31	27	25	16	17	16	19	15	14	13	15	18.5	31																							
26-Oct	16	17	Z	19	19	19	20	19	19	19	19	17	17	17	18	18	16	15	16	17	17	17	17	17	17.4	20																							
27-Oct	16	16	16	Z	15	15	13	12	11	12	14	14	15	17	17	16	15	14	13	11	9	8	10	10	13.4	17																							
28-Oct	9	10	14	15	Z	13	13	14	12	12	12	13	16	16	16	17	18	16	16	14	14	14	14	13	13.9	18																							
29-Oct	12	12	11	11	11	Z	11	11	12	14	14	15	16	17	16	16	16	16	17	17	17	17	17	17	14.6	17																							
30-Oct	18	18	18	18	18	18	Z	16	15	15	17	18	22	20	16	14	14	15	16	16	18	19	20	20	17.4	22																							
31-Oct	21	21	21	21	19	18	16	Z	14	13	13	12	11	9	9	9	7	6	6	4	1	0	1	2	11.0	21																							
																								17.1	15.9	16.1	16.4	15.6	17.2	15.2	15.5	17.0	18.8	19.8	20.8	22.6	24.4	24.7	24.5	22.9	20.4	19.0	19.1	18.7	18.6	18.0	17.7	Diurnal Average	
																								32	31	31	34	34	34	35	36	34	33	35	37	41	41	42	40	39	37	37	36	36	35	34	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**  
**Anzac - October 2014**





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

**Ozone (O<sub>3</sub>) - ppb**  
**Anzac - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	423	59.58	59.58
21 - 50	287	40.42	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Anzac - October 2014**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	3	11	17	20	16	56	80	14	13	12	5	13	56	30	21	395
21 - 50	0	0	0	2	2	31	57	54	6	11	2	2	23	68	21	4	283
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>	28	3	11	19	22	47	113	134	20	24	14	7	36	124	51	25	678

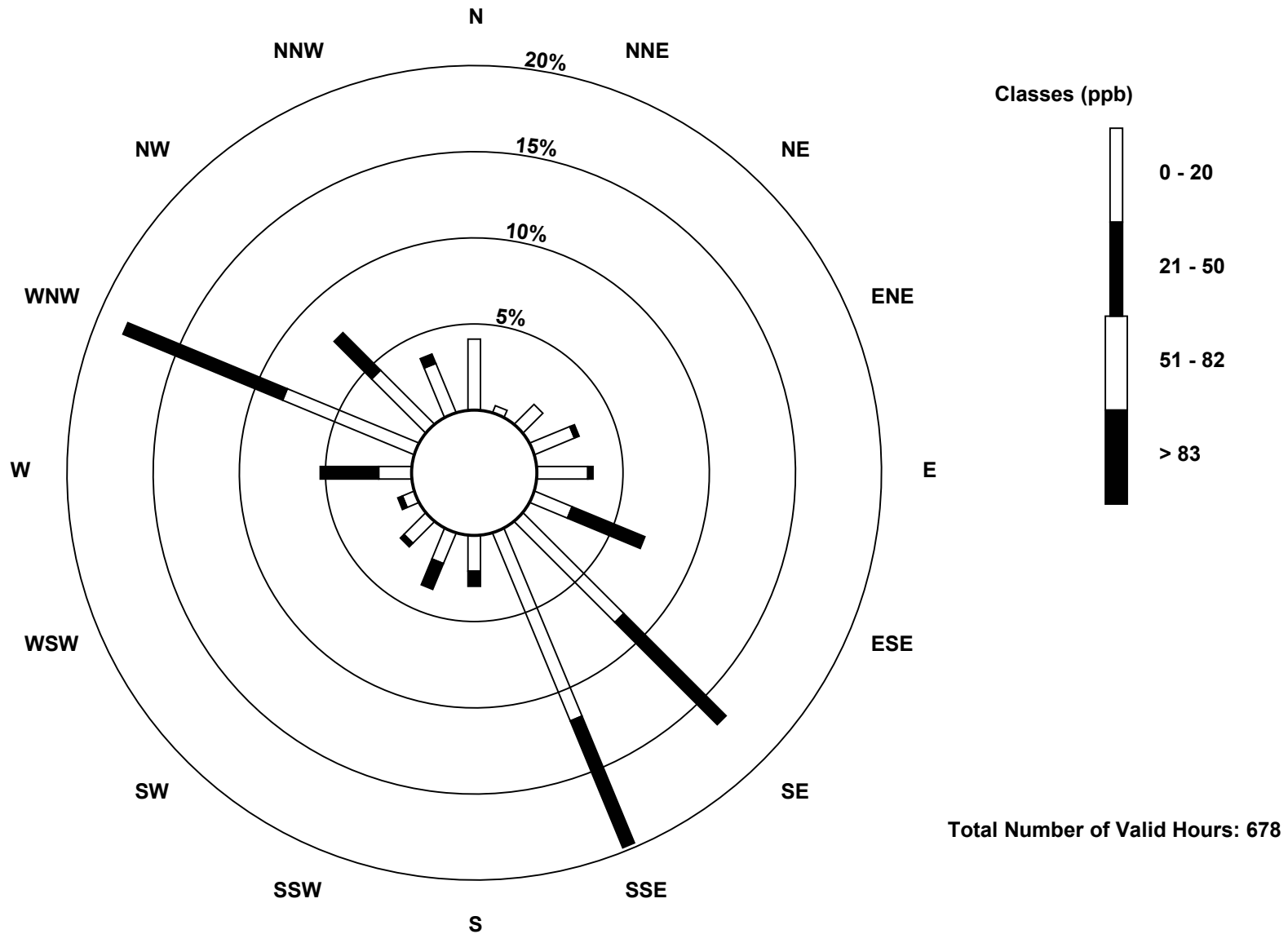
Total Number of Valid Hours: 678

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2014

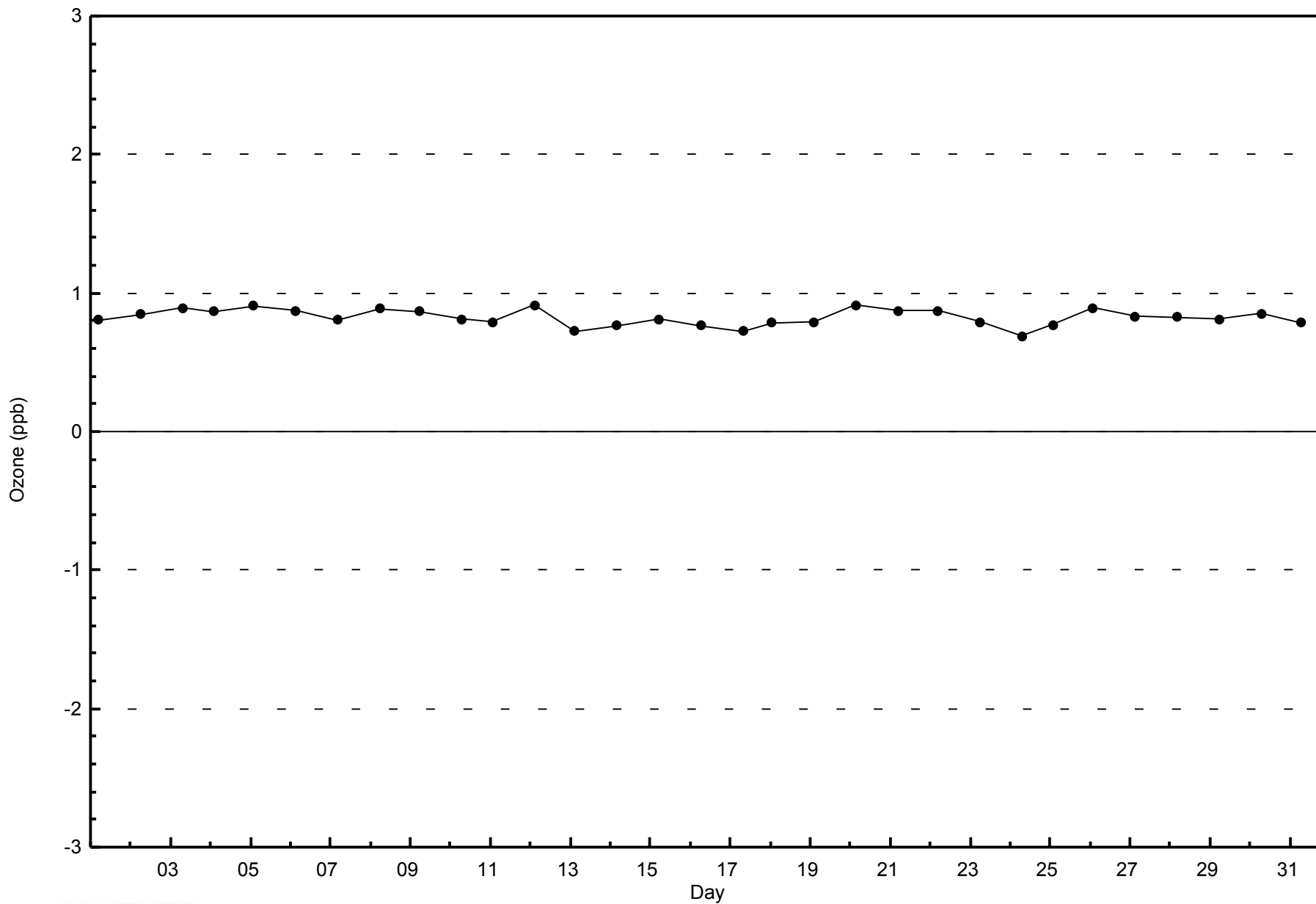
Ozone (O<sub>3</sub>) - ppb  
Anzac (AMS 14)





WBEA  
Zero Responses

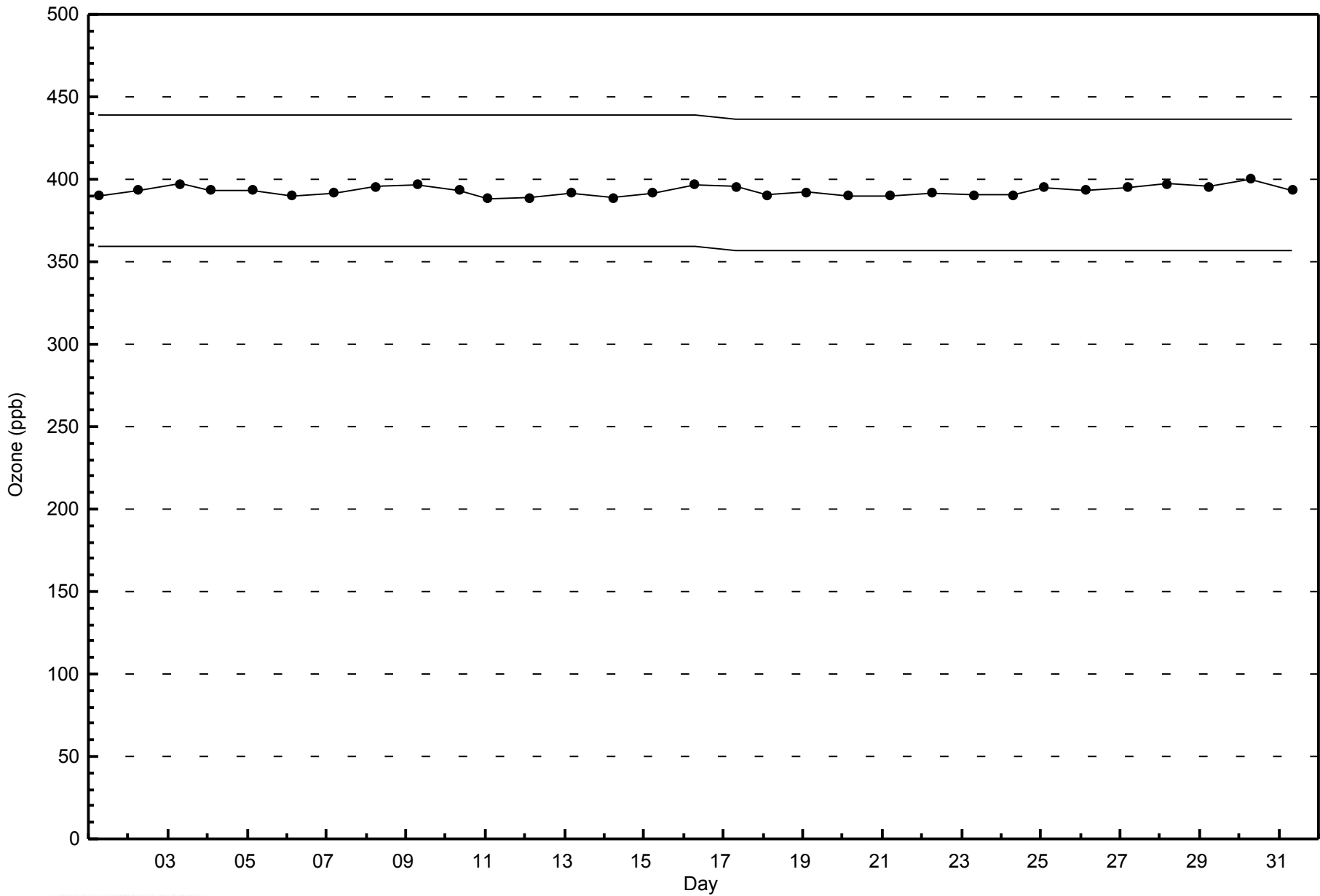
Ozone (O<sub>3</sub>) - ppb  
Anzac - October 2014





WBEA  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Anzac - October 2014





Summary of Hour Averages

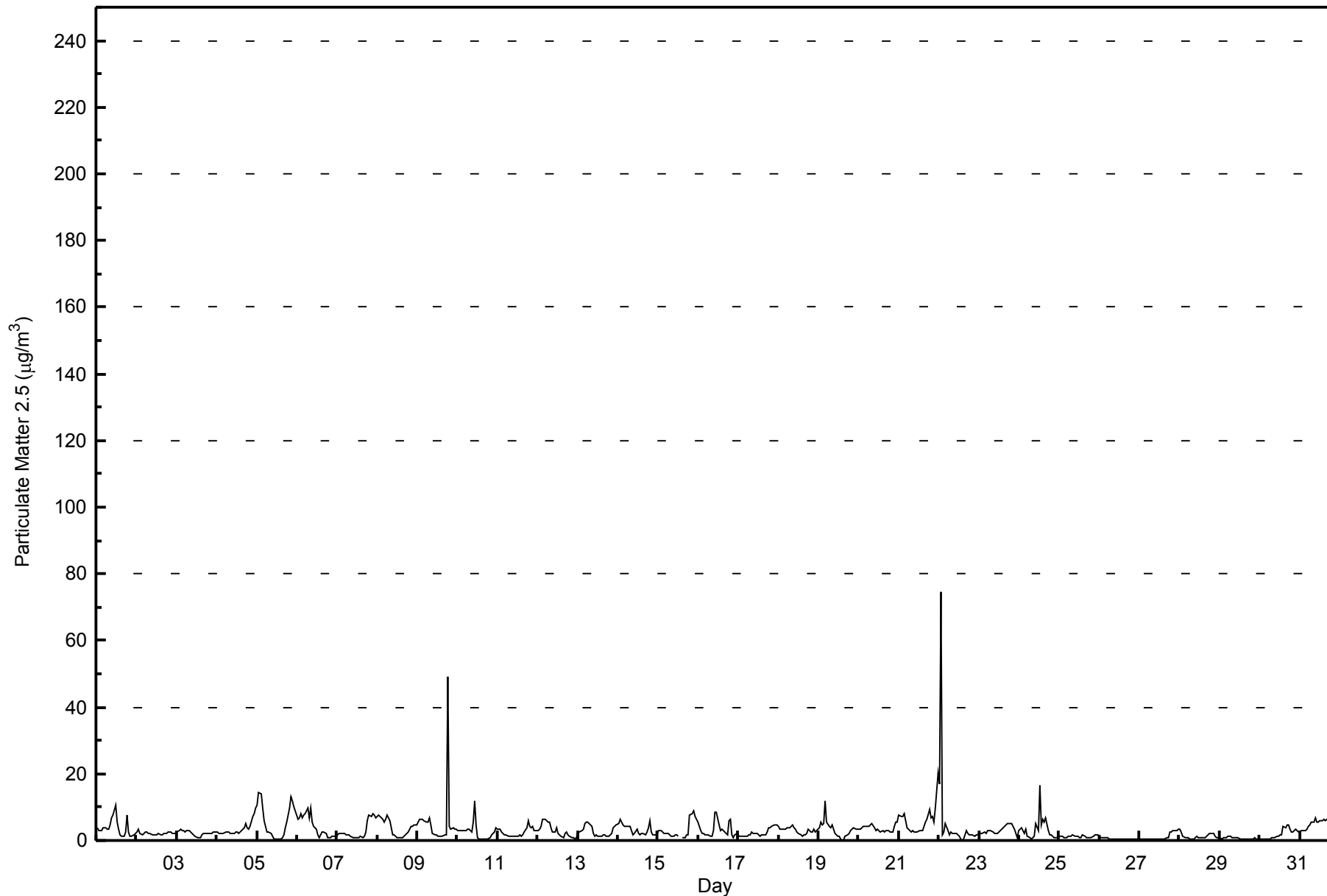
Anzac - October 2014

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 744																																														
Maximum Value: 74.5 µg/m <sup>3</sup> on Oct 22 02:00		Maximum Daily Average: 5.8 µg/m <sup>3</sup> on Oct 21																																														
Minimum Value: 0.0 µg/m <sup>3</sup> on Oct 22 15:00		Hours of Data: 743																																														
Maximum Diurnal Average: 5.9 µg/m <sup>3</sup> at hour 2		Hours of Missing Data: 1																																														
Monthly Average: 3.10 µg/m <sup>3</sup>		Hours of Calibration: 0																																														
Minimum Daily Average: 0.6 µg/m <sup>3</sup> on Oct 26		Percent Operational Time: 99.9																																														
Minimum Diurnal Average: 1.7 µg/m <sup>3</sup> at hour 14																																																
Percentiles: P <sub>1</sub> = 0.4 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 1.3 Median = 2.3 Q <sub>3</sub> = 3.8 P <sub>90</sub> = 6.1 P <sub>99</sub> = 13.5																																																
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-Oct	3.8	3.1	3.0	3.0	4.0	3.7	3.3	3.3	4.5	6.9	7.6	10.6	5.6	3.5	1.8	1.3	1.4	2.7	7.8	2.6	1.2	1.3	1.5	2.0	3.7	10.6																						
2-Oct	2.6	3.3	2.3	1.7	2.2	2.5	2.4	2.1	2.1	1.9	1.7	1.6	1.5	2.0	1.5	1.6	2.0	1.9	2.1	2.7	2.4	2.3	2.0	2.2	2.1	3.3																						
3-Oct	2.4	3.1	3.2	3.1	2.9	2.7	3.0	3.1	2.7	2.1	1.7	1.2	1.0	0.9	0.9	1.5	2.0	2.0	1.9	1.9	2.0	2.1	2.4	2.4	2.2	3.2																						
4-Oct	2.6	2.3	2.2	2.1	2.2	2.5	2.4	2.4	2.2	2.3	2.3	2.5	2.6	2.2	2.4	3.0	3.9	4.9	3.8	3.5	4.3	7.3	8.0	9.8	3.5	9.8																						
5-Oct	10.6	14.2	13.8	9.6	6.0	4.2	2.7	2.5	2.0	1.1	0.6	0.6	0.5	0.5	0.6	0.7	1.9	3.9	5.3	9.6	12.9	11.9	10.3	9.1	5.6	14.2																						
6-Oct	6.3	6.7	8.1	6.9	7.7	8.2	9.7	6.6	9.6	5.5	4.3	3.4	1.8	1.0	1.7	2.5	2.7	2.1	0.9	0.9	1.0	1.1	1.4	1.5	4.2	9.7																						
7-Oct	1.8	2.1	2.2	2.2	2.1	1.9	1.8	1.9	1.3	0.9	0.9	0.9	0.9	0.9	1.2	0.9	1.1	2.7	6.0	7.8	7.1	7.9	7.4	6.8	2.9	7.9																						
8-Oct	7.1	7.5	6.9	6.2	5.6	6.2	7.5	5.9	3.8	1.7	1.5	1.2	0.9	0.7	0.8	0.7	1.1	1.6	2.7	3.3	4.4	4.3	4.6	4.5	3.8	7.5																						
9-Oct	5.5	6.2	6.4	6.4	5.8	5.5	5.6	6.6	4.8	2.2	1.8	1.6	1.4	1.3	1.3	1.4	1.5	1.8	49.4	4.2	3.2	3.7	3.6	3.6	5.6	49.4																						
10-Oct	3.1	3.1	3.0	2.9	3.0	3.1	3.3	3.4	2.6	5.6	11.9	4.8	1.0	0.5	0.5	0.5	0.4	0.4	0.4	0.8	1.8	2.3	2.5	3.7	2.7	11.9																						
11-Oct	3.3	3.4	2.6	2.1	1.8	1.6	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.8	1.4	1.6	2.7	3.8	5.7	4.3	3.9	4.1	3.2	2.9	2.5	5.7																						
12-Oct	3.2	3.4	4.4	6.4	6.3	6.0	5.4	5.4	3.7	2.5	2.5	3.7	2.3	1.5	1.2	1.0	2.1	2.4	1.7	1.4	0.8	0.9	0.6	0.9	2.9	6.4																						
13-Oct	2.4	2.7	3.1	3.5	5.1	5.7	5.4	4.8	4.4	2.0	1.3	1.7	1.4	1.3	1.4	1.6	1.5	1.2	1.2	1.6	1.9	3.9	4.1	4.8	2.8	5.7																						
14-Oct	5.2	6.2	5.3	4.7	4.4	4.4	4.1	4.1	3.1	1.9	2.2	3.3	2.2	1.8	2.0	2.3	1.7	2.4	3.7	5.8	2.7	1.8	1.7	1.7	3.3	6.2																						
15-Oct	3.0	3.1	3.0	2.2	2.1	2.0	2.0	1.6	1.3	1.4	1.6	1.6	1.4	M	0.7	0.8	1.1	1.8	1.8	7.6	8.2	8.8	7.2	6.4	3.1	8.8																						
16-Oct	5.4	3.2	2.2	1.9	1.9	1.8	1.5	1.3	1.4	2.9	8.5	8.6	4.7	3.2	3.4	2.8	2.4	1.7	5.9	6.1	1.6	0.8	1.5	2.3	3.2	8.6																						
17-Oct	1.1	1.1	1.1	1.1	1.1	1.3	1.5	1.7	2.4	2.2	2.2	2.3	1.9	1.4	1.5	1.7	1.7	2.4	3.7	3.9	4.3	4.5	4.5	4.6	2.3	4.6																						
18-Oct	4.1	3.3	3.4	3.3	3.6	3.6	3.7	3.7	4.5	3.9	3.3	2.4	2.1	1.6	1.4	1.6	1.6	2.2	3.5	2.6	2.7	3.3	2.5	3.1	3.0	4.5																						
19-Oct	3.8	5.4	4.5	5.0	11.8	5.7	4.3	3.7	4.7	3.3	1.9	1.4	1.1	0.6	0.1	0.1	1.2	1.6	2.2	2.9	3.4	3.6	3.5	3.3	3.3	11.8																						
20-Oct	3.5	3.2	3.6	4.1	4.4	4.3	4.3	4.5	4.9	3.8	3.2	3.2	2.8	2.4	2.8	2.7	2.9	3.0	2.8	2.7	2.7	4.2	5.7	5.4	3.6	5.7																						
21-Oct	7.5	7.2	7.0	8.0	6.0	3.9	3.2	2.7	2.9	2.5	2.5	2.7	3.0	2.8	2.9	4.3	5.6	6.2	9.2	6.6	7.0	5.7	9.6	20.1	5.8	20.1																						
22-Oct	16.9	74.5	1.6	2.4	4.9	2.9	1.9	2.6	2.0	1.9	2.1	1.8	1.4	0.4	0.0	0.2	2.8	2.2	1.8	1.6	1.8	1.5	1.6	1.8	5.5	74.5																						
23-Oct	2.0	2.3	2.3	2.5	2.3	3.1	3.1	2.9	2.5	2.1	2.0	2.3	2.5	3.1	3.6	4.2	4.6	5.0	5.3	5.0	4.0	3.2	2.1	0.9	3.0	5.3																						
24-Oct	2.8	3.7	2.8	1.9	3.2	1.2	0.9	0.5	0.8	1.2	5.2	3.0	16.6	4.5	6.5	5.4	6.6	2.9	1.8	1.7	1.3	1.0	0.7	0.8	3.2	16.6																						
25-Oct	1.4	1.1	1.1	0.9	1.0	1.1	1.2	1.2	1.5	1.2	1.3	1.3	0.9	0.7	1.6	1.2	0.8	0.8	0.9	0.9	1.1	1.5	1.9	1.5	1.2	1.9																						
26-Oct	1.2	1.0	1.0	0.8	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.6	0.5	0.5	0.4	0.6	1.2																						
27-Oct	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.8	1.0	2.6	2.4	2.9	3.1	3.1	3.5	1.1	3.5																						
28-Oct	3.3	2.7	1.4	1.0	0.8	1.0	0.6	0.6	0.6	0.8	1.2	0.9	1.1	0.9	1.0	0.9	1.1	1.6	2.3	2.2	1.9	1.4	1.0	1.0	1.3	3.3																						
29-Oct	0.7	0.6	0.7	0.8	1.0	1.1	1.2	1.0	0.9	0.9	0.9	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	1.2																						
30-Oct	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	1.2	1.5	1.6	1.7	4.1	3.9	4.6	4.7	3.4	2.6	2.4	3.2	3.0	2.5	1.9	4.7																						
31-Oct	2.7	3.0	2.9	3.1	3.4	4.1	4.7	5.6	5.6	6.6	5.6	5.3	5.8	5.8	6.2	6.1	6.2	6.1	6.5	6.8	6.3	6.0	5.4	5.4	5.2	6.8																						
																								3.9	5.9	3.4	3.3	3.5	3.1	3.0	2.9	2.8	2.4	2.8	2.5	2.4	1.7	1.8	1.9	2.3	2.5	4.8	3.5	3.3	3.5	3.5	3.8	Diurnal Average
																								16.9	74.5	13.8	9.6	11.8	8.2	9.7	6.6	9.6	6.9	11.9	10.6	16.6	5.8	6.5	6.1	6.6	6.2	49.4	9.6	12.9	11.9	10.3	20.1	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 - October 2014





**WBEA**

**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**

**Anzac - October 2014**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	499	67.16	67.16
6 - 15	98	13.19	80.35
16 - 25	3	0.40	80.75
26 - 80	2	0.27	81.02
> 81.0	0	0.00	81.02

Total Number of Valid Hours: 743

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Anzac - October 2014**

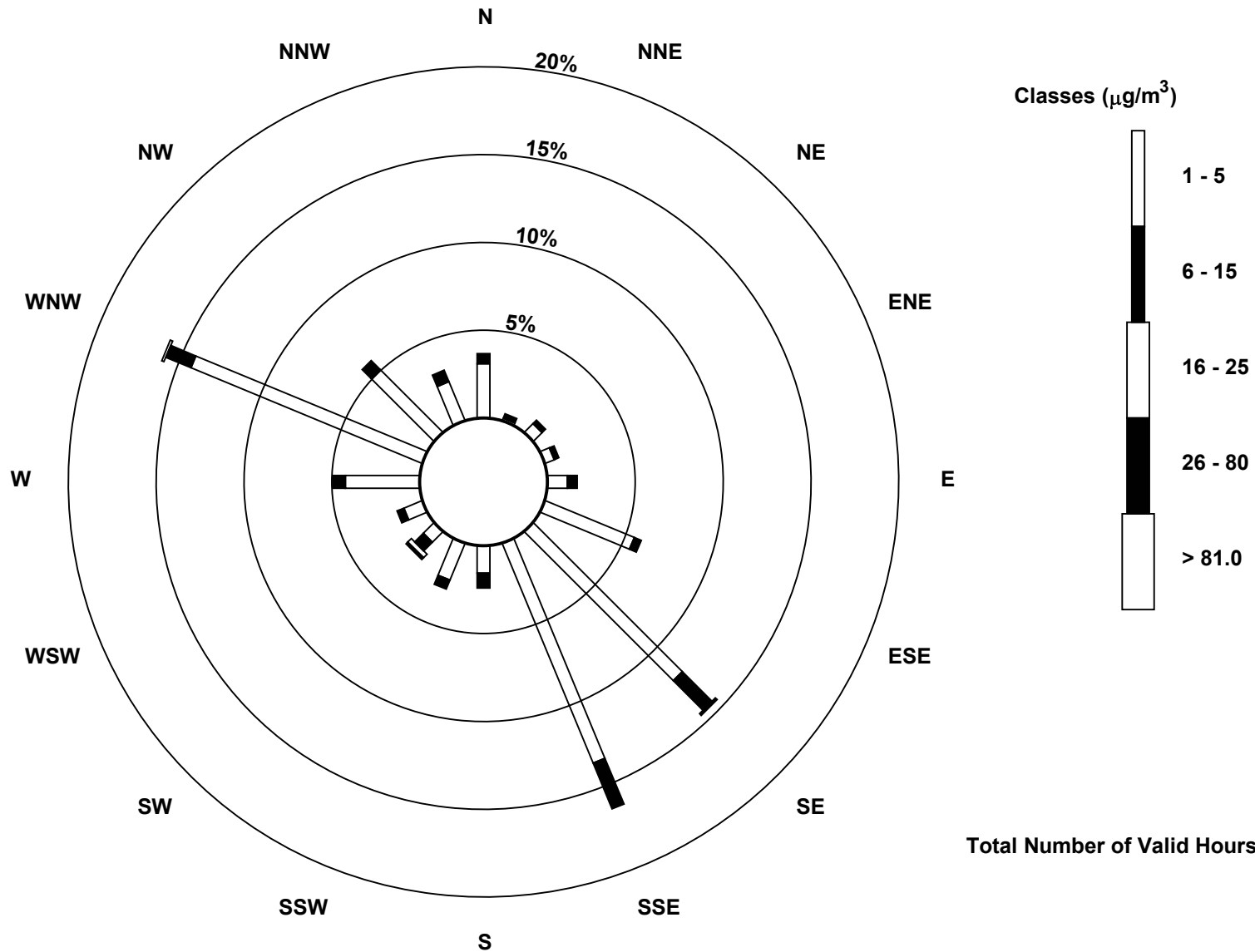
Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	22	1	5	4	8	39	85	96	11	16	6	8	30	101	36	17	485
6 - 15	4	2	2	2	4	3	17	20	6	4	5	3	5	11	5	5	98
16 - 25	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	3
26 - 80	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	26	3	7	6	12	42	103	116	17	20	14	11	35	113	41	22	588

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
 Anzac (AMS 14)



Total Number of Valid Hours: 709



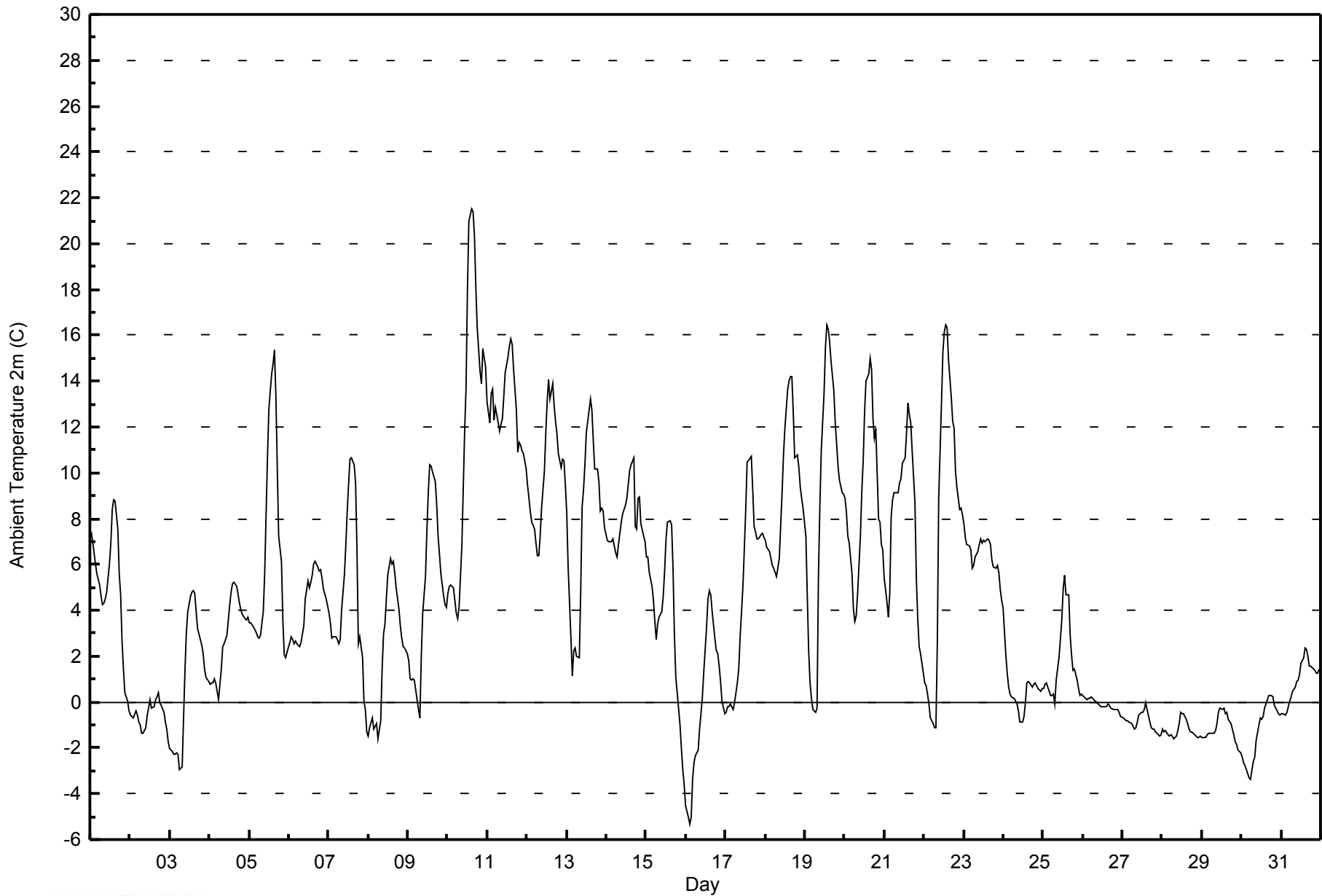


Maximum Value: 21.5 C on Oct 10 15:00		Maximum Daily Average: 12.9 C on Oct 11		Hours in Service: 744																																												
Minimum Value: -5.3 C on Oct 16 03:00		Minimum Daily Average: -1.3 C on Oct 30		Hours of Data: 744																																												
Maximum Diurnal Average: 8.1 C at hour 15		Minimum Diurnal Average: 1.8 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 4.43 C		Percentiles: P <sub>1</sub> = -3.3 P <sub>10</sub> = -1.2 Q <sub>1</sub> = 0.0 Median = 3.6 Q <sub>3</sub> = 7.8 P <sub>90</sub> = 12.1 P <sub>99</sub> = 15.0		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-Oct	7.4	7.0	6.5	6.0	5.6	5.1	4.6	4.3	4.3	4.5	4.8	6.0	7.0	8.4	8.8	8.8	7.5	5.6	4.7	2.7	1.5	0.4	0.0	-0.4	5.0	8.8																						
2-Oct	-0.6	-0.6	-0.7	-0.4	-0.6	-0.9	-1.0	-1.4	-1.3	-1.1	-0.6	-0.2	0.1	-0.3	-0.2	0.1	0.2	0.4	0.0	-0.1	-0.5	-0.9	-1.2	-1.7	-0.6	0.4																						
3-Oct	-2.0	-2.1	-2.3	-2.3	-2.2	-2.3	-2.9	-2.8	-0.7	1.4	3.0	4.0	4.6	4.8	4.9	4.7	4.0	3.2	2.7	2.5	2.1	1.5	1.1	0.9	1.1	4.9																						
4-Oct	0.8	0.8	0.9	1.0	0.8	0.1	0.7	1.5	2.4	2.6	2.9	3.6	4.3	4.8	5.1	5.2	5.1	4.7	4.3	4.0	3.8	3.7	3.6	3.7	2.9	5.2																						
5-Oct	3.4	3.4	3.3	3.2	3.0	2.8	2.8	2.9	4.0	5.6	8.2	10.6	12.8	14.3	14.7	15.4	13.4	10.3	7.2	6.2	3.6	2.0	2.0	2.1	6.6	15.4																						
6-Oct	2.6	2.8	2.7	2.6	2.7	2.5	2.4	2.6	3.0	3.3	4.5	5.3	5.0	5.2	5.5	6.0	6.1	5.9	5.7	5.7	5.4	4.9	4.5	4.2	4.2	6.1																						
7-Oct	3.9	3.5	2.8	2.9	2.8	2.7	2.6	2.8	4.0	5.5	6.8	8.3	9.5	10.6	10.7	10.3	9.5	6.6	2.6	2.8	1.9	0.0	-0.3	-1.3	4.6	10.7																						
8-Oct	-1.5	-1.1	-0.7	-1.2	-1.0	-0.9	-1.6	-0.8	1.5	3.0	3.4	4.5	5.6	6.2	6.0	6.2	5.7	5.0	4.0	3.3	2.8	2.4	2.4	2.1	2.3	6.2																						
9-Oct	1.8	1.0	1.0	1.0	1.0	0.1	-0.3	-0.7	2.0	3.9	5.5	7.5	9.2	10.3	10.3	10.1	9.6	8.6	7.2	6.4	5.6	4.6	4.3	4.1	4.8	10.3																						
10-Oct	4.8	5.0	5.1	5.0	4.4	3.9	3.6	4.1	6.8	9.3	11.8	13.7	18.0	20.9	21.5	21.4	20.4	18.1	16.3	14.4	13.9	15.4	15.0	14.6	12.0	21.5																						
11-Oct	13.1	12.2	13.5	13.6	12.3	12.9	12.2	11.8	12.2	12.4	13.3	14.4	15.1	15.5	15.9	15.6	14.5	12.8	10.9	11.3	11.2	10.9	10.9	10.2	12.9	15.9																						
12-Oct	9.4	8.9	8.3	7.9	7.6	6.9	6.4	6.4	7.2	8.4	10.0	11.7	13.1	14.1	13.2	13.9	12.9	12.2	11.7	10.8	10.3	10.6	10.5	9.5	10.1	14.1																						
13-Oct	8.3	5.9	2.8	1.1	2.3	2.4	2.0	1.9	4.9	8.5	9.3	10.3	11.7	12.7	13.2	12.7	11.4	10.2	10.2	9.6	8.3	8.5	8.4	7.6	7.7	13.2																						
14-Oct	7.1	7.0	7.0	7.0	7.1	6.5	6.3	6.9	7.4	7.8	8.2	8.6	8.9	9.5	10.1	10.4	10.6	7.7	7.5	8.9	9.0	7.8	7.2	7.0	8.0	10.6																						
15-Oct	6.3	6.3	5.7	5.0	4.5	3.5	2.7	3.4	3.7	4.0	4.6	5.7	7.1	7.8	7.9	7.7	5.9	2.9	1.1	0.4	-1.0	-2.0	-3.0	-3.6	3.6	7.9																						
16-Oct	-4.5	-5.1	-5.3	-5.0	-3.4	-2.6	-2.4	-2.1	-1.2	-0.5	0.2	1.3	3.3	4.5	4.9	4.7	3.9	2.7	2.3	2.1	1.6	0.9	0.0	-0.5	0.0	4.9																						
17-Oct	-0.5	-0.2	-0.2	-0.1	-0.3	0.0	0.4	0.8	1.5	2.9	5.1	6.7	8.4	10.5	10.6	10.7	9.2	7.7	7.4	7.1	7.1	7.3	7.4	7.2	4.9	10.7																						
18-Oct	7.1	6.8	6.6	6.3	6.0	5.8	5.6	5.5	6.2	7.7	9.2	10.8	11.9	13.7	14.0	14.2	14.2	12.6	10.7	10.8	10.2	9.4	8.9	8.4	9.3	14.2																						
19-Oct	7.3	4.7	2.2	0.8	0.1	-0.3	-0.5	-0.2	5.4	8.5	11.0	13.5	15.5	16.5	16.3	15.7	14.9	13.6	12.2	11.3	10.3	9.7	9.2	9.1	8.6	16.5																						
20-Oct	8.9	8.3	7.2	7.0	5.6	4.1	3.5	3.8	4.7	7.2	9.2	10.5	12.7	14.0	14.3	15.0	14.5	12.4	11.5	12.0	8.0	7.9	6.9	6.6	9.0	15.0																						
21-Oct	5.4	4.4	3.7	4.8	8.1	8.8	9.1	9.1	9.1	9.5	9.7	10.4	10.7	11.7	13.1	12.5	12.2	10.9	8.7	5.4	3.7	2.4	2.1	1.3	7.8	13.1																						
22-Oct	0.8	0.7	0.4	-0.1	-0.7	-1.0	-1.1	-1.1	2.6	8.9	13.1	15.3	16.1	16.5	16.3	14.9	13.3	12.2	11.9	10.1	9.3	8.4	8.5	8.2	7.6	16.5																						
23-Oct	7.8	7.2	6.9	6.8	6.6	5.8	6.0	6.3	6.5	6.8	7.1	6.9	7.1	7.0	7.1	7.1	6.8	6.2	5.9	5.8	6.0	5.7	5.0	4.5	6.5	7.8																						
24-Oct	4.1	2.0	1.3	0.7	0.4	0.2	0.2	0.0	-0.1	-0.4	-0.9	-0.9	-0.6	0.0	0.8	0.9	0.8	0.7	0.8	0.9	0.7	0.6	0.5	0.6	0.5	4.1																						
25-Oct	0.6	0.8	0.9	0.6	0.3	0.3	0.4	-0.1	1.0	1.9	2.7	3.6	4.9	5.6	4.7	4.7	2.9	2.0	1.4	1.5	1.0	0.6	0.3	0.3	1.8	5.6																						
26-Oct	0.3	0.3	0.1	0.1	0.1	0.2	0.1	0.0	0.0	-0.1	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	-0.4	-0.6	-0.1	0.3																						
27-Oct	-0.7	-0.8	-0.8	-0.8	-0.9	-0.9	-1.0	-1.2	-1.1	-0.9	-0.6	-0.5	-0.4	-0.3	0.0	-0.3	-0.9	-1.1	-1.2	-1.2	-1.3	-1.4	-1.5	-1.4	-0.9	0.0																						
28-Oct	-1.2	-1.3	-1.3	-1.4	-1.5	-1.4	-1.5	-1.6	-1.5	-1.2	-1.0	-0.4	-0.5	-0.5	-0.8	-0.9	-1.2	-1.3	-1.3	-1.4	-1.5	-1.5	-1.5	-1.5	-1.2	-0.4																						
29-Oct	-1.5	-1.6	-1.6	-1.4	-1.4	-1.4	-1.4	-1.4	-1.3	-0.9	-0.5	-0.3	-0.3	-0.2	-0.5	-0.5	-0.7	-1.0	-1.2	-1.4	-1.7	-1.9	-2.1	-2.2	-1.2	-0.2																						
30-Oct	-2.4	-2.7	-2.7	-3.0	-3.3	-3.4	-3.0	-2.6	-2.4	-1.6	-1.0	-0.7	-0.8	-0.6	-0.3	0.1	0.3	0.3	0.3	0.2	-0.1	-0.4	-0.5	-0.6	-1.3	0.3																						
31-Oct	-0.5	-0.5	-0.6	-0.5	-0.2	0.0	0.2	0.5	0.6	0.9	1.0	1.2	1.7	1.9	2.3	2.3	2.0	1.6	1.5	1.5	1.4	1.2	1.2	1.4	0.9	2.3																						
																								3.1	2.7	2.3	2.2	2.1	1.9	1.8	1.9	2.9	4.1	5.2	6.2	7.1	7.9	8.1	8.0	7.4	6.2	5.4	4.9	4.3	3.8	3.5	3.2	Diurnal Average
																								13.1	12.2	13.5	13.6	12.3	12.9	12.2	11.8	12.2	12.4	13.3	15.3	18.0	20.9	21.5	21.4	20.4	18.1	16.3	14.4	13.9	15.4	15.0	14.6	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature 2m (AT 2m) - C**  
**Anzac - October 2014**





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

**Ambient Temperature 2m (AT 2m) - C**  
**Anzac - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	189	25.40	25.40
0 - 10	430	57.80	83.20
10 - 20	121	16.26	99.46
> 20	4	0.54	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

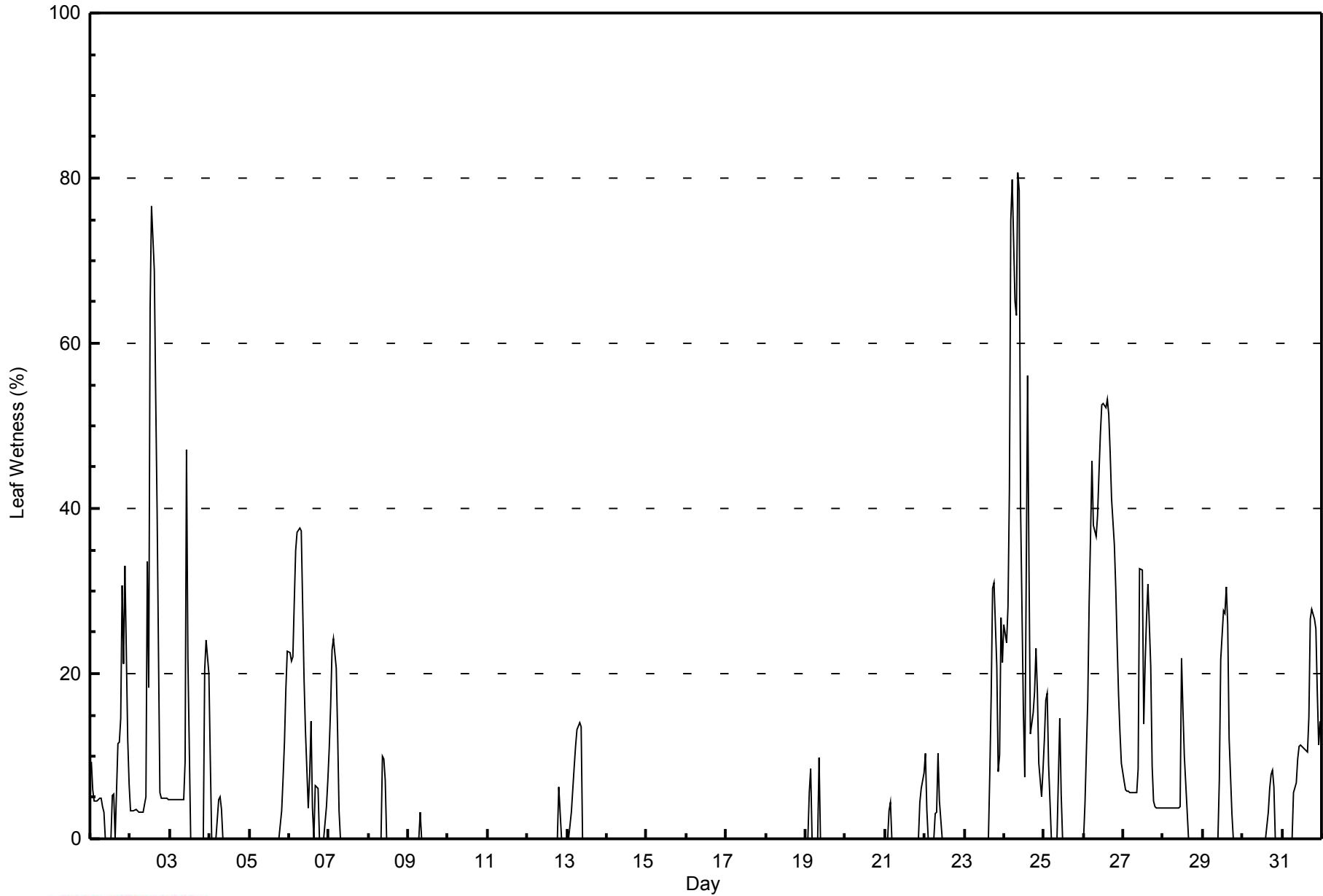


Maximum Value: 81 % on Oct 24 09:00										Maximum Daily Average: 35.6 % on Oct 24										Hours in Service: 744																												
Minimum Value: 0 % on Oct 1 10:00										Minimum Daily Average: 0.0 % on Oct 10										Hours of Data: 744																												
Maximum Diurnal Average: 8.3 % at hour 15										Minimum Diurnal Average: 3.5 % at hour 2										Hours of Missing Data: 0																												
Monthly Average: 5.8 %										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 5 P <sub>90</sub> = 21 P <sub>99</sub> = 62										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-Oct	9	6	5	5	5	5	5	4	3	0	0	0	5	5	0	12	12	15	31	21	33	12	7	8.3	33																							
2-Oct	3	3	3	3	3	3	3	3	3	5	33	18	64	77	69	53	40	22	6	5	5	5	5	5	18.4	77																						
3-Oct	5	5	5	5	5	5	5	5	5	9	47	22	0	0	0	0	0	0	0	0	20	24	20	7.7	47																							
4-Oct	10	0	0	0	0	5	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	10																							
5-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	7	12	18	23	2.6	23																						
6-Oct	23	21	22	29	35	37	38	37	28	19	13	4	8	14	4	0	6	6	0	0	0	0	4	7	14.8	38																						
7-Oct	11	16	23	24	21	13	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.6	24																							
8-Oct	0	0	0	0	0	0	0	0	10	10	7	0	0	0	0	0	0	0	0	0	0	0	0	1.1	10																							
9-Oct	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	3																							
10-Oct	0	0	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-Oct	0	0	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-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0.3	6																							
13-Oct	0	0	3	6	9	11	13	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.9	14																							
14-Oct	0	0	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-Oct	0	0	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-Oct	0	0	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-Oct	0	0	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-Oct	0	0	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-Oct	0	0	6	9	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	10																							
20-Oct	0	0	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-Oct	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	8	1.1	8																							
22-Oct	10	4	0	0	0	0	3	3	10	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1.5	10																							
23-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	17	30	31	21	8	10	27	21	7.3	31																							
24-Oct	26	24	28	42	75	80	65	63	81	78	40	15	7	31	56	33	13	15	18	23	18	9	5	8	35.6	81																						
25-Oct	12	17	18	9	0	0	0	0	0	15	5	0	0	0	0	0	0	0	0	0	0	0	0	3.1	18																							
26-Oct	0	4	17	29	37	46	38	37	39	44	49	53	53	52	53	51	47	41	36	30	24	17	13	9	34.1	53																						
27-Oct	7	6	6	6	6	6	6	6	6	8	33	33	14	21	27	31	21	9	5	4	4	4	4	4	11.3	33																						
28-Oct	4	4	4	4	4	4	4	4	4	4	4	22	16	10	3	0	0	0	0	0	0	0	0	3.8	22																							
29-Oct	0	0	0	0	0	0	0	0	0	0	7	22	28	27	30	26	12	3	0	0	0	0	0	6.5	30																							
30-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	6	8	8	6	0	0	0	0	1.3	8																							
31-Oct	0	0	0	0	0	0	0	6	7	10	11	11	11	11	11	11	15	27	28	27	25	18	11	14	10.5	28																						
																								3.9	3.5	4.6	5.6	6.4	6.9	6.1	6.1	7.1	6.7	8.1	6.4	6.5	8.0	8.3	7.0	6.1	5.6	4.7	5.0	3.6	4.3	4.2	4.1	Diurnal Average
																								26	24	28	42	75	80	65	63	81	78	49	53	64	77	69	53	47	41	36	31	25	33	27	23	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Leaf Wetness (SW) - %**  
**Anzac - October 2014**





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

**Leaf Wetness (SW) - %**  
**Anzac - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	494	66.40	66.40
0.4 - 0.5	0	0.00	66.40
0.6 - 0.7	0	0.00	66.40
0.8 - 1.4	0	0.00	66.40
1.5 - 10	121	16.26	82.66
> 10	129	17.34	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

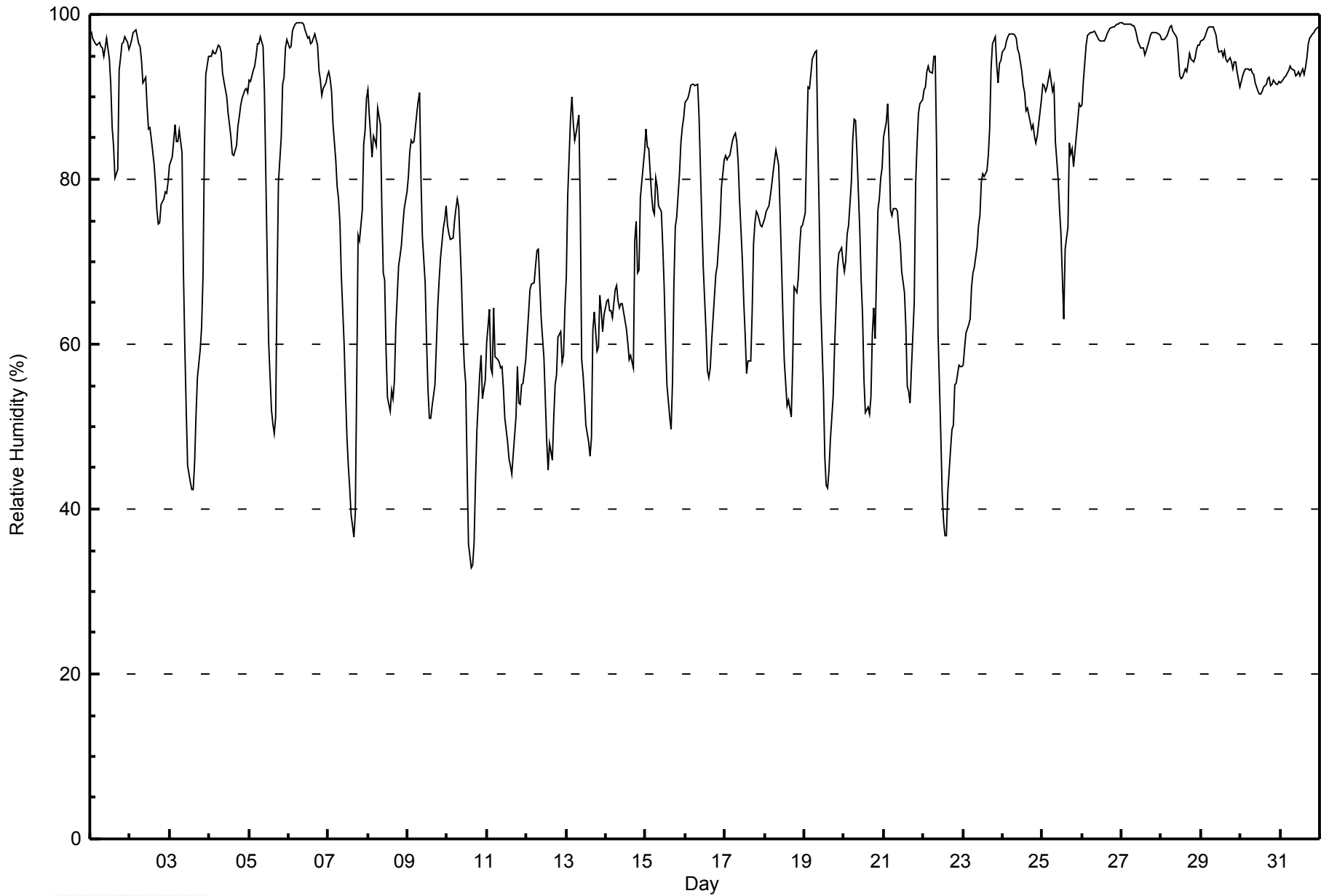


Maximum Value: 99 % on Oct 6 08:00																		Maximum Daily Average: 97.6 % on Oct 27																		Hours in Service: 744	
Minimum Value: 33 % on Oct 10 15:00																		Minimum Daily Average: 54.6 % on Oct 11																		Hours of Data: 744	
Maximum Diurnal Average: 87.6 % at hour 7																		Minimum Diurnal Average: 65.3 % at hour 15																		Hours of Missing Data: 0	
Monthly Average: 78.6 %																		Percentiles: P <sub>1</sub> = 38 P <sub>10</sub> = 54 Q <sub>1</sub> = 65 Median = 83 Q <sub>3</sub> = 93 P <sub>90</sub> = 97 P <sub>99</sub> = 99																		Hours of Calibration: 0	
																																				Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Oct	98	97	97	96	96	97	96	96	95	96	97	95	92	86	84	80	81	93	95	97	97	97	97	96	93.7	98											
2-Oct	96	97	98	98	97	96	96	94	92	92	89	86	86	85	82	79	76	75	75	77	78	79	78	80	86.7	98											
3-Oct	82	83	85	87	85	84	86	83	69	60	52	45	43	42	42	46	51	56	59	62	68	83	93	95	68.4	95											
4-Oct	95	95	96	95	95	96	96	95	93	92	90	88	87	85	83	83	84	86	88	89	90	91	91	91	90.6	96											
5-Oct	92	92	93	94	95	96	97	97	96	90	80	70	60	52	50	49	51	67	80	85	92	92	96	97	81.8	97											
6-Oct	96	96	98	98	99	99	99	99	99	99	98	97	97	96	97	97	98	96	93	92	90	91	92	92	96.2	99											
7-Oct	93	92	91	87	82	79	78	75	68	60	54	49	45	42	39	37	40	55	73	72	76	84	86	90	68.7	93											
8-Oct	91	88	83	85	85	84	89	87	76	69	68	59	54	52	54	53	56	62	69	71	72	74	77	79	72.3	91											
9-Oct	80	83	85	84	85	88	90	90	80	73	67	60	55	51	51	53	55	60	65	68	71	74	75	77	71.6	90											
10-Oct	74	73	73	73	75	76	78	77	67	62	58	55	45	36	33	33	36	43	50	56	59	53	55	56	58.1	78											
11-Oct	60	64	57	56	64	58	58	58	57	57	55	51	48	46	45	44	47	51	57	53	53	55	55	58	54.6	64											
12-Oct	61	64	67	67	68	70	71	72	67	63	58	53	48	45	48	46	51	55	56	61	61	58	59	64	59.7	72											
13-Oct	68	78	87	90	87	85	86	88	77	58	56	54	50	48	47	49	62	64	59	60	66	64	61	64	66.9	90											
14-Oct	65	65	64	64	63	67	67	65	64	65	65	63	62	60	58	59	57	72	75	69	69	78	82	83	66.7	83											
15-Oct	86	84	84	78	76	76	80	79	77	76	72	67	61	55	51	50	55	67	74	75	81	84	86	88	73.5	88											
16-Oct	89	90	90	91	92	91	91	91	88	81	75	69	62	57	56	57	60	66	69	70	72	75	79	82	76.8	92											
17-Oct	83	82	83	83	85	85	86	85	82	78	70	65	61	56	58	58	64	72	75	76	76	74	74	75	74.4	86											
18-Oct	75	76	77	78	79	81	82	84	82	76	70	64	58	53	53	52	51	58	67	66	68	72	74	74	69.6	84											
19-Oct	76	84	91	91	93	95	95	96	85	76	65	55	46	43	43	45	48	54	60	64	69	71	72	70	70.2	96											
20-Oct	69	70	73	74	80	85	87	87	83	74	68	64	56	52	52	51	54	61	64	61	76	78	80	81	70.0	87											
21-Oct	85	87	89	84	76	76	76	77	76	74	72	69	66	62	55	54	53	57	65	79	84	88	89	90	74.4	90											
22-Oct	91	91	93	94	93	93	95	95	83	62	49	42	38	37	37	42	47	50	50	55	55	57	57	57	65.2	95											
23-Oct	57	59	61	62	63	67	69	69	72	74	76	80	81	80	81	83	86	94	96	97	94	92	94	94	78.4	97											
24-Oct	95	96	97	97	98	98	98	97	97	96	95	93	91	91	88	89	88	86	87	85	84	85	88	90	92.0	98											
25-Oct	92	91	91	91	93	92	91	91	85	80	76	73	68	63	71	74	84	83	84	81	85	87	89	89	83.6	93											
26-Oct	89	92	96	97	98	98	98	98	98	97	97	97	97	97	97	98	98	98	98	99	99	99	99	99	97.1	99											
27-Oct	99	99	99	99	99	99	99	99	98	98	97	96	96	96	95	96	97	97	98	98	98	98	98	98	97.6	99											
28-Oct	97	97	97	97	98	98	99	98	97	97	95	93	92	92	93	93	94	95	95	94	95	96	96	96	95.7	99											
29-Oct	97	97	97	98	98	98	99	98	98	97	96	95	96	95	96	95	94	95	94	93	94	94	93	91	95.8	99											
30-Oct	92	93	93	93	93	93	93	93	93	92	91	90	90	91	91	92	92	92	91	92	92	92	92	92	92.0	93											
31-Oct	92	92	92	93	93	93	94	93	93	93	93	93	92	93	93	94	95	96	97	98	98	98	98	99	94.3	99											
																		84.4 85.4 86.3 86.4 86.5 86.9 87.6 87.3 83.5 79.2 75.6 71.9 68.5 65.8 65.3 65.4 67.9 72.9 76.1 77.3 79.4 81.1 82.4 83.4																		Diurnal Average	
																		99 99 99 99 99 99 99 99 99 99 99 98 97 97 97 98 98 98 98 99 99 99 99 99																		Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Anzac - October 2014**







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

**Relative Humidity (RH) - %**  
**Anzac - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	10	1.34	1.34
40 - 60	132	17.74	19.09
60 - 80	194	26.08	45.16
80 - 100	408	54.84	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 22 km/h on Oct 17 13:00	Maximum Daily Speed Average: 15.6 km/h on Oct 17	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 5 01:00	Minimum Daily Speed Average: 0.6 km/h on Oct 4	Hours of Data: 710
Maximum Diurnal Speed Average: 2.7 km/h at hour 22	Minimum Diurnal Speed Average: 1.0 km/h at hour 17	Hours of Missing Data: 34
Monthly Average Velocity: 1.8 km/h 187.3 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> = 14 P <sub>99</sub> = 20	Percent Operational Time: 95.4

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-Oct	N4	N5	N6	N4	N4	N3	NNE3	NE5	ENE6	ENE5	ESE6	E6	NE6	N5	NNW7	NNW5	N9	NNW5	NNW8	N9	N13	NNW13	AF	AF	N5.0	NNW13	
2-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNW15	NW13	AF	NW12	NW14	NW15	NW14	NW13	NW13	NW13	NW11	NW11	NW10	---	NW15	
3-Oct	NW10	NW9	NW9	NNW10	NW10	NNW7	W4	WSW5	WSW5	SSW4	SSW2	S3	SSW6	SSW8	S6	SSE7	SSE11	SSE12	SSE10	SSE12	SSE12	SSE10	SE10	SE13	SSW3.5	SE13	
4-Oct	SE13	SE12	SE10	SSE9	SSE9	SSE6	S4	W3	NW6	NW5	NW5	NNW5	W5	W4	W3	NNW3	N3	N3	N4	N4	N4	NW2	NW3	W3	SSW0.6	SE13	
5-Oct	NNW1	WNW3	WSW5	SW5	SW4	SSW6	S4	SW4	WNW8	WNW9	WNW10	NNW10	NNW11	NW11	NNW11	NNW12	NNW12	N6	N6	NNW4	NW3	N4	N3	NNW2	WNW4.9	NNW12	
6-Oct	NW1	E3	NNE2	NE2	SSE2	SSE4	E4	ESE6	WSW3	WSW5	W4	NNW7	NW10	NNW12	NW10	NW10	NNW9	NW11	NW14	NNW13	NW13	NW12	NW11	NNW12	NW5.6	NW14	
7-Oct	NNW11	NNW12	NW10	NNW11	NNW12	NNW11	NNW13	NNW13	NW11	NW11	NW10	NW11	NNW11	NNW12	NNW12	NW12	NNW9	NNW5	NNE4	ENE9	ESE5	SE6	SSE7	SSE6	NW7.1	NNW13	
8-Oct	SSE7	SSE7	SSE7	SSE7	SSE7	S6	SSE5	SSE6	SSE7	SSE10	SSE9	SSE10	SE10	ESE9	ESE8	SE8	SE6	SE6	SE6	ESE8	SE10	SE8	SE8	SE7	SE7.2	SE10	
9-Oct	SE6	SE7	SSE8	SSE9	SSE8	SE8	SE7	SE6	SE8	ESE8	SE9	SE9	SE10	SSE10	SE11	SE10	ESE8	SE7	SE7	SE9	SSE10	SE10	SSE11	SE11	SE8.5	SE11	
10-Oct	SSE15	SE11	SE11	SE9	SE11	SSE11	SSE10	SSE9	SSE7	SE7	SE8	SE8	SSE8	SSW12	SSW15	SSW14	S11	S12	S14	SSE12	S13	SSW13	SSW11	SW16	S9.8	SW16	
11-Oct	SW6	W6	NNW10	W12	W6	W13	W15	W17	W19	NNW17	NNW15	NNW13	NNW14	NNW13	NNW13	W13	NNW10	W7	W8	W10	W13	NNW14	NNW14	NNW14	W11.9	W19	
12-Oct	NNW12	NNW12	NNW12	NNW12	NNW13	NNW13	NNW12	NNW12	NNW12	NNW12	NNW10	NNW11	NNW12	NNW11	NNW8	W10	W7	W7	NNW9	NNW9	NNW7	W9	NNW11	NNW9	WNW10.5	NNW13	
13-Oct	NNW7	WSW5	SSE2	WSW2	W7	NNW7	SW5	SSW4	SSW3	WSW3	NNW3	W3	NNW3	NNW7	NNW4	NNW3	E2	ESE6	ESE8	SE8	SSE8	SSE9	SE8	ESE8	SSW1.4	SSE9	
14-Oct	ESE8	SE9	ESE9	SE10	SE10	SSE7	SE8	ESE9	ESE10	ESE11	ESE12	SE6	ESE7	SE6	SE4	SSW4	SSW4	SW4	NNW7	NNW11	NNW14	NNW10	NNW10	NNW10	SE3.4	NNW14	
15-Oct	NNW8	NNW12	NW10	NW11	NW10	NW8	NNW7	NNW10	NW9	NNW11	NW9	NNW7	NNW8	NW9	NNW9	NNW9	NNW8	NNW6	N6	N6	NW3	NW4	NNW3	N1	NW7.3	NNW12	
16-Oct	N2	N2	N1	SSW2	S2	SSE1	ENE2	E2	NE1	ESE5	SE6	S5	S3	ESE6	ESE9	ESE8	ESE9	ESE9	SE9	SE10	SE12	SSE14	SE13	SE13	SE5.3	SSE14	
17-Oct	SE12	SSE14	SSE13	SSE14	SSE12	SE11	SE13	SE14	SE16	SSE15	SSE17	SSE20	SSE22	SSE20	SSE20	SSE21	SSE20	SSE19	SSE17	SE14	SE14	SSE15	SSE14	SSE10	SSE15.6	SSE22	
18-Oct	SE12	SE11	SE11	SE11	SE9	SSE8	SSE6	SSE4	SSE3	NNW2	NNW6	NNW8	NNW6	NNW6	NNW7	W6	W8	W4	WSW4	NNW6	W7	NNW7	NNW7	NNW7	SW2.5	SSE12	
19-Oct	W6	W5	WSW4	SW4	SW3	S3	S5	SSE7	SSE11	SSE12	SE10	SE10	SE11	SE12	SE14	SSE11	SE11	SE10	SE10	SE11	SSE13	SE14	SE13	SE14	SSE8.0	SE14	
20-Oct	SSE14	SE11	ESE10	ESE10	ESE8	ESE7	ESE6	SE10	SSE10	SSE8	SSE5	SE6	E6	SE5	SE6	SSE8	SSE9	SSE10	S10	SSE9	SSE4	S6	E1	SSE5	SE7.1	SSE14	
21-Oct	SSW5	S3	SSW4	W7	NNW10	NNW9	NNW10	NNW9	NNW10	NNW10	NNW10	NNW7	W7	NNW7	NNW8	NNW6	NNW6	W6	W6	SW4	SSW4	SW4	SSW5	SW5	W5.7	NNW10	
22-Oct	SW5	SW5	SSW3	SSW4	SSW4	SSW4	S4	S6	SSE8	SSE9	SSE9	SSE11	SSE13	SSE14	SSE13	SE10	SE9	SE13	SE12	SSE9	SE9	SSE9	SE10	SE10	SSE7.8	SSE14	
23-Oct	SE10	ESE8	SE10	SE9	SE9	ESE7	ESE8	ESE11	ESE11	E10	ESE14	ESE15	ESE15	ESE11	ESE9	SE6	SE6	SSE5	S6	SSE4	WSW8	W13	NNW13	NNW14	SE5.7	ESE15	
24-Oct	W17	NNW19	NNW18	NNW17	NNW17	NNW16	NNW18	NNW16	NNW16	NNW16	NNW16	NNW16	NNW16	NNW16	NNW16	NNW16	NNW16	NNW16	NNW16	NNW16	NNW16	NNW16	NNW16	NNW16	NNW16	WNW15.6	NNW20
25-Oct	NNW13	NW12	NNW12	NNW12	NW10	NNW11	NNW10	NNW9	NNW9	NNW9	NNW9	NNW5	SSE5	SSW4	NNW2	ENE4	ENE7	E8	ESE7	ESE7	ESE6	ESE5	E5	E7	NW3.0	NNW13	
26-Oct	E5	ESE6	E8	E9	E11	E10	E8	ENE9	ENE9	ENE9	ENE8	ENE7	NE8	NE7	NE7	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	E11	
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N7	N7	N6	NNW6	NNW5	NNW4	NNW3	NNW3	NNW2	NW2	NNW2	N2	E1	---	N7
28-Oct	E2	SSE1	SE4	SSE4	SE4	SE5	SSE6	SSE5	SE5	SSE6	SSE6	SSE6	SE7	SE7	SE7	SE7	SE7	ESE6	SE6	SE6	ESE6	ESE6	ESE5	E5	SE5.2	SE7	
29-Oct	E5	E5	ENE6	ENE5	NE4	NE5	NE6	NE6	NE7	ENE7	NE6	ENE6	ENE6	E6	ENE6	ENE6	E6	E5	ESE5	SE6	SE6	SE7	SE7	SSE8	E5.1	SSE8	
30-Oct	SSE8	SSE8	SSE9	SE9	SSE9	SSE10	SSE12	SSE15	SSE16	SSE17	SSE17	SSE18	SSE14	SSE13	SSE14	SSE13	SSE13	SSE15	SSE18	SSE19	SSE19	SSE19	SSE20	SSE19	SSE14	SSE14.1	SSE20
31-Oct	SSE15	SSE15	SSE13	SSE14	SSE12	SE11	SE10	SSE9	SE7	SE9	SE9	SE8	SSE6	SSE6	SE6	SE6	SE6	SSE7	S5	SSE4	SSE4	S4	SSW4	W4	SSE7.7	SSE15	

S2.3	S1.9	S1.6	S1.8	S1.8	SSW1.7	S1.6	S1.9	SSW1.6	S1.6	S1.8	SSW1.2	SSW1.3	SSW1.9	SW1.4	SSW1.5	SSE1.0	SSE1.8	S2.0	SSE2.1	S2.5	SSW2.7	S2.5	SSW2.5	Diurnal Average
W17	NNW19	NNW18	NNW17	NNW16	NNW18	NNW16	W17	W19	SSE17	SSE17	SSE20	SSE22	SSE20	SSE20	SSE21	SSE20	NNW20	SSE18	SSE19	SSE19	SSE20	SSE19	SW16	Diurnal Maximum

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



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

**Wind Speed (WS) - km/h**  
**Anzac - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 8 km/h on Oct 24 02:00	Hours of Data: 710
Minimum Value: 0 km/h on Oct 21 21:00	Hours of Missing Data: 34
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 7	Hours of Calibration: 0
	Percent Operational Time: 95.4

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

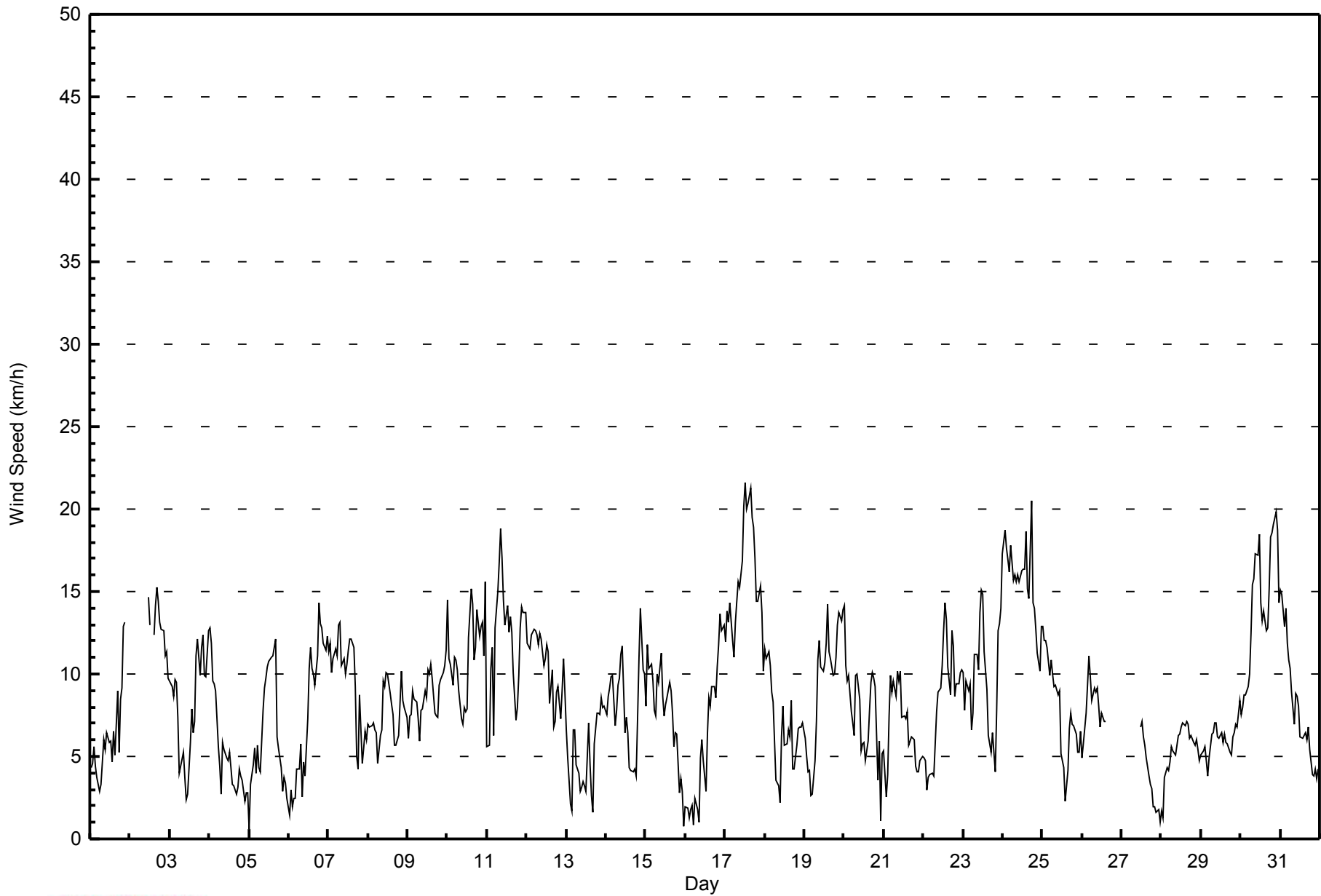
Diurnal Maximum

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Anzac - October 2014**





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

**Wind Speed (WS) - km/h**  
**Anzac - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	167	23.52	23.52
6 - 11	376	52.96	76.48
12 - 19	159	22.39	98.87
20 - 28	8	1.13	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Anzac - October 2014**

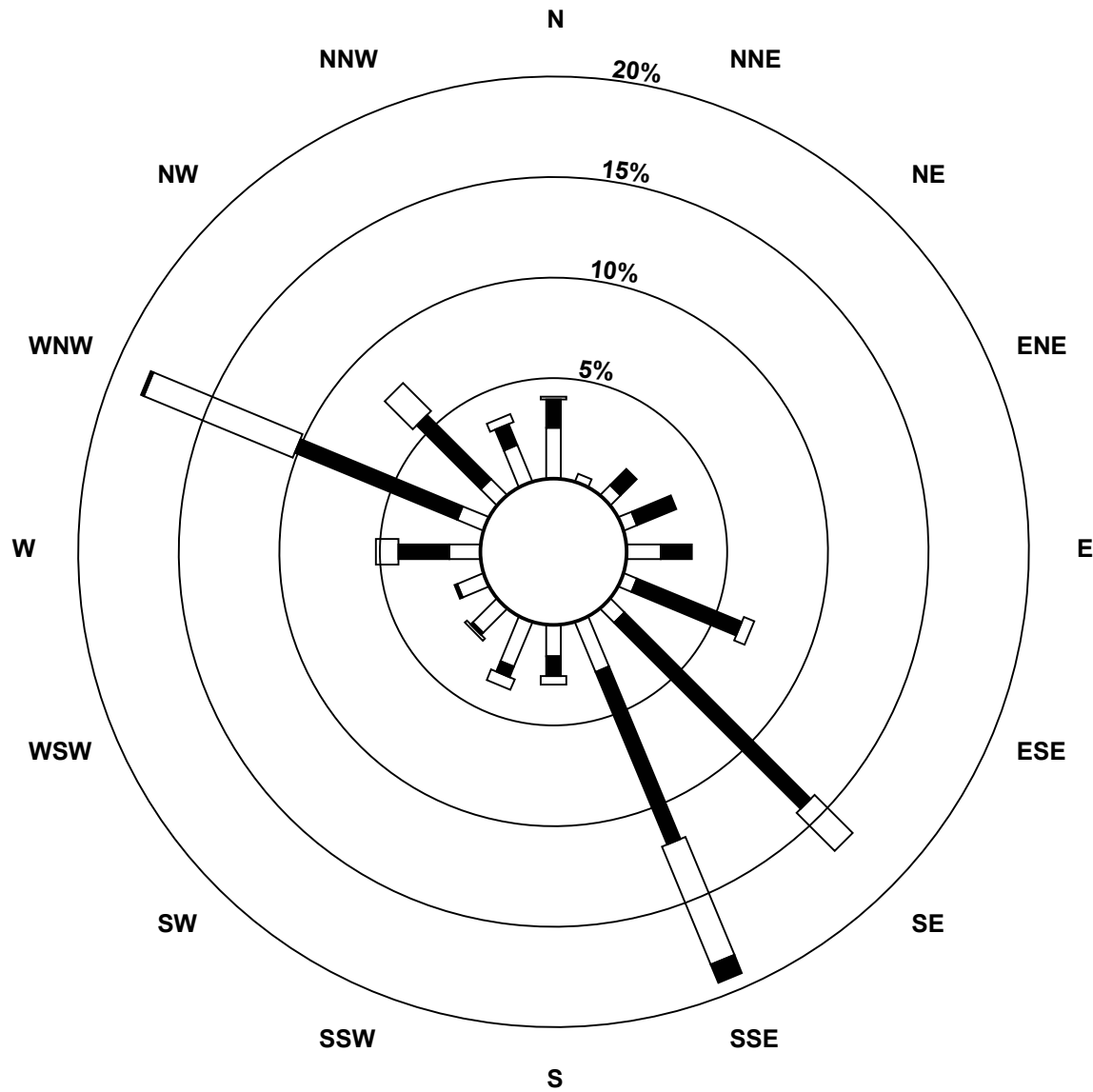
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	18	3	5	5	12	5	7	19	11	17	12	10	11	10	8	14	167
6 - 11	10	0	8	15	11	40	93	66	7	4	1	1	18	62	32	8	376
12 - 19	1	0	0	0	0	4	19	45	3	4	1	0	8	57	14	3	159
20 - 28	0	0	0	0	0	0	0	7	0	0	0	0	0	1	0	0	8
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>	29	3	13	20	23	49	119	137	21	25	14	11	37	130	54	25	710

Total Number of Valid Hours: 710

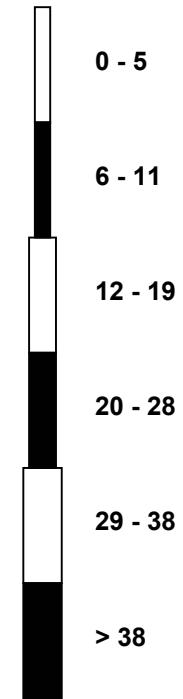
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Wind Speed (WS) - km/h  
Anzac (AMS 14)**



**Classes (km/h)**



**Total Number of Valid Hours: 710**



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Anzac - October 2014

Direction of Maximum Speed: 162 deg on Oct 17 13:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 151.7 deg on Oct 17	Hours of Data: 710
Direction of Minimum Speed: 291 deg on Oct 5 01:00	Direction of Minimum Daily Speed Average: 0.6 deg on Oct 4
	Hours of Missing Data: 34
Monthly Average Direction: 265.6 deg	Percent Operational Time: 95.4

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-Oct	354	7	354	351	352	350	13	44	63	77	111	92	52	1	348	347	352	339	327	355	349	345	AF	AF	6.5
2-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	327	320	AF	318	315	313	314	311	306	308	314	318	318	--
3-Oct	316	315	308	302	304	300	275	242	245	213	193	177	203	208	175	151	150	153	152	164	168	152	138	141	193.2
4-Oct	136	138	140	153	152	159	181	274	309	318	319	300	266	263	269	337	356	8	2	3	7	307	317	270	196.0
5-Oct	291	298	243	235	214	211	172	234	294	299	295	293	304	309	302	312	345	350	359	347	312	350	356	343	302.7
6-Oct	316	90	19	54	162	158	98	108	242	245	280	328	304	301	316	322	332	312	306	303	309	309	307	298	309.6
7-Oct	299	302	307	297	301	305	301	302	305	314	311	307	296	302	302	322	336	346	20	58	106	143	157	161	308.8
8-Oct	164	163	160	152	159	169	166	158	165	167	159	150	134	119	120	131	138	124	131	122	125	128	139	126	143.5
9-Oct	137	133	147	152	147	134	126	125	138	120	132	129	131	147	137	126	122	132	130	133	147	143	148	138	136.1
10-Oct	154	145	143	140	145	148	150	149	147	139	128	124	155	196	203	199	187	177	172	167	189	210	210	225	171.1
11-Oct	232	265	287	281	280	270	274	274	278	283	291	294	284	283	282	278	284	272	278	278	280	287	285	291	280.6
12-Oct	288	284	288	288	289	286	290	292	295	286	291	295	293	295	287	277	262	278	297	291	288	270	282	291	287.6
13-Oct	288	250	161	252	272	303	230	205	199	241	284	277	291	299	297	302	85	105	109	128	155	149	132	117	203.1
14-Oct	112	124	123	124	130	149	136	116	112	114	121	141	108	134	132	142	194	198	232	301	295	292	298	291	138.7
15-Oct	287	302	310	318	322	325	298	301	313	318	319	293	294	308	314	303	331	341	3	358	326	310	327	350	314.4
16-Oct	8	6	11	198	188	149	64	79	54	106	128	170	174	109	112	115	116	118	126	137	144	148	146	139	129.9
17-Oct	146	153	149	153	150	142	133	139	146	147	152	158	162	163	155	162	157	157	153	144	145	151	147	147	151.7
18-Oct	146	130	134	140	146	149	161	148	164	286	287	287	289	293	291	265	268	278	255	286	272	285	284	296	226.7
19-Oct	279	274	238	231	225	175	174	157	158	153	145	137	129	136	138	149	129	131	130	144	147	144	140	142	148.4
20-Oct	147	133	105	114	117	112	109	131	147	153	152	137	96	128	137	153	158	159	173	164	150	174	97	167	140.3
21-Oct	193	176	192	271	295	289	284	284	293	293	288	288	280	293	285	290	290	277	274	226	200	228	208	215	272.7
22-Oct	220	228	193	195	206	202	169	173	163	159	162	156	150	150	153	135	129	124	140	150	146	152	145	141	154.6
23-Oct	136	122	129	137	140	122	118	122	108	100	113	107	109	120	114	130	129	159	186	164	255	272	283	283	132.7
24-Oct	280	284	294	300	297	294	296	295	298	294	289	290	289	289	297	299	295	300	294	296	297	292	305	302	294.1
25-Oct	302	304	299	302	309	302	302	294	286	296	295	282	166	212	299	64	78	86	102	104	108	111	95	98	310.4
26-Oct	97	103	84	80	85	82	79	74	69	69	64	58	53	37	41	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	357	349	347	347	335	331	327	336	317	336	2	82	--
28-Oct	92	168	135	147	140	140	152	152	144	147	154	153	141	144	142	140	137	122	134	131	119	104	111	98	136.0
29-Oct	80	90	75	59	56	52	45	52	52	60	52	59	68	82	73	78	81	89	104	130	130	127	136	147	82.9
30-Oct	148	152	147	140	148	155	157	157	158	164	166	166	161	153	162	161	155	157	160	157	157	160	158	154	157.6
31-Oct	149	152	148	147	147	145	137	152	137	131	135	141	157	148	133	142	139	147	172	168	166	179	196	269	149.0

186.0 184.2 170.9 187.6 189.2 202.1 186.8 181.6 194.1 184.9 181.0 196.9 195.5 205.9 216.0 207.1 164.7 159.1 170.7 164.2 186.2 198.4 189.8 193.2

Diurnal Average

AF - Analyzer Failure

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





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Anzac - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 97 deg on Oct 20 23:00			Hours of Data:	710
Minimum Value: 8 deg on Oct 22 06:00			Hours of Missing Data:	34
			Hours of Calibration:	0
			Percent Operational Time:	95.4
Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 17 Q <sub>1</sub> = 19 Median = 23 Q <sub>3</sub> = 27 P <sub>90</sub> = 33 P <sub>99</sub> = 76				

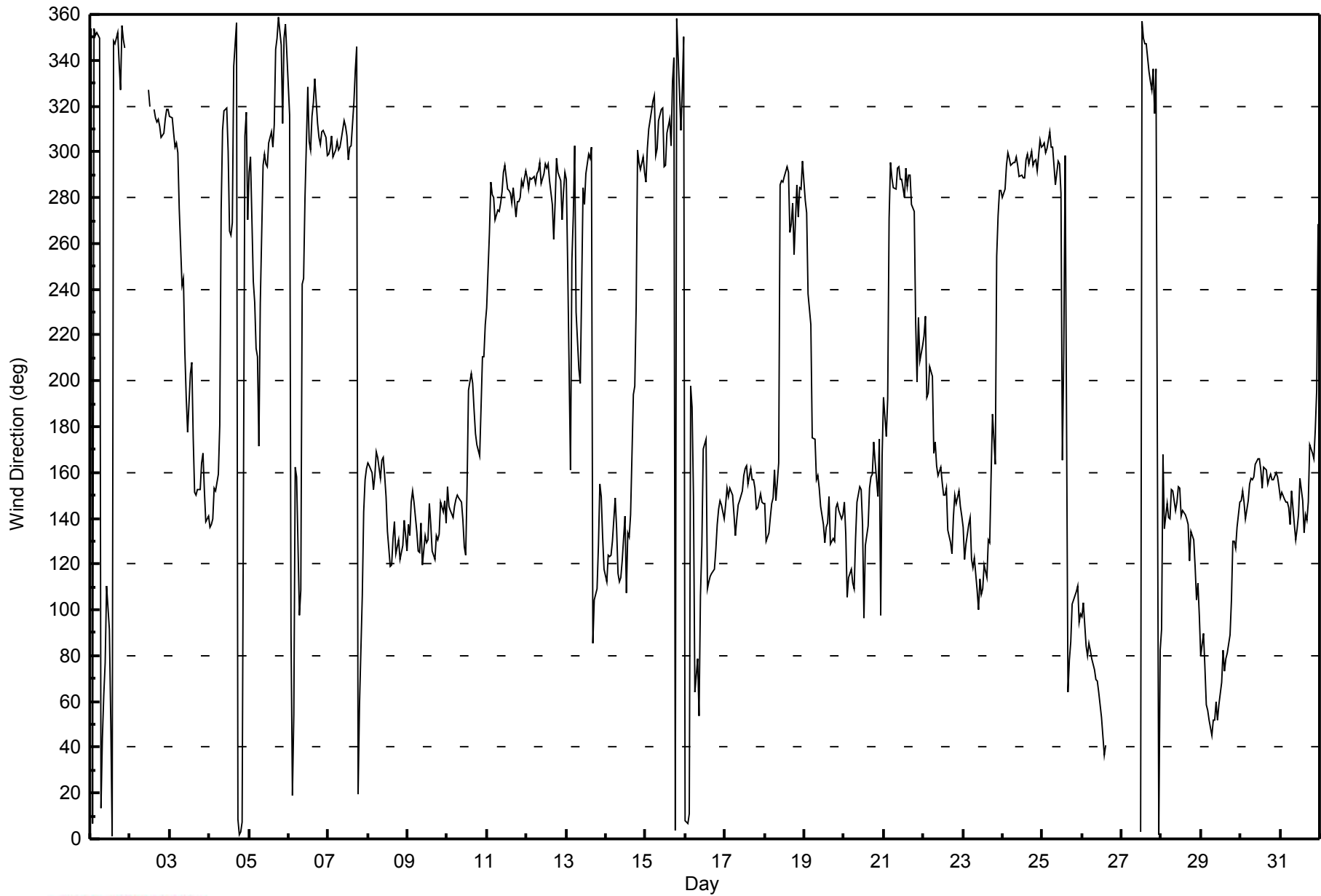
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	17	20	18	23	32	37	48	29	25	21	28	31	25	44	24	34	27	31	19	25	19	19	AF	AF	48
2-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	20	22	AF	22	22	22	22	23	23	23	23	20	19	23
3-Oct	19	19	21	23	23	26	44	25	24	43	79	79	59	34	34	22	20	17	20	20	21	22	22	20	79
4-Oct	23	21	21	19	18	23	23	53	24	21	26	39	37	40	44	40	25	19	19	19	25	45	24	45	53
5-Oct	86	36	41	22	34	28	34	37	30	27	27	25	28	27	25	23	18	16	14	51	28	18	41	36	86
6-Oct	60	54	55	50	60	38	36	35	86	22	40	33	24	26	22	20	20	25	22	26	23	23	23	24	86
7-Oct	24	24	24	26	23	25	25	25	28	24	28	29	29	29	28	26	27	15	20	16	29	14	15	11	29
8-Oct	12	14	18	17	18	16	19	14	18	20	22	24	22	30	21	29	21	21	18	18	23	19	21	25	30
9-Oct	31	18	18	17	16	14	15	19	20	26	24	29	28	29	23	22	19	15	16	18	18	18	16	16	31
10-Oct	15	20	19	19	16	18	17	21	23	24	18	25	29	28	28	26	25	19	19	15	28	24	24	17	29
11-Oct	47	31	26	29	29	29	28	29	28	29	30	30	27	31	28	31	30	27	26	30	28	29	29	29	47
12-Oct	29	25	28	28	28	27	30	28	27	27	31	26	26	29	30	29	28	33	24	25	25	27	30	26	33
13-Oct	25	23	55	75	20	20	31	17	21	68	48	46	57	22	33	27	44	15	19	24	16	16	18	17	75
14-Oct	18	18	17	17	19	21	19	19	21	20	24	33	24	26	26	24	22	18	29	25	27	27	27	25	33
15-Oct	26	23	21	22	19	20	28	24	24	23	31	30	30	31	27	25	17	16	14	13	64	22	19	31	64
16-Oct	12	15	37	66	23	68	31	41	77	30	41	59	77	39	24	22	21	20	18	18	18	17	17	15	77
17-Oct	17	14	15	14	15	17	19	19	18	18	19	19	19	20	22	20	20	18	20	19	20	20	18	24	24
18-Oct	22	18	19	20	19	17	22	21	24	62	28	26	30	29	27	29	28	31	33	22	19	20	23	24	62
19-Oct	21	18	22	12	27	40	25	13	14	17	22	21	22	21	19	19	16	16	16	21	19	18	18	17	40
20-Oct	18	20	20	23	23	27	20	23	19	19	26	33	32	33	20	19	14	14	16	15	50	18	97	23	97
21-Oct	24	41	27	18	20	23	23	22	22	26	25	37	33	29	30	24	23	22	17	15	22	8	19	11	41
22-Oct	11	16	10	10	8	8	16	16	14	12	17	22	21	24	24	20	14	14	20	18	23	15	17	17	24
23-Oct	17	20	14	22	18	19	21	16	22	24	22	22	24	26	26	26	19	25	30	23	34	27	29	26	34
24-Oct	27	29	27	24	25	27	28	25	27	29	29	29	28	27	26	25	29	26	28	27	25	29	25	23	29
25-Oct	25	25	26	26	25	25	24	27	27	27	24	45	39	39	53	20	11	17	18	22	22	21	20	23	53
26-Oct	26	27	23	20	20	21	21	22	20	22	22	25	25	22	23	AF	AF	AF	AF	AF	AF	AF	AF	AF	27
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	20	21	21	20	20	21	20	21	27	25	31	30	49	49
28-Oct	34	31	21	20	20	19	18	18	21	23	19	22	24	23	21	21	22	20	22	23	24	26	27	27	34
29-Oct	20	18	18	22	29	21	20	19	18	22	24	27	24	25	24	24	20	24	34	24	21	22	22	21	34
30-Oct	23	20	22	21	20	22	21	18	17	17	18	18	19	19	20	22	22	20	19	20	19	19	20	20	23
31-Oct	20	19	20	19	22	22	21	19	21	18	19	21	25	21	18	17	14	14	18	19	16	12	26	25	26
86 54 55 75 60 68 48 53 86 68 79 79 77 44 53 40 44 33 34 51 64 45 97 49																									
Diurnal Maximum																									

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Anzac - October 2014**



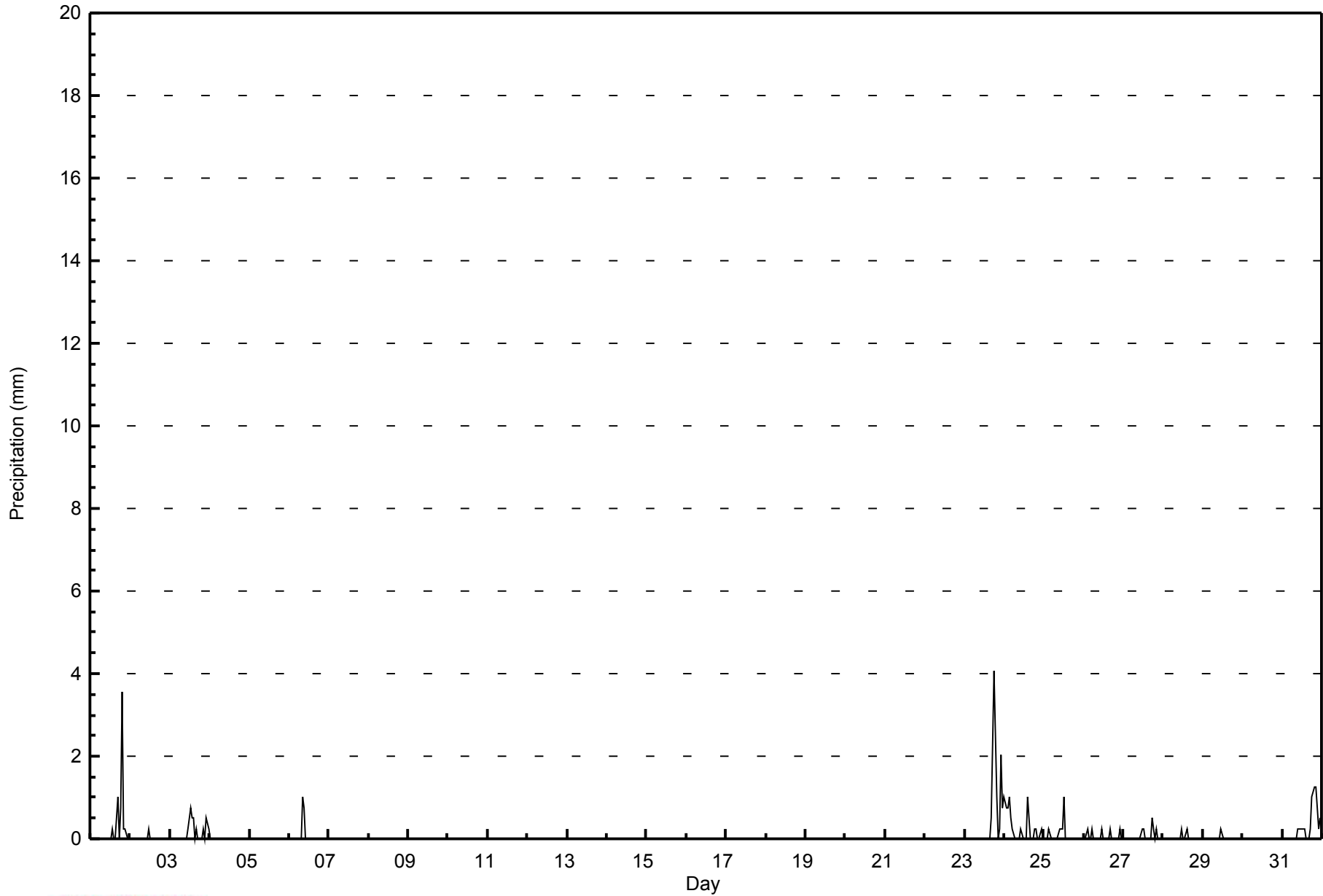


Maximum Value: 4.1 mm on Oct 23 19:00		Maximum Daily Total: 10.9 mm on Oct 23		Hours in Service: 744																																												
Minimum Value: 0.0 mm on Oct 1 01:00		Minimum Daily Total: 0.0 mm on Oct 4		Hours of Data: 744																																												
Maximum Diurnal Total: 6.4 mm at hour 19		Minimum Diurnal Total: 0.0 mm at hour 7		Hours of Missing Data: 0																																												
Monthly Total: 41.40 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-Oct	0.0	0.0	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	1.0	0.0	0.8	3.6	0.3	0.3	0.0	0.0	6.1	3.6																						
2-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3																						
3-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	0.5	0.5	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.5	0.3	3.3	0.8																						
4-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	1.0																						
7-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.3	4.1	1.0	0.0	0.3	2.0	0.8	10.9	4.1																						
24-Oct	1.0	0.8	0.8	1.0	0.5	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0	1.0	0.5	0.0	0.0	0.3	0.3	0.3	0.0	0.3	0.0	0.0	6.9	1.0																						
25-Oct	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0																						
26-Oct	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	1.3	0.3	0.3																						
27-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.5	0.3	0.0	0.3	0.0	0.0	0.0	1.5	0.5																							
28-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.3																						
29-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3																						
30-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
31-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3	1.0	1.3	1.3	0.8	0.3	0.5	6.6	1.3																						
																								1.0	0.8	1.0	1.3	0.5	0.5	0.0	0.0	1.0	1.3	0.8	2.0	2.3	1.0	1.8	0.5	2.0	3.0	6.4	6.1	2.0	1.3	3.3	1.5	Diurnal Average
																								1.0	0.8	0.8	1.0	0.5	0.3	0.0	0.0	1.0	0.8	0.3	0.3	1.0	0.5	1.0	0.5	1.0	2.3	4.1	3.6	1.3	0.8	2.0	0.8	Diurnal Maximum



Wood Buffalo Environmental Association  
Hourly Averages

Precipitation (PC) - mm  
Anzac - October 2014





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 15, 2014	Previous Calibration	September 10, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	7:30	End Time (MST)	11:35
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	PMT voltage	-596	-596
Analyzer Range (mv)	5000	5000	Lamp voltage	802	802
Calculated slope	0.998143	0.996989	Chamber temp.	44.3	44.3
Calculated intercept	0.648780	-0.220165	Pressure (mmHg)	683.0	683.0
Analyzer Background	12.4	12.4	Flow (lpm)	0.389	0.389
Analyzer Coefficient	0.930	0.930	Intensity	30000	30000

Analyzer make TEI 43C Analyzer serial # 613516095

### 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	78.3	798.7	801.6	0.996
calibrator zero	5000	0.0	0.0	0.3	NA
high point	5000	78.3	798.7	801.6	0.996
second point	5000	39.1	398.8	399.4	0.999
third point	5000	19.6	199.9	201.2	0.994
calibrator zero	5000	0.0	0.0	0.8	NA
as left zero	5000	0.0	0.0	0.8	NA
as left span	5000	78.3	798.7	799.2	0.999
Average Correction Factor					0.996

Corrected As found 801.3 Previous response 799.5 % change -0.2%

#### Notes:

no adjusted or maintenance done, filter changed out

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

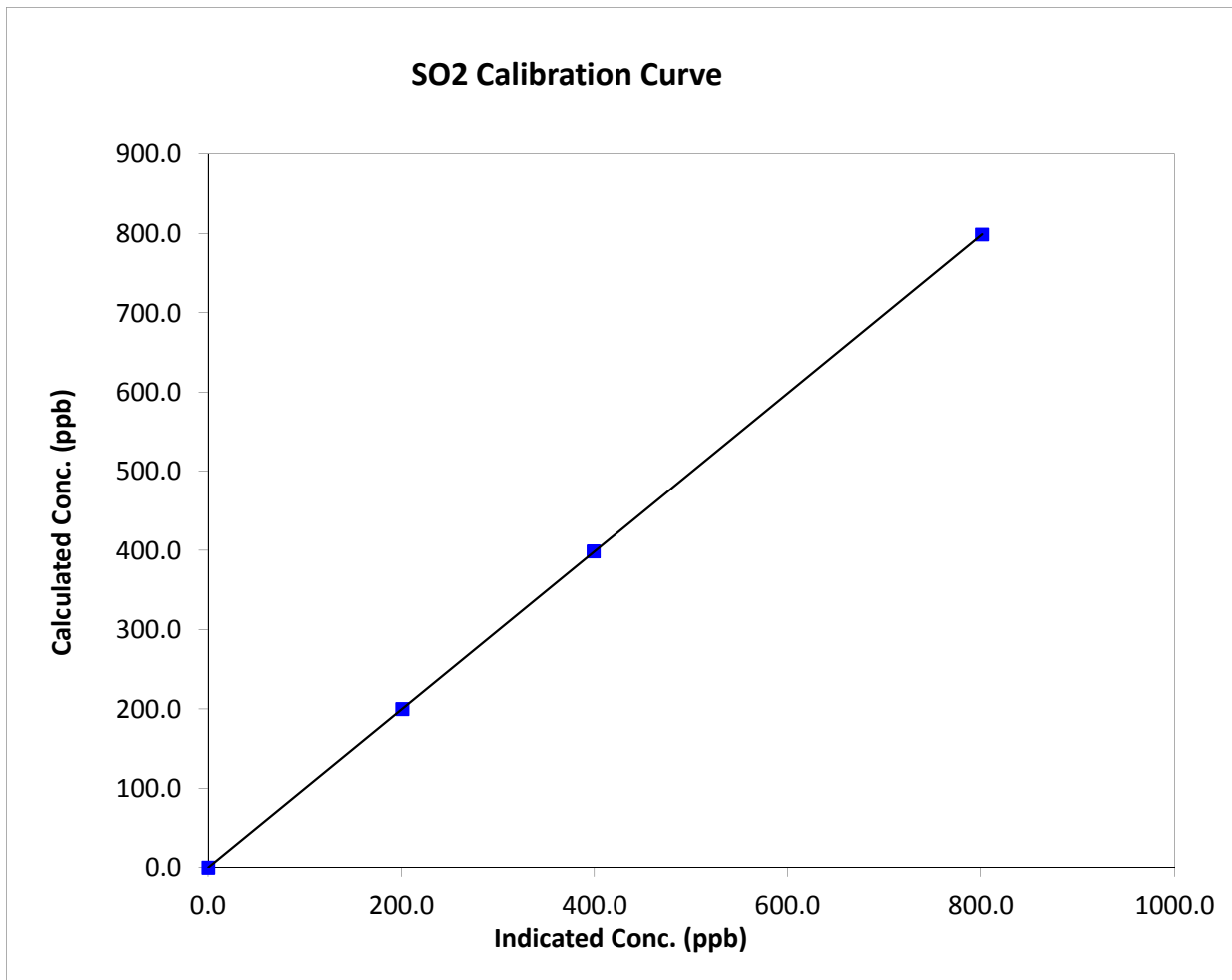
## SO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	October 15, 2014	Previous Calibration	September 10, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:30	End Time (MST)	11:35
Analyzer make	TEI 43C	Analyzer serial #	613516095

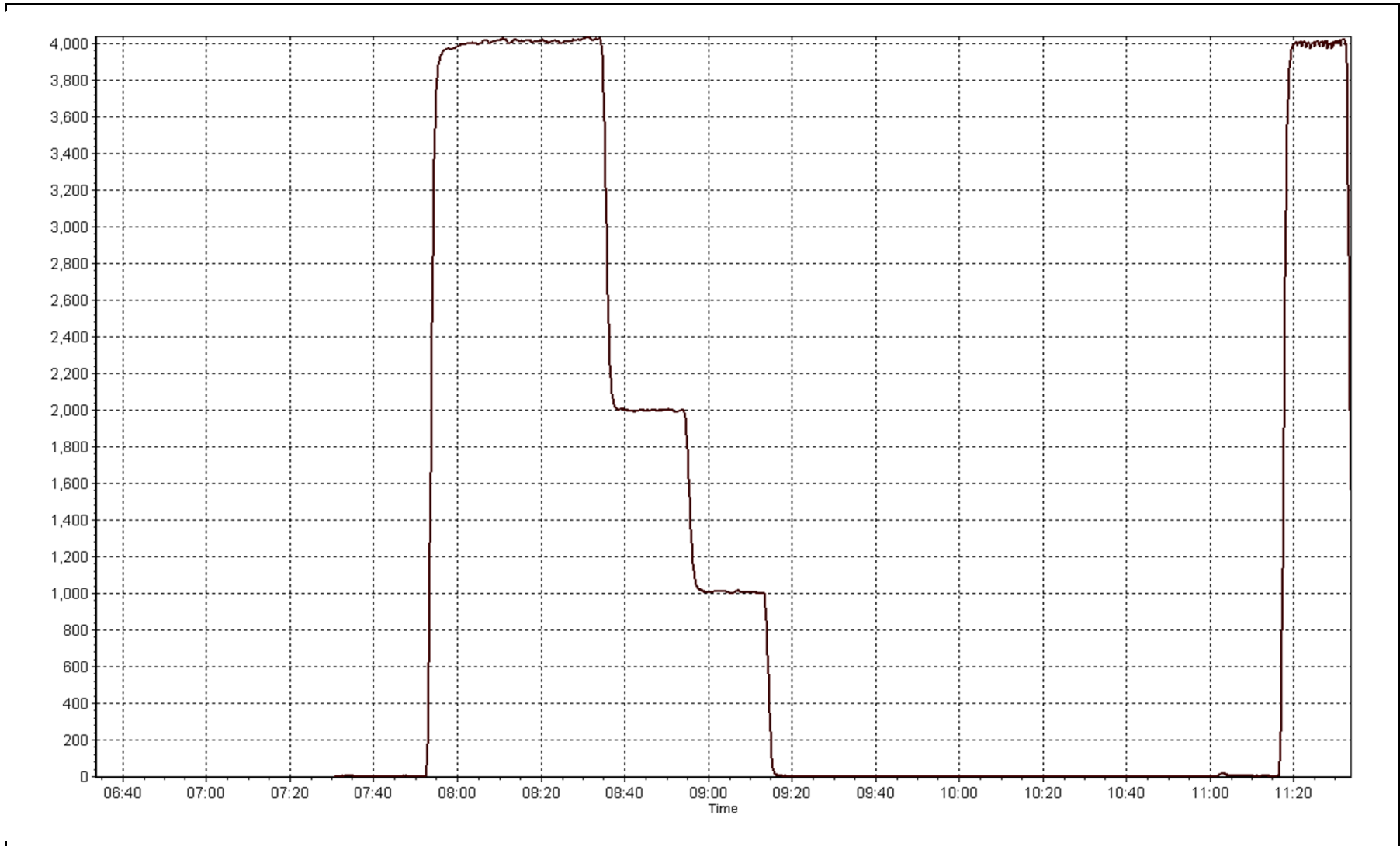
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999997
798.7	801.6	0.9963		
398.8	399.4	0.9985	Slope	0.996989
199.9	201.2	0.9936		
			Intercept	-0.220165



SO2 Calibration Plot

Date: October 15, 2014





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 8, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:38	End Time (MST)	12:52
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	-730	-730
Analyzer Range (input)	5000	5000	Lamp voltage	986	986
Calculated slope	0.987411	0.992783	Chamber temp.	45.1	45.1
Calculated intercept	0.181889	0.073757	Pressure	649	649
Analyzer Background	2.01	2.01	Flow	0.390	0.390
Analyzer Coefficient	1.118	1.118	Intensity	97	97
			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	75.2	0.998
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	75.2	0.998
second point	5000	20.8	39.9	40.6	0.984
third point	5000	10.4	20.0	20.3	0.986
calibrator zero	5000	0.0	0.0	-0.4	NA
as left zero	5000	0.0	0.0	-0.4	NA
as left span	5000	39.1	75.1	74.8	1.003
Average Correction Factor					0.989

Corrected As found	75.7	Previous response	75.8	% change	0.2%
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#### Notes:

scrubber checked before as founds, filter change out, No maintenance and adjustments made

Calibration Performed By:

Melissa Lemay





# Wood Buffalo Environmental Association

## TRS Calibration Summary

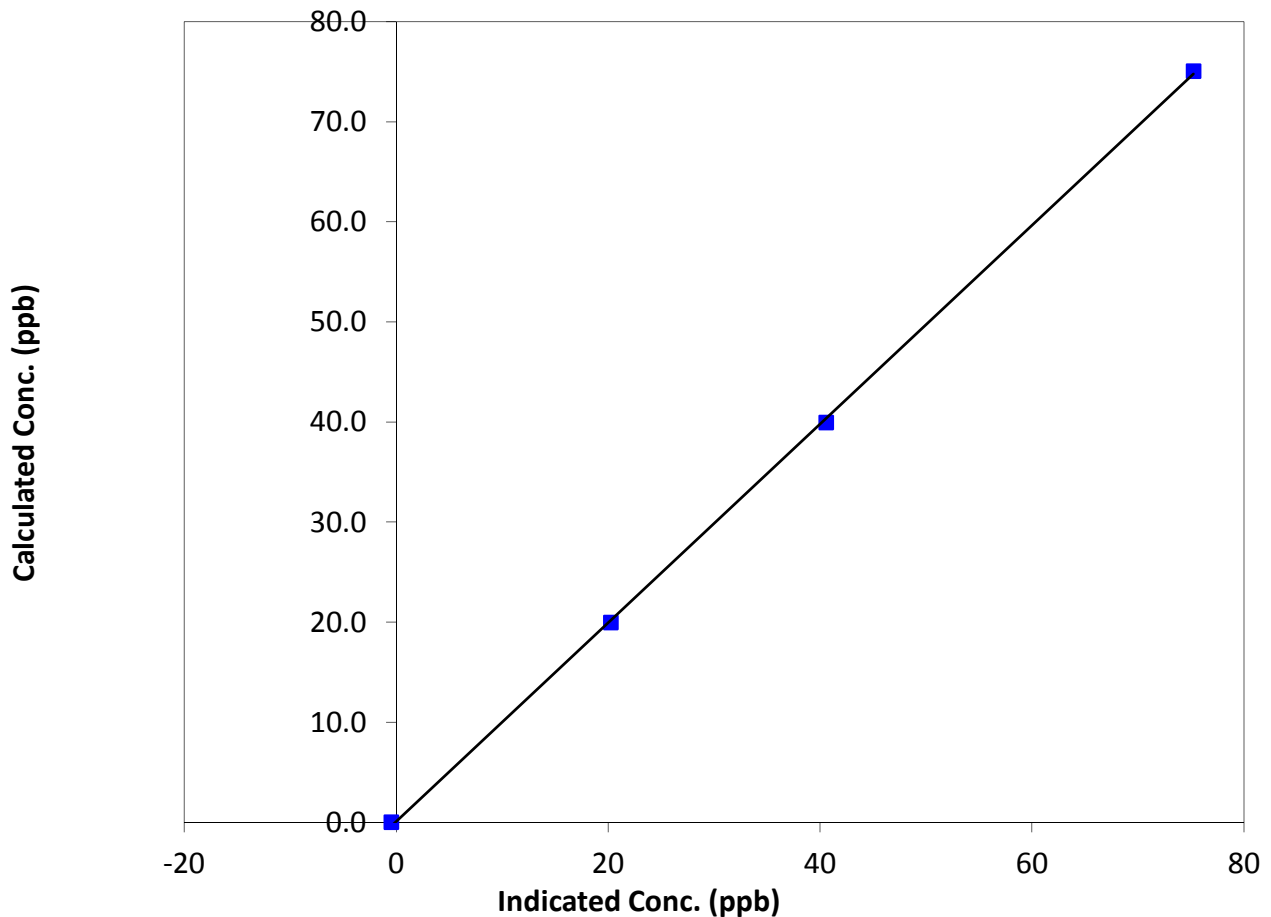
### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 8, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:38	End Time (MST)	12:52
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	0.999848
75.1	75.2	0.9978		
39.9	40.6	0.9836	Slope	0.992783
20.0	20.3	0.9856		
			Intercept	0.073757

**TRS Calibration Curve**







# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

### Station Information

Calibration Date	Wednesday, October 15, 2014	Prev Calibration	Wednesday, September 10, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	7:30	End Time (MST)	11:35
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	34.5	34.5
THC Range (input)	50	50	Flame Temp	405.0	405.0
NMHC Range (ppm)	50	50	Carrier Pressure	31.8	31.8
NMHC Range (input)	50	50	Fuel Pressure	41.4	41.4
THC Calc slope	1.001153	1.000735	Air Pressure	32.5	32.5
THC Calc intercept	0.016212	0.014244			
NMHC Calc slope	1.001637	1.002017			
NMHC Calc intercept	-0.005939	-0.009906			

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	16.33	1.022
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.3	16.69	16.69	1.000
second point	5000	39.1	8.34	8.26	1.009
third point	5000	19.6	4.18	4.18	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	16.69	16.70	1.000
Average Correction Factor					1.003

Corrected As found 16.33 Previous response 16.66 % change 2.0%

**Notes:**

Filter changed, No maintenance Done, Span adjusted

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	78.3	8.79	8.57	1.025
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.3	8.79	8.78	1.001
second point	5000	39.1	4.39	4.37	1.004
third point	5000	19.6	2.20	2.23	0.986
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	8.79	0.999
Average Correction Factor					0.997

Corrected As found      8.57      Previous response      8.78      % change      2.4%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	78.3	7.91	7.76	1.019
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.3	7.91	7.90	1.001
second point	5000	39.1	3.95	3.89	1.015
third point	5000	19.6	1.98	1.95	1.015
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	7.91	1.000
Average Correction Factor					

Corrected As found      7.76      Previous response      7.88      % change      1.6%



# Wood Buffalo Environmental Association

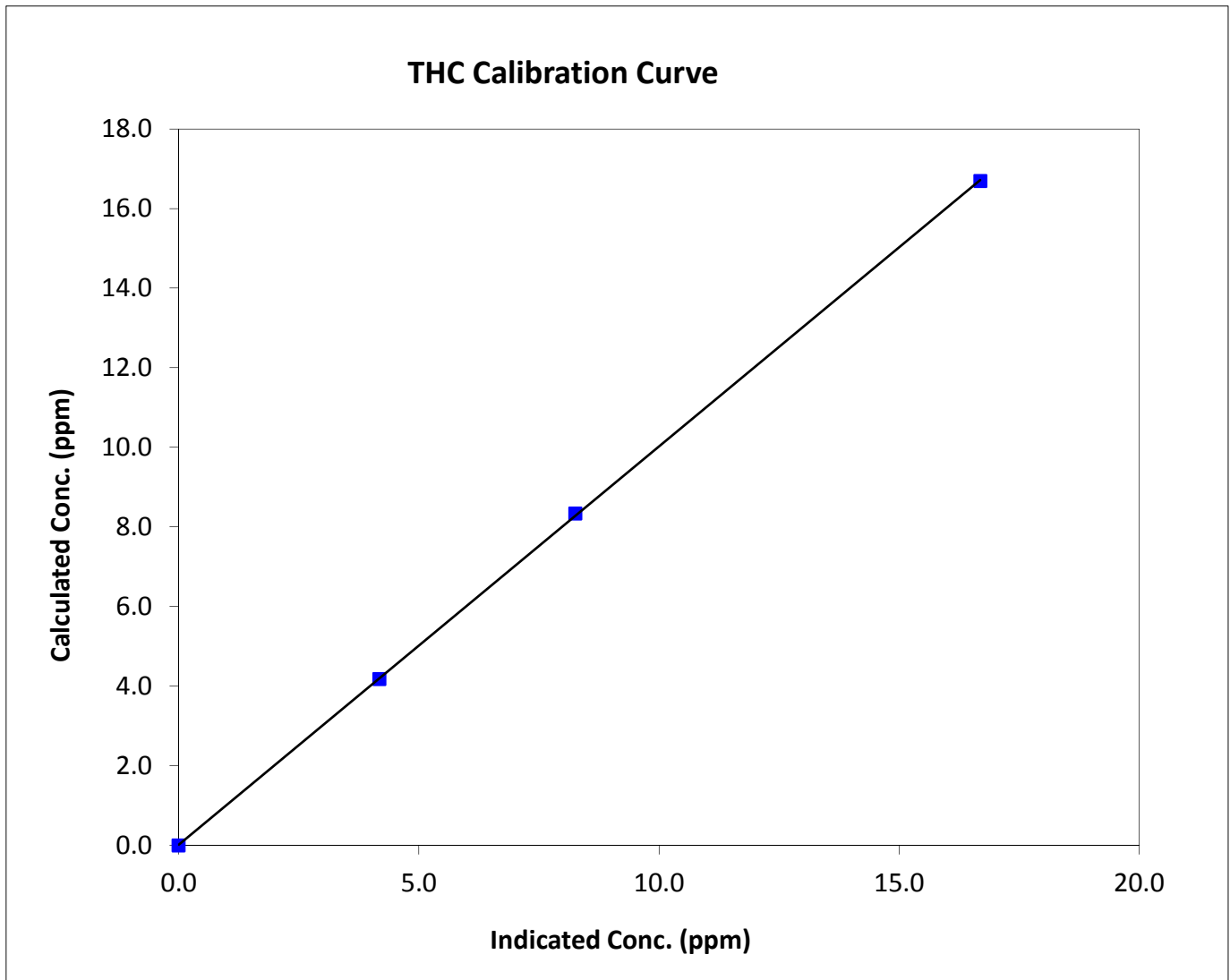
## THC Calibration Summary

### Station Information

Calibration Date	October 15, 2014	Previous Calibration	September 10, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:30	End Time (MST)	11:35
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	0.999972
16.69	16.69	1.0002		
8.34	8.26	1.0092	Slope	1.000735
4.18	4.18	0.9997		
			Intercept	0.014244





# Wood Buffalo Environmental Association

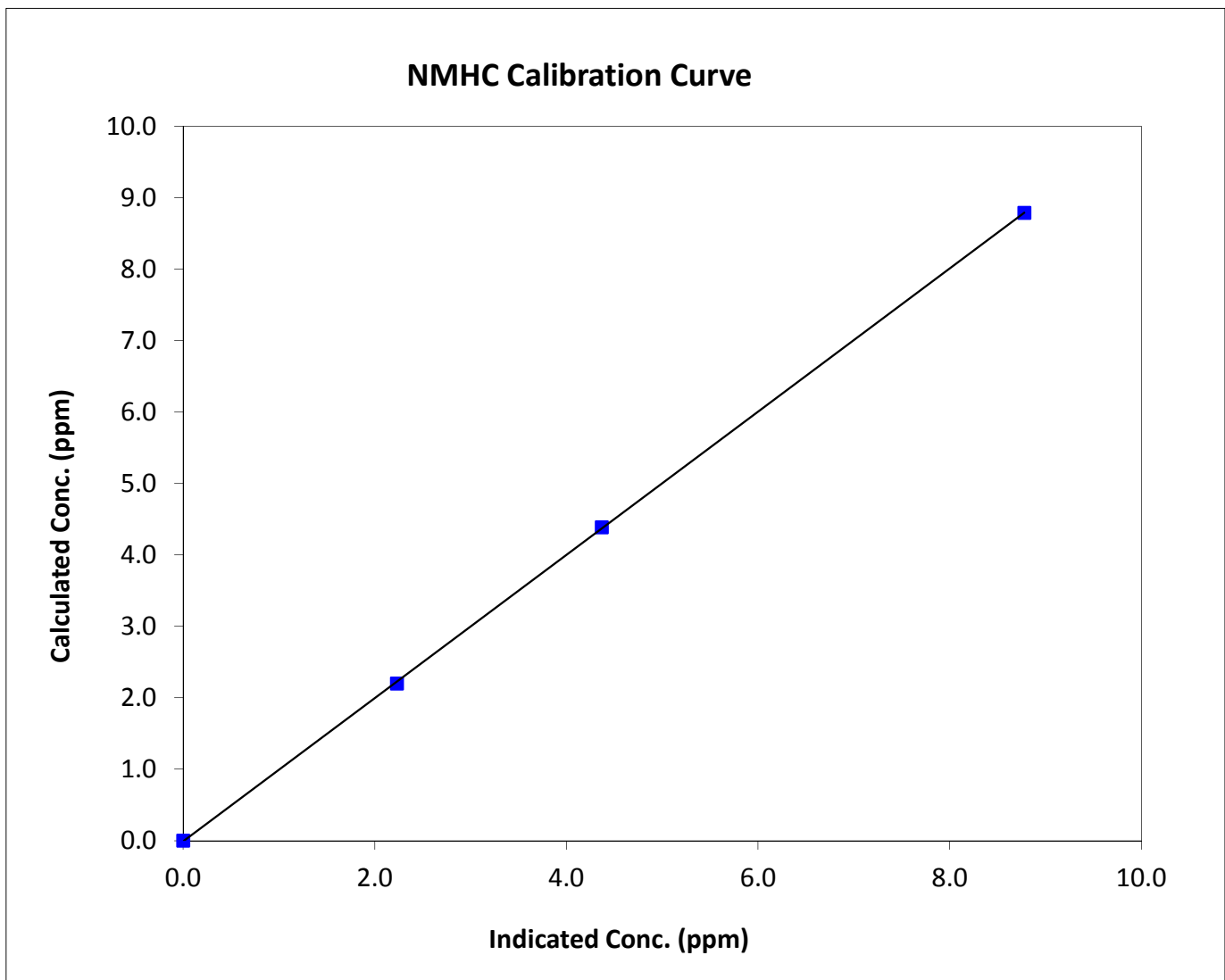
## NMHC Calibration Summary

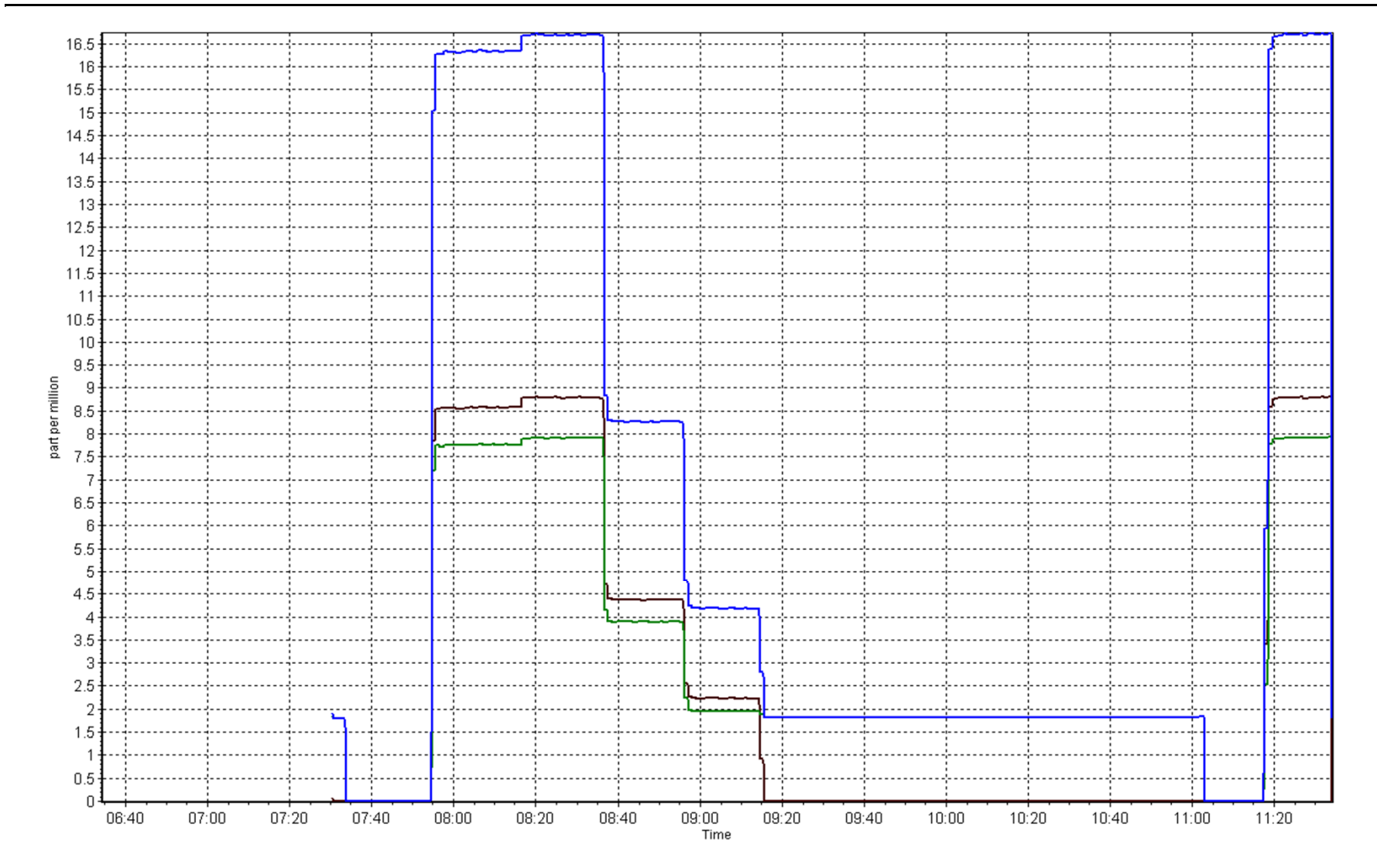
### Station Information

Calibration Date	October 15, 2014	Previous Calibration	September 10, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:30	End Time (MST)	11:35
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	0.999974
8.79	8.78	1.0006		
4.39	4.37	1.0039	Slope	1.002017
2.20	2.23	0.9862		
			Intercept	-0.009906







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 15, 2014	Previous Calibration	September 10, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	11:35	End Time (MST)	13:30
Barometric Pressure	732 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
NO2 calibration used	Wednesday, October 15, 2014	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.	30.1	30.1
Analyzer Range (input)	5000	5000	Lamp temp.	55.8	55.8
Calculated slope	1.001222	0.986170	Pressure	707.4	707.4
Calculated intercept	-1.328074	-0.838760	Flow cell A	0.876	0.876
Analyzer Background	0.3	0.3	Flow cell B	0.770	0.770
Analyzer Coefficient	1.032	1.032	Cell A Intensity	93993	93993
			Cell B Intensity	67442	67442

Analyzer make 49C Analyzer serial # 509110892

### 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	1.19	397.8	404.0	0.985
calibrator zero	5000	0.00	0.0	0.4	N/A
high point	5000	1.19	397.8	404.0	0.985
second point	5000	0.85	272.4	277.0	0.983
third point	5000	0.50	140.4	144.0	0.975
calibrator zero	5000	0.00	0.0	0.1	N/A
as left zero	5000	0.00	0.0	0.1	N/A
as left span	5000	N/A	397.8	392.6	1.013
Average Correction Factor					0.981

Corrected As found 403.6 Previous response 398.6 % change -1.2%

#### Notes:

No Maintenance or adjustments made Filter changed out

Calibration Performed By:

Melissa Lemay





## Wood Buffalo Environmental Association

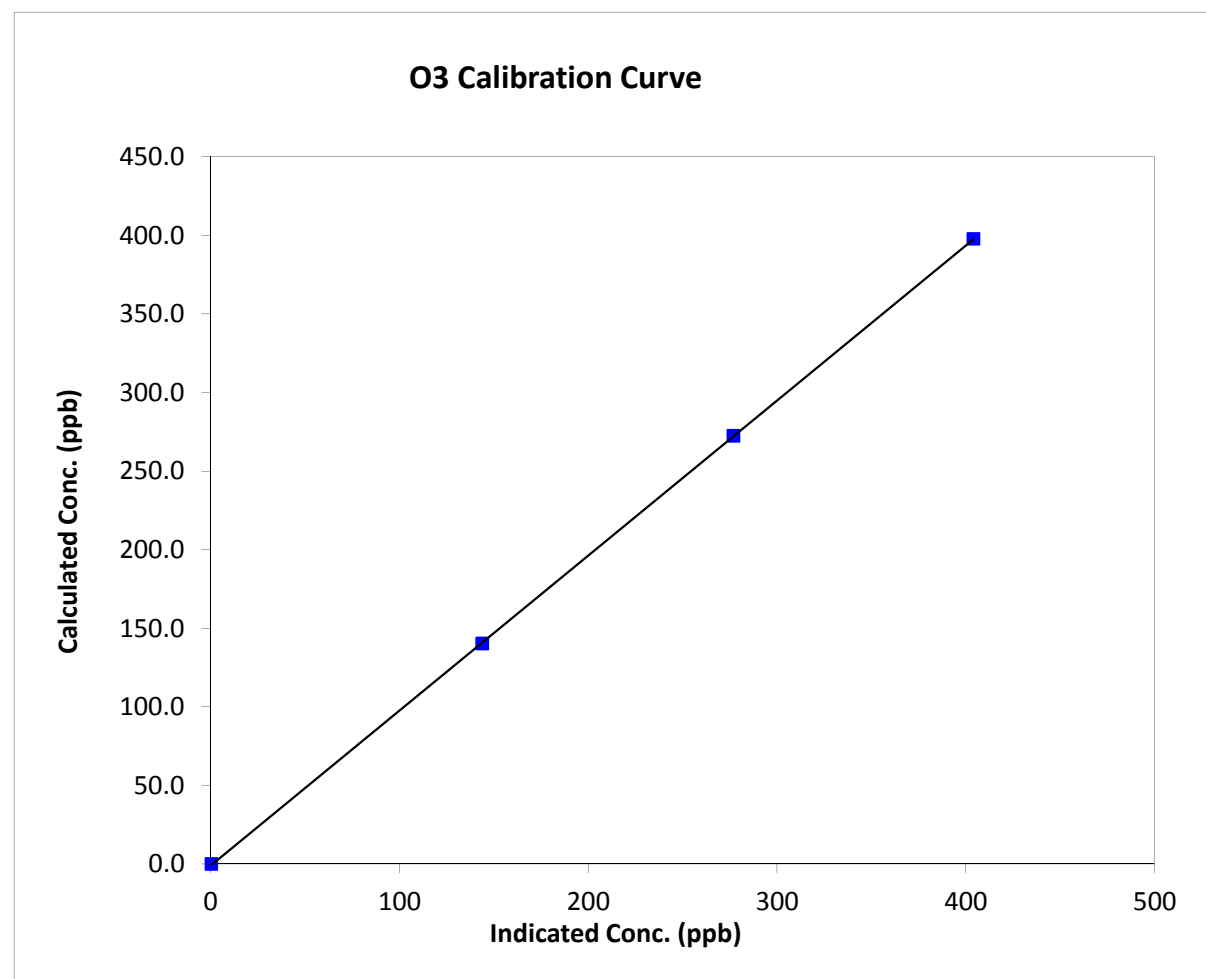
### O<sub>3</sub> Calibration Summary

#### Station Information

Calibration Date	Wednesday, October 15, 2014	Previous Calibration	September 10, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	11:35	End Time (MST)	13:30
Analyzer make	49C	Analyzer serial #	509110892

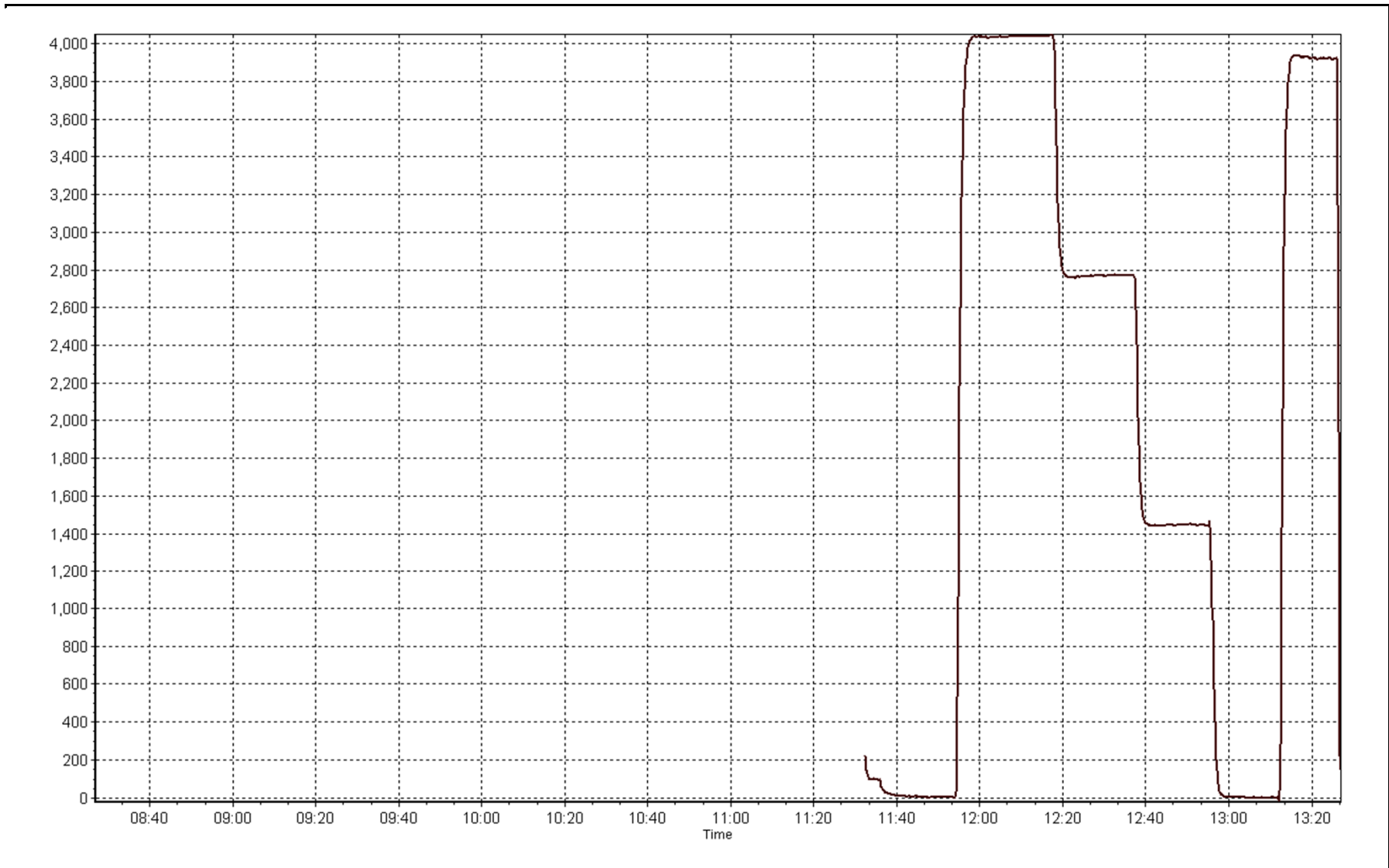
#### Calibration Data

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	0.4	N/A	Correlation Coefficient	0.999990
397.8	404.0	0.9847		
272.4	277.0	0.9834	Slope	0.986170
140.4	144.0	0.9750		
			Intercept	-0.838760



O3 Calibration Plot

Date: October 15, 2014





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 15, 2014	Previous Calibration	September 11, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Rotine		
Start Time (MST)	7:30	End Time (MST)	11:35
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)	5000	5000	5000
Before	Data Slope	1.004056	1.002496	1.002439
	Data Offset	0.885405	0.987239	-1.305905
After	Data Slope	1.004459	1.002016	1.007718
	Data Offset	0.940203	1.255986	-0.612214
Channel #		6	5	4
Voltage Range		0 - 5V	0 - 5V	0 - 5V

### Analyzer Information

Analyzer make/model 42C Analyzer serial # 509110890

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.949	ppb	0.921	ppb
NOx coefficient	0.999	ppb	0.997	ppb
NO2 coefficient	1.002	ppb	1.002	ppb
NO bkgrnd	15.0		14.5	
NOx bkgrnd	14.9		14.4	
Nt coefficient	n/a		n/a	
Chamber Temp	49.9	Deg C	49.9	Deg C
Moly Temp	317.0	Deg C	317.0	Deg C
PMT Temp	-2.6	Deg C	-2.6	Deg C
O3 flow	Ok	ccm	Ok	ccm
R Cell Press	202.4	mmHg	202.4	mmHg
Sample Flow	0.548	ccm	0.548	ccm

**Notes:**

Span adjustment performed; no other maintenance required.



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

October 15, 2014

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	0.9	0.3	0.0	N/A	N/A
as found span	5000	78.3	801.8	800.2	1.6	825.8	823.8	1.0	0.9709	0.9714
calibrator zero	5000	0.0	0.0	0.0	0.0	0.9	0.3	0.0	N/A	N/A
high point	5000	78.3	801.8	800.2	1.6	800.0	800.0	-0.9	1.0022	1.0003
second point	5000	39.1	400.4	399.6	0.8	393.2	393.2	-0.4	1.0183	1.0163
third point	5000	19.6	200.7	200.3	0.4	196.8	196.6	0.0	1.0198	1.0189
calibrator zero	5000	0.0	0.0	0.0	0.0	1.1	1.0	0.0	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	1.1	1.0	0.0	N/A	N/A
as left span	5000	78.3	801.8	389.8	412.0	800.4	403.6	396.2	1.0017	0.9658
Average Correction Factor									1.0134	1.0118

Corrected As found NO<sub>x</sub>= 824.9 NO= 823.5 Percent Change NO<sub>x</sub>= -3.3% NO= -3.2%  
 Previous Response NO<sub>x</sub>= 797.7 NO= 797.2

### 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	389.8	397.8	786.0	389.8	395.2	1.0044	1.0000	1.0066	99.3%
2nd NO <sub>2</sub> (200)	N/A	515.2	272.4	786.6	515.2	270.6	1.0036	1.0000	1.0067	99.3%
3rd NO <sub>2</sub> (100)	N/A	647.2	140.4	789.2	647.2	141.0	1.0003	1.0000	0.9957	100.4%
4th NO <sub>2</sub> (0)	787.6	N/A	-0.4	787.2	787.6	-1.3	1.0028	1.0000	N/A	N/A
Average Correction Factor							1.0028	1.0000	1.0030	99.7%

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

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

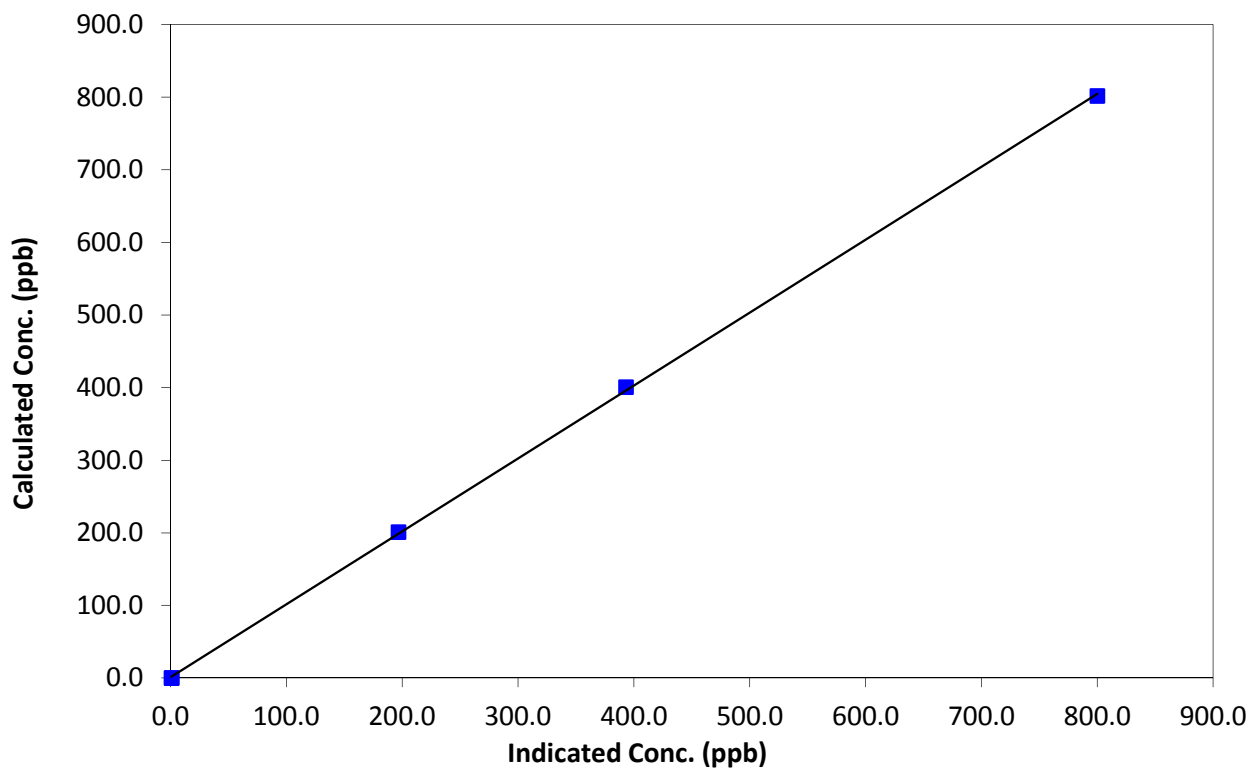
### Station Information

Calibration Date	October 15, 2014	Previous Calibration	September 11, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:30	End Time (MST)	11:35
Analyzer make	42C	Analyzer serial #	509110890

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.9	N/A	Correlation Coefficient	0.999913
801.8	800.0	1.0022		
400.4	393.2	1.0183	Slope	1.004459
200.7	196.8	1.0198		
0.0	1.1	0.0000	Intercept	0.940203

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

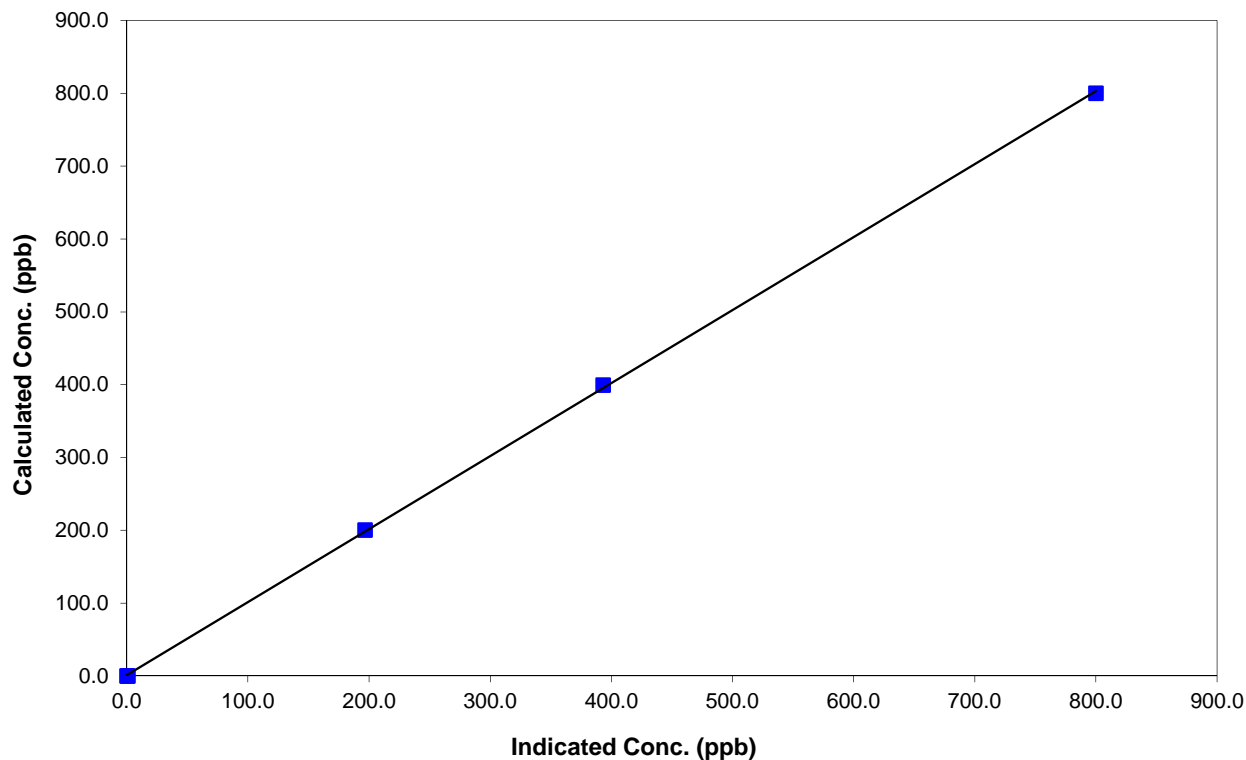
### Station Information

Calibration Date	October 15, 2014	Previous Calibration	September 11, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:30	End Time (MST)	11:35
Analyzer make	42C	Analyzer serial #	509110890

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999916
800.2	800.0	1.0003		
399.6	393.2	1.0163	Slope	1.002016
200.3	196.6	1.0189		
0.0	1.0	0.0000	Intercept	1.255986

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

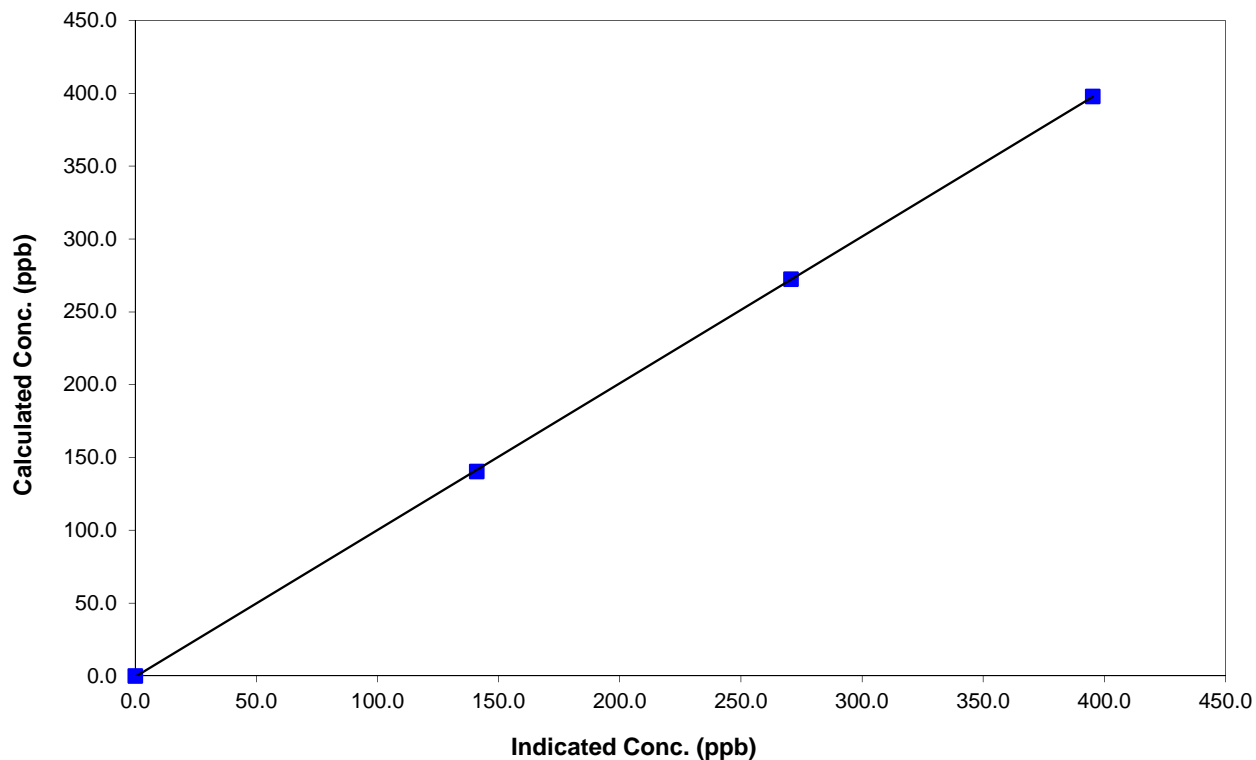
### Station Information

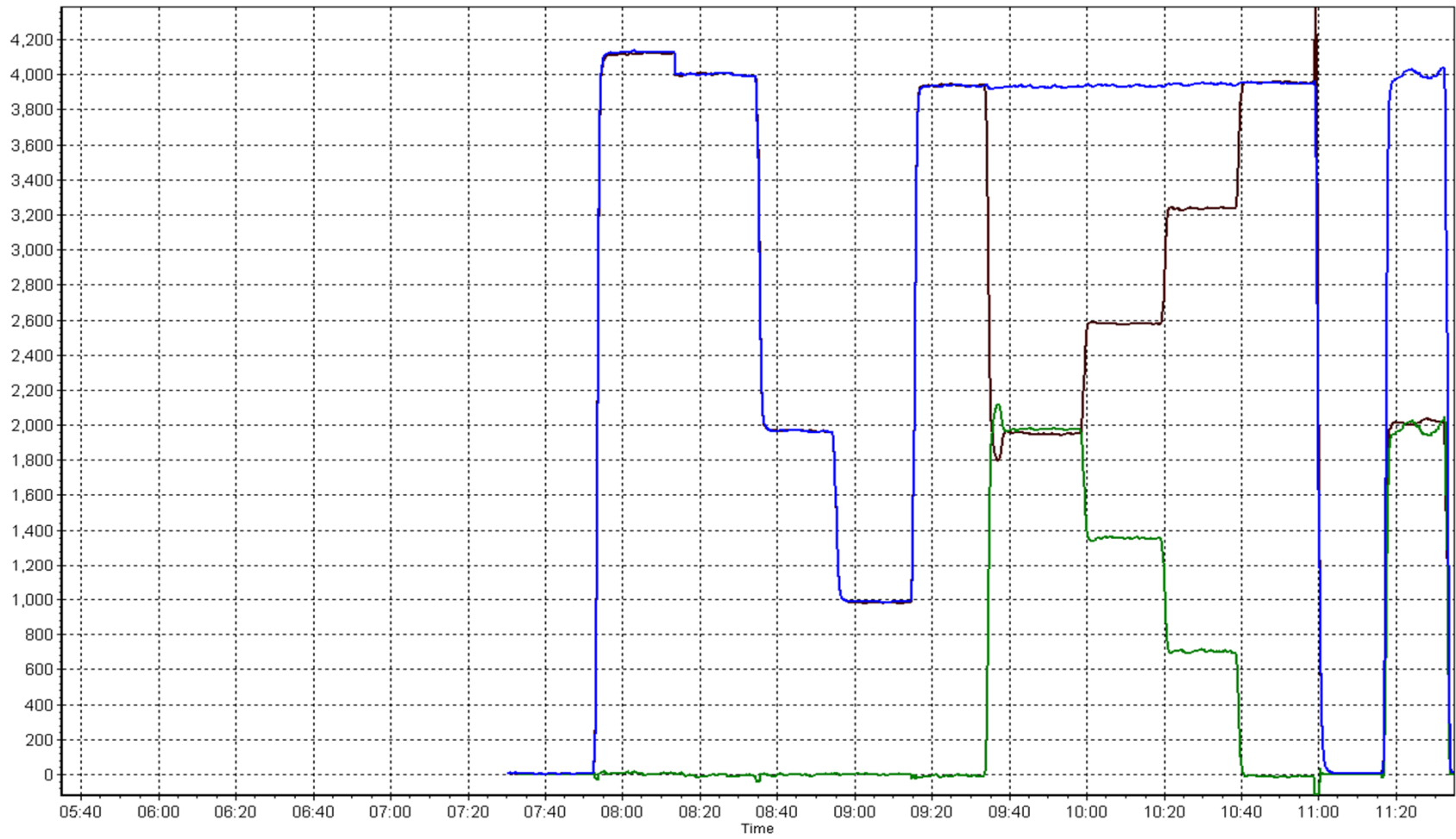
Calibration Date	October 15, 2014	Previous Calibration	September 11, 2014
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	7:30	End Time (MST)	11:35
Analyzer make	42C	Analyzer serial #	509110890

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999981
397.8	395.2	1.0066		
272.4	270.6	1.0067	Slope	1.007718
140.4	141.0	0.9957		
			Intercept	-0.612214

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







**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 15  
CNRL HORIZON  
OCTOBER 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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)  
OCTOBER 2014

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	699	37	45	98.92	23	0	5	0
TRS (ppb) Average	708	35	36	99.87	1	0	0	0
THC (ppm) Average	707	37	37	100.00	11.9	-	3.7	-
NO2 (ppb) Average	697	37	47	98.66	33	0	14	-
NO (ppb) Average	697	37	47	98.66	273	-	33	-
NOX (ppb) Average	697	37	47	98.66	288	-	44	-
PM2.5 (ug/m3) Average	741	0	3	99.60	23.3	-	9.7	0
Temperature 2 m (C) Average	744	0	0	100.00	19.6	-	12.6	-
Wind Speed 10 m (km/h) Average	742	0	2	99.73	25	-	15.0	-
Wind Direction 10 m (deg) Average	742	0	2	99.73	-	-	-	-
Precipitation (mm) Total	743	0	1	99.87	1.8	-	7.9	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	94	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	363	-	99	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	699	1.4	3	-	0	0	0	1	1	3	23
TRS (ppb) Average	708	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	707	2.47	0.7	-	2.1	2.2	2.3	2.3	2.5	2.7	11.9
NO2 (ppb) Average	697	6.5	6	-	0	1	2	5	9	15	33
NO (ppb) Average	697	5.3	18	-	0	0	0	0	3	14	273
NOX (ppb) Average	697	11.9	21	-	0	1	2	6	14	29	288
PM2.5 (ug/m3) Average	741	4.58	4.2	-	0.5	1.1	1.7	3.2	6	9.9	23.3
Temperature 2 m (C) Average	744	4.24	4.5	-	-6.7	-0.7	0.7	3.6	6.9	10.6	19.6
Wind Speed 10 m (km/h) Average	742	7.6	4	-	0	3	5	7	10	13	25
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	743	-	-	21.34	0	0	0	0	0	0	1.8
Relative Humidity (%) Average	744	79.7	15	-	40	57	70	83	92	96	99
Global Solar Radiation (W/m2) Average	744	46	80	-	0	0	0	0	64	169	363

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	13 Oct 2014 14:00	13 Oct 2014 15:00	2	Intermittent unstable operation - excessive baseline drift
SO2	13 Oct 2014 17:00	13 Oct 2014 17:00	1	Intermittent unstable operation - excessive baseline drift
SO2	14 Oct 2014 07:00	14 Oct 2014 07:00	1	Intermittent unstable operation - excessive baseline drift
SO2	14 Oct 2014 11:00	14 Oct 2014 12:00	2	Intermittent unstable operation - excessive baseline drift
SO2	16 Oct 2014 05:00	16 Oct 2014 05:00	1	Intermittent unstable operation - excessive baseline drift
SO2	26 Oct 2014 20:00	26 Oct 2014 20:00	1	Intermittent unstable operation - excessive baseline drift
TRS	21 Oct 2014 15:00	21 Oct 2014 15:00	1	Maintenance - cleaned glass manifold
NO2, NO, NOX	22 Oct 2014 03:00	22 Oct 2014 03:00	1	Intermittent unstable operation - NOx channel interference
NO2, NO, NOX	23 Oct 2014 03:00	23 Oct 2014 03:00	1	Intermittent unstable operation - NOx channel interference
NO2, NO, NOX	24 Oct 2014 03:00	24 Oct 2014 03:00	1	Intermittent unstable operation - NOx channel interference
NO2, NO, NOX	25 Oct 2014 03:00	25 Oct 2014 03:00	1	Intermittent unstable operation - NOx channel interference
NO2, NO, NOX	26 Oct 2014 03:00	26 Oct 2014 03:00	1	Intermittent unstable operation - NOx channel interference
NO2, NO, NOX	27 Oct 2014 03:00	27 Oct 2014 03:00	1	Intermittent unstable operation - NOx channel interference
NO2, NO, NOX	28 Oct 2014 03:00	28 Oct 2014 03:00	1	Intermittent unstable operation - NOx channel interference
NO2, NO, NOX	29 Oct 2014 03:00	29 Oct 2014 03:00	1	Intermittent unstable operation - NOx channel interference
NO2, NO, NOX	30 Oct 2014 03:00	30 Oct 2014 03:00	1	Intermittent unstable operation - NOx channel interference
NO2, NO, NOX	31 Oct 2014 03:00	31 Oct 2014 03:00	1	Intermittent unstable operation - NOx channel interference
PM2.5	19 Oct 2014 05:00	19 Oct 2014 06:00	2	Power condition issue/ interruption
PM2.5	21 Oct 2014 14:00	21 Oct 2014 14:00	1	Flow and zero reference checks, sample head cleaning
Wind Speed, Wind Direction	02 Oct 2014 05:00	02 Oct 2014 06:00	2	Flat line in sensor output signal
Precipitation Collector	21 Oct 2014 14:00	21 Oct 2014 14:00	1	Maintenance - tipping bucket cleaned

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Wood Buffalo Environmental Association

Summary of Hour Averages

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

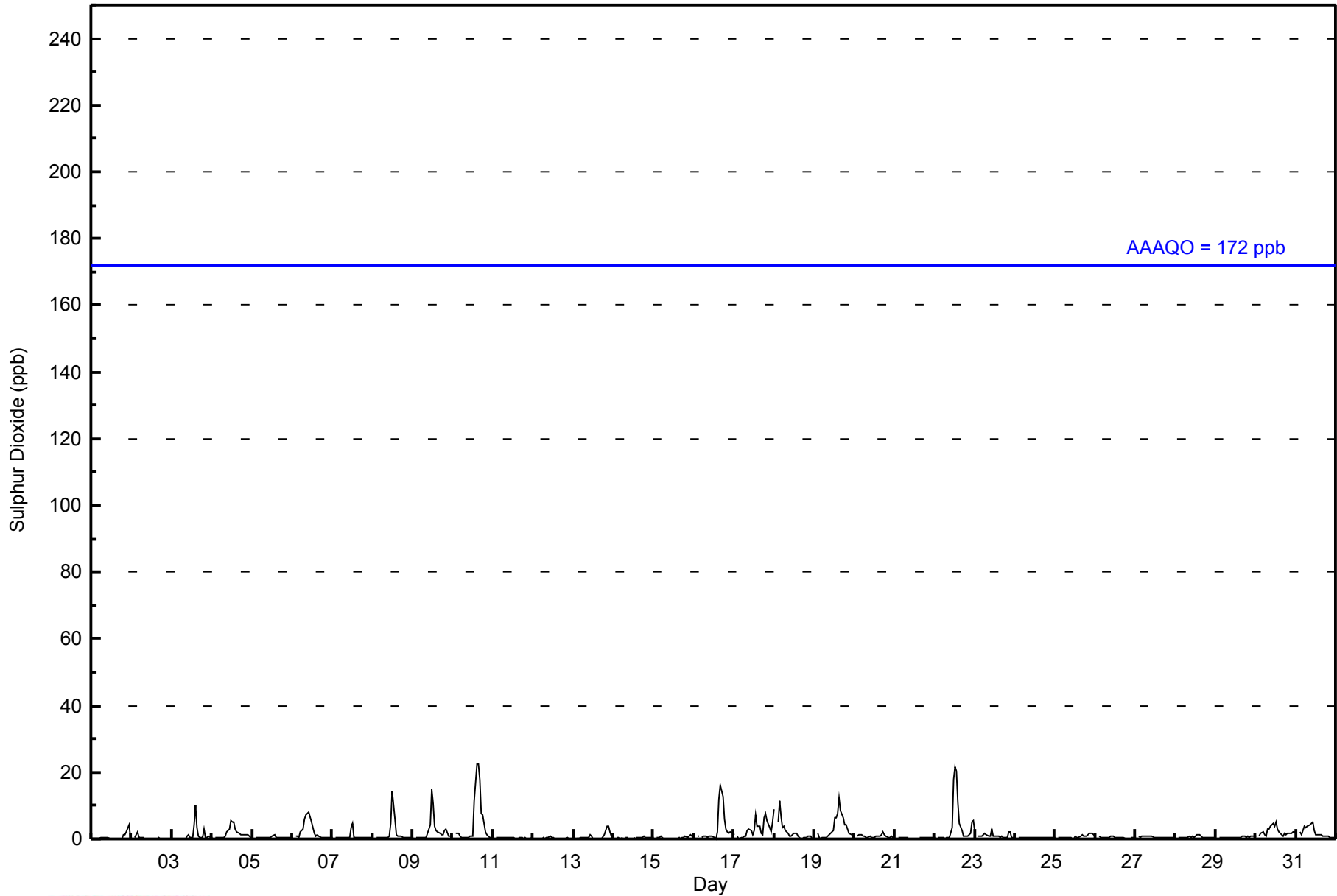
CNRL Horizon - October 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 23 ppb on Oct 10 15:00										Maximum Daily Average: 4.5 ppb on Oct 10										Hours of Data: 699																												
Minimum Value: 0 ppb on Oct 13 18:00										Minimum Daily Average: 0.2 ppb on Oct 12										Hours of Missing Data: 45																												
Maximum Diurnal Average: 2.9 ppb at hour 13										Minimum Diurnal Average: 0.7 ppb at hour 6										Hours of Calibration: 37																												
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> = 3 P <sub>99</sub> = 15										Percent Operational Time: 98.9																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4	1	0.6	4																						
2-Oct	0	Z	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																						
3-Oct	0	Z	0	0	0	0	0	0	0	1	1	0	4	10	3	1	0	1	3	0	1	1	0	1.3	10																							
4-Oct	0	Z	0	0	0	0	0	0	1	2	3	5	5	3	2	2	1	1	1	1	1	1	1	1.7	5																							
5-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1																							
6-Oct	0	Z	1	1	1	2	3	6	7	8	8	5	3	2	1	1	1	1	0	0	0	0	0	2.3	8																							
7-Oct	0	Z	0	0	0	0	0	0	1	0	0	4	5	0	0	0	0	0	0	0	0	0	0	0.7	5																							
8-Oct	0	Z	1	0	0	0	0	0	1	1	1	4	15	6	1	1	1	1	1	1	1	1	1	1.6	15																							
9-Oct	0	Z	0	0	0	0	0	0	1	2	4	15	11	4	3	2	2	1	1	3	3	1	1	2.4	15																							
10-Oct	1	Z	2	2	1	1	0	0	0	1	1	1	1	12	23	22	18	8	7	2	1	1	1	4.5	23																							
11-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
12-Oct	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
13-Oct	0	Z	0	0	0	0	0	0	0	1	1	0	UO	UO	0	UO	0	1	2	4	4	2	1	1.0	4																							
14-Oct	0	Z	0	0	0	0	UO	0	0	0	UO	UO	0	0	1	0	0	0	1	1	0	0	1	0.4	1																							
15-Oct	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	1	0.4	1																							
16-Oct	1	Z	1	1	UO	0	1	1	0	1	1	0	0	2	12	16	13	6	3	2	2	2	2	3.0	16																							
17-Oct	1	Z	1	0	1	1	1	1	3	3	2	1	3	7	4	4	2	1	6	7	6	3	2	2.8	7																							
18-Oct	9	Z	5	12	7	3	4	3	2	1	1	1	2	2	1	1	0	0	1	1	1	1	0	2.4	12																							
19-Oct	0	Z	2	0	0	0	0	0	1	1	2	3	6	6	8	12	8	6	4	4	3	2	1	3.1	12																							
20-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	2	1	1	1	1	1	0.8	2																							
21-Oct	1	Z	1	1	1	1	0	1	1	C	C	C	C	C	C	1	1	1	0	1	1	0	0	--	1																							
22-Oct	0	Z	0	0	0	0	0	0	0	0	4	18	22	20	11	5	3	1	1	1	1	2	5	4.3	22																							
23-Oct	2	Z	1	1	1	1	2	1	1	1	3	1	1	1	1	1	1	1	1	1	2	2	1	1.1	3																							
24-Oct	0	Z	0	0	0	0	0	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1																							
25-Oct	0	Z	0	0	0	0	0	0	1	1	0	0	1	1	1	1	1	1	1	1	1	2	2	0.8	2																							
26-Oct	1	Z	1	1	0	0	1	0	0	1	1	1	0	0	0	0	0	0	UO	0	0	1	1	0.5	1																							
27-Oct	0	Z	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	0	0	0	1	0.6	1																							
28-Oct	1	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0.6	1																							
29-Oct	0	Z	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1																							
30-Oct	1	Z	1	2	2	1	1	3	3	4	5	4	5	3	2	1	1	1	1	2	2	2	2	2.1	5																							
31-Oct	2	Z	2	1	3	4	3	4	4	5	5	2	1	1	1	1	1	1	1	1	1	0	1	1.9	5																							
																								0.8	--	0.8	0.9	0.8	0.7	0.8	0.9	1.0	1.2	1.6	2.4	2.9	2.7	2.6	2.5	2.1	1.4	1.3	1.3	1.1	1.0	1.1	0.9	Diurnal Average
																								9	--	5	12	7	4	4	6	7	8	8	18	22	20	23	22	18	13	7	7	6	4	5	5	Diurnal Maximum
Z - zerospan C - Calibration UO - Unstable Operation																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
CNRL Horizon - October 2014







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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**CNRL Horizon - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	683	97.71	97.71
11 - 20	13	1.86	99.57
21 - 60	3	0.43	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: 699

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**CNRL Horizon - October 2014**

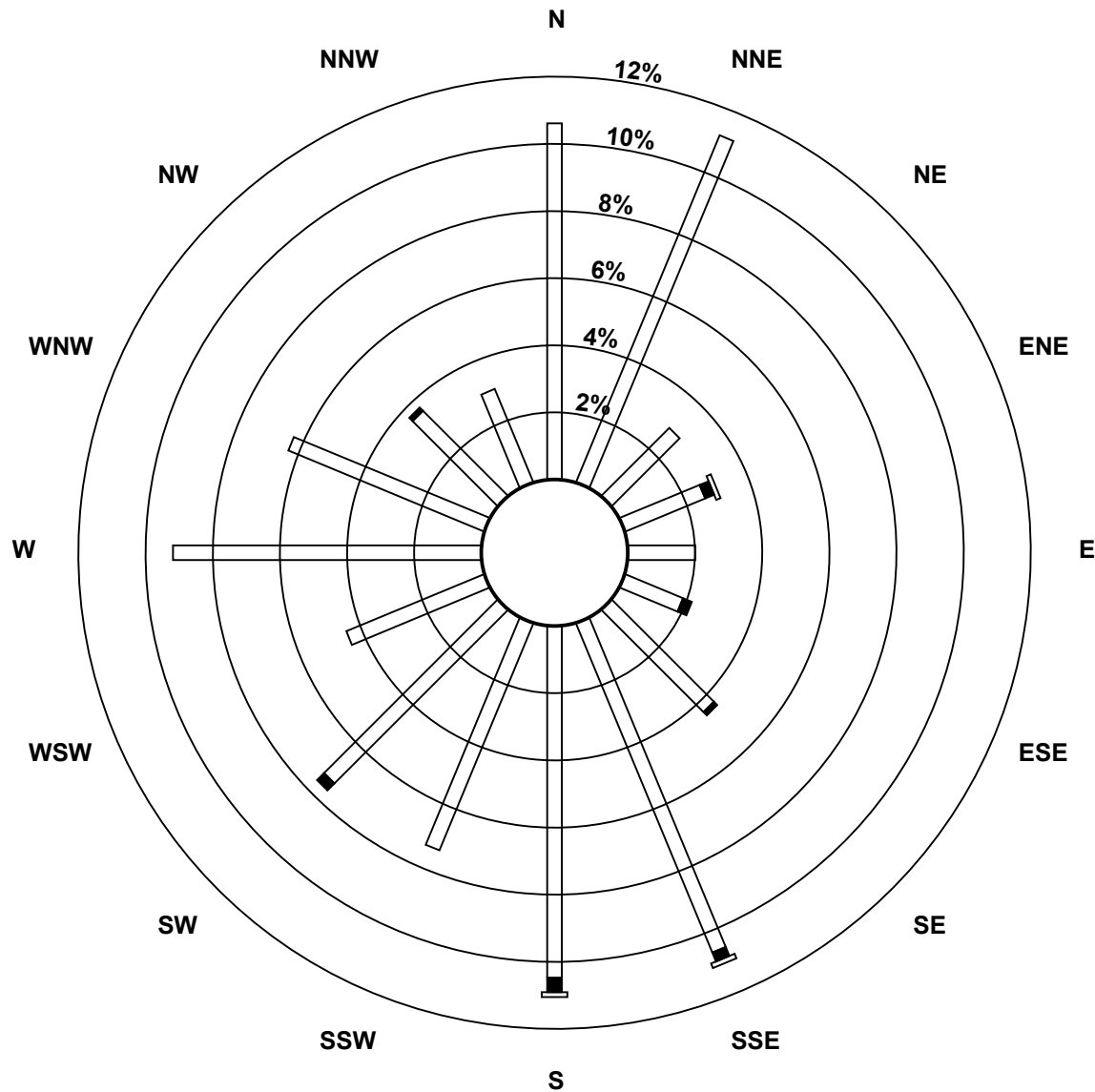
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	74	78	20	18	14	13	30	74	73	51	51	31	64	44	25	21	681
11 - 20	0	0	0	2	0	2	1	2	3	0	2	0	0	0	1	0	13
21 - 60	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	3
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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>	74	78	20	21	14	15	31	77	77	51	53	31	64	44	26	21	697

Total Number of Valid Hours: 697

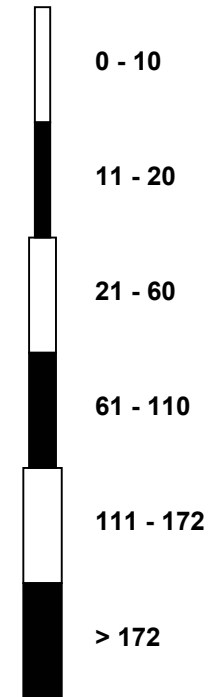
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
CNRL Horizon (AMS 15)**



Classes (ppb)

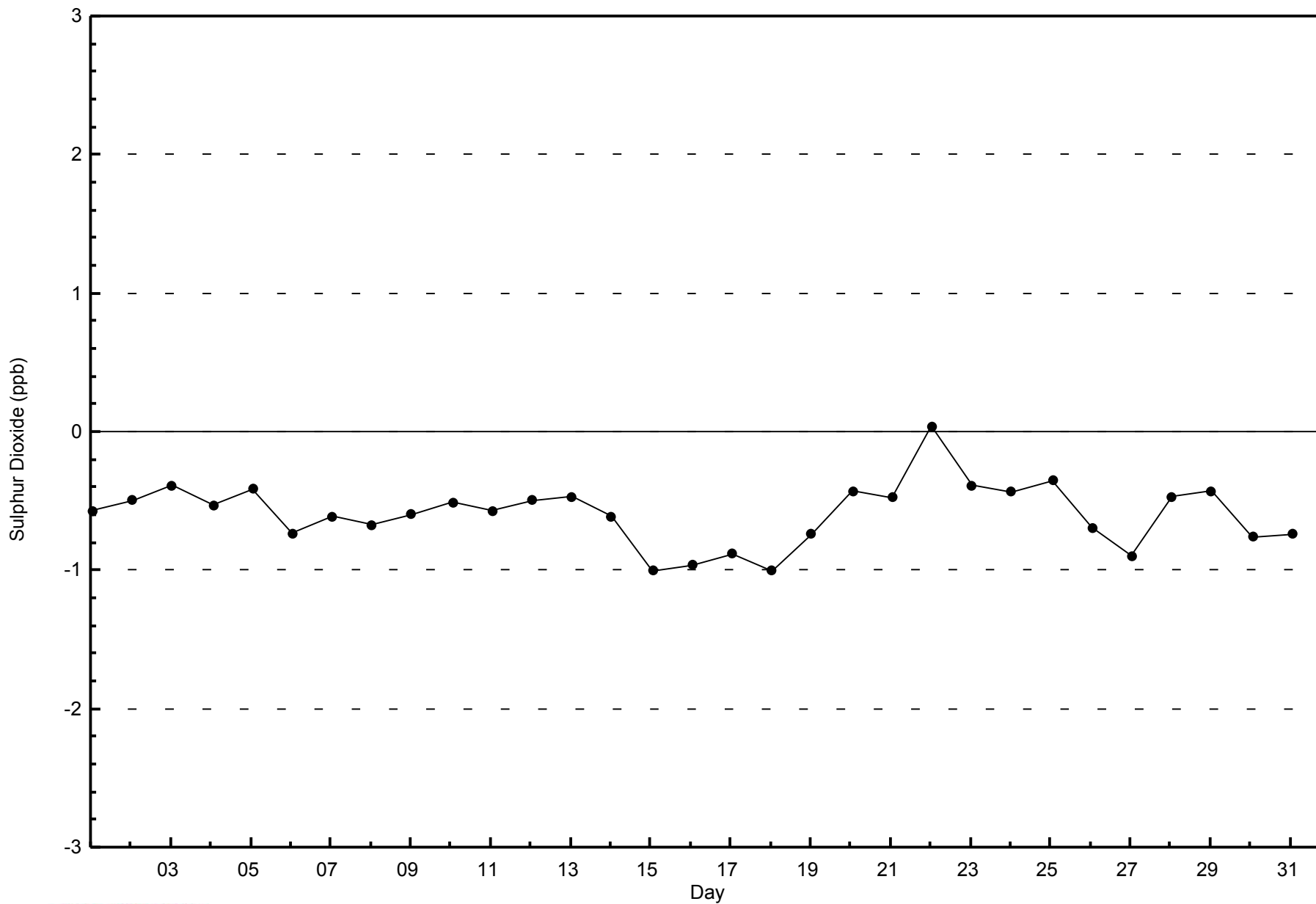


Total Number of Valid Hours: 697



WBEA  
Zero Responses

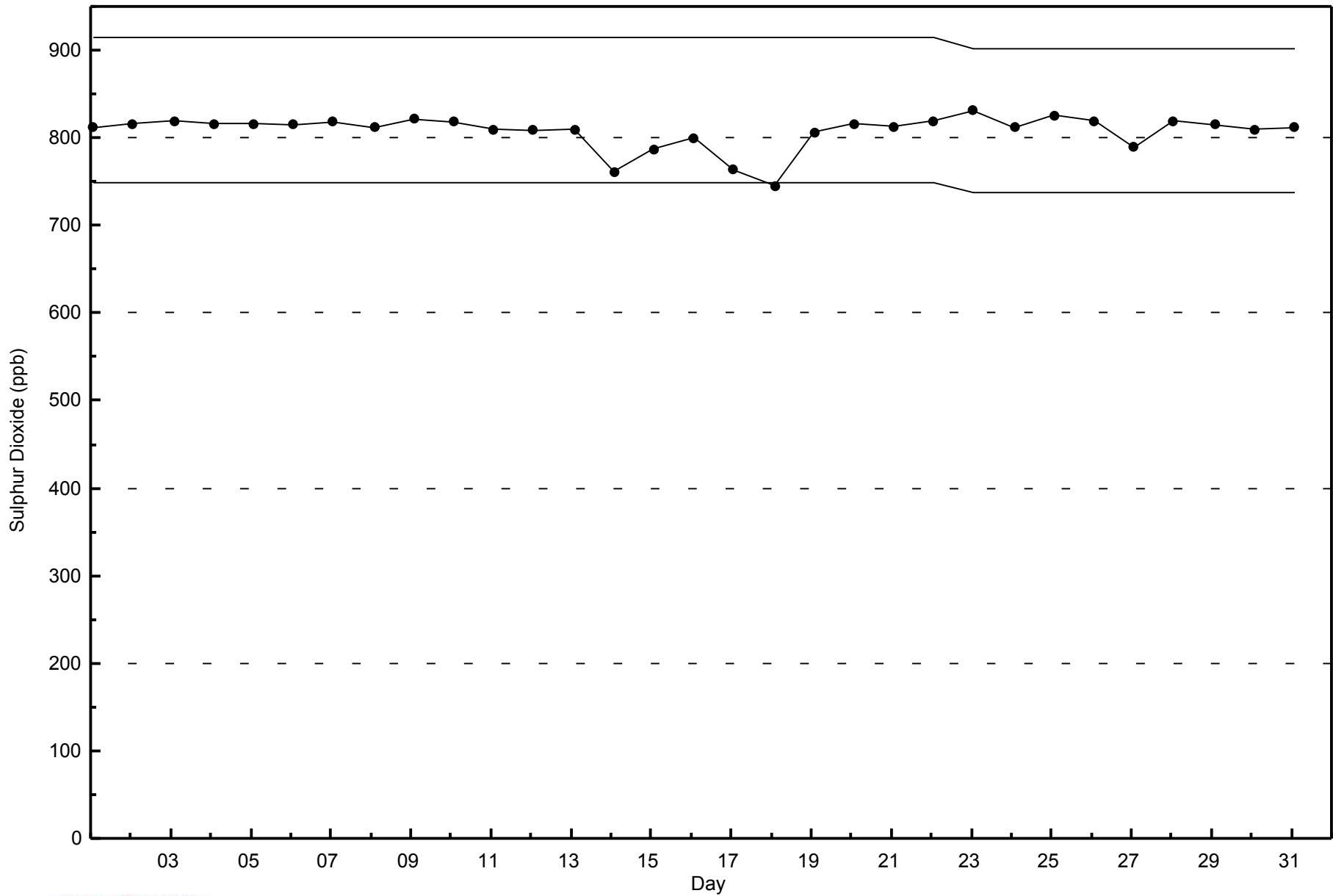
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
CNRL Horizon - October 2014





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
CNRL Horizon - October 2014



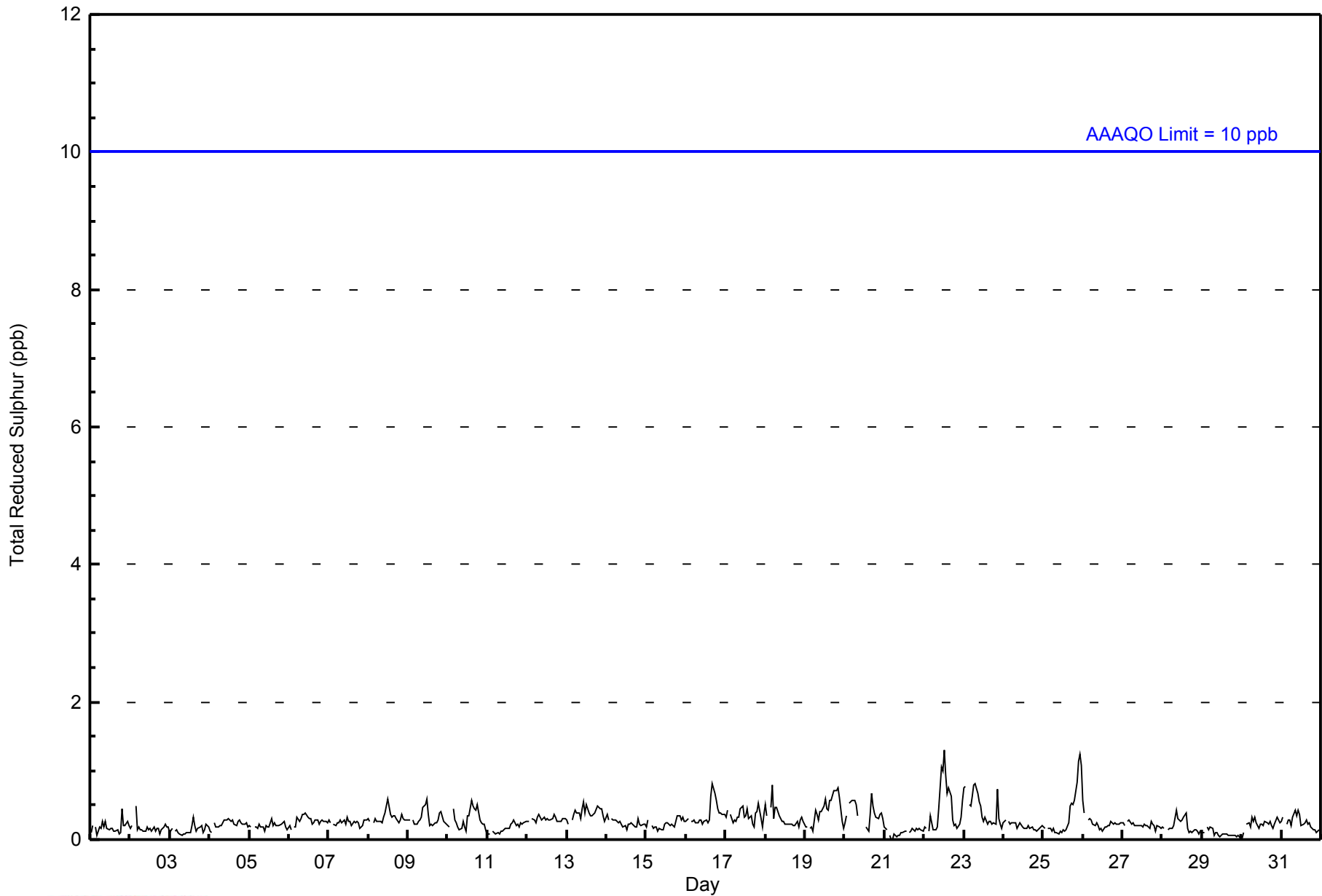


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 1 ppb on Oct 22 13:00										Maximum Daily Average: 0.4 ppb on Oct 23										Hours of Data: 708																												
Minimum Value: 0 ppb on Oct 21 05:00										Minimum Daily Average: 0.1 ppb on Oct 29										Hours of Missing Data: 36																												
Maximum Diurnal Average: 0.3 ppb at hour 13										Minimum Diurnal Average: 0.2 ppb at hour 6										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> = 0 P <sub>99</sub> = 1										Percent Operational Time: 99.9																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
2-Oct	0	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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
4-Oct	0	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																						
5-Oct	0	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																						
6-Oct	0	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-Oct	0	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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
9-Oct	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
10-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0.3	1																						
11-Oct	0	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																						
12-Oct	0	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																						
13-Oct	0	0	Z	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
14-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
15-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
16-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0.4	1																						
17-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1																						
18-Oct	1	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
19-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	1	1	0	0.4	1																						
20-Oct	0	0	Z	1	1	1	1	1	0	C	C	C	C	0	0	0	1	0	0	0	0	0	0	0	0.4	1																						
21-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0.1	0																						
22-Oct	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0.4	1																						
23-Oct	1	1	Z	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1																						
24-Oct	0	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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.4	1																						
26-Oct	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
28-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
31-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
																								0.2	0.2	--	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	Diurnal Average
																								1	1	--	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																



**WBEA**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**CNRL Horizon - October 2014**





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

**Total Reduced Sulphur (TRS) - ppb**  
**CNRL Horizon - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	708	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**CNRL Horizon - October 2014**

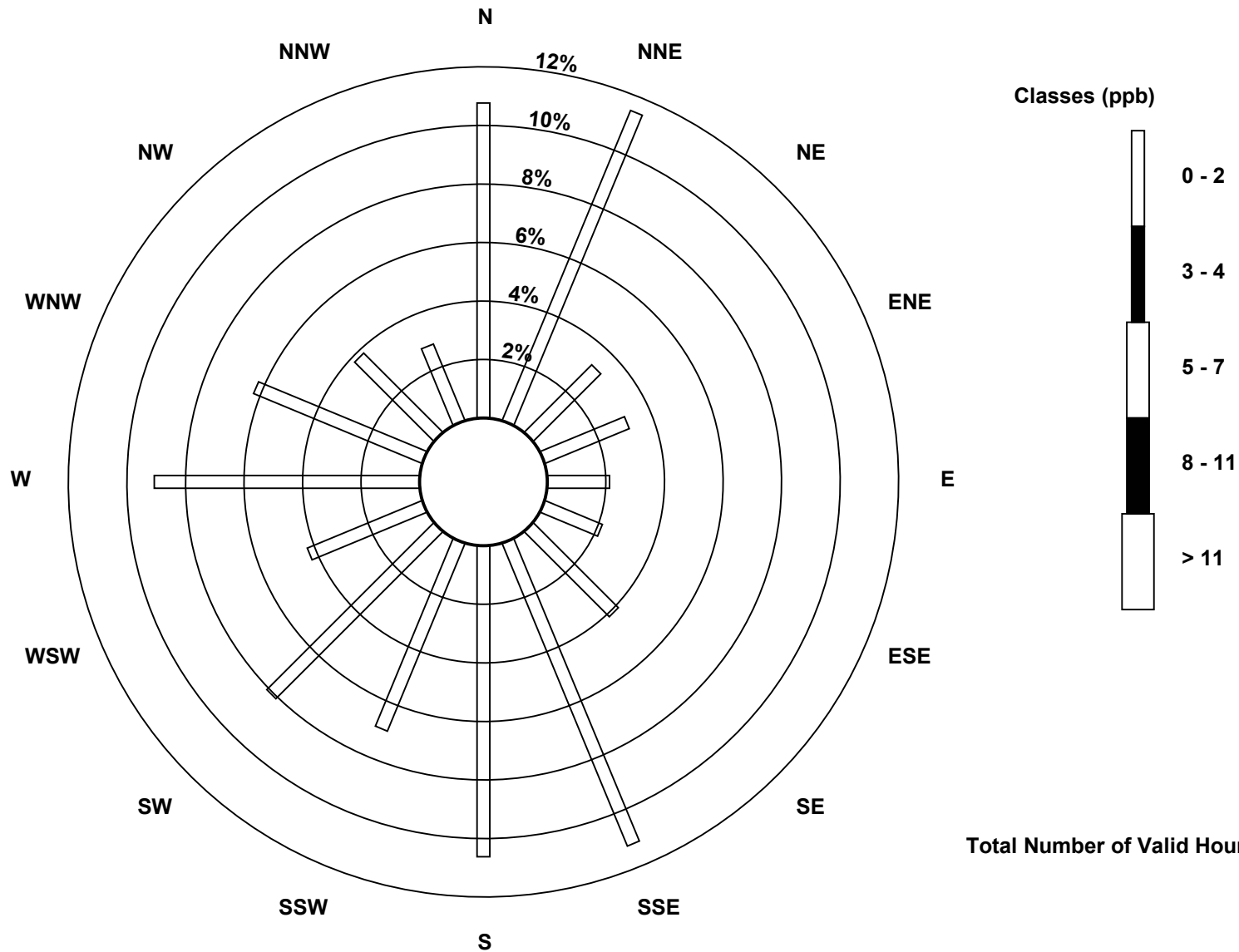
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	76	81	23	22	15	15	29	79	75	49	57	30	64	44	27	20	706
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	76	81	23	22	15	15	29	79	75	49	57	30	64	44	27	20	706

Total Number of Valid Hours: 706

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Total Reduced Sulphur (TRS) - ppb  
CNRL Horizon (AMS 15)**

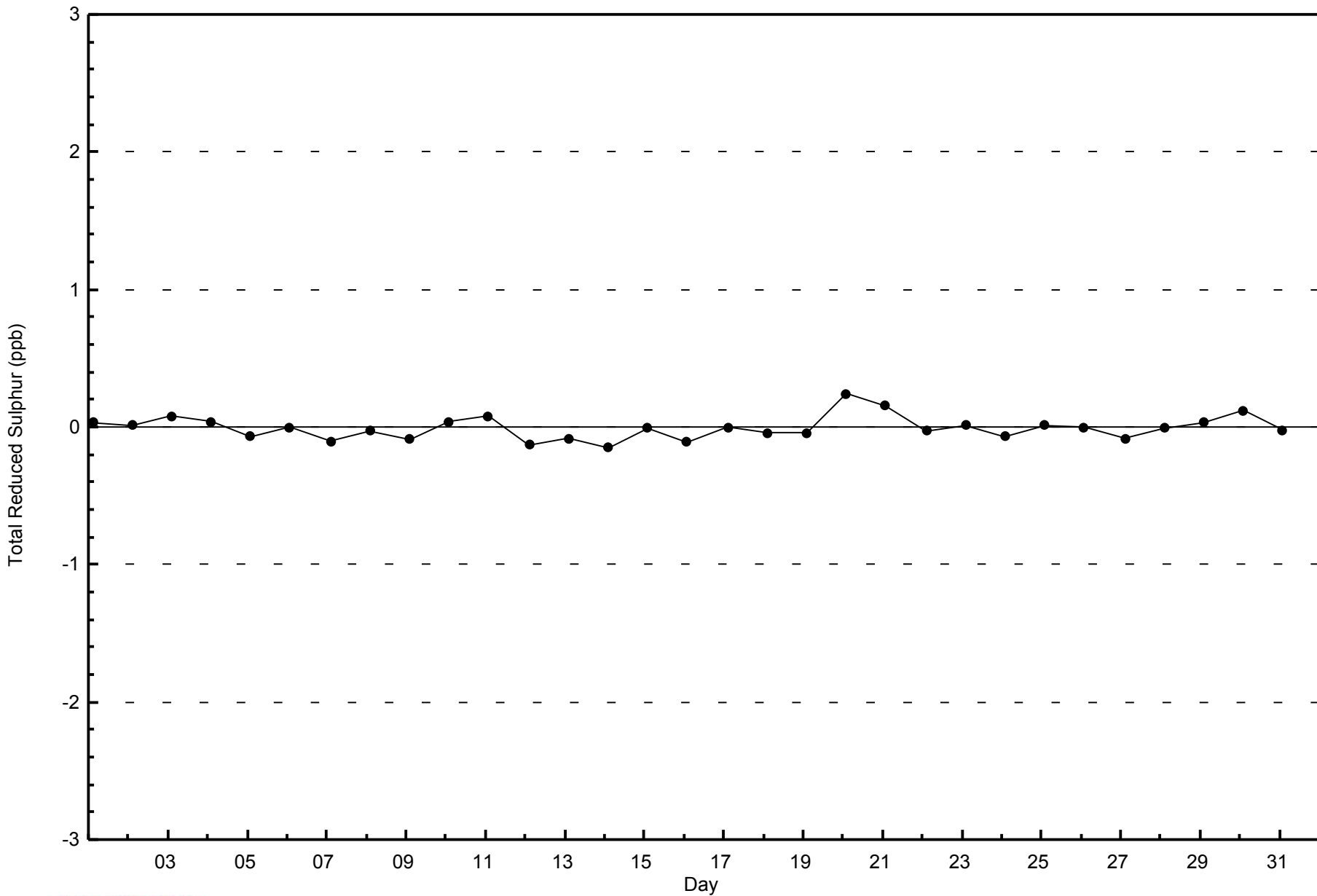


**Total Number of Valid Hours: 706**



WBEA  
Zero Responses

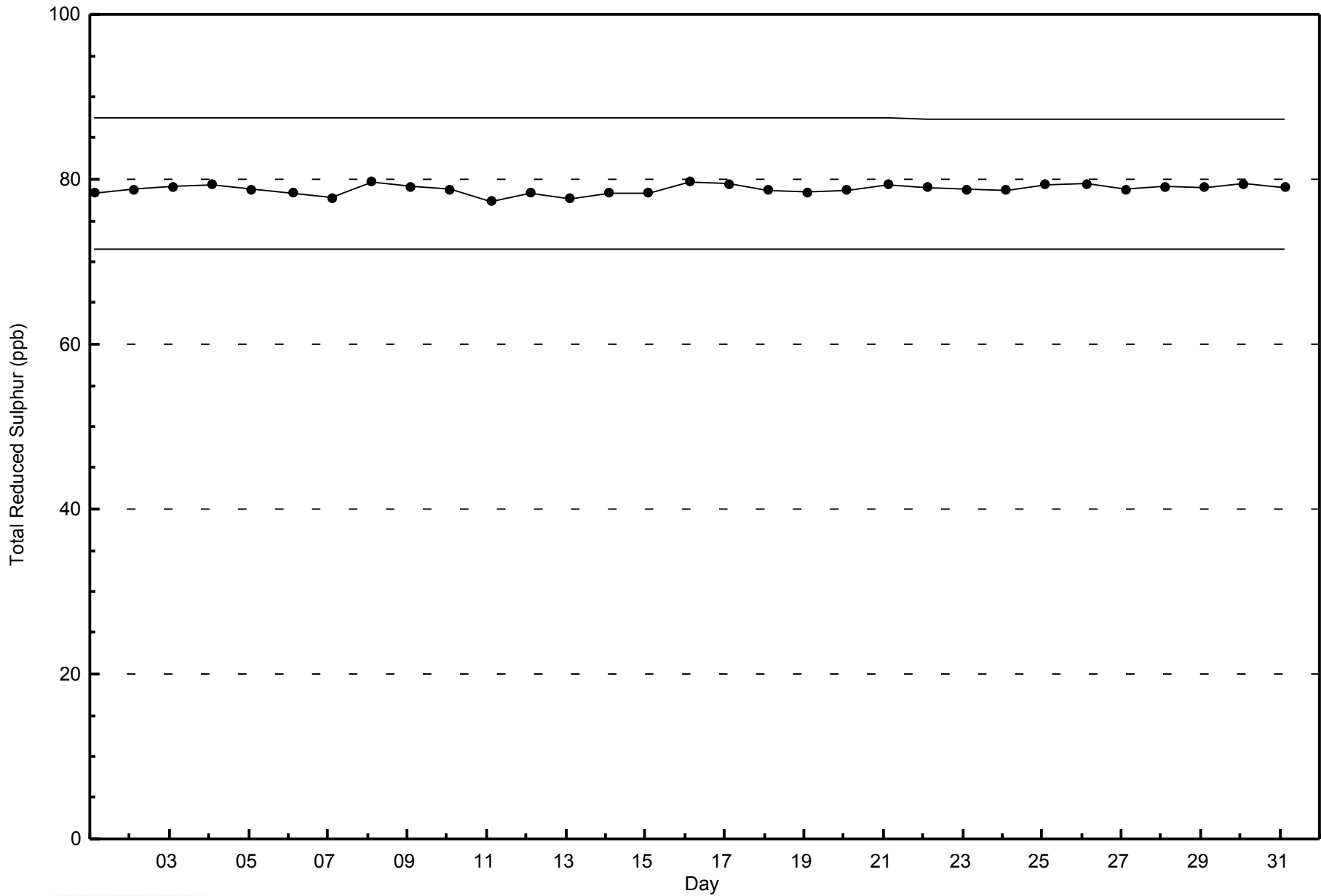
Total Reduced Sulphur (TRS) - ppb  
CNRL Horizon - October 2014





**WBEA**  
**Span Responses**

**Total Reduced Sulphur (TRS) - ppb**  
**CNRL Horizon - October 2014**



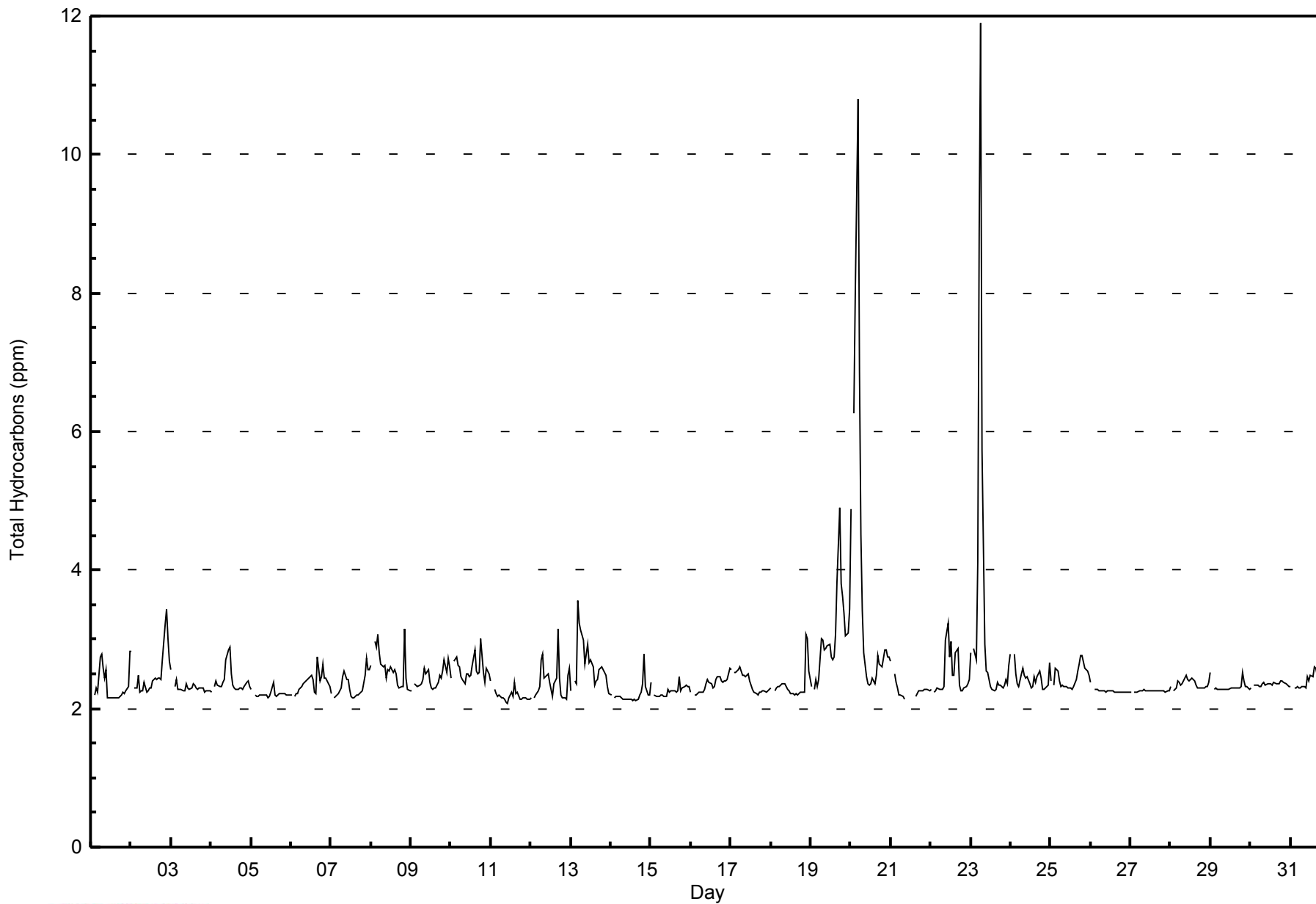


Maximum Value: 11.9 ppm on Oct 23 07:00																Maximum Daily Average: 3.7 ppm on Oct 20																Hours in Service: 744																	
Minimum Value: 2.1 ppm on Oct 11 11:00																Minimum Daily Average: 2.2 ppm on Oct 11																Hours of Data: 707																	
Maximum Diurnal Average: 2.8 ppm at hour 7																Minimum Diurnal Average: 2.3 ppm at hour 14																Hours of Missing Data: 37																	
Monthly Average: 2.47 ppm																Percentiles: P <sub>1</sub> = 2.1 P <sub>10</sub> = 2.2 Q <sub>1</sub> = 2.3 Median = 2.3 Q <sub>3</sub> = 2.5 P <sub>90</sub> = 2.7 P <sub>99</sub> = 5.4																Hours of Calibration: 37																	
																																Percent Operational Time: 100.0																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	2.2	Z	2.2	2.3	2.2	2.7	2.8	2.6	2.4	2.6	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.8	2.3	2.8																								
2-Oct	2.8	Z	2.3	2.3	2.5	2.2	2.3	2.3	2.4	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.7	3.2	3.4	3.0	2.7	2.5	3.4																							
3-Oct	2.6	Z	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.6																							
4-Oct	2.2	Z	2.3	2.4	2.3	2.3	2.3	2.4	2.4	2.7	2.8	2.9	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.9																							
5-Oct	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4																							
6-Oct	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.2	2.2	2.7	2.4	2.5	2.6	2.4	2.4	2.4	2.3	2.4	2.7																							
7-Oct	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.5	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.7	2.6	2.6	2.3	2.7																							
8-Oct	2.6	Z	3.0	2.9	3.1	2.8	2.6	2.6	2.6	2.4	2.6	2.5	2.6	2.5	2.6	2.5	2.3	2.3	2.3	2.3	3.2	2.4	2.3	2.3	2.6	3.2																							
9-Oct	2.3	Z	2.4	2.3	2.3	2.3	2.4	2.4	2.6	2.5	2.6	2.4	2.3	2.3	2.3	2.3	2.4	2.5	2.4	2.5	2.7	2.5	2.7	2.6	2.4	2.7																							
10-Oct	2.4	Z	2.7	2.7	2.6	2.6	2.5	2.4	2.4	2.5	2.5	2.5	2.5	2.6	2.9	2.5	2.5	2.5	3.0	2.5	2.4	2.6	2.5	2.5	2.6	3.0																							
11-Oct	2.4	Z	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.4	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.4																							
12-Oct	2.2	Z	2.2	2.2	2.3	2.3	2.7	2.8	2.4	2.5	2.5	2.4	2.3	2.2	2.4	2.4	3.1	2.4	2.2	2.2	2.2	2.1	2.5	2.6	2.4	3.1																							
13-Oct	2.3	Z	2.4	2.4	3.5	3.2	3.1	3.0	2.6	2.8	2.9	2.7	2.7	2.6	2.3	2.4	2.4	2.6	2.6	2.6	2.5	2.5	2.3	2.2	2.6	3.5																							
14-Oct	2.2	Z	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.4	2.8	2.3	2.2	2.2	2.8																							
15-Oct	2.4	Z	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	2.2	2.2	2.5	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.5																							
16-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.6	2.3	2.6																							
17-Oct	2.6	Z	2.5	2.5	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.4	2.6																							
18-Oct	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	3.1	3.0	2.5	2.3	3.1	4.9																							
19-Oct	2.3	Z	2.3	2.4	2.3	2.4	3.0	3.0	2.8	2.9	2.9	2.9	2.7	2.7	2.7	3.1	3.8	4.9	3.8	3.6	3.4	3.1	3.1	3.4	3.0	4.9																							
20-Oct	4.9	Z	6.3	8.0	10.8	6.9	4.5	3.4	2.8	2.5	2.4	2.3	2.4	2.4	2.4	2.5	2.8	2.6	2.6	2.6	2.8	2.9	2.8	2.7	3.7	10.8																							
21-Oct	2.7	Z	2.5	2.4	2.3	2.2	2.2	2.2	2.1	C	C	C	C	C	C	2.2	2.2	2.3	2.3	2.2	2.3	2.3	2.3	2.3	--	2.7																							
22-Oct	2.3	Z	2.2	2.3	2.3	2.3	2.3	2.3	2.3	3.0	3.2	2.7	3.0	2.5	2.5	2.8	2.9	2.3	2.3	2.2	2.3	2.3	2.4	2.4	2.5	3.2																							
23-Oct	2.8	Z	2.9	2.7	4.1	8.9	11.9	5.7	2.9	2.5	2.5	2.4	2.3	2.3	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.6	3.4	11.9																							
24-Oct	2.8	Z	2.8	2.5	2.4	2.3	2.5	2.6	2.5	2.4	2.5	2.4	2.3	2.3	2.5	2.4	2.5	2.5	2.4	2.3	2.3	2.3	2.3	2.7	2.5	2.8																							
25-Oct	2.4	Z	2.3	2.6	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.6	2.8	2.8	2.6	2.6	2.5	2.5	2.4	2.8																							
26-Oct	2.4	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4																							
27-Oct	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3																							
28-Oct	2.3	Z	2.2	2.3	2.4	2.4	2.3	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.5																							
29-Oct	2.5	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.4	2.3	2.3	2.3	2.5																							
30-Oct	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.4																							
31-Oct	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.4	2.5	2.5	2.6	2.6	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.6																							
																								2.5	--	2.5	2.5	2.7	2.7	2.8	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.4	Diurnal Average		
																								4.9	--	6.3	8.0	10.8	8.9	11.9	5.7	2.9	3.0	3.2	2.9	3.0	2.7	2.9	3.1	3.8	4.9	3.8	3.6	3.4	3.4	3.1	3.4	Diurnal Maximum	
Z - zerospan																								C - Calibration																									



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**CNRL Horizon - October 2014**





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

**Total Hydrocarbons (THC) - ppm**  
**CNRL Horizon - October 2014**

<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	677	95.76	95.76
3.1 - 10.0	28	3.96	99.72
> 10.0	2	0.28	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**CNRL Horizon - October 2014**

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	71	80	22	19	14	15	31	78	76	51	47	31	61	39	20	20	675
3.1 - 10.0	5	1	0	2	0	0	0	0	1	0	5	0	3	5	5	1	28
> 10.0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2
<b>Totals</b>	76	81	22	21	14	15	31	78	77	51	53	31	64	44	26	21	705

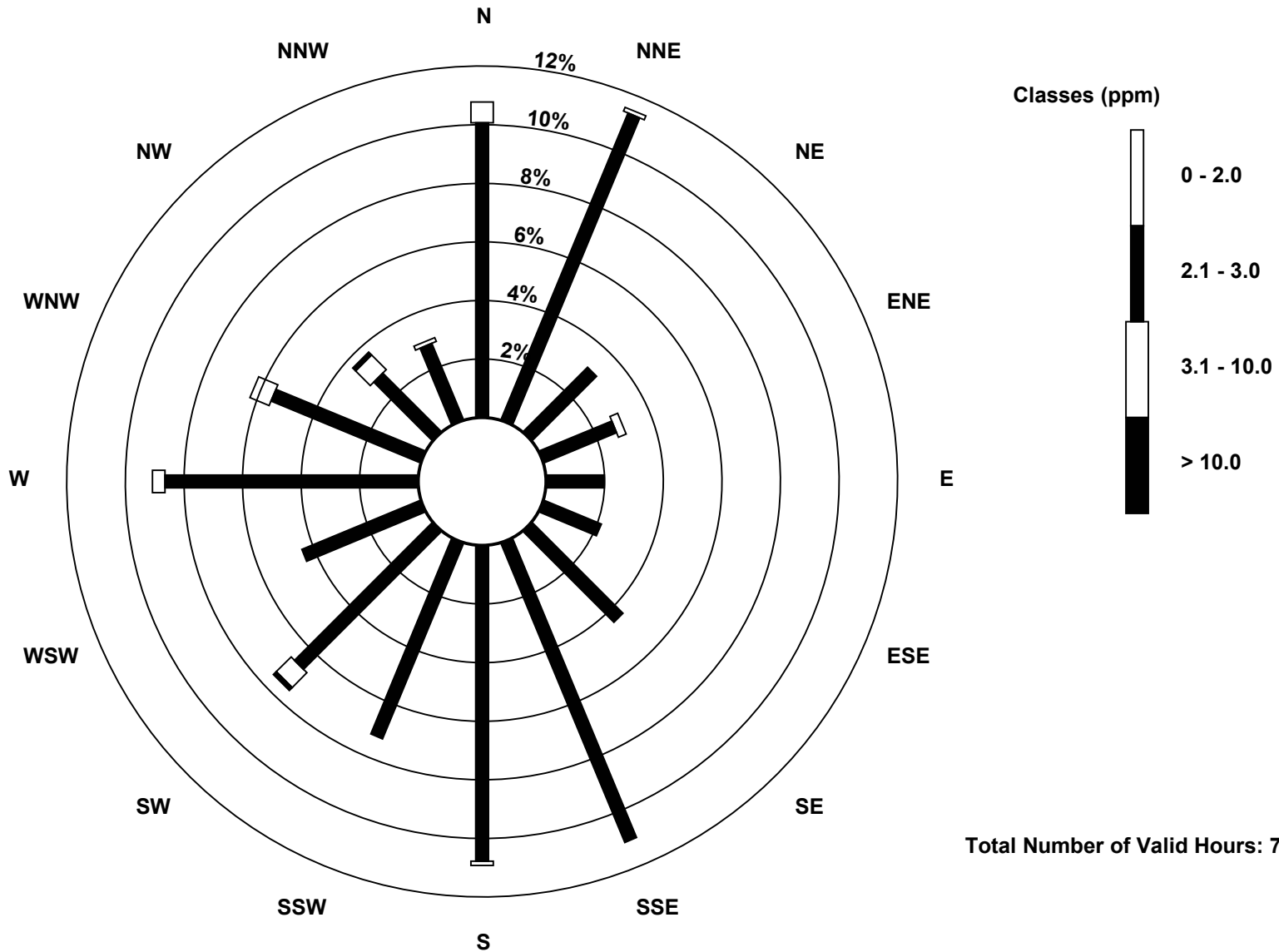
Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

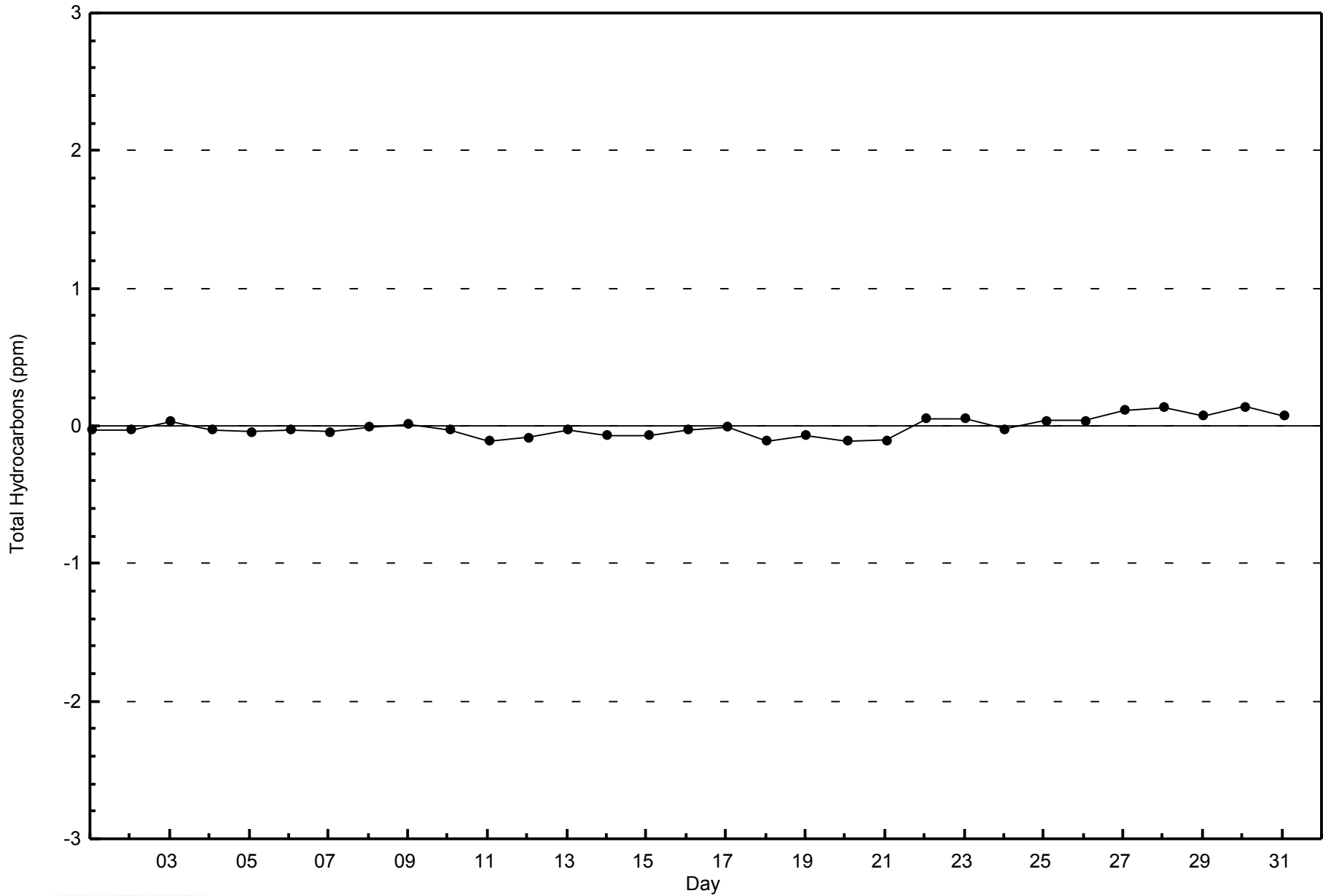
Total Hydrocarbons (THC) - ppm  
 CNRL Horizon (AMS 15)





WBEA  
Zero Responses

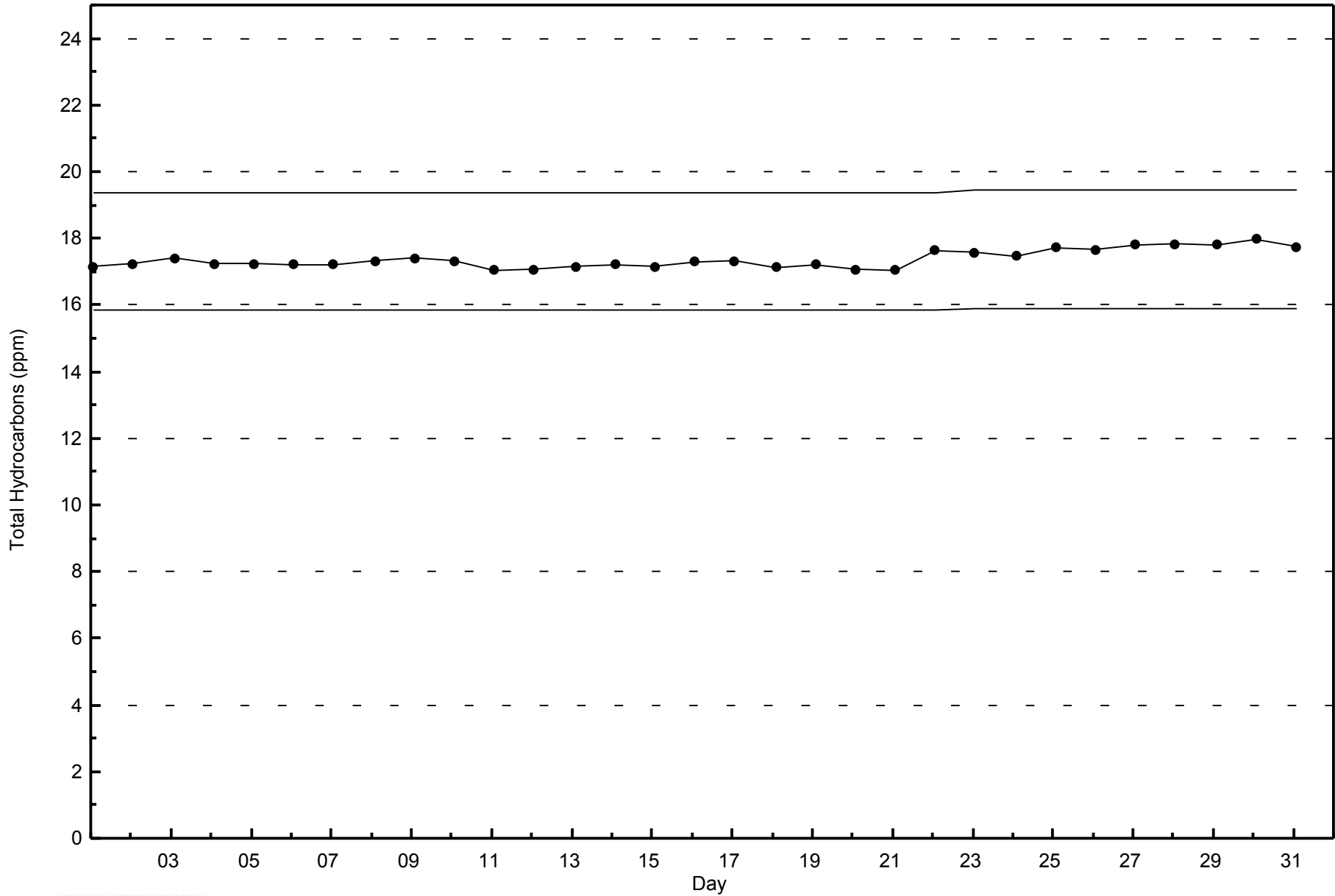
Total Hydrocarbons (THC) - ppm  
CNRL Horizon - October 2014





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
CNRL Horizon - October 2014



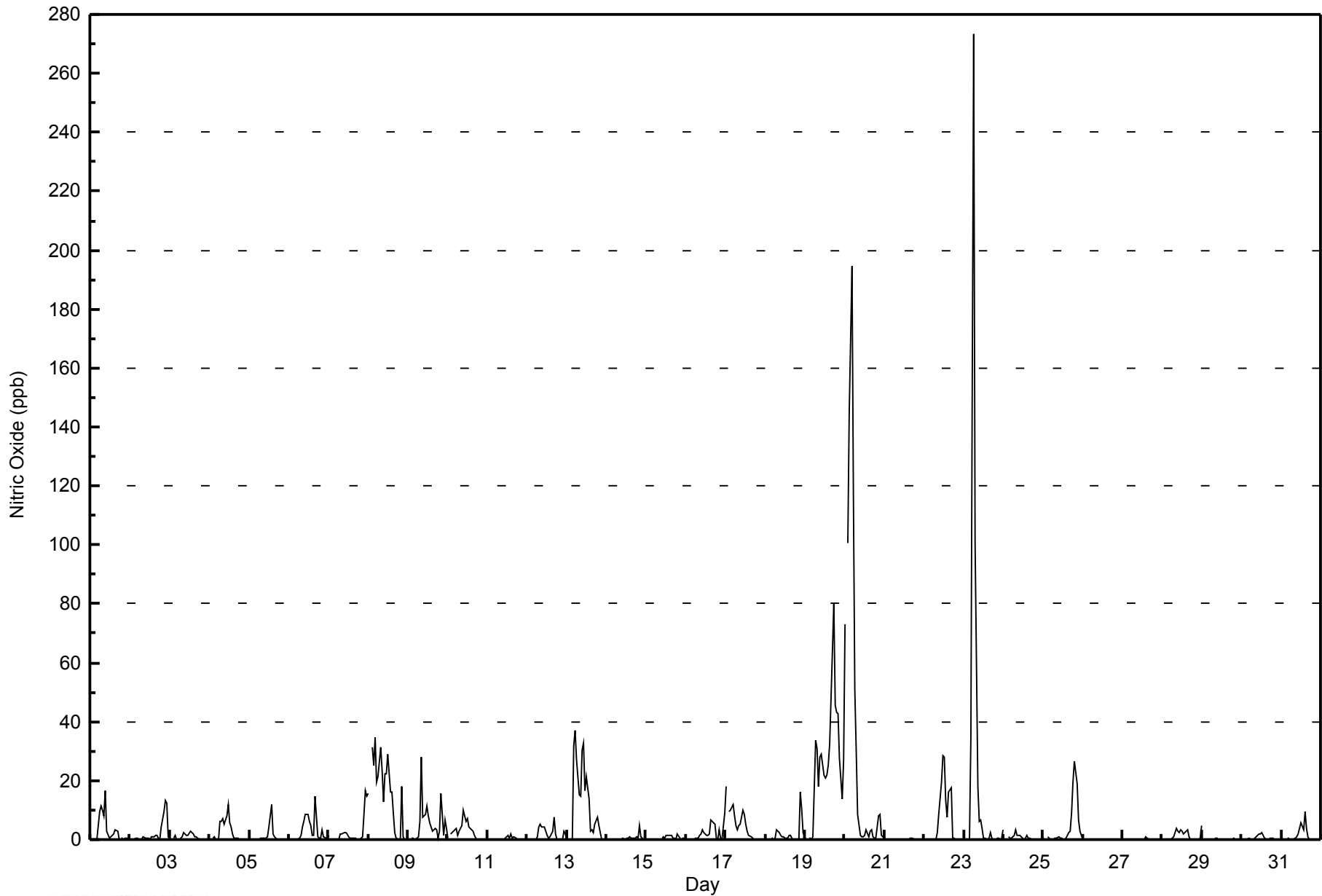


Maximum Value: 273 ppb on Oct 23 07:00																		Maximum Daily Average: 32.9 ppb on Oct 20						Hours in Service: 744																								
Minimum Value: 0 ppb on Oct 1 18:00																		Minimum Daily Average: 0.1 ppb on Oct 26						Hours of Data: 697																								
Maximum Diurnal Average: 14.1 ppb at hour 7																		Minimum Diurnal Average: 2.1 ppb at hour 24						Hours of Missing Data: 47																								
Monthly Average: 5.3 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> = 14 P <sub>99</sub> = 101						Hours of Calibration: 37																								
																		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-Oct	0	Z	0	0	0	10	11	10	8	17	3	0	1	1	2	3	3	0	0	0	0	1	0	0	3.1	17																						
2-Oct	0	Z	0	1	1	0	0	0	1	0	0	0	0	1	1	1	1	1	0	4	10	13	12	1	2.2	13																						
3-Oct	1	Z	0	2	0	0	0	1	2	2	1	1	3	2	2	1	1	0	0	0	0	0	0	0	0.9	3																						
4-Oct	0	Z	0	1	0	0	6	6	7	5	8	12	6	4	2	1	1	0	0	0	0	0	0	0	2.6	12																						
5-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	4	12	2	1	0	0	0	0	0	0	0	0	1.0	12																						
6-Oct	0	Z	0	0	0	0	0	2	4	6	8	9	6	5	1	2	14	1	0	1	3	1	0	0	2.8	14																						
7-Oct	2	Z	0	0	0	0	0	2	2	2	2	2	1	0	0	1	1	0	0	0	1	8	16	15	2.5	16																						
8-Oct	16	Z	31	25	34	19	21	31	23	13	22	22	29	16	16	9	2	1	0	0	18	1	0	0	15.3	34																						
9-Oct	0	Z	0	0	0	0	1	6	28	8	8	11	8	6	5	3	4	3	0	3	16	2	6	4	5.3	28																						
10-Oct	1	Z	2	3	3	4	2	3	5	10	8	6	7	4	3	3	1	1	0	0	0	0	0	0	2.9	10																						
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	2	1	1	0	0	0	0	0	0	0	0.3	2																						
12-Oct	0	Z	0	0	0	0	1	4	5	4	4	3	1	1	1	3	7	2	0	0	0	0	3	2	1.8	7																						
13-Oct	0	Z	0	0	32	37	27	15	15	31	33	16	22	14	3	3	2	5	7	5	2	0	0	0	11.7	37																						
14-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	5	1	0	0	0.5	5																						
15-Oct	1	Z	0	0	0	0	0	0	0	0	1	1	1	2	1	1	1	1	0	2	0	0	0	0	0.5	2																						
16-Oct	0	Z	0	0	0	0	0	1	1	2	3	2	1	1	2	7	6	5	0	0	3	0	0	9	2.0	9																						
17-Oct	18	Z	9	10	12	8	5	3	5	5	10	8	5	3	2	1	0	0	0	0	0	0	0	0	4.6	18																						
18-Oct	0	Z	0	0	1	0	0	3	2	1	1	1	0	0	1	1	0	0	0	0	0	16	11	2	1.9	16																						
19-Oct	0	Z	0	1	0	1	34	31	18	28	29	22	21	22	25	32	48	80	45	43	43	28	14	27	25.8	80																						
20-Oct	73	Z	101	145	194	117	51	30	8	2	1	1	2	3	1	3	3	1	0	0	8	9	1	1	32.9	194																						
21-Oct	1	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	1																						
22-Oct	0	Z	UO	0	0	0	0	0	2	9	20	28	28	13	8	16	17	0	0	0	0	0	0	0	6.5	28																						
23-Oct	0	Z	UO	0	35	156	273	101	18	6	7	4	0	0	0	1	2	1	0	0	1	0	0	0	27.6	273																						
24-Oct	3	Z	UO	1	0	0	1	3	1	1	2	1	0	0	2	0	1	0	0	0	0	0	0	1	0.8	3																						
25-Oct	0	Z	UO	1	0	0	0	1	0	1	0	0	0	0	1	2	3	9	20	27	19	7	3	2	4.3	27																						
26-Oct	1	Z	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																						
27-Oct	0	Z	UO	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.1	1																						
28-Oct	0	Z	UO	0	0	0	0	1	4	3	2	3	3	2	3	3	1	0	0	0	0	0	0	0	1.2	4																						
29-Oct	5	Z	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	5																						
30-Oct	0	Z	UO	0	0	0	0	0	0	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0.5	2																						
31-Oct	0	Z	UO	0	0	0	0	0	1	1	2	4	5	4	9	4	1	0	0	0	0	0	0	0	1.4	9																						
																								3.9	--	6.9	6.1	10.1	11.4	14.1	8.3	5.3	5.3	6.0	5.4	5.4	4.0	3.2	3.4	4.0	3.7	2.5	2.8	4.2	2.9	2.2	2.1	Diurnal Average
																								73	--	101	145	194	156	273	101	28	31	33	28	29	22	25	32	48	80	45	43	43	28	16	27	Diurnal Maximum
Z - zerospan																								C - Calibration						UO - Unstable Operation																		



WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
CNRL Horizon - October 2014





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

**Nitric Oxide (NO) - ppb**  
**CNRL Horizon - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	651	93.40	93.40
21 - 40	32	4.59	97.99
41 - 80	7	1.00	99.00
81 - 159	5	0.72	99.71
> 159	2	0.29	100.00

Total Number of Valid Hours: 697

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**CNRL Horizon - October 2014**

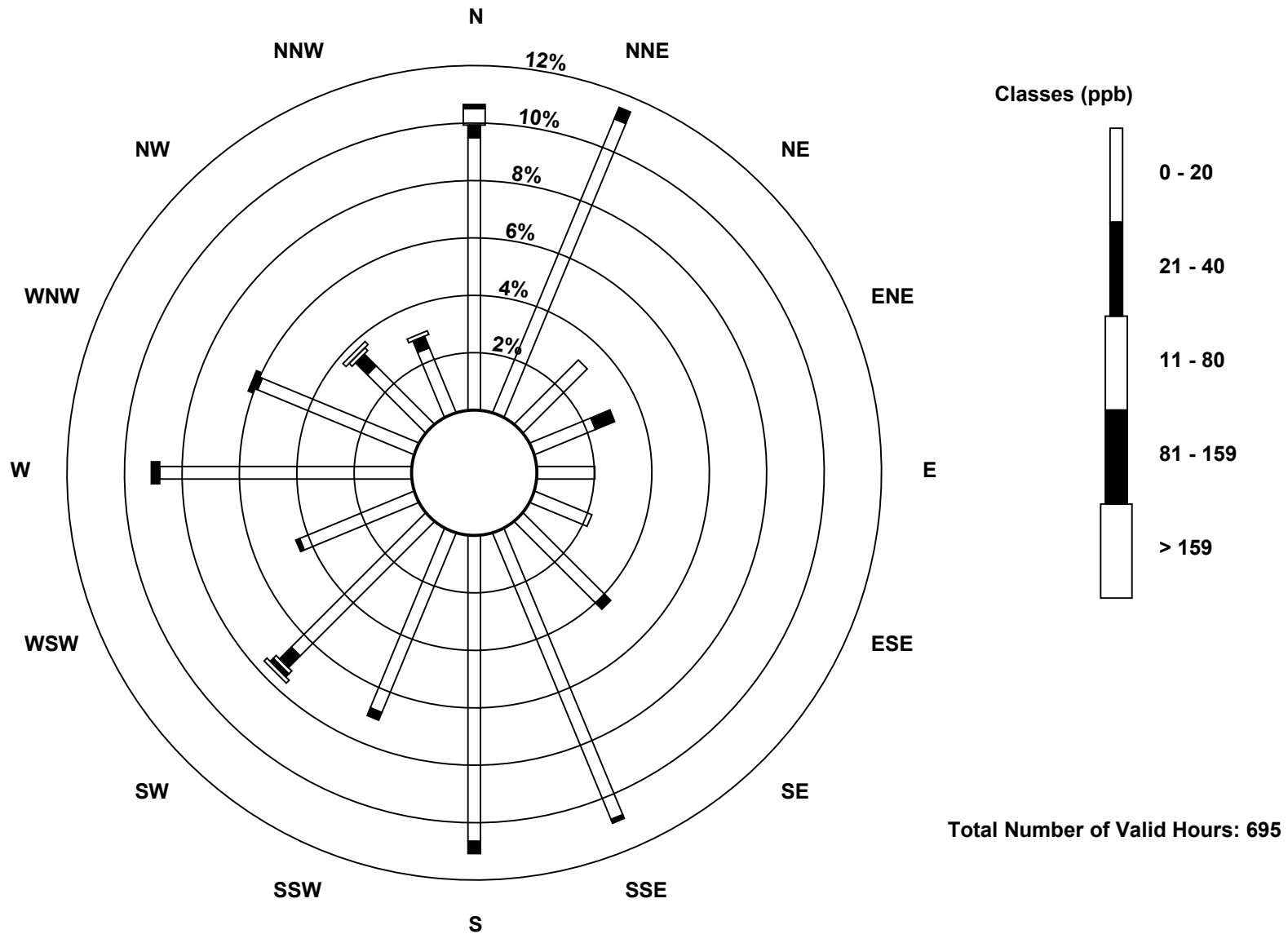
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	66	77	22	16	14	15	28	75	74	47	46	30	61	41	20	17	649
21 - 40	3	3	0	5	0	0	2	1	3	2	4	1	0	1	4	3	32
11 - 80	4	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	7
81 - 159	1	0	0	0	0	0	0	0	0	0	1	0	2	1	0	0	5
> 159	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2
<b>Totals</b>	74	80	22	21	14	15	30	76	77	49	53	31	63	43	26	21	695

Total Number of Valid Hours: 695

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitric Oxide (NO) - ppb  
CNRL Horizon (AMS 15)**

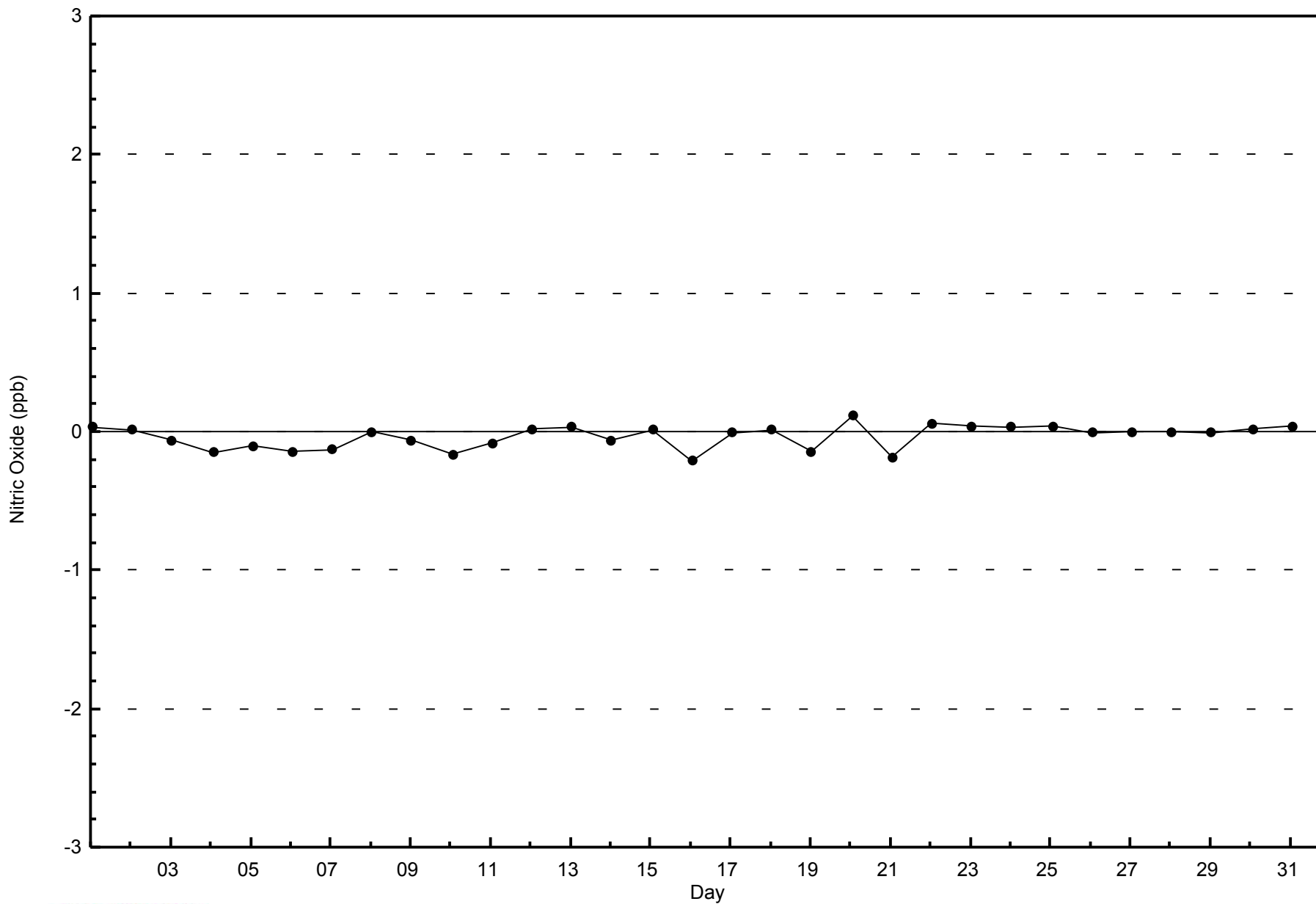






WBEA  
Zero Responses

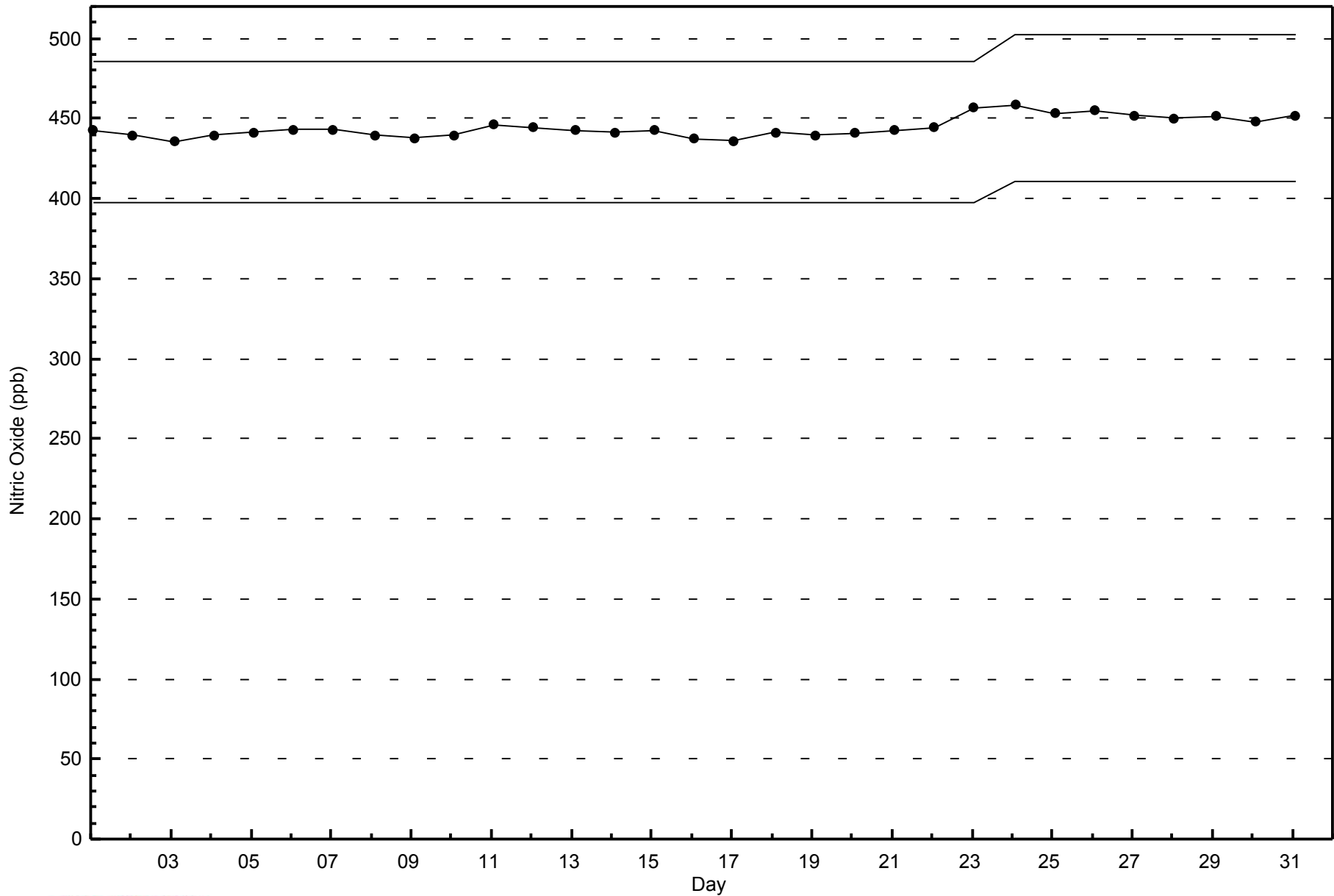
Nitric Oxide (NO) - ppb  
CNRL Horizon - October 2014





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
CNRL Horizon - October 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb

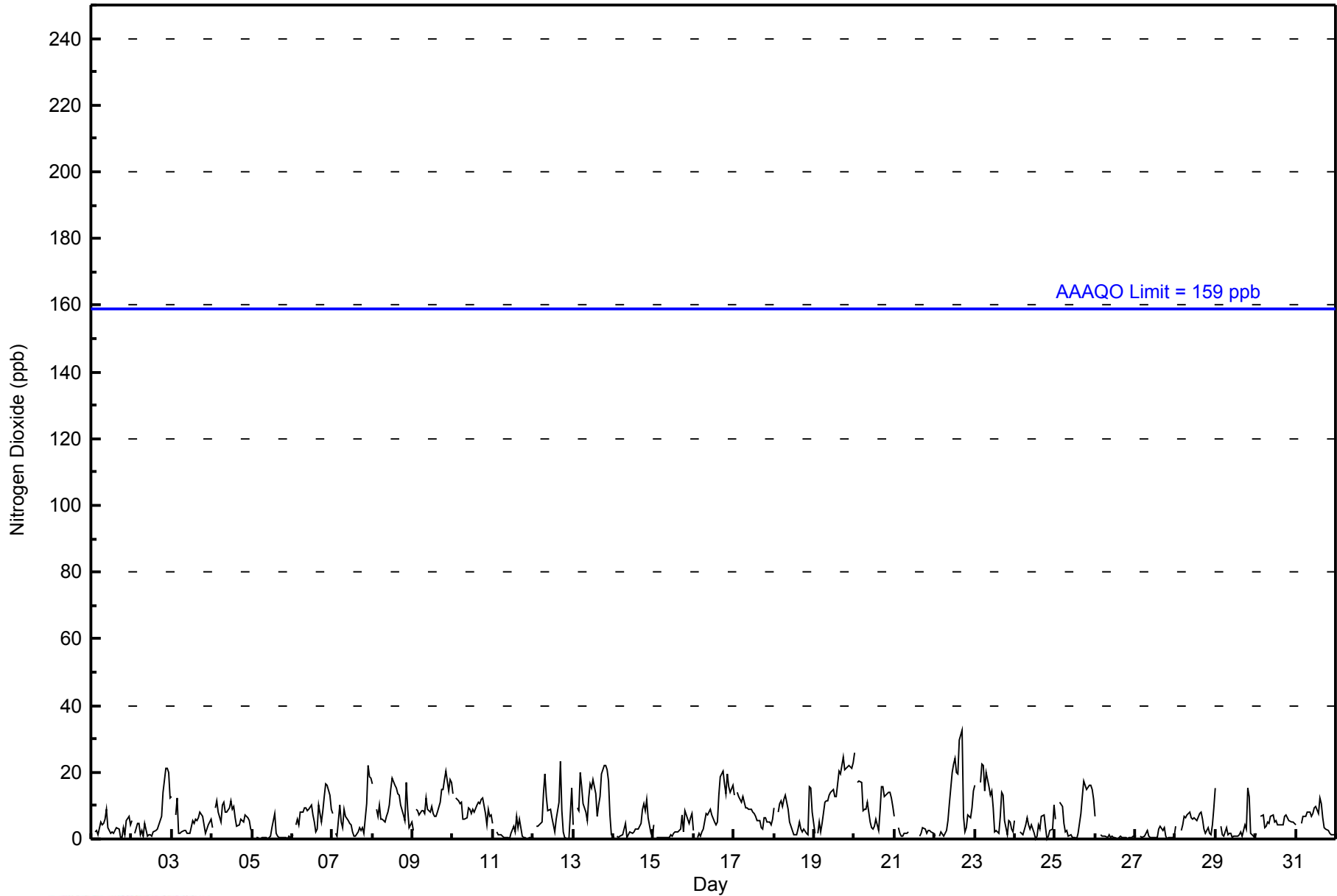
CNRL Horizon - October 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 33 ppb on Oct 22 17:00										Maximum Daily Average: 14.2 ppb on Oct 19										Hours of Data: 697																												
Minimum Value: 0 ppb on Oct 24 13:00										Minimum Daily Average: 0.9 ppb on Oct 26										Hours of Missing Data: 47																												
Maximum Diurnal Average: 8.6 ppb at hour 17										Minimum Diurnal Average: 5.2 ppb at hour 6										Hours of Calibration: 37																												
Monthly Average: 6.5 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 5 Q <sub>3</sub> = 9 P <sub>90</sub> = 15 P <sub>99</sub> = 23										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-Oct	1	Z	2	3	1	5	4	5	6	9	4	2	2	2	2	3	3	0	1	3	1	6	7	4	3.3	9																						
2-Oct	5	Z	2	5	5	1	3	1	5	1	1	1	1	2	3	3	4	5	7	14	21	21	20	12	6.2	21																						
3-Oct	13	Z	7	12	2	2	2	3	3	2	2	2	6	5	6	6	6	8	7	4	2	3	4	6	4.8	13																						
4-Oct	4	Z	9	12	8	5	10	11	8	8	9	12	9	10	6	4	4	6	6	5	7	7	6	3	7.3	12																						
5-Oct	2	Z	0	0	0	0	1	1	0	0	0	1	3	8	2	1	0	0	0	0	0	0	1	1	1.0	8																						
6-Oct	1	Z	4	6	4	8	8	9	9	9	9	10	7	5	2	3	10	5	9	13	17	16	13	9	8.1	17																						
7-Oct	8	Z	2	1	10	5	4	9	7	6	5	4	2	1	1	2	3	3	3	2	11	22	19	18	6.3	22																						
8-Oct	17	Z	9	7	10	6	6	5	7	8	10	15	18	16	15	14	13	10	7	6	17	9	3	5	10.1	18																						
9-Oct	3	Z	9	9	7	8	8	8	12	9	8	10	8	7	7	8	11	15	15	18	20	14	18	17	10.8	20																						
10-Oct	14	Z	12	12	11	11	6	6	6	9	9	8	9	8	10	11	11	12	12	8	4	9	7	7	9.2	14																						
11-Oct	5	Z	2	1	1	1	1	1	0	0	0	2	4	2	7	4	6	1	1	0	0	0	0	0	1.7	7																						
12-Oct	0	Z	4	4	5	5	14	20	13	8	9	6	4	2	6	11	23	8	2	1	0	0	8	15	7.3	23																						
13-Oct	4	Z	9	9	20	16	11	8	5	12	17	15	18	13	7	10	13	19	22	22	21	17	7	1	12.9	22																						
14-Oct	0	Z	1	1	1	1	3	5	1	1	2	2	2	3	3	3	5	9	11	9	12	6	2	1	3.5	12																						
15-Oct	4	Z	0	0	0	0	0	1	0	0	1	1	2	2	2	3	3	7	2	8	6	5	6	8	2.7	8																						
16-Oct	3	Z	0	2	1	2	3	8	7	8	9	7	5	4	5	13	19	21	17	14	20	16	14	16	9.2	21																						
17-Oct	13	Z	14	13	11	13	11	10	9	9	9	8	8	7	6	6	4	3	7	7	5	5	4	6	8.0	14																						
18-Oct	9	Z	8	11	11	10	12	13	9	5	4	3	1	1	3	5	3	2	3	2	1	16	15	8	6.7	16																						
19-Oct	2	Z	2	5	2	5	11	12	11	13	14	15	13	13	16	20	20	25	21	21	22	22	21	23	14.2	25																						
20-Oct	26	Z	17	17	17	8	9	9	11	5	3	3	4	6	3	9	16	16	13	13	14	14	12	10	11.0	26																						
21-Oct	7	Z	3	2	1	1	2	2	2	C	C	C	C	C	C	1	2	4	3	2	2	2	2	2	--	7																						
22-Oct	1	Z	UO	1	2	1	2	3	6	11	20	23	24	20	20	30	33	7	2	3	7	6	10	14	11.1	33																						
23-Oct	16	Z	UO	17	22	22	15	20	16	13	14	10	2	2	2	7	14	13	5	1	5	5	3	2	10.3	22																						
24-Oct	6	Z	UO	2	2	1	4	7	4	3	4	2	0	1	4	3	7	7	3	0	1	2	3	10	3.5	10																						
25-Oct	6	Z	UO	11	10	5	2	3	1	1	1	0	0	0	2	8	13	17	16	15	16	16	15	12	7.7	17																						
26-Oct	7	Z	UO	1	1	1	1	1	1	1	1	0	0	0	1	1	1	0	0	0	0	0	0	1	0.9	7																						
27-Oct	1	Z	UO	1	1	1	2	2	1	1	1	1	0	3	4	3	3	1	0	0	1	1	1	1	1.2	4																						
28-Oct	4	Z	UO	3	4	7	6	7	8	6	6	6	6	6	8	8	6	3	2	3	2	1	4	9	5.2	9																						
29-Oct	15	Z	UO	4	1	1	3	1	2	2	0	1	1	1	1	2	1	4	3	15	13	2	1	1	3.4	15																						
30-Oct	2	Z	UO	7	7	4	4	5	5	7	7	5	5	4	4	4	4	7	7	6	6	5	5	5	5.2	7																						
31-Oct	4	Z	UO	5	7	7	7	8	8	7	8	9	10	8	12	11	7	3	3	2	2	1	1	1	5.9	12																						
6.5																								--	5.6	5.8	6.0	5.2	5.6	6.4	5.9	5.8	6.2	6.1	5.9	5.3	5.6	6.9	8.6	7.8	6.7	7.0	8.2	8.1	7.5	7.4	Diurnal Average	
26																								--	17	17	22	22	15	20	16	13	20	23	24	20	20	30	33	25	22	22	22	22	21	23	Diurnal Maximum	
Z - zerospan C - Calibration UO - Unstable Operation																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																



WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
CNRL Horizon - October 2014





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**CNRL Horizon - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	675	96.84	96.84
21 - 40	22	3.16	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: 697

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**CNRL Horizon - October 2014**

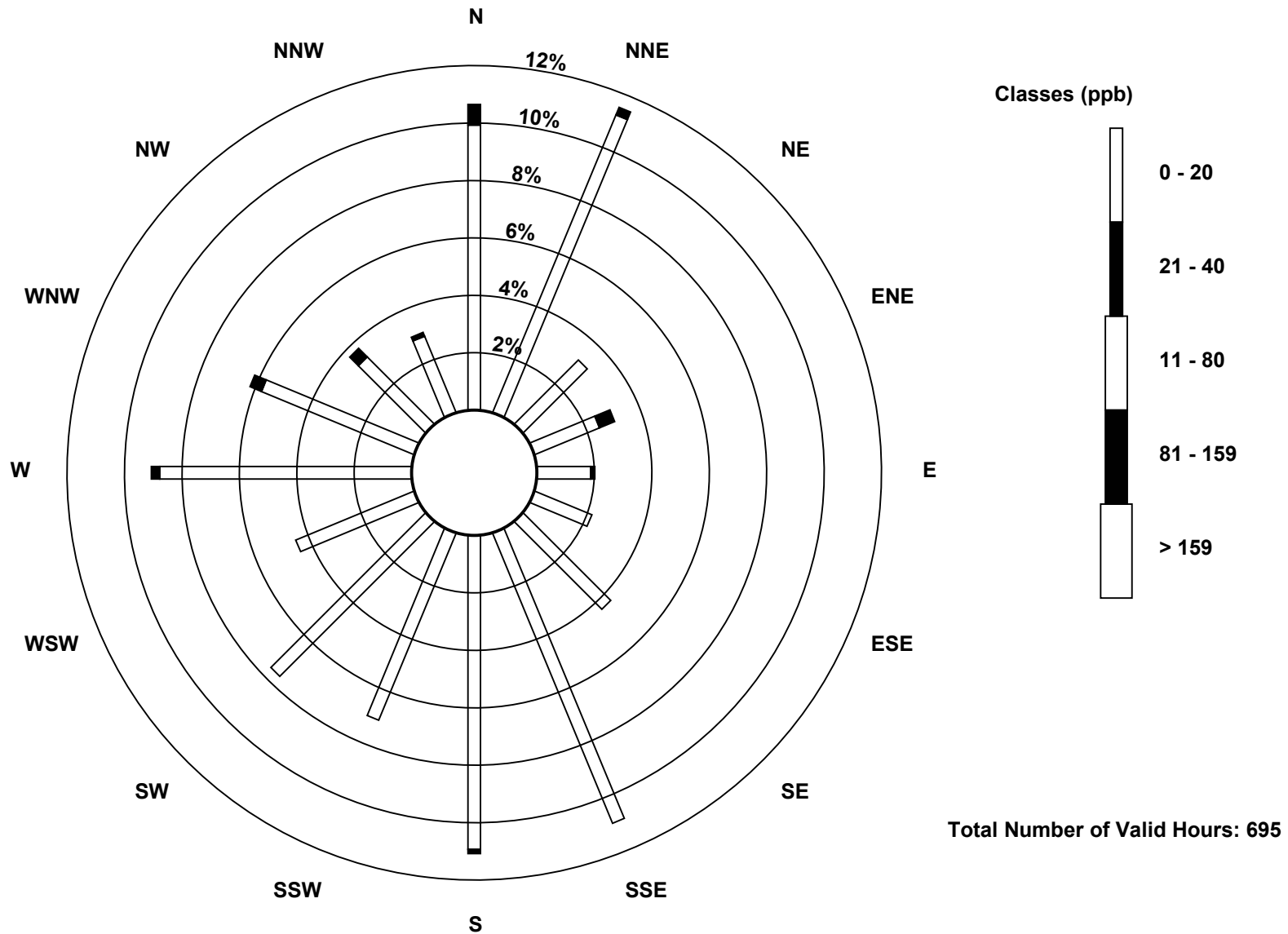
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	69	78	22	17	13	15	30	76	76	49	53	31	61	40	23	20	673
21 - 40	5	2	0	4	1	0	0	0	1	0	0	0	2	3	3	1	22
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	74	80	22	21	14	15	30	76	77	49	53	31	63	43	26	21	695

Total Number of Valid Hours: 695

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

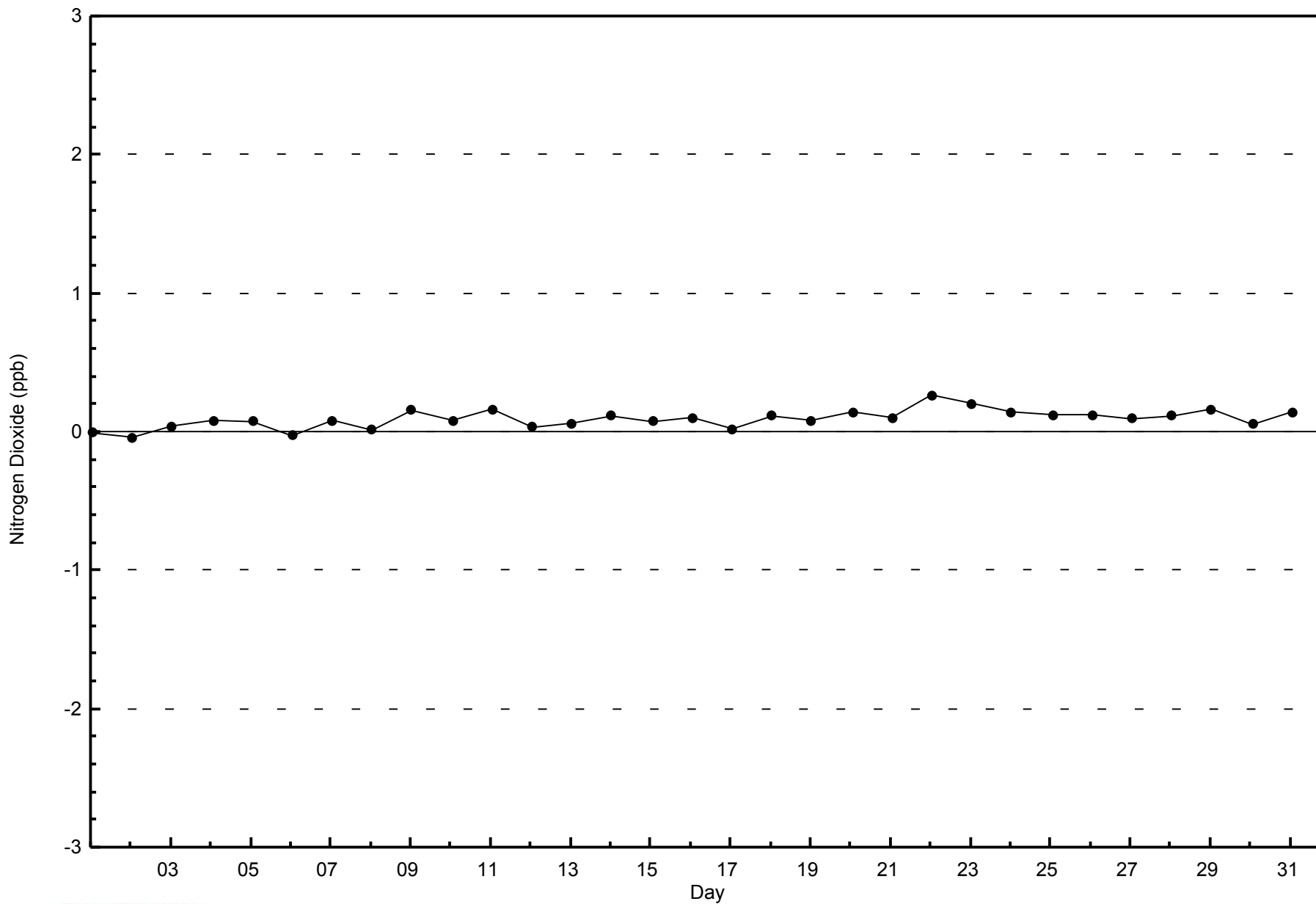
**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
CNRL Horizon (AMS 15)**





WBEA  
Zero Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
CNRL Horizon - October 2014

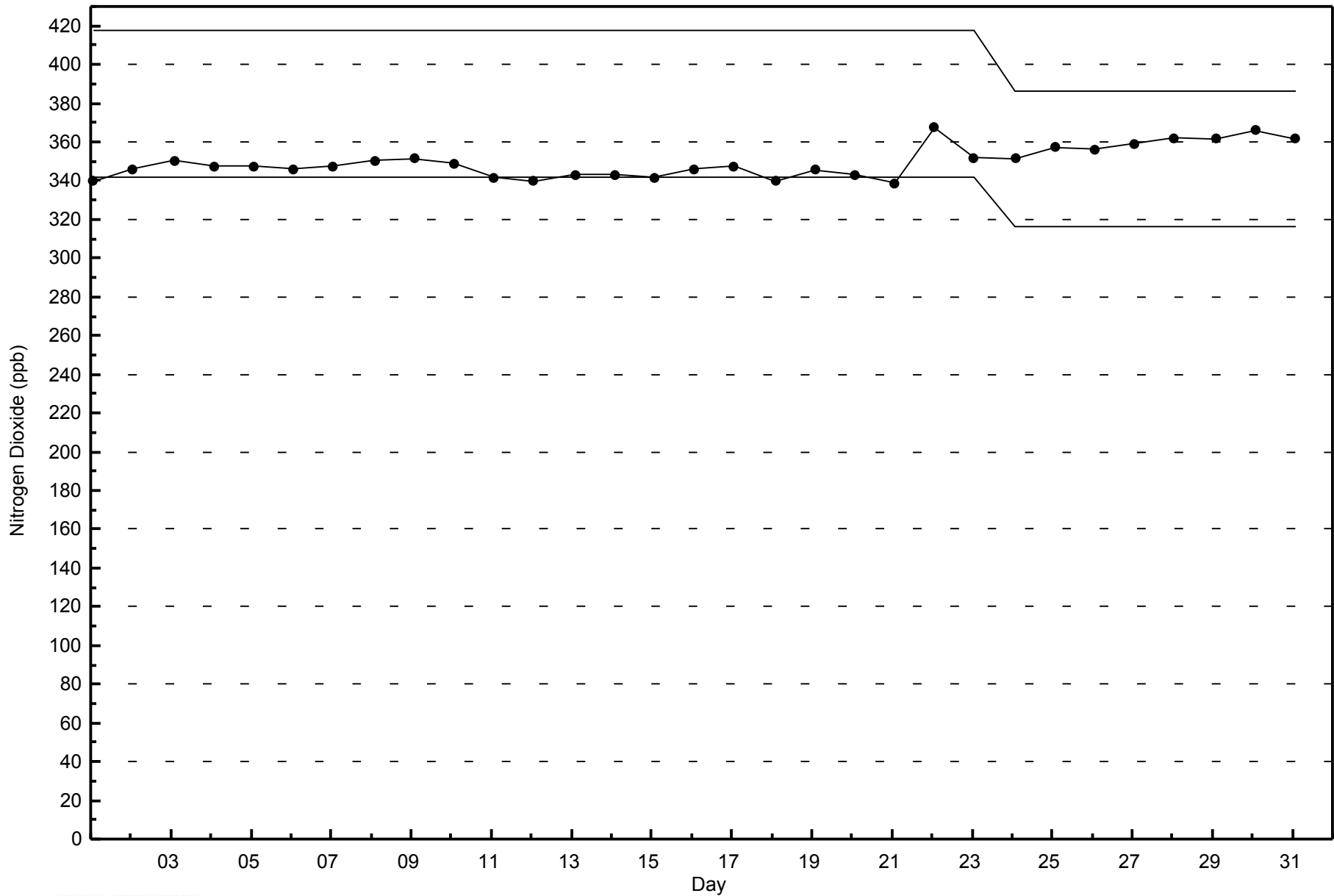






WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
CNRL Horizon - October 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb

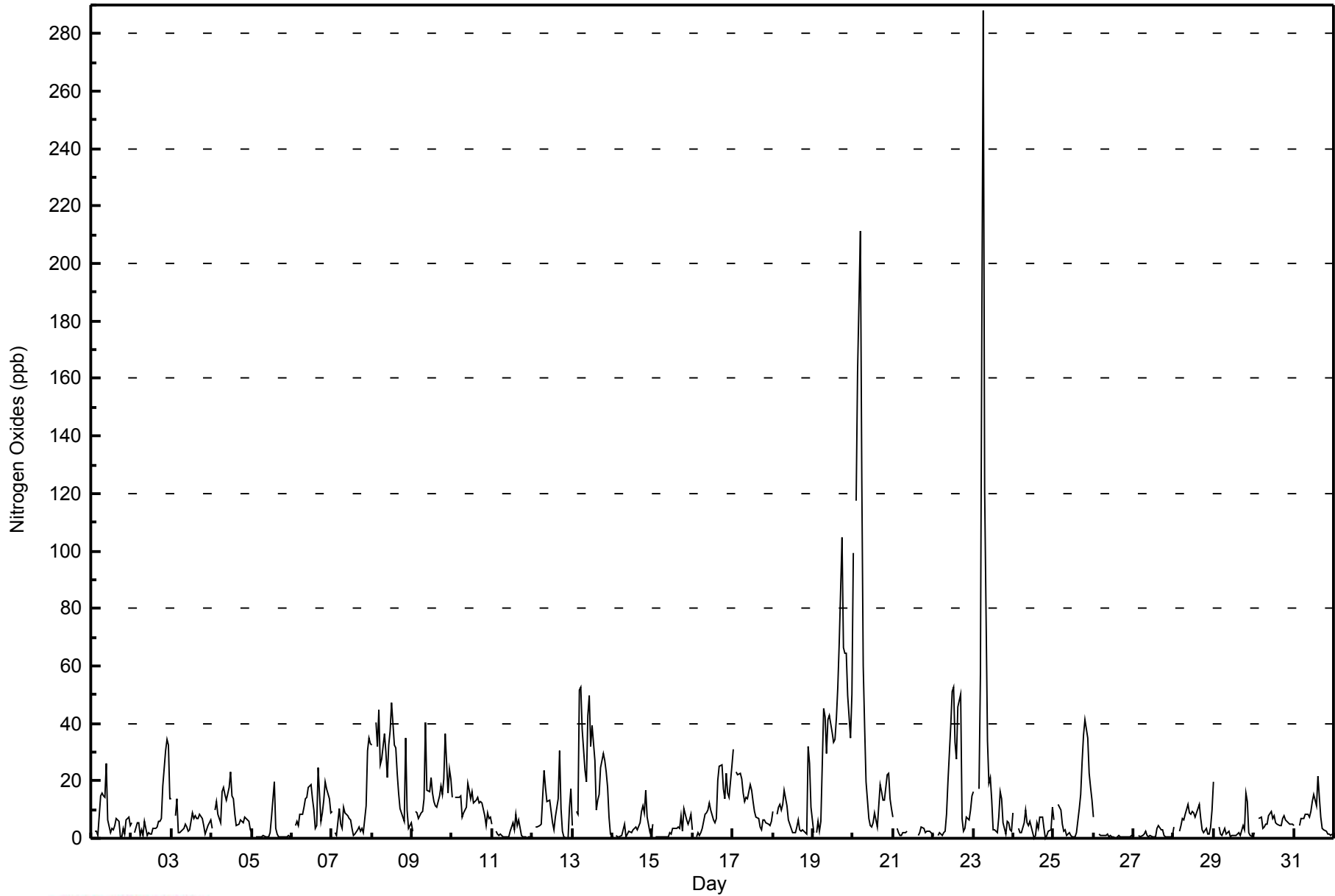
CNRL Horizon - October 2014

Maximum Value: 288 ppb on Oct 23 07:00																			Maximum Daily Average: 43.9 ppb on Oct 20						Hours in Service: 744	
Minimum Value: 0 ppb on Oct 24 20:00																			Minimum Daily Average: 0.9 ppb on Oct 26						Hours of Data: 697	
Maximum Diurnal Average: 19.6 ppb at hour 7																			Minimum Diurnal Average: 8.8 ppb at hour 15						Hours of Missing Data: 47	
Monthly Average: 11.9 ppb																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 6 Q <sub>3</sub> = 14 P <sub>90</sub> = 29 P <sub>99</sub> = 116						Hours of Calibration: 37	
																									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-Oct	1	Z	2	2	1	15	16	15	14	26	7	2	3	3	4	7	6	0	0	4	1	6	7	5	6.4	26
2-Oct	5	Z	2	5	5	1	3	1	6	1	2	1	1	3	4	4	6	6	7	18	31	34	33	14	8.4	34
3-Oct	14	Z	8	14	2	2	2	4	5	4	3	3	9	7	8	7	7	9	7	4	2	3	4	6	5.7	14
4-Oct	3	Z	10	13	8	5	16	17	15	13	18	23	15	14	8	4	5	6	6	5	7	7	6	3	9.9	23
5-Oct	2	Z	0	0	0	0	1	1	1	1	1	2	7	20	4	2	1	1	1	1	1	0	1	1	2.0	20
6-Oct	1	Z	5	6	4	8	8	11	14	14	18	19	14	10	4	5	25	6	9	13	20	17	14	9	10.9	25
7-Oct	9	Z	2	1	10	5	4	11	9	8	7	6	3	1	1	3	4	3	3	2	11	30	35	33	8.8	35
8-Oct	32	Z	40	32	45	25	27	36	30	21	32	37	47	32	31	23	16	11	8	6	35	10	3	5	25.5	47
9-Oct	3	Z	9	9	7	9	10	14	41	17	16	21	16	13	11	11	15	18	15	21	36	16	24	20	16.1	41
10-Oct	14	Z	14	14	14	15	7	9	11	19	17	14	16	12	14	14	12	13	13	8	5	9	7	7	12.1	19
11-Oct	5	Z	2	1	1	1	1	1	0	0	0	3	5	3	9	4	7	1	1	0	0	0	0	0	2.1	9
12-Oct	0	Z	4	4	5	5	14	24	18	13	13	9	5	3	7	14	31	10	2	0	0	0	11	17	9.1	31
13-Oct	4	Z	9	9	52	53	38	23	20	43	50	32	39	27	10	13	15	25	29	27	23	18	7	1	24.6	53
14-Oct	1	Z	1	0	1	1	3	5	1	1	2	2	3	4	4	3	5	9	11	9	17	7	2	1	4.1	17
15-Oct	5	Z	0	0	0	0	0	1	0	0	2	2	3	4	3	4	4	8	2	10	6	5	7	8	3.3	10
16-Oct	3	Z	1	2	1	2	3	8	9	10	12	10	6	6	7	20	25	26	17	14	23	16	14	25	11.2	26
17-Oct	31	Z	23	22	23	21	16	13	14	14	19	17	13	9	7	7	4	3	7	7	5	5	4	6	12.6	31
18-Oct	9	Z	8	11	12	10	12	17	11	6	5	3	2	2	4	6	3	3	3	2	1	32	26	11	8.6	32
19-Oct	2	Z	2	6	2	6	45	42	29	41	43	37	34	35	42	52	68	105	66	64	64	50	35	50	39.9	105
20-Oct	99	Z	118	162	212	125	60	39	20	7	4	4	5	9	4	12	19	16	13	13	22	23	14	11	43.9	212
21-Oct	7	Z	4	2	1	1	2	2	2	C	C	C	C	C	C	1	2	4	3	2	2	2	2	2	--	7
22-Oct	1	Z	UO	1	2	1	2	3	8	19	40	51	52	33	27	46	50	7	2	4	7	6	10	15	17.6	52
23-Oct	16	Z	UO	17	57	178	288	121	34	19	21	13	3	3	2	7	16	14	5	1	6	5	3	2	37.9	288
24-Oct	9	Z	UO	3	2	2	5	10	6	4	6	2	0	1	6	4	7	7	3	0	1	2	3	11	4.3	11
25-Oct	6	Z	UO	12	10	5	2	3	1	2	1	1	0	0	2	10	15	26	36	41	35	23	17	14	11.9	41
26-Oct	7	Z	UO	1	1	1	1	1	2	1	1	1	0	0	1	1	1	0	0	0	0	0	0	1	0.9	7
27-Oct	1	Z	UO	1	1	1	2	2	1	1	1	1	0	4	4	3	3	1	0	0	1	1	1	1	1.3	4
28-Oct	4	Z	UO	3	4	7	7	8	12	9	8	9	9	8	10	12	7	3	2	3	2	1	4	10	6.4	12
29-Oct	20	Z	UO	4	1	1	3	1	2	2	0	1	1	1	1	2	1	5	3	16	13	2	1	1	3.8	20
30-Oct	2	Z	UO	7	7	4	4	5	5	8	9	7	8	5	5	4	4	7	8	7	6	5	5	5	5.7	9
31-Oct	4	Z	UO	5	7	7	7	8	8	8	9	13	15	11	21	14	7	3	3	2	2	1	1	1	7.3	21
		10.4	--	12.6	11.9	16.1	16.7	19.6	14.7	11.2	11.1	12.2	11.5	11.2	9.3	8.8	10.3	12.5	11.5	9.2	9.8	12.4	10.9	9.7	9.5	Diurnal Average
		99	--	118	162	212	178	288	121	41	43	50	51	52	35	42	52	68	105	66	64	64	50	35	50	Diurnal Maximum
Z - zerospan		C - Calibration						UO - Unstable Operation																		



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**CNRL Horizon - October 2014**





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**CNRL Horizon - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	595	85.37	85.37
21 - 40	67	9.61	94.98
41 - 80	26	3.73	98.71
81 - 159	5	0.72	99.43
> 159	4	0.57	100.00

Total Number of Valid Hours: 697

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**CNRL Horizon - October 2014**

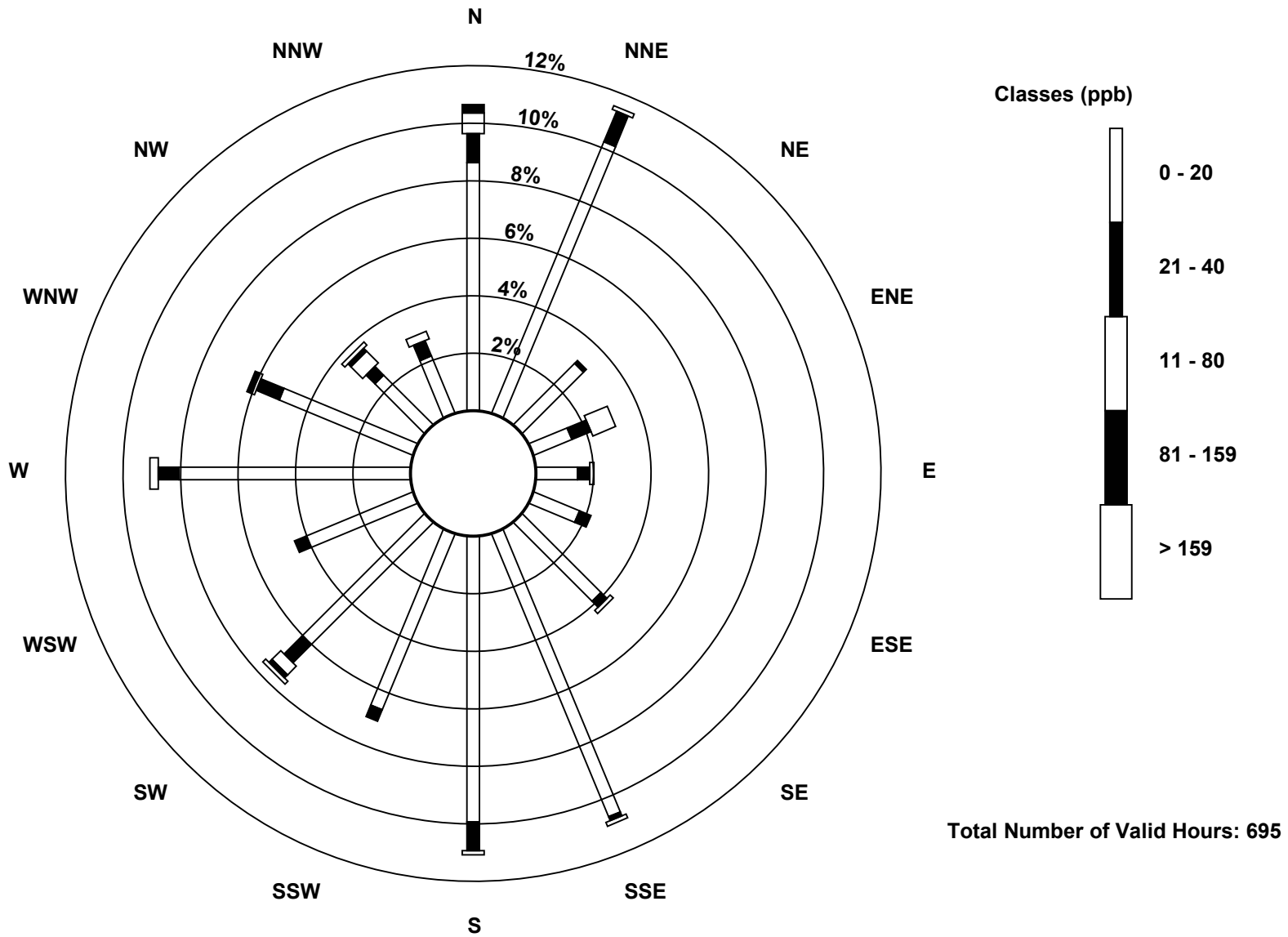
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	60	71	21	10	10	12	27	74	69	46	42	28	56	35	17	15	593
21 - 40	7	8	1	5	3	3	2	1	7	3	6	3	5	6	3	4	67
11 - 80	5	1	0	6	1	0	1	1	1	0	3	0	0	1	4	2	26
81 - 159	2	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	5
> 159	0	0	0	0	0	0	0	0	0	0	1	0	2	0	1	0	4
<b>Totals</b>	74	80	22	21	14	15	30	76	77	49	53	31	63	43	26	21	695

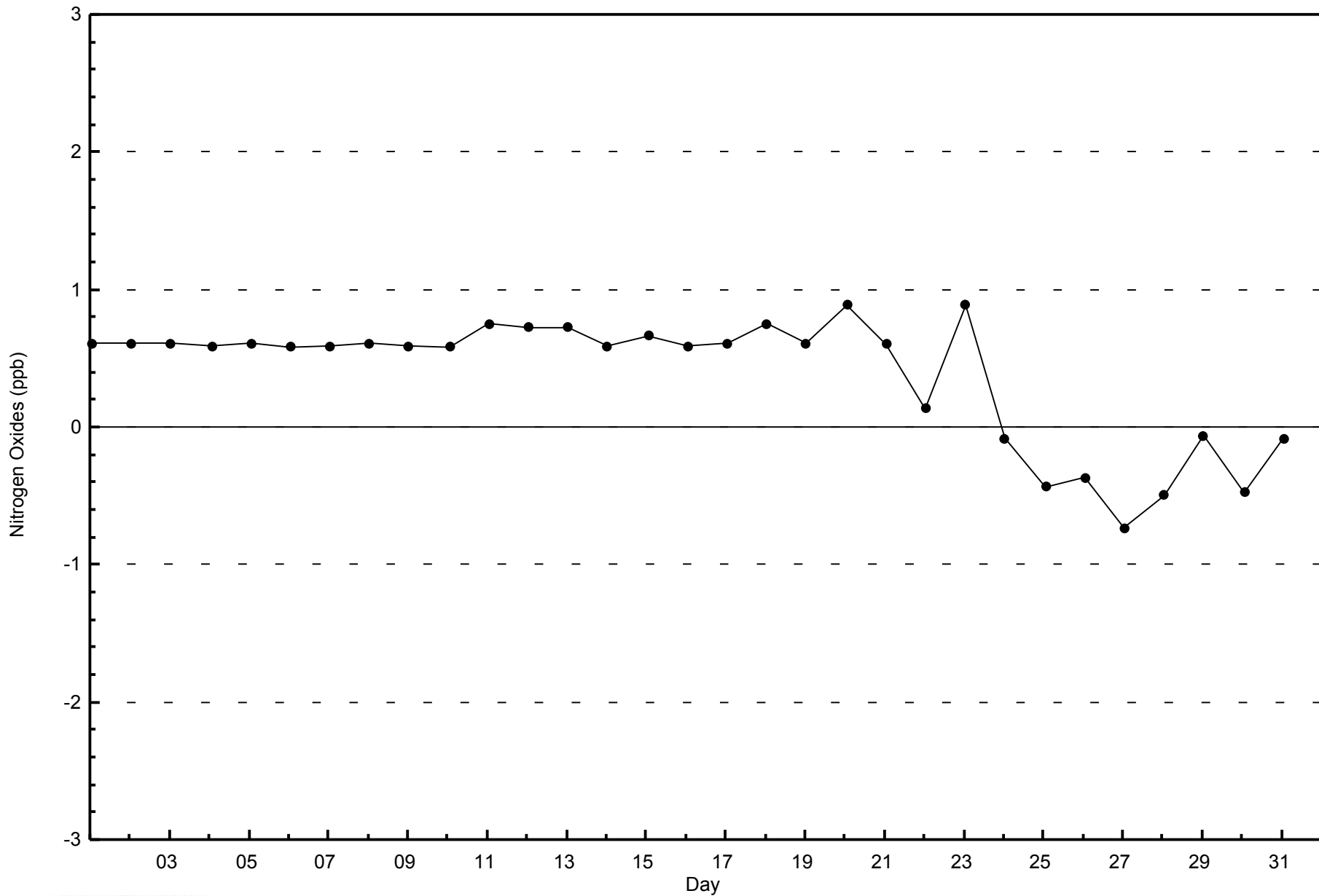
Total Number of Valid Hours: 695

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
CNRL Horizon (AMS 15)**

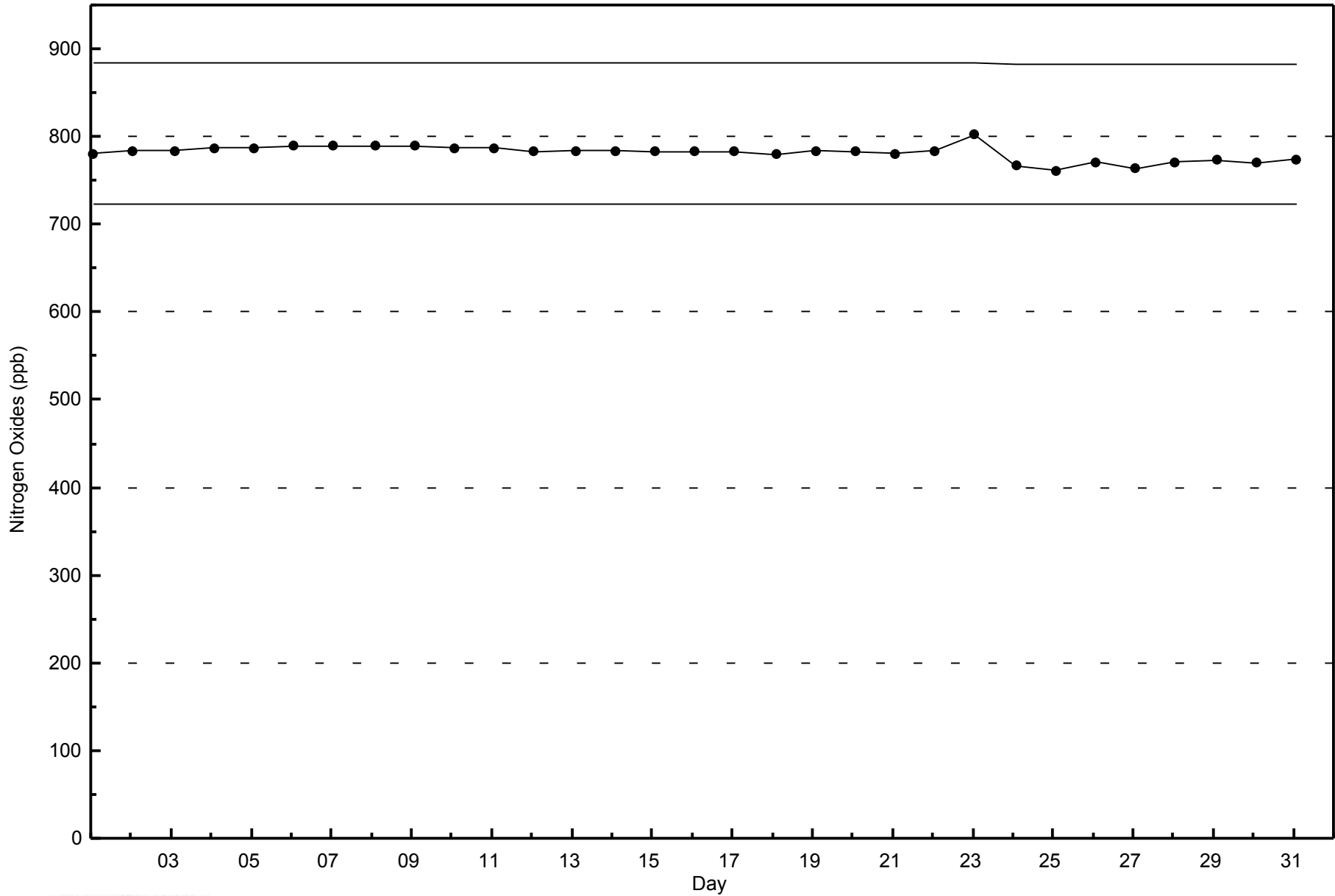






WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
CNRL Horizon - October 2014







Summary of Hour Averages

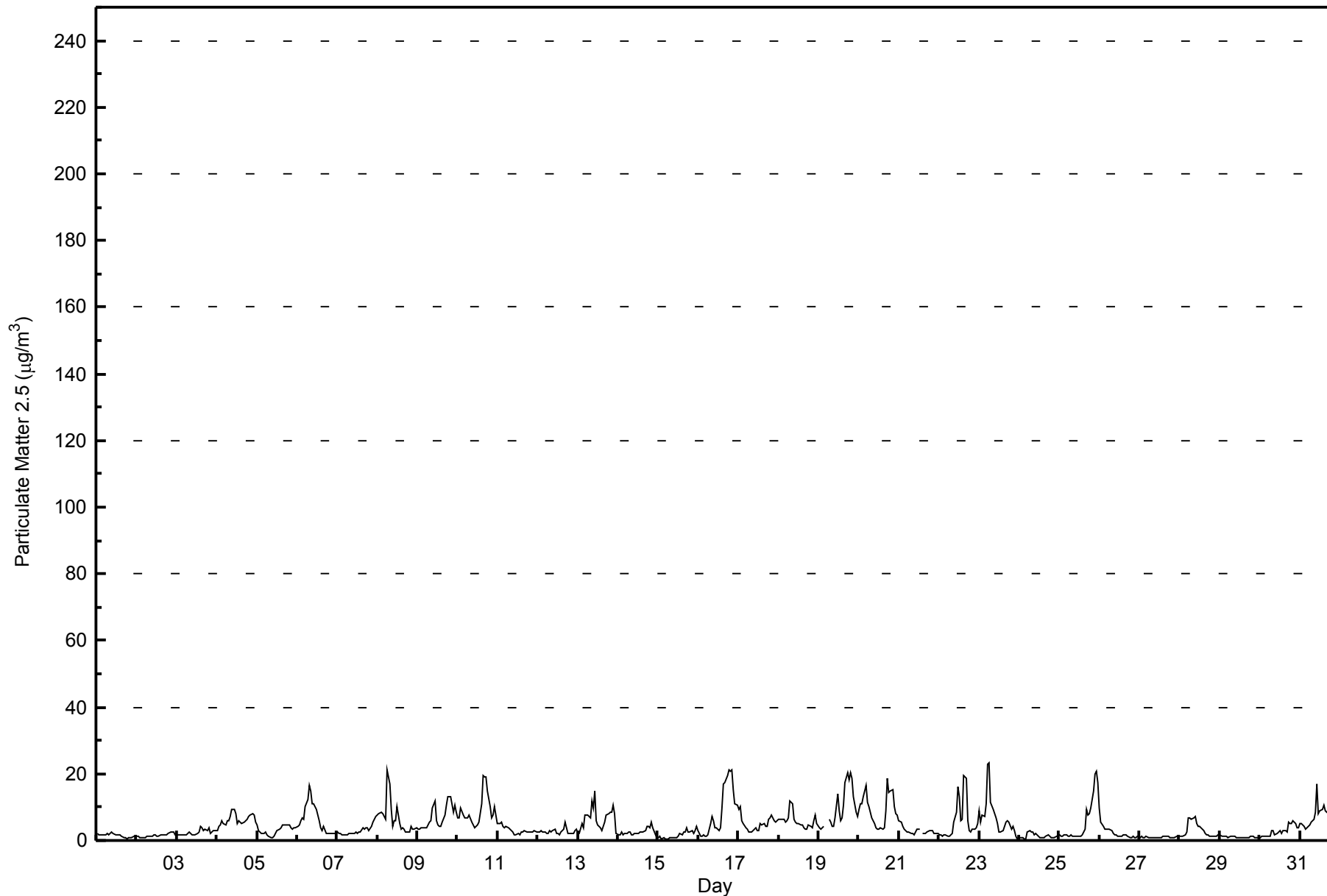
CNRL Horizon - October 2014

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 23.3 µg/m <sup>3</sup> on Oct 23 07:00 Minimum Value: 0.5 µg/m <sup>3</sup> on Oct 24 04:00 Maximum Diurnal Average: 6.0 µg/m <sup>3</sup> at hour 18 Monthly Average: 4.58 µg/m <sup>3</sup>		Maximum Daily Average: 9.7 µg/m <sup>3</sup> on Oct 19 Minimum Daily Average: 1.0 µg/m <sup>3</sup> on Oct 27 Minimum Diurnal Average: 3.4 µg/m <sup>3</sup> at hour 14 Percentiles: P <sub>1</sub> = 0.6 P <sub>10</sub> = 1.1 Q <sub>1</sub> = 1.7 Median = 3.2 Q <sub>3</sub> = 6.0 P <sub>90</sub> = 9.9 P <sub>99</sub> = 20.7		Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	2.3	1.9	1.6	1.6	1.5	1.9	1.9	1.9	2.1	2.7	2.0	1.7	1.6	1.5	1.6	1.2	1.0	0.7	0.6	0.8	0.7	0.9	1.2	1.3	1.5	2.7
2-Oct	1.3	1.1	1.0	1.0	1.0	1.0	1.4	1.4	1.4	1.2	1.7	1.6	1.5	1.4	1.5	1.7	1.6	1.6	1.6	1.9	2.3	2.5	2.4	1.8	1.5	2.5
3-Oct	1.8	1.7	1.6	1.8	1.5	1.6	1.9	2.7	2.0	1.8	1.7	1.7	2.1	2.7	4.2	3.9	3.1	3.6	3.2	4.0	2.3	2.6	3.1	2.9	2.5	4.2
4-Oct	2.8	4.1	4.8	6.0	5.2	4.7	5.7	5.8	7.2	9.4	9.5	7.9	5.3	5.9	5.6	5.2	5.6	6.1	6.4	7.1	7.5	7.9	7.6	5.5	6.2	9.5
5-Oct	4.5	2.9	2.2	2.2	2.2	2.4	1.9	1.4	1.0	1.0	1.5	2.2	2.8	3.5	3.6	4.9	4.6	4.5	4.7	4.6	3.7	3.3	3.8	3.9	3.0	4.9
6-Oct	4.1	4.6	5.8	6.8	6.4	10.3	12.1	16.7	14.6	11.0	10.9	9.5	7.5	6.1	3.8	3.2	4.3	2.0	2.1	2.2	2.3	2.0	2.0	2.1	6.4	16.7
7-Oct	2.4	2.1	2.0	1.7	1.9	1.7	1.7	2.2	2.1	2.0	2.2	2.6	2.3	2.4	2.6	3.9	3.5	3.9	3.8	2.9	4.2	5.4	6.2	7.4	3.1	7.4
8-Oct	7.7	8.2	8.5	8.0	7.3	6.4	21.0	17.0	9.5	4.2	5.8	6.0	10.1	5.3	3.2	3.8	3.5	2.5	2.5	2.7	4.1	3.2	3.4	3.6	6.6	21.0
9-Oct	3.2	3.4	3.7	3.6	3.6	3.9	4.5	5.5	6.1	9.9	11.8	5.9	4.6	4.3	4.3	5.4	7.6	10.7	13.2	13.2	13.2	8.7	10.4	8.3	7.0	13.2
10-Oct	7.0	6.7	9.9	7.8	6.7	6.7	6.7	7.5	5.6	4.5	4.0	4.1	4.5	5.4	11.0	19.6	19.1	19.0	14.8	10.2	6.9	7.6	10.0	7.4	8.9	19.6
11-Oct	5.2	5.1	5.5	4.4	3.9	4.1	3.6	3.5	3.1	2.4	1.9	1.9	1.9	1.8	2.3	2.5	3.0	2.5	2.7	2.4	2.5	2.6	2.8	2.7	3.1	5.5
12-Oct	2.6	2.6	2.8	2.7	2.5	2.1	2.2	3.0	2.7	2.8	3.3	2.2	2.0	1.9	2.6	3.4	5.7	3.7	2.3	2.1	2.2	1.9	3.1	3.5	2.7	5.7
13-Oct	2.0	2.1	5.2	3.9	7.7	7.7	7.6	6.8	11.8	9.9	14.8	5.7	4.8	3.7	2.9	4.4	5.7	7.5	8.2	8.5	8.5	10.8	8.0	2.3	6.7	14.8
14-Oct	1.7	1.7	2.5	1.8	2.0	1.9	2.4	2.6	1.9	1.9	2.1	2.1	2.3	2.4	2.4	2.3	3.0	4.0	4.1	3.8	5.7	4.0	1.7	0.7	2.5	5.7
15-Oct	1.0	1.1	0.6	0.6	0.6	0.6	0.5	1.0	0.8	0.8	1.0	1.0	1.4	2.0	1.9	2.5	2.3	3.7	2.4	2.7	2.9	2.2	3.1	4.1	1.7	4.1
16-Oct	2.9	1.3	1.2	1.5	1.2	1.4	1.7	5.1	7.1	5.8	3.8	3.7	3.0	3.7	9.9	16.8	17.5	19.6	21.1	20.9	21.1	15.1	11.1	10.5	8.6	21.1
17-Oct	9.5	10.4	6.1	5.1	4.0	3.3	2.6	2.7	2.7	2.9	3.7	3.0	3.2	5.2	4.8	4.9	4.2	4.0	6.2	6.7	7.4	6.0	5.6	6.1	5.0	10.4
18-Oct	6.5	6.2	6.2	6.2	5.6	5.8	6.9	11.8	11.0	6.2	5.7	5.1	5.1	4.8	4.5	3.7	3.2	3.4	4.9	4.1	3.7	6.1	7.5	5.0	5.8	11.8
19-Oct	3.7	3.6	3.6	4.2	PF	PF	6.4	5.6	4.1	4.4	6.9	13.9	8.9	6.1	6.8	10.4	17.2	20.5	18.2	20.4	18.6	13.2	8.5	7.1	9.7	20.5
20-Oct	9.2	10.8	11.0	13.3	16.6	11.4	10.2	8.6	6.8	5.1	3.7	3.3	3.4	3.7	3.2	3.9	8.7	18.5	14.4	14.9	15.4	10.1	8.0	7.6	9.2	18.5
21-Oct	6.1	5.5	4.1	3.4	2.9	2.4	2.4	2.3	2.0	1.9	2.7	3.4	3.5	M	2.1	2.1	2.3	2.7	2.9	2.9	2.8	2.3	2.1	2.1	2.9	6.1
22-Oct	1.7	1.6	1.4	1.6	1.6	1.4	1.5	1.6	2.1	5.4	8.5	16.3	13.2	5.9	6.2	19.5	18.7	5.8	2.9	2.7	3.3	3.2	3.8	5.1	5.6	19.5
23-Oct	8.8	5.4	7.6	7.3	11.0	22.8	23.3	11.5	9.1	8.1	6.8	4.9	2.7	2.5	2.8	4.3	5.7	5.9	5.7	3.6	4.2	2.8	1.2	0.6	7.0	23.3
24-Oct	1.0	0.8	0.8	0.5	0.6	2.5	3.0	2.5	2.3	1.7	2.3	1.4	1.0	0.9	1.0	0.8	1.1	1.5	1.3	1.1	1.0	1.0	1.1	1.8	1.4	3.0
25-Oct	1.5	1.1	1.2	1.5	1.6	1.4	1.3	1.5	1.3	1.4	1.2	1.1	1.1	1.1	1.7	3.5	9.5	7.5	7.9	9.8	14.6	20.0	20.8	17.4	5.5	20.8
26-Oct	9.9	5.4	4.1	3.6	3.2	3.4	3.3	2.9	2.2	1.8	1.6	1.4	1.4	1.5	1.6	1.6	1.5	1.4	1.0	1.0	1.1	1.0	1.1	1.1	2.4	9.9
27-Oct	1.0	1.1	0.9	1.0	1.1	1.0	0.9	0.9	0.8	0.8	0.9	0.9	0.9	1.0	1.1	1.4	1.2	1.2	1.0	1.0	1.0	1.0	1.2	1.1	1.0	1.4
28-Oct	1.4	1.3	1.3	1.6	2.5	6.9	6.9	6.6	6.6	7.4	5.0	4.4	4.1	3.8	3.1	2.2	1.7	1.7	1.5	1.4	1.4	1.3	1.3	1.5	3.2	7.4
29-Oct	1.7	1.5	1.4	1.4	1.1	1.0	1.1	1.1	1.1	1.1	0.9	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.1	1.2	1.2	1.0	0.9	0.9	1.1	1.7
30-Oct	0.9	1.1	1.1	1.1	1.2	1.2	1.4	2.8	2.9	1.7	2.0	2.5	3.1	2.1	3.0	2.9	2.7	5.4	5.2	5.3	6.0	5.0	3.9	3.9	2.8	6.0
31-Oct	5.0	4.9	4.1	3.6	4.0	4.3	4.9	5.3	6.4	8.4	17.0	8.2	8.9	9.4	10.5	9.0	8.3	9.0	9.3	9.8	9.5	9.2	8.8	8.1	7.7	17.0
																								Diurnal Average		
																								Diurnal Maximum		
3.9 3.6 3.7 3.6 3.7 4.2 4.9 4.9 4.5 4.2 4.7 4.2 3.8 3.4 3.8 5.0 5.8 6.0 5.7 5.7 5.8 5.3 5.0 4.4 9.9 10.8 11.0 13.3 16.6 22.8 23.3 17.0 14.6 11.0 17.0 16.3 13.2 9.4 11.0 19.6 19.1 20.5 21.1 20.9 21.1 20.0 20.8 17.4																										
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>) -  $\mu\text{g}/\text{m}^3$   
CNRL Horizon - October 2014





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**CNRL Horizon - October 2014**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	479	64.64	64.64
6 - 15	185	24.97	89.61
16 - 25	28	3.78	93.39
26 - 80	0	0.00	93.39
> 81.0	0	0.00	93.39

Total Number of Valid Hours: 741

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**CNRL Horizon - October 2014**

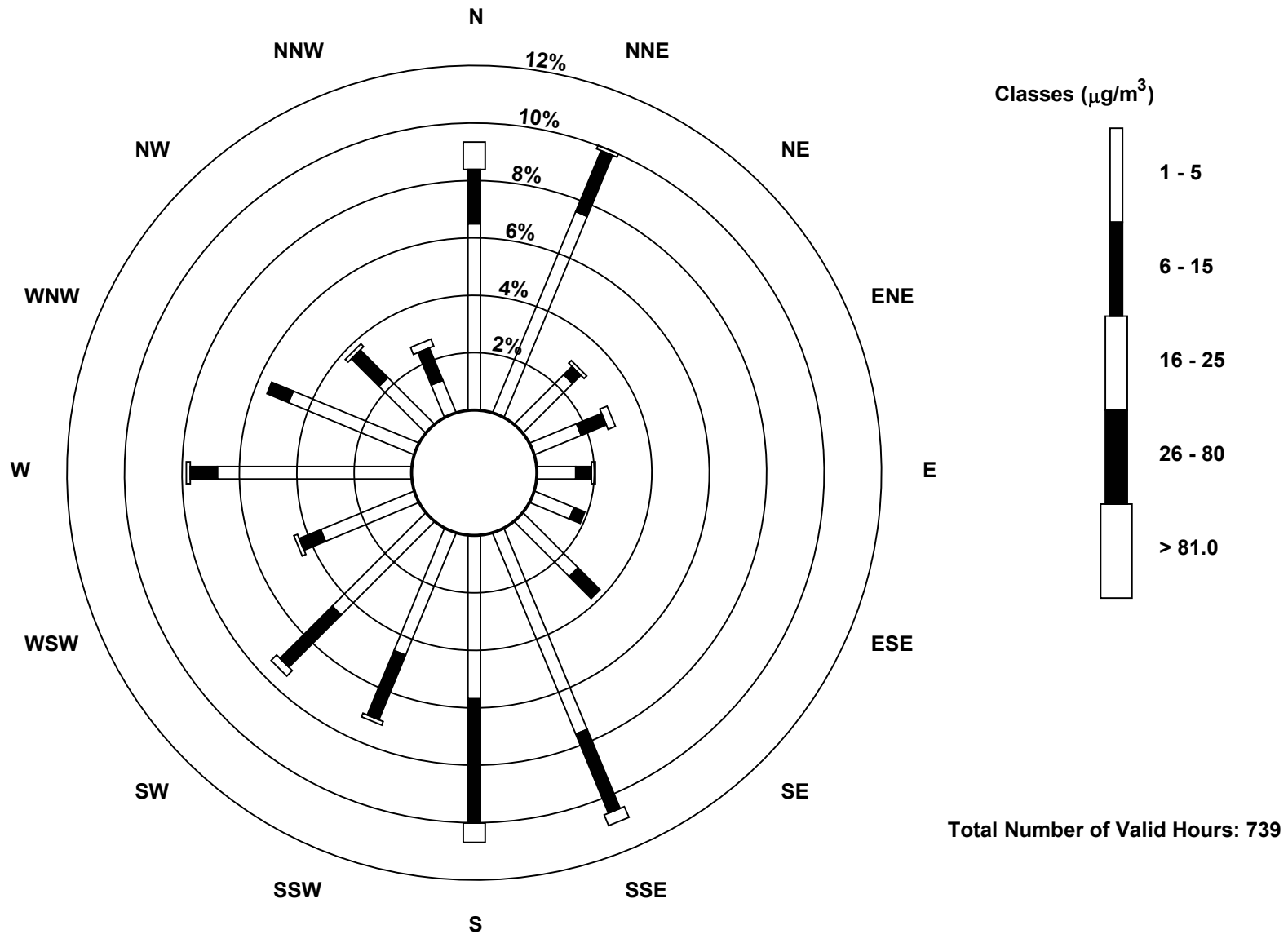
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	48	56	18	13	10	11	20	56	42	34	34	26	50	35	17	9	479
6 - 15	14	17	3	7	4	3	8	22	32	18	19	6	7	6	10	9	185
16 - 25	7	1	1	2	1	0	0	3	5	1	2	1	1	0	1	2	28
26 - 80	0	0	0	0	0	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>	69	74	22	22	15	14	28	81	79	53	55	33	58	41	28	20	692

Total Number of Valid Hours: 739

Total Number of Hours: 744

Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
 CNRL Horizon (AMS 15)



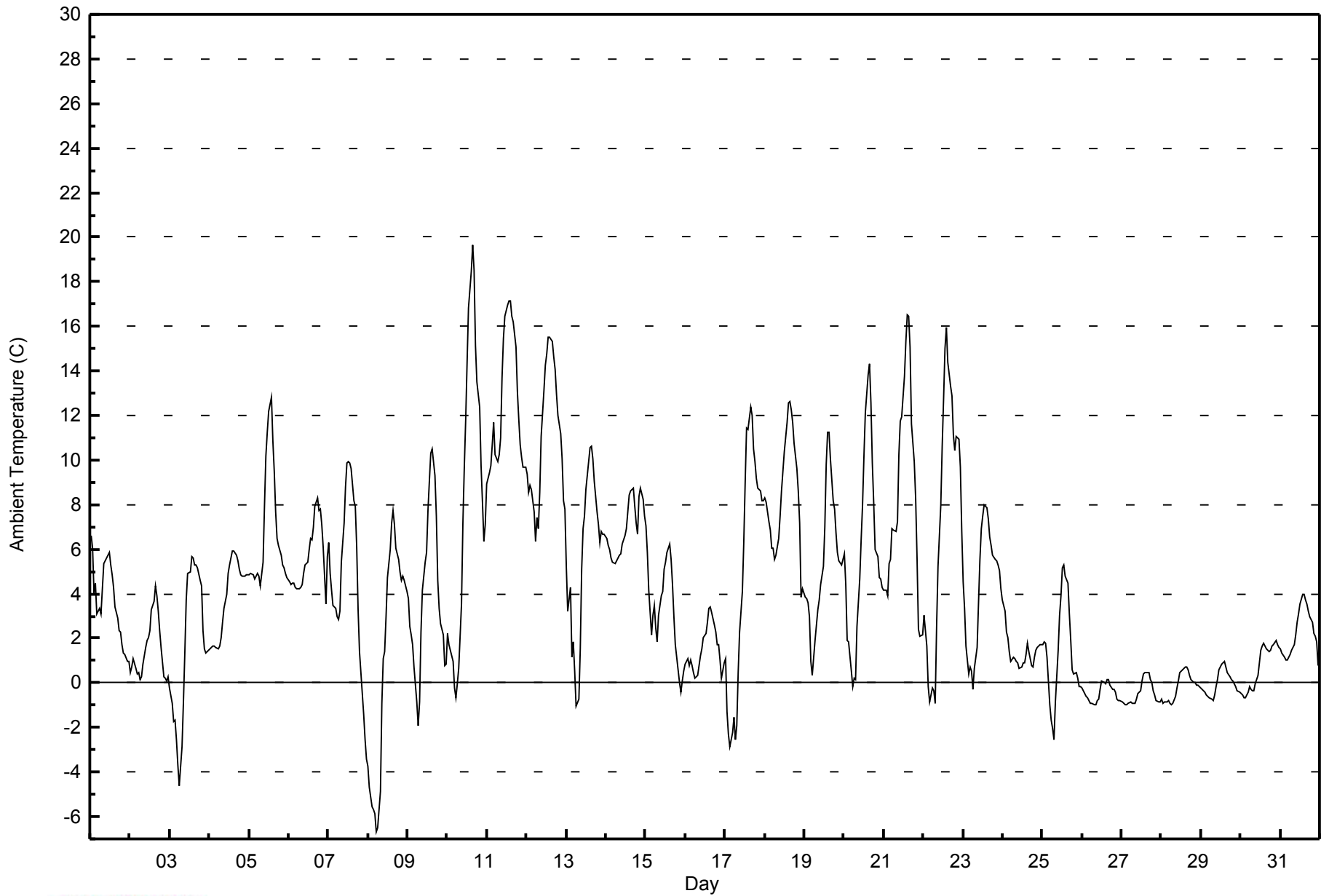


Maximum Value: 19.6 C on Oct 10 16:00		Maximum Daily Average: 12.6 C on Oct 11		Hours in Service: 744																																												
Minimum Value: -6.7 C on Oct 8 06:00		Minimum Daily Average: -0.5 C on Oct 26		Hours of Data: 744																																												
Maximum Diurnal Average: 8.0 C at hour 15		Minimum Diurnal Average: 1.2 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 4.24 C		Percentiles: P <sub>1</sub> = -4.7 P <sub>10</sub> = -0.7 Q <sub>1</sub> = 0.7 Median = 3.6 Q <sub>3</sub> = 6.9 P <sub>90</sub> = 10.6 P <sub>99</sub> = 16.7		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-Oct	6.6	6.0	4.1	4.5	3.1	3.4	3.1	4.2	5.3	5.5	5.6	5.9	5.3	4.8	4.3	3.4	2.9	2.4	2.3	1.7	1.3	1.3	1.0	1.0	3.7	6.6																						
2-Oct	0.5	0.7	1.1	0.6	0.4	0.5	0.2	0.3	0.8	1.6	1.9	2.0	2.3	3.3	3.7	4.3	3.9	3.2	2.4	1.6	0.3	0.2	0.1	0.3	1.5	4.3																						
3-Oct	-0.3	-0.9	-1.7	-1.7	-2.5	-3.6	-4.6	-2.8	-0.9	1.3	3.7	4.9	5.0	5.7	5.6	5.3	5.3	5.1	4.6	4.3	2.4	1.5	1.4	1.4	1.6	5.7																						
4-Oct	1.5	1.6	1.7	1.7	1.6	1.5	1.6	2.1	2.7	3.4	4.0	4.9	5.3	5.6	5.9	5.9	5.7	5.5	5.1	4.9	4.8	4.8	4.8	4.9	3.8	5.9																						
5-Oct	4.9	4.9	4.8	4.7	4.8	4.9	4.8	4.4	5.4	8.0	10.2	11.2	12.2	12.8	10.9	9.5	7.7	6.5	6.1	5.7	5.3	5.1	4.9	4.7	6.8	12.8																						
6-Oct	4.6	4.4	4.4	4.5	4.3	4.2	4.2	4.3	4.4	4.9	5.3	5.4	6.0	6.5	6.4	7.0	7.9	8.3	7.7	7.8	7.1	6.1	3.6	5.7	5.6	8.3																						
7-Oct	6.3	4.9	4.2	3.4	3.3	2.9	2.8	3.2	5.4	7.2	8.8	9.8	9.9	9.6	8.2	8.0	6.1	3.3	1.4	-0.5	-1.4	-2.6	-3.4	4.6	9.9																							
8-Oct	-3.7	-4.7	-5.5	-5.7	-5.9	-6.7	-6.5	-4.8	-0.9	1.1	1.4	3.0	4.8	6.0	7.1	7.7	7.1	6.0	5.5	5.0	4.6	4.8	4.6	4.1	1.2	7.7																						
9-Oct	3.8	2.5	2.1	1.7	0.7	-0.9	-1.9	-0.8	2.3	4.2	5.4	5.8	7.7	9.1	10.3	10.5	9.3	7.5	4.6	3.4	2.6	2.2	0.8	0.8	3.9	10.5																						
10-Oct	2.2	1.7	1.5	1.0	-0.2	-0.7	0.0	0.7	3.6	7.2	9.7	11.8	14.4	16.8	18.5	19.6	18.5	15.2	13.5	12.4	9.7	8.1	6.4	7.1	8.3	19.6																						
11-Oct	8.9	9.4	9.7	10.7	11.7	10.3	9.9	10.2	11.0	13.7	15.5	16.4	16.9	17.1	17.2	16.5	16.2	15.1	13.1	11.8	10.7	10.1	9.7	9.7	12.6	17.2																						
12-Oct	9.4	8.5	8.8	8.7	7.7	6.4	7.4	6.9	8.5	11.1	13.1	14.2	14.7	15.5	15.5	15.3	14.6	14.1	12.9	12.0	11.2	10.0	8.2	7.8	10.9	15.5																						
13-Oct	5.2	3.2	4.3	1.2	1.8	0.5	-1.1	-0.7	1.5	5.1	6.9	7.5	8.7	10.0	10.5	10.6	10.1	9.0	7.7	7.1	6.3	6.8	6.7	6.7	5.7	10.6																						
14-Oct	6.5	6.2	6.0	5.6	5.4	5.3	5.5	5.6	5.7	5.8	6.2	6.6	6.9	7.7	8.4	8.6	8.7	7.9	7.2	6.7	8.3	8.8	8.2	7.5	6.9	8.8																						
15-Oct	7.1	5.8	4.2	2.2	3.0	3.5	2.5	1.8	3.0	3.9	4.1	5.1	5.4	5.8	6.2	5.5	4.4	3.0	1.7	1.1	0.0	-0.4	0.1	0.6	3.3	7.1																						
16-Oct	0.8	1.1	0.8	1.0	0.8	0.5	0.2	0.3	0.8	1.2	1.5	2.0	2.2	2.7	3.3	3.4	3.1	2.6	2.3	1.7	1.7	1.0	0.2	0.9	1.5	3.4																						
17-Oct	1.1	-1.3	-2.3	-2.9	-2.2	-1.5	-2.6	-1.9	0.5	2.3	4.1	6.3	9.0	11.4	11.4	12.4	12.0	10.5	10.0	9.2	8.7	8.6	8.2	8.2	5.0	12.4																						
18-Oct	8.3	8.1	7.2	6.9	6.1	6.0	5.6	5.7	6.5	7.5	8.6	9.5	10.3	11.7	12.6	12.6	12.3	11.7	10.8	9.6	8.6	7.1	3.8	4.2	8.4	12.6																						
19-Oct	3.9	3.8	3.6	3.0	1.0	0.4	1.9	2.6	3.3	3.7	4.4	5.2	7.0	9.8	11.3	11.3	10.0	8.2	7.8	6.8	5.8	5.5	5.3	5.5	5.5	11.3																						
20-Oct	5.8	4.4	1.9	1.8	0.5	-0.2	0.2	0.2	2.5	4.7	6.4	8.0	10.2	12.1	13.8	14.3	12.5	9.8	8.0	6.0	5.6	4.7	4.7	4.3	5.9	14.3																						
21-Oct	4.1	4.2	3.9	5.4	5.5	7.0	6.8	6.8	7.2	10.2	11.8	11.9	13.8	15.3	16.5	16.5	15.1	11.6	9.9	8.3	5.6	2.4	2.1	2.2	8.5	16.5																						
22-Oct	3.0	2.4	1.6	-0.2	-0.8	-0.3	-0.4	-0.9	2.5	5.2	8.0	10.6	12.8	15.0	16.0	14.4	13.3	12.9	11.1	10.4	11.1	10.9	9.7	6.8	7.3	16.0																						
23-Oct	4.6	3.4	1.7	0.4	0.7	0.5	-0.3	0.7	1.6	3.6	5.5	6.9	7.5	8.0	7.8	7.4	6.5	6.1	5.7	5.5	5.5	5.3	5.1	4.2	4.3	8.0																						
24-Oct	3.7	3.2	2.3	2.0	1.4	0.9	1.2	1.1	1.0	0.9	0.7	0.7	0.9	0.9	1.3	1.8	1.4	0.8	0.7	1.1	1.4	1.6	1.7	1.7	1.4	3.7																						
25-Oct	1.7	1.9	1.8	1.2	-1.0	-1.7	-2.1	-2.5	-0.9	1.5	3.0	3.9	5.1	5.3	4.8	4.5	3.1	1.9	0.6	0.4	0.4	0.2	-0.1	-0.1	1.4	5.3																						
26-Oct	-0.2	-0.4	-0.6	-0.7	-0.8	-0.9	-0.9	-1.0	-1.0	-0.8	-0.7	-0.3	0.1	0.0	0.2	0.2	-0.1	-0.3	-0.3	-0.4	-0.7	-0.8	-0.8	-0.8	-0.5	0.2																						
27-Oct	-0.9	-0.9	-0.9	-1.0	-0.9	-0.8	-0.9	-0.9	-0.9	-0.7	-0.5	-0.3	0.1	0.4	0.5	0.4	0.4	0.1	0.0	-0.3	-0.5	-0.8	-0.8	-0.9	-0.5	0.5																						
28-Oct	-0.8	-0.9	-0.9	-0.8	-0.8	-0.9	-1.0	-0.9	-0.6	-0.2	0.1	0.5	0.6	0.6	0.7	0.7	0.6	0.3	0.1	0.0	0.0	-0.1	-0.1	-0.2	-0.2	0.7																						
29-Oct	-0.2	-0.4	-0.4	-0.5	-0.6	-0.7	-0.7	-0.8	-0.5	-0.2	0.2	0.6	0.9	0.9	1.0	0.7	0.5	0.3	0.2	0.1	-0.1	-0.1	-0.4	-0.4	0.0	1.0																						
30-Oct	-0.5	-0.6	-0.7	-0.6	-0.4	-0.2	-0.3	-0.4	-0.4	-0.1	0.3	0.9	1.5	1.7	1.8	1.5	1.4	1.4	1.5	1.6	1.7	1.9	1.7	1.6	0.7	1.9																						
31-Oct	1.5	1.4	1.1	1.0	1.1	1.1	1.3	1.4	1.7	2.2	2.7	3.1	3.5	4.0	4.0	3.7	3.5	3.2	3.0	2.7	2.2	2.1	1.8	0.8	2.3	4.0																						
																								3.2	2.7	2.3	1.9	1.6	1.3	1.2	1.4	2.6	4.0	5.1	5.9	6.8	7.6	8.0	7.9	7.3	6.3	5.5	4.8	4.3	3.8	3.2	3.1	Diurnal Average
																								9.4	9.4	9.7	10.7	11.7	10.3	9.9	10.2	11.0	13.7	15.5	16.4	16.9	17.1	18.5	19.6	18.5	15.2	13.5	12.4	11.2	10.9	9.7	9.7	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**CNRL Horizon - October 2014**





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

**Ambient Temperature (AT) - C**  
**CNRL Horizon - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	126	16.94	16.94
0 - 10	528	70.97	87.90
10 - 20	90	12.10	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



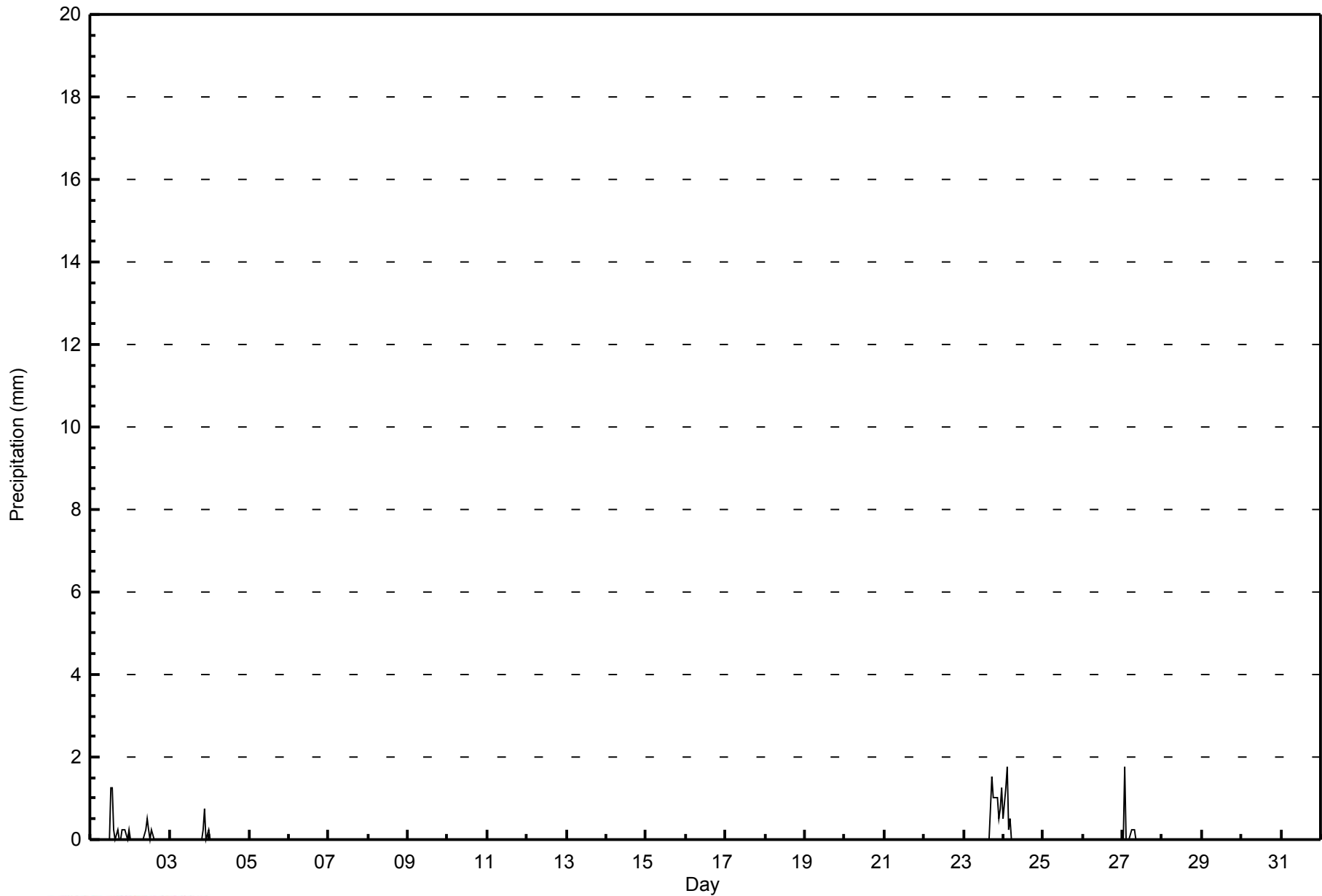


Maximum Value: 1.8 mm on Oct 24 03:00		Maximum Daily Total: 7.9 mm on Oct 23		Hours in Service: 744																							
Minimum Value: 0.0 mm on Oct 1 01:00		Minimum Daily Total: 0.0 mm on Oct 4		Hours of Data: 743																							
Maximum Diurnal Total: 3.0 mm at hour 2		Minimum Diurnal Total: 0.0 mm at hour 9		Hours of Missing Data: 1																							
Monthly Total: 21.34 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> = 1.3		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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.3	0.3	0.0	0.3	0.0	0.0	0.3	0.3	0.3	0.0	0.3	4.1	1.3	
2-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.5	
3-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.3	1.3	0.8	
4-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	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	
22-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.5	1.0	1.0	1.0	0.5	0.8	1.3	7.9	1.5	
24-Oct	0.5	1.3	1.8	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	1.8	
25-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Oct	0.0	1.8	0.0	0.0	0.0	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1.8	
28-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
29-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
30-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
31-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		0.5	3.0	1.8	0.3	0.5	0.3	0.3	0.3	0.0	0.3	0.5	0.3	1.3	1.5	0.3	0.0	1.0	1.5	1.0	1.3	1.5	1.5	0.8	1.8	Diurnal Average	
		0.5	1.8	1.8	0.3	0.5	0.3	0.3	0.3	0.0	0.3	0.5	0.3	1.3	1.3	0.3	0.0	0.8	1.5	1.0	1.0	1.0	0.8	0.8	1.3	Diurnal Maximum	
M - Maintenance																											



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Precipitation (PC) - mm**  
**CNRL Horizon - October 2014**



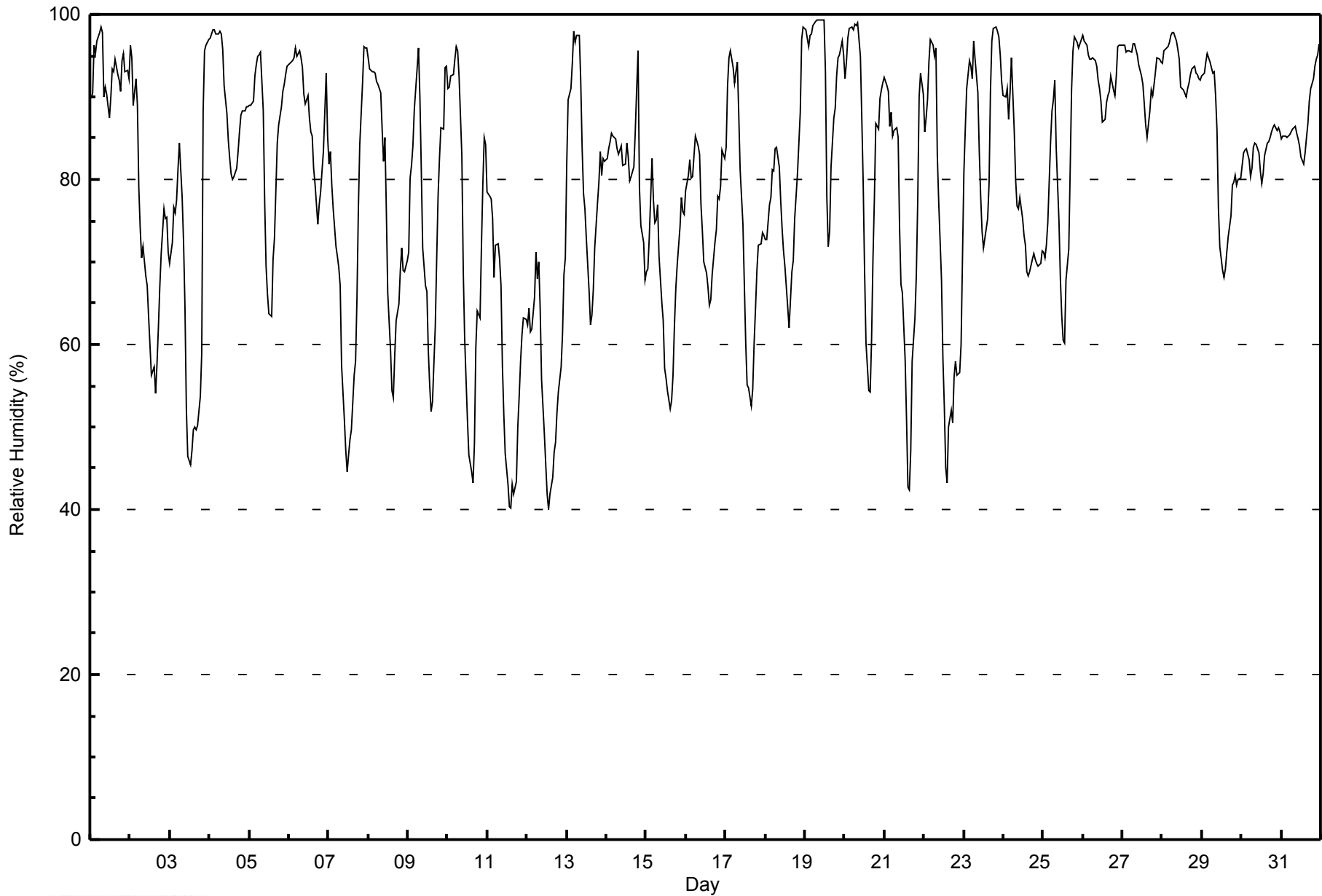


Maximum Value: 99 % on Oct 19 09:00														Maximum Daily Average: 93.9 % on Oct 28														Hours in Service: 744												
Minimum Value: 40 % on Oct 12 14:00														Minimum Daily Average: 56.9 % on Oct 12														Hours of Data: 744												
Maximum Diurnal Average: 88.9 % at hour 7														Minimum Diurnal Average: 65.1 % at hour 15														Hours of Missing Data: 0												
Monthly Average: 79.7 %														Percentiles: P <sub>1</sub> = 43 P <sub>10</sub> = 57 Q <sub>1</sub> = 70 Median = 83 Q <sub>3</sub> = 92 P <sub>90</sub> = 96 P <sub>99</sub> = 99														Hours of Calibration: 0												
																												Percent Operational Time: 100.0												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																
1-Oct	90	90	96	95	97	98	98	98	90	91	90	87	90	93	93	95	93	92	91	94	95	93	93	92	93.2	98														
2-Oct	96	95	89	92	89	79	74	70	72	68	67	63	60	56	57	54	58	62	67	71	76	75	75	71	72.4	96														
3-Oct	70	72	77	76	77	81	84	78	72	64	52	46	45	47	50	50	50	50	54	59	88	96	96	97	68.0	97														
4-Oct	97	98	98	98	98	98	98	98	96	91	88	85	82	81	80	80	81	83	86	88	88	88	89	89	89.9	98														
5-Oct	89	89	90	92	94	95	95	95	88	77	70	66	64	63	70	73	79	84	87	89	91	91	93	94	84.1	95														
6-Oct	94	94	94	95	96	95	96	95	94	90	89	90	87	86	85	81	79	75	77	78	81	83	93	85	88.1	96														
7-Oct	82	83	79	76	72	71	69	67	57	51	47	45	47	48	50	56	58	66	77	84	92	96	96	96	69.4	96														
8-Oct	95	93	93	93	93	92	91	91	86	82	85	76	66	59	54	54	59	63	65	69	72	69	69	70	76.6	95														
9-Oct	71	80	82	84	88	93	96	90	81	72	67	66	59	55	52	53	62	70	78	83	86	86	94	94	76.8	96														
10-Oct	91	91	93	93	94	96	96	92	83	69	61	56	51	47	45	43	48	60	64	63	72	79	85	84	73.1	96														
11-Oct	78	78	78	75	68	72	72	70	67	57	51	47	43	40	40	43	42	43	50	54	58	61	63	63	59.0	78														
12-Oct	62	64	62	62	66	71	68	70	64	56	49	45	42	40	42	44	47	48	52	54	57	61	68	70	56.9	71														
13-Oct	82	90	91	94	98	97	97	98	92	84	78	76	73	66	62	64	67	72	77	80	83	81	83	82	81.9	98														
14-Oct	82	84	85	86	85	85	84	83	84	84	82	82	84	83	80	80	82	86	91	96	79	74	72	68	82.5	96														
15-Oct	69	69	73	82	77	75	75	77	71	65	63	57	56	54	52	53	56	62	67	70	74	78	76	76	67.8	82														
16-Oct	79	81	82	80	80	83	85	84	83	77	74	70	69	67	65	65	69	72	74	78	78	79	84	83	76.6	85														
17-Oct	84	91	95	96	94	92	93	94	88	81	75	67	60	55	55	53	55	60	64	69	72	72	74	73	75.4	96														
18-Oct	73	73	77	78	81	81	84	84	81	77	74	71	70	65	62	65	69	70	75	81	84	88	97	98	77.5	98														
19-Oct	98	97	96	97	98	99	99	99	99	99	99	99	93	78	72	74	82	87	89	93	95	95	97	95	92.9	99														
20-Oct	92	94	97	98	98	98	99	99	99	95	87	80	69	60	54	54	61	70	78	87	86	90	91	92	84.5	99														
21-Oct	92	91	91	86	88	85	86	86	85	74	67	66	58	51	43	42	47	58	63	69	78	90	93	90	74.2	93														
22-Oct	86	87	90	94	97	96	95	96	83	77	68	58	53	45	43	50	52	51	56	58	56	57	60	71	69.9	97														
23-Oct	81	86	91	94	94	92	97	95	91	83	78	74	72	73	75	79	91	97	98	98	98	97	95	92	88.4	98														
24-Oct	90	90	91	87	91	95	86	80	77	77	78	75	73	72	69	68	69	70	71	70	70	70	71	71	77.5	95														
25-Oct	71	71	72	75	85	88	90	92	84	75	68	63	60	60	68	72	81	91	96	97	97	96	96	97	81.0	97														
26-Oct	97	97	96	95	94	95	95	94	94	92	91	89	87	87	89	90	91	93	91	90	93	96	96	96	92.9	97														
27-Oct	96	96	95	96	96	95	96	96	96	95	94	93	92	89	87	85	88	91	90	91	93	95	95	94	93.1	96														
28-Oct	94	96	96	96	97	97	98	98	97	96	95	91	91	91	90	91	92	93	93	94	93	93	92	92	93.9	98														
29-Oct	92	93	94	95	95	94	93	93	90	86	77	72	69	68	69	71	73	76	79	80	81	79	80	80	82.5	95														
30-Oct	82	83	83	84	82	80	81	84	84	84	83	81	80	81	83	84	85	85	86	86	87	86	86	86	83.6	87														
31-Oct	85	85	85	85	85	86	86	86	86	86	85	84	83	82	83	85	87	89	91	92	94	95	95	96	87.3	96														
														85.2	86.6	87.4	88.1	88.6	88.8	88.9	88.1	84.3	79.3	75.2	71.7	68.6	65.9	65.1	66.2	69.3	73.2	76.6	79.5	82.1	83.5	85.3	85.1	Diurnal Average		
														98	98	98	98	98	99	99	99	99	99	99	99	99	93	93	93	95	93	97	98	98	98	97	97	98	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**CNRL Horizon - October 2014**





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

**Relative Humidity (RH) - %**  
**CNRL Horizon - October 2014**

<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	92	12.37	12.37
60 - 80	224	30.11	42.47
80 - 100	428	57.53	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

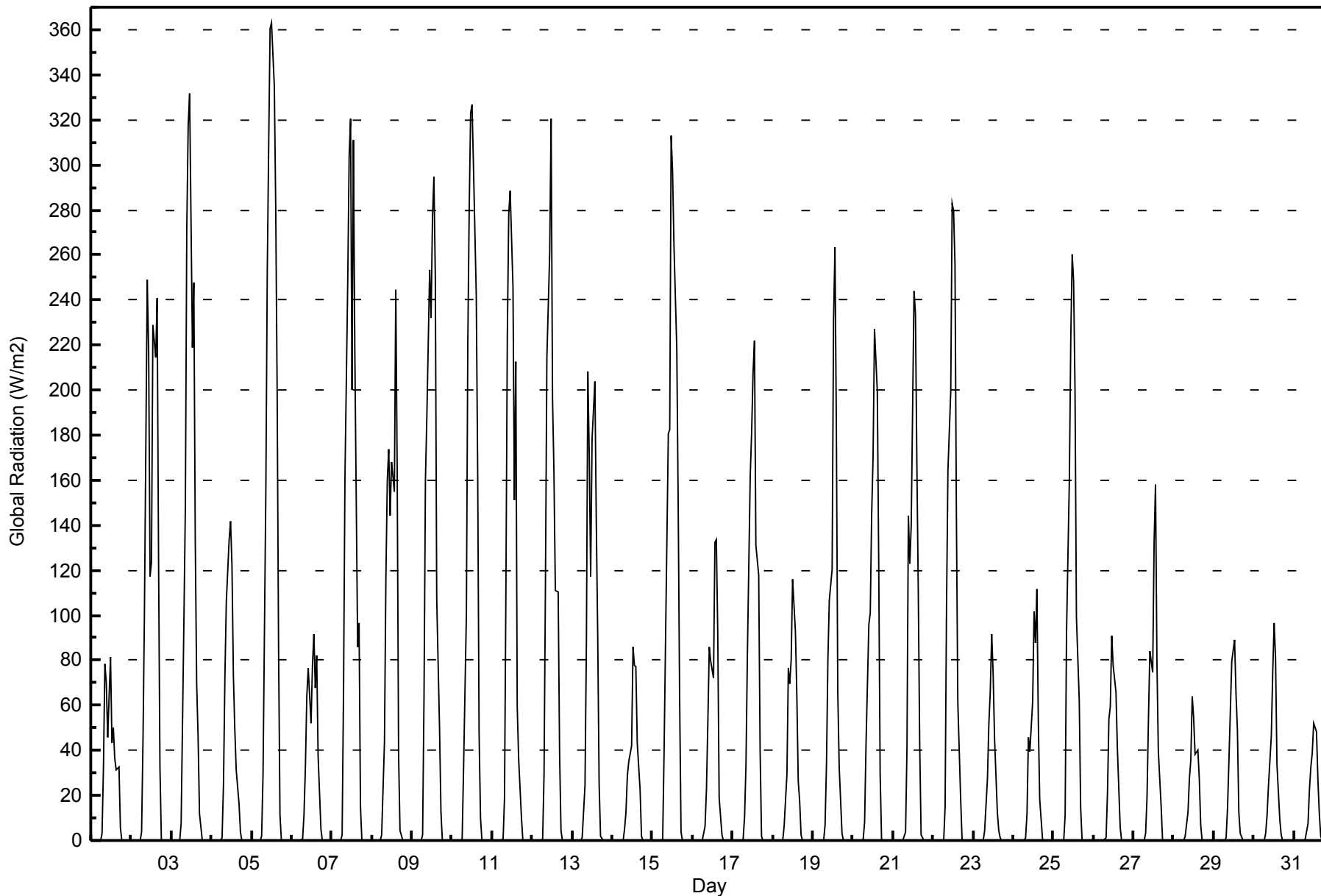


Maximum Value: 363 W/m2 on Oct 5 13:00																		Maximum Daily Average: 99.3 W/m2 on Oct 5																		Hours in Service: 744																																	
Minimum Value: 0 W/m2 on Oct 6 04:00																		Minimum Daily Average: 10.2 W/m2 on Oct 31																		Hours of Data: 744																																	
Maximum Diurnal Average: 166.8 W/m2 at hour 13																		Minimum Diurnal Average: 0.0 W/m2 at hour 5																		Hours of Missing Data: 0																																	
Monthly Average: 46.0 W/m2																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 64 P <sub>90</sub> = 169 P <sub>99</sub> = 319																		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-Oct	0	0	0	0	0	0	3	32	79	70	46	82	43	50	36	32	33	6	0	0	0	0	0	0	21.3	82																																											
2-Oct	0	0	0	0	0	0	4	44	100	249	217	117	124	229	214	241	126	33	1	0	0	0	0	0	70.8	249																																											
3-Oct	0	0	0	0	0	0	7	99	148	271	317	332	219	248	134	70	46	12	0	0	0	0	0	0	79.3	332																																											
4-Oct	0	0	0	0	0	0	2	25	73	106	134	142	122	74	50	31	17	4	0	0	0	0	0	0	32.4	142																																											
5-Oct	0	0	0	0	0	0	2	30	156	253	308	360	363	335	281	199	85	11	0	0	0	0	0	0	99.3	363																																											
6-Oct	0	0	0	0	0	0	1	11	33	64	76	52	78	91	68	82	38	5	0	0	0	0	0	0	24.9	91																																											
7-Oct	0	0	0	0	0	0	2	66	161	249	304	321	200	311	217	86	97	15	0	0	0	0	0	0	84.5	321																																											
8-Oct	0	0	0	0	0	0	3	44	117	160	174	144	168	155	245	164	38	4	0	0	0	0	0	0	58.9	245																																											
9-Oct	0	0	0	0	0	0	2	64	160	188	253	232	276	295	251	108	50	13	0	0	0	0	0	0	78.8	295																																											
10-Oct	0	0	0	0	0	0	1	32	100	220	281	323	327	300	242	164	47	10	0	0	0	0	0	0	85.3	327																																											
11-Oct	0	0	0	0	0	0	1	19	112	225	278	288	246	151	213	60	37	10	0	0	0	0	0	0	68.3	288																																											
12-Oct	0	0	0	0	0	0	1	29	116	215	261	321	196	163	111	110	39	5	0	0	0	0	0	0	65.3	321																																											
13-Oct	0	0	0	0	0	0	1	25	88	208	171	118	178	204	141	91	25	2	0	0	0	0	0	0	52.2	208																																											
14-Oct	0	0	0	0	0	0	0	5	12	29	35	42	86	78	77	43	22	2	0	0	0	0	0	0	18.0	86																																											
15-Oct	0	0	0	0	0	0	1	39	87	181	182	313	297	264	218	149	64	4	0	0	0	0	0	0	75.0	313																																											
16-Oct	0	0	0	0	0	0	0	6	23	53	86	80	72	132	134	92	19	2	0	0	0	0	0	0	29.1	134																																											
17-Oct	0	0	0	0	0	0	1	11	34	83	162	181	208	222	131	118	40	2	0	0	0	0	0	0	49.7	222																																											
18-Oct	0	0	0	0	0	0	0	7	30	76	70	81	116	93	64	26	17	3	0	0	0	0	0	0	24.3	116																																											
19-Oct	0	0	0	0	0	0	0	7	34	80	106	121	231	264	182	66	33	3	0	0	0	0	0	0	47.0	264																																											
20-Oct	0	0	0	0	0	0	0	8	43	96	101	145	170	227	200	122	30	1	0	0	0	0	0	0	47.6	227																																											
21-Oct	0	0	0	0	0	0	0	4	41	145	123	140	244	234	168	111	43	2	0	0	0	0	0	0	52.3	244																																											
22-Oct	0	0	0	0	0	0	0	15	103	164	200	283	280	256	144	61	19	1	0	0	0	0	0	0	63.6	283																																											
23-Oct	0	0	0	0	0	0	0	4	27	52	67	92	74	46	13	4	1	0	0	0	0	0	0	0	15.9	92																																											
24-Oct	0	0	0	0	0	0	0	1	12	46	40	62	101	88	112	54	18	0	0	0	0	0	0	0	22.2	112																																											
25-Oct	0	0	0	0	0	0	0	11	93	161	223	260	249	200	99	62	15	0	0	0	0	0	0	0	57.2	260																																											
26-Oct	0	0	0	0	0	0	0	1	21	54	59	91	78	66	41	23	6	0	0	0	0	0	0	0	18.3	91																																											
27-Oct	0	0	0	0	0	0	0	3	19	54	84	75	132	158	79	39	15	0	0	0	0	0	0	0	27.5	158																																											
28-Oct	0	0	0	0	0	0	0	2	12	28	36	64	54	38	40	28	7	0	0	0	0	0	0	0	12.9	64																																											
29-Oct	0	0	0	0	0	0	0	1	14	36	58	80	89	65	49	13	3	0	0	0	0	0	0	0	17.1	89																																											
30-Oct	0	0	0	0	0	0	0	3	11	24	46	75	97	81	34	10	2	0	0	0	0	0	0	0	16.0	97																																											
31-Oct	0	0	0	0	0	0	0	1	8	22	33	39	52	48	27	12	2	0	0	0	0	0	0	0	10.2	52																																											
																		0.0		0.0		0.0		0.0		0.0		0.0		1.0		20.9		66.7		124.6		146.2		163.0		166.8		166.6		129.5		79.7		33.4		4.8		0.1		0.0		0.0		0.0		0.0		0.0		0.0		Diurnal Average	
																		0		0		0		0		0		0		7		99		161		271		317		360		363		335		281		241		126		33		1		0		0		0		0		0		Diurnal Maximum			



**WBEA**  
**Hourly Averages**

**Global Radiation (GR) - W/m<sup>2</sup>**  
**CNRL Horizon - October 2014**





Maximum Speed: 25 km/h on Oct 2 11:00	Maximum Daily Speed Average: 14.5 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 17 03:00	Minimum Daily Speed Average: 0.6 km/h on Oct 4	Hours of Data: 742
Maximum Diurnal Speed Average: 2.7 km/h at hour 7	Minimum Diurnal Speed Average: 0.1 km/h at hour 14	Hours of Missing Data: 2
Monthly Average Velocity: 1.3 km/h 263.2 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 7 Q <sub>3</sub> = 10 P <sub>90</sub> = 13 P <sub>99</sub> = 21	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-Oct	NNE5	NNE4	NNW3	N4	W2	S3	SW2	SE2	SSE3	NE5	NNE5	NNE8	N9	NNE10	NNE13	N15	N17	N16	N17	N13	N10	NNW12	NW8	WNW6	N6.7	N17
2-Oct	W2	NW5	NW10	NNW12	AF	AF	NW20	NW17	NW14	NW22	NW25	NW21	NW23	WNW21	WNW21	WNW22	WNW20	WNW17	W13	WNW9	W7	WNW8	W10	W11	WNW14.5	NW25
3-Oct	W10	W10	W9	WSW10	WSW9	WSW7	SW6	S5	SSW6	S7	SSE8	SSE9	SSE10	SSE10	SSE9	SE10	SE10	SE9	SSE5	S10	SSW7	SE5	SE8	SSE4	S5.3	S10
4-Oct	NNE2	NNE4	N5	N5	N5	N4	NNW3	W1	SW3	SW3	SSE1	E2	ENE5	NE4	NNE5	NE4	ENE5	SSE4	SSE3	SSW4	SW5	WSW7	SW5	WSW6	NNW0.6	WSW7
5-Oct	SSW5	S7	S9	S10	SSW8	S10	SSW10	SSW12	SSW13	SSE8	SSE5	E6	ENE7	NNE11	NNE14	NNE13	NNE13	NNE8	NE10	NNE9	NNE6	NE7	NNE5	ENE4	E1.8	NNE14
6-Oct	E3	ENE4	S1	SSW4	SSW3	SE2	E1	SSW1	W3	S1	NE4	NNE4	NW5	N7	NNE8	NNW4	WNW5	WNW12	W9	WNW11	W9	W6	SW7	W11	WNW2.7	WNW12
7-Oct	W13	W13	WSW12	WSW13	WSW12	WSW10	W13	W8	WNW9	WNW11	WNW10	N5	NNE8	NNE10	NE11	NE8	NE10	ENE7	NE5	ENE5	E3	N4	WNW2	W3	WNW3.9	W13
8-Oct	W2	S3	SSW2	SE2	SW3	S1	WSW1	S3	S4	ESE3	N3	NNE4	ENE4	E5	ENE6	ENE6	NNE5	N5	NE6	NE6	ENE6	ESE8	SE6	ESE3	E2.2	ESE8
9-Oct	ESE4	N4	NNE5	N5	N5	N4	N3	NNW2	N3	SSW5	S4	ESE4	SW4	SE2	E3	ENE2	NNW3	N5	NNE3	N4	ENE3	S5	NW2	SW3	NNE1.0	SSW5
10-Oct	SW3	WSW4	WSW4	SW6	SW6	SW5	SW8	SSW8	SSW8	SSW9	S11	S10	S11	S10	S8	SSE7	SSE6	S6	SSW7	S7	S4	SSW5	SSE6	S10	SSW6.5	S11
11-Oct	S10	S10	S8	SSW9	SSW11	SSW9	SSW11	SW12	SW12	WSW12	W13	WNW15	WNW15	W14	WNW15	WSW7	W12	WSW10	SW10	SW9	SW9	SW12	WSW7	WSW11	WSW9.3	WNW15
12-Oct	WSW12	WSW12	W14	W14	W9	SW6	WNW9	W3	SSW5	WSW6	WNW10	WNW12	W14	W12	WNW12	WNW11	WNW7	W12	W11	W8	SW8	WSW7	W5	W5	W8.8	W14
13-Oct	SSW5	NW4	N6	NNW4	NW7	NNE1	SW5	WNW3	S2	ENE3	ENE3	S4	SSW4	SSE5	NE3	NNE5	NNE4	NNE5	NNE6	NNE6	N7	NNE8	N9	N9	N2.3	N9
14-Oct	NNE10	N10	N9	NNE10	N10	N10	N11	NNE11	NNE12	NNE13	NNE13	NNE11	N10	N8	N6	N3	WSW1	S3	SSE3	WNW2	W11	W12	W12	W13	N6.2	NNE13
15-Oct	W11	WNW13	WSW9	SSW6	SW5	W8	W9	SW8	SW9	W10	W11	W11	WNW11	WNW11	WNW10	NW14	WNW9	WNW9	WNW8	NW8	NNW5	NNW5	NNW3	WNW7.6	NW14	
16-Oct	NE5	NE6	NW1	NNE4	NE4	E2	ESE2	SE3	SE1	SSE3	SE4	SSE4	SSE6	S7	S6	S4	SW1	ENE5	NE3	NNW3	NNE5	NNE6	N5	NNW4	ENE1.4	S7
17-Oct	NW2	N3	NNE0	WSW4	SW6	WSW6	WSW4	WSW5	W4	W3	N3	E3	SE8	SE15	SE15	SSE16	SSE17	SSE16	SSE18	SSE13	SSE8	SSE7	SSE6	SSE9	SSE5.9	SSE18
18-Oct	SSE10	SSE5	SE3	SSE5	SE4	S5	WSW3	SSW4	S5	SSE7	S6	S4	SSE7	SSE7	S9	S6	SW7	SSW5	SW6	WSW8	WSW9	WNW4	SW3	SSW7	SSW4.8	SSE10
19-Oct	SW8	SW10	WSW5	SW2	S1	NE3	SSE2	SW2	S4	SE2	NW2	NNW3	NNE3	NNW5	NNW7	NW3	N1	N4	N7	N5	NNW5	ENE2	NW5	NW6	NW1.9	SW10
20-Oct	NW7	NW5	WNW4	W4	SW4	SW4	SW5	SW7	SW7	SSW7	SSW8	S9	S10	S9	S9	SSE7	SE5	S7	SSW6	WSW5	SSW4	SW5	SSW5	SSW6	SSW4.7	S10
21-Oct	S4	SSW8	SSW8	SW10	SSW5	SW10	SW9	SW8	SW9	SW9	SW9	SW8	SSW9	SSW10	SW10	SSW9	SW7	S7	SSW8	SW9	SW7	SW3	SSW5	SSW9	SSW7.8	SW10
22-Oct	SW10	SSW7	SSW7	S5	SSE7	S9	S8	S7	S5	S7	S6	S4	ENE3	SE6	ESE6	ENE7	E7	ESE7	SSE4	SSE7	S7	SSE10	S8	S5	SSE5.2	SSE10
23-Oct	W5	WSW2	SE3	SSE1	WNW7	W5	NW5	N5	N6	NNW9	NNW6	N8	NNE9	NNE8	NE3	NE3	NE5	NNE6	NNE8	N9	NNW11	NW11	NW11	WNW14	NNW5.0	WNW14
24-Oct	WNW13	WNW10	WNW9	WNW10	SW2	S6	W9	WNW11	W13	W12	W14	W11	W14	W14	W15	W16	WNW18	WNW14	W9	WSW8	W9	W9	W11	W10	W10.6	WNW18
25-Oct	W10	W11	W12	WNW11	SW2	SSW4	SSW8	SSW9	SSW8	SSW8	SSW8	S7	S5	S6	S6	SE6	E6	NNE4	N5	N6	N5	N6	N7	SW2.0	W12	
26-Oct	N7	N9	N9	NNE12	NNE14	NNE14	NNE12	NNE13	N13	NNE13	NNE15	NNE13	NNE13	NNE15	NNE17	N15	N16	N16	N16	N15	N14	N13	N12	N13	N13.2	NNE17
27-Oct	N11	N11	N11	NNE10	N10	N11	N8	N9	NNE10	NNE11	N10	NNE10	NNE8	NNE8	NE7	ENE3	NNW3	NNW3	N5	NNE6	NNE7	N5	N5	N4	NNE7.5	N11
28-Oct	NW3	E2	SSW1	S1	S3	S5	S2	S3	SSE5	SSE6	SSE8	SSE6	SE7	SE5	SE6	SE6	ESE5	ESE5	ESE5	ESE4	ESE4	E4	ENE4	NE4	SE3.4	SSE8
29-Oct	NNE4	NNE5	NNE5	N5	N7	N8	NNE7	NNE7	NNE6	NNE7	NNE9	NNE9	NNE10	NNE9	NNE9	NNE7	NNE6	NNE6	ENE6	E4	ESE5	ESE7	SE7	SE9	NE5.4	NNE10
30-Oct	SE10	SSE10	SSE10	SSE9	SSE12	SSE15	SSE14	SSE11	SSE12	SSE9	SSE11	SSE11	SSE13	SSE12	SSE12	SSE11	SSE12	SSE8	SE9	SSE8	SSE7	SSE11	SE11	SSE12	SSE10.7	SSE15
31-Oct	SSE14	SE13	SSE14	SSE14	SSE12	SSE11	SSE10	SSE11	SSE11	SSE11	SSE12	S13	S12	S12	S12	S10	S10	S8	S7	SSW7	S7	S8	SSW4	SSW1	SSE9.8	SSE14

WSW2.4	W2.0	W2.3	W2.1	WSW1.7	SW2.0	WSW2.7	WSW2.4	SW2.4	WSW1.8	W1.8	WNW0.9	W0.6	W0.1	WNW0.9	N0.8	NNW1.0	NNW0.6	NW0.8	WNW1.2	W1.5	W1.0	W1.5	WSW2.7	Diurnal Average
SSE14	SSE13	SSE14	W14	NNE14	SSE15	NW20	NW17	NW14	NW22	NW25	NW21	NW23	WNW21	WNW21	WNW22	WNW20	WNW17	SSE18	N15	N14	N13	N12	WNW14	Diurnal Maximum

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



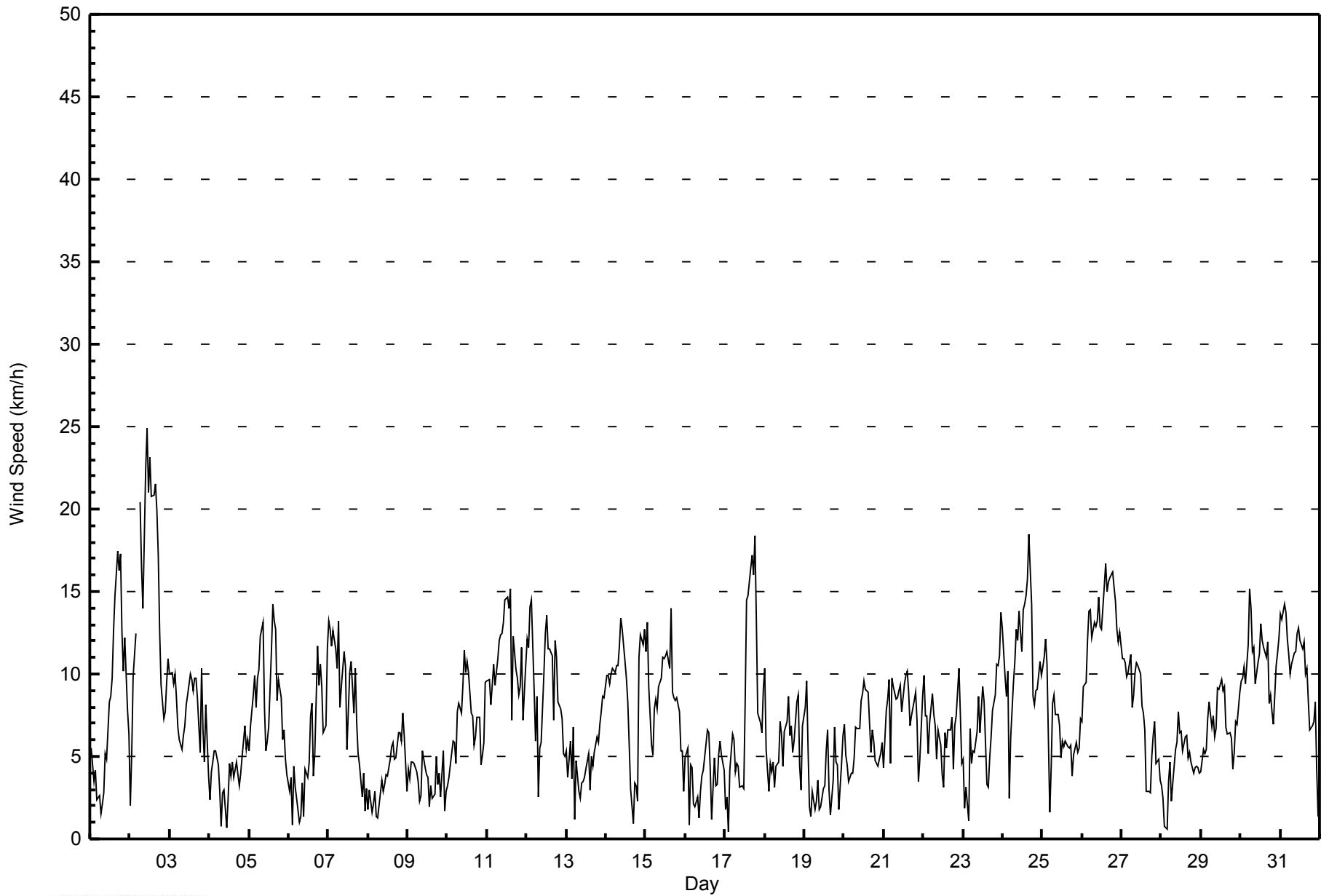


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Oct 2 11:00 Minimum Value: 0 km/h on Oct 10 00:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 P <sub>99</sub> = 6																	Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	1	1	1	1	1	1	1	1	1	2	3	2	2	2	3	4	5	4	5	4	2	4	3	2	5
2-Oct	2	3	4	4	AF	AF	5	4	4	6	7	6	6	6	6	6	5	5	3	3	2	2	2	3	7
3-Oct	2	2	2	3	2	1	1	1	2	2	2	3	3	2	3	3	3	2	1	4	4	2	2	4	
4-Oct	1	1	1	1	1	1	1	1	1	1	1	2	2	1	2	1	1	1	1	1	1	2	2	1	2
5-Oct	1	1	2	3	2	2	3	3	3	2	2	2	2	4	4	3	3	3	3	2	2	2	2	1	4
6-Oct	1	1	1	2	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	2	2	1	4	4
7-Oct	3	3	3	3	3	3	3	4	3	3	3	2	4	3	3	2	2	2	1	1	1	1	1	1	4
8-Oct	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	2	2	1	2
9-Oct	1	1	1	1	0	1	1	1	1	2	2	2	2	1	2	2	1	2	1	2	1	1	1	0	2
10-Oct	2	1	1	1	1	2	1	1	2	3	3	3	3	3	2	2	1	1	1	1	1	1	1	1	3
11-Oct	1	1	2	2	2	2	2	3	3	4	4	4	4	5	4	3	4	3	2	2	2	3	2	3	5
12-Oct	3	4	4	4	3	3	2	3	1	3	4	4	4	3	3	3	2	5	3	3	2	2	2	2	5
13-Oct	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	2	2	2
14-Oct	2	2	2	3	3	2	3	2	3	4	3	3	2	2	2	1	1	1	1	1	4	4	4	5	5
15-Oct	4	4	4	1	2	2	3	2	2	3	3	3	3	4	4	3	3	2	1	2	2	1	1	1	4
16-Oct	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	2	1	1	1	1	1	1	2
17-Oct	1	0	1	2	1	1	1	1	1	1	1	2	4	4	4	6	5	5	5	4	2	2	2	3	6
18-Oct	3	4	1	2	1	1	1	1	1	2	2	1	2	2	2	2	2	1	1	2	1	2	2	2	4
19-Oct	1	2	3	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	3
20-Oct	1	2	1	1	1	1	2	1	1	2	2	2	2	2	2	2	1	1	2	2	1	1	1	1	2
21-Oct	2	2	2	2	2	2	2	3	3	2	3	2	3	3	3	3	2	1	1	1	1	1	2	2	3
22-Oct	2	1	2	1	1	1	2	1	1	2	1	2	2	2	2	1	1	2	1	2	2	2	3	1	3
23-Oct	1	2	1	1	2	2	2	1	1	2	2	2	2	2	3	1	1	1	2	2	2	2	3	3	3
24-Oct	3	4	3	3	2	2	3	4	4	4	4	4	5	5	5	5	5	5	2	2	3	3	3	3	5
25-Oct	3	3	3	3	2	1	2	2	2	2	2	2	2	2	2	1	1	1	0	1	1	1	2	3	3
26-Oct	2	2	3	3	3	4	3	3	4	4	4	4	3	4	4	4	4	4	4	4	4	3	3	3	4
27-Oct	3	2	2	2	2	3	2	2	2	3	3	3	2	2	2	2	1	1	2	1	2	2	1	1	3
28-Oct	1	1	1	1	1	1	1	1	1	1	2	1	2	2	1	2	1	1	1	1	1	1	1	1	2
29-Oct	1	1	1	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	1	1	2	2	2	3
30-Oct	3	2	3	3	4	4	3	3	3	2	3	3	3	3	3	3	4	2	2	2	2	3	3	3	4
31-Oct	4	3	4	4	3	3	2	3	3	3	3	3	3	3	3	2	2	2	1	1	1	2	2	1	4
Diurnal Maximum																								4	
AF - Analyzer Failure																									



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**CNRL Horizon - October 2014**





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

**Wind Speed (WS) - km/h**  
**CNRL Horizon - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	272	36.66	36.66
6 - 11	351	47.30	83.96
12 - 19	110	14.82	98.79
20 - 28	9	1.21	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**CNRL Horizon - October 2014**

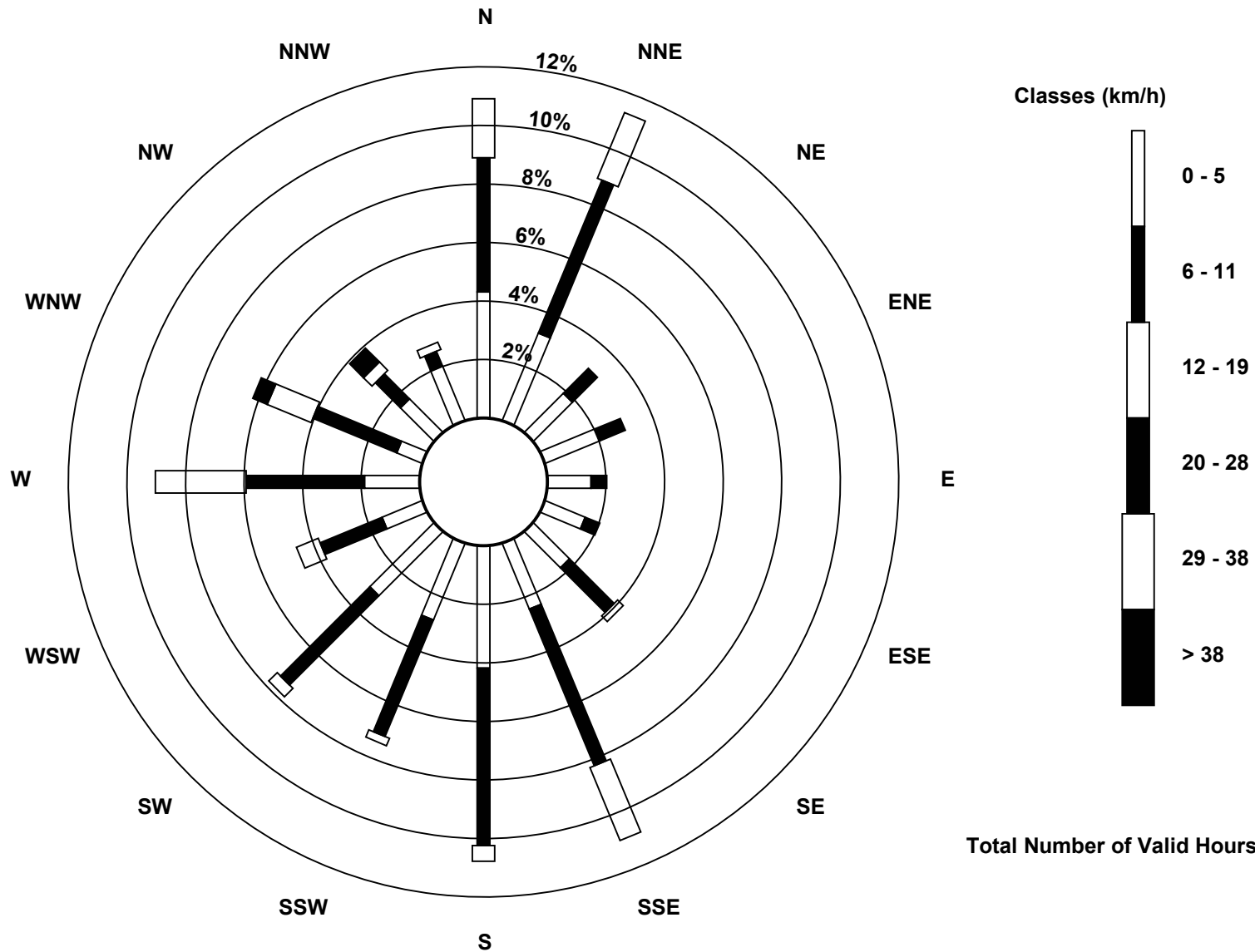
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	32	24	14	15	11	11	13	18	31	21	23	11	14	7	12	15	272
6 - 11	34	42	9	7	4	4	16	43	45	32	32	17	30	23	9	4	351
12 - 19	15	18	0	0	0	0	2	20	4	2	3	6	23	12	3	2	110
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	0	9
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	81	84	23	22	15	15	31	81	80	55	58	34	67	46	29	21	742

Total Number of Valid Hours: 742

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Wind Speed (WS) - km/h  
CNRL Horizon (AMS 15)**



**Total Number of Valid Hours: 742**



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg  
CNRL Horizon - October 2014**

Direction of Maximum Speed: 317 deg on Oct 2 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 303.7 deg on Oct 2	Hours of Data: 742
Direction of Minimum Speed: 23 deg on Oct 17 03:00	Direction of Minimum Daily Speed Average: 0.6 deg on Oct 4
Direction of Minimum Speed: 23 deg on Oct 17 03:00	Hours of Missing Data: 2
Monthly Average Direction: 243.5 deg	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	15	20	337	4	268	176	219	128	150	49	12	32	6	16	14	7	5	7	360	355	358	338	323	284	2.1
2-Oct	259	322	310	331	AF	AF	321	310	314	316	317	311	313	301	296	299	295	287	279	292	280	291	281	277	303.7
3-Oct	275	269	259	256	250	238	219	191	198	174	167	163	164	152	147	124	132	143	151	179	197	136	126	155	184.3
4-Oct	20	17	6	350	356	2	333	266	231	217	153	88	61	48	30	52	74	149	164	204	233	238	231	244	345.0
5-Oct	208	187	188	189	193	185	202	198	197	162	148	83	67	25	12	20	26	21	36	33	28	44	32	70	94.5
6-Oct	91	66	177	196	200	142	95	196	265	179	39	17	322	11	21	342	289	286	275	282	275	261	235	267	288.8
7-Oct	266	259	251	251	258	255	261	281	291	300	293	5	12	30	34	56	55	63	54	62	81	353	297	262	302.4
8-Oct	273	180	203	133	215	173	255	191	170	114	7	33	59	93	77	63	25	10	47	55	78	119	146	119	86.4
9-Oct	105	6	16	8	358	354	349	345	9	192	169	123	214	146	92	78	336	4	16	351	69	175	325	232	27.8
10-Oct	219	242	256	229	234	218	224	208	201	193	184	174	179	185	175	154	166	176	197	189	186	198	168	181	192.8
11-Oct	189	176	186	192	208	208	213	226	220	248	259	282	282	272	293	252	271	248	233	220	222	228	248	237	238.2
12-Oct	249	257	271	268	270	225	291	259	197	256	301	286	281	277	285	292	282	271	270	260	236	240	272	266	268.9
13-Oct	212	309	352	288	318	27	231	301	170	64	75	183	194	167	52	20	14	19	22	14	353	12	356	6	358.1
14-Oct	13	9	5	12	6	4	8	12	17	15	12	12	9	7	355	352	238	172	148	283	276	272	264	270	351.1
15-Oct	278	283	252	203	233	260	261	227	231	262	276	268	292	294	290	315	292	296	298	321	307	348	330	348	281.3
16-Oct	35	35	326	18	45	90	107	131	133	151	128	157	155	170	178	187	229	63	41	341	13	23	11	332	75.6
17-Oct	314	2	23	238	228	240	255	251	273	269	10	101	136	146	144	150	147	147	154	158	152	148	152	164	160.1
18-Oct	158	154	145	163	144	183	239	201	171	168	185	178	167	165	186	189	214	210	229	245	249	294	219	208	192.7
19-Oct	231	233	257	231	177	37	147	214	190	129	304	339	33	340	333	307	10	1	354	351	330	59	308	306	305.6
20-Oct	311	311	300	277	223	226	230	224	227	213	209	190	177	181	187	152	139	169	194	243	192	215	193	210	207.0
21-Oct	179	200	194	216	201	216	215	232	231	229	233	218	204	200	221	213	216	191	205	228	218	222	205	208	213.4
22-Oct	224	195	192	186	167	186	181	183	176	183	181	173	63	129	105	63	93	118	165	154	171	151	177	190	165.3
23-Oct	276	246	133	151	299	274	315	0	1	341	343	3	19	19	56	48	45	31	15	2	343	320	315	296	344.3
24-Oct	291	290	291	300	231	183	278	286	280	276	278	273	263	268	281	277	290	284	265	253	262	271	275	276	276.4
25-Oct	268	265	272	289	224	211	197	202	212	196	187	181	172	173	129	136	92	95	30	0	357	5	0	7	228.7
26-Oct	11	10	5	14	16	13	17	13	9	15	13	15	25	22	14	7	6	5	6	7	6	6	7	6	11.2
27-Oct	7	3	4	14	11	10	11	10	14	13	10	18	13	33	45	65	329	342	11	13	21	8	355	359	12.0
28-Oct	314	96	210	181	179	185	174	174	156	158	167	164	137	129	132	130	115	103	109	110	110	86	76	36	134.0
29-Oct	21	22	19	11	9	7	29	24	25	24	17	17	21	19	13	14	18	32	63	99	107	115	127	138	34.3
30-Oct	145	153	147	153	155	162	168	166	165	165	160	158	158	162	161	155	168	147	146	148	149	148	145	152	156.5
31-Oct	154	146	147	148	148	149	156	152	157	162	168	184	178	174	183	176	178	182	181	198	186	185	196	192	166.4

257.8 268.3 265.8 263.3 243.8 215.2 251.4 237.7 229.4 244.5 274.0 283.4 279.1 269.2 347.0 10.5 344.1 329.7 317.2 291.3 281.2 269.9 267.8 255.8  
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	Hours in Service: 744
Maximum Value: 97 deg on Oct 4 11:00	Hours of Data: 742
Minimum Value: 7 deg on Oct 16 22:00	Hours of Missing Data: 2
Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 14 Q <sub>1</sub> = 17 Median = 19 Q <sub>3</sub> = 27 P <sub>90</sub> = 46 P <sub>99</sub> = 86	Hours of Calibration: 0
	Percent Operational Time: 99.7

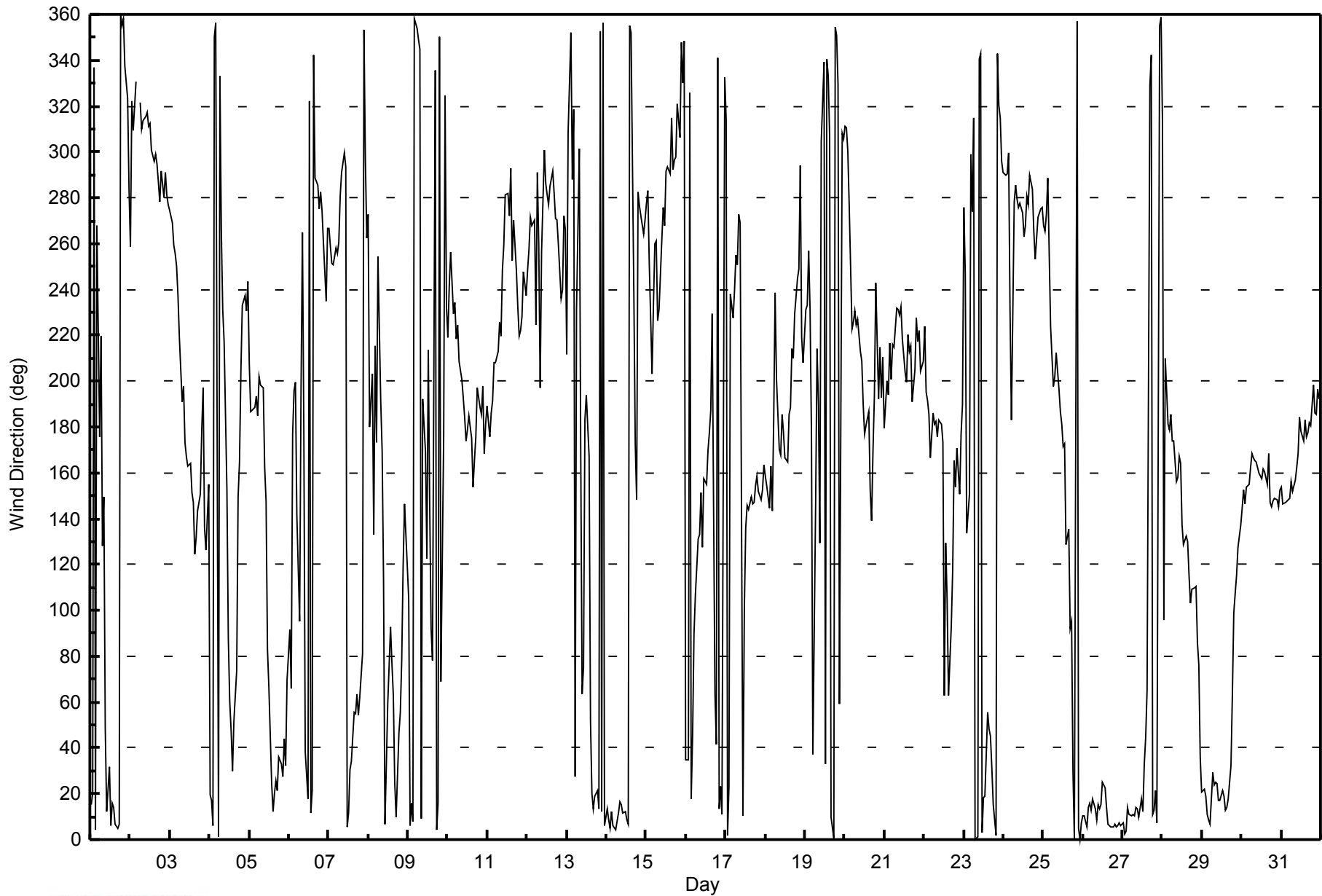
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	29	17	36	20	47	48	36	38	30	28	44	19	18	18	19	20	20	20	20	19	18	21	27	23	48
2-Oct	80	46	20	21	AF	AF	15	15	18	16	16	18	17	20	19	18	18	18	18	17	16	14	14	16	80
3-Oct	16	18	18	17	15	19	19	17	20	26	25	29	22	23	23	20	20	19	20	24	17	29	21	57	57
4-Oct	41	19	18	14	17	16	29	77	26	52	97	65	32	36	30	28	22	29	37	21	17	15	22	17	97
5-Oct	21	13	15	19	19	15	19	17	18	32	42	41	32	26	19	20	19	19	17	17	24	17	25	31	42
6-Oct	27	16	83	24	43	46	78	63	41	96	52	43	37	23	21	44	34	21	19	20	18	18	13	23	96
7-Oct	18	17	17	17	17	20	16	51	19	21	27	36	44	24	23	17	16	16	9	13	46	13	51	39	51
8-Oct	67	20	48	53	42	64	54	49	21	37	30	32	44	35	39	37	17	11	14	11	18	19	22	44	67
9-Oct	17	36	12	13	13	25	25	15	47	31	50	60	68	92	73	63	38	10	26	59	47	23	67	28	92
10-Oct	30	27	12	9	10	35	12	13	17	20	17	21	25	20	26	22	14	15	9	12	28	17	15	11	35
11-Oct	10	9	21	15	16	14	16	18	18	26	25	22	25	24	19	27	19	21	15	16	15	18	24	17	27
12-Oct	19	20	18	20	20	45	21	90	20	59	24	24	21	23	22	17	17	19	18	21	23	15	28	29	90
13-Oct	17	36	11	32	15	84	28	61	32	24	50	48	42	37	61	26	19	13	11	10	14	15	17	16	84
14-Oct	17	16	19	19	18	18	17	17	20	19	18	17	19	19	23	68	27	12	61	19	20	21	22	22	68
15-Oct	22	22	23	24	26	21	19	18	22	26	28	27	25	25	26	20	20	19	13	12	12	20	25	45	45
16-Oct	37	18	87	27	18	22	48	38	59	41	42	46	32	25	30	43	86	14	19	27	11	7	16	9	87
17-Oct	18	23	83	19	9	10	13	15	17	50	41	60	29	23	20	20	19	18	17	18	18	18	16	17	83
18-Oct	17	60	40	19	12	19	26	17	34	17	20	30	24	20	17	23	17	14	18	13	13	42	50	13	60
19-Oct	19	14	58	60	46	41	73	37	27	62	89	45	51	25	24	42	57	53	11	18	26	65	14	12	89
20-Oct	11	14	7	26	32	32	31	9	11	18	18	18	18	19	21	23	18	23	26	16	28	13	23	14	32
21-Oct	34	16	17	13	41	15	15	17	17	19	18	28	23	23	26	20	26	8	10	9	14	62	56	12	62
22-Oct	11	12	19	24	14	11	12	10	19	19	26	54	73	25	34	10	27	19	43	16	25	16	31	49	73
23-Oct	11	56	36	87	10	24	30	15	13	14	30	22	19	18	54	34	11	16	16	17	17	17	15	15	87
24-Oct	17	20	20	20	75	33	24	22	19	20	20	24	22	22	17	21	18	19	20	18	20	21	19	20	75
25-Oct	19	19	20	19	83	49	20	14	30	22	23	55	34	37	32	22	9	8	27	13	10	13	14	17	83
26-Oct	17	17	18	18	18	18	18	18	19	20	18	19	19	18	19	20	19	18	18	18	19	17	18	18	20
27-Oct	17	17	18	18	17	17	15	17	17	19	19	20	18	24	21	34	29	38	19	18	18	26	21	19	38
28-Oct	16	50	48	83	20	14	34	22	16	18	14	17	19	21	19	17	21	18	18	15	21	14	26	13	83
29-Oct	14	14	16	16	16	16	25	17	19	20	18	19	19	18	18	18	16	17	22	22	17	18	18	18	25
30-Oct	18	17	17	19	17	16	16	16	16	16	18	17	18	18	18	18	16	20	18	18	18	19	20	17	20
31-Oct	16	18	18	17	18	18	17	17	17	17	20	17	16	16	16	15	16	15	16	14	14	14	32	79	79
	80	60	87	87	83	84	78	90	59	96	97	65	73	92	73	63	86	53	43	61	47	65	67	79	
	Diurnal Maximum																								

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**CNRL Horizon - October 2014**







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 21, 2014	Previous Calibration	September 9, 2014
Station Name	CNRL	Station Number	15
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	14:45
Barometric Pressure	723 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.	1850
DACS voltage range	0-5000mV	DACS channel #	Diff 1

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-648	-648
Analyzer Range (mv)	5000	5000	Lamp voltage	778	770
Calculated slope	0.992017	0.993669	Chamber temp.	45.0	45.0
Calculated intercept	-0.468273	0.606764	Pressure (mmHg)	722.1	697.8
Analyzer Background	12.5	12.8	Flow (lpm)	0.439	0.423
Analyzer Coefficient	1.006	1.017	Intensity	86	85

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	-0.6	NA
as found span	5000	82.3	827.9	813.3	1.018
calibrator zero	5000	0.0	0.0	-0.2	NA
high point	5000	82.3	827.9	832.5	0.995
second point	5000	41.2	414.5	417.2	0.993
third point	5000	20.6	207.2	206.9	1.001
calibrator zero					
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	82.3	827.9	824.0	1.005
Average Correction Factor					0.996

Corrected As found 813.9 Previous response 835.1 % change 2.6%

#### Notes:

replaced sample pump after as founds. Adjusted span.

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

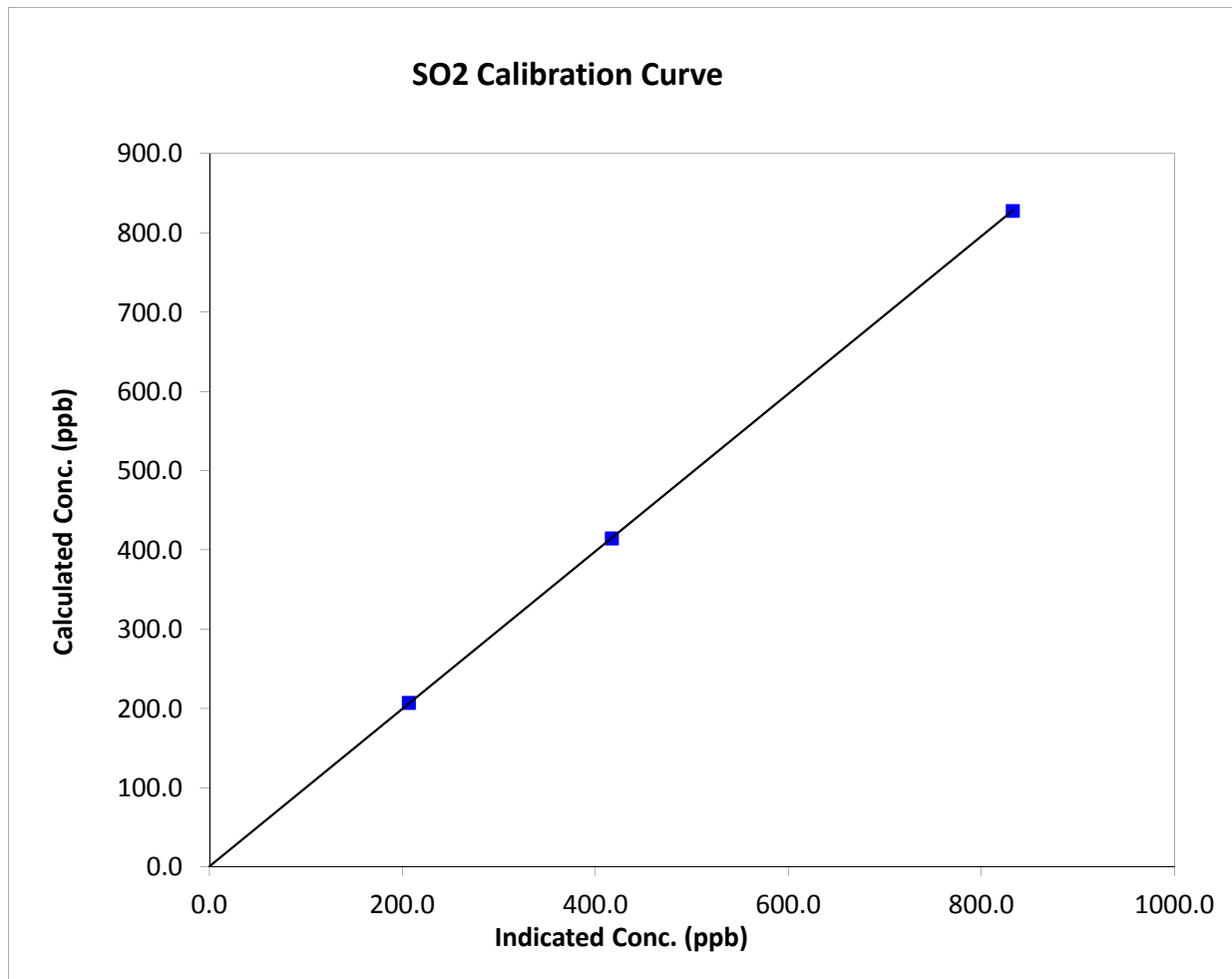
## SO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	October 21, 2014	Previous Calibration	September 9, 2014
Station Name	CNRL	Station Number	15
Start Time (MST)	9:15	End Time (MST)	14:45
Analyzer make	43i	Analyzer serial #	10710321322

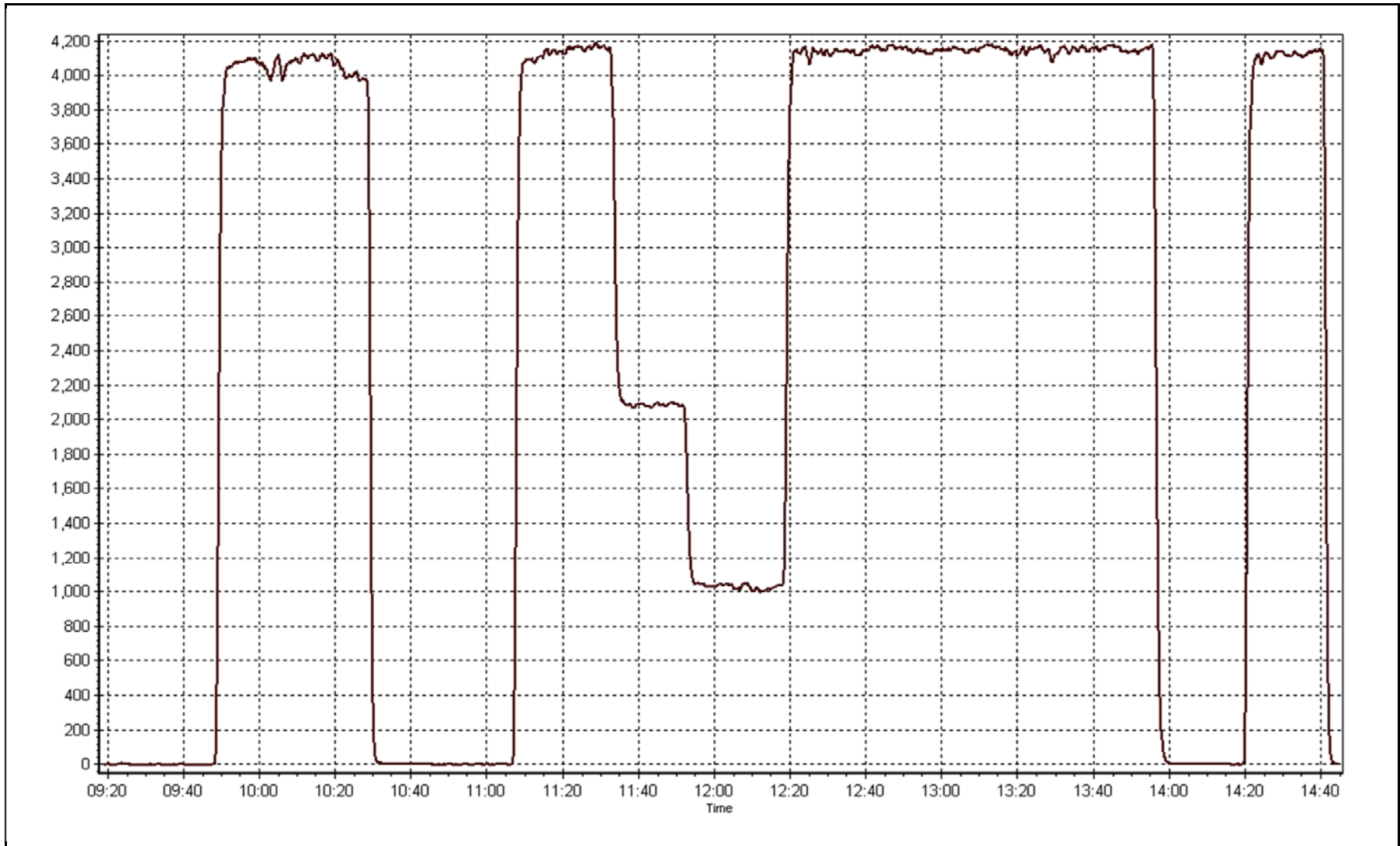
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999995
827.9	832.5	0.9945		
414.5	417.2	0.9934	Slope	0.993669
207.2	206.9	1.0015		
			Intercept	0.606764



SO2 Calibration Plot

Date: October 21, 2014





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	October 20, 2014	Previous Calibration	September 8, 2014
Station Name	CNRL Horizon	Station Number	15
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	12:15
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.	1850
DACS voltage range	0-5000mV	DACS channel #	DIFF 2

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-673	-673
Analyzer Range (input)	5000	5000	Lamp voltage	763	760
Calculated slope	0.998509	1.004342	Chamber temp.	45	45
Calculated intercept	-0.244167	-0.321683	Pressure	701.5	677.4
Analyzer Background	9.2	9.2	Flow	0.426	0.412
Analyzer Coefficient	0.927	0.927	Intensity	92	92
			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	0.2	NA
as found span	5000	38.5	80.1	79.9	1.002
SO2 scrubber check	5000	20.6	207.2	0.6	NA
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	38.5	80.1	79.9	1.002
second point	5000	19.2	39.9	40.4	0.989
third point	5000	9.6	20.0	20.2	0.989
calibrator zero					
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	38.5	80.1	80.0	1.001
Average Correction Factor					0.993

Corrected As found	79.7	Previous response	80.4	% change	0.9%
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#### Notes:

replaced inlet filter after as founds. No adjustments required.

Calibration Performed By:

Mike Martineau



# Wood Buffalo Environmental Association

## TRS Calibration Summary

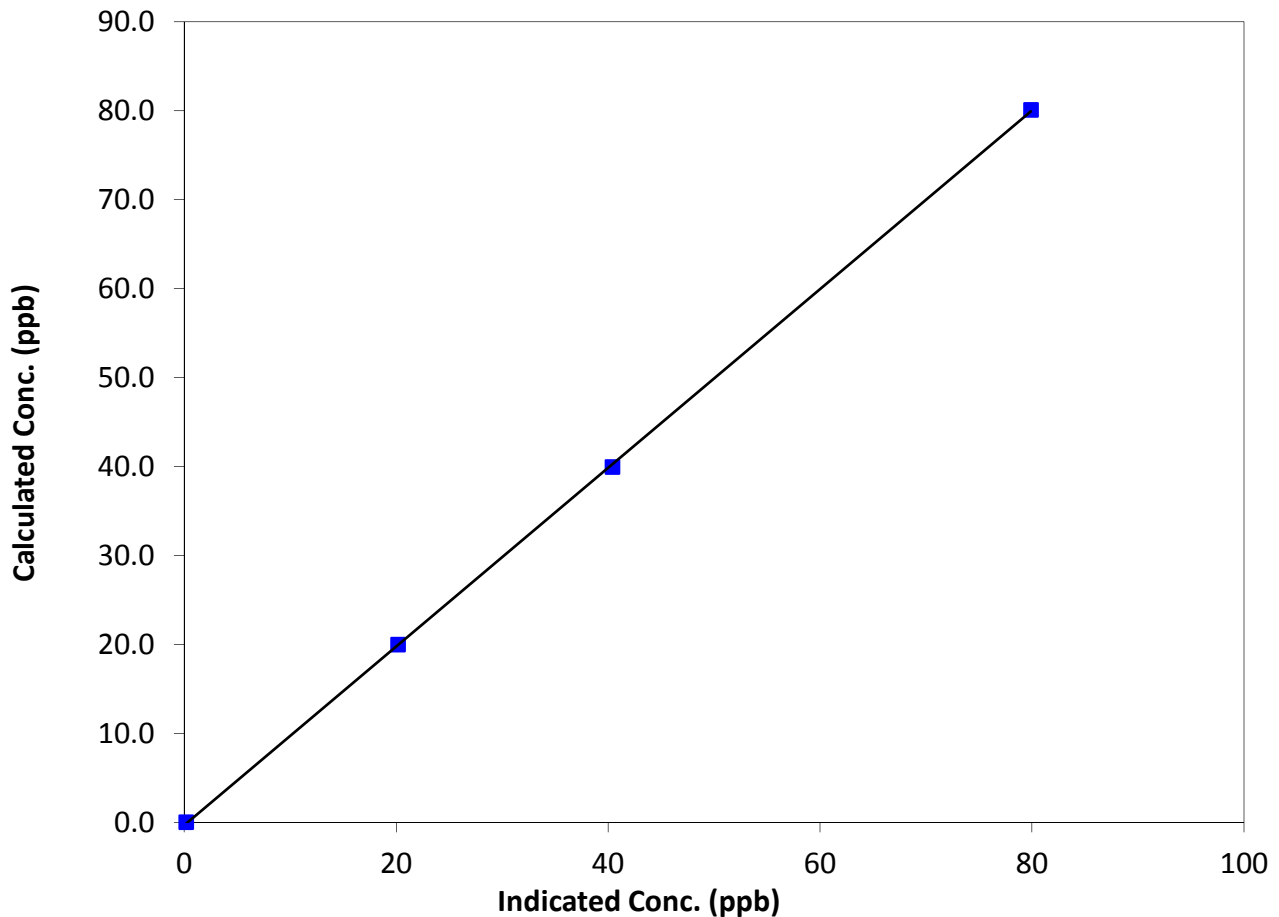
### Station Information

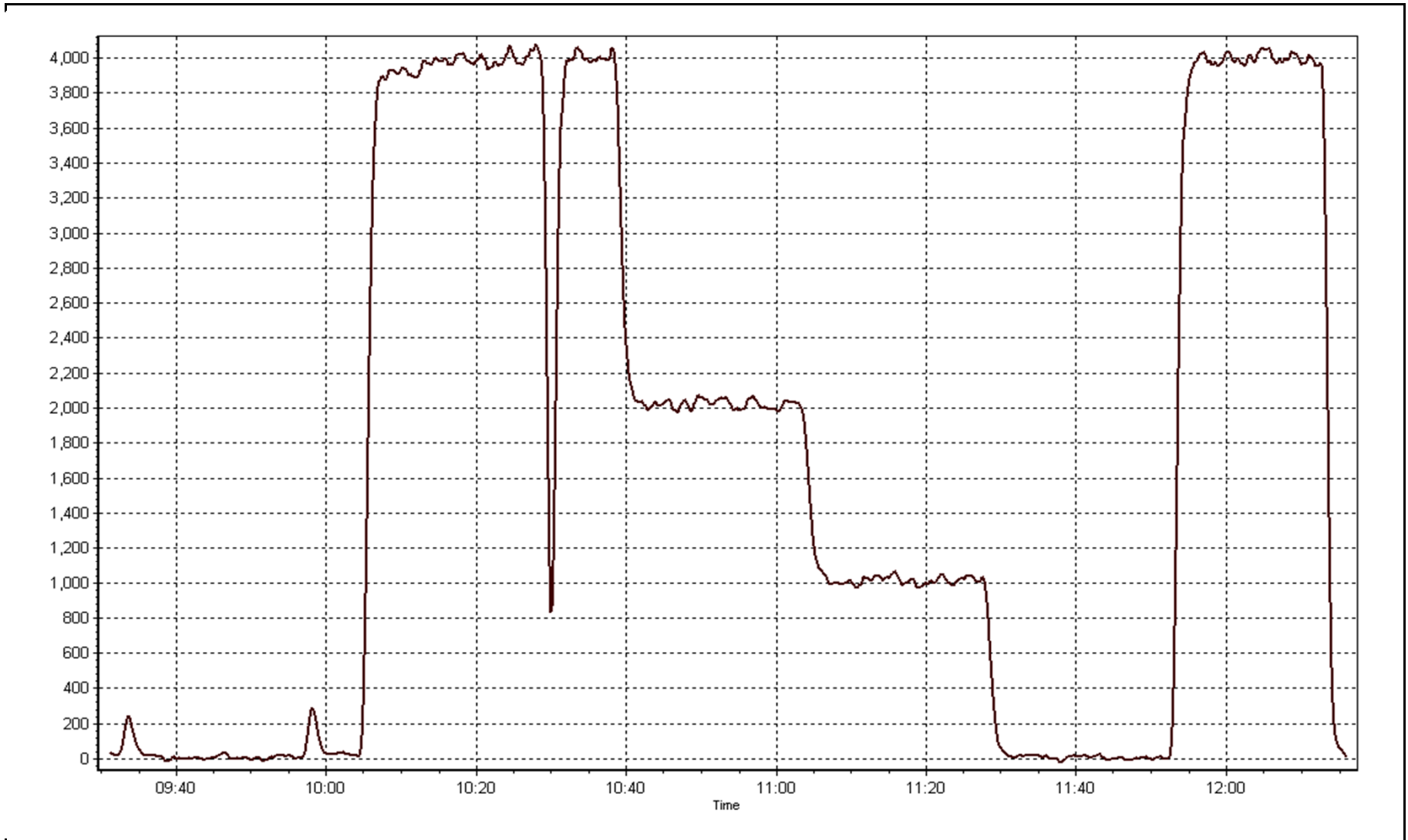
Calibration Date	October 20, 2014	Previous Calibration	September 8, 2014
Station Name	CNRL Horizon	Station Number	15
Start Time (MST)	9:30	End Time (MST)	12:15
Analyzer make	TEI 431	Analyzer serial #	0710321323

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999959
80.1	79.9	1.0023		
39.9	40.4	0.9885	Slope	1.004342
20.0	20.2	0.9895		
			Intercept	-0.321683

**TRS Calibration Curve**







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	October 21, 2014	Previous Calibration	September 9, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	14:45
Barometric Pressure	723 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.	2582
DACS voltage range	0-5000mV	DACS channel #	SE 3

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	6.0	6.0
Analyzer Range (mv)	5000	5000	Air or Bypass press	20.0	20.0
Calculated slope	1.003162	0.998531	Fuel Pressure	18.0	18.0
Calculated intercept	-0.016299	0.047533			

Analyzer make TEI 51C-LT Analyzer serial # 76232382

### 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	-0.15	N/A
as found span	5000	82.3	17.48	17.02	1.027
calibrator zero	5000	0.0	0.00	-0.03	N/A
high point	5000	82.3	17.48	17.47	1.000
second point	5000	41.2	8.75	8.70	1.006
third point	5000	20.6	4.38	4.32	1.014
calibrator zero					
as left zero	5000	0.0	0.00	-0.13	N/A
as left span	5000	82.3	17.48	17.45	1.002
Average Correction Factor					1.007

Corrected As found 17.16 Previous response 17.44 % change 1.6%

#### Notes:

adjusted zero and span. Inlet filter and hydrogen cylinder replaced after as founds.

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

## THC Calibration Summary

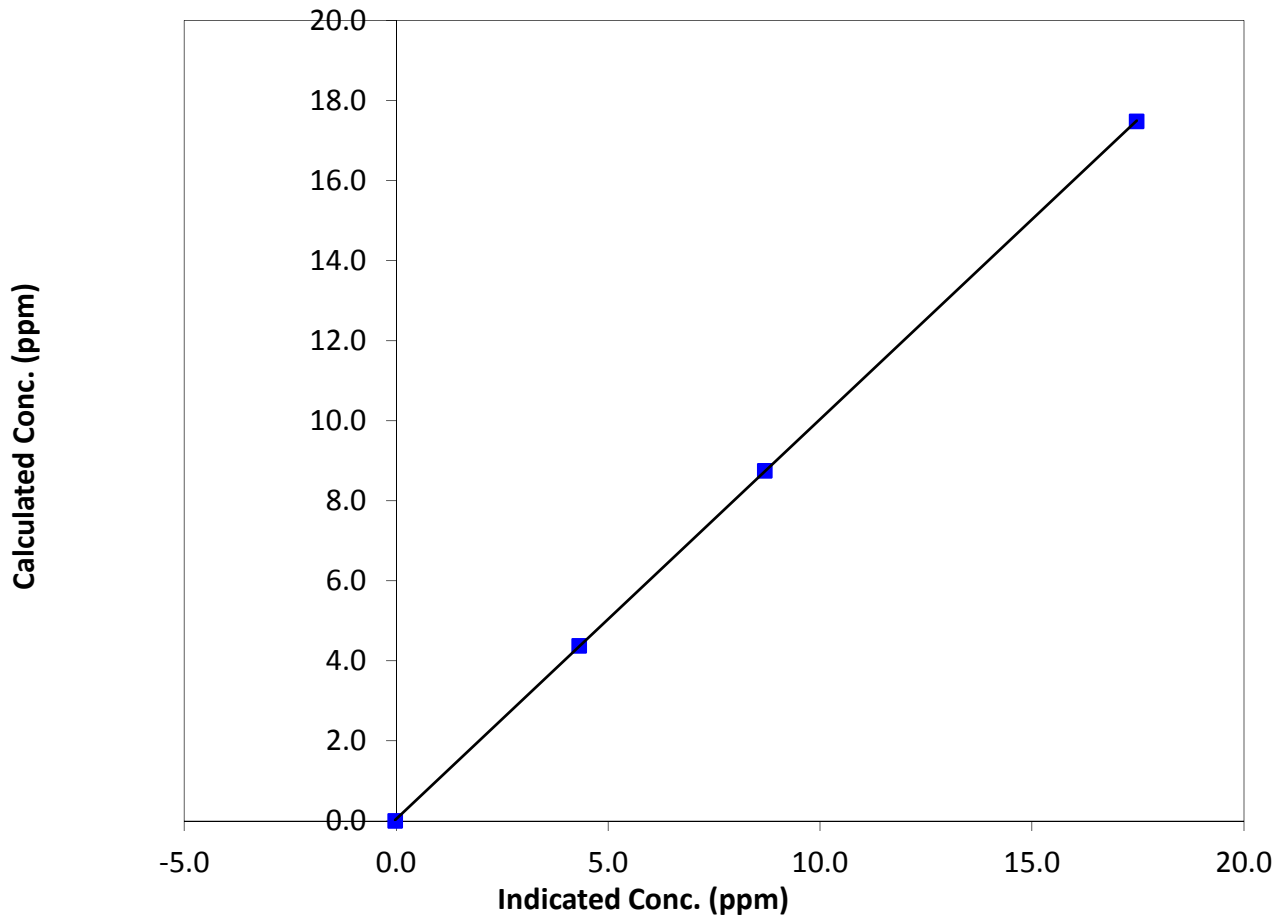
### Station Information

Calibration Date	October 21, 2014	Previous Calibration	September 9, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:15	End Time (MST)	14:45
Analyzer make	TEI 51C-LT	Analyzer serial #	76232382

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	N/A	Correlation Coefficient	0.999992
17.48	17.47	1.0005		
8.75	8.70	1.0062	Slope	0.998531
4.38	4.32	1.0135		
			Intercept	0.047533

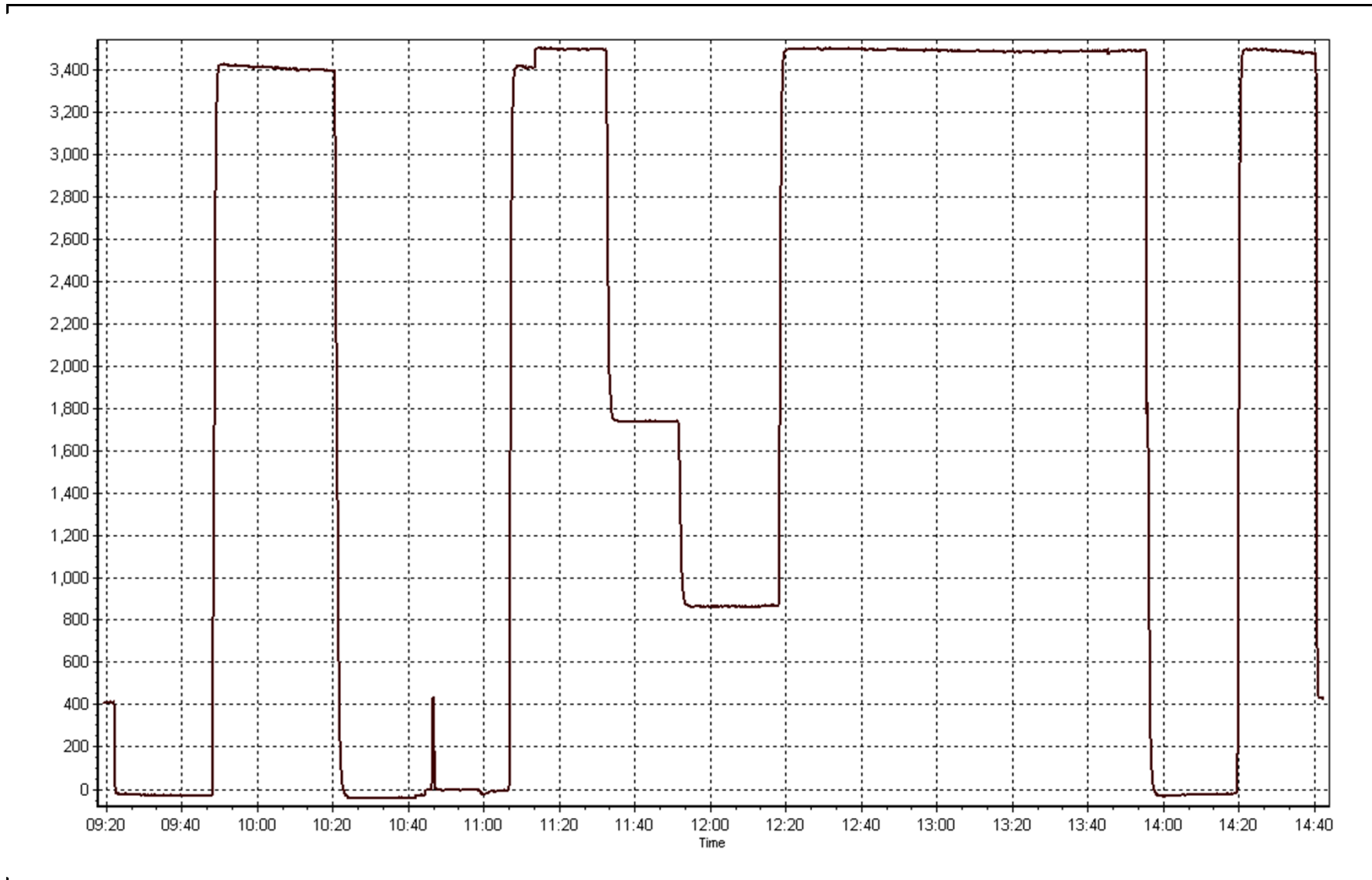
**THC Calibration Curve**





THC Calibration Plot

Date: October 21, 2014





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 21, 2014	Previous Calibration	September 9, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	9:15	End Time (MST)	14:45
Barometric Pressure	723 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
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	1.002040	0.999476	1.002050
	Data Offset	-1.026746	-0.287266	0.749136
After	Data Slope	1.004812	1.002412	1.000304
	Data Offset	-1.562354	-0.797425	0.253318
Channel #		Diff 3	Diff 4	Diff 5
Voltage Range		0-5000mv	0-5000mv	0-5000mv

### Analyzer Information

Analyzer make/model	42i	Analyzer serial #	710321429
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.885	ppb	0.704	ppb
NOX coefficient	1.000	ppb	1.000	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	10.6		9.0	
NOX bkgrnd	10.8		9.2	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	325.0	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	182.4	mmHg	155.4	mmHg
Sample Flow	0.688	ccm	0.749	ccm

**Notes:**

changed inlet filter and pump after as founds. Large span adjust due to new pump.



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

October 21, 2014

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	0.6	-0.1	0.1	N/A	N/A
as found span	5000	82.3	800.0	800.0	0.0	783.6	783.9	0.8	1.0209	1.0205
calibrator zero	5000	0.0	0.0	0.0	0.0	0.9	0.0	0.2	N/A	N/A
high point	5000	82.3	800.0	800.0	0.0	796.9	798.0	0.2	1.0038	1.0024
second point	5000	41.2	400.5	400.5	0.0	401.8	401.9	0.3	0.9966	0.9964
third point	5000	20.6	200.2	200.2	0.0	200.5	200.5	0.4	0.9986	0.9987
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	2.4	1.6	0.2	N/A	N/A
as left span	5000	82.3	800.0	449.7	350.2	787.6	451.3	337.7	1.0157	0.9964
Average Correction Factor									0.9997	0.9992

Corrected As found NO<sub>x</sub>= 783.0 NO= 783.9 Percent Change NO<sub>x</sub>= 2.1% NO= 2.1%  
 Previous Response NO<sub>x</sub>= 799.4 NO= 800.7

### 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			0.2			N/A	
1st NO <sub>2</sub> (300)	N/A	449.7	346.3	794.3	449.7	346.0	0.9909	1.0000	1.0011	99.9%
2nd NO <sub>2</sub> (200)	N/A	580.3	215.7	794.8	580.3	215.7	0.9902	1.0000	1.0002	100.0%
3rd NO <sub>2</sub> (100)	N/A	710.3	85.7	794.1	710.3	84.7	0.9910	1.0000	1.0114	98.9%
4th NO <sub>2</sub> (0)	796.0	N/A	0.0	796.0	796.0	0.0	0.9886	1.0000	N/A	N/A
Average Correction Factor							0.9902	1.0000	1.0042	99.6%

Calibration Performed By: Michael Martineau



# Wood Buffalo Environmental Association

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

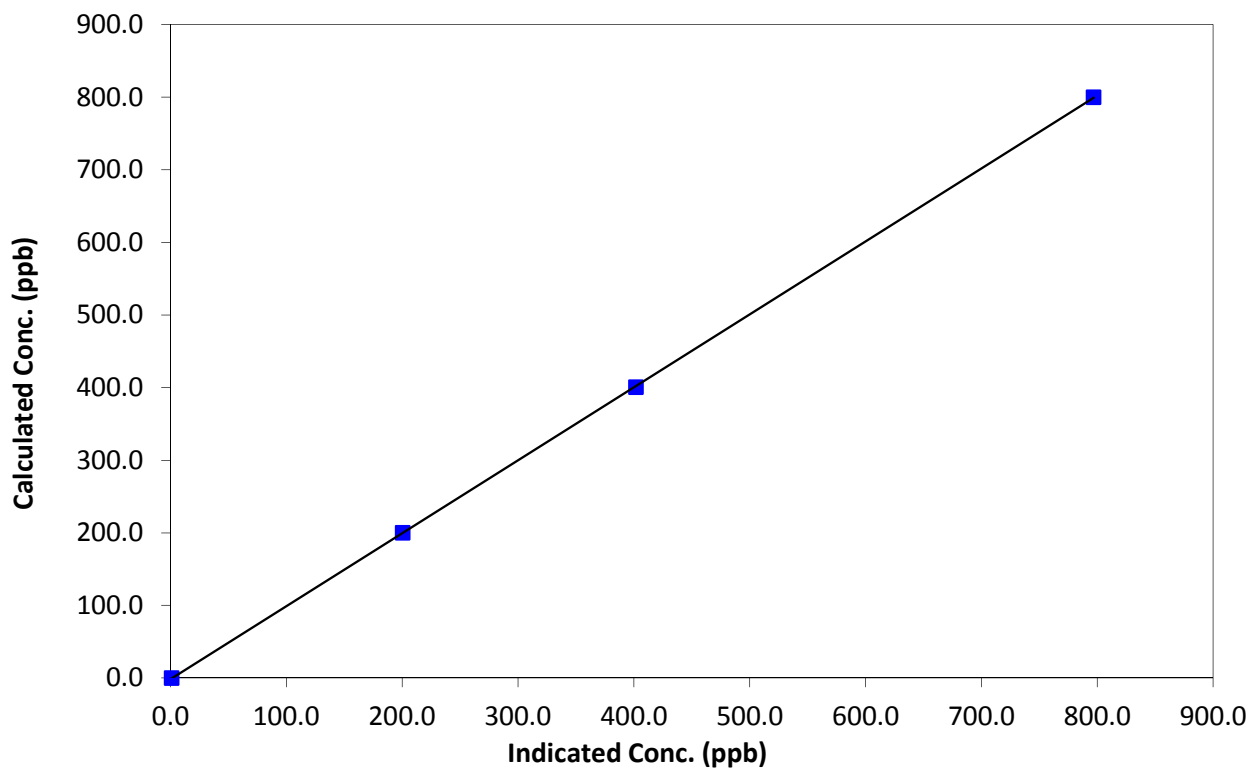
### Station Information

Calibration Date	October 21, 2014	Previous Calibration	September 9, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:15	End Time (MST)	14:45
Analyzer make	42i	Analyzer serial #	710321429

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.9	N/A	Correlation Coefficient	0.999988
800.0	796.9	1.0038		
400.5	401.8	0.9966	Slope	1.004812
200.2	200.5	0.9986		
			Intercept	-1.562354

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

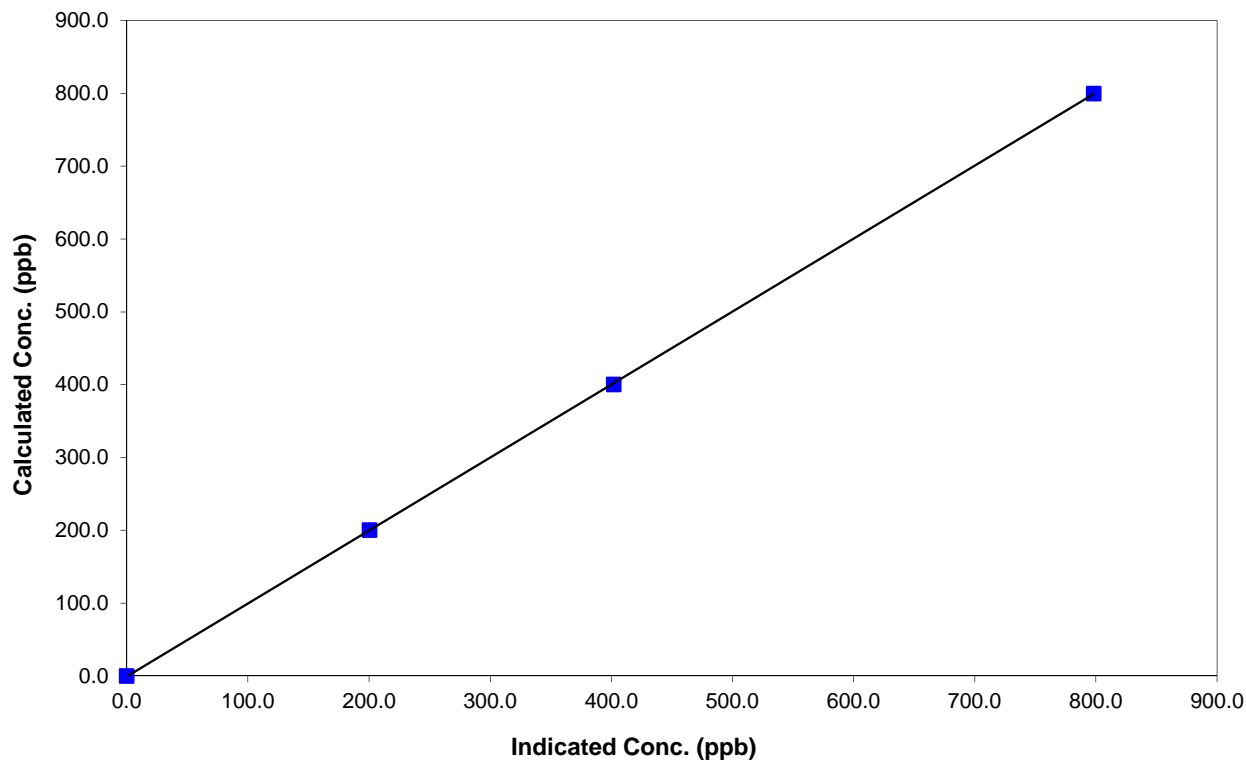
### Station Information

Calibration Date	October 21, 2014	Previous Calibration	September 9, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:15	End Time (MST)	14:45
Analyzer make	42i	Analyzer serial #	710321429

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999989
800.0	798.0	1.0024		
400.5	401.9	0.9964	Slope	1.002412
200.2	200.5	0.9987		
			Intercept	-0.797425

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

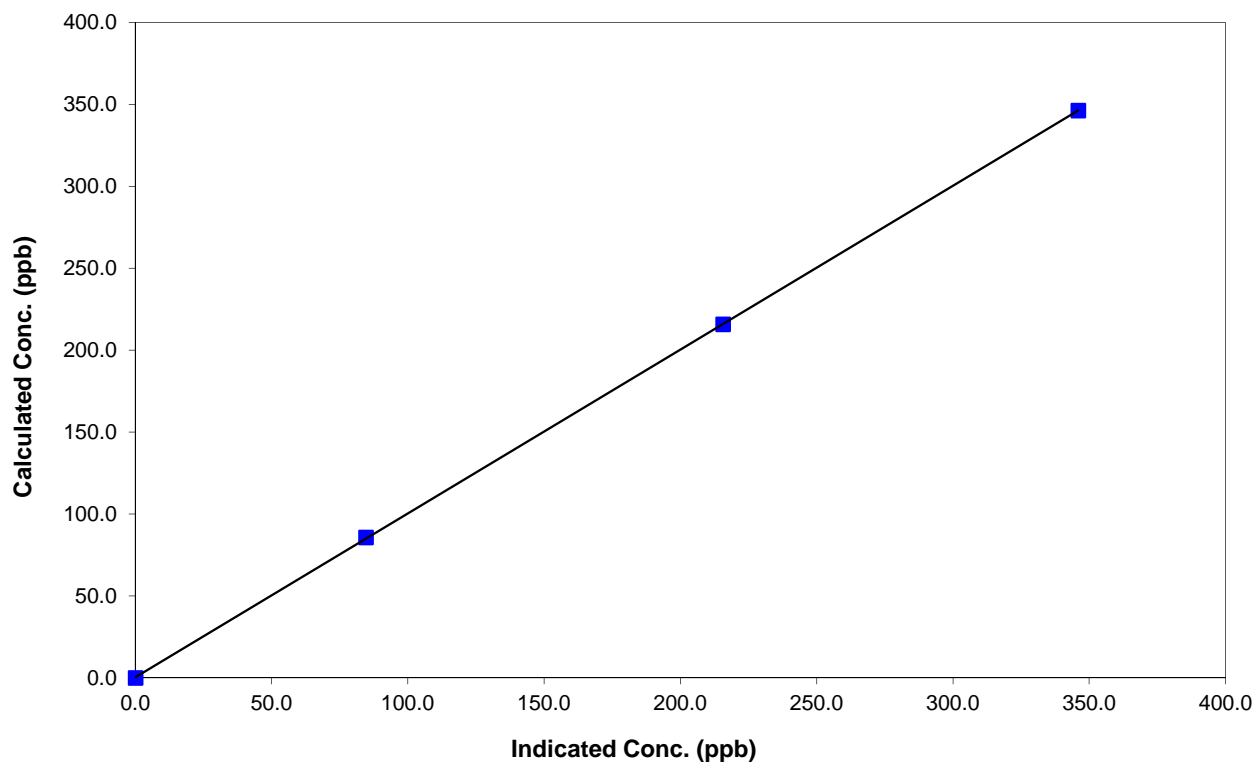
### Station Information

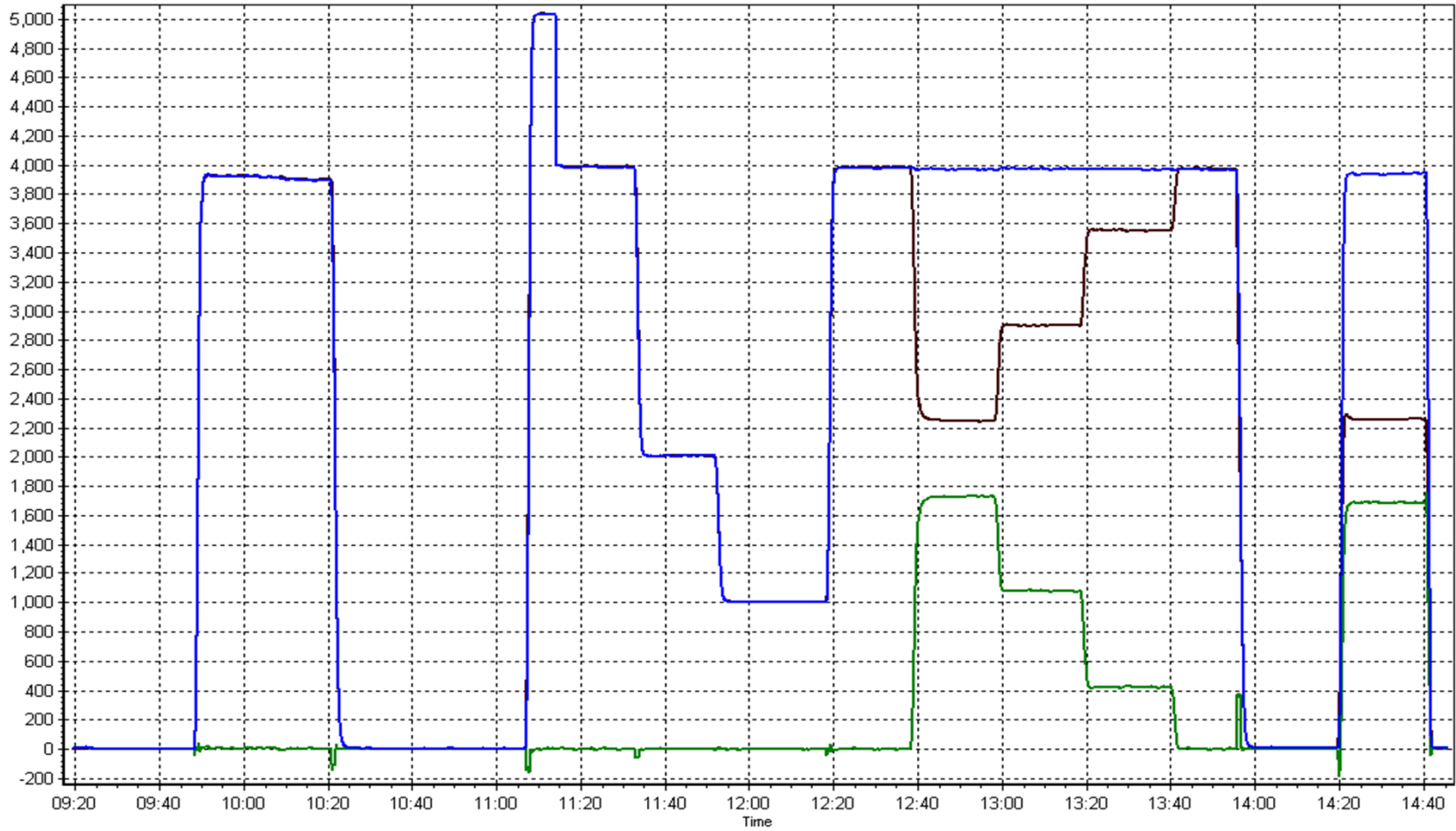
Calibration Date	October 21, 2014	Previous Calibration	September 9, 2014
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:15	End Time (MST)	14:45
Analyzer make	42i	Analyzer serial #	710321429

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999989
346.3	346.0	1.0011		
215.7	215.7	1.0002	Slope	1.000304
85.7	84.7	1.0114		
			Intercept	0.253318

### 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**  
**OCTOBER 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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
OCTOBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	37	37	100.00	26	0	5	0
THC (ppm) Average	706	38	38	100.00	5.6	-	3	-
NO2 (ppb) Average	707	37	37	100.00	45	0	16	0
NO (ppb) Average	707	37	37	100.00	174	-	38	-
NOX (ppb) Average	707	37	37	100.00	219	-	53	-
PM2.5 (ug/m3) Average	741	0	3	99.60	55.3	-	14.9	0
Temperature 2 m (C) Average	744	0	0	100.00	20.7	-	12.2	-
Relative Humidity (%) Average	744	0	0	100.00	100	-	95	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.3	-	29.2	-
Wind Speed 10 m (km/h) Average	737	0	7	99.06	25	-	-	-
Wind Direction 10 m (deg) Average	737	0	7	99.06	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	0.9	3	-	0	0	0	0	0	1	26
THC (ppm) Average	706	2.38	0.5	-	2	2.1	2.1	2.2	2.4	2.8	5.6
NO2 (ppb) Average	707	8.4	7	-	0	1	2	7	12	17	45
NO (ppb) Average	707	8.9	21	-	0	0	0	1	8	22	174
NOX (ppb) Average	707	17.3	27	-	0	1	3	9	20	37	219
PM2.5 (ug/m3) Average	741	5.31	4.6	-	0.4	1.6	2.3	4.2	6.5	9.9	55.3
Temperature 2 m (C) Average	744	4.34	4.5	-	-5.6	-0.5	0.7	3.6	7.2	10.6	20.7
Relative Humidity (%) Average	744	79.9	14	-	39	57	71	83	92	96	100
Barometric Pressure (inHg) Average	744	28.76	0.2	-	28.3	28.5	28.6	28.7	29	29.1	29.3
Wind Speed 10 m (km/h) Average	737	9.4	5	-	0	4	6	8	13	17	25
Wind Direction 10 m (deg) Average	737	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	17 Oct 2014 12:00	17 Oct 2014 13:00	2	Maintenance - Flow and zero check, sample head cleaning
PM2.5	20 Oct 2014 14:00	20 Oct 2014 14:00	1	Maintenance - Flow and zero reference checks
Wind Speed, Wind Direction	13 Oct 2014 03:00	13 Oct 2014 03:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	24 Oct 2014 09:00	24 Oct 2014 14:00	6	Flat line in sensor output signal

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 26 ppb on Oct 13 12:00	Maximum Daily Average: 5.2 ppb on Oct 20		Hours of Data:	707
Minimum Value: 0 ppb on Oct 2 00:00	Minimum Daily Average: 0.1 ppb on Oct 28		Hours of Missing Data:	37
Maximum Diurnal Average: 3.1 ppb at hour 12	Minimum Diurnal Average: 0.3 ppb at hour 6		Hours of Calibration:	37
Monthly Average: 0.9 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 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-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1
3-Oct	Z	0	0	0	0	0	0	0	0	0	0	18	17	13	3	2	0	0	0	0	1	0	0	0	2.5	18
4-Oct	Z	0	0	0	0	0	0	0	0	2	5	5	2	1	1	1	1	1	1	1	1	1	1	1	1.3	5
5-Oct	Z	0	0	0	0	1	0	0	0	0	1	1	2	3	2	0	0	0	0	0	0	0	0	0	0.6	3
6-Oct	Z	0	0	0	0	0	0	1	3	2	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0.6	3
7-Oct	Z	0	0	0	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
8-Oct	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
9-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1
10-Oct	Z	0	0	0	0	0	0	0	0	0	7	18	18	12	6	4	2	2	1	1	1	1	2	1	3.4	18
11-Oct	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Oct	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-Oct	Z	0	0	0	0	0	0	0	0	0	8	26	16	4	2	5	2	2	2	4	6	14	9	6	4.7	26
14-Oct	Z	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
15-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.3	1
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.4	1
17-Oct	Z	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	--	0
18-Oct	Z	0	0	0	0	0	0	0	1	2	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0.6	2
19-Oct	Z	0	0	0	0	0	0	0	0	0	0	1	2	2	2	1	1	1	0	0	0	0	0	0	0.6	2
20-Oct	Z	0	0	0	0	0	0	0	0	0	12	13	17	15	20	19	11	5	2	1	1	1	1	1	5.2	20
21-Oct	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1
22-Oct	Z	1	0	0	1	0	0	0	0	0	2	3	3	2	1	0	0	0	0	0	0	0	0	0	0.8	3
23-Oct	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Oct	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
25-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	3	2	1	0	0	0	1	1	0	0	0	0.6	3
26-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
27-Oct	Z	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
28-Oct	Z	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
29-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-Oct	Z	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	0	0	0	0	0	0	0	0	0.5	2

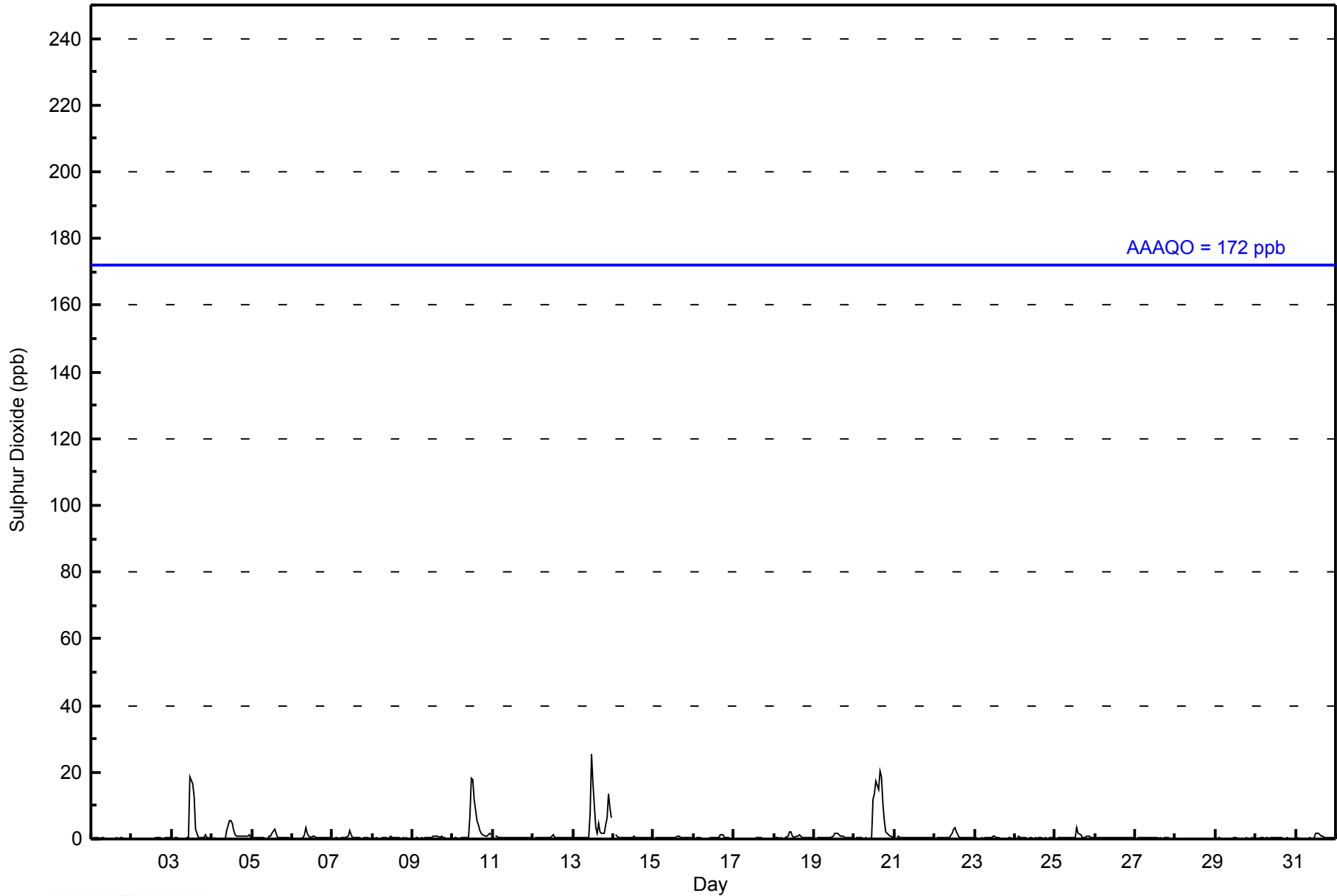
--	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	1.2	3.1	2.9	2.2	1.3	1.4	1.1	0.8	0.6	0.5	0.6	0.8	0.6	0.5	Diurnal Average
--	1	1	1	1	1	1	0	1	3	2	8	26	18	17	15	20	19	11	5	4	6	14	9	6	Diurnal Maximum

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Shell Muskeg River - October 2014







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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Shell Muskeg River - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	691	97.74	97.74
11 - 20	15	2.12	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Shell Muskeg River - October 2014**

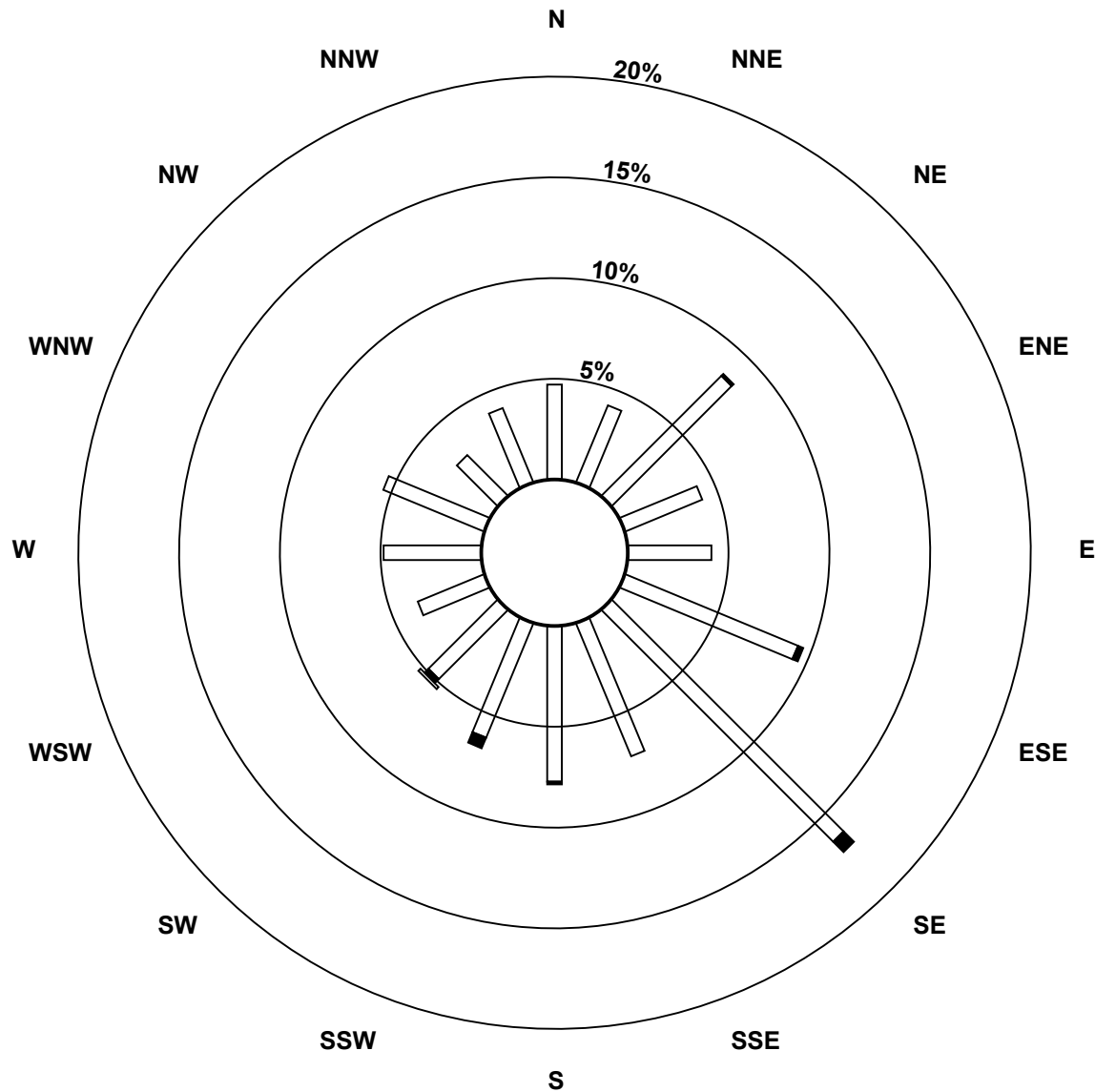
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	33	29	59	29	29	65	114	50	54	43	34	25	34	38	20	28	684
11 - 20	0	0	1	0	0	2	5	0	1	4	2	0	0	0	0	0	15
21 - 60	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	33	29	60	29	29	67	119	50	55	47	37	25	34	38	20	28	700

Total Number of Valid Hours: 700

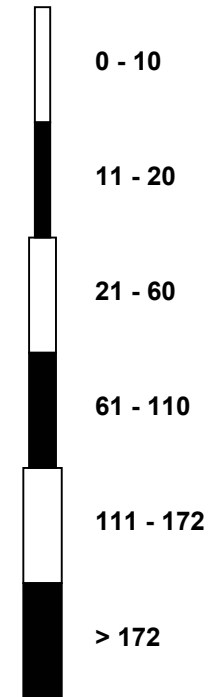
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Shell Muskeg River (AMS 16)**



Classes (ppb)

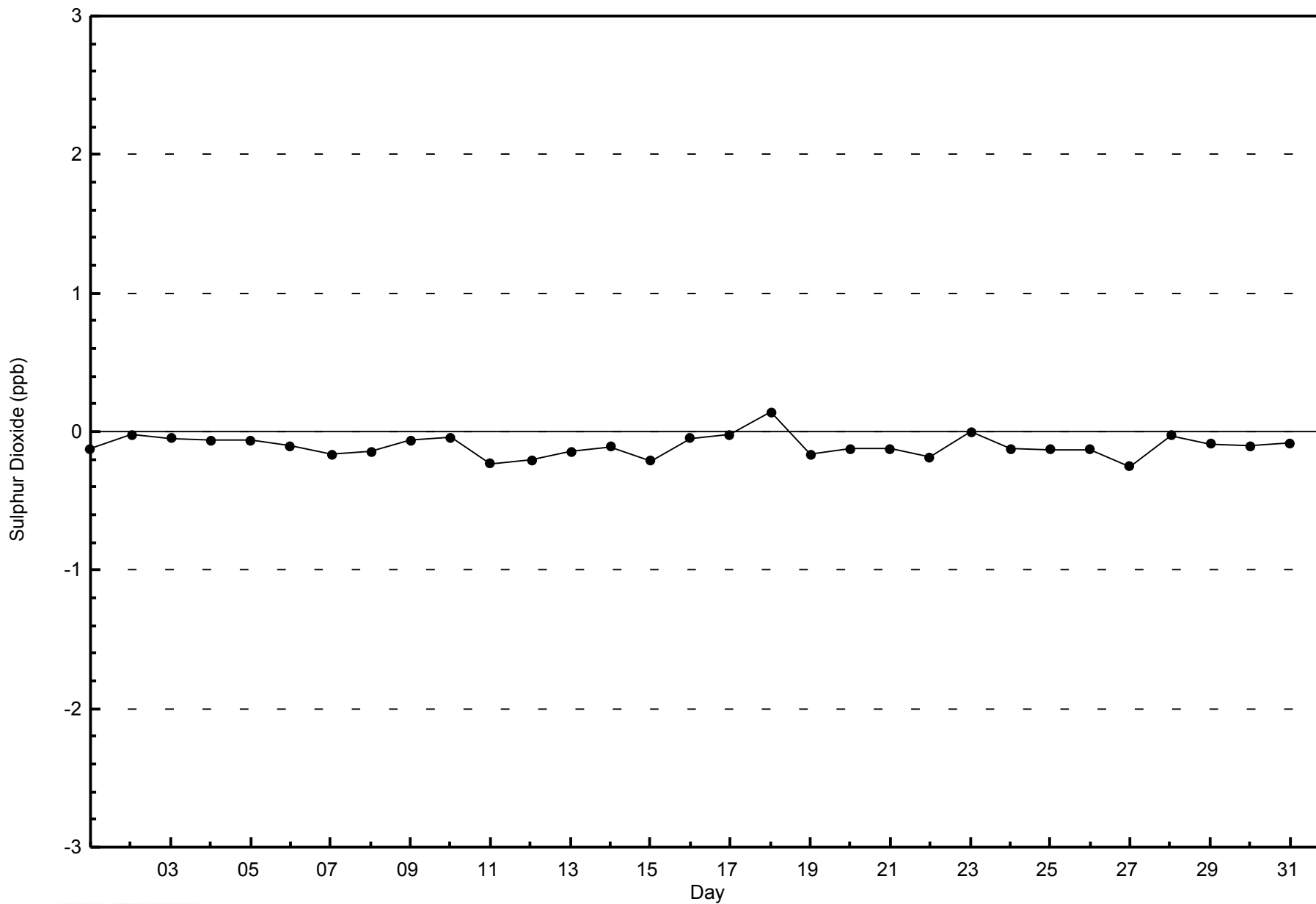


Total Number of Valid Hours: 700



WBEA  
Zero Responses

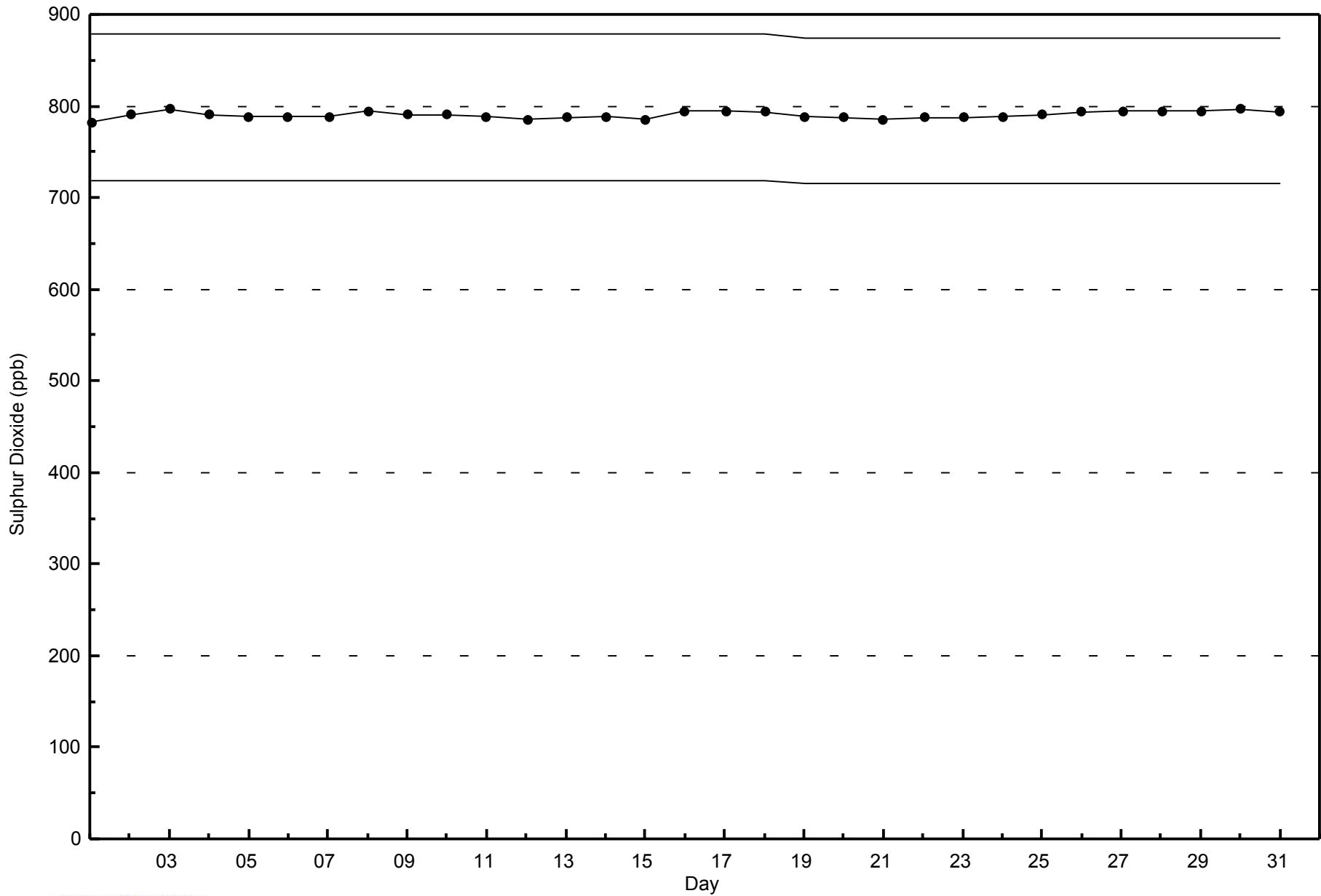
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Shell Muskeg River - October 2014





**WBEA**  
**Span Responses**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Shell Muskeg River - October 2014**

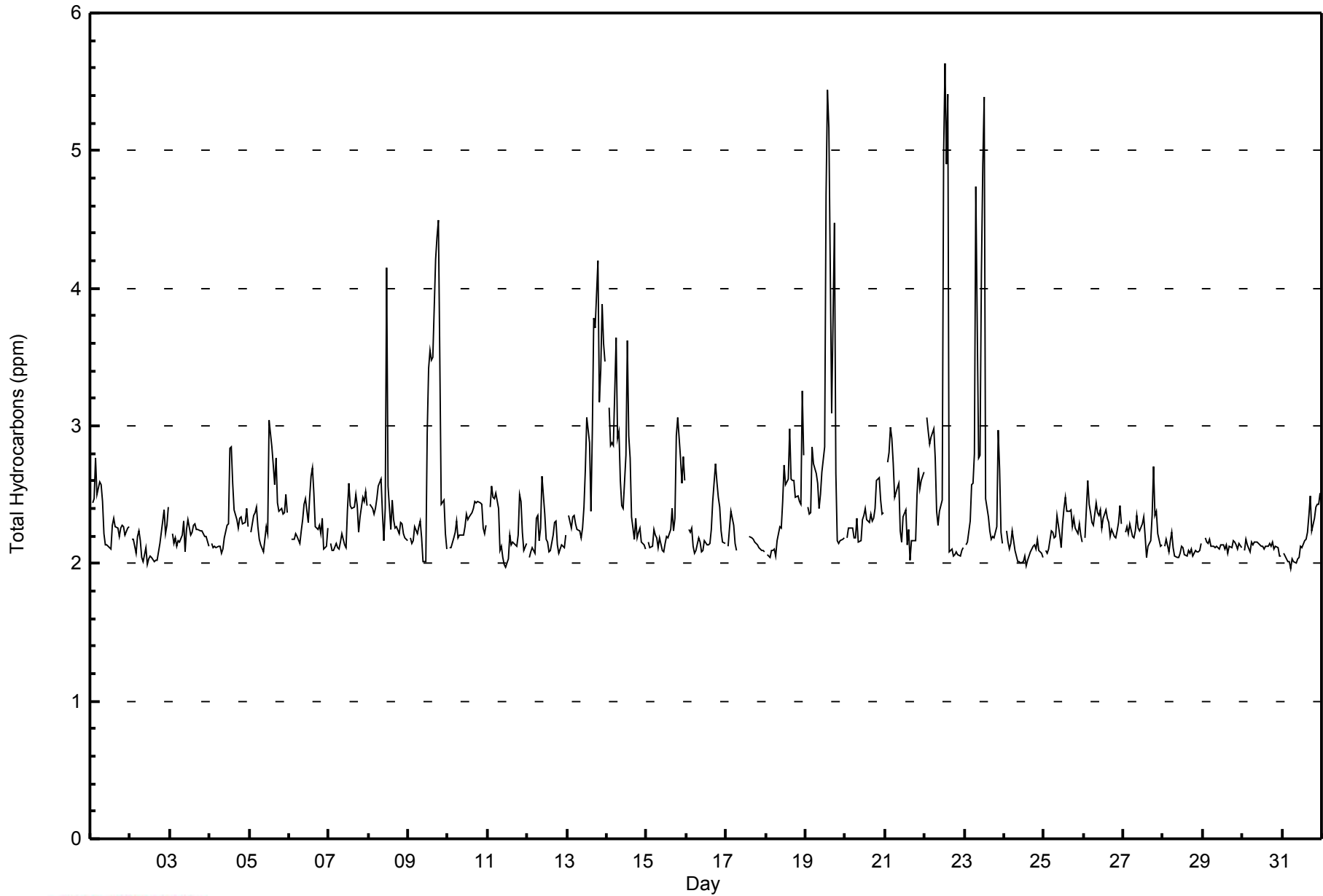






**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Shell Muskeg River - October 2014**





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

**Total Hydrocarbons (THC) - ppm**  
**Shell Muskeg River - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	36	5.10	5.10
2.1 - 3.0	632	89.52	94.62
3.1 - 10.0	38	5.38	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Shell Muskeg River - October 2014**

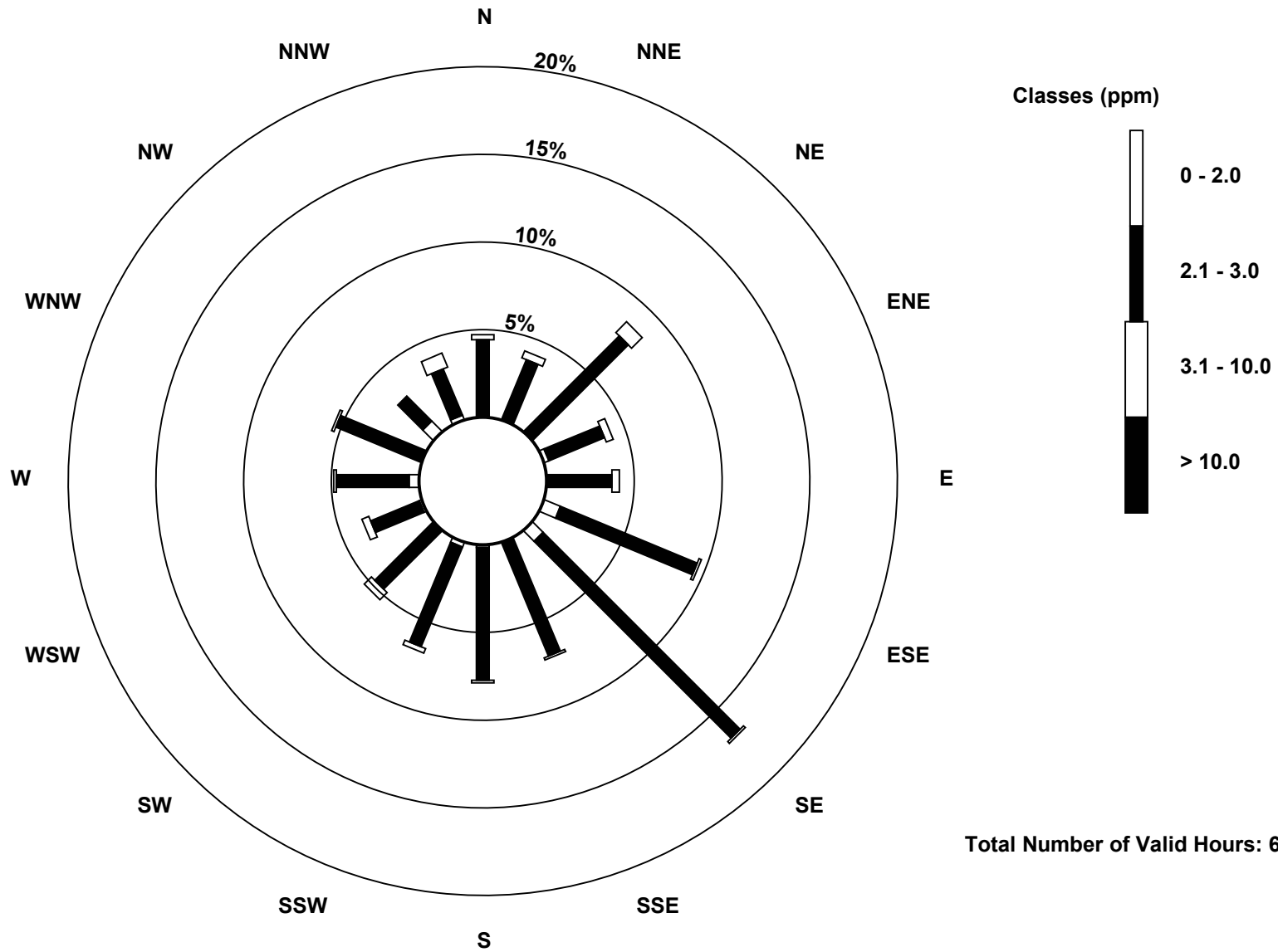
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	2	0	7	6	0	1	2	0	1	4	0	6	2	31
2.1 - 3.0	31	26	54	24	26	59	111	49	53	43	33	21	29	37	14	20	630
3.1 - 10.0	2	3	6	3	3	1	1	1	1	2	4	3	1	1	0	6	38
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>33</b>	<b>29</b>	<b>60</b>	<b>29</b>	<b>29</b>	<b>67</b>	<b>118</b>	<b>50</b>	<b>55</b>	<b>47</b>	<b>37</b>	<b>25</b>	<b>34</b>	<b>38</b>	<b>20</b>	<b>28</b>	<b>699</b>

Total Number of Valid Hours: 699

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Total Hydrocarbons (THC) - ppm  
Shell Muskeg River (AMS 16)

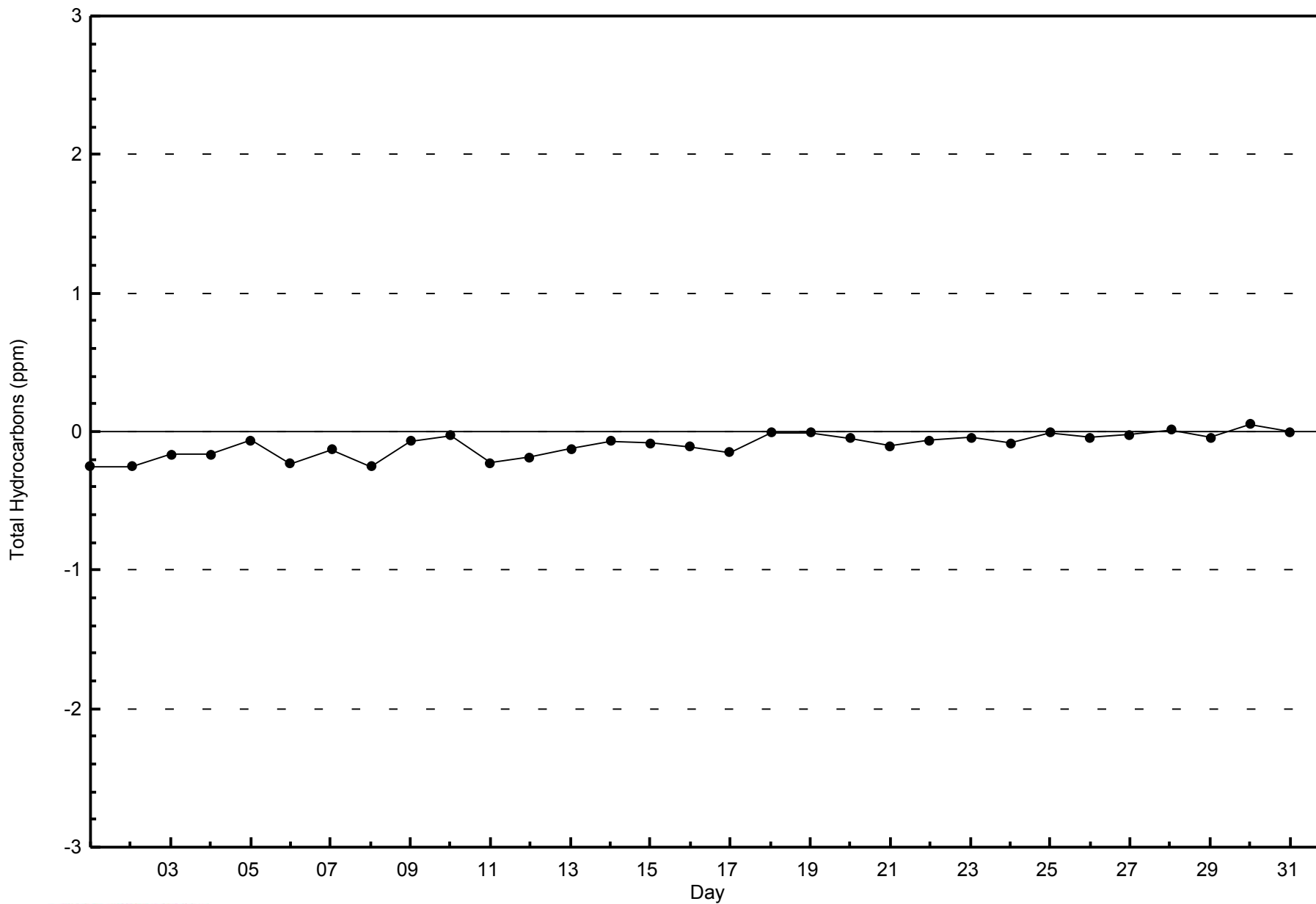


Total Number of Valid Hours: 699



WBEA  
Zero Responses

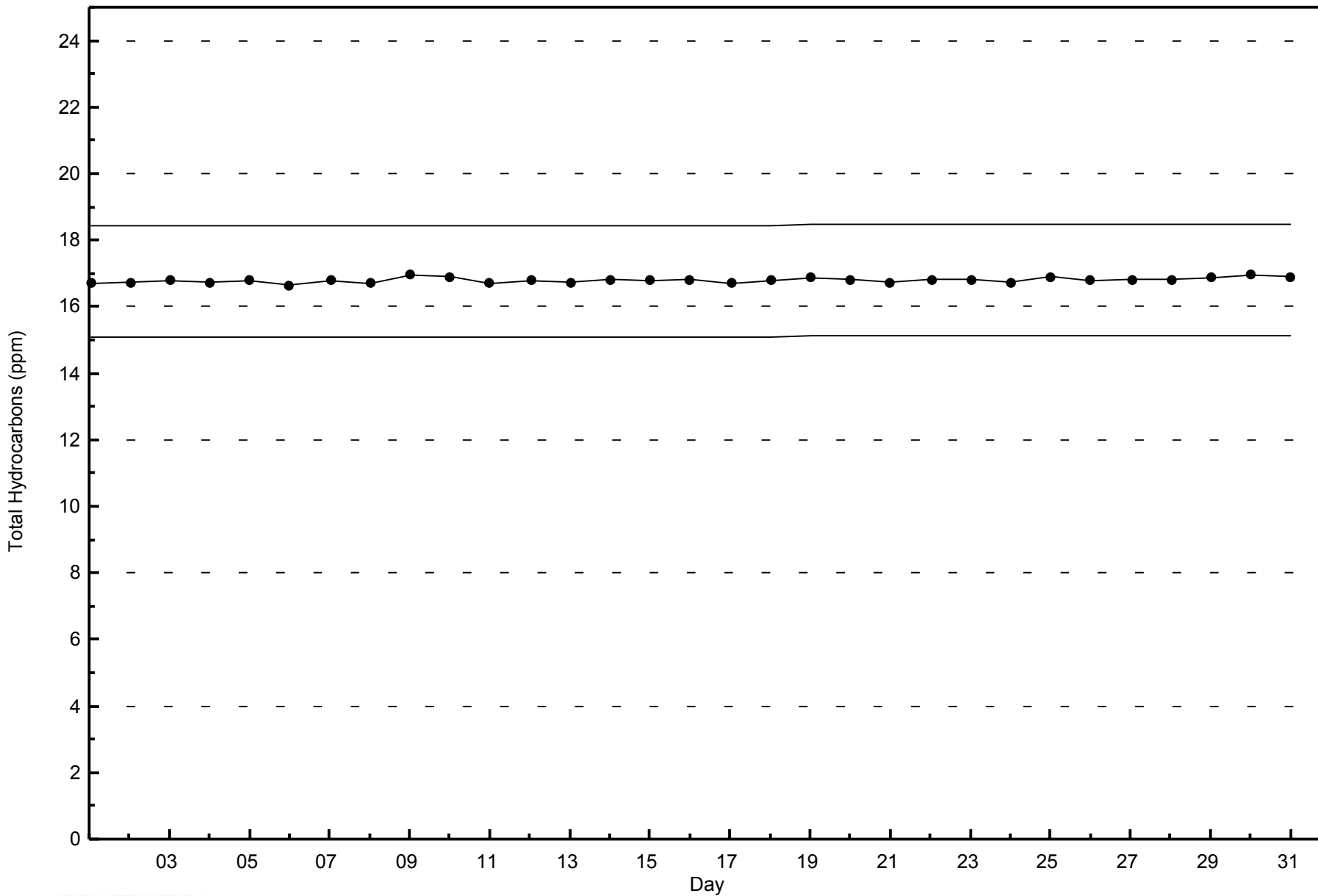
Total Hydrocarbons (THC) - ppm  
Shell Muskeg River - October 2014





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Shell Muskeg River - October 2014



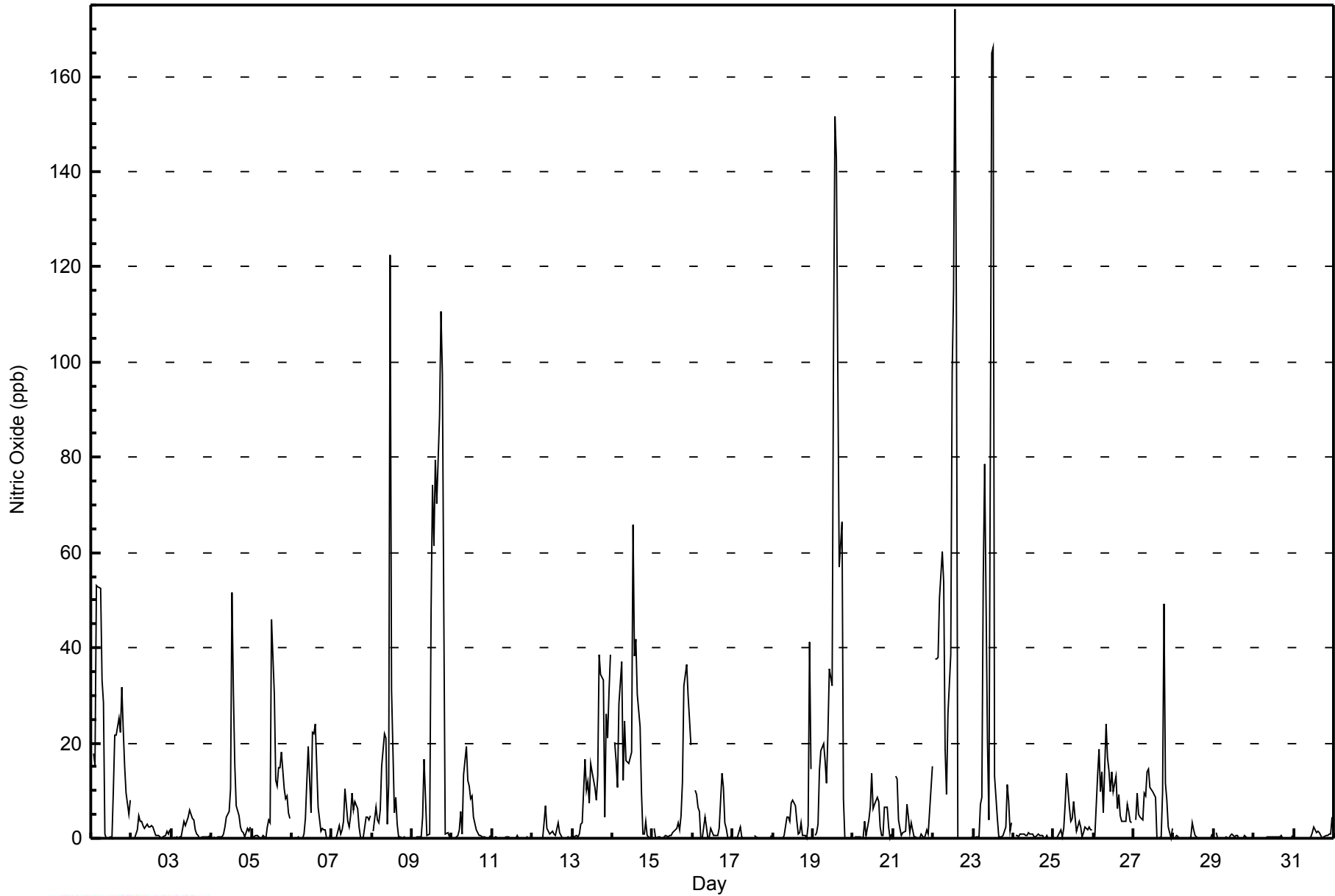


Maximum Value: 174 ppb on Oct 22 14:00														Maximum Daily Average: 37.7 ppb on Oct 22														Hours in Service: 744			
Minimum Value: 0 ppb on Oct 5 06:00														Minimum Daily Average: 0.1 ppb on Oct 11														Hours of Data: 707			
Maximum Diurnal Average: 25.5 ppb at hour 13														Minimum Diurnal Average: 3.4 ppb at hour 22														Hours of Missing Data: 37			
Monthly Average: 8.9 ppb														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 8 P <sub>90</sub> = 22 P <sub>99</sub> = 111														Hours of Calibration: 37			
																												Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Oct	Z	18	15	53	53	52	33	29	1	0	0	0	10	22	22	25	22	32	23	15	10	5	8	19.5	53						
2-Oct	Z	0	0	2	5	3	4	3	2	3	3	2	3	2	1	0	1	0	0	0	1	2	1	2	1.7	5					
3-Oct	Z	0	0	0	0	0	0	4	3	4	5	6	4	4	2	1	1	0	0	0	0	0	1	1.5	6						
4-Oct	Z	0	0	0	0	0	0	1	2	4	6	10	51	31	16	7	5	2	1	1	0	2	1	2	6.3	51					
5-Oct	Z	0	1	1	0	0	0	0	0	0	2	4	3	46	30	12	11	15	15	18	10	8	9	5	4	8.5	46				
6-Oct	Z	0	0	0	0	0	0	1	4	12	19	5	22	22	24	16	6	2	2	2	2	0	0	2	6.1	24					
7-Oct	Z	0	0	0	3	1	2	4	10	4	2	5	9	6	8	6	2	0	0	0	4	5	4	5	3.5	10					
8-Oct	Z	1	6	4	3	6	15	22	21	3	12	123	31	5	9	3	0	0	0	0	0	0	0	0	11.5	123					
9-Oct	Z	0	0	0	0	0	4	17	9	0	1	48	74	61	79	70	89	111	98	48	1	1	0	0	31.0	111					
10-Oct	Z	0	0	1	2	6	1	13	19	12	11	8	9	5	2	1	1	0	0	0	0	0	0	0	4.0	19					
11-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.1	1					
12-Oct	Z	0	0	0	0	0	0	3	7	2	1	1	1	1	1	3	1	0	0	0	0	0	0	0	1.0	7					
13-Oct	Z	0	1	0	1	3	3	17	10	12	8	16	14	11	8	13	38	35	33	4	26	21	31	39	14.9	39					
14-Oct	Z	20	16	11	28	37	12	25	16	16	16	18	66	38	42	30	23	9	1	1	3	1	0	0	18.7	66					
15-Oct	Z	2	0	0	0	0	0	0	1	0	1	1	1	2	2	3	2	5	12	32	37	30	25	20	7.6	37					
16-Oct	Z	10	9	7	6	0	0	4	2	0	0	2	1	1	0	1	2	14	11	3	2	0	0	1	3.3	14					
17-Oct	Z	0	0	0	2	0	0	C	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0	0	--	2					
18-Oct	Z	0	0	0	0	0	0	1	5	5	4	7	8	7	3	1	1	3	0	0	0	3	41	15	4.5	41					
19-Oct	Z	1	1	3	14	18	20	16	11	22	36	32	105	151	143	98	57	66	8	0	0	0	0	1	34.9	151					
20-Oct	Z	0	0	0	0	0	0	3	1	4	7	14	6	7	9	8	2	0	1	6	7	2	0	1	3.4	14					
21-Oct	Z	13	13	4	2	1	1	2	7	4	1	3	0	0	0	0	0	1	0	1	2	1	6	15	3.3	15					
22-Oct	Z	38	38	38	50	60	54	19	9	26	39	98	115	174	109	0	0	0	0	0	0	0	0	0	37.7	174					
23-Oct	Z	0	0	0	7	9	54	78	20	4	80	165	166	13	4	0	0	0	1	2	11	8	1	3	27.3	166					
24-Oct	Z	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	1	0	1	0	0	0.6	1					
25-Oct	Z	0	0	1	2	0	2	7	14	6	3	4	8	4	1	4	2	0	1	2	2	2	2	2	3.1	14					
26-Oct	Z	0	13	19	10	14	5	24	17	14	10	14	10	13	6	9	5	4	4	3	7	6	3	3	9.3	24					
27-Oct	Z	4	9	5	5	4	9	9	14	14	11	10	9	9	0	0	0	10	49	11	8	2	0	2	8.5	49					
28-Oct	Z	0	1	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	1	0.3	3					
29-Oct	Z	1	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0.3	1					
30-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1					
31-Oct	Z	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	0	0	0	1	0	1	1	5	0.7	5					
--	--	3.6	4.0	4.8	6.3	7.0	7.2	10.1	6.9	5.9	9.3	20.1	25.5	19.7	16.3	10.0	9.1	9.7	8.8	5.0	4.5	3.4	4.1	4.3	Diurnal Average						
--	--	38	38	53	53	60	54	78	21	26	80	165	166	174	143	98	89	111	98	48	37	30	41	39	Diurnal Maximum						
Z - zerospan		C - Calibration																													



WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
Shell Muskeg River - October 2014





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

**Nitric Oxide (NO) - ppb**  
**Shell Muskeg River - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	628	88.83	88.83
21 - 40	42	5.94	94.77
41 - 80	23	3.25	98.02
81 - 159	11	1.56	99.58
> 159	3	0.42	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Shell Muskeg River - October 2014**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	23	18	53	27	26	65	111	44	53	45	32	22	33	36	15	18	621
21 - 40	6	8	7	1	1	0	6	5	1	0	1	0	0	1	3	2	42
11 - 80	3	2	0	0	1	1	2	1	1	0	3	0	0	0	2	7	23
81 - 159	0	1	0	1	1	1	0	0	0	1	0	3	1	1	0	1	11
> 159	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	3
<b>Totals</b>	<b>33</b>	<b>29</b>	<b>60</b>	<b>29</b>	<b>29</b>	<b>67</b>	<b>119</b>	<b>50</b>	<b>55</b>	<b>47</b>	<b>37</b>	<b>25</b>	<b>34</b>	<b>38</b>	<b>20</b>	<b>28</b>	<b>700</b>

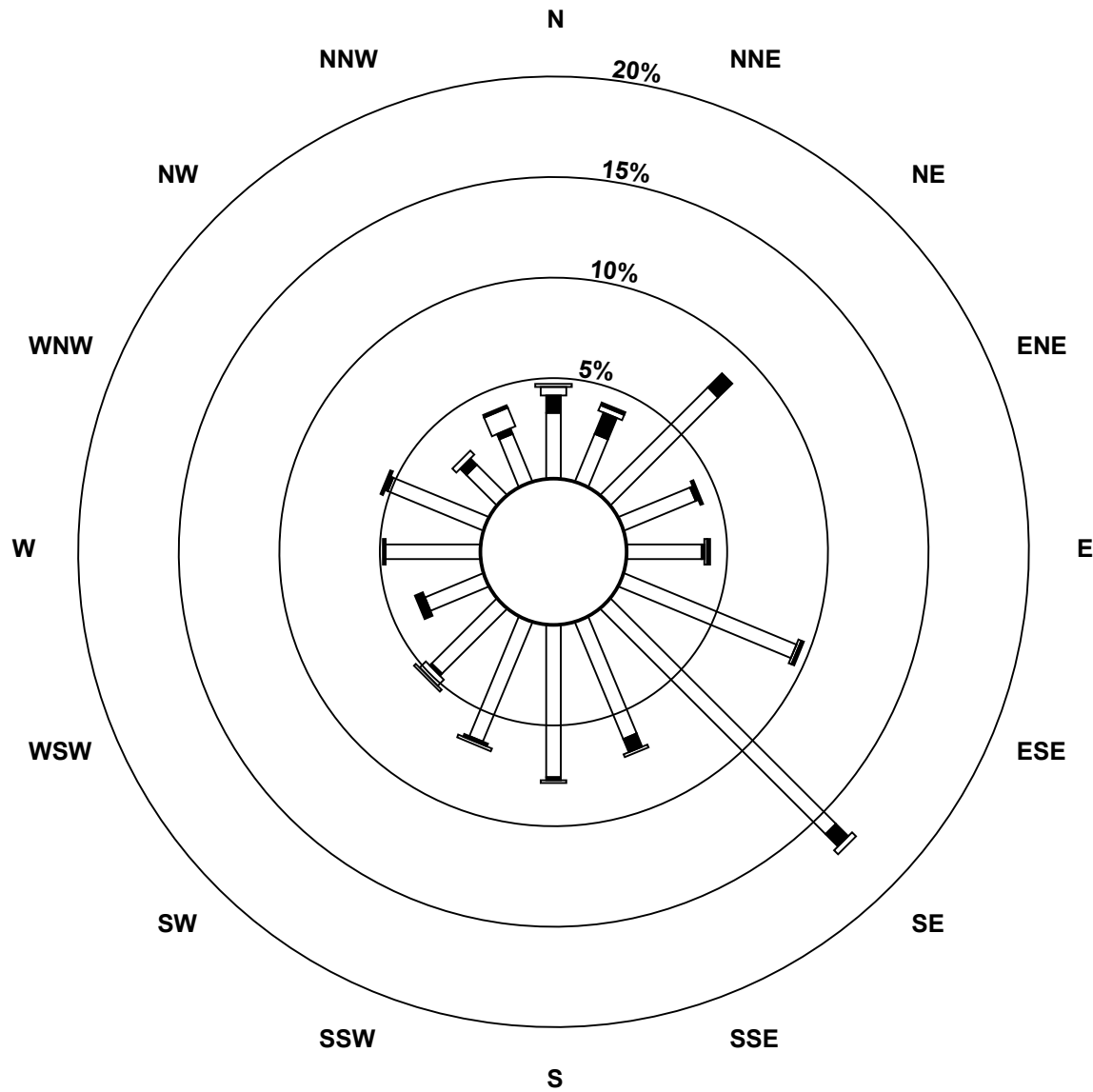
Total Number of Valid Hours: 700

Total Number of Hours: 744

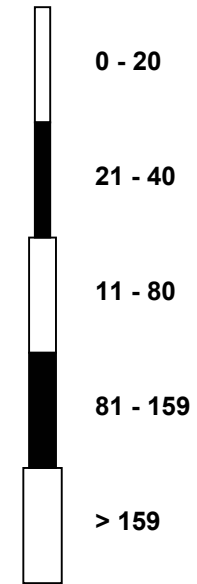


**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitric Oxide (NO) - ppb  
Shell Muskeg River (AMS 16)**



Classes (ppb)

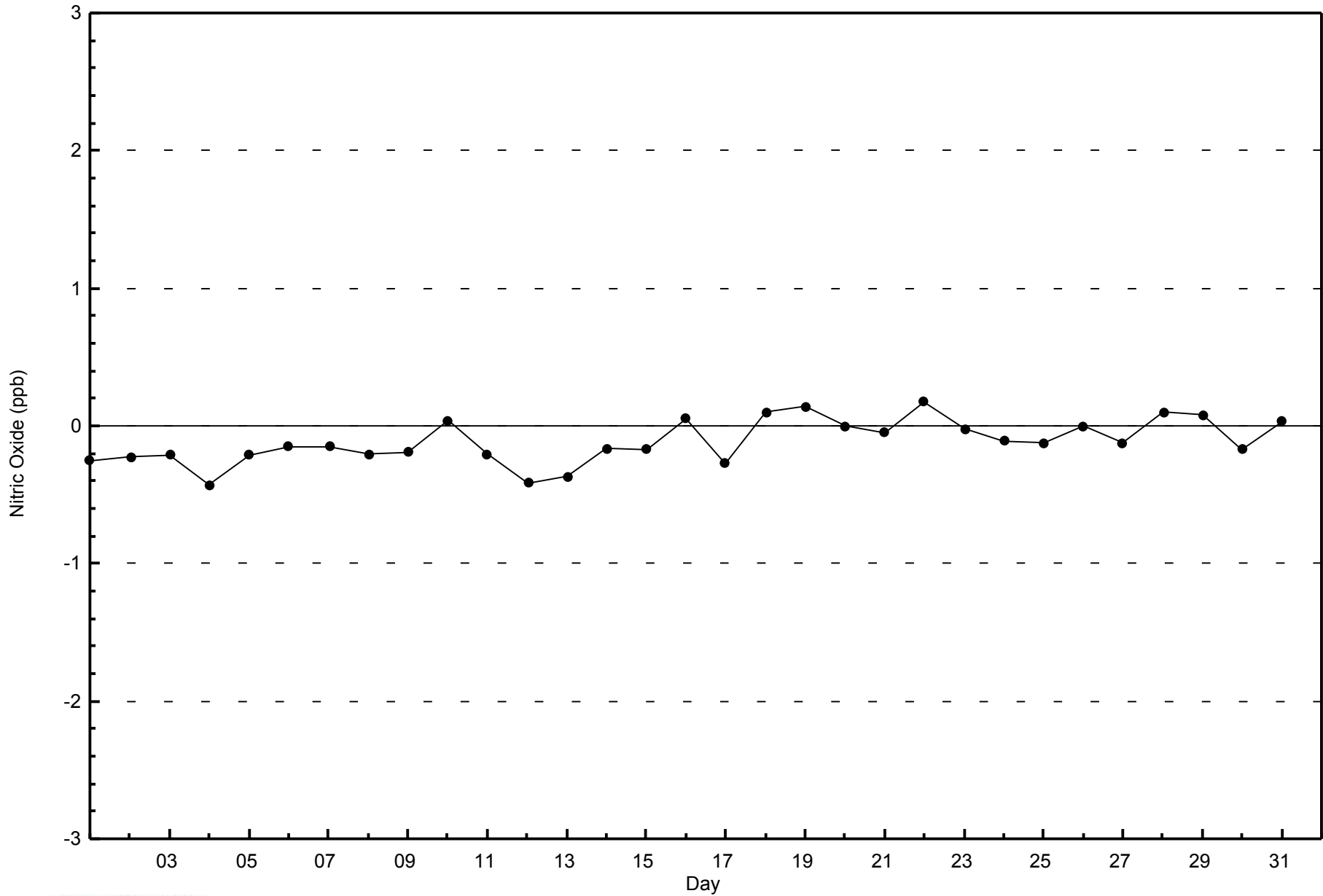


**Total Number of Valid Hours: 700**



WBEA  
Zero Responses

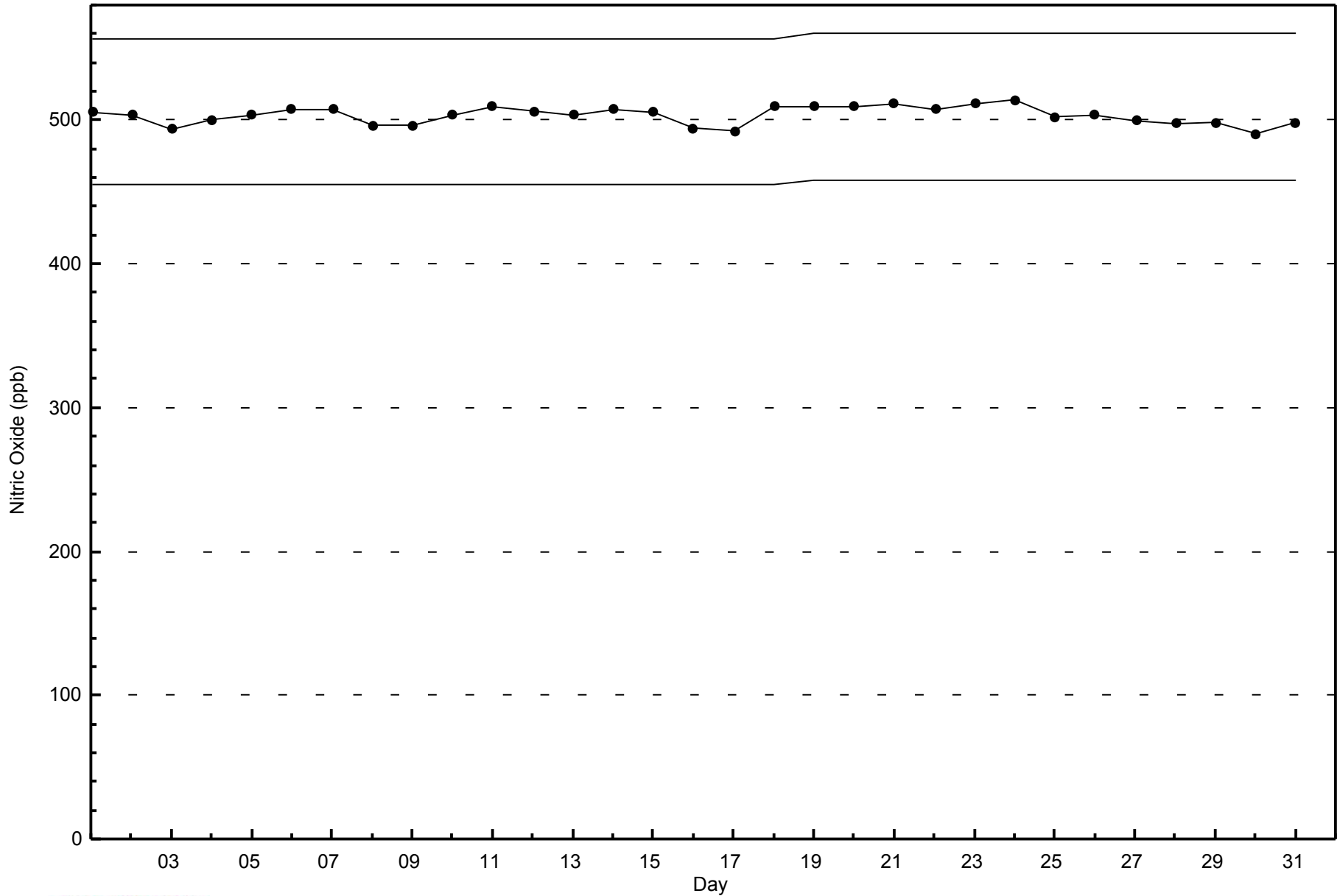
Nitric Oxide (NO) - ppb  
Shell Muskeg River - October 2014





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Shell Muskeg River - October 2014



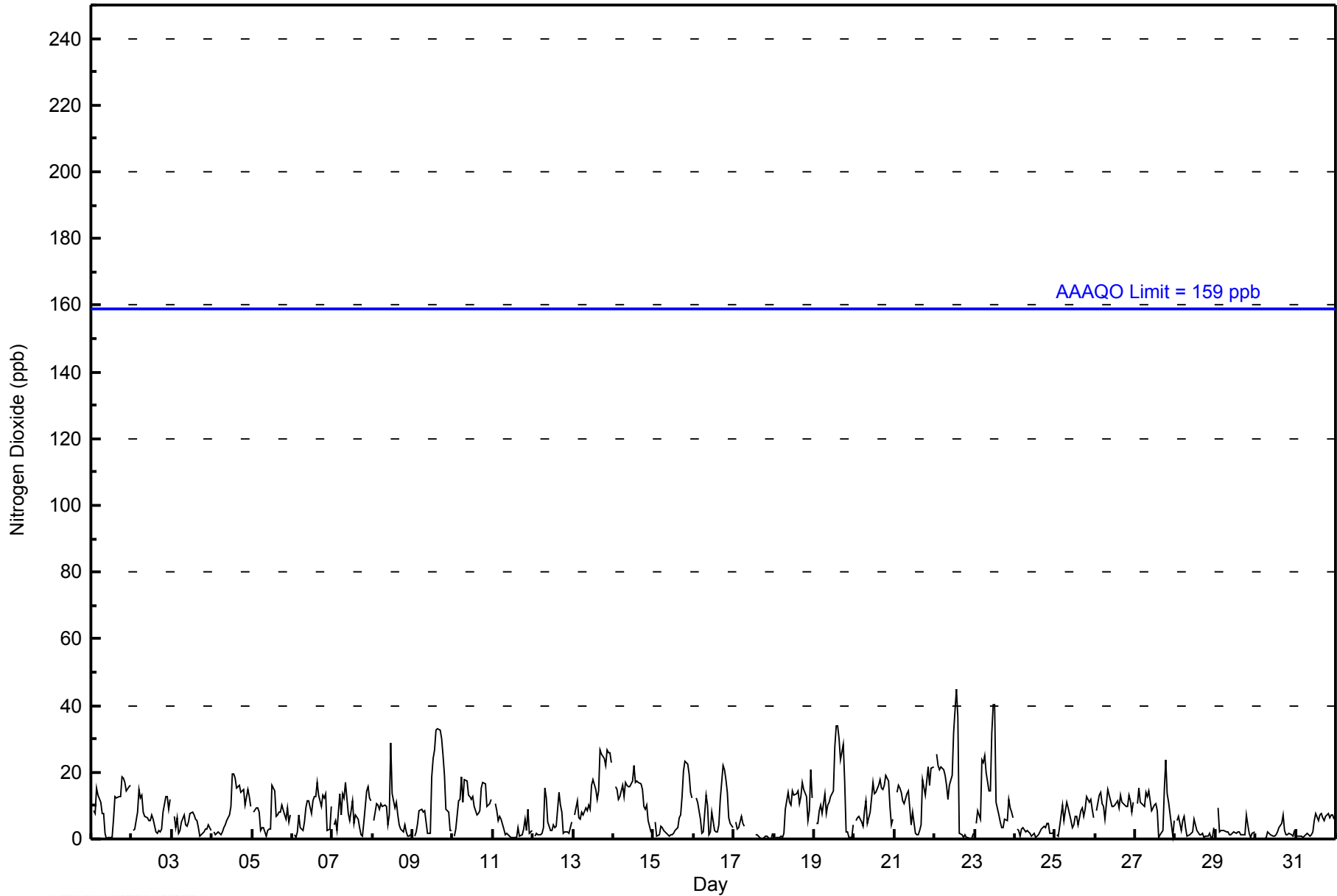


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																	
Maximum Value: 45 ppb on Oct 22 14:00										Maximum Daily Average: 15.6 ppb on Oct 13										Hours of Data: 707							
Minimum Value: 0 ppb on Oct 30 02:00										Minimum Daily Average: 1.7 ppb on Oct 30										Hours of Missing Data: 37							
Maximum Diurnal Average: 11.7 ppb at hour 13										Minimum Diurnal Average: 6.2 ppb at hour 2										Hours of Calibration: 37							
Monthly Average: 8.4 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 7 Q <sub>3</sub> = 12 P <sub>90</sub> = 17 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-Oct	Z	8	8	15	13	11	8	8	2	0	1	1	0	6	13	12	13	13	19	18	17	14	16	16	10.0	19	
2-Oct	Z	3	3	8	15	12	13	8	7	6	5	5	7	6	2	2	2	2	3	8	13	13	9	12	7.2	15	
3-Oct	Z	7	4	6	2	3	5	7	4	4	5	8	8	7	6	6	3	1	2	2	3	3	4	2	4.4	8	
4-Oct	Z	2	1	2	2	1	2	3	4	6	7	10	19	20	18	15	16	14	15	15	10	15	13	10	9.6	20	
5-Oct	Z	8	9	9	8	3	4	4	1	3	3	16	14	7	7	8	8	10	7	6	9	5	7	6.9	16		
6-Oct	Z	1	1	2	7	4	2	5	9	11	11	8	11	13	13	17	13	10	13	12	14	2	3	10	8.4	17	
7-Oct	Z	4	5	3	14	7	14	12	17	8	6	9	12	5	7	6	3	1	1	5	14	16	12	11	8.3	17	
8-Oct	Z	6	11	10	9	11	10	10	10	4	7	29	14	10	11	7	4	3	2	4	2	1	1	2	7.7	29	
9-Oct	Z	1	2	5	8	9	8	9	5	2	2	19	24	27	33	33	33	30	25	19	9	8	2	2	13.6	33	
10-Oct	Z	1	3	11	12	19	11	18	17	13	13	12	13	10	7	8	9	15	17	17	10	10	11	12	11.6	19	
11-Oct	Z	10	9	6	7	6	3	1	2	1	1	1	1	0	1	3	1	1	3	6	3	9	2	2	3.3	10	
12-Oct	Z	1	2	1	1	2	4	15	12	5	3	3	4	4	4	14	10	8	2	2	2	2	3	5	4.7	15	
13-Oct	Z	7	12	6	6	8	7	9	9	10	9	16	18	15	12	14	27	26	24	22	27	26	26	23	15.6	27	
14-Oct	Z	16	15	12	13	16	13	17	16	16	16	17	22	17	17	17	17	15	10	9	10	6	2	2	13.4	22	
15-Oct	Z	5	1	1	4	4	3	2	2	1	1	1	2	3	3	6	7	13	20	24	22	20	14	12	7.4	24	
16-Oct	Z	12	11	9	6	2	2	13	10	1	2	8	3	2	2	4	12	22	21	18	14	6	5	3	8.2	22	
17-Oct	Z	5	3	3	7	5	4	C	C	C	C	C	C	1	1	1	0	0	1	1	1	0	0	2	--	7	
18-Oct	Z	0	0	1	1	1	2	9	14	11	10	14	13	14	14	11	13	17	15	13	6	9	21	12	9.5	21	
19-Oct	Z	5	5	8	10	8	14	8	10	11	13	14	28	34	34	30	24	29	17	2	2	1	1	4	13.4	34	
20-Oct	Z	6	7	7	5	4	8	12	5	8	12	17	13	14	16	18	15	15	16	19	18	10	4	6	11.0	19	
21-Oct	Z	14	16	15	14	11	11	14	14	10	4	8	2	1	1	2	4	18	13	17	22	16	21	22	11.8	22	
22-Oct	Z	26	22	21	21	21	19	16	12	16	19	32	38	45	36	2	1	1	1	0	0	0	1	2	15.3	45	
23-Oct	Z	5	8	6	24	23	25	20	15	15	32	40	40	11	7	5	3	3	6	5	12	9	8	6	14.3	40	
24-Oct	Z	3	2	1	3	4	2	3	2	2	1	2	1	1	1	2	3	4	3	5	5	2	2	3	2.3	5	
25-Oct	Z	1	1	4	10	6	8	11	9	6	4	4	7	7	4	9	9	7	9	13	11	12	9	6	7.2	13	
26-Oct	Z	9	13	14	11	10	6	15	13	12	10	10	10	11	9	13	11	11	10	10	13	11	8	11	10.9	15	
27-Oct	Z	11	15	11	11	10	14	13	15	11	9	10	11	8	0	1	3	15	24	14	11	8	1	6	9.9	24	
28-Oct	Z	6	7	3	6	7	3	1	1	2	2	6	4	2	1	1	2	1	1	1	2	0	0	4	2.7	7	
29-Oct	Z	9	2	3	3	3	2	2	1	1	2	2	2	2	2	1	1	1	7	4	2	1	2	2	2.5	9	
30-Oct	Z	0	0	0	0	0	0	2	2	1	1	1	1	2	3	5	7	2	1	1	2	1	1	3	1.7	7	
31-Oct	Z	1	1	1	1	1	1	2	1	1	2	6	8	6	7	8	6	6	7	8	6	7	7	6	4.3	8	
--	--	6.2	6.3	6.5	8.1	7.3	7.3	8.9	8.0	6.5	7.0	10.5	11.7	10.2	9.5	9.0	9.1	10.0	10.2	9.7	9.3	8.0	6.8	7.3	Diurnal Average		
--	--	26	22	21	24	23	25	20	17	16	32	40	40	45	36	33	33	30	25	24	27	26	26	23	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 - October 2014





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Shell Muskeg River - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	660	93.35	93.35
21 - 40	46	6.51	99.86
41 - 80	1	0.14	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Shell Muskeg River - October 2014**

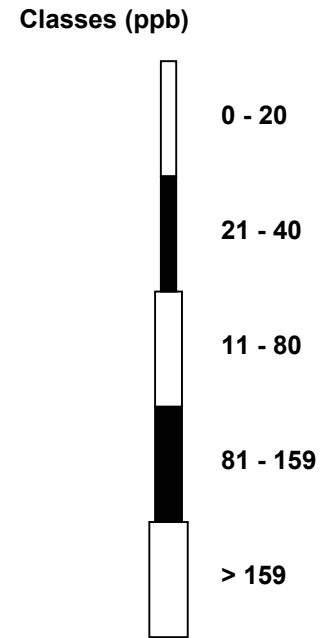
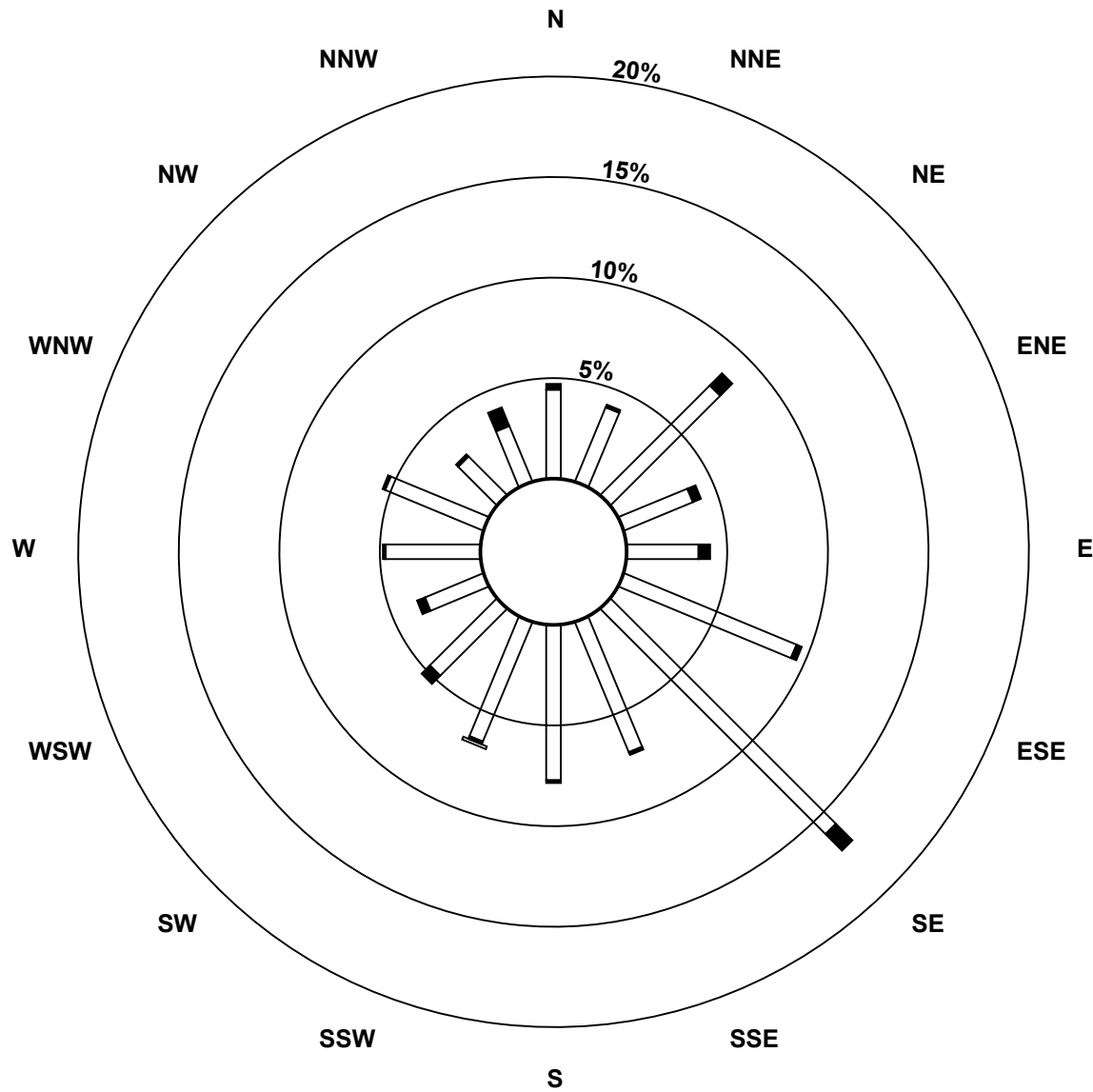
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	31	28	54	26	25	65	111	49	54	45	33	22	33	37	19	21	653
21 - 40	2	1	6	3	4	2	8	1	1	1	4	3	1	1	1	7	46
11 - 80	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>33</b>	<b>29</b>	<b>60</b>	<b>29</b>	<b>29</b>	<b>67</b>	<b>119</b>	<b>50</b>	<b>55</b>	<b>47</b>	<b>37</b>	<b>25</b>	<b>34</b>	<b>38</b>	<b>20</b>	<b>28</b>	<b>700</b>

Total Number of Valid Hours: 700

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Shell Muskeg River (AMS 16)**



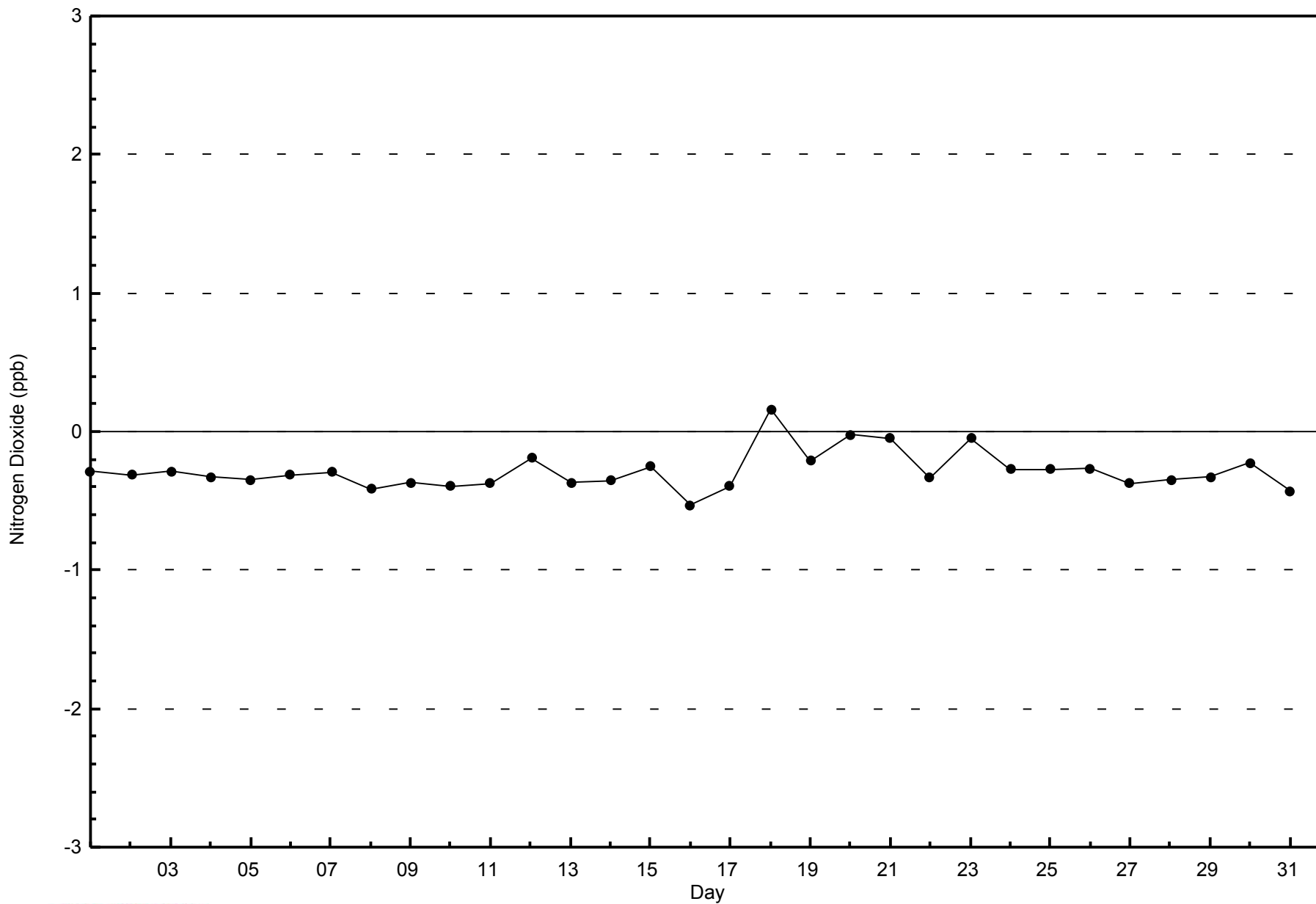
**Total Number of Valid Hours: 700**





WBEA  
Zero Responses

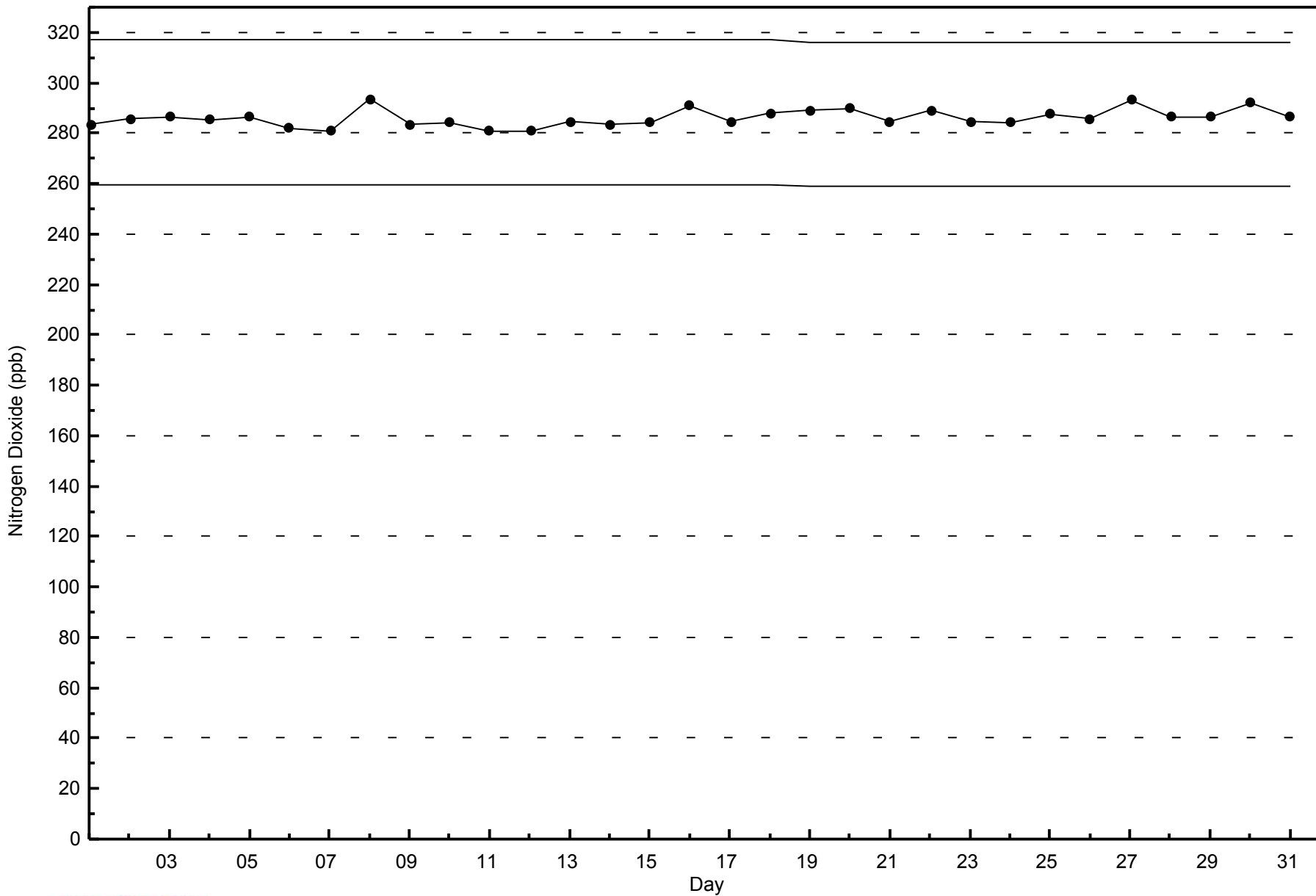
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Shell Muskeg River - October 2014





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Shell Muskeg River - October 2014



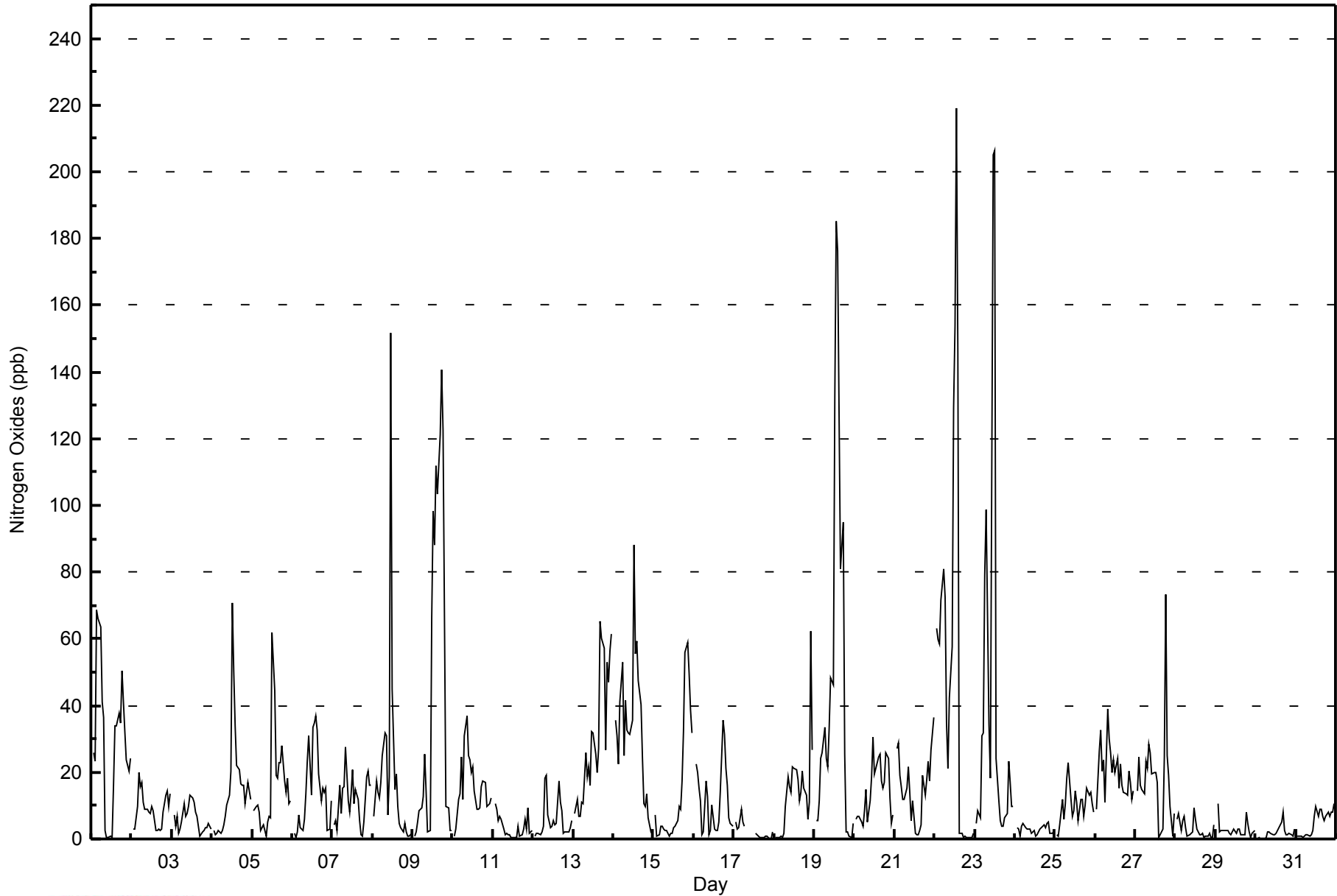


Maximum Value: 219 ppb on Oct 22 14:00																			Maximum Daily Average: 53.0 ppb on Oct 22						Hours in Service: 744			
Minimum Value: 0 ppb on Oct 30 05:00																			Minimum Daily Average: 1.8 ppb on Oct 30						Hours of Data: 707			
Maximum Diurnal Average: 37.2 ppb at hour 13																			Minimum Diurnal Average: 9.8 ppb at hour 2						Hours of Missing Data: 37			
Monthly Average: 17.3 ppb																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 3 Median = 9 Q <sub>3</sub> = 20 P <sub>90</sub> = 37 P <sub>99</sub> = 150						Hours of Calibration: 37			
																			Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Oct	Z	26	23	69	66	64	41	36	3	0	1	1	1	16	34	34	38	35	50	41	32	24	20	24	29.5	69		
2-Oct	Z	3	3	10	20	16	17	11	9	9	8	8	10	8	3	2	3	2	3	8	13	14	10	14	8.8	20		
3-Oct	Z	7	4	7	2	3	5	11	7	8	10	13	12	11	8	7	4	1	2	2	3	3	5	3	5.9	13		
4-Oct	Z	2	1	2	2	2	2	4	7	10	13	20	71	50	34	22	21	17	16	16	11	17	14	12	15.9	71		
5-Oct	Z	8	10	10	8	3	4	4	1	5	7	6	62	45	19	18	23	23	28	17	14	18	11	11	15.4	62		
6-Oct	Z	2	1	2	7	4	2	6	13	23	31	13	34	35	37	33	19	12	15	14	15	2	3	11	14.5	37		
7-Oct	Z	4	5	3	16	8	15	16	27	11	8	14	21	11	15	12	6	1	1	5	19	20	16	16	11.7	27		
8-Oct	Z	7	17	14	12	17	25	32	31	7	19	152	45	15	19	10	5	3	2	5	2	1	1	2	19.2	152		
9-Oct	Z	1	2	5	9	9	13	25	14	2	2	66	98	88	112	103	121	141	123	67	10	9	3	3	44.6	141		
10-Oct	Z	1	3	12	13	24	12	31	37	25	24	20	22	14	9	9	9	16	18	17	10	10	11	12	15.6	37		
11-Oct	Z	11	9	5	7	6	3	1	2	1	1	1	0	0	1	4	1	1	3	6	3	9	2	3	3.5	11		
12-Oct	Z	1	2	1	1	2	4	18	19	7	3	4	6	4	5	17	11	8	2	2	2	2	3	6	5.7	19		
13-Oct	Z	8	12	7	7	11	10	26	19	22	16	32	32	25	20	27	65	60	57	27	53	47	57	61	30.5	65		
14-Oct	Z	36	31	23	41	53	25	41	32	32	31	36	88	55	59	47	40	24	11	10	14	6	2	2	32.1	88		
15-Oct	Z	7	1	1	4	4	3	3	2	1	2	2	3	4	5	10	9	17	32	56	59	50	39	32	15.0	59		
16-Oct	Z	22	20	15	12	1	2	18	13	1	3	10	3	2	3	5	14	36	31	21	16	7	5	4	11.4	36		
17-Oct	Z	5	3	4	9	5	4	C	C	C	C	C	C	2	1	1	0	0	1	1	1	0	0	2	--	9		
18-Oct	Z	0	0	0	1	1	2	10	19	16	14	22	21	21	18	12	14	20	15	13	6	11	62	27	14.1	62		
19-Oct	Z	5	6	11	24	26	33	24	21	33	48	46	132	185	176	128	81	95	25	2	2	1	1	5	48.4	185		
20-Oct	Z	6	7	7	5	4	9	15	5	12	19	30	20	21	24	26	17	15	17	26	24	12	4	7	14.4	30		
21-Oct	Z	27	29	19	16	12	12	15	21	14	6	11	2	1	1	3	4	19	13	18	23	17	27	37	15.1	37		
22-Oct	Z	63	60	59	72	81	73	35	21	42	58	129	154	219	146	2	2	1	1	0	0	0	0	2	53.0	219		
23-Oct	Z	5	8	6	31	32	79	99	34	18	112	205	206	24	11	5	4	4	6	8	23	17	10	10	41.6	206		
24-Oct	Z	4	3	1	4	5	3	3	3	3	2	3	1	1	2	3	3	4	3	5	5	2	2	3	2.9	5		
25-Oct	Z	1	1	4	12	6	11	18	23	12	7	9	14	11	6	12	12	7	10	15	13	14	11	8	10.3	23		
26-Oct	Z	9	26	33	20	24	11	39	30	26	20	24	20	24	15	22	16	14	14	13	20	17	12	14	20.2	39		
27-Oct	Z	14	25	16	15	14	23	21	28	26	19	20	20	17	0	1	3	25	73	25	19	10	1	7	18.4	73		
28-Oct	Z	6	7	3	6	7	3	1	1	2	2	9	6	3	1	1	2	1	1	1	2	0	0	4	3.0	9		
29-Oct	Z	11	2	3	3	3	2	2	2	1	2	3	2	3	3	1	1	1	8	4	2	0	2	2	2.8	11		
30-Oct	Z	0	0	0	0	0	0	2	2	2	1	1	2	2	4	5	8	3	1	1	2	1	1	3	1.8	8		
31-Oct	Z	1	1	1	1	1	1	1	1	1	2	7	10	7	9	9	7	6	7	8	7	8	8	11	4.9	11		
--		9.8	10.4	11.3	14.4	14.3	14.5	19.0	14.9	12.4	16.3	30.5	37.2	29.9	25.8	19.1	18.1	19.7	19.0	14.7	13.7	11.4	11.0	11.5	Diurnal Average			
--		63	60	69	72	81	79	99	37	42	112	205	206	219	176	128	121	141	123	67	59	50	62	61	Diurnal Maximum			
Z - zerospan		C - Calibration																										



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Shell Muskeg River - October 2014





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Shell Muskeg River - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	537	75.95	75.95
21 - 40	105	14.85	90.81
41 - 80	41	5.80	96.61
81 - 159	17	2.40	99.01
> 159	5	0.71	99.72

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Shell Muskeg River - October 2014**

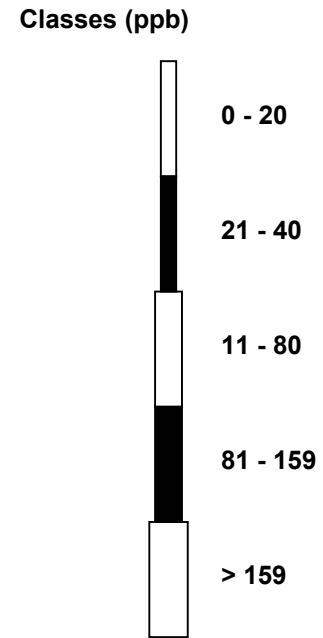
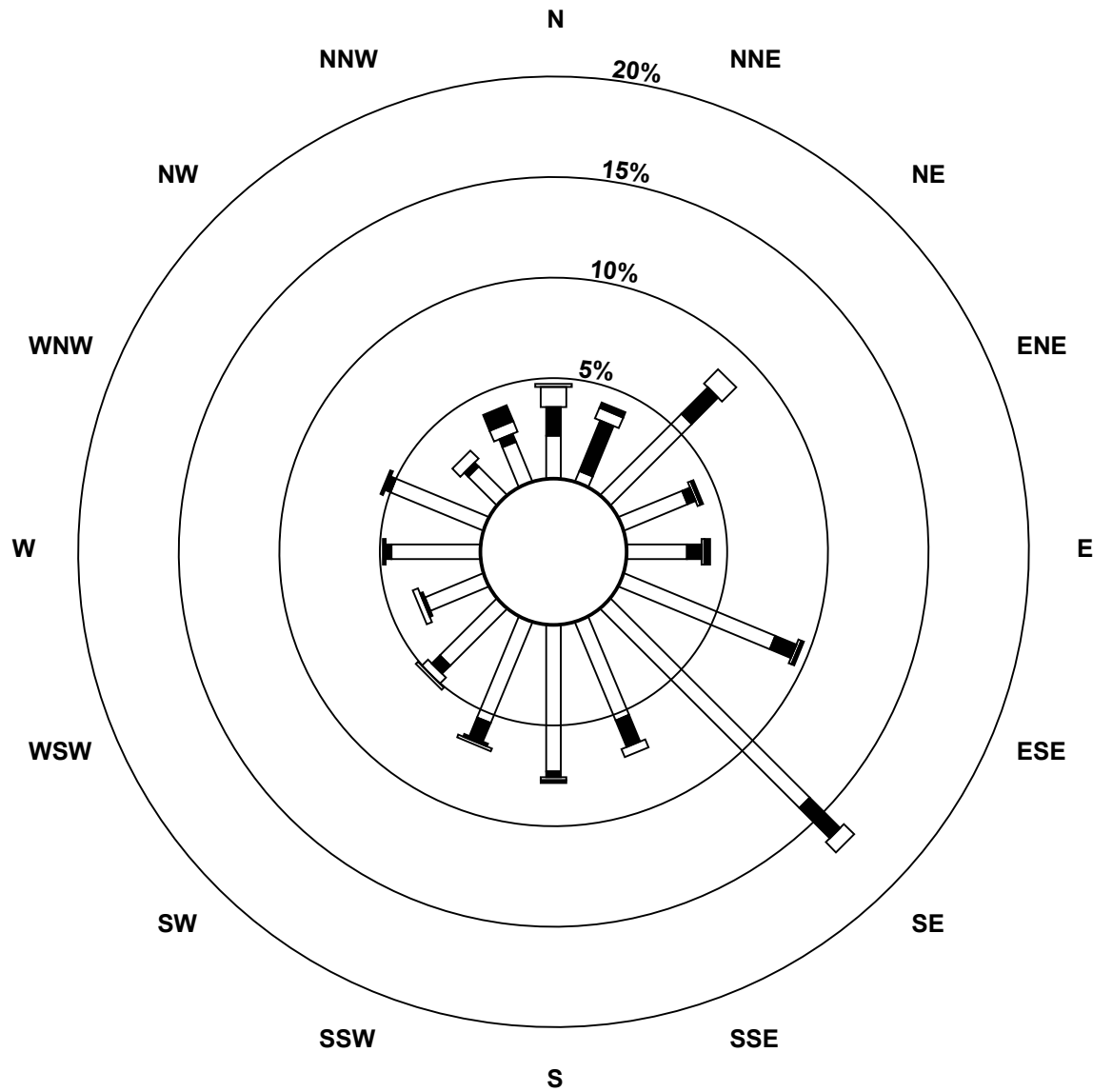
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	15	4	40	24	21	57	98	37	51	38	28	22	31	35	14	15	530
21 - 40	10	19	13	3	5	8	15	10	2	7	4	0	2	2	2	3	105
11 - 80	7	4	7	1	1	1	5	3	1	0	3	0	0	0	4	4	41
81 - 159	0	2	0	1	2	1	0	0	1	1	0	1	1	1	0	6	17
> 159	1	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	5
<b>Totals</b>	<b>33</b>	<b>29</b>	<b>60</b>	<b>29</b>	<b>29</b>	<b>67</b>	<b>118</b>	<b>50</b>	<b>55</b>	<b>47</b>	<b>36</b>	<b>25</b>	<b>34</b>	<b>38</b>	<b>20</b>	<b>28</b>	<b>698</b>

Total Number of Valid Hours: 700

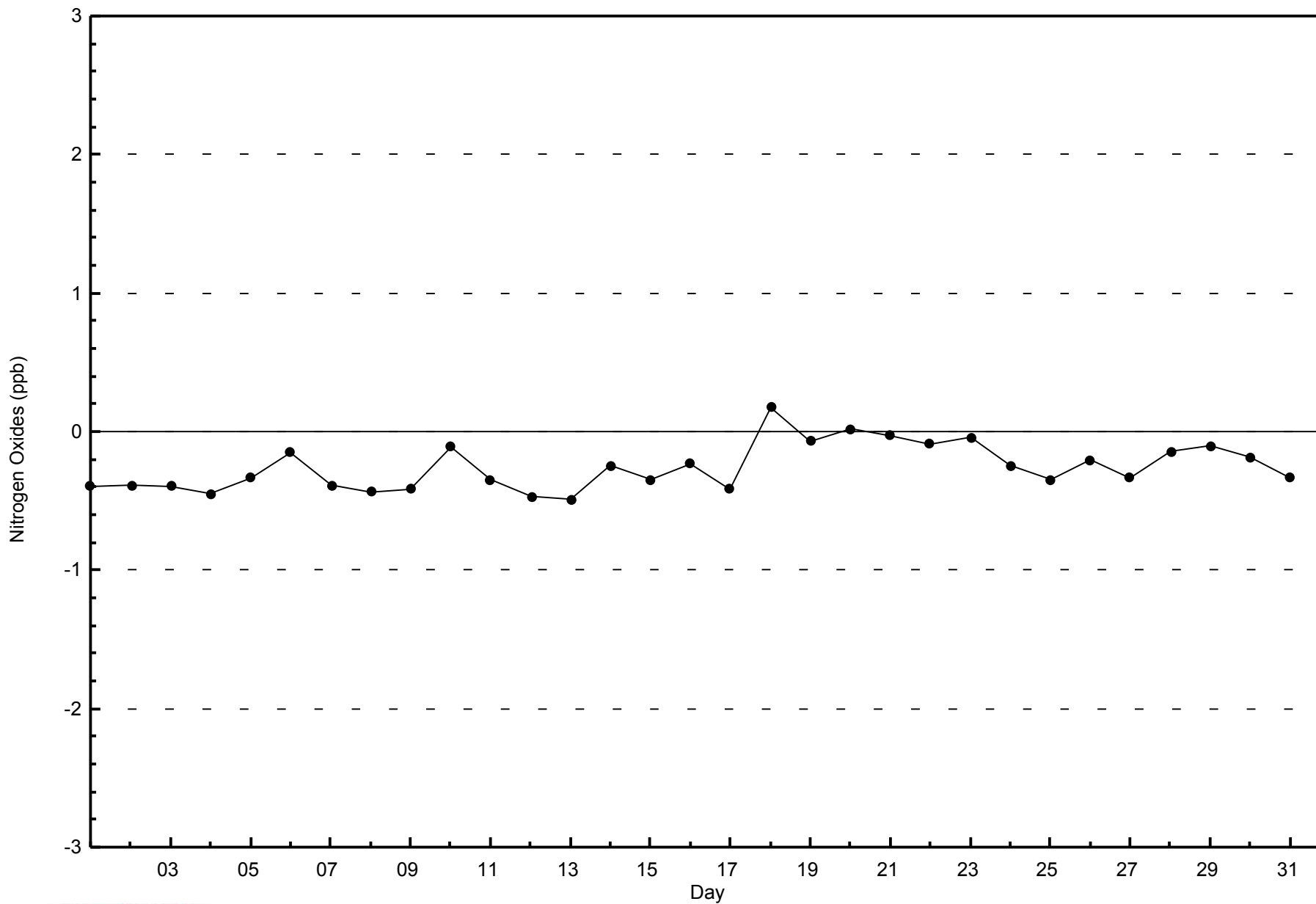
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Shell Muskeg River (AMS 16)**



**Total Number of Valid Hours: 700**

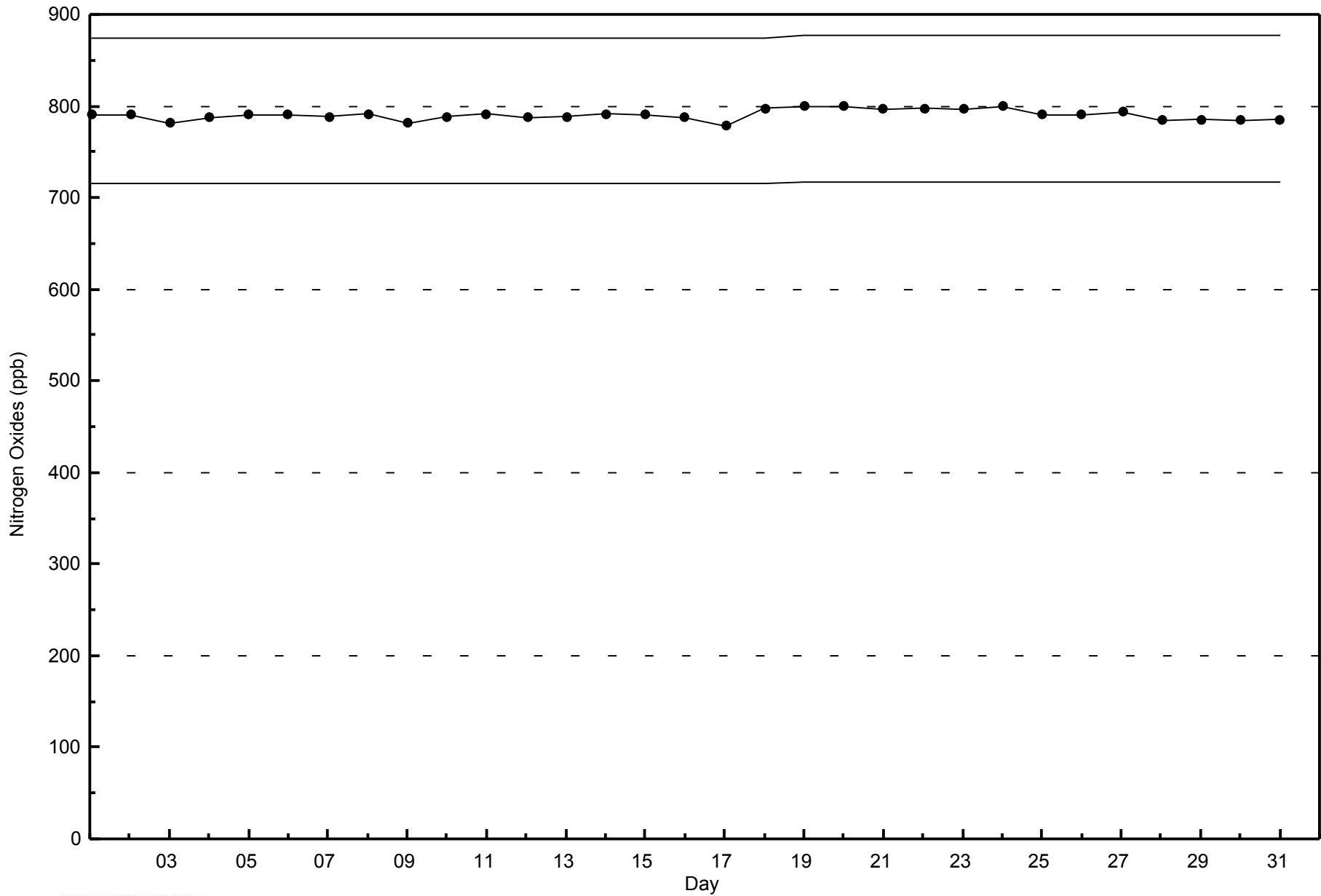






**WBEA**  
**Span Responses**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Shell Muskeg River - October 2014**



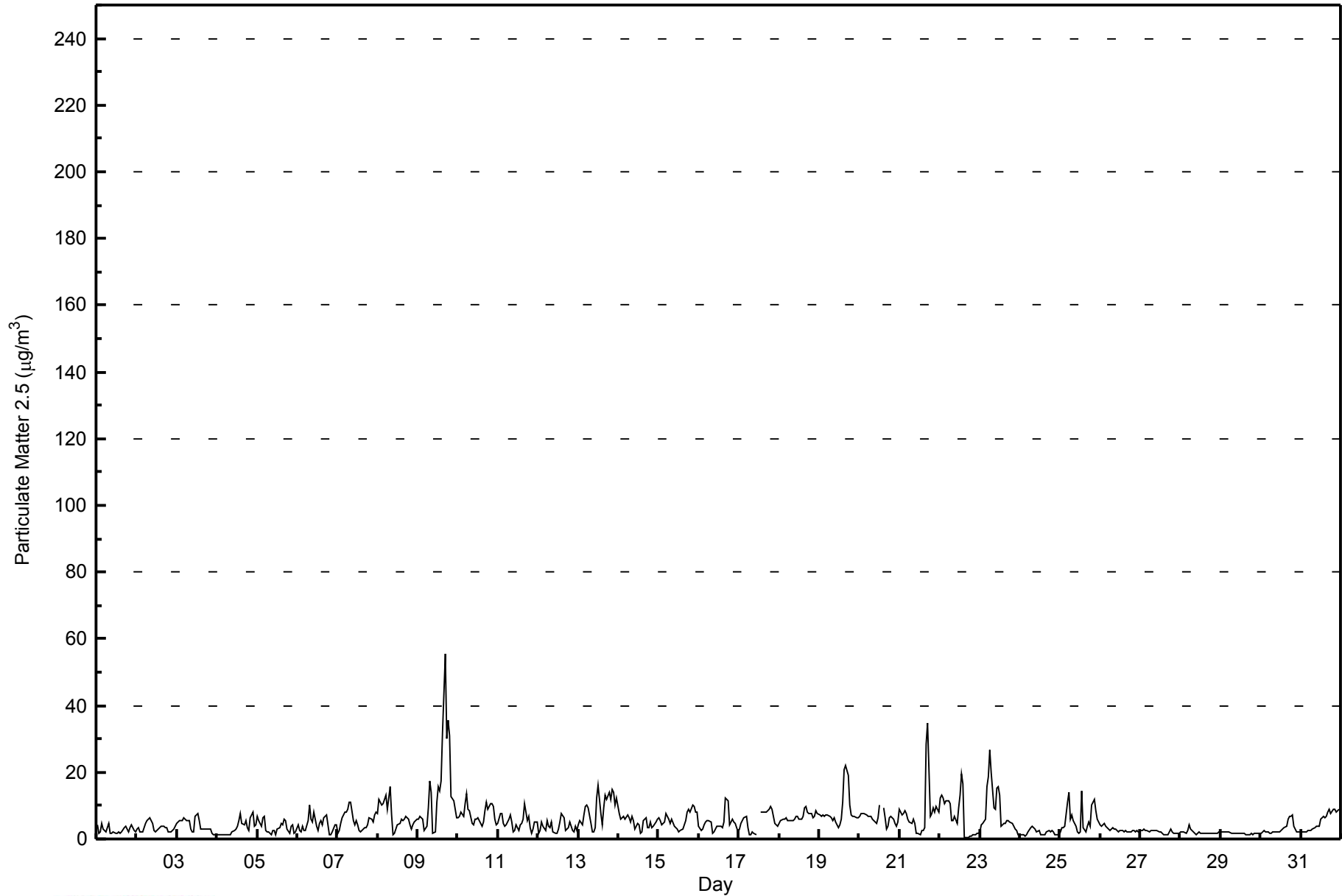


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 55.3 µg/m <sup>3</sup> on Oct 9 17:00 Minimum Value: 0.4 µg/m <sup>3</sup> on Oct 22 16:00 Maximum Diurnal Average: 8.2 µg/m <sup>3</sup> at hour 17 Monthly Average: 5.31 µg/m <sup>3</sup>																	Maximum Daily Average: 14.9 µg/m <sup>3</sup> on Oct 9 Minimum Daily Average: 1.7 µg/m <sup>3</sup> on Oct 29 Minimum Diurnal Average: 3.5 µg/m <sup>3</sup> at hour 10 Percentiles: P <sub>1</sub> = 1.1 P <sub>10</sub> = 1.6 Q <sub>1</sub> = 2.3 Median = 4.2 Q <sub>3</sub> = 6.5 P <sub>90</sub> = 9.9 P <sub>99</sub> = 27.1																	Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Oct	4.2	1.5	2.0	4.7	2.9	2.3	3.5	4.6	1.8	1.6	2.1	1.7	1.7	2.3	1.9	2.1	3.2	3.9	2.9	2.1	3.3	4.4	2.4	2.2	2.7	4.7									
2-Oct	3.1	3.5	1.9	2.0	3.5	4.6	5.6	5.8	6.4	4.7	2.6	2.3	2.5	3.2	3.6	4.0	3.8	3.3	3.3	2.0	2.1	2.3	3.2	4.0	3.5	6.4									
3-Oct	4.8	5.4	5.5	5.3	6.2	6.0	5.4	5.6	2.8	2.2	2.0	6.6	7.8	5.7	2.8	3.1	3.1	3.1	3.0	2.9	2.9	1.5	1.3	1.2	4.0	7.8									
4-Oct	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.5	2.1	2.7	2.8	3.9	5.4	7.6	4.7	4.2	5.7	3.4	2.7	6.2	8.2	3.7	4.2	3.3	8.2									
5-Oct	7.0	5.6	3.6	6.4	6.8	2.7	2.0	2.2	1.2	2.4	2.6	1.4	3.0	3.4	4.6	4.1	5.9	5.6	3.1	1.8	3.9	4.3	1.7	2.1	3.6	7.0									
6-Oct	4.1	2.5	2.1	3.9	2.6	2.3	5.7	10.1	6.0	5.2	8.2	4.0	2.4	4.8	5.7	4.1	6.5	7.3	4.4	1.3	1.2	2.2	4.3	4.3	4.4	10.1									
7-Oct	1.7	2.4	4.8	6.5	8.1	8.1	9.0	11.0	10.9	5.7	4.1	5.3	4.4	2.7	2.3	2.8	3.5	3.3	4.3	6.3	5.9	5.3	7.1	7.9	5.6	11.0									
8-Oct	7.5	11.8	10.0	10.7	12.0	13.1	8.7	15.6	7.0	1.3	1.7	2.9	4.1	4.5	5.7	5.6	5.8	6.6	6.1	4.1	3.2	4.2	5.3	5.9	6.8	15.6									
9-Oct	6.0	6.6	6.2	5.8	2.5	3.8	9.5	17.2	13.9	1.7	2.3	11.1	15.8	14.3	17.5	31.8	55.3	30.1	35.4	30.8	12.6	11.5	9.1	6.4	14.9	55.3									
10-Oct	6.4	6.9	8.2	6.8	10.5	13.5	8.9	8.4	4.7	4.1	5.9	6.1	6.2	5.5	3.9	5.1	8.3	10.8	9.1	10.5	10.6	9.7	5.8	4.1	7.5	13.5									
11-Oct	4.5	7.5	7.8	4.5	3.6	4.1	5.7	7.0	5.3	2.3	2.7	4.2	2.6	4.1	4.8	6.0	10.4	5.5	6.9	3.4	1.8	2.9	5.1	5.0	4.9	10.4									
12-Oct	1.8	2.7	5.1	3.9	2.4	5.4	3.9	3.4	5.2	2.3	1.7	1.8	3.1	5.2	7.7	6.4	2.7	3.1	3.6	5.1	2.5	2.1	3.8	2.3	3.6	7.7									
13-Oct	4.4	5.7	4.4	7.1	9.6	10.1	9.1	4.7	2.2	2.1	3.5	12.1	15.9	7.5	4.2	9.4	12.9	11.9	13.8	11.7	15.0	13.9	10.2	12.3	8.9	15.9									
14-Oct	7.7	6.0	6.4	6.8	5.9	7.1	6.4	5.1	6.6	5.7	3.0	4.7	4.4	1.6	1.9	5.5	6.2	3.4	3.6	5.2	3.3	3.9	5.2	5.8	5.1	7.7									
15-Oct	6.5	5.3	4.2	5.1	7.8	7.0	6.0	4.8	5.9	3.8	3.4	3.0	2.3	2.5	2.8	4.1	5.4	8.3	9.1	8.2	10.1	9.9	8.2	8.0	5.9	10.1									
16-Oct	3.9	2.5	3.1	4.3	4.9	5.4	5.5	4.9	1.8	1.9	2.9	3.9	3.7	3.8	3.5	5.3	12.4	11.4	4.4	5.0	6.1	5.0	4.6	2.3	4.7	12.4									
17-Oct	3.0	4.9	5.3	6.5	6.8	3.2	1.5	1.4	2.3	1.8	1.5	M	M	7.9	8.0	8.2	8.1	8.4	9.0	9.8	8.8	4.6	4.1	4.0	5.4	9.8									
18-Oct	4.8	5.6	5.8	6.0	6.2	5.4	5.3	5.4	5.6	5.7	6.8	7.0	5.8	6.0	6.7	9.3	9.9	7.9	7.8	7.5	6.4	6.8	8.4	7.7	6.7	9.9									
19-Oct	7.4	6.7	7.2	6.8	7.0	7.2	6.6	6.4	5.5	6.5	4.9	3.4	4.0	5.7	11.0	20.8	21.9	18.9	10.2	7.4	6.9	6.8	6.5	6.4	8.4	21.9									
20-Oct	6.8	7.7	7.6	7.6	7.2	6.9	6.9	6.9	5.9	5.2	4.5	6.3	10.2	M	9.5	6.5	2.9	3.7	6.2	6.6	6.1	4.7	4.0	5.2	6.3	10.2									
21-Oct	8.9	7.3	7.5	8.6	7.8	5.9	5.1	4.8	5.8	4.5	1.8	1.9	1.5	2.4	2.4	3.5	28.5	34.9	6.7	7.6	9.1	8.0	9.9	8.1	8.0	34.9									
22-Oct	12.4	13.0	12.4	10.8	11.6	11.6	10.8	5.6	5.6	6.9	4.6	9.3	13.3	19.4	16.5	0.4	0.5	0.6	0.7	1.0	1.3	1.4	1.7	1.6	7.2	19.4									
23-Oct	2.3	4.3	4.5	5.9	15.9	18.7	26.8	20.0	9.2	8.9	15.5	15.6	13.1	3.7	4.5	4.8	5.4	5.5	5.3	4.6	3.7	2.8	2.6	1.4	8.5	26.8									
24-Oct	1.1	1.3	1.1	0.9	1.3	2.2	3.6	3.6	3.3	2.9	2.1	2.4	1.4	1.2	1.2	1.3	2.0	2.4	2.2	2.5	2.1	1.3	1.4	1.3	1.9	3.6									
25-Oct	2.3	3.5	3.4	4.0	11.1	14.1	6.0	7.3	5.5	3.9	2.3	1.5	1.9	14.3	3.6	2.3	3.7	4.9	3.9	10.3	12.1	8.4	6.1	4.9	5.9	14.3									
26-Oct	4.2	3.9	4.7	3.7	3.4	2.9	2.5	3.5	3.0	2.8	2.6	2.2	2.5	2.6	2.0	2.6	2.3	2.2	2.2	2.4	2.3	2.3	2.5	2.3	2.8	4.7									
27-Oct	2.5	2.7	3.0	2.4	2.6	2.2	2.5	2.6	2.4	2.5	2.4	2.3	2.1	1.9	1.2	1.3	1.3	2.0	3.1	1.9	1.8	1.8	1.6	1.9	2.2	3.1									
28-Oct	1.9	2.0	2.0	1.7	2.5	4.3	2.8	2.6	1.5	1.3	1.5	1.9	1.9	1.7	1.5	1.6	1.7	1.7	1.8	1.7	1.6	1.6	1.8	1.9	1.9	4.3									
29-Oct	2.1	2.2	2.2	2.0	2.0	1.9	1.7	1.6	1.6	1.5	1.7	1.6	1.5	1.5	1.6	1.3	1.5	1.4	1.5	1.4	1.6	1.6	1.6	1.5	1.7	2.2									
30-Oct	1.8	2.1	2.4	2.2	1.9	1.8	1.8	2.0	2.1	2.2	2.1	2.1	2.4	2.8	3.3	3.6	5.8	6.6	6.6	7.4	4.0	2.2	2.1	2.1	3.1	7.4									
31-Oct	2.3	2.2	2.2	2.3	2.4	2.5	2.5	2.8	3.4	3.7	3.9	4.0	5.9	6.7	6.2	7.0	7.9	8.9	7.5	8.7	8.7	8.1	8.5	9.0	5.3	9.0									
																								Diurnal Average Diurnal Maximum											
4.5 4.7 4.8 5.0 5.8 6.1 5.9 6.1 4.7 3.5 3.5 4.5 5.0 5.1 5.2 5.8 8.2 7.5 6.2 5.9 5.4 5.0 4.6 4.4 12.4 13.0 12.4 10.8 15.9 18.7 26.8 20.0 13.9 8.9 15.5 15.6 15.9 19.4 17.5 31.8 55.3 34.9 35.4 30.8 15.0 13.9 10.2 12.3																																			
M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																																			



**WBEA**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Shell Muskeg River - October 2014**





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Shell Muskeg River - October 2014**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	462	62.35	62.35
6 - 15	252	34.01	96.36
16 - 25	14	1.89	98.25
26 - 80	8	1.08	99.33
> 81.0	0	0.00	99.33

Total Number of Valid Hours: 741

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Shell Muskeg River - October 2014**

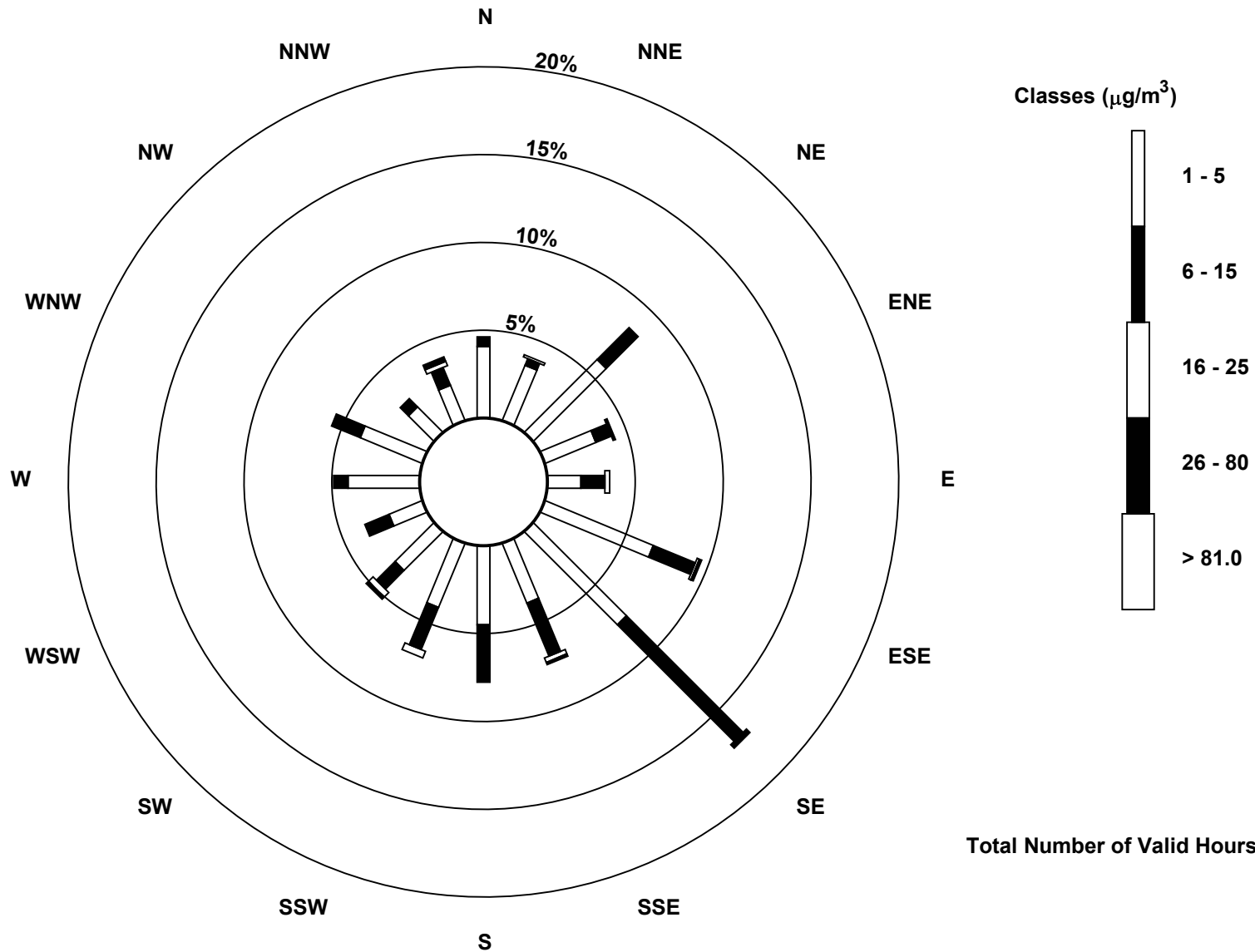
Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	30	25	43	23	14	49	55	27	33	29	23	15	30	28	15	16	455
6 - 15	4	3	19	7	10	19	69	24	24	19	11	11	6	13	5	8	252
16 - 25	0	1	0	0	2	1	0	2	0	3	3	0	0	0	0	2	14
26 - 80	0	0	0	1	0	1	2	1	0	0	1	0	0	0	0	2	8
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	34	29	62	31	26	70	126	54	57	51	38	26	36	41	20	28	729

Total Number of Valid Hours: 734

Total Number of Hours: 744

Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
 Shell Muskeg River (AMS 16)



Total Number of Valid Hours: 734

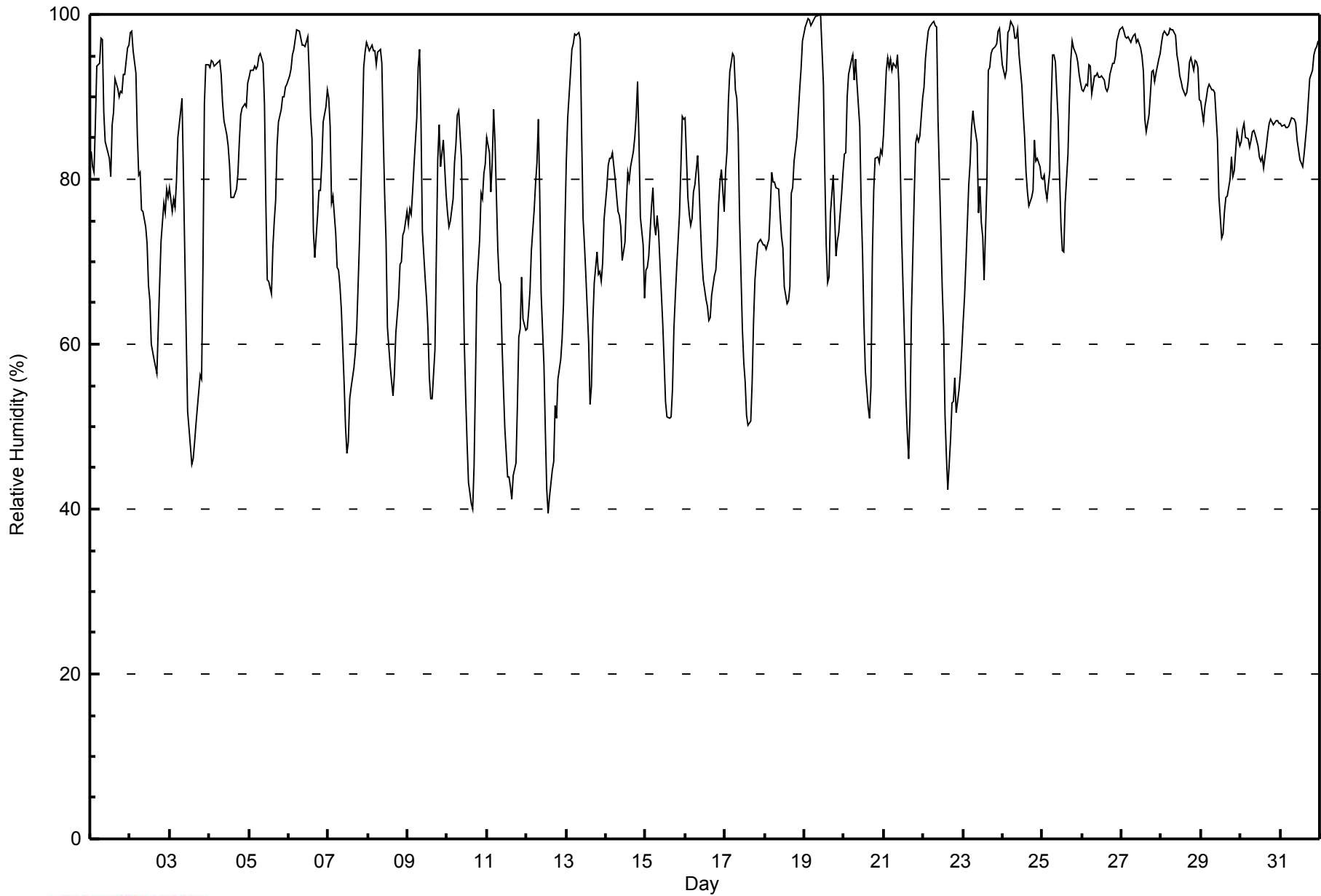


Maximum Value: 100 % on Oct 19 10:00																			Maximum Daily Average: 94.6 % on Oct 28						Hours in Service: 744																									
Minimum Value: 39 % on Oct 12 14:00																			Minimum Daily Average: 61.3 % on Oct 12						Hours of Data: 744																									
Maximum Diurnal Average: 89.3 % at hour 8																			Minimum Diurnal Average: 65.8 % at hour 15						Hours of Missing Data: 0																									
Monthly Average: 79.9 %																			Percentiles: P <sub>1</sub> = 43 P <sub>10</sub> = 57 Q <sub>1</sub> = 71 Median = 83 Q <sub>3</sub> = 92 P <sub>90</sub> = 96 P <sub>99</sub> = 99						Hours of Calibration: 0																									
																									Percent Operational Time: 100.0																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Oct	83	82	81	87	94	94	97	97	88	85	84	83	80	87	88	92	91	90	91	90	93	93	96	96	89.2	97																								
2-Oct	98	98	96	93	85	81	81	76	76	74	72	67	65	60	58	57	57	62	68	73	77	76	79	78	75.3	98																								
3-Oct	79	76	78	77	80	85	87	90	81	71	61	52	48	45	46	48	50	52	56	56	70	89	94	94	69.3	94																								
4-Oct	93	94	94	94	94	94	94	93	89	87	85	84	82	78	78	79	81	85	88	89	89	89	92	92	87.6	94																								
5-Oct	92	93	93	94	93	94	95	95	94	89	77	68	68	66	72	75	77	84	87	88	90	90	91	91	85.7	95																								
6-Oct	93	93	95	96	97	98	98	97	96	96	96	97	93	88	85	74	71	76	79	79	82	87	89	91	89.3	98																								
7-Oct	90	86	77	78	73	69	69	67	64	55	50	47	48	53	55	57	59	62	67	72	85	94	95	97	69.6	97																								
8-Oct	96	96	96	96	96	94	95	96	94	86	78	73	62	57	55	54	57	61	66	70	70	73	74	76	77.9	96																								
9-Oct	75	76	76	78	82	87	93	96	87	74	68	65	62	56	53	53	59	71	82	87	81	85	81	78	75.3	96																								
10-Oct	76	74	75	78	82	84	88	88	82	71	60	54	48	43	41	40	45	56	67	73	78	78	81	82	68.5	88																								
11-Oct	85	83	78	82	88	84	71	68	67	60	55	50	44	44	43	41	44	46	53	61	62	68	63	62	62.6	88																								
12-Oct	62	64	66	71	76	80	82	87	78	66	57	49	42	39	41	45	46	52	51	56	58	61	65	74	61.3	87																								
13-Oct	82	87	93	96	96	98	98	98	97	85	75	72	68	60	53	55	63	68	71	68	69	68	70	75	77.7	98																								
14-Oct	79	82	83	83	80	78	76	76	74	70	72	77	81	80	82	83	85	88	92	85	75	72	66	66	79.2	92																								
15-Oct	69	69	71	77	79	75	73	76	74	66	63	58	53	51	51	55	62	66	69	76	82	88	87	87	68.3	88																								
16-Oct	87	78	76	74	75	79	79	83	79	74	70	68	65	65	63	63	66	68	69	72	77	80	81	76	73.7	87																								
17-Oct	81	83	90	93	95	95	91	90	86	75	62	58	55	51	50	51	55	63	68	70	72	73	72	72	73.0	95																								
18-Oct	72	72	73	77	81	80	80	79	79	76	73	72	67	65	65	67	78	79	82	85	88	91	93	97	77.9	97																								
19-Oct	98	99	99	99	99	99	100	100	100	100	100	91	81	72	67	68	76	80	76	71	73	74	78	81	86.7	100																								
20-Oct	83	83	90	93	94	95	92	95	92	86	77	71	62	57	52	51	55	71	79	83	83	82	84	83	78.8	95																								
21-Oct	85	93	95	94	95	93	94	94	95	91	82	73	61	54	49	46	52	64	78	84	85	85	85	90	79.9	95																								
22-Oct	91	95	96	98	98	99	99	99	99	87	74	67	62	52	46	42	48	53	53	56	52	54	56	59	72.3	99																								
23-Oct	63	66	70	79	82	86	88	87	84	76	79	75	73	68	80	93	94	95	96	96	96	98	98	96	84.1	98																								
24-Oct	94	92	93	98	98	99	99	97	97	98	95	91	88	85	81	79	77	78	79	85	82	83	82	80	88.7	99																								
25-Oct	80	81	79	78	81	89	95	95	94	87	80	74	71	71	77	83	90	94	97	96	95	94	93	92	86.1	97																								
26-Oct	91	91	91	91	94	94	90	93	92	93	92	92	92	92	91	91	91	93	94	94	95	97	98	98	92.9	98																								
27-Oct	98	98	97	97	97	97	97	98	98	97	97	96	95	93	87	86	88	90	93	93	92	93	95	95	94.4	98																								
28-Oct	97	98	98	97	98	98	98	98	97	95	94	92	92	91	90	91	92	94	95	93	94	94	94	90	94.6	98																								
29-Oct	90	87	89	90	91	92	91	91	91	88	85	78	73	73	76	78	78	80	83	80	81	83	86	84	84.0	92																								
30-Oct	85	86	87	85	85	84	85	86	86	85	84	83	82	83	81	84	86	87	87	87	87	87	87	87	85.2	87																								
31-Oct	87	87	87	86	86	87	87	87	87	87	85	84	82	82	83	85	87	90	92	93	95	96	96	97	88.0	97																								
																								85.0	85.2	85.8	87.3	88.6	89.1	89.2	89.3	87.1	81.8	76.8	72.8	69.1	66.5	65.8	66.4	69.3	73.7	77.2	79.3	81.0	82.9	84.0	84.4	Diurnal Average		
																								98	99	99	99	99	99	100	100	100	100	100	100	97	95	93	91	93	94	95	97	96	96	98	98	98	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Shell Muskeg River - October 2014**







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

**Relative Humidity (RH) - %**  
**Shell Muskeg River - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	2	0.27	0.27
40 - 60	87	11.69	11.96
60 - 80	232	31.18	43.15
80 - 100	423	56.85	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

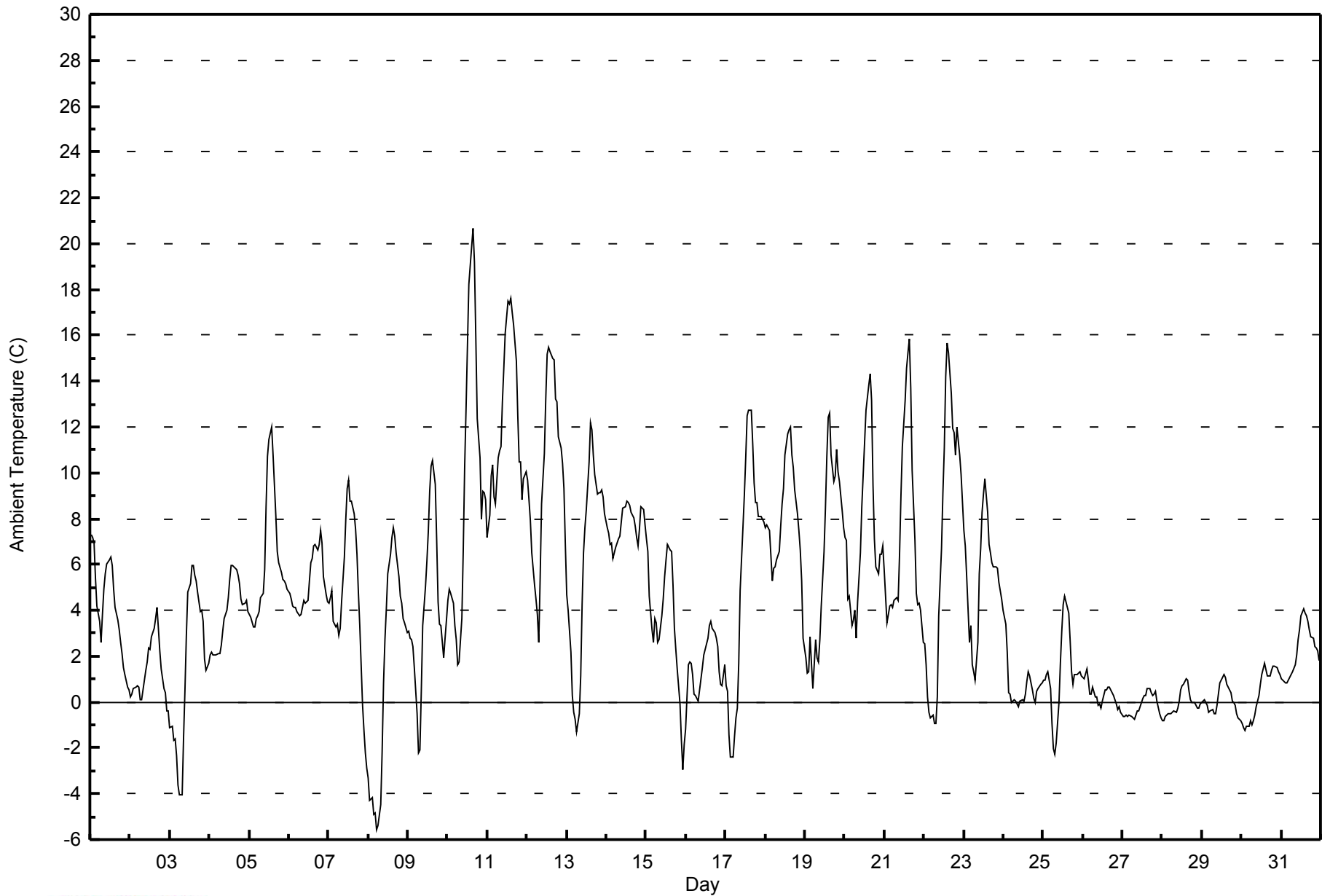


Maximum Value: 20.7 C on Oct 10 16:00		Maximum Daily Average: 12.2 C on Oct 11		Hours in Service: 744																							
Minimum Value: -5.6 C on Oct 8 06:00		Minimum Daily Average: -0.2 C on Oct 27		Hours of Data: 744																							
Maximum Diurnal Average: 8.1 C at hour 15		Minimum Diurnal Average: 1.4 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 4.34 C		Percentiles: P <sub>1</sub> = -4.1 P <sub>10</sub> = -0.5 Q <sub>1</sub> = 0.7 Median = 3.6 Q <sub>3</sub> = 7.2 P <sub>90</sub> = 10.6 P <sub>99</sub> = 17.2		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-Oct	7.3	7.2	7.0	5.4	4.2	3.5	2.6	3.8	5.0	5.6	6.0	6.2	6.3	6.0	4.9	4.1	3.6	3.2	2.6	2.1	1.5	1.2	0.7	0.6	4.2	7.3	
2-Oct	0.2	0.3	0.6	0.6	0.7	0.7	0.1	0.1	0.5	1.4	1.7	2.3	2.3	2.8	3.2	3.6	4.1	3.2	2.2	1.5	0.6	0.4	-0.4	-0.4	1.4	4.1	
3-Oct	-1.1	-1.1	-1.6	-1.6	-2.3	-3.6	-4.1	-4.0	-1.6	0.5	2.9	4.8	5.2	5.9	6.0	5.6	5.3	4.8	3.9	4.0	3.5	1.9	1.4	1.7	1.5	6.0	
4-Oct	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.5	3.1	3.6	4.0	4.6	5.3	5.9	6.0	5.9	5.8	5.5	5.1	4.5	4.3	4.3	4.4	3.9	3.9	6.0	
5-Oct	3.8	3.7	3.3	3.2	3.6	3.8	3.9	4.6	4.7	5.8	8.5	10.7	11.5	12.0	10.8	9.4	8.1	6.6	6.1	5.6	5.3	5.3	5.1	4.9	6.3	12.0	
6-Oct	4.7	4.5	4.2	4.1	4.1	4.0	3.7	3.9	4.1	4.4	4.3	4.4	5.3	6.1	6.3	6.8	6.9	6.7	6.8	7.5	6.9	5.5	4.7	4.3	5.2	7.5	
7-Oct	4.3	4.6	4.8	3.5	3.3	3.4	2.9	3.2	4.4	6.3	8.0	9.3	9.7	8.8	8.8	8.2	7.6	6.4	4.8	3.3	-0.1	-1.3	-2.2	-2.9	4.6	9.7	
8-Oct	-3.3	-4.3	-4.2	-4.9	-4.9	-5.6	-5.4	-4.5	-2.1	0.9	2.7	4.1	5.6	6.4	7.2	7.6	7.3	6.5	5.5	4.6	4.3	3.6	3.5	3.0	1.4	7.6	
9-Oct	3.1	2.8	2.7	2.4	1.5	-0.5	-2.2	-2.1	0.5	3.3	5.0	6.2	7.4	9.2	10.3	10.6	9.5	7.0	4.4	3.4	3.3	2.0	2.8	3.6	4.0	10.6	
10-Oct	4.5	4.9	4.8	4.3	3.3	2.7	1.6	1.8	3.6	6.6	10.2	12.8	15.5	18.2	19.9	20.7	19.2	15.8	12.4	10.6	8.0	9.2	9.1	8.8	9.5	20.7	
11-Oct	7.2	8.2	9.8	10.4	9.0	8.6	10.6	11.0	11.1	13.1	14.6	16.1	17.5	17.4	17.6	17.0	16.4	14.9	12.5	10.5	10.5	8.8	9.8	10.1	12.2	17.6	
12-Oct	9.7	8.8	7.9	6.5	5.1	4.5	3.8	2.6	5.4	8.6	10.9	13.2	15.2	15.5	15.3	15.0	14.9	13.3	13.1	11.6	11.1	10.4	9.3	6.9	9.9	15.5	
13-Oct	4.7	4.0	2.2	0.3	-0.5	-0.7	-1.3	-0.5	1.1	4.2	6.5	7.6	8.4	10.5	12.2	11.9	10.8	10.0	9.1	9.1	9.1	9.2	9.0	8.2	6.0	12.2	
14-Oct	7.6	7.4	6.9	6.9	6.3	6.7	7.0	7.1	7.3	7.9	8.5	8.5	8.7	8.7	8.6	8.3	8.0	7.7	7.2	6.8	7.6	8.5	8.4	7.7	7.7	8.7	
15-Oct	7.1	6.6	4.6	3.2	2.6	3.6	3.4	2.6	2.7	3.8	4.5	5.5	6.2	6.9	6.6	6.6	6.6	5.1	3.2	2.3	1.4	-0.1	-1.6	-3.0	-1.9	3.4	7.1
16-Oct	-1.2	1.6	1.8	1.7	1.2	0.4	0.3	0.1	0.6	1.0	1.5	2.0	2.6	2.8	3.4	3.5	3.2	3.1	2.8	2.4	1.3	0.8	0.7	1.6	1.6	3.5	
17-Oct	0.7	0.5	-1.4	-2.4	-2.4	-1.5	-0.7	-0.3	1.7	4.9	7.6	9.0	10.7	12.5	12.7	12.7	11.3	9.5	8.7	8.7	8.1	8.1	8.0	7.8	5.6	12.7	
18-Oct	7.6	7.7	7.5	6.4	5.3	5.8	5.9	6.2	6.6	7.7	8.7	9.3	10.8	11.7	11.9	12.0	10.8	10.2	9.3	8.2	7.5	6.6	5.3	2.8	8.0	12.0	
19-Oct	1.9	1.2	1.3	2.8	1.7	0.6	2.7	1.9	1.8	2.7	4.2	6.6	8.5	10.7	12.4	12.6	10.8	9.6	9.9	11.0	10.1	9.6	8.3	7.6	6.3	12.6	
20-Oct	7.2	7.1	4.5	4.6	3.3	3.6	4.0	2.8	4.4	6.5	8.5	9.9	11.3	12.7	13.8	14.3	13.2	9.5	7.1	5.9	5.6	6.5	6.4	6.8	7.5	14.3	
21-Oct	5.7	3.4	3.8	4.2	4.2	4.1	4.4	4.6	4.4	6.4	9.0	11.2	13.1	14.5	15.2	15.8	13.7	10.1	7.1	4.7	4.2	4.3	4.0	2.6	7.3	15.8	
22-Oct	2.5	1.7	0.2	-0.5	-0.7	-0.6	-0.9	-0.9	0.2	3.8	6.7	9.1	11.1	14.2	15.7	15.2	13.5	12.0	11.7	10.8	12.0	10.8	9.9	8.7	6.9	15.7	
23-Oct	7.5	6.8	5.4	2.6	3.3	1.6	1.3	0.9	2.6	5.6	6.7	8.3	9.0	9.7	8.3	6.9	6.5	6.1	5.9	5.9	5.9	5.2	4.8	4.5	5.5	9.7	
24-Oct	4.0	3.4	2.2	0.4	0.3	0.0	0.1	0.1	-0.1	-0.2	0.0	0.1	0.1	0.4	0.9	1.3	1.1	0.5	0.2	0.0	0.5	0.6	0.8	0.8	0.7	4.0	
25-Oct	0.9	1.0	1.2	1.3	0.6	-1.0	-2.1	-2.3	-1.8	0.0	1.7	3.1	4.3	4.6	4.4	3.9	2.7	1.3	0.8	1.2	1.2	1.2	1.3	1.1	1.3	4.6	
26-Oct	1.1	1.0	1.4	1.0	0.3	0.3	0.6	0.2	0.3	-0.1	-0.1	-0.3	0.0	0.5	0.5	0.7	0.6	0.5	0.3	0.1	-0.1	-0.3	-0.2	-0.5	0.3	1.4	
27-Oct	-0.6	-0.7	-0.6	-0.7	-0.6	-0.7	-0.7	-0.8	-0.5	-0.4	-0.4	0.0	0.2	0.3	0.3	0.6	0.6	0.4	0.3	0.4	0.5	0.0	-0.5	-0.7	-0.2	0.6	
28-Oct	-0.8	-0.8	-0.6	-0.5	-0.5	-0.5	-0.4	-0.4	-0.5	-0.3	0.1	0.5	0.7	0.8	1.0	1.0	0.5	0.1	0.0	0.0	-0.2	-0.2	-0.3	-0.1	-0.1	1.0	
29-Oct	0.0	0.1	0.0	-0.1	-0.5	-0.4	-0.3	-0.5	-0.5	-0.1	0.3	0.8	1.1	1.2	1.1	0.8	0.7	0.4	0.0	0.0	-0.2	-0.5	-0.7	-0.8	0.1	1.2	
30-Oct	-0.9	-1.1	-1.3	-1.1	-1.0	-0.8	-1.0	-0.8	-0.6	-0.2	0.3	0.8	1.2	1.4	1.7	1.2	1.1	1.2	1.4	1.6	1.6	1.5	1.3	1.2	0.4	1.7	
31-Oct	1.0	0.9	0.8	0.8	0.9	1.1	1.2	1.3	1.6	2.1	2.7	3.2	3.7	4.1	3.9	3.8	3.5	3.2	2.9	2.8	2.4	2.4	2.2	1.8	2.3	4.1	
																								Diurnal Average			
																								Diurnal Maximum			



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Shell Muskeg River - October 2014**





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

**Ambient Temperature (AT) - C**  
**Shell Muskeg River - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	114	15.32	15.32
0 - 10	542	72.85	88.17
10 - 20	87	11.69	99.87
> 20	1	0.13	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

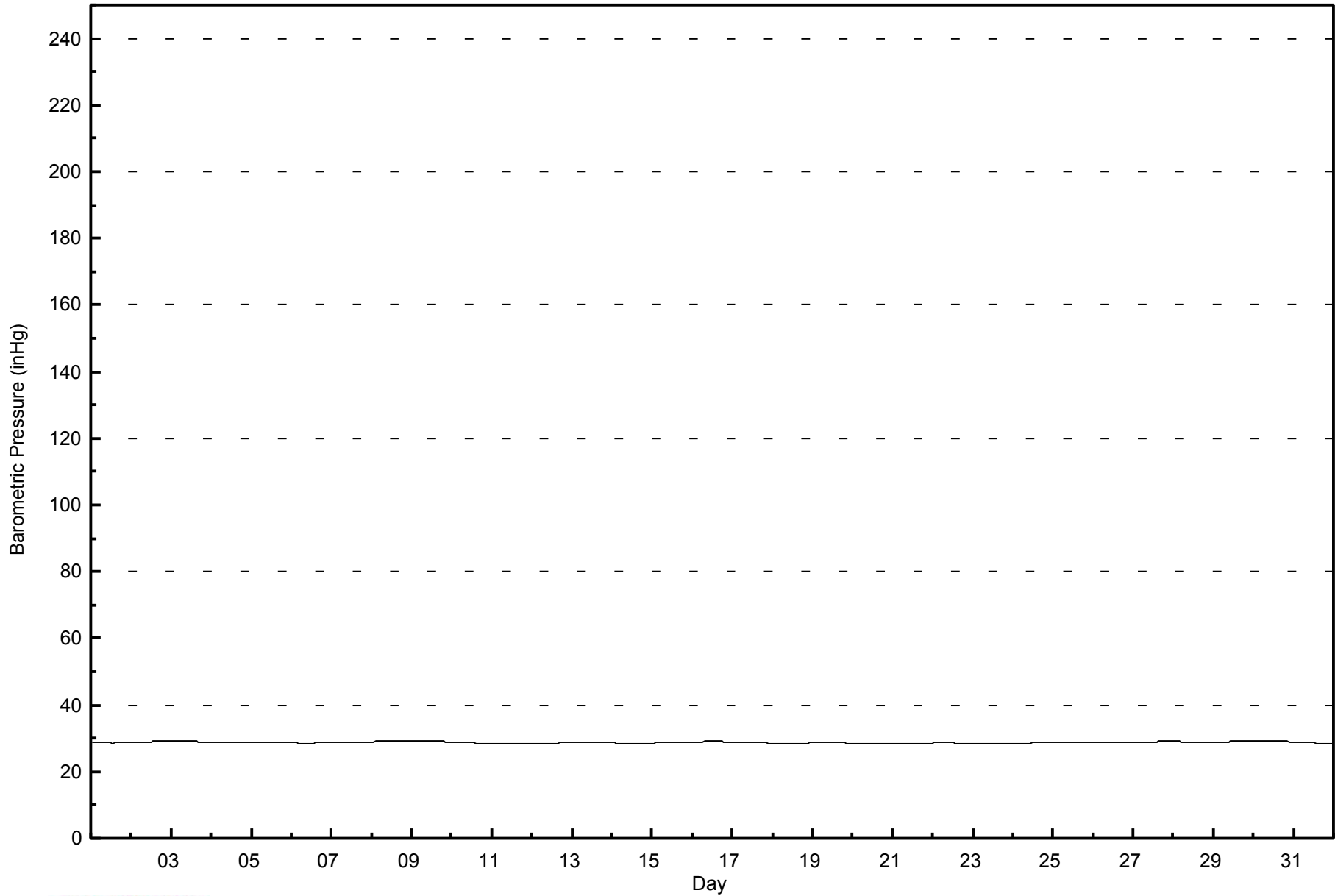


Maximum Value: 29.3 inHg on Oct 30 03:00		Maximum Daily Average: 29.2 inHg on Oct 30		Hours in Service: 744																																													
Minimum Value: 28.3 inHg on Oct 23 22:00		Minimum Daily Average: 28.3 inHg on Oct 11		Hours of Data: 744																																													
Maximum Diurnal Average: 28.8 inHg at hour 11		Minimum Diurnal Average: 28.7 inHg at hour 16		Hours of Missing Data: 0																																													
Monthly Average: 28.76 inHg		Percentiles: P <sub>1</sub> = 28.3 P <sub>10</sub> = 28.5 Q <sub>1</sub> = 28.6 Median = 28.7 Q <sub>3</sub> = 29.0 P <sub>90</sub> = 29.1 P <sub>99</sub> = 29.2		Hours of Calibration: 0																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.7	28.8																							
2-Oct	28.8	28.8	28.8	28.8	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.0	29.2																							
3-Oct	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.8	29.1	29.2																								
4-Oct	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8																							
5-Oct	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.8	28.8																							
6-Oct	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.7																							
7-Oct	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	28.8	29.0																							
8-Oct	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1																							
9-Oct	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.1	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.2																							
10-Oct	29.0	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.7	29.0																							
11-Oct	28.4	28.4	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.4	28.4	28.4	28.4	28.3	28.4																								
12-Oct	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.6	28.7																							
13-Oct	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.7	28.7																							
14-Oct	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6																							
15-Oct	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.7	28.9																							
16-Oct	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1																							
17-Oct	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.5	28.8	29.0																							
18-Oct	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.5	28.6																							
19-Oct	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.8																							
20-Oct	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.5	28.5																							
21-Oct	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.5	28.6																							
22-Oct	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.6	28.5	28.5	28.5	28.6	28.7																							
23-Oct	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.3	28.3	28.3	28.3	28.3	28.3	28.4	28.5																							
24-Oct	28.3	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.6	28.8																							
25-Oct	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9																							
26-Oct	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	28.8	28.8	28.8	28.8	28.9	28.9	28.8	28.9																							
27-Oct	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.0	29.1																							
28-Oct	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.1																							
29-Oct	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.1	29.2																							
30-Oct	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	29.1	29.1	29.1	29.1	29.1	29.1	29.0	28.9	28.9	29.2	29.3																							
31-Oct	28.9	28.9	28.9	28.8	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.9																							
																								28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	Diurnal Average	
																								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	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Barometric Pressure (BP) - inHg**  
**Shell Muskeg River - October 2014**





Maximum Speed: 25 km/h on Oct 2 17:00	Maximum Daily Speed Average: 16.3 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 13 05:00	Minimum Daily Speed Average: 1.6 km/h on Oct 13	Hours of Data: 737
Maximum Diurnal Speed Average: 2.7 km/h at hour 16	Minimum Diurnal Speed Average: 0.6 km/h at hour 12	Hours of Missing Data: 7
Monthly Average Velocity: 1.2 km/h 117.1 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 8 Q <sub>3</sub> = 13 P <sub>90</sub> = 17 P <sub>99</sub> = 20	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-Oct	NE13	NE13	NE14	N7	NNW7	NNE2	S3	SE2	E9	E9	ESE6	ENE11	E7	NE10	NNE15	NNE17	NNE17	NNE17	NNE19	N19	N19	N16	NNW9	NNW7	NNE9.1	N19	
2-Oct	W8	WNW11	WNW11	NNW16	NNW13	NNW15	NNW15	NW18	NW17	NNW19	NNW24	NNW21	NNW21	NW20	NW25	NW23	NW25	NW23	WNW17	WNW14	WNW13	NW12	WNW12	WNW13	NW16.3	NW25	
3-Oct	WNW13	WNW13	WNW12	WNW12	W10	WSW5	SW6	SW6	SW6	S6	SSW7	SSW8	SSW9	S9	SSE9	SSE11	SSE9	SSE8	S8	S11	S13	S9	SE10	SSE9	SSW5.7	S13	
4-Oct	SSE8	SSW4	S3	SW2	E3	SE4	SSE5	S5	S5	WSW6	WNW5	NNW3	N5	N6	NNE4	ESE3	NW5	WNW7	WSW6	SW4	SW6	WSW6	WSW4	SSW5	SW1.8	SSE8	
5-Oct	SSW5	SSW5	SSW5	S8	S7	S10	SSW7	SW10	SW11	SSW8	S6	SW4	N5	NE12	NE20	NE20	NE20	NE20	NE17	NE15	NE15	NE12	NE12	NE5	ENE4.2	NE20	
6-Oct	SE3	SE4	ESE5	S3	S4	SE5	S4	S3	S2	SSE2	E6	E2	NW6	N9	N10	N9	NNW7	WNW6	WNW8	WNW12	WNW12	W12	W10	W13	WNW2.5	W13	
7-Oct	WNW10	W14	WNW16	W15	WNW14	WNW15	WNW16	WNW14	WNW11	WNW9	NW9	N8	NNE11	NE18	NE18	NE17	ENE14	ENE12	ENE13	E9	SE5	S4	S4	S4	NNW4.1	NE18	
8-Oct	SSE4	SE5	SE4	SE5	ESE3	SE4	ESE4	SSE3	SSE3	SSE2	NNW3	NNE3	NE4	E3	ENE6	E5	E6	E11	E10	SE5	ESE6	SSE6	SSE7	SSE6	ESE3.7	ENE11	
9-Oct	E4	ESE6	SE3	ESE5	E8	ESE4	SSE3	SSW4	SW3	SSW3	ENE1	NNW4	NNW6	NNW6	NNW5	NNW4	NNW4	ENE3	ESE4	SSE6	SSE6	S8	S11	S8	SE1.6	S11	
10-Oct	SSW5	SSW6	SSW6	SSW6	SSW6	SW7	SW9	SSW7	SSW6	SW7	SSW10	SW10	SSW10	SSW13	SSW15	SSW11	S7	SSW6	SSW8	S7	S9	S9	S6	SSW7	SSW7.8	SSW15	
11-Oct	SSW8	S9	SSW7	SW10	SSW7	SW13	WSW18	WSW24	WSW22	W20	W18	WSW18	W19	WSW20	W21	W10	WSW21	W18	WSW13	WSW14	WSW16	WSW14	W15	WSW17	WSW14.7	WSW24	
12-Oct	W15	W15	W12	W10	W9	WSW11	SW7	S6	SW8	WSW9	WSW10	W9	WNW11	WNW16	NW11	NW11	WNW9	W11	WNW16	W13	W13	W15	WNW11	W8	W10.1	WNW16	
13-Oct	SW4	SW2	AF	SW4	W0	SSE3	S5	S6	SSW5	S6	SSW5	SW8	SW7	SSW6	SW5	E2	E3	NE4	ENE5	NE14	NE15	NE15	NE9	NE11	ESE1.6	NE15	
14-Oct	ENE11	NE8	NE6	NE12	N5	NNE11	NNE14	NNE13	NE19	NE17	NNE17	NNE12	NNW3	NW8	NW7	WNW6	W5	SSW3	S3	W11	WNW16	WNW19	WNW21	N6.3	WNW21		
15-Oct	WNW14	WNW14	W14	W12	WSW8	WSW12	W13	W13	WSW15	W14	W14	WNW13	WNW11	NW12	NW14	NW10	NNW11	NNW10	NNW12	N10	NNW6	NNW6	SSE2	SSW3	WNW9.2	WSW15	
16-Oct	SSE3	NE13	NE13	NE12	ENE8	SW4	SW3	SW2	S3	ESE8	ESE7	S4	S5	SSW5	ESE3	WNW4	WNW5	NE4	E8	SSE2	SE5	SSE5	SSE5	SSW4	E2.3	NE13	
17-Oct	WSW4	SW4	SSW3	S6	S7	SSW6	S7	S8	S7	SSE7	SE12	SSE15	SSE17	SE19	SE19	SE20	SE19	SE20	SE19	SE20	SE19	SE12	SE14	SE16	SE17	SE11.3	SE20
18-Oct	SE15	SE15	SE8	SE5	SE7	SE7	SSE6	SSE7	SE4	SE6	SSE8	SSE7	SSE7	SSE7	SE6	SSE7	SSE7	SSE7	SSE7	SSE7	S9	S8	SSW9	SW2	SE6	SSW7.0	SE15
19-Oct	SE7	SSE6	SSE4	SE1	ENE4	E6	ENE4	ESE3	ESE4	SE4	SSE3	SW4	WSW6	WSW6	WSW4	SSW6	SW2	E5	ESE8	SE6	SE6	SE7	ESE8	ESE7	SE3.3	ESE8	
20-Oct	SE5	SSE5	ESE6	SE7	SE7	SE8	SE7	SE7	SE8	SE7	SE9	SE10	SE12	SE10	SE10	SE10	SE10	ESE6	ESE5	SE6	SE6	SE6	SE8	SE6	SE7	SE7.4	SE12
21-Oct	SE6	SE8	ESE8	ESE7	ESE7	ESE7	ESE9	ESE8	ESE6	ESE7	ESE8	SE9	SSE17	SSE12	SSE13	SE10	SE7	SE6	SE5	ESE7	SE8	SE8	SE8	SE9	SE8.1	SSE17	
22-Oct	SE9	SE8	SE6	SE6	SE7	SE7	ESE7	SE6	SE4	SSE6	SE4	W2	WNW0	SSW5	E4	E10	E12	E11	E13	ESE11	ESE17	ESE13	ESE11	ESE12	ESE7.2	ESE17	
23-Oct	ESE11	SSE5	SE4	E5	ESE3	SSE4	SW5	NNE6	NE9	NE7	S2	SW3	N1	E9	ESE7	ENE7	NE12	NE16	NE16	NE15	NNW6	SW12	SW12	SSW14	ENE2.9	NE16	
24-Oct	SSW15	SSW16	SSW16	S14	S10	SSE8	S14	S9	AF	AF	AF	AF	AF	AF	AF	SSW12	SSW18	SW20	SW18	SSW11	SSE10	S13	S13	S13	SSW12.9	SW20	
25-Oct	S12	S10	SSW12	SW13	SW8	S5	SE7	SSE8	SSE7	SE7	ESE7	SE8	SE9	SE7	ESE5	E5	E6	ENE5	NE6	NE7	NE8	NE9	NE11	NE11	SE4.0	SW13	
26-Oct	NE12	NE12	NNE13	NNE16	NNE17	NNE21	NE19	NNE17	NNE14	NNE17	N15	NNE20	N14	NNE15	N16	N18	N19	N17	N18	N19	N19	N15	N13	N13	NNE15.7	NNE21	
27-Oct	N13	N15	N13	N14	N12	N14	N14	N12	N11	NNE13	NNE14	NNE11	NNE11	NE10	ENE10	ENE8	ENE7	W4	NW5	NNE10	NE12	NE9	ENE6	ENE5	NNE9.3	N15	
28-Oct	ESE2	ESE3	SE5	SE6	SSE6	SE6	SE7	SE7	SE7	SE8	SE7	SE6	ESE7	ESE6	ESE6	ESE6	ESE7	ESE5	ESE6	SE3	ESE5	ESE4	ENE5	ENE6	ESE5.3	SE8	
29-Oct	ENE6	NE9	NE12	NE11	NE8	NE10	NE14	ENE14	ENE11	ENE12	NE12	NE14	NE13	NE15	NE15	ENE12	ENE13	NE14	ENE9	E8	E7	E5	ESE5	SE5	ENE10.0	NE15	
30-Oct	SE8	ESE9	ESE9	SE9	SE10	SE11	SE12	SE14	SE13	SE13	SE13	SE15	SE17	SE15	SE19	SE15	SE13	ESE12	ESE12	ESE14	SE14	SE15	ESE16	SE17	SE13.1	SE19	
31-Oct	ESE16	ESE17	ESE17	ESE14	ESE14	ESE14	ESE11	ESE13	SE13	ESE11	SE12	SE11	SE10	SE10	SE10	SE8	SE9	SE9	SSE9	SSE7	SE8	SE7	SSE6	SE5	SE10.6	ESE17	

SSE2.3	SE1.5	SE1.1	SSE0.8	SE1.1	SSE1.7	SSE1.8	S1.5	SSE1.4	ESE1.4	ESE0.9	ESE0.6	ESE0.7	ENE1.6	ENE2.0	ENE2.7	NE2.2	NE2.1	ENE2.4	E2.2	ESE1.7	SSE1.6	SSE1.8	S2.2	Diurnal Average	
ESE16	ESE17	ESE17	NNE16	NNE17	NNE21	NE19	WSW24	WSW22	W20	NNW24	NNW21	NNW21	NW20	NW25	NW23	NW25	NW23	NNE19	N19	N19	N16	WNW19	WNW21	Diurnal Maximum	

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



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

**Wind Speed (WS) - km/h**  
**Shell Muskeg River - October 2014**

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 8 km/h on Oct 2 11:00			Hours of Data:	737
Minimum Value: 0 km/h on Oct 14 20:00			Hours of Missing Data:	7
			Hours of Calibration:	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> = 4 P <sub>99</sub> = 7			Percent Operational Time:	99.1

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

Diurnal Maximum

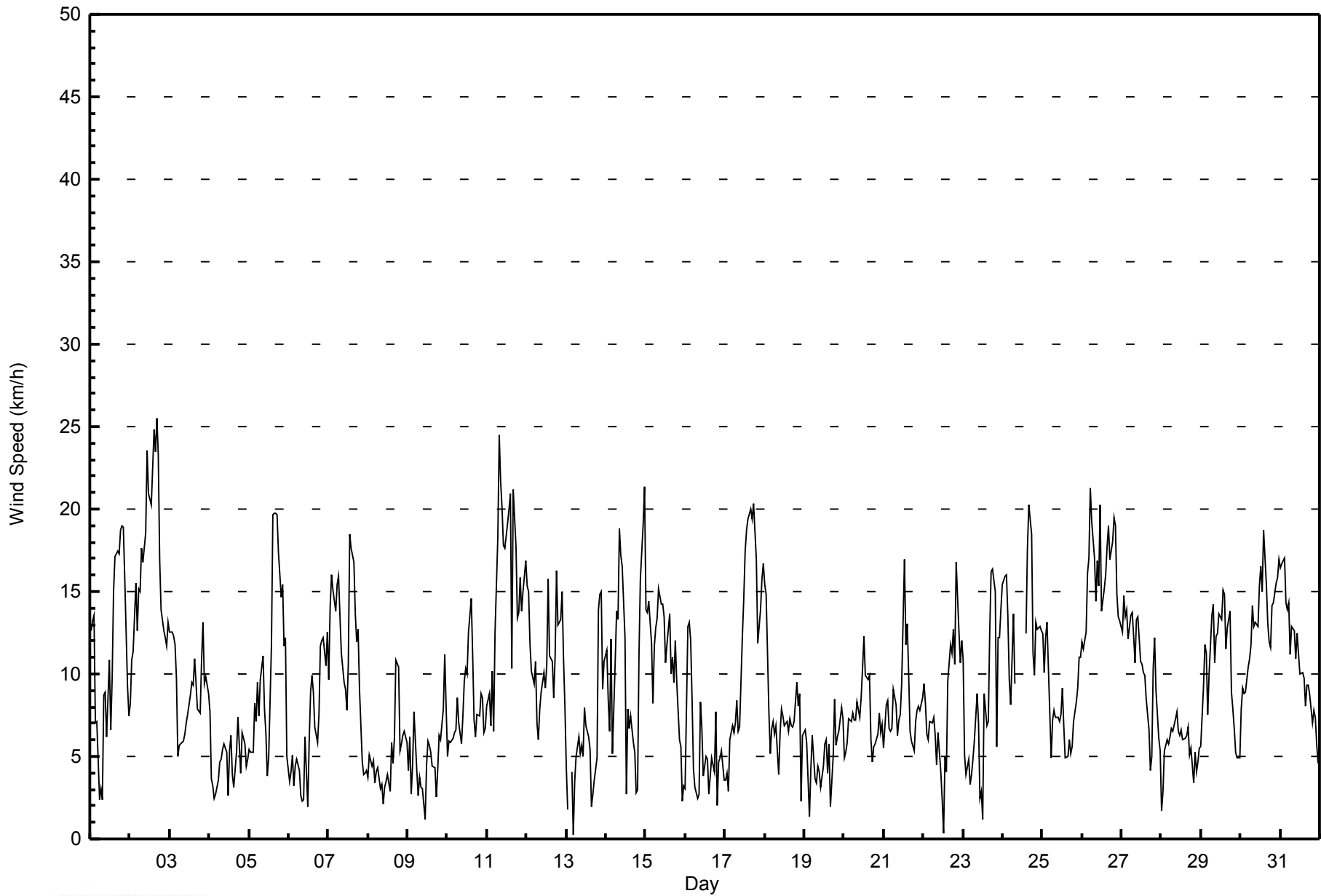
AF - Analyzer Failure





**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Shell Muskeg River - October 2014**





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

**Wind Speed (WS) - km/h**  
**Shell Muskeg River - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	167	22.66	22.66
6 - 11	326	44.23	66.89
12 - 19	220	29.85	96.74
20 - 28	24	3.26	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 737

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Shell Muskeg River - October 2014**

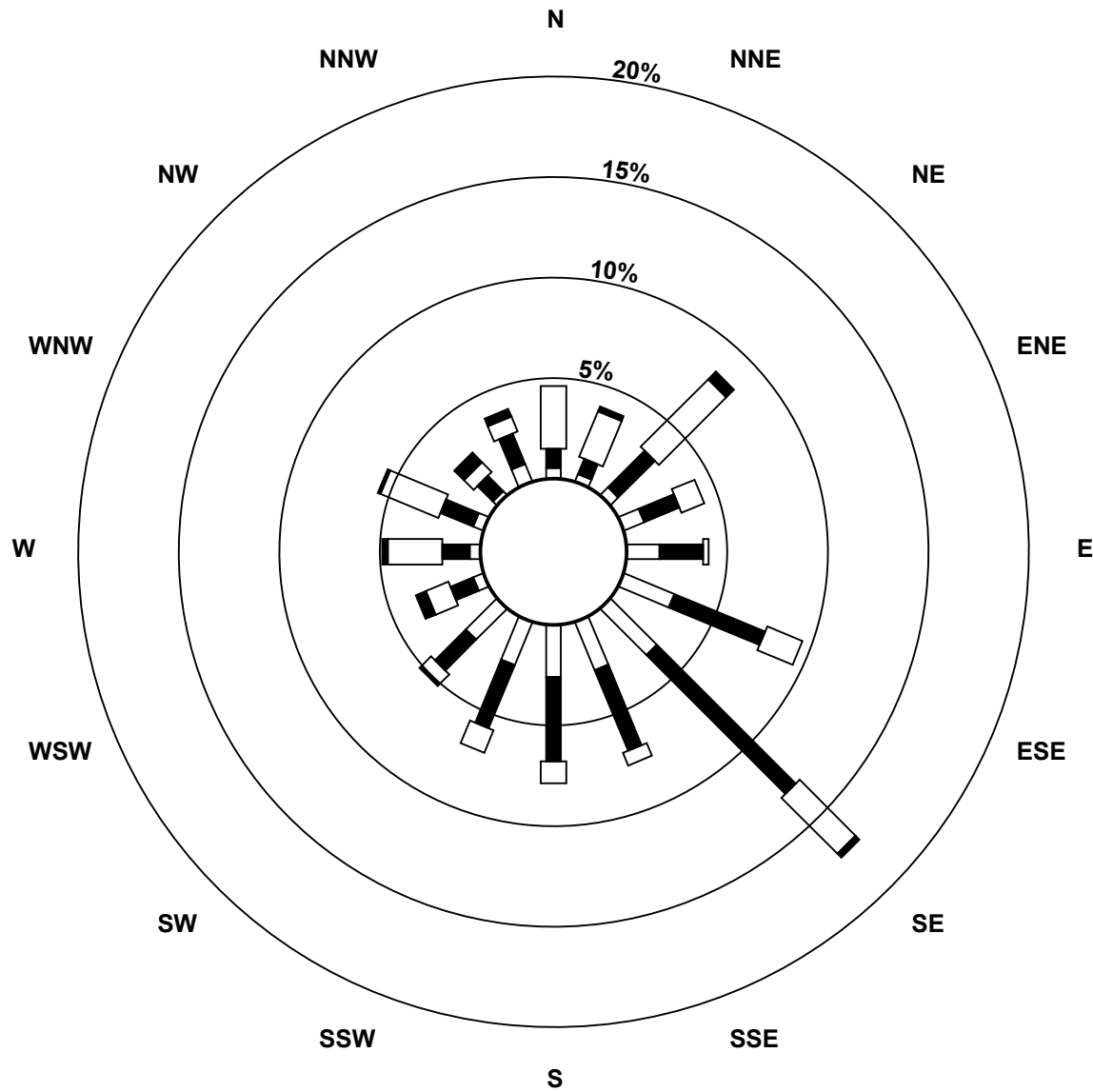
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	3	4	8	12	20	24	19	19	17	16	4	4	4	2	7	167
6 - 11	7	6	19	14	16	36	72	32	31	25	16	9	10	13	8	12	326
12 - 19	23	18	35	9	2	14	29	5	8	9	5	9	20	23	5	6	220
20 - 28	0	2	4	0	0	0	2	0	0	0	1	4	2	1	5	3	24
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>	34	29	62	31	30	70	127	56	58	51	38	26	36	41	20	28	737

Total Number of Valid Hours: 737

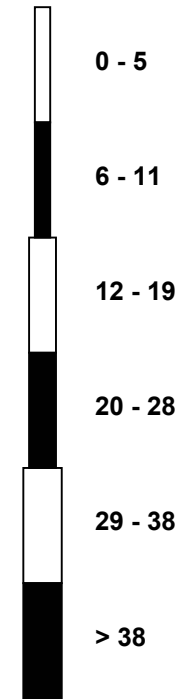
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Wind Speed (WS) - km/h  
Shell Muskeg River (AMS 16)**



**Classes (km/h)**



**Total Number of Valid Hours: 737**



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

**Wind Direction (WD) - deg**  
**Shell Muskeg River - October 2014**

Direction of Maximum Speed: 315 deg on Oct 2 17:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 316.4 deg on Oct 2	Hours of Data: 737
Direction of Minimum Speed: 275 deg on Oct 13 05:00	Direction of Minimum Daily Speed Average: 1.6 deg on Oct 13
Direction of Minimum Speed: 275 deg on Oct 13 05:00	Hours of Missing Data: 7
Monthly Average Direction: 215.2 deg	Percent Operational Time: 99.1

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	54	42	47	356	330	20	170	139	85	82	108	74	84	43	19	23	17	20	12	3	2	356	340	327	25.5	
2-Oct	275	295	296	328	331	342	331	324	325	329	330	331	327	326	316	316	315	308	293	298	296	313	294	294	316.4	
3-Oct	290	299	287	294	281	237	222	219	215	187	200	200	193	181	166	153	151	163	174	175	185	170	143	160	202.8	
4-Oct	167	195	188	226	96	124	150	172	190	248	290	333	351	358	29	104	322	299	245	225	227	251	242	205	233.2	
5-Oct	204	199	196	190	185	185	199	216	218	192	179	217	358	39	54	54	50	40	39	38	53	42	53	37	67.5	
6-Oct	133	126	112	171	170	140	171	178	182	160	94	87	308	352	355	352	329	298	300	294	283	270	272	264	289.9	
7-Oct	283	281	286	275	284	288	295	303	284	298	312	349	33	54	53	55	68	70	76	85	127	171	174	189	337.9	
8-Oct	158	144	139	133	123	146	108	155	159	159	342	12	49	85	74	94	94	79	81	130	107	165	164	162	115.1	
9-Oct	95	120	139	103	82	106	148	213	231	192	69	333	345	343	347	327	340	75	116	153	168	176	180	177	137.7	
10-Oct	201	208	210	206	211	215	219	202	204	217	213	216	198	198	193	192	182	197	196	178	171	191	191	202	199.9	
11-Oct	199	188	206	221	197	235	247	258	251	260	263	258	266	255	262	277	258	260	256	247	249	245	263	258	251.3	
12-Oct	267	275	273	264	262	250	229	190	222	240	246	259	294	302	306	315	293	273	285	273	265	263	292	277	271.4	
13-Oct	236	224	AF	222	275	164	182	184	197	180	207	226	221	209	216	92	91	48	69	56	54	53	44	46	111.4	
14-Oct	58	50	46	53	4	26	32	30	38	41	30	27	337	322	315	313	299	272	206	180	275	291	288	290	357.9	
15-Oct	285	298	276	265	253	238	260	265	254	275	274	288	294	316	308	321	333	333	345	349	328	339	164	213	289.8	
16-Oct	152	47	41	43	63	227	214	220	187	106	103	173	172	194	102	301	289	40	87	154	146	154	157	204	100.7	
17-Oct	252	234	212	180	188	192	183	179	176	165	145	154	148	143	136	131	134	134	138	139	125	131	130	133	146.2	
18-Oct	132	133	140	136	136	146	156	162	137	137	167	155	153	152	143	147	149	159	162	171	186	202	221	128	152.0	
19-Oct	129	147	166	134	64	101	75	123	119	137	164	215	257	238	258	211	232	96	111	133	129	127	115	104	136.8	
20-Oct	136	152	122	142	133	134	145	126	130	126	130	132	127	126	137	126	120	115	127	124	126	138	133	146	131.4	
21-Oct	135	125	123	123	113	116	119	122	117	112	120	140	152	147	148	141	139	137	128	115	127	127	128	132	130.7	
22-Oct	144	137	132	134	129	130	123	131	131	150	137	273	287	206	99	93	83	87	99	110	103	110	116	116	116.6	
23-Oct	120	156	142	92	111	167	217	29	42	42	183	226	356	82	111	59	44	37	36	36	345	218	220	200	77.9	
24-Oct	200	195	192	177	183	163	178	191	AF	AF	AF	AF	AF	AF	AF	204	209	215	227	200	168	172	179	183	188	193.0
25-Oct	187	184	196	225	218	178	143	153	157	139	118	137	129	126	103	93	81	78	53	43	41	39	40	44	127.7	
26-Oct	45	44	33	28	26	30	40	24	17	19	9	24	8	14	6	357	356	358	357	355	355	2	9	360	14.0	
27-Oct	0	353	354	355	358	351	355	356	6	19	21	12	17	40	60	57	58	272	326	29	44	55	58	60	15.0	
28-Oct	102	121	126	143	148	141	127	137	131	132	145	134	118	117	116	110	112	102	109	124	108	110	77	66	121.1	
29-Oct	60	48	48	53	55	51	50	57	64	61	53	52	50	45	49	62	59	56	72	89	97	99	116	141	59.8	
30-Oct	132	121	122	135	129	131	130	130	127	126	125	124	129	125	130	127	128	119	123	122	126	124	122	126	126.3	
31-Oct	123	121	117	117	118	119	119	119	125	121	132	142	144	141	144	144	145	143	149	151	143	145	151	145	130.8	
158.4 143.6 144.2 161.6 130.9 147.7 161.1 172.7 158.5 118.2 117.6 120.0 110.4 69.0 74.3 70.4 52.5 50.1 71.9 85.9 109.5 155.5 154.4 171.3																										
Diurnal Average																										

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



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

**Wind Direction (WD) - deg**  
**Shell Muskeg River - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 103 deg on Oct 9 11:00	Hours of Data: 737
Minimum Value: 4 deg on Oct 26 02:00	Hours of Missing Data: 7
Percentiles: P <sub>1</sub> = 5 P <sub>10</sub> = 9 Q <sub>1</sub> = 11 Median = 15 Q <sub>3</sub> = 25 P <sub>90</sub> = 43 P <sub>99</sub> = 89	Hours of Calibration: 0
	Percent Operational Time: 99.1

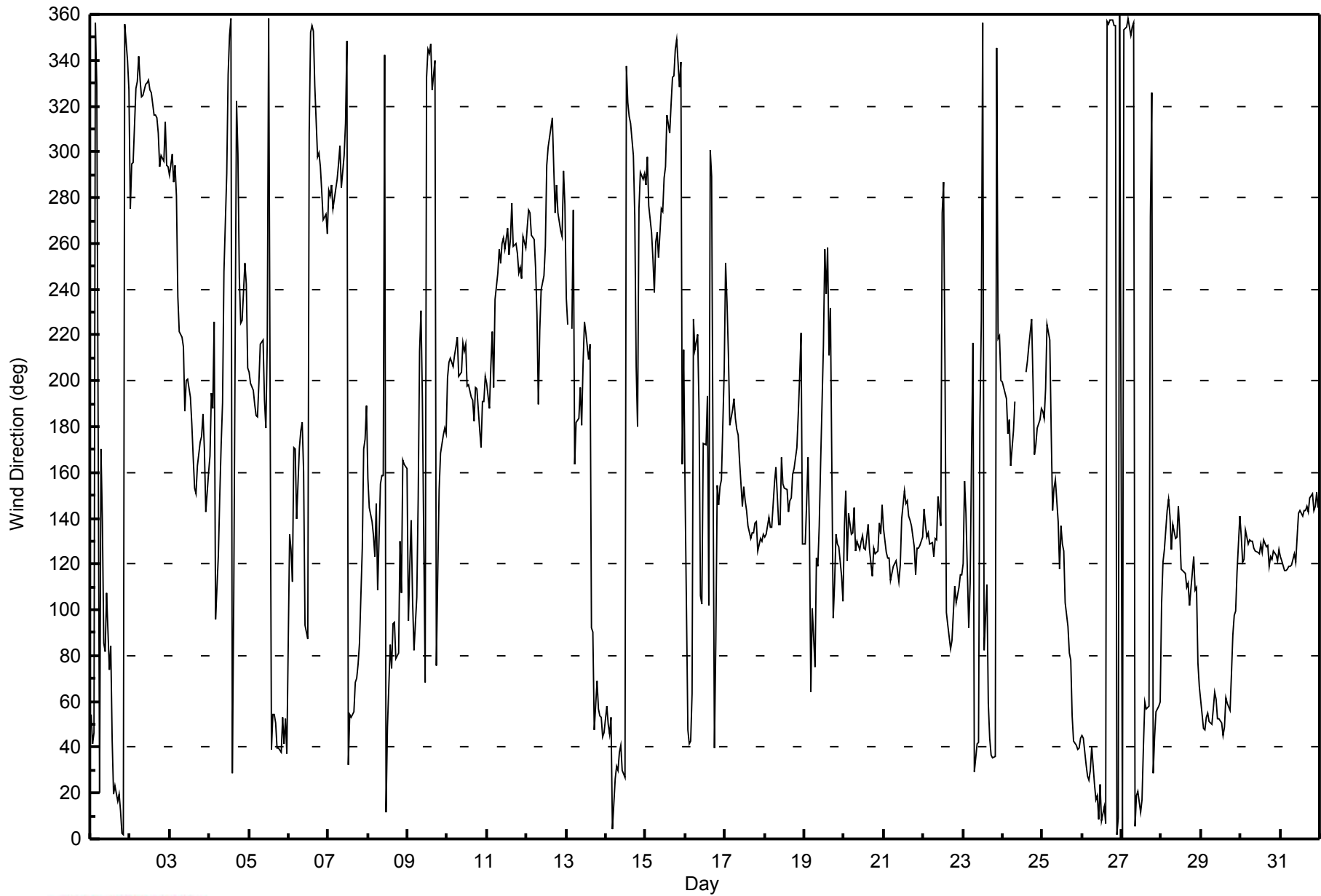
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	18	15	18	27	14	77	31	57	18	18	33	16	22	30	20	18	18	20	19	21	22	23	27	32	77
2-Oct	11	15	15	19	22	25	20	19	17	21	22	22	20	21	17	16	16	14	11	11	9	11	13	9	25
3-Oct	8	11	10	12	13	42	24	19	21	27	30	34	28	28	21	18	18	17	16	17	18	19	16	15	42
4-Oct	16	32	29	58	39	16	14	20	21	25	28	66	30	37	58	61	71	20	17	14	14	19	34	25	71
5-Oct	20	15	19	21	17	16	19	22	22	25	35	73	49	28	10	8	11	13	16	20	11	19	19	64	73
6-Oct	39	24	42	24	27	22	33	53	72	62	30	97	40	24	22	19	21	26	20	14	12	8	10	8	97
7-Oct	10	11	11	10	11	12	10	19	17	20	23	31	39	8	9	12	17	19	9	18	26	24	26	25	39
8-Oct	23	7	12	11	48	25	17	18	26	61	58	50	40	56	32	43	10	13	14	18	25	15	15	15	61
9-Oct	22	17	34	21	11	26	47	13	28	52	103	47	30	29	32	41	42	30	26	15	16	14	13	16	103
10-Oct	22	18	20	18	18	15	15	19	20	21	25	22	26	23	20	20	16	20	18	11	11	18	13	19	26
11-Oct	15	15	39	27	26	19	9	8	9	12	13	13	18	25	17	17	12	9	8	6	7	15	9	7	39
12-Oct	8	12	14	17	14	9	17	24	14	14	17	21	27	15	17	15	12	11	11	10	12	8	20	8	27
13-Oct	32	74	AF	36	90	24	12	11	17	23	38	20	28	37	50	67	35	35	41	7	6	7	29	21	90
14-Oct	7	15	28	10	49	19	12	13	10	11	9	15	65	23	29	14	18	9	47	47	27	11	13	13	65
15-Oct	14	21	14	9	20	12	10	10	11	18	20	23	30	25	20	34	23	18	19	17	18	44	64	43	64
16-Oct	62	19	19	18	43	27	30	36	42	16	26	51	60	38	63	44	24	58	25	76	14	13	14	34	76
17-Oct	18	13	14	11	11	13	13	11	14	21	16	16	14	14	14	15	14	12	13	12	14	13	12	11	21
18-Oct	11	11	17	22	21	20	13	14	25	16	14	16	17	18	15	13	9	5	9	11	6	25	89	6	89
19-Oct	9	11	83	86	14	17	28	13	13	19	33	75	59	53	77	34	91	21	11	21	15	15	13	10	91
20-Oct	15	14	12	9	10	9	9	13	10	11	12	15	11	13	15	11	13	13	14	15	11	12	9	12	15
21-Oct	19	13	15	11	16	14	8	10	11	9	13	17	7	10	11	9	11	10	10	5	9	10	8	9	19
22-Oct	8	7	11	13	6	7	7	9	9	9	38	90	98	42	95	12	9	10	10	13	10	9	11	8	98
23-Oct	10	15	19	14	10	18	58	26	6	31	92	86	99	19	24	11	6	5	5	6	81	35	35	16	99
24-Oct	11	9	11	7	9	10	9	8	AF	AF	AF	AF	AF	AF	AF	13	12	16	14	8	5	6	7	6	16
25-Oct	7	8	11	17	18	36	19	13	16	17	13	17	14	18	18	13	9	11	10	6	5	5	4	4	36
26-Oct	4	4	10	8	17	8	9	16	34	27	40	18	41	34	42	47	48	48	48	50	49	46	41	46	50
27-Oct	48	53	51	51	45	44	43	42	37	29	31	41	35	34	11	11	41	65	60	22	10	13	12	10	65
28-Oct	42	10	11	9	10	9	12	11	11	12	11	13	13	14	15	14	14	16	14	32	15	14	28	14	42
29-Oct	21	8	5	8	14	9	10	10	10	11	11	9	11	8	9	10	7	6	17	13	14	13	12	16	21
30-Oct	13	12	12	15	12	13	12	12	11	11	11	11	11	11	11	12	11	11	11	12	12	11	12	11	15
31-Oct	11	12	11	11	11	11	12	11	12	12	11	15	13	13	13	11	11	11	10	12	9	11	12	17	17
	62	74	83	86	90	77	58	57	72	62	103	97	99	56	95	67	91	65	60	76	81	46	89	64	
	Diurnal Maximum																								

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Shell Muskeg River - October 2014**



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# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 17, 2014	Previous Calibration	September 6, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	7:45	End Time (MST)	12:50
Barometric Pressure	731 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.	3492
DACS voltage range	0-5 v	DACS channel #	1

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-710	-710
Analyzer Range (mv)	5000	5000	Lamp voltage	796	805
Calculated slope	0.991937	0.983937	Chamber temp.	45.0	45.0
Calculated intercept	2.992274	3.051608	Pressure (mmHg)	709.3	705.0
Analyzer Background	6.3	6.4	Flow (lpm)	0.452	0.449
Analyzer Coefficient	1.290	1.290	Intensity	91	90

Analyzer make Thermo 43i Analyzer serial # 1118148498

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	NA
as found span	5000	78.7	799.6	813.2	0.983
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	78.7	799.6	812.0	0.985
second point	5000	39.4	400.3	399.4	1.002
third point	5000	19.7	200.2	199.0	1.006
calibrator zero					
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	78.1	793.5	805.6	0.985
Average Correction Factor					0.998

Corrected As found 813.4 Previous response 803.1 % change -1.3%

#### Notes:

Changed inlet filter.

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

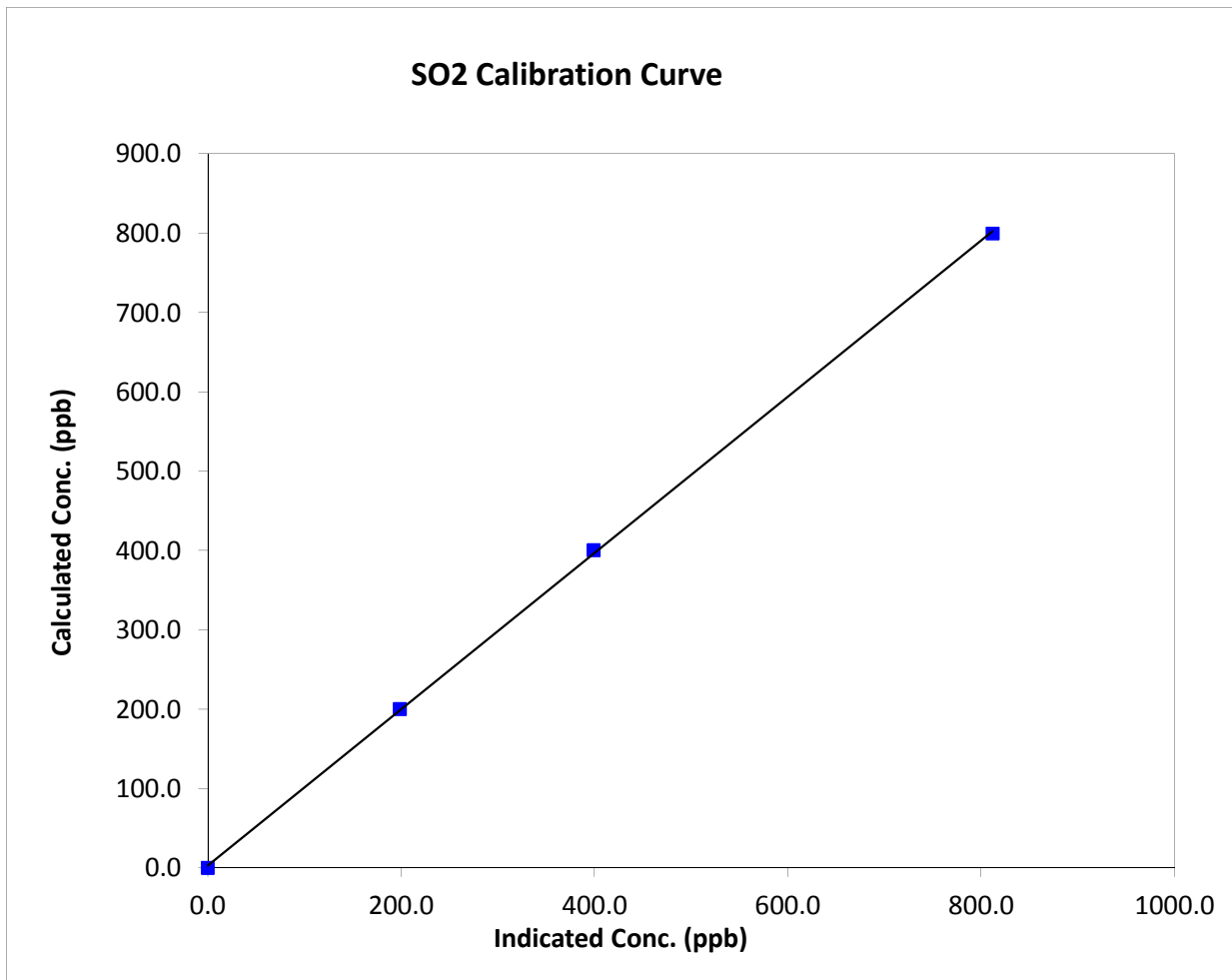
## SO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	October 17, 2014	Previous Calibration	September 6, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	7:45	End Time (MST)	12:50
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

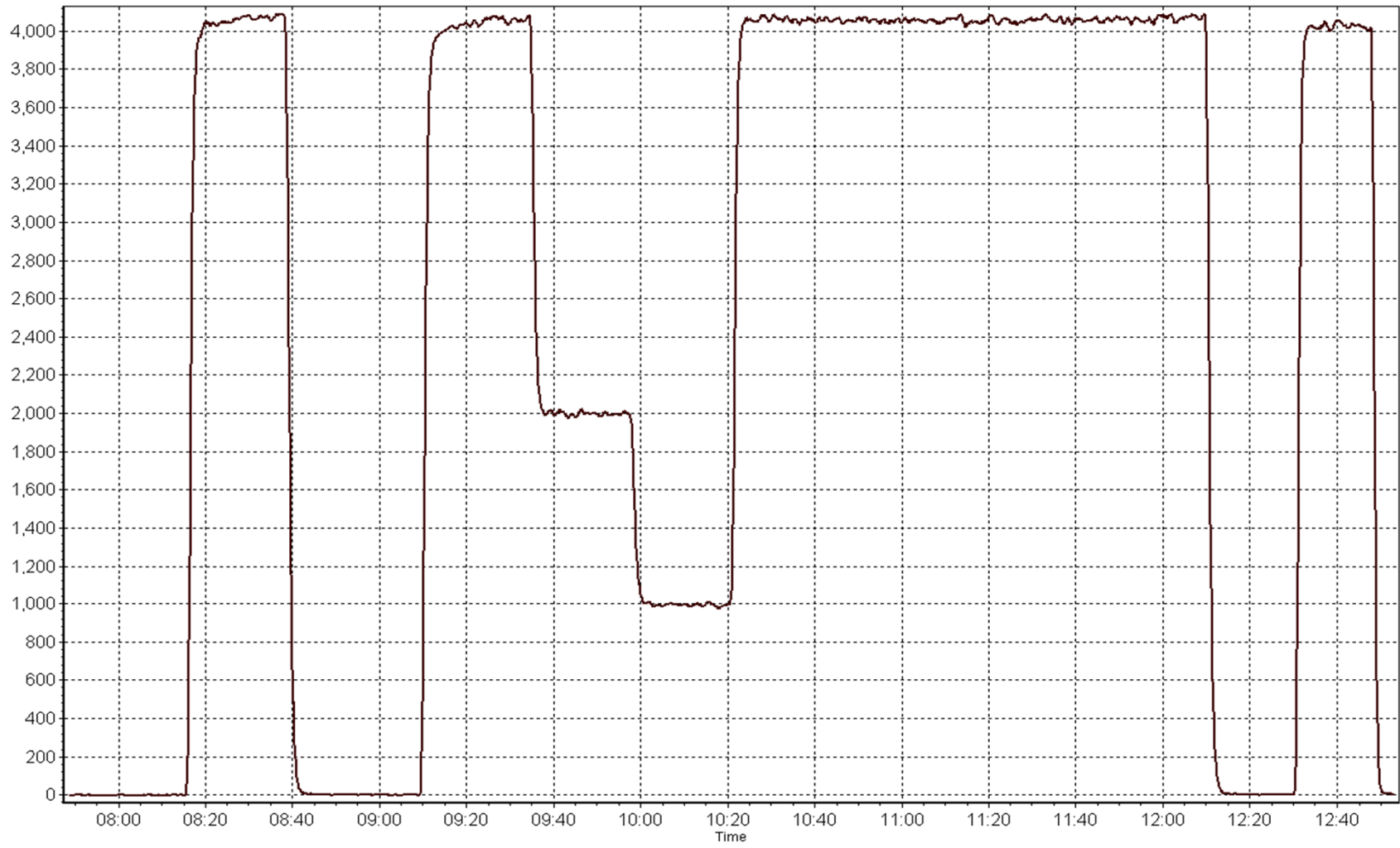
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999898
799.6	812.0	0.9847		
400.3	399.4	1.0023	Slope	0.983937
200.2	199.0	1.0058		
			Intercept	3.051608



SO2 Calibration Plot

Date: October 17, 2014





# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Friday, October 17, 2014	Previous Calibration	Saturday, September 06, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	7:45	End Time (MST)	12:50
Barometric Pressure	731 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.	3492
DACS voltage range	0-5 VDC	DACS channel #	DIFF 4

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.2	8.2
Analyzer Range (mv)	5000	5000	Air or Bypass press	34.9	34.9
Calculated slope	0.998438	0.994163	Fuel Pressure	24.2	24.2
Calculated intercept	0.083872	0.091934	Flame	n/a	157.2

Analyzer make Thermo 51i-LT Analyzer serial # 1218153485

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.19	N/A
as found span	5000	78.7	16.98	16.95	1.002
calibrator zero	5000	0.0	0.00	-0.07	N/A
high point	5000	78.7	16.98	17.01	0.998
second point	5000	39.4	8.50	8.41	1.011
third point	5000	19.7	4.25	4.19	1.016
calibrator zero					
as left zero	5000	0.0	0.00	-0.02	N/A
as left span	5000	78.7	16.98	16.82	1.010
Average Correction Factor					1.008

Corrected As found 17.14 Previous response 16.92 % change -1.3%

#### Notes:

changed inlet filter and adjusted zero.

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

## THC Calibration Summary

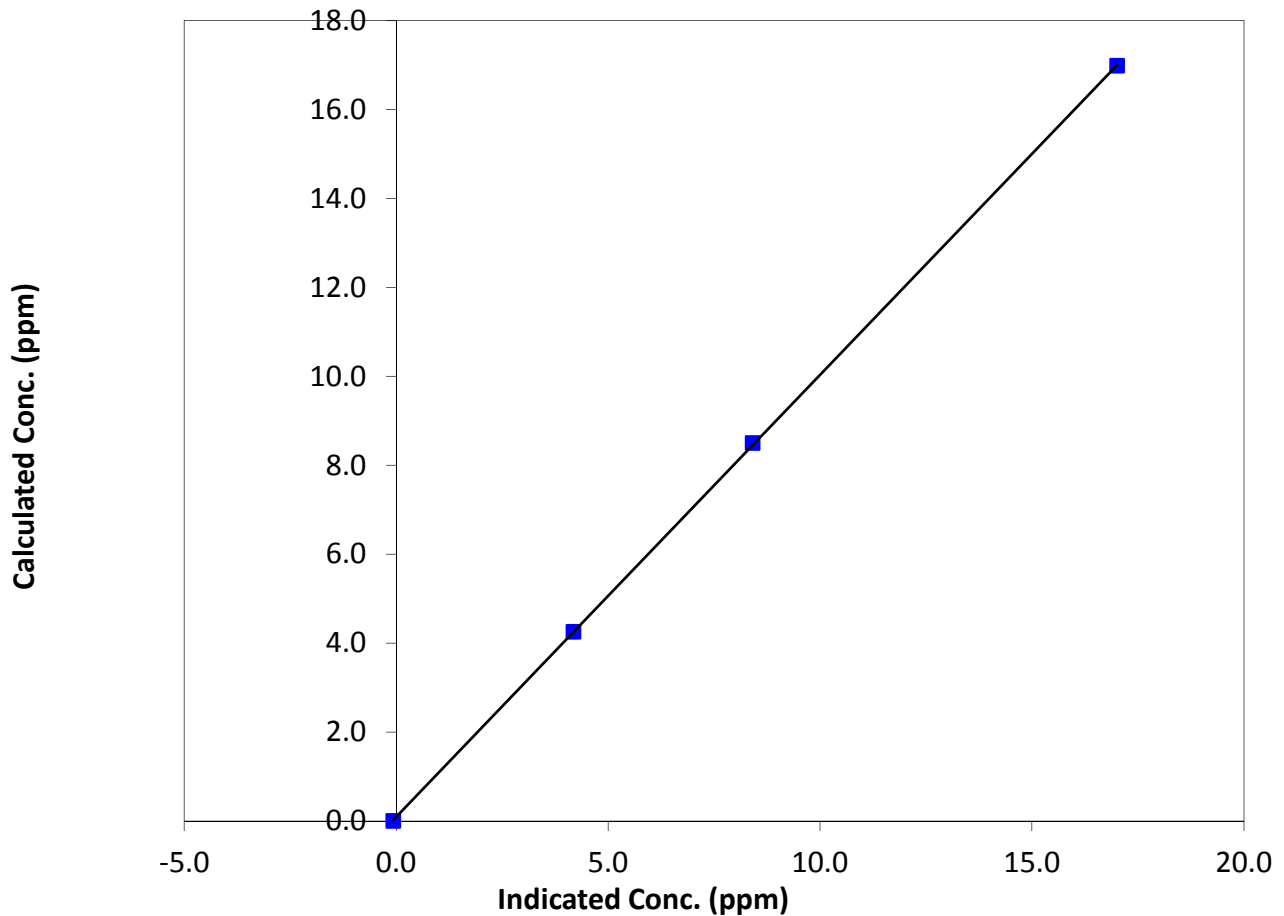
### Station Information

Calibration Date	October 17, 2014	Previous Calibration	September 6, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	7:45	End Time (MST)	12:50
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153485

### Calibration Data

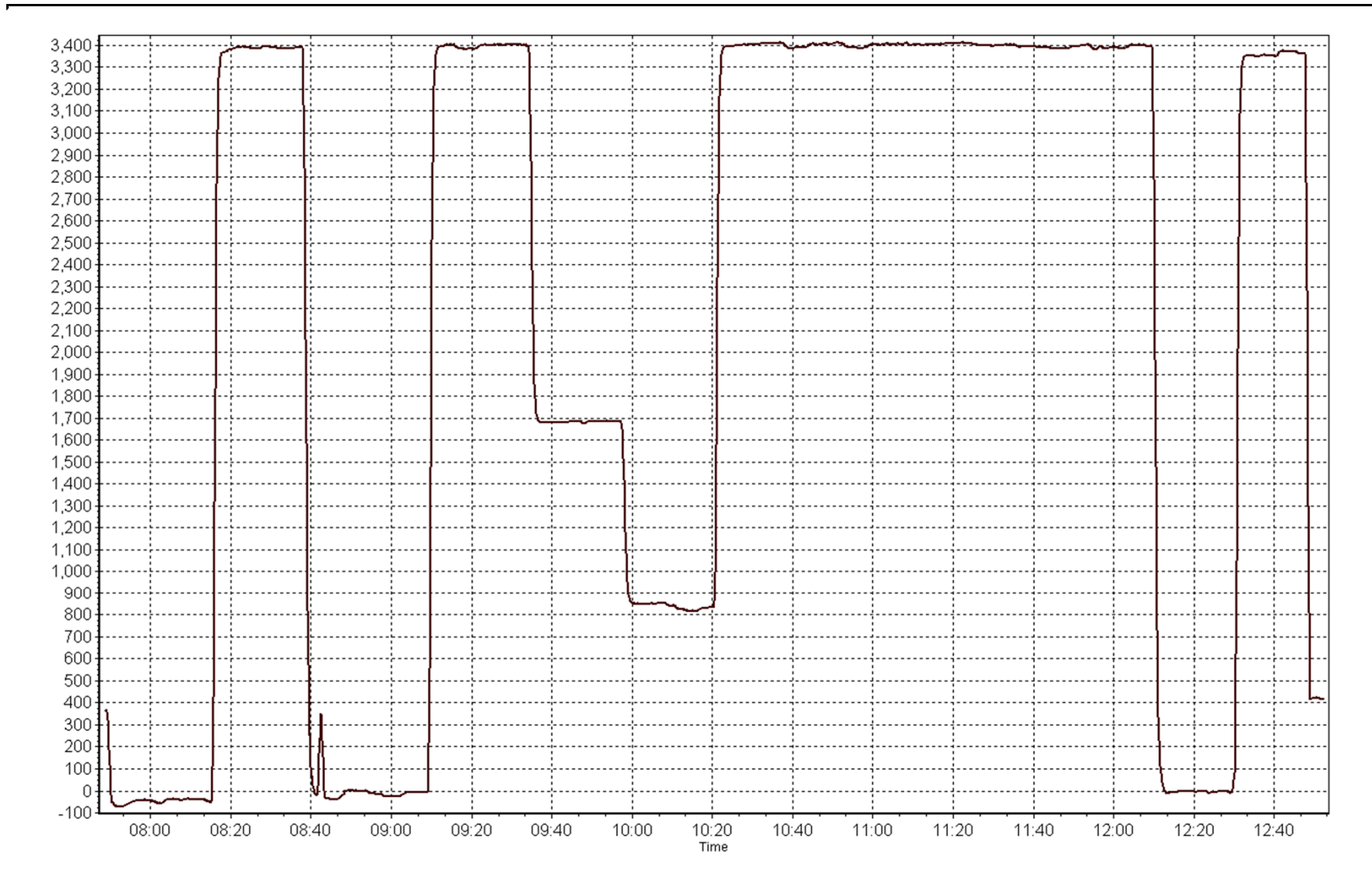
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.07	N/A	Correlation Coefficient	0.999979
16.98	17.01	0.9982		
8.50	8.41	1.0108	Slope	0.994163
4.25	4.19	1.0156		
			Intercept	0.091934

**THC Calibration Curve**



THC Calibration Plot

Date: October 17, 2014





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 17, 2014	Previous Calibration	September 6, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	7:45	End Time (MST)	12:50
Barometric Pressure	731 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
NOx Cal Gas Conc	51.3 ppm	Cal Gas Serial #	LL107937

### DACS Information

DACS make & model Campbell Scientific CR3000      DACS serial No. 8346

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	1.006600	1.004913	0.999766
	Data Offset	1.997378	2.389673	0.366515
After	Data Slope	0.998670	1.000228	1.003873
	Data Offset	2.920892	3.855097	-0.451251
Channel #		3	2	1
Voltage Range		0 - 5V	0 - 5V	0 - 5V

### Analyzer Information

Analyzer make/model API T200      Analyzer serial # 724

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	1.404	ppb	1.423	ppb
NOX coefficient	1.398	ppb	1.423	ppb
NO2 coefficient	n/a	ppb	n/a	ppb
NO bkgrnd	-0.2		-0.2	
NOX bkgrnd	0.2		0.2	
Nt coefficient	n/a		n/a	
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	315.1	Deg C	315.0	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	85.0	ccm	86.0	ccm
R Cell Press	2.9	mmHg	2.9	mmHg
Sample Flow	495.000	ccm	492.000	ccm

**Notes:**

changed inlet filter and adjusted span



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

October 17, 2014

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	-0.4	-0.2	-0.5	N/A	N/A
as found span	5000	78.7	807.5	805.9	1.6	795.7	795.6	0.1	1.0148	1.0130
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.4	N/A	N/A
high point	5000	78.7	807.5	805.9	1.6	807.8	804.4	3.4	0.9996	1.0018
second point	5000	39.4	404.2	403.5	0.8	398.0	395.6	1.2	1.0157	1.0199
third point	5000	19.7	202.1	201.7	0.4	198.3	195.2	2.0	1.0193	1.0332
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	0.5	0.9	-0.2	N/A	N/A
as left span	5000	78.1	801.3	508.0	293.3	797.2	507.6	289.0	1.0052	1.0008
Average Correction Factor									1.0115	1.0183

Corrected As found

NO<sub>x</sub>= 796.1

NO= 795.8

Percent Change

NO<sub>x</sub>= 0.5%

NO= 0.5%

Previous Response

NO<sub>x</sub>= 800.2

NO= 799.6

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

78.70

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	508.0	296.2	803.8	508.0	294.8	0.9890	1.0000	1.0047	99.5%
2nd NO <sub>2</sub> (200)	N/A	603.5	200.7	804.9	603.5	200.8	0.9876	1.0000	0.9993	100.1%
3rd NO <sub>2</sub> (100)	N/A	700.3	103.9	805.5	700.3	105.1	0.9869	1.0000	0.9891	101.1%
4th NO <sub>2</sub> (0)	804.2	N/A	5.4	809.6	804.2	5.4	0.9819	1.0000	N/A	N/A
Average Correction Factor							0.9863	1.0000	0.9977	100.2%

Calibration Performed By:

Michael Martineau





# Wood Buffalo Environmental Association

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

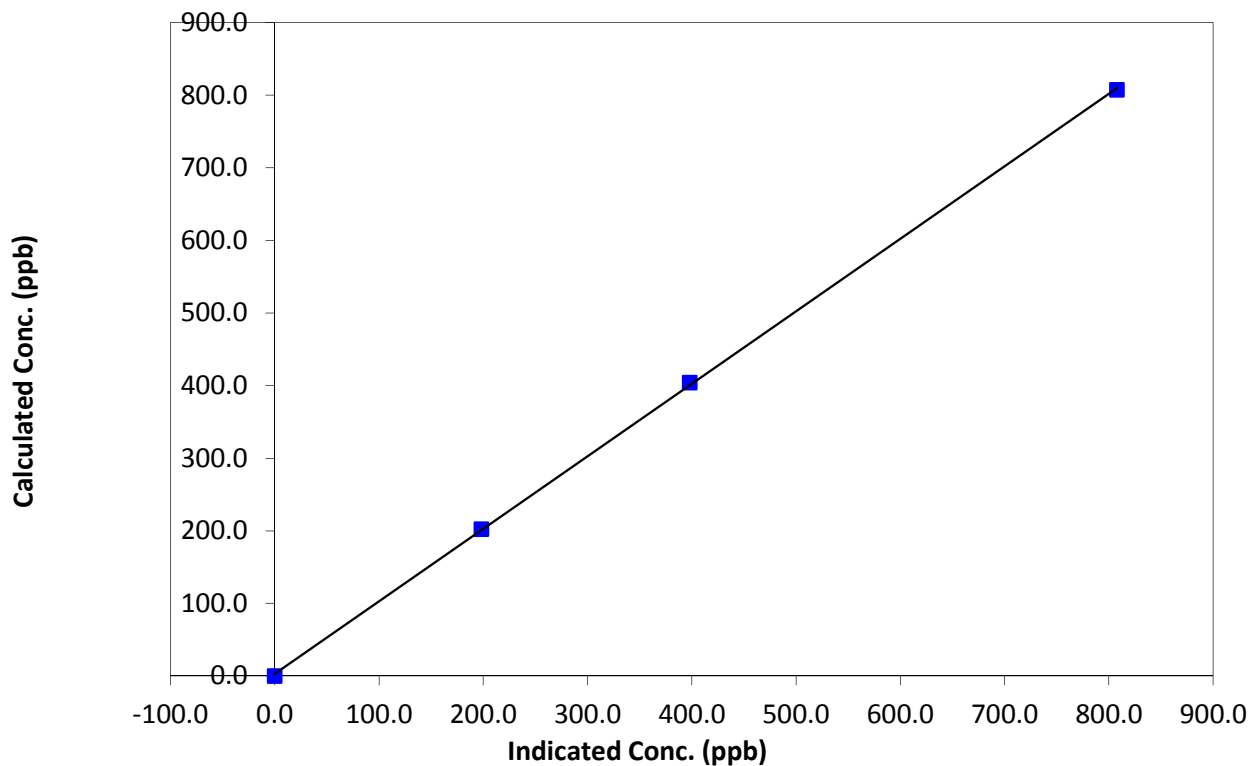
### Station Information

Calibration Date	October 17, 2014	Previous Calibration	September 6, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	7:45	End Time (MST)	12:50
Analyzer make	API T200	Analyzer serial #	724

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999919
807.5	807.8	0.9996		
404.2	398.0	1.0157	Slope	0.998670
202.1	198.3	1.0193		
			Intercept	2.920892

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

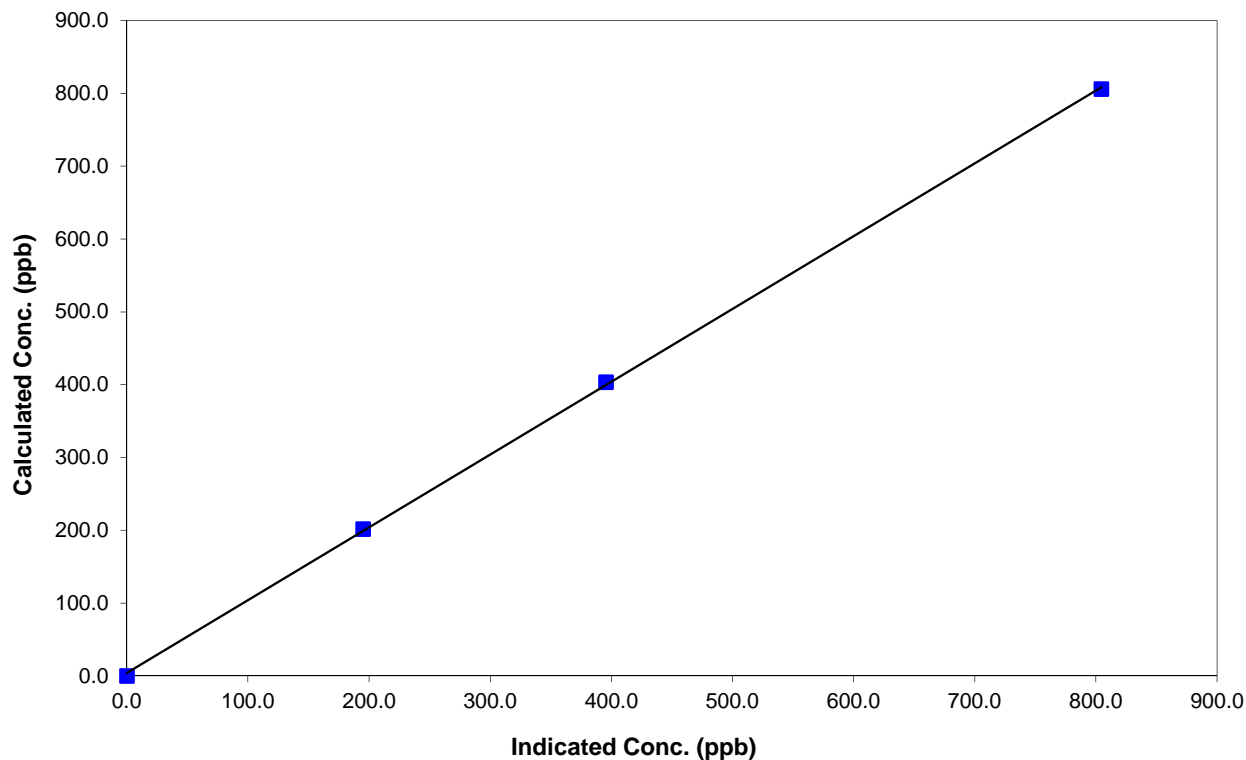
### Station Information

Calibration Date	October 17, 2014	Previous Calibration	September 6, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	7:45	End Time (MST)	12:50
Analyzer make	API T200	Analyzer serial #	724

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999876
805.9	804.4	1.0018		
403.5	395.6	1.0199	Slope	1.000228
201.7	195.2	1.0332		
			Intercept	3.855097

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

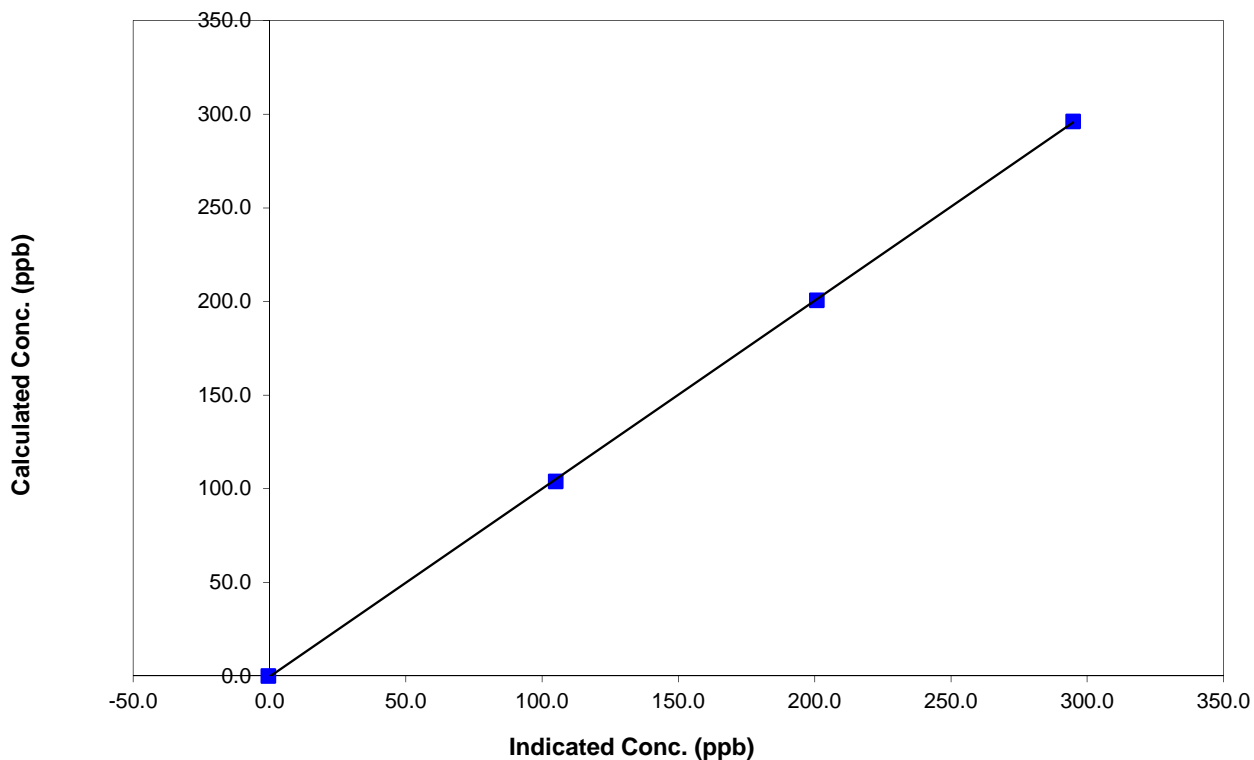
### Station Information

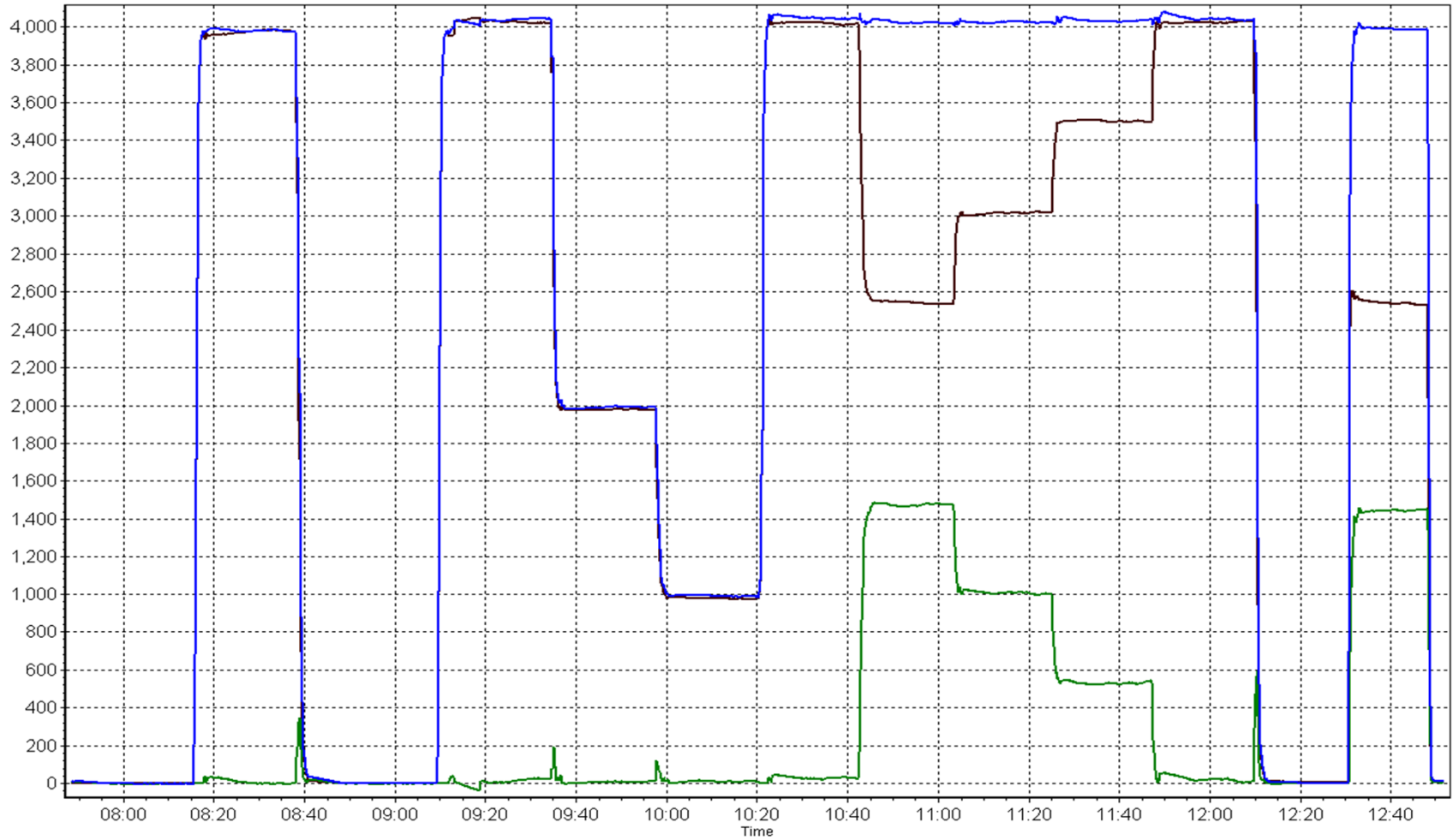
Calibration Date	October 17, 2014	Previous Calibration	September 6, 2014
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	7:45	End Time (MST)	12:50
Analyzer make	API T200	Analyzer serial #	724

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999945
296.2	294.8	1.0047		
200.7	200.8	0.9993	Slope	1.003873
103.9	105.1	0.9891		
			Intercept	-0.451251

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





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 17  
WAPASU  
OCTOBER 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

November 28, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
OCTOBER 2014

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	704	36	40	99.46	26	0	3	0
H2S (ppb) Average	707	34	37	99.60	2	0	1	0
THC (ppm) Average	703	36	41	99.33	2.7	-	2.2	-
O3 (ppb) Average	707	34	37	99.60	41	0	29	-
NO2 (ppb) Average	703	36	41	99.33	24	0	9	-
NO (ppb) Average	703	36	41	99.33	37	-	4	-
NOX (ppb) Average	703	36	41	99.33	54	-	11	-
PM2.5 (ug/m3) Average	735	0	9	98.79	32.1	-	7	0
Temperature 2 m (C) Average	744	0	0	100.00	19.4	-	11.7	-
Relative Humidity (%) Average	744	0	0	100.00	100	-	-	-
Wind Speed 10 m (km/h) Average	697	0	47	93.68	23	-	-	-
Wind Direction 10 m (deg) Average	697	0	47	93.68	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	704	0.7	2	-	0	0	0	0	1	1	26
H2S (ppb) Average	707	0.3	0	-	0	0	0	0	0	0	2
THC (ppm) Average	703	2.1	0.1	-	1.9	2	2	2.1	2.1	2.2	2.7
O3 (ppb) Average	707	18	8	-	1	7	13	18	24	28	41
NO2 (ppb) Average	703	3.1	4	-	0	0	0	1	4	9	24
NO (ppb) Average	703	1.2	2	-	0	0	0	1	1	3	37
NOX (ppb) Average	703	4.3	6	-	0	1	1	2	5	12	54
PM2.5 (ug/m3) Average	735	2.59	3.2	-	0	0.3	0.7	1.5	3.5	5.9	32.1
Temperature 2 m (C) Average	744	3.7	5	-	-8.6	-1.9	-0.7	2.5	7.5	10.9	19.4
Relative Humidity (%) Average	744	79.2	16	-	38	56	66	83	94	98	100
Wind Speed 10 m (km/h) Average	697	8.5	4	-	0	4	5	8	11	16	23
Wind Direction 10 m (deg) Average	697	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	01 Oct 2014 14:00	01 Oct 2014 16:00	3	Maintenance - Station operator on site
SO2	21 Oct 2014 08:00	21 Oct 2014 08:00	1	Maintenance - aborted cal
H2S	01 Oct 2014 14:00	01 Oct 2014 16:00	3	Maintenance - Station operator on site
THC	01 Oct 2014 14:00	01 Oct 2014 17:00	4	Maintenance - Station operator on site
THC	21 Oct 2014 08:00	21 Oct 2014 08:00	1	Maintenance - aborted cal
O3	01 Oct 2014 14:00	01 Oct 2014 16:00	3	Maintenance - Station operator on site
NO2, NO, NOX	01 Oct 2014 14:00	01 Oct 2014 17:00	4	Maintenance - Station operator on site
NO2, NO, NOX	21 Oct 2014 08:00	21 Oct 2014 08:00	1	Maintenance - aborted cal
PM2.5	01 Oct 2014 12:00	01 Oct 2014 17:00	6	Maintenance - Station operator on site
PM2.5	22 Oct 2014 08:00	22 Oct 2014 10:00	3	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	01 Oct 2014 21:00	02 Oct 2014 11:00	15	Flat line in sensor output signal
Wind Speed, Wind Direction	04 Oct 2014 22:00	04 Oct 2014 22:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	24 Oct 2014 04:00	25 Oct 2014 10:00	31	Flat line in sensor output signal

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Summary of Hour Averages

Wapasu - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 26 ppb on Oct 18 15:00	Maximum Daily Average: 3.4 ppb on Oct 18		Hours of Data:	704
Minimum Value: 0 ppb on Oct 1 17:00	Minimum Daily Average: 0.1 ppb on Oct 2		Hours of Missing Data:	40
Maximum Diurnal Average: 1.6 ppb at hour 15	Minimum Diurnal Average: 0.3 ppb at hour 1		Hours of Calibration:	36
Monthly Average: 0.7 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 9		Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	M	M	M	0	0	0	0	0	0	0	0	0.1	0
2-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	5	3	0	0	0	0	0	0	0	0	0	0.6	5
4-Oct	0	Z	0	0	0	0	0	0	0	0	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0.5	2
5-Oct	0	Z	3	3	3	3	4	7	9	6	3	2	2	2	1	0	0	0	0	0	0	0	0	0	2.3	9
6-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1
7-Oct	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Oct	0	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
10-Oct	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0.7	1
11-Oct	1	Z	4	4	2	8	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	8
12-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0.4	1
13-Oct	0	Z	0	0	0	0	0	1	0	0	1	1	1	0	5	6	3	4	4	2	1	1	1	0	1.4	6
14-Oct	1	Z	0	1	0	0	0	0	1	1	1	1	1	0	1	0	0	0	1	1	1	1	1	1	0.7	1
15-Oct	1	Z	1	1	1	0	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1
16-Oct	0	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
17-Oct	0	Z	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
18-Oct	0	Z	0	0	0	0	0	0	0	1	4	6	5	10	26	12	5	2	2	1	1	1	0	0	3.4	26
19-Oct	0	Z	0	0	0	0	0	0	0	0	3	2	2	1	1	1	1	1	1	1	1	0	0	0	0.8	3
20-Oct	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
21-Oct	1	Z	1	1	2	2	1	M	1	1	1	1	2	1	0	0	0	0	0	1	1	1	1	1	0.9	2
22-Oct	1	Z	2	5	9	12	11	C	C	C	C	C	0	0	0	0	0	0	0	0	0	1	0	0	2.5	12
23-Oct	0	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
24-Oct	0	Z	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Oct	0	Z	0	0	0	0	0	0	1	1	2	3	7	4	2	1	0	0	0	0	0	0	0	0	1.0	7
26-Oct	0	Z	0	0	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
27-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
28-Oct	0	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
29-Oct	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
30-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0

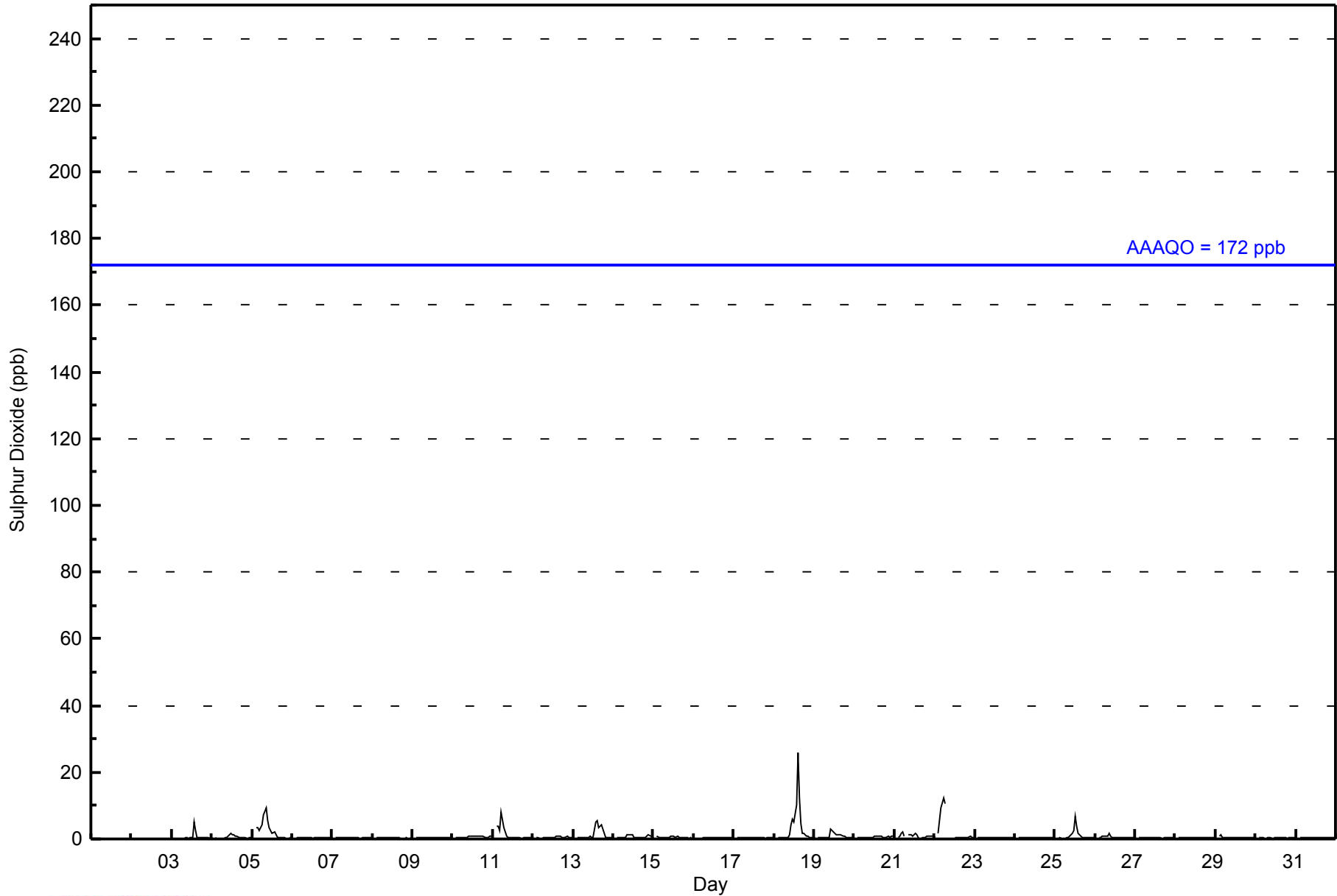
0.3	--	0.6	0.7	0.8	1.1	0.9	0.7	0.8	0.7	0.8	0.8	0.8	0.9	1.3	1.6	0.9	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	Diurnal Average
1	--	4	5	9	12	11	7	9	6	4	6	7	10	26	12	5	4	2	1	1	1	1	1	1	1	Diurnal Maximum

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  
Wapasu - October 2014





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Wapasu - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	700	99.43	99.43
11 - 20	3	0.43	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Wapasu - October 2014**

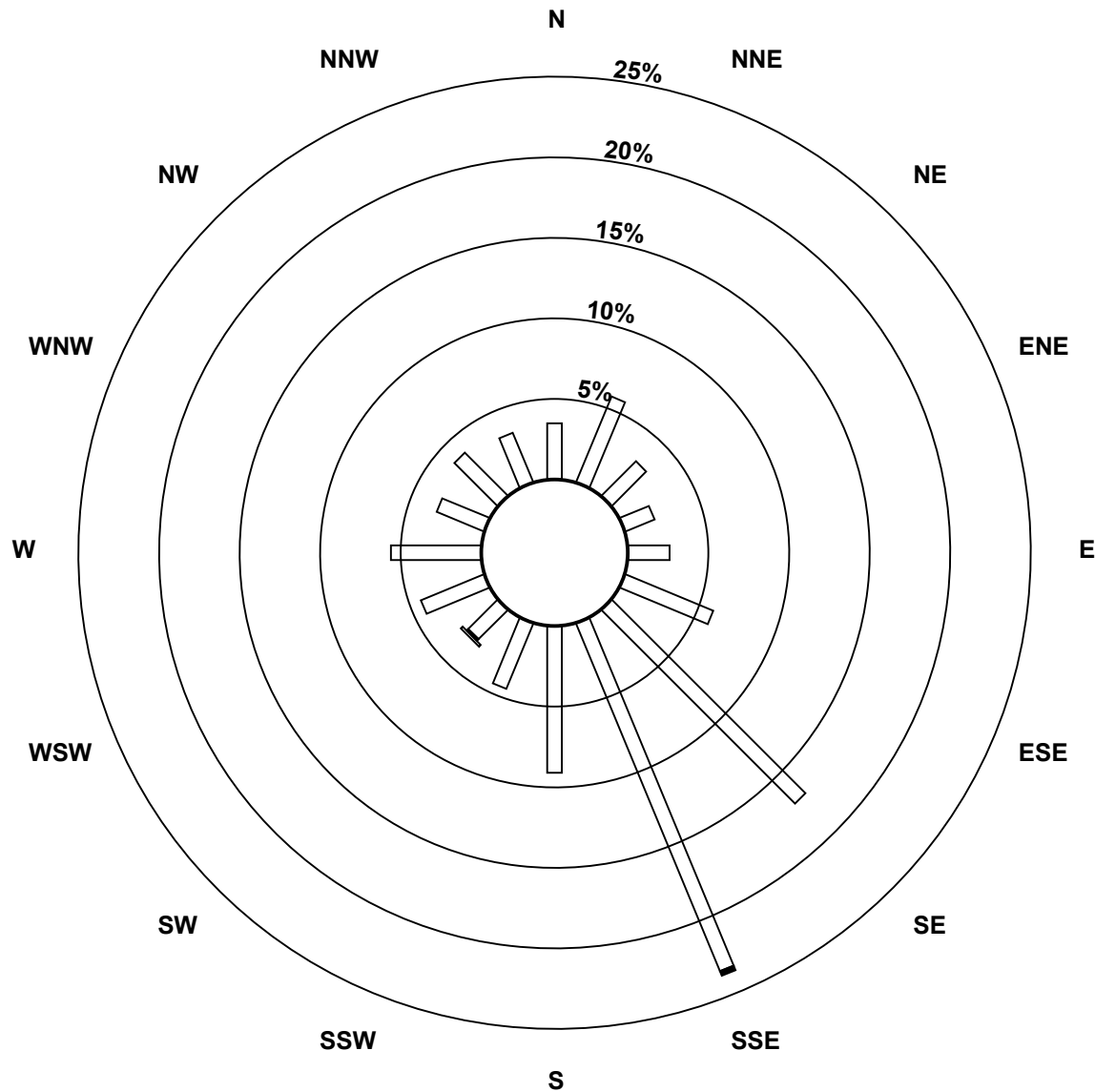
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	23	38	20	13	17	39	112	154	60	29	17	28	37	21	25	22	655
11 - 20	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	3
21 - 60	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	23	38	20	13	17	39	112	156	60	29	19	28	37	21	25	22	659

Total Number of Valid Hours: 659

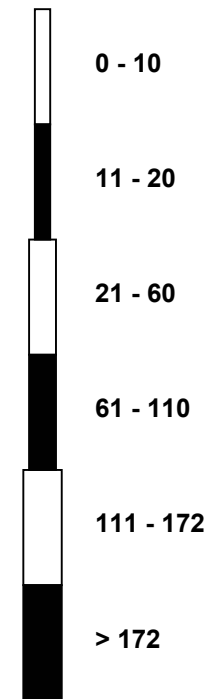
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu (AMS 17)**



Classes (ppb)

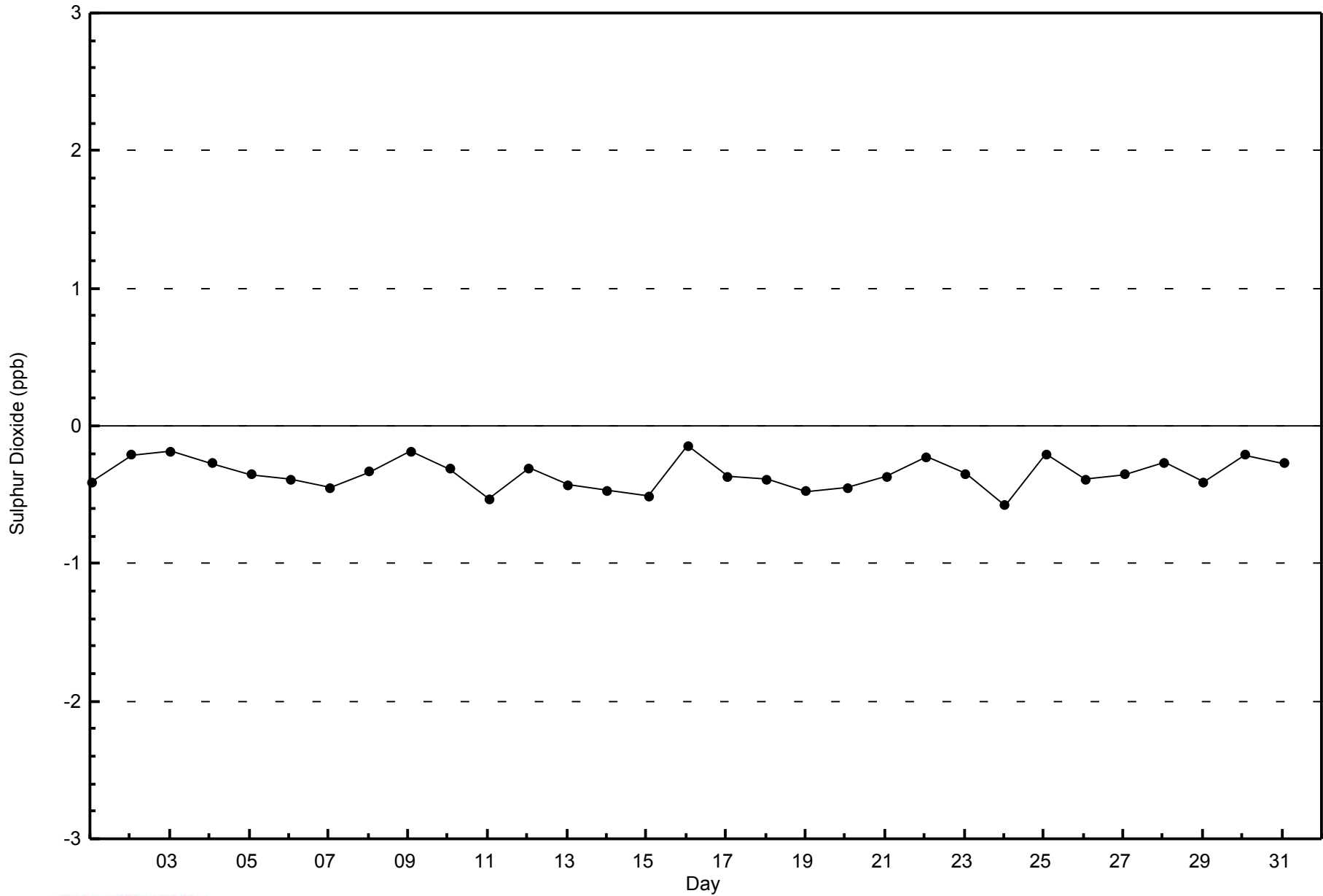


Total Number of Valid Hours: 659



WBEA  
Zero Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu - October 2014

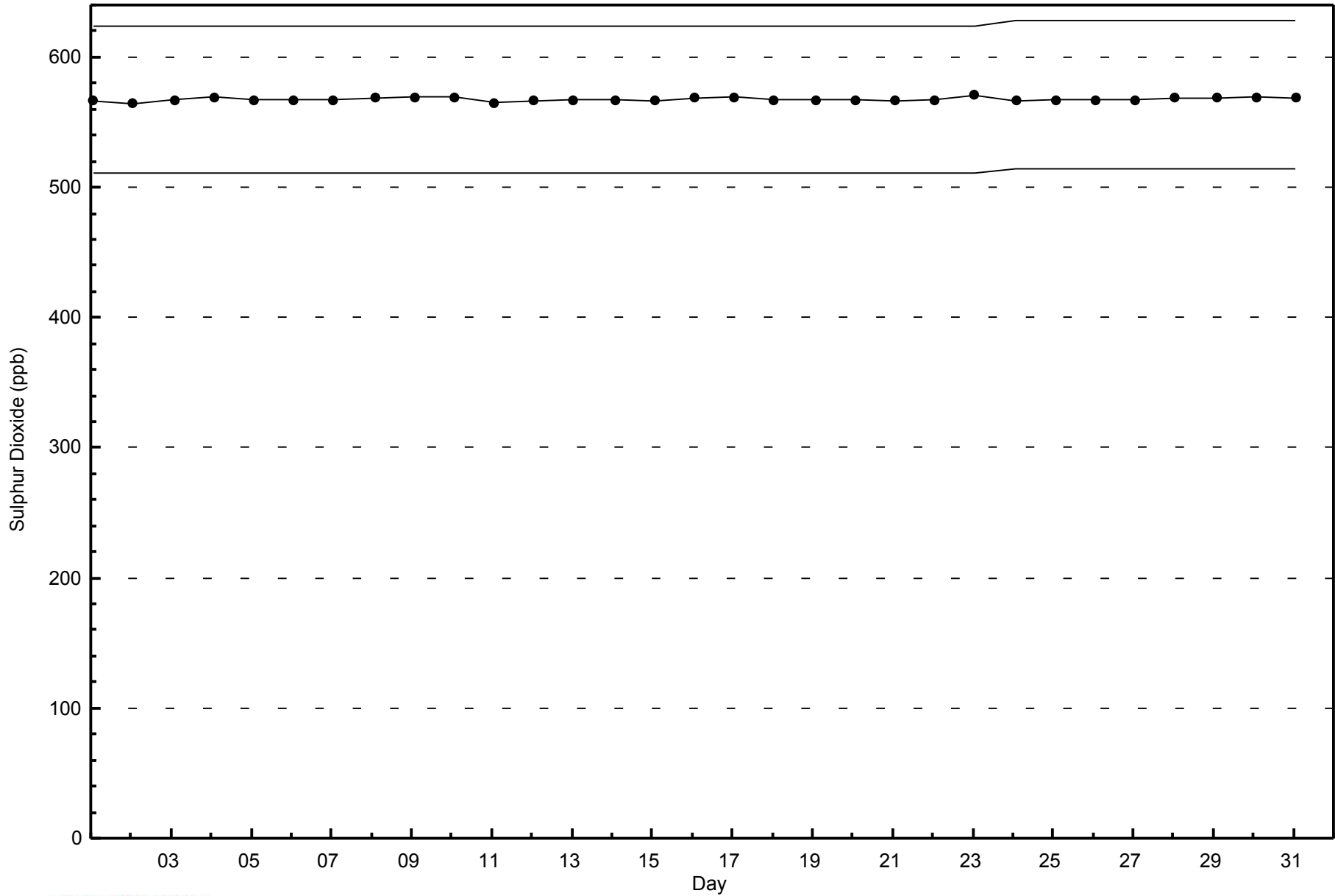






WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu - October 2014





Summary of Hour Averages

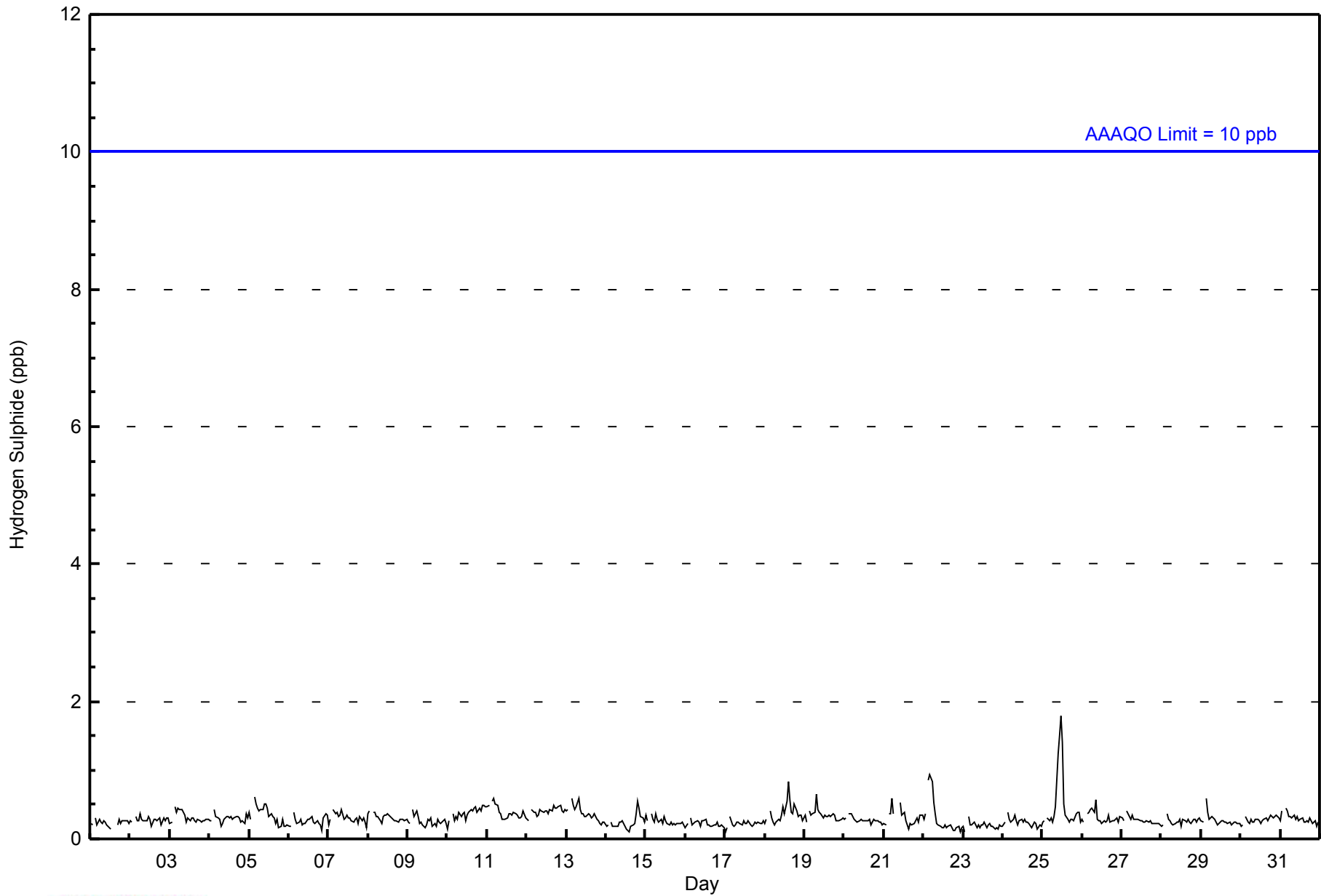
Wapasu - October 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 2 ppb on Oct 25 12:00										Maximum Daily Average: 0.5 ppb on Oct 25										Hours of Data: 707						
Minimum Value: 0 ppb on Oct 23 02:00										Minimum Daily Average: 0.2 ppb on Oct 23										Hours of Missing Data: 37						
Maximum Diurnal Average: 0.4 ppb at hour 4										Minimum Diurnal Average: 0.3 ppb at hour 1										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: 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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	M	M	M	0	0	0	0	0	0	0	0	0.2	0
2-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
3-Oct	0	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
4-Oct	0	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
5-Oct	0	0	Z	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
6-Oct	0	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-Oct	0	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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
9-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
10-Oct	0	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
11-Oct	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
12-Oct	0	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
13-Oct	0	0	Z	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
14-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1
15-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
16-Oct	0	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
17-Oct	0	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
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0.4	1
19-Oct	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
20-Oct	0	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
21-Oct	0	0	Z	0	0	1	0	C	C	C	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-Oct	0	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
23-Oct	0	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
24-Oct	0	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-Oct	0	0	Z	0	0	0	0	0	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0.5	2
26-Oct	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
28-Oct	0	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
29-Oct	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
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
31-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
0.3 0.3 -- 0.4 0.3																								Diurnal Average		
0 0 -- 1 1 1 1 1 1 1 1 1 1 2 1 1 1 1 0 0 1 1 0 0 0 0																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



WBEA  
Hourly Averages

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu - October 2014





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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Wapasu - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	707	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Wapasu - October 2014**

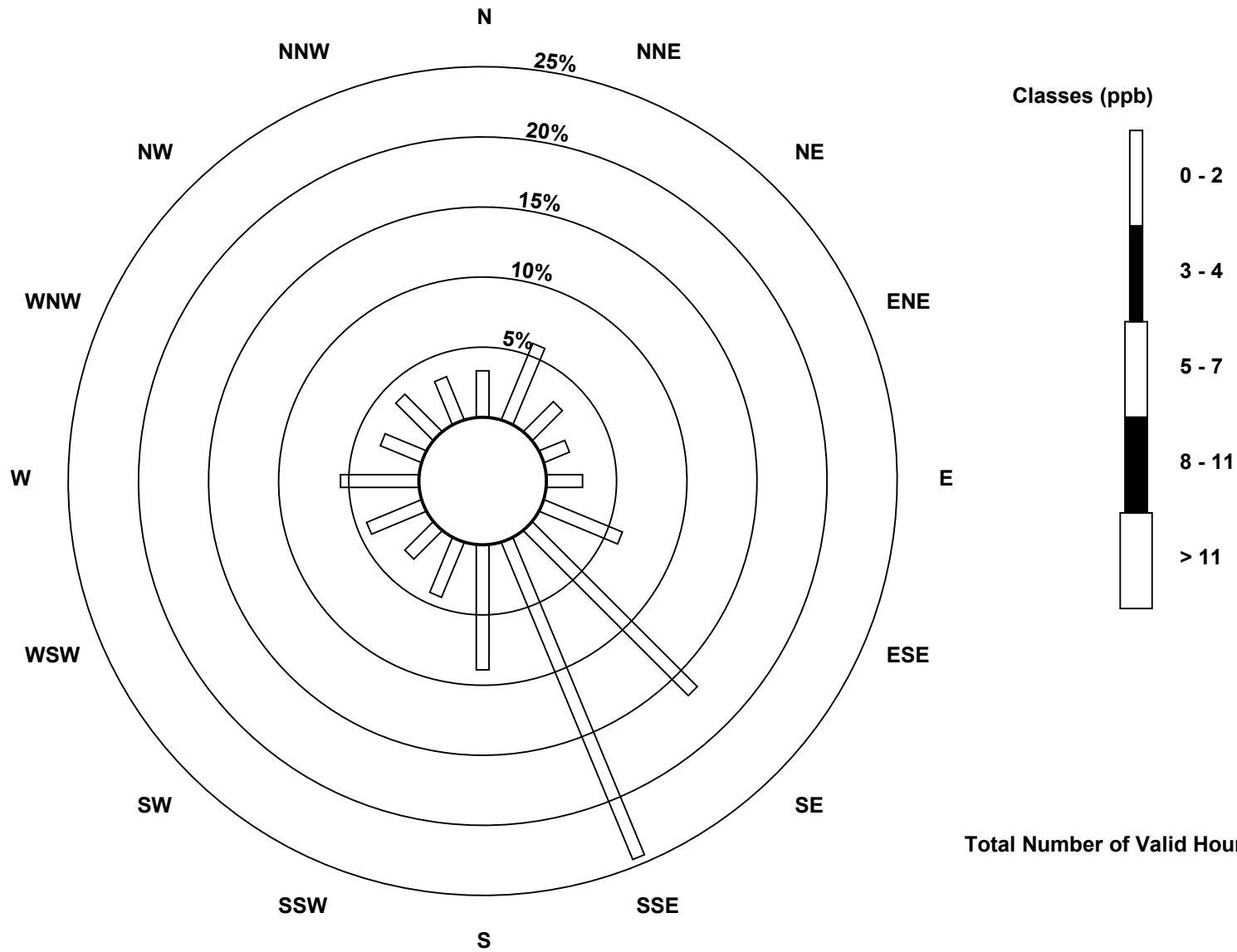
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	22	39	20	13	17	40	110	162	59	28	19	28	37	21	25	22	662
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	22	39	20	13	17	40	110	162	59	28	19	28	37	21	25	22	662

Total Number of Valid Hours: 662

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu (AMS 17)

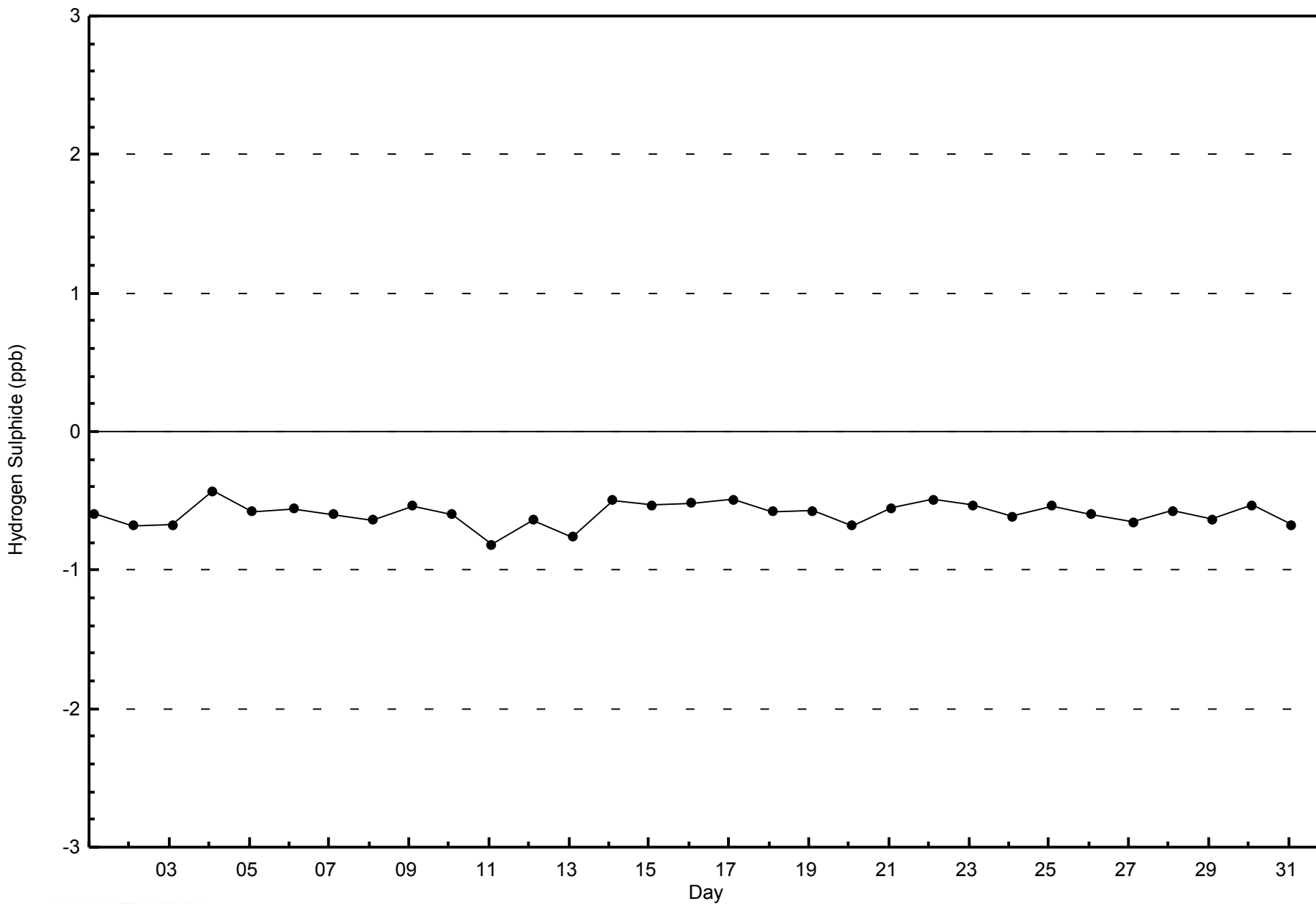


Total Number of Valid Hours: 662



WBEA  
Zero Responses

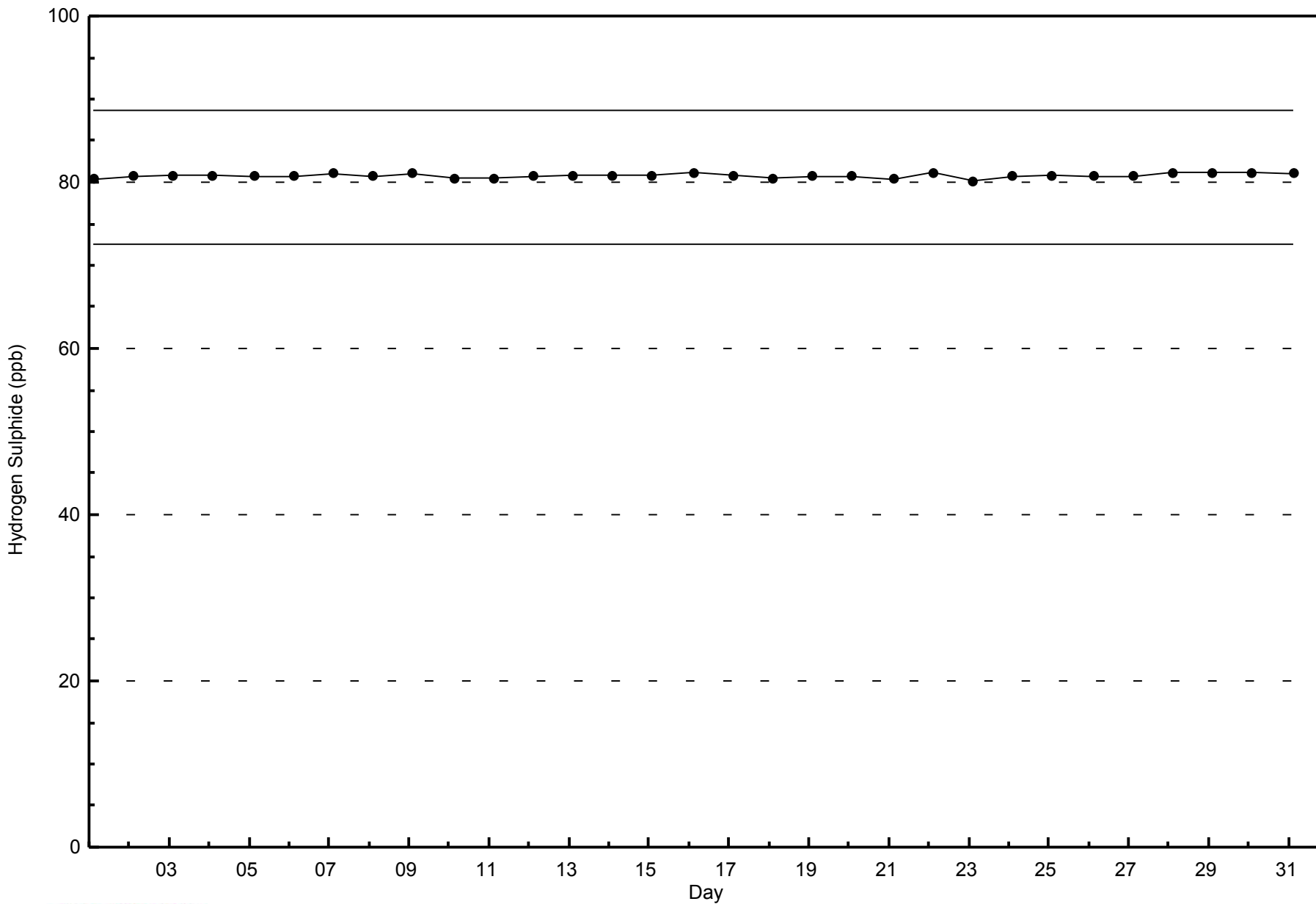
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu - October 2014





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu - October 2014





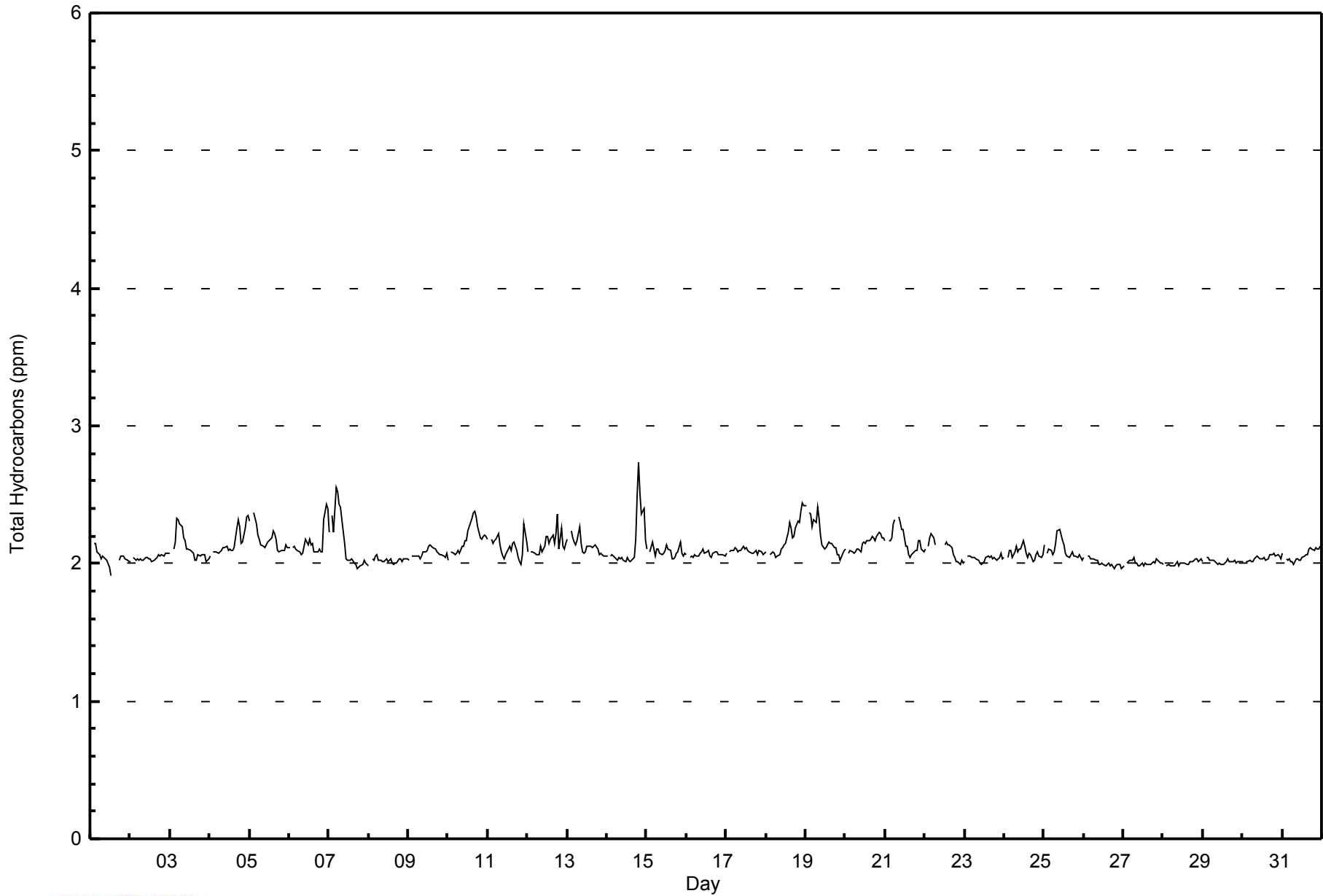


Maximum Value: 2.7 ppm on Oct 14 20:00		Maximum Daily Average: 2.2 ppm on Oct 19		Hours in Service: 744																								
Minimum Value: 1.9 ppm on Oct 1 13:00		Minimum Daily Average: 2.0 ppm on Oct 28		Hours of Data: 703																								
Maximum Diurnal Average: 2.1 ppm at hour 5		Minimum Diurnal Average: 2.1 ppm at hour 11		Hours of Missing Data: 41																								
Monthly Average: 2.10 ppm		Percentiles: P <sub>1</sub> = 2.0 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 2.0 Median = 2.1 Q <sub>3</sub> = 2.1 P <sub>90</sub> = 2.2 P <sub>99</sub> = 2.4		Hours of Calibration: 36																								
				Percent Operational Time: 99.3																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Oct	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	M	M	M	M	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	
2-Oct	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
3-Oct	2.1	Z	2.1	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1
4-Oct	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	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.3
5-Oct	2.3	Z	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
6-Oct	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.4	2.4	2.1	2.1	2.4
7-Oct	2.2	Z	2.4	2.2	2.6	2.5	2.4	2.4	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
8-Oct	2.0	Z	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
9-Oct	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1
10-Oct	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
11-Oct	2.2	Z	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.1	2.3	2.2	2.1	2.1	2.1	2.3
12-Oct	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.4	2.1	2.3	2.1	2.1	2.2	2.1	2.1	2.1	2.4
13-Oct	2.2	Z	2.2	2.2	2.2	2.1	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3
14-Oct	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.5	2.7	2.5	2.4	2.4	2.2	2.2	2.2	2.2	2.7
15-Oct	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	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.2
16-Oct	2.1	Z	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
17-Oct	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
18-Oct	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.2	2.2	2.2	2.4
19-Oct	2.4	Z	2.4	2.4	2.3	2.3	2.3	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.4
20-Oct	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
21-Oct	2.2	Z	2.2	2.2	2.2	2.3	2.3	M	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3
22-Oct	2.1	Z	2.1	2.2	2.2	2.2	2.1	C	C	C	C	C	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
23-Oct	2.0	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1
24-Oct	2.0	Z	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2
25-Oct	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.2
26-Oct	2.0	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
27-Oct	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
28-Oct	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
29-Oct	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
30-Oct	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
31-Oct	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
		2.1	--	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Average
		2.4	--	2.4	2.4	2.6	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.5	2.7	2.5	2.4	2.4	2.4	2.4	2.4	Diurnal Maximum
Z - zerospan		C - Calibration					M - Maintenance																					



WBEA  
Hourly Averages

Total Hydrocarbons (THC) - ppm  
Wapasu - October 2014





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

**Total Hydrocarbons (THC) - ppm**  
**Wapasu - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	249	35.42	35.42
2.1 - 3.0	454	64.58	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Wapasu - October 2014**

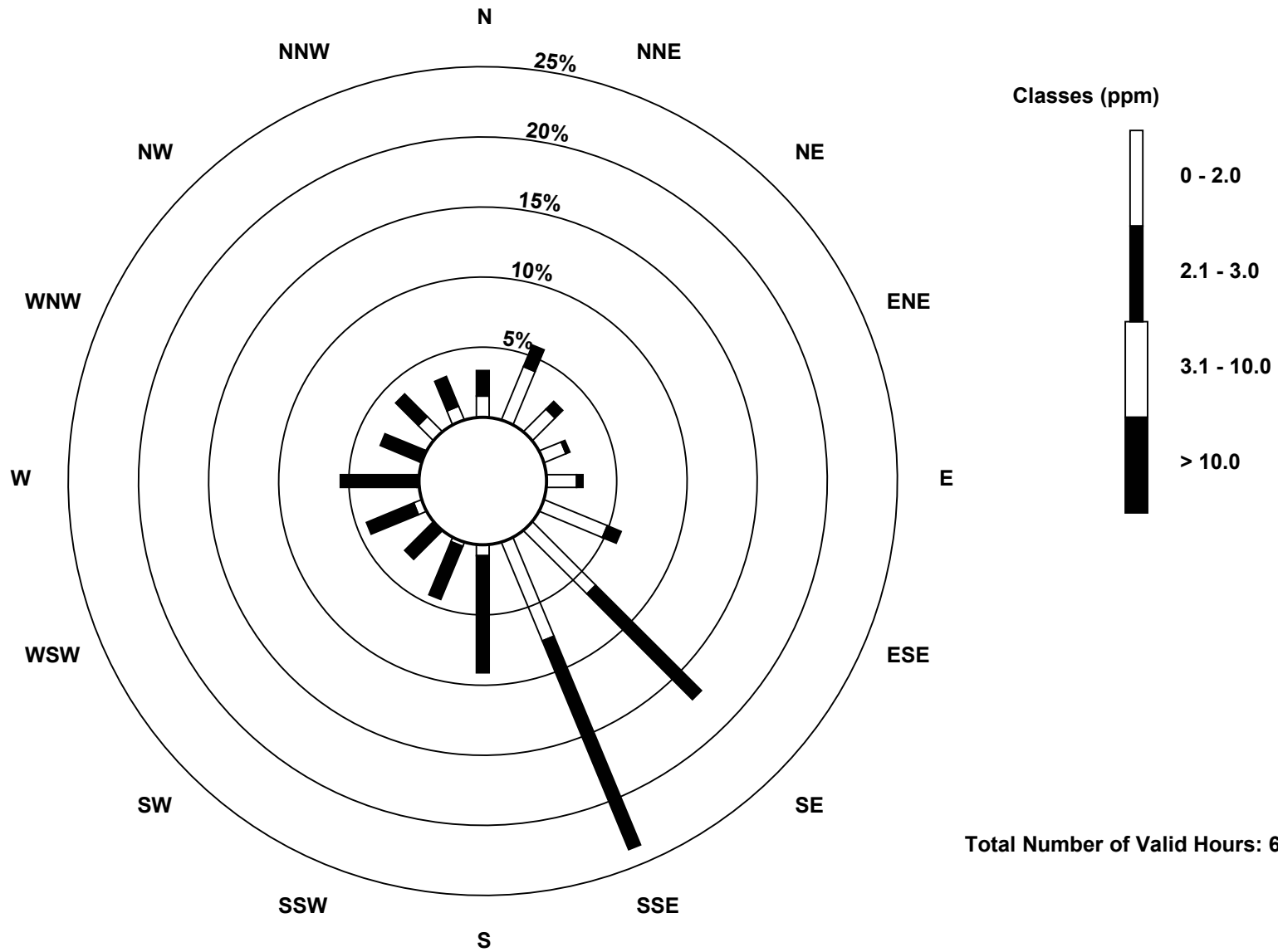
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	10	27	15	11	14	32	42	50	5	2	0	4	1	1	10	7	231
2.1 - 3.0	12	11	5	2	3	7	70	106	55	27	19	24	36	20	15	15	427
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	22	38	20	13	17	39	112	156	60	29	19	28	37	21	25	22	658

Total Number of Valid Hours: 658

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

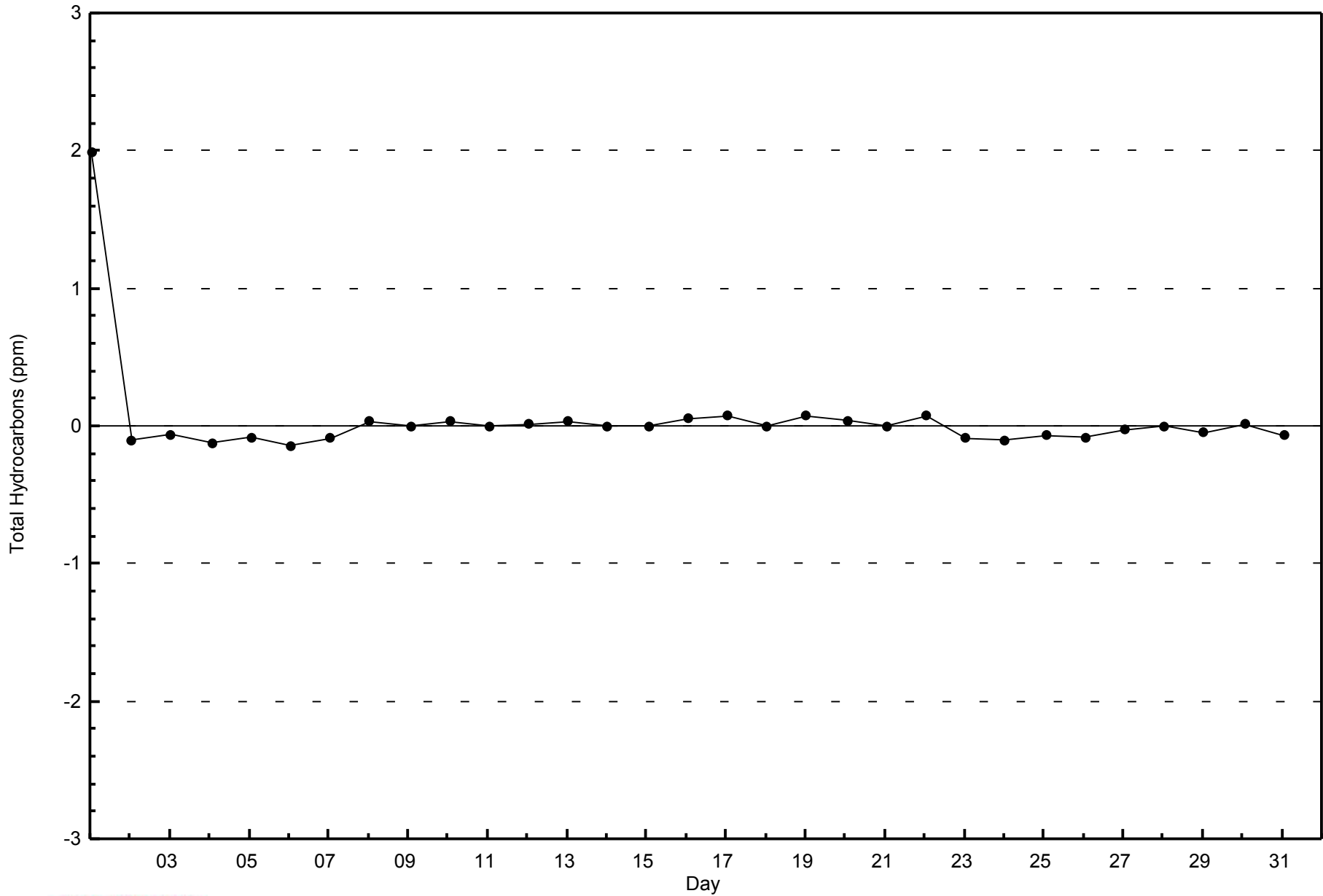
Total Hydrocarbons (THC) - ppm  
Wapasu (AMS 17)





WBEA  
Zero Responses

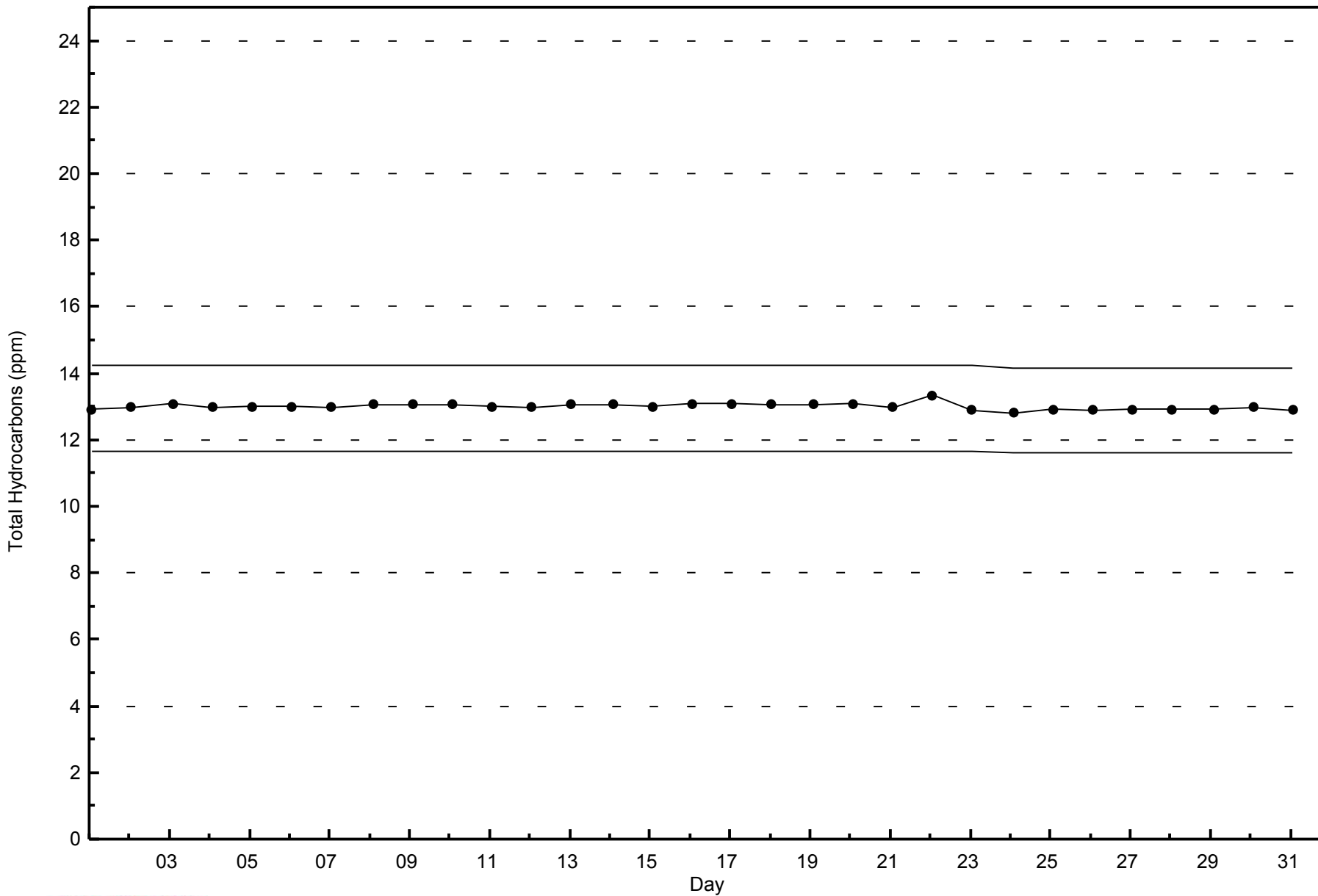
Total Hydrocarbons (THC) - ppm  
Wapasu - October 2014





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Wapasu - October 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 41 ppb on Oct 22 16:00	Maximum Daily Average: 29.4 ppb on Oct 10		Hours of Data:	707
Minimum Value: 1 ppb on Oct 3 06:00	Minimum Daily Average: 9.5 ppb on Oct 5		Hours of Missing Data:	37
Maximum Diurnal Average: 22.5 ppb at hour 16	Minimum Diurnal Average: 13.8 ppb at hour 6		Hours of Calibration:	34
Monthly Average: 18.0 ppb	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 7 Q <sub>1</sub> = 13 Median = 18 Q <sub>3</sub> = 24 P <sub>90</sub> = 28 P <sub>99</sub> = 37		Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	8	7	3	Z	6	6	6	7	11	13	13	13	12	M	M	M	13	14	14	16	15	17	19	20	11.7	20																							
2-Oct	20	19	20	Z	19	22	22	23	23	23	24	24	24	23	24	23	21	20	19	19	19	19	19	19	21.2	24																							
3-Oct	18	19	17	Z	1	1	1	5	10	13	23	24	24	22	24	25	24	24	24	24	23	23	22	21	17.9	25																							
4-Oct	21	20	19	Z	17	16	14	13	14	13	13	14	14	15	16	14	7	5	6	8	6	2	1	1	11.7	21																							
5-Oct	1	2	2	Z	2	4	5	3	5	6	7	9	14	15	14	15	15	14	14	14	16	16	14	13	9.5	16																							
6-Oct	12	11	10	Z	8	6	7	4	6	8	7	8	6	11	15	20	19	15	14	16	15	3	2	2	9.7	20																							
7-Oct	10	6	4	Z	2	5	10	10	14	21	28	28	26	26	27	28	28	23	16	17	20	19	16	15	17.4	28																							
8-Oct	14	10	15	Z	10	5	8	15	18	22	22	22	21	20	20	20	20	18	17	17	10	15	17	18	16.3	22																							
9-Oct	19	20	16	Z	17	7	6	15	13	20	24	27	28	28	30	31	30	27	13	23	24	25	24	24	21.4	31																							
10-Oct	25	26	26	Z	25	25	25	25	25	25	28	29	31	34	34	34	33	33	33	33	33	32	31	30	29.4	34																							
11-Oct	30	26	23	Z	17	14	17	23	27	30	32	34	36	38	37	37	36	34	33	33	32	30	23	25	29.0	38																							
12-Oct	27	26	24	Z	12	9	11	10	14	24	24	23	25	30	28	25	25	15	12	26	14	20	21	16	20.1	30																							
13-Oct	8	3	1	Z	6	8	5	4	9	18	23	24	22	22	23	23	14	9	13	12	17	26	24	22	14.6	26																							
14-Oct	26	27	28	Z	29	31	30	30	28	25	23	27	27	26	25	25	17	7	1	1	1	3	3	9	19.5	31																							
15-Oct	11	10	11	Z	9	12	13	11	12	12	14	16	16	16	16	17	17	16	18	18	13	9	13	13	13.6	18																							
16-Oct	20	21	22	Z	21	21	21	20	20	21	21	19	20	21	21	21	19	14	15	16	17	17	18	18	19.4	22																							
17-Oct	18	18	18	Z	18	18	17	16	18	20	23	25	26	25	23	24	26	22	23	25	25	24	24	24	21.7	26																							
18-Oct	23	22	22	Z	21	20	19	17	15	15	16	16	16	13	6	8	6	4	7	15	13	6	2	1	13.2	23																							
19-Oct	1	1	1	Z	1	1	3	3	7	13	19	23	25	29	31	32	27	21	22	27	29	30	32	32	17.7	32																							
20-Oct	32	33	33	Z	31	30	28	27	27	26	26	25	26	26	26	27	25	22	23	24	24	24	25	26	26.8	33																							
21-Oct	26	25	24	Z	17	9	8	10	12	13	18	19	21	24	28	31	21	12	11	18	14	13	17	17	17.8	31																							
22-Oct	15	15	16	Z	10	6	15	21	30	37	38	C	C	C	41	41	31	31	37	39	39	37	36	36	28.5	41																							
23-Oct	35	35	34	Z	30	24	18	28	31	31	30	26	23	21	18	15	14	10	10	11	11	10	14	17	21.5	35																							
24-Oct	14	11	9	Z	4	7	6	3	6	7	9	9	10	11	14	16	17	19	21	19	17	18	17	15	12.1	21																							
25-Oct	9	8	13	Z	10	14	11	3	6	8	11	14	13	15	18	17	8	9	13	14	13	14	16	19	12.0	19																							
26-Oct	19	18	16	Z	16	10	15	15	17	19	15	15	16	16	17	17	19	20	19	18	18	18	17	16	16.8	20																							
27-Oct	16	16	15	Z	16	15	15	15	16	16	17	19	21	20	20	19	17	13	10	6	8	5	11	18	15.0	21																							
28-Oct	21	23	23	Z	23	23	24	24	22	21	20	17	17	18	19	19	19	18	17	15	15	18	17	15	19.4	24																							
29-Oct	16	14	14	Z	15	16	15	17	18	18	19	20	20	20	20	20	19	18	22	24	24	26	24	22	19.3	26																							
30-Oct	23	23	23	Z	24	25	23	21	18	18	18	21	23	25	26	21	18	18	18	18	19	20	21	22	21.1	26																							
31-Oct	23	23	23	Z	22	21	20	18	17	17	15	15	14	13	12	11	11	10	10	9	8	8	6	3	14.4	23																							
																								18.2	17.3	17.0	--	14.8	13.8	14.1	14.7	16.5	18.5	20.0	20.1	20.6	21.4	22.4	22.5	19.9	17.3	17.0	18.6	17.8	17.7	17.6	17.7	Diurnal Average	
																								35	35	34	--	31	31	30	30	31	37	38	34	36	38	41	41	36	34	37	39	39	37	36	36	Diurnal Maximum	

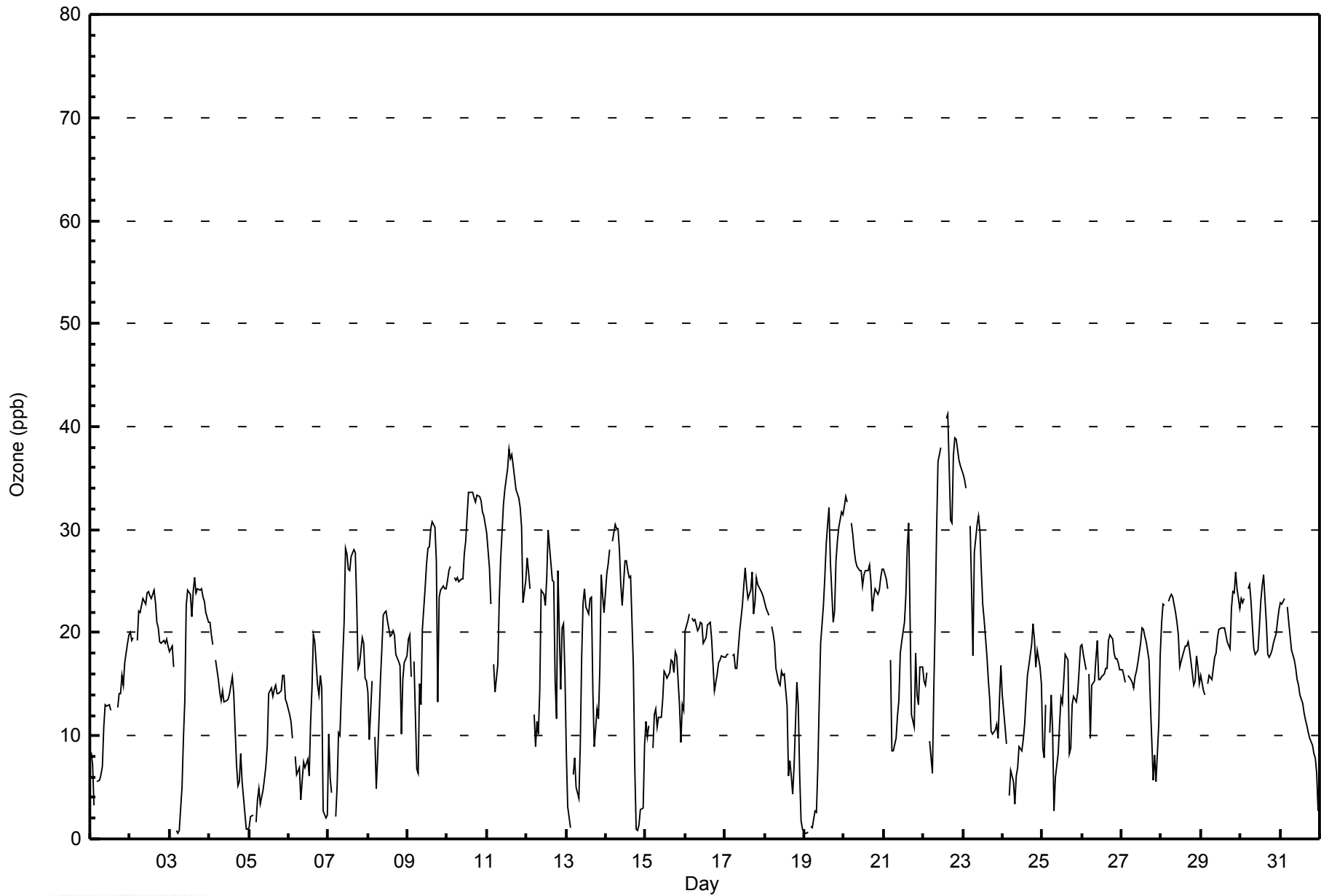
Z - zerospan      C - Calibration      M - Maintenance  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb





**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Wapasu - October 2014**





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

**Ozone (O<sub>3</sub>) - ppb**  
**Wapasu - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	440	62.23	62.23
21 - 50	267	37.77	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Wapasu - October 2014**

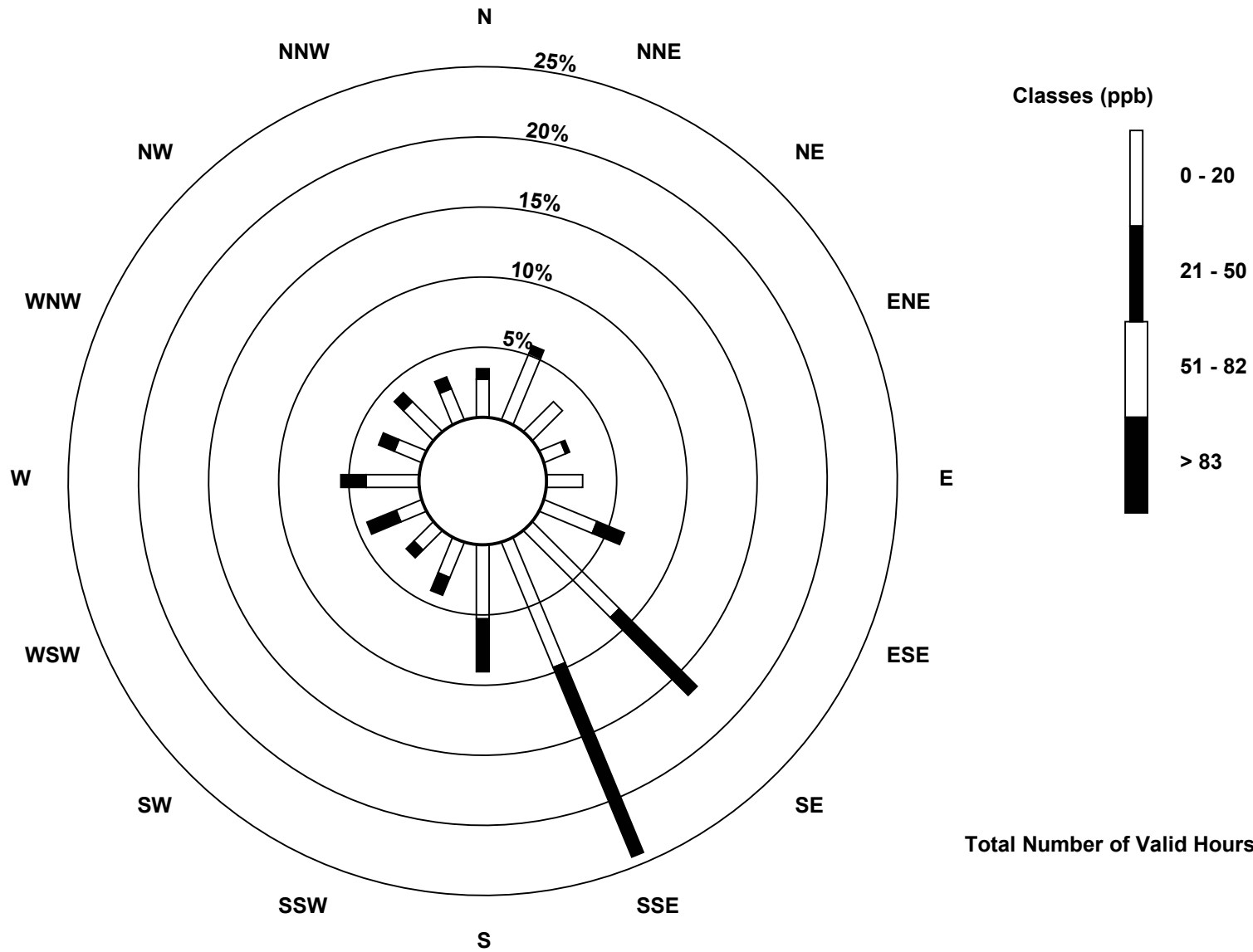
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	18	34	20	11	17	27	58	64	35	18	13	13	25	14	20	16	403
21 - 50	5	4	0	2	0	14	52	97	25	9	5	15	12	8	6	6	260
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	23	38	20	13	17	41	110	161	60	27	18	28	37	22	26	22	663

Total Number of Valid Hours: 663

Total Number of Hours: 744

Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

Ozone (O<sub>3</sub>) - ppb  
 Wapasu (AMS 17)

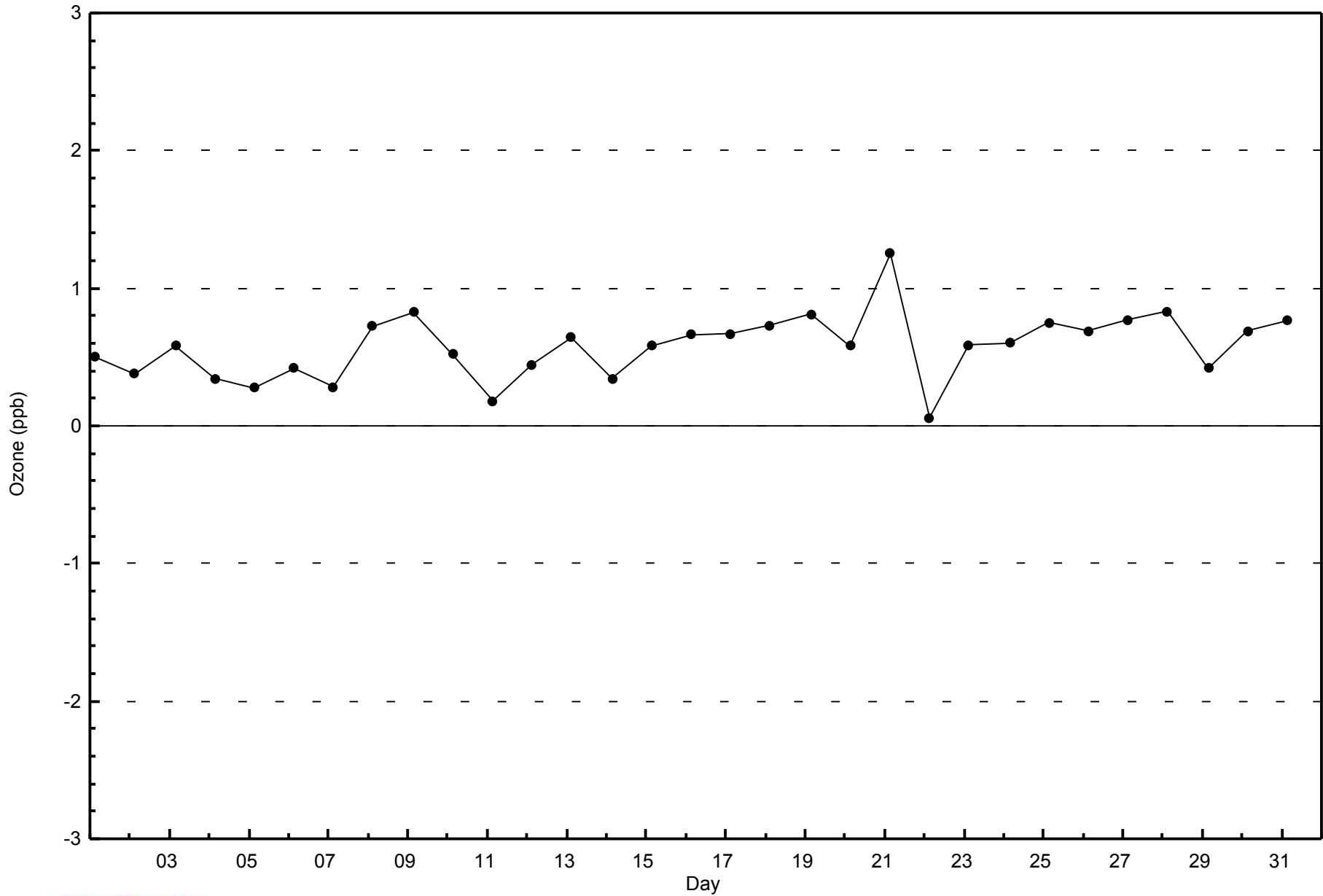


Total Number of Valid Hours: 663



WBEA  
Zero Responses

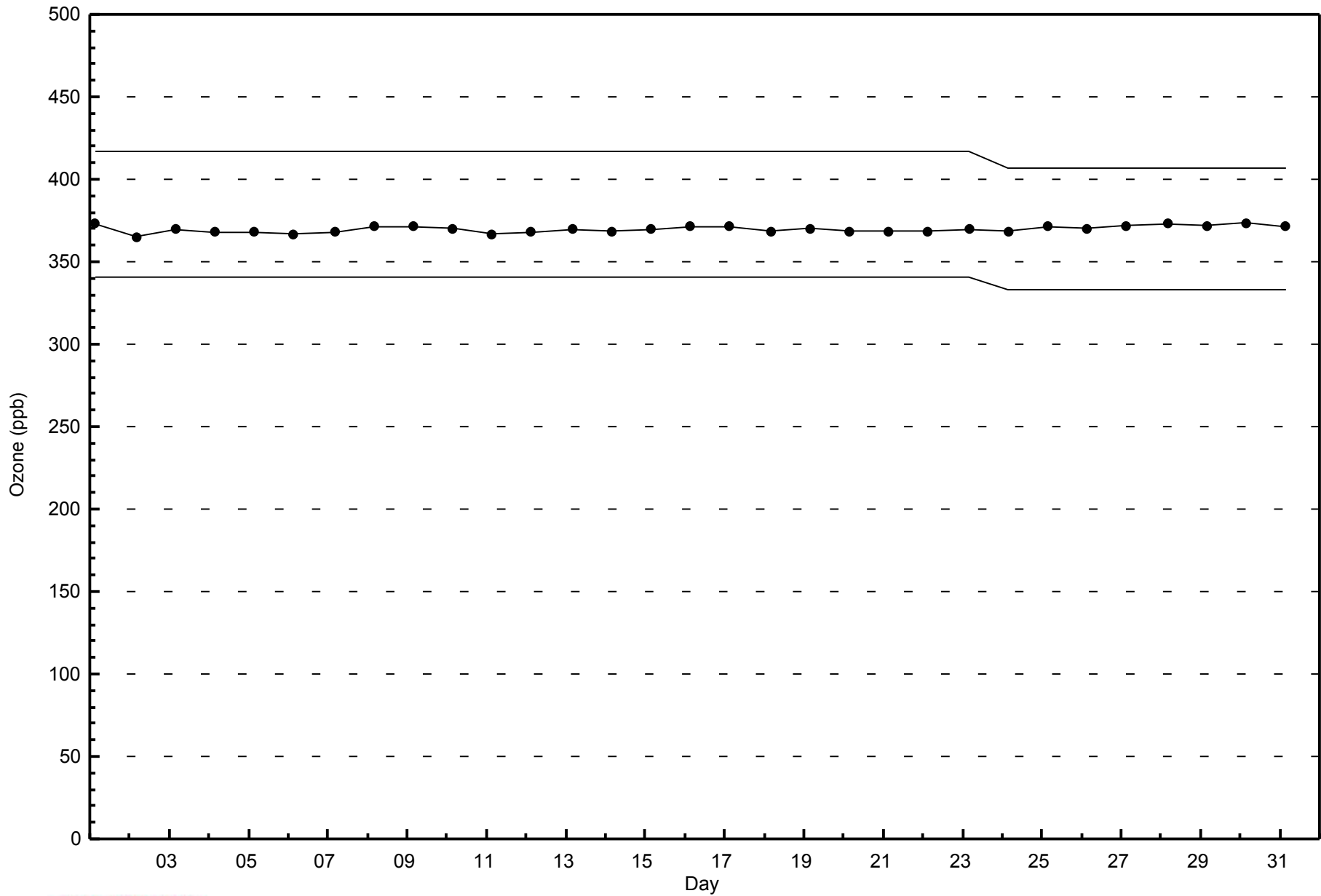
Ozone (O<sub>3</sub>) - ppb  
Wapasu - October 2014





WBEA  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Wapasu - October 2014



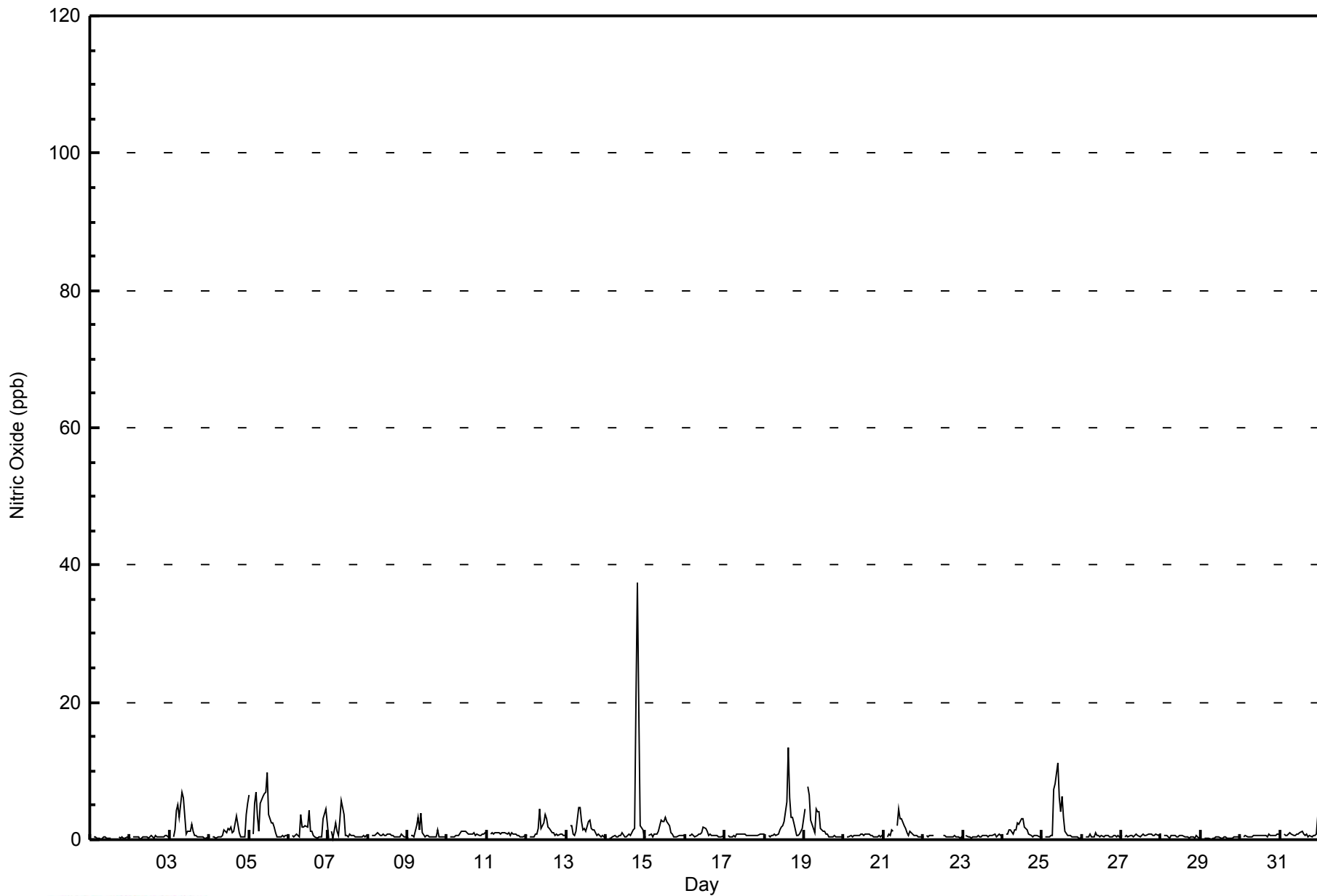


Maximum Value: 37 ppb on Oct 14 20:00														Maximum Daily Average: 4.0 ppb on Oct 14														Hours in Service: 744																				
Minimum Value: 0 ppb on Oct 1 07:00														Minimum Daily Average: 0.3 ppb on Oct 1														Hours of Data: 703																				
Maximum Diurnal Average: 2.1 ppb at hour 9														Minimum Diurnal Average: 0.7 ppb at hour 22														Hours of Missing Data: 41																				
Monthly Average: 1.2 ppb														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 3 P <sub>99</sub> = 7														Hours of Calibration: 36																				
																												Percent Operational Time: 99.3																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0	Z	0	0	0	0	0	0	0	1	0	0	0	M	M	M	M	0	0	0	0	0	0	0	0.3	1																						
2-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	1	0.4	1																						
3-Oct	0	Z	0	1	4	5	3	7	6	4	1	1	2	1	1	1	0	0	0	0	0	0	0	1.8	7																							
4-Oct	0	Z	0	0	0	0	0	0	1	1	1	2	1	2	1	1	3	2	1	0	0	0	4	5	1.3	5																						
5-Oct	7	Z	1	5	7	3	1	5	6	7	7	10	4	2	2	2	1	0	0	0	1	0	1	1	3.2	10																						
6-Oct	0	Z	1	0	1	1	0	4	2	2	2	2	4	1	1	1	0	0	1	0	0	3	4	2	1.4	4																						
7-Oct	0	Z	1	0	2	1	1	3	6	4	1	1	0	1	1	1	0	0	0	0	0	1	0	1	1.1	6																						
8-Oct	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	0	0	0.6	1																						
9-Oct	0	Z	1	1	0	2	3	1	4	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0.9	4																						
10-Oct	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1																						
11-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0.8	1																						
12-Oct	1	Z	0	0	0	1	1	2	5	2	3	4	3	2	2	1	1	1	1	1	1	1	1	1	1.4	5																						
13-Oct	1	Z	2	2	1	1	1	5	5	3	1	2	1	3	3	2	1	1	1	1	1	0	1	0	1.6	5																						
14-Oct	0	Z	0	0	0	1	0	0	1	1	0	0	1	1	1	1	1	2	21	37	19	2	1	0	4.0	37																						
15-Oct	0	Z	1	1	0	1	1	1	1	3	3	3	3	3	2	1	1	0	0	0	1	1	1	1	1.2	3																						
16-Oct	1	Z	1	1	1	1	0	1	1	1	1	2	2	1	1	1	1	1	1	1	0	0	0	1	0.8	2																						
17-Oct	1	Z	1	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1																						
18-Oct	1	Z	1	0	1	1	1	1	1	1	2	2	3	5	13	6	3	3	2	1	1	1	1	2	2.2	13																						
19-Oct	5	Z	8	7	3	2	1	4	4	4	2	1	1	1	0	0	0	0	1	0	0	0	0	0	2.1	8																						
20-Oct	0	Z	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	0.6	1																						
21-Oct	0	Z	0	1	1	1	1	M	2	4	3	3	2	2	1	1	1	1	1	1	1	0	0	0	1.3	4																						
22-Oct	1	Z	1	0	1	1	1	C	C	C	C	C	1	1	1	0	0	0	0	1	0	0	0	0	0.5	1																						
23-Oct	0	Z	1	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	0	1	1	1	0.5	1																						
24-Oct	1	Z	1	1	1	1	1	1	1	2	2	3	3	2	2	1	1	1	0	1	1	1	0	0	1.3	3																						
25-Oct	0	Z	0	0	0	1	1	7	8	11	6	4	6	3	1	1	1	1	0	0	0	0	0	0	2.4	11																						
26-Oct	0	Z	0	0	0	1	0	0	1	1	1	0	1	0	1	1	1	0	0	1	1	0	1	0	0.5	1																						
27-Oct	1	Z	0	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1																						
28-Oct	1	Z	1	1	0	0	1	1	1	0	0	1	1	1	0	1	0	0	0	0	0	1	0	0	0.5	1																						
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
30-Oct	0	Z	0	1	0	0	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0.6	1																						
31-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	3	0.8	3																						
																								0.8	--	0.8	0.9	1.0	1.0	0.8	1.7	2.1	2.0	1.5	1.6	1.5	1.4	1.4	1.0	0.9	0.7	1.3	1.7	1.1	0.7	0.8	0.9	Diurnal Average
																								7	--	8	7	7	5	3	7	8	11	7	10	6	5	13	6	3	3	21	37	19	3	4	5	Diurnal Maximum
Z - zerospan      C - Calibration      M - Maintenance																																																



WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
Wapasu - October 2014







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

**Nitric Oxide (NO) - ppb**  
**Wapasu - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	701	99.72	99.72
21 - 40	2	0.28	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Wapasu - October 2014**

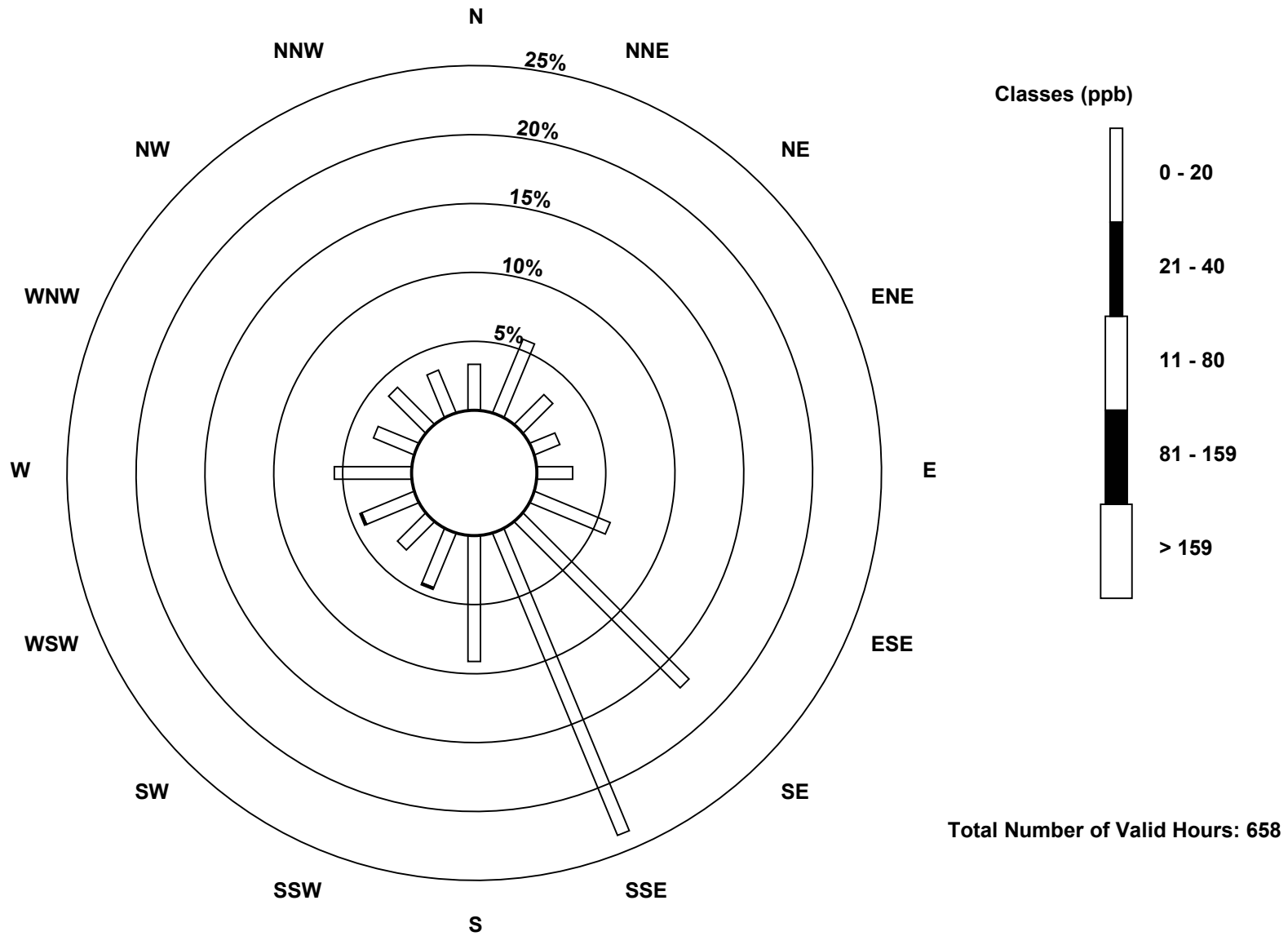
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	38	20	13	17	39	112	156	60	28	19	27	37	21	25	22	656
21 - 40	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	22	38	20	13	17	39	112	156	60	29	19	28	37	21	25	22	658

Total Number of Valid Hours: 658

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

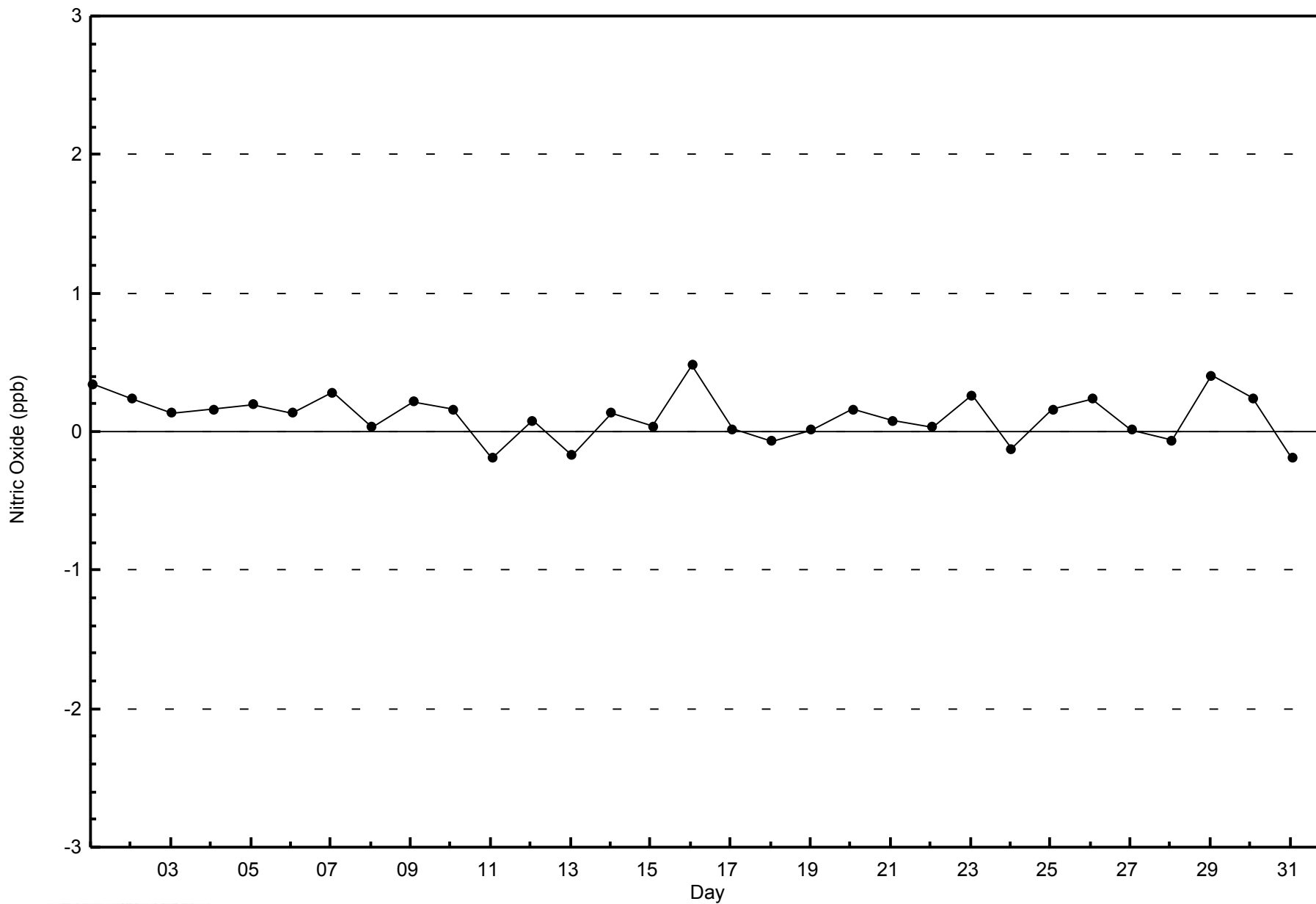
Nitric Oxide (NO) - ppb  
Wapasu (AMS 17)





WBEA  
Zero Responses

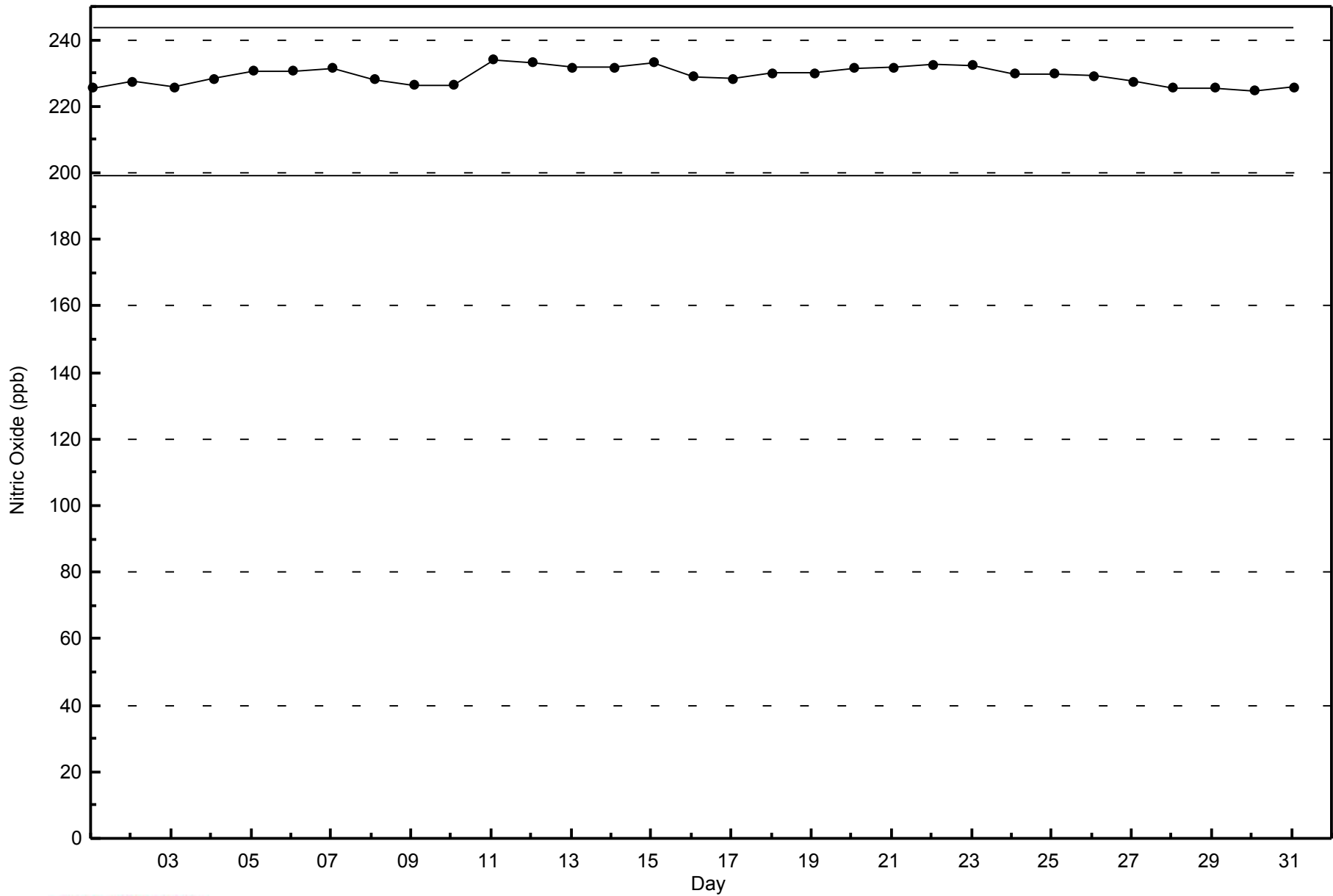
Nitric Oxide (NO) - ppb  
Wapasu - October 2014





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Wapasu - October 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 24 ppb on Oct 22 06:00	Maximum Daily Average: 8.8 ppb on Oct 18		Hours of Data:	703
Minimum Value: 0 ppb on Oct 2 08:00	Minimum Daily Average: 0.2 ppb on Oct 30		Hours of Missing Data:	41
Maximum Diurnal Average: 5.5 ppb at hour 6	Minimum Diurnal Average: 1.9 ppb at hour 13		Hours of Calibration:	36
Monthly Average: 3.1 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 4 P <sub>90</sub> = 9 P <sub>99</sub> = 19		Percent Operational Time:	99.3

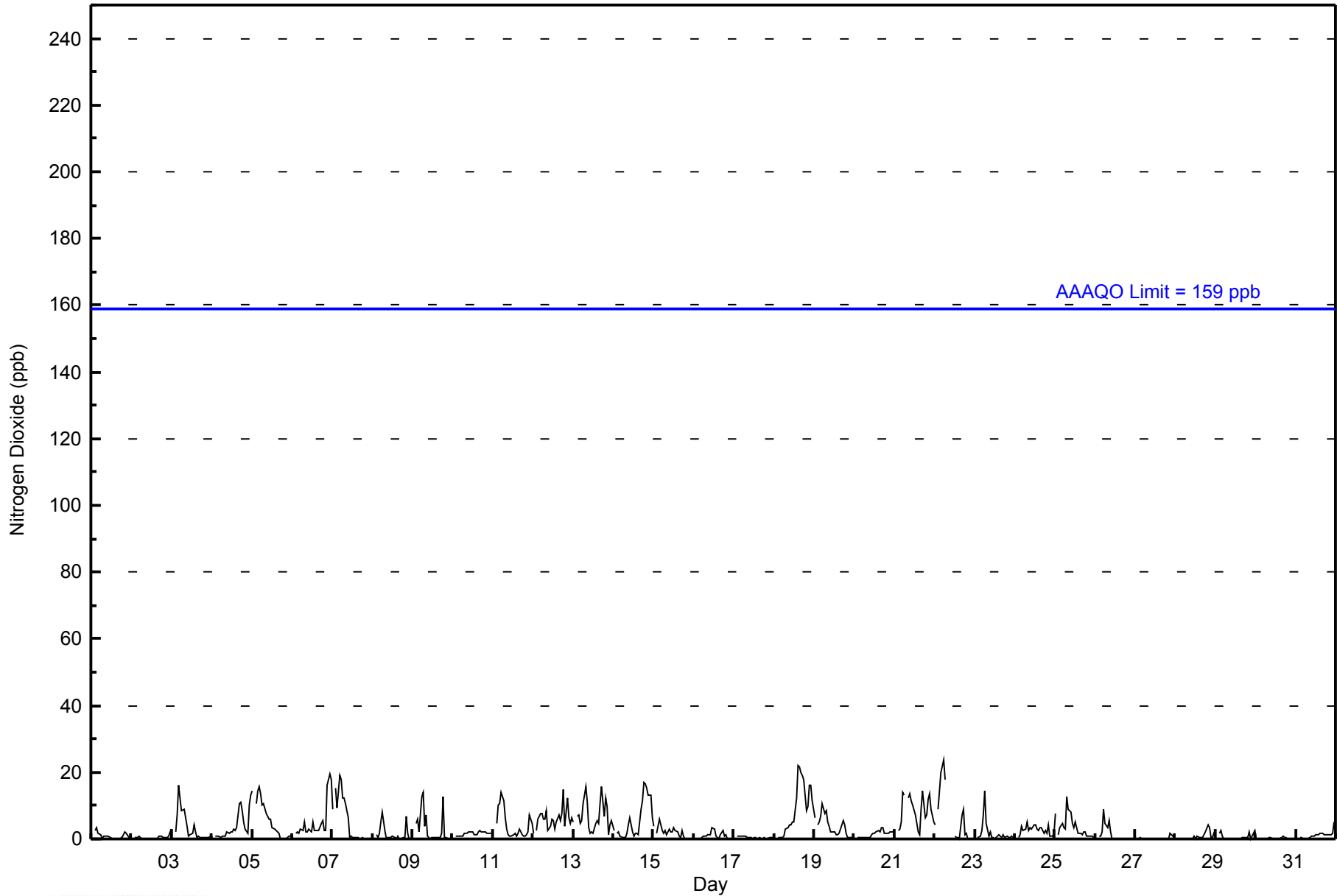
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	Z	3	3	2	1	0	1	1	1	1	1	0	M	M	M	M	0	0	1	2	2	0	0	1.0	3
2-Oct	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	2	0.4	2
3-Oct	3	Z	2	7	16	12	8	9	6	4	1	1	2	4	2	1	1	0	1	1	1	1	0	1	3.6	16
4-Oct	1	Z	1	1	1	1	1	1	1	2	2	2	2	3	3	3	11	11	9	5	3	2	10	13	3.7	13
5-Oct	15	Z	10	14	16	13	10	11	8	7	6	6	3	3	3	2	2	0	0	0	0	1	1	1	5.7	16
6-Oct	1	Z	2	2	2	3	2	5	2	2	3	2	5	2	2	3	3	5	5	3	3	16	20	18	4.8	20
7-Oct	9	Z	15	9	19	18	12	12	10	7	1	1	0	1	0	0	0	0	1	0	0	0	0	0	5.0	19
8-Oct	0	Z	1	1	2	5	8	2	0	1	0	0	1	1	0	1	0	0	0	1	7	2	0	0	1.4	8
9-Oct	0	Z	5	6	2	13	14	4	7	1	0	0	0	0	0	0	0	2	13	1	0	0	0	0	3.0	14
10-Oct	1	Z	1	1	1	1	1	2	2	2	2	2	2	1	1	2	3	2	2	2	2	2	2	2	1.6	3
11-Oct	2	Z	5	10	11	14	12	6	3	1	1	1	1	2	1	2	3	1	1	1	1	2	7	5	3.9	14
12-Oct	2	Z	3	6	8	8	6	6	9	3	4	6	5	3	5	7	5	8	15	4	12	7	5	6	6.1	15
13-Oct	5	Z	7	7	5	5	11	16	11	4	2	2	2	5	6	5	11	16	7	12	10	1	4	5	6.8	16
14-Oct	3	Z	2	2	1	1	1	0	2	4	6	2	1	2	2	1	9	12	17	17	15	13	13	7	5.7	17
15-Oct	4	Z	2	6	4	2	2	3	1	3	2	2	3	3	2	1	1	3	1	0	0	0	0	0	1.9	6
16-Oct	0	Z	0	0	0	1	1	1	1	1	1	3	3	1	1	0	1	3	1	1	0	0	0	0	0.9	3
17-Oct	0	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
18-Oct	0	Z	0	1	1	0	1	3	4	4	4	5	5	12	22	22	20	19	18	8	10	16	16	11	8.8	22
19-Oct	7	Z	4	5	7	10	8	8	5	4	2	2	2	1	1	2	3	6	4	2	1	1	1	1	3.7	10
20-Oct	1	Z	1	1	1	1	0	1	1	1	1	2	2	2	3	2	3	3	2	2	2	2	2	2	1.5	3
21-Oct	3	Z	3	3	5	14	13	M	12	13	11	10	7	5	2	1	9	15	6	7	12	14	9	5	8.1	15
22-Oct	4	Z	9	14	20	24	18	C	C	C	C	C	1	1	0	0	7	9	1	2	0	0	0	0	6.1	24
23-Oct	0	Z	0	1	2	7	14	5	1	2	0	0	0	0	1	1	1	1	0	1	0	1	1	0	1.8	14
24-Oct	0	Z	0	1	4	2	3	5	3	4	3	4	4	3	3	3	3	2	3	2	4	1	1	2	2.6	5
25-Oct	8	Z	1	4	5	3	3	13	9	8	5	3	5	3	2	2	1	2	2	1	1	1	1	1	3.6	13
26-Oct	0	Z	1	1	2	9	5	4	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	9
27-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0.2	2
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	2	4	4	1	0	2	0.7	4
29-Oct	1	Z	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	3	0.6	3
30-Oct	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.2	1
31-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	2	2	2	1	1	1	1	1	2	5	1.1	5
	2.2	--	2.6	3.5	4.4	5.5	5.0	4.0	3.5	2.7	2.0	2.0	1.9	2.0	2.1	2.1	3.3	3.9	3.6	2.5	3.0	2.7	3.2	2.9	Diurnal Average	
	15	--	15	14	20	24	18	16	12	13	11	10	7	12	22	22	20	19	18	17	15	16	20	18	Diurnal Maximum	

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



WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu - October 2014





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Wapasu - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	700	99.57	99.57
21 - 40	3	0.43	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Wapasu - October 2014**

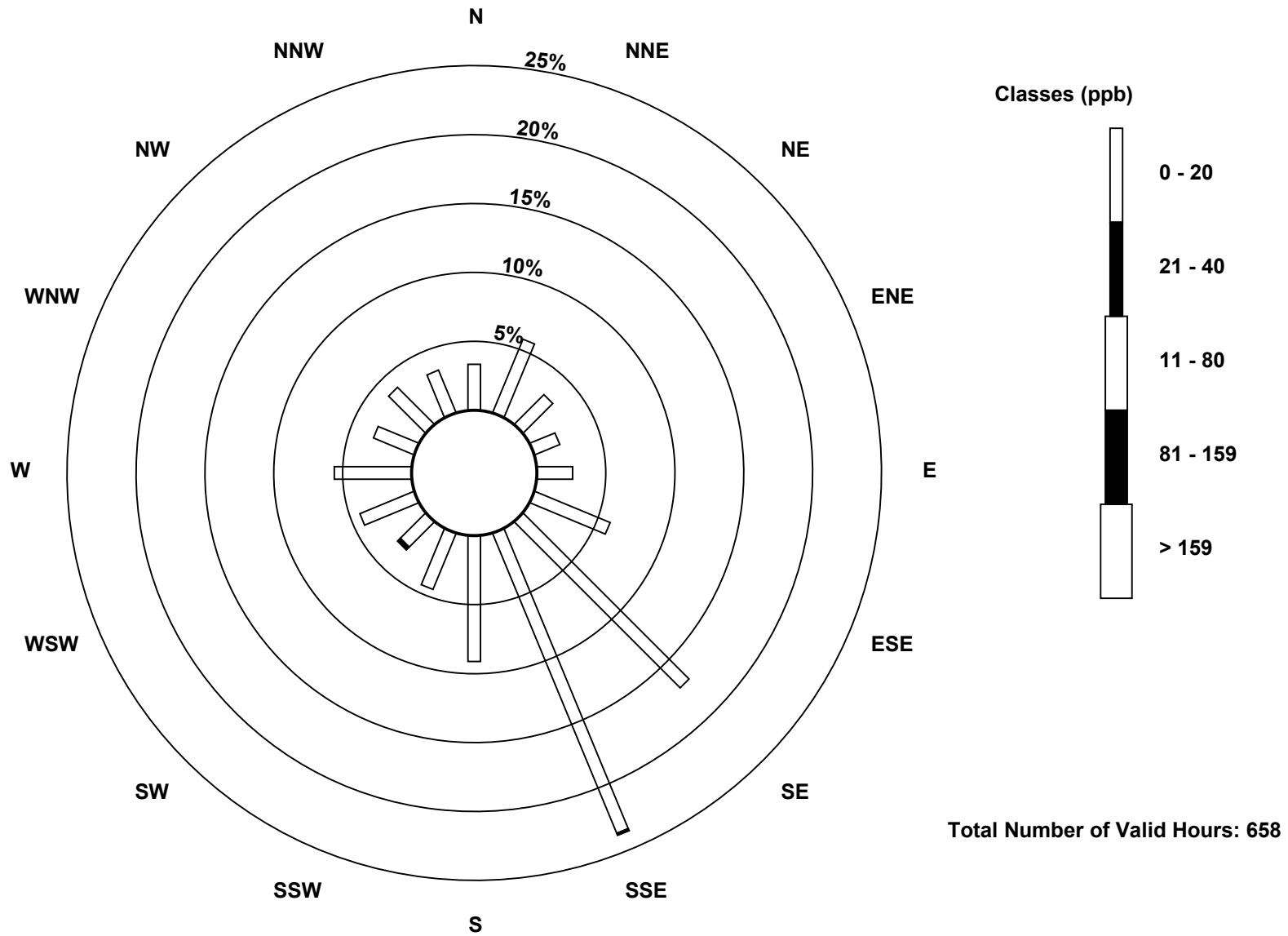
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	38	20	13	17	39	112	155	60	29	17	28	37	21	25	22	655
21 - 40	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	3
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	22	38	20	13	17	39	112	156	60	29	19	28	37	21	25	22	658

Total Number of Valid Hours: 658

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

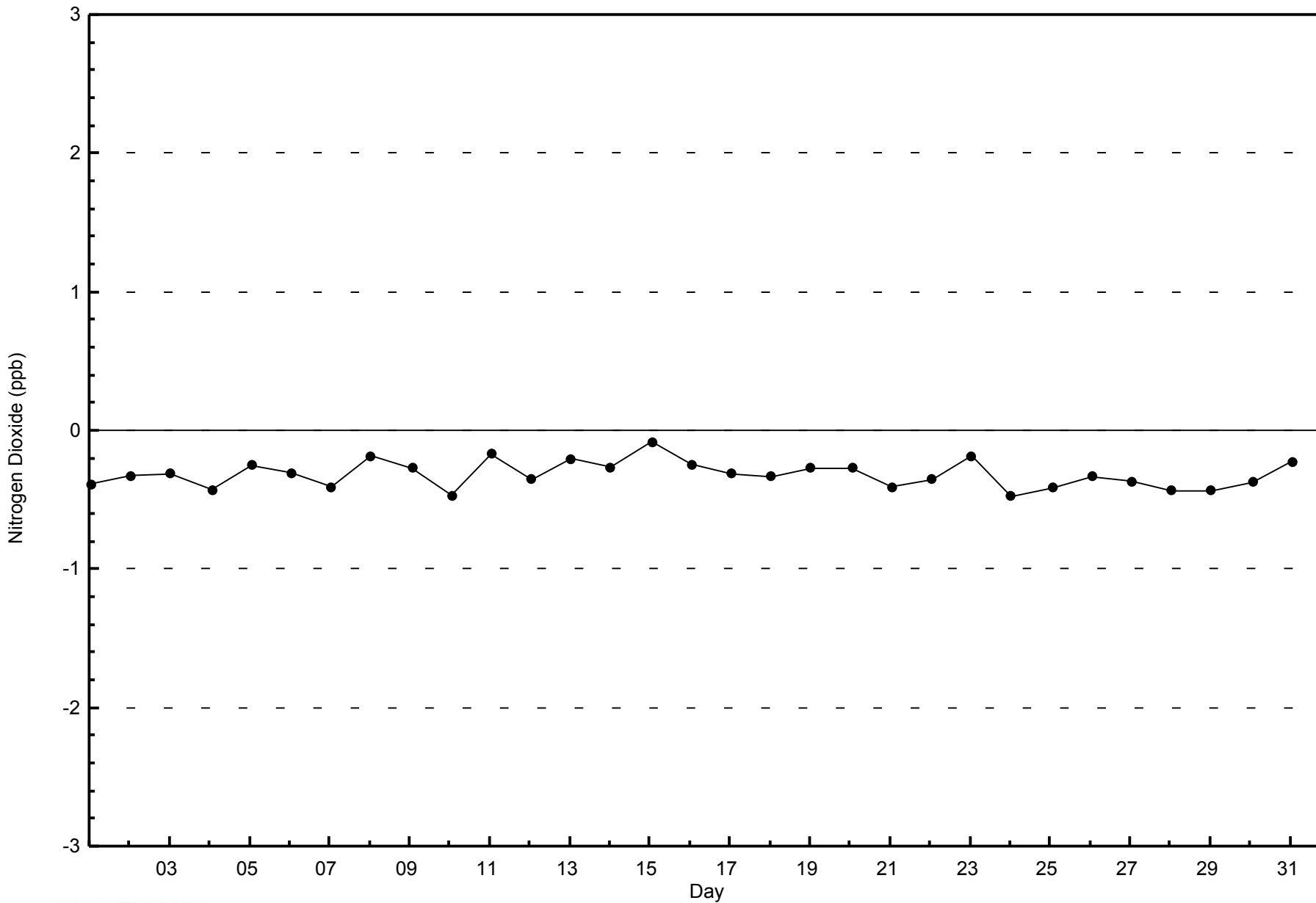
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu (AMS 17)





WBEA  
Zero Responses

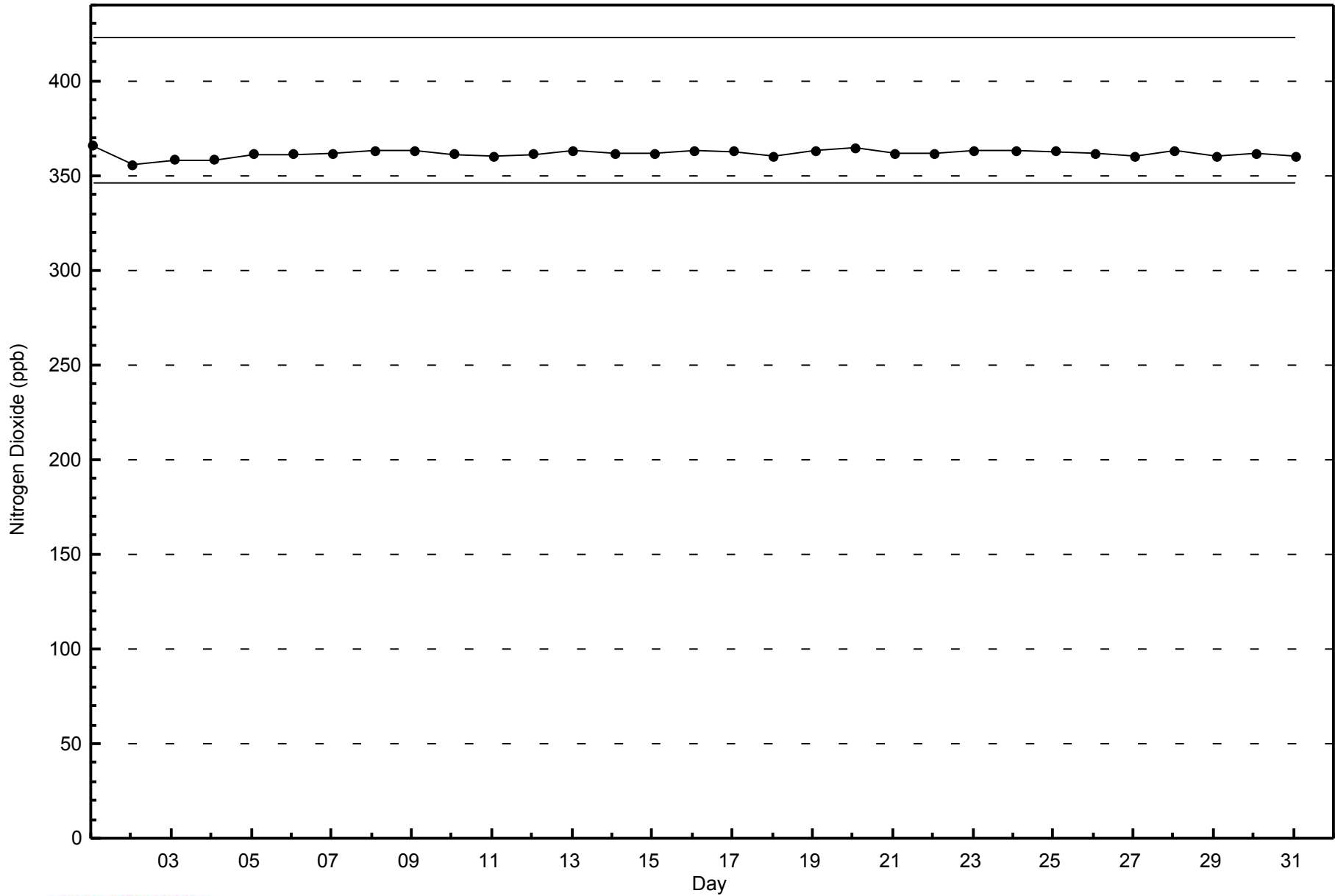
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu - October 2014





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu - October 2014



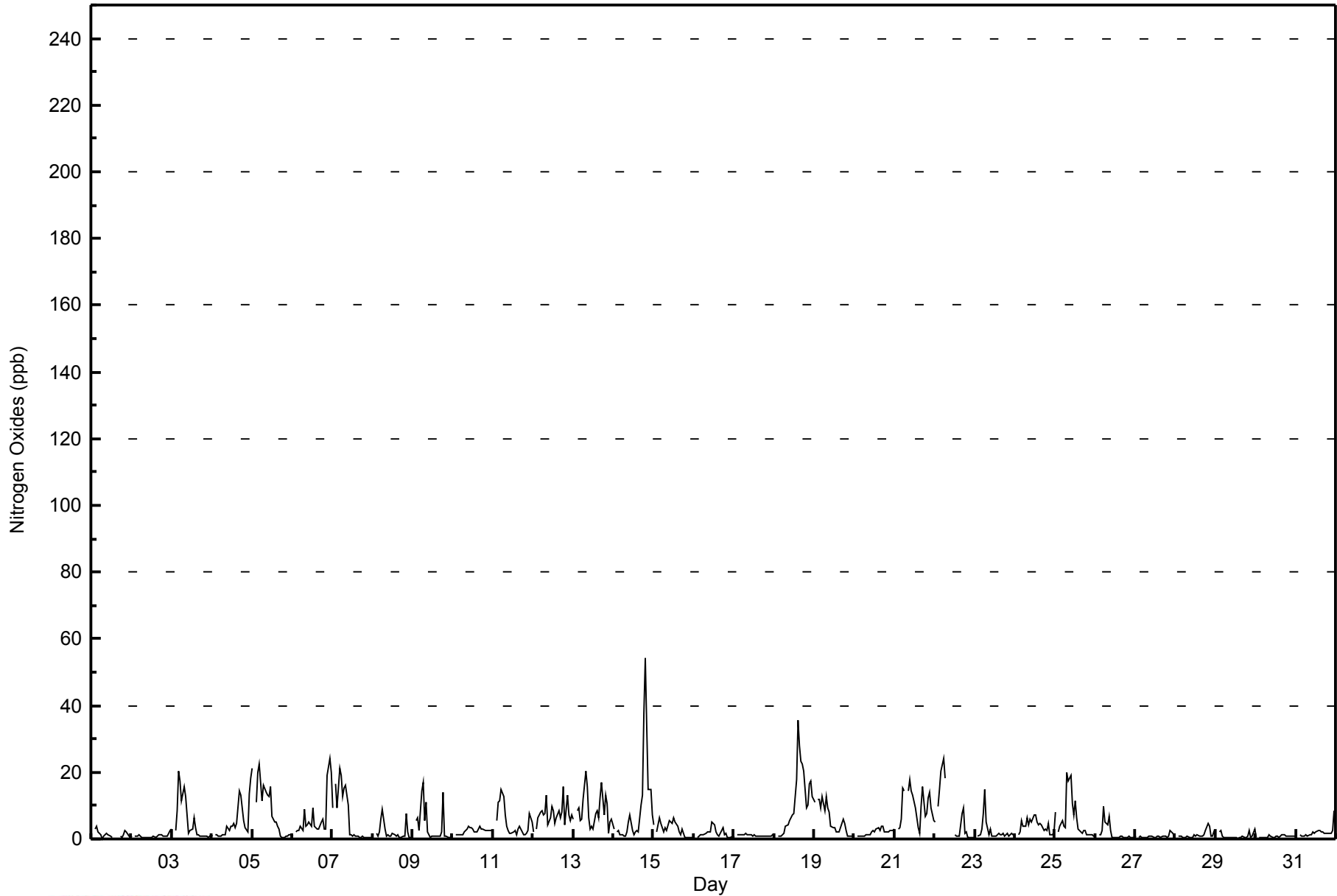


Maximum Value: 54 ppb on Oct 14 20:00														Maximum Daily Average: 11.1 ppb on Oct 18										Hours in Service: 744		
Minimum Value: 0 ppb on Oct 1 07:00														Minimum Daily Average: 0.8 ppb on Oct 30										Hours of Data: 703		
Maximum Diurnal Average: 6.5 ppb at hour 6														Minimum Diurnal Average: 3.0 ppb at hour 1										Hours of Missing Data: 41		
Monthly Average: 4.3 ppb														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 5 P <sub>90</sub> = 12 P <sub>99</sub> = 24										Hours of Calibration: 36		
																								Percent Operational Time: 99.3		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	Z	3	4	2	1	0	1	1	2	1	1	0	M	M	M	M	1	1	1	2	2	1	0	1.3	4
2-Oct	1	Z	1	1	1	1	0	0	1	0	1	0	0	1	0	1	1	1	1	1	1	1	2	3	0.9	3
3-Oct	3	Z	2	8	20	17	12	16	13	7	2	2	3	7	4	1	1	1	1	1	1	1	1	1	5.4	20
4-Oct	1	Z	1	1	1	1	1	1	1	4	3	4	4	5	4	5	14	13	9	5	3	2	14	18	5.0	18
5-Oct	21	Z	11	20	22	17	11	16	14	13	13	16	7	5	4	3	1	0	0	1	1	1	1	1	8.9	22
6-Oct	1	Z	2	2	2	4	3	9	4	4	5	4	9	4	4	3	3	5	6	3	3	19	24	20	6.2	24
7-Oct	9	Z	17	9	21	19	13	15	16	10	1	1	1	1	1	1	0	0	1	0	0	1	0	1	6.1	21
8-Oct	0	Z	2	1	2	6	9	3	1	1	1	1	2	1	1	1	0	1	1	1	8	2	0	0	2.0	9
9-Oct	0	Z	5	6	3	15	17	5	11	2	0	1	1	1	1	1	1	2	14	1	1	0	1	1	3.9	17
10-Oct	1	Z	1	1	1	1	1	2	3	4	3	3	3	2	2	3	4	3	3	3	2	2	2	3	2.4	4
11-Oct	2	Z	5	11	11	15	13	7	4	2	2	2	2	3	1	3	4	2	1	1	2	2	8	5	4.7	15
12-Oct	2	Z	3	6	8	8	7	8	13	4	6	10	8	5	7	8	7	8	16	4	13	7	5	7	7.5	16
13-Oct	6	Z	9	9	5	6	12	20	16	6	3	4	3	7	8	6	12	17	7	13	10	2	5	6	8.4	20
14-Oct	3	Z	2	3	1	1	1	1	2	5	7	2	1	2	3	2	10	13	38	54	34	15	15	7	9.7	54
15-Oct	4	Z	2	7	4	3	2	3	3	6	5	5	7	5	4	2	1	3	1	0	1	1	1	1	3.1	7
16-Oct	1	Z	1	1	1	1	1	2	2	2	2	5	4	2	1	1	2	3	1	2	0	0	0	1	1.6	5
17-Oct	1	Z	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2
18-Oct	1	Z	1	1	1	1	2	4	4	5	6	7	8	18	35	28	23	22	20	9	10	17	17	13	11.1	35
19-Oct	11	Z	12	12	9	13	8	13	9	8	4	3	3	2	2	2	3	6	5	2	1	1	1	1	5.7	13
20-Oct	1	Z	1	1	1	1	1	1	1	1	2	3	2	3	3	3	4	4	2	2	2	3	2	3	2.0	4
21-Oct	3	Z	3	4	6	15	14	M	14	18	14	13	9	6	3	2	10	16	7	8	12	14	10	6	9.4	18
22-Oct	5	Z	10	15	20	24	18	C	C	C	C	C	1	1	1	1	8	9	2	2	0	1	0	1	6.6	24
23-Oct	0	Z	1	1	3	7	15	5	1	3	1	1	1	1	2	1	1	2	1	2	1	1	2	1	2.3	15
24-Oct	1	Z	1	2	5	4	4	7	4	6	5	7	7	5	4	5	4	3	3	2	5	1	1	2	3.9	7
25-Oct	8	Z	2	4	5	4	4	20	17	19	11	7	12	7	3	2	2	3	3	1	1	1	1	1	6.0	20
26-Oct	1	Z	1	1	3	10	5	4	7	3	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1.8	10
27-Oct	1	Z	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	1	0.8	3
28-Oct	1	Z	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	2	5	4	1	1	2	1.2	5
29-Oct	1	Z	2	3	1	0	0	0	0	1	0	0	0	0	0	0	1	0	1	1	3	1	1	3	0.9	3
30-Oct	0	Z	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
31-Oct	1	Z	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	3	8	1.9	8
		3.0	--	3.4	4.5	5.4	6.5	5.8	5.8	5.6	4.7	3.5	3.6	3.4	3.3	3.5	3.1	4.2	4.7	4.9	4.2	4.1	3.4	3.9	3.8	Diurnal Average
		21	--	17	20	22	24	18	20	17	19	14	16	12	18	35	28	23	22	38	54	34	19	24	20	Diurnal Maximum
Z - zerospan		C - Calibration					M - Maintenance																			



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Wapasu - October 2014





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Wapasu - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	691	98.29	98.29
21 - 40	11	1.56	99.86
41 - 80	1	0.14	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Wapasu - October 2014**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	38	20	13	17	39	112	155	60	24	17	26	35	21	25	22	646
21 - 40	0	0	0	0	0	0	0	1	0	4	2	2	2	0	0	0	11
41 - 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	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>	22	38	20	13	17	39	112	156	60	29	19	28	37	21	25	22	658

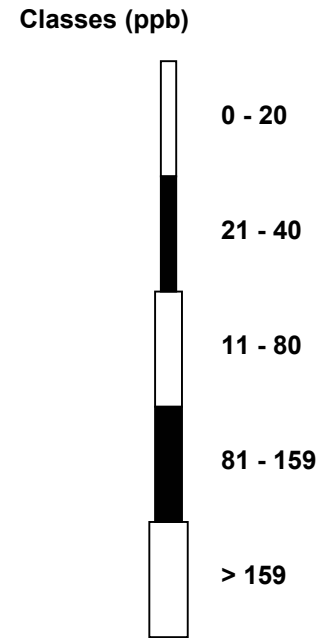
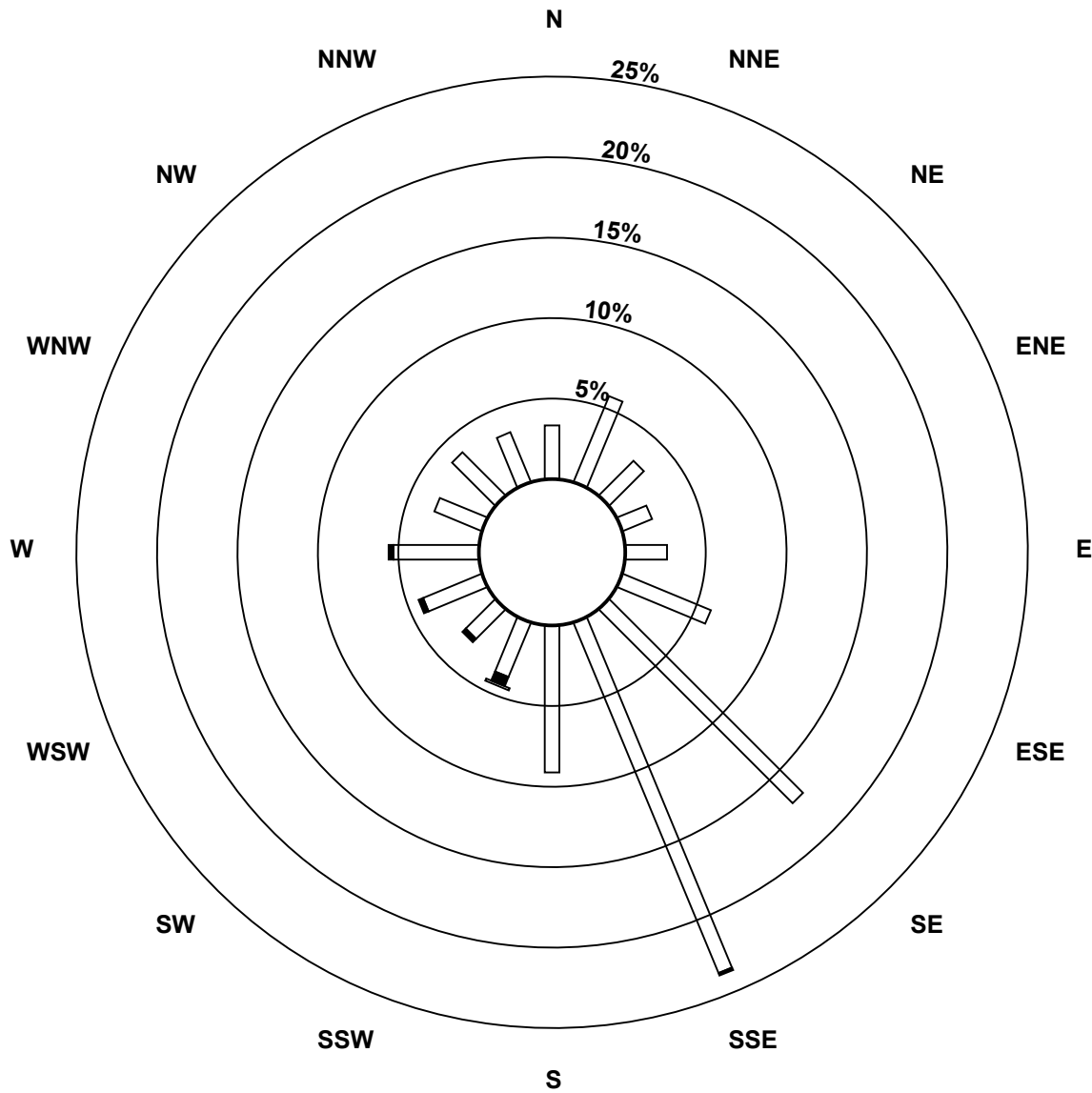
Total Number of Valid Hours: 658

Total Number of Hours: 744

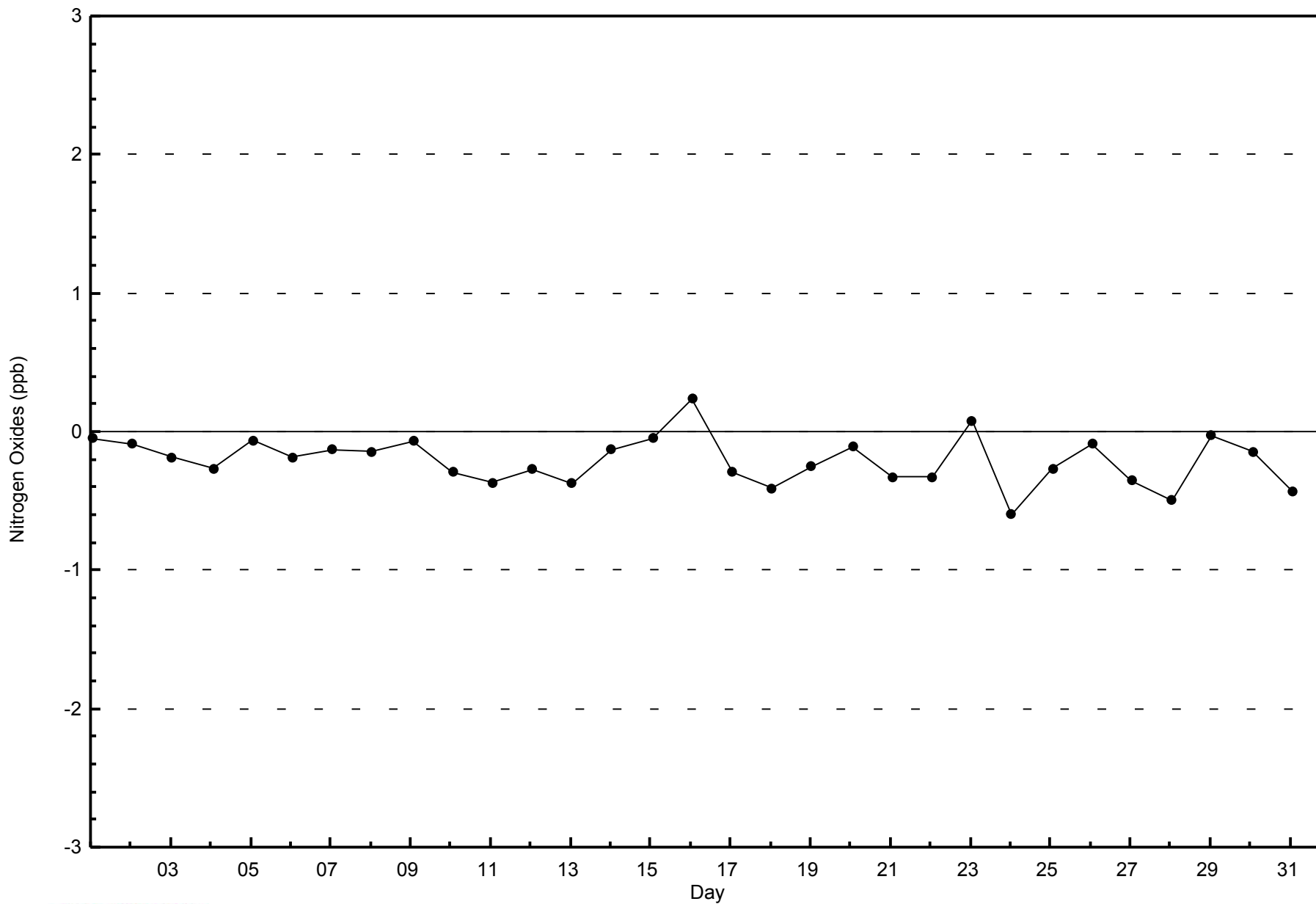


**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Wapasu (AMS 17)**



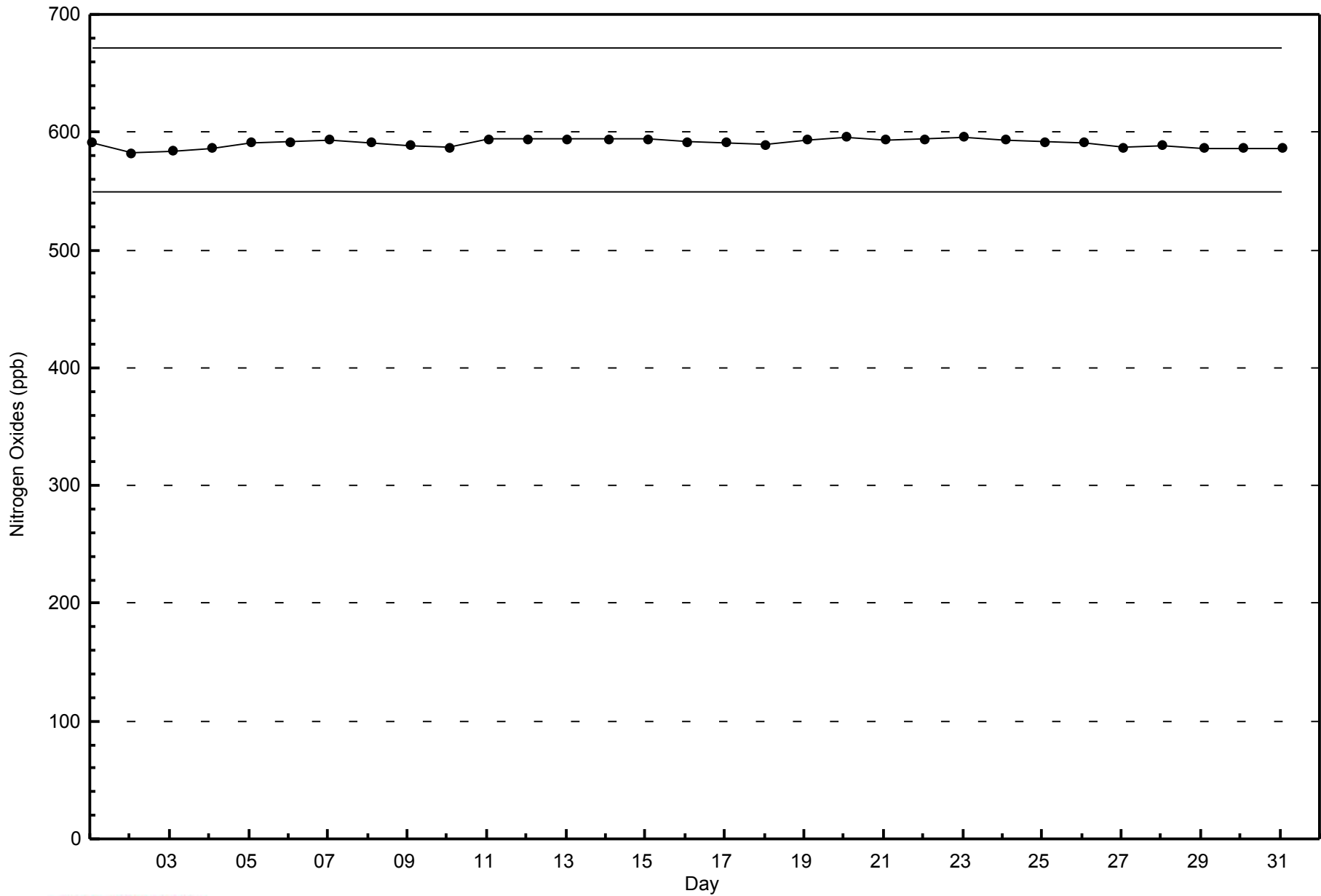
**Total Number of Valid Hours: 658**





WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Wapasu - October 2014





Summary of Hour Averages

Wapasu - October 2014

Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	744
Maximum Value: 32.1 µg/m <sup>3</sup> on Oct 22 06:00	Maximum Daily Average: 7.0 µg/m <sup>3</sup> on Oct 18	Hours of Data:	735
Minimum Value: 0.0 µg/m <sup>3</sup> on Oct 24 04:00	Minimum Daily Average: 0.3 µg/m <sup>3</sup> on Oct 29	Hours of Missing Data:	9
Maximum Diurnal Average: 3.9 µg/m <sup>3</sup> at hour 6	Minimum Diurnal Average: 1.9 µg/m <sup>3</sup> at hour 1	Hours of Calibration:	0
Monthly Average: 2.59 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 0.1 P <sub>10</sub> = 0.3 Q <sub>1</sub> = 0.7 Median = 1.5 Q <sub>3</sub> = 3.5 P <sub>90</sub> = 5.9 P <sub>99</sub> = 16.2	Percent Operational Time:	98.8

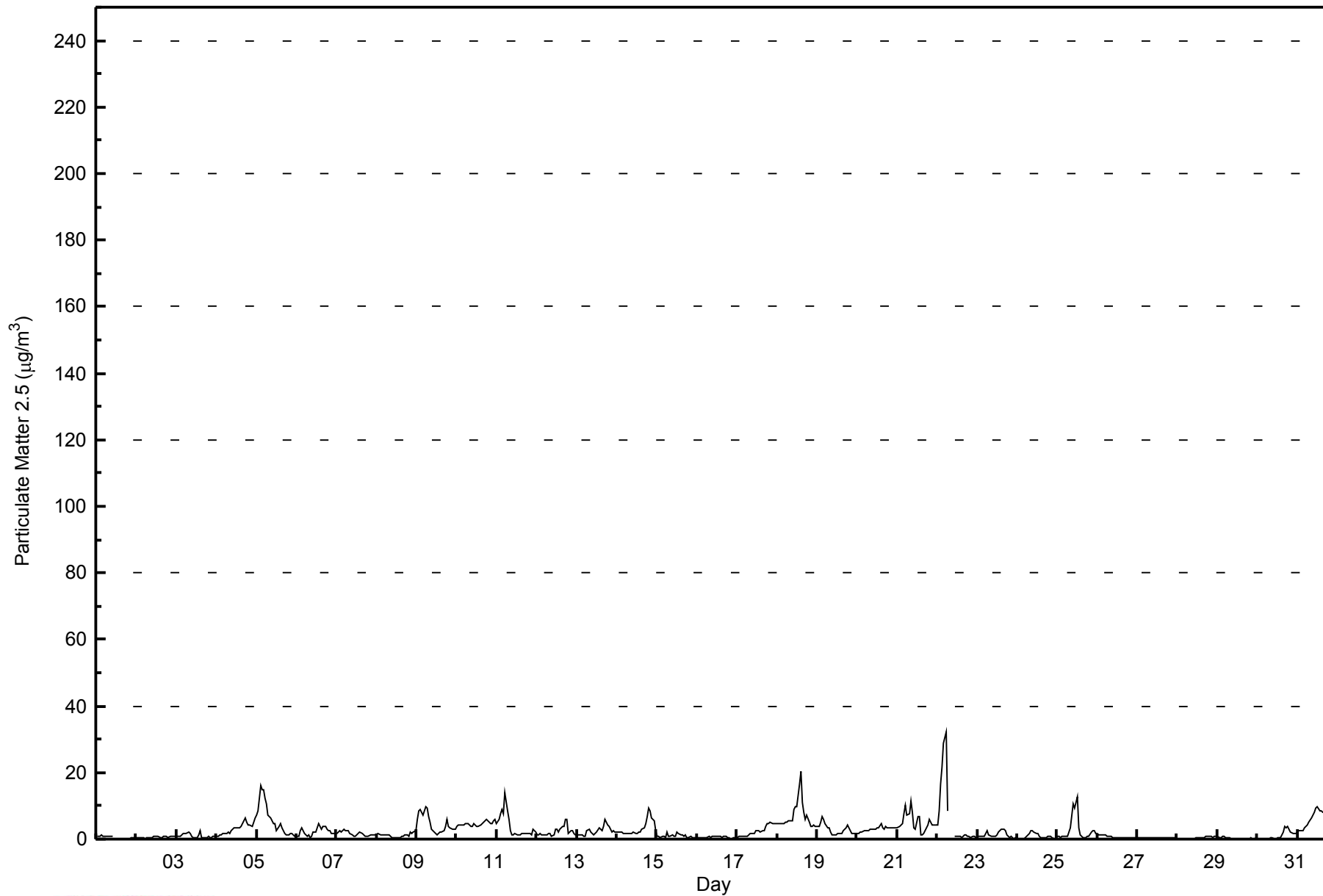
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	1.0	0.9	1.0	1.1	0.9	0.9	0.9	0.9	1.0	1.0	0.9	M	M	M	M	M	M	0.1	0.1	0.1	0.1	0.2	0.3	0.5	0.7	1.1																							
2-Oct	0.5	0.5	0.5	0.3	0.2	0.2	0.2	0.2	0.3	0.5	1.0	1.0	0.7	1.0	0.5	0.5	0.7	0.7	0.7	0.6	0.7	0.8	0.8	0.9	0.6	1.0																							
3-Oct	0.9	1.0	0.9	1.2	1.8	1.8	1.8	2.1	1.8	0.9	0.4	0.4	0.5	1.4	2.7	0.5	0.5	0.5	0.6	0.7	0.6	0.6	0.7	0.8	1.0	2.7																							
4-Oct	1.0	1.0	1.2	1.3	1.6	1.7	1.8	2.0	1.9	2.5	3.3	3.6	3.5	3.6	3.3	3.7	5.6	6.3	5.0	4.4	4.1	3.8	5.2	6.3	3.2	6.3																							
5-Oct	7.1	8.6	16.3	15.0	14.8	12.5	10.6	7.3	6.5	5.5	4.8	4.8	2.6	4.0	4.7	3.3	2.7	1.7	1.1	1.3	1.6	1.7	1.5	1.0	5.9	16.3																							
6-Oct	0.9	0.7	2.7	3.5	2.7	1.6	1.0	1.1	0.4	0.8	2.0	2.3	3.6	4.8	3.8	3.0	3.6	3.9	3.0	2.6	2.4	1.9	1.7	1.6	2.3	4.8																							
7-Oct	1.6	2.2	2.6	2.3	2.8	2.7	2.4	2.4	1.8	1.2	0.9	1.0	1.1	1.6	2.1	1.7	1.1	0.7	0.9	1.1	1.3	1.4	1.2	1.1	1.6	2.8																							
8-Oct	1.5	1.5	1.2	1.2	1.2	1.4	1.4	1.1	1.0	0.5	0.4	0.3	0.3	0.5	0.6	0.7	0.9	1.2	1.2	1.0	1.9	1.8	2.1	2.7	1.2	2.7																							
9-Oct	6.1	8.5	8.8	8.0	7.2	9.9	9.4	6.9	5.2	3.0	2.0	1.5	1.4	1.9	2.0	2.2	2.7	3.9	5.9	4.0	3.4	2.9	3.0	2.8	4.7	9.9																							
10-Oct	3.9	4.4	4.3	4.4	4.4	4.7	4.5	4.5	4.0	3.8	4.6	4.4	4.0	3.7	4.1	4.6	5.1	5.4	5.8	5.1	4.7	4.8	5.4	5.8	4.6	5.8																							
11-Oct	4.6	5.8	7.6	8.7	7.8	14.0	8.6	5.8	2.5	1.3	1.4	1.5	1.4	1.4	1.1	1.7	1.7	1.5	1.6	1.6	1.5	1.4	2.9	2.2	3.7	14.0																							
12-Oct	1.4	1.4	1.6	1.5	1.4	1.3	1.3	1.5	1.8	1.0	1.4	3.1	2.8	2.3	3.0	3.9	3.8	5.9	6.1	1.8	2.4	2.5	1.6	1.1	2.3	6.1																							
13-Oct	1.1	1.1	1.4	1.3	0.8	1.0	2.4	3.0	2.3	1.7	1.4	1.5	2.1	3.2	2.9	2.6	4.0	5.9	4.0	4.0	3.0	1.9	2.4	2.3	2.4	5.9																							
14-Oct	2.0	2.1	2.0	2.0	1.7	1.5	1.6	1.5	1.9	1.9	1.9	1.8	1.7	2.0	2.0	3.1	3.6	4.8	6.9	9.3	8.6	6.4	5.7	2.6	3.3	9.3																							
15-Oct	0.9	0.7	0.4	0.8	0.7	0.5	2.0	0.9	0.8	1.4	0.9	0.9	1.9	1.7	1.3	1.1	0.6	1.3	0.5	0.5	0.7	0.6	0.5	0.5	0.9	2.0																							
16-Oct	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.6	0.8	0.9	0.7	1.0	0.7	0.7	0.4	0.6	0.9	0.5	0.4	0.1	0.1	0.2	0.3	0.6	1.0																							
17-Oct	0.4	0.7	0.7	0.7	0.9	0.9	1.0	1.2	1.5	1.5	1.8	2.3	2.6	2.5	2.3	2.4	2.7	3.8	4.5	4.6	5.0	4.8	4.8	4.6	2.4	5.0																							
18-Oct	4.6	4.6	4.6	4.8	4.8	4.9	4.9	5.4	5.6	5.7	8.9	9.8	9.9	16.4	20.5	11.1	7.9	5.8	7.1	4.9	3.8	3.8	4.1	4.0	7.0	20.5																							
19-Oct	3.9	3.9	5.1	7.0	6.1	4.6	3.5	3.5	2.3	1.4	1.4	1.3	1.7	1.6	1.6	1.8	2.5	3.2	4.4	3.3	2.3	1.7	1.6	1.7	3.0	7.0																							
20-Oct	1.8	1.8	2.1	2.3	2.4	2.4	2.3	2.7	3.0	3.0	2.9	3.1	3.3	3.2	4.6	3.4	3.1	3.8	3.6	3.4	3.3	3.3	3.2	3.2	3.0	4.6																							
21-Oct	3.5	4.0	4.1	4.7	7.5	10.2	7.1	7.7	11.4	8.0	3.5	3.0	6.7	6.9	1.2	1.2	1.6	2.4	4.1	5.7	5.2	4.3	4.0	4.2	5.1	11.4																							
22-Oct	4.4	8.6	16.5	21.7	28.8	32.1	8.7	M	M	M	0.8	0.8	0.8	0.7	0.7	0.6	1.1	1.3	1.1	0.9	0.6	0.9	0.7	0.6	6.3	32.1																							
23-Oct	0.7	0.7	0.7	0.8	1.0	1.7	2.4	1.4	1.0	1.0	0.8	0.8	1.3	2.1	3.0	3.0	2.8	2.4	1.2	0.6	0.7	0.4	0.1	0.4	1.3	3.0																							
24-Oct	0.2	0.1	0.0	0.0	0.1	0.3	1.2	1.5	2.5	2.4	2.0	1.6	1.8	0.7	0.4	0.4	0.4	0.3	0.7	0.7	0.7	0.3	0.2	0.3	0.8	2.5																							
25-Oct	0.6	0.8	0.5	0.7	0.8	0.9	1.0	1.9	3.3	10.8	9.5	10.9	12.8	3.2	1.2	0.6	0.4	0.6	0.8	1.1	1.9	2.4	2.4	1.7	3.0	12.8																							
26-Oct	1.5	1.4	1.3	1.2	1.2	1.1	0.9	0.7	0.6	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.7	1.5																							
27-Oct	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.6	0.4	0.2	0.3	0.6																							
28-Oct	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.4	0.5	0.4	0.6	0.8	0.7	0.8	0.6	0.7	0.8	0.4	0.8																							
29-Oct	0.7	0.6	0.6	1.0	0.7	0.4	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.5	0.2	0.2	0.5	0.3	1.0																							
30-Oct	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.1	0.1	0.3	0.4	0.5	2.0	3.7	3.3	3.9	3.1	2.1	1.7	1.6	1.7	1.1	3.9																							
31-Oct	2.1	2.4	2.4	2.5	3.4	3.7	4.4	5.3	6.4	7.0	8.0	9.3	9.6	8.6	8.6	8.2	8.1	8.3	8.1	7.7	7.9	7.8	8.1	7.8	6.5	9.6																							
																								1.9	2.3	3.0	3.3	3.5	3.9	2.9	2.5	2.4	2.3	2.2	2.4	2.7	2.7	2.7	2.3	2.4	2.6	2.7	2.5	2.3	2.1	2.2	2.1	Diurnal Average	
																								7.1	8.6	16.5	21.7	28.8	32.1	10.6	7.7	11.4	10.8	9.5	10.9	12.8	16.4	20.5	11.1	8.1	8.3	8.1	9.3	8.6	7.8	8.1	7.8	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>) -  $\mu\text{g}/\text{m}^3$   
Wapasu - October 2014





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Wapasu - October 2014**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	370	50.34	50.34
6 - 15	79	10.75	61.09
16 - 25	5	0.68	61.77
26 - 80	2	0.27	62.04
> 81.0	0	0.00	62.04

Total Number of Valid Hours: 735

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Wapasu - October 2014**

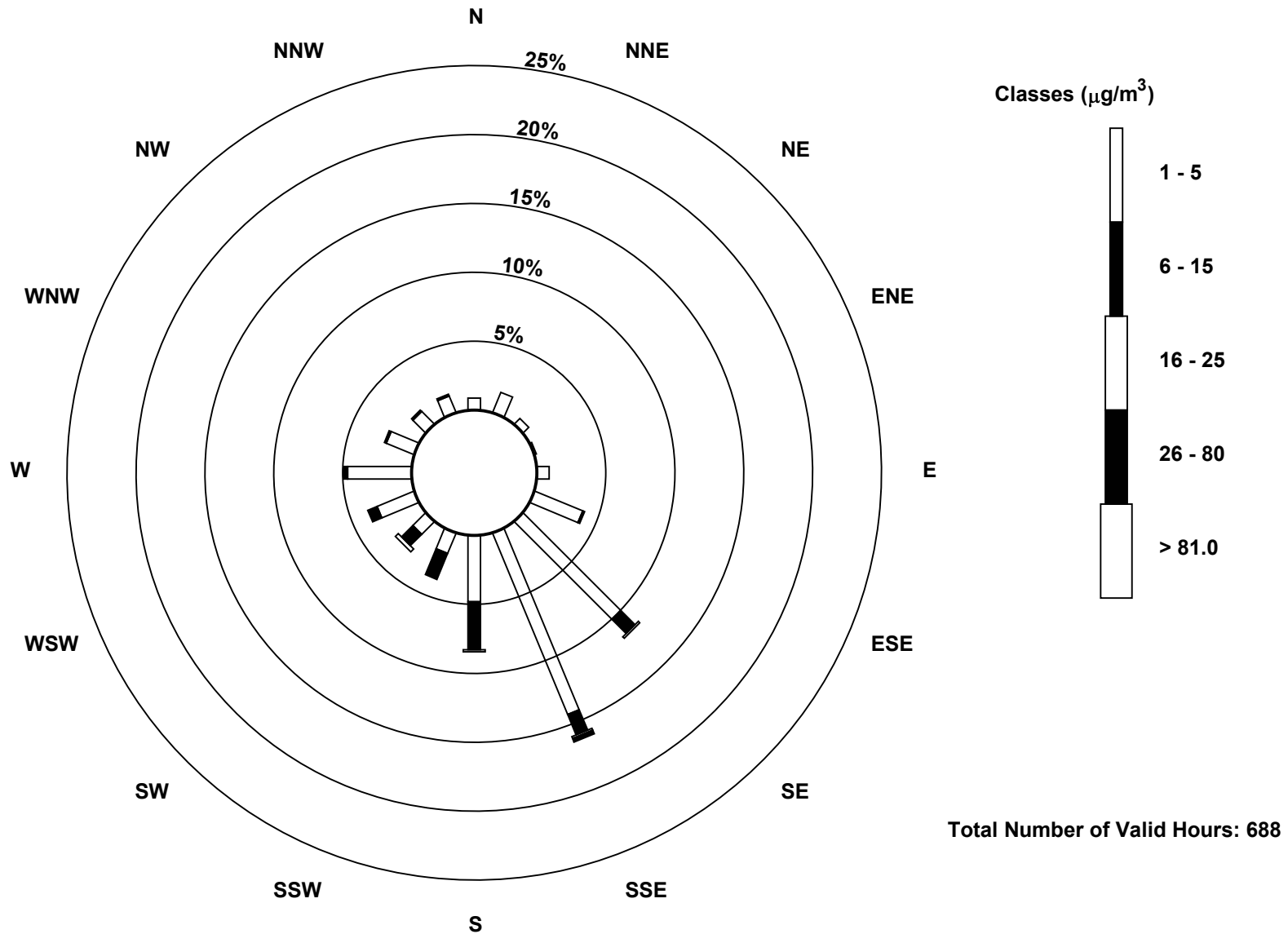
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	6	11	4	1	6	26	69	98	33	11	9	20	32	15	9	9	359
6 - 15	0	0	0	0	0	1	10	11	24	14	8	5	2	1	1	1	78
16 - 25	0	0	0	0	0	0	1	1	1	0	2	0	0	0	0	0	5
26 - 80	0	0	0	0	0	0	0	2	0	0	0	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>	6	11	4	1	6	27	80	112	58	25	19	25	34	16	10	10	444

Total Number of Valid Hours: 688

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
Wapasu (AMS 17)**





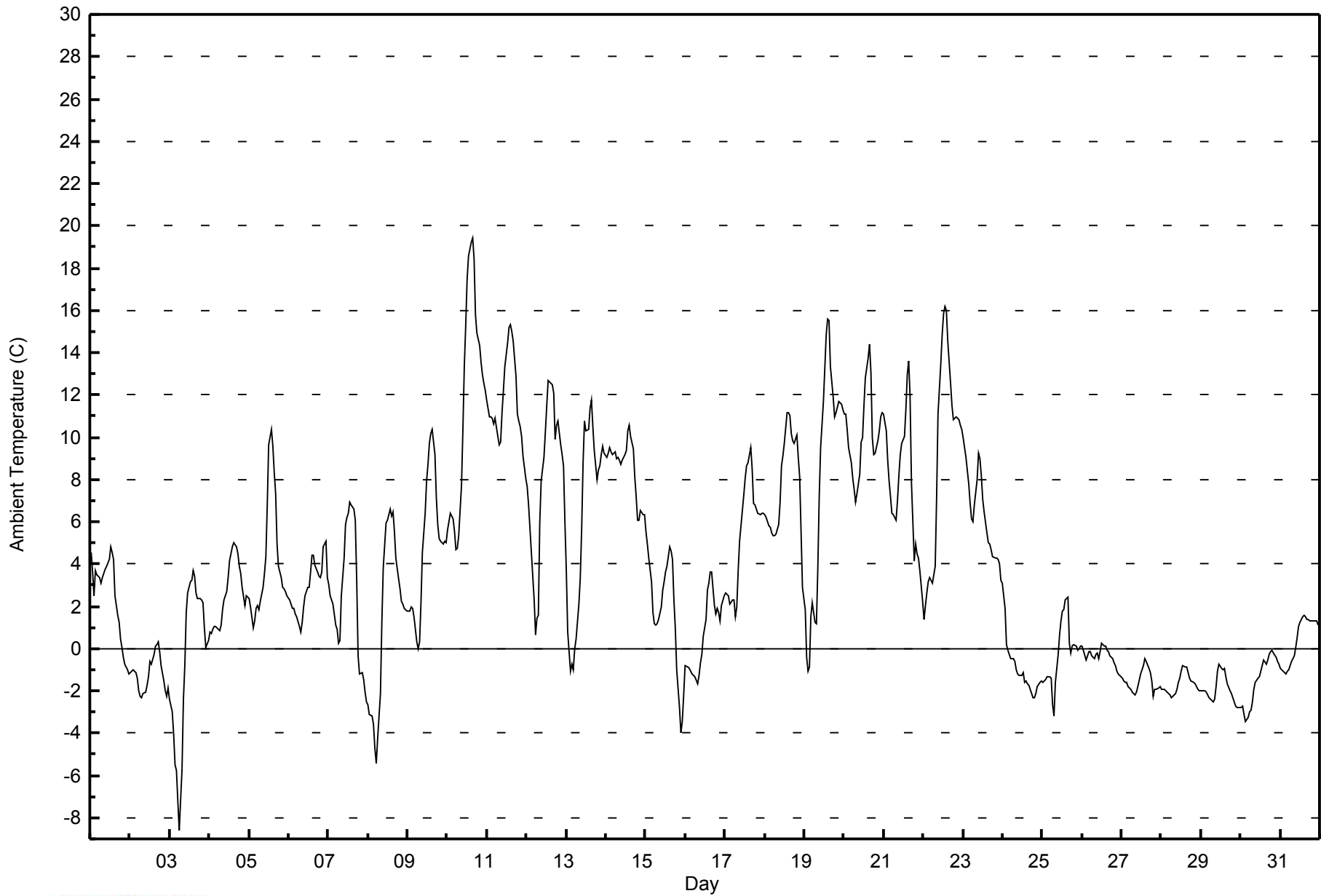


Maximum Value: 19.4 C on Oct 10 16:00																				Maximum Daily Average: 11.7 C on Oct 10					Hours in Service: 744																							
Minimum Value: -8.6 C on Oct 3 07:00																				Minimum Daily Average: -2.0 C on Oct 29					Hours of Data: 744																							
Maximum Diurnal Average: 6.8 C at hour 15																				Minimum Diurnal Average: 1.1 C at hour 7					Hours of Missing Data: 0																							
Monthly Average: 3.70 C																				Percentiles: P <sub>1</sub> = -4.2 P <sub>10</sub> = -1.9 Q <sub>1</sub> = -0.7 Median = 2.5 Q <sub>3</sub> = 7.5 P <sub>90</sub> = 10.9 P <sub>99</sub> = 15.8					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-Oct	4.5	3.6	2.5	3.7	3.5	3.3	3.1	3.4	3.6	3.8	3.9	4.2	4.8	4.6	4.2	2.5	1.6	1.3	0.4	0.1	-0.4	-0.8	-1.0	-1.2	2.5	4.8																						
2-Oct	-1.1	-1.1	-1.0	-1.1	-1.4	-2.0	-2.2	-2.4	-2.2	-2.1	-1.8	-1.3	-0.6	-0.8	-0.3	0.1	0.2	0.3	-0.2	-0.8	-1.5	-2.0	-2.3	-1.9	-1.2	0.3																						
3-Oct	-2.4	-3.0	-4.0	-5.5	-5.8	-7.2	-8.6	-5.7	-2.4	-0.8	1.7	2.6	3.2	3.2	3.7	3.4	2.7	2.4	2.4	2.3	2.2	1.0	0.0	0.4	-0.6	3.7																						
4-Oct	0.8	0.7	0.9	1.0	1.0	0.9	0.9	1.1	1.9	2.3	3.4	4.1	4.5	4.8	5.0	4.8	4.5	3.9	3.6	2.9	2.1	2.5	2.4	2.6	5.0																							
5-Oct	2.4	2.0	1.0	1.3	1.9	2.0	1.8	2.2	2.9	3.5	4.3	6.8	9.7	10.4	9.6	8.3	7.3	4.9	3.9	3.4	2.9	2.8	2.7	2.5	4.2	10.4																						
6-Oct	2.3	2.1	1.9	1.9	1.7	1.5	1.0	0.8	1.2	2.0	2.5	2.9	2.9	3.6	4.4	4.4	4.0	3.6	3.4	3.4	3.6	4.8	5.1	3.4	2.9	5.1																						
7-Oct	3.0	2.5	2.3	2.1	1.1	0.9	0.3	0.4	2.5	4.3	5.9	6.2	6.4	6.9	6.8	6.6	6.1	3.2	-0.3	-1.2	-1.1	-1.5	-2.1	-2.5	2.5	6.9																						
8-Oct	-2.6	-3.1	-3.2	-3.6	-4.7	-5.4	-4.2	-2.1	1.2	3.8	4.9	6.0	6.1	6.6	6.3	6.5	5.5	4.3	3.3	2.9	2.3	2.1	1.9	1.8	1.5	6.6																						
9-Oct	1.7	1.8	2.0	1.9	1.5	0.3	0.0	0.3	2.2	4.5	6.4	7.9	8.7	9.7	10.2	10.3	9.2	7.1	5.8	5.2	5.1	5.0	5.0	5.0	4.9	10.3																						
10-Oct	5.6	6.0	6.4	6.2	5.5	4.7	4.7	5.3	7.7	10.4	13.3	15.2	17.4	18.6	19.2	19.4	18.4	15.8	15.0	14.3	13.6	12.9	12.6	12.2	11.7	19.4																						
11-Oct	11.7	11.0	11.0	10.9	10.6	10.9	10.0	9.7	9.8	11.1	12.2	13.4	14.5	15.2	15.3	15.0	14.6	12.9	11.1	10.7	10.5	10.0	9.1	8.0	11.6	15.3																						
12-Oct	7.7	6.8	5.7	4.6	2.3	0.6	1.5	1.6	6.0	7.9	9.1	10.3	11.5	12.7	12.6	12.5	12.1	9.9	10.5	10.8	9.6	9.2	8.7	6.0	7.9	12.7																						
13-Oct	3.7	0.8	-1.1	-0.7	-1.0	0.0	0.5	2.1	3.3	5.7	8.8	10.7	10.3	11.4	11.8	10.5	9.4	8.0	8.4	8.6	9.2	9.6	9.3	6.2	11.8																							
14-Oct	9.1	9.3	9.5	9.3	9.2	9.3	9.0	9.0	8.9	8.7	8.9	9.2	9.4	10.3	10.6	10.1	9.4	8.1	7.2	6.1	6.1	6.6	6.3	6.3	8.6	10.6																						
15-Oct	5.5	5.0	4.3	3.2	1.7	1.2	1.1	1.2	1.4	2.0	2.7	3.1	3.7	3.9	4.8	4.6	4.2	2.3	1.0	-1.0	-2.8	-4.0	-3.4	-2.2	1.8	5.5																						
16-Oct	-0.8	-0.8	-0.9	-1.1	-1.2	-1.3	-1.3	-1.6	-1.2	-0.7	-0.3	0.6	1.4	2.8	3.1	3.6	3.6	2.0	1.7	1.9	1.7	1.3	2.0	2.5	0.7	3.6																						
17-Oct	2.6	2.6	2.5	2.1	2.3	2.3	1.5	1.9	3.7	5.1	6.5	7.3	8.1	8.7	8.8	9.5	8.5	6.8	6.8	6.6	6.4	6.3	6.4	6.4	5.4	9.5																						
18-Oct	6.4	6.2	5.8	5.7	5.5	5.3	5.3	5.4	5.9	6.9	8.7	9.1	9.7	11.1	11.2	11.1	10.1	9.8	9.7	10.1	9.0	8.1	5.6	2.9	7.7	11.2																						
19-Oct	1.9	-0.4	-1.1	-0.9	1.5	2.2	1.3	1.2	3.8	7.2	9.5	11.7	13.3	14.9	15.6	15.5	13.4	11.9	11.0	11.2	11.5	11.7	11.5	11.3	7.9	15.6																						
20-Oct	11.1	11.1	10.3	9.5	8.8	8.1	7.5	6.9	7.3	8.2	9.8	10.0	11.5	12.8	13.7	14.4	13.1	10.0	9.2	9.2	9.8	10.3	11.0	11.2	10.2	14.4																						
21-Oct	11.1	10.3	8.9	7.9	7.2	6.4	6.3	6.1	7.0	8.2	9.2	9.7	10.0	11.3	12.9	13.6	11.9	7.9	4.2	5.0	4.5	4.3	3.7	2.3	7.9	13.6																						
22-Oct	1.4	2.0	2.6	3.2	3.3	3.1	3.5	3.9	7.1	11.1	13.5	14.9	15.9	16.2	16.0	14.6	12.5	11.5	10.8	10.9	10.9	10.8	10.6	10.4	9.2	16.2																						
23-Oct	10.0	9.5	9.0	7.8	6.9	6.2	6.0	6.8	8.0	9.3	9.0	8.2	7.0	6.5	5.5	5.0	4.9	4.7	4.3	4.3	4.3	4.2	4.0	3.2	6.4	10.0																						
24-Oct	3.1	1.9	0.2	-0.1	-0.2	-0.5	-0.5	-0.6	-1.0	-1.2	-1.3	-1.3	-1.2	-1.6	-1.5	-1.6	-1.7	-2.1	-2.3	-2.3	-2.1	-1.8	-1.6	-1.5	-1.0	3.1																						
25-Oct	-1.6	-1.6	-1.5	-1.4	-1.3	-1.4	-2.7	-3.2	-1.6	-0.3	0.6	1.3	1.8	1.9	2.3	2.4	0.3	-0.2	0.1	0.2	0.1	-0.1	0.0	0.1	-0.2	2.4																						
26-Oct	0.1	-0.1	-0.5	-0.3	-0.2	-0.1	-0.3	-0.5	-0.2	-0.2	-0.5	-0.1	0.2	0.1	0.1	-0.1	-0.2	-0.3	-0.5	-0.7	-0.8	-1.1	-1.2	-1.3	-0.4	0.2																						
27-Oct	-1.4	-1.5	-1.6	-1.6	-1.8	-1.9	-2.1	-2.1	-2.2	-2.1	-1.8	-1.2	-1.0	-0.8	-0.5	-0.6	-0.9	-1.2	-1.5	-2.3	-1.9	-1.9	-1.9	-1.8	-1.6	-0.5																						
28-Oct	-1.9	-1.9	-2.0	-2.0	-2.1	-2.2	-2.3	-2.3	-2.1	-1.9	-1.6	-1.4	-1.1	-0.8	-0.9	-0.9	-1.1	-1.4	-1.5	-1.6	-1.7	-1.8	-1.9	-2.0	-1.7	-0.8																						
29-Oct	-2.0	-2.0	-2.0	-2.1	-2.2	-2.3	-2.5	-2.5	-2.4	-1.8	-1.1	-0.7	-1.0	-1.0	-1.0	-1.4	-1.7	-2.0	-2.1	-2.3	-2.5	-2.7	-2.8	-2.8	-2.0	-0.7																						
30-Oct	-2.8	-2.7	-3.1	-3.4	-3.2	-3.0	-2.9	-2.5	-2.0	-1.6	-1.4	-1.3	-1.1	-0.8	-0.5	-0.7	-0.6	-0.3	-0.1	-0.1	-0.2	-0.4	-0.6	-0.7	-1.5	-0.1																						
31-Oct	-0.9	-1.0	-1.1	-1.2	-1.1	-1.0	-0.8	-0.6	-0.3	0.1	0.5	1.0	1.2	1.5	1.6	1.5	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.1	0.4	1.6																						
																								2.8	2.4	2.1	1.8	1.6	1.3	1.1	1.4	2.5	3.7	4.7	5.4	6.0	6.5	6.8	6.7	5.9	4.8	4.1	3.9	3.6	3.4	3.3	2.9	Diurnal Average
																								11.7	11.1	11.0	10.9	10.6	10.9	10.0	9.7	9.8	11.1	13.5	15.2	17.4	18.6	19.2	19.4	18.4	15.8	15.0	14.3	13.6	12.9	12.6	12.2	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Wapasu - October 2014**





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

**Ambient Temperature (AT) - C**  
**Wapasu - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	231	31.05	31.05
0 - 10	407	54.70	85.75
10 - 20	106	14.25	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

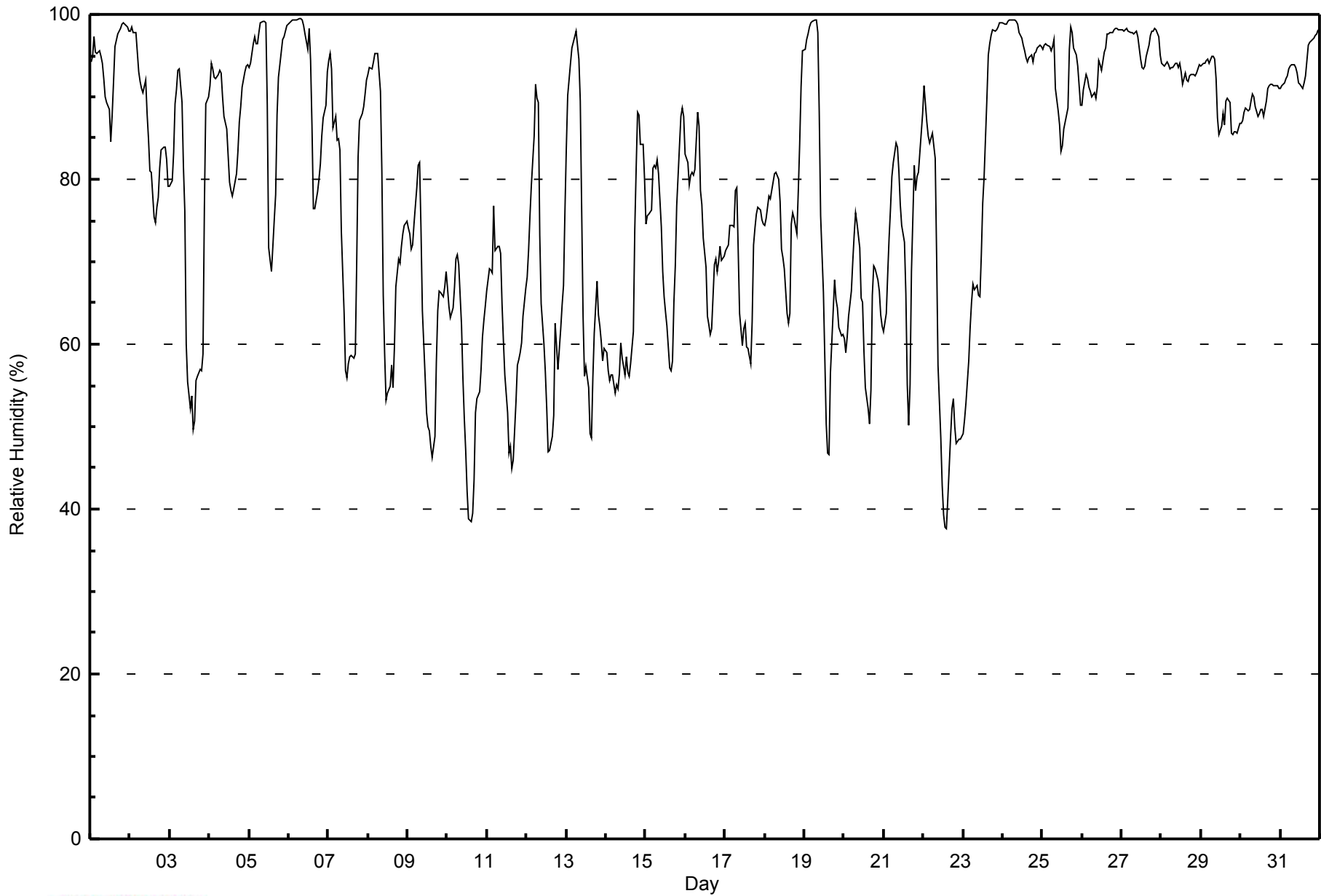


Maximum Value: 100 % on Oct 6 08:00																		Maximum Daily Average: 97.1 % on Oct 24																		Hours in Service: 744								
Minimum Value: 38 % on Oct 22 15:00																		Minimum Daily Average: 56.7 % on Oct 10																		Hours of Data: 744								
Maximum Diurnal Average: 87.1 % at hour 7																		Minimum Diurnal Average: 68.0 % at hour 15																		Hours of Missing Data: 0								
Monthly Average: 79.2 %																		Percentiles: P <sub>1</sub> = 42 P <sub>10</sub> = 56 Q <sub>1</sub> = 66 Median = 83 Q <sub>3</sub> = 94 P <sub>90</sub> = 98 P <sub>99</sub> = 99																		Hours of Calibration: 0								
																																				Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Oct	94	95	97	95	95	96	95	94	92	90	89	88	85	88	92	96	98	98	98	99	99	99	98	98	94.5	99																		
2-Oct	98	98	98	98	95	93	92	91	91	92	88	85	81	81	75	75	77	78	81	84	84	84	82	79	86.6	98																		
3-Oct	79	80	83	89	91	93	93	89	82	76	60	55	52	54	50	51	56	56	57	57	59	77	89	90	71.5	93																		
4-Oct	91	94	93	92	92	93	93	93	90	88	86	83	80	79	78	79	81	83	87	89	91	93	94	94	88.2	94																		
5-Oct	94	94	96	97	96	96	98	99	99	99	99	89	72	69	72	75	78	88	92	95	97	97	98	99	91.2	99																		
6-Oct	99	99	99	99	99	99	99	100	99	99	98	96	98	94	86	76	76	79	80	82	85	88	89	93	92.2	100																		
7-Oct	94	95	93	86	88	85	85	84	74	64	57	56	58	58	59	58	59	70	83	87	88	89	90	92	77.1	95																		
8-Oct	93	94	93	94	95	95	95	91	81	66	59	53	54	55	57	55	60	67	70	70	72	73	74	75	74.7	95																		
9-Oct	74	73	71	72	75	79	82	82	74	64	56	52	50	49	48	46	49	58	64	67	66	66	67	69	64.7	82																		
10-Oct	67	65	63	64	67	70	71	70	62	56	51	47	42	39	38	39	44	52	53	54	57	61	63	65	56.7	71																		
11-Oct	67	69	69	69	77	71	72	72	71	65	60	56	52	47	48	45	46	53	57	58	59	60	63	67	61.4	77																		
12-Oct	68	71	76	79	85	92	90	89	73	65	60	57	52	47	47	49	51	62	60	57	62	65	67	76	66.7	92																		
13-Oct	84	90	94	96	97	97	98	95	90	76	63	56	57	55	49	49	56	61	68	64	62	60	58	59	72.3	98																		
14-Oct	59	57	56	56	56	54	55	55	56	60	58	56	58	57	56	58	62	74	81	88	88	84	84	80	64.5	88																		
15-Oct	74	76	76	76	81	82	81	82	81	74	69	66	64	62	57	57	58	65	70	77	84	88	89	88	74.0	89																		
16-Oct	83	82	79	81	81	81	81	88	87	79	77	73	69	63	62	61	62	70	70	69	70	72	70	71	74.2	88																		
17-Oct	71	72	72	74	74	74	79	79	72	64	60	62	62	60	59	58	63	72	74	76	77	76	75	75	70.0	79																		
18-Oct	74	75	78	78	79	80	81	81	80	77	71	70	69	64	63	64	75	76	75	73	78	84	91	96	76.3	96																		
19-Oct	96	97	98	98	99	99	99	99	98	88	76	66	58	50	47	47	56	64	68	65	64	62	61	61	75.7	99																		
20-Oct	61	59	61	63	66	70	73	76	75	72	66	65	59	55	52	50	54	66	69	69	68	66	64	62	64.2	76																		
21-Oct	62	64	68	73	76	80	82	84	84	81	77	74	72	66	55	50	55	69	82	79	80	81	83	88	73.6	88																		
22-Oct	91	89	87	85	84	86	84	83	71	57	49	43	39	38	38	41	49	52	53	50	48	48	48	49	61.0	91																		
23-Oct	49	51	53	58	62	65	67	67	67	66	66	71	77	80	90	95	96	97	98	98	98	98	99	99	77.9	99																		
24-Oct	99	99	99	99	99	99	99	99	99	99	98	97	96	96	95	94	95	95	94	95	95	96	96	96	96	97.1	99																	
25-Oct	96	96	96	96	96	96	96	97	91	88	87	83	84	86	87	89	96	99	98	96	95	94	91	89	92.6	99																		
26-Oct	89	91	93	92	91	91	90	90	90	91	94	94	93	95	96	98	98	98	98	98	98	98	98	98	94.3	98																		
27-Oct	98	98	98	98	98	98	98	98	98	98	97	95	94	93	94	95	96	97	98	98	98	98	97	95	96.9	98																		
28-Oct	94	94	94	94	94	93	94	94	94	94	94	94	93	92	93	92	92	92	93	93	93	93	93	94	93.3	94																		
29-Oct	94	94	94	94	95	94	95	95	95	92	87	85	86	88	87	90	90	89	86	85	86	86	86	87	90.0	95																		
30-Oct	87	87	88	89	88	89	89	90	90	89	88	88	88	88	88	89	91	91	92	91	91	91	91	91	89.4	92																		
31-Oct	91	91	92	92	93	93	94	94	94	94	93	92	92	91	92	93	94	96	97	97	97	97	98	98	93.9	98																		
																		82.9	83.5	84.2	84.9	86.0	86.5	87.1	87.0	83.8	79.4	75.2	72.5	70.6	69.0	68.0	68.1	71.3	76.4	78.9	79.3	80.3	81.5	82.2	82.9	Diurnal Average		
																		99	99	99	99	99	99	99	100	99	99	99	97	98	96	96	98	98	99	98	99	99	99	99	99	99	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Wapasu - October 2014**





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

**Relative Humidity (RH) - %**  
**Wapasu - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	6	0.81	0.81
40 - 60	119	15.99	16.80
60 - 80	211	28.36	45.16
80 - 100	408	54.84	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 23 km/h on Oct 17 17:00	Maximum Daily Speed Average: 18.4 km/h on Oct 17	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 16 18:00	Minimum Daily Speed Average: 0.4 km/h on Oct 5	Hours of Data: 697
Maximum Diurnal Speed Average: 5.9 km/h at hour 6	Minimum Diurnal Speed Average: 2.3 km/h at hour 16	Hours of Missing Data: 47
Monthly Average Velocity: 4.3 km/h 155.2 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 4 Q <sub>1</sub> = 5 Median = 8 Q <sub>3</sub> = 11 P <sub>90</sub> = 16 P <sub>99</sub> = 21	Percent Operational Time: 93.7

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-Oct	N4	N3	N4	NNE3	N2	NE2	NE2	NNE2	E4	ENE3	NE4	ENE4	NE4	NNE5	N6	NNW9	N7	N9	N10	NNW12	AF	AF	AF	AF	N4.5	NNW12
2-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NW17	NW19	NW15	NW13	NW11	NW7	NNW7	NW7	NW7	NW7	NW6	NW7	NW8	---	NW19
3-Oct	WNW6	WNW6	WNW3	WSW2	SW3	SSE4	SSE4	SSE4	SSE4	SSE5	S4	SSW5	SSW6	SW7	SSW6	SSE7	SE8	SE9	SSE12	SSE13	SSE11	SSE12	SE13	SE14	SSE5.2	SE14
4-Oct	SE14	SE12	SE11	SE11	SE9	SSE4	S3	SSE5	S5	SW4	W4	NW3	NNW2	NW3	NNW3	NNW3	NW5	NNW3	WNW3	NW2	W0	AF	WSW2	SSE2	SE14	
5-Oct	SSW2	SE3	S5	SSW6	SSW7	SSW8	SSW6	SSW8	SSW6	SSW6	SSW7	SSW4	NNW5	N8	NNE9	NNE8	NNE8	NE7	NNE8	NNE7	NNE5	NNE4	NE5	NE4	ENE0.4	NNE9
6-Oct	E2	ESE3	ESE2	S3	SSE4	S4	SE2	E4	N2	NNE2	NNE5	NNW6	NW9	NW10	NNW9	NNW7	NW5	NNW5	W4	W5	W8	W7	W5	NW2.7	NW10	
7-Oct	W8	W5	W7	WNW5	W5	WNW7	W6	W5	W6	WNW8	NNW11	N11	N10	N9	N10	NNE8	NNE7	ENE5	E4	E6	E5	E6	E5	E6	NNW3.2	N11
8-Oct	ESE3	S5	SSE5	SE5	SE5	SE4	SSE5	SE5	SE7	SSE7	SE4	SSE3	NNE3	NNE5	NNW5	ESE7	ESE8	ESE7	ESE9	SE10	SE9	SE8	SE8	SE8	SE5.0	SE10
9-Oct	SE8	SE6	SE9	SE9	SE7	SE9	SE9	SE10	SE11	SE10	SSE11	SSE9	S10	S9	S8	SSE8	SSE7	SE7	SE12	SE13	SE13	SE15	SE14	SE14	SE9.7	SE15
10-Oct	SSE16	SSE15	SSE13	SSE14	SSE14	SSE13	SSE13	SSE11	SSE11	S11	S10	S11	SSW11	SSW13	S13	S12	SSE10	SE10	SSE10	S10	SSE11	SSE10	S10	S8	SSE11.2	SSE16
11-Oct	S9	S7	S6	SSW7	SW7	SW8	SW9	WSW9	WSW9	WSW12	W14	W13	W15	WNW14	W16	WNW12	W8	W8	WSW8	WSW7	WSW9	WSW8	WSW8	WSW8	WSW8.5	W16
12-Oct	W8	WSW6	WSW6	SW4	S4	S4	S4	S3	WSW4	WNW8	WNW9	WNW8	W9	WNW8	W8	W6	W5	SW2	W7	WNW9	W6	WSW6	W5	SW2	W4.9	W9
13-Oct	SSE2	SE3	SE5	SE6	SSE5	SE6	SSE6	SSE6	SSE5	SSE7	S6	SW6	WSW8	SSW6	SW5	SW4	SSW4	SSE3	SE4	SE6	SE6	SE8	SE10	SE10	SSE4.6	SE10
14-Oct	SE10	SE10	SE12	SE11	ESE12	ESE15	ESE16	ESE16	ESE13	ESE16	ESE17	ESE15	SE10	SE10	SSE5	SSW5	SSW5	W4	WSW4	SSW3	WSW5	W10	WNW8	WNW10	SE6.4	ESE17
15-Oct	W10	WNW8	WNW10	W8	WSW8	WSW8	WSW11	WSW9	W9	W11	W10	WNW11	WNW11	WNW9	W10	WNW9	NNW6	NNW7	N6	N4	NE2	ENE3	NE3	NNE3	WNW6.1	WNW11
16-Oct	N5	NNW7	NNW7	NNW7	NNW6	NNW4	NNW5	NNW3	N3	N1	ENE3	E3	WSW6	SSW6	S5	S5	SSW4	N0	SE8	SSE14	SSE12	SE15	SE17	SE17	SE2.4	SE17
17-Oct	SE16	SSE15	SSE14	SSE13	SSE14	SSE15	SSE16	SSE16	SSE18	SSE18	SSE17	SSE18	SSE18	SSE21	SSE20	SSE22	SSE23	SE21	SSE22	SE22	SSE22	SSE21	SSE21	SSE20	SSE18.4	SSE23
18-Oct	SSE20	SSE17	SSE16	SSE15	SSE13	SSE12	SSE10	S8	S6	S5	SSW6	WSW8	SW6	SW6	SW7	SW8	SSW6	SSW5	SW6	WSW8	W7	WNW6	W1	S2	S6.4	SSE20
19-Oct	SE2	ESE3	SE3	SE3	ESE4	SE4	ESE5	SE5	SE5	SSE8	SSE9	S10	SSE10	SSE11	SE12	SE13	SE13	SE15	SE16	SE17	SE17	SE19	SSE18	SSE17	SE9.8	SE19
20-Oct	SE17	SE16	SE14	SE15	SE14	SE14	SE13	SE13	SSE14	SSE11	SSE11	S10	S10	S10	S8	S8	S6	SSE5	SSE8	SSE7	SSE7	SSE7	SSE7	SSE8	SSE10.1	SE17
21-Oct	SSE8	S8	S7	S6	S5	SSE6	S5	SSE6	S5	SSW6	SW7	SW8	SW8	WSW8	WSW9	WSW8	SSW4	S4	SE6	SSE6	SSE6	SSE5	SSE6	SSE6	S5.1	WSW9
22-Oct	SSE6	SSE6	SE7	SSE7	SSE7	SSE7	SSE7	SSE6	SSE7	SSE9	SSE11	SSE11	S11	SSE10	SSE12	SSE11	SE10	SE13	SE16	SE17	SE16	SSE19	SSE17	SSE17	SSE10.7	SSE19
23-Oct	SSE15	SSE13	SE11	SE10	SE9	SE10	SE9	SE10	SE16	SE12	ESE13	ESE17	ESE19	ESE19	SE6	E6	E5	NE6	ENE8	ENE8	ENE5	NW4	NW11	NW10	ESE7.5	ESE19
24-Oct	NW14	NW15	NW10	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	NW15
25-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	SE11
26-Oct	SE12	ESE10	ESE10	ESE10	ESE10	ESE11	ESE11	ENE4	ESE11	NE4	NNE6	NE6	NNE5	NE7	NNE7	NNE8	NE9	NNE9	NNE9	NNE8	NNE8	NNE7	NNE8	NNE6	ENE6.1	SE12
27-Oct	NNE6	NNE6	N5	N5	NNE6	N6	N6	N5	NNE6	NNE5	NNE5	NE5	NNE5	NNE5	NNE6	NE5	NNE4	NNW2	NE2	NE2	N1	NNE1	SE4	SE5	NNE3.8	NNE6
28-Oct	SSE5	SE7	SSE7	SSE7	SSE7	SSE7	SSE7	SSE7	SSE8	SSE9	SSE9	SSE7	SE7	SSE4	SSE5	SSE7	SE7	SE8	SE8	SE8	SE7	ESE6	ESE5	ESE6	SE6.6	SSE9
29-Oct	ESE6	ESE6	ESE5	ESE5	E5	E5	E5	E6	E6	E5	ENE7	NE7	NE8	ENE8	ENE7	ENE6	E5	E4	ESE7	ESE7	SE8	SE9	SE10	SE10	E5.8	SE10
30-Oct	SSE9	SSE9	SSE11	SSE12	SSE14	SSE16	SSE17	SSE17	SSE17	SSE19	SSE18	SSE17	SSE19	SSE17	SSE20	SSE17	SSE14	SSE16	SSE17	SSE19	SSE18	SSE17	SSE20	SSE17	SSE16.0	SSE20
31-Oct	SSE17	SSE15	SSE16	SSE17	SSE15	SSE15	SSE15	SSE15	SSE14	SSE13	S12	S11	S9	S8	S8	S8	S8	S8	S7	S7	S7	S7	S5	S4	SSE10.6	SSE17

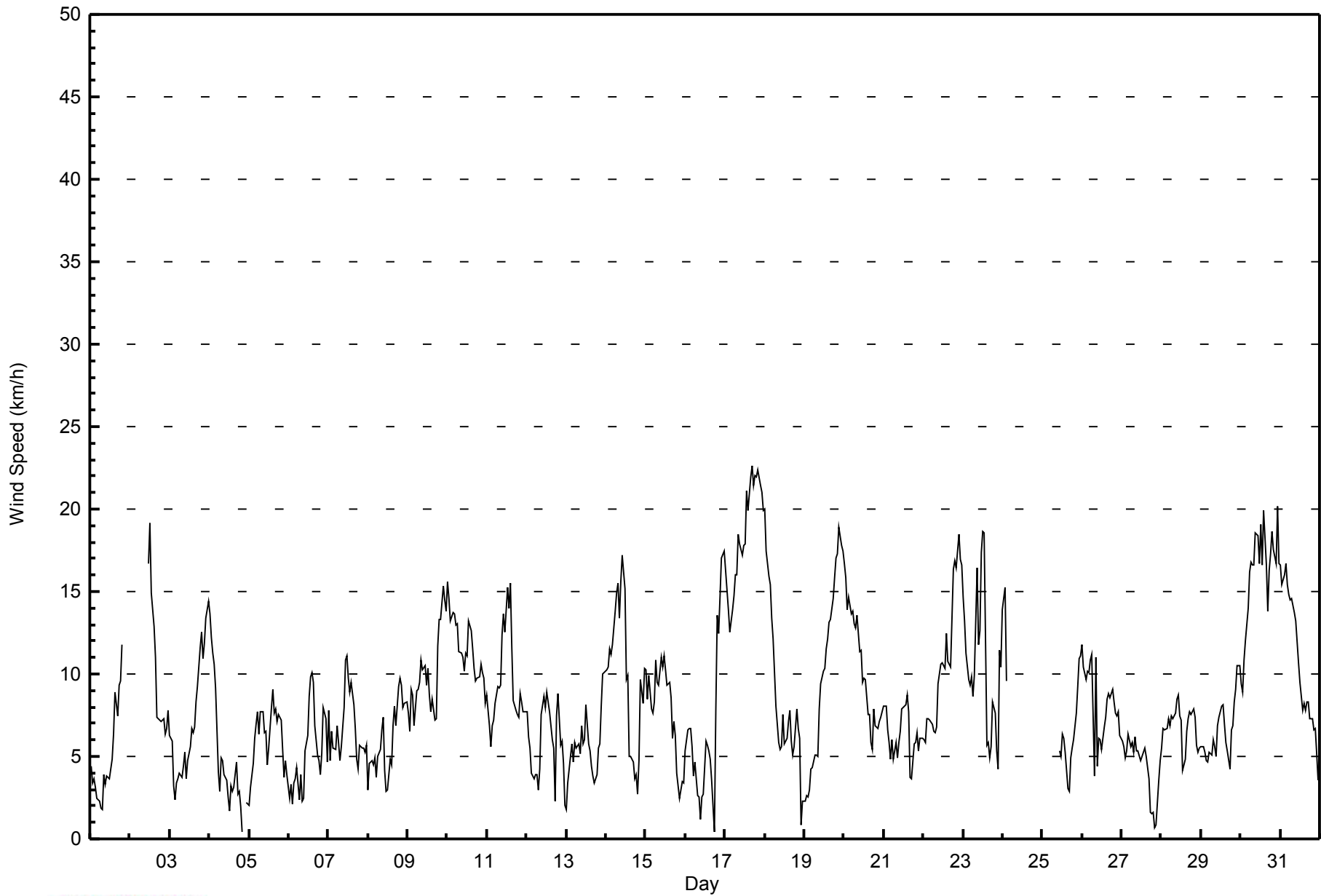
SSE5.0 SSE4.8 SSE4.9 SSE5.7 SSE5.6 SSE5.9 SSE5.8 SSE5.5 SSE5.7 SSE4.9 SSE4.0 S3.2SSW2.9 S2.5 S2.5 S2.3 SE2.6 SE3.1 SE4.0 SE4.6 SSE5.3 SSE5.4 SSE5.4 SSE5.6	Diurnal Average
SSE20 SSE17 SSE16 SSE17 SSE15 SSE16 SSE17 SSE17 SSE18 SSE19 SSE18 SSE18 NW19 SSE21 SSE20 SSE22 SSE23 SE21 SSE22 SSE22 SSE22 SSE21 SSE21 SSE20	Diurnal Maximum

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



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Wapasu - October 2014**







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

**Wind Speed (WS) - km/h**  
**Wapasu - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	196	28.12	28.12
6 - 11	352	50.50	78.62
12 - 19	135	19.37	97.99
20 - 28	14	2.01	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 697

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Wapasu - October 2014**

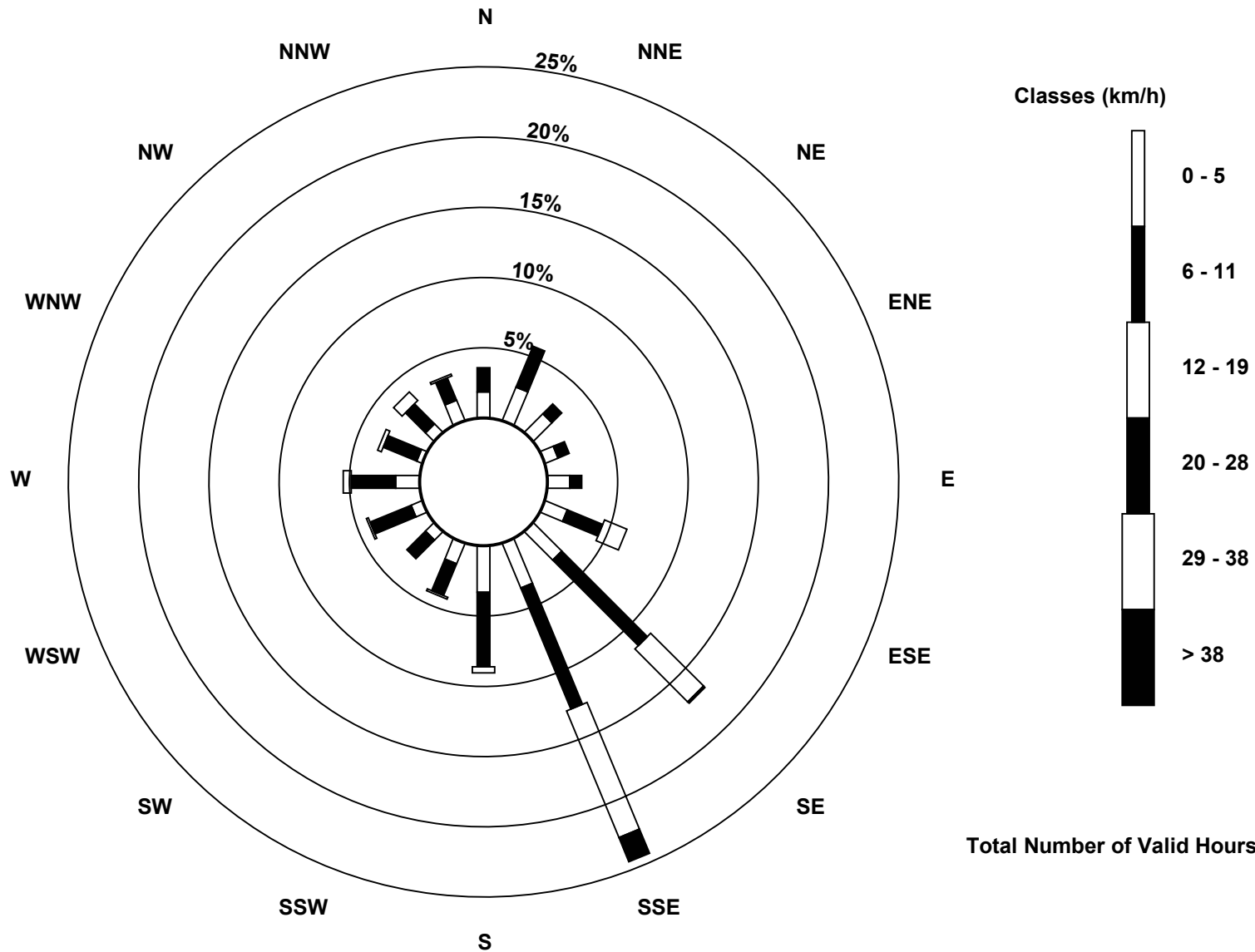
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	13	18	13	7	11	12	20	24	23	11	6	6	12	3	6	11	196
6 - 11	12	22	7	6	6	19	60	65	37	17	13	22	22	18	14	12	352
12 - 19	0	0	0	0	0	12	37	68	3	1	0	1	4	2	6	1	135
20 - 28	0	0	0	0	0	0	1	13	0	0	0	0	0	0	0	0	14
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>	25	40	20	13	17	43	118	170	63	29	19	29	38	23	26	24	697

Total Number of Valid Hours: 697

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Wind Speed (WS) - km/h  
Wapasu (AMS 17)**





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

**Wind Speed (WS) - km/h**  
**Wapasu - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Oct 18 00:00 Minimum Value: 1 km/h on Oct 13 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																	Hours in Service: 744 Hours of Data: 697 Hours of Missing Data: 47 Hours of Calibration: 0 Percent Operational Time: 93.7									
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-Oct	1	1	1	1	1	1	1	1	2	1	3	2	2	2	3	3	4	4	4	AF	AF	AF	AF	4		
2-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	5	5	4	4	4	2	2	3	2	2	2	2	5		
3-Oct	2	2	2	2	2	1	1	1	1	2	2	2	2	3	2	2	2	4	4	4	4	3	4	4		
4-Oct	4	3	3	3	2	3	1	2	2	1	1	2	1	2	1	1	1	1	1	1	1	AF	2	2	4	
5-Oct	1	1	1	2	2	3	2	3	3	3	2	2	2	3	3	3	3	2	3	3	2	1	2	3		
6-Oct	1	1	2	1	2	2	1	1	2	2	2	2	2	3	3	3	2	1	1	1	2	2	3	1	3	
7-Oct	2	2	2	2	2	2	2	1	2	2	4	4	3	3	3	3	2	2	1	1	1	1	1	1	4	
8-Oct	2	1	1	1	1	1	1	1	1	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	3	
9-Oct	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	2	2	3	3	3	4	4	3	4	
10-Oct	4	4	4	4	4	4	3	4	4	4	4	4	4	5	5	4	3	2	2	3	3	3	3	2	5	
11-Oct	3	2	2	3	3	3	3	3	3	4	4	4	5	4	5	5	3	3	3	2	2	2	2	2	5	
12-Oct	2	2	2	1	1	1	1	1	2	2	2	2	3	3	3	2	3	1	4	4	2	2	2	1	4	
13-Oct	1	1	1	1	1	1	1	1	1	2	2	2	3	2	2	2	1	1	2	1	1	2	2	2	3	
14-Oct	2	3	3	3	3	4	4	4	4	4	5	5	4	3	2	2	2	1	1	1	2	3	3	3	5	
15-Oct	4	3	3	3	2	3	3	3	3	4	3	4	3	3	3	2	3	2	2	1	1	1	1	2	4	
16-Oct	2	2	2	2	2	1	2	1	1	2	2	2	3	3	2	2	2	2	4	4	4	4	4	5	5	
17-Oct	5	4	4	4	4	4	4	5	5	5	5	5	6	7	6	6	7	6	6	6	6	6	6	7	7	
18-Oct	6	6	5	4	4	3	3	3	2	2	2	2	2	2	3	3	2	2	2	2	2	2	2	1	6	
19-Oct	1	1	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	4	4	4	5	5	5	5	
20-Oct	4	4	4	3	3	4	4	3	4	3	4	3	3	3	3	3	2	2	2	2	1	2	2	2	4	
21-Oct	2	2	2	2	1	1	1	1	1	2	2	3	2	3	3	3	1	1	1	1	1	1	1	1	3	
22-Oct	1	1	1	1	1	1	1	1	1	3	3	3	3	3	4	3	3	4	4	4	4	5	5	5	5	
23-Oct	4	4	3	2	2	2	3	5	5	4	5	6	6	3	2	1	1	2	2	2	2	4	4	4	6	
24-Oct	4	4	4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	
25-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	2	2	2	1	1	1	1	2	2	3	3	3	
26-Oct	3	3	2	2	2	3	3	3	4	3	2	2	2	2	3	3	3	3	3	3	3	3	2	2	4	
27-Oct	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	1	1	1	1	1	1	1	2	
28-Oct	1	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	1	1	1	3	
29-Oct	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	3	3	3	3	
30-Oct	3	3	3	3	4	4	5	5	5	6	6	6	6	5	6	6	5	5	6	6	6	6	6	6	6	
31-Oct	6	5	5	5	5	5	5	4	4	4	4	4	3	3	3	2	3	3	2	2	2	2	2	1	6	
																	Diurnal Maximum									
AF - Analyzer Failure																										



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

**Wind Direction (WD) - deg**  
**Wapasu - October 2014**

Direction of Maximum Speed: 147 deg on Oct 17 17:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 151.8 deg on Oct 17		Hours of Data: 697
Direction of Minimum Speed: 354 deg on Oct 16 18:00		Hours of Missing Data: 47
Direction of Minimum Daily Speed Average: 0.4 deg on Oct 5		Percent Operational Time: 93.7
Monthly Average Direction: 191.2 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-Oct	353	355	358	14	357	35	55	28	79	67	48	59	46	18	4	347	4	9	354	345	AF	AF	AF	AF	11.0	
2-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	311	314	312	315	312	320	330	305	311	309	309	304	304	--	
3-Oct	303	303	288	240	236	161	152	164	165	165	184	194	210	231	205	157	139	142	152	148	159	157	146	138	167.1	
4-Oct	141	143	144	143	145	158	180	157	174	232	270	307	348	312	344	335	323	332	294	314	268	AF	240	165	162.5	
5-Oct	201	157	170	194	198	205	194	202	197	203	203	212	344	10	15	17	17	36	31	32	31	13	46	43	63.6	
6-Oct	88	104	113	187	165	170	145	100	355	14	21	332	318	321	320	335	337	323	332	280	274	277	278	259	315.7	
7-Oct	268	272	280	292	279	287	277	272	278	294	327	350	350	1	3	12	30	63	85	100	101	93	101	101	338.8	
8-Oct	116	170	149	146	133	140	151	140	144	168	141	156	22	15	327	122	121	120	122	127	138	144	142	144	134.8	
9-Oct	141	137	134	135	140	133	130	132	138	145	159	166	170	171	172	167	149	138	135	142	144	144	143	144	145.8	
10-Oct	148	151	151	151	152	151	156	166	166	169	184	191	193	193	180	180	162	144	159	169	167	168	170	179	165.8	
11-Oct	181	180	175	210	224	226	231	239	245	253	267	266	266	285	263	283	270	259	252	250	251	249	256	251	249.6	
12-Oct	259	252	244	215	190	170	172	182	239	286	294	288	276	288	266	272	267	232	270	291	271	255	263	231	262.1	
13-Oct	158	134	142	141	147	145	153	155	161	168	187	235	239	203	219	230	205	162	125	128	132	137	135	134	162.3	
14-Oct	130	130	126	128	118	116	115	119	111	104	109	118	133	128	152	199	211	267	257	194	237	264	283	283	131.8	
15-Oct	279	285	293	269	241	240	245	250	263	272	280	282	293	286	279	289	327	341	358	5	39	57	40	26	284.6	
16-Oct	2	348	346	341	339	333	337	335	4	357	59	101	237	203	173	170	192	354	135	148	151	143	145	146	143.0	
17-Oct	146	149	153	157	156	154	149	152	154	155	158	158	162	156	153	149	147	146	152	146	148	149	149	151	151.8	
18-Oct	149	152	148	147	149	155	161	169	170	174	202	242	221	217	223	221	204	207	229	251	271	299	269	174	180.5	
19-Oct	126	114	139	125	103	130	104	137	126	153	161	173	165	151	143	141	138	135	136	139	142	143	148	148	142.8	
20-Oct	146	144	143	143	146	146	145	144	150	155	163	178	179	171	183	188	174	153	153	154	151	153	156	155	154.7	
21-Oct	164	175	175	183	173	161	177	160	180	201	230	230	236	241	243	248	205	186	145	150	151	155	150	147	188.3	
22-Oct	156	154	145	149	148	151	152	149	149	158	166	166	170	164	157	149	134	131	130	141	144	148	150	148	149.1	
23-Oct	148	148	145	138	132	135	132	127	130	130	119	119	118	121	133	97	81	50	58	74	72	307	316	307	120.3	
24-Oct	314	322	309	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
25-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	196	173	187	178	159	176	132	134	130	120	119	130	129	126	--
26-Oct	124	121	111	115	111	113	115	64	112	35	27	35	31	38	33	30	34	32	29	29	21	25	28	17	66.1	
27-Oct	21	22	4	10	13	9	9	5	14	14	27	36	30	27	33	38	30	331	41	44	11	15	128	143	24.1	
28-Oct	148	142	149	150	150	157	154	151	156	153	160	157	146	165	156	148	142	135	134	132	131	122	107	116	144.8	
29-Oct	111	106	111	107	99	96	91	81	90	94	61	45	56	62	68	64	81	101	113	123	129	124	128	139	96.9	
30-Oct	147	152	151	150	151	152	153	158	163	161	156	156	153	157	152	163	164	160	158	156	158	158	155	160	156.4	
31-Oct	164	155	155	152	156	157	156	154	159	162	171	177	176	180	178	174	185	185	187	189	177	179	190	190	166.6	

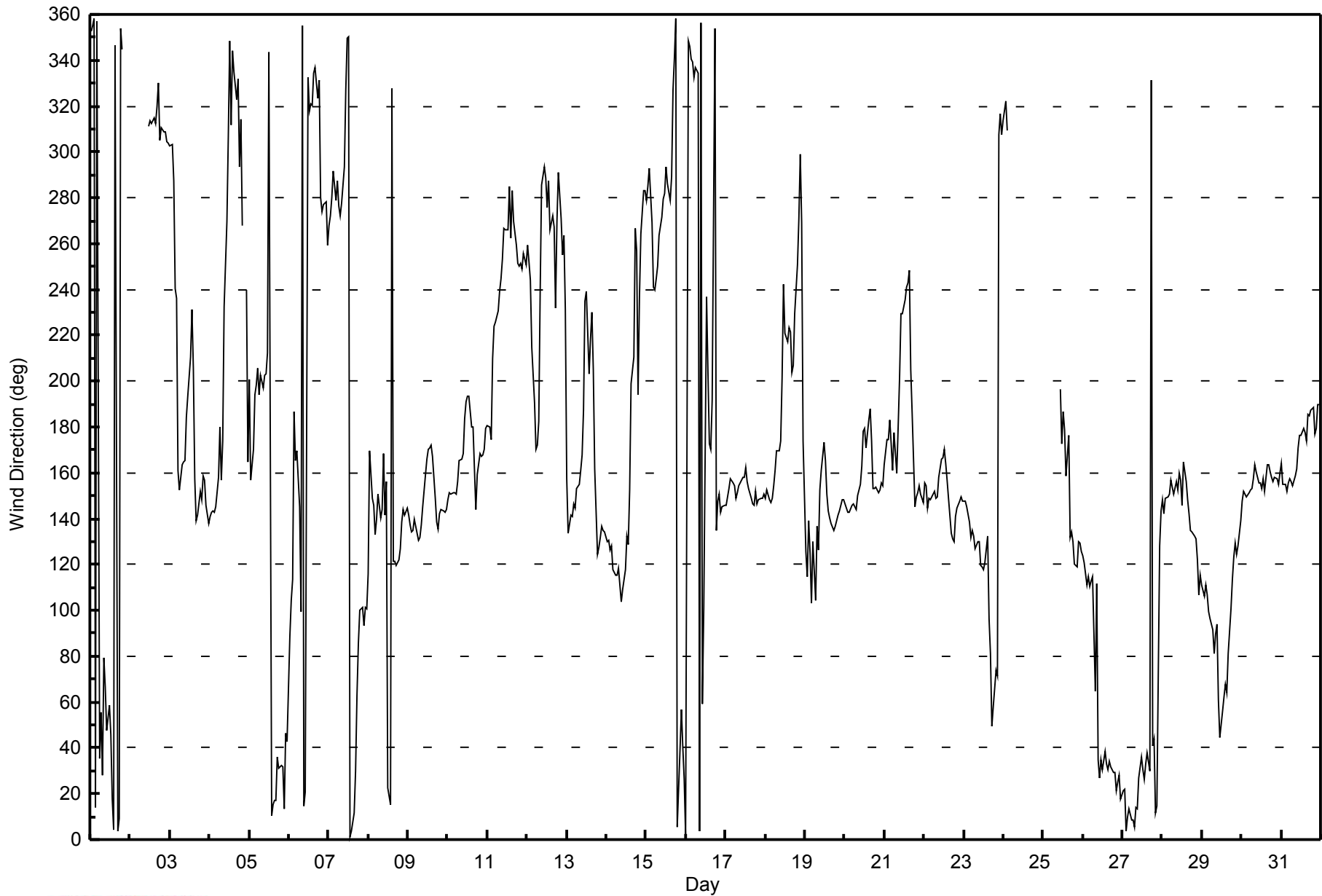
153.1	150.6	150.2	151.2	150.9	151.8	151.8	152.6	153.8	164.1	167.1	181.6	193.6	183.2	188.4	172.6	144.5	133.3	137.7	142.4	150.1	154.1	150.5	151.5
Diurnal Average																							

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



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Wapasu - October 2014**





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 96 deg on Oct 16 18:00 Minimum Value: 6 deg on Oct 21 19:00 Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 17 Q <sub>1</sub> = 20 Median = 25 Q <sub>3</sub> = 33 P <sub>90</sub> = 40 P <sub>99</sub> = 78		Hours in Service: 744 Hours of Data: 697 Hours of Missing Data: 47 Hours of Calibration: 0 Percent Operational Time: 93.7																																													
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-Oct	33	35	28	35	43	49	44	47	31	40	71	65	43	41	35	34	37	39	35	33	AF	AF	AF	AF	71																						
2-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	23	22	23	24	23	22	29	26	23	23	25	26	25	29																						
3-Oct	26	28	34	32	26	27	16	15	23	33	52	56	43	34	39	25	17	18	21	21	24	24	19	19	56																						
4-Oct	19	18	21	18	18	60	35	24	37	43	41	56	84	54	53	47	27	25	28	33	52	AF	51	22	84																						
5-Oct	56	27	21	32	32	31	41	37	37	35	40	56	50	46	40	39	39	32	36	33	38	40	32	45	56																						
6-Oct	40	32	46	34	46	46	43	29	75	79	35	32	22	24	23	25	24	22	23	27	24	25	25	22	79																						
7-Oct	25	32	27	33	27	28	26	29	28	29	31	36	39	43	41	38	33	21	18	12	14	17	11	10	43																						
8-Oct	52	21	13	9	14	18	12	13	18	34	52	79	76	61	45	49	18	17	18	19	16	16	17	17	79																						
9-Oct	17	18	17	19	21	14	16	16	19	22	29	35	33	33	39	30	22	14	17	18	19	18	18	18	39																						
10-Oct	19	20	21	21	20	21	22	26	27	28	35	36	37	34	35	30	26	18	22	26	25	26	26	31	37																						
11-Oct	30	33	26	40	33	32	31	30	27	24	26	29	26	28	27	28	28	24	22	23	22	23	24	23	40																						
12-Oct	24	22	28	34	34	17	21	31	38	29	27	31	32	33	29	23	31	33	31	26	29	38	32	56	56																						
13-Oct	33	28	13	9	21	12	10	14	20	26	45	36	29	47	39	51	36	43	43	14	12	15	18	17	51																						
14-Oct	17	19	18	18	20	20	19	19	21	21	22	22	40	24	34	32	32	25	27	31	24	26	27	27	40																						
15-Oct	28	27	27	26	22	26	22	20	23	26	30	33	31	28	31	29	44	27	37	21	45	20	25	23	45																						
16-Oct	35	31	34	27	30	38	30	48	62	91	87	82	44	51	38	31	29	96	26	21	22	17	18	19	96																						
17-Oct	20	21	27	29	25	24	21	23	21	22	23	25	28	25	23	22	20	20	20	20	20	22	23	25	29																						
18-Oct	21	22	20	20	20	21	25	29	28	37	44	26	37	38	33	34	31	32	28	23	25	27	71	15	71																						
19-Oct	27	41	35	43	21	20	19	16	18	22	31	33	29	24	23	20	18	17	19	19	18	18	20	20	43																						
20-Oct	18	18	18	19	18	19	18	17	19	23	25	32	33	28	34	37	28	17	21	17	17	18	21	20	37																						
21-Oct	22	26	26	29	27	20	32	22	28	37	32	30	28	28	26	28	29	24	6	8	9	10	11	7	37																						
22-Oct	8	11	9	7	9	7	8	10	17	21	26	27	32	31	25	21	17	18	19	19	20	20	19	19	32																						
23-Oct	19	19	19	16	15	15	17	19	19	22	20	21	21	24	46	24	19	24	21	24	21	53	20	24	53																						
24-Oct	23	22	24	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	24																						
25-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	38	30	30	28	20	29	12	11	15	16	18	18	19	38																						
26-Oct	18	18	20	20	20	21	21	61	27	54	35	32	37	31	33	34	34	35	36	35	36	37	34	36	61																						
27-Oct	38	38	34	36	36	35	37	33	35	36	38	37	38	34	36	38	32	36	22	26	83	66	27	15	83																						
28-Oct	18	19	18	20	20	20	20	19	21	21	25	22	20	27	23	19	18	17	17	17	18	19	18	22	27																						
29-Oct	20	19	20	17	20	21	21	21	24	25	28	31	25	24	23	22	24	19	19	20	19	19	18	18	31																						
30-Oct	20	22	19	20	20	21	22	23	28	24	23	24	23	23	22	26	27	25	24	24	26	24	22	27	28																						
31-Oct	26	24	25	22	25	23	24	22	24	27	28	32	29	31	29	27	32	34	33	29	26	30	31	24	34																						
Diurnal Maximum																								56	41	46	43	46	60	44	61	75	91	87	82	84	61	53	51	44	96	43	35	83	66	71	56
AF - Analyzer Failure																																															

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# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 22, 2014	Previous Calibration	September 3, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:00	End Time (MST)	11:20
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	866	866
Calculated slope	1.001116	0.999552	Chamber temp.	44.9	44.9
Calculated intercept	0.156594	0.685935	Pressure (mmHg)	680.8	680.8
Analyzer Background	8.3	8.3	Flow (lpm)	0.447	0.447
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	0.2	NA
as found span	5000	60.4	577.4	577.0	1.001
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	60.4	577.4	577.0	1.001
second point	5000	30.2	288.7	289.0	0.999
third point	5000	15.1	144.4	142.0	1.017
calibrator zero	6000	0.0	0.0	-0.2	NA
as left zero	6000	0.0	0.0	-0.2	NA
as left span	5000	60.4	577.4	575.0	1.004
Average Correction Factor					1.005

Corrected As found	576.8	Previous response	576.6	% change	0.0%
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#### Notes:

No Maintenance Done, Filter changed out, No adjustments made

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

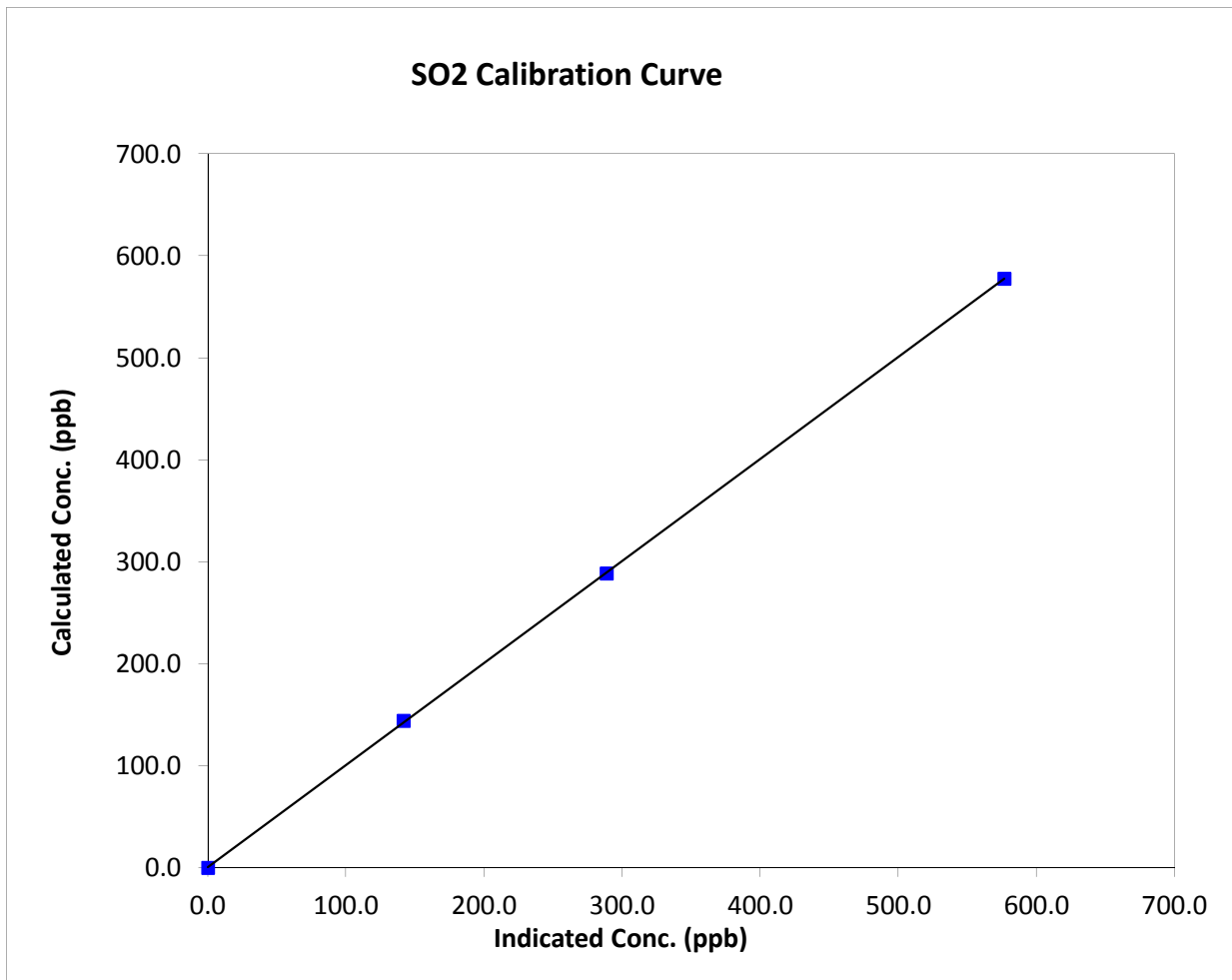
## SO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	October 22, 2014	Previous Calibration	September 3, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:00	End Time (MST)	11:20
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

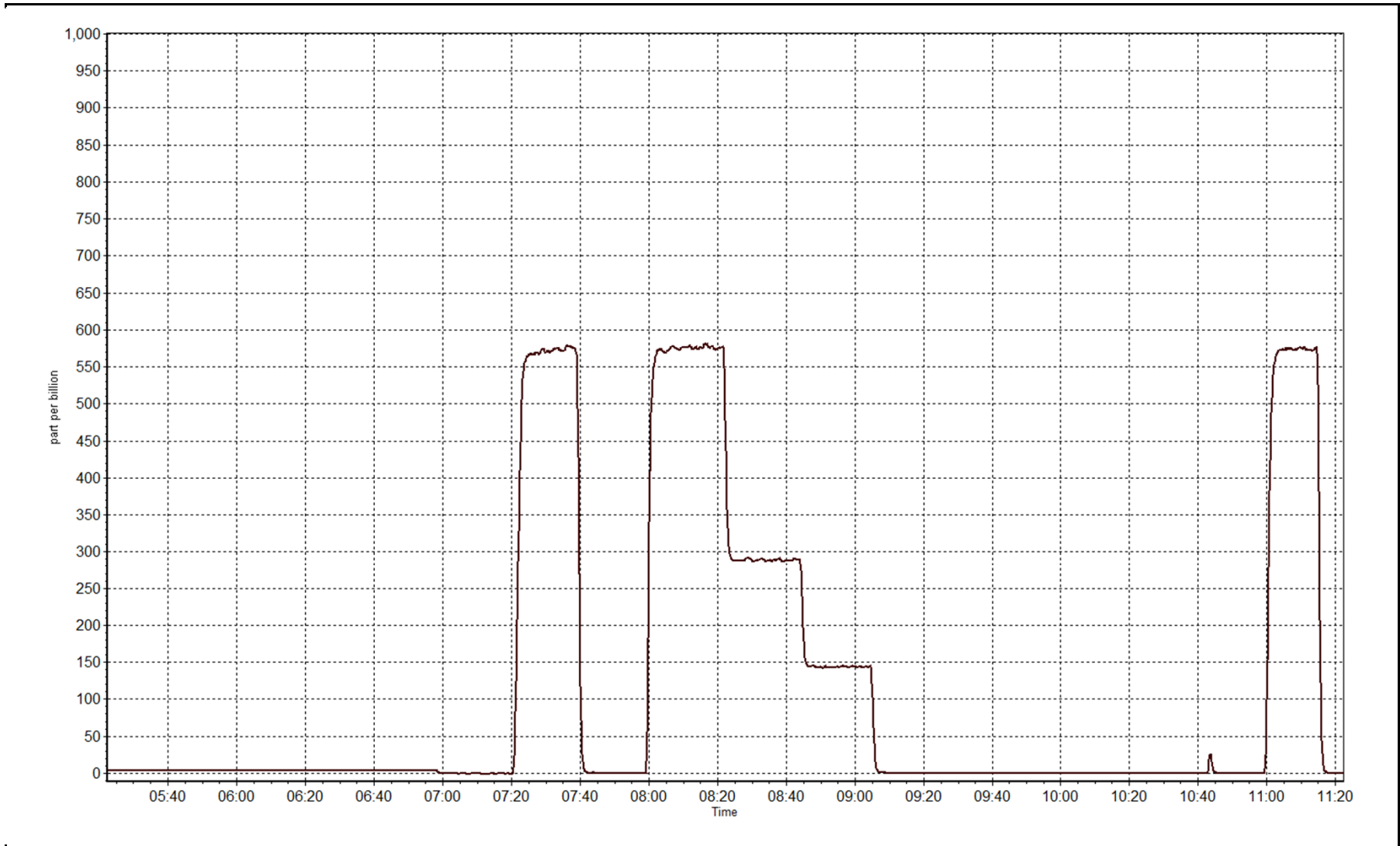
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999975
577.4	577.0	1.0007		
288.7	289.0	0.9990	Slope	0.999552
144.4	142.0	1.0166		
			Intercept	0.685935



SO2 Calibration Plot

Date: October 22, 2014





# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	October 21, 2014	Previous Calibration	September 4, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:37	End Time (MST)	9:55
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	997
Cal Gas Concentration	10.2 ppm H2S	Cal Gas Expiry Date	30-May-13
Gas Cert Reference	SA5558	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	805	805
Calculated slope	0.997623	0.978977	Chamber temp.	45	45
Calculated intercept	0.044932	0.244026	Pressure	552.2	552.2
Analyzer Background	11.8	11.8	Flow	0.968	0.968
Analyzer Coefficient	0.830	0.830	Intensity	90	90
			Converter temp.	339	339

Analyzer make/model	450i	Analyzer serial #	1218153583
Converter make/model		Converter serial #	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.5	NA
as found span	5000	39.3	80.2	81.5	0.984
SO2 scrubber check	5000	80.5	769.6	1.4	NA
calibrator zero	5000	0.0	0.0	-0.5	NA
high point	5000	39.3	80.2	81.5	0.984
second point	5000	19.6	40.0	40.8	0.980
third point	6000	11.8	20.1	20.4	0.983
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	39.3	80.2	82.3	0.974
Average Correction Factor					0.982

Corrected As found	82.0	Previous response	80.3	% change	-2.0%
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#### Notes:

Scrubber checked before the as founds, No Maintenance or adjustments Done, filter changed

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## H2S Calibration Summary

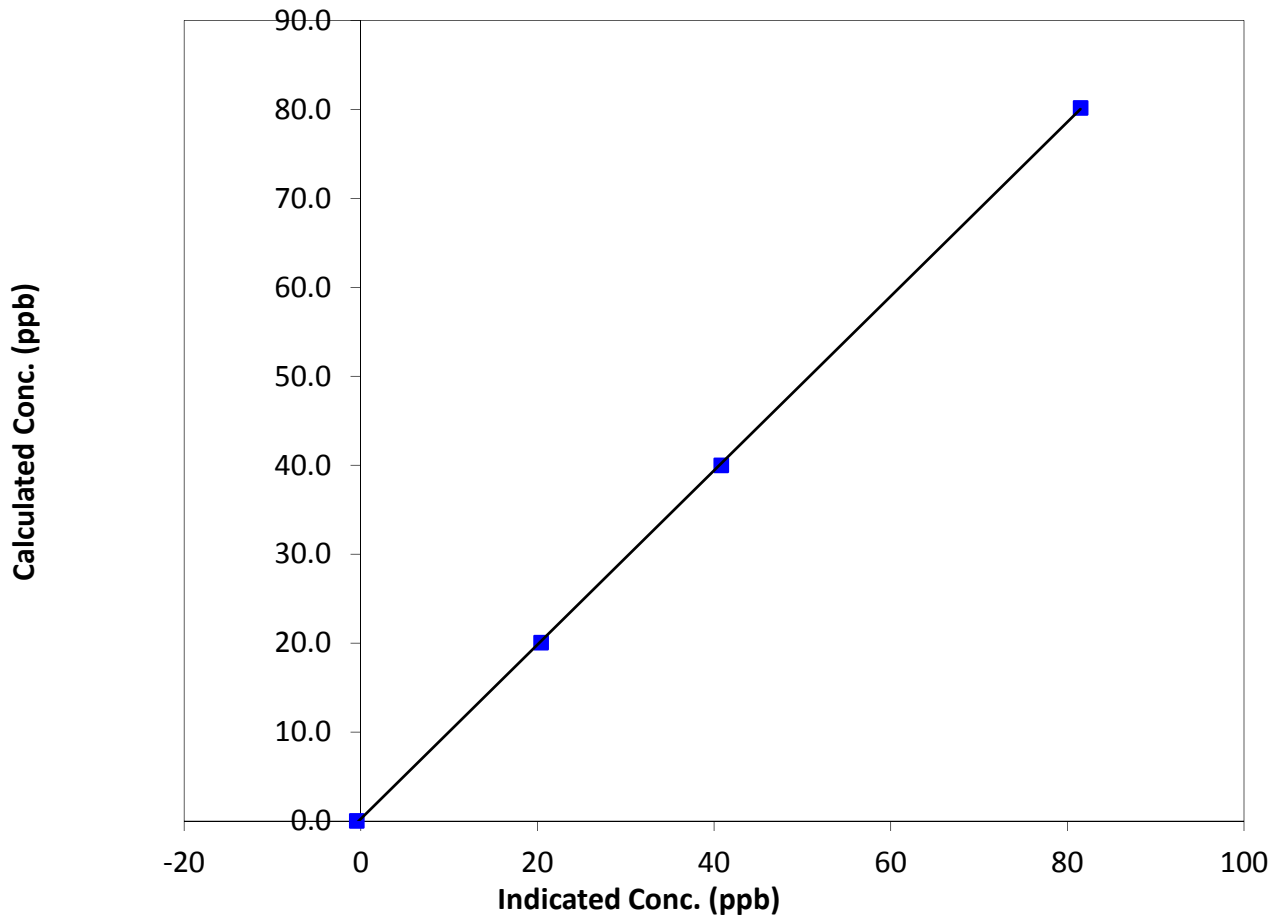
### Station Information

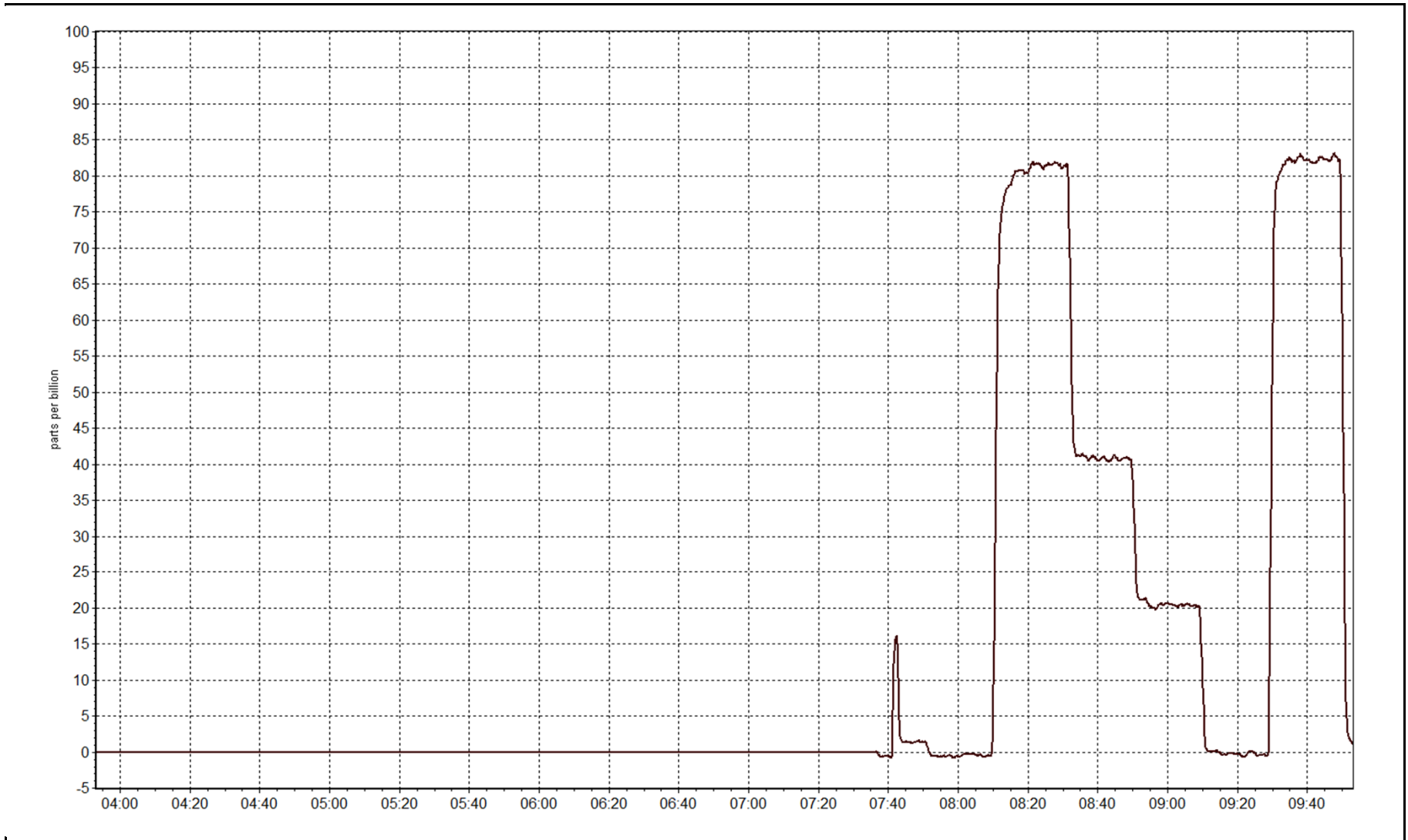
Calibration Date	October 21, 2014	Previous Calibration	September 4, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:37	End Time (MST)	9:55
Analyzer make	450i	Analyzer serial #	1218153583

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	N/A	Correlation Coefficient	0.999963
80.2	81.5	0.9837		
40.0	40.8	0.9800	Slope	0.978977
20.1	20.4	0.9833		
			Intercept	0.244026

### H2S Calibration Curve







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Wednesday, October 22, 2014	Previous Calibration	Wednesday, September 03, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:00	End Time (MST)	11:20
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	40.4	40.4
Calculated slope	1.018520	1.008376	Fuel Pressure	24.8	24.8
Calculated intercept	-0.020291	-0.055873		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	0.04	N/A
as found span	5000	60.4	13.19	13.05	1.011
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	60.4	13.19	13.10	1.007
second point	5000	30.2	6.60	6.66	0.991
third point	5000	15.1	3.30	3.36	0.982
calibrator zero	5000	0.0	0.00	0.07	N/A
as left zero	5000	0.0	0.00	0.07	N/A
as left span	5000	60.4	13.19	13.20	1.000
Average Correction Factor					0.993

Corrected As found 13.01 Previous response 12.97 % change -0.3%

#### Notes:

Filter changed, no adjustments made, hydrogen changed out

Calibration Performed By:

Melissa Lemay



## Wood Buffalo Environmental Association

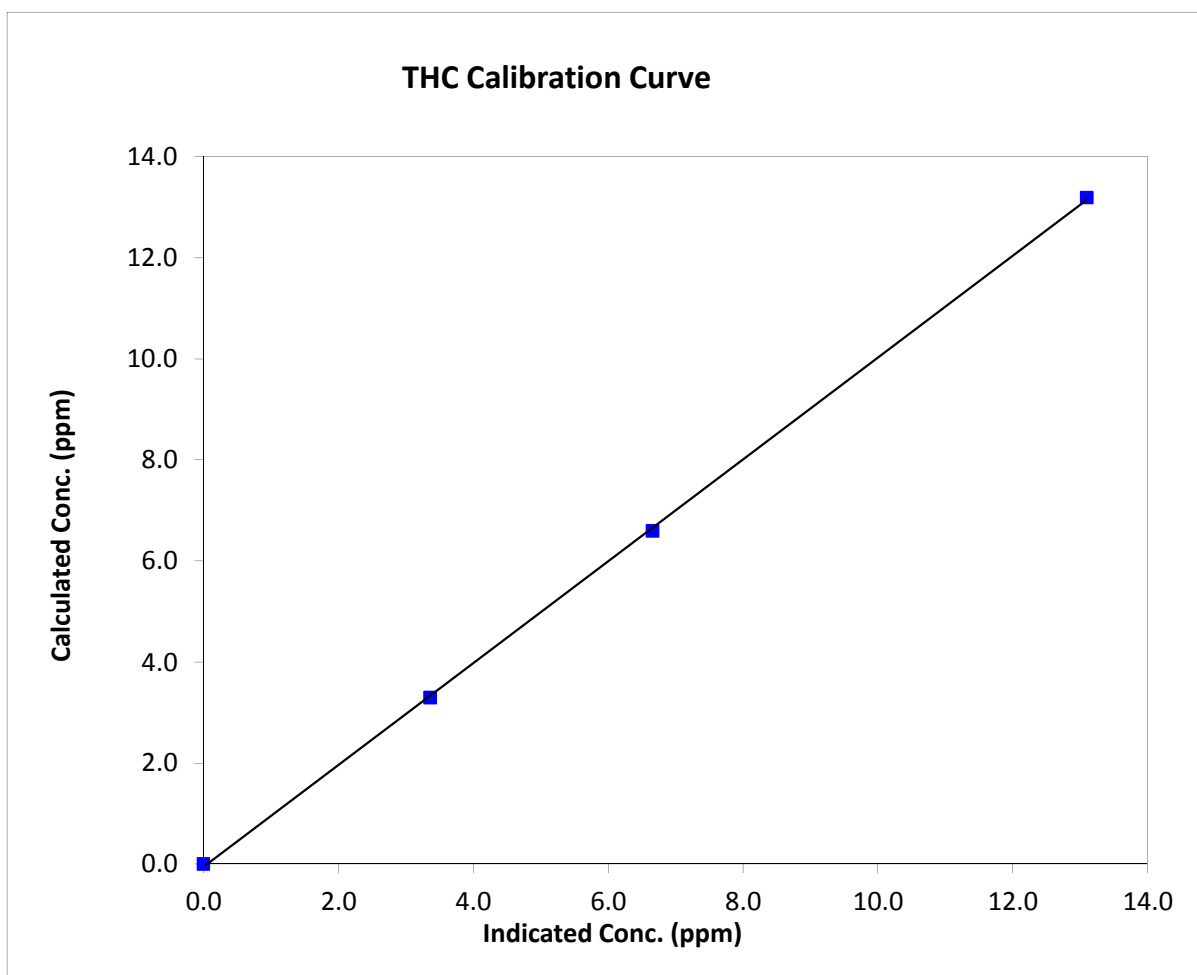
### THC Calibration Summary

#### Station Information

Calibration Date	October 22, 2014	Previous Calibration	September 3, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:00	End Time (MST)	11:20
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

#### Calibration Data

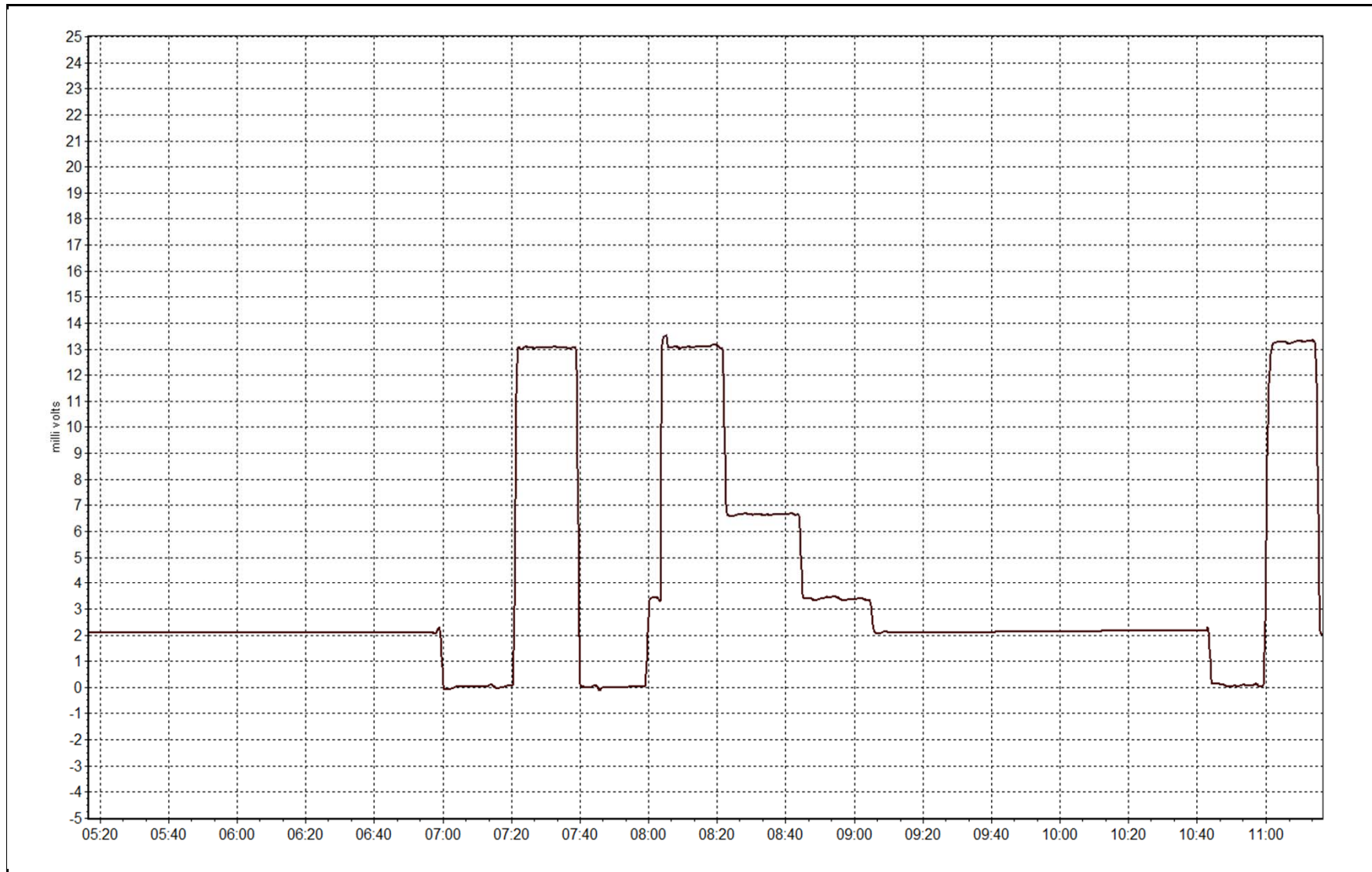
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999897
13.19	13.10	1.0072		
6.60	6.66	0.9906	Slope	1.008376
3.30	3.36	0.9817		
			Intercept	-0.055873





THC Calibration Plot

Date: October 22, 2014





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 22, 2014	Previous Calibration	September 4, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	11:15	End Time (MST)	13:00
Barometric Pressure	23 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	T700	Serial Number	997
NO2 calibration used	Wednesday, October 22, 2014	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.	29.4	29.4
Analyzer Range (input)	500	500	Photo Lamp Temp.	58.0	58.0
Calculated slope	0.996614	0.983326	Pressure	25.8	25.8
Calculated intercept	-0.366857	-0.382664	Flow	708-698	708-699
Analyzer Background	4.193	4.193			
Analyzer Coefficient	0.990	0.990			

Analyzer make T400 Analyzer serial # 824

### 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	0.00	0.0	0.8	N/A
as found span	5000	932.00	363.0	369.5	0.982
calibrator zero	5000	0.00	0.0	0.8	N/A
high point	5000	713.5	363.00	369.5	0.982
second point	5000	495.5	245.00	250.1	0.980
third point	5000	260.7	127.60	129.2	0.988
calibrator zero	5000	0.00	0.0	1.3	N/A
as left zero	5000	0.00	0.0	1.3	N/A
as left span	5000	714.70	363.0	369.8	0.982
Average Correction Factor					0.983

Corrected As found 368.7 Previous response 364.6 % change -1.1%

#### Notes:

Filter changed out, zero and span adjusted, no maintenance done

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

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

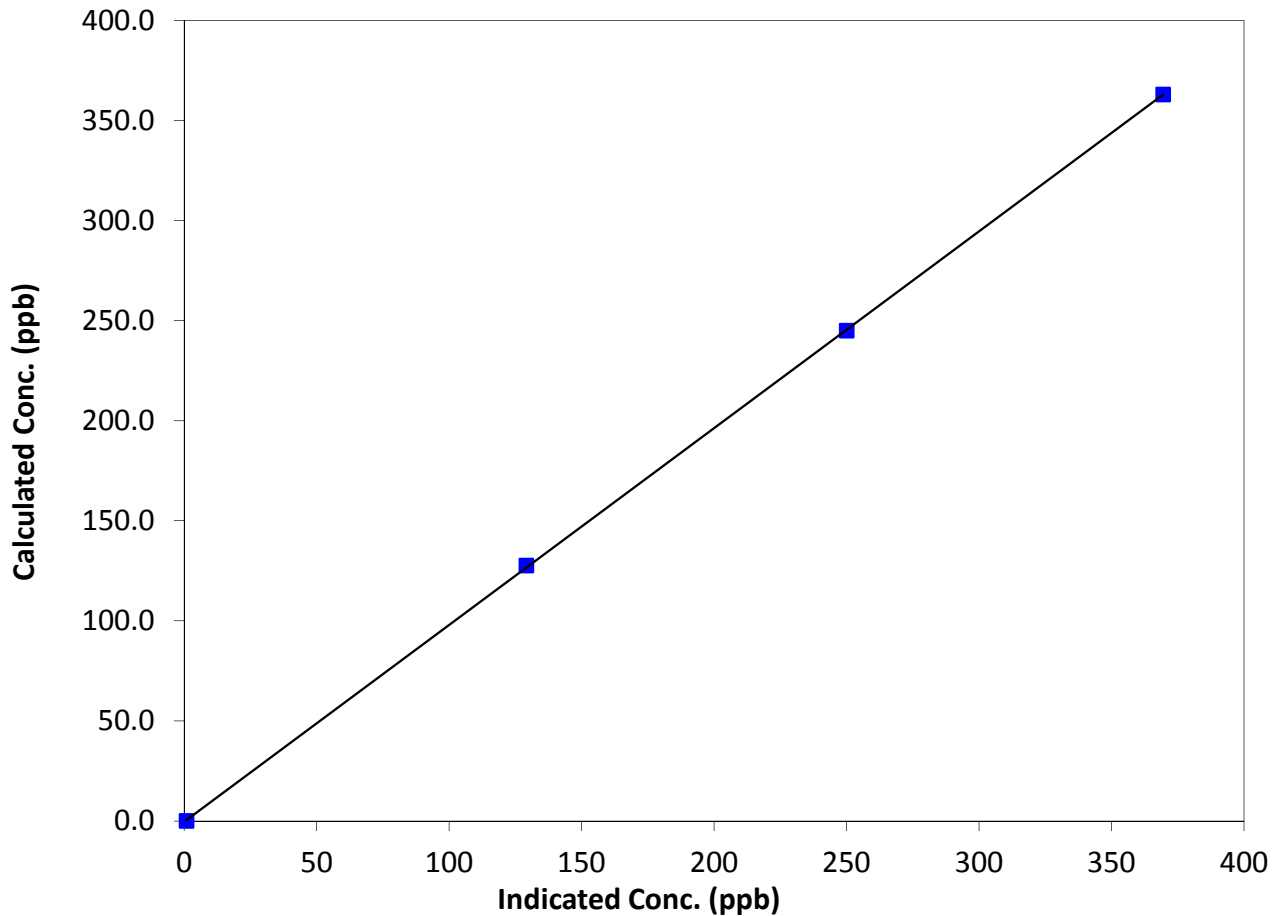
### Station Information

Calibration Date	Wednesday, October 22, 2014	Previous Calibration	September 4, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	11:15	End Time (MST)	13:00
Analyzer make	T400	Analyzer serial #	824

### Calibration Data

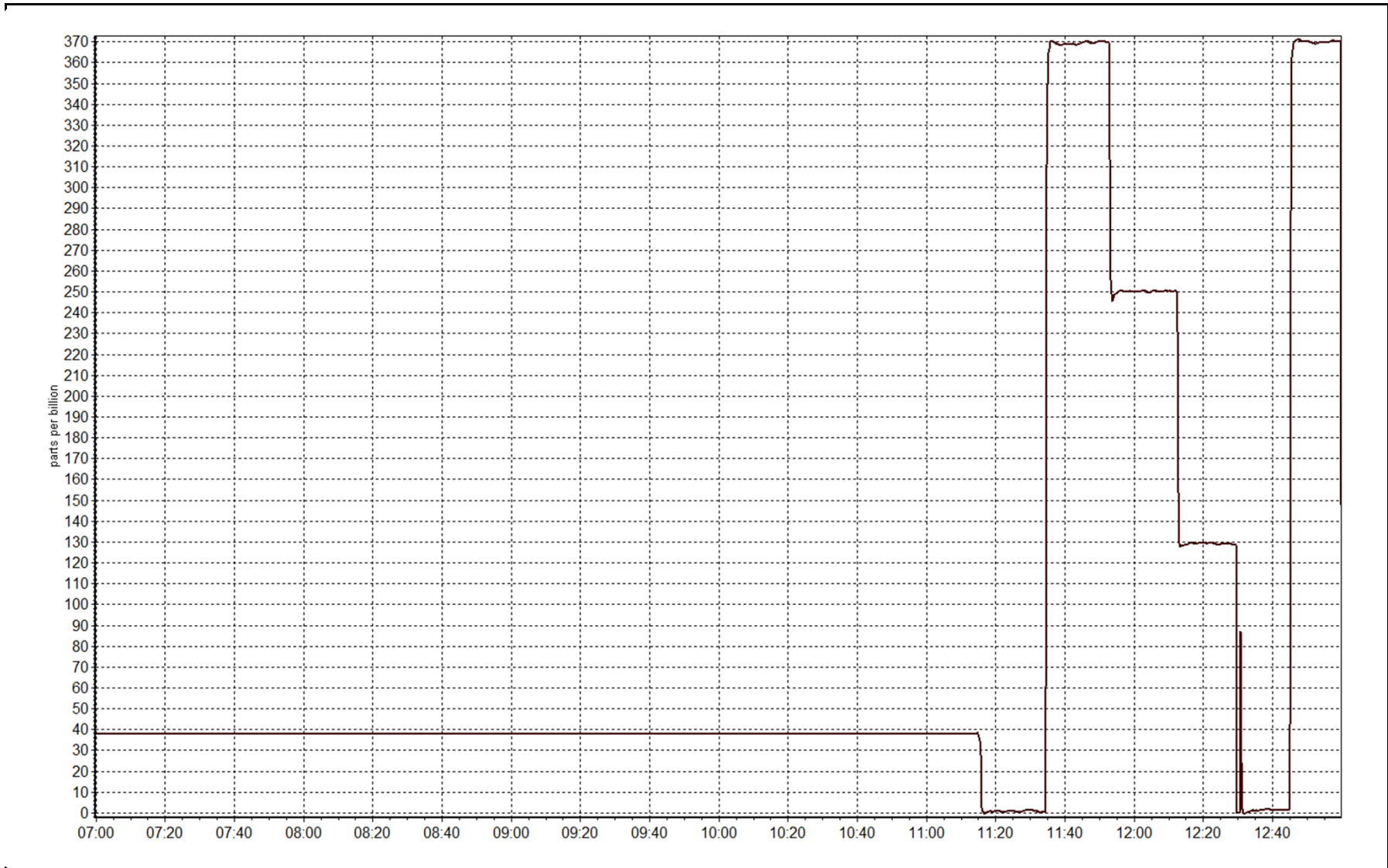
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.8	N/A	Correlation Coefficient	0.999981
363.0	369.5	0.9824		
245.0	250.1	0.9796	Slope	0.983326
127.6	129.2	0.9876		
			Intercept	-0.382664

**O<sub>3</sub> Calibration Curve**



O3 Calibration Plot

Date: October 22, 2014





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 22, 2014	Previous Calibration	September 3, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:00	End Time (MST)	11:20
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

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.998647	0.999699	1.000162
	Data Offset	-0.067624	0.072949	-0.648401
After	Data Slope	1.002474	1.003684	0.996794
	Data Offset	0.099176	0.028473	0.345415
Channel #				
Voltage Range				

### Analyzer Information

Analyzer make/model API T200      Analyzer serial # 833

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	316.5	Deg C	316.5	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	71.0	ccm	71.0	ccm
R Cell Press	5.8	mmHg	5.8	mmHg
Sample Flow	440-444	ccm	440-444	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:

October 22, 2014

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	0.0	0.4	-0.4	N/A	N/A
as found span	5000	60.4	600.4	600.4	0.0	599.0	598.5	0.5	1.0023	1.0031
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.4	-0.4	N/A	N/A
high point	5000	60.4	600.4	600.4	0.0	599.0	598.5	0.5	1.0023	1.0031
second point	5000	30.2	300.2	300.2	0.0	299.0	298.7	0.3	1.0040	1.0050
third point	5000	15.1	150.1	150.1	0.0	149.5	148.8	0.7	1.0040	1.0087
calibrator zero	6000	0.0	0.0	0.0	0.0	0.1	0.2	-0.2	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	0.1	0.2	-0.2	N/A	N/A
as left span	5000	60.4	600.4	235.0	365.4	599.0	235.0	363.0	1.0023	1.0000
Average Correction Factor									1.0034	1.0056

Corrected As found

NO<sub>x</sub>= 599.0

NO= 598.1

Percent Change

NO<sub>x</sub>= 0.4%

NO= 0.4%

Previous Response

NO<sub>x</sub>= 601.3

NO= 600.5

### 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	235.0	363.0	598.0	235.0	364.0	0.9920	1.0000	0.9973	100.3%
2nd NO <sub>2</sub> (200)	N/A	353.0	245.0	597.0	353.0	245.0	0.9937	1.0000	1.0000	100.0%
3rd NO <sub>2</sub> (100)	N/A	470.4	127.6	599.0	470.4	128.0	0.9903	1.0000	0.9969	100.3%
4th NO <sub>2</sub> (0)	598.0	N/A	-1.0	597.0	598.0	-1.0	0.9937	1.0000	N/A	N/A
Average Correction Factor							0.9924	1.0000	0.9980	100.2%

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

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

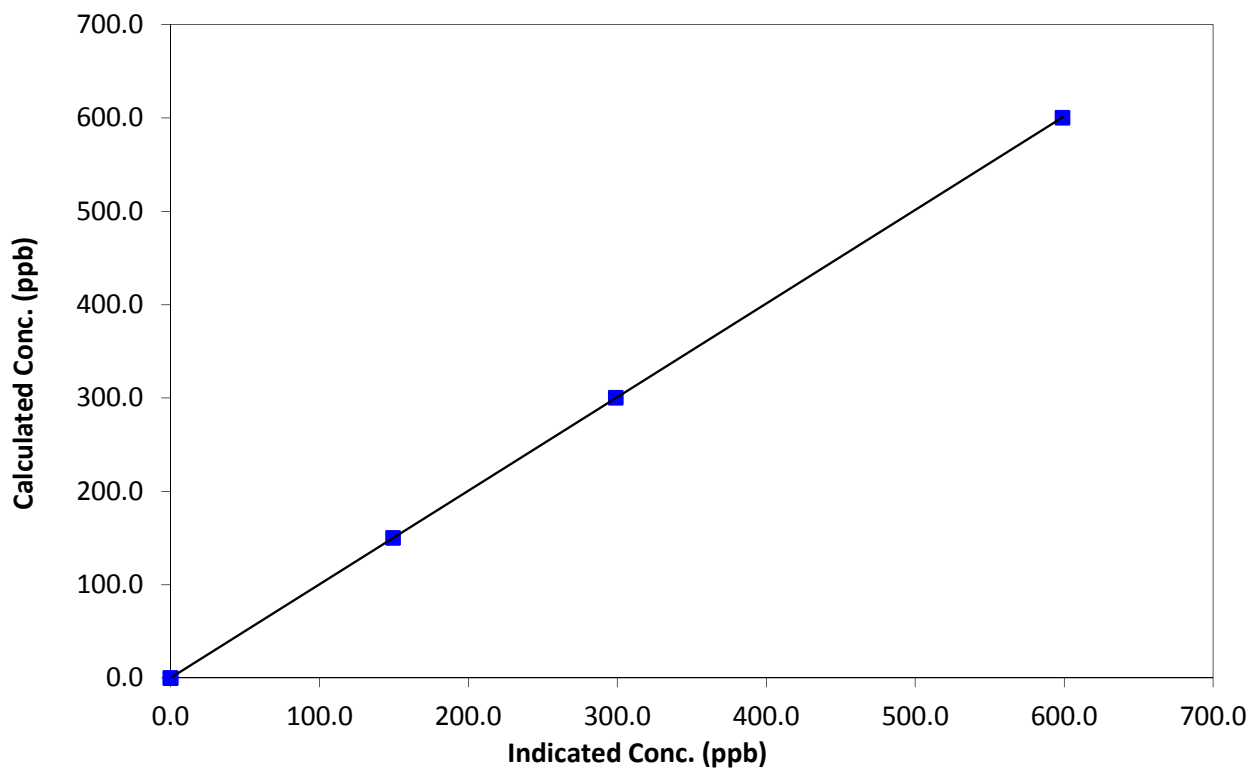
### Station Information

Calibration Date	October 22, 2014	Previous Calibration	September 3, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:00	End Time (MST)	11:20
Analyzer make	API T200	Analyzer serial #	833

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999999
600.4	599.0	1.0023		
300.2	299.0	1.0040	Slope	1.002474
150.1	149.5	1.0040		
0.0	0.1	0.0000	Intercept	0.099176

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

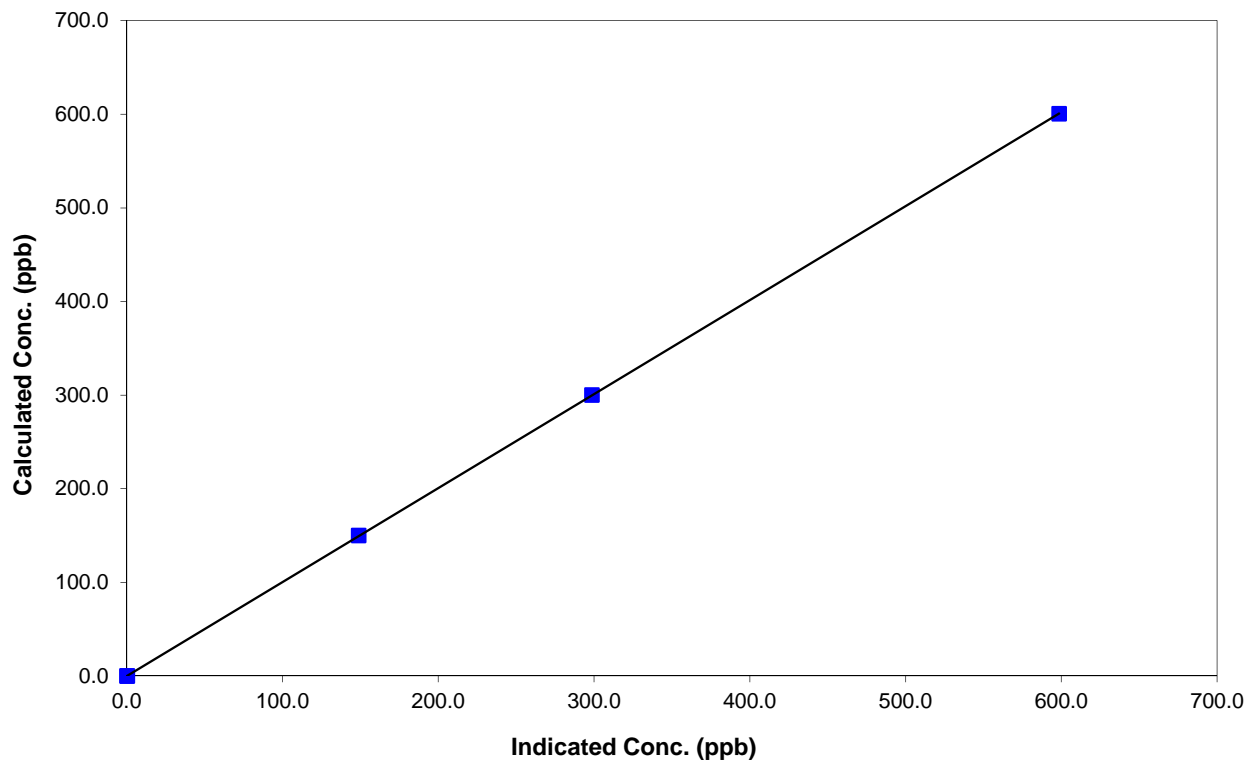
### Station Information

Calibration Date	October 22, 2014	Previous Calibration	September 3, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:00	End Time (MST)	11:20
Analyzer make	API T200	Analyzer serial #	833

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999996
600.4	598.5	1.0031		
300.2	298.7	1.0050	Slope	1.003684
150.1	148.8	1.0087		
0.0	0.2	0.0000	Intercept	0.028473

### NO Calibration Curve







# Wood Buffalo Environmental Association

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

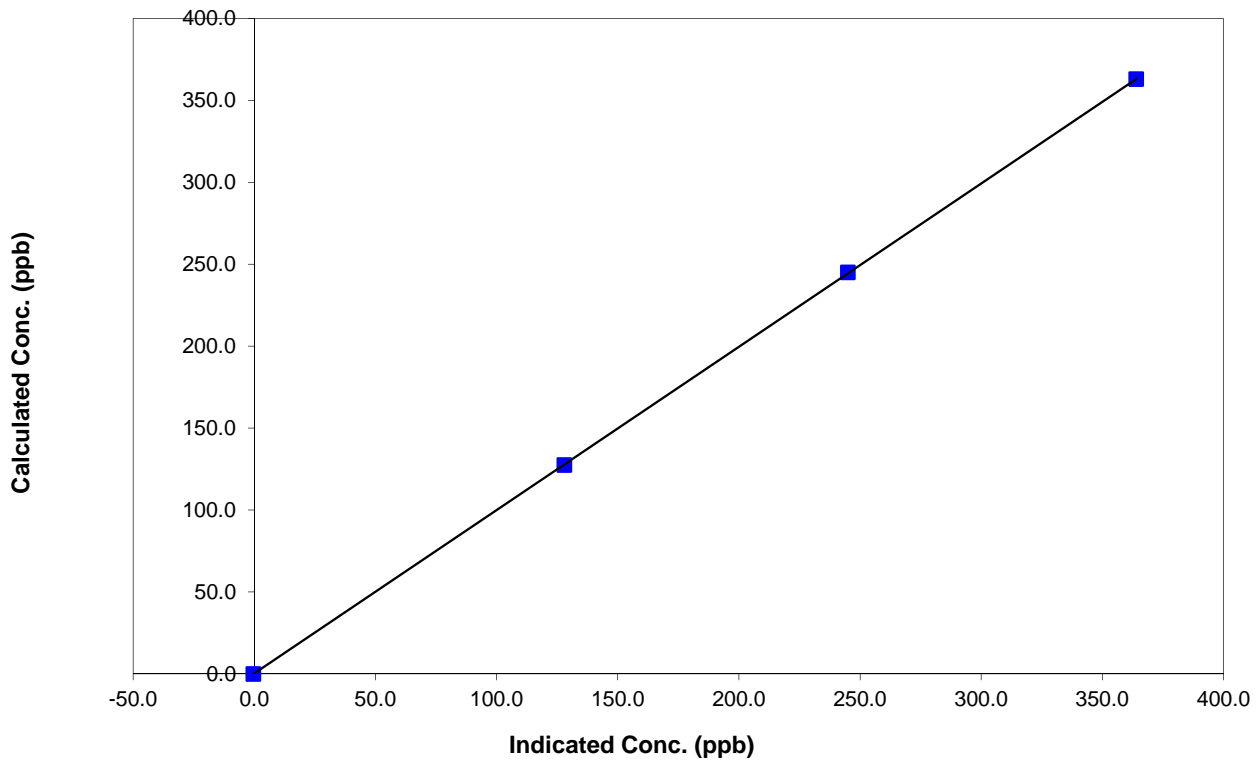
### Station Information

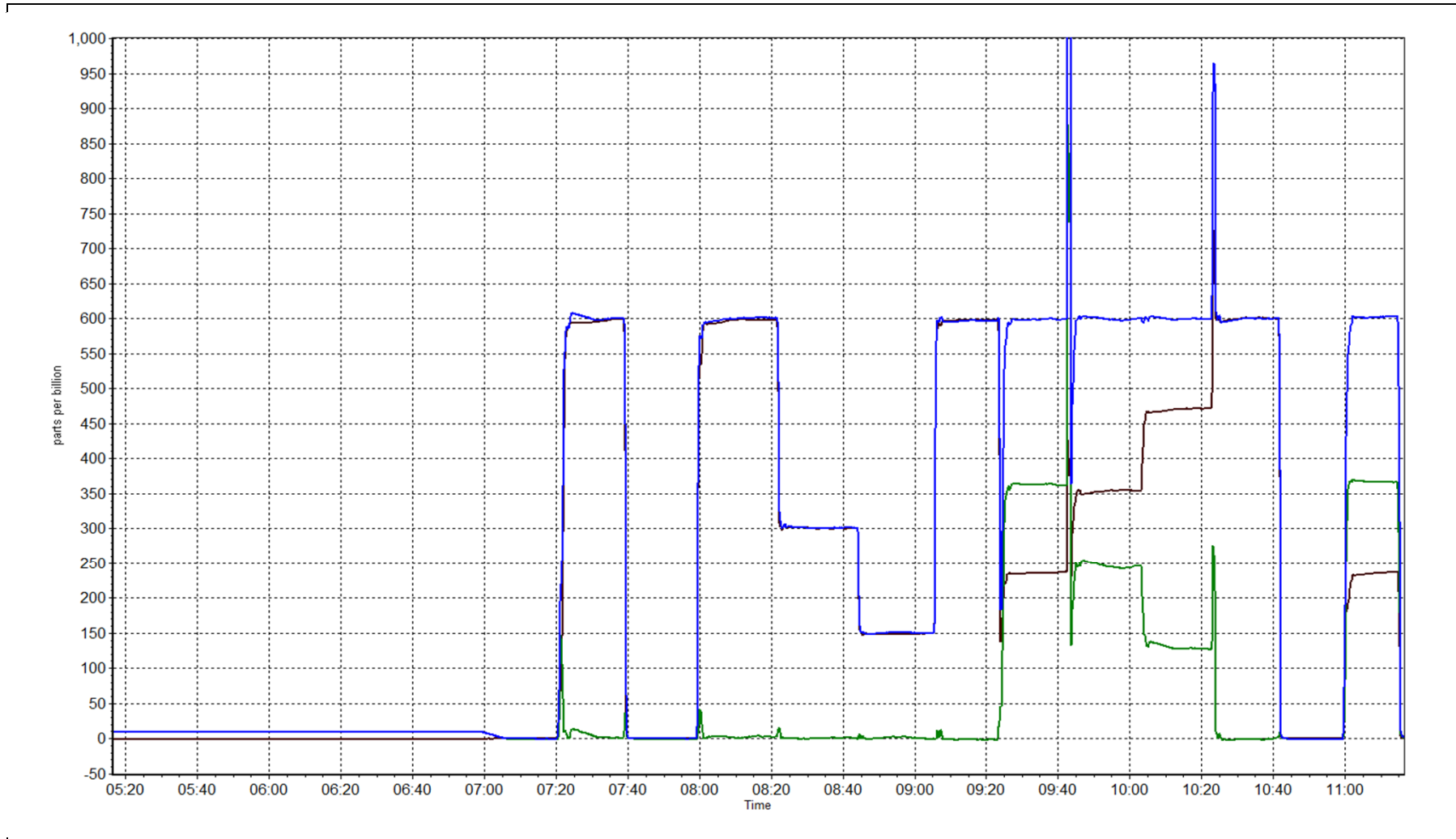
Calibration Date	October 22, 2014	Previous Calibration	September 3, 2014
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	7:00	End Time (MST)	11:20
Analyzer make	API T200	Analyzer serial #	833

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999995
363.0	364.0	0.9973		
245.0	245.0	1.0000	Slope	0.996794
127.6	128.0	0.9969		
			Intercept	0.345415

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





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 19  
FIREBAG  
OCTOBER 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

November 26, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
OCTOBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	36	36	100.00	20	0	4	0
H2S (ppb) Average	699	37	45	98.92	3	0	1	0
THC (ppm) Average	702	36	42	99.19	2.5	-	2.3	-
NO2 (ppb) Average	708	36	36	100.00	38	0	12	-
NO (ppb) Average	708	36	36	100.00	75	-	10	-
NOX (ppb) Average	708	36	36	100.00	112	-	22	-
Temperature 2 m (C) Average	744	0	0	100.00	17.9	-	11	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	-	-
Wind Speed 10 m (km/h) Average	702	0	42	94.35	37	-	-	-
Wind Direction 10 m (deg) Average	702	0	42	94.35	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.7	2	-	0	0	0	0	0	2	20
H2S (ppb) Average	699	0.3	0	-	0	0	0	0	0	0	3
THC (ppm) Average	702	2.14	0.1	-	2	2.1	2.1	2.1	2.2	2.2	2.5
NO2 (ppb) Average	708	4.3	5	-	0	0	1	3	6	11	38
NO (ppb) Average	708	2.5	5	-	0	0	0	1	2	7	75
NOX (ppb) Average	708	6.8	9	-	0	0	2	4	9	17	112
Temperature 2 m (C) Average	744	3.26	4.8	-	-6.8	-2.3	-1.1	2.5	6.9	10.1	17.9
Relative Humidity (%) Average	744	80.2	15	-	40	58	68	83	94	97	99
Wind Speed 10 m (km/h) Average	702	13.9	7	-	1	6	9	13	17	22	37
Wind Direction 10 m (deg) Average	702	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	14 Oct 2014 14:00	14 Oct 2014 14:00	1	Intermittent unstable operation - excessive baseline drift
H2S	16 Oct 2014 08:00	16 Oct 2014 08:00	1	Intermittent unstable operation - excessive baseline drift
H2S	21 Oct 2014 11:00	21 Oct 2014 13:00	3	Maintenance - verify analyzer response
H2S	27 Oct 2014 19:00	27 Oct 2014 19:00	1	Intermittent unstable operation - excessive baseline drift
H2S	30 Oct 2014 07:00	30 Oct 2014 08:00	2	Intermittent unstable operation - excessive baseline drift
THC	14 Oct 2014 20:00	15 Oct 2014 01:00	6	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	02 Oct 2014 02:00	02 Oct 2014 16:00	15	Flat line in sensor output signal
Wind Speed, Wind Direction	24 Oct 2014 09:00	25 Oct 2014 11:00	27	Flat line in sensor output signal

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Summary of Hour Averages

Firebag - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 20 ppb on Oct 22 05:00	Maximum Daily Average: 3.6 ppb on Oct 22		Hours of Data:	708
Minimum Value: 0 ppb on Oct 1 02:00	Minimum Daily Average: 0.1 ppb on Oct 1		Hours of Missing Data:	36
Maximum Diurnal Average: 1.7 ppb at hour 6	Minimum Diurnal Average: 0.3 ppb at hour 1		Hours of Calibration:	36
Monthly Average: 0.7 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 2 P <sub>99</sub> = 7		Percent Operational Time:	100.0

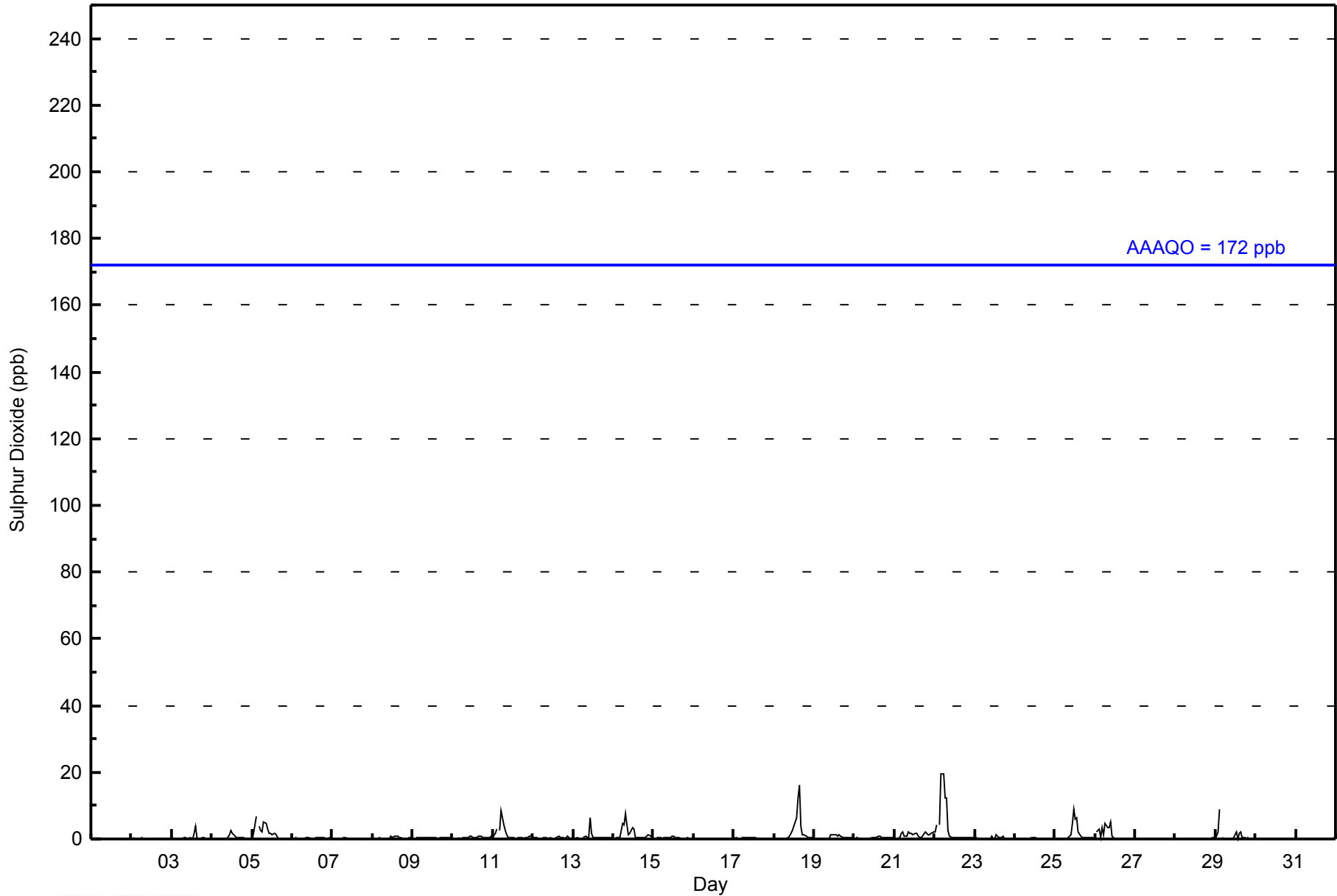
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0	0	0	0	0	0	0.4	4
4-Oct	0	0	Z	0	0	0	0	0	0	0	1	2	2	1	1	1	1	1	0	0	0	0	0	0	0.5	2
5-Oct	0	2	7	Z	4	2	2	5	5	3	2	2	1	2	1	0	0	0	0	0	0	0	0	1.7	7	
6-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
7-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
8-Oct	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	1	0	0	0	0	0	0.3	1	
9-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
10-Oct	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0.5	1
11-Oct	1	2	3	Z	3	8	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1.3	8
12-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0.3	1	
13-Oct	0	0	0	0	0	Z	0	1	0	1	6	2	0	0	0	0	1	0	0	0	0	0	0	0.7	6	
14-Oct	Z	0	0	0	0	5	4	8	4	1	2	3	3	0	0	0	0	0	1	1	1	1	0	1.6	8	
15-Oct	0	Z	1	0	0	0	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1	
16-Oct	0	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
17-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
18-Oct	0	0	0	0	Z	0	0	0	0	1	2	3	4	6	12	16	4	1	1	1	0	0	0	2.3	16	
19-Oct	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1	
20-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	1	0.4	1	
21-Oct	1	Z	0	0	2	2	1	1	2	2	2	1	2	2	1	0	0	1	2	2	1	1	2	1.3	2	
22-Oct	2	4	Z	4	20	20	12	12	2	1	0	0	0	0	0	0	0	0	0	0	1	0	0	3.6	20	
23-Oct	0	0	0	Z	0	0	0	0	0	0	1	0	0	1	0	0	1	1	0	0	0	0	0	0.3	1	
24-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
25-Oct	0	0	0	0	0	Z	0	0	0	1	5	9	6	6	2	1	0	0	0	0	0	0	0	1.4	9	
26-Oct	Z	2	3	0	3	1	5	3	3	5	1	0	0	0	0	0	0	0	0	0	0	0	0	1.3	5	
27-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
28-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
29-Oct	0	2	9	Z	0	0	0	0	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0.9	9	
30-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
31-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	1	
																								Diurnal Average		
																								Diurnal Maximum		

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag - October 2014





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Firebag - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	702	99.15	99.15
11 - 20	6	0.85	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Firebag - October 2014**

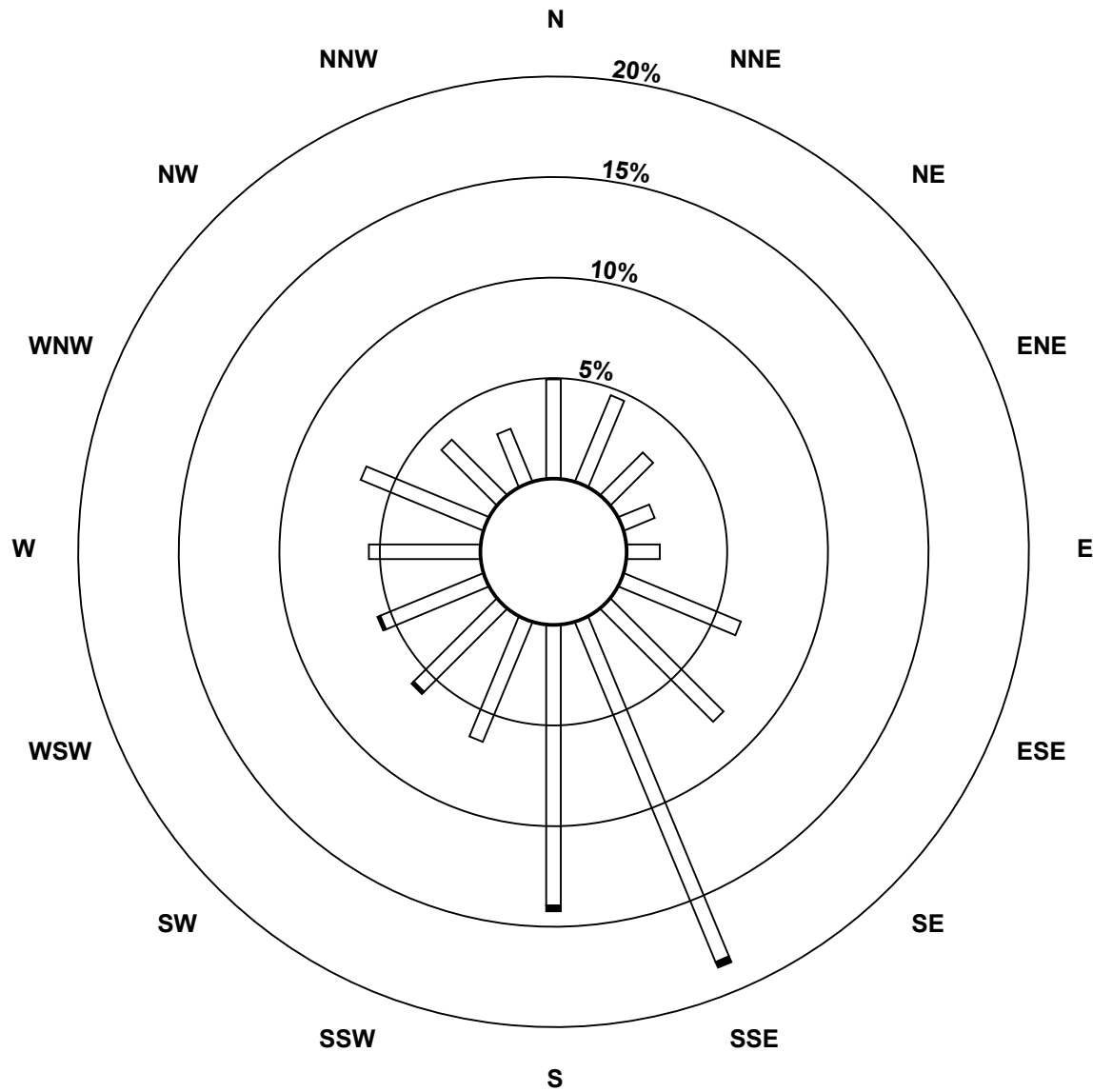
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	33	31	20	11	11	42	53	122	93	43	39	37	37	44	26	19	661
11 - 20	0	0	0	0	0	0	0	2	2	0	1	1	0	0	0	0	6
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>33</b>	<b>31</b>	<b>20</b>	<b>11</b>	<b>11</b>	<b>42</b>	<b>53</b>	<b>124</b>	<b>95</b>	<b>43</b>	<b>40</b>	<b>38</b>	<b>37</b>	<b>44</b>	<b>26</b>	<b>19</b>	<b>667</b>

Total Number of Valid Hours: 667

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag (AMS 19)**



Classes (ppb)

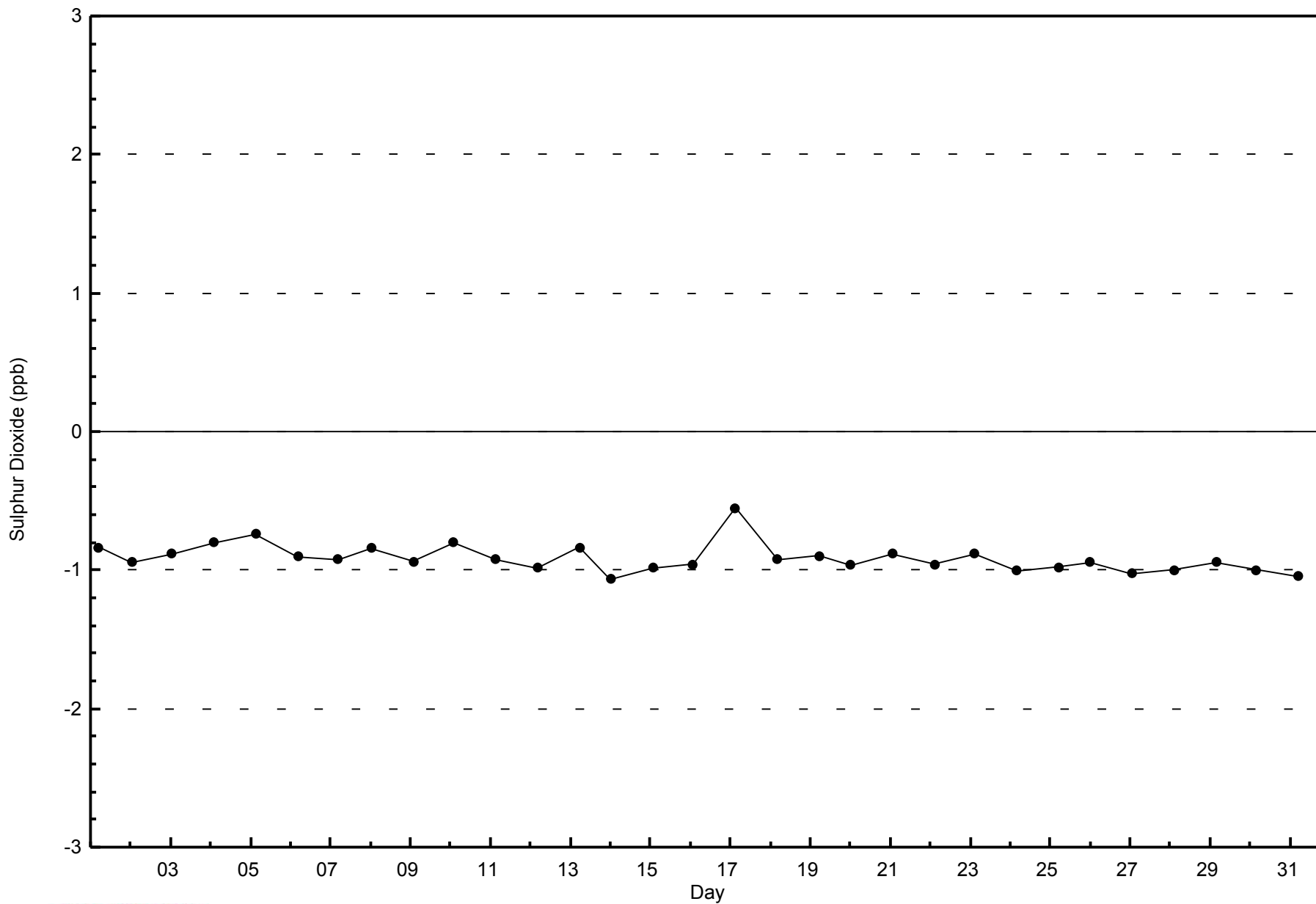


**Total Number of Valid Hours: 667**



WBEA  
Zero Responses

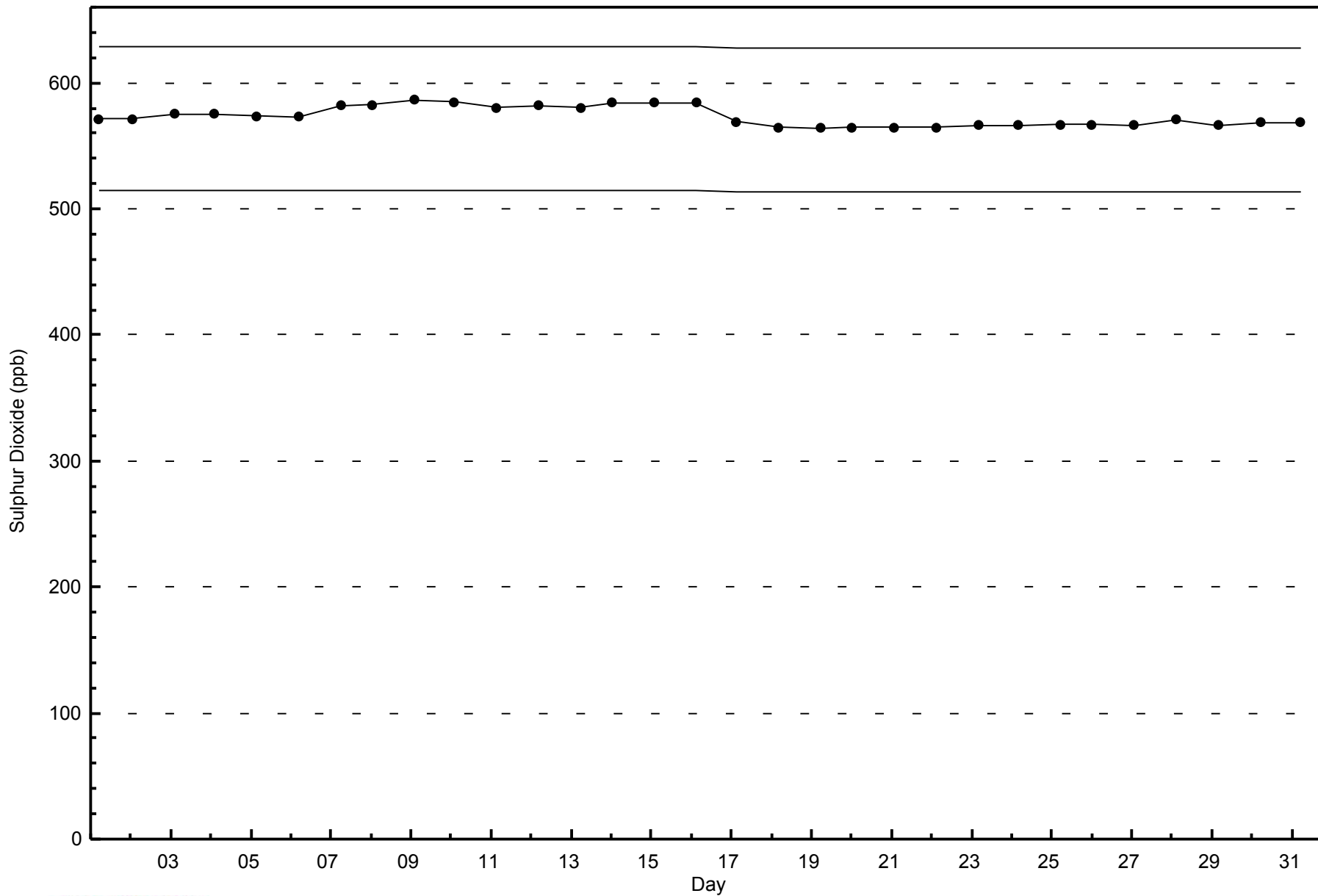
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag - October 2014





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag - October 2014





Summary of Hour Averages

Firebag - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 3 ppb on Oct 22 05:00	Maximum Daily Average: 0.5 ppb on Oct 7		Hours of Data:	699
Minimum Value: 0 ppb on Oct 21 04:00	Minimum Daily Average: 0.1 ppb on Oct 30		Hours of Missing Data:	45
Maximum Diurnal Average: 0.4 ppb at hour 5	Minimum Diurnal Average: 0.2 ppb at hour 19		Hours of Calibration:	37
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:	98.9

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-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1
4-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-Oct	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
6-Oct	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Oct	0	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	2	0.5	2
8-Oct	1	Z	0	0	2	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0.5	2
9-Oct	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.4	1
10-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
11-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Oct	0	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.2	1
14-Oct	0	Z	0	0	0	0	0	0	1	0	0	0	0	UO	0	0	0	0	0	0	0	0	0	0	0.2	1
15-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Oct	0	0	0	Z	0	0	0	UO	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.3	1
17-Oct	1	1	1	1	Z	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	--	1
18-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Oct	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
20-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
21-Oct	0	0	Z	0	0	0	0	0	1	0	M	M	M	0	0	0	0	0	0	0	0	0	0	0	0.2	1
22-Oct	0	0	0	Z	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
23-Oct	1	1	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Oct	0	0	0	0	0	0	Z	0	0	1	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0.5	3
26-Oct	0	Z	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	UO	0	0	0	0	0.1	0
28-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-Oct	0	0	1	1	Z	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
30-Oct	0	0	0	0	0	Z	UO	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-Oct	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

0.2	0.2	0.3	0.2	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	Diurnal Average
1	1	1	1	3	2	1	1	1	1	1	3	3	1	1	0	0	0	1	1	1	1	2	1	2	Diurnal Maximum	

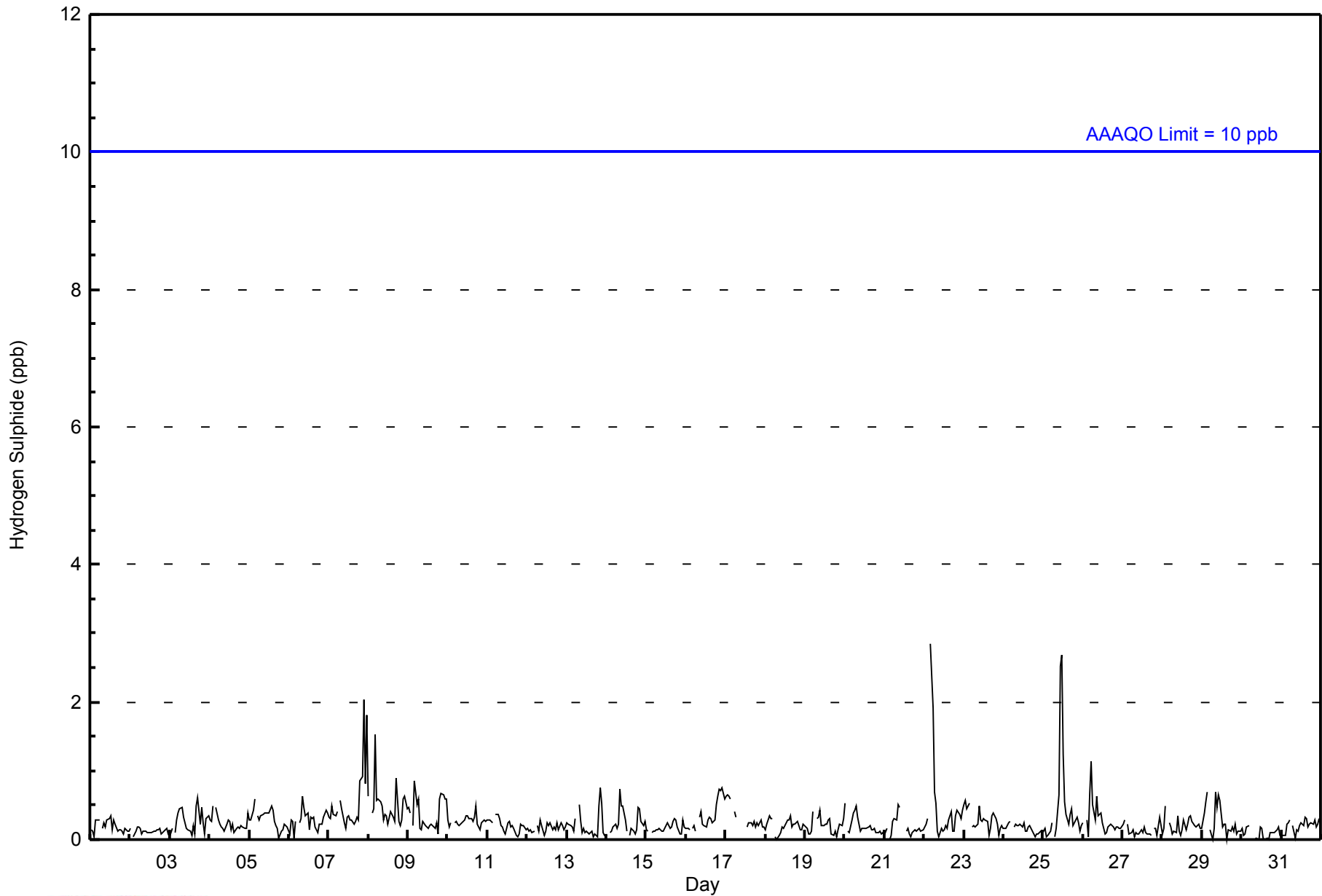
Z - zerospan      C - Calibration      M - Maintenance      UO - Unstable Operation  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb    24-hr 3 ppb





WBEA  
Hourly Averages

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag - October 2014





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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Firebag - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	696	99.57	99.57
3 - 4	3	0.43	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 699

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Firebag - October 2014**

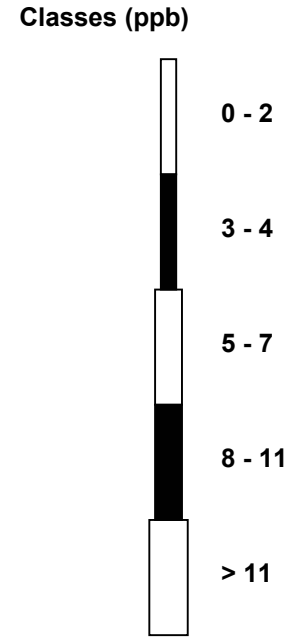
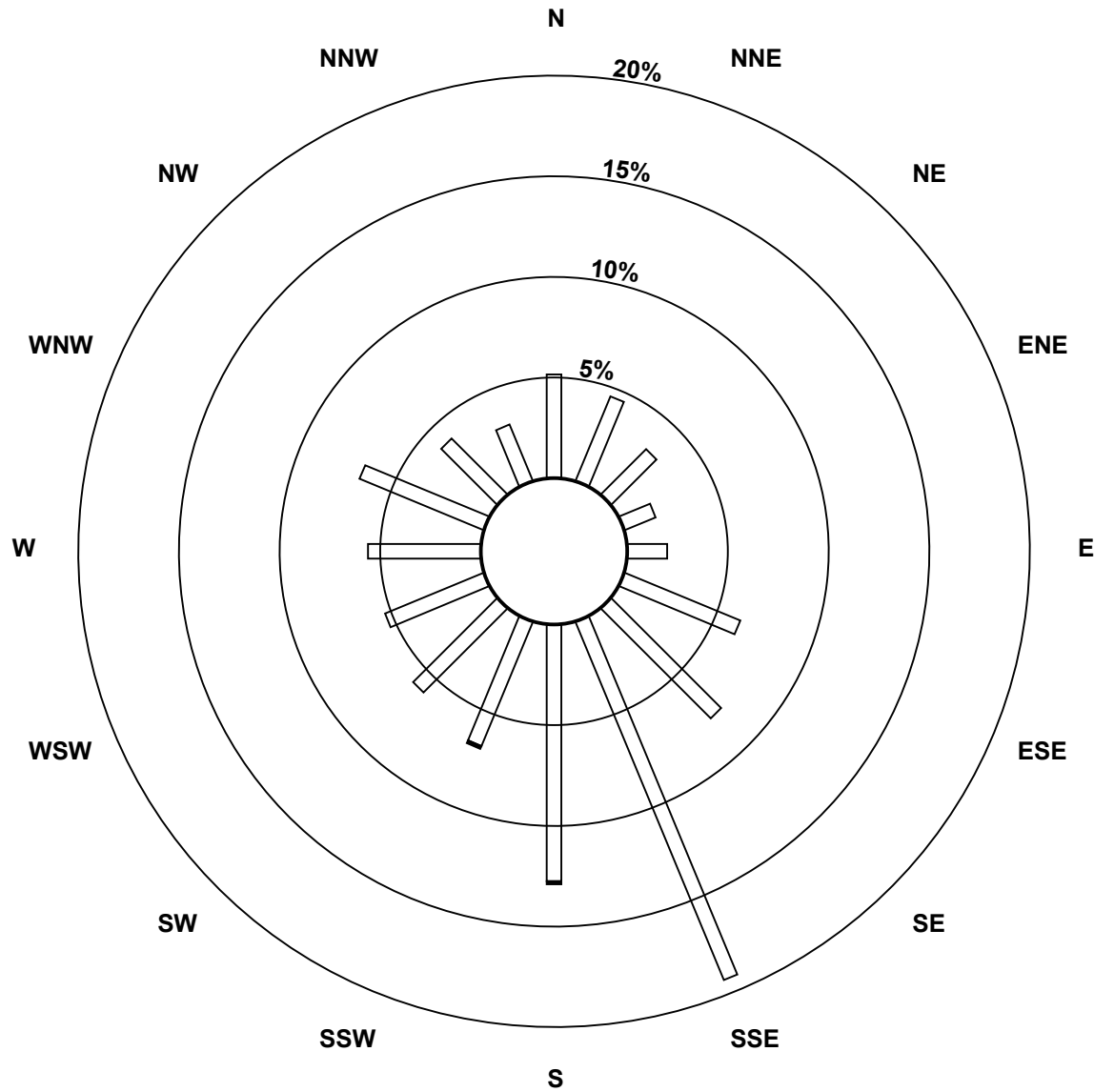
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	34	30	21	11	13	41	51	127	84	44	39	35	37	44	26	20	657
3 - 4	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	34	30	21	11	13	41	51	127	85	45	39	35	37	44	26	20	659

Total Number of Valid Hours: 659

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag (AMS 19)

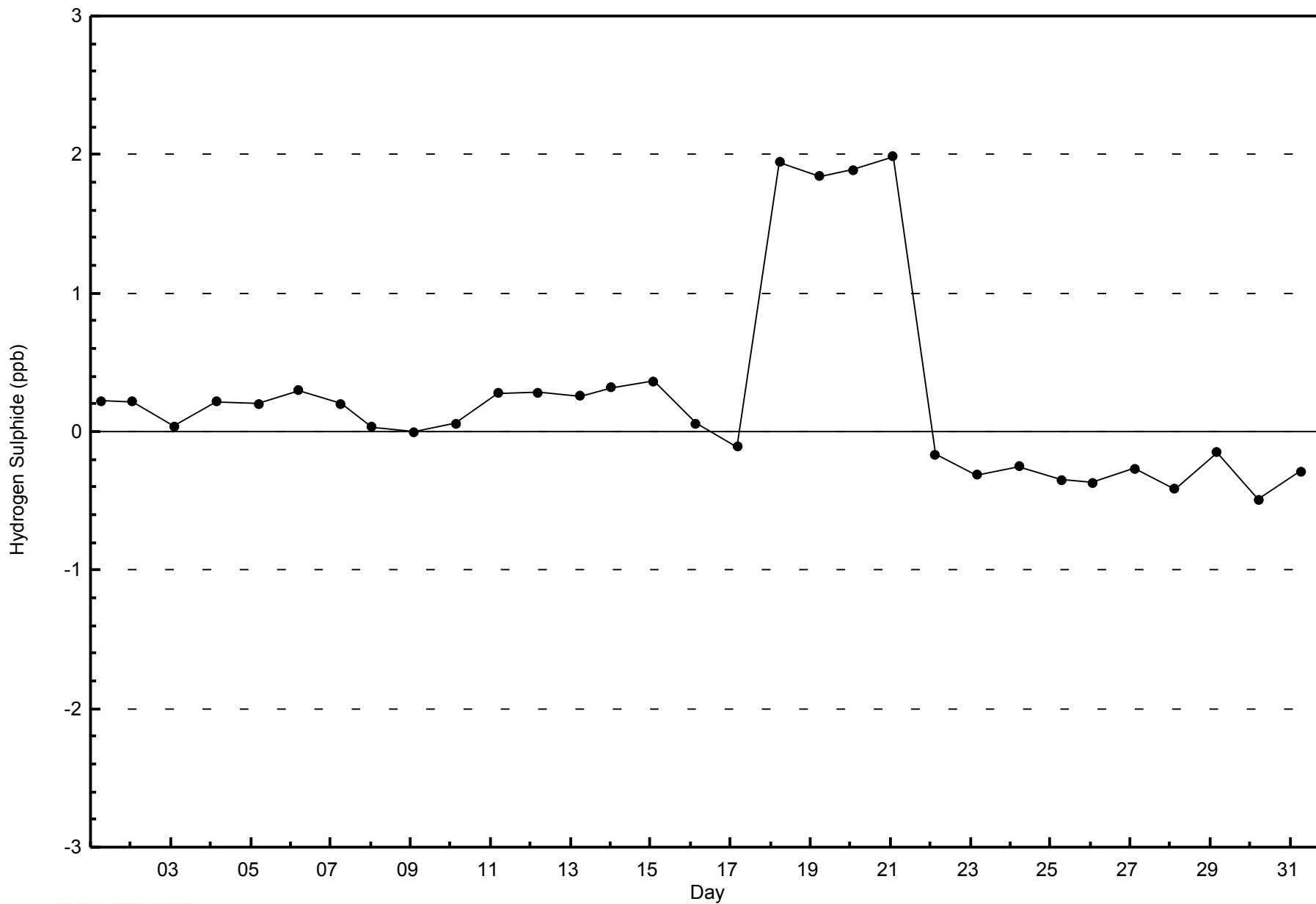


Total Number of Valid Hours: 659



WBEA  
Zero Responses

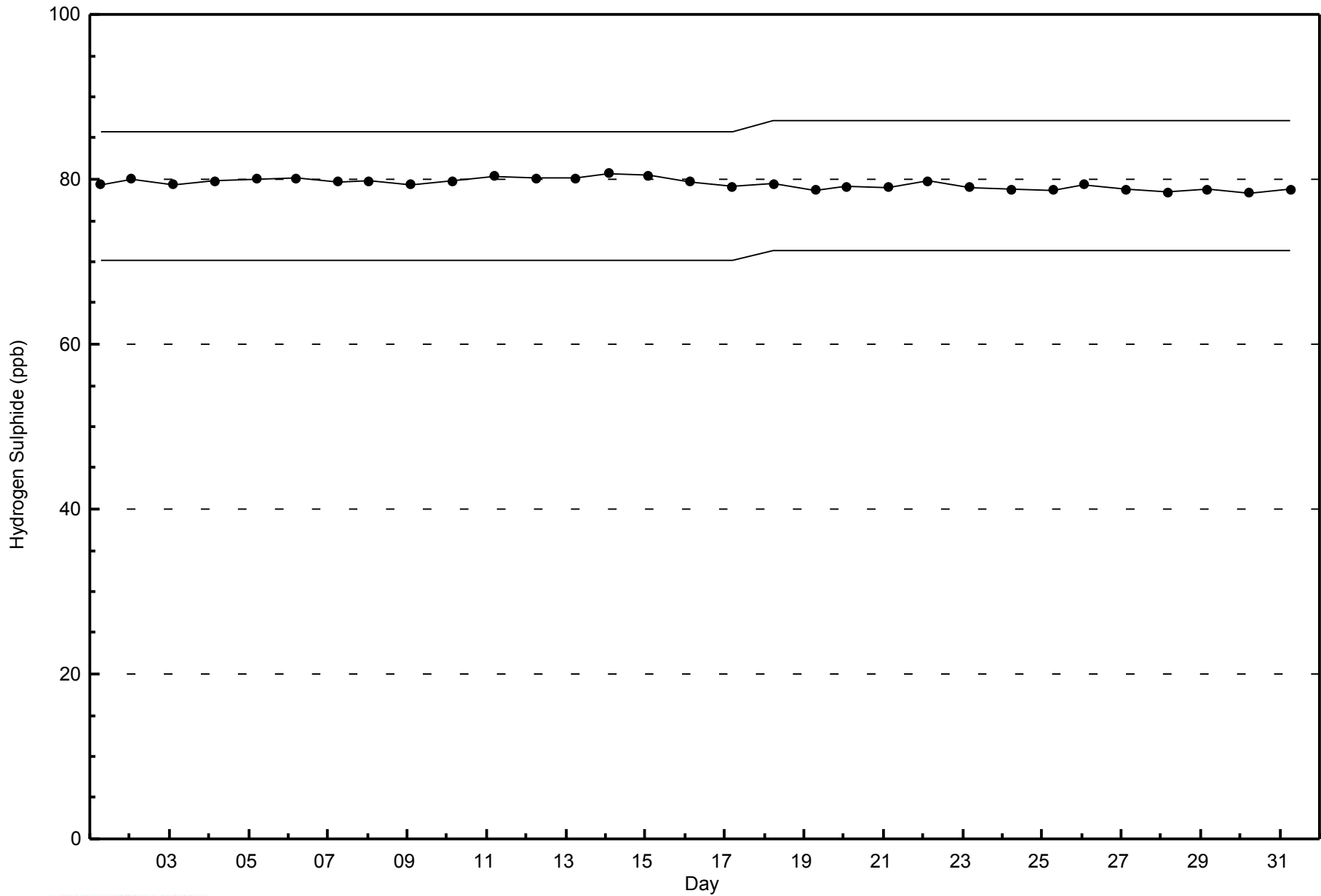
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag - October 2014





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag - October 2014



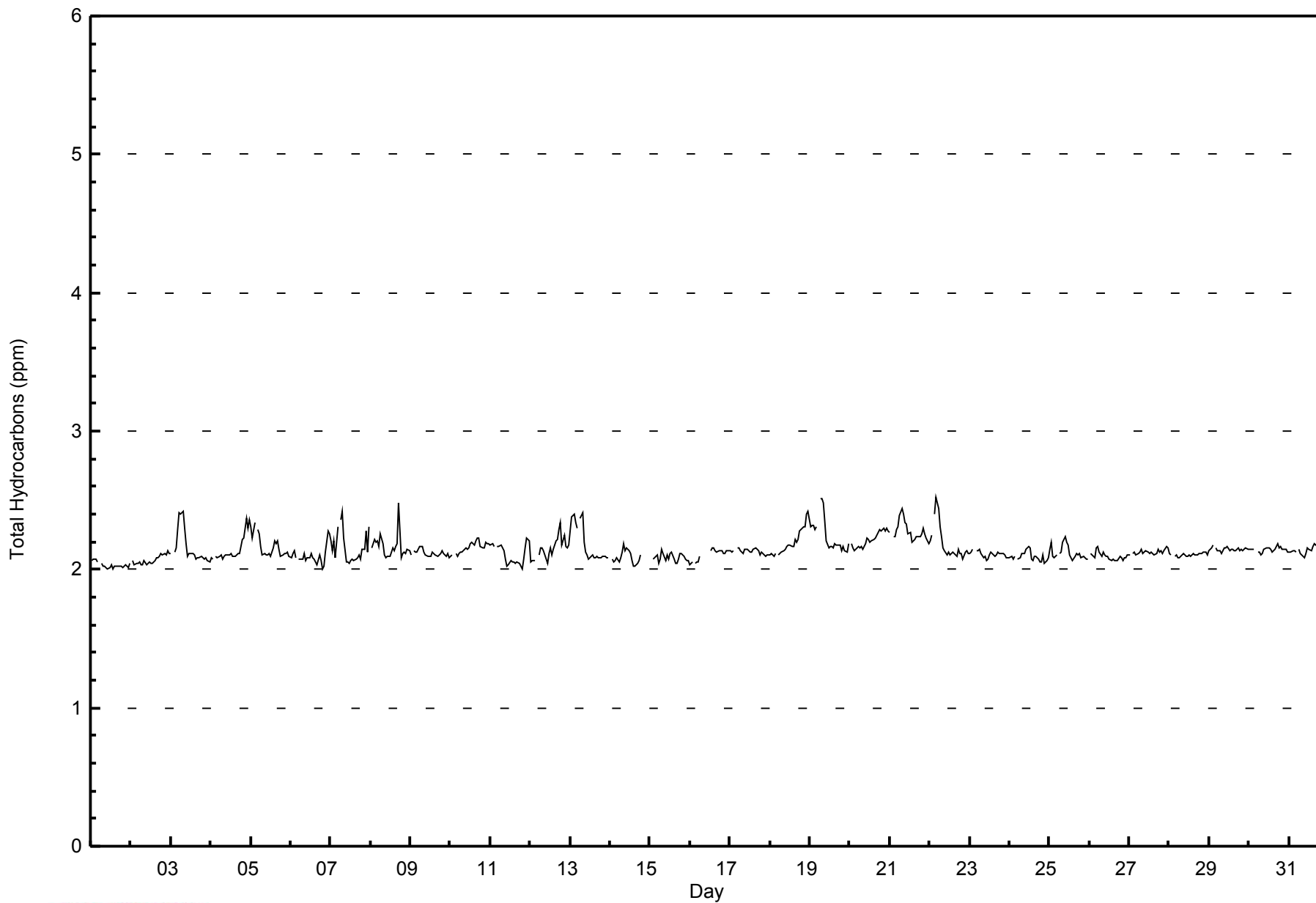


Maximum Value: 2.5 ppm on Oct 22 05:00      Maximum Daily Average: 2.3 ppm on Oct 21																				Hours in Service: 744 Hours of Data: 702 Hours of Missing Data: 42 Hours of Calibration: 36 Percent Operational Time: 99.2									
Minimum Value: 2.0 ppm on Oct 1 14:00      Minimum Daily Average: 2.0 ppm on Oct 1 Maximum Diurnal Average: 2.2 ppm at hour 8      Minimum Diurnal Average: 2.1 ppm at hour 15 Monthly Average: 2.14 ppm      Percentiles: P <sub>1</sub> = 2.0 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.1 Median = 2.1 Q <sub>3</sub> = 2.2 P <sub>90</sub> = 2.2 P <sub>99</sub> = 2.4																													
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-Oct	2.1	2.1	2.1	2.1	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	
2-Oct	Z	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
3-Oct	2.1	Z	2.1	2.2	2.3	2.4	2.4	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
4-Oct	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	2.2	2.2	2.2	2.4	2.3	2.4	2.1	2.4		
5-Oct	2.3	2.2	2.3	Z	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3		
6-Oct	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.3	2.3	2.1	2.3			
7-Oct	2.2	2.1	2.2	2.1	2.3	Z	2.4	2.4	2.2	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	2.1	2.3	2.2	2.4			
8-Oct	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.5	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5		
9-Oct	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2		
10-Oct	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
11-Oct	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.1	2.2			
12-Oct	2.1	2.1	2.1	2.1	Z	2.1	2.2	2.2	2.1	2.1	2.0	2.1	2.2	2.1	2.1	2.2	2.2	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2			
13-Oct	2.3	2.4	2.4	2.3	2.3	Z	2.4	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2			
14-Oct	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	UO	UO	UO	UO	UO	2.1			
15-Oct	UO	Z	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	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1			
16-Oct	2.0	2.1	Z	2.0	2.1	2.1	2.1	C	C	C	C	C	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1			
17-Oct	2.1	2.1	2.1	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1			
18-Oct	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.2			
19-Oct	2.3	2.3	2.3	2.3	2.3	Z	2.5	2.5	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.5			
20-Oct	Z	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2			
21-Oct	2.3	Z	2.2	2.2	2.3	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	2.3	2.3	2.3	2.2	2.2	2.3			
22-Oct	2.2	2.2	Z	2.4	2.5	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2			
23-Oct	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1			
24-Oct	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.2			
25-Oct	2.1	2.2	2.1	2.1	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1			
26-Oct	Z	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1			
27-Oct	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			
28-Oct	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1			
29-Oct	2.1	2.2	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.1			
30-Oct	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1			
31-Oct	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2			
																								Diurnal Average					
																								Diurnal Maximum					
Z - zerospan      C - Calibration      UO - Unstable Operation																													



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Firebag - October 2014**







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

**Total Hydrocarbons (THC) - ppm**  
**Firebag - October 2014**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	47	6.70	6.70
2.1 - 3.0	655	93.30	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Firebag - October 2014**

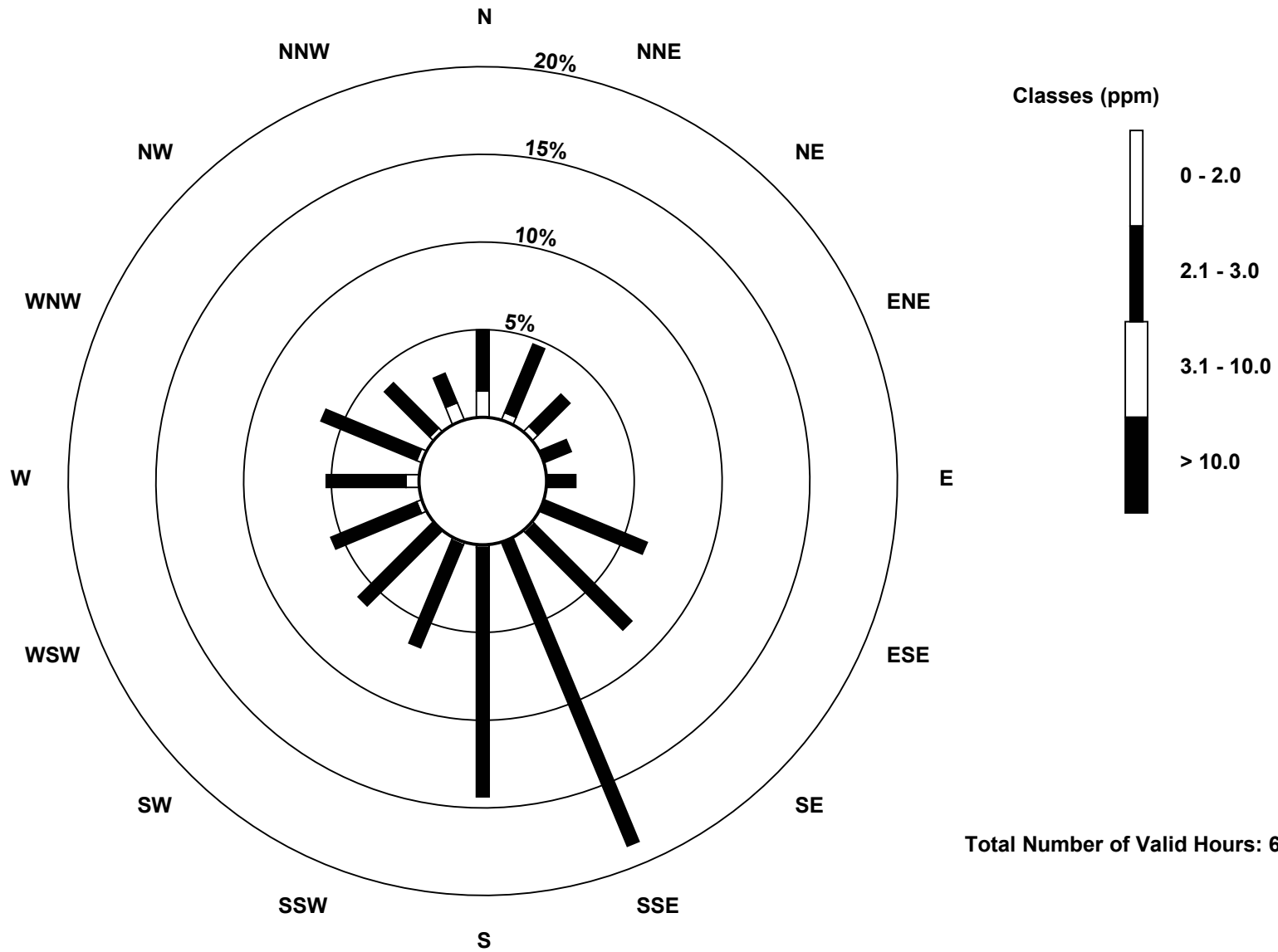
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	10	3	3	0	0	0	1	0	1	1	0	2	5	2	2	7	37
2.1 - 3.0	23	28	17	11	11	42	52	124	94	42	40	35	30	39	24	12	624
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>33</b>	<b>31</b>	<b>20</b>	<b>11</b>	<b>11</b>	<b>42</b>	<b>53</b>	<b>124</b>	<b>95</b>	<b>43</b>	<b>40</b>	<b>37</b>	<b>35</b>	<b>41</b>	<b>26</b>	<b>19</b>	<b>661</b>

Total Number of Valid Hours: 661

Total Number of Hours: 744

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Total Hydrocarbons (THC) - ppm  
Firebag (AMS 19)

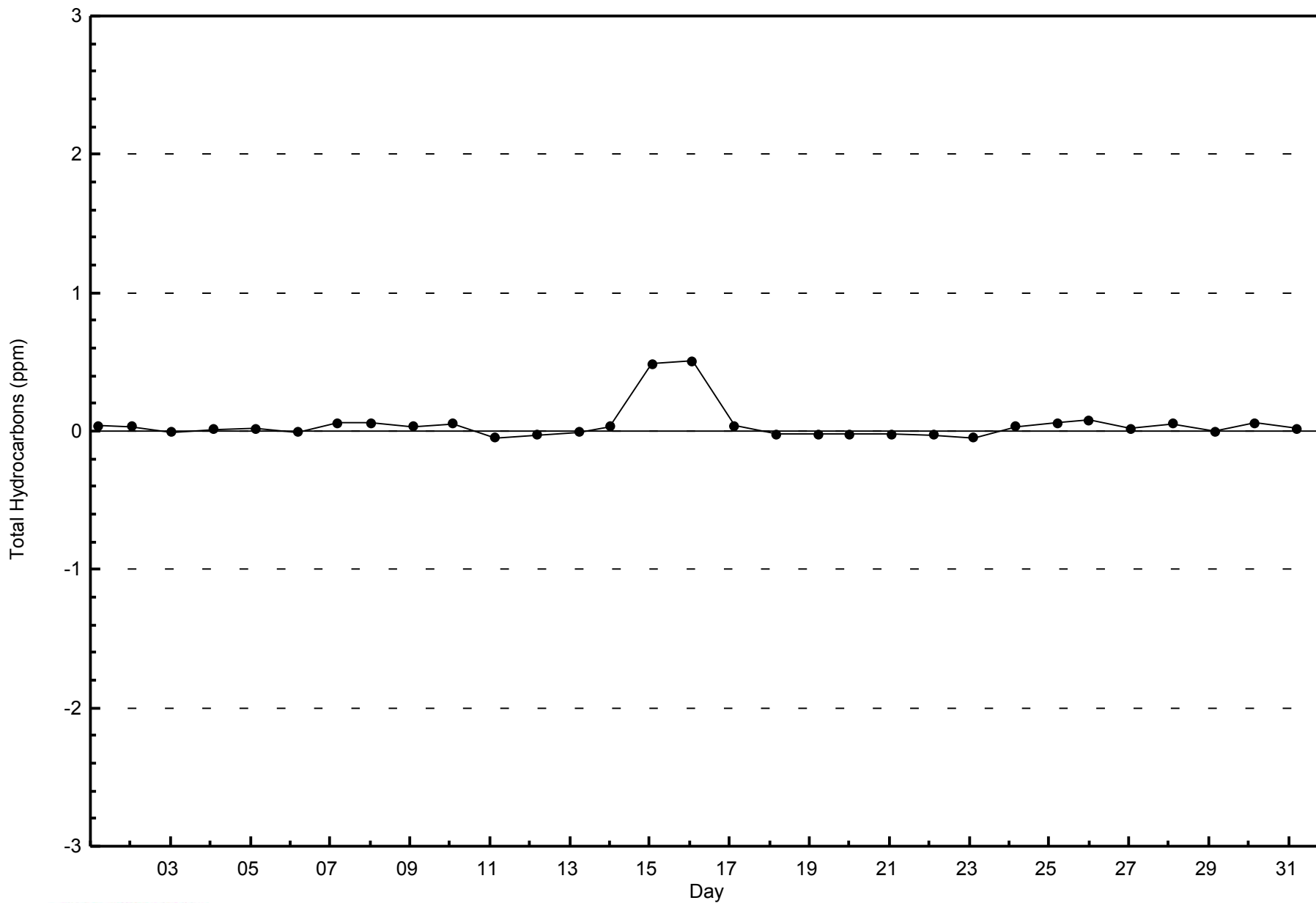


Total Number of Valid Hours: 661



WBEA  
Zero Responses

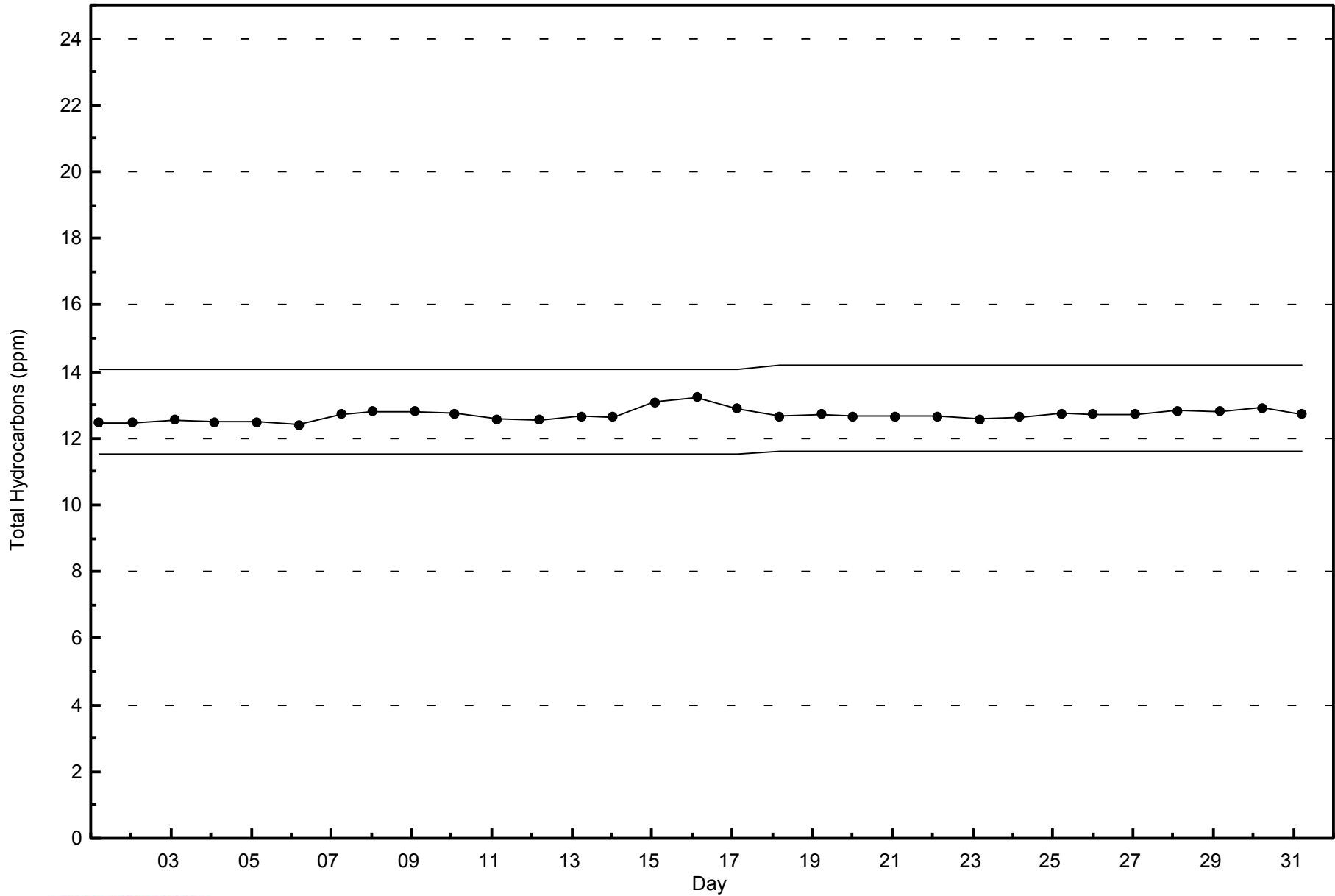
Total Hydrocarbons (THC) - ppm  
Firebag - October 2014





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Firebag - October 2014



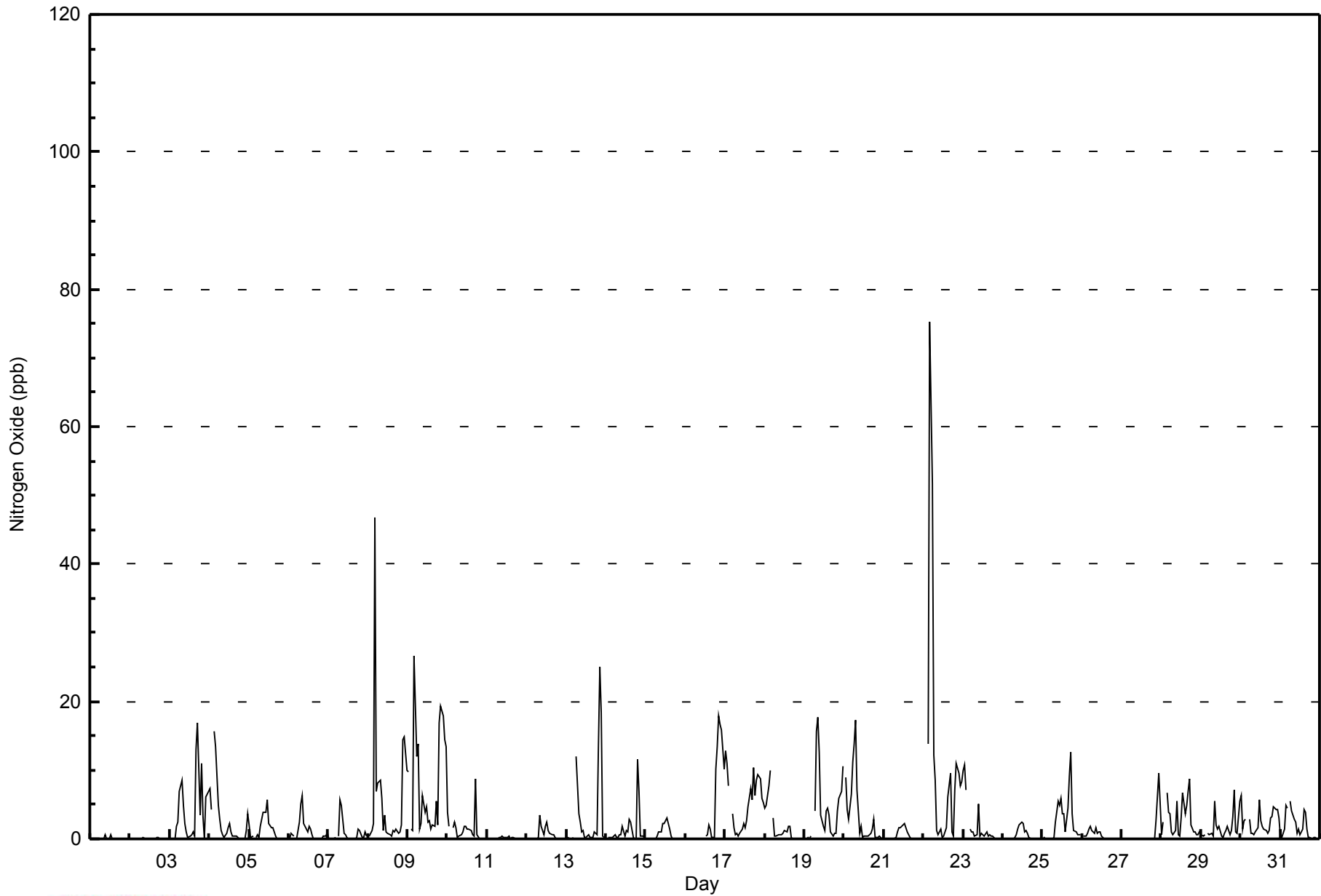


Maximum Value: 75 ppb on Oct 22 05:00																		Maximum Daily Average: 9.9 ppb on Oct 22																		Hours in Service: 744			
Minimum Value: 0 ppb on Oct 1 01:00																		Minimum Daily Average: 0.0 ppb on Oct 2																		Hours of Data: 708			
Maximum Diurnal Average: 7.3 ppb at hour 5																		Minimum Diurnal Average: 1.3 ppb at hour 19																		Hours of Missing Data: 36			
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> = 2 P <sub>90</sub> = 7 P <sub>99</sub> = 18																		Hours of Calibration: 36			
																																				Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24															
1-Oct	0	0	0	0	0	Z	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1													
2-Oct	Z	0	0	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-Oct	0	Z	0	0	2	2	7	9	5	2	1	0	1	1	1	0	13	17	3	11	3	0	6	7	4.0	17													
4-Oct	7	4	Z	16	13	5	3	1	1	0	1	2	2	1	0	0	0	0	0	0	0	0	1	4	2.7	16													
5-Oct	2	0	0	Z	0	1	0	2	4	4	4	6	2	2	2	1	0	0	0	0	0	0	0	0	1.3	6													
6-Oct	0	1	1	0	Z	0	2	5	6	2	2	1	2	1	1	0	0	0	0	0	0	0	0	1	1.1	6													
7-Oct	0	0	0	0	0	Z	0	6	5	1	1	0	0	0	0	0	0	0	2	1	0	0	1	0	0.8	6													
8-Oct	Z	1	1	2	47	7	8	9	6	1	4	1	1	1	0	1	1	2	1	1	2	14	15	10	5.9	47													
9-Oct	10	Z	1	1	27	12	14	1	2	6	4	5	2	3	1	2	2	6	2	17	19	18	14	13	8.0	27													
10-Oct	4	2	Z	2	2	2	0	0	1	1	2	2	2	1	1	1	0	9	1	0	0	0	0	0	1.4	9													
11-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0													
12-Oct	0	0	0	0	Z	0	0	0	4	2	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0.6	4													
13-Oct	0	0	0	0	0	Z	12	4	2	1	1	0	0	1	0	0	0	1	1	14	25	18	0	0	3.6	25													
14-Oct	Z	0	0	0	0	1	0	0	1	1	2	0	1	1	3	3	0	0	0	12	7	0	0	0	1.4	12													
15-Oct	0	Z	0	0	0	0	0	0	1	1	2	2	3	3	1	0	0	0	0	0	0	0	0	0	0.6	3													
16-Oct	0	0	Z	0	0	0	0	C	C	C	C	C	0	1	2	1	0	0	10	13	18	17	16	10	4.9	18													
17-Oct	13	11	8	Z	4	2	1	1	0	1	1	2	2	3	5	7	6	10	6	9	9	9	6	5	5.2	13													
18-Oct	4	5	8	10	Z	3	1	0	1	1	1	1	1	1	2	2	0	0	0	0	0	0	0	0	1.7	10													
19-Oct	0	0	0	0	0	Z	4	16	18	13	3	2	1	4	4	3	1	0	1	1	4	6	7	11	4.3	18													
20-Oct	Z	9	4	3	6	11	14	17	7	1	2	0	0	0	1	1	1	1	3	0	0	0	0	0	3.6	17													
21-Oct	0	Z	0	0	0	0	0	0	1	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0.5	2													
22-Oct	0	0	Z	14	75	52	12	9	1	1	1	0	0	1	2	6	10	1	0	7	11	10	8	8	9.9	75													
23-Oct	10	11	7	Z	1	1	1	0	1	5	0	1	1	0	1	0	1	0	0	0	0	0	0	0	1.8	11													
24-Oct	0	0	0	0	Z	0	0	0	1	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0.5	2													
25-Oct	0	0	0	0	0	Z	0	0	2	5	5	6	4	4	1	4	9	13	4	1	1	1	1	1	2.7	13													
26-Oct	Z	0	0	1	1	2	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2													
27-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	10	5	0.8	10													
28-Oct	1	2	Z	7	4	4	1	1	1	6	1	0	3	7	4	5	7	9	2	1	1	1	1	1	2.9	9													
29-Oct	1	0	1	Z	1	1	1	0	6	2	1	2	0	0	1	1	2	1	1	3	7	1	1	5	1.7	7													
30-Oct	6	2	3	3	Z	3	1	1	1	1	2	6	3	2	1	1	1	1	3	3	5	4	4	3	2.5	6													
31-Oct	0	0	1	5	5	Z	5	4	3	2	1	2	1	1	4	4	1	0	0	0	0	0	0	0	1.8	5													
2.2 1.9 1.4 2.4 7.3 4.3 2.9 2.9 2.7 2.2 1.6 1.6 1.3 1.4 1.3 1.5 1.8 2.3 1.3 3.0 3.7 3.3 2.9 2.8																								Diurnal Average															
13 11 8 16 75 52 14 17 18 13 5 6 4 7 5 7 13 17 10 17 25 18 16 13																								Diurnal Maximum															
Z - zerospan C - Calibration																																							



WBEA  
Hourly Averages

Nitrogen Oxide (NO) - ppb  
Firebag - October 2014





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

**Nitrogen Oxide (NO) - ppb**  
**Firebag - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	703	99.29	99.29
21 - 40	2	0.28	99.58
41 - 80	3	0.42	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**Firebag - October 2014**

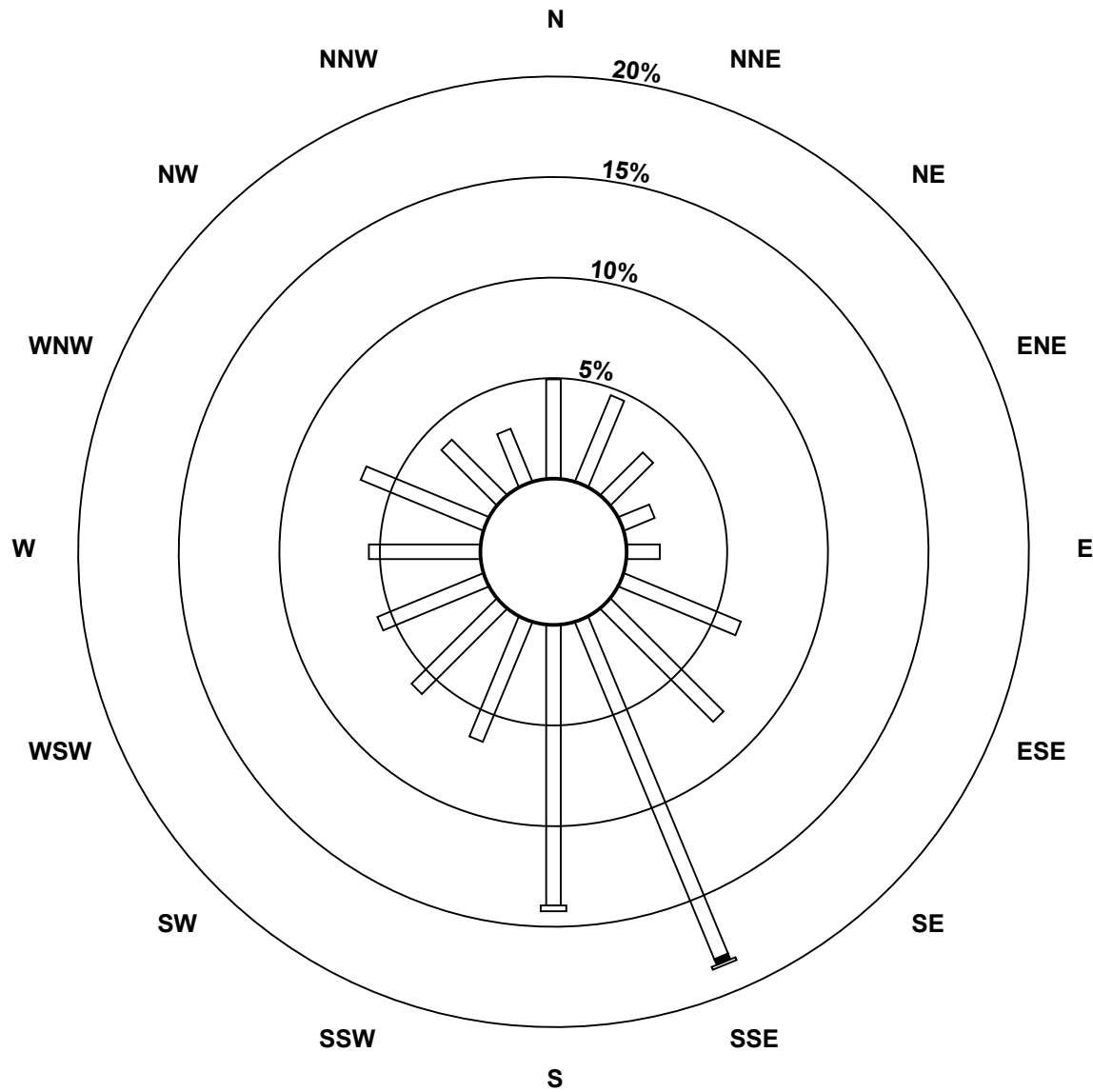
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	33	31	20	11	11	42	53	121	93	43	40	38	37	44	26	19	662
21 - 40	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
41 - 80	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>33</b>	<b>31</b>	<b>20</b>	<b>11</b>	<b>11</b>	<b>42</b>	<b>53</b>	<b>124</b>	<b>95</b>	<b>43</b>	<b>40</b>	<b>38</b>	<b>37</b>	<b>44</b>	<b>26</b>	<b>19</b>	<b>667</b>

Total Number of Valid Hours: 667

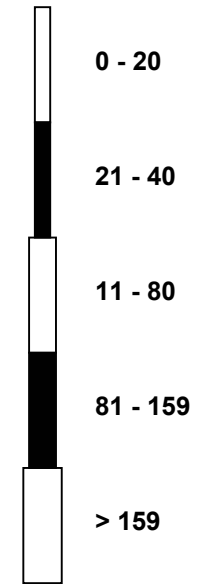
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Oxide (NO) - ppb  
Firebag (AMS 19)**



Classes (ppb)

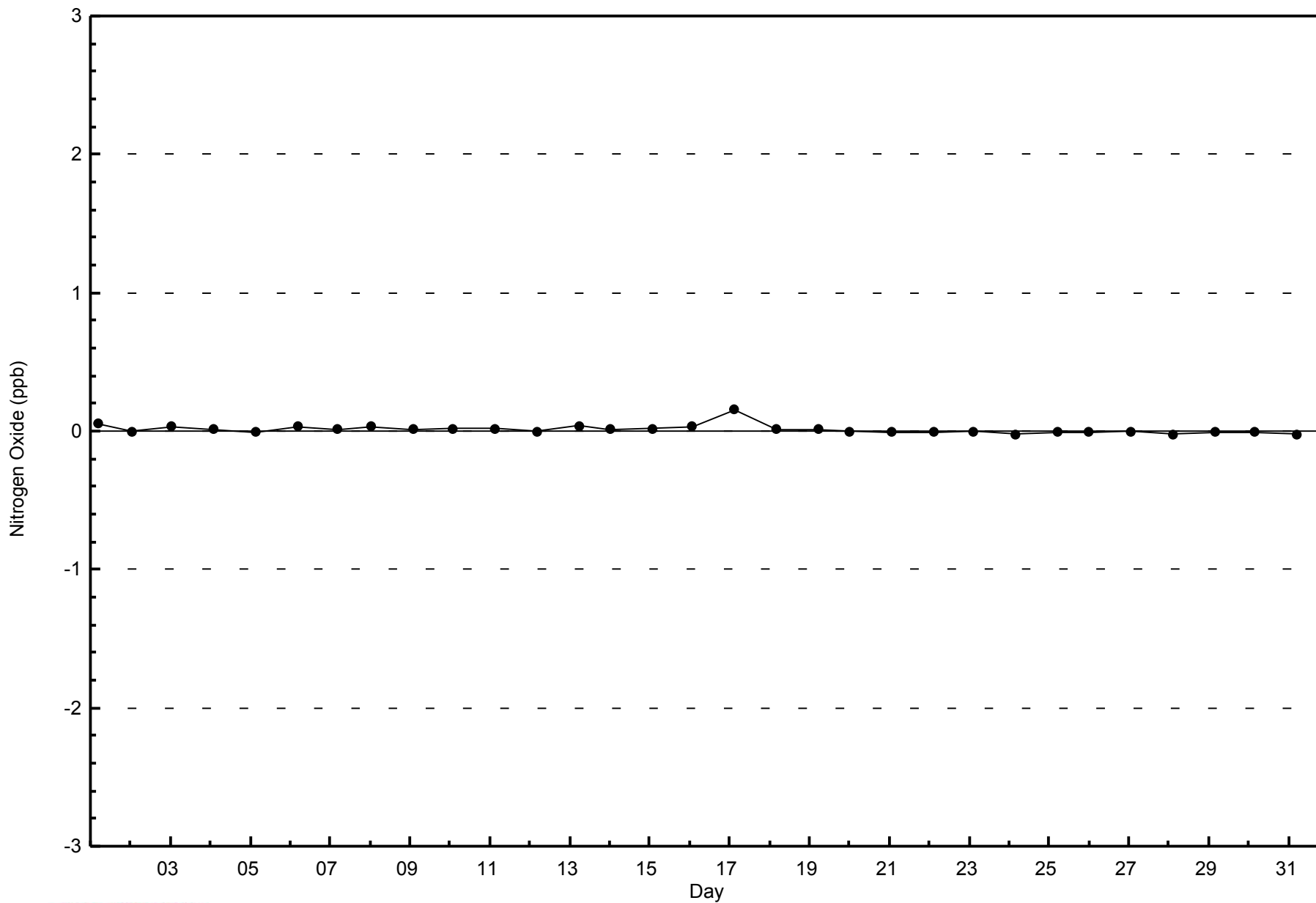


**Total Number of Valid Hours: 667**



WBEA  
Zero Responses

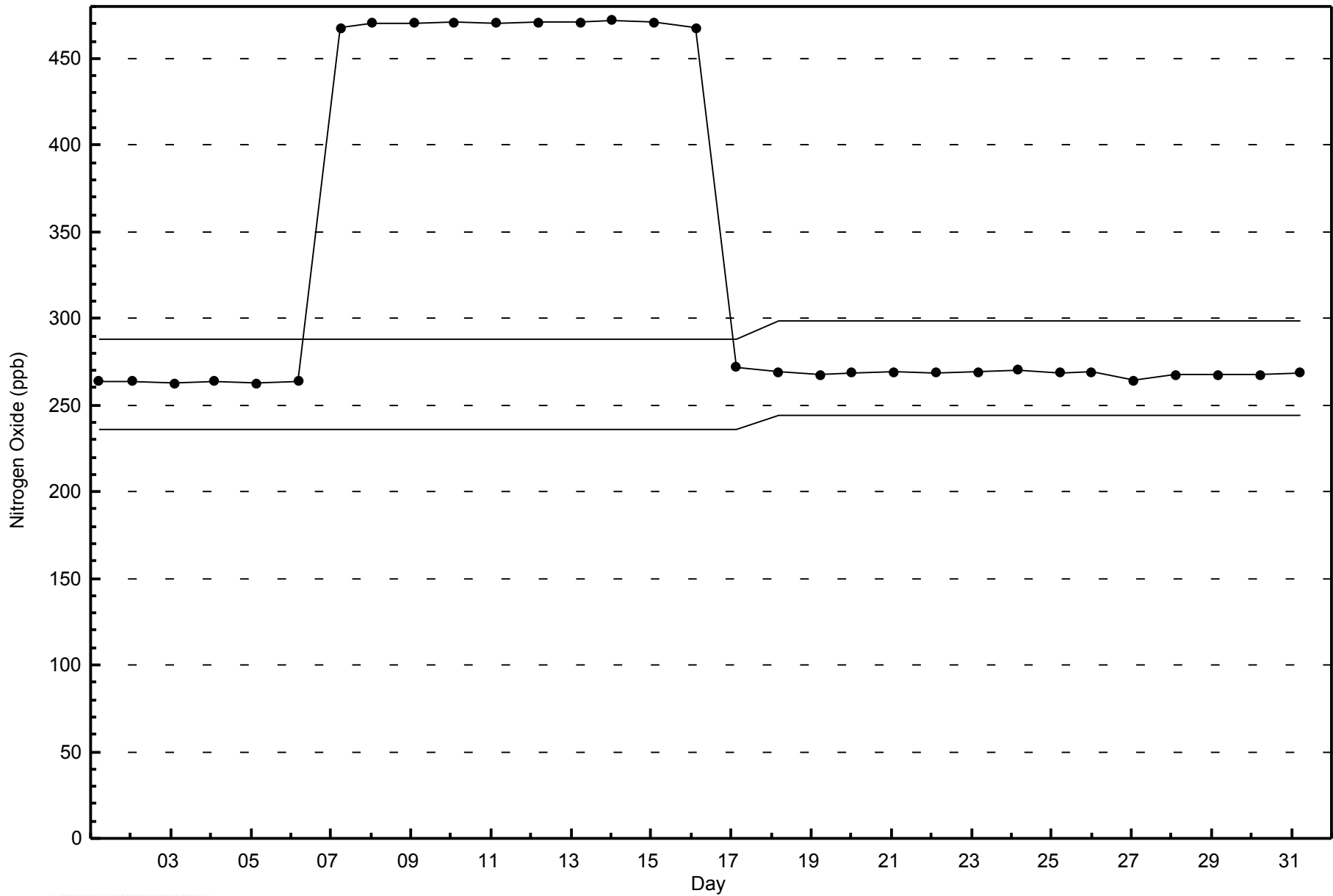
Nitrogen Oxide (NO) - ppb  
Firebag - October 2014





WBEA  
Span Responses

Nitrogen Oxide (NO) - ppb  
Firebag - October 2014





Summary of Hour Averages

Firebag - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 38 ppb on Oct 22 06:00	Maximum Daily Average: 12.0 ppb on Oct 22		Hours of Data:	708
Minimum Value: 0 ppb on Oct 1 15:00	Minimum Daily Average: 0.3 ppb on Oct 1		Hours of Missing Data:	36
Maximum Diurnal Average: 8.1 ppb at hour 5	Minimum Diurnal Average: 2.1 ppb at hour 13		Hours of Calibration:	36
Monthly Average: 4.3 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 3 Q <sub>3</sub> = 6 P <sub>90</sub> = 11 P <sub>99</sub> = 20		Percent Operational Time:	100.0

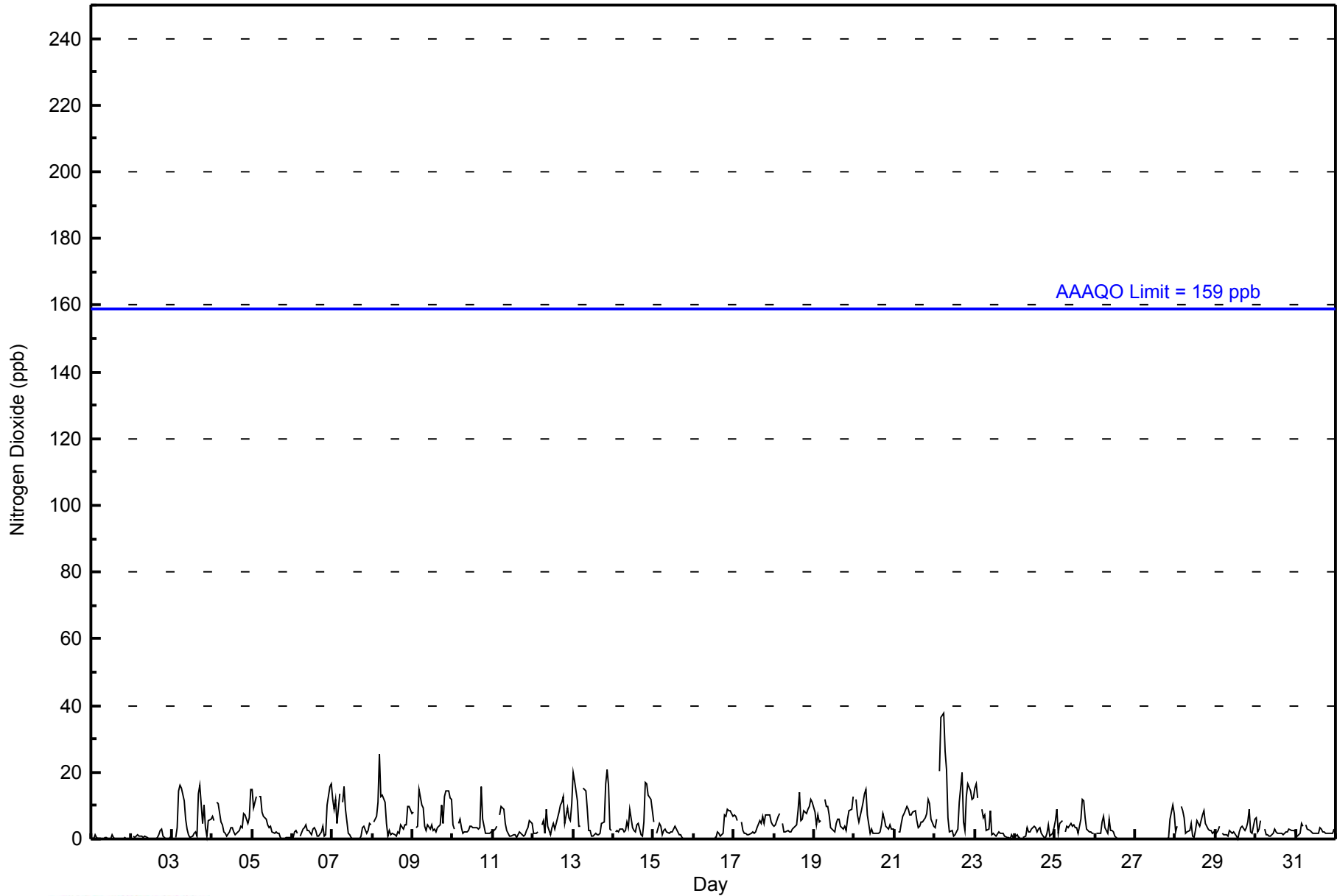
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	0	0	1	1	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1																							
2-Oct	Z	1	0	1	1	1	1	1	1	1	0	0	0	0	0	1	1	3	3	1	0	0	0	1	0.7	3																							
3-Oct	1	Z	1	3	15	16	15	12	6	3	1	1	1	2	2	1	14	16	5	10	3	1	6	6	6.0	16																							
4-Oct	7	5	Z	11	11	5	4	2	2	1	2	3	3	2	1	2	3	4	3	8	7	5	6	15	4.9	15																							
5-Oct	15	10	13	Z	13	13	8	7	6	4	3	4	2	2	2	2	2	1	0	0	1	1	0	0	4.6	15																							
6-Oct	1	2	3	2	Z	1	3	4	4	2	3	1	3	3	3	1	1	2	4	1	1	10	16	17	3.7	17																							
7-Oct	12	9	12	5	14	Z	11	16	9	2	1	0	0	0	0	0	0	1	4	4	2	2	5	4	4.9	16																							
8-Oct	Z	5	7	11	25	13	13	11	5	1	3	1	2	1	1	2	2	4	3	4	4	10	10	8	6.3	25																							
9-Oct	8	Z	4	4	15	10	9	4	3	4	3	4	3	3	2	3	4	10	5	13	15	14	12	12	7.1	15																							
10-Oct	4	3	Z	5	6	3	2	2	2	3	4	4	4	3	3	3	3	16	6	2	2	2	2	2	3.7	16																							
11-Oct	2	3	4	Z	7	10	9	5	3	2	1	1	1	1	1	1	2	1	1	1	3	4	6	5	3.1	10																							
12-Oct	2	2	2	2	Z	4	6	2	9	4	1	4	5	3	5	8	10	11	13	5	9	6	6	10	5.5	13																							
13-Oct	20	17	12	4	4	Z	15	14	9	3	3	1	1	2	1	1	2	5	5	17	21	16	3	2	7.6	21																							
14-Oct	Z	2	2	2	3	3	2	3	5	4	9	3	3	2	4	5	1	1	5	17	17	13	12	8	5.5	17																							
15-Oct	5	Z	2	5	4	1	3	3	2	2	2	3	4	2	1	1	1	0	0	0	0	0	0	0	1.8	5																							
16-Oct	0	0	Z	0	0	0	0	C	C	C	C	C	1	1	2	2	1	2	7	7	9	9	9	7	3.0	9																							
17-Oct	7	7	5	Z	5	3	2	2	1	1	2	2	2	2	3	6	5	7	5	7	7	7	5	4	4.2	7																							
18-Oct	4	4	7	8	Z	5	2	2	3	2	2	3	3	4	9	14	5	6	8	8	9	10	12	11	6.1	14																							
19-Oct	8	4	7	5	6	Z	12	10	10	7	3	3	2	5	6	6	4	3	4	3	6	9	9	13	6.2	13																							
20-Oct	Z	12	7	5	9	11	14	15	7	2	3	2	2	2	2	2	4	8	6	4	3	4	3	3	5.6	15																							
21-Oct	3	Z	2	2	5	7	8	10	9	7	7	8	9	6	3	4	5	5	6	8	12	11	6	4	6.3	12																							
22-Oct	4	6	Z	21	37	38	26	21	6	2	3	1	1	2	3	11	20	5	3	13	17	14	12	12	12.0	38																							
23-Oct	15	17	12	Z	9	6	7	3	3	8	1	2	1	1	2	2	2	2	1	0	0	0	1	0	4.2	17																							
24-Oct	0	1	0	1	Z	1	1	3	2	2	3	4	3	2	3	3	2	0	1	2	4	1	2	4	1.9	4																							
25-Oct	6	9	2	5	6	Z	2	4	3	5	4	4	3	4	2	6	12	11	6	3	2	2	2	2	4.5	12																							
26-Oct	Z	2	2	2	5	7	4	2	6	2	3	2	1	0	0	0	0	0	0	0	0	0	0	0	1.6	7																							
27-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	10	8	1.1	10																							
28-Oct	2	4	Z	10	9	6	2	2	3	5	1	1	3	5	4	6	7	9	5	3	3	2	2	2	4.0	10																							
29-Oct	1	2	4	Z	2	1	1	1	3	2	2	2	1	0	2	3	4	3	3	5	9	2	2	6	2.6	9																							
30-Oct	7	2	3	6	Z	3	1	1	1	1	2	3	2	2	2	2	1	2	2	2	3	3	3	2	2.4	7																							
31-Oct	1	1	2	5	4	Z	4	3	2	2	2	2	2	2	4	3	2	2	2	2	2	2	2	3	2.3	5																							
																								5.2	5.0	4.4	4.7	8.1	6.7	6.0	5.3	4.1	2.8	2.4	2.2	2.1	2.1	2.4	3.2	3.9	4.4	3.7	4.8	5.5	5.3	5.2	5.5	Diurnal Average	
																								20	17	13	21	37	38	26	21	10	8	9	8	9	6	9	14	20	16	13	17	21	16	16	17	Diurnal Maximum	

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



WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag - October 2014





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Firebag - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	702	99.15	99.15
21 - 40	6	0.85	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Firebag - October 2014**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	33	31	20	11	11	42	53	120	93	43	40	38	37	44	26	19	661
21 - 40	0	0	0	0	0	0	0	4	2	0	0	0	0	0	0	0	6
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>33</b>	<b>31</b>	<b>20</b>	<b>11</b>	<b>11</b>	<b>42</b>	<b>53</b>	<b>124</b>	<b>95</b>	<b>43</b>	<b>40</b>	<b>38</b>	<b>37</b>	<b>44</b>	<b>26</b>	<b>19</b>	<b>667</b>

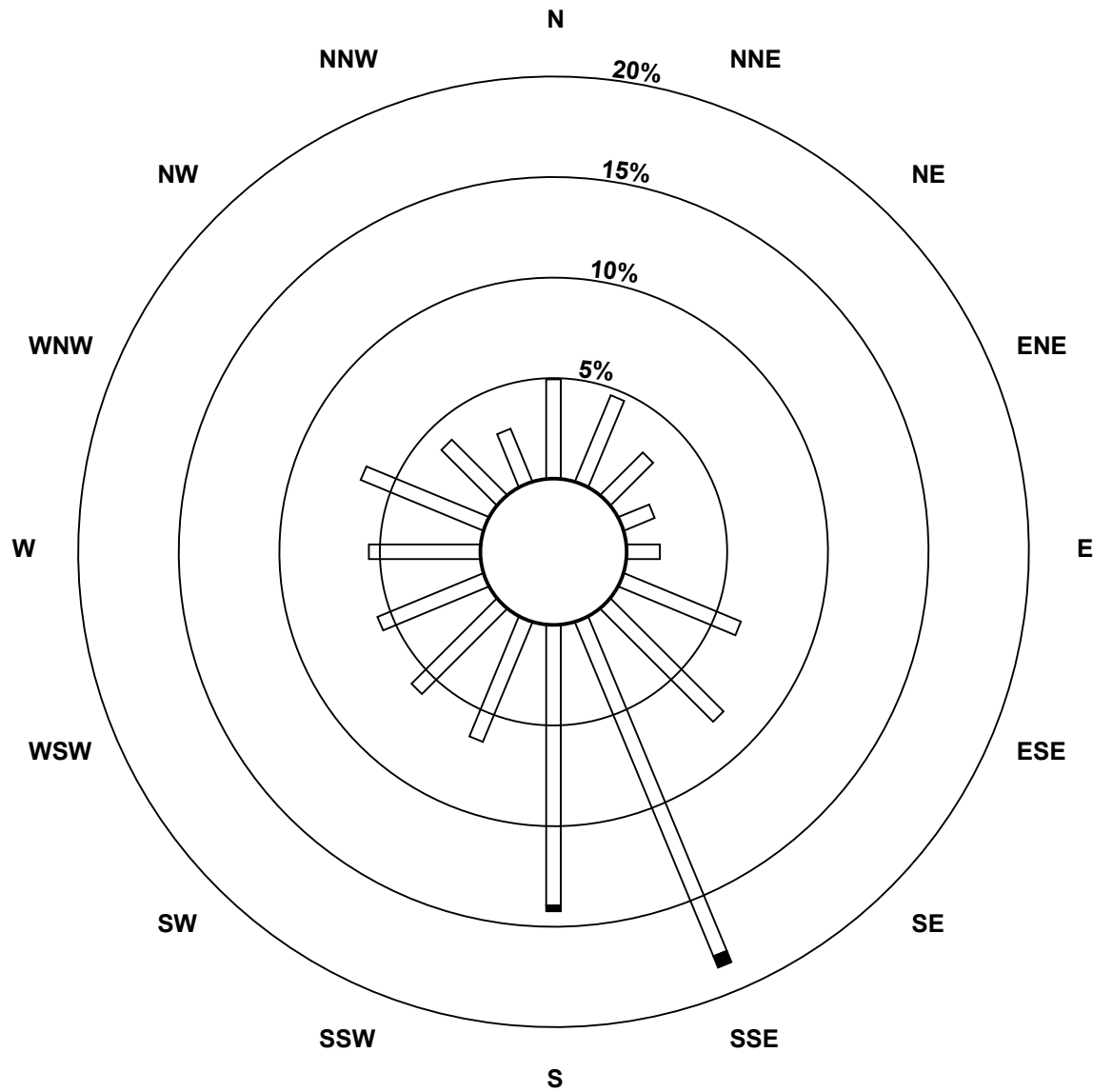
Total Number of Valid Hours: 667

Total Number of Hours: 744

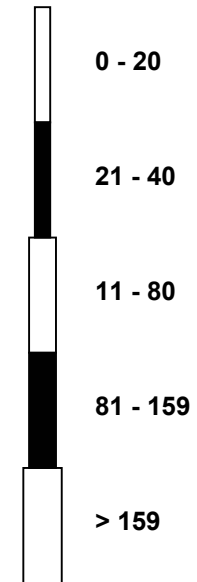


**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag (AMS 19)**



Classes (ppb)

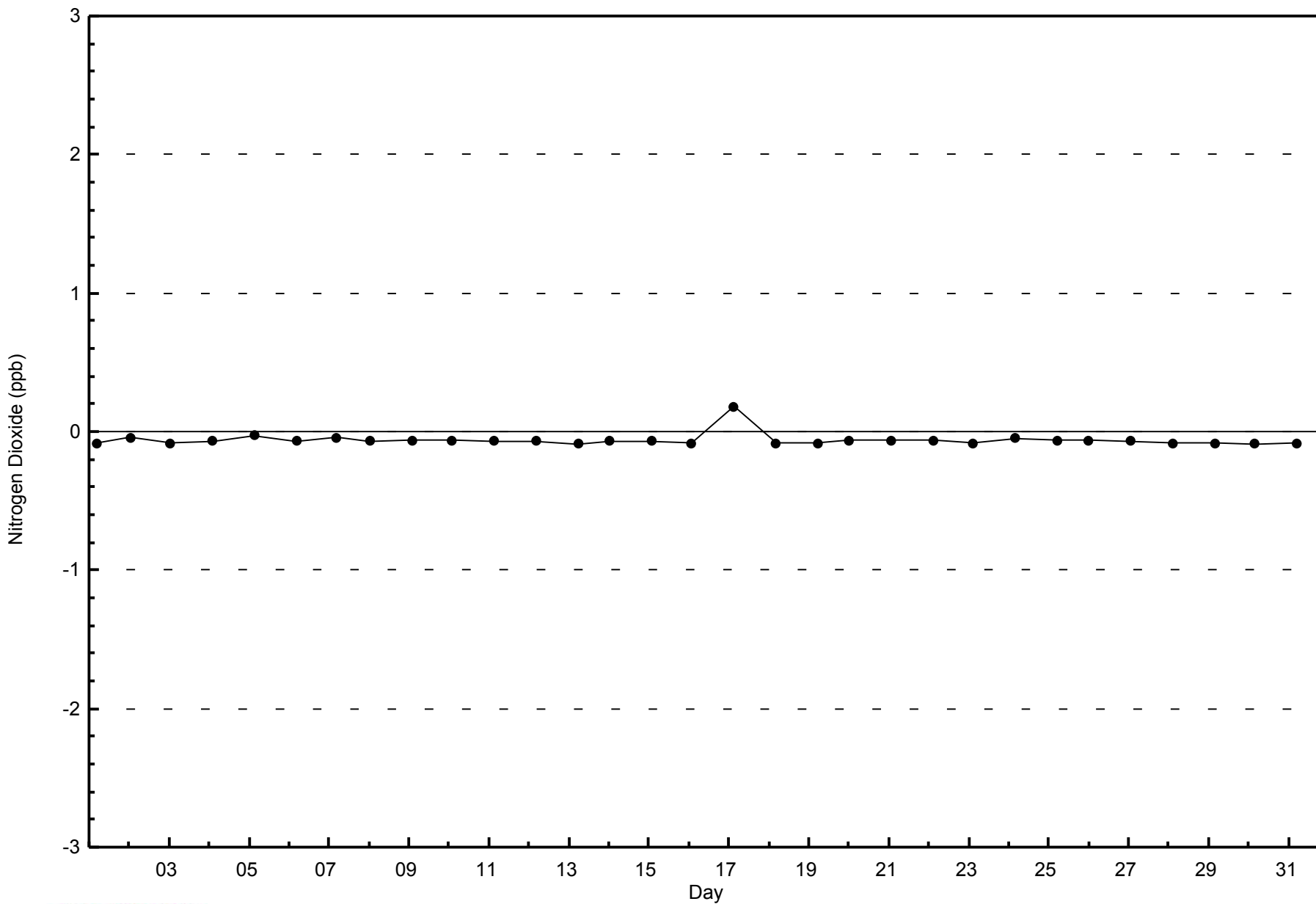


Total Number of Valid Hours: 667



WBEA  
Zero Responses

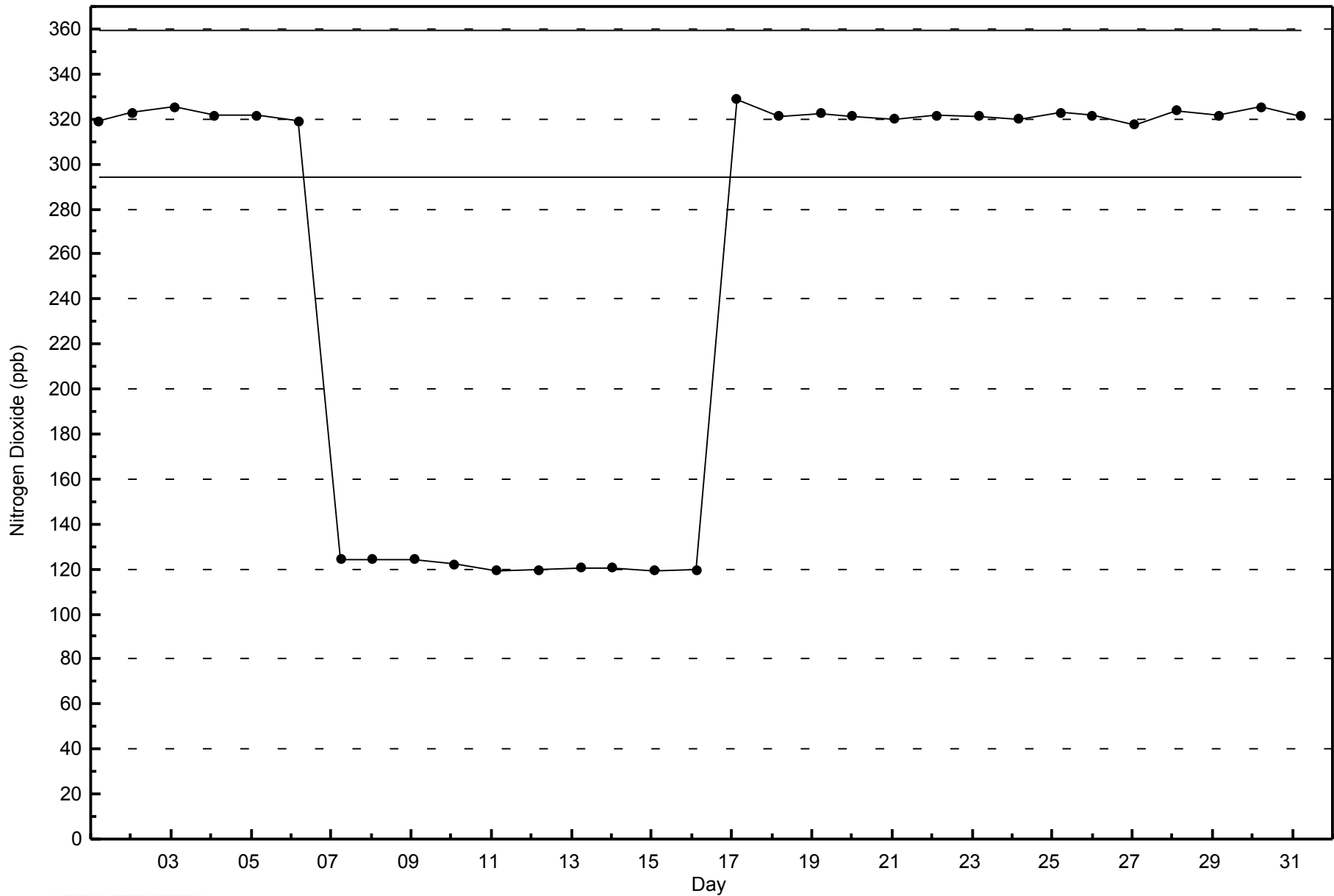
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag - October 2014





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag - October 2014



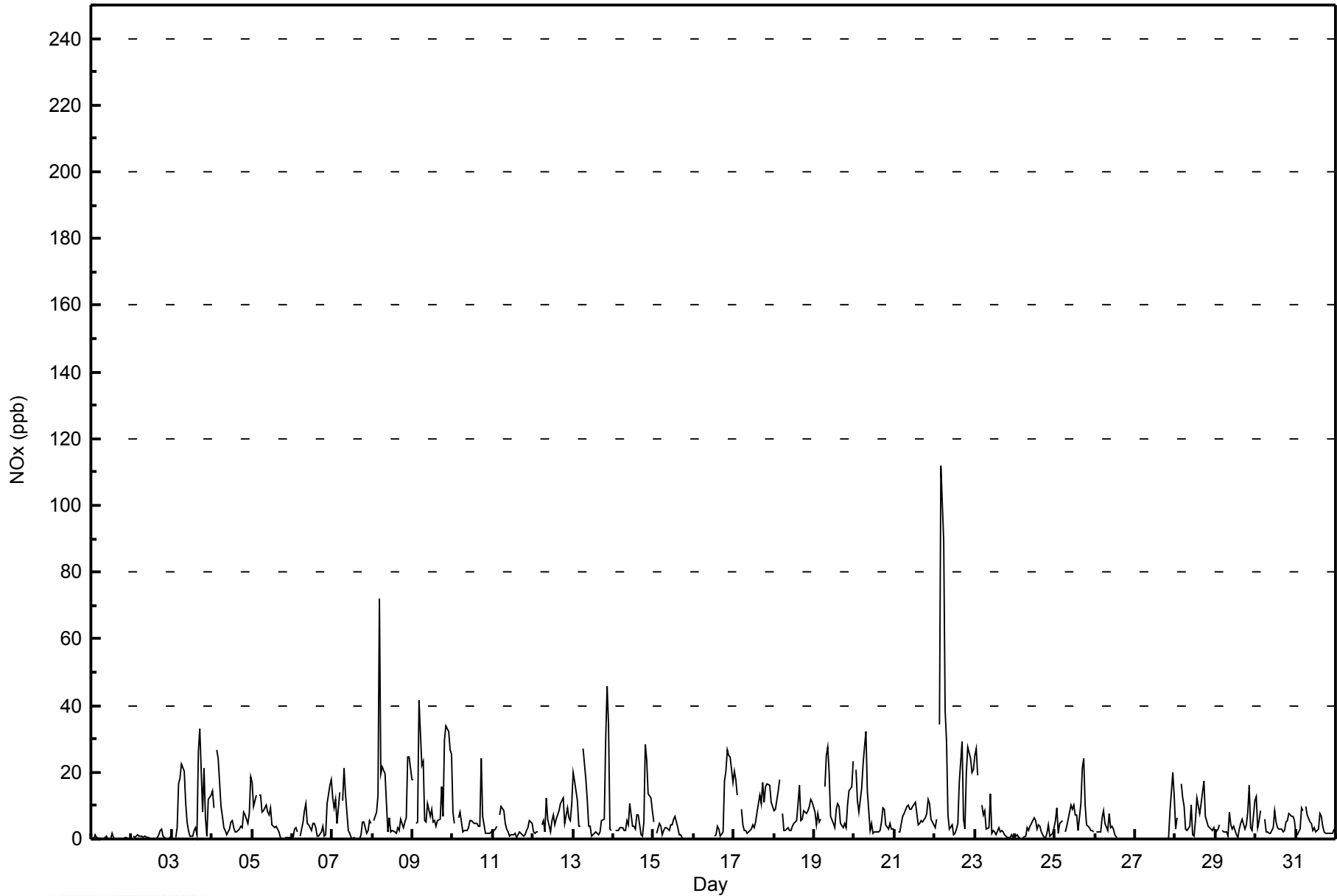


Maximum Value: 112 ppb on Oct 22 05:00																		Maximum Daily Average: 22.0 ppb on Oct 22						Hours in Service: 744		
Minimum Value: 0 ppb on Oct 1 19:00																		Minimum Daily Average: 0.3 ppb on Oct 1						Hours of Data: 708		
Maximum Diurnal Average: 15.4 ppb at hour 5																		Minimum Diurnal Average: 3.4 ppb at hour 13						Hours of Missing Data: 36		
Monthly Average: 6.8 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 2 Median = 4 Q <sub>3</sub> = 9 P <sub>90</sub> = 17 P <sub>99</sub> = 32						Hours of Calibration: 36		
																								Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	1	1	0	Z	0	0	0	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0.3	2
2-Oct	Z	1	0	1	1	1	1	1	1	1	0	0	0	0	0	1	1	3	3	1	0	0	0	0	0.7	3
3-Oct	1	Z	1	3	16	18	22	20	11	5	3	1	1	2	3	1	26	33	8	21	6	1	12	13	10.0	33
4-Oct	14	9	Z	27	24	10	7	3	2	1	3	5	6	3	2	2	3	4	3	8	7	5	8	19	7.6	27
5-Oct	17	10	13	Z	13	13	8	9	10	8	7	9	4	4	4	3	2	0	0	0	1	1	0	0	6.0	17
6-Oct	0	3	3	2	Z	1	5	9	11	5	4	2	5	5	3	1	1	2	4	1	1	11	16	18	4.9	18
7-Oct	12	9	12	5	14	Z	11	21	14	3	2	0	0	0	0	0	0	1	5	5	2	3	6	5	5.6	21
8-Oct	Z	5	8	13	72	19	21	20	11	2	6	2	3	2	2	3	3	6	4	5	6	24	25	18	12.2	72
9-Oct	18	Z	5	5	42	22	23	5	5	10	7	9	5	6	4	5	6	16	7	30	34	32	27	25	15.1	42
10-Oct	8	5	Z	6	8	5	2	3	3	4	6	5	5	5	5	4	4	24	7	2	2	2	2	2	5.0	24
11-Oct	2	3	4	Z	7	10	9	5	3	2	1	1	1	2	1	1	2	1	1	1	3	4	6	5	3.2	10
12-Oct	2	1	2	2	Z	4	6	2	12	6	2	5	7	4	6	9	11	11	12	5	9	6	5	10	6.1	12
13-Oct	20	17	12	4	4	Z	27	18	11	4	4	1	1	2	2	1	2	5	6	30	46	34	3	3	11.2	46
14-Oct	Z	3	3	3	3	3	2	3	6	4	11	4	4	3	7	7	1	1	5	29	24	13	12	9	6.9	29
15-Oct	5	Z	2	5	4	1	3	3	3	3	4	4	6	7	3	1	1	1	0	0	0	0	0	0	2.5	7
16-Oct	0	0	Z	0	0	0	0	C	C	C	C	C	1	1	4	3	1	2	17	20	27	25	24	17	8.0	27
17-Oct	20	18	13	Z	9	4	2	3	2	2	3	4	3	5	8	13	11	17	11	16	17	16	11	10	9.4	20
18-Oct	8	9	14	18	Z	8	3	2	3	3	3	4	5	5	10	16	5	6	8	8	9	10	12	11	7.8	18
19-Oct	8	4	7	5	6	Z	16	25	28	20	7	5	4	9	10	10	5	4	5	3	10	14	16	23	10.5	28
20-Oct	Z	21	11	8	15	22	27	32	14	2	5	2	2	2	2	3	5	9	9	4	3	5	3	3	9.2	32
21-Oct	3	Z	2	2	4	7	8	10	10	9	9	10	11	7	4	5	6	5	6	8	12	10	6	4	6.9	12
22-Oct	4	6	Z	34	112	89	38	29	7	3	4	1	2	3	5	17	29	6	3	20	28	24	20	21	22.0	112
23-Oct	25	27	19	Z	10	7	8	3	3	14	2	2	2	1	3	2	2	2	1	0	0	0	1	0	6.0	27
24-Oct	0	1	0	1	Z	1	1	4	3	4	5	6	6	3	4	4	2	0	1	2	4	1	2	4	2.5	6
25-Oct	6	9	2	5	6	Z	2	4	6	10	9	10	7	7	3	11	21	24	10	4	3	3	2	2	7.2	24
26-Oct	Z	2	2	2	6	9	5	3	8	3	4	3	1	0	0	0	0	0	0	0	0	0	0	0	2.1	9
27-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	20	13	1.9	20
28-Oct	3	6	Z	16	12	10	3	3	4	10	1	1	6	12	8	11	14	17	7	4	3	3	2	3	6.9	17
29-Oct	2	3	4	Z	3	2	2	1	8	4	3	4	1	0	3	5	6	3	4	8	16	3	3	11	4.4	16
30-Oct	13	3	5	9	Z	6	2	2	2	2	3	9	5	4	3	3	2	3	5	6	7	7	7	5	4.9	13
31-Oct	1	1	3	9	9	Z	10	7	5	5	2	3	2	3	8	7	4	2	2	2	2	2	2	3	4.0	10
																		7.4 6.9 5.7 7.1 15.4 10.9 8.9 8.3 6.8 5.0 4.0 3.8 3.4 3.5 3.7 4.7 5.7 6.8 5.0 7.8 9.1 8.6 8.1 8.3						Diurnal Average		
																		25 27 19 34 112 89 38 32 28 20 11 10 11 12 10 17 29 33 17 30 46 34 27 25						Diurnal Maximum		
Z - zerospan																		C - Calibration								



WBEA  
Hourly Averages

NOx (NO<sub>x</sub>) - ppb  
Firebag - October 2014





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

**NO<sub>x</sub> (NO<sub>x</sub>) - ppb**  
**Firebag - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	659	93.08	93.08
21 - 40	44	6.21	99.29
41 - 80	3	0.42	99.72
81 - 159	2	0.28	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**NO<sub>x</sub> (NO<sub>x</sub>) - ppb**  
**Firebag - October 2014**

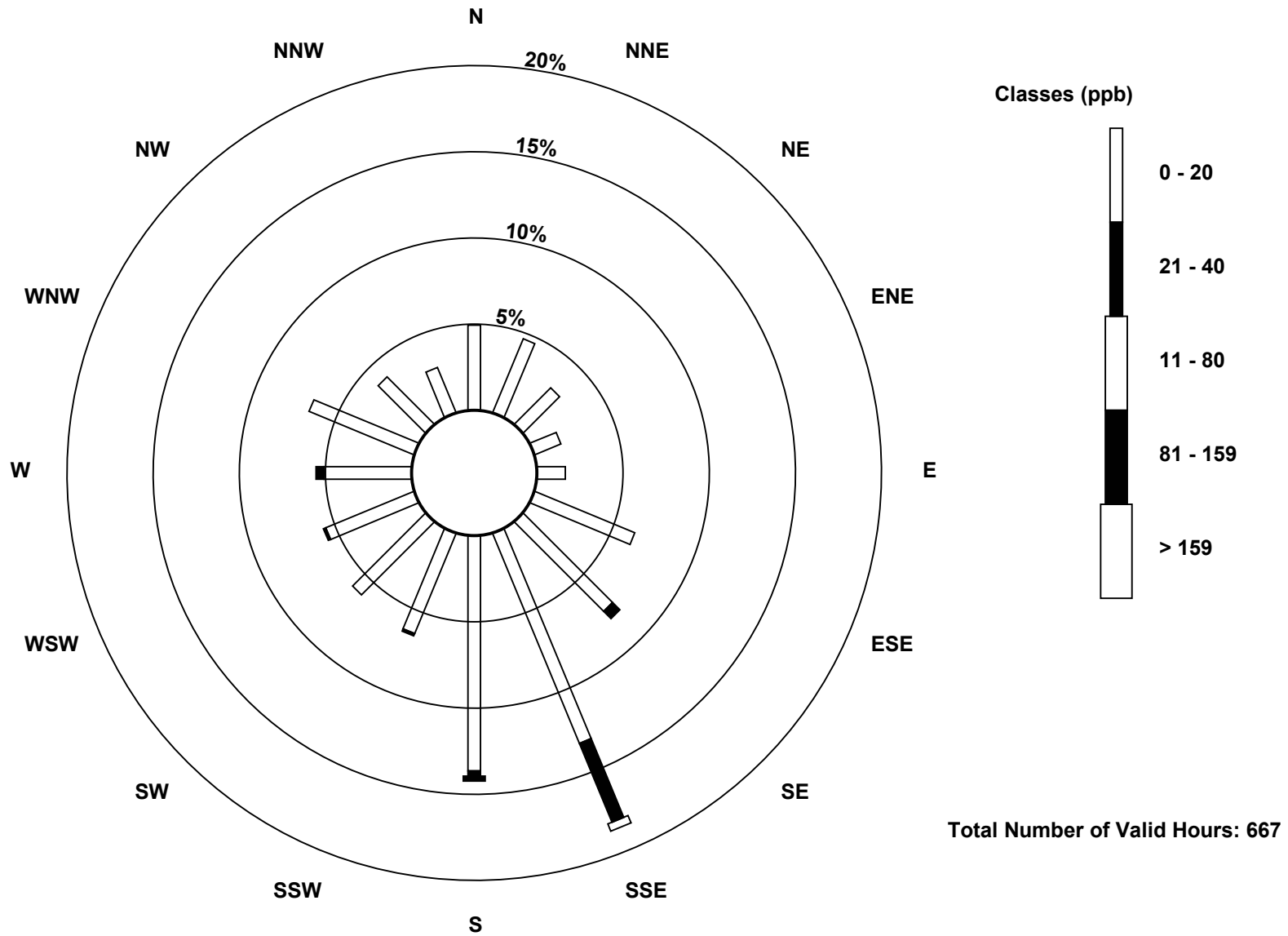
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	33	31	20	11	11	42	49	88	91	42	40	37	34	44	26	19	618
21 - 40	0	0	0	0	0	0	4	33	2	1	0	1	3	0	0	0	44
11 - 80	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>33</b>	<b>31</b>	<b>20</b>	<b>11</b>	<b>11</b>	<b>42</b>	<b>53</b>	<b>124</b>	<b>95</b>	<b>43</b>	<b>40</b>	<b>38</b>	<b>37</b>	<b>44</b>	<b>26</b>	<b>19</b>	<b>667</b>

Total Number of Valid Hours: 667

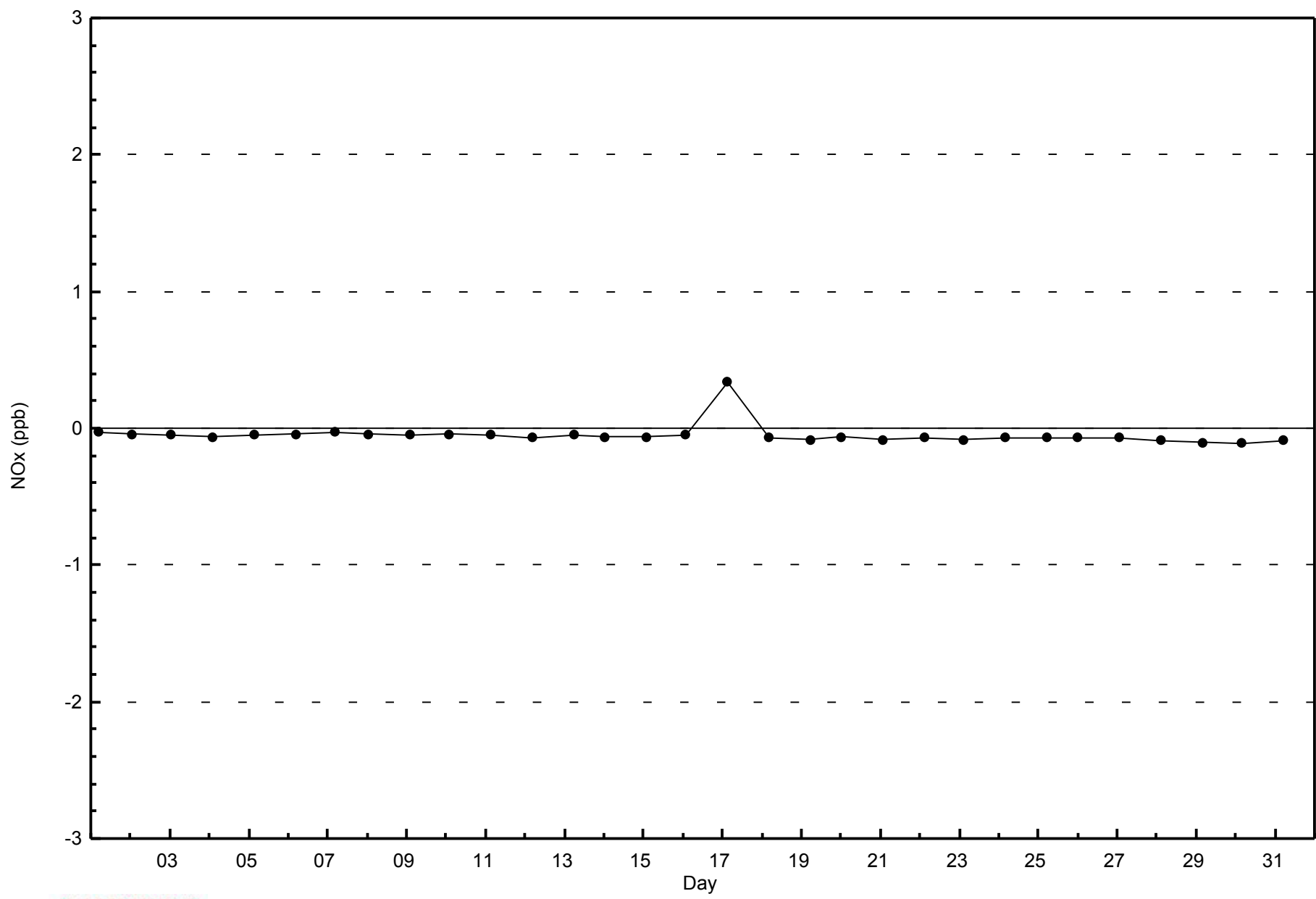
Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**NO<sub>x</sub> (NO<sub>x</sub>) - ppb  
Firebag (AMS 19)**



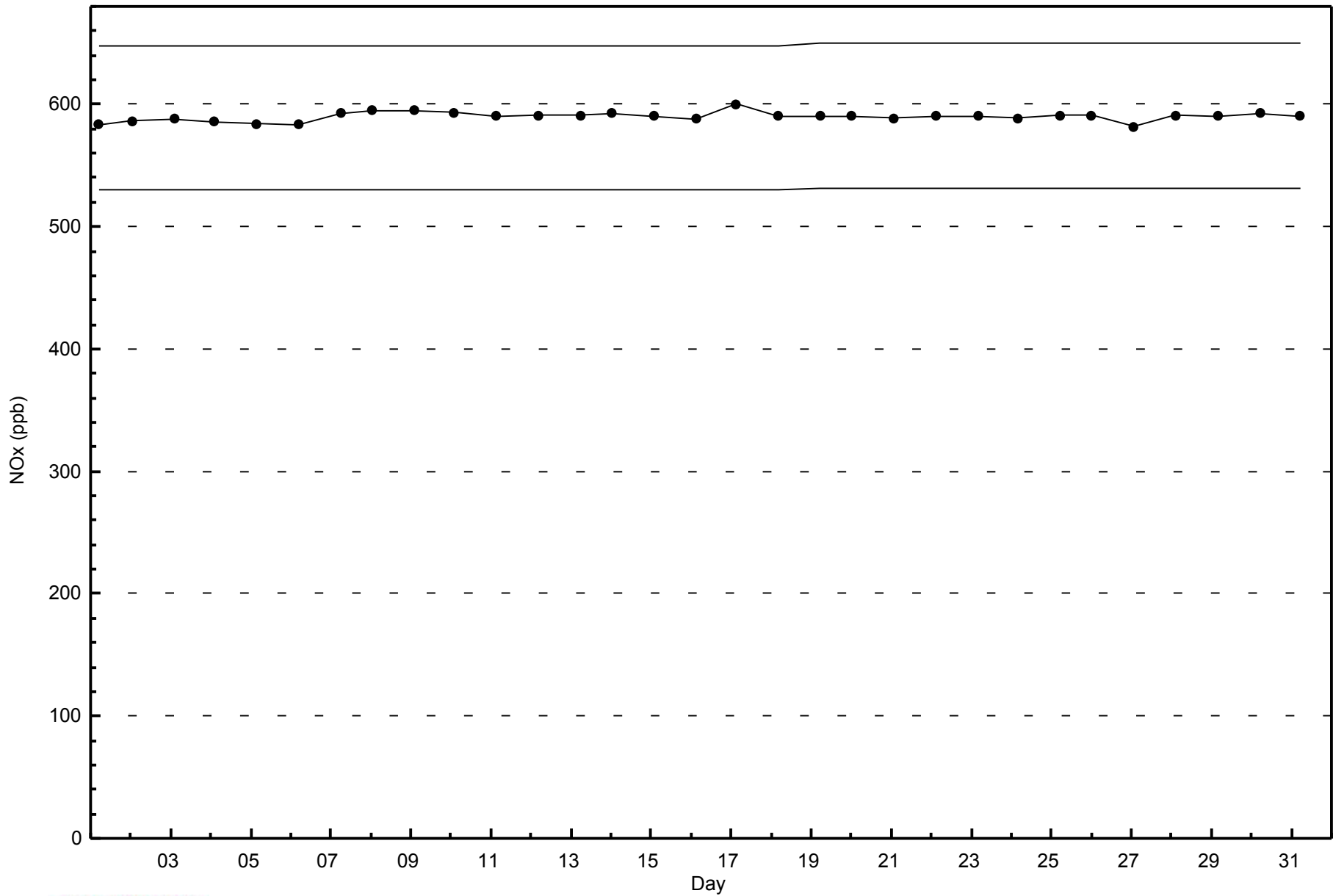






WBEA  
Span Responses

NOx (NO<sub>x</sub>) - ppb  
Firebag - October 2014



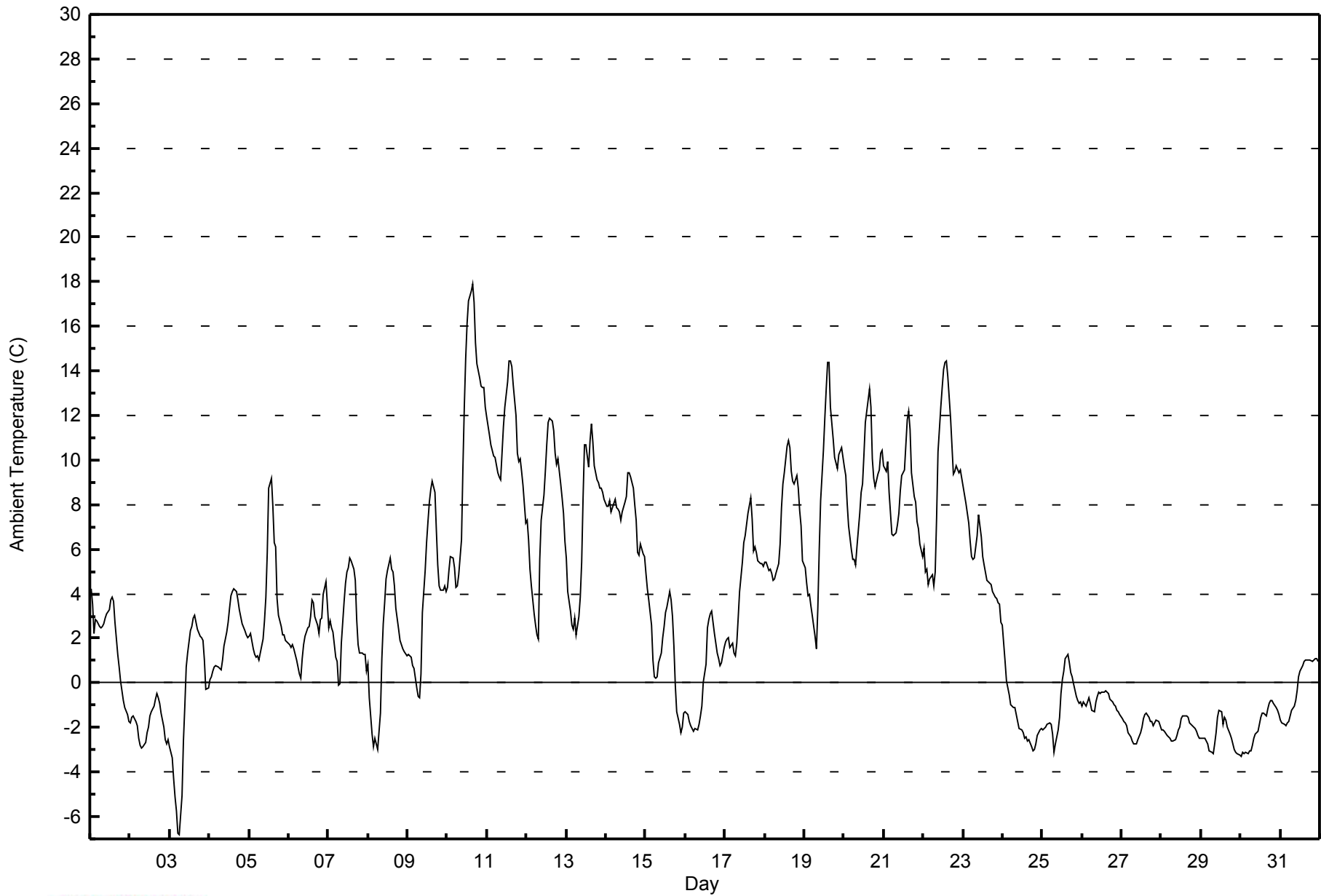


Maximum Value: 17.9 C on Oct 10 16:00																				Maximum Daily Average: 11.0 C on Oct 11					Hours in Service: 744																							
Minimum Value: -6.8 C on Oct 3 07:00																				Minimum Daily Average: -2.4 C on Oct 29					Hours of Data: 744																							
Maximum Diurnal Average: 5.9 C at hour 15																				Minimum Diurnal Average: 0.9 C at hour 7					Hours of Missing Data: 0																							
Monthly Average: 3.26 C																				Percentiles: P <sub>1</sub> = -3.3 P <sub>10</sub> = -2.3 Q <sub>1</sub> = -1.1 Median = 2.5 Q <sub>3</sub> = 6.9 P <sub>90</sub> = 10.1 P <sub>99</sub> = 13.9					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-Oct	4.2	3.5	2.2	2.9	2.8	2.5	2.5	2.6	2.6	2.9	3.1	3.3	3.7	3.9	3.6	2.7	1.3	0.7	0.1	-0.4	-0.8	-1.1	-1.4	-1.7	1.9	4.2																						
2-Oct	-1.8	-1.5	-1.5	-1.7	-2.0	-2.5	-2.8	-2.9	-2.8	-2.7	-2.3	-2.0	-1.5	-1.3	-1.1	-0.8	-0.5	-0.7	-0.9	-1.4	-2.0	-2.6	-2.8	-2.5	-1.8	-0.5																						
3-Oct	-2.8	-3.3	-4.3	-5.1	-5.7	-6.8	-6.8	-5.0	-2.6	-1.1	0.7	1.4	2.3	2.5	2.9	3.0	2.7	2.4	2.1	2.0	1.9	1.0	-0.3	-0.2	-0.8	3.0																						
4-Oct	0.2	0.3	0.5	0.7	0.8	0.7	0.6	0.6	1.0	1.6	2.3	2.7	3.3	3.9	4.1	4.2	4.1	3.7	3.3	3.0	2.6	2.3	2.1	2.1	2.1	4.2																						
5-Oct	2.1	2.2	1.5	1.3	1.2	1.2	1.0	1.4	2.0	2.8	3.9	5.9	8.7	9.2	7.9	6.3	6.1	3.8	3.0	2.5	2.2	2.1	1.9	1.8	3.4	9.2																						
6-Oct	1.7	1.6	1.7	1.5	1.3	1.0	0.4	0.2	1.1	1.7	2.1	2.5	2.5	3.0	3.7	3.6	3.0	2.6	2.2	2.8	2.9	3.9	4.6	3.5	2.3	4.6																						
7-Oct	2.4	2.8	2.5	2.3	1.1	0.9	-0.1	0.0	1.8	3.7	4.5	5.0	5.1	5.6	5.5	5.1	4.6	2.9	1.7	1.4	1.4	1.3	1.3	0.5	2.6	5.6																						
8-Oct	0.8	-0.7	-2.3	-2.9	-2.5	-2.7	-3.0	-1.4	1.1	2.6	3.6	4.6	5.0	5.6	5.1	5.0	4.3	3.3	2.4	1.9	1.7	1.6	1.4	1.2	1.5	5.6																						
9-Oct	1.3	1.2	1.1	0.8	0.7	-0.2	-0.6	-0.7	0.4	3.2	5.1	6.3	7.2	8.1	8.7	9.1	8.5	6.9	5.3	4.4	4.2	4.1	4.4	4.1	3.9	9.1																						
10-Oct	4.3	5.0	5.6	5.6	5.1	4.3	4.3	4.8	6.4	9.6	12.4	14.6	16.1	17.1	17.6	17.9	17.1	15.3	14.3	13.7	13.3	13.3	13.3	12.4	11.0	17.9																						
11-Oct	11.9	11.1	10.7	10.4	10.2	10.1	9.4	9.2	9.1	10.3	11.5	12.4	13.5	14.4	14.4	14.2	13.4	12.0	10.3	9.9	10.1	9.5	8.8	7.1	11.0	14.4																						
12-Oct	7.3	6.4	5.1	4.3	3.1	2.6	2.2	2.0	5.5	7.3	8.4	9.5	10.7	11.7	11.9	11.8	11.3	10.3	9.8	10.1	8.9	8.3	7.6	6.3	7.6	11.9																						
13-Oct	5.6	4.1	3.2	2.6	2.4	2.9	2.2	3.0	3.9	5.4	8.3	10.7	10.7	9.7	10.9	11.6	10.8	9.7	9.1	9.0	8.8	8.8	8.6	8.3	7.1	11.6																						
14-Oct	7.9	7.9	8.2	7.7	7.8	8.2	7.9	7.8	7.7	7.3	7.7	8.1	8.4	9.4	9.5	9.3	8.8	8.0	7.3	5.9	5.7	6.2	5.8	5.7	7.7	9.5																						
15-Oct	4.9	4.3	3.7	2.6	1.0	0.3	0.2	0.3	0.9	1.3	2.0	2.5	3.2	3.4	4.1	3.7	3.0	1.7	-0.1	-1.3	-1.9	-2.3	-2.0	-1.4	1.4	4.9																						
16-Oct	-1.3	-1.4	-1.8	-1.9	-2.0	-2.2	-2.0	-2.1	-1.9	-1.5	-1.1	0.0	0.8	2.4	2.8	3.1	3.2	2.2	1.8	1.3	1.1	0.8	0.9	1.6	0.1	3.2																						
17-Oct	1.8	2.0	2.0	1.6	1.8	1.4	1.2	1.8	2.9	4.1	5.4	6.3	6.6	7.1	7.6	8.3	7.4	5.9	6.1	5.9	5.5	5.3	5.3	5.2	4.5	8.3																						
18-Oct	5.4	5.4	5.0	5.1	4.9	4.6	4.7	4.9	5.4	6.3	7.9	9.0	9.4	10.6	10.9	10.6	9.5	9.0	8.9	9.3	8.8	7.7	7.1	5.5	7.3	10.9																						
19-Oct	5.2	4.5	3.9	4.0	3.5	3.0	2.1	1.5	3.4	6.0	8.2	10.5	11.9	13.2	14.4	14.4	12.4	10.9	10.1	9.9	9.6	10.2	10.5	10.1	8.1	14.4																						
20-Oct	9.7	9.3	8.0	7.1	6.0	5.5	5.6	5.3	6.1	7.6	8.5	8.9	10.3	11.7	12.7	13.2	12.4	10.0	9.2	8.8	9.3	9.6	10.3	10.5	9.0	13.2																						
21-Oct	9.7	9.5	9.9	8.5	7.6	6.6	6.6	6.7	7.1	7.6	8.6	9.3	9.5	10.7	11.8	12.2	11.4	9.4	8.4	8.1	7.3	6.9	6.2	5.7	8.6	12.2																						
22-Oct	6.1	5.0	5.1	4.4	4.6	4.8	4.4	4.9	7.4	10.4	12.4	13.3	14.1	14.4	14.4	13.8	11.9	10.6	9.4	9.5	9.8	9.4	9.5	9.2	9.1	14.4																						
23-Oct	8.8	8.5	8.0	7.2	6.3	5.7	5.5	5.6	6.6	7.5	7.0	6.5	5.7	5.3	4.6	4.5	4.5	4.4	4.1	3.8	3.8	3.6	3.5	2.7	5.6	8.8																						
24-Oct	2.6	0.9	0.1	-0.3	-0.6	-1.0	-1.1	-1.1	-1.4	-1.8	-2.0	-2.1	-2.3	-2.5	-2.5	-2.6	-2.5	-2.8	-3.1	-3.0	-2.7	-2.4	-2.1	-2.1	-1.6	2.6																						
25-Oct	-2.1	-2.0	-2.0	-1.9	-1.8	-1.9	-2.3	-3.1	-2.7	-2.1	-1.6	-0.5	0.1	0.5	1.1	1.3	0.9	0.5	0.3	0.0	-0.6	-0.8	-0.9	-0.9	-0.9	1.3																						
26-Oct	-1.0	-0.9	-1.0	-0.9	-0.6	-0.9	-1.2	-1.3	-0.9	-0.6	-0.4	-0.5	-0.4	-0.4	-0.3	-0.4	-0.5	-0.8	-0.9	-1.0	-1.0	-1.2	-1.3	-1.4	-0.8	-0.3																						
27-Oct	-1.6	-1.8	-1.8	-1.9	-2.2	-2.4	-2.6	-2.7	-2.7	-2.7	-2.6	-2.3	-2.0	-1.6	-1.4	-1.4	-1.5	-1.7	-1.8	-1.9	-1.8	-1.7	-1.7	-1.9	-2.0	-1.4																						
28-Oct	-2.1	-2.1	-2.2	-2.4	-2.4	-2.5	-2.6	-2.6	-2.6	-2.4	-2.1	-2.0	-1.6	-1.5	-1.5	-1.5	-1.5	-1.8	-1.9	-2.0	-2.1	-2.2	-2.3	-2.5	-2.1	-1.5																						
29-Oct	-2.5	-2.5	-2.5	-2.6	-2.8	-3.0	-3.1	-3.2	-2.7	-2.3	-1.5	-1.2	-1.3	-1.8	-1.5	-1.7	-2.0	-2.3	-2.5	-2.7	-3.0	-3.1	-3.2	-3.2	-2.4	-1.2																						
30-Oct	-3.3	-3.1	-3.2	-3.1	-3.2	-3.1	-3.0	-2.8	-2.5	-2.3	-2.1	-1.9	-1.5	-1.4	-1.4	-1.5	-1.2	-0.9	-0.8	-0.8	-0.9	-1.1	-1.3	-1.4	-2.0	-0.8																						
31-Oct	-1.7	-1.8	-1.9	-1.9	-1.8	-1.7	-1.5	-1.2	-1.1	-0.8	-0.3	0.3	0.5	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.0	-0.2	1.1																						
																								2.7	2.4	2.1	1.7	1.4	1.1	0.9	1.1	1.9	2.9	3.8	4.6	5.1	5.6	5.9	5.8	5.3	4.4	3.8	3.5	3.3	3.2	3.1	2.8	Diurnal Average
																								11.9	11.1	10.7	10.4	10.2	10.1	9.4	9.2	9.1	10.4	12.4	14.6	16.1	17.1	17.6	17.9	17.1	15.3	14.3	13.7	13.3	13.3	13.3	12.4	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Firebag - October 2014**





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

**Ambient Temperature (AT) - C**  
**Firebag - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	239	32.12	32.12
0 - 10	427	57.39	89.52
10 - 20	78	10.48	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

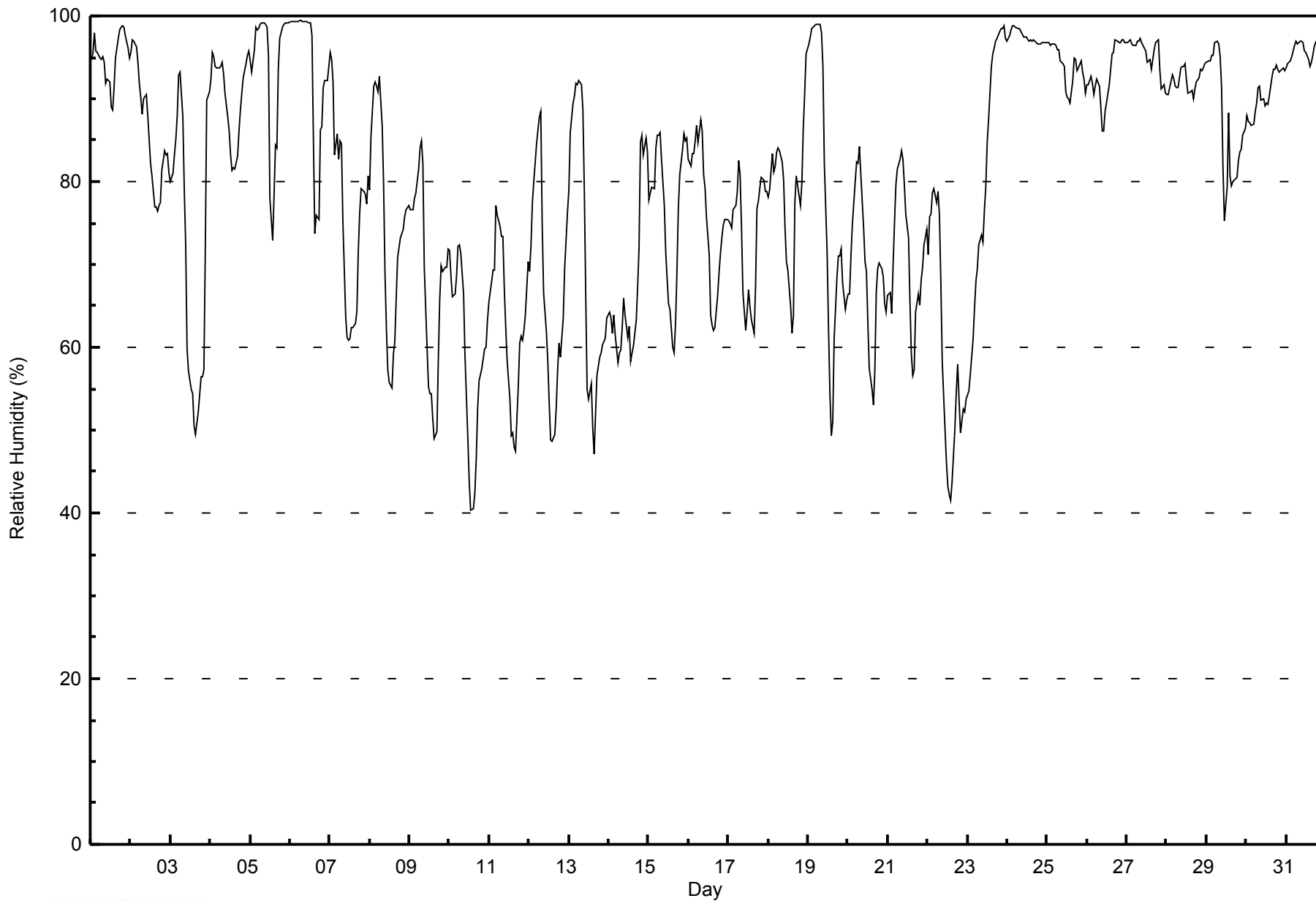


Maximum Value: 99 % on Oct 6 07:00																		Maximum Daily Average: 97.5 % on Oct 24						Hours in Service: 744			
Minimum Value: 40 % on Oct 10 14:00																		Minimum Daily Average: 58.6 % on Oct 10						Hours of Data: 744			
Maximum Diurnal Average: 87.9 % at hour 7																		Minimum Diurnal Average: 69.8 % at hour 15						Hours of Missing Data: 0			
Monthly Average: 80.2 %																		Percentiles: P <sub>1</sub> = 44 P <sub>10</sub> = 58 Q <sub>1</sub> = 68 Median = 83 Q <sub>3</sub> = 94 P <sub>90</sub> = 97 P <sub>99</sub> = 99						Hours of Calibration: 0			
																		Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	95	96	98	96	96	95	95	95	94	92	92	89	89	91	95	97	98	99	99	99	98	96	95	95.0	99		
2-Oct	96	97	97	96	94	92	90	88	90	90	88	85	82	81	77	77	76	77	78	81	84	83	83	81	86.0	97	
3-Oct	80	81	83	85	88	93	93	88	79	73	60	57	55	54	51	49	51	52	57	56	57	72	90	91	70.6	93	
4-Oct	92	96	95	94	94	94	94	94	93	91	88	86	83	81	82	82	83	86	89	91	93	94	95	96	90.2	96	
5-Oct	95	93	96	99	98	98	99	99	99	99	99	95	78	73	79	84	84	94	97	99	99	99	99	99	93.9	99	
6-Oct	99	99	99	99	99	99	99	99	99	99	99	99	98	85	74	76	75	86	87	91	92	92	94	93.4	99		
7-Oct	96	95	92	83	86	83	85	85	75	64	61	61	61	62	62	63	64	72	76	79	79	78	77	81	75.8	96	
8-Oct	79	85	91	92	92	91	93	87	80	69	62	57	56	55	59	61	66	71	73	74	74	76	77	77	74.8	93	
9-Oct	77	77	77	78	79	82	84	85	82	70	60	55	54	54	52	49	50	58	66	70	69	70	70	72	68.2	85	
10-Oct	72	69	66	66	69	72	72	71	66	59	54	49	44	40	41	42	46	53	56	57	59	60	60	63	58.6	72	
11-Oct	65	68	69	69	77	76	75	73	73	67	63	59	54	49	50	48	47	55	61	61	61	62	64	70	63.2	77	
12-Oct	69	72	77	80	85	86	88	89	75	67	62	58	53	49	49	49	53	57	61	59	64	70	73	76	67.5	89	
13-Oct	79	86	89	90	92	92	92	92	89	79	67	55	54	56	50	47	52	57	59	59	60	61	61	63	70.0	92	
14-Oct	64	64	62	64	62	58	59	60	62	66	64	61	63	58	59	60	63	67	72	85	86	83	85	84	67.1	86	
15-Oct	78	79	79	79	84	86	86	86	83	77	72	68	65	65	60	59	63	69	77	81	84	86	85	85	76.4	86	
16-Oct	83	82	83	83	85	87	85	87	86	81	79	76	71	64	63	62	62	66	69	71	73	75	75	75	76.0	87	
17-Oct	75	75	74	77	77	79	82	81	74	67	62	64	67	65	63	62	67	77	78	79	80	80	79	79	73.5	82	
18-Oct	78	79	83	81	82	84	84	84	82	80	74	70	69	65	62	64	77	81	80	77	80	86	91	95	78.7	95	
19-Oct	97	98	99	99	99	99	99	99	98	94	82	71	62	54	49	51	61	68	71	71	72	68	65	66	78.8	99	
20-Oct	66	66	71	75	80	82	82	84	81	74	70	69	63	58	55	53	57	67	69	70	69	69	65	64	69.3	84	
21-Oct	66	67	64	70	75	80	82	83	84	83	80	76	73	65	59	57	57	64	66	65	68	70	72	74	70.8	84	
22-Oct	71	76	76	79	79	78	79	76	68	58	50	46	43	42	41	44	50	55	58	54	50	53	52	54	59.6	79	
23-Oct	54	55	57	61	65	68	69	72	74	73	76	79	85	87	94	95	96	97	97	98	98	98	99	97	81.1	99	
24-Oct	97	98	98	99	99	99	99	98	98	98	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97.5	99
25-Oct	97	97	96	97	97	96	96	96	95	94	94	91	90	90	90	92	95	95	93	94	95	93	92	91	93.9	97	
26-Oct	92	92	93	92	90	91	92	91	89	86	86	88	89	92	94	95	96	97	97	97	97	97	97	97	97	92.8	97
27-Oct	97	97	97	97	96	96	97	97	97	97	96	96	94	95	95	94	96	97	97	97	94	91	92	91	95.5	97	
28-Oct	91	91	91	93	92	92	91	91	94	94	94	94	92	91	91	91	90	91	92	93	93	93	94	94	92.2	94	
29-Oct	94	95	95	95	95	97	97	97	95	91	82	75	79	88	81	79	80	80	80	83	84	84	86	86	87.4	97	
30-Oct	88	87	87	87	87	89	89	91	92	90	90	89	89	89	90	93	94	94	94	94	93	94	94	93	90.7	94	
31-Oct	94	94	95	95	96	97	97	97	97	97	97	96	96	95	94	94	95	96	97	97	98	98	98	99	96.1	99	
	83.1	83.9	84.9	85.5	86.7	87.4	87.9	87.6	85.3	81.2	77.4	74.8	72.6	71.0	69.8	69.8	72.4	76.3	78.7	79.8	80.6	81.6	82.4	83.2	Diurnal Average		
	99	99	99	99	99	99	99	99	99	99	99	99	99	98	97	97	97	98	99	99	99	99	99	99	99	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Firebag - October 2014**





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

**Relative Humidity (RH) - %**  
**Firebag - October 2014**

<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	95	12.77	12.77
60 - 80	237	31.85	44.62
80 - 100	412	55.38	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744





# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Wind Speed (WS) - km/h

## Firebag - October 2014

Maximum Speed: 37 km/h on Oct 30 21:00	Maximum Daily Speed Average: 28.2 km/h on Oct 30	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 19 05:00	Minimum Daily Speed Average: 3.1 km/h on Oct 5	Hours of Data: 702
Maximum Diurnal Speed Average: 7.3 km/h at hour 9	Minimum Diurnal Speed Average: 4.1 km/h at hour 17	Hours of Missing Data: 42
Monthly Average Velocity: 5.7 km/h 177.9 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 6 Q <sub>1</sub> = 9 Median = 13 Q <sub>3</sub> = 17 P <sub>90</sub> = 22 P <sub>99</sub> = 33	Percent Operational Time: 94.4

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-Oct	N13	NNW11	NNW9	N9	NNE8	NNE7	NNE4	N6	N6	NE6	NE7	NNE6	NE7	N7	NNE12	N14	N15	N16	N18	N21	NNW20	NNW25	NNW27	NNW23	N11.9	NNW27	
2-Oct	NNW20	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NW16	NW14	NW13	NW11	NW12	NW12	NNW13	NNW13	---	NNW20	
3-Oct	WNW12	WNW11	WNW9	WNW10	W9	W8	W7	W6	WSW6	SW5	WSW5	WSW7	SW6	SW10	SSW12	S13	SSE14	SSE15	SSE17	SSE21	SSE20	S20	SSE20	SSE18	SSW7.5	SSE21	
4-Oct	SSE17	SE15	SSE14	SSE14	SSE13	SSE12	S10	S10	S10	SSW5	W4	WNW3	SSE1	NW4	NNW5	NNW5	NW7	NNW5	NW5	NW6	NNW3	WNW3	W6	WSW6	S3.2	SSE17	
5-Oct	WSW6	SW5	SSW8	SW12	SW13	SW15	SW15	SW17	SW13	SW12	WSW12	WSW6	N10	N13	NNE14	NNE12	N14	NNE15	NNE17	NNE15	NNE11	N8	N7	NNE6	NW3.1	NNE17	
6-Oct	NNE3	E7	SE4	SW6	SSW7	SW7	S4	S2	ENE5	NE3	NNE7	N8	NW14	NW16	NNW18	NNW19	NNW15	NW12	NW13	WNW13	WNW11	WNW14	WNW15	WNW12	NW6.4	NNW19	
7-Oct	W13	WNW14	WNW16	WNW16	WNW12	WNW13	WNW12	W11	WNW12	NW15	NNW20	NNW20	NNW18	N16	N19	N15	NNE11	NE9	ENE9	E9	ESE9	ESE8	E8	ESE6	NNW7.7	NNW20	
8-Oct	ESE8	S5	SSE3	SSE2	SSE4	SE4	S4	S5	S8	S12	SE8	SSE4	ESE3	ESE7	ESE12	ESE11	ESE12	ESE11	SE10	SE11	SE11	SSE11	SSE12	SSE13	SE7.4	SSE13	
9-Oct	SSE12	SSE11	SE11	SE10	SSE10	SSE11	SE12	SE11	SE13	SSE16	SSE17	SSE16	SSE17	SSE16	S14	S15	S13	SSE11	SE16	SSE16	SSE17	SSE18	SSE20	SSE17	SSE13.9	SSE20	
10-Oct	SSE19	SSE20	SSE21	S21	S20	S19	S21	S18	S17	S18	SSW21	SSW22	SSW22	SSW25	SSW26	S23	S19	SSE15	S15	S17	S18	SSW19	SSW20	SSW20	S19.2	SSW26	
11-Oct	SSW19	SW16	SW13	WSW15	WSW17	WSW16	WSW16	WSW17	WSW18	W23	W24	W22	W23	W23	W24	W22	WNW11	W14	WSW14	W13	WSW15	WSW14	W15	WSW13	WSW16.5	W24	
12-Oct	W14	W13	W10	WSW10	WSW11	WSW9	WSW9	W8	WNW11	WNW15	NW16	WNW15	WNW13	WNW15	W13	W10	W9	W8	W12	WNW18	W12	W11	WNW8	WNW8	W11.0	WNW18	
13-Oct	WNW6	WSW4	SSW4	SW5	SW5	SSW4	S4	SSW5	SSW8	SSW9	SSW9	SSW9	SW13	SSW9	SSW7	S7	SW9	SSW8	S10	SSE10	SSE10	SSE11	SE12	SE11	S6.5	SW13	
14-Oct	SE11	SE11	SE13	ESE13	ESE15	ESE18	ESE18	ESE19	ESE18	E20	ESE22	ESE24	ESE19	SE17	SE13	S10	SSW10	SW7	WSW8	W8	WSW9	W19	WNW18	WNW17	SE7.6	ESE24	
15-Oct	W19	WNW17	WNW17	WNW16	W10	WSW11	WSW13	WSW13	W17	W19	WNW18	WNW17	WNW16	WNW14	WNW15	NW13	NNW8	N10	NNE10	NNE8	N7	N7	N10	N10	WNW10.4	W19	
16-Oct	N14	N14	N15	N14	N12	N7	N6	NW6	N5	NE6	E4	SSE8	S8	S5	SSE8	S10	S10	SSW9	SSE13	SSE20	SSE19	SSE19	SSE20	SSE21	SE3.2	SSE21	
17-Oct	SSE22	SSE21	SSE23	SSE21	S22	S22	S23	S23	S27	S27	SSE29	SSE32	SSE32	SSE34	SSE33	SSE32	SSE30	SSE30	SSE31	SSE31	SSE31	SSE31	SSE29	SSE30	SSE27	SSE27.5	SSE34
18-Oct	SSE27	SSE25	SSE22	SSE20	SSE18	S17	S16	SSW13	SW12	SW9	SW8	WSW10	WSW10	SW11	SW15	WSW17	SW12	SW10	WSW11	W14	W14	WNW12	NW10	WNW9	SSW10.1	SSE27	
19-Oct	WNW7	NW6	WSW9	W7	NNW1	E4	ESE7	SE9	SE8	SSE13	S18	S19	S19	SSE17	SSE18	SE17	SE16	SE18	SE19	SE22	SE19	SSE20	SSE24	SSE22	SSE11.9	SSE24	
20-Oct	SSE21	SSE18	SE16	SE19	SE15	SSE16	SSE15	SSE15	SSE19	S17	S20	S18	SSW19	S16	S13	SSW15	S12	S13	S13	S11	S11	S12	S13	S13	SSE14.7	SSE21	
21-Oct	S12	S13	SSW14	SW13	SW9	SW8	SW8	SSW7	SW9	WSW13	WSW12	WSW13	WSW15	WSW13	WSW14	WSW12	SW8	SW9	SW10	SSW10	SW10	SW8	SW8	SW9	SW10.1	WSW15	
22-Oct	SW9	SW7	SSW6	SSW5	S6	S6	SSE7	SSE11	S12	S13	S16	S17	S18	S19	S20	SSE17	SSE13	SE17	SE17	SSE17	SSE20	SSE20	SSE21	SSE22	SSE13.3	SSE22	
23-Oct	SSE18	SSE15	SSE13	SSE13	SE12	SE12	SE11	SE14	SE16	SE12	SE19	ESE23	ESE24	ESE26	ESE18	ESE13	ESE11	E10	ENE12	NE11	NE5	NW4	NW15	NW20	ESE10.0	ESE26	
24-Oct	NW23	NW23	NW21	WNW17	WNW21	WNW20	WNW19	NW16	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	NW23	
25-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	SE13	
26-Oct	SE13	ESE15	ESE14	SE16	ESE14	E14	ESE16	ESE19	ESE17	ESE19	E16	ENE13	ENE15	NE15	NE17	NE17	NE15	NE15	NE16	NE14	NE15	NNE14	NNE13	NNE12	ENE12.2	ESE19	
27-Oct	NNE12	NNE11	NNE9	NNE10	NNE11	N11	N11	NNE11	NNE12	N11	NNE11	NNE10	NE10	NNE9	NNE11	NE11	NNE8	N4	NNE3	NE7	NE4	SSE5	SSE8	SSE8	NNE7.4	NNE12	
28-Oct	S9	SSE12	SSE10	S11	S10	S13	S12	S12	SSE13	SSE14	S14	S13	SSE10	SSE12	SSE12	SSE12	SSE11	SSE10	SE10	SE10	SE10	SE10	SE8	ESE9	ESE7	SSE10.5	S14
29-Oct	ESE9	ESE8	E6	ENE7	ENE7	E6	ENE5	ENE8	ENE8	ENE9	E10	E11	E7	NE9	ESE8	SE9	ESE8	ESE9	SE11	SE11	SSE13	SE12	SE15	SSE16	ESE8.0	SSE16	
30-Oct	SSE14	SSE18	SSE19	S19	S20	SSE25	S28	S30	S30	S31	S28	SSE27	SSE29	SSE33	S32	S31	S28	S31	SSE32	SSE34	SSE37	SSE35	SSE34	SSE33	S28.2	SSE37	
31-Oct	S31	S28	S28	SSE29	SSE29	SSE27	SSE25	SSE26	S26	S27	S25	S22	SSW18	SSW17	S15	SSW15	SSW17	SSW17	SSW14	SSW14	SSW14	SSW12	SSW14	SW11	WSW9	S19.7	S31

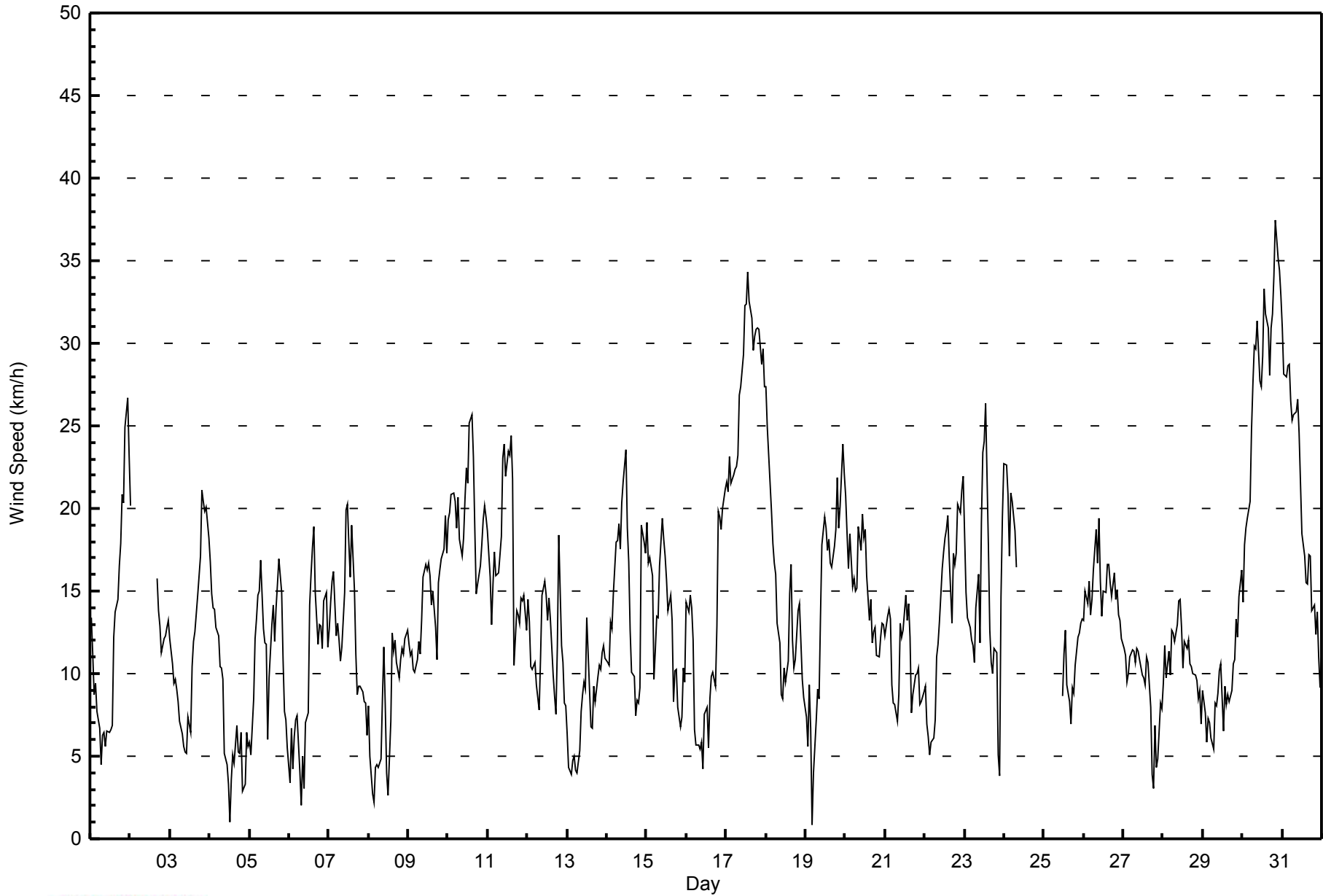
S5.0	S5.4	S5.6	S5.9	S5.8	S6.3	S6.8	S6.9	S7.3	S7.1	S6.1	S6.3	SSW6.0	S5.7	S5.5	S5.2	SSE4.1	SSE4.6	SSE4.9	SSE5.0	SSE6.0	S5.8	S5.4	S5.6	Diurnal Average	
S31	S28	S28	SSE29	SSE29	SSE27	S28	S30	S30	S31	SSE29	SSE32	SSE32	SSE34	SSE33	SSE32	SSE30	S31	SSE32	SSE34	SSE37	SSE35	SSE34	SSE33	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Firebag - October 2014**





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

**Wind Speed (WS) - km/h**  
**Firebag - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	50	7.12	7.12
6 - 11	231	32.91	40.03
12 - 19	302	43.02	83.05
20 - 28	89	12.68	95.73
29 - 38	30	4.27	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Firebag - October 2014**

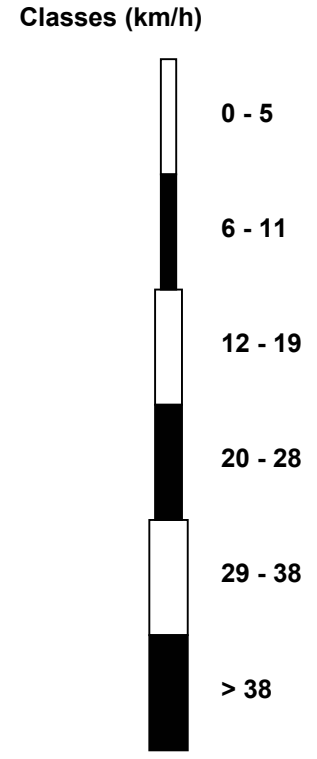
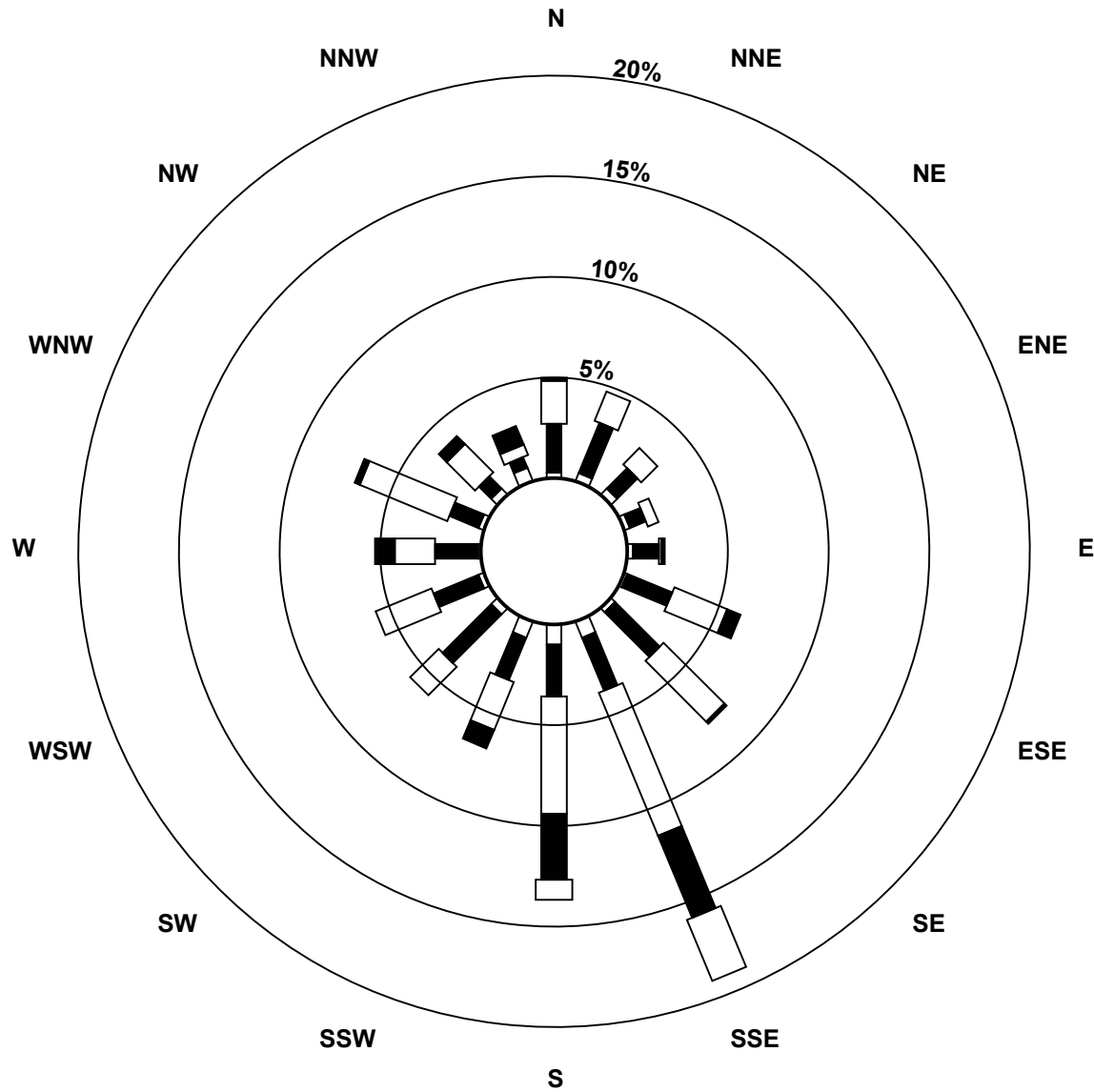
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	3	3	2	2	1	2	6	7	6	3	2	1	2	3	5	50
6 - 11	17	19	10	6	9	17	22	20	18	16	24	17	15	11	6	4	231
12 - 19	15	11	8	4	1	20	30	54	41	18	14	21	14	33	14	4	302
20 - 28	1	0	0	0	1	5	1	31	23	7	0	0	7	2	4	7	89
29 - 38	0	0	0	0	0	0	0	23	7	0	0	0	0	0	0	0	30
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	35	33	21	12	13	43	55	134	96	47	41	40	37	48	27	20	702

Total Number of Valid Hours: 702

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Wind Speed (WS) - km/h  
Firebag (AMS 19)**



**Total Number of Valid Hours: 702**



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Firebag - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 6 km/h on Oct 30 11:00			Hours of Data:	702
Minimum Value: 1 km/h on Oct 21 18:00			Hours of Missing Data:	42
			Hours of Calibration:	0
			Percent Operational Time:	94.4
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-Oct	3	2	1	2	1	1	1	2	2	2	3	3	3	2	2	4	3	3	3	5	5	5	6	6	6
2-Oct	5	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	2	2	2	2	2	2	2	5
3-Oct	2	2	1	1	1	2	1	1	2	2	3	3	3	3	3	2	2	2	3	4	4	3	3	3	4
4-Oct	3	2	2	2	2	2	2	1	1	2	1	2	1	2	2	2	2	1	1	1	1	1	1	1	3
5-Oct	1	2	2	3	2	2	3	2	3	2	2	3	3	4	3	2	2	3	3	3	2	2	2	2	4
6-Oct	2	2	2	2	2	3	1	1	3	2	2	3	3	3	4	4	3	2	3	2	2	3	3	2	4
7-Oct	2	3	3	3	2	2	2	1	2	4	4	4	4	4	4	4	2	2	1	1	1	1	2	1	4
8-Oct	1	1	1	1	1	2	1	1	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	3
9-Oct	2	2	2	2	2	1	2	2	3	2	2	3	3	3	3	2	3	2	3	2	2	3	3	3	3
10-Oct	3	2	3	3	3	2	3	3	2	2	3	3	4	4	4	4	4	2	2	2	3	3	2	3	4
11-Oct	3	2	2	3	4	3	2	3	4	4	5	5	5	5	5	5	3	3	2	2	2	2	3	2	5
12-Oct	2	2	2	2	1	2	1	1	3	3	3	3	3	4	3	3	2	1	4	5	2	2	2	1	5
13-Oct	1	2	1	2	2	1	1	2	1	2	2	2	3	2	2	3	1	1	1	2	1	2	2	2	3
14-Oct	2	2	3	2	3	3	4	3	4	3	4	4	5	3	3	2	2	1	1	2	2	5	4	4	5
15-Oct	4	4	4	4	3	2	2	3	4	4	3	4	4	3	4	3	2	2	2	1	1	2	2	4	4
16-Oct	3	3	3	3	3	2	2	1	2	2	2	3	4	3	2	2	1	1	3	3	3	3	3	3	4
17-Oct	3	3	3	3	3	3	3	4	4	5	4	5	5	6	6	6	6	5	4	5	6	5	5	5	6
18-Oct	5	4	4	3	3	2	2	2	2	2	2	2	2	2	3	3	2	2	2	3	3	2	2	1	5
19-Oct	1	2	2	2	2	2	2	4	2	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	4
20-Oct	3	3	2	3	2	2	3	3	3	3	3	2	2	3	2	2	3	1	1	2	2	1	1	2	3
21-Oct	2	2	2	2	3	3	3	2	2	2	2	2	2	3	3	2	2	1	1	1	1	1	2	1	3
22-Oct	1	2	2	1	1	1	2	3	1	2	4	3	3	3	3	4	2	3	3	3	3	3	3	3	4
23-Oct	3	2	2	2	2	2	2	4	3	4	4	4	4	4	5	2	2	2	2	3	2	2	4	4	5
24-Oct	6	5	5	4	4	4	3	4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	6
25-Oct	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
26-Oct	2	2	3	2	2	2	3	3	3	4	4	3	3	3	2	3	3	2	2	3	2	2	2	2	4
27-Oct	2	2	1	1	2	2	2	2	2	2	1	2	2	2	2	2	1	2	2	2	2	3	1	1	3
28-Oct	1	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2
29-Oct	2	2	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3
30-Oct	2	3	3	3	4	4	5	5	5	5	6	4	5	5	5	5	5	5	5	6	6	6	6	6	6
31-Oct	6	5	5	5	5	4	4	5	4	4	4	3	3	2	2	2	2	2	2	2	2	2	2	1	6
Diurnal Maximum																									

AF - Analyzer Failure



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Firebag - October 2014

Direction of Maximum Speed: 163 deg on Oct 30 21:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 168.8 deg on Oct 30	Hours of Data: 702
Direction of Minimum Speed: 345 deg on Oct 19 05:00	Direction of Minimum Daily Speed Average: 3.1 deg on Oct 5
Direction of Minimum Speed: 345 deg on Oct 19 05:00	Hours of Missing Data: 42
Monthly Average Direction: 217.6 deg	Percent Operational Time: 94.4

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-Oct	360	347	342	360	15	14	28	7	10	38	50	26	42	1	16	7	8	10	1	355	346	346	344	342	0.1
2-Oct	342	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	322	319	312	308	306	305	302	299	--
3-Oct	298	296	289	282	273	259	270	263	239	216	237	244	216	225	211	183	154	153	166	159	168	175	161	148	199.1
4-Oct	148	144	152	156	163	167	169	169	173	213	276	301	162	315	344	331	324	344	319	318	342	285	269	257	182.6
5-Oct	247	214	208	217	219	223	222	227	222	226	241	245	350	359	21	17	9	19	16	22	25	8	8	26	304.9
6-Oct	30	83	134	214	193	217	180	169	60	43	23	349	325	322	328	342	334	324	316	299	297	292	296	283	316.4
7-Oct	274	291	295	300	294	296	282	275	288	312	330	346	344	355	357	6	30	44	74	88	102	104	93	108	333.6
8-Oct	119	170	167	156	166	126	183	182	180	175	137	163	104	119	110	122	117	121	124	127	141	152	158	157	141.5
9-Oct	160	153	140	135	153	148	143	137	139	149	166	165	159	167	170	169	171	147	142	149	151	153	155	156	154.0
10-Oct	165	166	166	169	170	170	174	177	178	188	200	201	205	202	193	187	178	163	178	188	190	197	201	201	184.4
11-Oct	210	221	228	242	246	243	242	253	258	265	274	275	280	278	266	273	289	261	258	261	258	257	266	258	258.3
12-Oct	273	271	267	256	253	252	255	268	285	300	316	301	294	294	270	271	266	265	270	293	278	271	290	287	279.3
13-Oct	285	250	206	214	223	196	183	195	199	196	201	213	228	212	207	190	217	196	169	156	151	149	133	133	190.0
14-Oct	130	130	126	122	118	116	116	115	107	96	103	112	121	133	142	172	207	232	252	265	252	272	288	286	134.8
15-Oct	281	288	298	282	265	240	247	255	265	280	297	290	285	300	292	325	338	0	16	12	6	9	8	4	297.9
16-Oct	360	355	355	355	354	352	354	322	354	40	82	157	184	190	160	177	189	193	157	150	153	154	154	159	143.0
17-Oct	157	160	162	164	171	170	170	171	174	170	168	166	168	166	163	157	153	155	162	158	157	156	160	161	163.1
18-Oct	163	163	161	161	168	174	181	196	215	215	217	250	244	224	232	238	223	218	240	263	280	300	313	295	208.3
19-Oct	290	307	253	263	345	96	115	145	143	165	171	174	177	163	154	144	137	137	140	140	145	148	162	158	156.7
20-Oct	156	149	146	145	145	148	150	152	164	172	170	184	200	190	188	201	180	170	174	180	178	176	177	175	168.5
21-Oct	187	191	210	222	233	221	234	210	227	237	245	252	252	255	257	252	231	233	216	211	220	219	220	224	228.6
22-Oct	216	230	193	196	175	171	168	168	173	169	174	178	179	170	171	163	148	139	133	149	157	158	160	158	165.5
23-Oct	156	159	163	153	136	137	135	125	131	134	124	120	120	118	121	116	114	98	76	45	39	310	315	315	123.4
24-Oct	313	321	311	293	300	303	303	304	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
25-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	201	207	193	185	166	161	143	137	130	125	133	132	130	--
26-Oct	125	114	117	124	106	97	116	118	111	116	79	78	64	55	49	42	42	35	36	37	34	23	30	27	75.0
27-Oct	23	28	19	17	13	10	10	12	12	11	20	25	38	27	32	45	27	360	32	40	55	152	159	164	27.1
28-Oct	173	168	154	169	174	173	173	171	168	164	174	176	167	159	167	166	163	151	137	138	136	126	115	114	160.0
29-Oct	119	108	90	68	72	80	77	65	73	75	83	93	80	55	111	125	119	122	126	139	151	138	139	147	108.5
30-Oct	163	168	167	169	170	167	170	176	180	176	170	165	168	167	171	172	173	170	168	165	163	164	164	165	168.8
31-Oct	172	173	169	164	165	165	164	166	173	171	179	188	194	193	186	192	196	199	198	207	201	203	230	244	180.9

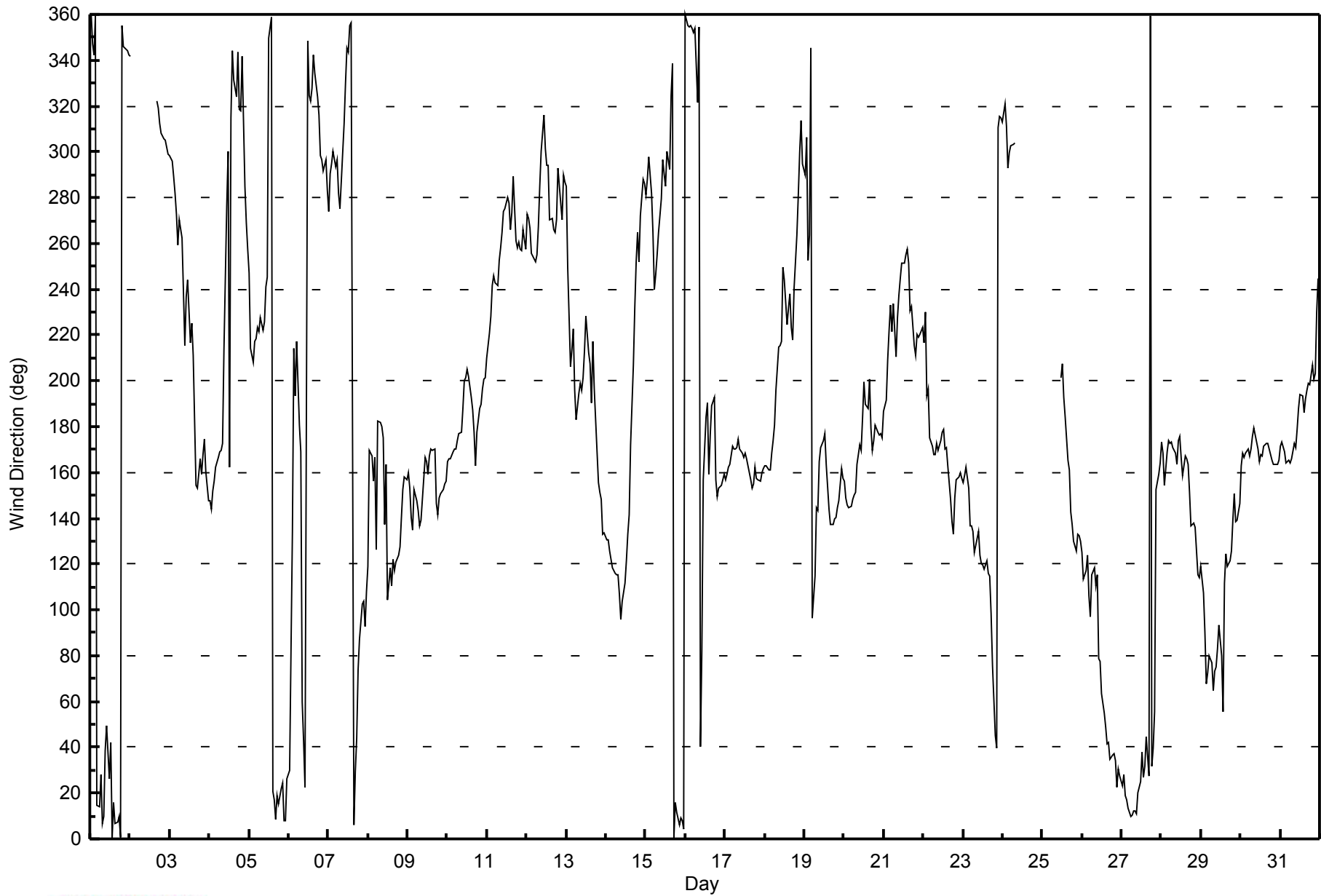
185.2	180.2	181.7	185.5	183.3	178.7	178.7	179.1	178.4	180.7	179.5	184.5	191.5	185.9	181.9	176.7	166.9	157.5	157.0	160.9	167.4	178.1	178.6	180.2
Diurnal Average																							

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



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Firebag - October 2014**







Summary of Hour Standard Deviations

Firebag - October 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 85 deg on Oct 4 13:00			Hours of Data:	702
Minimum Value: 5 deg on Oct 22 09:00			Hours of Missing Data:	42
			Hours of Calibration:	0
			Percent Operational Time:	94.4
Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 8 Q <sub>1</sub> = 9 Median = 11 Q <sub>3</sub> = 14 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-Oct	15	12	15	11	15	15	25	19	27	27	39	37	42	27	18	12	13	11	13	12	13	12	11	12	42
2-Oct	10	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	10	10	12	12	10	11	9	11	12
3-Oct	10	9	10	7	10	6	8	10	13	26	43	28	37	20	17	14	10	9	9	9	9	10	11	43	
4-Oct	11	10	12	9	9	9	8	8	9	33	31	49	85	62	27	37	15	11	12	14	41	13	10	20	85
5-Oct	15	18	9	11	10	9	9	9	13	12	11	50	27	20	20	19	15	10	11	11	19	18	32	50	
6-Oct	40	19	38	39	16	25	31	67	69	48	24	29	14	13	13	11	11	10	11	11	11	12	10	69	
7-Oct	8	11	10	10	10	9	11	9	12	18	15	14	17	20	16	15	15	18	8	11	9	8	15	11	20
8-Oct	10	29	33	26	16	49	21	10	10	11	25	60	57	39	15	14	10	10	11	11	10	11	9	11	60
9-Oct	11	11	9	12	11	9	10	10	11	12	13	14	15	16	13	12	10	13	9	9	9	8	8	9	16
10-Oct	8	7	7	8	7	7	8	8	7	9	10	10	12	11	9	9	8	8	9	6	7	9	7	7	12
11-Oct	10	9	7	11	9	8	8	11	10	11	13	14	14	16	13	17	17	9	9	8	9	9	10	9	17
12-Oct	10	9	13	16	7	10	10	8	11	15	17	19	20	20	16	11	10	9	11	11	11	30	27	8	30
13-Oct	15	15	14	22	16	22	13	20	9	10	14	19	12	15	21	25	8	19	7	9	8	9	12	11	25
14-Oct	11	11	10	11	10	10	10	9	12	10	10	10	15	13	12	13	13	10	11	15	14	11	12	13	15
15-Oct	11	11	13	14	16	11	9	11	14	13	17	21	20	20	18	18	26	14	11	11	10	11	13	26	
16-Oct	13	13	15	15	17	18	21	19	27	28	48	33	49	42	22	15	13	14	14	11	9	9	9	8	49
17-Oct	9	9	7	7	8	8	8	8	8	9	9	9	9	9	10	10	11	10	8	9	9	9	10	10	11
18-Oct	9	8	9	9	9	8	8	11	9	20	20	14	20	14	11	10	8	10	10	10	9	13	10	8	20
19-Oct	11	23	11	24	71	45	17	19	14	9	10	10	10	13	13	10	10	10	9	9	9	9	9	8	71
20-Oct	9	9	9	9	10	12	10	9	9	8	8	10	8	7	10	8	12	6	11	7	7	7	9	8	12
21-Oct	7	8	8	10	13	17	21	15	17	10	16	14	11	11	12	11	18	5	10	6	7	9	9	8	21
22-Oct	6	9	14	13	15	12	10	7	5	7	11	10	12	11	11	11	9	10	12	11	8	8	8	9	15
23-Oct	9	9	9	11	11	10	12	11	11	30	12	11	11	11	12	11	15	18	14	27	35	12	12	35	
24-Oct	12	11	11	11	11	10	10	11	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	12
25-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	9	10	8	11	12	10	11	12	12	10	11	11	12	12
26-Oct	11	9	12	9	15	10	11	9	11	11	15	14	13	9	9	10	10	8	9	9	9	10	9	9	15
27-Oct	9	9	9	9	10	9	10	9	9	10	12	11	11	13	11	12	9	50	73	12	28	40	10	12	73
28-Oct	10	10	10	9	9	8	8	9	8	8	9	9	11	12	10	8	11	13	11	11	12	12	12	23	23
29-Oct	11	12	18	12	13	18	18	12	14	14	16	15	41	18	20	16	23	21	16	19	13	11	10	10	41
30-Oct	10	9	8	8	9	8	8	9	9	9	9	9	8	8	9	9	9	9	9	9	8	9	9	9	10
31-Oct	9	9	9	9	9	9	9	8	9	8	8	8	8	7	12	7	9	7	11	10	8	10	11	10	12
Diurnal Maximum																									
40 29 38 39 71 49 31 67 69 48 48 60 85 62 27 37 26 50 73 19 41 40 27 32																									

AF - Analyzer Failure

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# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 16, 2014	Previous Calibration	September 5, 2014
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	7:20	End Time (MST)	11:40
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	789	789
Calculated slope	0.982299	0.999982	Chamber temp.	45.2	45.2
Calculated intercept	1.534090	0.268482	Pressure (mmHg)	688.3	688.3
Analyzer Background	9.5	9.3	Flow (lpm)	0.449	0.449
Analyzer Coefficient	0.973	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	-0.8	NA
as found span	5000	58.3	574.8	583.3	0.985
calibrator zero	5000	0.0	0.0	-0.8	NA
high point	5000	58.3	574.8	573.8	1.002
second point	5000	29.1	286.9	288.5	0.995
third point	5000	14.7	144.9	144.1	1.006
calibrator zero	6000	0.0	0.0	-0.8	NA
as left zero	6000	0.0	0.0	-0.8	NA
as left span	5000	58.3	574.8	573.6	1.002
Average Correction Factor					1.001

Corrected As found 584.1 Previous response 583.7 % change -0.1%

#### Notes:

No Maintenance Done, Filter changed out, span adjusted

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

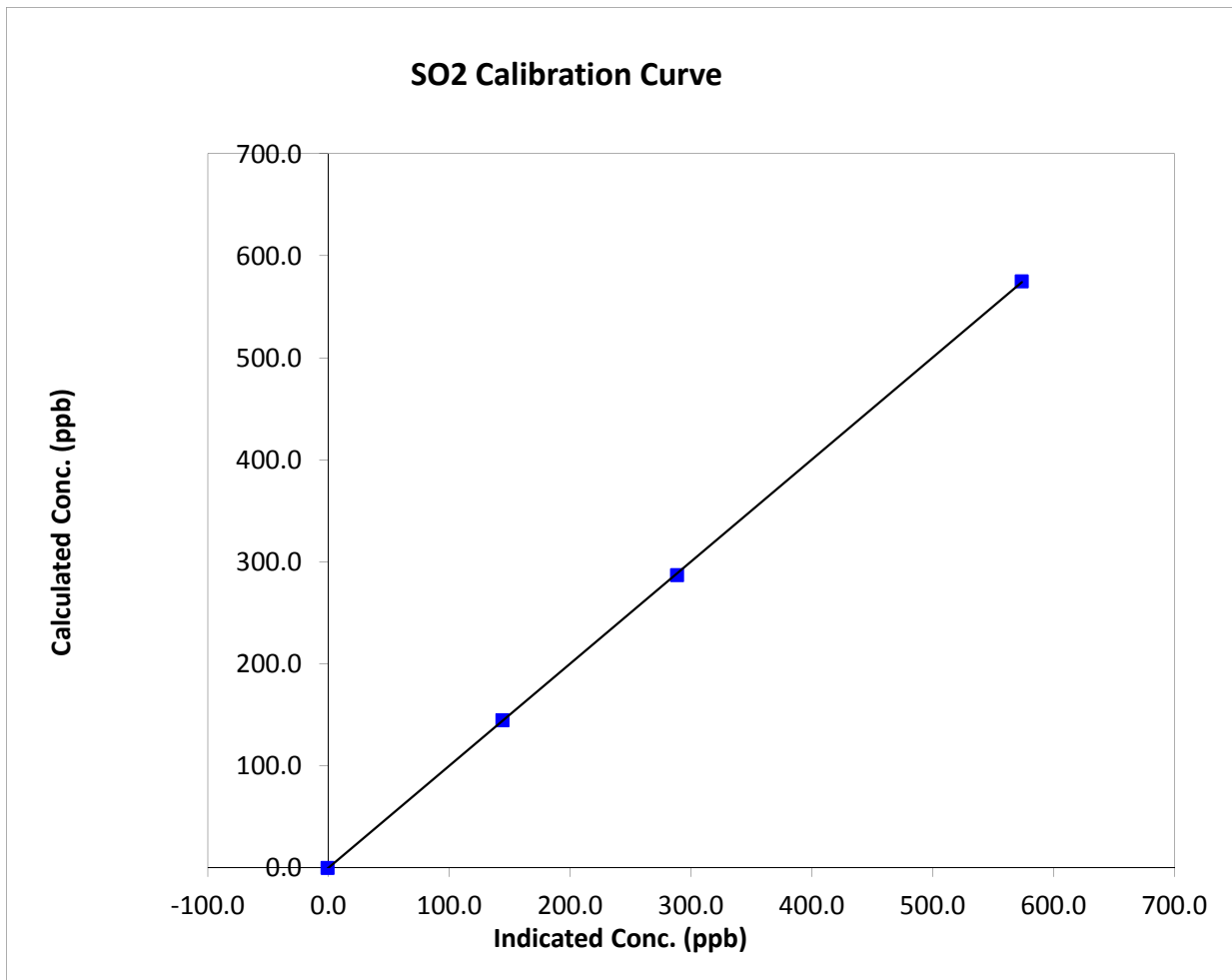
## SO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	October 16, 2014	Previous Calibration	September 5, 2014
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:20	End Time (MST)	11:40
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

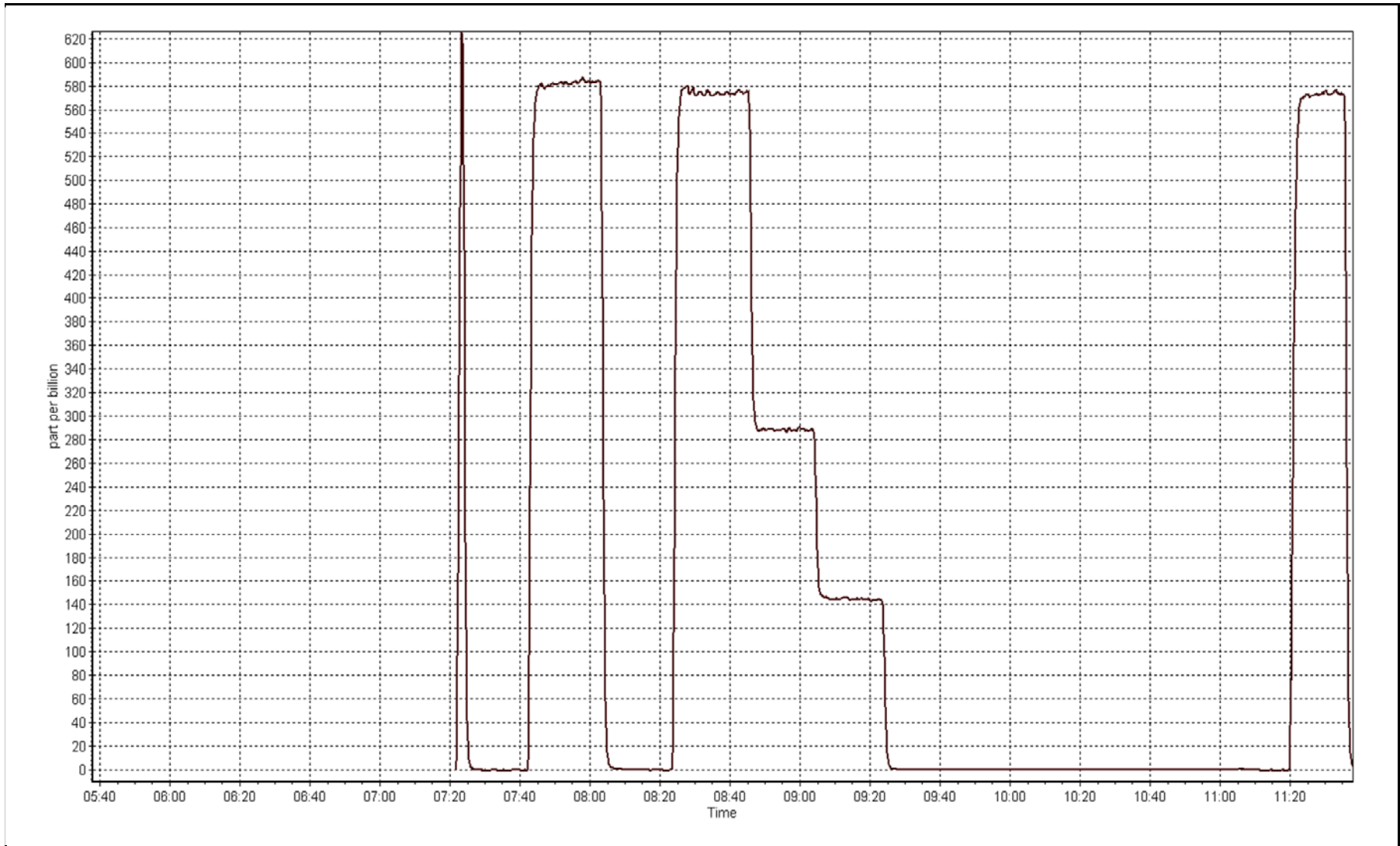
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.8	N/A	Correlation Coefficient	0.999975
574.8	573.8	1.0018		
286.9	288.5	0.9945	Slope	0.999982
144.9	144.1	1.0058		
			Intercept	0.268482



SO2 Calibration Plot

Date: October 16, 2014





# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	October 17, 2014	Previous Calibration	September 9, 2014
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	7:50	End Time (MST)	11:40
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	996
Cal Gas Concentration	4.85 ppm H2S	Cal Gas Expiry Date	10-Jun-14
Gas Cert Reference	ALM066720	SO2 gas conc.	49.3 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	N/A
DACS voltage range	NA	DACS channel #	TCP/IP

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	15	15
Analyzer Range (mv)	100	100	Lamp voltage	2236	2236
Calculated slope	1.005309	1.012028	Chamber temp.	30	30
Calculated intercept	-0.213099	-0.423320	Pressure	23.5	23.5
Analyzer Background	32.8	15.5	Flow	597	597
Analyzer Coefficient	0.660	1.061	Intensity	55	55
			Converter temp.	314	314

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	0.7	NA
as found span	5000	83.3	80.8	83.1	0.972
SO2 scrubber check	5000	29.2	287.9	6.4	NA
calibrator zero	5000	0.0	0.0	0.3	NA
high point	5000	83.3	80.8	80.0	1.010
second point	5000	41.7	40.4	41.0	0.987
third point	5000	21.0	20.4	20.3	1.002
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	83.3	80.8	80.0	1.010
Average Correction Factor					1.000

Corrected As found	82.4	Previous response	80.6	% change	-2.2%
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#### Notes:

Scrubber checked after PMT adjusted, PMT adjusted, Filter changed out, Zero and Span adjusted, Redid third point after as founds to prove stable third point

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## H2S Calibration Summary

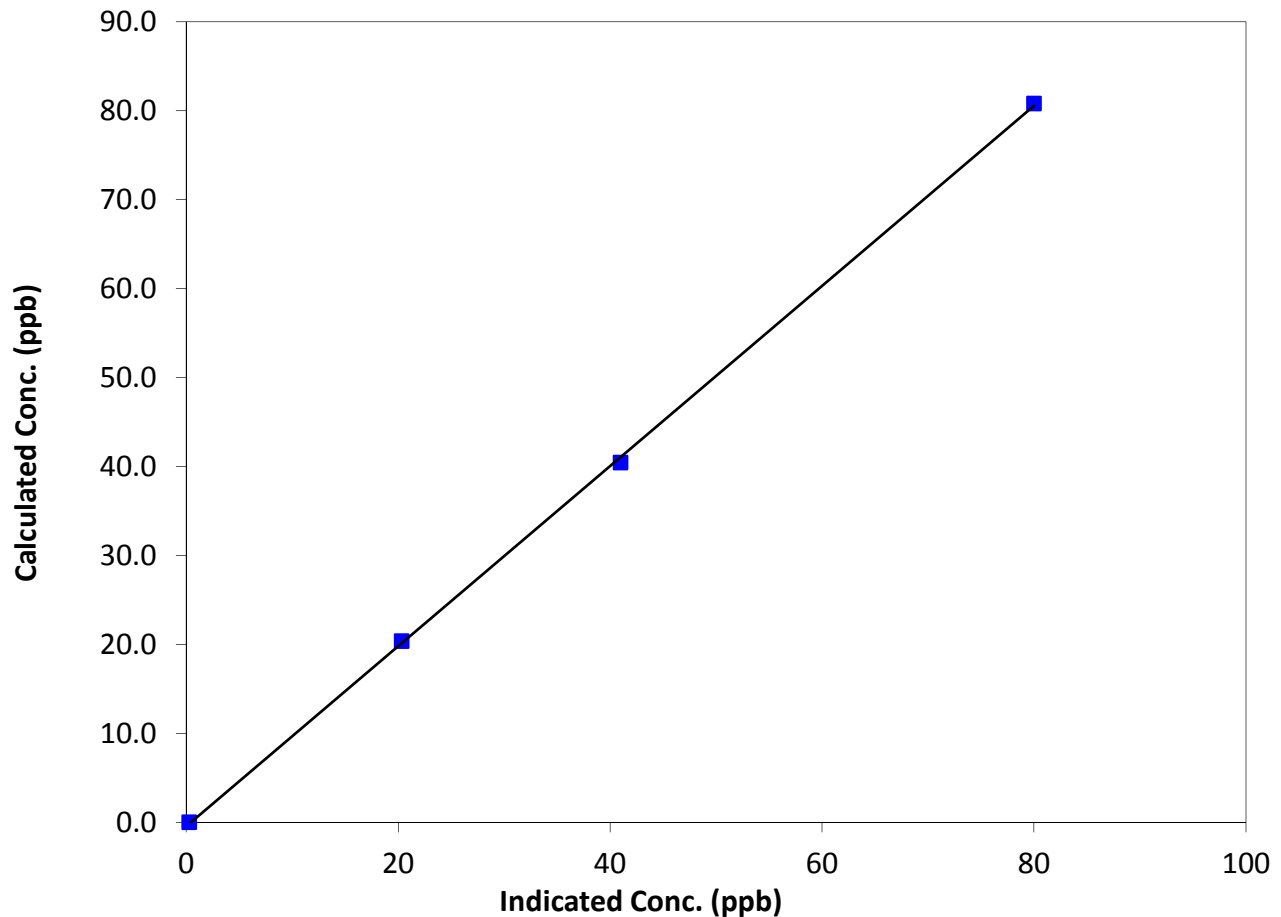
### Station Information

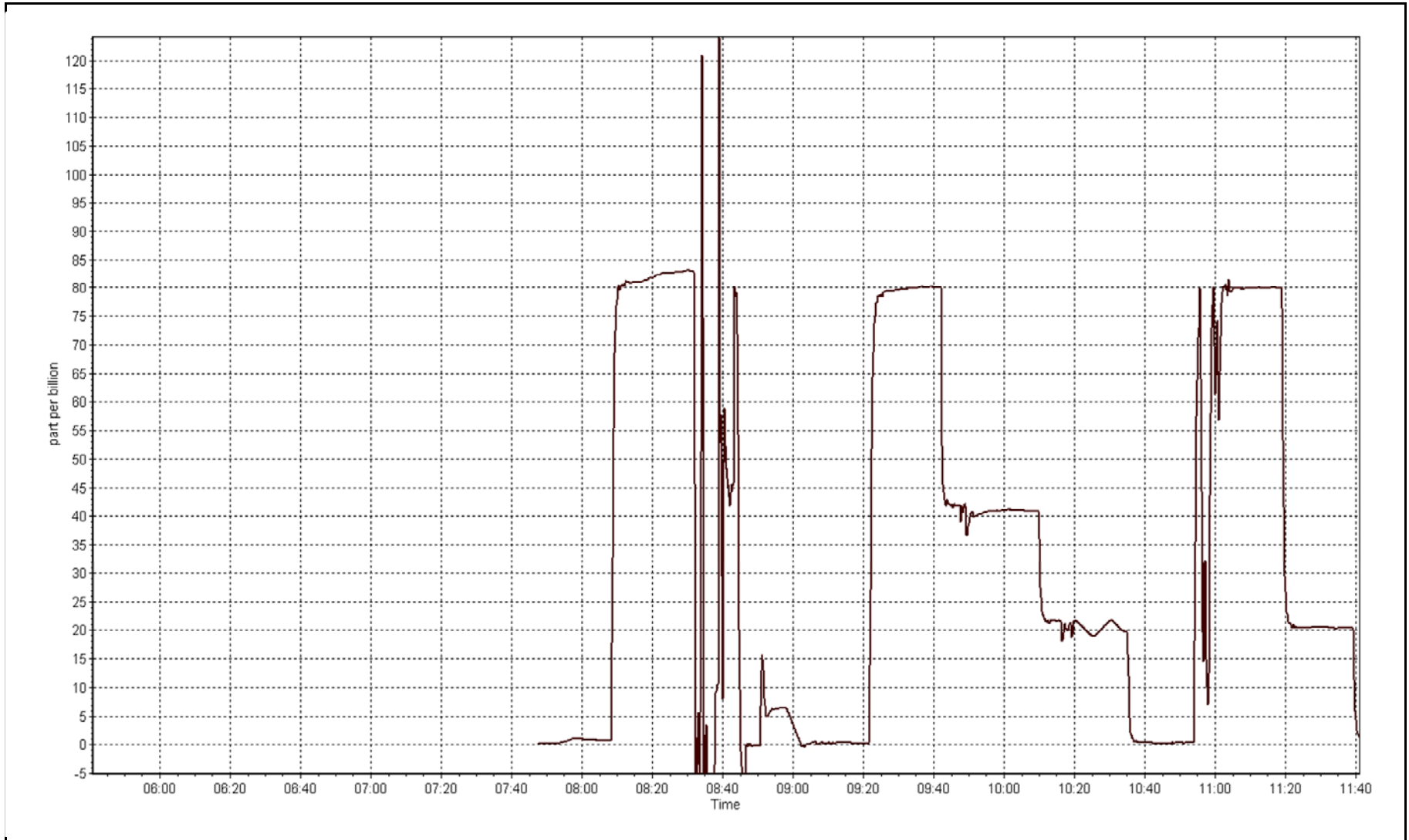
Calibration Date	October 17, 2014	Previous Calibration	September 9, 2014
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:50	End Time (MST)	11:40
Analyzer make	API H2S T101	Analyzer serial #	158

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999854
80.8	80.0	1.0100		
40.4	41.0	0.9866	Slope	1.012028
20.4	20.3	1.0020		
			Intercept	-0.423320

**H2S Calibration Curve**









# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	October 21, 2014	Previous Calibration	October 17, 2014
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	12:31
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	2241	2241
Calculated slope	1.012028	0.988453	Chamber temp.	34	34
Calculated intercept	-0.423320	0.018369	Pressure	22.9	22.9
Analyzer Background	15.5	19.6	Flow	578	578
Analyzer Coefficient	1.061	1.092	Intensity	56	56
			Converter temp.	315	315

Analyzer make/model	API H2S T101	Analyzer serial #	158
Converter make/model		Converter serial #	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	2.0	NA
as found span	5000	83.3	80.8	81.4	0.993
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	83.3	80.8	81.7	0.989
second point	5000	41.7	40.4	41.0	0.987
third point	5000	21.0	20.4	20.5	0.994
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	83.3	80.8	80.0	1.010
Average Correction Factor					0.990

Corrected As found	79.4	Previous response	80.3	% change	1.1%
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#### Notes:

Scrubber checked last calibration, zero adjusted

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## H2S Calibration Summary

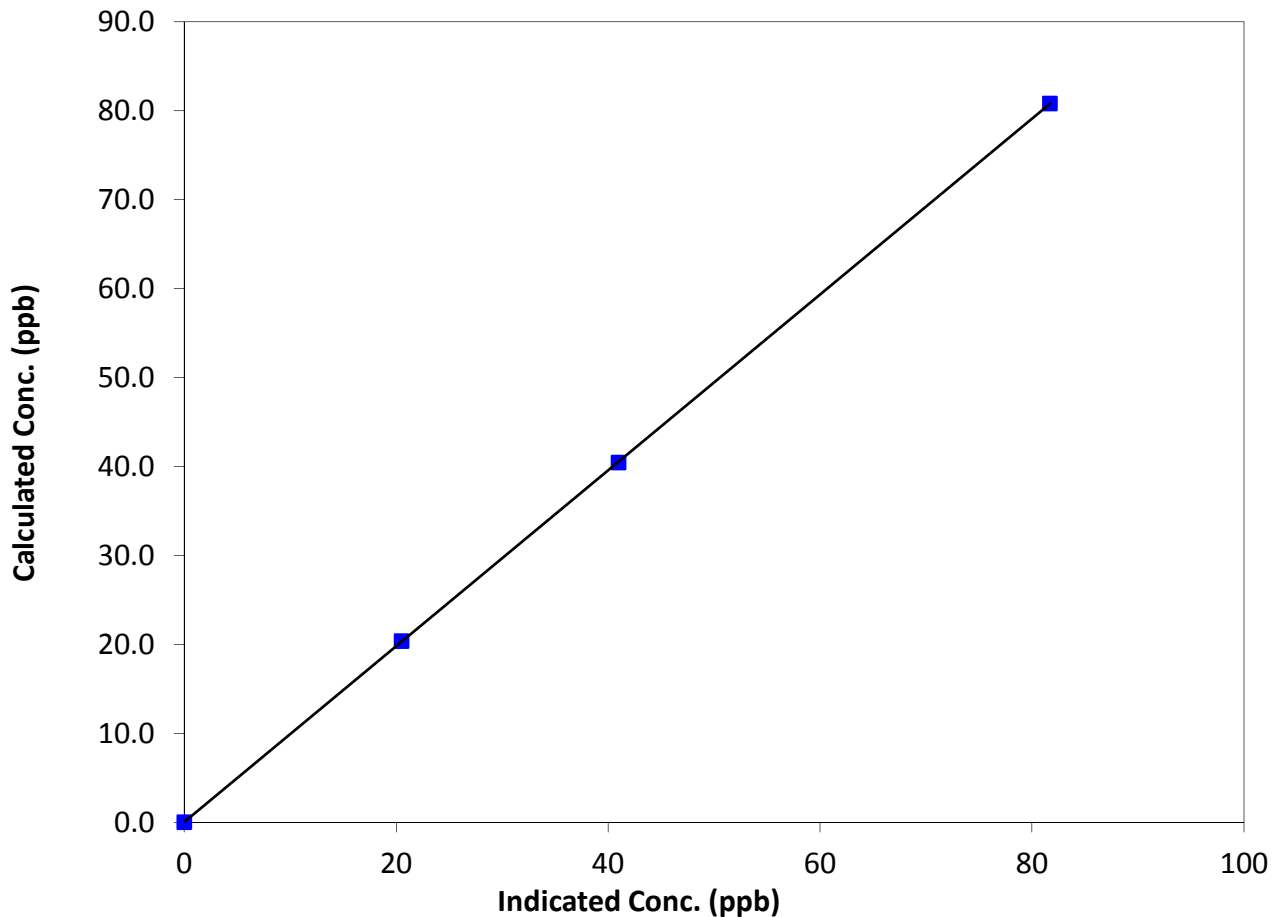
### Station Information

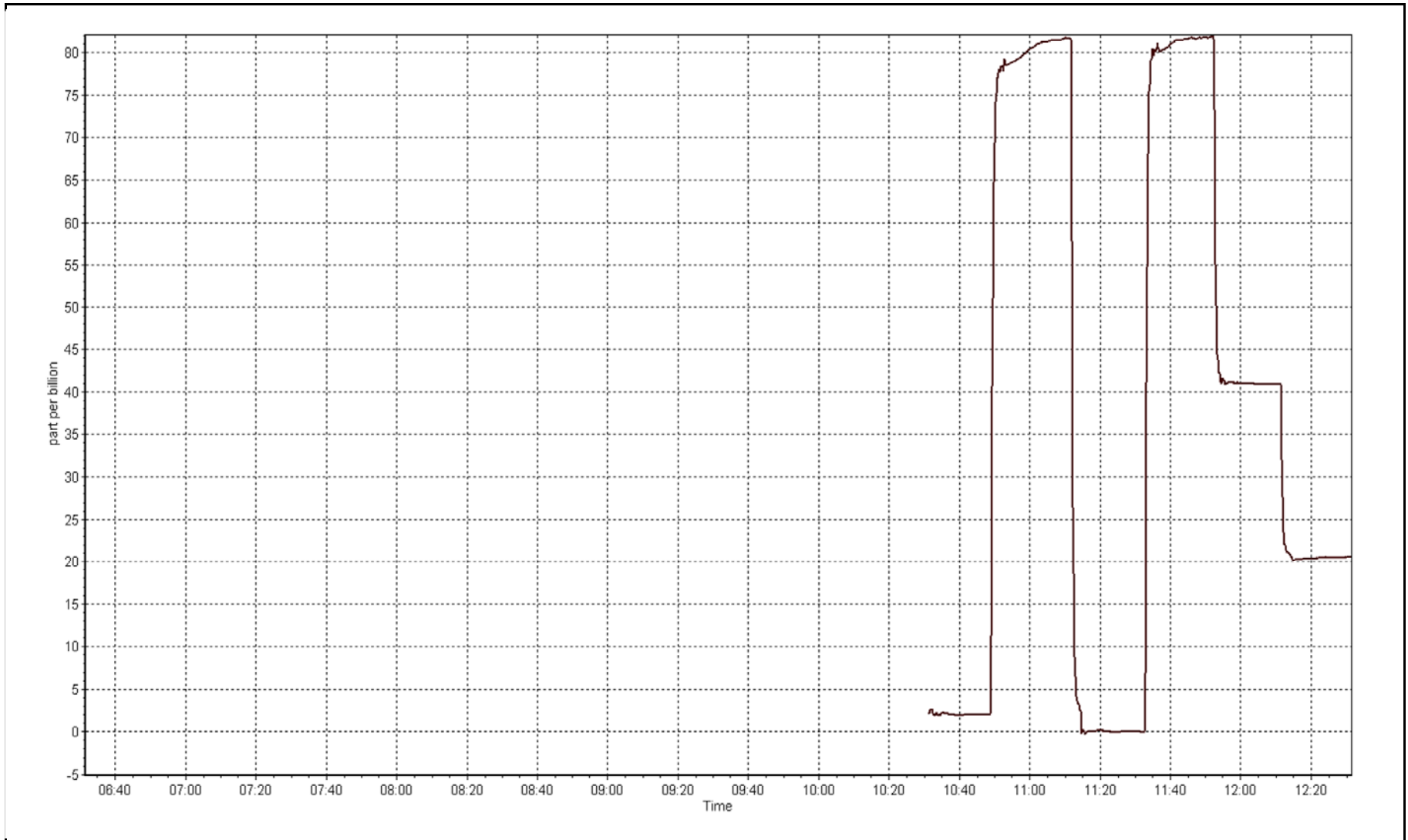
Calibration Date	October 21, 2014	Previous Calibration	October 17, 2014
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:30	End Time (MST)	12:31
Analyzer make	API H2S T101	Analyzer serial #	158

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999995
80.8	81.7	0.9890		
40.4	41.0	0.9866	Slope	0.988453
20.4	20.5	0.9937		
			Intercept	0.018369

**H2S Calibration Curve**







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Thursday, October 16, 2014	Previous Calibration	Tuesday, September 30, 2014
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	7:20	End Time (MST)	11:40
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	1.000172	0.999766	Fuel Pressure	22.9	22.9
Calculated intercept	-0.015025	0.005200		3.8	4.4
				3.366	3.415

Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089
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### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.44	N/A
as found span	5000	58.3	12.74	12.98	0.981
calibrator zero	5000	0.0	0.00	0.01	N/A
high point	5000	58.3	12.74	12.75	0.999
second point	5000	29.2	6.38	6.34	1.006
third point	5000	14.7	3.21	3.21	1.000
calibrator zero	5000	0.0	0.00	-0.02	N/A
as left zero	5000	0.0	0.00	-0.02	N/A
as left span	5000	58.3	12.74	12.90	0.987
Average Correction Factor					1.002

Corrected As found	12.54	Previous response	12.75	% change	1.7%
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#### Notes:

Filter changed out, No Maintenance done, Zero and span adjusted

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## THC Calibration Summary

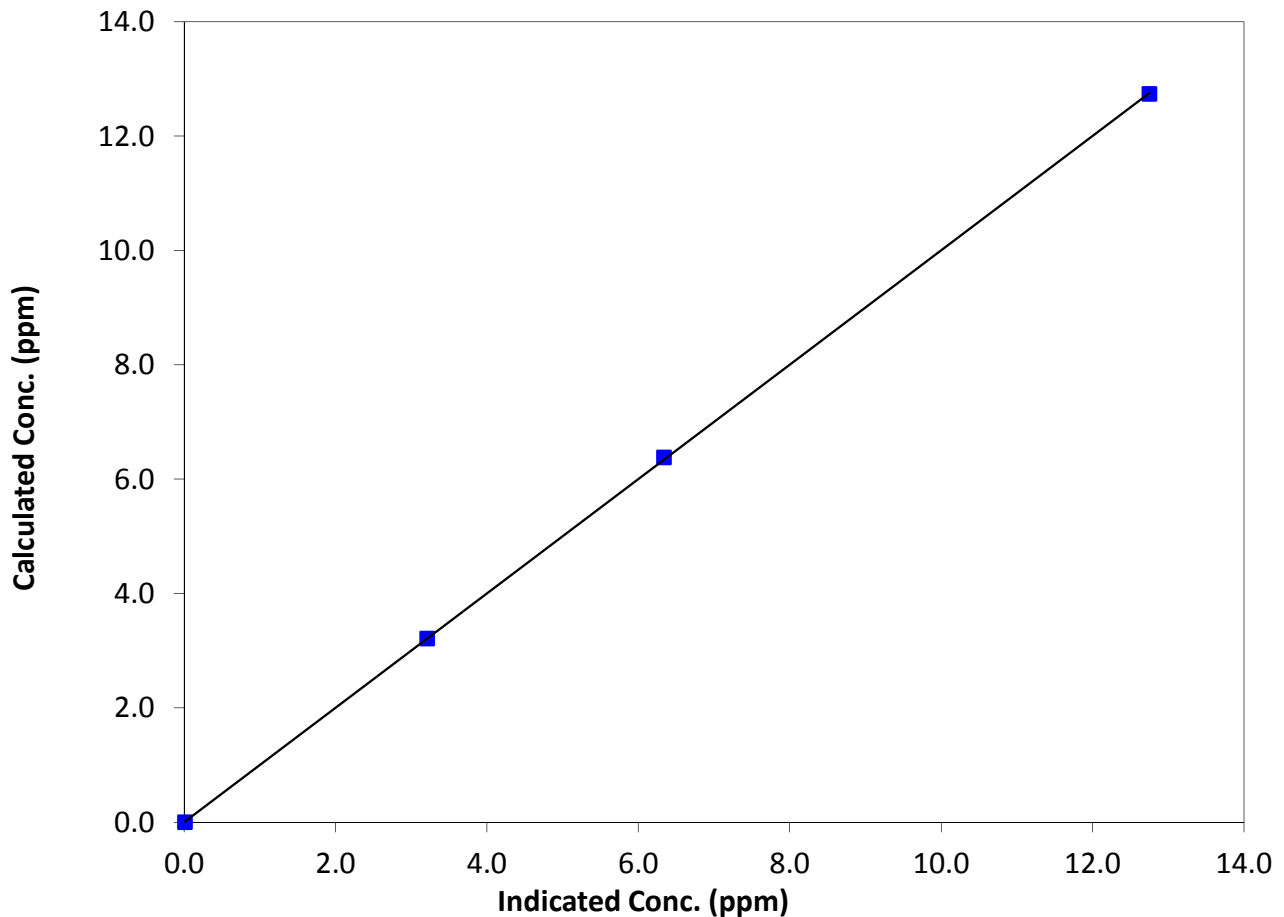
### Station Information

Calibration Date	October 16, 2014	Previous Calibration	September 30, 2014
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:20	End Time (MST)	11:40
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

### Calibration Data

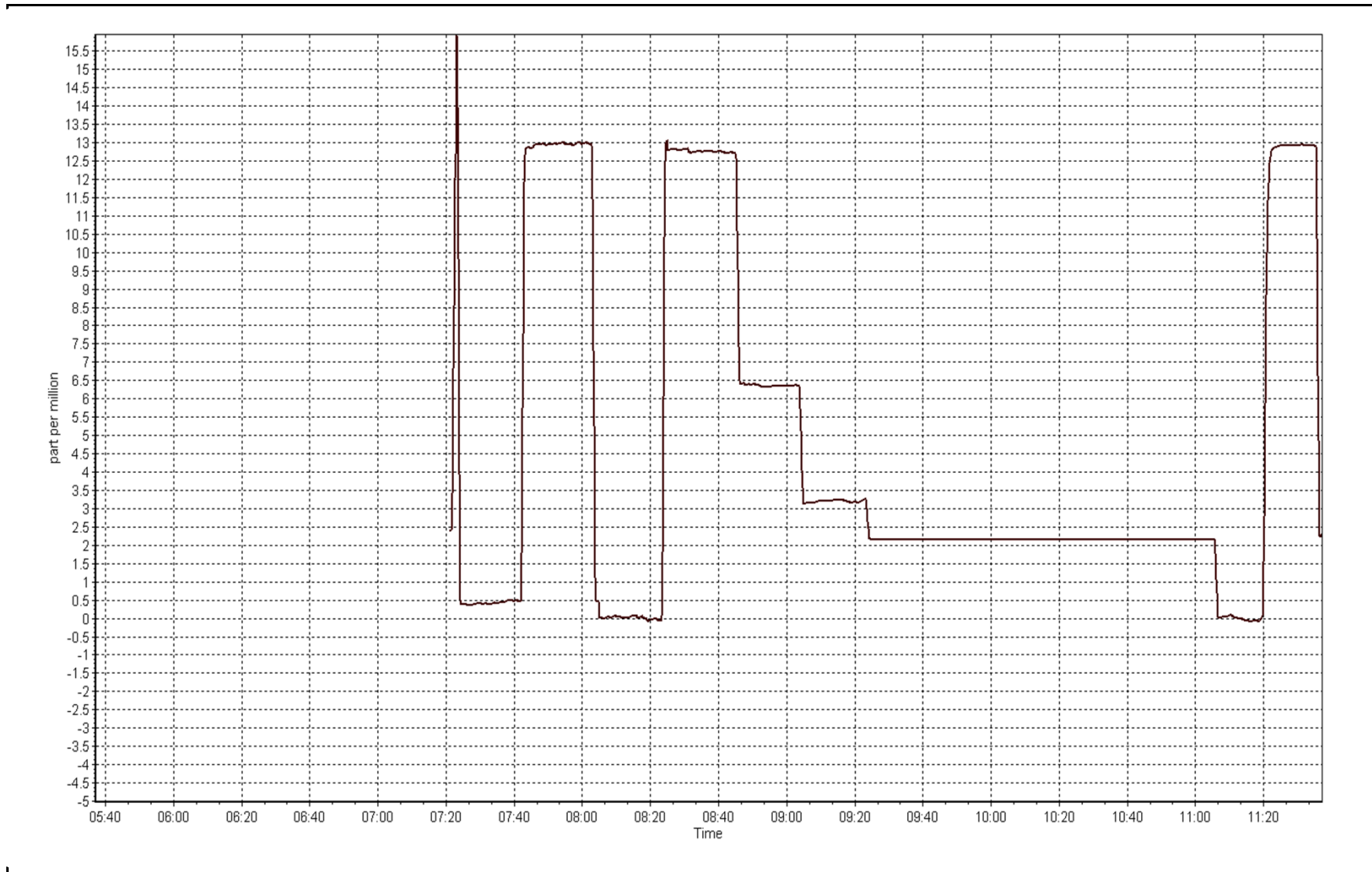
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	N/A	Correlation Coefficient	0.999980
12.74	12.75	0.9989		
6.38	6.34	1.0061	Slope	0.999766
3.21	3.21	1.0004		
			Intercept	0.005200

**THC Calibration Curve**



THC Calibration Plot

Date: October 16, 2014





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 16, 2014	Previous Calibration	September 5, 2014
Station Name	Firebag	Station Number	AMS 19
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	7:20	End Time (MST)	11:40
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

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	1.007183	1.007212	1.003948
	Data Offset	-0.195333	0.007981	0.428634
After	Data Slope	0.999860	0.998678	1.008146
	Data Offset	-0.378411	-0.215272	0.229865
Channel #				
Voltage Range				

### Analyzer Information

Analyzer make/model Thermo 42i      Analyzer serial # 1410661309

Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.824	ppb	0.837	ppb
NOX coefficient	0.998	ppb	0.998	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	3.5		3.5	
NOX bkgrnd	3.6		3.6	
Nt coefficient	N/A		N/A	
Chamber Temp	50.8	Deg C	50.8	Deg C
Moly Temp	322.1	Deg C	322.1	Deg C
PMT Temp	-3.1	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	160.8	mmHg	160.8	mmHg
Sample Flow	0.645	ccm	0.645	ccm

**Notes:**

Filter changed out, No maintenance span adjusted



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

October 16, 2014

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	0.0	0.1	-0.1	N/A	N/A
as found span	5000	58.3	600.5	600.5	0.0	591.6	592.1	-0.5	1.0150	1.0142
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	N/A	N/A
high point	5000	58.3	600.5	600.5	0.0	600.1	600.9	-0.8	1.0006	0.9993
second point	5000	29.1	299.7	299.7	0.0	302.1	302.0	0.1	0.9922	0.9925
third point	5000	14.7	151.4	151.4	0.0	151.3	150.9	0.4	1.0007	1.0034
calibrator zero	6000	0.0	0.0	0.0	0.0	0.1	0.2	0.0	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	0.1	0.2	0.0	N/A	N/A
as left span	5000	58.3	600.5	277.1	323.4	601.3	275.4	325.9	0.9987	1.0062
Average Correction Factor									0.9978	0.9984

Corrected As found

NO<sub>x</sub>= 591.6

NO= 592.0

Percent Change

NO<sub>x</sub>= 0.8%

NO= 0.7%

Previous Response

NO<sub>x</sub>= 596.4

NO= 596.2

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

58.30

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			-0.1			N/A	
1st NO <sub>2</sub> (300)	N/A	277.1	321.9	596.2	277.1	319.1	0.9956	1.0000	1.0088	99.1%
2nd NO <sub>2</sub> (200)	N/A	380.9	218.1	597.0	380.9	216.2	0.9943	1.0000	1.0088	99.1%
3rd NO <sub>2</sub> (100)	N/A	485.8	113.2	597.6	485.8	111.8	0.9933	1.0000	1.0125	98.8%
4th NO <sub>2</sub> (0)	599.0	N/A	-1.0	598.0	599.0	-1.0	0.9926	1.0000	N/A	N/A
Average Correction Factor							0.9939	1.0000	1.0100	99.0%

Calibration Performed By:

Melissa Lemay





# Wood Buffalo Environmental Association

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

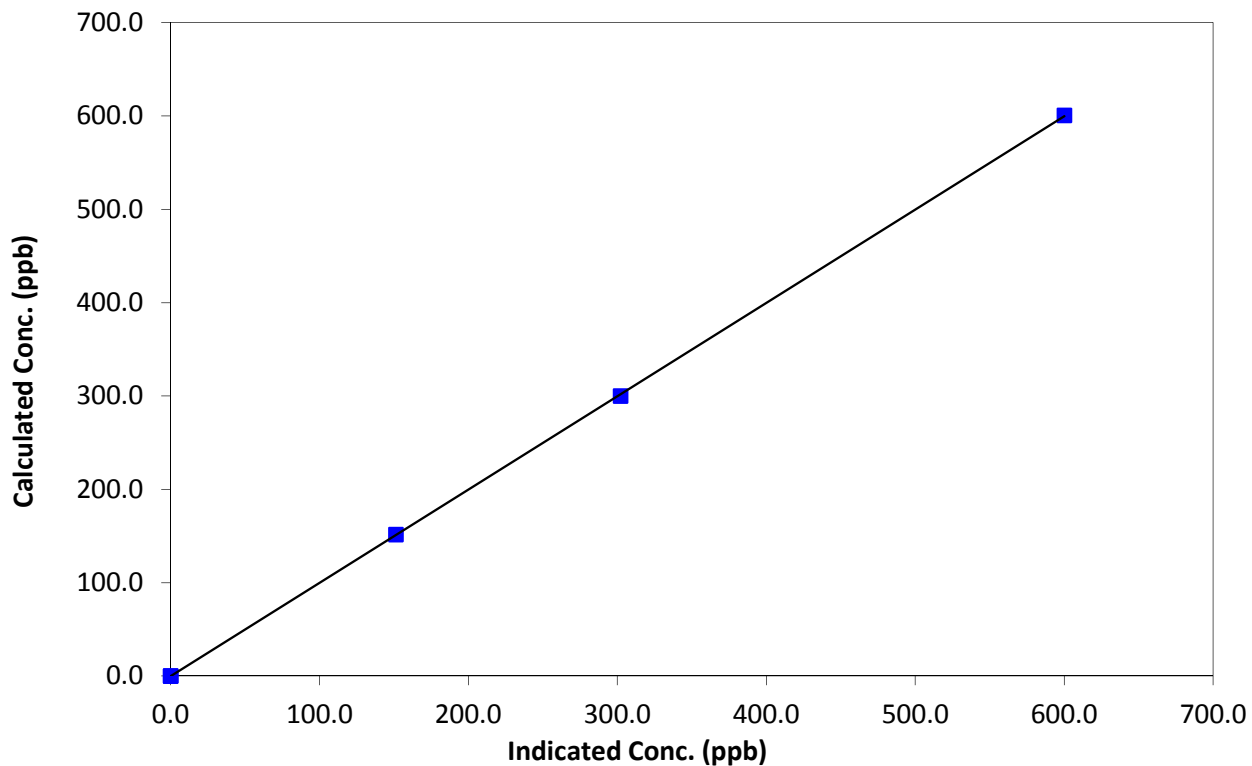
### Station Information

Calibration Date	October 16, 2014	Previous Calibration	September 5, 2014
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:20	End Time (MST)	11:40
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999980
600.5	600.1	1.0006		
299.7	302.1	0.9922	Slope	0.999860
151.4	151.3	1.0007		
0.0	0.1	0.0000	Intercept	-0.378411

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

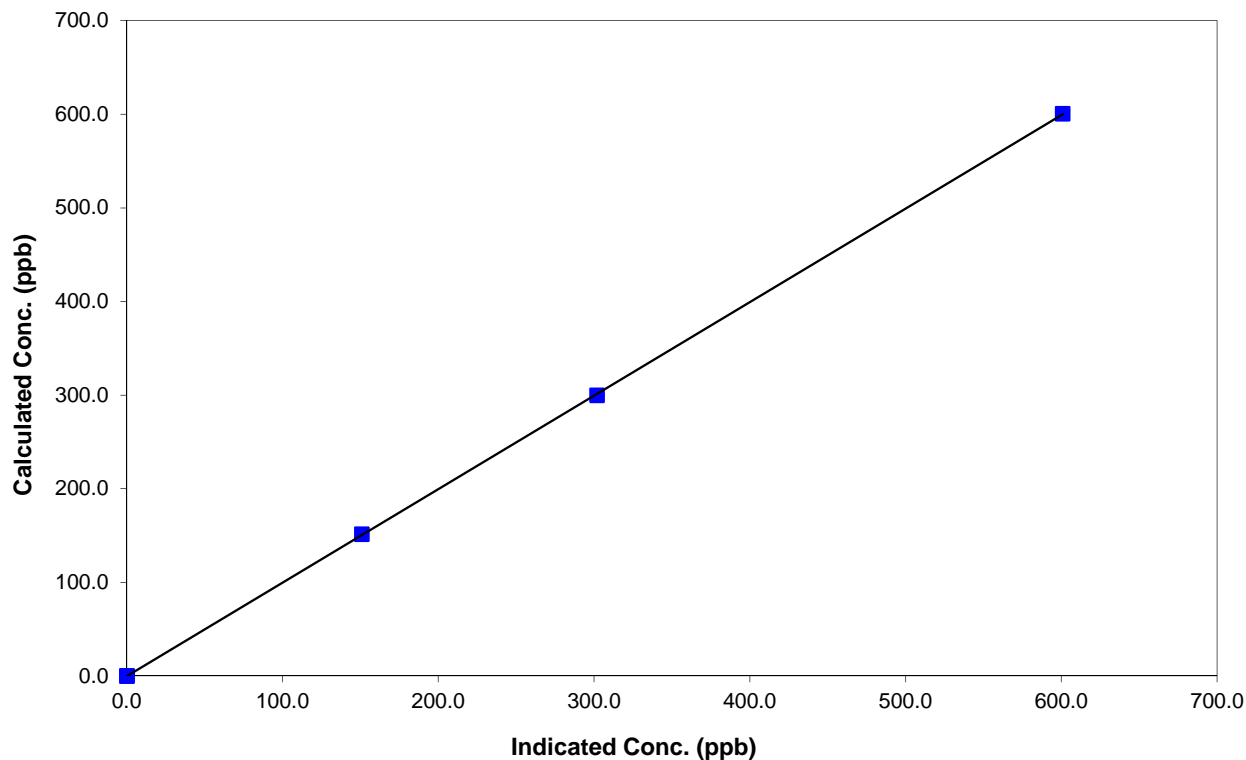
### Station Information

Calibration Date	October 16, 2014	Previous Calibration	September 5, 2014
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:20	End Time (MST)	11:40
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	0.999984
600.5	600.9	0.9993		
299.7	302.0	0.9925	Slope	0.998678
151.4	150.9	1.0034		
0.0	0.2	0.0000	Intercept	-0.215272

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

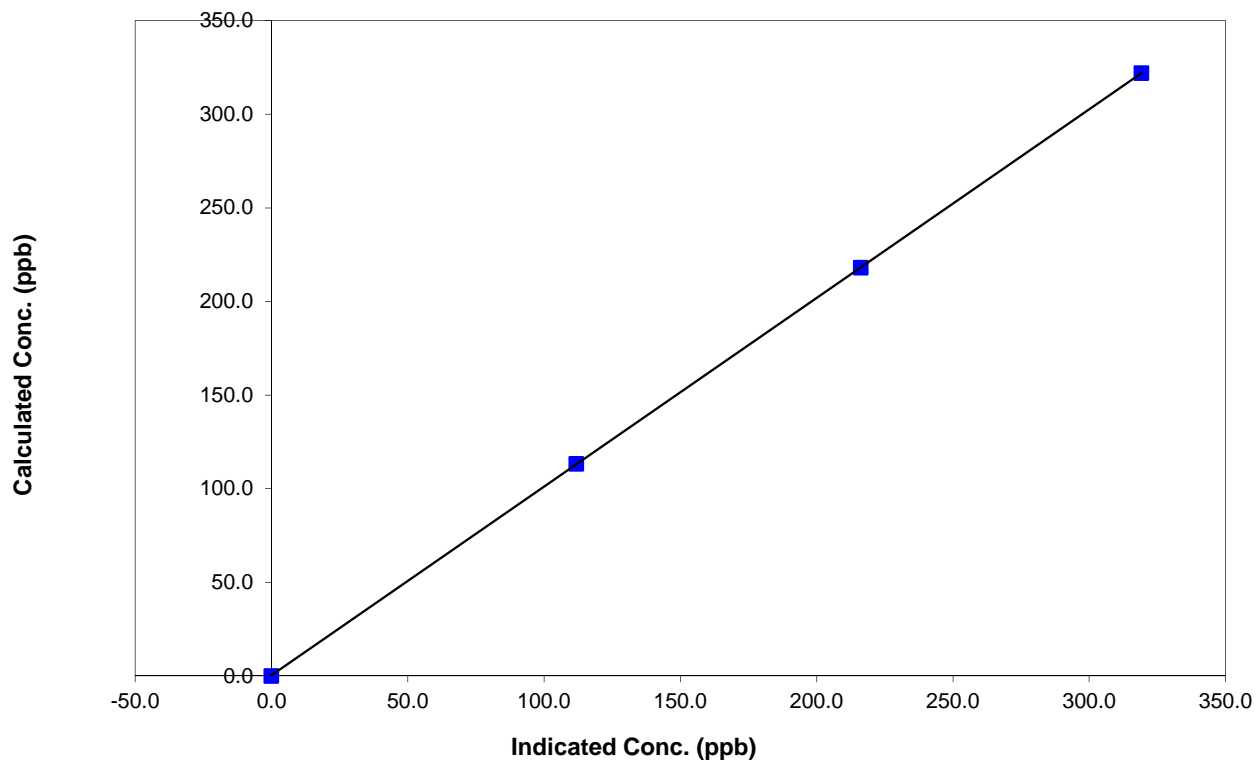
### Station Information

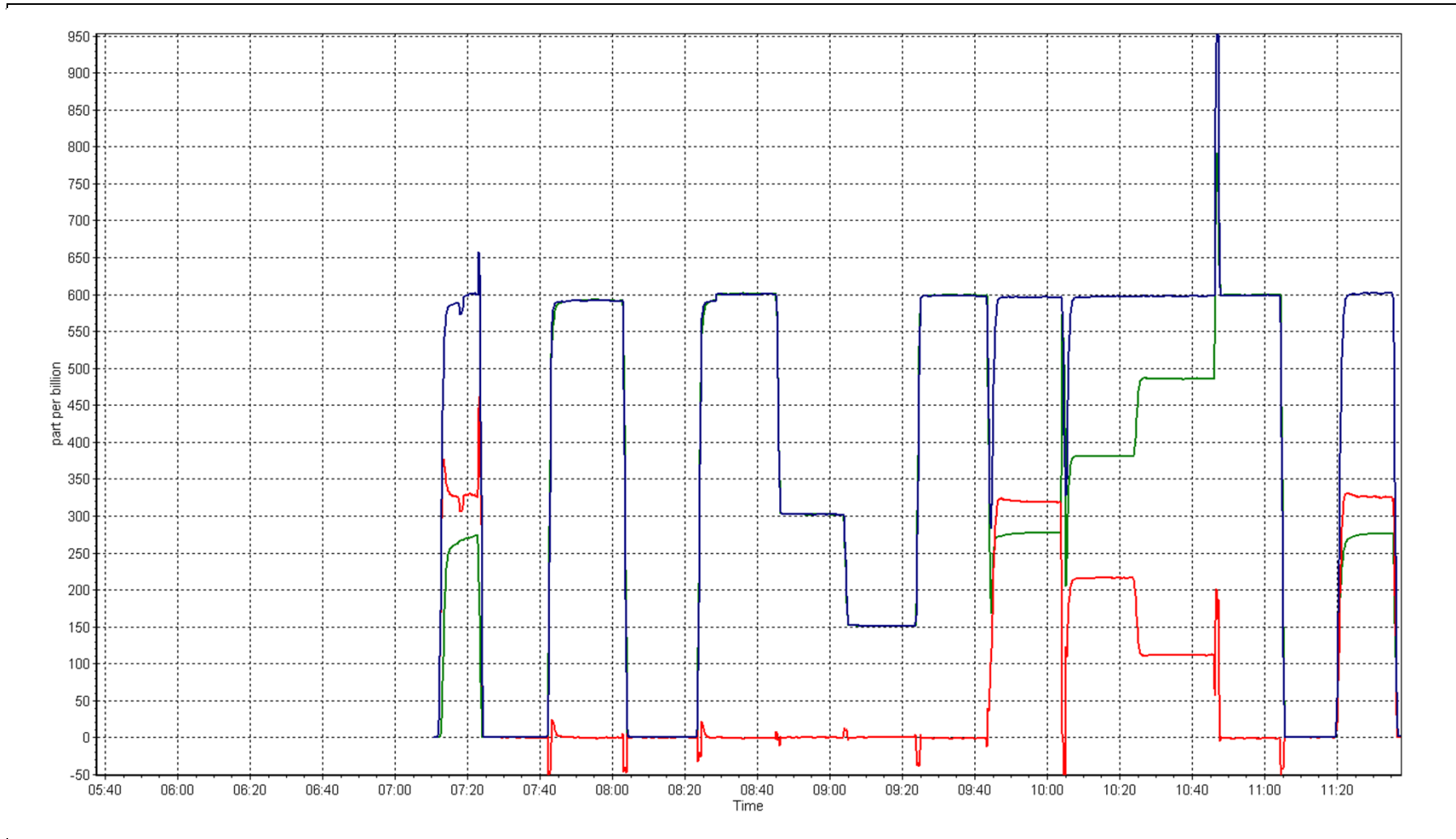
Calibration Date	October 16, 2014	Previous Calibration	September 5, 2014
Station Number	Firebag	Station Number	AMS 19
Start Time (MST)	7:20	End Time (MST)	11:40
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999998
321.9	319.1	1.0088		
218.1	216.2	1.0088	Slope	1.008146
113.2	111.8	1.0125		
			Intercept	0.229865

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





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 501  
STATOIL LEISMER  
OCTOBER 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

November 26, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)  
OCTOBER 2014

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	304	17	21	98.77	6	0	3	0
H2S (ppb) Average	309	18	20	99.39	3	0	1	0
NO2 (ppb) Average	308	21	21	100.00	26	0	6	-
NO (ppb) Average	308	21	21	100.00	79	-	12	-
NOX (ppb) Average	308	21	21	100.00	105	-	19	-
Temperature 2 m (C) Average	325	0	0	100.00	19.5	-	11.0	-
Relative Humidity (%) Average	325	0	0	100.00	100	-	-	-
Wind Speed 10 m (km/h) Average	314	0	11	96.62	33	-	-	-
Wind Direction 10 m (deg) Average	314	0	11	96.62	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)  
OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	304	0.8	1	-	0	0	0	0	1	2	6
H2S (ppb) Average	309	0.3	0	-	0	0	0	0	0	0	3
NO2 (ppb) Average	308	2.1	3	-	0	0	1	1	2	6	26
NO (ppb) Average	308	2.2	7	-	0	0	0	1	1	6	79
NOX (ppb) Average	308	4.3	9	-	0	1	1	2	4	11	105
Temperature 2 m (C) Average	325	5.28	4.8	-	-5.9	-0.7	1.5	4.9	8.8	12	19.5
Relative Humidity (%) Average	325	72.9	17	-	30	48	59	75	87	95	100
Wind Speed 10 m (km/h) Average	314	11	7	-	1	4	6	9	15	21	33
Wind Direction 10 m (deg) Average	314	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	03 Oct 2014 03:00	03 Oct 2014 03:00	1	Stabilization after daily span
SO2	05 Oct 2014 03:00	05 Oct 2014 03:00	1	Stabilization after daily span
SO2	06 Oct 2014 03:00	06 Oct 2014 03:00	1	Stabilization after daily span
SO2	07 Oct 2014 03:00	07 Oct 2014 03:00	1	Stabilization after daily span
H2S	01 Oct 2014 10:00	01 Oct 2014 11:00	2	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	01 Oct 2014 23:00	02 Oct 2014 08:00	10	Flat line in sensor output signal
Wind Speed, Wind Direction	06 Oct 2014 03:00	06 Oct 2014 03:00	1	Flat line in sensor output signal
SO2	14 Oct 2014 14:00	15 Oct 2014 00:00	11	Not in Service
H2S	14 Oct 2014 18:00	15 Oct 2014 00:00	7	Not in Service
NO2, NO, NOX	14 Oct 2014 18:00	15 Oct 2014 00:00	7	Not in Service
Temperature/ Relative Humidity	14 Oct 2014 14:00	15 Oct 2014 00:00	11	Not in Service
Wind Speed, Wind Direction	14 Oct 2014 14:00	15 Oct 2014 00:00	11	Not in Service

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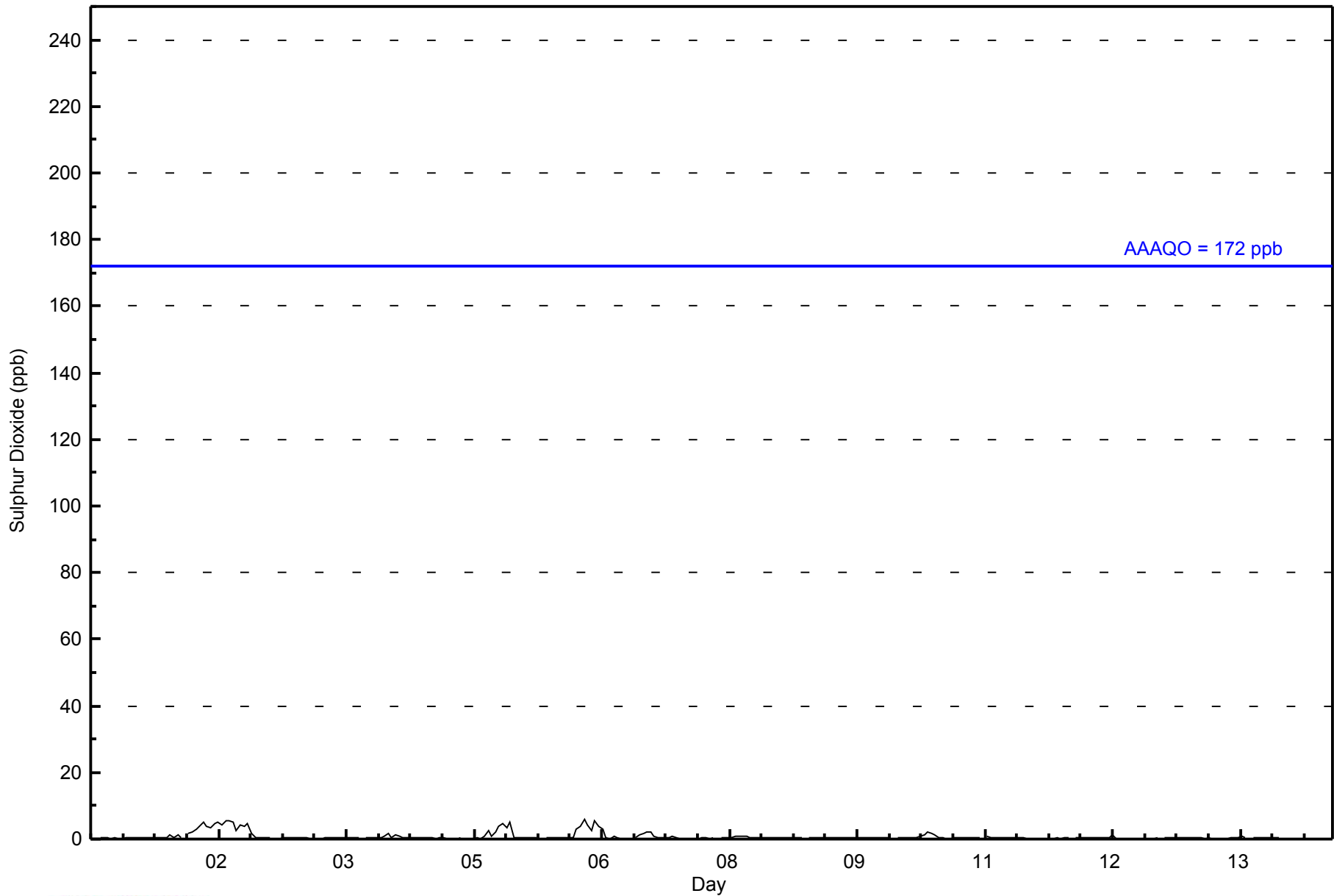


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 325																
Maximum Value: 6 ppb on Oct 6 14:00										Maximum Daily Average: 3.1 ppb on Oct 2										Hours of Data: 304						
Minimum Value: 0 ppb on Oct 7 16:00										Minimum Daily Average: 0.3 ppb on Oct 12										Hours of Missing Data: 21						
Maximum Diurnal Average: 1.3 ppb at hour 14										Minimum Diurnal Average: 0.3 ppb at hour 21										Hours of Calibration: 17						
Monthly Average: 0.8 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 6										Percent Operational Time: 98.8						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.4	1
2-Oct	0	Z	2	2	3	4	5	4	3	5	5	4	5	6	5	3	4	4	5	1	0	0	0	0	3.1	6
3-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
4-Oct	0	Z	0	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
5-Oct	0	Z	RE	0	0	0	0	0	0	0	1	3	1	2	4	5	4	5	1	0	0	0	0	0	1.2	5
6-Oct	0	Z	RE	1	1	1	0	0	0	0	0	3	4	6	4	3	6	4	3	0	0	1	0	0	1.7	6
7-Oct	0	Z	RE	1	1	2	2	2	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0.6	2
8-Oct	0	Z	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
9-Oct	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.4	1
10-Oct	1	Z	1	0	0	0	0	1	1	1	2	2	1	1	0	0	0	0	0	0	0	1	0	0	0.6	2
11-Oct	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.3	1
14-Oct	1	Z	1	0	0	0	0	0	0	0	C	C	C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	1
																								0.3	--	
																								1	--	
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration NS - Not in Service 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  
Statoil - Leismer - October 2014





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Statoil - Leismer - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	304	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: 304

Total Number of Hours: 336



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Statoil - Leismer - October 2014**

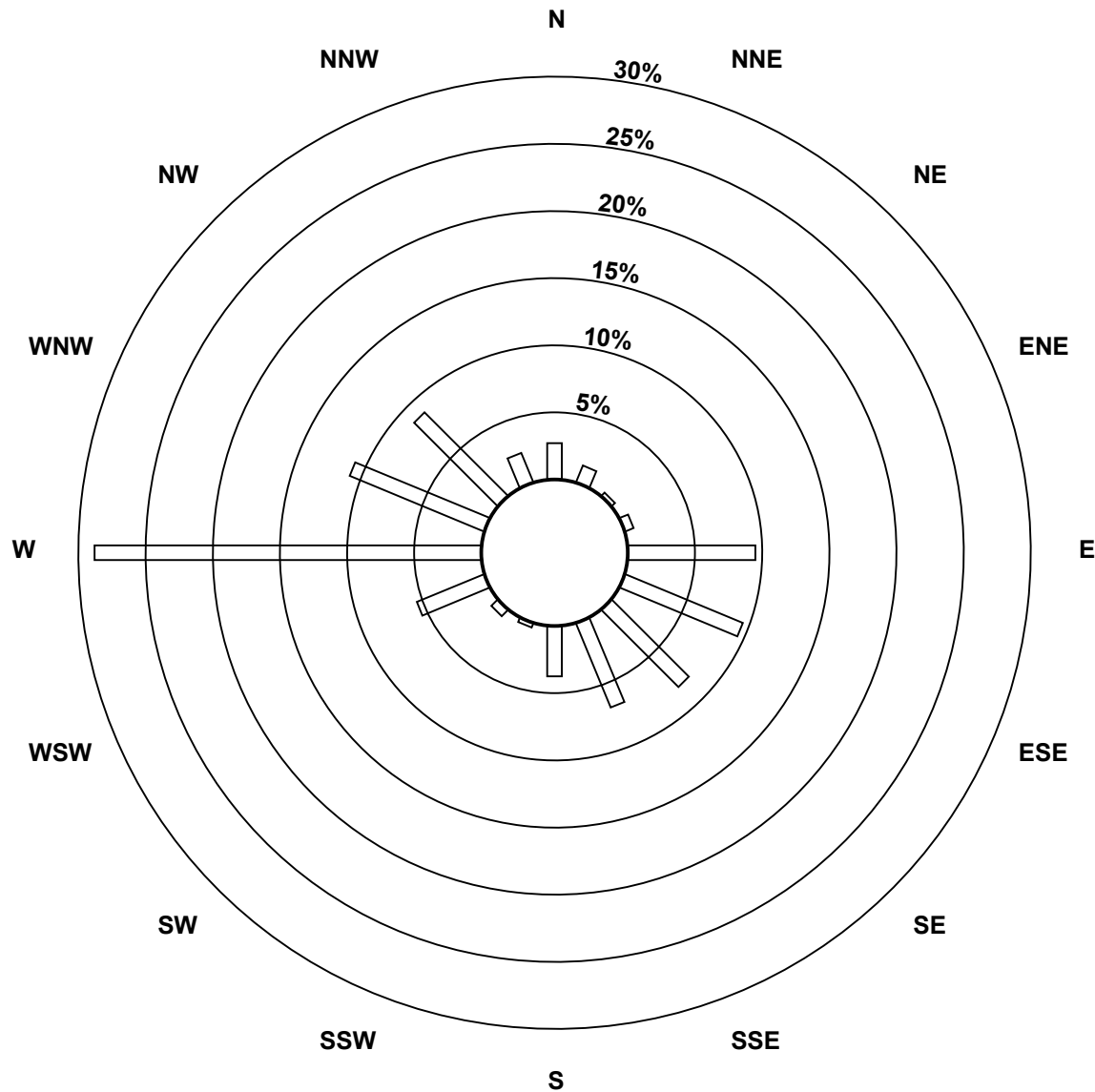
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	8	4	1	2	28	28	24	20	11	1	2	16	85	32	26	7	295
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 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>	8	4	1	2	28	28	24	20	11	1	2	16	85	32	26	7	295

Total Number of Valid Hours: 295

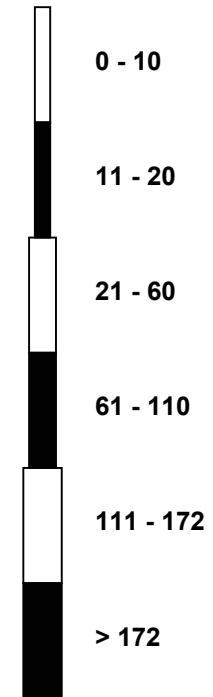
Total Number of Hours: 336

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Statoil - Leismer (AMS501)**



**Classes (ppb)**

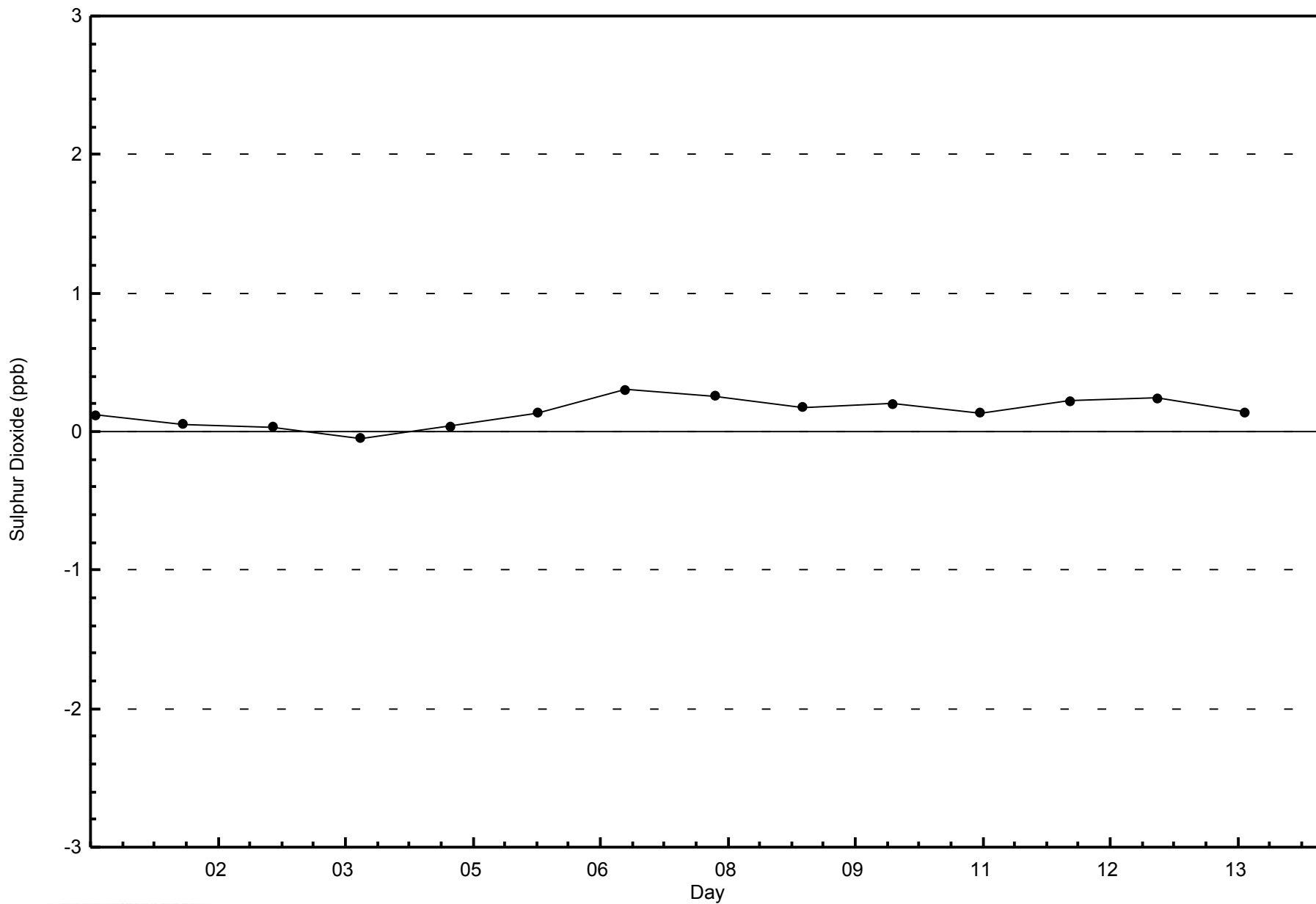


**Total Number of Valid Hours: 295**



WBEA  
Zero Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Statoil - Leismer - October 2014

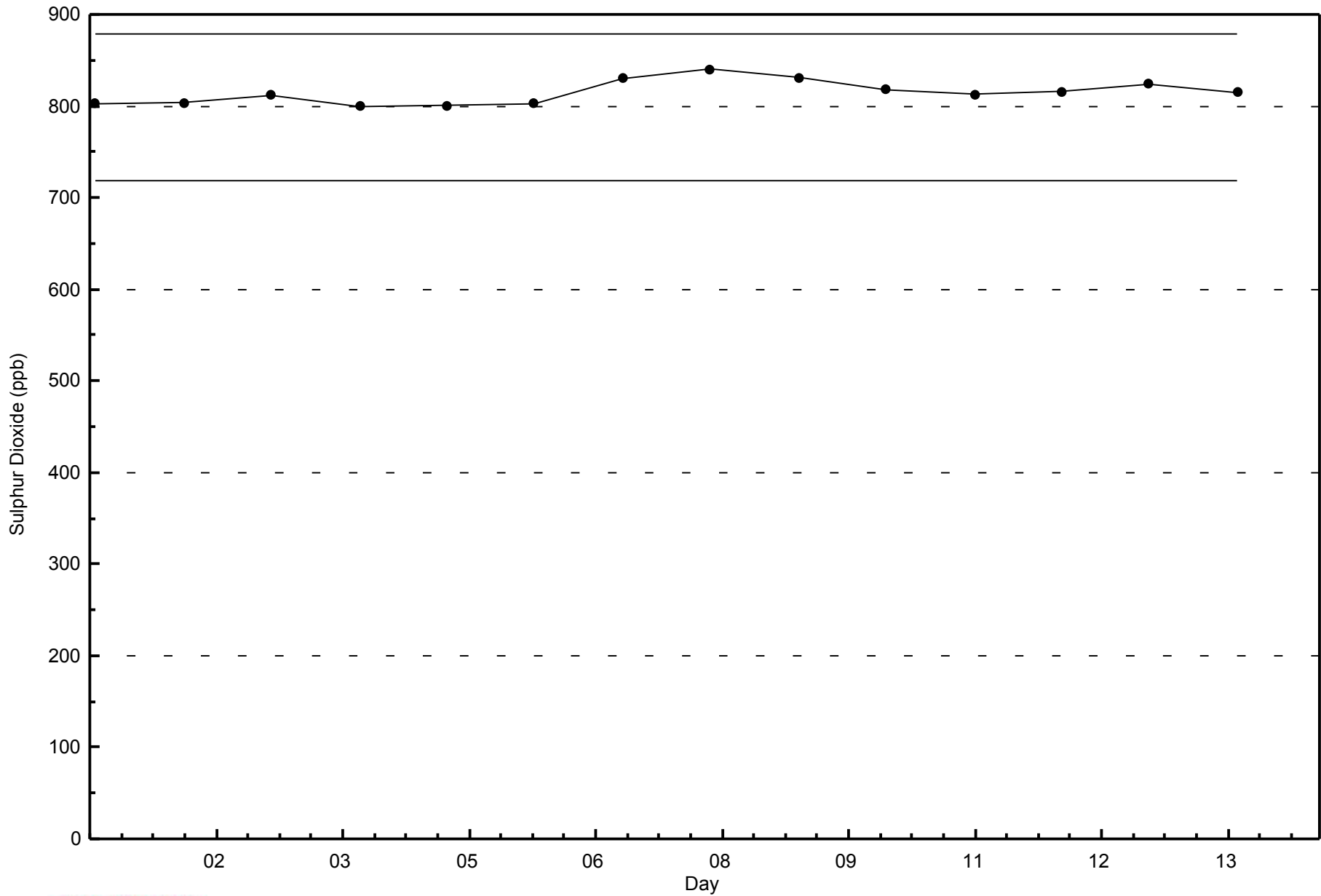






**WBEA**  
**Span Responses**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Statoil - Leismer - October 2014**



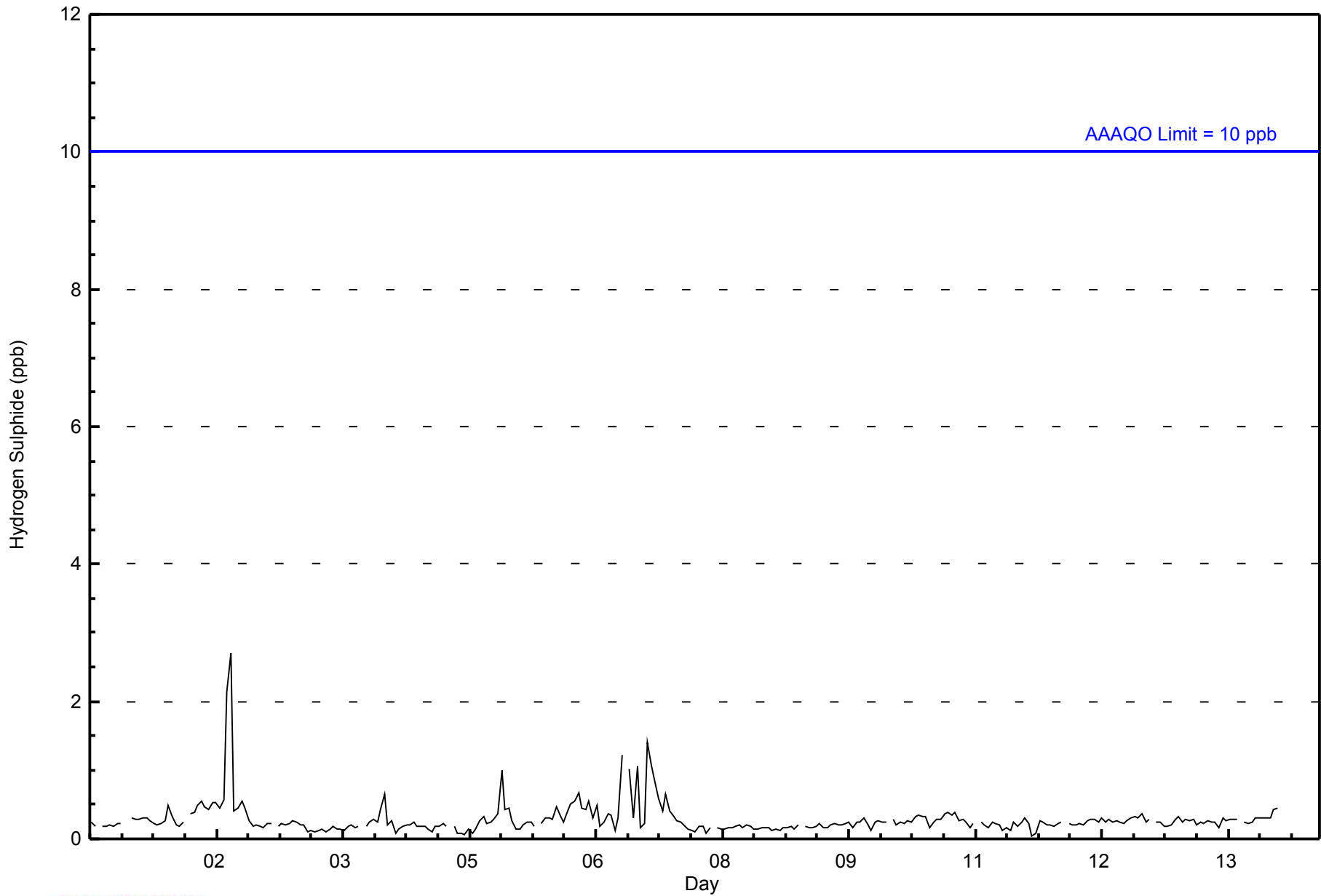


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 329																	
Maximum Value: 3 ppb on Oct 2 15:00										Maximum Daily Average: 0.6 ppb on Oct 2										Hours of Data: 309							
Minimum Value: 0 ppb on Oct 11 18:00										Minimum Daily Average: 0.2 ppb on Oct 8										Hours of Missing Data: 20							
Maximum Diurnal Average: 0.4 ppb at hour 15										Minimum Diurnal Average: 0.2 ppb at hour 21										Hours of Calibration: 18							
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: 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-Oct	0	0	Z	0	0	0	0	0	0	UO	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Oct	0	0	Z	0	0	0	1	0	0	1	1	0	1	2	3	0	0	1	0	0	0	0	0	0	0	0.6	3
3-Oct	0	0	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
4-Oct	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	0.2	1
5-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0.4	1
7-Oct	0	1	Z	1	0	1	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
8-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Oct	0	0	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
11-Oct	0	0	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-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
13-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
14-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	C	C	C	C	NS	NS	NS	NS	NS	NS	NS	NS	--	0
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan                      C - Calibration                      UO - Unstable Operation                      NS - Not in Service 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  
Statoil - Leismer - October 2014





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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Statoil - Leismer - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	308	99.68	99.68
3 - 4	1	0.32	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: 309

Total Number of Hours: 336



**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Statoil - Leismer - October 2014**

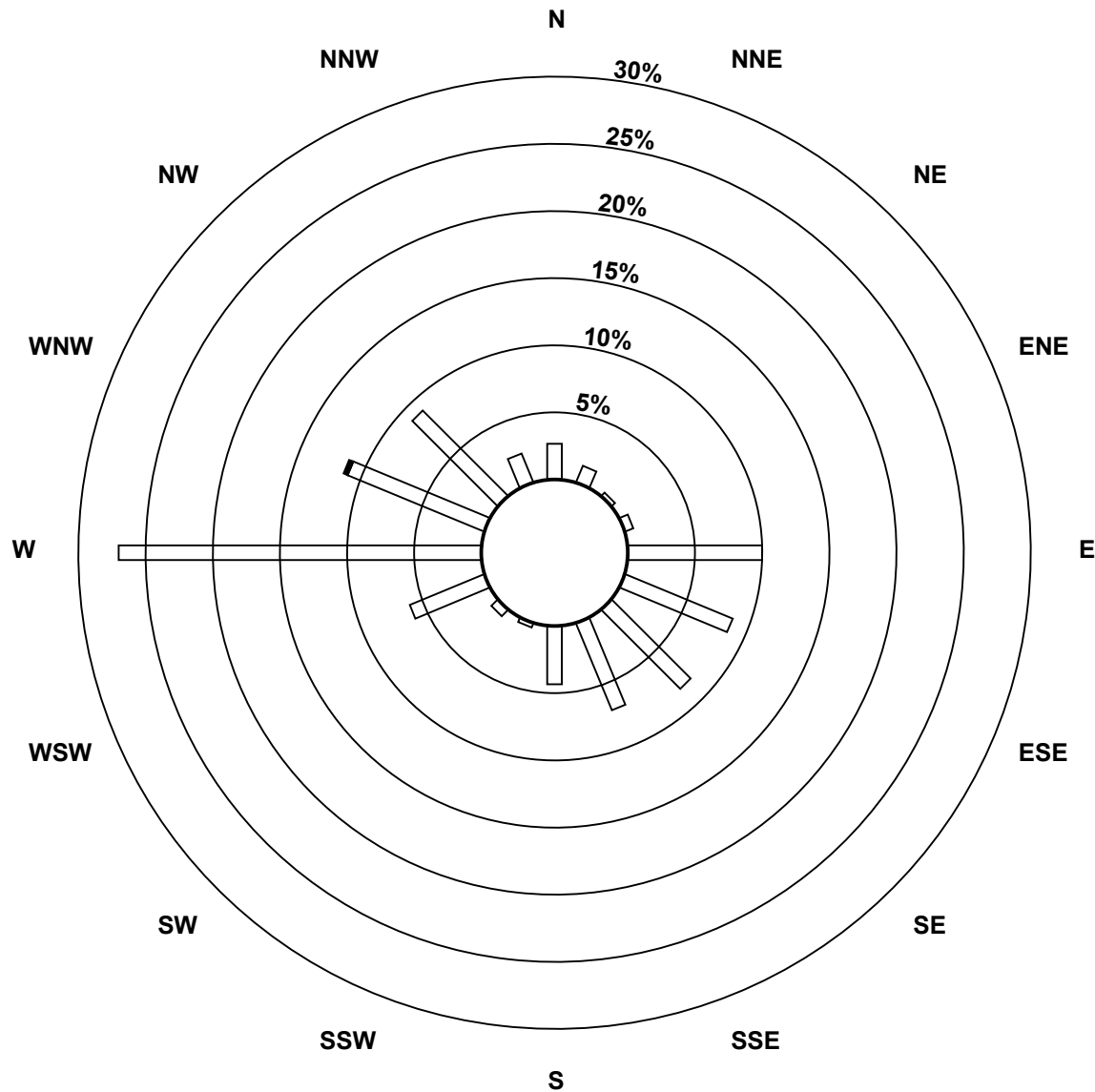
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	8	4	1	2	30	26	25	21	13	1	2	18	81	33	27	7	299
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	8	4	1	2	30	26	25	21	13	1	2	18	81	34	27	7	300

Total Number of Valid Hours: 300

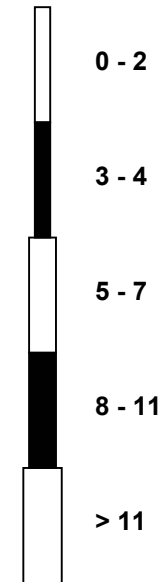
Total Number of Hours: 336

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Statoil - Leismer (AMS501)



Classes (ppb)

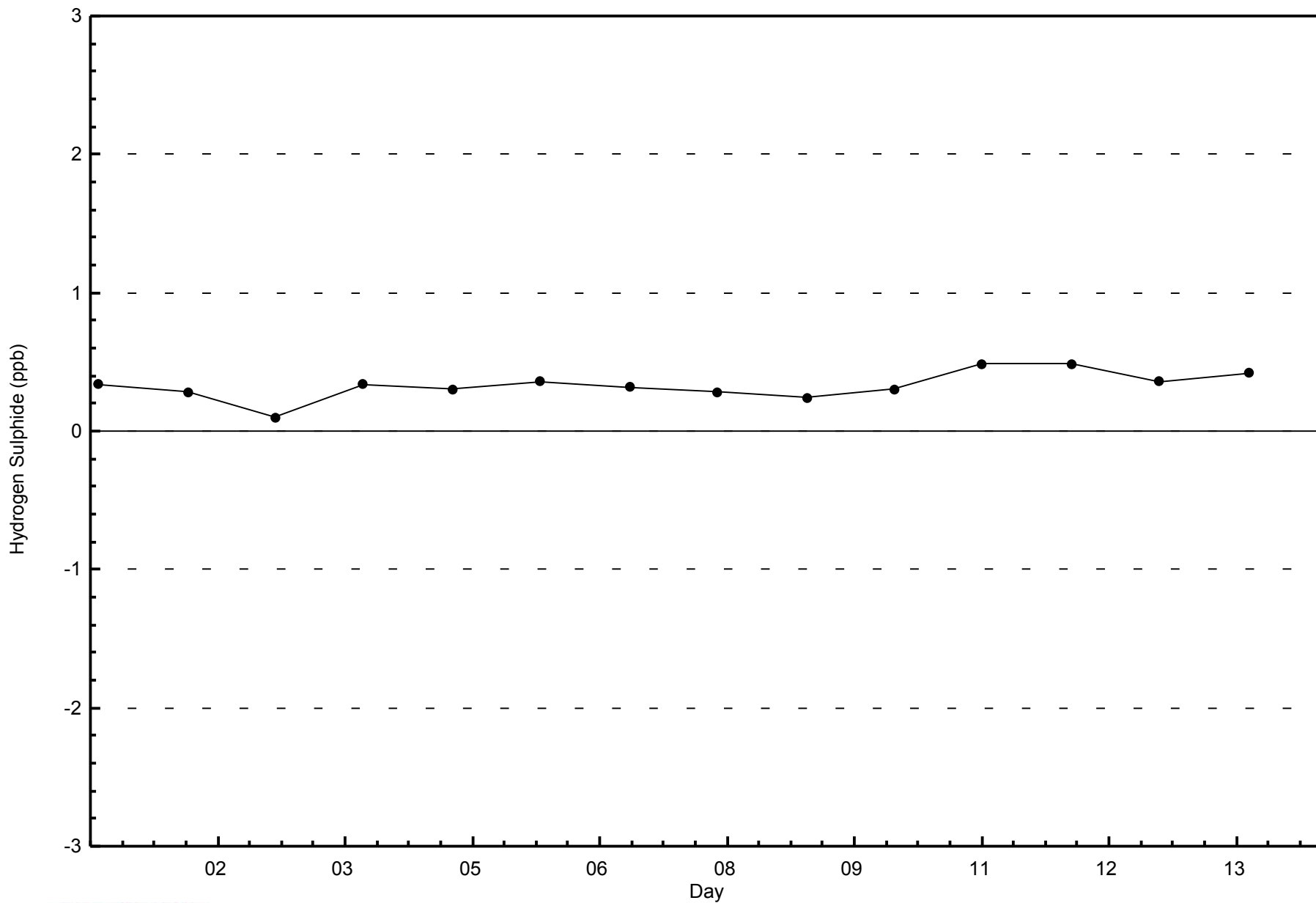


Total Number of Valid Hours: 300



WBEA  
Zero Responses

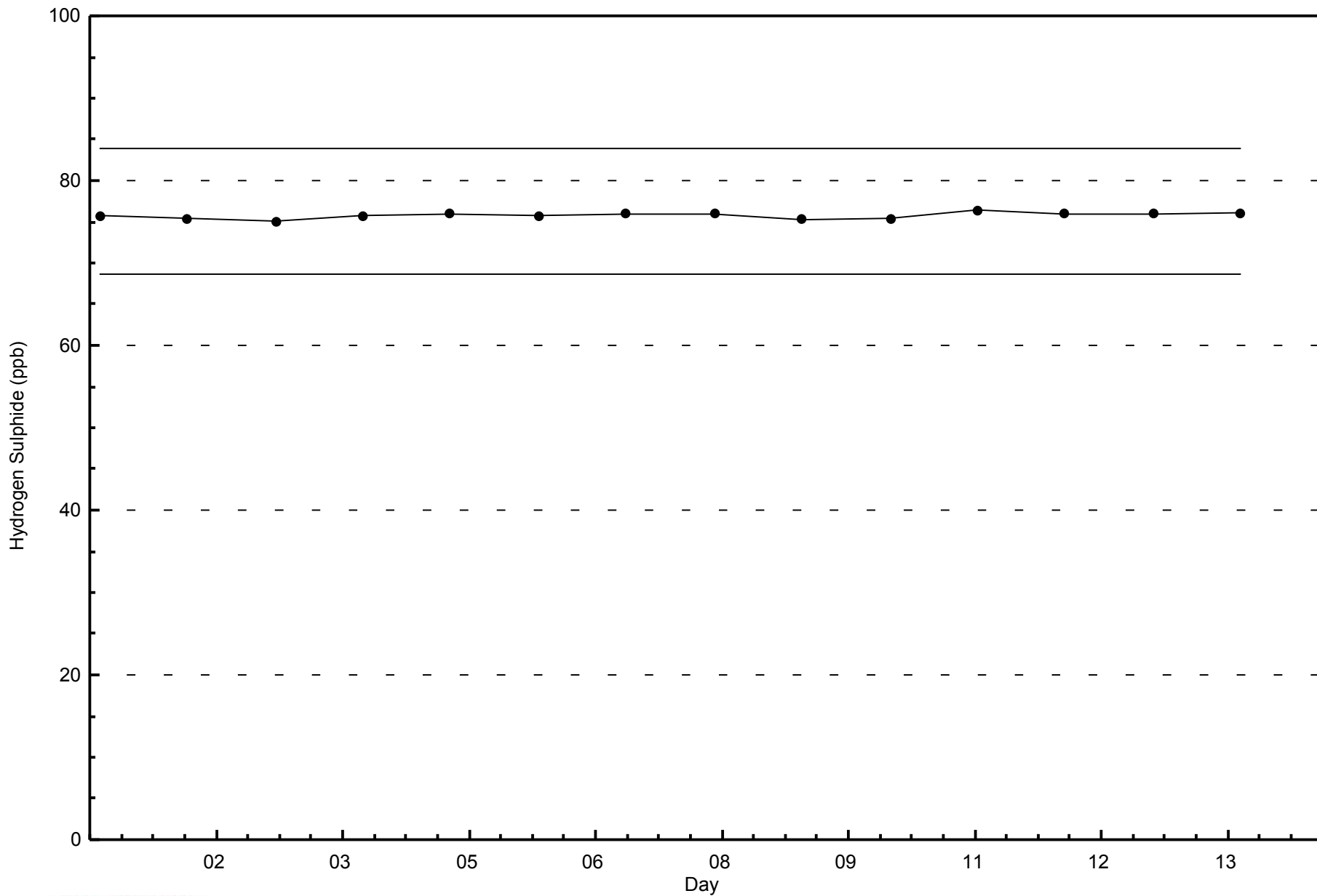
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Statoil - Leismer - October 2014





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Statoil - Leismer - October 2014



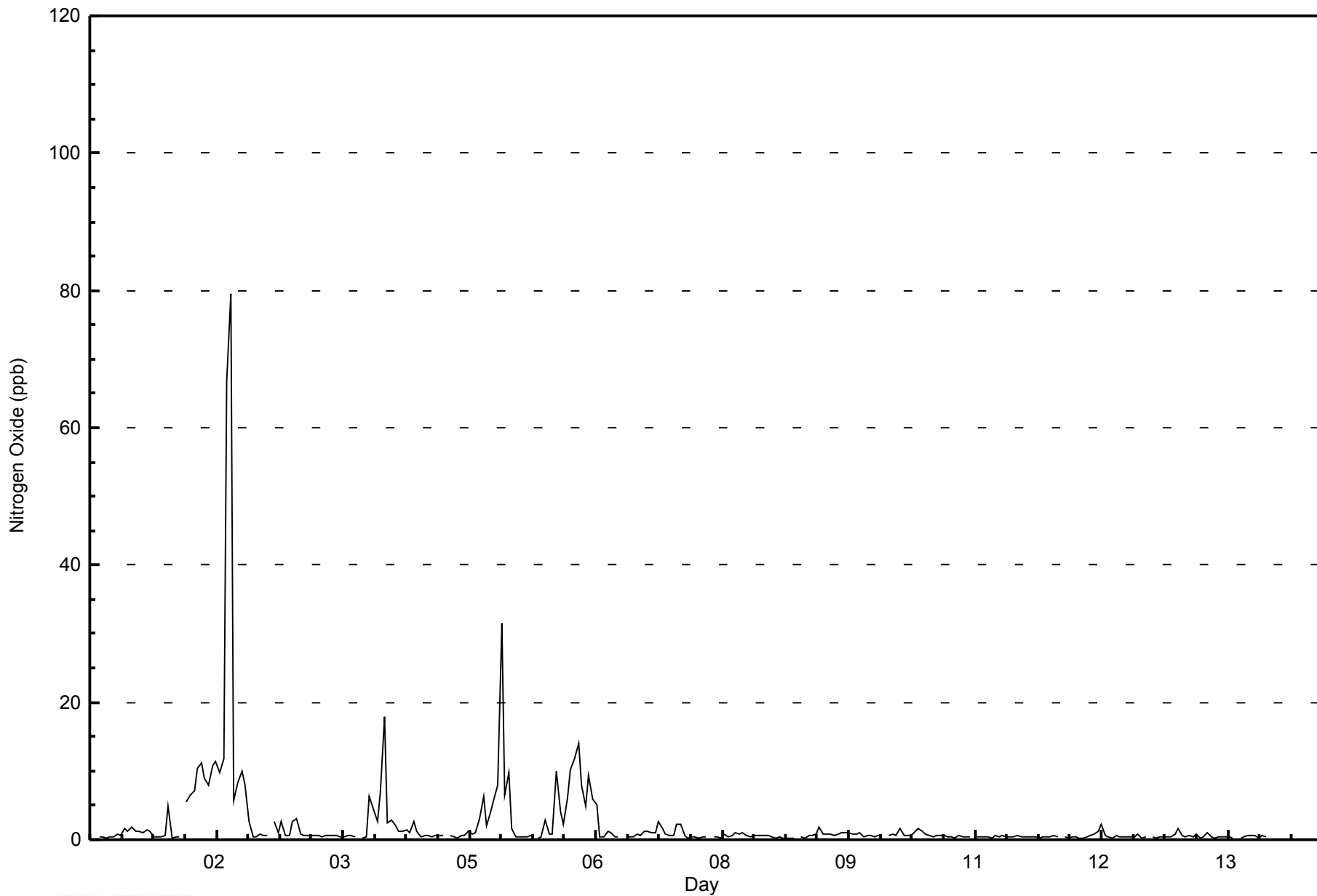






**WBEA**  
**Hourly Averages**

**Nitrogen Oxide (NO) - ppb**  
**Statoil - Leismer - October 2014**





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

**Nitrogen Oxide (NO) - ppb**  
**Statoil - Leismer - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	305	99.03	99.03
21 - 40	1	0.32	99.35
41 - 80	2	0.65	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 308

Total Number of Hours: 336



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**Statoil - Leismer - October 2014**

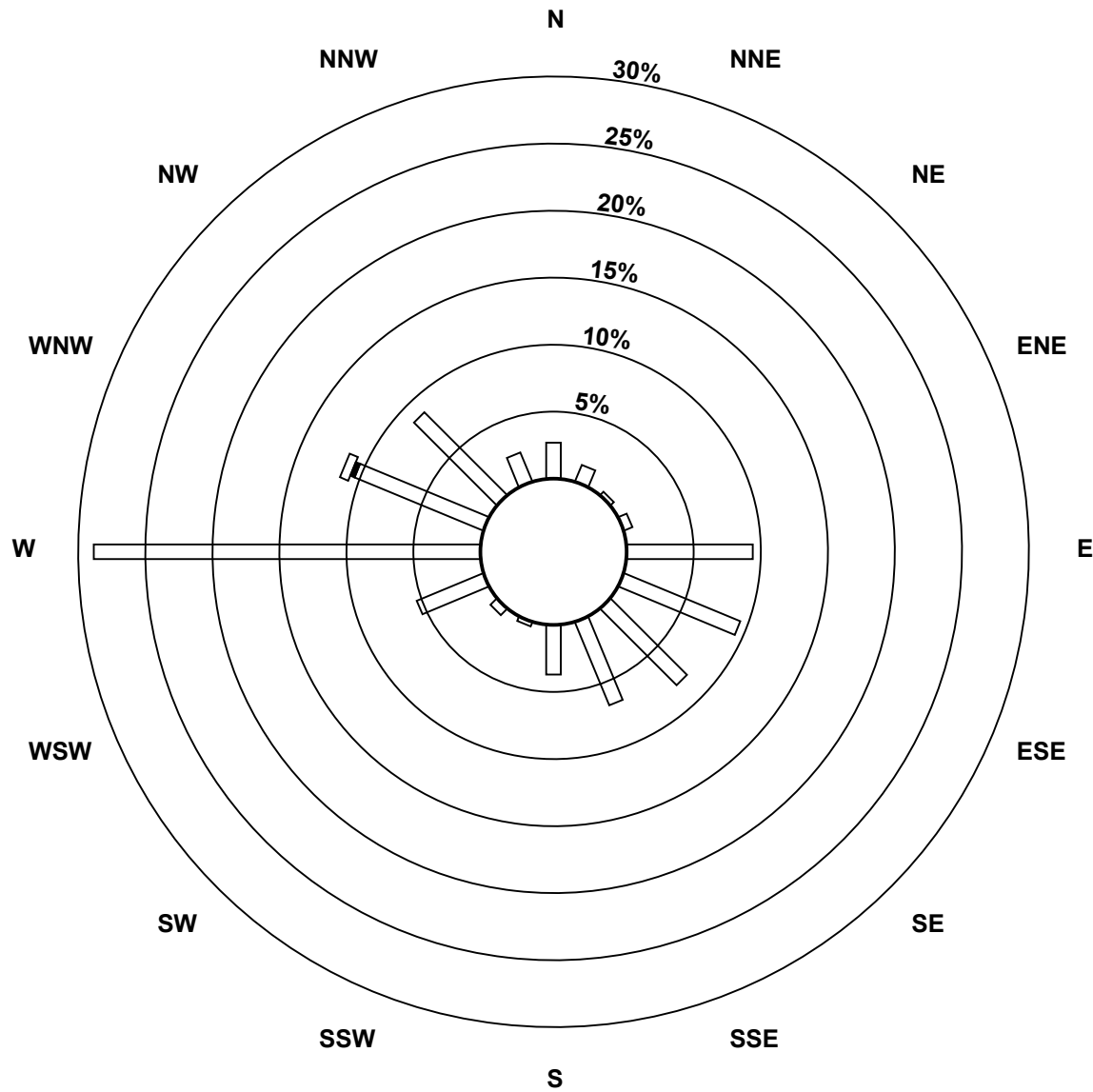
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	8	4	1	2	28	28	24	20	11	1	2	16	86	31	26	7	295
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	8	4	1	2	28	28	24	20	11	1	2	16	86	34	26	7	298

Total Number of Valid Hours: 298

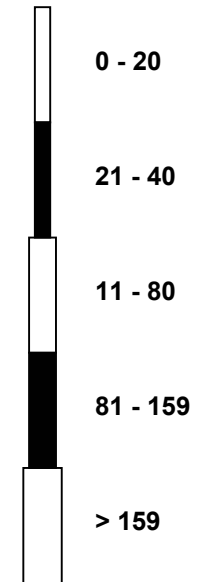
Total Number of Hours: 336

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Oxide (NO) - ppb  
Statoil - Leismer (AMS501)**



**Classes (ppb)**

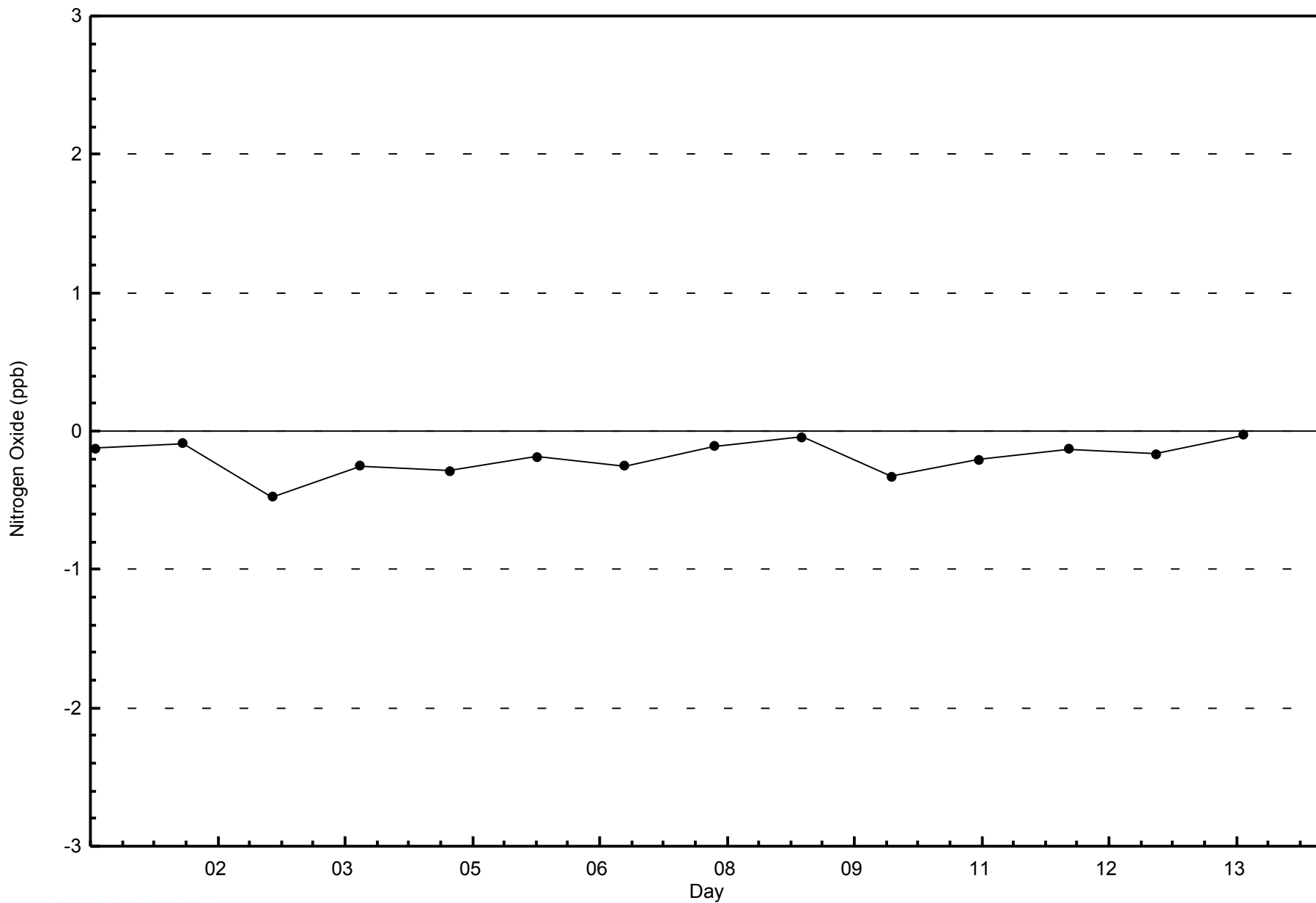


**Total Number of Valid Hours: 298**



WBEA  
Zero Responses

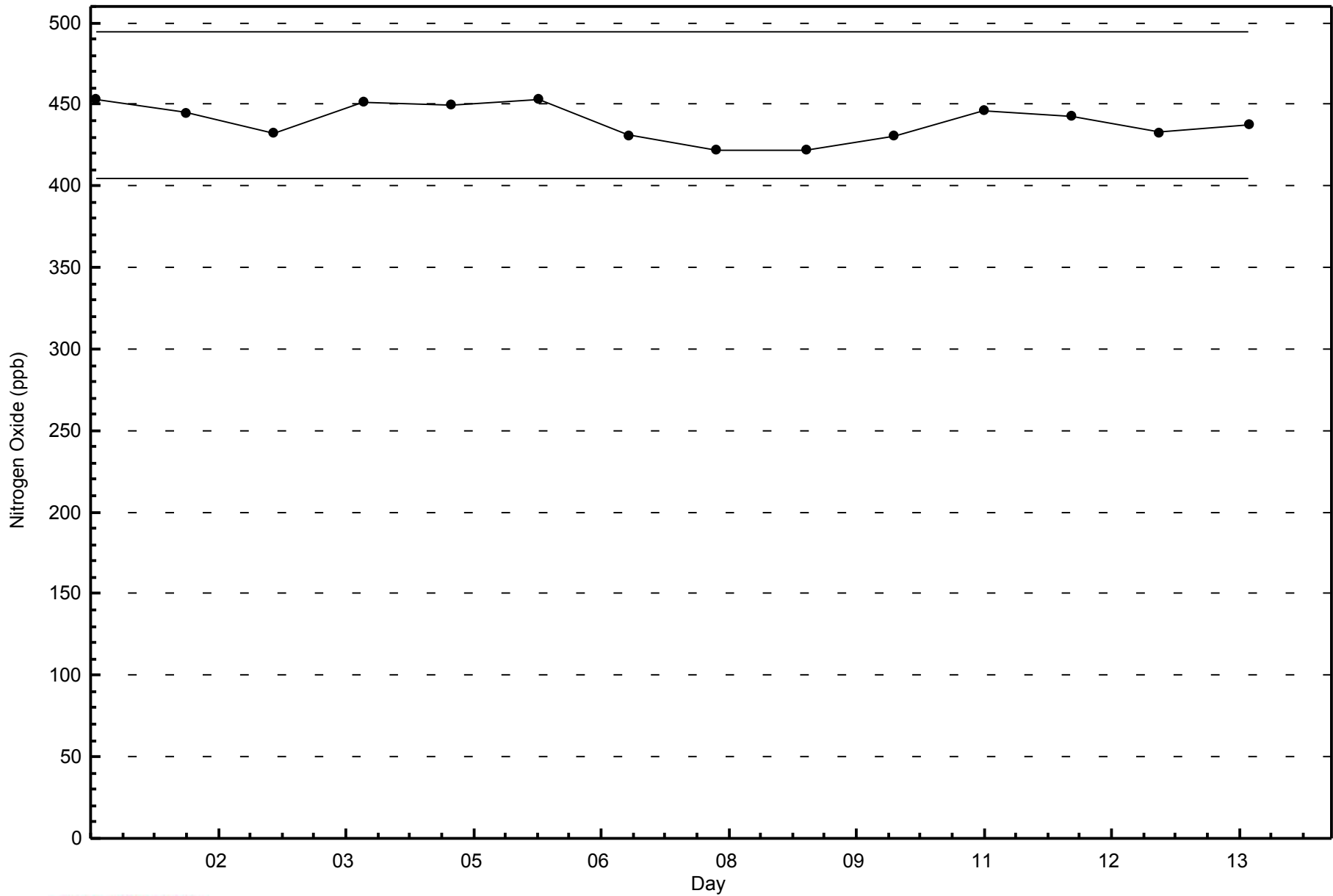
Nitrogen Oxide (NO) - ppb  
Statoil - Leismer - October 2014





WBEA  
Span Responses

Nitrogen Oxide (NO) - ppb  
Statoil - Leismer - October 2014





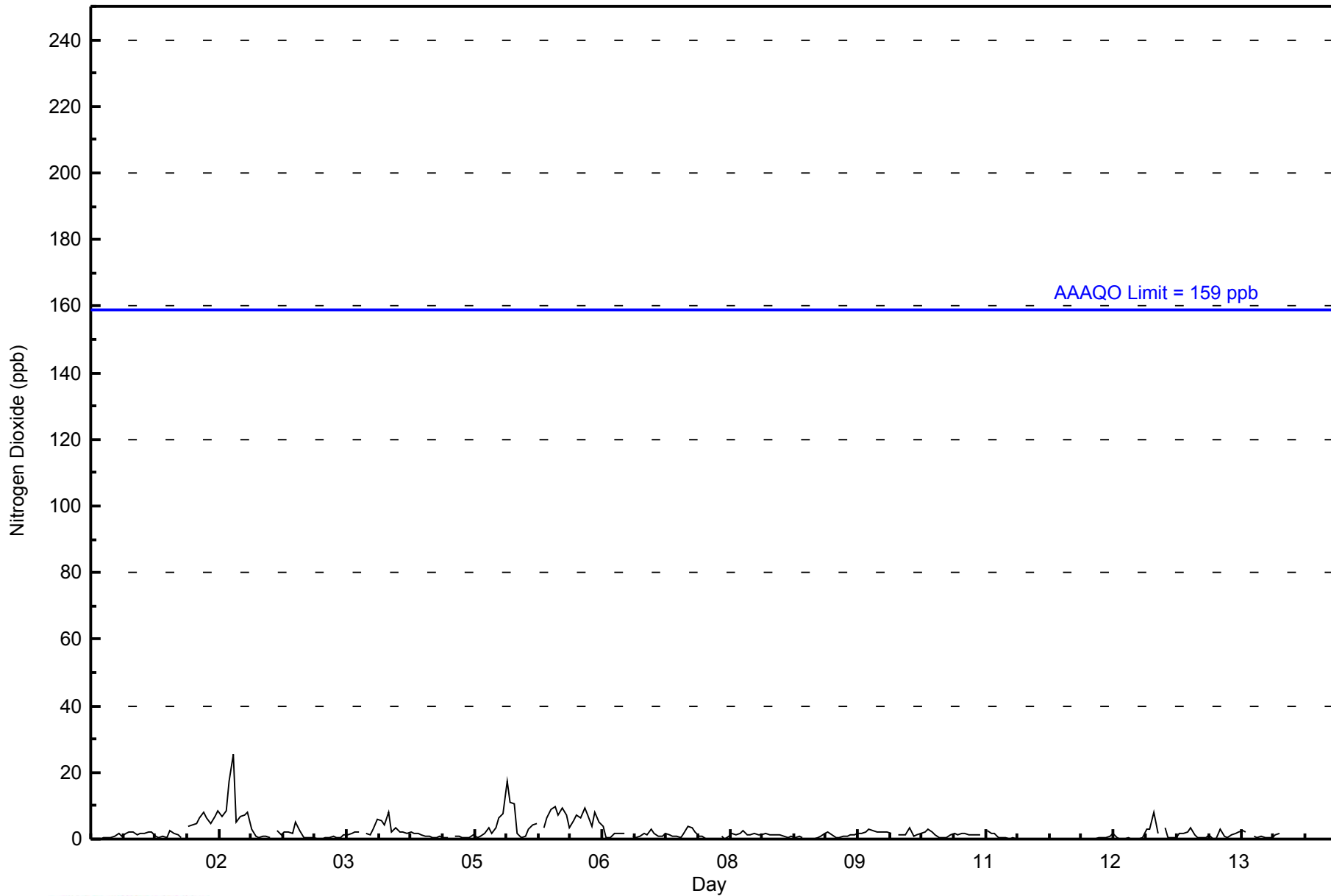
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0		Hours in Service: 329																									
Maximum Value: 26 ppb on Oct 2 15:00		Maximum Daily Average: 6.3 ppb on Oct 2																									
Minimum Value: 0 ppb on Oct 8 00:00		Hours of Data: 308																									
Maximum Diurnal Average: 3.7 ppb at hour 15		Hours of Missing Data: 21																									
Monthly Average: 2.1 ppb		Hours of Calibration: 21																									
		Percent Operational Time: 100.0																									
		Minimum Daily Average: 0.4 ppb on Oct 11																									
		Minimum Diurnal Average: 0.8 ppb at hour 21																									
		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 6 P <sub>99</sub> = 17																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	Z	0	1	1	1	1	2	1	2	2	2	1	2	2	2	2	1	1	1	1	3	2	1	1.2	3	
2-Oct	0	Z	4	4	5	6	8	6	5	7	8	7	9	18	26	5	7	7	8	3	1	1	1	1	6.3	26	
3-Oct	1	Z	3	1	2	2	2	5	3	1	1	0	0	0	0	1	1	1	1	1	1	2	2	1.3	5		
4-Oct	2	Z	2	1	3	6	5	4	8	2	3	2	2	2	2	2	2	1	1	1	0	0	1	1	2.3	8	
5-Oct	1	Z	1	1	1	1	1	1	1	1	2	4	2	4	6	8	17	11	11	2	1	1	3	4	3.5	17	
6-Oct	5	Z	3	6	9	10	7	9	7	4	5	7	7	9	7	4	8	5	4	0	0	2	2	2	5.4	10	
7-Oct	2	Z	1	1	1	2	1	3	2	1	1	2	1	1	1	1	2	4	3	2	1	1	0	0	1.3	4	
8-Oct	0	Z	1	0	1	2	1	2	3	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1.1	3	
9-Oct	0	Z	0	0	1	1	2	2	1	0	1	1	1	1	1	2	2	2	3	3	2	2	2	2	1.4	3	
10-Oct	2	Z	1	1	1	3	1	1	2	2	3	2	1	1	0	1	1	2	1	2	2	1	1	1	1.5	3	
11-Oct	1	Z	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
12-Oct	0	Z	0	0	0	0	0	0	1	0	1	1	2	0	0	0	0	0	0	0	1	3	3	8	0.9	8	
13-Oct	2	Z	3	1	1	0	2	2	2	3	1	0	1	0	1	0	0	3	1	1	1	2	2	2	1.4	3	
14-Oct	2	Z	1	1	1	1	1	1	1	2	C	C	C	C	C	C	C	C	NS	NS	NS	NS	NS	NS	NS	--	2
		1.2	--	1.6	1.4	1.9	2.4	2.2	2.7	2.5	1.9	2.2	2.3	2.1	3.0	3.7	1.9	3.3	2.9	2.6	1.1	0.8	1.4	1.5	1.9	Diurnal Average	
		5	--	4	6	9	10	8	9	8	7	8	7	9	18	26	8	17	11	11	3	2	3	3	8	Diurnal Maximum	
Z - zerospan		C - Calibration						NS - Not in Service																			
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr		159 ppb																									





**WBEA**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Statoil - Leismer - October 2014**





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Statoil - Leismer - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	307	99.68	99.68
21 - 40	1	0.32	100.00
11 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 308

Total Number of Hours: 336



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Statoil - Leismer - October 2014**

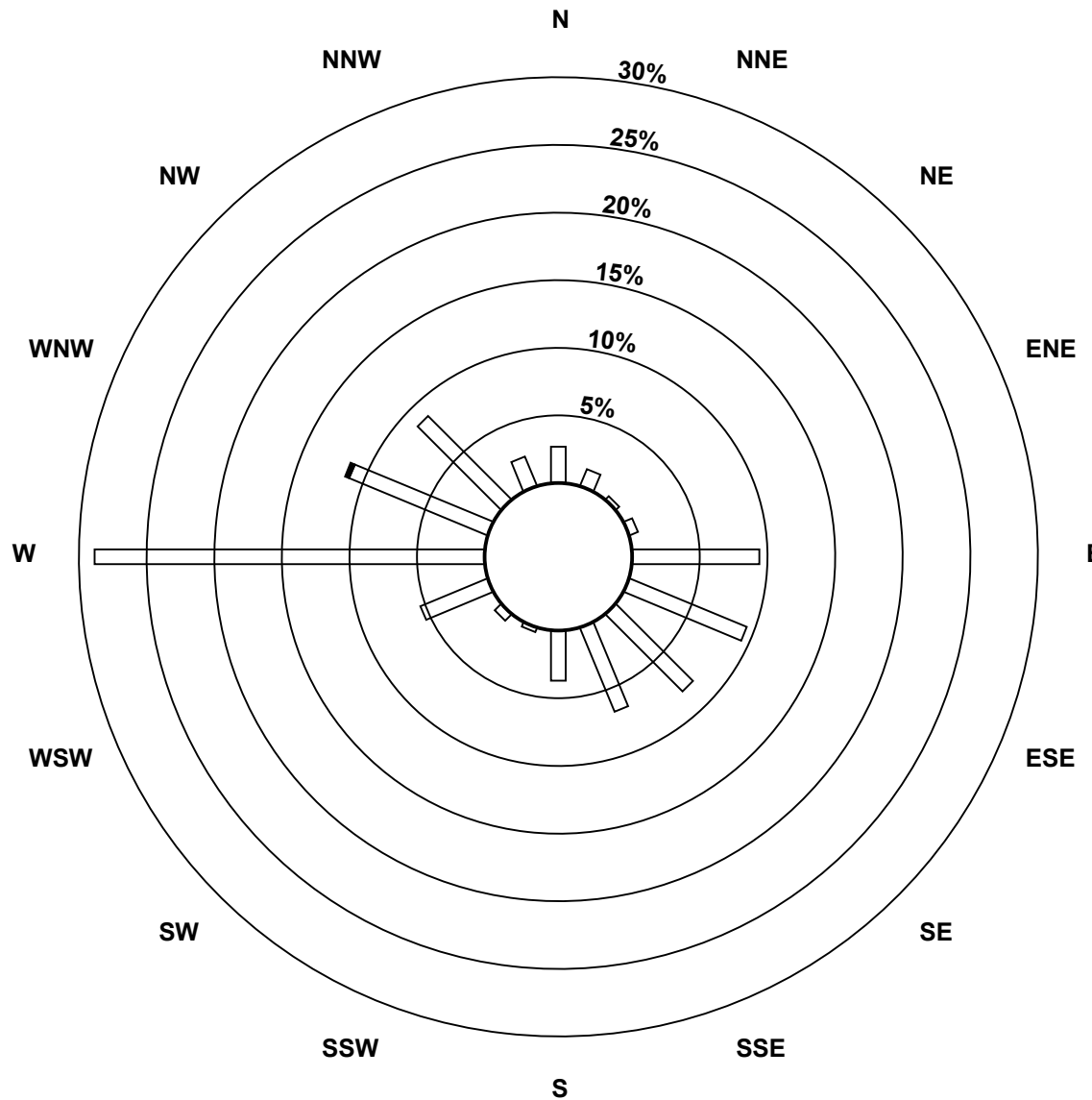
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	8	4	1	2	28	28	24	20	11	1	2	16	86	33	26	7	297
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	8	4	1	2	28	28	24	20	11	1	2	16	86	34	26	7	298

Total Number of Valid Hours: 298

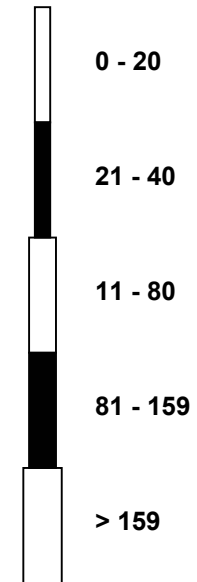
Total Number of Hours: 336

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Statoil - Leismer (AMS501)



Classes (ppb)

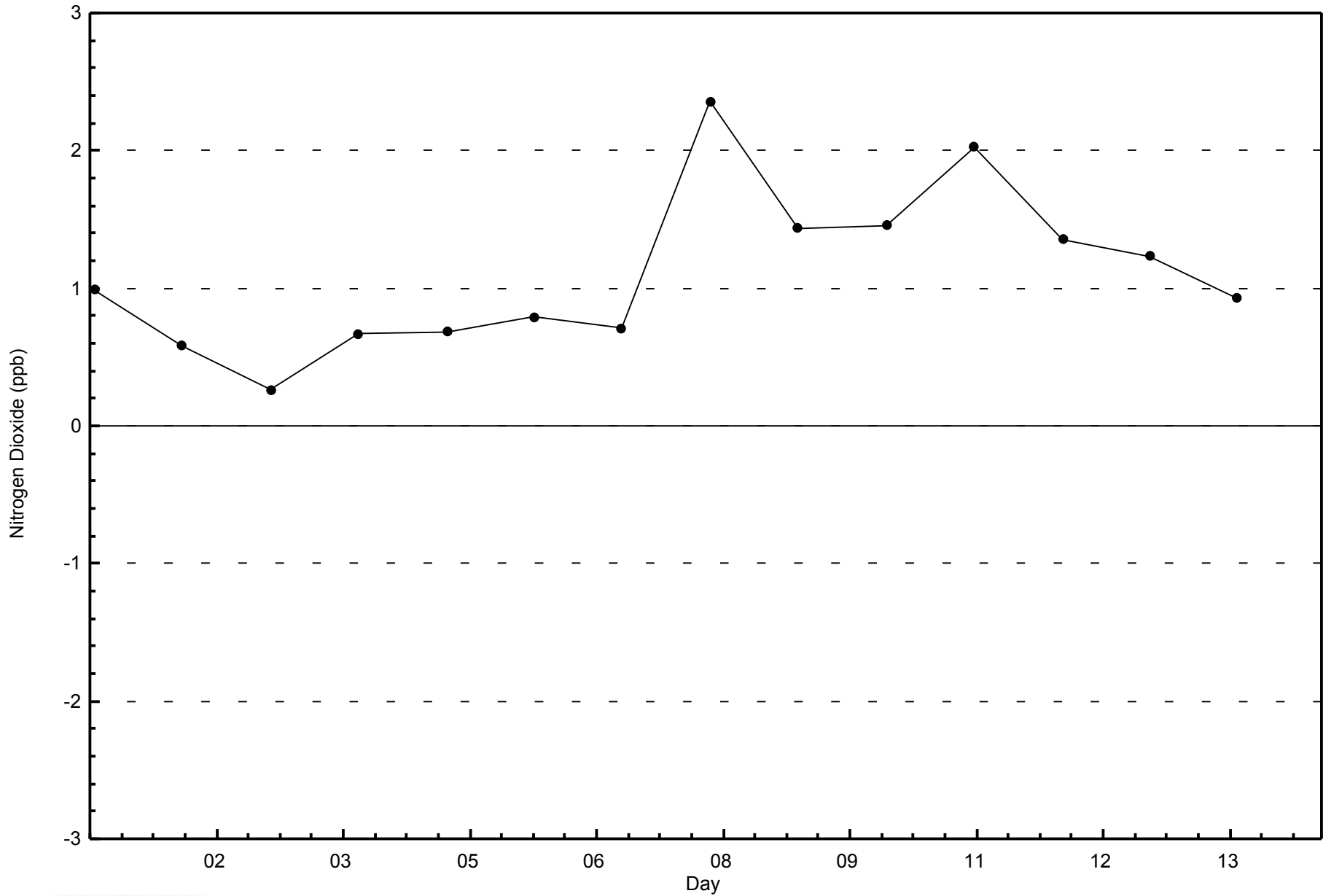


Total Number of Valid Hours: 298



WBEA  
Zero Responses

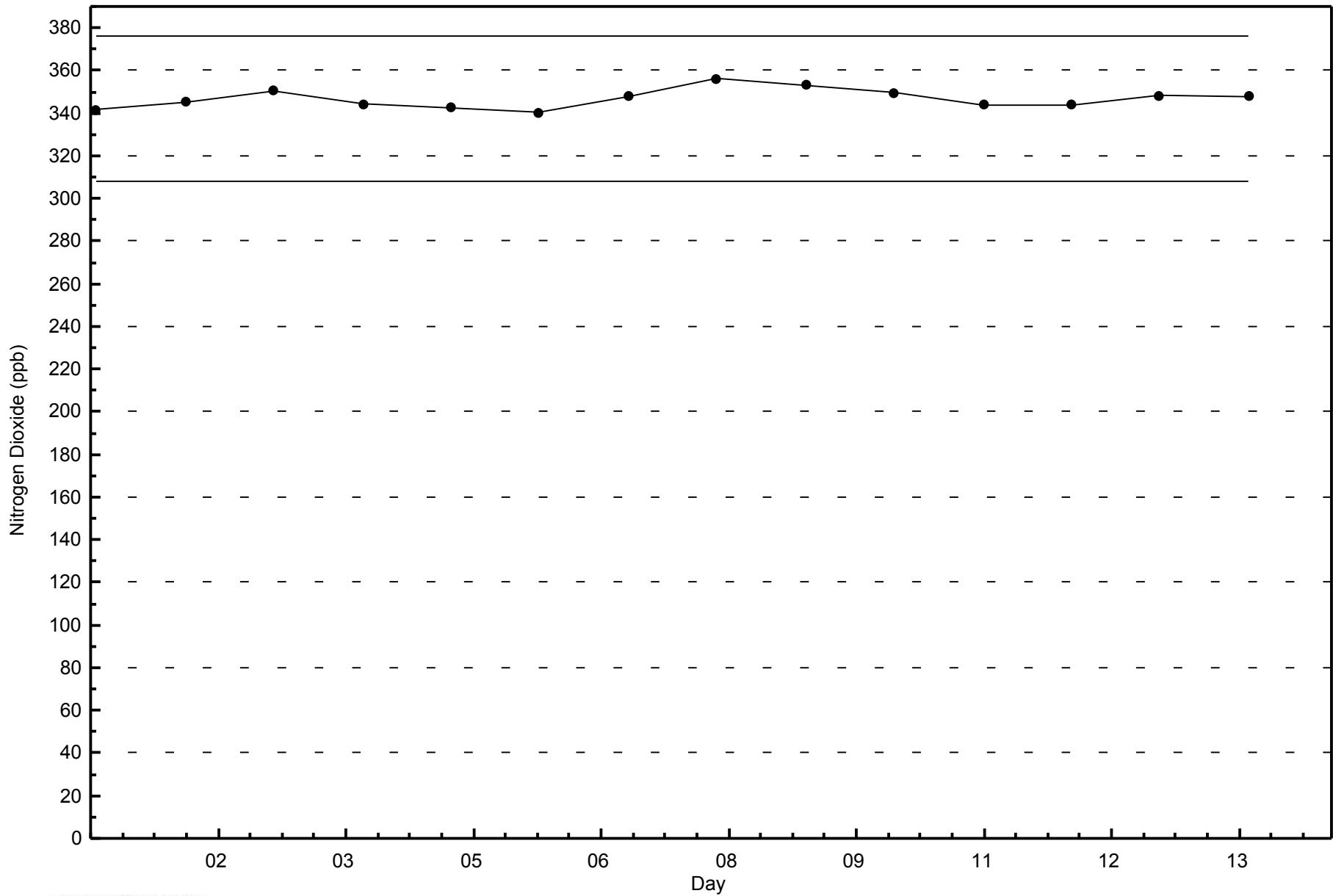
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Statoil - Leismer - October 2014





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Statoil - Leismer - October 2014



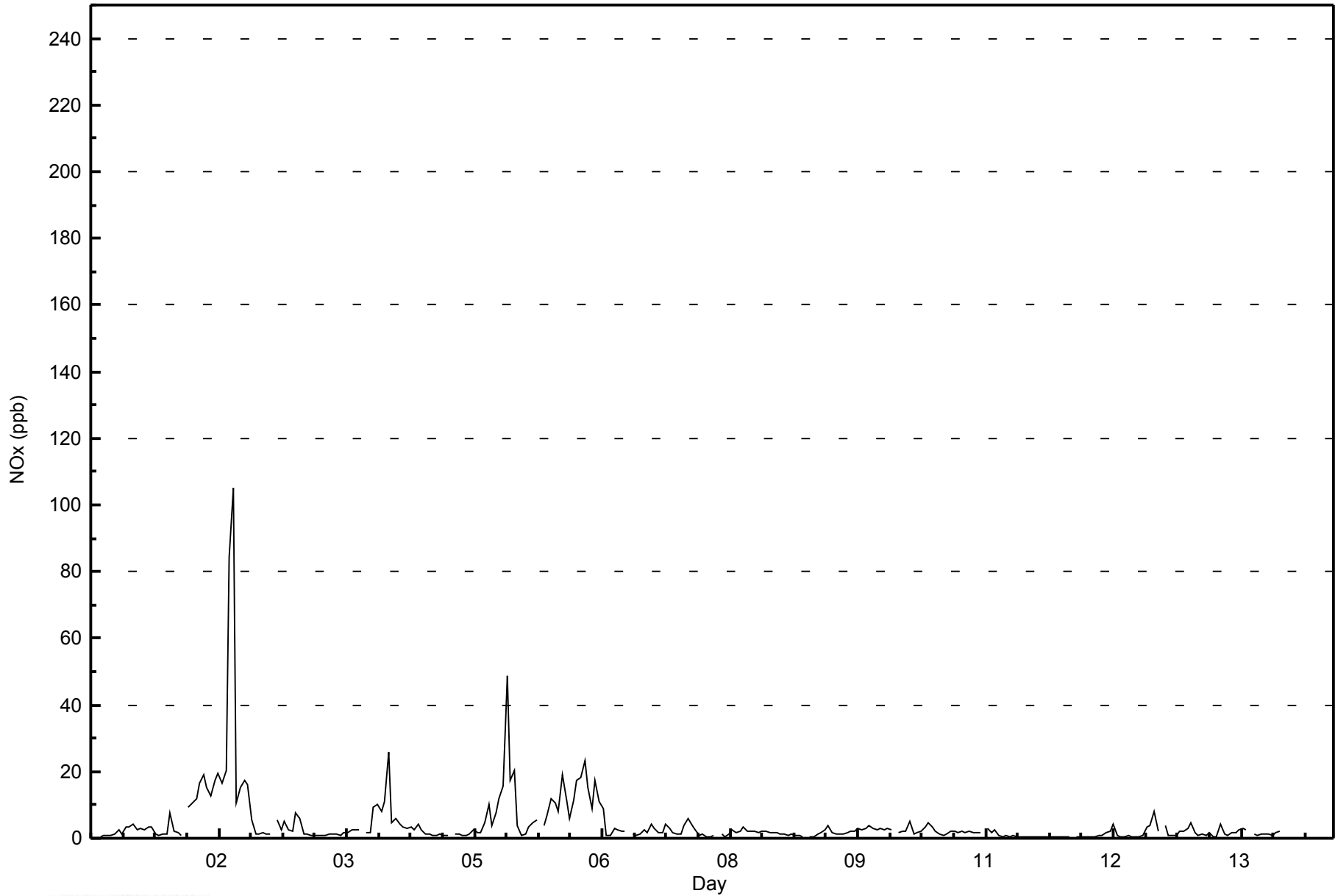


Maximum Value: 105 ppb on Oct 2 15:00										Maximum Daily Average: 18.7 ppb on Oct 2										Hours in Service: 329						
Minimum Value: 0 ppb on Oct 12 04:00										Minimum Daily Average: 0.8 ppb on Oct 11										Hours of Data: 308						
Maximum Diurnal Average: 11.4 ppb at hour 15										Minimum Diurnal Average: 1.2 ppb at hour 21										Hours of Missing Data: 21						
Monthly Average: 4.3 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 11 P <sub>99</sub> = 28										Hours of Calibration: 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-Oct	0	Z	1	1	1	1	1	3	1	3	3	4	3	3	3	3	3	1	1	1	1	7	2	2	2.2	7
2-Oct	1	Z	9	11	12	16	19	15	13	18	20	17	20	84	105	11	15	17	16	5	1	1	2	1	18.7	105
3-Oct	1	Z	5	2	5	3	2	8	6	1	1	1	1	1	1	1	1	1	1	1	2	2	3	2.3	8	
4-Oct	2	Z	2	2	9	10	8	11	26	5	6	4	4	3	4	3	4	3	1	1	1	1	1	4.9	26	
5-Oct	1	Z	1	1	1	1	1	3	2	2	5	10	4	8	12	16	49	17	20	4	1	1	3	5	7.3	49
6-Oct	6	Z	4	7	12	11	8	19	11	6	12	18	18	23	15	9	17	11	9	1	1	3	3	2	9.8	23
7-Oct	2	Z	1	1	1	2	2	4	3	2	2	4	3	2	1	1	4	6	4	2	1	1	0	0	2.2	6
8-Oct	1	Z	1	1	1	2	2	2	4	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1.6	4
9-Oct	1	Z	0	0	1	2	2	4	2	1	1	1	2	2	2	3	2	3	4	3	3	3	3	3	2.1	4
10-Oct	3	Z	2	2	2	5	1	2	2	3	5	3	2	1	1	1	2	2	2	2	2	2	2	2	2.2	5
11-Oct	2	Z	3	2	2	1	0	1	0	1	0	0	1	1	0	1	0	0	0	0	1	1	1	1	0.8	3
12-Oct	0	Z	0	0	0	1	0	1	1	1	2	2	4	1	1	0	1	0	0	0	1	3	4	8	1.4	8
13-Oct	2	Z	4	1	1	1	2	2	3	5	2	1	1	1	2	0	1	4	1	1	2	2	3	3	1.9	5
14-Oct	2	Z	1	1	1	1	1	1	2	2	C	C	C	C	C	C	C	NS	NS	NS	NS	NS	NS	NS	--	2
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan																										
C - Calibration																										
NS - Not in Service																										



WBEA  
Hourly Averages

NOx (NO<sub>x</sub>) - ppb  
Statoil - Leismer - October 2014







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

**NO<sub>x</sub> (NO<sub>x</sub>) - ppb**  
**Statoil - Leismer - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	303	98.38	98.38
21 - 40	2	0.65	99.03
11 - 80	1	0.32	99.35
81 - 159	2	0.65	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 308

Total Number of Hours: 336



**WBEA**  
**Frequency Distribution**

**NOx (NO<sub>x</sub>) - ppb**  
**Statoil - Leismer - October 2014**

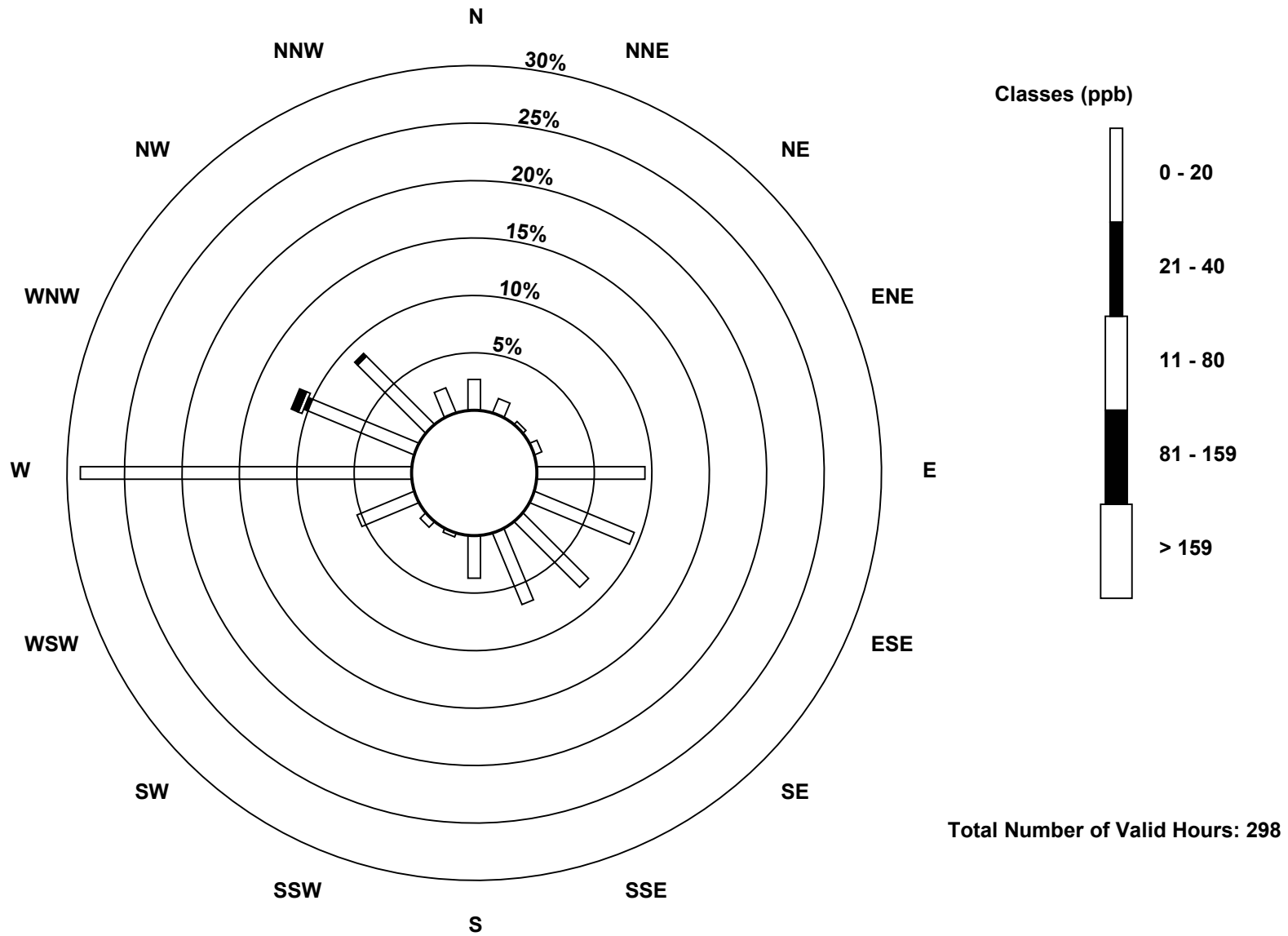
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	8	4	1	2	28	28	24	20	11	1	2	16	86	30	25	7	293
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	8	4	1	2	28	28	24	20	11	1	2	16	86	34	26	7	298

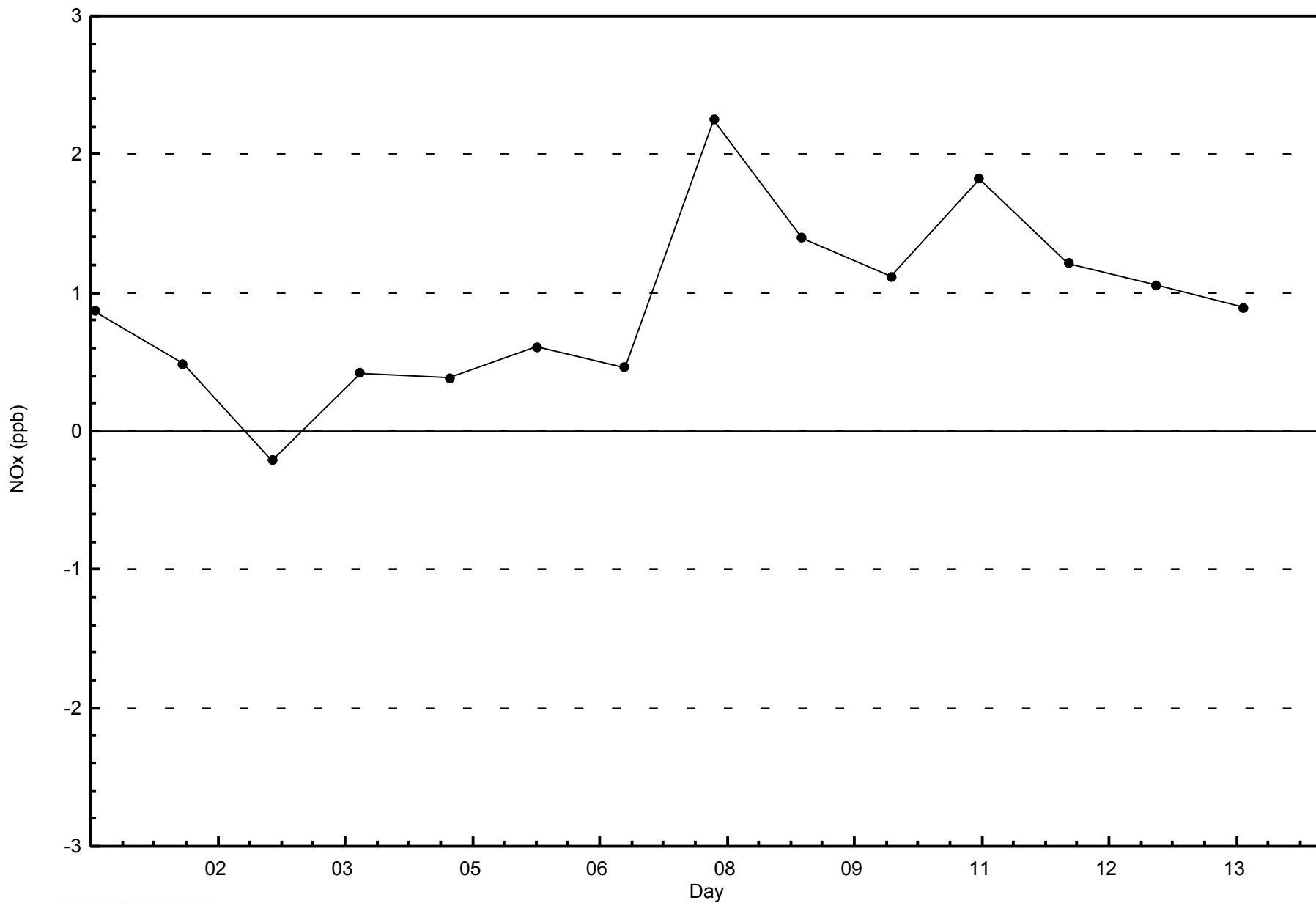
Total Number of Valid Hours: 298

Total Number of Hours: 336

Wood Buffalo Environmental Association  
Wind Rose Oct 2014

NO<sub>x</sub> (NO<sub>x</sub>) - ppb  
Statoil - Leismer (AMS501)

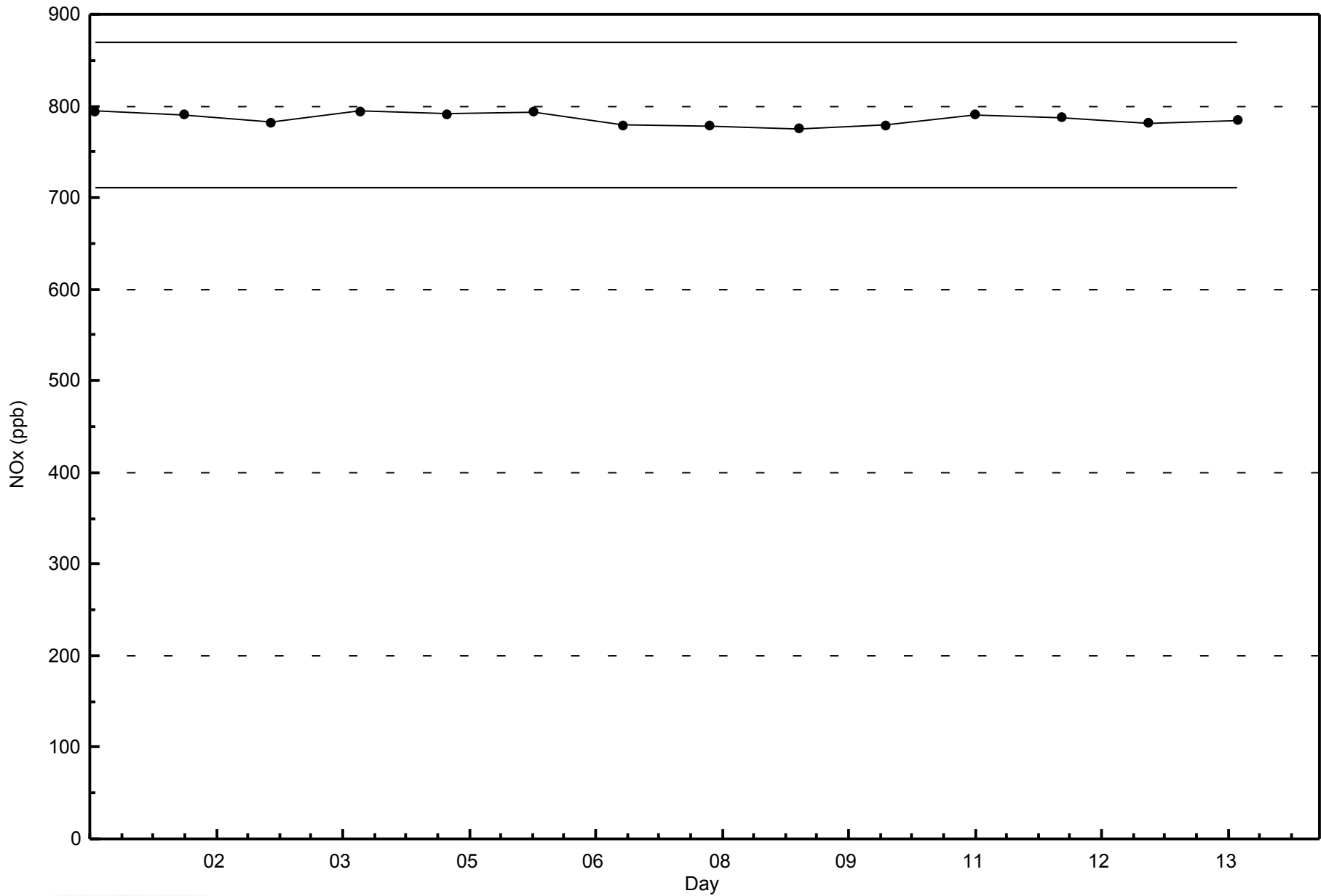






WBEA  
Span Responses

NOx (NO<sub>x</sub>) - ppb  
Statoil - Leismer - October 2014





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

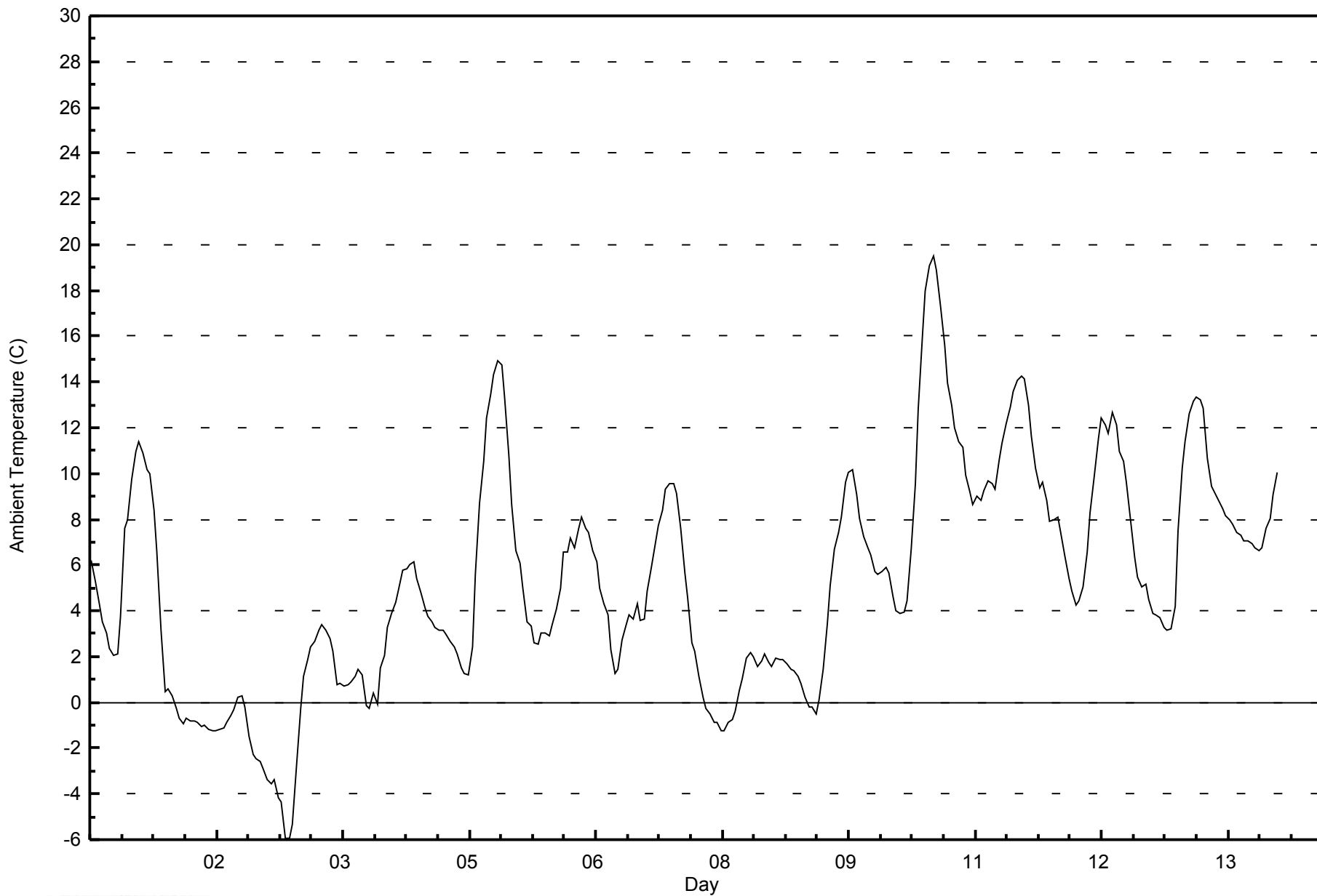
**Ambient Temperature (AT) - C**  
**Statoil - Leismer - October 2014**

Maximum Value: 19.5 C on Oct 10 15:00 Minimum Value: -5.9 C on Oct 3 07:00 Maximum Diurnal Average: 9.4 C at hour 16 Monthly Average: 5.28 C		Maximum Daily Average: 11.0 C on Oct 10 Minimum Daily Average: -1.1 C on Oct 2 Minimum Diurnal Average: 2.1 C at hour 7 Percentiles: P <sub>1</sub> = -4.4 P <sub>10</sub> = -0.7 Q <sub>1</sub> = 1.5 Median = 4.9 Q <sub>3</sub> = 8.8 P <sub>90</sub> = 12.0 P <sub>99</sub> = 18.8		Hours in Service: 325 Hours of Data: 325 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-Oct	6.2	5.3	4.2	3.5	3.0	2.4	2.1	2.1	3.7	7.6	7.9	9.8	11.0	11.4	10.9	10.2	10.0	8.4	6.6	3.1	0.5	0.6	0.3	-0.3	5.4	11.4
2-Oct	-0.7	-0.9	-0.7	-0.8	-0.8	-0.9	-1.0	-1.0	-1.2	-1.3	-1.3	-1.2	-1.1	-0.9	-0.5	-0.3	0.2	0.3	-0.2	-1.5	-2.3	-2.5	-2.6	-2.9	-1.1	0.3
3-Oct	-3.4	-3.6	-3.4	-4.2	-4.4	-5.9	-5.9	-5.3	-2.7	-0.3	1.1	1.9	2.4	2.7	3.2	3.4	3.2	2.8	2.2	0.8	0.9	0.7	0.7	0.9	-0.5	3.4
4-Oct	1.1	1.5	1.2	-0.2	-0.2	0.4	-0.1	1.5	2.0	3.3	3.9	4.4	4.9	5.7	5.9	6.0	6.1	5.4	4.8	4.1	3.8	3.5	3.3	3.1	3.1	6.1
5-Oct	3.1	2.9	2.7	2.4	2.1	1.5	1.3	1.2	2.4	5.6	8.7	10.5	12.4	13.5	14.3	14.9	14.8	13.3	10.8	8.7	6.6	6.1	5.0	3.5	7.0	14.9
6-Oct	3.3	2.6	2.5	3.1	3.0	2.9	3.4	4.0	5.0	6.6	6.6	7.2	6.8	7.6	8.1	7.6	7.5	6.6	6.1	5.0	4.3	3.8	2.3	1.3	4.9	8.1
7-Oct	1.5	2.7	3.4	3.8	3.7	4.3	3.6	3.7	4.9	5.9	7.0	7.7	8.4	9.3	9.6	9.6	9.1	7.6	5.6	4.5	2.6	2.3	1.1	0.2	5.1	9.6
8-Oct	-0.3	-0.5	-0.9	-0.9	-1.2	-1.3	-0.9	-0.8	-0.4	0.5	1.0	1.9	2.1	2.0	1.6	1.8	2.1	1.7	1.6	1.9	1.9	1.9	1.7	1.5	0.8	2.1
9-Oct	1.4	1.2	0.9	0.2	-0.2	-0.2	-0.5	0.1	1.4	3.5	5.1	6.7	7.4	8.1	9.6	10.1	10.2	9.1	8.0	7.2	6.7	6.4	5.7	5.6	4.7	10.2
10-Oct	5.7	5.9	5.6	4.6	4.0	3.9	3.9	4.5	6.7	9.6	12.8	16.0	18.0	19.1	19.5	18.9	17.3	15.6	14.0	13.0	12.0	11.4	11.1	9.9	11.0	19.5
11-Oct	9.2	8.6	9.0	8.8	9.3	9.7	9.6	9.3	10.6	11.4	12.2	12.9	13.6	14.1	14.2	14.1	13.0	11.6	10.2	9.4	9.6	8.8	7.9	8.0	10.6	14.2
12-Oct	8.1	7.4	6.4	5.4	4.9	4.2	4.4	5.1	6.6	8.3	9.8	11.5	12.4	12.1	11.7	12.7	12.1	11.0	10.6	9.6	8.0	6.3	5.5	5.0	8.3	12.7
13-Oct	5.1	4.5	3.9	3.8	3.7	3.3	3.2	3.2	4.2	7.5	10.2	11.4	12.6	13.2	13.3	13.2	12.9	10.7	9.4	9.2	8.8	8.5	8.2	8.0	8.0	13.3
14-Oct	7.8	7.5	7.3	7.1	7.1	7.0	6.8	6.6	6.8	7.6	8.1	9.1	10.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	10.0
																								Diurnal Average		
																								Diurnal Maximum		
NS - Not in Service																										



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Statoil - Leismer - October 2014**





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

**Ambient Temperature (AT) - C**  
**Statoil - Leismer - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	48	14.77	14.77
0 - 10	222	68.31	83.08
10 - 20	55	16.92	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 325

Total Number of Hours: 336





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

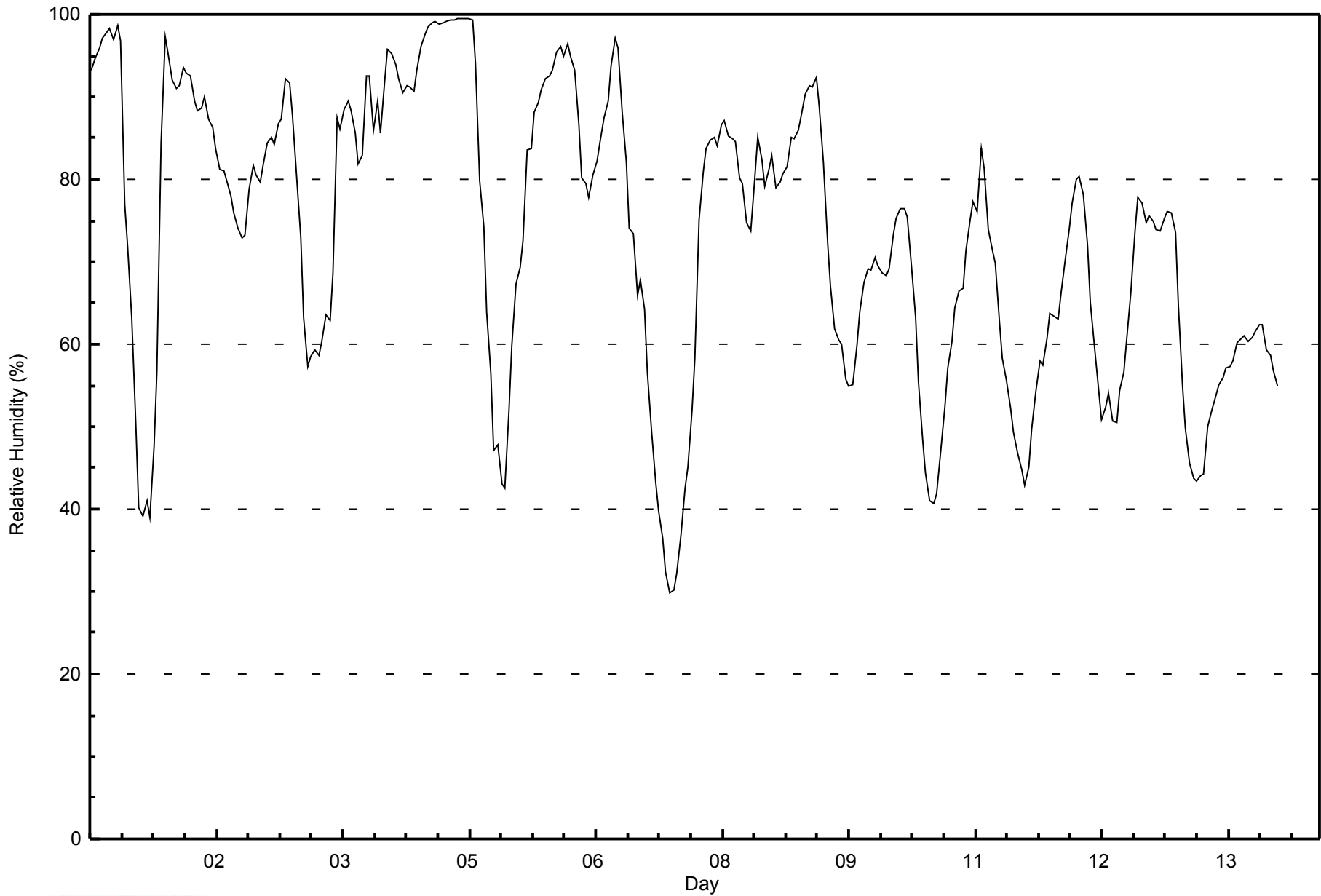
**Relative Humidity (RH) - %  
Statoil - Leismer - October 2014**

Maximum Value: 100 % on Oct 5 07:00														Maximum Daily Average: 92.1 % on Oct 4														Hours in Service: 325	
Minimum Value: 30 % on Oct 7 15:00														Minimum Daily Average: 56.3 % on Oct 7														Hours of Data: 325	
Maximum Diurnal Average: 84.2 % at hour 5														Minimum Diurnal Average: 57.0 % at hour 17														Hours of Missing Data: 0	
Monthly Average: 72.9 %														Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 48 Q <sub>1</sub> = 59 Median = 75 Q <sub>3</sub> = 87 P <sub>90</sub> = 95 P <sub>99</sub> = 100														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Oct	93	95	96	97	98	98	97	99	97	77	72	63	50	40	39	41	39	48	57	84	97	95	92	91	77.3	99			
2-Oct	91	94	93	93	90	88	89	90	87	86	84	81	81	80	78	76	74	73	73	79	82	81	80	82	83.4	94			
3-Oct	84	85	84	87	87	92	92	88	80	73	63	57	58	59	60	64	63	69	87	86	88	89	88	76.9	92				
4-Oct	86	82	83	93	93	86	89	86	92	96	95	94	92	90	91	91	93	96	98	98	99	99	99	92.1	99				
5-Oct	99	99	99	99	99	100	100	100	99	94	80	74	64	56	47	48	43	43	52	60	67	69	73	84	77.0	100			
6-Oct	84	88	89	91	92	92	93	95	96	95	96	95	93	87	80	79	78	81	82	84	87	90	94	97	89.2	97			
7-Oct	96	88	82	74	73	66	68	64	57	49	43	40	36	32	30	30	32	37	42	45	52	58	75	81	56.3	96			
8-Oct	84	85	85	84	87	87	85	85	85	80	79	75	74	78	85	82	79	81	83	79	80	81	82	85	82.1	87			
9-Oct	85	86	88	90	91	91	92	89	82	72	67	62	60	60	56	55	55	60	64	68	69	69	71	69	73.0	92			
10-Oct	69	68	69	73	75	76	76	76	69	63	55	49	44	41	41	42	47	53	57	60	64	66	67	71	61.4	76			
11-Oct	75	77	76	84	81	74	71	70	63	58	56	52	49	47	45	43	45	50	54	58	57	61	64	63	61.4	84			
12-Oct	63	66	70	74	77	80	80	78	72	65	60	54	51	52	54	51	50	54	57	61	66	74	78	77	65.2	80			
13-Oct	75	76	75	74	74	75	76	76	74	65	55	50	46	44	43	44	44	50	52	53	55	56	57	57	60.2	76			
14-Oct	58	60	61	61	60	61	62	62	62	59	59	57	55	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	62			
														81.5 82.0 82.2 83.8 84.2 83.4 83.6 82.6 79.6 73.8 68.9 64.5 61.0 59.0 57.5 57.1 57.0 60.3 64.5 70.5 74.0 75.9 78.4 80.4														Diurnal Average	
														99 99 99 99 99 100 100 100 99 96 96 95 93 90 91 91 91 93 96 98 98 99 99 99														Diurnal Maximum	
NS - Not in Service																													



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Statoil - Leismer - October 2014**





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

**Relative Humidity (RH) - %**  
**Statoil - Leismer - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	9	2.77	2.77
40 - 60	76	23.38	26.15
60 - 80	106	32.62	58.77
80 - 100	134	41.23	100.00

Total Number of Valid Hours: 325

Total Number of Hours: 336

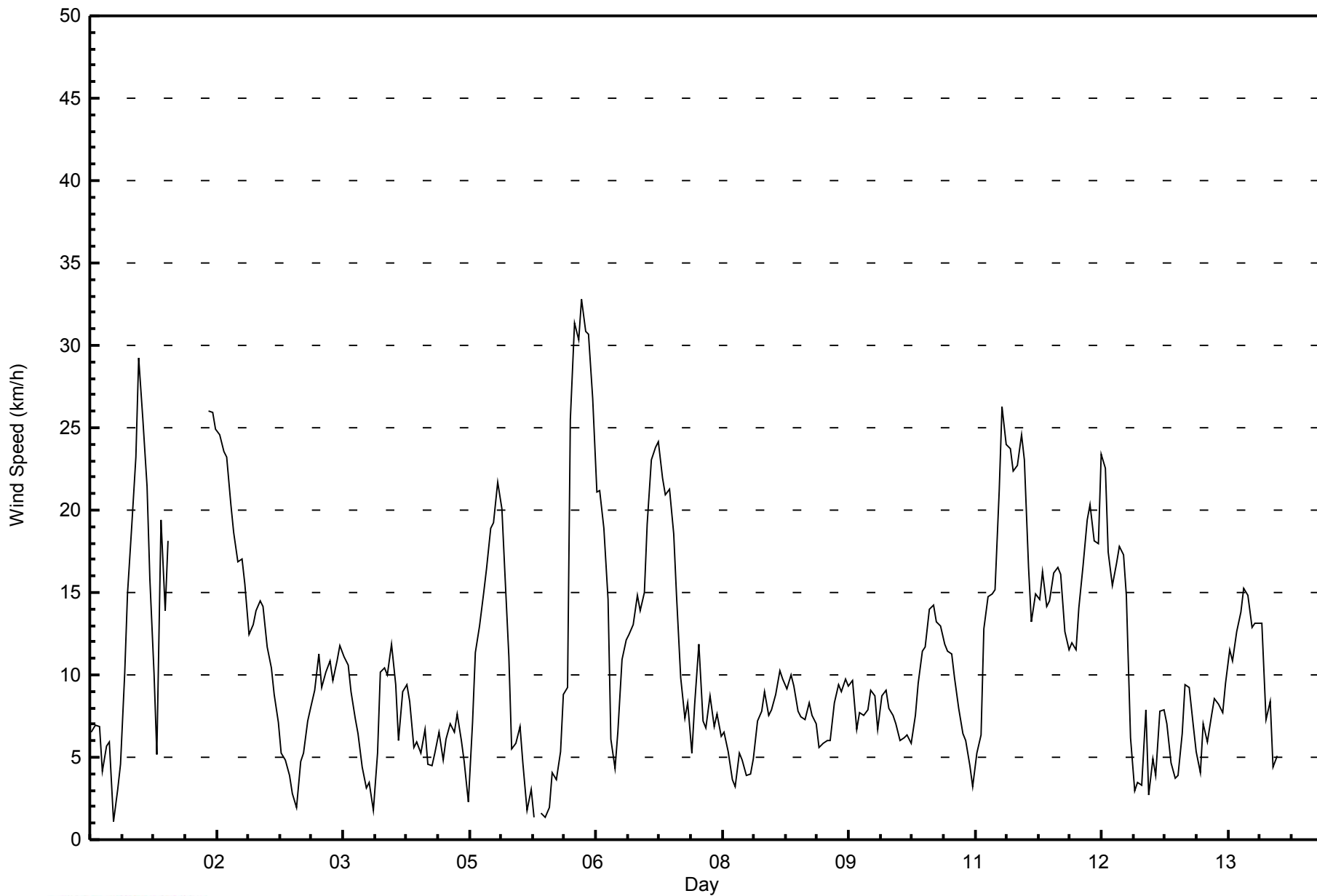


Maximum Speed: 33 km/h on Oct 6 15:00		Maximum Daily Speed Average: 15.6 km/h on Oct 11		Hours in Service: 325																						
Minimum Speed Value: 1 km/h on Oct 1 07:00		Minimum Daily Speed Average: 2.2 km/h on Oct 13		Hours of Data: 314																						
Maximum Diurnal Speed Average: 12.2 km/h at hour 14		Minimum Diurnal Speed Average: 0.7 km/h at hour 2		Hours of Missing Data: 11																						
Monthly Average Velocity: 4.7 km/h 275.4 deg		Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 15 P <sub>90</sub> = 21 P <sub>99</sub> = 30		Percent Operational Time: 96.6																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	W7	WNW7	W7	W4	W6	W6	N1	SE3	SSE5	W10	W15	W19	W23	W29	W25	W21	W16	WSW10	WSW5	W19	WNW14	NW18	AF	AF	W11.2	W29
2-Oct	AF	AF	AF	AF	AF	AF	AF	AF	NW26	WNW26	WNW25	WNW25	WNW24	WNW23	WNW20	WNW19	NW17	NW17	WNW16	W12	W13	W14	W14	W14	---	NW26
3-Oct	W12	W10	WNW9	W7	NW5	WSW5	W4	WSW3	SW2	SSE5	S5	SSE7	SSE8	SSE9	SSE11	SE9	SE10	SE11	SE10	SE11	SE12	SE11	SE11	SE9	SSE4.6	SE12
4-Oct	SE7	ESE6	ESE4	ENE3	E3	SSE2	WNW5	NW10	NW10	W10	NW12	NW9	WNW6	W9	NNW9	N8	NNE6	NNE6	NNE5	N7	N5	N5	NNW5	NNW7	NNW3.7	NW12
5-Oct	WNW5	NW6	W7	W7	W8	W6	WSW5	W2	W7	W11	W13	WNW15	WNW16	WNW19	WNW19	WNW22	WNW20	WNW16	NW11	NW6	WNW6	NW7	N5	WNW2	WNW9.5	WNW22
6-Oct	N3	SSE1	AF	WNW2	SSE1	SSE2	W4	W4	W5	W9	NNW9	NW25	NW31	WNW30	NW33	NW31	NW31	NW27	NW21	NW21	NW19	WNW15	WSW6	SW4	WNW13.6	NW33
7-Oct	WNW7	WNW11	WNW12	WNW12	W13	WNW15	W14	WNW15	WNW19	WNW23	NW24	NW24	NW22	WNW21	NW21	NW19	NNW15	NNW10	NNW7	N8	NNE5	NE8	E12	ESE7	NW11.7	NW24
8-Oct	E7	E9	ESE7	ESE8	ESE6	E7	E5	E4	E3	E5	E5	SE4	SSE4	ESE5	ENE7	E8	E9	E8	ESE8	E9	E10	E10	ESE9	E10	E6.6	E10
9-Oct	E9	E8	ESE7	E7	E8	ESE8	ESE7	ESE6	SE6	SE6	SE6	SE8	SE9	ESE9	SE10	ESE9	SE10	ESE7	ESE8	ESE8	ESE8	ESE9	ESE9	ESE7	ESE7.6	SE10
10-Oct	SE9	SE9	SE8	SE8	SE7	SE6	SSE6	SSE6	S6	S8	SSE10	S11	S12	S14	S14	S13	SSE13	SSE12	SSE11	SSE11	SSE10	SSE8	S6	SSW6	SSE8.9	S14
11-Oct	S4	S3	W5	W6	W13	W15	W15	W15	W21	W26	W24	W24	W22	W23	W25	W23	W17	W13	W15	W15	W16	W14	W14	W16	W15.6	W26
12-Oct	W17	W16	W13	W12	W12	W12	W14	W17	W19	W20	W18	W18	W23	W23	W17	W15	W17	W18	W17	W15	WSW6	WSW3	WSW3	WSW3	W14.4	W23
13-Oct	W8	WSW3	W5	W4	W8	W8	W7	WSW5	WSW4	WSW4	WSW6	WSW9	WSW9	W7	WNW5	S4	SE7	ESE6	ESE8	ESE9	ESE8	ESE8	ESE10	E12	SSW2.2	E12
14-Oct	E11	E13	E14	E15	E15	E13	E13	E13	ESE7	SE8	S4	WSW5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	E15
SW1.3/WSW0.7 W1.5 W1.0 W2.0/WSW2.7 W3.1 W3.1 W5.8 W8.1 W8.0 W10.1 W11.5 W12.2 W10.8/WNW8.9 W6.3/WNW4.8/WNW3.3 W3.5/WNW2.1 NW1.6 SSE1.1 S1.2																								Diurnal Average		
W17 W16 E14 E15 E15/WNW15 W15 W17 NW26 W26/WNW25 NW25 NW31/WNW30 NW33 NW31 NW31 NW27 NW21 NW21 NW19 NW18 W14 W16																								Diurnal Maximum		
AF - Analyzer Failure NS - Not in Service																										
All monthly, daily, and diurnal averages have been calculated using vector methods																										



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Statoil - Leismer - October 2014**





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

**Wind Speed (WS) - km/h**  
**Statoil - Leismer - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	60	19.11	19.11
6 - 11	136	43.31	62.42
12 - 19	79	25.16	87.58
20 - 28	33	10.51	98.09
29 - 38	6	1.91	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 314

Total Number of Hours: 336



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Statoil - Leismer - October 2014**

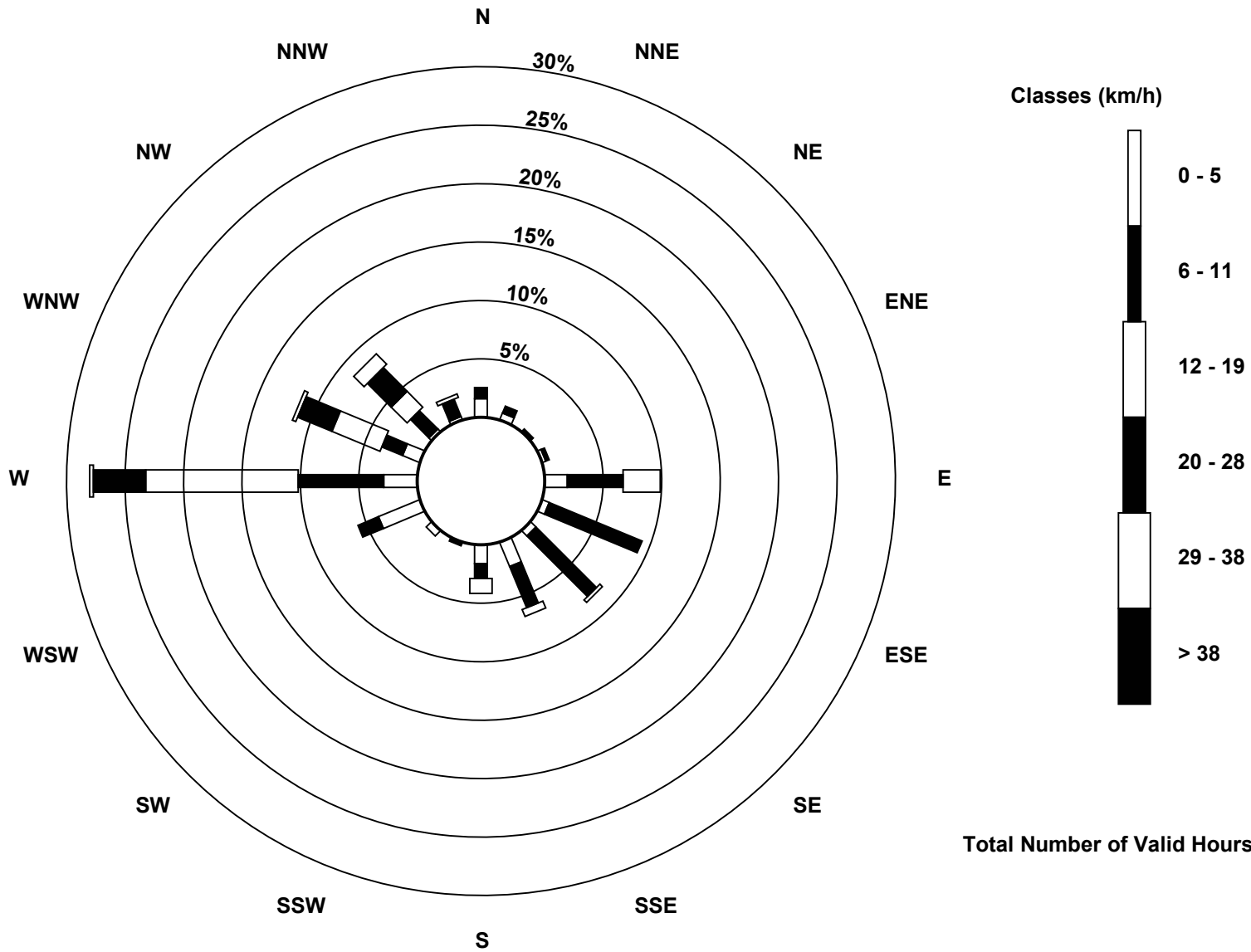
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	2	0	1	6	2	2	7	5	0	2	12	9	5	1	1	60
6 - 11	3	2	1	1	15	27	23	12	4	1	0	6	23	6	7	5	136
12 - 19	0	0	0	0	10	0	1	2	4	0	0	0	41	14	6	1	79
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	14	10	9	0	33
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4	0	6
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	8	4	1	2	31	29	26	21	13	1	2	18	88	36	27	7	314

Total Number of Valid Hours: 314

Total Number of Hours: 336

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Wind Speed (WS) - km/h  
Statoil - Leismer (AMS501)**



**Total Number of Valid Hours: 314**





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Oct 6 16:00														Hours in Service: 325 Hours of Data: 314 Hours of Missing Data: 11 Hours of Calibration: 0 Percent Operational Time: 96.6											
Minimum Value: 1 km/h on Oct 7 19:00																									
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																									
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-Oct	2	3	2	2	1	1	2	1	1	5	4	5	7	7	6	5	7	4	3	7	2	5	AF	AF	7
2-Oct	AF	AF	AF	AF	AF	AF	AF	AF	6	6	5	5	5	5	4	4	3	3	4	3	2	2	3	2	6
3-Oct	2	2	2	1	2	2	2	1	1	1	1	2	2	2	3	2	2	2	2	2	2	2	2	1	3
4-Oct	1	1	1	1	1	1	2	2	3	2	3	3	2	2	2	2	1	1	2	2	1	1	2	1	3
5-Oct	2	2	3	2	2	2	1	1	2	3	3	3	4	4	4	4	4	3	2	2	2	1	2	1	4
6-Oct	1	1	AF	2	1	1	2	1	2	2	2	7	5	6	7	7	7	5	4	4	4	4	3	1	7
7-Oct	1	2	2	3	3	3	3	3	4	5	5	5	4	5	5	4	4	3	1	1	1	3	3	2	5
8-Oct	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2
9-Oct	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	1	2	2	2	2	1	2	2
10-Oct	1	1	1	1	1	2	2	1	1	2	3	3	3	4	4	4	4	2	2	2	1	3	1	2	4
11-Oct	1	1	2	2	5	2	3	5	5	6	6	6	5	6	7	6	6	3	3	3	3	3	2	3	7
12-Oct	3	3	2	2	3	2	3	3	4	4	4	4	5	4	5	5	5	4	4	4	3	2	1	1	5
13-Oct	2	2	2	2	2	2	2	2	1	2	2	3	3	3	2	2	2	1	1	2	1	2	2	3	3
14-Oct	2	3	3	3	3	3	3	3	3	2	2	2	2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	3
Diurnal Maximum																									
3 3 3 3 5 3 3 5 6 6 6 7 7 7 7 7 7 7 5 4 7 4 5 3 3																									
AF - Analyzer Failure NS - Not in Service																									



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

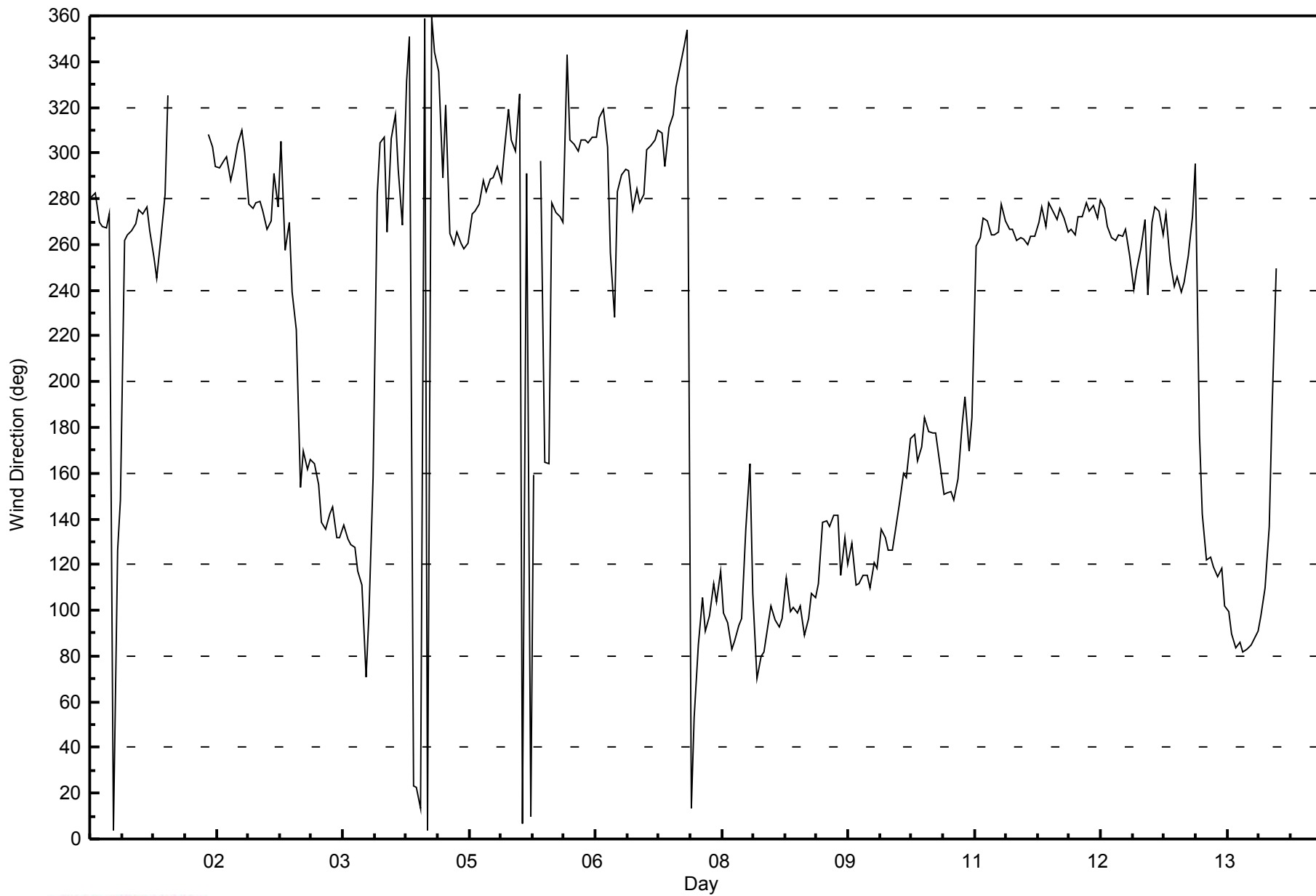
**Wind Direction (WD) - deg**  
**Statoil - Leismer - October 2014**

Direction of Maximum Speed: 306 deg on Oct 6 15:00																					Hours in Service: 325					
Direction of Maximum Daily Speed Average: 266.4 deg on Oct 11																					Hours of Data: 314					
Direction of Minimum Speed: 3 deg on Oct 1 07:00										Direction of Minimum Daily Speed Average: 2.2 deg on Oct 13											Hours of Missing Data: 11					
Monthly Average Direction: 273.2 deg																					Percent Operational Time: 96.6					
Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	281	283	270	268	267	274	3	127	149	262	264	266	269	275	273	277	266	255	246	263	282	326	AF	AF	272.3	
2-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	308	303	294	293	296	299	288	293	304	310	300	278	276	278	279	275	--
3-Oct	266	271	291	276	305	257	270	239	223	154	170	162	166	164	155	138	136	142	145	132	132	137	131	129	166.6	
4-Oct	127	117	111	71	97	158	282	305	307	265	306	317	293	269	331	351	23	23	14	359	4	359	344	335	330.5	
5-Oct	289	321	265	260	265	261	258	261	273	275	278	288	283	289	289	294	288	301	319	306	301	326	7	291	289.1	
6-Oct	10	159	AF	296	165	164	278	274	272	269	343	306	304	301	306	306	304	307	307	315	319	302	256	228	303.6	
7-Oct	283	291	293	292	275	285	278	282	301	303	305	310	309	294	311	317	329	338	347	354	13	53	85	106	308.0	
8-Oct	91	97	112	104	117	99	95	83	87	93	96	136	164	107	70	80	82	94	102	96	93	96	114	100	98.3	
9-Oct	101	99	102	89	96	107	106	112	139	139	136	142	142	115	132	120	129	111	112	115	115	110	121	118	117.0	
10-Oct	135	132	127	126	134	146	160	158	175	177	165	172	184	178	177	178	164	150	151	152	148	158	181	194	160.6	
11-Oct	169	184	260	263	272	271	265	264	265	278	270	266	267	262	263	262	260	264	264	269	276	268	278	274	266.4	
12-Oct	271	276	271	265	267	264	272	272	278	274	277	272	279	276	268	263	262	264	263	266	255	240	249	258	269.8	
13-Oct	271	238	270	276	275	264	273	253	242	246	239	243	255	272	295	177	142	122	123	119	115	118	102	99	213.2	
14-Oct	90	83	86	82	83	85	87	91	98	110	137	188	249	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	
Diurnal Average																										
232.9	243.7	261.0	272.6	259.0	252.9	263.7	263.9	280.8	274.8	277.1	275.5	275.4	275.5	280.6	283.1	279.8	287.9	281.8	278.0	286.6	314.7	152.1	185.0			
AF - Analyzer Failure    NS - Not in Service																										
All monthly, daily, and diurnal averages have been calculated using vector methods																										



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Statoil - Leismer - October 2014**





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

**Wind Direction (WD) - deg**  
**Statoil - Leismer - October 2014**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 86 deg on Oct 1 07:00														Hours in Service: 325 Hours of Data: 314 Hours of Missing Data: 11 Hours of Calibration: 0 Percent Operational Time: 96.6											
Minimum Value: 8 deg on Oct 10 01:00																									
Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 11 Q <sub>1</sub> = 13 Median = 16 Q <sub>3</sub> = 22 P <sub>90</sub> = 33 P <sub>99</sub> = 59																									
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-Oct	12	24	13	22	17	21	86	39	22	24	16	16	19	16	14	14	20	25	39	17	11	17	AF	AF	86
2-Oct	AF	AF	AF	AF	AF	AF	AF	AF	11	13	13	15	14	15	13	17	14	10	16	14	10	10	11	11	17
3-Oct	12	14	20	16	33	30	32	36	69	28	25	25	20	17	15	14	10	10	15	15	13	11	11	11	69
4-Oct	12	15	22	34	18	35	28	16	14	13	18	14	38	21	18	17	25	22	23	20	21	24	26	14	38
5-Oct	26	23	23	15	16	18	24	67	15	13	15	18	16	17	16	15	15	12	10	27	30	15	39	38	67
6-Oct	26	62	AF	54	84	44	48	39	23	16	16	12	11	12	12	11	10	11	11	10	9	16	33	28	84
7-Oct	16	14	18	18	12	15	10	12	13	12	14	15	18	16	16	14	15	10	9	11	19	25	20	18	25
8-Oct	20	14	15	16	16	18	22	38	46	20	30	39	28	26	17	20	19	19	18	15	15	15	19	14	46
9-Oct	14	15	16	15	13	13	12	16	16	16	23	22	15	22	21	22	13	16	15	15	13	14	16	15	23
10-Oct	8	8	9	9	9	14	10	11	17	19	18	20	20	21	20	18	18	10	8	8	8	16	13	33	33
11-Oct	17	36	21	35	11	10	12	13	13	13	14	15	16	15	16	14	14	12	11	10	11	10	10	11	36
12-Oct	11	11	11	12	12	12	11	11	12	12	15	16	17	13	17	16	16	11	12	10	26	59	40	52	59
13-Oct	15	59	34	26	11	12	12	31	26	31	31	31	28	43	55	61	20	11	13	14	16	15	14	15	61
14-Oct	15	16	15	14	16	18	16	15	16	29	20	46	42	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	46
Diurnal Maximum																									
AF - Analyzer Failure      NS - Not in Service																									



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 9, 2014
Station Name	Statoil	Station Number	AMS 501
Reason:	Removal		
Start Time (MST)	10:45	End Time (MST)	12:26
Barometric Pressure	mmHg	Station temp.	24 Deg C
Calibrator Make/Model	API T700	Serial Number	451
Cal Gas Concentration	49.4 ppm	Cal Gas Expiry Date	10/6/2016
Gas Cert Reference	EY0000359		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8203
DACS voltage range	0-5v	DACS channel #	

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	15	25
Analyzer Range (mv)	1000	1000	Lamp voltage	2962	2944
Calculated slope	1.010283	0.980415	Chamber temp.	50.0	50.0
Calculated intercept	-0.612261	-0.978653	Pressure ("Hg)	24.4	24.4
Analyzer Background	14.2	14.2	Flow (ccpm)	629	623
Analyzer Coefficient	1.086	1.086	Intensity	73	73

Analyzer make	API T100	Analyzer serial #	720
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### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	0.000
as found span	5000	79.5	785.5	801.6	0.980
calibrator zero	5000	0.0	0.0	0.2	0.000
high point	5000	79.5	785.5	801.6	0.980
second point	5000	39.8	393.2	402.9	0.976
third point	5000	20.0	197.6	203.1	0.973
calibrator zero					
as left zero					
as left span					
Average Correction Factor					0.976

Corrected As found	801.4	Previous response	778.1	% change	-2.9%
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#### Notes:

Removal cal, As Finds used as calibrator zero and high point

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

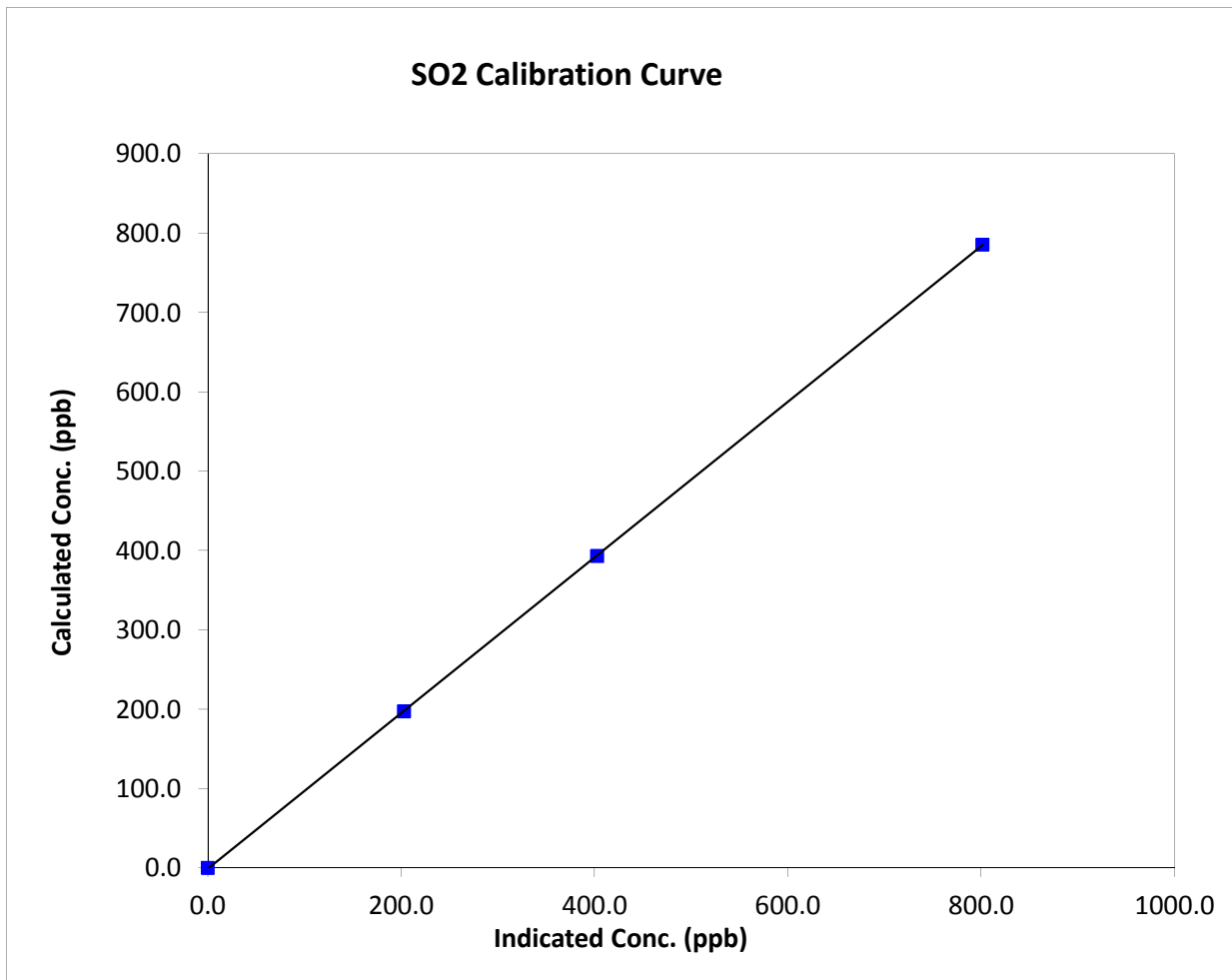
## SO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 9, 2014
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	10:45	End Time (MST)	12:26
Analyzer make	API T100	Analyzer serial #	720

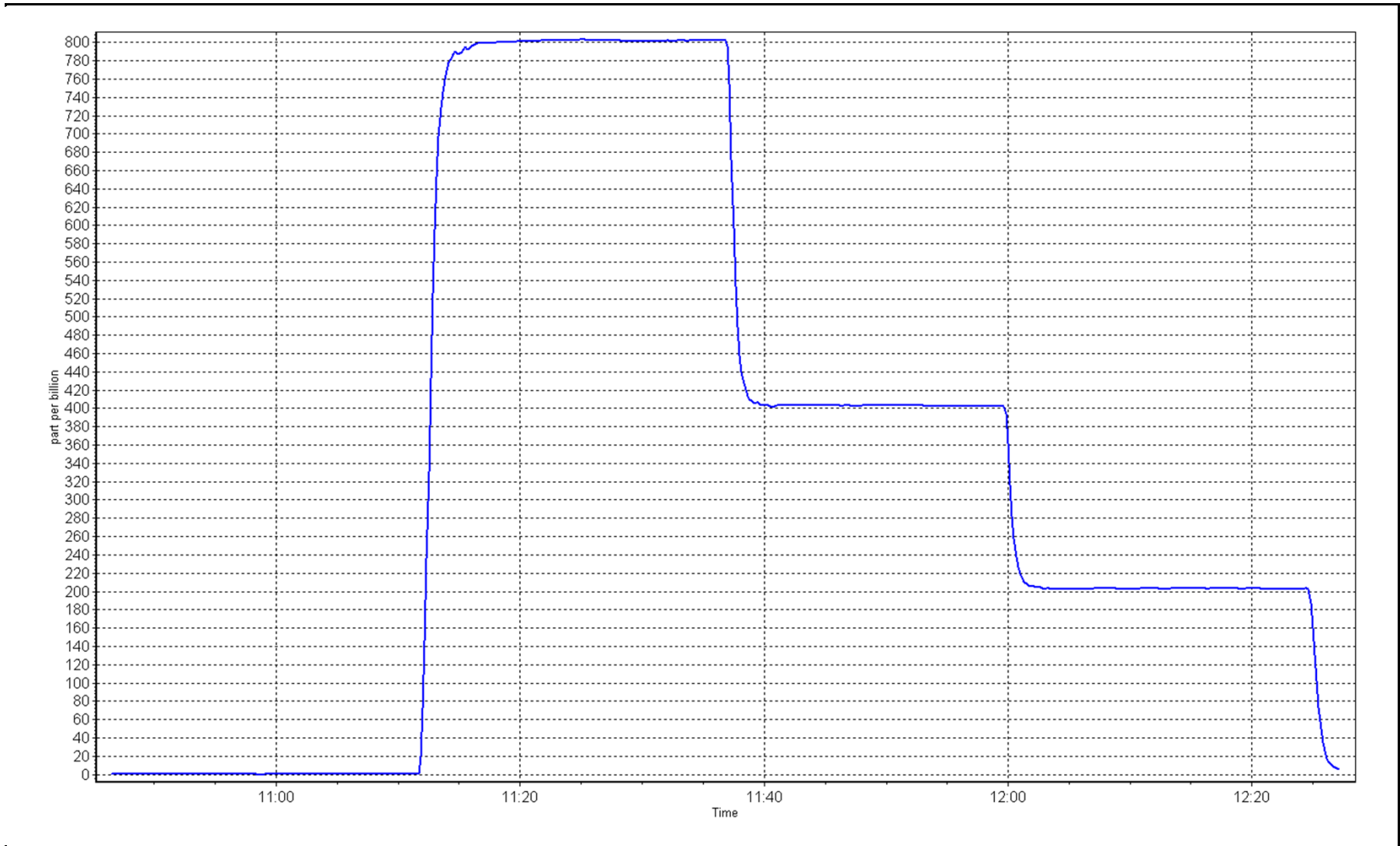
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999994
785.5	801.6	0.9799		
393.2	402.9	0.9760	Slope	0.980415
197.6	203.1	0.9728		
			Intercept	-0.978653



SO2 Calibration Plot

Date: October 14, 2014





# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 9, 2014
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	14:12	End Time (MST)	16:15
Barometric Pressure	NA mmHg	Station temp.	24 Deg C
Calibrator Make/Model	API T700	Serial number	451
Cal Gas Concentration	10.2 ppm H2S	Cal Gas Expiry Date	5/30/2016
Gas Cert Reference	LL23598	SO2 gas conc.	49.4 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8203
DACS voltage range		DACS channel #	

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	19.0	21.0
Analyzer Range (mv)	100	100	Lamp voltage	2129	2129
Calculated slope	0.998982	0.984063	Chamber temp.	50	50
Calculated intercept	-0.347985	-0.757311	Pressure	22.9	22.9
Analyzer Background	17.9	17.9	Flow	550	550
Analyzer Coefficient	0.955	0.955	Intensity	54	53
			Converter temp.	315	315

Analyzer make/model	API T101	Analyzer serial #	157
Converter make/model	Internal	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	0.5	NA
as found span	5000	36.8	75.1	76.9	0.977
SO2 scrubber check	5000	20.2	199.6	5.6	NA
calibrator zero	5000	0.0	0.0	0.5	NA
high point	5000	36.8	75.1	76.9	0.977
second point	5000	19.6	40.0	41.7	0.960
third point	5000	10.3	21.0	22.3	0.941
calibrator zero					
as left zero					
as left span					
Average Correction Factor					0.959

Corrected As found	76.4	Previous response	75.5	% change	-1.1%
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#### Notes:

Removal cal; As Finds used as calibrator zero and high point. Scrubber check after third point

Calibration Performed By:

Ryan Power





# Wood Buffalo Environmental Association

## H2S Calibration Summary

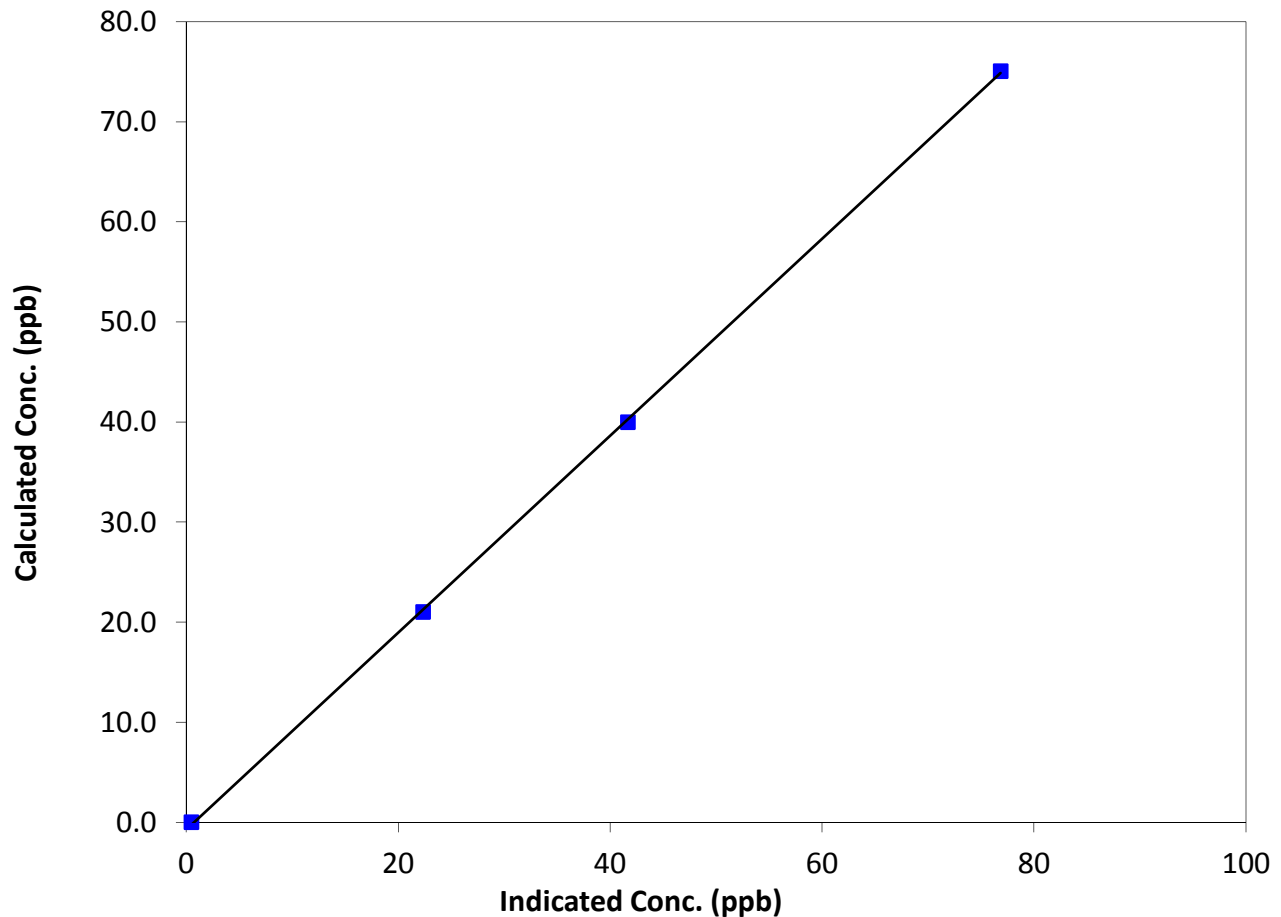
### Station Information

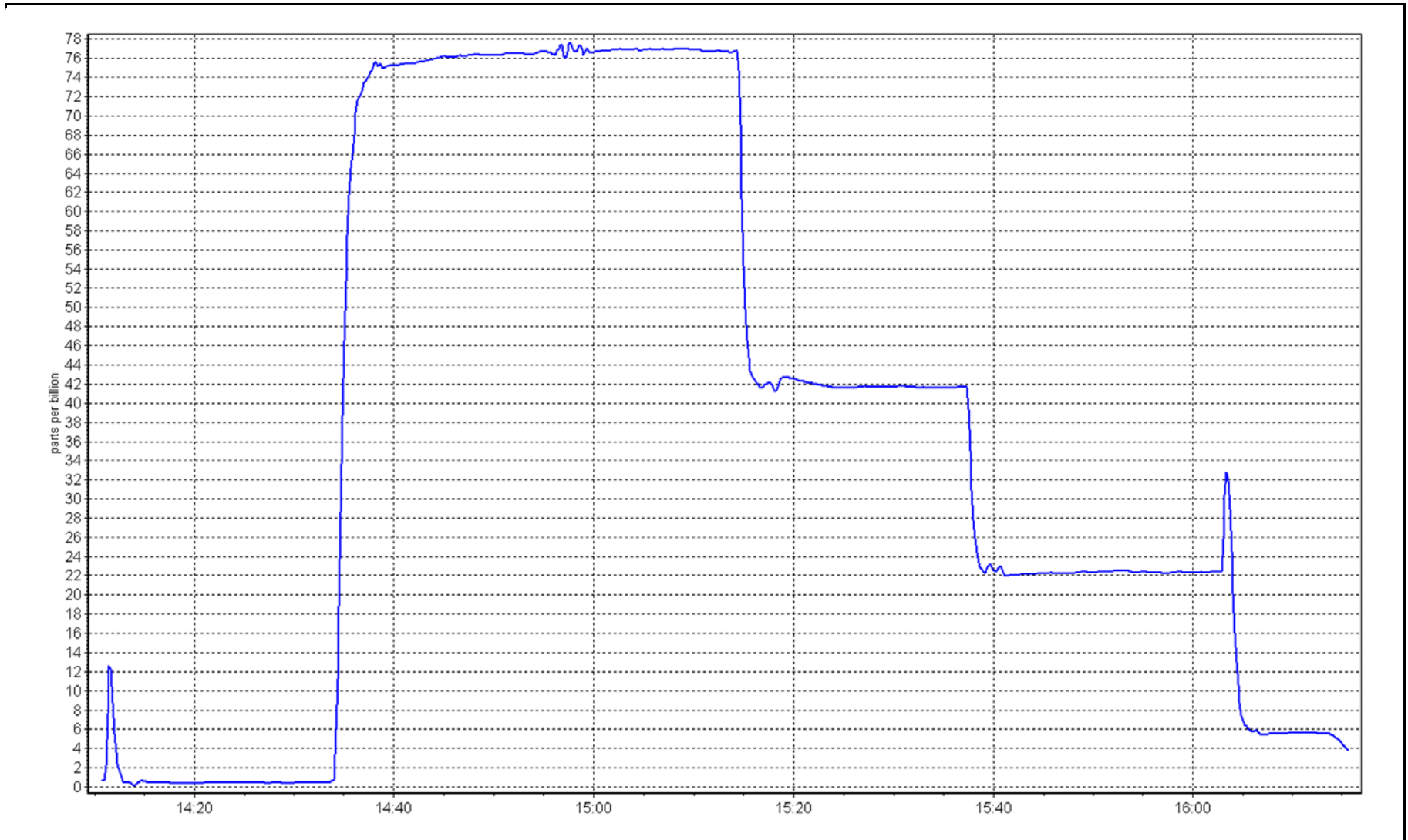
Calibration Date	October 14, 2014	Previous Calibration	September 9, 2014
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	14:12	End Time (MST)	16:15
Analyzer make	API T101	Analyzer serial #	157

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	N/A	Correlation Coefficient	0.999923
75.1	76.9	0.9769		
40.0	41.7	0.9595	Slope	0.984063
21.0	22.3	0.9406		
			Intercept	-0.757311

**H2S Calibration Curve**







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 9, 2014
Station Name	Statoil	Station Number	AMS 501
Reason:	Removal		
Start Time (MST)	10:45	End Time (MST)	14:11
Barometric Pressure	mmHg	Station Temperature	24.0 Deg C
Calibrator	API T700	Serial Number	451
NO Cal Gas Conc	50.3 ppm	Cal Gas Expiry Date	October 6, 2016
NOx Cal Gas Conc	50.6 ppm	Cal Gas Serial #	EY0000359

### DACs Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8203
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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	0.991718	0.995710	0.994228
	Data Offset	-1.498582	-0.960900	-1.746006
After	Data Slope	0.991718	0.995710	0.994228
	Data Offset	-1.498582	-0.960900	-1.746006
Channel #				
Voltage Range		0 - 5V	0 - 5V	0 - 5V

### Analyzer Information

Analyzer make/model	Teledyne T200	Analyzer serial #	722
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.994	ppb	0.994	ppb
NOX coefficient	0.989	ppb	0.989	ppb
		ppb		ppb
NO bkgrnd	0.2	mv	0.2	mv
NOX bkgrnd	0.3	mv	0.3	mv
Nt coefficient	N/A		NA	
Chamber Temp	20.3	Deg C	31.1	Deg C
Moly Temp	315.3	Deg C	315.0	Deg C
PMT Temp	6.7	Deg C	6.8	Deg C
O3 flow	82.0	ccm	84.0	ccm
R Cell Press	7.0	"Hg	6.6	"Hg
Sample Flow	439	ccm	459	ccm

**Notes:**

Removal cal; As Found used as calibrator zero and high point



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date: October 14, 2014 Station Number: AMS 501

### 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	-0.3	0.8	N/A	N/A
as found span	5000	79.5	804.5	799.8	4.8	798.9	800.6	-1.7	1.0070	0.9990
calibrator zero	5000	0.0	0.0	0.0	0.0	0.5	-0.3	0.8	N/A	N/A
high point	5000	79.5	804.5	799.8	4.8	798.9	800.6	-1.7	1.007	0.999
second point	5000	39.8	402.8	400.4	2.4	401.6	401.8	-0.2	1.003	0.996
third point	5000	20.0	202.4	201.2	1.2	203.0	201.7	1.3	0.997	0.997
calibrator zero										
as left zero										
as left span										
Average Correction Factor									1.0023	0.9976

Corrected As found NO<sub>x</sub>= 798.4 NO= 800.9 Percent Change NO<sub>x</sub>= 1.8% NO= 0.4%  
 Previous Response NO<sub>x</sub>= 812.8 NO= 804.2

### GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 79.50 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			0.8			N/A	
1st NO <sub>2</sub> (400)	N/A	400.2	403.8	806.9	400.2	406.7	0.981	1.000	0.993	100.7%
2nd NO <sub>2</sub> (200)	N/A	597.8	206.2	805.8	597.8	208.0	0.983	1.000	0.991	100.9%
3rd NO <sub>2</sub> (100)	N/A	701.3	102.7	808.7	701.3	107.4	0.979	1.000	0.956	104.6%
4th NO <sub>2</sub> (0)	804.0	N/A	1.5	805.5	804.0	1.5	0.983	1.000	N/A	N/A
Average Correction Factor							0.982	1.000	0.980	102.0%

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

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

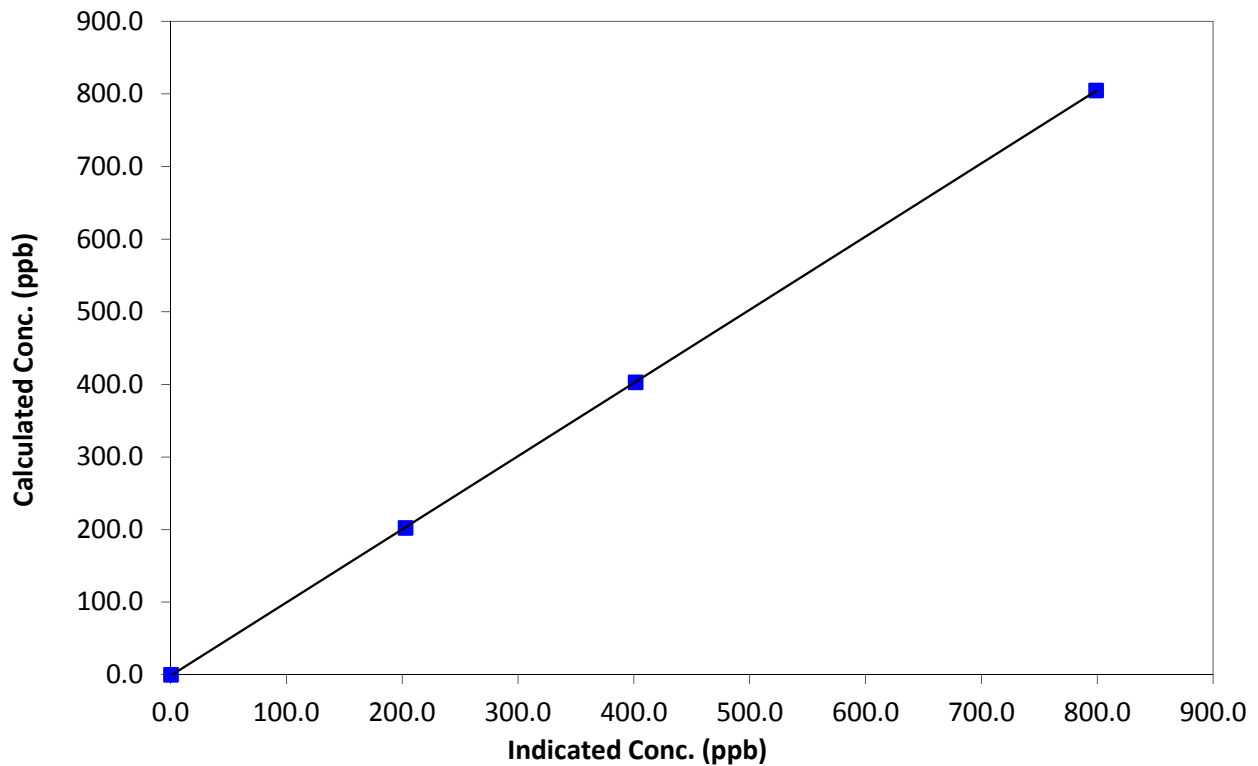
### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 9, 2014
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	10:45	End Time (MST)	14:11
Analyzer make	Teledyne T200	Analyzer serial #	722

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	N/A	Correlation Coefficient	0.999994
804.5	798.9	1.0070		
402.8	401.6	1.0030	Slope	1.008160
202.4	203.0	0.9968		
			Intercept	-1.447816

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

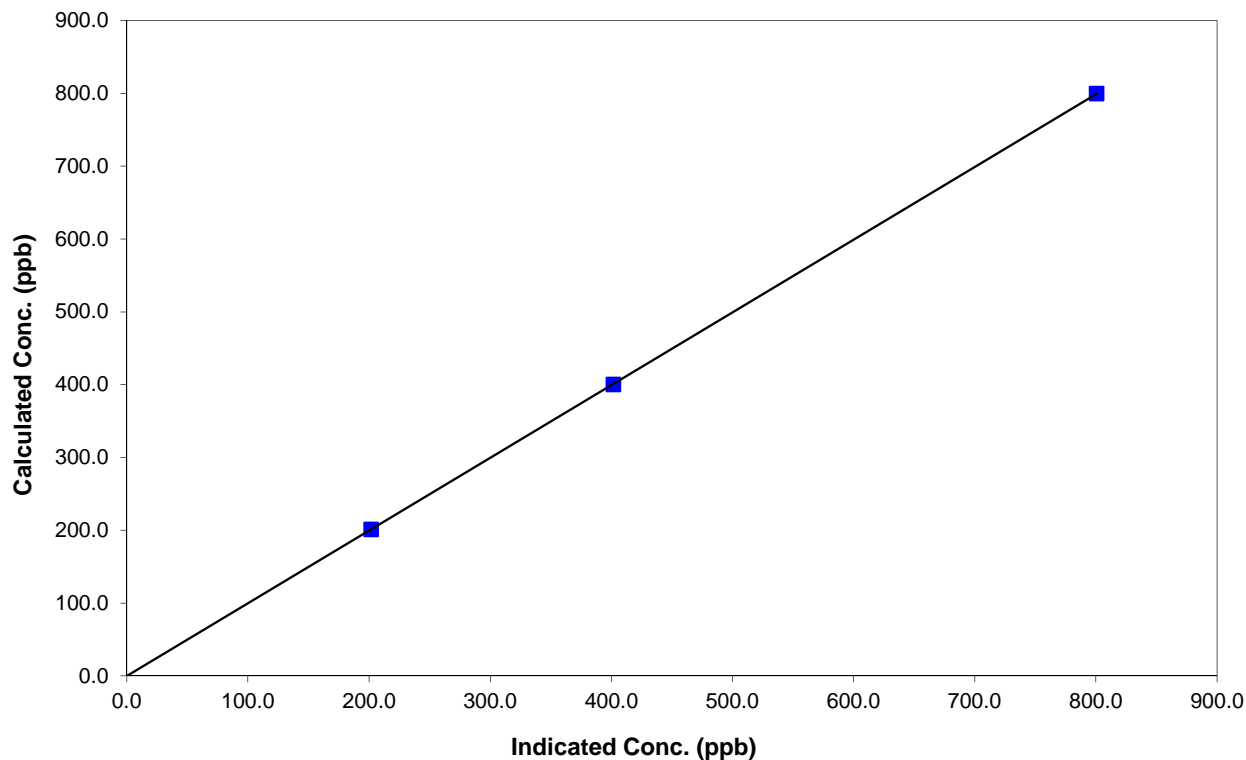
### Station Information

Calibration Date	October 14, 2014	Previous Calibration	September 9, 2014
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	10:45	End Time (MST)	14:11
Analyzer make	Teledyne T200	Analyzer serial #	722

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999997
799.8	800.6	0.9990		
400.4	401.8	0.9965	Slope	0.998634
201.2	201.7	0.9975		
			Intercept	-0.136016

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

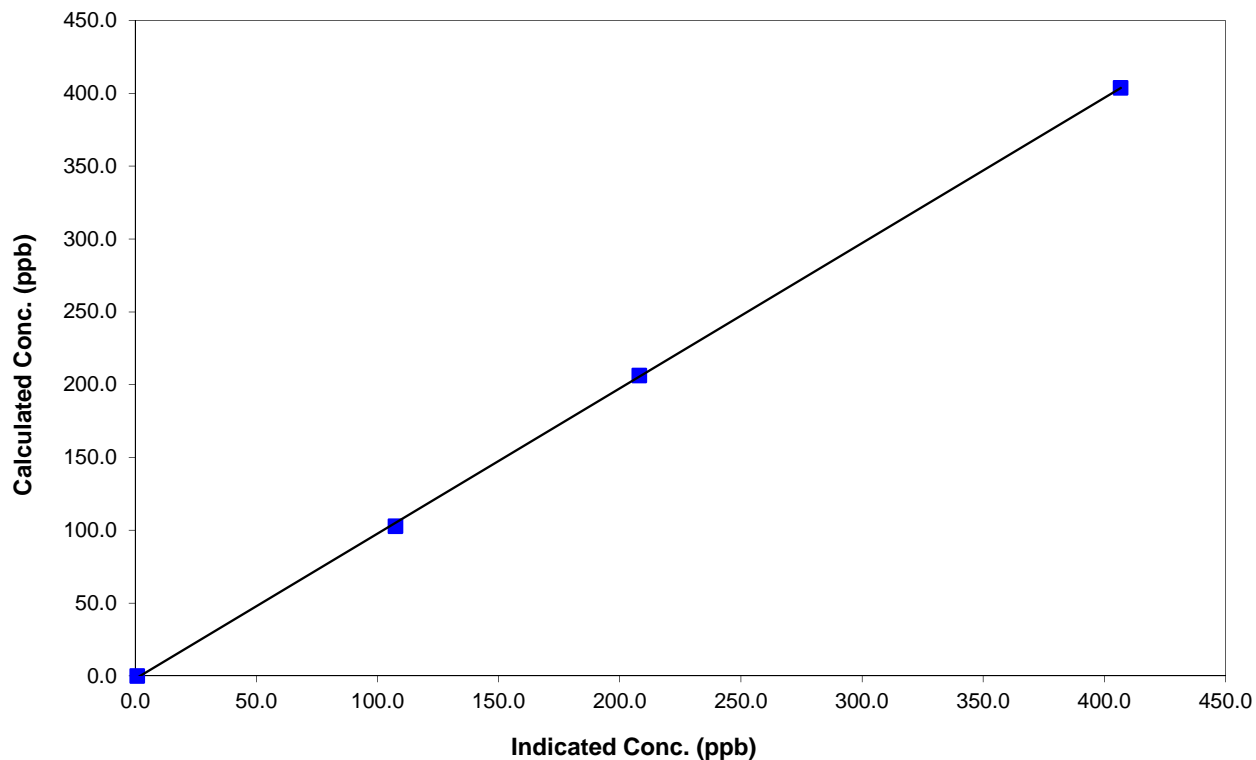
### Station Information

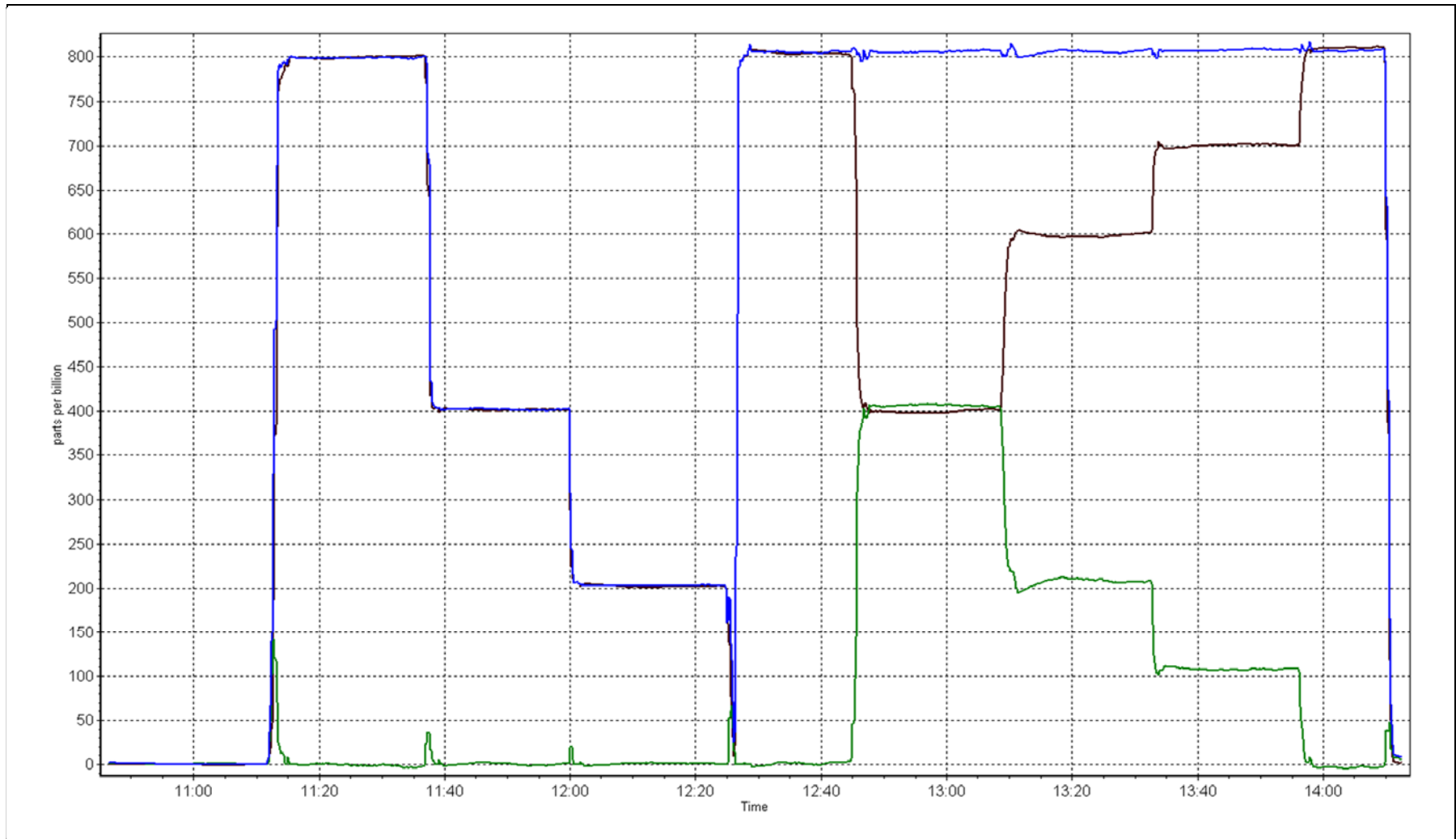
Calibration Date	October 14, 2014	Previous Calibration	September 9, 2014
Station Number	Statoil	Station Number	AMS 501
Start Time (MST)	10:45	End Time (MST)	14:11
Analyzer make	Teledyne T200	Analyzer serial #	722

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.8	N/A	Correlation Coefficient	0.999913
403.8	406.7	0.9929		
206.2	208.0	0.9913	Slope	0.997622
102.7	107.4	0.9564		
			Intercept	-2.112681

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







**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 502  
CONOCOPHILLIPS SURMONT  
OCTOBER 2014**

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

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

November 26, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
OCTOBER 2014

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	673	37	71	95.43	7	0	2	0
H2S (ppb) Average	703	37	41	99.46	2	0	0	0
NO2 (ppb) Average	705	36	39	99.60	35	0	13	-
NO (ppb) Average	705	36	39	99.60	31	-	7	-
NOX (ppb) Average	705	36	39	99.60	59	-	19	-
Temperature 2 m (C) Average	742	0	2	99.73	19.6	-	11.8	-
Relative Humidity (%) Average	742	0	2	99.73	99	-	-	-
Wind Speed 10 m (km/h) Average	742	0	2	99.73	32	-	-	-
Wind Direction 10 m (deg) Average	742	0	2	99.73	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
 OCTOBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	673	0.6	1	-	0	0	0	0	1	1	7
H2S (ppb) Average	703	0.2	0	-	0	0	0	0	0	0	2
NO2 (ppb) Average	705	5.3	5	-	0	1	2	4	7	12	35
NO (ppb) Average	705	3.2	4	-	0	0	1	1	4	8	31
NOX (ppb) Average	705	8.5	8	-	0	1	3	6	12	20	59
Temperature 2 m (C) Average	742	4.6	5.2	-	-4.3	-1.7	0	4.3	8.7	12.3	19.6
Relative Humidity (%) Average	742	76.2	18	-	38	52	61	78	94	98	99
Wind Speed 10 m (km/h) Average	742	13.1	7	-	1	6	8	11	17	23	32
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
OCTOBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	09 Oct 2014 11:00	09 Oct 2014 12:00	2	DAS collection error - data not recorded
SO2	01 Oct 2014 07:00	31 Oct 2014 07:00	31	Stabilization after daily span
SO2	29 Oct 2014 11:00	29 Oct 2014 11:00	1	Maintenance - replace glass manifold
H2S	21 Oct 2014 12:00	21 Oct 2014 13:00	2	Unstable operation - excessive baseline drift
NO2, NO, NOX	29 Oct 2014 11:00	29 Oct 2014 11:00	1	Maintenance - replace glass manifold

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 7 ppb on Oct 7 12:00	Maximum Daily Average: 1.8 ppb on Oct 7		Hours of Data:	673
Minimum Value: 0 ppb on Oct 31 21:00	Minimum Daily Average: 0.2 ppb on Oct 26		Hours of Missing Data:	71
Maximum Diurnal Average: 0.8 ppb at hour 12	Minimum Diurnal Average: 0.4 ppb at hour 5		Hours of Calibration:	37
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> = 4		Percent Operational Time:	95.4

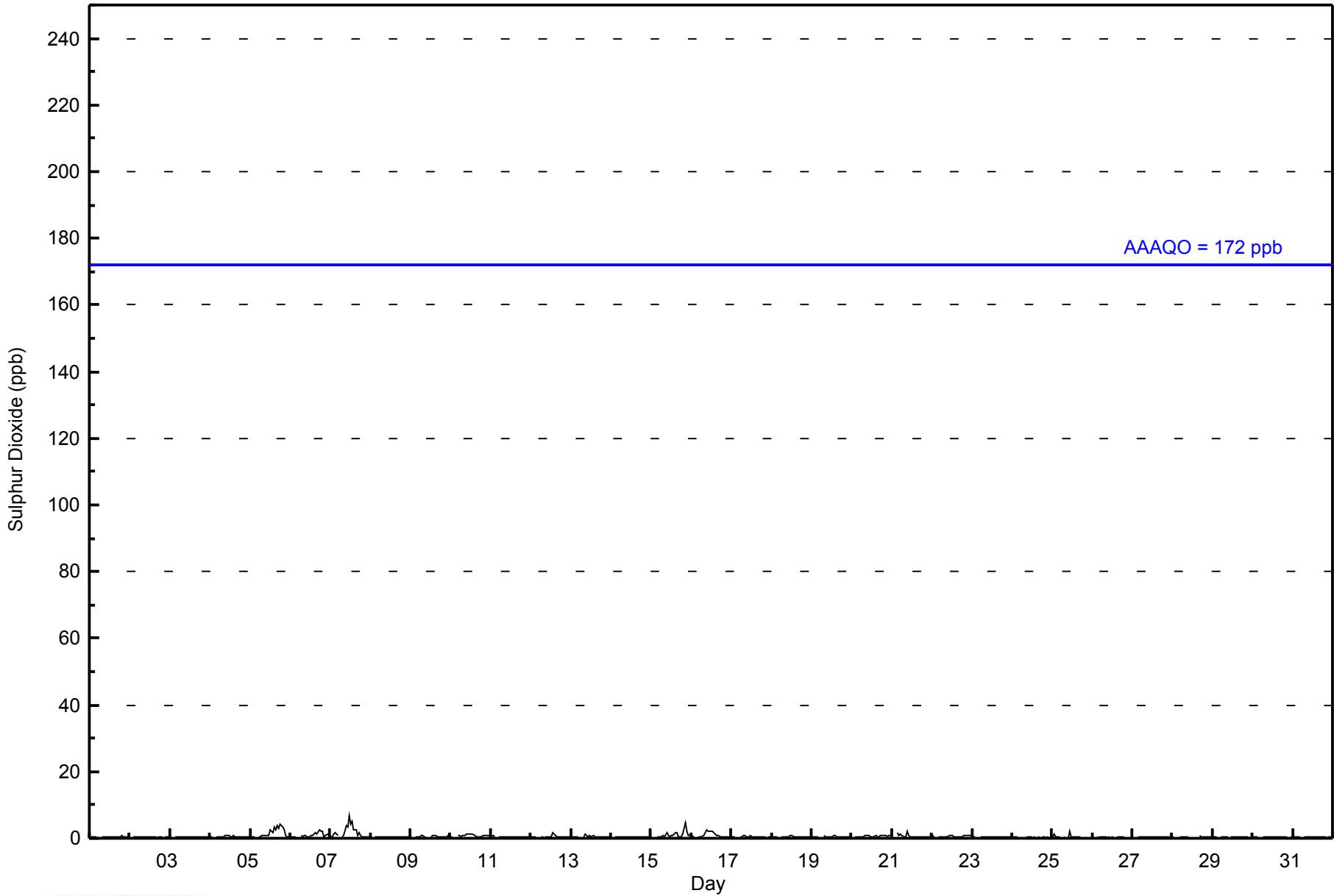
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	1	0	0	0	Z	RE	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0.5	1	
2-Oct	Z	RE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
3-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
4-Oct	0	0	Z	RE	0	0	0	0	1	1	1	1	0	1	1	1	0	0	0	0	0	1	0	0	0.5	1	
5-Oct	1	0	0	Z	RE	0	0	1	1	1	1	1	2	2	3	3	4	3	4	4	4	2	1	1	1.6	4	
6-Oct	0	0	0	0	Z	RE	1	1	1	1	1	0	1	1	1	2	1	3	2	2	1	1	1	1	1.0	3	
7-Oct	0	0	1	2	1	Z	RE	0	1	4	3	7	4	5	3	3	1	2	1	1	0	0	0	1.8	7		
8-Oct	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	
9-Oct	0	Z	RE	0	0	1	1	1	0	1	MS	MS	1	1	1	1	1	1	0	0	0	1	1	1	0.5	1	
10-Oct	1	1	Z	RE	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0.8	1	
11-Oct	1	1	1	Z	RE	1	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0.5	1	
12-Oct	0	0	0	0	Z	RE	0	0	0	1	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0.5	2	
13-Oct	0	0	0	1	1	Z	RE	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.5	1	
14-Oct	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0.4	1	
15-Oct	0	Z	RE	1	0	0	0	1	0	2	1	1	1	1	2	2	0	0	0	1	5	2	1	1	1.1	5	
16-Oct	1	1	Z	RE	0	0	0	1	2	2	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0.9	2	
17-Oct	0	0	0	Z	RE	0	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0.4	1	
18-Oct	0	0	0	0	Z	RE	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1	
19-Oct	0	0	0	0	0	Z	RE	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0.5	1	
20-Oct	Z	RE	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
21-Oct	1	Z	RE	1	1	1	1	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2	
22-Oct	1	1	Z	RE	0	0	0	1	0	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	0.5	1	
23-Oct	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	0	
24-Oct	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
25-Oct	0	1	0	0	0	Z	RE	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
26-Oct	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	
27-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
28-Oct	0	0	Z	RE	0	0	0	0	0	0	C	C	C	C	C	C	1	0	0	0	0	0	0	0	--	1	
29-Oct	0	0	0	Z	RE	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
30-Oct	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
31-Oct	0	0	0	0	0	Z	RE	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0.4	1	
	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.8	0.8	0.8	0.7	0.8	0.8	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.4	0.4	Diurnal Average		
	1	1	1	2	1	1	1	1	2	4	3	7	4	5	3	3	4	3	4	4	4	5	2	1	1	Diurnal Maximum	

Z - zerospan      C - Calibration      M - Maintenance      MS - Missing      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 - October 2014







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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	673	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: 673

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - October 2014**

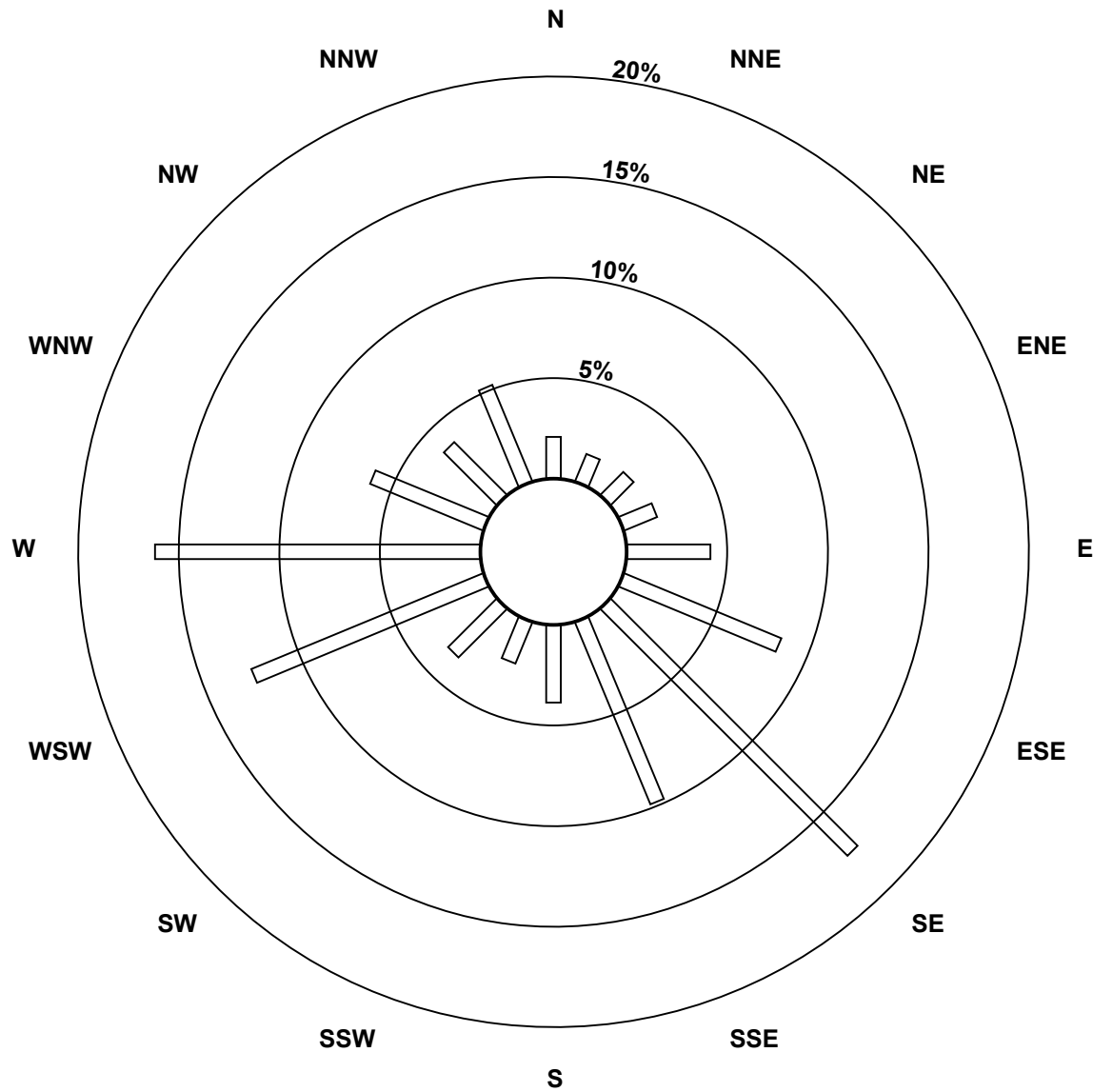
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	14	10	11	12	28	57	117	66	26	15	23	84	109	41	25	35	673
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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>	14	10	11	12	28	57	117	66	26	15	23	84	109	41	25	35	673

Total Number of Valid Hours: 673

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont (AMS502)**



Classes (ppb)

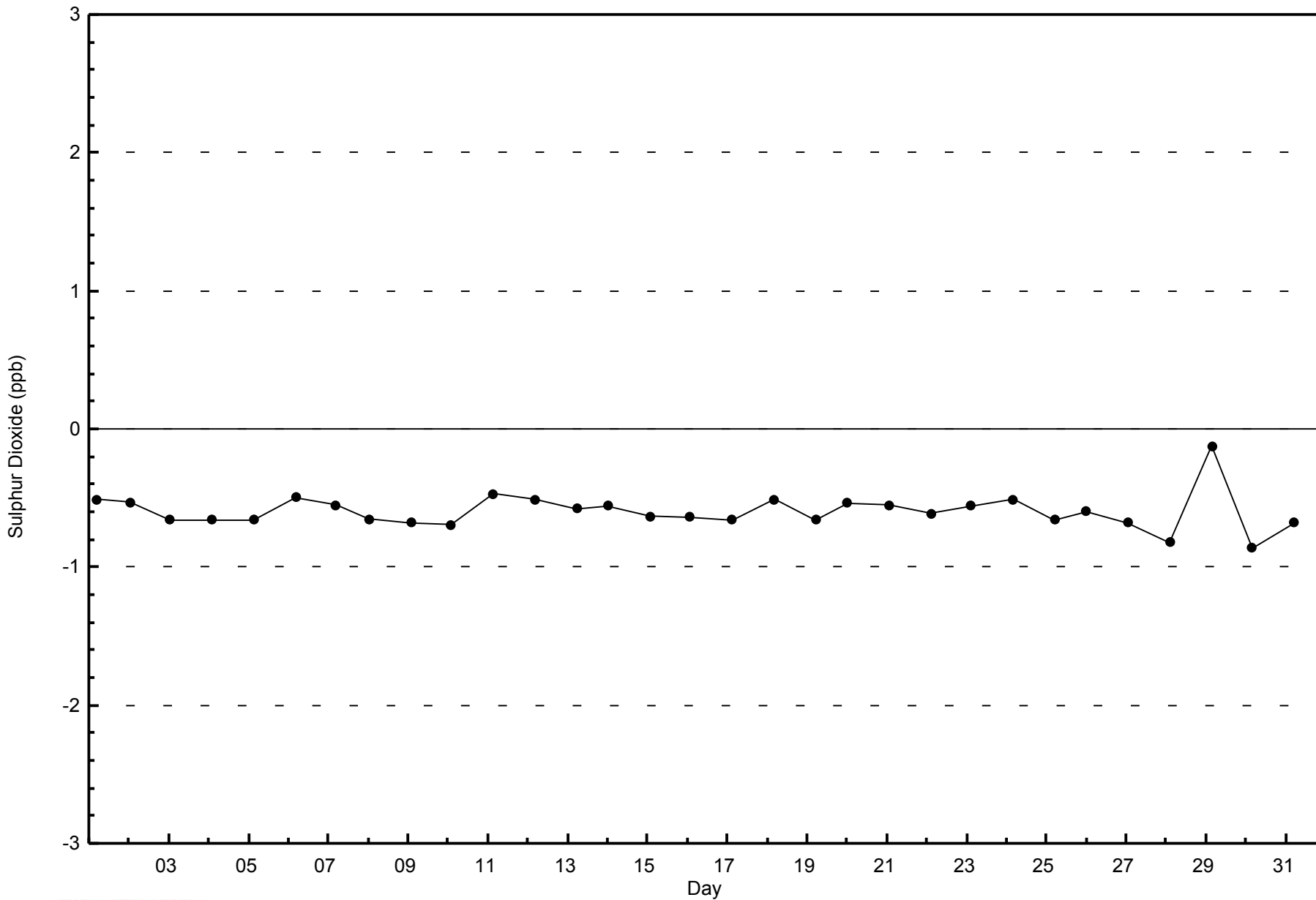


**Total Number of Valid Hours: 673**



WBEA  
Zero Responses

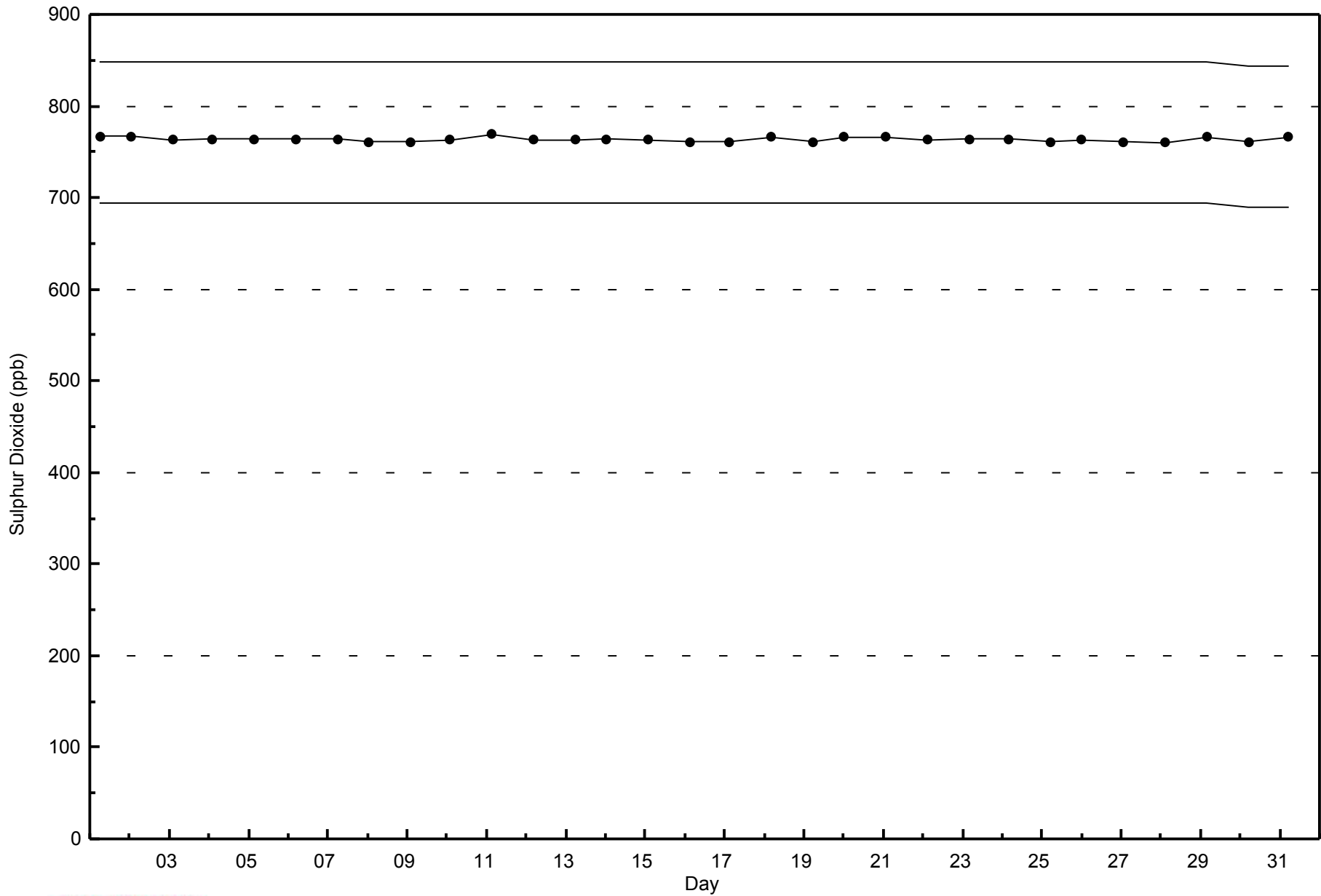
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
ConocoPhillips - Surmoint - October 2014





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont - October 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Oct 16 00:00	Maximum Daily Average: 0.5 ppb on Oct 5		Hours of Data:	703
Minimum Value: 0 ppb on Oct 3 17:00	Minimum Daily Average: 0.1 ppb on Oct 3		Hours of Missing Data:	41
Maximum Diurnal Average: 0.3 ppb at hour 8	Minimum Diurnal Average: 0.2 ppb at hour 4		Hours of Calibration:	37
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1		Percent Operational Time:	99.5

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-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
2-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-Oct	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.5	1
6-Oct	1	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
7-Oct	0	0	0	0	0	0	Z	0	0	1	1	1	0	0	0	0	1	0	0	1	0	0	0	0	0.3	1
8-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Oct	0	0	Z	0	0	0	1	1	0	0	MS	MS	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
10-Oct	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
11-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	0.4	2
16-Oct	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
17-Oct	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
18-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Oct	0	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
20-Oct	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0.4	1
21-Oct	0	0	Z	0	0	0	0	0	0	0	0	UO	UO	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-Oct	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
23-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
24-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Oct	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
26-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0.2	1
28-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.2	1
29-Oct	0	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0
30-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-Oct	0	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	1

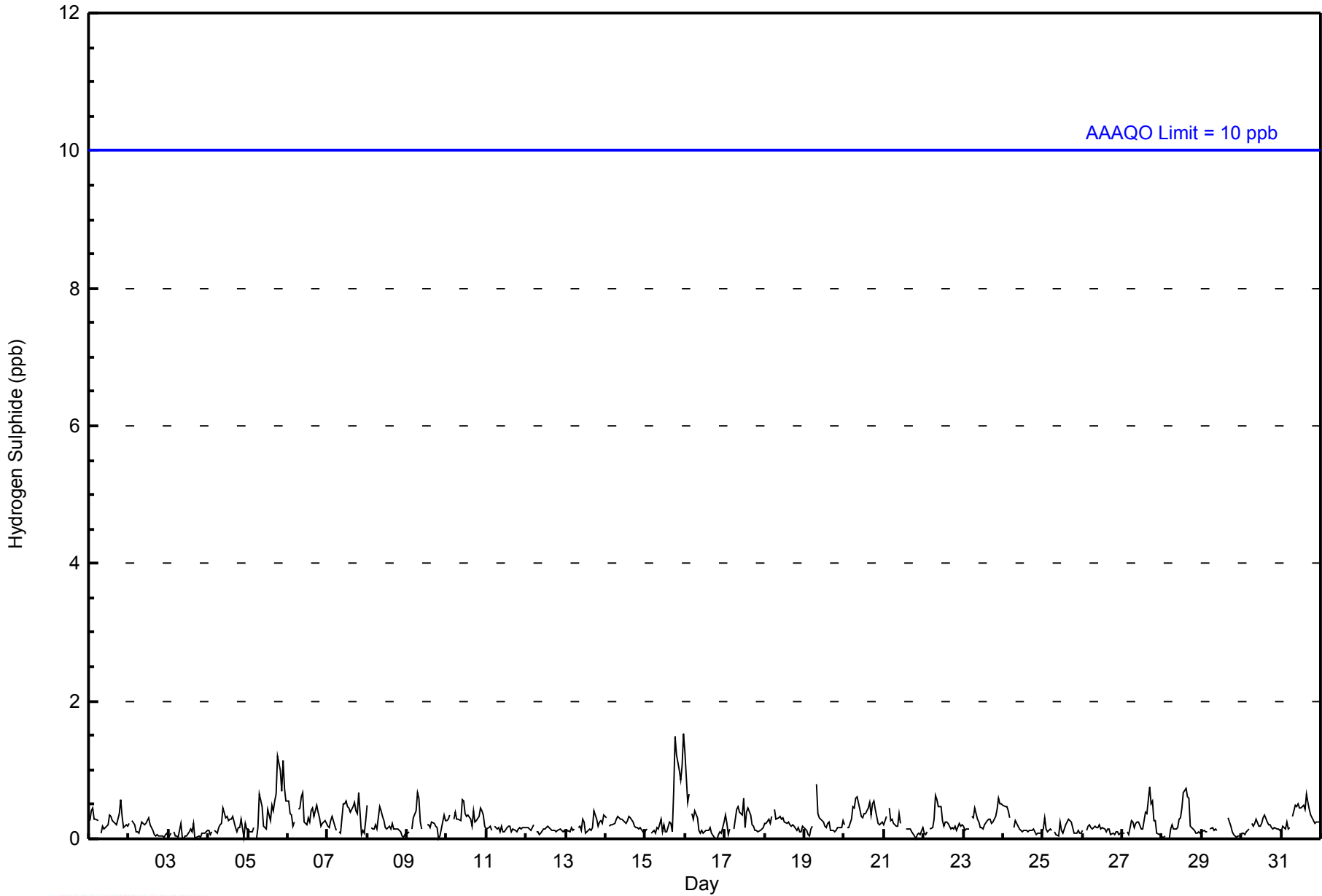
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average
1	1	1	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	2	Diurnal Maximum

Z - zerospan                      C - Calibration                      UO - Unstable Operation                      MS - Missing  
 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 - October 2014





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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**ConocoPhillips - Surmont - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	703	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: 703

Total Number of Hours: 744





**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**ConocoPhillips - Surmont - October 2014**

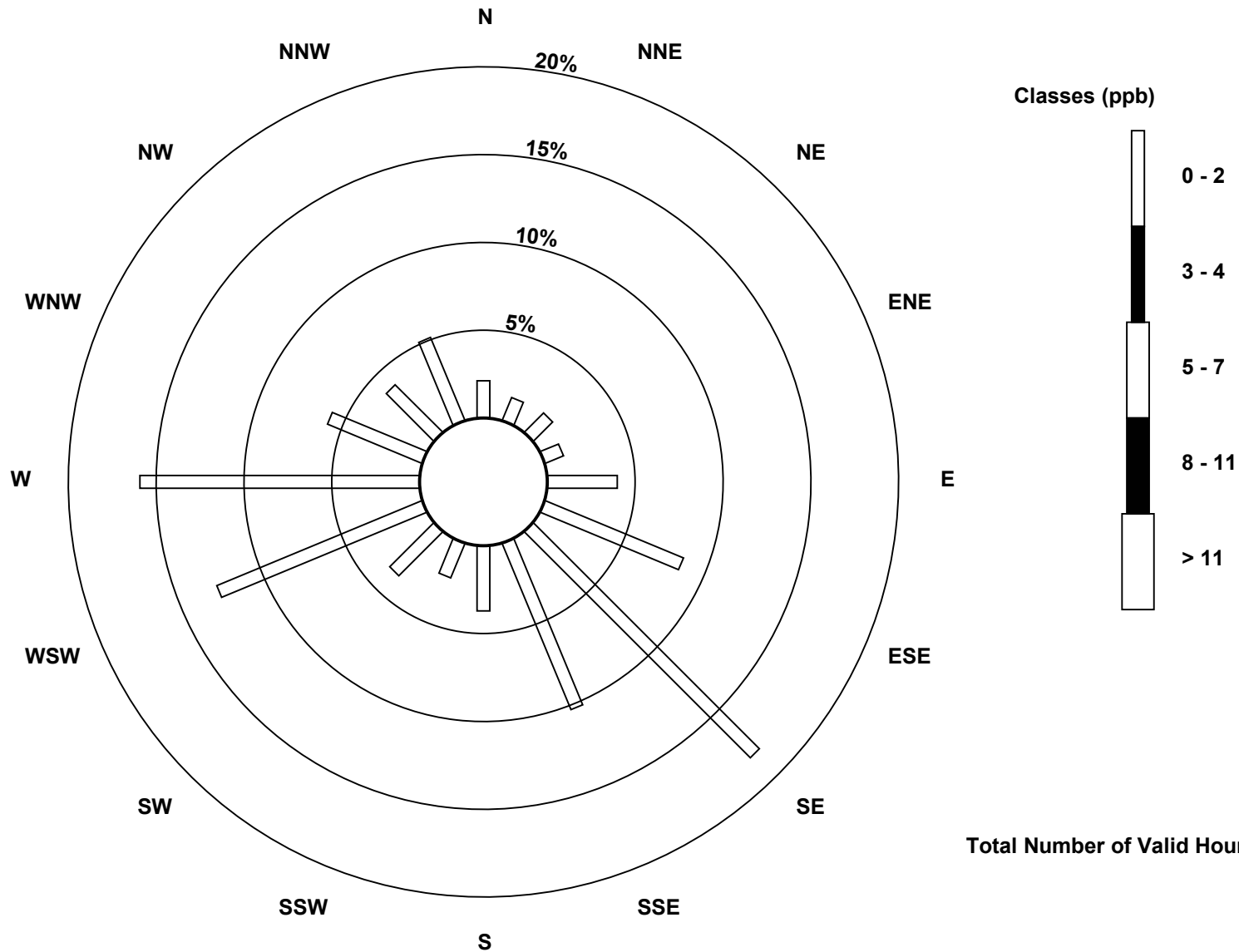
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	15	10	11	8	28	60	128	72	26	15	25	89	112	41	27	36	703
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	15	10	11	8	28	60	128	72	26	15	25	89	112	41	27	36	703

Total Number of Valid Hours: 703

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
ConocoPhillips - Surmont (AMS502)**

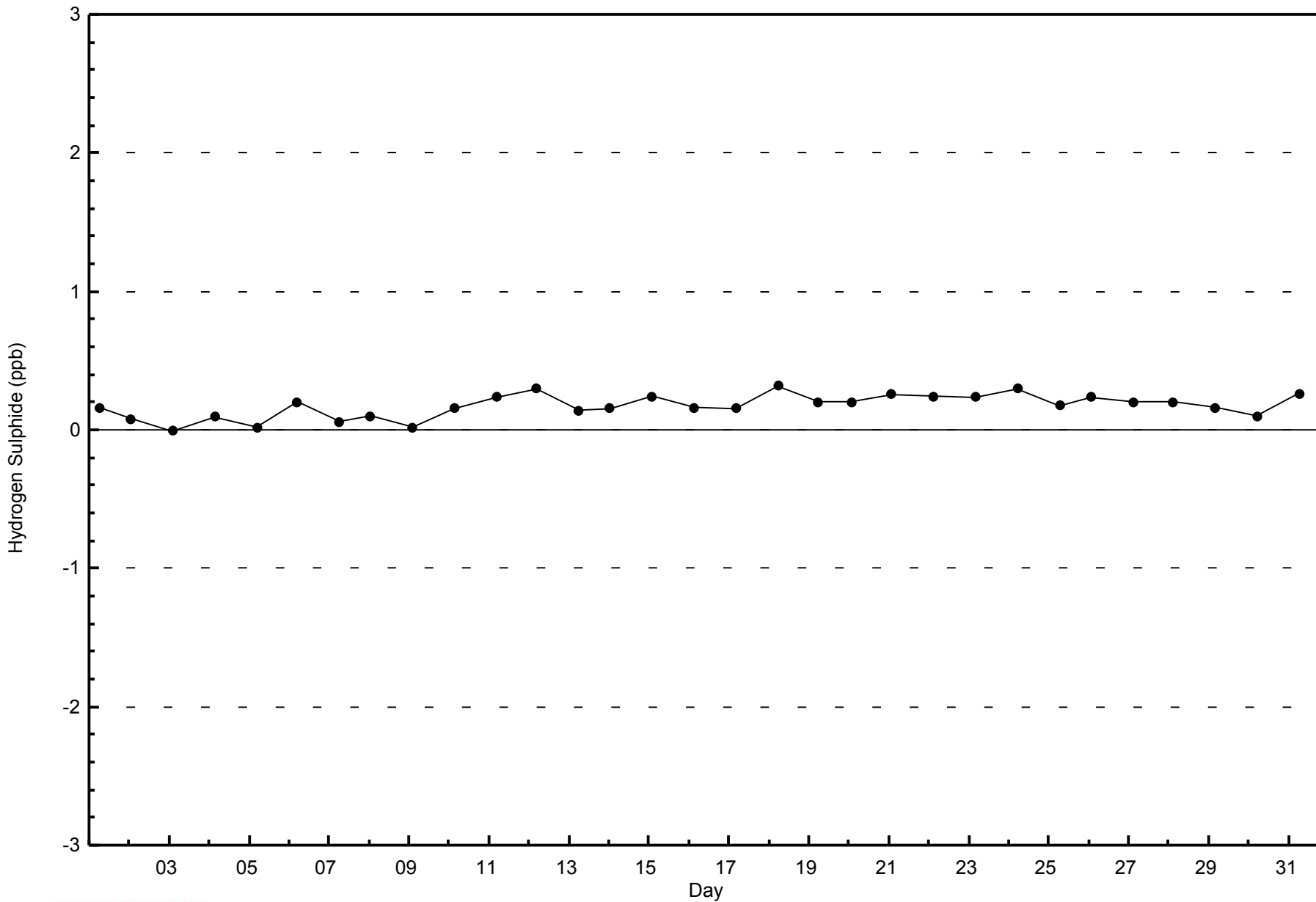


**Total Number of Valid Hours: 703**



WBEA  
Zero Responses

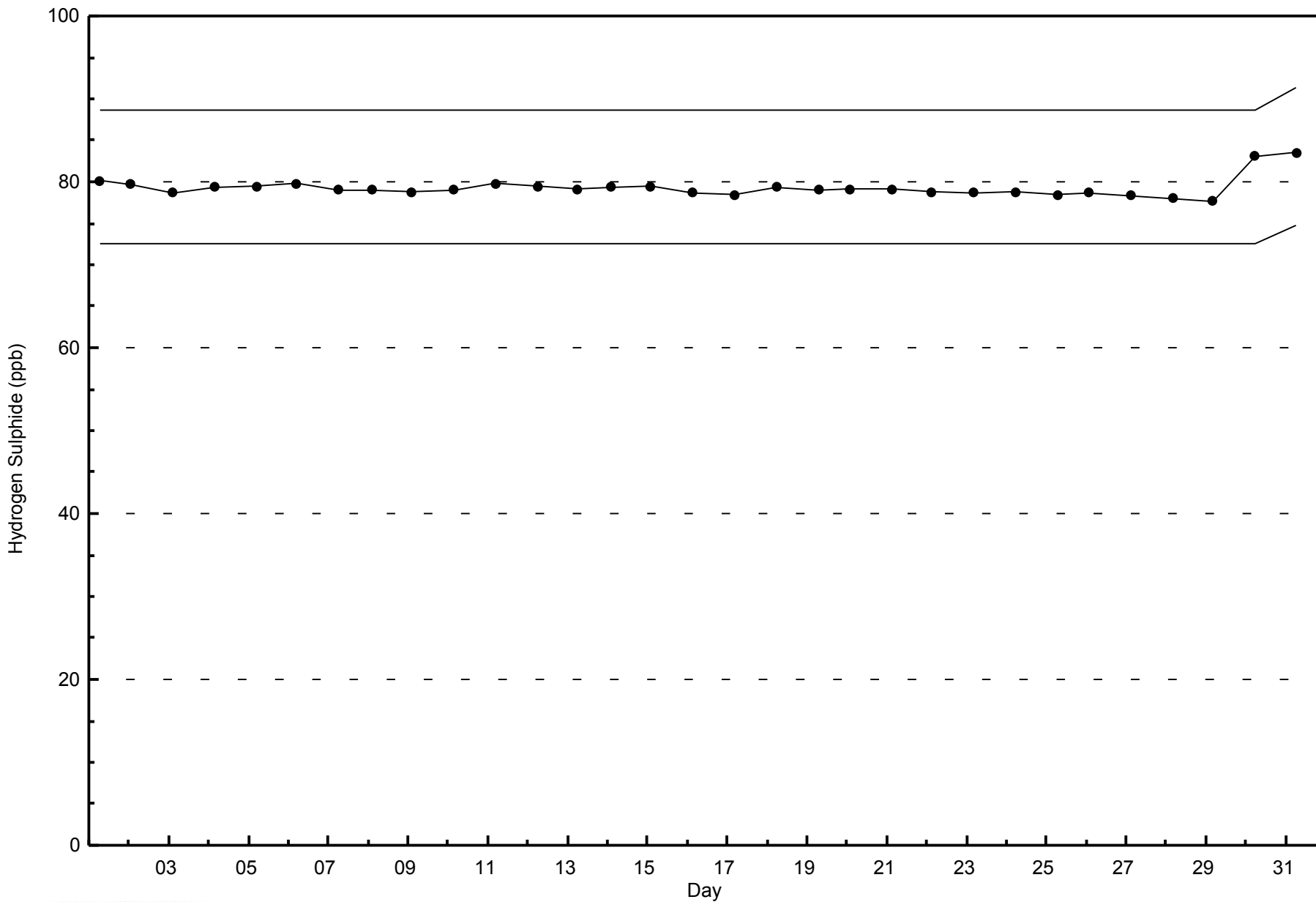
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
ConocoPhillips - Surmont - October 2014





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
ConocoPhillips - Surmont - October 2014



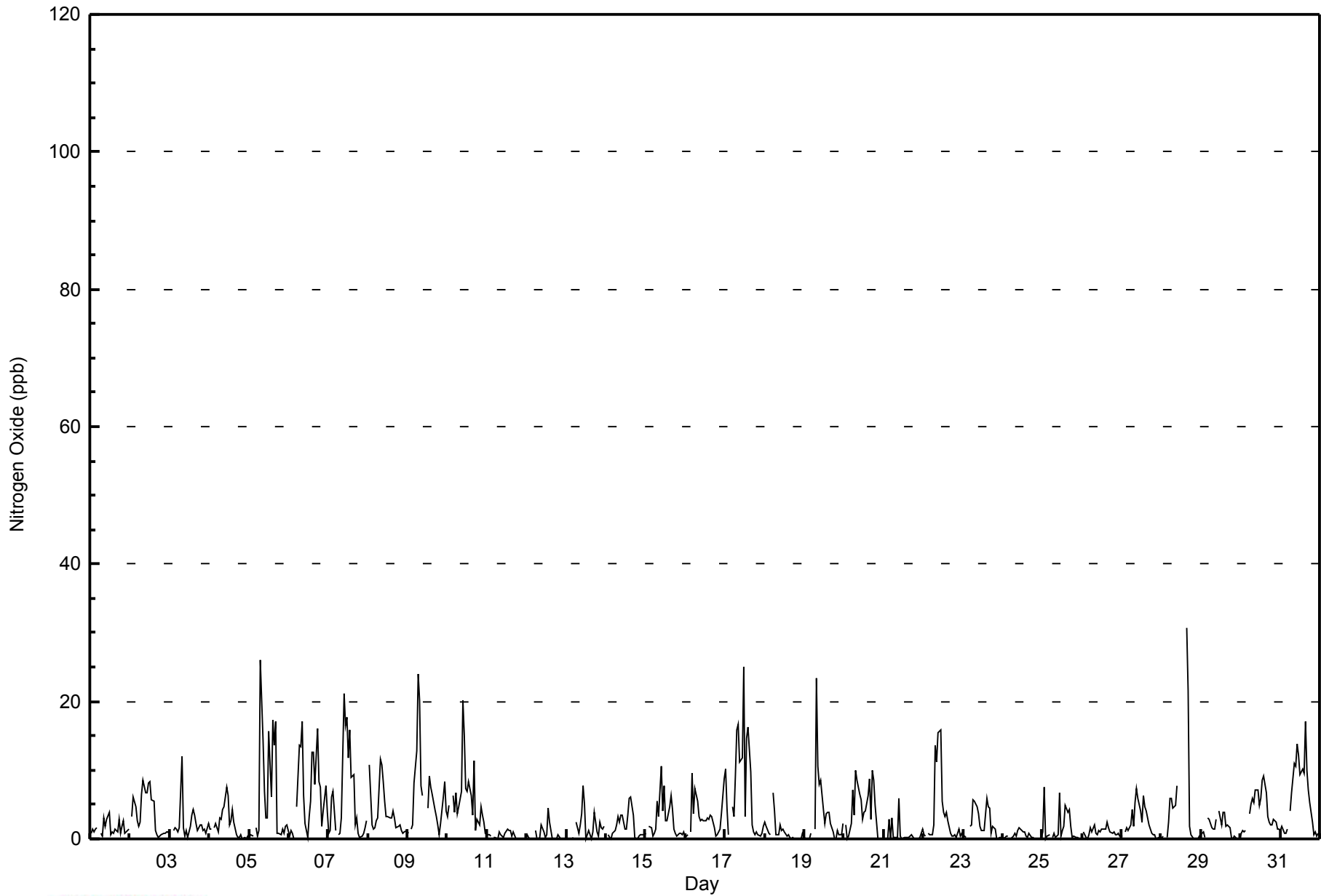


Maximum Value: 31 ppb on Oct 28 16:00																		Maximum Daily Average: 7.2 ppb on Oct 17																		Hours in Service: 744							
Minimum Value: 0 ppb on Oct 4 21:00																		Minimum Daily Average: 0.4 ppb on Oct 11																		Hours of Data: 705							
Maximum Diurnal Average: 6.7 ppb at hour 8																		Minimum Diurnal Average: 0.9 ppb at hour 21																		Hours of Missing Data: 39							
Monthly Average: 3.2 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 1 Q <sub>3</sub> = 4 P <sub>90</sub> = 8 P <sub>99</sub> = 21																		Hours of Calibration: 36							
																																				Percent Operational Time: 99.6							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																			
1-Oct	1	1	1	1	2	Z	1	0	3	2	3	4	1	1	1	1	1	3	1	2	3	1	1	1	1.5	4																	
2-Oct	Z	3	6	5	3	2	2	7	8	7	7	8	8	6	6	1	1	0	0	1	1	1	1	1	3.6	8																	
3-Oct	1	Z	1	2	1	1	2	12	2	0	1	0	2	4	4	4	2	1	2	2	1	1	1	2	2.2	12																	
4-Oct	1	1	Z	2	2	1	3	3	4	5	8	6	2	3	4	2	1	0	0	1	0	0	0	1	2.2	8																	
5-Oct	0	1	0	Z	2	0	1	26	14	7	3	3	16	6	17	14	17	1	1	1	1	2	2	5.9	26																		
6-Oct	0	1	1	0	Z	5	14	13	17	6	2	0	3	5	13	13	8	16	8	8	2	4	8	4	6.6	17																	
7-Oct	1	1	6	7	1	Z	1	1	3	21	16	18	12	16	9	9	2	3	1	0	0	1	2	3	5.8	21																	
8-Oct	Z	11	2	1	2	3	3	12	11	8	6	3	3	3	4	3	2	2	2	1	1	1	1	1	3.8	12																	
9-Oct	1	Z	1	2	8	13	24	20	8	6	MS	MS	4	9	8	7	4	3	2	1	2	6	8	4	6.8	24																	
10-Oct	3	5	Z	6	4	7	4	5	7	20	15	7	7	8	6	4	11	1	3	2	5	3	2	1	5.9	20																	
11-Oct	1	1	0	Z	0	0	0	1	1	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0.4	1																	
12-Oct	1	0	0	0	Z	1	0	0	0	2	1	0	1	4	2	0	0	0	0	1	0	0	0	0	0.6	4																	
13-Oct	0	0	0	0	0	Z	2	1	2	4	8	5	0	1	1	0	1	4	1	0	2	2	1	2	1.7	8																	
14-Oct	Z	1	0	0	1	1	2	3	2	3	3	1	2	4	6	3	0	0	0	0	1	1	1	1	1.8	6																	
15-Oct	1	Z	2	2	0	1	1	6	3	11	4	8	3	3	5	6	4	1	1	0	1	1	1	1	2.8	11																	
16-Oct	0	1	Z	1	10	4	7	6	3	3	3	3	3	3	3	3	3	2	0	1	1	1	4	9	3.1	10																	
17-Oct	10	5	1	Z	5	3	9	16	17	11	12	25	3	15	16	10	2	1	1	1	1	0	1	2	7.2	25																	
18-Oct	2	2	1	1	Z	7	4	1	1	2	1	1	1	0	1	0	0	0	0	0	0	0	0	1	1.1	7																	
19-Oct	0	0	0	0	1	Z	1	23	11	8	9	4	2	4	4	4	2	1	0	0	1	1	1	2	3.4	23																	
20-Oct	Z	2	0	0	2	7	4	10	9	7	6	3	4	4	6	9	3	10	9	5	0	0	0	0	4.3	10																	
21-Oct	0	Z	0	3	0	3	0	0	0	6	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.7	6																	
22-Oct	1	0	Z	1	1	1	2	14	11	15	16	5	4	3	4	3	1	0	0	1	0	1	0	1	3.7	16																	
23-Oct	0	0	0	Z	2	2	6	5	5	4	2	1	1	1	6	5	4	1	2	1	0	0	0	0	2.2	6																	
24-Oct	0	0	0	0	Z	0	0	1	0	1	2	1	1	1	0	0	1	0	0	0	0	0	0	0	0.5	2																	
25-Oct	1	8	0	0	1	Z	0	1	0	1	7	0	1	2	5	4	4	2	0	1	0	0	0	0	1.6	8																	
26-Oct	Z	1	0	0	1	2	1	2	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	0	1.0	2																	
27-Oct	0	Z	1	2	1	2	4	2	5	7	6	4	2	6	5	4	2	1	1	1	1	0	0	0	2.5	7																	
28-Oct	0	0	Z	0	2	6	6	4	5	8	C	C	C	C	C	31	22	2	1	0	0	0	0	0	4.8	31																	
29-Oct	1	1	0	Z	3	3	2	2	2	3	M	4	2	4	4	2	2	2	0	0	0	0	0	0	1.6	4																	
30-Oct	1	1	1	1	Z	4	5	6	5	7	7	5	6	9	9	7	3	2	2	2	3	2	1	2	4.0	9																	
31-Oct	1	2	1	1	1	Z	4	7	11	11	14	12	9	10	9	17	10	7	5	3	1	1	0	1	6.0	17																	
																		1.1 1.9 1.0 1.5 2.1 3.1 3.7 6.7 5.5 6.3 5.8 4.7 3.5 4.6 5.3 5.5 3.9 2.2 1.4 1.1 0.9 1.0 1.2 1.4																		Diurnal Average							
																		10 11 6 7 10 13 24 26 17 21 16 25 16 16 17 31 22 16 9 8 5 6 8 9																		Diurnal Maximum							
Z - zerospan																		C - Calibration																		M - Maintenance				MS - Missing			



**WBEA**  
**Hourly Averages**

**Nitrogen Oxide (NO) - ppb**  
**ConocoPhillips - Surmont - October 2014**





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

**Nitrogen Oxide (NO) - ppb**  
**ConocoPhillips - Surmont - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	698	99.01	99.01
21 - 40	7	0.99	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**ConocoPhillips - Surmont - October 2014**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	11	11	12	28	57	122	68	29	15	24	89	114	41	26	35	698
21 - 40	0	0	0	0	1	2	2	1	0	0	0	0	0	1	0	0	7
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>	16	11	11	12	29	59	124	69	29	15	24	89	114	42	26	35	705

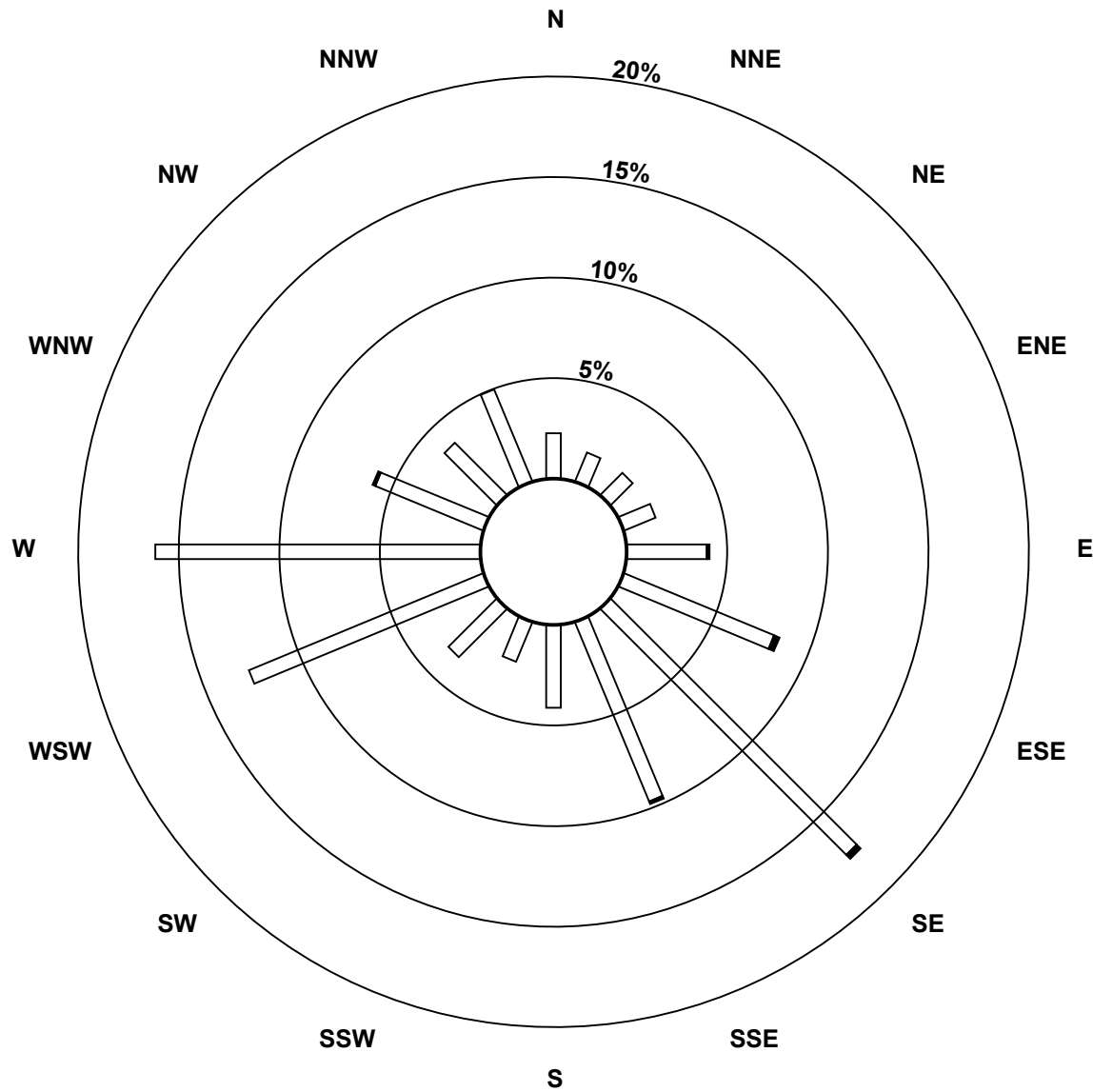
Total Number of Valid Hours: 705

Total Number of Hours: 744

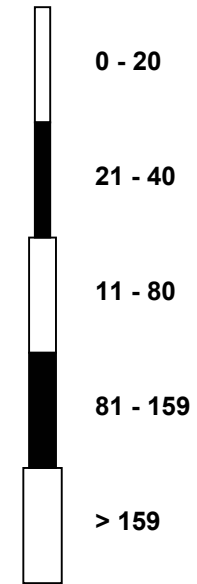


**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Nitrogen Oxide (NO) - ppb  
ConocoPhillips - Surmont (AMS502)**



Classes (ppb)

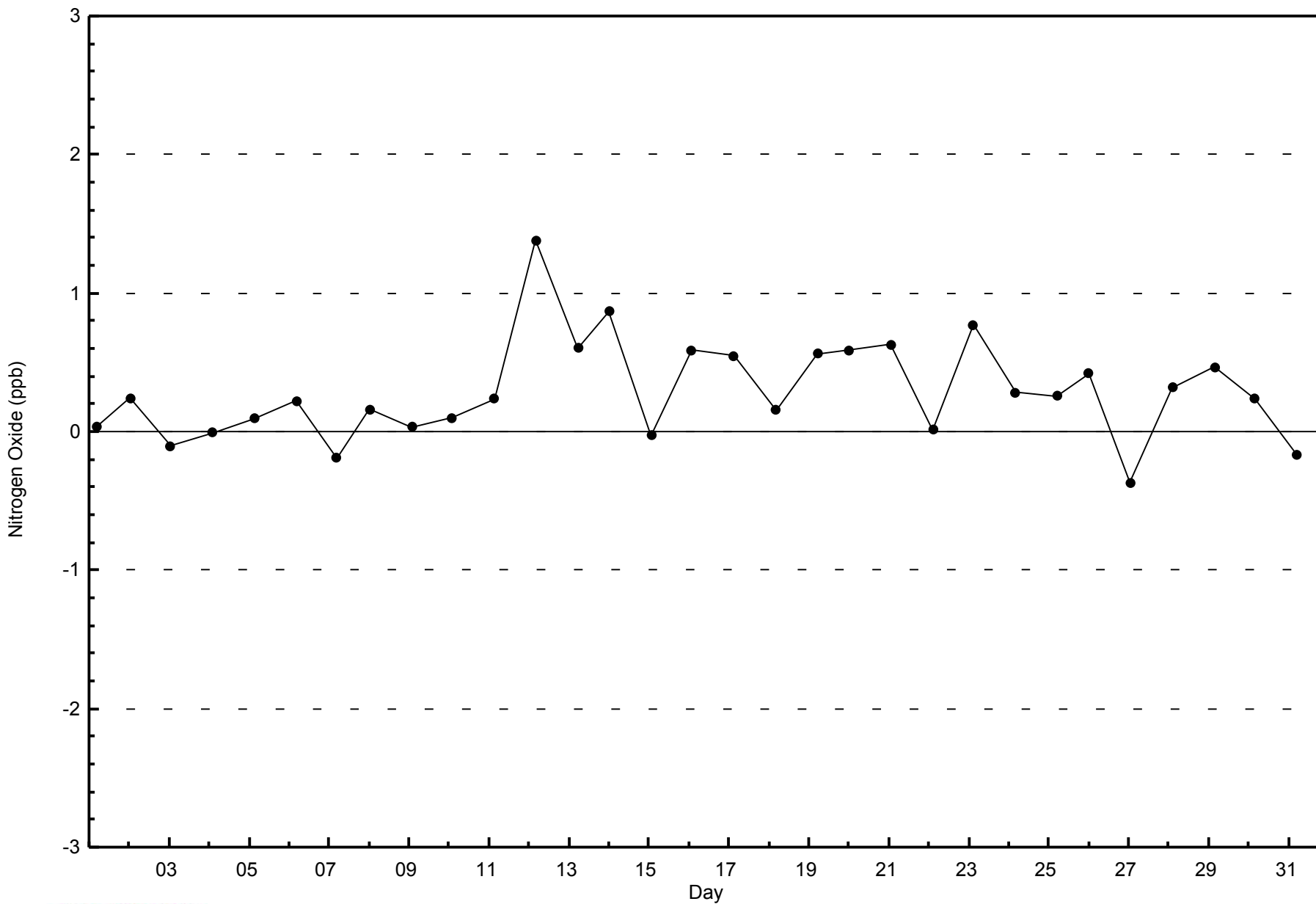


Total Number of Valid Hours: 705



WBEA  
Zero Responses

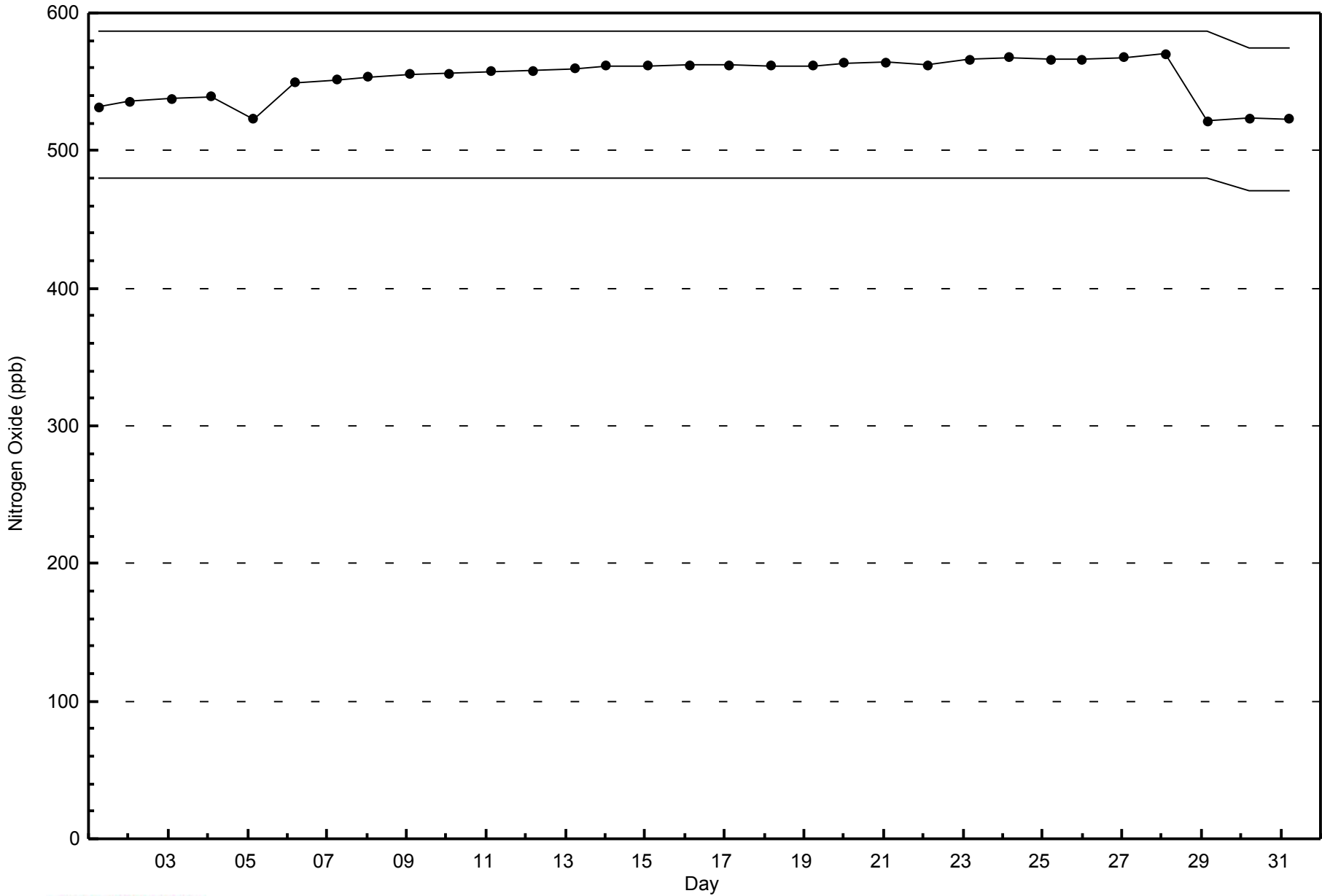
Nitrogen Oxide (NO) - ppb  
ConocoPhillips - Surmont - October 2014





**WBEA**  
**Span Responses**

**Nitrogen Oxide (NO) - ppb**  
**ConocoPhillips - Surmont - October 2014**





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 35 ppb on Oct 19 08:00	Maximum Daily Average: 12.9 ppb on Oct 10
Minimum Value: 0 ppb on Oct 12 21:00	Hours of Data: 705
Maximum Diurnal Average: 9.3 ppb at hour 8	Hours of Missing Data: 39
Monthly Average: 5.3 ppb	Hours of Calibration: 36
Minimum Daily Average: 1.1 ppb on Oct 24	Percent Operational Time: 99.6
Minimum Diurnal Average: 3.6 ppb at hour 3	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 4 Q <sub>3</sub> = 7 P <sub>90</sub> = 12 P <sub>99</sub> = 23	

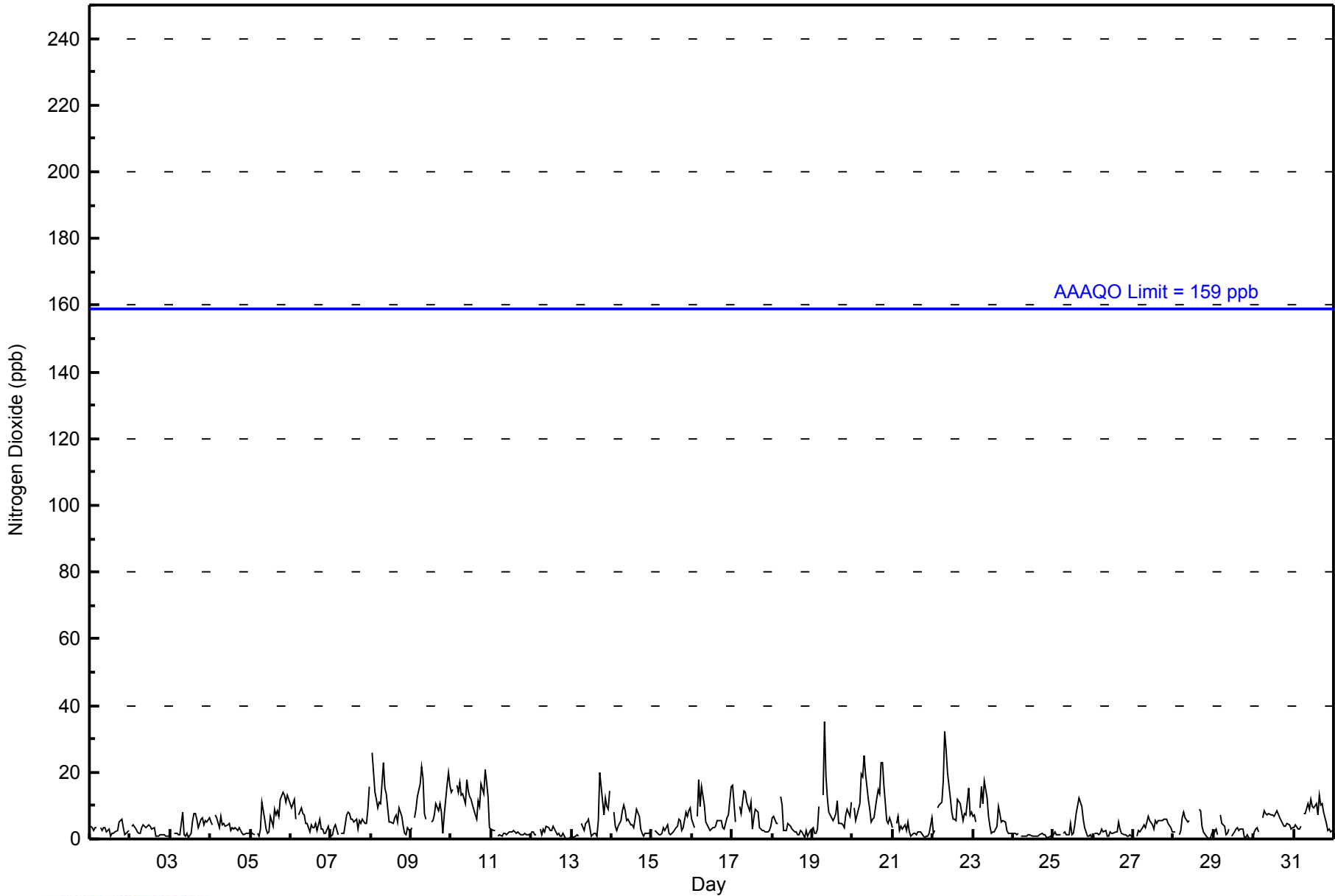
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	4	4	3	4	3	Z	3	3	4	4	2	3	1	2	2	2	3	5	6	6	4	1	2	3	3.1	6
2-Oct	Z	4	4	3	2	2	2	3	4	3	4	4	4	3	3	1	1	1	1	1	1	1	1	1	2.3	4
3-Oct	1	Z	2	2	2	1	1	8	1	1	2	0	2	6	8	8	6	4	6	6	4	6	5	6	3.7	8
4-Oct	5	4	Z	7	6	3	7	4	5	4	4	5	3	3	3	3	3	2	2	1	2	2	2	2	3.6	7
5-Oct	2	2	1	Z	2	1	3	11	6	3	2	2	7	4	9	7	8	7	12	14	13	11	13	12	6.6	14
6-Oct	10	10	12	6	Z	7	9	8	7	5	5	2	4	4	3	5	3	6	3	3	2	2	4	2	5.2	12
7-Oct	1	1	3	4	1	Z	2	2	2	7	8	8	6	6	5	6	3	5	5	6	5	5	9	16	4.9	16
8-Oct	Z	26	14	12	9	11	11	23	15	14	9	5	5	5	6	7	5	9	7	4	2	1	3	2	8.9	26
9-Oct	4	Z	6	9	13	16	21	18	8	6	MS	MS	5	6	7	10	9	10	8	2	7	16	20	16	10.3	21
10-Oct	14	15	Z	16	14	17	13	14	11	18	14	13	12	10	7	6	12	10	16	14	21	17	13	3	12.9	21
11-Oct	3	3	3	Z	1	1	1	2	2	1	2	2	2	2	2	2	2	1	1	1	2	1	1	1	1.7	3
12-Oct	2	2	1	1	Z	3	1	3	2	4	3	3	3	4	3	1	2	1	1	2	0	0	0	1	1.8	4
13-Oct	1	1	1	1	1	Z	5	3	5	5	6	3	1	2	2	1	6	20	11	7	12	10	9	15	5.4	20
14-Oct	Z	8	4	3	4	5	8	10	9	5	6	4	4	3	6	9	7	3	2	1	2	2	2	3	4.7	10
15-Oct	2	Z	3	2	1	1	2	3	3	4	2	1	2	2	3	4	6	5	2	3	8	7	8	9	3.7	9
16-Oct	6	3	Z	7	18	10	16	10	5	4	3	2	3	3	4	6	6	5	4	3	5	6	7	16	6.6	18
17-Oct	16	11	5	Z	10	8	11	14	14	11	8	11	3	6	9	8	3	3	3	2	2	2	3	4	7.3	16
18-Oct	6	7	5	5	Z	13	10	3	2	5	4	4	3	2	2	1	1	2	2	1	3	1	2	3	3.7	13
19-Oct	4	2	2	3	10	Z	13	35	19	12	8	6	5	6	8	11	5	5	4	3	7	9	7	11	8.5	35
20-Oct	Z	9	6	7	11	20	19	25	19	12	9	5	6	7	12	15	14	23	23	16	6	5	6	5	12.1	25
21-Oct	4	Z	5	7	2	4	3	4	2	5	2	1	2	2	1	2	2	2	1	1	1	1	2	6	2.6	7
22-Oct	2	3	Z	10	10	11	18	32	27	20	12	8	6	6	6	12	11	8	6	8	7	15	7	8	10.9	32
23-Oct	7	7	5	Z	9	16	11	17	12	7	4	2	2	2	4	10	8	5	6	5	2	2	2	2	6.3	17
24-Oct	2	2	1	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	0	1	1	1.1	2
25-Oct	1	2	1	1	1	Z	2	2	1	1	5	1	2	4	8	12	11	10	6	3	1	1	1	0	3.4	12
26-Oct	Z	2	2	1	2	3	2	2	1	1	2	2	2	2	2	5	3	2	1	1	1	1	1	1	1.8	5
27-Oct	0	Z	1	3	2	3	4	3	5	7	5	4	3	5	5	5	5	6	6	6	6	5	4	2	4.1	7
28-Oct	2	2	Z	1	3	6	8	6	5	6	C	C	C	C	C	9	9	4	2	1	0	0	0	2	3.7	9
29-Oct	1	3	1	Z	7	5	4	1	2	3	M	1	2	3	3	3	3	3	1	0	1	0	0	1	2.2	7
30-Oct	2	3	3	2	Z	6	9	8	7	8	7	7	7	8	9	7	5	5	4	4	5	4	3	4	5.5	9
31-Oct	3	4	3	3	4	Z	8	8	11	9	12	10	9	10	7	13	10	10	8	5	3	3	2	3	6.9	13
4.1 5.3 3.6 4.6 5.7 7.0 7.3 9.3 6.9 6.3 5.4 4.2 3.8 4.3 5.0 6.1 5.4 6.0 5.1 4.3 4.3 4.4 4.5 5.1																								Diurnal Average		
16 26 14 16 18 20 21 35 27 20 14 13 12 10 12 15 14 23 23 16 21 17 20 16																								Diurnal Maximum		

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



**WBEA**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - October 2014**





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	695	98.58	98.58
21 - 40	10	1.42	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - October 2014**

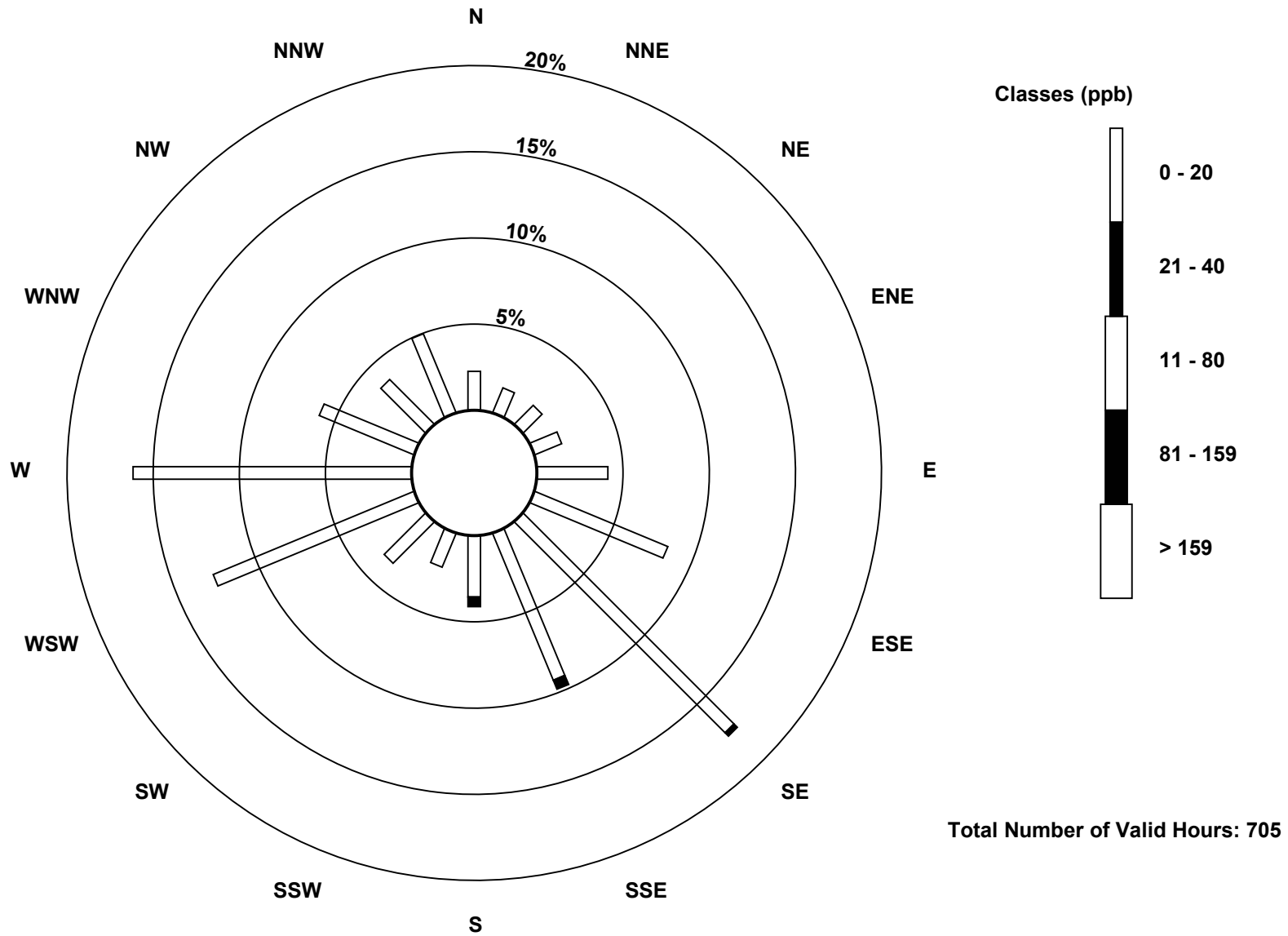
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	11	11	12	29	59	122	65	25	15	24	89	114	42	26	35	695
21 - 40	0	0	0	0	0	0	2	4	4	0	0	0	0	0	0	0	10
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	16	11	11	12	29	59	124	69	29	15	24	89	114	42	26	35	705

Total Number of Valid Hours: 705

Total Number of Hours: 744

Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
 ConocoPhillips - Surmont (AMS502)

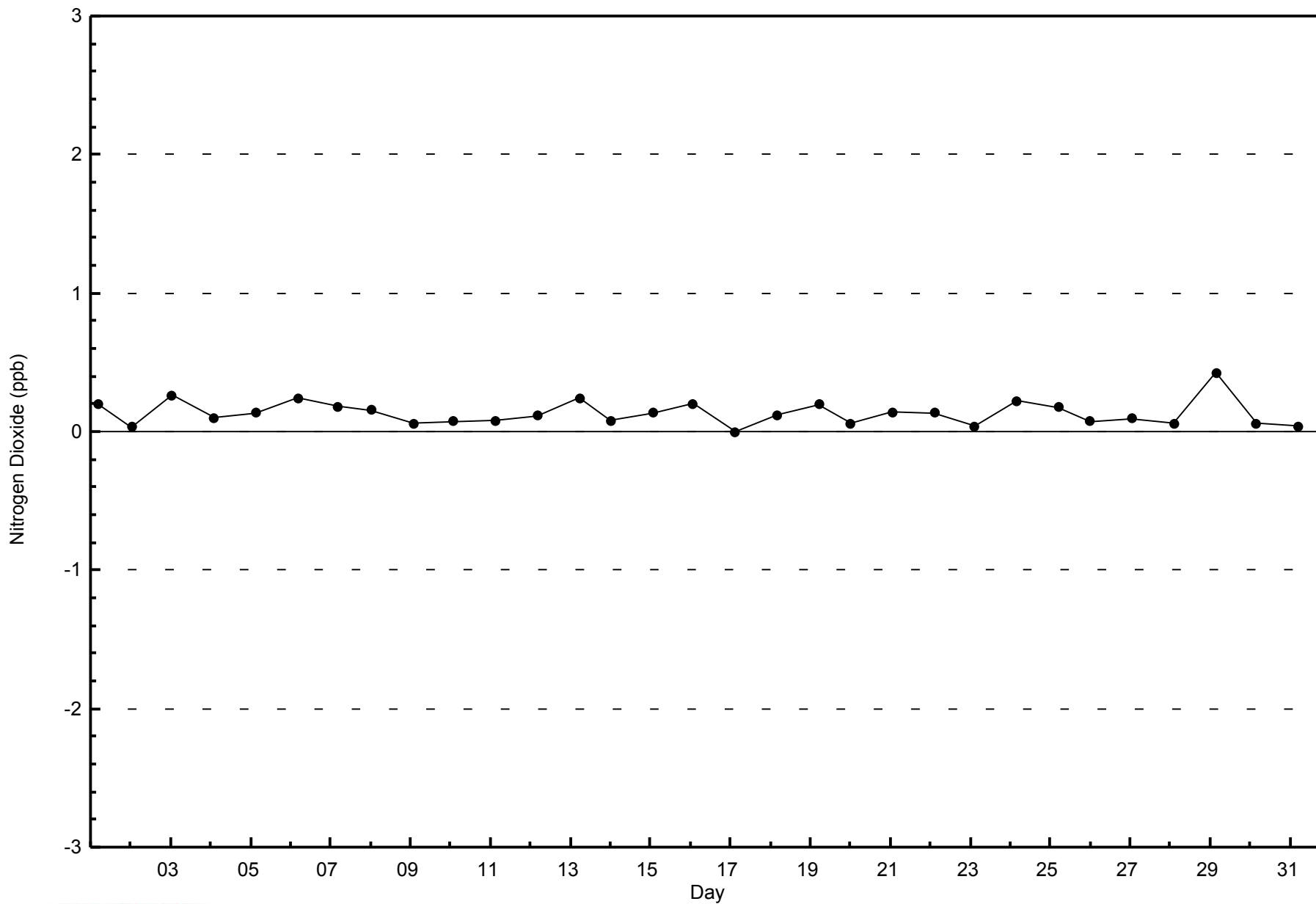






WBEA  
Zero Responses

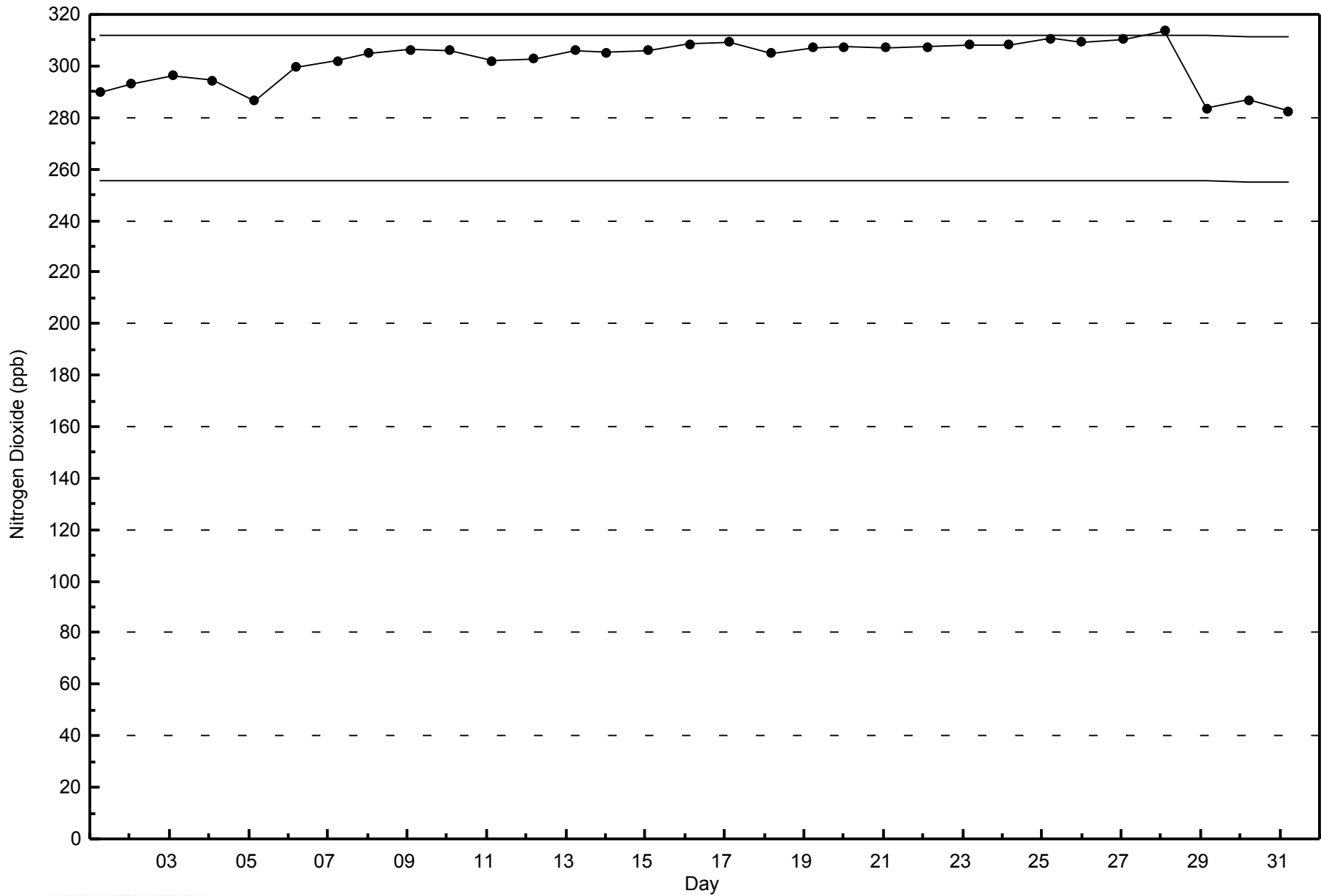
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont - October 2014





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont - October 2014



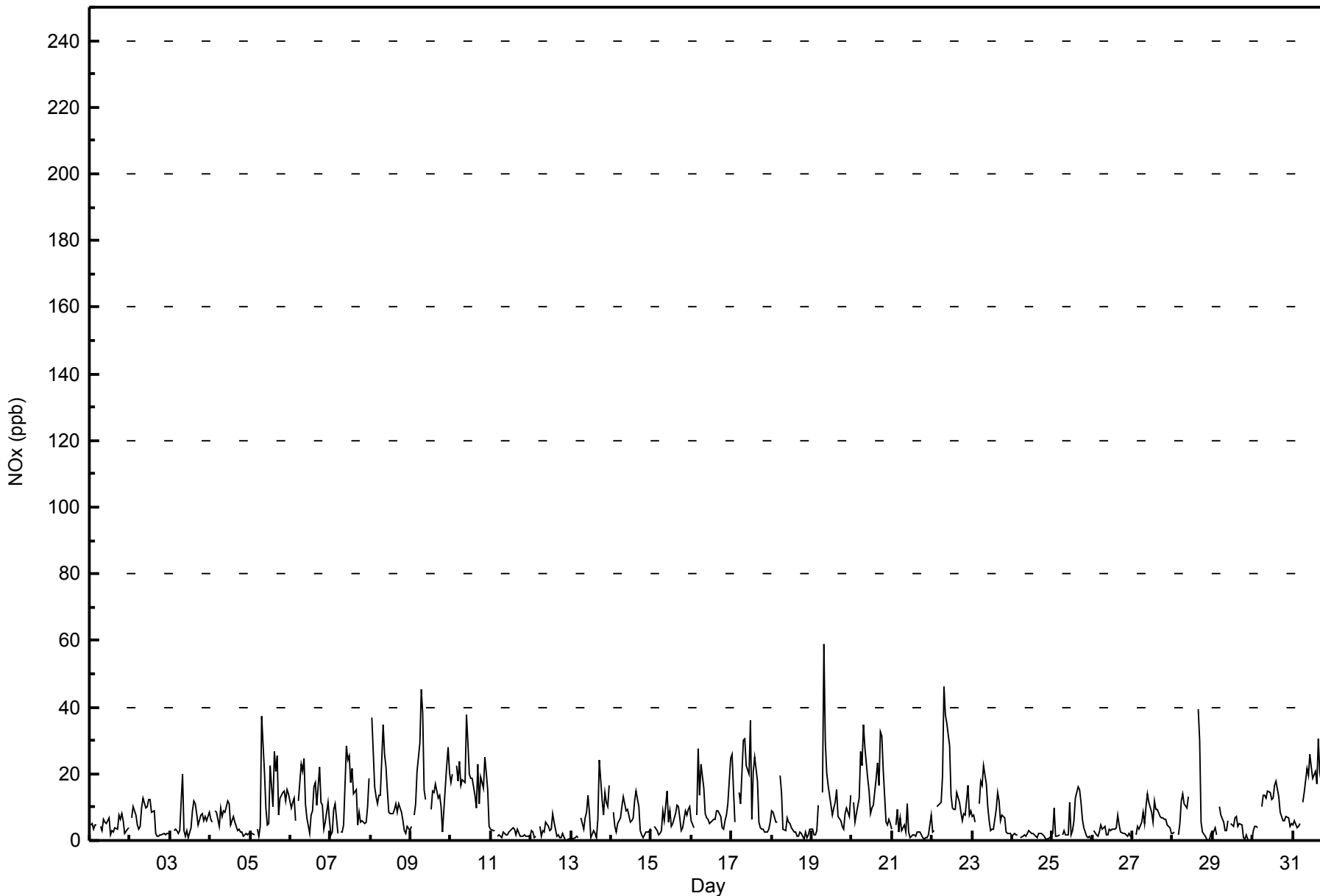


Maximum Value: 59 ppb on Oct 19 08:00																		Maximum Daily Average: 18.9 ppb on Oct 10						Hours in Service: 744													
Minimum Value: 0 ppb on Oct 28 22:00																		Minimum Daily Average: 1.6 ppb on Oct 24						Hours of Data: 705													
Maximum Diurnal Average: 16.0 ppb at hour 8																		Minimum Diurnal Average: 4.7 ppb at hour 3						Hours of Missing Data: 39													
Monthly Average: 8.5 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 3 Median = 6 Q <sub>3</sub> = 12 P <sub>90</sub> = 20 P <sub>99</sub> = 38						Hours of Calibration: 36													
																		Percent Operational Time: 99.6																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Oct	5	5	4	5	5	Z	4	3	6	5	5	7	2	3	3	4	4	8	6	8	6	2	3	4	4.6	8											
2-Oct	Z	7	10	7	5	3	4	10	13	10	10	12	12	9	9	2	1	1	2	2	2	2	2	2	6.0	13											
3-Oct	2	Z	3	3	3	2	3	20	3	1	3	1	4	9	12	11	8	5	8	8	6	7	6	9	5.9	20											
4-Oct	6	5	Z	9	9	4	10	7	9	9	12	11	5	6	7	6	3	4	3	2	1	2	2	2	5.8	12											
5-Oct	3	2	2	Z	3	1	4	37	20	10	5	5	22	10	27	21	25	8	13	15	15	12	15	14	12.5	37											
6-Oct	10	12	13	6	Z	12	23	21	24	11	7	2	8	9	16	17	11	22	11	11	3	6	12	6	11.8	24											
7-Oct	2	3	9	11	2	Z	2	3	5	28	24	25	18	22	14	15	5	8	5	6	5	5	10	19	10.7	28											
8-Oct	Z	37	16	13	11	14	14	35	26	22	15	8	8	8	9	11	8	11	9	6	3	2	4	3	12.7	37											
9-Oct	4	Z	8	11	21	29	45	38	15	12	MS	MS	9	15	15	17	13	14	10	3	10	22	28	20	17.1	45											
10-Oct	17	20	Z	22	18	24	17	18	18	38	29	20	19	19	14	10	23	11	19	15	25	20	15	4	18.9	38											
11-Oct	4	3	3	Z	1	2	1	3	2	2	2	3	4	4	3	2	3	1	1	1	2	1	1	1	2.2	4											
12-Oct	3	2	1	1	Z	4	1	3	2	6	4	3	3	8	5	1	2	1	1	2	0	0	0	1	2.4	8											
13-Oct	1	1	1	1	1	Z	7	3	7	9	14	8	1	3	2	1	6	24	12	8	15	12	10	16	7.1	24											
14-Oct	Z	9	4	3	5	7	10	13	11	9	9	6	6	7	12	15	10	3	2	1	2	3	2	3	6.5	15											
15-Oct	3	Z	4	3	2	2	3	9	6	15	6	9	4	5	8	10	10	7	3	4	9	8	9	10	6.5	15											
16-Oct	6	4	Z	8	27	14	23	16	8	7	6	5	6	6	6	9	9	7	4	4	6	8	11	24	9.7	27											
17-Oct	26	15	6	Z	14	11	20	30	31	22	20	36	6	21	25	18	5	4	3	3	2	3	3	6	14.4	36											
18-Oct	9	8	6	5	Z	19	14	3	3	7	5	5	4	3	3	1	1	3	2	1	3	1	2	3	4.8	19											
19-Oct	3	2	2	3	11	Z	15	59	30	20	17	11	8	10	11	15	7	6	4	3	8	10	7	13	11.9	59											
20-Oct	Z	11	6	8	13	27	22	35	28	18	15	8	10	11	19	23	17	33	31	21	5	5	6	5	16.4	35											
21-Oct	4	Z	5	10	2	7	3	4	3	11	2	1	2	2	1	2	3	3	1	1	1	1	2	7	3.3	11											
22-Oct	2	3	Z	10	11	11	20	46	38	35	28	14	10	9	9	14	12	9	6	8	8	17	8	9	14.6	46											
23-Oct	7	8	6	Z	11	18	16	23	17	10	6	3	3	4	10	14	12	6	7	7	2	2	2	2	8.5	23											
24-Oct	1	2	2	2	Z	1	1	2	1	2	3	2	2	2	1	1	2	2	2	1	1	0	1	1	1.6	3											
25-Oct	2	10	1	1	2	Z	2	3	2	2	12	2	3	6	13	16	15	11	6	4	1	1	1	0	5.1	16											
26-Oct	Z	3	2	1	3	5	3	4	2	1	3	3	3	4	4	7	5	3	2	2	2	1	2	1	2.8	7											
27-Oct	1	Z	2	4	4	5	8	5	10	14	11	8	5	12	9	9	7	7	7	6	7	5	4	2	6.7	14											
28-Oct	2	3	Z	2	5	12	14	11	10	13	C	C	C	C	C	40	30	5	3	1	0	0	0	2	8.5	40											
29-Oct	2	4	1	Z	10	8	6	3	3	6	M	5	4	7	7	4	5	5	1	0	2	1	0	1	3.8	10											
30-Oct	3	4	4	4	Z	10	14	14	13	15	14	12	13	16	18	13	9	7	6	6	7	7	4	5	9.5	18											
31-Oct	5	6	4	4	5	Z	12	14	22	20	26	22	19	21	17	30	20	18	13	7	3	4	3	3	12.9	30											
																		5.1 7.2 4.7 6.1 7.8 10.0 11.0 16.0 12.5 12.6 11.2 8.9 7.4 8.9 10.3 11.7 9.4 8.2 6.6 6.6 5.4 5.2 5.4 5.7 6.5						Diurnal Average													
																		26 37 16 22 27 29 45 59 38 38 29 36 22 22 27 40 30 33 31 21 25 22 28 24						Diurnal Maximum													
Z - zerospan																		C - Calibration						M - Maintenance						MS - Missing							



WBEA  
Hourly Averages

NOx (NO<sub>x</sub>) - ppb  
ConocoPhillips - Surmont - October 2014





**WBEA**

**Cumulative Frequency Distribution**

**NO<sub>x</sub> (NO<sub>x</sub>) - ppb**

**ConocoPhillips - Surmont - October 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	643	91.21	91.21
21 - 40	59	8.37	99.57
41 - 80	3	0.43	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**NOx (NO<sub>x</sub>) - ppb**  
**ConocoPhillips - Surmont - October 2014**

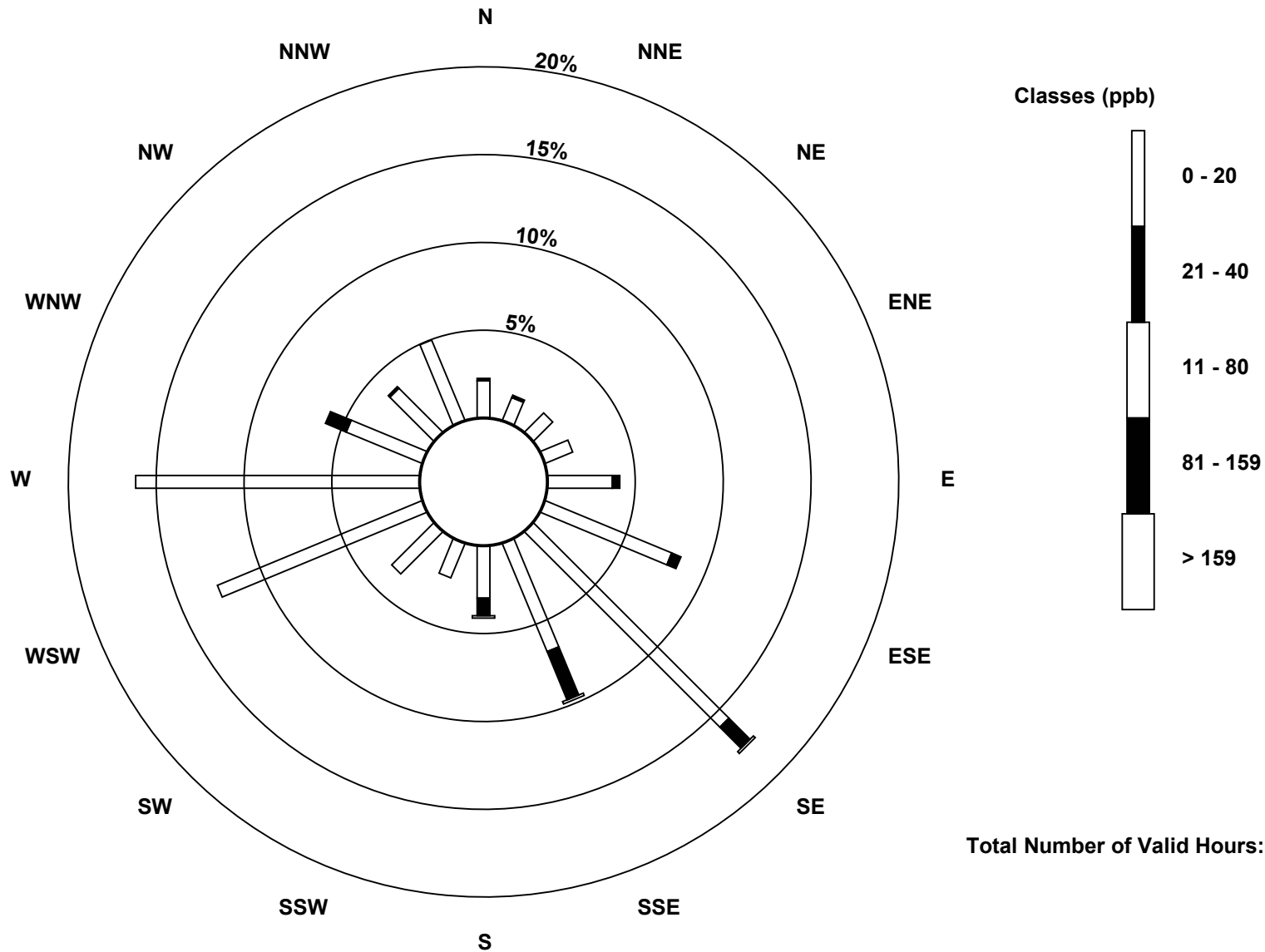
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	15	10	11	12	26	55	111	47	21	15	24	89	114	33	25	35	643
21 - 40	1	1	0	0	3	4	12	21	7	0	0	0	0	9	1	0	59
41 - 80	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	16	11	11	12	29	59	124	69	29	15	24	89	114	42	26	35	705

Total Number of Valid Hours: 705

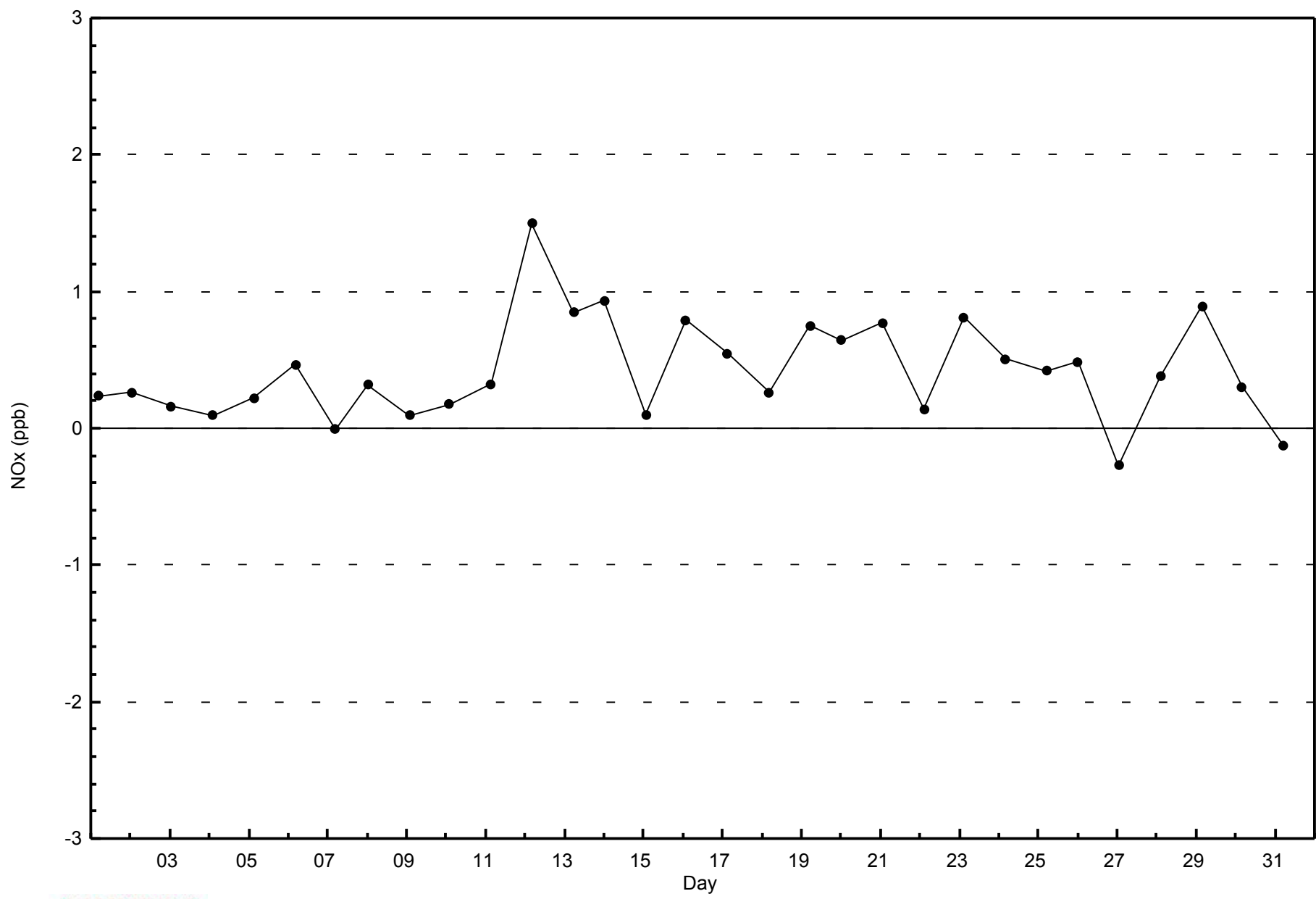
Total Number of Hours: 744

Wood Buffalo Environmental Association  
 Wind Rose Oct 2014

NO<sub>x</sub> (NO<sub>x</sub>) - ppb  
 ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 705

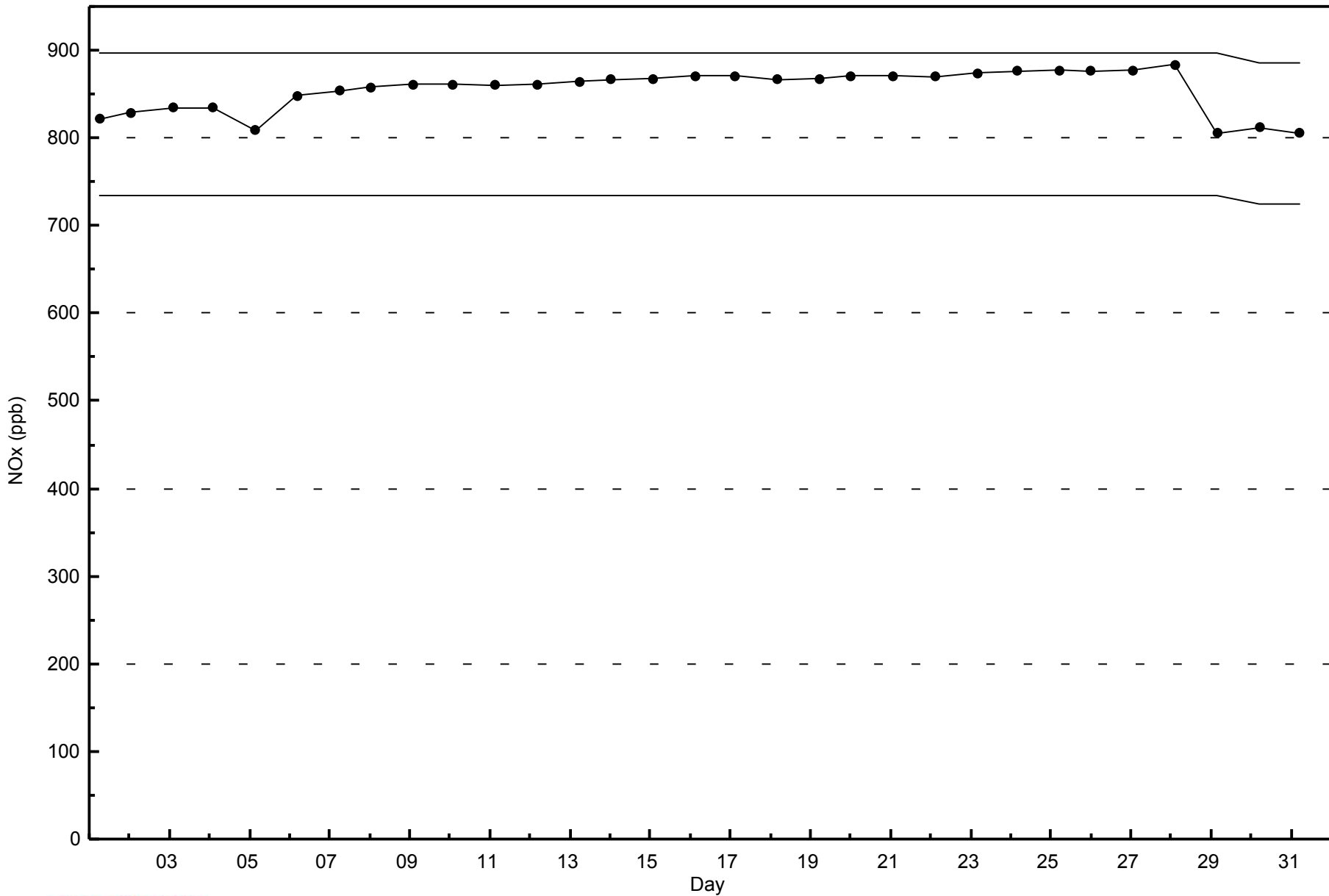






WBEA  
Span Responses

NOx (NO<sub>x</sub>) - ppb  
ConocoPhillips - Surmont - October 2014



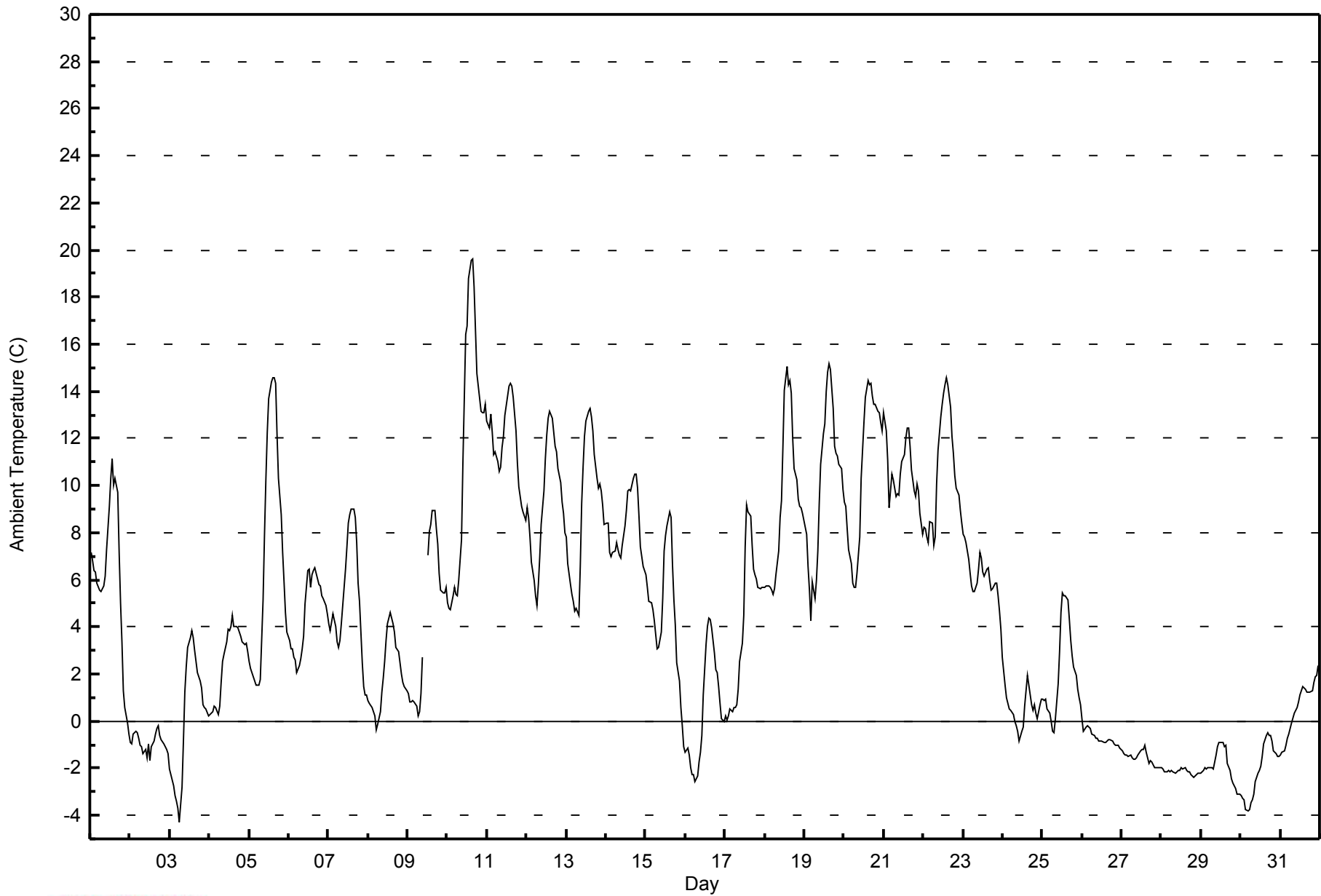


Maximum Value: 19.6 C on Oct 10 16:00																				Maximum Daily Average: 11.8 C on Oct 10					Hours in Service: 744	
Minimum Value: -4.3 C on Oct 3 07:00																				Minimum Daily Average: -2.1 C on Oct 28					Hours of Data: 742	
Maximum Diurnal Average: 7.5 C at hour 15																				Minimum Diurnal Average: 2.3 C at hour 7					Hours of Missing Data: 2	
Monthly Average: 4.60 C																				Percentiles: P <sub>1</sub> = -3.4 P <sub>10</sub> = -1.7 Q <sub>1</sub> = 0.0 Median = 4.3 Q <sub>3</sub> = 8.7 P <sub>90</sub> = 12.3 P <sub>99</sub> = 16.2					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-Oct	7.2	6.8	6.4	6.3	5.9	5.6	5.5	5.6	5.7	6.2	7.3	9.1	10.3	11.1	10.0	10.3	9.7	7.2	5.0	3.4	1.3	0.6	0.0	-0.5	6.1	11.1
2-Oct	-0.9	-1.0	-0.5	-0.5	-0.5	-0.7	-1.0	-1.1	-1.4	-1.2	-1.5	-1.0	-1.7	-1.1	-0.9	-0.6	-0.3	-0.2	-0.6	-0.8	-1.0	-1.1	-1.2	-1.4	-0.9	-0.2
3-Oct	-2.1	-2.5	-2.8	-3.1	-3.4	-3.7	-4.3	-2.8	-0.9	1.2	2.3	3.1	3.5	3.8	3.5	3.0	2.5	2.0	1.7	1.4	0.7	0.6	0.5	0.2	0.2	3.8
4-Oct	0.3	0.4	0.4	0.6	0.6	0.3	0.6	1.7	2.5	2.8	3.4	3.9	3.8	4.0	4.5	4.0	4.0	4.0	3.8	3.6	3.4	3.3	3.3	3.0	2.6	4.5
5-Oct	2.5	2.2	1.9	1.7	1.6	1.5	1.5	1.8	5.1	7.8	10.3	12.3	13.7	14.4	14.6	14.6	14.3	12.2	10.3	8.8	7.2	5.9	4.6	3.8	7.3	14.6
6-Oct	3.4	3.1	3.1	2.7	2.6	2.0	2.4	2.6	3.1	3.6	5.0	6.4	6.5	5.7	6.2	6.4	6.5	6.0	5.8	5.8	5.3	5.2	4.9	4.6	4.5	6.5
7-Oct	4.1	3.8	4.2	4.5	4.0	3.4	3.1	3.4	4.2	5.7	6.5	7.4	8.4	8.8	9.0	9.0	8.7	7.6	5.8	5.1	2.5	1.5	1.1	1.1	5.1	9.0
8-Oct	0.9	0.8	0.6	0.4	0.2	-0.4	-0.1	0.4	1.2	1.8	2.5	3.4	4.1	4.6	4.4	4.1	3.8	3.1	2.9	2.5	2.0	1.7	1.4	1.3	2.0	4.6
9-Oct	1.1	0.8	0.8	0.8	0.8	0.7	0.2	0.4	1.2	2.7	MS	MS	7.0	8.0	8.4	8.9	8.9	8.2	7.5	6.3	5.5	5.4	5.5	5.7	4.3	8.9
10-Oct	5.0	4.8	4.7	5.3	5.7	5.4	5.4	6.0	7.7	11.0	13.7	16.4	16.8	18.8	19.6	19.6	18.5	16.6	14.8	13.7	13.2	13.1	13.1	13.5	11.8	19.6
11-Oct	12.7	12.5	13.0	12.3	11.3	11.4	11.0	10.6	10.8	11.6	12.1	13.0	13.8	14.2	14.4	14.2	13.7	12.3	11.0	10.0	9.5	9.1	8.9	8.5	11.7	14.4
12-Oct	9.0	8.7	7.8	6.7	6.0	5.3	4.9	5.8	7.0	8.3	9.8	11.1	12.2	12.9	13.2	12.9	12.3	11.7	11.4	10.7	10.1	9.3	8.8	8.0	9.3	13.2
13-Oct	7.8	6.7	5.8	5.4	5.1	4.7	4.8	4.5	6.6	9.3	10.8	12.1	12.7	13.1	13.3	12.9	12.3	11.3	10.3	9.9	10.1	9.8	9.2	8.3	9.0	13.3
14-Oct	8.4	8.4	7.1	7.0	7.2	7.2	7.6	7.3	7.0	6.9	7.5	8.3	8.9	9.7	9.8	9.8	10.3	10.5	10.5	9.9	8.7	7.4	6.6	6.4	8.3	10.5
15-Oct	6.2	5.7	5.1	5.1	4.7	4.3	3.7	3.1	3.1	3.8	5.2	7.2	7.9	8.3	8.9	8.6	6.7	5.1	4.1	2.5	1.7	0.6	-0.2	-1.1	4.6	8.9
16-Oct	-1.3	-1.1	-1.4	-1.9	-2.3	-2.2	-2.6	-2.3	-1.7	-1.3	-0.6	1.1	3.3	4.0	4.4	4.3	3.9	2.9	2.2	2.1	1.5	0.7	0.1	0.0	0.5	4.4
17-Oct	0.2	0.0	0.2	0.5	0.4	0.6	0.6	0.7	1.4	2.5	3.3	4.5	7.4	9.2	8.9	8.7	7.4	6.5	6.2	6.0	5.7	5.6	5.7	5.7	4.1	9.2
18-Oct	5.7	5.8	5.7	5.7	5.6	5.4	5.6	6.2	7.2	8.7	9.4	11.6	14.0	15.1	14.3	14.5	13.9	12.0	10.7	10.3	9.4	9.1	9.1	8.8	9.3	15.1
19-Oct	8.2	7.9	6.5	5.6	4.3	5.9	5.2	6.0	7.2	9.2	10.9	12.2	12.6	14.0	14.8	15.2	14.9	13.3	11.7	11.4	11.3	10.9	10.7	9.8	10.0	15.2
20-Oct	9.3	9.1	8.1	7.3	6.7	5.9	5.7	5.7	6.2	7.8	10.3	11.5	12.7	13.8	14.4	14.3	14.4	13.8	13.4	13.4	13.1	13.1	12.7	12.3	10.6	14.4
21-Oct	13.1	12.3	11.1	9.1	9.8	10.5	10.2	9.6	9.6	9.6	10.5	11.0	11.3	12.0	12.5	12.4	11.7	10.6	9.8	9.6	10.1	9.8	8.8	7.9	10.5	13.1
22-Oct	8.3	8.2	7.8	7.6	8.5	8.4	7.4	7.8	10.0	11.5	12.9	13.4	13.9	14.3	14.6	14.3	13.3	12.1	11.3	10.4	9.9	9.6	8.9	8.4	10.5	14.6
23-Oct	7.9	7.8	7.6	6.9	6.3	5.7	5.5	5.5	5.8	6.4	7.2	6.9	6.3	6.2	6.5	6.5	6.0	5.5	5.6	5.8	5.9	5.3	4.7	3.9	6.2	7.9
24-Oct	2.7	1.5	1.0	0.8	0.5	0.4	0.3	0.0	-0.2	-0.4	-0.8	-0.4	-0.2	0.6	1.3	2.0	1.5	0.7	0.5	0.7	0.3	0.1	0.7	0.9	0.6	2.7
25-Oct	1.0	0.9	0.9	0.5	0.4	0.0	-0.4	-0.5	0.1	1.6	3.0	4.6	5.5	5.3	5.3	5.2	4.3	3.4	2.8	2.3	1.9	1.3	1.0	0.7	2.1	5.5
26-Oct	0.1	-0.5	-0.3	-0.2	-0.2	-0.3	-0.5	-0.6	-0.7	-0.7	-0.8	-0.9	-0.8	-0.9	-0.9	-0.8	-0.8	-0.8	-0.8	-0.9	-1.0	-1.0	-1.0	-1.2	-0.7	0.1
27-Oct	-1.3	-1.4	-1.5	-1.4	-1.5	-1.5	-1.6	-1.6	-1.6	-1.6	-1.5	-1.3	-1.2	-1.2	-1.0	-1.3	-1.8	-1.7	-1.7	-1.9	-2.0	-2.0	-2.0	-2.0	-1.6	-1.0
28-Oct	-2.0	-2.0	-2.2	-2.1	-2.1	-2.1	-2.1	-2.2	-2.2	-2.1	-2.1	-2.1	-2.1	-2.0	-2.0	-2.1	-2.1	-2.2	-2.3	-2.4	-2.3	-2.2	-2.2	-2.2	-2.1	-2.0
29-Oct	-2.2	-2.1	-2.0	-2.1	-1.9	-2.0	-2.0	-2.0	-1.7	-1.4	-1.1	-0.9	-0.9	-0.9	-1.1	-1.0	-1.8	-2.1	-2.5	-2.6	-2.7	-2.9	-3.1	-3.1	-1.9	-0.9
30-Oct	-3.2	-3.3	-3.4	-3.7	-3.8	-3.7	-3.5	-3.3	-3.1	-2.5	-2.2	-2.1	-1.9	-1.5	-1.0	-0.6	-0.5	-0.6	-0.6	-0.8	-1.2	-1.4	-1.5	-1.5	-2.1	-0.5
31-Oct	-1.4	-1.3	-1.3	-1.0	-0.7	-0.5	-0.3	-0.1	0.3	0.5	0.6	0.8	1.1	1.5	1.4	1.4	1.2	1.2	1.2	1.3	1.7	1.9	1.9	2.4	0.6	2.4
																								Diurnal Average		
																								Diurnal Maximum		
3.6 3.3 3.1 2.8 2.6 2.5 2.3 2.5 3.2 4.2 5.1 6.1 6.7 7.3 7.5 7.4 7.0 6.2 5.5 5.1 4.6 4.2 3.9 3.6																										
13.1 12.5 13.0 12.3 11.3 11.4 11.0 10.6 10.8 11.6 13.7 16.4 16.8 18.8 19.6 19.6 18.5 16.6 14.8 13.7 13.2 13.1 13.1 13.5																										
MS - Missing																										



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**ConocoPhillips - Surmont - October 2014**





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

**Ambient Temperature (AT) - C**  
**ConocoPhillips - Surmont - October 2014**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	186	25.07	25.07
0 - 10	425	57.28	82.35
10 - 20	131	17.65	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744

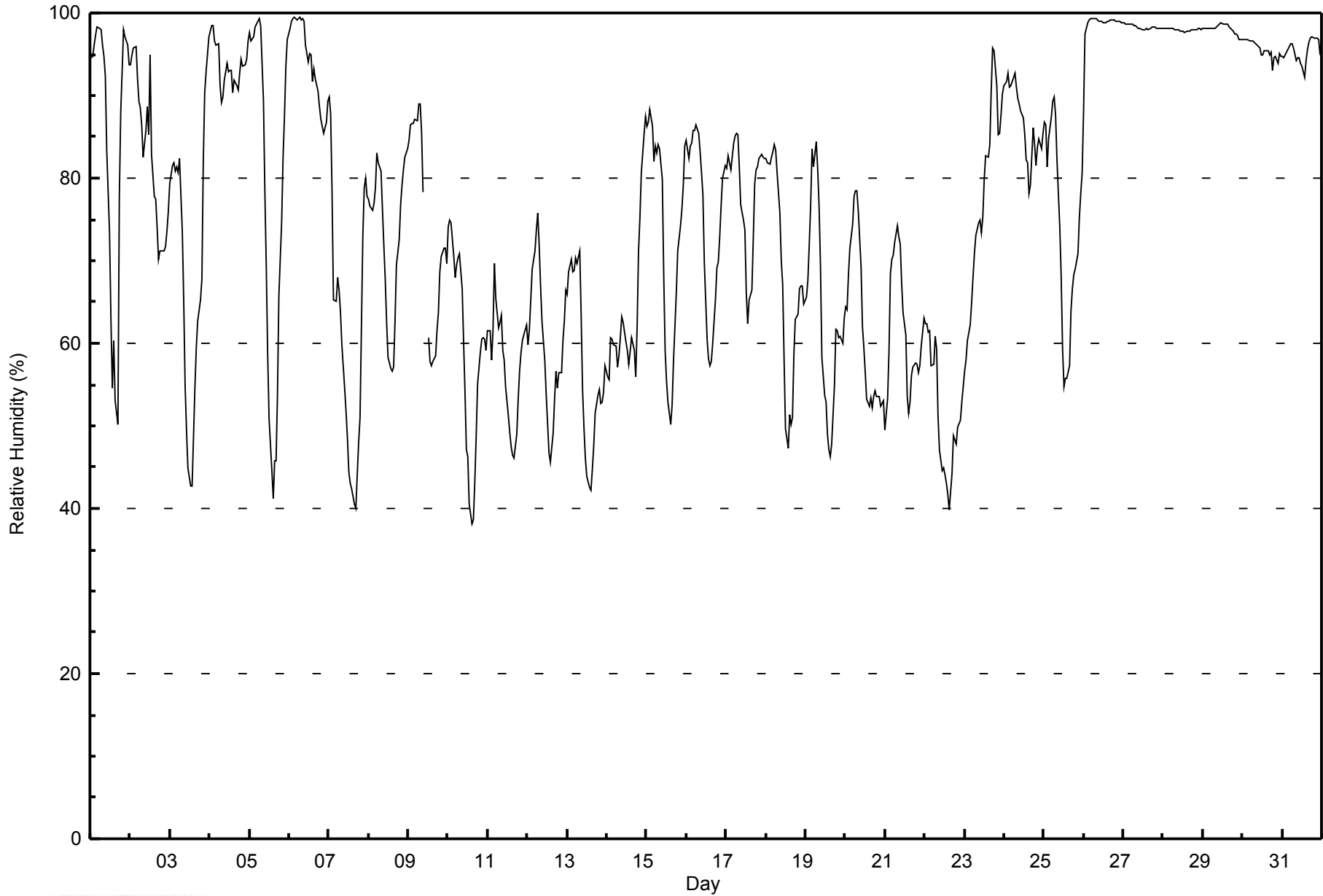


Maximum Value: 99 % on Oct 6 04:00																		Maximum Daily Average: 98.5 % on Oct 26																		Hours in Service: 744																																																																																																																															
Minimum Value: 38 % on Oct 10 15:00																		Minimum Daily Average: 51.5 % on Oct 22																		Hours of Data: 742																																																																																																																															
Maximum Diurnal Average: 84.0 % at hour 7																		Minimum Diurnal Average: 65.1 % at hour 15																		Hours of Missing Data: 2																																																																																																																															
Monthly Average: 76.2 %																		Percentiles: P <sub>1</sub> = 42 P <sub>10</sub> = 52 Q <sub>1</sub> = 61 Median = 78 Q <sub>3</sub> = 94 P <sub>90</sub> = 98 P <sub>99</sub> = 99																		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-Oct	95	95	96	97	98	98	98	96	95	92	83	73	63	55	60	53	50	78	88	93	98	97	96	94	85.1	98																																																																																																																																									
2-Oct	94	95	96	96	92	89	88	86	83	86	89	85	95	83	78	77	74	70	71	71	71	72	74	76	82.9	96																																																																																																																																									
3-Oct	79	81	82	81	81	81	82	74	65	55	50	45	43	43	49	54	59	63	65	68	82	90	93	97	69.3	97																																																																																																																																									
4-Oct	98	98	99	97	96	96	91	89	90	92	94	93	93	93	90	92	91	91	93	94	94	94	94	97	93.7	99																																																																																																																																									
5-Oct	98	97	97	98	99	99	99	99	98	89	78	69	59	51	45	41	46	46	54	66	75	83	88	94	97	77.6	99																																																																																																																																								
6-Oct	98	99	99	99	99	99	99	99	99	99	99	96	94	95	95	92	93	92	90	89	87	86	85	87	89	94.3	99																																																																																																																																								
7-Oct	90	88	78	65	65	68	66	64	60	55	52	48	44	43	42	41	40	44	48	51	73	79	80	78	60.9	90																																																																																																																																									
8-Oct	78	77	76	77	79	83	82	81	76	72	68	63	58	57	57	57	63	69	72	77	79	81	83	84	72.8	84																																																																																																																																									
9-Oct	85	87	87	87	87	87	89	89	85	78	MS	MS	61	58	57	58	59	62	64	69	70	72	71	70	74.1	89																																																																																																																																									
10-Oct	74	75	75	70	68	69	70	71	67	60	54	47	46	40	38	39	43	49	55	59	61	61	61	59	58.8	75																																																																																																																																									
11-Oct	62	62	58	62	70	65	62	63	63	59	58	55	51	49	47	47	46	49	53	57	59	60	61	62	57.5	70																																																																																																																																									
12-Oct	60	62	65	69	71	74	76	72	67	63	58	54	50	47	46	49	53	57	55	56	56	60	63	66	60.4	76																																																																																																																																									
13-Oct	66	69	70	69	69	70	70	71	63	54	50	46	44	42	42	45	48	52	54	54	53	53	54	57	56.9	71																																																																																																																																									
14-Oct	56	56	61	61	60	60	57	59	61	63	60	59	57	59	61	59	56	62	71	75	81	85	88	88	63.6	88																																																																																																																																									
15-Oct	86	87	88	86	82	84	83	84	83	80	68	59	55	53	50	52	58	62	66	71	74	76	79	84	73.0	88																																																																																																																																									
16-Oct	85	82	84	84	86	86	86	85	83	81	78	70	61	58	57	58	60	65	69	70	73	77	80	82	75.0	86																																																																																																																																									
17-Oct	81	83	82	81	84	85	85	85	81	77	75	74	66	62	65	66	73	79	81	81	82	83	82	82	78.2	85																																																																																																																																									
18-Oct	82	82	82	83	83	84	83	81	76	70	67	58	50	47	51	50	51	59	63	63	67	67	67	65	68.0	84																																																																																																																																									
19-Oct	66	68	72	77	84	81	84	81	77	70	58	54	53	49	47	46	48	55	62	62	61	61	60	63	64.0	84																																																																																																																																									
20-Oct	64	64	68	72	74	78	79	78	76	69	62	59	56	53	52	53	52	54	54	53	53	52	53	53	61.9	79																																																																																																																																									
21-Oct	49	53	59	69	70	71	72	74	73	72	67	64	61	54	51	53	56	57	58	57	56	57	60	63	61.6	74																																																																																																																																									
22-Oct	62	62	61	62	57	57	61	59	51	47	44	45	44	43	42	40	44	49	48	48	50	51	53	55	51.5	62																																																																																																																																									
23-Oct	57	58	60	62	65	68	71	73	75	75	73	75	80	83	83	84	90	96	95	91	85	85	88	90	77.6	96																																																																																																																																									
24-Oct	91	92	93	91	91	92	93	91	90	89	88	87	85	82	82	78	79	86	84	82	84	85	84	85	86.8	93																																																																																																																																									
25-Oct	87	87	81	85	87	89	90	88	82	74	68	59	55	56	56	57	64	67	68	69	71	75	78	81	73.9	90																																																																																																																																									
26-Oct	88	97	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	98.5	99																																																																																																																																									
27-Oct	99	99	99	99	99	99	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98.3	99																																																																																																																																									
28-Oct	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98.0	98																																																																																																																																									
29-Oct	98	98	98	98	98	98	98	98	98	98	99	99	99	99	99	99	98	98	98	97	97	97	97	97	98.1	99																																																																																																																																									
30-Oct	97	97	97	97	97	97	97	96	96	96	96	95	95	95	96	95	95	95	93	95	95	94	95	95	95.6	97																																																																																																																																									
31-Oct	95	95	95	96	96	96	96	96	94	95	95	94	94	92	94	96	96	97	97	97	97	97	97	95	95.4	97																																																																																																																																									
																		81.2						81.9						82.4						82.7						83.4						83.9						84.0						83.2						80.5						77.2						73.9						70.3						67.8						65.4						65.1						65.6						67.2						70.9						73.1						74.7						76.8						78.2						79.4						80.6						Diurnal Average	
																		99						99						99						99						99						99						99						99						99						99						99						99						99						99						99						99						99						99						99						99						99						Diurnal Maximum																			
MS - Missing																																																																																																																																																																			



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**ConocoPhillips - Surmont - October 2014**





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

**Relative Humidity (RH) - %**  
**ConocoPhillips - Surmont - October 2014**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	4	0.54	0.54
40 - 60	174	23.45	23.99
60 - 80	206	27.76	51.75
80 - 100	358	48.25	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



Maximum Speed: 32 km/h on Oct 24 04:00	Maximum Daily Speed Average: 24.4 km/h on Oct 24	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 28 00:00	Minimum Daily Speed Average: 2.6 km/h on Oct 4	Hours of Data: 742
Maximum Diurnal Speed Average: 6.1 km/h at hour 1	Minimum Diurnal Speed Average: 2.6 km/h at hour 18	Hours of Missing Data: 2
Monthly Average Velocity: 4.6 km/h 231.3 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 6 Q <sub>1</sub> = 8 Median = 11 Q <sub>3</sub> = 17 P <sub>90</sub> = 23 P <sub>99</sub> = 29	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-Oct	W7	WNW9	WNW9	NW7	NNW8	NNW7	WNW5	W2	SSE2	SSW7	SW7	SW15WSW23	W22	W16WNW16	W13NNW13	NW13	NW20	NW19	NW27	NW26	NW28	WNW10.9	NW28				
2-Oct	NW24	NW19WNW17	WNW21WNW27	WNW28WNW26	WNW28WNW27	WNW21WNW24	WNW21WNW22	WNW27WNW26	WNW23	W27	W24	W23	W27	W26	W27	W24	W20	WNW23.4	WNW28								
3-Oct	W16	W14	W15	W14	W13WSW11	WSW10	WSW9	SW9	SW6	SSW2	SSW6	S7	SSE8	SSE11	SE12	SE13	SE14	SE12	SE13	SSE16	SSE14	SE15	SE14	S6.1	SSE16		
4-Oct	SE13	SE11	SE10	SE8	SSE9	S9	SSW7	WSW8WNW10	NW9WNW11	NW9	NNW9	NW8WNW10	NNW9	NNW8	NNW6	NNW7	WNW7	NW5	NW4	NW6	W9	WNW2.6	SE13				
5-Oct	WSW10	WSW8	WSW5	SW6	WSW7	SW6	SSW6	E3	W9	W16	W18	W17WNW20	W21WNW23	WNW21WNW21	NW18	NW12	W17WNW20	NW10	NNW12	NNW8	NNW5	WNW10.4	WNW23				
6-Oct	W5	E4	SSW2	SSW2	SSE4	S6	SE4	ESE4	NW4	WNW8	W12WSW13	WNW14	W20	W23WNW24	W24WNW27	W24	W28	W29	W25	W22	W20	W12.8	W29				
7-Oct	W19	W19	W19WNW22	W21	W23	W25	W23	W25	W25WNW22	WNW22WNW20	WNW18	WNW22	NW19WNW17	NW15WNW10	WNW7	NNW6	NNE8	E5	ESE6	SE7	WNW14.3	W25					
8-Oct	SSE7	SSE7	SE7	SE8	SSE9	S10	S8	S8	SSE8	SSE10	SSE10	SE12	SSE12	SE9	SE9	SSE7	S7	SSE5	E6	E8	E10	ESE10	ESE9	ESE7	SE7.6	SE12	
9-Oct	ESE7	SE9	SE7	SE8	SSE9	SSE8	SE7	SE8	SE9	SSE8	MS	MS	ESE11	SE11	SE11	SE10	SE8	ESE7	ESE9	ESE10	SE11	SSE12	SSE10	SSE12	SE8.8	SSE12	
10-Oct	SE10	SSE13	SSE12	S15	SSE15	S15	S16	S13	S12	SSE9	SSE12	SSE13	SSE14	SSE16	S17	SSE16	SSE15	SSE13	SSE11	SSE12	SSE12	S14	S13	SSW17	SSE13.2	S17	
11-Oct	SW22WSW17	W18WSW21	WSW22WSW26	WSW27WSW26	WSW29	W30	W27	W25	W24WSW24	WSW27WSW27	WSW26WSW22	WSW23WSW26	WSW27WSW25	WSW26WSW23	WSW24	WSW27	WSW27	WSW26	WSW22	WSW23	WSW26	WSW27	WSW25	WSW26	WSW23	WSW24.2	W30
12-Oct	WSW23WSW24	WSW20WSW20	WSW23WSW21	WSW22	W22	W25	W20	W20	W22	W25	W21WSW19	SW14WSW17	W20WSW21	WSW19WSW17	WSW19WSW18	WSW20	WSW21	WSW20	WSW21	WSW20	WSW21	WSW19	WSW17	WSW19	WSW18	WSW20.2	W25
13-Oct	WSW22WSW21	SW22	SW22WSW20	WSW14	WSW9	WSW9	WSW7	SW6	SW10WSW15	WSW19WSW14	WSW11	WSW7	SSW4	E3	ESE6	ESE7	SE11	SSE12	SSE11	SE9	SW9.3	SW22					
14-Oct	SE10	SE9	ESE7	ESE9	ESE10	ESE11	ESE13	SE15	ESE8	ENE5	E8	ESE7	ENE5	ENE5	E6	ESE5	ESE4WSW12	WSW12WSW20	WSW21	W18	W14	W13	SSE3.1	WSW21			
15-Oct	W14	W13WSW10	W11	W15	W12	W15	W17	W15WNW16	WSW6	SW6WSW11	W11	W10NNW10	N10NNW10	NW13	NNW13	NW14	NW14	NW15	NW15	NW14	WNW10.2	W17					
16-Oct	NW13	NW13	NW11	N5	NNE3	NNW7	N5	N8	N9	NE7	ESE5	ESE6	SSE3	ESE7	ESE9	ESE11	SE11	SE9	SE11	SE12	SE11	SE11	SE12	SSE11	E3.3	NW13	
17-Oct	SSE11	SE10	SE11	SSE16	SSE18	SSE20	SSE18	SSE16	SSE13	SSE14	SE18	SE20	SE21	SE24	SE26	SE26	SE23	SE21	SE21	SE20	SE21	SE19	SE19	SE17	SE18.0	SE26	
18-Oct	SE17	SE13	SE12	SSE12	SSE11	SSE9	S8	SW7WSW11	W12	W13	W10	W13	W15WSW16	WSW15WSW16	WSW9	SW11WSW15	WSW10WSW14	WSW12	W12	SW8.5	SE17						
19-Oct	W12WSW12	WSW9	WSW8	SSW2	WSW4	S7	SSE9	SSE11	SE10	SE10	SE11	ESE12	SE13	SE13	ESE11	ESE11	ESE10	ESE10	SE15	SE16	SSE17	SSE17	SE13	SSE7.9	SSE17		
20-Oct	SSE16	SE17	SSE13	SE11	SSE11	ESE5	SE9	SE10	SE8	SSE11	ESE6	ESE7	ESE9	SE9	SE7	SE7	SE8	SSE9	S10	S11	S10	S10	S9	SSW11	SSE9.0	SE17	
21-Oct	SW19WSW12	W7	W8	W16	W18	W18	W15	W16WNW17	W18	W17	W15	W16WSW16	W11	WSW7WSW11	SW12WSW10	WSW14WSW12	SW10	SW12	WSW12.9	SW19							
22-Oct	SW13	SW12	SW9	SW9	SW8	SW5	SSW9	S10	S9	S11	SSE12	SE13	SE13	SE16	SE16	SE12	SE10	SE11	SE15	SE14	SE13	SSE11	SE13	SE13	SSE9.3	SE16	
23-Oct	SE12	SE14	SE14	SE10	SE7	ESE5	E5	E5	E7	E11	E14	E17	E18	E16	E11	ESE9	SE9	SSE6	S9	SSW14	SW25WSW20	WSW23WSW26	SSE5.9	WSW26			
24-Oct	WSW31WSW32	W31	W32	W32	W32	W27	W30	W27	W25	W25	W26	W26	W24	W26	W17	W14	W18	W19	W18WSW14	W17	W19	W24.4	W32				
25-Oct	W20	W23	W24	W26	W20	W17	W15	W14WSW15	W12	W7	SW7	S5	S7	SE8	ESE8	ESE8	ESE6	ESE7	E8	E10	E9	ESE10	ESE11	WSW5.5	W26		
26-Oct	ESE11	E10	ENE11	E12	E12	ENE10	NE9	NE10	NE12	NE11	NNE11	NE12	NNE12	NNE13	NNE13	NNE11	N13	N12	N11	N11	N10	N10	N11	N12	NNE9.3	NNE13	
27-Oct	N13	N11	N10	NNW10	NNW10	NNW11	NNW11	NNW12	NNW11	NNW11	NNW11	NNW11	NNW10	NNW11	NNW10	NNW9	NNW9	NNW9	NNW9	NNW7	NNW6	N3	NNE2	WSW1	NNW9.0	N13	
28-Oct	ENE1	ESE3	ESE5	ESE5	ESE4	SE6	SE6	SE7	SE6	SE6	SE6	SE6	SE7	SE8	SE7	ESE7	ESE7	ESE7	ESE7	ESE8	ESE7	ESE6	ESE6	ESE5	E5	ESE5.8	SE8
29-Oct	E4	ENE4	NE4	NE3	NNE3	NNE4	NE4	NE4	NE4	NNE5	NE5	NE5	ENE5	ENE5	ENE6	ENE6	ENE6	E6	E7	ESE7	ESE6	E7	ESE7	ESE8	ENE4.6	ESE8	
30-Oct	SE8	SE8	SE8	SE9	SE9	SE10	SE10	SE13	SE11	SSE12	SE13	SE12	SE13	SSE13	SSE13	SSE15	SSE17	SE19	SSE24	SSE21	SE21	SE21	SE21	SE22	SE14.3	SSE24	
31-Oct	SE20	SE21	SE20	SE20	SE21	SE18	SE16	SE15	SSE13	SE12	SE11	SE10	S7	SSE6	SE8	SE7	SE8	SSE7	S9	S8	WSW6	WSW7	WSW6	W13	SSE10.1	SE21	

SW6.1 SW5.2 SW5.0 SW5.5 SW5.9 SW6.0 SW5.8 SW5.1WSW5.3WSW4.5WSW4.4 SW4.1WSW4.2WSW4.4WSW4.0 SW3.7 SW2.9 SW2.6SSW3.4 SW4.3 SW4.8 SW4.7 SW4.8 SW5.2	Diurnal Average
WSW31WSW32 W31 W32 W32 W32 W27 W30WSW29 W30 W27 W25 W26WNW27WSW27WSW27 W27WNW27 W24 W28 W29 NW27 NW26 NW28	Diurnal Maximum

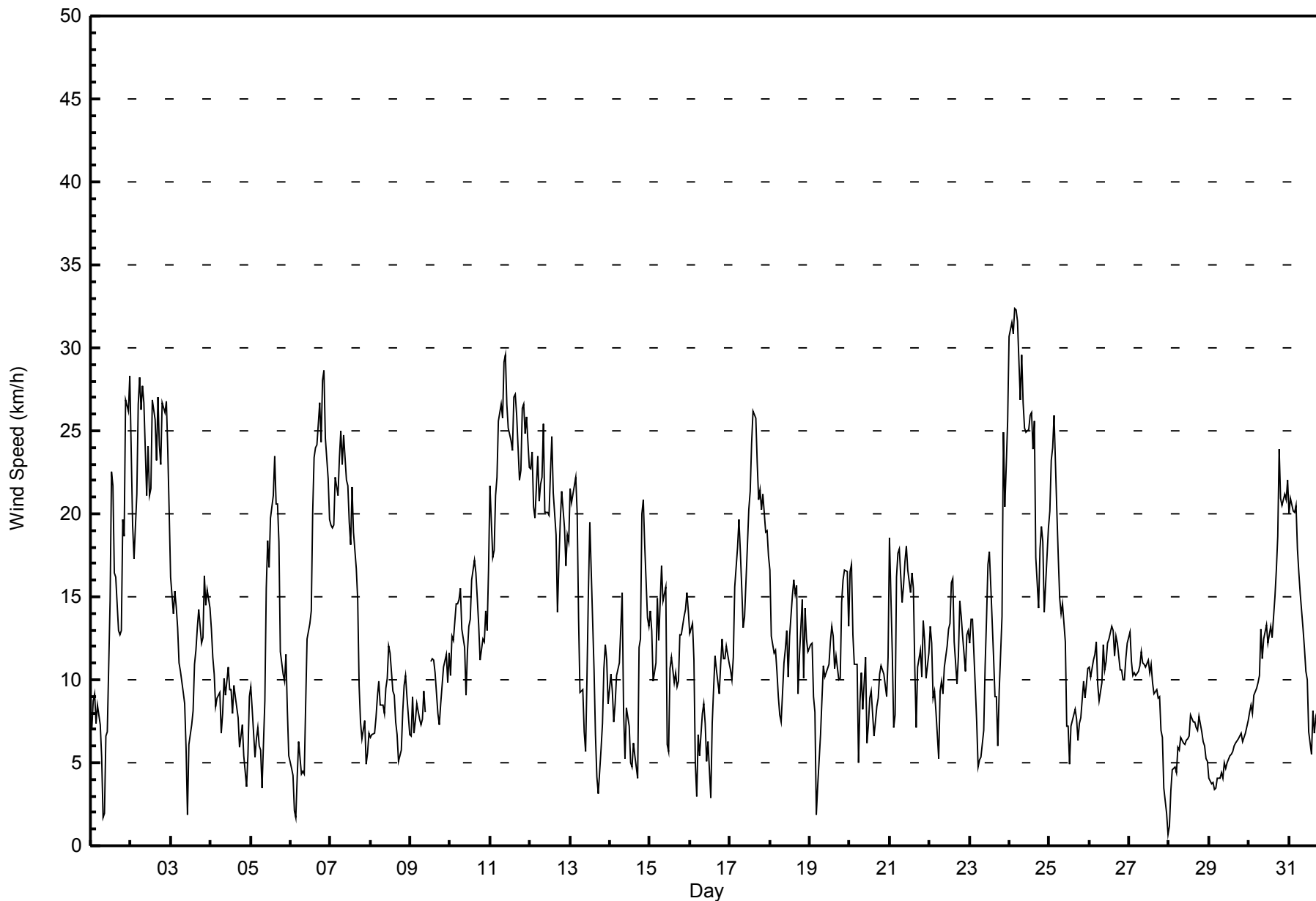
MS - Missing  
 All monthly, daily, and diurnal averages have been calculated using vector methods





**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**ConocoPhillips - Surmont - October 2014**





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

**Wind Speed (WS) - km/h**  
**ConocoPhillips - Surmont - October 2014**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	63	8.49	8.49
6 - 11	311	41.91	50.40
12 - 19	221	29.78	80.19
20 - 28	137	18.46	98.65
29 - 38	10	1.35	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**ConocoPhillips - Surmont - October 2014**

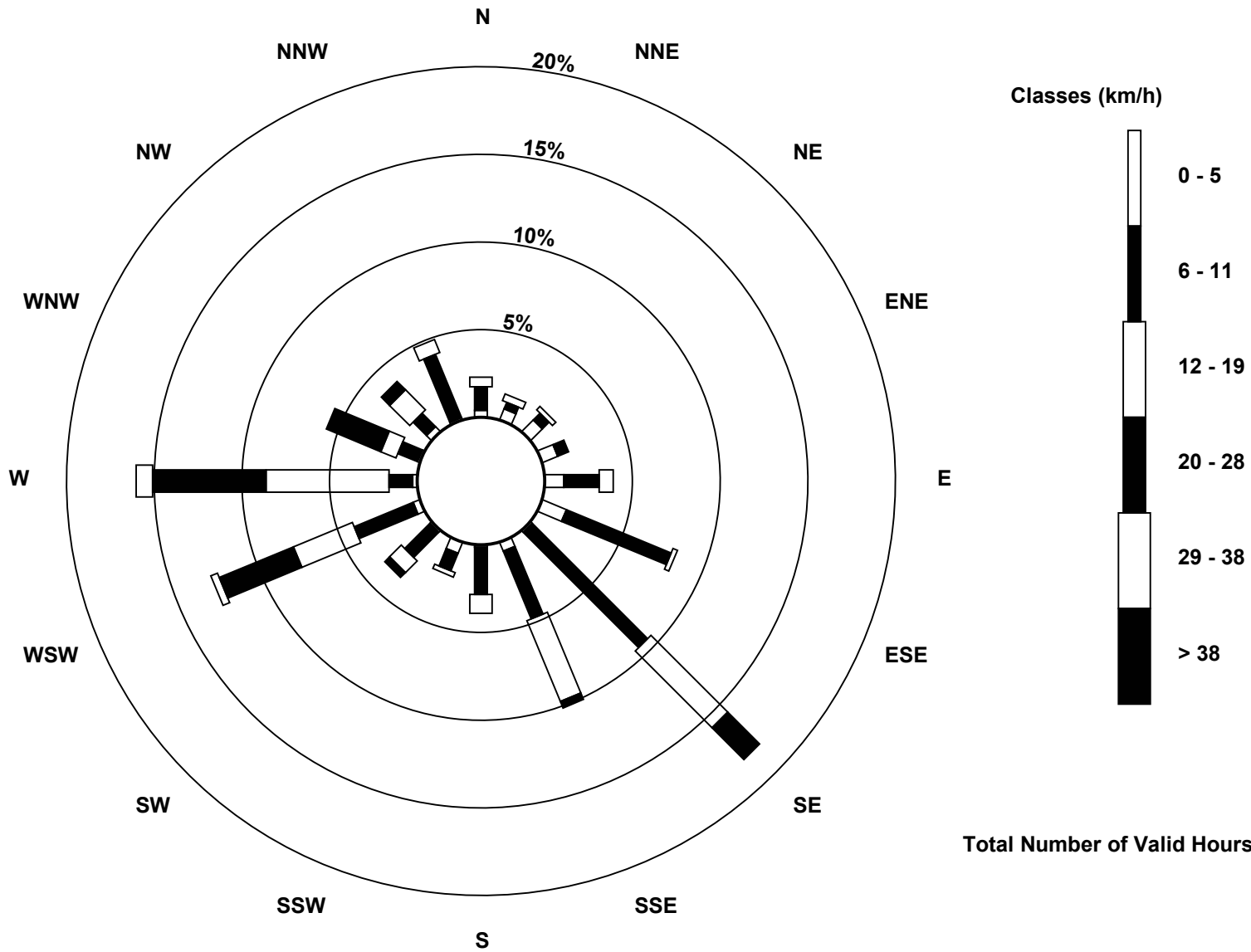
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	5	7	7	8	11	1	4	1	5	1	3	2	1	3	1	63
6 - 11	10	3	4	5	15	48	69	31	20	8	15	27	10	9	8	29	311
12 - 19	4	3	2	0	6	2	46	37	8	2	7	27	52	7	12	6	221
20 - 28	0	0	0	0	0	0	19	3	0	0	3	34	48	25	5	0	137
29 - 38	0	0	0	0	0	0	0	0	0	0	0	3	7	0	0	0	10
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	17	11	13	12	29	61	135	75	29	15	26	94	119	42	28	36	742

Total Number of Valid Hours: 742

Total Number of Hours: 744

**Wood Buffalo Environmental Association  
Wind Rose Oct 2014**

**Wind Speed (WS) - km/h  
ConocoPhillips - Surmont (AMS502)**



**Total Number of Valid Hours: 742**



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Oct 21 02:00																	Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7								
Minimum Value: 1 km/h on Oct 22 05:00																									
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 6																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Oct	2	2	2	2	2	1	2	2	2	2	3	5	5	6	6	6	5	4	3	5	5	6	6	7	7
2-Oct	6	5	4	7	6	6	5	7	6	5	7	5	5	6	6	5	5	4	4	5	4	5	5	4	7
3-Oct	3	3	3	2	2	2	2	2	2	2	2	2	3	2	2	2	2	3	2	3	3	3	3	3	3
4-Oct	3	3	2	2	2	2	1	1	2	2	3	3	2	2	2	2	1	2	2	2	2	1	2	1	3
5-Oct	1	2	1	2	2	2	2	1	5	3	4	4	5	4	5	5	5	4	2	2	3	2	2	2	5
6-Oct	1	3	2	2	2	3	2	2	2	2	2	3	3	4	4	4	5	5	5	5	5	5	4	4	5
7-Oct	4	3	3	4	4	4	4	4	4	5	4	4	4	5	4	4	3	2	2	2	2	2	1	1	5
8-Oct	1	1	1	1	2	2	2	2	2	2	2	3	3	2	2	2	1	1	2	2	2	2	2	1	3
9-Oct	2	2	2	2	2	2	2	2	1	2	MS	MS	2	2	2	2	2	1	1	2	2	2	2	3	3
10-Oct	2	3	3	3	3	3	3	2	2	2	3	3	3	4	5	4	4	3	3	3	3	3	3	4	5
11-Oct	4	3	4	4	4	5	5	5	5	6	5	5	5	6	5	6	5	4	4	4	4	4	4	3	6
12-Oct	3	4	3	3	4	3	3	4	4	4	3	4	5	6	4	4	3	3	4	4	3	3	3	2	6
13-Oct	3	3	3	3	4	4	5	6	6	4	4	4	4	3	2	2	1	1	1	1	2	2	1	6	
14-Oct	2	2	1	1	2	2	3	3	3	1	2	3	2	1	1	1	1	3	3	4	5	4	2	2	5
15-Oct	3	3	2	5	2	3	3	3	3	3	4	3	4	3	3	3	2	2	2	2	3	2	2	2	5
16-Oct	2	2	2	2	1	1	1	1	2	2	2	3	2	2	2	2	2	1	2	2	2	2	2	2	3
17-Oct	2	2	2	4	4	4	4	3	2	3	3	4	5	6	6	6	4	4	4	4	3	3	3	3	6
18-Oct	3	3	2	2	2	2	2	3	3	3	4	3	3	5	4	4	4	2	2	2	2	2	2	3	5
19-Oct	2	2	1	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	3	3	4	2	4
20-Oct	3	3	3	2	3	2	1	2	2	3	1	2	2	2	3	1	2	1	2	2	1	2	2	2	3
21-Oct	5	7	2	4	3	3	4	3	3	3	4	3	3	3	3	3	1	1	1	1	2	2	1	2	7
22-Oct	1	2	1	1	1	1	2	1	1	2	3	3	3	4	4	3	2	3	3	2	2	2	2	2	4
23-Oct	2	2	2	2	2	2	1	2	2	2	3	3	4	4	3	2	2	2	2	6	5	5	4	6	6
24-Oct	6	6	6	6	6	6	5	6	7	5	6	5	5	5	4	5	5	3	4	4	3	2	4	4	7
25-Oct	4	5	4	4	4	4	3	2	3	3	4	2	2	3	2	2	1	1	1	1	2	2	2	2	5
26-Oct	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	3	2	2	2	2	2	2	2	3
27-Oct	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2
28-Oct	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2
29-Oct	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2
30-Oct	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	3	3	5	5	4	5	4	4	5	5
31-Oct	4	4	4	4	4	4	4	3	3	3	2	2	2	2	3	1	2	2	2	1	1	1	1	2	4
																	Diurnal Maximum								
MS - Missing																									



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

ConocoPhillips - Surmont - October 2014

Direction of Maximum Speed: 267 deg on Oct 24 04:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 264.1 deg on Oct 24	Hours of Data: 742
Direction of Minimum Speed: 257 deg on Oct 28 00:00	Direction of Minimum Daily Speed Average: 2.6 deg on Oct 4
Direction of Minimum Speed: 257 deg on Oct 28 00:00	Hours of Missing Data: 2
Monthly Average Direction: 249.9 deg	Percent Operational Time: 99.7

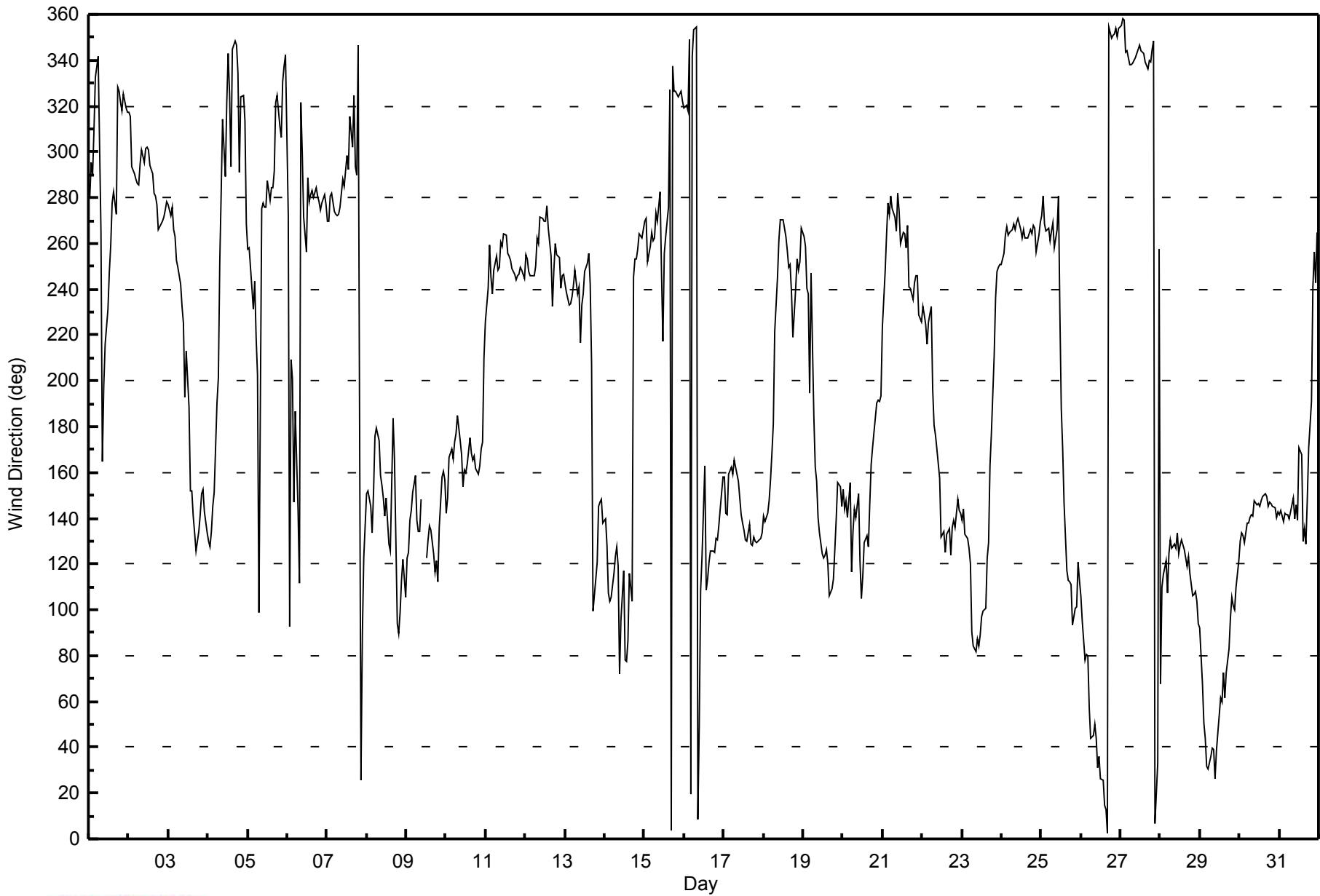
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	280	296	290	310	332	341	303	265	165	198	216	231	248	259	278	283	273	328	326	322	318	325	319	317	295.9
2-Oct	318	316	294	290	288	286	286	295	301	295	301	302	301	294	291	282	281	277	266	267	270	272	274	278	288.0
3-Oct	277	272	276	266	263	253	249	243	232	225	193	213	188	152	152	141	134	126	134	142	151	152	143	134	191.2
4-Oct	130	128	134	145	152	190	201	252	282	314	289	322	343	325	294	345	348	347	334	291	324	325	313	269	293.5
5-Oct	258	258	240	231	243	219	203	99	275	278	276	276	287	279	284	284	292	322	325	311	306	331	338	342	286.0
6-Oct	272	93	209	201	147	187	144	112	322	299	272	256	289	278	281	283	280	284	280	278	275	277	281	277	276.6
7-Oct	270	270	281	282	274	273	272	273	276	288	285	292	298	292	315	302	325	293	290	347	26	89	122	137	286.6
8-Oct	151	152	145	134	151	176	180	174	159	154	149	141	149	129	125	155	183	166	94	90	99	113	122	106	141.6
9-Oct	123	125	139	143	151	159	139	134	134	148	MS	MS	123	130	137	135	125	116	121	112	136	158	160	157	137.0
10-Oct	142	149	166	170	166	173	177	185	174	168	154	161	160	164	175	168	165	167	162	159	163	170	174	210	168.4
11-Oct	226	241	259	245	238	248	255	248	250	261	259	264	263	256	254	252	249	247	244	246	247	249	248	245	250.1
12-Oct	255	253	248	246	246	246	250	262	260	272	271	269	270	276	267	255	232	249	260	255	254	241	246	247	256.1
13-Oct	242	238	233	234	237	241	248	238	241	217	233	238	248	252	256	242	207	100	114	121	145	147	148	138	225.0
14-Oct	140	128	108	104	106	116	123	128	119	72	96	117	78	78	87	116	104	245	253	253	257	264	262	266	167.4
15-Oct	270	271	252	259	265	261	262	273	270	283	248	217	255	263	276	327	4	338	326	327	324	325	326	322	288.9
16-Oct	319	321	318	349	19	342	354	355	9	49	109	123	163	109	114	121	126	125	125	131	131	136	144	158	99.1
17-Oct	158	142	141	159	162	159	165	163	160	156	142	138	135	131	130	137	129	128	132	130	129	130	131	134	140.7
18-Oct	141	139	142	147	157	168	181	221	245	262	270	270	270	263	257	250	251	238	219	240	253	248	252	266	230.8
19-Oct	263	258	241	238	195	247	184	162	156	140	134	125	123	124	126	120	106	109	114	127	140	156	154	145	147.9
20-Oct	153	144	147	140	156	117	134	144	140	151	122	105	115	129	133	128	146	163	171	177	190	191	191	194	151.6
21-Oct	223	248	264	278	273	281	275	272	265	282	274	260	265	264	258	268	241	240	236	243	246	246	229	226	258.2
22-Oct	233	229	224	216	226	232	196	181	176	170	158	132	133	134	125	133	136	124	136	139	136	148	143	142	158.6
23-Oct	139	144	133	131	127	120	90	84	81	87	84	89	97	100	100	123	129	163	177	211	236	247	250	251	149.8
24-Oct	251	256	264	267	264	265	266	268	266	269	271	266	262	266	262	263	263	266	264	268	267	256	264	269	264.1
25-Oct	272	281	269	266	267	261	265	269	258	266	280	229	188	170	146	117	113	113	111	93	101	101	121	113	246.3
26-Oct	106	95	78	81	80	58	44	45	50	44	31	36	26	26	15	13	2	354	350	351	351	354	350	354	30.5
27-Oct	355	358	358	343	344	338	338	339	340	341	343	346	344	344	343	340	336	340	339	345	348	7	33	257	344.6
28-Oct	68	110	115	121	107	124	131	127	129	127	134	125	128	130	127	122	119	123	116	106	107	108	103	94	119.4
29-Oct	92	67	51	44	32	31	36	40	39	26	38	46	62	60	73	62	73	83	96	105	102	100	110	122	71.2
30-Oct	130	134	132	130	138	138	141	142	141	148	146	146	145	148	149	151	149	145	147	147	145	145	140	142	143.6
31-Oct	142	144	139	142	142	142	140	143	149	140	146	139	171	168	130	136	129	148	171	191	241	256	243	265	151.8
228.3 228.3 229.2 227.7 226.8 234.2 231.6 234.1 243.5 251.0 247.4 233.6 240.6 239.4 237.2 230.7 220.6 226.5 212.4 224.5 225.2 224.2 221.2 226.8																									
Diurnal Average																									

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



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**ConocoPhillips - Surmont - October 2014**





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744											
Maximum Value: 87 deg on Oct 28 00:00														Hours of Data: 742											
Minimum Value: 5 deg on Oct 22 05:00														Hours of Missing Data: 2											
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 9 Q <sub>1</sub> = 11 Median = 13 Q <sub>3</sub> = 16 P <sub>90</sub> = 25 P <sub>99</sub> = 70														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-Oct	15	26	12	21	13	19	26	83	75	27	27	17	14	26	26	23	36	20	10	13	13	11	12	13	83
2-Oct	13	13	15	14	12	11	11	14	14	15	15	16	15	15	13	11	11	10	10	9	9	10	12	10	16
3-Oct	9	12	10	11	9	11	7	8	10	23	77	41	36	27	19	17	12	11	11	13	12	13	13	11	77
4-Oct	13	11	13	18	18	16	19	16	14	24	22	28	19	30	26	16	15	25	30	30	40	52	34	18	52
5-Oct	10	14	19	21	13	23	33	49	50	11	11	13	15	12	13	14	17	10	13	20	20	11	13	37	50
6-Oct	45	66	63	71	46	48	48	50	60	20	8	10	29	11	11	10	10	11	11	11	10	10	10	10	71
7-Oct	10	11	9	8	9	9	9	9	10	13	14	18	22	19	21	22	17	20	24	39	17	30	10	10	39
8-Oct	14	15	12	11	14	14	15	15	18	17	15	16	17	19	18	27	15	24	24	13	12	13	13	16	27
9-Oct	16	10	19	12	15	14	15	14	12	23	MS	MS	15	16	17	14	13	9	11	11	11	12	13	14	23
10-Oct	15	13	15	14	14	13	12	13	13	15	12	16	16	17	17	17	16	16	15	13	14	14	16	16	17
11-Oct	9	16	11	9	9	11	9	9	9	11	12	14	13	16	12	12	11	9	9	8	8	8	8	8	16
12-Oct	9	9	8	8	9	8	9	10	9	12	11	13	14	13	15	13	13	13	10	9	8	8	8	7	15
13-Oct	8	7	8	8	9	12	21	22	73	50	27	17	13	21	20	13	32	31	11	9	12	13	10	11	73
14-Oct	11	17	11	10	11	13	12	11	19	19	17	24	25	34	23	18	63	11	13	11	10	10	9	9	63
15-Oct	9	9	11	25	11	14	14	13	12	16	46	39	30	20	30	33	13	16	11	9	12	10	8	8	46
16-Oct	8	7	8	16	19	9	15	13	17	23	41	42	80	30	18	13	11	11	10	10	11	10	11	11	80
17-Oct	12	10	11	14	13	12	13	12	13	13	12	13	13	13	12	13	11	11	11	10	10	9	9	10	14
18-Oct	11	12	11	11	15	16	22	27	13	11	10	17	15	15	12	14	14	16	8	8	10	7	10	30	30
19-Oct	13	11	10	15	81	56	13	8	12	14	16	12	10	13	13	12	11	10	9	10	12	12	12	11	81
20-Oct	11	11	13	14	19	38	16	13	16	15	24	20	17	14	27	17	11	9	11	16	9	11	13	13	38
21-Oct	12	65	15	59	8	10	9	9	10	10	10	11	10	10	10	11	9	7	5	8	7	8	12	9	65
22-Oct	7	7	7	9	5	18	11	13	11	14	14	14	14	14	15	13	11	11	13	10	13	17	10	10	18
23-Oct	10	10	11	14	21	19	15	15	14	14	14	17	15	14	14	13	13	31	19	26	10	12	11	10	31
24-Oct	9	10	10	10	9	10	9	10	11	12	12	12	11	11	10	11	11	9	10	10	10	10	11	11	12
25-Oct	11	11	9	9	12	10	10	8	15	13	53	20	47	31	28	14	11	13	12	11	11	11	12	12	53
26-Oct	11	14	13	13	13	15	14	13	15	15	15	15	14	16	14	14	15	16	14	13	13	13	13	15	16
27-Oct	15	14	14	12	13	13	12	12	14	13	14	13	14	14	16	13	13	13	14	14	12	27	25	87	87
28-Oct	66	13	11	12	14	10	12	11	12	13	14	12	13	12	12	13	13	13	13	13	12	13	14	13	66
29-Oct	15	18	14	16	15	15	14	14	16	16	18	19	15	13	16	15	13	15	12	11	12	12	13	12	19
30-Oct	10	12	11	11	13	12	13	12	14	14	14	15	14	14	13	14	13	12	11	12	12	13	12	12	15
31-Oct	12	12	11	11	12	13	13	13	15	14	16	14	26	33	18	14	12	12	14	16	19	10	10	11	33
66 66 63 71 81 56 48 83 75 50 77 42 80 34 30 33 63 31 30 39 40 52 34 87																									
Diurnal Maximum																									
MS - Missing																									





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 28, 2014	Previous Calibration	September 20, 2014
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	14:30
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	18	16
Analyzer Range (mv)	1000	1000	Lamp voltage	2970	2941
Calculated slope	0.997825	0.999358	Chamber temp.	50.0	50.0
Calculated intercept	0.818119	0.626548	Pressure (mmHg)	22.4	24.7
Analyzer Background	16.9	16.9	Flow (lpm)	0.561	0.636
Analyzer Coefficient	1.022	1.024	Intensity	73	73

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	-0.1	NA
as found span	5000	76.7	783.9	781.6	1.003
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	76.7	783.9	784.1	1.000
second point	5000	38.4	392.4	391.6	1.002
third point	5000	19.2	196.2	195.3	1.005
calibrator zero	5000	0.0	0.0	-0.1	NA
as left zero	5000	0.0	0.0	-0.7	NA
as left span	6000	92.0	783.5	769.5	1.018
Average Correction Factor					1.002

Corrected As found	781.7	Previous response	784.8	% change	0.4%
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#### Notes:

Slight adjustment to span.

Calibration Performed By: Devin Russell



## Wood Buffalo Environmental Association

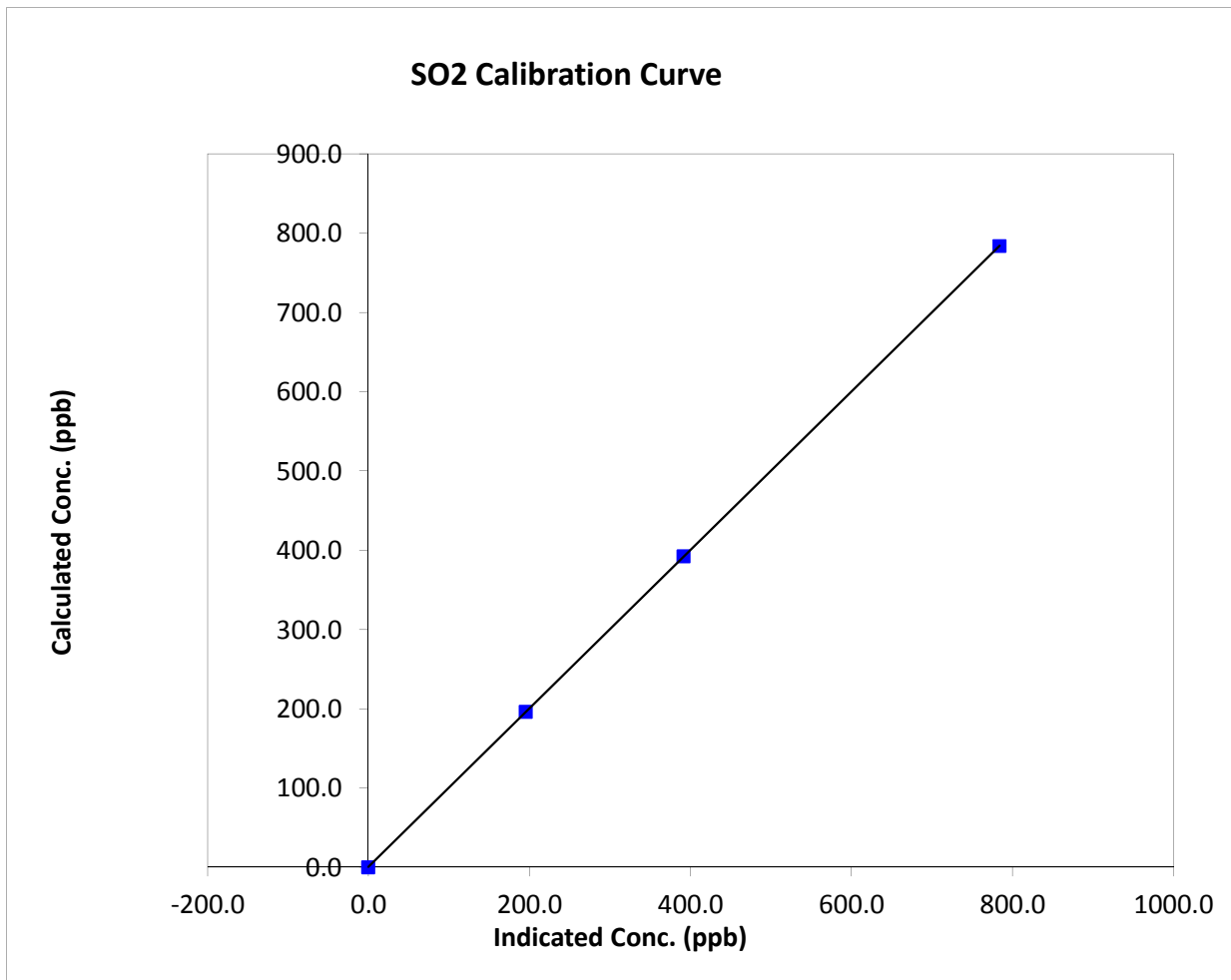
### SO<sub>2</sub> Calibration Summary

#### Station Information

Calibration Date	October 28, 2014	Previous Calibration	September 20, 2014
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	10:00	End Time (MST)	14:30
Analyzer make	API T100	Analyzer serial #	598

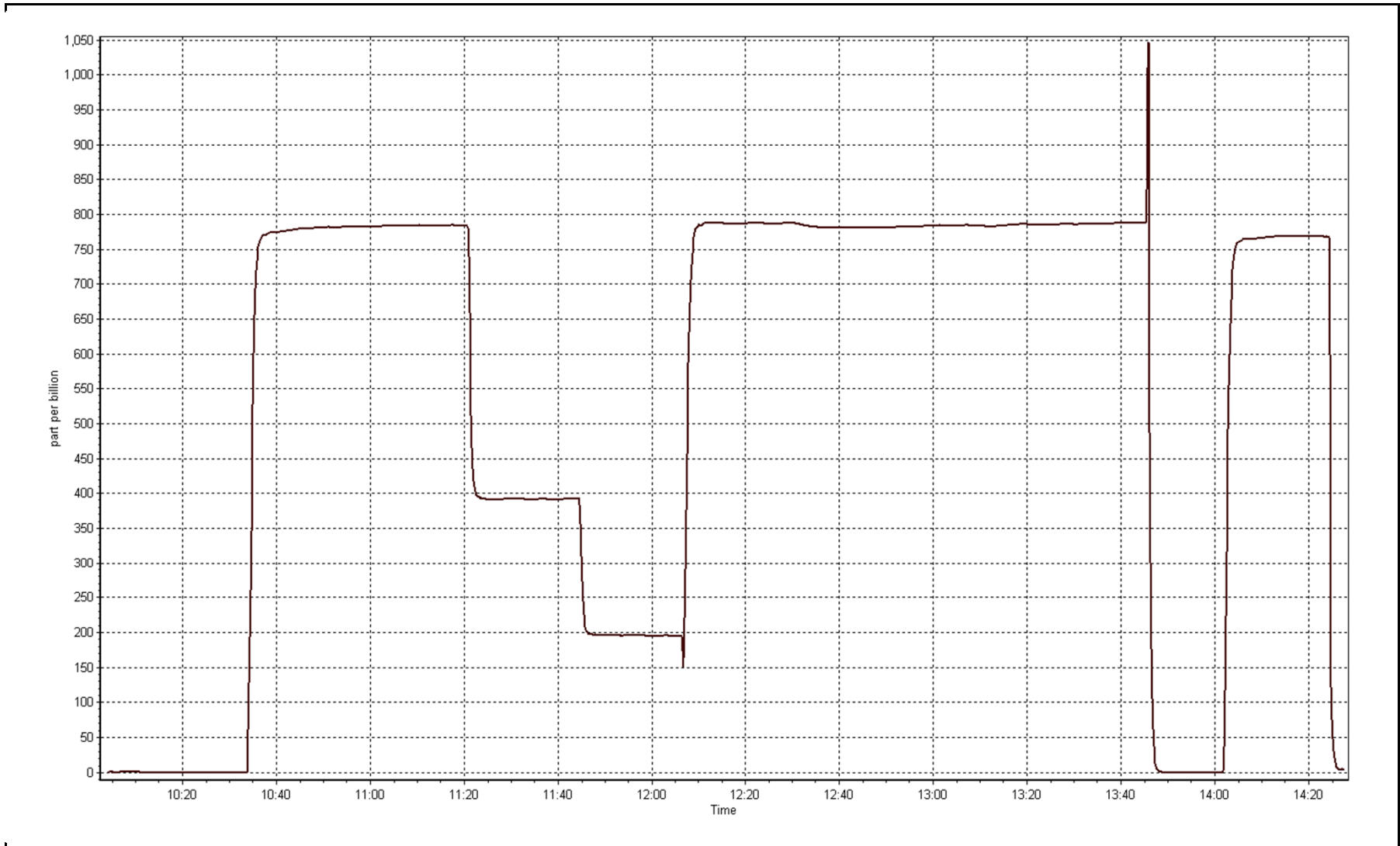
#### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999998
783.9	784.1	0.9998		
392.4	391.6	1.0021	Slope	0.999358
196.2	195.3	1.0047		
			Intercept	0.626548



SO2 Calibration Plot

Date: October 28, 2014





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 28, 2014	Previous Calibration	September 20, 2014
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	14:30
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	52.4 ppm	Cal Gas Serial #	LL110503

### DACS Information

DACS make & model Campbell Scientific CR3000      DACS serial No. 7882

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.999540	0.998668	0.988697
	Data Offset	-0.146156	0.676972	0.071579
After	Data Slope	1.005735	0.999664	1.000317
	Data Offset	-1.147109	-0.309038	-0.351249
Channel #		TCP/IP	TCP/IP	TCP/IP
Voltage Range				

### Analyzer Information

Analyzer make/model Thermo 42i      Analyzer serial # 1218153356

Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.763	ppb	0.738	ppb
NOX coefficient	0.997	ppb	0.997	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	9.7		5.0	
NOX bkgrnd	10.1		4.9	
PMT	-941		-940.200	
Chamber Temp	50.3	Deg C	50.5	Deg C
Moly Temp	322.9	Deg C	322.4	Deg C
Cooler Temp	-3.0	Deg C	-2.7	Deg C
O3 flow		ccm		ccm
Chamber Press	194.2	mmHg	202.0	mmHg
Sample Flow	0.516	ccm	0.509	ccm

**Notes:**

NOX and NO percent change both around 9%; suspect slight vacuum drop. Span adjusted.



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

October 28, 2014

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	0.6	0.4	0.2	N/A	N/A
as found span	5000	76.7	803.8	800.7	3.1	881.1	877.7	3.4	0.9123	0.9123
calibrator zero	5000	0.0	0.0	0.0	0.0	0.6	0.4	0.2	N/A	N/A
high point	5000	76.7	803.8	800.7	3.1	800.2	801.4	-1.3	1.0045	0.9991
second point	5000	38.4	402.4	400.9	1.5	401.2	401.1	0.1	1.0031	0.9996
third point	5000	19.2	201.2	200.4	0.8	202.0	200.9	1.0	0.9963	0.9976
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	0.6	0.4	0.2	N/A	N/A
as left span	6000	92.0	803.5	518.4	285.1	805.2	521.7	283.5	0.9978	0.9937
Average Correction Factor									1.0013	0.9988

Corrected As found

NO<sub>x</sub>= 880.5

NO= 877.3

Percent Change

NO<sub>x</sub>= -8.6%

NO= -8.7%

Previous Response

NO<sub>x</sub>= 804.3

NO= 801.1

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

76.70

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	518.4	282.7	801.3	518.4	282.9	0.9880	1.0000	0.9995	100.0%
2nd NO <sub>2</sub> (200)	N/A	605.5	195.7	801.5	605.5	196.1	0.9877	1.0000	0.9980	100.2%
3rd NO <sub>2</sub> (100)	N/A	697.7	103.4	801.6	697.7	103.8	0.9876	1.0000	0.9958	100.4%
4th NO <sub>2</sub> (0)	801.1	N/A	0.3	801.5	801.1	0.3	0.9878	1.0000	N/A	N/A
Average Correction Factor							0.9878	1.0000	0.9977	100.2%

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

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

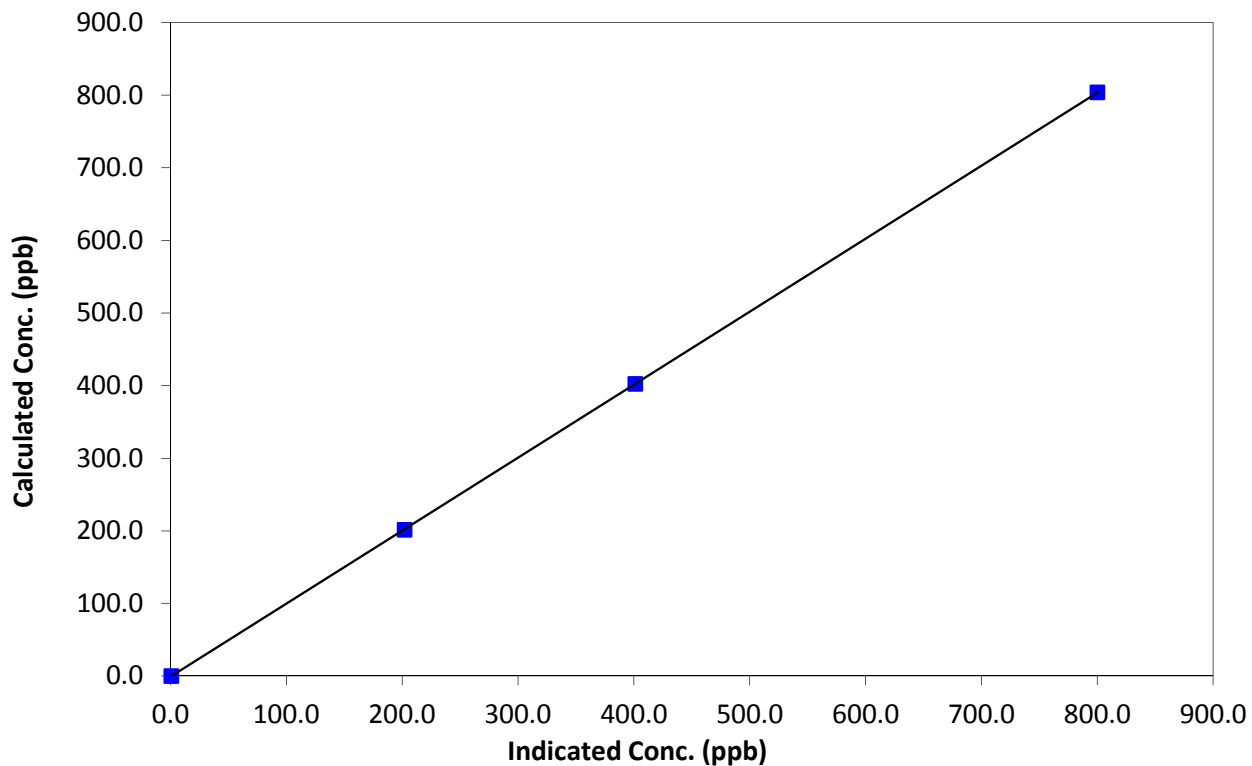
### Station Information

Calibration Date	October 28, 2014	Previous Calibration	September 20, 2014
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:00	End Time (MST)	14:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	N/A	Correlation Coefficient	0.999997
803.8	800.2	1.0045		
402.4	401.2	1.0031	Slope	1.005735
201.2	202.0	0.9963		
			Intercept	-1.147109

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

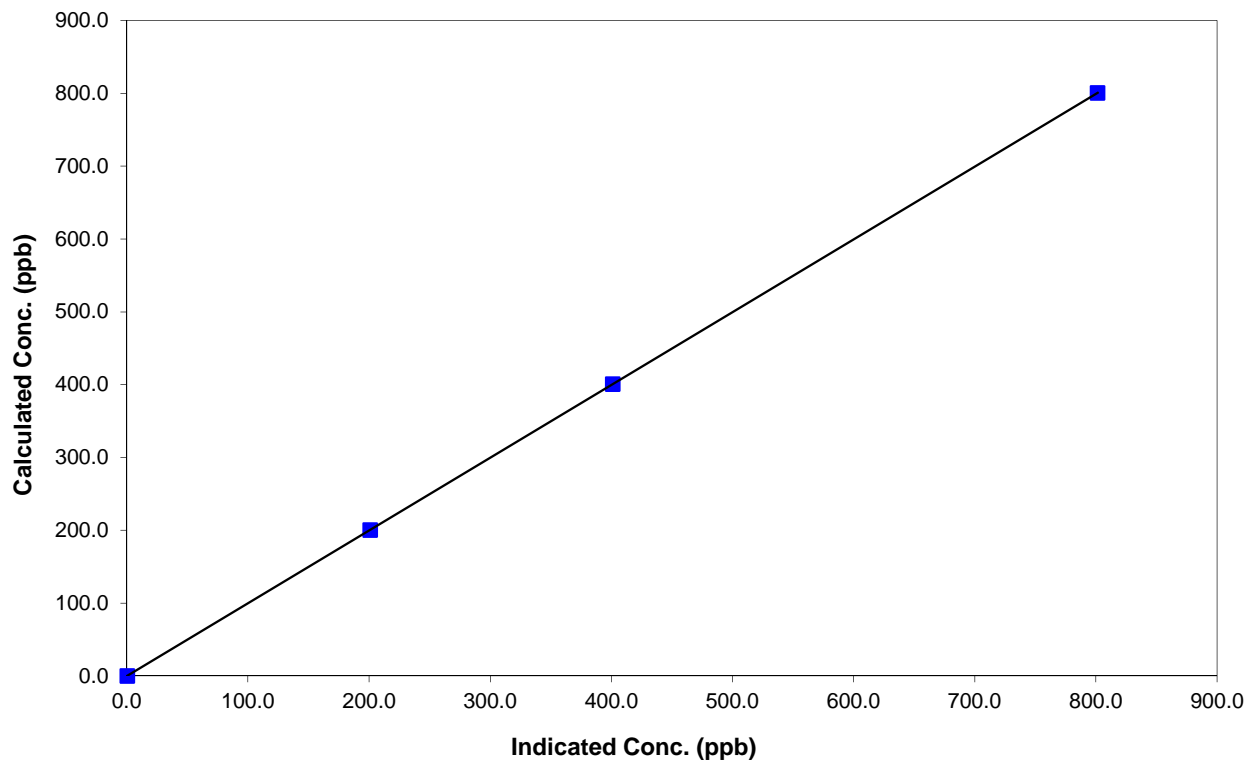
### Station Information

Calibration Date	October 28, 2014	Previous Calibration	September 20, 2014
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:00	End Time (MST)	14:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	1.000000
800.7	801.4	0.9991		
400.9	401.1	0.9996	Slope	0.999664
200.4	200.9	0.9976		
			Intercept	-0.309038

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

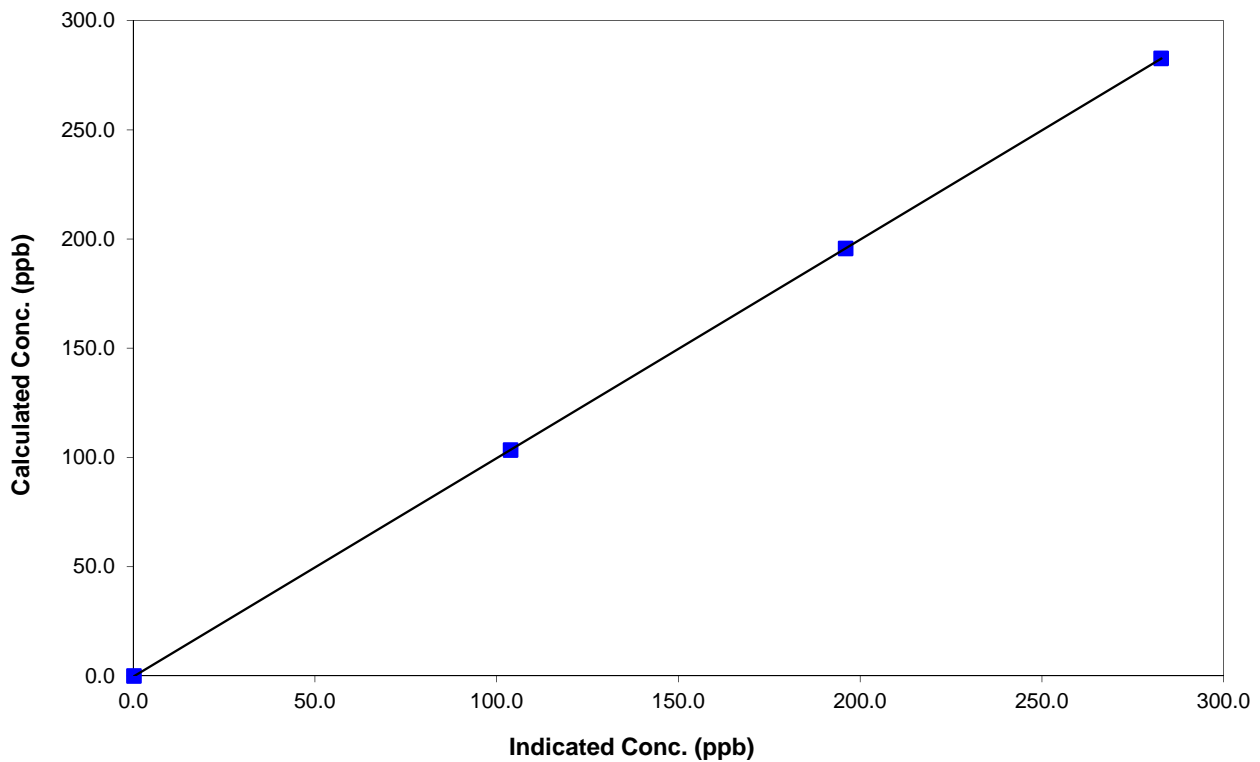
### Station Information

Calibration Date	October 28, 2014	Previous Calibration	September 20, 2014
Station Number	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:00	End Time (MST)	14:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

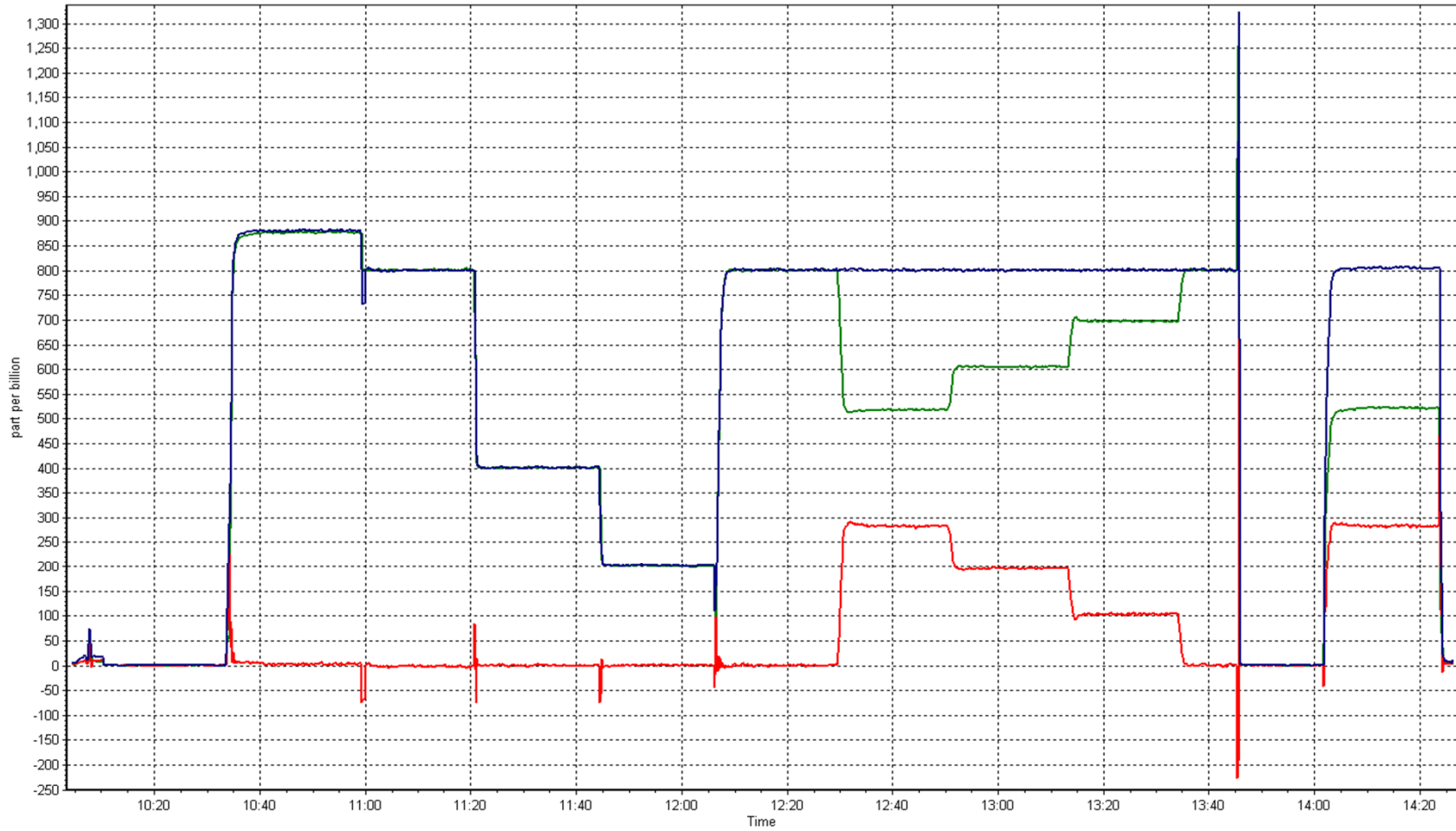
### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999999
282.7	282.9	0.9995		
195.7	196.1	0.9980	Slope	1.000317
103.4	103.8	0.9958		
			Intercept	-0.351249

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







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# WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

## INTEGRATED MONITORING PROGRAM MONTHLY REPORT

### DATA SUMMARY SEPTEMBER - AUGUST 2014

Prepared  
November 28, 2014

#### SAMPLE COLLECTION

**Wood Buffalo Environmental Association**  
Fort McMurray, Alberta

#### LABORATORY ANALYSIS

passive: Maxxam Analytics Ltd  
Edmonton, Alberta

VOC: Alberta Innovates - Technology Futures  
Vegreville, Alberta

particulate: ALS Canada Ltd  
Burlington, Ontario

PAH: Air Zone One Incorporated  
Mississauga, Ontario

precipitation: Alberta Innovates - Technology Futures  
Vegreville, Alberta

#### DATA SUMMARY

Aurora Atmospherics Inc.  
Calgary, Alberta

September 2014

**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION  
Passive Monitoring Results  
Continuous Air Monitoring Stations**

Station	Start	End	Result Type	NO <sub>2</sub> (ppb)	O <sub>3</sub> (ppb)	SO <sub>2</sub> (ppb)
<b>AMS 1 - Fort McKay</b>	27-Aug-14	30-Sep-14	Sample	2.4	15.0	1.6
			Sample	2.5	15.4	1.6
			Sample	2.6	15.1	1.3
			<b>Average</b>	<b>2.5</b>	<b>15.2</b>	<b>1.5</b>
<b>AMS 2 - Mildred Lake</b>	27-Aug-14	30-Sep-14	Sample	8.1	15.1	3
			Sample	6.5	16.4	3.3
			Sample	6.3	16.3	2.9
			<b>Average</b>	<b>7.0</b>	<b>15.9</b>	<b>3.1</b>
<b>AMS 6 - Patricia McInnes</b>	28-Aug-14	29-Sep-14	Sample	2.6	19.8	1.4
			Sample	1.9	22.1	1
			Sample	2.7	20.9	1.2
			<b>Average</b>	<b>2.4</b>	<b>20.9</b>	<b>1.2</b>
<b>AMS 8 - Fort Chipewyan</b>	04-Sep-14	02-Oct-14	Sample	0.3	DAMAGED	DAMAGED
			Sample	0.4	24.0	0.2
			Sample	0.9	23.6	0.6
			<b>Average</b>	<b>0.5</b>	<b>23.8</b>	<b>0.4</b>
<b>AMS 14 - Anzac</b>	28-Aug-14	29-Sep-14	Sample	0.8	17.2	0.5
			Sample	0.6	15.9	0.3
			Sample	0.5	16.6	0.6
			<b>Average</b>	<b>0.6</b>	<b>16.6</b>	<b>0.5</b>

September 2014  
**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**  
**Passive Monitoring Results**  
**Remote Forestry and Lake Sites**

Station	Start	End	Result Type	NO <sub>2</sub> (ppb)	O <sub>3</sub> (ppb)	SO <sub>2</sub> (ppb)
<b>AH3</b>	02-Sep-14	01-Oct-14	Sample	0.7	23.1	0.6
			Sample	0.8	20.8	0.6
			<b>Average</b>	<b>0.8</b>	<b>21.9</b>	<b>0.6</b>
<b>AH7</b>	04-Sep-14	03-Oct-14	Sample	2.1	22.4	2.2
			Sample	0.9	21.9	1.6
			<b>Average</b>	<b>1.5</b>	<b>22.2</b>	<b>1.9</b>
<b>AH8-R</b>	05-Sep-14	02-Oct-14	Sample	0.7	20.7	0.8
			Sample	0.8	19.9	0.9
			<b>Average</b>	<b>0.8</b>	<b>20.3</b>	<b>0.9</b>
<b>BM7</b>	03-Sep-14	03-Oct-14	<b>Sample</b>	<b>0.2</b>	<b>22.3</b>	<b>0.2</b>
<b>BM10</b>	05-Sep-14	02-Oct-14	<b>Sample</b>	<b>0.3</b>	<b>16.8</b>	<b>0.5</b>
<b>BM11</b>	05-Sep-14	03-Oct-14	<b>Sample</b>	<b>0.3</b>	<b>DAMAGED</b>	<b>DAMAGED</b>
<b>JP101 (JPL1)</b>	04-Sep-14	02-Oct-14	Sample	0.5	72.3	0.8
			Sample	0.3	23.4	0.4
			<b>Average</b>	<b>0.4</b>	<b>47.9</b>	<b>0.6</b>
<b>JP102 (JPH2)</b>	04-Sep-14	02-Oct-14	Sample	1.9	20.0	1.7
			Sample	2.2	18.6	2.4
			<b>Average</b>	<b>2.1</b>	<b>19.3</b>	<b>2.1</b>
<b>JP104 (JPH4)</b>	27-Aug-14	30-Sep-14	Sample	3.6	18.2	2.2
			Sample	3.8	19.8	1.8
			<b>Average</b>	<b>3.7</b>	<b>19.0</b>	<b>2.0</b>
<b>JP107 (JPL7)</b>	03-Sep-14	03-Oct-14	Sample	1.2	23.6	1.3
			Sample	1.4	23.0	1.5
			<b>Average</b>	<b>1.3</b>	<b>23.3</b>	<b>1.4</b>
<b>JP108 (JPL8)</b>	02-Sep-14	01-Oct-14	Sample	0.2	18.5	0.5
			Sample	0.1	19.5	0.4
			<b>Average</b>	<b>0.2</b>	<b>19.0</b>	<b>0.5</b>
<b>JP205 (205)</b>	03-Sep-14	03-Oct-14	Sample	0.4	23.8	1.1
			Sample	0.3	23.2	0.8
			<b>Average</b>	<b>0.4</b>	<b>23.5</b>	<b>1.0</b>
<b>JP210 (210)</b>	02-Sep-14	01-Oct-14	Sample	0.3	20.7	0.3
			Sample	0.2	20.6	0.5
			<b>Average</b>	<b>0.3</b>	<b>20.7</b>	<b>0.4</b>
<b>JP212</b>	05-Sep-14	03-Oct-14	<b>Sample</b>	<b>DAMAGED</b>	<b>DAMAGED</b>	<b>0.7</b>
<b>JP213 (213)</b>	02-Sep-14	01-Oct-14	Sample	0.2	26.19	0.2
			Sample	0.1	26.7	0.4
			<b>Average</b>	<b>0.2</b>	<b>26.4</b>	<b>0.3</b>

<b>NE7</b>	03-Sep-14	03-Oct-14	<b>Sample</b>	<b>0.6</b>	<b>18.1</b>	<b>0.9</b>
<b>NE10</b>	02-Sep-14	01-Oct-14	<b>Sample</b>	<b>0.2</b>	<b>17.0</b>	<b>0.3</b>
<b>NE11</b>	03-Sep-14	03-Oct-14	<b>Sample</b>	<b>MISSING</b>	<b>MISSING</b>	<b>MISSING</b>
<b>R2</b>	27-Aug-14	30-Sep-14	<b>Sample</b>	<b>2.8</b>	<b>12.2</b>	<b>1.3</b>
<b>SM7</b>	04-Sep-14	01-Oct-14	<b>Sample</b>	<b>0.6</b>	<b>22.4</b>	<b>0.3</b>
<b>SM8</b>	04-Sep-14	01-Oct-14	<b>Sample</b>	<b>0.3</b>	<b>19.1</b>	<b>0.4</b>
<b>WF4</b>	05-Sep-14	02-Oct-14	<b>Sample</b>	<b>0.8</b>	<b>14.3</b>	<b>0.9</b>
<b>JP316</b>	02-Sep-14	01-Oct-14	Sample	0.3	26.2	0.3
			Sample	0.2	23.0	0.5
			<b>Average</b>	<b>0.3</b>	<b>24.6</b>	<b>0.4</b>
<b>JP201</b>	05-Sep-14	02-Oct-14	Sample	0.2	23.1	0.5
			Sample	0.4	23.4	0.6
			<b>Average</b>	<b>0.3</b>	<b>23.3</b>	<b>0.6</b>
<b>JP311</b>	04-Sep-14	02-Oct-14	Sample	0.8	25.4	1.1
			Sample	0.6	23.4	0.7
			<b>Average</b>	<b>0.7</b>	<b>24.4</b>	<b>0.9</b>
<b>JE 306</b>	03-Sep-14		<b>Sample</b>	Could not collect, very wet landing. Working on building a landing pad.		
<b>JE 308</b>			<b>Sample</b>	Could not collect, very wet landing. Working on building a landing pad.		
<b>JE 312</b>	02-Sep-14	01-Oct-14	<b>Sample</b>	<b>0.2</b>	<b>18.29</b>	<b>0.8</b>
<b>JE 316</b>			<b>Sample</b>	Could not collect, very wet landing. Working on building a landing pad.		
<b>JE 323</b>			<b>Sample</b>	Could not collect, very wet landing. Working on building a landing pad.		



VOC Canisters		Results (ppbv)			
#	Compound Name	MDL	AMS 9	AMS 13	AMS 15
			Barge Landing 02-Sep	Fort McKay South 02-Sep	CNRL Horizon 02-Sep
	1,2,4-Trimethylbenzene	0.03			
	1,3,5-Trimethylbenzene	0.03			
	1,3-Butadiene	0.03			
	1-Butene	0.03			
	1-Pentene	0.03			
	2,2,4-Trimethylpentane	0.03			
	2,2-Dimethylbutane	0.03			
	2,3,4-Trimethylpentane	0.03			
	2,3-Dimethylbutane	0.03			
	2,3-Dimethylpentane	0.03			
	2,4-Dimethylpentane	0.03			
	2-Methyl-1-pentene	0.03			
	2-Methyl-2-butene	0.03			
	2-Methylheptane	0.03			
	2-Methylhexane	0.03			
	2-Methylpentane	0.03			
	3-Methyl-1-butene	0.03			
	3-Methylheptane	0.03			
	3-Methylhexane	0.03			
	3-Methylpentane	0.03			
	4-Methyl-1-pentene	0.03			
	Acetaldehyde	0.03			
	Acetone	0.03	2.68	2.23	1.87
	alpha-Pinene	0.03			0.11
	Benzene	0.03	0.25	0.22	0.65
	beta-Pinene	0.03			
	cis-2-Butene	0.03			
	cis-2-Hexene	0.03			
	cis-2-Pentene	0.03			
	Cyclohexane	0.03			
	Cyclopentane	0.03			
	Cyclopentene	0.03			
	Ethanol	0.03			
	Ethylbenzene	0.03			
	Formaldehyde	0.03			
	Isobutane	0.03			
	Isopentane	0.03			
	Isoprene	0.03		0.54	
	Isopropyl alcohol	0.03			
	Isopropylbenzene	0.03			
	m,p-Xylene	0.03			
	Methanol	0.03	3.91		
	Methyl ethyl ketone	0.03			
	Methyl isobutyl ketone	0.03			
	Methylcyclohexane	0.03			
	Methylcyclopentane	0.03			
	n-Butane	0.03			
	n-Decane	0.03			
	n-Dodecane	0.03			
	n-Heptane	0.03			
	n-Hexane	0.03			
	n-Nonane	0.03			
	n-Octane	0.03			
	n-Pentane	0.03			
	n-Propylbenzene	0.03			
	n-Undecane	0.03			
	Naphthalene	0.03			
	o-Xylene	0.03			
	Styrene	0.03			
	Toluene	0.03	0.2		
	trans-2-Butene	0.03			
	trans-2-Hexene	0.03			
	trans-2-Pentene	0.03			



VOC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 02-Sep	Patricia McInnes 02-Sep	Athabasca Valley 02-Sep	Anzac 02-Sep
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03				
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	1.75	2.04	3.65	2.45
	alpha-Pinene	0.03	0.14		0.13	0.14
	Benzene	0.03	0.15	0.21	0.19	0.29
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03				
	Isoprene	0.03	0.43			
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03			0.35	0.07
	Methanol	0.03			7.63	
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				
	n-Butane	0.03				
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03				
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03	0.16		0.91	0.2
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				





VOC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 9	AMS 12	AMS 13	AMS 15
			Barge Landing 08-Sep	Millennium Mine 08-Sep	Fort McKay South 08-Sep	CNRL Horizon 08-Sep
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03				
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	1.53	1.89	1.81	1.86
	alpha-Pinene	0.03				
	Benzene	0.03			0.18	
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03				
	Isoprene	0.03				
	Isopropyl alcohol	0.03		2.29		
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				
	n-Butane	0.03				
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03				
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03			0.64	
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 08-Sep	Patricia McInnes 08-Sep	Athabasca Valley 08-Sep	Anzac 08-Sep
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03	0.52			
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	1.8	1.51	1.92	1.76
	alpha-Pinene	0.03				
	Benzene	0.03	0.12	0.48		
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03		0.57		
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03				0.47
	Isoprene	0.03				
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03			0.48	
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03	0.68			
	n-Butane	0.03				
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03	4.46			
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03			0.45	0.85
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03	0.25		0.2	
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 9	AMS 12	AMS 13	AMS 15
			Barge Landing 14-Sep	Millennium Mine 14-Sep	Fort McKay South 14-Sep	CNRL Horizon 14-Sep
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03				
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	2.78	2.61	2.94	2.39
	alpha-Pinene	0.03				
	Benzene	0.03	0.29	0.21		
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03				1.37
	Isoprene	0.03			0.81	
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				
	n-Butane	0.03				
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03				
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03	0.38	0.11		
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 14-Sep	Patricia McInnes 14-Sep	Athabasca Valley 14-Sep	Anzac 14-Sep
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03				
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	2.59	2.61	4.75	2.67
	alpha-Pinene	0.03				
	Benzene	0.03			0.28	0.34
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03	0.39		1.34	
	Isoprene	0.03				
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				
	n-Butane	0.03			2.38	
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03				
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03	0.33		0.19	0.24
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 9	AMS 12	AMS 13	AMS 15
			Barge Landing 20-Sep	Millennium Mine 20-Sep	Fort McKay South 20-Sep	CNRL Horizon 20-Sep
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03				
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	2.73	1.85	2.75	2.43
	alpha-Pinene	0.03				
	Benzene	0.03				0.21
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03		0.62		
	Isoprene	0.03				
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				
	n-Butane	0.03		2.14		
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03				
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03	0.08			
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 20-Sep	Patricia McInnes 20-Sep	Athabasca Valley 20-Sep	Anzac 20-Sep
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03			0.15	
	3-Methylpentane	0.03				
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	1.92	2.64	3.36	2.36
	alpha-Pinene	0.03		0.14		
	Benzene	0.03	0.38			0.68
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03				
	Isoprene	0.03				
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				
	n-Butane	0.03				
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03				
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03	0.41			
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 9	AMS 12	AMS 13	AMS 15
			Barge Landing 26-Sep	Millennium Mine 26-Sep	Fort McKay South 26-Sep	CNRL Horizon 26-Sep
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03	0.24			
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	1.87	0.86	1.05	1.52
	alpha-Pinene	0.03				
	Benzene	0.03				
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03	2.04			
	Isoprene	0.03				
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				
	n-Butane	0.03				
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03	2.53			
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03				
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 26-Sep	Patricia McInnes 26-Sep	Athabasca Valley 26-Sep	Anzac 26-Sep
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03				
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	1.07	0.68	1.98	1.57
	alpha-Pinene	0.03				
	Benzene	0.03				
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03				
	Isoprene	0.03				
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				
	n-Butane	0.03				
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03				
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03				
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				





VOC Canisters			Results (ppbv)			
			AMS 9 Barge Landing 02-Oct	AMS 12 Millennium Mine 02-Oct	AMS 13 Fort McKay South 02-Oct	AMS 15 CNRL Horizon 02-Oct
#	Compound Name	MDL				
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03				
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03		0.98		
	alpha-Pinene	0.03				
	Benzene	0.03				
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03				4.46
	Isoprene	0.03				
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				
	n-Butane	0.03				
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03				
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03				
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 02-Oct	Patricia McInnes 02-Oct	Athabasca Valley 02-Oct	Anzac 02-Oct
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03	1.12			
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03	1.07			
	2-Methylpentane	0.03	5.58			
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03	3.05			
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03				
	alpha-Pinene	0.03				
	Benzene	0.03	1.43			
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03	1.37			
	Cyclopentane	0.03	1.09			
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03	0.76			
	Formaldehyde	0.03				
	Isobutane	0.03	59.6			
	Isopentane	0.03	22.2			
	Isoprene	0.03				
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03	1.16			
	n-Butane	0.03	105			
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03	1.67			
	n-Hexane	0.03	6.7			
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03	19.5			
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03	0.85			
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters		Results (ppbv)				
			AMS 9	AMS 12	AMS 13	AMS 15
#	Compound Name	MDL	Barge Landing 08-Oct	Millennium Mine 08-Oct	Fort McKay South 08-Oct	CNRL Horizon 08-Oct
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				22.8
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				2.08
	3-Methylpentane	0.03				10.6
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03				
	alpha-Pinene	0.03				
	Benzene	0.03				3.43
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				3.98
	Cyclopentane	0.03				5.47
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				572
	Isopentane	0.03	1.29		1.13	175
	Isoprene	0.03				
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				3.83
	n-Butane	0.03				1260
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				21.7
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03	1.05		1.17	140
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03				
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 08-Oct	Patricia McInnes 08-Oct	Athabasca Valley 08-Oct	Anzac 08-Oct
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03				
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03				
	alpha-Pinene	0.03				
	Benzene	0.03				
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03	1.56		0.22	
	Isoprene	0.03				
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				
	n-Butane	0.03				
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03	2.34			
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03				
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters			Results (ppbv)			
			AMS 9	AMS 12	AMS 13	AMS 15
#	Compound Name	MDL	Barge Landing	Millennium Mine	Fort McKay South	CNRL Horizon
			14-Oct	14-Oct	14-Oct	14-Oct
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03				
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	1.71	1.35	1.54	1.67
	alpha-Pinene	0.03				
	Benzene	0.03				
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03	0.09			
	Isoprene	0.03				
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				
	n-Butane	0.03				
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03				
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03				
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters		Results (ppbv)				
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 14-Oct	Patricia McInnes 14-Oct	Athabasca Valley 14-Oct	Anzac 14-Oct
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03				
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03				
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	1.05	1.53	2.18	1.44
	alpha-Pinene	0.03				
	Benzene	0.03				
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03				
	Isoprene	0.03				
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				
	n-Butane	0.03				
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03	0.6			
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03				
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters		Results (ppbv)				
#	Compound Name	MDL	AMS 9	AMS 12	AMS 13	AMS 15
			Barge Landing 20-Oct	Millennium Mine 20-Oct	Fort McKay South 20-Oct	CNRL Horizon 20-Oct
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03	0.24	0.13	0.22	
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03	0.1	0.09		0.84
	2,3,4-Trimethylpentane	0.03				0.25
	2,3-Dimethylbutane	0.03	0.14		0.11	1.85
	2,3-Dimethylpentane	0.03				0.93
	2,4-Dimethylpentane	0.03				0.45
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03	0.16		0.48	0.3
	2-Methylhexane	0.03			0.18	1.03
	2-Methylpentane	0.03	0.33		0.28	0.33
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03	0.16		0.34	0.28
	3-Methylpentane	0.03	0.43		0.37	3.3
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	2.42	2.27	1.58	1.84
	alpha-Pinene	0.03			0.19	0.17
	Benzene	0.03	0.41	0.33	0.4	0.43
	beta-Pinene	0.03	0.27	0.38	1.52	0.57
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03	0.17		0.26	3.45
	Cyclopentane	0.03				1.03
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03	0.07		0.11	0.07
	Formaldehyde	0.03				
	Isobutane	0.03	0.59	0.38	0.53	7.85
	Isopentane	0.03	0.81	0.31	0.5	10.3
	Isoprene	0.03				
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03	0.15		0.27	0.18
	Methanol	0.03				
	Methyl ethyl ketone	0.03	0.27			
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03	0.26	0.08	0.55	2.61
	Methylcyclopentane	0.03	0.15		0.17	1.77
	n-Butane	0.03	1.19	1.03	1.23	1.84
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03	0.3		0.77	0.59
	n-Hexane	0.03	0.48	0.27	0.58	0.44
	n-Nonane	0.03	0.1		0.16	0.19
	n-Octane	0.03	0.19		0.57	0.61
	n-Pentane	0.03	0.74		0.62	0.68
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03	0.06		0.11	0.09
	Styrene	0.03				
	Toluene	0.03	0.37	0.13	0.59	0.4
	trans-2-Butene	0.03				1.15
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 20-Oct	Patricia McInnes 20-Oct	Athabasca Valley 20-Oct	Anzac 20-Oct
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				
	1-Butene	0.03	0.23	0.29	0.2	0.2
	1-Pentene	0.03				
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03	0.09			
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03	0.21			
	2,3-Dimethylpentane	0.03	0.1			
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03	0.17			
	2-Methylhexane	0.03	0.16			
	2-Methylpentane	0.03	0.24	0.14	0.12	0.15
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03	0.15			
	3-Methylpentane	0.03	0.51	0.27		
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	1.82	2.12	2.84	2.28
	alpha-Pinene	0.03	0.15			0.06
	Benzene	0.03	0.38	0.42	0.39	0.43
	beta-Pinene	0.03	0.75	0.37		0.55
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03				
	cis-2-Pentene	0.03				
	Cyclohexane	0.03	0.29			
	Cyclopentane	0.03				
	Cyclopentene	0.03				
	Ethanol	0.03				
	Ethylbenzene	0.03	0.07			
	Formaldehyde	0.03				
	Isobutane	0.03	0.92	0.51	0.59	0.44
	Isopentane	0.03	1.06	0.45	0.49	0.41
	Isoprene	0.03				
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03	0.17	0.13	0.09	
	Methanol	0.03				
	Methyl ethyl ketone	0.03	0.2	0.2		
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03	0.34			0.08
	Methylcyclopentane	0.03	0.21	0.07		0.08
	n-Butane	0.03	1.14	1.29	1.34	1.24
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03	0.33	0.07		
	n-Hexane	0.03	0.44	0.3	0.3	0.32
	n-Nonane	0.03	0.09			
	n-Octane	0.03	0.18			
	n-Pentane	0.03	0.61	0.45		
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03	0.07			
	Styrene	0.03				
	Toluene	0.03	0.33	0.25	0.2	0.13
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				





VOC Canisters		Results (ppbv)				
			AMS 9	AMS 12	AMS 13	AMS 15
#	Compound Name	MDL	Barge Landing 26-Oct	Millennium Mine 26-Oct	Fort McKay South 26-Oct	CNRL Horizon 26-Oct
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03		3.49		
	1-Butene	0.03		1.34		
	1-Pentene	0.03		0.57		
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03				
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	1.98	0.98	1.2	
	alpha-Pinene	0.03				
	Benzene	0.03		11.9		
	beta-Pinene	0.03				
	cis-2-Butene	0.03				
	cis-2-Hexene	0.03		0.54		
	cis-2-Pentene	0.03				
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03		0.26		
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03	0.36	0.99		
	Isoprene	0.03		0.39		
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				
	n-Butane	0.03		1.47		
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03	0.44	1.74	0.24	
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03		0.24		
	trans-2-Butene	0.03				
	trans-2-Hexene	0.03				
	trans-2-Pentene	0.03				



VOC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 26-Oct	Patricia McInnes 26-Oct	Athabasca Valley 26-Oct	Anzac 26-Oct
	1,2,4-Trimethylbenzene	0.03				
	1,3,5-Trimethylbenzene	0.03				
	1,3-Butadiene	0.03				118
	1-Butene	0.03				12.1
	1-Pentene	0.03				11.9
	2,2,4-Trimethylpentane	0.03				
	2,2-Dimethylbutane	0.03				0.84
	2,3,4-Trimethylpentane	0.03				
	2,3-Dimethylbutane	0.03				0.82
	2,3-Dimethylpentane	0.03				
	2,4-Dimethylpentane	0.03				
	2-Methyl-1-pentene	0.03				
	2-Methyl-2-butene	0.03				
	2-Methylheptane	0.03				
	2-Methylhexane	0.03				
	2-Methylpentane	0.03				3.51
	3-Methyl-1-butene	0.03				
	3-Methylheptane	0.03				
	3-Methylhexane	0.03				
	3-Methylpentane	0.03				0.51
	4-Methyl-1-pentene	0.03				
	Acetaldehyde	0.03				
	Acetone	0.03	1.1	1.6	2.24	1.51
	alpha-Pinene	0.03				
	Benzene	0.03			1.34	41.5
	beta-Pinene	0.03				
	cis-2-Butene	0.03				3.75
	cis-2-Hexene	0.03				1
	cis-2-Pentene	0.03				0.44
	Cyclohexane	0.03				
	Cyclopentane	0.03				
	Cyclopentene	0.03				3.48
	Ethanol	0.03				
	Ethylbenzene	0.03				
	Formaldehyde	0.03				
	Isobutane	0.03				
	Isopentane	0.03		0.39	0.61	
	Isoprene	0.03				3.69
	Isopropyl alcohol	0.03				
	Isopropylbenzene	0.03				
	m,p-Xylene	0.03				
	Methanol	0.03				
	Methyl ethyl ketone	0.03				
	Methyl isobutyl ketone	0.03				
	Methylcyclohexane	0.03				
	Methylcyclopentane	0.03				
	n-Butane	0.03		0.17	0.64	
	n-Decane	0.03				
	n-Dodecane	0.03				
	n-Heptane	0.03				
	n-Hexane	0.03				
	n-Nonane	0.03				
	n-Octane	0.03				
	n-Pentane	0.03		0.88	1.11	
	n-Propylbenzene	0.03				
	n-Undecane	0.03				
	Naphthalene	0.03				
	o-Xylene	0.03				
	Styrene	0.03				
	Toluene	0.03				0.65
	trans-2-Butene	0.03				3.56
	trans-2-Hexene	0.03				0.18
	trans-2-Pentene	0.03				0.99



RSC Canisters		Results (ppbv)			
#	Compound Name	MDL	AMS 9	AMS 13	AMS 15
			Barge Landing 02-Sep	Fort McKay South 02-Sep	CNRL Horizon 02-Sep
	2,5-Dimethylthiophene	0.1			
	2-Ethylthiophene	0.1			
	2-Methylthiophene	0.1			
	3-Methylthiophene	0.1			
	Butyl mercaptan	0.1			
	Carbon disulphide	0.1			
	Carbonyl sulphide	0.1			
	Dimethyl disulphide	0.1			
	Dimethyl sulphide	0.1			
	Ethyl mercaptan	0.1			
	Ethyl sulphide	0.1			
	Hydrogen sulphide	0.1			
	Isobutyl mercaptan	0.1			
	Isopropyl mercaptan	0.1			
	Methyl mercaptan	0.1			
	Pentyl mercaptan	0.1			
	Propyl mercaptan	0.1			
	tert-Butyl mercaptan	0.1			
	Thiophene	0.1			



RSC Canisters			Results (ppbv)			
			AMS 1	AMS 6	AMS 7	AMS 14
#	Compound Name	MDL	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac
			02-Sep	02-Sep	02-Sep	02-Sep
	2,5-Dimethylthiophene	0.1				
	2-Ethylthiophene	0.1				
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1				
	Carbonyl sulphide	0.1				
	Dimethyl disulphide	0.1				
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1				
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				



RSC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 9	AMS 12	AMS 13	AMS 15
			Barge Landing 08-Sep	Millennium Mine 08-Sep	Fort McKay South 08-Sep	CNRL Horizon 08-Sep
	2,5-Dimethylthiophene	0.1				
	2-Ethylthiophene	0.1				
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1				
	Carbonyl sulphide	0.1		2.2		
	Dimethyl disulphide	0.1				
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1				
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				



RSC Canisters			Results (ppbv)			
			AMS 1	AMS 6	AMS 7	AMS 14
#	Compound Name	MDL	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac
			08-Sep	08-Sep	08-Sep	08-Sep
	2,5-Dimethylthiophene	0.1				
	2-Ethylthiophene	0.1				
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1				
	Carbonyl sulphide	0.1				
	Dimethyl disulphide	0.1				
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1				
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				



RSC Canisters			Results (ppbv)			
			AMS 9 Barge Landing 14-Sep	AMS 12 Millennium Mine 14-Sep	AMS 13 Fort McKay South 14-Sep	AMS 15 CNRL Horizon 14-Sep
#	Compound Name	MDL				
	2,5-Dimethylthiophene	0.1	1.8			
	2-Ethylthiophene	0.1	0.8			
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1	0.8		3.2	
	Carbonyl sulphide	0.1				
	Dimethyl disulphide	0.1				
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1				0.7
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				



RSC Canisters			Results (ppbv)			
			AMS 1 Fort McKay 14-Sep	AMS 6 Patricia McInnes 14-Sep	AMS 7 Athabasca Valley 14-Sep	AMS 14 Anzac 14-Sep
#	Compound Name	MDL				
	2,5-Dimethylthiophene	0.1				1.6
	2-Ethylthiophene	0.1				1.1
	2-Methylthiophene	0.1	4.1			0.8
	3-Methylthiophene	0.1	4.3			1
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1	3.2		0.8	0.8
	Carbonyl sulphide	0.1	2.1			
	Dimethyl disulphide	0.1	4			1.5
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1				
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1			0.2	





RSC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 9	AMS 12	AMS 13	AMS 15
			Barge Landing 20-Sep	Millennium Mine 20-Sep	Fort McKay South 20-Sep	CNRL Horizon 20-Sep
	2,5-Dimethylthiophene	0.1				
	2-Ethylthiophene	0.1				
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1		1		
	Carbonyl sulphide	0.1				
	Dimethyl disulphide	0.1				
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1				
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				



RSC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 20-Sep	Patricia McInnes 20-Sep	Athabasca Valley 20-Sep	Anzac 20-Sep
	2,5-Dimethylthiophene	0.1	2			
	2-Ethylthiophene	0.1				
	2-Methylthiophene	0.1	0.7			
	3-Methylthiophene	0.1	1			
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1	0.8	0.8	0.8	
	Carbonyl sulphide	0.1			1.9	
	Dimethyl disulphide	0.1				
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1			0.8	
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				



RSC Canisters			Results (ppbv)			
			AMS 9	AMS 12	AMS 13	AMS 15
#	Compound Name	MDL	Barge Landing	Millennium Mine	Fort McKay South	CNRL Horizon
			26-Sep	26-Sep	26-Sep	26-Sep
	2,5-Dimethylthiophene	0.1				
	2-Ethylthiophene	0.1				
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1			0.7	
	Carbonyl sulphide	0.1	0.6	1.4	1.9	0.4
	Dimethyl disulphide	0.1				
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1		2.2	1.7	0.6
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				



RSC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 26-Sep	Patricia McInnes 26-Sep	Athabasca Valley 26-Sep	Anzac 26-Sep
	2,5-Dimethylthiophene	0.1		0.9		
	2-Ethylthiophene	0.1		0.6		
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1	0.6			
	Carbonyl sulphide	0.1	1.5	1.3	0.4	0.6
	Dimethyl disulphide	0.1				
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1	1.7	1.6	0.4	
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1	0.7			



RSC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 9	AMS 12	AMS 13	AMS 15
			Barge Landing 08-Oct	Millennium Mine 08-Oct	Fort McKay South 08-Oct	CNRL Horizon 08-Oct
	2,5-Dimethylthiophene	0.1				
	2-Ethylthiophene	0.1				
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1				
	Carbonyl sulphide	0.1				
	Dimethyl disulphide	0.1				
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1				
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				



RSC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 08-Oct	Patricia McInnes 08-Oct	Athabasca Valley 08-Oct	Anzac 08-Oct
	2,5-Dimethylthiophene	0.1				
	2-Ethylthiophene	0.1				
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1	0.4			
	Carbonyl sulphide	0.1				
	Dimethyl disulphide	0.1				
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1				
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				



RSC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 9	AMS 12	AMS 13	AMS 15
			Barge Landing 14-Oct	Millennium Mine 14-Oct	Fort McKay South 14-Oct	CNRL Horizon 14-Oct
	2,5-Dimethylthiophene	0.1				
	2-Ethylthiophene	0.1				
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1				
	Carbonyl sulphide	0.1	0.9	0.9	1	0.9
	Dimethyl disulphide	0.1				
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1				
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				



RSC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 14-Oct	Patricia McInnes 14-Oct	Athabasca Valley 14-Oct	Anzac 14-Oct
	2,5-Dimethylthiophene	0.1				
	2-Ethylthiophene	0.1				
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1				
	Carbonyl sulphide	0.1	1	0.8	1	0.9
	Dimethyl disulphide	0.1				
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1				
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				





RSC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 9	AMS 12	AMS 13	AMS 15
			Barge Landing 20-Oct	Millennium Mine 20-Oct	Fort McKay South 20-Oct	CNRL Horizon 20-Oct
	2,5-Dimethylthiophene	0.1				
	2-Ethylthiophene	0.1				
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1				0.7
	Carbonyl sulphide	0.1	0.6			0.6
	Dimethyl disulphide	0.1				
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1				
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				



RSC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 20-Oct	Patricia McInnes 20-Oct	Athabasca Valley 20-Oct	Anzac 20-Oct
	2,5-Dimethylthiophene	0.1				
	2-Ethylthiophene	0.1				
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1	0.7			
	Carbonyl sulphide	0.1	0.5	0.6		
	Dimethyl disulphide	0.1				
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1				
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1	0.9			
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				



RSC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 9	AMS 12	AMS 13	AMS 15
			Barge Landing 26-Oct	Millennium Mine 26-Oct	Fort McKay South 26-Oct	CNRL Horizon 26-Oct
	2,5-Dimethylthiophene	0.1				
	2-Ethylthiophene	0.1				
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1	0.6			
	Carbonyl sulphide	0.1	0.3	0.5	0.4	0.4
	Dimethyl disulphide	0.1	0.6			
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1	0.3	0.8	0.6	
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				



RSC Canisters			Results (ppbv)			
#	Compound Name	MDL	AMS 1	AMS 6	AMS 7	AMS 14
			Fort McKay 26-Oct	Patricia McInnes 26-Oct	Athabasca Valley 26-Oct	Anzac 26-Oct
	2,5-Dimethylthiophene	0.1				
	2-Ethylthiophene	0.1				
	2-Methylthiophene	0.1				
	3-Methylthiophene	0.1				
	Butyl mercaptan	0.1				
	Carbon disulphide	0.1	0.6			
	Carbonyl sulphide	0.1	0.5	0.1	0.2	0.3
	Dimethyl disulphide	0.1	0.6	0.5		
	Dimethyl sulphide	0.1				
	Ethyl mercaptan	0.1				
	Ethyl sulphide	0.1				
	Hydrogen sulphide	0.1	0.8		0.5	
	Isobutyl mercaptan	0.1				
	Isopropyl mercaptan	0.1				
	Methyl mercaptan	0.1				
	Pentyl mercaptan	0.1				
	Propyl mercaptan	0.1				
	tert-Butyl mercaptan	0.1				
	Thiophene	0.1				



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Station #	AMS 1	AMS 7	AMS 14	MDL	Lab Blank	Travel Blank					
Station Name	Fort McKay	Athabasca Valley	Anzac								
Sample Date	2-Sep	2-Sep	2-Sep								
PM Size(µm)	2.5	2.5	2.5								
Total Air Volume (m3)	24.1	24	24.003								
Units	µg/M3	µg/M3	µg/M3								
Particulate Matter (µg)	69	186	106								
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg)	(µg)	(µg)					
Aluminum	0.0202	0.0454	0.0145	1.145429431	0.486982313	0.0137					
Arsenic	<0.000207	<0.000208	<0.000208	<	<	<0.000207					
Barium	0.000590	0.00275	0.000433	0.007946091	0.014225625	0.000218					
Beryllium	<0.000207	<0.000208	<0.000208	<	<	<0.000207					
Boron	<0.00830	<0.00833	<0.00833	0.241772166	<	<0.00830					
Cadmium	<0.000207	<0.000208	<0.000208	<	<	<0.000207					
Chromium	0.00427	0.00358	0.00325	<	0.102908156	0.00172					
Cobalt	0.000819	0.00108	0.00214	0.022821291	0.019739719	0.000725					
Copper	0.0267	0.00297	0.00110	0.019413106	0.643674844	0.000888					
Lead	0.000289	0.000406	0.000250	<	0.006976031	0.000223					
Manganese	0.00536	0.00637	0.00307	0.185784488	0.129157594	0.00191					
Molybdenum	<0.0000830	<0.0000833	<0.0000833	0.01442775	<	<0.0000830					
Nickel	0.000858	<0.000833	0.000975	<	0.020689219	<0.000830					
Silver	<0.0000830	<0.0000833	<0.0000833	<	<	<0.0000830					
Strontium	0.000349	0.000442	<0.000208	<	0.008419594	<0.000207					
Titanium	<0.000830	<0.000833	<0.000833	<	<	<0.000830					
Uranium	<0.0000830	<0.0000833	<0.0000833	<	<	<0.0000830					
Vanadium (corr)	0.00102	0.00150	0.00129	0.041366344	0.024582188	<0.000830					
Zinc	0.0121	0.0147	0.00729	0.197255709	0.292099219	0.0247					
Iron	0.0620	0.124	0.0372	0.404268047	1.494281438	0.0944					
Phosphorus	<0.207	<0.208	<0.208	<	<	<0.207					

Station #	AMS 1	AMS 7	AMS 14	AMS 12	AMS 13	AMS 15	AMS 16	Travel Blank
Station Name	Fort McKay	Athabasca Valley	Anzac	Millenium	Fort McKay South	CNRL Horizon	Shell Muskeg River	
Sample Date	2-Sep	2-Sep	2-Sep	2-Sep	2-Sep	2-Sep	2-Sep	2-Sep
PM Size(µm)	10	10	10	10	10	10	10	10
Total Air Volume (m3)	24.1	24	24	24	24	24	24	24
Units	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3
Particulate Matter (µg)	197	408	252	364	141	180	304	15
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)
Aluminum	0.0743	0.261	0.0683	0.0817	0.0339	0.0372	0.142	0.0128
Arsenic	<0.000207	0.000224	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208
Barium	0.00146	0.0105	0.00159	0.00234	0.000775	0.000867	0.00282	0.000228
Beryllium	<0.000207	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208
Boron	<0.00830	<0.00833	<0.00833	<0.00833	<0.00833	0.0106	0.0101	<0.00833
Cadmium	<0.000207	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208
Chromium	0.00426	0.00485	0.00409	0.00368	0.00412	0.00396	0.00499	0.00343
Cobalt	0.000754	0.00107	0.00125	0.00129	0.00193	0.00158	0.00252	0.000561
Copper	0.133	0.00619	0.00124	0.00282	0.0236	0.00119	0.0220	0.000774
Lead	0.000373	0.000586	0.000387	0.000406	0.000308	0.000328	0.00127	<0.000208
Manganese	0.0130	0.0167	0.00491	0.0101	0.00302	0.00438	0.0137	0.00908
Molybdenum	<0.0000830	<0.0000833	<0.0000833	0.000105	<0.0000833	<0.0000833	<0.0000833	0.000278
Nickel	<0.000830	0.00151	0.000868	0.00117	<0.000833	<0.000833	0.00140	<0.000833
Silver	<0.0000830	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833
Strontium	0.000928	0.00216	0.000493	0.0274	0.000368	0.000322	0.00173	<0.000208
Titanium	<0.000830	0.00661	<0.000833	0.00351	<0.000833	<0.000833	0.00367	<0.000833
Uranium	<0.0000830	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833
Vanadium (corr)	0.00141	0.00257	0.00173	0.00286	0.00114	0.00105	0.00167	<0.000833
Zinc	0.0172	0.0275	0.00878	0.0158	0.0105	0.00774	0.0230	0.00577
Iron	0.253	0.852	0.243	0.364	0.0886	0.108	0.612	0.146



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Station #	AMS 1	AMS 6	AMS 7	AMS 14	MDL	Lab Blank	Travel Blank			
Station Name	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac						
Sample Date	8-Sep	8-Sep	8-Sep	8-Sep						
PM Size(µm)	2.5	2.5	2.5	2.5						
Total Air Volume (m3)	24	24	24	24						
Units	µg/M3	µg/M3	µg/M3	µg/M3						
Particulate Matter (µg)	35	104	119	48						
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)	(µg)	(µg)			
Aluminum	0.0579	0.0283	0.0847	0.0258	1.145429431	1.389926813	0.0619			
Arsenic	0.000333	0.000232	<0.000208	<0.000208	<	0.007983563	<0.000208			
Barium	0.000570	0.000853	0.00239	0.000254	0.007946091	0.013675219	0.000270			
Beryllium	<0.000208	<0.000208	<0.000208	<0.000208	<	<	<0.000208			
Boron	<0.00833	0.0109	<0.00833	<0.00833	0.241772166	<	0.0100			
Cadmium	<0.000208	<0.000208	<0.000208	<0.000208	<	<	<0.000208			
Chromium	0.00347	0.00336	0.00422	0.00350	<	0.083181656	0.00352			
Cobalt	0.000578	0.000496	0.000423	0.00104	0.022821291	0.013877719	0.00149			
Copper	0.00116	0.00263	0.00224	0.00345	0.019413106	0.027933563	0.00121			
Lead	<0.000208	0.000425	0.000265	0.000234	<	<	<0.000208			
Manganese	0.00567	0.0977	0.00942	0.00245	0.185784488	0.136034438	0.0659			
Molybdenum	0.000493	0.00106	0.000260	0.000120	0.01442775	0.011833688	0.000275			
Nickel	<0.000833	<0.000833	0.00100	<0.000833	<	<	0.00130			
Silver	<0.000833	<0.000833	<0.000833	<0.000833	<	<	<0.000833			
Strontium	<0.000208	0.000310	0.000499	<0.000208	<	<	0.000267			
Titanium	<0.000833	<0.000833	<0.000833	<0.000833	<	<	<0.000833			
Uranium	<0.000833	<0.000833	<0.000833	<0.000833	<	<	<0.000833			
Vanadium (corr)	0.000902	0.00172	0.00167	0.00132	0.041366344	0.021642563	0.00178			
Zinc	0.00703	0.0141	0.0131	0.00706	0.197255709	0.1687725	0.0118			
Iron	0.0586	0.105	0.273	0.0226	0.404268047	1.406876531	0.0133			
Phosphorus	<0.208	<0.208	<0.208	<0.208	<	<	<0.208			

Station #	AMS 1	AMS 6	AMS 7	AMS 14	AMS 12	AMS 13	AMS 15	AMS 16	Travel Blank
Station Name	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac	Millenium	Fort McKay South	CNRL Horizon	Shell Muskeg River	
Sample Date	8-Sep	8-Sep	8-Sep	8-Sep	8-Sep	8-Sep	8-Sep	8-Sep	8-Sep
PM Size(µm)	10	10	10	10	10	10	10	10	10
Total Air Volume (m3)	24	24	24	24	24	24	24	24	24
Units	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3
Particulate Matter (µg)	143	196	698	75	211	108	87	574	9
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)
Aluminum	0.0862	0.275	4.56	0.0294	0.126	0.0662	0.0453	0.446	7.26
Arsenic	0.000231	0.000661	0.00159	<0.000208	<0.000208	<0.000208	<0.000208	0.000359	0.00325
Barium	0.00153	0.00237	0.0220	0.000593	0.00272	0.00155	0.000936	0.00566	0.0237
Beryllium	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208
Boron	<0.00833	<0.00833	<0.00833	<0.00833	<0.00833	<0.00833	0.0124	0.0133	0.0200
Cadmium	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	0.000248
Chromium	0.00421	0.00442	0.00795	0.00348	0.00380	0.00446	0.00392	0.00411	0.00932
Cobalt	0.00432	0.000657	0.00537	0.00223	0.000952	0.000693	0.000644	0.00145	0.0110
Copper	0.00222	0.00170	0.0104	0.00249	0.00170	0.00208	0.000871	0.00604	0.0272
Lead	<0.000208	0.000350	0.00239	0.000242	0.000509	0.000878	<0.000208	0.000623	0.00362
Manganese	0.0211	0.00860	0.0416	0.00457	0.0211	0.00673	0.00572	0.0285	0.0430
Molybdenum	0.000720	0.000275	0.00293	0.000162	0.000122	0.000176	0.000236	0.000386	0.00623
Nickel	<0.000833	0.00185	0.0377	<0.000833	0.00103	0.000864	<0.000833	0.00192	0.0911
Silver	<0.000833	<0.000833	0.000303	<0.000833	<0.000833	<0.000833	<0.000833	<0.000833	0.000345
Strontium	0.00106	0.00116	0.00854	0.000243	0.00122	0.000626	0.000461	0.00329	0.0108
Titanium	0.00405	0.00337	0.0856	<0.000833	0.00229	0.00107	<0.000833	0.0158	0.160
Uranium	<0.000833	<0.000833	0.000151	<0.000833	<0.000833	<0.000833	<0.000833	<0.000833	0.000259
Vanadium (corr)	0.00124	0.00462	0.104	0.000959	0.00141	0.00112	0.00113	0.00372	0.251
Zinc	0.0106	0.00994	0.0237	0.0105	0.0128	0.0142	0.0211	0.0238	0.0228
Iron	0.331	0.419	2.49	0.0632	0.627	0.304	0.194	1.36	0.727



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Station #	AMS 1	AMS 7	AMS 14	MDL	Lab Blank	Travel Blank
Station Name	Fort McKay	Athabasca Valley	Anzac			
Sample Date	14-Sep	14-Sep	14-Sep			14-Sep
PM Size(µm)	2.5	2.5	2.5			2.5
Total Air Volume (m3)	24.1	24	24			24
Units	µg/M3	µg/M3	µg/M3			µg/M3
Particulate Matter (µg)	219	374	183			0
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg)	(µg)	(µg)
Aluminum	0.0432	0.192	0.0331	1.145429431	1.041478969	0.0168
Arsenic	0.000600	0.000564	<0.000208	<	0.014469094	<0.000208
Barium	0.00128	0.00788	0.00137	0.007946091	0.030920344	0.000440
Beryllium	<0.000207	<0.000208	<0.000208	<	<	<0.000208
Boron	0.0190	<0.00833	<0.00833	0.241772166	0.45686175	0.0152
Cadmium	<0.000207	<0.000208	<0.000208	<	<	<0.000208
Chromium	0.00348	0.00354	0.00327	<	0.083831063	0.00392
Cobalt	0.000649	0.000763	0.000772	0.022821291	0.015639188	0.000930
Copper	0.00192	0.00485	0.00247	0.019413106	0.046307719	0.000719
Lead	0.000549	0.000871	0.00125	<	0.013228594	<0.000208
Manganese	0.00628	0.0393	0.0107	0.185784488	0.151279688	0.00227
Molybdenum	0.000748	0.000350	0.000341	0.01442775	0.018022313	0.000456
Nickel	0.00180	0.00100	0.000910	<	0.0433275	<0.000833
Silver	<0.0000830	<0.0000833	<0.0000833	<	<	<0.0000833
Strontium	0.000482	0.00131	0.000361	<	0.011609719	<0.000208
Titanium	<0.000830	0.00601	<0.000833	<	<	<0.000833
Uranium	0.000133	<0.0000833	<0.0000833	<	0.003203156	<0.0000833
Vanadium (corr)	0.00154	0.00148	0.00109	0.041366344	0.037099313	0.000888
Zinc	0.0148	0.0189	0.0164	0.197255709	0.355889438	0.00789
Iron	0.118	0.666	0.172	0.404268047	2.841118125	0.0383
Phosphorus	<0.207	<0.208	<0.208	<	<	<0.208

Station #	AMS 1	AMS 6	AMS 7	AMS 14	AMS 12	AMS 13	AMS 15	AMS 16	Travel Blank
Station Name	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac	Millenium	Fort McKay South	CNRL Horizon	Shell Muskeg River	
Sample Date	14-Sep	14-Sep	14-Sep	14-Sep	14-Sep	14-Sep	14-Sep	14-Sep	14-Sep
PM Size(µm)	10	10	10	10	10	10	10	10	10
Total Air Volume (m3)	24.1	24	24	24	24	24	24	24	24
Units	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3
Particulate Matter (µg)	542	265	710	240	28	365	425	940	<
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)
Aluminum	0.257	0.414	0.479	0.160	0.0370	0.130	0.271	0.439	0.0137
Arsenic	0.000532	0.000347	0.000975	0.000305	<0.000208	0.000422	0.000343	0.000610	<0.000208
Barium	0.00538	0.00572	0.0176	0.00370	0.000555	0.00356	0.00438	0.00939	0.000616
Beryllium	<0.000207	0.00122	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208
Boron	0.0135	0.0389	<0.00833	<0.00833	<0.00833	<0.00833	<0.00833	0.0170	0.0131
Cadmium	<0.000207	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208
Chromium	0.00518	0.00919	0.00448	0.00402	0.00261	0.00343	0.00316	0.00486	0.00247
Cobalt	0.00117	0.00225	0.000867	0.00105	0.000520	0.00111	0.00648	0.00176	0.000610
Copper	0.0105	0.00470	0.00927	0.00279	0.00238	0.0167	0.00140	0.00280	0.000506
Lead	0.000746	0.00223	0.00135	0.00134	<0.000208	0.000418	0.000481	0.000911	<0.000208
Manganese	0.0206	0.0165	0.0302	0.00757	0.00386	0.0125	0.0136	0.0484	0.00332
Molybdenum	0.000618	0.00142	0.000579	0.000248	0.0000930	0.000942	0.000325	0.000811	0.000783
Nickel	0.00977	0.00261	0.00155	0.00215	<0.000833	0.00120	0.00135	0.00207	<0.000833
Silver	<0.0000830	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833
Strontium	0.00268	0.00170	0.00328	0.000621	0.000233	0.00142	0.00216	0.00542	<0.000208
Titanium	0.00841	0.00520	0.0185	0.00222	<0.000833	0.00282	0.00734	0.0164	<0.000833
Uranium	<0.0000830	0.00138	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833
Vanadium (corr)	0.00323	0.00829	0.00249	0.00227	<0.000833	0.00208	0.00359	0.00410	<0.000833
Zinc	0.0188	0.0364	0.0324	0.0121	0.0112	0.0157	0.0385	0.0272	0.00461
Iron	0.922	0.751	1.77	0.416	0.0651	0.492	0.561	2.44	0.0325



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Station #	AMS 1	AMS 6	AMS 7	AMS 14	MDL	Lab Blank	Travel Blank			
Station Name	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac						
Sample Date	20-Sep	20-Sep	20-Sep	20-Sep						
PM Size(µm)	2.5	2.5	2.5	2.5						
Total Air Volume (m3)	24.1	24	24	24						
Units	µg/M3	µg/M3	µg/M3	µg/M3						
Particulate Matter (µg)	68	54	120	34						
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)	(µg)	(µg)	(µg)	(µg)	(µg)
Aluminum	0.0806	0.0250	0.0682	0.0183	1.145429431	1.941937969	0.0242			
Arsenic	0.000217	<0.000208	0.000705	<0.000208	<	0.005235281	<0.000208			
Barium	0.000648	0.000657	0.00282	0.000504	0.007946091	0.0156105	0.000863			
Beryllium	<0.000207	<0.000208	<0.000208	<0.000208	<	<	<0.000208			
Boron	<0.00830	<0.00833	<0.00833	<0.00833	0.241772166	<	<0.00833			
Cadmium	<0.000207	<0.000208	<0.000208	<0.000208	<	<	<0.000208			
Chromium	0.00442	0.00502	0.00193	0.00513	<	0.106434656	0.00102			
Cobalt	0.000397	0.000984	0.000581	0.000494	0.022821291	0.009570281	0.000458			
Copper	0.000979	0.00557	0.00444	0.000841	0.019413106	0.023586656	0.00325			
Lead	0.000252	0.000407	0.00110	0.000221	<	0.006068156	<0.000208			
Manganese	0.0121	0.00641	0.0103	0.00317	0.185784488	0.291045375	0.00258			
Molybdenum	<0.0000830	0.000269	0.000243	0.000341	0.01442775	<	0.000604			
Nickel	<0.000830	0.0115	0.00584	<0.000833	<	<	<0.000833			
Silver	<0.0000830	<0.0000833	<0.0000833	<0.0000833	<	<	<0.0000833			
Strontium	0.000433	<0.000208	0.000453	<0.000208	<	0.010426875	0.000228			
Titanium	<0.000830	<0.000833	0.00198	<0.000833	<	<	<0.000833			
Uranium	<0.0000830	<0.0000833	<0.0000833	<0.0000833	<	<	<0.0000833			
Vanadium (corr)	0.00116	0.00117	<0.000833	0.00125	0.041366344	0.0279405	<0.000833			
Zinc	0.00763	0.0103	0.0121	0.0103	0.197255709	0.183971063	0.00956			
Iron	0.0920	0.0635	0.196	0.0605	0.404268047	2.216821406	0.0117			
Phosphorus	<0.207	<0.208	<0.208	<0.208	<	<	<0.208			

Station #	AMS 1	AMS 6	AMS 7	AMS 14	AMS 12	AMS 13	AMS 15	AMS 16	Travel Blank
Station Name	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac	Millenium	Fort McKay South	CNRL Horizon	Shell Muskeg River	
Sample Date	20-Sep	20-Sep	20-Sep	20-Sep	20-Sep	20-Sep	20-Sep	20-Sep	20-Sep
PM Size(µm)	10	10	10	10	10	10	10	10	10
Total Air Volume (m3)	24.1	24	24	24.002	24	24	24	24	24.002
Units	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3
Particulate Matter (µg)	267	108	305	117	392	190	141	347	1
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)
Aluminum	0.186	0.0457	0.247	0.0419	0.223	0.0987	0.200	0.231	0.0185
Arsenic	0.000300	<0.000208	0.000794	<0.000208	0.000252	<0.000208	<0.000208	<0.000208	<0.000208
Barium	0.00352	0.00161	0.00838	0.000922	0.00421	0.00143	0.00193	0.00460	0.000237
Beryllium	<0.000207	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208
Boron	<0.00830	<0.00833	<0.00833	<0.00833	<0.00833	<0.00833	<0.00833	<0.00833	<0.00833
Cadmium	<0.000207	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208
Chromium	0.00546	0.00436	0.00472	0.00464	0.00590	0.00534	0.00434	0.00443	0.00362
Cobalt	0.000724	0.000302	0.000511	0.000430	0.000822	0.000375	0.000591	0.000716	0.000389
Copper	0.00222	0.00263	0.00961	0.00121	0.00244	0.0470	0.00100	0.00171	0.00344
Lead	0.000459	0.000314	0.00124	0.000322	0.000581	0.000469	0.000255	0.000514	<0.000208
Manganese	0.0121	0.0188	0.0153	0.00346	0.0206	0.00674	0.00952	0.0209	0.00256
Molybdenum	<0.0000830	0.000183	0.000275	0.000391	0.00104	0.00141	0.000541	0.000779	0.00205
Nickel	0.00117	<0.000833	0.000900	<0.000833	0.00159	0.00106	<0.000833	0.00106	<0.000833
Silver	<0.0000830	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833
Strontium	0.00194	0.000392	0.00152	0.000298	0.00236	0.000764	0.000894	0.00210	<0.000208
Titanium	0.00249	<0.000833	0.00564	<0.000833	0.00554	<0.000833	<0.000833	0.00677	<0.000833
Uranium	<0.0000830	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833
Vanadium (corr)	0.00203	0.00112	0.00174	0.00127	0.00222	0.00147	0.00130	0.00206	0.000837
Zinc	0.0135	0.0225	0.0177	0.00635	0.0156	0.0130	0.00827	0.0119	0.00593
Iron	0.594	0.144	0.749	0.110	0.948	0.246	0.250	1.20	0.0130





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Station #	AMS 1	AMS 6	AMS 7	AMS 14	MDL	Lab Blank	Travel Blank			
Station Name	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac						
Sample Date	26-Sep	26-Sep	26-Sep	26-Sep						
PM Size(µm)	2.5	2.5	2.5	2.5						
Total Air Volume (m3)	24.1	24	24	24						
Units	µg/M3	µg/M3	µg/M3	µg/M3						
Particulate Matter (µg)	21	26	13	5						
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)	(µg)	(µg)			
Aluminum	0.0287	0.0358	0.0200	0.0188	1.145429431	0.692674219	2.853928688			
Arsenic	0.000266	<0.000208	<0.000208	<0.000208	<	0.006407813	<0.000208			
Barium	0.000543	0.00124	0.000542	0.000388	0.007946091	0.013094063	0.053755875			
Beryllium	<0.000207	<0.000208	<0.000208	<0.000208	<	<	<0.000208			
Boron	<0.00830	<0.00833	<0.00833	<0.00833	0.241772166	<	<0.00833			
Cadmium	<0.000207	<0.000208	<0.000208	<0.000208	<	<	<0.000208			
Chromium	0.00305	0.00423	0.00133	0.00333	<	0.073529906	0.401112			
Cobalt	0.000531	0.000332	0.000222	0.000432	0.022821291	0.0128085	0.030333938			
Copper	0.00125	0.00130	0.000797	0.00113	0.019413106	0.030090469	<0.000417			
Lead	0.000260	<0.000208	<0.000208	<0.000208	<	0.006274406	<0.000208			
Manganese	0.0136	0.0141	0.00494	0.00136	0.185784488	0.327843563	0.26862075			
Molybdenum	0.000215	0.000223	0.0000981	0.000355	0.01442775	0.005174531	0.144959063			
Nickel	0.00232	0.00145	<0.000833	0.00304	<	0.055974281	<0.000833			
Silver	<0.0000830	<0.0000833	<0.0000833	<0.0000833	<	<	<0.0000833			
Strontium	0.000292	0.000272	<0.000208	<0.000208	<	0.007033875	<0.000208			
Titanium	<0.000830	<0.000833	<0.000833	<0.000833	<	<	0.145625625			
Uranium	<0.0000830	<0.0000833	<0.0000833	<0.0000833	<	<	<0.0000833			
Vanadium (corr)	0.000887	0.00117	<0.000833	0.000884	0.041366344	0.021380719	<0.000833			
Zinc	0.00948	0.0132	0.00855	0.00906	0.197255709	0.228348563	1.274722313			
Iron	0.0185	0.0636	0.0218	0.0138	0.404268047	0.444732094	4.203620438			
Phosphorus	<0.207	<0.208	<0.208	<0.208	<	<	<0.208			

Station #	AMS 1	AMS 6	AMS 7	AMS 14	AMS 12	AMS 13	AMS 15	AMS 16	Travel Blank
Station Name	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac	Millenium	Fort McKay South	CNRL Horizon	Shell Muskeg River	
Sample Date	26-Sep	26-Sep	26-Sep	26-Sep	26-Sep	26-Sep	26-Sep	26-Sep	26-Sep
PM Size(µm)	10	10	10	10	10	10	10	10	10
Total Air Volume (m3)	24.1	24	24	23.99	24	24	24	24	24
Units	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3
Particulate Matter (µg)	76	18	52	37	49	49	23	49	8
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)
Aluminum	0.0486	0.0660	0.0374	0.0219	0.0353	0.0312	0.0171	0.0530	0.808265531
Arsenic	<0.000207	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208
Barium	0.000854	0.00206	0.00115	0.000276	0.00108	0.000798	0.000291	0.000675	0.037582875
Beryllium	<0.000207	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208
Boron	<0.00830	<0.00833	<0.00833	<0.00834	<0.00833	<0.00833	<0.00833	<0.00833	<0.00833
Cadmium	<0.000207	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208
Chromium	0.00386	0.00431	0.00296	0.00296	0.00302	0.00320	0.00457	0.00347	0.178213219
Cobalt	0.000800	0.000370	0.000203	0.000266	0.000187	0.000245	0.000140	0.00113	0.011644313
Copper	0.00106	0.00177	0.00118	0.00249	0.000899	0.0108	0.000591	0.00636	0.041082469
Lead	<0.000207	0.000379	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208	<0.000208
Manganese	0.00751	0.00423	0.00399	0.00201	0.00566	0.00468	0.00596	0.00308	0.196178625
Molybdenum	0.000245	0.000252	0.000166	0.000233	0.000214	0.000543	0.000900	0.000591	0.091884375
Nickel	0.000938	0.00157	<0.000833	<0.000834	<0.000833	<0.000833	<0.000833	0.0195	<0.000833
Silver	<0.0000830	<0.0000833	<0.0000833	<0.0000834	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833
Strontium	0.000479	0.000551	0.000265	<0.000208	0.000303	0.000268	<0.000208	0.000816	<0.000208
Titanium	<0.000830	<0.000833	<0.000833	<0.000834	<0.000833	<0.000833	<0.000833	<0.000833	<0.000833
Uranium	<0.0000830	<0.0000833	<0.0000833	<0.0000834	<0.0000833	<0.0000833	<0.0000833	<0.0000833	<0.0000833
Vanadium (corr)	0.00114	0.00122	<0.000833	<0.000834	0.000864	0.000919	0.00112	0.000942	<0.000833
Zinc	0.0107	0.0178	0.0269	0.0371	0.0146	0.00872	0.00761	0.00659	0.568877063
Iron	0.102	0.0577	0.0550	0.0169	0.0572	0.0475	0.0606	0.108	1.490359219



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Station #	AMS 1	AMS 7	AMS 14	MDL	Lab Blank	Travel Blank
Station Name	Fort McKay	Athabasca Valley	Anzac			
Sample Date	2-Sep	2-Sep	2-Sep			2-Sep
PM Size(µm)	2.5	2.5	2.5			2.5
Total Air Volume (m3)	24.1	24	24.003			24.1
Particulate Matter (µg)	µg/M3	µg/M3	µg/M3			µg/M3
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg)	(µg)	(µg)
Chloride	<0.0166	0.0192	<0.0167	0.4	0.3201642	<0.0166
Nitrate	0.0571	0.0711	0.0620	0.2	1.277654249	0.0677
Sulphate	0.186	1.28	1.11	1	0	<0.0415
Ammonium (as N)	0.113	0.499	0.473	0.5	<	<0.0207
Calcium	0.104	0.124	<0.0833	2	0.4881754	<0.0830
Magnesium	<0.0415	<0.0417	<0.0417	1	<	<0.0415
Potassium	0.0124	0.0555	0.0336	0.2	<	<0.00830

Station #	AMS 1	AMS 7	AMS 14	AMS 12	AMS 13	AMS 15	AMS 16	Travel Blank
Station Name	Fort McKay	Athabasca Valley	Anzac	Millenium	Fort McKay South	CNRL Horizon	Shell Muskeg River	
Sample Date	41884	41884	41884	41884	41884	41884	41884	41884
PM Size(µm)	10	10	10	10	10	10	10	10
Total Air Volume (m3)	24.1	24	24	24	24	24	24	24
Particulate Matter (µg)	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)
Chloride	<0.0166	0.0290	0.0175	0.0168	0.0178	<0.0167	0.0172	<0.0167
Nitrate	0.0775	0.123	0.102	0.130	0.0735	0.0743	0.110	0.0593
Sulphate	0.242	1.27	1.09	3.51	0.187	0.205	0.307	<0.0417
Ammonium (as N)	0.0970	0.460	0.478	1.13	0.0931	0.103	0.140	<0.0208
Calcium	0.564	0.978	0.170	0.457	0.151	0.110	0.753	<0.0833
Magnesium	<0.0415	0.0671	<0.0417	<0.0417	<0.0417	<0.0417	<0.0417	<0.0417
Potassium	0.0213	0.0874	0.0743	0.169	0.0371	0.0325	0.0200	<0.00833



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Station #	AMS 1	AMS 6	AMS 7	AMS 14	MDL	Lab Blank	Travel Blank
Station Name	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac			
Sample Date	8-Sep	8-Sep	8-Sep	8-Sep			8-Sep
PM Size(µm)	2.5	2.5	2.5	2.5			2.5
Total Air Volume (m3)	24	24	24	24			24
Particulate Matter (µg)	µg/M3	µg/M3	µg/M3	µg/M3			µg/M3
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)	(µg)	(µg)
Chloride	0.0265	0.0277	0.0474	0.0287	0.4	0.3201642	0.0276
Nitrate	0.0696	0.0854	0.121	0.0822	0.2	1.277654249	0.0692
Sulphate	0.0984	1.16	0.368	0.253	1	0	0.846
Ammonium (as N)	0.0285	0.505	0.159	0.117	0.5	<	<0.0208
Calcium	0.126	<0.0833	0.211	<0.0833	2	0.4881754	0.0967
Magnesium	<0.0417	<0.0417	<0.0417	<0.0417	1	<	<0.0417
Potassium	<0.00833	0.0271	0.0264	<0.00833	0.2	<	<0.00833

Station #	AMS 1	AMS 6	AMS 7	AMS 14	AMS 12	AMS 13	AMS 15	AMS 16	Travel Blank
Station Name	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac	Millenium	Fort McKay South	CNRL Horizon	Shell Muskeg River	
Sample Date	41890	41890	41890	41890	41890	41890	41890	41890	41890
PM Size(µm)	10	10	10	10	10	10	10	10	10
Total Air Volume (m3)	24	24	24	24	24	24	24	24	24
Particulate Matter (µg)	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)
Chloride	0.0476	0.0428	0.0671	0.0441	0.0589	0.0471	0.0385	0.0663	0.0271
Nitrate	0.0858	0.100	0.166	0.0826	0.0976	0.0909	0.0806	0.0949	0.0557
Sulphate	0.275	0.516	0.434	0.153	0.746	0.116	0.202	0.223	<0.0417
Ammonium (as N)	0.0516	0.223	0.145	0.0435	0.0483	0.0299	0.0852	0.0412	<0.0208
Calcium	0.742	0.403	1.43	0.114	0.557	0.315	0.132	1.20	0.0885
Magnesium	<0.0417	<0.0417	0.154	<0.0417	<0.0417	<0.0417	<0.0417	0.0984	<0.0417
Potassium	0.0131	0.0188	0.0294	0.0165	<0.00833	0.00875	<0.00833	0.0132	<0.00833



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Station #	AMS 1	AMS 7	AMS 14	MDL	Lab Blank	Travel Blank
Station Name	Fort McKay	Athabasca Valley	Anzac			
Sample Date	14-Sep	14-Sep	14-Sep			14-Sep
PM Size(µm)	2.5	2.5	2.5			2.5
Total Air Volume (m3)	24.1	24	24			24
Particulate Matter (µg)	µg/M3	µg/M3	µg/M3			µg/M3
Unit	219 (µg/m3)	374 (µg/m3)	183 (µg/m3)	(µg)	(µg)	0 (µg)
Chloride	0.0251	0.0340	0.0292	0.4	0.3201642	0.0255
Nitrate	0.0925	0.114	0.0751	0.2	1.277654249	0.0640
Sulphate	0.982	0.494	0.394	1	0	<0.0417
Ammonium (as N)	0.447	0.260	0.234	0.5	<	<0.0208
Calcium	0.220	0.493	0.0905	2	0.4881754	<0.0833
Magnesium	<0.0415	0.0647	<0.0417	1	<	<0.0417
Potassium	0.0534	0.0647	0.0402	0.2	<	<0.00833

Station #	AMS 1	AMS 6	AMS 7	AMS 14	AMS 12	AMS 13	AMS 15	AMS 16	Travel Blank
Station Name	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac	Millenium	Fort McKay South	CNRL Horizon	Shell Muskeg River	
Sample Date	41896	41896	41896	41896	41896	41896	41896	41896	41896
PM Size(µm)	10	10	10	10	10	10	10	10	10
Total Air Volume (m3)	24.1	24	24	24	24	24	24	24	24
Particulate Matter (µg)	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3
Unit	542 (µg/m3)	265 (µg/m3)	710 (µg/m3)	240 (µg/m3)	28 (µg/m3)	365 (µg/m3)	425 (µg/m3)	940 (µg/m3)	< (µg)
Chloride	0.0369	0.0391	0.0604	0.0291	0.0259	0.0366	0.0304	0.0531	0.0268
Nitrate	0.176	0.104	0.161	0.0933	0.0636	0.124	0.102	0.169	0.0577
Sulphate	1.08	0.358	0.591	0.411	0.0487	0.867	0.684	1.44	<0.0417
Ammonium (as N)	0.420	0.217	0.246	0.333	<0.0208	0.368	0.340	0.439	<0.0208
Calcium	1.02	0.404	1.17	0.208	0.135	0.542	0.336	2.32	<0.0833
Magnesium	0.0438	0.0530	0.137	<0.0417	<0.0417	<0.0417	0.0456	0.111	<0.0417
Potassium	0.0729	0.0380	0.0687	0.0805	<0.00833	0.0614	0.0640	0.0576	<0.00833



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Station #	AMS 1	AMS 6	AMS 7	AMS 14	MDL	Lab Blank	Travel Blank
Station Name	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac			
Sample Date	20-Sep	20-Sep	20-Sep	20-Sep			20-Sep
PM Size(µm)	2.5	2.5	2.5	2.5			2.5
Total Air Volume (m3)	24.1	24	24	24			24
Particulate Matter (µg)	µg/M3	µg/M3	µg/M3	µg/M3			µg/M3
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)	(µg)	(µg)
Chloride	0.0168	<0.0167	<0.0167	<0.0167	0.4	0.3201642	0.0220
Nitrate	0.0669	0.0581	0.0862	0.0569	0.2	1.277654249	0.0905
Sulphate	0.200	0.233	0.158	0.143	1	0	<0.0417
Ammonium (as N)	0.0745	0.0737	0.0789	0.0498	0.5	<	0.0252
Calcium	0.129	0.119	0.136	<0.0833	2	0.4881754	<0.0833
Magnesium	<0.0415	<0.0417	<0.0417	<0.0417	1	<	<0.0417
Potassium	<0.00830	0.0232	0.0191	<0.00833	0.2	<	<0.00833

Station #	AMS 1	AMS 6	AMS 7	AMS 14	AMS 12	AMS 13	AMS 15	AMS 16	Travel Blank
Station Name	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac	Millenium	Fort McKay South	CNRL Horizon	Shell Muskeg River	
Sample Date	41902	41902	41902	41902	41902	41902	41902	41902	41902
PM Size(µm)	10	10	10	10	10	10	10	10	10
Total Air Volume (m3)	24.1	24	24	24.002	24	24	24	24	24.002
Particulate Matter (µg)	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)
Chloride	0.0205	0.0184	0.0335	0.0213	0.0739	0.0169	0.0237	0.0446	<0.0167
Nitrate	0.0618	0.0648	0.0814	0.106	0.0850	0.0786	0.0794	0.101	0.0672
Sulphate	0.204	0.171	0.203	0.188	0.373	0.166	0.235	0.255	<0.0417
Ammonium (as N)	0.0825	0.0572	0.0726	0.0642	0.0954	0.0696	0.0852	0.0762	<0.0208
Calcium	0.395	0.134	0.489	0.117	0.873	0.134	0.132	0.687	<0.0833
Magnesium	<0.0415	<0.0417	0.0590	<0.0417	0.0608	<0.0417	<0.0417	0.0448	<0.0417
Potassium	0.0192	0.00839	0.0348	0.0178	0.0185	0.0320	0.0217	0.0287	<0.00833



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION  
Particulate Matter - Ions

2014  
Indicated Sites and Dates

Station #	AMS 1	AMS 6	AMS 7	AMS 14	MDL	Lab Blank	Travel Blank		
Station Name	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac					
Sample Date	26-Sep	26-Sep	26-Sep	26-Sep				26-Sep	
PM Size(µm)	2.5	2.5	2.5	2.5				2.5	
Total Air Volume (m3)	24.1	24	24	24				24	
Particulate Matter (µg)	µg/M3	µg/M3	µg/M3	µg/M3				µg/M3	
Unit	21	26	13	5				4	
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)	(µg)		(µg)	
Chloride	<0.0166	<0.0167	<0.0167	<0.0167	0.4	0.3201642		<0.0167	
Nitrate	0.0720	0.0743	0.0668	0.0668	0.2	1.277654249		0.067186718	
Sulphate	0.0544	0.115	0.0498	0.610	1	0		<0.0417	
Ammonium (as N)	<0.0207	<0.0208	<0.0208	<0.0208	0.5	<		<0.0208	
Calcium	<0.0830	<0.0833	<0.0833	<0.0833	2	0.4881754		<0.0833	
Magnesium	<0.0415	<0.0417	<0.0417	<0.0417	1	<		<0.0417	
Potassium	<0.00830	<0.00833	<0.00833	0.239	0.2	<		<0.00833	

Station #	AMS 1	AMS 6	AMS 7	AMS 14	AMS 12	AMS 13	AMS 15	AMS 16	Travel Blank
Station Name	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac	Millenium	Fort McKay South	CNRL Horizon	Shell Muskeg River	
Sample Date	41908	41908	41908	41908	41908	41908	41908	41908	41908
PM Size(µm)	10	10	10	10	10	10	10	10	10
Total Air Volume (m3)	24.1	24	24	23.99	24	24	24	24	24
Particulate Matter (µg)	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3	µg/M3
Unit	76	18	52	37	49	49	23	49	8
Unit	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg/m3)	(µg)
Chloride	<0.0166	0.0418	0.0187	0.0186	0.0228	<0.0167	<0.0167	0.0219	<0.0167
Nitrate	0.0724	0.0929	0.0834	0.0664	0.0794	0.0700	0.0617	0.0822	0.060468046
Sulphate	0.0776	0.147	1.08	0.352	0.0692	0.0444	<0.0417	0.247	<0.0417
Ammonium (as N)	<0.0207	0.0307	<0.0208	<0.0208	<0.0208	<0.0208	<0.0208	<0.0208	<0.0208
Calcium	0.174	0.131	0.0889	<0.0834	0.0949	0.108	<0.0833	0.170	<0.0833
Magnesium	<0.0415	<0.0417	<0.0417	<0.0417	<0.0417	<0.0417	<0.0417	<0.0417	<0.0417
Potassium	0.0136	0.0233	0.0196	0.0124	0.0174	0.0285	<0.00833	0.0138	<0.00833



Compound Name	Results (ng/m3)						
	AMS 1	AMS 6	AMS 7	AMS 14	Lab Blank	Field Blank	AMS 6 Repeat
	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac			Patricia McInnes
	02-Sep	02-Sep	02-Sep	02-Sep	02-Sep	02-Sep	02-Sep
Naphthalene	3.71	11	20.9	29.3	0.009	0.022	10.8
Acenaphthylene	1.11	0.806	0.493	0.297	0.001	0.005	0.742
Acenaphthene	0.405	0.363	0.476	12.2	0.002	<0.001	0.366
Fluorene	1.22	0.61	0.971	7.93	0.002	<0.001	0.571
Phenanthrene	2.05	1.18	1.91	7.69	0.003	0.003	1.15
Anthracene	0.474	0.105	0.235	0.43	0.001	<0.001	0.123
Acridine	0.364	0.114	0.218	0.198	0.001	0.001	0.106
Fluoranthene	0.344	0.168	0.235	0.372	0.001	0.002	0.159
Pyrene	0.825	0.174	0.328	0.205	0.001	<0.001	0.17
Benzo(c)phenanthrene	0.008	0.013	0.015	0.009	0.001	0.002	0.01
Benzo(a)anthracene	0.011	0.019	0.017	0.012	0.001	<0.001	0.019
Chrysene	0.012	0.022	0.02	0.013	0.001	<0.001	0.021
7,12-Dimethylbenz(a)anthracene	0.039	0.041	0.053	0.049	0.002	<0.001	0.043
Benzo(b)fluoranthene	0.071	0.14	0.167	0.141	0.001	<0.001	0.134
Benzo(k)fluoranthene	0.08	0.157	0.188	0.159	0.001	<0.001	0.152
Benzo(a)pyrene	0.007	0.014	0.026	0.014	0.001	<0.001	0.015
3-Methylcholanthrene	0.154	0.186	0.274	0.265	0.001	<0.001	0.177
Indeno(123-cd)pyrene	0.005	0.005	0.011	0.007	0.001	<0.001	0.006
Dibenz(a,h)anthracene	0.004	0.007	0.008	0.006	0.001	<0.001	0.007
Benzo(ghi)perylene	0.004	0.022	0.034	0.003	0.001	<0.001	0.021
Dibenzo(a,l)pyrene	<0.001	0.007	0.007	<0.001	0.001	<0.001	0.006
Dibenzo(a,i)pyrene	0.002	0.003	0.003	0.004	0.001	<0.001	0.004
Dibenzo(a,h)pyrene	0.002	0.004	0.003	0.004	0.002	<0.001	0.003



Compound Name	Results (ng/m3)						
	AMS 1	AMS 6	AMS 7	AMS 14	Lab Blank	Field Blank	AMS 6 Repeat
	Fort McKay	Patricia McInnes	Athabasca Valley	Anzac			Patricia McInnes
	08-Sep	08-Sep	08-Sep	08-Sep	08-Sep	08-Sep	08-Sep
Naphthalene	0.978	5.92	1.4	2.9	0.009	0.025	5.75
Acenaphthylene	0.029	0.283	0.038	0.022	0.001	0.004	0.254
Acenaphthene	0.189	0.533	0.137	2.13	0.002	<0.001	0.511
Fluorene	0.192	0.645	0.184	1.23	0.002	0.001	0.618
Phenanthrene	0.255	1.34	0.477	0.965	0.003	<0.001	1.34
Anthracene	0.03	0.156	0.023	0.139	0.001	<0.001	0.133
Acridine	0.023	0.155	0.038	0.015	0.001	<0.001	0.146
Fluoranthene	0.023	0.185	0.043	0.062	0.001	<0.001	0.175
Pyrene	0.032	0.216	0.08	0.033	0.001	<0.001	0.208
Benzo(c)phenanthrene	0.008	0.019	0.003	0.003	0.001	<0.001	0.023
Benzo(a)anthracene	0.005	0.032	0.006	0.004	0.001	<0.001	0.032
Chrysene	0.006	0.036	0.007	0.004	0.001	<0.001	0.037
7,12-Dimethylbenz(a)anthracene	0.012	0.022	0.007	0.008	0.002	<0.001	0.021
Benzo(b)fluoranthene	0.044	0.221	0.039	0.02	0.001	<0.001	0.218
Benzo(k)fluoranthene	0.049	0.25	0.043	0.023	0.001	<0.001	0.246
Benzo(a)pyrene	0.008	0.016	0.008	0.009	0.001	<0.001	0.016
3-Methylcholanthrene	0.133	0.162	0.073	0.081	0.001	<0.001	0.151
Indeno(123-cd)pyrene	0.005	0.005	0.004	0.006	0.001	<0.001	0.006
Dibenz(a,h)anthracene	0.004	0.013	0.006	0.006	0.001	<0.001	0.011
Benzo(ghi)perylene	0.005	0.015	0.005	0.004	0.001	<0.001	0.016
Dibenzo(a,l)pyrene	0.004	0.006	0.003	0.003	0.001	<0.001	0.006
Dibenzo(a,i)pyrene	0.005	0.002	0.003	0.004	0.001	<0.001	0.002
Dibenzo(a,h)pyrene	0.006	0.003	0.003	0.003	0.002	<0.001	0.003





Compound Name	Results (ng/m3)						
	AMS 1	AMS 6	AMS 7	AMS 14	Lab Blank	Field Blank	AMS 6 Repeat
	Fort McKay 14-Sep	Patricia McInnes 14-Sep	Athabasca Valley 14-Sep	Anzac 14-Sep	14-Sep	14-Sep	Patricia McInnes 14-Sep
Naphthalene	18.2	20.6	47.7		0.004	0.148	18.4
Acenaphthylene	1.23	0.311	4.22	1.23	0.001	0.009	0.33
Acenaphthene	2.28	0.442	1.26	40.1	0.001	0.013	0.484
Fluorene	2.71	0.876	3.17	26.9	0.002	0.042	0.911
Phenanthrene	7.31	3.51	12.7	39.4	0.003	0.031	3.58
Anthracene	0.474	0.317	0.95	1.94	0.001	0.019	0.287
Acridine	1.55	0.199	0.777	0.912	0.001	0.028	0.189
Fluoranthene	0.563	0.261	2.36	2.44	0.001	0.014	0.267
Pyrene	0.559	0.417	2.36	1.18	0.002	0.012	0.438
Benzo(c)phenanthrene	0.027	0.026	0.03	0.034	0.001	0.005	0.027
Benzo(a)anthracene	0.108	0.053	0.499	0.139	0.002	0.005	0.055
Chrysene	0.112	0.075	0.394	0.119	0.002	0.002	0.072
7,12-Dimethylbenz(a)anthracene	0.248	0.323	0.233	0.25	0.001	0.005	0.305
Benzo(b)fluoranthene	0.152	0.275	0.568	0.205	0.001	0.006	0.244
Benzo(k)fluoranthene	0.158	0.311	0.379	0.165	0.001	0.005	0.28
Benzo(a)pyrene	0.059	0.042	0.072	0.065	0.001	0.002	0.037
3-Methylcholanthrene	0.054	0.008	0.02	0.007	0.001	0.004	0.006
Indeno(123-cd)pyrene	0.016	0.035	0.055	0.061	0.001	<0.001	0.037
Dibenz(a,h)anthracene	0.018	0.01	0.049	0.027	0.001	<0.001	0.008
Benzo(ghi)perylene	0.011	0.051	0.052	0.037	0.001	0.002	0.047
Dibenzo(a,l)pyrene	0.019	0.016	0.033	0.041	0.001	<0.001	0.016
Dibenzo(a,i)pyrene	0.005	0.005	0.004	0.005	0.001	<0.001	0.004
Dibenzo(a,h)pyrene	0.008	0.009	0.006	0.006	0.001	<0.001	0.009



Compound Name	Results (ng/m3)					
	AMS 1	AMS 6	AMS 14	Lab Blank	Field Blank	AMS 6 Repeat
	Fort McKay 20-Sep	Patricia McInnes 20-Sep	Anzac 20-Sep	20-Sep	20-Sep	Patricia McInnes 20-Sep
Naphthalene	8.68	11.7	31.2	0.004	0.105	13.1
Acenaphthylene	0.511	0.222	0.268	0.001	0.009	0.21
Acenaphthene	1.65	0.192	10.2	0.001	0.012	0.211
Fluorene	1.23	0.482	7.85	0.002	0.027	0.504
Phenanthrene	3.36	1.28	9.89	0.003	0.027	1.38
Anthracene	0.162	0.119	0.502	0.001	0.022	0.131
Acridine	0.954	0.081	0.481	0.001	0.016	0.097
Fluoranthene	0.247	0.226	0.522	0.001	0.021	0.242
Pyrene	0.228	0.188	0.275	0.002	0.018	0.199
Benzo(c)phenanthrene	0.013	0.027	0.012	0.001	0.004	0.031
Benzo(a)anthracene	0.059	0.049	0.024	0.002	0.003	0.052
Chrysene	0.045	0.035	0.021	0.002	0.002	0.039
7,12-Dimethylbenz(a)anthracene	0.128	0.099	0.06	0.001	0.011	0.103
Benzo(b)fluoranthene	0.068	0.074	0.067	0.001	0.009	0.078
Benzo(k)fluoranthene	0.099	0.073	0.086	0.001	0.008	0.084
Benzo(a)pyrene	0.043	0.041	0.051	0.001	<0.001	0.046
3-Methylcholanthrene	0.034	0.031	0.023	0.001	0.006	0.036
Indeno(123-cd)pyrene	0.024	0.049	0.033	0.001	<0.001	0.053
Dibenz(a,h)anthracene	0.011	0.011	0.008	0.001	0.001	0.011
Benzo(ghi)perylene	0.025	0.023	0.011	0.001	<0.001	0.022
Dibenzo(a,l)pyrene	0.012	0.007	0.014	0.001	<0.001	0.01
Dibenzo(a,i)pyrene	0.005	0.006	0.005	0.001	<0.001	0.007
Dibenzo(a,h)pyrene	0.005	0.005	0.005	0.001	<0.001	0.007



Compound Name	Results (ng/m3)						
	AMS 1	AMS 6	AMS 7	AMS 14	Lab Blank	Field Blank	AMS 14 Repeat
	Fort McKay 26-Sep	Patricia McInnes 26-Sep	Athabasca Valley 26-Sep	Anzac 26-Sep	26-Sep	26-Sep	Anzac 26-Sep
Naphthalene	5.07	7.68	2.31	2.81	0.004	0.188	2.67
Acenaphthylene	0.472	0.531	0.064	0.545	0.001	0.015	0.59
Acenaphthene	2.38	0.607	0.271	3.44	0.001	0.012	3.36
Fluorene	0.868	0.808	0.32	2.78	0.002	0.027	2.74
Phenanthrene	3.37	2.2	1.38	6.15	0.003	0.019	6.05
Anthracene	0.137	0.137	0.059	0.314	0.001	0.009	0.313
Acridine	0.81	0.332	0.255	0.164	0.001	0.009	0.177
Fluoranthene	0.157	0.337	0.124	0.526	0.001	0.017	0.519
Pyrene	0.149	0.308	0.184	0.224	0.002	0.017	0.216
Benzo(c)phenanthrene	0.01	0.025	0.01	0.009	0.001	0.005	0.009
Benz(a)anthracene	0.036	0.036	0.027	0.02	0.002	0.01	0.022
Chrysene	0.029	0.031	0.018	0.009	0.002	<0.001	0.01
7,12-Dimethylbenz(a)anthracene	0.026	0.229	0.015	0.014	0.001	0.01	0.012
Benzo(b)fluoranthene	0.069	0.073	0.03	0.014	0.001	0.007	0.016
Benzo(k)fluoranthene	0.1	0.121	0.03	0.028	0.001	0.007	0.025
Benzo(a)pyrene	0.027	0.029	0.02	0.011	0.001	<0.001	0.012
3-Methylcholanthrene	0.009	0.014	0.013	0.016	0.001	0.002	0.015
Indeno(123-cd)pyrene	0.007	0.02	0.007	0.007	0.001	0.002	0.007
Dibenz(a,h)anthracene	0.006	0.007	0.004	0.003	0.001	0.002	0.003
Benzo(ghi)perylene	0.016	0.013	0.005	0.005	0.001	<0.001	0.005
Dibenzo(a,l)pyrene	0.006	0.007	0.009	0.006	0.001	<0.001	0.007
Dibenzo(a,i)pyrene	0.003	0.005	0.004	0.004	0.001	<0.001	0.004
Dibenzo(a,h)pyrene	0.006	0.005	0.003	0.004	0.001	0.002	0.005



Compound Name	Results (ng/m3)						
	AMS 1	AMS 6	AMS 7	AMS 14	Lab Blank	Field Blank	AMS 6 Repeat
	Fort McKay 02-Oct	Patricia McInnes 02-Oct	Athabasca Valley 02-Oct	Anzac 02-Oct	02-Oct	02-Oct	Patricia McInnes 02-Oct
Naphthalene	4.46	6.54	9.01	8.77	0.004	0.171	7.07
Acenaphthylene	0.05	0.03	0.085	0.031	0.001	0.004	0.035
Acenaphthene	0.364	0.363	0.577	0.627	0.001	0.012	0.388
Fluorene	0.417	0.311	0.464	0.492	0.002	0.04	0.333
Phenanthrene	1.01	0.614	0.788	1.07	0.003	0.019	0.662
Anthracene	0.079	0.049	0.058	0.045	0.001	0.022	0.057
Acridine	0.075	0.04	0.086	0.057	0.001	0.022	0.039
Fluoranthene	0.062	0.065	0.124	0.107	0.001	0.019	0.067
Pyrene	0.076	0.047	0.113	0.081	0.002	0.018	0.05
Benzo(c)phenanthrene	0.007	0.007	1.74	0.009	0.001	0.001	0.008
Benzo(a)anthracene	0.015	0.017	0.024	0.034	0.002	0.007	0.02
Chrysene	0.011	0.013	0.015	0.017	0.002	<0.001	0.015
7,12-Dimethylbenz(a)anthracene	0.011	0.013	0.029	0.02	0.001	0.006	0.013
Benzo(b)fluoranthene	0.023	0.018	0.022	0.016	0.001	0.004	0.019
Benzo(k)fluoranthene	0.032	0.02	0.017	0.009	0.001	0.004	0.022
Benzo(a)pyrene	0.024	0.01	0.031	0.011	0.001	0.002	0.01
3-Methylcholanthrene	0.008	0.011	0.026	0.031	0.001	0.004	0.014
Indeno(123-cd)pyrene	0.006	0.007	0.02	0.008	0.001	<0.001	0.007
Dibenz(a,h)anthracene	0.003	0.004	0.007	0.005	0.001	0.002	0.007
Benzo(ghi)perylene	0.005	0.006	0.009	0.01	0.001	0.002	0.005
Dibenzo(a,l)pyrene	0.005	0.007	0.007	0.008	0.001	<0.001	0.008
Dibenzo(a,i)pyrene	0.004	0.006	0.005	0.007	0.001	<0.001	0.006
Dibenzo(a,h)pyrene	0.006	0.008	0.007	0.007	0.001	<0.001	0.009



Compound Name	Results (ng/m3)						
	AMS 1	AMS 6	AMS 7	AMS 14	Lab Blank	Field Blank	AMS 6 Repeat
	Fort McKay 08-Oct	Patricia McInnes 08-Oct	Athabasca Valley 08-Oct	Anzac 08-Oct	08-Oct	08-Oct	Patricia McInnes 08-Oct
Naphthalene	26.5	40	18.2	20.2	0.004	0.138	38.2
Acenaphthylene	2.07	0.406	0.258	0.062	0.001	0.012	0.373
Acenaphthene	1.55	0.835	0.43	4.61	0.001	0.012	0.787
Fluorene	2.2	1.31	0.822	3.32	0.002	0.029	1.23
Phenanthrene	5.52	2.91	1.68	4.79	0.003	0.01	2.8
Anthracene	0.52	0.352	0.136	0.341	0.001	0.007	0.313
Acridine	0.794	0.14	0.113	0.164	0.001	0.014	0.139
Fluoranthene	0.84	0.676	0.301	0.852	0.001	0.017	0.64
Pyrene	1.02	0.681	0.377	0.542	0.002	0.018	0.644
Benzo(c)phenanthrene	0.056	0.047	0.022	0.028	0.001	0.004	0.043
Benzo(a)anthracene	0.114	0.127	0.059	0.05	0.002	0.002	0.121
Chrysene	0.117	0.13	0.065	0.081	0.002	<0.001	0.118
7,12-Dimethylbenz(a)anthracene	0.019	0.127	0.033	0.016	0.001	0.007	0.123
Benzo(b)fluoranthene	0.028	0.039	0.015	0.014	0.001	0.001	0.037
Benzo(k)fluoranthene	0.044	0.019	0.023	0.015	0.001	0.002	0.014
Benzo(a)pyrene	0.085	0.026	0.062	0.024	0.001	<0.001	0.027
3-Methylcholanthrene	0.018	0.011	0.026	0.018	0.001	<0.001	0.011
Indeno(123-cd)pyrene	0.049	0.056	0.033	0.018	0.001	<0.001	0.053
Dibenz(a,h)anthracene	0.009	0.015	0.01	0.006	0.001	0.001	0.014
Benzo(ghi)perylene	0.012	0.023	0.01	0.007	0.001	<0.001	0.025
Dibenzo(a,l)pyrene	0.018	0.029	0.033	0.006	0.001	<0.001	0.028
Dibenzo(a,i)pyrene	0.004	0.009	0.005	0.011	0.001	<0.001	0.008
Dibenzo(a,h)pyrene	0.007	0.006	0.006	0.012	0.001	<0.001	0.006



Compound Name	Results (ng/m3)						
	AMS 1	AMS 6	AMS 7	AMS 14	Lab Blank	Field Blank	AMS 6 Repeat
	Fort McKay 14-Oct	Patricia McInnes 14-Oct	Athabasca Valley 14-Oct	Anzac 14-Oct	14-Oct	14-Oct	Patricia McInnes 14-Oct
Naphthalene	40.6	46.1	37.9	23.6	0.01	0.476	44
Acenaphthylene	5.41	0.309	1.9	0.36	0.002	0.029	0.335
Acenaphthene	2.9	1.75	2.12	12.2	0.006	0.011	1.69
Fluorene	3.36	2.79	2.57	6.6	0.001	0.043	2.72
Phenanthrene	6.43	3.97	3.82	4.53	0.002	0.132	3.98
Anthracene	0.686	0.269	0.232	0.251	0.001	0.011	0.272
Acridine	0.235	0.096	0.23	0.225	0.001	0.006	0.091
Fluoranthene	0.707	0.666	0.37	0.269	0.001	0.008	0.676
Pyrene	0.572	0.56	0.448	0.112	0.001	0.005	0.566
Benzo(c)phenanthrene	0.033	0.04	0.016	0.005	0.001	<0.001	0.042
Benzo(a)anthracene	0.047	0.038	0.016	0.004	0.001	<0.001	0.039
Chrysene	0.064	0.048	0.023	0.005	0.001	<0.001	0.05
7,12-Dimethylbenz(a)anthracene	0.009	0.013	0.01	0.01	0.001	0.002	0.014
Benzo(b)fluoranthene	0.095	0.051	0.03	0.011	0.001	0.004	0.047
Benzo(k)fluoranthene	0.107	0.054	0.034	0.013	0.001	0.005	0.051
Benzo(a)pyrene	0.068	0.051	0.031	0.018	0.001	<0.001	0.053
3-Methylcholanthrene	0.01	0.006	0.006	0.006	0.001	0.001	0.005
Indeno(123-cd)pyrene	0.024	0.014	0.012	0.008	0.001	<0.001	0.013
Dibenz(a,h)anthracene	0.006	0.009	0.005	0.005	0.001	<0.001	0.008
Benzo(ghi)perylene	0.006	0.06	0.045	0.011	0.001	<0.001	0.057
Dibenzo(a,l)pyrene	0.013	0.026	0.012	0.006	0.001	<0.001	0.027
Dibenzo(a,i)pyrene	0.006	0.01	0.009	0.009	0.001	<0.001	0.011
Dibenzo(a,h)pyrene	0.005	0.004	0.005	0.005	0.001	<0.001	0.003



Compound Name	Results (ng/m3)						
	AMS 1	AMS 6	AMS 7	AMS 14	Lab Blank	Field Blank	AMS 6 Repeat
	Fort McKay 20-Oct	Patricia McInnes 20-Oct	Athabasca Valley 20-Oct	Anzac 20-Oct	20-Oct	20-Oct	Patricia McInnes 20-Oct
Naphthalene	26.4	60.9	51.7	26.2	0.01	0.753	62.2
Acenaphthylene	1.59	1.4	2.96	0.299	0.002	0.012	1.43
Acenaphthene	2.82	2.33	2.08	15.6	0.006	0.029	2.45
Fluorene	3.15	4.42	3.42	8.93	0.001	0.048	4.48
Phenanthrene	4.67	4.66	4.81	6.28	0.002	0.141	4.74
Anthracene	0.358	0.323	0.296	0.239	0.001	0.019	0.316
Acridine	0.275	0.175	0.205	0.151	0.001	0.027	0.178
Fluoranthene	0.329	0.643	0.555	0.332	0.001	0.012	0.651
Pyrene	0.322	0.525	0.677	0.124	0.001	0.007	0.541
Benzo(c)phenanthrene	0.018	0.044	0.03	0.005	0.001	0.003	0.043
Benzo(a)anthracene	0.033	0.046	0.026	0.002	0.001	<0.001	0.049
Chrysene	0.067	0.059	0.049	0.003	0.001	<0.001	0.057
7,12-Dimethylbenz(a)anthracene	0.034	0.047	0.009	0.011	0.001	0.002	0.054
Benzo(b)fluoranthene	0.03	0.058	0.036	0.021	0.001	0.003	0.061
Benzo(k)fluoranthene	0.035	0.066	0.045	0.024	0.001	0.004	0.068
Benzo(a)pyrene	0.066	0.071	0.045	0.013	0.001	<0.001	0.076
3-Methylcholanthrene	0.007	0.008	0.01	0.015	0.001	<0.001	0.008
Indeno(123-cd)pyrene	0.009	0.024	0.013	0.007	0.001	<0.001	0.026
Dibenz(a,h)anthracene	0.012	0.011	0.007	0.006	0.001	<0.001	0.01
Benzo(ghi)perylene	0.047	0.061	0.071	0.011	0.001	<0.001	0.063
Dibenzo(a,l)pyrene	0.017	0.054	0.025	0.004	0.001	<0.001	0.059
Dibenzo(a,i)pyrene	0.006	0.027	0.016	0.016	0.001	<0.001	0.029
Dibenzo(a,h)pyrene	0.004	0.006	0.006	0.005	0.001	<0.001	0.006



Compound Name	Results (ng/m3)						
	AMS 1	AMS 6	AMS 7	AMS 14	Lab Blank	Field Blank	AMS 7 Repeat
	Fort McKay 26-Oct	Patricia McInnes 26-Oct	Athabasca Valley 26-Oct	Anzac 26-Oct	26-Oct	26-Oct	Athabasca Valley 26-Oct
Naphthalene	13.6	21.1	20.7	7.91	0.01	0.431	21.9
Acenaphthylene	0.757	0.52	1.3	3.62	0.002	0.008	1.42
Acenaphthene	1.99	2.15	2.49	4.51	0.006	0.013	2.78
Fluorene	1.47	2.16	3.05	2.48	0.001	0.02	3.33
Phenanthrene	2.03	2.89	2.78	1.59	0.002	0.125	3.12
Anthracene	0.127	0.444	0.345	0.158	0.001	0.009	0.373
Acridine	0.303	0.226	0.242	0.018	0.001	0.003	0.265
Fluoranthene	0.183	0.433	0.272	0.096	0.001	0.01	0.29
Pyrene	0.169	0.397	0.272	0.04	0.001	0.007	0.294
Benzo(c)phenanthrene	0.013	0.019	0.007	0.008	0.001	<0.001	0.008
Benzo(a)anthracene	0.007	0.013	0.007	0.002	0.001	<0.001	0.007
Chrysene	0.014	0.021	0.009	0.002	0.001	<0.001	0.011
7,12-Dimethylbenz(a)anthracene	0.031	0.016	0.015	0.019	0.001	0.002	0.015
Benzo(b)fluoranthene	0.011	0.024	0.01	0.005	0.001	0.001	0.01
Benzo(k)fluoranthene	0.019	0.027	0.01	0.007	0.001	<0.001	0.011
Benzo(a)pyrene	0.022	0.027	0.013	0.012	0.001	<0.001	0.014
3-Methylcholanthrene	0.014	0.012	0.006	0.008	0.001	<0.001	0.006
Indeno(123-cd)pyrene	0.011	0.011	0.01	0.006	0.001	<0.001	0.011
Dibenz(a,h)anthracene	0.008	0.006	0.005	0.004	0.001	<0.001	0.006
Benzo(ghi)perylene	0.017	0.021	0.018	0.001	0.001	<0.001	0.02
Dibenzo(a,l)pyrene	0.006	0.008	0.005	0.007	0.001	<0.001	0.005
Dibenzo(a,i)pyrene	0.012	0.012	0.011	0.012	0.001	<0.001	0.013
Dibenzo(a,h)pyrene	0.004	0.005	0.006	0.008	0.001	<0.001	0.007