



**Wood Buffalo Environmental Association**

# **SEPTEMBER 2015 MONTHLY REPORT**

CONTINUOUS MONITORING  
INTEGRATED MONITORING  
October 28, 2015

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



This page intentionally left blank



October 28, 2015

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

#100 – 330 Thickwood Blvd.  
Fort McMurray, AB, T9K 1Y1

Tel: (780) 799-4420  
Fax: (780) 715-2016  
Email: [info@wbea.org](mailto:info@wbea.org)

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

---

[www.wbea.org](http://www.wbea.org)

Enclosed is the September 2015 Ambient Air Quality Monitoring Report for the continuous ambient air quality monitoring stations of the Wood Buffalo Environmental Association regional air quality monitoring network.

The continuous ambient air quality monitoring network stations are:

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

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

<b>Member</b>	<b>EPEA Approval No.</b>
Athabasca Oil Corporation	289664-00-00
Brion Energy	254465-00-00
Canadian Natural Resources Ltd.	149968-00-01
Cenovus Energy	48522-01-00



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

#### **Aboriginal Communities**

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

#### **Government and Non-Industrial Organizations**

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



Figure 1 shows the location of the air monitoring stations in the WBEA network.

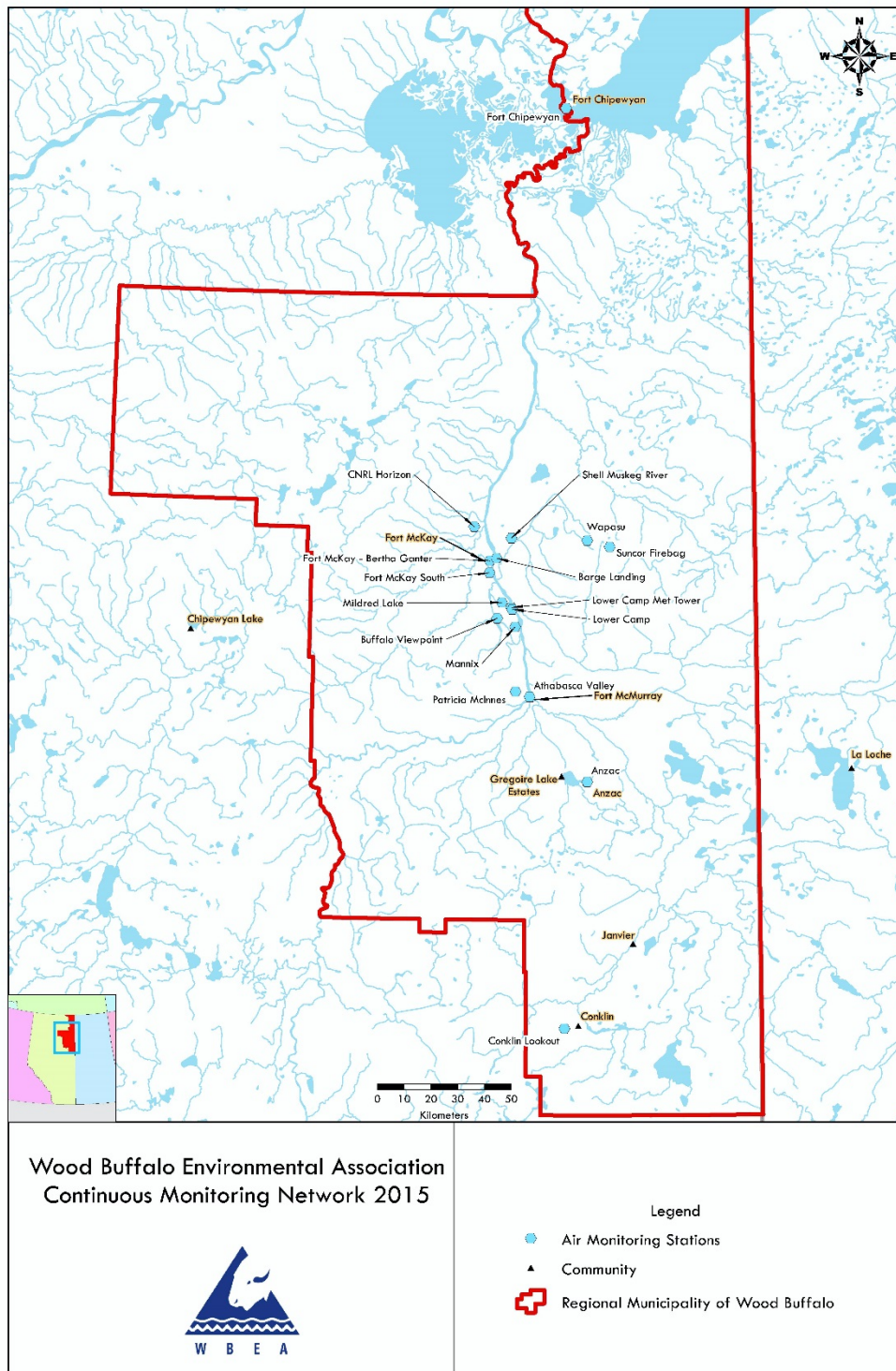


Figure 1 Map of WBEA Air Monitoring Network.

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

## 1.0 Concentrations in Excess of Alberta Ambient Air Quality Objectives

There were no ambient concentrations in excess of the air quality objectives as indicated in the Air Monitoring Directive Section III.A.3 (a & b) for SO<sub>2</sub>, CO, NO<sub>2</sub>, NH<sub>3</sub> and O<sub>3</sub>.

There were 2 H<sub>2</sub>S ambient ground level concentrations in excess of the 1-hour and 24-hour H<sub>2</sub>S air quality objectives reported to the Energy and Environmental Response Centre in real time. After data processing to account for analyzer drift with baseline correction, there were 0 concentrations in excess of the H<sub>2</sub>S air quality objectives.

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

<u>Site</u>	<u>Parameter</u>	<u>Date / Time</u>	<u>Reference</u>	<u>Period</u>	<u>Concentration ppb or ug/m<sup>3</sup></u>		<u>Status</u>
					<u>Reported</u>	<u>Final</u>	
AMS 5 Mannix	H <sub>2</sub> S	06Sept15:24:00	303163	24-hour	3.0	3.3	nae
AMS 5 Mannix	H <sub>2</sub> S	06Sept15:09:00	303149	1-hour	11.0	-	ret

\*status legend:

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

## 1.1 Data Processing and Validation

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

After data processing and validation, NO<sub>2</sub> concentrations were re-calculated from baseline-corrected NO<sub>x</sub> and NO concentrations. Specifically, the NO concentration was subtracted from the NO<sub>x</sub> concentration to determine the NO<sub>2</sub> concentration. In cases where the NO<sub>x</sub> and/or NO values exceeded the operating

range of the analyzer, values reported for NO<sub>2</sub> were determined as the largest of either the difference between baseline-corrected NO<sub>x</sub> and NO values, or the NO<sub>2</sub> value reported by the data acquisition system with baseline correction applied.

## **1.2 Revisions to CASA Data Warehouse**

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

There was 1 revision made to the August 2015 WBEA Air Monitoring Network Summary for reported ozone (O<sub>3</sub>) concentrations at AMS 18. The updated summary is attached at the end of this document.

## **2.0 Operational Status**

### **2.1 Continuous Monitoring**

The sulphur dioxide (SO<sub>2</sub>), total reduced sulphur (TRS), total hydrocarbons (THC), nitrogen dioxide (NO<sub>2</sub>), oxides of nitrogen (NO<sub>x</sub>), and particulate matter (PM<sub>2.5</sub>) analyzers routine operations were interrupted due to a fire at the Millennium mine air monitoring station (AMS 12) on August 29, 2015. The analyzers, supporting equipment and shelter were completely destroyed as a result of this fire. The WBEA Ambient Air Technical Committee discussed the monitoring options for the current location at their regular meeting on September 15, 2015. The committee reviewed the data collected at AMS 12, the safety and access concerns associated with the current location and the value of continued monitoring at this location. Based on the data available, information collected at the station is not representative of ambient air or fence-line monitoring. The monitoring location is within a developmental area and no longer representative of mining activities. As a result the committee unanimously recommended WBEA not replace AMS12 at the current location.

The total hydrocarbon (THC) analyzer at AMS 1, Bertha Ganter Fort McKay, operated less than 90% of the time in September 2015.

There were multiple issues associated with the operation of the THC analyzer, which resulted in 78 hours of invalid data.

- Unstable operation due to excessive baseline drift resulted in 21 hours of invalid data this reporting period.
- Maintenance to adjust chromatogram timing on September 12 resulted in 7 hours of invalid data.
- Inconsistent baseline response and associated troubleshooting and repairs on September 15 affected normal operations for 33 hours.
- Replacement and testing of the daily zero and span valve on September 17 interrupted normal operations for 1 hour.
- A data logger program update at the station on September 24 interrupted routine data collection of the THC analyzer for 1 hour.
- Fuel and carrier gas cylinder replacements on September 26 interrupted normal operations for 2 hours.

- Maintenance performed to relocate fuel and carrier gas lines on September 29 resulted in 3 hours of invalid data.
- Maintenance to clean up the station analyzer racks on September 30 resulted in 10 hours of invalid data.

After flagging and processing for monthly reports, data for THC at AMS 1 was available for 89% of the month. This incident was reported to Alberta Environment and Parks on October 28, 2015 (reference number 305111).

In September 2015, there were four incidents of a monitoring instrument not required for air quality compliance operating less than 90% of the time.

- On September 24 the precipitation collector was upgraded from a tipping bucket to a weight based rain gauge at Fort McKay Bertha Ganter (AMS 1), interrupting data collection for 100 hours due to wiring and data collection set up.
- Intermittent flat lines in the sensor output signal interrupted the normal operations of the 90m temperature and relative humidity sensor at the Mannix air monitoring station (AMS 5) for 143 hours.
- Normal operations of the solar radiation and leaf wetness sensors at the Fort Chipewyan air monitoring station (AMS 8) was invalidated for 101 and 113 hours due to on-going electrical interference on sensor output signals.

## **2.2 Intermittent Monitoring**

The results for passive and integrated monitoring of PAH, VOC, RSC, PM<sub>2.5</sub> and PM<sub>10</sub> samples were not available in time for submission with this report. These results will be submitted at a later date.

## **3.0 Monitoring Notes**

### **General Network Notes**

During this reporting period, the ambient monitoring network was internally audited by WBEA at AMS 13, 14, 17, and 19. As a result, internal audit calibrations were flagged as maintenance. The resulting downtimes are detailed in the Operational Notes section of each stations respective monthly report.

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***

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

for stabilization after exposure to high concentrations of NH<sub>3</sub> gas is an inherent behavior in the NH<sub>3</sub> analyzer operations resulting from the properties of the NH<sub>3</sub> gas. Data for 1 to 3 hours following the daily spans have been reported as invalid for a total of 44 hours this month.

Multiple instances of station cleanup and analyzer rack organization by the station operator interrupted the normal operations of air quality analyzers, except PM<sub>2.5</sub>, for a total of 2 to 10 hours this reporting period.

A data logger program update at the station on September 24 interrupted routine data collection of all parameters for 1 hour.

A loose signal wire interrupted data collection of the wind sensor for 25 hours from September 24 to 25. The connection was restored by the station operator.

Confirmation of calibration points for the ozone calibration on September 28 interrupted the normal operations of the NO<sub>2</sub> analyzer for 2 hours.

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

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

Maintenance and cleaning of the sample manifold on September 14 interrupted the normal operations of the H<sub>2</sub>S analyzer for 1 hour.

Depletion and replacement of the fuel cylinder at the station on September 28 affected the normal operation of the THC analyzer for 4 hours.

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

Sporadic values in the output signal of the 167m elevation wind sensor resulted in 1 hour of invalid data.

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

A power interruption to the station on September 4 affected the normal operations of the H<sub>2</sub>S analyzer for 1 hour.

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

A flat-line in the output signal of the sonic wind sensor at the 90 m level resulted in 1 hour of invalid data this reporting period.

Maintenance and cleaning of the sample manifold on September 11 interrupted the normal operations of the H<sub>2</sub>S analyzer for 1 hour.

Scheduled 2-year maintenance to replace all the meteorological sensors on September 22 interrupted the data collection for these parameters for 6 hours.

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

The NH<sub>3</sub> analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily span and routine monthly multipoint calibration periods. Additional time for stabilization after exposure to high concentrations of the NH<sub>3</sub> gas is an inherent behavior in the NH<sub>3</sub> analyzer operations resulting from the properties of the NH<sub>3</sub> gas. Data for 1 to 2 hours following each daily span has been reported as invalid for a total of 34 hours this month.

Confirmation of reference points for O<sub>3</sub> calibrations on September 25 and 30 interrupted the normal operation of the NO<sub>2</sub> analyzer for 5 hours.

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

A flat-line in the output signal of the wind sensor on September 17 resulted in 3 hours of invalid data.

Station operator activities on September 24 interrupted automated daily zero and spans cycles of the CO analyzer.

Station operator activities on September 26 affected the normal operations of the TRS analyzer for one hour.

Foreign debris in the sample chamber of the PM<sub>2.5</sub> analyzer interrupted the normal operations of the analyzer on September 18 for 9 hours. Follow-up maintenance and replacement of the analyzer on September 19 resulted in an additional 4 hours of downtime. Re-installation of the repaired analyzer on September 28 interrupted the normal data collection for continuous PM<sub>2.5</sub> parameter for 1 hour.

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

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

A flat-line in the output signal of the wind sensor on September 8 resulted in 1 hour of invalid data.

Maintenance on the daily zero and span systems and confirmation of analyzer response on September 9 interrupted the normal operations of the SO<sub>2</sub>, O<sub>3</sub>, and NO<sub>2</sub> analyzer for 1 to 2 hours.

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

Maintenance and cleaning of the sample manifold on September 4 interrupted the normal operations of the H<sub>2</sub>S analyzer for 1 hour.

Replacement of the sample pump and re-calibration on September 4 affected the normal operations of the THC analyzer for 6 hours.

Maintenance on the daily zero and span systems and confirmation of analyzer response on September 5 interrupted normal operations of the THC analyzer for 1 hour.

Depletion and replacement of the fuel gas cylinder on September 18 affected the normal operations of the THC analyzer for 3 hours.

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

Maintenance and cleaning of the sample manifold on September 10 interrupted the normal operations of the H<sub>2</sub>S analyzer for 2 hours.

Depletion and replacement of the fuel cylinder on September 29 affected the normal operation of the THC analyzer for 2 hours.

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

An internal WBEA audit on September 15, 16, and 17 interrupted the normal operations of all air quality analyzers for 2 to 4 hours this reporting period.

Maintenance and cleaning of the sample manifold on September 2 interrupted the normal operations of the TRS analyzer for 1 hour.

The PM<sub>2.5</sub> analyzer experienced a single episode of unstable operation on September 3 resulting in 4 hours of invalid data.

A flat-line in the output signal of the wind sensor on September 15 resulted in 5 hours of invalid data.

Maintenance and replacement of the data logger on September 20 resulted in 1 hour of invalid data for all parameters at the station.

Depletion and replacement of the fuel cylinder at the station on September 21 affected the normal operation of the THC analyzer for 1 hour.

Failure of the filter tape to self-advance on September 26 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for a total of 5 hours. Depletion and replacement of the filter tape on September 27 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for a total of 27 hours.

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

An internal WBEA audit on September 10, 11, and 14 interrupted the normal operations of all air quality analyzers for 2 to 5 hours this reporting period.

Maintenance to confirm daily zero and span responses on September 11 and 12 affected the normal operations of air analyzer analyzers for up to 4 hours.

Station operator activities at the station on September 11 affected the normal operations of the automated daily zero and span cycles of the NO<sub>2</sub> analyzer on September 12. This resulted in 2 hours of invalid data.

Replacement of the sample pump and follow-up calibration on September 23 affected the normal operation of the O<sub>3</sub> analyzer for 27 hours.

Depletion and replacement of the fuel cylinder at the station on September 30 affected the normal operation of the THC analyzer for 2 hours. Failure to completely open the cylinder valve caused the flame in the FID to shut off, which resulted in an additional 8 hours of invalid data.

A flat-line in the output signal of the wind sensor on September 5 and 16 resulted in a total of 3 hours of invalid data.

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

Maintenance on the daily zero and span systems and confirmation of analyzer response on September 3 interrupted the normal operations of the TRS analyzer for 1 hour.

On September 14, the normal baseline readings for the THC analyzer drifted below the background value of 1.8 ppm resulting in 2 hours of invalid data.

Maintenance and cleaning of the sample manifold on September 18 interrupted the normal operations of the TRS analyzer for 1 hour.

Flat-lines in the output signals of the wind sensor resulted in 5 hours of invalid data this reporting period.

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

Maintenance to the calibrator and zero air supply on September 23 interrupted the normal operations of the THC analyzer for 1 hour.

Re-calibration to address analyzer baseline drift on September 24 affected the normal operations of the THC analyzer for 9 hours.

Depletion and replacement of the fuel cylinder at the station on September 29 affected the normal operation of the THC analyzer for 3 hours.



***Station 17, Wapasu***

An internal WBEA audit on September 8 and 9 interrupted the normal operations of all air quality analyzers for 1 to 5 hours this reporting period.

The sample filter tape on the continuous PM<sub>2.5</sub> analyzer failed to automatically advance on September 13, resulting in 3 hours of invalid data.

***Station 18, Conklin Lookout***

The PM<sub>2.5</sub> analyzer experienced multiple episodes of unstable operations due to negative baseline. This resulted in 30 hours of invalid data during this reporting period.

Maintenance to the sample inlet, flow and zero reference checks on September 29 interrupted the normal operation of the PM<sub>2.5</sub> analyzer for 1 hour.

***Station 19, Firebag***

An internal WBEA audit on September 2 interrupted the normal operations of all air quality analyzers for 1 to 3 hours this reporting period.

***Station 502, ConocoPhillips Surmont***

The H<sub>2</sub>S analyzer experienced a single episode of unstable operation on September 8 resulting in 2 hours of invalid data.

Maintenance and cleaning of the sample manifold on September 11 interrupted the normal operations of the SO<sub>2</sub> and NO<sub>2</sub> analyzers for 1 hour.

A power spike at the station on September 25 interrupted the routine operations of the H<sub>2</sub>S analyzer for 1 hour.

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

Yours sincerely,

**Wood Buffalo Environmental Association**



Sanjay Prasad  
Air Quality Scientist



This page intentionally left blank

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

SEPTEMBER 2015  
page 1 of 2  
Prepared: Oct 27 2015 10:23


APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	9	2015					
254465-00-00							
149968-00-01							
48522-01-00	CONTINUOUS AMBIENT MONITORING						
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00	CONTINUOUS AMBIENT MONITORING						
224816-00-03	CONTINUOUS AMBIENT MONITORING						
189942-00-02	CONTINUOUS AMBIENT MONITORING						
206355-00-00	CONTINUOUS AMBIENT MONITORING						
46586-00-00	CONTINUOUS AMBIENT MONITORING						
216466-00-04	CONTINUOUS AMBIENT MONITORING						
137467-00-00	CONTINUOUS AMBIENT MONITORING						
20809-01-00	CONTINUOUS AMBIENT MONITORING						
241311-00-00	CONTINUOUS AMBIENT MONITORING						
094-02-00	CONTINUOUS AMBIENT MONITORING						
305529-00-00	CONTINUOUS AMBIENT MONITORING						
026-02-00	CONTINUOUS AMBIENT MONITORING						
228044-00-00	CONTINUOUS AMBIENT MONITORING						
73203-01-00	CONTINUOUS AMBIENT MONITORING						
			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
	SO2(ppm)	1	98.47	0.019	0	0.003	0
	SO2(ppm)	2	100.00	0.080	0	0.014	0
	SO2(ppm)	4	100.00	0.028	0	0.005	0
	SO2(ppm)	5	100.00	0.063	0	0.010	0
	SO2(ppm)	6	100.00	0.086	0	0.012	0
	SO2(ppm)	7	100.00	0.103	0	0.013	0
	SO2(ppm)	8	99.72	0.002	0	0.001	0
	SO2(ppm)	11	100.00	0.050	0	0.005	0
	SO2(ppm)	13	99.58	0.026	0	0.004	0
	SO2(ppm)	14	99.03	0.014	0	0.002	0
	SO2(ppm)	15	100.00	0.020	0	0.003	0
	SO2(ppm)	16	100.00	0.018	0	0.003	0
	SO2(ppm)	17	99.31	0.024	0	0.008	0
	SO2(ppm)	18	100.00	0.013	0	0.002	0
	SO2(ppm)	19	99.86	0.034	0	0.004	0
	SO2(ppm)	502	99.86	0.012	0	0.003	0
	H2S(ppm)	2	99.86	0.005	0	0.002	0
	H2S(ppm)	4	100.00	0.002	0	0.001	0
	H2S(ppm)	5	99.86	0.009	0	0.003	0
	H2S(ppm)	11	99.72	0.005	0	0.001	0
	H2S(ppm)	17	99.58	0.001	0	0.000	0
	H2S(ppm)	19	99.72	0.002	0	0.001	0
	H2S(ppm)	502	99.58	0.003	0	0.001	0
	TRS(ppm)	1	98.47	0.002	0	0.001	0
	TRS(ppm)	6	100.00	0.002	0	0.000	0
	TRS(ppm)	7	99.86	0.001	0	0.001	0
	TRS(ppm)	9	99.86	0.003	0	0.001	0
	TRS(ppm)	13	99.44	0.002	0	0.001	0
	TRS(ppm)	14	98.75	0.002	0	0.000	0
	TRS(ppm)	15	99.72	0.001	0	0.000	0
	TRS(ppm)	18	100.00	0.000	0	0.000	0
	THC(ppm)	1	89.17	3.5	-	2.2	-
	THC(ppm)	2	99.44	6.6	-	2.9	-
	THC(ppm)	4	99.86	7.3	-	2.6	-
	THC(ppm)	5	100.00	3.6	-	2.5	-
	THC(ppm)	6	100.00	2.2	-	2.0	-
	THC(ppm)	7	100.00	2.4	-	2.0	-
	THC(ppm)	9	98.61	3.5	-	2.5	-
	THC(ppm)	11	99.72	5.0	-	2.6	-
	THC(ppm)	13	99.44	4.6	-	2.7	-
	THC(ppm)	14	97.78	2.3	-	1.9	-
	THC(ppm)	15	99.72	5.0	-	2.6	-
	THC(ppm)	16	98.19	4.4	-	2.5	-
	THC(ppm)	17	99.72	3.1	-	2.2	-
	THC(ppm)	18	100.00	2.2	-	2.0	-
	THC(ppm)	19	99.72	2.7	-	2.3	-
	O3(ppm)	1	98.75	0.039	0	0.031	-
	O3(ppm)	6	100.00	0.040	0	0.031	-

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

SEPTEMBER 2015

page 2 of 2

Prepared: Oct 27 2015 10:23

APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	9	2015					
254465-00-00							
149968-00-01							
48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00	CONTINUOUS AMBIENT MONITORING						
224816-00-03	CONTINUOUS AMBIENT MONITORING						
189942-00-02				ONE-HOUR AVERAGE		24-HOUR AVERAGE	
206355-00-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
46586-00-00	O3(ppm)	7	100.00	0.035	0	0.023	-
216466-00-04	O3(ppm)	8	99.86	0.041	0	0.029	-
137467-00-00	O3(ppm)	13	99.58	0.034	0	0.024	-
20809-01-00	O3(ppm)	14	95.56	0.043	0	0.033	-
241311-00-02	O3(ppm)	17	99.72	0.035	0	0.025	-
094-02-00	O3(ppm)	18	100.00	0.046	0	0.035	-
305529-00-00	NO2(ppm)	1	98.19	0.017	0	0.007	-
026-02-00	NO2(ppm)	6	99.31	0.018	0	0.006	-
228044-00-00	NO2(ppm)	7	100.00	0.023	0	0.008	-
73203-01-00	NO2(ppm)	8	99.86	0.008	0	0.002	-
	NO2(ppm)	13	99.17	0.011	0	0.005	-
	NO2(ppm)	14	98.89	0.008	0	0.002	-
	NO2(ppm)	15	100.00	0.025	0	0.008	-
	NO2(ppm)	16	100.00	0.029	0	0.011	-
	NO2(ppm)	17	99.44	0.016	0	0.005	-
	NO2(ppm)	18	100.00	0.004	0	0.002	-
	NO2(ppm)	19	99.58	0.019	0	0.006	-
	NO2(ppm)	502	99.86	0.013	0	0.003	-
	CO(ppm)	7	99.86	0.3	0	0.1	-
	NH3(ppm)	1	93.89	0	-	0	0
	NH3(ppm)	6	95.28	0	-	0	0
	PM2.5(ug/m3)	1	99.86	57.4	-	12.7	0
	PM2.5(ug/m3)	6	100.00	27.7	-	6.1	0
	PM2.5(ug/m3)	7	98.06	18.8	-	7.3	0
	PM2.5(ug/m3)	8	99.72	46.5	-	15.3	0
	PM2.5(ug/m3)	13	94.86	20.4	-	6.6	0
	PM2.5(ug/m3)	14	100.00	37.6	-	7.9	0
	PM2.5(ug/m3)	15	100.00	22.7	-	7.8	0
	PM2.5(ug/m3)	16	100.00	25.1	-	8	0
	PM2.5(ug/m3)	17	99.44	18.7	-	6.8	0
	PM2.5(ug/m3)	18	95.69	8.8	-	5.4	0
	WIND	1	96.53	-	-	-	-
	WIND	2	100.00	-	-	-	-
	WIND	4	100.00	-	-	-	-
	WIND	5	99.17	-	-	-	-
	WIND	6	100.00	-	-	-	-
	WIND	7	99.58	-	-	-	-
	WIND	8	99.86	-	-	-	-
	WIND	9	100.00	-	-	-	-
	WIND	11	100.00	-	-	-	-
	WIND	13	99.17	-	-	-	-
	WIND	14	99.58	-	-	-	-
	WIND	15	99.31	-	-	-	-
	WIND	16	100.00	-	-	-	-
	WIND	17	100.00	-	-	-	-
	WIND	18	100.00	-	-	-	-
	WIND	19	100.00	-	-	-	-
	WIND	502	100.00	-	-	-	-
							
SIGNATURE OF ASSOCIATION REPRESENTATIVE				FOR ALBERTA ENVIRONMENT USE ONLY			



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 1**  
**BERTHA GANTER FORT MCKAY**  
**SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	675	34	45	98.47	19	0	3	0
TRS(ppb) Average	675	34	45	98.47	2	0	1	0
THC(ppm) Average	607	35	113	89.17	3.5	-	2.2	-
NMHC(ppm) Average	607	35	113	89.17	0.406	-	0.079	-
CH4(ppm) Average	607	35	113	89.17	3.1	-	2.1	-
O3 (ppb) Average	676	35	44	98.75	39	0	31	-
NO2 (ppb) Average	669	38	51	98.19	17	0	7	-
NO (ppb) Average	669	38	51	98.19	30	-	5	-
NOX (ppb) Average	669	38	51	98.19	40	-	9	-
NH3 (ppb) Average	630	46	90	93.89	0	0	0	-
PM2.5 (ug/m3) Average	717	2	3	99.86	57.4	-	12.7	0
Wind Speed 10 m (km/h) Average	695	0	25	96.53	21	-	12	-
Wind Direction 10 m (deg) Average	695	0	25	96.53	-	-	-	-
Temperature 2 m (C) Average	719	0	1	99.86	24.6	-	15.0	-
Temperature 10 m (C) Average	719	0	1	99.86	24.4	-	15.7	-
Relative Humidity (%) Average	719	0	1	99.86	99	-	95	-
Precipitation (mm) Total	620	0	100	86.11	3.8	-	15.7	-
Leaf Wetness (% of range) Average	719	0	1	99.86	74	-	23	-
Global Solar Radiation (W/m2) Average	719	0	1	99.86	641	-	178	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	675	0.6	2	-	0	0	0	0	0	1	19
TRS (ppb) Average	675	0.4	0	-	0	0	0	0	0	1	2
THC (ppm) Average	607	1.91	0.2	-	1.8	1.8	1.8	1.8	1.9	2.1	3.5
NMHC(ppm) Average	607	0.014	0.052	-	0	0	0	0	0	0	0.406
CH4(ppm) Average	607	1.9	0.1	-	1.8	1.8	1.8	1.8	1.9	2	3.1
O3 (ppb) Average	676	18.7	9	-	5	6	11	18	27	31	39
NO2 (ppb) Average	669	2.7	3	-	0	0	0	2	5	7	17
NO (ppb) Average	669	1.1	3	-	0	0	0	0	1	4	30
NOX (ppb) Average	669	3.8	5	-	0	0	0	2	6	10	40
NH3 (ppb) Average	630	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	717	4.67	3.6	-	1.2	2	2.7	3.7	5.7	8	57.4
Wind Speed 10 m (km/h) Average	695	5.9	3	-	0	2	3	5	8	10	21
Wind Direction 10 m (deg) Average	695	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	719	8.96	5.5	-	-3.3	2.2	5.1	8.3	12.8	16.4	24.6
Temperature 10 m (C) Average	719	9.57	5	-	-2	3.7	6	9.1	12.7	16.4	24.4
Relative Humidity (%) Average	719	75	20	-	30	44	58	80	94	97	99
Precipitation (mm) Total	620	-	-	16.76	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	719	6.1	13	-	0	0	0	0	5	23	74
Global Solar Radiation (W/m2) Average	719	121	171	-	0	0	0	15	210	400	641



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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	24 Sep 2015 13:00	24 Sep 2015 13:00	1	Data logger program uploaded - data not recorded
SO2, TRS, THC, NO2, NH3	30 Sep 2015 08:00	30 Sep 2015 17:00	10	Maintenance - Station wiring and tubing re-organization
THC	10 Sep 2015 16:00	10 Sep 2015 16:00	1	Unstable operation - excessive baseline drift
THC	10 Sep 2015 19:00	10 Sep 2015 20:00	2	Unstable operation - excessive baseline drift
THC	11 Sep 2015 11:00	11 Sep 2015 20:00	10	Unstable operation - excessive baseline drift
THC	12 Sep 2015 01:00	12 Sep 2015 01:00	1	Unstable operation - excessive baseline drift
THC	12 Sep 2015 03:00	12 Sep 2015 03:00	1	Unstable operation - excessive baseline drift
THC	12 Sep 2015 05:00	12 Sep 2015 10:00	6	Unstable operation - excessive baseline drift
THC	12 Sep 2015 11:00	12 Sep 2015 17:00	7	Maintenance - chromatogram timing adjustments
THC	15 Sep 2015 02:00	15 Sep 2015 12:00	11	Analyzer Failure - baseline collapse
THC	15 Sep 2015 13:00	16 Sep 2015 10:00	22	Maintenance - repair and troubleshooting
THC	17 Sep 2015 08:00	17 Sep 2015 08:00	1	Maintenance - replaced daily zero span valve
THC	26 Sep 2015 15:00	26 Sep 2015 16:00	2	Maintenance - replaced fuel and carrier gas cylinders
THC	29 Sep 2015 11:00	29 Sep 2015 13:00	3	Maintenance - Station wiring and tubing re-organization
O3	30 Sep 2015 11:00	30 Sep 2015 18:00	8	Maintenance - Station wiring and tubing re-organization
NO2, NO, NOX	28 Sep 2015 11:00	28 Sep 2015 12:00	2	Maintenance - confirmed calibration points for Ozone
NH3	01 Sep 2015 09:00	29 Sep 2015 07:00	33	Stabilization after daily span
Wind Speed, Wind Direction	24 Sep 2015 12:00	25 Sep 2015 12:00	25	Data collection interrupted
Precipitation Collector	24 Sep 2015 13:00	28 Sep 2015 16:00	100	Analyzer upgraded from tipping bucket to weight based rain gauge



Summary of Hour Averages

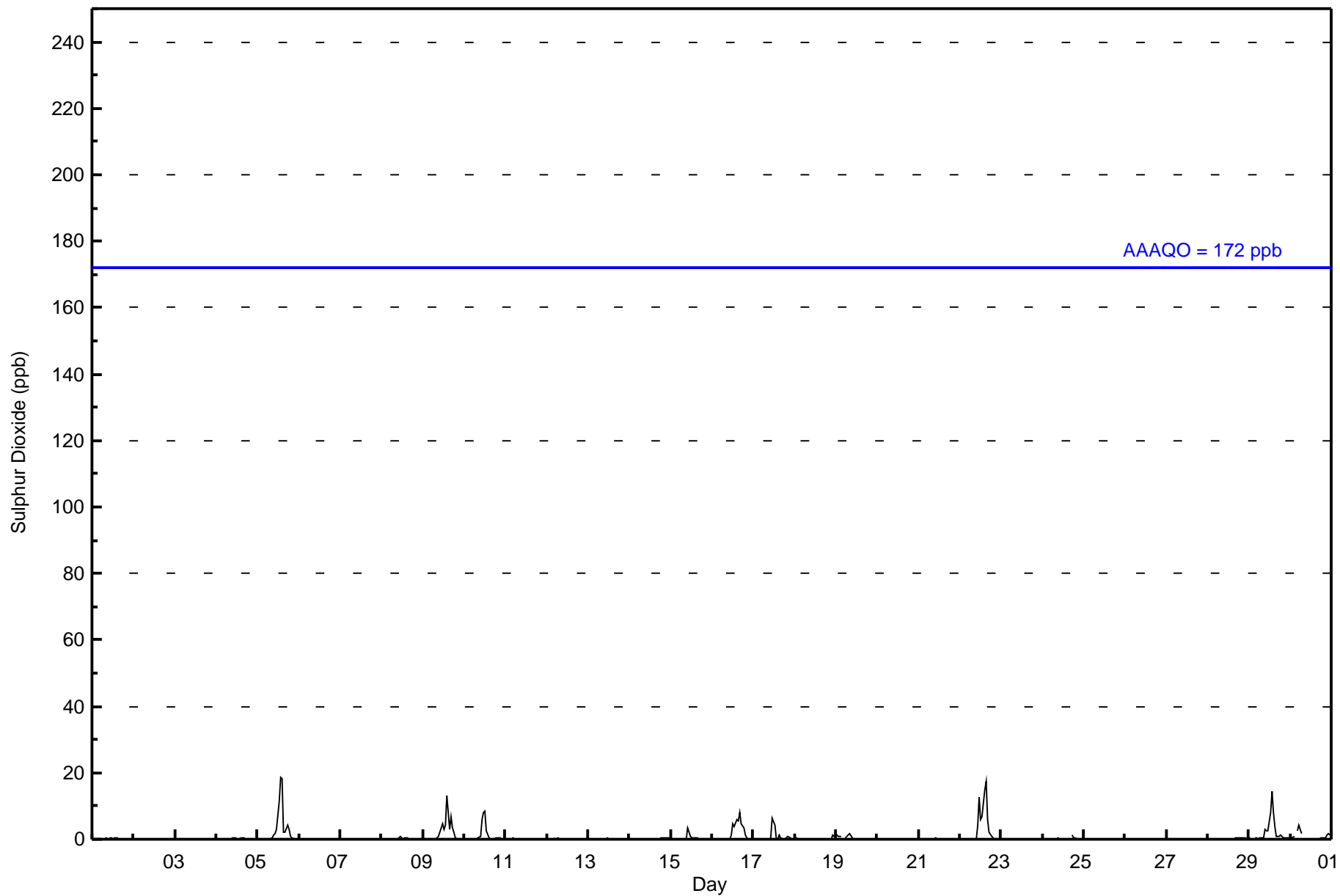
Fort McKay - Bertha Ganter - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 19 ppb on Sep 5 14:00	Maximum Daily Average: 3.1 ppb on Sep 22		Hours of Data:	675
Minimum Value: 0 ppb on Sep 1 18:00	Minimum Daily Average: 0.0 ppb on Sep 7		Hours of Missing Data:	45
Maximum Diurnal Average: 2.2 ppb at hour 15	Minimum Diurnal Average: 0.1 ppb at hour 4		Hours of Calibration:	34
Monthly Average: 0.6 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 O <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 13		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-Sep	0	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
2-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Sep	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
4-Sep	0	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-Sep	0	0	Z	0	0	0	0	0	0	1	2	3	11	19	18	2	2	4	3	1	0	0	0	0	2.9	19
6-Sep	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
7-Sep	0	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
8-Sep	0	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
9-Sep	Z	0	0	0	0	0	0	0	0	1	2	5	3	4	13	3	7	3	2	0	0	0	0	0	1.9	13
10-Sep	0	Z	0	0	0	0	0	0	0	1	6	8	8	3	0	0	0	0	0	0	0	0	0	0	1.2	8
11-Sep	0	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-Sep	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
13-Sep	0	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
14-Sep	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
15-Sep	Z	0	0	0	0	0	0	0	0	0	3	1	0	0	0	1	0	0	0	0	0	0	0	0	0.3	3
16-Sep	0	Z	0	0	0	0	0	0	0	0	1	5	4	6	5	8	5	3	1	0	0	0	0	0	1.7	8
17-Sep	0	0	Z	0	0	0	0	0	0	0	6	4	0	0	1	0	0	0	0	1	1	0	0	0	0.7	6
18-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1
19-Sep	1	1	1	1	Z	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
20-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Sep	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
22-Sep	0	Z	0	0	0	0	0	0	0	0	4	13	6	7	15	18	6	2	1	0	0	0	0	0	3.1	18
23-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	DF	C	C	C	C	1	0	0	0	0	0	0	0.2	1
25-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
26-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Sep	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
28-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1
29-Sep	0	0	Z	0	0	0	0	0	0	3	2	2	8	14	8	4	1	1	1	1	1	1	0	0	2.1	14
30-Sep	0	0	1	Z	3	4	2	M	M	M	M	M	M	M	M	M	M	0	0	1	1	1	2	1	--	4

0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.3	0.8	1.4	1.7	1.9	2.2	1.2	0.9	0.6	0.4	0.2	0.1	0.1	0.1	0.1	0.1	Diurnal Average
1	1	1	1	3	4	2	1	2	3	6	13	11	19	18	18	8	5	3	1	1	1	2	1	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	667	98.81	98.81
11 - 20	8	1.19	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: 675

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	43	20	3	5	4	5	18	58	86	62	60	38	53	77	65	51	648
11 - 20	0	0	0	0	0	0	0	5	2	1	0	0	0	0	0	0	8
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	43	20	3	5	4	5	18	63	88	63	60	38	53	77	65	51	656

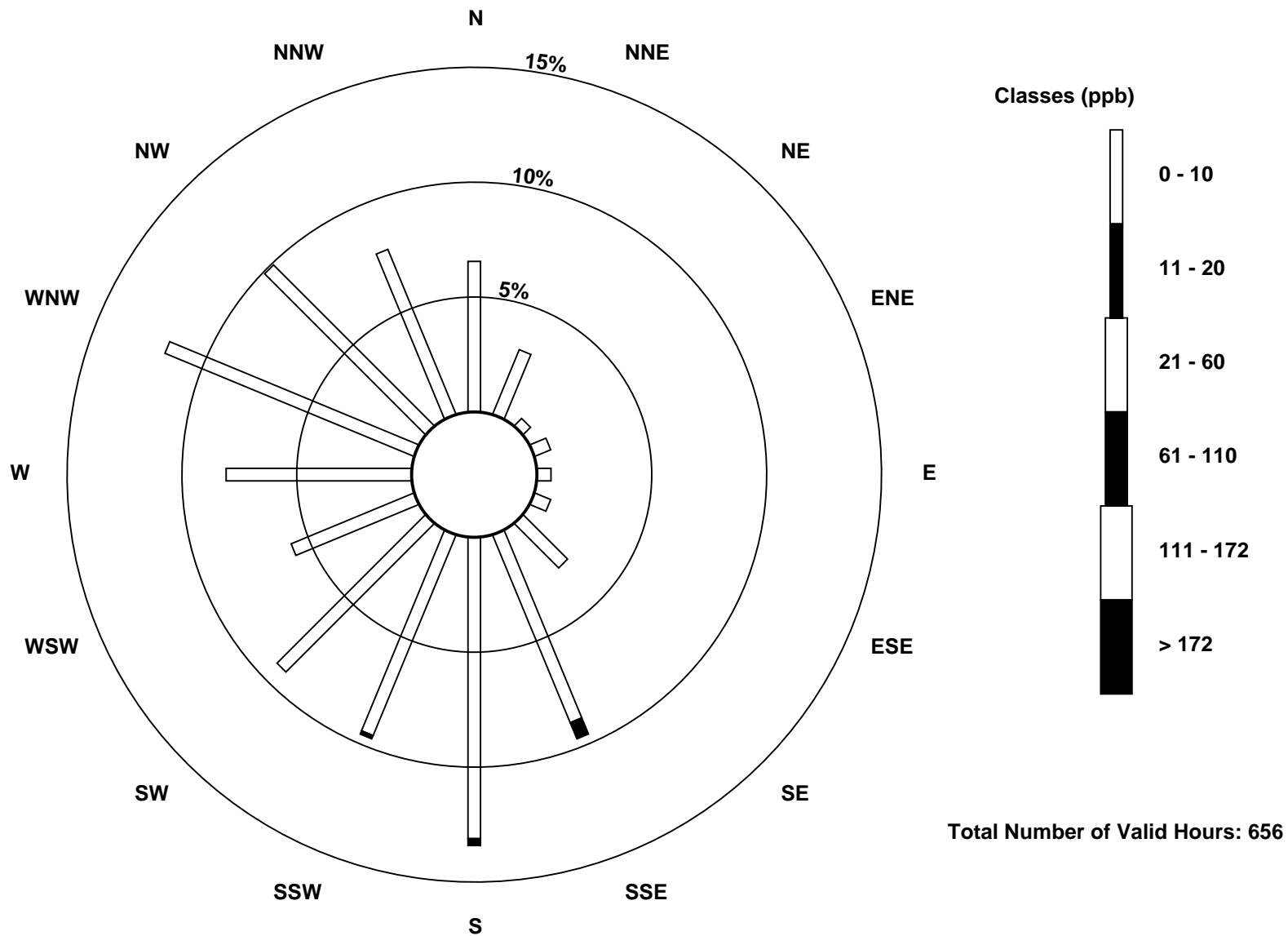
Total Number of Valid Hours: 656

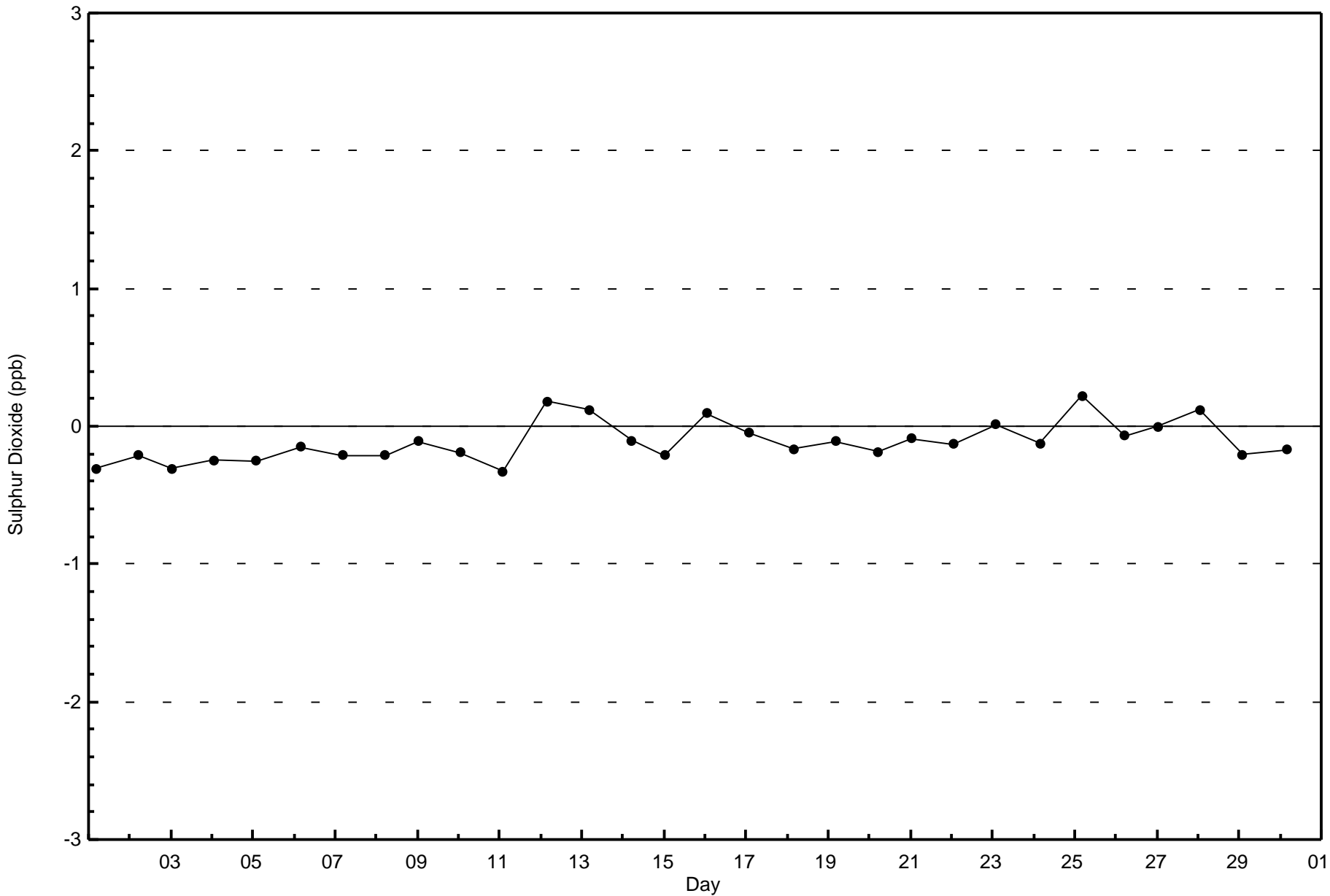
Total Number of Hours: 720

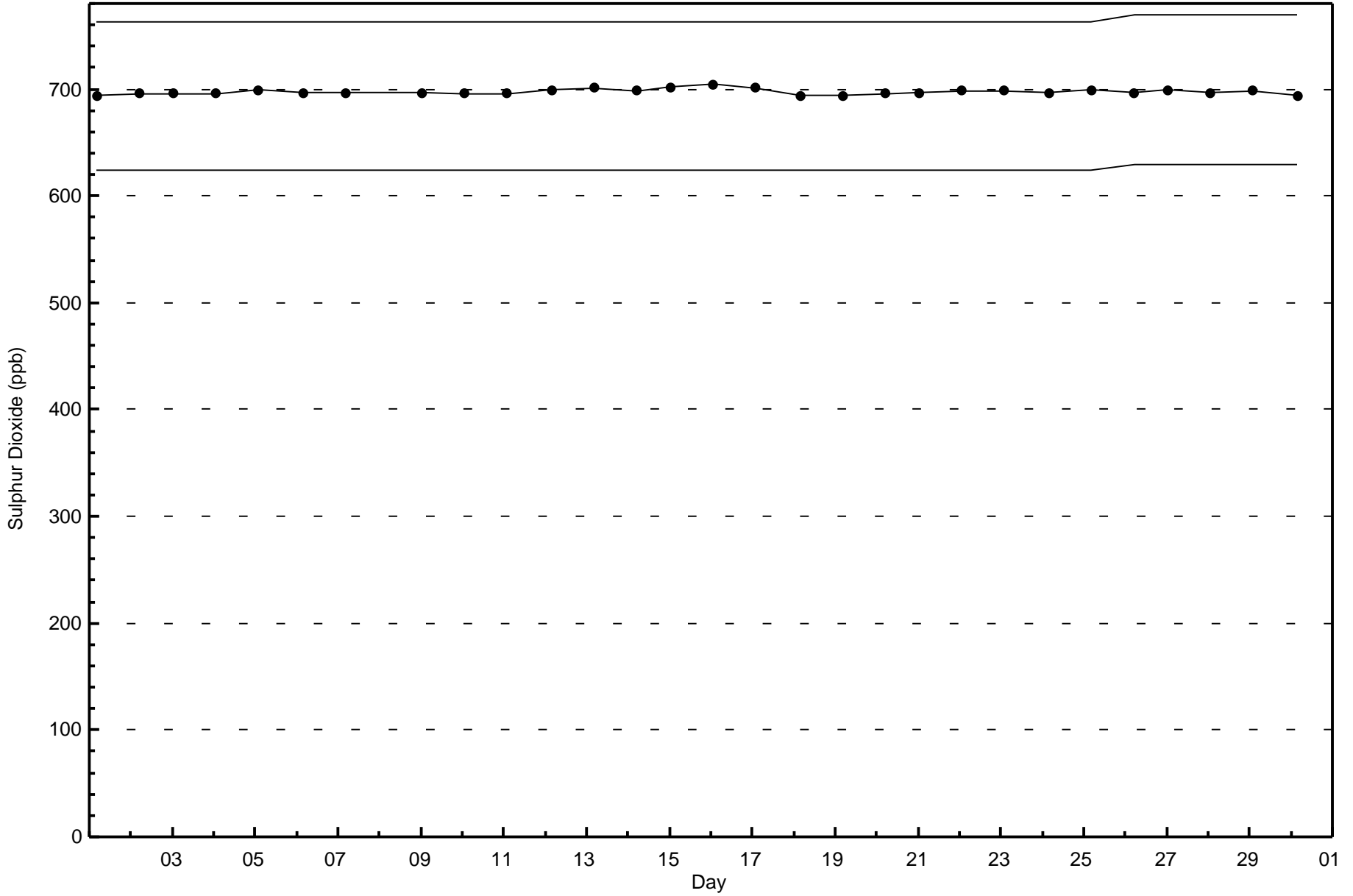


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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









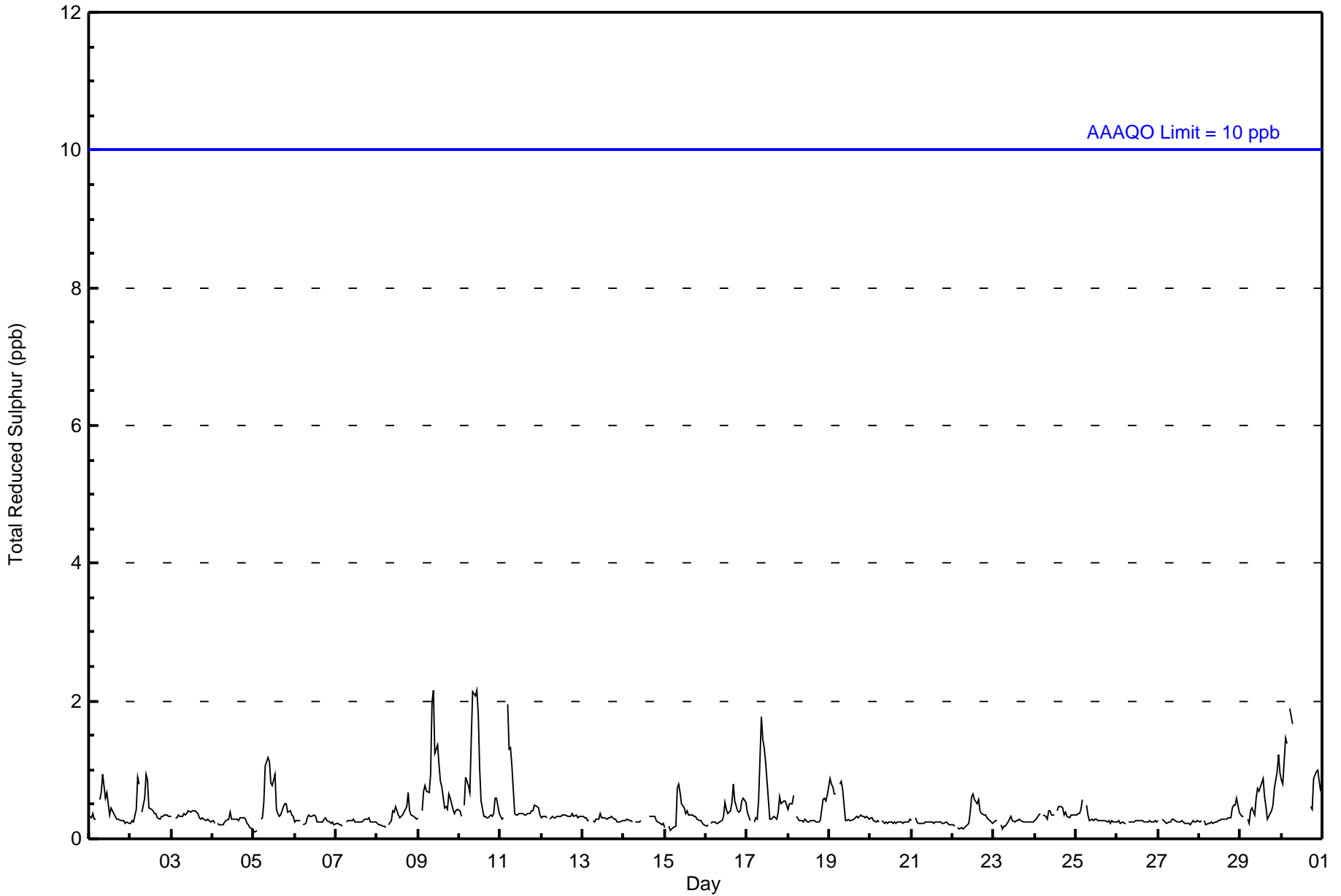


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Sep 10 11:00	Maximum Daily Average: 0.8 ppb on Sep 10		Hours of Data:	675
Minimum Value: 0 ppb on Sep 5 01:00	Minimum Daily Average: 0.2 ppb on Sep 21		Hours of Missing Data:	45
Maximum Diurnal Average: 0.6 ppb at hour 9	Minimum Diurnal Average: 0.3 ppb at hour 1		Hours of Calibration:	34
Monthly Average: 0.4 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 2		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-Sep	0	0	0	0	0	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
2-Sep	0	0	0	0	1	1	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
3-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
4-Sep	0	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-Sep	0	0	0	Z	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0.5	1
6-Sep	0	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
7-Sep	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
8-Sep	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
9-Sep	0	Z	0	1	1	1	1	1	2	2	1	1	1	1	1	0	0	0	1	1	0	0	0	0	0.8	2
10-Sep	0	0	Z	0	1	1	1	1	2	2	2	2	1	1	0	0	0	0	0	0	0	1	1	0	0.8	2
11-Sep	0	0	0	Z	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
12-Sep	0	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-Sep	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
14-Sep	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
15-Sep	0	Z	0	0	0	0	0	1	1	1	1	0	C	C	C	C	0	0	0	0	0	0	0	0	0.3	1
16-Sep	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	1	1	1	0.4	1
17-Sep	0	0	0	Z	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0.6	2
18-Sep	0	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1
19-Sep	1	1	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
20-Sep	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
21-Sep	0	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-Sep	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1
23-Sep	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-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	DF	0	0	0	0	0	0	0	0	0	0	0.4	0
25-Sep	0	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
26-Sep	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
27-Sep	0	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-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1
29-Sep	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	0.6	1
30-Sep	1	1	1	1	Z	2	2	M	M	M	M	M	M	M	M	M	M	0	0	1	1	1	1	1	--	2

0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.3	Diurnal Average
1	1	1	1	2	2	2	2	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	675	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 675

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	42	18	3	5	4	5	19	62	84	62	62	39	54	78	64	51	652
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>	42	18	3	5	4	5	19	62	84	62	62	39	54	78	64	51	652

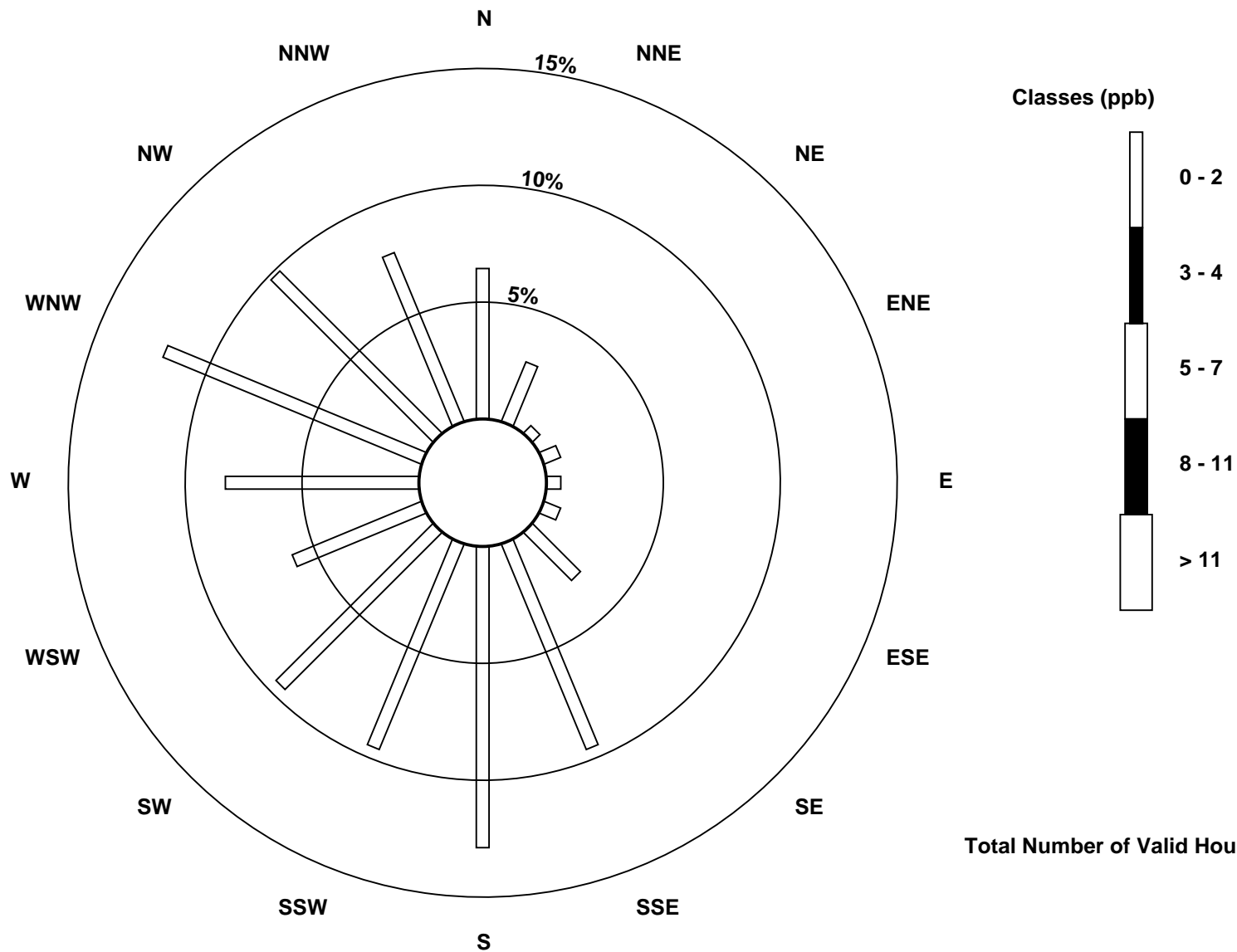
Total Number of Valid Hours: 652

Total Number of Hours: 720

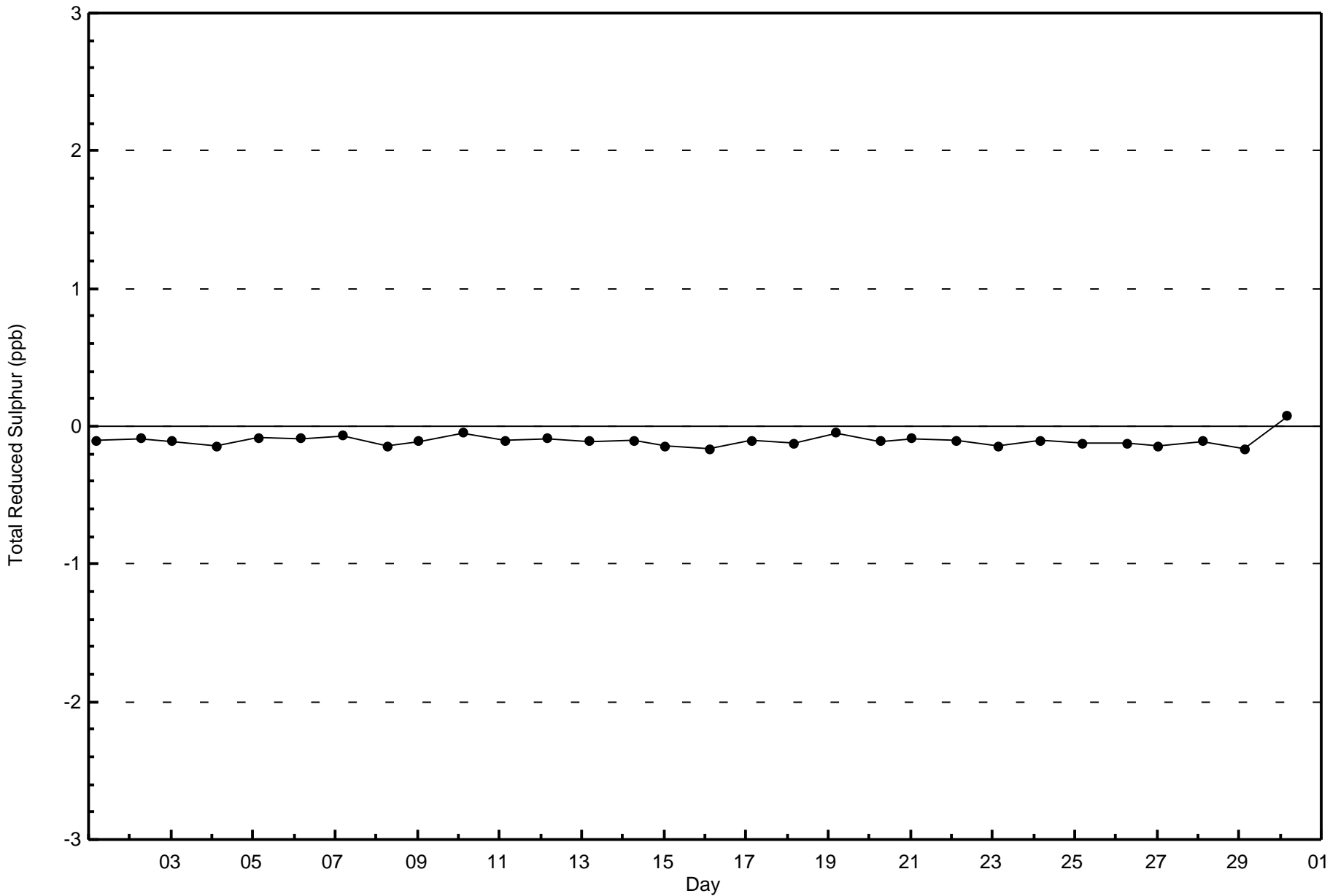


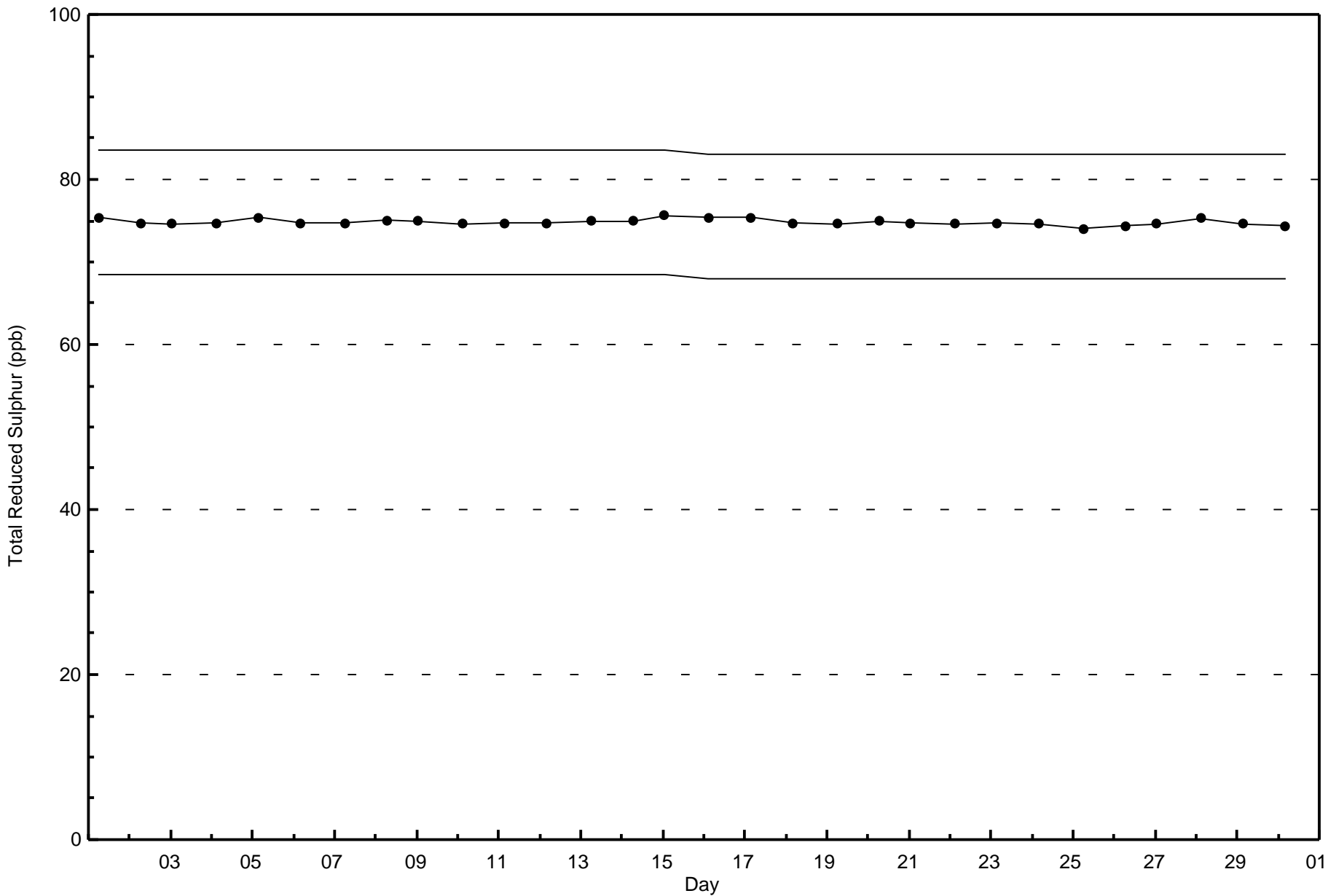
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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



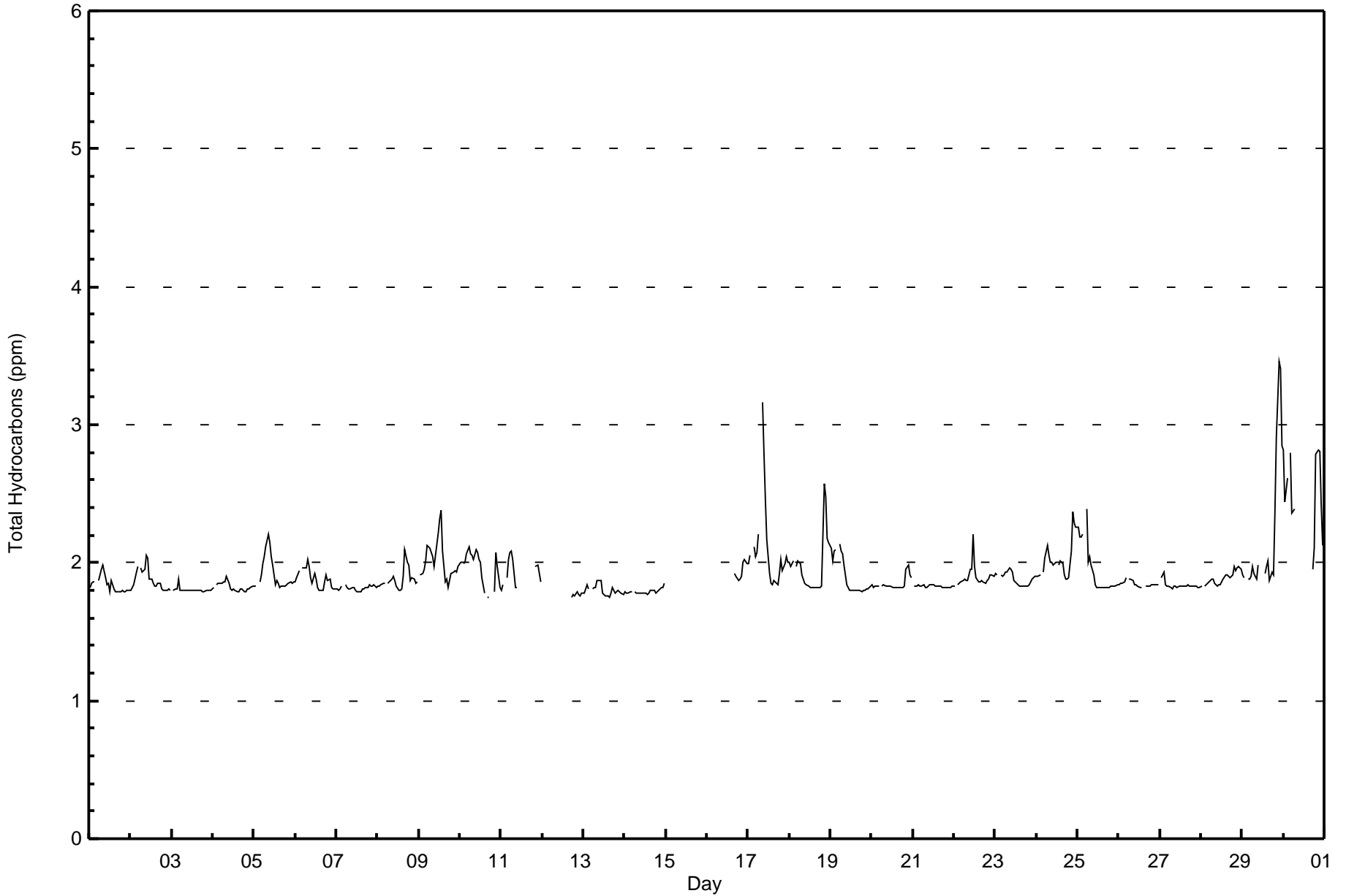
Total Number of Valid Hours: 652













**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	539	88.80	88.80
2.1 - 3.0	65	10.71	99.51
3.1 - 10.0	3	0.49	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 607

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	41	19	3	4	4	5	16	40	59	43	45	33	40	61	63	49	525
2.1 - 3.0	0	1	0	0	0	0	0	13	21	13	4	1	1	0	0	2	56
3.1 - 10.0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	3
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	41	20	3	4	4	5	16	54	82	56	49	34	41	61	63	51	584

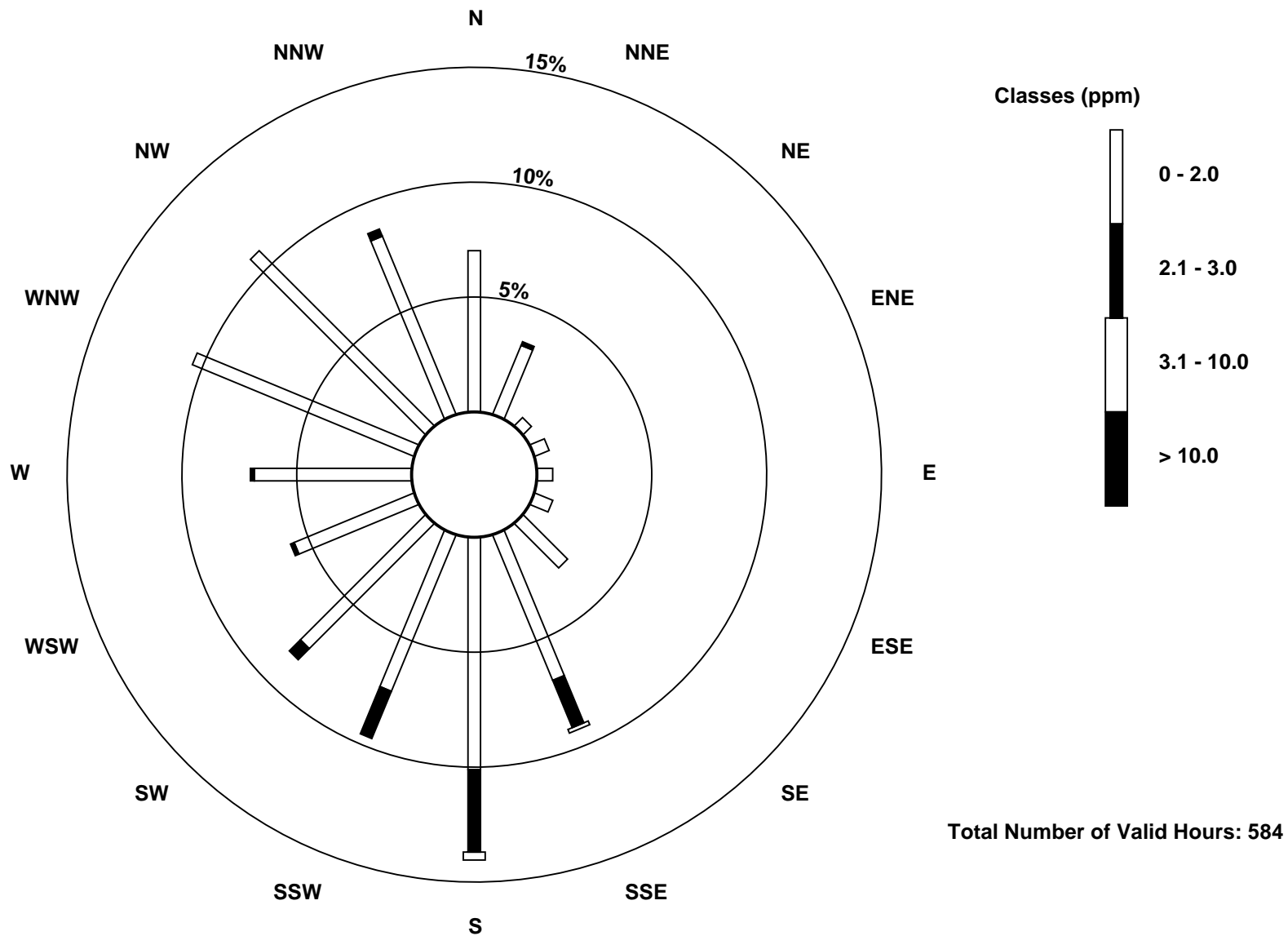
Total Number of Valid Hours: 584

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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



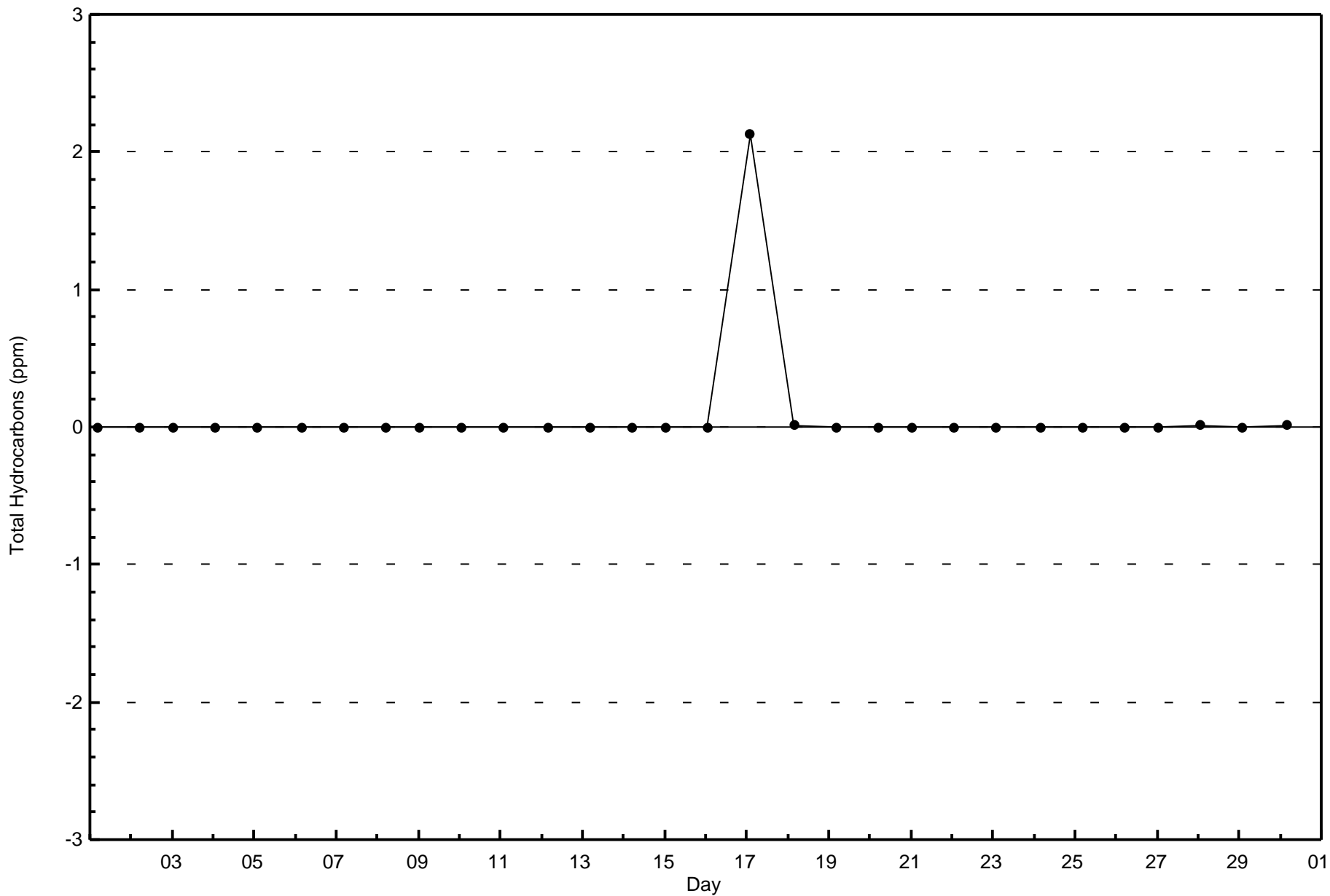


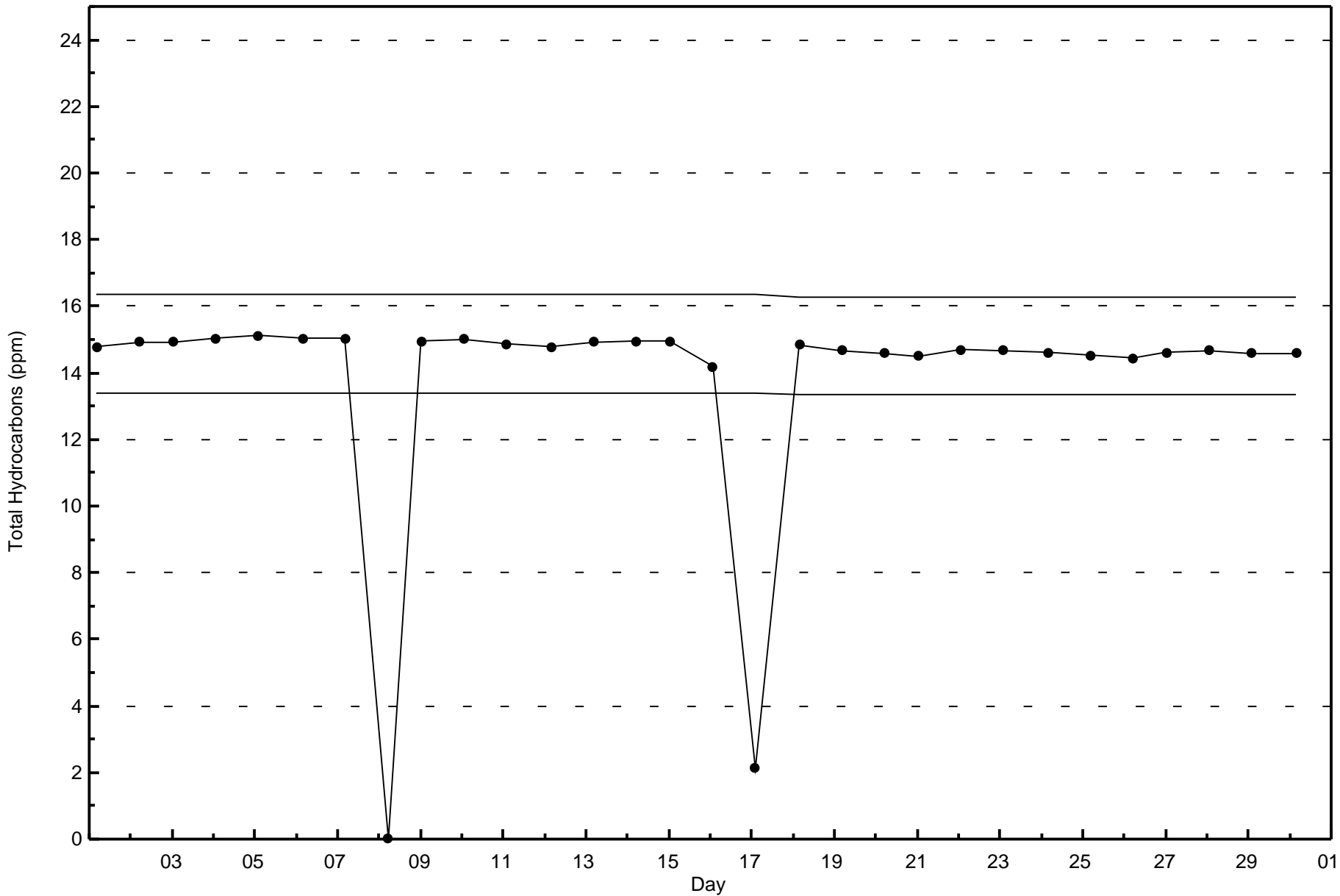
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - September 2015



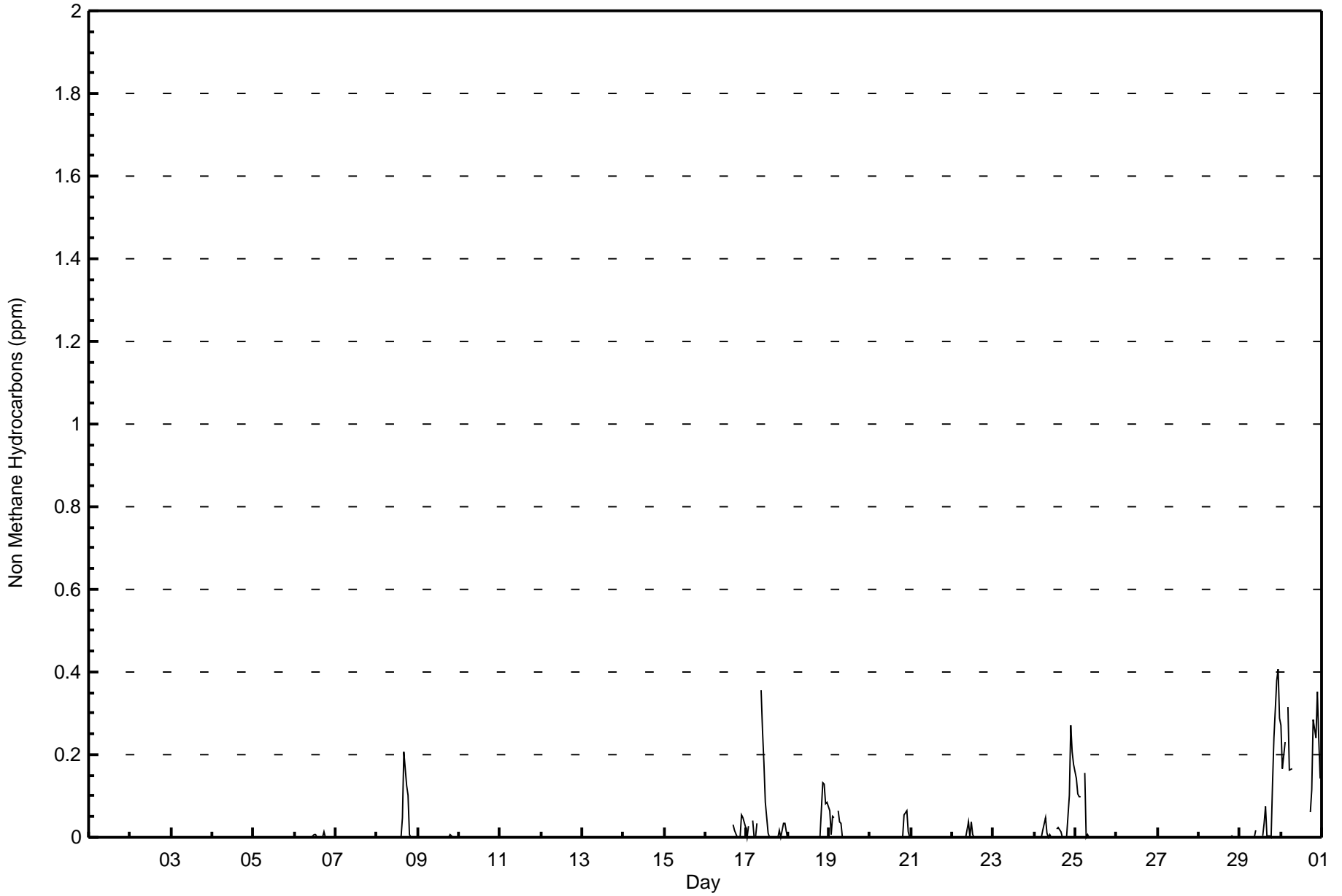




**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

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

Maximum Value: 0.406 ppm on Sep 29 23:00																	Maximum Daily Average: 0.079 ppm on Sep 29								Hours in Service: 720		
Minimum Value: 0.000 ppm on Sep 1 01:00																	Minimum Daily Average: 0.000 ppm on Sep 1								Hours of Data: 607		
Maximum Diurnal Average: 0.044 ppm at hour 22																	Minimum Diurnal Average: 0.001 ppm at hour 13								Hours of Missing Data: 113		
Monthly Average: 0.014 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> = 0.3								Hours of Calibration: 35		
																									Percent Operational Time: 89.2		
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-Sep	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-Sep	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3-Sep	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
4-Sep	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-Sep	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	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
6-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.012
7-Sep	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	
8-Sep	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	0.047	0.208	0.126	0.102	0.005	0.000	0.000	0.000	0.000	0.021	0.208	
9-Sep	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	0.007	0.000	0.000	0.000	0.000	0.000	0.007	
10-Sep	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	UO	0.000	0.000	UO	UO	0.000	0.000	0.000	0.000	0.000	0.000	
11-Sep	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0.000	0.000	0.000	0.000	--	0.000	
12-Sep	UO	0.000	UO	Z	UO	UO	UO	UO	UO	UO	M	M	M	M	M	M	M	M	0.000	0.000	0.000	0.000	0.000	0.000	--	0.000	
13-Sep	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		
14-Sep	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	
15-Sep	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	M	M	M	M	M	M	--	--	
16-Sep	M	M	M	M	M	M	M	M	M	M	C	C	C	C	C	C	0.031	0.019	0.000	0.000	0.000	0.053	0.047	0.024	--	0.053	
17-Sep	0.001	0.027	Z	0.040	0.000	0.001	0.035	M	0.356	0.259	0.179	0.085	0.010	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.034	0.034	0.013	0.013	0.050	0.356	
18-Sep	0.001	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	0.131	0.128	0.082	0.086	0.019	0.131	
19-Sep	0.064	0.008	0.052	0.046	Z	0.065	0.039	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.065	
20-Sep	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	0.053	0.063	0.015	0.000	0.006	0.063	
21-Sep	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-Sep	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.038	0.000	0.037	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.038	
23-Sep	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	
24-Sep	0.000	0.000	0.001	Z	0.000	0.017	0.047	0.011	0.000	0.007	0.000	0.000	DF	0.020	0.024	0.012	0.000	0.000	0.000	0.000	0.102	0.271	0.206	0.178	0.041	0.271	
25-Sep	0.144	0.105	0.099	0.098	Z	0.154	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.026	0.154	
26-Sep	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	M	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
27-Sep	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-Sep	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	0.003	0.001	0.000	0.000	0.000	0.003	
29-Sep	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.016	M	M	M	0.005	0.033	0.076	0.003	0.002	0.000	0.128	0.242	0.378	0.406	0.287	0.079	0.406	
30-Sep	0.271	0.165	0.231	Z	0.316	0.161	0.165	M	M	M	M	M	M	M	M	M	M	0.060	0.115	0.284	0.242	0.354	0.238	0.144	--	0.354	
	0.021 0.013 0.017 0.008 0.014 0.018 0.011 0.002 0.014 0.012 0.007 0.005 0.001 0.001 0.002 0.006 0.009 0.008 0.008 0.016 0.027 0.044 0.035 0.025																								Diurnal Average		
	0.271 0.165 0.231 0.098 0.316 0.161 0.165 0.033 0.356 0.259 0.179 0.085 0.010 0.020 0.033 0.076 0.208 0.126 0.115 0.284 0.242 0.378 0.406 0.287																								Diurnal Maximum		
Z - zerospan				C - Calibration				M - Maintenance				DF - DAS Failure				AF - Analyzer Failure				UO - Unstable Operation							







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	527	86.82	86.82
0.006 - 0.05	38	6.26	93.08
0.06 - 0.1	20	3.29	96.38
> 0.1	22	3.62	100.00

Total Number of Valid Hours: 607

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	39	19	2	2	4	5	16	46	56	42	46	32	38	61	60	49	517
0.006 - 0.05	2	0	1	1	0	0	0	3	14	3	2	2	3	0	2	1	34
0.06 - 0.1	0	0	0	1	0	0	0	2	4	6	0	0	0	0	1	1	15
> 0.1	0	1	0	0	0	0	0	3	8	5	1	0	0	0	0	0	18
<b>Totals</b>	41	20	3	4	4	5	16	54	82	56	49	34	41	61	63	51	584

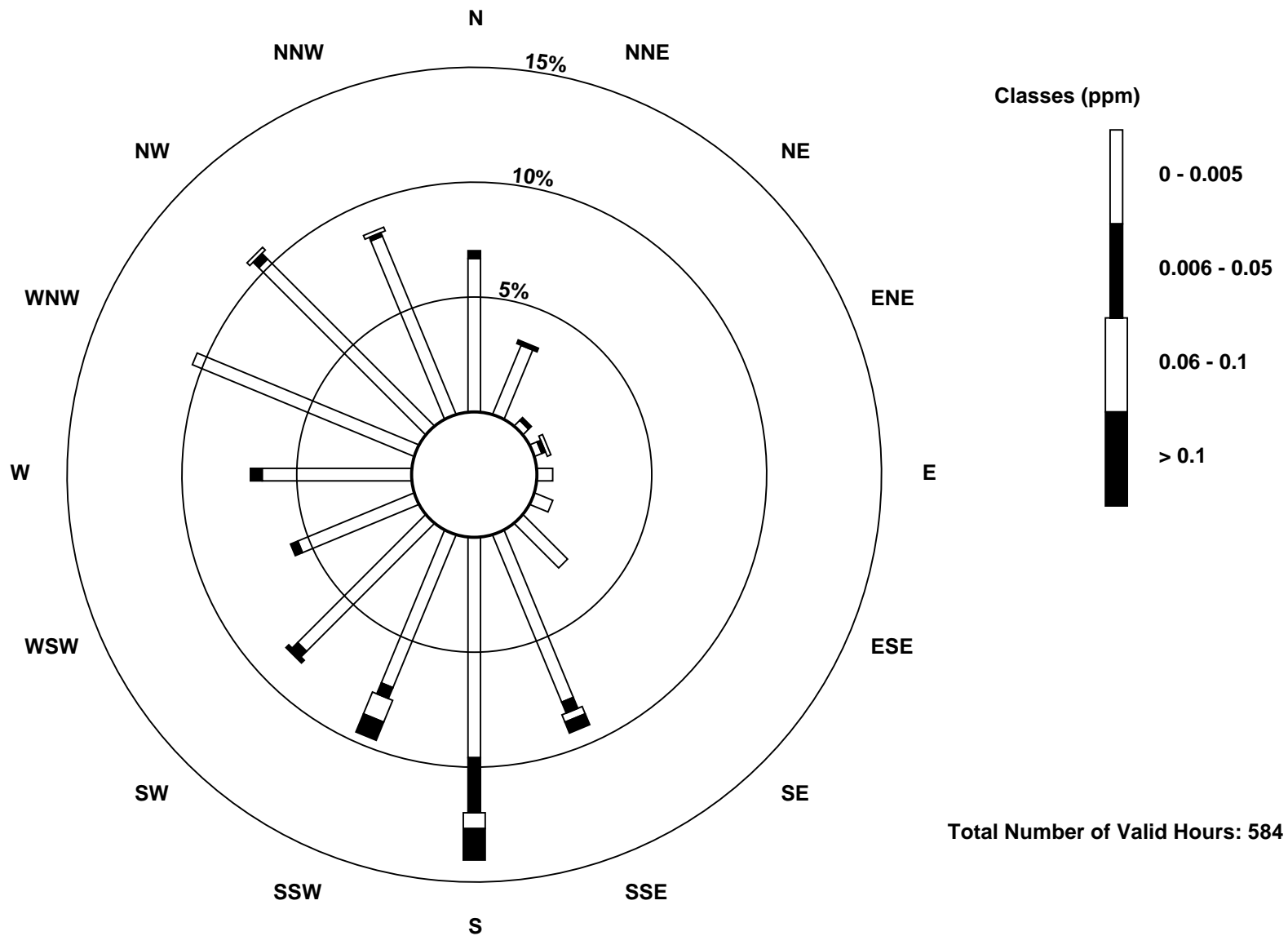
Total Number of Valid Hours: 584

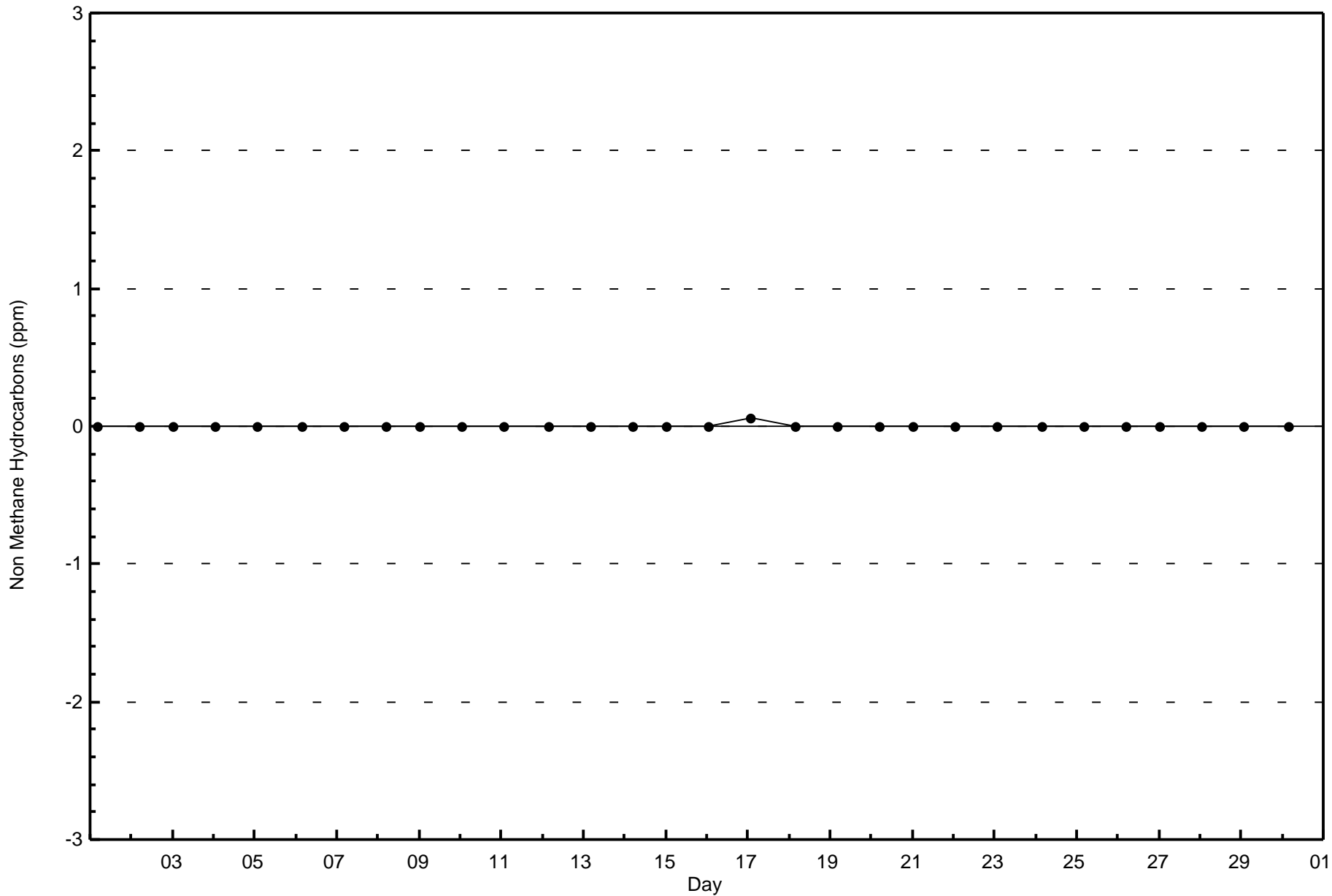
Total Number of Hours: 720

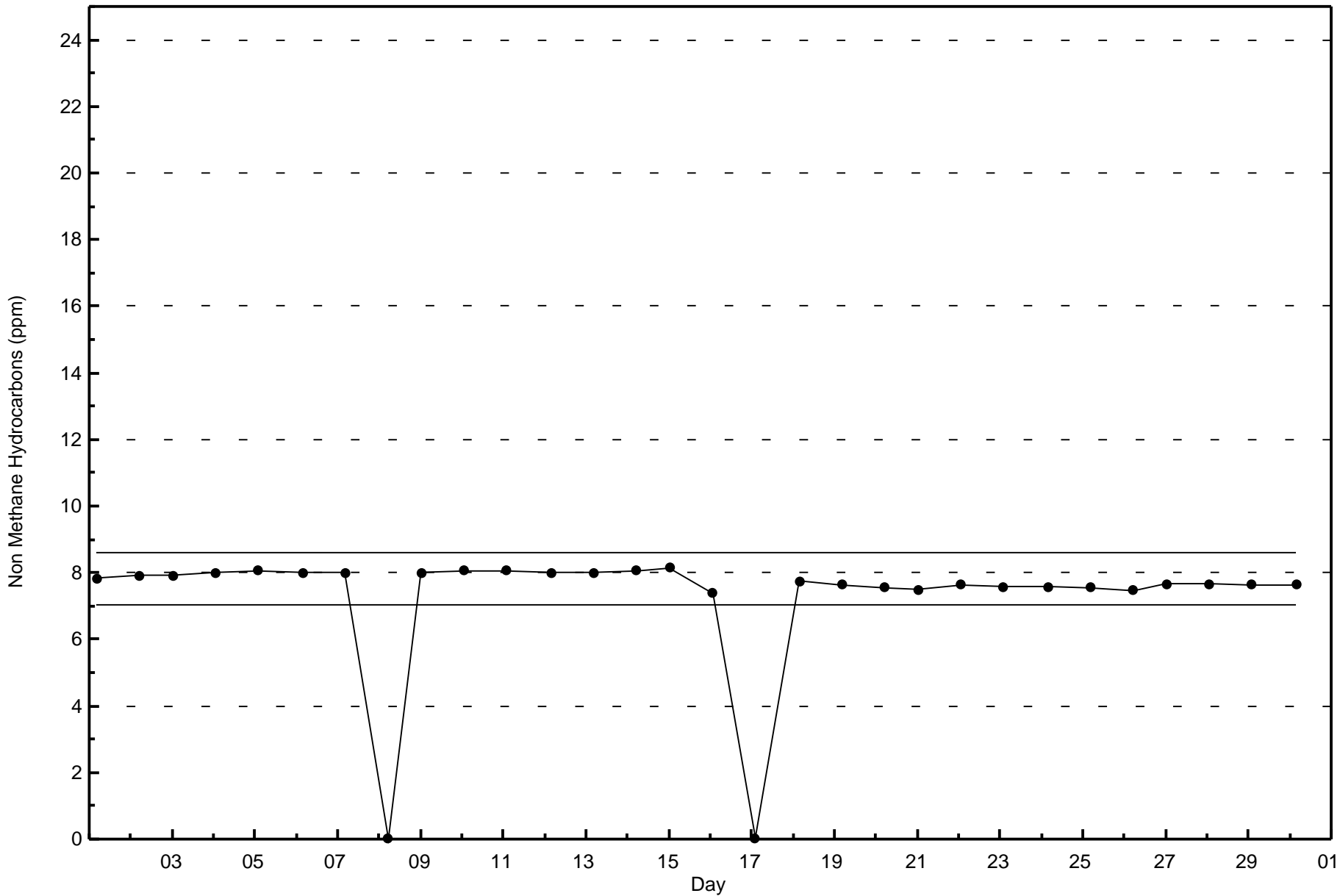


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

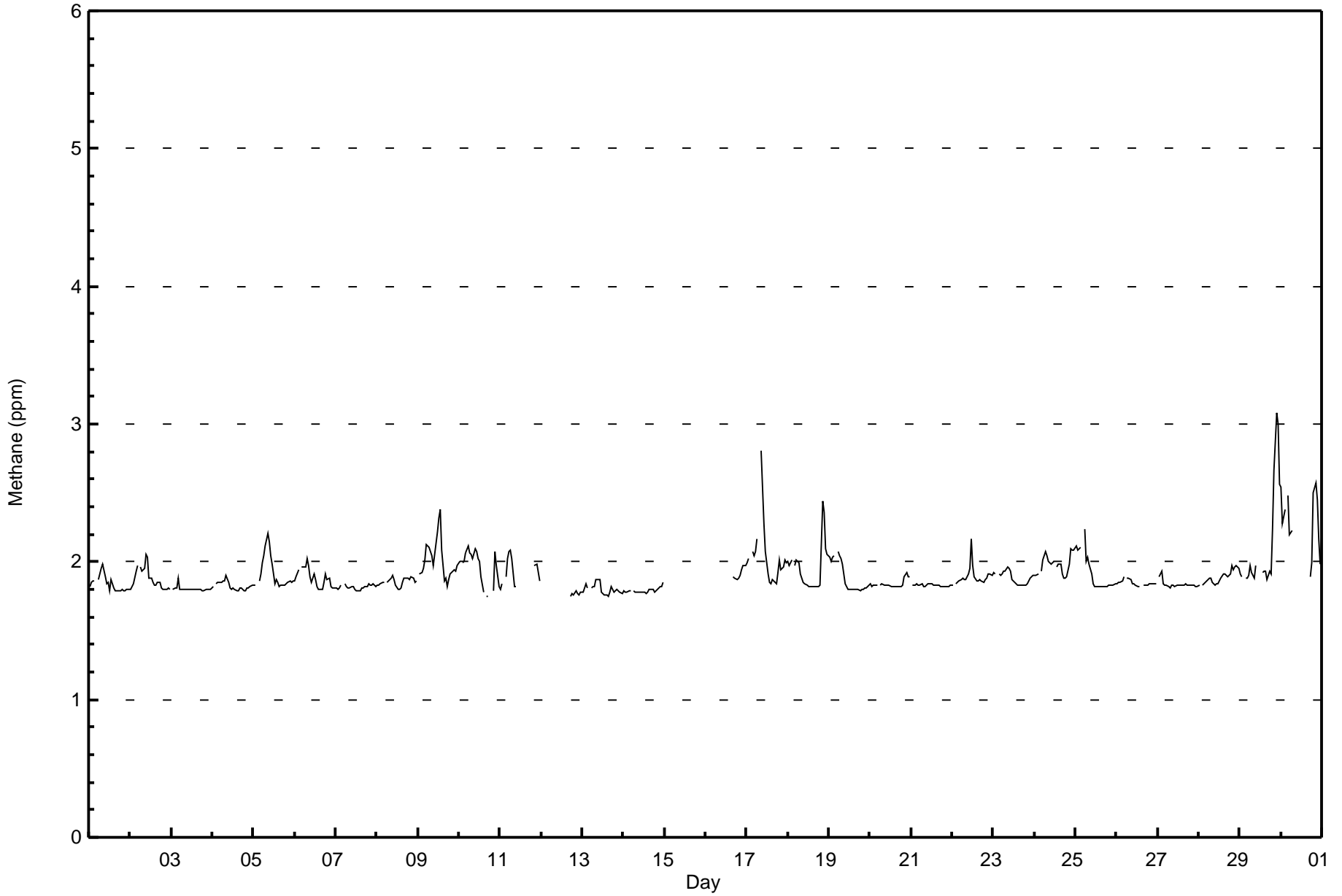
Non Methane Hydrocarbons (NMHC) - ppm  
Fort McKay - Bertha Ganter (AMS 1)













**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	549	90.44	90.44
2.1 - 3.0	57	9.39	99.84
3.1 - 10.0	1	0.16	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 607

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	41	20	3	4	4	5	16	40	65	44	45	33	41	61	63	49	534
2.1 - 3.0	0	0	0	0	0	0	0	14	16	12	4	1	0	0	0	2	49
3.1 - 10.0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	41	20	3	4	4	5	16	54	82	56	49	34	41	61	63	51	584

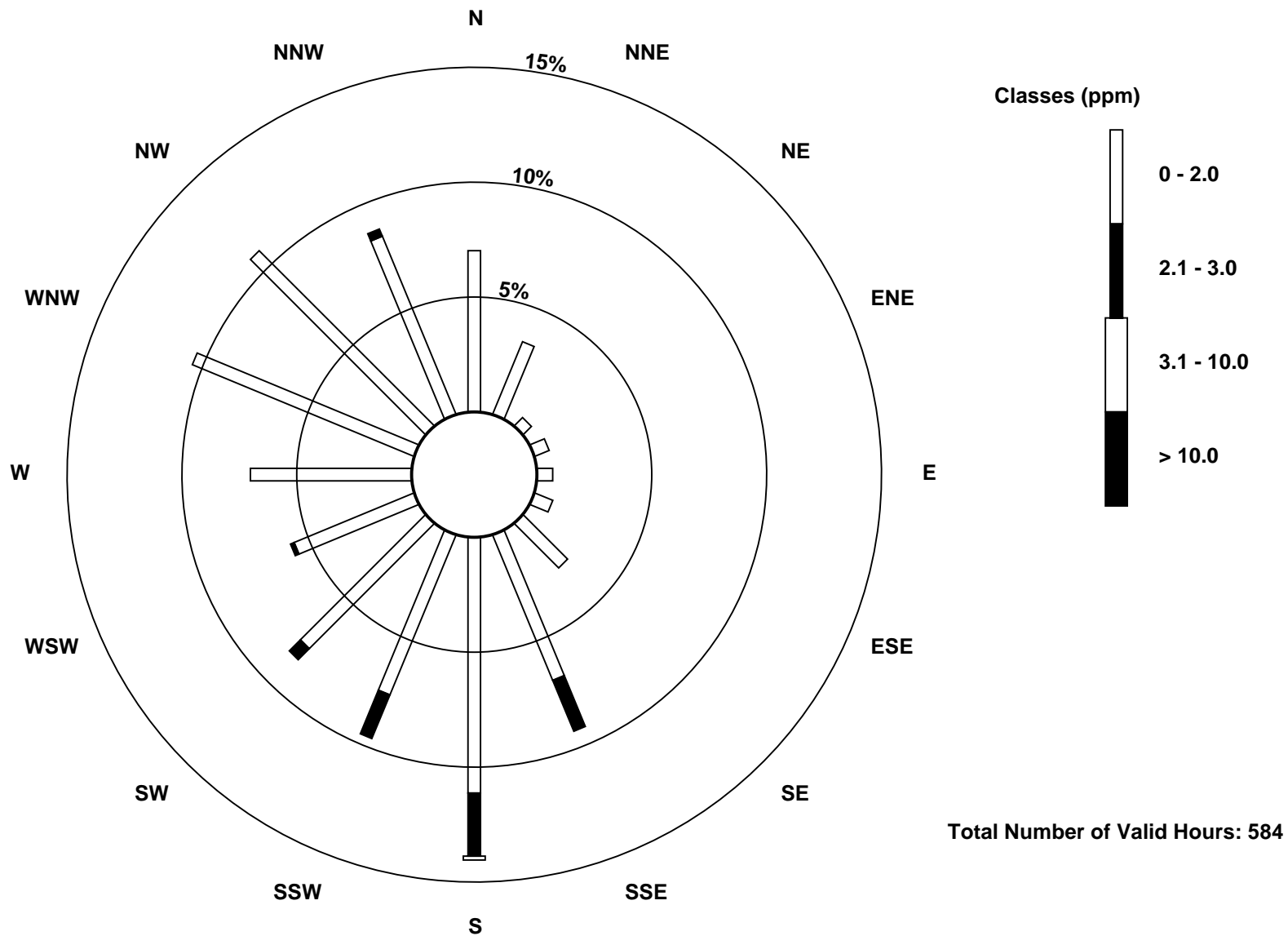
Total Number of Valid Hours: 584

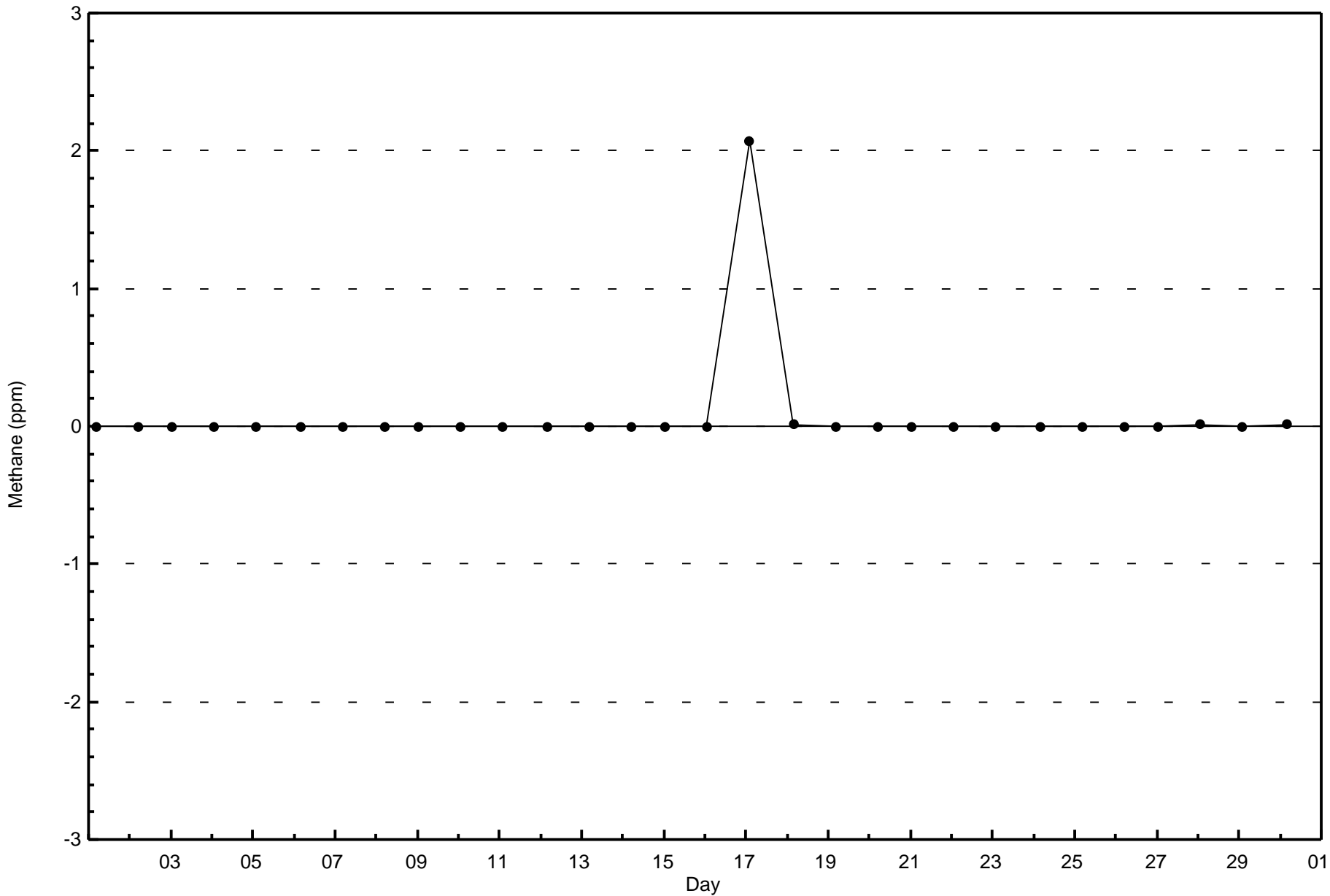
Total Number of Hours: 720

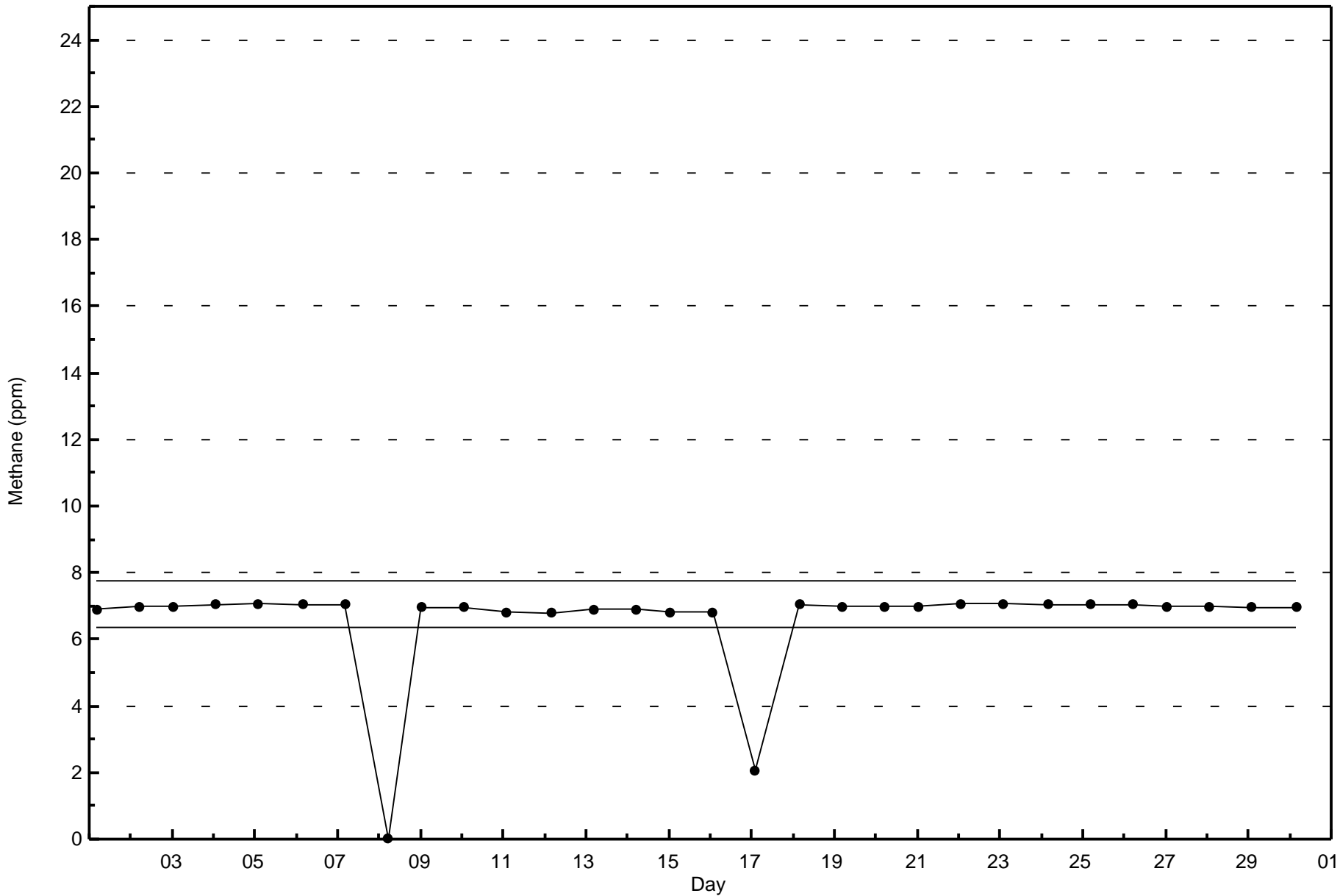


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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









Summary of Hour Averages

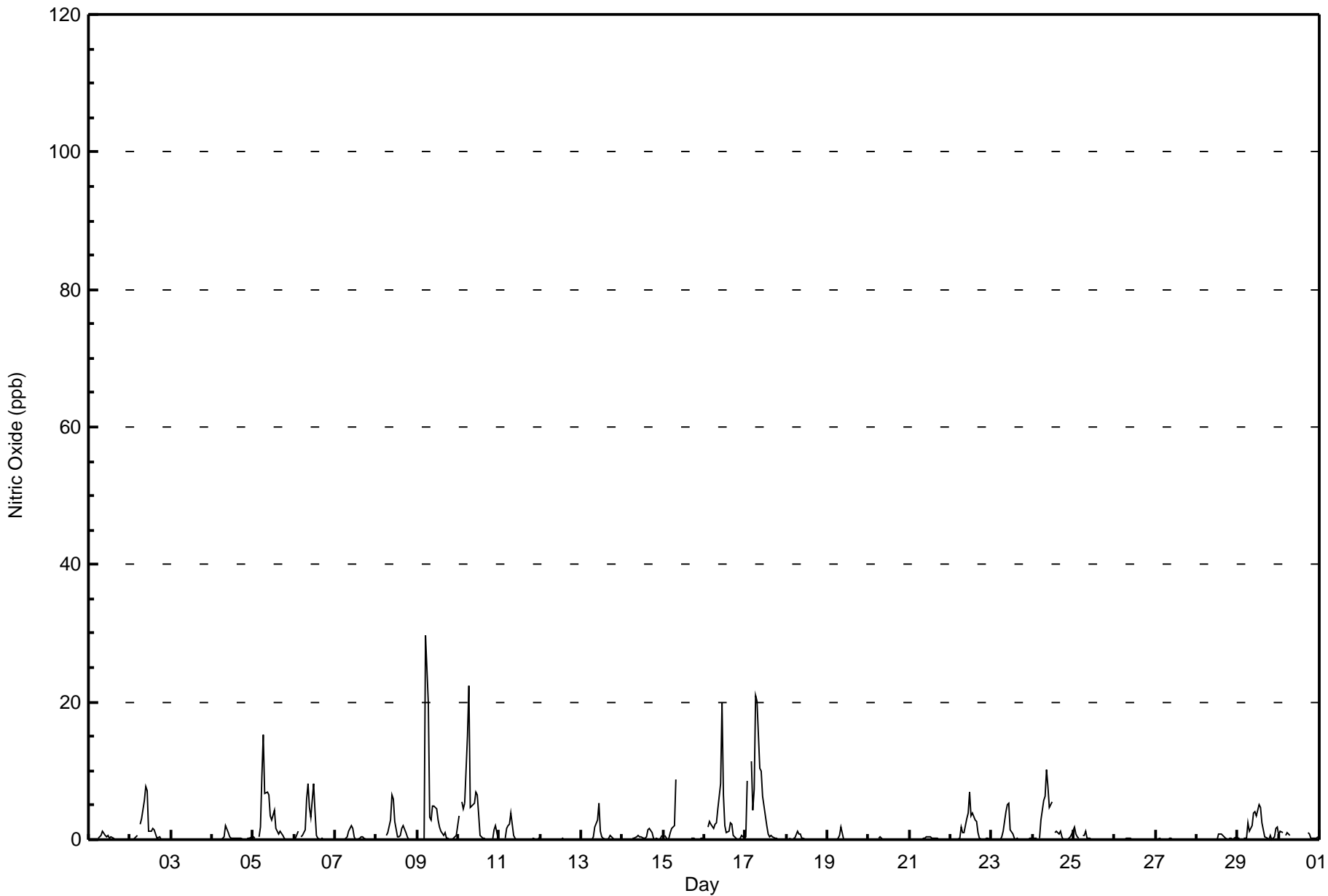
Fort McKay - Bertha Ganter - September 2015

Maximum Value: 30 ppb on Sep 9 06:00	Maximum Daily Average: 4.7 ppb on Sep 17	Hours in Service: 720
Minimum Value: 0 ppb on Sep 1 01:00	Minimum Daily Average: 0.0 ppb on Sep 3	Hours of Data: 669
Maximum Diurnal Average: 3.4 ppb at hour 7	Minimum Diurnal Average: 0.0 ppb at hour 21	Hours of Missing Data: 51
Monthly Average: 1.1 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 4 P <sub>99</sub> = 14	Hours of Calibration: 38
		Percent Operational Time: 98.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	0	0	0	Z	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
2-Sep	0	0	0	0	1	Z	2	3	6	8	7	1	1	2	1	1	0	1	0	0	0	0	0	0	1.5	8
3-Sep	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
4-Sep	0	Z	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
5-Sep	0	0	Z	0	2	9	15	7	7	6	4	3	4	2	1	1	1	1	0	0	0	0	0	0	2.8	15
6-Sep	0	0	1	Z	0	1	1	6	8	5	3	8	4	1	0	0	0	0	0	0	0	0	0	0	1.7	8
7-Sep	0	0	0	0	Z	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
8-Sep	0	0	0	0	0	Z	1	1	3	6	6	3	0	0	1	2	2	1	0	0	0	0	0	0	1.1	6
9-Sep	Z	0	0	0	0	30	20	3	3	5	5	4	3	2	1	1	1	0	0	0	0	0	0	1	3.5	30
10-Sep	3	Z	5	4	5	15	22	5	5	5	7	6	4	1	0	0	0	0	0	0	0	2	2	0	4.0	22
11-Sep	0	0	Z	0	2	2	2	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4
12-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-Sep	0	0	0	0	Z	0	0	0	2	3	5	1	0	0	0	0	0	1	0	0	0	0	0	0	0.6	5
14-Sep	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	1	2	1	0	0	0	0	1	0.4	2
15-Sep	Z	1	0	0	1	2	2	9	C	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	--	9
16-Sep	0	Z	2	3	2	2	2	2	5	8	20	6	2	1	1	3	2	1	0	0	0	0	1	0	2.7	20
17-Sep	0	9	Z	11	4	7	21	20	10	10	6	5	2	1	0	1	0	0	0	0	0	0	0	0	4.7	21
18-Sep	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
19-Sep	0	0	0	0	Z	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2
20-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Sep	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
22-Sep	0	Z	0	0	0	0	2	1	1	3	4	7	3	4	3	3	1	0	0	0	0	0	0	0	1.4	7
23-Sep	0	0	Z	0	0	0	0	1	4	5	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0.8	5
24-Sep	0	0	0	Z	0	3	6	6	10	8	5	6	DF	1	1	1	1	0	0	0	0	0	1	1	2.3	10
25-Sep	2	1	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
26-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Sep	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
28-Sep	0	Z	0	0	0	0	0	0	0	0	M	M	0	1	1	1	0	0	0	0	0	0	0	0	0.2	1
29-Sep	0	0	Z	0	0	0	2	1	2	4	4	4	5	5	2	1	0	0	0	1	0	0	2	2	1.6	5
30-Sep	1	1	1	Z	1	1	1	M	M	M	M	M	M	M	M	M	M	1	1	0	0	0	0	0	--	1

0.3	0.5	0.4	0.8	0.8	2.9	3.4	2.6	2.7	2.9	3.1	2.1	1.2	0.7	0.5	0.5	0.4	0.3	0.1	0.1	0.0	0.1	0.2	0.2	Diurnal Average	
3	9	5	11	5	30	22	20	10	10	20	8	5	5	3	3	2	1	1	1	0	2	2	2	Diurnal Maximum	

Z - zerospan      C - Calibration      M - Maintenance      DF - DAS Failure





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	666	99.55	99.55
21 - 40	3	0.45	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 669

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	42	20	3	4	4	5	17	61	85	60	60	37	53	76	65	51	643
21 - 40	0	0	0	0	0	0	0	0	1	1	0	1	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>	42	20	3	4	4	5	17	61	86	61	60	38	53	76	65	51	646

Total Number of Valid Hours: 646

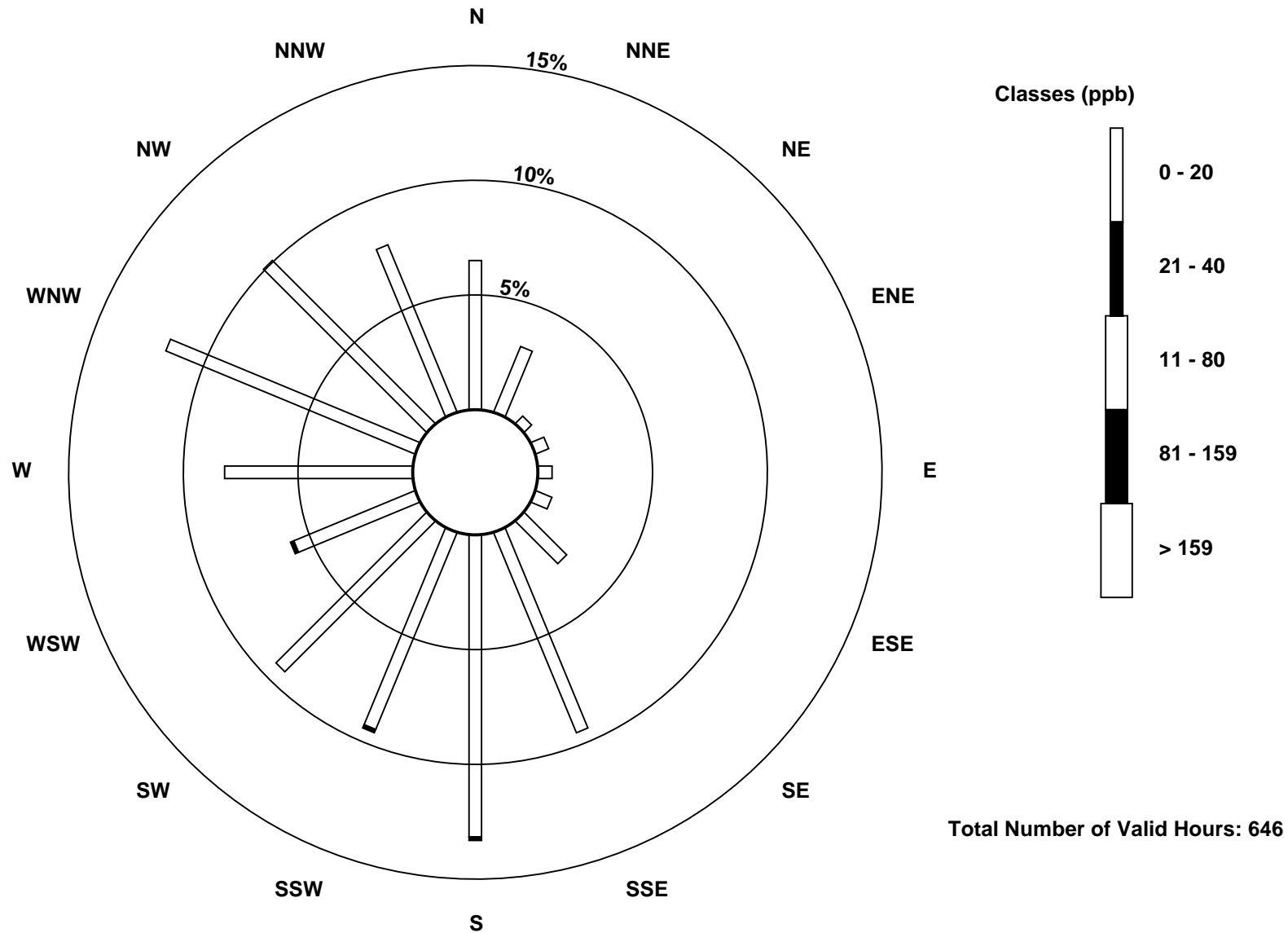
Total Number of Hours: 720

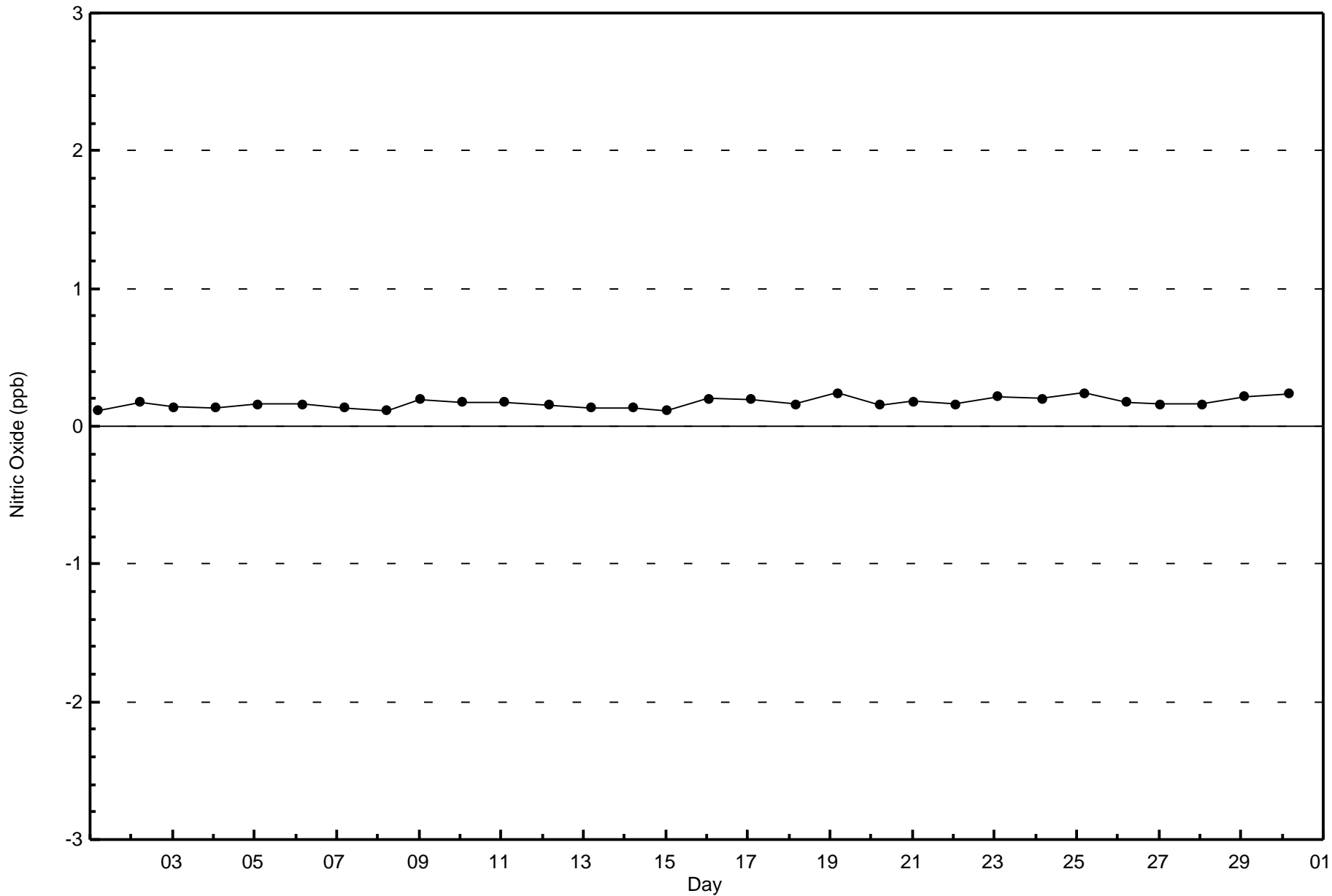


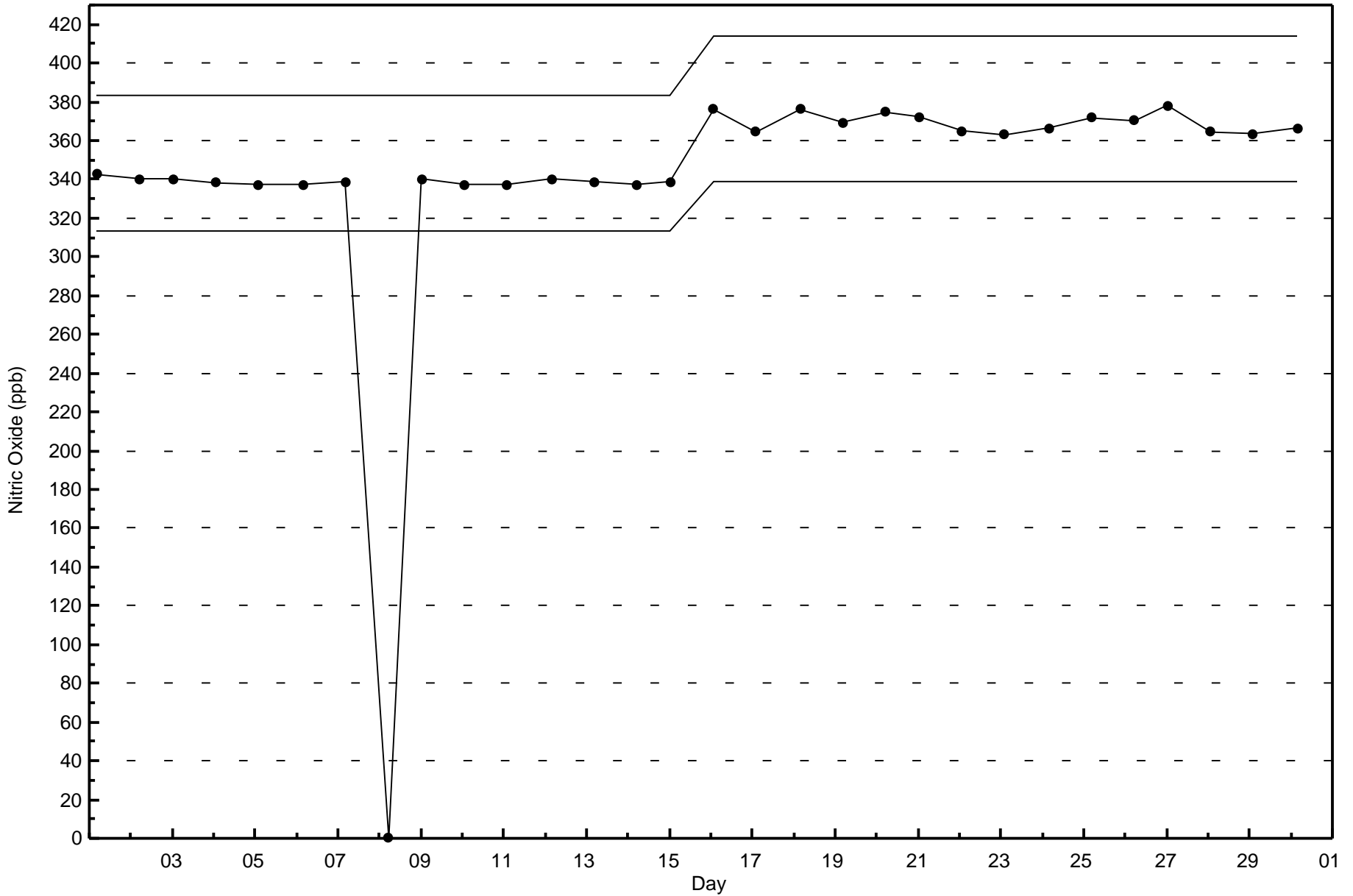


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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







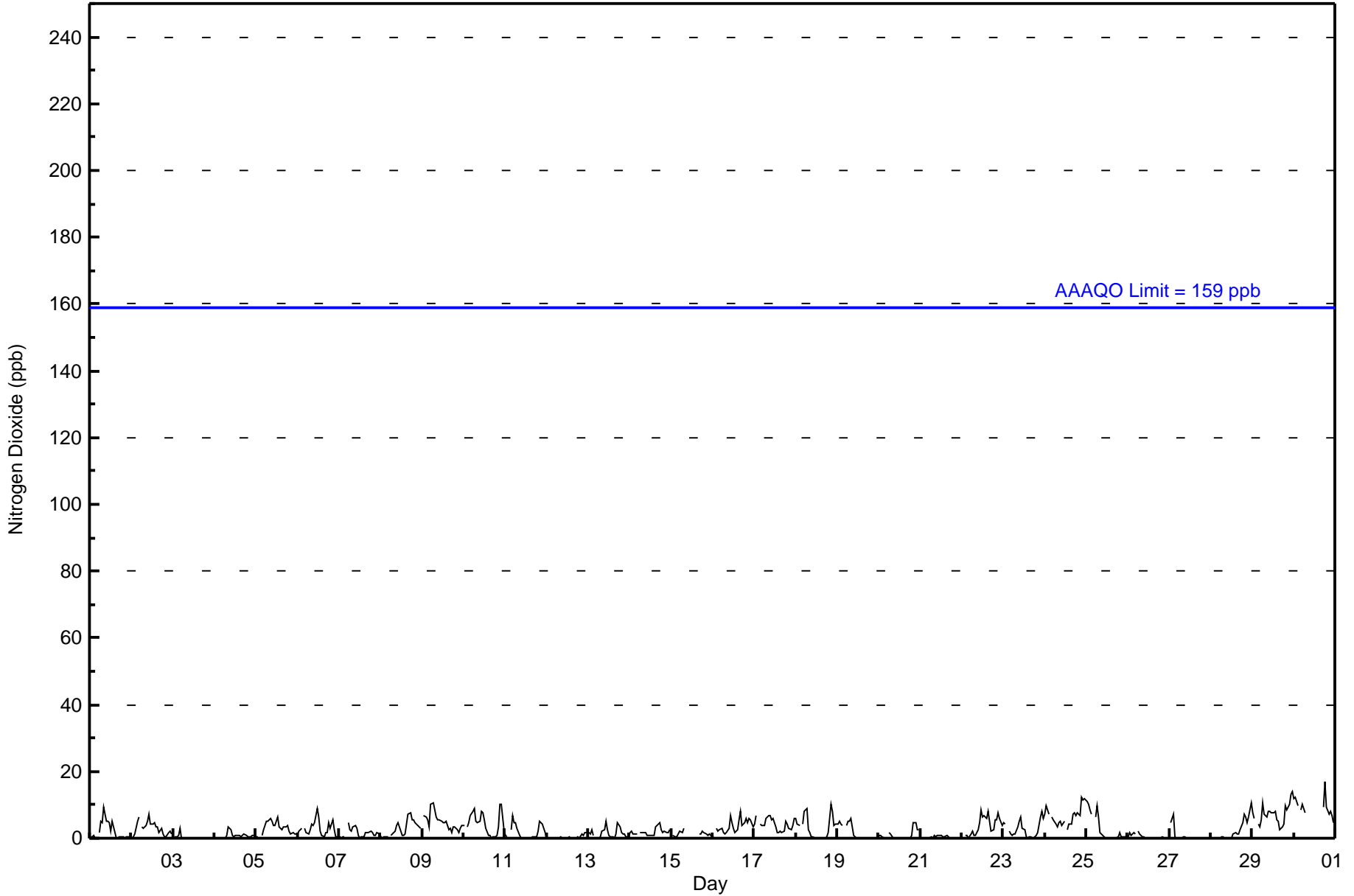


Number of Exceedences (AAAO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 17 ppb on Sep 30 19:00	Maximum Daily Average: 7.3 ppb on Sep 29		Hours of Data:	669
Minimum Value: 0 ppb on Sep 3 06:00	Minimum Daily Average: 0.2 ppb on Sep 3		Hours of Missing Data:	51
Maximum Diurnal Average: 3.5 ppb at hour 7	Minimum Diurnal Average: 1.5 ppb at hour 15		Hours of Calibration:	38
Monthly Average: 2.7 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 Q <sub>3</sub> = 5 P <sub>90</sub> = 7 P <sub>99</sub> = 12		Percent Operational Time:	98.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	1	1	1	0	Z	2	5	5	10	5	5	5	2	5	2	0	0	0	0	0	0	0	1	0	2.1	10
2-Sep	0	0	1	5	6	Z	3	3	4	5	7	4	4	5	3	4	2	3	1	1	1	2	2	1	2.9	7
3-Sep	Z	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3
4-Sep	0	Z	0	0	0	0	0	1	3	3	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0.8	3
5-Sep	0	0	Z	1	3	4	5	5	6	5	4	4	6	3	3	2	3	3	4	2	1	2	1	1	3.0	6
6-Sep	1	2	3	Z	3	2	1	3	4	4	5	9	7	2	1	1	2	2	5	3	6	3	1	0	2.9	9
7-Sep	0	0	0	0	Z	5	3	2	4	4	3	1	0	0	1	2	2	2	2	2	1	1	2	1	1.5	5
8-Sep	1	0	1	0	0	Z	1	1	2	4	5	4	1	1	1	4	7	8	6	5	5	4	4	3	2.9	8
9-Sep	Z	7	6	5	3	10	11	8	7	6	6	5	5	5	5	2	3	2	3	3	3	2	3	4	4.9	11
10-Sep	4	Z	3	5	7	8	9	5	5	5	8	8	6	3	1	1	0	0	0	1	3	10	10	2	4.5	10
11-Sep	1	1	Z	3	7	5	5	3	1	0	0	0	0	0	0	0	0	0	1	2	5	4	3	2	1.8	7
12-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	0.3	2
13-Sep	2	1	3	1	Z	0	0	1	2	3	5	2	1	0	0	0	1	5	3	2	1	1	0	0	1.5	5
14-Sep	2	2	1	1	1	Z	2	2	2	2	1	1	1	1	1	3	4	5	3	2	2	2	2	3	1.8	5
15-Sep	Z	1	0	0	1	2	2	3	C	C	C	C	C	C	C	C	C	1	1	2	2	1	1	1	--	3
16-Sep	1	Z	3	2	3	3	2	1	2	3	7	5	3	2	2	6	8	4	5	6	5	6	6	4	3.7	8
17-Sep	4	7	Z	4	4	4	4	6	7	7	6	6	3	2	2	2	2	2	5	4	3	3	4	6	4.1	7
18-Sep	6	4	4	Z	4	8	9	3	2	0	0	0	0	0	0	0	0	0	0	2	10	8	4	4	3.0	10
19-Sep	4	5	4	4	Z	4	5	5	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	6
20-Sep	1	1	0	0	0	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	1	5	5	3	2	0.9	5
21-Sep	Z	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.3	1
22-Sep	0	Z	1	1	0	1	2	1	1	2	5	9	6	7	6	8	5	2	3	5	5	8	6	4	3.8	9
23-Sep	5	4	Z	2	1	1	1	1	3	5	7	3	2	1	0	1	1	0	0	1	2	6	8	6	2.7	8
24-Sep	7	10	7	Z	7	5	4	3	5	5	4	5	DF	2	4	4	7	8	7	8	7	12	11	12	6.5	12
25-Sep	11	10	9	7	Z	6	10	6	2	1	1	0	0	0	0	0	0	0	1	2	0	0	1	0	2.9	11
26-Sep	0	2	1	2	1	Z	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
27-Sep	Z	5	7	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	7
28-Sep	0	Z	0	0	0	0	0	0	0	0	M	M	0	1	2	1	1	3	5	7	6	5	6	11	2.3	11
29-Sep	8	6	Z	4	3	6	11	7	7	8	8	8	8	8	6	5	3	3	4	10	9	10	13	14	7.3	14
30-Sep	12	12	10	Z	8	10	8	M	M	M	M	M	M	M	M	M	M	10	17	9	7	8	7	5	--	17

2.8	3.3	2.7	2.0	2.6	3.4	3.5	2.7	3.0	2.8	3.2	2.9	2.1	1.8	1.5	1.7	1.9	2.1	2.6	2.7	3.0	3.4	3.3	3.0	Diurnal Average		
12	12	10	7	8	10	11	8	10	8	8	8	9	8	8	6	8	8	10	17	10	10	12	13	14	Diurnal Maximum	

Z - zerspan      C - Calibration      M - Maintenance      DF - DAS Failure  
 Alberta Ambient Air Quality Objectives (AAAO): 1-hr 159 ppb





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	669	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: 669

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	42	20	3	4	4	5	17	61	86	61	60	38	53	76	65	51	646
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>	42	20	3	4	4	5	17	61	86	61	60	38	53	76	65	51	646

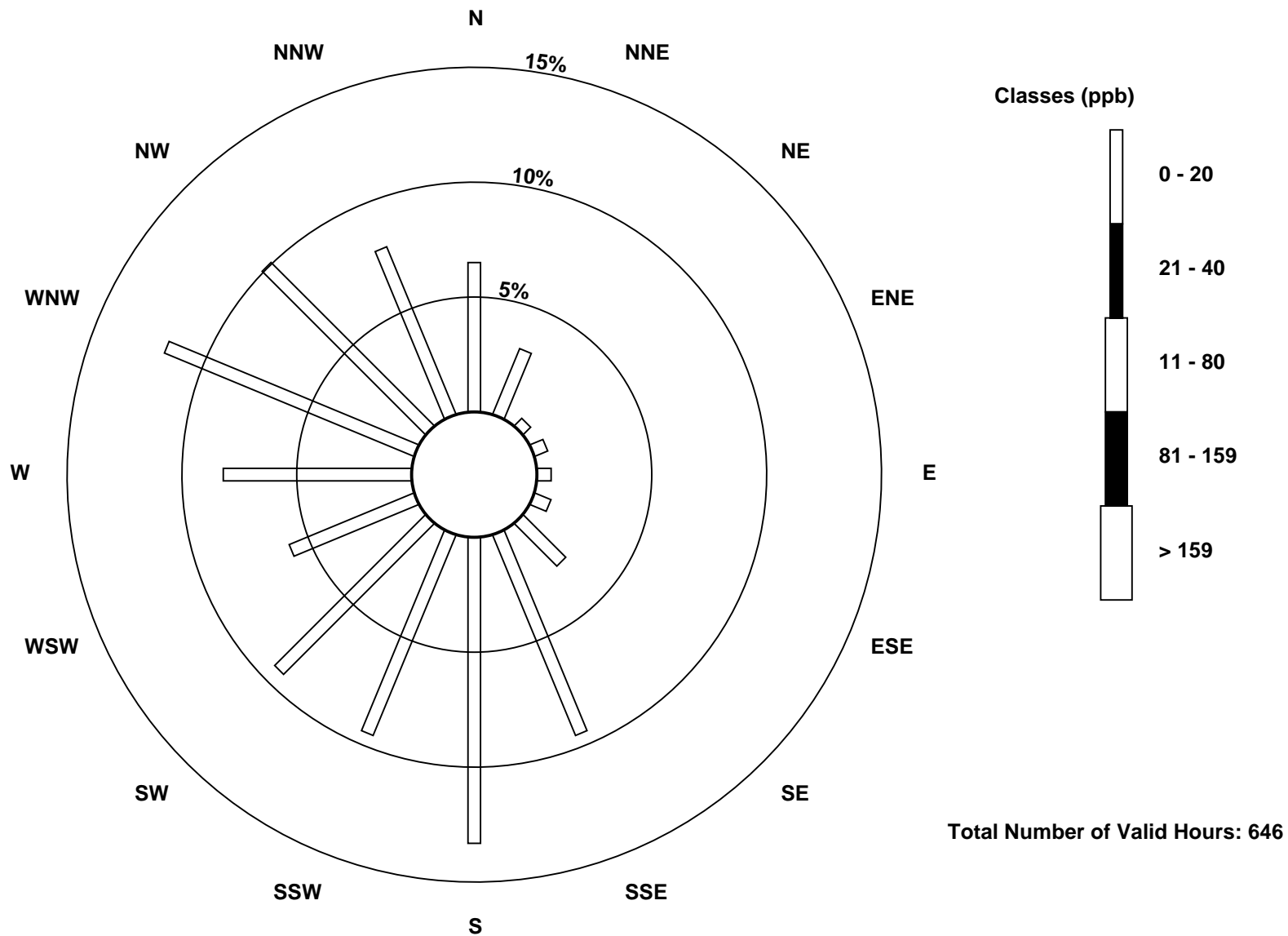
Total Number of Valid Hours: 646

Total Number of Hours: 720

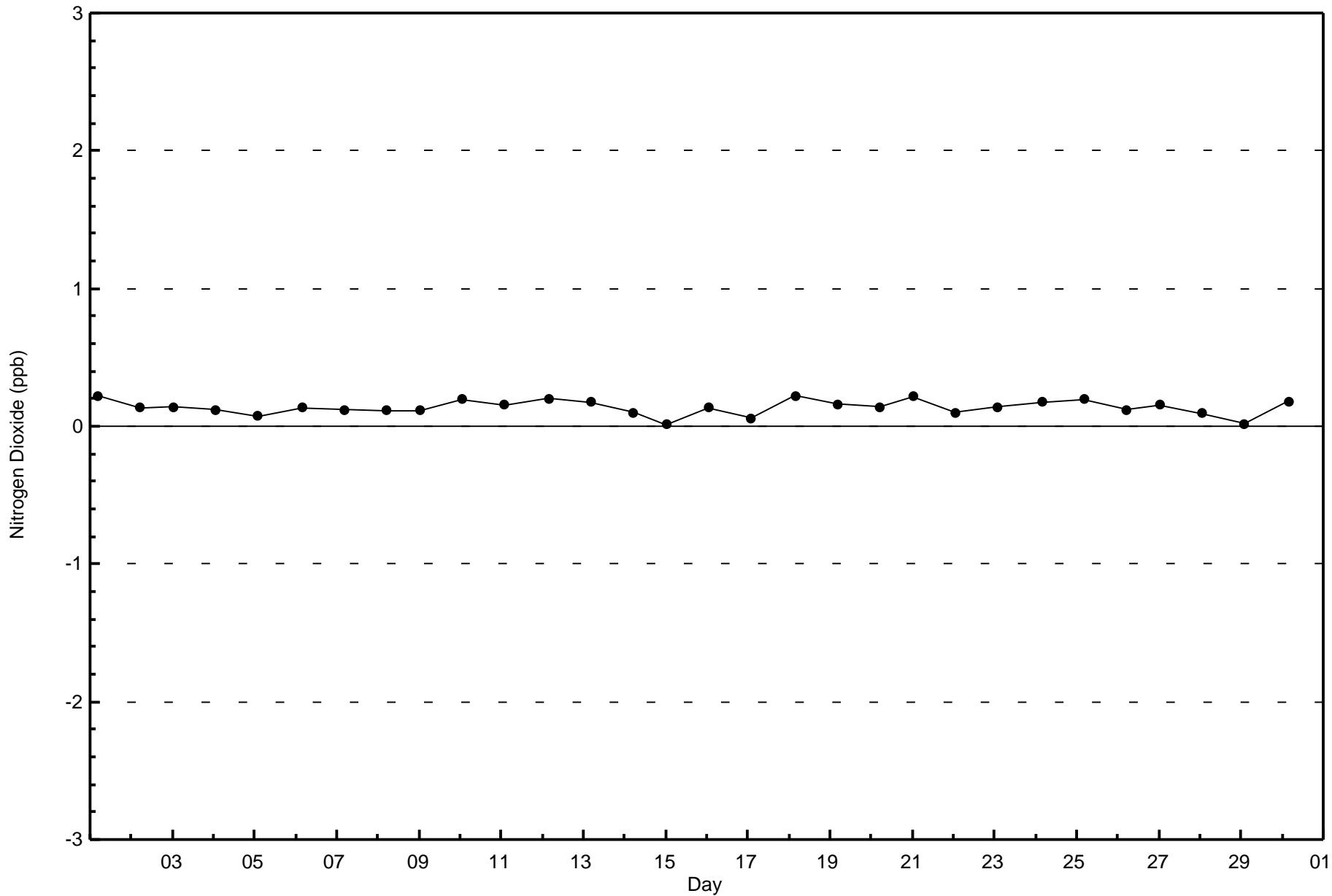


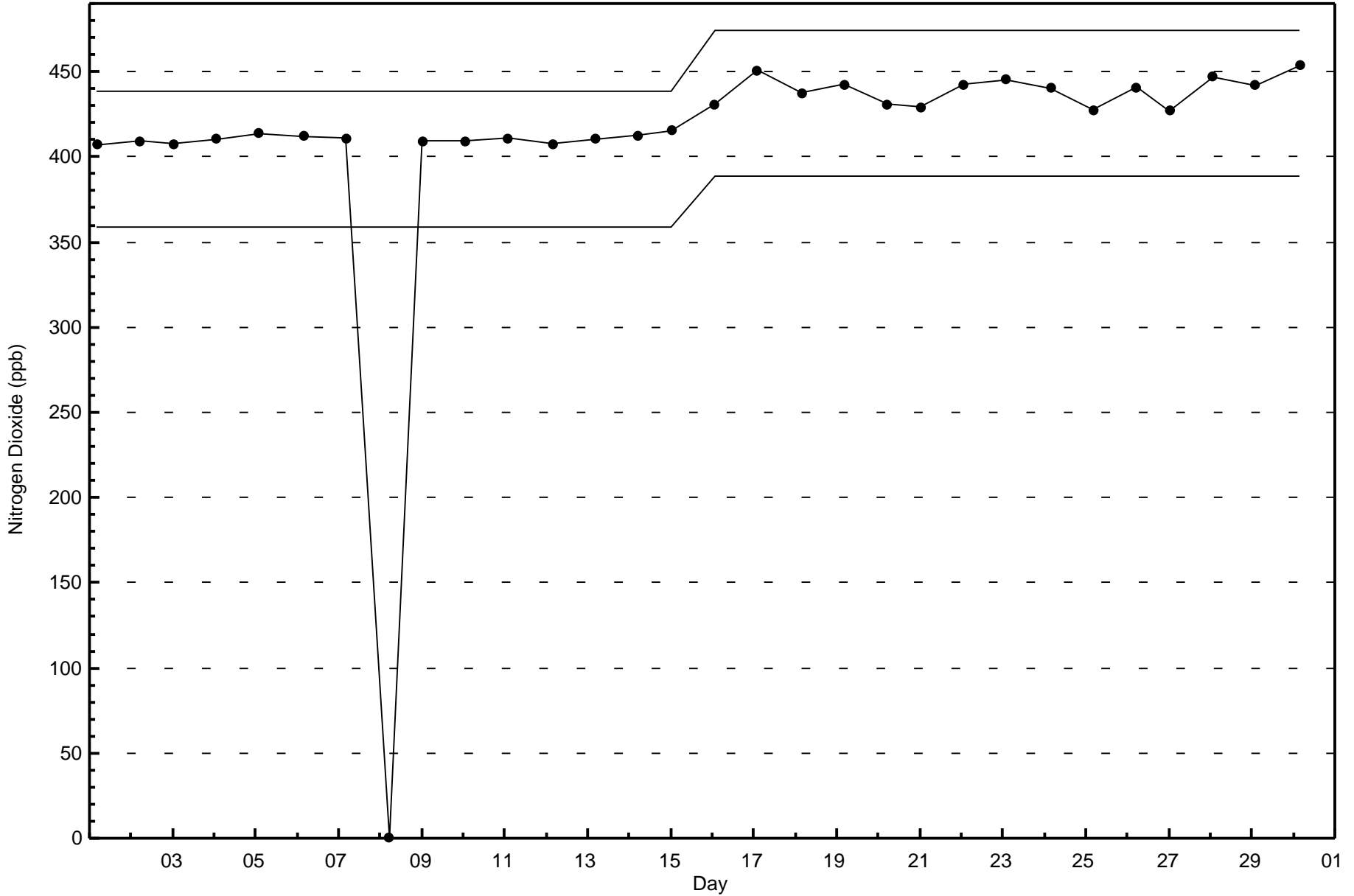
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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









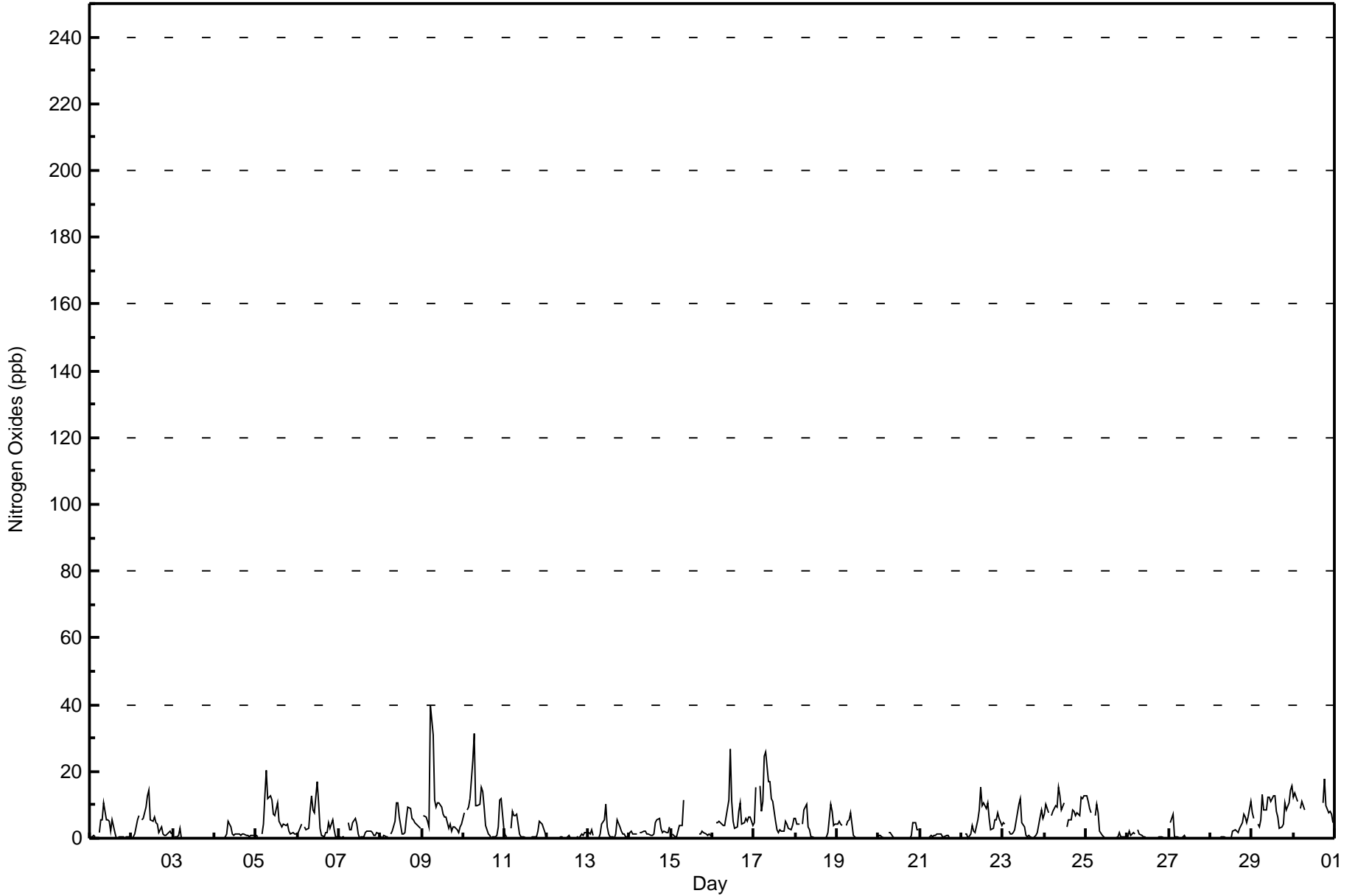


Maximum Value: 40 ppb on Sep 9 06:00	Maximum Daily Average: 8.9 ppb on Sep 17	Hours in Service: 720
Minimum Value: 0 ppb on Sep 3 07:00	Minimum Daily Average: 0.2 ppb on Sep 3	Hours of Data: 669
Maximum Diurnal Average: 7.0 ppb at hour 7	Minimum Diurnal Average: 2.0 ppb at hour 15	Hours of Missing Data: 51
Monthly Average: 3.8 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 O <sub>3</sub> = 6 P <sub>90</sub> = 10 P <sub>99</sub> = 23	Hours of Calibration: 38
		Percent Operational Time: 98.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	1	1	1	0	Z	2	5	5	11	6	5	5	2	5	2	0	0	0	0	0	0	0	1	0	2.3	11	
2-Sep	0	0	1	5	7	Z	6	6	9	13	14	6	5	6	5	4	2	3	1	1	1	2	2	1	4.4	14	
3-Sep	Z	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3	
4-Sep	0	Z	0	0	0	0	0	1	5	3	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1.0	5	
5-Sep	1	1	Z	1	4	13	20	12	13	11	7	7	11	5	4	3	4	4	4	4	2	1	2	1	1	5.8	20
6-Sep	1	2	4	Z	3	3	3	8	13	8	8	17	11	3	1	1	2	2	5	3	6	3	1	0	4.6	17	
7-Sep	0	0	0	0	Z	5	3	2	5	6	4	1	0	0	1	2	2	2	2	1	1	1	2	1	1.9	6	
8-Sep	1	0	1	0	0	Z	1	2	5	10	11	6	1	1	2	6	9	9	6	5	5	4	4	3	4.0	11	
9-Sep	Z	7	7	5	3	40	31	12	9	10	11	9	7	6	6	3	4	2	3	4	3	2	3	4	8.4	40	
10-Sep	7	Z	9	9	12	23	31	10	10	10	15	14	9	4	1	1	0	0	0	1	3	12	12	2	8.6	31	
11-Sep	1	1	Z	3	8	7	7	7	1	0	0	0	0	0	0	0	0	0	1	2	5	4	3	2	2.3	8	
12-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	2	0.3	2	
13-Sep	2	1	2	1	Z	0	0	1	4	5	10	3	1	1	0	0	1	5	3	2	1	1	0	0	2.1	10	
14-Sep	2	2	1	1	1	Z	2	2	2	2	1	1	1	1	1	5	6	6	3	2	2	2	2	3	2.2	6	
15-Sep	Z	1	1	1	2	4	4	12	C	C	C	C	C	C	C	C	1	1	2	2	1	1	1	1	--	12	
16-Sep	1	Z	5	5	5	4	4	4	6	11	27	11	5	3	3	8	11	4	5	6	5	6	6	4	6.5	27	
17-Sep	5	15	Z	16	8	11	25	26	17	17	12	11	5	2	2	3	2	2	5	4	3	2	4	6	8.9	26	
18-Sep	6	4	4	Z	4	8	10	4	2	0	1	0	0	0	0	0	0	0	0	2	10	8	4	4	3.2	10	
19-Sep	4	5	4	4	Z	4	5	6	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.8	8	
20-Sep	1	1	0	0	0	Z	2	2	0	0	0	0	0	0	0	0	0	0	0	0	1	5	5	3	2	0.9	5
21-Sep	Z	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1	
22-Sep	0	Z	1	1	0	1	4	2	2	6	8	15	10	11	9	11	6	2	3	5	5	8	6	4	5.2	15	
23-Sep	5	4	Z	2	1	1	2	2	7	10	12	5	3	1	0	1	1	0	0	1	2	6	8	6	3.5	12	
24-Sep	7	10	7	Z	7	8	10	9	15	13	8	10	DF	3	5	5	8	8	7	8	7	12	12	13	8.8	15	
25-Sep	13	11	9	7	Z	7	10	7	2	1	0	0	0	0	0	0	0	0	1	2	0	0	1	0	3.2	13	
26-Sep	0	2	1	2	1	Z	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2	
27-Sep	Z	5	7	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	7	
28-Sep	0	Z	0	0	0	0	0	0	0	0	M	M	0	2	2	2	2	3	5	7	6	5	6	11	2.5	11	
29-Sep	8	6	Z	4	3	6	13	8	8	12	12	11	13	13	8	6	3	3	4	10	9	11	15	16	8.8	16	
30-Sep	12	14	11	Z	9	11	8	M	M	M	M	M	M	M	M	M	M	10	18	10	8	8	7	5	--	18	

3.1	3.7	3.1	2.8	3.4	6.3	7.0	5.3	5.6	5.7	6.3	5.0	3.3	2.5	2.0	2.2	2.3	2.4	2.7	2.7	3.0	3.5	3.5	3.1	Diurnal Average		
13	15	11	16	12	40	31	26	17	17	27	17	13	13	9	11	11	10	18	10	10	10	12	15	16	Diurnal Maximum	

Z - zerospan      C - Calibration      M - Maintenance      DF - DAS Failure





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	662	98.95	98.95
21 - 40	7	1.05	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: 669

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	42	20	3	4	4	5	17	60	83	59	60	37	53	76	65	51	639
21 - 40	0	0	0	0	0	0	0	1	3	2	0	1	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>	42	20	3	4	4	5	17	61	86	61	60	38	53	76	65	51	646

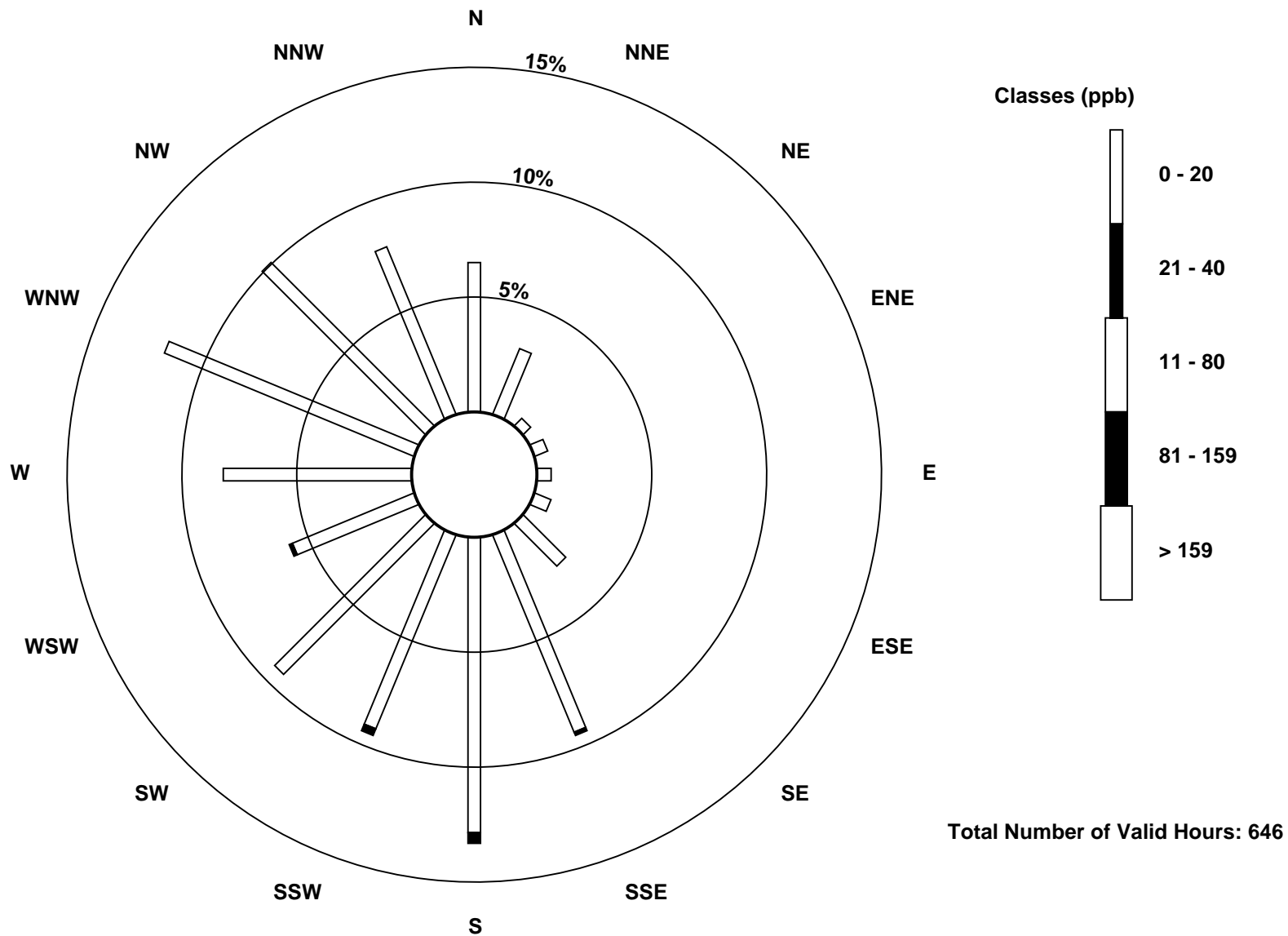
Total Number of Valid Hours: 646

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

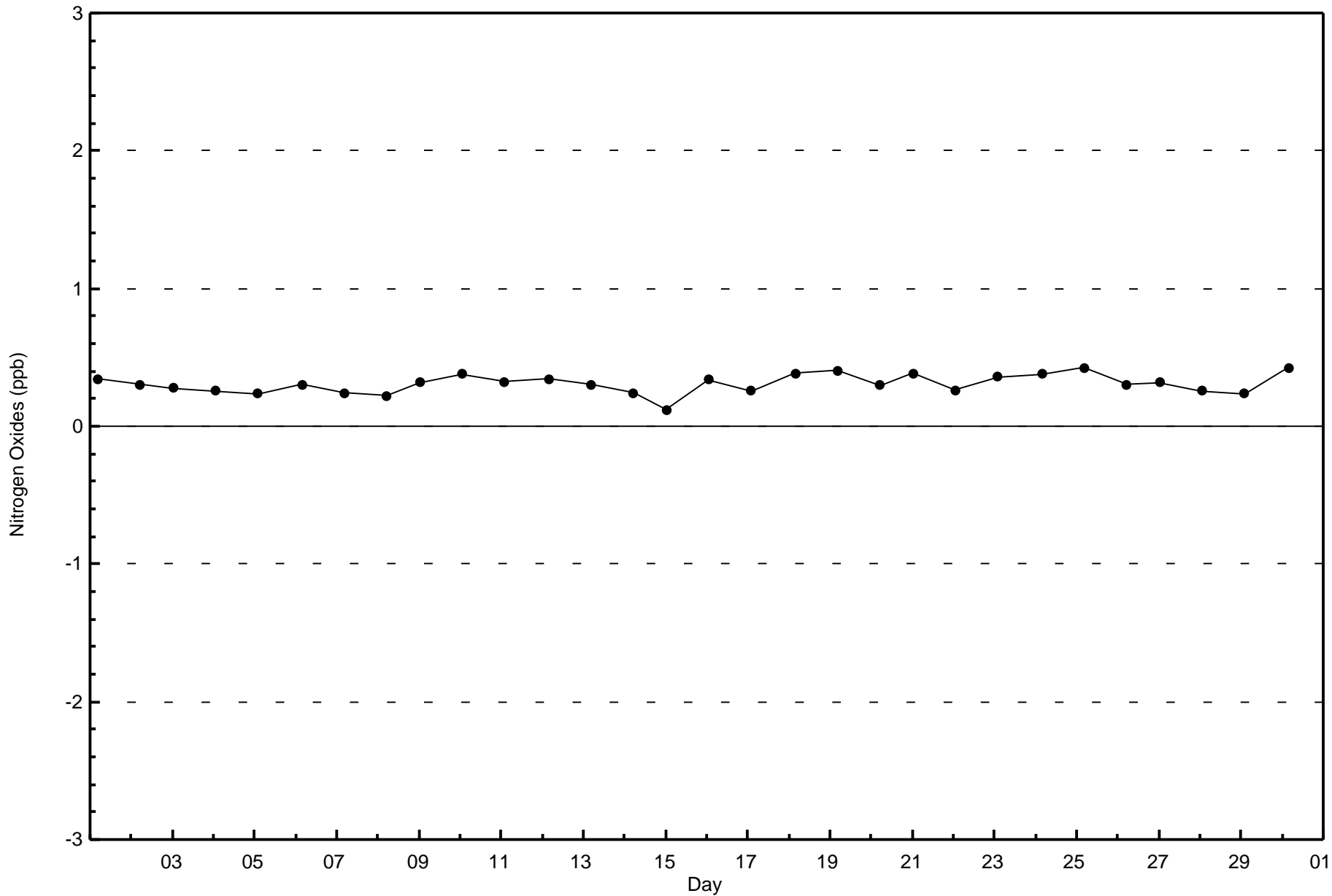
Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay - Bertha Ganter (AMS 1)



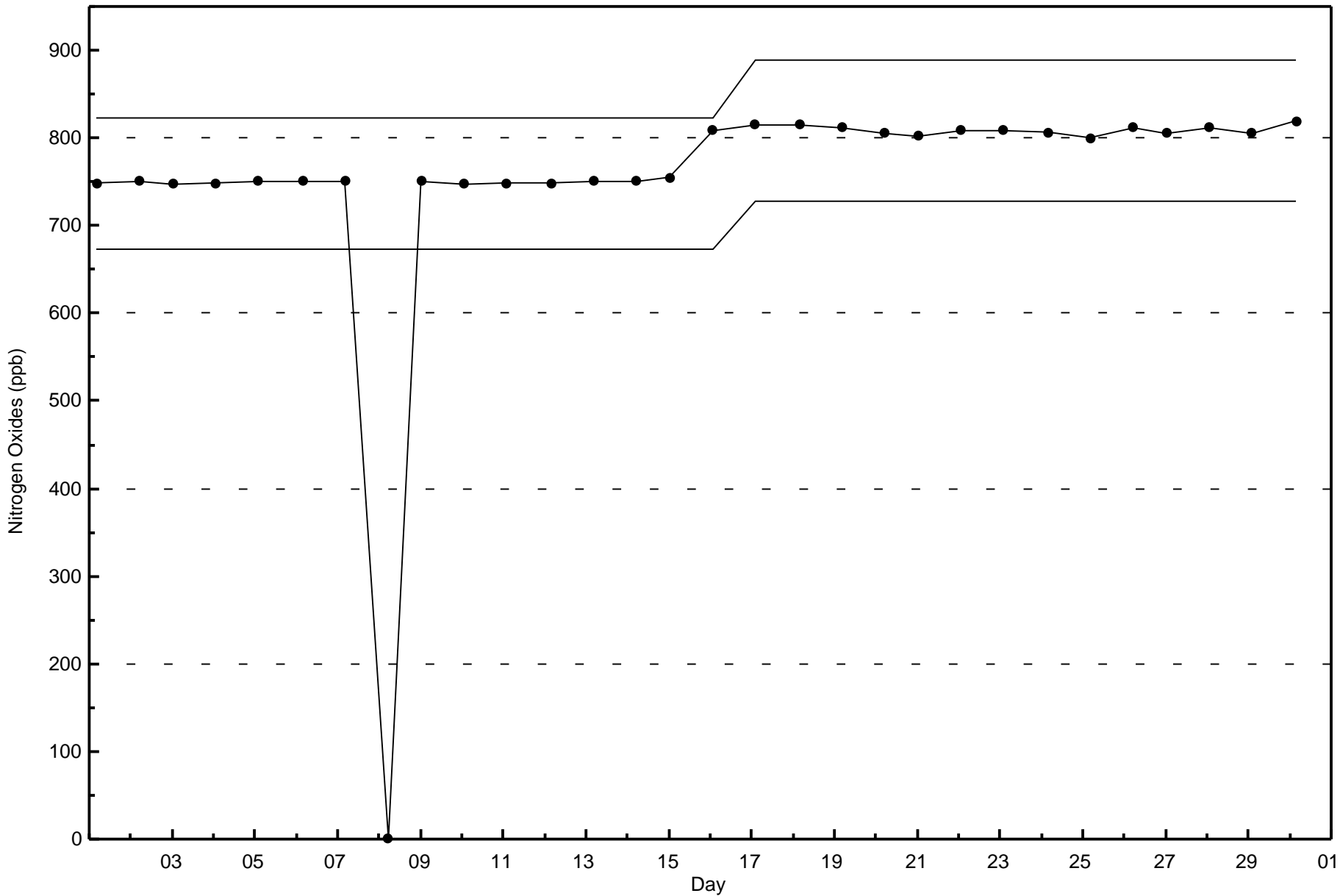


Wood Buffalo Environmental Association  
Zero Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay - Bertha Ganter - September 201









Summary of Hour Averages

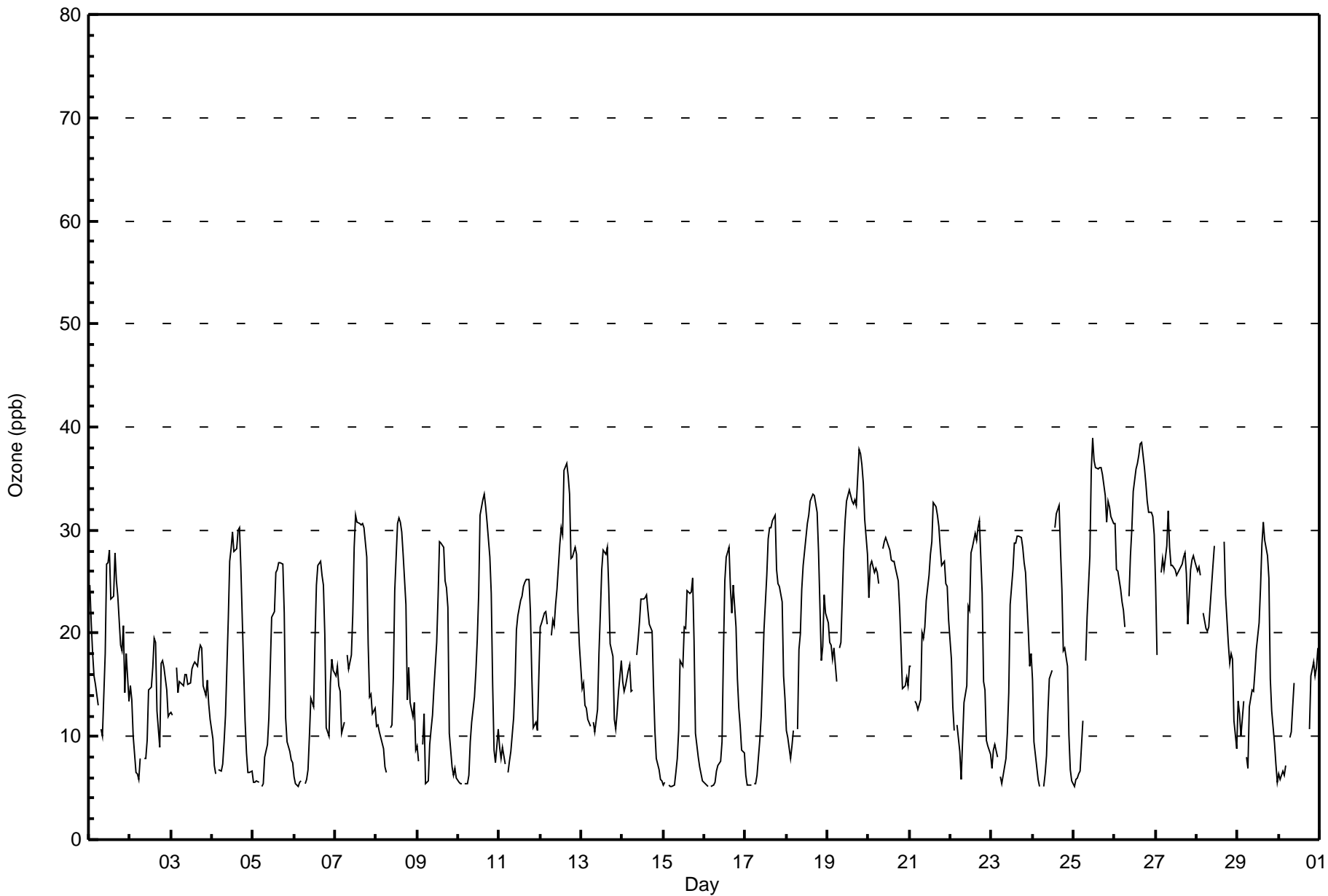
Fort McKay - Bertha Ganter - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 39 ppb on Sep 25 12:00	Maximum Daily Average: 30.5 ppb on Sep 26		Hours of Data:	676
Minimum Value: 5 ppb on Sep 15 05:00	Minimum Daily Average: 12.4 ppb on Sep 15		Hours of Missing Data:	44
Maximum Diurnal Average: 28.9 ppb at hour 16	Minimum Diurnal Average: 10.8 ppb at hour 7		Hours of Calibration:	35
Monthly Average: 18.7 ppb	Percentiles: P <sub>1</sub> = 5 P <sub>10</sub> = 6 Q <sub>1</sub> = 11 Median = 18 Q <sub>3</sub> = 27 P <sub>90</sub> = 31 P <sub>99</sub> = 37		Percent Operational Time:	98.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	25	21	18	16	15	13	Z	11	10	18	27	27	28	23	24	28	25	24	19	18	21	14	18	13	19.8	28
2-Sep	15	14	10	7	6	6	8	Z	8	8	10	14	15	17	20	19	13	9	17	17	17	14	12	12	12.4	20
3-Sep	12	12	Z	17	14	15	15	15	16	16	15	15	16	17	17	17	18	19	19	15	14	15	13	12	15.4	19
4-Sep	10	7	6	Z	7	7	7	9	12	21	27	28	30	28	28	30	26	16	11	8	7	7	7	7	16.1	30
5-Sep	6	6	6	6	Z	5	5	8	9	12	17	21	22	26	26	27	27	27	22	12	9	9	8	7	14.0	27
6-Sep	6	5	5	6	6	Z	5	6	7	10	14	13	19	25	27	27	26	25	20	11	10	15	17	16	13.9	27
7-Sep	16	17	15	14	10	11	Z	18	16	18	22	28	31	31	31	31	31	30	27	19	14	14	12	13	20.4	31
8-Sep	11	11	10	9	9	7	6	Z	11	11	16	24	31	31	31	30	28	23	14	17	13	12	13	9	16.4	31
9-Sep	9	8	Z	9	12	5	6	9	11	12	15	19	24	29	29	28	25	24	23	10	7	6	7	6	14.5	29
10-Sep	6	5	5	Z	5	5	6	9	11	14	16	19	24	31	33	33	32	31	27	24	15	9	7	11	16.6	33
11-Sep	9	8	9	7	Z	6	8	9	12	15	20	22	23	24	25	25	25	25	22	16	11	11	11	16	15.6	25
12-Sep	21	21	22	22	21	Z	20	21	21	23	24	29	30	30	36	36	35	33	27	27	28	28	22	19	25.9	36
13-Sep	15	15	13	13	12	11	Z	11	10	13	18	22	26	28	28	28	24	19	18	12	11	12	14	17	17.0	28
14-Sep	15	14	15	16	17	14	Z	18	19	21	23	23	23	24	22	21	20	15	11	8	7	6	6	6	16.3	24
15-Sep	5	6	Z	5	5	5	5	7	8	11	17	17	21	21	24	24	24	25	19	10	8	7	6	6	12.4	25
16-Sep	5	5	5	Z	5	5	6	7	7	8	10	18	25	27	28	24	22	25	21	16	13	11	9	8	13.5	28
17-Sep	6	5	5	5	Z	5	5	6	10	12	16	20	26	29	30	30	31	31	26	25	25	23	16	14	17.5	31
18-Sep	11	10	8	9	11	Z	11	18	20	24	27	29	31	32	33	34	33	33	32	28	17	19	24	22	22.3	34
19-Sep	21	19	19	17	19	15	Z	19	19	28	31	33	33	34	33	33	33	32	38	37	36	35	31	28	28.0	38
20-Sep	23	27	27	26	26	26	25	Z	28	29	29	29	28	27	27	27	26	25	22	19	15	15	16	15	24.2	29
21-Sep	17	17	Z	13	13	13	14	20	20	21	23	26	28	29	33	32	31	30	28	27	27	25	25	21	23.1	33
22-Sep	17	13	11	Z	11	9	6	10	13	15	23	22	28	28	30	29	30	31	24	15	15	10	9	8	17.7	31
23-Sep	7	9	9	8	Z	6	5	6	8	10	14	23	26	29	29	29	29	29	28	27	26	20	17	18	18.0	29
24-Sep	15	9	7	6	5	Z	5	6	8	12	16	16	DF	30	32	32	28	24	18	19	17	10	7	6	15.0	32
25-Sep	5	6	6	6	7	12	Z	17	22	28	36	39	37	36	36	36	36	35	33	31	33	32	31	31	25.7	39
26-Sep	31	26	26	24	23	22	21	Z	24	28	30	34	36	36	37	38	39	36	35	33	32	32	31	30	30.5	39
27-Sep	25	18	Z	26	27	26	28	32	28	27	27	26	26	26	26	27	27	28	26	21	26	27	28	27	26.3	32
28-Sep	26	27	26	Z	22	20	20	21	23	27	28	C	C	C	C	C	29	24	19	17	18	18	11	9	21.3	29
29-Sep	13	12	10	13	Z	8	7	13	15	14	16	18	21	24	29	31	29	28	25	16	13	9	7	6	16.4	31
30-Sep	6	6	7	6	7	Z	10	10	13	15	M	M	M	M	M	M	M	M	11	16	17	16	17	19	--	19

13.6	12.6	12.0	12.3	12.6	11.2	10.8	12.7	14.6	17.2	20.8	23.4	26.2	27.5	28.6	28.9	27.9	26.6	23.1	19.2	17.4	16.1	15.1	14.3	Diurnal Average	
31	27	27	26	27	26	28	32	28	29	36	39	37	36	37	38	39	36	38	37	36	35	31	31	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	383	56.66	56.66
21 - 50	293	43.34	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 676

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	26	9	0	1	2	0	9	30	59	38	22	15	30	51	36	41	369
21 - 50	17	11	3	4	2	5	10	30	25	22	39	25	23	26	30	12	284
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>	43	20	3	5	4	5	19	60	84	60	61	40	53	77	66	53	653

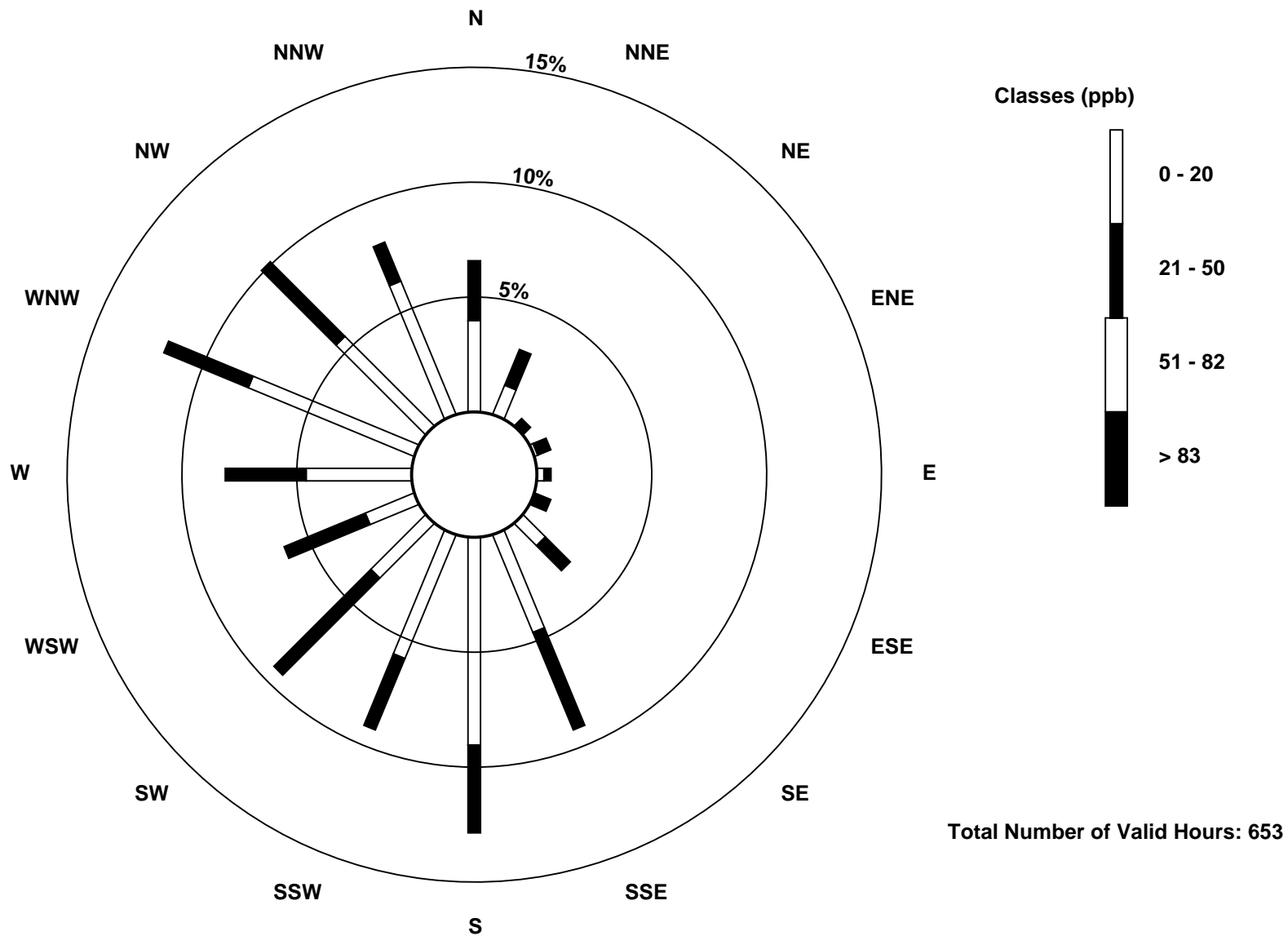
Total Number of Valid Hours: 653

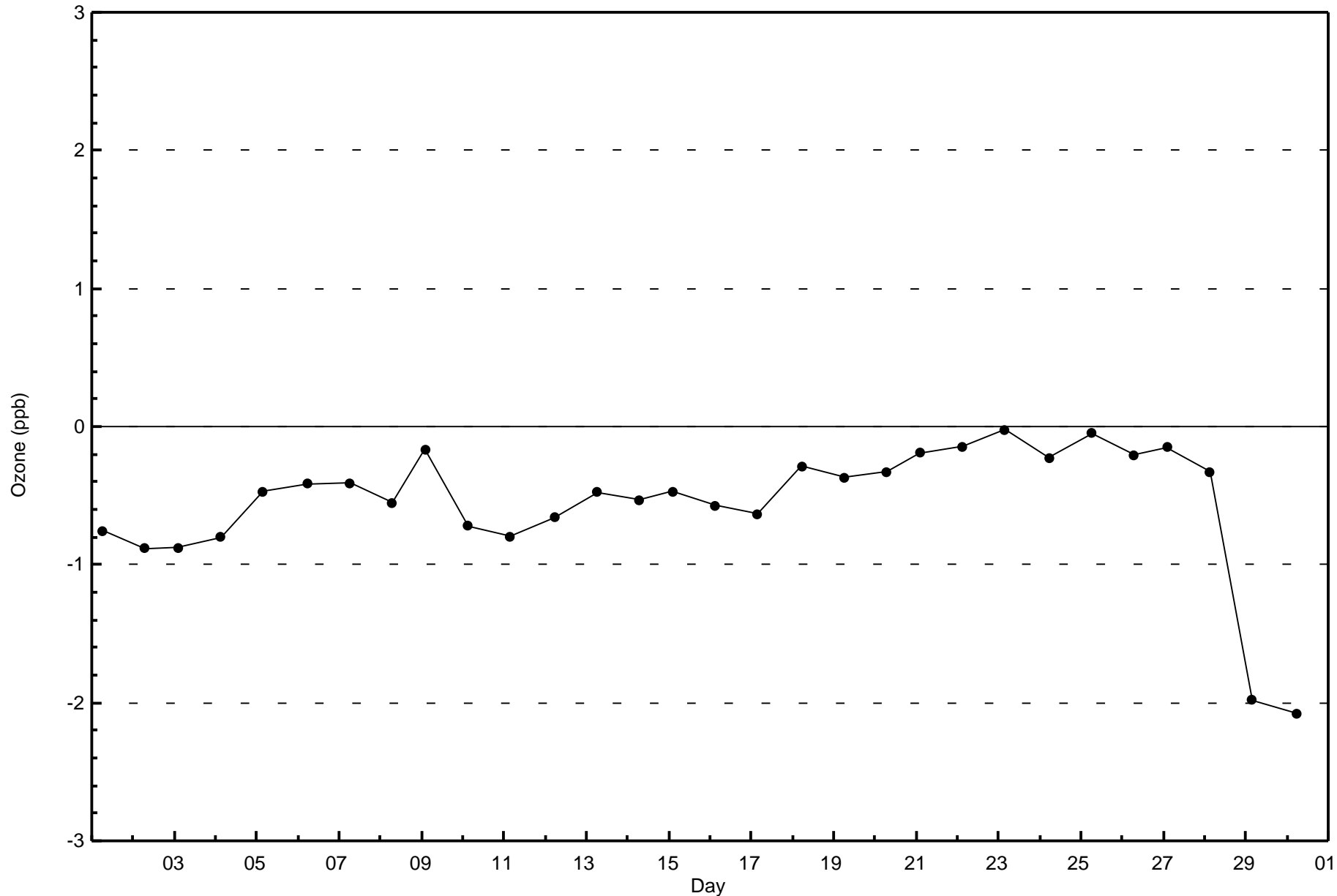
Total Number of Hours: 720

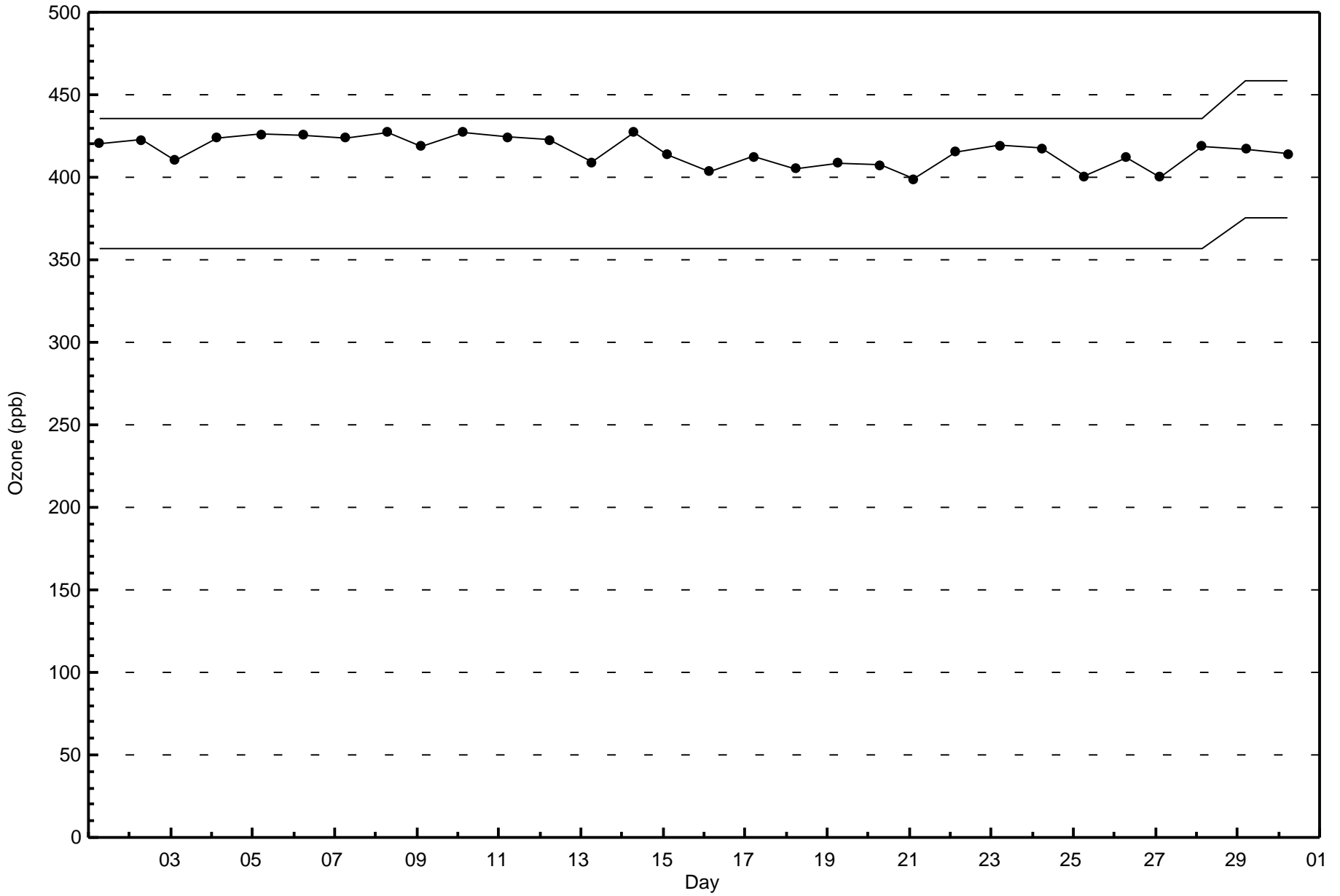


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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











Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 57.4 µg/m <sup>3</sup> on Sep 29 13:00	Maximum Daily Average: 12.7 µg/m <sup>3</sup> on Sep 29	Hours of Data:	717
Minimum Value: 1.2 µg/m <sup>3</sup> on Sep 18 14:00	Minimum Daily Average: 2.5 µg/m <sup>3</sup> on Sep 27	Hours of Missing Data:	3
Maximum Diurnal Average: 5.8 µg/m <sup>3</sup> at hour 20	Minimum Diurnal Average: 3.2 µg/m <sup>3</sup> at hour 15	Hours of Calibration:	2
Monthly Average: 4.67 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 1.4 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 2.7 Median = 3.7 Q <sub>3</sub> = 5.7 P <sub>90</sub> = 8.0 P <sub>99</sub> = 15.7	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-Sep	4.9	5.0	5.0	3.7	4.3	4.6	6.1	5.9	8.6	5.8	3.2	3.4	3.6	4.2	2.5	1.4	1.8	3.5	4.3	2.3	2.1	2.3	2.9	3.2	3.9	8.6
2-Sep	4.2	5.2	5.7	6.7	6.2	5.6	4.4	4.7	5.7	9.2	8.3	4.4	3.3	5.3	5.7	4.8	2.6	1.5	1.6	2.5	3.5	4.0	4.4	4.1	4.7	9.2
3-Sep	4.7	4.6	4.0	3.2	3.6	3.0	2.7	2.7	3.1	3.8	2.4	1.7	1.6	1.3	1.2	1.5	2.2	2.8	3.8	3.8	3.8	3.5	3.3	3.2	3.0	4.7
4-Sep	3.8	4.0	3.9	3.5	2.9	2.9	2.6	2.4	2.5	2.4	2.2	2.1	2.1	2.3	2.6	2.3	2.4	2.5	3.4	4.0	3.9	4.0	3.4	3.9	3.0	4.0
5-Sep	5.0	6.5	5.1	4.6	4.8	5.7	6.0	7.3	7.3	6.4	3.3	2.6	2.3	2.2	2.5	3.1	2.9	3.2	5.3	6.3	5.7	5.7	5.8	6.0	4.8	7.3
6-Sep	6.6	7.1	7.1	7.2	8.2	8.0	7.4	7.5	6.9	6.8	5.4	5.4	3.6	2.9	2.5	2.4	3.7	4.5	4.3	4.7	5.4	4.2	3.5	3.5	5.4	8.2
7-Sep	3.3	3.9	3.8	3.6	3.6	4.7	4.4	3.5	3.4	3.4	3.1	2.4	2.2	2.6	2.6	2.0	2.0	1.8	2.2	3.4	4.5	4.0	4.3	3.6	3.3	4.7
8-Sep	2.9	2.6	2.6	2.4	2.5	2.5	2.5	2.6	3.6	4.5	4.4	2.9	2.5	2.6	2.7	3.7	5.1	6.0	7.4	8.5	8.9	9.3	5.6	5.6	4.3	9.3
9-Sep	6.6	8.5	7.6	7.7	7.0	9.1	9.9	8.6	6.7	6.2	6.4	6.6	6.5	4.9	4.5	5.0	2.7	1.7	3.1	8.2	9.0	8.1	9.1	12.6	6.9	12.6
10-Sep	11.3	9.1	7.3	7.7	7.9	8.1	7.3	12.1	20.0	13.1	3.5	3.6	3.3	1.9	2.2	2.1	1.9	2.3	3.3	3.1	3.5	5.7	8.3	4.5	6.4	20.0
11-Sep	4.8	6.3	8.3	6.8	7.6	6.2	6.3	5.4	2.4	1.5	2.4	2.2	1.4	2.4	2.3	1.8	1.8	2.4	4.5	4.2	4.8	6.5	9.0	6.7	4.5	9.0
12-Sep	2.6	2.6	3.8	4.3	4.5	2.6	2.9	3.6	4.0	3.7	2.9	2.7	2.9	3.3	2.3	2.4	3.0	3.3	4.6	4.2	3.9	3.0	3.7	5.0	3.4	5.0
13-Sep	4.3	4.9	4.7	3.9	3.9	3.9	3.8	3.0	3.6	4.2	3.7	2.8	2.5	2.3	2.2	2.6	3.2	3.3	3.7	3.0	3.3	3.3	2.8	2.7	3.4	4.9
14-Sep	3.1	3.1	2.9	2.8	2.8	3.2	3.3	2.8	3.3	4.2	3.9	2.7	2.8	3.0	2.8	2.4	3.4	4.0	4.9	6.5	5.7	4.9	4.3	5.0	3.7	6.5
15-Sep	3.6	3.4	2.7	2.6	2.6	3.1	2.6	2.6	2.9	3.3	2.7	2.6	2.1	2.4	2.9	3.5	3.4	2.7	4.5	5.1	4.6	4.3	4.2	3.9	3.3	5.1
16-Sep	4.2	4.6	4.7	5.0	5.1	4.8	4.3	3.8	4.4	4.6	5.9	4.1	2.2	2.1	3.0	4.9	7.5	6.5	7.5	8.4	7.6	8.0	6.3	5.4	5.2	8.4
17-Sep	4.6	5.7	5.6	6.2	7.0	6.2	4.7	5.7	8.6	15.1	7.4	4.4	3.2	2.2	2.9	3.6	3.7	3.0	7.1	7.1	5.5	6.8	16.2	7.1	6.2	16.2
18-Sep	5.5	4.2	6.9	4.2	3.6	4.0	3.8	2.9	2.3	1.8	1.5	1.4	1.4	1.2	1.2	1.3	1.7	2.0	2.6	7.5	8.9	7.4	5.7	5.0	3.7	8.9
19-Sep	5.8	6.7	5.8	6.4	5.2	5.6	5.0	3.9	4.3	3.0	2.4	1.8	1.6	1.7	1.7	1.9	1.9	2.2	2.9	2.9	2.9	3.2	3.5	3.4	3.6	6.7
20-Sep	5.1	5.6	4.9	4.3	3.8	3.3	3.1	2.5	2.2	2.0	1.8	1.8	1.8	1.6	1.3	1.5	2.7	3.6	3.9	5.2	5.5	4.9	4.5	3.7	3.4	5.6
21-Sep	3.4	3.5	3.5	3.4	3.3	2.9	2.6	2.4	3.6	4.0	3.2	2.5	2.1	2.1	2.2	2.3	2.8	3.6	3.6	3.5	3.4	3.3	3.6	4.0	3.1	4.0
22-Sep	4.1	4.8	4.7	5.3	3.4	3.2	3.8	2.9	2.7	2.6	3.4	8.1	4.2	2.9	2.0	3.0	3.9	3.8	8.2	10.6	6.7	6.6	6.7	4.8	4.7	10.6
23-Sep	5.0	5.1	4.9	4.6	4.1	3.7	4.0	5.3	12.5	5.6	4.4	3.2	3.1	3.1	3.0	3.6	3.6	3.6	3.9	3.8	3.4	4.2	4.3	3.9	4.4	12.5
24-Sep	4.9	6.8	7.0	6.2	6.6	6.3	6.1	6.2	7.0	6.0	5.5	5.8	DF	5.0	6.0	6.9	7.7	6.3	7.7	7.5	7.0	8.2	8.2	8.6	6.7	8.6
25-Sep	9.3	9.7	9.8	9.7	9.0	9.6	9.0	7.7	7.3	4.9	3.0	2.3	2.6	2.2	1.8	1.3	1.4	1.6	2.9	5.5	2.6	2.4	2.8	2.3	5.0	9.8
26-Sep	2.6	4.6	4.1	4.6	3.7	3.7	3.3	2.7	2.2	2.1	1.9	1.7	1.8	1.8	1.9	2.3	2.2	2.4	2.7	3.2	3.4	3.4	2.5	2.9	2.8	4.6
27-Sep	7.0	5.9	4.3	2.8	2.7	2.9	2.4	2.0	1.9	2.0	1.5	1.5	1.6	1.4	1.4	1.5	2.0	2.6	3.0	2.8	1.9	1.7	1.6	1.8	2.5	7.0
28-Sep	1.9	2.2	2.2	2.2	2.5	2.8	2.4	2.3	2.3	2.0	1.7	1.7	1.5	1.7	1.9	2.0	2.4	9.3	13.6	11.7	7.7	5.1	4.8	4.5	3.9	13.6
29-Sep	3.5	3.3	3.3	2.7	2.7	2.8	3.3	3.2	C	C	6.1	24.4	57.4	24.8	16.6	13.1	7.6	12.7	11.6	15.5	21.0	17.9	15.3	11.2	12.7	57.4
30-Sep	13.2	8.7	10.2	10.4	11.2	11.0	9.9	7.8	7.2	11.3	15.6	16.4	6.0	4.4	7.0	7.0	5.2	7.4	15.8	9.7	6.1	6.6	6.1	5.2	9.1	16.4

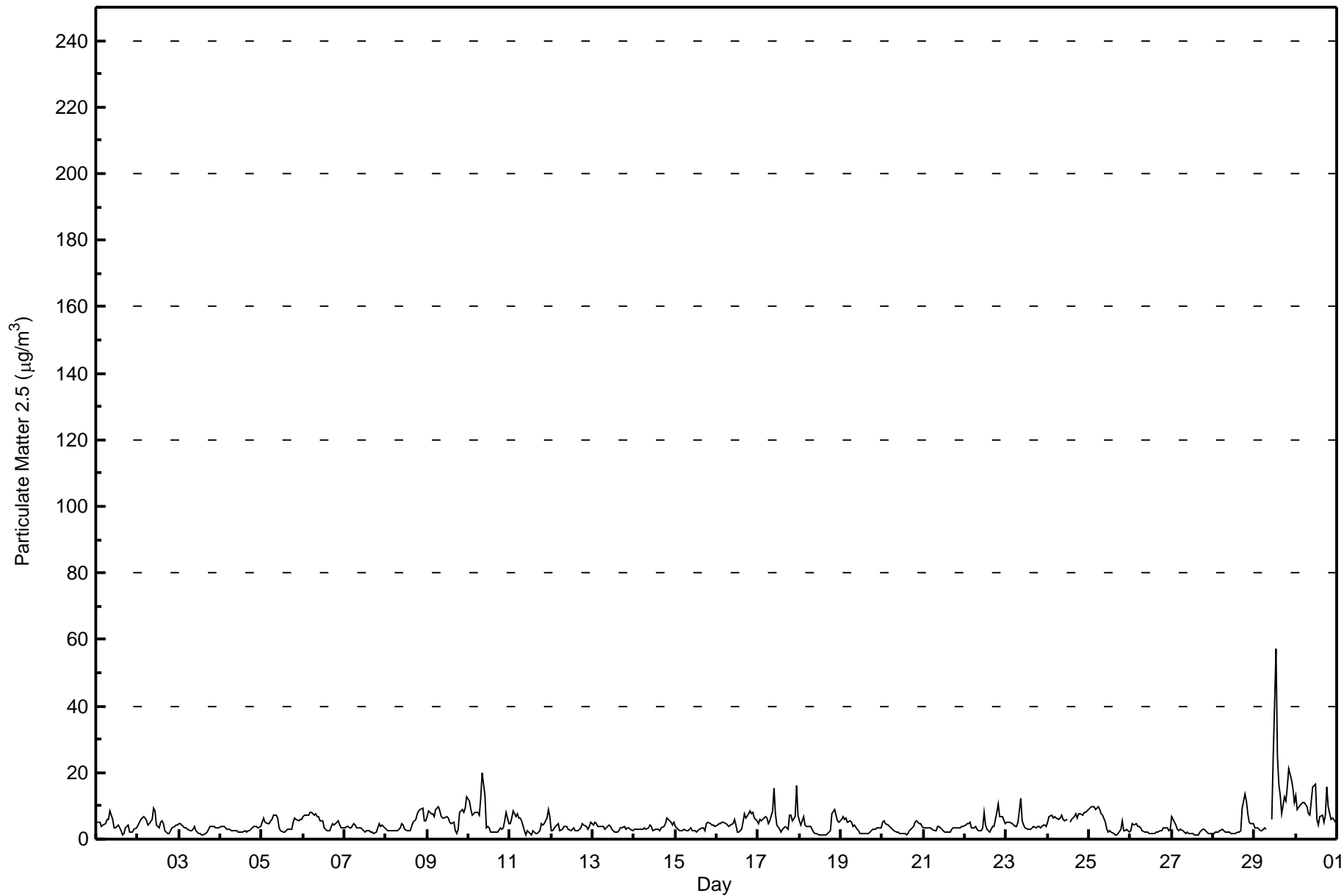
5.1	5.3	5.2	5.0	4.9	4.9	4.7	4.5	5.3	5.0	4.1	4.3	4.6	3.4	3.2	3.2	3.3	3.9	5.3	5.8	5.5	5.4	5.6	4.9	Diurnal Average	
13.2	9.7	10.2	10.4	11.2	11.0	9.9	12.1	20.0	15.1	15.6	24.4	57.4	24.8	16.6	13.1	7.7	12.7	15.8	15.5	21.0	17.9	16.2	12.6	Diurnal Maximum	

C - Calibration      DF - DAS Failure  
 Alberta Ambient Air Quality Objectives (AAAQO):    24-hr 30 µg/m<sup>3</sup>



Wood Buffalo Environmental Association  
Hourly Averages

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	524	73.08	73.08
6 - 15	182	25.38	98.47
16 - 25	10	1.39	99.86
26 - 80	1	0.14	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 717

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	40	17	3	4	3	5	17	43	38	31	53	37	48	79	57	45	520
6 - 15	4	3	0	1	1	0	2	17	50	35	12	4	7	5	11	10	162
16 - 25	0	0	0	0	0	0	0	4	4	2	0	0	0	0	0	0	10
26 - 80	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	44	20	3	5	4	5	19	65	92	68	65	41	55	84	68	55	693

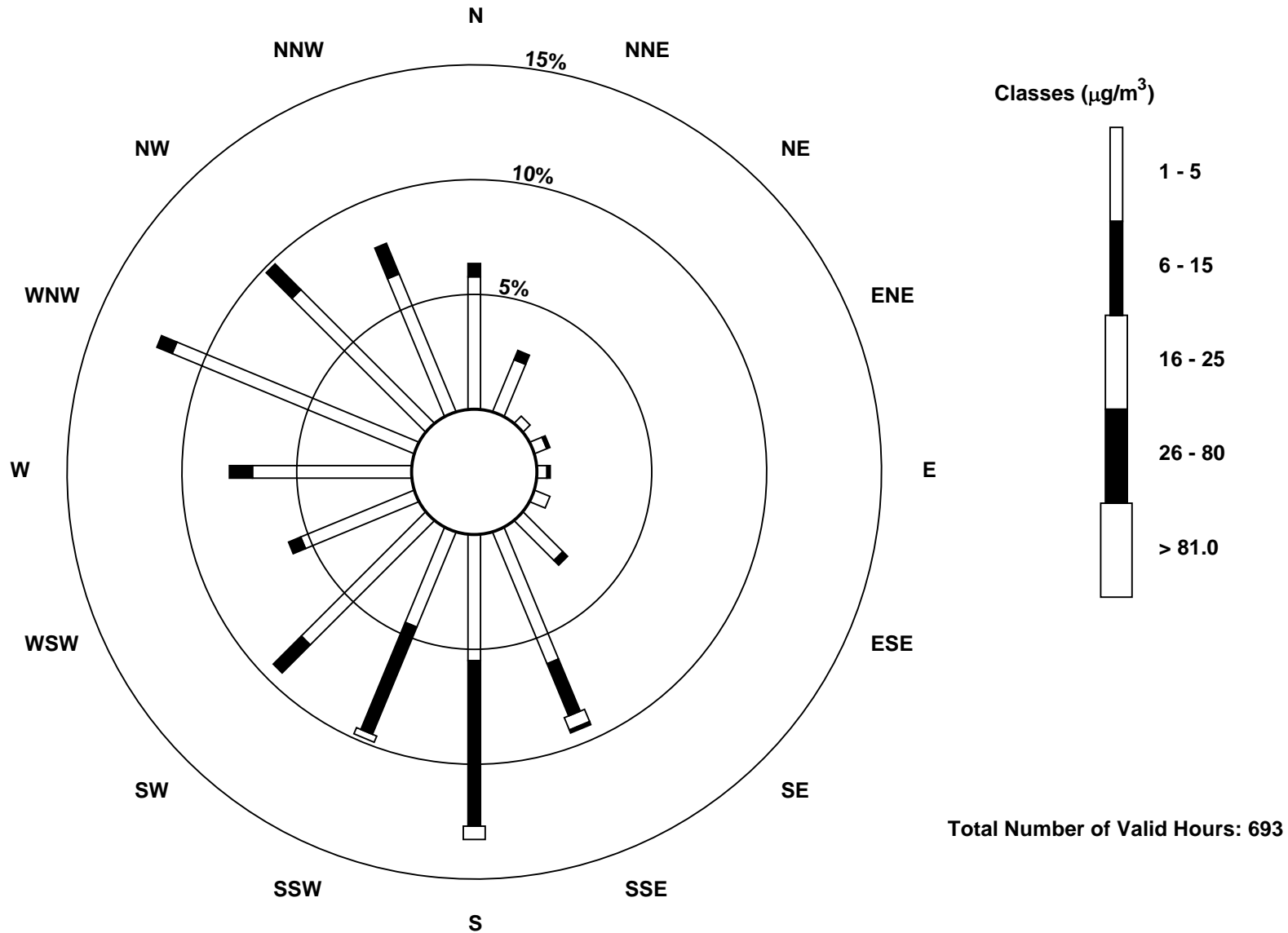
Total Number of Valid Hours: 693

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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





Summary of Hour Averages

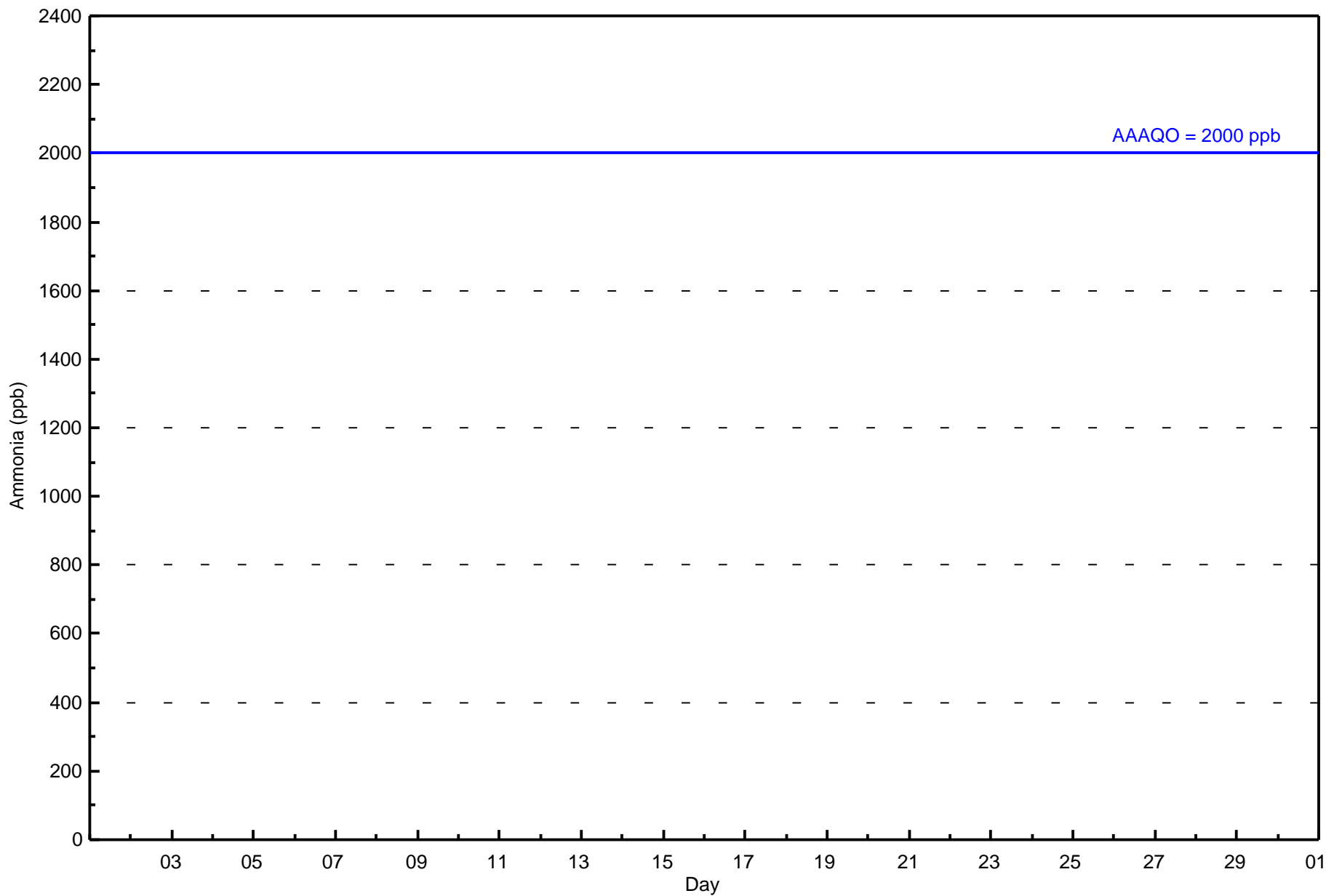
Fort McKay - Bertha Ganter - September 2015

Number of Exceedences (AAAQO): 1-hr: 0	Maximum Value: 0 ppb on Sep 1 01:00	Maximum Daily Average: 0.0 ppb on Sep 1	Hours in Service: 720
Minimum Value: 0 ppb on Sep 1 01:00	Maximum Diurnal Average: 0.0 ppb at hour 1	Minimum Diurnal Average: 0.0 ppb at hour 1	Hours of Data: 630
Monthly Average: 0.0 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 O <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 0		Hours of Missing Data: 90
			Hours of Calibration: 46
			Percent Operational Time: 93.9

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

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	630	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: 630

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	38	19	3	4	4	5	16	55	73	60	59	39	49	73	63	48	608
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>	<b>38</b>	<b>19</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>5</b>	<b>16</b>	<b>55</b>	<b>73</b>	<b>60</b>	<b>59</b>	<b>39</b>	<b>49</b>	<b>73</b>	<b>63</b>	<b>48</b>	<b>608</b>

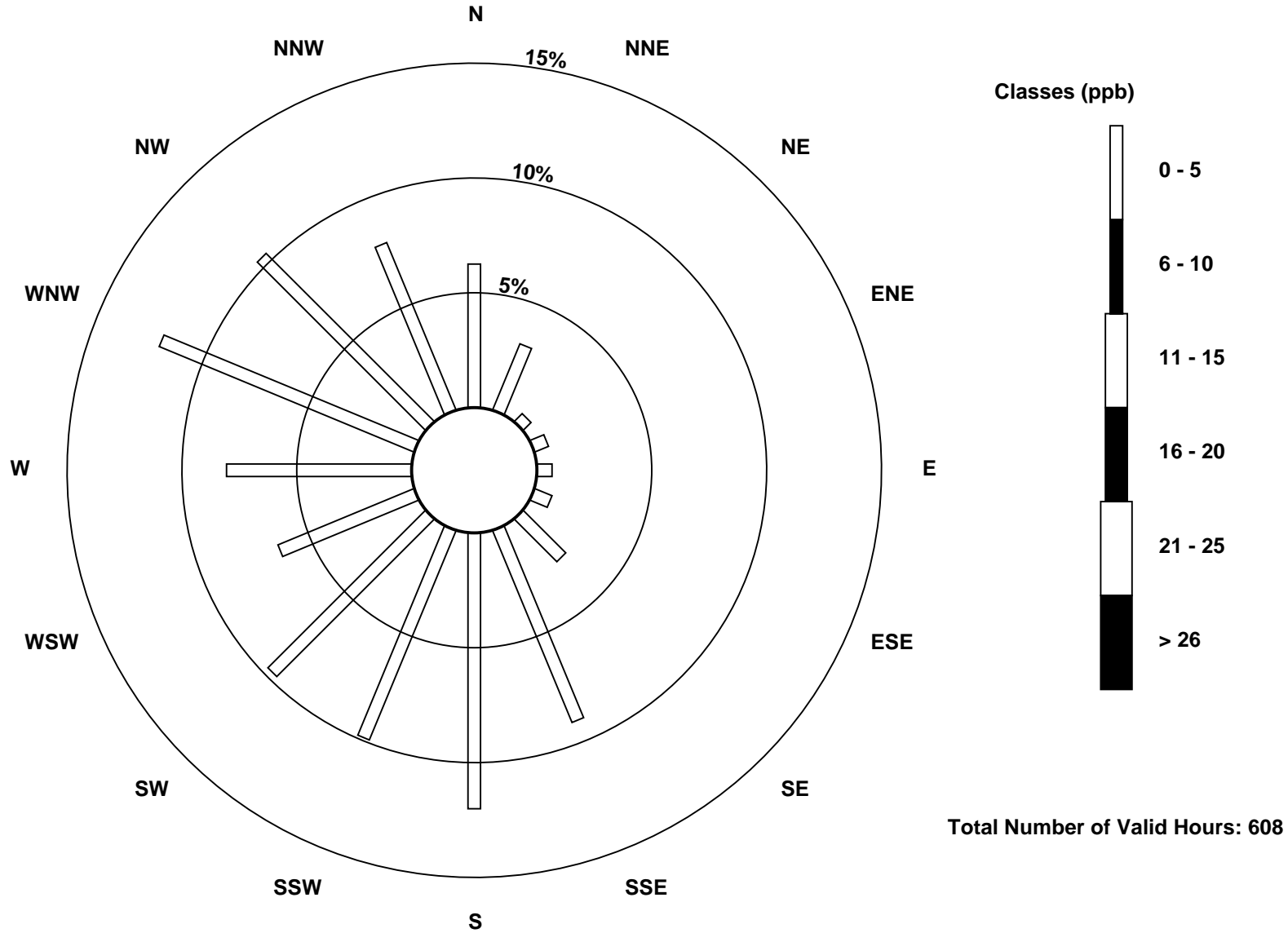
Total Number of Valid Hours: 608

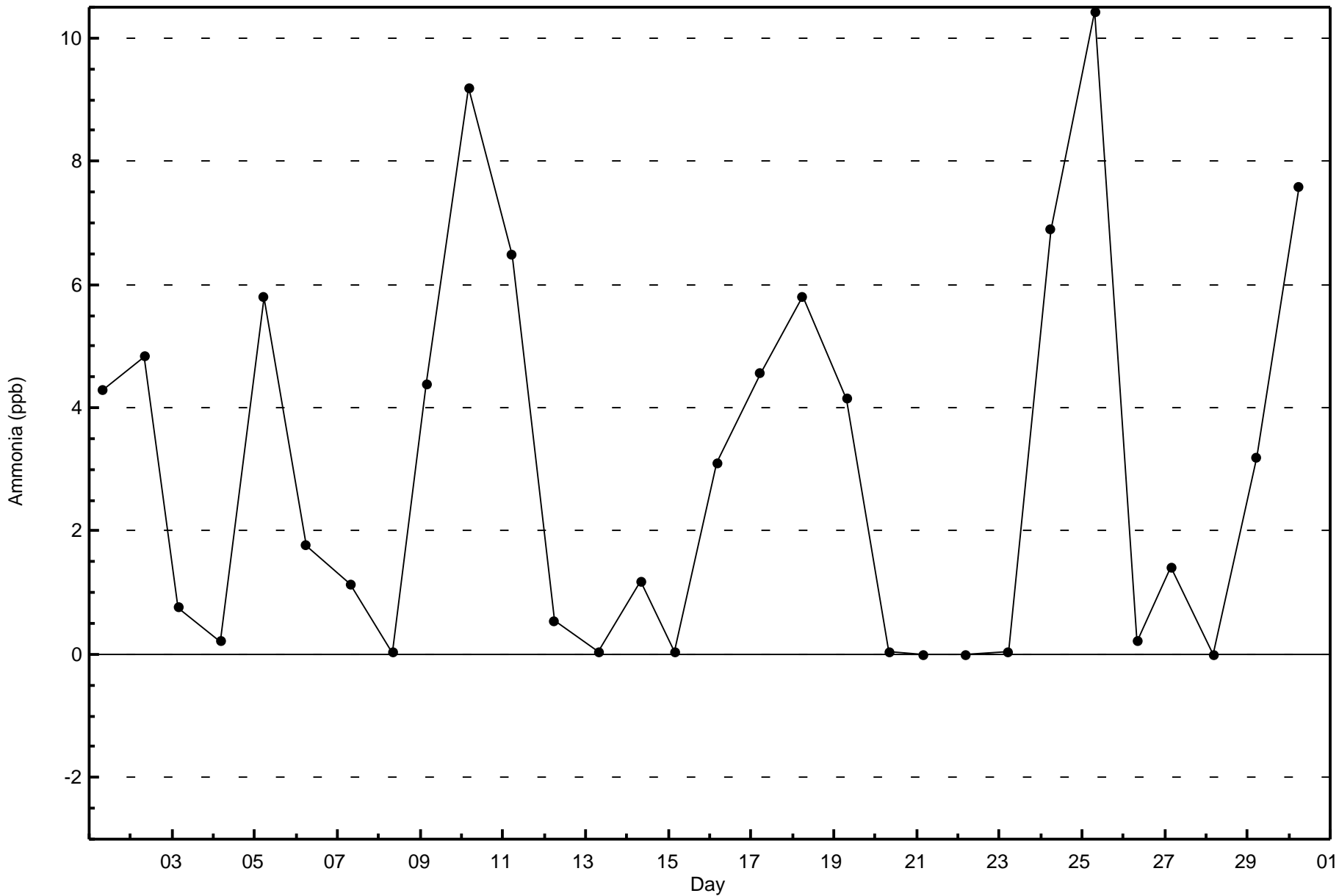
Total Number of Hours: 720

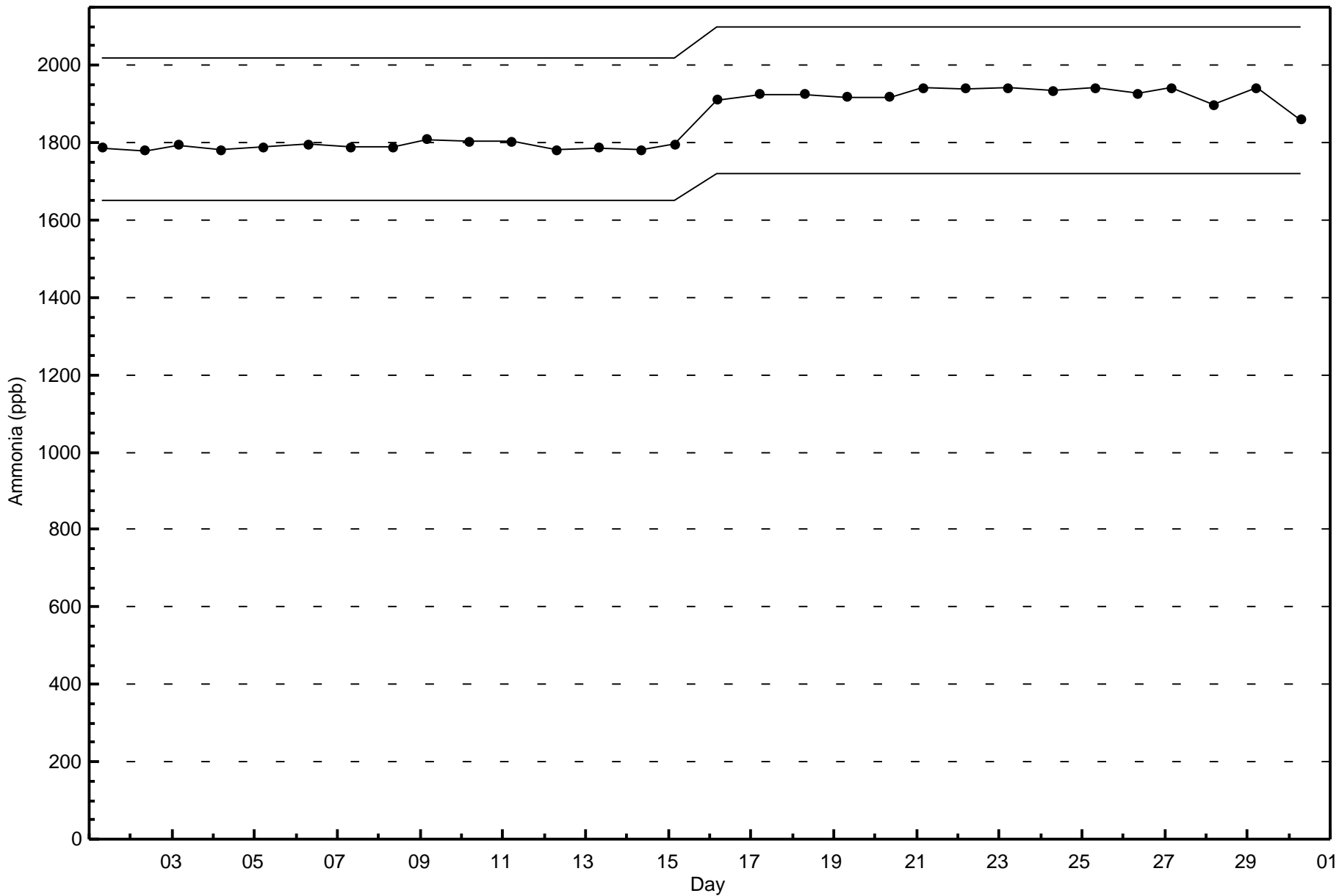


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Ammonia ( $\text{NH}_3$ ) - ppb  
Fort McKay - Bertha Ganter (AMS 1)









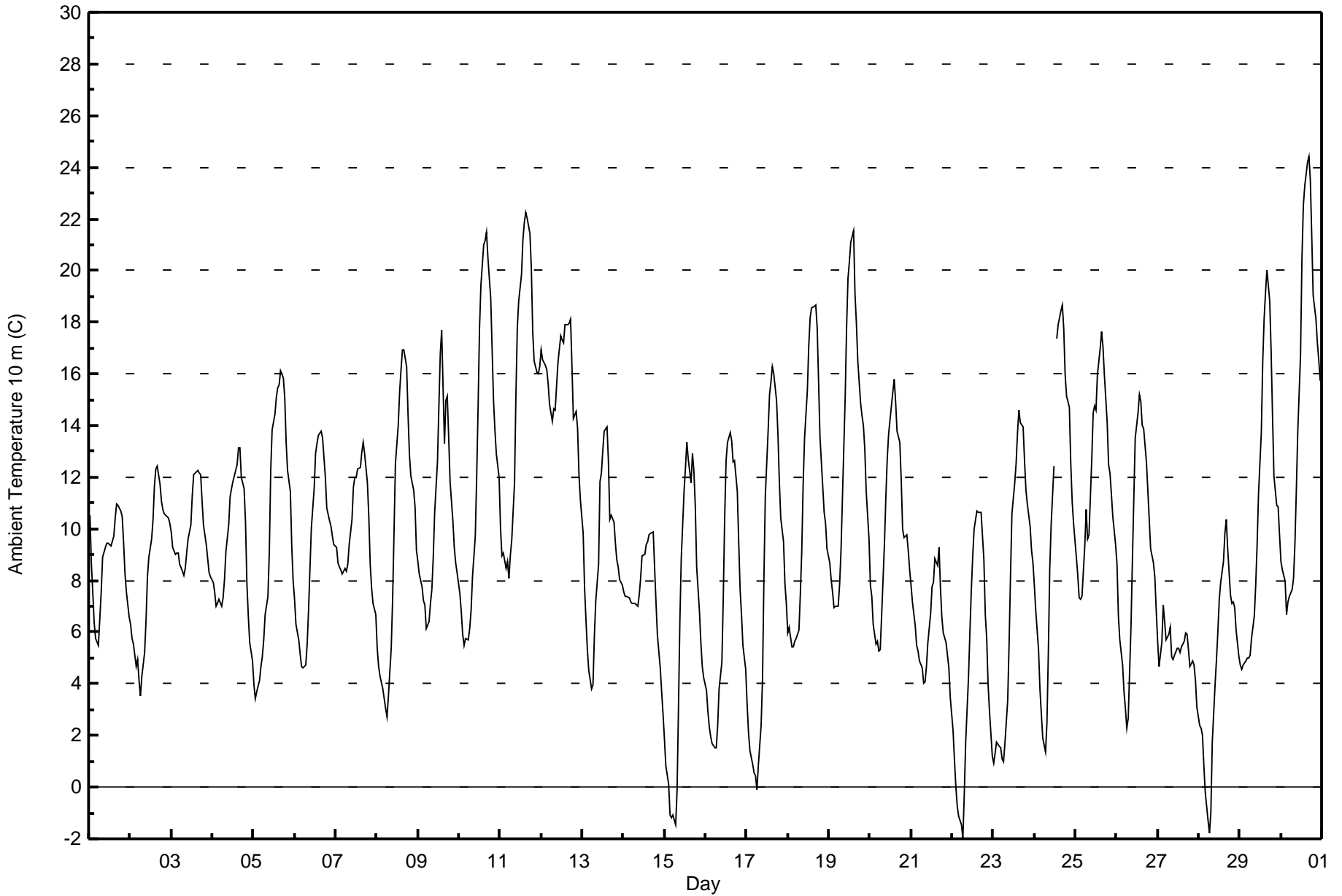
Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 10 m (AT 10m) - C

Fort McKay - Bertha Ganter - September 2015

Maximum Value: 24.4 C on Sep 30 17:00		Maximum Daily Average: 15.7 C on Sep 12		Hours in Service: 720																						
Minimum Value: -2.0 C on Sep 22 07:00		Minimum Daily Average: 4.5 C on Sep 22		Hours of Data: 719																						
Maximum Diurnal Average: 14.7 C at hour 15		Minimum Diurnal Average: 4.9 C at hour 6		Hours of Missing Data: 1																						
Monthly Average: 9.57 C		Percentiles: P <sub>1</sub> = -1.1 P <sub>10</sub> = 3.7 Q <sub>1</sub> = 6.0 Median = 9.1 Q <sub>3</sub> = 12.7 P <sub>90</sub> = 16.4 P <sub>99</sub> = 21.9		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-Sep	10.5	8.6	7.5	6.4	5.7	5.5	6.5	7.5	8.9	9.3	9.4	9.5	9.4	9.3	9.7	10.4	11.0	10.9	10.7	10.5	9.4	8.2	7.6	6.5	8.7	11.0
2-Sep	6.3	5.7	5.5	4.7	4.9	4.1	3.5	4.3	5.2	6.5	8.1	8.9	9.6	10.4	11.7	12.3	12.4	11.7	11.1	10.7	10.6	10.5	10.4	10.2	8.3	12.4
3-Sep	9.9	9.3	9.0	9.0	9.1	8.6	8.4	8.2	8.5	9.1	9.6	10.1	11.3	12.1	12.2	12.3	12.2	12.1	11.1	10.2	9.4	8.8	8.3	8.1	9.9	12.3
4-Sep	7.9	7.5	7.0	7.1	7.3	7.0	7.3	8.0	9.1	10.2	11.2	11.6	11.8	12.0	12.5	13.1	13.1	12.0	11.5	10.3	7.9	6.6	5.6	4.9	9.3	13.1
5-Sep	4.0	3.4	3.7	4.1	4.7	5.1	5.7	6.7	7.4	9.1	12.3	13.8	14.4	15.1	15.4	15.6	16.1	15.9	15.1	13.3	12.3	11.5	9.3	8.0	10.1	16.1
6-Sep	7.3	6.3	5.7	5.2	4.7	4.6	4.7	5.5	6.9	8.4	10.0	11.6	12.9	13.3	13.6	13.8	13.5	12.7	12.0	10.8	10.3	10.1	9.7	9.4	9.3	13.8
7-Sep	9.3	8.7	8.5	8.4	8.3	8.5	8.4	8.6	9.4	10.4	11.6	12.0	12.0	12.3	12.4	13.0	13.4	12.9	11.8	10.5	8.6	7.7	7.1	6.7	10.0	13.4
8-Sep	5.4	4.7	4.3	3.8	3.4	3.0	2.7	3.6	5.4	7.3	9.9	12.5	14.0	15.3	16.2	16.9	16.9	16.3	14.4	12.9	12.1	11.5	10.8	9.2	9.7	16.9
9-Sep	8.7	8.3	7.8	7.2	7.1	6.1	6.4	7.1	7.7	8.9	10.6	12.6	14.7	16.7	17.7	13.3	15.0	15.1	13.6	11.8	10.3	9.3	8.7	8.3	10.5	17.7
10-Sep	7.5	6.8	5.9	5.5	5.7	5.7	6.1	6.9	8.1	9.7	12.1	14.7	17.7	19.4	21.0	21.2	21.5	20.5	18.9	17.0	15.0	13.8	12.9	12.0	12.7	21.5
11-Sep	10.0	9.0	9.1	8.4	8.7	8.1	9.0	9.6	11.8	15.2	17.8	18.8	19.9	21.2	21.9	22.2	22.0	21.4	20.1	17.6	16.5	16.1	16.0	16.3	15.3	22.2
12-Sep	16.9	16.5	16.3	16.2	15.6	14.8	14.1	14.6	14.6	15.5	16.4	17.5	17.3	17.2	17.9	17.9	17.9	18.1	16.3	14.3	14.5	13.9	12.1	11.1	15.7	18.1
13-Sep	9.8	7.7	6.4	5.3	4.5	3.8	4.0	5.8	7.2	8.6	11.8	12.2	13.0	13.8	14.0	12.7	10.3	10.5	10.3	9.4	8.8	8.5	8.0	7.8	8.9	14.0
14-Sep	7.6	7.4	7.4	7.4	7.2	7.1	7.1	7.1	7.0	7.4	8.1	8.9	9.0	9.4	9.5	9.8	9.8	9.9	8.5	7.1	5.8	4.6	3.7	2.8	7.5	9.9
15-Sep	1.9	0.8	0.1	-1.1	-1.2	-1.1	-1.5	-0.1	3.0	6.4	8.8	11.5	12.4	13.3	12.7	11.8	12.9	12.3	10.9	8.5	6.8	5.6	4.7	4.2	6.0	13.3
16-Sep	3.8	2.9	2.3	1.9	1.7	1.5	1.5	2.4	3.8	4.9	7.4	10.5	12.6	13.3	13.7	13.4	12.6	12.7	11.4	9.5	7.6	6.7	5.5	4.6	7.0	13.7
17-Sep	3.2	2.1	1.4	0.9	0.5	0.4	-0.1	0.8	2.4	4.2	8.1	11.3	13.8	15.2	15.7	16.3	16.0	15.0	13.7	11.8	10.4	9.5	7.9	7.1	7.8	16.3
18-Sep	6.0	6.2	5.4	5.4	5.6	5.8	6.1	7.5	9.1	11.7	13.5	15.4	17.1	18.2	18.5	18.6	18.7	17.8	15.7	13.6	11.6	10.6	10.2	9.2	11.6	18.7
19-Sep	8.7	8.0	7.5	7.0	7.0	7.0	7.8	9.1	11.1	15.1	17.8	19.7	20.4	21.1	21.5	19.1	17.9	16.5	14.9	14.4	14.0	13.1	11.5	9.6	13.3	21.5
20-Sep	7.8	7.4	6.3	5.5	5.6	5.2	5.3	6.6	9.4	11.2	12.7	13.7	14.8	15.3	15.8	14.9	13.8	13.3	11.9	10.0	9.7	9.7	9.2	8.4	10.1	15.8
21-Sep	7.8	7.2	6.2	5.5	5.3	4.9	4.6	4.0	4.1	4.7	5.6	6.7	7.8	7.9	8.9	8.6	9.3	7.7	6.5	6.0	5.6	5.1	4.6	3.5	6.2	9.3
22-Sep	2.2	1.0	0.0	-0.8	-1.1	-1.4	-2.0	-0.3	1.8	4.2	6.0	7.6	8.9	10.0	10.7	10.6	10.7	10.6	8.8	6.7	5.8	3.9	2.9	1.2	4.5	10.7
23-Sep	0.9	1.3	1.8	1.6	1.5	1.1	1.0	1.7	3.4	5.6	8.2	10.6	11.8	12.6	13.7	14.6	14.1	13.9	12.7	11.5	11.0	10.1	9.2	8.7	7.6	14.6
24-Sep	7.8	6.8	5.3	3.8	2.9	1.9	1.4	2.5	5.2	8.5	10.2	12.4	DF	17.4	17.9	18.5	18.6	17.8	16.0	15.2	14.7	12.6	11.1	10.2	10.4	18.6
25-Sep	8.9	8.2	7.4	7.3	7.4	9.3	10.7	9.6	9.8	12.7	14.5	14.8	14.6	15.9	17.0	17.6	17.1	15.9	14.1	12.5	12.2	11.3	10.5	9.4	12.0	17.6
26-Sep	8.6	6.6	5.7	4.7	3.7	3.0	2.3	2.7	6.3	8.8	11.2	13.5	14.5	15.2	14.9	14.0	13.9	12.6	11.5	10.4	9.2	8.7	8.2	6.9	9.0	15.2
27-Sep	5.6	4.7	5.6	7.0	6.4	5.7	5.9	6.2	5.1	5.0	5.1	5.4	5.4	5.2	5.4	5.6	6.0	5.9	5.3	4.7	4.9	4.7	4.1	3.1	5.3	7.0
28-Sep	2.4	2.3	2.0	0.8	-0.2	-1.3	-1.8	-0.9	1.7	3.9	4.9	6.0	7.3	7.9	8.7	9.8	10.4	9.2	7.4	7.1	7.1	6.9	6.1	5.1	4.7	10.4
29-Sep	4.7	4.6	4.7	4.9	5.0	5.0	5.1	5.8	6.6	7.8	9.4	11.3	13.7	16.5	18.1	19.1	20.0	18.9	16.9	14.4	12.1	10.9	10.9	9.8	10.7	20.0
30-Sep	8.7	8.4	8.0	6.7	7.1	7.4	7.6	8.1	9.4	11.5	13.7	16.8	20.4	22.5	23.3	24.2	24.4	23.5	21.3	19.0	18.1	17.2	16.6	15.8	15.0	24.4
																								Diurnal Average		
																								Diurnal Maximum		
DF - DAS Failure																										





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	16	2.23	2.23
0 - 10	396	55.08	57.30
10 - 20	287	39.92	97.22
> 20	20	2.78	100.00

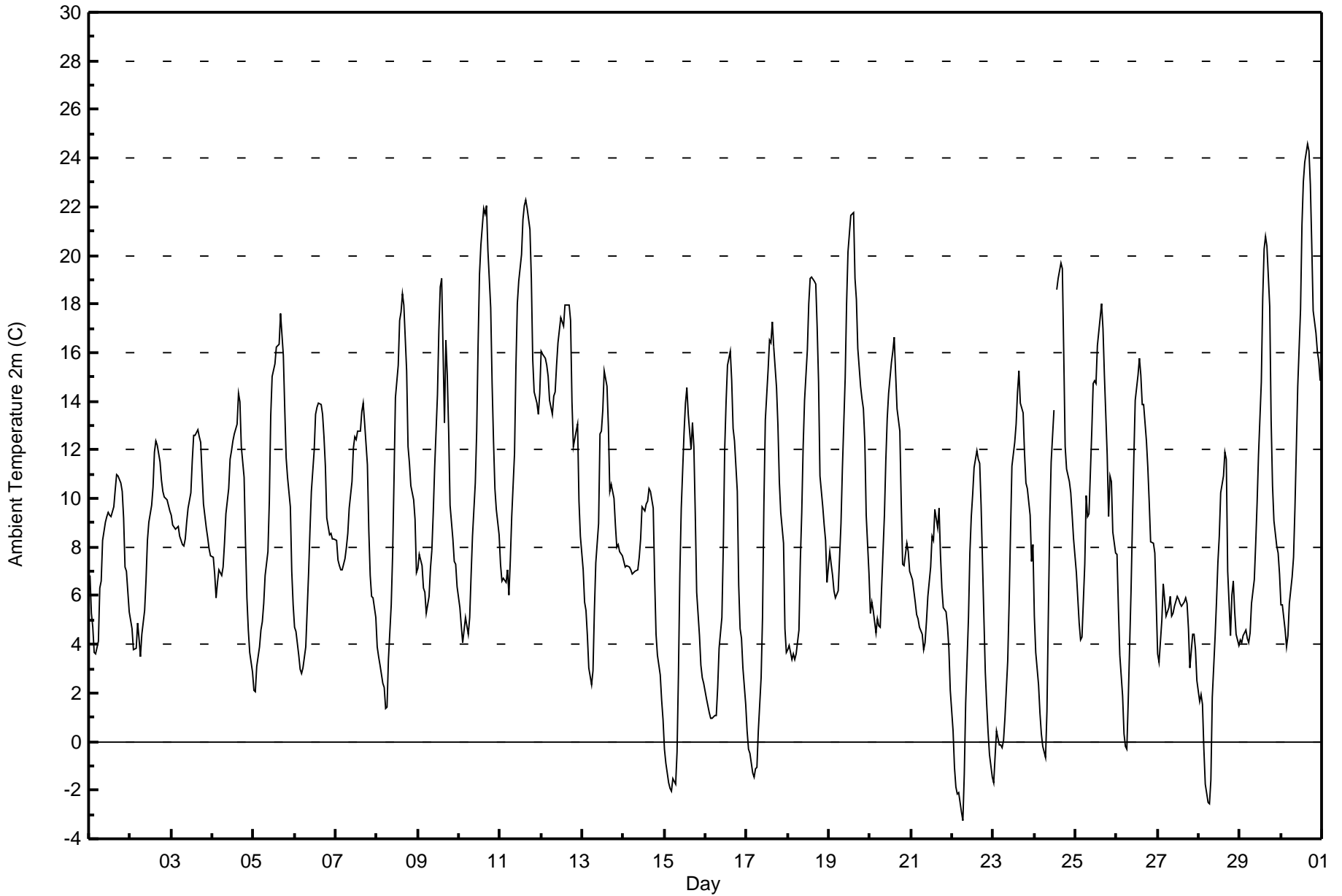
Total Number of Valid Hours: 719

Total Number of Hours: 720



Maximum Value: 24.6 C on Sep 30 16:00		Maximum Daily Average: 15.0 C on Sep 12		Hours in Service: 720																						
Minimum Value: -3.3 C on Sep 22 07:00		Minimum Daily Average: 3.5 C on Sep 22		Hours of Data: 719																						
Maximum Diurnal Average: 15.5 C at hour 15		Minimum Diurnal Average: 3.8 C at hour 6		Hours of Missing Data: 1																						
Monthly Average: 8.96 C		Percentiles: P <sub>1</sub> = -2.0 P <sub>10</sub> = 2.2 Q <sub>1</sub> = 5.1 Median = 8.3 Q <sub>3</sub> = 12.8 P <sub>90</sub> = 16.4 P <sub>99</sub> = 21.9		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-Sep	6.8	5.3	4.7	3.7	3.6	4.1	6.3	6.6	8.3	9.0	9.3	9.4	9.3	9.2	9.7	10.4	11.0	10.9	10.6	10.3	9.2	7.2	7.0	5.3	7.8	11.0
2-Sep	5.0	4.7	3.8	3.8	4.9	4.2	3.5	4.4	5.4	6.7	8.3	9.1	9.7	10.5	11.9	12.4	12.2	11.5	10.8	10.3	10.1	10.0	9.7	9.5	8.0	12.4
3-Sep	9.3	8.9	8.7	8.8	8.9	8.4	8.1	8.0	8.3	9.0	9.6	10.2	11.5	12.6	12.6	12.8	12.5	12.3	11.0	9.8	8.8	8.4	7.9	7.6	9.8	12.8
4-Sep	7.6	6.9	5.9	6.5	7.1	6.8	7.2	8.2	9.4	10.4	11.6	12.0	12.4	12.7	13.1	14.4	14.0	12.1	10.9	8.2	5.9	4.6	3.6	2.9	8.9	14.4
5-Sep	2.1	2.1	3.1	3.9	4.6	4.9	5.7	6.8	7.8	9.9	13.4	15.0	15.6	16.2	16.3	16.3	17.6	15.9	13.7	11.7	10.9	9.7	7.0	5.6	9.8	17.6
6-Sep	4.7	4.5	3.6	3.0	2.8	3.0	3.9	5.4	6.9	8.7	10.3	12.0	13.5	13.7	13.9	13.9	13.5	12.6	11.4	9.2	8.5	8.5	8.3	8.3	8.5	13.9
7-Sep	8.3	7.5	7.2	7.1	7.1	7.5	8.0	8.6	9.6	10.7	12.1	12.5	12.4	12.8	12.8	13.6	13.9	13.1	11.4	8.7	6.8	6.0	5.9	5.1	9.5	13.9
8-Sep	3.9	3.5	3.1	2.4	2.2	1.3	1.4	3.4	5.6	7.7	10.8	14.1	15.5	17.3	17.7	18.4	17.9	15.3	12.1	11.5	10.5	9.9	9.1	7.0	9.2	18.4
9-Sep	7.1	7.7	7.3	6.3	6.2	5.3	6.0	7.1	7.9	9.4	11.3	14.3	16.9	18.7	19.0	13.1	16.5	15.1	12.8	9.7	8.3	7.4	7.3	6.4	10.3	19.0
10-Sep	5.5	4.7	4.1	4.6	5.1	4.4	5.1	6.8	8.4	10.6	12.8	16.4	19.2	20.4	21.9	21.7	22.0	20.2	17.9	14.7	12.4	10.4	9.6	8.5	12.0	22.0
11-Sep	7.3	6.6	6.7	6.6	7.0	6.0	7.5	9.3	11.8	15.4	18.0	18.9	20.0	21.5	22.0	22.3	21.9	21.1	19.0	15.7	14.4	13.9	13.4	14.3	14.2	22.3
12-Sep	16.0	15.9	15.8	15.5	15.0	14.0	13.5	14.2	14.4	15.5	16.4	17.4	17.3	17.1	17.9	17.9	18.0	17.3	14.0	12.1	12.8	13.1	9.9	8.5	15.0	18.0
13-Sep	7.1	5.8	5.4	4.3	3.0	2.4	2.9	5.4	7.4	9.0	12.7	12.8	13.6	15.3	14.6	13.0	10.3	10.6	10.0	8.9	8.0	8.1	7.8	7.7	8.6	15.3
14-Sep	7.4	7.2	7.2	7.2	7.0	6.9	6.9	7.0	7.1	7.6	8.3	9.7	9.5	9.8	9.9	10.4	10.3	9.6	6.7	4.4	3.6	2.7	1.7	0.9	7.0	10.4
15-Sep	-0.3	-0.9	-1.7	-1.9	-2.0	-1.5	-1.7	-0.4	2.8	6.9	9.6	12.7	13.9	14.6	13.5	12.0	13.1	12.1	9.4	6.1	4.3	3.1	2.7	2.4	5.4	14.6
16-Sep	1.8	1.5	1.2	0.9	0.9	1.1	1.1	2.3	3.8	5.1	8.0	12.0	14.0	15.5	16.0	14.9	12.9	12.4	10.3	6.4	4.6	4.3	3.0	1.5	6.5	16.0
17-Sep	0.4	-0.3	-0.5	-1.3	-1.4	-1.1	-1.0	0.4	2.6	5.1	9.8	13.2	15.3	16.5	16.4	17.2	16.2	14.6	13.0	10.7	9.4	8.1	4.7	3.6	7.2	17.2
18-Sep	3.8	4.0	3.4	3.6	3.4	3.6	4.6	7.5	9.4	12.1	14.1	16.1	18.0	19.1	19.1	18.9	18.8	17.0	14.8	10.9	9.7	8.9	8.3	6.5	10.7	19.1
19-Sep	7.8	7.3	6.8	6.2	5.9	6.2	7.6	9.0	11.2	15.0	18.0	20.2	20.9	21.6	21.7	19.0	18.2	16.2	14.6	14.1	13.7	12.4	9.3	6.9	12.9	21.7
20-Sep	5.3	5.8	5.4	4.5	5.1	4.8	4.7	6.3	9.3	11.5	13.3	14.3	15.6	16.1	16.6	15.1	13.7	12.8	9.8	7.3	7.2	8.2	7.8	7.0	9.5	16.6
21-Sep	6.8	6.6	5.7	5.2	5.0	4.7	4.4	3.8	4.1	4.9	6.0	7.2	8.5	8.3	9.6	8.8	9.6	7.7	6.3	5.5	5.4	4.8	3.8	2.1	6.0	9.6
22-Sep	0.4	-1.1	-1.8	-2.2	-2.1	-2.9	-3.3	-1.3	1.6	5.1	7.8	9.3	10.2	11.3	12.0	11.6	11.4	9.7	5.1	2.9	1.5	0.4	-0.5	-1.5	3.5	12.0
23-Sep	-1.7	-0.6	0.5	-0.1	-0.1	-0.3	0.0	1.0	3.3	5.7	8.6	11.3	12.3	13.1	14.4	15.2	13.9	13.5	11.8	10.6	10.4	9.3	7.4	8.1	7.0	15.2
24-Sep	5.2	3.7	2.3	1.2	0.3	-0.2	-0.7	1.2	5.2	9.0	11.5	13.6	DF	18.6	19.0	19.7	19.5	15.9	12.1	11.2	10.7	10.2	9.3	8.3	9.0	19.7
25-Sep	7.0	5.9	4.9	4.2	4.3	7.3	10.1	9.2	9.4	12.8	14.7	14.8	14.7	16.3	17.4	18.0	17.0	15.1	11.8	9.3	10.9	10.7	8.6	7.8	10.9	18.0
26-Sep	7.7	5.5	3.6	1.9	0.3	-0.2	-0.3	1.7	6.1	8.9	11.6	14.1	15.1	15.8	15.1	13.9	13.9	12.4	11.3	9.8	8.2	8.2	7.8	5.7	8.2	15.8
27-Sep	3.6	3.3	5.0	6.5	5.8	5.1	5.5	6.0	5.1	5.3	5.6	6.0	5.9	5.7	5.6	5.7	5.9	5.7	4.6	3.0	4.4	4.4	3.8	2.5	5.0	6.5
28-Sep	1.6	1.9	1.5	-0.3	-1.7	-2.5	-2.6	-1.6	1.8	4.3	5.7	7.4	8.5	10.2	10.9	11.9	11.6	7.0	4.4	6.0	6.6	5.3	4.4	4.0	4.4	11.9
29-Sep	4.2	4.1	4.4	4.6	4.2	4.1	4.4	5.7	6.7	8.1	9.9	11.8	14.8	18.2	20.2	20.8	20.4	17.9	13.2	10.5	9.1	8.0	7.7	6.9	10.0	20.8
30-Sep	5.6	5.6	4.6	3.9	4.3	5.7	6.8	7.6	9.6	12.1	14.6	17.8	21.3	23.0	23.8	24.6	24.3	22.9	20.5	17.7	16.8	16.0	15.6	14.9	14.2	24.6
																								Diurnal Average		
																								Diurnal Maximum		
DF - DAS Failure																										







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

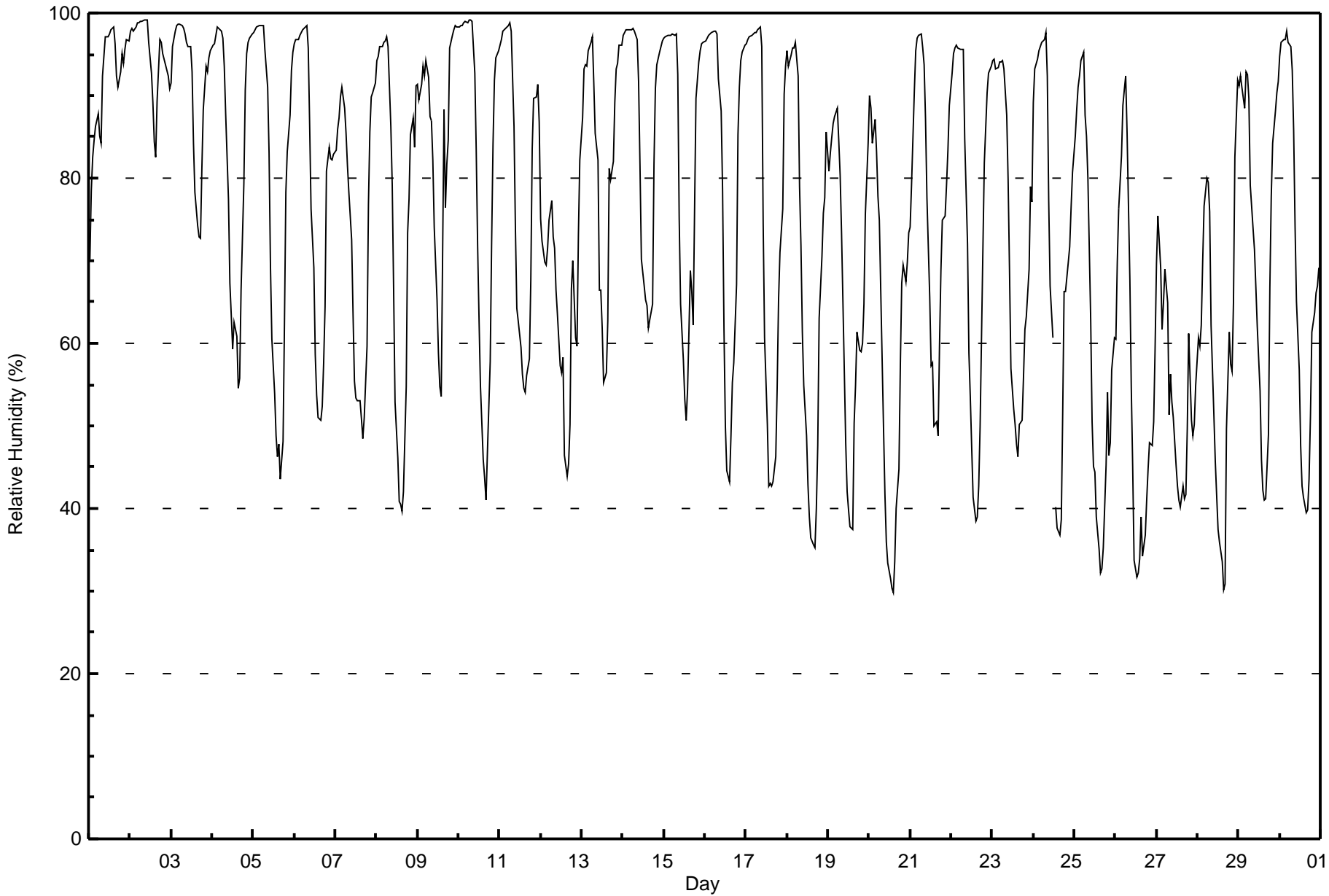
<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	37	5.15	5.15
0 - 10	406	56.47	61.61
10 - 20	251	34.91	96.52
> 20	25	3.48	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720

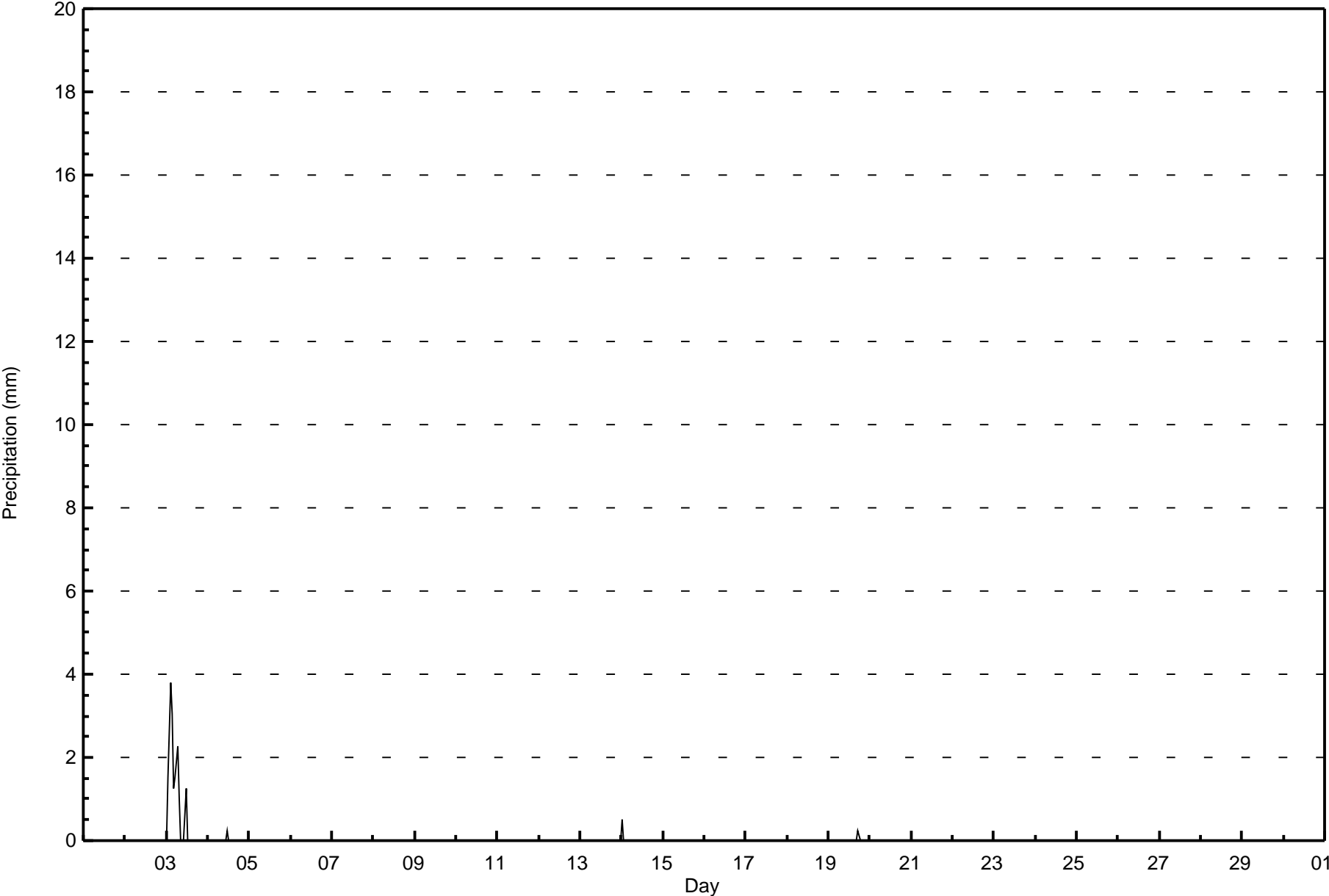


Maximum Value: 99 % on Sep 2 10:00																		Maximum Daily Average: 94.9 % on Sep 2																		Hours in Service: 720			
Minimum Value: 30 % on Sep 20 15:00																		Minimum Daily Average: 54.0 % on Sep 27																		Hours of Data: 719			
Maximum Diurnal Average: 92.9 % at hour 6																		Minimum Diurnal Average: 49.3 % at hour 15																		Hours of Missing Data: 1			
Monthly Average: 75.0 %																		Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 44 Q <sub>1</sub> = 58 Median = 80 Q <sub>3</sub> = 94 P <sub>90</sub> = 97 P <sub>99</sub> = 99																		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-Sep	70	78	82	85	86	88	85	84	92	97	97	97	97	98	98	96	92	91	93	95	94	96	97	97	91.1	98													
2-Sep	98	98	98	98	99	99	99	99	99	99	99	96	93	89	84	83	89	97	96	95	94	93	92	91	94.9	99													
3-Sep	92	96	98	98	99	99	99	98	97	96	96	96	93	84	78	74	73	73	81	88	94	93	95	95	91.0	99													
4-Sep	96	96	97	98	98	98	97	94	88	77	67	63	59	63	61	55	56	66	79	91	95	96	97	97	82.7	98													
5-Sep	98	98	98	98	99	99	98	96	91	83	69	61	54	49	46	48	44	48	62	78	83	88	93	95	78.2	99													
6-Sep	96	97	97	97	98	98	98	98	96	86	76	69	59	54	51	51	52	58	64	81	84	82	82	83	79.5	98													
7-Sep	83	86	87	90	91	89	85	82	78	73	64	55	53	53	53	51	48	51	60	77	86	90	90	92	73.6	92													
8-Sep	94	95	96	96	96	97	97	96	86	79	66	53	46	41	41	40	42	55	73	77	85	87	84	91	75.6	97													
9-Sep	91	90	91	94	92	94	92	87	87	82	74	65	59	55	54	88	76	82	85	96	97	98	98	98	84.4	98													
10-Sep	98	98	99	99	99	99	99	99	99	93	83	72	63	55	46	44	41	47	58	72	84	92	95	95	80.3	99													
11-Sep	96	97	98	98	98	98	99	98	86	74	64	63	59	56	55	54	56	58	68	84	90	90	91	87	79.9	99													
12-Sep	75	72	70	69	71	75	77	73	71	66	63	57	56	58	46	44	45	50	67	70	61	60	73	82	64.8	82													
13-Sep	87	93	94	94	95	97	97	92	85	82	66	66	62	55	56	63	81	80	82	89	93	94	96	96	83.2	97													
14-Sep	97	98	98	98	98	98	98	98	97	92	82	70	67	65	64	62	63	65	82	91	94	95	96	97	85.9	98													
15-Sep	97	97	97	97	97	97	97	97	93	75	65	58	53	51	54	69	66	62	76	90	94	95	96	96	82.2	97													
16-Sep	97	97	97	98	98	98	98	98	92	88	79	62	50	45	43	49	55	58	67	85	91	94	95	96	80.4	98													
17-Sep	96	97	97	97	97	98	98	98	98	96	75	61	50	43	43	43	43	46	55	65	71	76	90	94	76.1	98													
18-Sep	95	94	95	96	96	96	92	79	72	61	55	49	43	39	36	36	35	40	48	63	70	76	78	86	67.9	96													
19-Sep	81	83	85	87	87	88	85	80	73	56	48	42	40	38	38	50	55	61	59	59	60	65	76	84	65.9	88													
20-Sep	90	88	84	87	83	78	75	66	50	42	36	33	31	30	30	34	40	45	57	67	69	67	70	73	59.5	90													
21-Sep	74	79	90	96	97	97	98	96	94	87	78	66	57	58	50	51	49	60	69	75	75	79	83	89	76.9	98													
22-Sep	93	95	96	96	96	96	96	96	85	72	59	53	47	41	38	39	43	50	72	82	86	90	93	94	75.3	96													
23-Sep	94	94	93	93	94	94	94	93	88	80	69	57	52	50	48	46	50	51	56	62	63	69	79	77	72.8	94													
24-Sep	89	93	94	95	96	96	97	98	92	77	67	61	DF	40	38	37	39	51	66	66	70	72	76	81	73.6	98													
25-Sep	85	88	91	92	94	95	88	85	80	63	51	45	44	39	35	32	33	35	45	54	46	48	57	61	62.0	95													
26-Sep	61	70	76	83	89	91	92	85	68	55	45	34	32	32	34	39	34	37	41	45	48	48	50	59	56.1	92													
27-Sep	70	76	69	62	65	69	65	51	56	53	51	45	43	41	40	43	41	42	50	61	51	49	50	55	54.0	76													
28-Sep	61	60	62	70	77	80	80	76	62	51	46	41	37	36	34	30	31	50	61	57	57	65	83	92	58.2	92													
29-Sep	91	92	91	88	93	93	90	79	74	71	67	62	54	46	42	41	41	49	67	78	84	88	90	92	73.5	93													
30-Sep	95	96	97	97	98	97	96	93	86	74	65	57	48	43	41	39	40	44	51	61	64	66	67	69	70.1	98													
																								Diurnal Average															
																								Diurnal Maximum															
DF - DAS Failure																																							





Maximum Value: 3.8 mm on Sep 3 03:00		Maximum Daily Total: 15.7 mm on Sep 3		Hours in Service: 720																																																
Minimum Value: 0.0 mm on Sep 1 01:00		Minimum Daily Total: 0.0 mm on Sep 1		Hours of Data: 620																																																
Maximum Diurnal Total: 3.8 mm at hour 3		Minimum Diurnal Total: 0.0 mm at hour 9		Hours of Missing Data: 100																																																
Monthly Total: 16.76 mm		Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 1.1		Hours of Calibration: 0																																																
				Percent Operational Time: 86.1																																																
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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	1.5	3.8	3.0	1.3	1.5	2.3	1.0	0.0	0.0	0.0	1.3	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	15.7	3.8																							
4-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3																							
5-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5																							
15-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	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																							
20-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	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	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	0.0																							
25-Sep	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	--																							
26-Sep	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	--																							
27-Sep	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	--																							
28-Sep	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	0.0																							
29-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	3.8	3.0	1.3	1.5	2.3	1.0	0.0	0.0	0.0	1.5	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	Diurnal Average		
																								0.5	1.5	3.8	3.0	1.3	1.5	2.3	1.0	0.0	0.0	0.0	1.3	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	Diurnal Maximum	
M - Maintenance																																																				





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (mm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	611	98.55	98.55
0.4 - 0.5	1	0.16	98.71
0.6 - 0.7	0	0.00	98.71
0.8 - 1.4	3	0.48	99.19
1.5 - 10	5	0.81	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 620

Total Number of Hours: 720

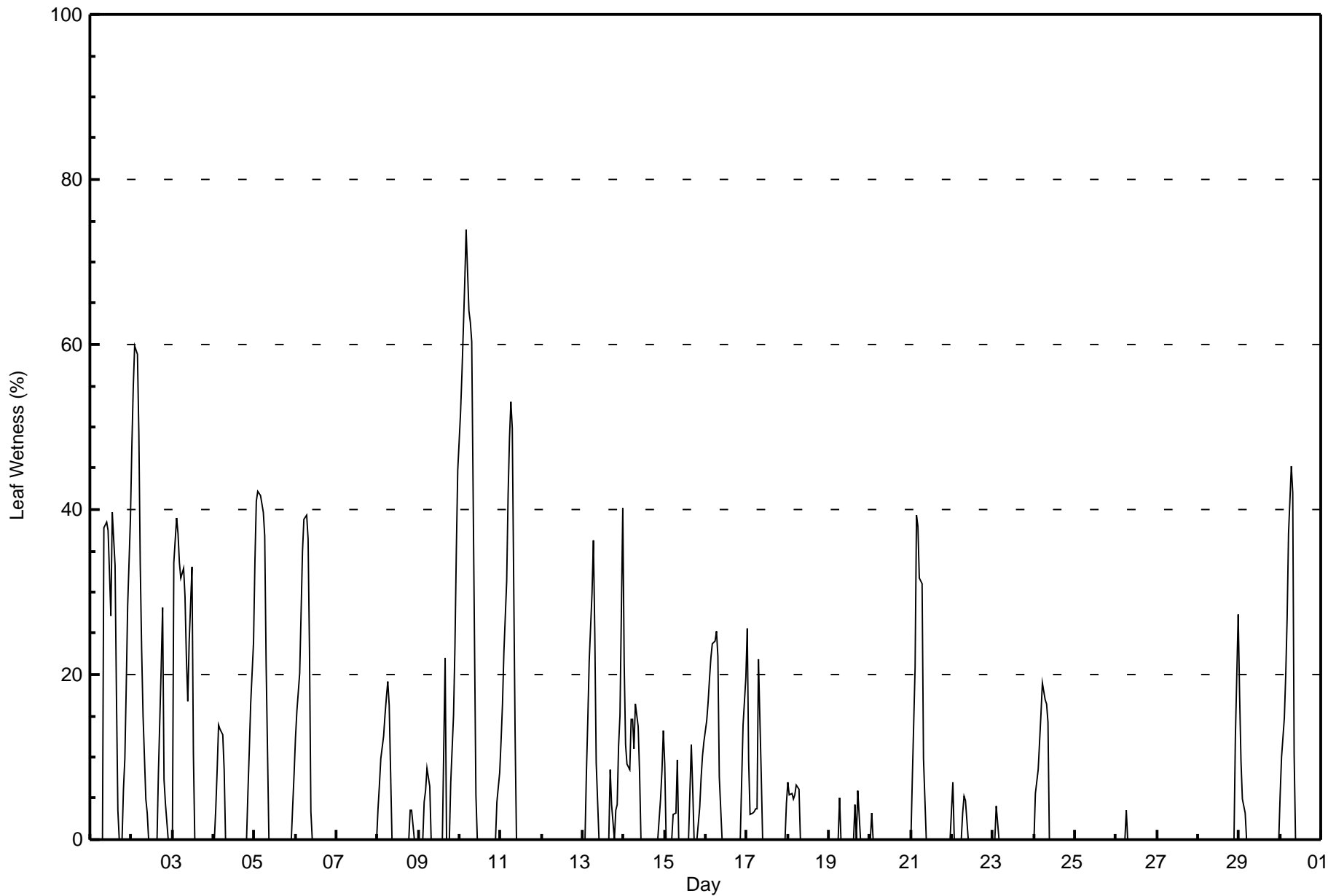


Summary of Hour Averages

Fort McKay - Bertha Ganter - September 2015

Maximum Value: 74 % on Sep 10 05:00																	Maximum Daily Average: 23.3 % on Sep 10																	Hours in Service: 720								
Minimum Value: 0 % on Sep 1 01:00																	Minimum Daily Average: 0.0 % on Sep 7																	Hours of Data: 719								
Maximum Diurnal Average: 15.7 % at hour 7																	Minimum Diurnal Average: 0.9 % at hour 17																	Hours of Missing Data: 1								
Monthly Average: 6.1 %																	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> = 23 P <sub>99</sub> = 59																	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-Sep	0	0	0	0	0	0	0	0	38	38	37	32	27	40	33	17	4	0	0	6	10	19	28	39	15.3	40																
2-Sep	48	55	60	59	49	33	23	15	5	3	0	0	0	0	0	0	8	21	28	7	4	0	0	0	17.4	60																
3-Sep	0	34	39	37	34	32	33	29	22	17	24	33	11	0	0	0	0	0	0	0	0	0	0	0	14.3	39																
4-Sep	0	4	9	14	13	13	8	0	0	0	0	0	0	0	0	0	0	0	0	0	6	11	17	24	4.9	24																
5-Sep	34	41	42	42	41	40	37	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	12.9	42																
6-Sep	12	16	20	27	35	39	39	36	23	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.5	39																
7-Sep	0	0	0	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-Sep	4	7	10	13	15	17	19	16	0	0	0	0	0	0	0	0	0	0	0	4	3	0	0	0	4.5	19																
9-Sep	0	0	0	5	6	9	6	0	0	0	0	0	0	0	0	22	0	0	0	7	15	23	35	45	7.2	45																
10-Sep	52	56	62	67	74	64	63	60	42	5	0	0	0	0	0	0	0	0	0	0	0	0	5	8	23.3	74																
11-Sep	12	16	23	31	42	49	53	50	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12.0	53																
12-Sep	0	0	0	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-Sep	0	0	8	15	22	30	36	25	9	0	0	0	0	0	0	8	4	0	4	4	11	15	40	9.7	40																	
14-Sep	21	11	9	9	15	14	11	16	14	8	0	0	0	0	0	0	0	0	0	0	0	5	8	13	6.5	21																
15-Sep	9	0	0	0	0	3	3	10	0	0	0	0	0	0	0	11	6	0	0	4	8	10	12	3.2	12																	
16-Sep	14	17	19	22	24	24	25	22	8	0	0	0	0	0	0	0	0	0	0	0	0	7	14	20	9.0	25																
17-Sep	26	9	3	3	3	4	4	22	8	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	3.6	26																
18-Sep	7	5	6	5	5	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	7																
19-Sep	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	4	0	6	0	0	0	0	0	0	0.6	6																
20-Sep	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	3																
21-Sep	0	7	21	39	38	32	31	10	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.6	39																
22-Sep	7	0	0	0	0	0	3	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	7																
23-Sep	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	4																
24-Sep	0	6	8	12	15	19	17	16	14	0	0	0	DF	0	0	0	0	0	0	0	0	0	0	0	4.7	19																
25-Sep	0	0	0	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-Sep	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	4																
27-Sep	0	0	0	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-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	27	1.7	27																
29-Sep	18	10	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.5	18																
30-Sep	5	10	15	20	27	37	45	42	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.8	45																
																	8.9	10.2	12.1	14.1	15.2	15.5	15.7	13.2	7.2	2.5	2.0	2.2	1.3	1.3	1.1	1.8	0.9	1.0	0.9	0.9	1.6	2.8	5.0	8.0	Diurnal Average	
																	52	56	62	67	74	64	63	60	42	38	37	33	27	40	33	22	8	21	28	7	15	23	35	45	Diurnal Maximum	
DF - DAS Failure																																										







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Leaf Wetness (LW) - %**  
**Fort McKay - Bertha Ganter - September 2015**

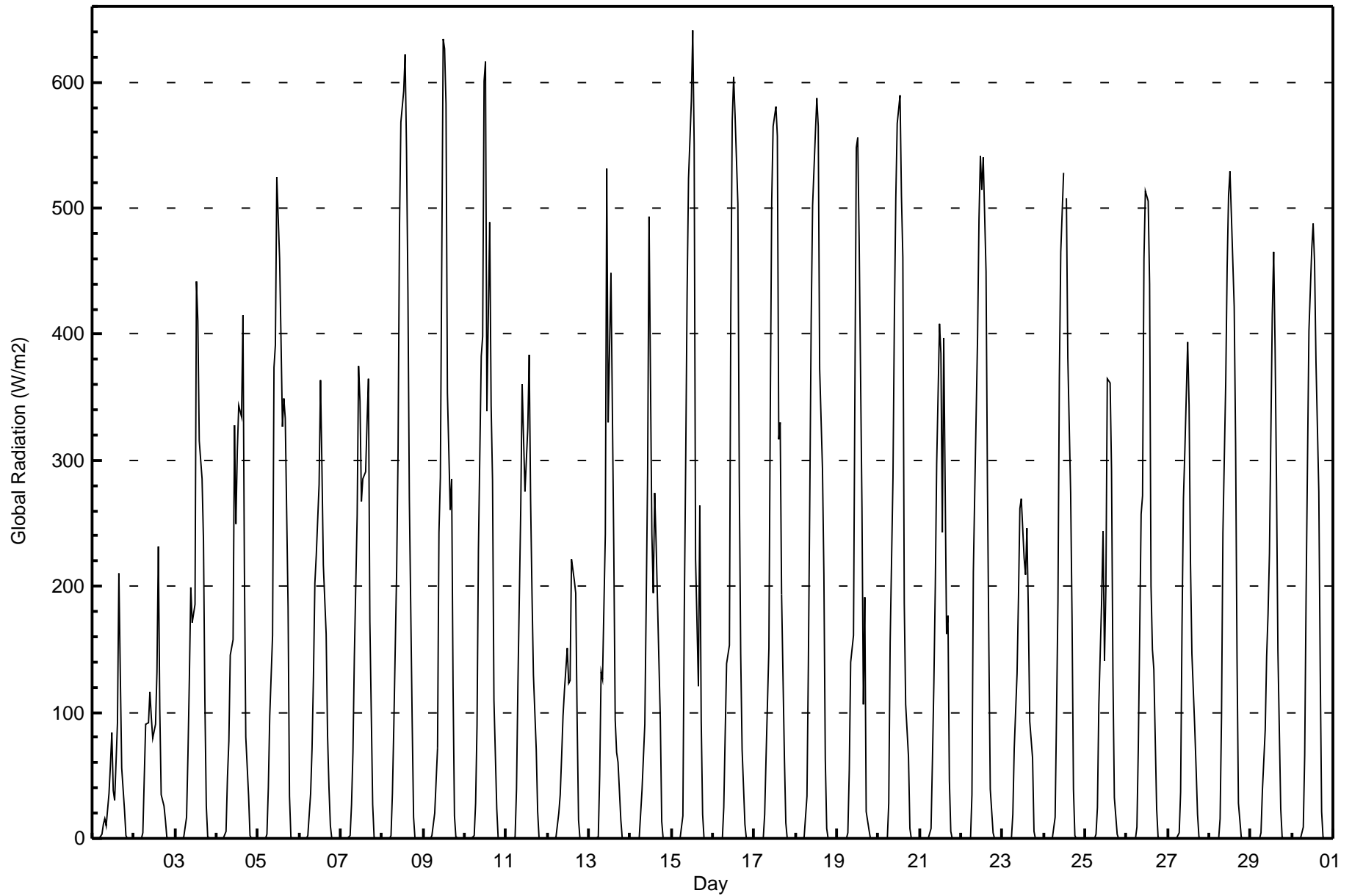
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	500	69.54	69.54
0.4 - 0.5	0	0.00	69.54
0.6 - 0.7	0	0.00	69.54
0.8 - 1.4	0	0.00	69.54
1.5 - 10	82	11.40	80.95
> 10	137	19.05	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



Maximum Value: 641 W/m2 on Sep 15 13:00		Maximum Daily Average: 178.0 W/m2 on Sep 8		Hours in Service: 720																							
Minimum Value: 0 W/m2 on Sep 1 02:00		Minimum Daily Average: 33.3 W/m2 on Sep 1		Hours of Data: 719																							
Maximum Diurnal Average: 415.2 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 3		Hours of Missing Data: 1																							
Monthly Average: 121.0 W/m2		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 15 Q <sub>3</sub> = 210 P <sub>90</sub> = 400 P <sub>99</sub> = 598		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-Sep	0	0	0	0	0	3	12	16	10	35	58	84	38	30	92	210	130	56	22	2	0	0	0	0	33.3	210	
2-Sep	0	0	0	0	0	4	48	91	92	116	96	80	91	132	232	103	35	26	15	2	0	0	0	0	48.4	232	
3-Sep	0	0	0	0	0	1	17	67	127	199	171	186	442	410	315	286	236	109	26	2	0	0	0	0	108.1	442	
4-Sep	0	0	0	0	0	5	48	77	146	157	327	249	308	343	334	415	217	80	33	2	0	0	0	0	114.3	415	
5-Sep	0	0	0	0	0	4	40	97	161	374	391	525	459	394	327	349	334	183	34	2	0	0	0	0	153.1	525	
6-Sep	0	0	0	0	0	3	36	71	129	203	225	281	364	295	217	163	81	41	11	0	0	0	0	0	88.3	364	
7-Sep	0	0	0	0	0	2	27	68	144	257	375	347	267	285	290	330	364	172	27	1	0	0	0	0	123.2	375	
8-Sep	0	0	0	0	0	2	36	89	212	307	483	568	592	622	546	433	270	94	17	1	0	0	0	0	178.0	622	
9-Sep	0	0	0	0	0	2	20	46	71	242	286	634	626	583	354	260	285	120	17	1	0	0	0	0	147.9	634	
10-Sep	0	0	0	0	0	2	29	90	230	382	398	600	616	339	488	343	285	110	24	0	0	0	0	0	164.0	616	
11-Sep	0	0	0	0	0	2	40	121	261	360	317	275	325	384	269	193	130	71	22	0	0	0	0	0	115.4	384	
12-Sep	0	0	0	0	0	1	20	35	65	97	117	151	123	126	222	204	194	94	14	0	0	0	0	0	61.0	222	
13-Sep	0	0	0	0	0	1	51	132	127	241	532	330	389	449	229	94	68	61	15	0	0	0	0	0	113.3	532	
14-Sep	0	0	0	0	0	0	19	38	91	188	290	494	241	195	274	235	188	94	13	0	0	0	0	0	98.4	494	
15-Sep	0	0	0	0	0	0	18	180	300	433	524	585	641	550	221	120	265	93	19	0	0	0	0	0	164.6	641	
16-Sep	0	0	0	0	0	0	24	83	138	153	421	569	604	574	504	284	146	70	11	0	0	0	0	0	149.2	604	
17-Sep	0	0	0	0	0	0	19	65	151	341	506	565	580	557	317	330	193	63	13	0	0	0	0	0	154.2	580	
18-Sep	0	0	0	0	0	1	33	138	270	411	502	561	587	564	372	294	209	63	8	0	0	0	0	0	167.2	587	
19-Sep	0	0	0	0	0	0	5	54	139	161	356	548	556	476	263	106	191	21	6	0	0	0	0	0	120.1	556	
20-Sep	0	0	0	0	0	0	28	156	286	414	507	567	589	510	461	187	107	64	8	0	0	0	0	0	161.9	589	
21-Sep	0	0	0	0	0	0	8	63	123	199	298	409	385	243	398	162	177	45	6	0	0	0	0	0	104.8	409	
22-Sep	0	0	0	0	0	0	35	211	276	398	491	541	515	540	450	281	152	40	4	0	0	0	0	0	163.9	541	
23-Sep	0	0	0	0	0	0	19	71	130	191	262	270	223	210	246	180	93	64	6	0	0	0	0	0	81.8	270	
24-Sep	0	0	0	0	0	0	17	99	188	366	465	528	DF	508	381	274	174	40	3	0	0	0	0	0	132.3	528	
25-Sep	0	0	0	0	0	0	3	25	107	189	244	141	199	364	362	292	129	33	4	0	0	0	0	0	87.1	364	
26-Sep	0	0	0	0	0	0	9	72	258	271	460	513	506	440	200	150	134	23	1	0	0	0	0	0	126.6	513	
27-Sep	0	0	0	0	0	0	4	36	169	270	308	394	343	218	146	89	55	19	1	0	0	0	0	0	85.5	394	
28-Sep	0	0	0	0	0	0	15	97	243	363	453	510	529	495	422	314	143	28	1	0	0	0	0	0	150.5	529	
29-Sep	0	0	0	0	0	0	5	38	87	144	177	226	415	465	389	282	149	23	1	0	0	0	0	0	100.1	465	
30-Sep	0	0	0	0	0	0	9	66	193	301	402	468	487	457	379	276	135	21	1	0	0	0	0	0	133.1	487	
		0.0	0.0	0.0	0.0	0.0	1.2	23.0	83.1	164.1	258.8	348.2	406.6	415.2	391.9	323.3	241.3	175.7	67.4	12.7	0.5	0.0	0.0	0.0	0.0	Diurnal Average	
		0	0	0	0	0	5	51	211	300	433	532	634	641	622	546	433	364	183	34	2	0	0	0	0	Diurnal Maximum	
DF - DAS Failure																											





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (W/m2)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	373	51.88	51.88
21 - 100	89	12.38	64.26
101 - 300	137	19.05	83.31
301 - 600	114	15.86	99.17
601 - 900	6	0.83	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720

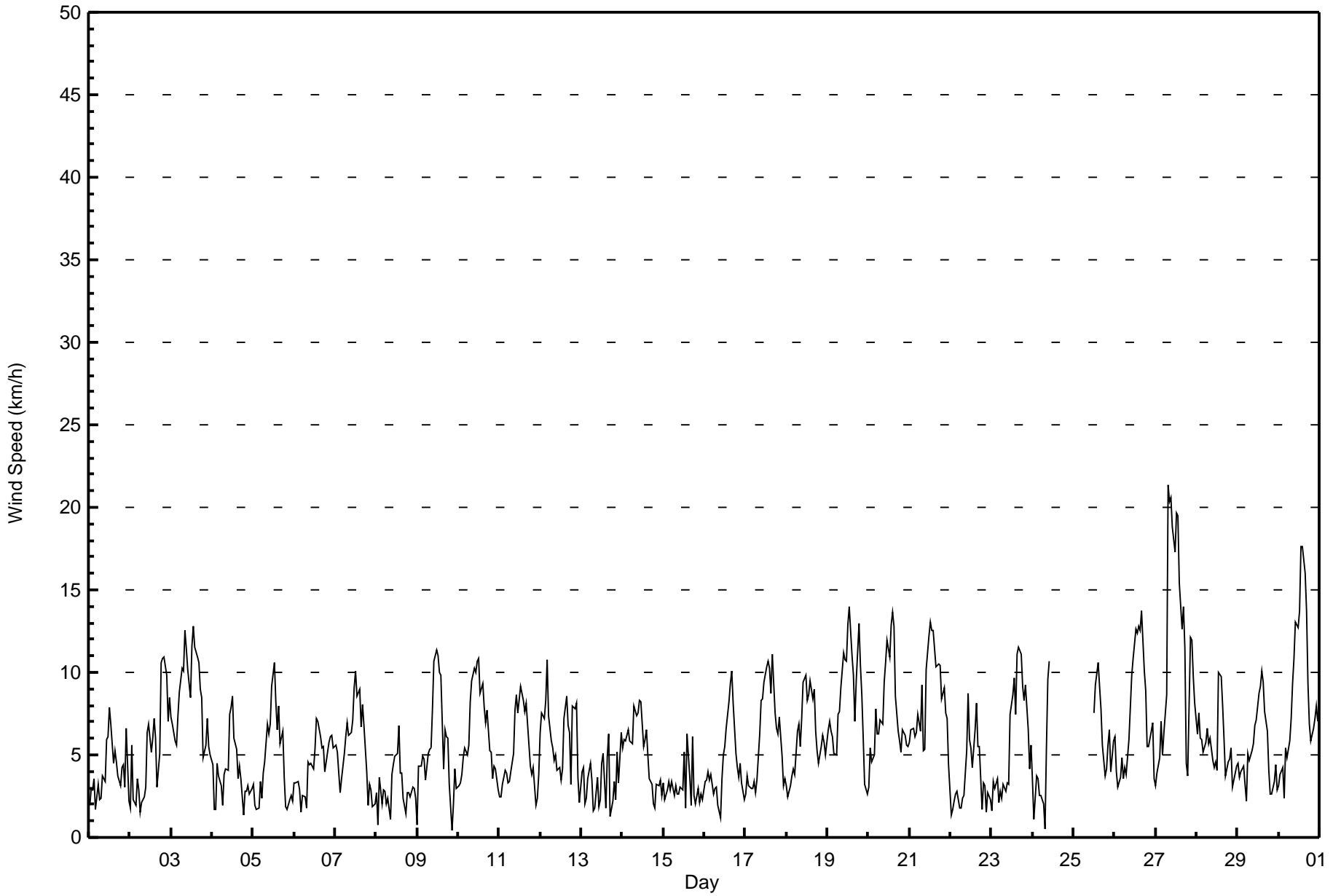


Maximum Speed: 21 km/h on Sep 27 08:00	Maximum Daily Speed Average: 10.2 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 9 21:00	Minimum Daily Speed Average: 1.0 km/h on Sep 8	Hours of Data: 695
Maximum Diurnal Speed Average: 2.9 km/h at hour 13	Minimum Diurnal Speed Average: 1.7 km/h at hour 9	Hours of Missing Data: 25
Monthly Average Velocity: 2.2 km/h 248.2 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> = 17	Percent Operational Time: 96.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	WNW2	WSW3	SW3	W4	WNW2	SSW3	SSW2	NNW2	SE4	N3	N6	N6	NW8	NW7	W4	WNW5	SW5	SW4	SSW3	SSW4	SW4	S3	S7	SSW2	W1.9	NW8	
2-Sep	WSW2	S6	SSW2	SW2	SSW4	NW3	NW1	WSW2	N2	NNW3	NNE6	NNE7	NNE5	NNE6	NNE7	NNE6	NNW3	NNW5	N11	N11	N11	N10	NNW7	NNW8	N4.0	N11	
3-Sep	NNW7	NNW7	NNW6	NW6	WNW7	WNW9	WNW10	NW10	NW13	WNW11	WNW10	WNW8	WNW12	NW13	NW12	NW11	NW11	NW9	NW8	NW5	WNW6	WNW7	WNW5	WNW5	NNW8.5	NW13	
4-Sep	WNW4	NNW2	WNW2	WNW4	NNW4	NW3	NNW2	WNW4	NNW4	NNW4	NNW7	NNW8	NNW9	N6	NNE5	ENE4	E4	N4	NNW1	W3	W3	W3	WNW3	W3	NNW3.0	NNW9	
5-Sep	WSW3	WSW2	SW2	WSW2	SSW3	SSW2	S4	S5	SSE7	SSE6	SSE7	SSE9	SSE11	SSE8	S7	S8	SSE6	S6	SSE4	WNW2	WNW2	W2	NW3	WNW2	S3.6	SSE11	
6-Sep	NW3	NW3	NW3	NW3	WNW2	NW3	WNW2	NW2	NNW5	NNW4	N4	N4	N5	N7	NNE7	NNE6	ENE5	NE5	N4	NNW5	NNW6	NNW6	NNW6	NNW5	N3.8	N7	
7-Sep	NNW6	NNW5	NNW4	NW3	NW4	NNW5	NNW6	NNW7	N6	N6	N7	N9	N10	N9	N9	NE7	NNE8	NNE7	N4	SW2	W3	W3	W2	WNW2	N4.7	N10	
8-Sep	NW3	WNW1	S4	WSW2	SSW3	WSW3	WSW2	SW2	SE1	SSE4	SSE4	SSE5	SSE5	ESE7	E4	ENE4	NNE2	ENE1	NNW3	N3	W2	S3	S3	NW2	SSE1.0	ESE7	
9-Sep	WSW1	S4	S4	S5	SSW5	SSW3	S5	S5	SSE5	SSE8	SSE11	SSE11	SSE11	SSE10	SSE10	SE4	SE6	SE6	SSE6	SW3	N0	W2	S4	SSW3	SSE5.1	SSE11	
10-Sep	SSW3	SSW3	SSW4	SSW5	S5	S5	S6	S8	SSE9	SSE10	SSE10	SSE11	SSE11	SSE9	S9	SSW8	SW7	SSW8	SSW5	SW5	S4	SSW4	SSW4	SW3	S6.1	SSE11	
11-Sep	WNW2	SW2	SW3	SSW4	SSW4	SW3	SSW3	SSW4	SW5	SSW8	SW9	SW8	SW9	SW9	SW8	SW8	SSW8	SSW6	SSW4	S4	S4	SE2	WSW2	W4	SW4.8	SW9	
12-Sep	W6	WNW8	WNW7	WNW8	WNW11	WNW7	WNW6	WNW5	W5	SW5	SW4	WSW4	SW3	WSW4	WNW7	W9	WSW7	WSW6	W3	WNW8	NNW8	N8	NNW4	NW2	WNW5.2	WNW11	
13-Sep	WNW4	W4	W2	NW2	WNW4	NW5	WNW4	W2	NW2	S4	SE2	NNW2	N4	ESE5	NNE2	WNW5	N6	SSE1	WSW2	NNW3	WNW2	NW5	NW3	N6	NW1.9	N6	
14-Sep	N5	N6	N6	N7	N6	NNW6	NNW6	N8	N7	N8	N8	NNE6	N6	NNE7	NE5	NNE4	NNE3	NNE2	NNW2	W3	W3	WNW3	WSW3	N4.6	N8		
15-Sep	W3	W2	WNW3	WNW3	W3	W3	WNW3	N3	N3	ENE3	SSW3	SSE3	S5	SE2	S6	SSE4	NW2	SSE6	S3	WNW2	W3	NW2	WNW3	WNW2	WSW1.2	S6	
16-Sep	WNW3	WNW3	WNW4	WNW3	WNW4	W3	W3	W3	W2	SW1	SSE4	SSE5	S6	SE7	SSE8	SSE9	S10	S8	S5	S4	S4	S4	S3	W2	S2.8	S10	
17-Sep	WNW3	WSW4	SW3	SW3	SSW3	SW3	SSW3	SSW4	SSE6	SSE8	SSE8	SSE9	S10	S11	S10	SSE9	S11	SSW8	S7	S6	S7	SSW5	SSW3	SSW4	S5.5	S11	
18-Sep	SSW3	SW2	SW3	WSW4	SW4	SW4	SSW6	S7	S6	SW7	SW9	SW10	W8	WSW9	SW9	WSW8	WSW9	WSW6	SW5	S5	S5	S6	SSW6	SSW5	SW5.6	SW10	
19-Sep	SSW7	S7	S6	S6	SSW5	S5	S7	S8	S9	SSW11	SW11	WSW11	SW13	SW14	W11	W10	SW7	SW10	SSW13	SW10	SW9	WNW6	W3	NW3	SW7.2	SW14	
20-Sep	WSW3	SSW5	SW5	W5	W8	W6	S6	S7	SW7	WSW9	WSW11	WSW12	WSW11	W13	WNW14	NW13	NW9	NW6	NW6	NW5	NW7	NW6	NW6	WNW5	W5.9	WNW14	
21-Sep	WNW6	NW7	WNW7	WNW6	WNW6	WNW7	NNW6	NNW9	NNW5	N5	NNW10	NNW12	NNW13	NNW13	NNW13	NW10	NW10	NW11	WNW10	WNW8	WNW9	WNW8	NW7	WNW4	NNW8.1	NNW13	
22-Sep	WNW1	WNW2	WNW2	W3	NW3	W2	WSW2	SW2	SSW3	SSE5	SSE9	SSE6	S5	SSW4	S7	S8	SE6	SE6	SSE2	SSW3	SSW3	S2	SW3	W2	S2.6	SSE9	
23-Sep	N2	N3	N3	NNW4	NW2	NNW3	WNW2	NNW3	NNW3	NNE3	SE3	SSE7	SSE9	SE10	ESE7	SE11	ESE12	ESE11	SE9	SE8	SSE9	SSE7	SSE4	SSE6	SE3.6	ESE12	
24-Sep	S3	E1	NNW4	NNW4	NW3	W3	NNW2	W1	S5	S10	SSE11	M	M	M	M	M	M	M	M	M	M	M	M	M	---	SSE11	
25-Sep	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	---	---	WSW11
26-Sep	W6	SSW4	SSW3	S4	SSW5	SW4	SW4	SW4	SW6	SW8	SW10	WSW11	W13	WSW12	WSW13	W13	W14	W10	W9	WSW5	SW6	WSW6	WSW7	WNW4	WSW6.7	W14	
27-Sep	SSW3	S4	S5	W7	SW5	SW6	W9	WNW21	NW20	NW21	NW19	NW17	NW20	NW20	NW15	NW13	NW14	NW11	NW5	NW4	NW12	NW12	NW10	NW8	NW10.2	WNW21	
28-Sep	WNW6	WNW8	NW6	WNW6	WNW5	WNW6	WNW7	WNW6	WNW6	NW5	WNW4	SSW5	SW4	SSE10	SSE10	SSE8	SSE6	S4	S5	S5	S5	SSE3	E3	SE4	SW2.1	SSE10	
29-Sep	SE4	SE4	SE4	SSE4	SSE3	S2	S5	S5	S5	S6	S7	S7	SSE9	SSE9	SSE10	SSE9	S8	S6	S4	SSW3	SSW3	S3	S4	SSW3	S5.1	SSE10	
30-Sep	SSW3	SSW4	SW4	SW2	S5	S5	SSW6	SSW7	S9	SSE11	SSE13	S13	S14	SSW18	S18	S16	S14	S9	S7	S6	S7	S7	S8	S7	S8.7	S18	

W2.2	W2.0	W2.0	W2.5	W2.6	W2.7	WSW2.3	W2.4	WSW1.7	SW1.9	SW2.4	SW2.2	SW2.9	SW2.5	SW2.6	SW2.3	SW2.3	SW2.0	SW2.0	WSW2.0	WSW2.3	W2.2	W2.1	W2.1	Diurnal Average
NNW7	WNW8	WNW7	WNW8	WNW11	WNW9	WNW10	WNW21	NW20	NW21	NW19	NW17	NW20	NW20	S18	S16	NW14	NW11	SSW13	N11	NW12	NW12	NW10	NNW8	Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	368	52.95	52.95
6 - 11	287	41.29	94.24
12 - 19	35	5.04	99.28
20 - 28	5	0.72	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 695

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	18	8	2	5	4	1	11	17	46	51	40	21	36	47	31	30	368
6 - 11	26	12	1	0	0	3	8	47	43	15	23	17	15	34	22	21	287
12 - 19	0	0	0	0	0	1	0	1	5	2	2	3	4	2	11	4	35
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	5
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	44	20	3	5	4	5	19	65	94	68	65	41	55	84	68	55	695

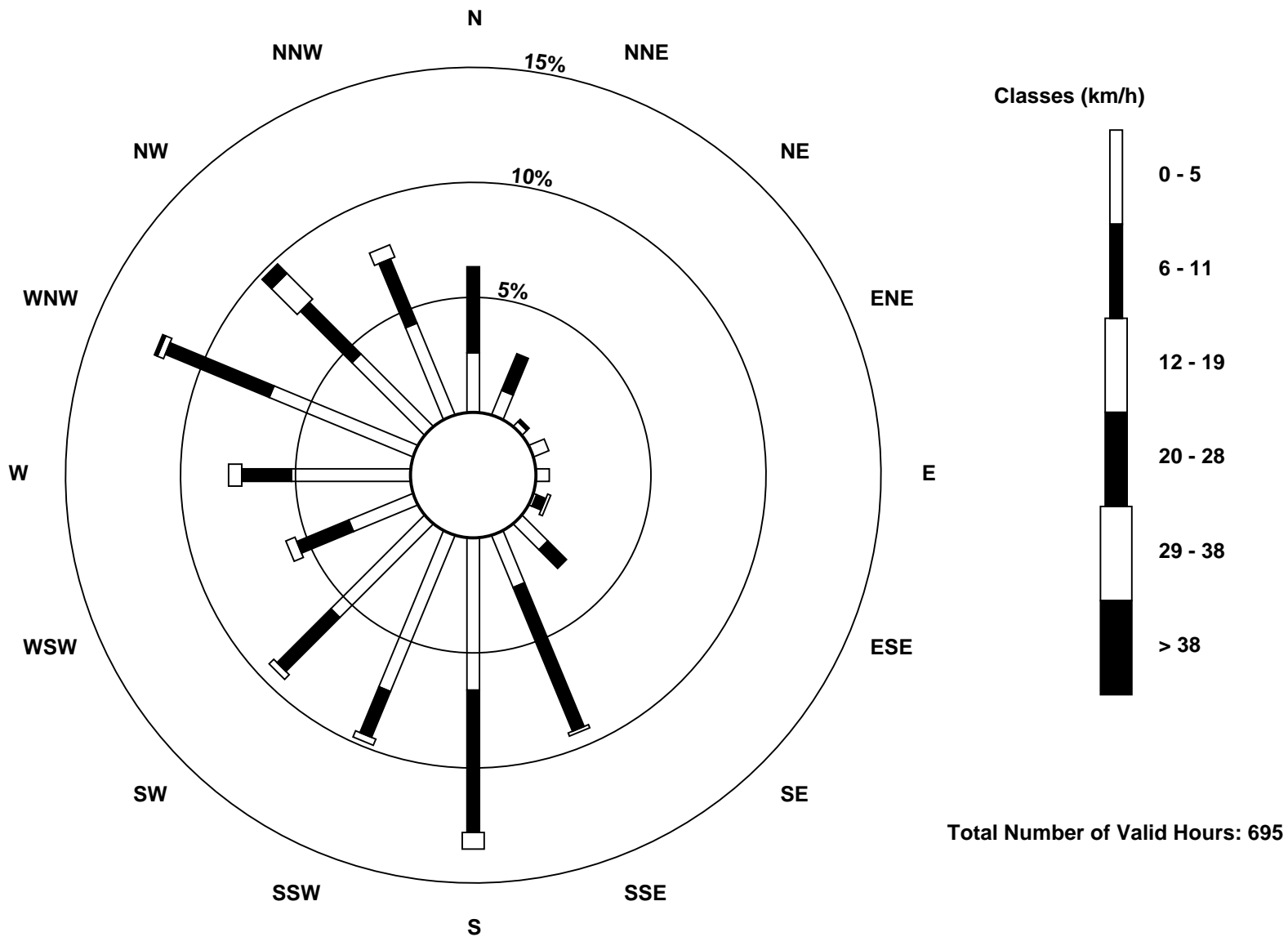
Total Number of Valid Hours: 695

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 8 km/h on Sep 27 08:00	Hours of Data: 695
Minimum Value: 0 km/h on Sep 10 01:00	Hours of Missing Data: 25
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 of Calibration: 0
	Percent Operational Time: 96.5

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

M - Maintenance



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

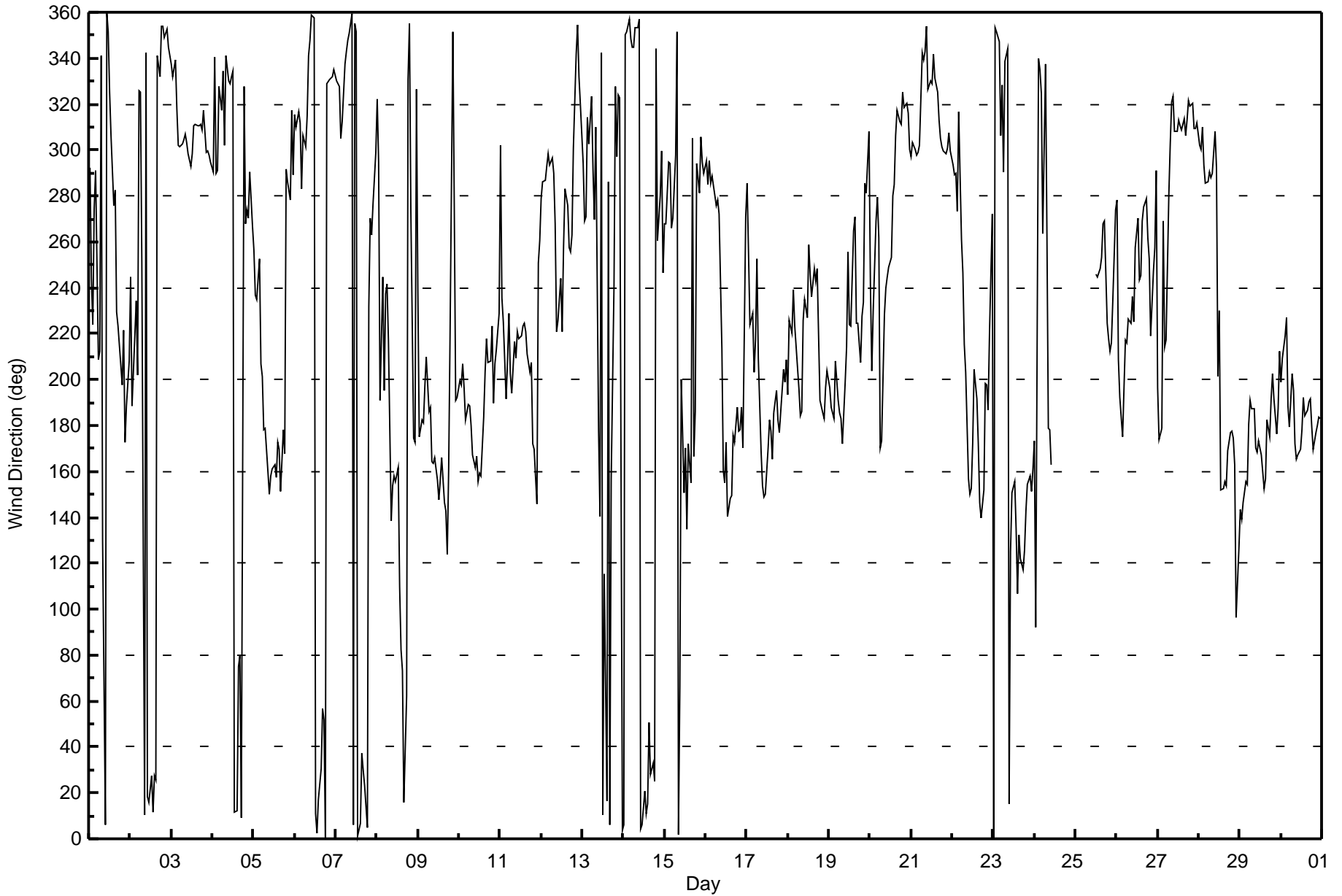
Fort McKay - Bertha Ganter - September 2015

Direction of Maximum Speed: 303 deg on Sep 27 08:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 305.5 deg on Sep 27	Hours of Data: 695
Direction of Minimum Speed: 352 deg on Sep 9 21:00	Direction of Minimum Daily Speed Average: 1.0 deg on Sep 8
Direction of Minimum Speed: 352 deg on Sep 9 21:00	Hours of Missing Data: 25
Monthly Average Direction: 267.4 deg	Percent Operational Time: 96.5

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-Sep	292	244	224	275	291	208	212	341	130	6	360	352	325	306	276	282	230	223	206	197	221	173	188	208	261.8
2-Sep	245	189	204	235	202	326	325	251	10	343	18	16	27	12	28	25	341	332	354	354	349	353	345	341	353.1
3-Sep	338	332	339	318	302	301	303	305	307	303	299	293	299	311	311	311	311	311	309	317	299	300	298	294	307.9
4-Sep	291	340	290	291	328	317	334	302	341	330	329	332	334	11	12	75	80	9	327	268	274	271	290	266	328.4
5-Sep	256	237	235	253	207	202	178	179	160	150	158	161	163	157	173	169	151	178	168	292	286	278	317	289	177.5
6-Sep	315	310	316	312	283	307	301	315	341	348	359	357	11	2	17	30	57	52	1	329	331	331	332	335	349.3
7-Sep	330	329	327	305	313	338	343	348	351	359	6	355	351	1	6	37	30	23	5	232	270	263	277	299	350.3
8-Sep	322	295	191	244	195	237	241	217	138	154	158	156	162	110	83	73	16	62	331	355	274	175	173	326	161.8
9-Sep	239	175	182	181	197	210	186	188	164	164	166	156	148	156	166	146	143	124	161	220	352	275	191	192	167.8
10-Sep	200	197	207	197	183	189	189	180	167	162	167	156	159	158	184	203	218	208	208	223	190	207	213	229	184.9
11-Sep	302	236	225	192	208	229	202	194	216	209	221	218	219	224	225	221	211	203	207	172	170	146	251	261	214.8
12-Sep	279	286	287	293	298	294	297	290	268	221	225	244	221	258	283	276	258	256	263	301	342	355	332	319	285.1
13-Sep	294	269	271	314	303	323	292	270	310	177	141	342	11	115	16	286	6	157	241	328	297	324	323	4	318.3
14-Sep	6	350	352	357	349	345	345	353	353	357	4	6	21	11	15	50	28	33	25	344	261	280	299	247	357.1
15-Sep	268	268	295	294	266	270	298	351	2	67	200	151	170	135	172	155	305	166	186	294	281	306	295	290	240.5
16-Sep	295	285	295	286	289	280	276	278	272	214	161	155	173	140	148	150	176	173	188	178	178	188	170	271	190.4
17-Sep	285	256	224	229	203	217	253	209	168	154	149	150	170	182	178	166	185	195	182	177	186	204	199	209	183.8
18-Sep	193	226	221	239	224	214	196	184	186	226	235	227	259	246	236	248	243	248	220	191	186	183	197	204	221.7
19-Sep	196	188	185	183	208	191	185	183	172	199	214	255	224	223	265	271	225	225	208	228	234	286	281	308	219.5
20-Sep	241	204	230	269	279	262	170	174	228	240	244	249	253	280	285	307	317	312	311	325	319	320	316	300	272.1
21-Sep	297	304	300	298	299	302	342	339	343	354	327	330	329	342	331	325	313	305	302	300	298	301	307	300	317.5
22-Sep	294	289	290	273	316	261	246	215	203	157	150	153	172	204	191	172	146	140	152	198	198	186	221	272	185.5
23-Sep	0	354	351	347	306	328	291	339	344	15	125	151	156	135	107	132	122	117	126	143	154	158	152	161	129.4
24-Sep	173	92	340	335	324	263	337	262	179	178	163	M	M	M	M	M	M	M	M	M	M	M	M	M	--
25-Sep	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--
26-Sep	278	209	192	175	197	217	216	226	224	236	225	257	270	244	245	269	275	279	262	252	219	247	257	291	248.7
27-Sep	196	174	178	269	214	217	281	303	321	323	308	308	313	311	309	314	306	313	322	319	320	309	309	312	305.5
28-Sep	302	301	310	293	285	286	291	288	290	308	292	201	230	152	153	155	154	169	177	177	175	163	96	126	227.5
29-Sep	143	139	146	156	154	180	191	187	187	170	169	173	167	160	152	157	183	175	191	202	192	176	187	212	170.2
30-Sep	199	209	219	227	189	179	202	195	172	165	167	170	178	192	184	187	190	191	179	170	177	180	183	183	183.6

278.9	260.1	259.7	269.8	259.0	264.2	256.2	262.3	246.8	222.8	218.3	230.2	235.9	227.8	234.5	231.7	234.4	227.9	232.8	247.5	252.4	265.9	260.5	277.0
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

Fort McKay - Bertha Ganter - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 100 deg on Sep 8 09:00	Hours of Data: 695
Minimum Value: 7 deg on Sep 29 20:00	Hours of Missing Data: 25
Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 15 Q <sub>1</sub> = 19 Median = 28 Q <sub>3</sub> = 42 P <sub>90</sub> = 54 P <sub>99</sub> = 83	Hours of Calibration: 0
	Percent Operational Time: 96.5

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-Sep	67	23	38	26	46	47	71	80	69	63	33	25	26	29	40	36	38	37	24	30	42	37	17	57	80
2-Sep	72	22	72	64	46	54	82	52	56	60	41	45	50	40	47	42	35	19	26	28	24	25	21	20	82
3-Sep	19	16	20	21	19	20	17	20	21	21	24	30	25	23	25	22	22	22	22	21	18	18	21	22	30
4-Sep	26	42	70	27	37	30	44	24	45	61	33	36	34	48	50	67	51	44	33	16	35	23	47	26	70
5-Sep	31	52	69	78	35	52	33	29	22	23	30	23	20	21	32	22	30	21	34	54	67	43	40	40	78
6-Sep	15	21	31	53	53	23	29	48	21	34	39	53	58	41	49	45	52	57	43	10	11	12	15	14	58
7-Sep	16	18	26	39	26	25	24	26	34	42	48	41	34	38	37	59	48	49	27	52	37	46	33	34	59
8-Sep	38	76	18	55	18	21	35	39	100	30	38	43	45	34	76	62	70	72	46	64	55	37	44	46	100
9-Sep	74	19	12	15	21	31	14	17	22	19	15	16	16	21	44	90	18	24	22	21	96	54	18	24	96
10-Sep	11	17	16	13	12	10	19	15	15	14	16	17	17	23	26	32	40	25	15	14	24	13	14	15	40
11-Sep	30	56	21	15	23	32	34	24	29	30	37	32	31	37	36	35	28	21	15	29	20	62	44	53	62
12-Sep	40	36	38	30	19	22	26	35	41	33	42	47	42	47	36	41	49	44	23	24	26	28	26	54	54
13-Sep	20	20	71	38	24	18	34	76	72	35	83	95	55	66	78	53	39	85	37	29	39	21	31	33	95
14-Sep	32	25	25	29	29	22	25	28	29	32	33	42	49	39	49	53	59	57	52	62	14	23	35	37	62
15-Sep	33	39	22	18	19	16	14	25	49	80	67	76	54	88	33	88	76	28	34	42	29	60	29	23	88
16-Sep	15	15	19	20	13	41	26	35	60	72	37	29	35	34	22	20	18	18	13	13	28	22	28	38	72
17-Sep	29	20	30	20	23	30	25	28	20	17	18	18	27	31	24	27	23	19	14	14	14	27	14	22	31
18-Sep	22	22	23	17	19	18	15	16	31	42	41	45	54	52	43	52	45	48	27	17	15	12	13	15	54
19-Sep	14	13	13	12	17	19	18	20	14	23	42	54	38	39	45	43	38	37	26	37	44	42	38	60	60
20-Sep	41	19	46	43	41	48	27	23	47	49	45	48	53	43	38	30	23	20	14	20	16	17	19	19	53
21-Sep	16	15	14	17	19	17	31	25	35	36	25	27	30	28	30	26	25	23	17	16	17	16	15	22	36
22-Sep	82	62	54	50	40	40	45	58	69	36	19	42	44	75	48	27	24	19	39	33	26	43	37	17	82
23-Sep	32	11	11	11	31	29	15	15	25	30	52	25	19	23	28	21	21	19	16	16	17	17	17	15	52
24-Sep	15	71	38	19	24	36	47	81	26	20	22	M	M	M	M	M	M	M	M	M	M	M	M	M	81
25-Sep	M	M	M	M	M	M	M	M	M	M	M	M	51	47	47	48	53	45	28	22	22	22	37	43	53
26-Sep	40	40	55	16	19	23	16	22	41	44	43	48	44	48	46	44	44	40	42	45	34	45	50	63	63
27-Sep	48	40	20	47	42	36	43	23	26	24	25	26	25	23	22	25	21	22	19	28	26	21	23	17	48
28-Sep	20	22	21	18	15	19	18	26	31	54	71	64	71	19	21	26	32	14	16	17	15	19	21	22	71
29-Sep	17	16	17	19	25	34	18	19	43	22	32	21	19	16	14	12	22	16	13	7	11	22	22	28	43
30-Sep	17	17	18	28	19	25	23	16	17	14	13	15	24	19	18	19	16	15	12	11	10	12	12	14	28

82	76	72	78	53	54	82	81	100	80	83	95	71	88	78	90	76	85	52	64	96	62	50	63	
Diurnal Maximum																								

M - Maintenance



# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	September 24, 2015	Last Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	13:20	End Time (MST)	16:25
Gas Cert Reference	SA140071A	Station temp.	21 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26-Sep-17
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
ZAG Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-614	-614
Analyzer IP address	192.168.1.43		Lamp voltage	808	808
Calculated slope	0.996937	1.001580	Chamber temp	45.0	45.0
Calculated intercept	1.991091	2.298894	Pressure	681.0	681.0
Analyzer Background	12.0	12.0	Flow	0.497	0.497
Analyzer Coefficient	0.985	0.985	Intensity	90	90

Analyzer make Thermo 43i      Analyzer serial # JC1501301448

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.0	-0.2	----
as found span	5500	78.1	710.0	706.7	1.005
calibrator zero	5500	0.0	0.0	0.2	----
high point	5500	78.1	710.0	708.3	1.002
second point	5500	43.8	398.2	393.3	1.012
third point	5500	21.9	199.1	194.2	1.025
as left zero	5500	0.0	0.0	0.0	----
as left span	5500	78.1	710.0	709.0	1.001
Average Correction Factor					1.013

Corrected As found      706.9      Previous response      710.2      % change      0.5%

**Notes:**

Second span point initiated prior to as found span by accident. Response was not low.

Calibration Performed By:

Zack Eastman



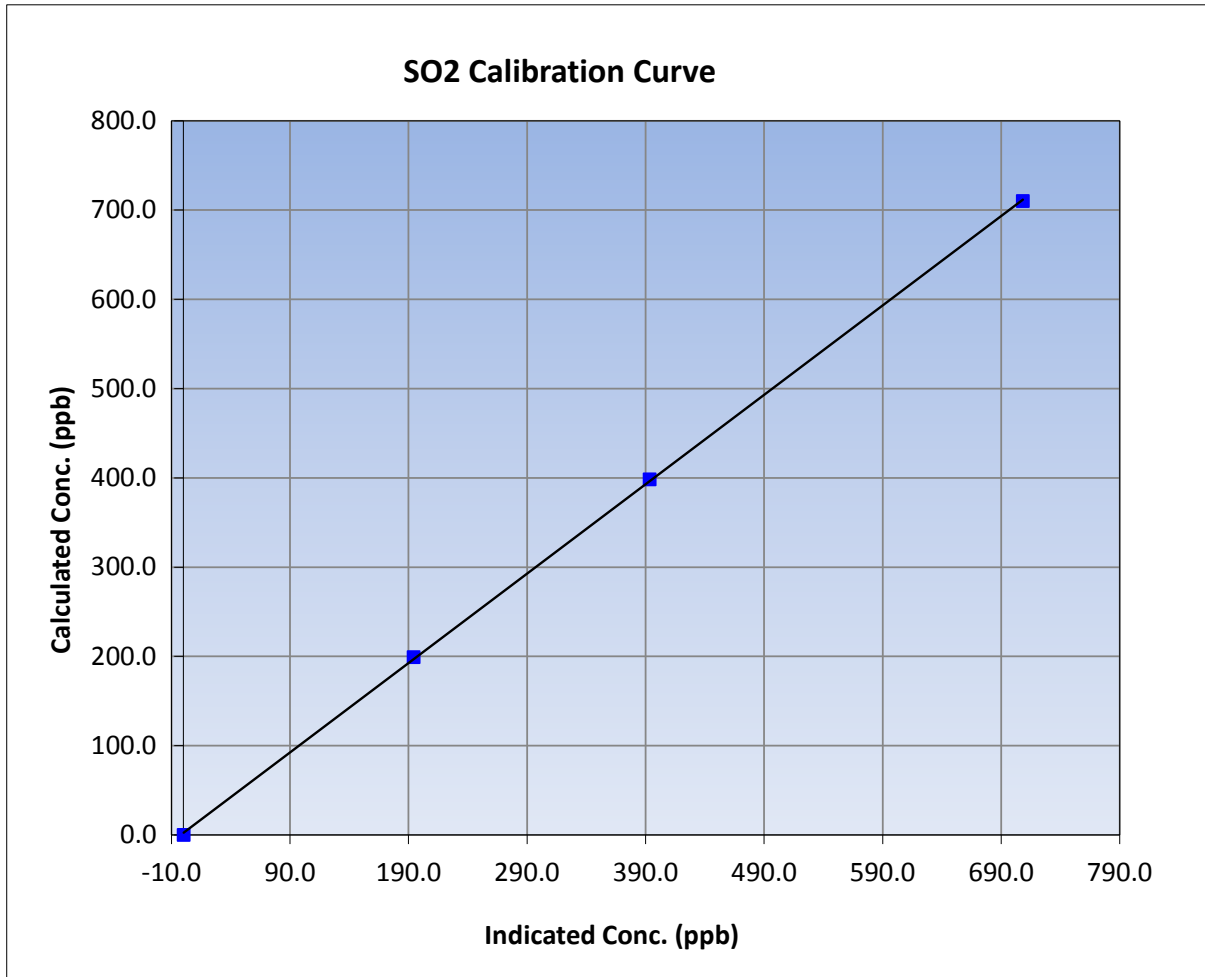
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:20	End Time (MST)	16:25
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301448

### Calibration Data

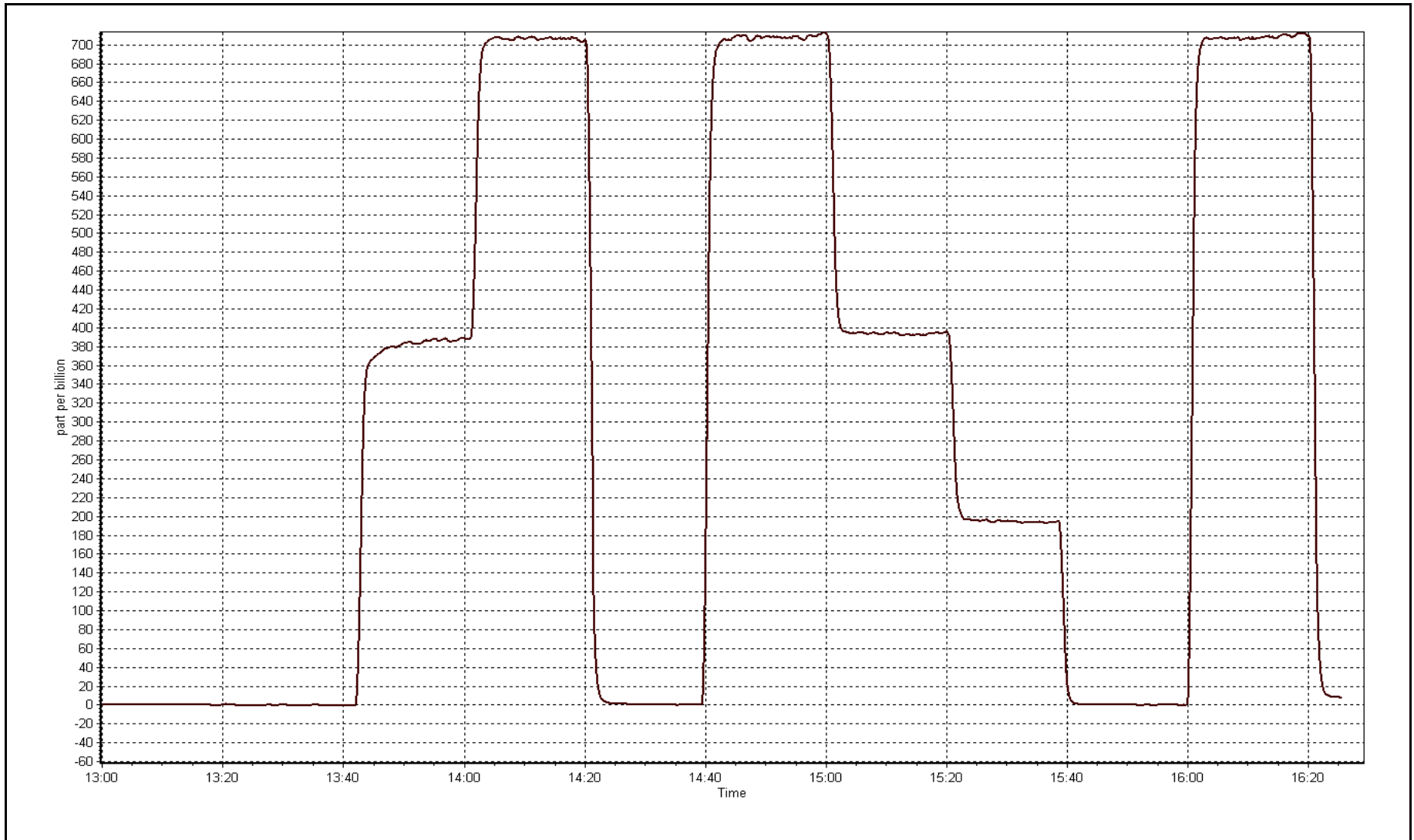
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999933
710.0	708.3	1.0024		
398.2	393.3	1.0124	Slope	1.001580
199.1	194.2	1.0252		
			Intercept	2.298894





SO2 Calibration Plot

Date: September 24, 2015





# Wood Buffalo Environmental Association TRS Calibration Report

## Station Information

Calibration Date	September 14, 2015	Last Calibration	August 19, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	11:10	End Time (MST)	14:15
Gas Cert Reference	LL27480	Station temp.	21 Deg C
Cal Gas Concentration	10.6 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
Dil air Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
SO2 gas concentration	50 ppm	SO2 gas cert/exp	SA140071A 26/Sep/17

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-860	-860
Analyzer IP address	192.168.1.42		Lamp voltage	1132	1134
Calculated slope	0.997013	0.991291	Chamber temp	45	45
Calculated intercept	0.178406	0.158225	Pressure	658.5	709.6
Analyzer Background	1.89	1.8	Flow	0.406	0.441
Analyzer Coefficient	1.006	1.006	Intensity	80	80
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153461	
Converter make/model	CDN-101		Converter serial #	470	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6500	0.0	0.0	-0.1	----
as found span	6500	46.0	75.0	75.5	0.993
SO2 scrubber check	5500	21.9	199.1	0.5	----
calibrator zero	6500	0.0	0.0	-0.1	----
high point	6500	46.0	75.0	75.5	0.993
second point	6500	24.6	40.1	40.3	0.996
third point	6500	12.3	20.1	20.0	1.002
as left zero	6500	0.0	0.0	0.0	----
as left span	6500	46.0	75.0	76.7	0.979
Average Correction Factor					0.997

Corrected As found	75.7	Previous response	75.1	% change	-0.8%
--------------------	------	-------------------	------	----------	-------

**Notes:**

Filter changed after as founds. Scrubber check completed after as founds. No adjustments made.

Calibration Performed By:

Devin Russell



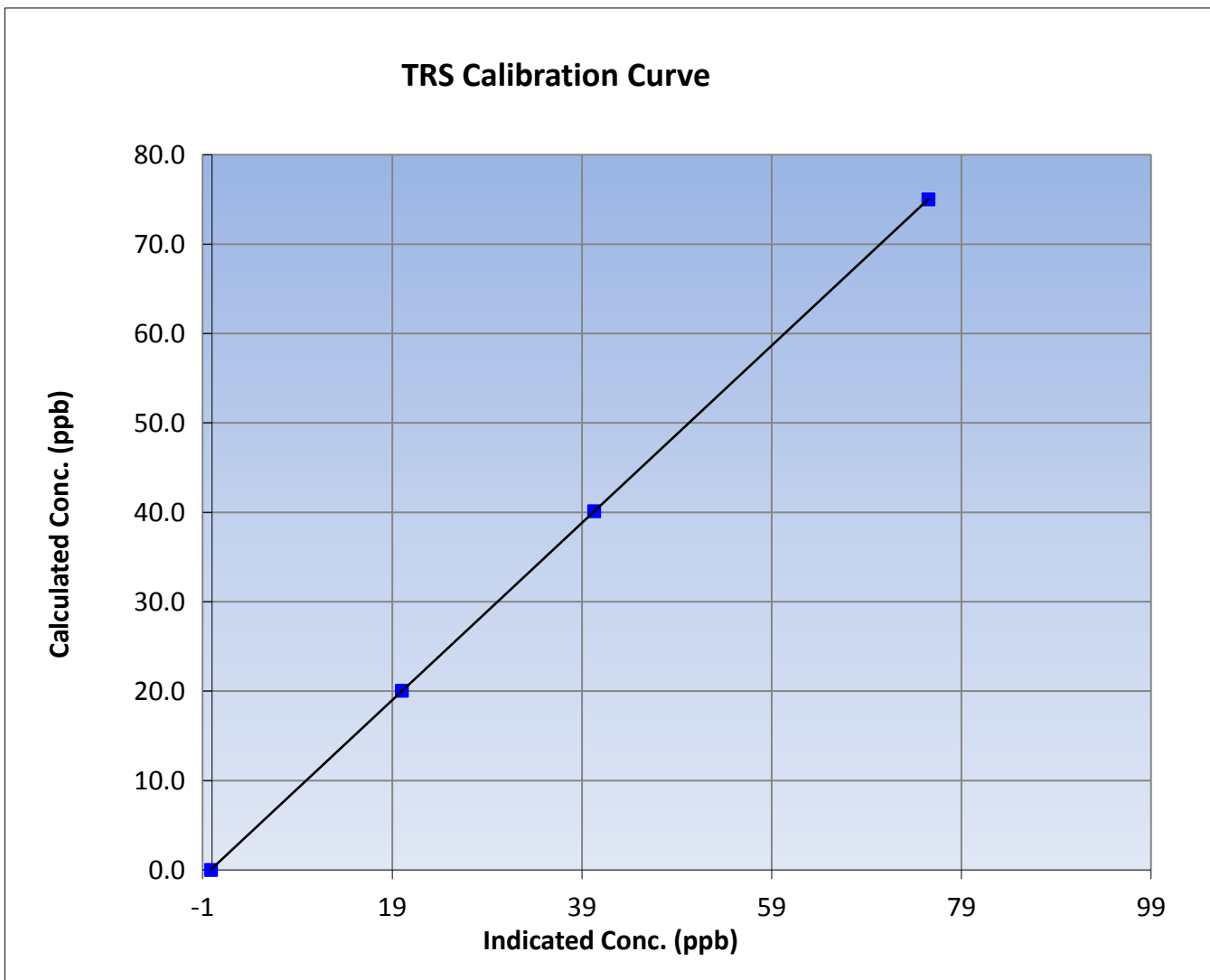
# Wood Buffalo Environmental Association TRS Calibration Report

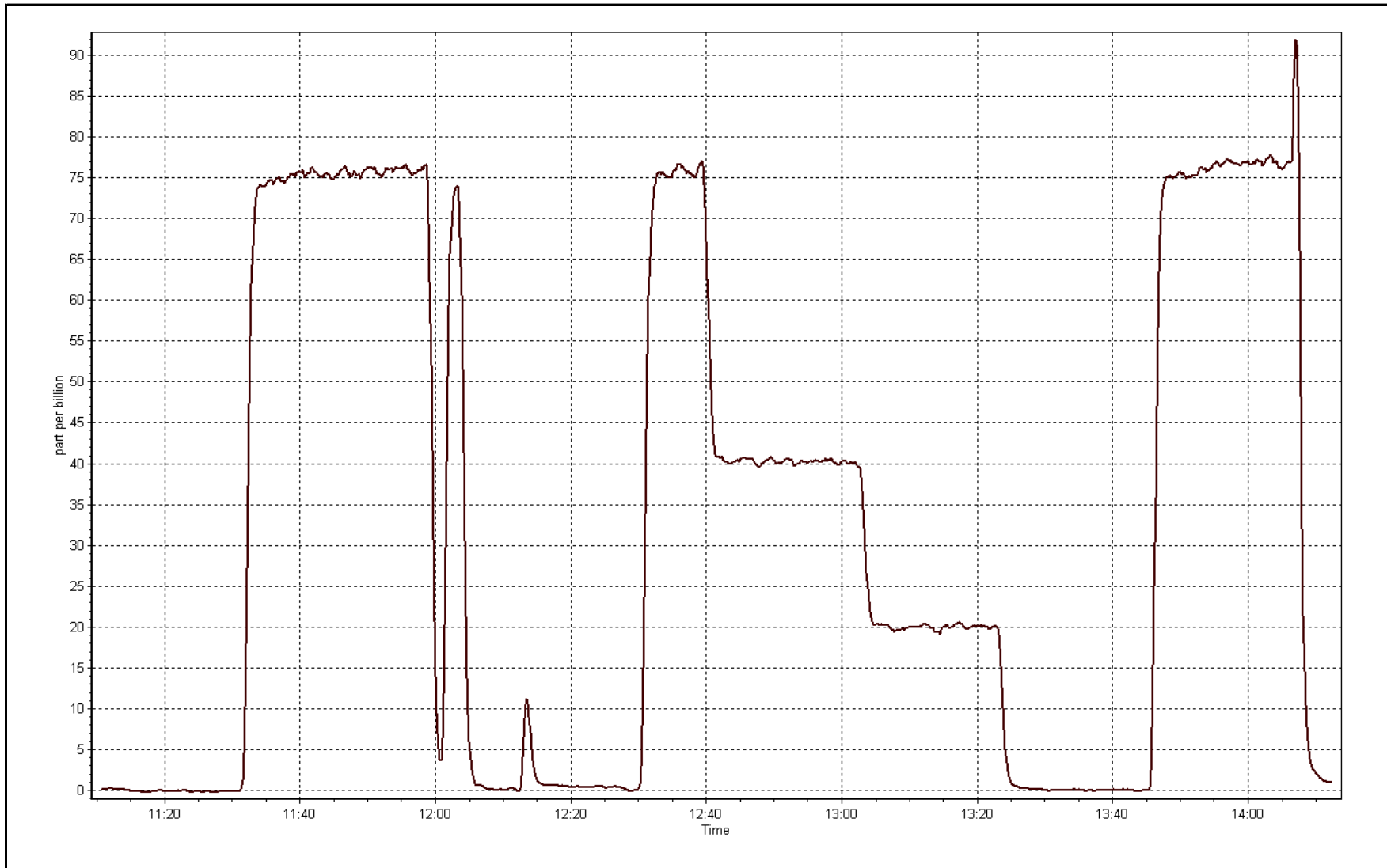
## Station Information

Calibration Date	September 14, 2015	Previous Calibration	August 19, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	11:10	End Time (MST)	14:15
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999998
75.0	75.5	0.9931		
40.1	40.3	0.9957	Slope	0.991291
20.1	20.0	1.0019		
			Intercept	0.158225







# Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	September-16-15	Last Calibration	August-18-15
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Removal		
Start Time (MST)	9:35	End Time (MST)	10:35
Gas Cert Reference	SA140071A	Cal Gas Expiry Date	September-26-17
CH4 Cal Gas Conc.	499.0 ppm	CH4 Equiv Conc.	1054.5 ppm
C3H8 Cal Gas Conc.	202.0 ppm	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	NA
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	NA
Analyzer IP address	192.168.1.55		Flame Temp	405.0	NA
THC Calc slope	0.998102	1.055243	Carrier Pressure	40.4	NA
THC Calc intercept	0.063084	0.000000	Fuel Pressure	42.2	NA
NMHC Calc slope	0.998143	1.039275	Air Pressure	32.3	NA
NMHC Calc intercept	0.022662	0.000000			

Analyzer make Thermo 55i Analyzer serial # 1331259520

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	----
as found span	5500	78.1	14.97	14.19	1.055
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	14.97	14.19	1.055
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.055

Corrected As found 14.19 Previous response 14.94 % change 5.3%

Notes:

Removal cal.

Calibration Performed By: Asad Hidayat



## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	78.1	7.89	7.59	1.039
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	7.89	7.59	1.039
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.039

Corrected As found      7.59      Previous response      7.88      % change      3.8%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	78.1	7.09	6.60	1.074
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	7.09	6.60	1.074
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.074

Corrected As found      6.60      Previous response      7.06      % change      7.0%



# Wood Buffalo Environmental Association

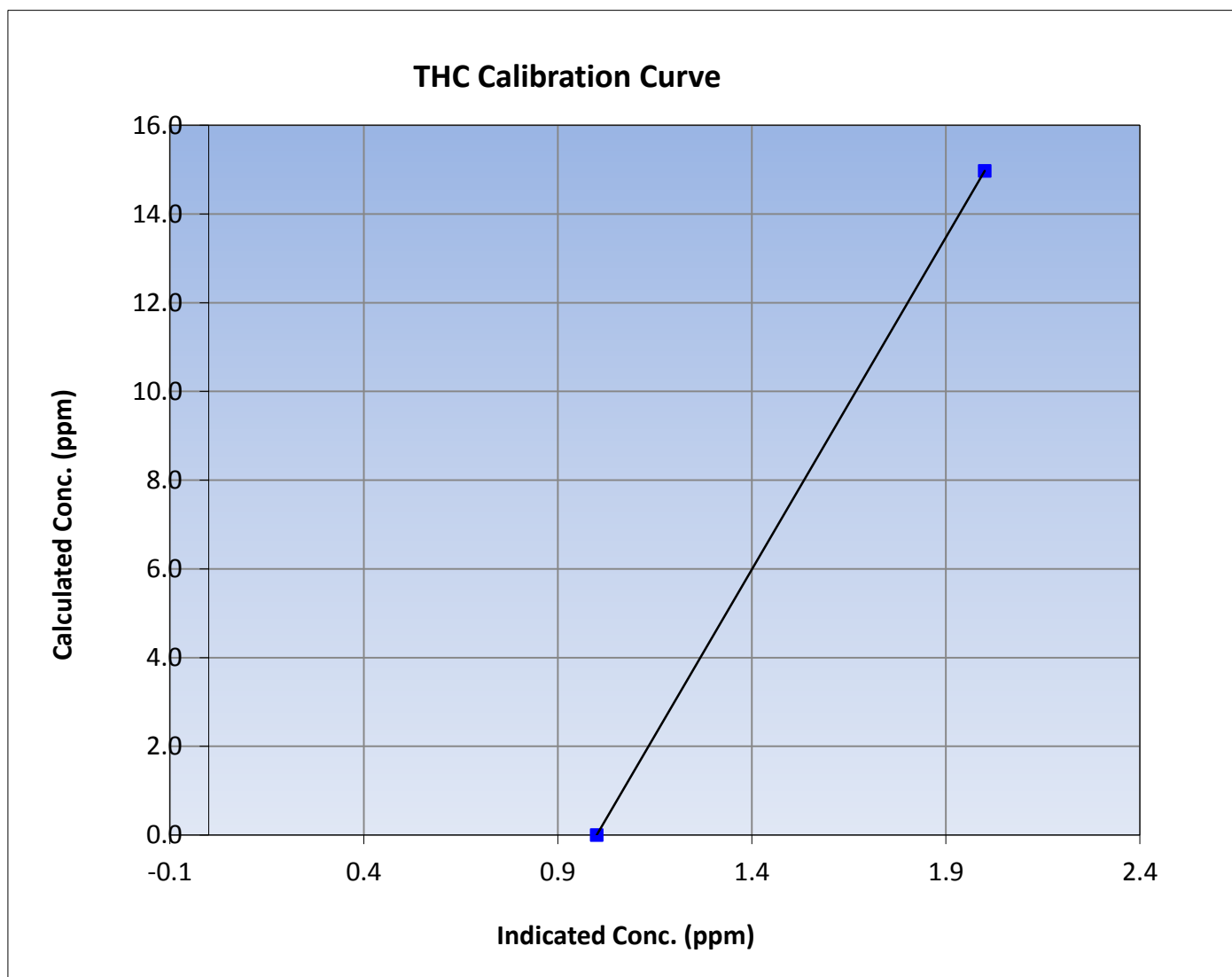
## THC Calibration Summary

### Station Information

Calibration Date	September 16, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:35	End Time (MST)	10:35
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	1.000000
14.97	14.19	1.0552		
			Slope	1.055243
			Intercept	0.000000





# Wood Buffalo Environmental Association

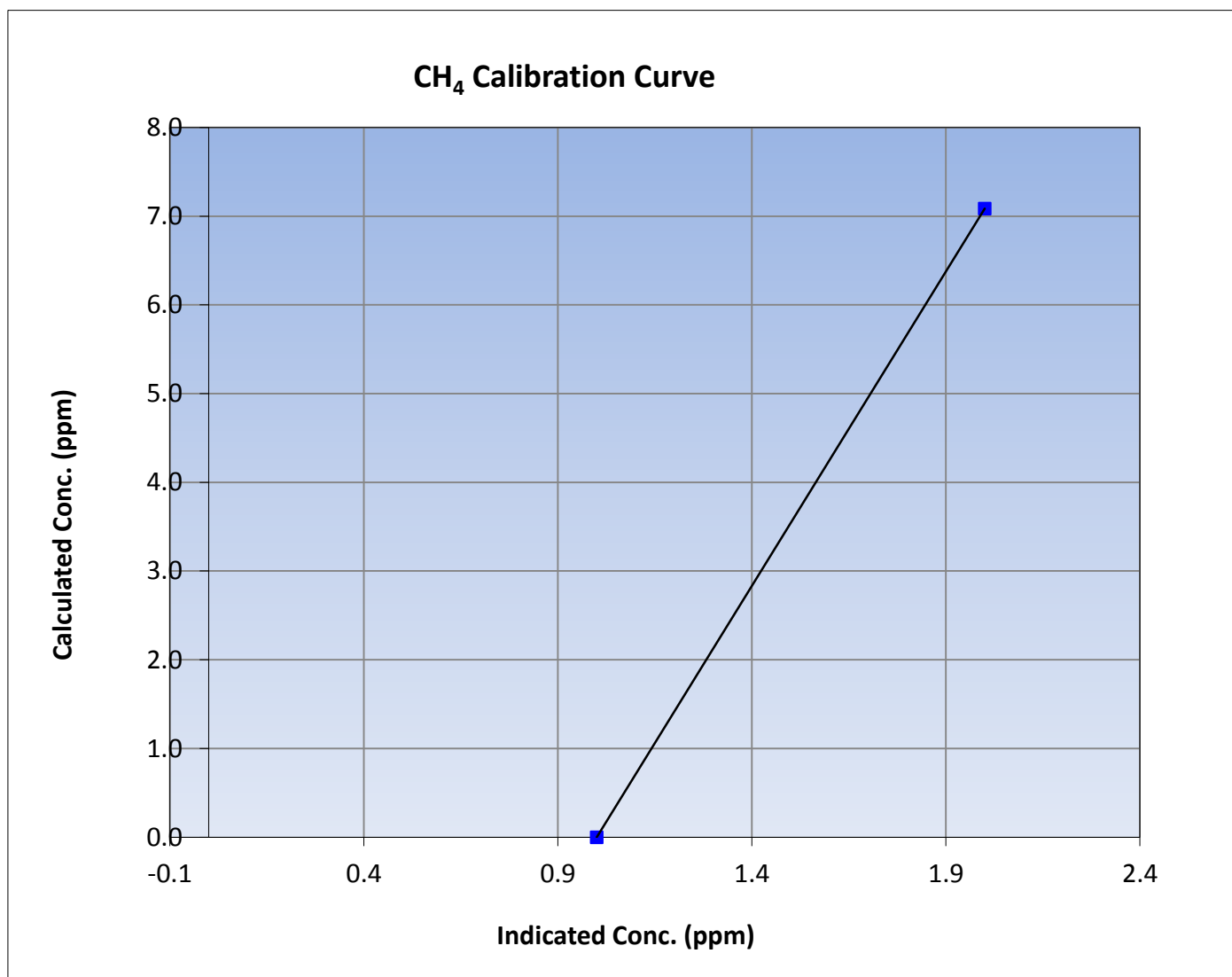
## CH<sub>4</sub> Calibration Summary

### Station Information

Calibration Date	September 16, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:35	End Time (MST)	10:35
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	1.000000
7.09	6.60	1.0736		
			Slope	1.073606
			Intercept	0.000000







# Wood Buffalo Environmental Association

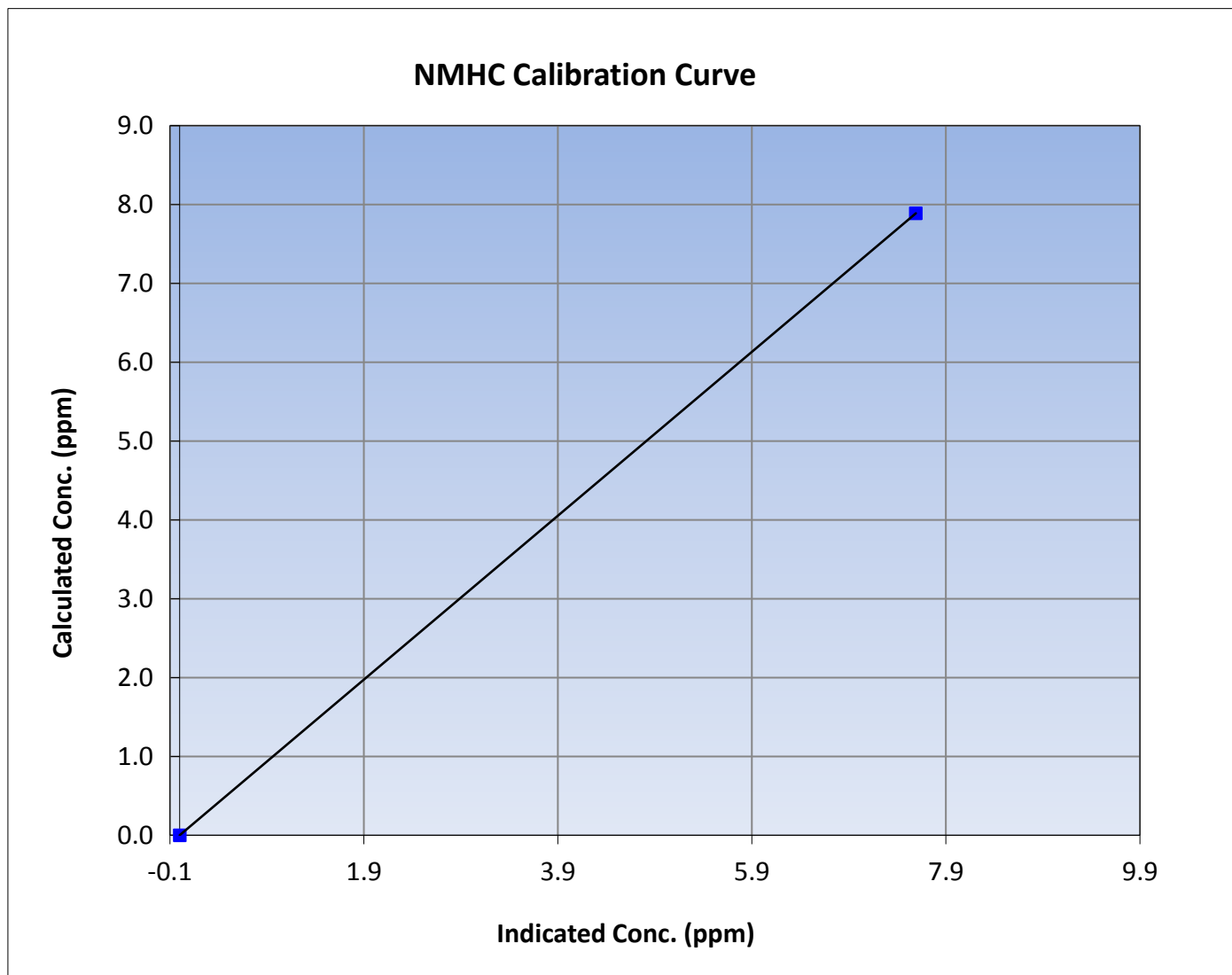
## NMHC Calibration Summary

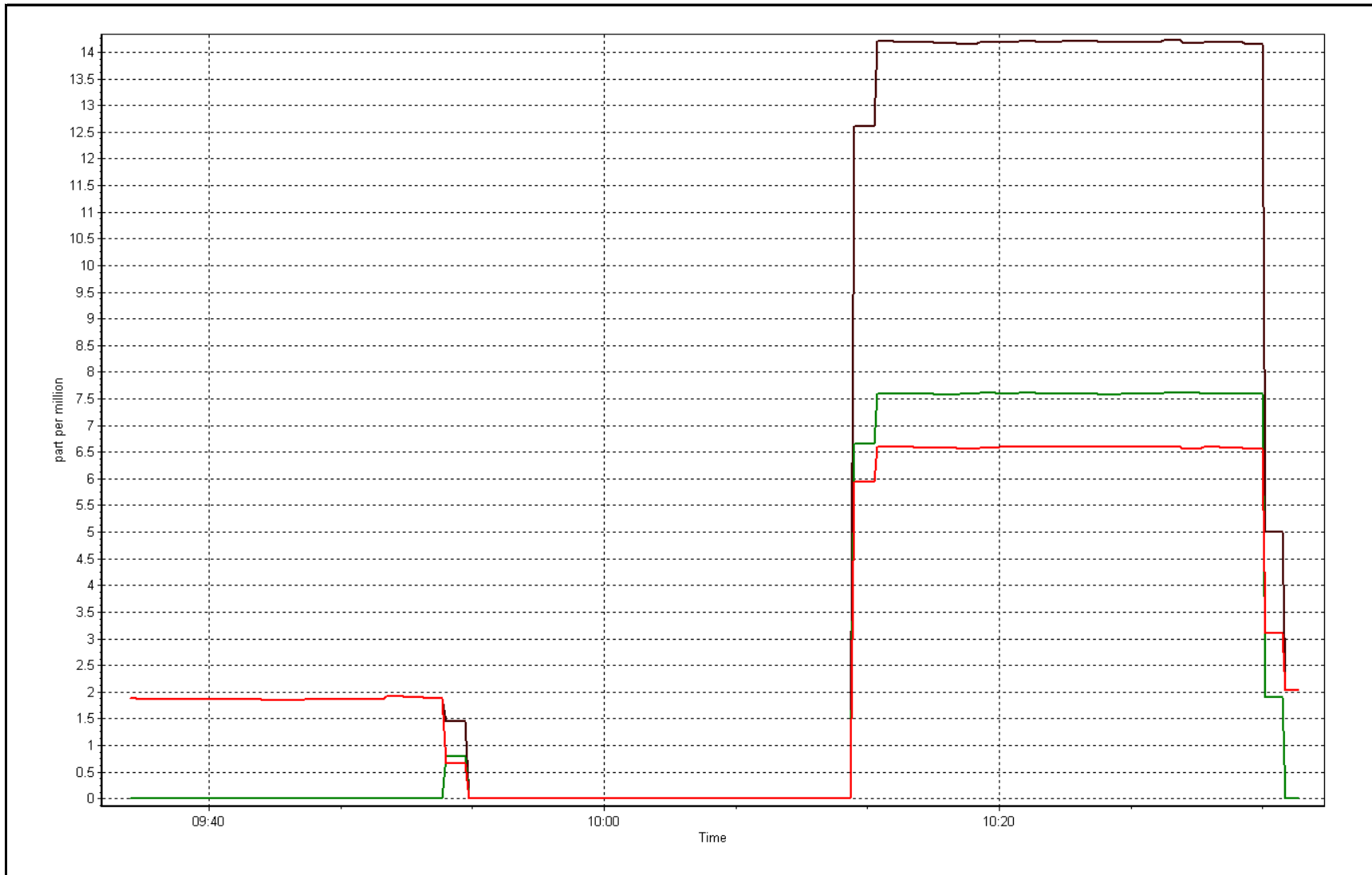
### Station Information

Calibration Date	September 16, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:35	End Time (MST)	10:35
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	1.000000
7.89	7.59	1.0393		
			Slope	1.039275
			Intercept	0.000000







# Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	September-16-15	Last Calibration	August-18-15
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Install		
Start Time (MST)	9:35	End Time (MST)	15:55
Gas Cert Reference	SA140071A	Cal Gas Expiry Date	September-26-17
CH4 Cal Gas Conc.	499.0 ppm	CH4 Equiv Conc.	1054.5 ppm
C3H8 Cal Gas Conc.	202.0 ppm	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	NA	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	NA	175.0
Analyzer IP address	192.168.1.55		Flame Temp	NA	405.0
THC Calc slope	NA	0.999421	Carrier Pressure	NA	34.5
THC Calc intercept	NA	0.019282	Fuel Pressure	NA	44.3
NMHC Calc slope	NA	1.001670	Air Pressure	NA	32.5
NMHC Calc intercept	NA	-0.002627			

Analyzer make Thermo 55i Analyzer serial # 1501663728

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	14.97	14.98	1.000
second point	5500	43.7	8.38	8.34	1.005
third point	5500	21.9	4.20	4.17	1.007
as left zero					
as left span					
Average Correction Factor					1.004

Corrected As found      NA      Previous response      NA      % change      NA

**Notes:**

Install cal. Sample inlet filter replaced after zero point. Adjusted span. Could not perform as left spans due to missing 24VDC supply for solenoid.

Calibration Performed By: Asad Hidayat



## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	7.89	7.88	1.001
second point	5500	43.7	4.41	4.40	1.003
third point	5500	21.9	2.21	2.22	0.996
as left zero					
as left span					
Average Correction Factor					1.000

Corrected As found      NA      Previous response      NA      % change      NA

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	7.09	7.10	0.998
second point	5500	43.7	3.96	3.94	1.006
third point	5500	21.9	1.99	1.95	1.019
as left zero					
as left span					
Average Correction Factor					1.008

Corrected As found      NA      Previous response      NA      % change      NA



# Wood Buffalo Environmental Association

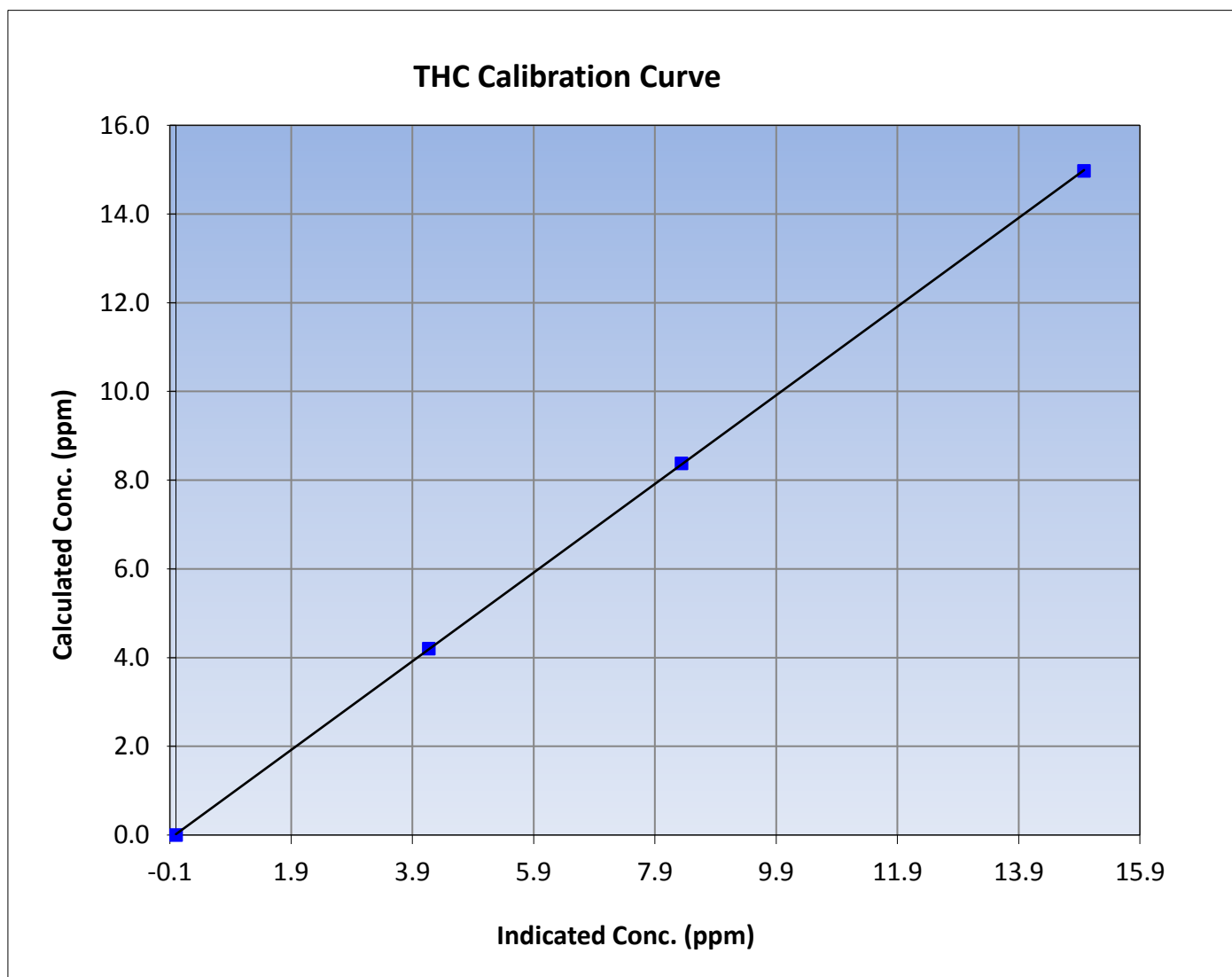
## THC Calibration Summary

### Station Information

Calibration Date	September 16, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:35	End Time (MST)	15:55
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999989
14.97	14.98	0.9996		
8.38	8.34	1.0046	Slope	0.999421
4.20	4.17	1.0069		
			Intercept	0.019282





# Wood Buffalo Environmental Association

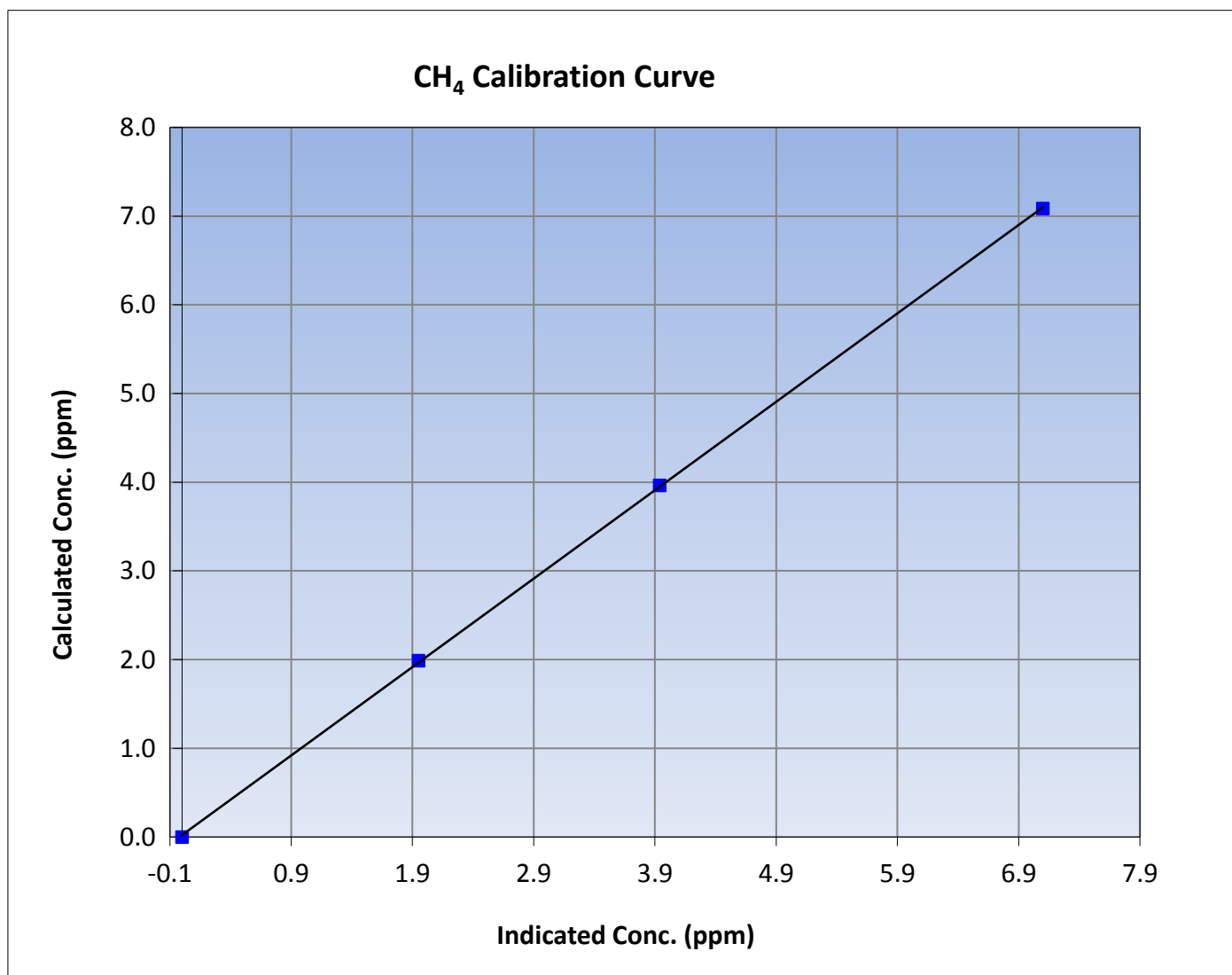
## CH<sub>4</sub> Calibration Summary

### Station Information

Calibration Date	September 16, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:35	End Time (MST)	15:55
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999951
7.09	7.10	0.9980		
3.96	3.94	1.0063	Slope	0.996898
1.99	1.95	1.0189		
			Intercept	0.021950





# Wood Buffalo Environmental Association

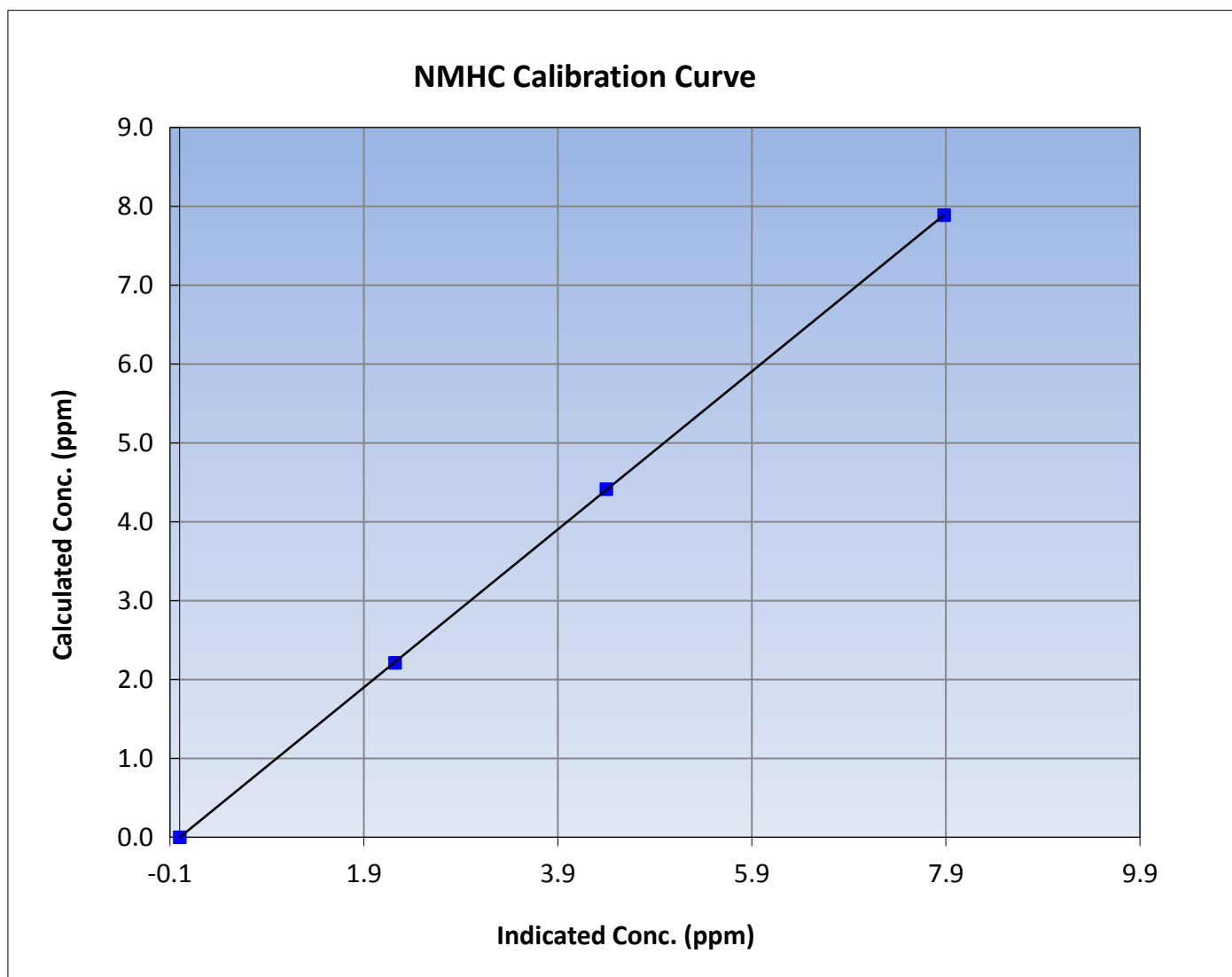
## NMHC Calibration Summary

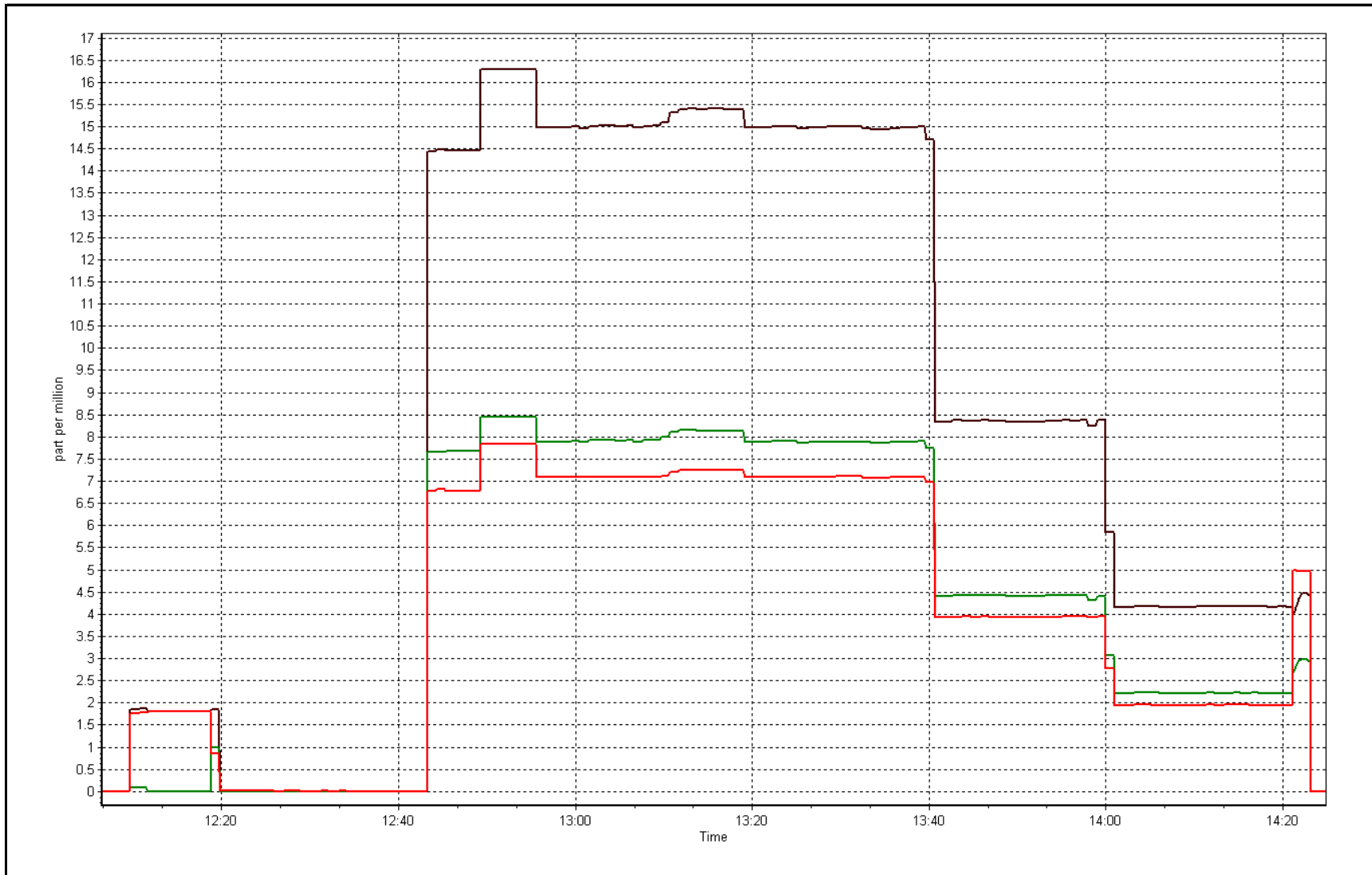
### Station Information

Calibration Date	September 16, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:35	End Time (MST)	15:55
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999995
7.89	7.88	1.0010		
4.41	4.40	1.0031	Slope	1.001670
2.21	2.22	0.9964		
			Intercept	-0.002627









# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	September 28, 2015	Previous Calibration	August 19, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	11:30	End Time (MST)	15:30
NO2 GPT Ref date	September-28-15	Transfer Standard	N/A
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.3	27.9
Analyzer IP address	192.168.1.48		Lamp temp.	53.5	53.6
Calculated slope	0.997534	1.002942	Pressure	653.4	704.1
Calculated intercept	-1.351783	-2.300044	Flow cell A	0.717	0.752
Analyzer Background	-4.5	-2.4	Flow cell B	0.706	0.743
Analyzer Coefficient	0.972	0.991	Cell A Intensity	75155	74400
			Cell B Intensity	70613	69700

Analyzer make	Thermo 49i	Analyzer serial #	1300156233
---------------	------------	-------------------	------------

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	1.7	----
as found span	5500	0.98	429.7	424.4	1.013
calibrator zero	5500	0.00	0.0	0.6	----
high point	5000	0.98	429.7	429.7	1.000
second point	5000	0.56	221.4	224.1	0.988
third point	5000	0.34	113.7	117.3	0.970
as left zero	5500	0.00	0.0	0.3	----
as left span	5000	0.98	429.7	424.3	1.013
Average Correction Factor					0.986

Corrected As found	422.7	Previous response	432.1	% change	2.2%
--------------------	-------	-------------------	-------	----------	------

**Notes:**

After 20 minutes of stable as founds span, O<sub>3</sub> concentration jumped from 408 ppb to 424 ppb. Checked diagnostics; no changes. As found span ran for another 20 min. Changed inlet filter. Span adjusted.

Calibration Performed By: Devin Russell



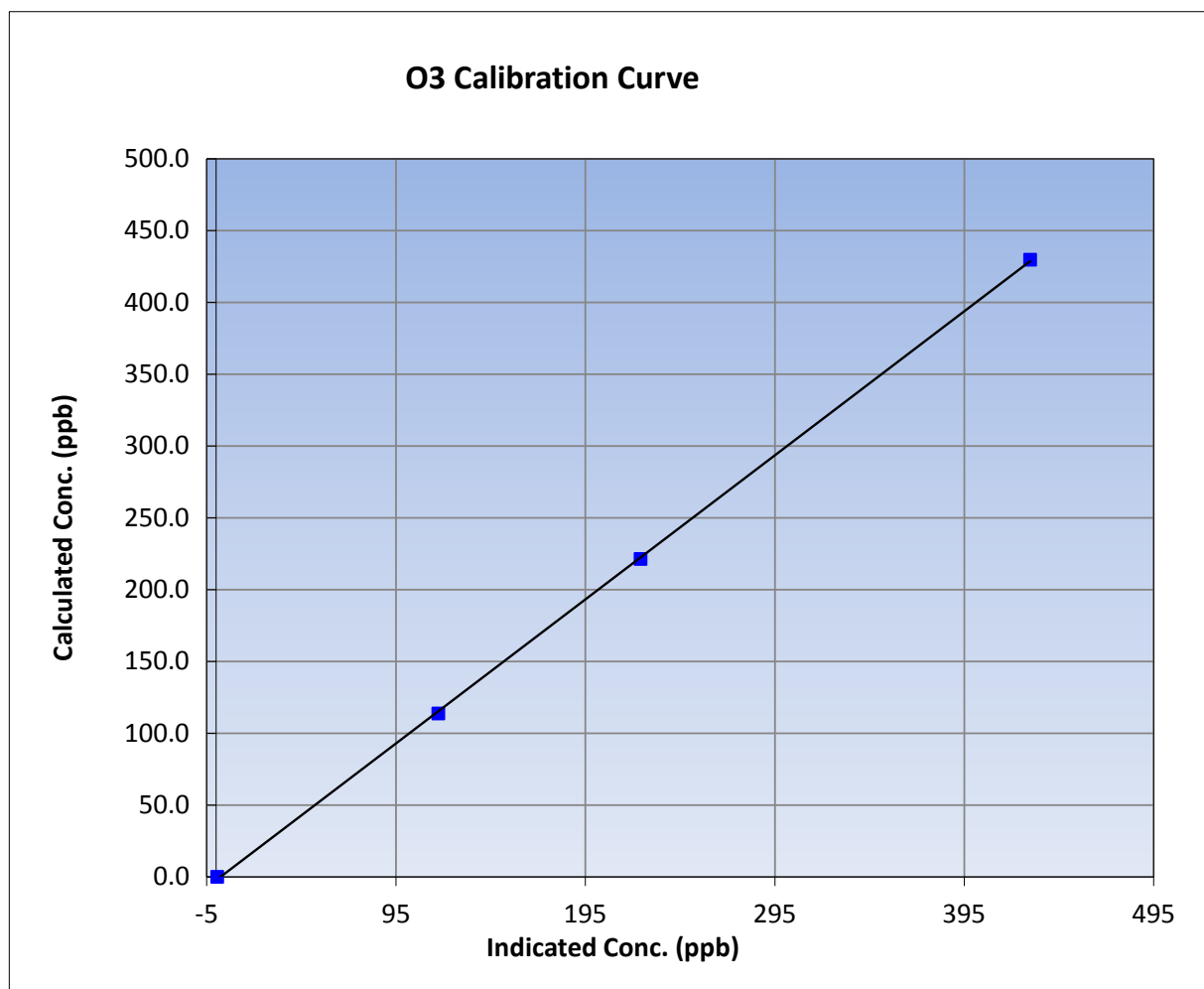
## Wood Buffalo Environmental Association O3 Calibration Report

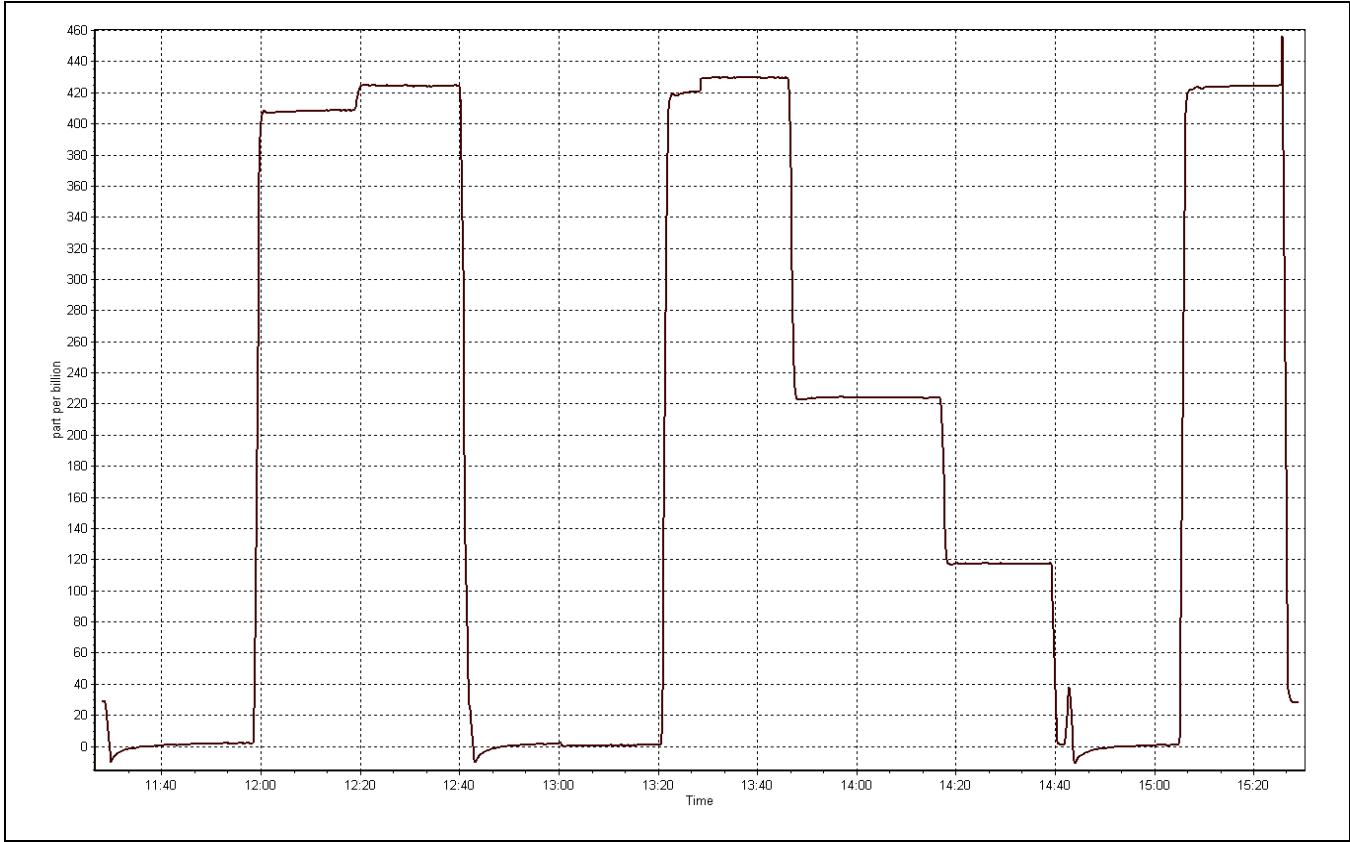
### Station Information

Calibration Date	September-28-15	Previous Calibration	August 19, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	11:30	End Time (MST)	15:30
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	0.6	----	Correlation Coefficient	0.999924
429.7	429.7	0.9999		
221.4	224.1	0.9879	Slope	1.002942
113.7	117.3	0.9696		
			Intercept	-2.300044





GPT test prior to calibration





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

## Station Information

Calibration Date	September 15, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	8:35	End Time (MST)	15:15
NO Cal Gas Conc	49.9 ppm	Gas Cert Reference	3222140.02
NOX Cal Gas Conc	49.9 ppm	Cal Gas Expiry Date	14/01/2016
Calibrator	Sabio 4010	Serial Number	1730512
Zero air Generator	Teledyne API T701	Serial Number	587

## DACS Information

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

## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998881	0.997847	1.002235
	Data Offset	2.361433	2.324574	1.155273
Current Calibration	Data Slope	1.000862	1.000691	1.001463
	Data Offset	2.303601	2.344833	1.067269

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153357
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.695		0.749	
NOX coefficient	0.998		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	5.2		5.6	
NOX bkgrnd	5.3		5.7	
Chamber Temp	50.5	Deg C	50.2	Deg C
Moly Temp	323.7	Deg C	324.5	Deg C
PMT voltage	-850.5	V	-850.3	V
PMT Temp	-2.7	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	183.3	mmHg	186.8	mmHg
R Cell Press Nox	183.3	mmHg	186.8	mmHg
NO sample flow	0.543	lpm	0.558	lpm
Nox sample Flow	0.543	lpm	0.558	lpm

**Notes:**

Calibration completed with audit cylinder. As founds completed for both cylinders. Filter changed after as founds. Span adjusted to match audit cylinder. As left span is with station cylinder.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

September 15, 2015

Station Number:

AMS 1

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.3	0.3	0.0	----	----
as found span	5500	82.6	749.4	749.4	0.0	696.8	697.4	-0.6	1.0755	1.0746
calibrator zero	5500	0.0	0.0	0.0	0.0	0.1	0.2	0.0	----	----
high point	5500	82.6	749.4	749.4	0.0	748.2	748.3	-0.1	1.0016	1.0015
second point	5500	46.3	420.1	420.1	0.0	415.2	415.3	-0.1	1.0117	1.0115
third point	5500	23.1	209.6	209.6	0.0	205.1	204.9	0.2	1.0219	1.0227
as left zero	5500	0.0	0.0	0.0	0.0	0.4	0.2	0.2	----	----
as left span	5500	82.6	749.4	315.8	433.6	804.2	395.7	408.5	0.9319	0.7982
Average Correction Factor									1.0117	1.0119

Corrected As found  
Previous Response

NO<sub>x</sub>= 696.6  
NO<sub>x</sub>= 747.9

NO= 697.1  
NO= 748.7

Percent Change

NO<sub>x</sub>= 7.4%

NO= 7.4%

### GPT Calibration Data

Dilution Flow

5500

ccm

Source Gas Flow

82.60

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	315.8	429.7	744.1	315.8	428.3	0.9922	1.0000	1.0033	99.7%
2nd NO2 (200)	----	524.1	221.4	744.5	524.1	220.3	0.9918	1.0000	1.0053	99.5%
3rd NO2 (100)	----	631.8	113.7	742.8	631.8	111.0	0.9940	1.0000	1.0249	97.6%
4th NO2 (0)	745.5	----	0.0	745.5	745.5	-0.1	0.9904	1.0000	N/A	----
Average Correction Factor							0.9921	1.0000	1.0112	98.9%

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

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

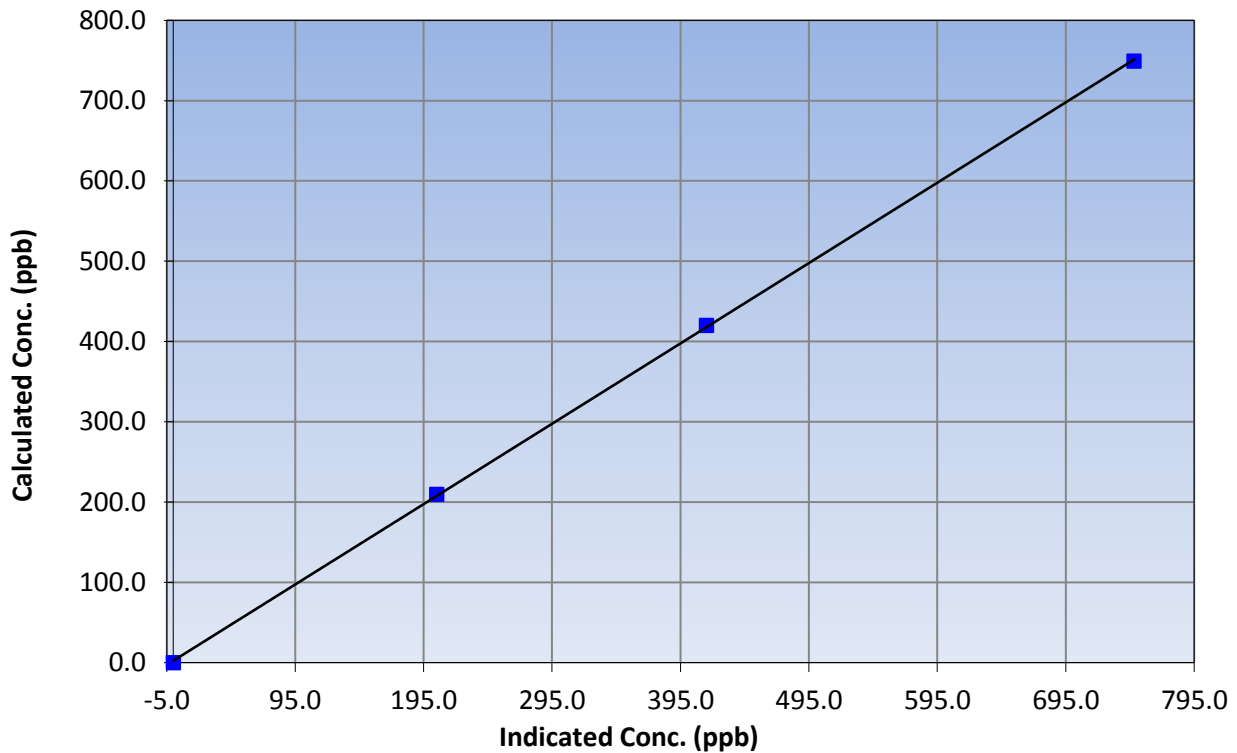
### Station Information

Calibration Date	September 15, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:35	End Time (MST)	15:15
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999941
749.4	748.2	1.0016		
420.1	415.2	1.0117	Slope	1.000862
209.6	205.1	1.0219		
			Intercept	2.303601

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

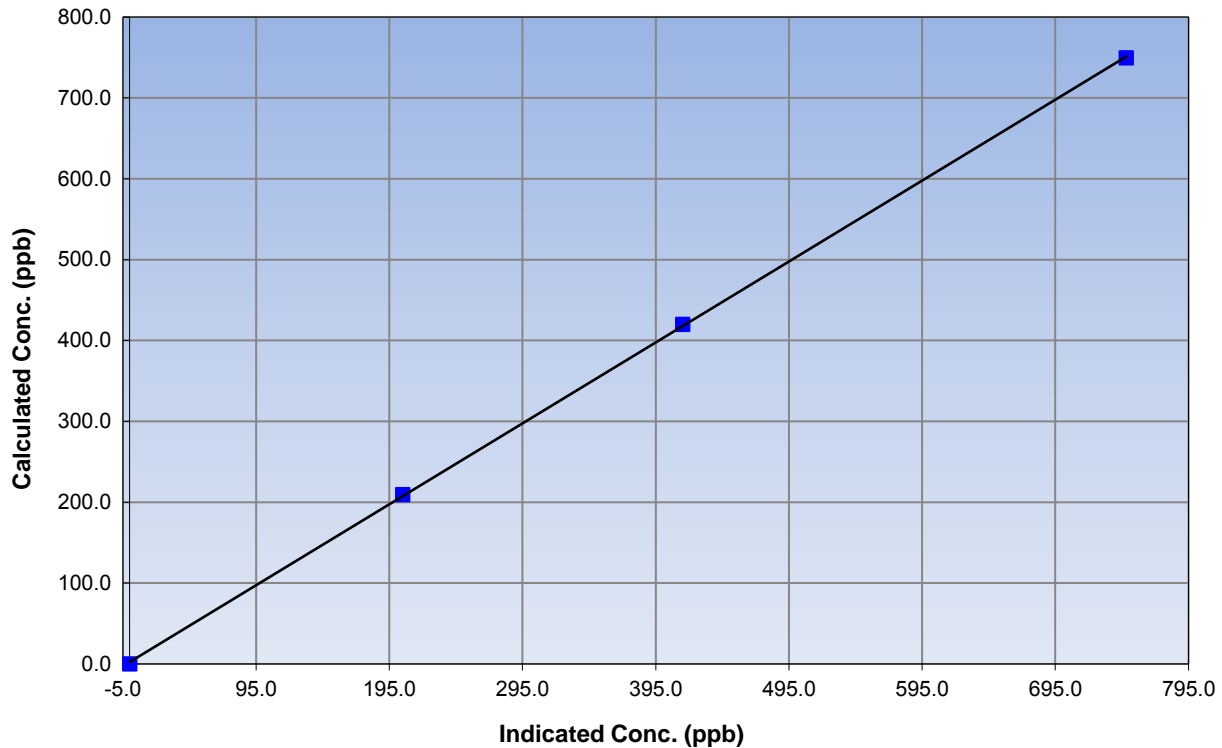
### Station Information

Calibration Date	September 15, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:35	End Time (MST)	15:15
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999939
749.4	748.3	1.0015		
420.1	415.3	1.0115	Slope	1.000691
209.6	204.9	1.0227		
			Intercept	2.344833

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

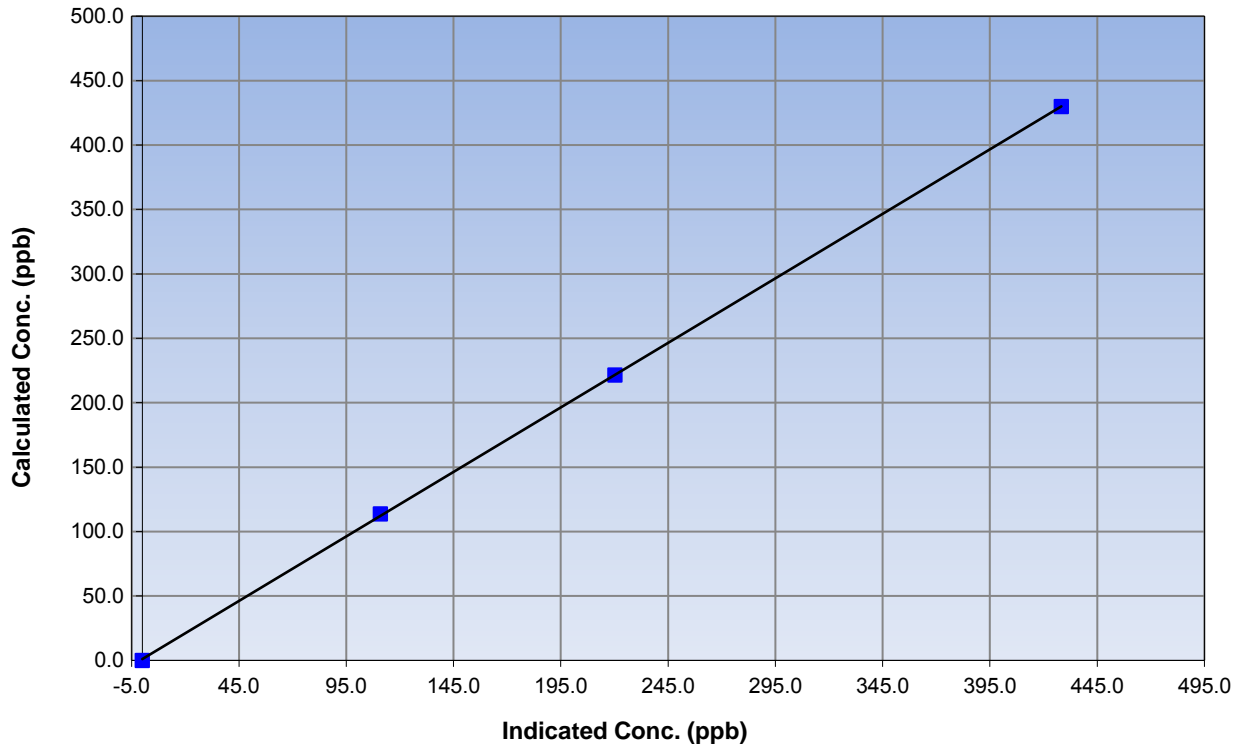
### Station Information

Calibration Date	September 15, 2015	Previous Calibration	August 18, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:35	End Time (MST)	15:15
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

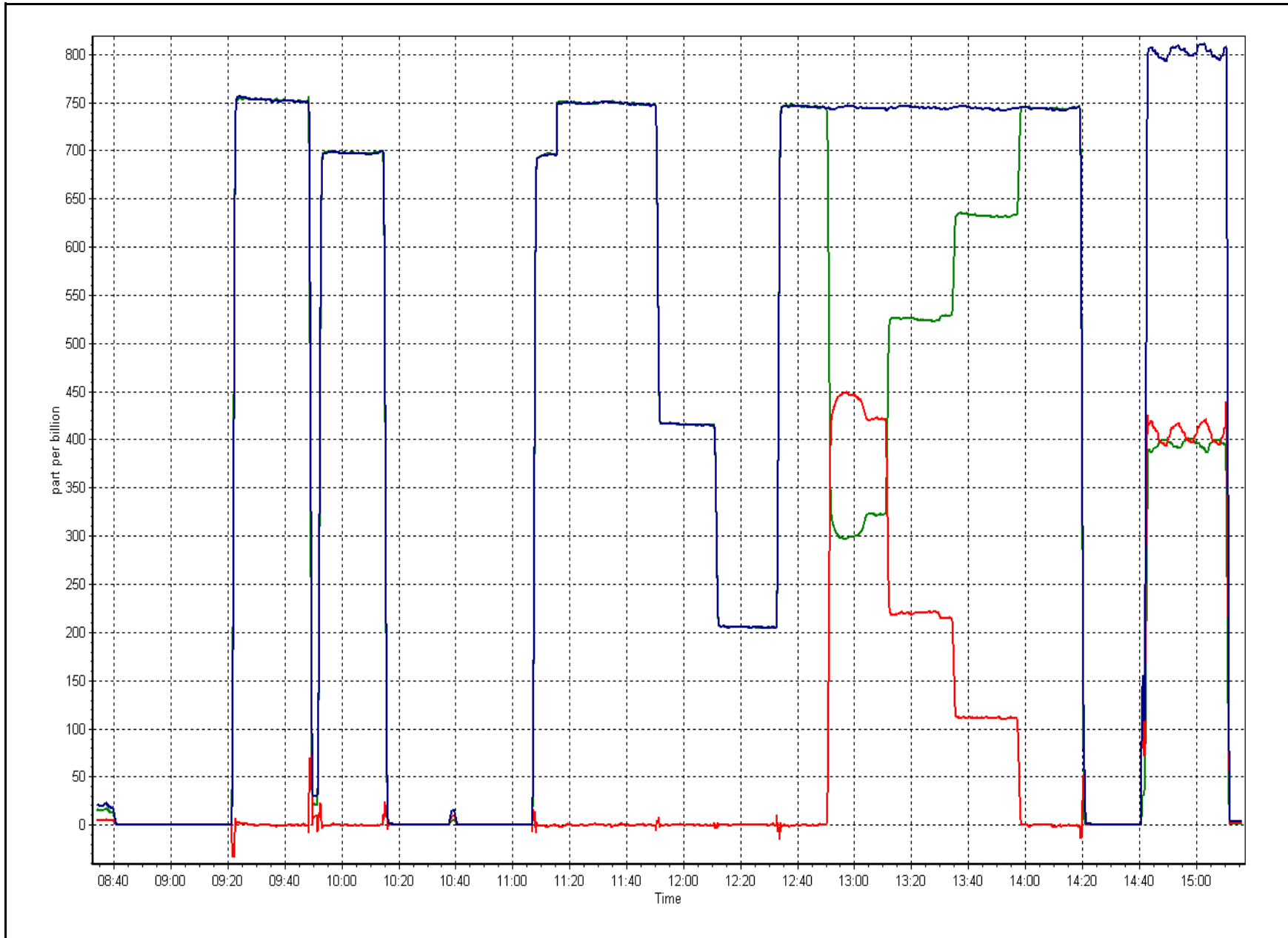
### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999965
429.7	428.3	1.0033		
221.4	220.3	1.0053	Slope	1.001463
113.7	111.0	1.0249		
			Intercept	1.067269

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









# Wood Buffalo Environmental Association

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

### Station Information

Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1	
NOX Calibration Date	September 15, 2015	NOX Previous Cal Date	August 18, 2015	
NH3 Calibration Date	September 29, 2015	NH3 Previous Cal Date	August 18, 2015	
Reason:	Routine			
Start Time (MST)	8:00	End Time (MST)	13:30	
Calibrator	Sabio 4010	Station Temperature	21.0	Deg C
NH3 Cal Gas Conc	192 ppm	Serial Number	14300410	
NOx Cal Gas Conc	49.92 ppm	NH3 Expiry Date / SN	3/Mar/2012	LL156612
NO Cal Gas Conc	49.92 ppm	NO Expiry Date / SN	14/Jan/2016	3222140

### DACs Information

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

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.994142	0.984511	1.000291	0.999053	0.993697
	Data Offset	0.916066	0.491531	2.280278	3.001943	0.722890
Cal Stats After	Data Slope	0.997477	0.985740	0.998879	1.002654	1.001994
	Data Offset	-0.111395	0.640545	2.136381	1.517950	0.489031
IP address		192.168.1.17				

### Analyzer Information

Analyzer make/model	API T201	Analyzer serial #	152	
Converter	API 501 NH3	Converter serial #	147	
Test Point	before		after	
NH3 Conc range	0-2500	ppb	2500	ppb
NOx Conc range	0-1000	ppb	1000	ppb
NO BKG	0.0	ppb	-0.3	ppb
NOx BKG	0.0	ppb	-0.1	ppb
Nt BKG	0.1		0.1	
NO coefficient	1.143		1.242	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.243		1.361	
NH3 coefficient	0.900		0.955	
Nt coefficient	1.283		1.366	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	316.3	Deg C	315.0	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	84.0	ccm	84.0	ccm
R Cell Press	4.6	mmHg	4.5	mmHg
PMT Voltage	645.0	v	645.0	v
Sample Flow 1 NO	515.0	ccm	516.0	ccm
Sample Flow 2 Nox	521.0	ccm	522.0	ccm
Sample Flow 3 Nt	550.0	ccm	555.0	ccm

**Notes:**

Calibration completed with audit cylinder. As founds completed for both cylinders. Filter changed after as founds. Zero and span adjusted to match audit cylinder. As left span is with station cylinder.

NH3 portion of calibration. NH3 span adjusted. Concentrations dropped to zero during high point, communications error suspect.



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

September 29, 2015

Station Number:

AMS 1

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

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NOx conc (ppb)	Calculated NH <sub>3</sub> conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH <sub>3</sub> conc (ppb)	Nt Correction factor	NH <sub>3</sub> Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-0.2	0.6	-0.9	----	----
as found NO	5500	82.6	749.7	749.7	----	811.8	820.9	-9.2	0.924	----
calibrator zero	5500	0.0	0.0	0.0	0.0	-2.7	-0.5	-0.9	----	----
high NO point	5500	82.6	749.7	749.7	----	748.2	750.2		1.002	
NO/O <sub>3</sub> point	5500	82.6	749.7	749.7	----	755.5	753.1		0.992	
as found NH <sub>3</sub>	6500	67.7	1999.8	NA	1999.8	2118.4	22.6	2095.9	0.944	0.954
first NH <sub>3</sub>	6500	67.7	1999.8	NA	1999.8	2028.1	22.5	2005.6	0.986	0.997
second NH <sub>3</sub>	6500	33.9	1001.4	NA	1001.4	1012.9	11.8	1001.0	0.989	1.000
third NH <sub>3</sub>	6500	17.0	502.2	NA	502.2	513.0	6.1	506.9	0.979	0.991
Average Correction Factor									0.9972	0.9961

NH<sub>3</sub> Corrected As Found  
 Nt Corrected As Found  
 NO<sub>x</sub> Corrected As Found

NH<sub>3</sub> = 2096.7 ppb  
 Nt = 812.0 ppb  
 NO<sub>x</sub> = 820.3 ppb

Previous Response  
 Previous Response  
 Previous Response

NH<sub>3</sub> = 2010.6 ppb  
 Nt = 761.0 ppb  
 NO<sub>x</sub> = 747.2 ppb

NH<sub>3</sub> percent change -4.1%  
 Nt percent change -6.3%  
 NO<sub>x</sub> percent change -8.9%



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date: September 15, 2015 Station Number: AMS 1

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

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO <sub>x</sub> conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO <sub>x</sub> conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO <sub>x</sub> Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-3.5	-3.4	-2.8	----	----
as found span	5500	82.6	749.7	749.7	749.7	678.8	680.1	698.3	1.1045	1.1023
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.5	0.1	-2.7	----	----
high point	5500	82.6	749.7	749.7	749.7	750.2	747.8	748.2	0.9994	1.0026
second point	5500	46.3	420.2	420.2	420.2	415.6	415.1	415.0	1.0111	1.0124
third point	5500	23.1	209.7	209.7	209.7	207.3	206.9	206.2	1.0116	1.0132
as left zero	5500	0.0	0.0	0.0	0.0	0.8	1.9	3.5	----	----
as left span	5500	82.6	749.7	315.0	749.7	807.1	393.0	790.6	0.9289	0.8016
Average Correction Factor									1.0073	1.0094

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	701.1	682.3	683.5	436.1
Previous Response	761.0	747.2	747.4	439.5
Percent Change	8.5%	9.5%	9.3%	0.8%

### GPT Calibration Data

Total Flow 5500 ccm Source Gas Flow 82.60 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			0.6			----	
1st NO <sub>2</sub> (300)	----	315.0	437.4	752.0	315.0	436.7	0.9969	1.0000	1.0017	99.8%
2nd NO <sub>2</sub> (200)	----	529.6	222.8	750.8	529.6	221.2	0.9986	1.0000	1.0074	99.3%
3rd NO <sub>2</sub> (100)	----	639.8	112.7	750.7	639.8	110.9	0.9987	1.0000	1.0157	98.5%
4th NO <sub>2</sub> (0)	752.4	----	0.7	753.1	752.4	0.6	0.9955	1.0000	----	----
Average Correction Factor							0.9974	1.0000	1.0083	99.2%

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

## NH3 Calibration Summary

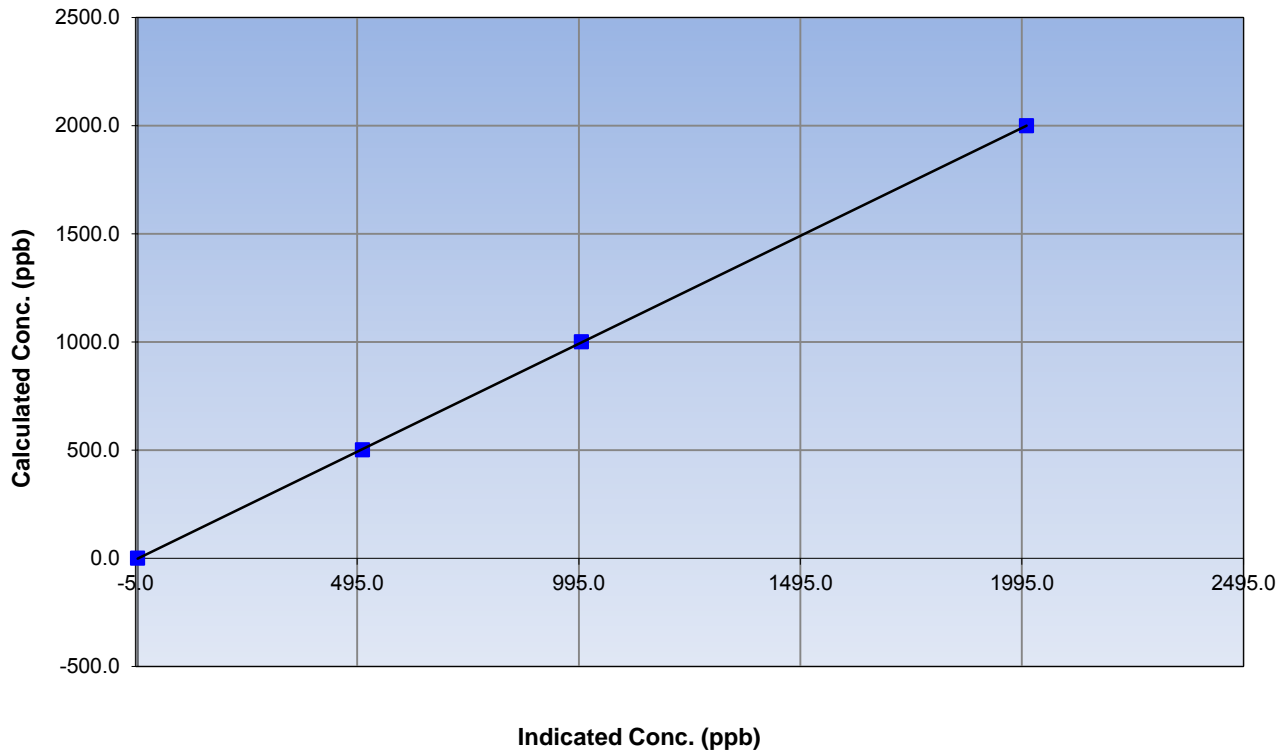
### Station Information

Calibration Date	September 29, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:00	End Time (MST)	13:30
Analyzer make	API T201	Analyzer serial #	152

### NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.9	----	Correlation Coefficient	0.999990
1999.8	2005.6	0.9971		
1001.4	1001.0	1.0004	Slope	0.997477
502.2	506.9	0.9907	Intercept	-0.111395

### NH3 Calibration Curve





# Wood Buffalo Environmental Association

## Nt Calibration Summary

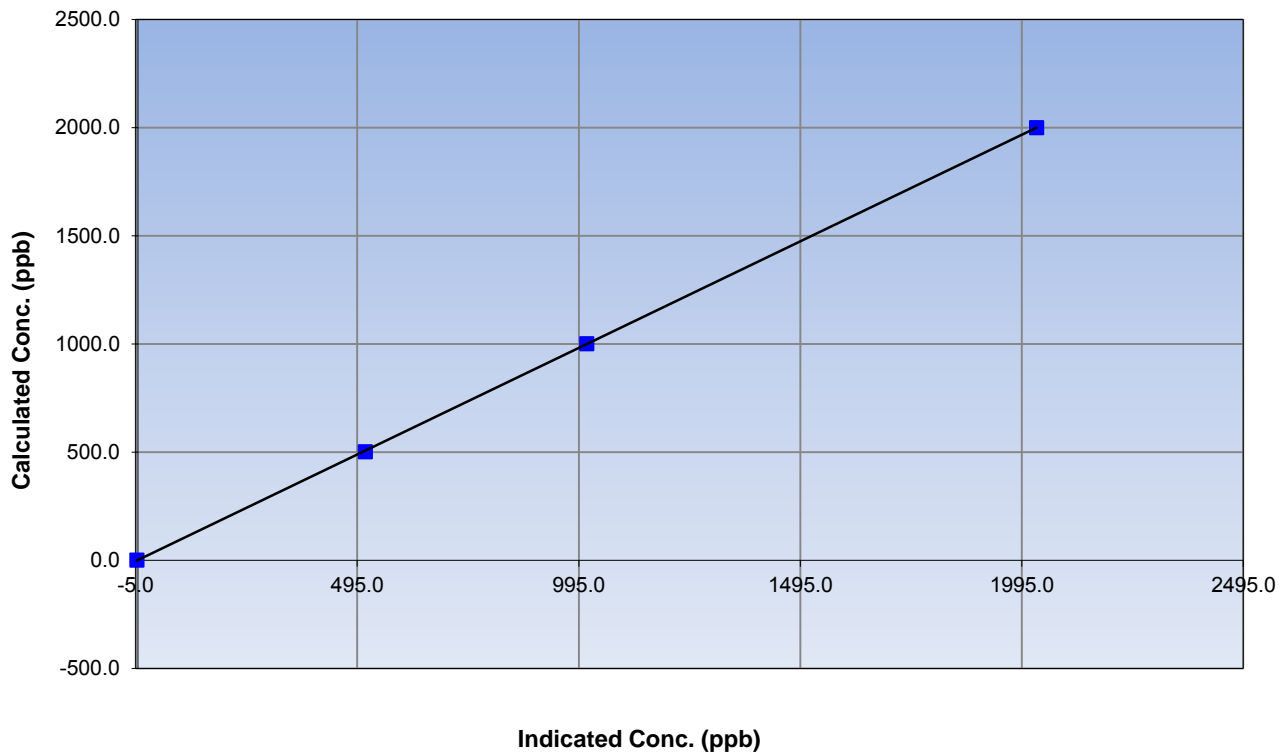
### Station Information

Calibration Date	September 29, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:00	End Time (MST)	13:30
Analyzer make	API T201	Analyzer serial #	152

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

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-2.7	----	Correlation Coefficient	0.999988
1999.8	2028.1	0.9860		
1001.4	1012.9	0.9886	Slope	0.985740
502.2	513.0	0.9788		
			Intercept	0.640545

### Nt Calibration Curve





# Wood Buffalo Environmental Association

## NOx Calibration Summary

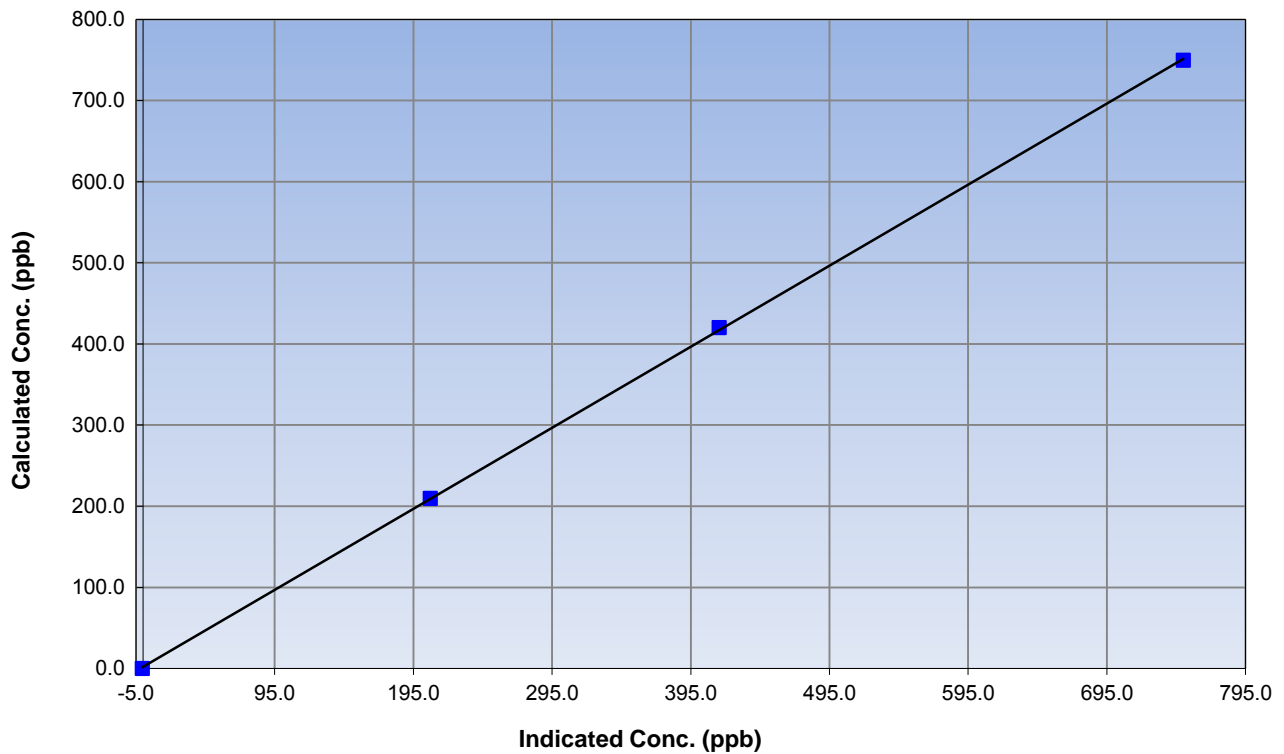
### Station Information

Calibration Date	September 15, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:00	End Time (MST)	13:30
Analyzer make	API T201	Analyzer serial #	152

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

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	----	Correlation Coefficient	0.999952
749.7	750.2	0.9994		
420.2	415.6	1.0111	Slope	0.998879
209.7	207.3	1.0116		
			Intercept	2.136381

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

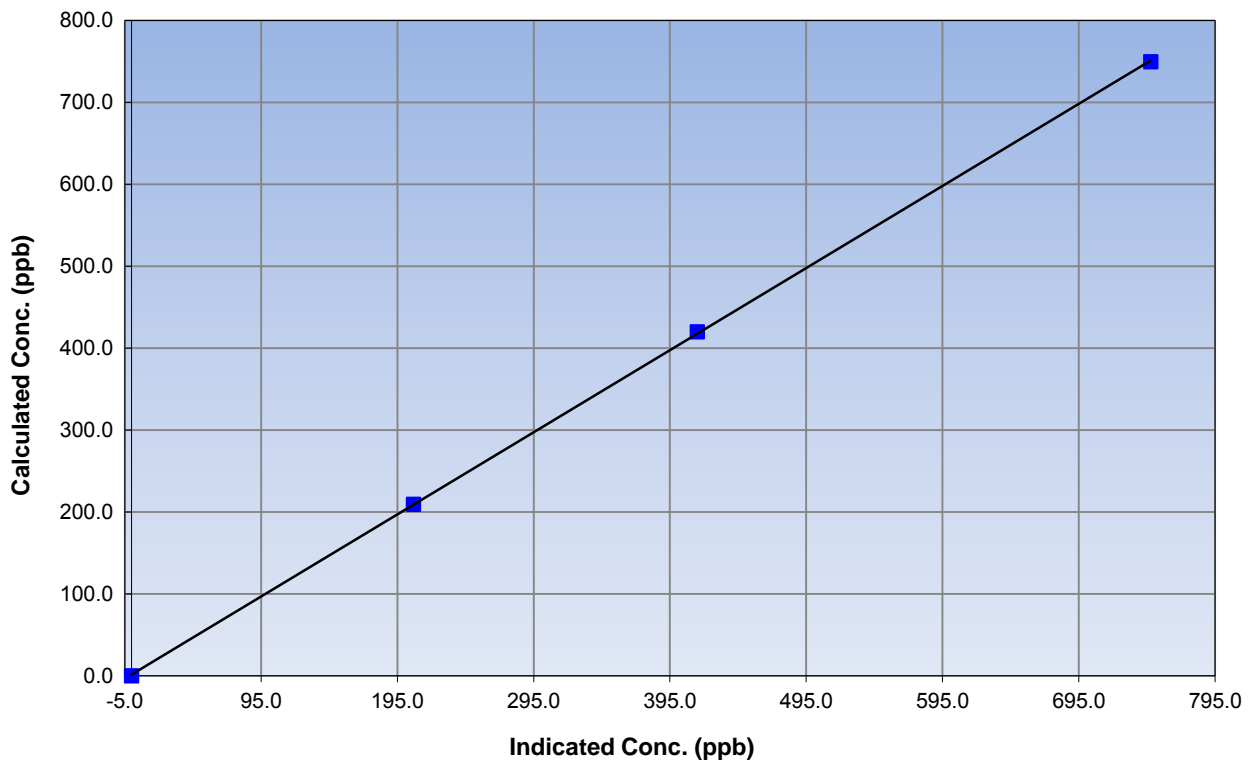
### Station Information

Calibration Date	September 15, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:00	End Time (MST)	13:30
Analyzer make	API T201	Analyzer serial #	152

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999961
749.7	747.8	1.0026		
420.2	415.1	1.0124	Slope	1.002654
209.7	206.9	1.0132		
			Intercept	1.517950

### NO Calibration Curve







# Wood Buffalo Environmental Association

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

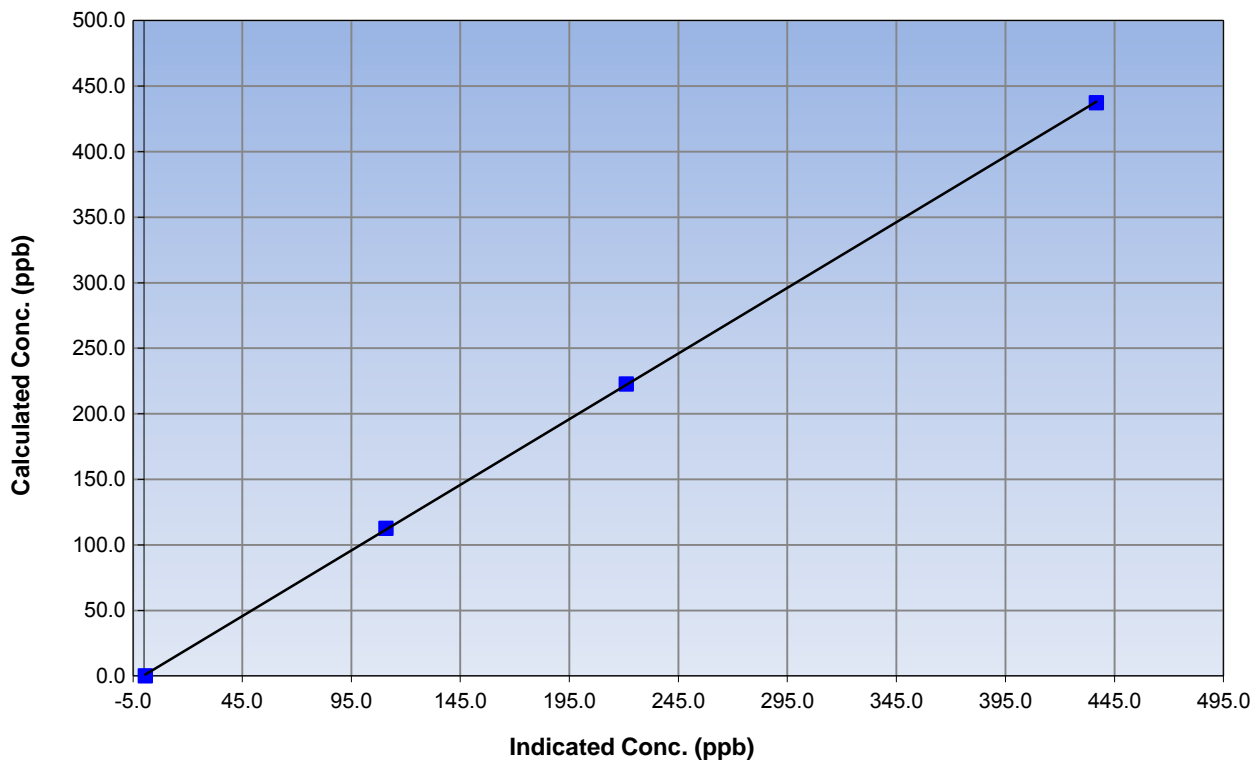
### Station Information

Calibration Date	September 15, 2015	Previous Calibration	August 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:00	End Time (MST)	13:30
Analyzer make	API T201	Analyzer serial #	152

### Calibration Information

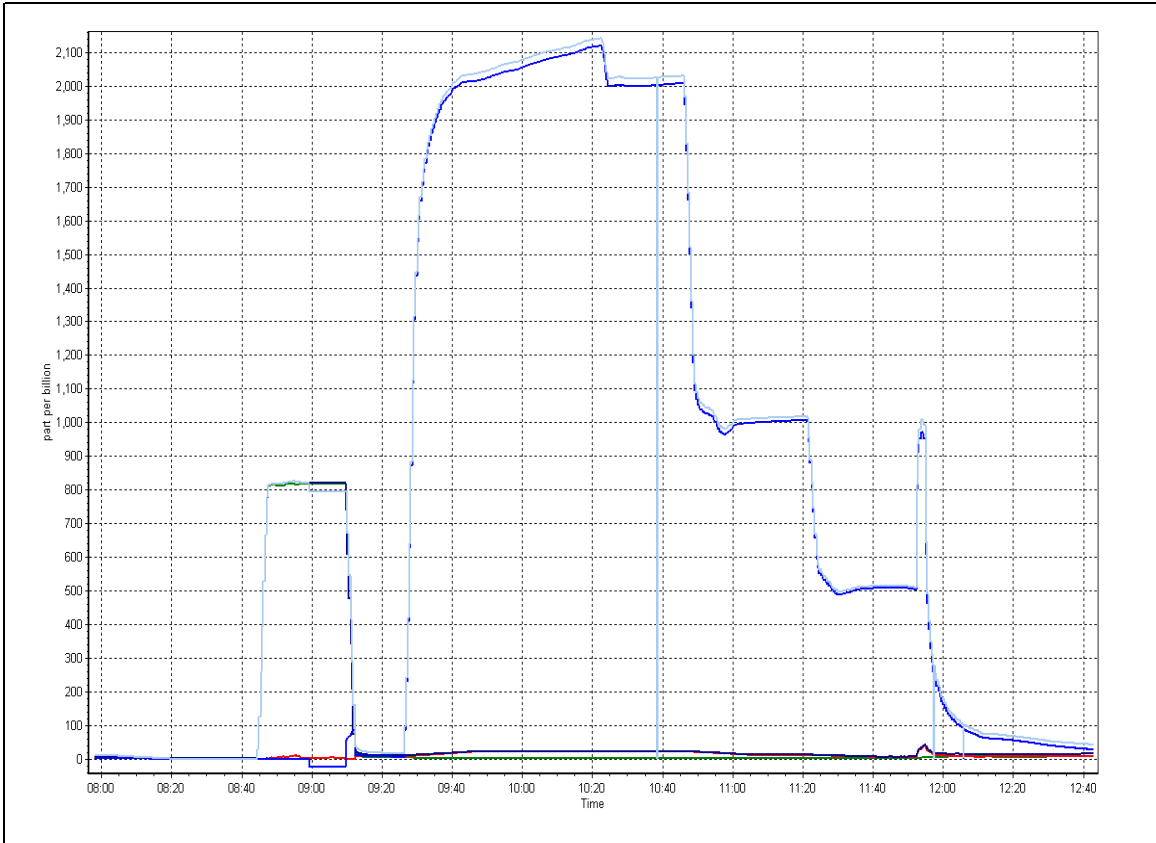
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	----	Correlation Coefficient	0.999969
437.4	436.7	1.0017		
222.8	221.2	1.0074	Slope	1.001994
112.7	110.9	1.0157		
			Intercept	0.489031

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



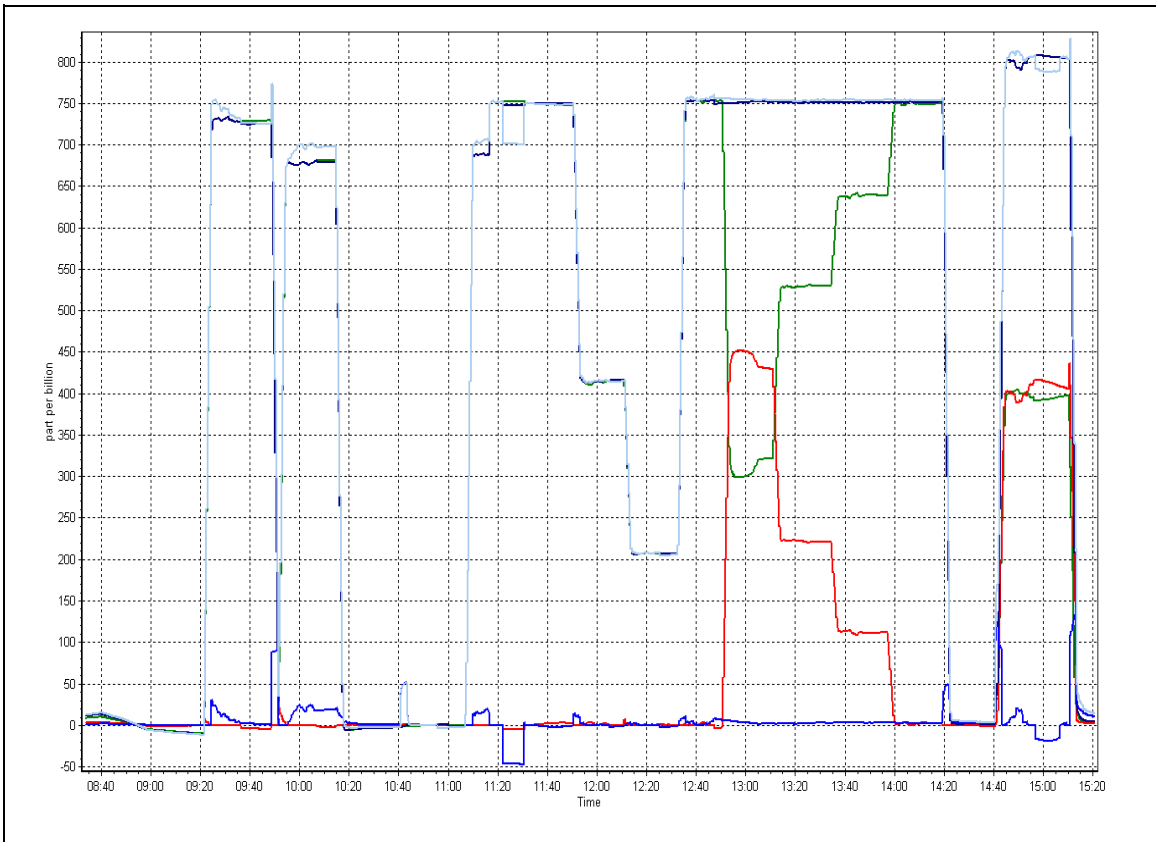
NH<sub>3</sub> Calibration Plot

Date: September 29, 2015



NO<sub>x</sub> Calibration Plot

Date: September 15, 2015





# Wood Buffalo Environmental Association

## SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	September 29, 2015	Previous Calibration:	August 19, 2015
Station Name:	Bertha Ganter - Fort McKay	Station Number:	AMS 1
Start Time (MST):	8:11	End Time (MST):	9:30
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	954

SHARP INFORMATION			
Particulate Fraction:		PM2.5	
Make/Model:		Thermo / SHARP 5030	
Serial Number		E-803	
C <sub>14</sub> Source SN:		4173	
Confirmation of Time settings:	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
Parameters Checked:	<input checked="" type="checkbox"/> T1	<input type="checkbox"/> T2	<input type="checkbox"/> T3
	<input type="checkbox"/> T4	<input checked="" type="checkbox"/> P3	<input checked="" type="checkbox"/> Main Flow
	<input type="checkbox"/> Beta	<input type="checkbox"/> Neph	<input checked="" type="checkbox"/>

### CALIBRATION DATA

Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	6.0	6.6	0.6	6.0
T2	23.0	na	na	
T3	24.0	na	na	
T4	21.0	na	na	
RH (%)	23.0	na	na	

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	974	974.6	0.6	974

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1007	7	1007	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	219		220
Neph	1.7		0
C14	900.5		867.9
Indicated Concentration (ug/m3)	1.1	yes	-0.1
Offset 1	220.8		220.8
Offset 2	34.7		34.7

Leak Check (Quarterly)			
Leak Check Date:		Previous Leak Check Date:	April 20, 2015

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

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

Mass Foil Calibration (Annually)	
Foil Calibration Date:	Previous Foil Calibration:
Zeroed?:	
Foil Mass:	Mass foil set S/N:
Previous Correction Factor:	
New Correction Factor:	

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	29/09/2015
Pump	Good	
Filter Tape	Replaced	
Mass Foil Cal Set	na	
HEPA filter	Good	

### NOTES:

Filter tape roll changed. Cyclone head replaced with clean head. Nephelometer zeroed.

Calibration Performed By:	Devin Russell
---------------------------	---------------



This page intentionally left blank



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 2  
MILDRED LAKE  
SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	685	35	35	100.00	80	0	14	0
H2S (ppb) Average	685	34	35	99.86	5	0	2	0
THC (ppm) Average	681	35	39	99.44	6.6	-	2.9	-
Temperature (C) Average	720	0	0	100.00	23.7	-	15.8	-
Relative Humidity (%) Average	720	0	0	100.00	100	-	93	-
Wind Speed 10 m (km/h) Average	718	2	2	100.00	30	-	18	-
Wind Direction 10 m (deg) Average	718	2	2	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	685	2.3	7	-	0	0	0	1	2	5	80
H2S (ppb) Average	685	0.6	1	-	0	0	0	0	1	1	5
THC (ppm) Average	681	2.41	0.4	-	1.9	2.1	2.2	2.3	2.5	2.9	6.6
Temperature 2 m (C) Average	720	9.95	4.7	-	-1.3	4.4	6.6	9.4	12.9	16.6	23.7
Relative Humidity (%) Average	720	70.9	19	-	30	45	56	72	88	96	100
Wind Speed 10 m (km/h) Average	718	9.3	5	-	1	4	6	9	12	15	30
Wind Direction 10 m (deg) Average	718	-	-	-	-	-	-	-	-	-	-



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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	14 Sep 2015 13:00	14 Sep 2015 13:00	1	Maintenance - sample manifold cleaning
THC	28 Sep 2015 13:00	28 Sep 2015 16:00	4	Maintenance - replaced fuel cylinder

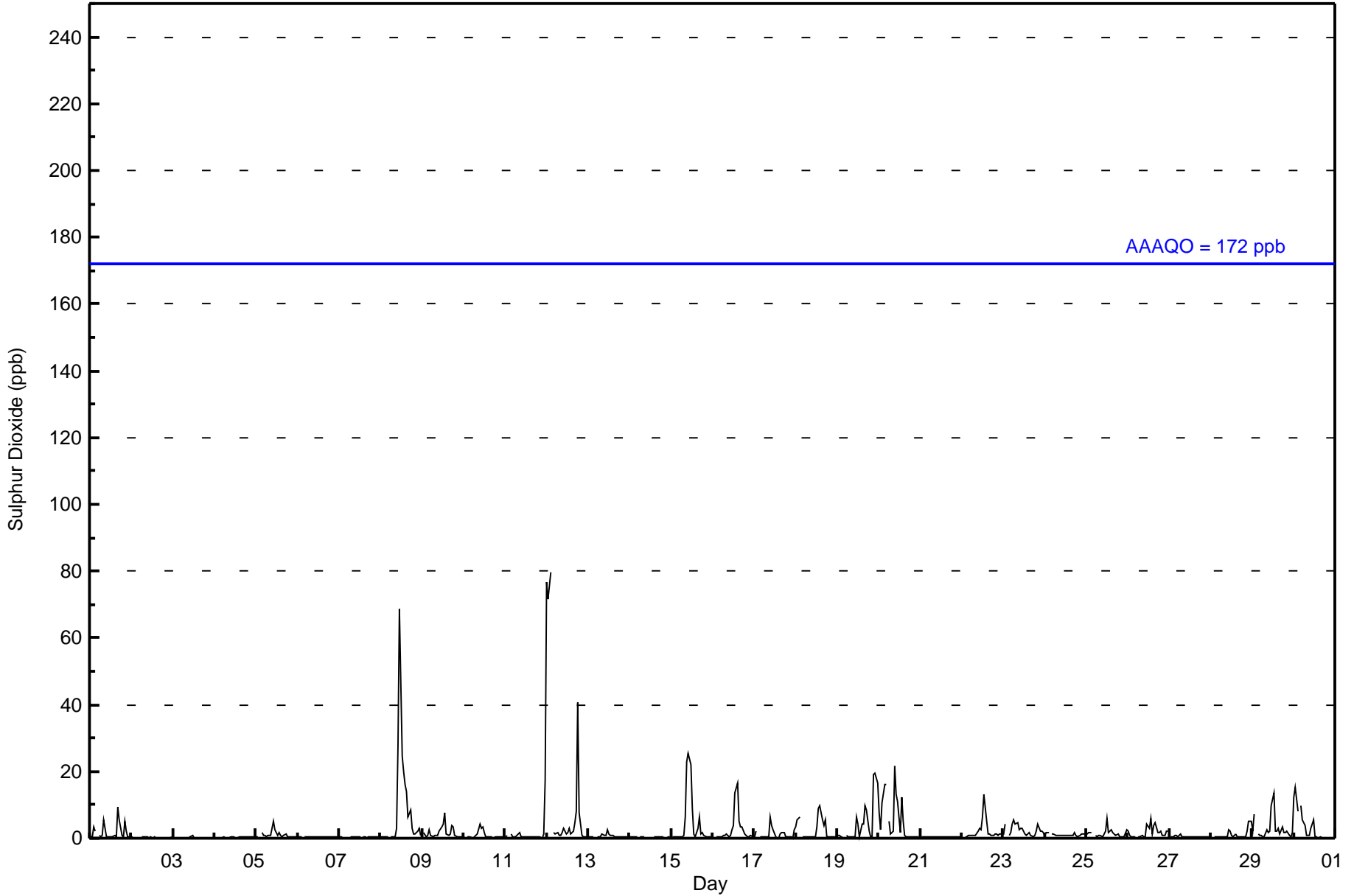


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 80 ppb on Sep 12 03:00	Maximum Daily Average: 13.6 ppb on Sep 12
Minimum Value: 0 ppb on Sep 30 23:00	Hours of Data: 685
Maximum Diurnal Average: 5.5 ppb at hour 12	Hours of Missing Data: 35
Monthly Average: 2.3 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.2 ppb on Sep 3	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.7 ppb at hour 8	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 5 P <sub>99</sub> = 25	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	0	3	2	Z	1	1	1	6	1	1	1	0	1	1	1	9	6	1	0	5	2	0	0	1.8	9
2-Sep	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
3-Sep	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
4-Sep	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
5-Sep	0	0	Z	2	1	1	1	1	1	1	3	5	3	1	2	1	1	1	1	1	1	1	0	0	1.1	5
6-Sep	0	0	1	Z	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
7-Sep	0	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-Sep	0	0	0	0	0	Z	0	1	1	3	27	69	25	20	16	14	6	9	3	1	1	2	3	1	8.8	69
9-Sep	Z	2	1	1	2	1	1	1	1	1	2	3	4	8	1	1	1	4	3	1	1	0	0	0	1.7	8
10-Sep	0	Z	0	0	0	0	0	1	1	4	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0.8	4
11-Sep	0	1	Z	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	17	1.2	17
12-Sep	77	72	80	Z	2	1	2	1	1	2	3	1	1	3	1	2	5	8	41	7	1	1	0	0	13.6	80
13-Sep	0	0	0	1	Z	1	1	1	1	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0	0.7	3
14-Sep	0	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.3	0
15-Sep	Z	0	0	1	0	0	1	1	6	23	25	22	9	1	1	3	6	1	2	1	1	1	1	0	4.6	25
16-Sep	1	Z	0	0	0	1	1	1	1	1	1	3	4	14	16	5	3	3	1	1	0	1	1	1	2.6	16
17-Sep	0	2	Z	0	0	0	0	0	0	6	4	3	0	0	0	1	2	2	0	0	0	0	0	3	1.2	6
18-Sep	3	5	6	Z	1	0	0	0	0	0	0	0	3	9	10	5	4	5	1	0	0	0	0	0	2.5	10
19-Sep	1	1	0	0	Z	1	0	0	0	0	0	6	4	0	4	4	10	8	2	0	0	19	20	16	4.4	20
20-Sep	8	3	11	16	16	Z	5	1	2	22	13	11	2	12	5	1	0	0	1	0	0	0	0	0	5.7	22
21-Sep	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.4	1
22-Sep	1	Z	0	1	1	1	1	1	1	2	3	2	7	13	5	1	1	1	1	1	1	1	1	1	2.1	13
23-Sep	1	4	Z	1	2	4	6	4	5	2	3	3	1	1	1	2	1	1	1	2	4	2	2	2	2.4	6
24-Sep	1	2	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1.0	2
25-Sep	1	2	2	2	Z	1	1	1	1	1	1	2	6	2	3	2	1	1	1	1	1	0	1	3	1.4	6
26-Sep	2	1	1	0	1	Z	1	0	1	1	0	4	3	6	1	4	5	2	2	2	1	1	2	2	1.8	6
27-Sep	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
28-Sep	0	Z	0	0	1	0	0	1	1	0	2	2	1	0	1	0	0	0	0	0	0	2	5	5	1.1	5
29-Sep	2	7	Z	1	1	1	1	1	2	2	2	10	14	2	2	3	1	3	2	2	2	1	1	2	2.7	14
30-Sep	12	15	8	Z	10	5	4	1	1	1	3	5	1	0	0	0	0	0	0	0	0	0	0	0	2.9	15

4.6	4.8	4.7	1.3	1.7	0.9	1.0	0.7	1.2	2.7	3.6	5.5	3.1	3.4	2.5	1.8	2.0	2.0	2.2	0.9	0.8	1.3	1.5	2.0		Diurnal Average
77	72	80	16	16	5	6	4	6	23	27	69	25	20	16	14	10	9	41	7	5	19	20	17		Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	655	95.62	95.62
11 - 20	19	2.77	98.39
21 - 60	7	1.02	99.42
61 - 110	4	0.58	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	61	36	19	13	7	15	29	88	87	59	27	58	28	36	49	41	653
11 - 20	0	0	0	0	0	0	0	5	0	1	2	2	8	0	1	0	19
21 - 60	0	1	0	0	0	0	0	0	1	0	2	1	2	0	0	0	7
61 - 110	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	4
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	61	37	19	13	7	15	29	93	89	60	31	61	41	36	50	41	683

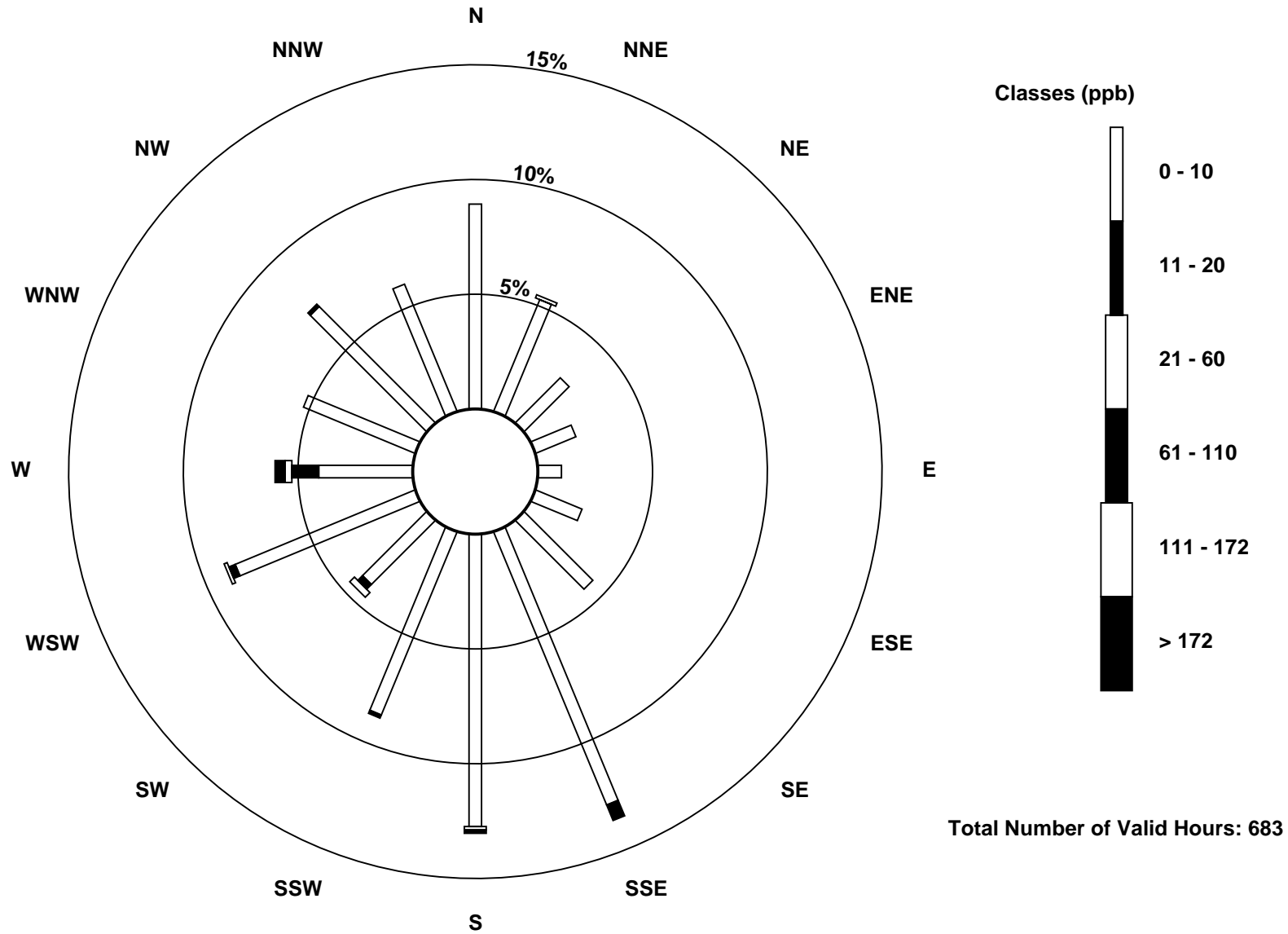
Total Number of Valid Hours: 683

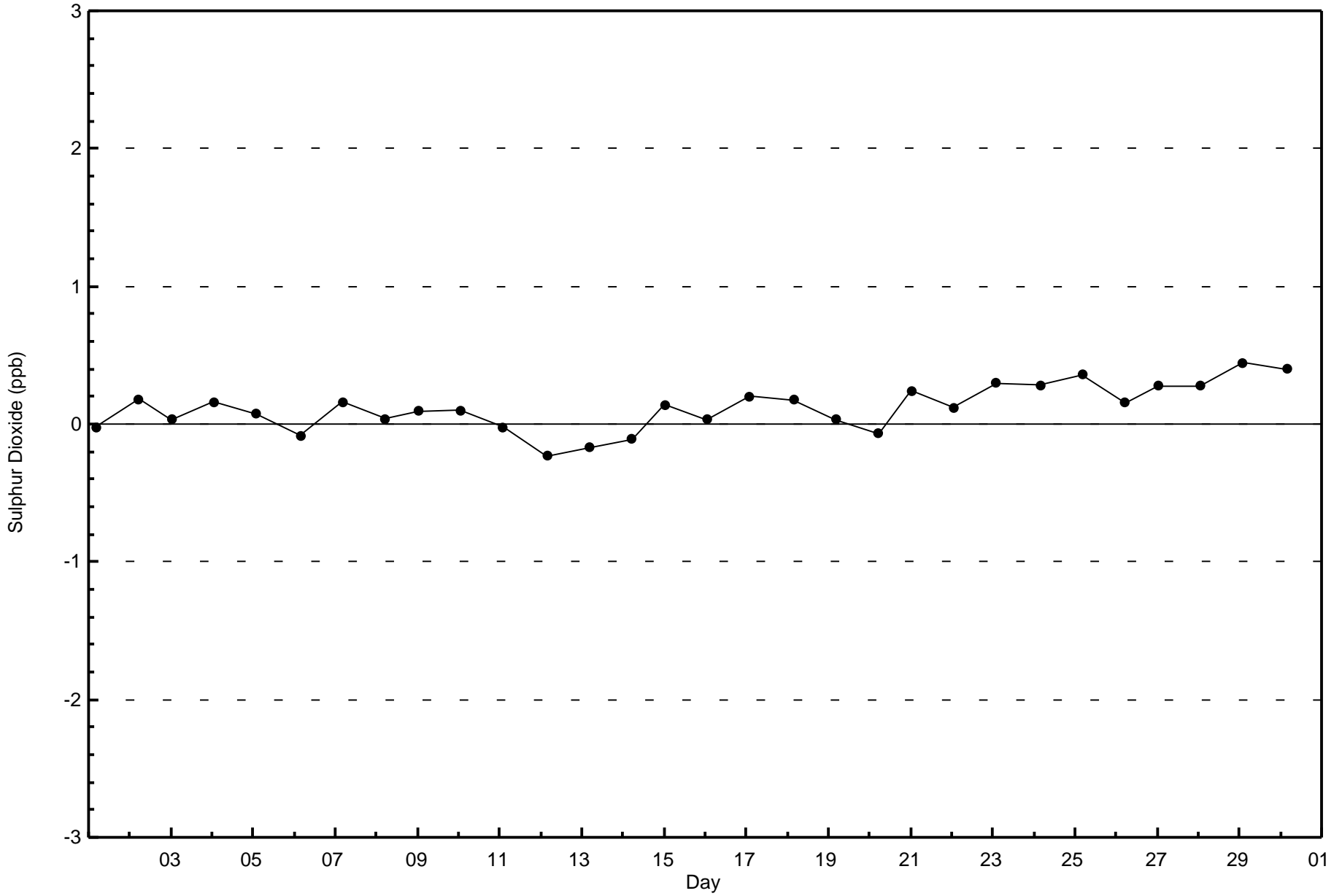
Total Number of Hours: 720

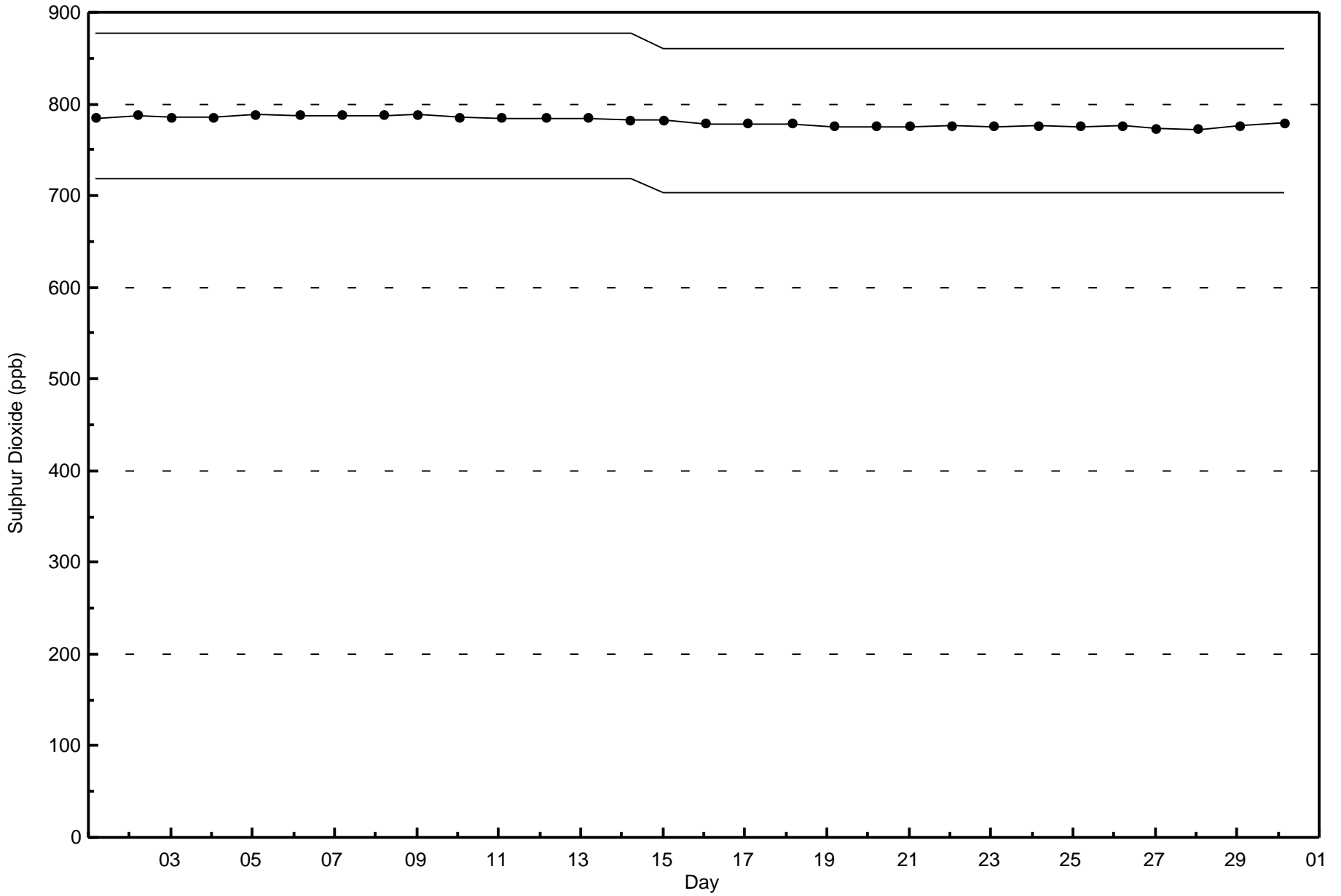


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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









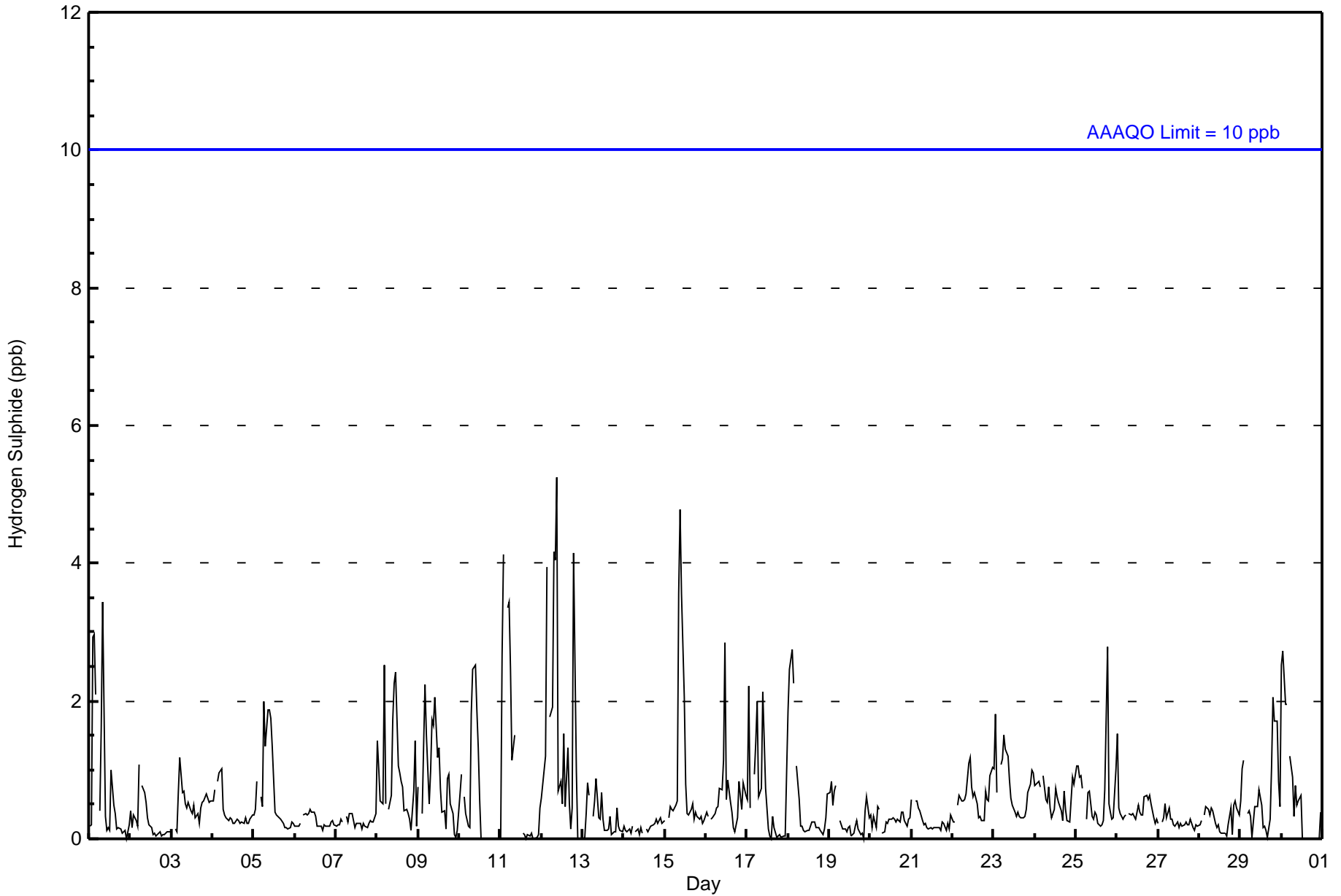


Number of Exceedences (AAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 5 ppb on Sep 12 10:00	Maximum Daily Average: 1.5 ppb on Sep 12		Hours of Data:	685
Minimum Value: 0 ppb on Sep 1 23:00	Minimum Daily Average: 0.2 ppb on Sep 14		Hours of Missing Data:	35
Maximum Diurnal Average: 1.0 ppb at hour 9	Minimum Diurnal Average: 0.2 ppb at hour 17		Hours of Calibration:	34
Monthly Average: 0.6 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 4		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-Sep	0	0	3	3	2	Z	0	2	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.8	3
2-Sep	0	0	0	0	0	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
3-Sep	0	Z	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.5	1
4-Sep	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
5-Sep	0	0	1	Z	1	0	2	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2
6-Sep	0	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
7-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Sep	1	1	1	1	3	1	Z	0	1	2	2	2	1	1	1	1	0	0	0	0	0	1	1	0	0	0.9	3
9-Sep	1	Z	0	1	2	1	1	1	2	2	2	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0.9	2
10-Sep	1	1	Z	1	0	0	0	2	2	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3
11-Sep	0	3	4	Z	3	3	2	1	2	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	1.0	4
12-Sep	1	1	1	4	Z	2	2	4	4	5	1	1	1	2	0	1	0	0	0	4	1	0	0	0	0	1.5	5
13-Sep	0	0	0	1	1	Z	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Sep	0	0	0	0	0	0	Z	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Sep	0	Z	0	0	0	0	0	1	4	5	4	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0.9	5
16-Sep	0	0	Z	0	0	0	0	0	1	1	1	3	1	1	1	0	0	0	0	1	1	0	1	1	0	0.6	3
17-Sep	1	2	0	Z	1	1	2	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.7	2
18-Sep	2	2	3	2	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.6	3
19-Sep	1	1	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1
20-Sep	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
21-Sep	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-Sep	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	0.6	1
23-Sep	1	2	1	Z	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.8	2
24-Sep	1	1	1	1	Z	1	1	1	1	0	0	0	1	1	0	0	1	0	0	0	1	1	1	1	1	0.6	1
25-Sep	1	1	1	1	1	Z	0	1	1	0	0	0	0	0	0	0	0	1	3	1	0	0	0	1	0	0.6	3
26-Sep	2	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0.4	2
27-Sep	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	0.2	1
28-Sep	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	0.3	1
29-Sep	1	1	1	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	2	2	2	1	0	0	0.7	2
30-Sep	3	3	2	2	Z	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3

0.6	0.9	0.9	0.9	0.9	0.8	0.7	0.7	1.0	1.0	0.7	0.7	0.4	0.4	0.3	0.3	0.2	0.3	0.4	0.5	0.3	0.3	0.4	0.4	Diurnal Average	
3	3	4	4	3	3	2	4	4	5	4	3	1	2	1	1	1	1	3	4	2	2	1	1	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	663	96.79	96.79
3 - 4	20	2.92	99.71
5 - 7	2	0.29	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	65	36	20	13	7	12	25	91	87	55	30	58	40	31	52	40	662
3 - 4	0	1	0	0	0	2	2	4	3	1	0	2	2	3	0	0	20
5 - 7	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	38	20	13	7	14	27	95	90	56	30	60	43	34	52	40	684

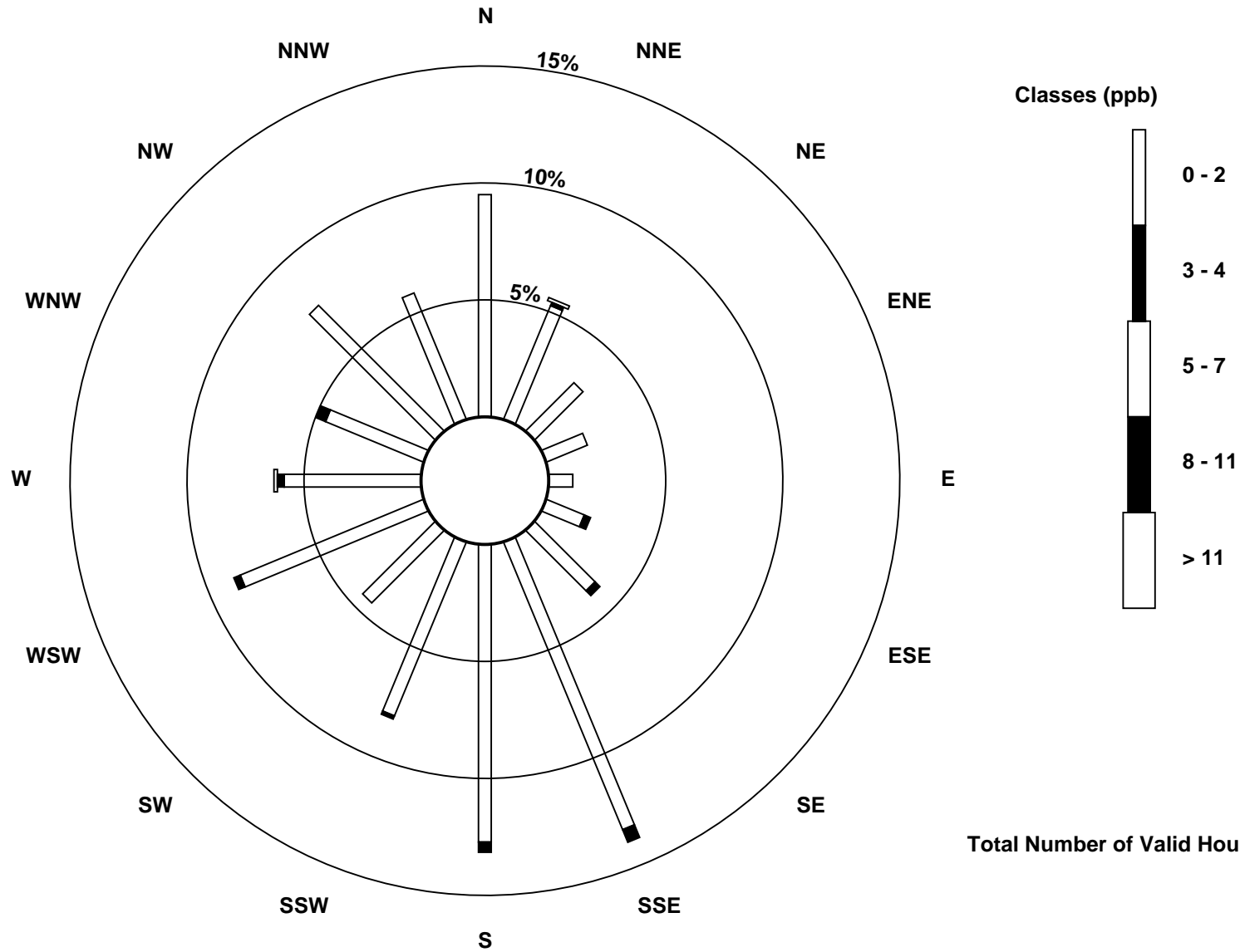
Total Number of Valid Hours: 684

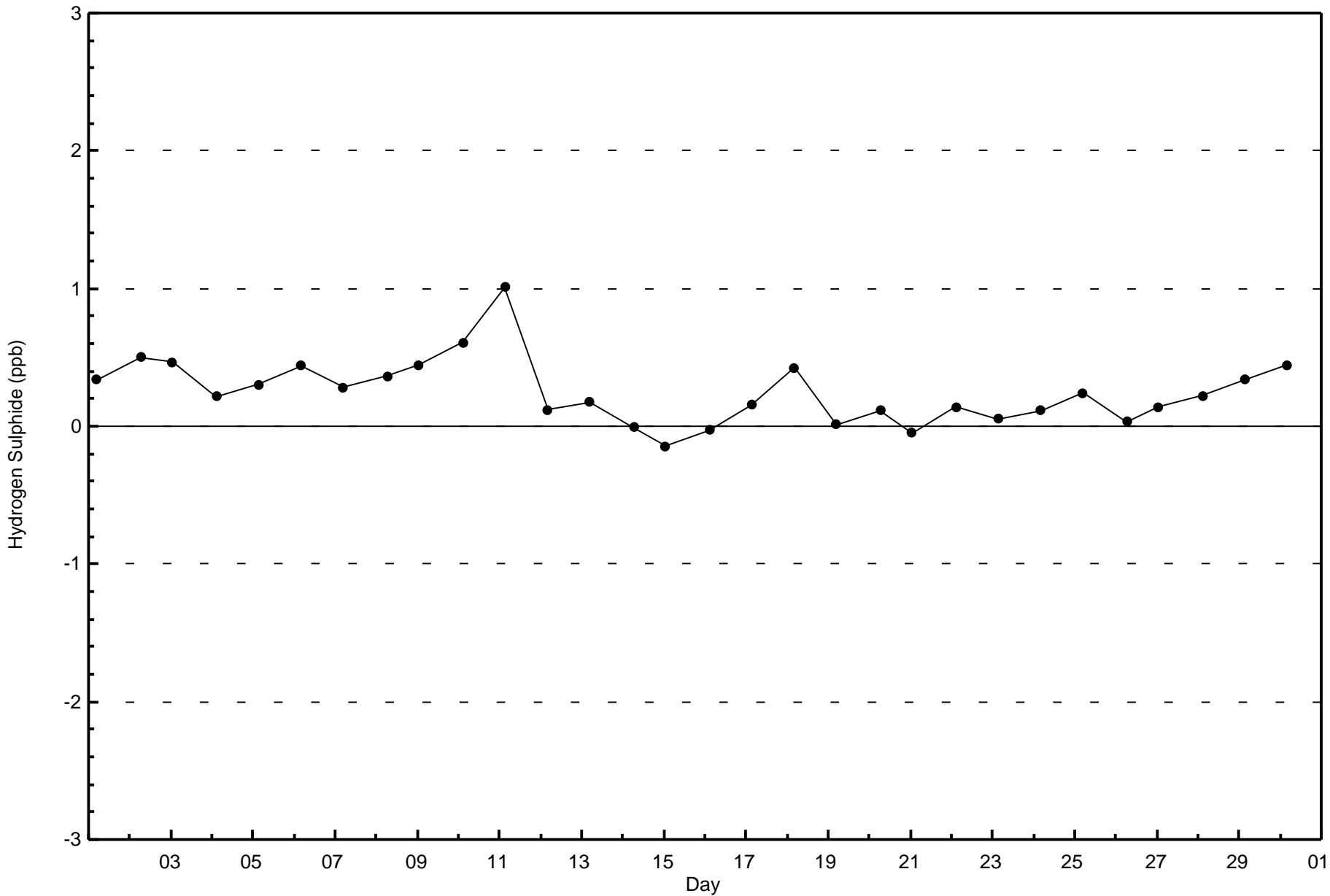
Total Number of Hours: 720

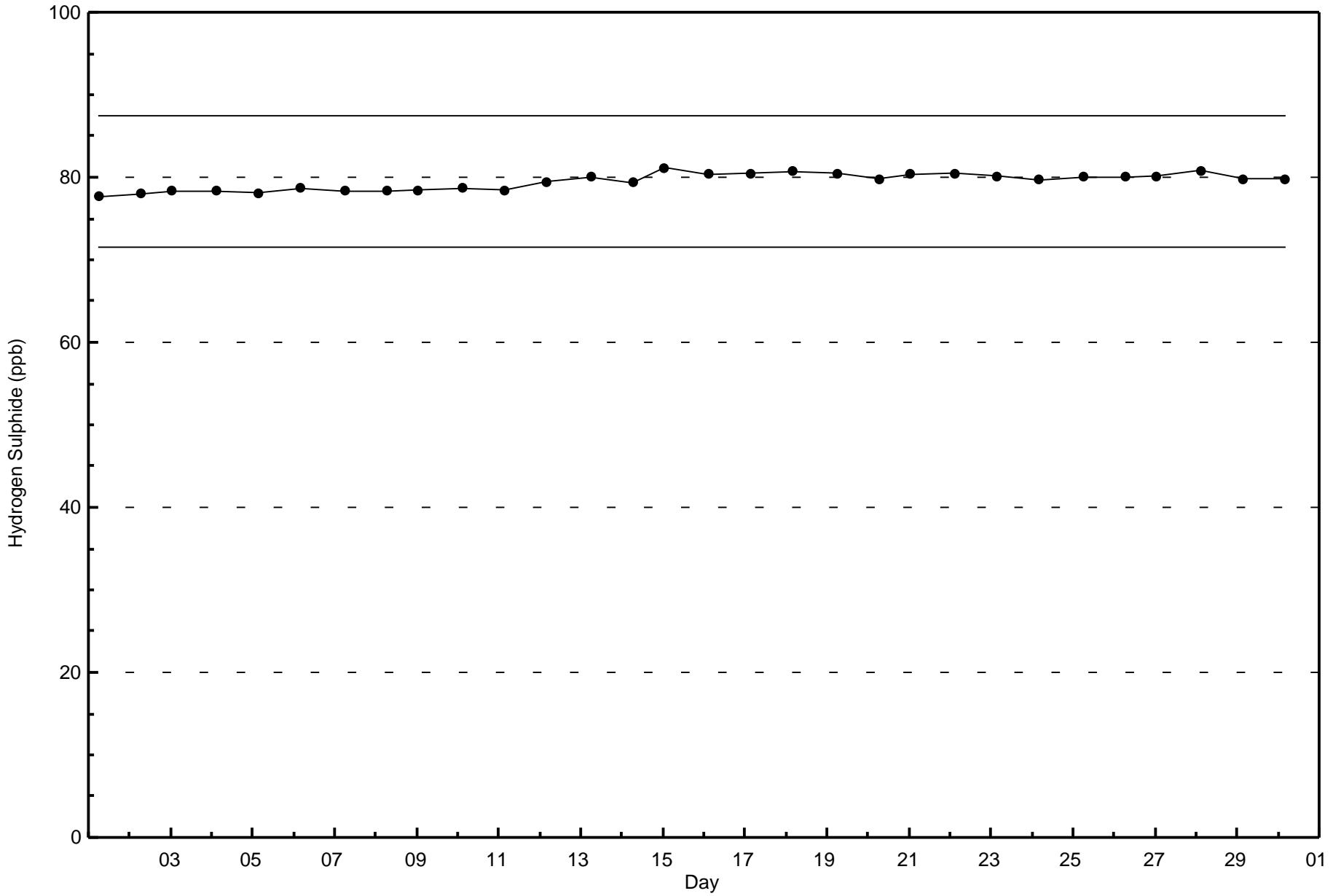


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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



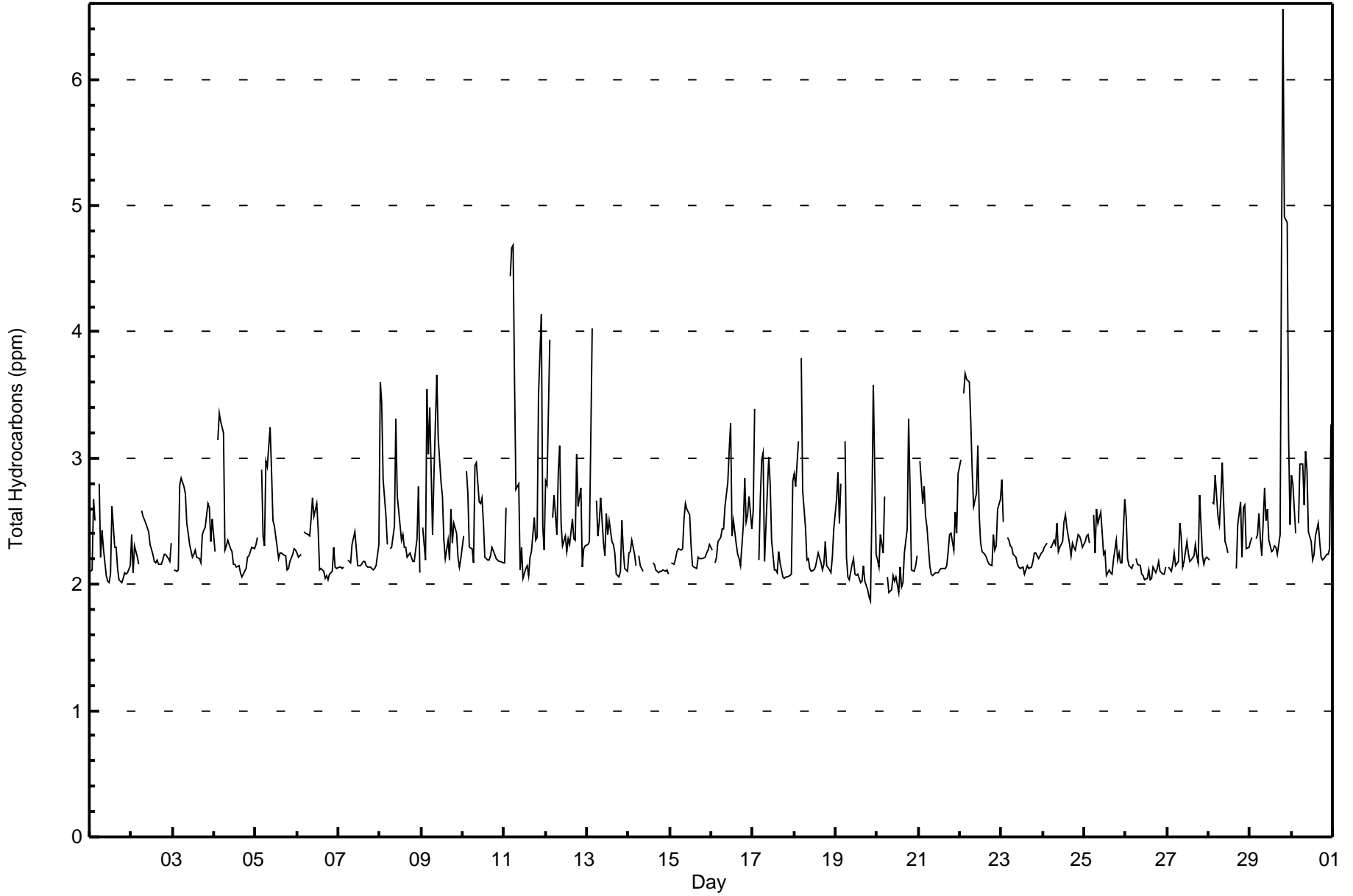






Maximum Value: 6.6 ppm on Sep 29 20:00																		Maximum Daily Average: 2.9 ppm on Sep 29						Hours in Service: 720		
Minimum Value: 1.9 ppm on Sep 19 21:00																		Minimum Daily Average: 2.1 ppm on Sep 26						Hours of Data: 681		
Maximum Diurnal Average: 2.7 ppm at hour 6																		Minimum Diurnal Average: 2.2 ppm at hour 17						Hours of Missing Data: 39		
Monthly Average: 2.41 ppm																		Percentiles: P <sub>1</sub> = 2.0 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.2 Median = 2.3 Q <sub>3</sub> = 2.5 P <sub>90</sub> = 2.9 P <sub>99</sub> = 4.4						Hours of Calibration: 35		
																								Percent Operational Time: 99.4		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	2.1	2.1	2.7	2.5	Z	2.8	2.2	2.4	2.3	2.1	2.0	2.0	2.1	2.6	2.3	2.3	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.8
2-Sep	2.4	2.1	2.3	2.2	2.2	Z	2.6	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	2.2	2.2	2.2	2.3	2.3	2.6
3-Sep	Z	2.1	2.1	2.1	2.8	2.8	2.8	2.7	2.5	2.4	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.4	2.4	2.5	2.6	2.6	2.3	2.5	2.4	2.8
4-Sep	2.3	Z	3.1	3.4	3.3	3.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.4	3.4
5-Sep	2.3	2.4	Z	2.9	2.4	2.3	3.0	2.9	3.2	2.9	2.5	2.5	2.3	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.3	2.4	3.2
6-Sep	2.2	2.2	2.2	Z	2.4	2.4	2.4	2.4	2.5	2.7	2.5	2.6	2.4	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.3	2.1	2.1	2.3	2.7
7-Sep	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.3	2.4	2.3	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.4
8-Sep	3.6	3.4	2.8	2.5	2.3	Z	2.3	2.3	2.5	3.3	2.7	2.6	2.4	2.4	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.4	2.8	2.1	2.5	3.6
9-Sep	Z	2.4	2.2	3.5	3.0	3.4	2.4	2.9	3.3	3.7	3.2	2.8	2.7	2.4	2.2	2.3	2.2	2.6	2.3	2.5	2.4	2.2	2.1	2.2	2.7	3.7
10-Sep	2.4	Z	2.9	2.7	2.3	2.3	2.2	2.9	3.0	2.6	2.6	2.7	2.5	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	3.0
11-Sep	2.2	2.6	Z	4.4	4.7	4.7	3.6	2.8	2.8	2.1	2.3	2.1	2.1	2.1	2.1	2.2	2.3	2.5	2.3	2.4	3.5	4.1	2.5	2.3	2.8	4.7
12-Sep	2.8	2.8	3.9	Z	2.5	2.7	2.4	2.9	3.1	2.5	2.3	2.4	2.3	2.4	2.3	2.5	2.4	2.4	3.0	2.6	2.8	2.1	2.3	2.3	2.6	3.9
13-Sep	2.3	2.3	3.1	4.0	Z	2.7	2.4	2.5	2.7	2.3	2.2	2.6	2.4	2.5	2.3	2.3	2.2	2.1	2.1	2.1	2.5	2.3	2.1	2.1	2.4	4.0
14-Sep	2.3	2.3	2.3	2.2	2.1	Z	2.2	2.1	2.1	2.1	C	C	C	C	C	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3
15-Sep	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.5	2.6	2.6	2.6	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.6
16-Sep	2.3	Z	2.2	2.2	2.3	2.4	2.4	2.4	2.6	2.8	3.1	3.3	2.4	2.5	2.3	2.2	2.2	2.1	2.5	2.8	2.5	2.5	2.7	2.4	2.5	3.3
17-Sep	2.6	3.4	Z	2.2	2.7	3.0	3.0	2.2	2.7	3.0	2.8	2.3	2.1	2.1	2.1	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.8	2.4	3.4
18-Sep	2.9	2.8	3.1	Z	3.8	2.7	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.1	2.2	2.3	2.1	2.1	2.1	2.2	2.4	2.4	3.8
19-Sep	2.7	2.9	2.5	2.8	Z	3.1	2.2	2.1	2.0	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	1.9	1.9	2.6	3.6	2.2	2.3	3.6
20-Sep	2.2	2.1	2.4	2.3	2.7	Z	2.1	1.9	2.0	2.1	2.0	2.1	1.9	2.1	2.0	2.0	2.2	2.4	3.3	2.8	2.1	2.1	2.1	2.2	2.2	3.3
21-Sep	Z	3.0	2.6	2.8	2.5	2.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.4	2.3	2.6	2.4	2.9	2.3	3.0
22-Sep	3.0	Z	3.5	3.7	3.6	3.6	3.3	2.9	2.6	2.7	3.1	2.5	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.4	2.3	2.3	2.6	2.7	2.7	3.7
23-Sep	2.8	2.5	Z	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.8
24-Sep	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.5	2.3	2.3	2.3	2.5	2.5	2.5	2.3	2.2	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.5
25-Sep	2.3	2.4	2.4	2.3	Z	2.5	2.2	2.6	2.5	2.6	2.4	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.2	2.7	2.3	2.7
26-Sep	2.5	2.2	2.1	2.1	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.5
27-Sep	Z	2.1	2.1	2.2	2.2	2.1	2.2	2.5	2.4	2.1	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.7	2.2	2.2	2.2	2.2	2.7
28-Sep	2.2	Z	2.6	2.6	2.9	2.5	2.5	2.7	3.0	2.3	2.3	2.3	M	M	M	M	2.1	2.5	2.6	2.2	2.6	2.6	2.3	2.3	2.5	3.0
29-Sep	2.3	2.4	Z	2.4	2.4	2.6	2.4	2.2	2.8	2.5	2.6	2.3	2.3	2.3	2.3	2.3	2.2	2.4	4.7	6.6	4.9	4.9	3.2	2.5	2.9	6.6
30-Sep	2.9	2.8	2.4	Z	2.5	3.0	3.0	2.6	3.1	2.9	2.4	2.3	2.2	2.2	2.4	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.3	3.3	2.5	3.3
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance																										







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	21	3.08	3.08
2.1 - 3.0	616	90.46	93.54
3.1 - 10.0	44	6.46	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
0 - 2.0	1	2	0	0	0	0	0	0	0	0	1	0	10	4	3	0	0	21
2.1 - 3.0	60	34	18	13	7	15	28	83	77	56	25	51	35	31	47	34	614	
3.1 - 10.0	0	1	1	0	0	0	1	10	12	2	3	0	2	2	3	7	44	
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Totals</b>	61	37	19	13	7	15	29	93	89	59	28	61	41	36	50	41	679	

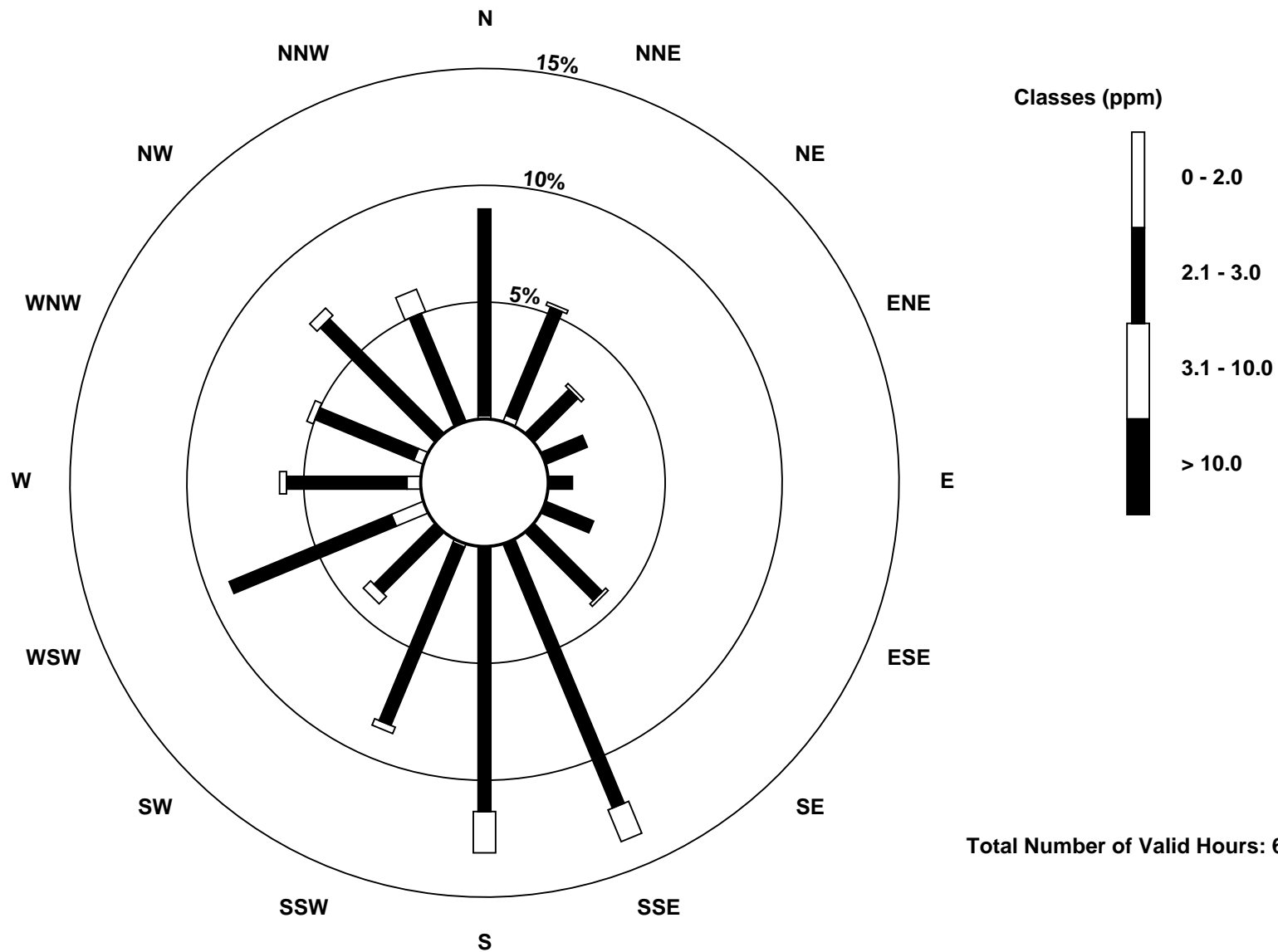
Total Number of Valid Hours: 679

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

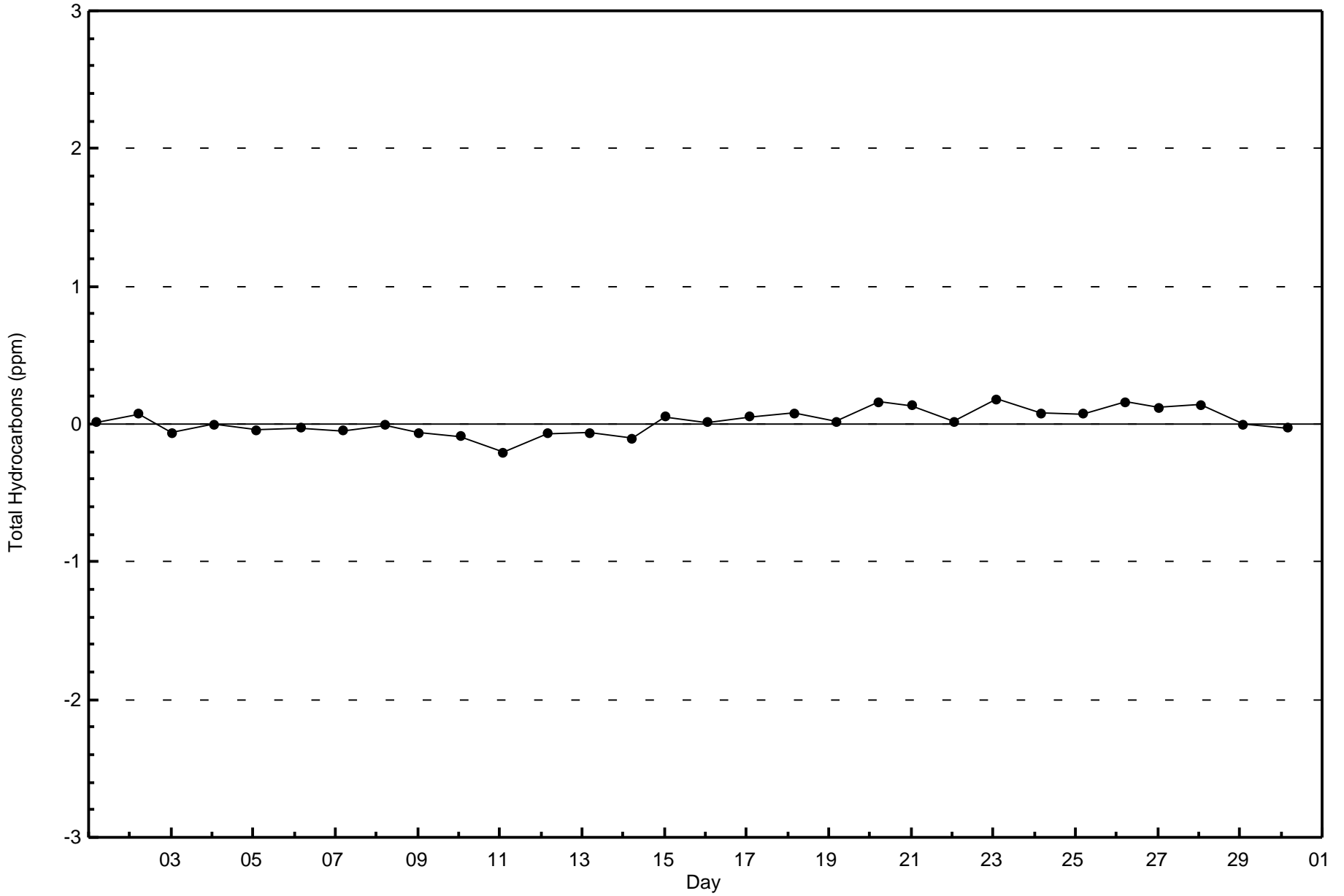
Total Hydrocarbons (THC) - ppm  
Mildred Lake (AMS 2)

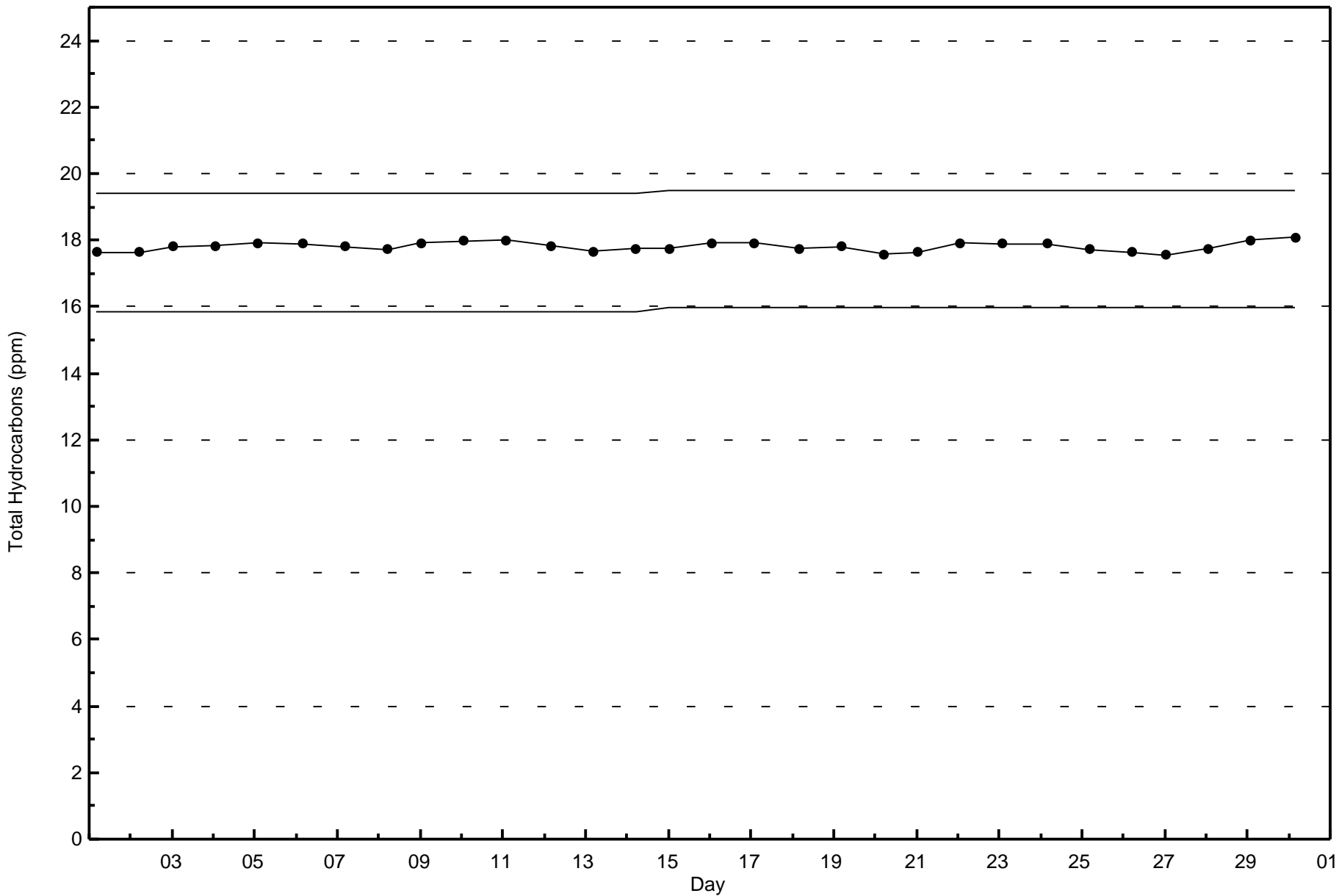




Wood Buffalo Environmental Association  
Zero Responses

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







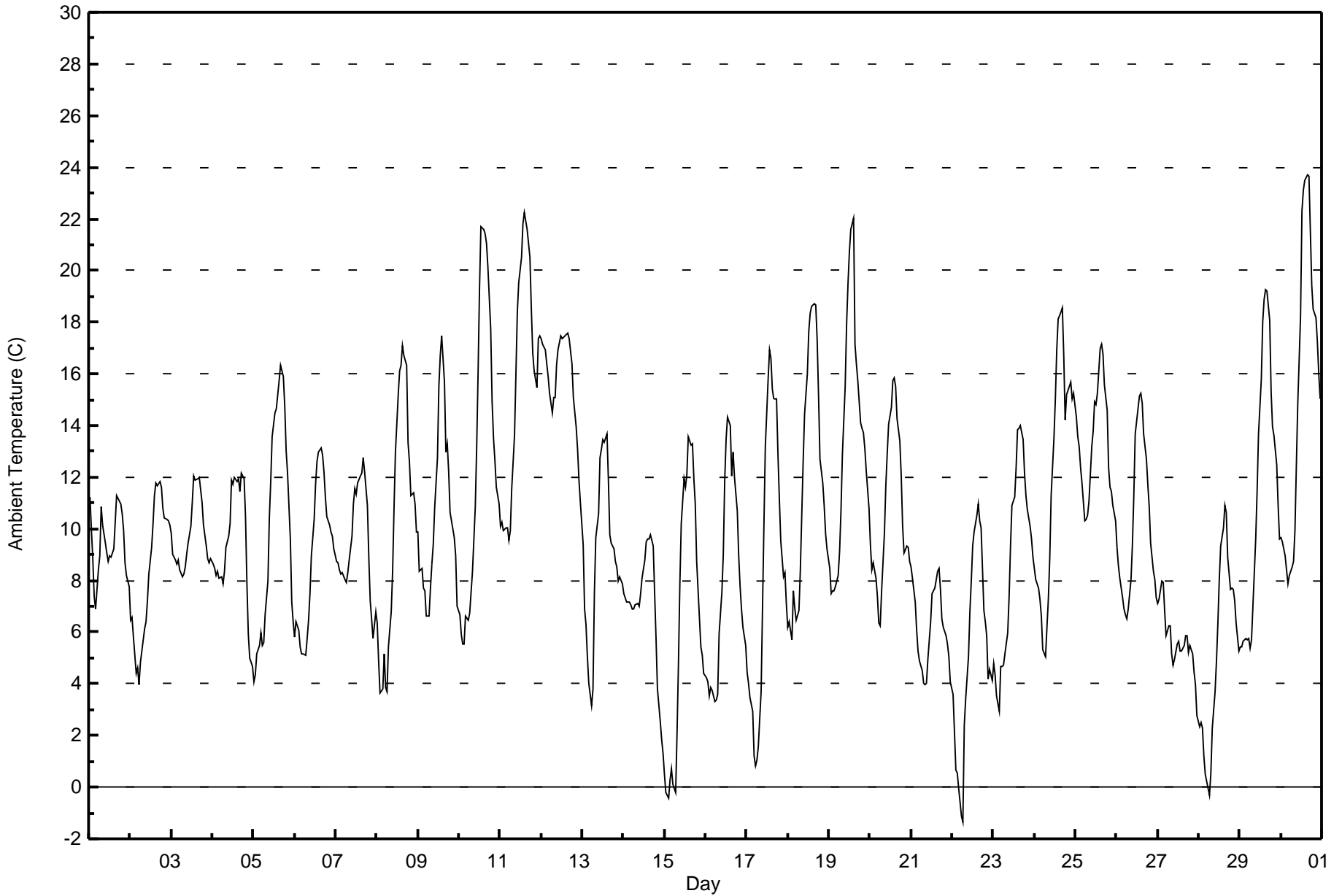
# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Ambient Temperature (AT) - C

## Mildred Lake - September 2015

Maximum Value: 23.7 C on Sep 30 16:00      Maximum Daily Average: 15.8 C on Sep 12																						Hours in Service: 720 Hours of Data: 720				
Minimum Value: -1.3 C on Sep 22 07:00      Minimum Daily Average: 5.1 C on Sep 22 Maximum Diurnal Average: 14.8 C at hour 15      Minimum Diurnal Average: 5.8 C at hour 6 Monthly Average: 9.95 C      Percentiles: P <sub>1</sub> = -0.1 P <sub>10</sub> = 4.4 Q <sub>1</sub> = 6.6 Median = 9.4 Q <sub>3</sub> = 12.9 P <sub>90</sub> = 16.6 P <sub>99</sub> = 21.9																						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-Sep	11.3	10.0	8.9	7.4	6.9	8.4	9.0	10.9	10.1	9.4	9.1	8.7	9.0	8.9	9.2	10.2	11.3	11.2	11.0	10.6	9.9	8.7	8.2	7.8	9.4	11.3
2-Sep	6.5	6.5	5.8	4.4	4.6	4.0	4.8	5.3	6.1	6.4	7.2	8.2	9.3	10.2	11.3	11.8	11.7	11.8	11.6	10.8	10.4	10.3	10.3	10.2	8.3	11.8
3-Sep	9.8	9.0	8.8	8.6	8.8	8.4	8.2	8.2	8.5	9.0	9.4	10.1	11.0	12.1	11.9	11.9	12.0	11.5	11.0	10.1	9.4	8.9	8.7	8.8	9.8	12.1
4-Sep	8.7	8.5	8.2	8.3	8.1	8.1	7.8	8.4	9.3	9.7	10.2	11.9	11.7	12.0	11.8	11.9	11.4	12.1	12.0	10.5	7.9	5.9	5.0	4.6	9.3	12.1
5-Sep	4.1	4.3	5.1	5.5	6.0	5.5	5.6	6.7	8.0	10.4	11.8	13.5	14.5	14.6	15.2	15.7	16.3	15.9	14.8	13.0	12.1	9.6	7.2	6.4	10.1	16.3
6-Sep	5.8	6.4	6.1	5.4	5.2	5.2	5.1	5.7	6.5	7.5	8.9	10.4	11.7	12.6	12.9	13.1	12.8	12.2	11.2	10.5	10.2	9.9	9.7	9.2	8.9	13.1
7-Sep	8.7	8.7	8.4	8.2	8.3	8.1	7.9	8.3	8.8	9.7	11.0	11.6	11.3	11.8	12.0	12.1	12.7	12.2	10.9	8.9	7.2	6.5	5.7	6.8	9.4	12.7
8-Sep	6.4	4.9	3.7	3.8	5.2	3.9	3.7	5.5	6.8	8.4	10.8	13.0	15.2	16.1	16.3	17.1	16.7	16.3	13.3	12.6	11.3	11.4	11.0	9.9	10.1	17.1
9-Sep	9.9	8.4	8.5	7.7	7.6	6.6	6.6	7.7	8.6	9.4	10.8	12.8	15.5	16.7	17.5	15.7	13.0	13.3	12.2	10.6	10.0	9.7	9.0	7.0	10.6	17.5
10-Sep	6.7	5.9	5.5	5.5	6.6	6.4	6.7	7.5	8.4	10.8	13.2	16.1	19.3	21.7	21.6	21.4	21.1	20.1	17.7	14.9	13.5	12.7	11.6	11.0	12.8	21.7
11-Sep	10.1	10.3	9.9	10.0	10.0	9.5	9.9	11.5	13.6	16.0	18.4	19.5	20.5	21.8	22.3	21.9	21.6	20.5	18.5	16.8	16.1	15.4	17.4	17.5	15.8	22.3
12-Sep	17.4	17.2	16.9	16.4	15.9	15.3	14.5	15.1	15.1	16.3	16.9	17.5	17.4	17.4	17.5	17.6	17.4	16.9	16.4	15.1	13.9	13.1	11.9	11.0	15.8	17.6
13-Sep	9.4	6.9	6.3	5.1	4.0	3.1	3.8	7.5	9.6	10.6	12.7	13.1	13.5	13.3	13.7	11.9	9.7	9.4	9.2	8.7	8.5	8.0	8.1	7.8	8.9	13.7
14-Sep	7.5	7.3	7.2	7.2	7.1	6.9	6.9	7.1	7.1	7.0	7.5	8.1	8.8	9.5	9.6	9.6	9.8	9.3	7.5	5.7	3.8	2.6	1.9	1.3	6.9	9.8
15-Sep	0.5	-0.2	-0.4	0.3	0.7	0.1	-0.2	2.1	4.8	7.9	10.2	11.9	11.6	12.1	13.5	13.3	13.3	11.9	10.9	8.8	6.5	5.4	5.1	4.4	6.4	13.5
16-Sep	4.3	4.1	3.5	3.9	3.7	3.3	3.4	3.6	5.9	7.5	9.0	11.8	13.4	14.3	14.0	12.0	13.0	12.0	10.7	9.0	7.7	6.9	6.2	5.5	7.9	14.3
17-Sep	4.5	4.0	3.5	3.0	1.2	0.8	1.1	1.6	3.7	6.9	10.1	13.2	15.8	16.9	16.6	15.4	15.0	15.0	12.9	11.2	9.5	8.2	8.3	7.1	8.6	16.9
18-Sep	6.2	6.4	5.7	7.6	7.0	6.5	6.9	8.4	10.6	12.6	14.4	16.0	17.6	18.3	18.6	18.7	18.7	17.3	15.1	12.7	11.8	10.9	9.8	9.2	12.0	18.7
19-Sep	8.4	7.5	7.6	7.6	7.7	8.2	9.1	10.7	12.9	15.5	17.9	19.5	20.7	21.6	22.0	17.1	16.4	15.7	14.1	13.9	13.8	13.2	12.3	10.8	13.5	22.0
20-Sep	9.4	8.4	8.7	8.1	7.4	6.3	6.3	7.6	9.8	11.7	12.9	14.1	14.7	15.8	15.9	15.5	14.2	13.4	12.0	10.1	9.1	9.3	9.3	8.7	10.8	15.9
21-Sep	8.5	8.1	7.2	6.1	5.3	4.9	4.5	4.0	4.0	4.0	5.0	6.4	7.5	7.6	7.7	8.4	8.5	7.7	6.5	6.2	5.9	5.5	5.1	4.1	6.2	8.5
22-Sep	3.6	2.1	0.6	0.5	0.0	-1.2	-1.3	2.4	3.4	5.1	6.8	8.0	9.3	9.9	10.5	11.0	10.3	10.1	6.8	6.4	5.8	4.2	4.6	4.1	5.1	11.0
23-Sep	4.8	4.3	3.5	2.9	4.7	4.7	4.7	5.2	6.0	7.4	9.4	10.9	11.2	12.4	13.9	13.9	14.0	13.4	12.2	11.3	10.7	10.1	9.6	8.9	8.7	14.0
24-Sep	8.5	8.1	7.7	7.3	6.6	5.3	5.1	6.2	7.3	8.8	11.3	13.5	15.0	16.9	18.1	18.4	18.6	16.7	14.2	15.2	15.5	15.7	15.0	15.2	12.1	18.6
25-Sep	14.3	13.6	13.2	12.4	11.8	10.3	10.4	10.5	11.1	13.2	13.8	14.9	14.8	15.3	17.0	17.1	16.7	15.6	14.6	12.4	11.6	11.5	10.9	10.3	13.2	17.1
26-Sep	9.3	8.6	8.1	7.3	6.9	6.7	6.5	6.9	8.0	9.4	11.3	13.7	14.7	15.1	15.3	14.9	13.7	12.7	11.7	10.8	9.5	8.4	8.0	7.3	10.2	15.3
27-Sep	7.1	7.3	8.0	8.0	6.8	5.9	6.2	6.3	5.2	4.7	4.9	5.5	5.6	5.3	5.3	5.5	5.9	5.9	5.2	5.5	5.2	4.4	4.0	2.8	5.7	8.0
28-Sep	2.3	2.5	2.3	1.2	0.5	-0.1	-0.3	0.6	2.3	3.7	4.9	6.4	8.0	9.3	10.1	10.9	10.6	8.9	7.6	7.7	7.6	7.2	6.4	5.3	5.2	10.9
29-Sep	5.4	5.4	5.7	5.8	5.7	5.8	5.4	5.7	8.3	9.6	11.4	13.7	15.8	18.0	18.9	19.3	19.2	18.1	15.3	13.9	13.6	12.5	10.9	9.6	11.4	19.3
30-Sep	9.7	9.5	8.9	8.4	7.9	8.2	8.5	8.8	10.0	12.4	14.8	18.2	22.3	23.1	23.5	23.7	23.6	21.5	19.4	18.5	18.2	17.2	16.0	15.0	15.3	23.7
																								Diurnal Average		
																								Diurnal Maximum		







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	8	1.11	1.11
0 - 10	388	53.89	55.00
10 - 20	304	42.22	97.22
> 20	20	2.78	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

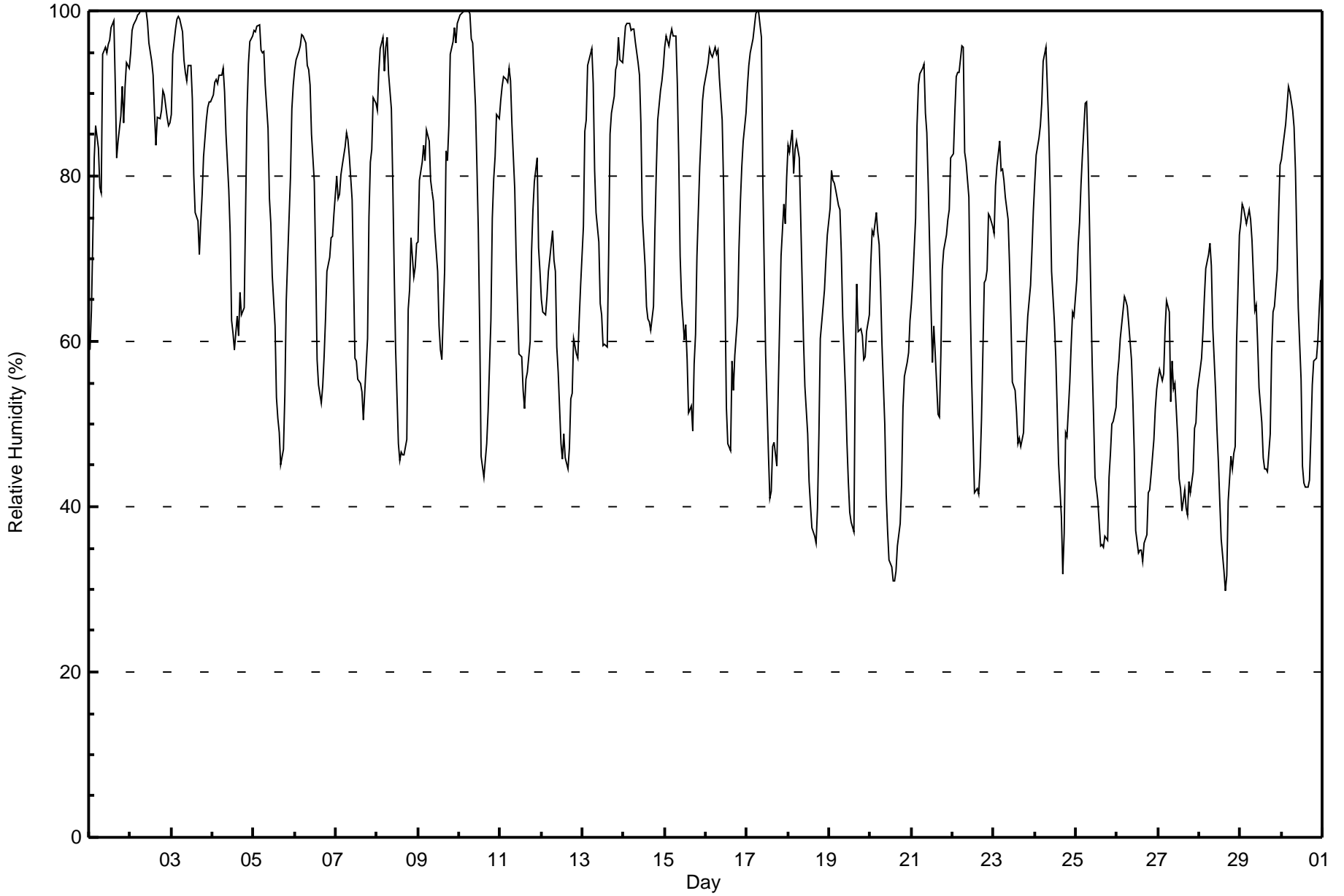


**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

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

Maximum Value: 100 % on Sep 2 07:00																	Maximum Daily Average: 93.5 % on Sep 2																	Hours in Service: 720	
Minimum Value: 30 % on Sep 28 16:00																	Minimum Daily Average: 49.2 % on Sep 26																	Hours of Data: 720	
Maximum Diurnal Average: 87.7 % at hour 6																	Minimum Diurnal Average: 50.7 % at hour 15																	Hours of Missing Data: 0	
Monthly Average: 70.9 %																	Percentiles: P <sub>1</sub> = 33 P <sub>10</sub> = 45 Q <sub>1</sub> = 56 Median = 72 O <sub>3</sub> = 88 P <sub>90</sub> = 96 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-Sep	59	64	73	82	86	83	79	78	95	96	95	96	97	98	99	91	82	84	87	91	87	91	94	93	86.6	99									
2-Sep	95	98	98	99	100	100	100	100	100	100	99	96	94	92	88	84	87	87	88	90	90	87	86	86	93.5	100									
3-Sep	88	95	98	99	99	99	97	94	93	91	93	93	89	80	76	75	71	74	78	82	87	88	89	89	88.2	99									
4-Sep	90	91	92	91	92	92	93	90	85	78	73	63	61	59	63	61	66	63	64	76	88	94	96	97	79.9	97									
5-Sep	98	98	98	98	95	95	95	91	86	77	74	68	62	53	51	49	45	47	54	65	70	80	88	91	76.1	98									
6-Sep	93	94	95	96	97	97	96	93	93	91	85	79	69	58	55	53	55	58	63	68	70	73	73	75	78.3	97									
7-Sep	80	77	78	80	81	84	85	84	82	77	68	58	58	55	55	54	51	54	60	75	82	83	90	89	72.5	90									
8-Sep	88	93	95	97	93	96	97	92	88	79	69	59	48	46	47	46	46	48	64	66	73	68	69	72	72.4	97									
9-Sep	72	80	82	84	82	86	84	79	78	77	73	69	62	59	58	69	83	82	86	95	96	98	96	98	80.3	98									
10-Sep	99	100	100	100	100	100	100	97	96	89	81	74	62	46	44	46	48	52	62	75	80	82	87	87	79.4	100									
11-Sep	89	91	92	92	91	93	91	86	79	70	64	59	58	54	52	55	56	60	71	76	79	82	71	68	74.2	93									
12-Sep	65	64	63	65	69	70	73	70	68	59	56	48	46	49	46	44	47	53	54	60	58	58	63	67	59.0	73									
13-Sep	74	86	87	93	94	95	91	81	76	72	65	63	59	60	59	70	85	88	90	93	94	97	94	94	81.6	97									
14-Sep	96	98	98	98	98	98	98	96	94	92	86	75	69	64	63	62	61	64	73	81	87	90	92	93	84.5	98									
15-Sep	96	97	96	97	98	97	97	91	82	70	65	60	62	58	51	52	49	57	61	70	81	85	89	91	77.2	98									
16-Sep	93	94	95	95	94	96	95	95	92	87	79	66	52	48	47	58	54	58	63	71	77	81	84	88	77.5	96									
17-Sep	91	93	95	97	98	100	100	100	97	80	69	59	46	41	42	47	48	45	54	62	70	77	74	80	73.5	100									
18-Sep	84	83	86	80	83	84	82	75	68	60	55	49	43	40	38	36	36	40	49	60	64	66	70	73	62.6	86									
19-Sep	76	81	79	79	78	76	76	71	63	54	48	43	39	38	37	58	67	61	62	61	58	58	61	63	62.0	81									
20-Sep	69	73	73	76	73	72	66	60	50	42	37	34	33	31	31	32	35	38	43	52	56	57	59	63	52.2	76									
21-Sep	65	68	75	86	91	92	93	93	88	85	79	64	57	62	59	51	51	58	69	71	73	75	76	82	73.4	93									
22-Sep	83	88	92	93	93	96	96	83	82	77	65	55	48	42	42	42	45	51	67	68	69	75	75	74	70.8	96									
23-Sep	73	79	81	84	81	81	80	77	75	69	63	55	54	51	48	48	47	49	55	60	63	67	71	76	66.1	84									
24-Sep	79	83	85	86	89	94	96	91	86	78	68	62	58	52	45	39	32	37	49	49	55	60	64	63	66.6	96									
25-Sep	67	72	74	79	83	89	89	83	75	57	51	44	42	41	35	35	35	37	36	44	46	50	50	52	56.9	89									
26-Sep	56	58	60	64	65	65	64	62	58	53	47	37	34	35	35	33	36	37	42	42	44	48	52	54	49.2	65									
27-Sep	56	57	55	56	62	65	64	53	58	54	55	48	43	42	40	42	40	39	43	42	44	50	50	54	50.4	65									
28-Sep	57	58	61	65	69	70	72	69	62	54	49	45	41	36	32	30	32	41	46	45	46	47	60	73	52.5	73									
29-Sep	74	77	76	74	75	76	75	72	64	64	60	54	50	46	45	45	44	49	59	64	64	69	75	81	63.8	81									
30-Sep	82	84	86	89	91	90	88	86	81	72	64	55	45	43	42	42	43	49	55	58	58	60	64	67	66.4	91									
79.5																	82.3																	Diurnal Average	
99																	100																	Diurnal Maximum	





Maximum Speed: 30 km/h on Sep 27 09:00	Maximum Daily Speed Average: 16.4 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 1 km/h on Sep 10 01:00	Minimum Daily Speed Average: 2.3 km/h on Sep 15	Hours of Data: 718
Maximum Diurnal Speed Average: 4.7 km/h at hour 13	Minimum Diurnal Speed Average: 1.6 km/h at hour 2	Hours of Missing Data: 2
Monthly Average Velocity: 2.5 km/h 252.6 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 12 P <sub>90</sub> = 15 P <sub>99</sub> = 23	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	SSW7	S5	SE5	ESE2	SSW3	S5	SSW7	SSE17	ESE6	N14	N13	NNE13	NNW14	NW14	WNW12	NW11	NW9	W6	WSW7	WSW10	WSW11	WSW7	SW6	WNW5	WNW3.0	SSE17	
2-Sep	SW1	SSW8	S6	S5	S3	NE3	E4	NNE4	NNE4	N9	NNE10	NNE7	NNE11	NNE13	NNE14	NNE14	N15	N9	N11	N13	N9	NNE9	N10	N10	NNE6.4	N15	
3-Sep	N10	NNW11	N12	NNW12	NW11	NW14	NW17	NW17	NW17	NW17	WNW14	WNW15	NW16	NW17	NW19	NW15	NNW17	NW12	NW13	NW13	WNW11	WNW11	WNW8	NW13.3	NW19		
4-Sep	WNW9	NW7	NNW6	NNW5	NNW5	NNW6	N6	N8	N6	NNW10	NNW6	NNW8	N11	N11	NE8	ENE5	SSE3	S3	NE4	NE4	ENE2	S3	SSW3	S5	N3.9	N11	
5-Sep	S4	ENE1	SSE4	SE3	SSW8	SSW9	SSW8	SSW8	S9	SSE8	SSE9	S8	SSW4	ESE5	S8	S6	S7	SSW7	SSW6	S3	SSW3	E1	ENE3	NE4	S4.8	S9	
6-Sep	NNE5	N7	N9	N9	NNE5	N7	N8	N9	N10	N11	N10	N10	NNW12	N11	NNE11	NE9	NNE8	NE8	NNE7	N7	N7	N9	N8	N8	N8.3	NNW12	
7-Sep	N10	N10	N10	N8	N9	NNE7	NNE8	N9	N11	N11	N11	NNE13	N13	N14	NNE14	NNE13	NNE13	NE10	ENE5	NE1	ENE2	WNW1	SSW2	WNW2	N8.1	NNE14	
8-Sep	NNW3	NE2	SSE3	SSW3	WSW4	SSE3	S3	SSW4	SSE4	SE5	S6	S7	SW6	SW5	NW2	SW5	WNW3	S2	NE2	NE5	ESE4	SE8	SSE8	SSW8	S2.5	SE8	
9-Sep	SSE7	SSE4	S8	S8	S10	S7	SSW8	S8	S7	SSE8	SSE8	SSE9	SSE9	SSE12	SSE10	N1	ESE6	SE8	SE3	SSW4	SSW3	SSW5	S4	ESE2	SSE6.1	SSE12	
10-Sep	WSW1	SSE2	SSW4	S4	SSW7	S7	SSW8	SSE6	SE7	SSE8	SSE10	SSE10	S8	SSW9	SSW11	SW9	SW9	SW7	SSW6	SSW6	SW5	WSW3	SSW4	SSW5	SSW5.7	SSW11	
11-Sep	SSE4	SE6	S6	S8	S8	S7	SSW6	S7	S8	SSW10	SSW8	WSW11	C	C	WSW13	WSW10	SW9	SW3	SW2	SW6	SW4	SW3	WSW7	WSW8	SSW6.0	WSW13	
12-Sep	W10	W11	W10	W12	WNW9	W6	WSW4	WNW9	WNW6	W7	W8	WNW11	WNW11	WNW11	WNW13	W15	W15	W14	W16	WNW13	NW11	N10	NNE8	N5	WNW9.1	W16	
13-Sep	NNW2	NW3	NNW5	NNW3	N3	N2	NE2	SE1	SSW4	E4	SW4	W5	W5	NNW3	N1	NNW9	NNW7	NNE5	E2	W2	NNW4	N4	N9	N11	NNW2.7	N11	
14-Sep	NNE11	NNE9	N8	NNE9	NNE10	N9	NNE9	NNE8	NNE10	NNE12	NNE11	NNE12	N10	N12	NNE11	NE9	NE8	ENE7	NE6	ENE5	ENE4	NE5	ENE5	NE3	NNE7.9	NNE12	
15-Sep	NNW1	ESE1	N3	N5	N5	NE2	NNE3	ENE3	NNE4	NNE1	WSW4	SW5	SE7	SSE9	S14	SSE12	SSE10	E6	SE6	ESE5	ESE4	NE4	ENE3	NNE3	SE2.3	S14	
16-Sep	N4	N4	N4	N4	ENE3	N2	E3	WSW3	SW3	SW3	SSW3	SSW7	SSW7	SSE8	SE11	S11	S9	S8	SSE8	S7	SSE9	SSE8	S7	S3.2	SE11		
17-Sep	S6	S7	S7	SSW8	S6	S5	SSW4	SSW6	S6	SSE8	SSE9	SSE12	SW8	SW8	SSW8	SSE8	WSW5	SSW8	S11	SSW12	S8	S6	S8	SSE7	S7.2	SSW12	
18-Sep	SE7	SSE6	SSE6	S8	S8	SSE8	S9	S9	SW9	WSW9	SW11	WSW13	WSW13	W12	W11	W12	WSW14	WSW12	WSW7	SSW8	SSW9	SSW7	S5	S7	SW7.0	WSW14	
19-Sep	SSE5	SSE9	S8	SSE9	SSE10	SSE12	S12	S16	SSW17	SW14	SW14	WSW17	WSW18	WSW16	WSW20	W20	WSW10	W20	WSW14	WSW18	W14	W15	W14	WSW12	SW11.0	W20	
20-Sep	WNW10	WSW12	W13	W14	W17	W12	WSW13	WSW13	WSW12	W13	W16	W21	WNW21	W18	WNW18	WNW17	NW15	NW13	NW9	N7	NNW8	NNW7	NNW9	NNW8	WNW11.6	W21	
21-Sep	NW11	NW12	NW12	NW13	NW13	NW13	NNW14	N14	N14	N12	NNW11	NNW18	NNW18	NNW17	N16	N15	NNW12	NW15	NW12	NW14	NW13	NW11	NNW10	NW7	NNW12.5	NNW18	
22-Sep	NW8	NW6	NW5	NW6	NW4	NNE1	SSE1	S2	SSE4	S6	S7	SSE7	S8	SSE8	S10	S8	S6	S6	S6	SE8	SE7	SSE7	S6	SSE8	S3.7	S10	
23-Sep	SSE9	SE6	E5	SE5	SSE13	SSE11	SSE10	SSE10	SSE11	SSE17	SSE17	SSE16	SE15	ESE13	ESE14	SE13	ESE14	SE16	SE14	SE14	SSE19	SSE19	SSE17	SSE16	SE12.4	SSE19	
24-Sep	SSE16	SSE14	SSE11	S15	SSE10	S5	S6	S7	S11	SSW10	SSW8	SSE8	SSE8	S11	S9	SSE8	ESE10	SE10	SE6	E6	ESE7	ESE7	SSE11	SE9	SSE12	SSE8.5	SSE16
25-Sep	SSE9	SSE12	SSE15	SSE14	S11	SSW10	SSW10	W8	WNW10	NW15	WNW9	W12	W14	WSW15	WSW16	WSW15	WSW12	W11	W11	WSW9	WSW10	WSW10	WSW13	W11	WSW8.5	WSW16	
26-Sep	W11	WSW10	WSW10	WSW10	WSW10	WSW10	WSW11	WSW12	WSW14	WSW16	WSW15	WSW14	W17	W20	WSW20	WSW24	W23	WNW21	WNW18	W15	W12	WSW12	WSW14	WSW13	WSW14.3	WSW24	
27-Sep	WSW10	SW10	WSW14	W16	W10	WSW11	WNW14	WNW23	NW30	NNW30	NW22	NW23	NW27	NW28	NW26	NW22	NW20	NW16	NNW9	NW13	NNW16	NNW16	NNW19	NNW14	NW16.4	NNW30	
28-Sep	NW14	NW14	NW11	WNW12	NW10	WNW10	WNW10	NNW8	NNW7	WNW6	SSW8	SW9	SSW9	SW7	SW9	SSW10	S8	S9	S10	S10	SSE9	SE8	SE9	WSW4.2	NW14		
29-Sep	SSE11	SSE9	SSE9	SSE12	S11	S11	SSW9	S8	S10	S8	SSE7	SE10	SSE10	S9	S8	SSE7	SSE6	SSE5	SSE8	SSE6	SSE7	S6	S6	S6	SSE8.1	SSE12	
30-Sep	SSE8	SSE9	SSE8	SSE7	SSE9	SSE11	SSE13	SSE14	SSE16	SSE14	SE12	SSE11	SW14	SW15	SSW16	SSW17	SSW15	S10	S9	S10	SSW13	SSW11	S6	SSE8	S10.6	SSW17	

WSW1.6 SW1.6 SW1.9 SW2.2 SW2.5 SW2.5 SW2.7 SW2.4	WSW2.0	NNW2.0	WSW2.7	W3.6	W4.7	W4.3	W4.1	W3.5	W3.4	WSW2.9	WSW2.2	WSW2.3	WSW2.2	SW1.8	WSW1.8	SW1.7	Diurnal Average							
SSE16	NW14	SSE15	W16	W17	NW14	NW17	WNW23	NNW30	NNW30	NW22	NW23	NW27	NW28	NW26	WSW24	W23	WNW21	WNW18	WSW18	SSE19	SSE19	NW19	SSE16	Diurnal Maximum

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

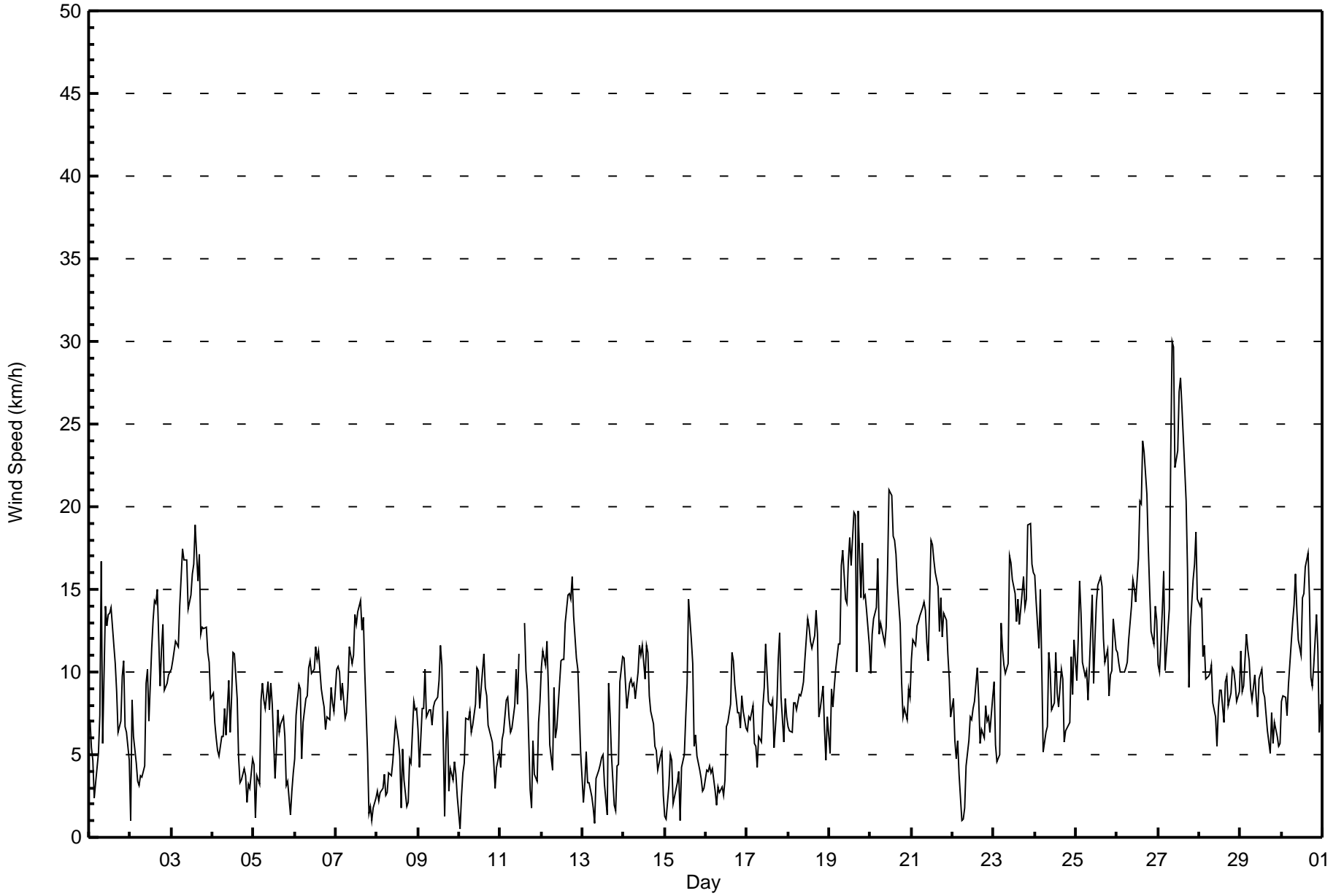


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 9 km/h on Sep 19 18:00	Hours of Data: 718
Minimum Value: 0 km/h on Sep 15 07:00	Hours of Missing Data: 2
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 5 P <sub>99</sub> = 7	Hours of Calibration: 2
	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-Sep	3	2	2	2	1	2	3	5	4	3	3	3	4	4	4	3	3	2	2	4	4	2	2	3	5
2-Sep	2	2	3	2	2	2	1	1	1	2	3	2	3	3	4	3	2	4	4	4	2	2	2	2	4
3-Sep	2	2	2	2	3	4	4	4	4	5	4	5	5	5	5	4	5	3	4	4	3	3	3	3	5
4-Sep	3	2	2	2	1	2	1	2	2	3	3	4	3	3	2	2	1	1	1	1	0	1	1	1	4
5-Sep	1	1	2	1	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	1	1	1	3
6-Sep	1	2	1	2	1	2	2	1	2	2	2	2	2	3	3	3	2	2	1	1	1	2	1	1	3
7-Sep	2	2	1	1	2	1	1	2	2	2	3	4	3	3	4	3	4	3	2	1	1	1	1	1	4
8-Sep	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2
9-Sep	2	2	2	2	2	1	2	2	1	2	2	2	2	3	4	4	2	3	2	2	2	1	2	1	4
10-Sep	1	1	2	1	2	2	2	1	1	2	2	2	2	3	3	3	3	2	1	2	1	1	1	1	3
11-Sep	1	2	1	2	2	1	2	2	2	2	3	4	C	C	4	4	3	3	1	1	1	1	3	3	4
12-Sep	3	4	4	5	3	2	3	3	2	2	4	3	3	3	4	5	5	5	5	4	3	2	2	1	5
13-Sep	1	2	1	2	1	1	1	1	1	2	2	2	2	2	2	4	3	2	1	1	1	3	3	2	4
14-Sep	2	2	2	2	2	2	2	2	3	3	3	4	3	3	3	3	3	2	1	1	1	1	1	1	4
15-Sep	1	1	1	1	1	1	0	1	1	1	1	2	2	3	3	3	3	3	2	1	1	1	1	1	3
16-Sep	1	1	1	1	1	1	1	1	2	1	1	2	2	2	3	3	2	2	2	2	1	2	2	1	3
17-Sep	2	1	2	1	1	1	2	1	1	2	2	3	3	3	2	2	3	2	3	2	2	3	2	2	3
18-Sep	2	2	1	2	2	2	2	2	3	3	4	5	4	4	4	4	5	4	2	2	3	2	2	1	5
19-Sep	1	1	2	3	3	2	3	3	3	5	5	7	6	6	7	8	4	9	5	6	5	5	4	4	9
20-Sep	4	4	4	5	5	4	4	4	4	4	6	7	6	7	6	5	4	3	2	1	1	1	2	2	7
21-Sep	3	3	3	3	3	3	3	3	3	3	4	4	4	4	5	4	3	5	4	3	3	3	2	2	5
22-Sep	2	1	1	2	1	1	1	2	1	1	2	2	3	3	3	2	2	2	1	2	1	1	1	2	3
23-Sep	2	2	1	4	2	2	2	2	4	4	5	4	4	3	5	4	3	4	3	4	4	4	3	3	5
24-Sep	3	3	5	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	3	2	3	5
25-Sep	2	2	3	4	3	2	3	3	3	5	4	5	5	5	5	5	4	4	4	3	3	3	4	4	5
26-Sep	4	3	3	3	3	3	4	4	5	5	5	5	6	7	8	8	8	7	6	5	5	4	5	4	8
27-Sep	4	3	4	5	4	4	5	8	9	6	6	7	7	7	7	7	6	4	2	5	4	4	5	5	9
28-Sep	3	4	3	3	3	3	3	3	2	3	3	2	2	2	3	3	2	1	2	2	2	2	2	2	4
29-Sep	3	2	2	3	3	3	2	2	2	2	2	2	2	2	2	2	1	1	2	2	1	1	1	1	3
30-Sep	1	1	1	1	2	2	3	3	2	2	3	3	4	4	4	4	3	2	2	2	2	2	2	1	4
	4	4	5	5	5	4	5	8	9	6	6	7	7	7	8	8	8	9	6	6	5	5	5	5	

Diurnal Maximum

C - Calibration





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	153	21.31	21.31
6 - 11	370	51.53	72.84
12 - 19	175	24.37	97.21
20 - 28	18	2.51	99.72
29 - 38	2	0.28	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 718

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	13	11	13	12	6	7	6	12	17	16	12	7	3	5	3	10	153
6 - 11	43	19	7	1	2	5	17	64	73	39	15	22	14	17	14	18	370
12 - 19	12	11	0	0	0	3	6	24	4	6	4	30	22	11	30	12	175
20 - 28	0	0	0	0	0	0	0	0	0	0	0	4	4	3	7	0	18
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	68	41	20	13	8	15	29	100	94	61	31	63	43	36	54	42	718

Total Number of Valid Hours: 718

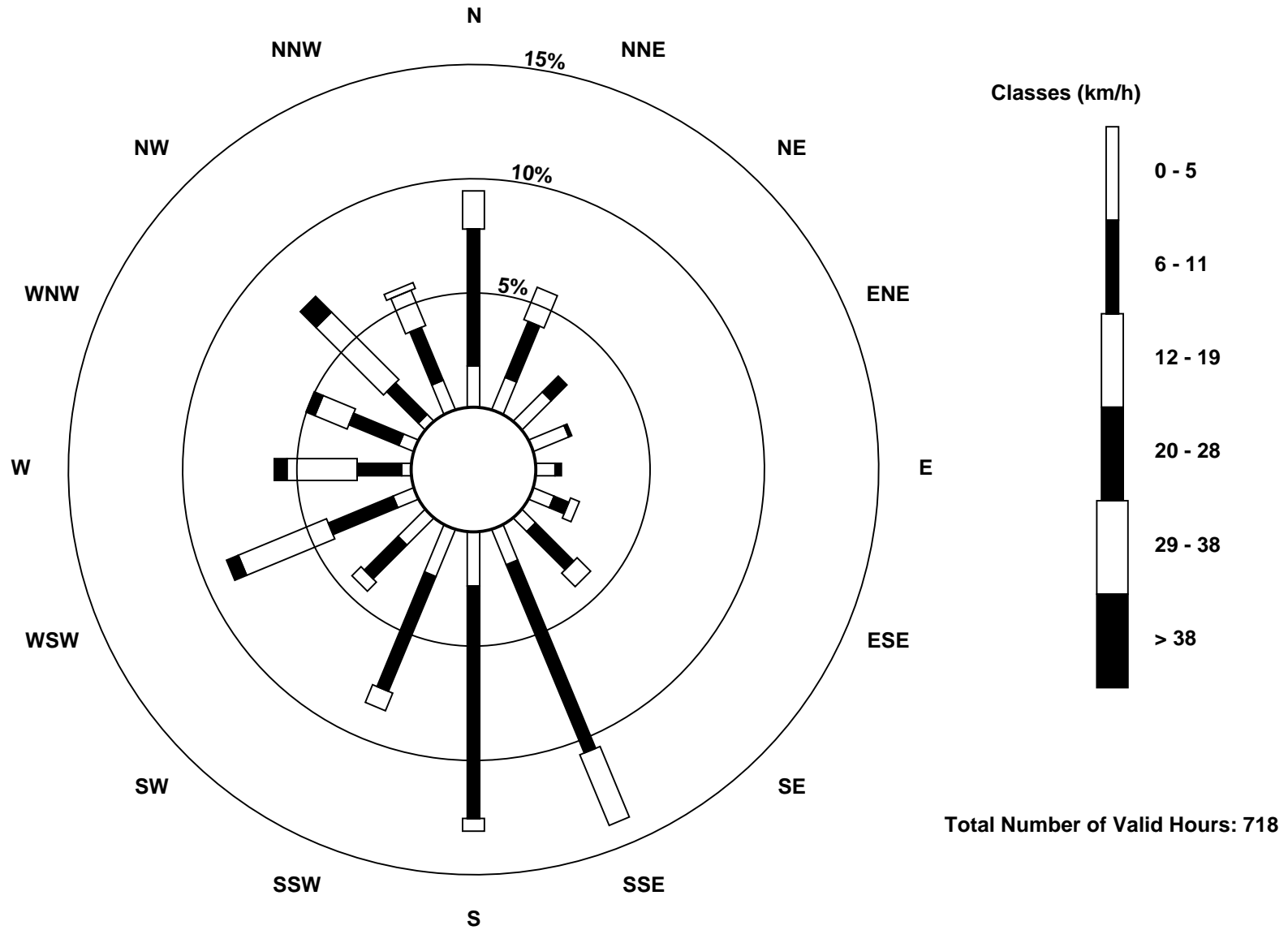
Total Number of Hours: 720





Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

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

Direction of Maximum Speed: 326 deg on Sep 27 09:00		Hours in Service: 720
Direction of Maximum Daily Speed Average: 310.4 deg on Sep 27		Hours of Data: 718
Direction of Minimum Speed: 251 deg on Sep 10 01:00	Direction of Minimum Daily Speed Average: 2.3 deg on Sep 15	Hours of Missing Data: 2
Monthly Average Direction: 249.6 deg		Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	207	171	139	107	195	183	211	162	114	6	4	16	348	320	297	309	307	262	244	249	254	247	232	284	282.9
2-Sep	215	195	180	173	172	37	82	32	20	7	20	28	14	13	26	24	6	8	7	7	8	20	7	0	16.8
3-Sep	357	348	356	344	319	317	321	322	325	320	301	295	309	315	323	314	329	310	308	308	310	303	297	303	318.5
4-Sep	301	320	327	329	340	345	10	360	356	341	343	330	352	353	38	57	152	183	45	45	60	186	192	185	350.4
5-Sep	169	57	149	138	201	207	202	201	183	166	160	187	203	116	175	180	186	195	208	175	193	95	71	42	179.3
6-Sep	22	8	9	10	21	7	9	7	4	6	4	352	347	9	20	34	31	42	18	6	4	1	359	7	9.6
7-Sep	350	355	357	1	358	15	12	4	3	11	9	14	2	4	13	24	25	53	71	38	57	282	196	300	10.7
8-Sep	333	54	151	213	237	160	171	195	164	139	178	184	216	229	322	221	298	190	43	50	105	140	165	193	179.1
9-Sep	165	149	184	172	172	190	195	182	183	166	165	162	160	156	158	352	107	145	136	192	194	194	185	118	167.7
10-Sep	251	168	201	177	205	191	201	160	140	147	166	159	171	212	213	223	225	229	209	206	219	253	212	205	194.2
11-Sep	167	137	176	170	183	183	193	183	191	193	210	249	C	C	246	237	234	217	220	215	227	229	247	255	210.6
12-Sep	262	265	266	280	284	269	246	297	295	280	279	295	295	291	297	281	275	274	280	286	326	358	13	11	288.9
13-Sep	339	320	334	330	11	6	53	143	198	94	224	260	273	336	360	336	339	18	101	273	339	349	10	10	343.6
14-Sep	17	18	7	13	14	10	12	21	22	15	14	24	10	11	13	52	52	58	55	61	65	44	67	49	24.8
15-Sep	347	110	10	4	4	55	28	74	15	22	244	221	146	147	176	165	156	85	132	119	105	55	62	27	126.2
16-Sep	5	356	8	356	7	65	10	82	241	222	220	211	192	200	167	126	179	185	181	162	178	163	154	189	170.7
17-Sep	178	175	190	200	176	190	193	204	189	154	154	162	220	215	196	162	238	204	188	194	186	186	185	166	186.4
18-Sep	143	159	150	174	170	168	181	191	214	239	236	247	255	273	270	269	258	252	243	197	205	196	179	183	220.9
19-Sep	157	158	175	155	159	158	180	190	195	222	227	253	254	241	257	259	246	260	247	248	259	271	273	258	231.6
20-Sep	283	250	262	260	277	268	258	247	243	261	264	278	284	272	283	292	311	316	318	349	348	342	333	335	282.7
21-Sep	311	309	304	308	317	321	337	4	353	6	348	341	338	338	355	352	338	314	309	314	318	319	328	316	331.2
22-Sep	318	318	304	309	319	15	155	175	163	187	179	158	173	154	176	170	169	178	171	135	144	147	173	167	174.1
23-Sep	164	134	91	134	161	162	162	153	155	158	149	147	130	115	123	129	120	131	128	132	159	164	161	160	144.9
24-Sep	164	161	167	170	165	170	191	188	191	204	213	166	169	175	149	118	143	137	79	105	120	158	140	152	160.8
25-Sep	150	161	163	161	170	194	206	267	293	304	291	273	265	253	256	254	254	262	271	243	249	258	255	265	242.9
26-Sep	263	247	239	237	243	246	254	246	254	248	248	253	260	262	250	257	276	282	283	274	260	250	255	253	258.0
27-Sep	250	226	247	269	263	252	284	300	326	337	319	305	318	323	319	322	314	319	333	312	333	335	321	329	310.4
28-Sep	326	311	306	302	306	294	296	303	338	335	300	211	223	209	226	219	210	176	186	188	170	156	136	139	253.4
29-Sep	161	150	158	162	170	176	192	178	169	175	160	136	160	170	169	166	166	147	162	147	156	169	186	172	164.9
30-Sep	153	159	152	155	149	164	165	166	167	159	145	159	222	222	211	199	196	179	175	188	196	197	177	166	178.8

246.8 225.0 229.9 233.7 227.0 223.9 235.4 235.7 254.2 281.8 255.4 261.4 276.1 278.6 267.4 267.2 270.9 257.0 249.8 239.8 239.7 235.1 243.9 235.7

Diurnal Average

**C - Calibration**

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

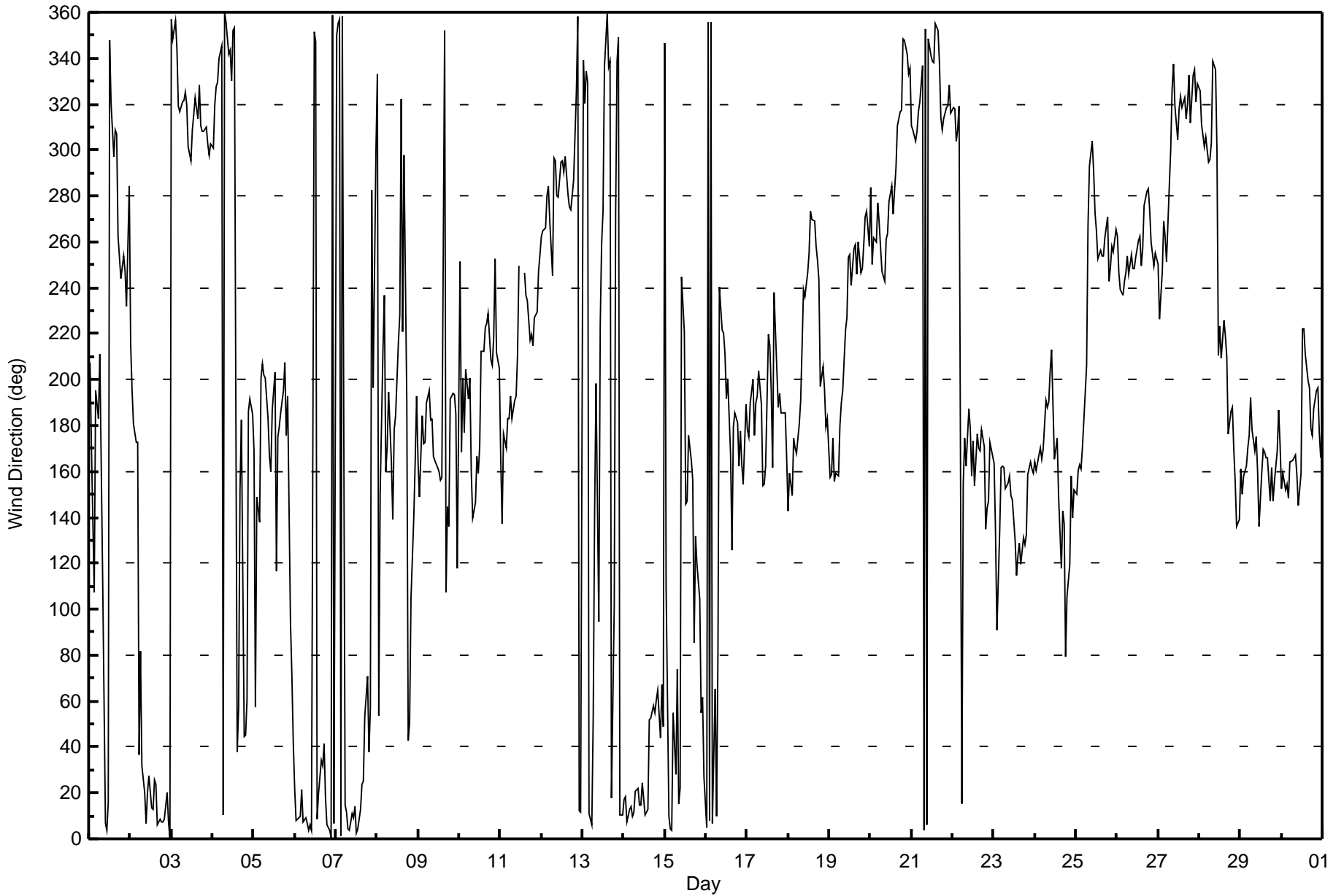
Wind Direction (WD) - deg  
Mildred Lake - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 101 deg on Sep 15 10:00	Hours of Data: 718
Minimum Value: 8 deg on Sep 24 19:00	Hours of Missing Data: 2
Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 13 Q <sub>1</sub> = 16 Median = 20 Q <sub>3</sub> = 27 P <sub>90</sub> = 40 P <sub>99</sub> = 88	Hours of Calibration: 2
	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-Sep	19	40	38	62	52	37	31	20	53	16	14	16	22	18	20	19	26	28	26	24	24	31	32	54	62
2-Sep	92	16	31	27	70	46	25	29	23	13	18	21	14	15	17	16	12	32	16	13	12	16	14	11	92
3-Sep	11	9	13	10	16	17	15	16	15	17	21	20	20	19	16	20	16	19	18	19	16	18	19	19	21
4-Sep	19	21	25	27	15	23	13	16	27	24	30	39	18	24	32	46	43	17	34	12	39	27	31	24	46
5-Sep	19	70	40	65	24	19	15	21	22	23	18	25	55	32	28	30	34	29	21	19	31	83	16	17	83
6-Sep	19	12	12	12	16	13	11	11	11	11	12	14	14	27	19	20	18	19	16	11	10	10	11	19	27
7-Sep	9	11	10	11	12	13	15	11	13	17	24	20	18	17	19	24	22	27	17	29	35	54	63	49	63
8-Sep	70	48	28	21	33	41	29	20	40	36	38	32	40	50	93	42	63	63	55	15	22	20	25	24	93
9-Sep	24	29	15	14	16	17	14	21	21	16	19	19	23	18	23	97	52	27	62	46	20	17	34	53	97
10-Sep	84	37	34	15	15	15	15	20	19	21	18	22	23	22	19	23	20	25	14	20	32	43	14	14	84
11-Sep	21	33	15	10	14	13	20	17	20	15	38	25	C	C	24	26	27	89	75	18	28	34	34	25	89
12-Sep	21	23	25	23	24	41	50	22	30	31	29	20	19	22	18	22	23	23	21	19	23	14	13	14	50
13-Sep	56	33	14	41	34	57	68	82	38	76	55	47	42	78	99	24	33	21	61	46	27	36	14	13	99
14-Sep	15	15	13	14	15	13	13	17	18	17	21	24	26	26	27	34	29	22	10	11	13	12	14	46	46
15-Sep	67	55	18	12	16	45	16	26	38	101	46	49	25	29	18	23	21	41	17	18	11	21	30	23	101
16-Sep	12	11	18	18	33	42	44	22	31	52	59	76	32	32	35	18	20	17	15	24	18	15	17	22	76
17-Sep	15	15	13	9	20	27	34	18	23	19	21	24	31	29	30	20	56	21	15	13	16	27	14	14	56
18-Sep	20	18	14	15	19	18	19	24	22	30	28	27	28	27	27	26	26	25	30	17	19	23	29	15	30
19-Sep	27	11	18	18	18	14	17	12	14	28	27	27	26	26	23	22	28	24	24	22	23	23	21	23	28
20-Sep	27	24	21	23	21	26	24	26	25	27	25	24	21	25	22	23	17	15	15	15	13	13	11	15	27
21-Sep	16	17	18	17	15	16	19	15	16	15	19	17	17	17	20	17	18	19	19	16	16	16	12	16	20
22-Sep	14	17	15	20	24	90	76	62	33	26	28	31	36	30	26	29	24	18	8	18	14	16	13	13	90
23-Sep	12	33	28	55	12	12	10	17	23	16	20	19	19	17	22	19	18	17	17	17	16	12	13	14	55
24-Sep	11	11	19	12	15	41	25	18	16	17	23	28	17	20	31	16	21	21	8	22	20	16	20	16	41
25-Sep	14	12	11	22	21	17	20	34	20	20	26	24	22	23	25	23	25	25	24	26	23	24	22	23	34
26-Sep	27	24	23	24	26	22	26	26	24	22	23	26	26	24	24	22	21	19	20	21	24	23	22	21	27
27-Sep	24	22	23	22	27	24	24	18	22	13	18	19	16	16	15	22	17	15	15	15	17	12	15	11	27
28-Sep	12	18	17	16	16	18	20	18	19	35	51	34	27	24	41	25	17	17	16	15	16	15	17	15	51
29-Sep	15	17	17	13	17	15	12	19	16	23	21	24	20	23	18	18	18	12	10	14	10	14	14	18	24
30-Sep	10	9	10	10	14	17	14	10	10	15	19	31	21	21	18	14	13	14	11	14	12	15	27	16	31

92	70	40	65	70	90	76	82	53	101	59	76	55	78	99	97	63	89	75	46	39	83	63	54	
Diurnal Maximum																								

C - Calibration





# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	September 14, 2015	Last Calibration	August 19, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	13:15
Gas Cert Reference	SA1301009	Station temp.	22 Deg C
Cal Gas Concentration	47.2 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	1185
ZAG Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8346

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-652	-653
Analyzer IP address	192.168.1.43		Lamp voltage	785	783
Calculated slope	0.999051	0.999111	Chamber temp	45.2	44.9
Calculated intercept	0.584649	2.383501	Pressure	680.8	690.2
Analyzer Background	20.6	20.5	Flow	0.476	0.488
Analyzer Coefficient	0.976	0.965	Intensity	91	91

Analyzer make TEI 43i Analyzer serial # JC1404901075

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	82.7	780.7	790.6	0.987
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	82.7	780.7	780.3	1.000
second point	5000	41.4	390.8	387.0	1.010
third point	5000	20.8	196.4	192.3	1.021
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	82.7	780.7	785.2	0.994
Average Correction Factor					1.010

Corrected As found 790.7 Previous response 780.8 % change -1.3%

**Notes:**

Changed inlet filter after as founds. Adjusted span.

Calibration Performed By:

Evan Magill



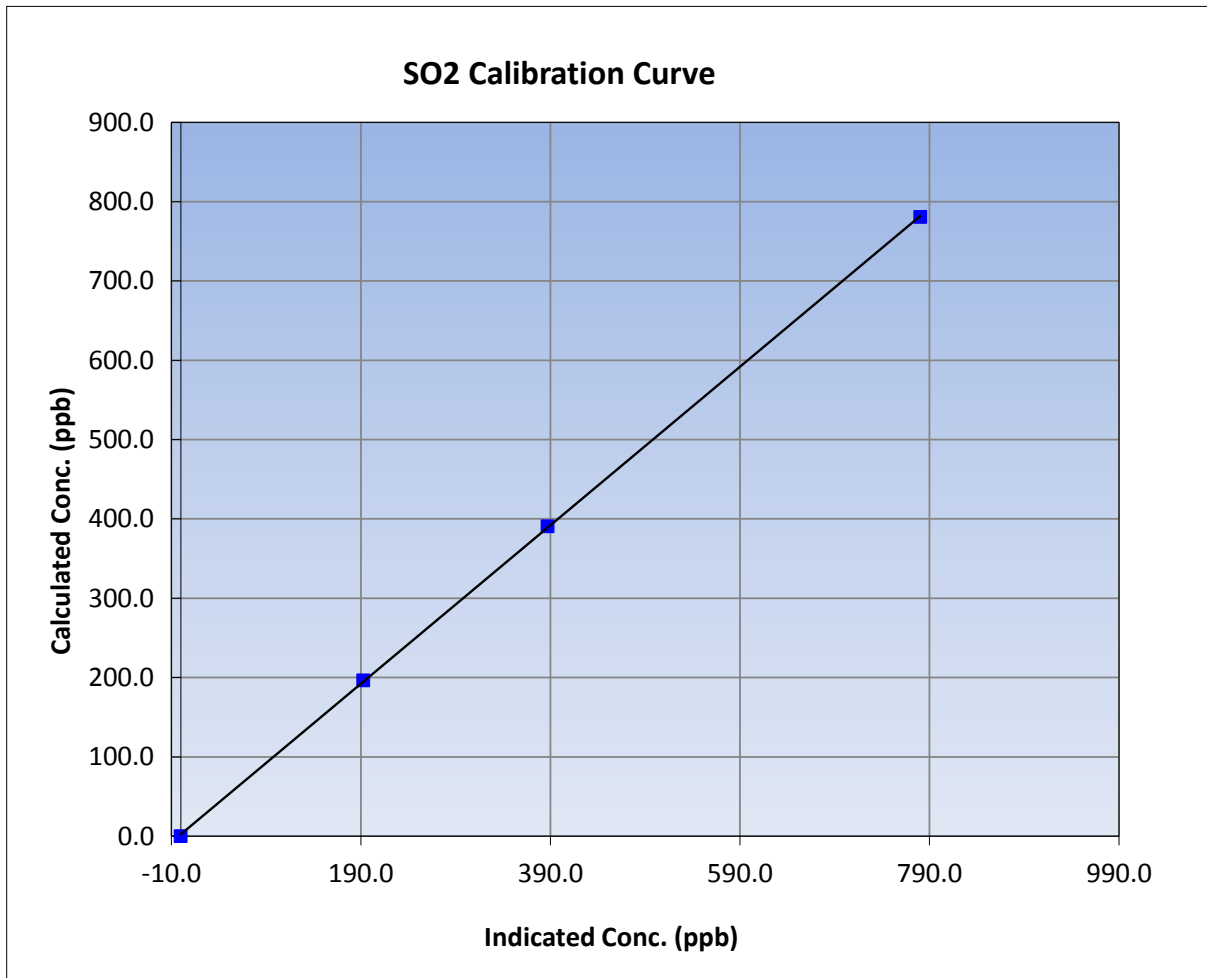
## Wood Buffalo Environmental Association SO2 Calibration Report

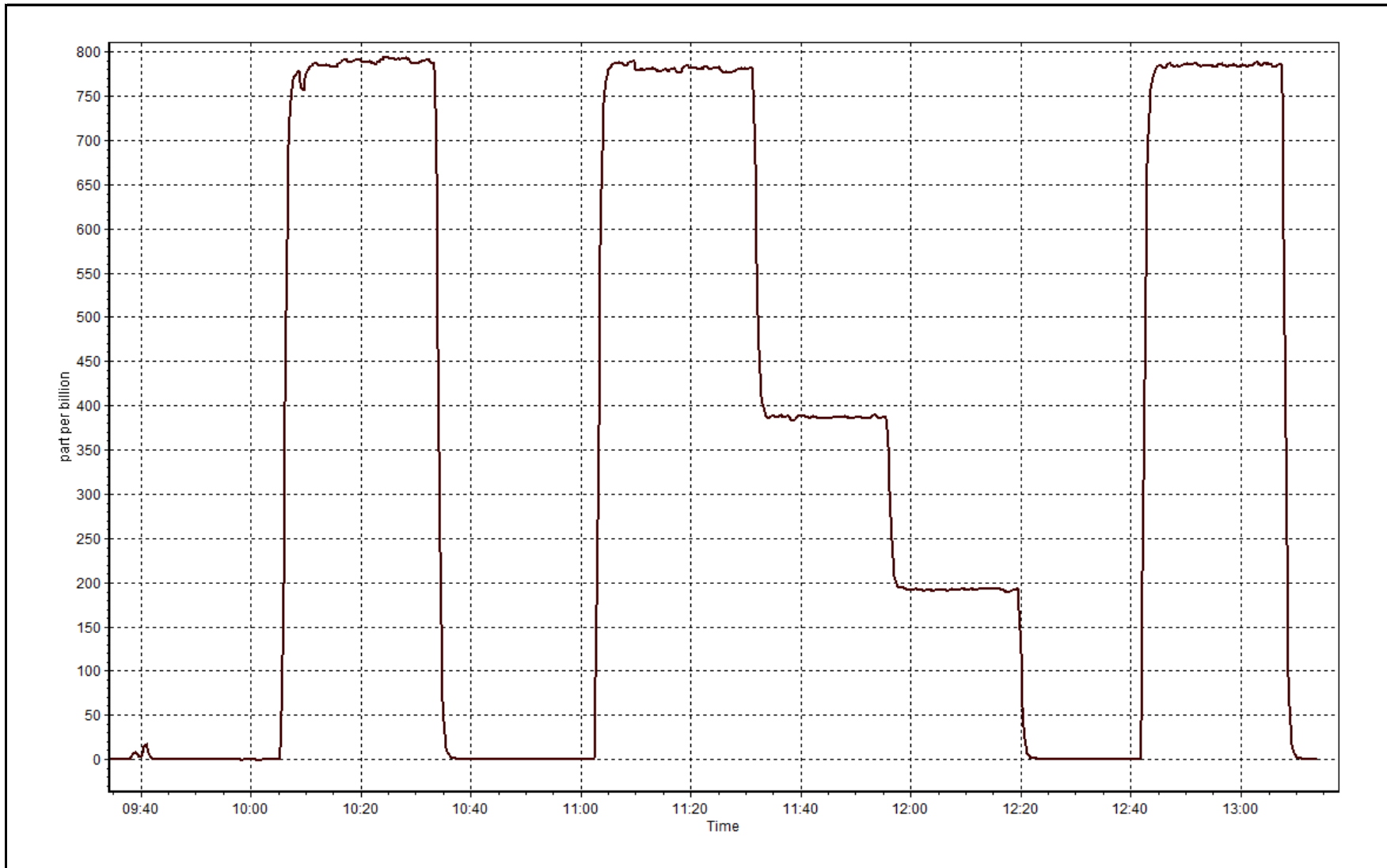
### Station Information

Calibration Date	September 14, 2015	Previous Calibration	August 19, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	9:40	End Time (MST)	13:15
Analyzer make	TEI 43i	Analyzer serial #	JC1404901075

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999960
780.7	780.3	1.0005		
390.8	387.0	1.0099	Slope	0.999111
196.4	192.3	1.0210		
			Intercept	2.383501







# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	September 11, 2015	Last Calibration	August 20, 2015
Station Name	Mildred Airstrip	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	13:05
Gas Cert Reference	ALM028262	Station temp.	22 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	API T700	Serial Number	1185
ZAG air Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346
SO2 gas concentration	47.2 ppm	SO2 gas cert/exp	SA1301009 12-Dec-16

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-601	-601
Analyzer IP address	192.168.1.42		Lamp voltage	774	775
Calculated slope	1.001661	0.992397	Chamber temp	45	45
Calculated intercept	-0.280538	0.432944	Pressure	562.1	579.2
Analyzer Background	13.9	14.2	Flow	0.892	0.823
Analyzer Coefficient	0.908	0.928	Intensity	87	88
			Converter temp.	323	325

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

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	4000	0.0	0.0	0.3	----
as found span	4000	64.1	80.8	79.9	1.011
SO2 scrubber check	5000	21.2	200.1	1.6	----
calibrator zero	4000	0.0	0.0	-0.1	----
high point	4000	64.1	80.8	81.1	0.996
second point	4000	32.1	40.4	40.1	1.008
third point	4000	16.0	20.2	19.6	1.029
as left zero	4000	0.0	0.0	0.0	----
as left span	4000	64.1	80.8	81.4	0.992
Average Correction Factor					1.011

Corrected As found	79.5	Previous response	80.9	% change	1.8%
--------------------	------	-------------------	------	----------	------

**Notes:**

Changed inlet filter and performed scrubber check after as founds. Small adjustment on zero and span.

Calibration Performed By: Evan Magill





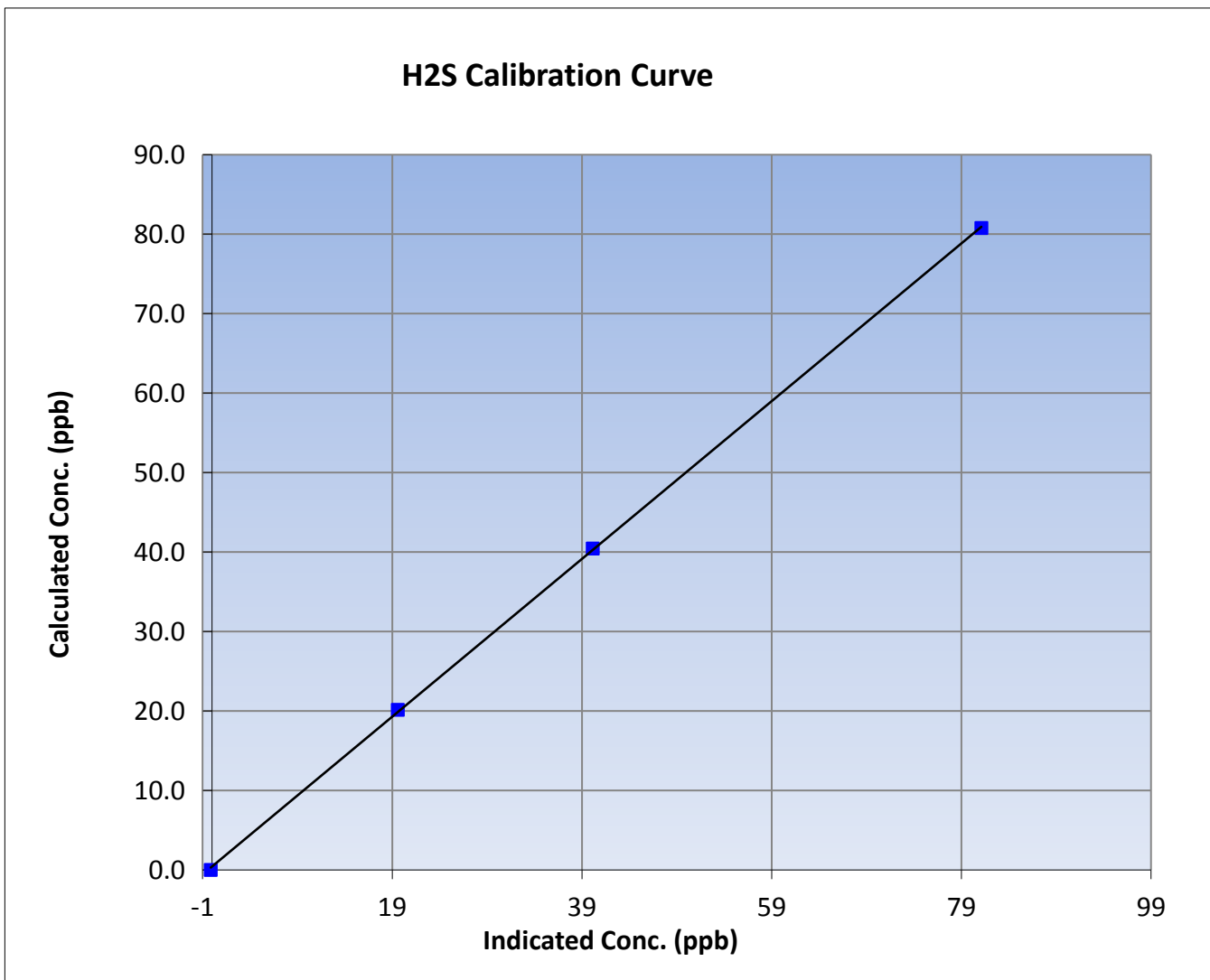
# Wood Buffalo Environmental Association H2S Calibration Report

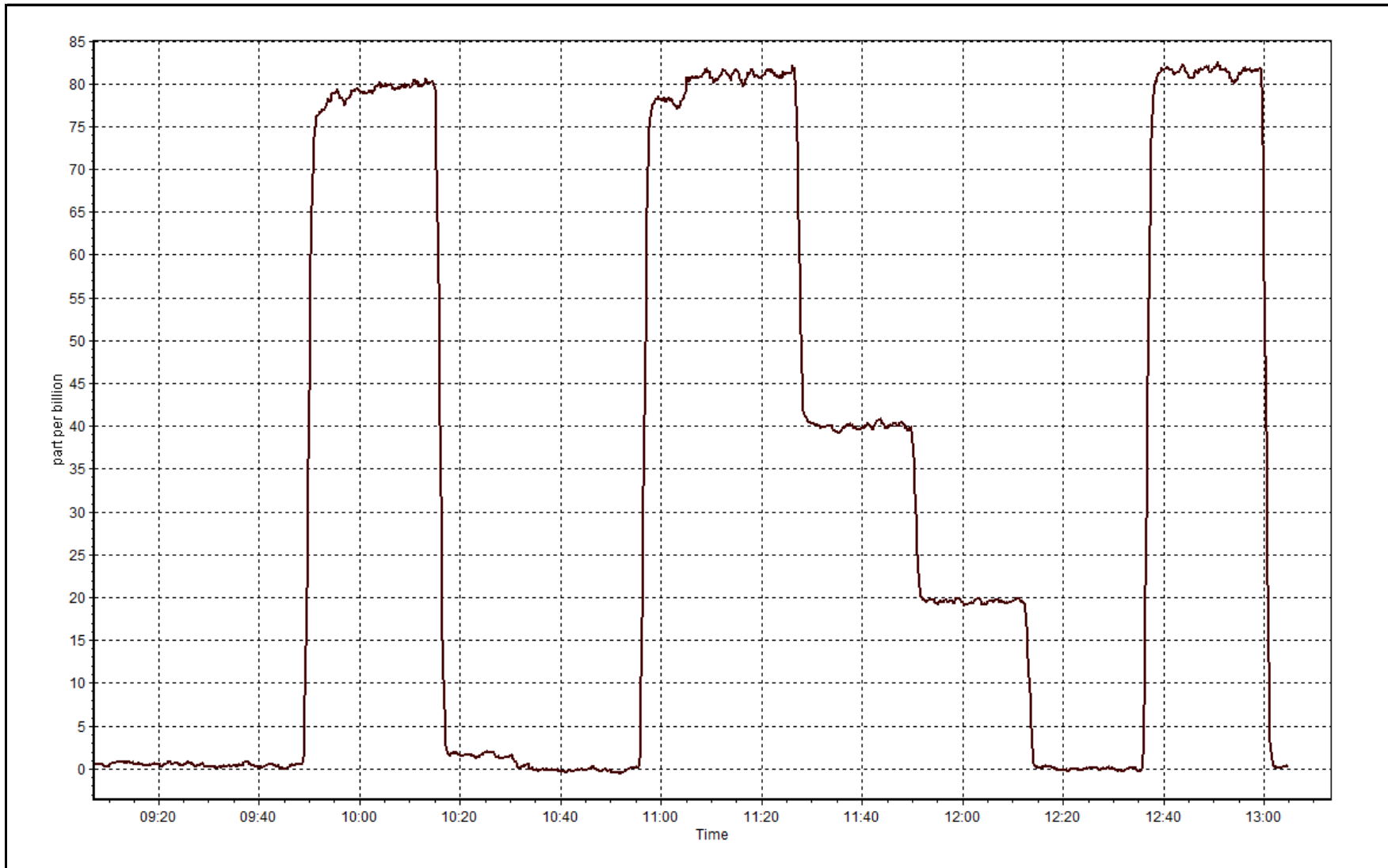
## Station Information

Calibration Date	September 11, 2015	Previous Calibration	August 20, 2015
Station Name	Mildred Airstrip	Station Number	AMS 2
Start Time (MST)	9:15	End Time (MST)	13:05
Analyzer make	TEI 450i	Analyzer serial #	815129107

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999936
80.8	81.1	0.9958		
40.4	40.1	1.0079	Slope	0.992397
20.2	19.6	1.0286		
			Intercept	0.432944







# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	September-14-15	Last Calibration	August-19-15
Station Name	Mildred Airstrip	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	13:15
Gas Cert Reference	SA1301009	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	510 ppm	CH4 Equiv Conc.	1087.5 ppm
C3H8 Cal Gas Conc.	210 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1185
ZAG make/model	Teledyne API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	39.9	39.9
Calculated slope	0.994523	0.995349	Fuel Pressure	25.7	25.6
Calculated intercept	0.038211	0.033100	Analyzer Coeff	4.6	4.5
			Analyzer BKG	2.400	2.140

Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231
---------------	---------------	-------------------	------------

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.19	----
as found span	5000	82.7	17.99	18.07	0.995
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	82.7	17.99	18.06	0.996
second point	5000	41.4	9.00	8.99	1.002
third point	5000	20.8	4.52	4.47	1.012
as left zero	5000	0.0	0.00	-0.03	----
as left span	5000	82.7	17.99	17.90	1.005
Average Correction Factor					1.003

Corrected As found	18.26	Previous response	18.05	% change	-1.2%
--------------------	-------	-------------------	-------	----------	-------

Notes:

Changed inlet filter after as founds. Adjusted zero.

Calibration Performed By:

Evan Magill



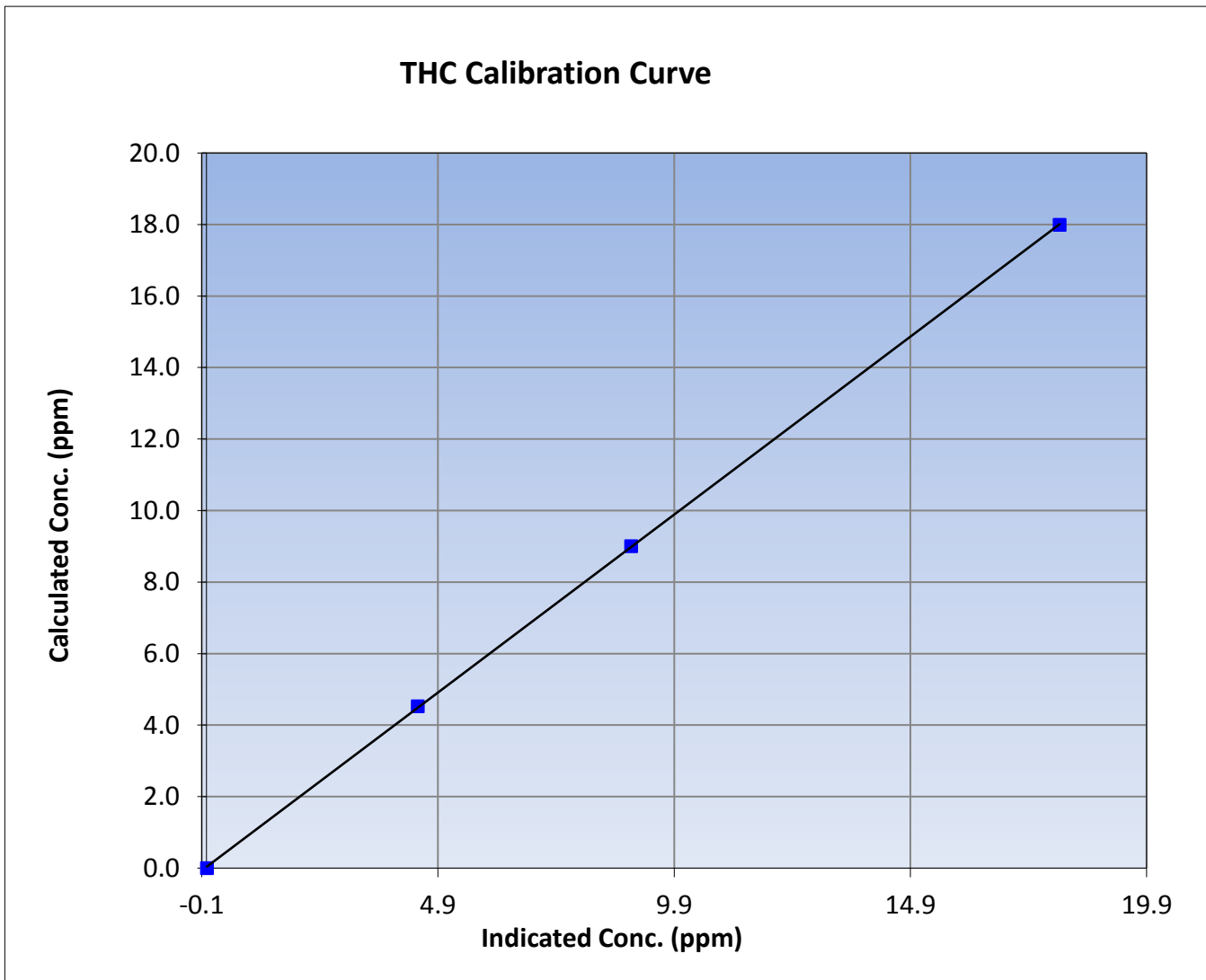
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	September 14, 2015	Previous Calibration	August 19, 2015
Station Name	Mildred Airstrip	Station Number	AMS 2
Start Time (MST)	9:40	End Time (MST)	13:15
Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231

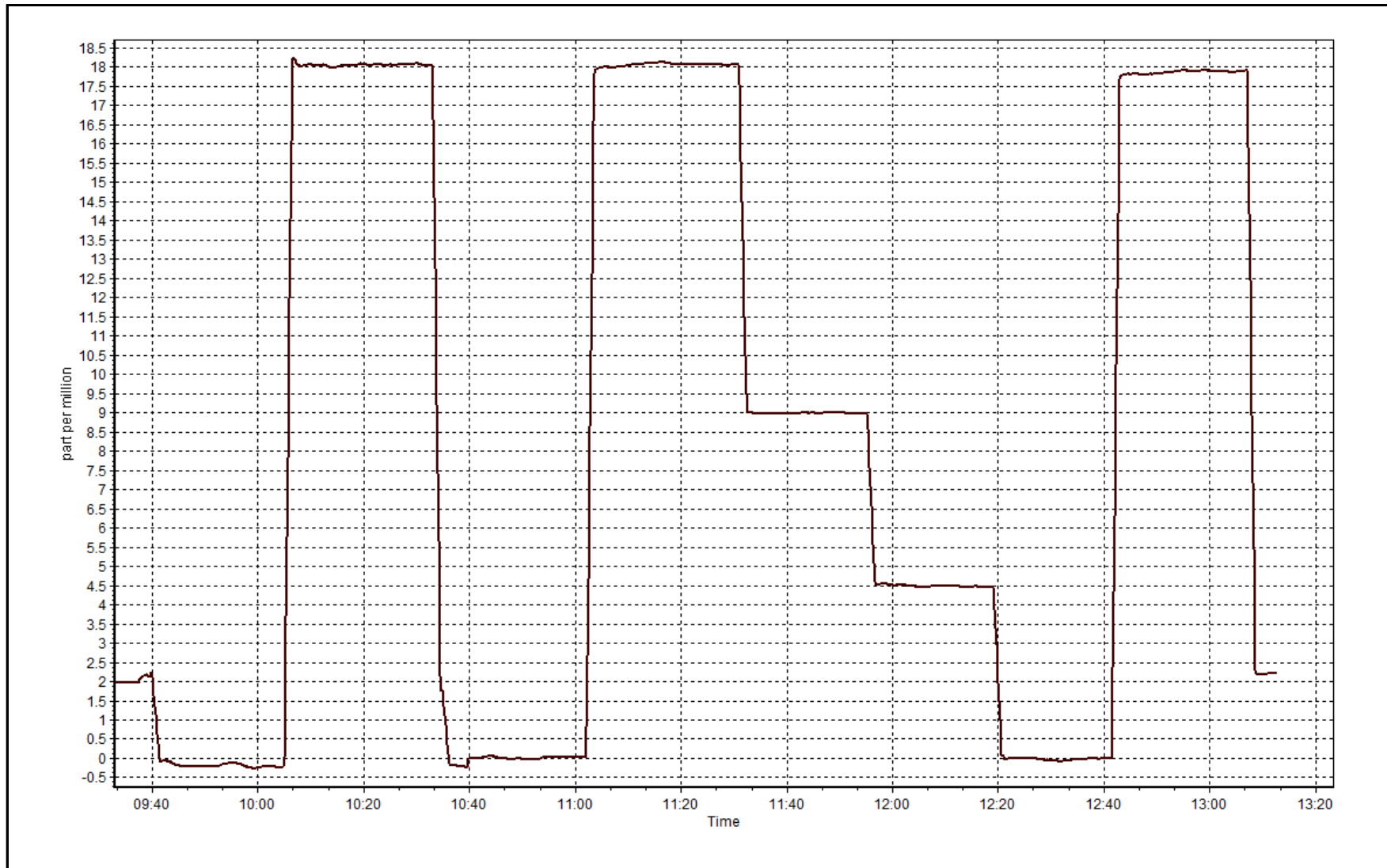
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999974
17.99	18.06	0.9960		
9.00	8.99	1.0016	Slope	0.995349
4.52	4.47	1.0121		
			Intercept	0.033100



THC Calibration Plot

Date: September 14, 2015





# Wood Buffalo Environmental Association

## WS/WD Calibration Report

### Station Information

Calibration Date	September-11-15	Previous Calibration	August-26-14
Station Name	Mildred Airstrip	Station Number	AMS 2
Reason:	<b>Routine</b> Installation   Removal		
Start Time (MST)	11:55	End Time (MST)	13:25
Barometric Press	n/a	Station Temp	22 Deg C
WS Calibrator	MetOne 053	Serial Number	P15103

### WIND SPEED

Sensor make/model	Met One 010C-1	Sensor serial #	B2027
DACS make	Campbel Scientific CR3000	DACS serial No.	8346
DACS voltage range	5000	DACS channel #	
	<u>Before</u>		<u>After</u>
Calculated slope	1.000378012	Calculated slope	0.998843
Calculated intercept	-0.037275954	Calculated intercept	-0.025014

### Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0.0	0.0	n/a
200	20.2	20.3	0.9957
400	39.4	39.4	0.9990
600	58.6	58.7	0.9977
800	77.8	77.8	0.9989
Average Correction Factor			0.9978

### WIND DIRECTION

Sensor make/model	Met One 020C-1	Sensor serial #	B1462
DACS make	Campbel Scientific CR3000	DACS serial No.	8346
DACS voltage range	5000	DACS channel #	
	<u>Before</u>		<u>After</u>
Calculated slope	0.991730615	Calculated slope	0.988857
Calculated intercept	-0.546541918	Calculated intercept	-0.308884
As Found Declination (west of North)	14	As Left Declination (west of North)	14

### Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	1.3	n/a
90	89.4	1.0065
180	181.9	0.9896
270	276.5	0.9767
357	359.7	0.9926
Average Correction Factor		0.9913

Notes:

Annual audit  
 Too cloudy to capture solar noon today, used compass to determine declination.

Calibration Performed By: Evan Magill



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

### **AMS 3 LOWER CAMP METEOROLOGY SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*



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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
Temperature 20 m (C) Average	720	0	0	100.00	24	-	16.4	-
Temperature 45 m (C) Average	720	0	0	100.00	24	-	16.5	-
Temperature 100 m (C) Average	720	0	0	100.00	23.5	-	17.1	-
Temperature 167 m (C) Average	720	0	0	100.00	23.1	-	17.2	-
Relative Humidity 20 m (%) Average	720	0	0	100.00	99	-	92.0	-
Relative Humidity 45 m (%) Average	720	0	0	100.00	99	-	91.0	-
Relative Humidity 100 m (%) Average	720	0	0	100.00	99	-	91.0	-
Relative Humidity 167 m (%) Average	720	0	0	100.00	98	-	89.0	-
Wind Speed 20 m (km/h) Average	720	0	0	100.00	25	-	15.0	-
Wind Speed 45 m (km/h) Average	720	0	0	100.00	36	-	20.0	-
Wind Speed 100 m (km/h) Average	720	0	0	100.00	47	-	28.0	-
Wind Speed 167 m (km/h) Average	719	0	1	99.86	56	-	33.0	-
Wind Direction 20 m (deg) Average	720	0	0	100.00	-	-	-	-
Wind Direction 45 m (deg) Average	720	0	0	100.00	-	-	-	-
Wind Direction 100 m (deg) Average	720	0	0	100.00	-	-	-	-
Wind Direction 167 m (deg) Average	719	0	1	99.86	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	720	0	0	100.00	0.9	-	0.2	-
Vertical Wind Speed 45 m (km/h) Average	720	0	0	100.00	1.5	-	0.6	-
Vertical Wind Speed 100 m (km/h) Average	720	0	0	100.00	3.4	-	1.2	-
Vertical Wind Speed 167 m (km/h) Average	719	0	1	99.86	4.3	-	1.5	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
Temperature 20 m (C) Average	720	10.29	4.7	-	-1	4.8	7	9.7	13	16.7	24
Temperature 45 m (C) Average	720	10.31	4.6	-	-0.9	4.9	7.2	9.8	13	16.6	24
Temperature 100 m (C) Average	720	10.32	4.5	-	-0.3	5	7.2	9.7	12.9	16.5	23.5
Temperature 167 m (C) Average	720	10.27	4.4	-	-0.6	5.3	7.4	9.7	12.8	16.6	23.1
Relative Humidity 20 m (%) Average	720	70.6	19	-	28	43	55	72	87	97	99
Relative Humidity 45 m (%) Average	720	69.1	19	-	27	43	53	70	85	95	99
Relative Humidity 100 m (%) Average	720	66.6	18	-	27	43	52	67	82	91	99
Relative Humidity 167 m (%) Average	720	64.5	16	-	27	43	52	64	77	87	98
Wind Speed 20 m (km/h) Average	720	7.8	5	-	0	2	4	7	11	15	25
Wind Speed 45 m (km/h) Average	720	10.7	7	-	0	3	5	10	15	19	36
Wind Speed 100 m (km/h) Average	720	15.6	9	-	0	4	9	15	21	28	47
Wind Speed 167 m (km/h) Average	719	18.4	11	-	0	5	10	17	26	34	56
Wind Direction 20 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	719	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	720	-0.09	0.3	-	-1	-0.5	-0.3	-0.1	0.1	0.3	0.9
Vertical Wind Speed 45 m (km/h) Average	720	-0.02	0.6	-	-1.9	-0.8	-0.4	0	0.4	0.7	1.5
Vertical Wind Speed 100 m (km/h) Average	720	0.26	0.7	-	-1.6	-0.4	-0.1	0.2	0.6	1.1	3.4
Vertical Wind Speed 167 m (km/h) Average	719	0.57	0.8	-	-1.4	-0.3	0.1	0.4	0.9	1.7	4.3

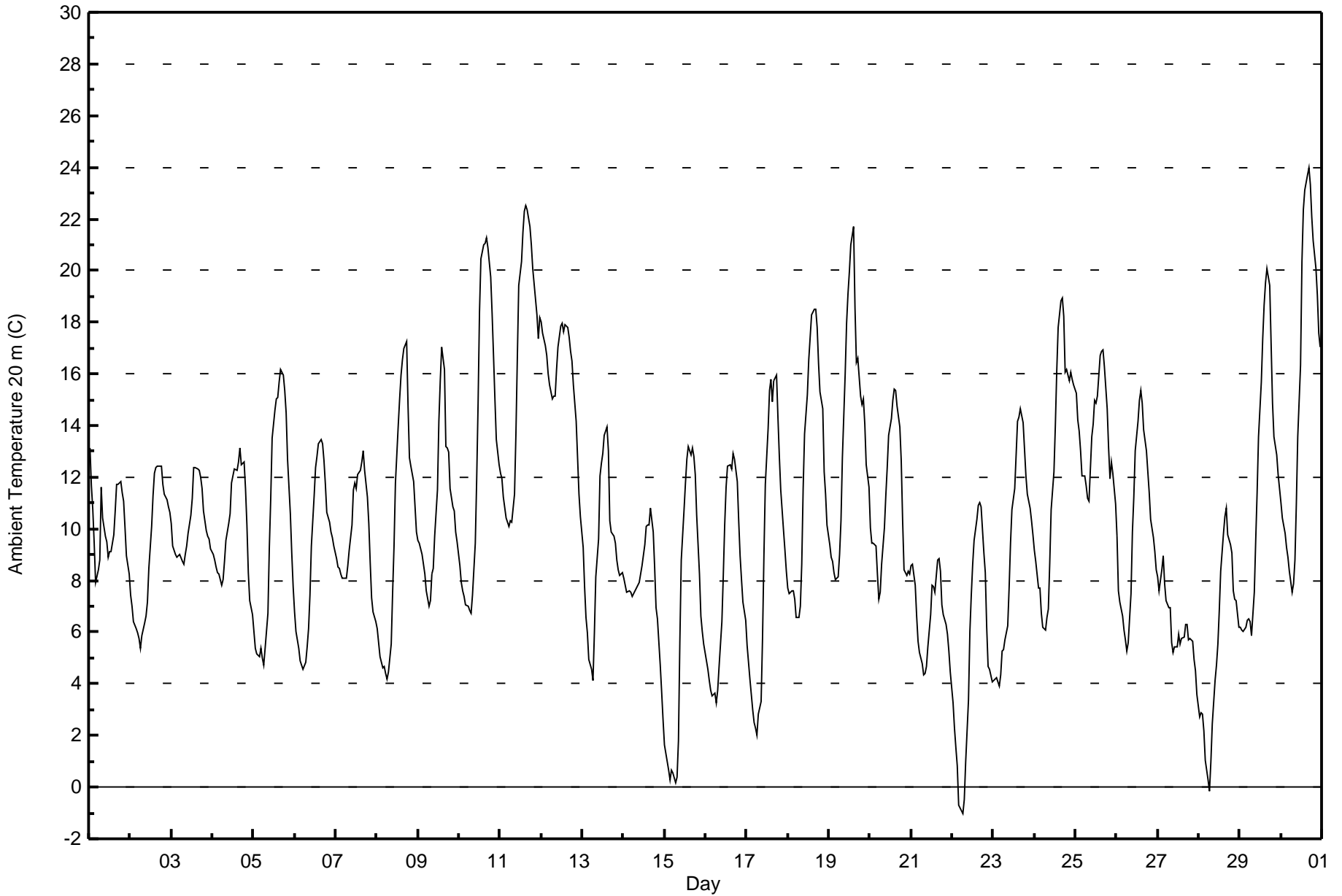
WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)  
SEPTEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction, Vertical Wind Speed 167 m	01 Sep 2015 09:00	01 Sep 2015 09:00	1	Intermittent unstable operation



Maximum Value: 24.0 C on Sep 30 17:00		Maximum Daily Average: 16.4 C on Sep 11		Hours in Service: 720																																												
Minimum Value: -1.0 C on Sep 22 07:00		Minimum Daily Average: 5.0 C on Sep 22		Hours of Data: 720																																												
Maximum Diurnal Average: 14.8 C at hour 16		Minimum Diurnal Average: 6.2 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 10.29 C		Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 4.8 Q <sub>1</sub> = 7.0 Median = 9.7 Q <sub>3</sub> = 13.0 P <sub>90</sub> = 16.7 P <sub>99</sub> = 22.3		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Sep	13.2	11.7	10.7	9.4	7.9	8.4	8.8	11.6	10.4	9.7	9.5	8.9	9.1	9.1	9.7	10.7	11.7	11.7	11.8	11.4	11.1	10.1	9.0	8.2	10.2	13.2																						
2-Sep	7.4	7.0	6.4	6.1	6.0	5.8	5.4	5.8	6.3	6.6	7.2	8.4	10.1	11.3	12.2	12.4	12.4	12.4	12.4	11.7	11.3	11.1	10.9	10.7	9.1	12.4																						
3-Sep	10.2	9.3	9.0	8.9	9.0	9.0	8.7	8.7	9.0	9.3	9.8	10.5	11.2	12.3	12.4	12.3	12.3	12.0	11.6	10.7	9.9	9.7	9.6	9.2	10.2	12.4																						
4-Sep	9.0	8.8	8.5	8.3	8.2	7.8	8.0	8.7	9.6	10.2	10.6	11.8	12.0	12.3	12.3	12.6	13.1	12.5	12.6	11.6	10.1	8.3	7.2	6.7	10.0	13.1																						
5-Sep	6.1	5.4	5.1	5.0	5.4	5.0	4.7	5.4	6.7	9.3	11.2	13.5	14.6	15.0	15.1	15.7	16.2	16.0	15.3	14.5	12.7	10.6	9.1	7.8	10.2	16.2																						
6-Sep	6.8	6.0	5.4	4.9	4.7	4.6	4.8	5.4	6.1	7.4	9.3	11.3	12.4	12.8	13.3	13.4	13.3	12.6	11.7	10.7	10.3	9.9	9.7	9.3	9.0	13.4																						
7-Sep	8.9	8.5	8.5	8.3	8.1	8.1	8.1	8.6	9.2	10.2	11.5	11.8	11.5	12.1	12.3	12.6	13.0	12.3	11.2	10.2	8.7	7.3	6.8	6.4	9.7	13.0																						
8-Sep	6.1	5.6	5.0	4.6	4.7	4.4	4.2	4.5	5.5	7.5	9.3	11.8	14.0	15.1	16.0	16.6	17.0	17.2	14.8	12.8	12.4	11.9	10.8	9.9	10.1	17.2																						
9-Sep	9.5	9.4	9.0	8.6	8.2	7.6	7.0	7.2	8.3	8.5	9.7	11.5	14.2	15.8	17.0	16.2	13.2	13.1	13.0	11.6	10.8	10.7	9.9	9.5	10.8	17.0																						
10-Sep	8.6	7.9	7.6	7.4	7.1	7.0	6.9	6.7	7.4	9.5	11.9	14.9	18.4	20.4	21.0	21.1	21.3	20.9	19.8	18.3	16.7	15.0	13.4	12.5	13.4	21.3																						
11-Sep	12.2	12.0	11.2	10.4	10.3	10.1	10.3	10.3	11.3	13.7	16.6	19.5	20.3	21.5	22.3	22.5	22.4	21.7	21.0	20.1	19.5	18.3	17.4	18.2	16.4	22.5																						
12-Sep	18.0	17.6	17.1	16.7	16.0	15.6	15.1	15.1	15.1	16.2	17.1	17.9	18.0	17.6	17.9	17.8	17.4	16.9	16.5	15.6	14.2	12.8	11.3	10.5	16.0	18.0																						
13-Sep	9.3	7.8	6.6	6.0	4.9	4.5	4.1	6.0	8.1	9.6	12.0	12.5	12.9	13.6	14.0	13.0	10.3	9.9	9.7	9.4	8.8	8.4	8.2	8.3	9.1	14.0																						
14-Sep	8.1	7.8	7.6	7.6	7.6	7.4	7.5	7.6	7.8	7.9	8.3	8.6	9.4	10.1	10.1	10.8	9.9	8.5	6.9	6.5	4.7	3.7	2.6	2.6	7.8	10.8																						
15-Sep	1.6	1.3	0.7	0.3	0.6	0.5	0.2	0.4	1.8	5.6	8.8	10.7	11.8	12.7	13.2	12.9	13.1	12.8	12.1	10.5	8.2	6.6	6.0	5.6	6.6	13.2																						
16-Sep	4.9	4.6	4.1	3.7	3.6	3.6	3.3	3.7	4.7	6.4	8.2	10.2	11.6	12.4	12.5	12.3	12.9	12.7	11.8	10.3	9.0	8.1	7.2	6.4	7.8	12.9																						
17-Sep	5.5	4.8	4.2	3.0	2.5	2.3	2.0	2.8	3.3	5.7	8.9	11.7	13.9	15.3	15.8	14.9	15.7	15.9	14.3	12.8	11.5	10.0	9.2	8.4	8.9	15.9																						
18-Sep	7.7	7.5	7.6	7.6	7.3	6.6	6.6	7.0	8.6	11.6	13.7	15.2	16.5	17.4	18.3	18.5	18.5	17.8	16.4	15.3	14.7	12.2	11.3	10.1	12.2	18.5																						
19-Sep	9.4	8.9	8.7	8.3	8.0	8.2	9.0	10.3	12.8	16.0	18.0	19.1	19.9	21.0	21.7	18.5	16.4	16.6	15.1	14.8	15.0	14.1	12.5	11.6	13.9	21.7																						
20-Sep	10.0	9.5	9.4	9.4	8.3	7.3	7.5	8.6	10.1	11.3	12.4	13.6	14.3	15.0	15.4	15.4	14.7	13.9	12.6	10.3	8.4	8.2	8.4	8.2	10.9	15.4																						
21-Sep	8.6	8.7	7.8	6.6	5.7	5.2	4.8	4.3	4.4	4.7	5.4	6.7	7.8	7.8	7.6	8.8	8.8	8.4	7.1	6.7	6.3	5.9	5.2	4.5	6.6	8.8																						
22-Sep	3.3	2.3	1.5	0.8	-0.7	-0.9	-1.0	-0.5	1.0	3.3	6.0	7.4	8.6	9.5	10.4	10.9	11.0	10.9	9.1	8.3	6.2	4.7	4.6	4.1	5.0	11.0																						
23-Sep	4.1	4.2	4.3	3.9	4.4	5.3	5.3	5.7	6.2	7.7	9.4	10.7	11.6	12.9	14.2	14.3	14.7	14.1	13.1	12.1	11.4	10.8	10.3	9.8	9.2	14.7																						
24-Sep	9.2	8.8	7.7	7.7	6.7	6.2	6.1	6.6	6.9	8.7	10.7	12.2	14.0	16.1	17.8	18.8	18.9	18.2	16.1	16.2	15.8	16.1	15.8	15.6	12.4	18.9																						
25-Sep	15.2	14.2	13.8	13.0	12.0	12.0	11.7	11.2	11.1	13.5	14.0	15.0	14.9	15.2	16.7	16.9	17.0	16.3	14.7	13.1	11.9	12.6	12.1	11.0	13.7	17.0																						
26-Sep	9.7	7.6	7.1	6.6	6.1	5.7	5.2	5.6	7.5	9.9	11.2	13.0	14.2	15.0	15.3	14.9	13.8	13.0	12.2	11.4	10.4	9.7	9.1	8.4	10.1	15.3																						
27-Sep	8.1	7.6	8.4	9.0	7.9	7.2	6.9	6.9	5.6	5.2	5.4	5.4	5.9	5.5	5.8	5.8	6.3	6.3	5.7	5.8	5.7	4.9	4.5	3.6	6.2	9.0																						
28-Sep	2.7	2.9	2.9	2.2	1.0	0.3	-0.1	1.0	2.4	4.1	4.7	5.6	6.8	8.4	9.8	10.5	10.8	9.8	9.4	9.0	7.6	7.3	7.2	6.2	5.5	10.8																						
29-Sep	6.2	6.1	6.0	6.2	6.5	6.5	6.4	5.9	7.6	9.5	11.4	13.6	15.7	17.4	18.7	19.5	20.1	19.4	17.2	14.9	13.6	12.9	12.1	11.6	11.9	20.1																						
30-Sep	11.0	10.4	9.8	9.3	8.9	8.4	7.5	7.8	8.8	10.9	13.6	16.3	20.3	22.3	23.1	23.7	24.0	23.3	22.1	21.2	20.1	19.0	17.6	17.0	15.7	24.0																						
																								8.4	7.8	7.4	7.0	6.6	6.3	6.2	6.6	7.5	9.0	10.5	12.0	13.2	14.1	14.7	14.8	14.7	14.3	13.3	12.3	11.3	10.4	9.7	9.1	Diurnal Average
																								18.0	17.6	17.1	16.7	16.0	15.6	15.1	15.1	15.1	16.2	18.0	19.5	20.3	22.3	23.1	23.7	24.0	23.3	22.1	21.2	20.1	19.0	17.6	18.2	Diurnal Maximum





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	5	0.69	0.69
0 - 10	369	51.25	51.94
10 - 20	321	44.58	96.53
> 20	25	3.47	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature 45 m (AT45m) - C**

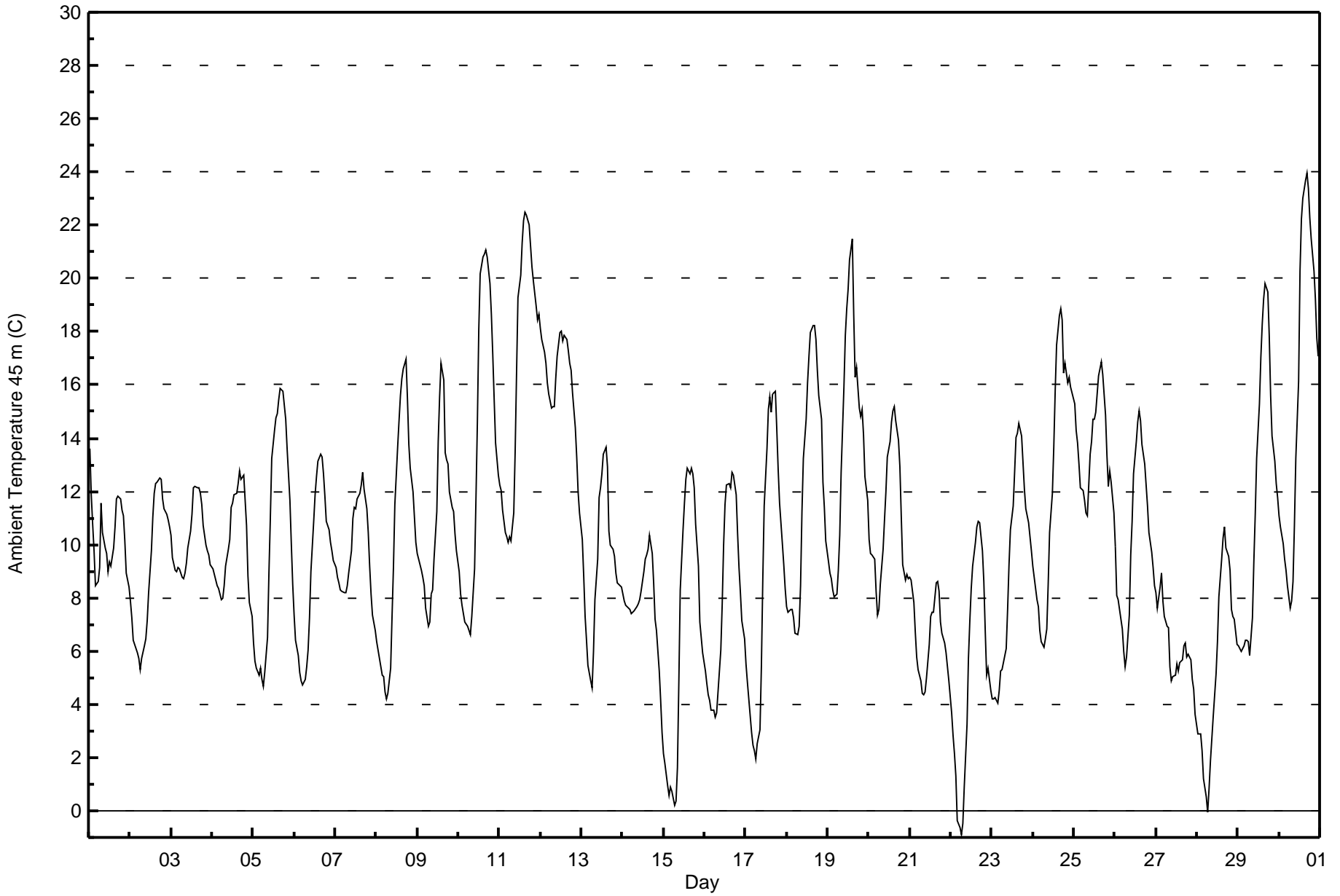
**Lower Camp Met Tower - September 2015**

Maximum Value: 24.0 C on Sep 30 17:00		Maximum Daily Average: 16.5 C on Sep 11		Hours in Service: 720																							
Minimum Value: -0.9 C on Sep 22 07:00		Minimum Daily Average: 5.2 C on Sep 22		Hours of Data: 720																							
Maximum Diurnal Average: 14.6 C at hour 16		Minimum Diurnal Average: 6.2 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 10.31 C		Percentiles: P <sub>1</sub> = 0.5 P <sub>10</sub> = 4.9 Q <sub>1</sub> = 7.2 Median = 9.8 Q <sub>3</sub> = 13.0 P <sub>90</sub> = 16.6 P <sub>99</sub> = 22.3		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	13.6	11.8	10.8	9.8	8.5	8.6	9.1	11.5	10.4	9.9	9.7	9.0	9.3	9.2	9.9	10.7	11.7	11.8	11.7	11.3	11.1	10.1	8.9	8.4	10.3	13.6	
2-Sep	7.9	7.3	6.4	6.1	5.9	5.7	5.3	5.7	6.2	6.5	7.1	8.2	9.8	11.0	11.9	12.3	12.3	12.5	12.5	11.7	11.4	11.1	10.9	10.7	9.0	12.5	
3-Sep	10.3	9.5	9.0	9.0	9.1	9.1	8.8	8.7	8.9	9.3	9.9	10.5	11.1	12.1	12.2	12.1	12.1	11.9	11.5	10.7	10.0	9.8	9.6	9.2	10.2	12.2	
4-Sep	9.1	8.9	8.7	8.5	8.3	7.9	8.0	8.5	9.2	9.8	10.2	11.4	11.5	11.9	11.9	12.3	12.8	12.4	12.6	11.7	10.7	8.8	7.8	7.3	10.0	12.8	
5-Sep	6.3	5.6	5.4	5.1	5.3	4.9	4.6	5.2	6.5	9.0	11.0	13.2	14.3	14.8	14.9	15.4	15.9	15.7	15.3	14.7	13.6	11.6	10.0	8.5	10.3	15.9	
6-Sep	7.4	6.4	5.8	5.2	4.9	4.7	4.9	5.4	6.0	7.3	9.0	10.9	11.9	12.5	13.1	13.4	13.3	12.7	11.8	10.9	10.6	10.1	9.8	9.4	9.1	13.4	
7-Sep	9.2	8.8	8.6	8.3	8.2	8.2	8.2	8.5	8.9	9.8	11.0	11.4	11.3	11.7	11.9	12.2	12.7	12.1	11.4	10.4	9.2	8.1	7.4	6.8	9.8	12.7	
8-Sep	6.4	6.1	5.7	5.1	5.1	4.5	4.2	4.4	5.4	7.3	9.1	11.5	13.7	14.7	15.6	16.2	16.6	17.0	15.5	13.8	12.9	12.0	11.0	10.1	10.2	17.0	
9-Sep	9.7	9.5	9.1	8.8	8.5	7.6	6.9	7.1	8.2	8.3	9.5	11.2	13.8	15.5	16.8	16.2	13.4	13.2	13.0	12.0	11.4	11.2	10.4	9.8	10.9	16.8	
10-Sep	9.0	8.2	7.7	7.4	7.1	7.0	6.8	6.6	7.3	9.1	11.8	14.6	18.1	20.2	20.8	20.9	21.1	20.8	19.8	18.7	17.1	15.5	13.8	12.6	13.4	21.1	
11-Sep	12.2	12.0	11.3	10.5	10.3	10.1	10.3	10.1	11.2	13.5	16.4	19.3	20.1	21.3	22.2	22.5	22.4	22.0	21.2	20.5	19.9	19.0	18.5	18.6	16.5	22.5	
12-Sep	18.2	17.7	17.2	16.8	16.1	15.6	15.1	15.2	15.2	16.2	17.1	17.9	18.0	17.7	17.8	17.7	17.3	16.8	16.6	15.7	14.4	13.3	12.0	11.2	16.1	18.2	
13-Sep	10.2	8.8	7.3	6.4	5.4	4.9	4.6	6.0	7.9	9.5	11.8	12.1	12.6	13.4	13.7	12.9	10.5	10.0	9.8	9.6	9.0	8.6	8.5	8.4	9.2	13.7	
14-Sep	8.1	7.9	7.7	7.6	7.6	7.4	7.4	7.5	7.6	7.8	7.9	8.2	9.0	9.4	9.6	9.8	10.4	9.7	8.5	7.2	6.8	5.3	4.2	3.0	7.7	10.4	
15-Sep	2.2	1.8	1.0	0.6	0.9	0.7	0.2	0.4	1.6	4.8	8.3	10.5	11.6	12.4	12.9	12.7	12.9	12.6	12.1	10.8	9.2	7.1	6.5	5.9	6.6	12.9	
16-Sep	5.2	4.8	4.4	4.1	3.8	3.8	3.5	3.7	4.5	6.1	7.8	10.0	11.5	12.2	12.3	12.2	12.7	12.6	11.9	10.4	9.2	8.2	7.2	6.5	7.8	12.7	
17-Sep	5.5	4.8	4.2	2.9	2.5	2.3	2.0	2.5	3.1	5.4	8.7	11.4	13.6	15.1	15.6	14.9	15.7	15.8	14.4	12.8	11.5	10.0	9.3	8.4	8.8	15.8	
18-Sep	7.7	7.5	7.6	7.6	7.2	6.7	6.6	6.9	8.5	11.3	13.2	14.7	16.1	17.1	18.0	18.3	18.2	17.7	16.5	15.6	14.7	12.3	11.4	10.1	12.1	18.3	
19-Sep	9.4	8.9	8.7	8.3	8.1	8.1	9.0	10.4	12.7	15.9	17.9	18.9	19.6	20.7	21.5	18.6	16.3	16.7	15.1	14.8	15.1	14.1	12.6	11.7	13.9	21.5	
20-Sep	10.2	9.7	9.6	9.4	8.3	7.3	7.6	8.5	9.8	10.9	12.0	13.3	13.9	14.6	15.0	15.2	14.7	13.9	12.9	11.0	9.3	8.7	8.9	8.7	11.0	15.2	
21-Sep	8.8	8.7	7.8	6.7	5.8	5.3	4.9	4.4	4.3	4.4	5.0	6.2	7.3	7.5	7.4	8.6	8.6	8.3	7.1	6.7	6.3	5.9	5.4	4.9	6.5	8.8	
22-Sep	3.7	2.9	2.1	1.3	-0.4	-0.7	-0.9	-0.5	0.9	3.3	5.7	7.2	8.3	9.2	10.1	10.7	10.9	10.8	9.8	8.6	6.8	5.1	5.4	4.5	5.2	10.9	
23-Sep	4.2	4.2	4.3	4.1	4.5	5.2	5.3	5.6	6.1	7.6	9.2	10.5	11.4	12.7	14.0	14.2	14.5	14.1	13.1	12.1	11.4	10.8	10.3	9.8	9.1	14.5	
24-Sep	9.2	8.8	7.9	7.7	6.8	6.4	6.1	6.5	6.8	8.5	10.5	11.9	13.7	15.8	17.5	18.6	18.8	18.4	16.4	16.8	16.1	16.3	15.9	15.7	12.4	18.8	
25-Sep	15.3	14.3	13.8	13.0	12.1	12.0	11.7	11.2	11.1	13.4	13.9	14.7	14.7	15.0	16.3	16.6	16.8	16.4	14.9	13.3	12.2	12.8	12.3	11.2	13.7	16.8	
26-Sep	9.9	8.1	7.9	7.2	6.8	6.0	5.4	5.8	7.4	9.6	10.9	12.6	13.9	14.6	15.0	14.7	13.8	13.0	12.2	11.4	10.5	9.7	9.2	8.5	10.2	15.0	
27-Sep	8.2	7.6	8.4	8.9	7.9	7.3	6.9	6.9	5.4	4.9	5.1	5.1	5.5	5.3	5.6	5.7	6.2	6.3	5.8	5.9	5.7	4.9	4.5	3.6	6.1	8.9	
28-Sep	2.9	2.9	2.9	2.3	1.2	0.5	0.0	0.9	1.9	3.6	4.4	5.2	6.4	8.0	9.5	10.2	10.6	9.9	9.6	9.0	7.6	7.3	7.2	6.2	5.4	10.6	
29-Sep	6.2	6.1	6.0	6.2	6.4	6.4	6.3	5.8	7.2	9.3	11.1	13.2	15.3	17.0	18.3	19.2	19.8	19.5	17.9	15.6	14.1	13.2	12.3	11.7	11.8	19.8	
30-Sep	11.1	10.6	10.0	9.4	9.0	8.5	7.6	7.9	8.6	10.7	13.3	16.1	20.3	22.2	23.0	23.7	24.0	23.4	22.3	21.5	20.3	19.2	17.7	17.1	15.7	24.0	
		8.6	8.0	7.6	7.1	6.7	6.4	6.2	6.6	7.3	8.8	10.3	11.7	12.9	13.8	14.5	14.6	14.6	14.3	13.4	12.5	11.6	10.7	10.0	9.3	Diurnal Average	
		18.2	17.7	17.2	16.8	16.1	15.6	15.1	15.2	15.2	16.2	17.9	19.3	20.3	22.2	23.0	23.7	24.0	23.4	22.3	21.5	20.3	19.2	18.5	18.6	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

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







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	5	0.69	0.69
0 - 10	370	51.39	52.08
10 - 20	321	44.58	96.67
> 20	24	3.33	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature 100 m (AT100m) - C**

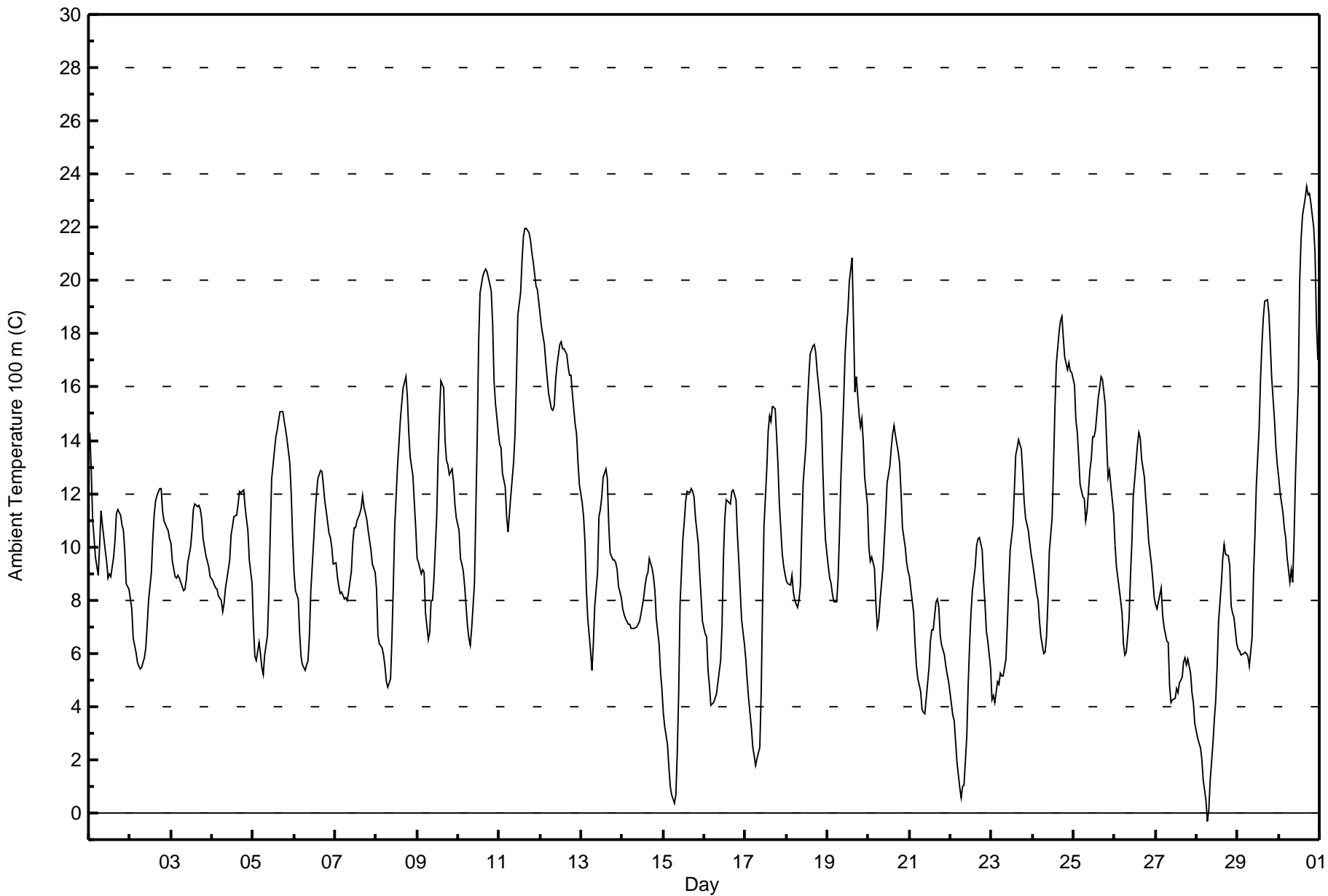
**Lower Camp Met Tower - September 2015**

Maximum Value: 23.5 C on Sep 30 17:00		Maximum Daily Average: 17.1 C on Sep 11		Hours in Service: 720																							
Minimum Value: -0.3 C on Sep 28 07:00		Minimum Daily Average: 5.1 C on Sep 28		Hours of Data: 720																							
Maximum Diurnal Average: 14.1 C at hour 17		Minimum Diurnal Average: 6.4 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 10.32 C		Percentiles: P <sub>1</sub> = 1.0 P <sub>10</sub> = 5.0 Q <sub>1</sub> = 7.2 Median = 9.7 Q <sub>3</sub> = 12.9 P <sub>90</sub> = 16.5 P <sub>99</sub> = 21.7		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	14.3	12.9	11.0	10.4	9.6	8.9	10.1	11.3	10.8	9.9	9.5	8.8	9.0	8.9	9.6	10.3	11.3	11.4	11.2	10.8	10.6	9.8	8.6	8.4	10.3	14.3	
2-Sep	8.1	7.7	6.6	6.0	5.7	5.5	5.4	5.5	5.8	6.2	7.1	8.0	9.1	10.3	11.2	11.7	11.9	12.2	12.2	11.3	11.0	10.7	10.6	10.3	8.8	12.2	
3-Sep	10.1	9.5	8.9	8.8	8.9	8.8	8.5	8.3	8.4	8.8	9.4	10.0	10.6	11.4	11.6	11.5	11.6	11.4	11.0	10.3	9.7	9.5	9.3	8.9	9.8	11.6	
4-Sep	8.7	8.6	8.5	8.4	8.2	8.0	7.6	7.9	8.5	9.2	9.5	10.5	10.8	11.1	11.2	11.6	12.1	12.0	12.1	11.5	11.0	10.6	9.5	8.6	9.8	12.1	
5-Sep	7.0	5.9	5.8	6.4	6.0	5.4	5.2	5.9	6.7	8.3	10.5	12.6	13.6	14.1	14.4	14.7	15.1	15.1	14.7	14.4	14.0	13.2	12.0	10.4	10.5	15.1	
6-Sep	9.0	8.3	8.0	6.8	5.9	5.5	5.4	5.6	5.7	6.7	8.4	10.2	11.2	11.9	12.5	12.9	12.8	12.3	11.7	11.3	10.5	10.4	10.0	9.4	9.3	12.9	
7-Sep	9.4	8.9	8.5	8.2	8.3	8.0	8.1	8.0	8.3	9.1	10.2	10.7	10.7	11.0	11.2	11.5	11.9	11.5	11.1	10.6	10.3	9.9	9.4	9.0	9.7	11.9	
8-Sep	8.4	6.7	6.4	6.2	6.0	5.5	4.9	4.7	5.1	6.6	8.5	10.8	13.0	13.9	14.8	15.4	16.0	16.4	15.7	14.3	13.4	12.6	11.7	10.7	10.3	16.4	
9-Sep	9.6	9.4	9.0	9.1	9.0	7.5	6.5	6.8	8.0	8.0	8.8	11.1	13.4	14.9	16.2	16.0	14.0	13.3	13.1	12.7	12.9	12.4	11.6	11.1	11.0	16.2	
10-Sep	10.6	9.6	9.4	9.1	8.5	7.0	6.6	6.3	6.9	8.6	11.4	14.2	17.7	19.5	20.2	20.3	20.4	20.3	19.9	19.6	18.4	16.2	15.4	14.4	13.8	20.4	
11-Sep	13.9	13.7	12.7	12.2	11.2	10.5	11.3	12.0	13.2	14.2	16.3	18.7	19.6	20.7	21.7	22.0	22.0	21.8	21.5	21.0	20.7	19.8	19.6	19.2	17.1	22.0	
12-Sep	18.7	18.2	17.6	16.9	16.3	15.8	15.2	15.1	15.3	16.2	16.8	17.6	17.7	17.5	17.4	17.2	16.8	16.4	16.5	15.7	14.6	14.2	13.2	12.3	16.2	18.7	
13-Sep	11.7	11.1	10.2	8.4	7.3	6.1	5.4	6.3	7.7	9.1	11.1	11.4	11.9	12.6	12.9	12.6	10.8	9.8	9.5	9.5	9.4	9.1	8.5	8.1	9.6	12.9	
14-Sep	7.7	7.4	7.3	7.1	7.1	6.9	6.9	6.9	7.0	7.1	7.2	7.5	8.1	8.6	8.9	9.0	9.6	9.2	8.9	8.4	7.3	6.4	5.3	4.7	7.5	9.6	
15-Sep	3.8	3.2	2.5	1.7	1.0	0.7	0.3	0.7	2.2	4.5	7.8	10.3	10.9	11.7	12.1	12.0	12.2	12.1	11.9	11.1	10.2	9.0	8.1	7.2	7.0	12.2	
16-Sep	6.7	6.6	5.3	4.8	4.0	4.1	4.3	4.4	4.9	5.7	7.1	9.6	11.1	11.8	11.7	11.6	12.1	12.1	11.8	10.5	9.5	8.3	7.2	6.3	8.0	12.1	
17-Sep	5.8	5.0	4.3	3.2	2.5	2.1	1.8	2.1	2.5	4.5	7.9	10.8	12.9	14.3	14.9	14.7	15.3	15.2	14.2	13.1	11.6	9.8	9.3	9.0	8.6	15.3	
18-Sep	8.7	8.6	8.6	8.9	8.3	8.0	7.7	8.0	8.5	10.5	12.4	13.8	15.3	16.3	17.2	17.6	17.6	17.3	16.6	16.1	15.0	13.0	11.3	10.3	12.3	17.6	
19-Sep	9.2	8.8	8.6	8.2	7.9	7.9	8.8	10.6	12.6	15.5	17.2	18.2	18.8	20.0	20.8	18.5	15.8	16.4	15.0	14.5	14.8	13.9	12.6	11.6	13.6	20.8	
20-Sep	10.0	9.5	9.6	9.2	7.9	7.0	7.2	8.0	9.2	10.2	11.2	12.4	13.0	13.7	14.2	14.6	14.2	13.5	13.1	12.0	10.7	10.0	9.4	9.1	10.8	14.6	
21-Sep	8.9	8.4	7.5	6.4	5.5	5.0	4.5	3.9	3.8	3.7	4.3	5.5	6.5	6.9	6.9	7.9	8.1	7.7	6.7	6.3	5.9	5.5	5.2	4.9	6.1	8.9	
22-Sep	4.1	3.7	3.5	2.7	1.9	1.0	0.6	1.0	1.1	2.9	4.8	6.3	7.5	8.4	9.3	10.0	10.3	10.3	9.9	8.7	7.9	6.8	6.5	5.4	5.6	10.3	
23-Sep	4.2	4.4	4.1	4.9	4.8	5.3	5.1	5.2	5.8	7.1	8.6	9.9	10.8	12.1	13.4	13.7	14.0	13.7	12.7	11.7	11.1	10.6	10.1	9.7	8.9	14.0	
24-Sep	9.4	9.0	8.3	8.0	7.2	6.6	6.0	6.0	6.6	7.9	9.8	11.1	13.0	15.2	16.9	18.1	18.5	18.7	17.9	17.1	16.6	16.9	16.6	16.5	12.4	18.7	
25-Sep	16.1	14.8	14.3	13.4	12.4	11.9	11.8	11.0	11.3	12.9	13.3	14.1	14.1	14.4	15.6	16.0	16.4	16.3	15.3	13.9	12.6	12.8	12.3	11.3	13.7	16.4	
26-Sep	10.1	9.2	8.8	8.0	7.5	6.3	6.0	6.0	7.3	8.9	10.1	11.9	13.1	13.8	14.3	14.1	13.3	12.6	11.8	11.1	10.2	9.4	8.8	8.1	10.0	14.3	
27-Sep	7.8	7.7	8.2	8.5	7.5	7.0	6.5	6.4	4.8	4.2	4.3	4.3	4.7	4.5	4.9	5.1	5.7	5.8	5.6	5.8	5.3	4.5	4.1	3.4	5.7	8.5	
28-Sep	2.9	2.6	2.5	2.0	1.3	0.5	-0.3	0.1	1.2	2.6	3.5	4.2	5.5	7.2	8.6	9.5	10.1	9.7	9.7	9.3	7.8	7.5	7.4	6.3	5.1	10.1	
29-Sep	6.2	6.1	6.0	6.0	6.0	6.0	5.9	5.5	6.6	8.9	10.4	12.3	14.4	16.3	17.6	18.6	19.2	19.3	18.8	17.6	16.3	14.8	13.8	13.1	11.9	19.3	
30-Sep	12.6	12.0	11.3	10.7	10.3	9.6	8.7	9.1	8.6	10.4	12.7	16.0	20.0	21.6	22.4	23.1	23.5	23.2	23.3	22.9	22.0	21.0	18.4	17.0	16.3	23.5	
		9.1	8.6	8.1	7.7	7.1	6.6	6.4	6.6	7.1	8.3	9.7	11.1	12.3	13.2	13.8	14.1	14.1	13.9	13.4	12.8	12.0	11.3	10.5	9.8	Diurnal Average	
		18.7	18.2	17.6	16.9	16.3	15.8	15.2	15.1	15.3	16.2	17.2	18.7	20.0	21.6	22.4	23.1	23.5	23.2	23.3	22.9	22.0	21.0	19.6	19.2	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

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





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	1	0.14	0.14
0 - 10	370	51.39	51.53
10 - 20	327	45.42	96.94
> 20	22	3.06	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

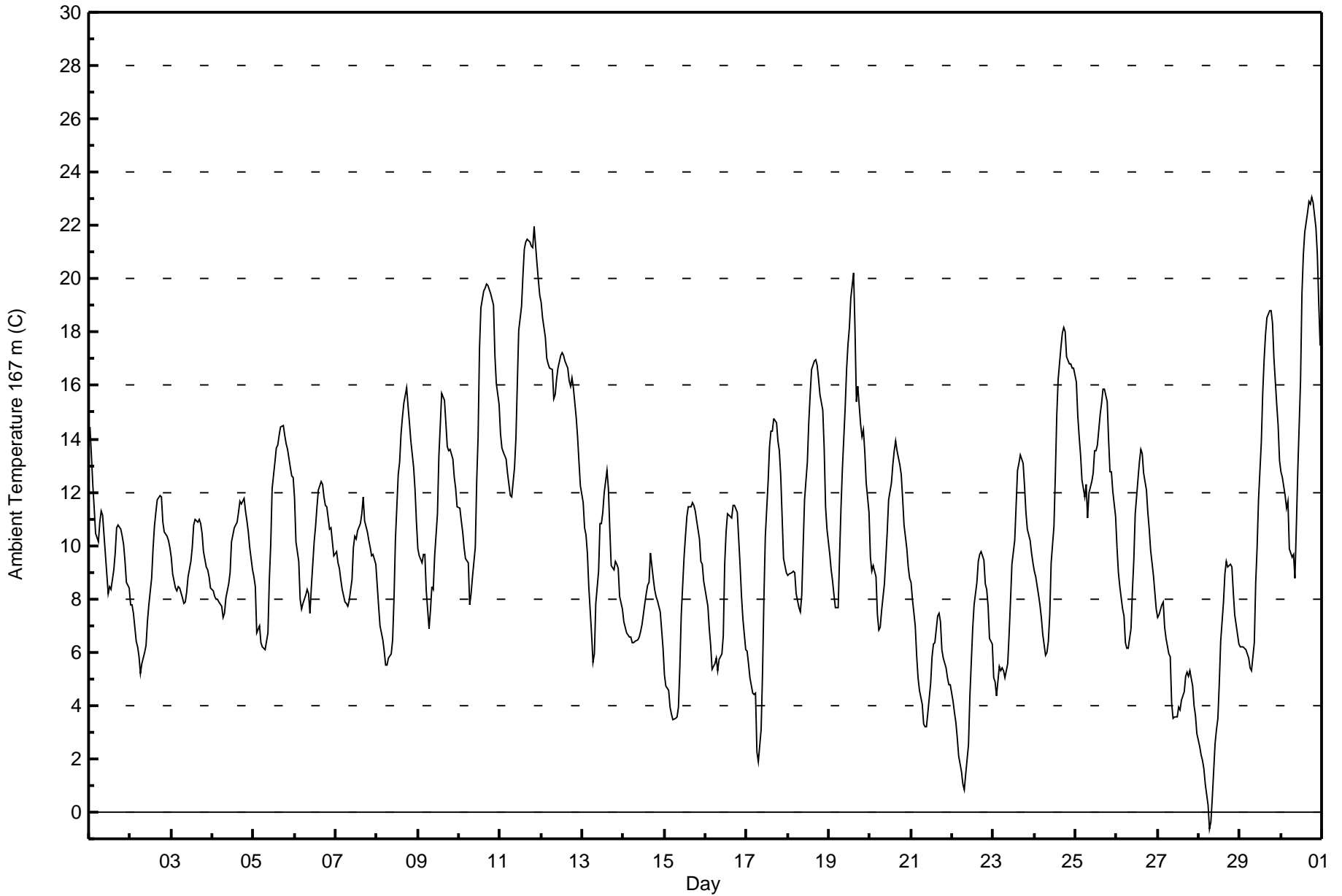


Maximum Value: 23.1 C on Sep 30 19:00		Maximum Daily Average: 17.2 C on Sep 11		Hours in Service: 720																																												
Minimum Value: -0.6 C on Sep 28 07:00		Minimum Daily Average: 4.7 C on Sep 28		Hours of Data: 720																																												
Maximum Diurnal Average: 13.6 C at hour 17		Minimum Diurnal Average: 6.8 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 10.27 C		Percentiles: P <sub>1</sub> = 1.4 P <sub>10</sub> = 5.3 Q <sub>1</sub> = 7.4 Median = 9.7 Q <sub>3</sub> = 12.8 P <sub>90</sub> = 16.6 P <sub>99</sub> = 21.9		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Sep	14.4	13.4	12.3	11.4	10.4	10.1	10.9	11.3	11.1	9.7	8.9	8.2	8.5	8.3	9.1	9.7	10.6	10.8	10.6	10.3	10.0	9.4	8.6	8.4	10.3	14.4																						
2-Sep	7.8	7.8	7.5	6.4	6.2	5.8	5.2	5.6	6.0	6.2	7.1	7.8	8.8	9.9	10.7	11.2	11.7	11.9	11.8	10.9	10.5	10.3	10.2	9.9	8.6	11.9																						
3-Sep	9.5	8.9	8.4	8.3	8.5	8.4	8.0	7.8	7.9	8.2	8.8	9.4	9.9	10.8	11.0	10.9	11.0	10.8	10.4	9.8	9.2	9.1	8.8	8.4	9.3	11.0																						
4-Sep	8.3	8.1	8.0	8.0	7.9	7.7	7.3	7.4	8.1	8.5	9.0	10.1	10.4	10.7	10.9	11.3	11.6	11.6	11.8	11.3	10.9	10.5	9.9	9.1	9.5	11.8																						
5-Sep	8.8	8.4	6.7	7.0	6.3	6.2	6.2	6.1	6.7	8.7	10.1	12.1	13.1	13.6	13.8	14.1	14.4	14.5	14.1	13.8	13.6	12.9	12.6	12.6	10.7	14.5																						
6-Sep	11.8	10.1	9.4	8.0	7.6	7.8	8.1	8.4	8.2	7.4	8.5	10.1	10.7	11.4	12.1	12.4	12.3	11.8	11.5	11.4	10.6	10.7	10.2	9.6	10.0	12.4																						
7-Sep	9.8	9.3	9.2	8.7	8.4	7.9	7.8	7.7	7.9	8.7	9.9	10.3	10.3	10.5	10.8	11.2	11.8	10.9	10.5	10.2	9.9	9.6	9.7	9.3	9.6	11.8																						
8-Sep	8.5	7.7	7.0	6.5	6.0	5.5	5.5	5.8	5.9	6.5	8.1	10.3	12.7	13.1	14.2	14.8	15.3	15.9	15.3	14.6	13.9	12.9	12.1	10.9	10.4	15.9																						
9-Sep	9.9	9.6	9.4	9.7	9.7	8.3	6.9	7.6	8.4	8.4	9.6	11.2	13.3	14.5	15.7	15.5	14.6	13.7	13.5	13.6	13.2	12.5	12.1	11.4	11.4	15.7																						
10-Sep	11.4	10.9	10.5	9.9	9.5	9.4	7.8	8.2	8.9	9.9	12.4	14.1	17.4	18.9	19.5	19.7	19.8	19.8	19.5	19.3	19.0	17.1	16.1	15.3	14.3	19.8																						
11-Sep	14.2	13.7	13.5	13.3	12.7	12.3	11.9	11.8	12.9	14.0	16.1	18.1	19.0	20.1	21.1	21.4	21.5	21.4	21.2	21.2	22.0	20.6	20.0	19.4	17.2	22.0																						
12-Sep	19.1	18.6	17.8	17.0	16.8	16.6	16.6	15.5	15.7	16.2	16.7	17.1	17.2	17.1	16.9	16.7	16.2	16.0	16.3	15.9	14.8	14.1	13.1	12.2	16.3	19.1																						
13-Sep	11.6	10.7	10.4	9.7	8.5	6.7	5.6	5.9	7.8	9.0	10.8	10.8	11.2	12.0	12.8	12.1	10.6	9.3	9.1	9.4	9.3	9.1	8.1	7.6	9.5	12.8																						
14-Sep	7.1	6.9	6.7	6.5	6.5	6.3	6.4	6.4	6.5	6.6	6.8	7.0	7.8	8.2	8.5	8.6	9.7	8.8	8.4	8.1	8.0	7.5	6.8	6.2	7.3	9.7																						
15-Sep	5.2	4.7	4.6	3.9	3.7	3.5	3.5	3.6	4.0	5.5	7.4	9.5	10.3	11.1	11.5	11.4	11.6	11.5	11.3	10.9	10.3	9.4	9.3	8.7	7.8	11.6																						
16-Sep	8.0	7.7	6.9	6.3	5.4	5.6	5.8	5.3	5.7	5.9	6.6	9.3	10.5	11.2	11.1	11.0	11.5	11.5	11.3	10.2	9.2	8.1	7.3	6.1	8.2	11.5																						
17-Sep	6.0	5.6	5.1	4.5	4.4	4.5	2.3	1.9	3.1	5.2	8.0	10.4	12.4	13.7	14.3	14.3	14.7	14.6	13.9	13.5	12.6	9.5	9.2	9.0	8.9	14.7																						
18-Sep	8.9	8.9	9.0	9.0	9.0	8.2	7.7	7.5	8.2	10.0	11.7	13.1	14.6	15.7	16.6	16.9	16.9	16.7	16.2	15.7	15.1	13.7	11.4	10.6	12.1	16.9																						
19-Sep	9.7	9.1	8.7	8.1	7.7	7.7	9.6	11.4	12.9	15.2	16.6	17.6	18.2	19.3	20.2	18.1	15.4	16.0	14.6	14.1	14.3	13.5	12.4	11.2	13.4	20.2																						
20-Sep	9.6	9.0	9.3	8.8	7.4	6.8	6.9	7.6	8.6	9.5	10.5	11.7	12.4	13.0	13.6	13.9	13.6	13.0	12.7	11.7	10.8	9.9	9.2	8.8	10.3	13.9																						
21-Sep	8.6	8.0	7.0	5.9	5.1	4.6	4.0	3.3	3.2	3.2	3.7	4.8	5.8	6.3	6.3	7.4	7.5	7.1	6.1	5.8	5.4	5.0	4.8	4.8	5.6	8.6																						
22-Sep	4.2	3.7	3.4	2.8	2.1	1.5	1.0	0.9	1.4	2.5	4.4	5.6	6.9	7.8	8.6	9.4	9.7	9.7	9.4	8.6	8.4	7.7	6.5	6.3	5.5	9.7																						
23-Sep	5.1	4.9	4.3	5.4	5.3	5.4	5.3	5.0	5.5	6.7	7.9	9.3	10.2	11.5	12.8	13.1	13.4	13.1	12.2	11.2	10.6	10.2	9.7	9.4	8.7	13.4																						
24-Sep	9.0	8.8	8.2	7.8	7.3	6.7	5.9	6.0	6.4	7.4	9.3	10.7	12.7	14.9	16.2	17.5	18.0	18.2	18.0	17.1	16.8	16.8	16.6	16.7	12.2	18.2																						
25-Sep	16.1	14.9	14.1	13.4	12.5	11.8	12.3	11.0	12.0	12.4	12.7	13.5	13.5	13.8	14.9	15.3	15.9	15.9	15.4	14.0	12.7	12.7	12.0	11.1	13.5	16.1																						
26-Sep	9.9	9.0	8.5	7.6	7.3	6.4	6.1	6.1	6.9	8.3	9.5	11.2	12.5	13.1	13.6	13.4	12.7	12.1	11.3	10.6	9.8	8.9	8.2	7.6	9.6	13.6																						
27-Sep	7.3	7.4	7.8	7.9	6.9	6.5	5.9	5.8	4.1	3.5	3.6	3.6	4.0	3.8	4.2	4.5	5.1	5.3	5.1	5.3	4.7	4.0	3.6	2.9	5.1	7.9																						
28-Sep	2.5	2.2	1.9	1.6	1.1	0.3	-0.6	-0.4	0.5	2.6	3.1	3.5	4.8	6.4	7.9	8.9	9.4	9.2	9.3	9.2	8.3	7.4	7.0	6.3	4.7	9.4																						
29-Sep	6.2	6.2	6.2	6.1	5.9	5.8	5.4	5.3	6.3	8.6	9.9	11.7	13.9	15.7	17.0	17.9	18.5	18.8	18.8	18.3	17.0	15.3	14.5	13.2	11.8	18.8																						
30-Sep	12.7	12.5	11.9	11.4	11.7	9.9	9.6	9.7	8.8	10.7	12.8	16.2	19.4	20.9	21.7	22.5	22.9	22.8	23.1	22.8	21.9	20.9	19.1	17.5	16.4	23.1																						
																								9.4	8.9	8.4	8.0	7.6	7.1	6.8	6.9	7.3	8.2	9.4	10.6	11.7	12.6	13.3	13.5	13.6	13.4	13.1	12.6	12.1	11.3	10.6	10.0	Diurnal Average
																								19.1	18.6	17.8	17.0	16.8	16.6	16.6	15.5	15.7	16.2	16.7	18.1	19.4	20.9	21.7	22.5	22.9	22.8	23.1	22.8	22.0	20.9	20.0	19.4	Diurnal Maximum



**Wood Buffalo Environmental Association**  
**Hourly Averages**

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





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	2	0.28	0.28
0 - 10	382	53.06	53.33
10 - 20	317	44.03	97.36
> 20	19	2.64	100.00

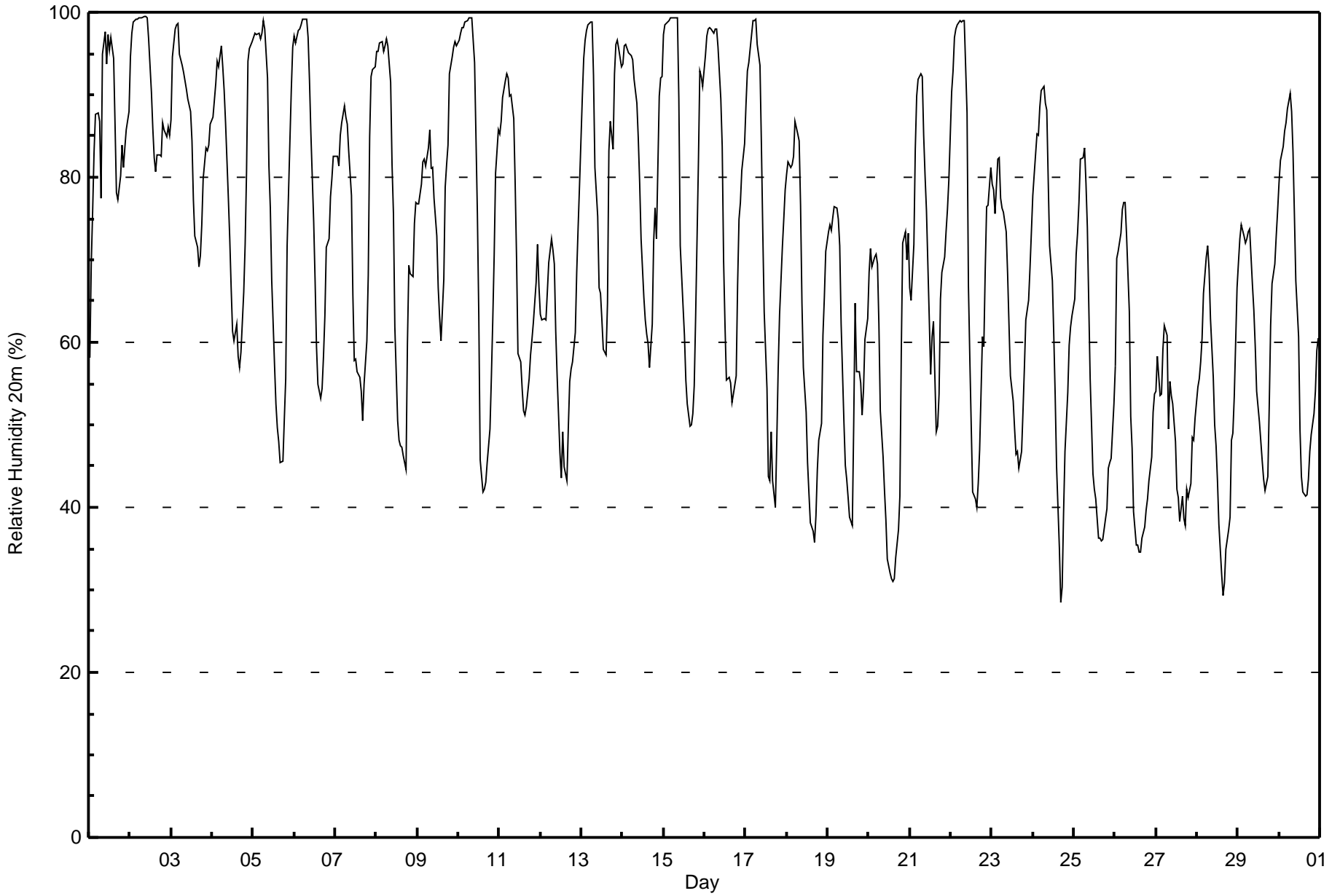
Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 99 % on Sep 2 09:00																	Maximum Daily Average: 91.6 % on Sep 2																	Hours in Service: 720															
Minimum Value: 28 % on Sep 24 17:00																	Minimum Daily Average: 48.9 % on Sep 27																	Hours of Data: 720															
Maximum Diurnal Average: 87.8 % at hour 6																	Minimum Diurnal Average: 49.9 % at hour 16																	Hours of Missing Data: 0															
Monthly Average: 70.6 %																	Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 43 Q <sub>1</sub> = 55 Median = 72 Q <sub>3</sub> = 87 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-Sep	58	70	76	83	88	88	87	77	95	98	94	97	95	97	94	86	78	77	80	84	81	84	86	88	85.0	98																							
2-Sep	95	98	99	99	99	99	99	99	99	99	99	97	90	86	82	81	83	83	83	87	86	85	86	85	91.6	99																							
3-Sep	87	95	98	98	99	95	94	93	92	91	89	88	84	77	73	72	69	71	74	80	84	83	84	86	85.6	99																							
4-Sep	87	89	91	94	93	96	93	90	87	77	73	67	61	60	62	58	57	59	66	72	81	94	96	96	79.2	96																							
5-Sep	97	97	97	97	97	98	99	98	92	81	76	68	57	53	50	48	45	46	51	56	72	84	91	96	76.9	99																							
6-Sep	97	96	98	98	99	99	99	99	97	92	85	75	67	59	55	53	54	58	63	71	72	78	80	83	80.4	99																							
7-Sep	82	83	81	85	87	89	87	86	83	78	66	58	58	56	56	54	51	55	60	68	85	92	93	93	74.4	93																							
8-Sep	95	95	96	96	95	96	97	96	92	82	76	62	51	48	47	47	46	45	60	69	68	68	74	77	74.1	97																							
9-Sep	77	77	79	82	82	81	84	86	81	81	77	73	67	63	60	68	79	82	84	93	95	96	96	96	80.7	96																							
10-Sep	97	97	98	98	99	99	99	99	99	94	85	76	63	46	42	42	43	45	49	56	63	70	81	86	76.1	99																							
11-Sep	85	87	90	92	93	92	90	90	87	79	70	59	58	54	52	51	52	56	58	60	62	67	72	67	71.8	93																							
12-Sep	63	63	63	63	66	70	73	71	69	61	56	47	44	49	45	43	50	55	57	58	61	68	74	79	60.3	79																							
13-Sep	90	94	97	98	99	99	99	92	81	75	67	66	63	59	58	65	83	87	83	93	96	97	96	93	84.5	99																							
14-Sep	94	96	96	95	95	95	94	92	89	85	79	73	65	63	61	60	57	62	72	76	73	90	92	92	81.1	96																							
15-Sep	97	98	99	99	99	99	99	99	99	89	72	64	61	55	53	50	50	51	55	63	82	93	92	91	79.6	99																							
16-Sep	95	97	98	98	98	97	98	98	96	90	84	70	62	55	56	55	53	54	56	67	75	77	81	84	78.9	98																							
17-Sep	89	93	94	97	99	99	99	96	93	84	73	64	54	44	43	49	43	40	48	57	63	72	75	79	72.8	99																							
18-Sep	80	82	81	81	83	87	85	84	77	65	57	52	45	42	38	37	36	39	45	48	50	61	65	71	62.1	87																							
19-Sep	73	74	73	75	76	76	75	72	62	50	45	43	41	39	38	50	65	56	56	55	51	54	60	63	59.4	76																							
20-Sep	68	71	69	70	71	69	62	52	46	42	38	34	32	31	31	31	34	37	41	59	72	73	70	73	53.3	73																							
21-Sep	67	65	72	83	90	92	93	92	85	80	76	63	56	61	62	49	50	54	65	69	70	73	76	80	71.8	93																							
22-Sep	90	93	97	98	98	99	99	99	99	88	67	58	50	42	41	40	43	47	61	60	69	76	77	81	73.8	99																							
23-Sep	79	79	76	82	82	78	76	73	68	62	56	53	49	46	47	45	47	52	57	63	65	69	73	64.7	82																								
24-Sep	78	80	85	85	88	91	91	89	88	80	72	67	61	54	45	35	28	30	39	47	54	60	62	63	65.5	91																							
25-Sep	65	71	73	77	82	82	84	79	74	56	50	44	42	41	36	36	36	36	39	40	45	45	46	52	55.5	84																							
26-Sep	57	70	71	73	76	77	77	73	64	51	47	39	35	35	35	34	36	38	40	41	43	46	51	54	52.7	77																							
27-Sep	54	58	54	54	59	62	61	50	55	54	53	48	42	41	38	41	39	38	42	41	43	49	48	51	48.9	62																							
28-Sep	55	56	58	61	66	70	72	69	63	56	50	47	43	38	32	29	31	35	37	39	48	49	53	67	50.9	72																							
29-Sep	70	73	74	73	72	73	73	74	67	64	60	54	50	48	46	43	42	44	52	62	67	70	73	76	62.4	76																							
30-Sep	79	82	84	86	87	88	90	88	83	75	67	61	49	44	42	41	42	43	47	49	51	54	59	60	64.7	90																							
																								80.0	82.6	83.9	85.7	87.2	87.8	87.6	85.3	82.3	75.5	68.8	62.2	56.8	53.0	50.7	49.9	50.6	52.3	57.2	62.5	67.5	72.4	75.2	77.9	Diurnal Average	
																								97	98	99	99	99	99	99	99	99	99	99	97	95	97	94	86	83	87	84	93	96	97	96	96	Diurnal Maximum	







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	43	5.97	5.97
40 - 60	193	26.81	32.78
60 - 80	214	29.72	62.50
80 - 100	270	37.50	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

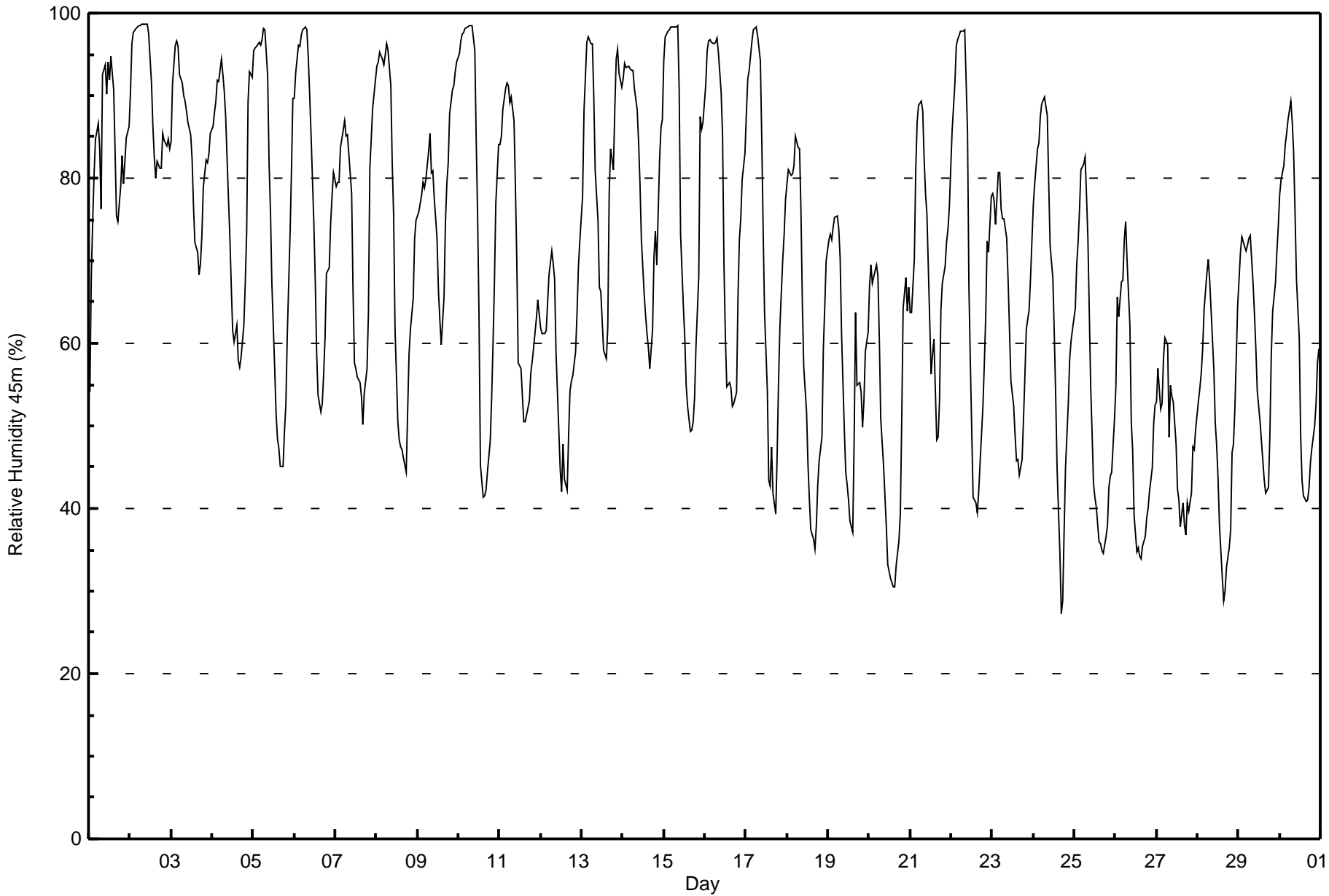


Maximum Value: 99 % on Sep 2 10:00																	Maximum Daily Average: 90.7 % on Sep 2																	Hours in Service: 720	
Minimum Value: 27 % on Sep 24 17:00																	Minimum Daily Average: 48.1 % on Sep 27																	Hours of Data: 720	
Maximum Diurnal Average: 86.4 % at hour 6																	Minimum Diurnal Average: 49.0 % at hour 16																	Hours of Missing Data: 0	
Monthly Average: 69.1 %																	Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 43 Q <sub>1</sub> = 53 Median = 70 Q <sub>3</sub> = 85 P <sub>90</sub> = 95 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-Sep	54	68	75	81	85	87	84	76	93	94	90	94	92	95	91	83	76	75	79	83	79	82	85	86	82.7	95									
2-Sep	91	96	98	98	98	98	99	99	99	99	99	97	92	86	83	80	82	81	81	85	85	84	85	84	90.7	99									
3-Sep	84	91	96	97	96	93	92	90	89	88	87	85	82	77	72	71	68	70	73	79	82	82	83	85	83.9	97									
4-Sep	86	88	89	92	92	94	92	91	87	78	73	67	62	60	62	58	57	58	62	67	73	89	93	92	77.7	94									
5-Sep	95	96	96	96	96	97	98	98	92	82	76	67	57	52	49	47	45	45	49	52	61	73	81	90	74.6	98									
6-Sep	90	93	96	96	97	98	98	98	95	90	85	75	68	59	54	52	53	56	61	68	69	75	78	81	78.5	98									
7-Sep	79	80	80	84	85	87	85	85	83	78	66	58	57	56	55	54	50	54	57	64	81	85	89	92	72.6	92									
8-Sep	94	94	95	94	94	95	96	95	91	82	75	62	51	48	48	47	46	44	52	59	62	65	73	75	72.4	96									
9-Sep	75	76	78	79	79	80	83	86	81	81	78	73	66	63	60	66	75	79	82	88	91	91	93	94	79.0	94									
10-Sep	95	97	97	98	98	98	98	99	99	95	85	75	63	45	41	42	42	44	48	53	60	67	77	84	75.1	99									
11-Sep	84	85	88	91	92	91	89	90	87	79	70	58	57	54	51	50	51	53	56	58	59	63	65	63	70.2	92									
12-Sep	62	61	61	61	65	68	71	70	68	59	54	45	42	48	44	42	49	54	55	56	59	64	69	72	58.3	72									
13-Sep	78	88	92	96	97	96	96	90	81	75	67	66	63	59	58	62	78	84	81	88	94	96	93	91	82.1	97									
14-Sep	92	94	93	94	93	93	93	91	88	84	79	73	66	63	61	60	57	62	70	73	70	82	86	87	79.4	94									
15-Sep	94	97	98	98	98	98	98	98	98	91	73	64	61	55	52	49	50	51	53	60	68	88	86	87	77.8	98									
16-Sep	91	95	97	97	96	96	97	97	95	90	85	69	61	55	55	54	52	53	54	65	72	75	80	83	77.8	97									
17-Sep	88	92	93	97	98	98	98	97	94	85	74	64	54	43	43	47	42	39	47	55	62	70	73	77	72.2	98									
18-Sep	79	81	80	80	82	85	84	84	76	65	57	52	45	41	37	36	35	38	43	46	49	59	64	70	61.2	85									
19-Sep	73	73	72	74	75	75	74	70	61	50	44	43	41	39	37	48	64	55	55	54	50	53	59	61	58.4	75									
20-Sep	67	69	67	69	69	68	61	51	45	41	38	33	32	31	31	31	33	36	39	51	64	68	64	67	51.0	69									
21-Sep	64	64	70	81	87	89	89	88	82	78	76	63	56	59	61	48	49	53	64	67	69	72	74	76	70.0	89									
22-Sep	86	89	92	96	97	98	98	98	98	86	67	58	50	41	41	40	42	46	52	57	63	72	71	78	71.4	98									
23-Sep	78	77	74	81	81	76	75	75	73	68	62	55	52	49	46	46	44	46	51	56	62	64	68	72	63.8	81									
24-Sep	77	79	84	84	87	89	90	89	88	80	72	68	61	54	45	34	27	29	37	45	53	58	60	62	64.6	90									
25-Sep	64	69	72	76	81	82	83	78	73	55	49	43	41	40	36	36	35	35	37	38	43	44	44	51	54.3	83									
26-Sep	55	66	63	68	68	73	75	70	62	51	47	39	35	35	34	34	35	37	39	40	42	45	50	53	50.6	75									
27-Sep	53	57	52	53	58	61	60	49	55	54	53	48	42	41	38	41	38	37	41	40	42	47	47	50	48.1	61									
28-Sep	53	54	57	59	64	68	70	68	64	57	50	48	44	38	32	29	30	33	35	37	47	48	52	65	50.1	70									
29-Sep	68	71	73	72	71	72	73	73	67	64	59	54	51	48	46	43	42	43	49	59	64	67	71	74	61.4	74									
30-Sep	78	80	82	84	85	87	89	87	83	76	68	61	49	43	42	41	41	43	46	47	50	53	58	59	63.7	89									
77.5																	80.7																	Diurnal Average	
95																	97																	Diurnal Maximum	
82.0																	84.2																		
85.5																	86.4																		
86.3																	84.3																		
81.6																	75.0																		
68.6																	61.9																		
56.4																	52.6																		
50.1																	49.0																		
49.6																	51.0																		
55.0																	59.7																		
64.2																	69.4																		
72.3																	75.4																		



Wood Buffalo Environmental Association  
Hourly Averages

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	47	6.53	6.53
40 - 60	206	28.61	35.14
60 - 80	218	30.28	65.42
80 - 100	249	34.58	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

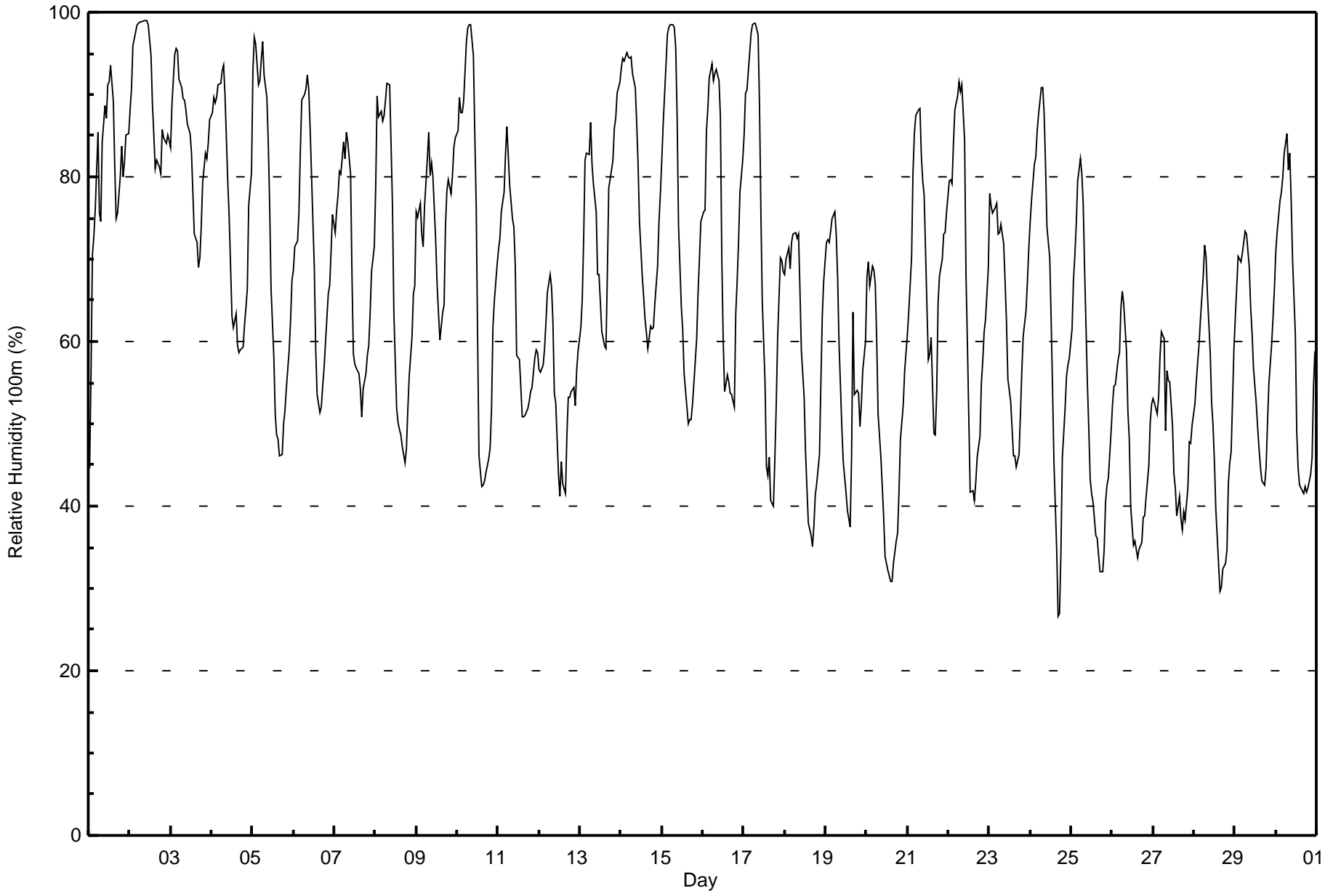


Maximum Value: 99 % on Sep 2 11:00																		Maximum Daily Average: 90.8 % on Sep 2																		Hours in Service: 720													
Minimum Value: 27 % on Sep 24 17:00																		Minimum Daily Average: 47.8 % on Sep 26																		Hours of Data: 720													
Maximum Diurnal Average: 83.5 % at hour 7																		Minimum Diurnal Average: 49.2 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 66.6 %																		Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 43 Q <sub>1</sub> = 52 Median = 67 Q <sub>3</sub> = 82 P <sub>90</sub> = 91 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-Sep	45	56	70	73	76	85	76	75	84	89	87	91	91	94	89	81	75	76	80	84	80	82	85	85	79.5	94																							
2-Sep	88	91	96	98	98	99	99	99	99	99	99	99	95	89	85	81	82	81	80	86	85	84	85	84	90.8	99																							
3-Sep	84	89	95	96	95	92	91	90	89	88	86	85	83	78	73	72	69	70	74	79	83	82	84	87	83.9	96																							
4-Sep	88	90	89	90	91	91	93	94	90	79	75	69	63	62	63	59	59	59	59	62	64	66	77	81	75.5	94																							
5-Sep	93	97	96	91	92	94	96	92	90	84	77	66	58	51	49	48	46	46	50	52	54	59	63	68	71.3	97																							
6-Sep	69	71	72	76	83	89	90	91	92	91	86	75	69	59	53	51	52	55	57	60	66	67	71	75	71.7	92																							
7-Sep	73	76	78	81	80	84	82	85	84	80	68	58	57	57	56	54	51	54	56	58	60	63	69	72	68.2	85																							
8-Sep	79	90	87	88	87	87	89	91	91	84	77	64	52	50	49	49	47	45	47	52	56	60	66	67	68.9	91																							
9-Sep	76	75	77	73	72	76	82	85	80	82	80	72	67	63	60	64	64	74	78	80	78	80	84	85	75.3	85																							
10-Sep	86	90	88	88	89	96	98	98	98	95	85	77	61	46	42	43	43	44	46	47	52	62	65	69	71.2	98																							
11-Sep	71	73	76	78	83	86	83	79	75	74	69	58	58	54	51	51	51	52	53	54	54	58	59	59	64.9	86																							
12-Sep	57	56	57	59	62	66	68	67	62	54	53	44	41	45	43	42	49	53	53	54	54	52	56	59	54.4	68																							
13-Sep	62	65	72	82	83	83	87	82	79	76	68	68	65	61	60	59	68	79	81	82	86	87	90	92	75.6	92																							
14-Sep	93	94	94	95	95	94	95	93	91	87	82	75	68	65	63	61	59	62	62	62	65	69	75	78	78.1	95																							
15-Sep	82	87	94	97	98	98	98	98	96	87	74	64	61	56	54	50	50	52	52	55	60	66	70	75	73.9	98																							
16-Sep	76	76	86	88	92	94	92	93	93	92	87	70	60	54	56	55	54	54	52	63	67	72	78	82	74.4	94																							
17-Sep	85	90	90	95	97	98	99	99	97	89	76	65	55	45	44	46	41	40	46	52	60	70	70	68	71.6	99																							
18-Sep	68	70	71	69	72	73	73	73	73	66	59	53	47	42	38	36	35	38	41	43	46	55	63	67	57.2	73																							
19-Sep	72	72	72	73	75	76	73	68	60	50	45	44	42	39	38	46	63	54	54	54	50	52	56	60	57.8	76																							
20-Sep	68	70	67	69	69	67	60	51	46	42	39	34	32	32	31	31	33	36	37	42	48	52	56	59	48.7	70																							
21-Sep	61	64	70	80	85	88	88	88	82	80	78	64	58	58	61	49	49	54	65	68	70	73	73	76	70.1	88																							
22-Sep	79	80	79	84	88	90	91	90	91	84	68	60	51	42	42	41	43	46	48	55	58	61	63	69	66.8	91																							
23-Sep	78	76	76	76	77	73	73	74	72	67	62	55	53	50	46	46	45	46	51	56	61	64	67	71	63.2	78																							
24-Sep	75	77	81	82	86	88	91	91	88	81	74	70	63	54	45	35	27	27	34	46	52	56	57	58	64.0	91																							
25-Sep	62	67	70	74	79	82	80	77	69	55	49	43	41	41	36	36	34	32	32	35	40	43	43	49	53.0	82																							
26-Sep	52	55	55	58	59	64	66	65	59	52	48	40	35	36	35	34	35	36	39	39	41	45	50	52	47.8	66																							
27-Sep	53	52	51	53	58	61	60	49	57	55	55	50	44	42	39	41	39	37	39	38	42	48	48	50	48.4	61																							
28-Sep	52	55	57	60	63	68	72	70	66	59	53	50	45	40	33	30	30	32	33	35	43	45	47	59	49.8	72																							
29-Sep	63	67	70	70	71	72	73	73	69	64	61	57	52	49	47	45	43	43	45	50	55	60	63	67	59.5	73																							
30-Sep	71	73	77	78	80	83	85	81	83	77	70	61	49	45	43	42	42	42	42	42	44	46	54	59	61.2	85																							
																								72.0	74.8	77.2	79.1	81.2	83.3	83.5	82.0	80.2	75.4	69.7	62.7	57.2	53.3	50.8	49.2	49.2	50.5	52.9	56.1	59.1	62.7	66.2	69.3	Diurnal Average	
																								93	97	96	98	98	99	99	99	99	99	99	99	95	94	89	81	82	81	81	86	86	87	90	92	Diurnal Maximum	



Wood Buffalo Environmental Association  
Hourly Averages

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	45	6.25	6.25
40 - 60	239	33.19	39.44
60 - 80	236	32.78	72.22
80 - 100	200	27.78	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



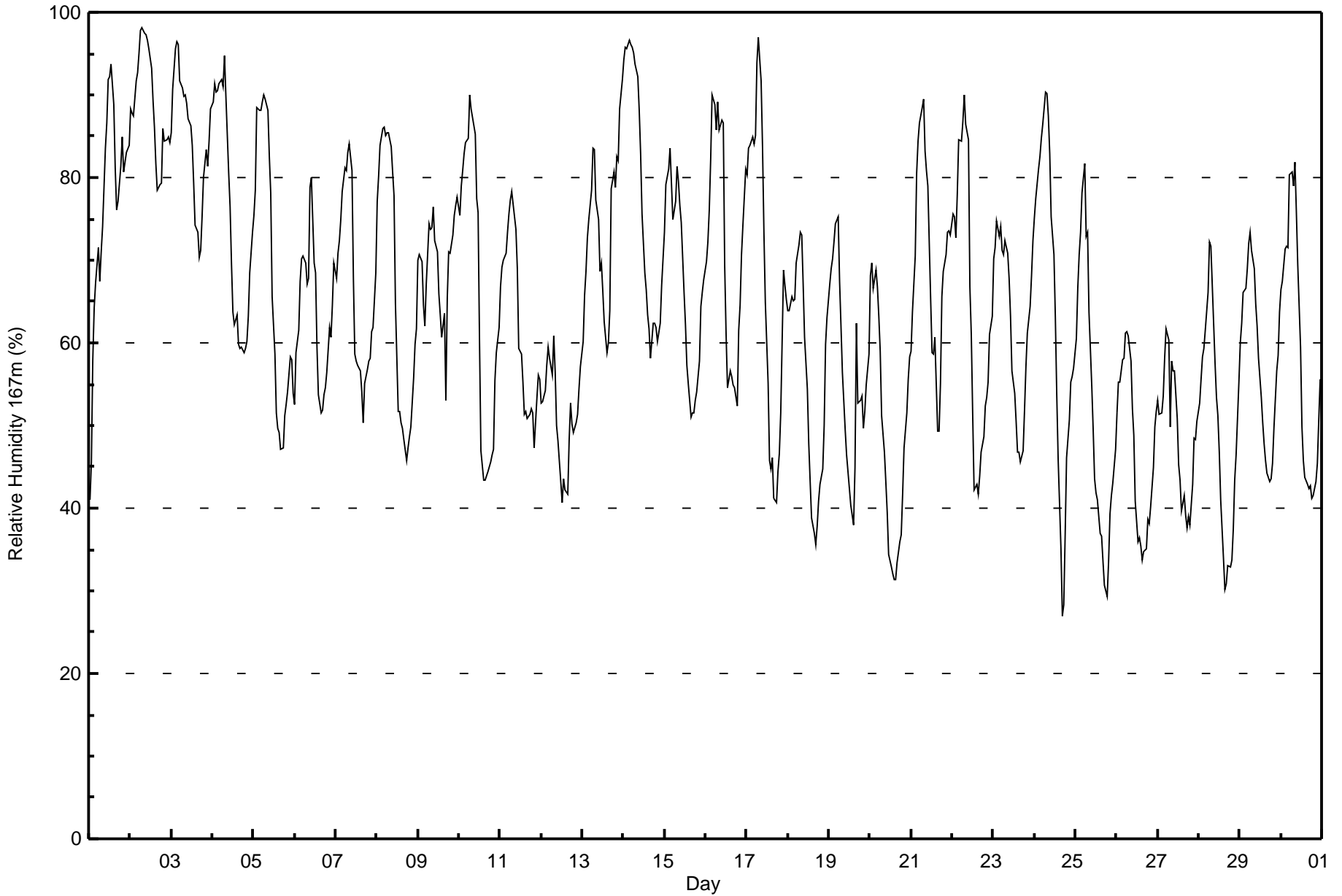


Maximum Value: 98 % on Sep 2 08:00																	Maximum Daily Average: 89.1 % on Sep 2																	Hours in Service: 720															
Minimum Value: 27 % on Sep 24 17:00																	Minimum Daily Average: 47.3 % on Sep 26																	Hours of Data: 720															
Maximum Diurnal Average: 78.7 % at hour 7																	Minimum Diurnal Average: 49.0 % at hour 17																	Hours of Missing Data: 0															
Monthly Average: 64.5 %																	Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 43 Q <sub>1</sub> = 52 Median = 64 Q <sub>3</sub> = 77 P <sub>90</sub> = 87 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-Sep	41	46	58	64	67	72	67	71	74	84	87	92	92	94	89	81	76	77	81	85	81	82	83	84	76.1	94																							
2-Sep	88	88	87	92	93	95	98	98	98	97	97	96	93	89	86	82	79	79	79	86	84	85	85	84	89.1	98																							
3-Sep	85	91	96	96	96	92	91	90	90	89	87	86	84	79	74	73	70	71	75	80	83	81	84	88	84.7	96																							
4-Sep	89	91	90	91	91	92	91	95	90	81	76	70	64	62	63	60	59	59	59	59	60	63	68	73	74.9	95																							
5-Sep	75	78	88	88	88	89	90	89	88	83	78	66	59	52	50	49	47	47	51	53	54	58	58	54	68.0	90																							
6-Sep	52	59	62	68	70	70	70	67	68	79	80	70	69	59	54	51	52	54	55	57	62	61	65	70	63.3	80																							
7-Sep	68	71	72	75	78	81	81	83	84	81	68	59	58	57	57	54	50	55	57	58	58	61	62	68	66.5	84																							
8-Sep	77	80	84	86	86	85	85	85	84	81	78	65	52	52	50	50	48	46	47	49	50	56	60	62	66.5	86																							
9-Sep	70	71	70	65	62	67	74	74	74	76	72	71	66	63	61	64	53	65	71	71	73	75	77	78	69.3	78																							
10-Sep	75	79	81	83	84	85	90	88	87	85	77	76	60	47	43	43	44	44	46	46	47	55	59	62	66.2	90																							
11-Sep	67	69	70	71	73	76	77	78	75	74	69	59	59	55	51	52	51	51	52	52	47	53	56	56	62.3	78																							
12-Sep	53	53	54	57	59	58	56	61	57	50	48	43	41	44	42	42	48	53	50	49	50	51	54	57	51.3	61																							
13-Sep	60	66	69	73	75	79	84	83	77	75	69	70	66	62	59	60	64	79	81	79	83	82	88	92	73.9	92																							
14-Sep	94	96	96	97	96	96	95	94	92	88	83	76	69	66	63	62	58	62	62	62	60	62	67	70	77.7	97																							
15-Sep	73	79	81	84	79	75	77	81	79	77	75	66	62	57	55	51	52	52	53	54	58	64	66	68	67.4	84																							
16-Sep	70	72	76	82	90	89	86	89	86	87	87	69	61	55	57	56	55	55	52	62	65	71	74	81	71.9	90																							
17-Sep	80	84	84	85	84	85	94	97	92	84	73	65	55	46	45	46	41	41	44	47	51	69	67	65	67.7	97																							
18-Sep	64	64	66	65	65	70	72	73	73	67	61	54	48	43	39	37	36	38	41	43	45	50	60	63	55.7	73																							
19-Sep	67	69	70	72	74	75	68	62	56	49	46	44	42	40	38	45	62	53	53	54	50	52	55	59	56.5	75																							
20-Sep	68	70	67	69	67	63	59	51	47	43	39	34	33	32	31	31	33	36	37	42	47	51	56	58	48.5	70																							
21-Sep	59	64	71	81	84	87	88	90	83	81	79	65	59	59	61	49	49	55	66	69	71	73	74	73	70.3	90																							
22-Sep	76	75	73	78	85	84	87	90	86	85	67	61	51	42	43	42	44	47	49	52	53	55	61	63	64.5	90																							
23-Sep	70	72	75	73	74	71	71	72	71	68	63	57	54	51	47	47	46	47	52	57	61	64	68	72	62.6	75																							
24-Sep	75	77	81	83	85	86	90	90	88	83	75	71	63	54	46	35	27	28	37	46	51	55	56	57	64.1	90																							
25-Sep	61	67	71	73	78	82	73	73	64	55	49	44	42	41	37	37	34	31	29	34	39	42	43	47	51.8	82																							
26-Sep	52	55	55	58	58	61	61	61	58	52	49	41	36	36	35	34	35	35	39	38	40	45	50	52	47.3	61																							
27-Sep	53	51	52	54	58	62	60	50	58	57	57	51	45	43	40	42	39	38	39	38	43	48	48	50	49.0	62																							
28-Sep	53	56	58	59	61	66	72	72	67	57	53	51	47	41	34	30	31	33	33	34	37	43	46	55	49.6	72																							
29-Sep	60	62	66	67	69	72	73	71	69	65	62	58	53	50	48	46	44	43	44	45	50	57	58	64	58.2	73																							
30-Sep	67	68	71	72	72	80	81	79	82	76	69	60	50	46	44	43	42	43	41	41	43	45	51	56	59.2	82																							
																								68.1	70.7	73.1	75.3	76.8	78.2	78.7	78.6	76.5	73.6	69.1	62.9	57.7	54.0	51.4	49.7	49.0	50.5	52.5	54.7	56.6	60.4	63.3	66.0	Diurnal Average	
																								94	96	96	97	96	96	98	98	98	97	97	96	93	94	89	82	79	79	81	86	84	85	88	92	Diurnal Maximum	



Wood Buffalo Environmental Association  
Hourly Averages

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	45	6.25	6.25
40 - 60	260	36.11	42.36
60 - 80	258	35.83	78.19
80 - 100	157	21.81	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 25 km/h on Sep 26 16:00		Maximum Daily Speed Average: 12.4 km/h on Sep 27		Hours in Service: 720																						
Minimum Speed Value: 0 km/h on Sep 1 07:00		Minimum Daily Speed Average: 1.4 km/h on Sep 13		Hours of Data: 720																						
Maximum Diurnal Speed Average: 4.6 km/h at hour 14		Minimum Diurnal Speed Average: 1.2 km/h at hour 24		Hours of Missing Data: 0																						
Monthly Average Velocity: 2.1 km/h 229.6 deg		Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 7 Q <sub>3</sub> = 11 P <sub>90</sub> = 15 P <sub>99</sub> = 22		Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	SE6	SE8	SE6	ESE2	NNE1	ESE3	SSE0	SSE15	ESE4	NNW8	NNW8	N9	NNW9	NW13	WNW10	NW9	W8	W8	SW6	WSW11	WSW13	SW5	S5	SW1	W2.2	SSE15
2-Sep	SSE3	SE7	SE7	SE6	SE6	NNE1	NNE3	NW3	NNW3	NNW5	NW4	NNW1	N7	NNE9	NNE11	NNE12	N15	NNW8	NNW6	N8	N7	N7	N6	N8	N4.2	N15
3-Sep	NNW6	NNW6	NNW7	NNW7	NW7	NW10	NW11	NW10	NW10	NW11	WNW13	WNW15	WNW16	NW14	NW14	NW14	NW13	NW11	NW13	NW9	NW9	WNW10	WNW8	NNW3	NW10.1	WNW16
4-Sep	NNW4	N3	N1	N2	WNW2	N3	NNW3	N4	NNW3	NNW5	NNW4	NNE4	N7	N8	N6	NNW1	WNW3	W3	NE2	NE1	NNW1	SSE1	SSE1	SE2	NNW2.5	N8
5-Sep	E1	NE3	E2	SSE6	SSE7	SE7	SE7	SE7	SE7	SSE8	SSE8	SSE8	SSE1	ESE1	SSE5	SE4	SSE5	S7	SW4	SSW2	N1	NNW2	N1	NNW1	SSE3.5	SSE8
6-Sep	N3	NNW3	N4	NNW4	NW1	NW2	NW3	NNW3	NNW4	NNW5	NNW4	NNW5	NNW7	N8	NNE8	NNE7	NNE6	NNE6	NNE5	N4	NNW3	N5	N5	N4	N4.3	NNE8
7-Sep	NNW4	NNW4	N5	NNW3	N3	N2	NNW4	NNW4	NNW5	N6	N7	N9	N9	N8	N9	N9	NNE9	NE6	ENE3	WSW0	N1	N2	W1	N2	N4.5	N9
8-Sep	NNW0	SE1	SE2	SE2	SE8	SE7	SE6	SE6	SE6	SE4	SSE6	SSE6	SSE3	WSW4	SW3	WSW6	WSW4	WSW2	NNW2	NNW2	SE2	SSE6	SE5	E4	SSE2.6	SE8
9-Sep	E4	SSE2	SSE3	SSE9	SSE15	SSE11	SSE9	SE7	SSE7	SE8	SE8	SSE10	SSE9	SSE11	SE10	NE2	SW2	SE8	ESE2	SSE3	SE3	SSE4	SE2	SSE3	SSE5.9	SSE15
10-Sep	SE3	SE4	SE7	SE8	SE8	SSE9	SE7	SSE8	SE8	SE8	SSE11	SSE11	SSE7	SW8	SW11	SW10	WSW10	WSW10	SSW5	SW6	SSE3	E1	SSE3	SE7	S5.6	SSE11
11-Sep	SE9	SSE9	SSE7	SE8	SSE7	SSE7	SSE9	SE13	SSE14	SSE14	SSE9	WSW10	WSW7	WSW10	WSW11	SW17	SW10	S4	S3	SW3	WSW7	WSW3	SW2	W11	SSW5.7	SW17
12-Sep	W16	W15	W13	W16	WNW8	WNW4	W6	W6	W7	WSW8	WSW7	WNW8	WNW10	W9	WNW12	W16	W16	W16	W15	W15	NW7	N4	NNW2	NW1	W9.4	W16
13-Sep	SW1	NW1	NNW1	NNW1	NNW2	N1	SSE1	SSE1	SE1	SW3	SW2	W5	WSW5	WSW2	NE3	NNW6	N3	NNW2	W1	NNW1	N2	NW2	NNW5	N6	NW1.4	N6
14-Sep	N7	NNW5	N6	N8	N5	N7	N7	N5	NNE8	N9	N10	NNE9	N6	N9	N9	NE4	NNE4	NNE4	NNW2	NE0	ENE4	N1	NNE1	NNE2	N5.3	N10
15-Sep	N1	N0	NNW2	NW3	NW3	WNW3	WNW3	WNW2	NW3	N3	SW1	SSW3	SSE6	SE9	SSE11	SSE13	SSE9	SSE9	SE6	E1	NNE3	N1	NNW3	NNW3	SSE1.4	SSE13
16-Sep	NNW2	NW2	NW1	NW3	NNW2	NNE2	NNW2	N1	NNW2	N3	N3	SE1	S3	SE5	SE8	SSE12	S9	S8	S9	SE9	SSE5	SE5	SSE7	SSE6	SSE2.6	SSE12
17-Sep	SSE9	SSE5	SSE6	SE7	SE7	SSE7	SSE6	SSE6	SE8	SSE8	SSE9	SSE13	S10	SSW8	SSW7	SSE8	SW8	SW6	S12	S13	SSE12	ESE5	SE10	SSE12	SSE7.6	S13
18-Sep	SSE13	SSE11	SSE8	SSE11	SSE11	SE10	SSE14	SSE14	SSE12	SSW4	W11	W13	W17	WSW16	W12	W12	W17	WSW13	SW8	SSW8	SSW10	SE6	ESE8	SE11	SSW6.8	W17
19-Sep	SE11	SE12	ESE11	ESE10	E7	E6	SE10	SSE8	S13	SSW16	SW18	WSW21	W19	WSW20	W20	W24	WSW12	W20	WSW17	WSW19	WSW17	W14	W11	W13	SW9.2	W24
20-Sep	WNW5	WSW6	WSW10	W14	W20	W15	W11	SW9	WSW13	WSW15	WSW18	W19	WNW20	W20	W18	WNW16	NW14	NW10	NW8	N4	NNW3	NNW2	NW2	N2	W10.3	WNW20
21-Sep	NW7	NW11	NW11	NW11	NW10	NW9	NNW10	N9	N10	N8	NNW7	NNW11	NNW11	NNW12	N9	NNW10	NNW7	NW11	NW10	NW11	NW10	NNW6	N4	N4	NNW8.8	NNW12
22-Sep	N1	NNW2	NNW2	NNW3	NW2	NW1	WSW1	SE2	SSE5	SSE4	SE6	SSE5	SSE7	SSE9	SSE8	S7	S7	SSW5	SE3	SE7	E2	SE1	SE2	ENE1	SSE2.7	SSE9
23-Sep	E3	ESE4	ESE3	SE2	SSE5	SSE12	SSE12	SSE13	SSE13	SSE17	SSE16	SSE15	SSE12	SE10	SE12	SE10	SE11	SE14	SE13	SE12	SSE13	SSE14	SSE16	SSE15	SE10.9	SSE17
24-Sep	SSE12	SE9	SSE1	SSE5	SSE5	S2	S4	S6	SSE8	S7	S6	SSE9	SSE10	SSE10	SSE8	SE9	SSE9	SE2	NW2	ESE3	SSE2	SSE10	SSE11	SSE11	SSE6.5	SSE12
25-Sep	SSE10	S4	SSE10	SSE8	S4	S8	SSE9	W10	W11	NW14	WNW7	W12	W15	WSW16	W16	WSW18	W12	W11	W8	SW6	WSW9	WSW12	WSW10	WNW10	WSW7.9	WSW18
26-Sep	WSW5	SSE10	SE10	SE11	SSE12	SSE10	SE10	SE8	S6	WSW14	W13	WSW16	WSW20	W20	W22	W25	W24	W19	WNW15	W16	W11	WSW12	W13	W12	WSW9.6	W25
27-Sep	WSW7	SSE11	SW8	W16	W11	WSW9	W16	WNW21	NW24	NNW18	NW17	NW24	NW22	NW22	NW18	NW15	NW16	NW12	NNW7	NW10	NW11	NNW10	NW14	NW12	NW12.4	NW24
28-Sep	NW9	NW10	NW9	NW11	NW6	NNW3	N3	E1	NE2	NNE3	WSW3	W6	W6	WSW3	WSW6	SW8	SSW5	SSE9	S10	S13	SSE9	SSE7	SSE8	SE6	WSW2.1	S13
29-Sep	SE7	SE8	SE8	SSE7	SSE6	S5	S7	SE2	SE6	SSE8	SE6	SSE7	SSE8	SSE8	SSE6	SSE5	SE2	SSE2	SE7	SE3	SSE4	SSE8	SSE10	SSE11	SSE6.2	SSE11
30-Sep	SSE11	SSE13	SSE14	SSE14	SSE17	SSE10	SE7	SE11	SSE11	SSE12	SSE12	SSE15	S13	SW16	SSW14	SSW13	S14	S14	S15	S17	S17	S17	SE8	SE10	SSE12.2	S17
SSE1.4 SSE1.9 S1.7SSW1.8 S2.1 S2.0 S2.0 S2.2 S1.7 SW1.5 SW2.6WSW3.7 W4.3 W4.6 W4.2 W4.6 W4.3WSW3.7WSW2.9 SW3.0 SW2.3SSW1.4 S1.2 S1.2																								Diurnal Average		
W16 W15 SSE14 W16 W20 W15 W16WNW21 NW24NNW18 SW18 NW24 NW22 NW22 W22 W25 W24 W20WSW17WSW19WSW17 S17 SSE16 SSE15																								Diurnal Maximum		
All monthly, daily, and diurnal averages have been calculated using vector methods																										

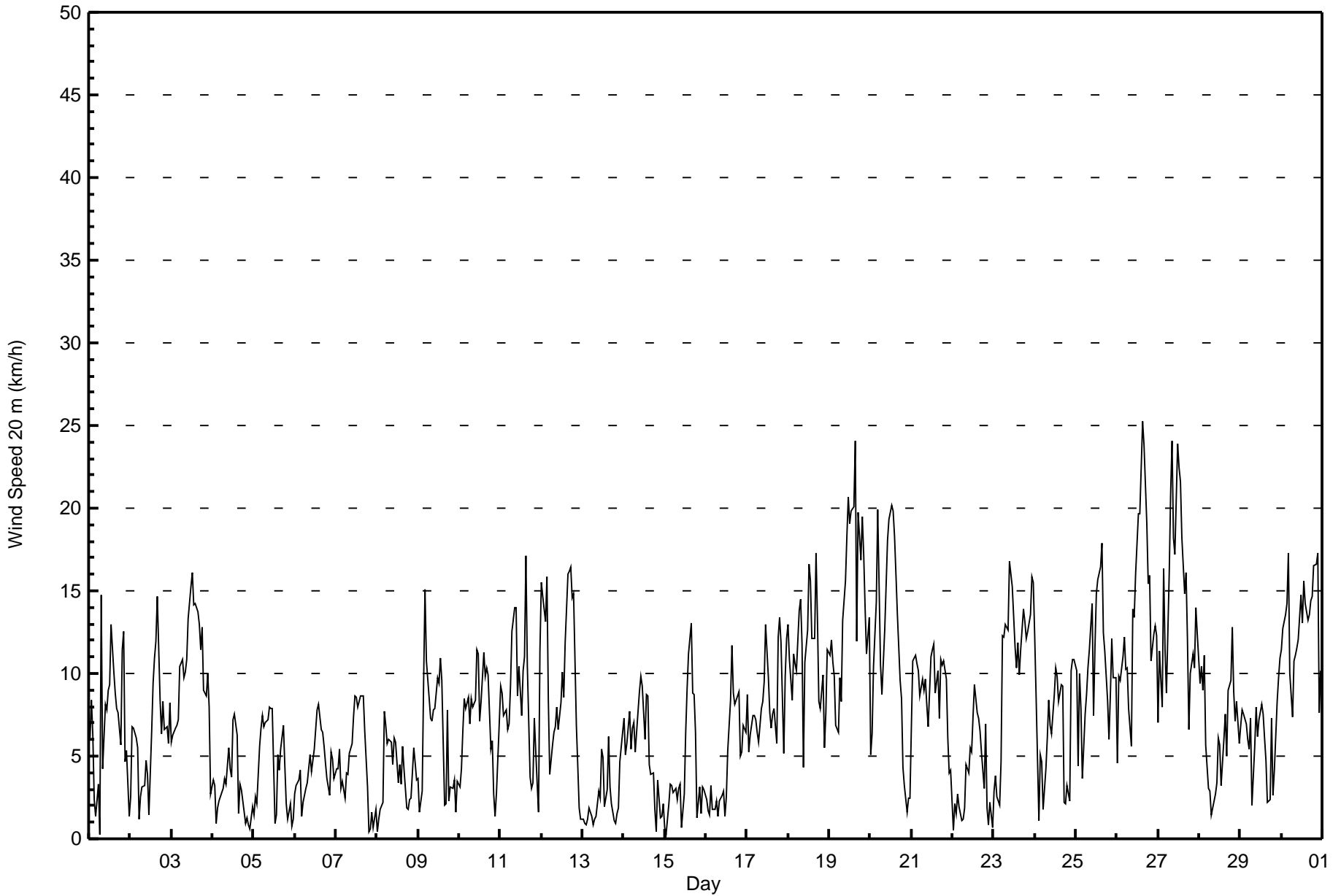


Summary of Hour Standard Deviations

Lower Camp Met Tower - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 10 km/h on Sep 27 09:00			Hours of Data:	720
Minimum Value: 1 km/h on Sep 8 01:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 9				

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	253	35.14	35.14
6 - 11	319	44.31	79.44
12 - 19	130	18.06	97.50
20 - 28	18	2.50	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

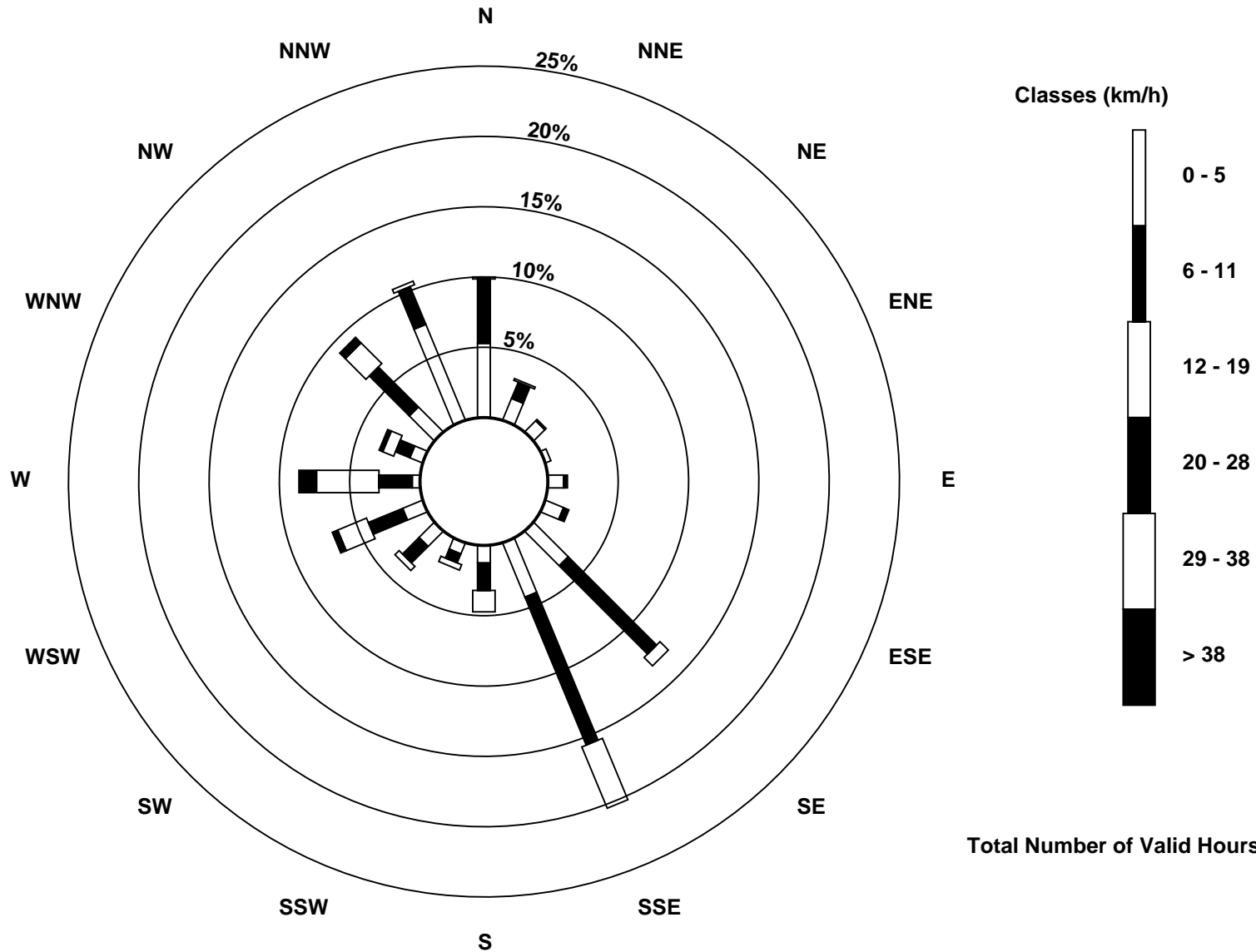
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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







Maximum Speed: 36 km/h on Sep 26 16:00	Maximum Daily Speed Average: 16.8 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 8 02:00	Minimum Daily Speed Average: 1.8 km/h on Sep 15	Hours of Data: 720
Maximum Diurnal Speed Average: 6.4 km/h at hour 14	Minimum Diurnal Speed Average: 1.4 km/h at hour 24	Hours of Missing Data: 0
Monthly Average Velocity: 2.7 km/h 238.3 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 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-Sep	SE9	SE11	SE9	ESE4	NNE2	ESE5	SSE2	SSE18	ESE6	NNW13	NNW12	N13	NNW14	NW18	WNW15	NW13	W11	W12	SW7	WSW14	WSW18	SW7	S7	SW2	W3.2	WSW18
2-Sep	SSE3	SE9	SE9	SE8	SE7	NNE2	NNE3	NW4	NNW4	NNW7	NW7	NNW3	N8	NNE13	NNE16	NNE17	N20	NNW13	NNW10	N12	N9	N10	N9	N12	N6.1	N20
3-Sep	NNW10	NNW10	NNW11	NNW11	NW11	NW15	NW15	NW14	NW14	NW15	WNW19	WNW21	WNW22	NW19	NW19	NW18	NW17	NW16	NW18	NW13	NW13	WNW15	WNW12	NNW4	NW14.3	WNW22
4-Sep	NNW5	N5	N2	N2	WNW2	N5	NNW5	N5	NNW4	NNW8	NNW5	NNE5	N9	N10	N8	NNW2	WNW4	W3	NE2	NE1	NNW1	SSE1	SSE1	SE3	NNW3.4	N10
5-Sep	E2	NE3	E3	SSE7	SSE8	SE9	SE9	SE8	SE9	SSE9	SSE9	SSE1	ESE2	ESE2	SSE6	SE5	SSE7	S8	SW6	SSW3	N1	NNW2	N2	NNW3	SSE4.2	SE9
6-Sep	N4	NNW6	N7	NNW7	NW2	NW3	NW5	NNW5	NNW7	NNW7	NNW6	NNW8	NNW10	N11	NNE12	NNE10	NNE10	NNE9	NNE8	N7	NNW5	N9	N8	N6	N6.7	NNE12
7-Sep	NNW7	NNW8	N9	NNW5	N6	N4	NNW7	NNW6	NNW8	N8	N10	N12	N12	N11	N13	N12	NNE12	NE11	ENE6	WSW1	N0	N2	W1	N2	N6.7	N13
8-Sep	NNW1	SE0	SE2	SE4	SE10	SE9	SE8	SE7	SE7	SE5	SSE6	SSE6	SSE3	WSW5	SW4	WSW7	WSW5	WSW2	NNW2	NNW3	SE4	SSE9	SE7	E4	SSE3.3	SE10
9-Sep	E4	SSE3	SSE4	SSE11	SSE18	SSE13	SSE11	SE9	SSE9	SE10	SE10	SSE11	SSE11	SSE13	SE12	NE3	SW2	SE11	ESE4	SSE5	SE6	SSE7	SE5	SSE6	SSE7.8	SSE18
10-Sep	SE5	SE7	SE9	SE11	SE10	SSE10	SE9	SSE11	SE10	SE11	SSE13	SSE13	SSE8	SW10	SW14	SW12	WSW14	WSW13	SSW8	SW8	SSE4	E3	SSE4	SE9	S7.1	WSW14
11-Sep	SE12	SSE12	SSE11	SE12	SSE9	SSE9	SSE12	SE17	SSE19	SSE17	SSE10	WSW15	WSW11	WSW14	WSW16	SW21	SW13	S4	S3	SW6	WSW11	WSW6	SW5	W17	SSW7.9	SW21
12-Sep	W23	W22	W20	W23	WNW13	WNW6	W10	W10	W11	WSW13	WSW9	WNW12	WNW15	W12	WNW17	W22	W23	W24	W21	W21	NW10	N8	NNW6	NW3	W14.1	W24
13-Sep	SW1	NW1	NNW2	NNW2	NNW3	N3	SSE1	SSE1	SE2	SW3	SW3	W7	WSW6	WSW2	NE4	NNW9	N5	NNW3	W1	NNW1	N2	NW3	NNW8	N10	NW2.2	N10
14-Sep	N11	NNW8	N9	N11	N9	N10	N9	N7	NNE10	N12	N13	NNE13	N8	N12	NE6	NNE5	NNE7	NNW3	NE2	ENE4	N3	NNE2	NNE3	N10	N7.6	N13
15-Sep	N2	N2	NNW1	NW4	NW4	WNW3	WNW4	WNW2	NW4	N3	SW0	SSW3	SSE8	SE11	SSE13	SSE15	SSE11	SSE11	SE9	E4	NNE3	N3	NNW4	NNW5	SSE1.8	SSE15
16-Sep	NNW4	NW2	NW2	NW4	NNW4	NNE3	NNW3	N1	NNW3	N3	N3	SE1	S2	SE6	SE11	SSE15	S10	S9	S11	SE12	SSE8	SE8	SSE10	SSE8	SSE3.2	SSE15
17-Sep	SSE11	SSE7	SSE9	SE10	SE10	SSE9	SSE8	SSE7	SE9	SSE10	SSE11	SSE15	S11	SSW9	SSW8	SSE10	SW10	SW7	S14	S15	SSE14	ESE7	SE12	SSE15	SSE9.3	SSE15
18-Sep	SSE17	SSE14	SSE11	SSE15	SSE14	SE14	SSE17	SSE18	SSE14	SSW5	W14	W18	W23	WSW22	W17	W17	W25	WSW19	SW12	SSW9	SSW12	SE7	ESE10	SE14	SSW9.0	W25
19-Sep	SE14	SE15	ESE14	ESE13	E11	E9	SE13	SSE11	S15	SSW19	SW22	WSW28	W27	WSW25	W28	W34	WSW17	W28	WSW22	WSW25	WSW26	W20	W16	W20	WSW12.5	W34
20-Sep	WNW8	WSW10	WSW15	W21	W28	W22	W15	SW11	WSW17	WSW22	WSW26	W26	WNW27	W27	W26	WNW22	NW18	NW13	NW13	N8	NNW6	NNW4	NW5	N5	W14.7	W28
21-Sep	NW10	NW15	NW16	NW15	NW14	NW13	NNW13	N13	N14	N12	NNW9	NNW15	NNW16	NNW16	N12	NNW15	NNW10	NW15	NW15	NW15	NW14	NNW9	N7	N7	NNW12.5	NNW16
22-Sep	N3	NNW4	NNW2	NNW3	NW2	NW1	WSW1	SE2	SSE5	SSE4	SE6	SSE6	SSE8	SSE11	SSE9	S8	S7	SSW6	SE5	SE9	E5	SE3	SE6	ENE2	SSE3.3	SSE11
23-Sep	E3	ESE6	ESE4	SE4	SSE8	SSE17	SSE17	SSE16	SSE17	SSE22	SSE21	SSE19	SSE15	SE13	SE15	SE13	SE15	SE18	SE18	SE16	SSE17	SSE18	SSE22	SSE22	SE14.7	SSE22
24-Sep	SSE18	SE13	SSE4	SSE7	SSE7	S3	S6	S7	SSE10	S7	S7	SSE10	SSE12	SSE12	SSE10	SE12	SSE12	SE4	NW1	ESE5	SSE4	SSE15	SSE16	SSE16	SSE8.9	SSE18
25-Sep	SSE15	S7	SSE15	SSE12	S6	S9	SSE10	W15	W17	NW19	NNW10	W17	W22	WSW23	W24	WSW26	W18	W17	W12	SW10	WSW13	WSW16	WSW15	WNW14	WSW11.5	WSW26
26-Sep	WSW7	SSE13	SE9	SE13	SSE12	SSE13	SE13	SE10	S7	WSW20	W19	WSW22	WSW28	W28	W32	W36	W33	W27	WNW22	W22	W15	WSW19	W19	W18	WSW13.9	W36
27-Sep	WSW11	SSE13	SW11	W24	W17	WSW13	W23	WNW29	NW32	NNW25	NW23	NW32	NW29	NW28	NW24	NW20	NW21	NW16	NNW10	NW14	NW15	NNW14	NW19	NW16	NW16.8	NW32
28-Sep	NW13	NW14	NW12	NW16	NW9	NNW5	N4	E1	NE3	NNE3	WSW4	W7	W7	WSW4	WSW7	SW9	SSW6	SSE11	S12	S14	SSE12	SSE10	SSE12	SE9	WSW2.6	NW16
29-Sep	SE11	SE11	SE11	SSE10	SSE8	S7	S9	SE4	SE7	SSE9	SE7	SSE8	SSE9	SSE9	SSE7	SSE5	SE3	SSE3	SE10	SE6	SSE8	SSE11	SSE13	SSE15	SSE8.3	SSE15
30-Sep	SSE16	SSE17	SSE18	SSE18	SSE21	SSE13	SE9	SE15	SSE14	SSE15	SSE16	SSE19	S16	SW19	SSW18	SSW16	S15	S16	S16	S18	S18	S18	SE10	SE12	SSE14.9	SSE21
S1.7 SSE2.3 S2.1 SSW2.3 S2.4 S2.3 S2.4 S2.6 S1.7 WSW2.0 WSW3.4 W5.2 W6.1 W6.4 W5.9 W6.3 W6.0 WSW5.0 WSW3.7 SW3.7 SW3.3 SW1.8 SSW1.6 SSW1.4																								Diurnal Average		
W23 W22 W20 W24 W28 W22 W23 WNW29 NW32 NNW25 WSW26 NW32 NW29 W28 W32 W36 W33 W28 WSW22 WSW25 WSW26 W20 SSE22 SSE22																								Diurnal Maximum		

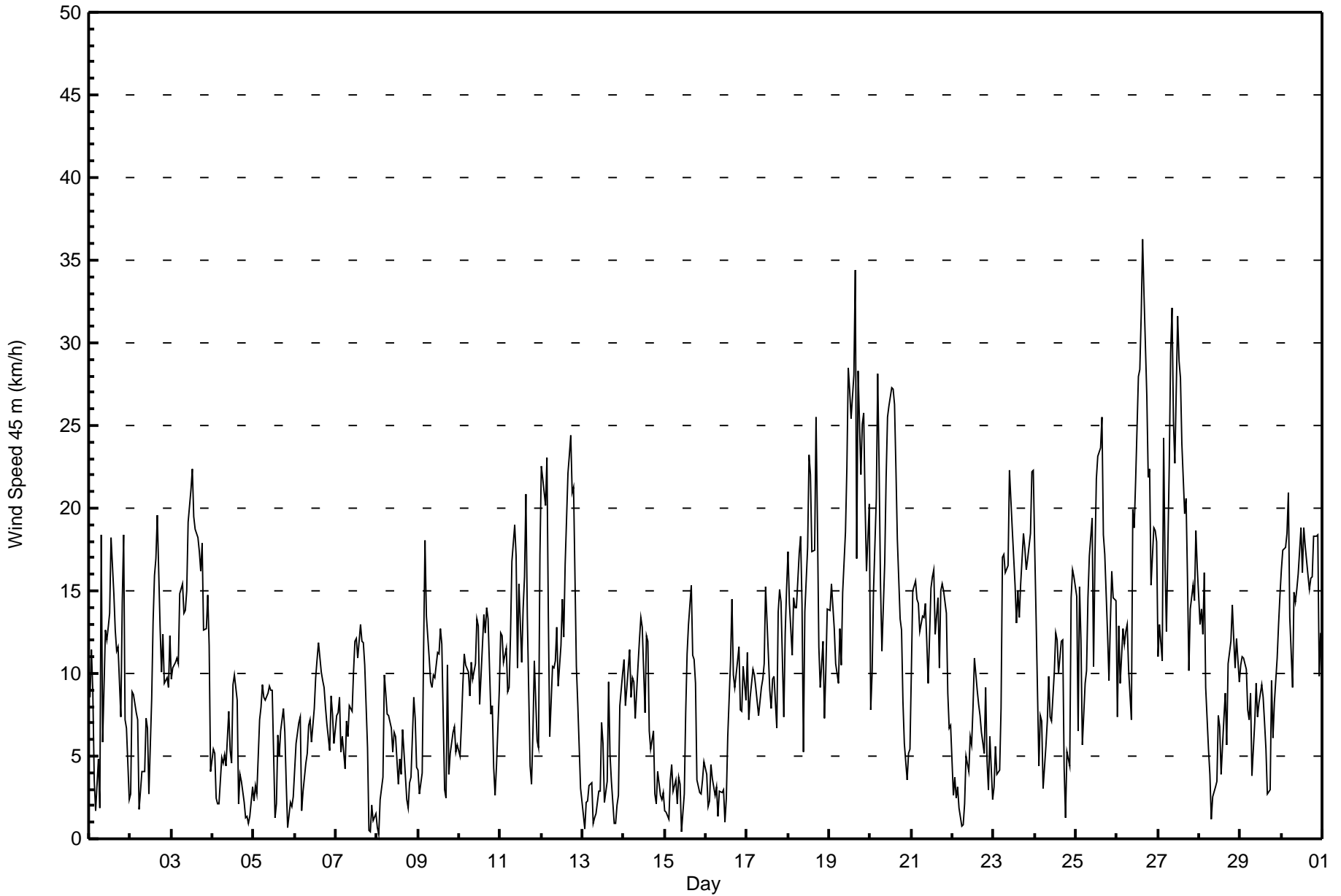
All monthly, daily, and diurnal averages have been calculated using vector methods



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

Diurnal Maximum





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	180	25.00	25.00
6 - 11	252	35.00	60.00
12 - 19	219	30.42	90.42
20 - 28	61	8.47	98.89
29 - 38	8	1.11	100.00
> 38	0	0.00	100.00

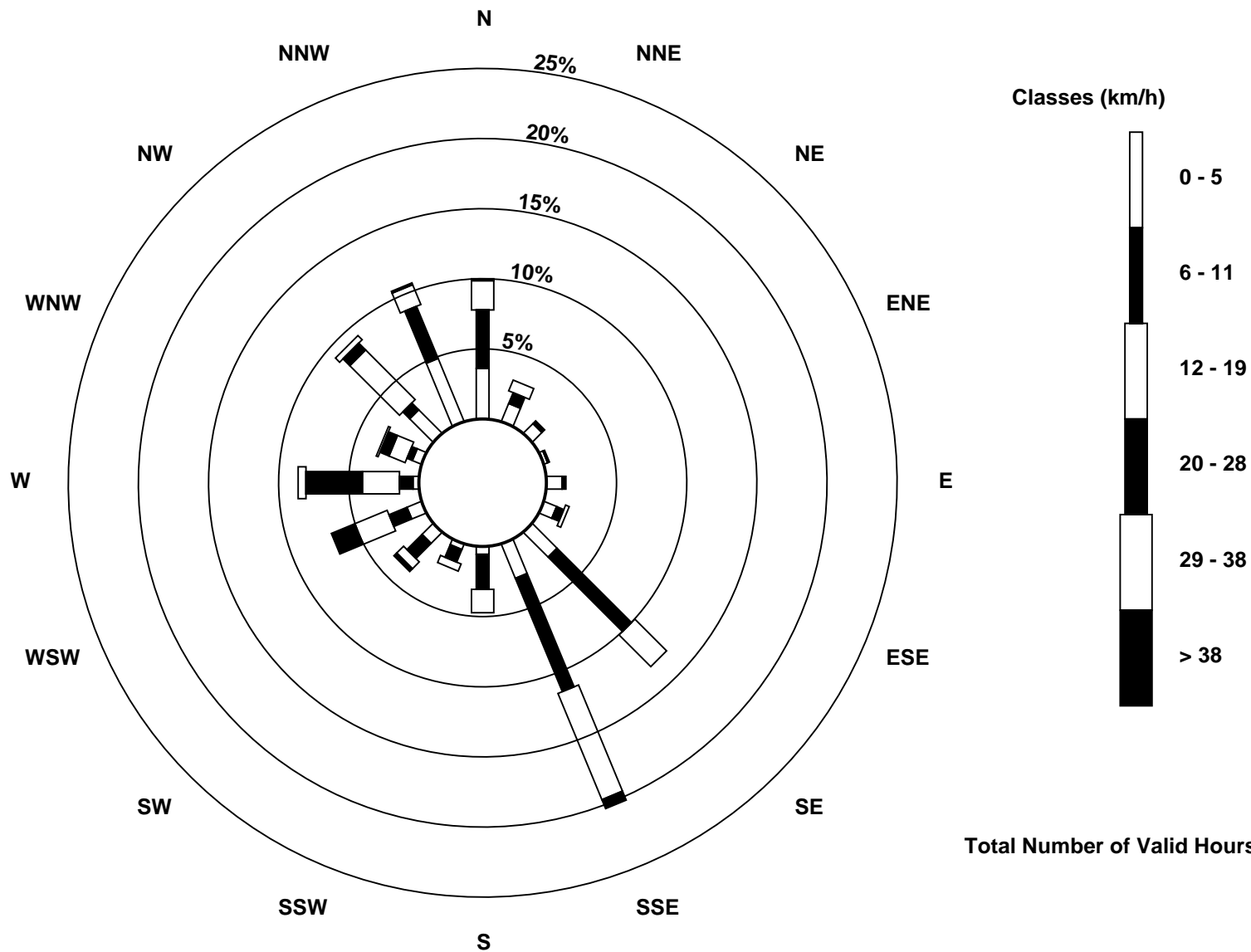
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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





Maximum Speed: 47 km/h on Sep 19 16:00	Maximum Daily Speed Average: 25.3 km/h on Sep 23	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 16 12:00	Minimum Daily Speed Average: 3.6 km/h on Sep 8	Hours of Data: 720
Maximum Diurnal Speed Average: 7.6 km/h at hour 14	Minimum Diurnal Speed Average: 2.2 km/h at hour 9	Hours of Missing Data: 0
Monthly Average Velocity: 4.4 km/h 229.0 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 9 Median = 15 Q <sub>3</sub> = 21 P <sub>90</sub> = 28 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-Sep	S6	SSE11	SSE13	SSE9	SE5	SSE12	SSE9	SSE30	ESE13	N21	N21	N22	NNW21	WNW28	WNW22	WNW18	W15	W14	SW10	WSW17	WSW22	WSW13	SW15	SW8	WSW4.8	SSE30
2-Sep	WSW4	S8	SSE10	SSE9	SSE8	NNE3	ENE1	N4	N5	N11	N13	NNE6	NNE13	NNE19	NNE22	NNE26	N28	N19	N17	N21	N17	NNE19	N17	N19	N10.1	N28
3-Sep	N16	NNW18	NNW20	NNW19	NW20	WNW24	WNW25	NW23	NW22	NW22	WNW27	WNW29	WNW30	WNW26	NW26	NW24	NW25	WNW24	WNW24	WNW20	WNW22	WNW24	WNW19	WNW8	NW21.5	WNW30
4-Sep	WNW10	NW8	WNW4	WNW5	WNW5	NNW8	NNW8	N7	N6	NW10	NNW7	N5	NNW12	NNW13	N11	NNE3	WNW4	WNW3	NE3	E5	E3	SSE2	SSE3	SSE4	NNW4.3	NNW13
5-Sep	SSE8	SE7	SE6	SSE10	SSE9	SSE12	SSE13	SSE10	SSE9	SE12	SSE9	SE11	SE2	ESE5	SE8	SE7	SE9	SSE9	SW7	SSW4	S3	E2	E4	E3	SSE6.8	SSE13
6-Sep	NE3	NNE7	NNE10	N12	NNE5	N8	N8	NNW8	NNW12	NNW11	N9	N10	NNW12	NNW15	NNE18	NNE15	NNE15	NNE16	NNE17	NNE16	N9	NNW16	NNW15	N11	N10.9	NNE18
7-Sep	NNW14	NNW17	NNW17	NNW12	NNW14	N9	N12	N11	N12	N10	N14	N16	N18	N15	N18	N18	N18	NE16	ENE9	ENE4	E2	WNW1	W1	WSW5	N10.7	N18
8-Sep	NW5	NNE4	SE3	SSW3	SSW5	S4	S4	SSE5	SE7	SE7	SE6	SE6	SSE2	W5	WSW4	WSW6	W5	WSW2	NNE3	ENE9	SE11	SE19	SSE16	SSE9	SSE3.6	SE19
9-Sep	SSE9	SSE8	SSE13	SSE17	SSE21	SSE18	SSE14	SSE15	SSE10	SE11	SE13	SE13	SE12	SE16	SE14	NE3	S3	SE18	SE10	SSE8	S6	SSE8	SSE10	SSE11	SSE11.5	SSE21
10-Sep	SSE10	SSE10	S8	S9	S8	SSE16	SSE14	SE16	SE14	SE16	SSE18	SSE13	SSE10	SW13	SW16	SW15	SW16	SW17	SW16	SW20	SW17	SSW6	S7	S10	S10.8	SW20
11-Sep	SSE8	SSE12	SSE14	SSE18	SSE16	SSE16	SSE14	SSE13	S13	SSE14	SSE12	WSW18	SW13	SW15	WSW19	SW26	SW20	SW8	SW12	SW19	SW23	SW16	WSW15	WSW30	SSW12.8	WSW30
12-Sep	W36	WSW36	WSW33	W36	W26	W16	WSW19	W17	W17	WSW17	WSW14	W18	W20	W21	W23	W31	WSW31	WSW32	WSW32	W33	WNW19	NNW18	N15	N13	W21.9	WSW36
13-Sep	N9	NNW7	N6	NNW5	NNW8	NW10	NNW3	SE2	NE1	S1	SW2	W7	W6	W2	NNE4	NNW14	NW12	NNE9	ENE2	S1	NNW6	NNW8	N14	N16	NNW5.3	N16
14-Sep	N16	N14	N14	N16	N13	N15	N15	NNE12	NNE15	N17	N18	NNE17	N10	N16	N16	NE9	NNE7	NE11	NE10	ENE15	ENE8	ENE7	E4	ESE3	NNE11.3	N18
15-Sep	WSW1	SE1	ESE2	NNW6	N4	NE2	NE4	NE3	NNE4	NW3	WNW1	SSE3	SE11	SE16	SE18	SSE17	SE15	SE15	SE16	SE14	SE6	SE6	SE6	SW1	SE5.5	SE18
16-Sep	NNW3	N3	N6	NNW6	NNW8	WNW0	NW2	ESE2	WNW2	NW2	NW3	S0	SSW2	SE5	ESE15	SE18	SSE11	S10	SSE13	SSE18	SSE15	SE14	SE18	SSE13	SSE4.8	SE18
17-Sep	SSE14	SSE16	SSE12	SSE14	SSE14	SSE13	SSE13	SSE10	SE12	SE12	SE13	SE19	SSE13	SSW10	SSW9	SSE12	SW13	SSW8	S21	S27	S20	SE11	SSE12	SSE15	SSE13.0	S27
18-Sep	SSE14	SSE12	SSE14	SSE14	SSE16	SSE13	S13	S11	S10	SW8	WSW15	WSW21	WSW25	WSW23	WSW21	WSW22	WSW29	WSW25	SW19	SW20	SW28	S13	SE12	SSE16	SSW13.1	WSW29
19-Sep	SE16	SE18	SE15	SE16	ESE14	SE13	SSE17	S16	S21	SW26	SW28	WSW34	WSW32	SW30	WSW35	WSW47	WSW22	WSW39	SW31	SW33	WSW32	WSW30	W27	WSW29	SW19.6	WSW47
20-Sep	W12	WSW17	WSW22	WSW28	W39	WSW32	WSW22	SW17	SW19	WSW24	WSW28	W35	W37	W36	W34	WNW31	NW26	NW20	NW22	NNW18	NNW13	NNW13	NW14	NW13	W21.1	W39
21-Sep	WNW21	WNW24	WNW24	WNW22	WNW22	WNW21	NNW22	N20	N21	N17	NNW12	NNW20	NNW22	NW24	N18	NNW21	NW15	NW21	WNW24	WNW23	NW22	NW15	NW12	NW12	NW18.7	WNW24
22-Sep	NW9	WNW9	WNW8	W8	WNW5	WNW3	SE2	SSW3	SE5	SE4	SE7	SE7	SE9	SE13	SE11	S10	S8	S8	SSE9	SE17	SE15	SE17	SSE15	SE17	SSE5.7	SE17
23-Sep	SE9	SE12	SE9	SE18	SE22	SE31	SE30	SE28	SE30	SE37	SE31	SE28	SE23	SE20	SE23	SE22	ESE23	SE27	SE28	SE27	SE31	SE31	SE36	SE36	SE25.3	SE37
24-Sep	SE34	SE30	SE22	SE25	SE18	SSE11	SSE13	SSE11	SSE11	S7	S8	SE13	SE15	SE13	SE13	SE16	ESE11	ESE12	SE12	SE16	SE29	SE30	SE31	SE17.0	SE34	
25-Sep	SE29	SE21	SE30	SE30	SE19	SSE17	S14	WSW22	W27	WNW27	W15	WSW21	WSW29	WSW26	WSW28	WSW24	WSW25	WSW23	WSW18	WSW21	WSW25	WSW24	WSW23	SW15.7	SE30	
26-Sep	WSW17	SSW6	SSW9	S9	SSW8	S9	SSE9	SSW9	SW11	WSW22	WSW21	WSW23	WSW31	WSW36	WSW36	WSW45	W45	W37	W31	W33	WSW24	WSW25	WSW27	WSW24	WSW21.4	W45
27-Sep	WSW17	S10	SW17	WSW32	WSW24	WSW18	W32	WNW41	NW45	NNW36	NW30	WNW41	NW38	NW39	NW34	NW30	NW28	NW23	NW18	WNW23	NW24	NW24	NW27	NW26	WNW24.8	NW45
28-Sep	NW23	NW23	WNW20	WNW25	WNW21	W15	WNW5	WNW3	NNW3	N3	WSW4	WSW8	W7	W5	WSW9	SW10	SSW6	SSE11	S14	S22	SSE16	SE20	SE27	SE22	WSW5.2	SE27
29-Sep	SE23	SE23	SE22	SE21	SE17	SE18	SSE14	SE10	SE10	SSE12	SE10	SE10	SE11	SE10	SE8	SE6	SE4	SSE6	SSE13	SSE15	SE16	SSE18	S9	SSE13	SE13.1	SE23
30-Sep	SSE17	SSE19	SSE19	SSE20	SSE25	SSE21	SSE19	SSE24	SSE21	SE20	SE23	SSE24	S18	SSW22	SSW20	S17	S19	S20	S25	S23	SSW20	SSW22	S14	SSE11	SSE18.6	SSE25

SSW3.3	S3.4	S3.8	SSW4.6	SSW4.4	S4.5	S4.1	SSW3.9	SSW2.2	WSW2.4	WSW3.3	WSW5.4	W7.2	W7.6	W6.8	W7.5	W7.5	WSW6.3	SW6.0	SW6.7	SW6.2	SSW4.2	SSW4.2	SSW4.3	Diurnal Average		
WSW36	WSW36	WSW33	W36	W39	WSW32	W32	WNW41	NW45	SE37	SE31	WNW41	NW38	NW39	WSW36	WSW47	W45	WSW39	WSW32	W33	WSW32	SE31	SE36	SE36	Diurnal Maximum		

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



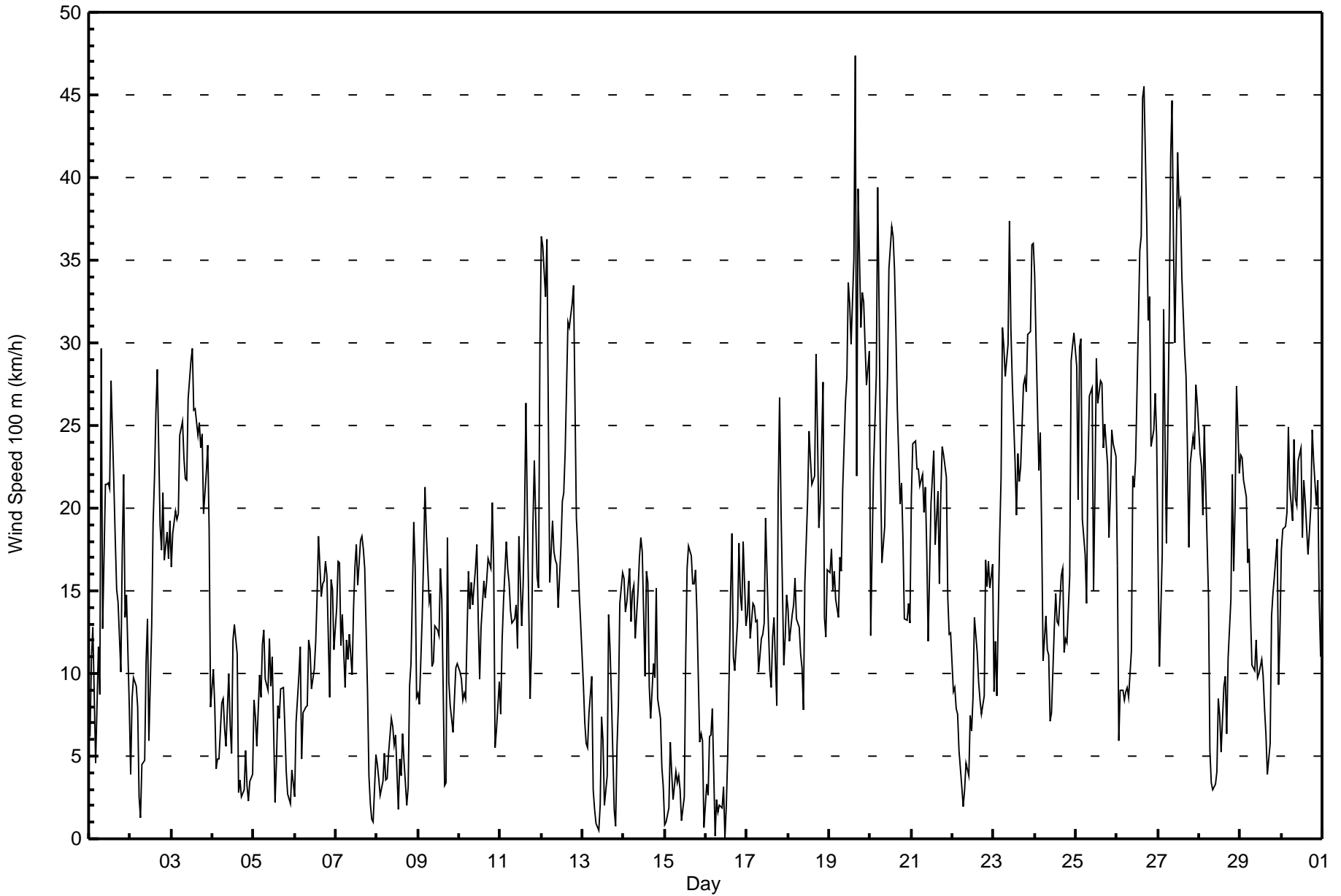
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 100 m (WS100m) - km/h

Lower Camp Met Tower - September 2015

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







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	97	13.47	13.47
6 - 11	160	22.22	35.69
12 - 19	245	34.03	69.72
20 - 28	149	20.69	90.42
29 - 38	60	8.33	98.75
> 38	9	1.25	100.00

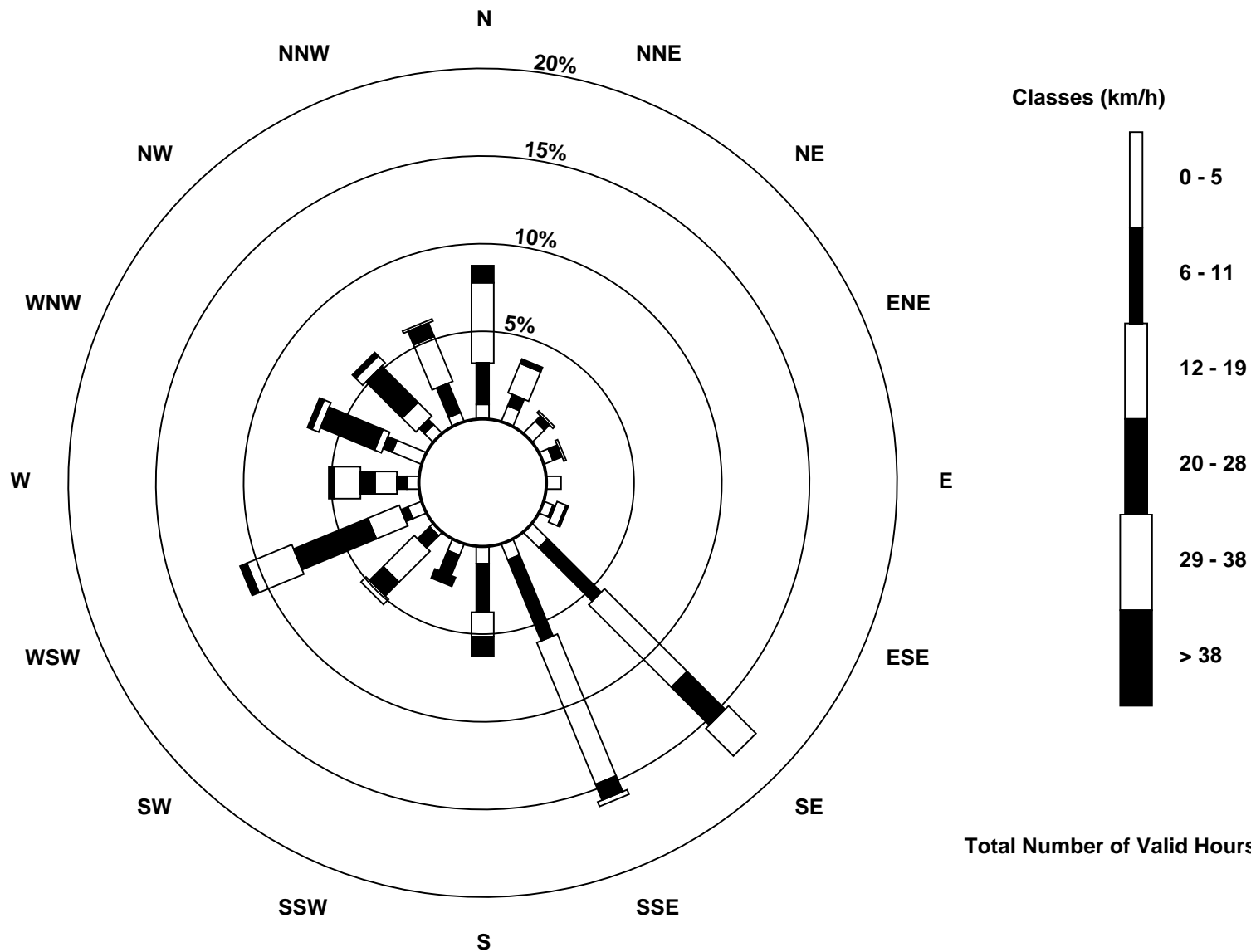
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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





Maximum Speed: 56 km/h on Sep 19 16:00	Maximum Daily Speed Average: 29.7 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 16 02:00	Minimum Daily Speed Average: 3.6 km/h on Sep 8	Hours of Data: 719
Maximum Diurnal Speed Average: 9.3 km/h at hour 14	Minimum Diurnal Speed Average: 4.4 km/h at hour 10	Hours of Missing Data: 1
Monthly Average Velocity: 6.6 km/h 243.1 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 5 Q <sub>1</sub> = 10 Median = 17 Q <sub>3</sub> = 26 P <sub>90</sub> = 34 P <sub>99</sub> = 46	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-Sep	SW13	SSW9	S10	SSE11	SSE8	SSE15	SSE14	SE34	UO	N27	N27	NNE28	N26	NW34	WNW25	WNW21	W17	W16	SW12	WSW22	WSW26	WSW19	WSW23	WSW14	W7.8	SE34
2-Sep	WSW8	SSW11	SSW8	SSW7	SSW5	W4	SE3	N2	NNE4	NNE12	NNE20	NNE10	NNE14	NNE20	NNE22	NNE29	NNE33	N23	N22	N26	NNE22	NNE26	NNE23	N24	NNE12.1	NNE33
3-Sep	N21	N20	N25	NNW23	NW25	NW31	NW33	NW30	NW27	NW26	WNW30	WNW33	WNW33	WNW29	NW30	NW27	NW27	WNW25	WNW27	WNW25	WNW28	WNW29	WNW22	WNW12	NW25.3	WNW33
4-Sep	WNW15	WNW11	WNW7	WNW9	WNW9	WNW9	NNW12	N8	NNW7	NW11	NNW8	N6	NNW13	NNW13	N11	NNE4	NW4	NNW3	NE4	E8	E6	ESE4	SSW4	S3	NNW5.3	WNW15
5-Sep	S9	SSE10	S7	SSE11	S13	S13	SSE12	S11	S10	SSE10	SSE9	SE11	S2	ESE5	SSE8	SE8	SE9	S9	SW6	S5	SSW4	NE1	E4	E6	SSE7.2	S13
6-Sep	E11	E11	ENE9	NE8	ENE5	ESE4	E5	E6	N10	N15	NNE12	N12	NNW13	N16	NNE19	NNE17	NNE19	NE20	NE24	NNE22	NNE17	NNE22	N19	NNE15	NNE12.1	NE24
7-Sep	N15	N18	N20	N16	N16	NNE14	NNE17	N15	N15	N11	N14	N17	N19	N17	N19	N19	NNE18	NE18	NE10	NE6	ENE4	NW1	WSW3	W9	N12.6	N20
8-Sep	WNW7	WNW4	SW4	WSW7	WSW9	SW6	SW4	SW4	S3	SE6	SE5	SSE6	SW2	W5	WSW4	W6	W4	W2	NNE3	ENE14	ESE17	SSE24	SSE19	S15	S3.6	SSE24
9-Sep	SSE13	SSE13	SSE15	SSE15	SSE17	S14	S11	S9	S9	S8	S9	SSE9	SSE9	SE15	SSE13	NNE2	SW6	SSE18	SE13	S10	SSW10	S11	S10	SSW7	SSE10.3	SSE18
10-Sep	S6	SSW6	SW8	SSW9	SSW11	SSW11	S9	S9	S7	SSE13	SSE14	SSE11	S10	SW15	SW17	SW16	SW17	SW20	SW20	WSW21	SW21	SW21	SW15	SW17	SSW12.3	WSW21
11-Sep	SSW13	SSW7	SSW9	S10	S13	S13	SSW13	SSW13	SSW16	SSW13	SSW12	WSW22	SW16	WSW19	WSW25	SW31	WSW25	SW12	WSW16	WSW26	WSW32	SW26	WSW27	W40	SW17.2	W40
12-Sep	W46	W45	W44	W43	W30	WNW20	W24	WNW20	WNW19	W19	W21	W22	W25	W28	W29	W35	W36	WSW38	W41	W41	NW25	N23	NNE23	N21	W26.4	W46
13-Sep	NNE13	N9	NNW9	NW9	NW13	NW12	NNW8	NW6	NNW3	NE3	W1	W8	W6	W3	N4	NNW14	NW15	NNE13	ENE6	ESE5	WNW8	NW9	N20	N20	NNW7.1	N20
14-Sep	N20	NNE18	N17	NNE20	NNE15	N18	NNE19	NNE15	NNE16	NNE17	N19	NNE18	N10	N17	N16	NNE9	NNE8	NE11	ENE10	ENE15	ENE13	ENE11	ENE13	ESE9	NNE13.2	NNE20
15-Sep	SSE8	SSW5	SSW4	W3	E1	ESE5	SE5	SE8	ESE3	SW1	WNW1	SE5	SE12	SE16	SSE18	SSE17	SE15	SE15	SE17	SE17	SE10	SE11	SE8	SE8.5	SSE18	
16-Sep	SE4	SW0	NW1	WNW2	W5	S4	SSW4	S5	SW7	SW6	W5	SW1	SSW3	SSE4	SE14	SE17	S11	S10	S15	SSE19	SSE16	SSE16	SSE20	SSE14	S7.3	SSE20
17-Sep	S10	S14	S12	SSW8	S10	S9	SSE11	S7	S6	SSE8	SSE12	SSE18	S13	SSW11	SSW10	SSE11	SW15	SSW10	S24	SSW27	SSW28	SSE12	SSW12	SSW13	S12.3	SSW28
18-Sep	SSW10	SSW8	SSW10	SSW11	SSW12	SSW14	SSW16	SSW14	SSW12	SW11	WSW18	WSW24	WSW29	WSW27	WSW24	WSW25	WSW34	WSW30	WSW23	SW24	SW33	SSW21	S15	S16	SW17.6	WSW34
19-Sep	S15	S17	S13	SSE16	SSE17	SSE16	SSW21	SSW28	SSW36	SW35	SW31	WSW39	WSW38	SW34	WSW41	WSW56	WSW29	WSW49	WSW39	WSW42	WSW42	WSW39	W36	WSW38	SW27.9	WSW56
20-Sep	W20	WSW26	WSW31	WSW37	W46	W39	WSW32	WSW23	WSW23	WSW28	WSW32	W39	W41	W41	W38	WNW34	WNW30	NW24	NW25	NNW24	NNW18	NNW19	NNW20	NNW17	W25.7	W46
21-Sep	NW25	WNW29	WNW29	WNW28	NW28	NW26	NNW27	N23	N24	N19	NNW13	NNW23	NNW24	NW27	N21	NNW23	NNW17	NW24	WNW28	WNW29	NW28	NW19	NW18	NW19	NW22.5	WNW29
22-Sep	NW17	NW14	NW10	WNW10	W9	W7	WSW2	W5	SW3	S5	SE7	SE7	SE8	SE13	SSE12	S11	S9	S9	SSE10	SE23	SE21	SSE25	SSE19	SSE20	S5.8	SSE25
23-Sep	SSE19	SE19	SE15	SE27	SSE27	SE34	SE36	SE34	SE36	SE40	SE34	SE29	SE24	SE21	SE26	SE24	SE25	SE31	SE34	SE33	SE36	SE35	SE39	SSE37	SE29.6	SE40
24-Sep	SSE37	SE32	SE28	SE29	SE25	SSE18	SSE21	SSE12	S15	SSW9	S8	SSE11	SE12	SE11	SE13	SE17	SSE16	SE13	ESE19	SE20	SE25	SSE30	SSE31	SSE32	SE19.5	SSE37
25-Sep	SSE29	SSE23	SSE29	SSE32	SE25	S23	SSW19	W30	WNW31	WNW32	W19	WSW25	WSW33	WSW31	WSW33	WSW32	WSW29	WSW32	W33	WSW27	WSW33	WSW37	WSW35	WSW33	WSW21.1	WSW37
26-Sep	WSW24	WSW12	WSW14	SW12	SW15	SW14	SW15	SW22	SW19	WSW27	WSW26	WSW26	WSW36	WSW40	WSW42	WSW52	W50	W43	W37	W40	WSW32	WSW33	WSW36	WSW33	WSW28.7	WSW52
27-Sep	WSW24	SW13	SW25	WSW39	W31	WSW25	W38	WNW47	NW50	NNW41	NW33	WNW45	NW42	NW42	NW38	NW35	WNW32	NW28	NW21	WNW28	NW29	NW28	NW34	NW32	WNW29.7	NW50
28-Sep	NW31	NW30	WNW25	WNW31	WNW28	W20	W12	WNW8	NW8	NNW5	WSW5	WSW10	W8	W7	WSW11	SW11	SSW8	S11	SSW17	S22	S22	SSE20	SE29	SE28	WSW8.1	NW31
29-Sep	SE26	SE27	SSE25	SSE25	SSE22	SSE21	SSE13	SSE13	SSE13	S10	SE9	SE10	SE10	SE9	SE7	SSE6	SE4	S7	S15	S17	SSE18	S16	SSW18	SSW11	SSE13.9	SE27
30-Sep	S14	S14	S15	S14	S19	SSE24	SSE25	S26	SSE20	SSE18	SSE19	S21	SSW22	SSW25	SSW24	S21	S21	S24	SSW24	SSW35	SSW40	SSW41	SSW26	SSW18	S21.8	SSW41

SW5.5	SW5.0	SW5.6	SW6.5	SW6.5	SW6.2	SW6.1	SW6.1	WSW5.3	W4.4	W4.8	W6.9	W8.9	W9.3	W8.5	W9.1	W9.2	WSW7.8	WSW7.6	SW8.6	SW8.8	SW7.0	SW6.5	SW6.5	Diurnal Average
W46	W45	W44	W43	W46	W39	W38	WNW47	NW50	NNW41	SE34	WNW45	NW42	NW42	WSW42	WSW56	W50	WSW49	W41	WSW42	WSW42	SSW41	SE39	W40	Diurnal Maximum

UO - Unstable Operation  
 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

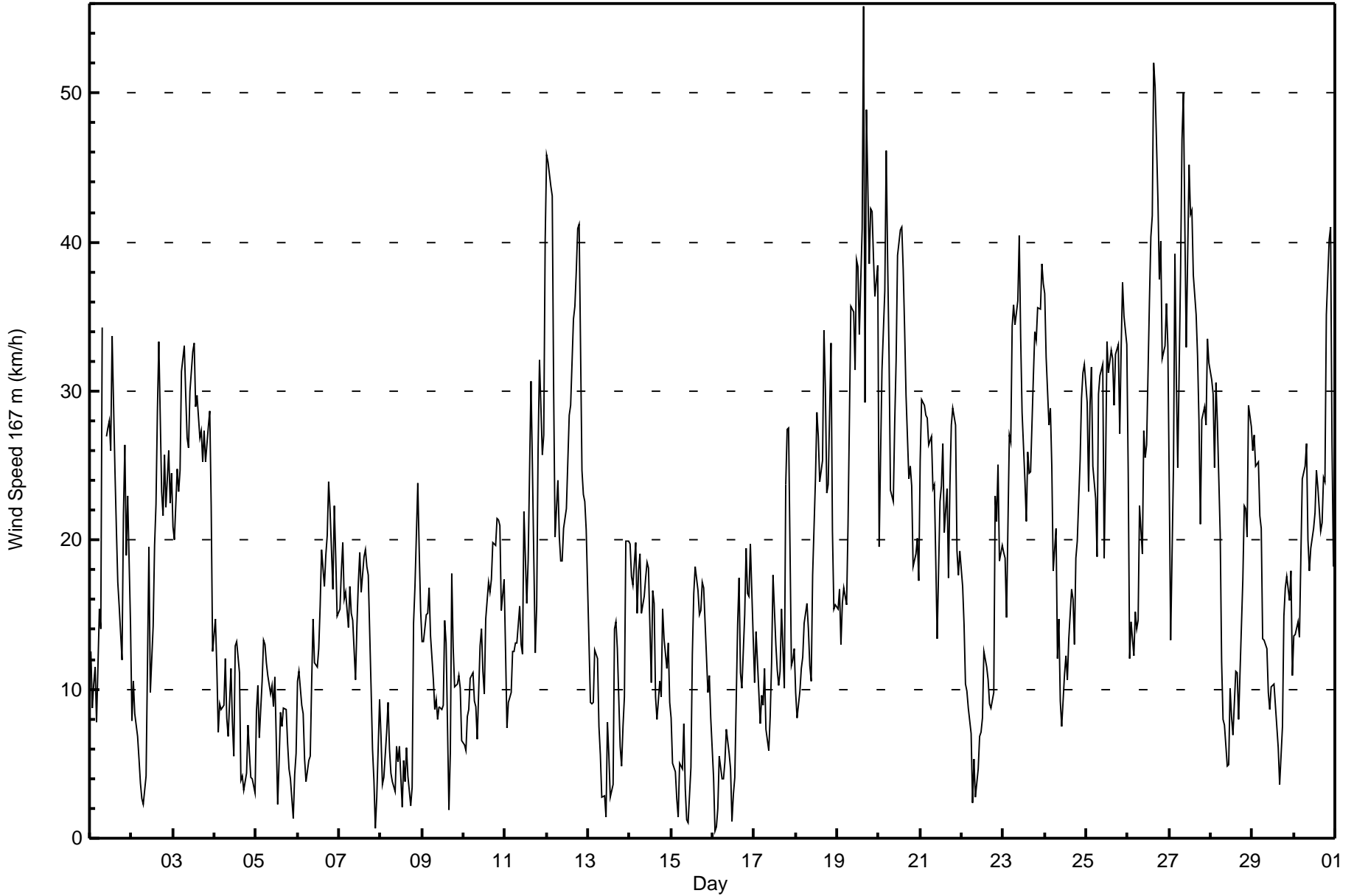
Lower Camp Met Tower - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 16 km/h on Sep 19 18:00			Hours of Data:	719
Minimum Value: 1 km/h on Sep 16 07:00			Hours of Missing Data:	1
			Hours of Calibration:	0
			Percent Operational Time:	99.9
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 10				

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

Diurnal Maximum

UO - Unstable Operation





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	72	10.01	10.01
6 - 11	158	21.97	31.99
12 - 19	194	26.98	58.97
20 - 28	161	22.39	81.36
29 - 38	97	13.49	94.85
> 38	37	5.15	100.00

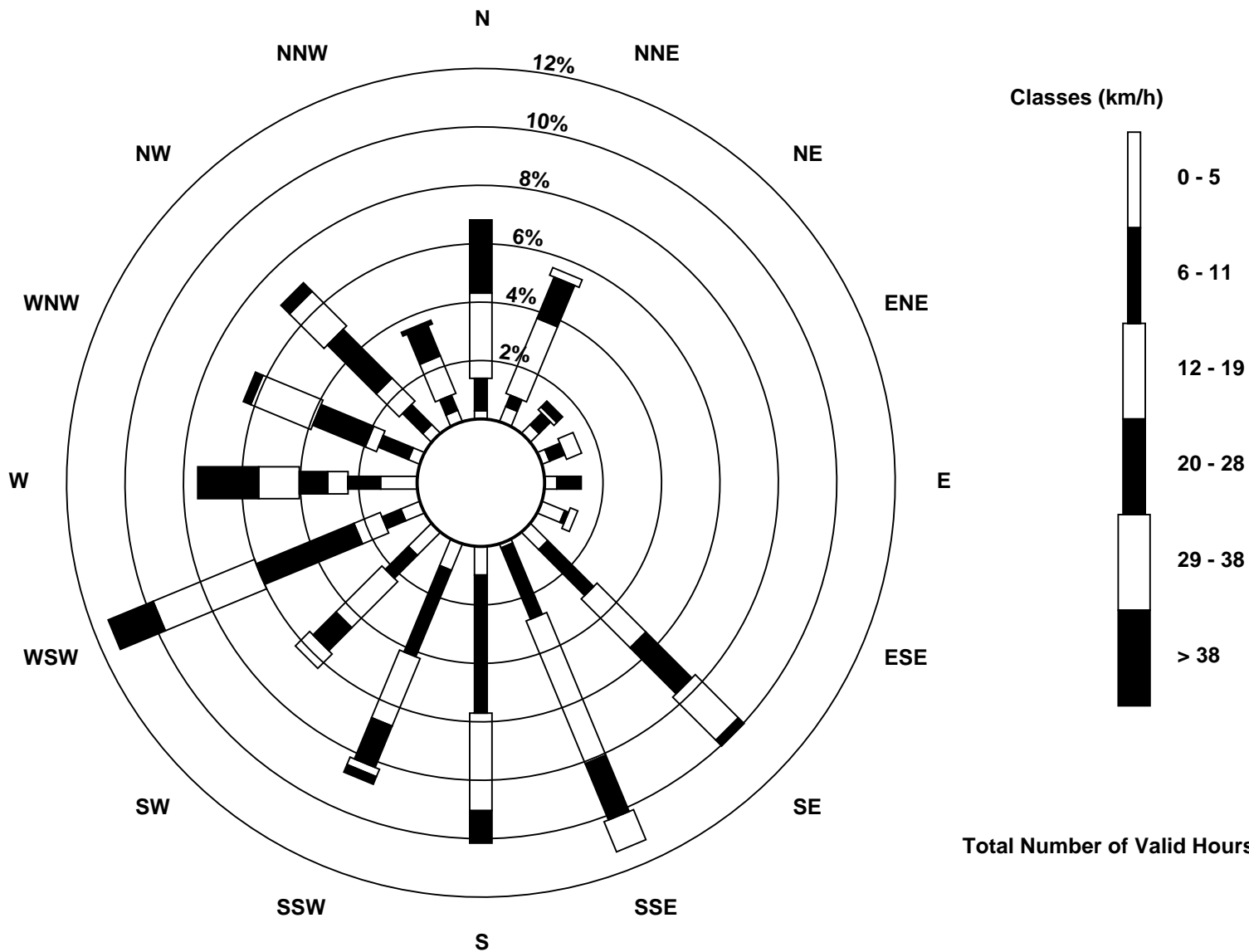
Total Number of Valid Hours: 719

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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





Direction of Maximum Speed: 265 deg on Sep 26 16:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 308.0 deg on Sep 27		Hours of Data:	720
Direction of Minimum Speed: 147 deg on Sep 1 07:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 1.4 deg on Sep 13		Percent Operational Time:	100.0
Monthly Average Direction: 288.1 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	137	139	145	105	32	118	147	164	118	347	345	359	335	309	296	313	277	281	232	240	258	229	190	231	269.7
2-Sep	151	136	135	138	137	24	24	315	344	330	322	331	9	12	19	13	360	339	347	354	360	9	349	352	8.0
3-Sep	341	332	339	329	318	314	321	324	325	320	299	298	303	309	317	313	320	310	304	320	313	298	297	345	314.0
4-Sep	330	350	351	350	301	354	336	354	346	332	344	25	353	359	9	347	283	279	38	43	348	148	164	144	347.5
5-Sep	98	44	93	147	147	142	145	136	145	150	167	157	151	102	154	141	150	177	235	208	9	346	11	342	149.5
6-Sep	357	347	351	345	317	321	320	337	339	346	342	345	342	349	15	30	25	26	14	351	338	357	356	349	355.5
7-Sep	345	341	349	348	354	10	340	343	347	353	358	356	357	358	2	3	12	55	71	250	354	4	272	6	360.0
8-Sep	346	124	128	139	137	129	132	138	132	142	168	166	155	244	236	244	257	257	343	339	139	147	137	101	155.7
9-Sep	91	148	166	157	160	163	155	146	148	142	135	155	153	155	145	40	229	146	105	148	142	160	127	149	149.8
10-Sep	140	132	142	146	142	153	144	147	143	139	155	161	155	222	222	227	241	242	210	223	166	86	150	126	172.5
11-Sep	137	153	152	141	151	154	156	143	147	152	158	258	248	246	247	235	233	170	176	220	246	256	222	264	192.1
12-Sep	273	273	273	276	288	299	274	271	262	255	256	292	284	273	283	276	268	264	276	280	306	3	343	318	276.8
13-Sep	235	323	346	328	332	354	150	148	143	215	229	268	257	255	36	345	352	332	268	339	350	314	345	350	315.3
14-Sep	357	347	350	356	350	353	2	9	12	7	1	12	353	356	355	39	26	32	340	35	61	356	28	12	4.3
15-Sep	355	358	330	318	307	300	297	291	304	354	214	199	151	143	161	162	152	159	132	80	12	355	346	341	161.6
16-Sep	335	324	322	317	335	15	327	5	335	355	8	138	180	138	130	156	175	173	174	146	148	141	155	164	154.6
17-Sep	151	156	147	133	136	149	153	153	138	147	156	157	171	205	203	152	234	218	182	182	164	105	143	148	161.8
18-Sep	150	149	156	154	155	145	156	150	153	206	260	262	259	254	264	267	259	255	231	196	203	125	118	143	200.0
19-Sep	128	126	117	120	92	88	140	154	185	212	226	254	262	243	262	267	255	263	240	239	252	267	281	266	234.5
20-Sep	291	254	246	259	273	271	259	232	244	257	257	279	288	279	278	295	317	323	325	355	332	344	316	351	277.8
21-Sep	323	315	310	312	317	313	334	354	352	349	335	335	335	331	355	340	330	318	308	315	319	346	351	354	329.3
22-Sep	3	344	332	335	309	318	256	129	160	154	145	158	168	158	160	182	184	196	138	139	96	130	126	65	161.1
23-Sep	96	119	111	124	154	150	148	156	150	152	148	152	148	132	142	138	131	138	139	144	154	149	149	148	145.0
24-Sep	150	144	168	160	154	190	176	170	162	177	180	154	154	147	147	145	154	145	318	115	161	158	149	157	155.6
25-Sep	159	177	155	163	175	187	161	268	279	305	285	263	269	258	260	256	260	262	264	231	245	242	256	283	249.0
26-Sep	253	148	143	142	157	153	140	138	176	255	259	257	258	265	260	265	273	274	282	275	262	258	269	264	248.4
27-Sep	246	157	214	268	268	249	274	299	319	336	318	307	318	322	321	324	318	322	333	318	326	331	321	326	308.0
28-Sep	320	319	317	306	324	330	358	80	49	12	248	261	274	252	255	235	198	166	187	172	148	147	152	140	237.0
29-Sep	143	140	142	148	159	171	176	136	141	153	140	154	157	153	150	152	135	164	143	134	149	153	152	151	150.7
30-Sep	155	154	157	159	157	148	133	145	148	152	151	154	190	218	212	194	185	172	172	176	177	175	139	132	167.3

164.9 156.4 169.5 191.7 182.7 172.1 174.8 170.9 177.8 232.4 234.3 251.4 265.7 264.2 263.2 261.6 263.8 250.5 237.5 227.9 233.1 209.5 191.0 186.2

Diurnal Average

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





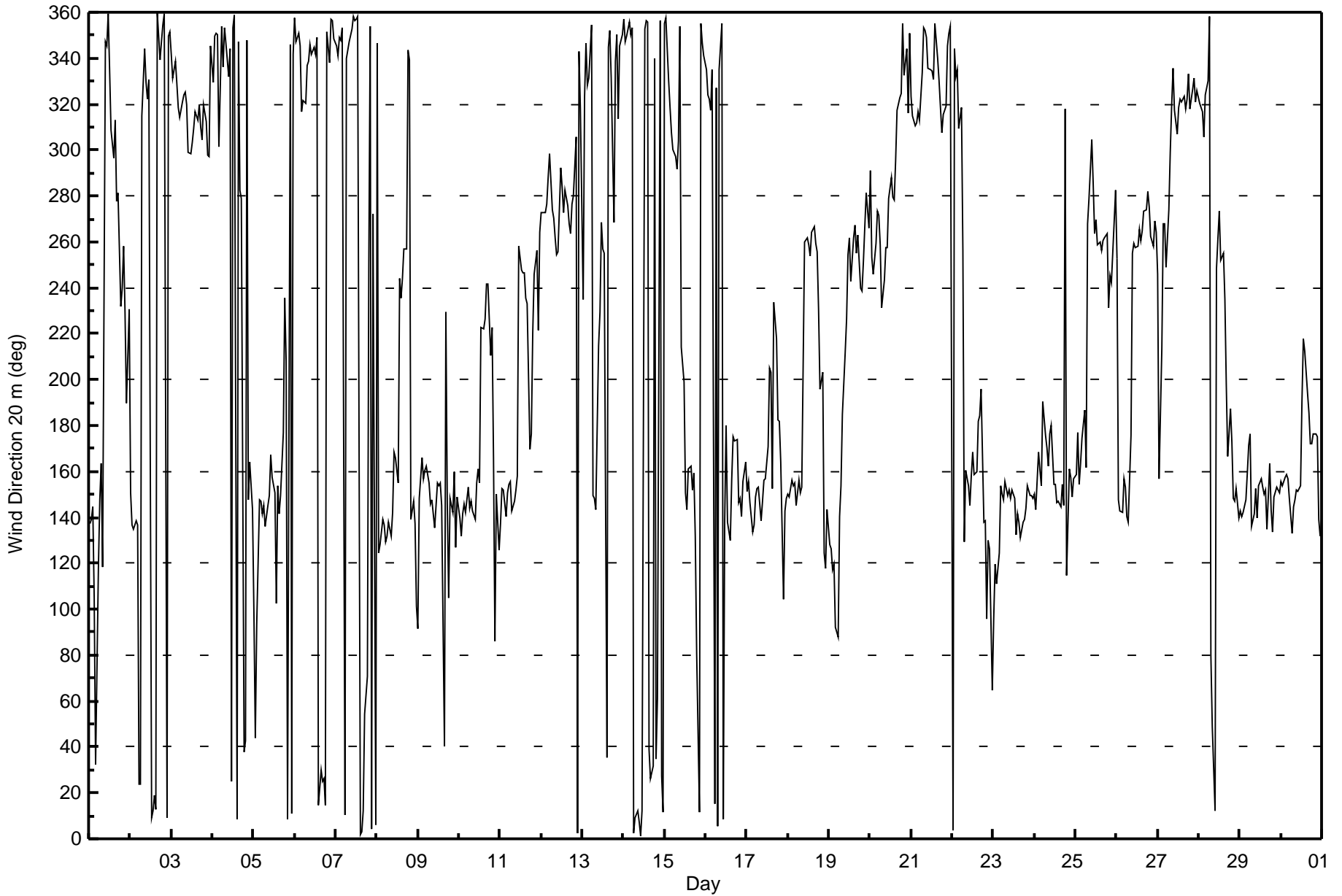
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 20 m (WD20m) - deg

Lower Camp Met Tower - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 112 deg on Sep 24 03:00		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: 8 deg on Sep 30 05:00																										
Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 15 Q <sub>1</sub> = 19 Median = 23 Q <sub>3</sub> = 36 P <sub>90</sub> = 61 P <sub>99</sub> = 90																										
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-Sep	21	18	21	61	66	56	102	24	67	21	24	23	28	22	21	24	23	21	23	12	19	47	29	81	102	
2-Sep	87	16	22	25	23	72	36	27	34	23	49	62	25	25	28	23	16	23	23	22	22	22	21	19	87	
3-Sep	21	18	20	18	21	21	20	21	22	22	23	19	20	21	22	21	20	22	18	27	22	22	26	37	37	
4-Sep	37	25	68	46	50	26	36	32	36	30	36	51	33	25	28	86	38	14	61	68	87	64	62	51	87	
5-Sep	58	41	71	48	19	17	17	17	17	22	14	20	96	74	25	31	32	27	27	57	89	45	54	48	96	
6-Sep	30	25	24	20	48	28	20	30	27	25	33	22	23	31	29	30	26	28	24	13	21	17	17	30	48	
7-Sep	21	20	18	24	25	42	21	23	23	24	25	23	25	28	30	29	25	39	28	95	76	27	83	32	95	
8-Sep	73	79	48	52	10	13	14	16	19	33	16	18	67	42	52	24	33	36	53	53	60	23	33	32	79	
9-Sep	36	66	46	12	8	15	19	23	20	21	22	17	18	18	18	73	89	22	46	68	58	26	72	19	89	
10-Sep	16	19	15	13	15	16	19	17	18	23	18	12	32	36	18	17	19	15	12	15	56	96	39	18	96	
11-Sep	14	14	19	20	24	24	28	18	16	14	34	19	24	20	20	11	14	36	19	27	16	39	51	22	51	
12-Sep	16	18	20	18	35	53	72	23	20	19	28	22	19	18	20	19	18	18	18	19	39	24	75	55	75	
13-Sep	36	71	88	64	39	79	75	73	72	37	57	48	37	80	49	34	59	56	64	87	67	43	20	20	88	
14-Sep	19	30	22	20	21	22	20	30	28	26	23	29	38	27	28	51	50	49	67	99	22	78	79	26	99	
15-Sep	89	92	50	20	20	28	20	22	29	27	87	39	28	31	24	11	19	15	24	73	25	55	25	21	92	
16-Sep	21	42	89	38	69	45	51	57	32	29	42	66	32	29	25	18	23	15	22	13	25	55	29	63	89	
17-Sep	17	33	32	16	18	16	24	26	19	19	18	16	25	29	33	19	56	48	11	12	14	45	13	13	56	
18-Sep	15	15	21	15	20	21	11	13	13	52	23	23	19	17	22	22	19	18	22	12	11	45	24	16	52	
19-Sep	15	17	28	28	43	45	27	38	14	16	14	20	19	19	20	22	21	21	17	15	16	21	20	19	45	
20-Sep	40	44	28	19	17	19	24	22	19	20	19	23	23	22	23	24	20	17	15	19	29	37	45	25	45	
21-Sep	21	18	18	18	17	19	27	23	24	25	29	27	26	23	25	25	27	34	19	20	20	27	18	20	34	
22-Sep	87	53	61	42	36	62	80	71	22	25	27	29	16	19	30	25	21	18	31	15	70	73	85	88	88	
23-Sep	39	29	31	82	48	18	17	16	18	17	18	19	21	23	24	24	24	19	19	18	18	17	17	18	82	
24-Sep	20	48	112	54	42	69	30	22	12	23	37	19	17	17	20	20	13	81	27	58	58	20	19	18	112	
25-Sep	18	53	23	38	46	22	52	24	22	21	30	21	21	18	22	16	18	18	22	19	14	12	19	21	53	
26-Sep	52	27	16	14	11	16	15	25	47	20	21	19	17	22	19	20	20	18	21	21	23	18	20	20	52	
27-Sep	29	15	38	20	21	23	19	21	23	20	21	19	19	19	21	24	18	19	16	16	19	17	18	15	38	
28-Sep	15	17	19	19	32	67	43	61	56	65	88	34	36	62	42	24	42	11	13	11	17	22	23	40	88	
29-Sep	26	22	20	21	24	35	19	88	57	19	22	22	19	19	17	29	40	28	13	48	19	12	12	11	88	
30-Sep	14	12	10	10	8	19	27	19	20	20	21	15	26	18	15	15	13	9	8	9	10	10	34	19	34	
		89	92	112	82	69	79	102	88	72	65	88	66	96	80	52	86	89	81	67	99	89	96	85	88	
		Diurnal Maximum																								





Direction of Maximum Speed: 256 deg on Sep 26 16:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 298.9 deg on Sep 27		Hours of Data:	720
Direction of Minimum Speed: 202 deg on Sep 8 02:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 2.0 deg on Sep 15		Percent Operational Time:	100.0
Monthly Average Direction: 285.1 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	136	135	136	123	16	127	130	150	110	341	342	357	329	299	284	304	267	271	224	233	249	226	191	210	262.5
2-Sep	166	136	131	132	130	20	15	316	340	327	328	337	6	10	16	9	356	334	341	350	354	9	346	346	2.6
3-Sep	338	328	333	324	309	303	311	314	316	310	289	287	294	302	307	304	313	301	295	310	301	286	285	326	305.1
4-Sep	314	335	333	341	298	352	339	348	344	323	338	12	346	348	5	339	274	271	32	47	341	216	150	149	339.6
5-Sep	121	77	112	142	140	135	137	131	136	139	155	146	142	95	144	133	139	166	228	196	83	349	36	357	140.6
6-Sep	357	356	358	344	346	340	334	337	335	339	340	338	333	343	13	28	24	25	15	348	337	348	348	348	354.0
7-Sep	340	340	343	346	351	0	337	338	341	346	353	351	351	353	355	358	9	48	64	292	241	340	279	341	354.3
8-Sep	4	202	146	147	138	130	132	132	126	133	156	154	142	242	233	243	253	249	336	8	132	134	137	114	149.4
9-Sep	105	146	154	149	150	152	143	136	139	133	130	141	141	141	137	33	217	137	109	139	138	148	134	142	140.2
10-Sep	135	135	139	140	140	142	136	138	134	130	143	148	146	214	215	219	234	233	203	208	178	111	138	127	165.0
11-Sep	131	143	141	136	141	145	146	137	140	142	148	249	239	240	239	228	225	186	199	215	226	228	231	256	187.1
12-Sep	262	261	263	264	273	280	258	260	253	246	247	282	275	263	272	266	257	253	265	269	298	351	345	326	266.9
13-Sep	292	321	330	303	337	347	145	128	122	211	227	265	255	258	27	336	336	347	290	297	2	320	344	342	319.9
14-Sep	350	343	343	350	344	348	359	8	9	6	359	9	351	349	348	34	15	30	8	54	54	353	32	25	0.7
15-Sep	344	234	311	335	321	312	302	294	310	344	222	190	139	134	149	151	142	146	124	112	39	9	340	346	136.1
16-Sep	346	342	351	336	349	4	341	2	342	350	360	132	174	132	119	143	166	165	163	139	140	135	139	153	136.9
17-Sep	142	145	136	129	130	141	143	144	128	137	143	144	161	198	195	143	227	209	174	174	158	101	135	140	151.9
18-Sep	141	140	144	144	146	140	147	143	144	208	252	253	250	245	256	258	250	247	227	188	196	124	112	133	194.9
19-Sep	120	117	111	112	88	88	136	152	176	204	219	246	252	234	252	257	247	252	232	231	242	256	270	255	227.4
20-Sep	276	245	239	250	263	260	250	225	235	250	249	268	278	269	267	285	308	314	314	343	341	346	318	340	269.5
21-Sep	311	304	299	302	306	303	326	349	345	344	330	327	328	324	350	332	325	310	297	305	309	335	340	336	320.8
22-Sep	354	327	342	330	354	340	190	120	148	141	133	147	155	147	148	172	175	186	140	138	117	130	142	145	147.7
23-Sep	104	119	111	125	140	140	140	144	140	141	138	141	137	124	131	129	122	129	131	134	141	140	140	139	135.5
24-Sep	139	133	137	144	134	158	161	158	154	171	169	141	142	137	138	134	143	129	50	122	139	138	136	138	141.5
25-Sep	140	145	137	140	149	174	155	258	268	296	275	254	260	248	251	248	250	251	256	224	236	235	246	269	239.7
26-Sep	244	141	151	142	156	146	135	135	172	246	252	248	249	256	250	256	263	263	271	264	252	248	256	254	241.3
27-Sep	240	148	211	257	259	241	264	289	310	330	310	298	310	315	312	315	309	313	325	306	320	326	312	318	298.9
28-Sep	312	309	308	295	306	301	340	35	37	4	248	259	267	251	247	229	193	157	176	165	136	133	140	129	235.8
29-Sep	132	132	133	136	146	154	161	133	126	141	133	141	143	140	141	139	121	158	143	132	141	144	141	140	139.7
30-Sep	143	145	146	147	146	139	129	138	137	140	139	141	180	208	202	183	176	165	168	172	172	171	136	124	157.6

159.4 150.0 162.0 185.3 177.1 165.4 168.5 165.2 172.3 242.5 236.0 250.9 262.4 260.1 258.1 257.8 258.2 246.8 233.6 222.5 221.8 201.5 181.8 183.2

Diurnal Average

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



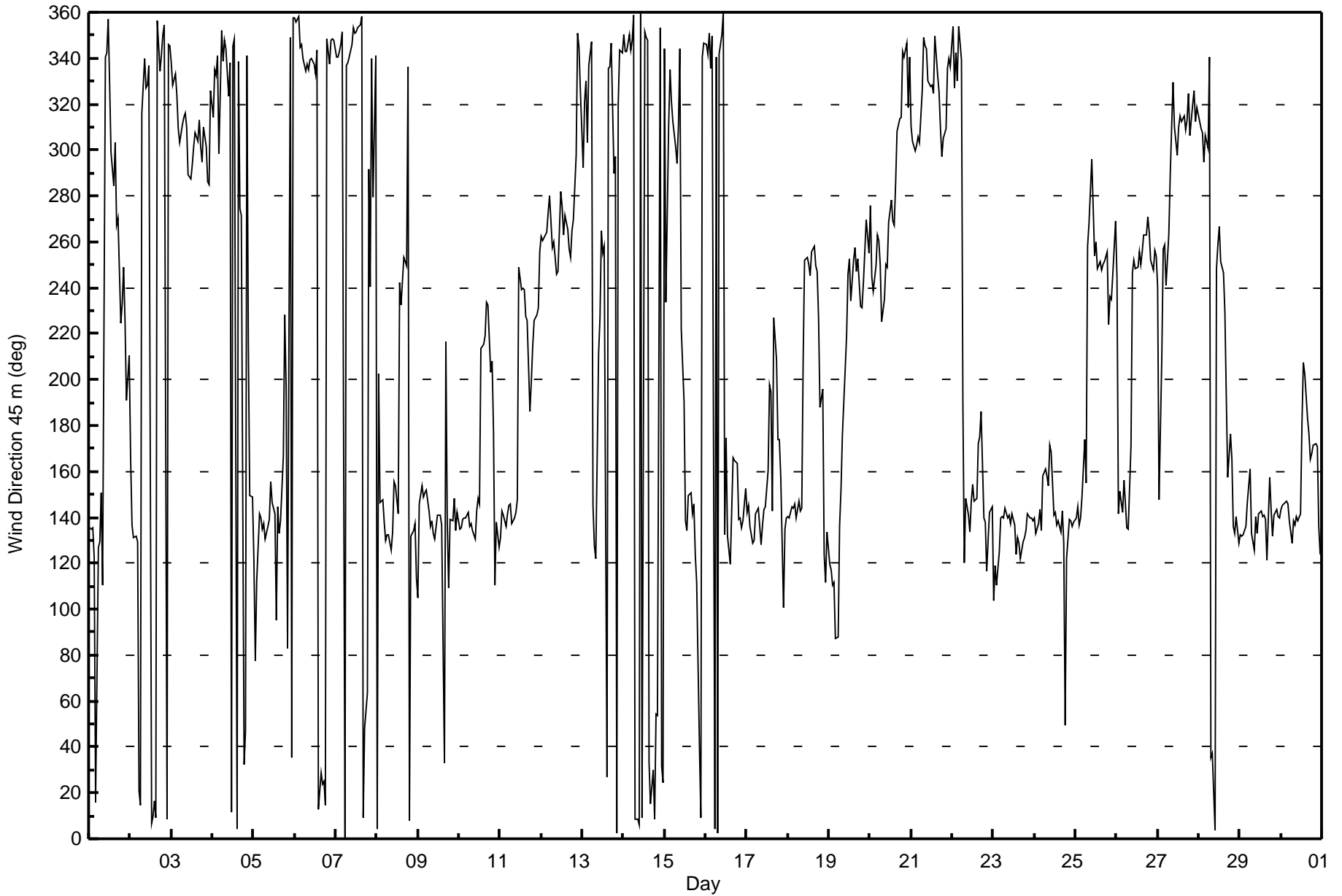
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 45 m (WD45m) - deg

Lower Camp Met Tower - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																			Hours in Service: 720																								
Maximum Value: 100 deg on Sep 9 17:00																			Hours of Data: 720																								
Minimum Value: 5 deg on Sep 30 05:00																			Hours of Missing Data: 0																								
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 10 Q <sub>1</sub> = 13 Median = 16 Q <sub>3</sub> = 27 P <sub>90</sub> = 47 P <sub>99</sub> = 90																			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-Sep	14	11	14	62	87	47	100	21	64	15	17	17	23	19	15	17	16	14	21	9	12	39	26	71	100																		
2-Sep	79	11	17	18	18	72	41	20	27	15	35	51	20	18	19	17	13	17	16	16	17	17	16	13	79																		
3-Sep	14	11	13	11	15	14	14	16	16	16	15	13	12	15	16	16	15	17	11	24	15	14	17	31	31																		
4-Sep	33	21	46	46	50	13	24	22	28	23	31	42	24	20	22	78	28	15	73	44	78	82	39	30	82																		
5-Sep	41	41	70	37	14	12	12	14	11	16	11	16	95	63	19	27	25	27	23	40	97	40	31	22	97																		
6-Sep	20	13	10	11	33	27	15	18	16	16	21	15	16	26	21	18	17	18	14	9	10	11	12	25	33																		
7-Sep	16	11	13	14	16	21	13	16	15	19	18	16	20	21	24	27	20	22	11	69	82	27	49	63	82																		
8-Sep	89	90	36	25	7	9	9	11	19	24	13	14	73	37	49	19	30	32	48	33	45	13	16	20	90																		
9-Sep	44	52	36	11	6	11	16	19	16	15	16	12	12	15	13	72	100	16	31	35	9	9	27	10	100																		
10-Sep	7	9	9	8	9	13	15	13	13	17	14	9	32	35	17	14	14	10	11	11	38	58	31	13	58																		
11-Sep	10	9	12	13	17	17	20	11	8	9	36	11	16	13	12	7	11	26	16	15	10	25	16	10	36																		
12-Sep	9	10	11	9	20	39	38	12	11	8	22	17	13	13	13	11	11	10	11	11	34	12	13	30	39																		
13-Sep	60	99	68	36	25	38	71	57	66	41	47	39	30	83	41	29	57	40	92	65	72	56	13	13	99																		
14-Sep	15	24	15	14	14	17	16	22	20	20	18	22	33	21	21	36	36	27	55	50	24	57	77	22	77																		
15-Sep	59	33	58	18	12	38	14	23	21	25	94	45	24	26	22	8	14	12	15	71	34	35	18	12	94																		
16-Sep	14	32	47	28	50	36	46	67	22	26	39	75	32	24	20	14	21	12	20	9	16	28	17	44	75																		
17-Sep	12	22	19	10	14	12	18	21	17	15	14	12	23	32	32	17	55	44	8	8	11	36	9	9	55																		
18-Sep	9	10	17	10	13	13	8	7	9	48	16	14	11	9	15	13	11	13	19	10	12	42	17	13	48																		
19-Sep	12	11	20	23	27	33	23	29	11	17	11	14	11	16	13	15	14	14	13	11	8	15	13	13	33																		
20-Sep	34	29	18	13	10	11	19	18	12	12	11	16	15	15	15	18	15	13	11	17	17	18	19	16	34																		
21-Sep	16	12	13	12	12	13	24	17	17	18	21	22	19	18	19	18	19	30	13	14	14	19	13	16	30																		
22-Sep	32	30	33	27	47	77	68	73	17	24	24	23	13	14	25	21	19	12	22	12	24	33	55	87	87																		
23-Sep	70	21	23	36	23	13	11	13	13	13	14	14	15	18	19	19	18	13	13	13	13	12	11	12	70																		
24-Sep	14	28	60	37	29	43	24	17	10	23	38	15	13	12	16	15	10	28	64	48	33	13	12	12	64																		
25-Sep	14	35	16	33	34	21	34	20	13	13	25	14	12	10	13	9	11	11	18	12	8	8	13	15	35																		
26-Sep	42	15	19	13	11	14	10	16	44	11	12	12	10	14	12	14	12	12	13	12	17	10	12	12	44																		
27-Sep	22	15	36	13	14	16	14	15	22	16	17	16	16	16	17	20	14	14	12	12	15	13	13	11	36																		
28-Sep	12	14	16	13	24	50	40	62	45	64	88	26	30	55	40	22	41	11	10	9	13	13	17	24	88																		
29-Sep	17	16	13	14	21	30	16	65	43	14	16	16	15	15	13	31	35	27	14	13	10	8	7	7	65																		
30-Sep	9	6	6	7	5	13	24	14	14	15	15	11	25	19	16	12	9	7	7	6	6	7	32	16	32																		
																			89	99	70	62	87	77	100	73	66	64	94	75	95	83	49	78	100	44	92	71	97	82	77	87	
Diurnal Maximum																																											





Direction of Maximum Speed: 255 deg on Sep 19 16:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 138.1 deg on Sep 23		Hours of Data:	720
Direction of Minimum Speed: 181 deg on Sep 16 12:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 3.6 deg on Sep 8		Percent Operational Time:	100.0
Monthly Average Direction: 259.6 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	170	157	148	150	146	147	162	147	117	356	356	7	340	301	282	297	261	264	228	239	250	239	220	228	256.3
2-Sep	238	174	157	152	149	21	76	360	360	350	1	13	13	16	21	16	2	349	355	359	5	14	3	356	8.6
3-Sep	352	338	341	332	307	299	302	306	311	305	288	285	292	301	307	304	312	300	295	303	297	287	283	293	304.3
4-Sep	287	305	296	302	287	329	348	360	349	325	343	359	348	346	5	13	290	298	39	91	89	168	154	159	337.4
5-Sep	151	139	144	152	163	148	151	158	151	136	148	140	132	103	146	131	138	165	223	192	178	79	101	82	147.2
6-Sep	52	19	13	7	20	351	2	347	346	344	352	351	334	348	16	28	30	32	26	13	356	348	346	354	4.4
7-Sep	348	338	342	346	344	355	357	352	351	355	358	357	358	356	358	2	11	49	57	61	91	292	262	243	358.3
8-Sep	314	14	141	203	195	179	190	167	133	124	142	146	168	260	245	253	261	251	20	62	126	141	150	167	156.1
9-Sep	147	157	150	153	153	153	150	147	151	146	134	137	139	136	139	35	181	140	133	157	169	167	153	154	147.4
10-Sep	159	159	171	172	174	153	148	143	138	138	147	148	159	217	216	220	230	229	215	226	216	198	184	183	182.7
11-Sep	162	154	160	155	157	156	160	163	173	161	167	245	234	235	237	228	229	218	230	227	230	220	239	254	206.6
12-Sep	259	258	255	261	268	267	255	265	262	255	253	280	273	263	268	263	255	252	258	263	297	342	354	354	267.1
13-Sep	349	347	360	345	333	326	335	129	46	185	231	270	266	264	18	335	320	13	59	180	328	329	355	354	337.6
14-Sep	2	3	358	3	359	358	8	14	14	11	4	12	359	353	352	34	16	37	51	67	74	59	101	118	15.1
15-Sep	256	161	122	339	7	44	41	55	18	320	289	150	132	133	145	147	140	142	131	127	127	129	127	229	129.5
16-Sep	344	358	351	341	340	303	319	123	286	305	305	181	196	141	123	141	168	170	164	147	148	145	142	149	146.3
17-Sep	152	152	155	153	149	151	150	153	139	136	140	146	165	195	192	150	226	211	178	180	174	133	153	160	161.6
18-Sep	157	152	151	160	157	166	175	182	169	231	247	250	248	244	254	255	248	247	236	215	218	182	138	151	212.4
19-Sep	138	139	130	134	123	125	153	174	189	214	222	244	250	232	249	255	245	251	234	233	242	254	259	253	226.6
20-Sep	265	246	244	250	259	258	246	233	233	249	247	265	276	266	264	283	304	309	307	329	337	330	323	322	271.3
21-Sep	301	299	296	297	302	303	328	358	351	352	335	328	329	323	352	336	325	307	296	301	306	319	321	304	318.1
22-Sep	315	300	290	276	285	298	139	205	141	144	132	135	143	139	145	171	177	187	154	143	137	138	151	146	157.5
23-Sep	144	140	132	143	139	142	144	144	143	142	138	140	134	125	133	129	123	129	132	135	142	142	142	143	138.1
24-Sep	145	143	138	141	140	147	149	151	164	190	170	140	146	139	134	132	143	121	105	136	132	143	142	144	141.9
25-Sep	146	140	142	139	139	168	173	258	271	295	275	253	256	245	249	245	248	252	258	237	240	239	243	257	230.7
26-Sep	244	196	208	188	204	176	164	202	217	243	248	246	247	253	247	253	260	260	267	260	251	247	252	251	246.5
27-Sep	243	176	225	255	256	247	261	288	310	330	309	297	308	313	311	314	304	310	319	300	318	324	311	316	297.7
28-Sep	312	304	301	291	291	270	294	298	347	350	246	255	262	262	247	229	204	165	187	175	153	138	137	136	236.7
29-Sep	138	138	140	142	144	144	153	146	138	148	133	130	137	135	136	137	130	165	165	149	145	147	173	154	144.3
30-Sep	148	148	147	150	150	152	150	155	147	144	142	150	191	211	207	186	182	174	180	188	201	202	172	155	167.8

202.4 183.3 185.7 198.4 203.6 190.9 188.8 193.4 212.6 257.3 241.7 254.8 266.7 264.6 259.6 261.5 260.4 247.4 232.1 219.5 221.8 204.3 196.8 205.7

Diurnal Average

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

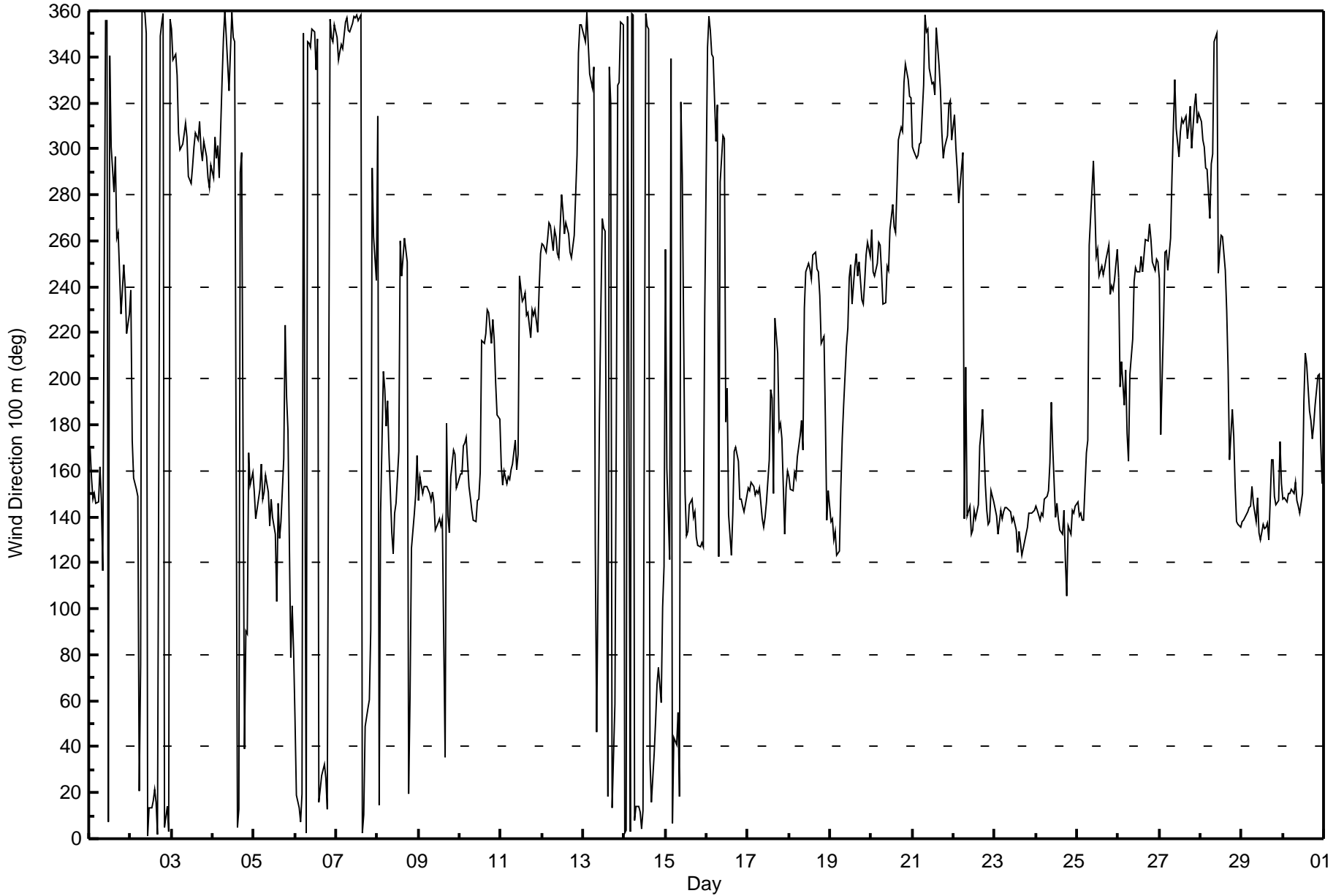


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Sep 13 14:00																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 2 deg on Sep 24 00:00																									
Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 10 Q <sub>3</sub> = 17 P <sub>90</sub> = 31 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-Sep	31	22	6	11	28	6	45	14	49	7	9	10	22	15	11	13	12	10	15	6	7	25	15	44	49
2-Sep	51	17	15	18	17	70	64	18	21	10	14	23	10	9	9	6	7	10	11	8	8	7	10	5	70
3-Sep	9	4	5	6	11	8	8	10	11	11	10	10	8	10	10	11	11	12	7	22	7	8	10	21	22
4-Sep	19	18	34	38	26	21	10	13	23	15	20	39	14	16	16	75	40	28	75	14	22	45	25	18	75
5-Sep	6	13	19	17	13	9	6	8	11	8	8	7	89	43	14	15	13	28	16	20	56	47	26	21	89
6-Sep	36	17	9	7	9	7	11	8	8	7	12	9	12	22	12	11	11	12	5	4	17	4	4	10	36
7-Sep	15	3	4	6	5	7	7	8	8	13	12	11	13	13	16	15	10	12	7	23	15	74	74	15	74
8-Sep	32	31	21	21	16	18	15	18	16	14	13	9	82	40	52	19	30	40	40	14	16	6	6	15	82
9-Sep	16	16	8	5	4	6	8	8	9	12	6	4	8	7	9	73	73	8	8	18	9	8	11	8	73
10-Sep	6	5	9	7	14	6	7	5	5	5	8	10	29	22	13	10	10	5	6	6	9	39	23	22	39
11-Sep	14	9	5	4	5	6	13	12	10	11	38	8	13	8	8	5	9	16	4	5	4	8	10	4	38
12-Sep	3	4	4	3	9	15	7	9	7	6	15	14	11	8	9	6	5	5	5	5	28	7	5	7	28
13-Sep	8	7	14	16	12	7	32	58	77	92	66	37	30	102	43	21	42	23	57	73	30	9	12	7	102
14-Sep	10	16	9	8	9	7	8	11	11	11	10	14	31	13	14	31	29	14	8	5	19	21	20	36	36
15-Sep	76	65	74	18	13	44	22	19	29	25	91	87	13	17	16	4	6	4	6	8	14	10	19	84	91
16-Sep	31	17	8	13	22	99	24	45	49	69	34	95	19	39	13	11	18	11	14	8	9	9	5	14	99
17-Sep	8	6	8	6	6	6	7	11	9	5	5	8	24	30	28	15	49	36	7	4	9	26	14	12	49
18-Sep	11	11	10	8	9	18	15	15	15	31	12	9	6	6	10	9	8	9	11	7	5	30	14	12	31
19-Sep	9	10	15	16	19	23	15	19	11	12	8	11	7	12	9	10	11	10	9	8	6	9	7	6	23
20-Sep	24	10	5	8	5	6	12	12	9	9	9	12	9	10	10	14	11	9	6	10	8	4	7	5	24
21-Sep	6	6	7	7	7	7	23	10	14	11	18	16	14	15	14	15	16	29	8	7	8	15	8	9	29
22-Sep	11	17	13	17	18	57	50	38	15	18	12	16	11	7	18	17	18	15	17	7	5	8	7	6	57
23-Sep	16	6	9	6	4	3	3	3	3	3	6	5	7	10	11	9	10	8	7	6	4	4	3	2	16
24-Sep	3	4	8	6	7	15	10	8	10	22	32	6	8	10	10	8	7	11	9	15	7	4	3	4	32
25-Sep	5	6	3	5	7	14	19	17	9	10	20	9	6	6	9	6	7	8	9	6	4	5	7	8	20
26-Sep	16	26	20	25	17	30	26	28	25	7	8	9	7	9	10	11	6	7	9	7	11	6	7	7	30
27-Sep	11	24	22	8	8	10	8	11	19	13	13	11	11	11	11	16	10	10	8	7	14	7	10	7	24
28-Sep	7	10	11	7	6	17	32	42	44	71	95	22	24	40	36	18	37	14	10	6	13	5	3	4	95
29-Sep	4	4	4	4	7	8	8	16	31	9	8	8	7	8	8	18	21	16	9	8	3	8	16	9	31
30-Sep	5	4	3	4	3	7	10	8	8	5	5	7	23	16	15	11	9	5	3	7	5	6	28	23	28
Diurnal Maximum																									
76 65 74 38 28 99 64 58 77 92 95 95 89 102 52 75 73 40 75 73 56 74 74 84																									



**Wood Buffalo Environmental Association**  
**Hourly Averages**

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







Maximum Value: 0.9 km/h on Sep 30 22:00		Maximum Daily Average: 0.2 km/h on Sep 30		Hours in Service: 720																							
Minimum Value: -1.0 km/h on Sep 26 17:00		Minimum Daily Average: -0.4 km/h on Sep 27		Hours of Data: 720																							
Maximum Diurnal Average: 0.0 km/h at hour 8		Minimum Diurnal Average: -0.2 km/h at hour 14		Hours of Missing Data: 0																							
Monthly Average: -0.09 km/h		Percentiles: $P_1 = -0.8$ $P_{10} = -0.5$ $Q_1 = -0.3$ Median = -0.1 $Q_3 = 0.1$ $P_{90} = 0.3$ $P_{99} = 0.6$		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	0.2	0.2	0.1	0.0	0.1	-0.1	-0.2	0.4	-0.2	-0.3	-0.3	-0.3	-0.3	-0.5	-0.3	-0.3	-0.2	-0.2	0.0	-0.2	-0.3	0.2	0.5	0.1	-0.1	0.5	
2-Sep	0.1	0.0	0.0	0.0	0.1	0.0	-0.2	-0.1	-0.2	-0.1	-0.1	0.0	-0.5	-0.5	-0.4	-0.5	-0.9	-0.3	-0.2	-0.4	-0.3	-0.3	-0.3	-0.3	-0.2	0.1	
3-Sep	-0.2	-0.2	-0.1	-0.2	-0.3	-0.3	-0.4	-0.4	-0.4	-0.4	-0.5	-0.3	-0.6	-0.7	-0.6	-0.7	-0.8	-0.5	-0.4	-0.5	-0.3	-0.2	-0.2	-0.2	-0.2	-0.4	-0.1
4-Sep	-0.2	-0.1	0.0	-0.1	-0.2	-0.1	-0.2	-0.1	-0.1	0.0	-0.1	-0.2	-0.2	-0.5	-0.4	-0.5	0.1	-0.1	-0.1	0.0	0.0	0.0	0.1	0.1	0.1	-0.1	0.1
5-Sep	0.0	0.0	0.0	0.2	0.0	0.1	-0.1	0.0	0.1	0.2	0.1	0.2	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1
6-Sep	-0.1	-0.1	-0.1	-0.3	0.0	-0.1	-0.1	0.0	-0.1	-0.2	-0.2	-0.1	-0.3	-0.4	-0.3	-0.6	-0.3	-0.3	-0.2	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	0.0
7-Sep	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	0.0	-0.3	-0.5	-0.6	-0.4	-0.5	-0.4	-0.4	-0.6	-0.4	-0.3	0.1	0.1	0.1	0.1	0.0	0.0	-0.2	0.1
8-Sep	0.1	0.1	0.1	0.0	0.2	0.2	0.1	0.1	-0.1	0.0	0.1	0.0	0.3	0.2	0.1	0.2	0.0	0.0	0.1	0.0	0.0	-0.1	-0.1	0.0	0.1	0.1	0.3
9-Sep	-0.1	-0.1	0.1	0.2	0.4	0.3	0.1	0.2	0.2	0.1	-0.1	0.4	0.4	0.1	0.1	-0.3	-0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4
10-Sep	0.1	0.0	0.1	0.1	0.1	0.3	0.2	0.3	0.4	0.1	0.1	0.1	0.4	0.0	0.0	-0.1	-0.1	-0.1	0.1	0.1	0.0	0.0	0.0	0.2	0.1	0.1	0.4
11-Sep	0.1	0.2	0.1	0.0	-0.1	0.0	0.3	0.3	0.5	0.3	0.1	-0.3	-0.1	-0.1	0.0	-0.2	0.1	0.2	0.2	0.0	-0.2	0.0	0.1	-0.4	0.0	0.0	0.5
12-Sep	-0.6	-0.6	-0.4	-0.7	-0.2	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	-0.4	-0.4	-0.4	-0.5	-0.7	-0.5	-0.5	-0.5	-0.5	-0.3	-0.1	0.0	0.0	-0.3	0.0	0.0
13-Sep	0.0	0.0	0.0	0.0	-0.1	0.0	0.1	0.2	0.3	0.1	0.0	0.0	-0.1	0.0	0.0	-0.3	-0.2	-0.1	0.0	0.0	-0.1	0.0	-0.2	-0.1	0.0	0.0	0.3
14-Sep	-0.2	-0.1	-0.1	-0.3	-0.2	-0.2	-0.3	-0.2	-0.5	-0.5	-0.6	-0.7	-0.4	-0.4	-0.4	-0.2	-0.2	-0.2	-0.1	0.0	-0.3	0.0	0.0	0.0	-0.3	0.0	0.0
15-Sep	0.0	0.0	-0.1	-0.3	-0.3	-0.3	-0.2	-0.1	0.1	-0.5	0.2	0.3	-0.1	0.1	0.3	0.0	0.2	0.0	-0.1	0.0	-0.1	0.0	-0.2	-0.1	0.0	0.0	0.3
16-Sep	-0.1	-0.1	-0.1	-0.3	-0.1	-0.1	-0.2	-0.1	-0.1	-0.3	-0.1	-0.2	0.0	0.1	-0.3	0.3	0.3	0.3	0.4	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.4
17-Sep	0.2	0.1	0.0	-0.2	-0.1	0.1	0.1	0.3	-0.1	0.4	0.1	0.2	0.4	0.2	0.3	0.2	-0.1	0.0	0.7	0.7	0.7	-0.5	0.0	0.2	0.2	0.2	0.7
18-Sep	0.3	0.2	0.2	0.2	0.3	0.7	0.5	0.6	0.3	0.0	-0.5	-0.4	-0.4	-0.3	-0.3	-0.2	-0.4	-0.3	0.0	0.5	0.3	-0.1	-0.6	-0.2	0.0	0.0	0.7
19-Sep	-0.7	-0.8	-0.9	-0.7	-0.7	-0.6	0.0	0.2	0.7	0.3	-0.2	-0.6	-0.7	-0.3	-0.7	-0.6	-0.3	-0.5	-0.2	-0.2	-0.2	-0.5	-0.4	-0.3	-0.4	0.0	0.7
20-Sep	-0.2	0.0	0.0	-0.4	-0.9	-0.6	-0.2	-0.1	-0.1	-0.3	-0.5	-0.7	-0.9	-0.8	-0.6	-0.4	-0.7	-0.4	-0.4	-0.1	-0.2	0.0	-0.1	0.0	-0.4	0.0	0.0
21-Sep	-0.2	-0.3	-0.3	-0.3	-0.4	-0.3	-0.5	-0.4	-0.3	-0.3	-0.3	-0.3	-0.4	-0.6	-0.4	-0.3	-0.3	-0.4	-0.2	-0.3	-0.3	-0.2	-0.1	-0.3	-0.3	0.0	-0.1
22-Sep	0.0	-0.1	0.0	-0.1	-0.1	0.0	0.0	0.0	0.2	0.2	0.0	0.1	0.0	0.1	0.1	0.3	0.3	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.3
23-Sep	-0.1	-0.1	0.0	0.1	0.2	0.2	0.2	0.4	0.1	0.0	0.2	0.3	0.3	-0.2	-0.1	0.0	-0.1	-0.2	-0.1	-0.1	0.3	0.1	0.2	0.1	0.1	0.1	0.4
24-Sep	0.2	0.1	0.1	0.4	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.2	0.1	0.1	0.1	0.4
25-Sep	-0.1	0.0	0.1	0.2	0.2	0.3	0.4	-0.4	-0.4	-0.5	-0.2	-0.3	-0.4	-0.3	-0.3	-0.5	-0.2	-0.2	-0.3	0.0	-0.1	-0.1	-0.2	-0.4	-0.1	0.1	0.4
26-Sep	-0.1	0.5	0.3	0.3	0.6	0.4	0.2	0.4	0.3	-0.2	-0.4	-0.6	-0.5	-0.6	-0.5	-0.5	-1.0	-0.7	-0.5	-0.7	-0.3	-0.3	-0.3	-0.3	-0.2	0.0	0.6
27-Sep	-0.1	0.2	0.2	-0.5	-0.4	-0.1	-0.8	-0.6	-0.7	-0.5	-0.5	-0.9	-0.9	-0.7	-0.7	-0.4	-0.7	-0.5	-0.1	-0.3	-0.3	-0.3	-0.6	-0.6	-0.4	0.0	0.2
28-Sep	-0.3	-0.4	-0.2	-0.2	0.0	-0.1	-0.3	0.0	-0.1	0.2	0.0	0.2	0.1	0.1	-0.3	-0.2	0.2	0.5	0.3	0.7	-0.4	-0.2	0.2	-0.1	0.0	0.0	0.7
29-Sep	-0.1	-0.2	-0.1	0.2	0.1	0.1	0.2	-0.1	-0.1	-0.1	0.1	0.4	0.4	0.3	0.3	0.0	0.1	0.1	0.2	0.1	0.0	-0.1	0.4	0.0	0.1	0.1	0.4
30-Sep	0.0	0.1	0.1	0.1	0.0	-0.1	-0.1	-0.2	-0.3	0.0	0.3	0.1	0.3	-0.1	0.3	0.3	0.5	0.6	0.8	0.7	0.8	0.9	0.2	-0.3	0.2	0.1	0.9
																								Diurnal Average			
																								Diurnal Maximum			



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.0 km/h on Sep 27 09:00 Minimum Value: 0.1 km/h on Sep 8 01:00 Percentiles: P <sub>1</sub> = 0.1 P <sub>10</sub> = 0.4 Q <sub>1</sub> = 0.9 Median = 1.6 Q <sub>3</sub> = 2.2 P <sub>90</sub> = 2.8 P <sub>99</sub> = 4.4																								Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	1.0	1.6	1.2	0.7	0.2	0.7	0.9	3.1	1.7	1.8	1.9	2.2	2.4	2.8	2.2	2.1	1.7	1.5	0.9	1.5	2.3	1.4	1.3	0.8	3.1
2-Sep	0.5	1.0	1.3	1.2	1.3	0.7	0.6	0.8	0.9	1.2	1.1	0.7	1.6	2.5	3.0	3.0	2.9	1.9	1.5	2.0	1.5	1.7	1.3	1.8	3.0
3-Sep	1.3	1.3	1.6	1.5	1.7	2.4	2.5	2.3	2.4	2.5	3.0	3.2	3.4	3.1	3.1	2.9	2.8	2.6	2.7	2.2	2.1	2.2	1.9	0.9	3.4
4-Sep	1.0	0.7	0.3	0.4	0.4	0.6	0.8	1.0	1.2	1.5	1.3	1.6	1.8	1.9	1.7	1.1	1.0	0.2	0.5	0.3	0.3	0.2	0.1	0.2	1.9
5-Sep	0.2	0.4	0.5	1.2	1.0	1.3	1.4	1.3	1.3	1.8	1.4	1.7	1.3	1.0	1.1	1.2	1.6	1.2	0.8	0.5	0.3	0.3	0.1	0.1	1.8
6-Sep	0.2	0.4	0.6	0.7	0.3	0.3	0.5	0.8	1.1	1.2	1.2	1.4	1.7	2.0	2.3	1.9	1.7	1.5	1.1	0.6	0.3	0.9	0.9	0.8	2.3
7-Sep	0.7	0.8	1.0	0.7	0.7	0.5	0.8	1.0	1.3	1.4	1.8	2.0	2.2	2.1	2.3	2.3	2.4	2.2	0.8	0.2	0.1	0.1	0.2	0.2	2.4
8-Sep	0.1	0.2	0.2	0.4	0.8	1.0	0.9	1.0	1.2	1.3	1.4	1.5	1.6	1.7	1.6	1.4	1.2	0.6	0.3	0.3	0.5	1.0	0.8	0.5	1.7
9-Sep	0.7	0.6	1.0	1.2	1.4	1.6	1.9	1.7	1.6	1.8	2.0	2.1	1.9	2.1	2.2	1.6	1.4	1.3	0.6	0.4	0.4	0.4	0.5	0.4	2.2
10-Sep	0.3	0.6	1.1	1.4	1.3	1.6	1.5	1.8	1.9	2.0	2.1	1.7	1.9	1.6	1.7	1.4	1.6	1.4	0.9	0.8	0.7	0.5	0.6	1.2	2.1
11-Sep	1.3	1.5	1.6	1.7	1.6	1.7	2.0	2.6	2.7	2.3	2.0	2.1	1.6	1.8	2.0	2.0	1.4	0.6	0.4	0.7	1.1	0.8	0.4	2.0	2.7
12-Sep	2.7	2.8	2.7	2.9	2.3	1.3	1.8	1.4	1.3	1.4	1.1	1.7	1.9	1.6	2.4	3.1	3.1	2.9	2.8	2.9	1.9	0.7	0.4	0.2	3.1
13-Sep	0.1	0.2	0.2	0.1	0.2	0.3	0.2	0.6	0.9	1.1	1.4	1.5	1.5	1.2	1.2	1.5	1.0	0.7	0.3	0.3	0.4	0.3	0.9	1.4	1.5
14-Sep	1.6	1.3	1.4	1.7	1.3	1.6	1.6	1.4	2.0	2.3	2.5	2.5	1.8	2.3	2.3	1.7	1.4	1.5	0.5	0.4	0.6	0.2	0.3	0.2	2.5
15-Sep	0.2	0.2	0.2	0.4	0.5	0.5	0.7	0.7	1.0	1.1	1.5	1.4	1.5	2.3	2.3	1.8	2.0	1.7	1.5	0.6	0.4	0.2	0.2	0.3	2.3
16-Sep	0.2	0.2	0.2	0.4	0.5	0.3	0.3	0.3	0.7	0.9	1.3	1.4	1.0	1.5	2.0	2.3	1.4	1.0	1.2	1.2	0.9	1.2	1.9	1.3	2.3
17-Sep	1.4	1.3	1.5	1.4	1.5	1.4	1.4	1.5	1.8	2.0	2.0	2.6	2.1	1.8	1.5	1.2	1.5	1.0	1.3	1.6	1.8	1.5	1.4	2.0	2.6
18-Sep	2.3	2.0	1.8	2.0	1.9	2.0	2.0	2.4	1.9	1.5	2.3	2.7	3.1	2.8	2.6	2.5	3.1	2.3	1.2	1.1	1.5	1.2	1.6	1.6	3.1
19-Sep	1.8	2.2	2.4	2.2	2.3	2.1	2.4	1.8	2.0	2.2	2.4	3.5	3.7	2.9	3.6	4.8	2.3	3.8	2.3	2.6	3.1	2.6	2.3	2.4	4.8
20-Sep	1.3	1.5	1.7	2.6	3.7	2.9	2.2	1.7	2.0	2.9	3.2	4.0	4.3	4.2	3.9	3.5	2.8	2.0	1.4	0.6	0.5	0.2	0.4	0.3	4.3
21-Sep	1.5	2.2	2.4	2.2	2.1	1.9	2.3	2.1	2.5	2.1	1.9	2.7	3.0	2.8	2.1	2.5	1.8	2.5	2.3	2.5	2.1	1.4	0.8	0.7	3.0
22-Sep	0.2	0.3	0.2	0.3	0.2	0.4	0.3	0.6	1.1	1.3	1.6	1.6	1.6	2.0	1.8	1.5	1.1	0.8	0.4	0.7	0.6	0.3	0.7	0.6	2.0
23-Sep	0.7	0.8	0.6	0.7	1.3	2.8	2.6	2.5	2.8	3.7	3.6	3.2	2.8	2.5	2.8	2.5	2.7	2.9	2.7	2.6	2.8	2.8	3.4	3.6	3.7
24-Sep	3.0	2.8	1.3	1.7	1.3	0.6	0.9	1.1	1.3	1.3	1.6	2.0	2.3	2.1	1.8	1.9	1.6	0.5	0.3	0.6	0.6	2.0	2.2	2.2	3.0
25-Sep	2.2	1.3	2.5	2.6	1.1	1.3	1.4	2.1	2.3	3.2	1.9	2.5	3.1	3.0	3.2	3.1	2.3	2.1	1.6	1.0	1.1	1.6	1.9	1.9	3.2
26-Sep	1.5	1.7	1.3	1.6	1.3	1.3	1.5	1.4	1.6	2.7	2.7	2.9	3.5	3.9	3.9	4.7	4.4	3.7	3.3	3.3	2.0	2.4	2.6	2.4	4.7
27-Sep	1.6	1.6	2.0	3.2	2.3	1.7	3.2	4.7	5.0	3.9	3.6	4.9	4.4	4.1	3.8	3.2	3.1	2.6	1.2	2.0	2.3	2.3	2.9	2.4	5.0
28-Sep	1.8	2.1	1.9	2.4	1.6	1.3	0.6	0.5	1.0	1.4	1.6	2.0	1.9	1.6	1.7	1.4	1.1	0.8	1.0	1.5	1.7	1.6	2.2	1.7	2.4
29-Sep	1.8	1.8	1.7	1.6	1.4	1.6	1.2	1.0	1.7	1.6	1.6	1.9	1.9	1.8	1.5	1.2	0.8	0.4	0.7	0.5	0.8	1.1	1.2	1.6	1.9
30-Sep	2.0	1.8	1.7	2.1	1.9	1.6	1.3	2.4	2.3	2.7	2.9	2.9	2.3	2.0	2.0	1.9	1.7	1.3	1.3	1.6	1.5	1.8	1.6	1.6	2.9
Diurnal Maximum																									



Maximum Value: 1.5 km/h on Sep 26 02:00		Maximum Daily Average: 0.6 km/h on Sep 23		Hours in Service: 720																						
Minimum Value: -1.9 km/h on Sep 27 09:00		Minimum Daily Average: -0.9 km/h on Sep 27		Hours of Data: 720																						
Maximum Diurnal Average: 0.2 km/h at hour 8		Minimum Diurnal Average: -0.2 km/h at hour 16		Hours of Missing Data: 0																						
Monthly Average: -0.02 km/h		Percentiles: P <sub>1</sub> = -1.4 P <sub>10</sub> = -0.8 Q <sub>1</sub> = -0.4 Median = 0.0 Q <sub>3</sub> = 0.4 P <sub>90</sub> = 0.7 P <sub>99</sub> = 1.2		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0.7	0.7	0.4	0.1	0.1	0.2	0.0	0.9	0.1	-0.3	-0.3	-0.3	-0.6	-0.9	-0.8	-0.8	-0.5	-0.6	0.1	0.0	-0.2	0.3	0.5	0.1	0.0	0.9
2-Sep	0.1	0.4	0.3	0.3	0.4	-0.1	-0.2	0.0	-0.1	-0.2	-0.2	0.0	-0.3	-0.4	-0.5	-0.6	-1.0	-0.7	-0.3	-0.5	-0.3	-0.3	-0.3	-0.5	-0.2	0.4
3-Sep	-0.4	-0.5	-0.4	-0.6	-0.6	-0.8	-0.9	-0.8	-0.8	-0.9	-1.0	-0.9	-1.3	-1.0	-1.1	-1.3	-1.2	-0.9	-1.1	-0.9	-0.5	-0.7	-0.3	-0.2	-0.8	-0.2
4-Sep	-0.3	-0.3	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	0.0	-0.4	-0.2	-0.1	-0.7	-0.5	0.1	-0.2	-0.2	0.0	0.0	0.0	0.1	0.1	0.1	0.2	-0.1	0.2
5-Sep	0.1	0.2	0.2	0.6	0.2	0.3	0.3	0.2	0.3	0.5	0.4	0.5	0.0	0.1	0.3	0.2	0.4	0.2	0.2	0.1	0.1	0.0	0.1	0.1	0.2	0.6
6-Sep	-0.1	-0.2	-0.1	-0.5	-0.1	-0.1	-0.2	-0.1	-0.2	-0.3	-0.3	-0.4	-0.6	-0.7	-0.4	-0.3	-0.2	-0.2	-0.1	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.1
7-Sep	-0.3	-0.3	-0.3	-0.2	-0.2	-0.1	-0.2	-0.2	-0.3	-0.5	-0.6	-0.8	-0.5	-0.4	-0.6	-0.4	-0.5	-0.4	-0.2	0.1	0.1	0.1	0.1	0.0	-0.3	0.1
8-Sep	0.1	0.1	0.2	0.2	0.8	0.8	0.6	0.4	0.3	0.1	0.3	0.3	0.6	0.1	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.3	0.8
9-Sep	0.1	-0.1	0.1	0.6	1.2	0.9	0.3	0.4	0.5	0.4	0.2	0.7	0.8	0.7	0.7	-0.1	-0.2	0.4	0.1	0.5	0.6	0.4	0.6	0.4	0.4	1.2
10-Sep	0.4	0.6	0.5	0.6	0.6	0.7	0.7	0.8	0.9	0.5	0.5	0.5	0.6	0.0	0.1	-0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.9	0.4	0.9
11-Sep	0.8	0.8	0.5	0.5	0.2	0.0	1.1	0.9	1.3	1.0	0.4	-0.3	0.1	-0.1	0.1	0.2	0.2	0.2	0.0	-0.1	-0.1	0.0	0.1	-0.7	0.3	1.3
12-Sep	-1.1	-1.0	-0.7	-1.1	-0.3	-0.3	0.1	-0.3	-0.1	0.1	-0.1	-0.6	-0.9	-0.6	-1.0	-1.1	-0.8	-0.6	-1.2	-1.2	-0.3	-0.2	-0.2	-0.1	-0.6	0.1
13-Sep	0.0	0.0	0.0	0.0	-0.1	-0.1	0.1	0.2	0.6	0.2	0.1	-0.2	-0.1	0.2	0.3	-0.6	-0.4	-0.1	0.0	0.0	-0.2	-0.1	-0.3	-0.3	0.0	0.6
14-Sep	-0.5	-0.1	-0.3	-0.5	-0.2	-0.5	-0.3	-0.1	-0.4	-0.7	-0.7	-0.3	-0.6	-0.5	0.1	-0.2	-0.2	0.0	0.0	-0.3	-0.1	0.1	0.0	-0.3	0.1	0.1
15-Sep	0.0	0.1	-0.1	-0.3	-0.5	-0.4	-0.2	-0.2	0.0	-0.4	0.3	0.3	0.1	0.6	0.9	0.6	0.6	0.4	0.2	0.2	0.0	0.1	-0.2	-0.2	0.1	0.9
16-Sep	-0.1	0.0	-0.1	-0.3	-0.2	-0.2	-0.1	-0.1	-0.1	-0.4	0.0	-0.2	0.0	0.3	0.2	0.8	0.5	0.6	0.5	0.4	0.5	0.3	0.3	0.4	0.1	0.8
17-Sep	0.7	0.3	0.1	0.1	0.1	0.6	0.5	0.6	0.3	0.9	0.5	0.8	0.7	0.2	0.3	0.6	0.1	0.1	0.5	0.8	1.4	-0.3	0.5	0.8	0.5	1.4
18-Sep	0.8	0.7	0.7	1.0	1.1	1.4	1.4	1.4	0.8	0.1	-0.4	-0.5	-0.8	-0.2	-0.5	-0.7	-0.5	-0.2	0.2	0.5	0.5	0.2	-0.4	0.1	0.3	1.4
19-Sep	-0.3	-0.4	-0.5	-0.4	-0.7	-0.6	0.4	0.8	0.8	0.0	-0.1	-0.5	-0.7	0.0	-0.8	-1.1	-0.2	-0.8	-0.2	0.1	0.0	-0.6	-0.8	-0.6	-0.3	0.8
20-Sep	-0.3	0.2	0.4	-0.5	-1.4	-0.9	-0.4	-0.1	0.0	-0.3	-0.6	-1.1	-1.6	-1.3	-1.2	-1.3	-1.2	-0.9	-0.9	-0.2	-0.3	-0.1	-0.3	-0.2	-0.6	0.4
21-Sep	-0.6	-1.0	-0.7	-0.8	-0.8	-0.6	-0.7	-0.5	-0.6	-0.3	-0.5	-0.9	-0.8	-1.0	-0.7	-0.6	-0.6	-0.8	-0.7	-0.8	-0.7	-0.4	-0.3	-0.5	-0.7	-0.3
22-Sep	0.0	-0.1	0.0	-0.2	0.0	0.0	0.0	0.1	0.5	0.4	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.1	0.5	0.4	0.4	0.1	0.4	0.3	0.2	0.5
23-Sep	0.0	0.2	0.2	0.3	0.5	0.7	0.4	0.8	0.8	0.8	1.0	1.0	0.6	0.4	0.5	0.5	0.4	0.6	0.6	0.5	0.7	0.7	0.8	0.7	0.6	1.0
24-Sep	0.7	0.6	0.5	0.8	0.1	0.1	0.2	0.5	0.6	0.4	0.3	0.6	0.7	0.4	0.5	0.5	0.6	0.3	0.1	0.3	0.1	0.8	0.7	0.6	0.5	0.8
25-Sep	0.2	0.1	0.5	0.7	0.4	0.4	0.6	-0.4	-0.6	-1.1	-0.2	-0.4	-0.9	-0.5	-0.4	-0.5	-0.4	-0.4	-0.5	0.1	-0.1	0.1	-0.2	-0.8	-0.2	0.7
26-Sep	-0.1	1.5	0.8	1.0	1.0	0.9	0.9	1.1	0.7	-0.2	-0.4	-0.7	-0.8	-1.0	-0.6	-1.1	-1.7	-1.2	-1.0	-1.1	-0.4	-0.2	-0.4	-0.5	-0.1	1.5
27-Sep	0.0	0.7	0.3	-0.6	-0.6	-0.1	-1.1	-1.4	-1.9	-1.1	-1.2	-1.7	-1.5	-1.6	-1.4	-0.8	-1.2	-0.8	-0.5	-0.9	-0.8	-0.7	-1.2	-1.1	-0.9	0.7
28-Sep	-0.8	-0.9	-0.6	-0.8	-0.2	-0.1	-0.3	0.0	-0.1	0.4	0.1	0.1	-0.2	0.1	-0.4	-0.2	0.2	0.9	0.3	0.8	0.0	0.2	0.7	0.3	0.0	0.9
29-Sep	0.4	0.4	0.2	0.5	0.4	0.5	0.6	0.0	0.2	0.2	0.3	0.6	0.7	0.5	0.5	0.3	0.3	0.2	0.9	0.4	0.4	0.2	1.1	0.8	0.4	1.1
30-Sep	0.6	0.9	0.9	0.9	0.8	0.3	0.1	0.2	0.0	0.3	0.7	0.6	0.3	0.1	0.1	0.1	0.4	0.7	0.7	0.6	0.6	0.8	0.5	0.0	0.5	0.9
																								Diurnal Average		
																								Diurnal Maximum		



**Wood Buffalo Environmental Association**

**Summary of Hour Standard Deviations**

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

**Lower Camp Met Tower - September 2015**

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 5.7 km/h on Sep 27 09:00			Hours of Data:	720
Minimum Value: 0.1 km/h on Sep 13 04:00			Hours of Missing Data:	0
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.4 Q <sub>1</sub> = 1.0 Median = 1.7 Q <sub>3</sub> = 2.3 P <sub>90</sub> = 2.9 P <sub>99</sub> = 4.7			Hours of Calibration:	0
			Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	1.3	1.6	1.1	0.7	0.3	0.8	1.0	3.3	1.7	2.0	2.2	2.4	2.4	2.8	2.2	2.2	1.8	1.5	1.1	1.6	2.3	1.7	1.5	1.0	3.3
2-Sep	0.7	1.0	1.2	1.2	1.4	0.7	0.6	0.8	0.9	1.3	1.3	0.7	1.8	2.7	3.1	3.2	2.8	2.0	1.6	2.1	1.7	1.8	1.5	1.8	3.2
3-Sep	1.4	1.4	1.8	1.7	1.9	2.6	2.7	2.6	2.8	2.9	3.1	3.4	3.4	3.4	3.2	3.0	2.8	2.5	2.5	2.2	2.3	2.3	2.2	1.0	3.4
4-Sep	1.2	0.8	0.4	0.5	0.4	0.7	0.8	1.1	1.2	1.7	1.5	1.8	1.9	1.9	1.8	1.2	1.2	0.3	0.5	0.4	0.3	0.2	0.2	0.3	1.9
5-Sep	0.3	0.6	0.6	1.2	1.1	1.3	1.4	1.3	1.3	1.7	1.3	1.7	1.5	1.1	1.1	1.2	1.6	1.3	0.9	0.5	0.4	0.3	0.2	0.3	1.7
6-Sep	0.3	0.4	0.6	0.8	0.3	0.4	0.6	0.9	1.3	1.4	1.3	1.5	1.7	2.0	2.5	1.9	1.7	1.5	1.2	0.6	0.4	0.9	1.0	0.8	2.5
7-Sep	0.9	1.0	1.1	0.8	0.9	0.5	1.0	1.1	1.5	1.5	1.9	2.1	2.3	2.3	2.4	2.5	2.3	2.2	0.7	0.2	0.2	0.2	0.2	0.2	2.5
8-Sep	0.2	0.2	0.3	0.3	0.7	0.8	0.7	1.0	1.2	1.4	1.4	1.6	1.7	1.9	1.7	1.6	1.3	0.7	0.4	0.4	0.6	1.2	0.8	0.7	1.9
9-Sep	0.8	0.7	1.2	1.2	1.0	1.6	1.9	1.9	1.6	1.7	1.9	2.0	1.8	2.1	2.1	1.7	1.6	1.3	0.7	0.6	0.5	0.5	0.7	0.5	2.1
10-Sep	0.3	0.7	1.0	1.2	1.3	1.8	1.6	1.9	1.9	2.1	2.1	1.6	1.8	1.7	1.8	1.6	1.6	1.4	0.9	1.0	0.8	0.8	0.8	1.3	2.1
11-Sep	1.2	1.4	1.6	1.9	1.8	1.8	2.0	2.6	2.4	2.0	2.1	2.0	1.5	1.6	2.0	2.3	1.7	0.7	0.5	1.0	1.3	1.0	0.6	2.1	2.6
12-Sep	2.7	2.8	2.8	2.9	2.7	1.6	1.8	1.5	1.3	1.2	1.3	2.0	2.2	1.8	2.6	3.2	3.0	2.9	2.8	3.1	2.2	0.7	0.4	0.4	3.2
13-Sep	0.2	0.2	0.2	0.1	0.2	0.4	0.2	0.6	0.9	1.0	1.5	1.6	1.7	1.4	1.3	1.6	1.2	0.9	0.4	0.2	0.5	0.2	1.1	1.6	1.7
14-Sep	1.7	1.5	1.5	1.8	1.4	1.7	1.7	1.6	2.0	2.5	2.5	2.5	1.9	2.4	2.3	1.8	1.6	1.5	0.7	0.6	0.7	0.4	0.3	0.4	2.5
15-Sep	0.2	0.2	0.2	0.4	0.4	0.4	0.5	0.6	1.0	1.1	1.7	1.5	1.5	2.3	2.5	1.6	1.9	1.7	1.5	0.7	0.5	0.4	0.3	0.3	2.5
16-Sep	0.3	0.2	0.3	0.4	0.6	0.3	0.3	0.3	0.6	0.9	1.3	1.4	1.0	1.4	2.0	2.4	1.5	1.1	1.2	1.2	1.0	1.3	2.0	1.5	2.4
17-Sep	1.3	1.4	1.5	1.3	1.4	1.4	1.5	1.6	1.9	2.0	2.0	2.5	2.2	2.0	1.8	1.3	1.6	1.2	1.5	1.8	1.8	1.9	1.3	1.9	2.5
18-Sep	2.1	2.0	1.9	2.0	1.8	2.0	1.7	2.2	1.8	1.7	2.4	2.6	2.8	2.3	2.4	2.6	2.8	2.2	1.0	1.1	1.6	1.4	1.7	1.5	2.8
19-Sep	1.5	2.0	2.4	2.3	2.5	2.3	2.6	2.0	2.3	2.7	2.8	3.4	3.6	3.2	3.6	4.8	2.3	4.0	2.6	2.9	2.8	2.7	2.4	2.4	4.8
20-Sep	1.4	1.7	1.7	2.6	3.7	3.0	2.4	2.0	2.2	2.9	2.9	4.5	4.5	4.4	3.9	3.7	2.8	2.2	1.6	0.7	0.3	0.2	0.6	0.4	4.5
21-Sep	1.7	2.3	2.4	2.2	2.2	2.2	2.5	2.4	2.6	2.5	2.0	2.9	3.1	3.0	2.3	2.8	2.0	2.7	2.4	2.5	2.4	1.7	0.9	0.8	3.1
22-Sep	0.3	0.4	0.2	0.4	0.2	0.4	0.3	0.6	1.1	1.4	1.7	1.7	1.6	1.9	1.8	1.6	1.2	0.8	0.7	1.0	0.7	0.5	1.0	0.8	1.9
23-Sep	0.8	0.8	0.7	1.1	1.7	2.9	2.6	2.7	2.8	3.8	3.7	3.2	2.8	2.5	2.9	2.6	2.7	2.8	2.9	2.6	3.0	2.8	3.3	3.5	3.8
24-Sep	3.1	3.0	1.7	2.2	1.5	0.8	1.0	1.2	1.3	1.4	1.7	2.1	2.2	1.9	1.7	1.9	1.5	0.5	0.4	0.7	0.7	2.3	2.4	2.3	3.1
25-Sep	2.6	1.6	2.9	2.9	1.5	1.4	1.4	2.2	2.4	3.3	2.0	2.5	3.2	2.6	3.0	2.6	2.3	2.1	1.8	1.2	1.0	1.7	1.9	2.1	3.3
26-Sep	1.7	1.7	1.5	1.7	1.3	1.3	1.5	1.6	1.7	2.5	2.6	2.7	3.1	3.9	3.8	4.5	4.7	3.9	3.4	3.4	2.2	2.2	2.9	2.4	4.7
27-Sep	1.7	1.7	2.2	3.5	2.5	1.8	3.5	4.7	5.7	4.6	3.9	4.9	4.9	4.7	4.2	3.7	3.5	2.9	1.4	2.2	2.6	2.6	3.0	2.6	5.7
28-Sep	2.0	2.3	2.1	2.4	1.9	1.6	0.8	0.6	1.0	1.5	1.8	2.2	2.1	2.0	2.0	1.6	1.3	0.9	1.0	1.6	1.8	1.6	2.4	1.8	2.4
29-Sep	1.9	1.8	1.6	1.7	1.6	1.9	1.3	1.2	1.6	1.7	1.5	1.8	1.9	1.7	1.4	1.3	0.9	0.5	0.9	0.7	1.0	1.2	1.1	1.4	1.9
30-Sep	2.0	1.5	1.4	1.8	1.6	1.5	1.4	2.3	2.4	2.7	2.9	2.9	2.4	2.2	2.3	2.1	1.9	1.4	1.2	1.7	1.8	1.9	2.0	1.7	2.9

3.1	3.0	2.9	3.5	3.7	3.0	3.5	4.7	5.7	4.6	3.9	4.9	4.9	4.7	4.2	4.8	4.7	4.0	3.4	3.4	3.0	2.8	3.3	3.5	
Diurnal Maximum																								



Maximum Value: 3.4 km/h on Sep 24 03:00      Maximum Daily Average: 1.2 km/h on Sep 23																				Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Minimum Value: -1.6 km/h on Sep 19 01:00      Minimum Daily Average: -0.6 km/h on Sep 27 Maximum Diurnal Average: 0.5 km/h at hour 21      Minimum Diurnal Average: 0.0 km/h at hour 13 Monthly Average: 0.26 km/h      Percentiles: P <sub>1</sub> = -1.2 P <sub>10</sub> = -0.4 Q <sub>1</sub> = -0.1 Median = 0.2 Q <sub>3</sub> = 0.6 P <sub>90</sub> = 1.1 P <sub>99</sub> = 2.0																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0.0	0.6	0.5	0.3	0.3	0.6	0.1	1.9	0.9	0.5	0.1	0.3	-0.3	-0.9	-0.6	-0.9	0.4	-0.3	0.6	0.6	0.8	1.0	0.8	0.4	0.3	1.9
2-Sep	-0.2	0.1	0.2	0.5	0.5	-0.2	0.1	0.2	0.2	0.1	0.1	-0.1	0.5	0.1	0.2	-0.1	-0.2	-0.3	0.1	0.0	0.1	0.0	0.1	0.2	0.1	0.5
3-Sep	0.2	-0.3	-0.4	-0.6	-0.6	-0.8	-0.2	-0.1	-0.6	-0.4	-0.4	-0.4	-1.0	-0.5	-0.7	-0.7	-1.2	-1.0	-0.9	-0.4	-0.3	0.0	0.8	0.4	-0.4	0.8
4-Sep	0.4	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	0.3	0.2	-0.4	0.2	-0.1	-0.5	-0.2	-0.1	0.2	0.3	-0.1	0.0	0.3	0.1	0.1	0.2	0.1	0.0	0.4
5-Sep	0.6	0.6	0.4	0.6	-0.5	0.0	0.2	0.0	-0.3	0.2	0.0	0.2	0.3	-0.1	0.4	0.0	0.2	0.7	0.7	-0.1	0.2	0.1	0.2	0.1	0.2	0.7
6-Sep	0.1	0.2	0.2	0.0	0.1	-0.1	-0.1	-0.3	-0.3	-0.3	0.0	0.1	-0.2	-0.4	0.2	0.1	-0.2	0.0	0.2	0.1	-0.1	-0.2	-0.1	-0.1	-0.1	0.2
7-Sep	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.1	0.0	-0.2	-0.1	-0.3	-0.4	-0.1	0.1	0.1	0.1	0.1	-0.3	-0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1
8-Sep	0.0	0.1	0.1	0.0	-0.1	0.0	-0.1	0.2	0.3	0.3	0.0	-0.2	0.9	0.3	0.4	0.6	-0.1	-0.3	-0.1	0.2	0.4	1.1	0.9	0.2	0.2	1.1
9-Sep	0.2	-0.4	0.3	0.1	0.7	2.0	0.8	1.3	0.8	0.4	0.1	0.3	0.4	0.9	0.7	-0.2	-0.1	0.7	0.4	0.3	0.1	0.1	0.7	0.6	0.5	2.0
10-Sep	0.4	0.5	0.1	-0.4	-0.1	0.4	0.8	0.9	0.8	0.8	1.5	-0.1	0.6	0.5	0.3	-0.2	0.4	0.5	0.4	1.2	0.9	0.0	-0.1	0.6	0.5	1.5
11-Sep	0.1	0.7	0.8	1.3	1.2	0.7	1.6	0.3	0.0	0.1	0.8	0.4	0.5	0.2	0.5	0.7	0.8	0.2	0.2	0.3	0.9	0.1	0.2	0.0	0.5	1.6
12-Sep	-0.1	0.4	0.8	0.2	1.3	0.3	2.0	0.5	0.4	0.6	0.2	-0.1	-0.6	0.0	-0.4	0.0	0.3	0.5	0.1	-0.2	0.2	-0.2	0.0	0.0	0.3	2.0
13-Sep	0.0	-0.1	0.1	0.0	-0.1	-0.6	0.0	0.1	0.3	0.1	-0.3	0.4	-0.4	0.9	-0.1	-0.3	-0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.9
14-Sep	-0.1	0.3	0.1	0.2	0.2	0.1	0.3	0.2	0.0	0.2	0.0	-0.1	-0.3	-0.1	-0.4	0.0	0.0	0.1	0.4	0.7	0.0	0.2	0.0	0.2	0.1	0.7
15-Sep	0.1	0.0	0.1	-0.2	-0.1	-0.1	0.0	0.0	0.0	-0.3	0.5	0.1	-0.1	1.0	1.5	0.5	0.5	0.8	0.6	0.7	0.4	0.2	0.2	0.0	0.3	1.5
16-Sep	0.0	0.1	0.0	-0.1	-0.1	0.0	-0.1	0.1	-0.1	-0.2	0.0	0.1	-0.2	0.0	0.5	1.2	0.5	0.6	0.6	0.5	1.1	0.4	1.1	0.3	0.3	1.2
17-Sep	0.7	1.0	0.1	0.2	0.5	1.0	0.9	1.0	0.7	0.5	0.4	1.0	1.2	0.4	0.1	0.6	0.6	0.2	-0.3	-0.4	1.1	0.3	-0.2	0.2	0.5	1.2
18-Sep	0.5	0.6	1.1	0.8	1.8	1.5	0.2	0.0	0.1	0.6	0.4	0.0	-0.2	0.0	0.0	0.1	0.3	0.5	0.7	0.9	1.6	0.6	-0.9	-1.1	0.4	1.8
19-Sep	-1.6	-1.2	-1.0	-0.7	0.6	0.5	1.6	1.4	0.4	0.6	1.3	0.3	0.3	1.3	0.3	0.1	0.2	0.4	1.1	1.2	0.8	0.3	-0.1	0.4	0.3	1.6
20-Sep	0.2	1.1	1.3	0.5	-0.3	0.2	0.8	0.5	0.8	0.3	0.2	-0.2	-1.3	-0.6	-0.5	-0.7	-0.8	-0.8	-0.9	-0.2	-0.3	-0.3	-0.4	-0.3	-0.1	1.3
21-Sep	-0.5	-1.0	-0.8	-0.8	-1.0	-0.7	-0.2	0.6	0.5	0.8	0.1	-0.6	-0.7	-1.1	0.0	-0.2	-0.6	-0.5	-0.7	-0.4	-0.3	-0.3	-0.5	-0.5	-0.4	0.8
22-Sep	-0.3	-0.3	-0.3	-0.2	-0.1	0.1	0.1	0.1	0.5	0.2	0.2	-0.1	0.1	0.3	0.6	-0.2	0.0	0.0	0.7	0.4	1.1	1.5	1.0	1.8	0.3	1.8
23-Sep	0.0	0.7	0.5	1.9	2.1	1.1	0.3	1.2	1.2	1.3	1.4	1.5	1.2	1.0	1.2	1.1	0.6	1.2	1.2	1.4	2.1	1.2	1.3	1.4	1.2	2.1
24-Sep	1.6	3.1	3.4	3.0	1.2	0.5	0.6	0.8	0.5	0.4	0.3	0.7	0.7	0.2	0.3	0.3	0.9	0.6	0.4	0.1	0.7	2.0	1.7	2.1	1.1	3.4
25-Sep	2.4	1.8	2.5	3.4	2.1	0.8	0.6	0.3	0.1	-1.3	-0.2	0.3	0.2	0.5	0.3	0.1	0.5	0.5	-0.1	0.5	0.1	0.4	0.6	-0.1	0.7	3.4
26-Sep	0.7	0.2	-0.4	0.0	-0.3	0.3	0.1	0.5	1.1	0.4	0.2	0.1	0.2	0.2	0.9	0.2	-0.2	0.2	-0.5	-0.2	0.2	0.6	0.6	0.8	0.2	1.1
27-Sep	0.5	0.3	0.6	0.7	0.2	0.7	-0.1	-0.8	-1.5	-1.2	-0.8	-1.5	-1.0	-1.4	-0.7	-0.7	-0.7	-0.9	-0.7	-1.0	-1.0	-1.0	-1.0	-1.1	-0.6	0.7
28-Sep	-0.9	-0.6	-0.6	-0.6	0.5	1.6	-0.3	-0.1	-0.1	0.1	0.0	0.1	-0.4	0.1	-0.3	0.2	0.2	0.5	0.5	0.1	0.9	1.1	2.1	1.8	0.2	2.1
29-Sep	1.9	1.3	1.3	1.4	1.7	2.1	0.8	0.0	0.3	0.4	0.4	0.3	0.5	0.3	-0.1	0.2	-0.1	0.1	0.8	1.0	1.3	0.4	0.2	0.4	0.7	2.1
30-Sep	1.0	1.1	1.2	1.6	0.8	0.4	0.0	0.8	-0.2	0.8	1.2	1.4	0.7	0.6	0.5	-0.2	-0.3	0.0	-1.0	0.7	1.5	1.1	0.7	-0.9	0.6	1.6
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.2 km/h on Sep 27 09:00 Minimum Value: 0.2 km/h on Sep 7 22:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 1.0 Median = 1.5 Q <sub>3</sub> = 2.1 P <sub>90</sub> = 2.7 P <sub>99</sub> = 4.6																							Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	2.0	1.3	1.0	0.7	0.7	1.1	1.8	2.8	1.9	1.6	2.1	2.5	2.2	2.4	2.0	1.8	2.1	1.7	1.4	1.6	2.4	1.9	1.9	1.5	2.8
2-Sep	0.9	1.2	1.1	1.2	1.3	0.7	0.6	1.1	1.3	1.1	1.3	1.1	1.8	2.3	2.7	2.2	1.5	1.6	1.4	1.8	1.6	1.7	1.5	1.2	2.7
3-Sep	1.3	0.7	1.3	1.1	1.4	2.4	2.7	2.9	3.0	3.1	2.7	3.5	2.9	3.5	3.4	2.9	2.3	1.7	2.0	2.4	1.8	1.9	2.0	1.5	3.5
4-Sep	1.5	0.9	0.6	0.9	0.8	0.6	0.9	1.1	1.4	1.8	1.8	1.9	1.9	1.8	1.4	1.5	0.4	0.6	0.7	0.5	0.3	0.5	0.5	0.5	1.9
5-Sep	0.5	0.7	0.6	1.0	1.0	1.0	1.0	1.0	1.1	1.2	0.8	1.3	2.0	1.5	1.3	1.4	1.5	1.6	1.3	0.9	0.9	0.5	0.4	0.3	2.0
6-Sep	0.3	0.8	0.5	0.5	0.4	0.3	0.4	0.6	0.9	1.2	1.2	1.2	2.0	2.0	2.4	2.1	1.7	1.4	1.0	0.6	0.5	0.5	0.5	0.7	2.4
7-Sep	0.8	0.5	0.4	0.4	0.5	0.5	0.9	0.8	1.3	1.5	1.9	2.1	2.1	2.1	2.3	2.4	2.5	2.3	0.7	0.3	0.3	0.2	0.3	0.3	2.5
8-Sep	0.3	0.3	0.3	0.4	0.7	0.7	0.5	0.9	0.8	1.1	0.9	1.0	1.9	2.8	2.2	1.9	1.3	0.8	0.5	0.7	0.9	1.2	1.0	1.3	2.8
9-Sep	1.4	1.2	1.4	1.3	1.3	1.4	1.5	1.5	1.3	1.5	1.1	0.7	0.9	1.3	1.9	2.0	2.1	1.2	0.9	0.8	0.7	0.8	0.8	0.7	2.1
10-Sep	0.7	0.7	0.9	0.9	1.0	1.4	1.4	1.3	1.2	1.6	1.2	1.5	1.8	2.6	2.7	2.1	2.2	1.5	0.9	0.8	1.3	1.8	1.5	1.7	2.7
11-Sep	1.3	1.0	1.2	1.1	1.4	1.4	2.0	1.5	1.4	1.5	2.0	1.9	1.8	2.2	2.4	2.4	2.0	0.8	0.4	1.2	1.3	1.7	1.3	1.3	2.4
12-Sep	1.2	1.5	1.8	1.6	2.0	2.1	1.8	1.3	0.9	0.8	1.6	2.4	2.3	1.9	2.8	2.5	2.2	1.8	2.2	2.4	2.2	0.8	0.7	0.8	2.8
13-Sep	0.5	0.4	0.4	0.2	0.4	0.7	0.5	0.4	0.9	0.9	1.3	2.1	2.1	1.8	1.4	1.7	1.2	1.2	0.8	0.4	0.5	0.3	1.4	1.3	2.1
14-Sep	1.7	1.8	1.5	1.6	1.4	1.3	1.6	1.9	1.9	2.4	2.4	2.3	2.1	2.3	2.4	2.1	2.3	1.4	0.7	0.5	1.4	0.9	0.6	0.5	2.4
15-Sep	0.4	0.2	0.3	0.5	0.4	0.5	0.6	0.7	0.6	0.8	1.6	1.4	1.6	2.4	3.0	1.6	1.7	1.2	1.1	0.9	0.9	0.6	0.4	0.3	3.0
16-Sep	0.3	0.3	0.2	0.3	0.5	0.2	0.2	0.2	0.3	0.6	1.1	1.2	0.5	1.3	1.9	2.1	1.7	1.2	1.0	1.6	1.7	1.8	1.7	1.8	2.1
17-Sep	1.1	1.4	1.5	1.2	1.1	1.2	1.6	1.5	1.5	1.2	1.0	2.1	2.3	2.4	2.2	1.5	1.7	1.5	1.4	1.4	1.8	2.3	1.5	1.5	2.4
18-Sep	1.4	1.3	1.7	1.4	1.5	1.9	1.2	1.3	1.7	2.0	2.7	2.7	2.5	2.3	2.2	2.0	2.2	2.0	0.9	1.2	1.9	1.9	1.8	1.6	2.7
19-Sep	1.6	2.2	2.4	2.7	3.3	2.8	2.6	2.1	2.3	3.5	3.6	3.2	3.1	4.0	3.1	3.9	2.2	3.8	2.2	3.2	3.0	2.5	2.0	1.8	4.0
20-Sep	1.9	2.1	2.0	2.4	2.6	2.3	2.6	2.9	2.9	3.2	3.2	4.3	4.1	3.9	3.5	3.8	3.0	2.2	1.2	0.6	0.5	0.5	1.0	0.6	4.3
21-Sep	1.3	1.9	2.1	2.2	2.1	1.9	2.4	2.4	2.7	2.6	2.3	3.1	3.5	3.3	2.3	2.9	2.0	2.6	2.3	2.3	2.2	1.7	1.1	1.3	3.5
22-Sep	0.8	0.5	0.4	0.5	0.4	0.5	0.4	0.5	0.8	1.0	1.2	1.5	1.5	1.7	1.9	2.1	1.3	1.2	1.2	1.6	0.8	1.0	1.2	1.5	2.1
23-Sep	1.3	0.9	0.8	1.6	1.5	1.4	1.6	1.8	1.6	1.9	2.5	2.1	2.4	2.7	2.9	2.3	2.8	2.6	2.8	2.5	2.1	2.2	1.8	1.7	2.9
24-Sep	2.0	1.8	2.1	2.1	1.9	1.4	1.6	1.2	1.4	1.7	1.5	1.2	1.6	1.4	1.7	1.8	1.5	0.6	0.8	1.3	1.4	1.8	1.4	2.0	2.1
25-Sep	1.9	1.6	1.8	2.0	1.9	1.7	1.5	2.0	1.6	3.2	2.2	1.9	2.2	2.3	2.8	2.1	1.7	1.8	1.8	0.9	1.1	2.2	2.2	1.9	3.2
26-Sep	1.7	1.4	2.0	2.0	1.5	1.7	1.8	2.0	2.3	2.6	2.8	2.9	2.9	3.4	3.8	3.9	3.3	3.2	3.2	2.8	2.1	2.5	2.8	2.4	3.9
27-Sep	2.1	1.5	2.6	3.0	2.1	2.3	3.1	4.9	5.2	4.9	4.2	4.6	5.1	4.6	4.9	4.1	3.5	3.0	1.0	2.1	2.3	2.4	3.4	2.3	5.2
28-Sep	2.0	2.6	2.4	2.0	1.6	2.2	1.4	0.8	0.9	1.6	2.3	2.8	2.5	2.6	2.6	2.3	1.7	1.1	1.3	1.3	1.6	1.0	1.1	1.1	2.8
29-Sep	1.1	1.2	1.2	1.2	1.4	1.9	1.5	1.7	1.7	1.2	0.8	1.1	1.3	1.3	1.2	1.3	1.0	0.8	1.3	1.1	0.9	1.4	1.4	1.1	1.9
30-Sep	1.2	1.1	1.1	1.1	1.2	1.7	1.7	2.0	1.7	1.3	1.7	2.0	2.7	2.7	2.8	2.3	1.8	1.3	1.1	1.6	1.5	1.6	2.0	2.1	2.8
Diurnal Maximum																									



Maximum Value: 4.3 km/h on Sep 24 03:00		Maximum Daily Average: 1.5 km/h on Sep 19		Hours in Service: 720																						
Minimum Value: -1.4 km/h on Sep 27 14:00		Minimum Daily Average: -0.2 km/h on Sep 27		Hours of Data: 719																						
Maximum Diurnal Average: 1.1 km/h at hour 21		Minimum Diurnal Average: 0.2 km/h at hour 12		Hours of Missing Data: 1																						
Monthly Average: 0.57 km/h		Percentiles: $P_1 = -1.1$ $P_{10} = -0.3$ $Q_1 = 0.1$ Median = 0.4 $Q_3 = 0.9$ $P_{90} = 1.7$ $P_{99} = 3.5$		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-Sep	0.1	0.4	0.2	0.7	0.5	0.6	0.4	2.3	UO	0.8	0.1	0.3	-0.3	-0.9	0.0	-0.7	0.8	0.0	1.1	1.0	1.2	2.0	2.3	1.2	0.6	2.3
2-Sep	0.2	0.6	0.2	0.5	0.2	0.1	0.2	0.0	0.1	0.2	0.3	0.2	0.4	0.4	0.4	0.3	0.2	-0.2	0.2	0.1	0.3	0.2	0.3	0.4	0.2	0.6
3-Sep	0.4	0.0	0.0	-0.3	-0.5	-0.4	0.4	0.7	-0.3	-0.2	0.2	-0.2	-1.0	0.2	-0.4	-0.4	-1.0	-0.6	-0.7	0.1	0.3	0.5	1.9	1.2	0.0	1.9
4-Sep	1.4	0.1	0.2	0.0	0.0	0.0	0.1	0.3	0.1	-0.5	0.5	-0.5	-0.3	-0.1	0.3	0.3	0.0	0.3	0.8	0.4	0.4	0.6	0.2	0.2	1.4	
5-Sep	0.3	0.6	0.6	0.3	-0.5	-0.1	0.3	0.2	0.0	0.1	0.0	-0.1	0.5	-0.2	0.4	0.1	-0.1	1.0	1.0	0.2	0.3	0.1	0.3	0.2	0.2	1.0
6-Sep	0.5	0.7	0.4	0.3	0.1	0.3	0.1	0.2	0.2	-0.2	0.2	0.2	-0.2	0.4	0.4	0.0	0.2	0.5	0.5	0.0	0.0	0.1	0.1	0.2	0.7	
7-Sep	0.3	0.3	0.2	0.3	0.3	0.0	0.1	0.1	-0.1	0.1	-0.4	0.0	0.1	0.2	0.5	0.3	0.4	0.0	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.5
8-Sep	-0.1	0.1	0.3	0.2	0.3	0.2	0.2	0.3	0.3	0.3	-0.2	-0.4	0.4	0.2	0.7	0.5	0.2	-0.5	0.0	0.7	1.0	1.7	1.3	0.5	0.3	1.7
9-Sep	0.6	-0.3	0.2	-0.3	0.0	0.9	0.3	0.6	0.3	0.1	0.4	0.3	0.3	0.6	0.6	0.4	0.4	0.7	0.7	0.5	0.8	0.4	0.5	0.5	0.4	0.9
10-Sep	0.3	0.6	0.7	0.4	0.8	0.6	0.4	0.4	0.3	0.9	1.1	-0.5	0.6	1.3	1.1	0.3	0.7	1.2	1.5	1.6	2.2	1.1	0.8	1.6	0.8	2.2
11-Sep	0.5	0.5	0.4	0.3	0.2	0.2	1.0	0.7	0.7	0.4	1.0	1.1	1.1	0.7	1.3	1.6	1.4	0.9	0.8	1.3	1.7	1.8	0.6	0.8	0.9	1.8
12-Sep	0.3	1.0	2.3	0.8	1.7	0.9	1.8	0.5	0.4	0.5	0.5	0.6	0.3	0.4	0.3	0.7	1.0	1.0	1.3	0.1	0.6	0.1	0.1	0.2	0.7	2.3
13-Sep	0.2	0.0	0.1	-0.1	-0.1	-0.2	-0.1	0.0	-0.2	0.3	-0.3	0.8	-0.2	1.1	-0.4	-0.1	0.1	0.4	0.3	0.5	0.2	0.1	-0.1	0.1	0.1	1.1
14-Sep	-0.1	0.5	0.0	0.4	0.3	0.2	0.4	0.2	0.1	0.3	0.0	-0.1	-0.3	0.2	0.1	-0.2	0.0	0.2	0.6	1.1	0.8	0.5	0.4	0.5	0.3	1.1
15-Sep	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.5	0.3	-0.1	0.4	-0.2	-0.2	0.9	2.2	-0.2	0.2	0.6	1.0	1.4	1.1	0.6	0.9	0.5	0.5	2.2
16-Sep	0.3	0.1	0.1	0.1	-0.1	0.2	0.4	0.2	0.5	0.3	-0.2	0.0	-0.1	-0.1	0.5	1.1	0.6	0.6	0.5	0.4	1.2	0.1	0.9	0.6	0.3	1.2
17-Sep	0.6	0.7	0.0	0.4	0.1	0.5	0.6	0.5	0.5	0.3	0.3	0.4	1.4	1.0	0.4	0.7	1.1	0.8	0.7	2.5	3.5	0.6	0.0	0.7	0.8	3.5
18-Sep	0.6	0.5	0.4	0.7	1.4	1.5	1.4	0.9	0.8	1.1	1.0	0.7	0.3	0.3	0.4	0.6	0.9	1.3	1.2	2.0	2.5	2.0	-0.8	-0.6	0.9	2.5
19-Sep	-1.0	-1.1	-0.5	-0.4	0.8	1.4	2.3	4.1	4.2	2.8	2.5	1.2	1.4	2.5	1.2	1.0	0.9	1.5	2.2	2.6	1.9	1.6	0.7	1.0	1.5	4.2
20-Sep	1.0	2.2	2.2	1.6	0.3	0.6	1.6	1.4	1.5	0.9	1.0	0.9	-0.9	0.3	0.2	-0.3	-0.8	-0.7	-0.9	-0.2	0.0	-0.1	-0.2	-0.2	0.5	2.2
21-Sep	-0.2	-0.9	-0.6	-0.8	-0.9	-0.5	-0.1	0.6	0.7	1.4	0.3	-0.6	-0.3	-1.1	0.2	0.1	-0.4	0.0	-0.3	0.0	0.1	0.1	-0.5	-0.3	-0.2	1.4
22-Sep	-0.2	-0.1	-0.1	0.1	0.0	0.2	0.2	0.1	0.3	0.4	0.0	-0.3	-0.1	-0.2	0.5	0.1	0.4	0.4	0.9	0.7	1.2	1.9	1.3	1.7	0.4	1.9
23-Sep	0.7	1.8	1.5	2.6	2.2	1.1	0.7	0.8	1.1	1.1	1.4	1.2	1.1	1.7	1.8	1.6	1.1	1.9	2.0	2.1	2.1	0.7	0.9	1.3	1.5	2.6
24-Sep	1.7	3.7	4.3	3.3	1.7	1.3	1.0	0.5	0.6	0.8	0.5	0.4	0.0	-0.2	0.1	0.8	0.9	1.2	0.2	1.6	1.7	1.6	1.8	1.3	4.3	
25-Sep	2.4	2.5	2.3	4.1	3.4	1.3	2.1	0.9	0.0	-1.1	0.2	0.9	1.0	1.4	1.0	0.8	1.1	1.1	0.7	1.2	1.0	1.7	1.7	0.6	1.3	4.1
26-Sep	1.6	0.7	-0.3	-0.2	-0.6	0.8	1.0	2.8	2.6	1.4	0.9	0.8	0.8	1.3	2.0	1.7	1.2	1.4	0.1	0.6	1.0	1.6	1.4	1.5	1.1	2.8
27-Sep	1.3	1.1	1.9	1.3	0.8	1.1	0.6	0.1	-1.1	-0.8	-0.7	-1.2	-0.4	-1.4	-0.3	-0.7	-0.7	-0.8	-0.8	-1.0	-0.9	-0.9	-1.1	-1.2	-0.2	1.9
28-Sep	-0.9	-0.6	-0.3	-0.1	1.3	3.2	-0.2	0.1	-0.5	-0.3	-0.1	-0.1	-0.5	-0.2	0.2	0.5	0.3	0.6	1.9	0.8	0.8	1.3	2.5	2.6	0.5	3.2
29-Sep	2.2	1.6	1.3	1.5	2.1	2.5	0.5	0.4	0.2	0.2	0.4	0.0	0.2	0.1	-0.2	0.1	-0.3	0.2	0.4	0.2	1.0	0.5	1.5	0.6	0.7	2.5
30-Sep	0.3	0.4	0.4	0.7	-0.3	0.0	-0.1	0.0	-0.3	0.5	0.6	0.4	2.0	1.7	1.7	0.9	0.8	-0.1	2.2	2.9	3.5	4.2	3.6	-0.3	1.1	4.2
																								Diurnal Average		
																								Diurnal Maximum		
0.5 0.6 0.6 0.6 0.5 0.6 0.6 0.7 0.5 0.4 0.4 0.2 0.3 0.4 0.6 0.4 0.4 0.5 0.7 0.8 1.1 0.9 0.8 0.6																										
2.4 3.7 4.3 4.1 3.4 3.2 2.3 4.1 4.2 2.8 2.5 1.2 2.0 2.5 2.2 1.7 1.4 1.9 2.2 2.9 3.5 4.2 3.6 2.6																										
UO - Unstable Operation																										



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 5.8 km/h on Sep 27 13:00			Hours of Data:	719
Minimum Value: 0.2 km/h on Sep 16 04:00			Hours of Missing Data:	1
			Hours of Calibration:	0
			Percent Operational Time:	99.9
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> = 2.1 P <sub>90</sub> = 2.7 P <sub>99</sub> = 4.2				

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	2.3	1.2	0.7	0.9	0.7	0.9	2.0	2.9	UO	1.7	2.1	2.6	2.2	3.1	1.8	1.7	2.1	1.9	1.3	1.4	2.3	1.9	1.1	1.6	3.1
2-Sep	1.0	1.0	0.8	0.8	0.8	0.4	0.5	0.7	1.0	0.9	1.6	1.6	1.9	2.2	2.6	1.7	1.3	1.7	1.6	2.0	1.6	1.6	1.5	1.3	2.6
3-Sep	1.7	0.7	0.7	1.0	1.3	2.3	2.8	3.0	3.3	3.4	2.9	3.5	2.8	3.8	3.4	3.0	2.2	1.6	1.9	2.5	1.7	1.8	2.1	1.8	3.8
4-Sep	1.7	1.1	1.0	0.9	0.8	0.8	0.8	1.0	1.4	1.9	2.2	1.8	2.5	2.2	1.9	1.6	1.5	0.6	0.7	0.6	0.3	0.4	0.6	0.4	2.5
5-Sep	0.4	0.6	0.7	1.3	0.9	0.9	0.8	0.8	0.9	1.0	1.0	1.5	2.2	1.6	1.6	1.5	1.7	1.6	1.4	0.6	0.9	0.5	0.4	0.3	2.2
6-Sep	0.5	0.7	0.8	0.6	0.5	0.4	0.4	0.6	0.7	0.9	0.9	1.1	2.0	2.1	2.4	2.3	1.6	1.0	0.6	0.4	0.7	0.4	0.6	0.5	2.4
7-Sep	0.5	0.3	0.4	0.5	0.4	0.5	1.0	0.8	1.1	1.7	2.2	2.4	2.1	2.3	2.7	2.7	3.0	2.0	0.9	0.3	0.3	0.2	0.4	0.4	3.0
8-Sep	0.3	0.4	0.3	0.3	0.6	0.6	0.3	0.4	0.4	0.6	0.7	1.1	1.8	3.2	2.4	1.9	1.4	0.8	0.7	0.5	0.9	1.2	1.1	1.1	3.2
9-Sep	1.1	1.1	1.2	0.9	1.0	1.1	1.0	0.8	0.9	0.7	0.7	0.8	0.9	1.5	1.8	1.8	2.0	1.3	1.1	0.8	0.7	0.7	0.7	0.5	2.0
10-Sep	0.5	0.5	0.6	0.8	1.1	0.8	0.8	0.6	0.6	1.4	1.0	1.4	1.9	2.8	3.2	2.5	2.3	1.3	0.7	0.8	0.5	2.1	2.3	2.4	3.2
11-Sep	1.4	0.7	0.9	1.0	0.9	1.1	1.4	1.4	1.8	1.3	2.1	1.7	1.6	2.0	2.0	2.0	1.9	0.8	0.6	0.7	0.6	0.9	1.5	1.1	2.1
12-Sep	1.1	1.2	1.4	1.2	1.6	1.8	1.7	1.3	1.1	1.1	1.4	2.4	2.2	1.5	2.3	2.2	1.2	0.9	1.5	1.5	2.7	1.1	0.6	0.8	2.7
13-Sep	0.5	0.6	0.4	0.4	0.5	0.6	0.5	0.6	0.7	1.0	1.4	2.2	2.1	1.7	1.2	2.3	1.6	1.2	1.1	0.8	0.7	0.5	1.5	1.6	2.3
14-Sep	2.0	2.1	1.7	1.7	1.6	1.2	1.4	1.8	1.9	2.4	2.3	2.3	2.1	2.5	2.6	2.4	2.6	1.5	0.8	0.3	0.8	0.4	0.5	0.5	2.6
15-Sep	0.6	0.4	0.4	0.5	0.4	0.3	0.6	0.6	0.5	0.8	1.3	1.4	1.8	2.9	3.3	1.8	2.1	1.5	1.1	0.7	0.8	0.8	0.5	0.8	3.3
16-Sep	0.5	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.9	1.0	0.5	1.1	2.2	2.2	1.5	0.9	0.8	1.7	1.6	1.7	1.8	2.1	2.2
17-Sep	0.8	1.0	1.1	0.7	0.7	0.6	1.0	0.9	0.8	0.7	1.0	2.0	2.2	2.6	2.3	1.4	2.0	1.3	1.2	1.1	1.4	2.1	1.3	1.0	2.6
18-Sep	1.0	1.0	1.0	1.1	1.2	1.2	1.2	1.5	1.7	2.0	2.4	2.3	2.1	2.0	1.9	1.7	1.8	1.7	0.8	1.2	1.1	2.0	1.2	1.3	2.4
19-Sep	1.2	1.5	2.2	2.1	3.1	2.8	2.4	2.2	2.1	3.5	3.8	2.8	2.8	4.0	2.4	3.1	1.7	3.0	1.8	2.9	2.6	2.1	1.2	1.3	4.0
20-Sep	2.1	1.9	1.7	2.2	1.8	1.5	2.0	2.9	2.8	2.9	3.1	4.2	3.6	3.8	3.3	3.6	3.3	2.2	0.9	0.5	0.7	0.4	0.9	0.7	4.2
21-Sep	0.9	1.2	1.8	1.9	1.8	1.8	2.3	2.6	2.8	2.9	2.6	3.1	3.7	3.2	2.5	3.3	1.9	2.7	2.1	2.4	2.1	1.9	1.2	1.1	3.7
22-Sep	0.9	0.7	0.4	0.6	0.5	0.5	0.4	0.4	0.4	0.5	1.1	1.4	1.4	1.8	2.1	1.8	1.1	0.9	1.1	1.5	1.1	1.2	1.2	1.6	2.1
23-Sep	1.3	1.0	1.0	1.4	1.7	1.0	1.0	1.1	1.4	1.8	2.5	2.3	2.6	2.7	3.0	2.3	3.0	2.7	2.6	2.6	2.2	2.5	2.3	2.2	3.0
24-Sep	2.0	2.0	2.0	2.1	2.1	1.6	1.7	1.1	1.1	1.6	1.4	1.3	1.3	1.2	1.9	2.0	1.6	0.7	1.0	1.7	1.4	2.4	2.1	2.6	2.6
25-Sep	2.3	1.8	2.0	2.6	1.8	1.2	2.0	1.5	1.5	3.3	2.6	1.9	1.8	1.9	2.1	1.9	1.2	1.4	0.9	0.7	1.0	1.7	1.6	1.8	3.3
26-Sep	1.5	1.9	2.6	2.5	2.1	1.8	1.7	1.9	2.3	2.3	2.1	2.8	2.6	2.7	3.6	3.1	3.0	2.6	2.7	2.1	1.8	2.0	2.1	1.8	3.6
27-Sep	1.7	1.5	2.6	2.6	1.5	2.3	2.4	5.0	5.1	4.4	4.2	4.7	5.8	5.0	4.9	4.2	4.0	2.8	1.1	2.1	2.0	2.2	3.2	2.2	5.8
28-Sep	1.8	2.6	2.6	1.8	1.4	2.3	1.7	1.1	0.9	1.5	2.8	2.8	2.3	2.6	2.9	2.4	2.0	0.9	0.8	1.1	1.3	1.5	1.6	1.4	2.9
29-Sep	1.4	1.5	1.2	1.3	1.3	1.8	1.3	1.4	1.7	1.0	0.8	1.1	1.5	1.6	1.4	1.4	1.0	0.5	0.6	0.8	1.0	1.3	2.1	0.9	2.1
30-Sep	0.9	0.9	1.0	1.0	1.1	1.8	1.7	1.3	1.3	1.2	1.5	1.2	2.7	2.7	3.1	1.6	1.3	1.0	1.0	0.8	0.9	1.2	2.7	1.8	3.1

2.3 2.6 2.6 2.6 3.1 2.8 2.8 5.0 5.1 4.4 4.2 4.7 5.8 5.0 4.9 4.2 4.0 3.0 2.7 2.9 2.7 2.5 3.2 2.6																								Diurnal Maximum
---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-----------------

UO - Unstable Operation





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 4  
BUFFALO VIEWPOINT  
SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	687	33	33	100.00	28	0	5	0
H2S (ppb) Average	686	34	34	100.00	2	0	1	0
THC (ppm) Average	686	33	34	99.86	7.3	-	2.6	-
Temperature (C) Average	720	0	0	100.00	24.2	-	15.4	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	93	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	37	-	23	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	687	0.7	2	-	0	0	0	0	0	1	28
H2S (ppb) Average	686	0.2	0	-	0	0	0	0	0	1	2
THC (ppm) Average	686	2.24	0.3	-	2	2.1	2.1	2.2	2.3	2.4	7.3
Temperature 2 m (C) Average	720	9.57	4.9	-	-1.8	3.7	6	9	12.7	16.5	24.2
Relative Humidity (%) Average	720	72	20	-	29	45	56	74	90	97	99
Wind Speed 10 m (km/h) Average	720	10.7	6	-	1	5	7	9	14	18	37
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	04 Sep 2015 12:00	04 Sep 2015 12:00	1	Power interruption

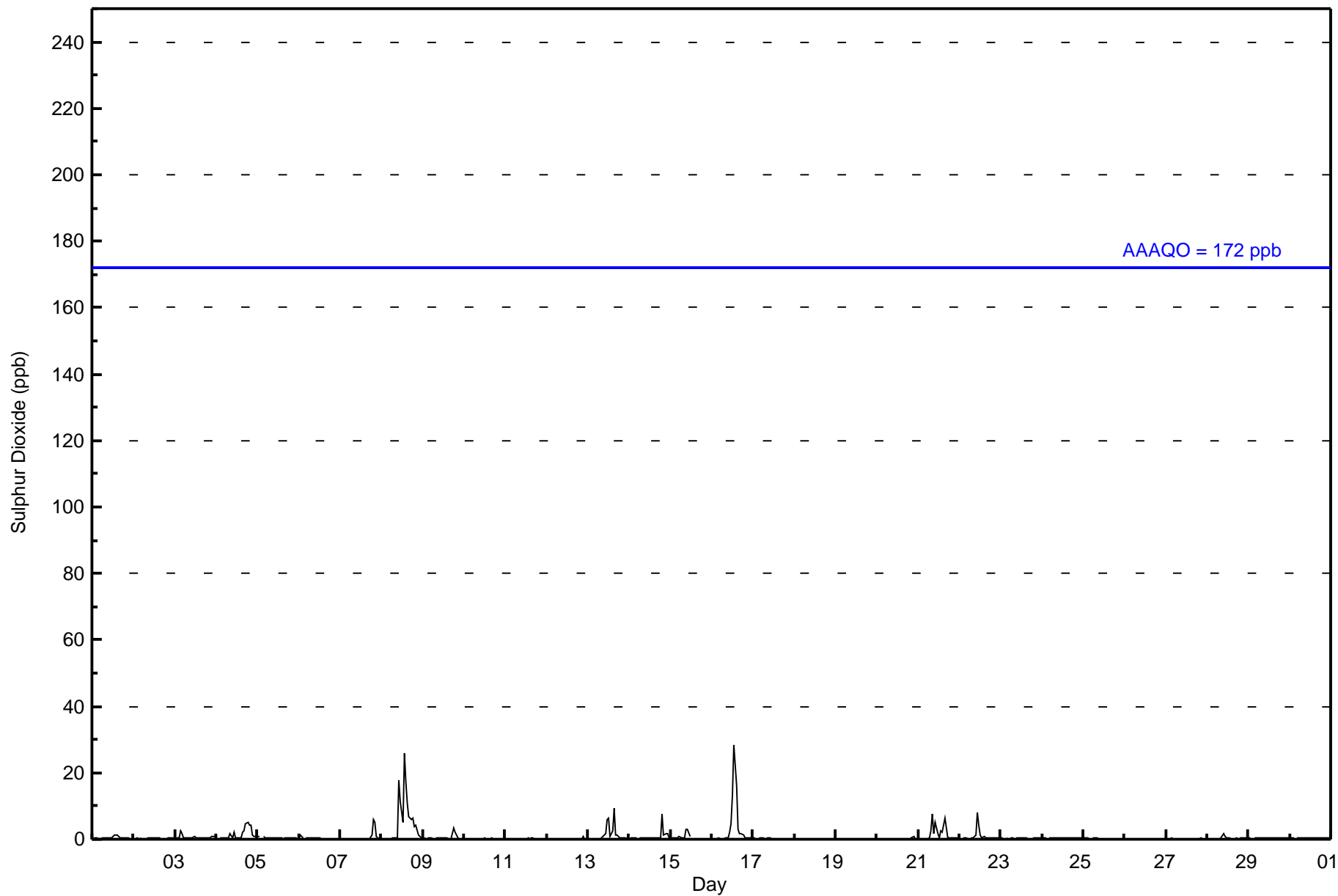


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 28 ppb on Sep 16 14:00	Maximum Daily Average: 5.2 ppb on Sep 8		Hours of Data:	687
Minimum Value: 0 ppb on Sep 20 15:00	Minimum Daily Average: 0.1 ppb on Sep 20		Hours of Missing Data:	33
Maximum Diurnal Average: 2.2 ppb at hour 14	Minimum Diurnal Average: 0.2 ppb at hour 3		Hours of Calibration:	33
Monthly Average: 0.7 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 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-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1
2-Sep	0	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
3-Sep	Z	0	0	3	1	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	1	1	1	1	0.6	3
4-Sep	1	Z	1	0	0	0	0	0	2	0	2	0	0	0	0	2	2	5	5	4	4	1	1	1	1.5	5
5-Sep	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
6-Sep	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	5	1	0	0	0.6	6
8-Sep	0	0	0	0	0	Z	0	0	0	1	18	11	5	26	17	11	7	6	6	4	4	1	1	1	5.2	26
9-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	0	0	0	0	0.5	3
10-Sep	0	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
11-Sep	0	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-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1
13-Sep	0	0	0	0	Z	0	0	0	0	1	2	6	6	1	3	9	1	1	0	0	0	0	0	0	1.4	9
14-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1	2	2	0	0.8	8
15-Sep	Z	0	0	0	1	1	0	0	0	3	3	1	C	C	C	0	0	0	0	0	0	0	0	0	0.6	3
16-Sep	0	Z	0	0	0	0	0	0	0	0	2	5	13	28	16	3	2	2	1	1	0	0	0	0	3.3	28
17-Sep	0	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-Sep	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
19-Sep	0	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
20-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1
21-Sep	Z	0	0	0	0	0	1	3	8	2	5	1	0	3	2	6	3	0	0	0	0	0	0	0	1.6	8
22-Sep	0	Z	0	0	0	0	0	0	0	1	8	4	1	1	1	1	1	0	0	0	1	0	0	0	1.0	8
23-Sep	0	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-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.4	1
25-Sep	0	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-Sep	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
27-Sep	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
28-Sep	0	Z	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
29-Sep	0	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-Sep	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

0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.3	0.6	0.5	1.6	1.2	1.1	2.2	1.5	1.3	0.7	0.7	0.7	1.0	0.7	0.4	0.3	0.3	Diurnal Average
1	1	1	3	1	1	1	3	8	3	18	11	13	28	17	11	7	6	6	8	5	2	2	1	Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	679	98.84	98.84
11 - 20	6	0.87	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: 687

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	65	14	9	4	4	24	95	142	40	22	48	71	36	50	30	25	679
11 - 20	1	1	0	0	0	0	4	0	0	0	0	0	0	0	0	0	6
21 - 60	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	66	15	9	4	4	24	99	143	40	22	48	71	36	50	30	26	687

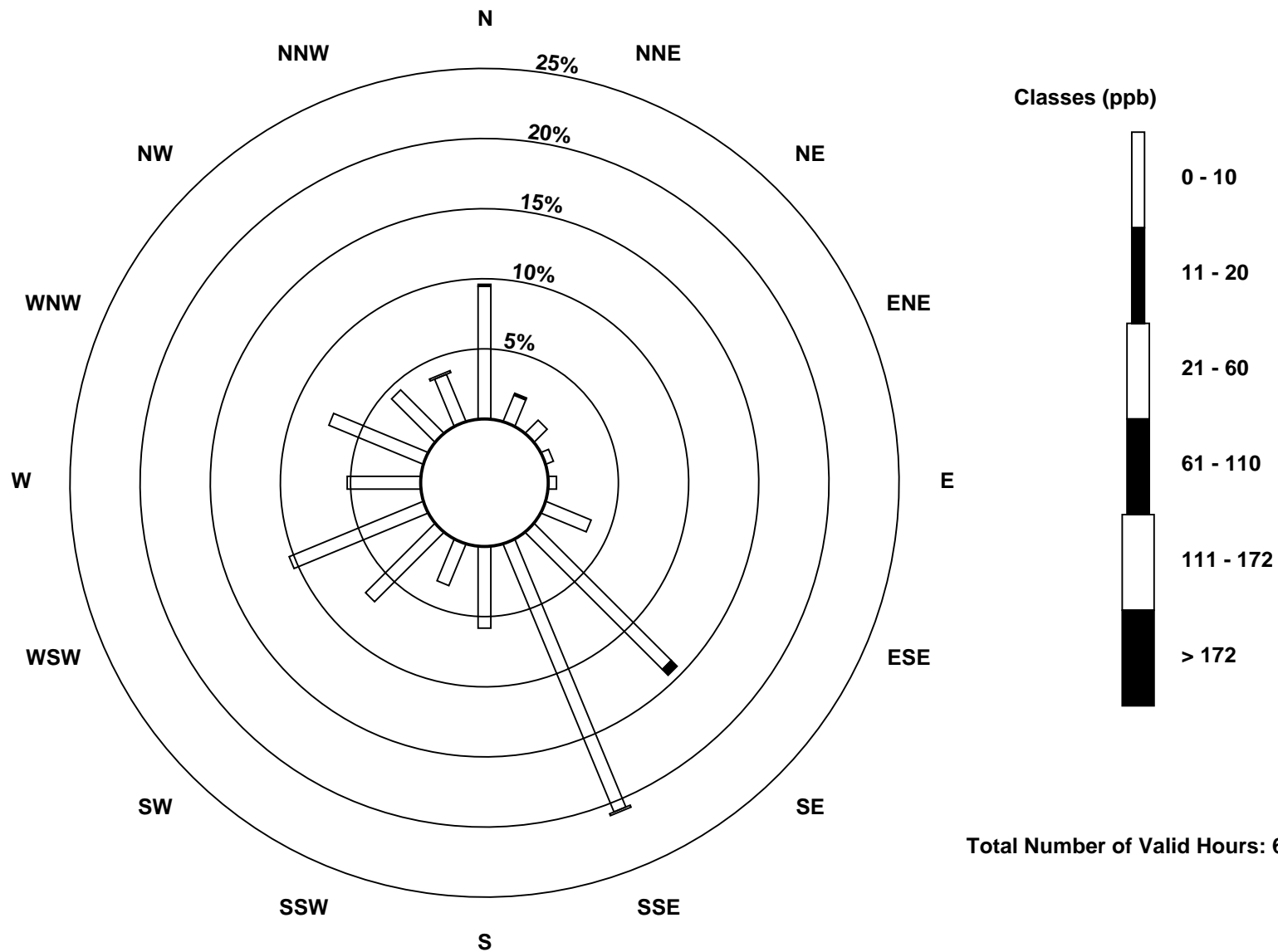
Total Number of Valid Hours: 687

Total Number of Hours: 720

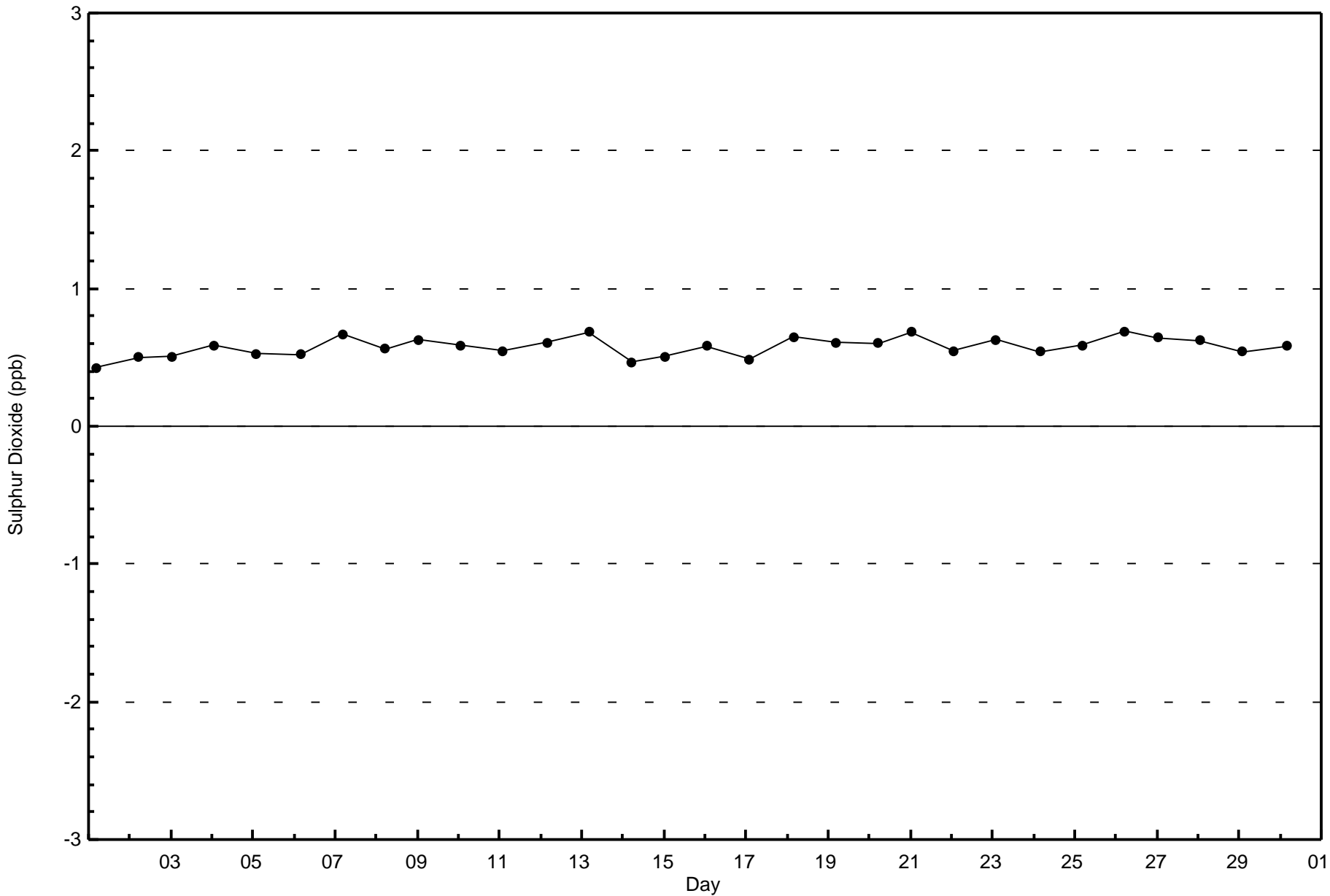


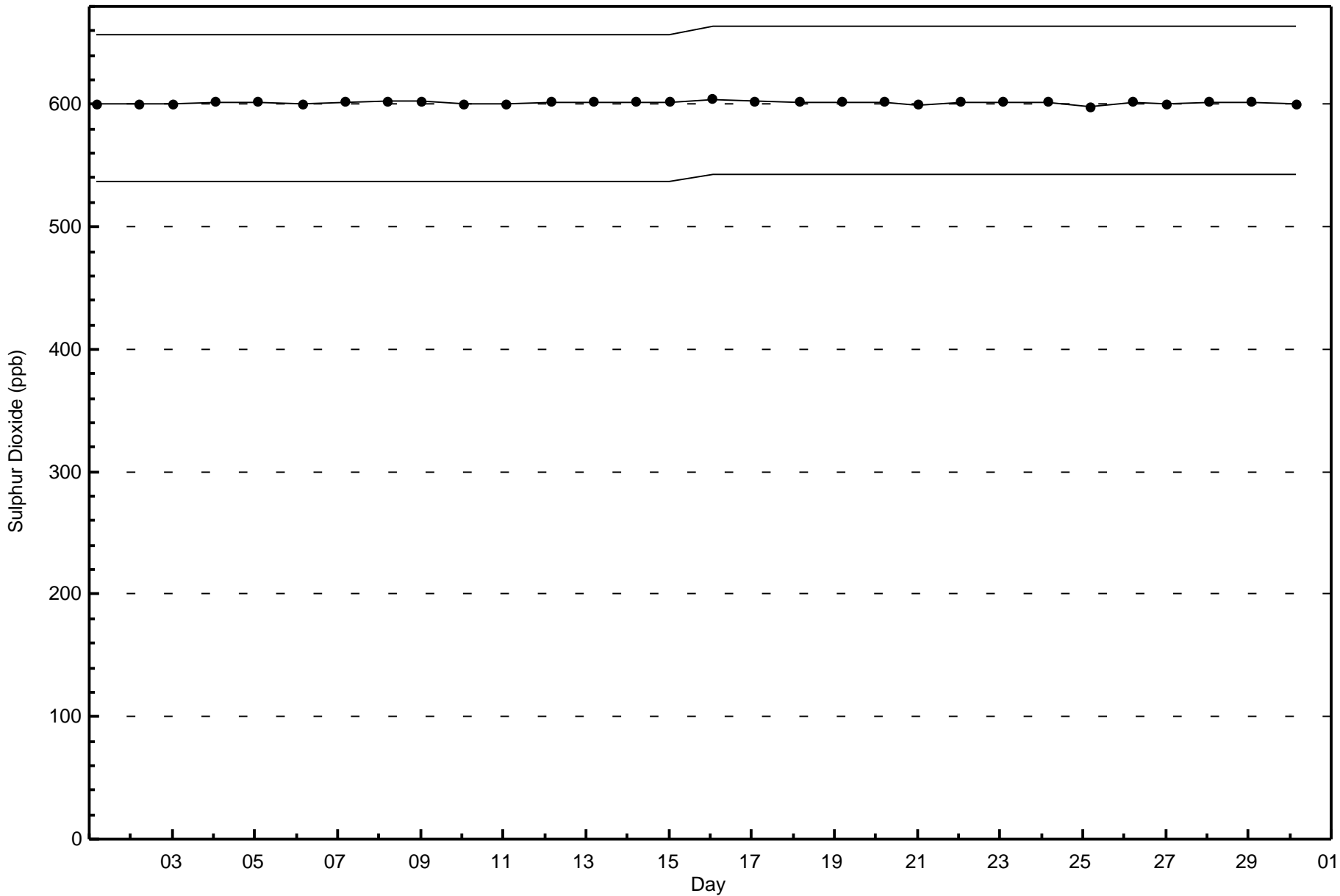
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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



Total Number of Valid Hours: 687





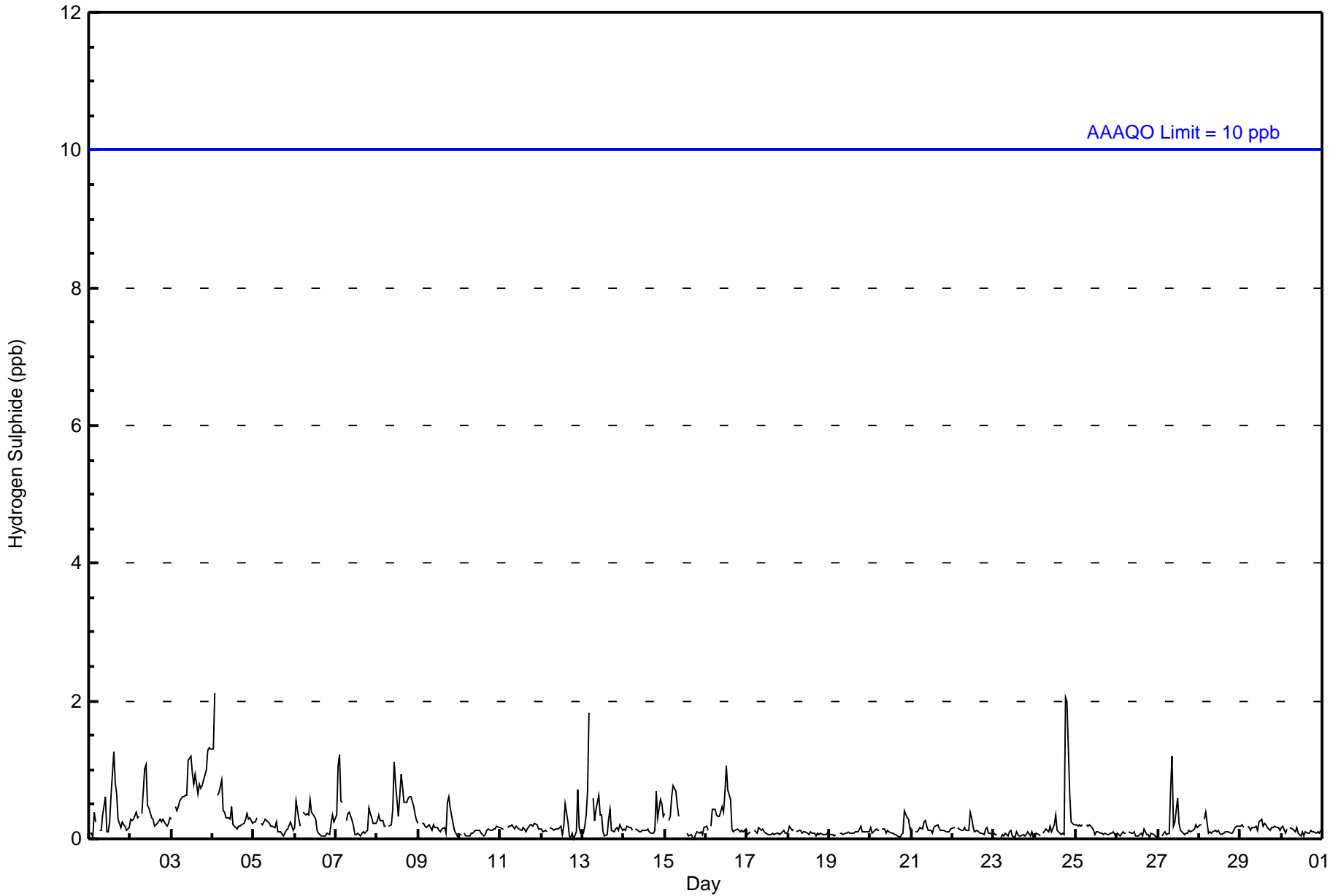


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Sep 4 02:00	Maximum Daily Average: 0.8 ppb on Sep 3		Hours of Data:	686
Minimum Value: 0 ppb on Sep 12 20:00	Minimum Daily Average: 0.1 ppb on Sep 23		Hours of Missing Data:	34
Maximum Diurnal Average: 0.3 ppb at hour 5	Minimum Diurnal Average: 0.2 ppb at hour 18		Hours of Calibration:	34
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 O <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 1		Percent Operational Time:	100.0

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

0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	Diurnal Average
1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	686	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	68	13	9	4	4	24	100	144	39	21	47	72	36	51	30	24	686
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	68	13	9	4	4	24	100	144	39	21	47	72	36	51	30	24	686

Total Number of Valid Hours: 686

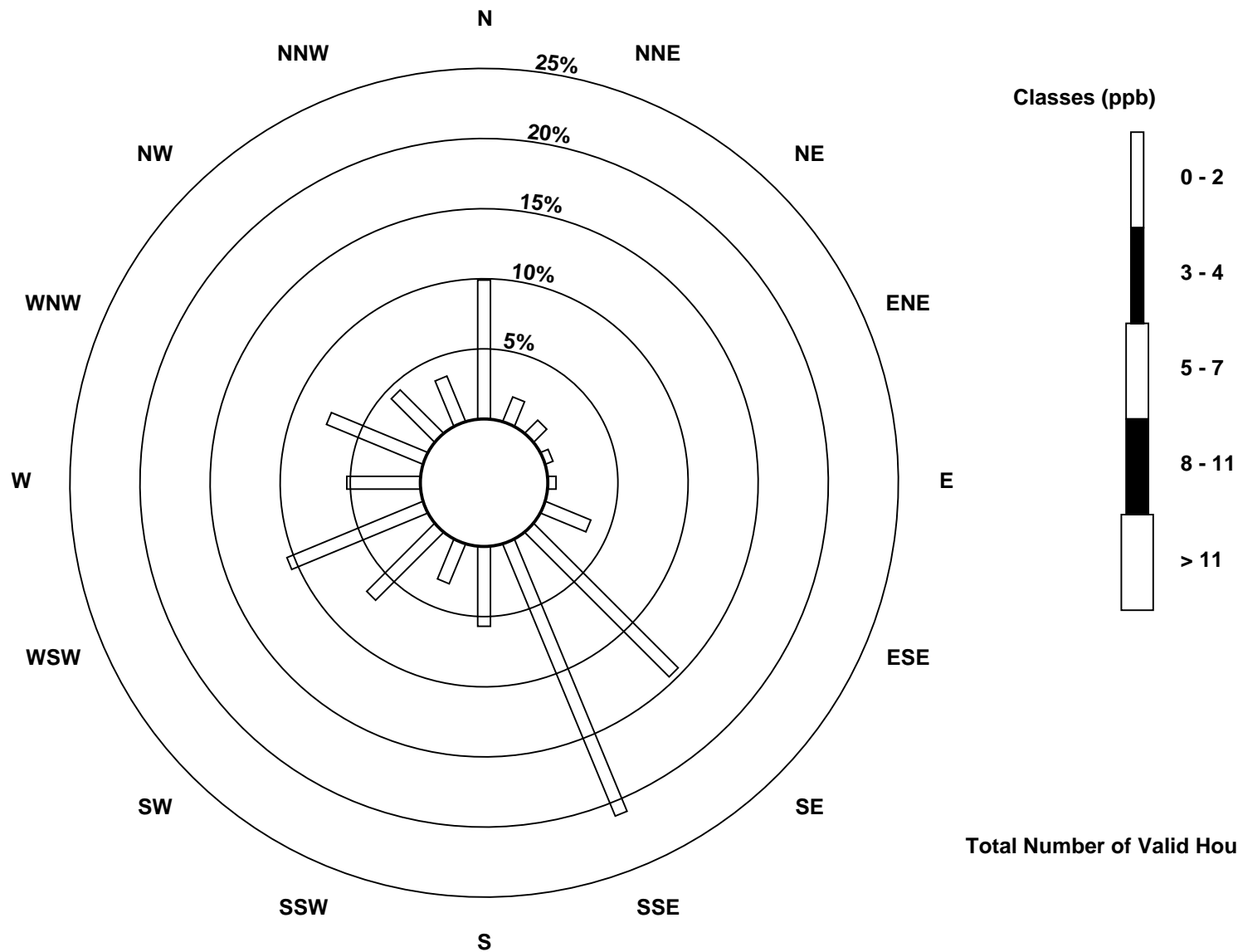
Total Number of Hours: 720



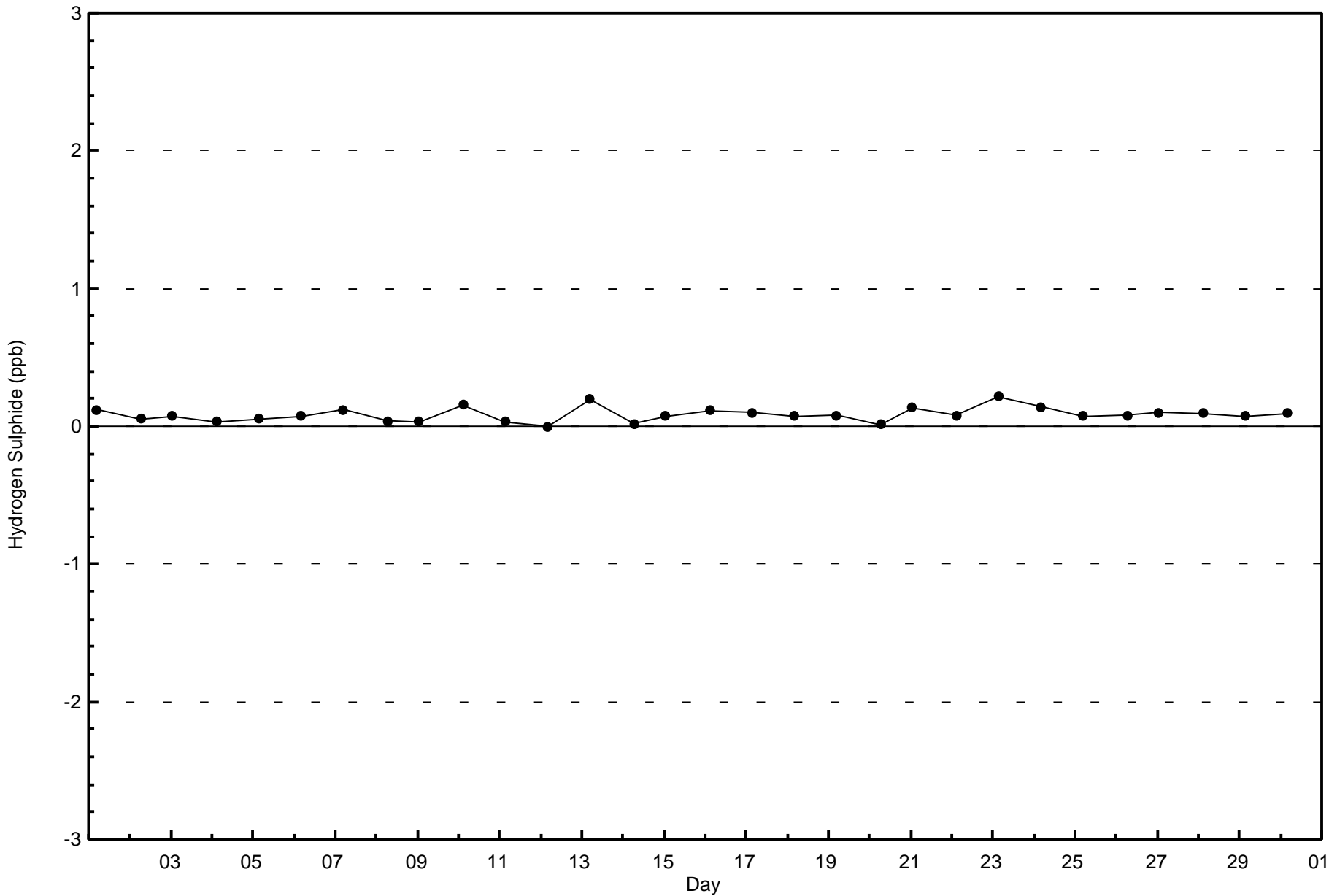


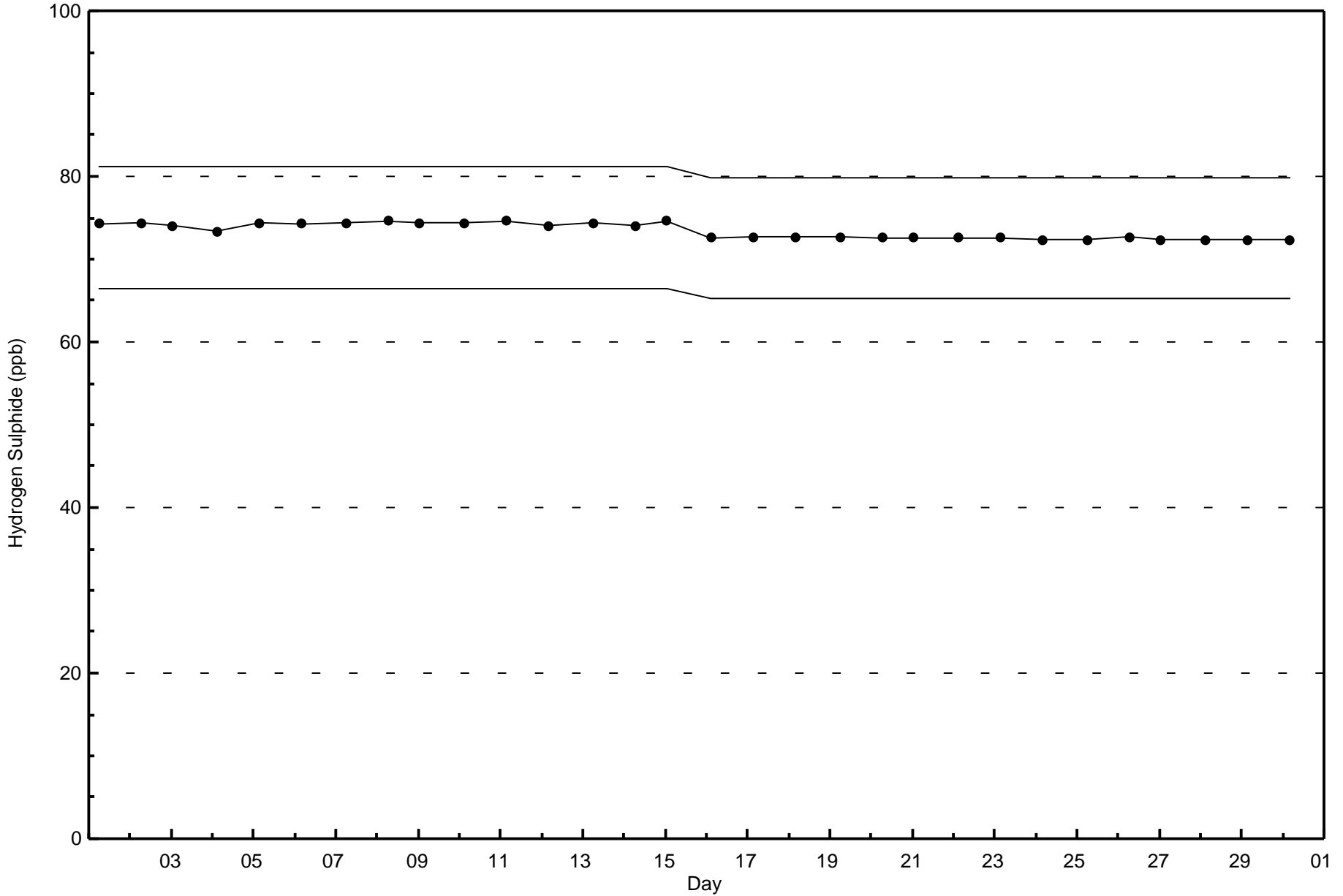
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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



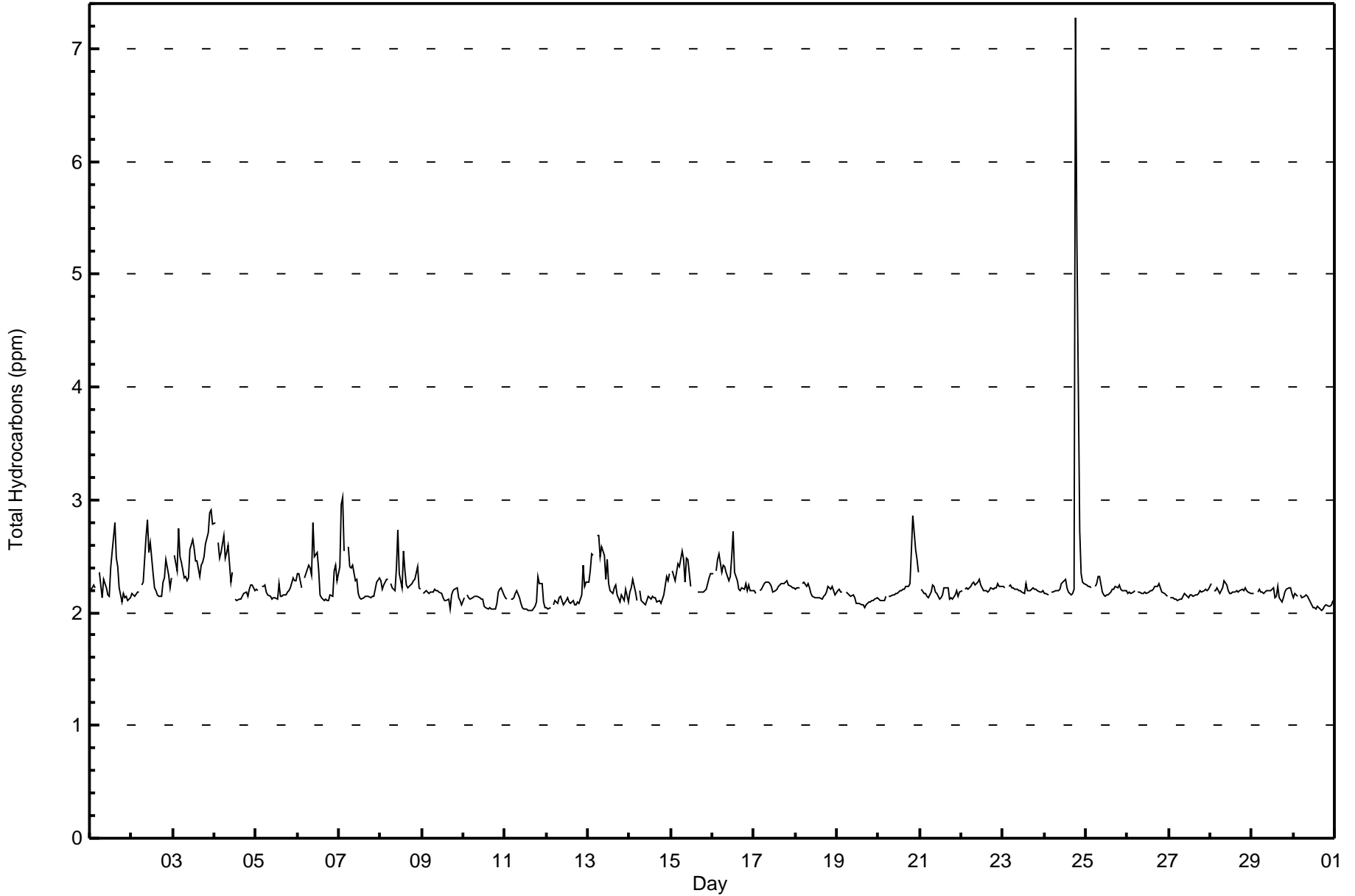
Total Number of Valid Hours: 686







Maximum Value: 7.3 ppm on Sep 24 19:00																			Maximum Daily Average: 2.6 ppm on Sep 24						Hours in Service: 720		
Minimum Value: 2.0 ppm on Sep 30 17:00																			Minimum Daily Average: 2.1 ppm on Sep 30						Hours of Data: 686		
Maximum Diurnal Average: 2.3 ppm at hour 19																			Minimum Diurnal Average: 2.2 ppm at hour 18						Hours of Missing Data: 34		
Monthly Average: 2.24 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> = 2.9						Hours of Calibration: 33		
																									Percent Operational Time: 99.9		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	2.2	2.2	2.2	2.2	Z	2.4	2.2	2.1	2.3	2.2	2.2	2.1	2.4	2.5	2.8	2.5	2.4	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.8
2-Sep	2.2	2.2	2.1	2.2	2.2	Z	2.2	2.3	2.7	2.8	2.5	2.6	2.3	2.2	2.2	2.2	2.1	2.1	2.3	2.3	2.5	2.3	2.2	2.3	2.3	2.8	
3-Sep	Z	2.5	2.4	2.7	2.5	2.4	2.3	2.3	2.3	2.3	2.6	2.6	2.6	2.5	2.5	2.3	2.4	2.4	2.5	2.6	2.7	2.9	2.9	2.8	2.5	2.9	
4-Sep	2.8	Z	2.6	2.5	2.5	2.7	2.5	2.5	2.6	2.3	2.4	PF	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.8	
5-Sep	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3	
6-Sep	2.3	2.3	2.2	Z	2.3	2.3	2.4	2.4	2.3	2.8	2.5	2.5	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.4	2.4	2.3	2.3	2.8	
7-Sep	2.4	3.0	3.0	2.5	Z	2.6	2.4	2.4	2.4	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	3.0	
8-Sep	2.3	2.2	2.2	2.3	2.3	Z	2.3	2.2	2.2	2.4	2.7	2.3	2.2	2.5	2.4	2.3	2.2	2.2	2.3	2.3	2.3	2.4	2.2	2.2	2.3	2.7	
9-Sep	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	
10-Sep	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.1	2.2	
11-Sep	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.3	2.3	2.1	2.0	2.1	2.3	
12-Sep	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.2	2.3	2.1	2.4	
13-Sep	2.3	2.4	2.5	2.5	Z	2.7	2.7	2.5	2.6	2.5	2.3	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.1	2.3	2.7	
14-Sep	2.2	2.2	2.3	2.2	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	2.2	2.3	2.3	2.3	2.2	2.3	
15-Sep	Z	2.4	2.3	2.4	2.4	2.4	2.5	2.5	2.3	2.5	2.5	2.2	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.5	
16-Sep	2.3	Z	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.5	2.7	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.7	
17-Sep	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	
18-Sep	2.2	2.2	2.2	Z	2.3	2.3	2.2	2.3	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	2.3	
19-Sep	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
20-Sep	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.6	2.9	2.6	2.5	2.4	2.9	
21-Sep	Z	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.2	
22-Sep	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	
23-Sep	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
24-Sep	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	7.3	5.3	2.7	2.3	2.3	7.3	
25-Sep	2.2	2.2	2.2	2.2	Z	2.2	2.3	2.3	2.3	2.3	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
26-Sep	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.3	
27-Sep	Z	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
28-Sep	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
29-Sep	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
30-Sep	2.1	2.2	2.1	Z	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
																			Diurnal Average								
																			Diurnal Maximum								
																			2.2 2.2 2.3 2.3 2.2 2.3 2.3 2.3 2.3 2.3 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.3 2.3 2.3 2.3 2.2 2.2								
																			2.8 3.0 3.0 2.7 2.5 2.7 2.7 2.5 2.7 2.8 2.7 2.6 2.7 2.5 2.8 2.5 2.4 2.4 7.3 5.3 2.9 2.9 2.9 2.8								
Z - zerospan																			C - Calibration						PF - Power Failure		





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	25	3.64	3.64
2.1 - 3.0	659	96.06	99.71
3.1 - 10.0	2	0.29	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	1	4	6	9	5	0	0	0	0	25
2.1 - 3.0	66	15	9	4	3	23	99	142	36	16	39	66	36	49	30	26	659
3.1 - 10.0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	66	15	9	4	4	24	99	143	40	22	48	71	36	49	30	26	686

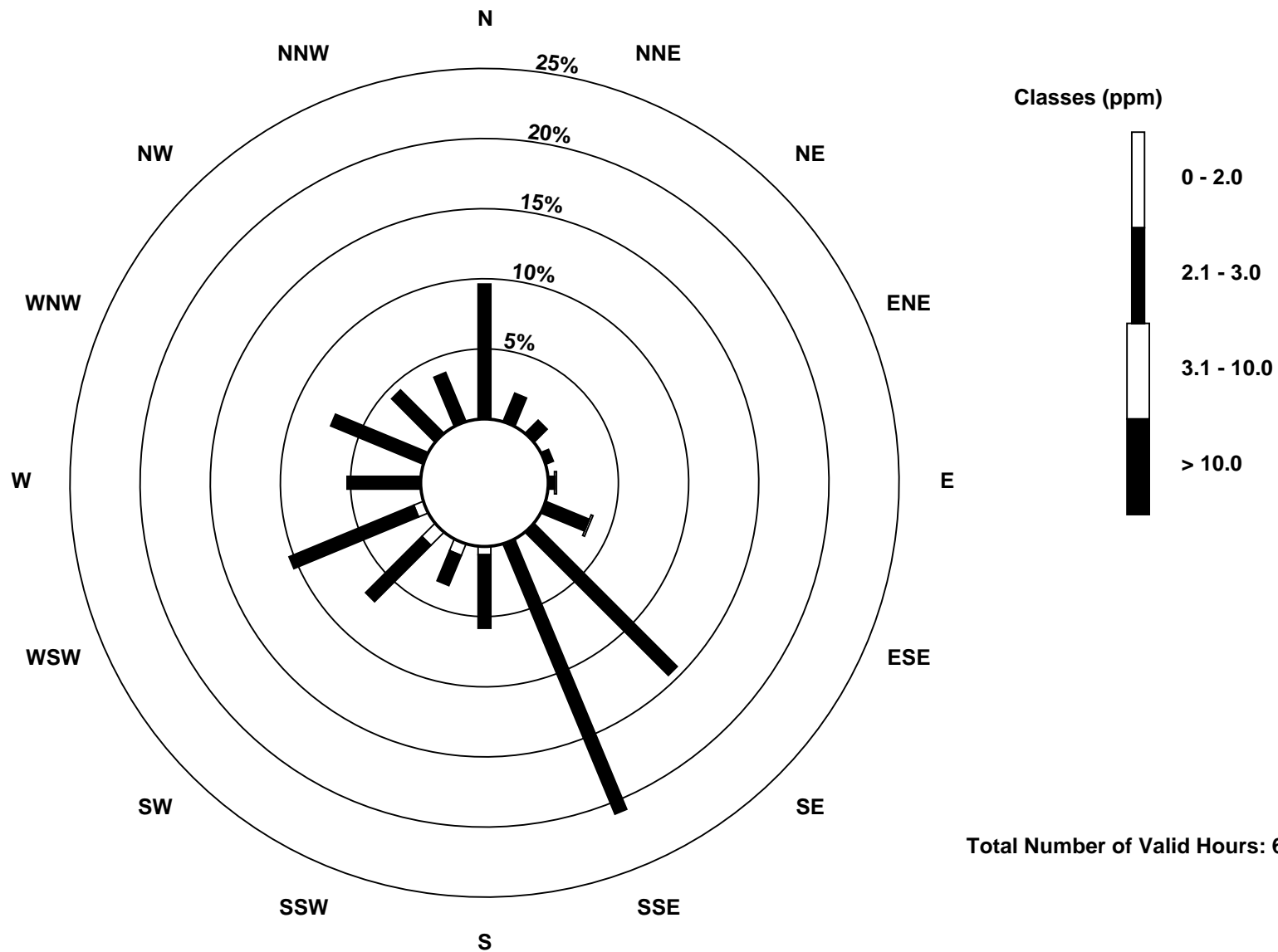
Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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

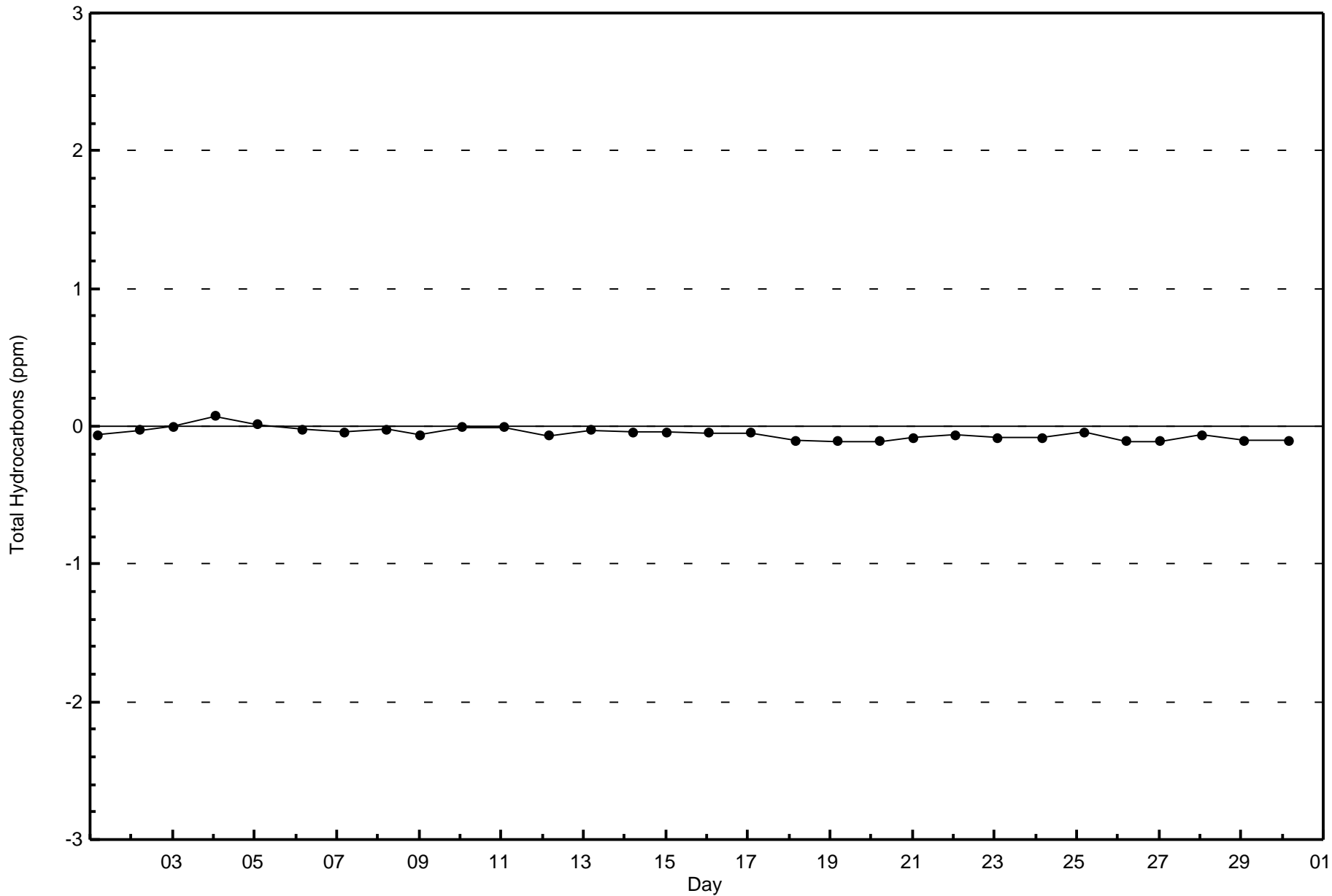


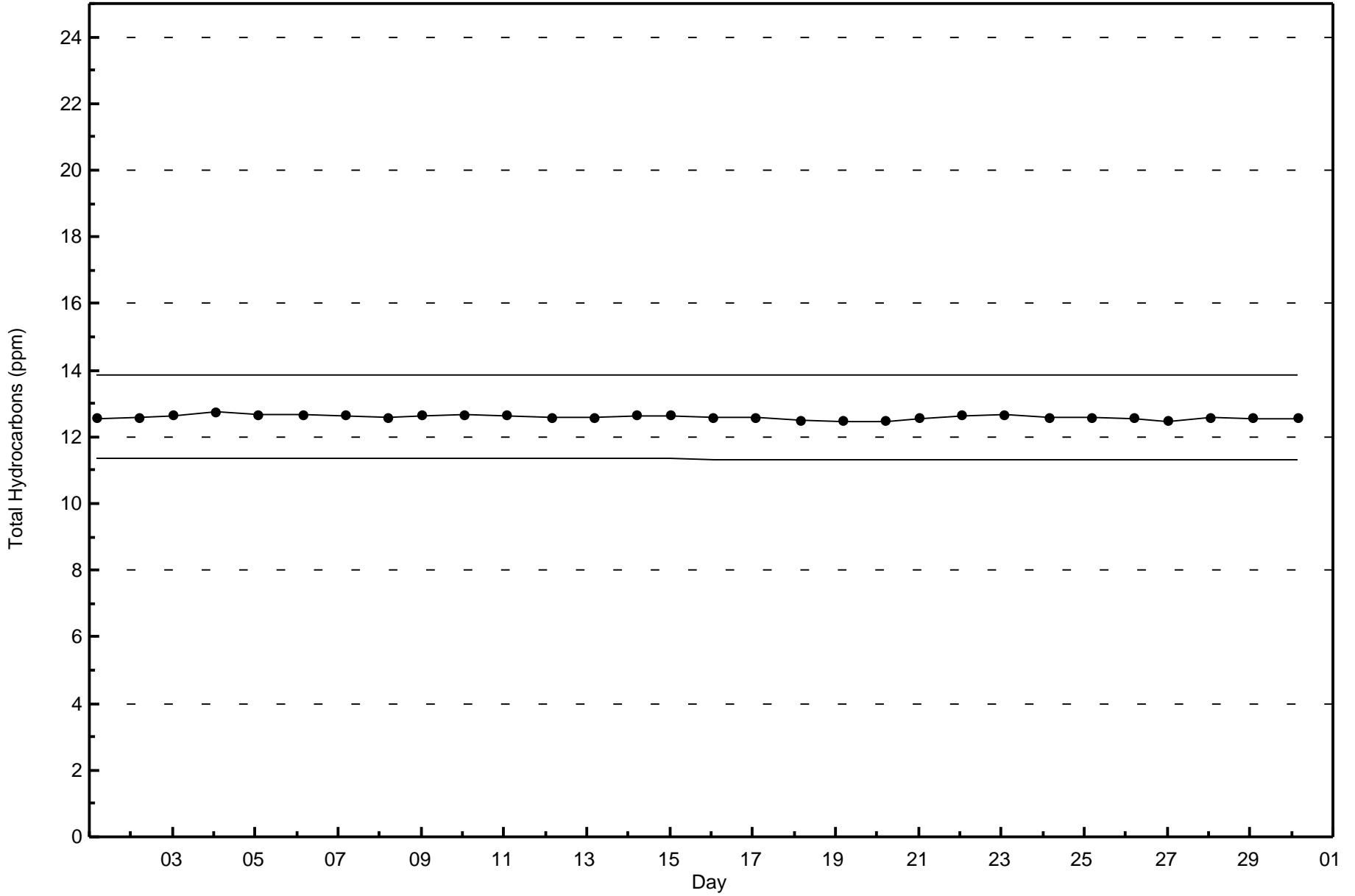




Wood Buffalo Environmental Association  
Zero Responses

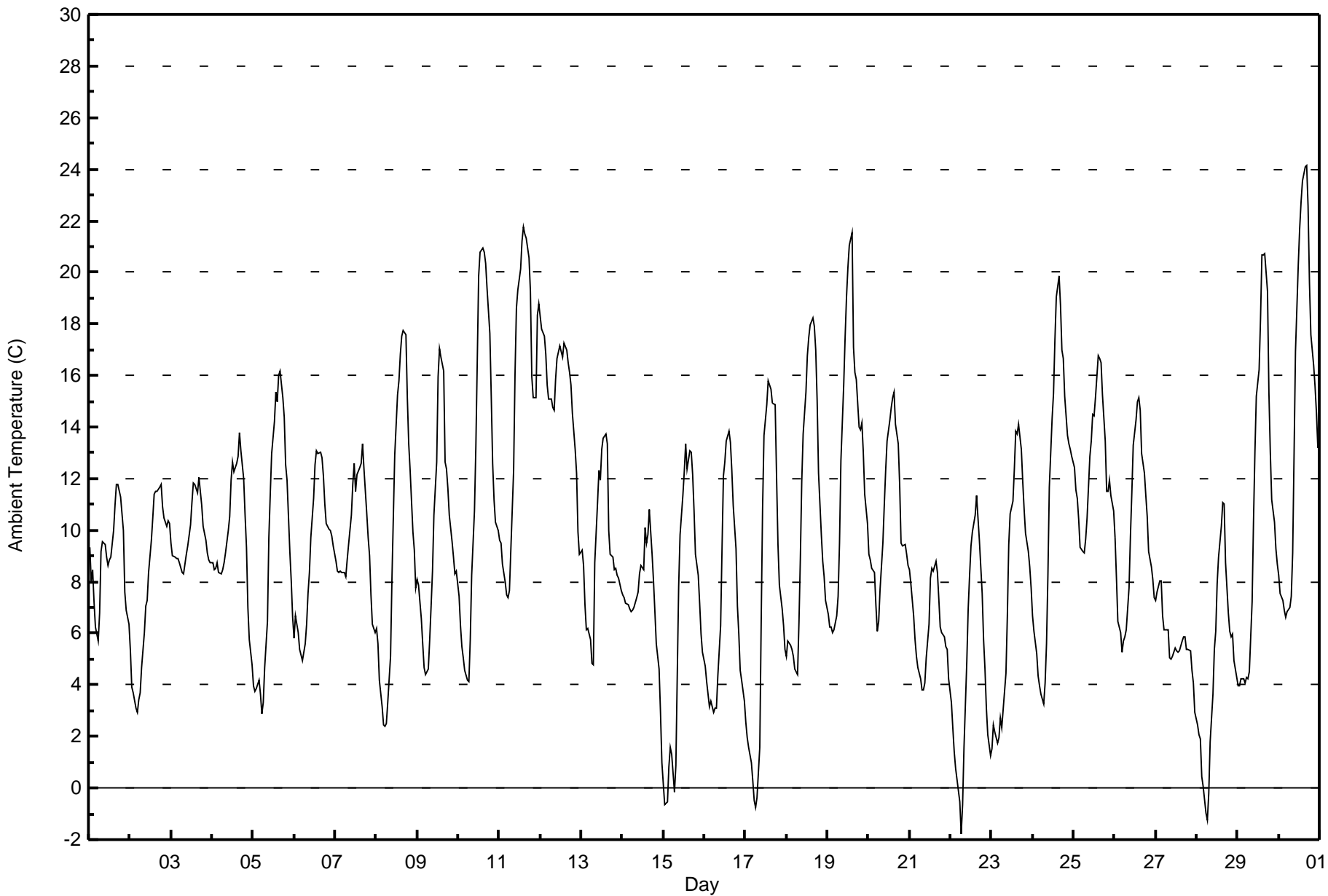
Total Hydrocarbons (THC) - ppm  
Buffalo Viewpoint - September 2015







Maximum Value: 24.2 C on Sep 30 17:00		Maximum Daily Average: 15.4 C on Sep 12		Hours in Service: 720																						
Minimum Value: -1.8 C on Sep 22 07:00		Minimum Daily Average: 4.7 C on Sep 22		Hours of Data: 720																						
Maximum Diurnal Average: 14.8 C at hour 16		Minimum Diurnal Average: 5.0 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: 9.57 C		Percentiles: P <sub>1</sub> = -0.6 P <sub>10</sub> = 3.7 Q <sub>1</sub> = 6.0 Median = 9.0 Q <sub>3</sub> = 12.7 P <sub>90</sub> = 16.5 P <sub>99</sub> = 21.6		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	9.3	8.0	8.4	7.2	6.3	5.7	6.8	9.2	9.5	9.5	8.9	8.6	8.9	9.0	10.0	11.0	11.8	11.8	11.3	10.6	10.0	7.6	6.9	6.3	8.9	11.8
2-Sep	5.3	3.9	3.7	3.1	2.9	3.4	3.7	4.7	6.0	7.1	7.3	8.4	9.6	10.5	11.4	11.5	11.5	11.7	11.8	10.9	10.5	10.1	10.3	10.3	7.9	11.8
3-Sep	9.5	9.0	8.9	8.9	8.9	8.7	8.4	8.3	8.7	9.0	9.4	10.2	11.1	11.8	11.8	11.4	12.0	11.5	11.0	10.2	9.6	9.1	8.8	8.7	9.8	12.0
4-Sep	8.7	8.5	8.5	8.7	8.4	8.3	8.5	8.7	9.1	10.0	10.5	11.9	12.6	12.3	12.6	12.9	13.8	13.1	12.0	10.6	9.3	7.0	5.7	4.8	9.9	13.8
5-Sep	4.0	3.7	3.9	4.2	3.7	2.9	3.3	4.7	6.5	9.7	11.4	13.0	14.2	15.3	15.0	16.0	16.1	15.1	14.4	12.5	11.9	9.2	8.0	6.6	9.4	16.1
6-Sep	5.8	6.7	6.0	5.4	5.2	4.9	5.6	6.4	7.5	8.4	9.7	11.2	12.6	13.1	13.0	13.0	12.8	12.1	11.0	10.3	10.0	10.0	9.8	9.4	9.2	13.1
7-Sep	8.8	8.4	8.4	8.4	8.3	8.3	8.2	8.9	9.5	10.6	11.8	12.6	11.5	12.1	12.4	12.6	13.4	12.3	10.6	9.7	9.0	7.5	6.3	6.0	9.8	13.4
8-Sep	6.2	5.6	4.2	3.2	2.4	2.4	2.5	3.3	5.1	8.1	10.5	12.9	15.2	15.8	16.8	17.5	17.7	17.6	15.1	13.3	12.3	10.0	9.2	7.7	9.8	17.7
9-Sep	8.1	7.9	6.6	5.6	4.7	4.4	4.6	5.8	7.1	8.4	10.6	12.7	15.9	17.0	16.7	16.2	12.7	12.3	11.6	10.6	9.6	9.0	8.3	8.4	9.8	17.0
10-Sep	7.4	6.3	5.5	5.0	4.5	4.2	4.1	5.8	8.3	10.8	13.2	16.5	19.9	20.8	20.9	20.8	20.3	19.4	17.6	15.2	12.6	11.2	10.3	10.0	12.1	20.9
11-Sep	9.6	9.5	8.7	8.0	7.5	7.4	7.6	9.2	12.3	16.1	18.6	19.3	20.1	21.2	21.8	21.5	21.3	20.6	19.3	16.0	15.1	15.1	18.3	18.8	15.1	21.8
12-Sep	18.3	17.8	17.6	16.8	15.6	15.1	15.1	14.8	14.6	15.8	16.7	17.2	16.9	16.7	17.2	17.0	16.5	16.1	15.6	14.6	13.2	12.2	9.9	9.1	15.4	18.3
13-Sep	9.2	8.6	7.1	6.1	6.2	5.7	4.8	4.8	8.7	11.1	12.3	12.0	13.1	13.5	13.8	13.3	10.0	9.0	9.0	8.5	8.5	8.3	8.2	7.7	9.1	13.8
14-Sep	7.5	7.4	7.2	7.1	7.0	6.8	6.9	7.0	7.4	7.6	8.3	8.6	8.5	10.1	9.5	9.8	10.8	9.1	8.0	6.8	5.6	4.6	2.9	1.0	7.3	10.8
15-Sep	0.2	-0.6	-0.5	0.8	1.6	1.3	-0.1	0.9	4.4	7.8	9.8	11.3	12.3	13.3	12.4	13.1	13.0	12.1	10.8	9.0	8.3	7.2	6.0	5.3	6.6	13.3
16-Sep	4.7	4.1	3.6	3.1	3.4	2.9	3.1	3.1	4.4	6.3	9.3	12.1	12.6	13.5	13.9	13.4	12.3	11.0	9.3	7.1	6.0	4.5	4.2	3.3	7.1	13.9
17-Sep	2.6	2.0	1.6	1.0	0.3	-0.5	-0.8	-0.4	1.6	6.5	10.9	13.7	14.9	15.8	15.6	15.5	14.9	14.9	12.0	9.4	7.9	6.9	6.3	5.4	7.4	15.8
18-Sep	5.1	5.7	5.5	5.4	5.1	4.6	4.4	6.4	8.9	11.9	13.7	15.4	16.8	17.4	18.0	18.2	17.9	17.0	15.0	12.2	9.8	8.8	8.2	7.2	10.8	18.2
19-Sep	6.8	6.2	6.2	6.0	6.1	6.7	7.4	9.5	12.7	15.6	17.5	19.0	20.2	21.0	21.5	17.1	16.1	15.8	14.0	13.9	14.2	13.0	11.4	10.3	12.8	21.5
20-Sep	9.1	8.8	8.5	8.3	7.1	6.1	6.4	7.7	9.5	11.0	12.3	13.5	14.3	14.8	15.1	15.3	14.1	13.3	11.8	9.5	9.4	9.5	9.1	8.6	10.5	15.3
21-Sep	8.5	7.9	6.7	5.7	5.1	4.7	4.3	3.8	3.8	4.1	5.1	6.4	8.2	8.5	8.4	8.8	8.4	7.3	6.3	6.1	5.9	5.5	5.4	4.3	6.2	8.8
22-Sep	3.3	2.4	1.4	0.7	0.3	-0.6	-1.8	-0.6	1.6	4.9	6.9	8.2	9.4	9.9	10.6	11.3	10.5	9.6	7.6	5.7	4.6	3.1	2.1	1.3	4.7	11.3
23-Sep	1.5	2.4	2.2	1.8	2.0	2.7	2.4	3.1	4.4	6.7	9.4	10.7	11.1	12.4	13.9	13.7	14.1	13.1	11.9	10.8	9.9	9.2	8.6	7.8	7.7	14.1
24-Sep	6.7	6.1	5.2	4.3	4.0	3.6	3.3	4.1	5.6	8.3	11.6	14.3	15.3	17.4	19.0	19.9	18.7	17.0	16.6	15.2	13.7	13.3	13.1	12.9	11.2	19.9
25-Sep	12.4	11.6	11.2	10.4	9.3	9.2	9.1	9.7	10.5	12.8	13.4	14.5	14.4	15.1	16.8	16.6	16.5	15.2	13.5	11.5	11.5	11.9	11.3	10.8	12.5	16.8
26-Sep	9.7	8.1	6.5	6.0	5.3	5.7	5.9	6.1	7.7	9.8	11.4	13.3	14.3	15.0	15.1	14.7	13.0	12.2	11.4	10.5	9.2	8.6	8.1	7.4	9.8	15.1
27-Sep	7.3	7.6	8.0	8.1	6.7	6.1	6.2	6.1	5.1	5.0	5.1	5.4	5.3	5.3	5.3	5.7	5.8	5.9	5.4	5.4	5.3	4.6	4.1	3.0	5.7	8.1
28-Sep	2.4	2.1	1.9	0.5	0.1	-1.0	-1.3	-0.2	1.8	3.6	5.4	6.1	7.9	9.0	10.1	11.1	11.0	8.8	6.8	6.1	5.9	6.0	4.9	4.3	4.7	11.1
29-Sep	4.0	3.9	4.3	4.2	4.1	4.3	4.2	4.5	7.2	10.3	13.0	15.2	16.2	18.2	20.7	20.7	20.7	19.3	15.3	13.0	11.2	10.3	9.3	8.7	11.0	20.7
30-Sep	8.2	7.6	7.3	6.9	6.6	6.8	7.0	7.4	9.1	13.0	16.9	20.3	21.7	22.7	23.5	24.1	24.2	22.6	19.6	17.6	16.4	15.6	14.6	13.2	14.7	24.2
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	12	1.67	1.67
0 - 10	409	56.81	58.47
10 - 20	276	38.33	96.81
> 20	23	3.19	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

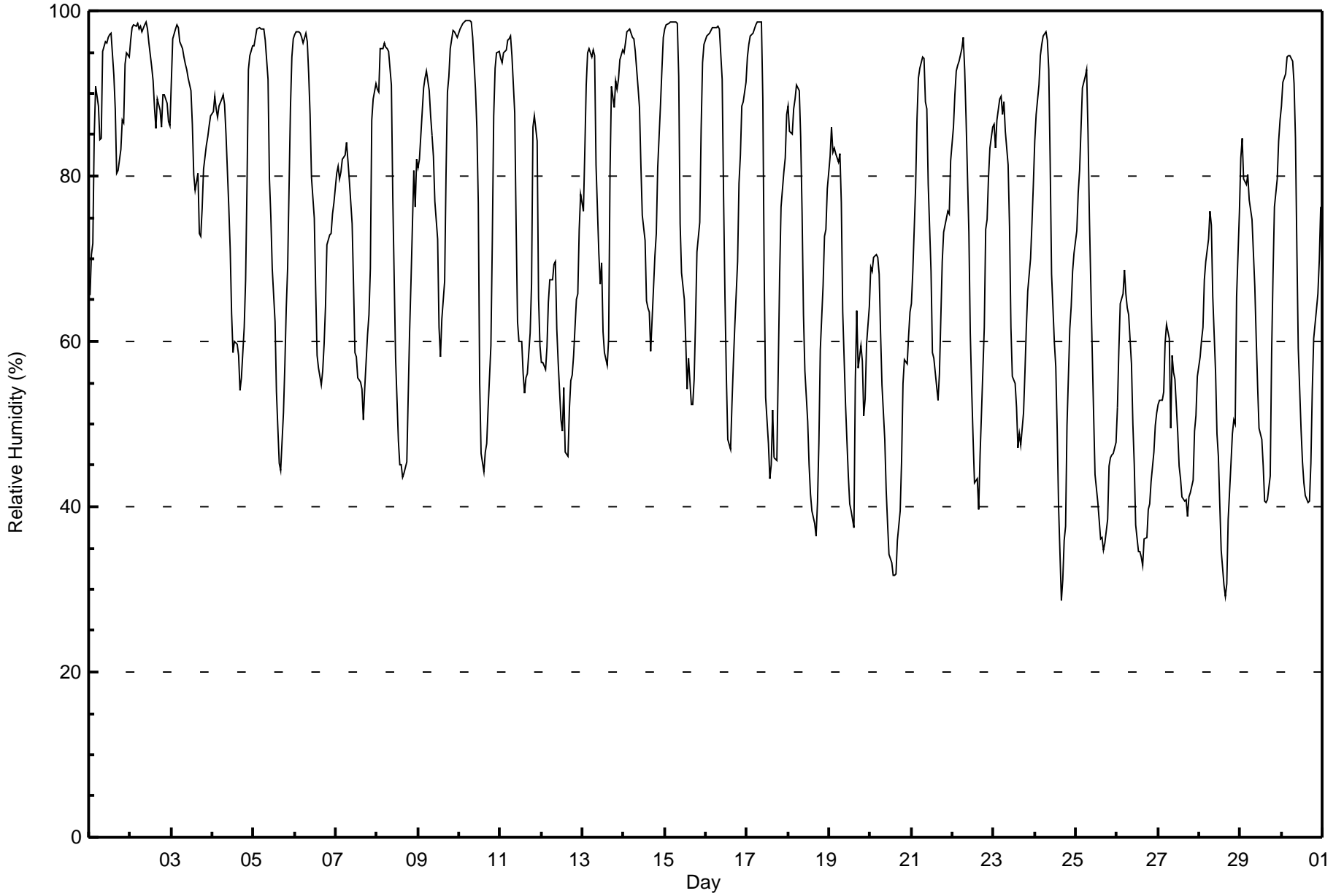
**Buffalo Viewpoint - September 2015**

Maximum Value: 99 % on Sep 10 06:00														Maximum Daily Average: 93.2 % on Sep 2														Hours in Service: 720			
Minimum Value: 29 % on Sep 24 16:00														Minimum Daily Average: 48.9 % on Sep 26														Hours of Data: 720			
Maximum Diurnal Average: 88.8 % at hour 5														Minimum Diurnal Average: 50.7 % at hour 16														Hours of Missing Data: 0			
Monthly Average: 72.0 %														Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 45 Q <sub>1</sub> = 56 Median = 74 O <sub>3</sub> = 90 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-Sep	66	71	72	85	91	88	84	85	95	96	96	97	97	97	92	88	80	81	83	87	86	94	95	94	87.5	97					
2-Sep	96	98	98	98	98	98	98	97	98	99	98	96	93	92	88	86	89	88	86	90	90	89	87	86	93.2	99					
3-Sep	91	97	98	98	98	96	95	94	94	93	92	90	86	80	78	80	73	73	76	81	84	85	86	87	87.8	98					
4-Sep	88	90	88	87	89	89	90	89	85	76	71	63	59	60	60	58	54	56	62	67	79	93	95	96	76.8	96					
5-Sep	96	97	98	98	98	98	98	96	92	80	75	69	62	54	50	45	44	51	57	64	69	88	94	97	77.9	98					
6-Sep	97	98	98	97	97	96	97	96	92	87	80	75	66	58	57	55	57	60	64	72	73	73	75	77	79.0	98					
7-Sep	80	81	80	81	82	83	84	82	79	74	67	59	58	56	55	54	51	54	61	63	69	87	89	91	71.6	91					
8-Sep	91	90	95	95	96	96	95	95	91	78	68	58	48	45	45	44	44	45	53	61	67	81	76	82	72.5	96					
9-Sep	81	82	88	91	92	93	90	87	85	82	77	72	62	58	63	67	80	90	92	95	98	97	97	97	84.0	98					
10-Sep	98	98	99	99	99	99	99	99	97	90	86	77	55	46	44	47	48	52	59	72	87	93	95	95	80.5	99					
11-Sep	94	94	95	95	96	97	97	95	88	74	62	60	60	56	54	56	56	61	67	86	87	84	65	59	76.6	97					
12-Sep	57	57	57	59	65	67	67	69	70	62	58	51	49	54	47	46	52	55	56	58	65	66	74	78	60.0	78					
13-Sep	76	83	91	95	95	94	95	95	81	71	67	69	61	59	57	60	81	91	88	92	90	92	94	95	82.2	95					
14-Sep	95	96	97	98	97	97	97	95	91	88	81	75	72	65	64	63	59	66	70	73	81	89	93	97	83.3	98					
15-Sep	98	98	98	99	99	99	99	99	92	74	68	65	60	54	58	52	52	55	63	71	74	86	94	96	79.3	99					
16-Sep	97	97	97	98	98	98	98	98	98	92	77	65	56	48	47	52	58	62	70	79	82	88	89	91	80.7	98					
17-Sep	94	96	97	97	98	98	99	99	99	89	68	53	48	43	45	52	46	46	57	68	76	80	82	87	75.7	99					
18-Sep	88	85	85	88	89	91	90	85	76	63	56	50	45	41	40	38	36	40	48	59	67	73	74	79	66.1	91					
19-Sep	82	86	83	83	83	82	83	77	64	52	48	44	40	39	37	55	64	57	59	58	51	53	60	64	62.7	86					
20-Sep	69	68	70	71	70	68	61	55	48	42	38	34	33	32	32	32	36	40	46	55	58	57	61	64	51.6	71					
21-Sep	65	69	79	87	92	93	94	94	89	88	79	69	59	58	56	53	56	63	70	73	75	76	75	82	74.7	94					
22-Sep	86	90	93	93	94	95	97	93	87	73	61	54	48	43	43	40	46	51	62	74	75	80	83	86	72.8	97					
23-Sep	86	83	87	89	90	87	89	85	81	74	62	56	55	52	47	49	48	51	56	62	66	70	74	79	70.0	90					
24-Sep	84	88	91	95	96	97	97	96	93	82	68	60	57	49	40	29	31	36	38	50	61	64	68	71	68.4	97					
25-Sep	73	78	81	86	91	92	93	85	75	59	51	44	42	40	36	36	35	36	38	45	46	46	46	48	58.4	93					
26-Sep	52	59	65	66	69	66	64	63	57	50	45	38	35	35	34	33	36	36	40	40	43	47	50	51	48.9	69					
27-Sep	52	53	53	54	60	62	60	50	58	56	56	49	45	43	41	41	41	39	41	42	43	49	51	56	49.8	62					
28-Sep	58	60	62	67	70	72	76	74	65	56	49	46	40	35	31	29	31	39	45	49	50	50	65	76	54.0	76					
29-Sep	82	85	80	79	80	77	76	75	67	60	55	50	48	45	41	41	41	44	59	68	76	80	84	87	65.7	87					
30-Sep	89	91	92	94	95	95	94	91	84	71	59	49	45	43	41	41	41	45	54	60	64	66	70	76	68.8	95					
82.1														83.9														85.5			
98														98														99			
87.4														88.8														88.8			
88.6														88.6														86.4			
82.4														74.4														67.3			
61.2														56.2														52.7			
50.8														50.7														52.2			
55.4														60.7														67.1			
71.1														75.8														78.1			
80.8														92														95			
92														89														91			
97														97														97			
Diurnal Average														Diurnal Maximum																	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

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





Maximum Speed: 37 km/h on Sep 27 09:00	Maximum Daily Speed Average: 20.6 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 1 km/h on Sep 2 06:00	Minimum Daily Speed Average: 1.8 km/h on Sep 1	Hours of Data: 720
Maximum Diurnal Speed Average: 5.4 km/h at hour 14	Minimum Diurnal Speed Average: 2.2 km/h at hour 9	Hours of Missing Data: 0
Monthly Average Velocity: 2.9 km/h 237.9 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 9 Q <sub>3</sub> = 14 P <sub>90</sub> = 18 P <sub>99</sub> = 31	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	SE11	SE10	SSE6	SSE7	S6	SSE9	SSE7	SE15	ESE2	N23	N22	N21	NNW22	WNW18	W13	WNW10	WSW7	WSW5	SSW5	SW9	SW7	SSE8	S10	S6	WSW1.8	N23
2-Sep	SSE6	SSE8	SE9	SE9	SSE8	SSE1	S4	SE3	NE3	N10	N14	N9	N15	N19	N17	N20	N26	N26	N20	N21	N16	N13	N19	N20	N9.3	N26
3-Sep	N18	NNW17	NNW19	NNW18	WNW16	WNW19	WNW21	WNW21	WNW21	WNW21	W17	W18	WNW21	WNW22	WNW19	WNW19	WNW21	WNW19	WNW18	WNW18	WNW16	W12	WSW13	W11	WNW16.8	WNW22
4-Sep	W12	W10	WSW7	WSW7	WSW7	W7	WNW7	NNW8	NNW7	NW12	NW8	WNW11	NW14	NW10	NNW8	NE6	NNE6	NE3	ESE3	E4	SSE5	SSE6	SE8	SE9	WNW3.6	NW14
5-Sep	SSE8	S4	SE8	SSE10	SSE9	SSE9	SSE10	SSE7	SSE8	SE6	SE6	SSE5	NNE2	E4	SE7	SSE5	SSE8	S7	S4	ESE2	SE4	S2	SSE3	S3	SSE5.4	SSE10
6-Sep	NW1	N5	N8	N9	NNE7	N4	NNE6	N6	N8	N10	N9	NNW9	N13	N14	N16	NNE13	N12	NNE13	N12	N11	N10	N13	N9	N8	N9.4	N16
7-Sep	NNW9	NW7	NW6	NNW5	N9	N6	NNW9	N8	NNW8	N11	N15	N15	N20	N17	N19	NNE15	N16	NE12	ENE8	ENE6	S3	S4	S5	SW4	N7.9	N20
8-Sep	SW5	SW3	SSE6	S7	SSE8	SSE9	SE9	SE7	SSE5	SSE4	SE4	SE5	NNW5	NNW6	N5	NNE4	N5	NNW1	SSE3	NE4	ESE4	SE7	SSE8	SSE8	SE2.9	SSE9
9-Sep	SSE8	SSE6	SSE7	SSE7	SSE6	SSE7	SSE7	SSE6	SSE6	SE6	SE6	ESE7	ESE7	SE11	ESE6	NNW11	WSW5	SSE7	S6	SE7	SSE8	SSE8	S6	SE6	SSE5.4	NNW11
10-Sep	SSE5	SSE6	S8	SSE7	SSE9	SSE10	SSE8	SSE8	SE8	SE7	SE8	SE8	SSW8	SSW10	SSW10	SW9	SW8	SSW7	S7	S8	SE9	SE12	SE13	SE13	SSE7.5	SE13
11-Sep	SE10	SE7	SSE7	SSE6	S5	SSE7	SSE9	SSE8	SSE7	S6	SW10	SW10	SSW8	SW10	SW13	SW13	SW9	S5	S6	SSE10	SSE11	SSE10	SW12	WSW17	S7.2	WSW17
12-Sep	WSW17	WSW14	WSW17	WSW21	WSW15	W12	WSW14	W11	W8	WSW8	WSW8	W11	W9	WSW8	W15	W16	WSW17	WSW15	WSW17	WSW17	W14	NW13	NNW9	N9	W11.8	WSW21
13-Sep	N6	N2	W2	WSW5	WNW3	WNW3	SW2	SSE5	E2	NNE4	WNW3	WNW6	NW6	WNW7	WNW5	NNW13	WNW6	NNE9	NNE4	SW5	SW6	WNW6	N10	N12	NW3.5	NNW13
14-Sep	N14	N12	N14	N14	N15	N15	N15	N14	NNE15	N17	N18	N14	N12	N13	N14	NE10	NE7	NE6	ENE7	ENE8	SE3	NE4	ESE3	S6	NNE10.0	S6
15-Sep	SSE6	SSE6	SSE4	WSW2	NNE4	ESE3	SSE4	SSE4	SSE2	NNE4	NNW5	ESE5	SE10	SE12	SSE11	SE11	SE9	SE8	SE6	SE6	SE4	SE4	S4	SW3	SE4.4	SE12
16-Sep	WSW2	WSW2	SW3	SSW4	W2	SSE5	SSW4	SE6	SSW4	S2	NW3	NNE6	SE5	SSE3	SE7	SSE11	SSE9	SSE7	SSE7	SSE8	SSE7	SSE8	SSE9	SSE9	SSE4.2	SSE11
17-Sep	SSE10	SSE7	SSE9	SSE9	SSE8	SSE6	SSE8	SSE8	SSE5	SE5	SE7	S12	SSW9	SSW9	S7	SW3	WSW8	S7	SSE9	SSE9	SSE10	SE11	SE12	SE12	SSE7.7	SE12
18-Sep	SE9	SE8	SE10	ESE10	SE9	SE9	SE8	SE8	S4	WSW11	SW13	SW15	WSW16	WSW15	WSW13	WSW15	WSW16	SW14	SSW8	S8	SSE11	SSE9	SSE12	SE12	SSW6.8	WSW16
19-Sep	SE12	SE14	SE14	SE13	SE13	SE12	SE12	SSE11	S13	SSW17	SSW16	WSW23	WSW21	SW20	WSW23	WSW26	SW13	WSW26	SW16	SW19	SW18	WSW18	WSW14	WSW14	SSW12.5	WSW26
20-Sep	SW14	SW14	SW15	WSW17	WSW21	WSW18	SW14	SW13	SW13	WSW17	WSW19	WSW22	W23	W26	W22	W20	WNW19	WNW16	WNW11	NW10	NW9	NW12	NW12	NW13	W14.4	W26
21-Sep	WNW14	WNW15	W14	W14	WNW16	WNW18	NW20	NNW22	NNW20	NNW16	NW16	NW17	NW18	NW19	NNW23	NNW19	NNW13	WNW20	WNW17	WNW15	NW15	WNW16	WNW13	W9	NW15.5	NNW23
22-Sep	W9	W9	W5	SW6	WSW7	S4	SSE6	SE6	SSE5	SE4	ESE6	ESE7	ESE7	SE9	ESE10	SSE7	SSE7	SSE6	SE7	SE7	SSE7	SSE8	SSE8	SSE6	SSE4.5	ESE10
23-Sep	SE7	SSE5	SSE5	SSE7	SE8	SE10	SE10	SE11	SSE9	SSE10	SE16	SE13	ESE13	ESE10	ESE15	ESE14	ESE15	SE14	SE13	SE14	SE13	SE12	SE12	SE11	SE10.7	SE16
24-Sep	SSE10	SSE10	SSE10	SSE8	SSE6	S7	SSE8	SSE8	SSE7	S6	S6	SSE6	ESE10	SE7	ESE6	SE7	SE9	ESE5	E7	ESE6	SE5	SSE7	SSE7	SSE9	SSE6.9	SSE10
25-Sep	SSE10	SSE8	SSE11	SSE10	SSE7	SSE8	SSE7	W9	W12	WNW19	W12	WSW16	WSW19	WSW15	WSW16	WSW15	WSW13	WSW11	SW10	SSW11	SW13	SW15	SW14	WSW17	SW9.8	WNW19
26-Sep	SW14	SSW9	SSW6	S8	S9	SSW11	SSW11	SW13	SW12	SW14	WSW15	WSW16	WSW24	WSW24	SW25	WSW28	WSW29	WSW23	WSW20	WSW22	SW14	SW16	WSW17	SW17	SW15.6	WSW29
27-Sep	SW14	SSW10	SW15	WSW20	WSW14	SW12	WSW23	WNW36	WNW37	NW32	WNW27	WNW32	WNW34	NW33	WNW32	WNW29	WNW24	WNW22	NW12	WNW14	NW19	NW23	NW25	NW16	WNW20.6	WNW37
28-Sep	NW15	WNW13	W13	W11	W11	WSW11	W11	W9	WNW10	WNW9	NW6	W5	W5	WSW8	WSW8	WSW6	SW5	S7	SSE8	SSE9	SSE10	SSE11	SSE8	SSE7	WSW5.1	NW15
29-Sep	SSE6	SE9	SE7	SSE6	SSE6	SSE8	SSE9	SSE9	SSE10	SSE9	SE6	SE8	SE9	SE6	N4	N4	NNW1	S4	SE8	SE8	SE8	SE10	SE13	SE11	SE6.6	SE13
30-Sep	SE8	SSE8	SE8	SE7	SE12	SSE12	SE13	SSE13	SSE13	SE11	SSE11	S13	SSW16	SSW17	S15	S15	S13	SSE10	SSE9	SSE9	SSE10	SSE11	SE11	SE13	SSE10.8	SSW17

SSW3.0	SSW2.8	SSW3.4	SSW3.9	SSW3.2	SSW3.6	SSW3.5	SSW2.7	SSW2.2	SSW3.4	SSW3.3	W4.5	W5.3	W5.4	W5.2	W5.1	W4.7	WSW3.5	SW2.3	SSW2.5	SSW3.2	SSW3.0	SSW3.1	SSW3.2	Diurnal Average
N18	NNW17	NNW19	WSW21	WSW21	WNW19	WSW23	WNW36	WNW37	NW32	WNW27	WNW32	WNW34	NW33	WNW32	WNW29	WSW29	WSW26	N20	WSW22	NW19	NW23	NW25	N20	Diurnal Maximum

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

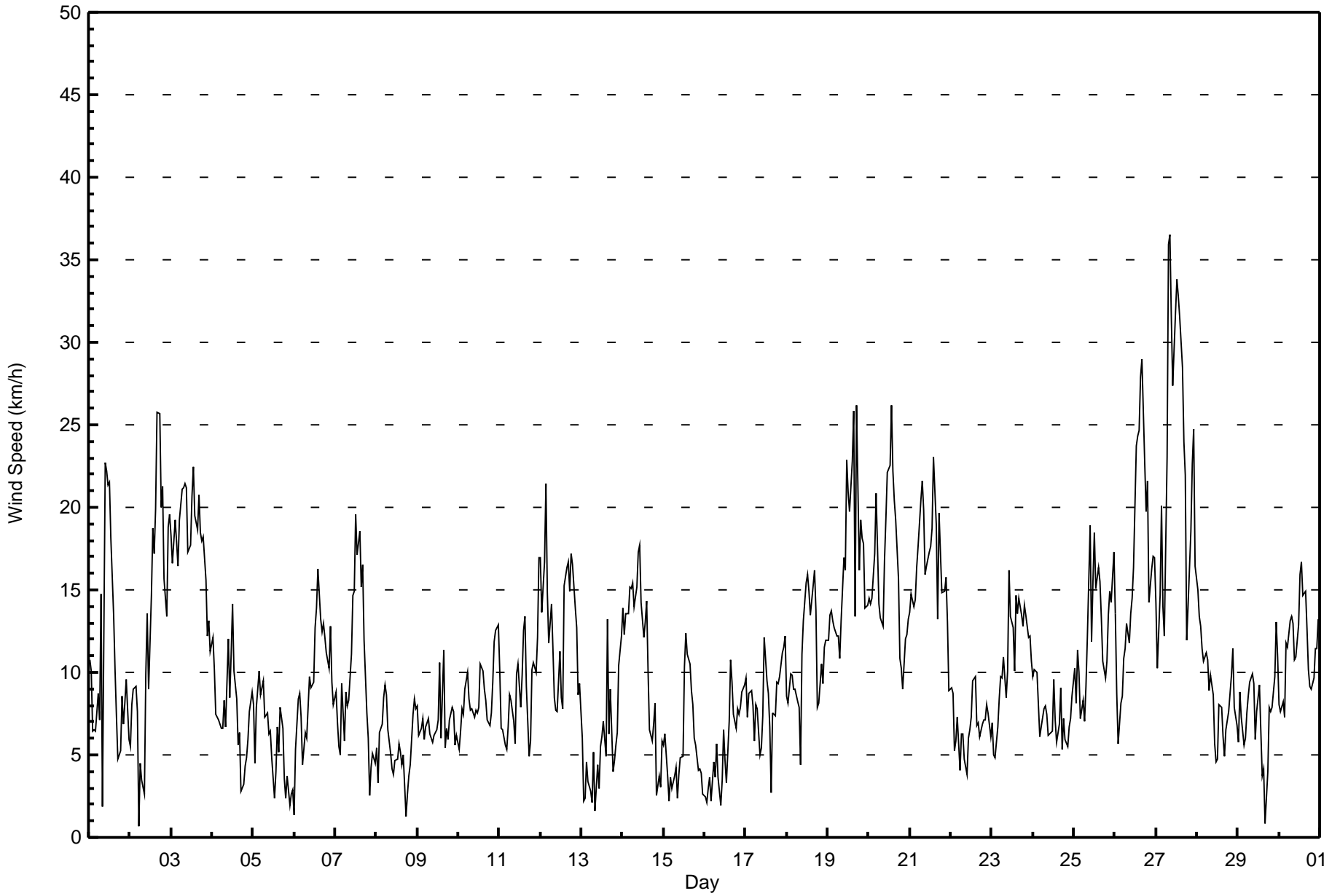




Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 10 km/h on Sep 19 16:00			Hours of Data:	720
Minimum Value: 0 km/h on Sep 15 00:00			Hours of Missing Data:	0
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 8			Hours of Calibration:	0
			Percent Operational Time:	100.0

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

Diurnal Maximum





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	109	15.14	15.14
6 - 11	347	48.19	63.33
12 - 19	205	28.47	91.81
20 - 28	50	6.94	98.75
29 - 38	9	1.25	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	7	6	4	0	3	9	9	21	14	5	9	6	5	4	2	5	109
6 - 11	19	5	4	4	1	12	69	129	21	14	10	16	15	10	8	10	347
12 - 19	34	4	1	0	0	4	27	4	6	4	28	35	14	22	15	7	205
20 - 28	10	0	0	0	0	0	0	0	0	0	2	16	4	11	3	4	50
29 - 38	0	0	0	0	0	0	0	0	0	0	0	1	0	6	2	0	9
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	70	15	9	4	4	25	105	154	41	23	49	74	38	53	30	26	720

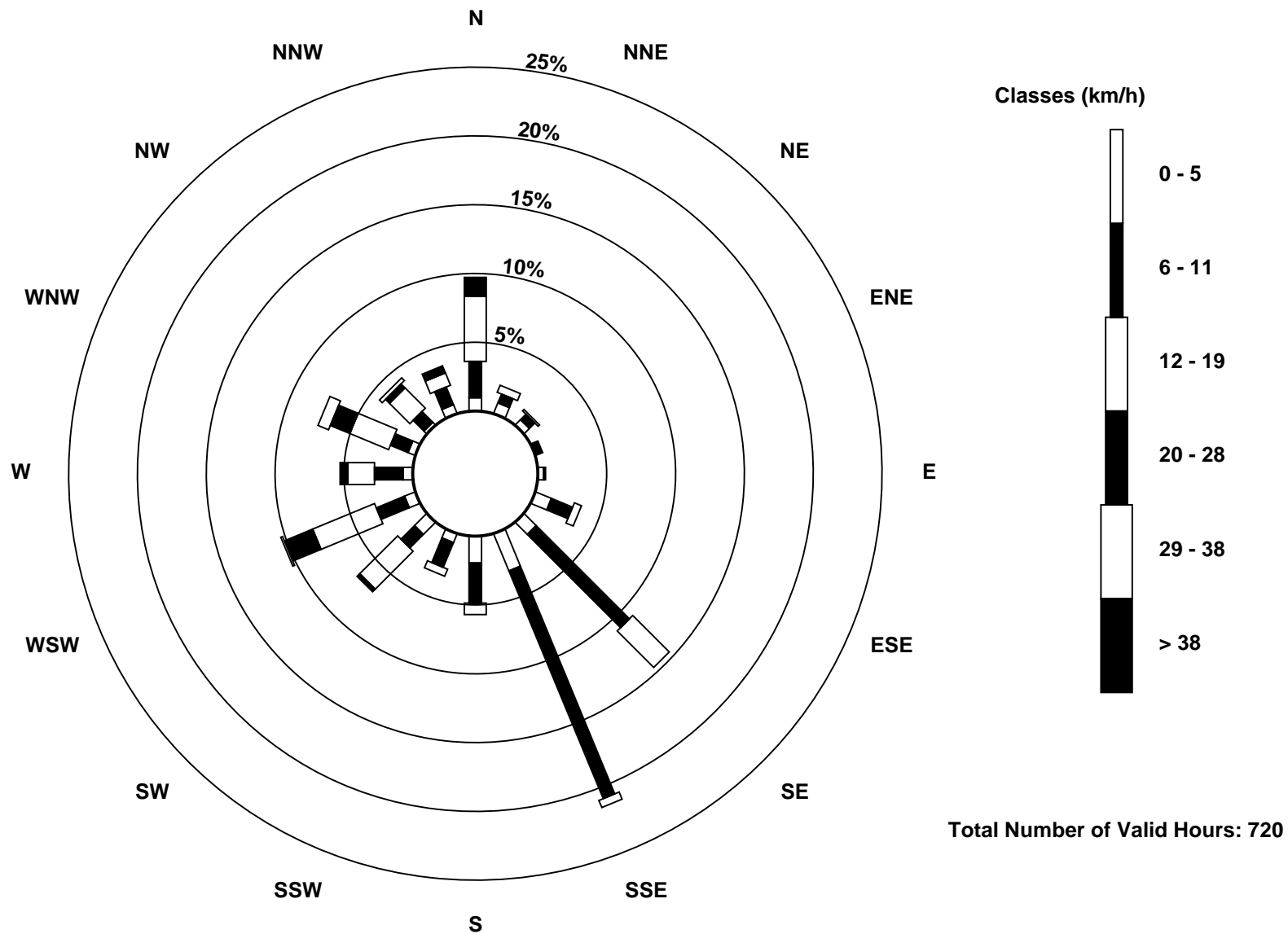
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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





Direction of Maximum Speed: 303 deg on Sep 27 09:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 291.1 deg on Sep 27		Hours of Data:	720
Direction of Minimum Speed: 168 deg on Sep 2 06:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 1.8 deg on Sep 1		Percent Operational Time:	100.0
Monthly Average Direction: 234.8 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	144	145	147	156	171	168	156	144	115	351	353	4	331	296	270	283	248	248	198	231	222	168	188	170	255.8
2-Sep	158	152	145	144	150	168	170	146	39	355	7	7	8	359	7	8	357	356	354	356	2	8	0	355	7.0
3-Sep	352	345	345	333	302	300	301	297	301	298	281	273	286	295	287	299	294	297	294	290	284	272	258	262	298.6
4-Sep	266	270	254	248	256	265	300	329	347	317	323	295	315	308	339	34	30	53	110	93	167	161	146	143	297.4
5-Sep	154	183	135	154	163	152	151	150	130	132	161	26	84	140	158	161	180	188	114	143	173	147	180	151.0	
6-Sep	315	356	8	5	30	7	13	1	355	7	1	348	353	352	360	13	11	17	10	2	5	351	357	7	3.2
7-Sep	345	323	326	333	353	6	347	350	347	355	359	354	357	0	1	12	8	34	61	75	190	187	169	219	0.2
8-Sep	232	226	149	169	149	147	137	145	148	150	144	128	346	344	354	13	353	342	152	45	105	140	159	147	140.3
9-Sep	149	162	154	151	161	160	151	148	155	140	127	121	117	124	105	332	251	161	170	143	152	162	170	140	148.0
10-Sep	161	161	174	164	168	158	166	152	144	129	131	126	204	206	205	214	221	207	185	169	145	139	136	140	165.5
11-Sep	141	139	156	154	173	161	153	150	153	180	225	233	208	225	230	215	214	174	181	157	158	150	227	244	189.6
12-Sep	245	253	242	247	257	261	249	259	261	240	239	273	264	242	270	261	248	242	252	252	275	320	346	350	259.8
13-Sep	349	2	262	239	301	290	226	149	80	19	298	288	308	297	301	338	301	18	33	230	236	282	353	3	320.9
14-Sep	8	5	353	4	8	5	3	10	12	3	358	7	10	4	10	34	37	37	63	67	124	49	108	174	13.2
15-Sep	168	154	160	255	23	105	161	152	152	16	345	113	131	138	156	132	136	134	142	133	143	165	179	219	141.3
16-Sep	242	239	219	209	276	156	192	146	197	191	311	13	128	164	132	150	162	156	161	152	157	148	149	156	160.4
17-Sep	148	157	152	154	156	157	153	154	159	133	129	173	195	196	171	228	240	181	156	149	149	143	145	140	159.7
18-Sep	135	126	128	123	132	131	142	130	177	240	234	234	252	252	255	243	249	232	204	172	148	149	153	146	194.3
19-Sep	141	136	143	138	139	141	145	152	172	204	212	244	241	219	245	248	236	243	220	224	232	242	243	246	212.5
20-Sep	233	232	231	238	246	238	224	221	220	248	247	258	267	264	262	266	285	295	283	313	307	321	305	306	260.1
21-Sep	294	283	279	280	299	301	316	334	331	347	322	313	312	325	333	339	329	290	290	300	307	300	288	268	309.9
22-Sep	268	277	277	231	239	187	150	142	156	132	117	104	111	124	123	168	150	153	134	133	154	154	148	155	156.4
23-Sep	144	157	158	158	146	144	146	144	161	148	140	134	119	107	119	122	123	125	125	129	134	144	144	143	135.4
24-Sep	148	148	156	161	158	173	159	159	164	190	185	150	120	129	116	139	131	112	88	123	140	162	152	158	147.2
25-Sep	155	162	154	158	167	165	160	268	265	290	268	253	250	238	250	249	240	242	231	212	221	227	232	241	231.2
26-Sep	227	200	193	178	183	213	207	215	226	236	246	246	249	242	234	243	254	254	256	251	236	232	237	233	236.2
27-Sep	227	212	222	245	242	236	258	284	303	317	302	296	301	307	301	292	296	302	308	297	311	316	309	308	291.1
28-Sep	314	303	272	271	268	255	267	271	285	285	319	270	270	239	246	244	227	169	159	149	149	150	147	159	250.1
29-Sep	159	146	144	150	150	159	164	157	148	148	137	134	127	132	358	11	327	190	130	140	143	146	139	140	143.6
30-Sep	143	148	145	145	140	147	146	147	150	145	155	186	199	200	190	182	178	158	151	151	151	148	143	137	160.2

205.3 201.7 193.6 204.0 207.4 198.4 201.0 206.8 246.8 295.5 284.3 271.5 281.1 271.7 275.0 275.4 267.6 258.1 221.3 208.8 202.3 199.9 200.7 200.8

Diurnal Average

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



**Wood Buffalo Environmental Association**

**Summary of Hour Standard Deviations**

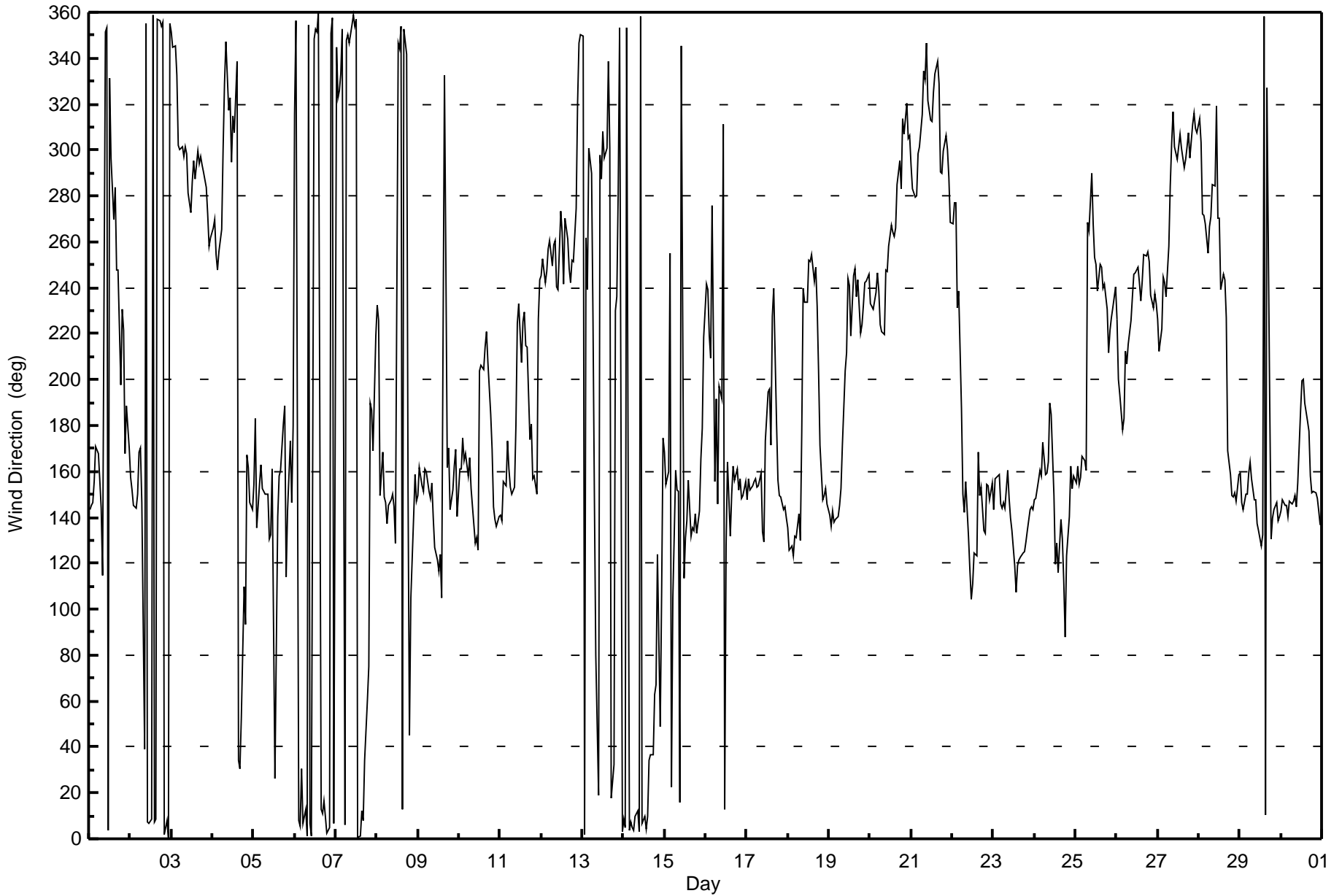
**Wind Direction (WD) - deg**

**Buffalo Viewpoint - September 2015**

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 99 deg on Sep 29 17:00			Hours of Data:	720
Minimum Value: 3 deg on Sep 17 07:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 12 Q <sub>1</sub> = 15 Median = 18 Q <sub>3</sub> = 24 P <sub>90</sub> = 40 P <sub>99</sub> = 81				

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-Sep	8	10	11	20	20	16	26	26	86	16	18	17	26	20	16	23	23	34	21	16	19	18	13	34	86
2-Sep	57	11	11	9	36	85	42	18	55	17	15	20	16	17	16	16	18	17	17	16	16	14	16	17	85
3-Sep	16	13	14	18	15	15	14	14	15	15	20	19	18	15	16	16	15	17	17	15	16	18	13	15	20
4-Sep	16	16	19	18	22	34	31	20	30	15	33	20	18	22	43	38	34	52	15	32	16	12	8	6	52
5-Sep	9	50	29	18	19	13	15	20	25	31	26	47	81	64	28	45	28	20	16	44	27	82	53	58	82
6-Sep	83	13	16	11	15	26	6	12	14	15	17	15	14	16	16	17	15	15	13	13	14	14	15	21	83
7-Sep	26	15	26	27	17	24	14	19	19	16	18	19	17	17	17	18	17	27	19	10	42	18	26	34	42
8-Sep	21	49	13	11	11	10	10	13	30	29	60	68	72	43	42	48	24	93	37	44	38	17	20	17	93
9-Sep	19	18	15	17	26	12	15	19	19	24	23	23	31	25	48	38	73	23	23	15	11	13	17	8	73
10-Sep	16	14	17	13	12	13	14	14	20	20	20	28	43	25	21	22	15	17	10	15	7	5	5	7	43
11-Sep	8	14	16	23	20	19	14	12	23	32	23	22	21	19	19	15	21	24	15	11	9	15	23	16	32
12-Sep	15	17	16	14	17	16	15	16	18	21	28	21	20	26	17	17	15	16	13	13	25	22	12	10	28
13-Sep	12	79	50	31	38	49	56	17	74	46	72	39	31	27	34	25	80	18	36	58	21	26	28	16	80
14-Sep	15	16	15	16	14	15	15	16	15	17	17	19	18	18	20	22	36	20	11	11	55	45	42	9	55
15-Sep	11	9	29	51	29	42	36	13	51	51	36	87	28	26	26	27	24	20	18	11	17	28	18	15	87
16-Sep	32	51	38	25	75	35	30	14	20	61	48	27	53	76	41	25	21	18	19	16	19	15	18	15	76
17-Sep	12	12	8	8	10	15	3	8	25	31	34	26	33	33	36	87	46	46	18	15	15	10	10	9	87
18-Sep	10	10	9	8	12	9	11	14	45	21	20	20	21	21	23	22	18	17	23	12	7	17	13	10	45
19-Sep	12	9	11	12	13	15	15	19	20	21	20	20	20	19	17	17	19	16	16	18	16	15	16	16	21
20-Sep	17	17	16	16	14	17	19	18	22	20	21	20	21	19	18	18	20	15	13	10	14	13	13	12	22
21-Sep	17	17	17	16	15	15	13	18	17	17	15	19	19	18	18	17	27	17	15	14	14	15	16	12	27
22-Sep	10	14	33	26	16	33	18	13	25	52	41	44	38	28	37	35	23	17	13	10	13	14	12	17	52
23-Sep	14	15	14	18	18	20	19	21	23	24	20	24	21	22	22	21	21	19	19	20	21	19	19	19	24
24-Sep	18	20	18	20	15	22	21	19	22	32	31	46	22	30	39	29	19	16	14	20	18	20	18	19	46
25-Sep	20	19	19	20	27	19	25	36	17	18	21	16	17	20	22	19	17	15	13	12	13	16	16	16	36
26-Sep	18	35	39	24	15	15	14	12	18	20	21	20	18	20	19	18	14	15	16	12	17	17	16	16	39
27-Sep	15	18	19	17	16	18	17	17	18	14	17	16	15	15	15	17	16	15	14	15	18	13	13	15	19
28-Sep	15	15	20	15	17	14	11	14	16	25	42	68	73	40	37	45	41	16	15	18	16	17	22	27	73
29-Sep	26	20	21	17	15	18	14	16	19	23	34	30	22	39	66	61	99	57	9	7	7	11	7	9	99
30-Sep	10	9	12	12	11	16	16	15	16	20	25	26	20	20	24	21	20	18	14	14	12	13	11	8	26

Diurnal Maximum																								83	79	50	51	75	85	56	36	86	61	72	87	81	76	66	87	99	93	37	58	55	82	53	58
-----------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----







# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	September 15, 2015	Last Calibration	August 12, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	12:00	End Time (MST)	14:35
Gas Cert Reference	LL107926	Station temp.	21 Deg C
Cal Gas Concentration	51 ppm	Cal Gas Exp Date	29-May-14
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635

## Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-592	-592
Analyzer IP address	192.168.1.43		Lamp voltage	829	832
Calculated slope	0.997630	0.991506	Chamber temp	45.0	45.0
Calculated intercept	-0.340911	-0.688778	Pressure	689.2	694.9
Analyzer Background	10.0	9.9	Flow	0.488	0.492
Analyzer Coefficient	0.856	0.856	Intensity	85	85

Analyzer make TEI 43i Analyzer serial # JC1327300932

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.4	----
as found span	5000	58.8	599.8	605.1	0.991
calibrator zero	5000	0.0	0.0	0.4	----
high point	5000	58.8	599.8	605.1	0.991
second point	5000	29.4	299.9	304.5	0.985
third point	5000	14.7	149.9	151.4	0.991
as left zero	5000	0.0	0.0	0.6	----
as left span	5000	58.8	599.8	604.0	0.993
Average Correction Factor					0.989

Corrected As found 604.6 Previous response 601.5 % change -0.5%

**Notes:**

Sample inlet filter replaced after as founds. No adjustments.

Calibration Performed By: Asad Hidayat



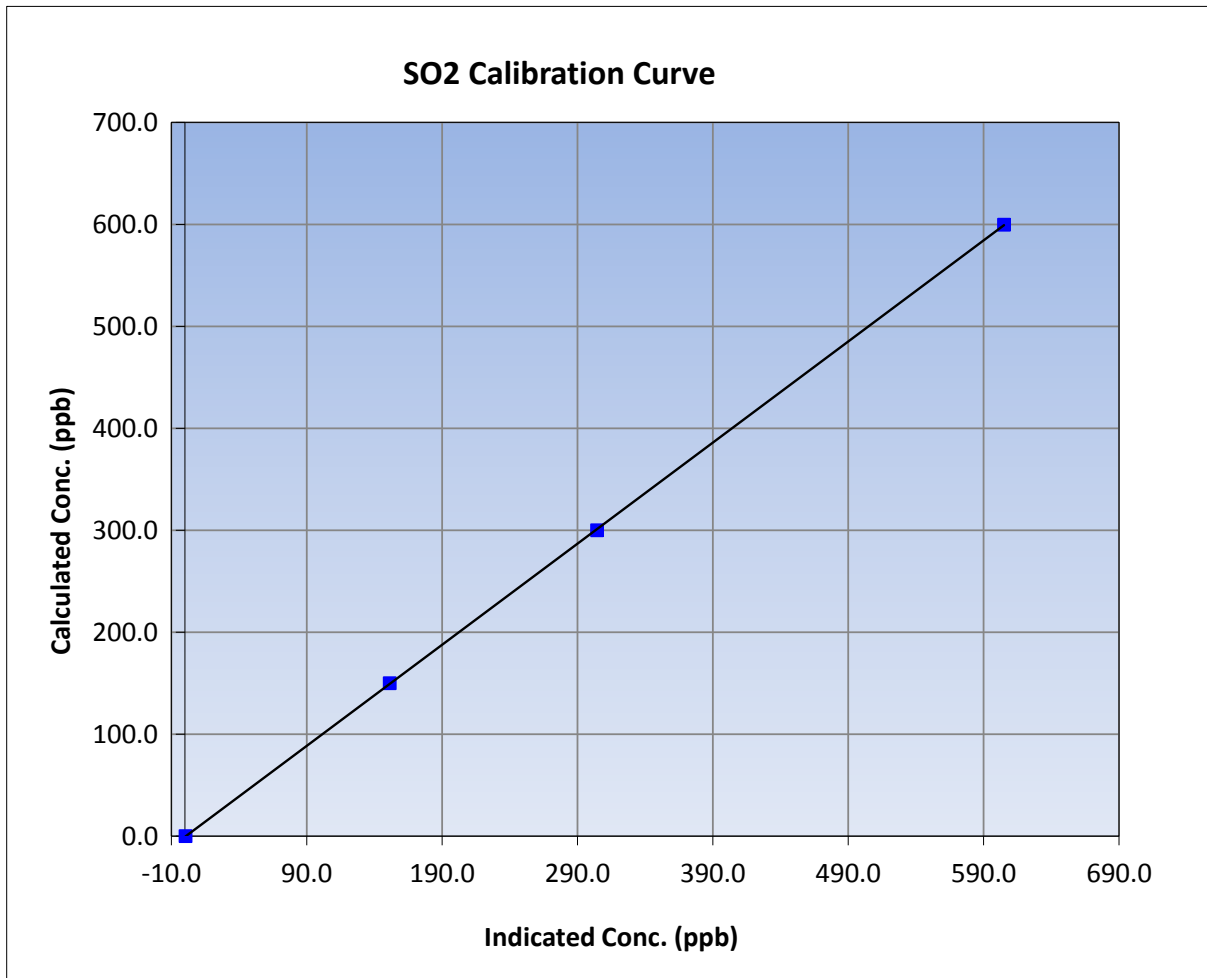
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 15, 2015	Previous Calibration	August 12, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	12:00	End Time (MST)	14:35
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

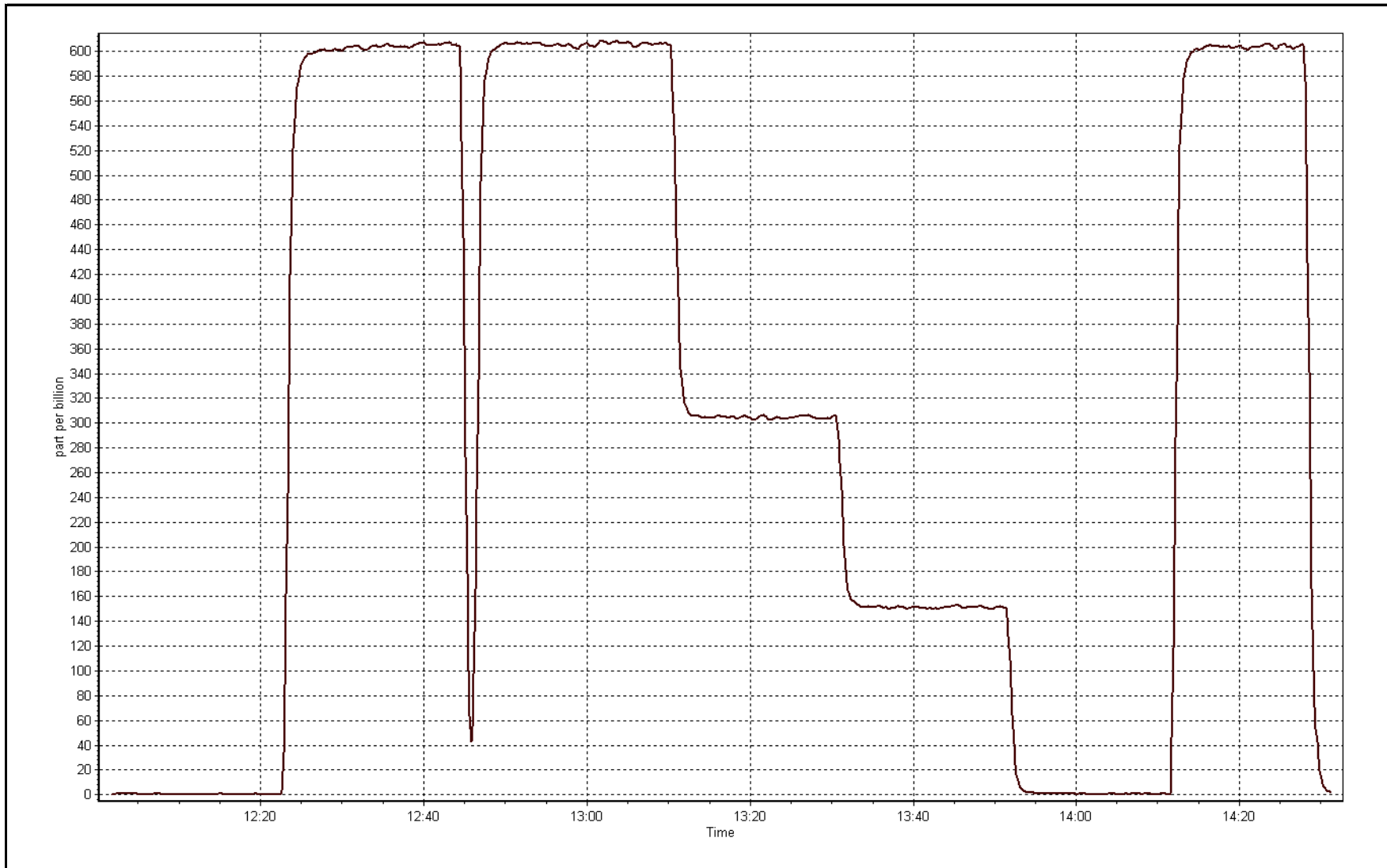
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999987
599.8	605.1	0.9913		
299.9	304.5	0.9848	Slope	0.991506
149.9	151.4	0.9906		
			Intercept	-0.688778



SO2 Calibration Plot

Date: September 15, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	September 15, 2015	Last Calibration	August 7, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	8:57	End Time (MST)	12:00
Gas Cert Reference	LL101590	Station temp.	22 Deg C
Cal Gas Concentration	9.75 ppm	Cal Gas Exp Date	2/22/2015
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG air Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635
SO2 gas concentration	51 ppm	SO2 gas cert/exp	LL107926 29-May-14

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-616	-617
Analyzer IP address	192.168.1.42		Lamp voltage	868	867
Calculated slope	1.006660	1.005594	Chamber temp	45	45
Calculated intercept	-0.366422	-0.139943	Pressure	539.4	558.6
Analyzer Background	14	13.4	Flow	1.031	1.062
Analyzer Coefficient	0.828	0.808	Intensity	94	95
			Converter temp.	330	331

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

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	46.1	74.9	75.3	0.995
SO2 scrubber check	5000	14.7	149.9	2.7	----
calibrator zero	6000	0.0	0.0	0.0	----
high point	6000	46.1	74.9	74.5	1.006
second point	6000	25.8	41.9	42.2	0.994
third point	6000	15.4	25.0	24.9	1.003
as left zero	5000	0.0	0.0	0.3	----
as left span	6000	46.1	74.9	73.5	1.019
Average Correction Factor					1.001

Corrected As found	75.3	Previous response	74.8	% change	-0.6%
--------------------	------	-------------------	------	----------	-------

**Notes:**

Inlet filter changed and scrubber check done after as founds. Adjusted averaging time from 60s to 90s. Slightly adjusted span.

Calibration Performed By: Asad Hidayat



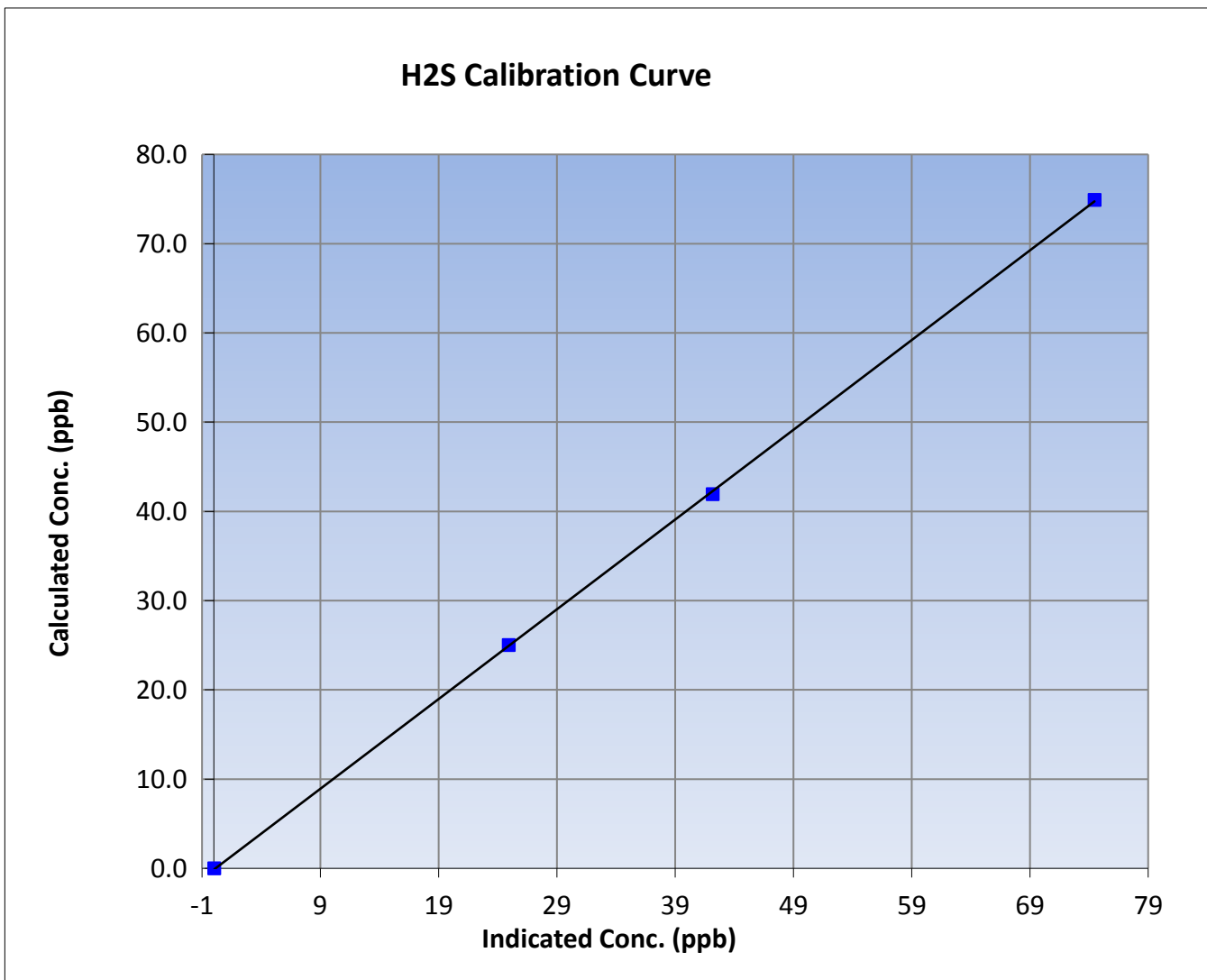
# Wood Buffalo Environmental Association H2S Calibration Report

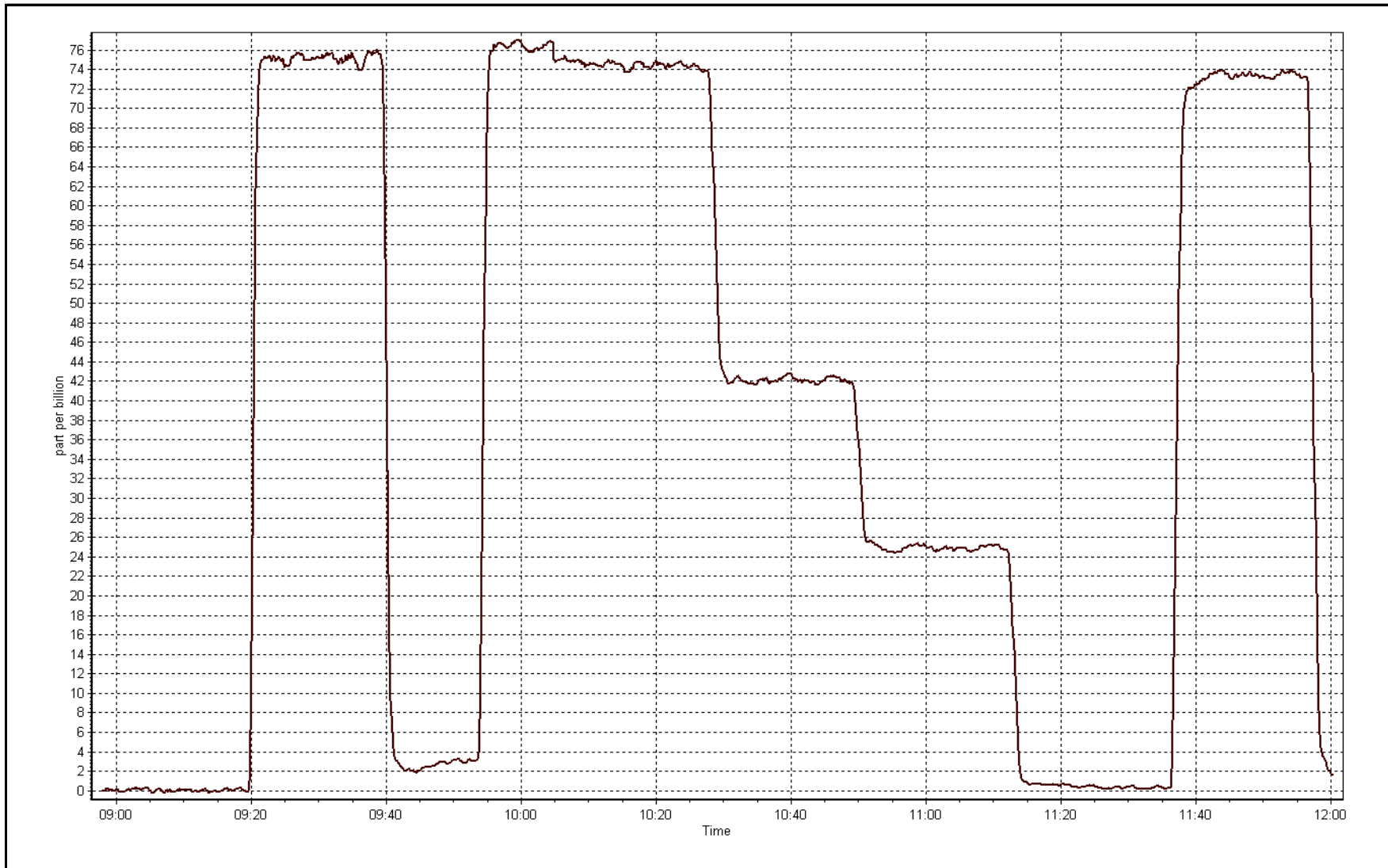
## Station Information

Calibration Date	September 15, 2015	Previous Calibration	August 7, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	8:57	End Time (MST)	12:00
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	0.0	----	Correlation Coefficient	0.999940
74.9	74.5	1.0061		
41.9	42.2	0.9937	Slope	1.005594
25.0	24.9	1.0034		
			Intercept	-0.139943







# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	September-15-15	Last Calibration	August-12-15
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	12:00	End Time (MST)	14:31
Gas Cert Reference	LL107926	Cal Gas Expiry Date	29-May-14
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1067.8 ppm
C3H8 Cal Gas Conc.	201 ppm	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG make/model	Teledyne API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635

## Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	30.4	30.4
Calculated slope	1.002261	1.004096	Fuel Pressure	19.9	19.9
Calculated intercept	-0.013850	-0.064098	Analyzer Coeff	4.1	4.1
			Analyzer BKG	0.950	0.950

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	-0.05	----
as found span	5000	58.8	12.56	12.30	1.021
calibrator zero	5000	0.0	0.00	0.05	----
high point	5000	58.8	12.56	12.55	1.001
second point	5000	29.4	6.28	6.36	0.987
third point	5000	14.7	3.14	3.18	0.987
as left zero	5000	0.0	0.00	0.02	----
as left span	5000	58.8	12.56	12.63	0.994
Average Correction Factor					0.992

Corrected As found 12.35 Previous response 12.54 % change 1.6%

**Notes:**

Inlet filter replaced after as founds. Span prior to filter change was low due to filthy sample inlet filter. No adjustments.

Calibration Performed By:

Asad Hidayat



# Wood Buffalo Environmental Association THC Calibration Report

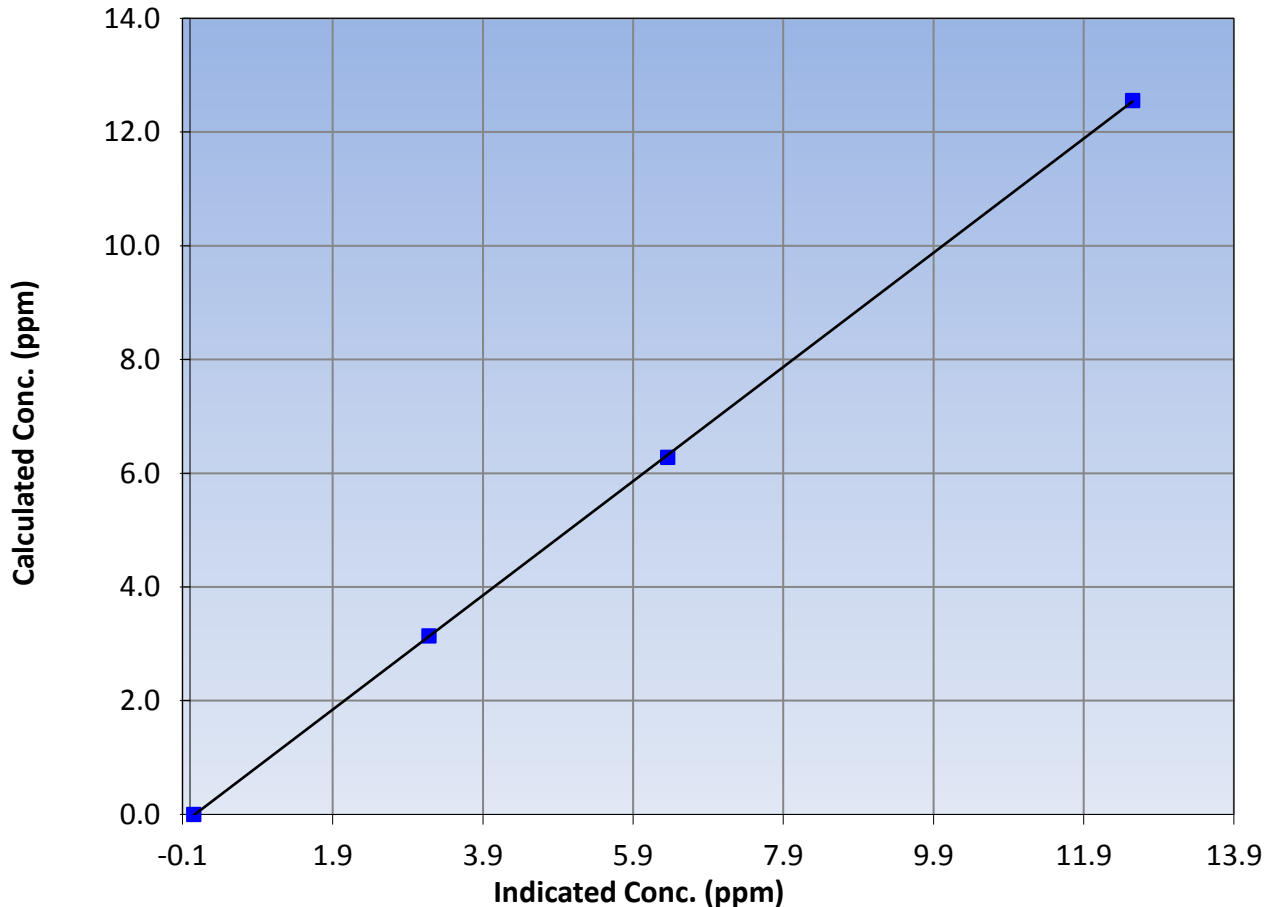
## Station Information

Calibration Date	September 15, 2015	Previous Calibration	August 12, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	12:00	End Time (MST)	14:31
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.05	----	Correlation Coefficient	0.999970
12.56	12.55	1.0005		
6.28	6.36	0.9872	Slope	1.004096
3.14	3.18	0.9872		
			Intercept	-0.064098

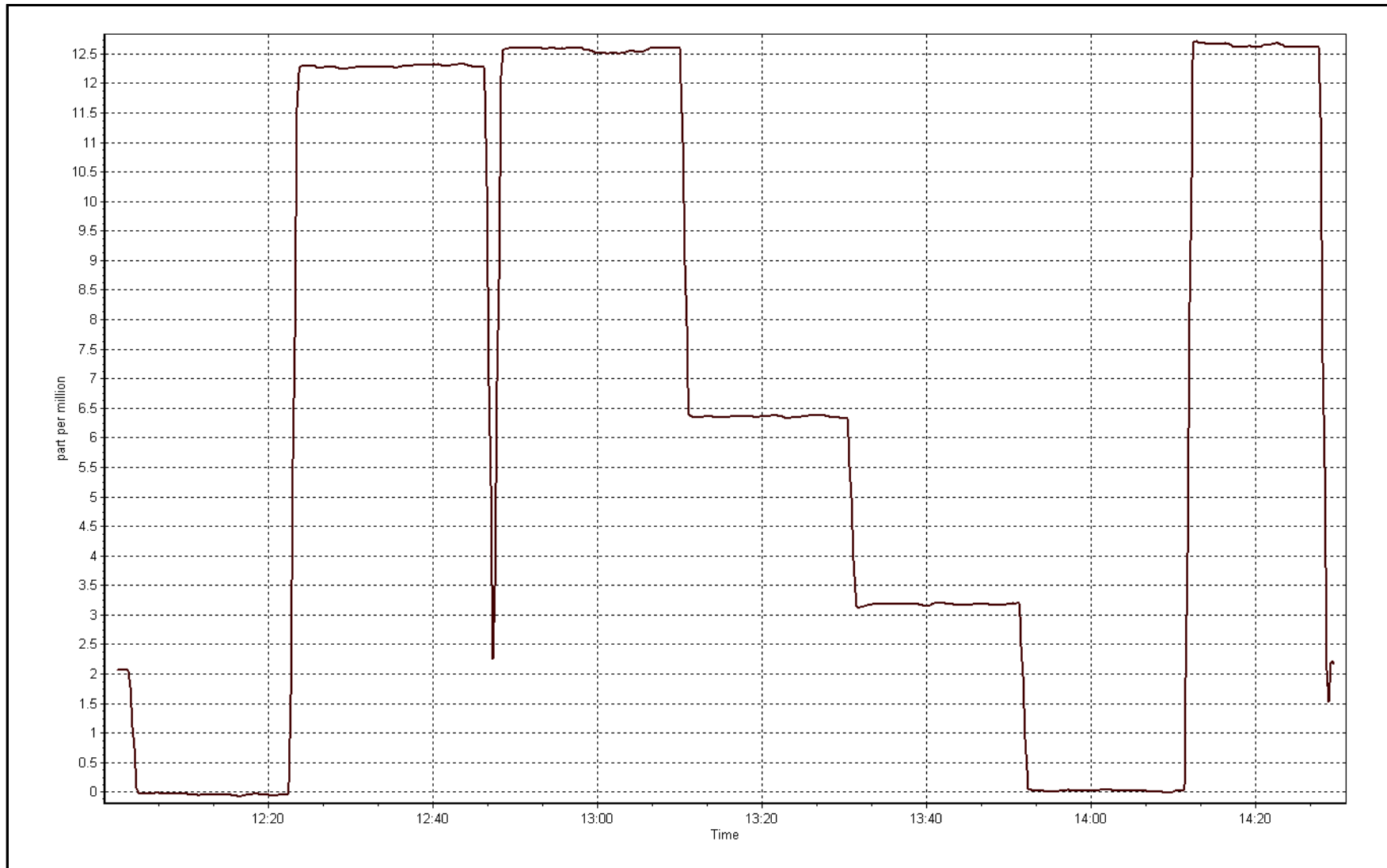
**THC Calibration Curve**





THC Calibration Plot

Date: September 15, 2015





This page intentionally left blank



## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 5  
MANNIX  
SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	686	34	34	100.00	63	0	10	0
H2S (ppb) Average	683	36	37	99.86	9	0	3	0
THC (ppm) Average	686	34	34	100.00	3.6	-	2.5	-
Temperature 2 m (C) Average	714	0	6	99.17	24	-	15.4	-
Temperature 20 m (C) Average	714	0	6	99.17	23.5	-	16.1	-
Temperature 45 m (C) Average	714	0	6	99.17	23.1	-	16.2	-
Temperature 75 m (C) Average	714	0	6	99.17	22.8	-	16.8	-
Temperature 90 m (C) Average	577	0	143	80.14	22.7	-	15.6	-
Relative Humidity 2 m (%) Average	714	0	6	99.17	98	-	90	-
Relative Humidity 20 m (%) Average	714	0	6	99.17	99	-	90	-
Relative Humidity 45 m (%) Average	714	0	6	99.17	98	-	89	-
Relative Humidity 75 m (%) Average	714	0	6	99.17	97	-	88	-
Relative Humidity 90 m (%) Average	577	0	143	80.14	98	-	88	-
Wind Speed 20 m (km/h) Average	714	0	6	99.17	39	-	22	-
Wind Speed 45 m (km/h) Average	714	0	6	99.17	46	-	29	-
Wind Speed 75 m (km/h) Average	714	0	6	99.17	50	-	32	-
Wind Speed 90 m (km/h) Average	713	0	7	99.03	46	-	33	-
Wind Direction 20 m (deg) Average	714	0	6	99.17	-	-	-	-
Wind Direction 45 m (deg) Average	714	0	6	99.17	-	-	-	-
Wind Direction 75 m (deg) Average	714	0	6	99.17	-	-	-	-
Wind Direction 90 m (deg) Average	713	0	7	99.03	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	714	0	6	99.17	0.6	-	0.4	-
Vertical Wind Speed 45 m (km/h) Average	714	0	6	99.17	1.5	-	1.1	-
Vertical Wind Speed 75 m (km/h) Average	714	0	6	99.17	1.5	-	0.8	-
Vertical Wind Speed 90 m (km/h) Average	713	0	7	99.03	9.1	-	3.3	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	686	1.8	5	-	0	0	0	0	1	4	63
H2S (ppb) Average	683	0.6	1	-	0	0	0	0	1	1	9
THC (ppm) Average	686	2.21	0.2	-	2	2.1	2.1	2.2	2.2	2.4	3.6
Temperature 2 m (C) Average	714	9.57	4.7	-	-1.8	4.2	6	9	12.4	16.1	24
Temperature 20 m (C) Average	714	10.01	4.5	-	-1.4	4.7	6.9	9.4	12.7	16.5	23.5
Temperature 45 m (C) Average	714	10.02	4.5	-	-1.4	4.9	6.9	9.5	12.6	16.4	23.1
Temperature 75 m (C) Average	714	10.07	4.4	-	-1.2	5	7.2	9.6	12.6	16.3	22.8
Temperature 90 m (C) Average	577	9.91	4.7	-	-1.1	4.6	6.7	9	12.7	16.8	22.7
Relative Humidity 2 m (%) Average	714	71.2	19	-	29	45	57	74	89	94	98
Relative Humidity 20 m (%) Average	714	67.6	18	-	27	43	54	68	84	91	99
Relative Humidity 45 m (%) Average	714	66.4	18	-	27	42	53	66	82	89	98
Relative Humidity 75 m (%) Average	714	65.3	17	-	26	42	53	65	79	89	97
Relative Humidity 90 m (%) Average	577	65.5	18	-	26	42	52	66	81	89	98
Wind Speed 20 m (km/h) Average	714	10.6	6	-	0	4	6	9	13	19	39
Wind Speed 45 m (km/h) Average	714	15.4	8	-	0	6	10	15	20	25	46
Wind Speed 75 m (km/h) Average	714	17.7	9	-	1	6	11	17	24	29	50
Wind Speed 90 m (km/h) Average	713	18.8	9	-	0	7	12	19	25	31	46
Wind Direction 20 m (deg) Average	714	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	714	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	714	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	713	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	714	-0.02	0.3	-	-1.1	-0.4	-0.2	0	0.2	0.4	0.6
Vertical Wind Speed 45 m (km/h) Average	714	0.2	0.5	-	-1.7	-0.4	-0.2	0.1	0.6	0.9	1.5
Vertical Wind Speed 75 m (km/h) Average	714	0.15	0.4	-	-0.8	-0.3	-0.1	0.1	0.3	0.6	1.5
Vertical Wind Speed 90 m (km/h) Average	713	0.78	1.2	-	-2.7	-0.4	0.1	0.6	1.4	2.4	9.1

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	11 Sep 2015 14:00	11 Sep 2015 14:00	1	Maintenance - cleaned glass manifold
ALL METEOROLOGICAL SENSORS 2, 20, 45, 75, 90 m	22 Sep 2015 09:00	22 Sep 2015 14:00	6	Maintenance - 2 year sensor replacement
Temperature, Relative Humidity 90 m	02 Sep 2015 13:00	22 Sep 2015 14:00	143	Flat line in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 90 m	01 Sep 2015 14:00	01 Sep 2015 14:00	1	Intermittent unstable operation



Summary of Hour Averages

Mannix - September 2015

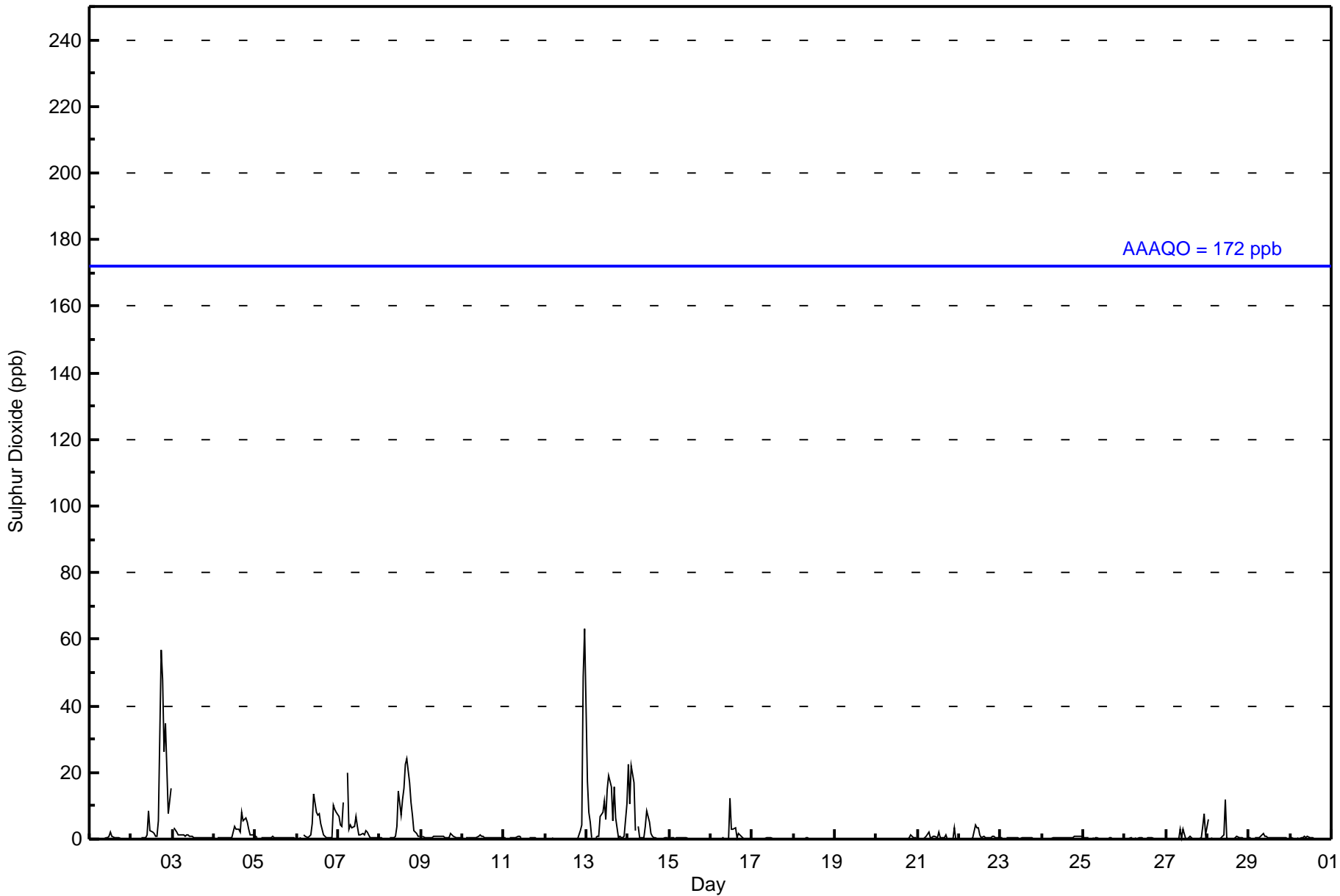
Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 63 ppb on Sep 13 00:00	Maximum Daily Average: 9.8 ppb on Sep 2		Hours of Data:	686
Minimum Value: 0 ppb on Sep 22 01:00	Minimum Daily Average: 0.1 ppb on Sep 19		Hours of Missing Data:	34
Maximum Diurnal Average: 3.5 ppb at hour 24	Minimum Diurnal Average: 0.4 ppb at hour 5		Hours of Calibration:	34
Monthly Average: 1.8 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> = 4 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-Sep	0	0	0	0	Z	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0.3	2
2-Sep	0	0	0	0	0	Z	0	0	0	1	8	3	2	2	1	1	6	57	48	26	35	8	12	15	9.8	57
3-Sep	Z	3	2	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0.9	3
4-Sep	0	Z	0	0	0	0	0	0	0	0	1	2	4	3	3	2	8	6	6	5	3	1	1	1	2.1	8
5-Sep	1	1	Z	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
6-Sep	0	0	1	Z	1	1	1	1	1	5	13	8	7	8	5	1	1	1	0	0	0	10	9	8	3.6	13
7-Sep	7	4	4	11	Z	20	3	4	3	4	7	4	1	1	2	1	3	2	1	0	0	0	0	0	3.6	20
8-Sep	0	0	0	0	0	Z	1	0	1	1	4	14	7	12	15	23	24	17	11	7	2	2	1	1	6.3	24
9-Sep	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	2	1	1	1	0	0	0	0.7	2
10-Sep	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
11-Sep	0	0	Z	0	0	0	0	0	1	1	1	C	C	C	C	0	0	0	0	0	0	0	0	0	0.3	1
12-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	49	63	5.3	63
13-Sep	18	8	5	1	Z	0	1	1	7	8	11	6	15	19	16	6	16	6	1	1	1	0	1	11	6.8	19
14-Sep	22	11	22	17	2	Z	4	0	0	0	4	8	5	2	1	0	0	0	0	0	0	0	0	0	4.5	22
15-Sep	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
16-Sep	0	Z	0	0	0	0	0	0	0	0	0	12	3	3	3	0	2	1	0	0	0	0	0	0	1.2	12
17-Sep	0	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-Sep	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
19-Sep	0	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-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1
21-Sep	Z	0	0	0	0	1	2	0	0	1	1	0	2	0	1	0	1	0	0	0	0	3	0	0	0.6	3
22-Sep	0	Z	0	0	0	0	0	0	0	4	3	3	1	1	1	1	0	0	1	1	1	0	0	0	0.8	4
23-Sep	0	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
24-Sep	0	0	0	Z	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	1	1	1	1	1	0.4	1
25-Sep	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
26-Sep	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
27-Sep	Z	0	0	0	0	0	0	0	3	0	3	0	0	0	1	0	0	0	0	0	0	4	8	1	1.0	8
28-Sep	6	Z	0	0	0	0	0	0	0	1	12	1	0	0	0	0	0	1	0	0	0	0	0	0	1.1	12
29-Sep	0	0	Z	0	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0.4	2
30-Sep	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1

2.3	1.3	1.5	1.4	0.4	1.1	0.6	0.5	0.9	1.1	2.5	2.4	1.9	1.9	1.8	1.3	2.2	3.2	2.4	1.5	1.7	1.3	2.8	3.5	Diurnal Average	
22	11	22	17	2	20	4	4	7	8	13	14	15	19	16	23	24	57	48	26	35	10	49	63	Diurnal Maximum	

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







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	655	95.48	95.48
11 - 20	21	3.06	98.54
21 - 60	9	1.31	99.85
61 - 110	1	0.15	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	24	29	6	5	8	16	105	120	46	30	38	75	54	45	18	30	649
11 - 20	7	1	0	0	1	1	2	0	1	1	0	0	2	1	3	1	21
21 - 60	7	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	9
61 - 110	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	39	30	6	5	9	17	107	120	47	32	38	76	56	46	21	31	680

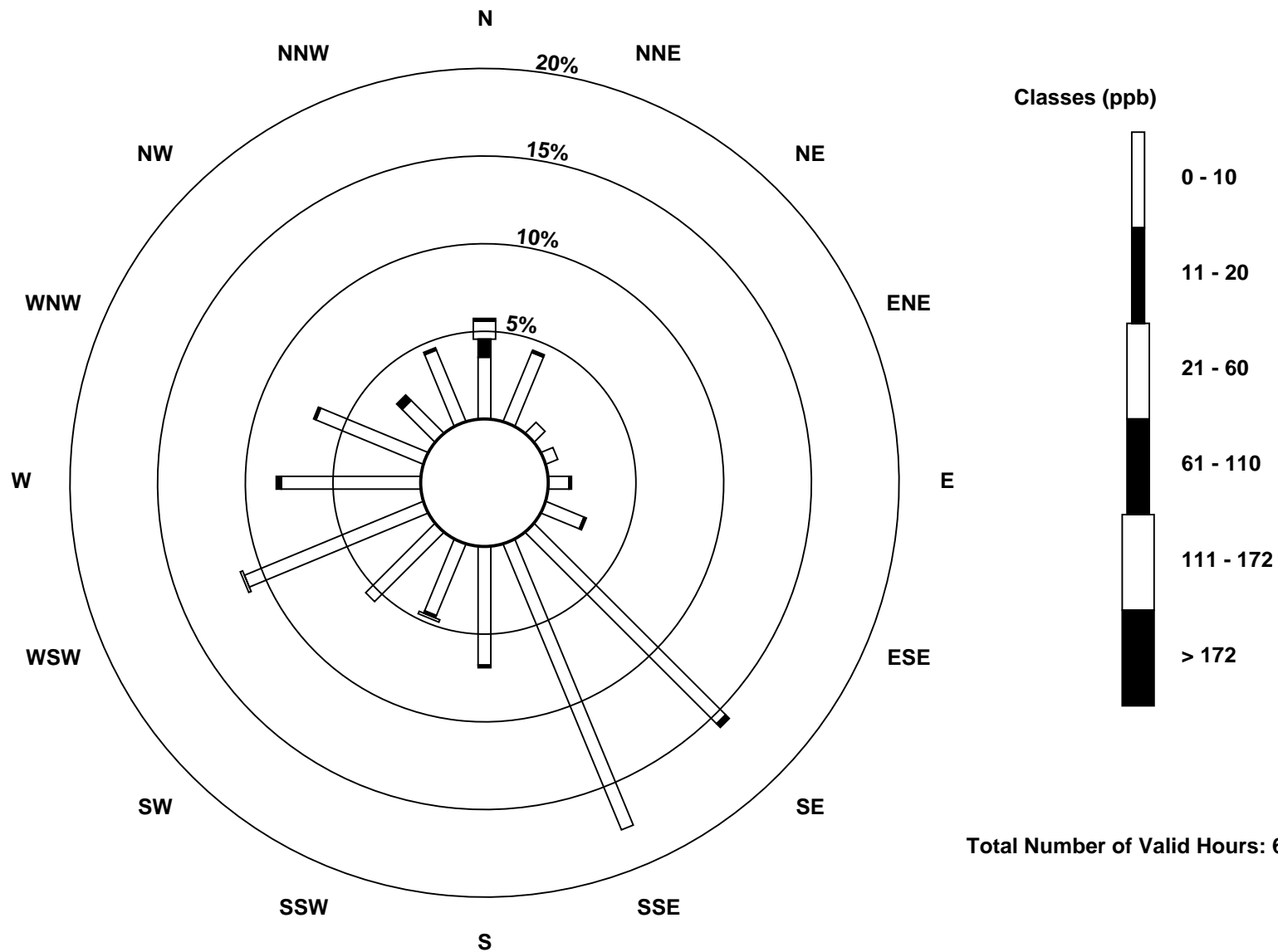
Total Number of Valid Hours: 680

Total Number of Hours: 720

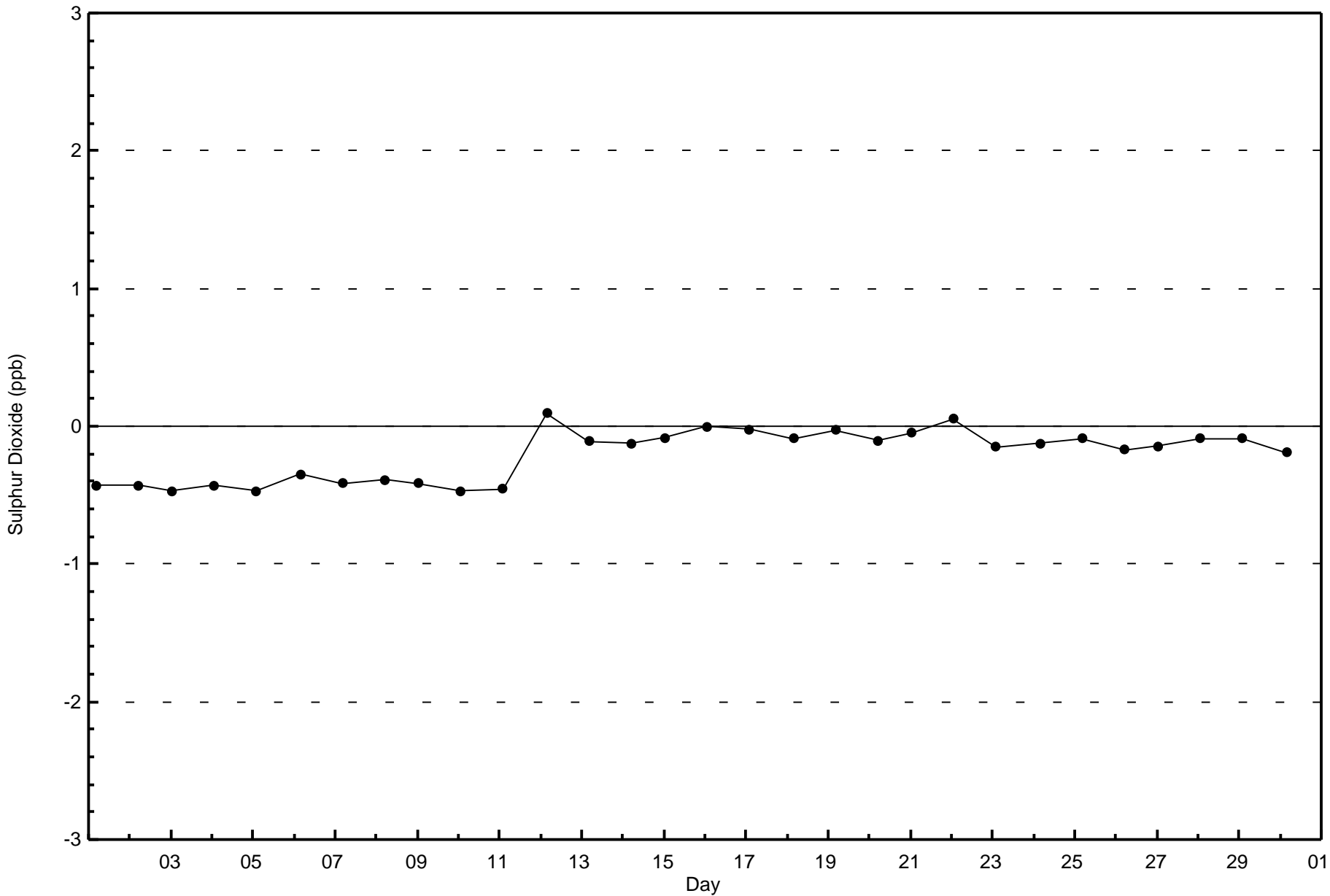


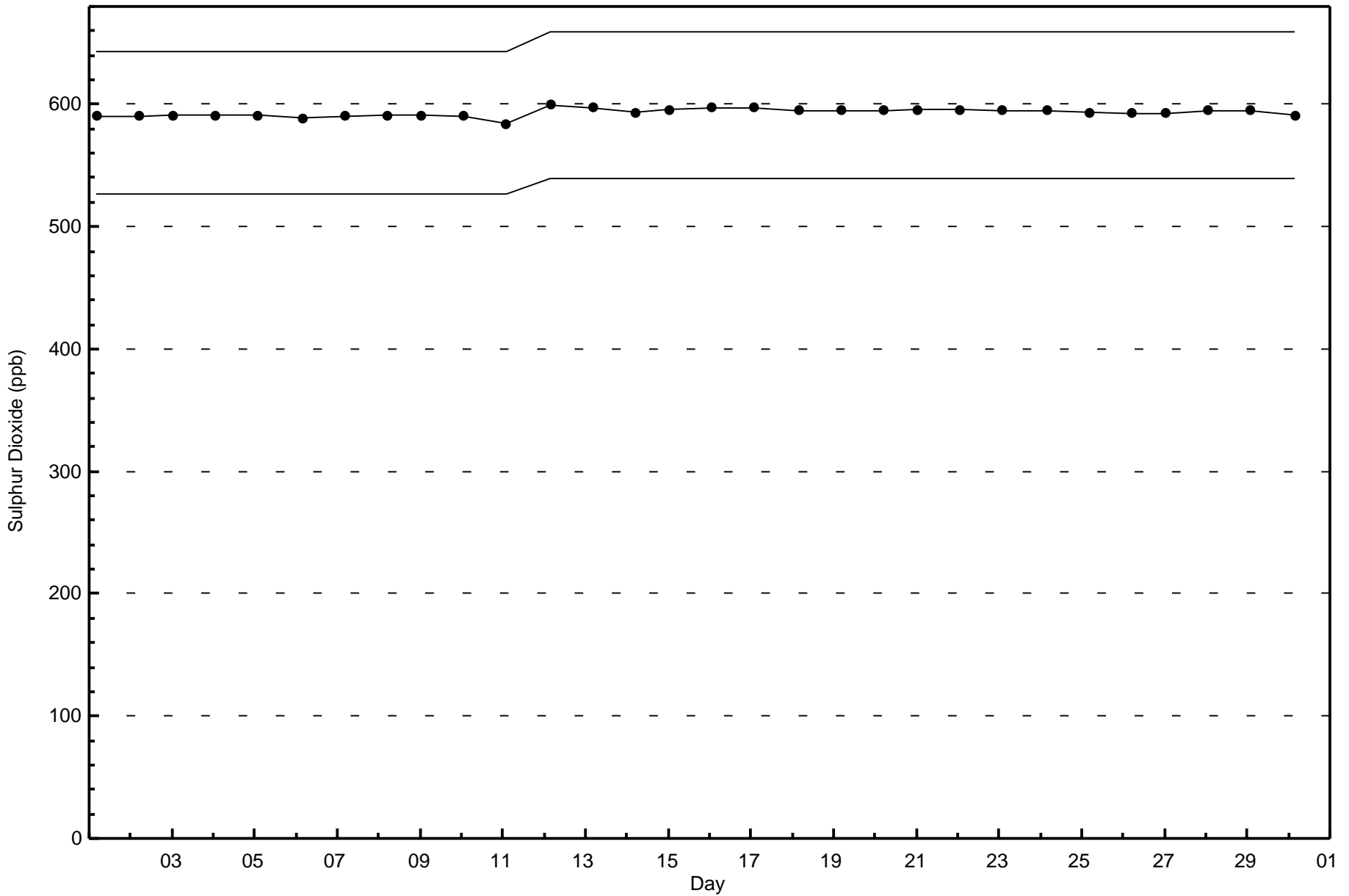
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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



Total Number of Valid Hours: 680





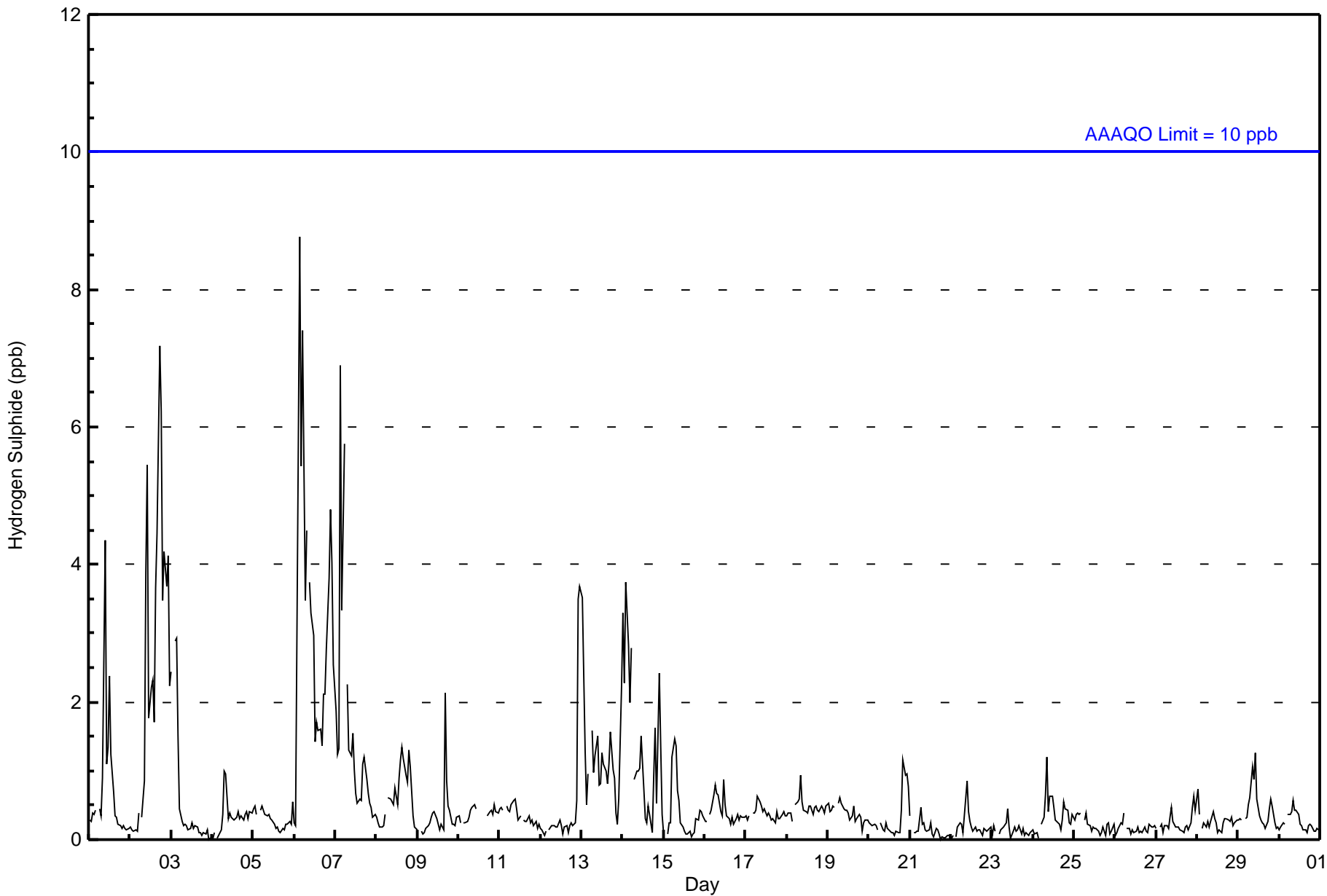


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 9 ppb on Sep 6 04:00	Maximum Daily Average: 3.3 ppb on Sep 6		Hours of Data:	683
Minimum Value: 0 ppb on Sep 3 23:00	Minimum Daily Average: 0.1 ppb on Sep 21		Hours of Missing Data:	37
Maximum Diurnal Average: 1.0 ppb at hour 4	Minimum Diurnal Average: 0.4 ppb at hour 15		Hours of Calibration:	36
Monthly Average: 0.6 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 O <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 6		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-Sep	0	0	0	0	0	Z	0	0	1	4	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0.7	4
2-Sep	0	0	0	0	0	0	Z	0	1	4	5	2	2	2	2	4	4	7	6	3	4	4	4	2	2.6	7
3-Sep	2	Z	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3
4-Sep	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
5-Sep	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
6-Sep	0	0	6	9	5	7	3	4	Z	4	3	3	1	2	2	2	1	2	2	3	4	5	4	3	3.3	9
7-Sep	2	1	1	7	3	6	Z	2	1	1	2	1	1	1	1	1	1	1	1	1	1	0	0	0	1.5	7
8-Sep	0	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	1
9-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0.4	2
10-Sep	0	0	Z	0	0	0	0	0	0	1	0	C	C	C	C	C	C	0	0	0	0	1	0	0	--	1
11-Sep	0	0	0	Z	0	0	0	1	1	1	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	0.5	4
13-Sep	4	2	1	0	1	Z	2	1	1	2	1	1	1	1	1	1	1	2	1	1	0	0	1	2	1.2	4
14-Sep	3	2	4	3	2	3	Z	1	1	1	1	2	1	0	0	0	0	0	1	2	1	2	1	0	1.4	4
15-Sep	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
16-Sep	0	0	Z	0	0	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
17-Sep	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
18-Sep	0	0	0	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
19-Sep	1	0	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
20-Sep	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
21-Sep	0	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-Sep	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
23-Sep	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
24-Sep	0	0	0	0	Z	0	0	1	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0.4	1
25-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Sep	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
27-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1
28-Sep	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
29-Sep	0	0	0	Z	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0.4	1
30-Sep	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1

0.6	0.5	0.8	1.0	0.7	0.9	0.6	0.7	0.6	0.9	0.7	0.6	0.5	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	Diurnal Average	
4	2	6	9	5	7	3	4	1	4	5	3	2	2	2	4	4	7	6	3	4	5	4	4	Diurnal Maximum	

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







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	646	94.58	94.58
3 - 4	27	3.95	98.54
5 - 7	9	1.32	99.85
8 - 11	1	0.15	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



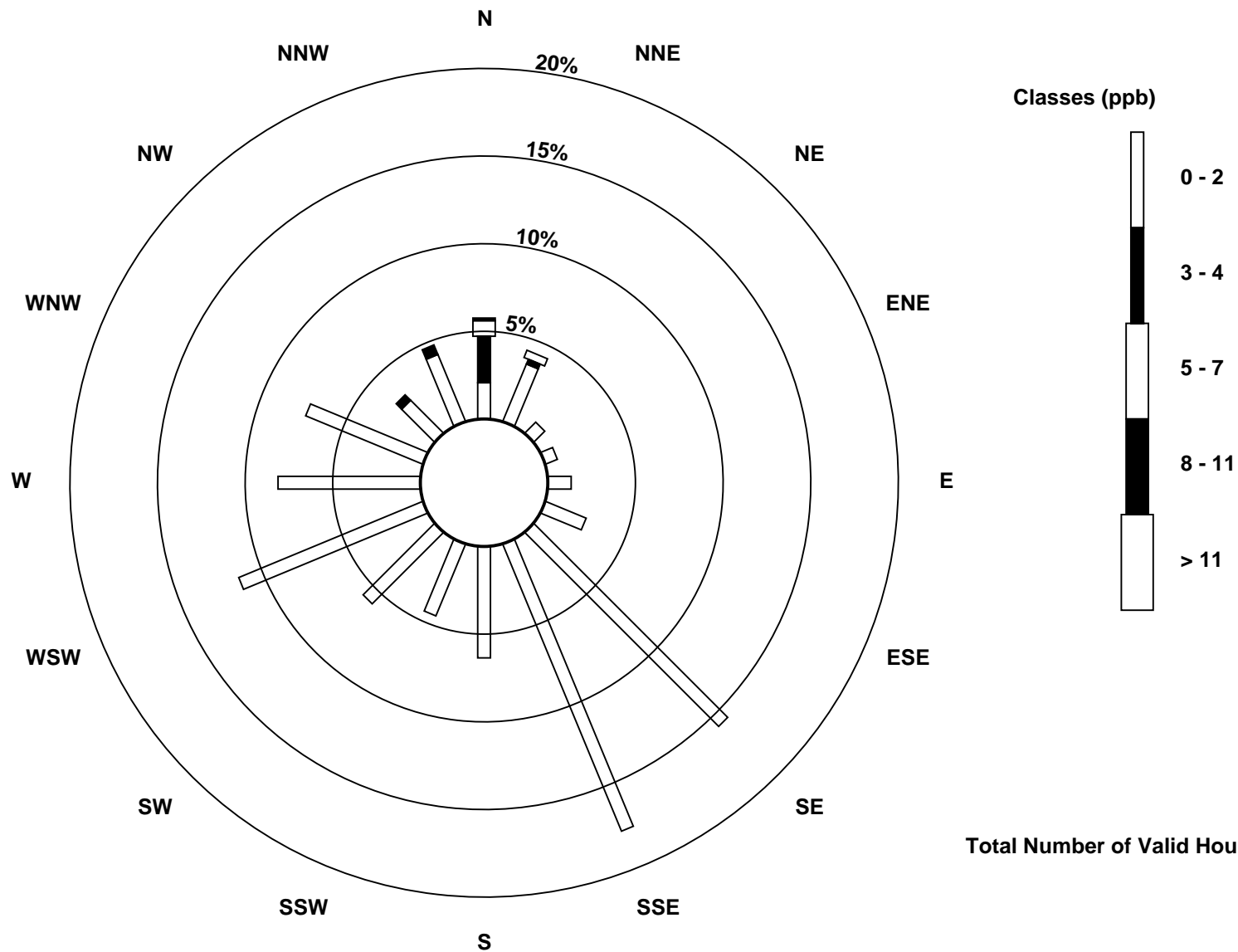
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

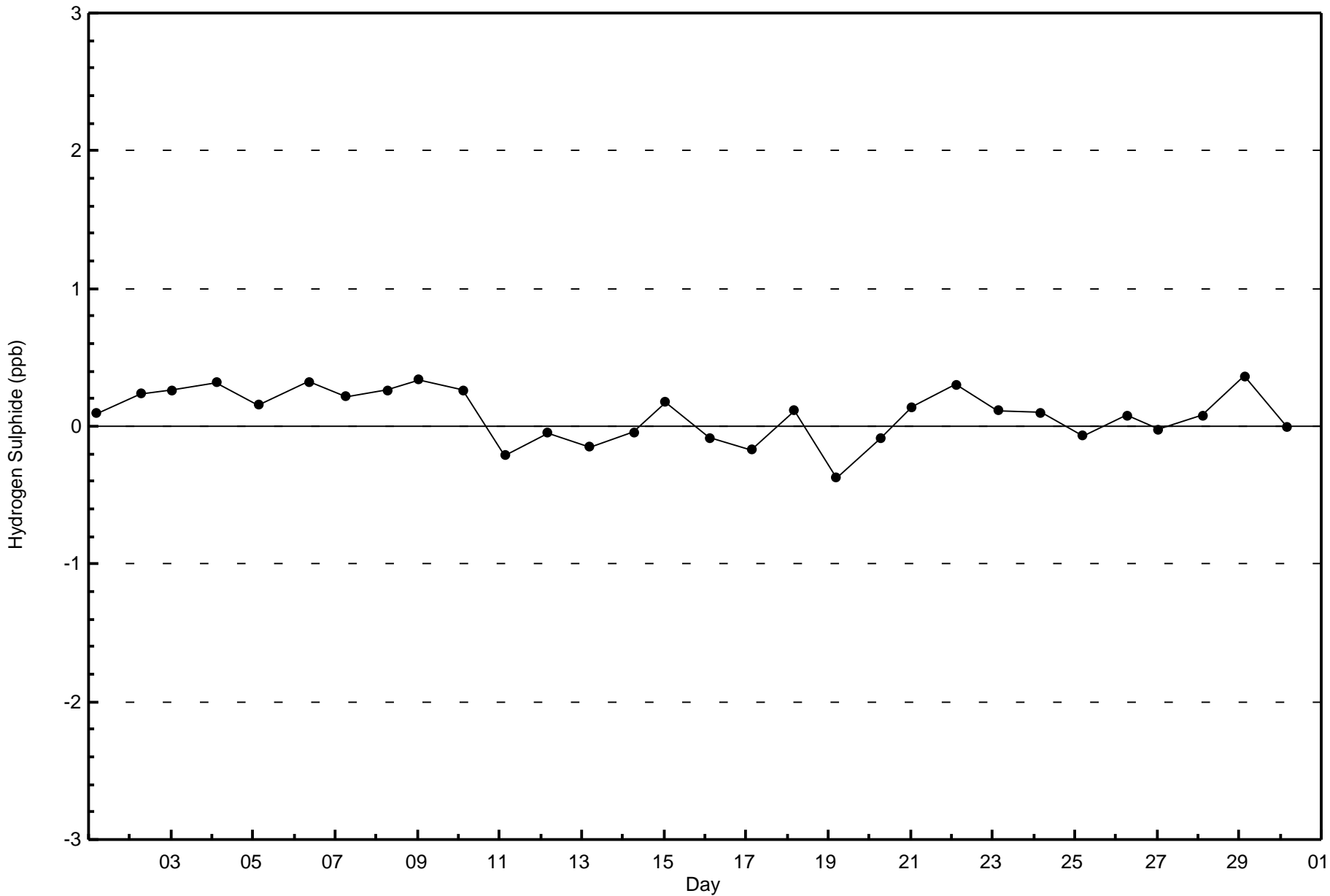
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	14	24	6	5	9	17	106	120	43	30	39	77	55	49	18	28	640
3 - 4	18	2	0	0	0	0	0	0	0	0	0	0	0	0	3	4	27
5 - 7	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
8 - 11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	39	29	6	5	9	17	106	120	43	30	39	77	55	49	21	32	677

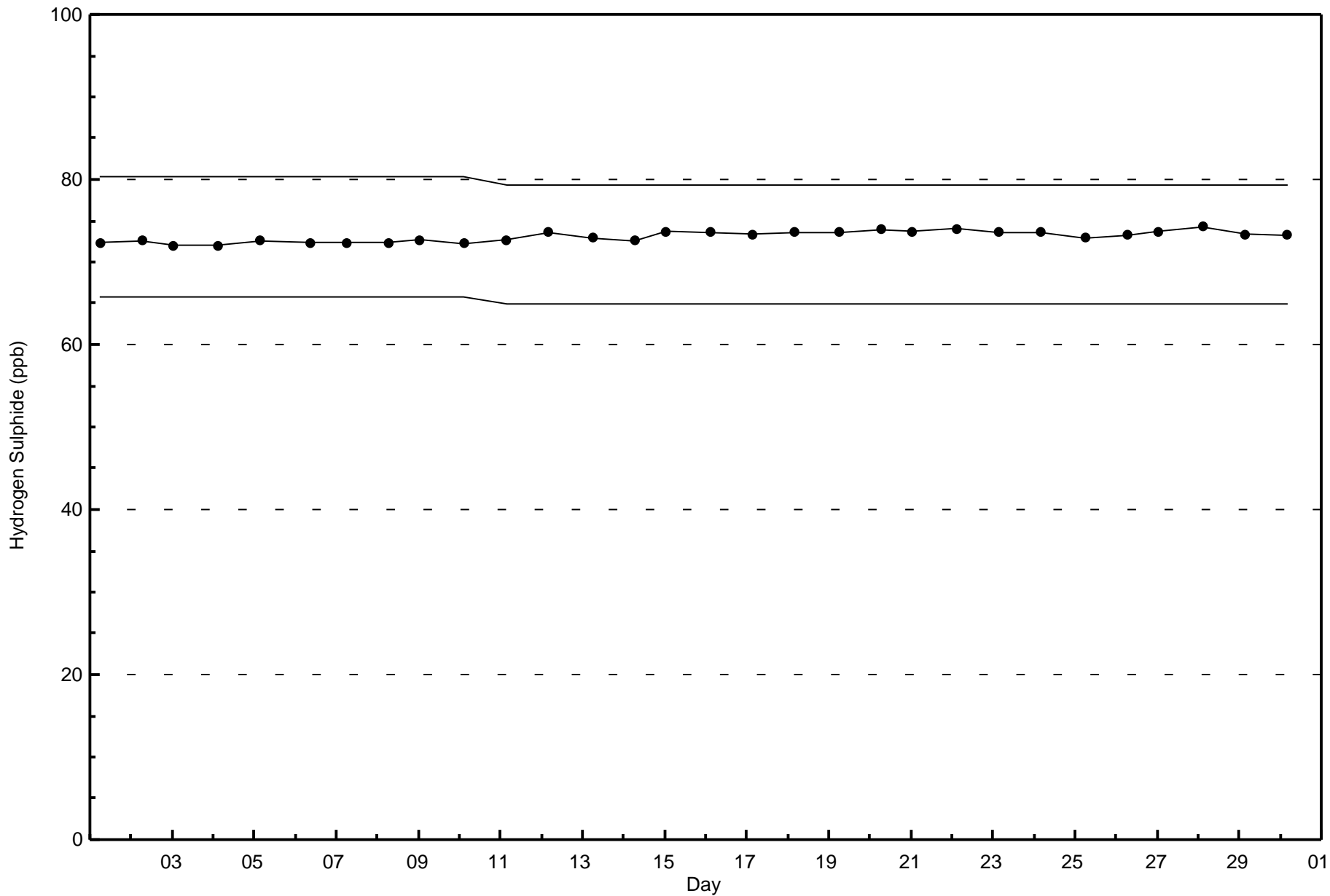
Total Number of Valid Hours: 677

Total Number of Hours: 720



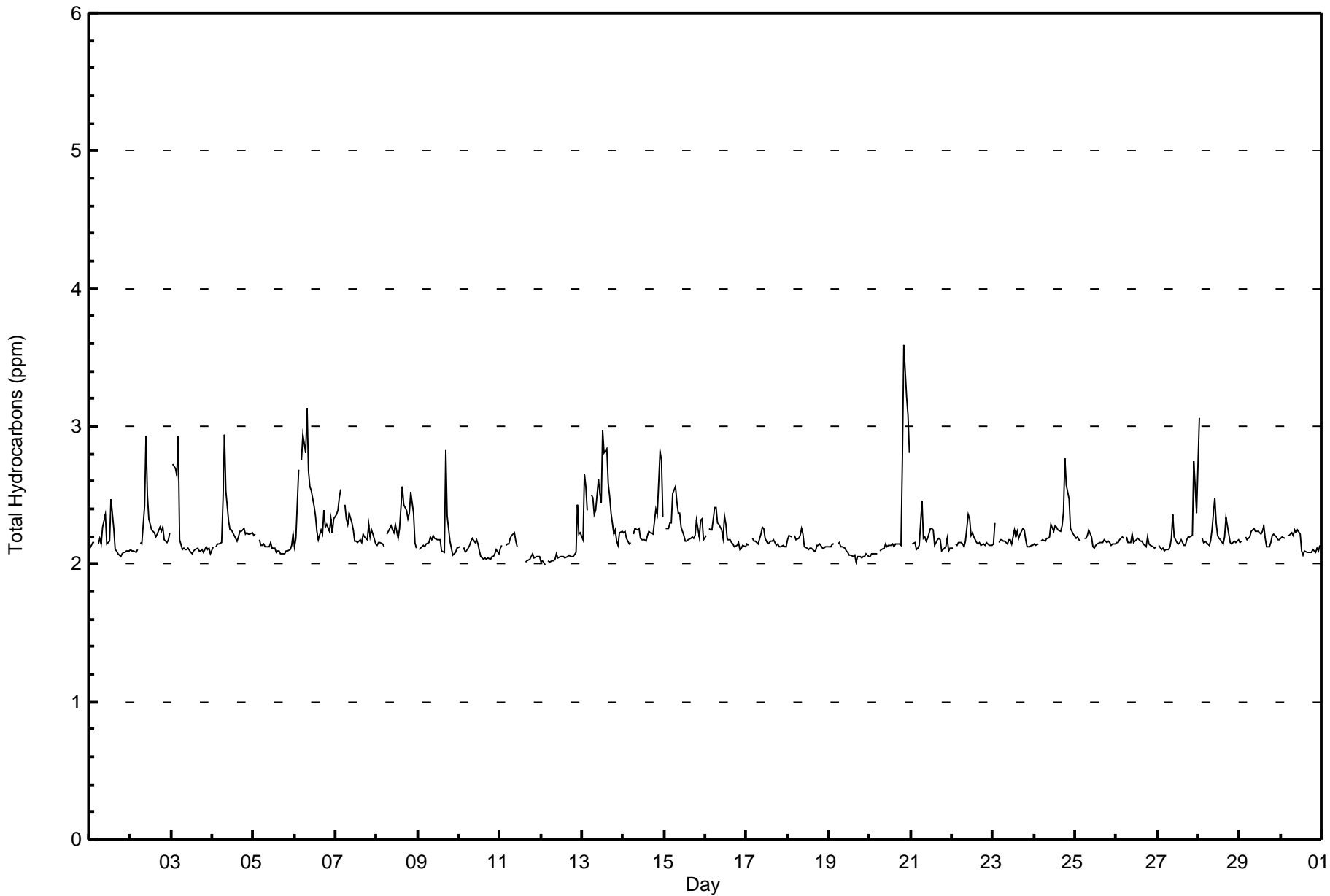
Total Number of Valid Hours: 677







Maximum Value: 3.6 ppm on Sep 20 21:00																				Maximum Daily Average: 2.5 ppm on Sep 13					Hours in Service: 720		
Minimum Value: 2.0 ppm on Sep 12 03:00																				Minimum Daily Average: 2.1 ppm on Sep 12					Hours of Data: 686		
Maximum Diurnal Average: 2.3 ppm at hour 10																				Minimum Diurnal Average: 2.2 ppm at hour 16					Hours of Missing Data: 34		
Monthly Average: 2.21 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> = 2.2 P <sub>90</sub> = 2.4 P <sub>99</sub> = 2.9					Hours of Calibration: 34		
																									Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	2.1	2.1	2.2	2.2	Z	2.1	2.2	2.1	2.3	2.4	2.1	2.2	2.2	2.5	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5
2-Sep	2.1	2.1	2.1	2.1	2.1	Z	2.2	2.1	2.4	2.9	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.9
3-Sep	Z	2.7	2.7	2.6	2.9	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	2.9	
4-Sep	2.1	Z	2.1	2.1	2.1	2.2	2.5	2.9	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.9	
5-Sep	2.2	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
6-Sep	2.1	2.2	2.7	Z	2.8	2.9	2.8	3.1	2.7	2.6	2.5	2.4	2.4	2.2	2.2	2.3	2.2	2.4	2.3	2.3	2.2	2.3	2.2	2.3	2.2	3.1	
7-Sep	2.4	2.4	2.5	2.5	Z	2.4	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.3	2.5	
8-Sep	2.1	2.2	2.2	2.1	2.1	Z	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.3	2.4	2.6	2.4	2.4	2.3	2.4	2.5	2.4	2.2	2.1	2.3	2.6	
9-Sep	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	2.1	2.1	2.8	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.8	
10-Sep	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
11-Sep	2.1	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	C	C	C	C	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	
12-Sep	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.2	2.2	2.1	2.4	
13-Sep	2.2	2.7	2.6	2.4	Z	2.5	2.5	2.4	2.4	2.6	2.5	2.4	3.0	2.8	2.8	2.6	2.5	2.4	2.2	2.3	2.2	2.1	2.2	2.2	2.5	3.0	
14-Sep	2.2	2.2	2.2	2.1	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.8	2.8	2.3	2.8	
15-Sep	Z	2.3	2.3	2.3	2.3	2.5	2.6	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.2	2.6	
16-Sep	2.2	Z	2.3	2.2	2.2	2.4	2.4	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.4	
17-Sep	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.1	2.2	2.3	2.3	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	2.3	
18-Sep	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
19-Sep	2.1	2.1	2.1	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	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2	
20-Sep	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.8	3.6	3.2	3.1	2.8	2.3	3.6	
21-Sep	Z	2.1	2.2	2.1	2.1	2.1	2.5	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.5	
22-Sep	2.1	Z	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.4	
23-Sep	2.1	2.3	Z	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	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3	
24-Sep	2.2	2.1	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.2	2.2	2.3	2.4	2.8	2.6	2.5	2.3	2.2	2.2	2.8	
25-Sep	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	
26-Sep	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
27-Sep	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.7	2.6	2.4	2.7	
28-Sep	3.1	Z	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.5	2.3	2.2	2.2	2.2	2.1	2.2	2.3	2.3	2.2	2.1	2.2	2.2	2.2	2.2	2.2	3.1	
29-Sep	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
30-Sep	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
																								Diurnal Average			
																								Diurnal Maximum			
2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.3 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2																								2.2			
3.1 2.7 2.7 2.6 2.9 2.9 2.8 3.1 2.7 2.9 2.5 2.4 3.0 2.8 2.8 2.6 2.8 2.4 2.8 2.8 3.6 3.2 3.1 2.8																								2.8			
Z - zerospan C - Calibration																											





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	21	3.06	3.06
2.1 - 3.0	660	96.21	99.27
3.1 - 10.0	5	0.73	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
0 - 2.0	0	0	0	0	0	0	0	0	0	0	6	4	4	7	0	0	0	21
2.1 - 3.0	39	30	6	5	9	17	107	120	47	26	34	72	49	45	19	29	654	
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	5	
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Totals</b>	39	30	6	5	9	17	107	120	47	32	38	76	56	46	21	31	680	

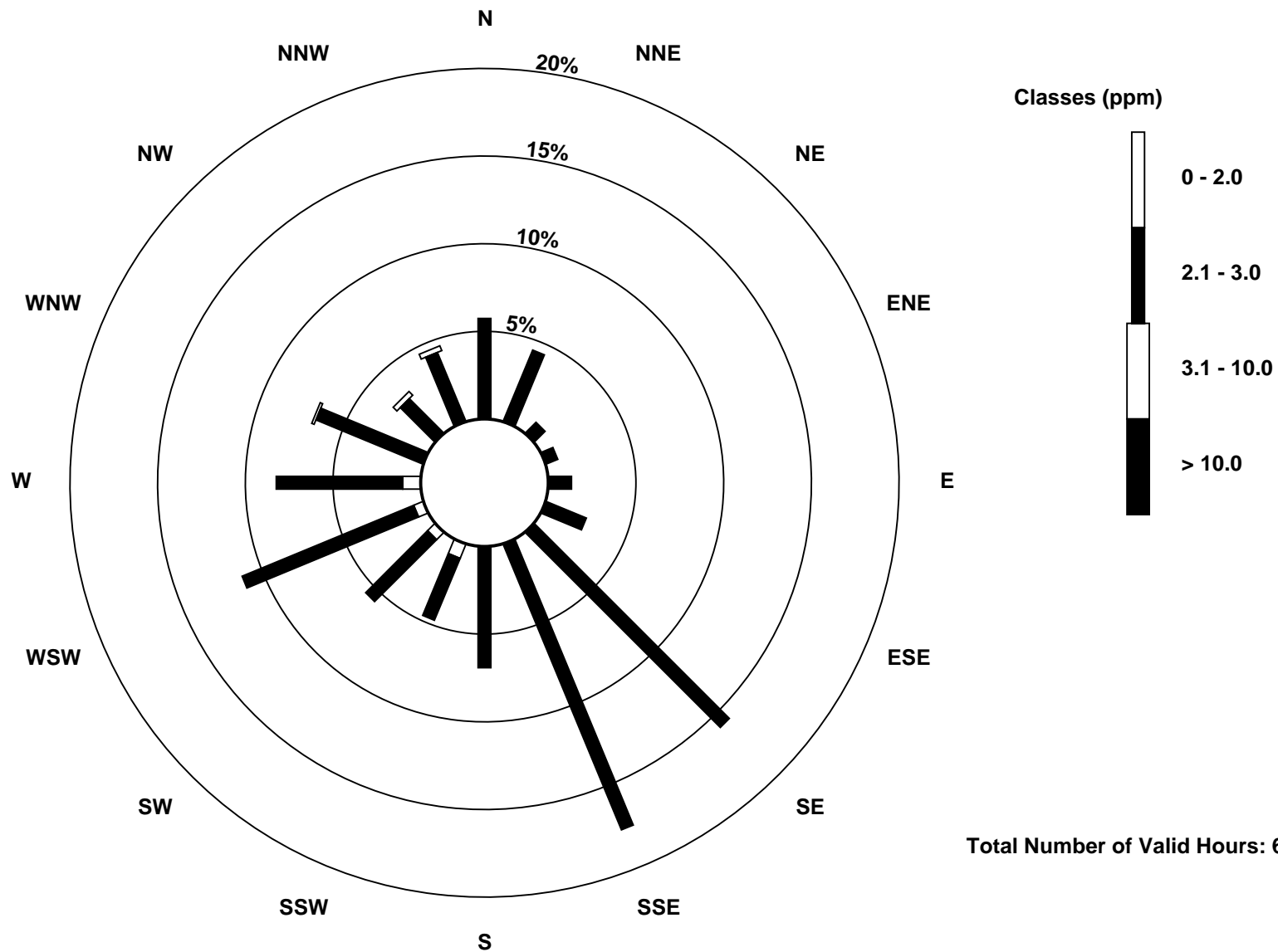
Total Number of Valid Hours: 680

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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



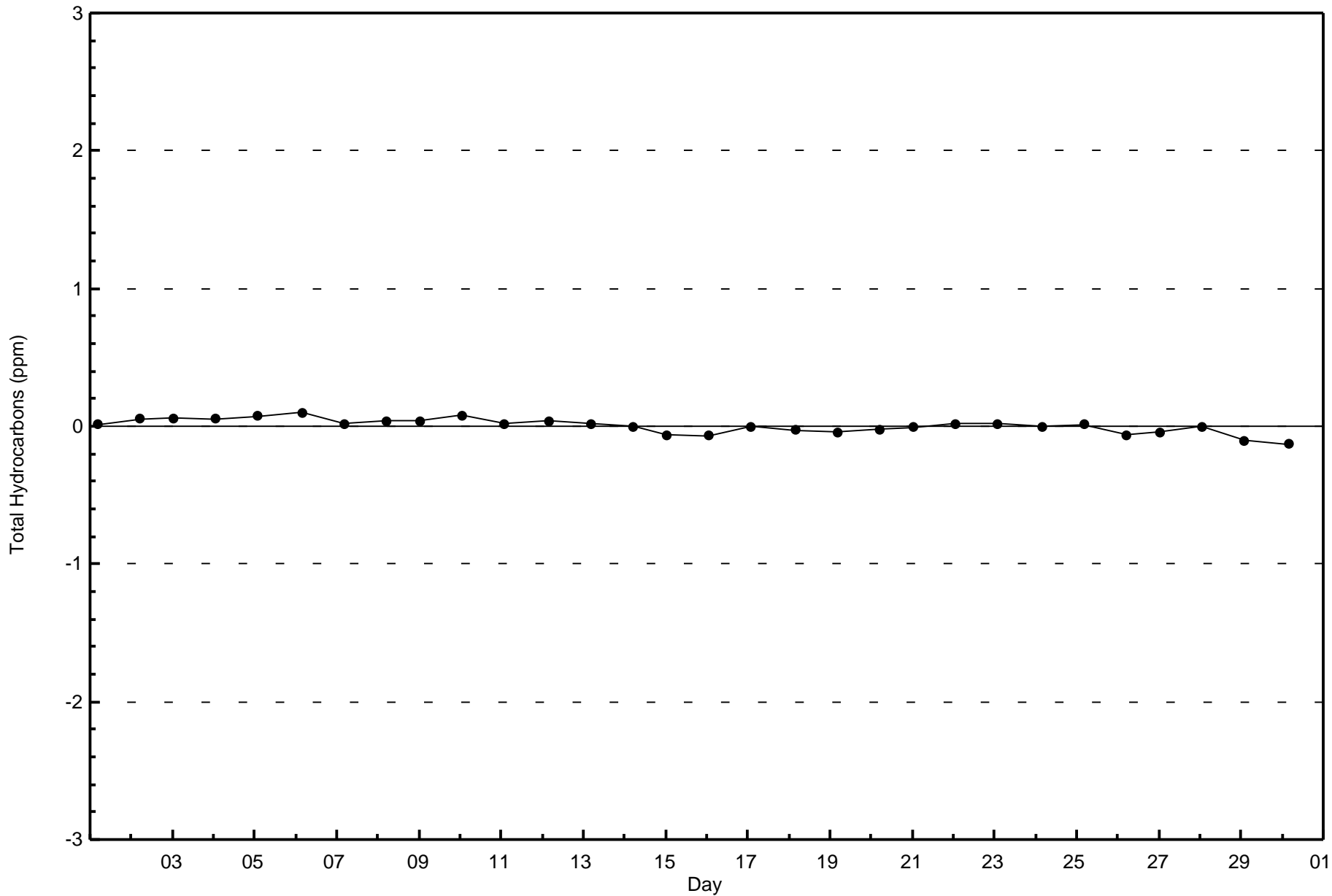


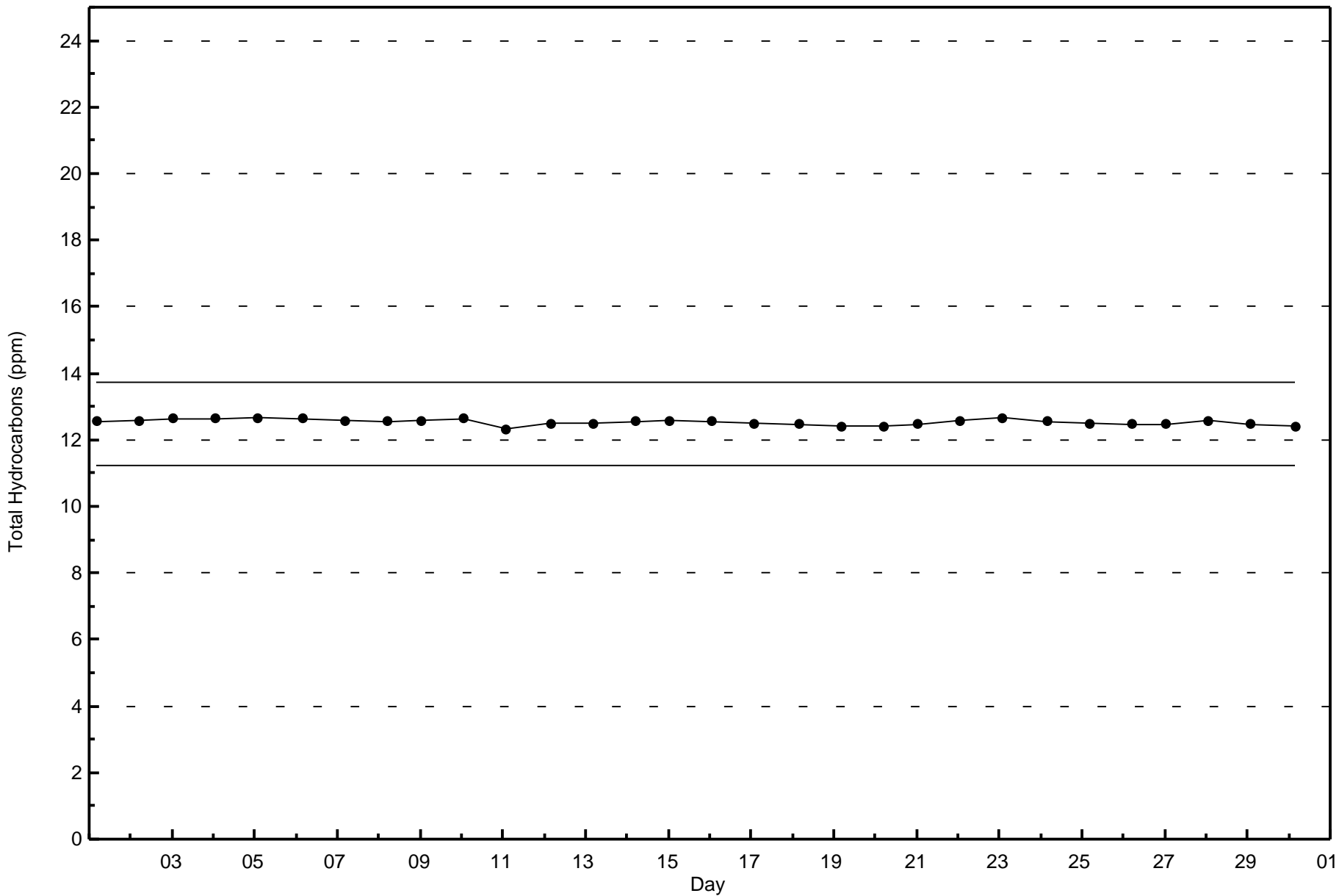
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

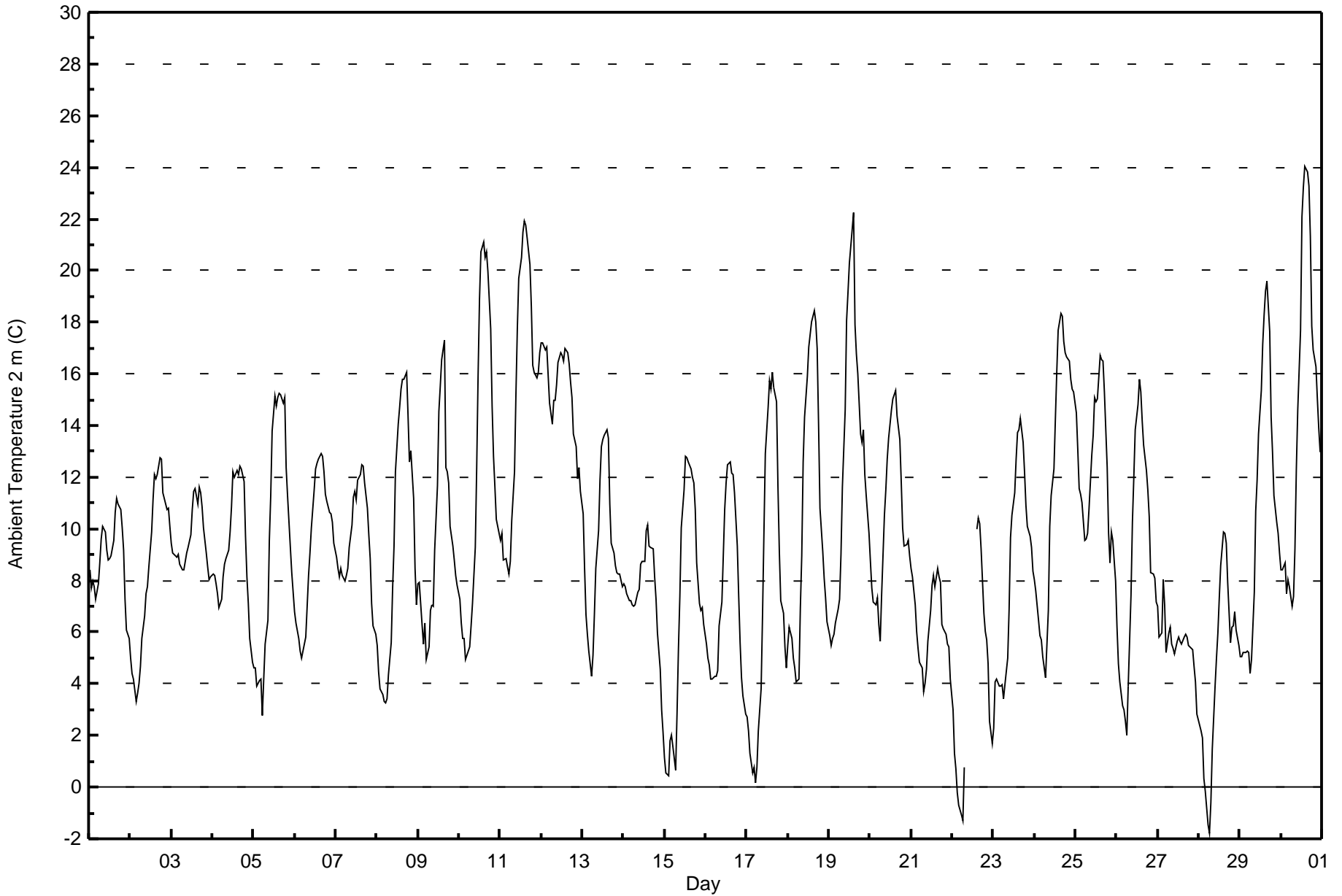
Mannix - September 2015







Maximum Value: 24.0 C on Sep 30 15:00		Maximum Daily Average: 15.4 C on Sep 12		Hours in Service: 720																						
Minimum Value: -1.8 C on Sep 28 07:00		Minimum Daily Average: 3.9 C on Sep 22		Hours of Data: 714																						
Maximum Diurnal Average: 14.5 C at hour 15		Minimum Diurnal Average: 5.2 C at hour 6		Hours of Missing Data: 6																						
Monthly Average: 9.57 C		Percentiles: P <sub>1</sub> = -0.3 P <sub>10</sub> = 4.2 Q <sub>1</sub> = 6.0 Median = 9.0 Q <sub>3</sub> = 12.4 P <sub>90</sub> = 16.1 P <sub>99</sub> = 21.8		Hours of Calibration: 0																						
				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-Sep	8.4	7.7	8.0	7.7	7.3	7.9	8.7	9.6	10.1	9.9	9.1	8.8	8.9	9.0	9.6	10.6	11.2	11.0	10.8	10.1	9.2	7.3	6.1	5.7	8.9	11.2
2-Sep	5.0	4.4	4.2	3.3	3.6	4.0	4.7	5.7	6.6	7.5	7.7	8.5	9.9	11.1	12.1	11.9	12.1	12.8	12.7	11.4	11.2	10.8	10.8	10.1	8.4	12.8
3-Sep	9.5	9.1	8.9	8.9	9.0	8.7	8.4	8.4	8.8	9.1	9.3	9.8	10.7	11.5	11.6	10.9	11.6	11.4	10.9	10.1	9.1	8.5	8.0	8.1	9.6	11.6
4-Sep	8.2	8.2	7.8	7.5	7.0	7.3	8.2	8.6	8.9	9.2	9.9	10.9	12.2	12.0	12.3	12.1	12.4	12.3	11.8	9.7	8.2	7.1	5.8	4.8	9.3	12.4
5-Sep	4.6	4.6	3.9	4.1	4.2	2.8	4.2	5.5	6.5	9.5	11.3	13.8	15.2	14.8	15.1	15.3	15.2	14.9	15.1	12.4	11.3	9.3	8.3	7.5	9.6	15.3
6-Sep	6.8	6.3	5.8	5.3	5.0	5.3	5.8	7.0	8.2	9.1	10.0	11.5	12.3	12.5	12.7	12.9	12.8	12.2	11.3	11.1	10.6	10.6	10.3	9.4	9.4	12.9
7-Sep	8.9	8.5	8.2	8.5	8.2	8.0	8.2	8.5	9.3	10.2	11.2	11.5	11.1	11.9	12.1	12.5	12.4	11.8	10.8	9.8	8.8	7.1	6.2	5.9	9.6	12.5
8-Sep	5.5	4.4	3.8	3.6	3.3	3.3	3.4	4.3	5.6	7.7	9.4	12.2	14.1	14.7	15.4	15.8	15.8	16.0	14.4	12.6	13.0	11.2	8.5	7.1	9.4	16.0
9-Sep	7.9	7.9	6.3	5.5	6.4	4.9	5.4	6.8	7.1	7.0	9.2	11.6	14.6	15.5	16.5	17.3	12.3	12.2	11.8	10.1	9.3	8.8	8.2	7.8	9.6	17.3
10-Sep	7.3	6.3	5.7	5.8	5.0	5.3	5.4	6.2	7.1	9.3	12.4	16.0	18.9	20.7	21.1	20.5	20.7	20.0	17.8	14.8	12.8	11.6	10.4	9.8	12.1	21.1
11-Sep	9.6	9.8	8.8	8.8	8.5	8.2	8.7	10.3	12.2	15.2	17.7	19.7	20.5	21.5	21.9	21.8	21.3	20.3	18.6	16.3	16.1	15.8	16.1	16.8	15.2	21.9
12-Sep	17.2	17.2	16.9	17.1	16.0	14.9	14.1	15.0	15.0	15.6	16.5	16.8	16.7	16.5	17.0	16.8	16.4	15.7	15.1	13.7	13.2	11.9	12.4	11.4	15.4	17.2
13-Sep	10.6	8.5	6.7	5.9	5.3	4.3	5.1	6.7	8.5	9.9	11.9	13.2	13.5	13.6	13.8	13.5	11.0	9.4	9.0	8.6	8.3	8.2	8.2	7.8	9.2	13.8
14-Sep	7.9	7.8	7.5	7.2	7.2	7.1	7.0	7.1	7.6	7.6	8.6	8.7	8.7	9.9	10.2	9.4	9.3	9.2	8.2	7.3	6.0	4.6	3.0	2.1	7.5	10.2
15-Sep	1.1	0.5	0.5	1.8	2.0	1.6	0.7	2.9	5.4	7.4	10.0	11.5	12.8	12.7	12.6	12.3	12.0	11.8	10.7	8.7	7.1	6.8	6.9	6.3	6.9	12.8
16-Sep	5.6	5.0	4.7	4.2	4.2	4.3	4.3	4.5	6.3	7.2	9.0	10.7	11.8	12.5	12.6	12.2	12.1	11.4	9.3	7.4	5.6	4.2	3.5	2.8	7.3	12.6
17-Sep	2.7	2.2	1.3	0.6	0.8	0.2	0.8	2.2	3.8	6.6	9.8	12.9	14.7	15.7	15.4	16.0	15.5	14.9	11.7	9.1	7.2	6.7	5.4	4.6	7.5	16.0
18-Sep	5.5	6.2	5.7	5.0	4.6	4.1	4.2	6.9	8.9	12.6	14.3	15.9	17.0	17.5	18.0	18.4	18.0	17.0	14.0	10.8	9.1	8.1	7.3	6.4	10.7	18.4
19-Sep	5.9	5.5	5.8	5.9	6.3	6.9	7.3	9.0	11.6	14.6	18.1	19.2	20.3	20.9	22.2	17.9	16.8	16.0	13.7	13.4	13.8	12.1	11.3	9.8	12.7	22.2
20-Sep	8.8	7.7	7.1	7.0	7.4	6.3	5.6	7.4	10.5	11.5	12.7	13.5	14.6	15.0	15.2	15.4	14.4	13.4	11.8	10.0	9.3	9.4	9.6	8.9	10.5	15.4
21-Sep	8.5	8.2	7.1	6.0	5.4	4.8	4.6	3.7	4.0	4.5	5.6	6.8	7.8	8.2	7.8	8.4	8.1	7.9	6.3	6.1	5.9	5.6	5.4	4.2	6.3	8.5
22-Sep	3.0	1.3	0.7	-0.2	-0.7	-1.1	-1.3	0.7	M	M	M	M	M	M	10.0	10.4	10.2	9.3	6.7	6.0	5.7	4.8	2.6	1.7	3.9	10.4
23-Sep	2.3	4.1	4.2	3.9	3.9	4.0	3.4	4.0	5.0	6.9	9.7	10.5	11.4	12.7	13.7	13.9	14.2	13.4	12.2	10.9	10.1	9.7	9.3	8.3	8.4	14.2
24-Sep	8.1	7.6	6.5	5.9	5.7	5.1	4.2	5.5	6.8	10.1	11.3	12.3	14.2	16.1	17.7	18.3	18.2	17.2	16.8	16.7	16.5	15.8	15.4	15.3	12.0	18.3
25-Sep	14.5	13.1	11.6	11.4	11.0	9.6	9.6	9.8	10.7	12.9	13.6	15.1	14.9	15.0	16.7	16.6	16.5	15.3	12.4	9.8	8.7	9.9	9.6	8.0	12.3	16.7
26-Sep	6.2	4.8	4.1	3.1	3.0	2.5	2.0	3.9	7.4	10.3	12.0	13.8	14.8	15.8	15.3	14.2	13.3	12.3	11.5	10.5	8.3	8.2	8.1	7.1	8.9	15.8
27-Sep	7.0	5.8	6.0	8.0	7.1	5.2	6.0	6.2	5.5	5.4	5.1	5.7	5.8	5.6	5.6	5.8	5.9	5.8	5.5	5.4	5.3	4.7	4.1	2.8	5.6	8.0
28-Sep	2.4	2.2	1.9	0.3	-0.1	-1.5	-1.8	-0.6	1.5	3.9	5.0	6.0	7.3	8.6	9.9	9.8	9.5	7.9	5.6	6.2	6.2	6.8	6.1	5.5	4.5	9.9
29-Sep	5.0	5.1	5.2	5.2	5.3	5.2	4.4	4.9	7.6	10.7	11.9	13.7	15.4	17.1	18.3	19.2	19.6	17.6	14.3	13.0	11.3	10.3	9.8	9.1	10.8	19.6
30-Sep	8.4	8.4	8.7	7.5	8.0	7.8	7.0	7.4	9.3	12.3	14.6	17.7	22.1	23.2	24.0	23.8	23.3	21.3	17.8	16.9	16.3	15.0	13.9	13.0	14.5	24.0
																								Diurnal Average		
																								Diurnal Maximum		
M - Maintenance																										





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	8	1.12	1.12
0 - 10	412	57.70	58.82
10 - 20	275	38.52	97.34
> 20	19	2.66	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 720



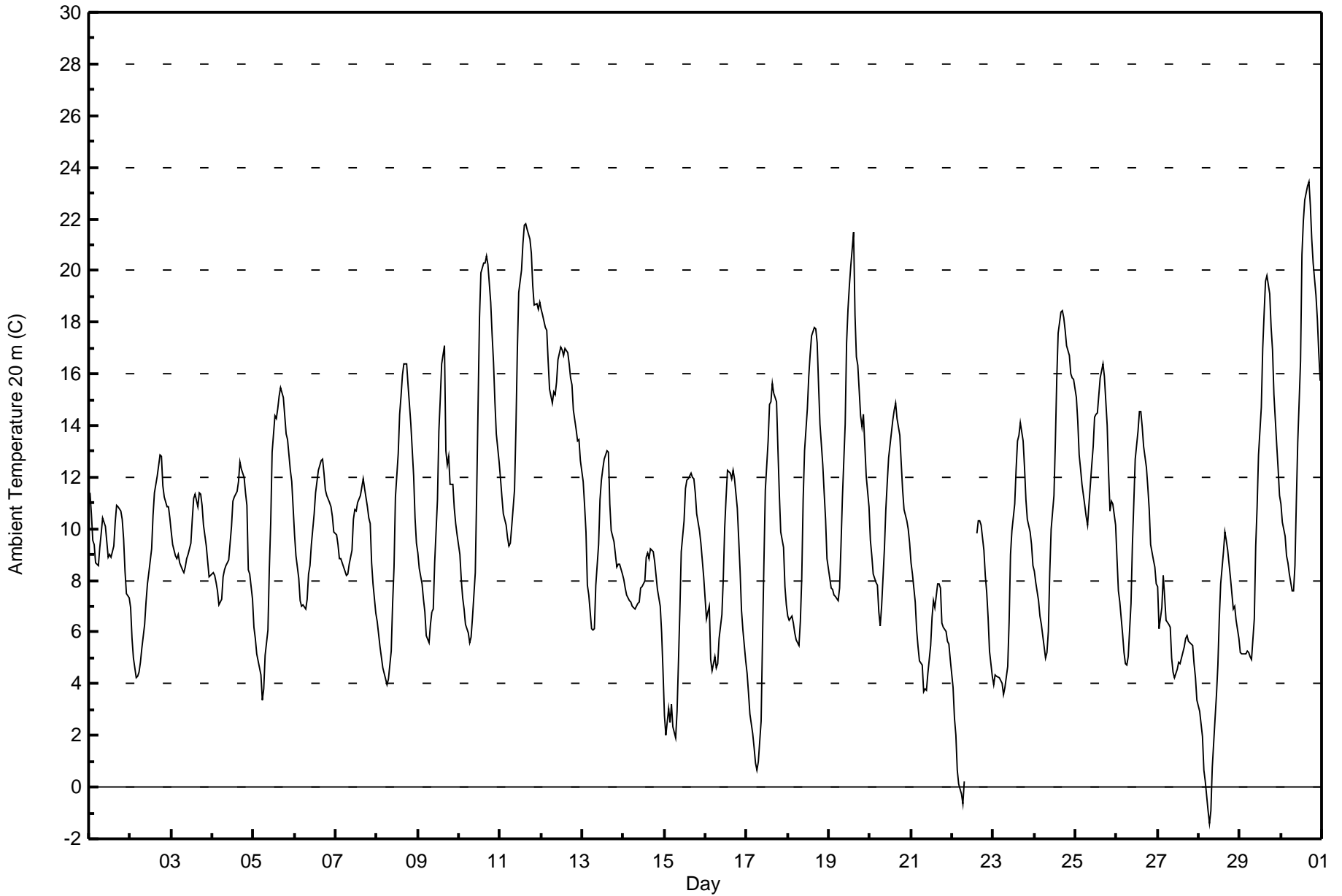
Maximum Value: 23.5 C on Sep 30 17:00	Maximum Daily Average: 16.1 C on Sep 11	Hours in Service: 720
Minimum Value: -1.4 C on Sep 28 07:00	Minimum Daily Average: 4.6 C on Sep 28	Hours of Data: 714
Maximum Diurnal Average: 14.2 C at hour 16	Minimum Diurnal Average: 5.8 C at hour 7	Hours of Missing Data: 6
Monthly Average: 10.01 C	Percentiles: P <sub>1</sub> = 0.1 P <sub>10</sub> = 4.7 Q <sub>1</sub> = 6.9 Median = 9.4 Q <sub>3</sub> = 12.7 P <sub>90</sub> = 16.5 P <sub>99</sub> = 21.7	Hours of Calibration: 0
		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-Sep	11.4	10.6	9.6	9.4	8.7	8.6	9.3	9.8	10.4	10.1	9.5	8.9	9.0	8.9	9.3	10.3	10.9	10.8	10.7	10.4	9.6	8.4	7.5	7.3	9.6	11.4
2-Sep	6.9	5.7	5.0	4.2	4.3	4.4	4.8	5.4	6.3	7.2	7.9	8.3	9.2	10.5	11.4	11.7	12.1	12.8	12.8	11.7	11.2	10.8	10.9	10.4	8.6	12.8
3-Sep	9.9	9.4	8.9	8.9	9.0	8.7	8.4	8.3	8.5	8.9	9.0	9.5	10.4	11.2	11.3	10.8	11.4	11.4	10.9	10.2	9.4	8.8	8.1	8.2	9.6	11.4
4-Sep	8.3	8.2	7.9	7.6	7.1	7.3	8.1	8.4	8.6	8.8	9.4	10.1	11.1	11.3	11.4	11.8	12.6	12.3	12.0	11.4	10.9	8.4	8.2	7.3	9.5	12.6
5-Sep	6.2	5.8	5.1	4.6	4.3	3.4	3.8	5.1	6.1	8.5	10.3	13.0	14.4	14.2	14.6	15.2	15.5	15.1	14.4	13.7	13.4	12.2	11.8	10.8	10.1	15.5
6-Sep	9.7	9.0	8.1	7.2	7.0	7.1	6.9	7.3	8.3	8.6	9.4	10.6	11.4	11.8	12.3	12.7	12.7	12.2	11.5	11.3	11.0	10.9	10.5	9.9	9.9	12.7
7-Sep	9.7	9.4	8.8	8.8	8.7	8.4	8.2	8.3	8.6	9.2	10.4	10.7	10.7	11.0	11.3	11.6	12.0	11.5	10.9	10.4	10.2	8.7	7.8	6.7	9.7	12.0
8-Sep	6.4	5.9	5.5	4.6	4.4	4.2	4.0	4.2	5.3	7.1	8.5	11.2	12.9	14.5	15.1	16.0	16.4	16.4	15.6	14.8	14.1	12.0	10.4	9.4	10.0	16.4
9-Sep	9.1	8.5	7.9	7.3	6.8	5.8	5.6	6.3	6.8	6.9	8.7	11.1	13.8	15.0	16.4	17.1	13.0	12.5	12.8	11.7	11.7	10.8	10.2	9.8	10.2	17.1
10-Sep	9.0	8.0	7.3	6.9	6.3	6.0	5.6	5.8	6.6	8.3	11.4	14.8	18.2	19.9	20.3	20.3	20.6	20.2	18.7	17.5	16.4	14.9	13.7	12.6	12.9	20.6
11-Sep	11.9	11.3	10.6	10.2	9.7	9.4	9.4	10.1	11.5	13.9	16.9	19.1	20.0	21.1	21.8	21.8	21.6	21.2	20.6	19.4	18.7	18.7	18.5	18.8	16.1	21.8
12-Sep	18.5	18.3	17.8	17.7	16.5	15.4	14.9	15.3	15.2	15.7	16.6	17.0	16.9	16.7	17.0	16.8	16.4	15.8	15.6	14.6	13.8	13.4	13.5	12.7	15.9	18.5
13-Sep	11.8	10.9	9.9	7.8	7.4	6.1	6.1	6.2	7.8	9.4	11.1	11.9	12.3	12.7	13.0	12.9	10.9	9.9	9.5	9.0	8.5	8.6	8.6	8.3	9.6	13.0
14-Sep	8.0	7.7	7.4	7.2	7.2	7.0	6.9	6.9	7.1	7.2	7.7	7.8	8.0	8.9	9.1	8.9	9.2	9.1	8.8	8.2	7.6	7.0	6.0	4.5	7.6	9.2
15-Sep	2.8	2.0	3.0	2.5	3.2	2.4	1.9	2.9	4.9	6.8	9.1	10.3	11.5	11.9	11.9	12.1	12.0	11.9	11.4	10.6	10.0	9.4	8.8	8.1	7.6	12.1
16-Sep	6.5	6.8	7.0	5.0	4.5	5.1	4.6	4.8	5.8	6.7	8.1	10.1	11.2	12.3	12.1	11.9	12.3	11.9	10.8	9.6	8.4	6.9	6.1	4.9	8.1	12.3
17-Sep	4.4	3.7	2.8	2.0	1.5	0.9	0.7	1.0	2.5	5.7	8.7	11.5	13.4	14.8	14.9	15.6	15.2	14.9	13.1	11.4	9.9	9.3	7.8	7.0	8.0	15.6
18-Sep	6.6	6.5	6.6	6.4	5.9	5.7	5.5	6.4	8.1	11.1	13.0	14.6	15.9	16.8	17.5	17.8	17.7	17.2	15.6	14.0	12.5	11.4	10.4	8.8	11.3	17.8
19-Sep	8.1	7.7	7.7	7.4	7.4	7.2	7.7	9.3	11.2	14.0	17.2	18.5	19.4	20.2	21.5	18.3	16.6	16.3	14.4	13.9	14.5	13.3	12.1	10.9	13.1	21.5
20-Sep	9.6	9.0	8.2	7.9	7.8	6.8	6.2	7.0	9.2	10.7	11.8	12.8	13.7	14.2	14.6	14.8	14.3	13.6	12.5	11.5	10.7	10.3	10.0	9.4	10.7	14.8
21-Sep	8.7	8.2	7.2	6.1	5.4	4.9	4.7	3.7	3.8	3.8	4.4	5.5	6.6	7.2	6.9	7.9	7.9	7.7	6.4	6.2	6.0	5.6	5.5	4.9	6.0	8.7
22-Sep	3.8	2.7	2.0	0.7	0.1	-0.3	-0.6	0.2	M	M	M	M	M	M	9.8	10.3	10.3	10.2	9.2	8.2	7.5	6.6	5.3	4.3	5.0	10.3
23-Sep	4.0	4.4	4.3	4.2	4.1	4.0	3.6	3.9	4.7	6.4	9.0	10.0	10.9	12.3	13.4	13.6	14.1	13.4	12.4	11.1	10.3	9.9	9.4	8.6	8.4	14.1
24-Sep	8.4	7.9	7.2	6.6	6.3	5.9	5.0	5.2	6.0	8.3	10.0	11.3	13.4	15.8	17.6	18.4	18.4	18.2	17.7	17.1	16.7	16.0	15.9	15.8	12.0	18.4
25-Sep	15.1	14.2	12.9	12.3	11.7	10.9	10.5	10.2	11.0	12.5	13.2	14.3	14.4	14.5	15.9	16.1	16.4	15.9	14.0	12.1	10.7	11.1	11.0	10.1	13.0	16.4
26-Sep	8.9	7.6	7.2	5.9	5.2	4.8	4.7	5.1	7.1	9.4	11.0	12.7	13.8	14.6	14.5	14.0	13.2	12.4	11.6	10.8	9.4	8.8	8.5	7.9	9.5	14.6
27-Sep	7.7	6.1	7.0	8.2	7.4	6.4	6.3	6.2	5.0	4.4	4.3	4.6	4.8	4.8	5.0	5.4	5.7	5.9	5.6	5.6	5.5	4.8	4.2	3.4	5.6	8.2
28-Sep	2.9	2.5	2.0	0.7	0.2	-0.9	-1.4	-0.9	0.8	2.7	3.6	4.7	6.5	7.9	9.1	9.9	9.6	9.2	8.1	7.5	6.9	7.0	6.5	5.7	4.6	9.9
29-Sep	5.2	5.2	5.2	5.2	5.3	5.2	5.0	4.9	6.5	9.3	10.8	12.8	14.7	17.0	18.4	19.6	19.8	19.1	17.8	16.9	15.2	13.3	12.3	11.3	11.5	19.8
30-Sep	10.9	10.3	9.7	9.0	8.7	8.2	7.6	7.6	8.6	11.1	13.4	16.5	20.6	21.9	22.7	23.3	23.5	22.5	21.2	20.3	19.0	18.1	16.8	15.7	15.3	23.5

8.4	7.8	7.3	6.8	6.4	6.0	5.8	6.2	7.3	8.7	10.1	11.5	12.7	13.6	14.0	14.2	14.1	13.7	12.9	12.0	11.3	10.5	9.9	9.1	Diurnal Average	
18.5	18.3	17.8	17.7	16.5	15.4	14.9	15.3	15.2	15.7	17.2	19.1	20.6	21.9	22.7	23.3	23.5	22.5	21.2	20.3	19.0	18.7	18.5	18.8	Diurnal Maximum	

M - Maintenance







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	5	0.70	0.70
0 - 10	383	53.64	54.34
10 - 20	305	42.72	97.06
> 20	21	2.94	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 720



Summary of Hour Averages

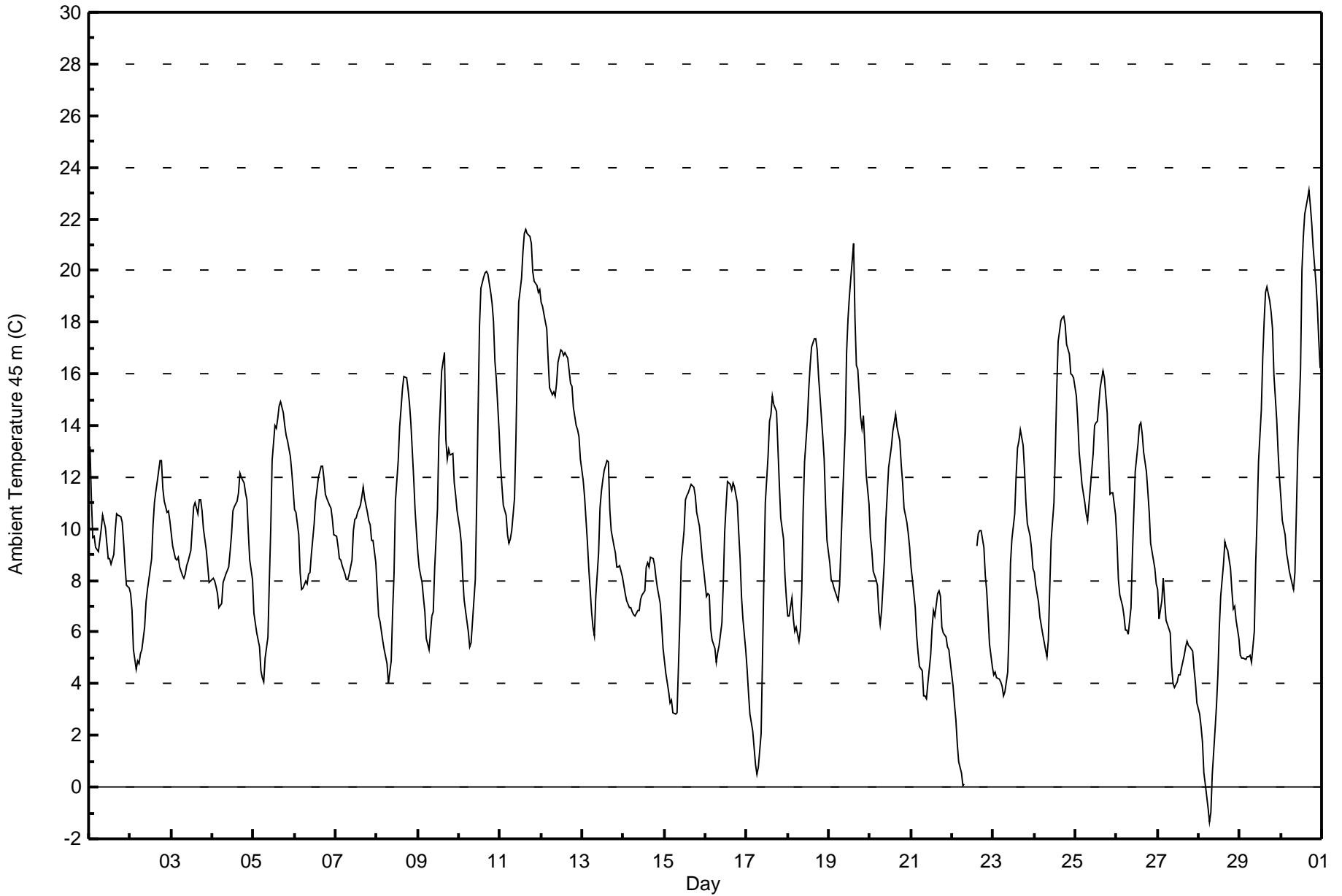
Mannix - September 2015

Maximum Value: 23.1 C on Sep 30 17:00	Maximum Daily Average: 16.2 C on Sep 11	Hours in Service: 720
Minimum Value: -1.4 C on Sep 28 07:00	Minimum Daily Average: 4.5 C on Sep 28	Hours of Data: 714
Maximum Diurnal Average: 13.9 C at hour 16	Minimum Diurnal Average: 6.0 C at hour 7	Hours of Missing Data: 6
Monthly Average: 10.02 C	Percentiles: P <sub>1</sub> = 0.5 P <sub>10</sub> = 4.9 Q <sub>1</sub> = 6.9 Median = 9.5 Q <sub>3</sub> = 12.6 P <sub>90</sub> = 16.4 P <sub>99</sub> = 21.4	Hours of Calibration: 0
		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-Sep	13.2	11.2	9.7	9.7	9.3	9.1	9.6	10.0	10.5	10.0	9.5	8.8	8.8	8.6	9.0	9.9	10.6	10.5	10.5	10.3	9.5	8.6	7.8	7.7	9.7	13.2
2-Sep	7.5	6.9	5.3	4.6	4.9	4.8	5.1	5.3	6.2	7.2	7.7	8.0	8.9	10.2	11.0	11.4	11.8	12.7	12.6	11.5	11.1	10.6	10.7	10.3	8.6	12.7
3-Sep	9.8	9.4	8.9	8.8	8.9	8.5	8.2	8.1	8.3	8.6	8.7	9.2	10.0	10.8	11.0	10.6	11.1	11.1	10.7	10.0	9.2	8.6	7.9	8.0	9.3	11.1
4-Sep	8.1	8.0	7.7	7.5	6.9	7.1	7.9	8.1	8.3	8.5	9.1	9.7	10.7	10.9	11.1	11.4	12.1	12.0	11.8	11.4	11.1	9.9	8.8	8.0	9.4	12.1
5-Sep	6.7	6.4	6.0	5.5	4.5	4.2	4.1	5.0	5.8	8.0	10.0	12.7	14.0	13.9	14.3	14.8	14.9	14.5	14.0	13.6	13.4	12.8	12.2	11.5	10.1	14.9
6-Sep	10.7	10.6	9.8	8.3	7.6	7.7	8.0	7.9	8.3	8.3	9.0	10.2	11.1	11.5	12.0	12.4	12.4	12.0	11.4	11.2	10.9	10.8	10.4	9.8	10.1	12.4
7-Sep	9.7	9.3	8.8	8.8	8.5	8.2	8.0	8.0	8.3	8.8	10.0	10.4	10.4	10.6	10.9	11.2	11.6	11.2	10.6	10.3	10.1	9.6	9.6	8.7	9.7	11.6
8-Sep	7.6	6.6	6.4	5.6	5.3	5.1	4.8	4.0	4.9	6.8	8.2	11.1	12.6	13.9	14.7	15.4	15.9	15.9	15.4	14.9	14.1	12.0	10.8	9.9	10.1	15.9
9-Sep	9.1	8.5	7.9	7.3	6.8	5.8	5.3	6.0	6.6	6.8	8.5	10.8	13.5	14.8	16.1	16.8	13.5	12.7	13.1	12.9	12.9	11.8	11.3	10.7	10.4	16.8
10-Sep	10.0	9.4	8.2	7.3	6.8	6.0	5.4	5.6	6.4	8.0	11.0	14.5	17.9	19.3	19.8	19.9	20.0	19.9	19.1	18.7	18.0	16.5	15.8	13.8	13.2	20.0
11-Sep	12.5	11.7	10.9	10.5	9.8	9.4	9.6	9.9	11.2	13.5	16.5	18.8	19.7	20.7	21.4	21.6	21.4	21.3	21.0	20.0	19.6	19.4	19.1	19.2	16.2	21.6
12-Sep	18.8	18.6	18.0	17.7	16.6	15.5	15.2	15.3	15.1	15.6	16.4	16.9	16.9	16.7	16.8	16.6	16.1	15.6	15.5	14.7	14.0	13.8	13.5	12.7	16.0	18.8
13-Sep	11.9	11.2	10.4	9.5	8.5	6.8	6.2	5.9	7.4	9.0	10.8	11.5	11.9	12.3	12.6	12.6	10.7	9.9	9.3	9.1	8.5	8.5	8.6	8.1	9.6	12.6
14-Sep	7.8	7.5	7.2	7.0	7.0	6.8	6.7	6.6	6.8	6.9	7.3	7.4	7.6	8.5	8.7	8.5	8.9	8.9	8.6	8.1	7.7	7.1	6.3	5.4	7.5	8.9
15-Sep	4.9	4.4	3.7	3.2	3.4	2.9	2.8	2.9	4.7	6.5	8.8	9.9	11.1	11.3	11.4	11.7	11.6	11.6	11.3	10.6	10.1	9.5	8.9	8.4	7.7	11.7
16-Sep	7.4	7.5	7.5	6.1	5.7	5.4	4.8	5.2	5.5	6.3	7.9	9.9	10.9	11.8	11.7	11.5	11.8	11.6	11.0	9.9	8.8	7.4	6.5	5.3	8.2	11.8
17-Sep	4.6	3.7	2.8	2.2	1.5	0.9	0.5	0.8	2.0	5.0	8.2	11.0	12.8	14.1	14.5	15.2	14.8	14.6	13.1	11.7	10.4	9.6	8.2	7.3	7.9	15.2
18-Sep	6.6	6.6	7.4	6.5	6.0	6.2	5.6	6.1	7.6	10.7	12.6	14.2	15.4	16.3	17.1	17.3	17.3	16.9	15.9	15.1	13.6	12.7	11.0	9.5	11.4	17.3
19-Sep	8.7	8.1	7.9	7.7	7.5	7.2	7.8	9.3	10.9	13.8	16.8	18.1	19.0	19.7	21.1	18.1	16.3	16.2	14.3	13.9	14.4	13.3	12.1	10.9	13.0	21.1
20-Sep	9.6	9.2	8.3	8.1	7.8	6.8	6.3	6.8	8.8	10.3	11.4	12.4	13.2	13.8	14.1	14.4	14.0	13.4	12.5	11.8	10.8	10.2	9.8	9.3	10.5	14.4
21-Sep	8.5	8.0	6.9	5.9	5.2	4.7	4.5	3.5	3.5	3.4	4.0	5.1	6.1	6.8	6.6	7.5	7.6	7.4	6.2	6.0	5.8	5.4	5.3	4.9	5.8	8.5
22-Sep	3.9	3.2	2.6	1.7	1.0	0.6	0.1	0.1	M	M	M	M	M	M	9.3	9.8	9.9	9.9	9.3	8.2	7.6	6.6	5.5	4.7	5.2	9.9
23-Sep	4.3	4.4	4.2	4.2	4.1	3.9	3.5	3.7	4.5	6.1	8.7	9.6	10.6	12.0	13.2	13.4	13.9	13.2	12.2	11.0	10.2	9.7	9.2	8.5	8.3	13.9
24-Sep	8.3	7.8	7.2	6.6	6.2	5.9	5.3	5.1	5.7	7.7	9.6	11.0	13.0	15.4	17.3	18.1	18.2	18.2	17.9	17.2	16.8	16.0	16.0	15.8	11.9	18.2
25-Sep	15.2	14.2	13.0	12.4	11.7	11.0	10.6	10.3	11.0	12.2	12.9	14.0	14.1	14.2	15.4	15.8	16.1	15.8	14.5	12.8	11.3	11.4	11.4	10.5	13.0	16.1
26-Sep	9.5	8.0	7.5	7.0	6.6	6.1	6.1	5.9	6.9	9.0	10.6	12.2	13.3	14.0	14.1	13.7	13.0	12.2	11.5	10.6	9.5	8.8	8.5	7.9	9.7	14.1
27-Sep	7.7	6.5	7.2	8.1	7.2	6.4	6.1	6.0	4.7	4.0	3.9	4.1	4.4	4.3	4.6	5.1	5.4	5.6	5.5	5.4	5.3	4.5	4.0	3.3	5.4	8.1
28-Sep	2.8	2.3	1.8	0.6	0.1	-0.8	-1.4	-1.0	0.5	2.2	3.2	4.3	6.1	7.4	8.6	9.5	9.3	9.2	8.5	7.6	6.9	7.0	6.5	5.8	4.5	9.5
29-Sep	5.1	5.0	5.0	5.0	5.1	5.1	5.1	4.9	6.0	8.7	10.5	12.6	14.6	16.6	18.0	19.2	19.4	18.8	18.4	17.7	16.0	14.2	13.0	11.9	11.5	19.4
30-Sep	11.2	10.3	9.8	9.1	8.8	8.4	7.9	7.7	8.3	10.6	13.0	16.2	20.0	21.3	22.2	22.8	23.1	22.5	21.8	20.9	19.5	18.6	17.3	16.2	15.3	23.1

8.7	8.2	7.6	7.1	6.6	6.2	6.0	6.1	7.1	8.4	9.8	11.2	12.4	13.2	13.6	13.9	13.8	13.5	12.9	12.2	11.6	10.8	10.2	9.5		Diurnal Average
18.8	18.6	18.0	17.7	16.6	15.5	15.2	15.3	15.1	15.6	16.8	18.8	20.0	21.3	22.2	22.8	23.1	22.5	21.8	20.9	19.6	19.4	19.1	19.2		Diurnal Maximum

M - Maintenance





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	3	0.42	0.42
0 - 10	390	54.62	55.04
10 - 20	306	42.86	97.90
> 20	15	2.10	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 720



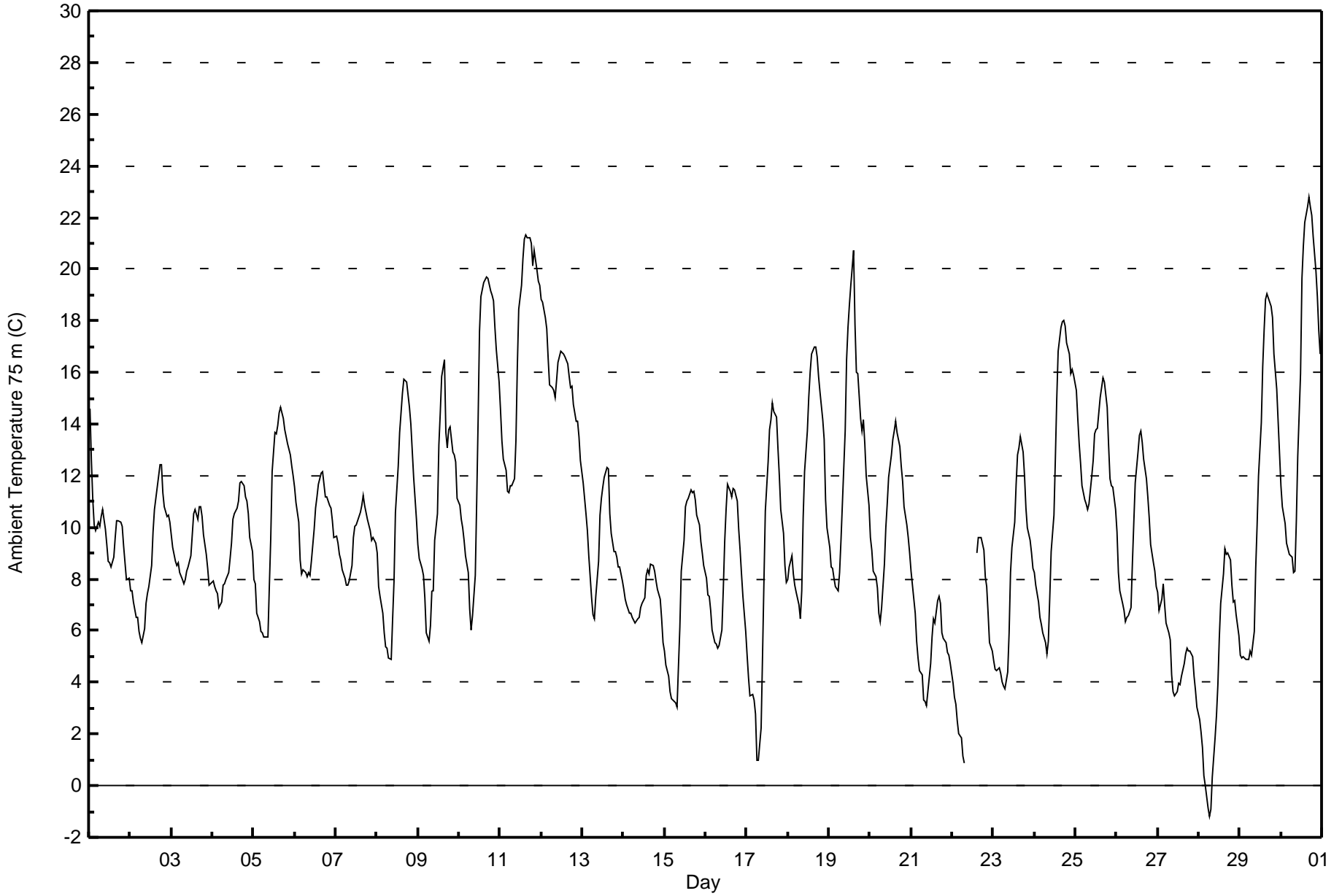
Summary of Hour Averages

Mannix - September 2015

Maximum Value: 22.8 C on Sep 30 17:00	Maximum Daily Average: 16.8 C on Sep 11	Hours in Service: 720
Minimum Value: -1.2 C on Sep 28 07:00	Minimum Daily Average: 4.3 C on Sep 28	Hours of Data: 714
Maximum Diurnal Average: 13.6 C at hour 16	Minimum Diurnal Average: 6.3 C at hour 8	Hours of Missing Data: 6
Monthly Average: 10.07 C	Percentiles: P <sub>1</sub> = 1.0 P <sub>10</sub> = 5.0 Q <sub>1</sub> = 7.2 Median = 9.6 Q <sub>3</sub> = 12.6 P <sub>90</sub> = 16.3 P <sub>99</sub> = 21.2	Hours of Calibration: 0
		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-Sep	14.6	12.6	11.1	10.1	9.9	10.2	10.1	10.4	10.7	9.9	9.3	8.7	8.6	8.5	8.8	9.6	10.3	10.2	10.2	10.0	9.3	8.6	8.0	8.0	9.9	14.6																						
2-Sep	7.5	7.5	7.1	6.5	6.5	6.0	5.7	5.5	6.1	7.1	7.4	7.7	8.5	9.8	10.7	11.1	11.6	12.4	12.4	11.3	10.8	10.4	10.5	10.2	8.8	12.4																						
3-Sep	9.7	9.2	8.7	8.5	8.6	8.3	8.0	7.8	8.0	8.3	8.4	8.9	9.7	10.5	10.7	10.3	10.8	10.8	10.4	9.7	9.0	8.4	7.8	7.8	9.1	10.8																						
4-Sep	7.9	7.7	7.5	7.4	6.9	7.1	7.7	7.8	8.0	8.2	8.8	9.4	10.3	10.6	10.8	11.0	11.7	11.8	11.6	11.2	11.0	10.5	9.6	9.1	9.3	11.8																						
5-Sep	8.0	7.8	6.7	6.4	6.0	5.9	5.7	5.7	5.7	7.7	9.6	12.1	13.7	13.6	14.0	14.4	14.6	14.2	13.8	13.5	13.2	12.8	12.3	12.0	10.4	14.6																						
6-Sep	11.5	11.0	10.2	8.7	8.2	8.3	8.3	8.1	8.2	8.1	8.7	9.9	10.8	11.2	11.7	12.1	12.2	11.7	11.2	11.2	10.8	10.7	10.3	9.6	10.1	12.2																						
7-Sep	9.6	9.4	8.9	8.8	8.4	8.0	7.8	7.8	7.9	8.5	9.6	10.1	10.1	10.3	10.6	10.8	11.3	10.8	10.3	10.1	9.9	9.5	9.6	9.4	9.5	11.3																						
8-Sep	9.0	7.7	7.3	6.7	5.9	5.4	5.3	4.9	4.9	6.5	7.9	10.6	12.4	13.7	14.4	15.2	15.7	15.6	15.2	14.6	14.0	12.0	11.2	10.3	10.3	15.7																						
9-Sep	9.3	8.8	8.4	8.1	7.3	5.9	5.6	6.2	7.5	7.5	9.5	10.5	13.2	14.4	15.8	16.5	13.7	13.1	13.8	13.9	12.9	12.8	12.6	11.1	10.8	16.5																						
10-Sep	10.9	10.3	10.0	9.5	8.9	8.3	6.9	6.0	6.6	8.2	11.0	14.1	17.6	18.9	19.5	19.6	19.7	19.6	19.2	19.0	18.8	17.7	16.9	15.6	13.9	19.7																						
11-Sep	14.6	13.4	12.6	12.2	11.4	11.4	11.6	11.6	11.9	13.4	16.2	18.4	19.4	20.4	21.1	21.3	21.2	21.2	21.0	20.1	20.7	20.0	19.5	19.4	16.8	21.3																						
12-Sep	18.8	18.7	18.1	17.7	16.6	15.5	15.4	15.3	15.0	15.7	16.4	16.8	16.7	16.7	16.6	16.4	15.8	15.4	15.4	14.8	14.1	14.1	13.5	12.6	15.9	18.8																						
13-Sep	11.7	11.1	10.5	9.9	8.9	7.3	6.6	6.5	7.3	8.7	10.5	11.1	11.5	11.9	12.3	12.3	10.6	9.8	9.1	9.1	8.8	8.5	8.5	7.9	9.6	12.3																						
14-Sep	7.6	7.2	7.0	6.7	6.7	6.5	6.4	6.3	6.5	6.5	6.9	7.1	7.3	8.2	8.4	8.2	8.6	8.5	8.3	7.9	7.6	7.2	6.4	5.5	7.2	8.6																						
15-Sep	5.2	4.7	4.3	3.6	3.4	3.3	3.2	3.0	4.6	6.1	8.3	9.5	10.8	11.0	11.2	11.5	11.4	11.4	11.1	10.5	10.1	9.4	9.0	8.5	7.7	11.5																						
16-Sep	8.0	7.4	7.3	6.8	6.0	5.5	5.5	5.3	5.4	6.0	7.6	9.5	10.7	11.7	11.4	11.2	11.5	11.5	11.0	10.0	9.1	8.2	7.3	6.0	8.3	11.7																						
17-Sep	5.1	4.2	3.5	3.5	3.3	2.8	1.0	1.0	2.3	5.0	7.9	10.6	12.5	13.8	14.1	14.8	14.5	14.3	13.1	12.0	10.7	9.8	8.5	7.9	8.2	14.8																						
18-Sep	8.0	8.5	8.9	8.2	7.8	7.5	7.0	6.5	7.6	10.3	12.2	13.7	15.0	16.0	16.7	17.0	17.0	16.6	15.8	15.2	14.2	13.4	11.1	10.0	11.8	17.0																						
19-Sep	9.2	8.5	8.4	8.0	7.7	7.6	8.2	9.5	10.9	13.7	16.5	17.8	18.6	19.3	20.7	17.9	16.0	16.0	14.2	13.7	14.2	13.2	12.0	10.9	13.0	20.7																						
20-Sep	9.6	9.1	8.3	8.1	7.7	6.7	6.3	6.9	8.6	10.0	10.9	12.0	12.8	13.4	13.7	14.1	13.7	13.1	12.4	11.7	10.8	10.1	9.6	9.0	10.4	14.1																						
21-Sep	8.3	7.7	6.7	5.6	4.9	4.5	4.3	3.3	3.3	3.1	3.7	4.7	5.7	6.5	6.3	7.2	7.3	7.1	5.9	5.7	5.6	5.2	5.1	4.7	5.5	8.3																						
22-Sep	3.9	3.5	3.1	2.5	2.0	1.8	1.1	0.9	M	M	M	M	M	M	9.0	9.6	9.6	9.6	9.1	8.1	7.7	6.7	5.6	5.2	5.5	9.6																						
23-Sep	4.8	4.5	4.4	4.5	4.4	4.0	3.9	3.7	4.4	5.9	8.3	9.2	10.2	11.7	12.8	13.1	13.5	12.9	12.0	10.8	10.0	9.5	9.0	8.4	8.2	13.5																						
24-Sep	8.2	7.8	7.1	6.5	6.2	5.9	5.5	5.1	5.6	7.3	9.1	10.5	12.6	15.0	16.8	17.7	18.0	18.0	17.8	17.2	16.7	16.0	16.1	15.9	11.8	18.0																						
25-Sep	15.3	14.2	13.2	12.5	11.6	11.1	10.9	10.7	10.9	12.0	12.6	13.6	13.8	13.8	15.0	15.4	15.8	15.7	14.6	13.2	11.9	11.6	11.5	10.7	13.0	15.8																						
26-Sep	9.8	8.2	7.5	7.0	6.8	6.4	6.5	6.5	6.9	8.6	10.2	11.7	12.9	13.6	13.7	13.3	12.6	11.9	11.2	10.4	9.3	8.6	8.3	7.7	9.6	13.7																						
27-Sep	7.5	6.8	7.2	7.8	7.0	6.3	5.9	5.7	4.3	3.6	3.5	3.6	4.0	3.9	4.2	4.7	5.1	5.3	5.2	5.2	5.0	4.2	3.7	3.0	5.1	7.8																						
28-Sep	2.5	2.1	1.5	0.4	0.0	-0.8	-1.2	-0.9	0.3	1.9	2.7	3.9	5.7	7.1	8.2	9.2	8.9	9.0	8.7	7.7	7.1	7.2	6.6	5.8	4.3	9.2																						
29-Sep	5.0	4.9	5.0	4.9	4.9	4.9	5.2	5.0	6.0	8.4	10.1	12.0	14.1	16.2	17.6	18.8	19.0	18.7	18.5	18.1	16.7	15.4	14.1	12.8	11.5	19.0																						
30-Sep	11.6	10.8	10.2	9.4	9.2	8.9	8.9	8.2	8.3	10.3	12.7	15.9	19.6	20.9	21.8	22.4	22.8	22.4	22.1	21.3	19.9	18.9	17.6	16.7	15.4	22.8																						
																								9.1	8.5	8.0	7.6	7.1	6.7	6.4	6.3	7.0	8.2	9.5	10.8	12.0	12.8	13.3	13.6	13.5	13.3	12.8	12.2	11.7	11.0	10.4	9.7	Diurnal Average
																								18.8	18.7	18.1	17.7	16.6	15.5	15.4	15.3	15.0	15.7	16.5	18.4	19.6	20.9	21.8	22.4	22.8	22.4	22.1	21.3	20.7	20.0	19.5	19.4	Diurnal Maximum

M - Maintenance





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	3	0.42	0.42
0 - 10	381	53.36	53.78
10 - 20	314	43.98	97.76
> 20	16	2.24	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 720

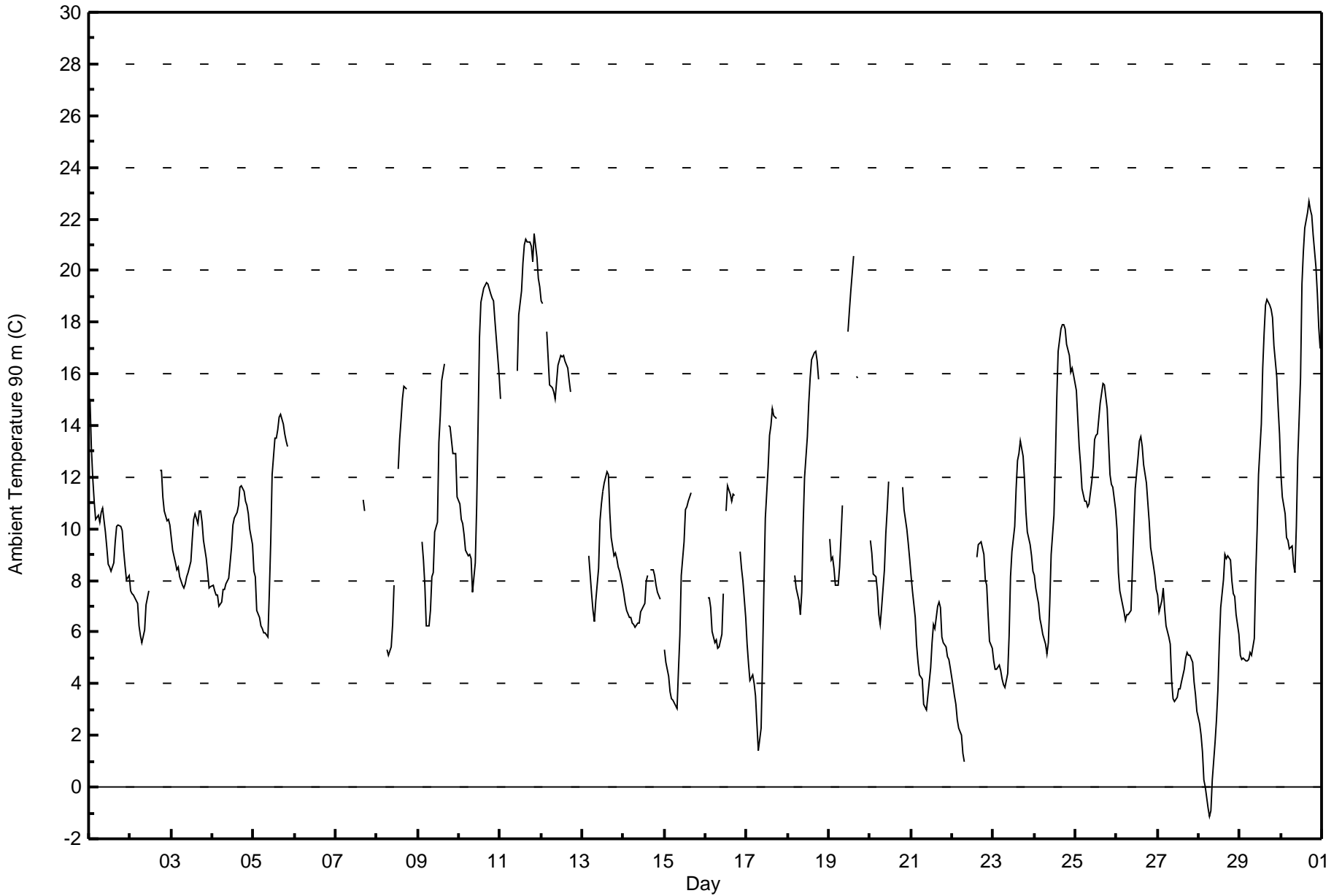




Summary of Hour Averages

Mannix - September 2015

Maximum Value: 22.7 C on Sep 30 17:00		Maximum Daily Average: 15.6 C on Sep 30		Hours in Service: 720																							
Minimum Value: -1.1 C on Sep 28 07:00		Minimum Daily Average: 4.3 C on Sep 28		Hours of Data: 577																							
Maximum Diurnal Average: 13.7 C at hour 16		Minimum Diurnal Average: 6.2 C at hour 8		Hours of Missing Data: 143																							
Monthly Average: 9.91 C		Percentiles: P <sub>1</sub> = 0.8 P <sub>10</sub> = 4.6 Q <sub>1</sub> = 6.7 Median = 9.0 Q <sub>3</sub> = 12.7 P <sub>90</sub> = 16.8 P <sub>99</sub> = 21.4		Hours of Calibration: 0																							
				Percent Operational Time: 80.1																							
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-Sep	15.1	13.1	11.9	11.1	10.4	10.5	10.2	10.6	10.8	9.9	9.3	8.6	8.5	8.3	8.7	9.5	10.1	10.1	10.1	9.9	9.2	8.6	8.0	8.2	10.0	15.1	
2-Sep	7.6	7.5	7.4	7.2	7.1	6.2	5.9	5.6	6.1	7.0	7.3	7.6	AF	AF	AF	AF	AF	12.3	12.3	11.2	10.7	10.3	10.4	10.1	8.4	12.3	
3-Sep	9.7	9.2	8.7	8.4	8.5	8.1	7.8	7.7	7.9	8.1	8.3	8.7	9.6	10.4	10.6	10.2	10.7	10.7	10.3	9.6	8.9	8.3	7.7	7.7	9.0	10.7	
4-Sep	7.8	7.6	7.4	7.4	7.0	7.1	7.7	7.6	7.9	8.1	8.7	9.3	10.2	10.4	10.6	10.9	11.6	11.7	11.4	11.1	10.9	10.6	10.0	9.4	9.3	11.7	
5-Sep	8.4	8.2	6.8	6.6	6.2	6.1	6.0	6.0	5.8	7.5	9.5	12.1	13.5	13.5	13.9	14.3	14.4	14.1	13.7	13.4	13.2	AF	AF	AF	10.2	14.4	
6-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
7-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	11.1	10.7	AF	AF	AF	AF	--	11.1	
8-Sep	AF	AF	AF	AF	AF	AF	5.3	5.1	5.4	6.3	7.8	AF	12.3	13.4	14.2	15.0	15.5	15.4	AF	AF	AF	AF	AF	AF	--	15.5	
9-Sep	AF	AF	9.5	8.8	7.8	6.2	6.2	6.8	8.1	8.3	9.9	10.2	13.3	14.4	15.7	16.4	AF	AF	14.0	13.9	12.9	12.9	12.9	11.2	11.0	16.4	
10-Sep	11.0	10.4	10.2	9.7	9.2	9.0	9.0	8.8	7.5	8.7	10.9	14.0	17.4	18.8	19.3	19.4	19.5	19.5	19.1	18.9	18.8	18.1	17.4	15.9	14.2	19.5	
11-Sep	15.0	AF	AF	AF	AF	AF	AF	AF	AF	AF	16.1	18.3	19.2	20.3	21.0	21.2	21.1	21.1	20.9	20.3	21.4	20.5	19.7	19.4	--	21.4	
12-Sep	18.8	18.7	AF	17.6	16.6	15.6	15.5	15.3	15.0	15.7	16.3	16.7	16.7	16.5	16.2	15.7	15.3	AF	AF	AF	AF	AF	AF	AF	--	18.8	
13-Sep	AF	AF	AF	AF	8.9	7.5	6.8	6.4	7.2	8.5	10.3	11.0	11.4	11.8	12.2	12.1	10.6	9.7	9.0	9.1	8.9	8.5	8.4	7.8	9.3	12.2	
14-Sep	7.5	7.1	6.9	6.6	6.6	6.4	6.3	6.2	6.3	6.4	6.8	6.9	7.1	8.0	8.2	AF	8.4	8.4	8.2	7.8	7.5	7.3	AF	AF	7.2	8.4	
15-Sep	5.3	4.8	4.3	3.7	3.4	3.4	3.1	3.0	4.5	5.9	8.2	9.5	10.8	10.8	11.1	11.4	AF	AF	AF	AF	AF	AF	AF	AF	--	11.4	
16-Sep	AF	7.4	7.3	6.9	6.0	5.6	5.7	5.4	5.4	5.9	7.5	AF	10.7	11.6	11.3	11.1	11.3	11.3	AF	AF	9.1	8.5	8.0	6.6	8.1	11.6	
17-Sep	5.6	4.8	4.2	4.4	4.0	3.6	2.5	1.4	2.3	4.8	7.8	10.4	12.4	13.6	14.0	14.7	14.4	14.3	AF	AF	AF	AF	AF	AF	7.7	14.7	
18-Sep	AF	AF	AF	AF	8.2	7.7	7.2	6.7	7.5	10.2	12.0	13.6	14.8	15.8	16.5	16.8	16.9	16.5	15.8	AF	AF	AF	AF	AF	--	16.9	
19-Sep	9.6	8.8	8.9	8.5	7.8	7.8	8.5	9.7	10.9	AF	AF	17.6	18.4	19.2	20.5	AF	15.9	15.9	AF	AF	AF	AF	AF	AF	--	20.5	
20-Sep	9.6	9.1	8.3	8.1	7.6	6.7	6.3	6.9	8.4	9.8	10.8	11.8	AF	AF	AF	AF	AF	AF	AF	11.6	10.8	10.0	9.5	8.9	--	11.8	
21-Sep	8.2	7.6	6.5	5.5	4.8	4.3	4.2	3.2	3.1	3.0	3.5	4.6	5.6	6.3	6.2	7.0	7.2	6.9	5.8	5.6	5.4	5.0	4.9	4.6	5.4	8.2	
22-Sep	3.9	3.5	3.2	2.6	2.3	2.0	1.3	1.0	M	M	M	M	M	M	8.9	9.4	9.4	9.5	9.0	8.0	7.8	6.7	5.6	5.4	5.5	9.5	
23-Sep	4.9	4.6	4.5	4.7	4.5	4.2	4.0	3.8	4.4	5.9	8.1	9.1	10.1	11.5	12.7	12.9	13.4	12.8	11.9	10.7	9.9	9.4	8.9	8.4	8.1	13.4	
24-Sep	8.2	7.7	7.1	6.5	6.2	5.9	5.5	5.1	5.6	7.1	9.0	10.5	12.6	15.0	16.9	17.7	17.9	17.9	17.8	17.1	16.7	16.0	16.2	15.9	11.8	17.9	
25-Sep	15.4	14.3	13.2	12.5	11.6	11.1	11.1	10.9	10.9	11.9	12.5	13.5	13.6	13.7	14.9	15.3	15.6	15.5	14.6	13.3	12.1	11.7	11.6	10.7	13.0	15.6	
26-Sep	10.0	8.3	7.6	7.1	6.8	6.4	6.7	6.7	6.8	8.5	10.1	11.6	12.7	13.4	13.6	13.2	12.5	11.8	11.0	10.3	9.3	8.6	8.2	7.6	9.5	13.6	
27-Sep	7.4	6.8	7.2	7.7	6.9	6.2	5.8	5.5	4.1	3.4	3.3	3.5	3.8	3.8	4.1	4.6	5.0	5.2	5.1	5.1	4.9	4.1	3.6	2.9	5.0	7.7	
28-Sep	2.4	2.0	1.4	0.3	0.0	-0.8	-1.1	-0.9	0.3	1.7	2.6	3.8	5.5	6.9	8.1	9.0	8.8	8.9	8.8	8.0	7.5	7.4	6.7	5.9	4.3	9.0	
29-Sep	5.1	4.9	5.0	4.9	4.9	4.9	5.2	5.1	5.8	8.2	9.9	12.1	14.1	16.2	17.6	18.7	18.9	18.6	18.5	18.2	17.1	15.9	14.7	13.7	11.6	18.9	
30-Sep	12.1	11.2	10.6	9.7	9.6	9.2	9.3	8.6	8.3	10.1	12.7	15.9	19.5	20.7	21.6	22.3	22.7	22.3	22.1	21.4	20.1	19.1	17.8	17.0	15.6	22.7	
		9.1	8.2	7.3	7.4	7.0	6.6	6.4	6.2	6.8	7.6	9.2	10.8	12.2	13.0	13.4	13.7	13.6	13.3	12.8	12.1	11.5	10.8	10.5	9.9	Diurnal Average	
		18.8	18.7	13.2	17.6	16.6	15.6	15.5	15.3	15.0	15.7	16.3	18.3	19.5	20.7	21.6	22.3	22.7	22.3	22.1	21.4	21.4	20.5	19.7	19.4	Diurnal Maximum	
M - Maintenance		AF - Analyzer Failure																									





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	3	0.52	0.52
0 - 10	330	57.19	57.71
10 - 20	226	39.17	96.88
> 20	18	3.12	100.00

Total Number of Valid Hours: 577

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

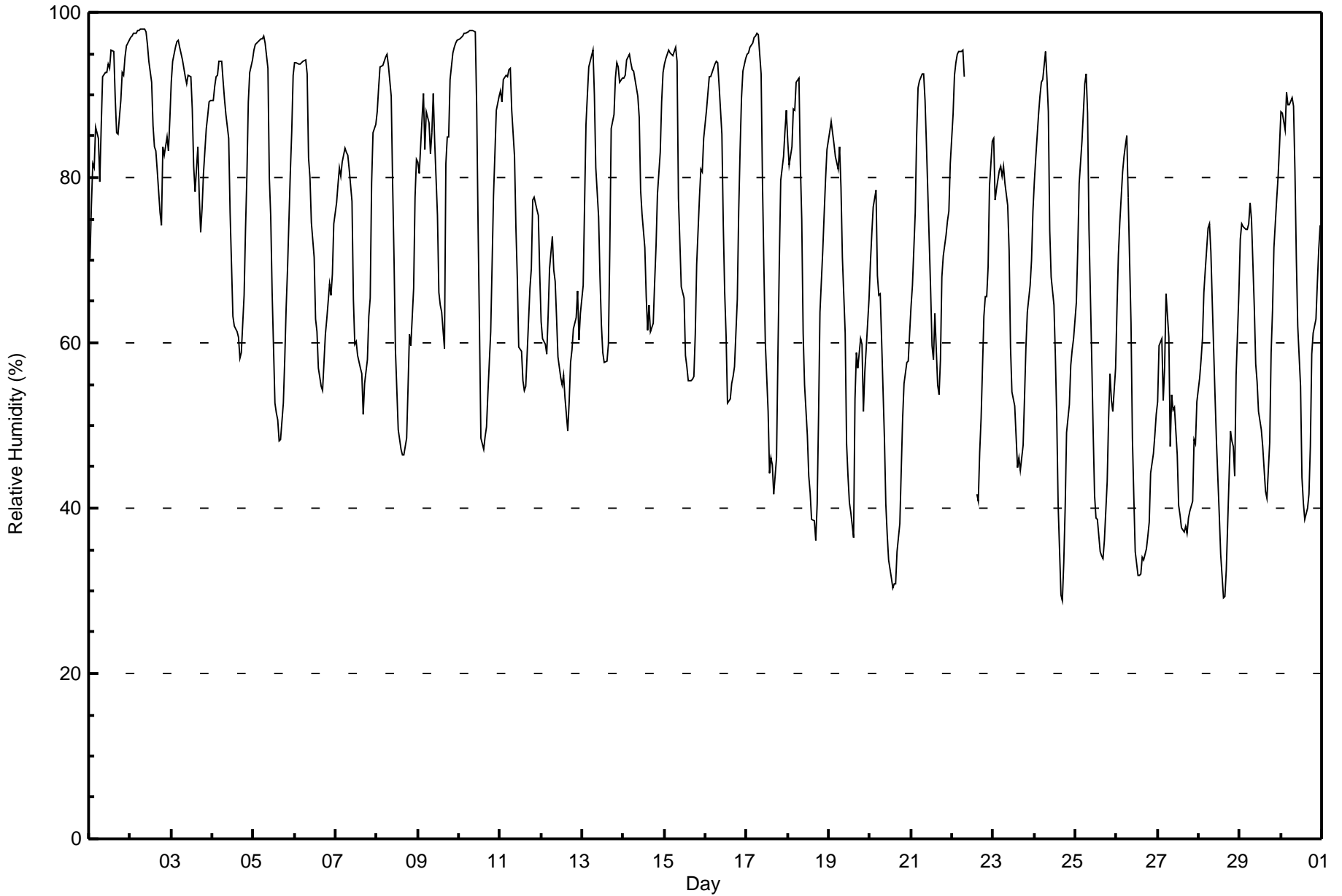
Mannix - September 2015

Maximum Value: 98 % on Sep 2 07:00      Maximum Daily Average: 90.1 % on Sep 2																		Hours in Service: 720 Hours of Data: 714 Hours of Missing Data: 6 Hours of Calibration: 0 Percent Operational Time: 99.2																															
Minimum Value: 29 % on Sep 24 17:00      Minimum Daily Average: 48.3 % on Sep 27 Maximum Diurnal Average: 88.2 % at hour 7      Minimum Diurnal Average: 50.9 % at hour 16 Monthly Average: 71.2 %      Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 45 Q <sub>1</sub> = 57 Median = 74 Q <sub>3</sub> = 89 P <sub>90</sub> = 94 P <sub>99</sub> = 98																																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Sep	70	77	82	81	86	85	79	86	92	93	93	94	93	95	95	90	85	85	89	93	92	95	96	97	88.5	97																							
2-Sep	97	97	97	98	98	98	98	98	98	98	96	94	91	86	84	83	81	76	74	84	83	85	83	87	90.1	98																							
3-Sep	91	94	96	96	97	96	94	93	92	91	92	92	88	81	78	84	78	73	76	81	86	87	89	89	88.2	97																							
4-Sep	89	91	92	92	94	94	92	89	88	85	76	69	63	62	61	61	58	59	66	74	80	89	93	94	79.7	94																							
5-Sep	95	96	96	97	97	97	97	96	93	80	75	66	53	51	51	48	48	53	58	64	69	81	86	92	76.7	97																							
6-Sep	94	94	94	94	94	94	94	93	82	80	75	70	63	61	57	55	54	58	61	63	67	66	68	74	75.2	94																							
7-Sep	77	79	81	80	82	84	83	83	81	77	65	60	60	58	57	56	51	55	58	63	65	79	85	86	71.2	86																							
8-Sep	88	91	93	94	94	95	95	94	90	79	70	59	50	48	47	46	46	48	55	61	60	67	78	82	72.1	95																							
9-Sep	82	81	87	90	83	88	87	83	85	90	84	75	66	65	64	59	82	85	85	92	95	96	96	97	83.2	97																							
10-Sep	97	97	97	97	97	98	98	98	98	98	89	74	62	49	47	49	50	54	61	69	78	83	88	90	79.8	98																							
11-Sep	90	89	92	92	92	93	93	88	83	74	68	59	59	55	54	55	59	67	69	77	78	76	75	68	75.3	93																							
12-Sep	62	61	60	59	63	69	73	69	68	63	58	56	55	56	53	49	53	58	59	62	63	66	60	64	60.8	73																							
13-Sep	67	77	86	90	93	95	95	90	81	75	68	62	59	58	58	60	71	86	88	92	94	93	92	92	80.1	95																							
14-Sep	92	92	94	95	94	93	93	92	90	87	79	76	72	66	62	65	61	62	67	72	78	83	89	93	81.1	95																							
15-Sep	94	94	95	95	95	95	96	94	77	72	67	65	59	57	55	55	56	61	69	78	81	81	85	85	76.4	96																							
16-Sep	88	90	92	92	93	94	94	94	91	85	74	66	61	53	53	55	56	57	65	76	83	90	93	94	78.7	94																							
17-Sep	95	95	96	96	97	97	97	97	92	79	69	60	52	44	46	45	42	46	59	70	80	83	86	88	75.5	97																							
18-Sep	84	81	84	88	88	92	92	82	75	61	55	49	44	42	39	38	36	40	51	64	71	76	80	83	66.5	92																							
19-Sep	86	87	85	84	82	81	84	79	70	61	48	44	41	39	36	53	59	57	60	60	52	56	59	65	63.7	87																							
20-Sep	70	73	76	78	68	66	66	60	48	41	37	34	31	30	31	31	35	38	45	51	55	58	58	61	51.7	78																							
21-Sep	64	67	76	85	91	92	93	93	89	84	78	66	60	58	64	55	54	58	68	71	73	75	76	82	73.7	93																							
22-Sep	88	92	94	95	95	95	95	92	M	M	M	M	M	M	42	41	47	51	63	66	66	69	79	84	75.2	95																							
23-Sep	85	77	79	81	81	80	81	79	77	71	59	54	52	49	45	46	45	48	53	59	64	67	70	76	65.8	85																							
24-Sep	79	82	88	90	91	92	95	92	88	74	68	65	59	51	40	29	29	33	40	49	52	57	59	60	65.2	95																							
25-Sep	65	71	79	82	84	91	93	88	74	58	49	42	39	39	35	34	34	36	43	51	56	53	52	57	58.5	93																							
26-Sep	64	71	75	81	83	84	85	78	62	49	41	35	32	32	32	34	34	35	37	38	44	47	49	51	53.0	85																							
27-Sep	53	60	61	53	57	66	61	47	54	52	52	46	40	39	38	37	38	37	39	40	41	48	48	53	48.3	66																							
28-Sep	56	58	61	66	69	74	74	71	65	53	48	44	39	34	29	29	33	38	49	48	48	44	56	66	52.2	74																							
29-Sep	73	74	74	74	74	74	77	75	64	57	55	52	50	47	45	42	41	48	59	64	71	77	80	84	63.8	84																							
30-Sep	88	88	86	90	89	89	90	89	81	70	62	55	44	41	39	40	42	48	59	61	63	67	71	74	67.7	90																							
																								80.8	82.6	84.9	86.2	86.7	87.9	88.2	85.4	80.3	73.7	67.3	61.5	56.4	53.4	51.2	50.9	51.9	54.8	60.6	66.1	69.5	73.1	75.8	79.0	Diurnal Average	
																								97	97	97	98	98	98	98	98	98	98	96	94	93	95	95	90	85	86	89	93	95	96	96	97	Diurnal Maximum	
M - Maintenance																																																	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

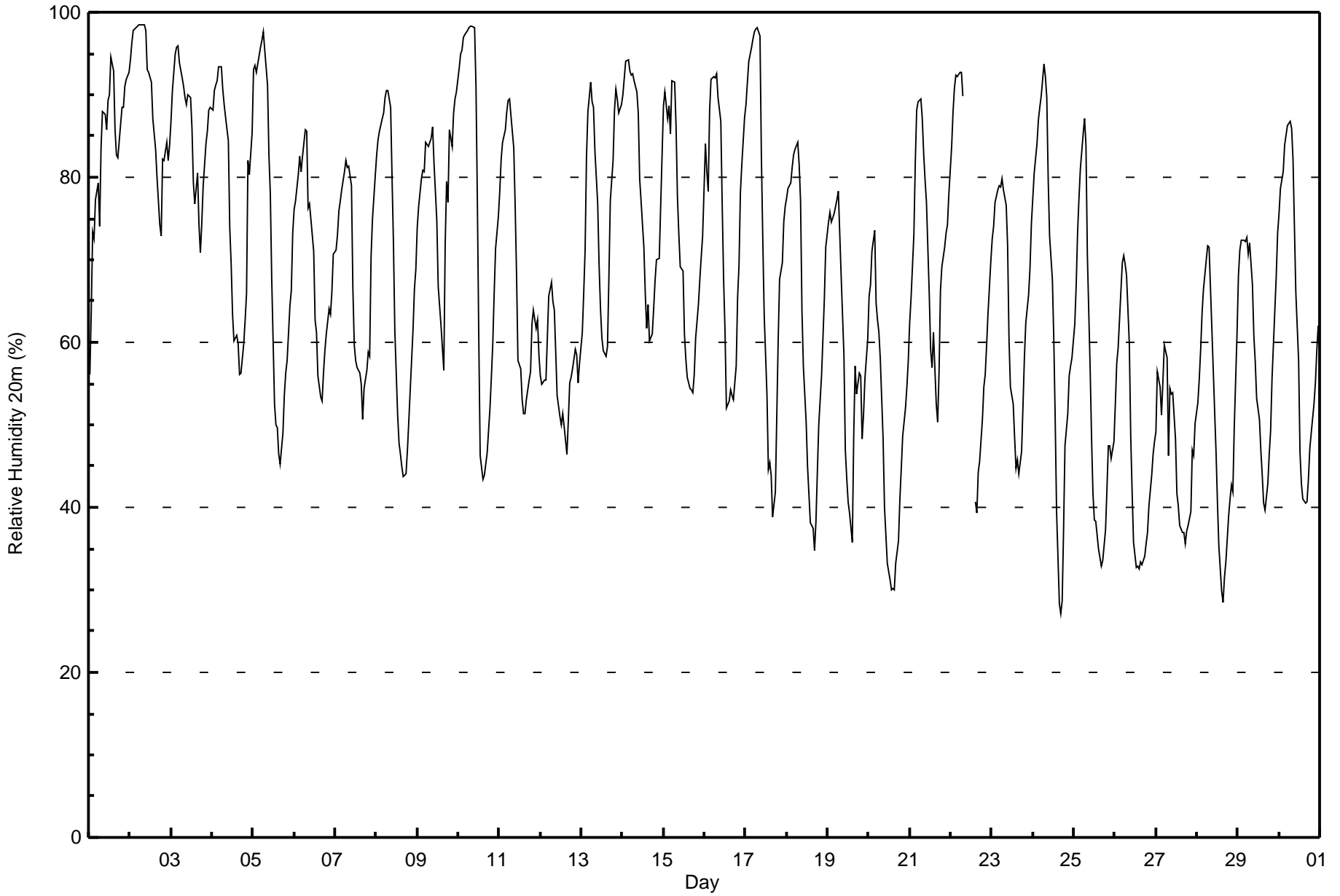
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	46	6.44	6.44
40 - 60	179	25.07	31.51
60 - 80	199	27.87	59.38
80 - 100	290	40.62	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 720



Maximum Value: 99 % on Sep 2 07:00																	Maximum Daily Average: 89.6 % on Sep 2																	Hours in Service: 720															
Minimum Value: 27 % on Sep 24 17:00																	Minimum Daily Average: 47.0 % on Sep 27																	Hours of Data: 714															
Maximum Diurnal Average: 84.5 % at hour 7																	Minimum Diurnal Average: 49.3 % at hour 16																	Hours of Missing Data: 6															
Monthly Average: 67.6 %																	Percentiles: P <sub>1</sub> = 30 P <sub>10</sub> = 43 Q <sub>1</sub> = 54 Median = 68 Q <sub>3</sub> = 84 P <sub>90</sub> = 91 P <sub>99</sub> = 98																	Hours of Calibration: 0															
																																		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-Sep	56	64	73	72	77	79	74	84	88	88	86	89	90	95	93	86	83	82	86	89	89	91	92	93	83.3	95																							
2-Sep	94	96	98	98	98	98	99	99	98	98	93	93	92	87	85	83	80	74	73	82	82	84	82	84	89.6	99																							
3-Sep	87	90	95	96	96	94	92	91	90	89	90	90	86	79	77	80	74	71	74	79	84	86	88	88	86.1	96																							
4-Sep	88	91	91	92	93	93	91	89	87	84	74	70	63	60	61	60	56	60	63	66	82	80	85	85	76.5	93																							
5-Sep	93	94	93	95	96	97	98	95	91	83	78	68	53	50	50	46	45	49	54	56	58	64	66	73	72.6	98																							
6-Sep	76	77	80	83	81	83	86	86	76	77	75	71	63	61	56	53	53	56	59	61	64	63	66	71	69.8	86																							
7-Sep	71	73	76	77	78	81	82	81	81	79	67	60	58	57	56	55	51	54	57	59	58	70	75	80	68.2	82																							
8-Sep	83	85	86	87	88	90	90	90	88	80	72	61	51	48	46	45	44	44	47	51	54	62	67	69	67.8	90																							
9-Sep	74	76	80	81	81	84	84	84	85	86	82	75	67	64	62	57	72	80	77	86	84	88	89	90	78.6	90																							
10-Sep	93	95	95	97	97	98	98	98	98	98	91	77	60	46	43	44	45	47	52	56	60	66	71	75	75.1	98																							
11-Sep	78	82	84	86	88	89	89	87	84	77	68	58	57	53	51	51	53	55	56	62	64	62	63	59	69.1	89																							
12-Sep	56	55	55	55	61	66	67	65	64	59	54	51	50	51	50	46	51	55	56	57	59	59	55	57	56.4	67																							
13-Sep	61	66	71	83	88	92	89	89	83	77	69	64	61	59	58	60	68	77	82	88	91	90	88	89	76.7	92																							
14-Sep	90	92	94	94	93	92	93	92	90	88	80	77	72	66	62	65	60	61	64	67	70	70	76	83	78.8	94																							
15-Sep	89	90	87	89	85	92	92	86	78	73	69	69	61	58	56	54	54	54	56	60	65	68	70	73	72.0	92																							
16-Sep	84	81	78	88	92	92	92	93	90	87	77	68	61	52	53	54	54	53	57	65	69	78	82	87	74.4	93																							
17-Sep	89	91	94	96	97	98	98	98	97	83	73	63	54	45	45	44	39	42	51	60	68	70	75	76	72.7	98																							
18-Sep	77	79	79	81	83	83	84	81	77	64	57	50	45	41	38	37	35	38	44	50	56	60	65	72	61.6	84																							
19-Sep	74	76	75	75	76	77	78	73	68	58	47	44	41	39	36	49	57	54	56	56	48	51	56	60	59.3	78																							
20-Sep	66	67	71	73	65	63	61	58	48	40	37	33	31	30	30	30	33	36	41	45	49	52	55	58	48.8	73																							
21-Sep	62	65	73	82	88	89	89	87	83	80	77	66	59	57	61	53	50	56	66	69	72	73	74	78	71.3	89																							
22-Sep	84	88	91	92	92	93	93	90	M	M	M	M	M	M	41	39	44	46	51	55	56	60	64	70	69.3	93																							
23-Sep	73	74	77	79	79	79	80	78	77	72	60	55	53	49	45	46	44	47	52	58	62	66	69	74	64.4	80																							
24-Sep	78	81	84	87	89	90	94	92	90	80	73	68	61	51	40	28	27	29	37	48	51	56	57	58	64.4	94																							
25-Sep	62	67	73	77	81	85	87	84	71	57	48	42	38	38	35	34	33	34	37	42	47	48	46	48	54.8	87																							
26-Sep	53	57	59	66	70	71	69	68	60	49	42	36	33	33	33	33	33	34	36	37	40	44	46	48	47.9	71																							
27-Sep	49	56	55	51	55	60	58	46	54	54	54	48	42	40	38	37	37	36	37	38	39	47	46	50	47.0	60																							
28-Sep	53	56	59	64	66	70	72	72	67	57	52	47	40	35	30	29	32	33	39	41	43	42	50	61	50.3	72																							
29-Sep	68	71	72	72	72	73	71	72	67	61	58	53	51	47	44	41	40	43	46	49	56	64	68	73	59.6	73																							
30-Sep	76	79	81	84	85	86	87	86	82	74	66	58	47	43	41	41	41	43	47	49	52	55	59	62	63.5	87																							
																								74.6	77.1	79.4	81.7	83.0	84.5	84.5	83.2	79.7	74.1	67.8	62.1	56.4	52.9	50.5	49.3	49.6	51.3	55.1	59.2	61.9	65.6	68.0	71.5	Diurnal Average	
																								94	96	98	98	98	98	99	99	98	98	93	93	92	95	93	86	83	82	86	89	91	91	92	93	Diurnal Maximum	
M - Maintenance																																																	







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	51	7.14	7.14
40 - 60	219	30.67	37.82
60 - 80	222	31.09	68.91
80 - 100	222	31.09	100.00

Total Number of Valid Hours: 714

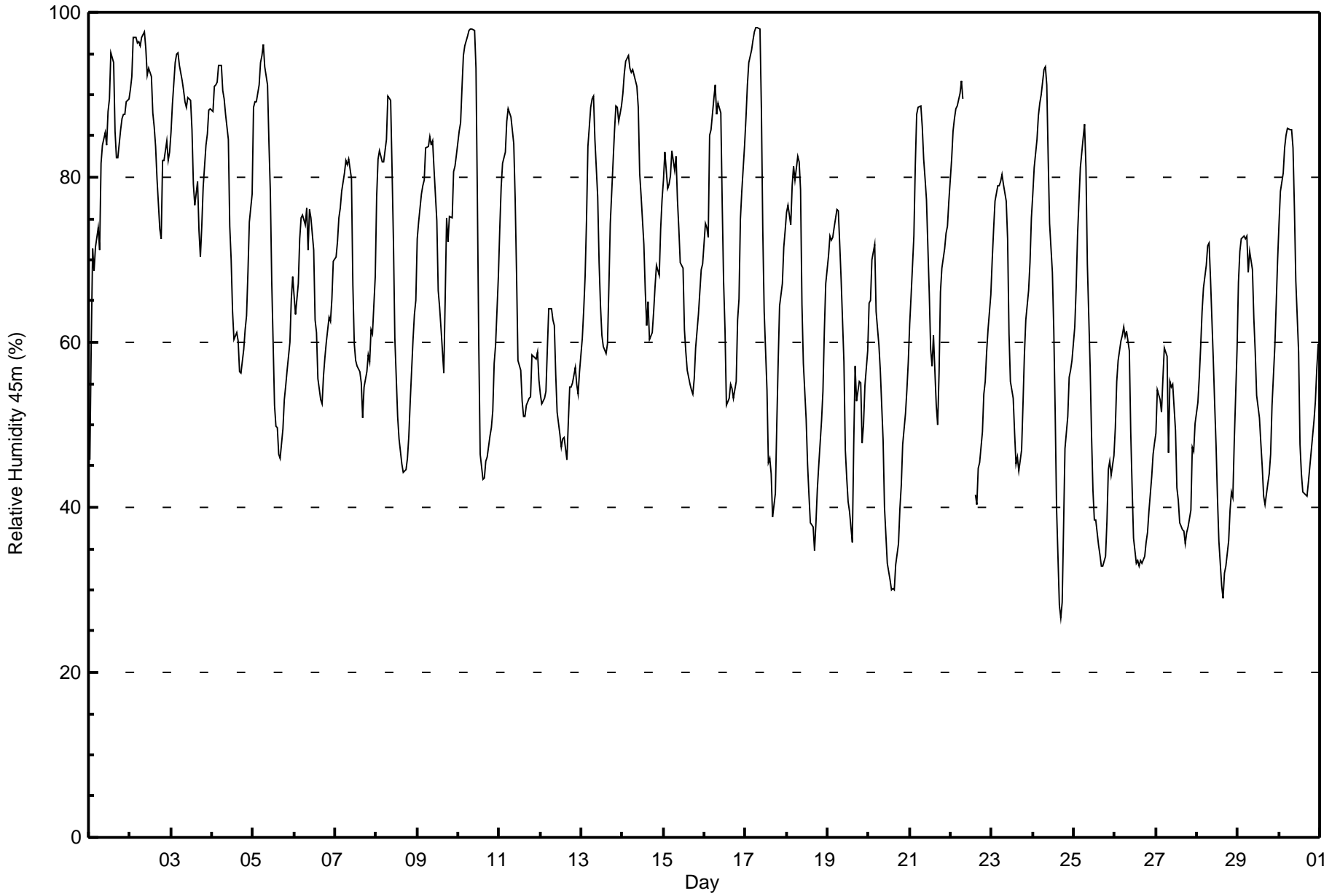
Total Number of Hours: 720



Maximum Value: 98 % on Sep 17 08:00	Maximum Daily Average: 88.8 % on Sep 2	Hours in Service: 720
Minimum Value: 27 % on Sep 24 17:00	Minimum Daily Average: 46.0 % on Sep 26	Hours of Data: 714
Maximum Diurnal Average: 82.5 % at hour 6	Minimum Diurnal Average: 49.4 % at hour 17	Hours of Missing Data: 6
Monthly Average: 66.4 %	Percentiles: P <sub>1</sub> = 30 P <sub>10</sub> = 42 Q <sub>1</sub> = 53 Median = 66 O <sub>3</sub> = 82 P <sub>90</sub> = 89 P <sub>99</sub> = 98	Hours of Calibration: 0
		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-Sep	46	60	71	69	72	74	71	82	84	85	84	88	89	95	94	86	82	82	86	87	88	88	89	89	80.9	95																							
2-Sep	91	92	97	97	96	96	96	97	98	96	92	93	92	88	86	84	80	74	73	82	82	84	82	83	88.8	98																							
3-Sep	85	89	94	95	95	94	92	91	89	88	90	89	86	79	77	80	74	70	74	79	84	85	88	88	85.6	95																							
4-Sep	88	91	91	91	94	93	90	89	88	85	74	70	64	60	61	60	56	56	59	62	63	68	75	78	75.3	94																							
5-Sep	88	89	89	91	94	95	96	93	91	84	78	67	52	50	50	46	46	50	53	55	57	60	65	68	71.2	96																							
6-Sep	66	63	67	73	75	75	74	76	71	76	75	71	63	61	56	53	53	56	58	60	63	62	65	70	66.0	76																							
7-Sep	70	72	75	76	78	81	82	81	82	80	67	60	58	57	56	55	51	54	57	58	58	62	61	68	66.7	82																							
8-Sep	78	82	83	82	82	83	85	90	89	81	72	60	51	48	47	45	44	45	46	49	53	60	63	65	66.0	90																							
9-Sep	73	75	78	79	80	84	84	85	84	84	81	75	66	64	62	56	65	75	72	75	75	81	81	83	75.7	85																							
10-Sep	86	87	91	95	96	97	98	98	98	98	93	77	60	46	43	44	46	46	49	50	52	57	60	68	72.2	98																							
11-Sep	74	79	82	83	87	88	88	87	84	78	68	58	57	53	51	51	52	53	53	58	58	58	59	55	67.3	88																							
12-Sep	54	52	53	54	59	64	64	63	62	56	52	49	47	48	48	46	50	55	55	55	57	55	54	56	54.5	64																							
13-Sep	60	64	68	75	84	88	89	90	85	78	70	64	61	59	59	60	67	74	82	86	89	88	87	89	75.6	90																							
14-Sep	90	92	94	95	93	93	93	92	91	89	80	78	72	66	62	65	60	61	64	67	69	68	74	77	78.6	95																							
15-Sep	80	83	79	79	80	83	81	83	77	74	70	69	62	59	57	55	54	54	56	59	63	66	69	69	69.2	83																							
16-Sep	74	74	73	85	86	90	91	88	89	88	77	67	61	52	53	55	54	53	55	63	65	75	78	84	72.1	91																							
17-Sep	87	91	94	95	97	98	98	98	98	88	74	64	54	45	46	44	39	42	50	58	64	67	71	74	72.3	98																							
18-Sep	76	77	74	79	81	80	83	82	78	65	57	51	45	42	38	38	35	38	42	45	50	54	61	67	59.9	83																							
19-Sep	71	73	72	73	74	76	76	72	68	58	47	44	41	39	36	48	57	53	55	55	48	50	55	59	58.2	76																							
20-Sep	65	65	70	72	64	62	60	57	48	40	37	33	31	30	30	30	33	36	40	43	48	51	54	58	48.1	72																							
21-Sep	62	66	73	81	88	88	89	86	82	80	77	66	59	57	61	52	50	56	66	69	71	73	74	77	71.0	89																							
22-Sep	82	86	87	88	89	90	92	89	M	M	M	M	M	M	42	40	45	45	49	54	55	59	61	66	67.7	92																							
23-Sep	70	74	77	79	79	80	80	79	77	72	61	55	53	49	45	46	44	47	53	59	63	66	70	75	64.7	80																							
24-Sep	78	81	85	87	89	90	93	93	91	82	74	68	62	52	40	28	27	28	38	47	51	56	57	58	64.8	93																							
25-Sep	62	67	73	77	81	85	86	81	70	57	49	42	39	38	35	34	33	33	34	38	45	46	44	46	53.9	86																							
26-Sep	50	55	58	60	61	62	61	61	59	49	42	36	33	34	33	34	33	34	36	37	40	44	46	48	46.0	62																							
27-Sep	49	54	53	51	56	59	58	47	55	55	55	49	42	41	38	37	37	36	37	38	40	47	47	50	47.1	59																							
28-Sep	53	56	60	64	67	69	72	72	68	58	53	47	41	36	30	29	32	33	36	40	42	41	48	59	50.2	72																							
29-Sep	67	71	73	73	73	73	68	71	69	63	59	54	51	48	45	41	40	43	44	46	52	59	65	70	59.1	73																							
30-Sep	74	78	81	84	85	86	86	86	84	76	67	59	48	44	42	41	41	43	45	47	50	53	57	60	63.2	86																							
																								71.6	74.6	77.1	79.4	81.1	82.5	82.5	82.0	79.6	74.5	68.1	62.2	56.5	53.2	50.7	49.4	49.4	50.9	53.8	57.3	59.8	62.9	65.3	68.6	Diurnal Average	
																								91	92	97	97	97	98	98	98	98	98	93	93	92	95	94	86	82	82	86	87	89	88	89	89	Diurnal Maximum	

M - Maintenance





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	54	7.56	7.56
40 - 60	233	32.63	40.20
60 - 80	229	32.07	72.27
80 - 100	198	27.73	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 720



Maximum Value: 97 % on Sep 2 09:00	Maximum Daily Average: 87.7 % on Sep 2	Hours in Service: 720
Minimum Value: 26 % on Sep 24 17:00	Minimum Daily Average: 45.6 % on Sep 26	Hours of Data: 714
Maximum Diurnal Average: 79.8 % at hour 8	Minimum Diurnal Average: 49.8 % at hour 17	Hours of Missing Data: 6
Monthly Average: 65.3 %	Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 42 Q <sub>1</sub> = 53 Median = 65 Q <sub>3</sub> = 79 P <sub>90</sub> = 89 P <sub>99</sub> = 96	Hours of Calibration: 0
		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-Sep	39	49	59	65	66	66	68	79	79	84	83	88	90	94	93	86	83	83	86	87	87	86	87	87	78.2	94
2-Sep	90	89	89	89	90	91	94	96	97	94	93	94	93	89	87	85	81	74	73	82	83	85	83	83	87.7	97
3-Sep	85	89	94	95	96	94	92	91	90	89	90	90	87	80	78	80	74	71	75	80	85	86	89	89	86.2	96
4-Sep	89	92	92	91	93	94	91	91	89	85	75	71	65	61	62	61	58	57	59	62	63	64	68	71	75.2	94
5-Sep	77	79	87	88	88	89	90	89	90	85	80	69	54	51	51	47	47	50	53	54	57	59	65	62	69.2	90
6-Sep	56	58	63	67	71	71	71	71	69	75	76	72	64	62	56	54	53	56	58	59	62	62	65	70	64.2	76
7-Sep	70	72	74	75	79	81	83	82	84	81	68	61	59	58	58	56	52	55	57	59	58	61	60	62	66.9	84
8-Sep	65	76	79	78	79	81	81	83	87	82	73	62	52	49	48	46	45	45	47	49	53	59	61	62	64.2	87
9-Sep	69	71	72	72	74	80	80	82	76	79	73	75	67	65	62	57	62	70	65	65	73	72	71	77	71.3	82
10-Sep	79	82	83	85	87	89	92	95	96	96	89	79	60	47	44	44	46	46	48	48	48	52	55	60	68.7	96
11-Sep	64	70	73	75	78	79	78	79	80	78	69	59	57	54	52	52	53	53	53	57	53	56	57	54	63.8	80
12-Sep	53	52	53	54	59	63	62	62	61	54	50	48	46	47	48	46	51	55	54	54	56	53	53	56	53.7	63
13-Sep	60	64	67	73	81	87	86	85	84	79	71	66	62	61	60	61	66	74	83	84	84	86	87	89	75.0	89
14-Sep	91	93	95	96	94	94	94	94	92	90	82	79	73	68	63	66	62	62	64	66	69	66	72	74	79.2	96
15-Sep	75	76	73	76	79	77	76	80	77	75	71	71	63	60	57	56	55	54	56	59	62	66	67	68	67.8	80
16-Sep	70	73	72	76	82	85	85	87	87	89	78	69	62	53	54	56	55	53	54	61	62	69	72	80	70.2	89
17-Sep	84	88	91	89	89	91	96	97	95	85	75	65	55	46	47	45	39	42	49	56	62	65	69	69	70.5	97
18-Sep	67	67	66	69	71	72	75	79	78	66	59	52	46	42	39	38	35	39	42	45	48	51	60	65	57.1	79
19-Sep	68	70	69	71	73	74	73	70	67	57	48	44	42	40	37	48	58	53	55	55	48	50	55	59	57.6	74
20-Sep	65	65	70	71	64	61	59	55	48	41	37	34	32	31	31	31	34	36	39	42	47	51	55	58	48.2	71
21-Sep	63	66	73	82	88	88	89	86	83	81	79	67	60	58	61	53	51	57	66	70	72	74	75	77	71.6	89
22-Sep	82	82	82	85	83	83	90	89	M	M	M	M	M	M	42	41	45	46	49	53	53	58	60	62	65.8	90
23-Sep	69	73	76	78	77	79	79	79	77	73	62	56	54	50	46	47	45	47	53	59	63	67	70	75	64.6	79
24-Sep	78	81	85	87	89	90	92	92	91	84	76	70	63	53	41	28	26	29	39	47	51	55	55	57	65.0	92
25-Sep	61	66	72	76	81	84	82	76	68	57	49	42	39	39	36	35	33	33	32	36	42	44	43	45	53.1	84
26-Sep	48	54	57	59	59	60	58	57	57	50	43	37	34	34	34	34	34	34	36	37	39	44	47	48	45.6	60
27-Sep	49	53	52	52	56	59	59	47	56	56	56	51	43	42	39	38	38	36	37	37	40	48	47	51	47.6	59
28-Sep	53	56	60	64	66	69	71	72	68	59	54	49	42	37	31	29	32	33	34	38	40	40	46	57	50.0	72
29-Sep	65	70	72	73	73	73	67	68	68	64	60	55	52	49	46	42	41	43	43	45	49	55	59	65	58.2	73
30-Sep	72	75	78	82	83	84	81	83	83	77	68	59	48	45	43	42	42	43	44	45	49	51	55	57	62.0	84

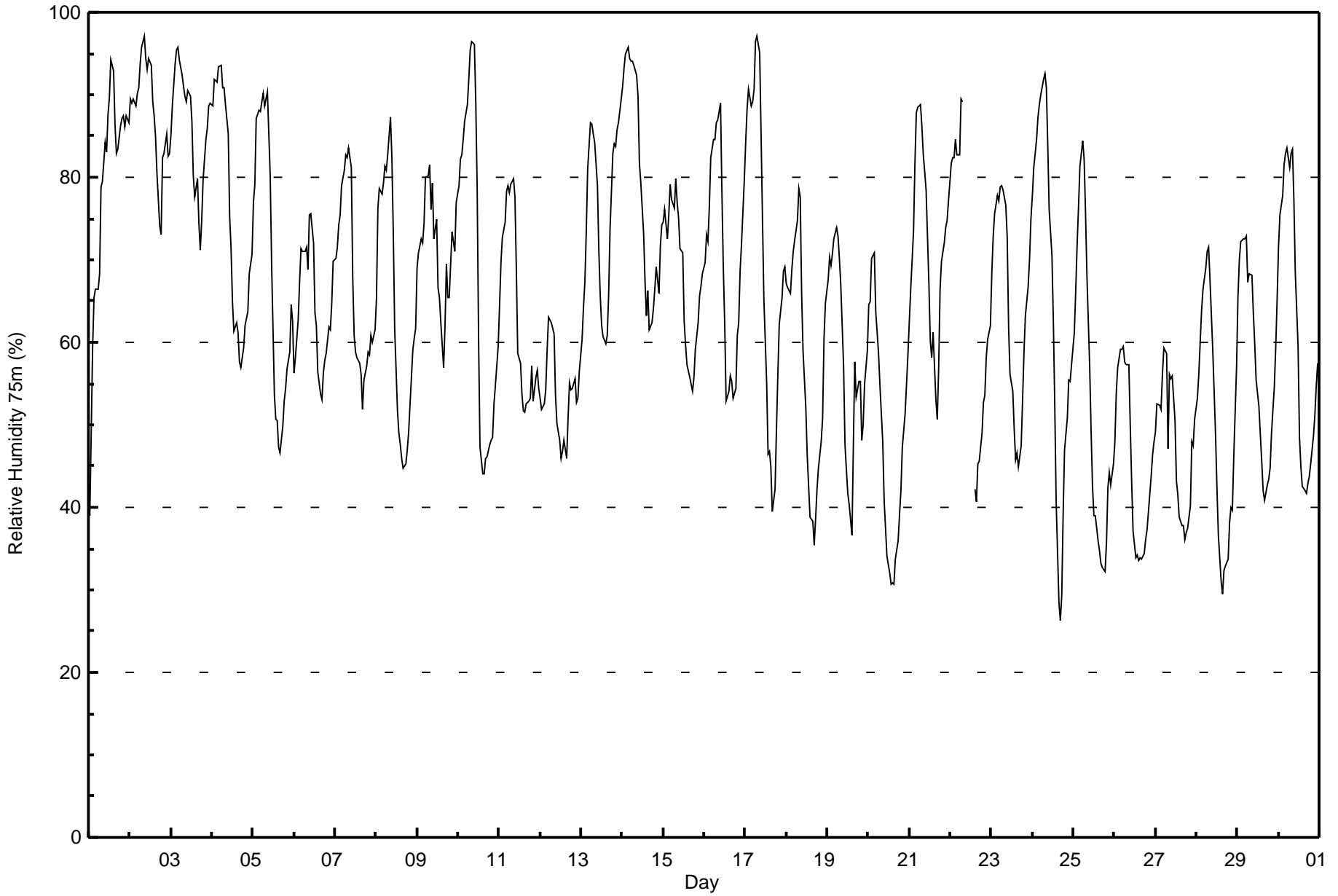
68.5	71.7	74.3	76.4	78.3	79.6	79.8	79.8	78.5	74.7	68.6	63.3	57.4	53.9	51.5	50.1	49.8	51.0	53.5	56.4	58.7	61.1	63.5	66.3	Diurnal Average	
91	93	95	96	96	94	96	97	97	96	93	94	93	94	93	86	83	83	86	87	87	86	89	89	Diurnal Maximum	

M - Maintenance



**Wood Buffalo Environmental Association**  
**Hourly Averages**

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	53	7.42	7.42
40 - 60	241	33.75	41.18
60 - 80	252	35.29	76.47
80 - 100	168	23.53	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 720



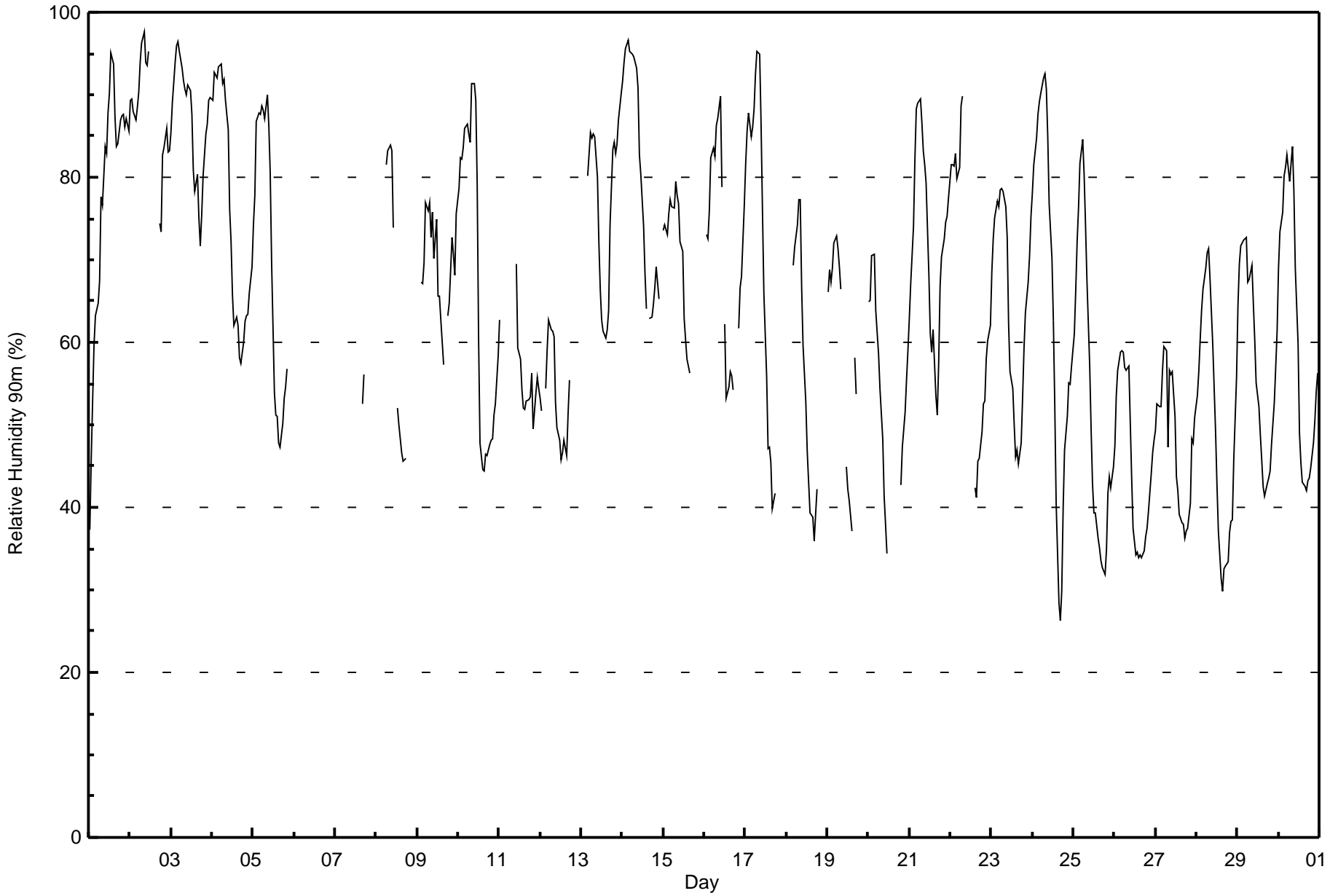
Maximum Value: 98 % on Sep 2 09:00	Maximum Daily Average: 87.9 % on Sep 2	Hours in Service: 720
Minimum Value: 26 % on Sep 24 17:00	Minimum Daily Average: 45.6 % on Sep 26	Hours of Data: 577
Maximum Diurnal Average: 79.2 % at hour 6	Minimum Diurnal Average: 48.8 % at hour 17	Hours of Missing Data: 143
Monthly Average: 65.5 %	Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 42 Q <sub>1</sub> = 52 Median = 66 Q <sub>3</sub> = 81 P <sub>90</sub> = 89 P <sub>99</sub> = 95	Hours of Calibration: 0
		Percent Operational Time: 80.1

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-Sep	37	46	53	60	63	65	67	78	77	84	83	88	90	95	94	87	84	84	87	88	88	86	87	86	77.3	95
2-Sep	89	89	88	87	89	90	94	96	98	94	94	95	AF	AF	AF	AF	AF	74	73	83	84	86	83	83	87.9	98
3-Sep	85	89	94	96	96	95	93	92	91	90	91	88	81	78	80	75	72	75	80	85	86	89	90	86.8	96	
4-Sep	89	93	92	92	93	94	91	92	89	86	76	72	66	62	63	62	58	57	60	62	63	63	66	69	75.5	94
5-Sep	74	78	87	88	88	89	88	87	90	86	81	70	54	51	51	48	47	50	53	55	57	AF	AF	AF	70.0	90
6-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
7-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	52	56	AF	AF	AF	AF	AF	--	56
8-Sep	AF	AF	AF	AF	AF	AF	82	83	84	83	74	AF	52	50	48	47	46	46	AF	AF	AF	AF	AF	AF	--	84
9-Sep	AF	AF	67	67	70	77	76	77	73	76	70	75	66	66	63	57	AF	AF	63	65	73	71	68	76	69.7	77
10-Sep	79	82	82	84	86	86	85	84	91	91	89	79	61	48	45	44	46	46	48	48	48	51	53	58	67.3	91
11-Sep	63	AF	AF	AF	AF	AF	AF	AF	AF	AF	70	59	58	54	52	52	53	53	53	56	50	54	56	54	--	70
12-Sep	53	52	AF	54	59	63	62	61	61	53	50	48	46	47	48	46	51	55	AF	AF	AF	AF	AF	AF	--	63
13-Sep	AF	AF	AF	AF	80	85	85	85	85	80	72	66	63	61	60	61	64	74	83	84	83	84	87	90	76.8	90
14-Sep	92	94	96	97	95	95	95	95	93	91	83	80	74	68	64	AF	63	63	65	67	69	65	AF	AF	81.1	97
15-Sep	74	74	73	76	77	76	76	80	78	77	72	71	63	60	58	56	AF	AF	AF	AF	AF	AF	AF	AF	--	80
16-Sep	AF	73	73	76	82	84	82	86	87	90	79	AF	62	53	54	56	56	54	AF	AF	62	67	68	77	71.1	90
17-Sep	82	86	88	85	86	88	93	95	95	87	76	66	56	47	47	45	40	42	AF	AF	AF	AF	AF	AF	72.3	95
18-Sep	AF	AF	AF	AF	69	72	74	77	77	67	60	53	47	43	39	39	36	39	42	AF	AF	AF	AF	AF	--	77
19-Sep	66	69	67	69	72	73	71	69	66	AF	AF	45	42	41	37	AF	58	54	AF	AF	AF	AF	AF	AF	--	73
20-Sep	65	65	71	71	64	61	59	54	48	41	38	34	AF	AF	AF	AF	AF	AF	AF	43	47	52	55	59	--	71
21-Sep	63	67	74	82	88	89	89	87	83	81	79	68	61	59	62	54	51	57	67	70	73	75	75	77	72.2	89
22-Sep	82	81	81	83	80	81	89	90	M	M	M	M	M	M	42	41	46	46	49	53	53	58	60	62	65.4	90
23-Sep	69	73	75	77	76	78	79	78	76	73	62	56	54	50	46	47	45	48	53	59	64	67	70	75	64.7	79
24-Sep	78	82	85	88	89	90	92	93	91	85	77	70	63	53	41	28	26	30	40	47	51	55	55	57	65.2	93
25-Sep	61	66	72	76	82	85	80	74	68	57	49	43	39	39	36	35	34	33	32	35	42	44	42	45	52.9	85
26-Sep	47	54	57	59	59	59	57	57	57	50	44	37	34	35	34	34	34	35	36	37	40	44	47	48	45.6	59
27-Sep	49	53	52	52	56	59	59	47	57	56	56	51	44	42	39	38	38	36	37	37	40	48	48	51	47.8	59
28-Sep	54	56	60	64	66	69	71	71	68	60	54	49	43	37	31	30	33	33	33	37	38	39	46	56	49.9	71
29-Sep	64	69	72	72	73	73	67	68	69	65	60	55	52	49	46	43	41	43	44	44	48	53	57	61	57.8	73
30-Sep	69	73	76	80	81	83	80	82	84	78	69	60	49	45	43	42	42	43	43	45	48	51	54	56	61.5	84

68.9	72.3	75.4	76.4	77.7	79.2	79.1	79.2	78.3	75.2	69.5	63.3	57.0	53.5	50.9	48.9	48.8	50.9	54.2	56.9	59.2	61.8	63.3	66.5	Diurnal Average	
92	94	96	97	96	95	95	96	98	94	94	95	90	95	94	87	84	84	87	88	88	86	89	90	Diurnal Maximum	

M - Maintenance      AF - Analyzer Failure







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	46	7.97	7.97
40 - 60	191	33.10	41.07
60 - 80	184	31.89	72.96
80 - 100	156	27.04	100.00

Total Number of Valid Hours: 577

Total Number of Hours: 720



Maximum Speed: 39 km/h on Sep 27 08:00	Maximum Daily Speed Average: 19.3 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 28 16:00	Minimum Daily Speed Average: 2.8 km/h on Sep 8	Hours of Data: 714
Maximum Diurnal Speed Average: 6.5 km/h at hour 14	Minimum Diurnal Speed Average: 2.4 km/h at hour 9	Hours of Missing Data: 6
Monthly Average Velocity: 3.6 km/h 229.7 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 13 P <sub>90</sub> = 19 P <sub>99</sub> = 30	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-Sep	S6	SSE8	SE8	SE5	SSE5	SSE10	S10	SE16	ENE5	N14	NNW15	N19	NNW17	WNW19	W17	W14	WSW11	WSW7	SSW4	SW7	WSW10	SW9	SSW7	S4	WSW3.1	WNW19	
2-Sep	S5	SSE8	S6	SSE6	S4	S3	S3	WSW3	N2	N10	NNE12	NNE9	N13	NNE11	NNE15	N14	N20	N23	N20	N16	N20	N20	N22	NNW12	N8.5	N23	
3-Sep	NNW10	NNW10	NW12	NW11	WNW12	WNW18	WNW19	WNW19	WNW20	WNW20	W21	W22	W23	WNW22	W25	WNW19	W21	WNW20	WNW19	WNW16	W15	W15	W14	W14	WNW16.5	W25	
4-Sep	W13	W12	WSW10	WSW9	WSW10	W11	WNW6	NNW3	WNW4	W9	NW8	WNW5	NW7	NW8	N7	NNE2	ENE4	WNW2	SSE5	SE4	S3	WSW4	SSE3	SE4	W4.0	W13	
5-Sep	SE6	SE7	SSW4	S4	S6	SSE6	SSE5	SSE5	SSE5	SE6	SE8	SE7	ESE7	SE7	SE6	SE6	S6	S6	S5	S3	SSE3	WNW2	N1	NE2	SSE4.4	SE8	
6-Sep	NNE2	NNW3	N4	N4	NNE3	N1	NW2	NNW4	N8	NNW5	N4	NNW6	N9	N8	NNE14	NNE12	NNE12	NNE12	NNE12	NNE13	N10	NNE13	N11	N9	N7.4	NNE14	
7-Sep	NNW7	NNW7	NNW7	N6	NNW3	N8	N8	N7	NNW6	NNW7	NNE11	N10	NNW10	NNW11	NNW11	NNW10	NNE13	NE12	NE8	N3	NNE2	WSW5	WSW7	WSW9	N6.4	NNE13	
8-Sep	WSW9	W5	SW6	SW5	S5	SSE6	SSE5	SSE4	SSE3	ESE3	SE5	SE5	NE2	SE3	S2	WSW3	SSW3	SSW3	W4	NNE5	E6	SE9	SSE7	S8	S2.8	SE9	
9-Sep	SSE8	SSE7	SSE9	SSE9	SE11	SSE10	SSE10	SSE7	SSE7	SSE9	SE7	SE5	SE7	SE9	SE8	SE4	NNW4	SE6	SE4	S6	S7	SSE6	SSE6	SE5	SSE6.7	SE11	
10-Sep	SSE7	SSE8	SSE8	SSE7	SSE8	SSE8	SSE7	SSE6	SE5	SSE7	SE8	SE7	S6	SSW10	SSW9	SW11	SSW8	SSW8	SSW7	SSW8	S8	S6	S6	SSE7	S6.7	SW11	
11-Sep	SSE6	SE8	SSE8	SSE10	SSE9	SSE8	SSE8	SSE7	SSE8	SSE10	S7	SW14	SW11	SW16	SW15	SW17	SW11	SSW5	SSW5	SSW7	SSW9	SSW7	SW9	WSW11	SSW7.6	SW17	
12-Sep	W13	WSW16	WSW17	W21	W20	W10	W9	W11	W11	WSW10	WSW9	W9	W10	WSW9	W15	W19	WSW21	WSW19	W19	W16	W16	NW9	N13	N12	W12.4	W21	
13-Sep	N6	NNW5	NNE3	W5	WNW3	WSW1	ENE2	SSW2	SE1	ENE2	ESE1	NW6	WNW6	NW6	NW5	WNW10	NW12	N7	NNE5	SW6	WSW8	WNW6	NNW7	N8	NW3.5	NW12	
14-Sep	N16	NNE12	N10	N14	NNE16	N15	NNE16	NNE14	NNE11	NNE13	N13	N11	N9	NNW9	NNW10	NNE11	ENE8	E5	NE6	NE7	E4	NNE5	E4	SW2	NNE9.1	N16	
15-Sep	WSW5	WSW6	SW3	WNW3	W2	SE2	SE2	SE2	SE1	E3	E2	SSE2	SE9	SE11	SSE13	SSE14	SE10	SE10	SE9	SE8	SE4	SE5	SE4	ESE3	S2	SSE4.4	SSE14
16-Sep	W3	W4	S2	WSW4	SW2	ESE2	SW2	S3	SW4	WSW3	W3	E3	SE4	SE6	SE10	SE11	SSE8	SSE8	SSE8	SSE8	SSE10	SSE10	SSE11	SSE9	SSE4.6	SE11	
17-Sep	SSE7	SSE8	SSE8	SSE8	SSE8	SSE8	SSE7	SSE10	SSE6	SE5	SE7	SSE11	SSE11	SSW9	SSE7	SSE7	SW11	SSW7	S12	S12	SSE10	S11	SSE9	SSE9	SSE8.3	S12	
18-Sep	SE7	SE7	SE9	SSE9	SSE9	SSE9	SSE9	SSE7	SSE6	SW10	SW12	SW19	WSW20	WSW18	WSW19	SW19	WSW20	WSW18	SSW9	S9	S9	SSE12	SSE11	SSE10	SSW9.1	WSW20	
19-Sep	SSE11	SSE11	S14	SSE14	SSE14	SSE13	SSE12	S12	S12	S11	SSW18	WSW23	SW25	SW24	WSW28	WSW30	WSW18	WSW29	SW16	SW20	SW17	WSW15	WSW15	W13	SW14.7	WSW30	
20-Sep	WSW13	SW12	WSW13	WSW16	WSW21	WSW19	SW9	SSW8	SSW12	WSW19	WSW23	W28	WSW29	W31	WSW27	W26	W21	WNW15	WNW12	NW7	NW7	NNW9	NNW11	NW10	W15.0	W31	
21-Sep	WNW13	W16	W20	W19	WNW15	WNW15	NW14	NNW19	NNW16	NNW13	NNW12	NW14	NW15	NW15	NNW14	NNW14	NNW10	WNW19	WNW17	WNW16	WNW15	WNW13	W12	W11	NW13.3	W20	
22-Sep	W11	WSW9	W5	WSW9	WSW9	WSW5	SW5	SSW4	M	M	M	M	M	M	SE6	SSE9	S6	S5	SSE8	SE10	SE9	SE10	SSE9	SSE9	S4.8	W11	
23-Sep	SSE8	SE7	SE6	SE10	SE13	SE13	SE12	SE14	SE12	SE14	SE14	ESE12	ESE12	ESE15	ESE13	ESE13	ESE12	SE15	SE15	SE15	SE17	SE15	SE13	SE12.4	SE17		
24-Sep	SE13	SE13	SE12	SE10	SE10	SSE10	SSE8	SSE9	SSE8	S7	SE7	SE8	SE9	SE8	SE8	SE10	SE7	E5	E9	SE8	ESE11	SE14	SE12	SE13	SE9.3	SE14	
25-Sep	SE13	SE10	SE12	SE12	SE9	SSE9	S8	WSW10	W18	W21	W15	WSW15	WSW20	WSW18	SW20	WSW21	WSW17	WSW13	SW11	SW9	SW11	SW14	SW14	SW10	SW10.2	W21	
26-Sep	SSW8	S7	SSW6	SSE8	SSE8	SSE7	S7	SSW10	SSW11	SW15	WSW19	WSW20	WSW29	SW25	WSW28	WSW27	WSW33	WSW23	WSW24	WSW21	SW13	WSW17	WSW17	SW16	SW15.2	WSW33	
27-Sep	SW9	SSE8	SSW11	WSW19	WSW16	SW9	WSW19	W39	WNW35	NW28	WNW29	WNW33	WNW33	WNW33	WNW29	WNW28	WNW21	WNW18	WNW13	WNW15	WNW16	NW18	WNW25	WNW17	WNW19.3	W39	
28-Sep	WNW14	WNW14	W12	W14	W13	WSW11	WSW9	WSW8	W8	WNW6	W4	W5	W3	W4	WSW7	SE0	ESE6	SSE5	S9	SSE11	SSE10	SE11	SE12	SE11	SW4.4	W14	
29-Sep	SE11	SE12	SE12	SE11	SE11	SE10	SSE8	SSE7	SE8	SSE8	SE8	ESE7	SE8	ESE6	ESE5	SSW2	SW4	SSE7	SSE9	SSE8	SSE8	SSE11	SSE10	SSE10	SE7.9	SE12	
30-Sep	SE8	SE9	SE10	SSE9	SE12	SE11	SSE9	SSE9	SSE11	SSE12	SE12	SE11	SSW15	S16	SSW16	S14	S15	SSE13	SSE14	SSE15	S13	SSE14	SSE14	SSE12	SSE11.7	SSW16	

SSW2.8	SSW3.1	SSW3.9	SSW4.0	SSW4.0	S3.9	SSW3.5	SSW3.1	WSW2.4	W2.8	WSW3.0	WSW4.6	W5.9	WSW6.5	WSW6.1	WSW6.2	WSW5.3	WSW4.5	SW3.3	SW3.8	SSW3.7	SSW3.4	SW3.1	SSW3.0	Diurnal Average
N16	W16	W20	W21	WSW21	WSW19	WNW19	W39	WNW35	NW28	WNW29	WNW33	WNW33	WNW33	WNW29	WSW30	WSW33	WSW29	WSW24	WSW21	N20	N20	WNW25	WNW17	Diurnal Maximum

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

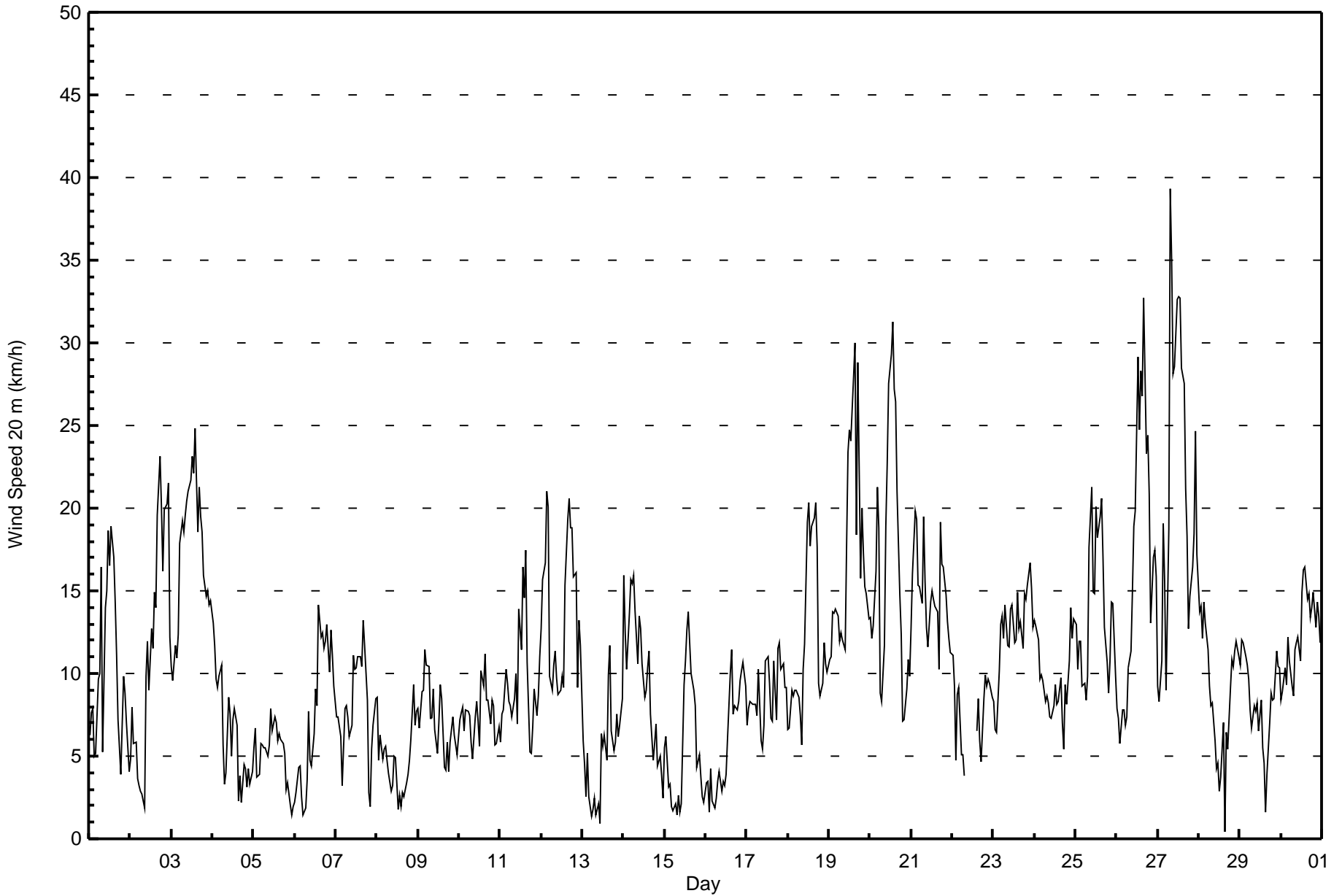


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 11 km/h on Sep 27 09:00	Hours of Data: 714
Minimum Value: 1 km/h on Sep 6 01:00	Hours of Missing Data: 6
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 9	Hours of Calibration: 0
	Percent Operational Time: 99.2

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

5	4	4	5	5	5	7	10	11	9	8	9	9	8	10	9	8	10	7	6	7	7	7	7	5	
Diurnal Maximum																									

M - Maintenance





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	134	18.77	18.77
6 - 11	328	45.94	64.71
12 - 19	192	26.89	91.60
20 - 28	47	6.58	98.18
29 - 38	12	1.68	99.86
> 38	1	0.14	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	7	8	2	4	7	5	19	14	15	9	8	9	12	6	2	7	134
6 - 11	19	5	3	1	2	6	63	102	24	20	16	23	11	5	11	17	328
12 - 19	9	17	1	0	0	6	29	14	9	4	14	26	22	25	7	9	192
20 - 28	6	0	0	0	0	0	0	0	0	0	4	17	12	7	1	0	47
29 - 38	0	0	0	0	0	0	0	0	0	0	0	5	1	6	0	0	12
> 38	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
<b>Totals</b>	41	30	6	5	9	17	111	130	48	33	42	80	59	49	21	33	714

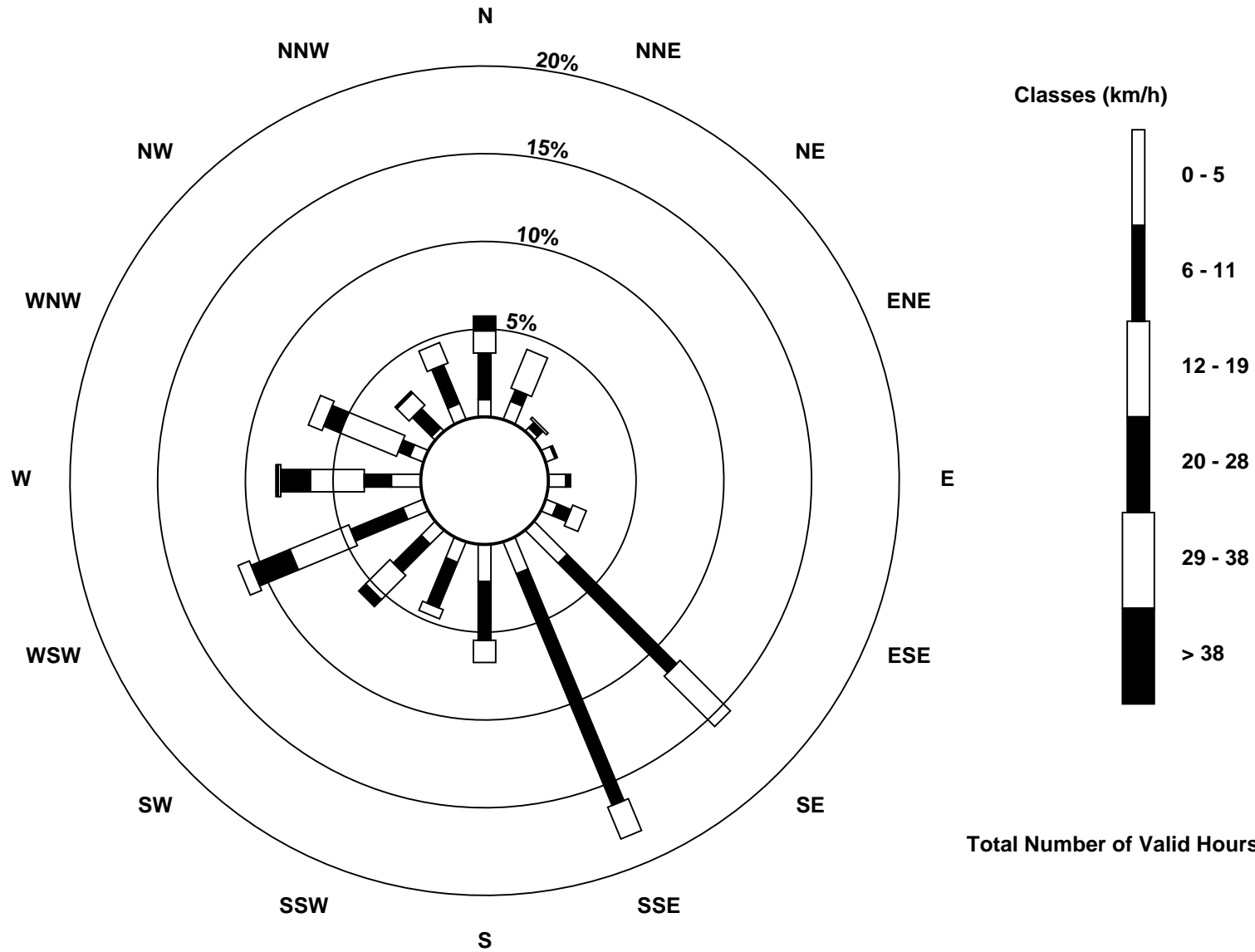
Total Number of Valid Hours: 714

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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







Maximum Speed: 46 km/h on Sep 27 08:00	Maximum Daily Speed Average: 25.4 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 13 11:00	Minimum Daily Speed Average: 3.9 km/h on Sep 8	Hours of Data: 714
Maximum Diurnal Speed Average: 8.1 km/h at hour 14	Minimum Diurnal Speed Average: 3.4 km/h at hour 9	Hours of Missing Data: 6
Monthly Average Velocity: 4.9 km/h 220.2 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 6 Q <sub>1</sub> = 10 Median = 15 Q <sub>3</sub> = 20 P <sub>90</sub> = 25 P <sub>99</sub> = 38	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-Sep	SSW15	SSE14	SSE14	SE10	SSE10	SE17	SSE17	SE25	ENE9	N22	NNW24	N29	NNW26	WNW26	W19	W17	WSW13	WSW9	SSW7	SW10	WSW13	SW16	SSW16	SW10	WSW4.1	N29
2-Sep	SSW8	S15	S13	S10	S6	S4	SSE4	SW2	NNE3	N14	NNE17	NNE12	N17	NNE14	NNE19	NNE20	N28	N33	N28	N24	N28	N28	N31	N19	N11.4	N33
3-Sep	NNW17	NNW16	NNW19	NNW18	NW19	NNW25	NNW26	NNW26	NNW27	NNW26	W24	W25	W28	NNW28	W28	NNW25	NNW26	NNW26	NNW24	NNW22	NNW20	W18	W18	W17	NNW21.7	W28
4-Sep	W16	W14	W12	W12	W14	W14	NW10	NNW6	NW6	W10	NW12	NNW6	NNW10	NW12	N9	N3	ENE4	NW3	SSE6	SE6	SSE5	SSW9	SSE6	SSE8	W5.2	W16
5-Sep	SSE12	SE12	SSE8	SSE10	SSE11	SE10	SSE10	SSE10	SSE8	SE7	SE9	ESE8	ESE9	SE10	SE8	SE8	S9	S9	S10	S6	SSE6	E1	ENE3	ENE5	SSE7.6	SE12
6-Sep	ENE6	NNE6	NNE8	NNE8	NE5	NNE4	NE3	N8	NNE12	N8	N6	NNW9	N12	N11	NNE19	NNE16	NNE17	NNE16	NNE19	N16	N19	N17	N15	NNE11.3	NNE19	
7-Sep	N13	N13	NNW13	N11	NNW6	N12	N12	N12	NNW10	NNW10	NNE14	N14	NNW15	NNW17	N16	NNW16	NNE17	NE15	NE11	NE4	NE3	WSW6	WSW7	W12	N9.9	NNE17
8-Sep	W14	WNW8	W8	WSW9	SSW7	SSW9	SSW7	SSE6	SSE4	ESE3	SE6	SE5	NE2	SSE3	SSW3	W3	S3	SSW5	WSW5	NE7	E9	SE15	SSE13	S17	S3.9	S17
9-Sep	SSE14	SSE13	SSE15	SSE16	SSE18	SSE17	SSE16	SSE9	SSE11	SSE13	SSE9	SE7	SE9	SE12	SE12	SSE7	NNW8	SE9	SE7	S13	S16	S17	S15	SSE11	SSE11.1	SSE18
10-Sep	SSE13	SSE14	SSE16	SSE13	SSE16	SSE14	SSE12	SSE8	SE6	SSE9	SSE11	SE9	S8	SSW15	SSW15	SW17	SSW15	SSW14	SSW15	SSW19	SSW20	SSW16	SSW14	S14	S12.2	SSW20
11-Sep	SSE13	SSE14	SSE15	SSE17	SSE16	SSE15	SSE14	SSE12	SSE12	SSE14	S10	WSW18	SW16	SW22	SW20	SW26	SW18	SW10	SSW11	SSW14	SW20	SW17	SW17	WSW17	SSW12.9	SW26
12-Sep	WSW18	WSW22	WSW25	W26	W25	W16	W15	W15	W15	W14	WSW13	W12	W13	WSW14	W19	W23	WSW25	WSW24	W24	W21	W23	NW17	N21	N18	W16.7	W26
13-Sep	N10	N9	N7	NNW7	NNW6	NW3	NE3	S3	ESE2	ENE3	SSW0	NW9	NW7	NW8	NW6	NW13	NW19	N10	NNE6	SW8	WSW10	NNW9	NNW12	N14	NNW5.7	NW19
14-Sep	N22	NNE17	N15	N19	NNE21	NNE21	NNE22	NNE18	NNE14	NNE17	NNE17	N15	N12	NNW13	NNW15	NNE14	ENE9	E6	NE7	ENE10	ENE6	NE8	E8	SE4	NNE12.5	N22
15-Sep	SSE5	S6	SSE7	SSW3	WNW2	SE2	SE3	ESE2	ESE2	SSE3	SE12	SE14	SSE17	SSE18	SE13	SE13	SE12	SE12	SE12	SE8	SE9	SE6	ESE4	SE4	SE7.0	SSE18
16-Sep	S4	SW2	SE2	SSE1	S1	SE4	SSW3	SSE6	SW3	WSW3	E4	SE5	SE7	SE12	SE15	SSE11	SSE12	SSE15	SSE15	SSE17	SSE19	SSE19	SSE18	SSE7.8	SSE19	
17-Sep	SSE13	SSE14	SSE15	SSE15	SSE13	SSE13	SSE12	SSE14	SSE8	SE7	SE10	SSE15	SSE15	SSW13	SSE11	S11	SSW18	SSW13	S21	S23	S21	S21	S19	SSE17	SSE14.1	S23
18-Sep	SSE12	SSE11	SSE14	SSE15	SSE16	SSE16	SSE15	SSE11	SSE7	SW13	SW15	SW24	WSW25	WSW21	WSW23	SW26	WSW26	WSW24	SW17	SSW20	SSW22	S24	SSE20	S20	SSW14.5	SW26
19-Sep	S22	S22	S25	S25	S24	SSE23	S22	S24	S24	S22	SSW26	WSW30	SW32	SW32	WSW35	WSW38	WSW23	WSW36	SW24	SW28	SW24	WSW23	WSW21	W18	SW22.1	WSW38
20-Sep	WSW20	WSW19	WSW20	WSW25	W27	WSW25	SW16	SSW14	SSW18	WSW22	WSW28	W31	WSW34	W36	WSW32	W31	W24	WNW21	WNW17	NW14	NW13	NNW15	NW18	NW15	W19.5	W36
21-Sep	WNW18	W19	W22	W22	WNW20	WNW22	NW22	N29	NNW23	NNW18	NNW16	NW20	NW22	NW21	N20	NNW20	NNW15	WNW24	WNW22	WNW23	WNW21	WNW19	W15	WNW15	NW18.2	N29
22-Sep	W15	W13	WNW11	W13	W13	W8	WSW5	SW5	M	M	M	M	M	M	SE8	SSE11	SSE10	S8	SE14	SE15	SE15	SE16	SSE16	SE16	S5.5	SE16
23-Sep	SE14	ESE10	SE11	SE16	SE19	SE19	SE17	SE20	SE18	ESE16	ESE18	ESE19	ESE16	E15	ESE19	ESE16	ESE17	ESE15	ESE20	SE20	SE22	SE23	SE23	SE20	ESE17.5	SE23
24-Sep	SE21	SE20	SE18	SE15	SE16	SE16	SE15	SE12	SSE13	SSE11	SE9	SE10	SE12	ESE10	ESE11	SE14	SE10	E8	E14	ESE12	ESE15	SE21	SE20	SE21	SE13.9	SE21
25-Sep	SE20	SE16	SE18	SE19	SE15	SSE17	SSE16	WSW15	W22	W27	W18	WSW17	WSW24	SW23	SW25	WSW24	WSW21	SW18	WSW18	SW18	SW20	SW23	SW22	SW18	SW14.2	W27
26-Sep	SW17	SSW13	SW11	S11	SSW11	SSW11	SSW16	SSW21	SSW17	SW19	SW23	SW25	WSW35	SW31	WSW35	WSW33	WSW38	WSW29	WSW29	WSW26	SW19	SW23	SW24	SW22	SW21.6	WSW38
27-Sep	SW15	SSE13	SSW18	WSW24	WSW21	SW14	WSW24	W46	WNW45	NW39	WNW37	W40	WNW42	WNW42	WNW37	W35	WNW28	WNW25	WNW18	W20	WNW23	NW26	WNW33	WNW26	W25.4	W46
28-Sep	WNW21	WNW20	W15	W18	W17	WSW16	WSW13	W11	W10	WNW8	W5	W5	WSW4	W5	WSW9	SSW1	E8	SSE8	S18	SSE17	SSE17	SE17	SE18	SE17	SW5.7	WNW21
29-Sep	SE16	SE17	SE17	SE16	SE16	SE15	SSE13	SSE12	SE11	SSE10	SE9	ESE7	ESE9	ESE6	ESE5	SSW1	SSW6	SSE11	SSE16	SSE15	SSE16	SSE19	SSE18	SSE18	SE11.8	SSE19
30-Sep	SSE15	SE15	SE17	SSE16	SE20	SE19	SSE18	SSE16	SSE17	SSE16	SE16	SE14	S23	S25	S24	S23	S24	SSE20	SSE23	SSE24	SSE24	SSE23	SSE22	SSE20	SSE19.1	S25

SSW4.6	S4.8	S5.7	SSW5.6	SSW5.5	S5.7	S5.6	SSW4.6	SW3.4	W3.5	WSW3.8	W5.4	W7.1	WSW8.1	WSW7.2	WSW7.6	WSW6.6	WSW5.7	SW5.3	SSW6.1	SSW6.2	SSW6.0	SSW5.3	SSW5.0	Diurnal Average																								
																							N22	WSW22	S25	W26	WSW27	WNW25	WNW26	W46	WNW45	NW39	WNW37	W40	WNW42	WNW42	WNW37	WSW38	WSW38	WSW36	WSW29	SW28	N28	N28	WNW33	WNW26	Diurnal Maximum	

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

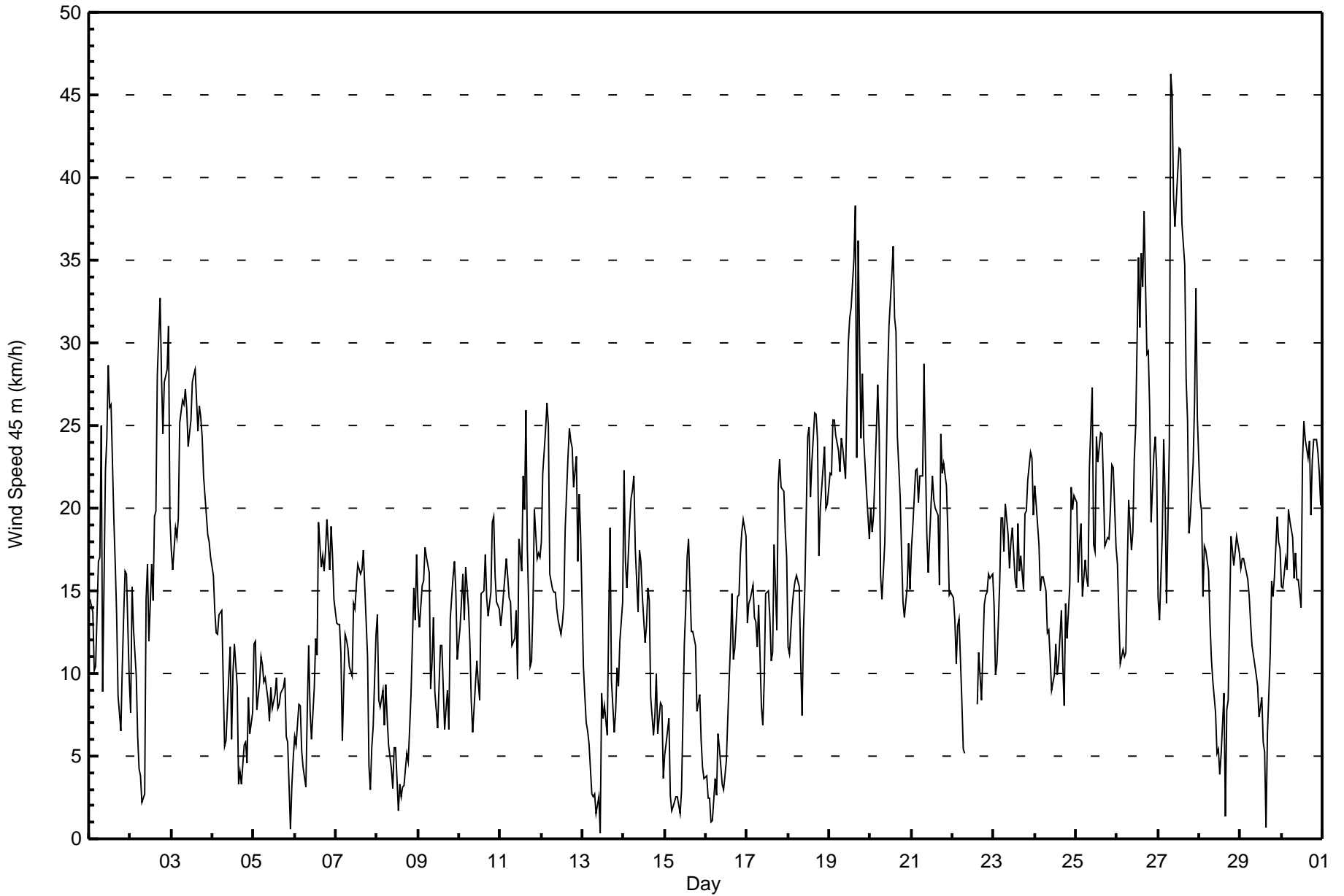


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 12 km/h on Sep 9 17:00	Hours of Data: 714
Minimum Value: 1 km/h on Sep 6 05:00	Hours of Missing Data: 6
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 9	Hours of Calibration: 0
	Percent Operational Time: 99.2

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

Diurnal Maximum

M - Maintenance





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	64	8.96	8.96
6 - 11	157	21.99	30.95
12 - 19	303	42.44	73.39
20 - 28	158	22.13	95.52
29 - 38	26	3.64	99.16
> 38	6	0.84	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	2	6	4	2	6	9	7	5	7	4	4	4	1	2	0	64
6 - 11	10	4	4	5	5	8	28	34	12	11	5	6	5	5	6	9	157
12 - 19	20	20	1	0	2	11	49	77	10	21	17	13	32	5	9	16	303
20 - 28	9	4	0	0	0	1	14	9	20	5	18	27	15	27	5	4	158
29 - 38	4	0	0	0	0	0	0	0	0	0	3	12	4	3	0	0	26
> 38	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	0	6
<b>Totals</b>	44	30	11	9	9	26	100	127	47	44	47	62	62	44	23	29	714

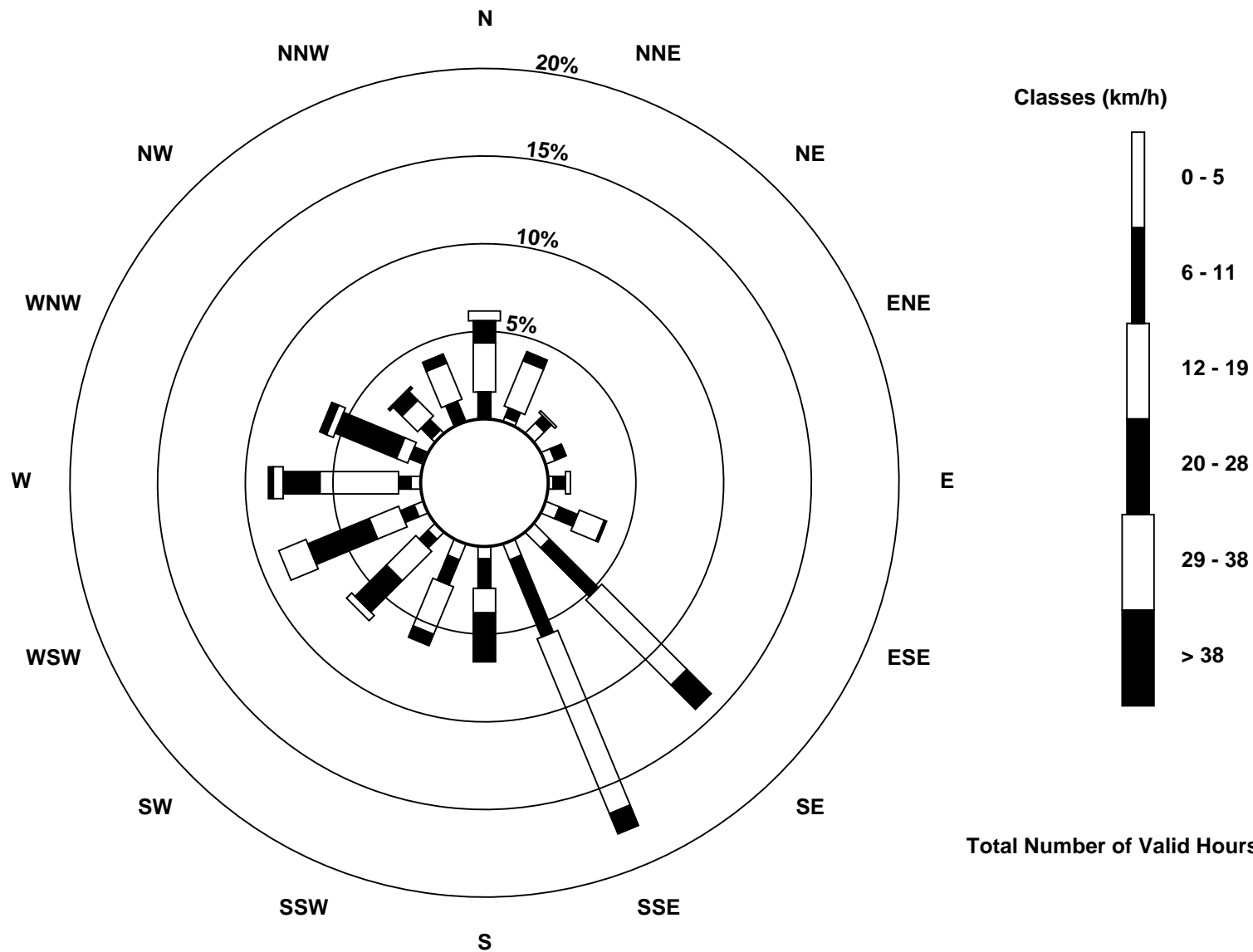
Total Number of Valid Hours: 714

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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



Total Number of Valid Hours: 714



Maximum Speed: 50 km/h on Sep 27 08:00	Maximum Daily Speed Average: 28.1 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 1 km/h on Sep 29 16:00	Minimum Daily Speed Average: 3.7 km/h on Sep 8	Hours of Data: 714
Maximum Diurnal Speed Average: 9.0 km/h at hour 14	Minimum Diurnal Speed Average: 4.0 km/h at hour 10	Hours of Missing Data: 6
Monthly Average Velocity: 5.9 km/h 222.5 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 6 Q <sub>1</sub> = 11 Median = 17 Q <sub>3</sub> = 24 P <sub>90</sub> = 29 P <sub>99</sub> = 42	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-Sep	SW17	S16	SSE17	SSE14	SSE14	SE22	SSE21	SE29	ENE13	N26	N29	N33	NNW30	NNW29	W21	W17	WSW15	WSW9	SSW7	SW12	WSW16	SW18	SW20	WSW14	WSW4.9	N33
2-Sep	SW7	S13	S15	S11	SSW5	WSW2	SE3	SE2	NE4	N18	NNE20	NNE14	NNE18	NNE16	NNE21	NNE23	NNE32	N38	N33	N29	NNE31	NNE33	N36	N23	NNE13.9	N38
3-Sep	N22	NNW20	NNW23	NNW22	NNW22	NNW28	NNW29	NNW29	NNW29	NNW27	W25	W27	NNW28	NNW29	W29	NNW27	NNW27	NNW27	NNW26	NNW25	NNW22	W20	W20	W19	NNW23.4	NNW29
4-Sep	W18	W16	W14	W14	W17	W17	NW11	NNW6	NW6	NNW10	NW12	NNW6	NNW11	NW12	N10	NNE3	NE4	NW3	SSE5	SE5	SSE4	S10	S11	S11	NNW5.9	W18
5-Sep	SSE13	SSE14	SE10	SSE14	SSE17	SE15	SE15	SE14	SSE12	SE7	SE7	ESE8	SE10	SE8	SE8	SSE9	S11	S11	SSE9	SSE8	SE2	ENE4	E5	SSE9.3	SSE17	
6-Sep	ENE9	NE8	NE8	NE9	ENE7	E3	E3	NNE8	NNE12	N9	N7	N9	N13	N12	NNE21	NNE19	NNE20	NNE20	NNE22	NNE24	NNE20	NNE23	N20	N17	NNE12.7	NNE24
7-Sep	N15	N16	N17	N15	N8	N15	N14	N13	NNW11	N10	NNE15	N15	N17	NNW18	N18	N18	NNE19	NE18	NE13	NE6	NE4	W2	WSW4	WSW11	N11.5	NNE19
8-Sep	W14	NW12	WNW7	W10	WSW8	SW8	SW8	SW6	S4	SE3	SE5	SE5	ENE2	SSE3	SW3	W3	S4	SSW5	WSW4	NE7	ESE8	SE20	SE18	SSE23	SSW3.7	SSE23
9-Sep	SSE21	SSE19	SSE21	SSE23	SSE24	SSE23	SSE19	SSE10	SSE14	SSE17	SSE12	SE7	SE9	SE10	SE13	SSE7	NW10	SE7	SSE8	S15	S13	S23	S21	S9	SSE13.6	SSE24
10-Sep	S9	S9	S10	SSE10	SSE14	SSE19	SSE17	SSE12	SSE8	SSE10	SSE12	SE10	S10	SSW16	SSW16	SW19	SSW16	SSW16	SSW19	SW22	SW22	SW22	SW21	SSW19	SSW13.6	SW22
11-Sep	SSW15	S14	S15	SSE15	SSE20	SSE17	S15	S15	S15	SSE15	SSW12	SW19	SW18	SW24	SW22	SW29	SW21	SW13	SW13	SW19	SW28	SW25	WSW24	WSW22	SSW16.3	SW29
12-Sep	WSW23	WSW27	WSW30	W31	W29	W21	W20	W19	W18	W18	WSW17	W15	W16	W19	W21	W26	WSW28	WSW28	W28	W26	W27	NNW21	N26	N23	W19.9	W31
13-Sep	NNE14	N11	N10	NNW8	NNW8	NNW4	N5	ESE1	ESE2	ENE3	SW1	NW9	NW7	NW8	NW6	NW13	NW21	N11	NE7	SW6	W14	WNW12	NNW15	N17	NNW6.9	NNW21
14-Sep	N25	NNE20	N18	N22	NNE23	NNE23	NNE25	NNE20	NNE15	NNE20	NNE19	N16	N12	N13	NNW16	NNE16	ENE9	E6	NE9	ENE12	ENE8	NE12	E10	ESE5	NNE14.2	N25
15-Sep	SSE7	SSE9	SE10	SE4	N1	SE3	SE3	SE3	SE2	SE1	SSE3	SE10	SE13	SSE17	SE18	SE12	SE13	SE14	SE12	SE8	SE11	SE7	SE6	SE4	SE7.8	SE18
16-Sep	SE7	S3	SE2	SE3	SE2	SSE6	SSW3	SSE8	S7	SSW3	W2	ESE4	SE5	SE7	SE11	SE14	SSE11	SSE13	SSE17	SSE19	SSE22	SSE25	SSE27	S24	SSE9.7	SSE27
17-Sep	SSE19	SSE21	SSE20	SSE16	SSE15	SSE16	SSE17	SSE17	SSE10	SSE9	SSE12	SSE17	SSE16	S15	SSE12	S12	SW19	SSW14	S27	S28	S28	S28	S23	S21	S17.5	S28
18-Sep	S15	S12	S9	SSE15	S17	S15	S17	S13	S10	SW13	SW16	SW26	WSW26	WSW22	WSW25	SW28	WSW28	WSW26	SW20	SSW23	SSW27	S26	S23	S26	SSW17.4	SW28
19-Sep	S29	S28	S33	S32	S31	S29	S30	S32	S30	SSW26	SSW29	SW33	SW34	SW36	WSW38	WSW43	WSW26	WSW41	SW29	SW33	SW28	WSW27	WSW26	W23	SW27.0	WSW43
20-Sep	WSW26	WSW23	WSW25	WSW30	WSW32	WSW30	SW21	SW19	SSW20	WSW24	WSW30	W33	WSW36	W38	WSW34	W33	W25	WNW22	WNW21	NW17	NNW17	NNW19	NW20	NW17	W22.0	W38
21-Sep	WNW20	NNW20	W24	W24	WNW22	WNW24	NW25	N34	NNW26	NNW20	NNW17	NW21	NW23	NNW22	N23	NNW22	NNW17	WNW25	WNW24	WNW25	WNW24	WNW21	W16	NNW17	NW20.2	N34
22-Sep	WNW17	WNW15	WNW13	W13	WNW14	NW10	NNW1	SW4	M	M	M	M	M	M	SE8	SE12	SSE11	S9	SE17	SE18	SE18	SE18	SE19	SE21	S4.8	SE21
23-Sep	SE15	ESE8	SE12	SE15	SE23	SE16	ESE12	SE22	SE20	SE16	ESE16	SE16	ESE12	ESE12	ESE15	ESE13	ESE14	ESE12	ESE16	SE18	SE23	SE25	SE25	SE21	ESE16.5	SE25
24-Sep	SE24	SE21	SE22	SE19	SE17	SE16	SE17	SE16	SSE16	S12	SE9	SE10	SE12	SE9	ESE9	SE14	SE12	E7	E12	ESE10	ESE13	SE26	SE25	SE27	SE15.3	SE27
25-Sep	SE27	SE21	SE23	SE23	SE18	SSE21	S20	WSW22	W27	W30	W19	WSW19	WSW26	SW25	SW27	WSW27	WSW24	SW20	WSW23	SW25	SW29	SW29	SW29	SW24	SW16.8	W30
26-Sep	SW22	SW17	SW16	SSW14	SW15	SW17	SW22	SW27	SW21	SW20	SW25	WSW28	WSW38	SW34	WSW39	WSW38	WSW41	WSW33	WSW32	WSW30	SW24	SW28	SW29	SW27	SW26.0	WSW41
27-Sep	SW19	S13	SSW22	WSW28	WSW25	SW18	WSW27	W50	WNW48	NW43	WNW39	W43	WNW44	WNW44	WNW40	W37	WNW30	WNW27	WNW21	WNW23	WNW26	NW29	WNW35	WNW28	W28.1	W50
28-Sep	WNW23	WNW23	W17	W21	W21	W19	W16	W15	WNW11	WNW8	W6	WSW6	WSW4	W5	WSW9	SW2	E6	SSE10	S24	SSE24	SSE23	SE24	SE22	SE19	SW6.5	S24
29-Sep	SE18	SE18	SE15	SE16	SE19	SE19	SSE17	SSE18	SE13	SSE10	SE10	ESE6	ESE6	ESE5	ESE5	SSE1	SSW8	SSE14	SSE18	SSE18	SSE23	S23	S20	S21	SSE13.3	S23
30-Sep	SSE19	SSE20	SSE23	SSE22	SSE28	SSE28	SSE29	SSE25	SSE22	SSE17	SE17	SE15	S25	S28	S26	S25	S27	SSE23	SSE28	S31	S32	S31	S29	S25	SSE24.3	S32

SSW5.8	SSW5.6	SSW6.5	SSW6.4	SSW6.5	SSW6.8	SSW6.7	SSW5.8	SW4.3	W4.0	WSW4.4	W6.1	W7.9	WSW9.0	WSW7.8	WSW8.4	WSW7.2	WSW6.4	SW6.5	SSW7.2	SSW7.6	SSW7.5	SSW7.0	SSW6.6	Diurnal Average
S29	S28	S33	S32	WSW32	WSW30	S30	W50	WNW48	NW43	WNW39	NNW43	NNW44	NNW44	NNW40	WSW43	WSW41	WSW41	N33	SW33	S32	NNE33	N36	WNW28	Diurnal Maximum

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



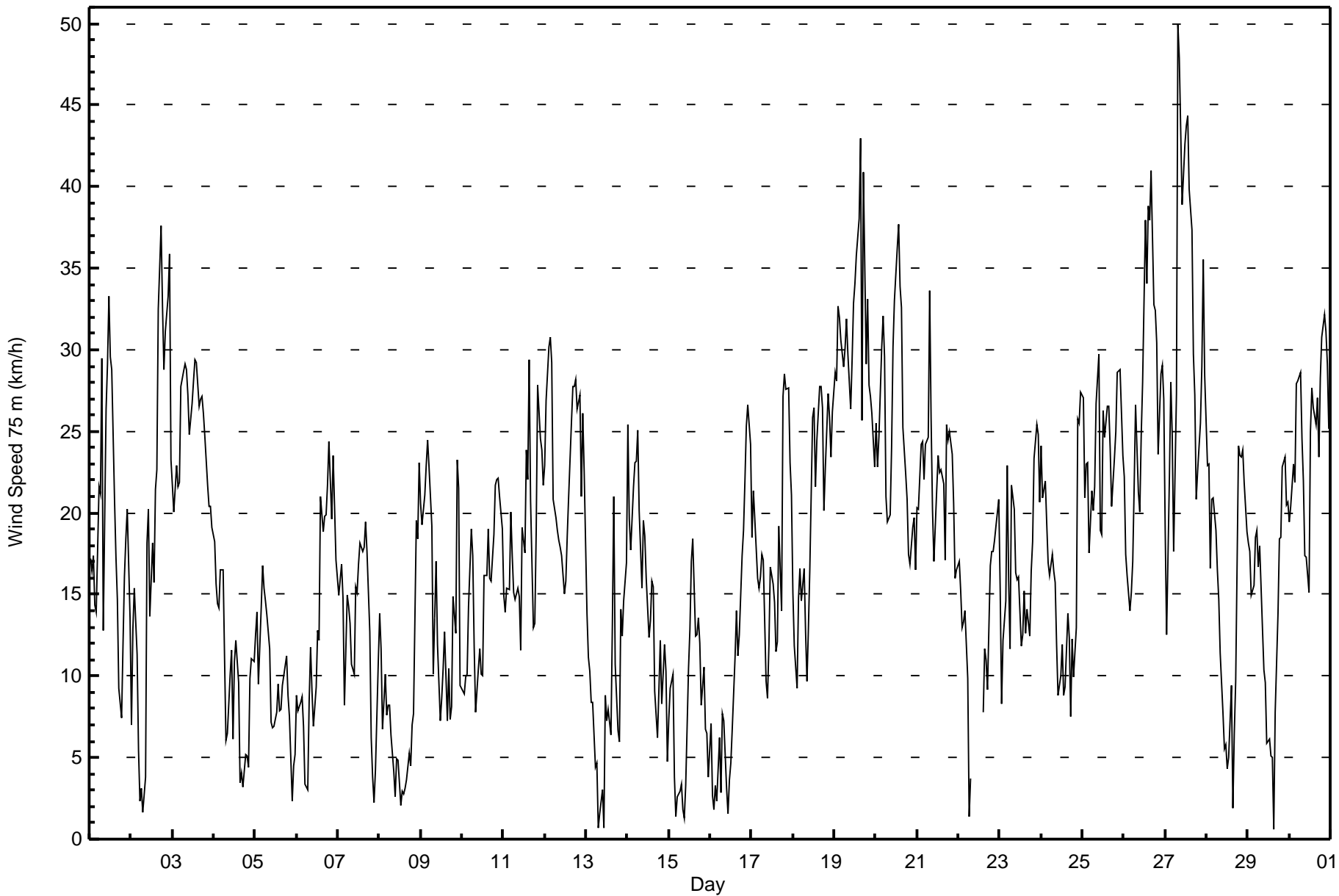
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 14 km/h on Sep 9 17:00	Hours of Data: 714
Minimum Value: 1 km/h on Sep 15 05:00	Hours of Missing Data: 6
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 9	Hours of Calibration: 0
	Percent Operational Time: 99.2

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

6	6	6	5	5	5	12	10	9	8	7	7	8	8	11	9	14	10	7	7	6	6	6	5	
Diurnal Maximum																								

M - Maintenance







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	63	8.82	8.82
6 - 11	124	17.37	26.19
12 - 19	231	32.35	58.54
20 - 28	218	30.53	89.08
29 - 38	66	9.24	98.32
> 38	12	1.68	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 720



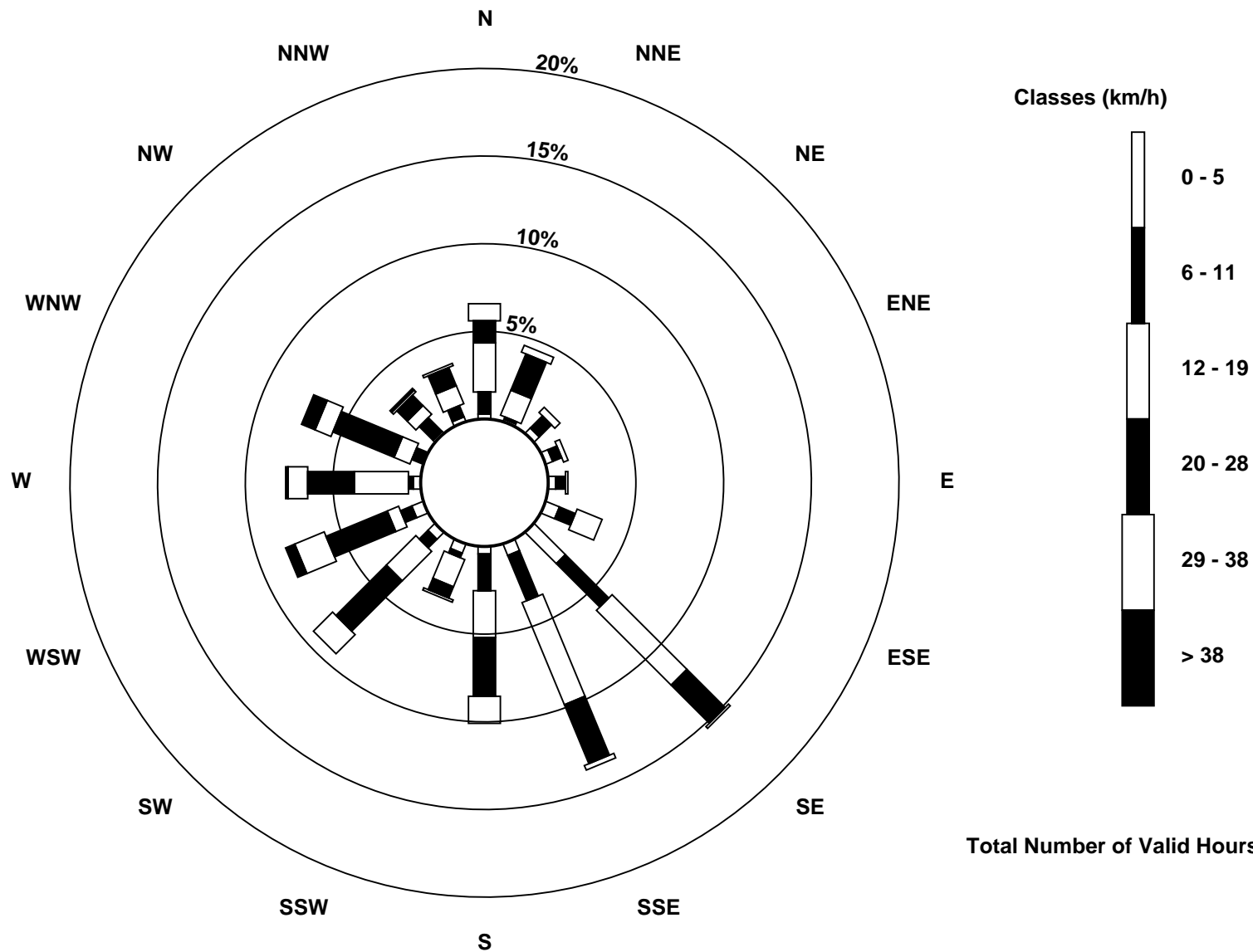
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	1	3	3	3	6	18	5	3	4	4	5	3	0	1	2	63
6 - 11	9	1	7	4	4	7	25	20	15	2	5	5	2	5	8	5	124
12 - 19	20	11	3	2	1	11	43	45	19	12	17	5	22	7	5	8	231
20 - 28	9	16	0	0	0	0	22	26	24	5	29	27	19	27	6	8	218
29 - 38	7	3	0	0	0	0	1	2	11	1	11	13	8	7	1	1	66
> 38	0	0	0	0	0	0	0	0	0	0	0	4	1	6	1	0	12
<b>Totals</b>	47	32	13	9	8	24	109	98	72	24	66	59	55	52	22	24	714

Total Number of Valid Hours: 714

Total Number of Hours: 720



Total Number of Valid Hours: 714



Maximum Speed: 46 km/h on Sep 27 08:00	Maximum Daily Speed Average: 28.9 km/h on Sep 19	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 13 11:00	Minimum Daily Speed Average: 3.4 km/h on Sep 8	Hours of Data: 713
Maximum Diurnal Speed Average: 8.6 km/h at hour 14	Minimum Diurnal Speed Average: 4.3 km/h at hour 10	Hours of Missing Data: 7
Monthly Average Velocity: 6.3 km/h 220.8 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 7 Q <sub>1</sub> = 12 Median = 19 Q <sub>3</sub> = 25 P <sub>90</sub> = 31 P <sub>99</sub> = 42	Percent Operational Time: 99.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	SW20	S16	SSE15	SSE12	SSE13	SE24	SSE24	SE32	ENE15	N28	NNW31	N35	NNW31	UO	W20	W17	WSW15	WSW10	SSW8	SW13	WSW17	SW20	SW22	WSW16	SW4.8	N35	
2-Sep	WSW8	S12	S14	S11	SW5	WNW3	ESE5	ESE3	NNE4	N20	N22	NNE15	N18	NNE16	NNE22	N24	N34	N39	N35	N30	N32	N35	N38	N25	N15.1	N39	
3-Sep	NNW23	NNW21	NNW24	NW23	NW22	WNW28	WNW29	WNW29	WNW29	WNW27	W25	W27	W28	W29	W29	WNW27	W27	WNW27	W26	WNW25	W22	W21	W21	W20	NNW23.6	WNW29	
4-Sep	W19	W16	W15	W14	W17	W17	NW12	NNW7	NW7	W10	NW12	WNW6	NW11	NW12	NNW10	N4	NE4	WNW3	SSE5	ESE6	SE5	S10	S13	S13	W6.1	W19	
5-Sep	S13	SSE14	SE11	SE16	SSE20	SE18	SE17	SE16	SSE14	SE9	ESE9	ESE8	ESE9	SE10	SE9	SE9	SSE10	SSE11	S12	SSE10	SE8	SE3	ENE5	ENE6	SE10.5	SSE20	
6-Sep	ENE11	NE9	NE10	NE9	ENE7	ESE4	E6	NNE8	NNE11	N10	N8	N10	N13	N12	N21	NNE20	NNE21	NNE22	NNE24	NNE26	N20	N25	N21	N18	NNE13.3	NNE26	
7-Sep	N16	N17	N18	N16	N10	N17	N16	N14	NNW11	NNW10	NNE16	N16	NNW18	NNW19	N18	NNW18	NNE20	NNE19	NE13	NE7	NE4	W1	SW3	WSW9	N12.2	NNE20	
8-Sep	W13	NW11	WNW6	W11	WSW9	SW8	SW8	SW5	SSW3	SE3	SE5	SE5	E2	SSE3	SSW3	W3	S4	SSW5	WSW4	NE7	ESE11	SE22	SE21	SSE25	S3.4	SSE25	
9-Sep	SSE24	SSE23	SSE23	SSE23	SSE26	SSE24	SSE18	S10	SSE13	S16	S11	SE8	SE9	SE12	SE14	SSE8	NW10	ESE12	SSE10	S15	S11	S24	S23	S8	SSE14.3	SSE26	
10-Sep	S9	S7	S8	S8	SSE11	SSE15	SSE15	S12	SSE10	SSE12	SSE13	SE11	S11	SSW17	SSW17	SSW20	SSW17	SSW17	SSW20	SW22	SSW23	SW25	SW24	SSW23	SSW13.9	SW25	
11-Sep	SSW17	S14	S14	SSE13	SSE17	SSE15	S14	S14	S16	SSE16	S13	SW19	SW18	SW24	SW23	SW30	SW22	SW14	SW15	SW22	SW31	SW29	WSW27	WSW24	SSW17.4	SW31	
12-Sep	WSW25	WSW29	WSW32	WSW32	W31	W22	W21	W20	W20	W19	WSW19	W16	W17	WSW20	W22	WSW26	WSW28	WSW29	WSW30	WSW29	W28	NNW22	N28	N24	W21.0	WSW32	
13-Sep	N15	N12	N11	NNW9	NW10	NNW7	NNW7	N1	ESE1	NE3	SW0	NW9	WNW7	NW8	NW7	WNW13	NW22	N11	NNE7	SW5	WSW14	W14	NNW15	N18	NNW7.6	NW22	
14-Sep	N26	N21	N19	N23	N24	N24	N26	NNE21	NNE16	NNE20	N19	N16	N13	NNW14	NNW16	NNE16	NE9	ENE7	NE10	ENE13	ENE9	NE13	ENE12	ESE8	NNE14.9	N26	
15-Sep	SE9	SSE10	SE10	ESE4	NE2	SE4	ESE5	ESE5	SE2	SE1	SSE3	SE12	SE14	SE18	SE19	SE13	SE14	SE15	SE13	ESE10	SE12	SE9	ESE9	ESE6	SE9.0	SE19	
16-Sep	SE7	SSE4	ESE3	ESE5	ESE4	SSE7	S4	SE9	S8	S3	W1	E4	SE5	SE7	SE12	SE15	SSE12	SSE13	SSE18	SSE21	SSE24	SSE27	SSE29	S26	SSE10.6	SSE29	
17-Sep	S19	SSE23	S19	S12	SSE12	SSE13	SSE18	SSE19	SSE11	SSE10	SSE13	SSE18	SSE16	S15	SSE12	S13	SSW20	S15	S30	SSE31	S30	S31	S25	S21	S18.1	SSE31	
18-Sep	SSW16	SSW14	SSW9	SSE13	S14	S14	S16	S14	S11	SW13	SW17	SW26	SW27	WSW21	WSW25	SW28	WSW28	SW27	SW21	SSW24	SSW29	S26	S25	S29	SSW18.4	S29	
19-Sep	S32	S31	S35	S34	S34	S32	S34	S36	S33	S28	SSW30	SW33	SW35	SW37	SW39	WSW44	WSW26	WSW42	SW31	SW35	SW29	WSW29	WSW28	WSW24	SSW28.9	WSW44	
20-Sep	WSW28	WSW25	SW27	WSW33	WSW33	WSW31	SW23	SW22	SSW21	WSW24	WSW30	WSW33	WSW36	WSW37	WSW34	W32	W25	WNW22	WNW22	NW19	NNW18	NNW21	NW21	NW17	WSW23.0	WSW37	
21-Sep	WNW21	W21	W25	W25	WNW23	WNW24	NW25	NNW35	NNW27	NNW21	NNW17	NW22	NW24	NW23	NNW23	NNW23	NNW18	WNW25	WNW25	WNW25	WNW24	WNW21	W16	W17	NW20.7	NNW35	
22-Sep	WNW18	WNW15	WNW12	W13	WNW13	NW10	N3	SW3	M	M	M	M	M	M	SE9	SSE12	SSE12	S10	SE18	SE20	SE20	SE21	SE21	SE24	SSE5.7	SE24	
23-Sep	SE19	ESE13	SE16	SE19	SE26	ESE17	ESE17	SE24	SE25	SE21	SE21	SE21	ESE18	ESE19	ESE23	ESE19	ESE21	ESE20	ESE24	ESE24	SE27	SE29	SE28	SE22	ESE21.3	SE29	
24-Sep	SE28	SE24	SE26	SE23	SE19	SE17	SE20	SE19	SSE18	S13	SSE10	SE12	SE13	SE11	SE12	SE16	SE14	E10	E19	ESE16	ESE21	SE30	SE30	SE32	SE18.3	SE32	
25-Sep	SE31	SE24	SE26	SE27	SE21	SSE23	S21	W24	W28	WNW30	W19	WSW18	WSW25	WSW24	WSW25	WSW26	WSW25	WSW24	WSW21	WSW25	WSW28	WSW32	WSW32	WSW32	WSW26	SW16.8	WSW32
26-Sep	WSW25	SW19	WSW19	SW15	SW17	SW19	SW23	SW28	SW22	SW19	WSW24	WSW27	WSW35	WSW32	WSW37	WSW37	W38	WSW31	W30	WSW29	WSW25	WSW29	WSW30	WSW28	WSW26.1	W38	
27-Sep	SW20	S13	SW23	WSW29	WSW25	SW19	WSW27	W46	WNW46	NW45	WNW39	WNW42	WNW44	WNW44	WNW40	WNW37	WNW30	WNW27	WNW21	WNW23	WNW26	NW29	WNW36	WNW29	NNW28.5	W46	
28-Sep	WNW24	WNW24	W17	W22	W22	W20	W18	W16	WNW12	WNW7	W6	WSW6	WSW5	WSW5	WSW10	SW2	ESE8	S11	S26	SSE28	SSE28	SE28	SE26	SE24	SW6.9	SSE28	
29-Sep	SE21	SE20	ESE17	SE17	SE21	SE22	SSE18	SSE22	SSE15	SSE11	SE10	ESE8	ESE9	ESE6	ESE6	SSE1	SSW8	SSE14	SSE19	SSE20	SSE27	S24	SSW21	S19	SSE14.3	SSE27	
30-Sep	S20	SSE21	SSE25	SSE24	SSE31	SSE31	SSE34	SSE29	SSE25	SSE19	SSE19	SSE17	S26	S28	SSW27	S26	S28	SSE25	S31	S34	S35	S34	S31	S27	S26.5	S35	

SSW6.7	SSW6.2	SSW6.7	SSW6.6	SSW6.7	SSW7.1	SSW7.1	SSW6.2	SW4.9	W4.3	WSW4.6	WSW6.1	W7.8	WSW8.6	WSW7.8	WSW8.4	WSW7.3	WSW6.4	SW6.9	SSW7.9	SSW8.3	SSW8.2	SSW7.7	SSW7.3	Diurnal Average
S32	S31	S35	S34	S34	S32	S34	W46	WNW46	NW45	WNW39	WNW42	WNW44	WNW44	WNW40	WSW44	W38	WSW42	N35	SW35	S35	N35	N38	SE32	Diurnal Maximum

M - Maintenance UO - Unstable Operation  
 All monthly, daily, and diurnal averages have been calculated using vector methods



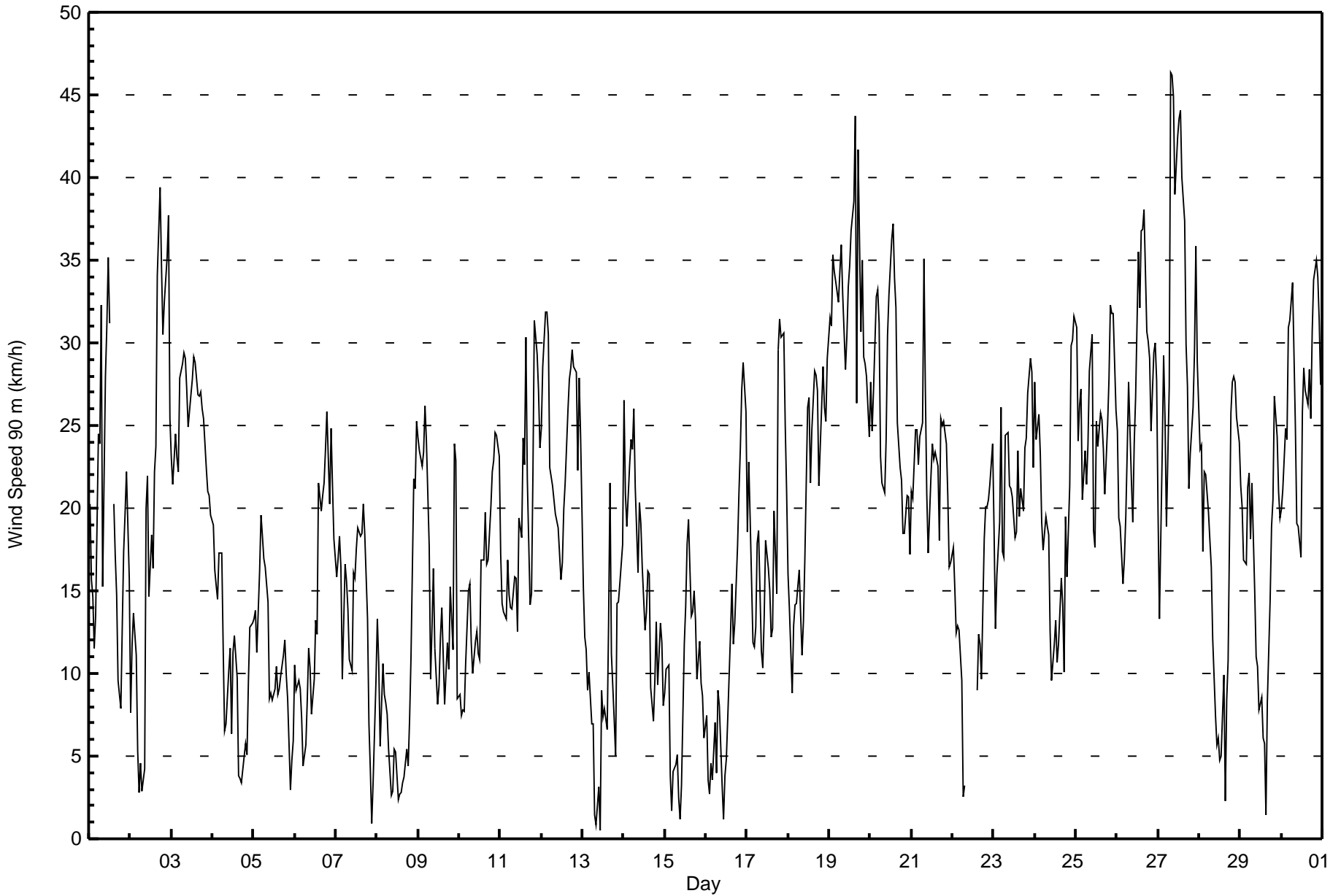
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 15 km/h on Sep 9 17:00	Hours of Data: 713
Minimum Value: 1 km/h on Sep 7 23:00	Hours of Missing Data: 7
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 10	Hours of Calibration: 0
	Percent Operational Time: 99.0

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

Diurnal Maximum

M - Maintenance

UO - Unstable Operation





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	56	7.85	7.85
6 - 11	117	16.41	24.26
12 - 19	203	28.47	52.73
20 - 28	232	32.54	85.27
29 - 38	93	13.04	98.32
> 38	12	1.68	100.00

Total Number of Valid Hours: 713

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	1	4	1	2	10	9	5	3	3	7	3	3	2	0	0	56
6 - 11	6	3	7	5	1	15	18	13	15	3	2	6	3	4	9	7	117
12 - 19	20	6	2	3	1	9	30	37	28	8	13	7	18	7	5	9	203
20 - 28	17	9	0	0	0	8	31	24	16	10	23	31	25	22	6	10	232
29 - 38	7	0	0	0	0	0	6	6	18	2	9	27	6	8	1	3	93
> 38	1	0	0	0	0	0	0	0	0	0	1	2	1	6	1	0	12
<b>Totals</b>	54	19	13	9	4	42	94	85	80	26	55	76	56	49	22	29	713

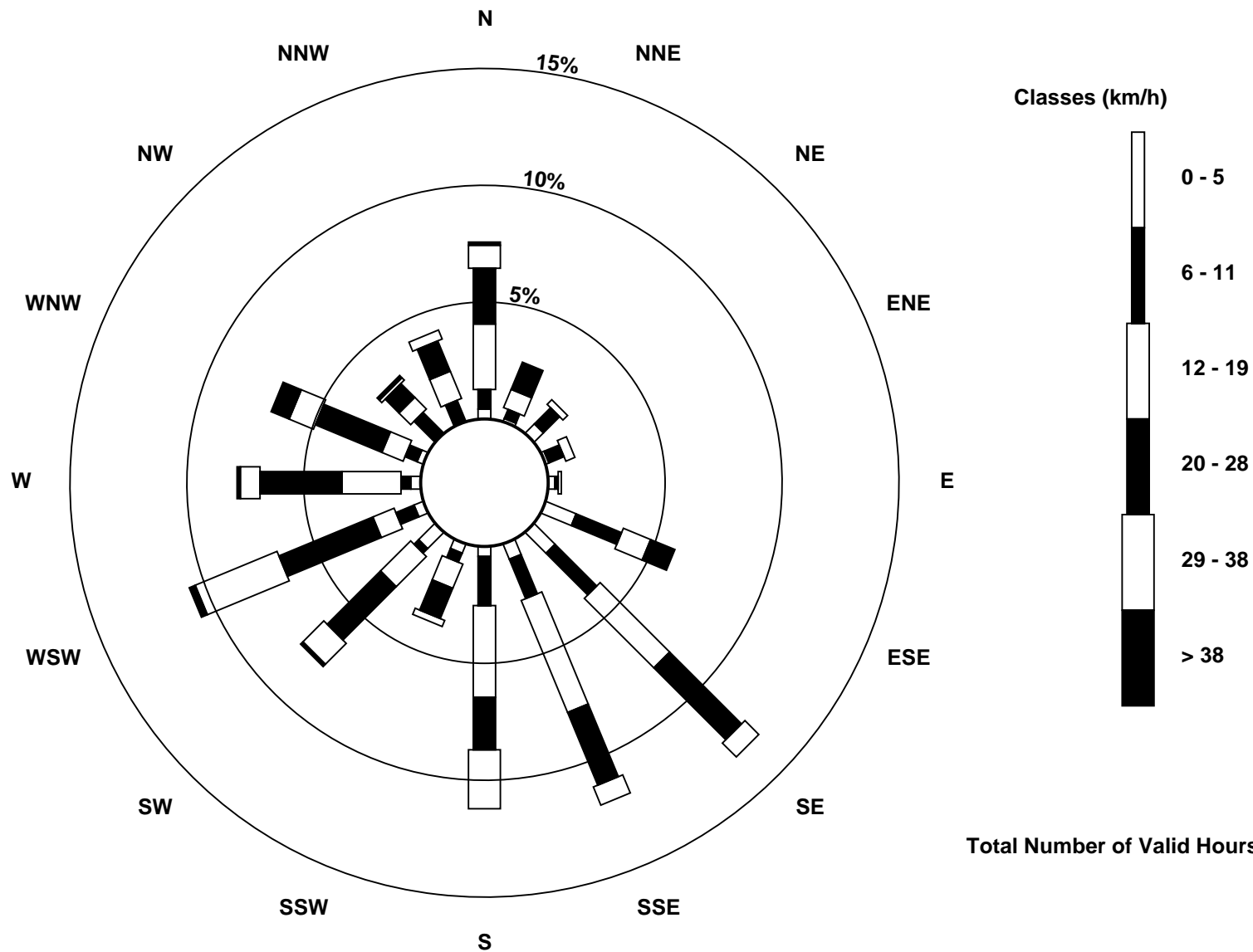
Total Number of Valid Hours: 713

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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





Direction of Maximum Speed: 275 deg on Sep 27 08:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 284.1 deg on Sep 27	Hours of Data: 714
Direction of Minimum Speed: 132 deg on Sep 28 16:00	Hours of Missing Data: 6
Direction of Minimum Daily Speed Average: 2.8 deg on Sep 8	Percent Operational Time: 99.2
Monthly Average Direction: 233.4 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	176	149	143	141	156	150	170	145	59	353	342	351	336	293	271	277	252	247	205	232	242	216	201	191	253.1
2-Sep	184	167	170	161	170	184	172	243	4	2	14	17	9	22	17	11	9	6	7	358	9	9	3	347	9.7
3-Sep	337	334	326	324	300	288	288	288	292	284	269	269	279	283	275	284	280	284	282	284	280	271	259	267	284.9
4-Sep	273	274	257	254	253	262	295	345	301	273	315	282	322	317	352	23	66	298	157	144	189	250	157	138	276.9
5-Sep	144	143	193	174	174	163	167	166	159	138	130	124	123	145	133	141	170	180	189	182	150	294	3	46	152.8
6-Sep	17	344	4	359	30	357	321	332	5	344	349	342	355	2	13	16	18	26	16	17	4	12	3	358	6.7
7-Sep	344	344	337	3	327	353	7	351	338	344	25	4	345	337	348	341	20	39	44	10	19	250	254	250	351.8
8-Sep	254	261	236	222	185	164	163	163	155	109	139	137	38	137	188	258	195	203	259	29	96	145	164	170	176.5
9-Sep	152	149	152	148	144	154	156	147	151	147	144	136	132	129	139	146	342	129	128	176	178	161	164	145	148.0
10-Sep	152	156	157	149	163	150	157	149	141	151	145	134	169	212	204	219	206	213	203	201	188	187	183	161	175.7
11-Sep	147	145	154	147	150	150	153	148	151	157	183	236	226	233	235	223	218	206	197	195	213	212	228	240	196.8
12-Sep	259	252	251	264	266	261	260	267	270	256	248	263	270	253	264	260	257	254	265	264	275	320	7	3	267.2
13-Sep	356	345	15	280	297	238	70	200	124	77	113	305	300	304	312	298	313	4	15	236	250	282	331	349	313.7
14-Sep	5	13	5	4	13	11	13	23	23	19	11	359	353	347	338	27	65	82	36	56	80	30	83	221	16.1
15-Sep	249	252	217	282	265	139	143	148	93	101	147	141	140	152	150	145	140	143	143	142	144	126	117	183	152.3
16-Sep	269	271	186	250	216	120	229	177	216	241	265	96	125	136	138	140	167	158	163	157	162	162	159	163	166.0
17-Sep	151	151	155	156	147	153	151	167	151	133	134	148	163	194	158	168	214	197	172	171	168	172	163	157	163.6
18-Sep	146	142	146	150	155	154	159	153	156	229	231	234	237	254	252	235	244	238	213	188	186	166	161	160	206.7
19-Sep	164	167	173	168	166	161	166	176	183	190	212	237	236	228	238	249	245	248	229	230	231	240	248	263	219.5
20-Sep	246	236	238	237	257	256	222	206	205	251	246	263	257	260	257	262	276	292	282	308	312	328	310	320	260.2
21-Sep	286	275	274	274	285	290	309	348	339	343	335	321	317	323	348	341	336	285	285	289	290	289	275	278	304.0
22-Sep	268	254	277	247	251	242	225	211	M	M	M	M	M	M	130	152	169	180	149	141	141	144	156	148	187.3
23-Sep	148	129	130	140	140	137	137	137	130	127	127	130	114	107	123	123	120	122	128	132	135	137	135	136	130.1
24-Sep	136	137	144	140	134	148	154	147	162	171	142	131	134	128	127	134	138	97	87	124	119	138	135	141	135.9
25-Sep	142	142	145	139	139	161	174	258	269	280	270	252	252	238	234	252	242	238	236	221	228	230	231	219	229.4
26-Sep	206	183	195	157	158	158	184	201	211	231	238	240	249	236	242	243	258	252	255	253	233	237	237	236	235.1
27-Sep	222	151	200	245	246	214	254	275	292	320	300	285	291	291	292	284	288	292	292	282	299	314	301	299	284.1
28-Sep	300	287	264	264	268	242	251	247	272	290	275	269	260	273	249	132	102	156	171	158	153	145	138	129	232.8
29-Sep	134	135	134	135	138	143	157	149	142	150	135	117	127	110	116	197	219	165	157	153	150	157	157	156	144.3
30-Sep	146	144	144	151	145	145	149	161	151	155	138	137	192	188	199	188	177	162	166	168	171	168	166	163	163.9

212.9 196.1 196.7 208.3 203.2 190.9 196.7 211.0 236.5 263.7 252.7 256.7 259.4 253.8 250.7 250.9 254.7 247.9 226.9 216.4 211.3 209.3 213.9 210.2

Diurnal Average

M - Maintenance

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



Summary of Hour Standard Deviations

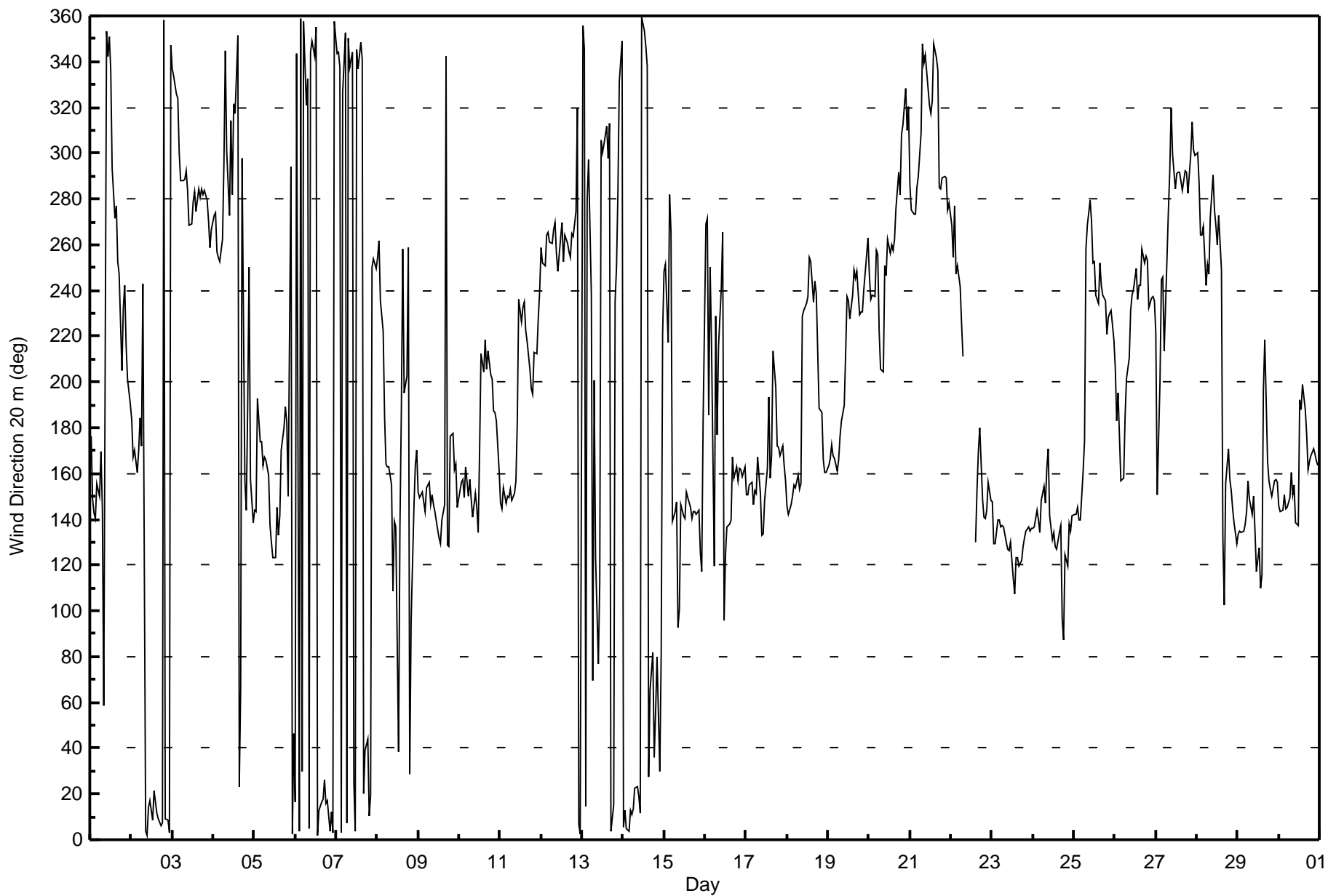
Mannix - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 106 deg on Sep 28 16:00	Hours of Data: 714
Minimum Value: 5 deg on Sep 7 23:00	Hours of Missing Data: 6
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 10 Q <sub>1</sub> = 12 Median = 14 Q <sub>3</sub> = 21 P <sub>90</sub> = 36 P <sub>99</sub> = 79	Hours of Calibration: 0
	Percent Operational Time: 99.2

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	17	12	13	20	40	19	35	16	53	17	17	17	25	22	10	13	13	20	20	16	12	14	17	29	53
2-Sep	39	13	18	13	41	45	36	48	66	14	18	16	15	17	15	14	14	15	14	17	11	11	14	17	66
3-Sep	15	14	15	16	19	12	11	11	12	12	10	12	11	11	9	13	11	11	10	11	9	10	8	6	19
4-Sep	8	9	11	9	10	13	21	34	55	16	21	29	37	27	37	71	61	86	33	16	28	63	17	11	86
5-Sep	14	10	56	79	18	17	17	27	33	28	16	20	30	25	30	32	30	21	20	23	20	47	51	39	79
6-Sep	29	34	33	22	26	47	50	35	13	20	30	23	24	22	14	15	12	13	11	11	16	12	16	17	50
7-Sep	14	14	16	34	41	20	18	20	22	28	19	24	24	21	27	23	18	22	12	43	51	10	5	7	51
8-Sep	6	10	6	14	20	13	13	18	34	50	26	21	92	66	79	61	63	39	26	31	27	12	18	17	92
9-Sep	14	18	13	13	11	13	13	14	14	13	14	22	15	15	22	64	76	20	16	17	13	14	14	20	76
10-Sep	11	10	11	12	13	12	15	18	20	17	15	19	49	28	24	21	20	20	12	11	13	13	14	12	49
11-Sep	13	16	13	10	12	13	12	15	13	15	41	15	17	13	13	14	14	15	16	13	10	10	10	14	41
12-Sep	10	9	9	9	6	12	12	11	8	12	11	13	9	11	9	10	10	11	9	7	18	29	14	15	29
13-Sep	24	30	49	29	48	84	29	38	71	78	93	31	33	30	36	24	21	24	18	21	9	12	31	18	93
14-Sep	14	13	15	15	12	12	12	14	15	14	19	23	29	26	25	20	24	38	14	11	30	17	24	51	51
15-Sep	10	7	32	14	32	42	31	35	36	78	76	18	21	19	19	18	14	14	16	19	22	22	27	42	78
16-Sep	23	28	62	26	55	25	56	27	18	37	43	62	41	43	20	18	25	15	12	17	13	11	12	12	62
17-Sep	15	13	12	12	12	12	15	14	18	22	19	23	27	32	30	50	19	26	15	13	12	13	12	12	50
18-Sep	13	11	11	12	13	11	13	14	27	18	18	16	14	19	16	17	18	13	14	13	13	13	11	12	27
19-Sep	13	13	13	13	12	13	14	16	17	18	18	20	15	13	14	13	13	14	21	18	12	16	10	13	21
20-Sep	9	10	9	10	11	12	24	17	17	16	15	13	14	14	14	13	12	12	9	19	17	15	15	20	24
21-Sep	11	9	7	7	13	11	18	13	17	17	19	20	19	19	16	18	19	18	11	10	11	12	9	8	20
22-Sep	7	10	29	11	11	44	22	33	M	M	M	M	M	M	35	23	27	19	10	10	11	13	10	10	44
23-Sep	11	14	15	13	12	11	10	12	12	13	14	14	19	20	17	16	18	17	14	13	12	11	12	12	20
24-Sep	12	12	12	11	12	17	20	13	15	20	25	17	17	17	15	13	13	24	12	17	16	12	12	12	25
25-Sep	12	11	10	12	12	14	18	25	8	13	16	18	13	13	16	14	13	9	10	13	11	9	8	14	25
26-Sep	18	14	21	8	11	14	15	11	16	13	13	14	14	16	16	13	10	11	11	11	11	10	10	10	21
27-Sep	22	20	18	14	13	15	19	10	18	13	12	12	13	11	13	11	11	11	10	11	20	14	11	11	22
28-Sep	12	12	11	8	12	8	8	10	14	39	50	59	82	66	40	106	25	21	10	10	11	11	11	12	106
29-Sep	14	11	11	11	13	12	10	17	13	17	17	21	14	30	41	80	60	14	8	7	10	10	9	9	80
30-Sep	10	11	11	13	11	13	16	22	13	14	12	13	23	19	18	19	16	9	6	6	11	7	7	8	23

39	34	62	79	55	84	56	48	71	78	93	62	92	66	79	106	76	86	33	43	51	63	51	51	
Diurnal Maximum																								

M - Maintenance





Direction of Maximum Speed: 269 deg on Sep 27 08:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 279.1 deg on Sep 27		Hours of Data:	714
Direction of Minimum Speed: 200 deg on Sep 13 11:00		Hours of Missing Data:	6
Direction of Minimum Daily Speed Average: 3.9 deg on Sep 8		Percent Operational Time:	99.2
Monthly Average Direction: 231.1 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	193	158	149	137	148	145	166	142	67	357	348	354	340	298	272	280	252	247	204	233	244	222	210	220	242.2
2-Sep	205	173	179	169	178	187	168	225	20	5	13	21	11	21	17	13	10	7	8	1	11	10	5	355	11.0
3-Sep	343	338	332	329	305	291	291	293	294	287	271	271	281	286	277	287	283	287	286	287	284	274	261	271	289.9
4-Sep	276	278	264	262	259	271	307	340	310	278	321	287	327	321	352	6	58	304	155	138	162	201	166	163	281.2
5-Sep	153	141	163	157	166	141	152	157	155	137	128	123	121	145	131	144	169	180	183	170	148	99	66	74	148.3
6-Sep	72	23	20	20	35	29	35	7	12	351	354	347	356	5	15	18	19	27	18	17	7	11	6	2	13.3
7-Sep	352	349	348	4	345	1	8	354	341	346	24	5	348	341	351	346	20	38	43	34	38	253	253	265	355.8
8-Sep	275	289	271	248	211	198	192	168	165	122	139	135	53	150	205	265	188	202	250	39	100	143	157	169	187.0
9-Sep	155	151	153	150	147	155	157	150	154	149	150	137	133	128	140	153	333	125	136	181	179	170	179	158	154.0
10-Sep	154	162	158	153	166	155	158	151	144	149	147	136	174	210	203	215	204	211	208	210	201	202	205	180	181.8
11-Sep	164	152	156	151	152	153	156	154	156	158	187	237	225	233	235	223	219	215	211	210	219	216	235	246	199.2
12-Sep	258	255	252	264	268	269	264	269	273	262	250	267	273	257	266	260	255	254	264	262	279	326	9	7	270.2
13-Sep	6	358	8	329	345	319	46	184	116	68	200	314	307	309	316	304	317	2	25	234	255	287	334	357	327.4
14-Sep	7	15	9	7	14	12	14	24	26	20	12	1	354	348	340	29	65	83	39	58	71	43	81	126	18.8
15-Sep	165	187	163	208	303	140	140	141	114	115	168	137	138	151	147	143	138	140	137	133	139	126	123	129	144.0
16-Sep	172	233	140	154	180	135	196	158	208	229	258	101	133	136	135	140	166	156	164	154	159	164	158	166	158.8
17-Sep	157	152	155	156	151	152	153	163	154	143	138	152	165	192	159	175	213	193	173	173	170	175	170	163	166.4
18-Sep	156	148	152	151	157	159	163	156	165	228	230	234	237	253	251	233	243	238	220	197	194	172	168	171	202.2
19-Sep	171	171	175	171	170	166	173	179	183	191	213	237	236	227	238	250	245	248	230	228	232	242	250	262	215.0
20-Sep	247	238	238	239	259	256	225	213	206	249	247	262	256	261	257	264	277	294	285	314	326	332	314	324	262.3
21-Sep	291	279	277	276	289	296	312	351	341	345	337	323	320	326	352	343	340	288	288	291	294	293	279	283	308.9
22-Sep	278	276	290	265	272	280	250	225	M	M	M	M	M	M	126	147	165	174	142	133	131	134	149	146	182.9
23-Sep	137	119	124	130	129	128	127	130	125	122	120	122	108	101	116	114	113	113	120	124	129	129	128	127	122.8
24-Sep	128	129	135	131	127	142	143	142	158	168	139	126	129	123	121	128	130	95	87	117	113	132	130	136	129.9
25-Sep	136	135	136	130	131	158	167	251	265	276	266	247	246	234	231	245	237	234	237	224	226	228	230	224	221.9
26-Sep	214	197	217	183	192	199	205	210	208	225	234	236	245	231	237	238	253	247	250	247	230	233	233	232	231.1
27-Sep	220	155	202	240	243	215	249	269	288	315	295	280	286	287	287	279	283	288	289	278	295	310	297	295	279.1
28-Sep	298	286	262	264	268	249	256	260	274	290	275	261	247	263	242	202	95	157	170	152	147	138	131	124	225.8
29-Sep	127	127	126	127	130	135	154	149	141	147	131	111	118	107	107	209	208	158	152	149	147	156	158	156	141.2
30-Sep	147	143	143	147	144	145	148	158	149	152	137	136	185	181	191	181	172	158	162	164	168	167	166	166	161.1

196.2 182.9 186.9 193.4 195.0 186.9 191.0 201.7 225.8 264.0 255.8 259.2 260.2 253.5 249.1 248.4 250.7 243.0 215.2 208.0 204.0 199.3 201.8 198.2

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 45 m (WD45m) - deg

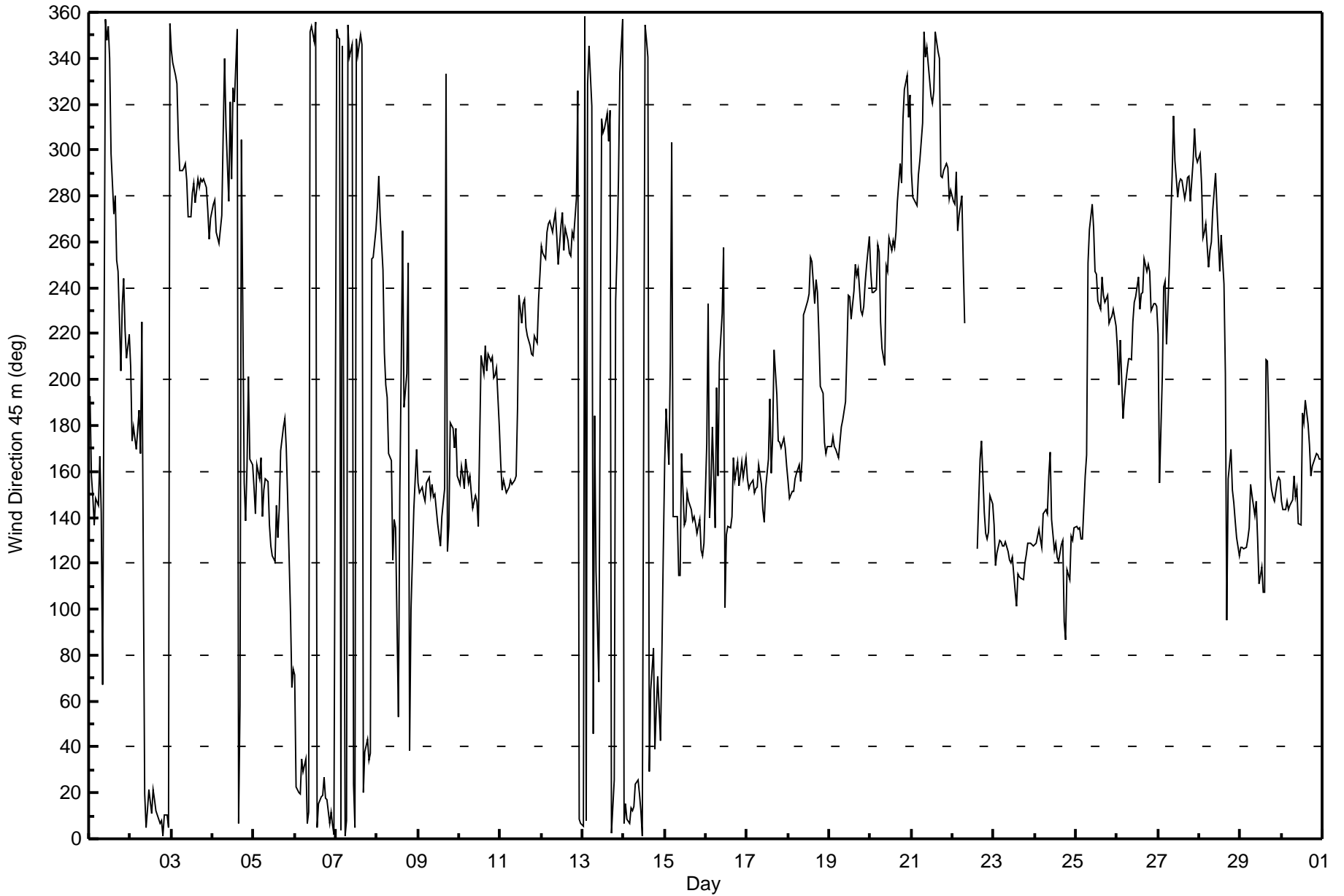
Mannix - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 106 deg on Sep 29 16:00	Hours of Data: 714
Minimum Value: 2 deg on Sep 30 19:00	Hours of Missing Data: 6
Percentiles: P <sub>1</sub> = 4 P <sub>10</sub> = 6 Q <sub>1</sub> = 7 Median = 10 Q <sub>3</sub> = 15 P <sub>90</sub> = 29 P <sub>99</sub> = 77	Hours of Calibration: 0
	Percent Operational Time: 99.2

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	17	12	8	7	14	12	30	10	48	11	10	10	21	20	8	12	10	18	17	12	10	10	10	9	48
2-Sep	37	7	11	9	42	48	51	46	43	8	12	12	9	13	10	8	8	9	9	12	7	6	9	12	51
3-Sep	10	8	8	10	14	7	7	7	7	9	9	11	9	8	7	10	9	7	8	7	7	8	5	5	14
4-Sep	6	8	9	6	7	11	13	25	46	17	17	29	36	19	31	65	58	79	35	9	23	17	11	8	79
5-Sep	7	8	43	45	13	8	8	20	22	20	11	16	26	18	25	29	23	12	8	18	13	92	13	11	92
6-Sep	7	20	13	14	16	16	51	12	8	11	17	15	17	16	9	10	8	8	6	6	11	6	10	12	51
7-Sep	8	7	8	26	32	12	10	15	12	21	14	19	19	13	23	16	13	16	9	33	48	14	7	10	48
8-Sep	3	14	12	12	20	9	16	11	22	50	18	18	88	63	73	57	49	34	11	40	23	8	13	8	88
9-Sep	8	11	7	7	6	7	6	12	8	8	9	14	9	10	18	61	74	14	25	10	4	5	5	12	74
10-Sep	6	6	5	5	4	6	8	12	15	10	9	14	44	20	14	16	12	14	6	4	5	4	9	7	44
11-Sep	8	9	6	5	6	6	5	8	7	9	38	11	11	10	8	10	9	11	11	6	5	6	4	10	38
12-Sep	7	6	6	8	5	6	4	9	7	11	9	13	7	8	7	8	8	8	7	6	18	25	9	10	25
13-Sep	12	13	22	26	45	68	31	54	74	78	93	29	28	25	34	22	18	23	18	38	7	8	28	11	93
14-Sep	8	9	10	9	7	7	7	10	10	10	14	16	23	18	19	14	21	29	10	8	18	17	13	21	29
15-Sep	20	10	10	26	36	52	20	27	41	74	62	14	16	15	15	13	9	8	8	11	8	14	14	22	74
16-Sep	24	32	44	78	71	15	41	23	11	34	56	54	33	33	15	13	19	9	5	11	6	5	4	7	78
17-Sep	10	7	6	5	6	7	9	7	13	16	14	19	21	24	24	45	14	19	7	4	4	5	5	4	45
18-Sep	8	6	4	6	8	5	6	8	19	15	14	13	11	16	14	13	16	10	7	7	6	9	4	4	19
19-Sep	4	5	4	4	4	5	6	7	8	10	12	17	13	10	12	12	11	11	17	15	9	12	7	12	17
20-Sep	7	7	6	7	9	10	17	10	12	15	13	11	12	13	12	12	11	8	7	15	10	10	9	15	17
21-Sep	7	7	6	6	10	6	14	8	12	10	14	16	14	15	10	12	14	15	8	7	7	8	8	6	16
22-Sep	5	7	9	10	9	24	35	34	M	M	M	M	M	M	29	16	19	10	6	5	5	8	5	4	35
23-Sep	10	8	8	7	7	5	5	7	6	9	10	10	14	16	13	13	14	14	11	10	7	6	6	6	16
24-Sep	6	6	7	7	6	14	13	8	9	13	22	12	11	14	11	8	8	22	8	12	12	7	6	8	22
25-Sep	7	6	6	6	7	10	13	22	6	11	13	15	10	10	12	12	10	7	6	8	5	5	4	8	22
26-Sep	10	9	10	8	13	13	5	5	12	10	10	12	12	14	12	11	8	8	8	8	9	7	7	8	14
27-Sep	16	17	15	12	9	11	14	9	17	10	9	10	10	8	11	10	9	9	7	9	18	11	7	6	18
28-Sep	7	11	10	6	5	5	7	6	12	30	44	50	71	52	32	97	18	22	4	7	7	7	7	6	97
29-Sep	7	6	5	5	8	7	6	10	9	11	13	17	12	27	33	106	56	11	5	3	5	6	4	3	106
30-Sep	5	6	6	7	7	7	9	14	8	10	10	9	18	11	13	12	9	6	2	3	4	4	4	3	18

37	32	44	78	71	68	51	54	74	78	93	54	88	63	73	106	74	79	35	40	48	92	28	22	
Diurnal Maximum																								

M - Maintenance







Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 75 m (WD75m) - deg

Mannix - September 2015

Direction of Maximum Speed: 271 deg on Sep 27 08:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 280.5 deg on Sep 27	Hours of Data: 714
Direction of Minimum Speed: 160 deg on Sep 29 16:00	Hours of Missing Data: 6
Direction of Minimum Daily Speed Average: 3.7 deg on Sep 8	Percent Operational Time: 99.2
Monthly Average Direction: 232.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	220	175	163	151	155	142	160	140	65	0	353	358	343	301	273	281	251	248	206	236	247	231	222	238	244.4
2-Sep	235	182	181	191	213	250	132	142	36	10	15	25	14	24	20	15	12	9	9	4	12	13	8	2	12.1
3-Sep	349	344	339	332	309	292	293	294	296	288	272	272	282	286	278	288	284	288	286	288	286	277	264	274	292.5
4-Sep	277	280	271	273	267	281	315	337	316	283	325	289	329	321	354	12	55	306	152	133	149	182	183	185	283.4
5-Sep	166	151	146	148	152	141	137	142	152	137	128	128	123	144	133	141	166	174	177	165	150	145	72	83	146.4
6-Sep	73	43	48	51	72	92	93	29	27	0	357	354	359	6	17	20	21	28	22	21	12	13	11	8	21.2
7-Sep	1	354	358	9	1	9	11	357	343	350	23	6	351	344	356	349	20	39	42	47	46	261	244	258	2.6
8-Sep	281	305	293	274	245	220	224	214	184	138	139	133	76	163	214	267	188	202	246	50	106	141	145	164	192.2
9-Sep	158	154	157	158	154	161	164	159	162	164	168	142	137	132	144	161	324	126	157	188	187	174	187	173	162.2
10-Sep	177	177	177	168	165	161	167	161	154	150	153	146	181	209	201	214	204	212	211	218	214	217	216	210	192.3
11-Sep	199	181	176	163	161	164	176	176	169	165	192	236	223	232	235	222	221	221	222	223	226	221	240	250	208.6
12-Sep	257	256	253	263	269	272	267	271	274	267	253	270	275	259	267	260	254	253	263	260	280	337	11	10	271.4
13-Sep	12	6	8	344	333	346	350	103	120	61	218	312	311	313	320	307	321	5	36	236	260	286	338	2	333.1
14-Sep	9	17	11	10	16	15	15	24	26	21	14	5	356	349	340	31	63	80	44	63	72	50	82	115	21.6
15-Sep	147	166	144	145	6	131	127	130	135	134	163	136	137	148	146	142	139	138	135	131	136	131	131	126	140.3
16-Sep	141	173	133	129	131	152	192	151	189	205	266	104	137	135	135	142	166	155	165	154	158	167	161	172	158.1
17-Sep	167	160	168	167	160	157	156	162	162	155	151	156	167	190	159	179	214	192	174	173	174	177	179	175	170.7
18-Sep	182	189	176	164	169	181	184	174	180	228	229	233	237	252	251	232	242	238	225	205	206	182	174	181	209.7
19-Sep	181	178	180	176	174	174	181	183	186	194	213	236	236	225	238	250	246	248	230	228	233	244	250	259	215.2
20-Sep	247	240	238	240	258	256	230	223	208	249	247	260	256	260	257	264	278	294	288	318	337	334	318	326	262.6
21-Sep	294	282	279	277	292	298	315	353	342	345	338	324	321	327	352	343	341	289	289	293	296	295	281	286	310.8
22-Sep	285	291	301	280	286	308	336	231	M	M	M	M	M	M	126	146	164	170	140	131	128	130	144	140	170.2
23-Sep	131	121	125	125	127	125	122	128	127	125	123	124	111	103	116	114	116	113	120	124	129	129	129	127	123.4
24-Sep	128	128	132	130	127	139	136	141	156	169	146	131	133	124	123	130	131	97	115	114	133	132	137	131.4	
25-Sep	136	134	131	130	130	156	173	255	268	279	268	248	246	235	232	245	238	236	241	231	230	231	234	231	222.5
26-Sep	224	216	228	207	216	220	220	222	215	226	235	238	246	231	238	238	254	249	251	249	234	235	235	234	234.7
27-Sep	225	175	211	242	244	221	251	271	291	317	297	281	288	289	289	281	284	291	292	282	297	312	299	297	280.5
28-Sep	301	289	267	269	274	259	268	271	283	297	274	257	250	259	242	223	98	165	173	154	148	137	131	126	227.4
29-Sep	127	127	126	126	130	133	148	152	145	153	137	115	116	106	102	160	206	157	157	152	147	171	178	172	146.5
30-Sep	161	154	153	155	150	151	151	158	155	157	146	146	185	182	191	180	172	161	166	169	173	173	174	177	165.3

206.3 195.2 193.5 198.6 197.8 192.2 195.6 203.3 220.9 265.4 257.3 260.6 262.3 255.1 251.7 250.3 252.4 244.0 217.9 211.4 209.0 200.8 204.0 205.3

Diurnal Average

M - Maintenance

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



Summary of Hour Standard Deviations

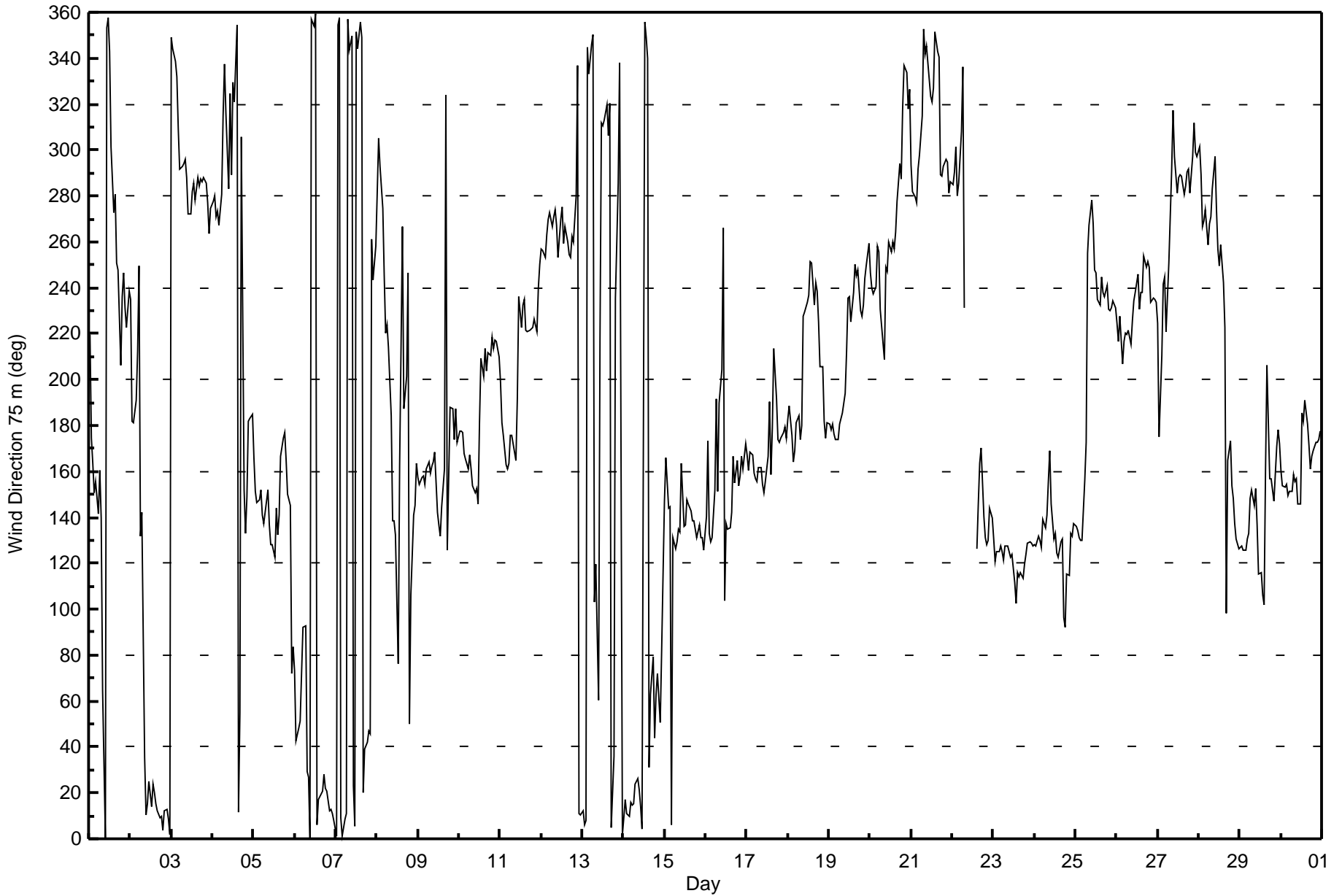
Mannix - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 103 deg on Sep 29 16:00	Hours of Data: 714
Minimum Value: 2 deg on Sep 30 19:00	Hours of Missing Data: 6
Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 5 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 14 P <sub>90</sub> = 25 P <sub>99</sub> = 77	Hours of Calibration: 0
	Percent Operational Time: 99.2

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	12	18	8	7	15	7	21	7	40	10	8	8	20	19	8	12	10	17	19	10	10	9	9	8	40
2-Sep	37	10	9	12	38	66	16	57	26	6	10	10	7	11	8	7	7	7	7	10	6	5	6	11	66
3-Sep	10	7	7	9	13	6	6	6	7	9	9	10	8	7	7	10	8	6	7	6	6	8	4	5	13
4-Sep	5	7	7	5	6	9	11	23	40	17	16	29	29	19	30	61	56	84	35	11	20	8	4	6	84
5-Sep	6	12	29	9	6	6	4	10	16	18	12	13	25	16	21	25	19	9	5	16	10	67	14	8	67
6-Sep	13	10	13	11	10	20	53	13	9	12	14	15	15	15	9	8	6	6	4	4	9	4	8	11	53
7-Sep	7	5	7	17	27	8	9	13	11	19	11	17	18	11	21	15	12	15	9	21	29	62	13	13	62
8-Sep	13	13	17	10	18	8	7	7	21	53	18	17	92	64	70	62	49	33	18	41	21	5	9	6	92
9-Sep	5	7	4	4	3	5	4	11	9	7	9	12	9	11	14	58	73	13	26	8	6	4	7	16	73
10-Sep	13	9	11	10	3	3	7	8	11	9	9	11	39	17	14	15	12	13	6	5	3	3	5	5	39
11-Sep	10	17	8	8	5	9	5	5	8	8	34	9	10	9	7	8	7	10	9	6	5	6	4	9	34
12-Sep	7	6	5	7	5	5	3	7	7	10	7	13	6	8	7	8	6	7	6	5	20	21	6	8	21
13-Sep	9	9	9	21	8	28	27	67	71	63	91	27	27	22	28	21	17	23	24	37	7	7	27	7	91
14-Sep	6	7	7	7	6	5	6	8	8	8	12	15	22	15	19	13	19	24	8	7	13	12	9	18	24
15-Sep	13	7	7	24	42	59	14	20	50	80	50	13	14	14	12	13	8	7	7	11	6	13	14	13	80
16-Sep	9	36	29	12	20	11	40	19	9	34	79	52	25	23	13	13	18	8	3	9	6	4	3	5	79
17-Sep	7	5	3	3	6	4	4	5	11	13	11	16	19	20	20	42	13	17	6	3	3	4	5	3	42
18-Sep	9	8	12	6	9	8	11	11	14	14	11	12	9	15	13	12	14	9	6	6	4	10	4	4	15
19-Sep	4	5	4	3	4	5	5	5	6	8	10	16	12	10	11	11	11	10	15	14	8	10	6	11	16
20-Sep	5	6	5	6	8	9	13	9	12	13	13	11	11	12	12	12	10	7	5	15	9	8	8	14	15
21-Sep	6	7	6	6	10	6	13	6	11	9	12	15	13	13	9	11	12	15	8	6	7	7	7	5	15
22-Sep	4	5	8	8	8	18	87	47	M	M	M	M	M	M	25	15	17	10	7	5	5	7	5	4	87
23-Sep	10	11	9	9	6	8	10	7	7	10	11	11	15	17	14	15	15	14	13	10	8	6	6	6	17
24-Sep	5	7	5	5	7	14	8	6	9	12	21	11	11	15	12	8	7	20	12	14	14	6	5	6	21
25-Sep	5	5	4	6	6	10	17	17	6	11	13	14	9	9	11	11	8	6	6	7	3	4	4	6	17
26-Sep	7	8	7	8	8	8	4	4	8	9	9	10	11	14	11	10	8	7	8	7	8	7	6	7	14
27-Sep	12	16	11	10	8	11	12	8	17	9	9	9	9	8	10	9	8	8	6	8	18	10	6	6	18
28-Sep	6	11	11	6	4	5	6	4	10	25	36	50	66	58	27	93	19	24	6	5	6	6	6	7	93
29-Sep	7	7	7	7	6	5	7	5	9	12	12	17	14	23	27	103	35	10	3	4	3	10	11	7	103
30-Sep	5	4	3	5	3	4	5	7	6	10	11	10	15	9	12	10	8	5	2	3	3	3	3	4	15

37	36	29	24	42	66	87	67	71	80	91	52	92	64	70	103	73	84	35	41	29	67	27	18	
Diurnal Maximum																								

M - Maintenance





Summary of Hour Standard Deviations

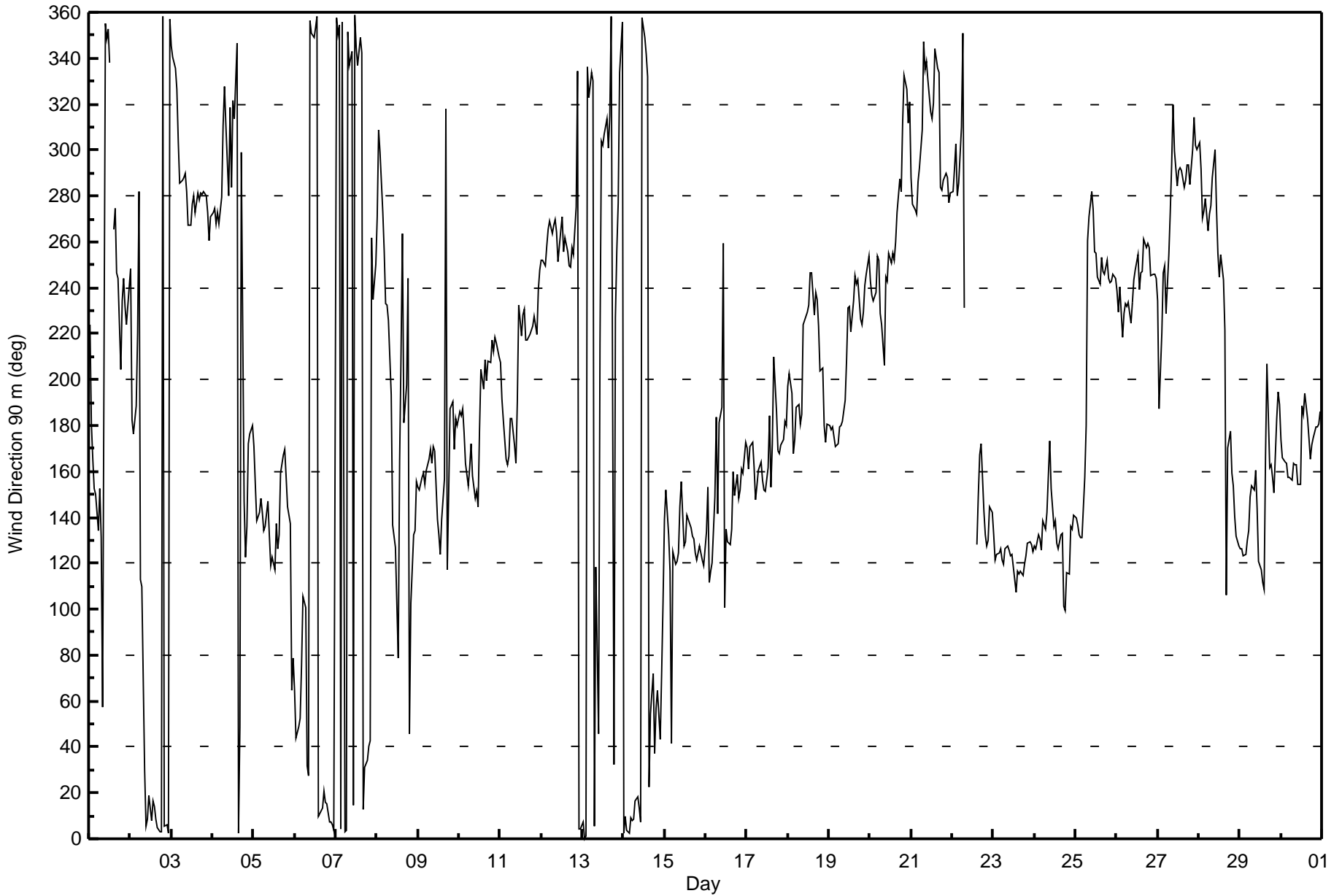
Mannix - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 97 deg on Sep 13 09:00	Hours of Data: 713
Minimum Value: 2 deg on Sep 30 19:00	Hours of Missing Data: 7
Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 4 O <sub>1</sub> = 6 Median = 9 O <sub>3</sub> = 14 P <sub>90</sub> = 24 P <sub>99</sub> = 84	Hours of Calibration: 0
	Percent Operational Time: 99.0

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-Sep	9	22	12	5	13	7	20	7	37	9	7	8	20	UO	6	11	9	16	20	9	9	9	8	8	37
2-Sep	32	12	10	9	24	83	12	30	28	5	8	9	6	10	8	6	6	6	6	9	5	4	6	11	83
3-Sep	10	7	7	8	13	5	6	6	6	8	8	9	7	6	6	9	7	6	6	5	5	7	4	4	13
4-Sep	4	6	6	4	6	8	10	21	35	16	15	26	26	17	30	59	60	80	34	10	20	4	4	4	80
5-Sep	9	13	15	5	4	4	3	7	12	19	11	16	27	17	23	24	20	9	5	15	10	62	14	5	62
6-Sep	13	9	12	11	12	14	43	19	10	11	13	13	14	15	9	7	5	5	3	3	9	3	8	11	43
7-Sep	6	5	7	11	20	6	8	12	11	18	10	17	17	11	21	15	11	15	9	13	17	88	18	16	88
8-Sep	15	12	16	10	15	7	8	7	30	51	22	19	85	70	71	54	49	34	42	37	18	4	8	5	85
9-Sep	4	7	2	3	2	5	4	14	12	5	11	11	9	13	14	57	74	8	29	9	9	3	8	18	74
10-Sep	15	9	16	16	5	6	7	8	8	8	8	11	38	17	13	15	12	13	7	5	2	4	6	4	38
11-Sep	7	17	10	12	7	13	7	6	9	8	32	9	10	9	8	9	7	10	8	6	5	6	4	7	32
12-Sep	6	5	4	6	5	4	3	6	6	8	6	11	6	7	6	7	6	6	5	4	20	19	5	7	20
13-Sep	8	8	6	21	6	17	14	69	97	70	94	27	25	21	24	20	16	22	24	39	6	7	26	6	97
14-Sep	6	6	6	6	6	5	5	8	8	8	11	14	21	15	20	12	20	24	7	6	13	11	9	14	24
15-Sep	14	7	8	28	38	54	9	15	48	91	54	14	15	14	12	13	8	6	6	9	5	10	10	8	91
16-Sep	9	32	24	7	12	11	36	16	10	35	79	49	31	24	15	13	17	8	3	9	6	3	3	6	79
17-Sep	8	5	5	5	13	5	3	5	9	13	10	16	18	20	21	44	14	17	5	3	4	5	5	6	44
18-Sep	8	7	16	8	11	9	12	12	13	14	11	11	9	14	12	11	14	8	5	7	4	11	5	4	16
19-Sep	4	6	5	3	3	4	4	4	6	8	10	16	12	9	11	11	11	10	15	13	8	9	5	10	16
20-Sep	5	6	5	6	7	8	12	9	12	12	12	10	10	12	11	11	9	6	5	15	8	8	7	13	15
21-Sep	5	6	5	5	9	6	13	5	10	9	12	15	12	13	9	11	12	15	7	5	6	7	7	5	15
22-Sep	4	5	9	8	6	17	71	50	M	M	M	M	M	M	25	14	16	10	7	4	3	6	5	3	71
23-Sep	8	5	4	5	3	4	5	5	4	7	8	9	11	13	10	10	10	11	9	8	6	5	4	4	13
24-Sep	3	5	4	4	5	14	7	7	10	11	20	10	10	15	9	7	7	15	7	9	9	6	5	6	20
25-Sep	4	4	3	5	5	9	20	14	5	10	11	14	9	10	12	11	8	6	5	6	3	4	4	5	20
26-Sep	8	8	6	9	9	7	4	4	9	11	9	11	10	15	11	10	7	6	7	6	7	6	6	7	15
27-Sep	14	15	10	9	7	10	10	8	17	9	8	9	9	7	9	9	8	8	6	7	18	10	6	5	18
28-Sep	6	10	11	5	3	5	5	4	10	29	36	48	62	58	26	86	19	24	6	5	6	5	5	4	86
29-Sep	5	6	4	4	5	5	5	4	8	12	12	15	12	21	28	95	28	9	2	5	3	12	10	8	95
30-Sep	7	5	3	5	3	4	3	5	6	9	10	10	15	9	12	9	8	5	2	3	3	3	3	4	15

32	32	24	28	38	83	71	69	97	91	94	49	85	70	71	95	74	80	42	39	20	88	26	18	
Diurnal Maximum																								

M - Maintenance      UO - Unstable Operation





Summary of Hour Averages

Mannix - September 2015

Maximum Value: 0.6 km/h on Sep 24 19:00		Maximum Daily Average: 0.4 km/h on Sep 23		Hours in Service: 720																						
Minimum Value: -1.1 km/h on Sep 27 11:00		Minimum Daily Average: -0.5 km/h on Sep 27		Hours of Data: 714																						
Maximum Diurnal Average: 0.0 km/h at hour 2		Minimum Diurnal Average: -0.1 km/h at hour 14		Hours of Missing Data: 6																						
Monthly Average: -0.02 km/h		Percentiles: P <sub>1</sub> = -0.8 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> = 0.6		Hours of Calibration: 0																						
				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-Sep	-0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.3	0.1	-0.4	-0.5	-0.7	-0.5	-0.5	0.2	0.0	0.0	-0.1	-0.1	-0.2	-0.2	-0.2	-0.1	-0.2	-0.1	0.3
2-Sep	0.0	0.1	0.2	0.2	0.0	0.0	0.0	-0.1	0.0	-0.4	-0.3	-0.2	-0.3	-0.3	-0.3	-0.4	-0.5	-0.4	-0.5	-0.4	-0.7	-0.7	-0.9	-0.3	-0.3	0.2
3-Sep	-0.3	-0.3	-0.5	-0.5	-0.5	-0.6	-0.6	-0.6	-0.8	-0.3	0.3	0.2	-0.1	-0.1	0.0	-0.4	-0.3	-0.5	-0.2	-0.2	0.1	0.2	-0.1	0.2	-0.2	0.3
4-Sep	0.2	0.2	-0.1	-0.2	-0.2	-0.1	0.1	0.1	0.1	0.2	-0.1	-0.3	-0.3	-0.2	-0.1	0.2	0.4	-0.1	0.1	0.0	-0.2	-0.1	0.0	0.1	0.0	0.4
5-Sep	0.2	0.2	-0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.6	0.0	0.2	0.3	0.1	0.2	0.3	0.1	0.0	-0.1	0.0	0.0	0.0	0.1	0.1	0.6
6-Sep	0.0	-0.2	-0.2	-0.2	0.0	0.0	-0.1	-0.3	-0.2	0.1	0.1	-0.2	-0.3	-0.2	-0.4	-0.2	-0.3	0.0	-0.4	-0.4	-0.3	-0.3	-0.4	-0.3	-0.2	0.1
7-Sep	-0.2	-0.2	-0.2	-0.2	-0.1	-0.3	-0.2	-0.2	0.1	-0.1	0.2	-0.1	-0.2	-0.3	-0.2	-0.1	-0.2	0.5	0.1	-0.1	0.0	-0.1	0.0	-0.1	-0.1	0.5
8-Sep	-0.1	0.0	-0.3	-0.1	-0.2	-0.1	0.0	0.1	0.3	0.4	-0.1	0.1	0.0	0.3	0.2	0.2	-0.1	0.1	0.0	0.0	0.1	0.3	0.2	0.2	0.1	0.4
9-Sep	0.3	0.2	0.4	0.3	0.2	0.4	0.3	0.1	0.3	0.2	0.0	0.3	0.2	0.0	0.2	0.2	0.0	0.0	0.0	-0.1	-0.1	0.2	0.0	0.2	0.2	0.4
10-Sep	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.1	-0.1	0.0	-0.1	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.1	0.1	0.3
11-Sep	0.1	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.1	0.3	0.1	-0.4	-0.2	-0.3	-0.1	-0.3	-0.2	-0.1	-0.1	-0.1	-0.2	-0.2	-0.3	-0.3	0.0	0.3
12-Sep	-0.1	-0.4	-0.4	0.1	0.0	-0.2	0.0	0.0	0.1	-0.2	-0.2	-0.1	0.0	-0.2	-0.1	0.1	-0.2	-0.2	0.1	0.1	-0.3	-0.4	-0.4	-0.5	-0.1	0.1
13-Sep	-0.3	-0.2	0.0	-0.3	-0.1	0.0	0.1	0.3	0.4	0.0	0.1	-0.1	-0.2	-0.2	0.0	-0.2	-0.4	-0.2	-0.1	0.0	-0.1	0.0	-0.3	-0.2	-0.1	0.4
14-Sep	-0.5	-0.4	-0.2	-0.5	-0.5	-0.5	-0.5	-0.2	-0.1	-0.2	-0.2	0.1	-0.1	-0.1	-0.3	0.1	0.5	0.3	0.1	0.3	0.1	0.0	0.1	-0.1	-0.1	0.5
15-Sep	-0.2	-0.3	-0.1	-0.2	-0.1	0.1	0.0	0.1	0.1	0.1	0.6	0.2	0.2	0.3	0.1	0.2	0.1	0.0	0.2	0.2	0.2	0.2	0.1	-0.1	0.1	0.6
16-Sep	-0.2	-0.2	0.0	-0.3	-0.1	0.1	-0.1	0.0	0.0	0.0	-0.1	0.4	0.2	-0.1	0.2	0.3	0.1	0.2	0.3	0.2	0.2	0.4	0.4	0.4	0.1	0.4
17-Sep	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.1	0.3	0.4	0.2	0.3	0.1	0.0	0.2	0.4	0.1	0.1	0.3	0.3	0.4	0.2	0.4	0.4	0.2	0.4
18-Sep	0.1	0.1	0.2	0.4	0.3	0.3	0.3	0.2	0.1	-0.4	0.0	-0.3	-0.4	-0.1	-0.2	-0.3	-0.3	-0.2	-0.2	-0.1	-0.1	0.3	0.4	0.5	0.0	0.5
19-Sep	0.5	0.4	0.3	0.5	0.5	0.6	0.5	0.1	0.1	0.1	-0.3	-0.4	-0.4	-0.4	-0.5	-0.5	-0.3	-0.4	-0.2	-0.3	-0.2	-0.2	-0.4	0.0	0.0	0.6
20-Sep	-0.3	-0.3	-0.2	-0.3	-0.2	-0.2	-0.1	-0.2	-0.2	-0.1	-0.1	-0.2	-0.4	-0.3	-0.3	-0.2	-0.2	-0.5	-0.3	-0.2	-0.3	-0.4	-0.4	-0.3	-0.3	-0.1
21-Sep	-0.3	0.1	0.2	0.1	-0.2	-0.6	-0.5	-0.6	-0.4	-0.2	-0.5	-0.6	-0.5	-0.5	-0.4	-0.5	-0.2	-0.3	-0.4	-0.5	-0.4	-0.3	0.2	0.0	-0.3	0.2
22-Sep	0.0	-0.1	0.0	-0.2	-0.3	-0.2	-0.3	-0.1	M	M	M	M	M	M	0.3	0.1	0.3	0.1	0.3	0.3	0.3	0.4	0.4	0.3	0.1	0.4
23-Sep	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.1	0.2	0.3	0.5	0.4	0.4	0.3	0.6	0.5	0.5	0.2	0.3	0.4	0.6	0.6	0.4	0.6
24-Sep	0.4	0.5	0.3	0.3	0.3	0.3	0.2	0.2	0.4	0.3	0.4	0.2	0.1	0.4	0.3	0.3	0.4	0.4	0.6	0.3	0.4	0.3	0.4	0.4	0.3	0.6
25-Sep	0.4	0.3	0.4	0.3	0.4	0.4	0.1	-0.2	-0.2	-0.3	-0.1	-0.1	-0.4	-0.5	-0.5	-0.4	-0.3	-0.4	-0.4	-0.3	-0.3	-0.4	-0.3	-0.2	-0.1	0.4
26-Sep	-0.2	-0.1	-0.2	0.1	-0.1	-0.1	-0.1	-0.2	-0.3	-0.3	-0.4	-0.1	-0.6	-0.5	-0.7	-0.8	-0.7	-0.6	-0.5	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	0.1
27-Sep	0.0	0.3	-0.2	-0.5	-0.4	-0.3	-0.2	-0.5	-1.0	-1.0	-1.1	-0.3	-0.8	-1.0	-0.5	-0.3	-0.4	-0.5	-0.4	0.0	-0.4	-0.6	-0.8	-0.6	-0.5	0.3
28-Sep	-0.4	-0.2	0.0	-0.1	-0.1	-0.5	-0.3	-0.4	-0.2	0.2	0.1	-0.1	0.1	0.2	-0.1	0.2	0.2	0.2	0.1	0.4	0.4	0.3	0.4	0.2	0.0	0.4
29-Sep	0.3	0.2	0.2	0.4	0.4	0.3	0.4	0.3	0.3	0.5	0.1	0.4	0.0	0.3	0.1	0.1	0.3	0.3	0.4	0.4	0.5	0.6	0.4	0.4	0.3	0.6
30-Sep	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.3	0.6	0.3	0.4	0.5	0.1	0.1	-0.2	0.0	0.1	0.5	0.5	0.3	0.2	0.2	0.4	0.5	0.3	0.6
																								Diurnal Average		
																								Diurnal Maximum		
M - Maintenance																										



Summary of Hour Standard Deviations

Mannix - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4.2 km/h on Sep 27 09:00			Hours of Data:	714
Minimum Value: 0.1 km/h on Sep 5 23:00			Hours of Missing Data:	6
			Hours of Calibration:	0
			Percent Operational Time:	99.2
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 1.1 Median = 1.5 Q <sub>3</sub> = 2.0 P <sub>90</sub> = 2.6 P <sub>99</sub> = 3.7				

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

2.5	2.0	2.3	2.8	2.4	2.4	2.6	3.8	4.2	4.1	3.4	3.8	4.0	3.6	3.9	3.6	3.3	3.7	3.1	2.8	2.8	2.8	3.4	2.3	
Diurnal Maximum																								

M - Maintenance



Summary of Hour Averages

Mannix - September 2015

Maximum Value: 1.5 km/h on Sep 23 23:00		Maximum Daily Average: 1.1 km/h on Sep 30		Hours in Service: 720																						
Minimum Value: -1.7 km/h on Sep 27 10:00		Minimum Daily Average: -0.6 km/h on Sep 27		Hours of Data: 714																						
Maximum Diurnal Average: 0.3 km/h at hour 6		Minimum Diurnal Average: 0.1 km/h at hour 13		Hours of Missing Data: 6																						
Monthly Average: 0.20 km/h		Percentiles: P <sub>1</sub> = -1.0 P <sub>10</sub> = -0.4 Q <sub>1</sub> = -0.2 Median = 0.1 Q <sub>3</sub> = 0.6 P <sub>90</sub> = 0.9 P <sub>99</sub> = 1.4		Hours of Calibration: 0																						
				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-Sep	-0.1	0.5	0.6	0.3	0.4	0.7	0.5	1.0	0.3	-0.6	-0.6	-0.7	-0.5	-0.6	0.2	0.0	0.0	-0.1	0.1	0.0	-0.3	-0.3	-0.2	-0.2	0.0	1.0
2-Sep	0.0	0.2	0.1	0.3	0.1	0.1	0.3	0.1	0.2	-0.2	-0.1	0.1	0.0	0.0	0.1	0.0	-0.6	-0.4	0.0	-0.1	-0.5	-0.6	-0.7	-0.2	-0.1	0.3
3-Sep	-0.3	-0.6	-0.7	-0.4	-0.3	-0.5	-0.4	-0.5	-0.6	-0.2	0.1	-0.2	0.1	0.0	-0.3	-0.3	-0.2	-0.1	-0.2	0.0	-0.1	-0.2	-0.1	-0.2	-0.2	0.1
4-Sep	0.1	0.1	-0.1	-0.2	-0.2	-0.2	0.2	0.6	0.6	-0.2	-0.2	-0.3	-0.1	-0.3	0.5	0.4	0.1	0.2	0.1	0.1	0.0	0.1	0.3	0.1	0.3	0.6
5-Sep	0.5	0.6	0.3	0.5	0.3	0.5	0.4	0.3	0.5	1.0	0.1	0.7	1.1	0.4	0.7	0.8	0.4	0.4	0.3	0.1	0.2	0.1	0.2	0.2	0.4	1.1
6-Sep	0.2	0.0	0.0	0.1	0.1	0.1	0.1	-0.1	0.1	0.6	0.3	0.2	-0.3	-0.1	-0.4	0.1	0.0	0.1	-0.2	-0.1	-0.2	-0.1	-0.3	-0.2	0.0	0.6
7-Sep	-0.2	-0.1	-0.2	0.1	0.0	-0.1	-0.1	-0.1	0.6	0.1	0.6	0.3	-0.3	-0.1	0.2	0.1	0.2	0.8	0.2	-0.1	0.1	0.1	0.1	0.0	0.1	0.8
8-Sep	-0.1	-0.2	-0.1	0.0	-0.1	-0.2	-0.1	0.2	0.4	0.5	0.0	0.1	0.3	0.8	0.7	0.5	0.2	0.5	0.1	0.2	0.5	0.7	0.5	0.5	0.3	0.8
9-Sep	0.7	0.6	0.9	0.7	0.8	0.9	0.7	0.6	0.5	0.8	0.4	0.5	0.4	0.5	0.4	0.8	0.1	0.2	0.2	0.1	0.2	0.6	0.3	0.6	0.5	0.9
10-Sep	0.5	0.3	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.2	0.5	0.4	0.3	0.1	0.0	-0.1	0.1	0.0	-0.2	-0.3	-0.3	-0.2	-0.2	0.1	0.2	0.6
11-Sep	0.2	0.6	0.6	0.8	0.6	0.6	0.5	0.5	0.4	0.8	0.6	-0.3	-0.1	-0.3	-0.1	-0.2	-0.1	-0.2	-0.1	-0.3	-0.4	-0.3	-0.5	-0.5	0.1	0.8
12-Sep	-0.3	-0.4	-0.6	-0.3	-0.2	0.0	-0.2	-0.1	0.0	-0.2	-0.2	0.0	0.0	-0.2	-0.3	-0.1	-0.3	-0.4	0.0	-0.3	-0.3	-0.2	-0.1	-0.2	-0.2	0.0
13-Sep	0.0	0.0	0.1	-0.1	0.1	0.0	0.1	0.4	0.5	0.3	0.3	0.2	0.0	-0.5	0.2	0.0	-0.4	-0.1	0.2	0.2	-0.2	0.0	-0.1	0.0	0.0	0.5
14-Sep	-0.2	-0.1	0.3	-0.5	-0.1	-0.3	-0.3	0.0	0.3	0.3	0.1	0.5	0.2	0.6	-0.2	0.4	0.3	0.5	0.4	0.4	0.2	0.1	0.2	0.3	0.1	0.6
15-Sep	0.2	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.4	0.1	1.1	0.3	0.4	0.9	0.6	0.8	0.3	0.2	0.5	0.5	0.6	0.4	0.2	0.2	0.4	1.1
16-Sep	0.1	0.0	0.2	0.2	0.2	0.2	0.1	0.2	0.0	0.2	0.1	0.9	0.5	0.2	0.7	0.6	0.5	0.7	0.5	0.6	0.6	0.5	0.8	0.7	0.4	0.9
17-Sep	0.6	0.7	0.5	0.7	0.7	0.8	0.5	0.1	0.7	0.9	0.7	0.8	0.4	0.4	0.4	0.7	0.2	0.3	0.6	0.4	0.5	0.5	0.6	0.6	0.6	0.9
18-Sep	0.3	0.3	0.6	0.8	0.7	0.7	0.6	0.4	0.5	-0.5	0.4	-0.3	-0.5	-0.1	-0.3	-0.1	-0.2	-0.4	-0.3	-0.1	-0.2	0.4	0.6	0.6	0.2	0.8
19-Sep	0.6	0.7	0.7	0.7	0.7	0.7	0.8	0.6	0.3	0.3	-0.1	-0.5	-0.2	-0.5	-0.7	-0.9	-0.4	-0.7	-0.3	-0.4	-0.1	-0.4	-0.4	-0.2	0.0	0.8
20-Sep	-0.5	-0.4	-0.2	-0.5	-0.5	-0.5	-0.2	-0.2	-0.1	0.0	0.0	0.0	-0.4	-0.2	-0.3	-0.2	0.0	-0.3	-0.3	-0.3	-0.5	-0.5	-0.1	-0.4	-0.3	0.0
21-Sep	-0.2	0.0	-0.1	-0.1	-0.2	-0.5	-0.4	-1.1	-0.5	-0.3	-0.5	-0.6	-0.4	-0.4	-0.4	-0.3	-0.2	-0.2	-0.3	-0.3	-0.4	-0.2	0.2	-0.2	-0.3	0.2
22-Sep	-0.1	-0.1	-0.2	-0.2	-0.2	-0.1	0.0	0.2	M	M	M	M	M	M	0.8	0.3	0.8	0.5	1.0	0.9	1.1	1.2	1.0	0.9	0.4	1.2
23-Sep	0.9	0.9	0.9	1.0	1.3	1.2	1.1	1.1	0.8	0.5	0.6	0.8	1.0	1.0	1.2	0.9	1.1	1.3	1.0	0.6	1.2	1.3	1.5	1.4	1.0	1.5
24-Sep	1.2	1.2	1.0	0.9	0.8	1.0	0.9	0.6	0.8	0.9	0.7	0.4	0.5	0.6	0.2	0.7	0.6	0.4	0.5	0.5	0.8	1.1	1.2	1.4	0.8	1.4
25-Sep	1.2	0.7	1.0	1.1	0.9	1.0	0.7	-0.3	-0.5	-0.5	-0.2	-0.2	-0.3	-0.3	-0.2	-0.1	0.1	-0.4	-0.3	-0.2	-0.2	-0.2	-0.2	-0.1	0.1	1.2
26-Sep	-0.2	-0.1	-0.2	0.2	0.0	-0.1	-0.1	-0.2	-0.1	-0.1	-0.3	0.1	-0.5	0.2	0.0	-0.4	-0.7	-0.5	-0.3	-0.2	-0.2	-0.1	-0.3	-0.3	-0.2	0.2
27-Sep	0.3	0.9	0.1	-0.3	-0.2	0.0	-0.2	-0.5	-1.4	-1.7	-1.4	-0.2	-1.0	-1.7	-0.9	-0.4	-0.4	-0.6	-0.6	-0.4	-0.7	-1.0	-1.1	-0.8	-0.6	0.9
28-Sep	-0.7	-0.4	-0.1	-0.2	-0.3	-0.5	-0.3	-0.4	-0.3	0.4	0.4	-0.2	0.7	0.4	0.2	0.5	0.6	0.6	0.7	1.1	1.1	0.9	1.0	0.7	0.2	1.1
29-Sep	0.8	0.7	0.8	1.0	1.0	0.8	0.7	0.6	0.7	1.2	0.3	0.4	-0.1	0.3	0.3	0.3	0.3	0.6	1.0	1.0	1.2	1.5	1.1	1.2	0.7	1.5
30-Sep	1.2	1.2	1.2	1.3	1.5	1.5	1.4	1.0	1.3	1.2	0.9	1.0	1.1	1.1	0.7	1.0	1.1	1.3	1.3	1.2	1.1	1.0	1.1	1.1	1.1	1.5
																								Diurnal Average		
																								Diurnal Maximum		
M - Maintenance																										





Summary of Hour Standard Deviations

Mannix - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4.6 km/h on Sep 27 10:00			Hours of Data:	714
Minimum Value: 0.1 km/h on Sep 8 01:00			Hours of Missing Data:	6
			Hours of Calibration:	0
			Percent Operational Time:	99.2
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.9 Median = 1.5 Q <sub>3</sub> = 2.1 P <sub>90</sub> = 2.7 P <sub>99</sub> = 3.9				

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-Sep	0.4	1.0	1.1	0.5	0.6	0.9	1.6	2.0	1.1	2.2	2.9	3.1	2.9	2.3	1.7	1.7	1.7	1.2	0.7	1.0	1.1	0.6	0.8	0.5	3.1
2-Sep	0.3	0.6	0.6	0.3	0.5	0.4	0.5	0.5	0.8	1.6	2.1	1.4	1.7	2.0	2.2	2.1	3.1	3.6	2.9	2.6	2.3	2.5	3.2	2.6	3.6
3-Sep	2.1	1.6	2.0	2.3	1.9	2.1	2.2	2.3	2.6	2.4	2.0	2.4	2.4	2.5	2.1	1.9	2.1	2.0	1.9	1.9	1.5	1.1	1.1	0.9	2.6
4-Sep	1.0	1.2	0.8	0.6	0.7	0.7	1.1	1.1	1.2	1.0	1.5	1.6	2.1	1.8	1.9	1.5	1.7	1.2	0.6	0.6	0.3	0.2	0.2	0.3	2.1
5-Sep	0.6	0.6	0.6	0.9	0.7	0.6	0.6	0.9	1.2	1.8	1.5	2.0	2.3	1.8	1.7	1.9	1.8	1.1	0.8	0.5	0.3	0.3	0.3	0.3	2.3
6-Sep	0.3	0.4	0.6	0.3	0.3	0.4	0.6	0.7	0.8	1.3	1.5	1.7	1.7	1.9	1.8	1.9	1.9	1.8	1.4	1.5	1.2	1.6	1.2	1.1	1.9
7-Sep	0.9	0.9	1.1	1.1	1.0	1.3	1.3	1.3	1.7	1.6	2.3	2.1	2.1	2.6	2.5	2.7	2.5	2.1	1.2	0.7	0.6	0.4	0.2	0.2	2.7
8-Sep	0.1	0.3	0.3	0.4	0.2	0.3	0.3	0.6	1.0	1.3	1.7	1.7	2.0	1.9	2.0	2.1	1.5	1.2	0.3	0.5	1.0	1.3	0.8	0.6	2.1
9-Sep	1.1	1.1	1.2	1.3	1.6	1.5	1.3	1.2	1.1	1.2	1.0	1.4	1.5	1.9	1.6	2.0	1.7	0.9	0.7	0.4	0.3	0.5	0.5	0.7	2.0
10-Sep	0.6	0.4	0.6	0.7	0.5	1.1	1.1	1.1	1.1	1.3	1.5	1.7	2.1	2.3	2.0	1.9	1.7	1.4	0.6	0.2	0.3	0.3	0.6	0.6	2.3
11-Sep	0.6	1.4	0.9	1.0	1.1	1.1	0.8	1.0	1.2	1.5	1.8	2.0	1.9	2.3	2.1	2.6	1.8	0.9	0.5	0.5	0.4	0.6	0.8	1.3	2.6
12-Sep	1.4	1.5	1.6	2.0	1.4	1.1	0.6	1.1	0.9	0.9	1.1	1.2	1.0	0.9	1.7	1.9	2.5	2.1	1.7	1.3	1.5	1.7	2.0	1.9	2.5
13-Sep	0.9	0.6	0.5	0.3	0.4	0.3	0.3	0.7	1.3	1.3	1.7	2.1	2.1	1.8	1.8	1.9	1.7	1.1	0.8	0.4	0.6	0.7	1.4	1.5	2.1
14-Sep	2.3	1.9	1.7	1.9	2.1	1.8	2.1	2.0	1.9	2.1	2.4	2.3	1.9	2.6	2.4	2.0	1.6	1.2	0.9	0.8	0.5	0.5	0.5	0.5	2.6
15-Sep	0.3	0.2	0.3	0.5	0.3	0.4	0.3	0.5	1.0	1.3	1.7	2.0	2.5	2.8	2.6	2.3	1.7	1.6	1.2	0.9	0.6	0.8	0.6	0.6	2.8
16-Sep	0.5	0.6	0.3	0.3	0.3	0.2	0.3	0.5	0.8	1.2	1.4	1.6	2.0	2.2	2.3	2.2	1.8	1.3	0.6	0.8	0.7	0.6	1.0	0.8	2.3
17-Sep	0.9	1.3	1.2	1.0	1.1	1.1	1.3	1.2	1.4	1.5	1.7	2.5	2.4	2.6	1.8	2.4	1.9	1.3	1.5	0.9	0.9	1.2	0.7	0.7	2.6
18-Sep	0.9	0.8	0.9	1.1	1.0	0.8	0.8	1.1	1.3	1.9	2.5	3.1	3.0	2.6	2.8	3.0	2.6	2.4	0.9	0.5	0.7	0.8	0.8	1.0	3.1
19-Sep	0.9	1.1	1.4	1.3	1.4	1.4	1.6	2.1	2.1	2.3	3.2	3.4	3.6	3.4	3.9	3.6	2.6	3.9	2.3	2.8	2.3	2.2	1.9	1.4	3.9
20-Sep	1.6	1.2	1.6	1.7	2.6	2.0	1.3	1.4	2.0	2.8	3.3	3.5	3.6	3.7	3.3	3.0	2.3	1.8	0.9	0.9	1.0	1.7	1.8	1.6	3.7
21-Sep	1.3	1.6	1.6	1.6	1.9	1.7	2.4	3.0	2.9	2.6	2.3	2.8	2.9	2.9	2.7	2.7	2.0	2.1	1.8	1.9	1.7	1.7	1.2	0.7	3.0
22-Sep	0.4	0.3	0.5	0.4	0.3	0.4	0.3	0.7	M	M	M	M	M	M	2.4	2.1	1.5	0.8	0.8	1.1	1.3	1.3	0.8	0.6	2.4
23-Sep	0.8	1.0	1.3	1.4	2.1	1.7	1.5	2.1	1.8	2.1	2.6	2.6	2.7	2.6	3.3	2.7	2.9	2.9	3.1	2.7	2.5	2.5	2.2	1.8	3.3
24-Sep	1.8	1.8	1.7	1.5	1.5	1.2	0.7	1.3	1.3	2.1	1.9	1.8	1.7	1.8	1.7	1.5	1.1	0.6	1.1	1.8	2.3	2.1	1.7	2.1	2.3
25-Sep	2.0	1.5	1.3	1.6	1.3	0.8	0.9	1.1	1.3	2.5	1.9	2.3	2.8	2.4	2.8	2.7	2.3	1.4	0.6	0.7	0.8	1.3	1.3	1.3	2.8
26-Sep	0.7	0.5	0.8	0.9	0.9	1.0	0.6	1.0	1.5	2.3	2.8	3.4	3.9	4.2	4.4	3.8	3.3	3.0	3.1	2.9	1.7	2.4	2.4	2.2	4.4
27-Sep	2.0	0.9	1.6	2.9	2.4	1.6	3.1	4.2	4.5	4.6	3.2	4.0	3.9	3.5	3.7	3.6	2.8	2.5	1.5	2.1	2.5	2.9	3.0	2.1	4.6
28-Sep	1.8	1.6	1.4	1.3	0.9	0.6	0.5	0.7	1.4	2.0	2.1	2.4	2.3	2.5	2.3	1.9	1.5	0.7	0.6	1.1	1.4	1.6	1.6	1.4	2.5
29-Sep	1.7	1.7	1.4	1.5	1.7	1.6	0.6	1.1	1.5	2.2	1.8	1.7	1.6	1.7	1.8	1.7	1.5	0.8	0.4	0.2	0.6	0.7	1.0	0.7	2.2
30-Sep	1.0	1.2	1.4	1.3	1.9	1.7	1.5	1.4	1.9	2.1	1.8	1.8	3.0	2.8	2.8	2.6	2.3	1.3	0.7	0.9	1.2	1.2	1.1	0.9	3.0
Diurnal Maximum																									

2.3	1.9	2.0	2.9	2.6	2.1	3.1	4.2	4.5	4.6	3.3	4.0	3.9	4.2	4.4	3.8	3.3	3.9	3.1	2.9	2.5	2.9	3.2	2.6	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	--

M - Maintenance



Summary of Hour Averages

Mannix - September 2015

Maximum Value: 1.5 km/h on Sep 30 07:00		Maximum Daily Average: 0.8 km/h on Sep 30		Hours in Service: 720																						
Minimum Value: -0.8 km/h on Sep 19 14:00		Minimum Daily Average: -0.1 km/h on Sep 19		Hours of Data: 714																						
Maximum Diurnal Average: 0.3 km/h at hour 16		Minimum Diurnal Average: 0.0 km/h at hour 22		Hours of Missing Data: 6																						
Monthly Average: 0.15 km/h		Percentiles: P <sub>1</sub> = -0.6 P <sub>10</sub> = -0.3 Q <sub>1</sub> = -0.1 Median = 0.1 Q <sub>3</sub> = 0.3 P <sub>90</sub> = 0.6 P <sub>99</sub> = 1.1		Hours of Calibration: 0																						
				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-Sep	-0.4	0.2	0.4	0.1	0.1	-0.1	0.1	-0.4	0.0	-0.1	-0.1	0.1	0.2	0.1	0.4	0.0	-0.1	-0.2	0.1	-0.1	-0.4	-0.4	-0.2	-0.3	0.0	0.4
2-Sep	-0.1	0.1	-0.1	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.1	0.3	0.2	0.5	0.3	-0.1	0.1	0.5	0.2	-0.1	-0.3	0.0	0.3	0.1	0.5
3-Sep	0.0	-0.2	-0.1	-0.1	0.2	0.2	0.4	0.3	0.3	0.4	0.5	0.8	0.5	0.7	0.3	0.2	0.1	0.2	0.2	0.0	0.2	0.0	-0.1	-0.1	0.2	0.8
4-Sep	0.1	0.1	-0.1	0.0	-0.1	0.0	0.5	0.9	0.6	-0.2	0.1	-0.2	-0.3	0.1	-0.2	0.4	0.2	0.2	0.1	-0.1	0.0	0.2	0.0	0.0	0.1	0.9
5-Sep	0.2	0.2	0.1	0.2	0.2	-0.1	-0.1	0.0	0.2	0.7	-0.2	0.4	1.0	0.0	0.7	0.5	0.2	0.3	0.3	0.1	0.1	0.0	0.2	0.1	0.2	1.0
6-Sep	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.3	0.6	0.2	0.3	-0.1	0.0	-0.4	0.1	0.2	0.3	0.2	0.2	0.1	0.2	0.1	-0.1	0.1	0.6
7-Sep	-0.1	0.1	0.2	0.4	0.2	0.1	0.2	0.0	0.8	0.3	1.0	0.5	0.0	-0.1	0.5	0.4	0.5	0.9	0.2	-0.1	0.2	0.1	0.0	0.1	0.3	1.0
8-Sep	0.1	0.1	0.1	0.2	-0.1	-0.2	-0.1	-0.1	0.1	0.2	-0.4	-0.4	0.0	1.0	0.9	0.6	0.1	0.5	0.0	0.3	0.4	0.1	0.2	0.6	0.2	1.0
9-Sep	0.7	0.5	0.7	0.5	0.5	0.7	0.4	0.0	0.1	0.4	0.2	0.1	-0.1	0.2	0.0	0.5	0.4	-0.2	0.1	-0.1	0.0	0.7	0.1	0.3	0.3	0.7
10-Sep	0.1	0.0	0.1	0.2	0.4	0.5	0.1	-0.1	0.1	0.1	0.3	0.0	0.1	-0.2	-0.1	-0.1	-0.2	-0.2	-0.4	-0.4	-0.5	-0.4	-0.4	-0.4	-0.1	0.5
11-Sep	-0.2	0.2	0.2	0.4	0.4	0.3	0.1	0.1	0.1	0.6	0.5	-0.4	-0.2	-0.6	-0.2	-0.4	-0.4	-0.2	-0.3	-0.5	-0.6	-0.6	-0.6	-0.6	-0.1	0.6
12-Sep	-0.4	-0.5	-0.4	-0.2	-0.2	0.4	0.0	0.0	0.0	-0.2	-0.2	0.0	0.2	-0.1	-0.2	0.0	-0.2	-0.3	0.2	0.0	0.0	0.2	0.4	0.3	-0.1	0.4
13-Sep	0.1	0.2	0.2	0.0	0.1	0.1	0.0	0.2	0.4	0.2	0.4	0.2	0.0	-0.5	0.1	0.1	0.0	0.1	0.2	0.1	-0.2	0.0	0.2	0.3	0.1	0.4
14-Sep	0.0	0.1	0.7	0.1	0.1	0.1	-0.1	0.0	0.4	0.5	0.4	0.8	0.6	1.0	-0.2	0.5	0.1	0.4	0.4	0.5	0.2	0.2	0.0	0.2	0.3	1.0
15-Sep	0.1	0.2	0.0	0.2	0.1	0.1	-0.1	-0.1	0.2	0.1	0.9	-0.1	-0.1	0.7	-0.1	0.3	-0.4	-0.5	-0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.9
16-Sep	0.1	-0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	-0.2	0.8	0.3	-0.1	0.3	0.2	0.4	0.4	0.4	0.3	0.3	0.2	0.5	0.6	0.2	0.8
17-Sep	0.4	0.5	0.2	0.4	0.5	0.6	0.3	0.1	0.3	0.5	0.3	0.6	0.1	0.1	0.1	0.6	-0.1	0.1	0.4	0.3	0.4	0.3	0.4	0.4	0.3	0.6
18-Sep	0.1	-0.2	0.2	0.5	0.4	0.1	0.1	0.1	0.2	-0.5	0.0	-0.2	-0.6	0.2	-0.4	0.0	0.0	-0.4	-0.4	-0.4	-0.6	0.1	0.4	0.3	0.0	0.5
19-Sep	0.3	0.4	0.3	0.5	0.3	0.3	0.4	0.1	0.0	0.1	-0.4	-0.5	0.1	-0.8	-0.3	-0.8	-0.4	-0.6	-0.4	-0.4	-0.2	-0.5	-0.5	-0.2	-0.1	0.5
20-Sep	-0.6	-0.4	-0.4	-0.7	-0.3	-0.4	-0.3	-0.3	-0.1	0.2	0.0	0.4	-0.2	0.2	0.4	0.2	0.3	0.2	-0.1	0.1	-0.2	-0.3	0.3	-0.2	-0.1	0.4
21-Sep	0.1	0.3	0.2	0.2	0.4	0.1	0.4	-0.5	0.1	0.0	-0.5	-0.3	0.0	-0.2	-0.3	0.2	0.0	0.3	0.0	0.1	0.0	0.1	0.3	0.0	0.0	0.4
22-Sep	0.0	0.1	0.1	0.0	0.0	0.2	0.1	0.2	M	M	M	M	M	M	0.6	-0.1	0.8	0.3	0.3	-0.1	0.1	0.2	0.4	0.2	0.2	0.8
23-Sep	-0.1	0.1	0.1	-0.1	-0.2	-0.2	-0.3	-0.2	-0.5	-0.5	-0.2	-0.2	0.6	0.4	0.2	0.6	0.5	0.8	0.1	-0.4	-0.3	-0.5	-0.2	0.0	0.0	0.8
24-Sep	-0.1	-0.1	-0.1	-0.1	-0.2	0.3	0.1	0.1	0.6	0.5	0.4	-0.1	0.1	0.0	-0.5	-0.2	-0.2	0.1	0.0	0.1	-0.1	-0.1	-0.1	0.1	0.0	0.6
25-Sep	0.1	-0.2	-0.2	-0.3	0.0	0.7	0.3	0.1	0.2	0.5	0.4	0.1	0.3	-0.1	0.3	0.5	0.4	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.7
26-Sep	0.0	-0.2	-0.1	0.0	-0.1	-0.1	0.1	0.0	-0.2	0.1	-0.3	0.2	0.4	0.8	0.8	0.1	0.4	0.1	0.4	0.3	0.1	0.2	0.0	0.0	0.1	0.8
27-Sep	0.4	0.3	0.0	0.3	0.1	0.0	0.4	1.2	0.6	0.0	0.1	1.4	1.0	0.1	0.6	1.1	0.9	0.5	0.3	0.6	0.4	0.3	0.5	0.3	0.5	1.4
28-Sep	0.4	0.5	0.3	0.3	0.4	0.0	0.0	-0.2	-0.1	0.9	0.6	-0.1	1.2	0.8	0.5	0.6	0.6	0.3	0.4	0.9	0.6	-0.1	-0.2	-0.3	0.3	1.2
29-Sep	-0.3	-0.4	-0.3	-0.2	0.0	-0.1	0.5	0.7	0.4	0.8	0.1	0.1	-0.4	0.0	0.3	0.5	0.3	0.5	0.8	0.8	1.0	0.8	0.5	0.5	0.3	1.0
30-Sep	0.9	1.0	1.1	1.2	1.3	1.5	1.5	1.0	1.0	0.8	0.4	0.8	1.0	0.6	0.3	0.7	0.6	0.9	0.6	0.5	0.6	0.4	0.6	0.7	0.8	1.5
																								Diurnal Average		
																								Diurnal Maximum		
M - Maintenance																										



Summary of Hour Standard Deviations

Mannix - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 4.5 km/h on Sep 26 14:00	Hours of Data: 714
Minimum Value: 0.2 km/h on Sep 8 00:00	Hours of Missing Data: 6
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> = 2.1 P <sub>90</sub> = 2.8 P <sub>99</sub> = 4.1	Hours of Calibration: 0
	Percent Operational Time: 99.2

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	0.6	0.7	0.6	0.4	0.4	0.8	1.5	1.8	1.1	1.9	2.8	2.9	2.9	2.3	1.8	1.9	1.7	1.3	1.0	1.2	1.0	0.5	0.6	0.4	2.9
2-Sep	0.4	0.7	0.5	0.3	0.4	0.4	0.5	0.5	0.9	1.6	2.2	1.2	1.5	2.2	2.2	1.9	2.9	3.3	2.8	2.6	2.2	2.2	2.8	2.9	3.3
3-Sep	2.1	1.6	1.9	2.3	1.7	2.0	2.4	2.2	2.7	2.5	2.0	2.5	2.6	2.5	2.3	1.8	2.1	1.9	1.9	1.8	1.5	1.0	0.9	0.8	2.7
4-Sep	0.9	1.2	0.7	0.4	0.5	0.5	1.1	1.4	1.2	1.0	1.8	1.9	2.3	2.0	2.2	1.7	1.8	1.3	0.6	0.6	0.4	0.2	0.2	0.2	2.3
5-Sep	0.4	0.5	0.7	1.0	0.6	0.6	0.7	0.8	1.1	1.8	1.6	2.1	2.5	1.9	2.3	2.2	2.0	1.0	0.7	0.4	0.4	0.4	0.4	0.3	2.5
6-Sep	0.4	0.5	0.8	0.3	0.3	0.7	0.9	0.8	0.9	1.2	1.6	1.7	1.7	2.1	1.6	1.7	1.6	1.4	1.0	1.1	0.8	1.1	0.9	1.0	2.1
7-Sep	1.0	0.8	0.9	1.0	1.1	1.3	1.4	1.3	1.7	1.7	2.6	2.3	2.3	2.7	2.8	2.6	2.5	2.1	1.0	0.9	1.0	0.6	0.3	0.2	2.8
8-Sep	0.2	0.4	0.3	0.3	0.2	0.3	0.3	0.3	0.7	1.2	1.5	1.5	2.3	2.2	2.4	2.5	1.5	1.4	0.4	0.7	1.5	1.0	0.8	0.5	2.5
9-Sep	0.8	0.9	0.7	0.6	1.0	1.0	0.8	0.8	0.8	0.7	0.8	1.1	1.2	2.1	1.6	2.1	1.8	1.4	0.9	0.5	0.4	0.4	0.6	0.8	2.1
10-Sep	0.6	0.3	0.5	0.5	0.5	0.7	0.8	0.8	0.8	1.0	1.3	1.5	2.0	2.6	2.3	1.9	1.6	1.4	0.6	0.3	0.2	0.4	0.7	0.9	2.6
11-Sep	0.7	1.8	0.9	0.6	0.7	0.8	0.5	0.5	1.0	1.3	1.7	2.0	1.9	2.4	2.1	2.3	1.6	1.2	0.6	0.5	0.3	0.7	0.9	1.7	2.4
12-Sep	1.7	1.7	1.6	2.3	1.6	1.0	0.7	1.2	1.1	0.9	1.0	1.4	1.1	0.9	1.6	2.0	2.3	2.0	1.8	1.5	1.6	2.0	1.7	1.9	2.3
13-Sep	0.8	0.9	0.6	0.3	0.4	0.5	0.4	0.6	1.2	1.4	2.0	2.5	2.2	2.1	1.9	1.9	1.6	1.2	0.9	0.4	0.4	0.6	1.3	1.3	2.5
14-Sep	1.9	1.8	1.7	1.6	2.0	1.7	1.9	1.8	1.8	2.2	2.5	2.5	2.1	2.8	2.5	2.1	1.8	1.5	0.8	0.5	0.5	0.4	0.5	1.0	2.8
15-Sep	0.6	0.2	0.4	0.6	0.3	0.6	0.6	0.8	1.1	1.3	1.8	2.2	2.9	3.0	2.8	2.6	1.7	1.4	1.8	1.2	0.8	1.2	1.0	0.9	3.0
16-Sep	0.5	0.7	0.5	0.5	0.4	0.2	0.4	0.5	0.5	1.1	1.5	1.9	2.3	2.6	2.6	2.3	2.0	1.3	0.4	0.6	0.4	0.4	0.8	0.6	2.6
17-Sep	0.7	0.8	0.6	0.5	0.6	0.7	1.0	0.9	1.2	1.4	1.5	2.7	2.6	3.0	2.0	2.7	1.9	1.4	1.2	0.7	0.7	1.0	0.8	0.4	3.0
18-Sep	0.8	0.6	0.8	0.6	0.7	0.5	0.5	0.8	1.3	2.0	2.5	3.1	3.0	2.9	2.8	2.9	2.6	2.3	0.9	0.4	0.5	0.8	0.9	1.1	3.1
19-Sep	1.0	0.9	1.0	0.9	1.3	1.3	1.6	2.0	2.0	2.3	3.2	3.7	3.9	3.3	4.1	3.5	2.7	4.0	2.1	3.0	2.4	2.5	1.8	1.6	4.1
20-Sep	1.4	1.5	1.7	1.6	2.7	2.1	1.2	1.5	2.0	3.1	3.4	3.6	3.9	3.9	3.8	3.3	2.5	1.8	0.9	0.9	0.8	1.4	1.9	1.7	3.9
21-Sep	1.2	1.6	1.7	1.8	2.0	1.8	2.3	2.6	2.8	2.6	2.3	2.7	3.1	3.0	2.7	3.0	2.1	2.3	2.0	1.9	1.7	1.6	1.3	0.7	3.1
22-Sep	0.4	0.5	0.6	0.4	0.3	0.4	0.3	0.6	M	M	M	M	M	M	2.8	2.3	1.6	0.9	0.6	1.1	1.4	1.5	0.7	0.5	2.8
23-Sep	1.0	1.6	1.7	1.8	2.0	1.9	1.8	2.2	2.0	2.2	3.0	2.7	3.2	3.3	3.6	3.1	3.4	3.4	3.3	2.9	2.7	2.4	2.1	1.9	3.6
24-Sep	1.8	1.8	1.7	1.5	1.8	1.2	0.9	1.0	1.2	2.1	2.0	1.8	1.7	1.9	1.7	1.5	1.0	1.3	2.4	2.5	3.1	1.9	1.7	1.8	3.1
25-Sep	1.5	1.2	1.1	1.7	1.4	0.7	0.9	1.1	1.4	2.6	2.0	2.5	2.8	2.5	2.8	2.7	2.2	1.5	0.5	0.6	0.9	1.4	1.6	1.5	2.8
26-Sep	0.7	0.7	0.9	1.1	1.3	1.2	0.7	0.8	1.5	2.4	2.7	3.5	4.0	4.5	4.1	3.7	3.5	2.9	3.0	2.7	1.7	2.5	2.3	2.4	4.5
27-Sep	2.1	1.2	1.8	3.1	2.1	1.6	3.4	4.4	4.4	4.1	3.3	4.1	4.1	3.6	3.9	3.5	2.9	2.5	1.4	2.2	2.5	2.7	2.9	2.1	4.4
28-Sep	1.9	1.7	1.5	1.2	0.8	0.5	0.5	0.7	1.2	2.3	2.2	2.5	2.5	2.8	2.5	2.4	1.8	0.8	0.4	1.0	1.2	1.2	1.4	1.8	2.8
29-Sep	1.8	1.9	1.7	1.7	1.6	1.3	0.5	0.8	1.3	2.0	1.7	1.7	1.8	1.7	2.0	1.7	1.6	0.7	0.3	0.2	0.5	0.6	1.4	0.9	2.0
30-Sep	0.6	0.8	0.9	0.9	1.1	1.0	0.9	1.1	1.5	1.9	1.6	1.8	3.1	3.0	2.9	2.5	2.2	1.3	0.6	0.8	0.9	1.0	0.8	0.9	3.1

2.1	1.9	1.9	3.1	2.7	2.1	3.4	4.4	4.4	4.1	3.4	4.1	4.1	4.5	4.1	3.7	3.5	4.0	3.3	3.0	3.1	2.7	2.9	2.9	
Diurnal Maximum																								

M - Maintenance



Summary of Hour Averages

Mannix - September 2015

Maximum Value: 9.1 km/h on Sep 27 08:00		Maximum Daily Average: 3.3 km/h on Sep 27		Hours in Service: 720																						
Minimum Value: -2.7 km/h on Sep 25 21:00		Minimum Daily Average: -1.1 km/h on Sep 26		Hours of Data: 713																						
Maximum Diurnal Average: 1.0 km/h at hour 16		Minimum Diurnal Average: 0.6 km/h at hour 21		Hours of Missing Data: 7																						
Monthly Average: 0.78 km/h		Percentiles: P <sub>1</sub> = -1.9 P <sub>10</sub> = -0.4 Q <sub>1</sub> = 0.1 Median = 0.6 Q <sub>3</sub> = 1.4 P <sub>90</sub> = 2.4 P <sub>99</sub> = 3.9		Hours of Calibration: 0																						
				Percent Operational Time: 99.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0.6	0.7	0.7	0.5	0.5	0.1	0.7	-0.6	-0.5	0.8	1.2	1.1	1.8	UO	2.4	1.8	1.3	0.6	0.4	0.8	1.1	0.8	1.0	0.9	0.8	2.4
2-Sep	0.7	0.4	0.4	0.5	0.2	0.4	0.0	-0.1	0.1	0.1	0.0	-0.1	0.3	0.1	0.5	0.3	0.1	0.5	0.8	0.9	0.1	-0.1	0.5	0.9	0.3	0.9
3-Sep	1.2	0.9	1.1	1.3	2.3	3.2	3.5	3.4	3.4	3.3	2.9	3.6	3.4	3.9	3.3	3.0	2.9	3.2	2.9	2.7	2.6	2.3	2.0	1.9	2.7	3.9
4-Sep	2.1	1.8	1.4	1.5	1.8	1.8	1.6	1.4	1.2	0.7	1.0	0.2	0.4	1.1	0.0	0.5	0.1	0.5	0.1	-0.3	0.0	0.5	0.6	0.7	0.9	2.1
5-Sep	0.7	0.5	0.2	0.6	0.7	0.4	0.2	0.2	0.6	0.4	-0.6	-0.2	0.4	-0.2	0.2	0.4	0.4	0.6	0.6	0.2	0.2	0.0	-0.1	-0.2	0.3	0.7
6-Sep	-0.2	-0.2	-0.3	0.0	-0.2	-0.1	-0.2	-0.1	0.0	0.7	0.3	0.5	0.2	0.1	-0.6	-0.1	0.0	-0.1	0.0	0.1	0.2	0.3	0.3	0.1	0.0	0.7
7-Sep	0.2	0.8	0.9	0.6	0.5	0.2	0.3	0.3	1.4	0.7	0.8	0.7	0.8	0.9	1.1	1.2	0.5	0.5	-0.3	-0.4	0.1	0.2	0.2	0.9	0.5	1.4
8-Sep	1.5	1.2	0.6	1.4	0.8	0.2	0.3	0.2	0.2	0.0	-0.6	-0.7	-0.4	1.0	1.0	0.8	0.1	0.7	0.2	0.0	-0.2	0.2	0.4	1.4	0.4	1.5
9-Sep	1.5	1.3	1.4	1.3	1.4	1.5	0.8	0.2	0.4	0.8	0.5	0.1	-0.2	-0.3	0.1	1.1	1.9	-0.5	0.2	0.6	0.4	1.4	1.3	0.4	0.7	1.9
10-Sep	0.3	0.2	0.3	0.3	0.5	0.7	0.6	0.2	0.4	0.4	0.6	0.2	0.4	0.6	0.7	0.9	0.5	0.6	0.4	0.6	0.4	0.7	0.6	0.5	0.5	0.9
11-Sep	0.3	0.6	0.5	0.5	0.7	0.6	0.5	0.5	0.5	1.0	1.1	0.9	0.7	1.1	1.5	1.3	0.8	0.5	0.4	0.7	1.3	0.9	1.5	1.5	0.8	1.5
12-Sep	1.9	2.2	2.7	2.9	3.0	2.9	2.2	2.1	2.0	1.8	1.6	1.6	1.9	1.9	2.1	2.6	2.4	2.5	3.2	2.8	3.0	1.6	0.7	0.6	2.2	3.2
13-Sep	0.3	0.3	0.3	0.5	0.8	0.4	0.4	0.1	0.3	0.0	0.5	0.9	0.5	-0.1	0.5	1.4	1.9	0.2	-0.1	0.5	1.2	1.5	1.2	0.8	0.6	1.9
14-Sep	0.4	0.1	0.8	0.3	0.1	0.1	-0.1	-0.2	0.1	0.2	0.3	1.1	1.0	1.7	0.7	0.2	-0.4	0.0	0.1	0.0	-0.2	-0.2	-0.3	-0.2	0.2	1.7
15-Sep	0.1	0.4	0.0	0.2	0.1	-0.1	-0.3	-0.3	0.0	0.0	0.9	-0.5	-0.4	0.9	0.0	0.1	-0.6	-0.7	-0.5	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	0.9
16-Sep	0.0	-0.2	0.0	-0.1	0.0	0.2	0.1	0.1	0.2	0.0	-0.2	0.5	0.1	-0.5	-0.1	0.1	0.6	0.6	0.9	0.8	1.0	1.3	1.6	1.6	0.4	1.6
17-Sep	1.0	1.2	0.8	0.5	0.5	0.6	0.8	0.5	0.4	0.5	0.7	1.0	0.6	0.7	0.2	0.7	0.9	0.7	1.4	1.4	1.4	1.4	1.4	1.1	0.9	1.4
18-Sep	0.5	0.2	0.4	0.6	0.6	0.5	0.7	0.5	0.6	0.2	0.8	1.6	1.5	2.2	1.7	2.0	2.3	1.7	0.8	0.5	0.5	1.0	1.2	1.6	1.0	2.3
19-Sep	1.6	1.6	1.9	1.7	1.3	1.3	1.9	1.8	1.5	1.3	1.1	2.0	2.9	1.5	2.8	3.0	1.9	3.1	1.7	2.0	1.8	2.0	2.0	2.2	1.9	3.1
20-Sep	1.8	1.5	1.5	1.9	3.0	2.7	1.3	0.9	0.9	2.4	2.6	3.6	3.3	3.9	3.8	3.7	3.0	2.6	2.4	1.7	1.0	1.2	2.2	1.1	2.2	3.9
21-Sep	2.4	2.5	2.7	2.8	2.7	2.6	2.7	0.7	1.6	1.1	0.5	1.5	2.0	1.8	0.7	1.5	1.0	3.1	2.6	2.8	2.7	2.3	2.0	1.9	2.0	3.1
22-Sep	2.0	1.8	1.4	1.5	1.4	1.1	0.2	0.3	M	M	M	M	M	M	0.6	0.1	1.2	0.5	0.7	0.2	0.0	0.2	0.7	0.6	0.8	2.0
23-Sep	0.0	-0.4	-0.4	-0.6	-0.8	-0.9	-0.8	-0.7	-0.8	-0.9	-0.8	-0.8	0.0	0.0	-0.3	0.0	-0.1	0.2	-0.6	-1.0	-0.6	-0.6	-0.4	-0.4	-0.5	0.2
24-Sep	-0.4	-0.4	0.1	0.0	-0.6	0.1	0.2	0.3	0.7	0.4	0.6	-0.2	0.2	-0.1	-0.6	-0.1	-0.1	0.0	-0.1	-0.3	-0.5	0.1	0.1	0.6	0.0	0.7
25-Sep	0.6	0.2	0.0	-0.2	0.1	0.9	0.3	1.5	2.0	2.5	1.5	-0.2	-0.1	-1.4	-1.6	-0.1	-0.9	-1.3	-1.0	-1.9	-0.7	-2.6	-2.5	-1.9	-0.4	2.5
26-Sep	-2.1	-1.7	-1.6	-1.4	-1.4	-1.6	-1.7	-2.2	-1.9	-1.5	-1.9	-1.3	0.1	-1.3	-0.8	-1.6	2.1	0.9	1.3	0.6	-1.6	-1.8	-2.0	-2.0	-1.1	2.1
27-Sep	-1.2	0.5	1.4	2.3	1.9	1.0	3.3	9.1	7.7	4.0	3.6	4.5	4.8	3.9	4.1	4.1	3.4	3.1	2.3	2.4	2.7	3.1	3.9	3.1	3.3	9.1
28-Sep	2.8	2.5	1.4	1.8	2.1	1.1	1.3	0.9	0.8	1.6	1.0	0.1	1.3	1.0	0.7	0.7	0.3	0.3	0.4	0.8	0.8	0.3	-0.2	-0.7	1.0	2.8
29-Sep	-0.8	-0.8	-1.0	-0.6	-0.1	0.0	0.5	0.6	0.5	0.7	0.2	-0.3	-0.7	-0.3	0.1	0.7	0.3	0.4	0.6	0.7	1.1	0.5	0.3	0.4	0.1	1.1
30-Sep	0.6	0.8	0.9	1.0	1.2	1.4	1.6	1.0	1.0	0.8	0.5	0.9	1.0	0.5	0.1	0.7	0.6	0.7	0.4	0.6	0.9	0.6	0.7	0.5	0.8	1.6
																								Diurnal Average		
																								Diurnal Maximum		
0.7 0.7 0.7 0.8 0.8 0.8 0.8 0.7 0.9 0.8 0.7 0.8 1.0 0.9 0.8 1.0 1.0 0.9 0.7 0.7 0.6 0.6 0.7 0.7																										
2.8 2.5 2.7 2.9 3.0 3.2 3.5 9.1 7.7 4.0 3.6 4.5 4.8 3.9 4.1 4.1 3.4 3.2 3.2 2.8 3.0 3.1 3.9 3.1																										
M - Maintenance UO - Unstable Operation																										



Summary of Hour Standard Deviations

Mannix - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 5.4 km/h on Sep 26 15:00			Hours of Data:	713
Minimum Value: 0.2 km/h on Sep 6 00:00			Hours of Missing Data:	7
			Hours of Calibration:	0
			Percent Operational Time:	99.0
Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.8 Median = 1.4 Q <sub>3</sub> = 2.2 P <sub>90</sub> = 2.9 P <sub>99</sub> = 4.6				

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-Sep	0.7	0.7	0.6	0.4	0.4	0.9	1.7	1.9	1.1	2.0	2.9	3.1	3.0	UO	1.7	2.0	1.8	1.5	1.1	1.4	1.2	0.7	0.7	0.5	3.1
2-Sep	0.7	0.8	0.6	0.3	0.4	0.6	0.4	0.5	0.9	1.5	2.2	1.2	1.5	2.2	2.3	2.0	2.8	3.4	2.9	2.8	2.2	2.2	2.9	3.3	3.4
3-Sep	2.3	1.7	1.8	2.3	1.9	1.9	2.2	2.1	2.4	2.2	2.1	2.6	2.6	2.5	2.3	1.8	2.1	1.8	1.8	1.5	1.1	0.9	0.9	2.6	
4-Sep	0.9	1.2	0.8	0.5	0.5	0.5	1.2	1.4	1.2	1.1	1.9	1.9	2.4	2.0	2.2	1.9	1.8	1.4	0.6	0.5	0.4	0.3	0.3	0.3	2.4
5-Sep	0.4	0.4	0.7	1.1	0.5	0.5	0.4	0.8	1.1	1.5	1.2	1.7	2.3	2.0	2.0	2.3	2.2	0.9	0.8	0.4	0.4	0.4	0.4	0.2	2.3
6-Sep	0.5	0.5	0.8	0.3	0.3	0.7	0.9	0.9	1.0	1.2	1.6	1.7	1.9	2.2	1.6	1.8	1.6	1.4	0.8	0.8	0.8	0.9	1.0	1.1	2.2
7-Sep	1.1	0.9	0.9	1.1	1.2	1.5	1.5	1.3	1.7	1.8	2.8	2.3	2.4	2.6	2.7	2.6	2.6	2.1	0.9	0.9	1.2	0.6	0.4	0.5	2.8
8-Sep	0.2	0.6	0.4	0.5	0.7	0.4	0.4	0.2	0.4	1.0	1.3	1.2	2.4	2.2	2.4	2.4	1.5	1.5	0.5	0.7	1.2	0.9	0.8	0.5	2.4
9-Sep	0.7	0.8	0.5	0.5	0.8	0.8	0.8	0.8	0.7	0.6	0.7	0.9	1.1	1.8	1.7	2.5	4.7	1.2	0.9	0.6	0.4	0.5	0.8	1.0	4.7
10-Sep	0.7	0.3	0.6	0.6	0.6	0.7	0.6	0.7	0.8	0.9	1.2	1.4	2.1	2.7	2.4	2.0	1.6	1.4	0.7	0.3	0.3	0.5	0.8	1.0	2.7
11-Sep	0.8	1.8	0.9	0.6	0.7	0.8	0.6	0.4	0.9	1.2	1.8	2.2	2.1	2.6	2.3	2.3	1.6	1.3	0.8	0.5	0.3	0.8	1.0	2.0	2.6
12-Sep	2.0	2.1	1.9	2.4	1.8	1.1	0.9	1.4	1.1	1.1	1.2	1.5	1.2	1.0	1.8	2.1	2.4	2.2	2.0	1.7	1.8	2.5	1.9	1.8	2.5
13-Sep	0.8	1.0	0.8	0.5	0.6	0.6	0.5	0.5	1.2	1.4	2.0	2.6	2.3	2.3	2.1	1.7	1.6	1.4	0.9	0.5	0.5	0.7	1.6	1.3	2.6
14-Sep	2.0	1.8	1.9	1.6	2.0	1.8	1.9	1.9	1.8	2.2	2.7	2.5	2.2	2.9	2.4	2.3	1.7	1.4	0.7	0.4	0.6	0.3	0.4	0.6	2.9
15-Sep	0.7	0.3	0.5	0.5	0.5	0.6	0.5	0.6	1.0	1.2	1.9	2.3	2.9	3.2	3.0	2.6	1.6	1.3	1.3	1.2	0.7	1.1	1.0	0.7	3.2
16-Sep	0.5	0.8	0.3	0.4	0.4	0.2	0.3	0.5	0.5	1.0	1.4	1.9	2.2	2.5	2.4	2.4	2.2	1.3	0.3	0.6	0.3	0.3	0.6	0.5	2.5
17-Sep	0.8	0.7	0.6	0.4	0.5	0.5	0.8	0.9	1.1	1.3	1.4	2.7	2.8	3.1	2.1	2.7	2.1	1.5	1.3	0.7	0.7	1.0	0.9	0.5	3.1
18-Sep	0.9	0.6	1.1	0.6	0.8	0.6	0.5	0.8	1.4	2.0	2.6	3.2	3.3	3.2	2.8	2.9	2.9	2.4	1.0	0.5	0.6	0.9	1.0	1.1	3.3
19-Sep	1.0	1.0	0.9	0.9	1.3	1.4	1.6	1.8	1.9	2.4	3.4	4.2	4.2	3.6	4.4	3.8	2.8	4.5	2.5	3.4	2.8	2.7	2.0	1.7	4.5
20-Sep	1.5	1.7	1.8	1.9	2.8	2.2	1.5	1.6	2.2	3.3	3.6	3.7	4.1	4.1	3.9	3.6	2.5	1.7	0.9	1.1	0.8	1.4	1.9	1.7	4.1
21-Sep	1.1	1.5	1.7	1.8	1.8	1.7	2.5	2.5	2.7	2.6	2.4	2.8	3.0	3.0	2.7	3.0	2.0	2.3	1.7	1.8	1.6	1.4	1.3	0.7	3.0
22-Sep	0.4	0.5	0.8	0.5	0.4	0.6	0.3	0.7	M	M	M	M	M	M	2.7	2.1	1.6	0.9	0.6	0.8	1.0	1.3	0.8	0.6	2.7
23-Sep	1.0	1.3	1.3	1.5	1.4	1.4	1.6	1.8	1.6	1.9	2.7	2.5	2.4	2.4	3.1	2.8	2.9	2.8	3.1	2.6	2.6	2.1	1.5	1.5	3.1
24-Sep	1.2	1.4	1.3	1.1	1.4	1.2	0.6	0.9	1.1	2.0	2.1	1.6	1.7	1.6	1.5	1.2	0.9	0.9	1.2	2.3	2.7	1.7	1.3	1.6	2.7
25-Sep	1.2	1.0	0.7	1.2	1.0	0.6	0.9	1.4	1.5	2.5	2.3	2.9	3.6	2.9	2.9	3.5	2.7	1.7	1.1	0.9	0.8	1.4	1.7	1.6	3.6
26-Sep	0.8	0.8	0.9	1.1	1.3	1.2	0.7	0.9	1.4	2.3	2.8	3.9	5.2	4.9	5.4	4.9	5.1	4.0	4.3	3.8	2.2	3.0	2.8	2.8	5.4
27-Sep	2.2	1.5	1.9	3.1	2.3	1.8	4.0	5.0	4.5	3.8	3.3	4.0	4.0	3.5	3.7	3.4	2.9	2.5	1.3	2.3	2.4	2.6	2.9	2.0	5.0
28-Sep	1.9	1.7	1.6	1.3	0.8	0.6	0.6	0.7	1.1	2.3	2.3	2.6	2.7	2.9	2.5	2.4	1.4	0.8	0.4	0.9	1.0	0.8	1.0	1.2	2.9
29-Sep	1.4	1.7	1.4	1.4	1.3	0.9	0.3	0.8	1.3	2.0	1.7	1.5	1.5	1.5	1.8	1.7	1.7	0.6	0.3	0.2	0.4	0.7	1.4	1.0	2.0
30-Sep	0.7	0.9	0.7	0.8	1.0	1.0	0.8	1.1	1.5	1.9	1.6	1.8	3.3	3.0	2.9	2.6	2.2	1.3	0.5	0.8	1.0	1.1	1.0	0.9	3.3

2.3	2.1	1.9	3.1	2.8	2.2	4.0	5.0	4.5	3.8	3.6	4.2	5.2	4.9	5.4	4.9	5.1	4.5	4.3	3.8	2.8	3.0	2.9	3.3	
Diurnal Maximum																								

M - Maintenance      UO - Unstable Operation



# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	September 11, 2015	Last Calibration	August 6, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	11:10	End Time (MST)	14:30
Gas Cert Reference	S9610161A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG Make/Model	API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-635	-635
Analyzer IP address	192.168.1.43		Lamp voltage	862	865
Calculated slope	1.001305	0.991071	Chamber temp	45.0	45.0
Calculated intercept	0.535966	1.228849	Pressure	691.3	689.4
Analyzer Background	8.0	7.8	Flow	0.478	0.477
Analyzer Coefficient	1.015	1.033	Intensity	90	90

Analyzer make TEI 43i Analyzer serial # 1008841399

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	----
as found span	5000	60.0	600.0	589.9	1.017
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	60.0	600.0	604.4	0.993
second point	5000	30.0	300.0	302.1	0.993
third point	5000	15.0	150.0	147.9	1.015
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	60.0	600.0	605.5	0.991
Average Correction Factor					1.000

Corrected As found 590.3 Previous response 598.7 % change 1.4%

**Notes:**

Filter changed after As Found. Zero and span adjusted.

Calibration Performed By: Ryan Power



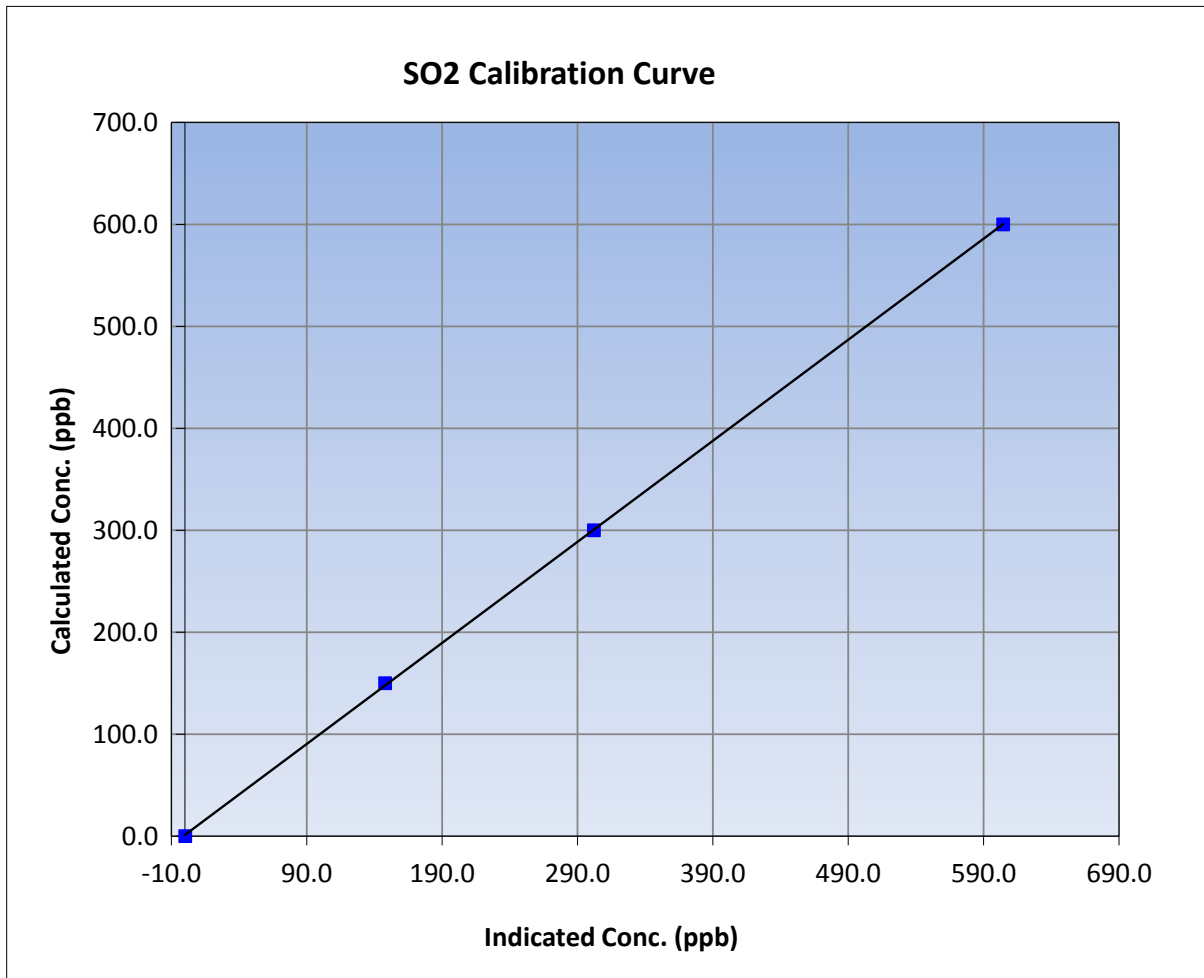
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 11, 2015	Previous Calibration	August 6, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:10	End Time (MST)	14:30
Analyzer make	TEI 43i	Analyzer serial #	1008841399

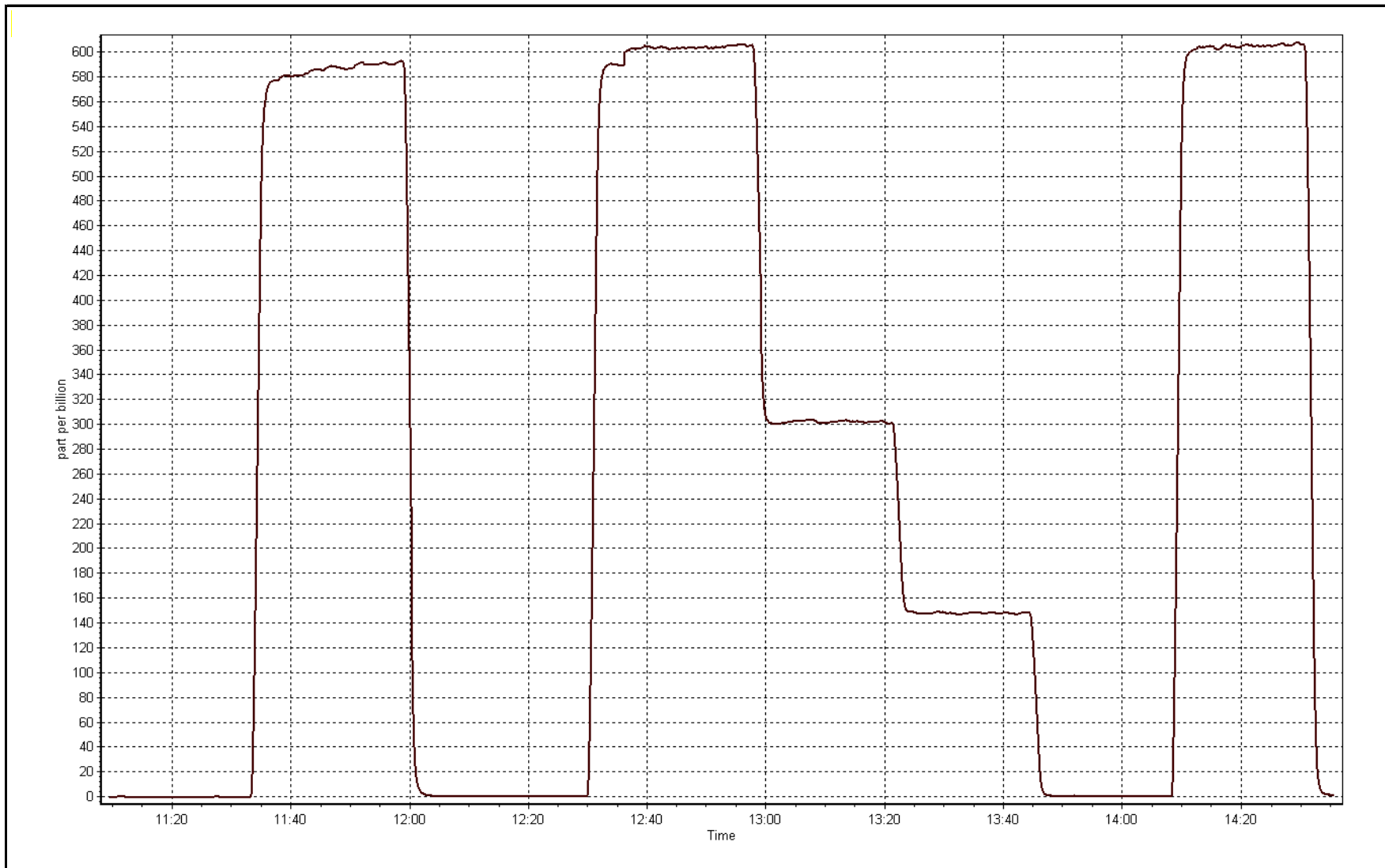
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999963
600.0	604.4	0.9927		
300.0	302.1	0.9930	Slope	0.991071
150.0	147.9	1.0145		
			Intercept	1.228849



SO2 Calibration Plot

Date: September 11, 2015







# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	September 10, 2015	Last Calibration	August 6, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	11:20	End Time (MST)	15:18
Gas Cert Reference	CC62844	Station temp.	21 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG air Make/Model	API 701	Serial Number	138
DACS make/model	Campbell Scientific CR3000	Serial Number	2633
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S960161A 09-Sep-17

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-623	-658
Analyzer IP address	192.168.1.42		Lamp voltage	878	802
Calculated slope	0.999198	0.996828	Chamber temp	45	45
Calculated intercept	-0.157071	-0.050060	Pressure	517.7	518.6
Analyzer Background	17.6	18.8	Flow	1.064	1.066
Analyzer Coefficient	1.370	1.235	Intensity	115	90
			Converter temp.	328	326

Analyzer make/model	Thermo 450i	Analyzer serial #	815129108
Converter make/model	NA	Converter serial #	NA

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	74.4	75.0	71.8	1.044
SO2 scrubber check	5000	15.0	150.0	1.5	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	74.4	75.0	75.2	0.997
second point	5000	41.7	42.0	42.3	0.993
third point	5000	24.8	25.0	25.2	0.992
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	74.4	75.0	74.8	1.003
Average Correction Factor					0.994

Corrected As found	71.6	Previous response	75.2	% change	5.1%
--------------------	------	-------------------	------	----------	------

**Notes:**

Calibrator MFC calibration prior to analyzer calibration. High lamp intensity alarm on arrival, PMT voltage adjustment and initial flash reference adjustment carried out. Two factors more than likely adding to the 5.1% change, other diagnostics fine. Filter changed after As Finds. Scrubber check after third point

Calibration Performed By: Ryan Power



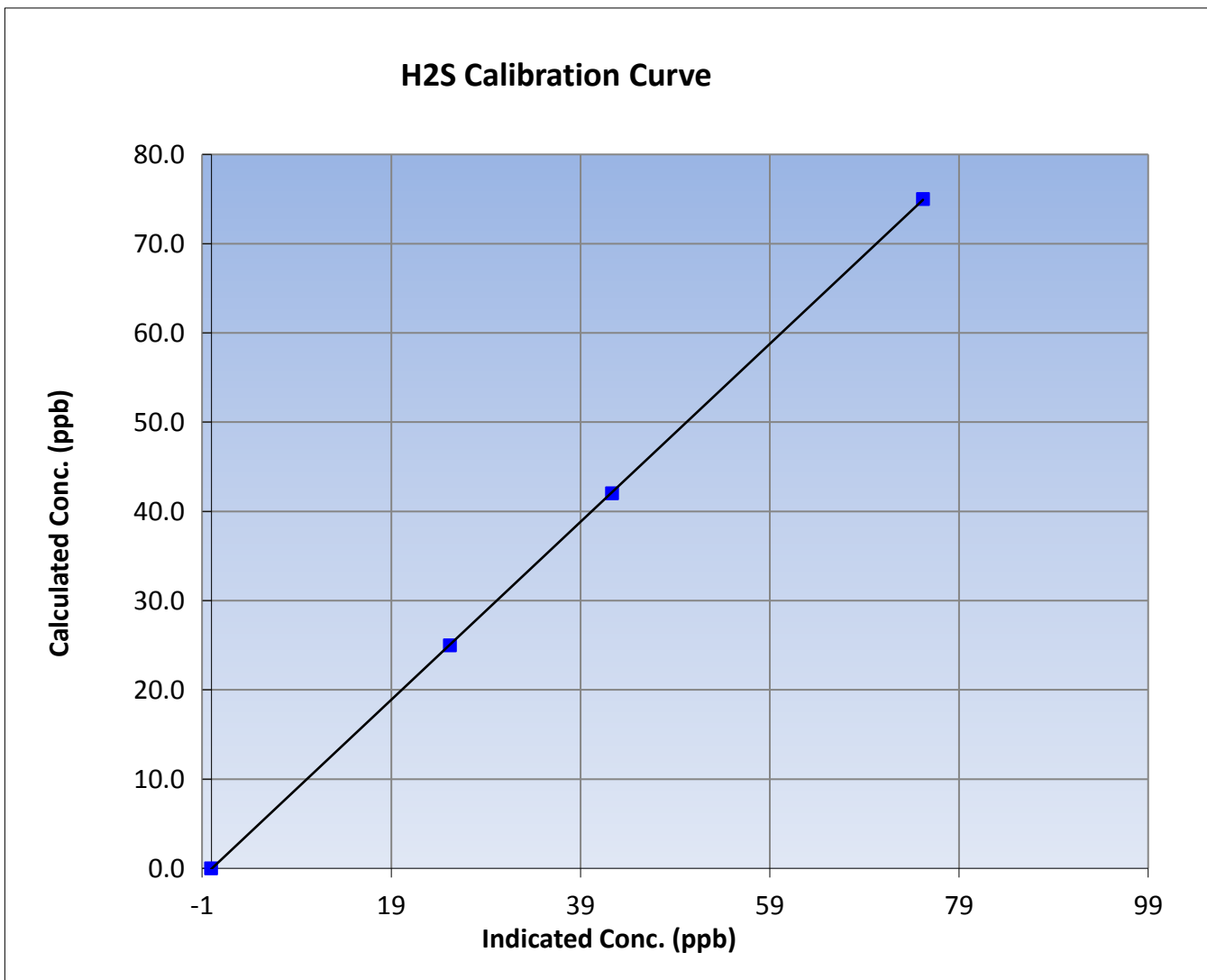
# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	September 10, 2015	Previous Calibration	August 6, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:20	End Time (MST)	15:18
Analyzer make	Thermo 450i	Analyzer serial #	815129108

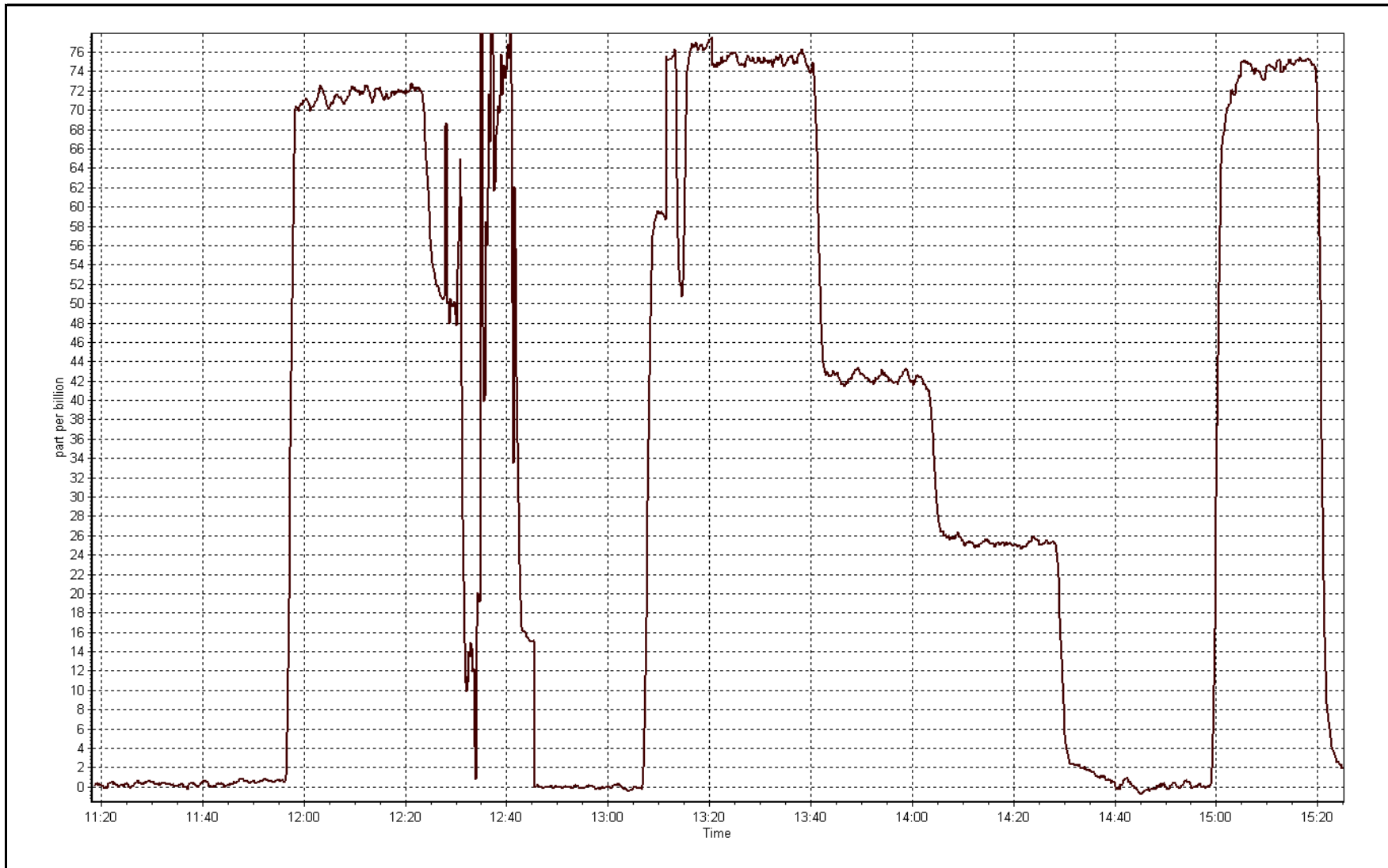
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999989
75.0	75.2	0.9973		
42.0	42.3	0.9930	Slope	0.996828
25.0	25.2	0.9924		
			Intercept	-0.050060



H2S Calibration Plot

Date: September 10, 2015





# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	September-11-15	Last Calibration	August-06-15
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	11:05	End Time (MST)	14:30
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Sept-26-2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.4	9.4
Analyzer IP address	192.168.1.51		Air or Bypass Press	42.3	42.3
Calculated slope	0.998797	0.999996	Fuel Pressure	20.2	20.2
Calculated intercept	0.026030	0.012023	Analyzer Coeff	3.8	3.3
			Analyzer BKG	3.280	3.874

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

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.02	----
as found span	5000	60.0	12.46	12.31	1.012
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.0	12.46	12.45	1.000
second point	5000	30.0	6.23	6.21	1.003
third point	5000	15.0	3.11	3.09	1.008
as left zero	5000	0.0	0.00	0.05	----
as left span	5000	60.0	12.46	12.44	1.001
Average Correction Factor					1.004

Corrected As found	12.33	Previous response	12.44	% change	0.9%
--------------------	-------	-------------------	-------	----------	------

Notes:

Filter changed after As Found. Span adjusted.

Calibration Performed By:

\_\_\_\_\_  
Ryan Power



# Wood Buffalo Environmental Association THC Calibration Report

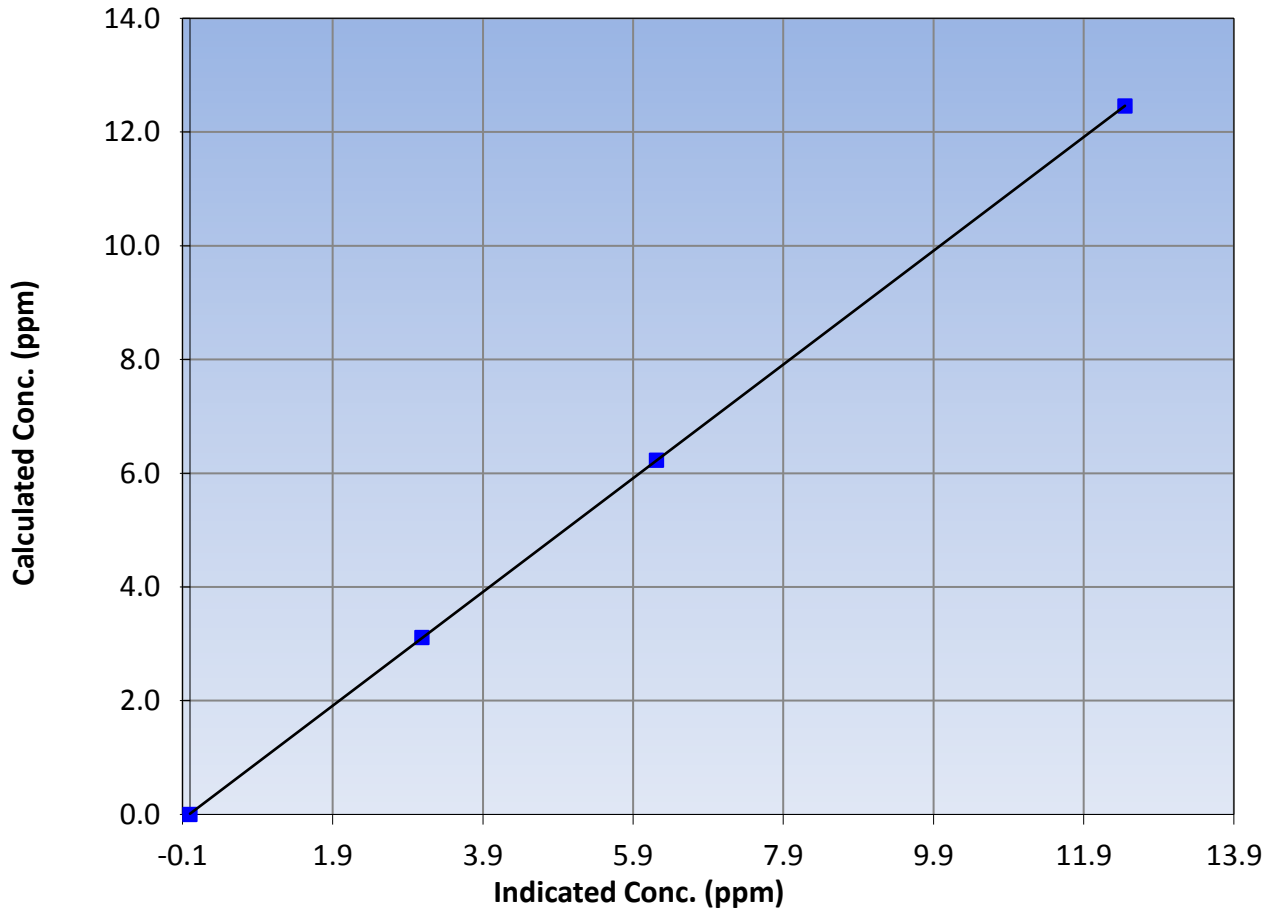
## Station Information

Calibration Date	September 11, 2015	Previous Calibration	August 6, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:05	End Time (MST)	14:30
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

## Calibration Data

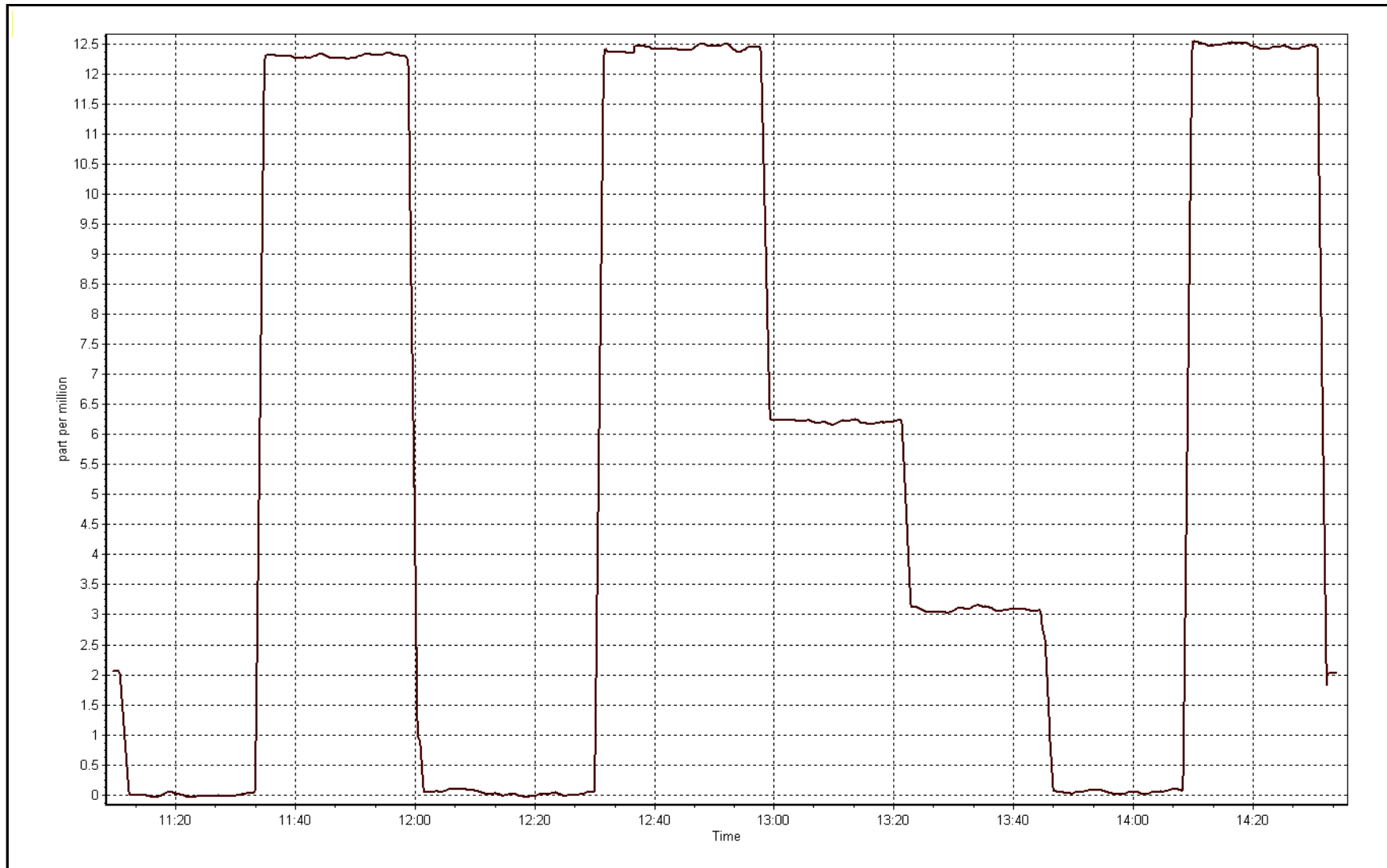
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999996
12.46	12.45	1.0005		
6.23	6.21	1.0029	Slope	0.999996
3.11	3.09	1.0078		
			Intercept	0.012023

**THC Calibration Curve**



THC Calibration Plot

Date: September 11, 2015





## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 6**  
**PATRICIA MCINNES**  
**SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*



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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	682	38	38	100.00	86	0	12	0
TRS (ppb) Average	684	36	36	100.00	2	0	0	0
THC (ppm) Average	683	37	37	100.00	2.2	-	2	-
NMHC(ppm) Average	683	37	37	100.00	0.054	-	0.002	-
CH4(ppm) Average	683	37	37	100.00	2.2	-	2	-
O3 (ppb) Average	684	36	36	100.00	40	0	31	-
NO2 (ppb) Average	678	37	42	99.31	18	0	6	-
NO (ppb) Average	678	37	42	99.31	32	-	5	-
NOX (ppb) Average	678	37	42	99.31	48	-	9	-
NH3 (ppb) Average	639	47	81	95.28	0	0	0	-
PM2.5 (ug/m3) Average	720	0	0	100.00	27.7	-	6.1	0
Temperature 2 m (C) Average	720	0	0	100.00	23.3	-	15.5	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	92	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	33	-	18	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	682	0.8	4	-	0	0	0	0	0	1	86
TRS (ppb) Average	684	0.2	0	-	0	0	0	0	0	0	2
THC (ppm) Average	683	1.94	0.1	-	1.8	1.9	1.9	1.9	2	2	2.2
NMHC(ppm) Average	683	0	0.003	-	0	0	0	0	0	0	0.054
CH4(ppm) Average	683	1.94	0.1	-	1.8	1.9	1.9	1.9	2	2	2.2
O3 (ppb) Average	684	19.1	8	-	3	7	13	19	26	30	40
NO2 (ppb) Average	678	2.7	3	-	0	0	0	2	4	7	18
NO (ppb) Average	678	1.4	3	-	0	0	0	0	1	4	32
NOX (ppb) Average	678	4.1	5	-	0	0	1	2	5	11	48
NH3 (ppb) Average	639	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	720	3.54	3.1	-	0	0.3	1.5	2.9	4.6	7.1	27.7
Temperature 2 m (C) Average	720	9.16	5	-	-2.3	3.5	5.5	8.6	12.1	16.3	23.3
Relative Humidity (%) Average	720	71.8	19	-	25	44	57	73	89	95	99
Wind Speed 10 m (km/h) Average	720	9.7	6	-	1	3	6	9	13	17	33
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NO, NOX	25 Sep 2015 13:00	25 Sep 2015 15:00	3	Maintenance - confirmed calibration points for Ozone
NO2, NO, NOX	30 Sep 2015 09:00	30 Sep 2015 10:00	2	Maintenance - confirmed calibration points for Ozone
NH3	01 Sep 2015 08:00	30 Sep 2015 08:00	34	Stabilization after daily span

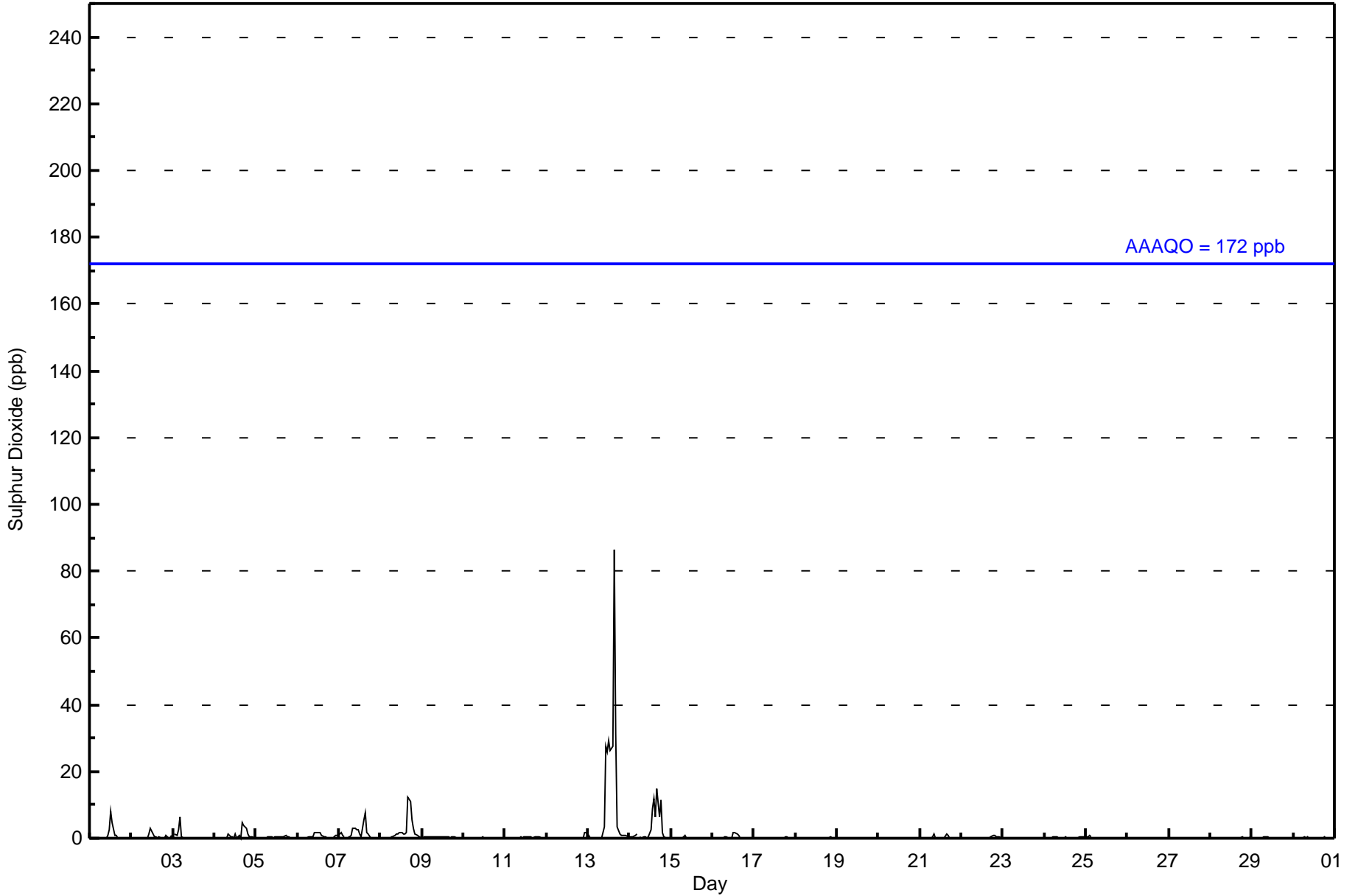


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 86 ppb on Sep 13 16:00	Maximum Daily Average: 11.6 ppb on Sep 13		Hours of Data:	682
Minimum Value: 0 ppb on Sep 5 04:00	Minimum Daily Average: 0.0 ppb on Sep 20		Hours of Missing Data:	38
Maximum Diurnal Average: 3.7 ppb at hour 16	Minimum Diurnal Average: 0.1 ppb at hour 6		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 = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 26		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	0	0	0	Z	0	0	0	0	0	1	3	8	5	1	1	0	0	0	0	0	0	0	0	0.8	8
2-Sep	0	0	0	0	0	Z	0	0	0	0	1	3	1	0	0	0	0	0	0	0	1	0	0	1	0.4	3
3-Sep	Z	1	1	3	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	6
4-Sep	0	Z	0	0	0	0	0	0	1	0	0	0	1	0	1	0	5	4	3	1	0	0	0	0	0.8	5
5-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.3	1
6-Sep	0	0	0	Z	0	0	0	0	0	1	2	2	2	2	1	1	0	0	0	0	0	0	1	1	0.6	2
7-Sep	1	2	1	1	Z	0	0	1	3	3	3	2	1	1	5	8	2	1	0	0	0	0	0	0	1.5	8
8-Sep	0	0	0	0	0	Z	0	0	1	1	1	2	2	1	1	2	12	11	5	3	1	1	0	0	2.0	12
9-Sep	Z	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
10-Sep	0	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
11-Sep	0	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-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0.3	2
13-Sep	1	0	0	0	Z	0	0	0	0	3	28	26	29	26	28	86	31	4	1	1	1	1	1	0	11.6	86
14-Sep	0	0	1	1	1	Z	0	0	0	0	1	3	9	12	6	15	6	11	2	1	0	0	0	0	3.0	15
15-Sep	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
16-Sep	0	Z	0	0	0	0	0	0	0	0	0	2	2	1	1	0	0	0	0	0	0	0	0	0	0.4	2
17-Sep	0	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
18-Sep	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
19-Sep	0	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-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Sep	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.2	1
22-Sep	0	Z	0	0	0	0	0	0	C	C	C	C	C	C	C	C	0	0	1	1	1	0	0	0	--	1
23-Sep	0	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
24-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
25-Sep	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
26-Sep	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
27-Sep	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
28-Sep	0	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
29-Sep	0	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-Sep	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

0.2	0.2	0.2	0.3	0.4	0.1	0.2	0.2	0.4	0.4	1.3	1.4	1.8	1.6	1.8	3.7	2.3	1.0	0.9	0.4	0.3	0.2	0.2	0.2	Diurnal Average
1	2	1	3	6	1	0	1	3	3	28	26	29	26	28	86	31	11	11	3	1	1	2	2	Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	670	98.24	98.24
11 - 20	5	0.73	98.97
21 - 60	6	0.88	99.85
61 - 110	1	0.15	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	39	9	5	4	11	43	39	27	63	67	89	75	50	61	48	40	670
11 - 20	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
21 - 60	1	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	6
61 - 110	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	14	5	4	11	43	39	27	63	67	89	75	51	61	48	40	682

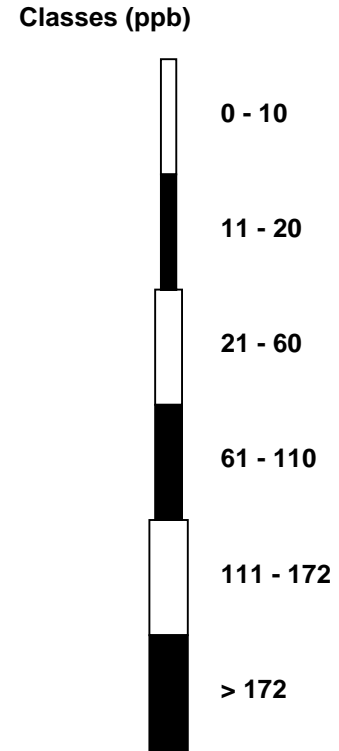
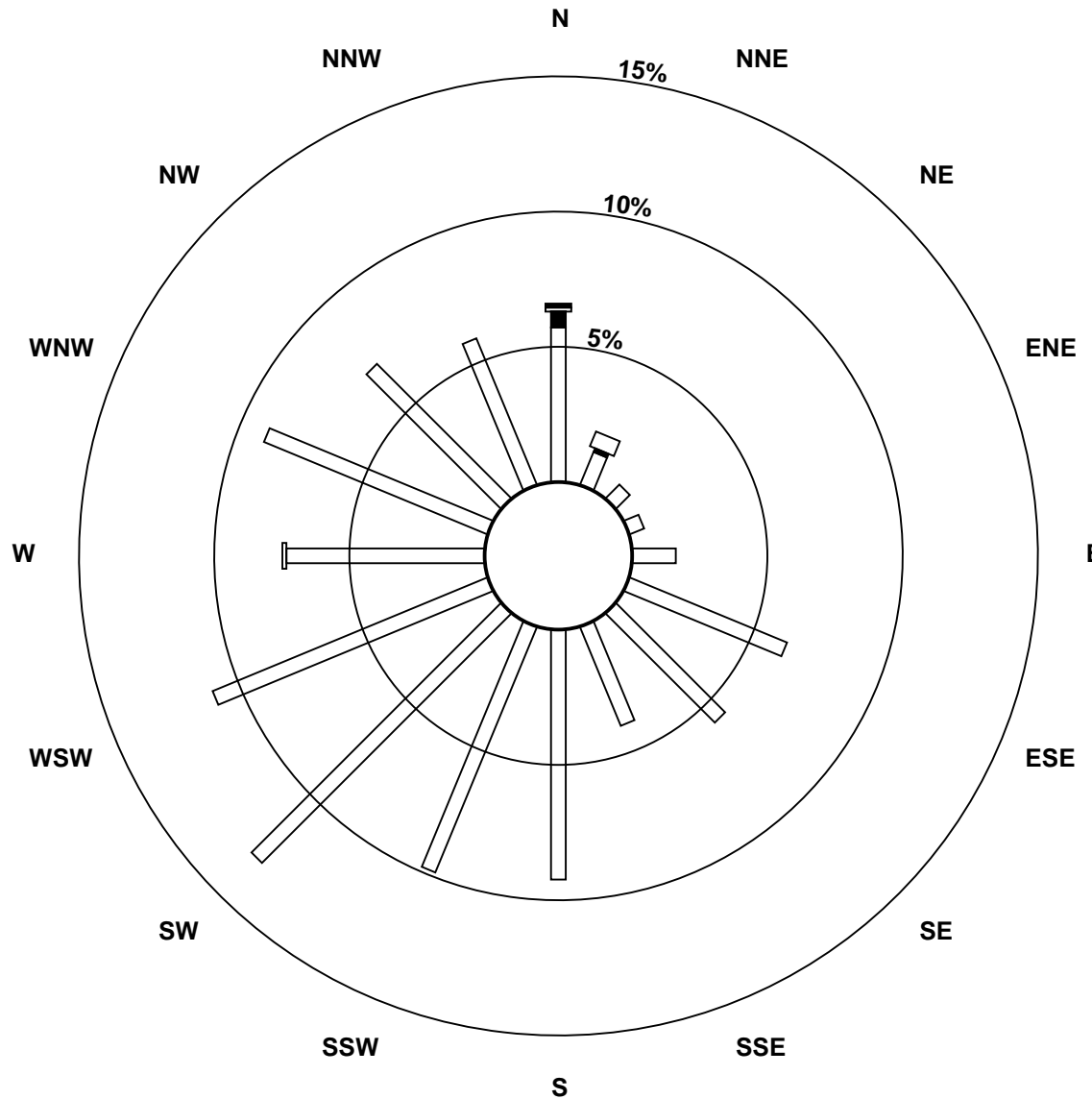
Total Number of Valid Hours: 682

Total Number of Hours: 720



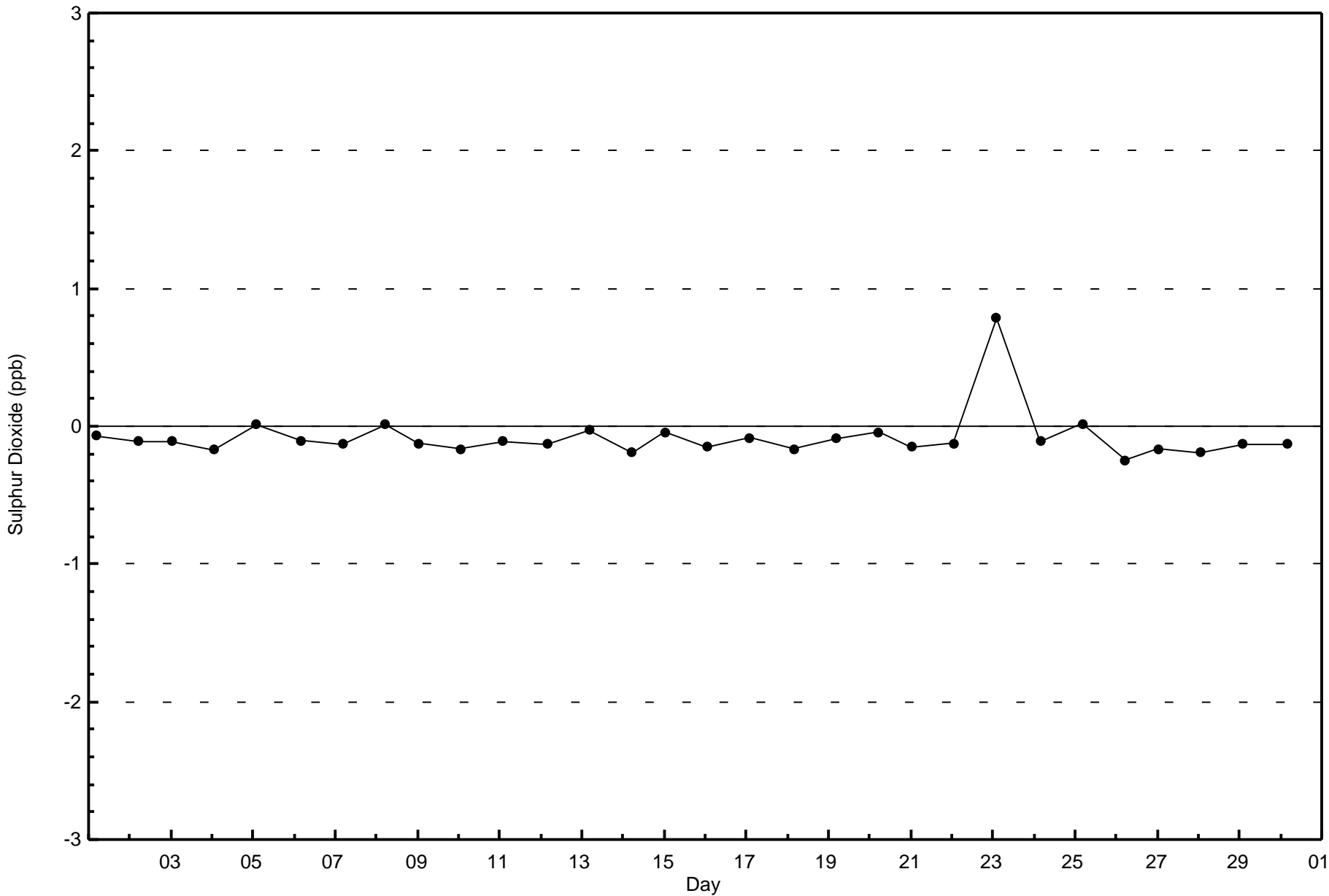
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

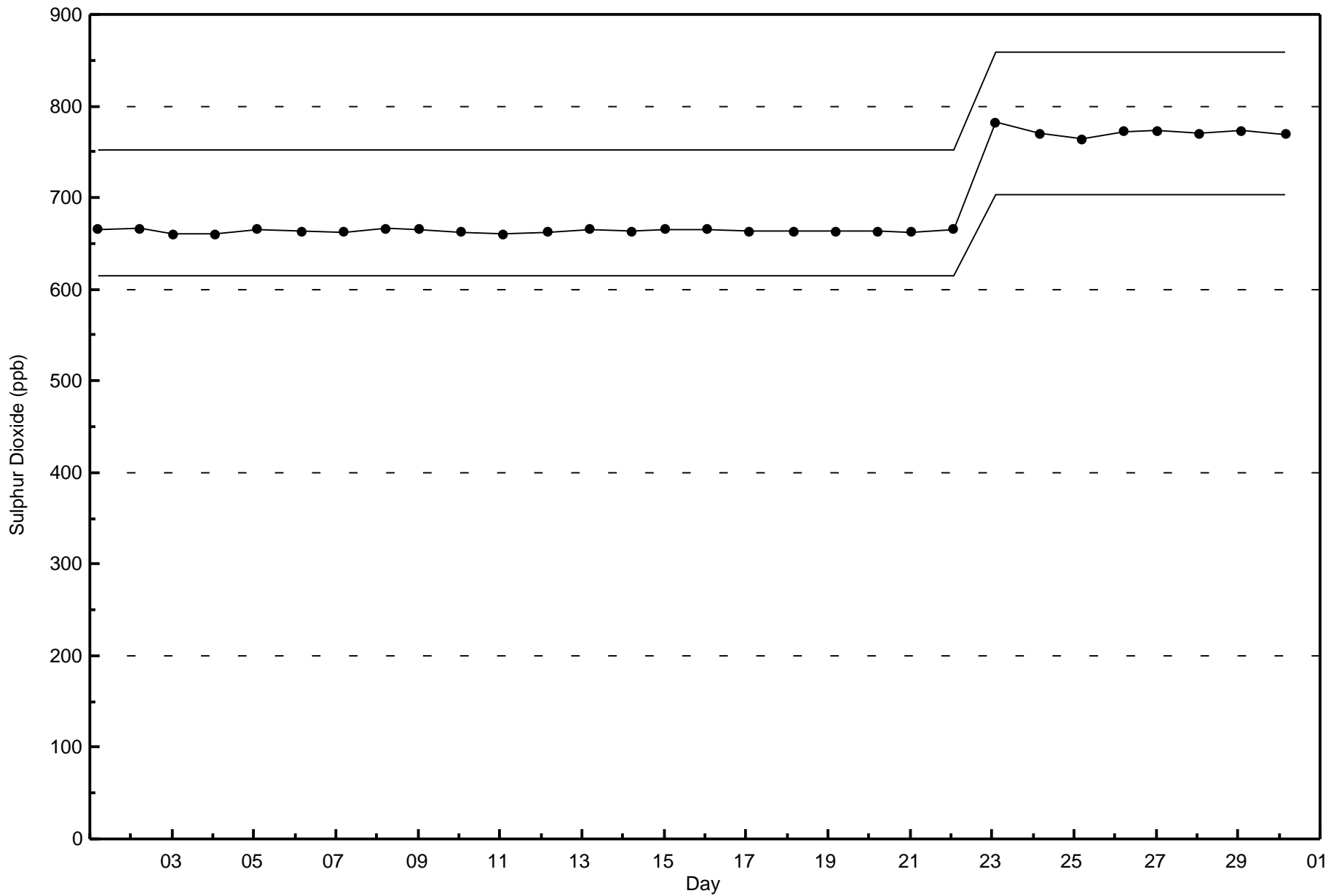
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Patricia McInnes (AMS 6)



Total Number of Valid Hours: 682







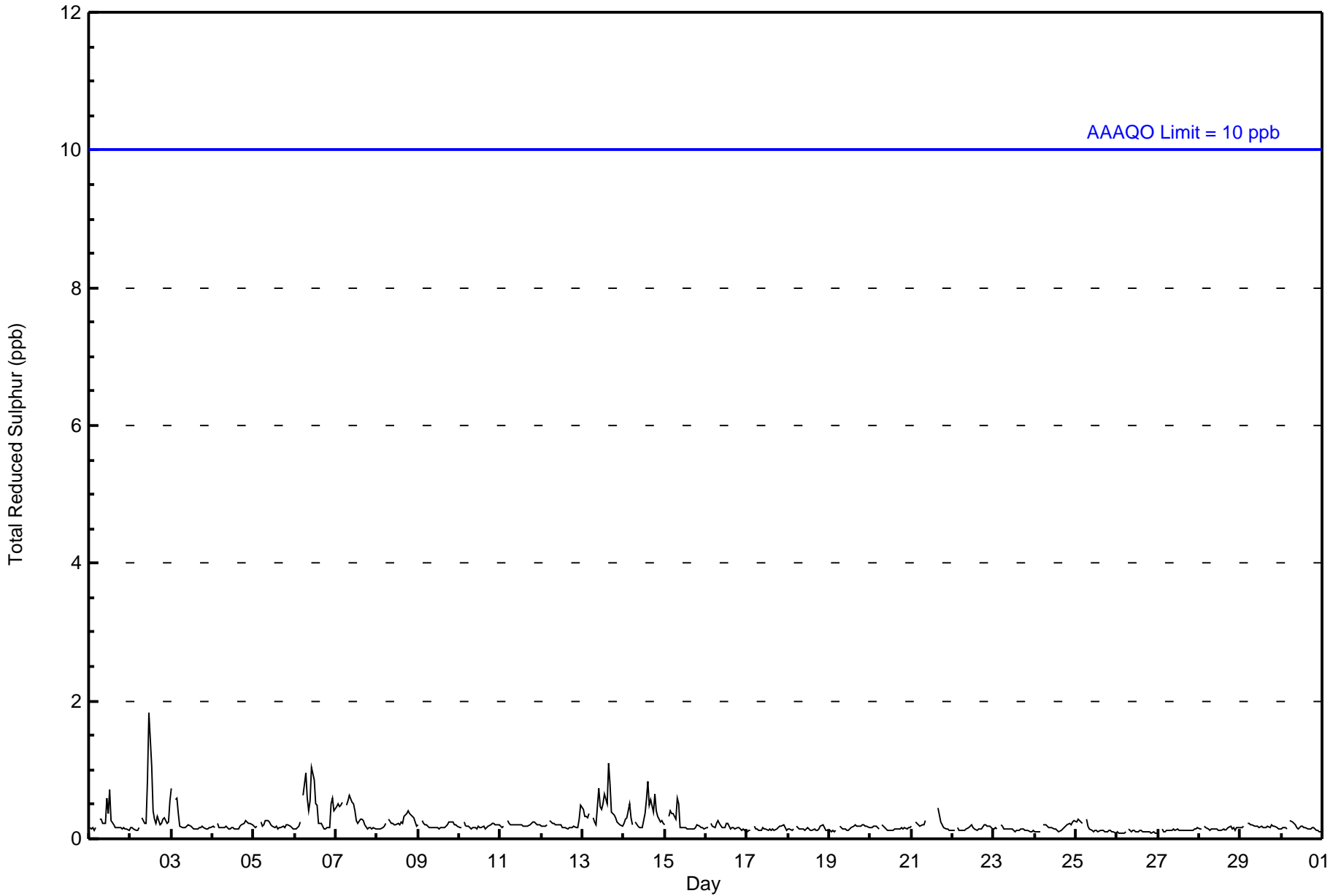


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Sep 2 12:00	Maximum Daily Average: 0.4 ppb on Sep 13		Hours of Data:	684
Minimum Value: 0 ppb on Sep 26 23:00	Minimum Daily Average: 0.1 ppb on Sep 26		Hours of Missing Data:	36
Maximum Diurnal Average: 0.3 ppb at hour 12	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-Sep	0	0	0	0	0	Z	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
2-Sep	0	0	0	0	0	0	Z	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2
3-Sep	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
4-Sep	0	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-Sep	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
6-Sep	0	0	0	0	Z	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	0	0.4	1
7-Sep	0	1	0	0	1	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Sep	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
9-Sep	0	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-Sep	0	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
11-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Sep	0	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-Sep	0	0	0	0	0	Z	0	0	0	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1
14-Sep	0	0	0	1	0	0	Z	0	0	0	0	0	1	1	1	0	1	0	1	0	0	0	0	0	0.3	1
15-Sep	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
16-Sep	0	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-Sep	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
18-Sep	0	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
19-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Sep	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
21-Sep	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
22-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-Sep	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
24-Sep	0	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-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Sep	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
27-Sep	0	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
28-Sep	0	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-Sep	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-Sep	0	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	0.2	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	0.2	0.2	0.2	Diurnal Average
1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0	1	0	0	1	1	1	1	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	684	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	46	14	5	4	11	48	42	28	64	65	89	74	48	65	44	37	684
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	46	14	5	4	11	48	42	28	64	65	89	74	48	65	44	37	684

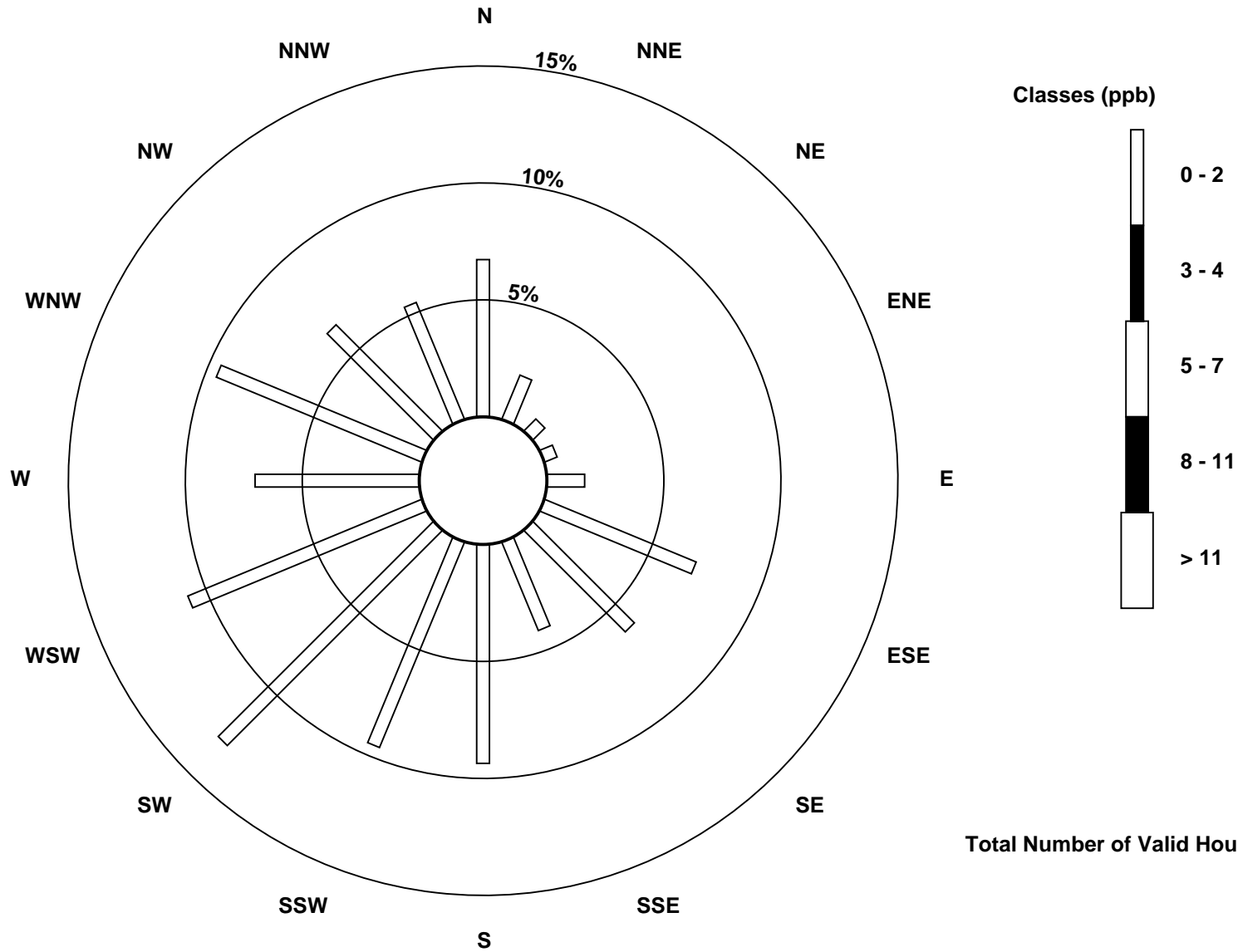
Total Number of Valid Hours: 684

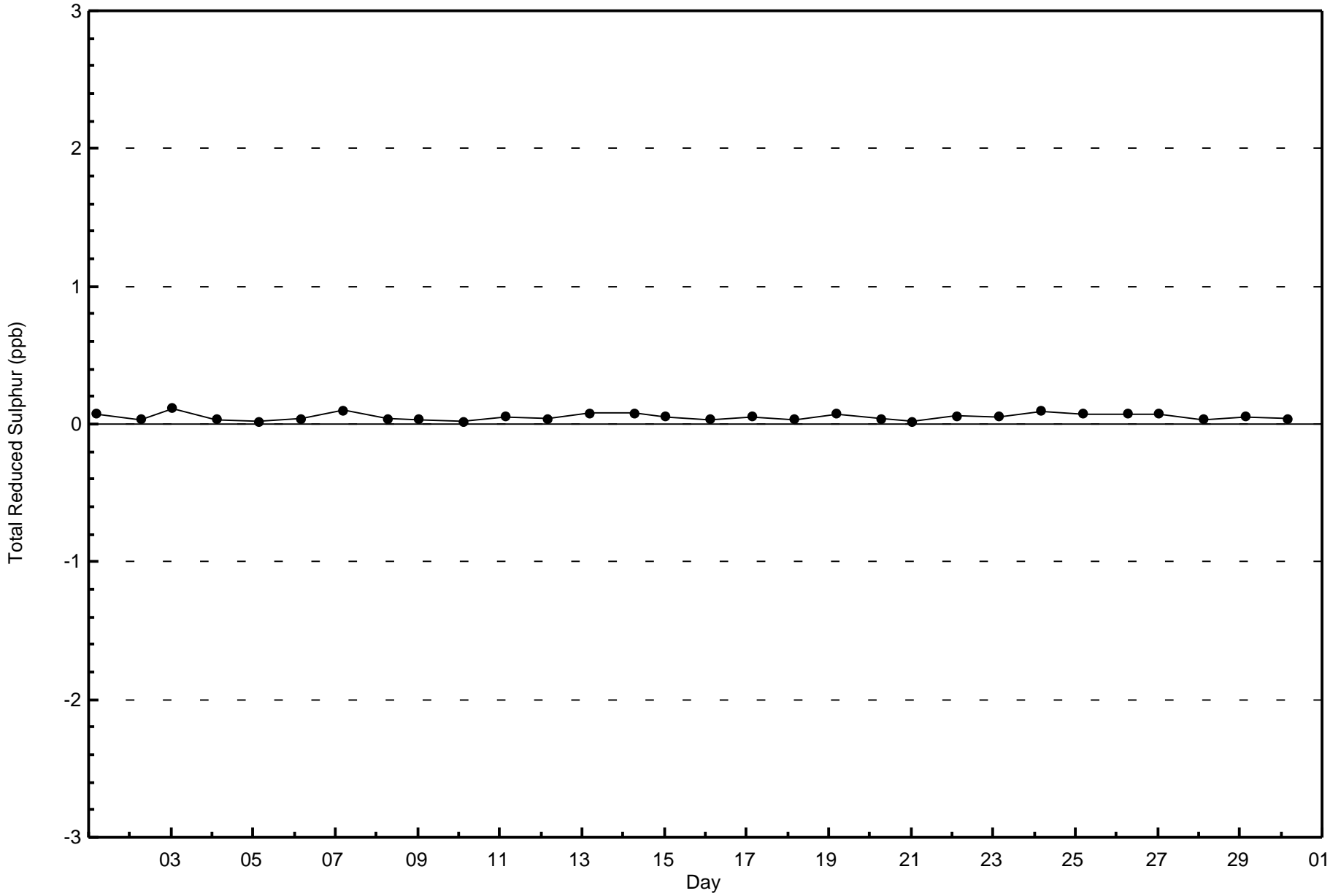
Total Number of Hours: 720



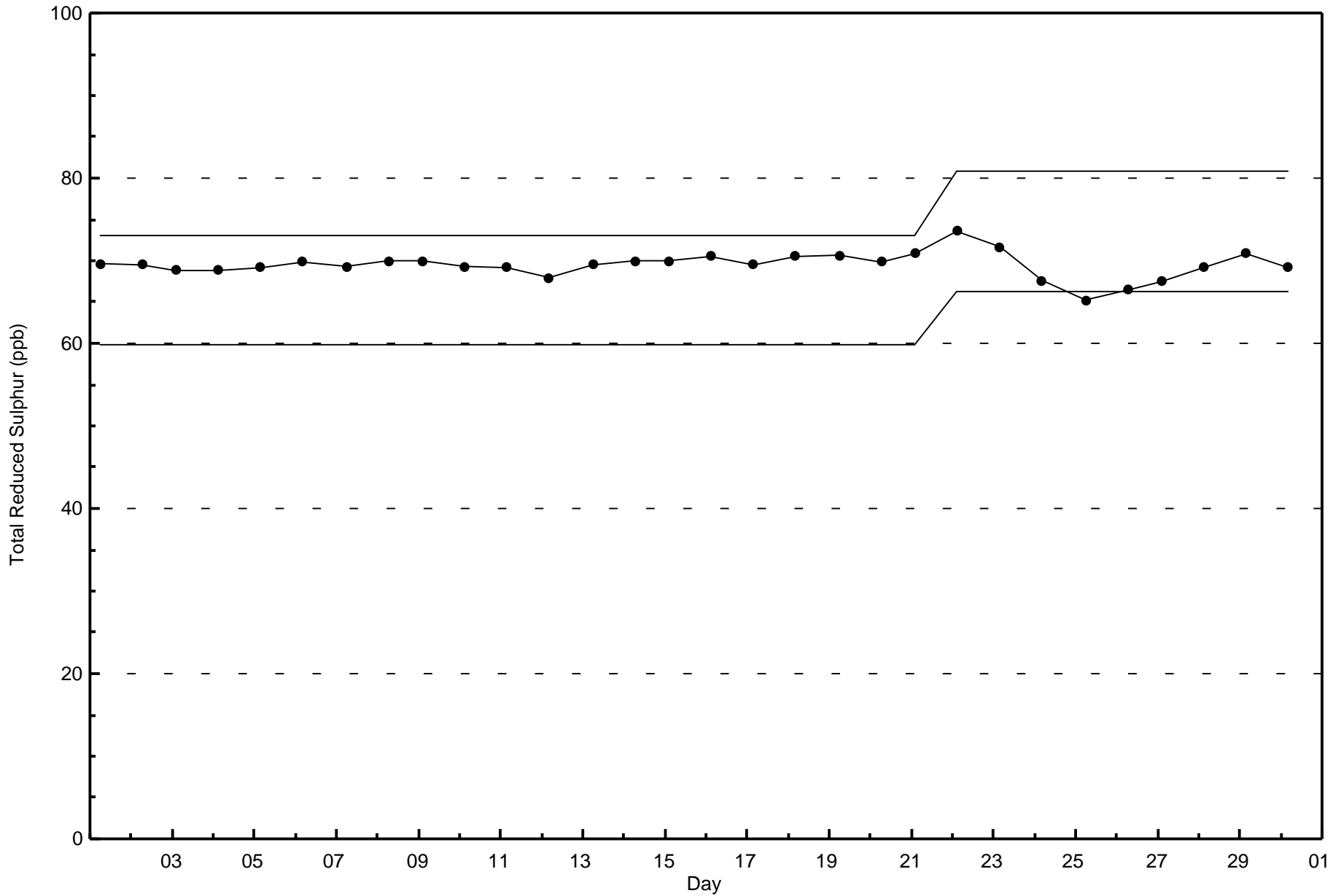
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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











**Wood Buffalo Environmental Association**

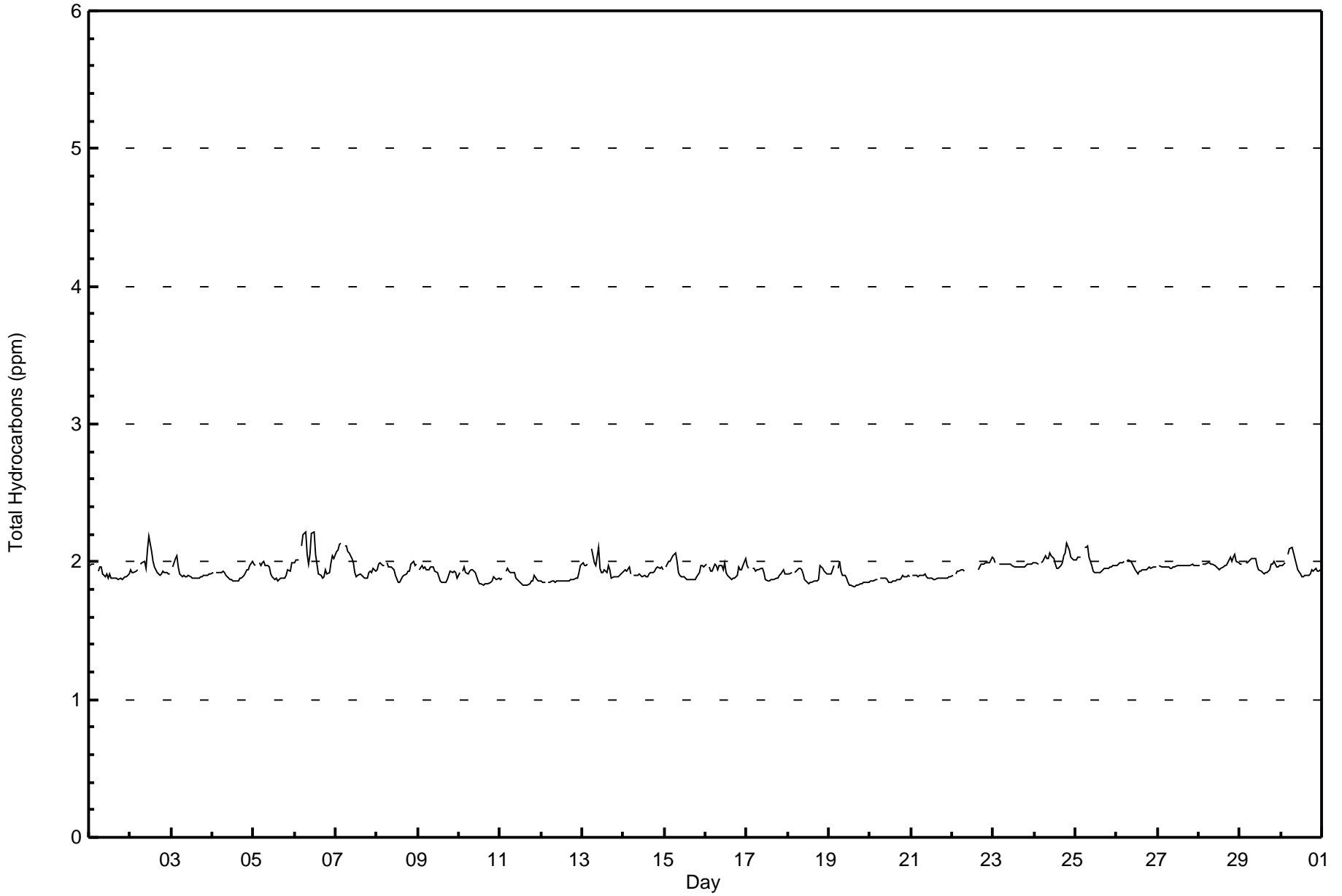
**Summary of Hour Averages**

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

Maximum Value: 2.2 ppm on Sep 6 07:00	Maximum Daily Average: 2.0 ppm on Sep 6	Hours in Service: 720
Minimum Value: 1.8 ppm on Sep 19 16:00	Minimum Daily Average: 1.9 ppm on Sep 12	Hours of Data: 683
Maximum Diurnal Average: 2.0 ppm at hour 7	Minimum Diurnal Average: 1.9 ppm at hour 15	Hours of Missing Data: 37
Monthly Average: 1.94 ppm	Percentiles: $P_1 = 1.8$ $P_{10} = 1.9$ $Q_1 = 1.9$ Median = 1.9 $Q_3 = 2.0$ $P_{90} = 2.0$ $P_{99} = 2.1$	Hours of Calibration: 37
		Percent Operational Time: 100.0

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

Z - zerospan      C - Calibration





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	650	95.17	95.17
2.1 - 3.0	33	4.83	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	43	14	3	4	11	42	37	26	61	63	89	74	51	61	41	30	650
2.1 - 3.0	2	0	2	0	0	1	2	2	2	4	0	1	0	0	7	10	33
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	14	5	4	11	43	39	28	63	67	89	75	51	61	48	40	683

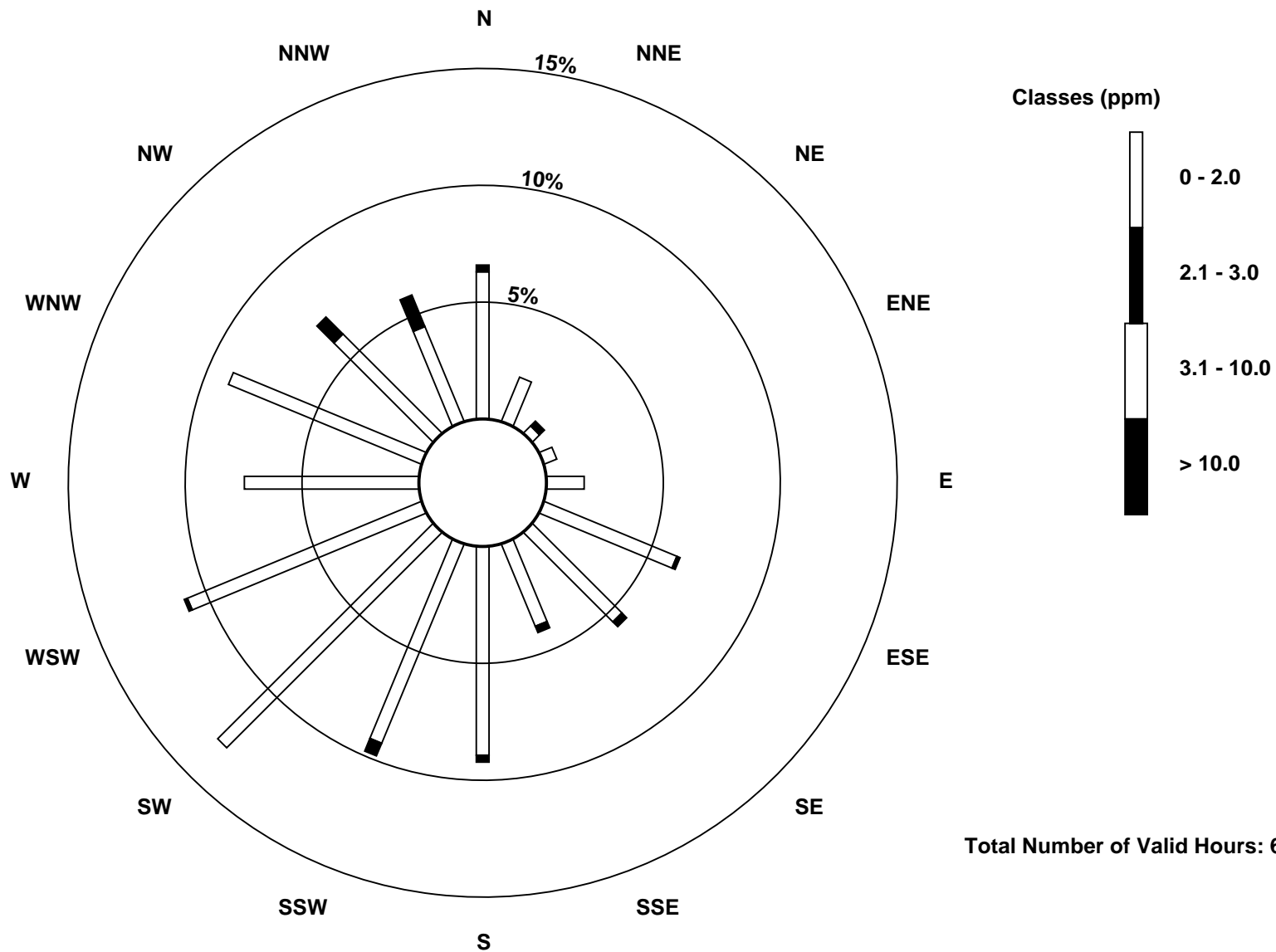
Total Number of Valid Hours: 683

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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



Total Number of Valid Hours: 683

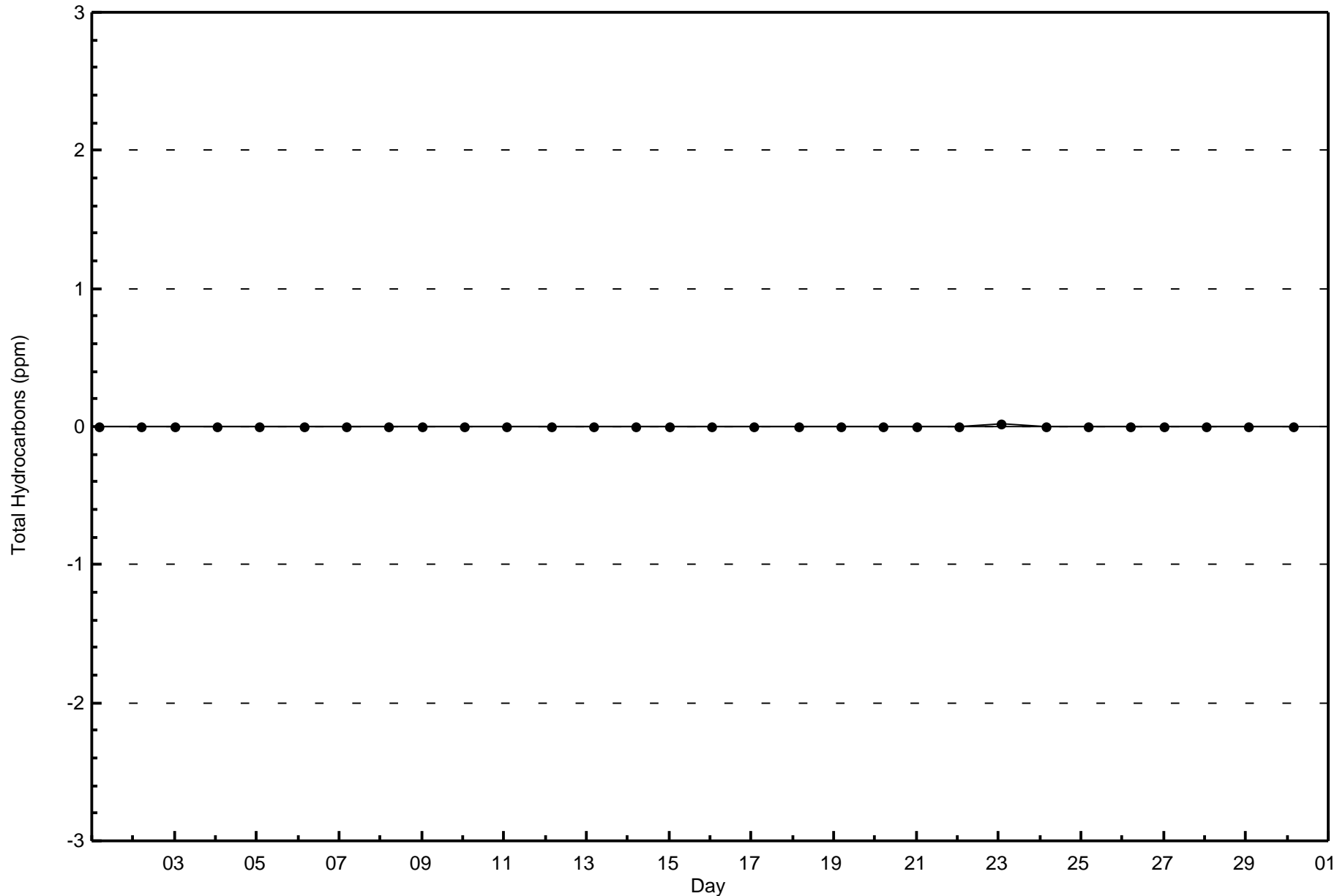


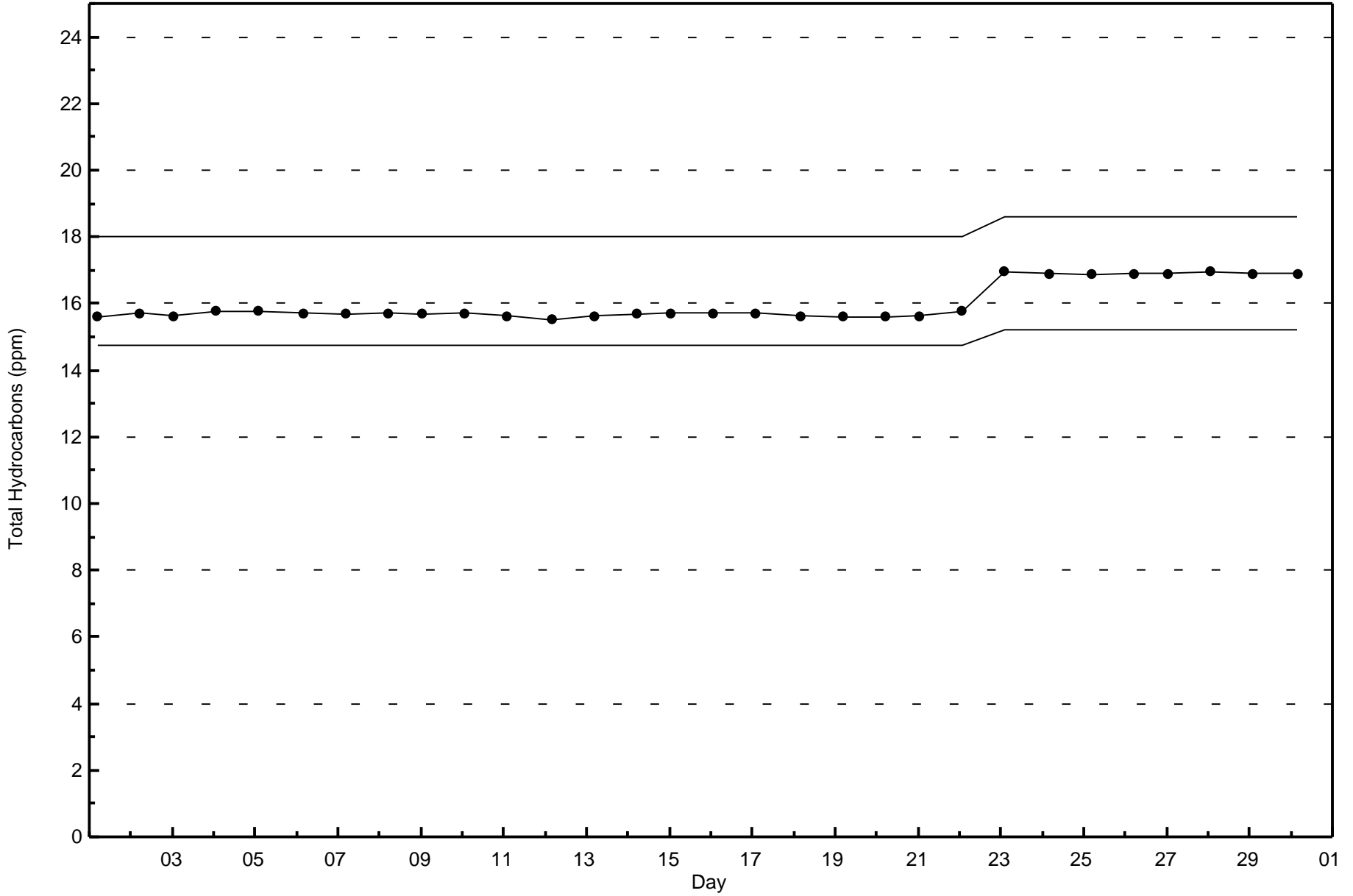
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Patricia McInnes - September 2015

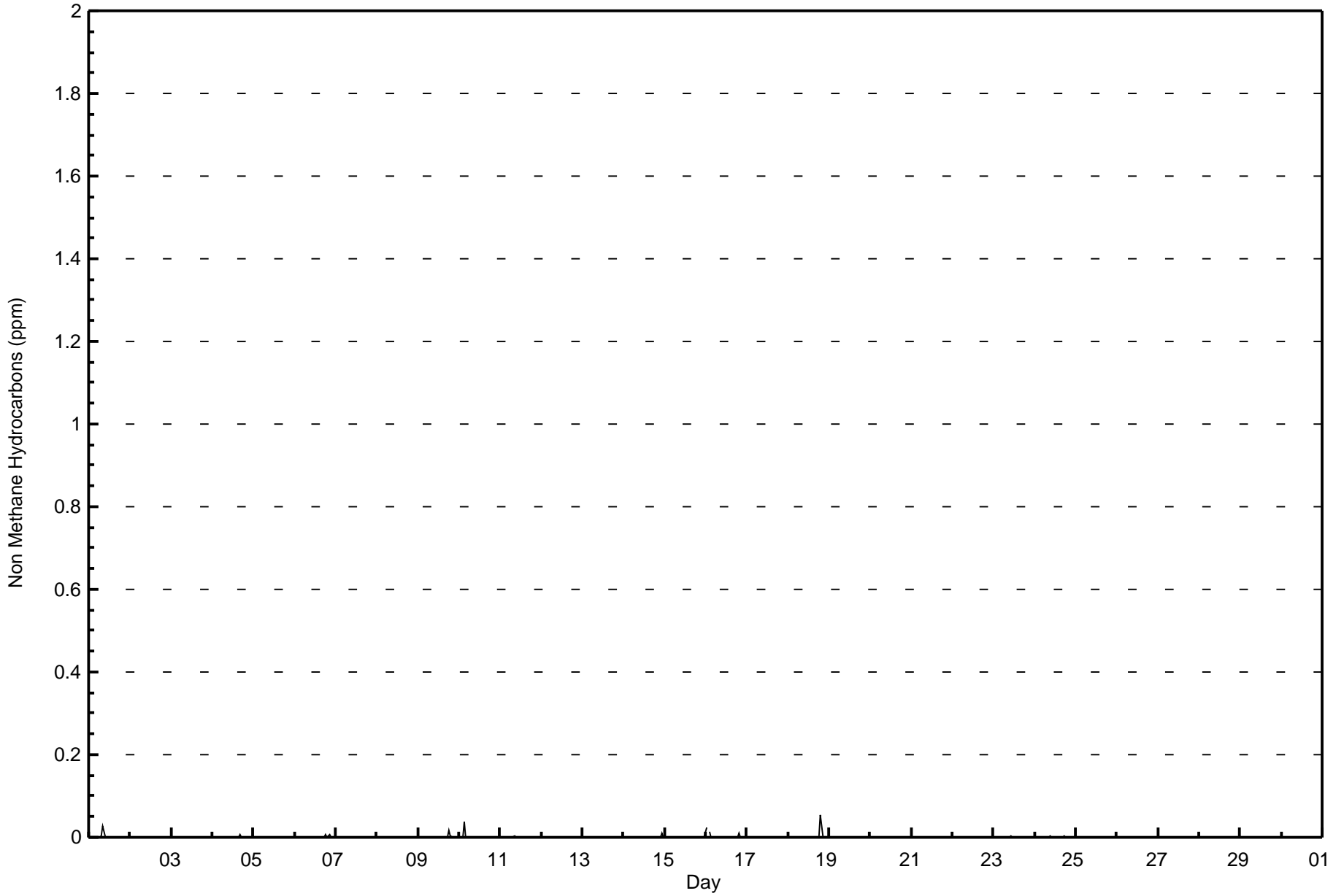








Maximum Value: 0.054 ppm on Sep 18 20:00																				Maximum Daily Average: 0.002 ppm on Sep 18					Hours in Service:	720		
Minimum Value: 0.000 ppm on Sep 1 01:00																				Minimum Daily Average: 0.000 ppm on Sep 2					Hours of Data:	683		
Maximum Diurnal Average: 0.002 ppm at hour 20																				Minimum Diurnal Average: 0.000 ppm at hour 2					Hours of Missing Data:	37		
Monthly Average: 0.000 ppm																				Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 0.0					Hours of Calibration:	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-Sep	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.002	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.026		
2-Sep	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
3-Sep	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	
4-Sep	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	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	
5-Sep	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
6-Sep	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	0.005	0.000	0.006	0.000	0.000	0.000	0.001	0.006		
7-Sep	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	
8-Sep	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	
9-Sep	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	0.016	0.004	0.000	0.000	0.000	0.001	0.016		
10-Sep	0.000	Z	0.000	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.036		
11-Sep	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	0.004	0.004	
12-Sep	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	
13-Sep	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-Sep	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	0.010	0.000	0.000	0.010	0.010	
15-Sep	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-Sep	0.023	Z	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.002	0.023		
17-Sep	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
18-Sep	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	0.054	0.000	0.000	0.000	0.002	0.054	0.054	
19-Sep	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	
20-Sep	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	
21-Sep	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	
22-Sep	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.000	0.000	
23-Sep	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
24-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.005	
25-Sep	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	
26-Sep	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	
27-Sep	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	
28-Sep	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-Sep	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
30-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
																				0.001 0.000 0.001 0.001 0.000 0.000 0.000 0.000 0.001 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.001 0.002 0.000 0.000 0.000 0.000					Diurnal Average			
																				0.023 0.000 0.015 0.036 0.000 0.000 0.000 0.002 0.026 0.005 0.002 0.000 0.000 0.000 0.000 0.000 0.006 0.004 0.016 0.054 0.006 0.000 0.010 0.000					Diurnal Maximum			
Z - zerospan																				C - Calibration								





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	673	98.54	98.54
0.006 - 0.05	10	1.46	100.00
0.06 - 0.1	0	0.00	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



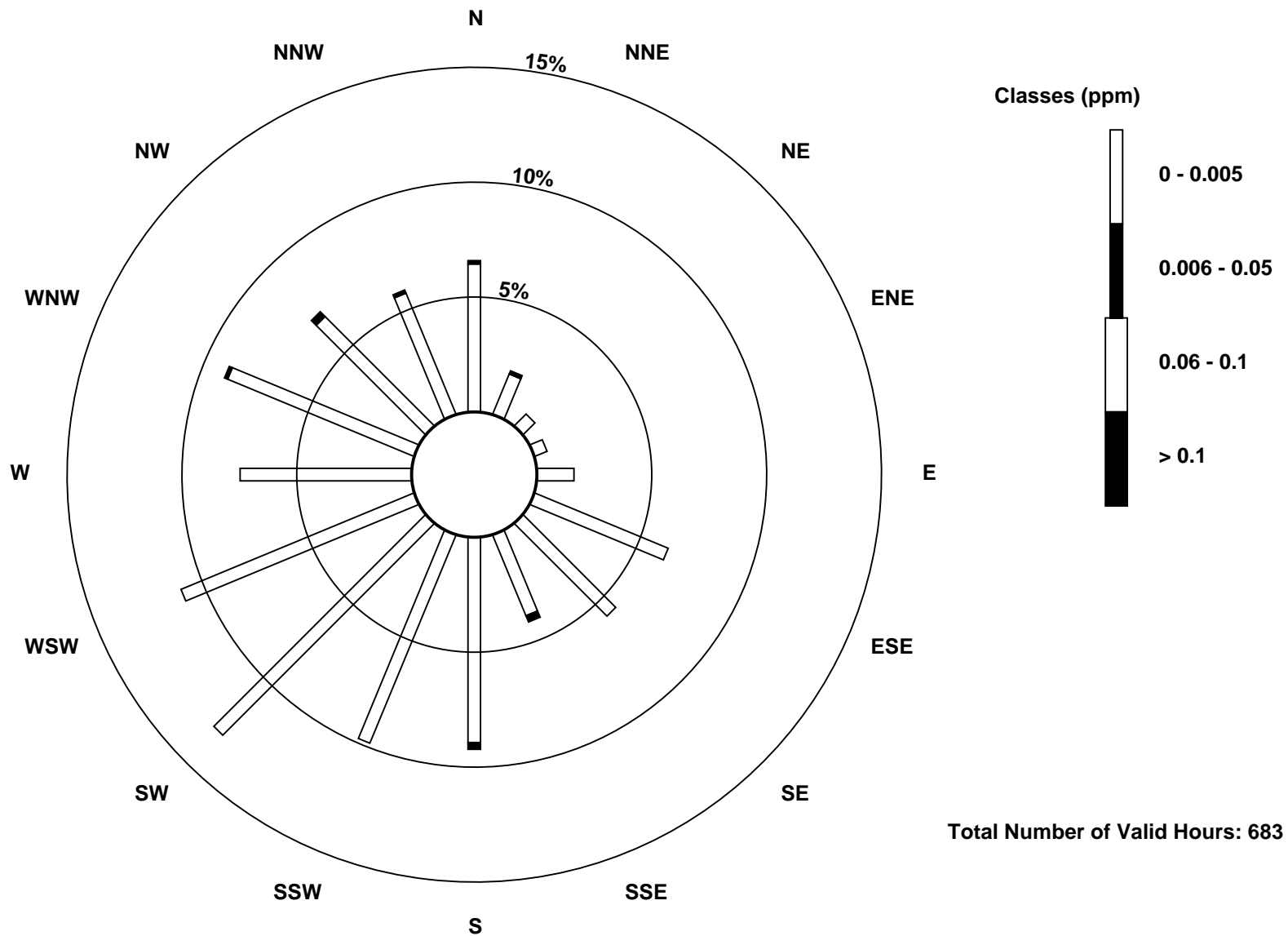
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	44	13	5	4	11	43	39	26	61	67	89	75	51	60	46	39	673
0.006 - 0.05	1	1	0	0	0	0	0	2	2	0	0	0	0	1	2	1	10
0.06 - 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	14	5	4	11	43	39	28	63	67	89	75	51	61	48	40	683

Total Number of Valid Hours: 683

Total Number of Hours: 720



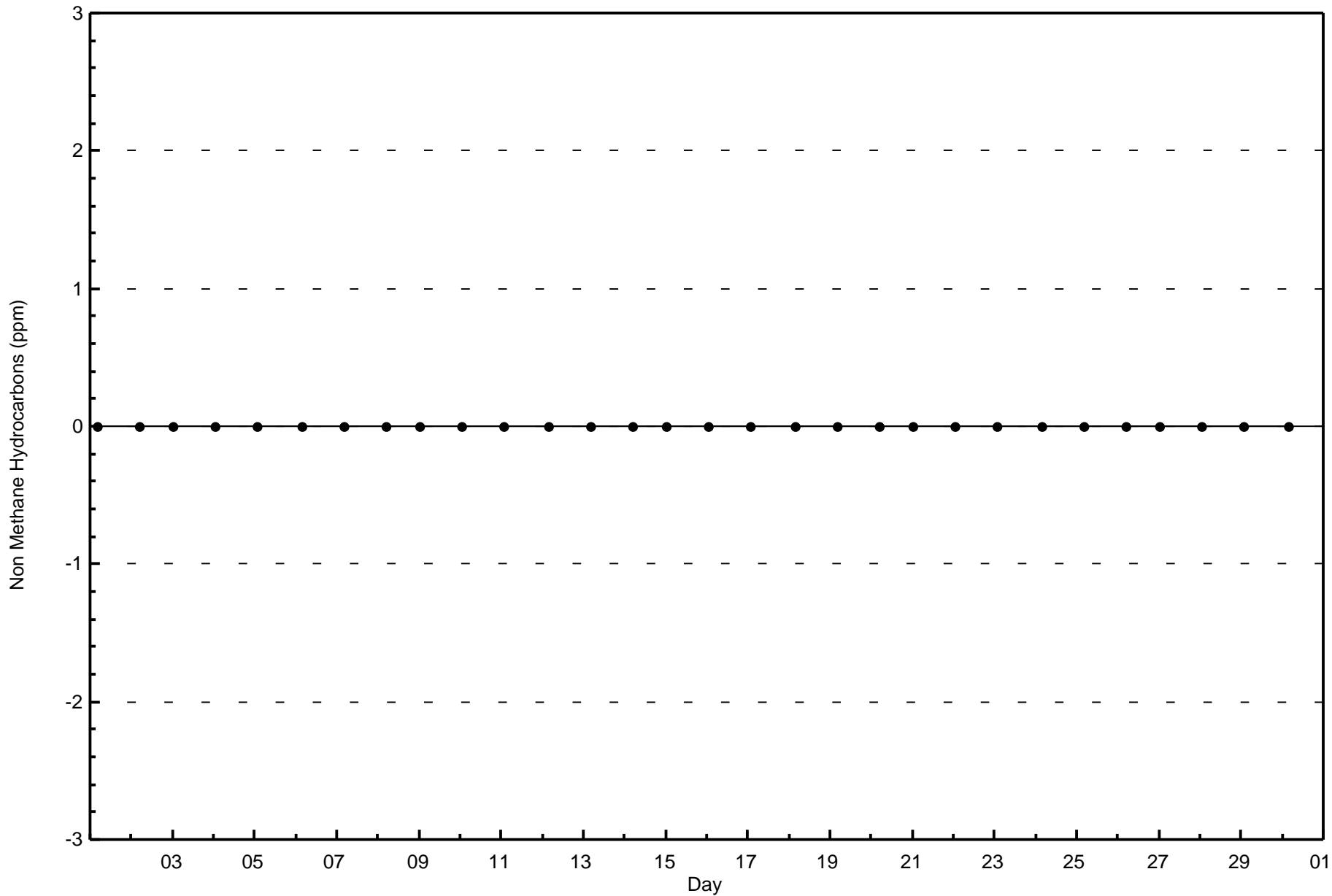


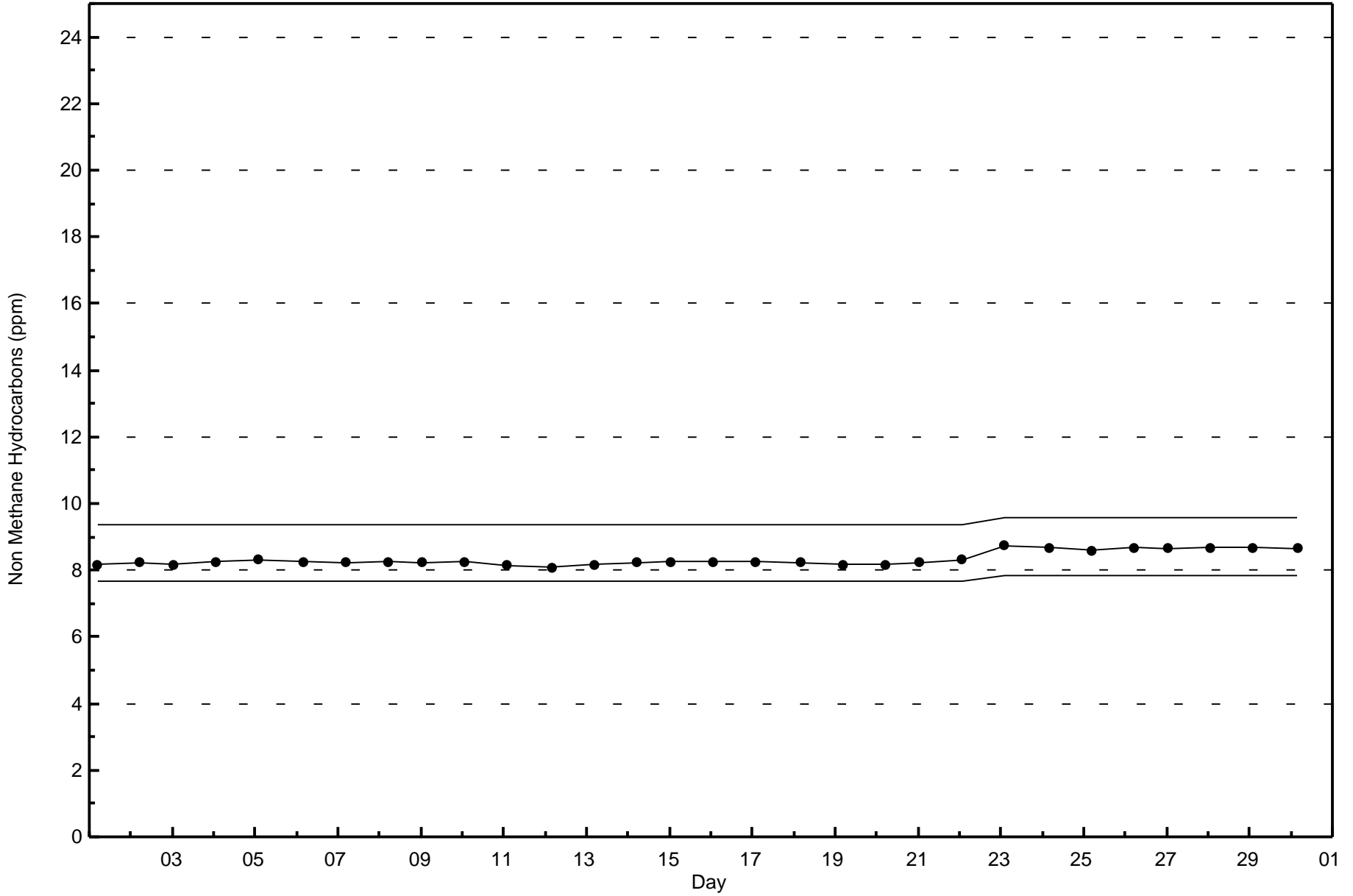
Wood Buffalo Environmental Association

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

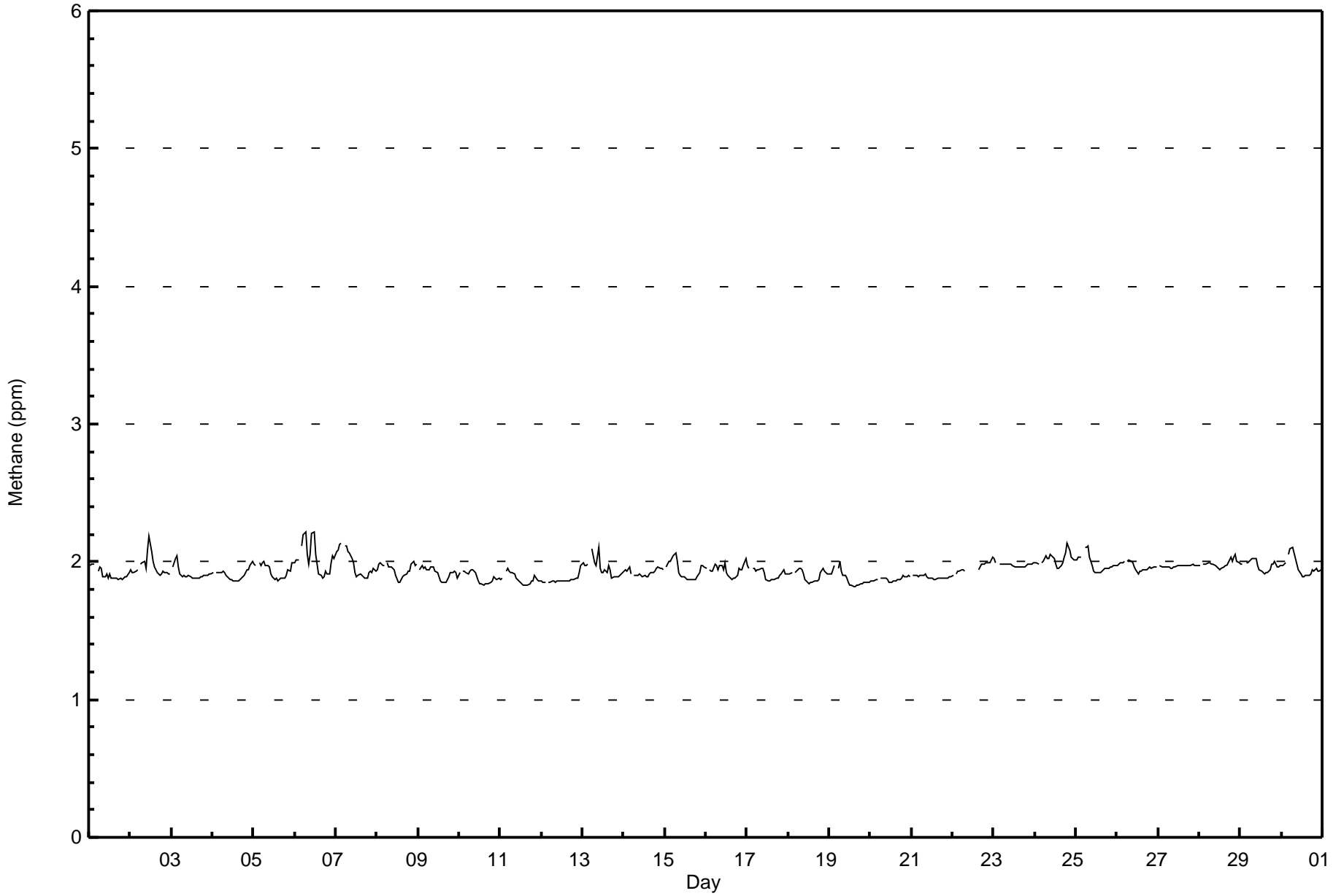
Patricia McInnes - September 2015













**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	650	95.17	95.17
2.1 - 3.0	33	4.83	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	43	14	3	4	11	42	37	26	61	63	89	74	51	61	41	30	650
2.1 - 3.0	2	0	2	0	0	1	2	2	2	4	0	1	0	0	7	10	33
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	14	5	4	11	43	39	28	63	67	89	75	51	61	48	40	683

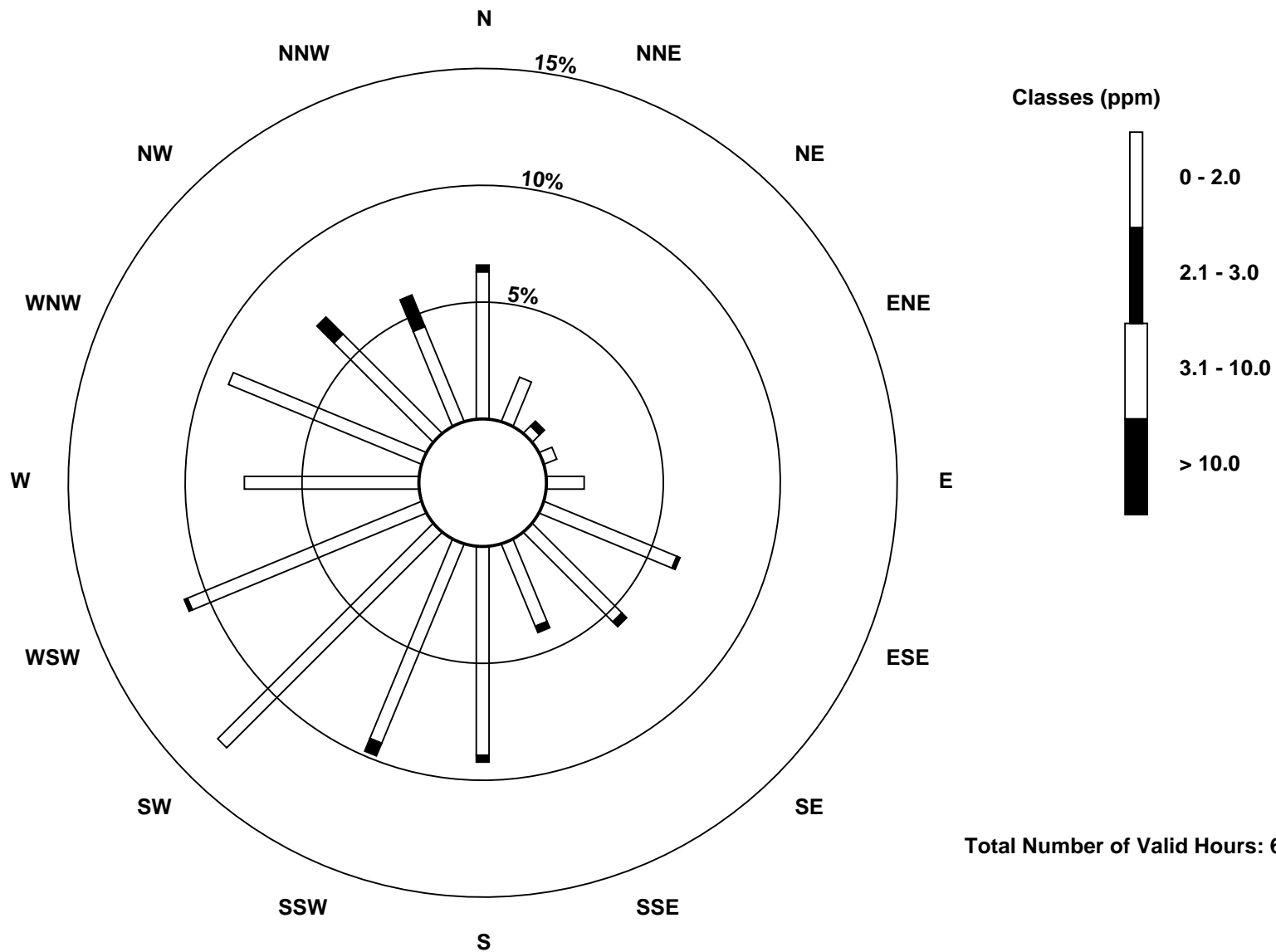
Total Number of Valid Hours: 683

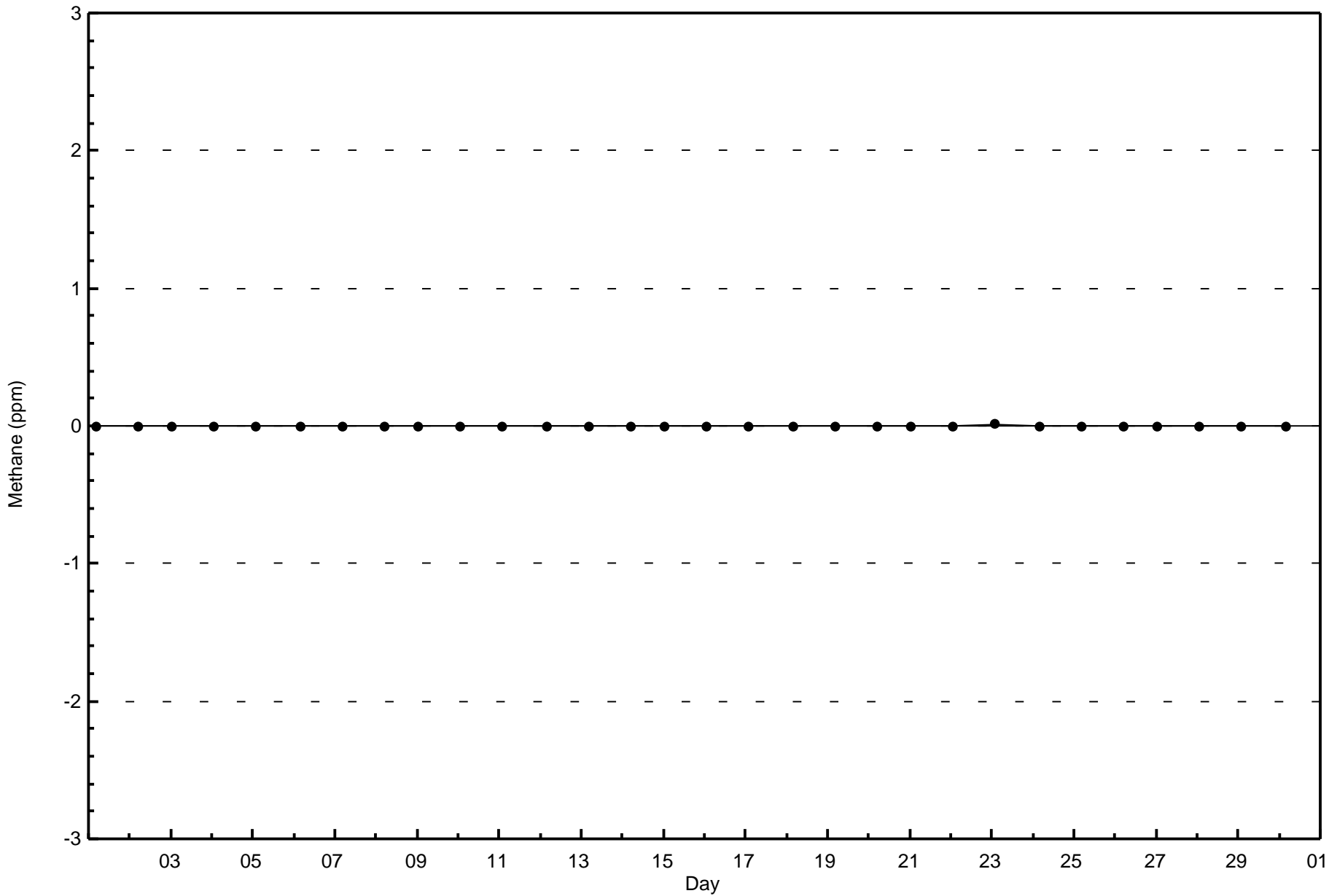
Total Number of Hours: 720

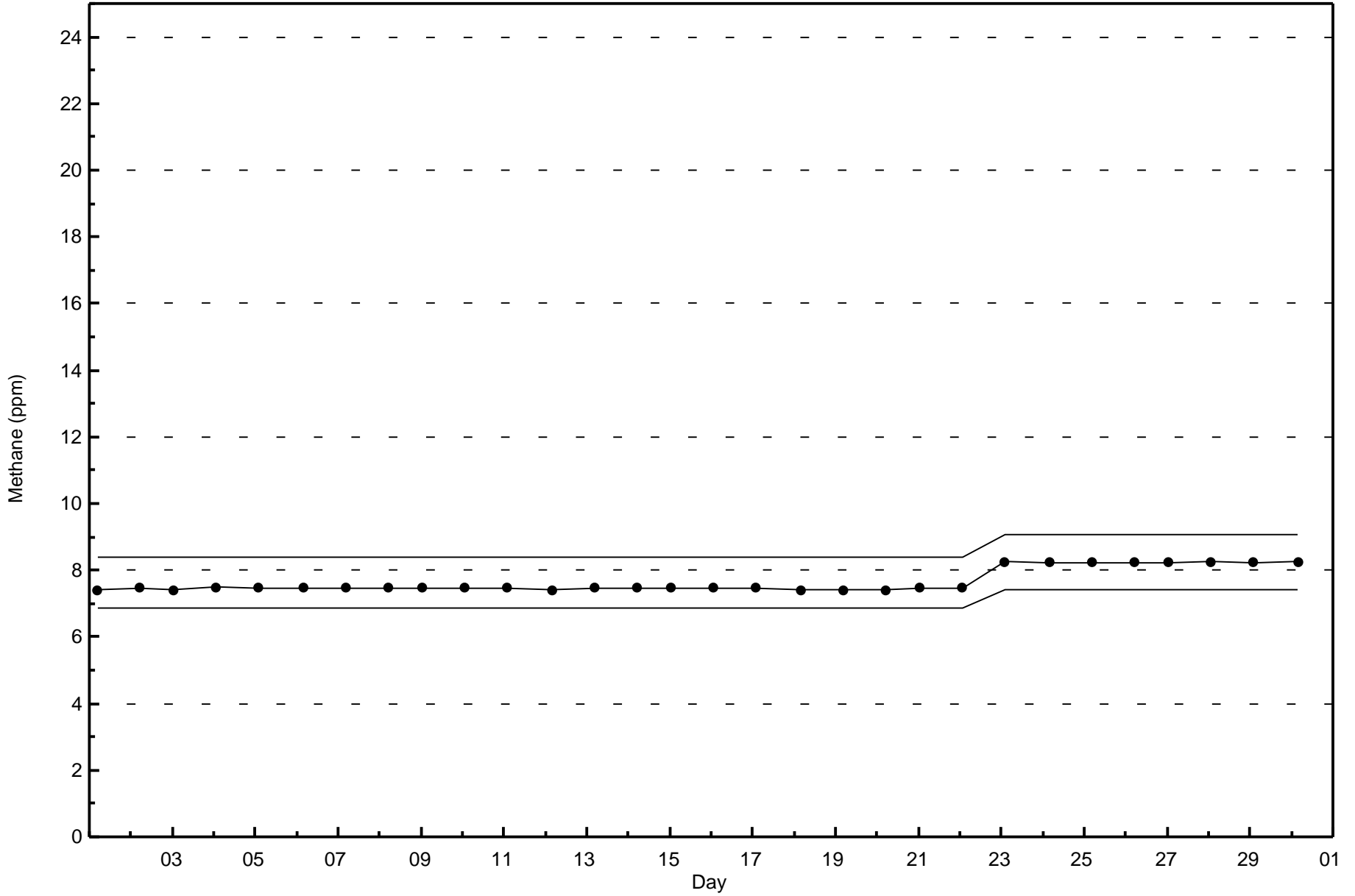


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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







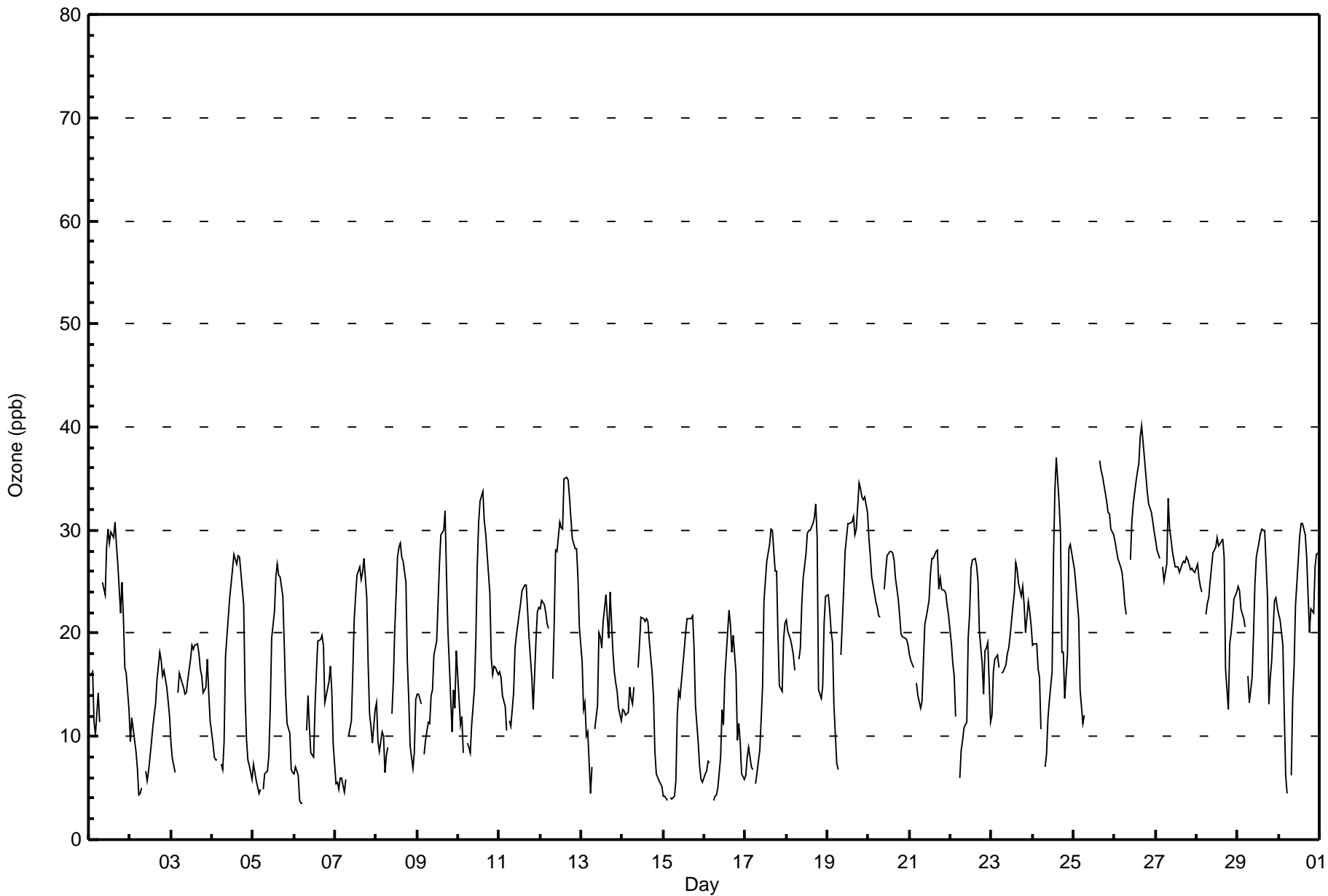


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 40 ppb on Sep 26 17:00	Maximum Daily Average: 31.0 ppb on Sep 26		Hours of Data:	684
Minimum Value: 3 ppb on Sep 6 05:00	Minimum Daily Average: 10.8 ppb on Sep 2		Hours of Missing Data:	36
Maximum Diurnal Average: 27.3 ppb at hour 16	Minimum Diurnal Average: 11.4 ppb at hour 6		Hours of Calibration:	36
Monthly Average: 19.1 ppb	Percentiles: P <sub>1</sub> = 4 P <sub>10</sub> = 7 Q <sub>1</sub> = 13 Median = 19 Q <sub>3</sub> = 26 P <sub>90</sub> = 30 P <sub>99</sub> = 36		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	16	16	16	11	10	14	11	Z	25	24	28	30	29	30	29	31	29	27	22	25	22	17	16	13	21.3	31
2-Sep	10	12	11	9	7	4	4	5	Z	7	6	7	9	11	12	13	15	18	17	16	16	15	13	12	10.8	18
3-Sep	9	8	7	Z	14	16	15	15	14	14	15	18	19	18	19	19	18	17	16	14	15	18	14	11	14.9	19
4-Sep	9	8	8	8	Z	7	7	10	18	22	24	25	26	28	27	27	27	26	23	14	10	8	7	6	16.2	28
5-Sep	7	6	6	4	5	Z	5	6	7	8	13	20	22	25	27	26	25	24	19	14	11	10	7	6	13.2	27
6-Sep	6	7	6	4	3	4	Z	11	14	11	8	8	13	16	19	19	20	19	13	14	15	17	14	9	11.8	20
7-Sep	5	5	5	6	6	5	6	Z	10	11	16	21	24	26	26	25	26	27	23	17	12	11	9	13	14.6	27
8-Sep	13	10	9	10	10	6	8	9	Z	12	15	20	27	28	29	27	27	25	17	14	9	7	8	14	15.5	29
9-Sep	14	14	13	Z	8	10	11	11	14	14	18	19	23	27	30	30	32	26	20	17	10	15	13	18	17.7	32
10-Sep	14	11	12	8	Z	9	9	8	11	15	20	27	31	33	34	31	30	28	24	18	16	17	17	16	19.0	34
11-Sep	16	16	14	13	11	Z	11	11	14	19	20	21	23	24	24	25	25	20	18	16	13	19	22	23	18.1	25
12-Sep	22	23	23	22	21	21	Z	16	21	28	28	31	30	30	35	35	35	33	31	29	28	28	25	21	26.8	35
13-Sep	17	13	13	10	10	4	7	Z	11	13	20	20	19	21	24	22	20	24	18	16	15	14	13	12	15.4	24
14-Sep	13	12	12	12	15	14	13	15	Z	17	19	22	21	21	21	21	19	16	14	9	6	6	5	5	14.3	22
15-Sep	4	4	4	Z	4	4	4	6	12	14	14	17	18	20	21	21	21	22	19	13	9	7	6	6	11.8	22
16-Sep	6	7	8	7	Z	4	4	4	5	8	13	11	16	18	22	21	18	20	16	10	11	10	6	6	10.9	22
17-Sep	6	8	9	7	7	Z	5	7	9	12	15	23	27	28	29	30	30	26	26	20	15	14	19	21	17.1	30
18-Sep	21	20	19	19	18	16	Z	18	19	23	25	28	30	30	30	31	31	33	29	15	14	15	21	24	22.9	33
19-Sep	24	22	20	19	13	8	7	Z	18	24	28	29	31	31	31	31	30	30	35	34	33	33	33	32	25.9	35
20-Sep	29	28	26	24	23	22	22	22	Z	24	26	28	28	28	28	27	25	23	22	20	20	20	19	19	24.0	29
21-Sep	18	17	17	Z	15	14	13	13	17	21	22	23	26	27	27	28	28	24	25	24	24	24	23	22	21.4	28
22-Sep	19	17	16	12	Z	6	9	10	11	11	20	22	26	27	27	27	25	20	17	14	18	19	19	11	17.5	27
23-Sep	12	16	18	18	17	Z	16	16	17	18	19	20	23	24	27	26	25	24	24	23	20	23	22	21	20.3	27
24-Sep	19	19	19	17	16	11	Z	7	8	12	13	16	27	34	37	33	30	18	18	14	18	28	29	28	20.4	37
25-Sep	26	25	23	21	15	11	12	Z	27	C	C	C	C	C	C	37	36	35	34	33	32	32	30	30	--	37
26-Sep	29	28	27	26	26	25	23	22	Z	27	31	33	35	36	37	39	40	37	35	34	32	32	31	30	31.0	40
27-Sep	29	28	27	Z	26	25	27	33	30	29	28	26	26	26	26	27	27	27	27	27	26	26	26	26	27.3	33
28-Sep	27	25	25	24	Z	22	23	23	25	28	28	28	29	28	29	29	27	17	13	19	20	22	23	24	24.3	29
29-Sep	24	24	22	21	21	Z	16	13	16	20	25	27	29	30	30	30	30	23	13	16	17	23	23	23	22.5	30
30-Sep	22	21	19	12	6	4	Z	6	14	17	23	27	29	31	31	30	27	24	20	22	22	26	28	28	21.3	31

16.3	15.7	15.1	13.8	13.1	11.4	11.6	12.7	15.4	17.3	19.9	22.3	24.7	26.1	27.1	27.3	26.6	24.4	21.7	19.0	17.7	18.5	18.1	17.5	Diurnal Average	
29	28	27	26	26	25	27	33	30	29	31	33	35	36	37	39	40	37	35	34	33	33	33	32	Diurnal Maximum	

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







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	375	54.82	54.82
21 - 50	309	45.18	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	26	7	2	2	2	34	25	20	53	38	38	7	19	38	34	30	375
21 - 50	18	7	3	1	9	14	19	6	13	27	49	62	31	24	15	11	309
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>	44	14	5	3	11	48	44	26	66	65	87	69	50	62	49	41	684

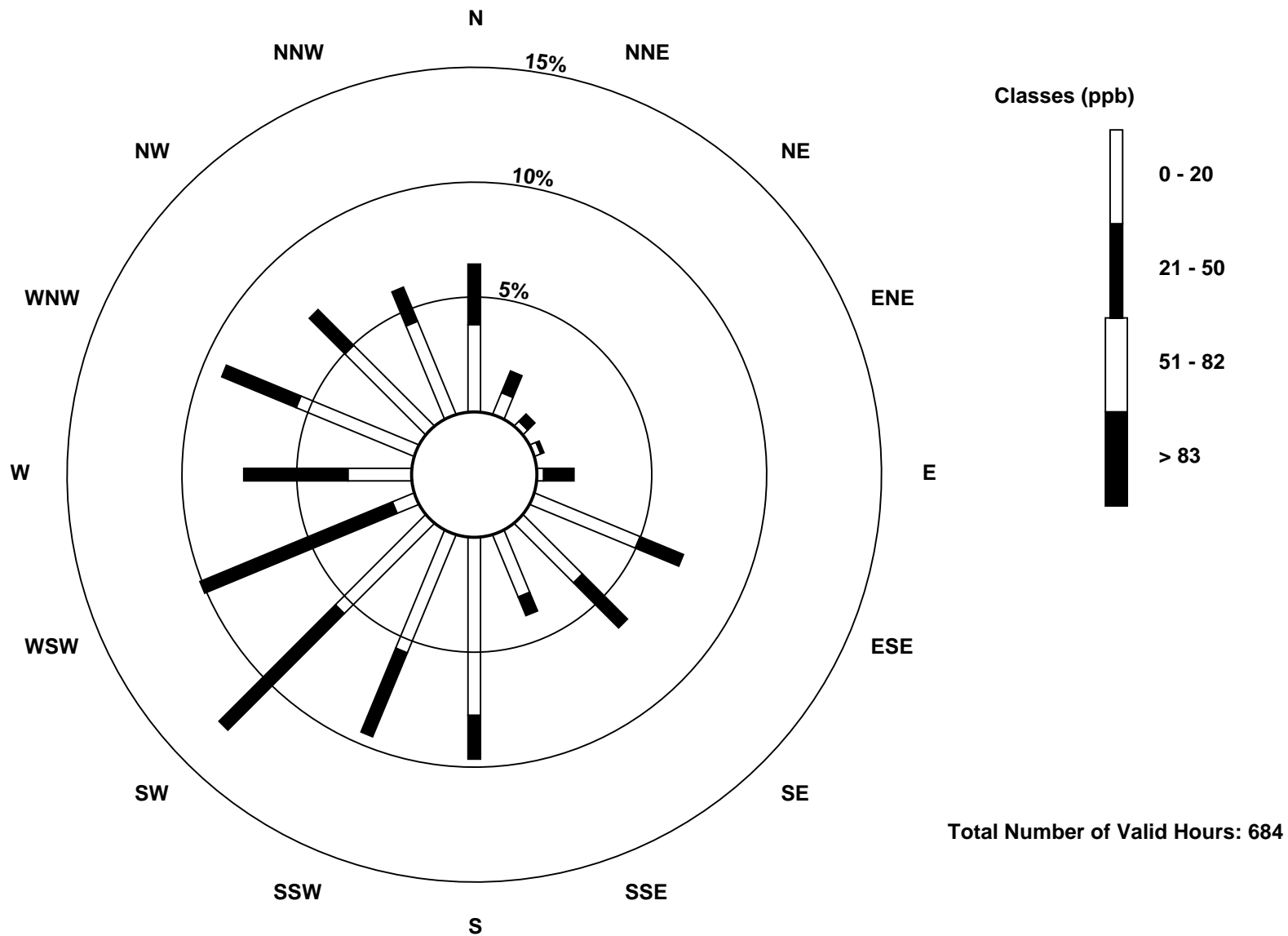
Total Number of Valid Hours: 684

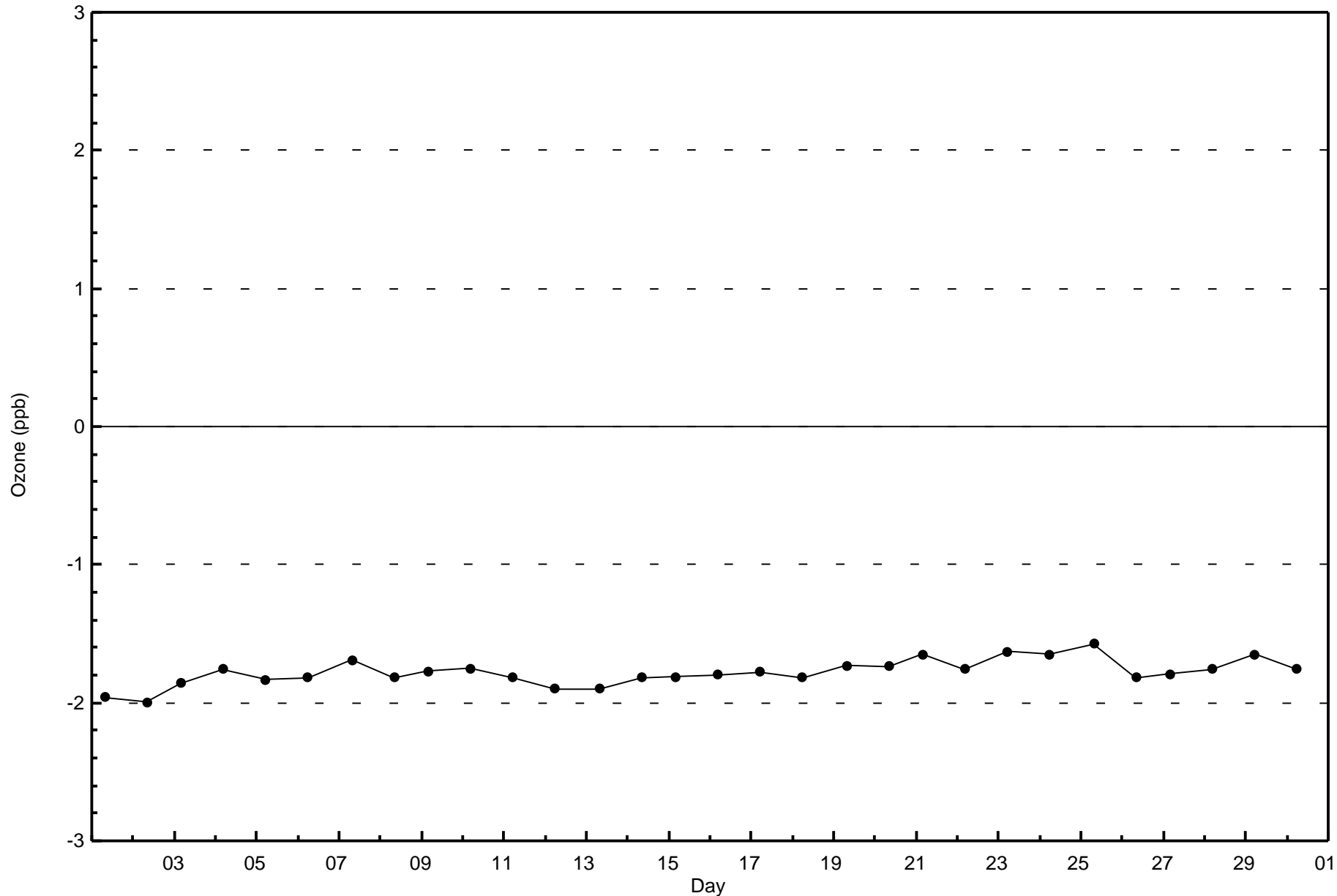
Total Number of Hours: 720

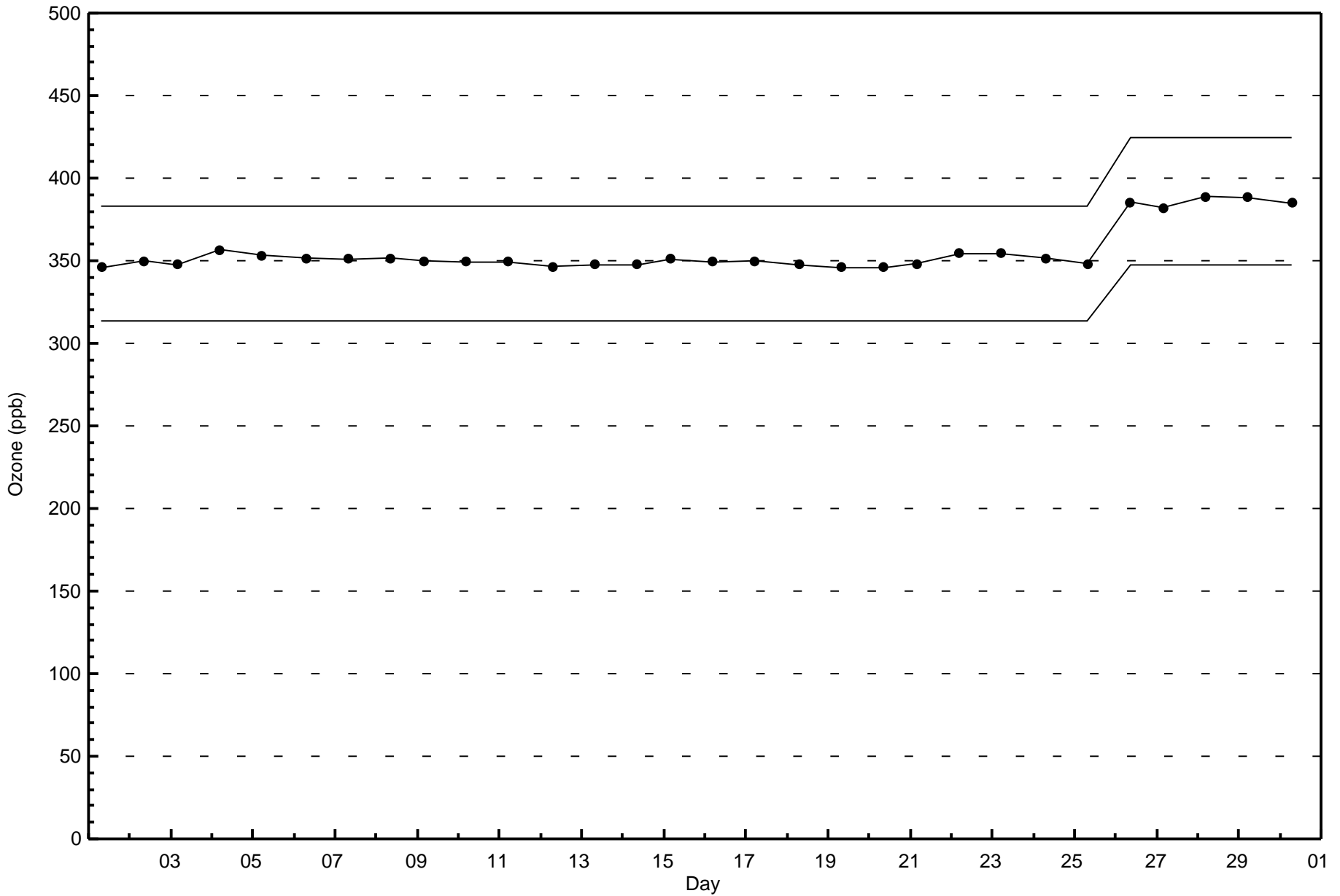


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Ozone (O<sub>3</sub>) - ppb  
Patricia McInnes (AMS 6)

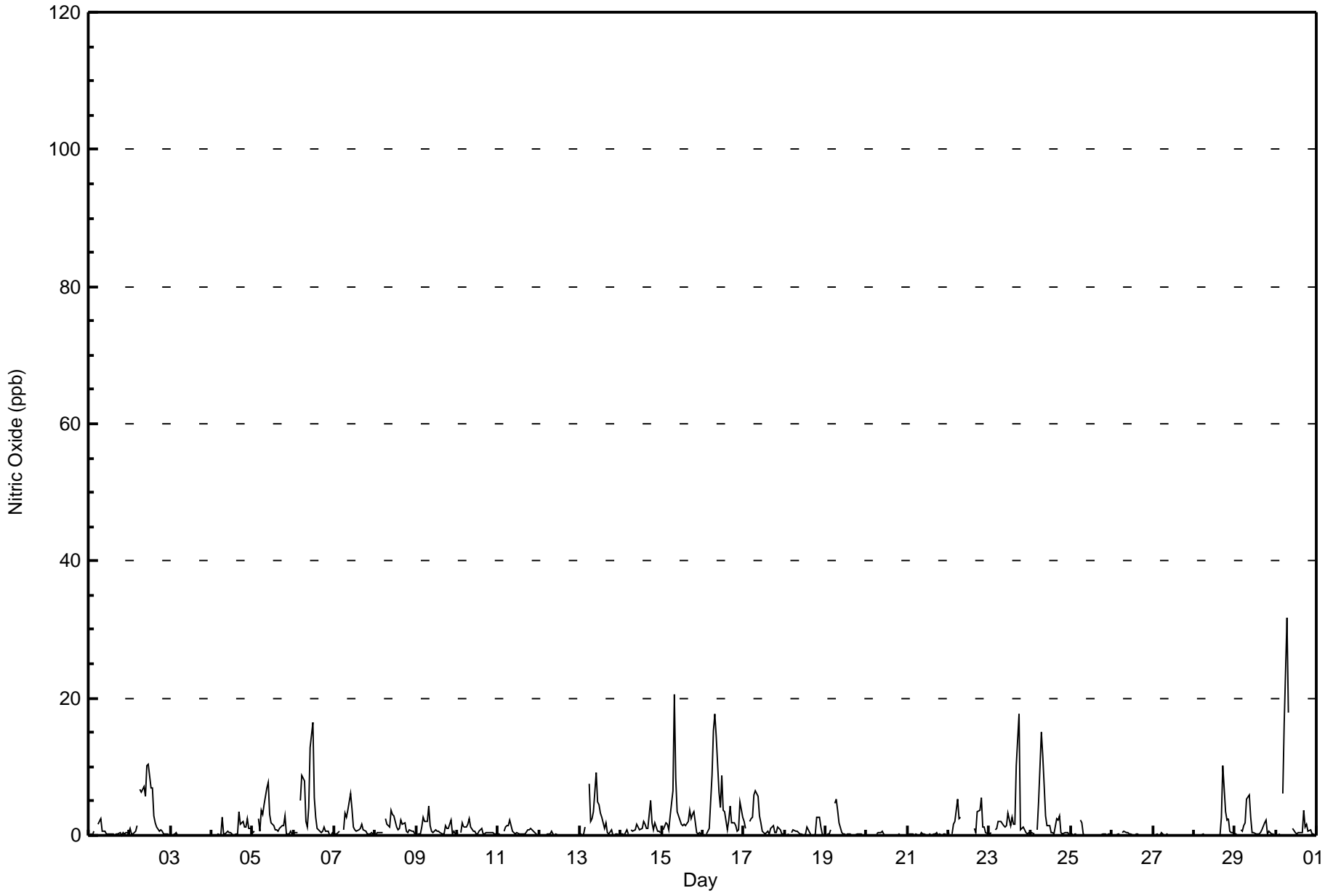








Maximum Value: 32 ppb on Sep 30 07:00																		Maximum Daily Average: 4.6 ppb on Sep 16						Hours in Service: 720		
Minimum Value: 0 ppb on Sep 25 12:00																		Minimum Daily Average: 0.1 ppb on Sep 27						Hours of Data: 678		
Maximum Diurnal Average: 4.2 ppb at hour 7																		Minimum Diurnal Average: 0.2 ppb at hour 3						Hours of Missing Data: 42		
Monthly Average: 1.4 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 4 P <sub>99</sub> = 16						Hours of Calibration: 37		
																		Percent Operational Time: 99.3								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	0	0	1	Z	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
2-Sep	1	0	0	1	1	Z	7	6	7	6	10	10	7	7	3	2	1	1	1	1	0	0	0	0	3.1	10
3-Sep	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
4-Sep	0	Z	0	0	0	0	3	0	0	1	0	0	0	0	0	0	3	2	1	1	2	1	1	0.8	3	
5-Sep	0	1	Z	3	1	4	3	4	7	8	3	2	1	1	1	1	1	1	1	3	0	0	1	2.0	8	
6-Sep	0	0	0	Z	5	9	8	2	1	4	13	16	6	3	1	1	0	1	1	1	1	0	0	3.2	16	
7-Sep	0	0	0	1	Z	1	3	3	4	6	4	1	1	1	1	1	2	1	1	0	0	0	0	1.3	6	
8-Sep	0	0	0	0	0	Z	2	2	1	4	3	3	1	1	1	2	2	2	1	0	1	1	1	1.2	4	
9-Sep	Z	0	0	1	3	2	2	4	1	1	0	1	1	1	0	0	0	1	1	1	2	0	1	1.1	4	
10-Sep	0	Z	0	2	1	1	2	2	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0.7	2	
11-Sep	0	0	Z	1	1	1	1	2	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0.6	2	
12-Sep	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
13-Sep	0	0	0	1	Z	8	2	2	3	9	5	5	3	3	1	2	0	0	1	0	0	0	0	2.0	9	
14-Sep	0	0	0	1	0	Z	1	1	1	2	1	1	1	2	2	1	1	5	2	1	2	1	1	1.1	5	
15-Sep	Z	1	2	2	1	3	6	21	8	3	3	2	1	2	1	2	4	3	3	3	0	0	0	3.1	21	
16-Sep	0	Z	0	1	1	9	15	18	14	6	4	9	4	4	1	2	4	2	2	1	1	1	5	4.6	18	
17-Sep	2	1	Z	2	2	3	6	6	6	3	2	1	0	0	1	0	1	1	0	0	1	1	0	1.7	6	
18-Sep	0	0	0	Z	0	1	1	1	0	0	0	0	0	1	1	0	0	0	0	3	3	1	0	0.6	3	
19-Sep	0	0	0	1	Z	5	5	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	5	
20-Sep	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
21-Sep	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-Sep	0	Z	0	2	2	5	2	3	C	C	C	C	C	C	C	1	0	4	4	5	1	1	0	--	5	
23-Sep	0	0	Z	1	1	2	2	2	1	1	1	3	1	3	2	2	10	18	1	1	1	0	0	2.4	18	
24-Sep	0	0	0	Z	1	5	15	12	7	3	2	1	0	0	0	3	2	3	0	0	0	0	0	2.5	15	
25-Sep	0	0	0	0	Z	2	2	0	0	0	0	0	M	M	M	0	0	0	0	0	0	0	0	0.3	2	
26-Sep	0	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
27-Sep	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	
28-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	10	4	2	2	1	0	1.0	10	
29-Sep	0	0	Z	1	1	1	2	5	6	3	0	0	0	0	0	0	1	2	2	0	1	0	0	1.2	6	
30-Sep	0	0	0	Z	6	16	32	18	M	M	1	0	0	0	0	0	4	1	2	1	1	0	0	4.0	32	
0.3 0.2 0.2 0.8 1.1 3.2 4.2 4.1 2.7 2.2 1.9 2.0 1.1 1.0 0.6 0.7 1.4 2.0 1.0 0.9 0.7 0.4 0.4 0.3																								Diurnal Average		
2 1 2 3 6 16 32 21 14 9 13 16 7 7 3 3 10 18 4 5 3 2 5 3																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	676	99.71	99.71
21 - 40	2	0.29	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 678

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	45	13	5	4	11	43	39	26	62	67	89	73	50	61	48	40	676
21 - 40	0	1	0	0	0	0	0	1	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>	45	14	5	4	11	43	39	27	62	67	89	73	50	61	48	40	678

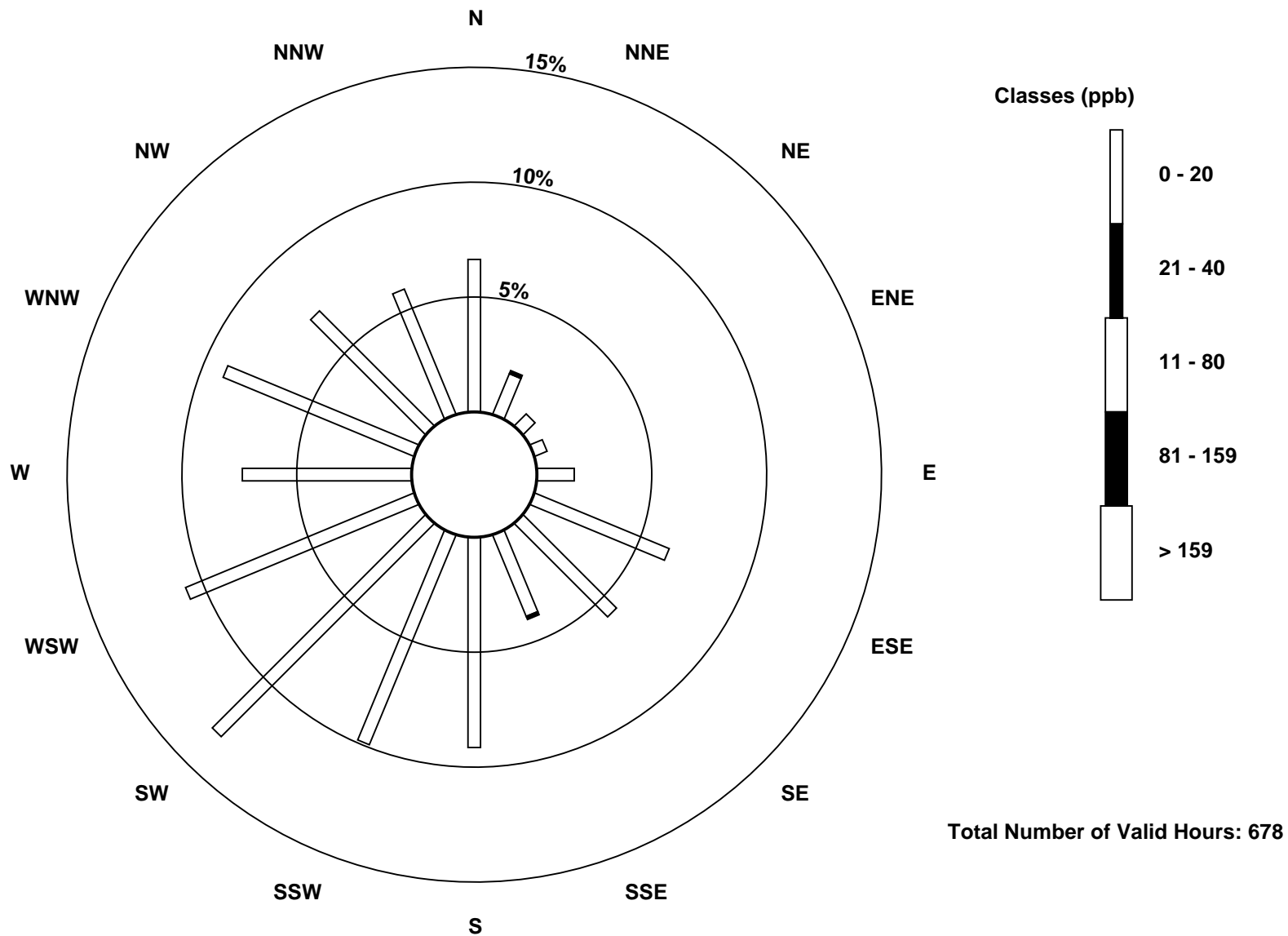
Total Number of Valid Hours: 678

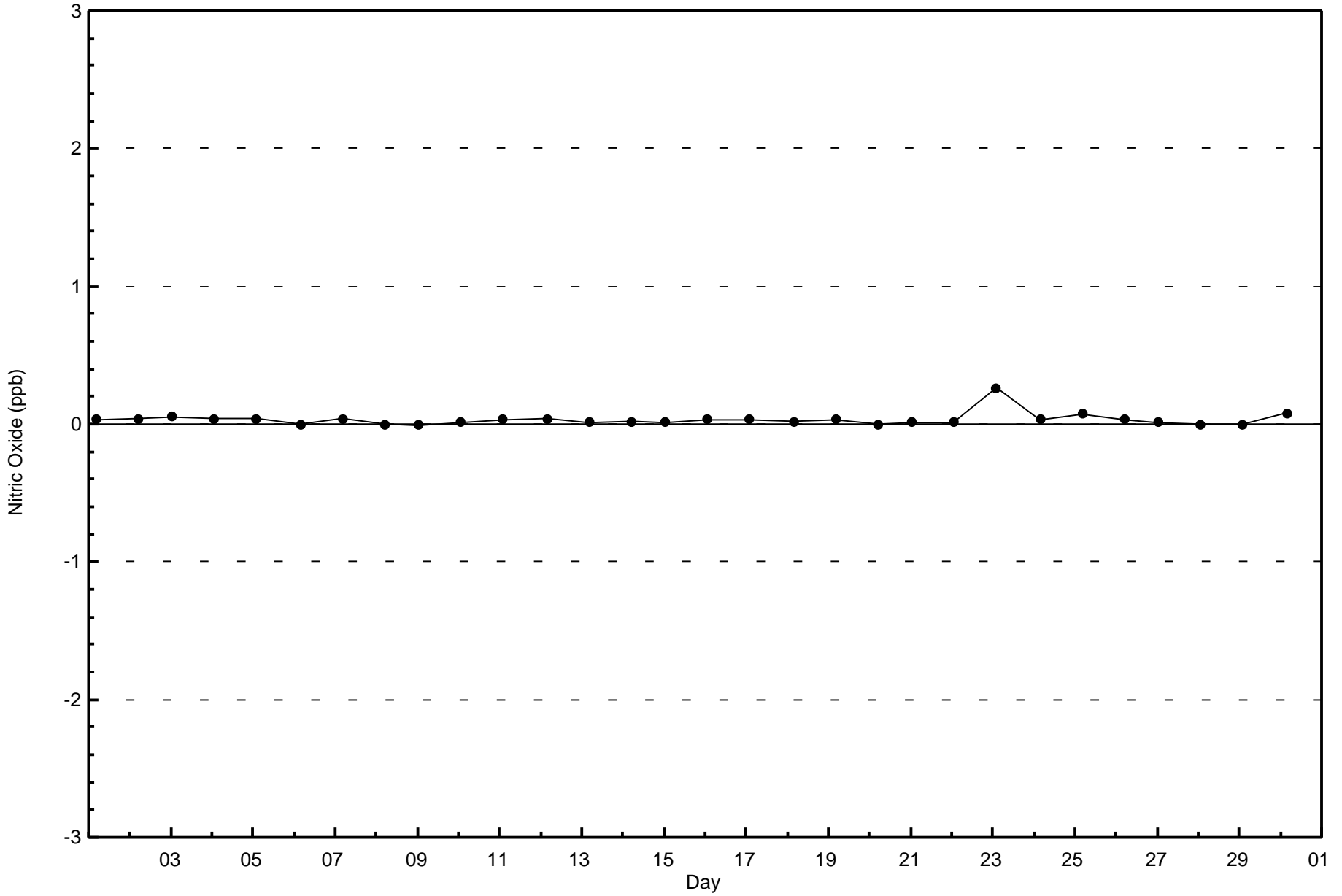
Total Number of Hours: 720

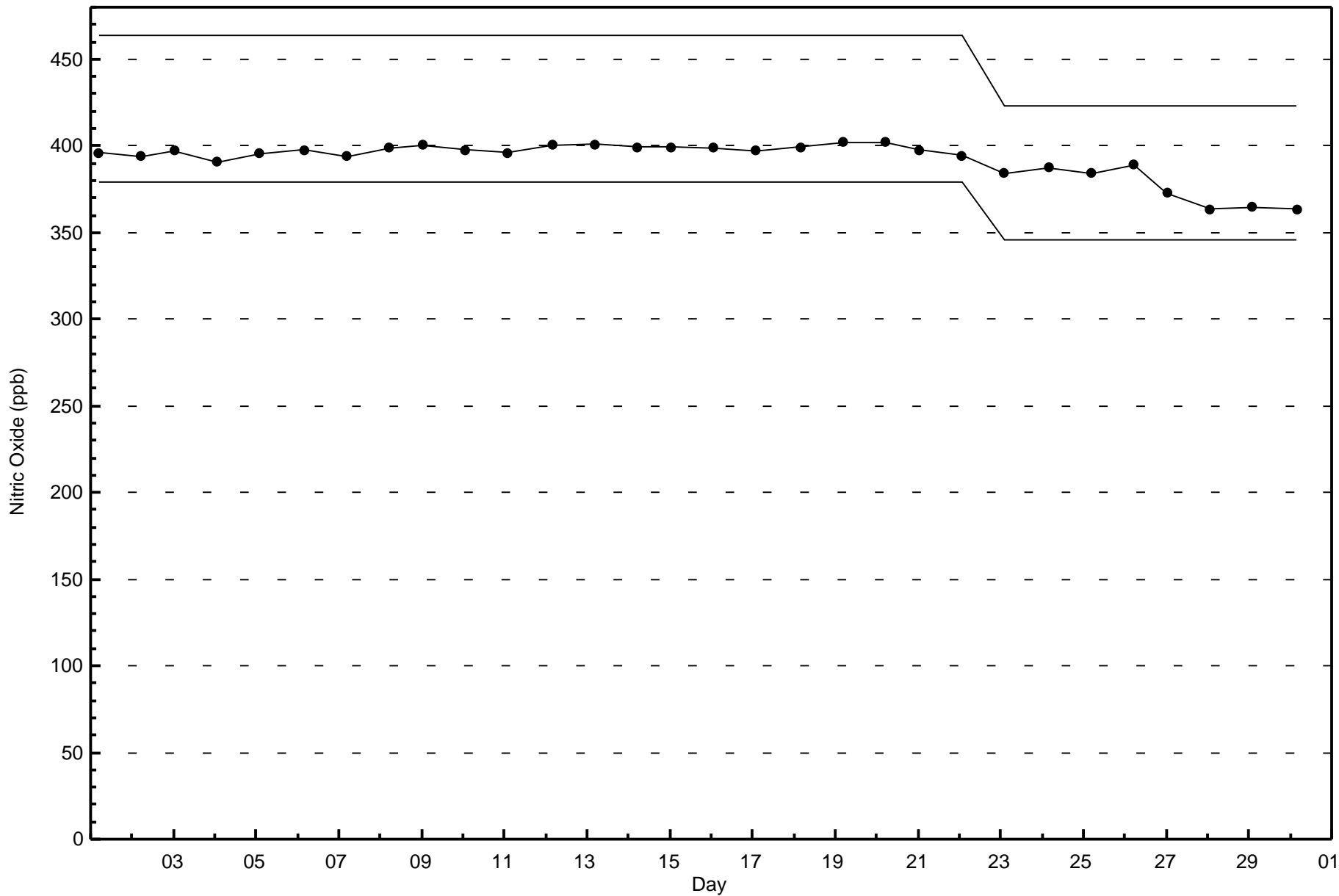


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitric Oxide (NO) - ppb  
Patricia McInnes (AMS 6)







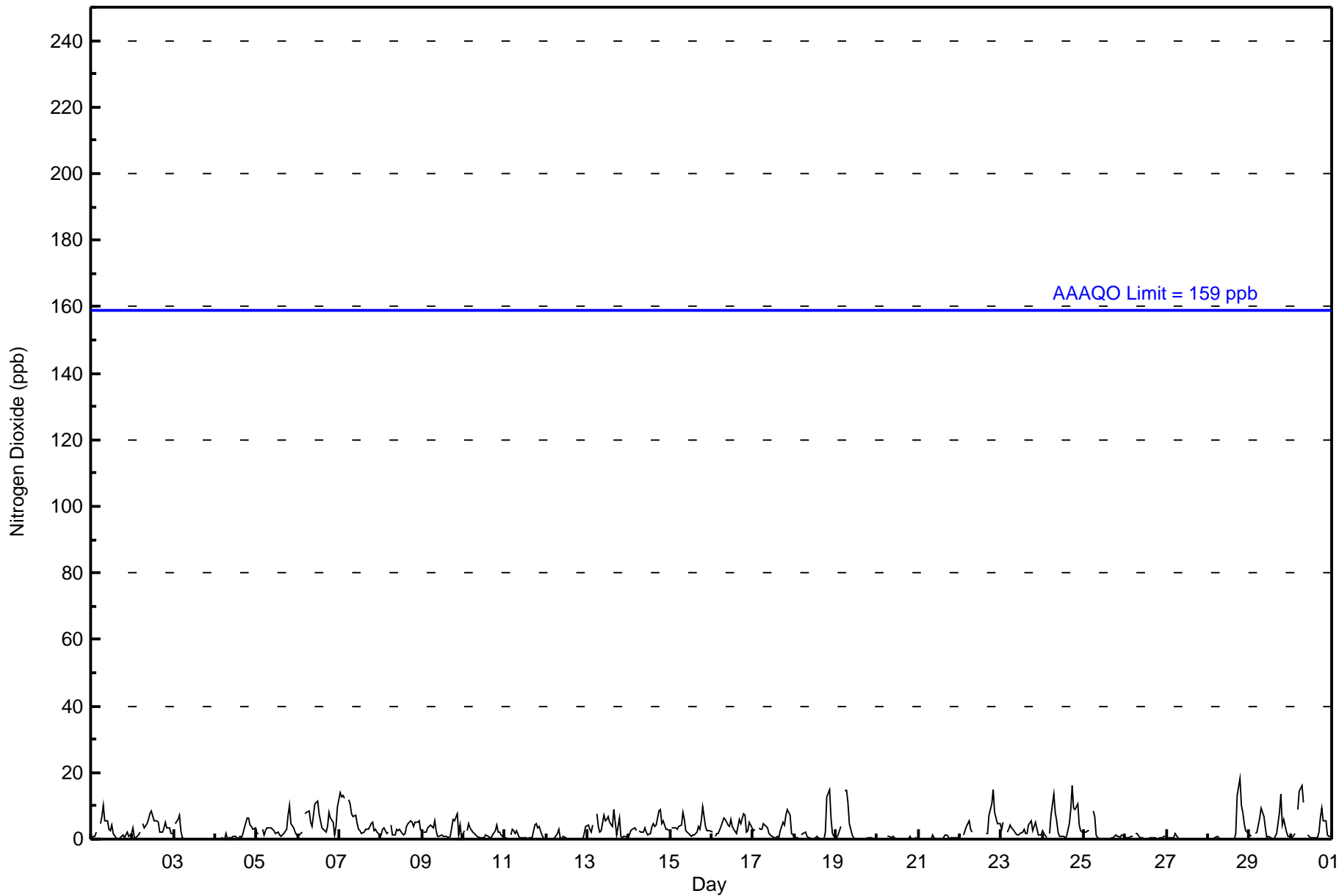


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 18 ppb on Sep 28 19:00	Maximum Daily Average: 6.0 ppb on Sep 7		Hours of Data:	678
Minimum Value: 0 ppb on Sep 3 07:00	Minimum Daily Average: 0.2 ppb on Sep 27		Hours of Missing Data:	42
Maximum Diurnal Average: 5.0 ppb at hour 19	Minimum Diurnal Average: 1.2 ppb at hour 15		Hours of Calibration:	37
Monthly Average: 2.7 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 7 P <sub>99</sub> = 15		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-Sep	1	1	1	2	Z	5	7	10	5	6	3	2	4	2	0	0	0	1	1	1	1	2	1	2	2.4	10
2-Sep	3	1	0	1	2	Z	5	4	5	6	8	9	5	6	5	5	2	2	3	5	3	3	2	2	3.8	9
3-Sep	Z	5	6	7	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	7
4-Sep	0	Z	0	0	0	0	2	0	0	1	1	1	1	0	1	1	2	4	6	7	4	4	3	4	1.7	7
5-Sep	2	2	Z	3	1	3	3	4	4	3	2	2	2	1	1	1	2	3	7	10	5	3	2	1	2.9	10
6-Sep	1	1	2	Z	8	8	9	5	4	7	11	12	8	6	4	2	2	4	8	7	5	1	4	10	5.5	12
7-Sep	14	13	13	12	Z	12	11	8	7	7	5	3	3	2	2	3	3	3	5	5	2	3	2	1	6.0	14
8-Sep	1	3	3	2	2	Z	4	1	1	3	3	3	2	1	2	4	5	6	5	4	5	5	6	3	3.2	6
9-Sep	Z	2	2	3	4	4	4	6	3	1	1	1	1	1	1	1	1	3	6	6	8	1	4	1	2.7	8
10-Sep	3	Z	3	5	3	2	2	1	1	1	1	1	0	1	1	1	1	1	3	4	2	2	1	1	1.6	5
11-Sep	0	1	Z	1	3	3	2	3	1	0	0	0	0	0	0	0	1	4	5	4	4	1	0	0	1.5	5
12-Sep	0	0	0	Z	0	1	2	3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2	4	0.6	4
13-Sep	4	3	2	4	Z	8	4	2	2	7	5	6	7	5	4	9	5	1	6	1	0	1	1	0	3.9	9
14-Sep	1	3	3	3	3	Z	3	2	2	4	2	1	2	4	5	4	4	9	9	5	6	3	3	3	3.5	9
15-Sep	Z	3	3	4	3	4	4	8	6	2	2	1	1	1	1	2	4	3	6	10	4	3	3	3	3.5	10
16-Sep	2	Z	1	2	2	4	5	6	6	4	4	6	4	3	2	4	6	5	8	7	2	3	5	4	4.0	8
17-Sep	3	3	Z	3	3	3	5	4	3	2	1	1	1	1	1	1	3	5	4	7	9	7	2	1	3.1	9
18-Sep	1	1	1	Z	1	2	2	1	0	0	0	0	0	1	0	0	0	0	2	13	15	6	2	1	2.1	15
19-Sep	1	1	3	4	Z	15	15	11	5	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	2.5	15
20-Sep	0	0	0	0	0	Z	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
21-Sep	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	0	1	0	0	1	0	0.4	1
22-Sep	1	Z	1	3	4	5	3	2	C	C	C	C	C	C	C	2	2	7	11	15	8	6	5	5	--	15
23-Sep	3	5	Z	2	3	4	4	3	2	1	1	2	2	3	2	2	4	5	3	4	5	1	1	1	2.8	5
24-Sep	3	2	1	Z	2	7	13	8	6	2	1	1	1	1	1	5	9	16	9	9	11	4	3	2	5.0	16
25-Sep	2	2	2	2	Z	9	7	1	1	0	0	0	M	M	M	0	0	1	1	1	1	1	1	1	1.7	9
26-Sep	1	1	1	1	1	Z	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.5	2
27-Sep	Z	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
28-Sep	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	13	18	10	8	5	3	2	2.7	18
29-Sep	1	1	Z	2	2	4	6	9	7	3	1	1	0	0	0	1	2	8	14	4	6	2	1	1	3.3	14
30-Sep	1	1	2	Z	9	15	16	11	M	M	1	1	0	0	0	1	2	6	10	6	6	1	1	1	4.3	16

1.9	2.1	2.0	2.7	2.4	4.8	4.6	3.9	2.6	2.3	1.9	1.8	1.6	1.4	1.2	1.6	2.0	3.7	5.0	4.8	4.0	2.4	1.9	1.7	Diurnal Average	
14	13	13	12	9	15	16	11	7	7	11	12	8	6	5	9	9	16	18	15	15	7	6	10	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Patricia McInnes - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	678	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: 678

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Patricia McInnes - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	45	14	5	4	11	43	39	27	62	67	89	73	50	61	48	40	678
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>	45	14	5	4	11	43	39	27	62	67	89	73	50	61	48	40	678

Total Number of Valid Hours: 678

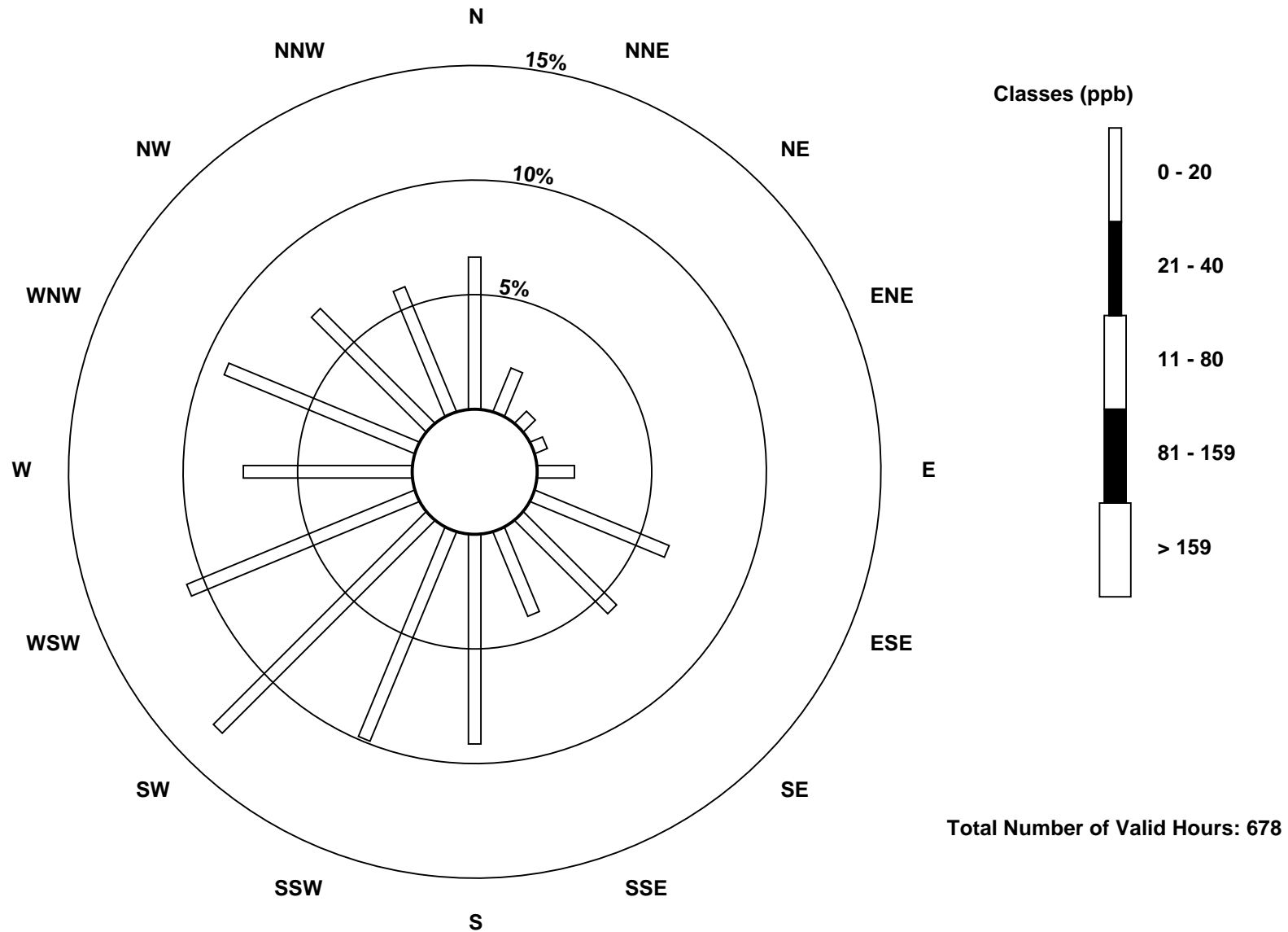
Total Number of Hours: 720

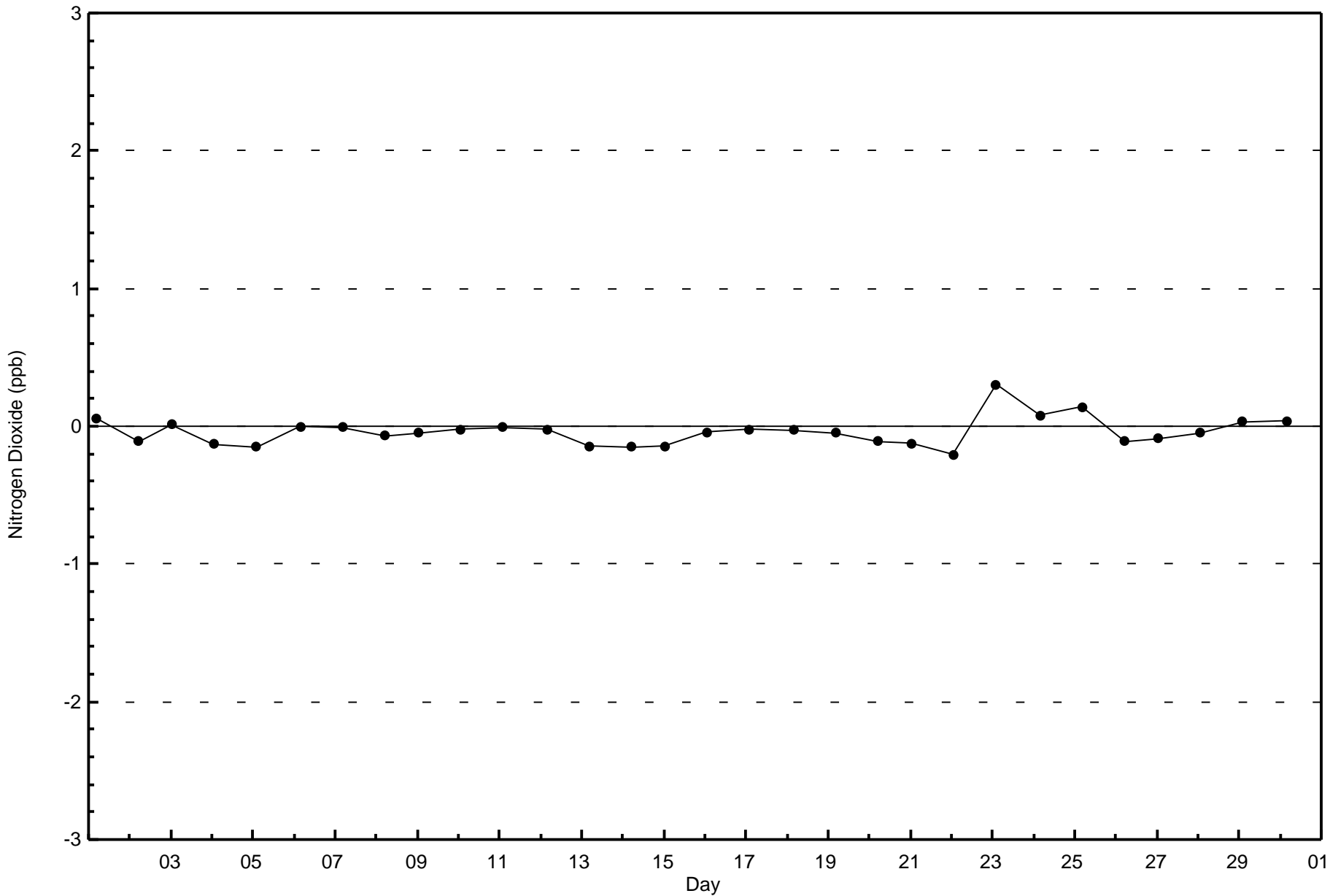


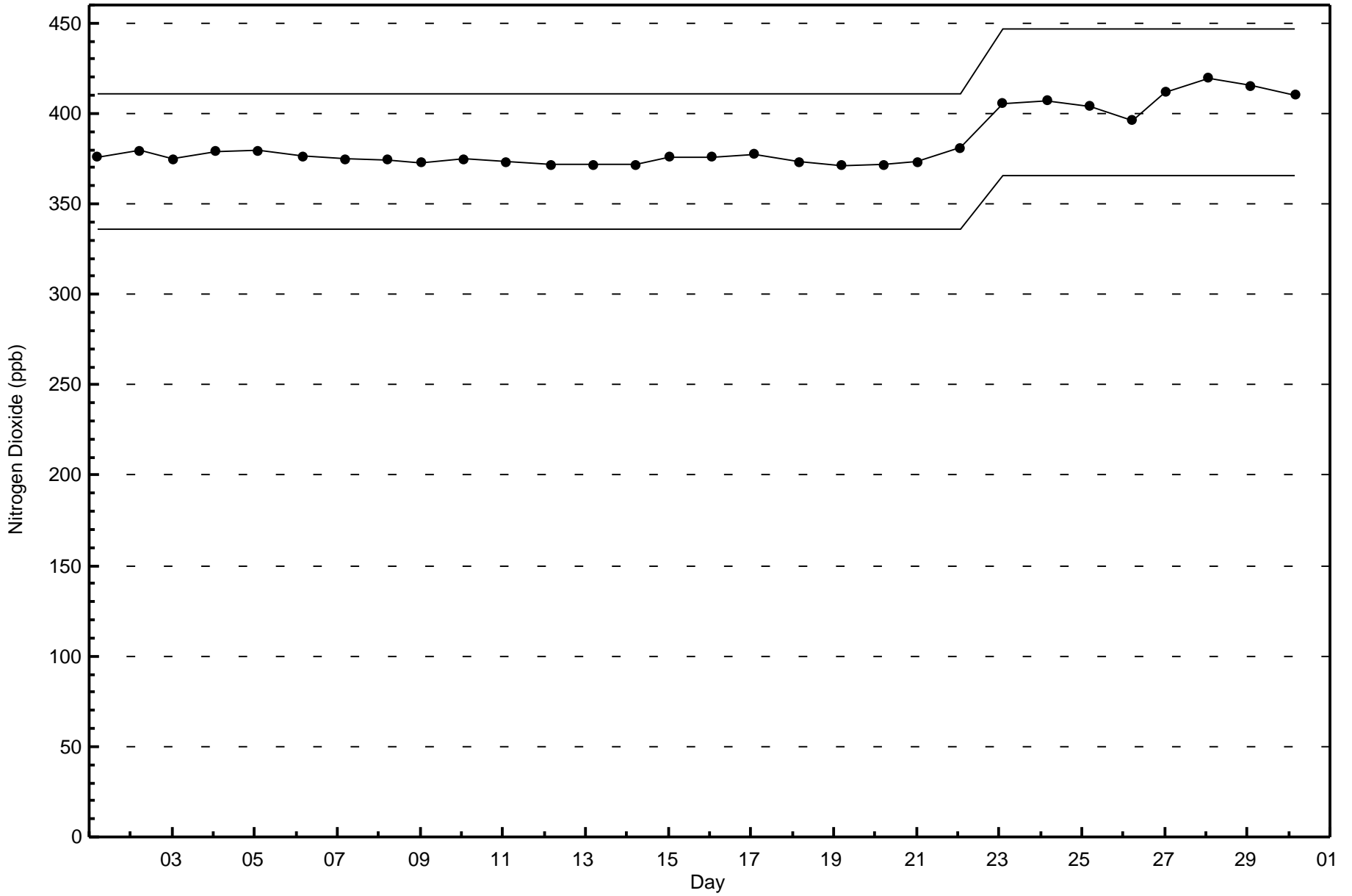


**Wood Buffalo Environmental Association**  
**Wind Rose Sep 2015**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Patricia McInnes (AMS 6)**

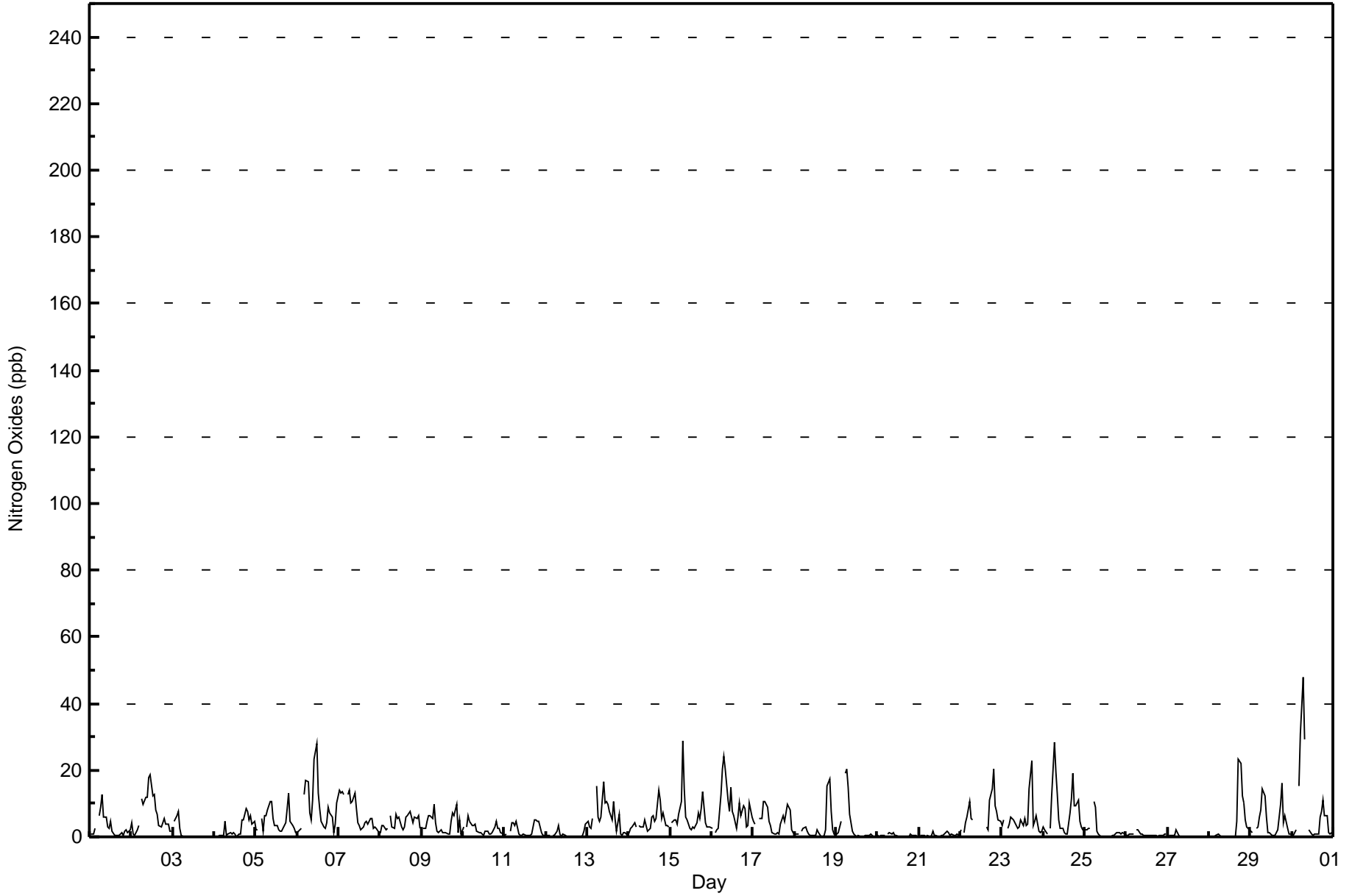








Maximum Value: 48 ppb on Sep 30 07:00																		Maximum Daily Average: 8.7 ppb on Sep 6						Hours in Service: 720		
Minimum Value: 0 ppb on Sep 25 12:00																		Minimum Daily Average: 0.2 ppb on Sep 27						Hours of Data: 678		
Maximum Diurnal Average: 8.8 ppb at hour 7																		Minimum Diurnal Average: 1.8 ppb at hour 15						Hours of Missing Data: 42		
Monthly Average: 4.1 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 5 P <sub>90</sub> = 11 P <sub>99</sub> = 23						Hours of Calibration: 37		
																		Percent Operational Time: 99.3								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	1	1	1	3	Z	6	9	13	6	6	3	3	5	2	1	0	0	1	1	1	2	2	1	2	2.9	13
2-Sep	4	1	1	2	4	Z	11	10	12	12	18	19	12	13	8	7	3	3	4	6	4	4	2	2	7.0	19
3-Sep	Z	5	6	7	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	7	
4-Sep	0	Z	0	0	1	0	5	0	1	1	1	1	1	0	1	5	5	8	8	5	6	4	5	2.6	8	
5-Sep	2	2	Z	5	2	6	6	8	11	11	5	3	4	2	2	3	4	8	13	5	4	3	1	4.9	13	
6-Sep	1	2	2	Z	13	17	17	7	5	11	23	28	13	8	5	3	2	4	9	7	6	1	4	8.7	28	
7-Sep	14	13	14	13	Z	13	14	10	11	13	9	4	3	2	3	4	5	4	5	5	3	3	3	7.3	14	
8-Sep	1	4	4	2	3	Z	6	3	3	7	6	6	3	2	3	6	6	7	6	4	6	5	6	4.4	7	
9-Sep	Z	2	2	4	6	6	6	10	4	2	1	2	1	1	1	1	1	5	7	6	10	1	5	3.8	10	
10-Sep	3	Z	3	6	5	3	3	4	2	1	1	1	0	2	2	1	1	1	3	5	3	3	1	2.3	6	
11-Sep	1	1	Z	2	4	4	3	5	1	1	1	1	0	0	0	0	1	5	5	5	5	1	0	2.0	5	
12-Sep	0	0	0	Z	0	1	2	4	1	0	1	0	0	0	0	0	0	0	0	0	0	2	4	0.7	4	
13-Sep	5	3	2	5	Z	15	6	5	6	16	10	10	8	5	11	5	1	7	1	0	1	1	1	5.9	16	
14-Sep	1	3	3	4	3	Z	3	3	3	5	4	2	3	6	6	5	5	14	11	6	7	3	4	4.6	14	
15-Sep	Z	4	5	5	4	7	11	29	14	6	5	3	2	3	3	4	7	5	9	13	4	3	3	6.6	29	
16-Sep	2	Z	1	2	3	13	20	24	20	11	8	15	8	7	2	6	10	6	9	9	3	3	10	8.6	24	
17-Sep	5	4	Z	5	5	5	11	11	9	5	3	1	1	1	1	1	4	6	5	7	10	8	4.8	11		
18-Sep	1	1	1	Z	2	3	3	1	1	1	0	0	1	2	1	0	0	0	2	15	17	8	2	2.7	17	
19-Sep	1	1	3	5	Z	19	20	15	7	2	1	0	0	0	0	0	0	0	1	1	1	1	0	3.4	20	
20-Sep	0	0	0	0	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0.4	1	
21-Sep	Z	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	2	1	0	1	0	0	1	0.5	2	
22-Sep	2	Z	1	4	6	11	6	5	C	C	C	C	C	C	C	3	2	11	14	20	9	8	5	--	20	
23-Sep	3	5	Z	3	4	6	6	5	3	3	3	5	4	5	4	4	14	23	4	5	6	2	1	5.1	23	
24-Sep	3	2	1	Z	2	12	28	19	13	5	2	2	1	1	1	7	11	19	9	9	11	5	3	7.5	28	
25-Sep	2	2	2	3	Z	11	9	2	1	0	0	0	M	M	M	0	0	1	1	1	1	1	1	2.0	11	
26-Sep	1	1	1	1	1	Z	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.7	2	
27-Sep	Z	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2	
28-Sep	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5	23	22	12	10	5	3	3.7	23	
29-Sep	2	1	Z	2	3	6	8	15	12	6	1	1	0	0	0	1	2	10	16	4	6	2	1	4.4	16	
30-Sep	1	1	2	Z	15	31	48	29	M	M	2	1	1	1	1	1	6	7	11	6	6	1	1	8.2	48	
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance																										





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	667	98.38	98.38
21 - 40	10	1.47	99.85
41 - 80	1	0.15	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 678

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	45	13	5	4	11	41	39	23	60	67	89	73	50	61	48	38	667
21 - 40	0	1	0	0	0	2	0	3	2	0	0	0	0	0	0	2	10
11 - 80	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	14	5	4	11	43	39	27	62	67	89	73	50	61	48	40	678

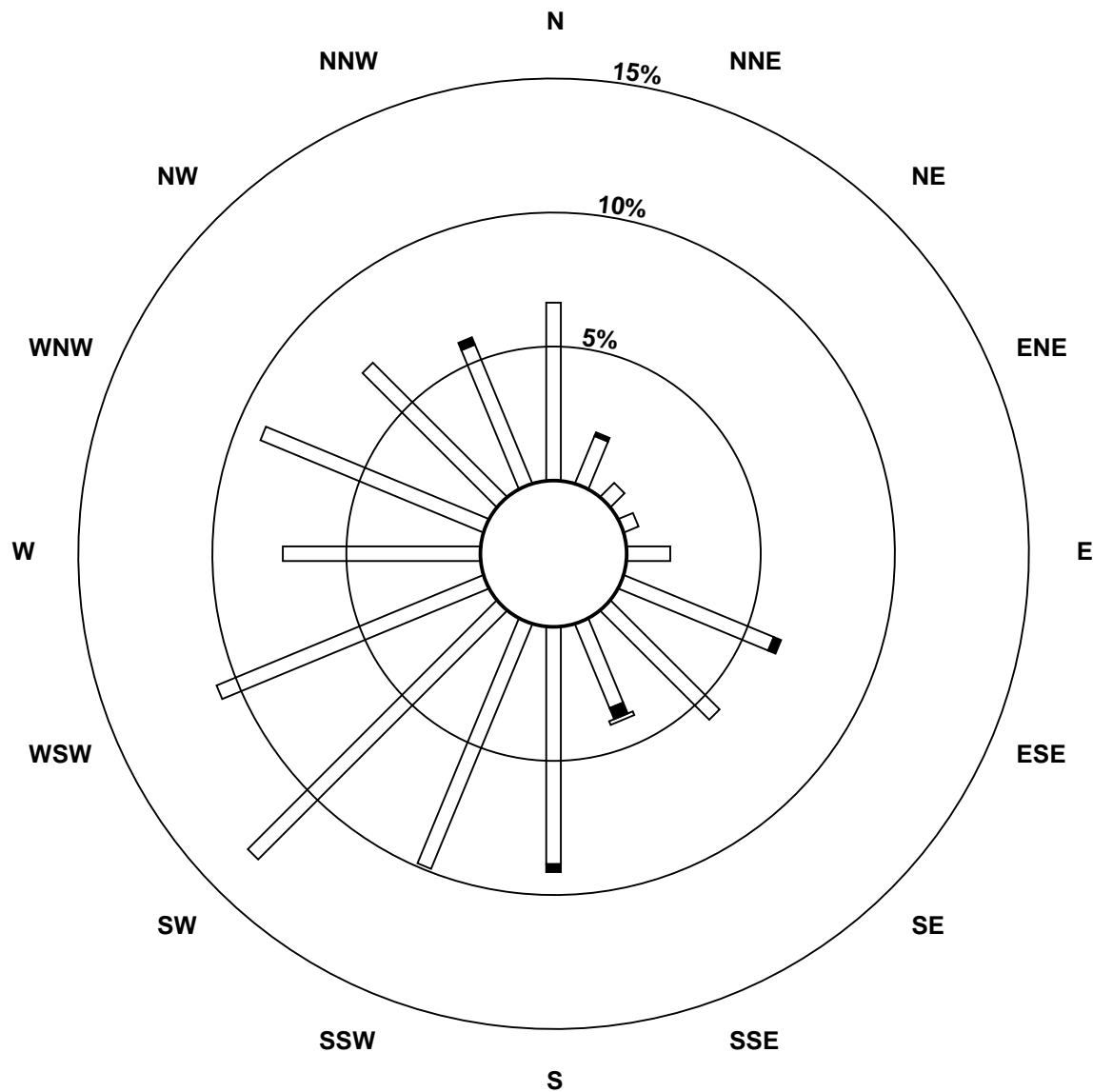
Total Number of Valid Hours: 678

Total Number of Hours: 720

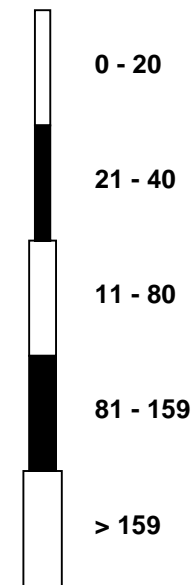


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Patricia McInnes (AMS 6)

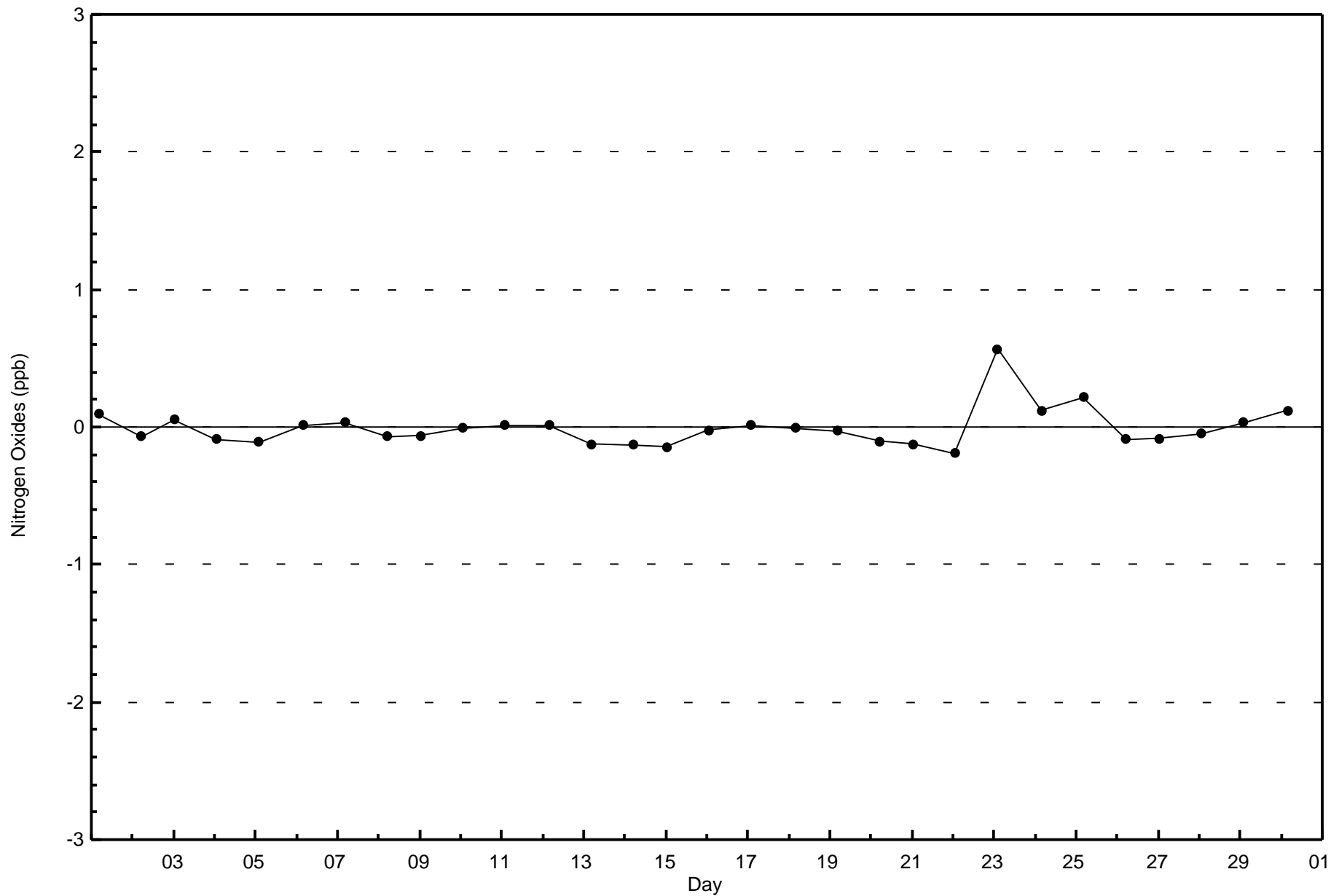


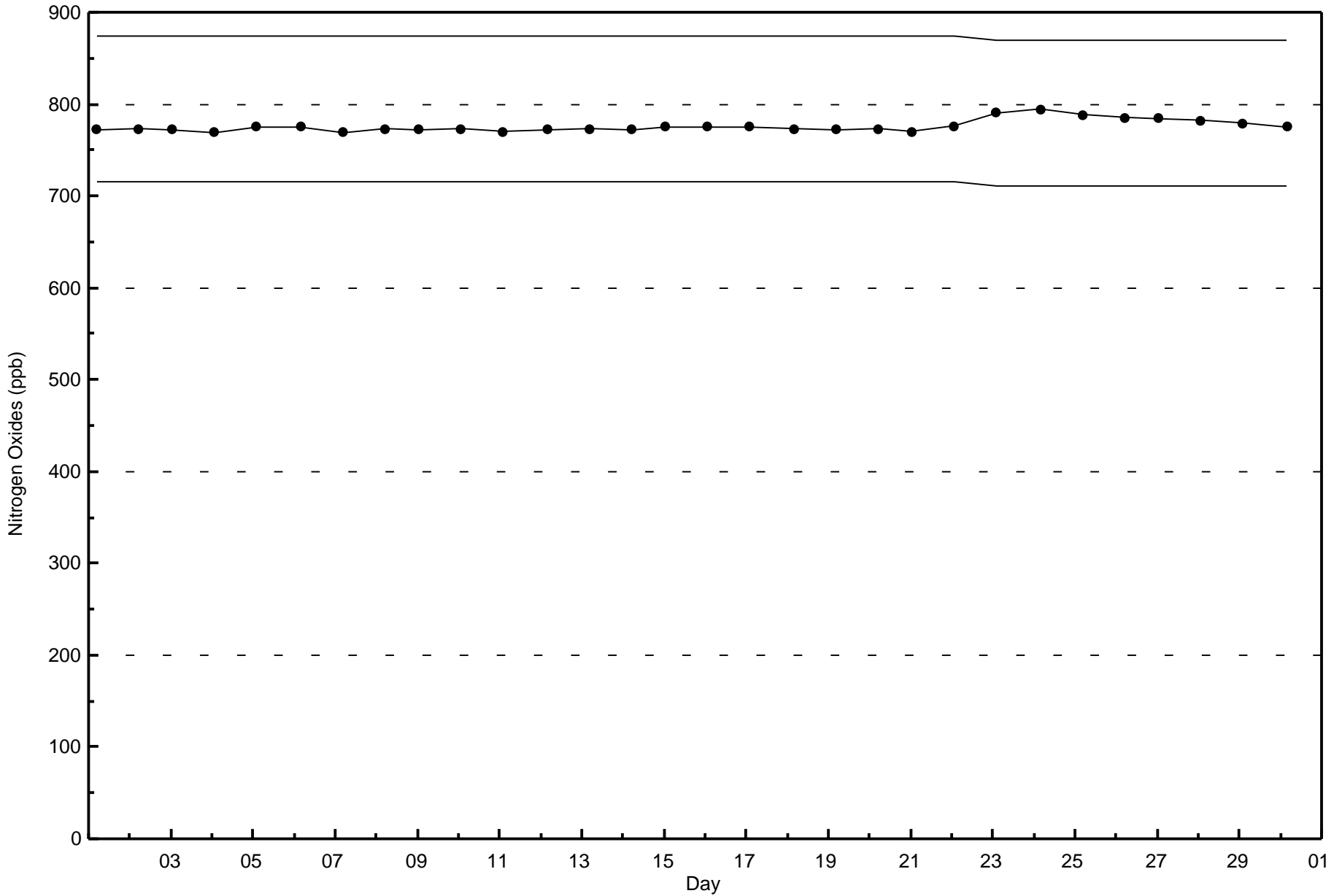
Classes (ppb)



Total Number of Valid Hours: 678





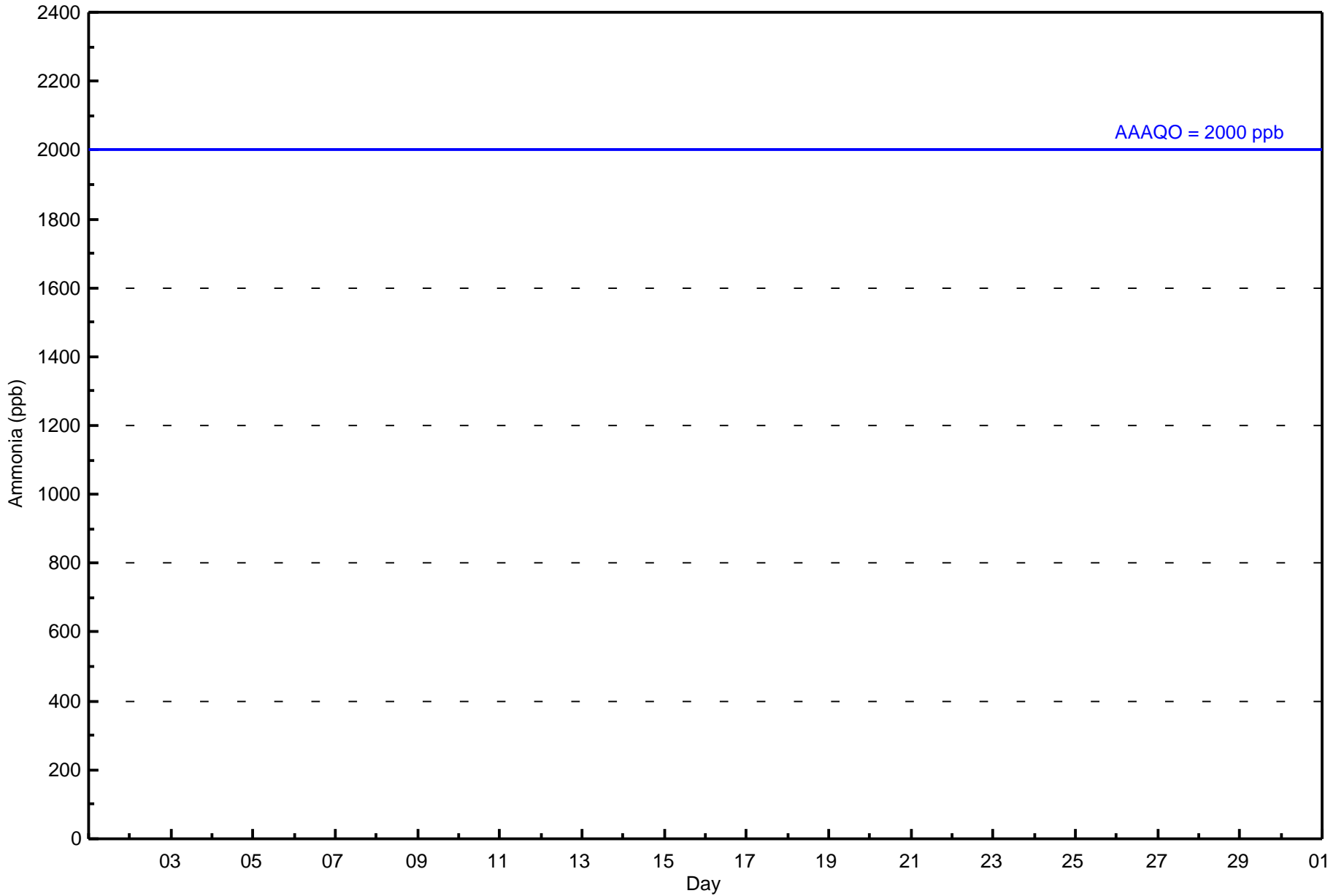




Number of Exceedences (AAAQO): 1-hr: 0	Maximum Value: 0 ppb on Sep 1 01:00	Maximum Daily Average: 0.0 ppb on Sep 1	Hours in Service: 720
Minimum Value: 0 ppb on Sep 1 01:00	Maximum Diurnal Average: 0.0 ppb at hour 1	Minimum Daily Average: 0.0 ppb on Sep 1	Hours of Data: 639
Monthly Average: 0.0 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 O <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 0		Hours of Missing Data: 81
			Hours of Calibration: 47
			Percent Operational Time: 95.3

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

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	639	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: 639

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	44	13	5	3	8	38	37	22	61	64	80	71	48	60	46	39	639
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>	44	13	5	3	8	38	37	22	61	64	80	71	48	60	46	39	639

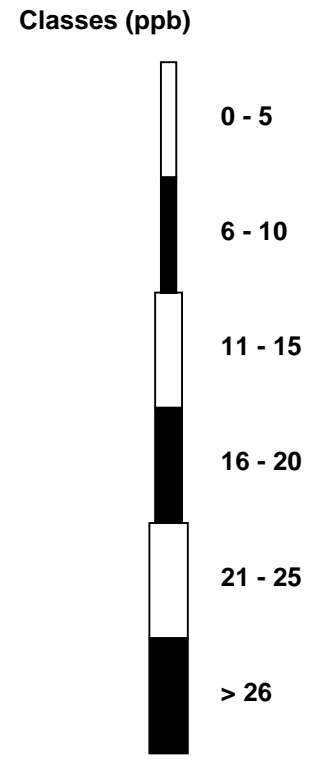
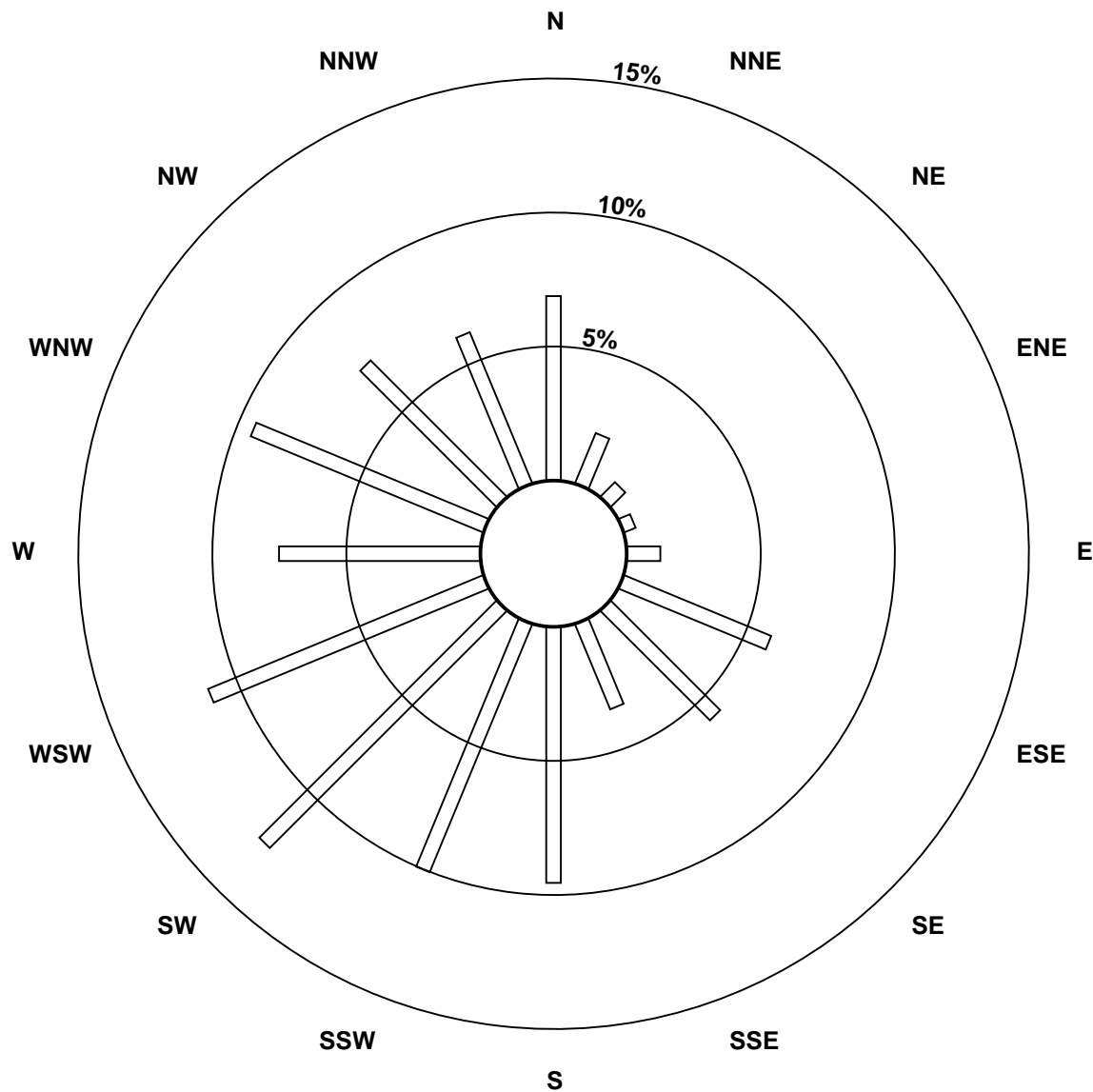
Total Number of Valid Hours: 639

Total Number of Hours: 720

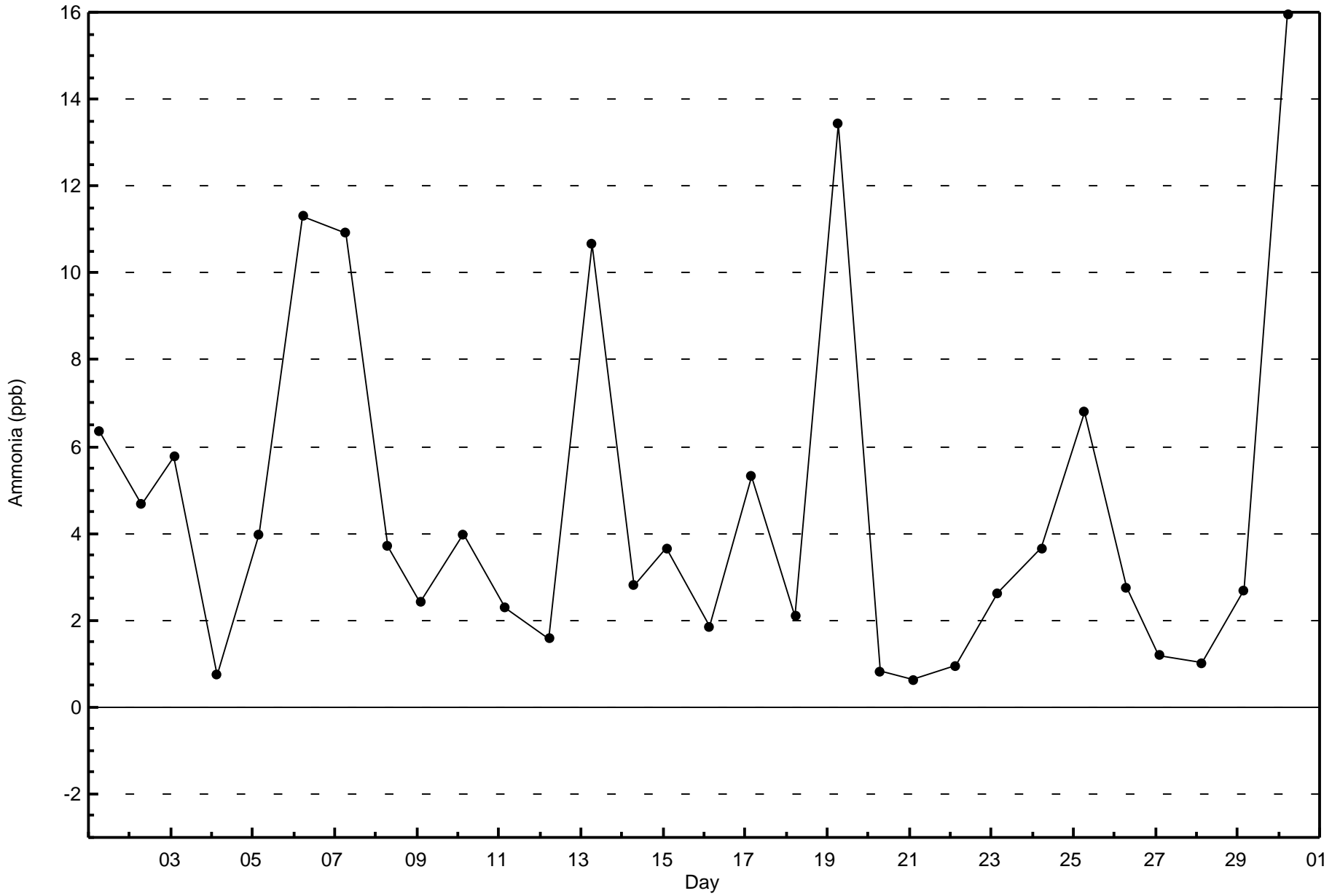


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

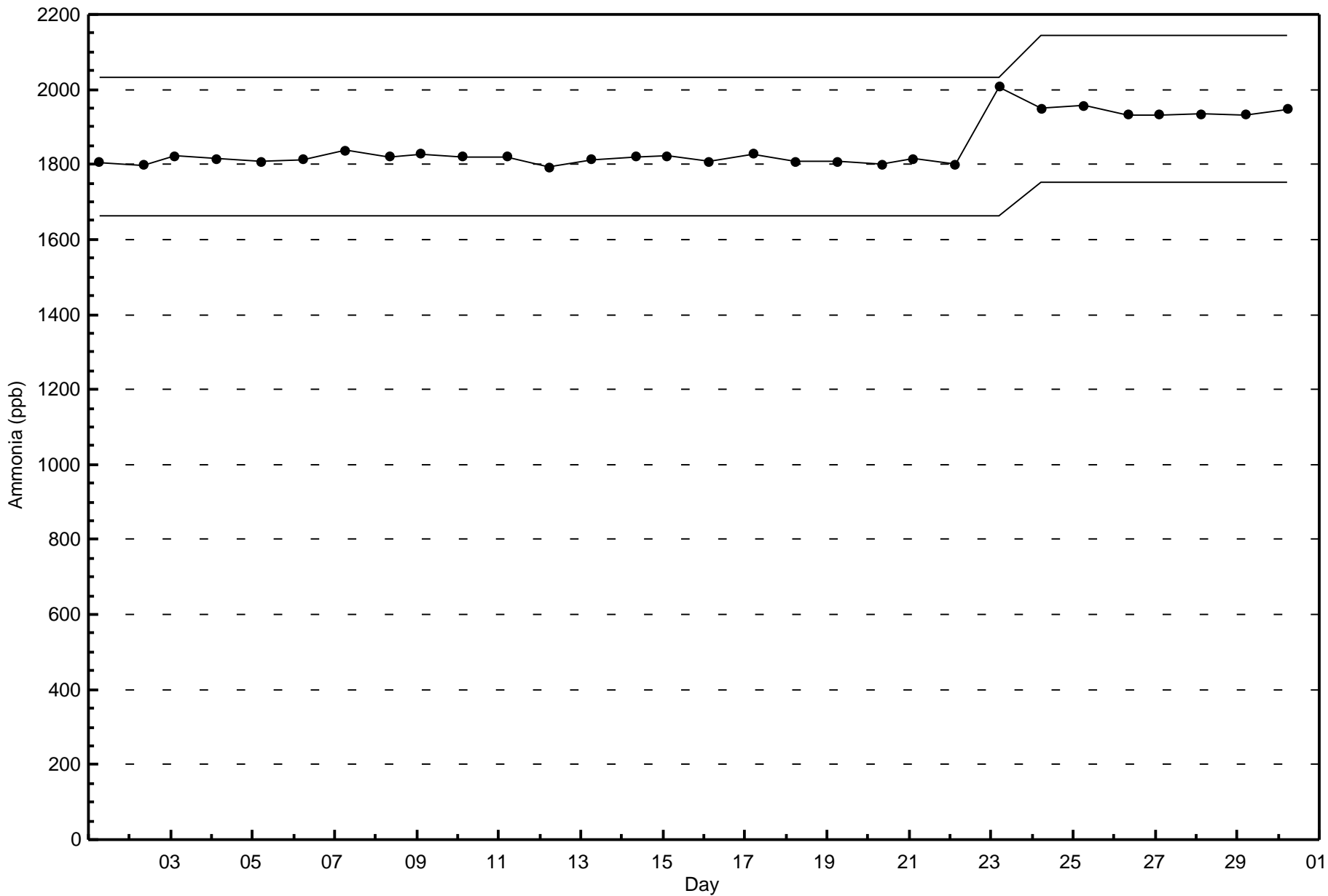
Ammonia (NH<sub>3</sub>) - ppb  
Patricia McInnes (AMS 6)



Total Number of Valid Hours: 639









Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 27.7 µg/m <sup>3</sup> on Sep 18 21:00	Maximum Daily Average: 6.1 µg/m <sup>3</sup> on Sep 8	Hours of Data:	720
Minimum Value: 0.0 µg/m <sup>3</sup> on Sep 25 21:00	Minimum Daily Average: 0.0 µg/m <sup>3</sup> on Sep 27	Hours of Missing Data:	0
Maximum Diurnal Average: 6.3 µg/m <sup>3</sup> at hour 21	Minimum Diurnal Average: 1.9 µg/m <sup>3</sup> at hour 14	Hours of Calibration:	0
Monthly Average: 3.54 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.3 Q <sub>1</sub> = 1.5 Median = 2.9 Q <sub>3</sub> = 4.6 P <sub>90</sub> = 7.1 P <sub>99</sub> = 16.6	Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Sep	1.6	1.4	1.4	1.5	2.4	2.8	3.3	2.2	1.6	1.9	2.1	2.6	3.9	3.1	2.4	1.7	1.5	1.6	1.3	1.1	1.3	1.7	1.8	1.6	2.0	3.9																						
2-Sep	1.5	1.2	0.8	0.8	1.2	1.8	2.1	2.5	8.3	3.6	20.1	20.7	4.8	2.8	4.5	5.9	7.4	3.7	3.0	2.8	3.2	2.9	3.8	2.9	4.7	20.7																						
3-Sep	3.3	3.1	3.7	6.2	5.1	2.5	2.0	1.8	1.6	1.3	2.2	1.6	1.1	1.1	1.0	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	1.9	6.2																							
4-Sep	0.9	0.9	0.9	1.0	1.1	1.1	1.5	1.1	1.4	1.4	1.3	1.3	1.5	1.1	1.5	1.2	1.4	2.1	3.5	6.1	7.6	6.1	6.2	10.6	2.6	10.6																						
5-Sep	3.7	3.0	3.9	4.9	3.2	3.2	3.6	4.8	4.3	2.5	1.8	1.2	1.7	1.6	1.3	2.0	2.4	3.8	8.0	13.6	13.0	14.9	12.7	10.6	5.2	14.9																						
6-Sep	9.4	7.7	6.7	7.3	7.6	8.0	8.0	4.3	1.6	2.2	4.7	5.4	3.7	3.3	2.3	2.4	2.7	3.6	4.0	3.7	2.9	2.7	3.0	3.9	4.6	9.4																						
7-Sep	4.9	5.0	4.9	4.6	4.4	4.1	4.2	4.2	4.2	3.9	3.1	2.1	2.0	1.8	2.0	2.5	3.2	4.2	4.5	5.5	4.2	4.2	4.6	4.7	3.9	5.5																						
8-Sep	4.1	4.5	4.2	3.9	4.3	5.4	4.9	4.4	4.5	5.2	4.0	3.0	1.8	1.9	2.2	2.8	4.3	5.6	7.9	11.1	16.6	17.3	13.8	8.3	6.1	17.3																						
9-Sep	6.2	6.5	6.2	6.8	7.2	6.5	5.6	5.6	4.4	4.2	3.9	3.9	1.9	1.8	2.1	2.9	2.9	4.3	4.7	3.5	8.8	4.8	9.8	3.4	4.9	9.8																						
10-Sep	4.9	4.2	3.8	4.4	2.5	2.1	2.2	1.9	1.7	1.9	1.9	3.0	3.5	4.1	3.7	3.4	3.4	3.1	7.1	9.4	3.8	2.6	3.6	4.9	3.6	9.4																						
11-Sep	4.1	3.9	4.2	4.6	4.9	5.0	4.5	3.2	2.1	2.4	2.9	2.5	2.3	2.4	3.5	3.5	2.7	4.9	3.7	5.0	7.2	6.5	6.6	7.1	4.2	7.2																						
12-Sep	6.9	5.8	4.5	4.3	4.2	4.3	3.1	3.2	3.0	3.4	3.2	2.8	2.9	3.0	2.7	2.5	3.2	3.3	3.3	4.1	4.3	4.0	3.8	5.2	3.8	6.9																						
13-Sep	6.3	5.7	4.0	3.9	4.0	5.0	3.7	2.6	1.9	3.5	3.7	3.3	4.5	5.1	5.2	9.5	8.9	4.8	7.5	4.4	4.4	4.1	4.0	3.7	4.7	9.5																						
14-Sep	3.8	4.2	2.7	4.5	3.9	3.6	3.1	3.6	3.7	3.5	2.5	1.8	1.9	4.5	4.4	3.4	5.4	5.8	7.0	7.5	10.9	11.0	15.0	6.5	5.2	15.0																						
15-Sep	5.5	5.3	5.4	5.1	4.9	4.0	4.3	18.2	16.7	2.1	1.6	1.5	1.4	1.2	1.4	1.6	2.1	2.8	5.0	7.9	5.1	6.5	6.1	5.7	5.1	18.2																						
16-Sep	4.0	2.7	2.5	2.4	2.3	2.8	3.2	4.8	5.4	3.7	2.2	2.4	2.0	1.9	1.3	2.2	6.2	4.3	8.3	6.9	4.7	9.0	7.4	4.3	4.0	9.0																						
17-Sep	2.3	1.9	1.5	1.8	1.7	1.2	1.4	1.4	1.9	1.5	1.4	1.4	1.4	1.7	2.0	2.1	3.0	5.4	9.7	9.5	10.3	6.4	4.6	3.8	3.3	10.3																						
18-Sep	4.6	4.6	4.6	4.7	4.7	4.3	4.4	3.5	2.2	1.1	1.1	1.0	0.9	0.9	0.9	0.8	0.8	0.9	1.5	12.5	27.7	10.7	3.0	2.2	4.3	27.7																						
19-Sep	2.0	2.5	6.3	2.3	3.7	3.3	3.5	2.6	2.4	1.8	1.3	1.1	1.0	1.0	1.0	1.7	1.7	1.8	2.0	2.7	3.5	3.0	2.8	2.6	2.4	6.3																						
20-Sep	3.4	3.6	3.2	3.0	2.8	2.7	2.6	2.1	1.8	2.0	1.7	1.4	1.6	1.5	1.3	1.3	1.2	1.1	1.1	1.3	1.4	1.5	1.7	1.6	2.0	3.6																						
21-Sep	1.6	1.8	2.6	2.9	2.3	1.7	1.5	1.5	1.6	1.3	1.3	1.1	1.0	1.0	1.1	1.7	1.7	1.5	1.2	1.3	1.6	1.8	1.8	1.7	1.6	2.9																						
22-Sep	1.9	2.1	2.2	2.4	3.2	3.4	2.7	2.3	3.6	4.3	2.7	2.6	2.1	1.7	1.6	1.8	3.0	7.1	8.0	10.7	6.8	7.5	4.9	4.8	3.9	10.7																						
23-Sep	4.1	3.9	3.1	2.9	2.9	2.9	3.7	3.2	3.0	2.8	2.3	2.1	1.9	2.0	2.0	2.2	3.4	4.0	4.7	5.7	5.2	4.1	3.9	3.9	3.3	5.7																						
24-Sep	4.6	5.2	4.8	4.7	4.5	5.2	6.5	6.7	5.9	5.0	4.2	3.5	3.1	1.9	1.5	2.4	3.9	7.1	8.2	9.7	11.6	7.6	6.9	6.8	5.5	11.6																						
25-Sep	8.3	8.1	6.9	7.6	8.7	8.8	8.6	7.8	5.6	3.0	1.8	1.6	0.1	0.3	0.3	0.3	0.4	1.2	0.6	0.1	0.0	0.1	0.3	0.0	3.4	8.8																						
26-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.8	0.9	0.3	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.9																						
27-Sep	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2																						
28-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.7	3.6	8.3	5.2	5.8	1.5	1.8	0.3	1.2	8.3																						
29-Sep	0.2	0.2	0.4	0.4	0.6	0.8	1.2	2.5	2.2	1.7	2.0	2.6	2.1	1.7	1.6	1.8	2.9	6.3	13.8	11.9	9.6	5.1	4.5	3.8	3.3	13.8																						
30-Sep	4.9	5.4	4.4	5.3	6.1	8.3	10.2	9.3	3.8	3.7	4.0	3.8	2.1	2.4	2.7	3.2	4.5	5.6	10.1	5.3	7.0	4.7	4.8	6.3	5.3	10.2																						
																								3.6	3.5	3.3	3.5	3.5	3.5	3.5	3.7	3.3	2.5	2.8	2.7	1.9	1.9	2.0	2.3	2.9	3.5	5.0	5.7	6.3	5.1	4.8	4.1	Diurnal Average
																								9.4	8.1	6.9	7.6	8.7	8.8	10.2	18.2	16.7	5.2	20.1	20.7	4.8	5.1	5.2	9.5	8.9	7.1	13.8	13.6	27.7	17.3	15.0	10.6	Diurnal Maximum

Alberta Ambient Air Quality Objectives (AAAQO):	24-hr 30 µg/m <sup>3</sup>
---	----------------------------

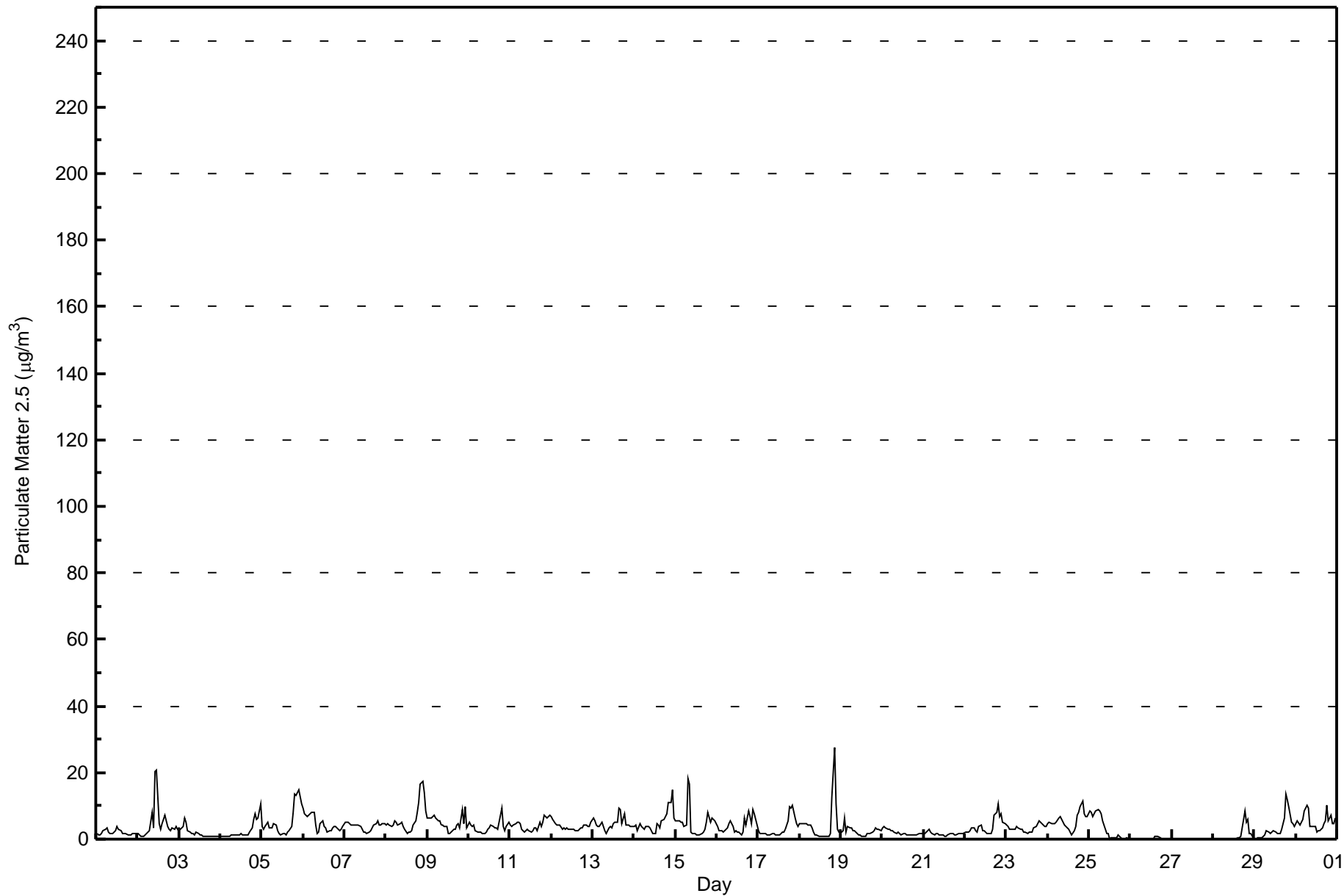


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$

Patricia McInnes - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Patricia McInnes - September 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	496	68.89	68.89
6 - 15	113	15.69	84.58
16 - 25	6	0.83	85.42
26 - 80	1	0.14	85.56
> 81.0	0	0.00	85.56

Total Number of Valid Hours: 720

Total Number of Hours: 720



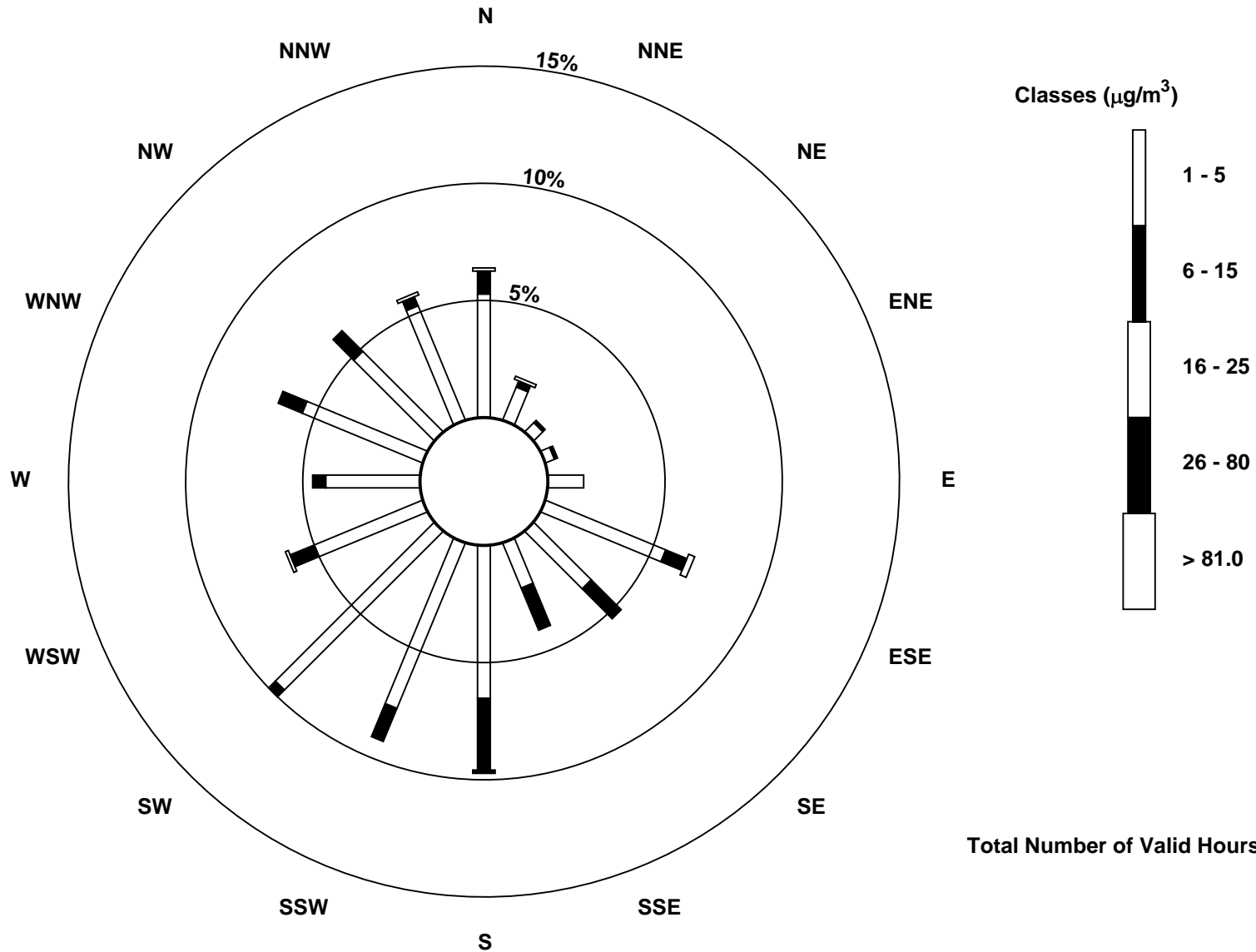
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Patricia McInnes - September 2015**

Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	38	11	4	3	11	40	25	15	47	55	69	36	29	40	35	38	496
6 - 15	7	2	1	1	0	7	13	14	22	11	3	8	4	8	9	3	113
16 - 25	1	1	0	0	0	2	0	0	0	0	0	1	0	0	0	1	6
26 - 80	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	46	14	5	4	11	49	38	29	70	66	72	45	33	48	44	42	616

Total Number of Valid Hours: 720

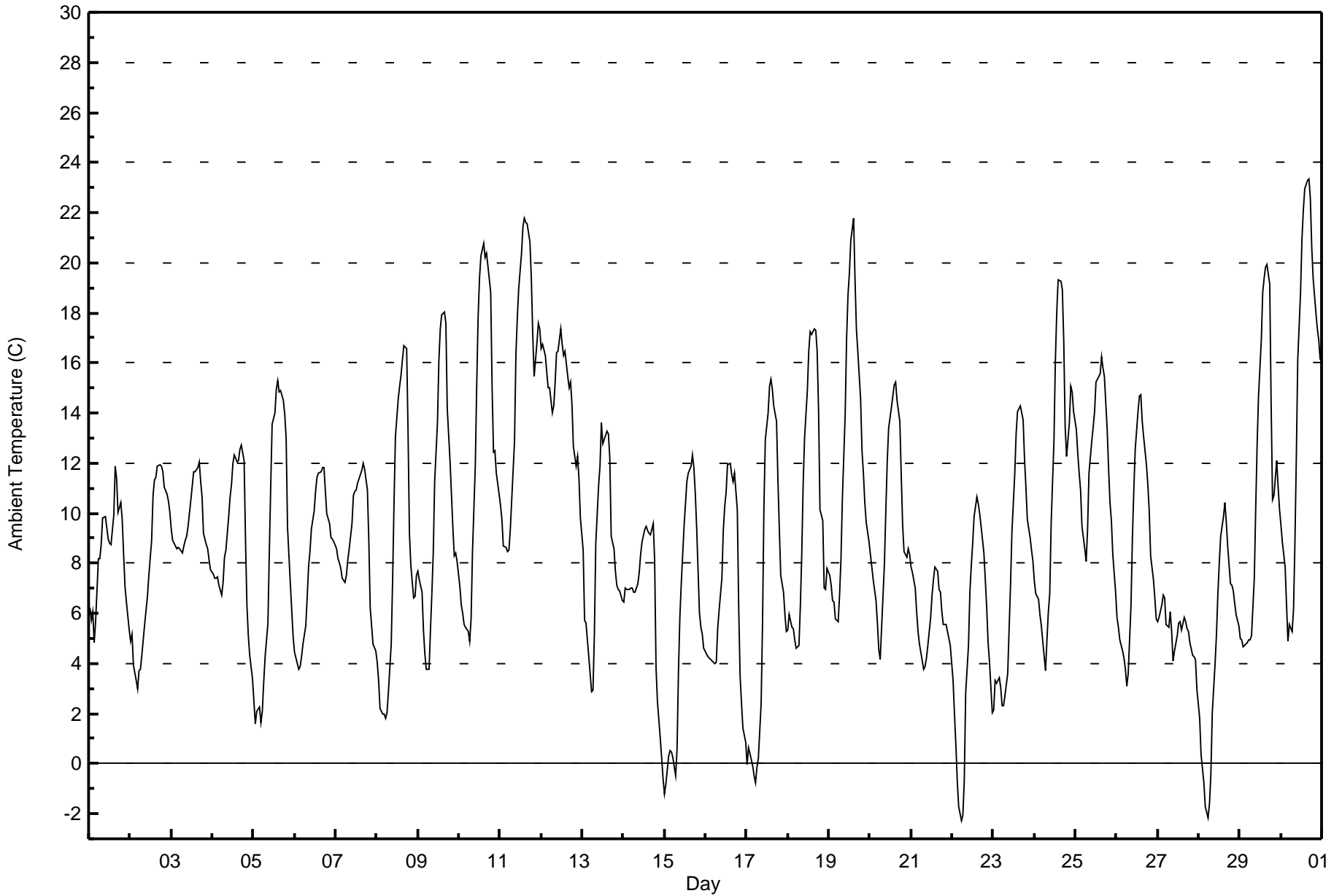
Total Number of Hours: 720



Total Number of Valid Hours: 720



Maximum Value: 23.3 C on Sep 30 17:00		Maximum Daily Average: 15.5 C on Sep 11		Hours in Service: 720																							
Minimum Value: -2.3 C on Sep 22 06:00		Minimum Daily Average: 4.5 C on Sep 28		Hours of Data: 720																							
Maximum Diurnal Average: 14.4 C at hour 15		Minimum Diurnal Average: 4.7 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 9.16 C		Percentiles: P <sub>1</sub> = -0.8 P <sub>10</sub> = 3.5 Q <sub>1</sub> = 5.5 Median = 8.6 Q <sub>3</sub> = 12.1 P <sub>90</sub> = 16.3 P <sub>99</sub> = 21.8		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	6.2	5.7	6.1	4.8	5.7	8.2	8.2	8.7	9.8	9.9	9.4	9.0	8.8	8.7	9.9	11.9	11.4	10.1	10.4	9.8	8.4	7.1	6.4	5.3	8.3	11.9	
2-Sep	4.9	5.2	3.9	3.3	3.0	3.7	3.8	4.3	5.6	6.1	6.7	7.5	8.9	10.7	11.3	11.5	11.9	12.0	11.9	11.6	11.1	10.7	10.5	10.0	7.9	12.0	
3-Sep	9.4	8.9	8.7	8.6	8.6	8.6	8.4	8.7	8.9	9.1	9.5	10.5	11.1	11.7	11.7	11.8	12.0	11.3	10.7	9.2	8.7	8.6	8.1	7.7	9.6	12.0	
4-Sep	7.6	7.4	7.4	7.5	7.1	6.7	7.2	8.2	8.5	9.9	10.6	11.2	12.0	12.3	12.1	12.1	12.6	12.7	12.1	8.9	6.4	5.1	4.3	3.4	8.9	12.7	
5-Sep	2.5	1.6	2.1	2.2	1.6	2.1	3.3	4.3	5.6	8.5	11.1	13.6	14.0	14.9	15.3	14.8	14.9	14.5	13.9	13.0	9.4	7.2	6.1	5.1	8.4	15.3	
6-Sep	4.4	4.2	3.8	3.9	4.3	4.8	5.5	6.6	7.9	8.5	9.3	10.1	10.8	11.4	11.6	11.6	11.8	11.8	10.9	10.0	9.6	9.0	9.0	8.9	8.3	11.8	
7-Sep	8.6	8.2	8.0	7.8	7.4	7.2	7.5	8.1	8.6	9.6	10.7	10.9	10.9	11.2	11.5	11.7	12.0	11.8	10.9	8.9	6.3	5.5	4.8	4.5	8.9	12.0	
8-Sep	4.1	3.3	2.2	2.0	2.0	1.8	2.0	2.9	4.8	7.4	10.4	13.0	14.6	15.1	15.5	16.1	16.7	16.6	13.3	9.2	7.9	6.6	6.7	7.5	8.4	16.7	
9-Sep	7.7	7.3	6.8	5.3	4.4	3.7	3.8	5.3	6.8	8.4	11.3	13.6	16.1	17.4	17.9	18.0	17.6	14.2	13.1	12.0	9.4	8.3	8.4	8.0	10.2	18.0	
10-Sep	7.1	6.3	6.0	5.6	5.4	5.3	4.9	5.8	8.5	11.9	15.1	17.8	19.4	20.3	20.8	20.2	20.4	19.9	18.8	15.0	12.4	12.5	11.6	10.7	12.6	20.8	
11-Sep	10.3	9.7	8.7	8.6	8.4	8.5	9.3	10.5	12.9	16.3	17.8	19.0	20.4	21.5	21.8	21.6	21.5	20.8	19.3	17.1	15.4	16.8	17.6	17.3	15.5	21.8	
12-Sep	16.6	16.7	16.3	15.6	15.0	15.0	14.0	14.3	15.2	16.4	16.5	17.4	16.7	16.3	16.5	15.5	15.0	15.2	14.3	12.7	11.9	12.2	11.4	9.8	14.9	17.4	
13-Sep	8.5	5.7	5.6	4.9	4.3	2.9	2.9	5.2	8.8	11.1	11.9	13.6	12.8	12.9	13.3	13.1	12.2	9.1	8.6	7.7	7.1	6.9	6.9	6.5	8.4	13.6	
14-Sep	6.5	7.0	7.0	6.9	7.0	7.0	6.9	6.9	7.2	7.6	8.3	8.8	9.4	9.4	9.3	9.2	9.2	9.6	8.1	3.8	2.5	1.0	0.3	-0.6	6.6	9.6	
15-Sep	-1.2	-0.8	0.3	0.5	0.5	0.2	-0.5	0.6	3.6	5.9	7.2	9.5	10.4	11.3	11.6	11.9	12.3	11.8	10.8	9.4	6.0	5.4	5.2	4.6	5.7	12.3	
16-Sep	4.4	4.2	4.2	4.2	4.1	4.0	4.1	5.4	6.1	7.4	9.3	10.3	10.8	11.9	12.0	11.5	11.3	11.6	10.2	6.3	3.5	2.4	1.4	0.8	6.7	12.0	
17-Sep	0.0	0.6	0.4	-0.1	-0.5	-0.8	-0.1	0.2	2.4	5.6	10.2	13.0	14.0	15.1	15.4	15.0	14.3	13.7	11.3	9.4	7.5	6.8	5.9	5.3	6.9	15.4	
18-Sep	5.3	6.0	5.4	5.4	4.9	4.6	4.7	6.3	8.4	11.2	13.0	14.9	16.5	17.3	17.1	17.4	17.3	16.5	14.1	10.2	9.7	7.0	7.0	7.8	10.3	17.4	
19-Sep	7.5	7.1	6.5	6.4	5.8	5.7	6.7	8.2	10.6	13.9	17.0	18.7	19.6	20.9	21.8	19.4	17.4	16.5	14.6	12.5	11.6	10.4	9.6	8.9	12.4	21.8	
20-Sep	8.3	7.8	7.4	6.5	5.6	4.5	4.2	5.4	8.0	10.1	12.1	13.4	14.2	14.6	15.1	15.2	14.5	13.7	11.5	9.6	8.5	8.2	8.6	8.4	9.8	15.2	
21-Sep	7.8	7.6	7.0	6.0	5.3	4.8	4.1	3.8	3.9	4.2	4.7	5.8	6.7	7.4	7.8	7.7	7.0	6.8	6.1	5.6	5.5	5.3	5.0	4.7	5.9	7.8	
22-Sep	3.3	2.0	0.7	-0.7	-1.7	-2.3	-2.1	-0.7	2.8	4.7	6.8	7.9	8.8	9.9	10.6	10.4	10.0	9.5	8.4	7.4	6.3	4.8	4.1	2.0	4.7	10.6	
23-Sep	2.1	3.3	3.2	3.4	3.0	2.3	2.3	2.7	3.6	5.4	7.1	9.3	11.6	13.2	14.0	14.2	14.3	13.7	12.1	11.0	9.8	9.0	8.5	8.1	7.8	14.3	
24-Sep	7.3	6.8	6.6	5.9	5.5	4.9	3.7	4.9	6.0	6.8	9.6	12.9	16.1	18.0	19.3	19.3	18.9	16.9	13.4	12.3	13.6	15.0	14.8	14.1	11.4	19.3	
25-Sep	13.3	12.4	11.6	10.9	9.5	8.6	8.1	9.3	11.6	12.9	13.5	14.1	15.2	15.3	15.5	16.3	15.8	15.5	13.3	11.8	10.4	9.7	8.4	6.9	12.1	16.3	
26-Sep	5.9	5.5	4.9	4.5	4.2	3.8	3.1	3.6	6.3	9.0	10.9	12.6	14.1	14.7	14.7	13.6	13.1	11.9	11.1	10.1	8.3	7.4	6.6	5.8	8.6	14.7	
27-Sep	5.7	5.8	6.4	6.7	6.6	5.5	5.5	6.1	5.3	4.1	4.5	5.1	5.6	5.7	5.3	5.8	5.7	5.4	5.3	4.9	4.3	4.2	4.2	3.0	5.3	6.7	
28-Sep	1.8	0.3	-0.2	-0.8	-1.7	-2.1	-1.6	-0.4	2.0	4.0	5.1	6.8	8.0	9.1	9.8	10.4	9.7	8.7	7.2	7.1	6.9	6.4	5.9	5.5	4.5	10.4	
29-Sep	5.0	4.9	4.7	4.8	4.9	5.0	4.9	5.1	7.4	10.2	12.7	14.7	16.9	18.8	19.4	19.8	19.9	19.2	14.4	10.5	10.7	12.1	11.1	10.1	11.1	19.9	
30-Sep	9.5	8.9	7.9	6.3	4.9	5.5	5.3	6.2	8.8	12.3	16.1	18.8	21.0	22.1	22.9	23.3	23.3	22.5	20.6	19.4	18.0	17.4	16.9	16.1	14.8	23.3	
		6.3	6.0	5.6	5.2	4.8	4.7	4.7	5.6	7.2	8.9	10.6	12.1	13.2	14.0	14.4	14.3	14.1	13.4	12.0	10.2	8.9	8.3	7.8	7.2	Diurnal Average	
		16.6	16.7	16.3	15.6	15.0	15.0	14.0	14.3	15.2	16.4	17.8	19.0	21.0	22.1	22.9	23.3	23.3	22.5	20.6	19.4	18.0	17.4	17.6	17.3	Diurnal Maximum	







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Patricia McInnes - September 2015**

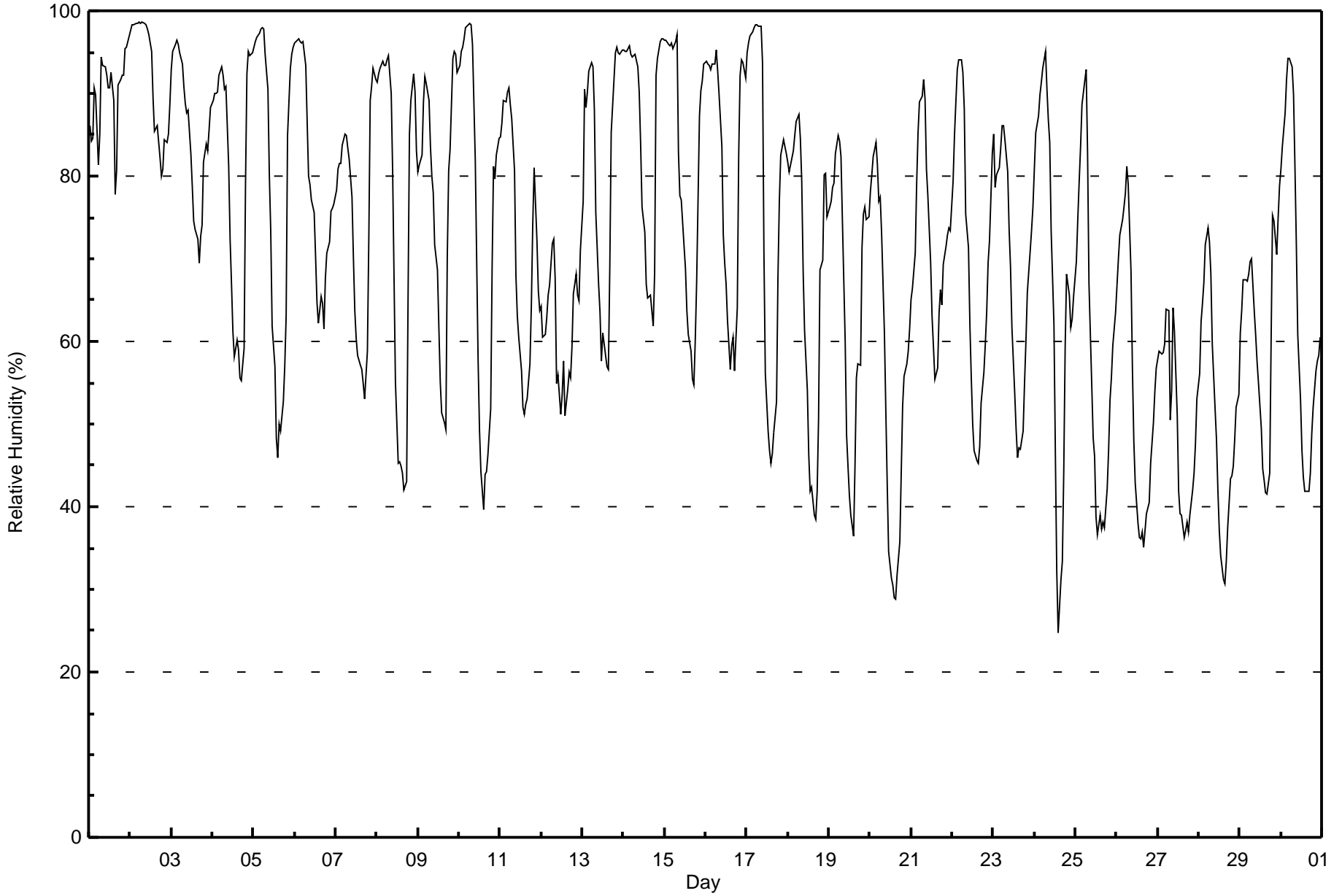
<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	20	2.78	2.78
0 - 10	418	58.06	60.83
10 - 20	263	36.53	97.36
> 20	19	2.64	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 99 % on Sep 2 06:00														Maximum Daily Average: 91.9 % on Sep 2														Hours in Service: 720	
Minimum Value: 25 % on Sep 24 15:00														Minimum Daily Average: 49.8 % on Sep 27														Hours of Data: 720	
Maximum Diurnal Average: 88.4 % at hour 7														Minimum Diurnal Average: 50.2 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 71.8 %														Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 44 Q <sub>1</sub> = 57 Median = 73 Q <sub>3</sub> = 89 P <sub>90</sub> = 95 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-Sep	86	84	85	91	90	81	85	94	93	93	92	91	91	93	89	78	81	91	92	92	92	96	96	97	89.7	97			
2-Sep	98	98	98	98	99	99	99	99	99	98	98	97	95	90	85	86	86	82	80	81	84	84	85	89	91.9	99			
3-Sep	93	95	96	96	96	95	94	91	89	88	88	83	79	75	74	72	69	73	74	82	84	83	86	88	85.0	96			
4-Sep	89	90	90	90	92	93	92	91	91	81	72	67	61	58	60	59	56	55	59	79	92	95	95	95	79.3	95			
5-Sep	96	96	97	97	98	98	98	95	91	80	73	62	57	48	46	50	49	53	57	63	85	93	95	96	78.0	98			
6-Sep	96	96	97	96	96	96	93	87	80	79	77	76	70	65	62	65	65	62	68	71	72	76	76	77	79.0	97			
7-Sep	78	81	82	81	84	85	85	83	82	78	70	64	60	58	57	57	55	53	59	72	89	91	93	92	74.6	93			
8-Sep	91	92	93	94	93	93	94	95	90	81	68	55	45	45	45	44	42	43	65	85	89	92	90	83	75.4	95			
9-Sep	80	81	83	89	92	91	89	84	80	78	72	69	62	55	51	50	49	70	81	83	94	95	95	93	77.7	95			
10-Sep	93	95	96	97	98	98	98	98	96	82	70	58	49	44	40	44	44	46	52	69	81	80	83	85	74.8	98			
11-Sep	85	86	89	89	90	91	89	87	81	68	63	60	56	52	51	52	53	57	64	74	81	72	66	64	71.7	91			
12-Sep	64	61	61	63	66	67	72	72	68	55	56	51	54	58	51	54	56	56	59	66	68	66	65	71	61.6	72			
13-Sep	77	91	88	90	93	94	93	88	76	67	64	58	61	60	57	57	69	85	92	95	96	95	95	95	80.5	96			
14-Sep	95	95	95	96	95	94	95	95	93	90	84	76	73	67	65	65	66	62	68	92	94	96	97	97	85.2	97			
15-Sep	96	96	96	96	96	95	96	97	83	78	77	72	69	64	61	59	55	55	60	67	87	90	92	93	80.5	97			
16-Sep	94	94	93	93	94	94	95	93	90	84	73	69	67	63	57	59	61	56	64	83	92	94	94	92	81.1	95			
17-Sep	95	96	97	98	98	98	98	98	98	94	71	56	49	47	45	46	49	53	68	77	82	84	84	83	77.7	98			
18-Sep	82	80	82	83	85	87	87	85	79	68	61	54	46	42	42	39	39	42	51	69	70	80	80	75	67.0	87			
19-Sep	76	77	79	79	83	85	84	82	75	60	49	45	41	39	36	45	56	57	57	71	75	76	75	75	65.8	85			
20-Sep	78	80	82	84	81	77	77	73	61	52	43	35	31	30	29	29	32	36	44	52	56	57	59	61	55.8	84			
21-Sep	65	66	71	79	85	89	90	92	89	81	78	69	63	59	55	57	63	66	64	69	71	73	74	73	72.7	92			
22-Sep	79	85	89	93	94	94	92	88	75	71	62	56	50	47	46	45	47	52	56	60	63	69	72	83	69.6	94			
23-Sep	85	79	80	81	83	86	86	84	81	74	69	62	54	49	46	47	47	49	55	60	66	71	73	76	68.5	86			
24-Sep	81	85	87	90	91	93	95	91	87	84	73	62	47	32	25	31	33	44	59	68	66	62	63	65	67.3	95			
25-Sep	70	75	79	84	89	91	93	83	67	55	48	46	39	37	39	37	38	37	42	47	53	56	60	64	59.4	93			
26-Sep	67	70	73	75	76	78	81	79	68	57	48	43	38	36	36	37	35	39	40	40	45	50	54	57	55.1	81			
27-Sep	58	59	58	59	60	64	64	51	54	64	61	51	42	39	39	36	37	38	37	39	42	44	48	53	49.8	64			
28-Sep	56	62	65	67	72	74	72	68	60	52	48	42	37	34	31	31	33	38	43	44	45	48	52	53	51.1	74			
29-Sep	61	64	68	67	67	68	70	70	64	61	57	55	49	45	43	42	42	44	60	75	75	71	75	79	61.3	79			
30-Sep	81	83	88	92	94	94	93	90	81	72	61	53	47	44	42	42	42	44	49	52	56	58	58	60	65.7	94			
	81.5	83.2	84.5	86.2	87.6	88.1	88.4	86.0	80.6	74.1	67.5	61.2	56.1	52.4	50.2	50.5	51.6	54.7	60.7	69.3	74.9	76.6	77.5	78.8	Diurnal Average				
	98	98	98	98	99	99	99	99	99	98	98	97	95	93	89	86	86	91	92	95	96	96	97	97	Diurnal Maximum				





Maximum Speed: 33 km/h on Sep 27 09:00	Maximum Daily Speed Average: 15.9 km/h on Sep 26	Hours in Service: 720
Minimum Speed Value: 1 km/h on Sep 4 20:00	Minimum Daily Speed Average: 0.4 km/h on Sep 8	Hours of Data: 720
Maximum Diurnal Speed Average: 7.0 km/h at hour 15	Minimum Diurnal Speed Average: 2.6 km/h at hour 19	Hours of Missing Data: 0
Monthly Average Velocity: 4.2 km/h 249.9 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 13 P <sub>90</sub> = 17 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-Sep	SW3	SSW5	S3	SSW3	S3	SE6	SE3	ENE4	NNE10	N12	NNW15	NNW20	NW17	WNW14	W12	W11	W11	WSW10	SW7	WSW10	WSW4	SW5	SW7	S3	WNW4.3	NNW20
2-Sep	SSE4	SSW5	SW3	SSW4	SW2	ESE3	SW2	NW4	N8	N9	NNW8	N8	N12	N16	N15	N15	N18	N15	N12	N16	N18	N18	N17	NNW12	N8.4	N18
3-Sep	NNW9	NNW12	NW10	WNW11	WNW13	WNW14	WNW12	NW16	WNW13	W14	W17	WNW21	WNW23	WNW22	WNW20	WNW19	WNW19	WNW14	WNW15	WNW12	WNW13	WNW13	W13	W11	WNW14.4	WNW23
4-Sep	W11	W11	W10	W9	WSW8	W7	WNW4	NW8	NW8	N8	N10	NNW9	N5	NW10	NNW12	NNW10	N7	NE7	E6	SSE1	WSW3	WSW2	SW2	S3	NW4.8	NNW12
5-Sep	WSW1	SSW2	S2	S3	NSW2	SSW2	SSE1	SE5	SE5	E5	ESE5	ESE5	E8	ESE10	ESE10	ESE8	ESE8	SE7	ESE6	ESE4	WNW3	WNW4	NW4	NW5	ESE3.0	ESE10
6-Sep	NW4	NW4	NNW4	N4	NNW2	NNW2	NW5	N6	N7	NNW8	NNW10	NNW11	NNW13	N13	N13	NNW11	NNW10	N10	N8	NNW8	NNW8	NW8	NW8	NNW10	NNW7.6	N13
7-Sep	NW10	NW7	NW8	NW7	NW7	NW7	NW7	NNW9	NNW11	NNW12	N11	N13	NNE13	N14	NNW13	N13	N11	NNE12	NE9	NNW4	WNW4	W3	WNW4	W4	NNW7.9	N14
8-Sep	W4	S2	SSW2	SW5	SW3	SSW3	SSW4	SW8	SW7	S4	ESE3	ENE4	NNE4	NNE8	NE9	NNE8	N5	N5	NW5	W3	WSW2	ESE2	S2	SSW4	W0.4	NE9
9-Sep	SE4	S4	S5	S6	S7	SSW6	SSW7	S7	SSW7	SSW6	SSW8	SSE7	S14	SSW14	SSW15	SW16	WSW9	N9	S4	SSW4	S3	SW5	S5	SW8	SSW6.3	SW16
10-Sep	S6	S7	S7	SSE6	S5	SSW6	SSW6	SSW7	SSW9	SSW11	SSW11	SW12	SW15	SW14	SW15	SW13	SW13	SW11	SSW7	SSW5	SW6	SW8	SW8	SW9	SSW8.6	SW15
11-Sep	SW10	SSW7	S7	S9	S9	SSW9	SSW8	SSW6	SSW8	SW15	SW16	SW18	SW17	SW22	SW21	SW17	SW14	SSW9	SSW5	SW6	SW6	SW11	WSW14	WSW14	SW11.1	SW22
12-Sep	WSW14	WSW18	WSW19	WSW18	WSW16	W11	SW6	SW7	W8	WNW8	WSW6	W8	W8	WSW10	W16	W18	WSW20	W17	WSW15	WSW13	WSW15	WNW13	NNW11	NNW10	W11.8	WSW20
13-Sep	WNW4	WSW3	NW8	WNW4	NW5	SSW2	SW4	S5	SE2	NE3	NNE8	NNE7	NNE8	NNE9	N5	N3	W4	W10	S3	W6	W5	SW4	WNW2	NW5	NW2.3	W10
14-Sep	NNW6	NNW8	NNW9	NNW9	NNW11	NNW11	NNW10	NNW10	N11	N13	N15	N16	NNW18	N15	N10	N11	N10	ENE7	NNE4	NW4	W3	WNW4	WNW3	WNW3	N8.5	NNW18
15-Sep	WNW4	NW2	WNW1	NW3	NNW2	N2	NNW4	NNE3	ESE4	ESE5	ESE7	ESE12	ESE12	ESE10	ESE10	E8	E9	ESE11	ESE8	ESE5	NW2	N2	NW3	NW4	E3.3	ESE14
16-Sep	NW4	NW3	NW4	WNW1	WSW2	WSW2	ESE1	ESE3	SW2	S2	NNE1	E6	SE6	SSE8	SSE5	E10	SE7	SSE8	SSE7	S3	SW3	S2	S3	S3	SSE2.2	E10
17-Sep	SSW4	SSW5	S6	S7	S7	S6	S5	S5	S6	S8	S8	S13	S13	SSW11	SSW12	W5	SSE6	SSE7	S9	SSW6	S5	S6	SSW7	SW8	S6.8	S13
18-Sep	SW10	SW10	SW13	SW12	SW11	SW9	SSW6	SW10	SW12	WSW17	WSW18	WSW18	WSW18	W17	WSW20	W19	WSW20	WSW16	SW6	SSE5	S6	SSE4	SSW8	SSW9	SW11.4	WSW20
19-Sep	SSW7	S7	S7	S7	S6	SSE5	S6	SSE5	S7	SSW11	SW16	SW22	WSW27	WSW25	SW28	W28	W18	W22	WSW17	SW18	SW13	SW14	WSW17	WSW16	SW12.9	SW28
20-Sep	WSW15	WSW14	WSW17	WSW15	WSW14	SW12	WSW13	SW11	SW14	SSW13	SW17	WSW25	WSW29	WSW27	W23	W23	WNW16	WNW13	WNW9	WNW6	WNW9	NW9	NW9	NW10	WSW13.5	WSW29
21-Sep	WNW11	W11	WNW14	WNW13	WNW12	WNW11	WNW16	NW16	NNW16	NNW17	NW14	NW16	NW16	NW13	NNW16	NNW13	NW7	WNW10	WNW12	WNW11	WNW12	WNW11	WNW12	WNW10	NW12.3	NNW17
22-Sep	WNW9	WNW9	W5	SW4	SSW1	SW5	SW6	SW4	SE2	SE5	ESE6	ESE7	ESE9	ESE9	SE7	SSE7	SSW2	ESE6	ESE8	ESE5	SE6	SE7	SE5	SSE2	SSE2.9	WNW9
23-Sep	ESE3	ESE5	ESE9	ESE10	SE10	ESE11	ESE15	ESE16	ESE17	ESE18	ESE17	ESE13	E11	E10	E16	ESE17	ESE17	ESE17	ESE16	SE12	ESE10	ESE13	SE10	SE8	ESE12.4	ESE18
24-Sep	SE7	ESE9	SE11	SE9	SE11	SE7	SSE5	SSE8	SSE8	SSW8	S5	SSE8	S9	S10	SSW6	E7	ENE6	NNE4	NE2	ESE3	SE7	SE9	SE11	SE6	SE6.1	SE11
25-Sep	SE9	SE8	SSE9	SE10	SSE4	SSW5	SSW6	WSW13	W15	WNW22	W15	WSW13	W21	WSW21	WSW20	WSW18	WSW16	WSW13	WSW12	WSW13	SW12	WSW11	SW9	SW9	WSW10.0	WNW22
26-Sep	SW12	SW14	SW13	SW15	WSW14	SW12	SW9	SW10	SW13	SW12	WSW17	SW19	WSW22	WSW25	SW28	WSW27	WSW27	WSW18	WSW17	WSW15	WSW13	WSW14	SW11	SW11	WSW15.9	SW28
27-Sep	SSW11	SSW12	SW13	SW13	WSW12	SW11	WSW16	W29	WNW33	NW23	WNW22	WNW27	WNW29	NW31	NW27	WNW24	WNW19	W12	W12	W11	W10	WNW11	NW11	WNW11	W15.7	WNW33
28-Sep	WNW10	WNW6	W12	W12	WSW11	W10	W11	WNW10	NW8	NW4	NW6	W4	W8	WSW9	WSW10	WSW10	SW7	S5	SSE6	SE7	SE6	SE9	SE9	SE11	WSW4.6	W12
29-Sep	SE11	SE12	SE10	SE12	SE11	SE9	SE7	SE6	SE8	S9	SW13	SSW11	SW9	WSW8	SW8	S8	SSW8	SSE6	SSE4	SSW3	SSW6	SSW9	SW9	SSW8	S6.5	SW13
30-Sep	SW8	SSW8	S6	S5	S5	SSE6	SSE6	S6	SSE8	S9	S12	SSW17	SSW19	SSW18	SSW17	SSW19	S16	S11	S8	S8	S9	SSW9	SSW8	SSW8	S9.9	SSW19

WSW4.0	SW4.1	SW4.4	SW4.3	SW3.8	SW3.7	SW3.6	WSW3.5	WSW3.2	W3.2	W4.1	W5.1	W6.6	W6.7	WSW7.0	W6.4	W5.6	W3.4	SW2.6	WSW3.5	WSW3.7	WSW3.7	WSW3.8	WSW4.2	Diurnal Average	
WSW15	WSW18	WSW19	WSW18	WSW16	WNW14	WNW16	W29	WNW33	NW23	WNW22	WNW27	WNW29	NW31	SW28	W28	WSW27	W22	WSW17	SW18	N18	N18	WSW17	WSW16	Diurnal Maximum	

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

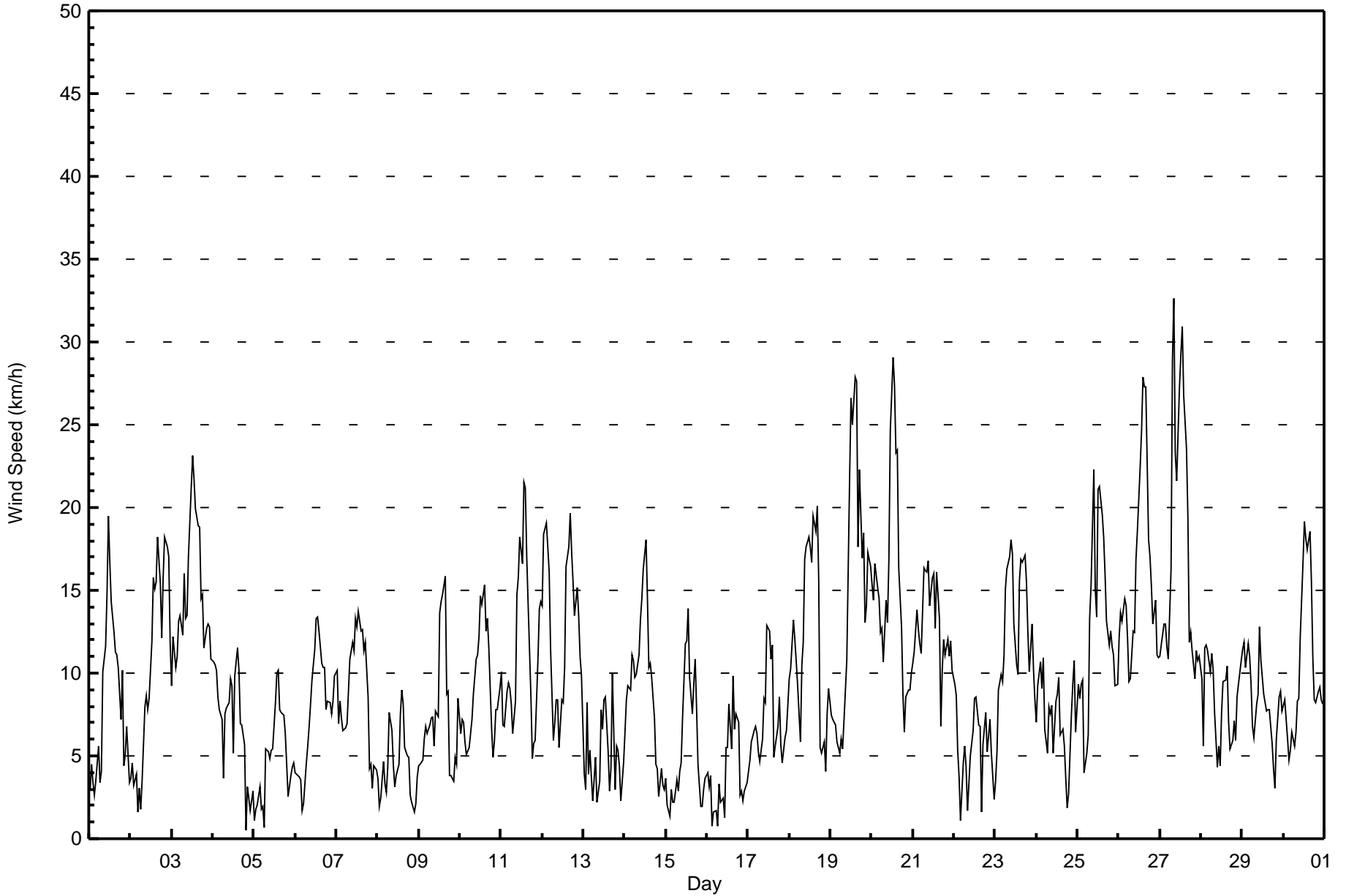
Wind Speed (WS) - km/h

Patricia McInnes - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 10 km/h on Sep 19 18:00			Hours of Data:	720
Minimum Value: 0 km/h on Sep 15 04:00			Hours of Missing Data:	0
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 P <sub>99</sub> = 7			Hours of Calibration:	0
			Percent Operational Time:	100.0

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

Diurnal Maximum





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Patricia McInnes - September 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	176	24.44	24.44
6 - 11	316	43.89	68.33
12 - 19	189	26.25	94.58
20 - 28	34	4.72	99.31
29 - 38	5	0.69	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Patricia McInnes - September 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	5	2	2	1	15	8	12	29	20	16	9	10	14	19	6	176
6 - 11	17	7	3	2	9	20	34	17	36	39	37	12	20	18	22	23	316
12 - 19	21	2	0	0	1	14	3	0	5	10	34	41	16	23	7	12	189
20 - 28	0	0	0	0	0	0	0	0	0	0	5	13	5	8	2	1	34
29 - 38	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	0	5
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	46	14	5	4	11	49	45	29	70	69	92	76	52	65	51	42	720

Total Number of Valid Hours: 720

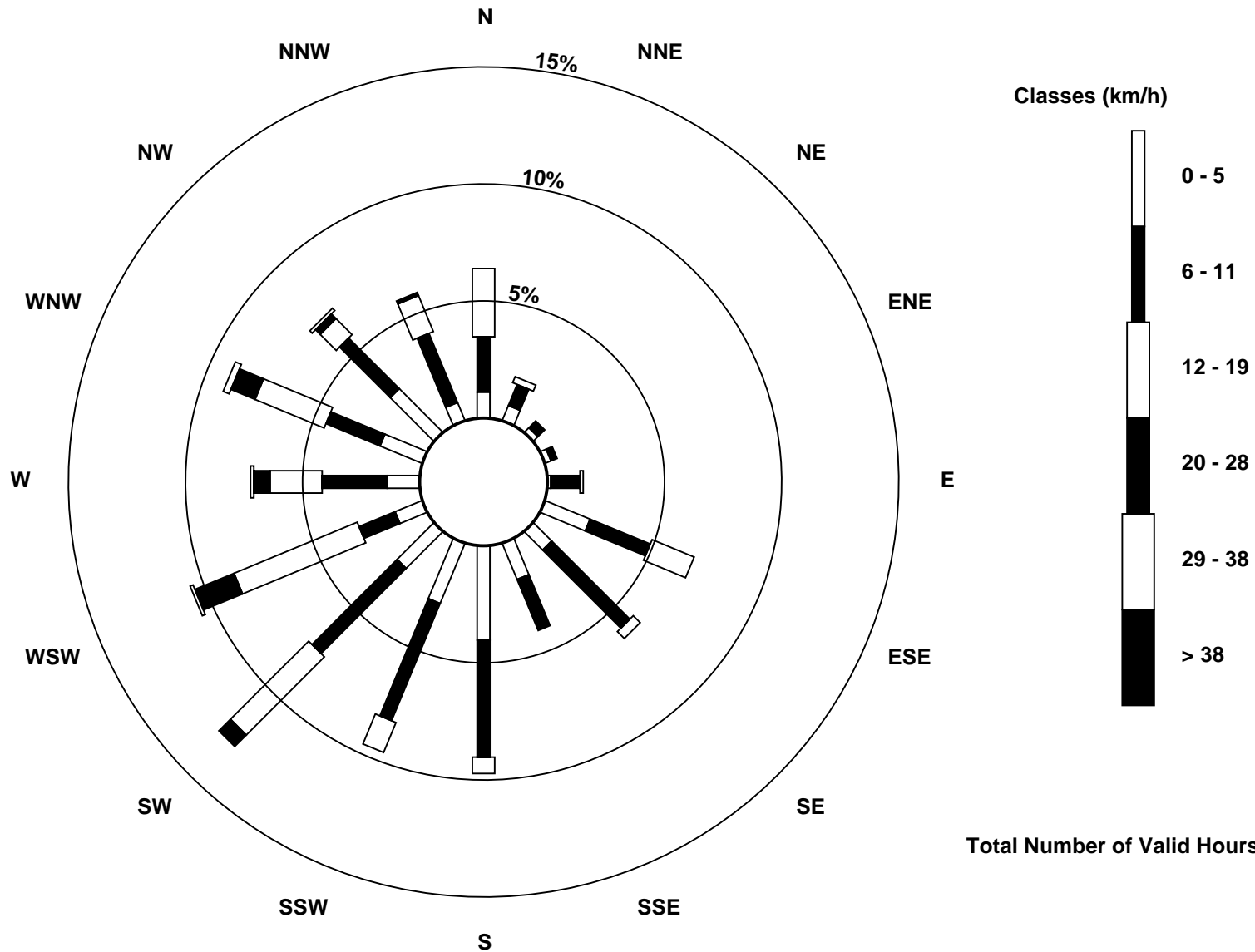
Total Number of Hours: 720





Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Wind Speed (WS) - km/h  
Patricia McInnes (AMS 6)





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Patricia McInnes - September 2015**

Direction of Maximum Speed: 290 deg on Sep 27 09:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 238.4 deg on Sep 26		Hours of Data:	720
Direction of Minimum Speed: 160 deg on Sep 4 20:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 0.4 deg on Sep 8		Percent Operational Time:	100.0
Monthly Average Direction: 256.8 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	230	197	190	194	171	133	130	66	25	352	331	344	318	298	280	271	266	251	229	247	239	226	231	190	285.4
2-Sep	162	213	224	205	225	120	234	323	4	1	346	355	8	9	5	0	350	359	4	6	4	360	349	343	357.2
3-Sep	329	335	309	302	302	293	292	307	282	275	276	289	290	292	290	298	291	284	284	282	286	285	278	269	291.5
4-Sep	270	270	268	266	257	281	282	309	317	353	350	337	4	315	342	333	4	42	79	160	253	249	230	190	311.0
5-Sep	245	208	170	183	237	200	150	125	129	84	112	104	98	112	117	122	108	134	120	117	298	293	315	312	120.7
6-Sep	310	307	328	355	337	340	321	349	354	341	345	335	335	355	349	334	338	359	351	341	336	318	324	327	338.9
7-Sep	323	321	316	322	322	317	325	330	332	343	357	3	14	356	347	356	11	17	38	347	296	271	290	259	343.7
8-Sep	259	188	203	230	221	194	207	224	221	175	109	67	32	28	38	22	6	350	317	268	247	107	171	213	277.1
9-Sep	134	178	181	186	185	196	195	189	193	197	192	168	186	199	197	217	254	1	180	193	187	227	191	226	197.7
10-Sep	181	179	176	155	180	194	205	207	197	192	201	219	222	225	224	229	223	223	203	212	222	222	216	219	209.7
11-Sep	224	210	183	186	179	207	207	202	210	228	228	229	229	232	228	227	230	201	207	233	216	227	240	238	221.4
12-Sep	237	244	247	253	258	266	224	214	266	290	251	266	268	257	261	260	258	262	252	255	258	303	325	335	261.2
13-Sep	301	247	309	295	307	212	221	191	124	56	32	17	21	22	6	356	277	259	169	281	278	229	291	320	313.4
14-Sep	331	347	339	330	346	345	345	347	354	3	356	353	346	359	6	0	3	66	30	315	266	299	292	290	350.0
15-Sep	295	316	300	310	327	350	331	17	102	109	121	120	122	118	119	101	94	104	103	316	11	313	305	100.8	
16-Sep	314	306	304	296	243	248	122	112	224	186	14	84	143	157	163	87	142	152	155	179	221	170	171	177	153.3
17-Sep	195	194	186	171	181	183	182	190	180	177	173	173	190	193	208	279	167	165	183	201	189	190	201	216	188.2
18-Sep	227	220	228	223	221	218	207	222	233	240	243	245	247	263	249	260	249	248	227	168	178	167	213	207	234.7
19-Sep	198	190	177	178	171	159	175	159	179	198	218	231	243	246	234	264	263	265	247	229	217	228	242	243	231.3
20-Sep	239	244	241	241	248	235	237	230	221	192	227	248	248	250	260	277	286	296	299	297	288	311	313	309	255.1
21-Sep	295	278	282	283	289	291	299	317	333	327	322	313	310	319	328	345	324	300	294	294	298	287	285	292	305.7
22-Sep	292	283	264	233	206	215	222	215	135	128	118	110	107	121	145	162	213	116	107	105	125	133	135	163	150.0
23-Sep	113	112	119	117	125	122	119	121	122	122	114	109	99	100	101	104	105	110	113	125	120	123	129	128	115.2
24-Sep	133	122	132	133	125	142	165	153	153	195	189	153	188	179	197	95	72	25	52	118	136	129	124	127	141.6
25-Sep	126	144	148	138	155	206	211	246	276	291	281	253	261	241	246	250	251	246	240	238	234	240	223	227	241.5
26-Sep	231	236	232	235	237	232	216	219	222	218	241	236	238	242	233	243	255	252	256	254	244	242	235	224	238.4
27-Sep	213	212	221	227	237	222	247	276	290	309	300	297	295	306	304	291	284	275	272	262	260	286	320	303	280.4
28-Sep	292	287	273	265	258	264	278	297	306	311	309	272	275	256	243	251	227	187	165	146	139	131	125	130	251.9
29-Sep	130	131	127	129	129	134	137	136	145	183	214	205	230	241	228	190	202	164	160	198	205	212	216	211	175.0
30-Sep	214	209	190	189	172	160	161	174	159	173	180	206	202	206	206	199	184	178	175	182	178	193	197	193	190.5

241.6 232.4 233.0 226.8 230.9 225.4 231.7 245.4 256.3 261.1 260.6 263.1 262.1 262.1 256.6 269.0 266.6 260.7 235.3 244.0 244.9 245.3 250.3 247.2

Diurnal Average

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

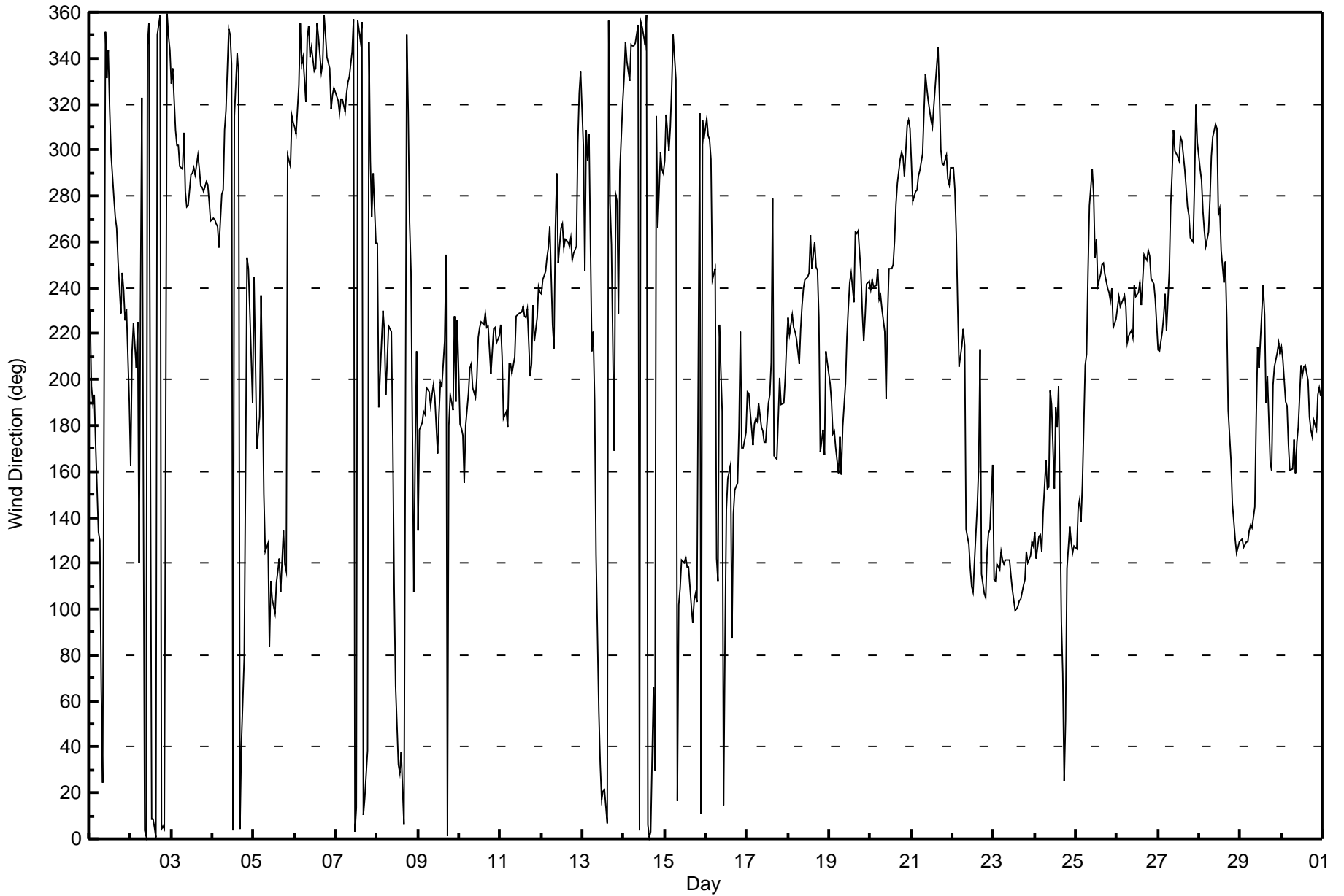
Wind Direction (WD) - deg

Patricia McInnes - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 102 deg on Sep 5 07:00			Hours of Data:	720
Minimum Value: 7 deg on Sep 18 23:00			Hours of Missing Data:	0
Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 10 Q <sub>1</sub> = 12 Median = 16 Q <sub>3</sub> = 24 P <sub>90</sub> = 42 P <sub>99</sub> = 84			Hours of Calibration:	0
			Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	39	16	24	53	45	60	74	56	24	24	20	14	41	32	15	20	24	20	23	14	40	18	10	61	74
2-Sep	40	43	43	38	67	39	72	29	13	19	14	14	13	14	14	13	14	15	14	15	14	14	14	14	72
3-Sep	10	9	13	9	9	11	15	13	17	13	14	14	14	13	14	16	14	15	14	12	12	11	11	11	17
4-Sep	9	11	11	15	18	13	85	15	18	29	25	24	57	19	15	16	31	20	14	89	18	50	69	36	89
5-Sep	56	63	51	21	65	56	102	26	20	26	26	33	23	24	29	25	20	18	13	19	45	20	12	8	102
6-Sep	25	7	35	18	85	46	17	30	19	13	13	12	10	20	21	11	9	15	13	10	13	8	8	9	85
7-Sep	9	11	13	15	10	11	10	13	11	14	20	17	16	17	24	23	21	16	15	33	7	14	8	10	33
8-Sep	10	58	28	14	25	35	20	15	15	29	58	67	80	40	26	31	37	26	10	37	59	68	60	21	80
9-Sep	29	27	14	14	12	13	16	16	17	19	19	20	21	22	20	20	65	47	60	30	35	11	23	13	65
10-Sep	18	10	18	11	16	16	16	17	17	16	20	20	22	24	20	20	17	16	15	13	9	7	8	10	24
11-Sep	8	14	14	12	10	17	19	18	20	19	14	16	16	14	12	13	13	16	17	12	11	9	10	10	20
12-Sep	10	10	10	10	10	16	17	24	13	16	16	15	10	12	13	12	11	11	9	10	12	17	12	7	24
13-Sep	57	20	26	22	43	58	24	26	62	53	27	46	24	25	36	48	33	32	35	23	19	30	45	15	62
14-Sep	17	14	11	13	13	12	13	15	14	15	16	17	15	20	25	19	25	26	38	9	45	14	22	48	48
15-Sep	31	19	35	11	25	36	13	37	37	35	27	21	21	20	27	24	22	15	13	49	28	47	16	8	49
16-Sep	11	13	33	85	59	67	91	34	44	31	84	32	42	35	51	21	19	18	14	53	29	46	34	23	91
17-Sep	21	13	13	14	12	11	16	20	19	17	26	25	26	29	23	74	54	23	16	15	16	10	10	10	74
18-Sep	8	11	9	10	9	10	19	15	13	16	17	19	26	21	17	17	18	13	21	13	18	20	7	11	26
19-Sep	12	11	18	12	10	16	11	16	24	18	18	18	15	16	14	25	14	14	24	16	15	12	10	10	25
20-Sep	10	10	10	10	11	11	11	20	15	16	22	16	16	21	20	17	15	13	8	9	11	10	12	14	22
21-Sep	12	13	11	11	13	11	10	18	12	12	17	15	17	24	12	16	34	18	11	10	11	11	10	10	34
22-Sep	7	11	28	29	96	62	16	28	75	28	40	40	33	44	41	42	79	15	11	14	18	30	19	35	96
23-Sep	33	15	15	16	18	16	13	12	12	14	14	17	17	17	15	15	14	12	14	13	11	13	14	14	33
24-Sep	11	14	13	14	12	25	19	13	20	19	44	27	26	22	60	22	23	24	29	35	15	10	12	12	60
25-Sep	12	13	12	15	32	16	24	13	13	14	17	14	19	16	15	17	13	12	9	10	10	11	14	9	32
26-Sep	8	8	8	8	9	9	13	11	12	18	16	17	17	22	17	21	13	13	12	13	10	11	10	9	22
27-Sep	13	12	11	11	12	16	18	15	16	15	15	16	18	14	14	15	14	13	11	10	13	16	13	12	18
28-Sep	10	19	9	10	8	8	12	9	19	61	51	70	47	43	36	28	25	15	13	12	17	12	13	14	70
29-Sep	13	14	13	14	14	14	13	15	14	24	16	19	30	48	42	36	26	14	9	26	12	8	8	10	48
30-Sep	9	10	14	15	14	10	13	18	12	16	17	16	18	20	18	17	15	13	11	10	10	15	14	12	20

	57	63	51	85	96	67	102	56	75	61	84	70	80	48	60	74	79	47	60	89	59	68	69	61	
	Diurnal Maximum																								





# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	September 22, 2015	Last Calibration	August 12, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	14:45
Gas Cert Reference	EY0000355	Station temp.	21 Deg C
Cal Gas Concentration	49.8 ppm	Cal Gas Exp Date	18/09/2018
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG Make/Model	API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-678	-678
Analyzer IP address	192.168.1.43		Lamp voltage	762	760
Calculated slope	1.028492	0.998170	Chamber temp	44.9	45.3
Calculated intercept	0.082279	0.676652	Pressure	691.9	699.7
Analyzer Background	5.3	5.8	Flow	0.441	0.448
Analyzer Coefficient	0.999	1.095	Intensity	90	92

Analyzer make Termo 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	6000	0.0	0.0	0.4	----
as found span	6000	94.7	786.0	716.0	1.098
calibrator zero	6000	0.0	0.0	0.7	----
high point	6000	94.7	786.0	787.1	0.999
second point	6000	47.3	392.6	393.0	0.999
third point	6000	23.7	196.7	194.3	1.012
as left zero	6000	0.0	0.0	0.8	----
as left span	6000	94.7	786.0	777.1	1.012
Average Correction Factor					1.003

Corrected As found 715.6 Previous response 764.2 % change 6.8%

**Notes:**

Inlet filter changed after as founds. New cal cylinder installed. Span adjusted.

Calibration Performed By: Devin Russell



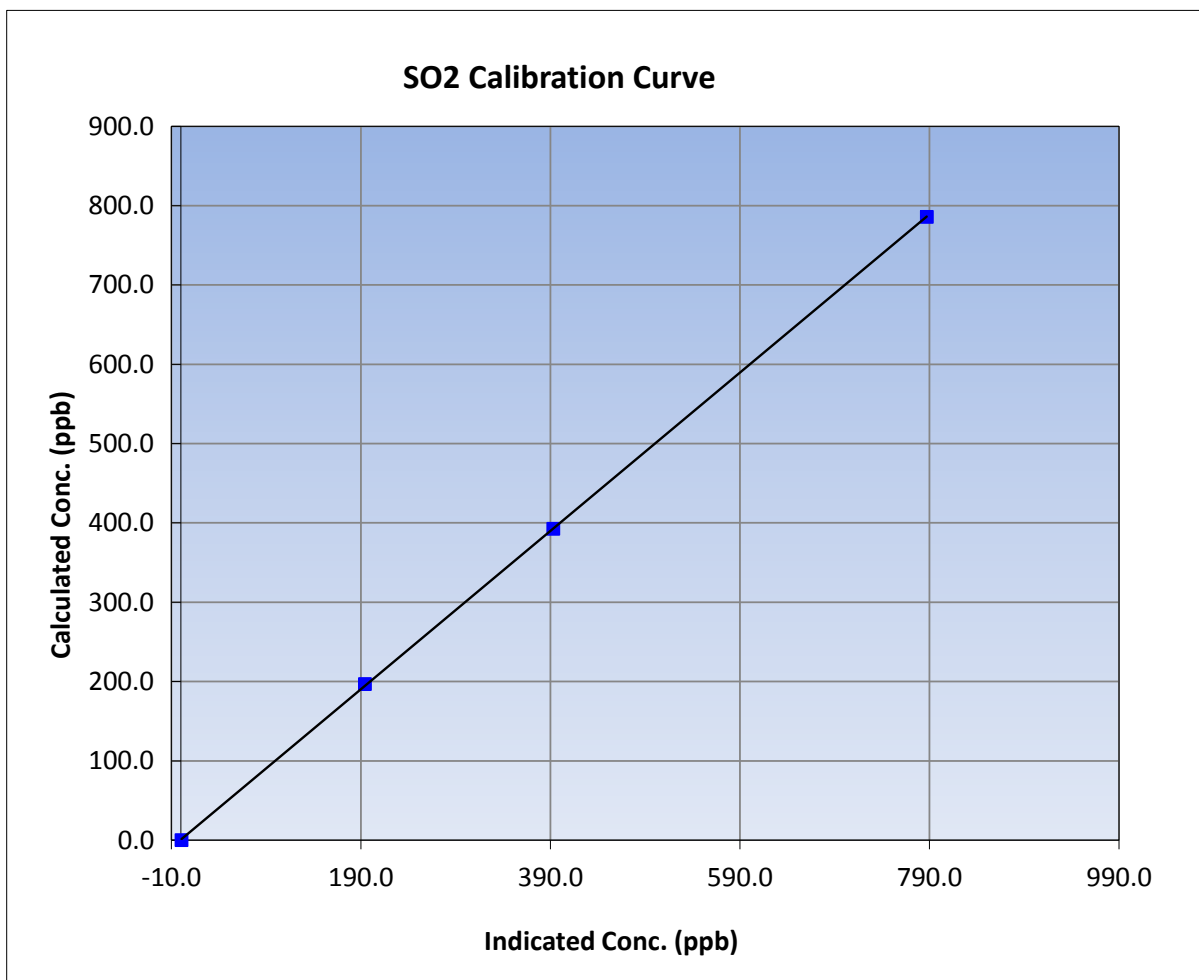
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 22, 2015	Previous Calibration	August 12, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	Termo 43i	Analyzer serial #	1008841397

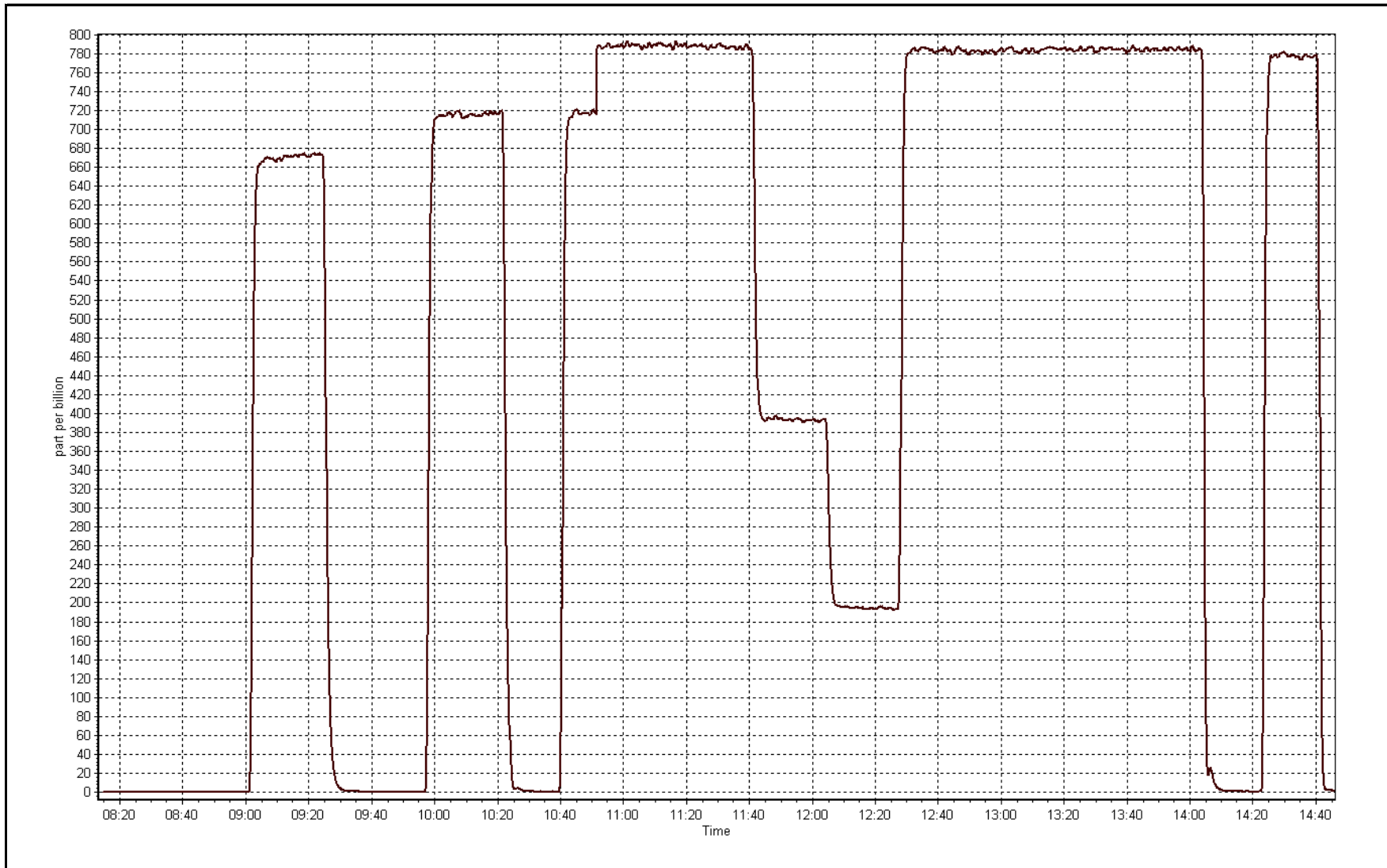
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.7	----	Correlation Coefficient	0.999981
786.0	787.1	0.9986		
392.6	393.0	0.9989	Slope	0.998170
196.7	194.3	1.0123		
			Intercept	0.676652



SO2 Calibration Plot

Date: September 22, 2015





# Wood Buffalo Environmental Association TRS Calibration Report

W B E A

### Station Information

Calibration Date	September 21, 2015	Last Calibration	August 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	14:50
Gas Cert Reference	SA5551	Station temp.	22 Deg C
Cal Gas Concentration	5.28 ppm	Cal Gas Exp Date	13/02/2018
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
Dil air Make/Model	API T701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036
SO2 gas concentration	47 ppm	SO2 gas cert/exp	SA130110A December-12-16

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-720	-720
Analyzer IP address	192.168.1.42		Lamp voltage	985	988
Calculated slope	0.985207	1.001386	Chamber temp	45	45
Calculated intercept	-0.029556	-0.096709	Pressure	683.3	693.6
Analyzer Background	2.57	2.29	Flow	0.433	0.438
Analyzer Coefficient	1.409	1.273	Intensity	90	90
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1218153358
Converter make/model	CDN-101	Converter serial #	520

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	79.5	70.0	79.3	0.883
SO2 scrubber check	6000	22.1	173.1	4.0	----
calibrator zero	6000	0.0	0.0	0.4	----
high point	6000	79.5	70.0	70.0	0.999
second point	6000	39.8	35.0	35.2	0.995
third point	6000	20.5	18.0	17.6	1.023
as left zero	6000	0.0	0.0	0.4	----
as left span	6000	79.5	70.0	63.0	1.110
Average Correction Factor					1.006

Corrected As found      79.2      Previous response      71.0      % change      -10.3%

**Notes:**

Filter changed after as founds. Scrubber check completed after as founds; new H2S calibration cylinder installed. Span adjusted.

Calibration Performed By: \_\_\_\_\_ Devin Russell





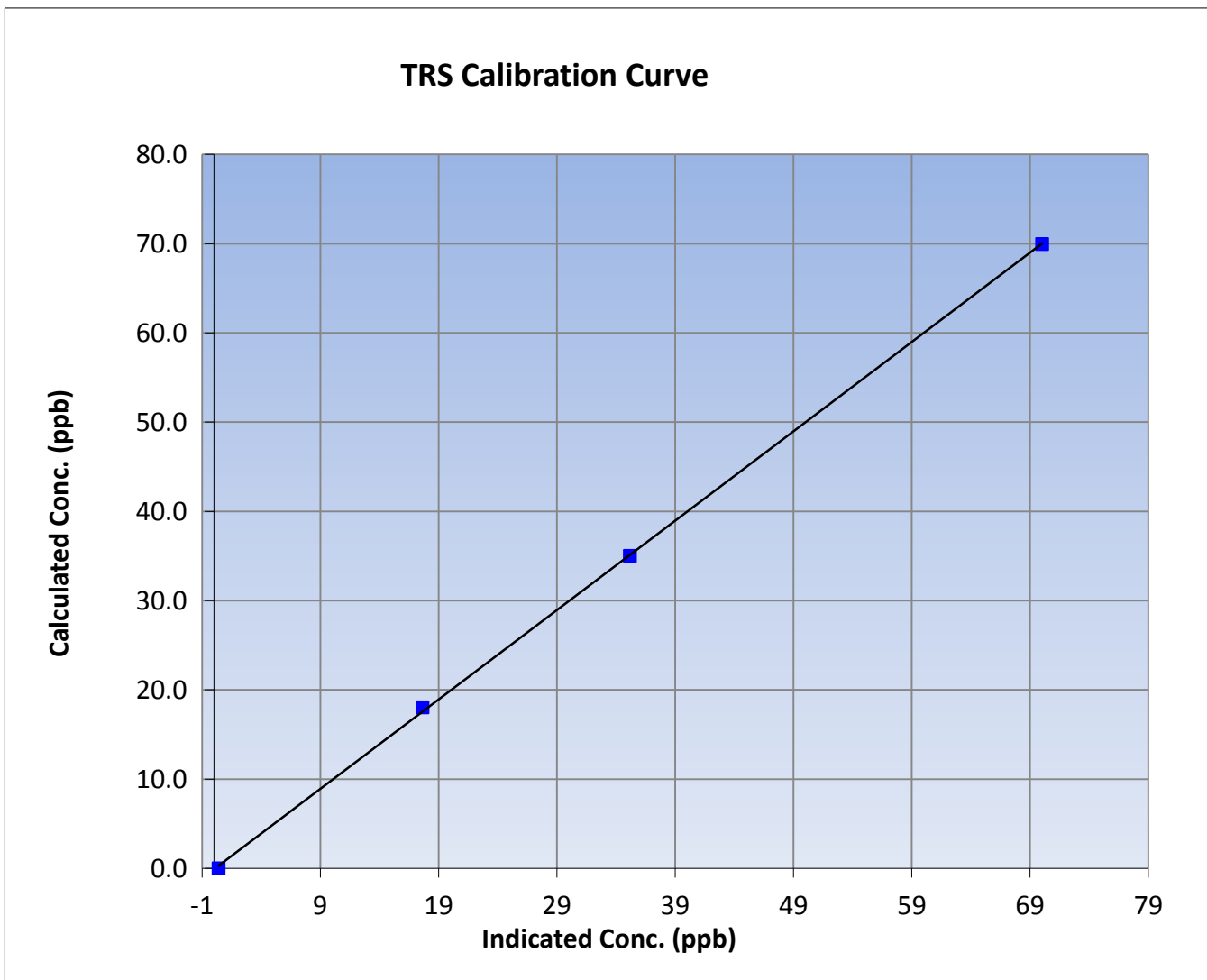
# Wood Buffalo Environmental Association TRS Calibration Report

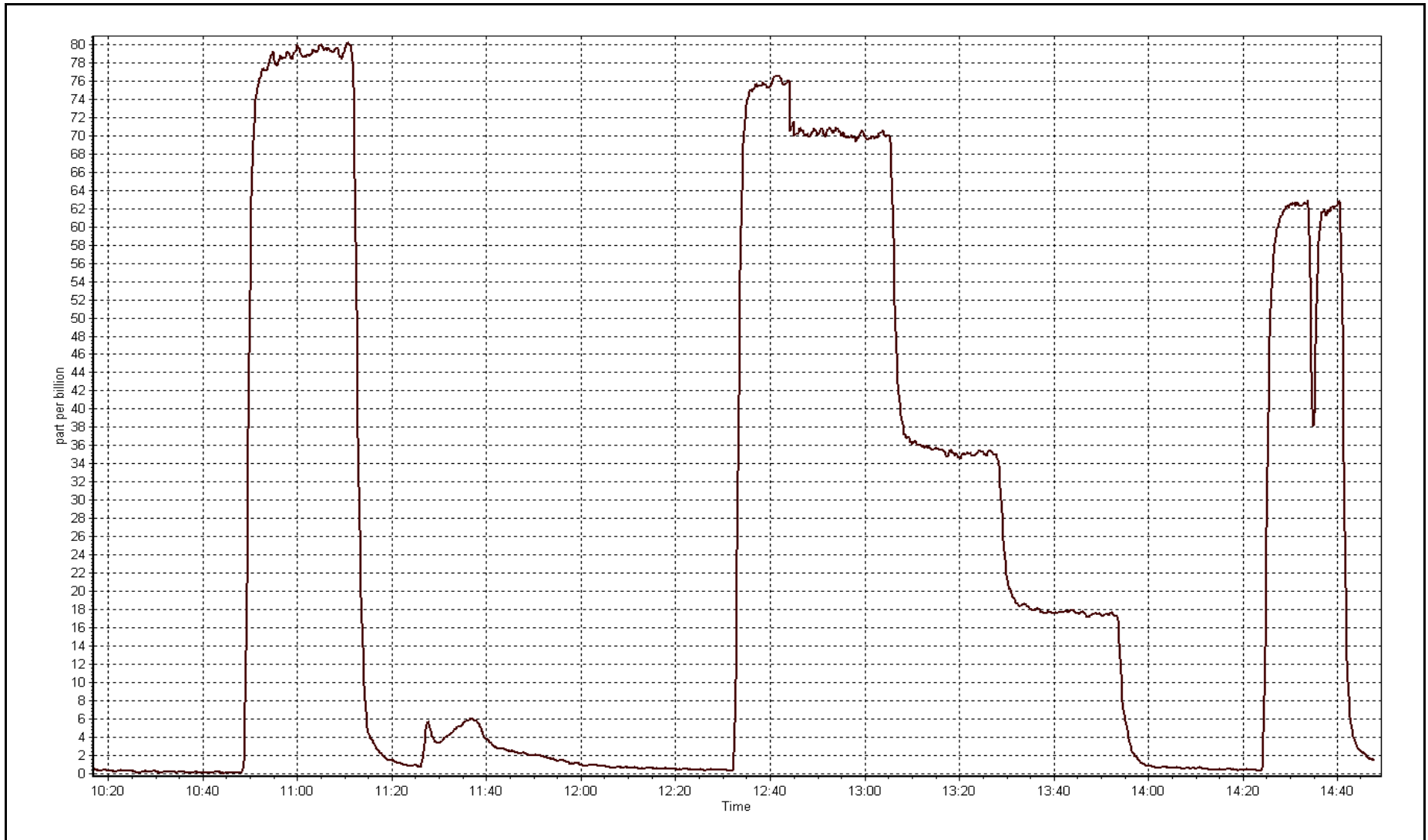
## Station Information

Calibration Date	September 21, 2015	Previous Calibration	August 7, 2015
Station Name	AMS 6	Station Number	AMS 6
Start Time (MST)	10:25	End Time (MST)	14:50
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999871
70.0	70.0	0.9991		
35.0	35.2	0.9953	Slope	1.001386
18.0	17.6	1.0233		
			Intercept	-0.096709







# Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	September-22-15	Last Calibration	August-12-15
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	14:45
Gas Cert Reference	EY0000355	Cal Gas Expiry Date	September-18-18
CH4 Cal Gas Conc.	518.0 ppm	CH4 Equiv Conc.	1068.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	14300410
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.3
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	1.019433	0.995849	Carrier Pressure	34.5	34.5
THC Calc intercept	0.000000	0.054157	Fuel Pressure	42.3	42.3
NMHC Calc slope	1.025201	0.995294	Air Pressure	32.4	32.4
NMHC Calc intercept	0.000000	0.030105			

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	6000	0.0	0.00	0.00	----
as found span	6000	94.7	16.86	16.49	1.022
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	94.7	16.86	16.89	0.998
second point	6000	47.3	8.42	8.40	1.002
third point	6000	23.7	4.22	4.11	1.026
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	94.7	16.86	16.89	0.998
Average Correction Factor					1.009

Corrected As found 16.49 Previous response 16.54 % change 0.3%

**Notes:**

Inlter filter changed fater as founds. Span adjusted.

Calibration Performed By: Devin Russell



## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0	0.00	0.00	----
as found span	6000	94.7	8.68	8.66	1.002
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	94.7	8.68	8.70	0.998
second point	6000	47.3	4.34	4.33	1.001
third point	6000	23.7	2.17	2.11	1.030
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	94.7	8.68	8.70	0.998
Average Correction Factor					1.010

Corrected As found      8.66      Previous response      8.47      % change      -2.2%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0	0.00	0.00	----
as found span	6000	94.7	8.18	7.84	1.043
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	94.7	8.18	8.19	0.998
second point	6000	47.3	4.08	4.07	1.003
third point	6000	23.7	2.05	2.00	1.023
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	94.7	8.18	8.19	0.998
Average Correction Factor					1.008

Corrected As found      7.84      Previous response      8.07      % change      2.9%



# Wood Buffalo Environmental Association

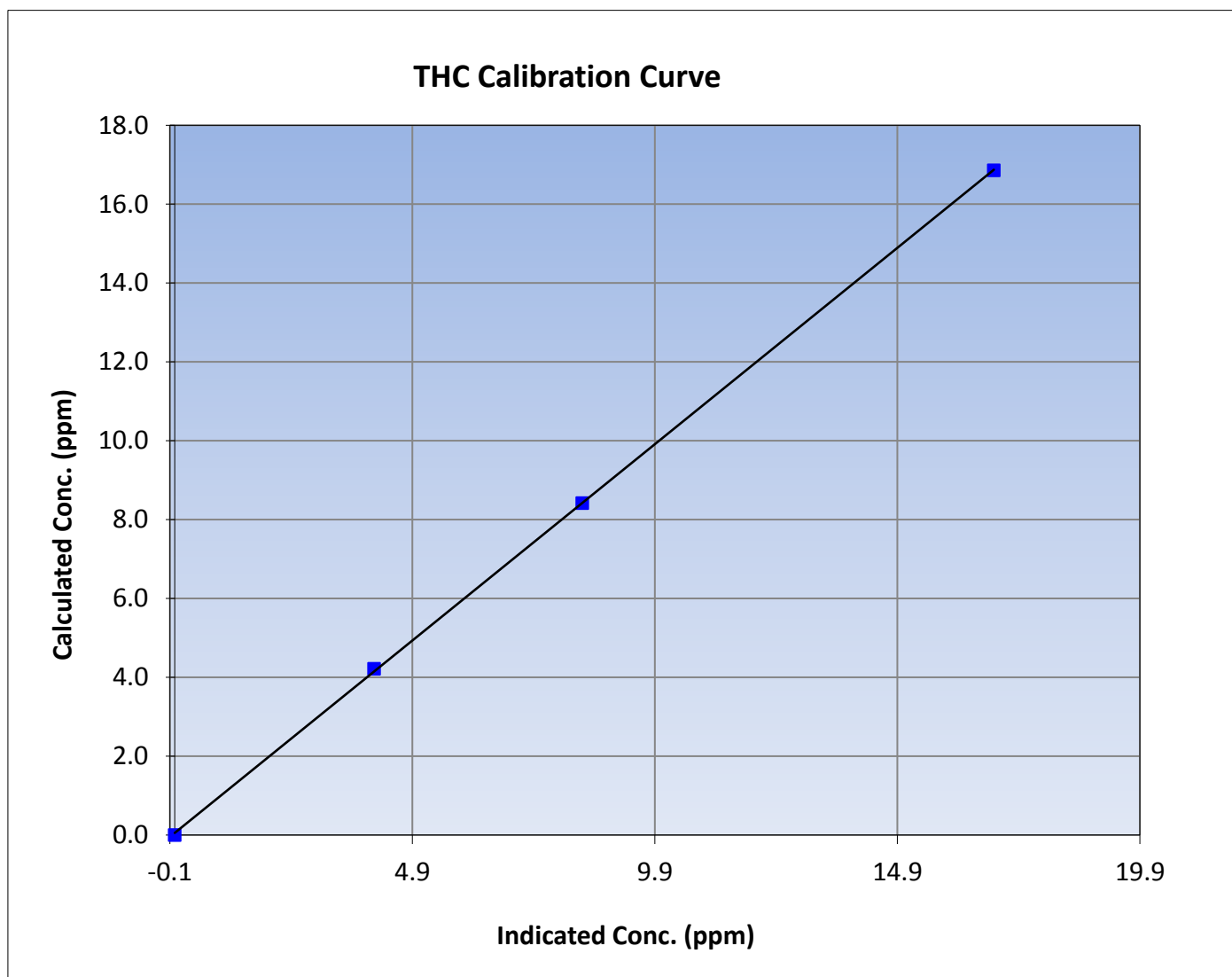
## THC Calibration Summary

### Station Information

Calibration Date	September 22, 2015	Previous Calibration	August 12, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999946
16.86	16.89	0.9980		
8.42	8.40	1.0023	Slope	0.995849
4.22	4.11	1.0264		
			Intercept	0.054157





# Wood Buffalo Environmental Association

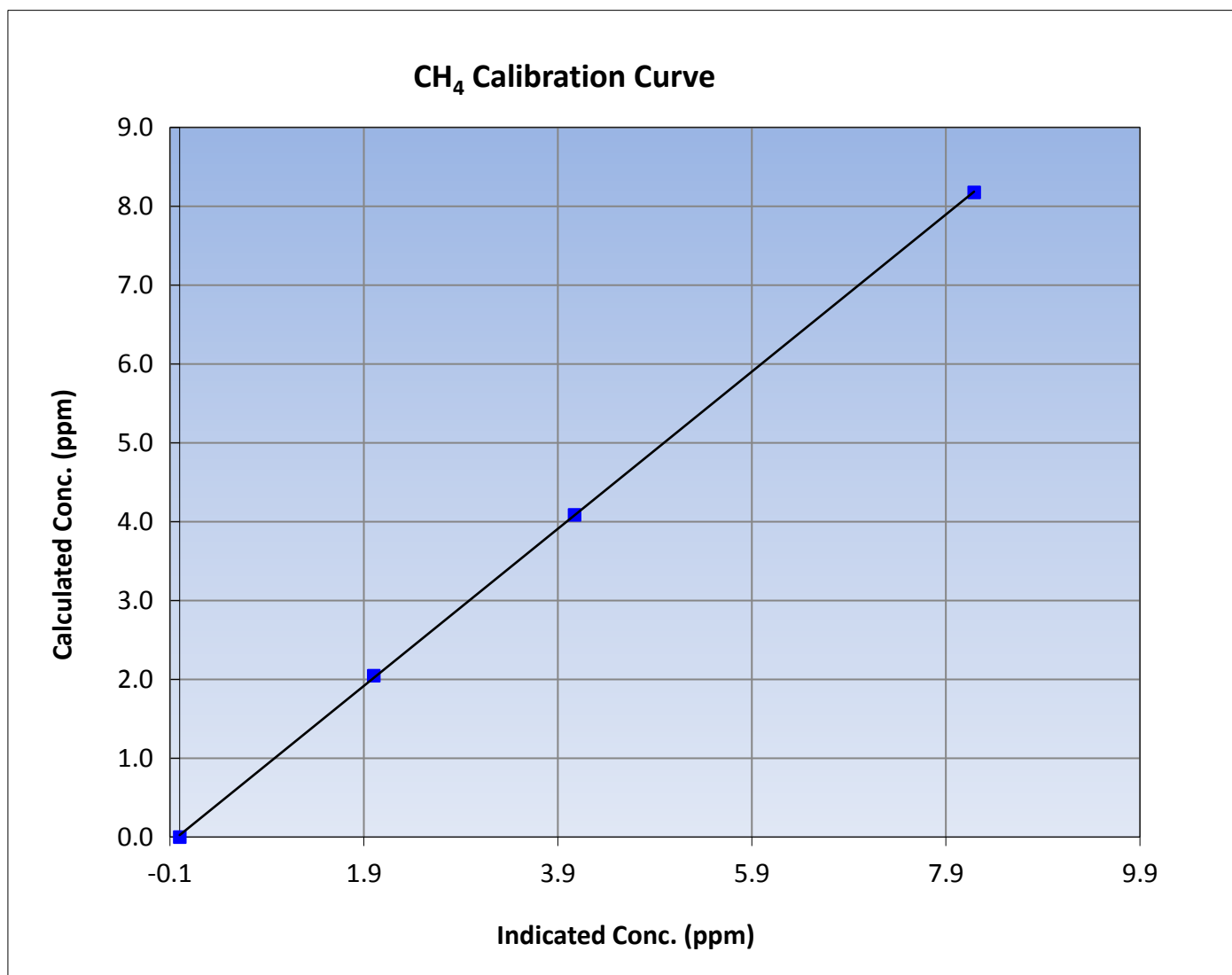
## CH<sub>4</sub> Calibration Summary

### Station Information

Calibration Date	September 22, 2015	Previous Calibration	August 12, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999958
8.18	8.19	0.9983		
4.08	4.07	1.0033	Slope	0.996437
2.05	2.00	1.0231		
			Intercept	0.024060





# Wood Buffalo Environmental Association

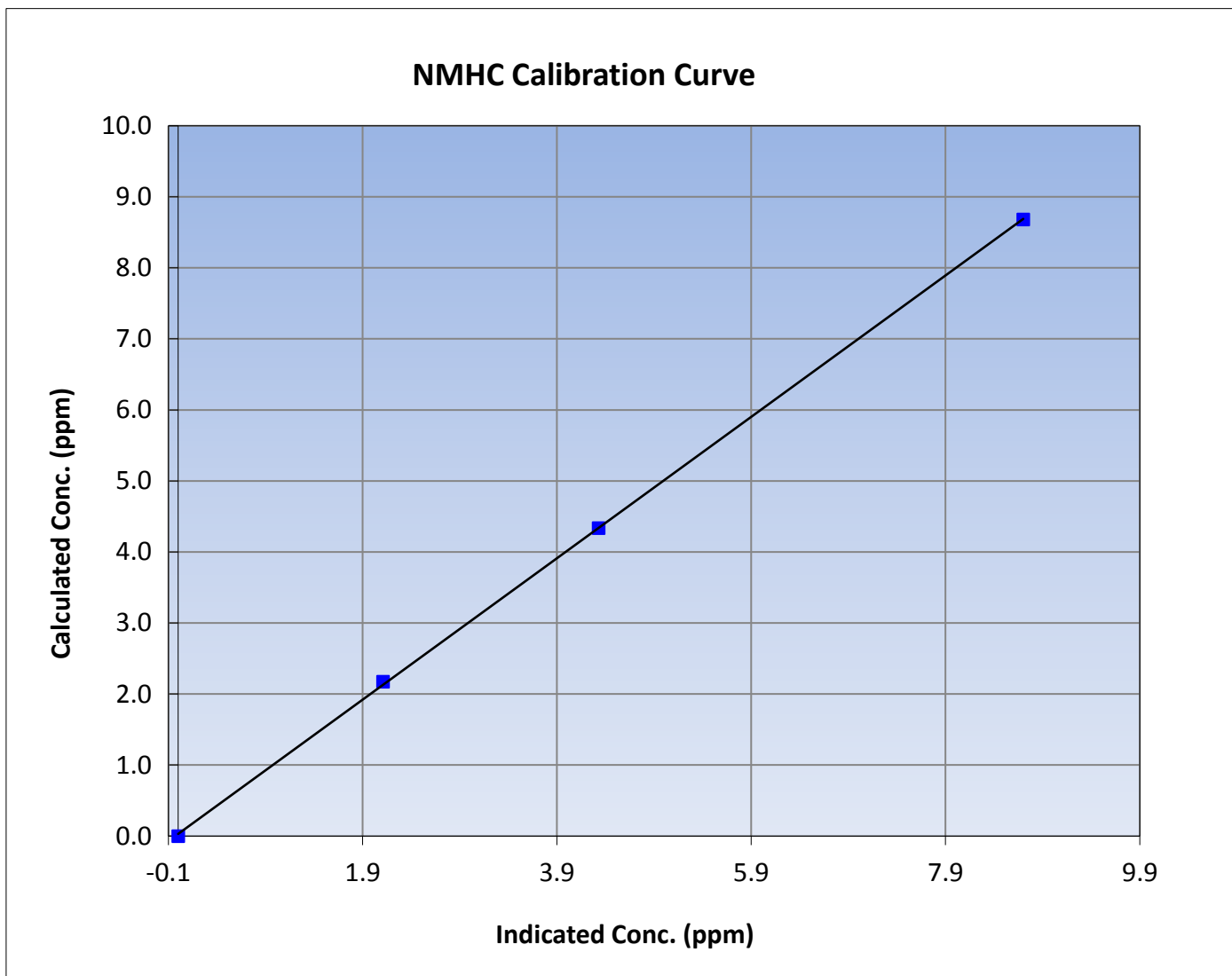
## NMHC Calibration Summary

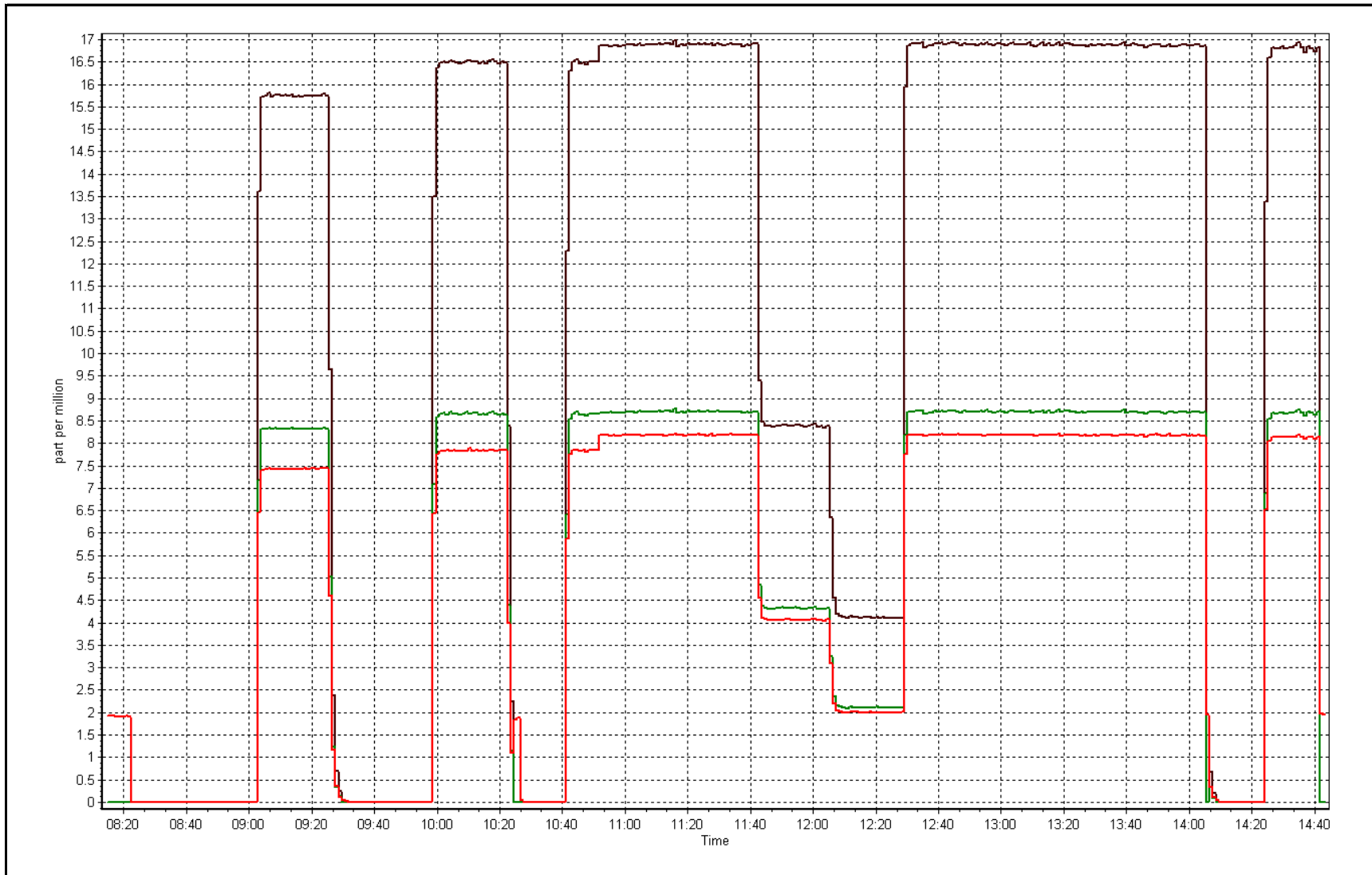
### Station Information

Calibration Date	September 22, 2015	Previous Calibration	August 12, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999932
8.68	8.70	0.9978		
4.34	4.33	1.0013	Slope	0.995294
2.17	2.11	1.0296		
			Intercept	0.030105









# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	September 25, 2015	Previous Calibration	August 13, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	15:00
NO2 GPT Ref date	September-25-15	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	24.8	25.7
Analyzer IP address	192.168.1.48		Lamp temp.	53.5	53.4
Calculated slope	0.999466	0.998285	Pressure	662.0	668.5
Calculated intercept	-0.468291	-0.866702	Flow cell A	0.705	0.709
Analyzer Background	-1.5	-1.6	Flow cell B	0.725	0.730
Analyzer Coefficient	0.915	0.995	Cell A Intensity	80212	79200
			Cell B Intensity	75180	74250

Analyzer make	Thermo 49i	Analyzer serial #	1300156234
---------------	------------	-------------------	------------

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.00	0.0	0.1	----
as found span	6000	0.78	382.6	348.5	1.098
calibrator zero	6000	0.00	0.0	0.4	----
high point	6000	0.78	382.6	384.8	0.994
second point	6000	0.52	238.5	238.0	1.002
third point	6000	0.26	99.3	101.9	0.974
as left zero	6000	0.00	0.0	-0.2	----
as left span	6000	0.78	382.6	378.8	1.010
Average Correction Factor					0.990

Corrected As found	348.4	Previous response	383.3	% change	10.0%
--------------------	-------	-------------------	-------	----------	-------

**Notes:**

Filter changed after as founds. As found span 9.8% low. NO mix cylinder was replaced on September 22. Span adjusted. Third point above 5% out. Checked GPT points, recalibrated O3 adjusting span again to match new NO2 value from GPT check.

Calibration Performed By:

Devin Russell



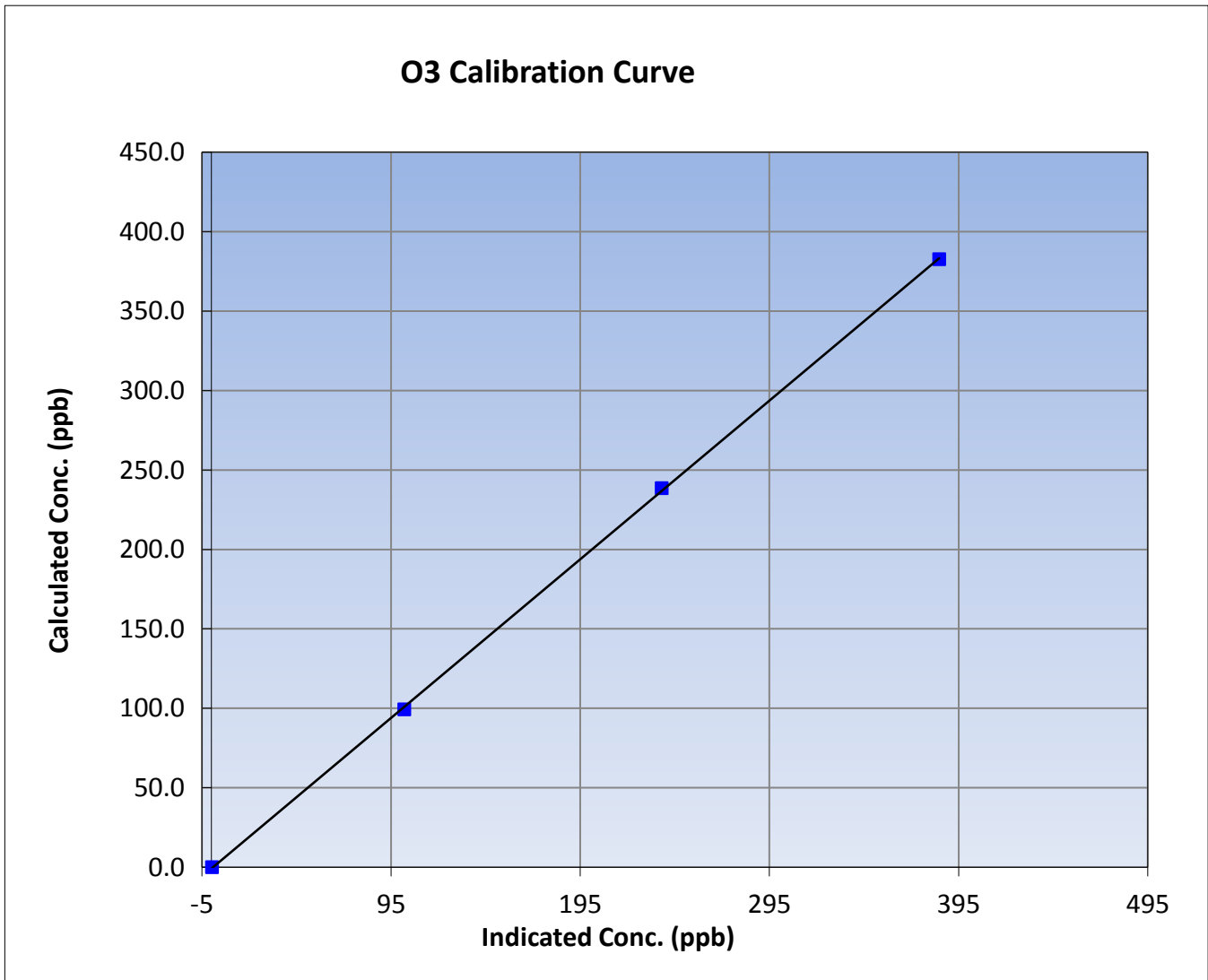
# Wood Buffalo Environmental Association O3 Calibration Report

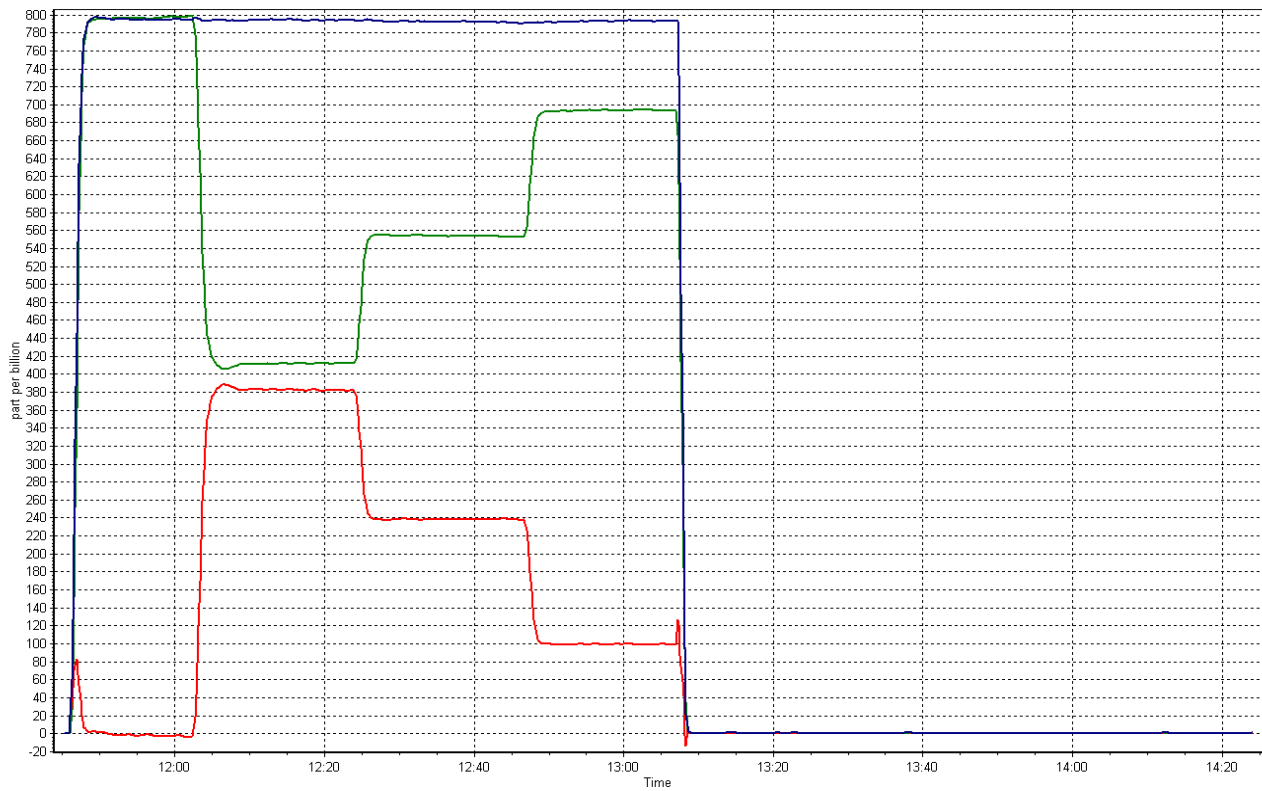
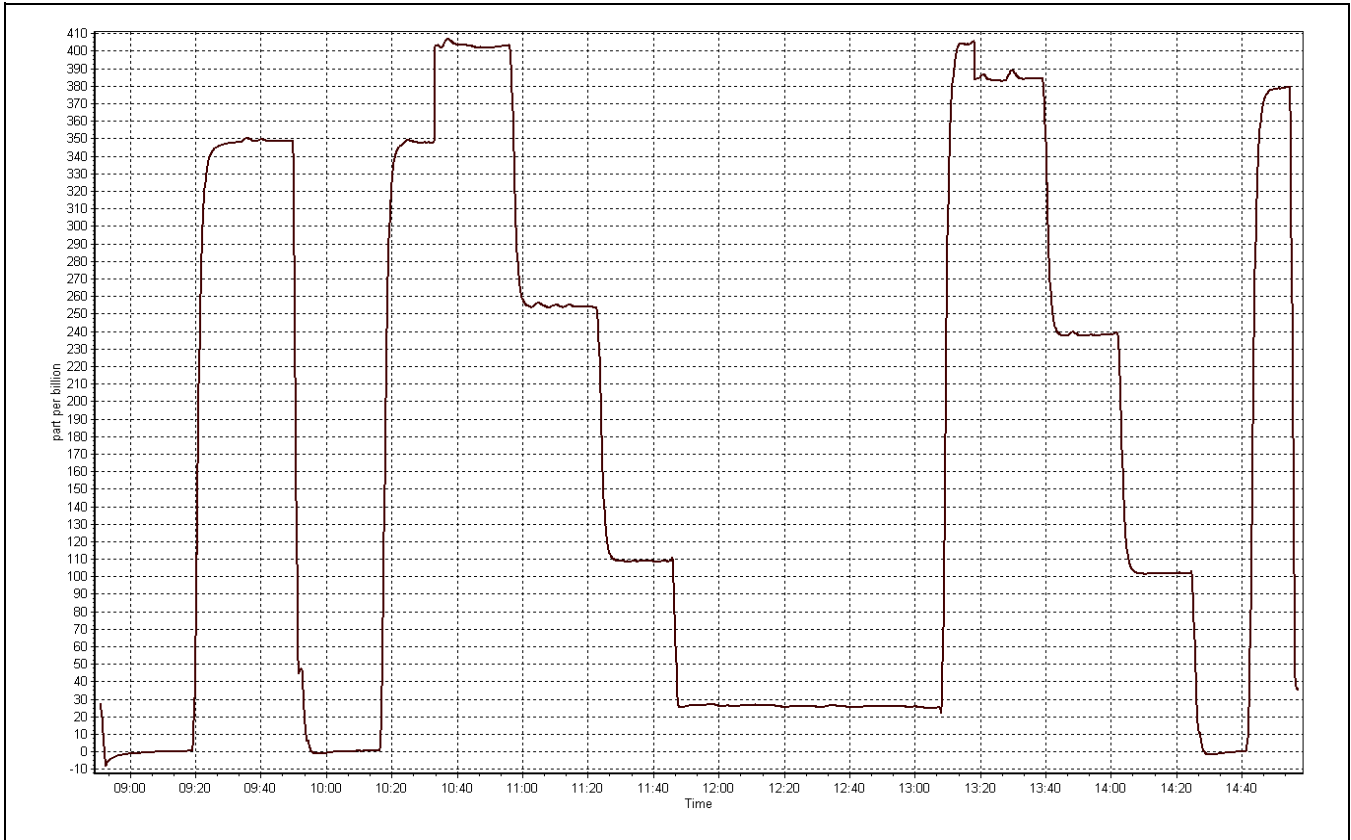
## Station Information

Calibration Date	September-25-15	Previous Calibration	August 13, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	15:00
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	0.4	----	Correlation Coefficient	0.999923
382.6	384.8	0.9943		
238.5	238.0	1.0021	Slope	0.998285
99.3	101.9	0.9742		
			Intercept	-0.866702







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

## Station Information

Calibration Date	September 22, 2015	Previous Calibration	August 12, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	14:45
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	EY0000355
NOx Cal Gas Conc	50.7 ppm	Cal Gas Expiry Date	18/09/2018
Calibrator	Sabio 4010	Serial Number	14300410
Zero air Generator	Teledyne API T701	Serial Number	60

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9036
-------------------	----------------------------	-----------------	------

## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.019870	1.024075	0.996554
	Data Offset	0.183577	-0.010241	0.015480
Current Calibration	Data Slope	0.998144	0.992328	1.002938
	Data Offset	-0.242261	0.034875	0.981015

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153460
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.932		1.019	
NOx coefficient	1.000		0.993	
NO2 coefficient	1.000		1.000	
NO bkgnd	2.3		2.500	
NOx bkgnd	2.6		2.800	
Chamber Temp	50.7	Deg C	50.600	Deg C
Moly Temp	322.4	Deg C	327.400	Deg C
PMT voltage	-761.5	V	-761.500	V
PMT Temp	-3	Deg C	-2.900	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	165.5	mmHg	166.700	mmHg
R Cell Press Nox	165.5	mmHg	166.700	mmHg
NO sample flow	0.864	lpm	0.874	lpm
Nox sample Flow	0.864	lpm	0.874	lpm

**Notes:**

Inlter filter changed after as founds. Cal cylinder changed. Span adjusted. Second high NO point used for GPT reference.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date: September 22, 2015 Station Number: AMS 6

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	0.1	0.2	-0.1	----	----
as found span	6000	94.7	800.2	800.2	0.0	730.0	728.5	1.5	1.0962	1.0984
calibrator zero	6000	0.0	0.0	0.0	0.0	0.1	0.2	-0.1	----	----
high point	6000	94.7	800.2	800.2	0.0	801.1	805.7	-4.6	0.9989	0.9932
second point	6000	47.3	399.7	399.7	0.0	403.1	405.0	-1.9	0.9915	0.9869
third point	6000	23.7	200.3	200.3	0.0	199.5	200.1	-0.6	1.0039	1.0011
as left zero	6000	0.0	0.0	0.0	0.0	0.2	0.2	0.0	----	----
as left span	6000	94.7	800.2	400.8	399.4	794.7	406.0	388.7	1.0069	0.9871
Average Correction Factor									0.9981	0.9937

Corrected As found NO<sub>x</sub>= 729.9 NO= 728.4 Percent Change NO<sub>x</sub>= 7.5% NO= 7.3%  
 Previous Response NO<sub>x</sub>= 784.4 NO= 781.4

### GPT Calibration Data

Dilution Flow 6000 ccm Source Gas Flow 94.70 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO2 (300)	----	400.8	401.9	801.7	400.8	400.6	0.9827	1.0000	1.0033	99.7%
2nd NO2 (200)	----	552.8	249.9	799.9	552.8	247.2	0.9848	1.0000	1.0112	98.9%
3rd NO2 (100)	----	701.0	101.6	800.7	701.0	99.7	0.9839	1.0000	1.0196	98.1%
4th NO2 (0)	802.7	----	-2.5	800.2	802.7	-3.3	0.9845	1.0000	N/A	----
Average Correction Factor							0.9840	1.0000	1.0114	98.9%

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

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

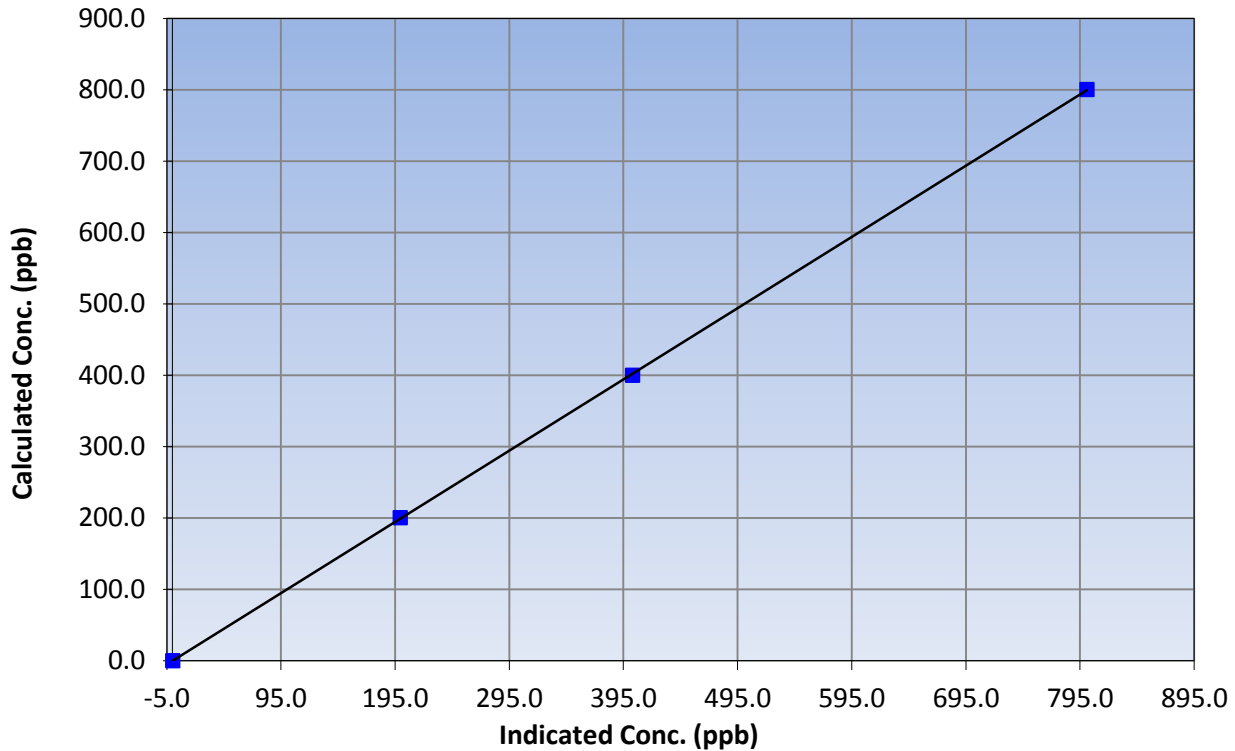
### Station Information

Calibration Date	September 22, 2015	Previous Calibration	August 12, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999975
800.2	801.1	0.9989		
399.7	403.1	0.9915	Slope	0.998144
200.3	199.5	1.0039		
			Intercept	-0.242261

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

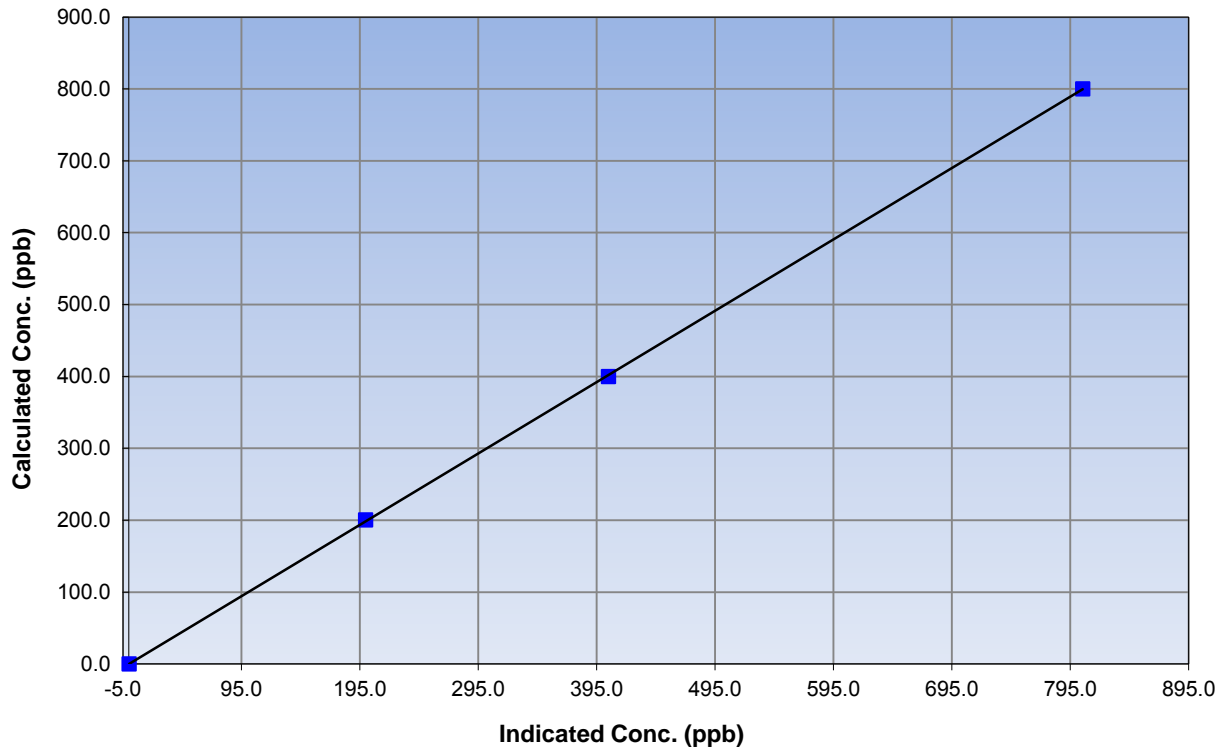
### Station Information

Calibration Date	September 22, 2015	Previous Calibration	August 12, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999976
800.2	805.7	0.9932		
399.7	405.0	0.9869	Slope	0.992328
200.3	200.1	1.0011		
			Intercept	0.034875

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

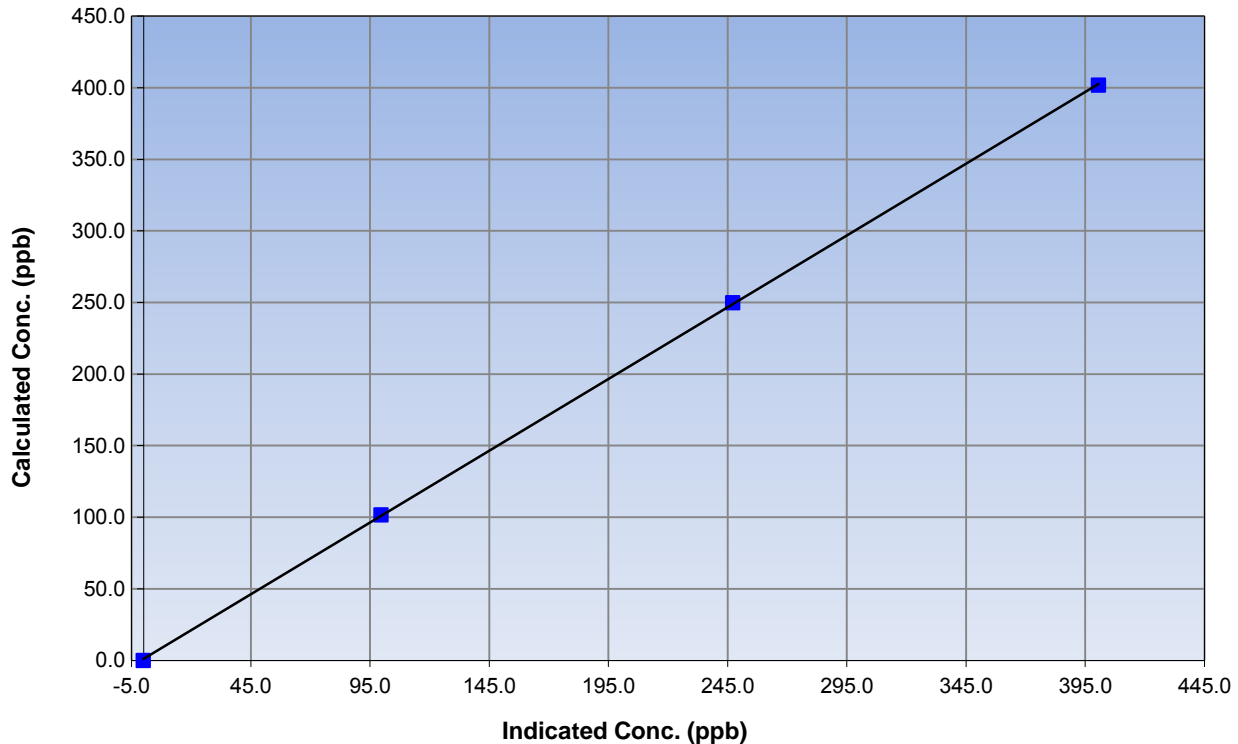
### Station Information

Calibration Date	September 22, 2015	Previous Calibration	August 12, 2015
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

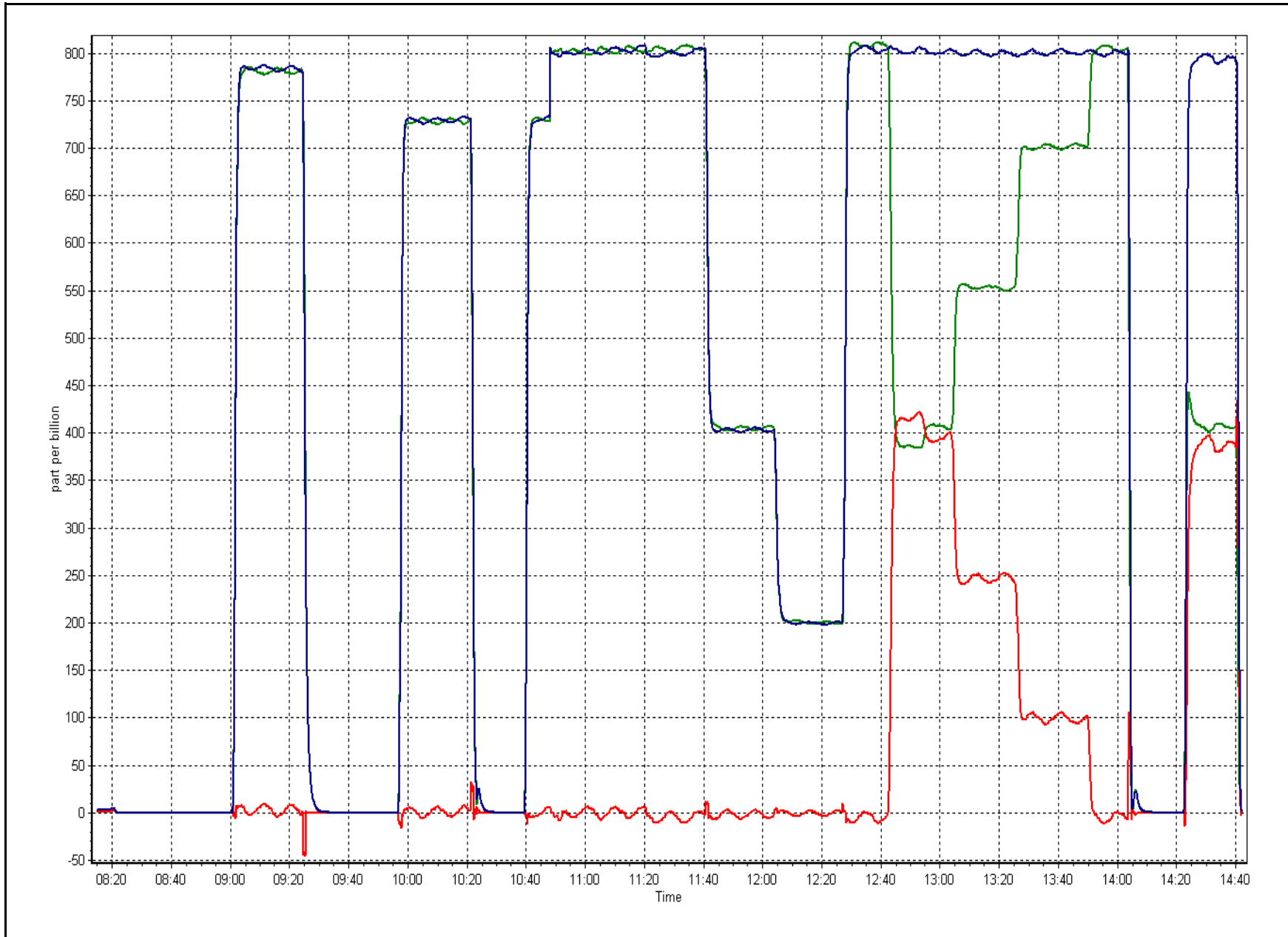
### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999967
401.9	400.6	1.0033		
249.9	247.2	1.0112	Slope	1.002938
101.6	99.7	1.0196		
			Intercept	0.981015

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









# Wood Buffalo Environmental Association

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

### Station Information

Station Name	Patricia McInnis	Station Number	AMS 6
NOX Calibration Date	September 22, 2015	NOX Previous Cal Date	August 12, 2015
NH3 Calibration Date	September 23, 2015	NH3 Previous Cal Date	August 13, 2015
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	14:50
Calibrator	Sabio 4010	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	75.1 ppm	Serial Number	14300410
NOx Cal Gas Conc	50.7 ppm	NH3 Expiry Date / SN	4/Aug/2012 SGAL-3617
NO Cal Gas Conc	50.7 ppm	NO Expiry Date / SN	18/Sep/2018 EY0000355

### DACs Information

DACS make & model Campbell Scientific CR3000      DACS serial No. 9036

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.994575	0.982417	1.017314	1.021185	1.013295
	Data Offset	-1.661543	-2.137959	-0.315367	-0.571864	-0.100392
Cal Stats After	Data Slope	0.952121	0.940780	0.998053	0.995976	1.008884
	Data Offset	-5.813997	-6.604802	-1.018915	-0.343045	-0.097960
IP address		192.168.1.17				

### Analyzer Information

Analyzer make/model	API T201	Analyzer serial #	215	
Converter	API 501 NH#	Converter serial #	217	
Test Point	before		after	
NH3 Conc range	0-2500	ppb	2500	ppb
NOX Conc range	0-1000	ppb	1000	ppb
NO BKG	-1.2	ppb	-1.2	ppb
NOx BKG	-0.6	ppb	-0.6	ppb
Nt BKG	-0.4		-0.4	
NO coefficient	0.970		1.074	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	0.981		1.084	
NH3 coefficient	NA		NA	
Nt coefficient	0.970		1.072	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	315.9	Deg C	314.4	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	85.0	ccm	86.0	ccm
R Cell Press	4.4	mmHg	4.5	mmHg
PMT Voltage	693.0	v	693.0	v
Sample Flow 1 NO	544.0	ccm	555.0	ccm
Sample Flow 2 Nox	544.0	ccm	555.0	ccm
Sample Flow 3 Nt	544.0	ccm	555.0	ccm

**Notes:**

Inler filter changed after as founds. NO cylinder changed. Span adjusted. Second High NO point used for GPT reference. NH3 span adjusted.



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

September 23, 2015

Station Number:

AMS 6

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

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NOx conc (ppb)	Calculated NH <sub>3</sub> conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH <sub>3</sub> conc (ppb)	Nt Correction factor	NH <sub>3</sub> Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	0.6	0.4	0.2	----	----
as found NO	6000	94.7	800.2	800.2	----	817.3	815.8	1.3	0.979	----
calibrator zero	6000	0.0	0.0	0.0	0.0	0.7	0.2	0.2	----	----
high NO point	6000	94.7	800.2	800.2	----	802.3	801.2		0.997	
NO/O <sub>3</sub> point	6000	94.7	800.2	800.2	----	807.4	805.2		0.991	
as found NH <sub>3</sub>	3500	93.2	1999.8	NA	1999.8	2191.1	25.8	2165.3	0.913	0.924
first NH <sub>3</sub>	3500	93.2	1999.8	NA	1999.8	2127.0	25.7	2101.4	0.940	0.952
second NH <sub>3</sub>	3500	46.6	999.9	NA	999.9	1080.3	14.9	1065.4	0.926	0.939
third NH <sub>3</sub>	3500	23.3	500.0	NA	500.0	540.0	7.0	533.1	0.926	0.938
Average Correction Factor									0.9943	0.9427

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

NH<sub>3</sub> = 2165.1 ppb  
 Nt = 816.7 ppb  
 NOx = 815.5 ppb

Previous Response  
 Previous Response  
 Previous Response

NH<sub>3</sub> = 2012.4 ppb  
 Nt = 816.7 ppb  
 NOx = 786.9 ppb

NH<sub>3</sub> percent change -7.1%  
 Nt percent change 0.0%  
 NOx percent change -3.5%



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

September 22, 2015

Station Number:

AMS 6

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

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO <sub>x</sub> conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO <sub>x</sub> conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO <sub>x</sub> Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	0.2	0.4	0.7	----	----
as found span	6000	94.7	800.2	800.2	800.2	728.9	727.0	730.1	1.0979	1.1008
calibrator zero	6000	0.0	0.0	0.0	0.0	0.2	0.4	0.7	----	----
high point	6000	94.7	800.2	800.2	800.2	801.2	803.1	802.3	0.9988	0.9964
second point	6000	47.3	399.7	399.7	399.7	405.4	403.7	405.3	0.9858	0.9900
third point	6000	23.7	200.3	200.3	200.3	200.2	200.0	201.4	1.0005	1.0012
as left zero	6000	0.0	0.0	0.0	0.0	-3.0	-3.0	-1.2	----	----
as left span	6000	94.7	800.2	398.1	800.2	801.0	412.3	804.6	0.9990	0.9655
Average Correction Factor									0.9950	0.9959

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	729.4	728.7	726.6	403.4
Previous Response	816.7	786.9	784.2	401.9
Percent Change	12.0%	8.0%	7.9%	-0.4%

### GPT Calibration Data

Total Flow 6000 ccm Source Gas Flow 94.70 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO <sub>2</sub> conc (ppb)	Indicated NO <sub>x</sub> conc (ppb)	Indicated NO conc (ppb)	Indicated NO <sub>2</sub> conc (ppb)	NO <sub>x</sub> Correction factor	NO Correction factor	NO <sub>2</sub> Correction factor	Converter Efficiency
Cal zero			0.0			0.1			----	
1st NO <sub>2</sub> (300)	----	398.1	407.1	801.8	398.1	403.5	0.9980	1.0000	1.0091	99.1%
2nd NO <sub>2</sub> (200)	----	552.2	253.0	803.4	552.2	251.2	0.9961	1.0000	1.0069	99.3%
3rd NO <sub>2</sub> (100)	----	709.2	96.0	804.4	709.2	95.1	0.9948	1.0000	1.0100	99.0%
4th NO <sub>2</sub> (0)	805.2	----	0.0	805.2	805.2	0.1	0.9938	1.0000	----	----
Average Correction Factor							0.9957	1.0000	1.0087	99.1%

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

## NH3 Calibration Summary

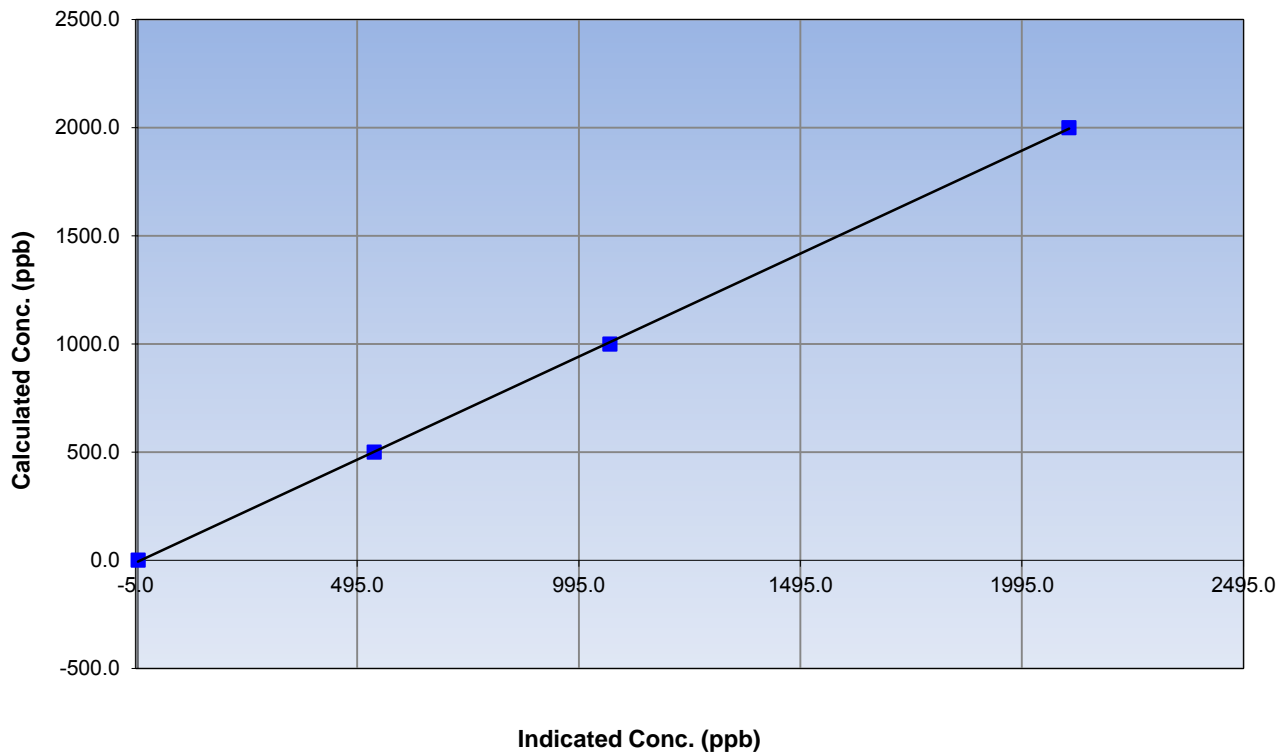
### Station Information

Calibration Date	September 23, 2015	Previous Calibration	August 12, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:40	End Time (MST)	14:50
Analyzer make	API T201	Analyzer serial #	215

### NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999939
1999.8	2101.4	0.9517		
999.9	1065.4	0.9386	Slope	0.952121
500.0	533.1	0.9379		
			Intercept	-5.813997

### NH3 Calibration Curve





# Wood Buffalo Environmental Association

## Nt Calibration Summary

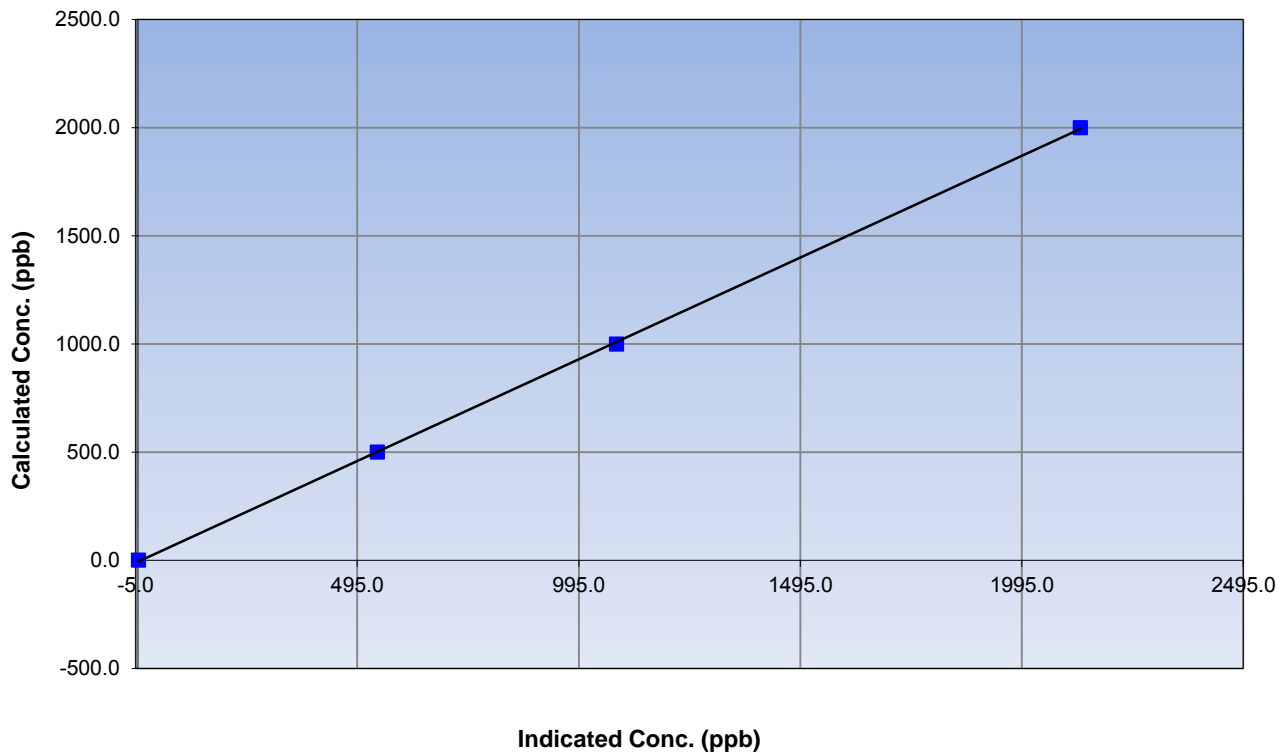
### Station Information

Calibration Date	September 23, 2015	Previous Calibration	August 12, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:40	End Time (MST)	14:50
Analyzer make	API T201	Analyzer serial #	215

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

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.7	----	Correlation Coefficient	0.999925
1999.8	2127.0	0.9402		
999.9	1080.3	0.9256	Slope	0.940780
500.0	540.0	0.9258		
			Intercept	-6.604802

### Nt Calibration Curve





# Wood Buffalo Environmental Association

## NOx Calibration Summary

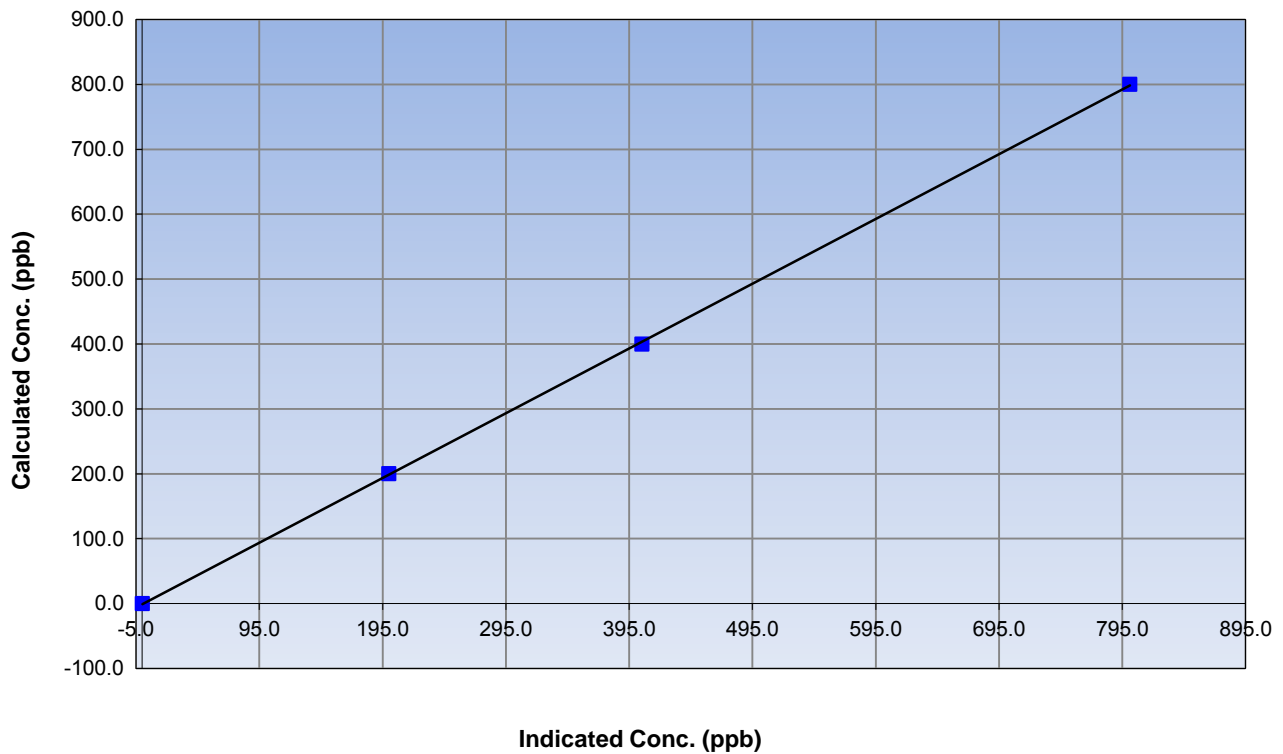
### Station Information

Calibration Date	September 22, 2015	Previous Calibration	August 12, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:40	End Time (MST)	14:50
Analyzer make	API T201	Analyzer serial #	215

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

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999940
800.2	801.2	0.9988		
399.7	405.4	0.9858		
200.3	200.2	1.0005	Slope	0.998053
			Intercept	-1.018915

### NOx Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

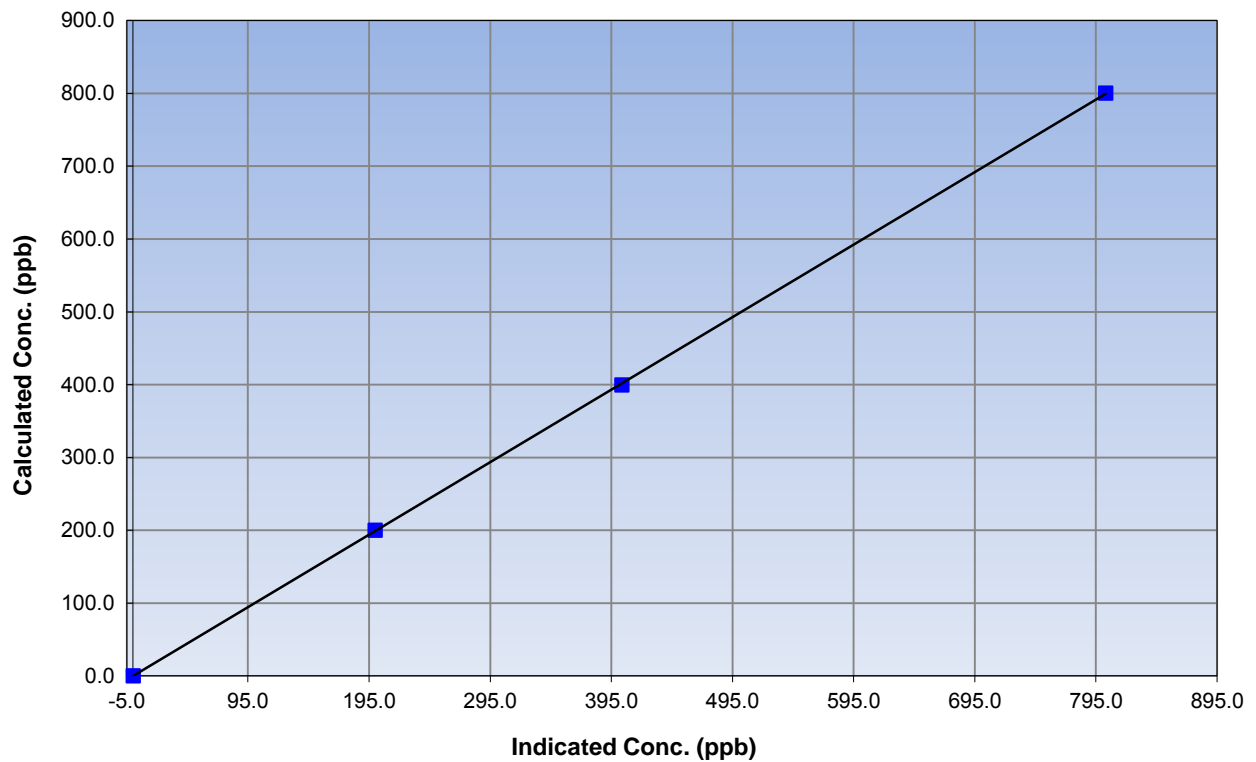
### Station Information

Calibration Date	September 22, 2015	Previous Calibration	August 12, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:40	End Time (MST)	14:50
Analyzer make	API T201	Analyzer serial #	215

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999981
800.2	803.1	0.9964		
399.7	403.7	0.9900	Slope	0.995976
200.3	200.0	1.0012		
			Intercept	-0.343045

### NO Calibration Curve







# Wood Buffalo Environmental Association

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

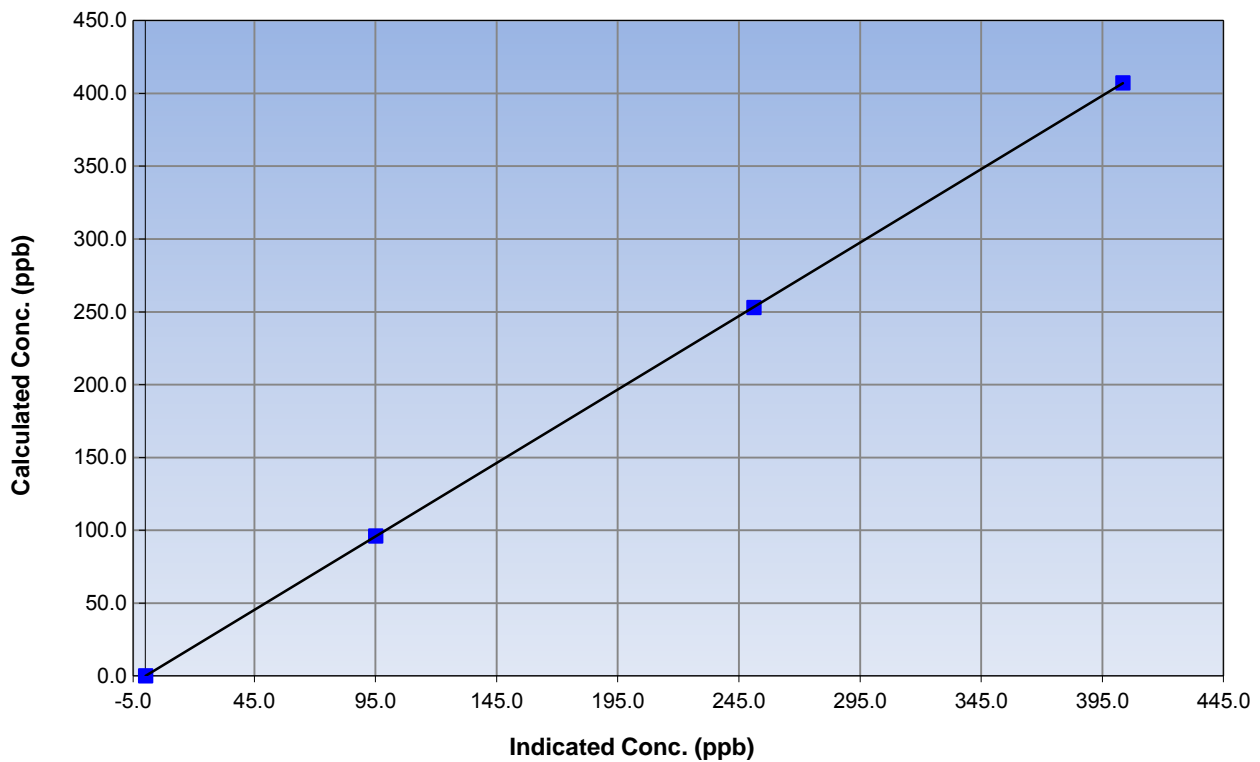
### Station Information

Calibration Date	September 22, 2015	Previous Calibration	August 12, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:40	End Time (MST)	14:50
Analyzer make	API T201	Analyzer serial #	215

### Calibration Information

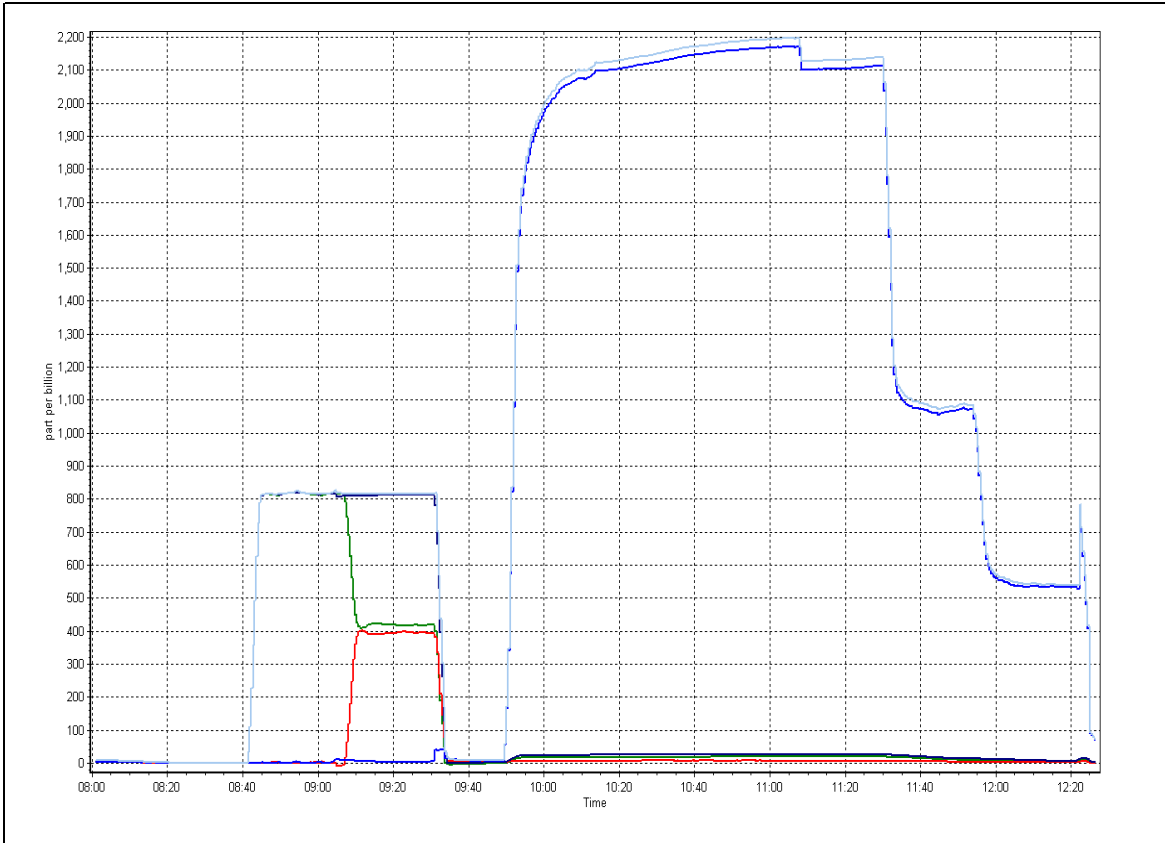
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999997
407.1	403.5	1.0091		
253.0	251.2	1.0069	Slope	1.008884
96.0	95.1	1.0100		
			Intercept	-0.097960

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



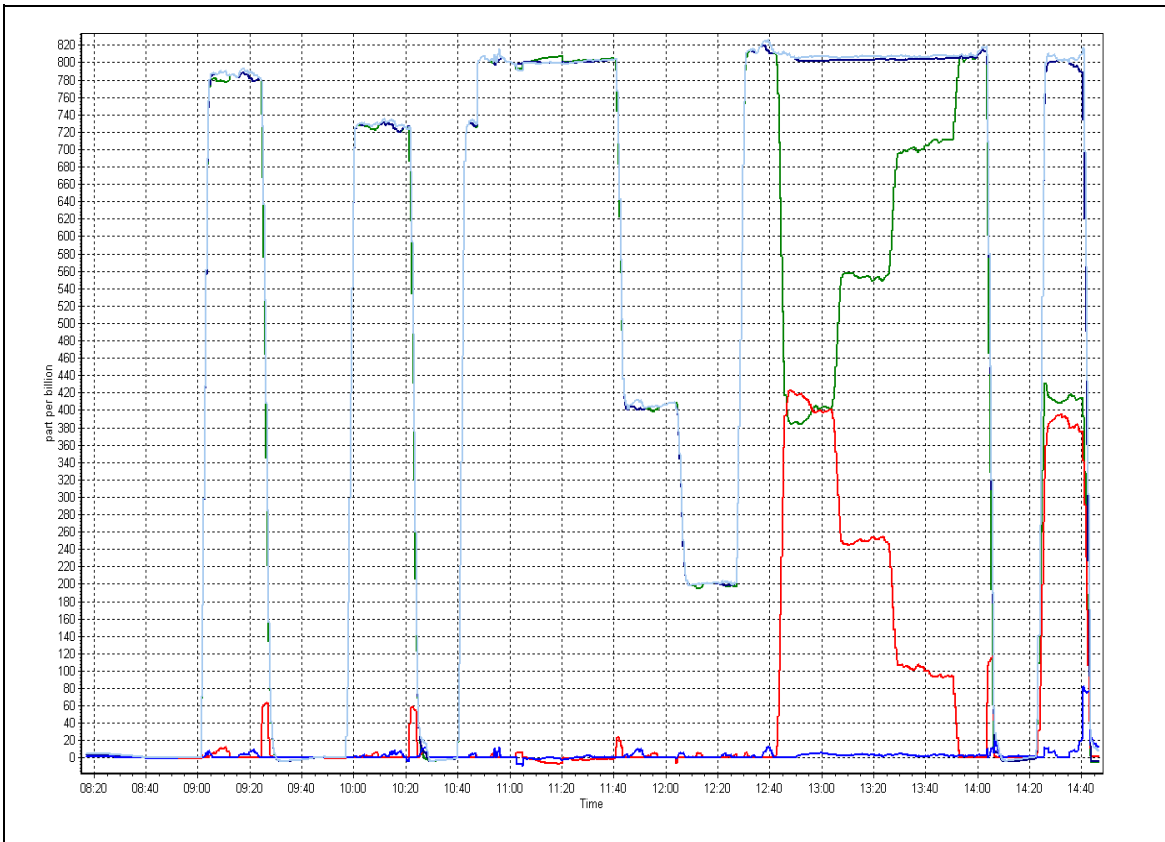
NH<sub>3</sub> Calibration Plot

Date: September 22, 2015



NO<sub>x</sub> Calibration Plot

Date:





# Wood Buffalo Environmental Association

## SHARP CALIBRATION

W B E A

### STATION INFORMATION

Calibration Date: September 25, 2015 Previous Calibration: August 12, 2015  
 Station Name: Patricia McInnis Station Number: AMS 6  
 Start Time (MST): 11:45 End Time (MST): 12:40  
 Calibrator Make/Model: Delta Cal Calibrator Serial Number: 1212

### SHARP INFORMATION

Particulate Fraction: PM2.5  
 Make/Model: Thermo / SHARP 5030  
 Serial Number: E-1475  
 C<sub>14</sub> Source SN: 5680  
 Confirmation of Time settings: Yes  No   
 Parameters Checked:  T1  T2  T3  T4  P3  Main Flow  Beta  Neph

### CALIBRATION DATA

#### Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	15.0	14.7	-0.3	15.0
T2	21.0	na	na	21.0
T3	22.0	na	na	22.0
T4	15.0	na	na	15.0
RH (%)	29.0	na	na	29.0

#### Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	966	963.9	-2.1	966

#### Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1001	1	1001	1000

#### Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	202		201
Neph	1.2		-0.7
C14	-5.4		-2.4

Indicated Concentration (ug/m3)	yes
Offset 1	200.8
Offset 2	32.1

#### Leak Check (Quarterly)

Leak Check Date: \_\_\_\_\_ Previous Leak Check Date: May 20, 2015

#### Measured

#### Difference LPM (Limit +/- 0.42 LPM)

Flow without adaptor (LPM): \_\_\_\_\_ 0.00

\*Flow with adaptor (LPM): \_\_\_\_\_

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

#### Mass Foil Calibration (Annually)

Foil Calibration Date: \_\_\_\_\_ Previous Foil Calibration: May 20, 2015

Zeroed?: \_\_\_\_\_

Foil Mass: \_\_\_\_\_

Mass foil set S/N: \_\_\_\_\_

Previous Correction Factor: \_\_\_\_\_

New Correction Factor: \_\_\_\_\_

### INSPECTION DATA

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

#### NOTES:

Nephelometer zeroed. Cyclone head cleaned. Filter tape is about halfway through the roll.

Calibration Performed By: \_\_\_\_\_

Devin Russell



## Wood Buffalo Environmental Association

### SHARP CALIBRATION

#### STATION INFORMATION

Calibration Date:	September 28, 2015	Previous Calibration:	September 25, 2015
Station Name:	Patricia McInnis	Station Number:	AMS 6
Start Time (MST):	12:43	End Time (MST):	13:50
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1212

#### SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number:	E-1475
C <sub>14</sub> Source SN:	5680
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Parameters Checked:	<input checked="" type="checkbox"/> T1 <input type="checkbox"/> T2 <input type="checkbox"/> T3 <input type="checkbox"/> T4 <input type="checkbox"/> P3 <input checked="" type="checkbox"/> Main Flow <input type="checkbox"/> Beta <input type="checkbox"/> Neph <input checked="" type="checkbox"/>

#### CALIBRATION DATA

##### Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	9.0	8.5	-0.5	9.0
T2	21.0	na	na	21.0
T3	22.0	na	na	22.0
T4	15.0	na	na	15.0
RH (%)	20.0	na	na	20.0

##### Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	974	971.3	-2.7	974

##### Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1023	23	1023	1000

#### Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	201		202
Neph	-0.6		0
C14	17.4		5.9
Indicated Concentration (ug/m3)	-0.6	yes	0
Offset 1	202		202.2
Offset 2	32.6		32

#### Leak Check (Quarterly)

Leak Check Date: 28/9/15 Previous Leak Check Date:

	<b>Measured</b>	<b>Difference LPM (Limit +/- 0.42 LPM)</b>
Flow without adaptor (LPM):	17.10	
*Flow with adaptor (LPM):	16.73	0.37

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

#### Mass Foil Calibration (Annually)

Foil Calibration Date:	Previous Foil Calibration:
Zeroed?:	
Foil Mass:	<u>Mass foil set S/N:</u>
Previous Correction Factor:	
New Correction Factor:	

#### INSPECTION DATA

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

#### NOTES:

Baseline was low, below zero. Nephelometer zeroed, was at -0.6, now at 0. Heater working, Leak check done, passed; Flow, pressure and temperature good

Calibration Performed By: Melissa Lemay



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 7  
ATHABASCA VALLEY  
SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
 SEPTEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	683	37	37	100.00	103	0	13	0
TRS (ppb) Average	683	36	37	99.86	1	0	1	0
THC (ppm) Average	684	36	36	100.00	2.4	-	2	-
NMHC (ppm) Average	684	36	36	100.00	0.426	-	0.061	-
CH4(ppm) Average	684	36	36	100.00	2.3	-	2	-
O3 (ppb) Average	687	33	33	100.00	35	0	23	-
NO2 (ppb) Average	684	36	36	100.00	23	0	8	-
NO (ppb) Average	684	36	36	100.00	23	-	5	-
NOX (ppb) Average	684	36	36	100.00	36	-	13	-
PM2.5 (ug/m3) Average	704	2	16	98.06	18.8	-	7.3	0
CO(ppm) Average	687	32	33	99.86	0.3	0	0.1	-
Temperature 2 m (C) Average	720	0	0	100.00	24.5	-	15.1	-
Barometric Pressure (inHg) Average	720	0	0	100.00	29.2	-	29.2	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	91	-
Wind Speed 10 m (km/h) Average	717	0	3	99.58	38	-	20	-
Wind Direction 10 m (deg) Average	717	0	3	99.58	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
 SEPTEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	683	1.5	5	-	1	1	1	1	1	2	103
TRS (ppb) Average	683	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	684	1.91	0.1	-	1.8	1.8	1.9	1.9	1.9	2	2.4
NMHC (ppm) Average	684	0.008	0.034	-	0	0	0	0	0	0	0.426
CH4(ppm) Average	684	1.91	0.1	-	1.8	1.8	1.9	1.9	1.9	2	2.3
O3 (ppb) Average	687	12.8	9	-	0	2	5	12	20	25	35
NO2 (ppb) Average	684	5.1	4	-	0	1	2	4	6	10	23
NO (ppb) Average	684	2.7	4	-	0	0	0	1	3	8	23
NOX (ppb) Average	684	7.7	7	-	0	2	3	6	10	17	36
PM2.5 (ug/m3) Average	704	4.57	2.6	-	0.3	2	3	3.8	5.5	8.2	18.8
CO(ppm) Average	687	0.05	0	-	0	0	0	0	0.1	0.1	0.3
Temperature 2 m (C) Average	720	9.85	4.8	-	-0.8	4.4	6.3	9.4	12.8	16.4	24.5
Barometric Pressure (inHg) Average	720	28.87	0.2	-	28.4	28.6	28.8	28.9	29	29.1	29.2
Relative Humidity (%) Average	720	72.1	19	-	28	44	58	75	88	94	99
Wind Speed 10 m (km/h) Average	717	9	6	-	0	3	5	8	12	16	38
Wind Direction 10 m (deg) Average	717	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
 SEPTEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	26 Sep 2015 09:00	26 Sep 2015 09:00	1	Maintenance - tech activities
PM2.5	26 Sep 2015 00:00	26 Sep 2015 08:00	9	Unstable Operation - debris in chamber
PM2.5	26 Sep 2015 09:00	26 Sep 2015 12:00	4	Analyzer replacement and calibration
PM2.5	28 Sep 2015 08:00	28 Sep 2015 08:00	1	Re-install original repaired analyzer
CO	24 Sep 2015 08:00	24 Sep 2015 08:00	1	Maintenance - tech activities interrupted daily zero and span
Wind Speed, Wind Direction	17 Sep 2015 06:00	17 Sep 2015 08:00	3	Flat line in sensor output signal - Sensor frozen

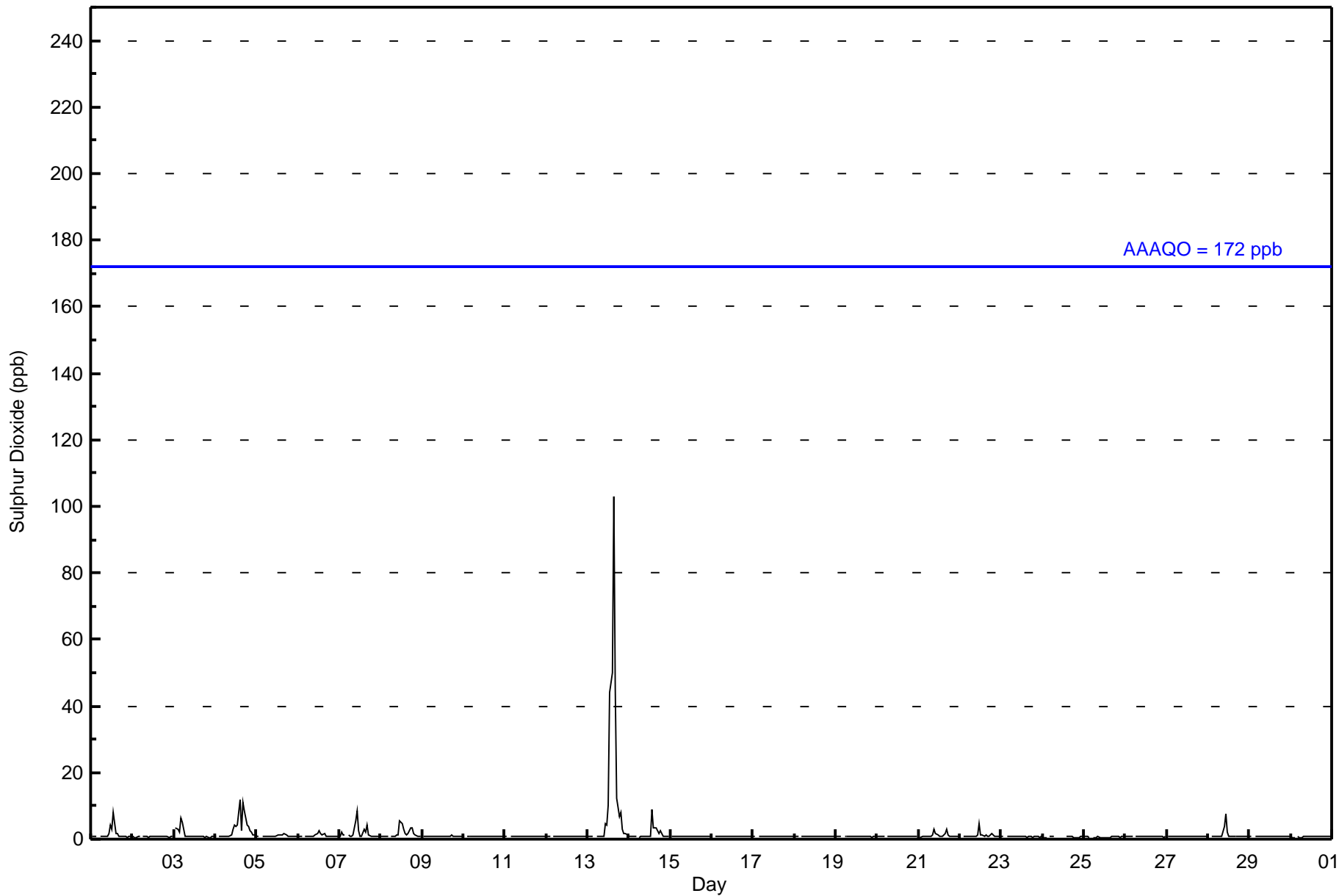


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 103 ppb on Sep 13 16:00	Maximum Daily Average: 13.2 ppb on Sep 13		Hours of Data:	683
Minimum Value: 1 ppb on Sep 25 08:00	Minimum Daily Average: 0.6 ppb on Sep 25		Hours of Missing Data:	37
Maximum Diurnal Average: 4.5 ppb at hour 16	Minimum Diurnal Average: 0.8 ppb at hour 7		Hours of Calibration:	37
Monthly Average: 1.5 ppb	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 1 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-Sep	1	1	1	1	Z	1	1	1	1	1	2	4	3	8	2	2	1	1	1	1	1	1	1	1	1.4	8
2-Sep	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
3-Sep	Z	3	3	2	6	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	6
4-Sep	1	Z	1	1	1	1	1	1	1	1	3	4	4	4	12	3	11	8	4	4	2	2	1	1	3.1	12
5-Sep	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1.0	2
6-Sep	1	1	1	Z	1	1	1	1	1	1	2	3	2	1	2	1	1	1	1	1	1	1	1	1	1.0	3
7-Sep	1	2	1	1	Z	1	1	1	1	5	8	3	1	1	3	2	4	1	1	1	1	1	1	1	1.9	8
8-Sep	1	1	1	1	1	Z	1	1	1	1	6	5	3	2	1	2	3	3	2	1	1	1	1	1	1.7	6
9-Sep	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
10-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
11-Sep	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
12-Sep	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
13-Sep	1	1	1	1	Z	1	1	1	1	1	5	4	10	44	50	103	45	12	7	8	3	2	2	1	13.2	103
14-Sep	1	1	1	1	1	Z	1	1	1	1	1	1	9	3	4	3	2	3	2	1	1	1	1	1	1.7	9
15-Sep	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
16-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
17-Sep	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
18-Sep	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
19-Sep	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
20-Sep	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
21-Sep	Z	1	1	1	1	1	1	1	1	3	2	1	1	1	2	3	1	1	1	1	1	1	1	1	1.1	3
22-Sep	1	Z	1	1	1	1	1	1	1	1	1	5	1	1	1	1	1	1	2	1	1	1	1	1	1.1	5
23-Sep	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
24-Sep	1	1	1	Z	1	1	1	C	C	C	C	C	C	C	1	1	1	1	1	1	1	1	1	1	--	1
25-Sep	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
26-Sep	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
27-Sep	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
28-Sep	1	Z	1	1	1	1	1	1	1	4	8	2	1	1	1	1	1	1	1	1	1	1	1	1	1.3	8
29-Sep	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
30-Sep	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

0.8	0.9	0.8	0.8	1.0	0.9	0.8	0.8	0.8	1.2	1.6	1.6	1.5	3.1	3.0	4.5	2.9	1.6	1.3	1.2	0.9	0.8	0.8	0.8	Diurnal Average
1	3	3	2	6	5	1	1	1	5	8	6	10	44	50	103	45	12	7	8	3	2	2	1	Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Athabasca Valley - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	676	98.98	98.98
11 - 20	3	0.44	99.41
21 - 60	3	0.44	99.85
61 - 110	1	0.15	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Athabasca Valley - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	31	10	5	11	39	50	150	55	17	21	73	59	35	37	26	54	673
11 - 20	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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>	<b>33</b>	<b>10</b>	<b>5</b>	<b>11</b>	<b>39</b>	<b>50</b>	<b>150</b>	<b>55</b>	<b>17</b>	<b>21</b>	<b>73</b>	<b>59</b>	<b>36</b>	<b>37</b>	<b>27</b>	<b>57</b>	<b>680</b>

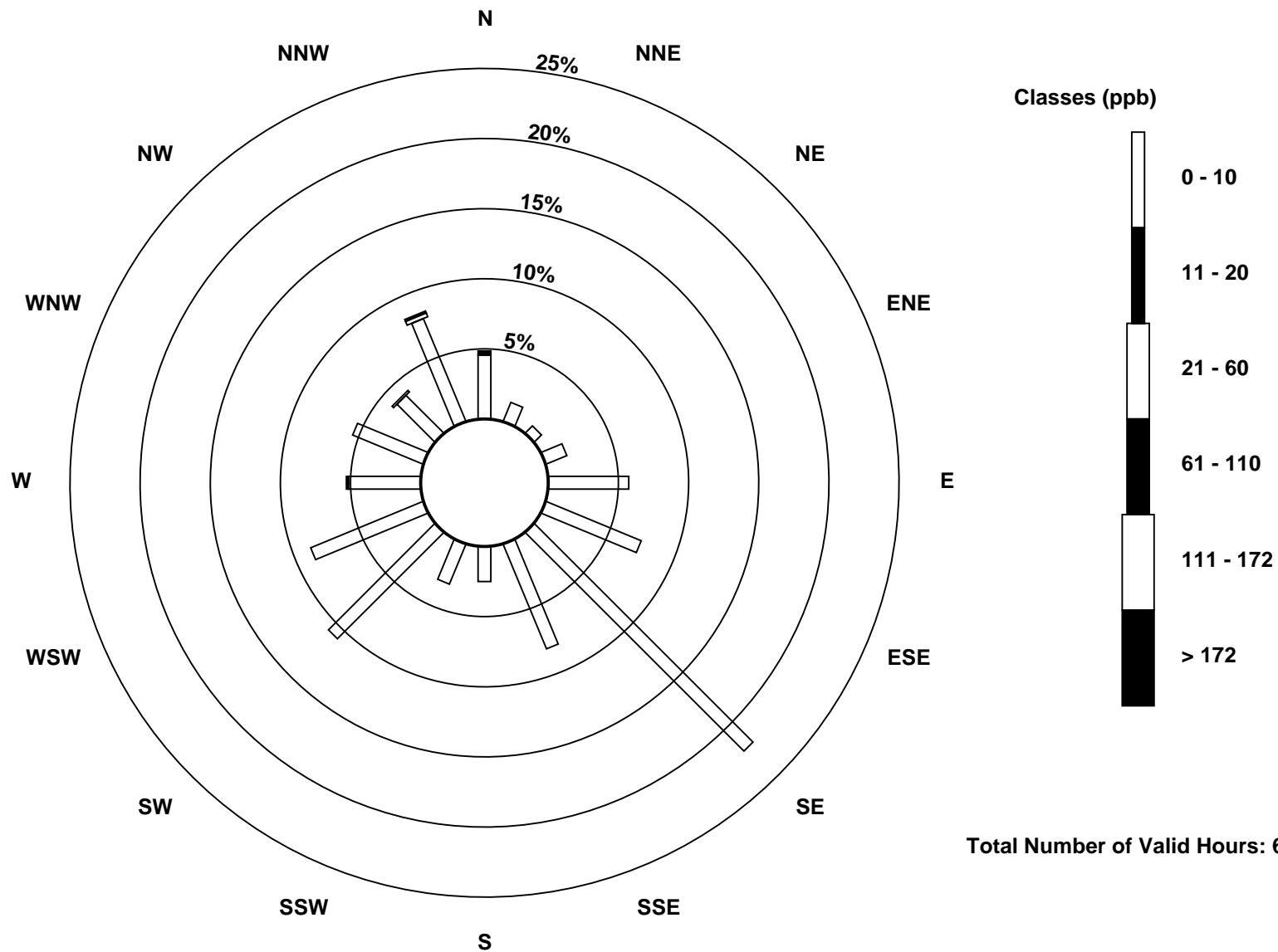
Total Number of Valid Hours: 680

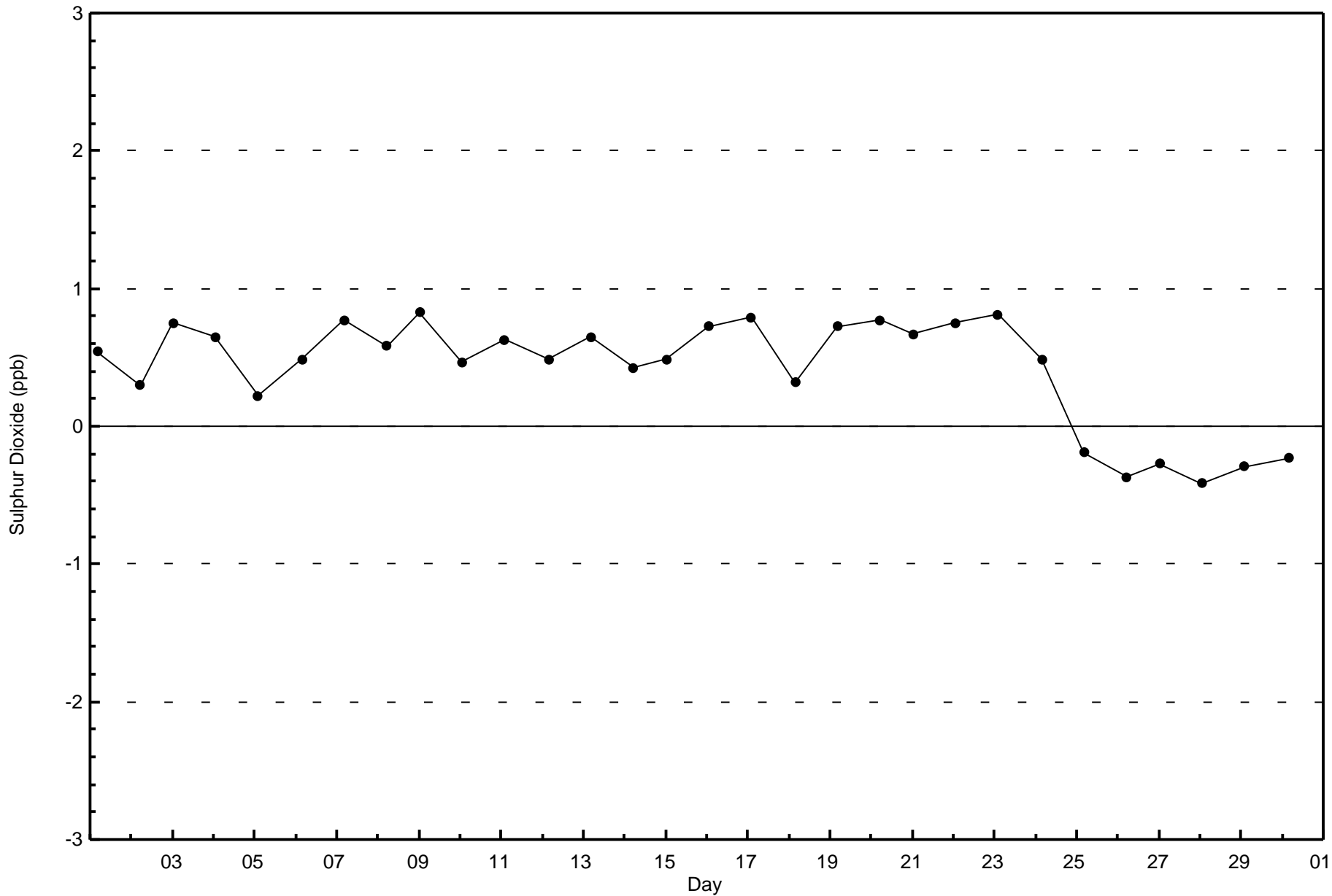
Total Number of Hours: 720

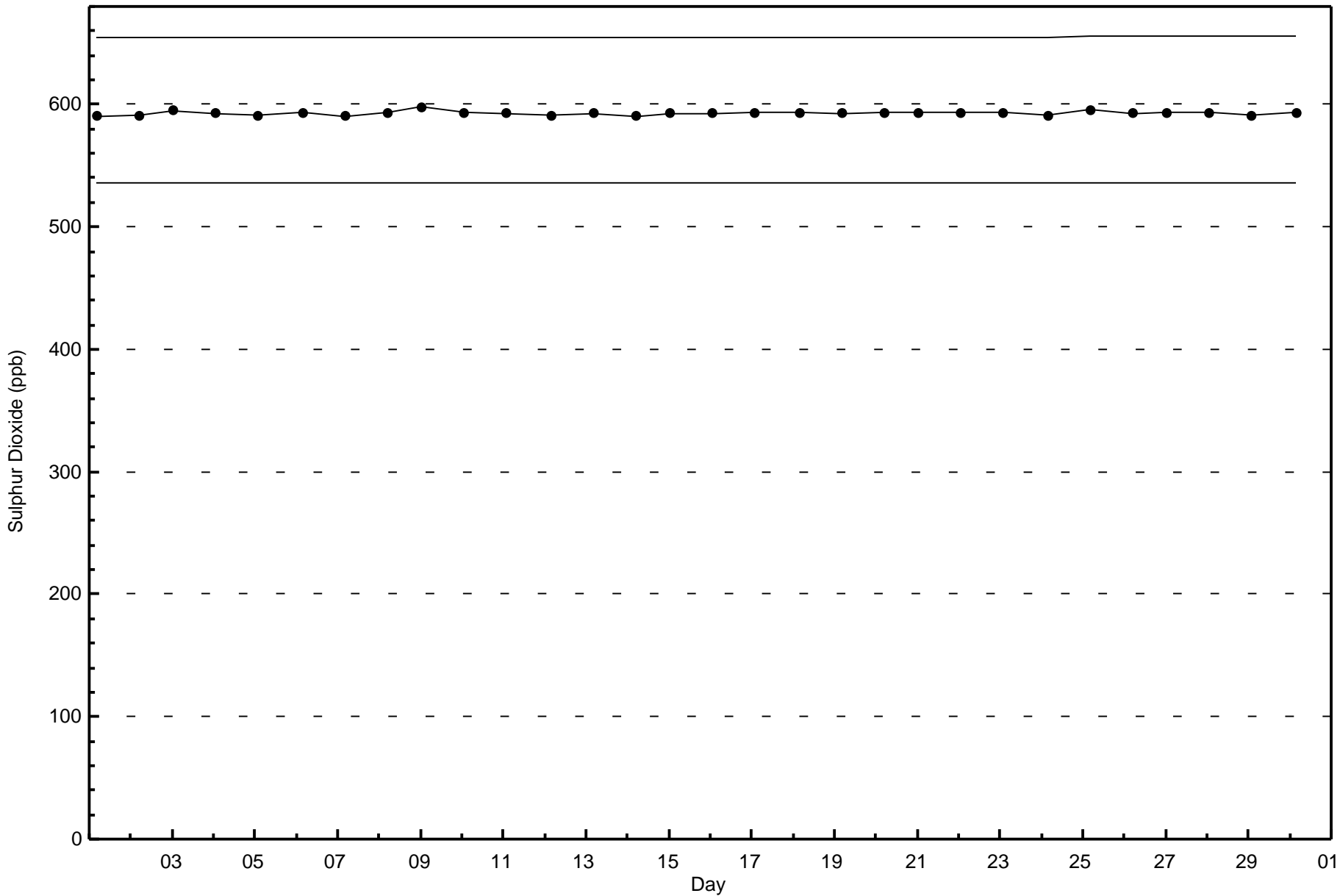


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley (AMS 7)









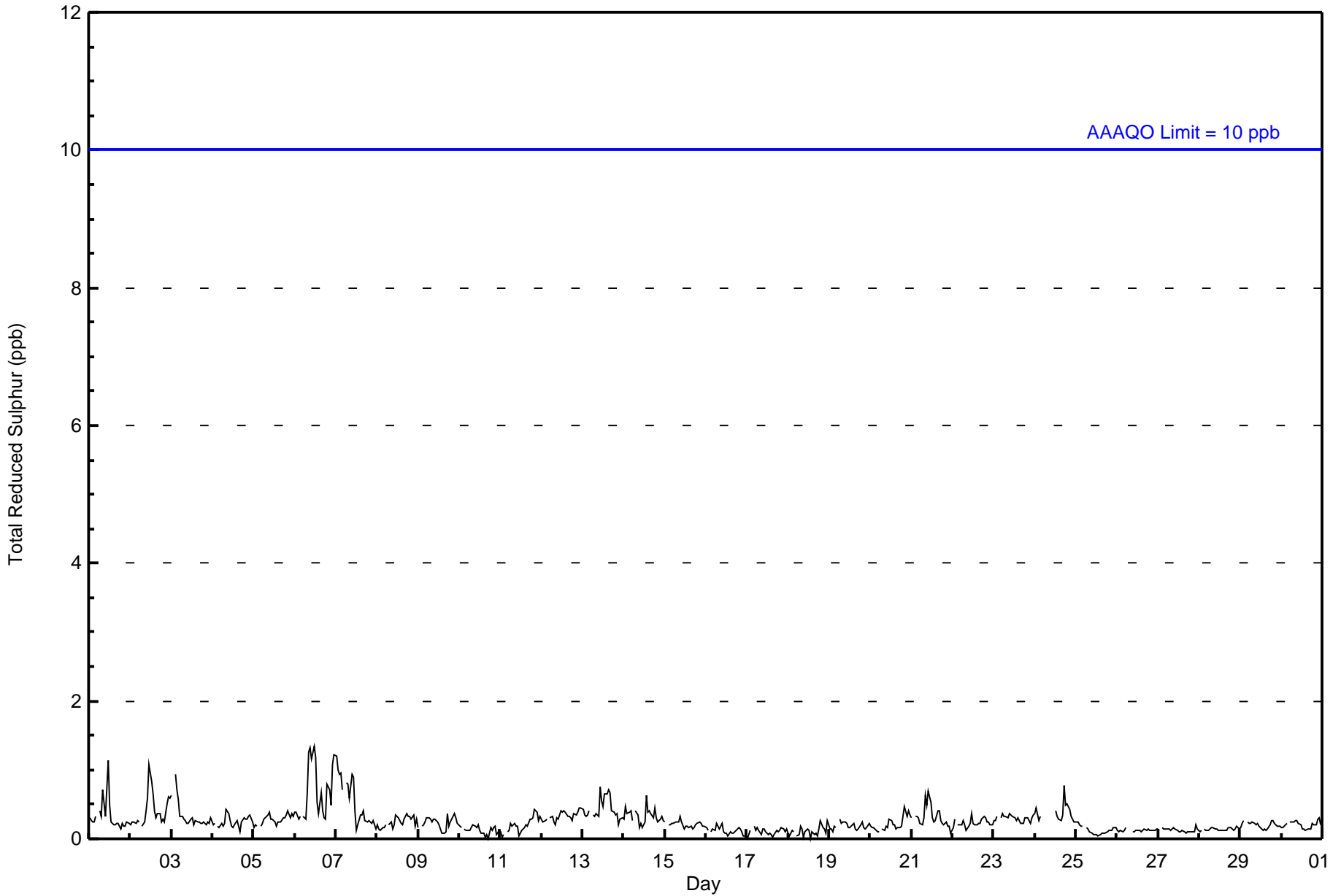


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 1 ppb on Sep 6 12:00	Maximum Daily Average: 0.7 ppb on Sep 6		Hours of Data:	683
Minimum Value: 0 ppb on Sep 18 14:00	Minimum Daily Average: 0.1 ppb on Sep 17		Hours of Missing Data:	37
Maximum Diurnal Average: 0.3 ppb at hour 12	Minimum Diurnal Average: 0.2 ppb at hour 6		Hours of Calibration:	36
Monthly Average: 0.3 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 O <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-Sep	0	0	0	0	0	Z	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
2-Sep	0	0	0	0	0	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0.4	1
3-Sep	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
4-Sep	0	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-Sep	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	
6-Sep	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	0	1	0	0	0	1	1	0	1	1	0.7	1	
7-Sep	1	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
8-Sep	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	
9-Sep	0	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-Sep	0	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	
11-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
12-Sep	0	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-Sep	0	0	0	0	0	Z	0	0	0	0	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0.4	1	
14-Sep	0	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1	
15-Sep	0	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-Sep	0	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	
17-Sep	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	
18-Sep	0	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	
19-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
20-Sep	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	
21-Sep	0	Z	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
22-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
23-Sep	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	
24-Sep	0	0	0	0	Z	0	C	C	C	C	C	C	0	0	0	1	0	1	0	0	0	0	0	0	--	1	
25-Sep	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-Sep	0	0	0	0	0	0	Z	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
27-Sep	0	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	
28-Sep	0	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-Sep	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-Sep	0	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	

0.3	0.2	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.3	Diurnal Average	
1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Athabasca Valley - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	683	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: 683

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb  
Athabasca Valley - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 2	33	10	5	10	39	53	153	50	18	19	72	60	37	37	27	57	680
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>33</b>	<b>10</b>	<b>5</b>	<b>10</b>	<b>39</b>	<b>53</b>	<b>153</b>	<b>50</b>	<b>18</b>	<b>19</b>	<b>72</b>	<b>60</b>	<b>37</b>	<b>37</b>	<b>27</b>	<b>57</b>	<b>680</b>

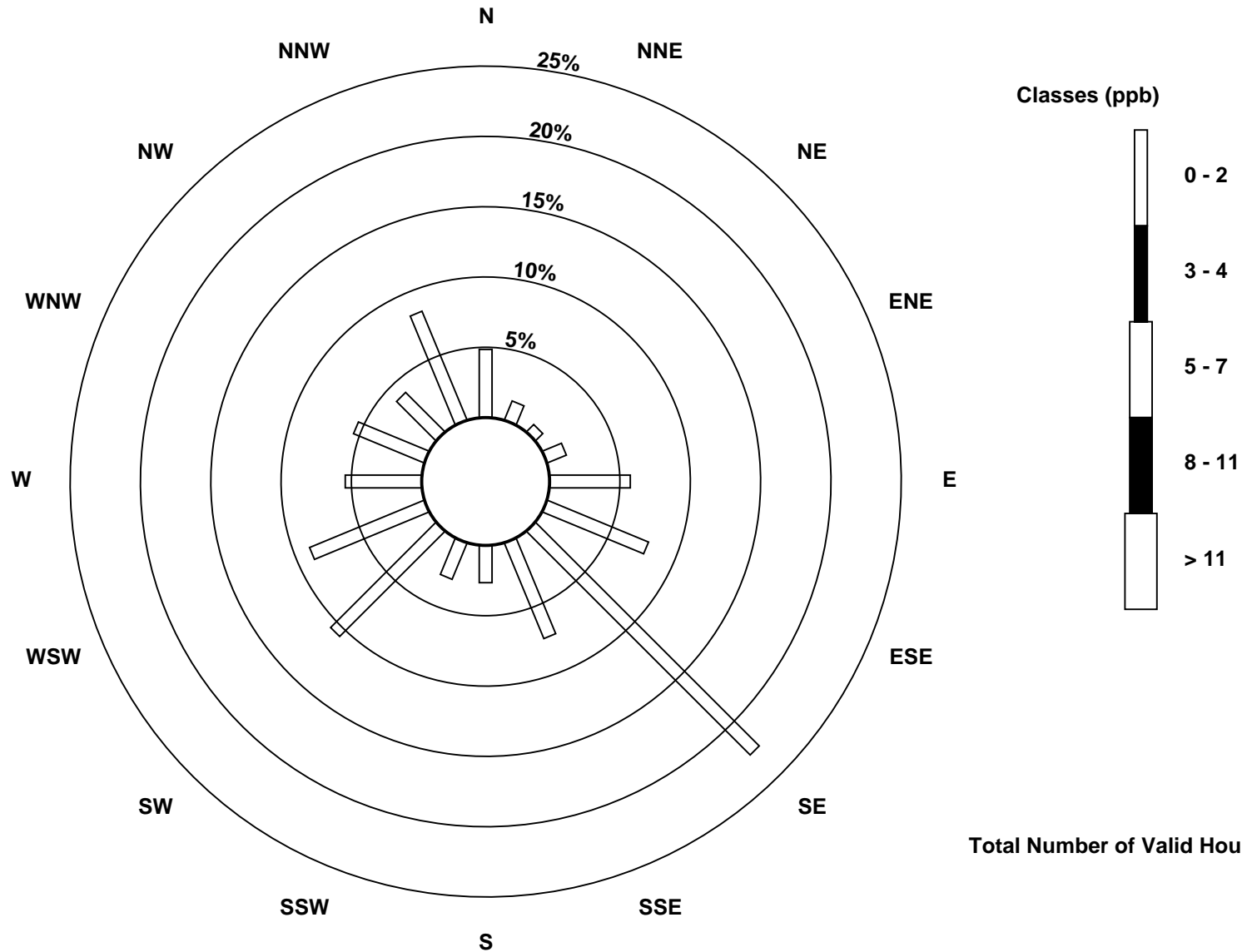
Total Number of Valid Hours: 680

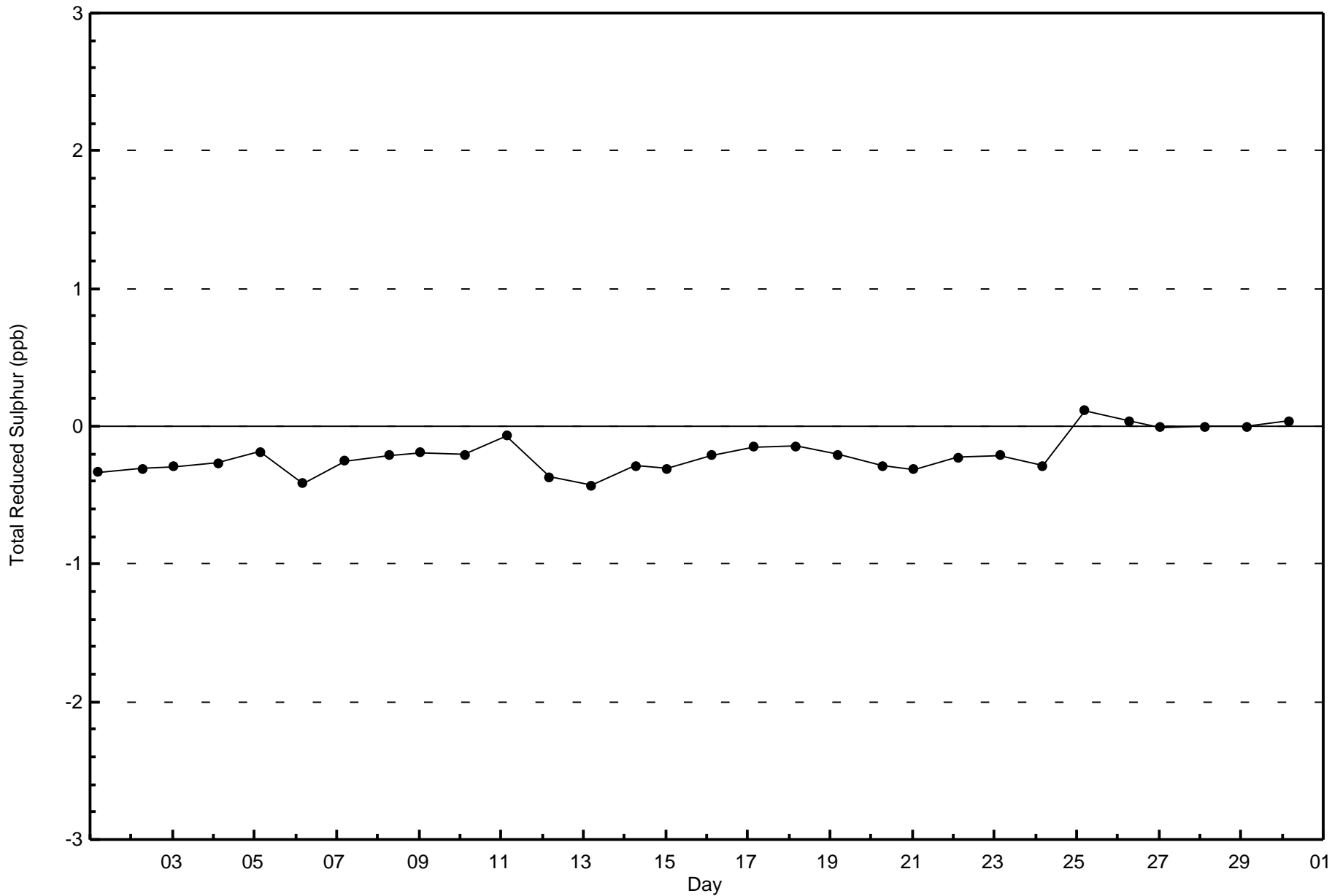
Total Number of Hours: 720

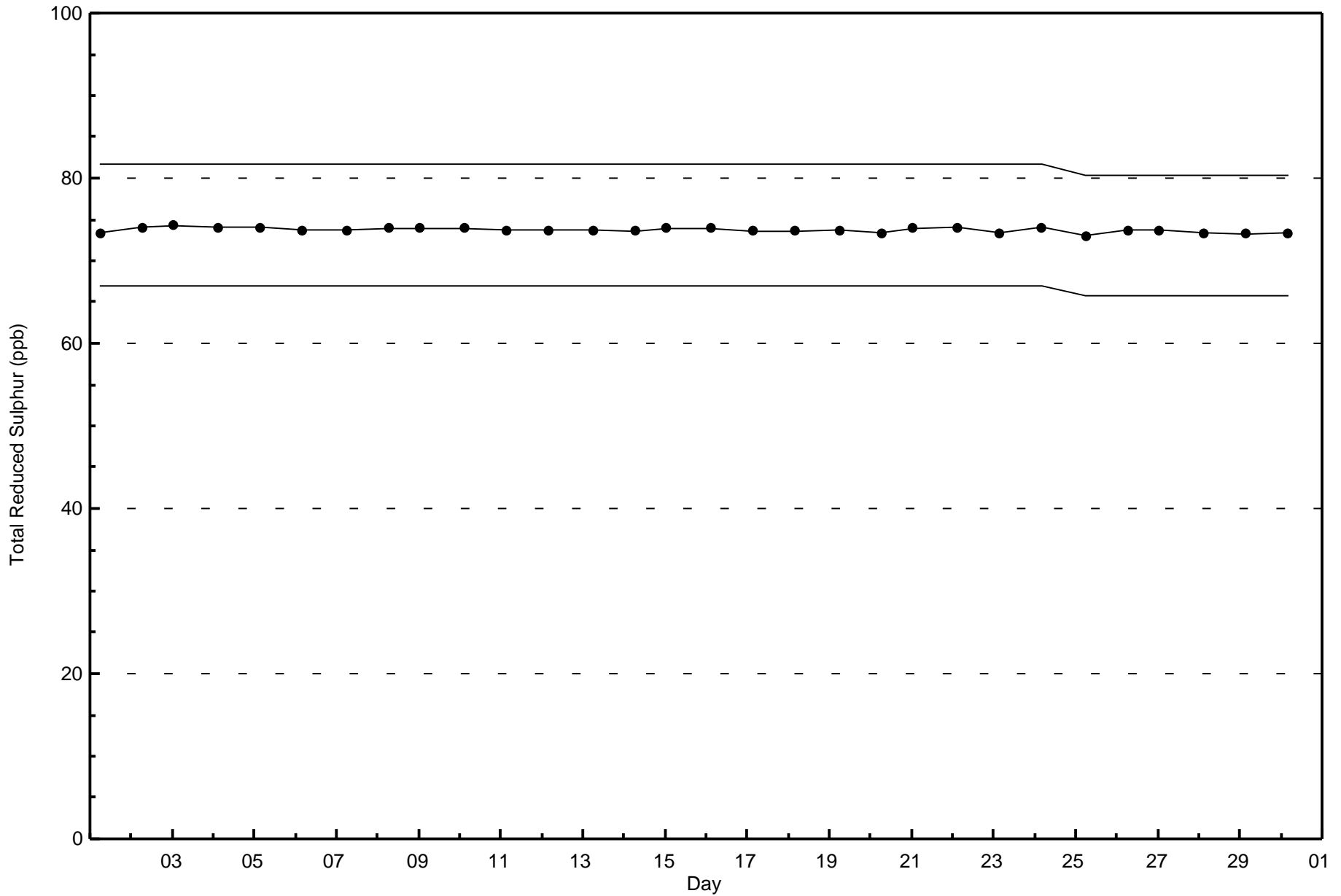


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Total Reduced Sulphur (TRS) - ppb  
Athabasca Valley (AMS 7)









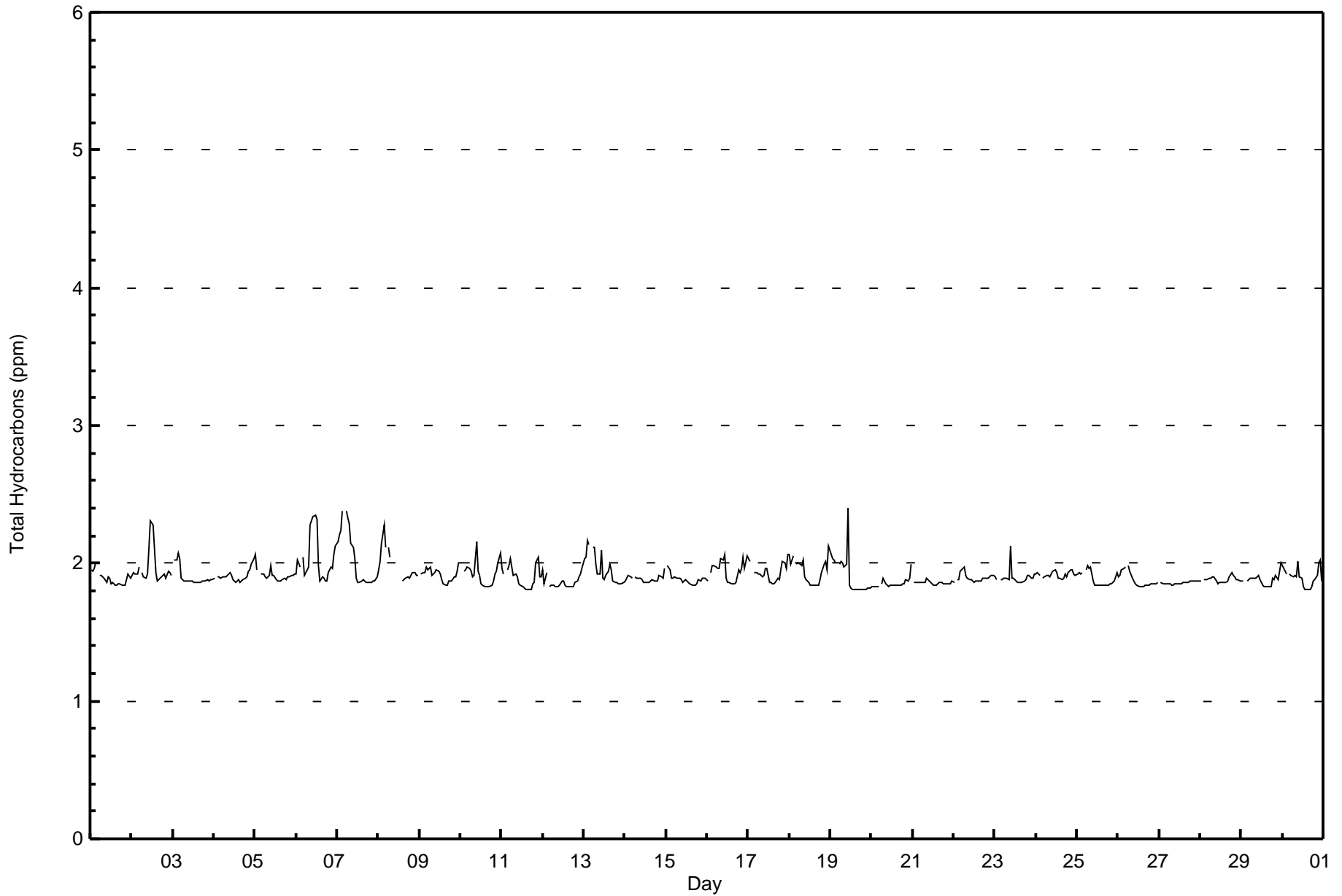
Maximum Value: 2.4 ppm on Sep 19 11:00																Maximum Daily Average: 2.0 ppm on Sep 6							Hours in Service: 720									
Minimum Value: 1.8 ppm on Sep 19 17:00																Minimum Daily Average: 1.9 ppm on Sep 20							Hours of Data: 684									
Maximum Diurnal Average: 2.0 ppm at hour 4																Minimum Diurnal Average: 1.9 ppm at hour 15							Hours of Missing Data: 36									
Monthly Average: 1.91 ppm																Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.8 Q <sub>1</sub> = 1.9 Median = 1.9 Q <sub>3</sub> = 1.9 P <sub>90</sub> = 2.0 P <sub>99</sub> = 2.3							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-Sep	2.0	1.9	2.0	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1	1.9	2.0
2-Sep	1.9	1.9	1.9	1.9	2.0	Z	1.9	1.9	1.9	1.9	2.1	2.3	2.3	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.3
3-Sep	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
4-Sep	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0
5-Sep	2.1	2.0	Z	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	1.9	2.1
6-Sep	1.9	2.0	2.0	Z	2.0	1.9	2.0	2.0	2.3	2.3	2.3	2.4	2.3	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.4	
7-Sep	2.2	2.2	2.2	2.4	Z	2.4	2.3	2.3	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.4
8-Sep	2.0	2.0	2.1	2.3	2.1	Z	2.1	2.0	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	--	2.3	
9-Sep	Z	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.8	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	2.0	2.0	
10-Sep	2.0	Z	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.2	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	2.1	1.9	1.9	1.9	2.2	2.2	
11-Sep	2.0	1.9	Z	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	
12-Sep	2.0	1.8	1.9	Z	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	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0
13-Sep	2.0	2.0	2.2	2.1	Z	2.1	2.1	2.0	1.9	1.9	2.1	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	
14-Sep	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	2.0	1.9	1.9	1.9	2.0	1.9	2.0	
15-Sep	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
16-Sep	1.9	Z	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.1	1.9	1.9	1.9	2.1	2.1	
17-Sep	2.0	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	1.9	1.9	1.9	2.1	2.1	
18-Sep	2.1	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.0	2.1	1.9	1.9	1.9	2.1	2.1	
19-Sep	2.1	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.4	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.4	2.4
20-Sep	1.8	1.8	1.8	1.8	1.8	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	1.9	2.0
21-Sep	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	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
22-Sep	1.9	Z	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	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-Sep	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
24-Sep	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0
25-Sep	1.9	1.9	1.9	1.9	Z	1.9	2.0	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
26-Sep	1.9	1.9	2.0	2.0	2.0	Z	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0
27-Sep	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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-Sep	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
29-Sep	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0
30-Sep	2.0	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0	1.9	2.0
2.0 2.0 2.0 2.0 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9																								Diurnal Average								
2.2 2.2 2.2 2.4 2.1 2.4 2.3 2.3 2.3 2.3 2.4 2.4 2.3 2.1 1.9 2.0 2.0 1.9 2.0 2.0 2.0 2.0 2.1 2.1																								Diurnal Maximum								
Z - zerospan C - Calibration																																





Wood Buffalo Environmental Association  
Hourly Averages

Total Hydrocarbons (THC) - ppm  
Athabasca Valley - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	642	93.86	93.86
2.1 - 3.0	42	6.14	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - September 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	27	10	6	11	36	46	135	56	18	21	74	60	37	35	24	43	639
2.1 - 3.0	6	0	0	0	2	3	14	1	0	0	0	0	0	0	2	14	42
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>10</b>	<b>6</b>	<b>11</b>	<b>38</b>	<b>49</b>	<b>149</b>	<b>57</b>	<b>18</b>	<b>21</b>	<b>74</b>	<b>60</b>	<b>37</b>	<b>35</b>	<b>26</b>	<b>57</b>	<b>681</b>

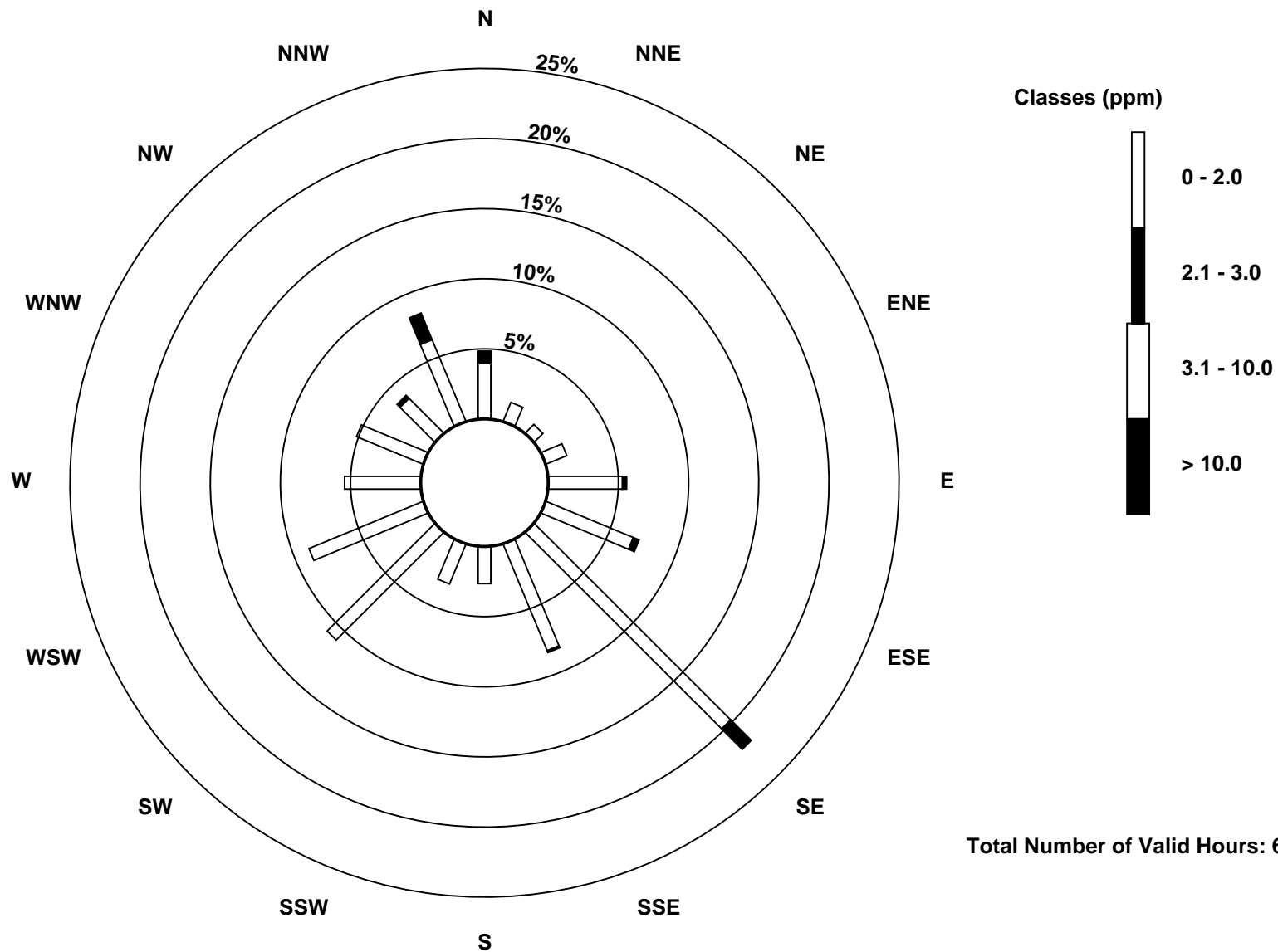
Total Number of Valid Hours: 681

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

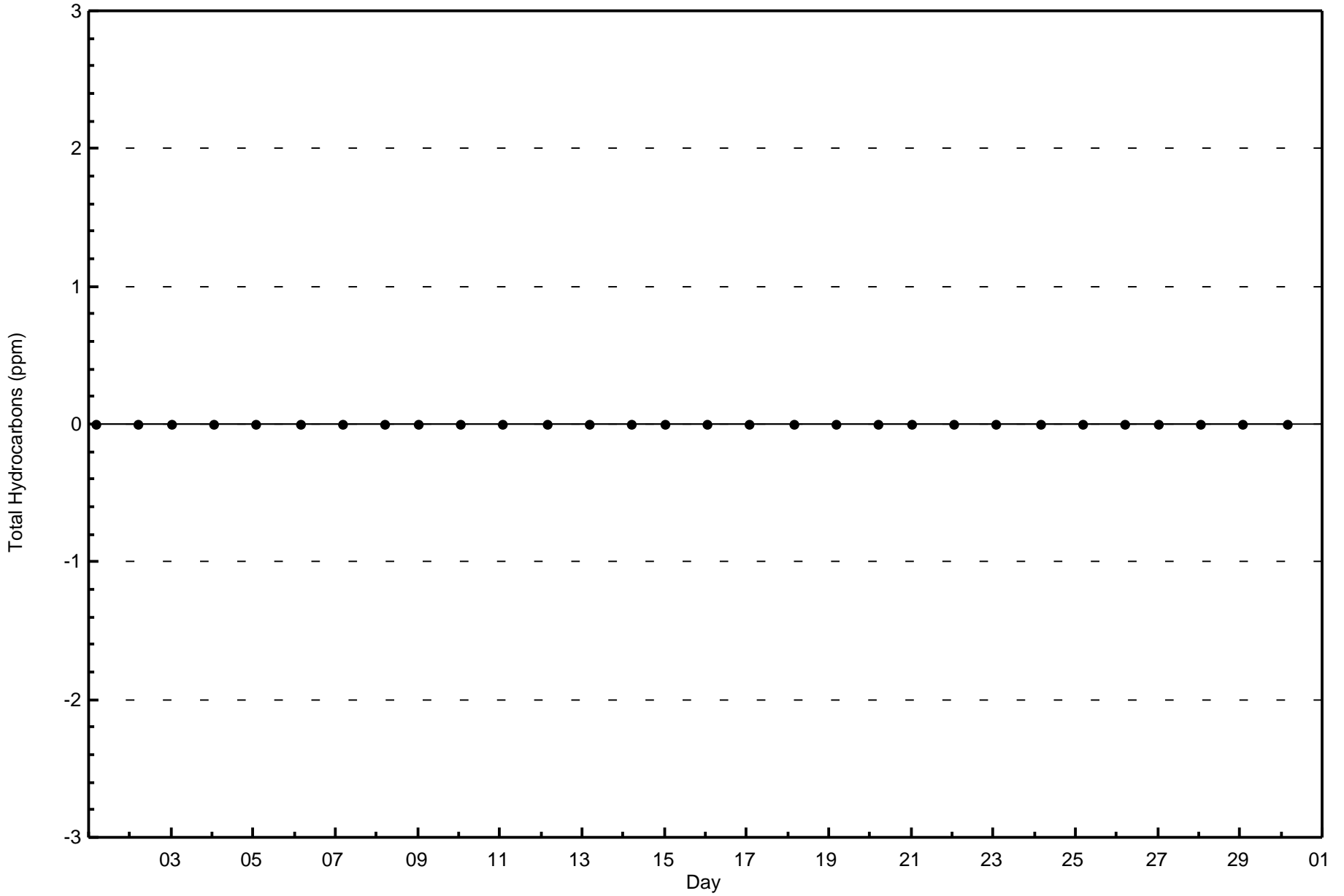
Total Hydrocarbons (THC) - ppm  
Athabasca Valley (AMS 7)

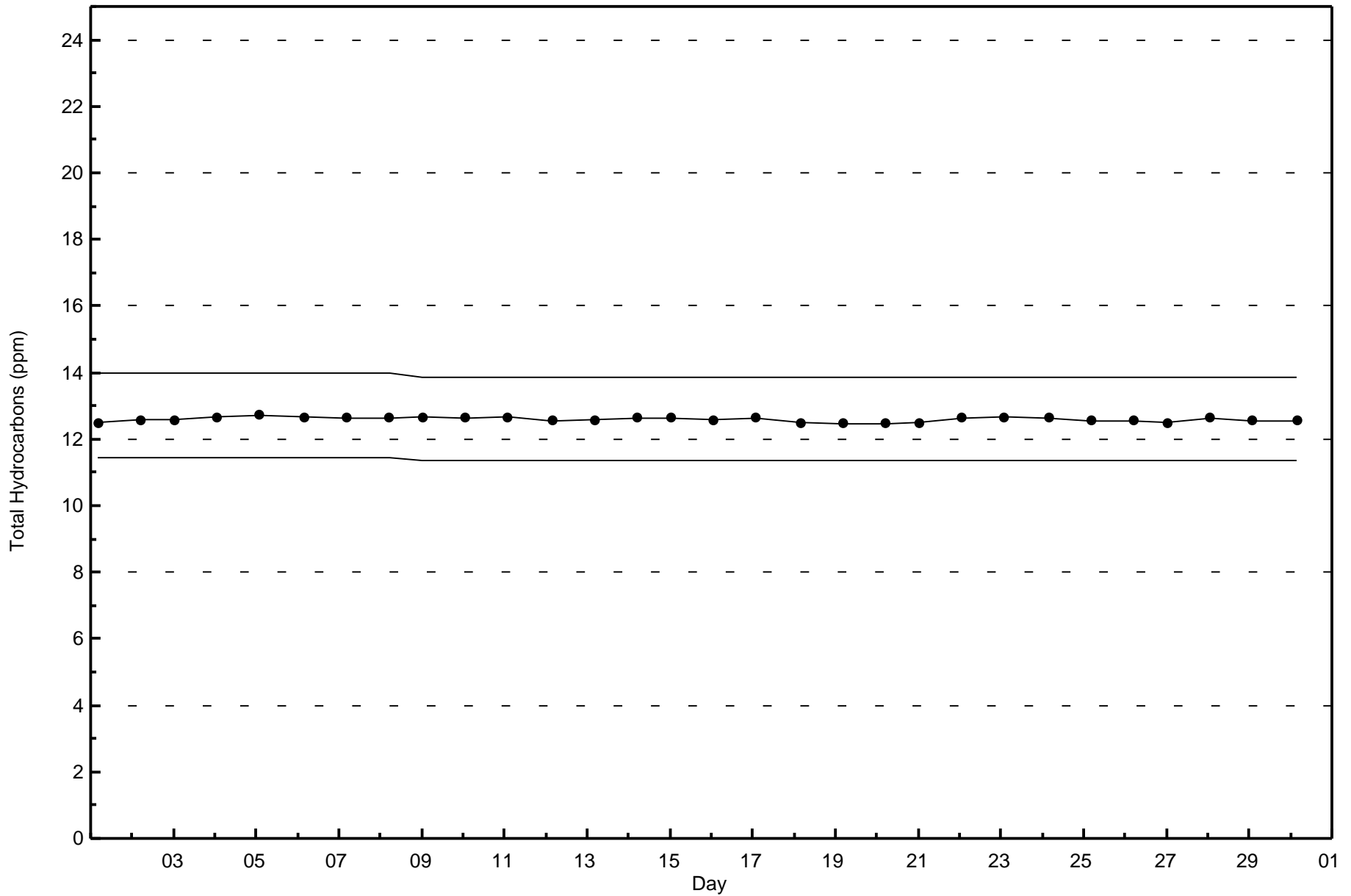




Wood Buffalo Environmental Association  
Zero Responses

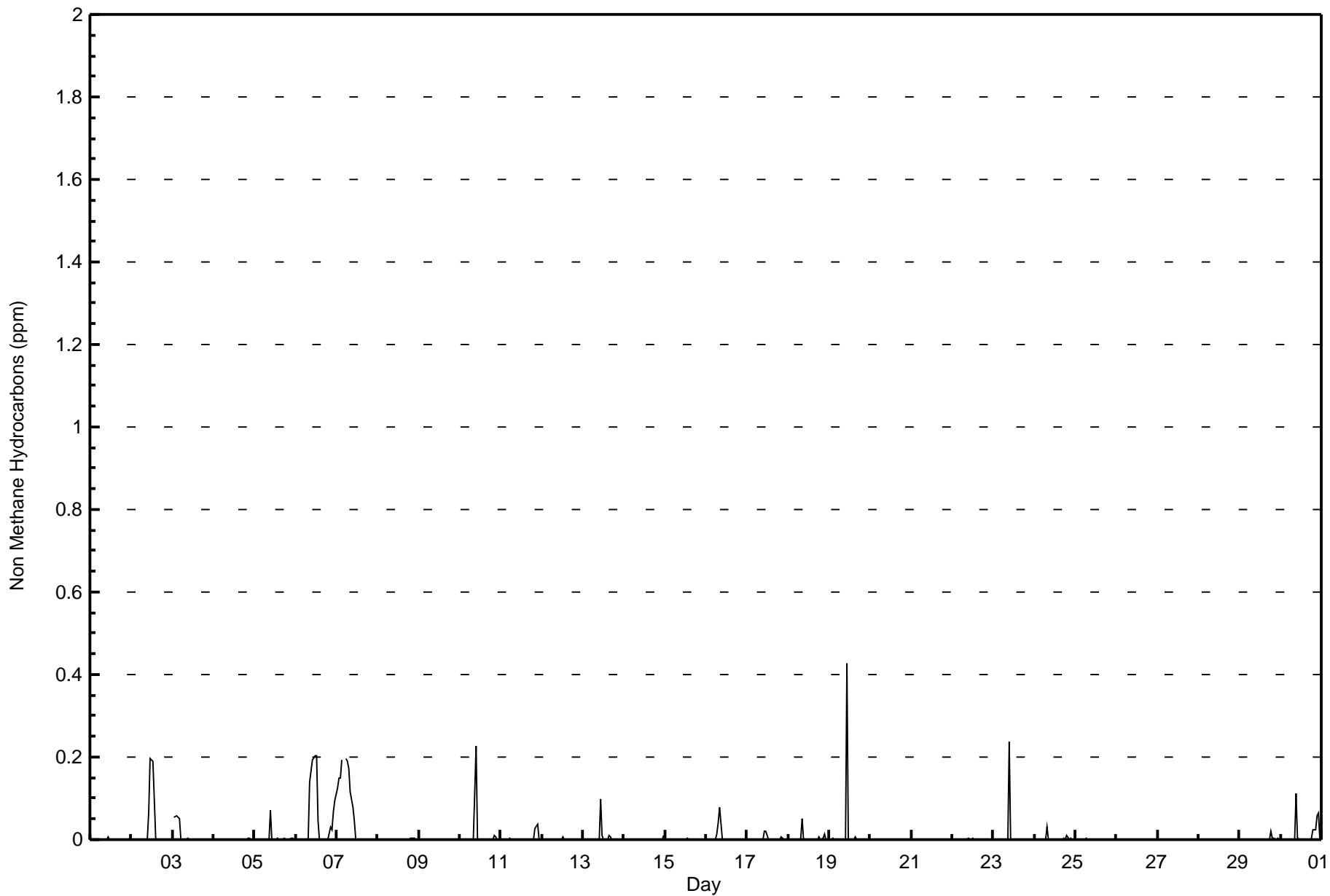
Total Hydrocarbons (THC) - ppm  
Athabasca Valley - September 2015







Maximum Value: 0.426 ppm on Sep 19 11:00		Maximum Daily Average: 0.061 ppm on Sep 7		Hours in Service:	720																						
Minimum Value: 0.000 ppm on Sep 1 01:00		Minimum Daily Average: 0.000 ppm on Sep 27		Hours of Data:	684																						
Maximum Diurnal Average: 0.031 ppm at hour 10		Minimum Diurnal Average: 0.000 ppm at hour 15		Hours of Missing Data:	36																						
Monthly Average: 0.008 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:	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-Sep	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.007	
2-Sep	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.064	0.198	0.189	0.100	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.024	0.198	
3-Sep	Z	0.055	0.056	0.053	0.052	0.000	0.000	0.000	0.000	0.002	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	0.010	0.056	
4-Sep	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.002	0.001	0.000	0.000	0.005
5-Sep	0.000	0.000	Z	0.000	0.001	0.001	0.000	0.000	0.000	0.001	0.071	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.003	0.000	0.001	0.000	0.004	0.002	0.000	0.004	0.071
6-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.002	0.138	0.168	0.194	0.205	0.203	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.023	0.068	0.097	0.051	0.205	
7-Sep	0.124	0.149	0.151	0.194	Z	0.198	0.188	0.173	0.115	0.077	0.044	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.061	0.198	
8-Sep	0.000	0.001	0.000	0.000	0.000	Z	0.000	0.000	C	C	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.002	0.003	0.000	0.000	--	0.004
9-Sep	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.002	
10-Sep	0.000	Z	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.226	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.006	0.000	0.000	0.011	0.226	
11-Sep	0.000	0.000	Z	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	0.028	0.036	0.001	0.000	0.003	0.036	
12-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	
13-Sep	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.099	0.009	0.000	0.000	0.001	0.009	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.099	
14-Sep	0.000	0.000	0.000	0.000	0.001	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	0.000	0.000	0.000	0.012	0.001	0.012	
15-Sep	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
16-Sep	0.000	Z	0.000	0.000	0.000	0.000	0.014	0.040	0.079	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.079	
17-Sep	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.001	0.000	0.002	0.022	
18-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.004	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.001	0.003	0.013	0.000	0.000	0.003	0.051	
19-Sep	0.000	0.000	0.003	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.426	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.426	
20-Sep	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	0.001	0.000	0.000	0.000	0.000	0.001	
21-Sep	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-Sep	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
23-Sep	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.239	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	0.010	0.239	
24-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.010	0.000	0.002	0.000	0.000	0.000	0.002	0.029	
25-Sep	0.000	0.000	0.000	0.000	Z	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.003	
26-Sep	0.000	0.000	0.000	0.000	0.001	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	
27-Sep	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-Sep	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	
29-Sep	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	0.019	0.003	0.002	0.000	0.003	0.000	0.001	0.019	
30-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.111	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.024	0.023	0.058	0.065	0.000	0.013	0.111	
																								Diurnal Average			
																								Diurnal Maximum			
0.005 0.008 0.008 0.010 0.002 0.008 0.007 0.008 0.013 0.031 0.030 0.015 0.014 0.005 0.000 0.001 0.000 0.000 0.001 0.001 0.004 0.005 0.005 0.004																											
0.124 0.149 0.151 0.194 0.052 0.198 0.188 0.173 0.138 0.239 0.426 0.205 0.203 0.100 0.003 0.009 0.007 0.005 0.019 0.024 0.030 0.058 0.068 0.097																											
Z - zerospan C - Calibration																											







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Athabasca Valley - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	623	91.08	91.08
0.006 - 0.05	31	4.53	95.61
0.06 - 0.1	16	2.34	97.95
> 0.1	14	2.05	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



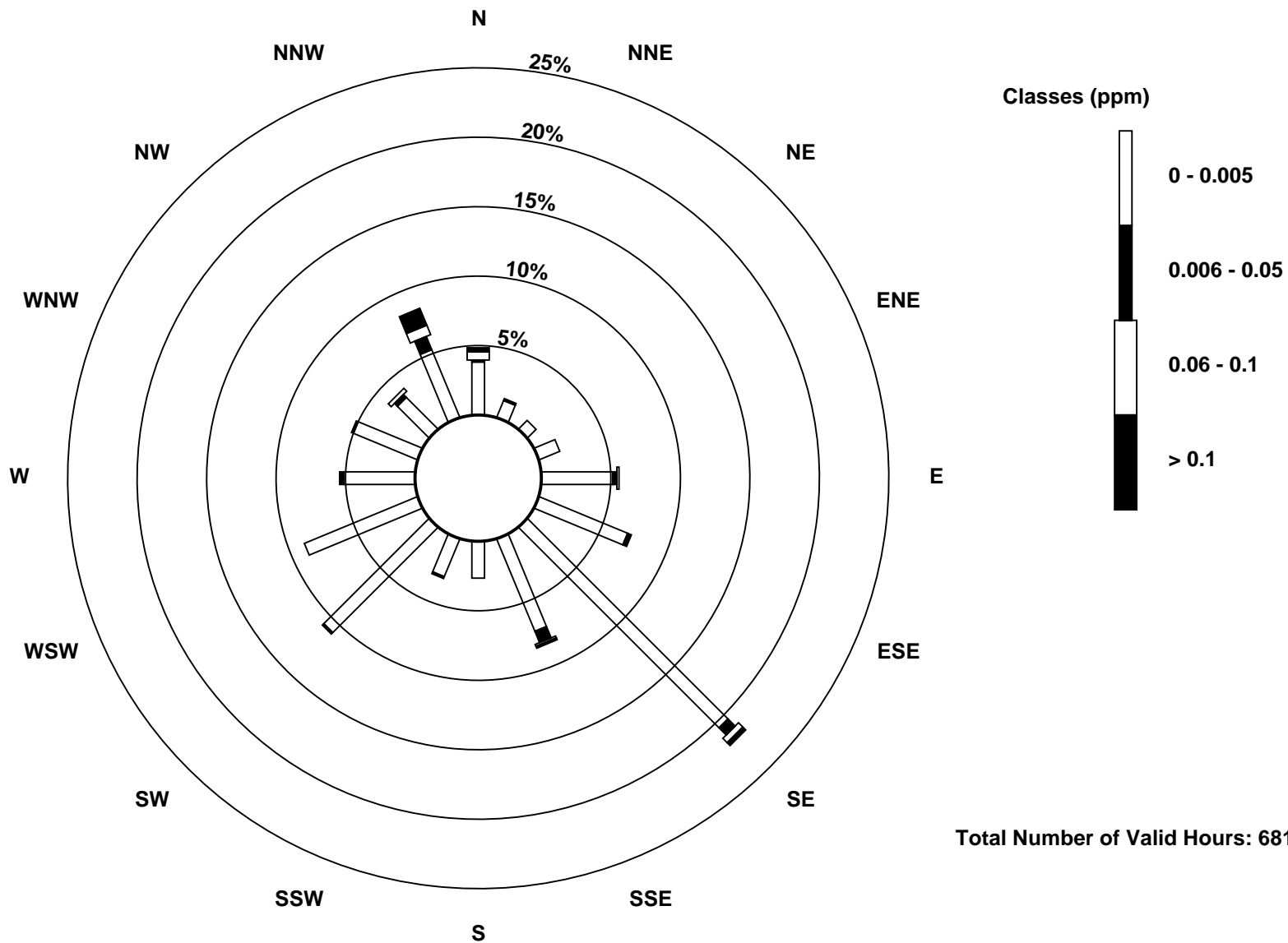
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Athabasca Valley - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 0.005	26	9	6	11	35	47	139	49	18	20	73	60	35	34	22	36	620
0.006 - 0.05	1	1	0	0	2	2	5	6	0	1	1	0	2	1	2	7	31
0.06 - 0.1	4	0	0	0	1	0	3	1	0	0	0	0	0	0	2	5	16
> 0.1	2	0	0	0	0	0	2	1	0	0	0	0	0	0	0	9	14
<b>Totals</b>	<b>33</b>	<b>10</b>	<b>6</b>	<b>11</b>	<b>38</b>	<b>49</b>	<b>149</b>	<b>57</b>	<b>18</b>	<b>21</b>	<b>74</b>	<b>60</b>	<b>37</b>	<b>35</b>	<b>26</b>	<b>57</b>	<b>681</b>

Total Number of Valid Hours: 681

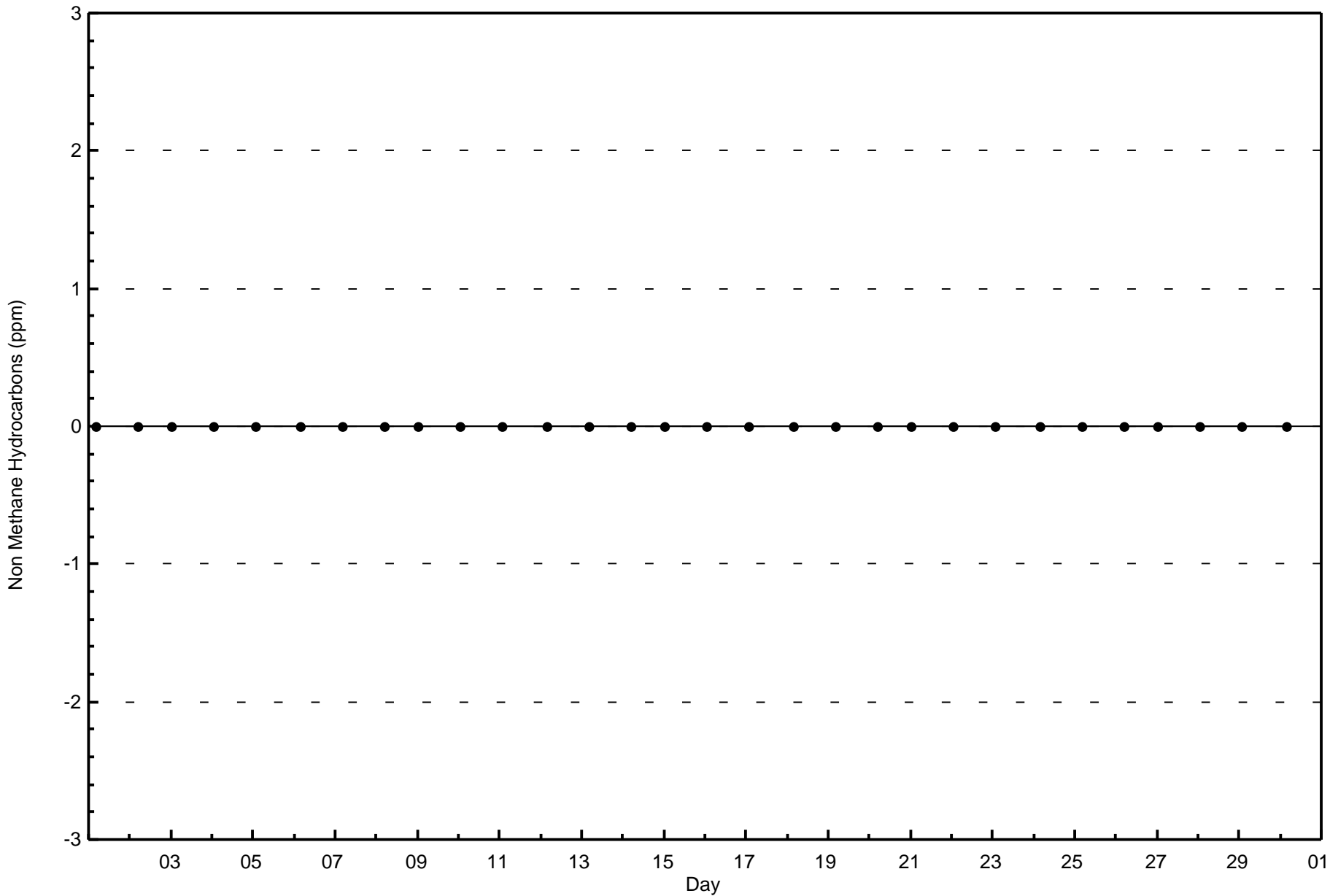
Total Number of Hours: 720

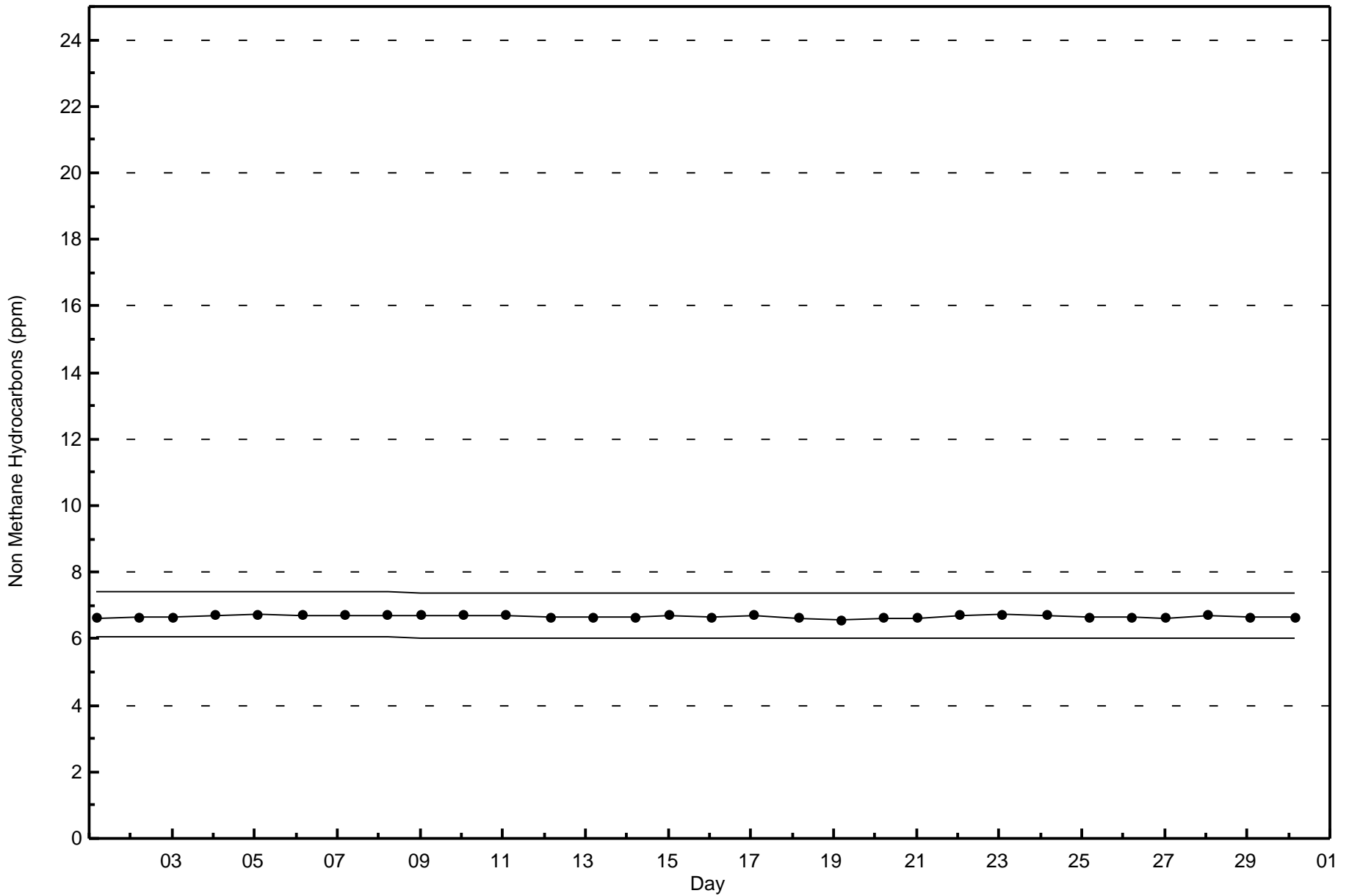




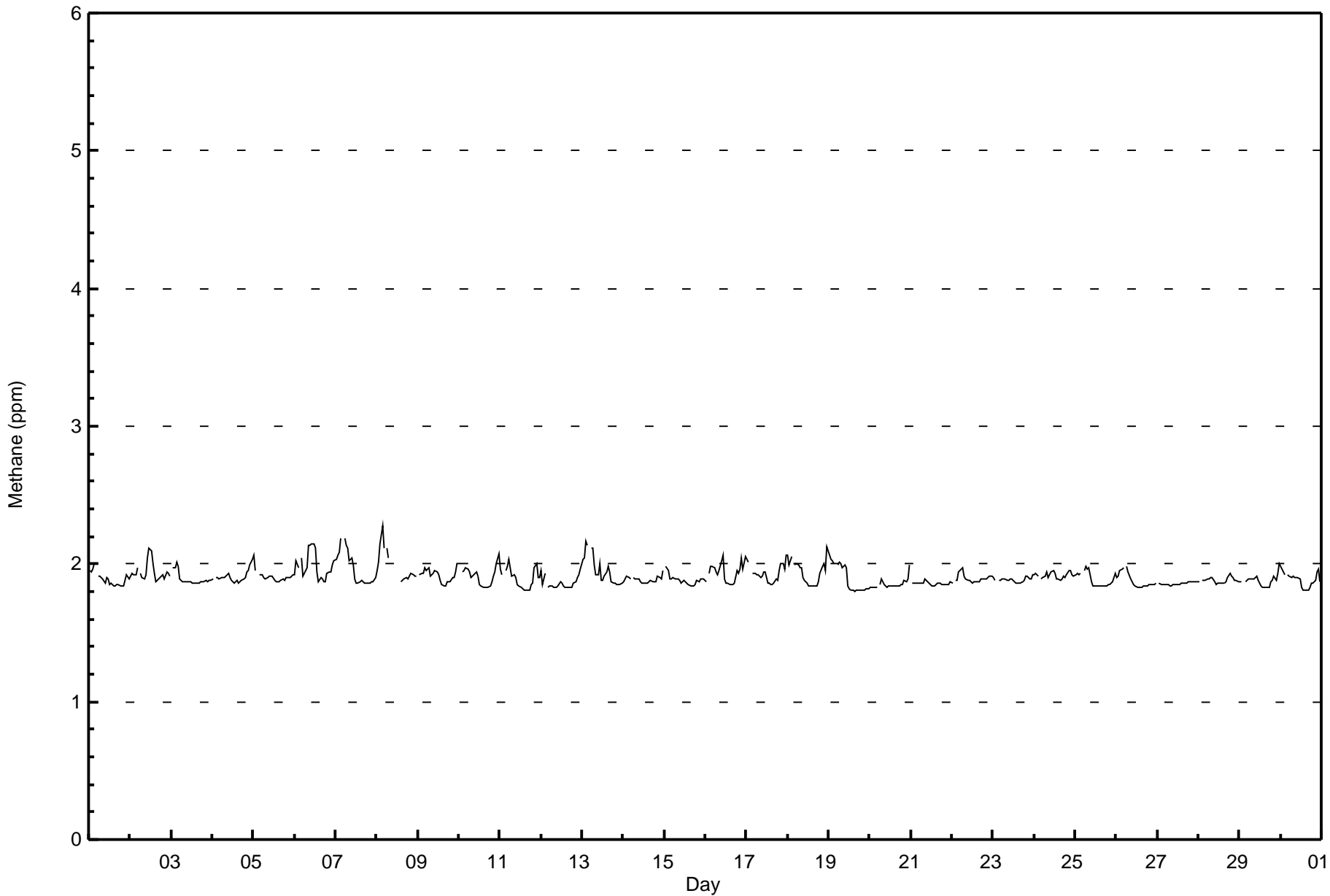
Wood Buffalo Environmental Association  
Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley - September 2015











**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Athabasca Valley - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	654	95.61	95.61
2.1 - 3.0	30	4.39	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Athabasca Valley - September 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	30	10	6	11	36	46	137	57	18	21	74	60	37	35	26	47	651
2.1 - 3.0	3	0	0	0	2	3	12	0	0	0	0	0	0	0	0	10	30
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>10</b>	<b>6</b>	<b>11</b>	<b>38</b>	<b>49</b>	<b>149</b>	<b>57</b>	<b>18</b>	<b>21</b>	<b>74</b>	<b>60</b>	<b>37</b>	<b>35</b>	<b>26</b>	<b>57</b>	<b>681</b>

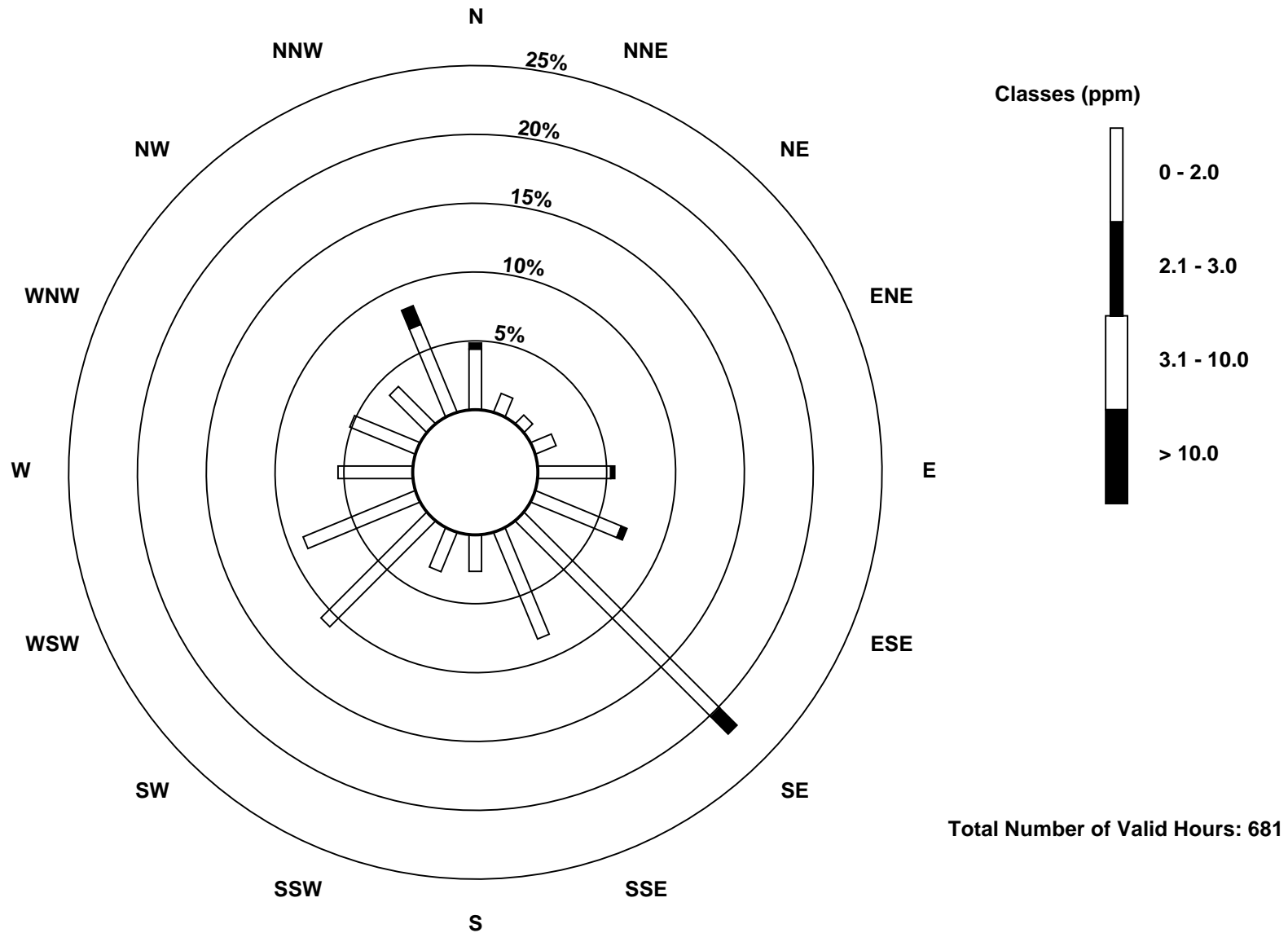
Total Number of Valid Hours: 681

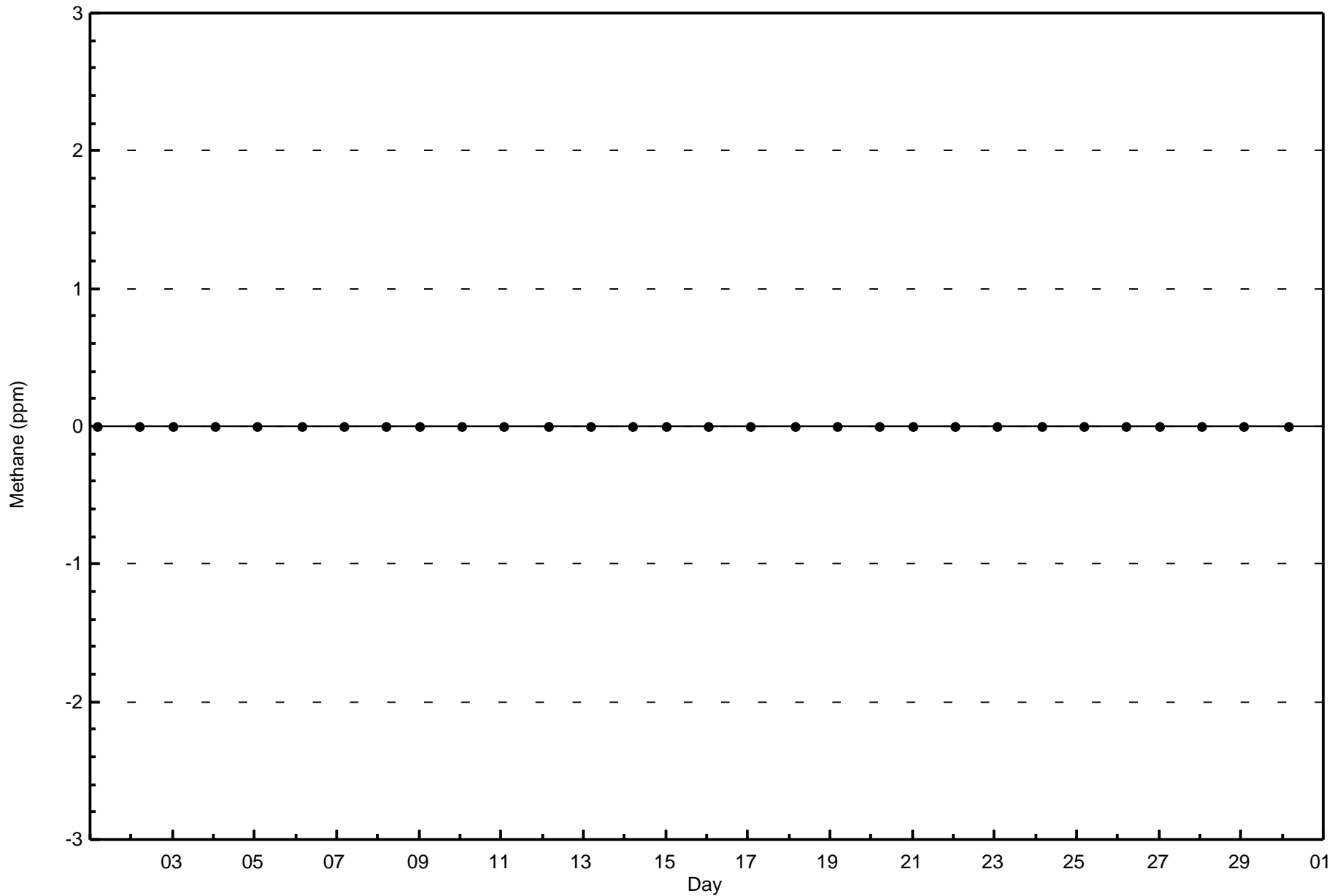
Total Number of Hours: 720

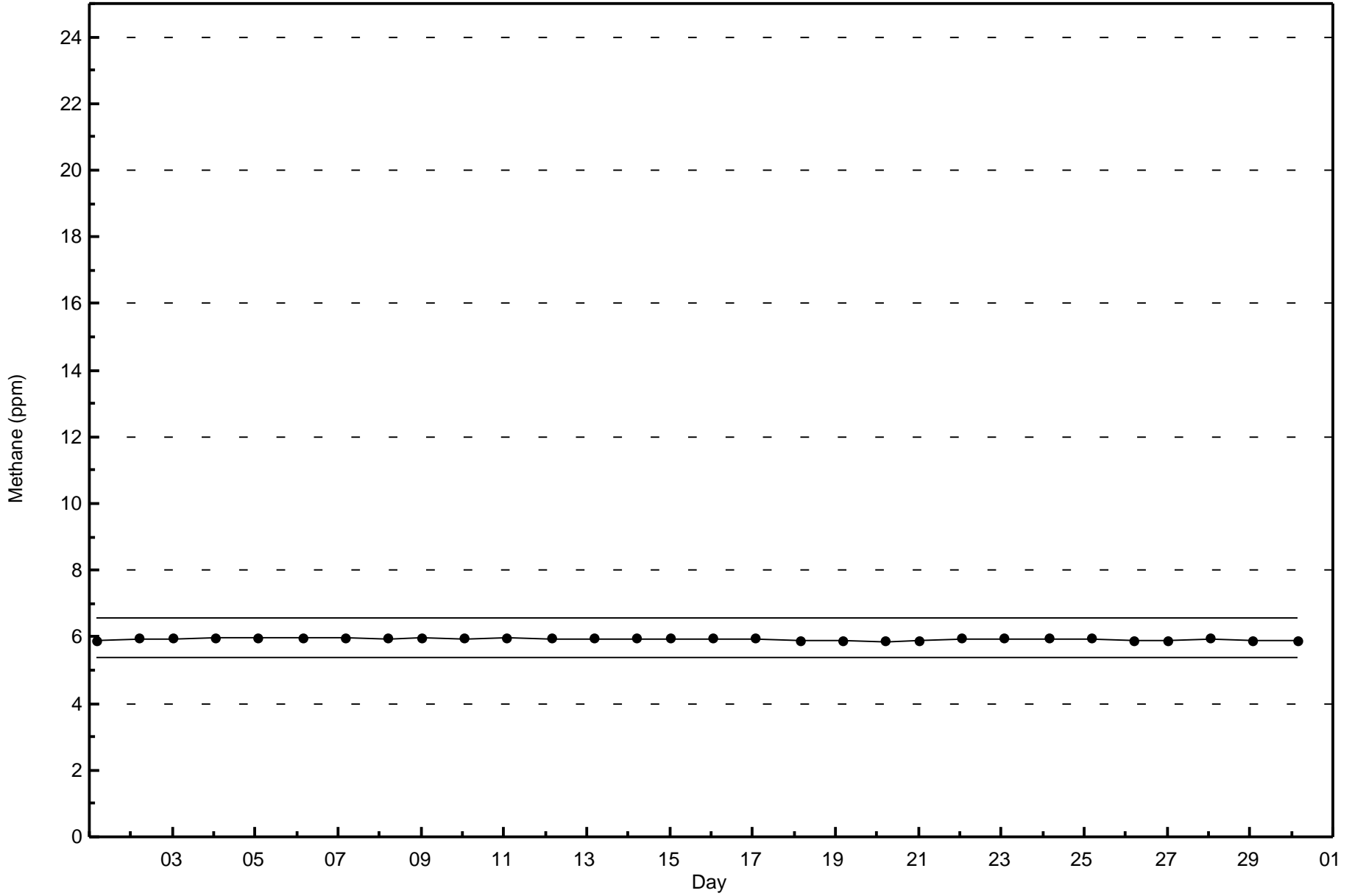


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley (AMS 7)







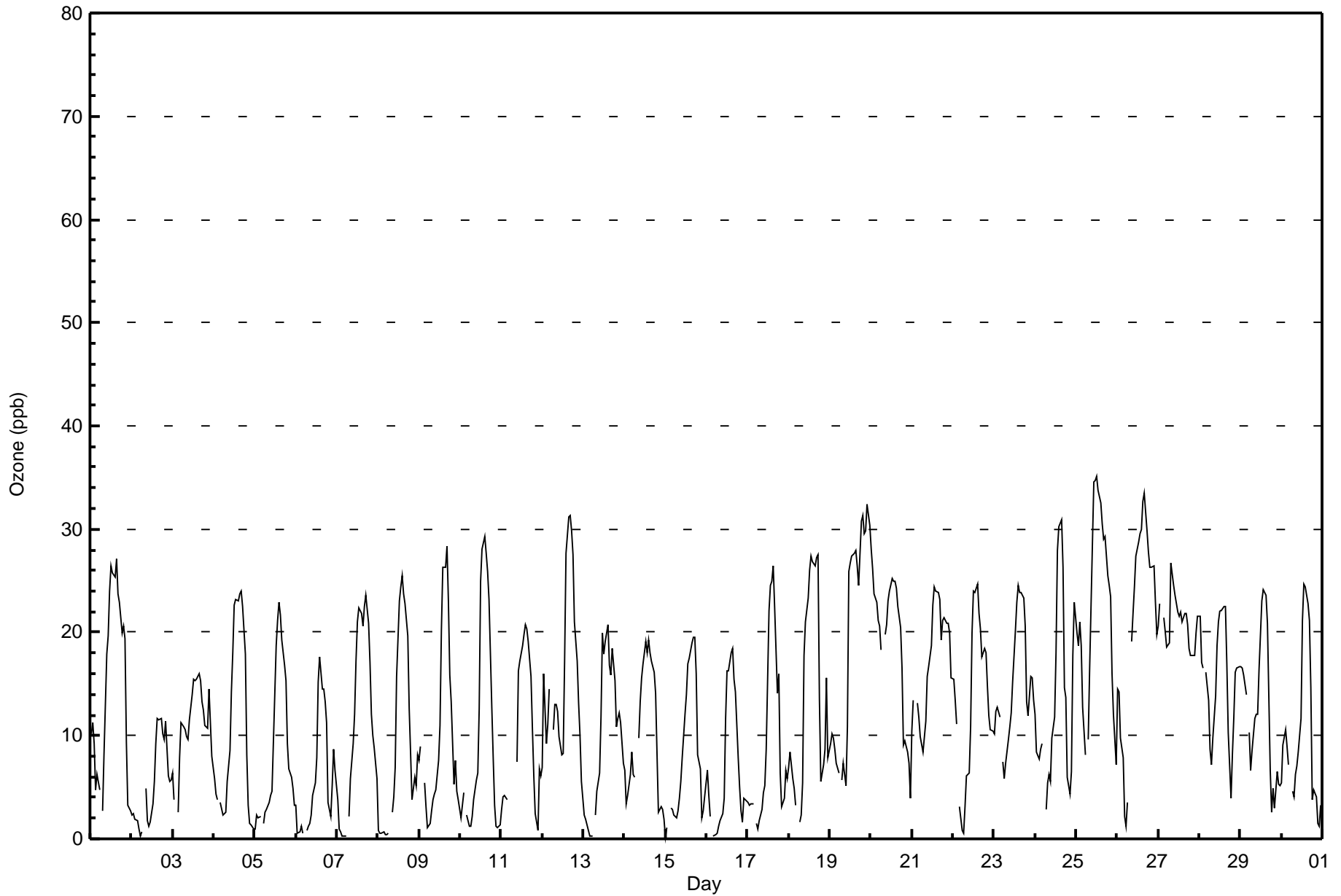


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 35 ppb on Sep 25 13:00	Maximum Daily Average: 22.7 ppb on Sep 25		Hours of Data:	687
Minimum Value: 0 ppb on Sep 15 01:00	Minimum Daily Average: 5.3 ppb on Sep 2		Hours of Missing Data:	33
Maximum Diurnal Average: 23.4 ppb at hour 15	Minimum Diurnal Average: 5.0 ppb at hour 7		Hours of Calibration:	33
Monthly Average: 12.8 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 2 Q <sub>1</sub> = 5 Median = 12 Q <sub>3</sub> = 20 P <sub>90</sub> = 25 P <sub>99</sub> = 33		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	10	11	9	5	6	5	Z	3	8	18	20	24	26	26	25	27	24	23	20	21	19	9	3	3	15.0	27
2-Sep	2	2	2	2	1	0	1	Z	5	2	1	2	3	6	9	12	12	12	10	10	11	6	6	6	5.3	12
3-Sep	6	4	Z	3	8	11	11	11	10	10	12	14	15	15	15	16	15	13	12	11	11	15	11	8	11.2	16
4-Sep	6	4	4	Z	4	2	2	3	6	9	14	18	23	23	23	24	24	23	18	8	3	1	1	1	10.6	24
5-Sep	1	2	2	2	Z	1	3	3	3	4	5	9	19	21	23	22	19	17	15	9	7	6	5	3	8.8	23
6-Sep	3	1	1	1	0	Z	1	1	1	2	4	5	8	15	18	14	15	13	11	4	2	5	9	7	6.2	18
7-Sep	4	1	1	0	0	0	Z	2	6	9	12	17	21	22	22	21	23	24	21	17	12	10	9	6	11.3	24
8-Sep	1	1	1	1	0	0	1	Z	3	4	7	16	23	24	25	24	23	20	13	8	4	6	5	8	9.4	25
9-Sep	8	9	Z	5	3	1	1	3	4	4	5	8	11	20	26	26	28	23	16	13	5	8	5	4	10.3	28
10-Sep	2	3	4	Z	2	1	1	2	4	6	6	13	25	28	29	28	26	23	13	8	3	1	1	1	10.1	29
11-Sep	3	4	4	4	Z	1	C	C	C	7	16	17	19	20	21	20	19	16	11	6	2	1	7	6	10.2	21
12-Sep	7	16	9	11	14	Z	11	13	13	12	10	8	8	17	28	31	31	30	28	21	17	13	10	6	15.9	31
13-Sep	2	2	1	1	0	0	Z	2	5	6	12	20	18	19	21	17	16	18	15	11	12	12	11	7	10.0	21
14-Sep	7	3	4	6	8	6	6	Z	10	13	16	17	19	18	19	18	17	16	14	8	3	3	3	2	10.3	19
15-Sep	0	1	Z	3	3	2	2	3	4	6	8	12	14	17	18	19	19	19	16	8	7	2	3	4	8.2	19
16-Sep	7	4	2	Z	0	0	1	1	2	2	4	12	16	16	18	18	16	14	8	5	3	2	4	4	6.9	18
17-Sep	4	3	3	3	Z	1	1	2	3	5	5	9	22	25	25	26	23	14	16	6	3	4	7	6	9.4	26
18-Sep	7	8	6	5	3	Z	2	2	5	18	21	23	26	27	27	26	27	28	14	6	7	9	16	8	13.9	28
19-Sep	9	10	10	9	7	6	Z	6	7	5	11	26	27	27	28	28	26	25	31	31	30	30	32	30	19.6	32
20-Sep	28	26	24	23	21	21	18	Z	20	21	23	24	25	25	25	24	23	20	17	9	9	8	7	4	19.4	28
21-Sep	10	13	Z	13	12	10	8	10	11	16	17	19	23	24	24	24	23	19	21	21	21	21	20	16	17.3	24
22-Sep	15	13	11	Z	3	1	1	3	6	6	11	20	24	24	25	22	20	18	18	18	15	12	11	10	13.4	25
23-Sep	10	12	13	12	Z	7	6	7	10	11	12	15	20	23	24	24	23	21	13	12	16	16	13	15.0	24	
24-Sep	12	8	8	9	9	Z	3	5	6	6	10	12	18	28	30	31	26	15	14	6	4	6	18	23	13.3	31
25-Sep	20	19	21	19	13	8	Z	10	16	29	35	35	35	34	33	30	29	29	25	25	24	16	12	7	22.7	35
26-Sep	14	14	10	8	2	1	4	Z	19	22	24	27	29	30	30	33	34	30	28	26	26	26	23	20	20.9	34
27-Sep	21	23	Z	21	20	19	19	27	26	25	24	22	22	22	21	22	22	21	18	18	18	18	20	22	21.2	27
28-Sep	22	17	17	Z	16	13	9	7	10	14	19	21	22	22	22	23	17	10	4	8	12	16	17	17	15.4	23
29-Sep	17	17	16	14	Z	10	7	8	12	12	12	16	23	24	24	24	21	7	3	5	3	6	5	5	12.6	24
30-Sep	5	9	11	9	7	Z	5	4	6	7	8	12	21	25	24	23	21	15	4	5	4	2	1	3	10.0	25

8.8	8.8	7.7	7.5	6.6	5.3	5.0	5.8	8.3	10.3	12.7	16.4	20.2	22.3	23.4	23.2	22.1	19.2	15.8	12.2	10.3	9.7	9.9	8.6	Diurnal Average	
28	26	24	23	21	21	19	27	26	29	35	35	35	34	33	33	34	30	31	31	30	30	32	30	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Athabasca Valley - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	518	75.40	75.40
21 - 50	169	24.60	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 687

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Athabasca Valley - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	25	9	4	11	37	40	147	54	16	14	39	23	19	18	12	47	515
21 - 50	8	1	1	0	1	9	4	2	3	6	33	40	17	19	14	11	169
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>	33	10	5	11	38	49	151	56	19	20	72	63	36	37	26	58	684

Total Number of Valid Hours: 684

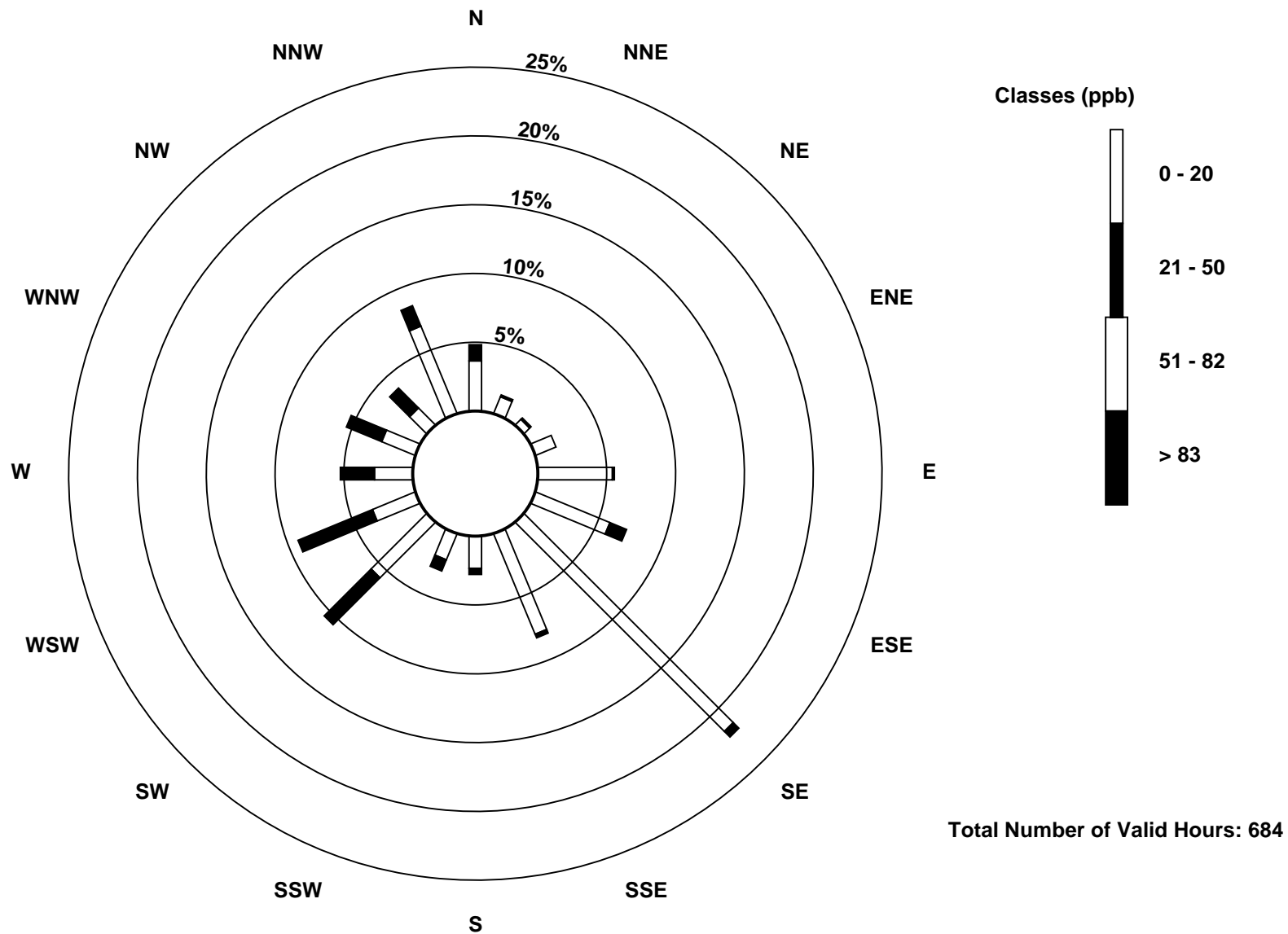
Total Number of Hours: 720





Wood Buffalo Environmental Association  
Wind Rose Sep 2015

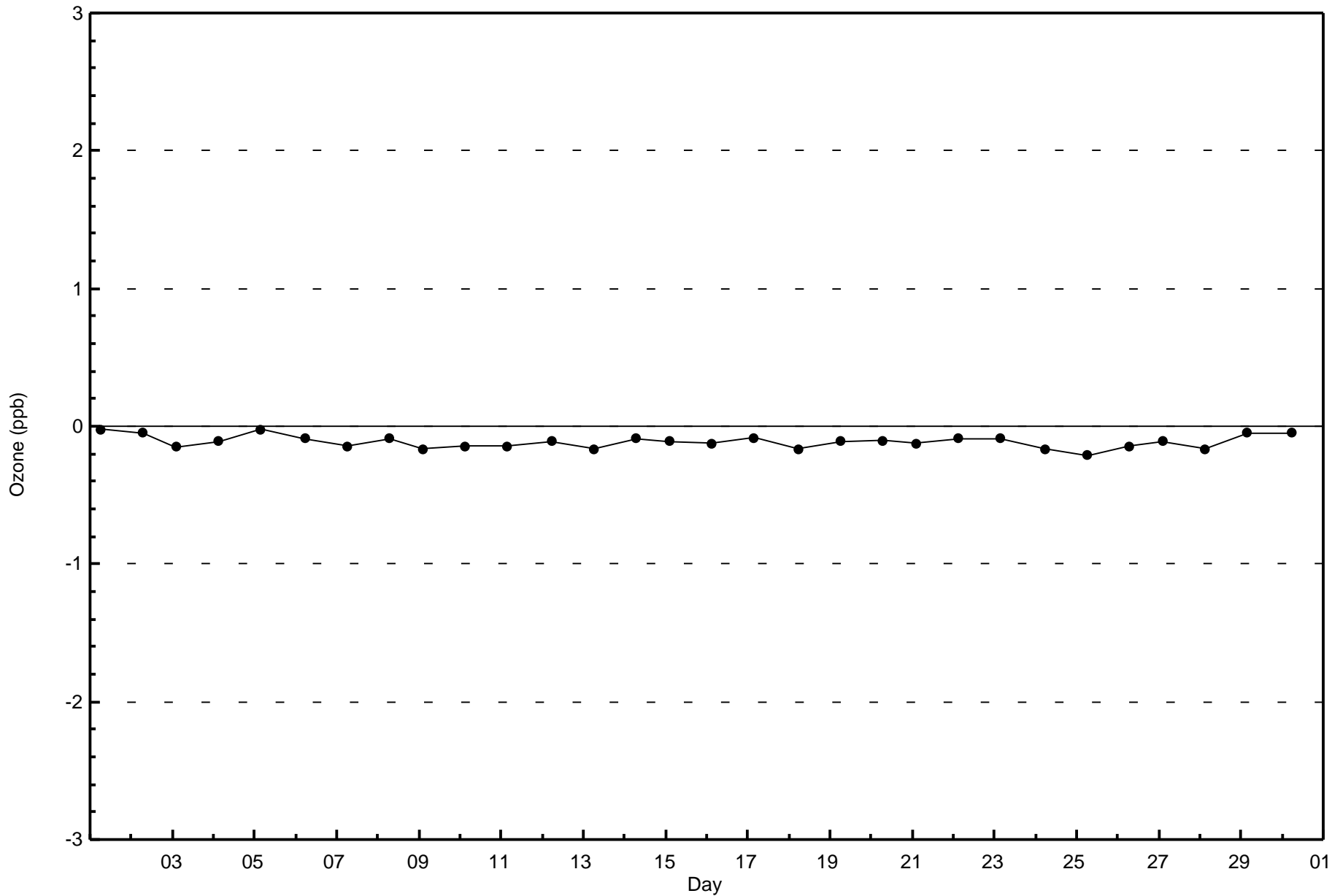
Ozone (O<sub>3</sub>) - ppb  
Athabasca Valley (AMS 7)

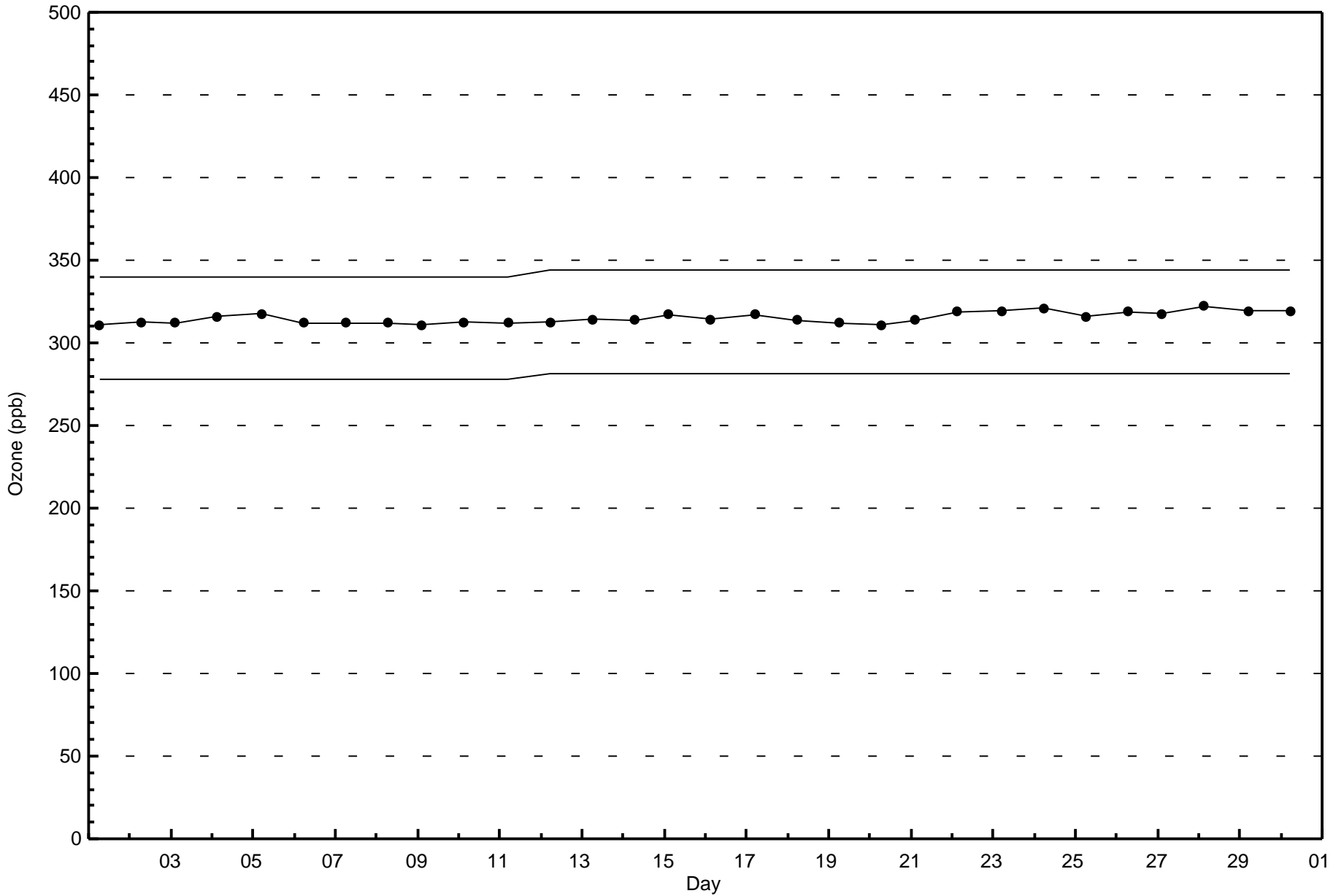




Wood Buffalo Environmental Association  
Zero Responses

Ozone (O<sub>3</sub>) - ppb  
Athabasca Valley - September 2015







Maximum Value: 23 ppb on Sep 22 07:00																		Maximum Daily Average: 5.5 ppb on Sep 16						Hours in Service: 720																									
Minimum Value: 0 ppb on Sep 3 06:00																		Minimum Daily Average: 0.1 ppb on Sep 3						Hours of Data: 684																									
Maximum Diurnal Average: 6.3 ppb at hour 7																		Minimum Diurnal Average: 0.7 ppb at hour 3						Hours of Missing Data: 36																									
Monthly Average: 2.7 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 3 P <sub>90</sub> = 8 P <sub>99</sub> = 16						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-Sep	0	0	0	2	Z	2	3	5	3	1	1	0	0	0	0	0	0	0	1	0	0	1	4	1	1.1	5																							
2-Sep	1	1	1	2	3	Z	7	3	1	6	21	20	16	10	3	1	2	1	1	0	0	0	0	0	4.5	21																							
3-Sep	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
4-Sep	0	Z	0	0	1	3	3	3	3	2	2	1	0	1	1	0	1	1	1	2	3	5	3	4	1.7	5																							
5-Sep	3	1	Z	1	2	3	2	3	3	5	7	4	1	2	1	2	2	2	2	2	3	2	1	0	2.4	7																							
6-Sep	1	3	2	Z	3	1	2	5	14	13	12	10	6	2	1	1	1	1	1	1	1	0	0	0	3.6	14																							
7-Sep	0	2	2	14	Z	19	13	12	5	3	4	1	0	0	1	1	1	1	1	1	1	0	0	0	3.6	19																							
8-Sep	3	4	3	5	6	Z	16	16	C	C	C	C	C	C	1	2	2	2	2	2	4	0	3	0	--	16																							
9-Sep	Z	0	1	1	3	10	9	7	7	8	10	9	5	2	1	1	0	0	2	2	4	1	1	3	3.8	10																							
10-Sep	2	Z	1	2	2	6	9	10	11	9	8	5	1	1	1	1	1	1	5	2	4	12	10	7	4.8	12																							
11-Sep	2	1	Z	2	2	5	9	8	12	10	1	1	0	1	1	1	1	2	2	2	6	12	6	4	3.9	12																							
12-Sep	3	0	1	Z	1	1	2	1	1	1	3	4	3	2	0	0	0	0	0	1	2	1	1	1	1.3	4																							
13-Sep	2	1	2	2	Z	8	9	6	3	5	6	2	2	2	1	2	1	0	1	1	0	0	0	1	2.5	9																							
14-Sep	0	1	0	0	0	Z	1	2	2	2	2	2	1	2	1	1	1	2	2	1	3	1	1	2	1.2	3																							
15-Sep	Z	2	1	0	1	2	7	10	12	9	6	4	3	1	2	1	1	2	4	4	3	4	2	0	3.4	12																							
16-Sep	0	Z	0	5	6	6	10	10	13	16	16	4	2	3	2	2	3	2	5	4	4	6	4	3	5.5	16																							
17-Sep	1	2	Z	2	3	7	11	11	12	11	11	8	1	1	1	0	4	7	3	5	13	5	2	1	5.2	13																							
18-Sep	1	1	1	Z	3	5	8	11	12	2	1	1	1	0	1	1	1	1	7	4	4	6	1	1	3.1	12																							
19-Sep	1	1	1	1	Z	2	3	4	4	11	12	1	2	0	1	0	0	0	0	0	0	0	0	0	1.9	12																							
20-Sep	0	0	0	0	0	Z	1	3	1	1	1	0	1	0	0	0	0	0	0	0	1	0	0	1	0.5	3																							
21-Sep	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
22-Sep	0	Z	0	1	7	18	23	11	5	9	7	3	1	1	1	2	2	2	1	1	1	1	0	0	4.3	23																							
23-Sep	0	0	Z	1	1	2	3	3	3	4	4	3	1	1	1	1	1	0	1	2	1	1	0	0	1.5	4																							
24-Sep	0	0	0	Z	1	3	8	6	5	7	2	3	1	1	0	0	1	2	0	3	4	1	0	0	2.1	8																							
25-Sep	0	0	0	0	Z	3	7	2	1	0	0	0	0	0	0	0	0	0	1	1	0	1	2	3	1.0	7																							
26-Sep	1	0	0	1	12	Z	11	6	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.6	12																							
27-Sep	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1																							
28-Sep	0	Z	0	1	1	0	5	8	10	7	4	1	0	1	1	1	5	11	9	3	2	0	0	0	3.0	11																							
29-Sep	0	0	Z	1	1	2	4	4	4	5	7	4	1	1	1	1	2	11	12	6	6	3	4	3	3.5	12																							
30-Sep	1	1	0	Z	2	2	4	6	5	6	7	5	2	1	1	2	2	4	12	7	9	11	9	3	4.5	12																							
																								1.0	0.8	0.7	1.7	2.4	4.4	6.3	5.8	5.4	5.4	5.3	3.3	1.8	1.3	0.8	0.8	1.1	1.9	2.5	1.9	2.6	2.5	1.9	1.3	Diurnal Average	
																								3	4	3	14	12	19	23	16	14	16	21	20	16	10	3	2	5	11	12	7	13	12	10	7	Diurnal Maximum	
Z - zerospan C - Calibration																																																	

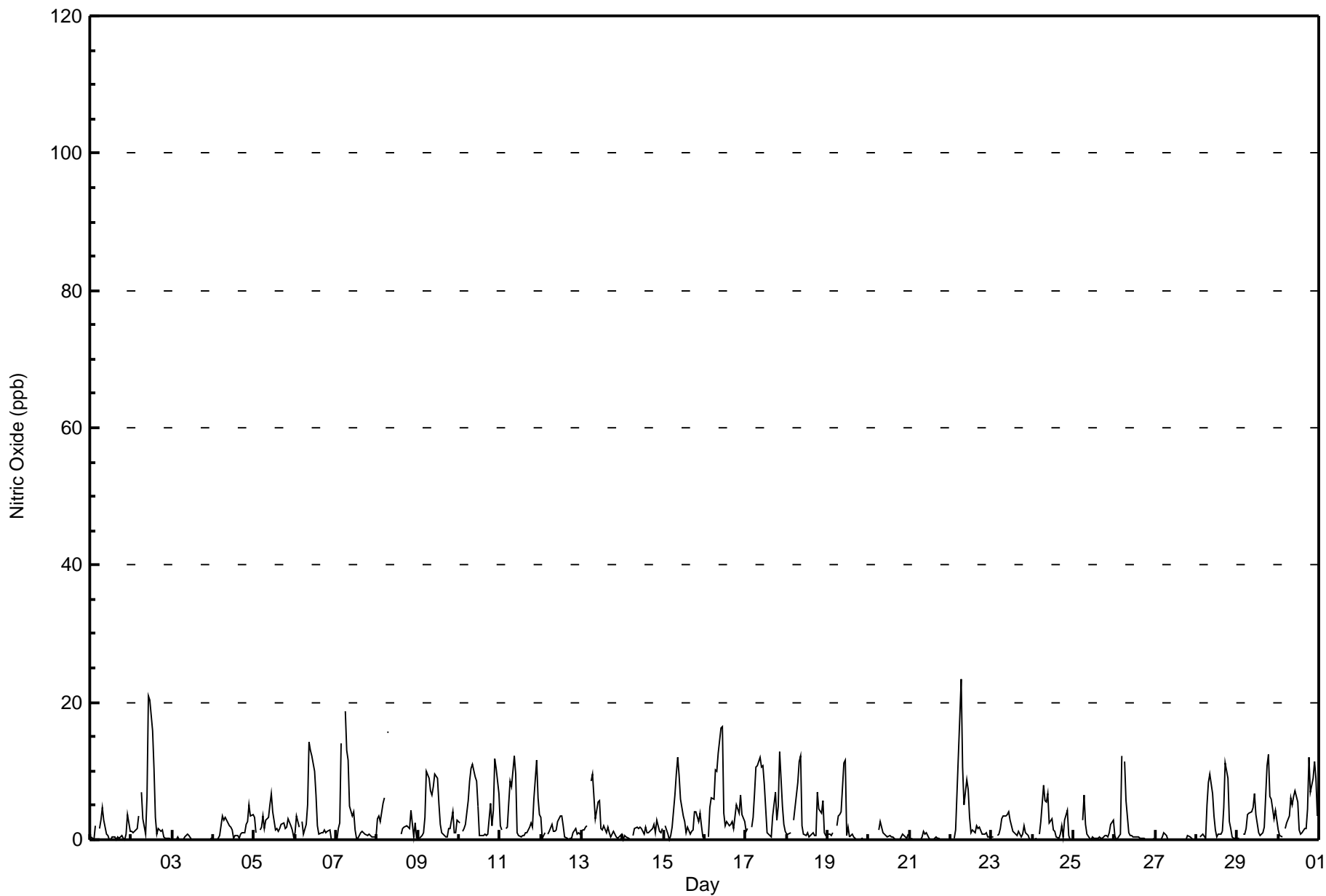


Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Athabasca Valley - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Athabasca Valley - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	682	99.71	99.71
21 - 40	2	0.29	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Athabasca Valley - September 2015**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	33	10	6	11	38	48	149	57	18	21	74	60	37	35	26	56	679
21 - 40	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	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>	33	10	6	11	38	49	149	57	18	21	74	60	37	35	26	57	681

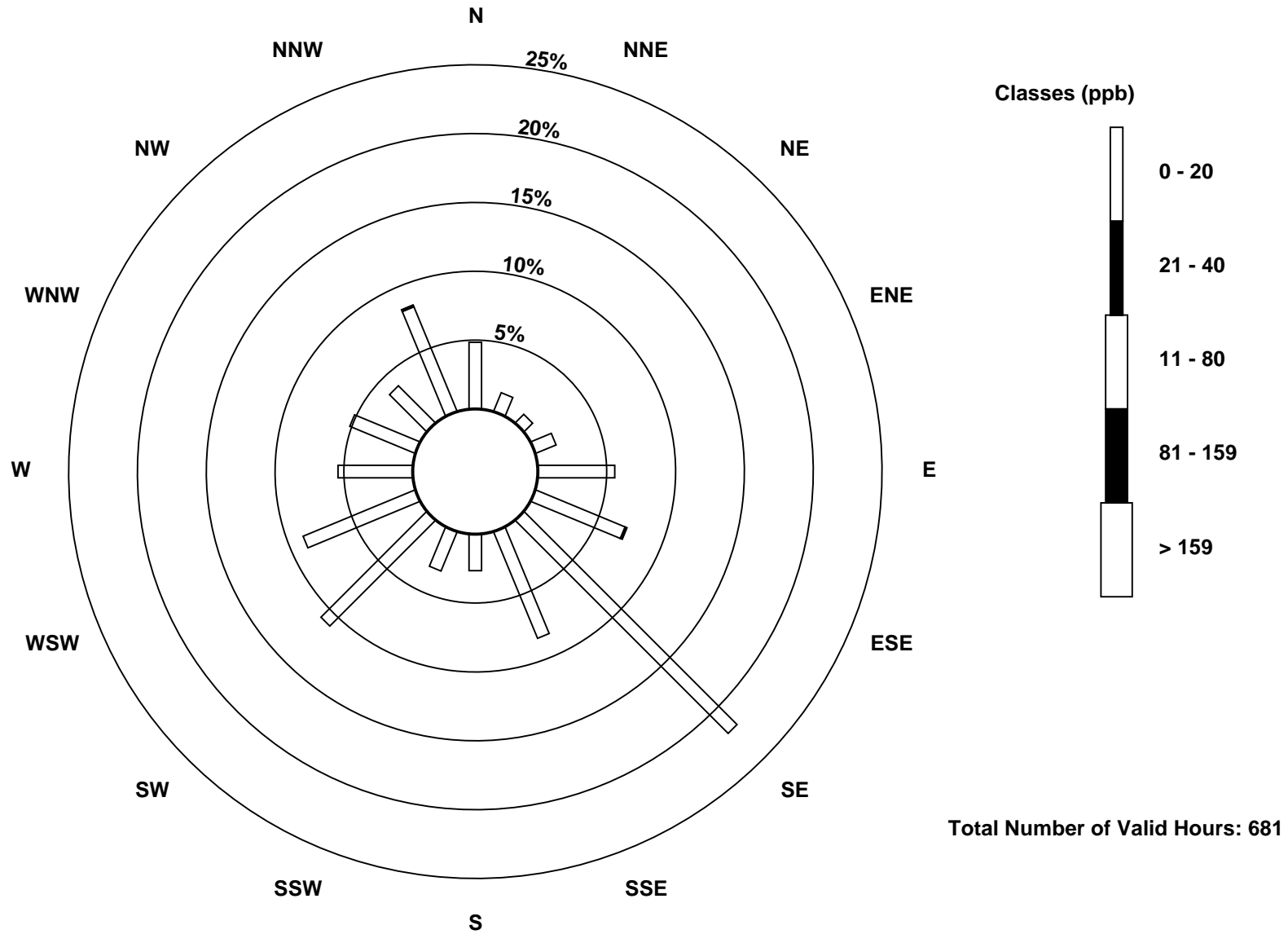
Total Number of Valid Hours: 681

Total Number of Hours: 720

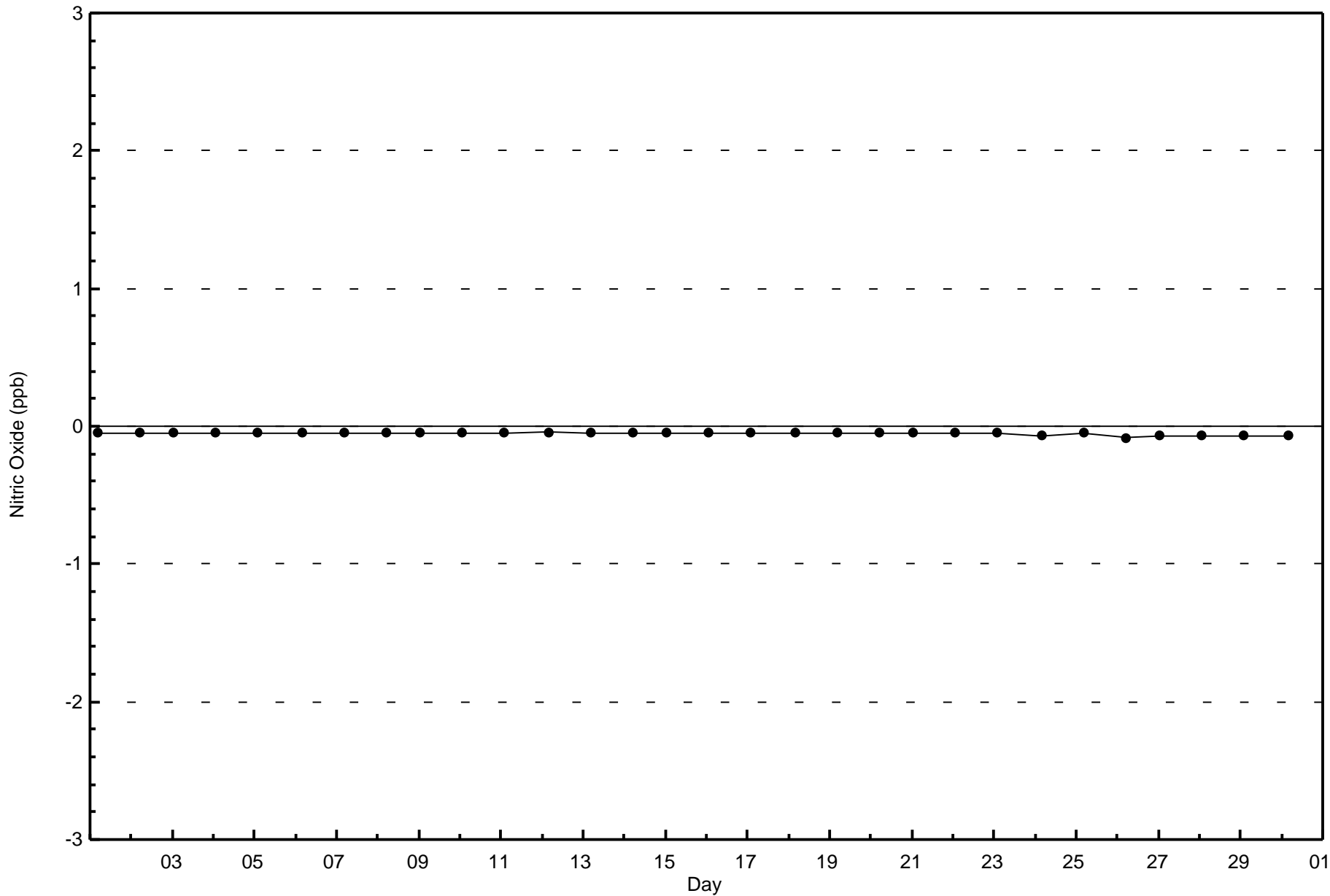


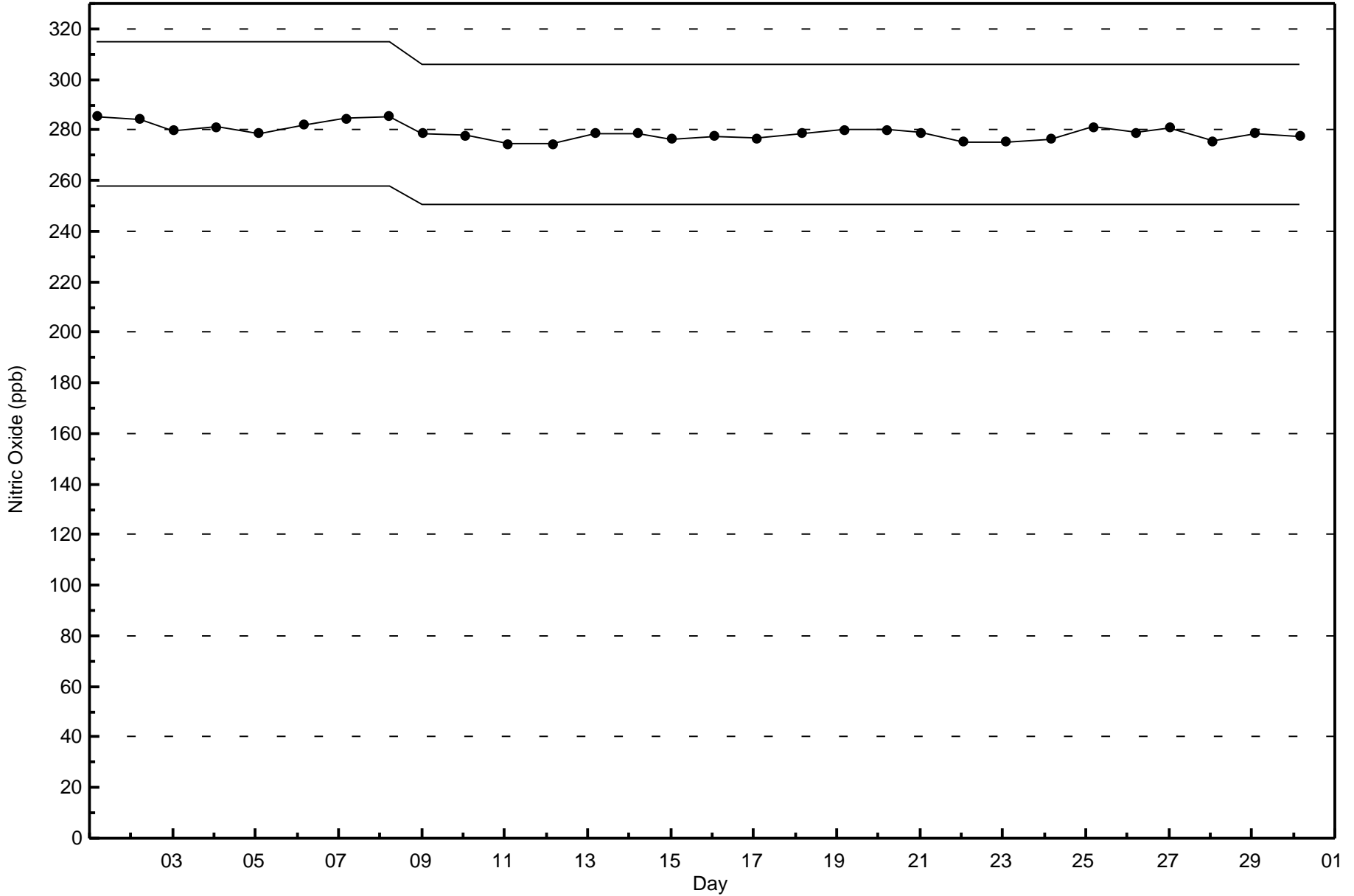
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitric Oxide (NO) - ppb  
Athabasca Valley (AMS 7)









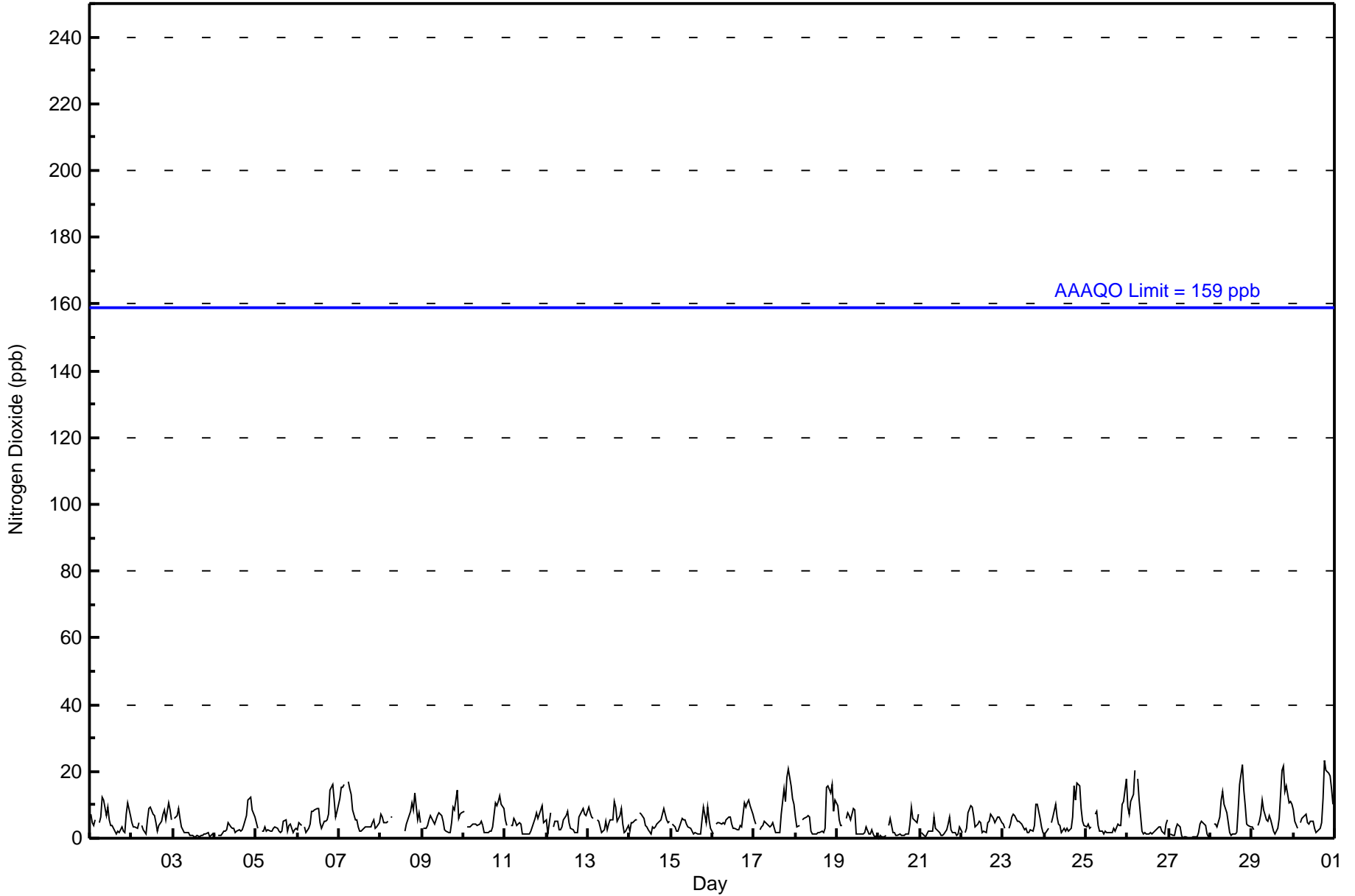


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 23 ppb on Sep 30 19:00	Maximum Daily Average: 8.4 ppb on Sep 30		Hours of Data:	684
Minimum Value: 0 ppb on Sep 27 12:00	Minimum Daily Average: 1.6 ppb on Sep 27		Hours of Missing Data:	36
Maximum Diurnal Average: 8.7 ppb at hour 21	Minimum Diurnal Average: 2.0 ppb at hour 15		Hours of Calibration:	36
Monthly Average: 5.1 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 4 Q <sub>3</sub> = 6 P <sub>90</sub> = 10 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-Sep	7	5	4	6	Z	5	7	12	12	7	9	5	4	4	2	1	2	2	3	2	2	7	10	7	5.4	12
2-Sep	5	4	3	3	5	Z	4	3	1	6	9	9	7	7	5	2	4	5	7	8	6	10	8	5	5.5	10
3-Sep	Z	6	7	9	6	4	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2.2	9
4-Sep	1	Z	1	1	1	2	2	3	5	3	3	3	2	2	3	2	3	4	7	11	12	12	8	6	4.1	12
5-Sep	5	3	Z	2	2	3	2	3	2	2	3	4	3	2	2	2	5	5	2	4	4	2	3	3	3.0	5
6-Sep	2	5	4	Z	3	2	3	4	8	8	9	9	9	5	3	5	5	5	7	14	16	12	6	8	6.6	16
7-Sep	12	15	15	16	Z	17	15	13	9	6	5	4	2	2	3	4	3	3	3	5	5	3	3	5	7.3	17
8-Sep	7	6	5	5	5	Z	6	7	C	C	C	C	C	C	2	4	5	8	11	9	14	6	8	5	--	14
9-Sep	Z	3	3	4	6	7	5	4	5	7	8	7	5	3	2	2	2	5	9	8	14	6	7	8	5.6	14
10-Sep	8	Z	3	3	3	4	4	4	4	4	5	4	2	2	2	2	2	3	11	10	11	13	10	9	5.4	13
11-Sep	5	4	Z	4	4	6	5	4	5	4	1	1	1	1	1	2	3	6	8	6	7	10	5	5	4.3	10
12-Sep	6	1	8	Z	3	5	5	2	3	3	6	7	8	5	3	3	2	2	2	7	8	9	7	7	4.7	9
13-Sep	9	8	7	6	Z	6	5	3	2	3	5	3	4	5	6	11	9	5	7	9	4	2	2	4	5.4	11
14-Sep	2	5	5	6	5	Z	8	7	6	4	3	3	1	4	3	4	4	5	6	7	9	6	5	5	4.8	9
15-Sep	Z	4	3	2	2	4	6	5	5	4	3	3	2	1	2	1	1	1	5	9	5	9	5	3	3.9	9
16-Sep	1	Z	4	5	5	4	5	4	6	7	7	4	3	3	3	3	4	4	11	9	11	11	10	7	5.6	11
17-Sep	5	4	Z	3	3	4	5	5	4	3	4	5	2	2	2	2	7	15	11	18	21	16	12	10	7.0	21
18-Sep	7	4	4	Z	6	6	6	7	7	2	1	1	1	2	2	2	2	3	15	16	14	16	8	12	6.1	16
19-Sep	10	5	4	4	Z	6	8	7	6	9	9	1	1	1	1	1	2	3	1	1	2	1	1	1	3.7	10
20-Sep	0	1	1	0	1	Z	4	6	2	2	1	1	1	1	1	1	1	1	4	9	6	5	5	7	2.6	9
21-Sep	Z	2	1	1	1	2	2	2	6	3	3	2	1	1	1	3	4	6	2	2	2	1	1	3	2.2	6
22-Sep	2	Z	2	3	8	10	9	7	3	4	5	5	2	2	2	5	5	7	6	5	6	6	6	5	4.9	10
23-Sep	4	3	Z	3	4	6	7	7	5	5	5	4	3	3	2	2	3	2	4	10	10	6	3	2	4.4	10
24-Sep	1	2	3	Z	5	7	10	6	4	4	2	3	2	3	2	3	6	16	11	17	16	9	5	4	6.1	17
25-Sep	3	4	3	4	Z	7	8	4	2	2	1	2	2	2	2	2	3	2	4	4	4	10	11	18	4.5	18
26-Sep	9	7	11	13	20	Z	18	12	2	1	2	1	1	2	1	2	2	3	3	3	2	1	4	5	5.5	20
27-Sep	Z	1	1	1	3	4	4	1	0	0	0	0	0	0	0	0	1	2	4	5	4	4	1	0	1.6	5
28-Sep	1	Z	4	4	4	6	11	14	10	8	5	2	1	1	1	2	9	16	22	15	10	4	4	4	6.8	22
29-Sep	3	3	Z	4	5	7	11	9	5	5	7	6	2	1	2	3	6	21	21	14	16	11	11	10	7.9	21
30-Sep	8	5	3	Z	5	6	7	7	5	4	5	5	3	2	2	3	5	12	23	20	20	19	15	10	8.4	23

5.0	4.3	4.3	4.4	4.5	5.6	6.4	5.7	4.6	4.2	4.3	3.6	2.6	2.3	2.0	2.6	3.7	5.8	7.8	8.6	8.7	7.5	6.2	5.9	Diurnal Average	
12	15	15	16	20	17	18	14	12	9	9	9	9	7	6	11	9	21	23	20	21	19	15	18	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Athabasca Valley - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	679	99.27	99.27
21 - 40	5	0.73	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	33	10	6	11	38	49	148	55	18	20	73	60	37	35	26	57	676
21 - 40	0	0	0	0	0	0	1	2	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>	<b>33</b>	<b>10</b>	<b>6</b>	<b>11</b>	<b>38</b>	<b>49</b>	<b>149</b>	<b>57</b>	<b>18</b>	<b>21</b>	<b>74</b>	<b>60</b>	<b>37</b>	<b>35</b>	<b>26</b>	<b>57</b>	<b>681</b>

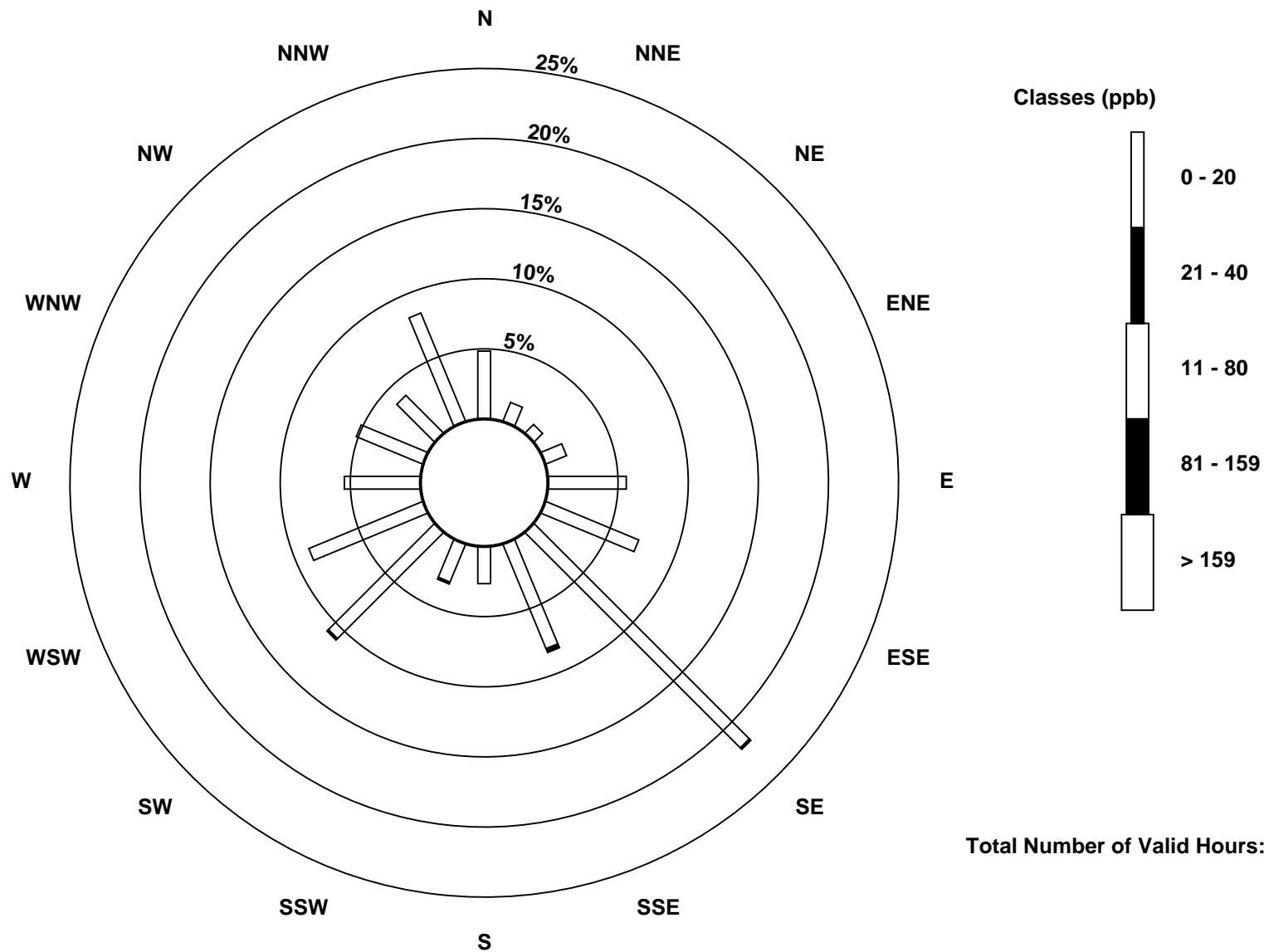
Total Number of Valid Hours: 681

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley (AMS 7)

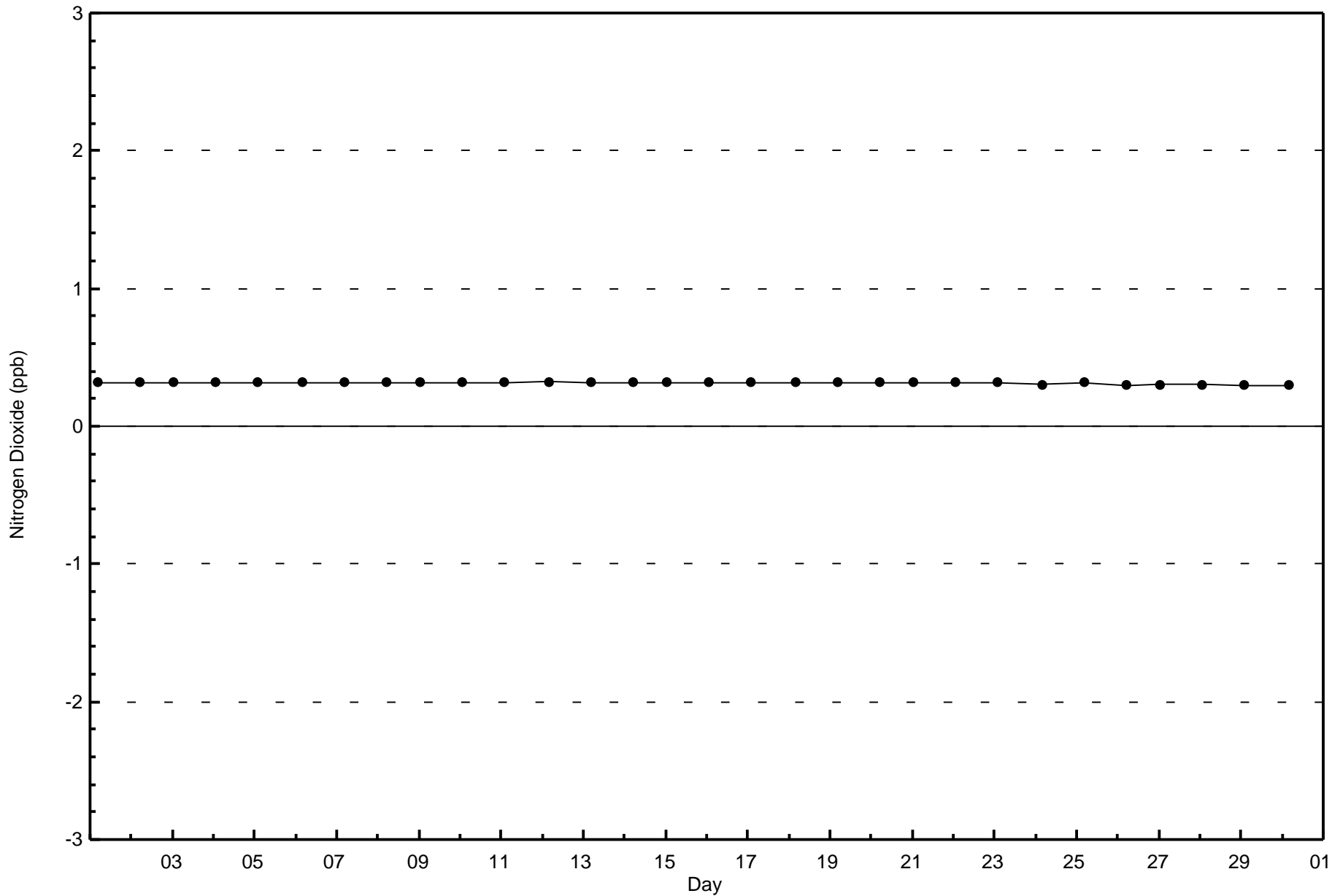


Total Number of Valid Hours: 681

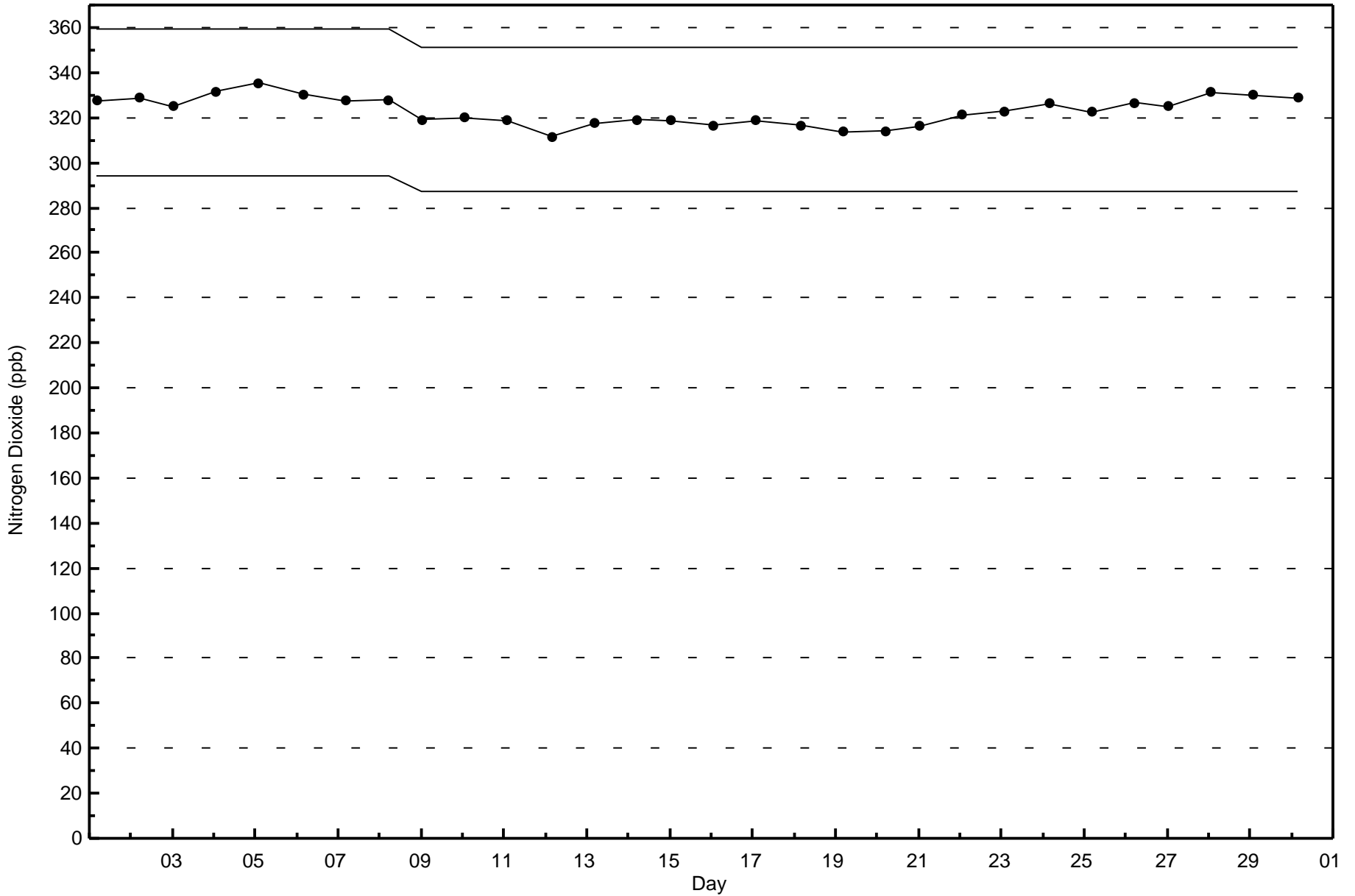


Wood Buffalo Environmental Association  
Zero Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley - September 2015

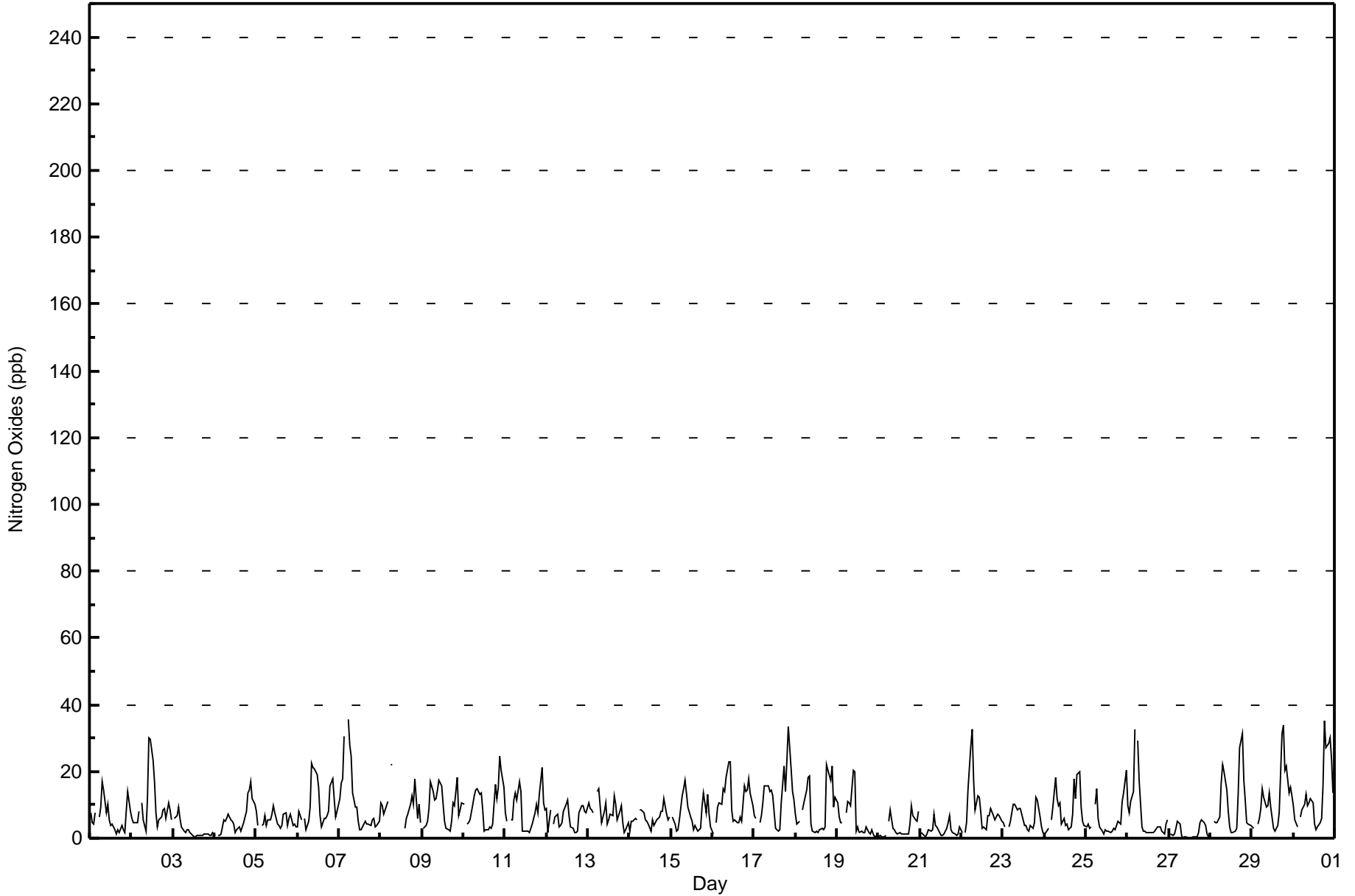








Maximum Value: 36 ppb on Sep 7 06:00																	Maximum Daily Average: 12.8 ppb on Sep 30																	Hours in Service: 720	
Minimum Value: 0 ppb on Sep 27 12:00																	Minimum Daily Average: 1.8 ppb on Sep 27																	Hours of Data: 684	
Maximum Diurnal Average: 12.8 ppb at hour 7																	Minimum Diurnal Average: 2.9 ppb at hour 15																	Hours of Missing Data: 36	
Monthly Average: 7.7 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 2 Q <sub>1</sub> = 3 Median = 6 O <sub>3</sub> = 10 P <sub>90</sub> = 17 P <sub>99</sub> = 31																	Hours of Calibration: 36	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Sep	7	5	4	8	Z	6	9	17	14	8	10	6	4	4	2	1	3	2	4	2	2	8	14	8	6.4	17									
2-Sep	6	5	5	4	8	Z	11	6	2	12	30	30	23	17	8	3	6	6	9	9	6	11	9	5	9.9	30									
3-Sep	Z	6	7	9	6	4	2	2	2	3	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2.3	9									
4-Sep	1	Z	1	1	1	6	5	6	7	5	5	4	2	3	3	2	3	5	8	14	14	17	12	10	5.9	17									
5-Sep	8	4	Z	4	4	7	4	5	5	7	10	8	4	4	3	4	7	8	4	6	7	4	4	3	5.4	10									
6-Sep	4	8	6	Z	6	3	5	9	22	21	21	19	15	7	3	6	6	7	8	16	18	12	6	8	10.2	22									
7-Sep	12	17	18	30	Z	36	28	25	14	9	9	5	2	2	4	5	4	4	4	5	6	3	4	5	11.0	36									
8-Sep	11	10	7	10	11	Z	22	22	C	C	C	C	C	C	3	6	7	10	13	10	18	6	10	5	--	22									
9-Sep	Z	3	4	5	9	17	14	11	12	14	17	16	10	5	3	2	2	5	11	10	18	7	8	10	9.3	18									
10-Sep	10	Z	4	5	5	10	13	14	15	13	13	9	2	2	2	3	3	4	16	12	15	25	21	15	10.2	25									
11-Sep	7	5	Z	5	6	11	14	12	17	14	2	2	2	2	2	3	4	8	10	8	13	21	11	9	8.1	21									
12-Sep	9	2	9	Z	4	6	7	3	4	5	8	10	12	7	3	3	2	2	2	7	10	10	8	8	6.1	12									
13-Sep	11	9	8	8	Z	14	15	10	5	8	11	4	6	7	7	13	10	6	8	10	5	2	3	5	7.9	15									
14-Sep	2	5	5	6	5	Z	8	9	8	6	5	4	2	5	4	5	6	6	8	8	12	7	6	6	6.0	12									
15-Sep	Z	6	4	2	3	5	13	15	17	13	9	6	5	2	4	2	3	3	9	13	7	13	7	3	7.3	17									
16-Sep	1	Z	5	9	11	10	15	14	18	23	23	8	5	6	4	5	7	5	16	14	14	18	14	10	11.1	23									
17-Sep	7	6	Z	5	7	11	16	16	16	14	14	13	3	3	2	2	11	22	14	23	33	21	14	11	12.2	33									
18-Sep	7	4	5	Z	8	11	14	18	19	4	2	2	2	2	2	3	3	4	22	20	17	22	9	12	9.3	22									
19-Sep	11	6	5	5	Z	8	11	10	10	20	20	2	3	2	2	2	2	3	2	1	3	1	1	1	5.6	20									
20-Sep	0	1	1	0	1	Z	5	8	3	2	2	1	2	1	1	1	1	1	4	10	7	5	5	8	3.1	10									
21-Sep	Z	2	1	1	1	2	2	3	7	4	4	2	1	1	1	3	5	7	3	2	1	1	1	3	2.4	7									
22-Sep	2	Z	2	5	15	28	32	17	8	13	12	8	3	3	3	7	7	9	7	6	7	7	7	5	9.2	32									
23-Sep	5	3	Z	4	5	8	10	10	9	9	9	7	4	4	2	2	4	3	5	12	11	6	3	2	6.0	12									
24-Sep	1	2	3	Z	6	9	18	12	10	11	4	6	4	4	2	3	7	18	12	19	20	9	5	4	8.2	20									
25-Sep	3	4	3	4	Z	10	15	6	3	2	1	2	2	2	2	2	3	2	5	5	4	11	13	20	5.5	20									
26-Sep	10	7	11	14	33	Z	29	17	3	2	2	2	2	2	2	2	2	3	3	3	2	1	4	6	7.1	33									
27-Sep	Z	1	1	1	3	5	4	1	0	0	0	0	0	0	0	0	1	2	4	6	5	4	1	0	1.8	6									
28-Sep	1	Z	5	5	4	6	16	22	20	14	8	3	2	2	2	3	13	27	31	17	11	5	4	4	9.8	31									
29-Sep	4	3	Z	4	6	9	15	12	9	10	13	9	3	2	3	4	8	31	34	20	22	14	15	13	11.5	34									
30-Sep	10	5	3	Z	7	8	10	13	10	11	12	11	4	2	3	4	6	16	35	27	28	30	24	14	12.8	35									
																	5.9 5.2 5.0 6.1 6.9 10.0 12.8 11.5 10.0 9.6 9.7 6.9 4.5 3.6 2.9 3.4 4.8 7.6 10.3 10.5 11.3 10.1 8.1 7.2																	Diurnal Average	
																	12 17 18 30 33 36 32 25 22 23 30 30 23 17 8 13 13 31 35 27 33 30 24 20																	Diurnal Maximum	
Z - zerospan C - Calibration																																			





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Athabasca Valley - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	646	94.44	94.44
21 - 40	38	5.56	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Athabasca Valley - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	32	10	6	11	36	46	141	48	15	20	72	60	37	35	26	48	643
21 - 40	1	0	0	0	2	3	8	9	3	1	2	0	0	0	0	9	38
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>10</b>	<b>6</b>	<b>11</b>	<b>38</b>	<b>49</b>	<b>149</b>	<b>57</b>	<b>18</b>	<b>21</b>	<b>74</b>	<b>60</b>	<b>37</b>	<b>35</b>	<b>26</b>	<b>57</b>	<b>681</b>

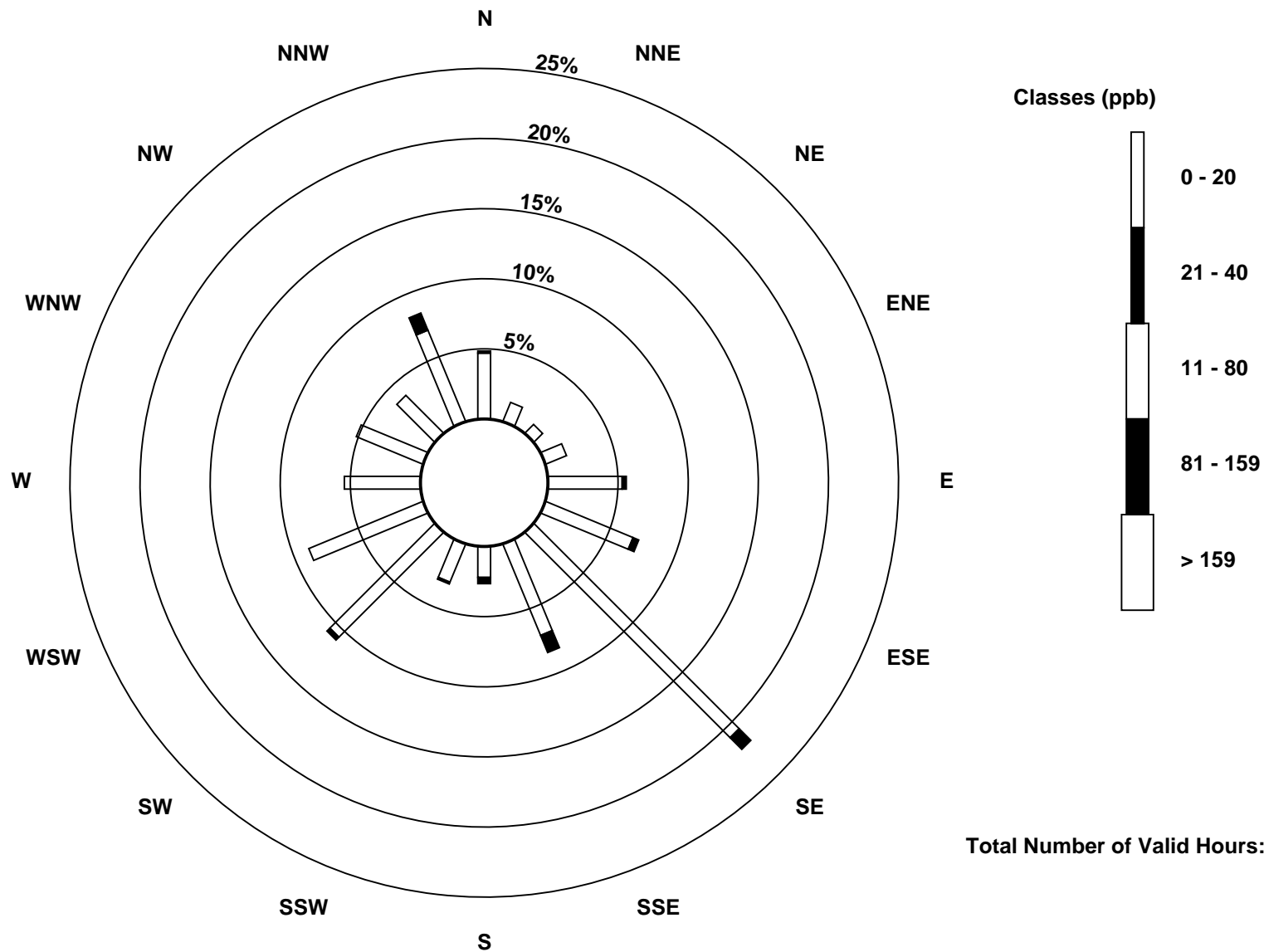
Total Number of Valid Hours: 681

Total Number of Hours: 720

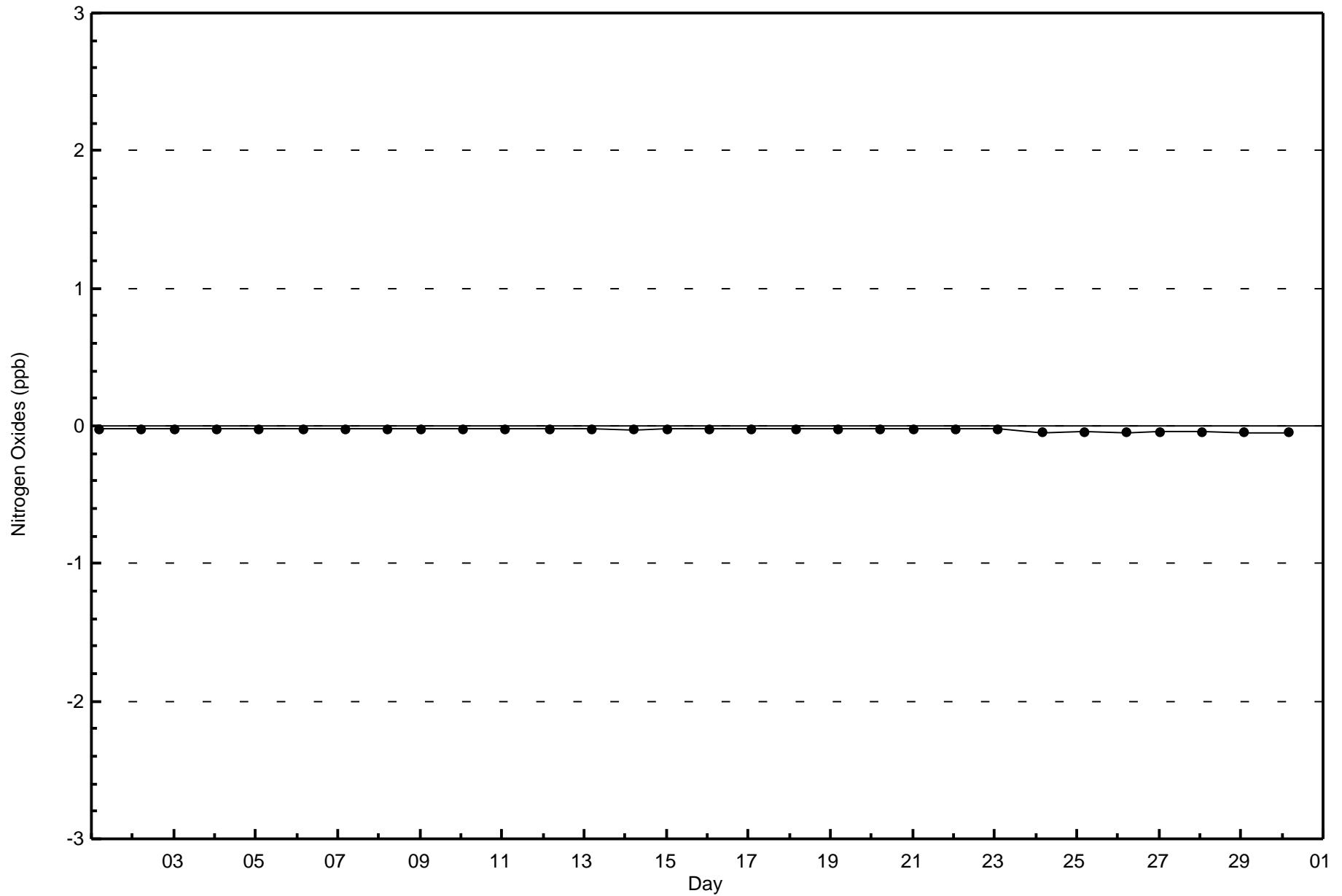


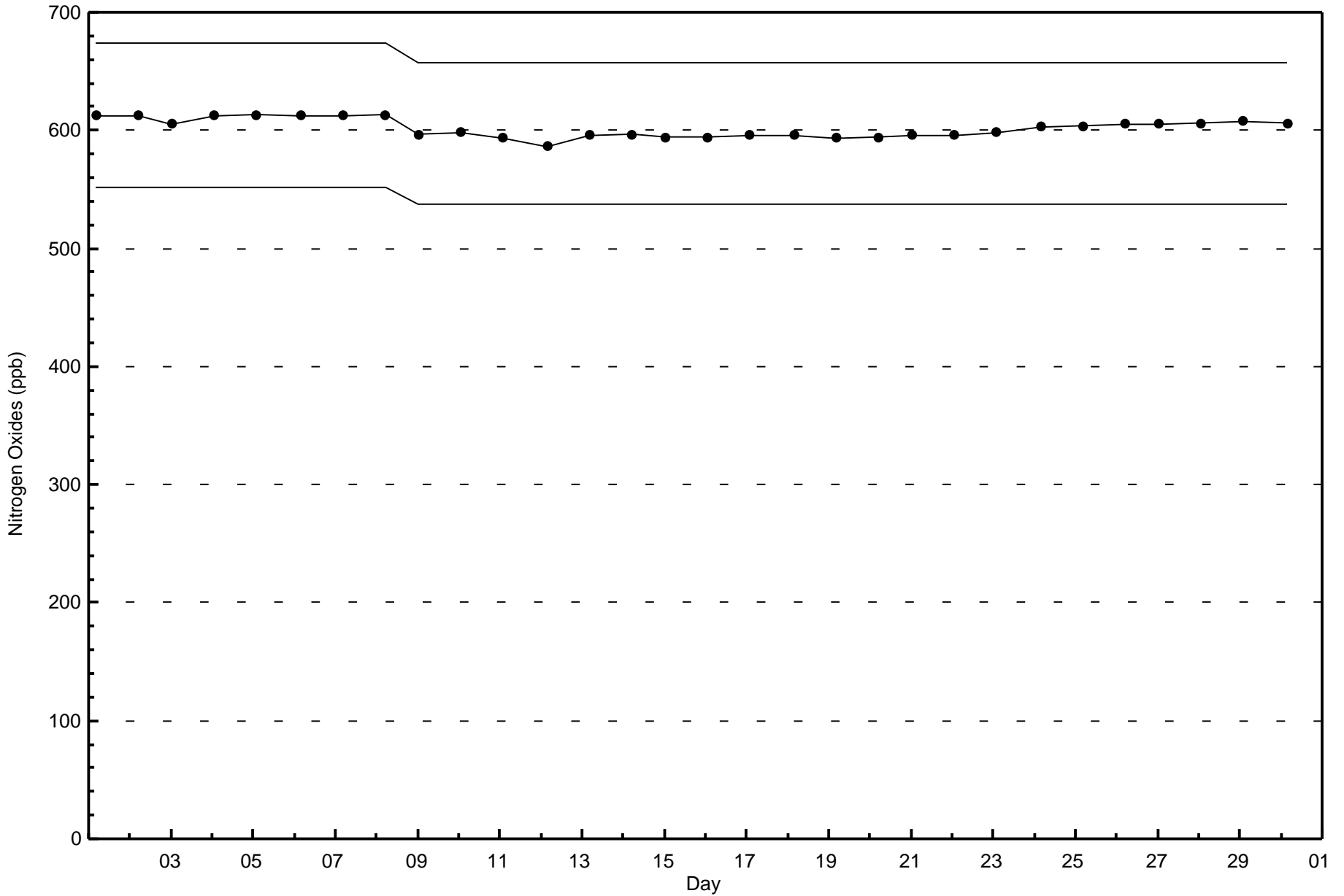
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 681









Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 18.8 µg/m <sup>3</sup> on Sep 11 22:00	Maximum Daily Average: 7.3 µg/m <sup>3</sup> on Sep 5	Hours of Data:	704
Minimum Value: 0.3 µg/m <sup>3</sup> on Sep 28 15:00	Minimum Daily Average: 2.0 µg/m <sup>3</sup> on Sep 27	Hours of Missing Data:	16
Maximum Diurnal Average: 6.7 µg/m <sup>3</sup> at hour 21	Minimum Diurnal Average: 3.2 µg/m <sup>3</sup> at hour 14	Hours of Calibration:	2
Monthly Average: 4.57 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 0.6 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 3.0 Median = 3.8 Q <sub>3</sub> = 5.5 P <sub>90</sub> = 8.2 P <sub>99</sub> = 13.6	Percent Operational Time:	98.1

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	11.1	9.7	10.1	10.9	11.8	12.5	12.8	14.4	11.5	7.1	2.9	3.6	4.5	5.2	3.8	2.5	3.9	5.2	5.2	4.7	4.1	4.8	5.1	4.1	7.1	14.4
2-Sep	3.3	3.2	3.2	3.2	3.4	3.5	3.5	3.3	3.2	4.4	8.5	7.0	6.1	2.6	3.4	4.8	6.1	5.8	5.2	5.2	4.9	4.6	4.4	4.3	4.5	8.5
3-Sep	3.7	3.7	3.5	3.8	4.4	3.2	2.7	2.3	2.2	2.3	2.3	2.1	2.1	2.2	2.5	2.9	3.0	2.9	2.9	2.9	2.5	2.6	2.6	2.6	2.8	4.4
4-Sep	2.7	2.9	3.1	3.1	3.2	3.3	3.3	3.5	4.5	4.3	3.8	2.8	2.6	3.3	3.8	3.6	4.0	4.2	5.5	7.6	10.5	11.6	9.8	8.4	4.8	11.6
5-Sep	9.2	8.2	6.7	6.1	5.9	5.7	5.0	4.9	5.3	6.0	5.9	5.2	5.2	5.7	6.0	7.0	8.5	10.5	10.0	10.8	11.8	9.3	9.2	8.3	7.3	11.8
6-Sep	8.7	8.3	6.4	5.6	5.2	4.4	4.4	4.7	5.4	5.5	5.4	5.2	5.1	4.1	3.9	4.3	4.4	5.3	5.5	5.3	5.4	4.8	4.5	4.2	5.3	8.7
7-Sep	3.9	3.9	3.9	3.6	3.3	3.6	3.4	3.4	2.8	2.7	2.5	2.4	2.7	3.1	3.5	3.9	2.8	2.9	3.2	3.7	3.4	3.5	3.1	3.2	3.3	3.9
8-Sep	3.8	3.6	5.2	5.3	2.8	2.7	3.1	3.4	3.9	4.1	4.4	4.7	4.4	4.8	5.4	6.4	7.3	10.2	9.4	11.0	13.1	9.8	9.1	6.7	6.0	13.1
9-Sep	6.3	5.6	5.2	4.6	4.2	3.9	4.0	3.4	3.0	3.2	3.4	3.6	3.5	2.4	3.5	4.9	4.6	5.9	6.4	5.3	7.8	6.5	8.5	7.7	4.9	8.5
10-Sep	6.7	5.3	4.1	3.0	2.8	2.9	2.9	3.1	3.3	3.2	3.8	2.6	2.6	3.7	4.4	5.1	5.5	5.9	7.4	8.3	5.6	7.7	8.5	10.4	5.0	10.4
11-Sep	8.3	8.2	8.0	7.0	5.9	5.3	4.2	3.5	3.9	4.3	2.2	3.7	4.9	4.7	5.0	5.7	4.3	5.6	6.5	5.1	10.1	18.8	10.8	8.4	6.4	18.8
12-Sep	9.2	7.4	9.0	8.2	6.0	6.1	5.5	3.9	5.3	5.5	3.9	3.7	5.1	5.7	4.5	5.8	5.1	4.6	4.2	5.1	4.9	5.3	5.0	5.2	5.6	9.2
13-Sep	7.5	6.7	4.7	4.0	3.8	3.3	3.1	2.7	2.6	2.6	3.8	3.0	4.0	5.4	7.0	9.7	9.6	9.4	9.2	9.3	7.4	6.2	5.6	5.3	5.7	9.7
14-Sep	5.6	5.5	4.8	4.6	4.1	4.0	3.7	4.1	3.9	3.7	3.4	3.2	3.1	4.2	4.0	4.3	4.4	4.7	5.9	6.8	7.3	5.1	4.0	3.4	4.5	7.3
15-Sep	4.6	4.3	3.9	3.2	3.1	3.1	2.9	3.0	4.8	5.7	5.2	4.7	4.2	4.0	4.7	5.1	5.8	6.6	7.1	9.4	8.1	8.6	7.7	4.9	5.2	9.4
16-Sep	4.0	3.9	3.8	3.9	3.7	3.6	3.3	3.4	3.4	3.9	4.2	3.6	3.4	3.8	3.9	4.9	5.0	5.3	7.6	8.1	9.2	8.5	6.2	4.7	4.8	9.2
17-Sep	3.4	2.8	7.4	2.1	2.0	2.1	2.2	2.3	2.4	3.1	3.1	2.9	2.5	3.7	4.5	5.3	6.9	10.3	7.5	10.4	11.3	9.7	7.9	6.6	5.1	11.3
18-Sep	4.6	3.7	3.6	3.3	3.3	3.5	3.5	3.7	4.0	2.8	2.7	3.0	3.2	3.8	3.7	3.9	3.6	3.6	8.1	12.1	10.6	10.3	5.5	7.7	4.9	12.1
19-Sep	6.9	7.6	10.7	3.8	3.4	3.1	3.1	3.0	2.6	3.2	3.0	1.9	2.6	2.6	3.0	3.5	4.0	4.1	3.6	3.6	3.6	3.3	3.1	3.0	3.8	10.7
20-Sep	3.7	3.8	3.3	2.9	3.1	3.1	3.4	3.7	3.1	2.8	2.6	2.5	2.4	2.3	2.5	2.7	3.1	3.4	3.9	5.0	5.2	4.7	4.0	4.3	3.4	5.2
21-Sep	3.0	3.0	3.3	3.4	3.3	3.0	3.1	3.1	3.3	3.3	3.9	3.4	3.0	3.0	3.0	3.2	3.2	3.3	2.9	2.8	2.8	2.7	2.8	3.0	3.1	3.9
22-Sep	2.8	2.8	2.8	2.8	3.0	3.6	4.0	3.5	3.2	3.2	3.2	3.4	3.1	2.9	3.5	4.6	6.8	8.2	7.3	7.3	7.7	7.2	5.7	4.5	4.5	8.2
23-Sep	4.0	4.1	4.4	3.2	3.1	3.2	3.4	3.3	4.2	4.8	4.5	C	C	1.2	1.1	1.1	1.3	1.3	1.7	2.8	2.9	2.0	2.1	2.1	2.8	4.8
24-Sep	2.4	2.2	2.0	2.0	2.0	2.2	2.8	2.8	3.3	3.6	3.1	3.7	3.5	2.0	2.0	2.0	3.0	7.4	5.5	8.1	9.0	11.2	7.4	5.5	4.1	11.2
25-Sep	6.0	6.7	7.6	6.8	7.9	7.8	7.7	7.1	6.3	2.9	1.1	0.9	0.7	0.4	0.3	0.4	0.6	0.4	0.7	0.8	0.9	1.4	2.8	UO	3.4	7.9
26-Sep	UO	UO	UO	UO	UO	UO	UO	UO	M	M	M	M	1.8	2.0	1.8	1.8	2.2	2.3	2.2	1.9	1.7	1.7	2.0	2.4	--	2.4
27-Sep	2.3	2.1	2.0	2.0	2.0	2.1	1.9	1.9	1.7	2.7	1.8	1.5	1.6	1.8	1.9	1.8	1.6	1.9	2.4	2.1	1.9	1.9	2.1	2.1	2.0	2.7
28-Sep	1.6	1.9	1.8	1.8	1.8	1.9	2.6	M	3.3	3.1	2.9	1.7	1.1	0.9	0.3	0.3	0.9	1.8	5.0	4.8	3.7	3.5	3.5	3.2	2.3	5.0
29-Sep	3.0	3.0	3.1	3.4	3.7	4.2	5.0	5.0	4.8	4.0	4.5	3.8	2.4	1.4	1.3	1.3	1.7	5.5	15.3	11.7	11.0	5.8	6.2	6.0	4.9	15.3
30-Sep	5.0	4.8	13.9	3.2	3.2	3.2	3.3	3.9	3.9	4.5	4.4	4.7	3.4	2.9	1.5	1.6	1.9	4.4	12.7	13.4	13.7	14.6	14.5	6.5	6.2	14.6

5.1	4.8	5.2	4.2	4.0	3.9	3.9	3.9	4.0	3.9	3.7	3.4	3.3	3.2	3.3	3.8	4.2	5.1	6.0	6.5	6.7	6.6	5.8	5.1	Diurnal Average	
11.1	9.7	13.9	10.9	11.8	12.5	12.8	14.4	11.5	7.1	8.5	7.0	6.1	5.7	7.0	9.7	9.6	10.5	15.3	13.4	13.7	18.8	14.5	10.4	Diurnal Maximum	

C - Calibration      M - Maintenance      UO - Unstable Operation  
 Alberta Ambient Air Quality Objectives (AAAQO):      24-hr 30 µg/m<sup>3</sup>

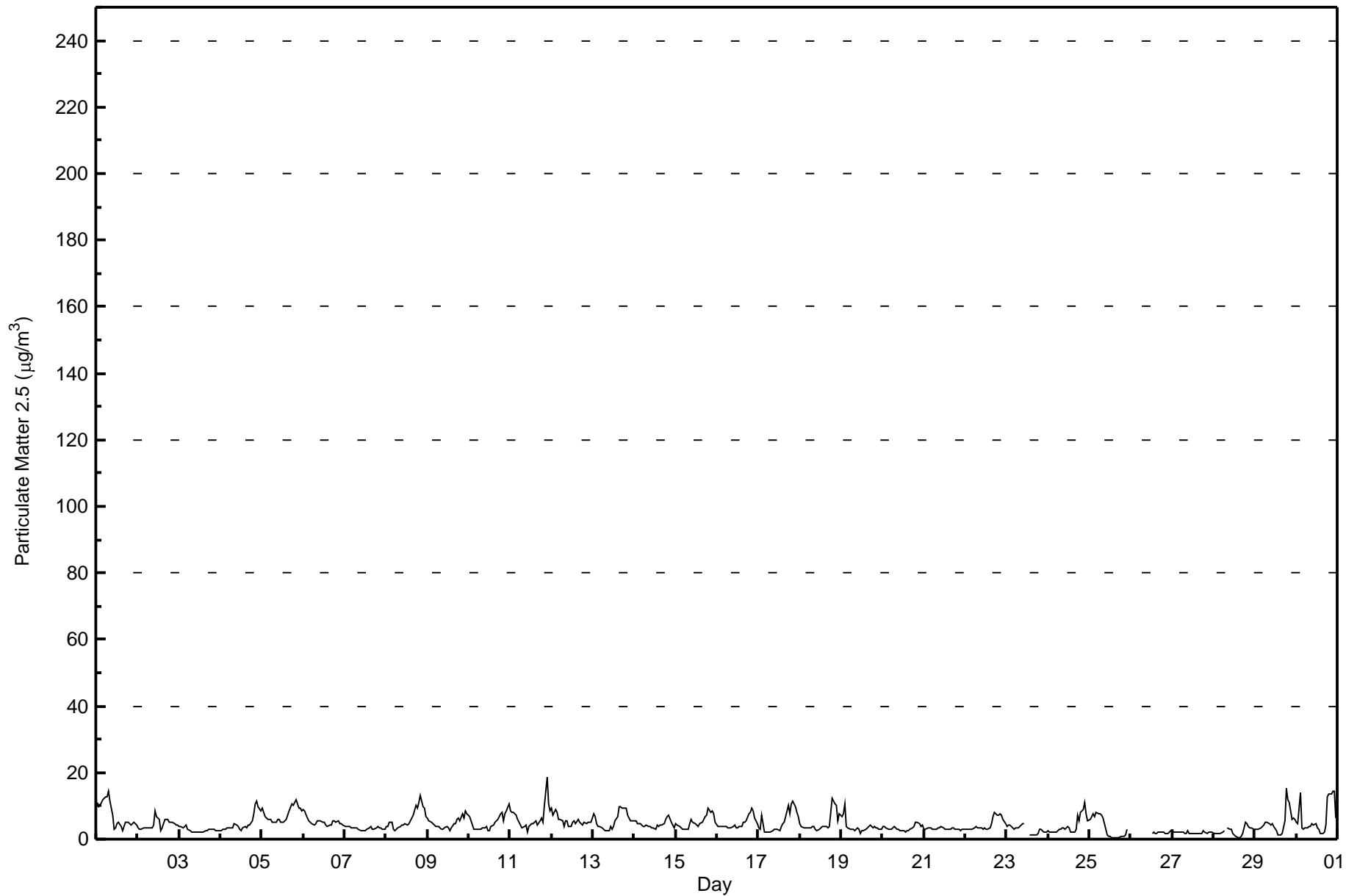


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$

Athabasca Valley - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Athabasca Valley - September 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	517	73.44	73.44
6 - 15	172	24.43	97.87
16 - 25	1	0.14	98.01
26 - 80	0	0.00	98.01
> 81.0	0	0.00	98.01

Total Number of Valid Hours: 704

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Athabasca Valley - September 2015**

Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	28	8	5	9	23	34	114	27	8	11	52	53	30	37	24	51	514
6 - 15	5	2	1	2	16	17	47	25	11	9	16	4	5	0	3	9	172
16 - 25	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>33</b>	<b>10</b>	<b>6</b>	<b>11</b>	<b>39</b>	<b>51</b>	<b>161</b>	<b>53</b>	<b>19</b>	<b>20</b>	<b>68</b>	<b>57</b>	<b>35</b>	<b>37</b>	<b>27</b>	<b>60</b>	<b>687</b>

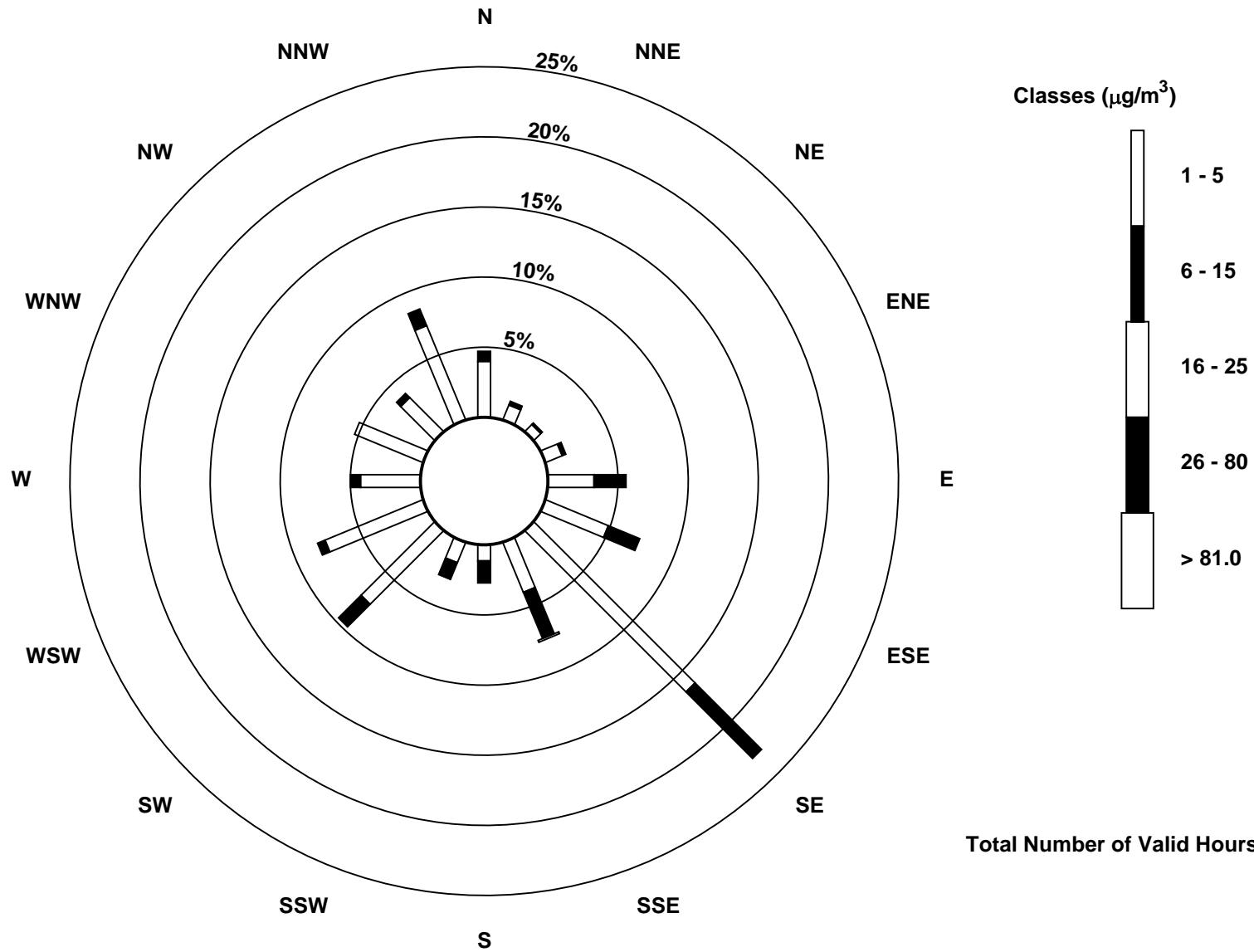
Total Number of Valid Hours: 701

Total Number of Hours: 720



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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Athabasca Valley (AMS 7)**



Total Number of Valid Hours: 701



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 0.3 ppm on Sep 30 22:00	Maximum Daily Average: 0.1 ppm on Sep 30		Hours of Data:	687
Minimum Value: 0.0 ppm on Sep 4 13:00	Minimum Daily Average: 0.0 ppm on Sep 27		Hours of Missing Data:	33
Maximum Diurnal Average: 0.1 ppm at hour 21	Minimum Diurnal Average: 0.0 ppm at hour 16		Hours of Calibration:	32
Monthly Average: 0.05 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> = 0.2		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-Sep	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1		
2-Sep	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	Z	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-Sep	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	0.0	0.0
4-Sep	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0
5-Sep	0.1	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.1	0.1	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
6-Sep	0.1	0.1	0.1	0.1	0.1	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.1
9-Sep	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	0.0	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
10-Sep	0.1	0.1	0.0	0.0	0.0	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2
11-Sep	0.1	0.0	0.0	0.0	0.0	0.1	Z	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2
12-Sep	0.1	0.0	0.1	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.1	0.1	0.1	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
13-Sep	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	Z	0.0	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	0.2
14-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1
15-Sep	0.1	0.0	0.0	0.0	Z	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1
16-Sep	0.0	0.0	0.0	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
17-Sep	0.0	0.0	0.0	0.0	0.0	0.0	Z	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.3
18-Sep	0.1	0.0	0.0	0.0	0.1	0.1	0.1	Z	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2
19-Sep	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	Z	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
20-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
21-Sep	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
22-Sep	0.0	0.0	0.0	0.0	0.1	Z	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1
23-Sep	0.0	0.0	0.0	0.0	0.0	0.0	Z	0.1	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.1	
24-Sep	0.1	0.1	0.0	0.0	0.0	0.0	0.1	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.1	0.0	0.0	0.0	0.1	0.2	
25-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.2	0.2
26-Sep	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
27-Sep	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	0.1	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	0.1
28-Sep	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2
29-Sep	0.0	0.0	0.0	0.0	0.0	0.0	Z	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.3
30-Sep	0.1	0.1	0.1	0.0	0.0	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.2	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.3

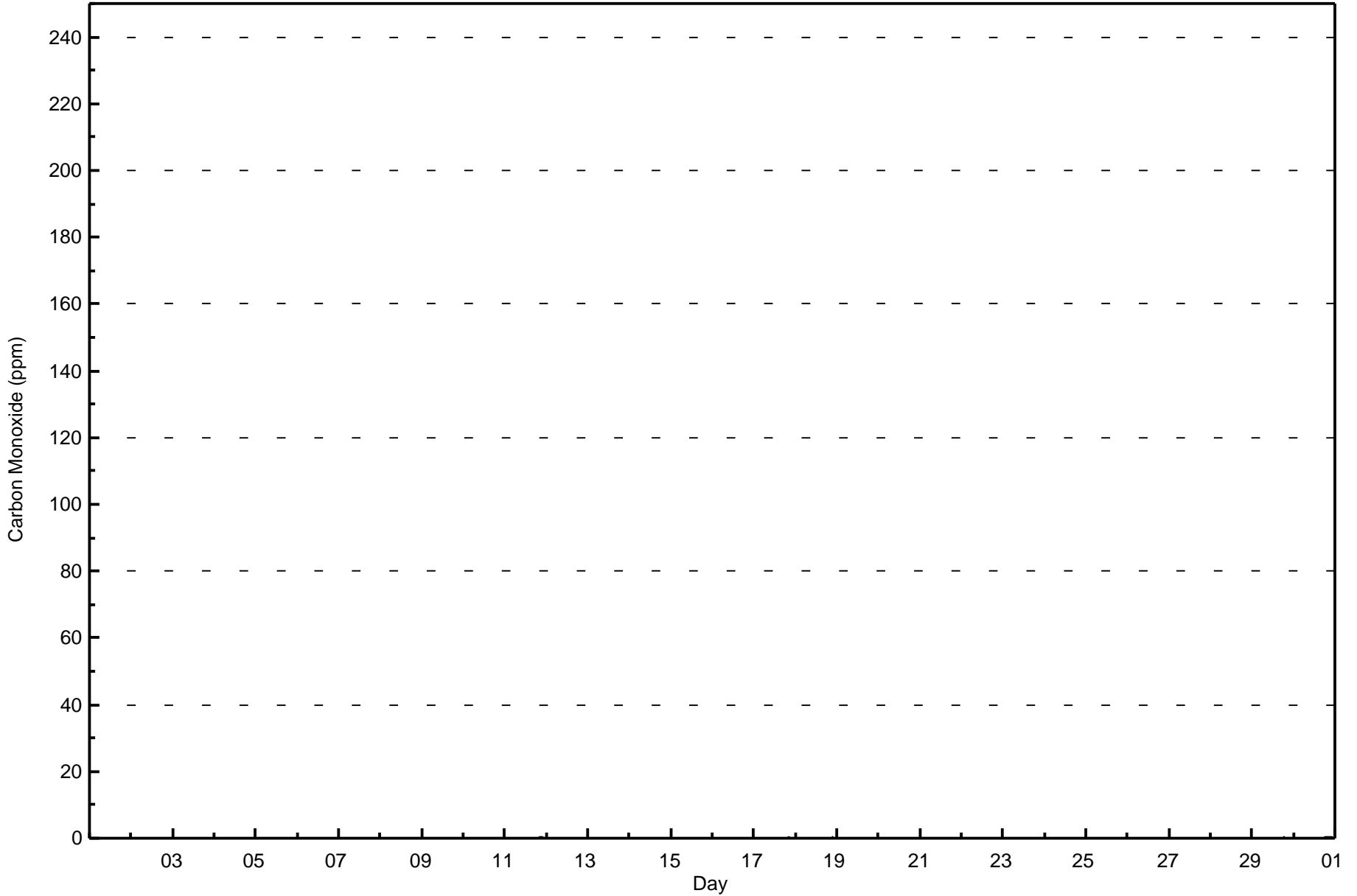
0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average
0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Maximum

Z - zerspan      C - Calibration      M - Maintenance  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 13 ppm



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Carbon Monoxide (CO) - ppm**  
**Athabasca Valley - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Carbon Monoxide (CO) - ppm**  
**Athabasca Valley - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	687	100.00	100.00
0.4 - 0.5	0	0.00	100.00
0.6 - 0.7	0	0.00	100.00
0.8 - 1.4	0	0.00	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 687

Total Number of Hours: 720





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Carbon Monoxide (CO) - ppm  
Athabasca Valley - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 0.3	31	9	5	11	38	51	153	57	19	22	70	62	36	35	27	59	685
0.4 - 0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.6 - 0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.8 - 1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.5 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>31</b>	<b>9</b>	<b>5</b>	<b>11</b>	<b>38</b>	<b>51</b>	<b>153</b>	<b>57</b>	<b>19</b>	<b>22</b>	<b>70</b>	<b>62</b>	<b>36</b>	<b>35</b>	<b>27</b>	<b>59</b>	<b>685</b>

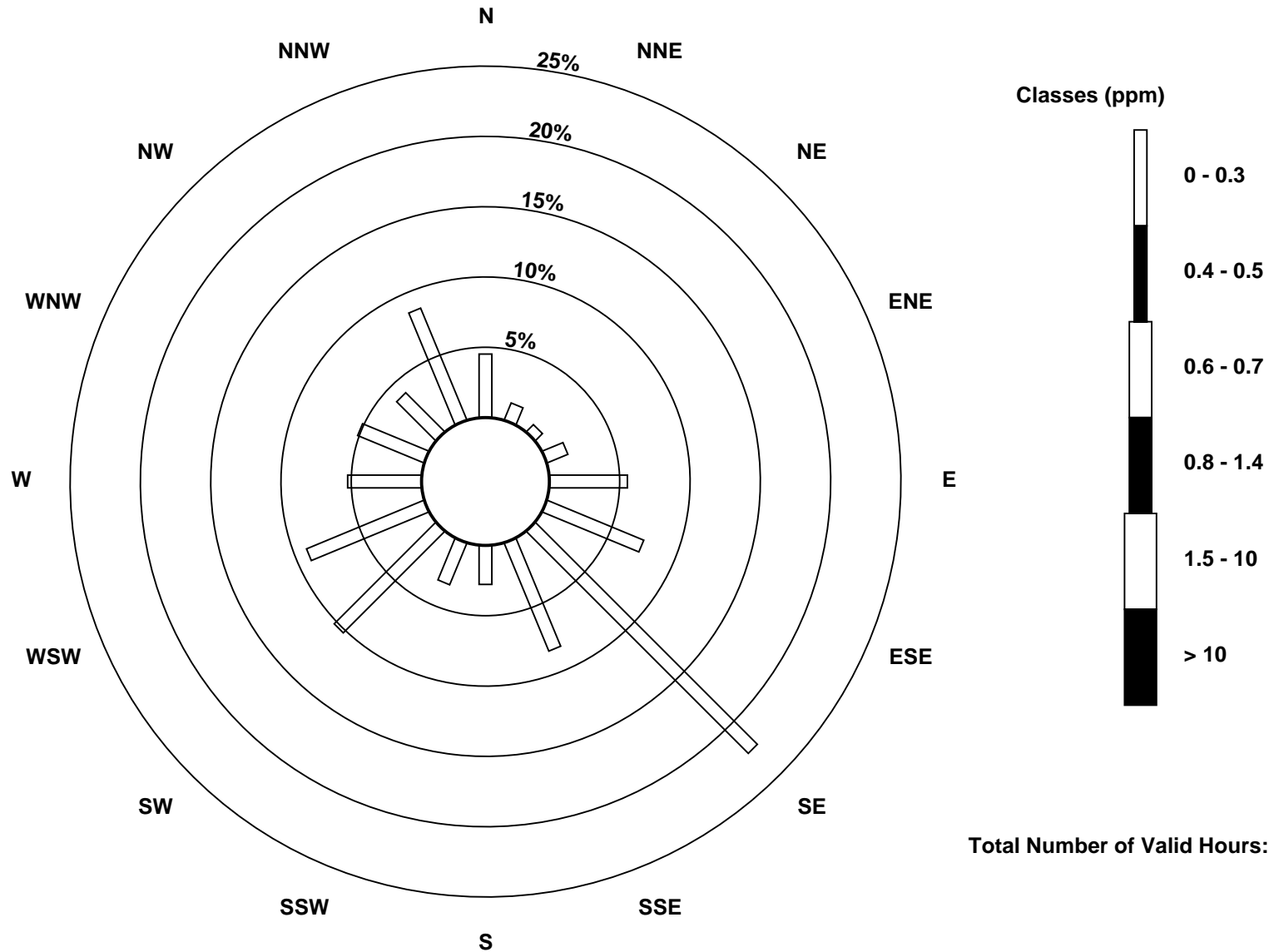
Total Number of Valid Hours: 685

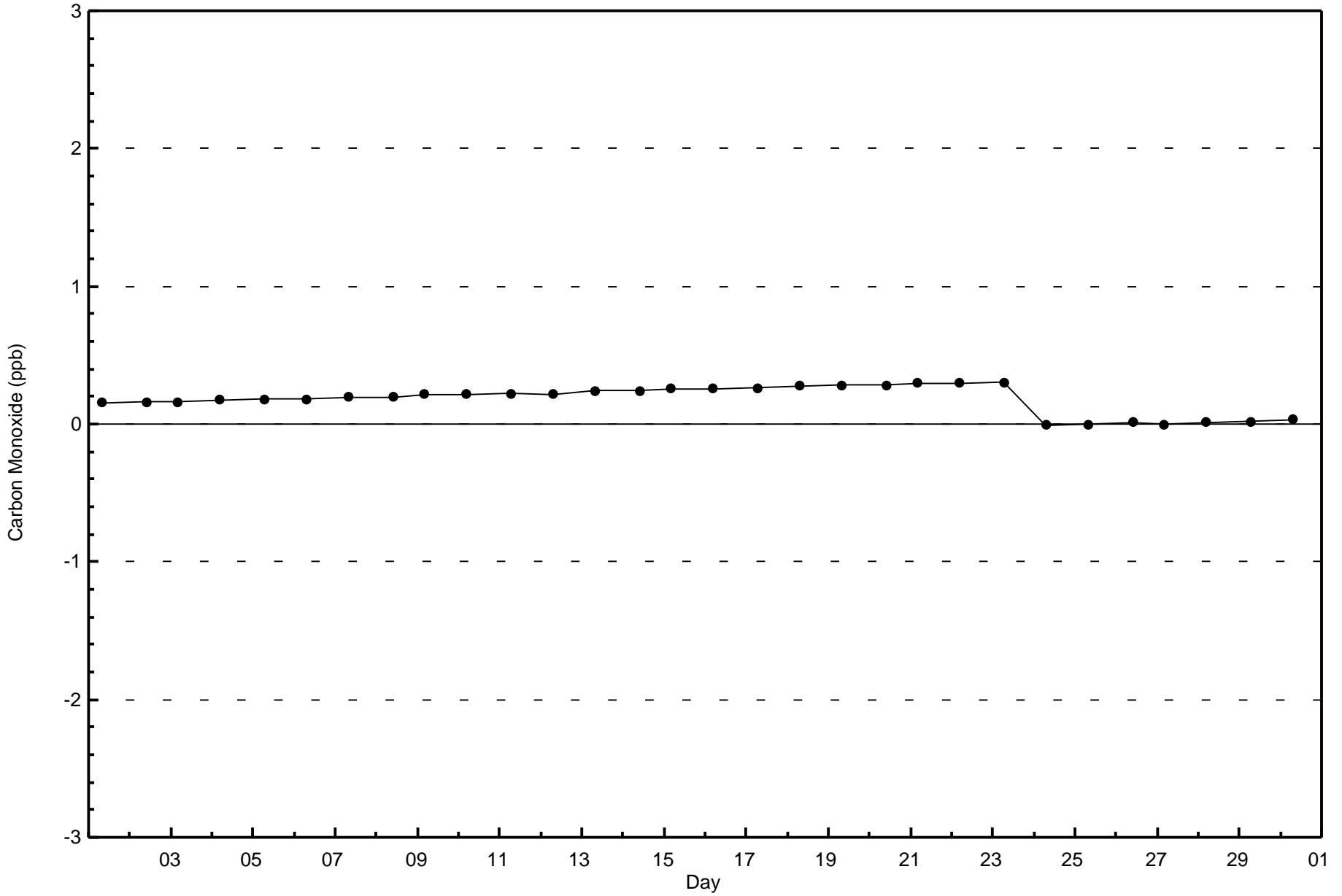
Total Number of Hours: 720

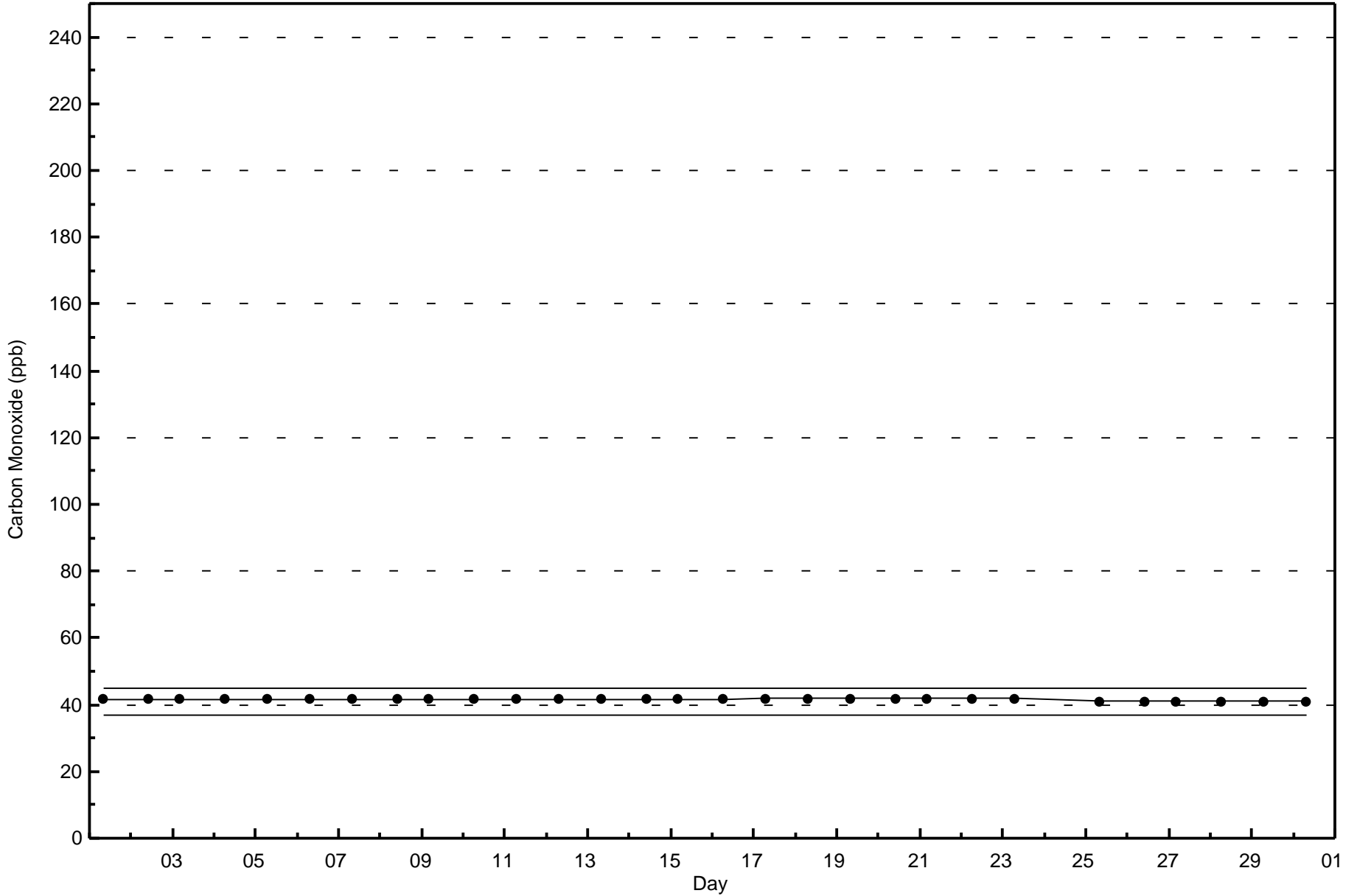


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Carbon Monoxide (CO) - ppm  
Athabasca Valley (AMS 7)

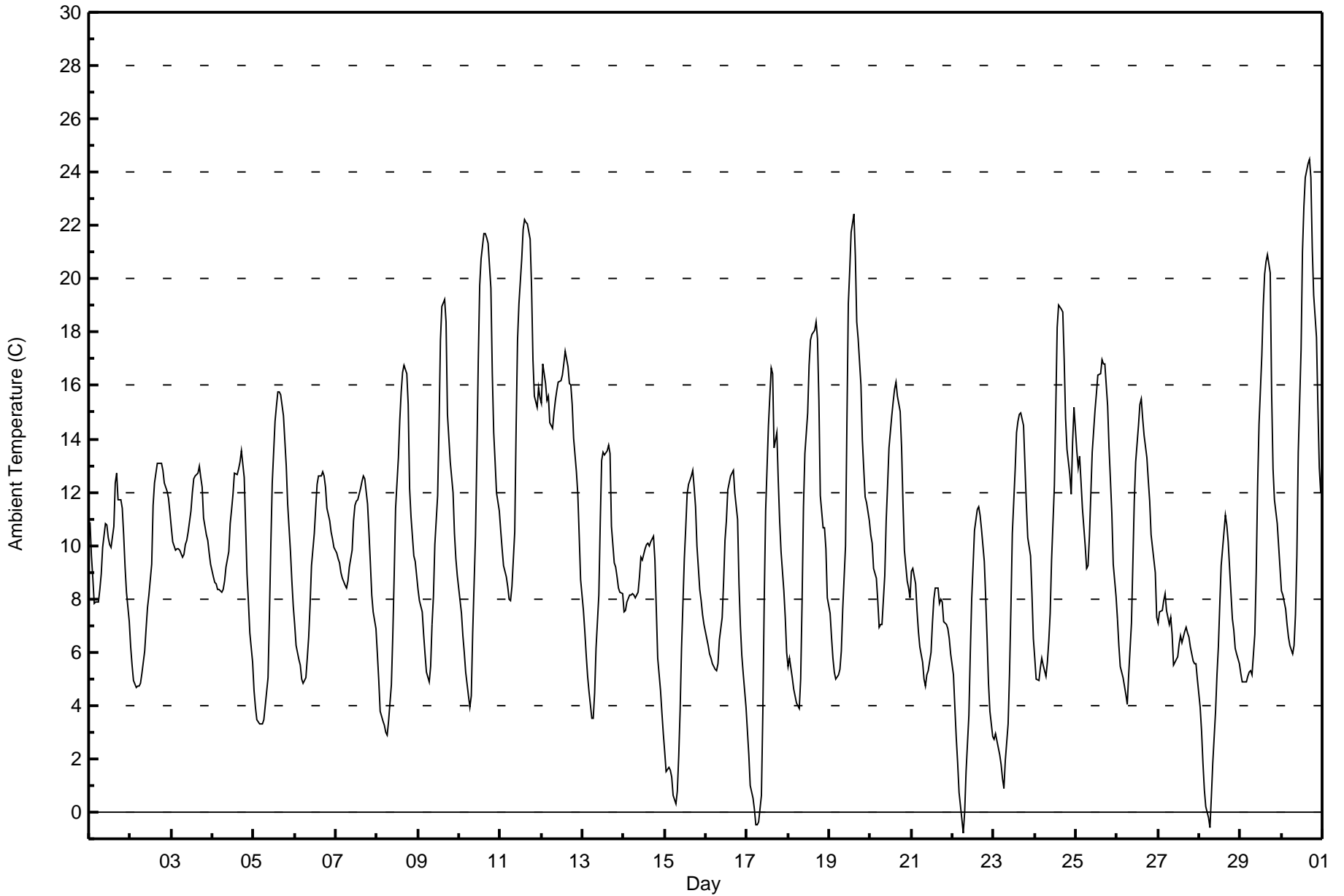








Maximum Value: 24.5 C on Sep 30 17:00		Maximum Daily Average: 15.1 C on Sep 11		Hours in Service: 720																																												
Minimum Value: -0.8 C on Sep 22 07:00		Minimum Daily Average: 5.3 C on Sep 28		Hours of Data: 720																																												
Maximum Diurnal Average: 15.2 C at hour 16		Minimum Diurnal Average: 5.2 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 9.85 C		Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 4.4 Q <sub>1</sub> = 6.3 Median = 9.4 Q <sub>3</sub> = 12.8 P <sub>90</sub> = 16.4 P <sub>99</sub> = 22.1		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Sep	10.9	9.6	8.8	7.8	7.9	7.9	8.3	8.9	9.9	10.8	10.8	10.3	10.0	9.9	10.7	12.4	12.7	11.7	11.7	11.4	10.4	9.2	8.2	7.1	9.9	12.7																						
2-Sep	6.2	5.5	4.9	4.7	4.7	4.7	4.8	5.2	6.1	6.9	7.7	8.2	9.3	11.5	12.3	12.7	13.1	13.1	13.1	12.8	12.4	12.0	11.8	11.2	9.0	13.1																						
3-Sep	10.7	10.1	9.8	9.9	9.9	9.8	9.6	9.7	10.1	10.2	10.5	11.3	12.0	12.5	12.6	12.7	13.0	12.5	12.2	11.0	10.4	10.2	9.7	9.3	10.8	13.0																						
4-Sep	8.8	8.6	8.5	8.4	8.4	8.2	8.3	8.7	9.2	9.8	10.8	11.3	11.9	12.7	12.7	12.9	13.1	13.6	12.5	10.8	8.9	7.9	6.7	5.6	9.9	13.6																						
5-Sep	4.6	3.9	3.4	3.3	3.3	3.3	3.5	4.0	5.0	7.4	10.0	12.4	14.7	15.2	15.8	15.8	15.6	14.9	13.9	13.0	11.6	9.8	8.7	7.7	9.2	15.8																						
6-Sep	7.0	6.2	5.7	5.5	5.0	4.8	5.0	5.8	6.6	7.8	9.3	10.5	11.4	12.3	12.6	12.6	12.7	12.6	12.2	11.4	10.9	10.5	10.2	10.0	9.1	12.7																						
7-Sep	9.7	9.5	9.3	9.0	8.8	8.5	8.4	8.7	9.2	9.8	10.9	11.5	11.6	11.7	12.2	12.4	12.6	12.5	11.6	10.5	9.4	8.1	7.5	6.9	10.0	12.6																						
8-Sep	5.9	4.9	3.8	3.4	3.3	3.0	2.9	3.4	4.8	6.6	8.9	11.4	13.3	14.7	15.8	16.5	16.7	16.5	15.3	12.2	11.1	9.6	9.4	8.9	9.3	16.7																						
9-Sep	8.4	7.9	7.5	6.7	5.9	5.2	4.9	5.5	7.1	8.1	10.0	11.9	14.5	17.7	19.0	19.2	18.4	14.9	14.0	13.1	12.0	10.5	9.5	8.9	10.9	19.2																						
10-Sep	7.9	7.5	6.6	6.0	5.2	4.4	3.9	4.4	6.7	10.3	13.4	17.0	19.8	20.8	21.7	21.7	21.6	21.3	19.7	16.5	14.2	13.2	12.0	11.3	12.8	21.7																						
11-Sep	10.5	9.9	9.2	8.8	8.5	8.0	7.9	8.5	10.5	14.5	17.7	19.1	20.8	21.8	22.2	22.1	22.1	21.5	19.7	17.0	15.6	15.2	15.9	15.6	15.1	22.2																						
12-Sep	15.4	16.8	16.1	15.5	15.6	14.6	14.4	15.0	15.5	15.8	16.1	16.2	16.4	16.8	17.3	16.7	16.1	16.0	15.3	14.0	12.8	11.9	10.3	8.7	15.0	17.3																						
13-Sep	7.6	6.8	5.9	5.1	4.5	3.5	3.5	4.5	6.2	8.1	10.8	13.2	13.5	13.4	13.6	13.8	13.5	10.7	9.3	9.2	8.8	8.4	8.3	8.2	8.8	13.8																						
14-Sep	7.5	7.6	7.9	8.1	8.2	8.2	8.1	8.0	8.2	8.8	9.5	9.4	9.9	10.0	10.1	10.0	10.1	10.3	9.5	7.6	5.8	4.6	3.7	2.9	8.1	10.3																						
15-Sep	2.3	1.5	1.7	1.6	1.3	0.6	0.3	0.8	2.1	3.8	6.2	9.5	10.7	11.9	12.3	12.6	12.8	12.2	11.5	10.0	8.4	8.0	7.4	7.1	6.5	12.8																						
16-Sep	6.5	6.2	6.0	5.8	5.6	5.4	5.3	5.6	6.4	7.3	8.6	10.2	10.9	12.1	12.6	12.7	12.8	12.0	11.0	8.6	7.0	5.9	5.2	3.9	8.1	12.8																						
17-Sep	3.0	2.2	1.0	0.5	0.1	-0.5	-0.5	-0.4	0.7	3.7	7.9	11.3	14.5	15.6	16.7	16.4	13.7	14.2	12.5	10.9	9.8	8.3	7.3	6.0	7.3	16.7																						
18-Sep	5.5	5.8	5.0	4.6	4.4	4.1	3.9	5.0	7.9	11.5	13.4	15.0	16.8	17.7	17.9	18.1	18.4	17.8	15.5	11.9	10.6	10.7	9.9	8.0	10.8	18.4																						
19-Sep	7.5	6.5	5.8	5.2	5.0	5.1	5.4	6.1	7.6	10.0	14.7	19.0	20.3	21.8	22.4	20.9	18.4	17.8	16.0	14.0	12.9	11.8	11.6	10.9	12.4	22.4																						
20-Sep	10.4	10.1	9.2	8.8	7.9	6.9	7.0	7.0	8.9	10.9	12.2	13.7	14.8	15.4	15.9	16.1	15.6	15.0	13.7	11.5	9.8	8.6	8.4	8.1	11.1	16.1																						
21-Sep	9.0	9.1	8.5	7.6	6.8	6.2	5.6	5.0	4.7	5.1	5.3	6.0	7.1	8.0	8.4	8.4	7.8	8.0	7.9	7.1	7.1	6.9	6.5	5.9	7.0	9.1																						
22-Sep	5.2	3.9	2.8	1.8	0.7	-0.3	-0.8	0.0	1.5	3.6	5.9	8.0	9.2	10.6	11.3	11.4	11.1	10.6	9.4	8.0	6.5	4.9	3.8	2.8	5.5	11.4																						
23-Sep	2.7	3.0	2.7	2.1	1.8	1.3	0.9	1.9	3.3	5.2	7.6	10.4	12.8	14.3	14.7	14.9	15.0	14.5	13.0	11.6	10.3	9.6	8.2	6.5	7.8	15.0																						
24-Sep	5.8	5.0	4.9	5.4	5.8	5.5	5.1	5.6	6.4	7.5	9.5	12.2	15.1	18.2	19.0	18.9	18.8	17.0	14.8	13.6	12.7	11.9	13.9	15.2	11.2	19.0																						
25-Sep	13.5	12.9	13.3	12.4	11.4	10.0	9.2	9.3	10.3	13.5	14.3	15.1	15.7	16.4	16.5	17.0	16.8	16.8	15.2	13.7	12.5	11.2	9.3	8.1	13.1	17.0																						
26-Sep	7.2	6.3	5.5	5.1	4.7	4.4	4.0	5.1	7.1	9.4	11.7	13.2	14.5	15.3	15.5	14.8	14.2	13.3	12.5	11.7	10.4	9.4	9.0	7.3	9.6	15.5																						
27-Sep	7.1	7.5	7.6	7.9	8.2	7.6	7.0	7.3	6.7	5.5	5.6	5.9	6.3	6.6	6.3	6.8	6.9	6.7	6.6	6.2	5.7	5.6	5.5	5.0	6.6	8.2																						
28-Sep	3.9	3.1	1.8	0.8	0.2	-0.2	-0.6	0.6	1.8	3.8	5.2	6.2	7.8	9.3	10.5	11.1	10.7	10.1	8.2	7.3	6.8	6.2	5.9	5.6	5.3	11.1																						
29-Sep	5.2	4.9	4.9	4.9	5.1	5.2	5.3	5.2	6.7	9.0	12.2	14.6	17.1	19.0	20.2	20.7	20.9	20.2	15.7	12.9	11.7	10.8	10.0	9.1	11.3	20.9																						
30-Sep	8.3	8.2	7.6	7.0	6.6	6.3	5.9	6.2	7.4	9.6	13.5	17.3	21.0	22.7	23.8	24.3	24.5	23.8	21.1	19.4	17.8	15.2	12.9	12.0	14.3	24.5																						
																								7.5	7.0	6.5	6.1	5.8	5.4	5.2	5.7	6.8	8.5	10.3	12.0	13.5	14.5	15.1	15.2	15.0	14.4	13.2	11.6	10.5	9.5	8.9	8.1	Diurnal Average
																								15.4	16.8	16.1	15.5	15.6	14.6	14.4	15.0	15.5	15.8	17.7	19.1	21.0	22.7	23.8	24.3	24.5	23.8	21.1	19.4	17.8	15.2	15.9	15.6	Diurnal Maximum





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Athabasca Valley - September 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	8	1.11	1.11
0 - 10	388	53.89	55.00
10 - 20	298	41.39	96.39
> 20	26	3.61	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



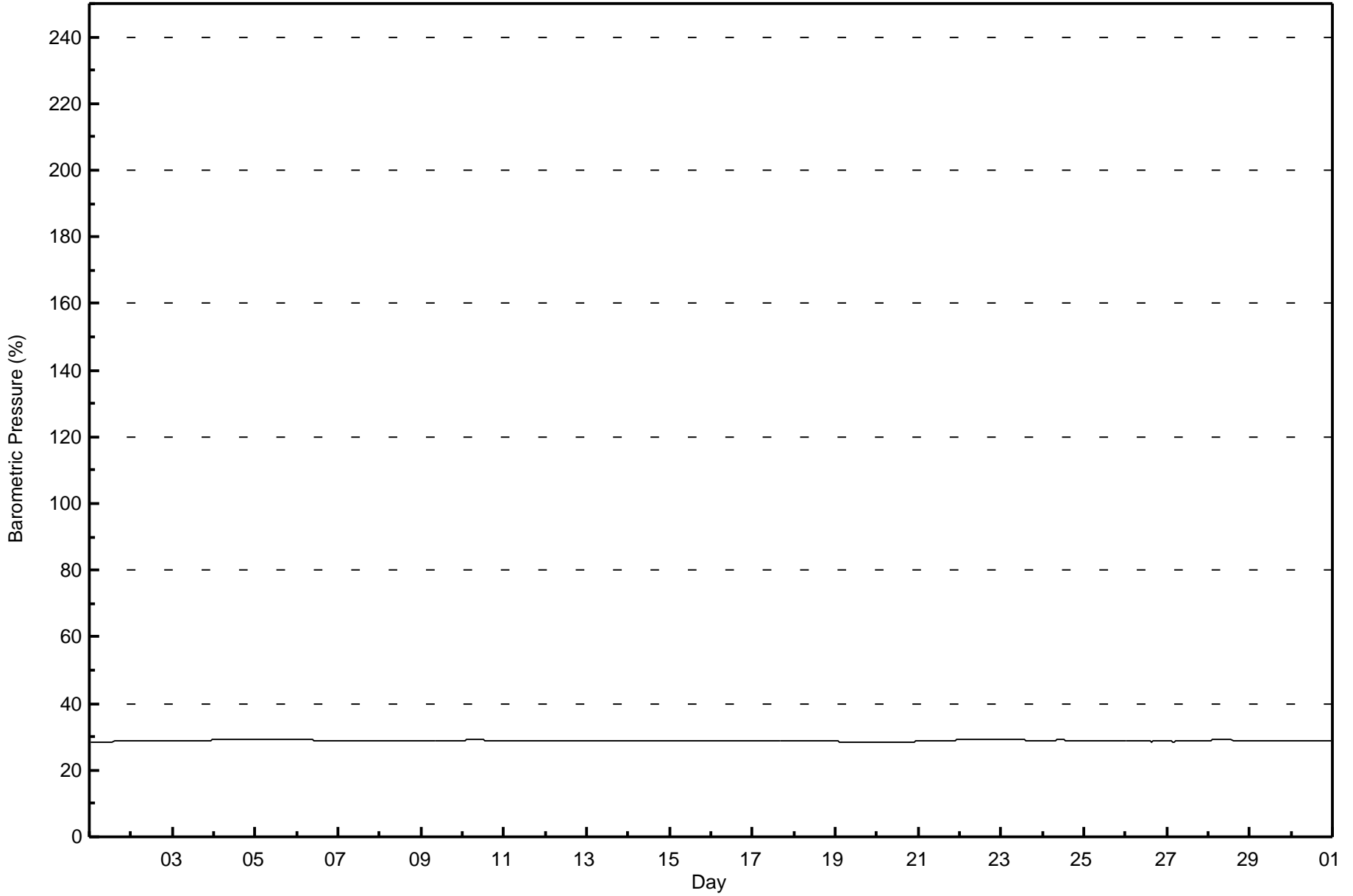
Maximum Value: 29.2 % on Sep 5 01:00																				Maximum Daily Average: 29.2 % on Sep 5					Hours in Service:	720	
Minimum Value: 28.4 % on Sep 19 15:00																				Minimum Daily Average: 28.5 % on Sep 19					Hours of Data:	720	
Maximum Diurnal Average: 28.9 % at hour 10																				Minimum Diurnal Average: 28.8 % at hour 16					Hours of Missing Data:	0	
Monthly Average: 28.87 %																				Percentiles: P <sub>1</sub> = 28.4 P <sub>10</sub> = 28.6 Q <sub>1</sub> = 28.8 Median = 28.9 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-Sep	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	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.6	28.8	
2-Sep	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	28.8
3-Sep	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	29.0
4-Sep	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2
5-Sep	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
6-Sep	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.1
7-Sep	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	28.9	29.0	
8-Sep	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	28.9	29.0
9-Sep	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	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
10-Sep	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	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
11-Sep	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	29.0
12-Sep	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8
13-Sep	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	28.7	28.8	28.8	28.8	28.8	28.8	28.8
14-Sep	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	28.9	28.9	28.9	28.9	28.9	28.9
15-Sep	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
16-Sep	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
17-Sep	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	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.9
18-Sep	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	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7
19-Sep	28.6	28.6	28.6	28.6	28.6	28.6	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	28.4	28.5	28.6	28.6
20-Sep	28.5	28.5	28.5	28.5	28.5	28.5	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	28.5	28.6
21-Sep	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.8	29.0
22-Sep	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	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.2
23-Sep	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	29.0	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
24-Sep	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	29.0	29.1
25-Sep	28.8	28.8	28.8	28.8	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
26-Sep	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	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.8
27-Sep	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	28.8	29.0	
28-Sep	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	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	29.0	29.1
29-Sep	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9
30-Sep	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	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
																								Diurnal Average			
																								Diurnal Maximum			





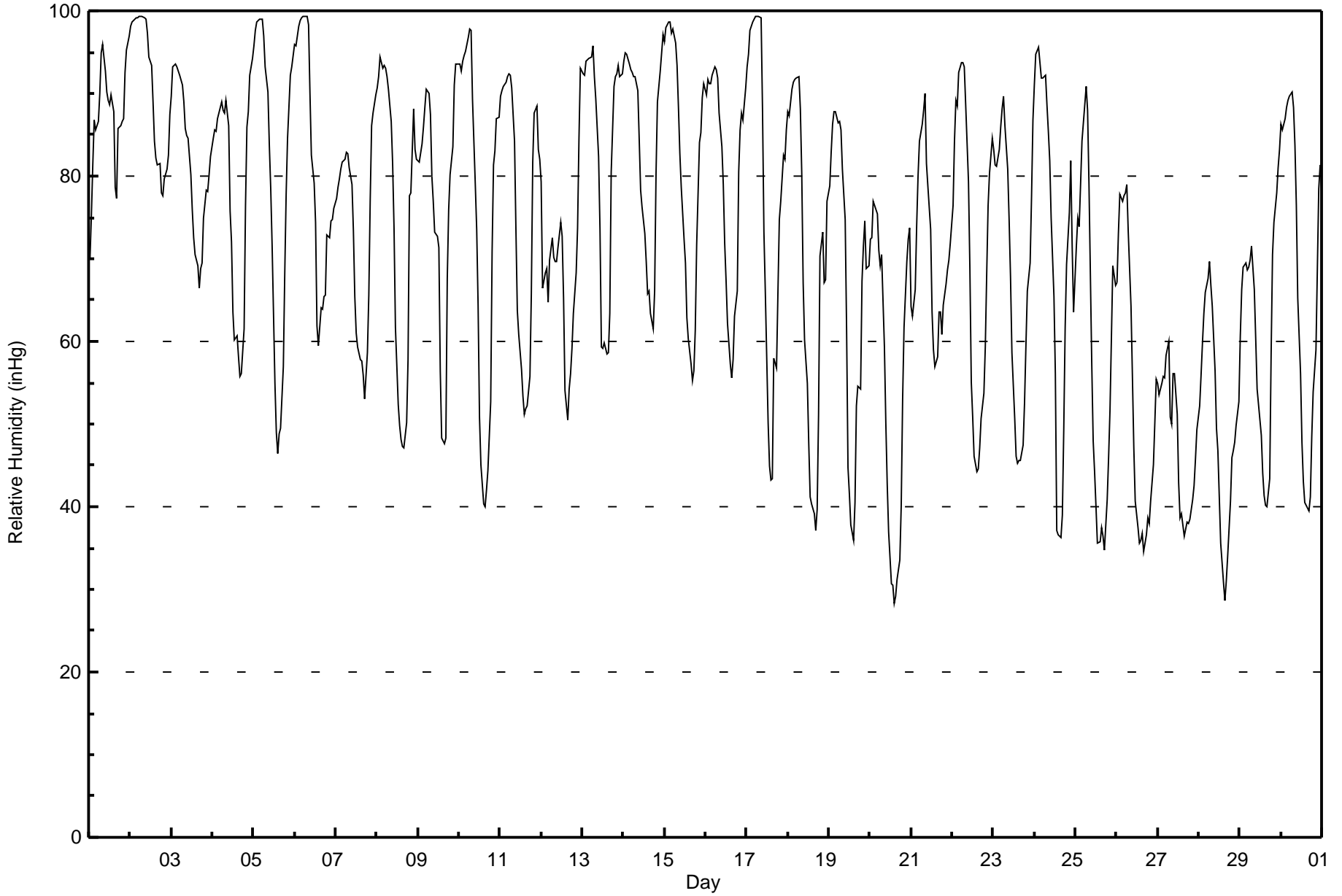
**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Barometric Pressure (BP) - %**  
**Athabasca Valley - September 2015**





Maximum Value: 99 inHg on Sep 2 08:00      Maximum Daily Average: 90.8 inHg on Sep 2																			Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																									
Minimum Value: 28 inHg on Sep 20 15:00      Minimum Daily Average: 47.7 inHg on Sep 27 Maximum Diurnal Average: 87.9 inHg at hour 7      Minimum Diurnal Average: 49.7 inHg at hour 16 Monthly Average: 72.1 inHg      Percentiles: P <sub>1</sub> = 30 P <sub>10</sub> = 44 Q <sub>1</sub> = 58 Median = 75 Q <sub>3</sub> = 88 P <sub>90</sub> = 94 P <sub>99</sub> = 99																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Sep	70	75	81	87	86	87	90	95	96	93	90	89	89	90	88	79	77	86	86	87	87	93	95	97	87.1	97																		
2-Sep	98	99	99	99	99	99	99	99	99	99	97	94	93	89	84	82	81	81	78	78	80	81	83	87	90.8	99																		
3-Sep	90	93	94	93	93	92	91	89	86	85	85	80	76	73	71	69	66	69	70	75	78	78	80	82	81.5	94																		
4-Sep	85	86	85	87	88	89	88	88	89	86	76	72	64	60	61	58	56	56	61	76	86	88	92	94	77.9	94																		
5-Sep	96	98	99	99	99	99	97	93	90	84	78	72	55	49	46	49	50	57	68	78	85	92	93	95	80.0	99																		
6-Sep	96	96	98	99	99	99	99	99	98	90	83	79	74	62	59	64	64	65	66	73	72	75	75	76	81.7	99																		
7-Sep	77	79	80	81	82	82	83	83	81	79	73	65	61	59	58	58	56	53	59	66	77	86	88	90	73.1	90																		
8-Sep	91	92	94	93	93	93	92	90	87	82	74	62	52	50	48	47	47	50	58	78	78	88	83	82	75.2	94																		
9-Sep	82	82	84	86	88	90	90	87	80	77	73	73	71	56	48	48	48	68	76	80	84	91	94	94	77.1	94																		
10-Sep	94	93	94	95	95	97	98	98	89	79	74	64	51	45	40	40	42	44	53	71	81	83	87	87	74.7	98																		
11-Sep	90	90	91	91	92	92	92	91	84	74	64	61	57	53	51	52	52	56	66	82	88	88	83	82	75.9	92																		
12-Sep	79	66	68	69	65	70	73	70	70	70	71	74	73	65	54	51	54	56	59	63	68	74	85	93	68.3	93																		
13-Sep	92	92	94	94	94	94	96	92	89	82	74	59	59	60	59	59	63	80	91	92	92	93	92	92	82.8	96																		
14-Sep	94	95	95	94	93	92	92	92	90	84	78	76	73	70	66	66	63	62	66	80	89	93	95	97	83.1	97																		
15-Sep	96	98	99	99	97	98	96	93	88	83	79	72	69	63	60	57	55	56	61	72	84	85	89	91	81.0	99																		
16-Sep	90	92	91	91	92	93	93	92	88	84	79	72	67	62	57	56	58	63	66	81	86	88	87	91	79.9	93																		
17-Sep	93	95	98	99	99	99	99	99	99	88	73	66	50	45	43	43	58	57	66	75	77	83	82	86	78.0	99																		
18-Sep	88	87	91	91	92	92	92	88	80	67	60	55	48	41	40	39	37	40	51	70	73	67	67	77	68.1	92																		
19-Sep	79	83	86	88	88	87	87	86	81	75	62	45	41	38	36	41	52	55	54	67	72	75	69	69	67.2	88																		
20-Sep	72	73	77	76	75	71	69	71	59	50	43	37	31	31	28	29	31	34	40	53	62	70	72	74	55.3	77																		
21-Sep	64	63	66	74	80	84	86	88	90	81	79	73	64	59	57	58	64	64	61	64	67	69	70	72	70.7	90																		
22-Sep	76	84	89	88	93	94	94	93	89	79	69	55	51	46	44	45	47	51	54	59	68	76	80	85	71.2	94																		
23-Sep	83	81	81	83	86	88	90	86	81	75	68	59	51	46	45	46	46	48	53	60	66	69	77	87	68.9	90																		
24-Sep	91	95	96	94	92	92	92	89	85	82	75	65	56	37	37	36	39	49	62	69	76	82	71	64	71.9	96																		
25-Sep	71	75	74	79	84	89	91	88	79	57	48	44	40	36	36	37	36	35	41	46	52	60	69	67	59.7	91																		
26-Sep	67	73	78	77	78	78	79	73	64	56	47	41	37	36	36	37	35	37	39	38	41	45	50	55	54.0	79																		
27-Sep	55	54	55	56	56	58	60	51	50	56	56	51	43	39	39	36	37	38	38	38	41	43	46	49	47.7	60																		
28-Sep	52	56	60	63	66	68	70	67	64	56	49	47	41	36	31	29	31	34	41	46	47	48	50	53	50.1	70																		
29-Sep	61	66	69	70	69	69	70	71	66	60	54	52	49	44	41	40	40	43	58	70	74	78	81	83	61.7	83																		
30-Sep	86	86	87	88	89	90	90	88	84	76	65	56	48	43	41	40	39	41	48	54	59	69	79	81	67.8	90																		
																			81.9	83.2	85.1	86.1	86.7	87.5	87.9	86.3	82.6	76.3	69.8	63.7	57.8	52.7	50.2	49.7	50.9	54.2	59.6	68.0	73.0	76.9	78.8	81.0	Diurnal Average	
																			98	99	99	99	99	99	99	99	99	99	97	94	93	90	88	82	81	86	91	92	92	93	95	97	Diurnal Maximum	





Maximum Speed: 38 km/h on Sep 27 09:00	Maximum Daily Speed Average: 17.1 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 20 21:00	Minimum Daily Speed Average: 1.0 km/h on Sep 13	Hours of Data: 717
Maximum Diurnal Speed Average: 7.8 km/h at hour 16	Minimum Diurnal Speed Average: 0.8 km/h at hour 10	Hours of Missing Data: 3
Monthly Average Velocity: 2.4 km/h 238.3 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 8 Q <sub>3</sub> = 12 P <sub>90</sub> = 16 P <sub>99</sub> = 30	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-Sep	SE7	SE7	SE7	SSE8	SE7	SE5	SE5	N2	NNE4	N9	NNW15	NNW22	NW18	WNW20	WNW16	WNW12	WSW11	WSW13	SW8	WSW10	WSW8	SE1	SE4	SE5	WNW3.3	NNW22
2-Sep	SE5	SE7	SE7	SE7	SE5	SE5	SSE4	NE3	N8	NNW10	NNW8	NNW8	NNW10	N12	N10	N10	NNW15	NNW13	NNE9	NNE12	N13	N13	NNW14	NNW13	N6.1	NNW15
3-Sep	NNW11	NNW12	NW10	NW13	WNW16	WNW14	WNW14	NW13	W14	W17	W22	WNW24	WNW27	WNW26	WNW25	NW26	NW23	WNW19	WNW18	WNW17	W17	W19	W13	SW6	WNW16.6	WNW27
4-Sep	WSW5	SSW5	WSW6	SW7	SW7	SW6	WSW7	WSW5	NNW4	NNE5	NNE5	NNW9	NNW6	WNW4	N10	N9	N7	NNW6	NNE2	SW2	E3	ESE4	SE4	SE4	NW1.9	N10
5-Sep	SE5	SSE8	SE9	SSE9	SSE8	SSE7	SE8	SE7	SE9	SE6	NE0	N2	SE5	ESE8	SE9	SE8	SSE5	SE4	E5	ESE1	ENE1	E3	E4	E3	SE5.1	SE9
6-Sep	E2	ESE4	E4	ESE4	SE6	E5	E3	NE2	N5	NNW9	NNW11	NNW11	N10	N9	N10	NNW10	N8	NNE6	N5	NNW6	NNW8	NNW7	NNW8	NNW8	N5.0	NNW11
7-Sep	NNW8	NNW7	N7	NNW7	NNW6	NNW6	NNW6	NNW8	N10	N9	NNW12	NNW13	NNW13	NNW13	NNW11	N11	NNW14	NNE8	NE5	NE2	SW2	S1	S2	SE2	N6.8	NNW14
8-Sep	SE4	SE4	ESE4	SE7	SE7	SE8	SE8	ESE7	SE5	ESE5	E5	WNW3	WNW4	NW5	NNW8	NW10	NW9	NNW9	W3	S2	SE4	ESE2	SSE5	SE5	ESE1.3	NW10
9-Sep	SE7	SSE6	SE8	SE9	SE7	SSE6	SE9	SE9	SE7	SE7	ESE4	E6	ESE7	SW7	SW13	WSW14	W10	N9	SW4	SSE4	S3	SE2	SE2	SSE3	SSE3.9	WSW14
10-Sep	SE4	SE6	SE8	SE10	SE10	SE11	SE11	SE11	SE10	SE8	E7	SSE3	SW9	WSW10	SW10	WSW11	SW11	WSW8	SW4	E1	SE4	SSE3	S2	SE5	SSE4.9	WSW11
11-Sep	SE7	SE11	SE9	SSE10	SE11	SSE9	SE10	SE9	SE8	SSE8	SW15	SW11	WSW9	SW12	WSW22	WSW14	SW8	SSW6	SE1	ESE1	SSE2	SSE3	SW7	SW7	SSW6.4	WSW22
12-Sep	SSW7	SW12	S7	SW8	SSW6	SSW4	SSW6	SW9	SW8	SW6	S2	ESE4	E3	WSW8	WSW13	W19	WSW15	WSW12	SW15	SSW11	SSW9	SSE3	WSW1	E3	SW6.7	W19
13-Sep	ESE4	ESE3	ESE3	E3	SE4	SE5	ESE6	SE5	W2	WNW3	NW5	NNW9	N8	NNW10	NNW7	NNW4	NW2	W11	S4	SW4	WSW6	SW5	SW7	WSW4	WNW1.0	W11
14-Sep	SW6	W3	WNW5	NW8	NNW10	NNW11	NNW11	NNW10	NNW13	N11	N12	NNW16	NNW18	N15	N9	NNW10	N8	ENE6	ENE4	W2	E4	E4	SE1	E2	NNW6.6	NNW18
15-Sep	ESE5	ESE5	ESE4	E5	E6	ESE5	SE5	E4	ENE5	E5	SE7	SSE13	SSE12	SE11	SE5	E7	E8	E9	ESE6	ESE3	E2	SE2	E2	ENE1	ESE5.0	SSE13
16-Sep	ENE3	E2	ENE2	ESE3	ESE3	ESE3	SE6	SE5	E3	E4	E5	SSE6	SE8	SSE7	SE7	ESE6	SW7	SW8	S5	S2	ESE2	SE5	SSE5	SE5	SE3.6	SE8
17-Sep	SE5	SE6	SE10	SE10	SSE9	AF	AF	AF	SE9	SE9	ESE5	NNE3	WSW9	SW8	SW7	W9	ESE4	S5	S6	SSE7	SSE5	SE6	SE8	SE5	SSE4.8	SE10
18-Sep	SE7	SE11	SE11	SE11	SE11	SE11	SE10	SE9	ESE6	SW12	SSW12	SW15	SW15	W20	WSW21	WSW17	WSW18	WSW14	SW2	E1	SE4	SSE8	SSE8	SE4	SSW6.3	WSW21
19-Sep	SE8	SE11	SE10	SE12	SE11	SE11	SE11	SE12	SE14	SSE8	SSE4	SW17	WSW17	SW18	SW23	W26	W18	W17	W16	SW15	SSW11	SW12	WSW18	WSW17	SW8.8	W26
20-Sep	WSW15	WSW14	WSW15	WSW19	WSW20	WSW24	SW9	SE4	SSW11	SW11	SW17	WSW20	W29	WSW24	W29	WNW26	WNW21	NW18	NW12	WNW5	SSE0	SW2	SW1	ESE1	WSW12.8	W29
21-Sep	WSW5	W15	W18	WNW18	WNW15	WNW12	NW15	NW16	NNW16	NNW16	NNW13	NNW14	NNW15	NW13	NW16	N10	NW7	WNW7	WNW17	WNW15	WNW12	WNW14	W13	SW5	NW12.0	WNW18
22-Sep	WSW7	WSW5	SW9	SW7	SSE2	SE3	ESE5	SE5	SW2	WSW1	ENE4	SSE7	ESE7	SSE8	ESE7	S4	S1	ESE7	ESE6	E6	ESE5	ESE5	ESE6	ESE6	SSE3.3	SW9
23-Sep	SE7	SE9	SE10	SE8	SE7	SE7	ESE6	SE8	SE13	SE14	SSE11	SSE8	ESE9	ESE10	ESE15	ESE15	ESE13	ESE14	SE10	SE6	SE8	SE10	E5	ENE3	SE9.1	ESE15
24-Sep	NNE2	ENE2	SE5	ESE6	SE10	SSE7	SSE8	SSE11	SSE12	S5	WSW5	NE2	W1	SW3	N3	NNW5	N5	NNW2	NNW1	W0	SE0	N1	SE7	SE12	SE2.7	SSE12
25-Sep	SE4	SSE7	SSE14	SE13	SSE8	SSW6	SSW6	SW7	SW13	WNW18	WNW17	W13	W22	WSW18	WSW19	WSW15	W15	WSW11	SW9	SW10	WSW7	WSW3	SSE1	SSE3	WSW7.7	W22
26-Sep	SSE3	SE3	SE4	SE5	SSE5	SSE6	ESE4	SW12	SW13	SW13	WSW18	WSW20	WSW24	WSW22	WSW26	W30	W22	W16	WSW15	WSW13	WSW15	W8	SSW4	WSW10.6	W30	
27-Sep	S5	SSW9	SW12	SW12	WSW9	SW8	WSW11	WNW33	WNW38	NW32	NW27	NW30	NW31	NW37	NW32	WNW29	WNW24	WNW15	W12	W12	WSW13	W13	NW11	NW16	WNW17.1	WNW38
28-Sep	WNW13	W11	WSW13	W11	WSW9	W8	SW4	ESE3	E6	E5	E5	E7	SSW3	SSW10	SW9	SW9	SSW6	S5	SE8	SE8	SE9	SE12	SE10	SE13	SSW3.9	WNW13
29-Sep	SE13	SE14	SE15	SE12	SE11	SE12	SE8	SE10	SE12	SE11	E6	ENE3	SW6	SW8	SW7	SW7	SW5	SW2	SSW1	S2	SE2	SSW1	SSW1	SSE4	SSE5.9	SE15
30-Sep	SSE4	SE8	SE11	SE10	SSE10	SE12	SE11	SE10	SE13	SE12	SE9	ESE5	SW8	SW16	SW14	SW14	S11	SSE9	SSE5	SE7	SE8	SSE5	SE3	SSE1	SSE7.5	SW16

S2.5	S3.5	SSE4.3	S4.3	SSE4.0	S3.6	SSE3.4	SSE2.0	S1.5	W0.8	NNW2.5	NNW4.2	W6.2	W7.4	W7.6	W7.8	W6.6	W4.4	WSW2.7	WSW2.7	SSW1.8	SSW1.7	SSW1.6	S1.7	Diurnal Average
WSW15	W15	W18	WSW19	WSW20	WSW24	NW15	WNW33	WNW38	NW32	NW27	NW30	NW31	NW37	NW32	WNW29	W30	W22	WNW18	WNW17	W17	W19	WSW18	WSW17	Diurnal Maximum

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

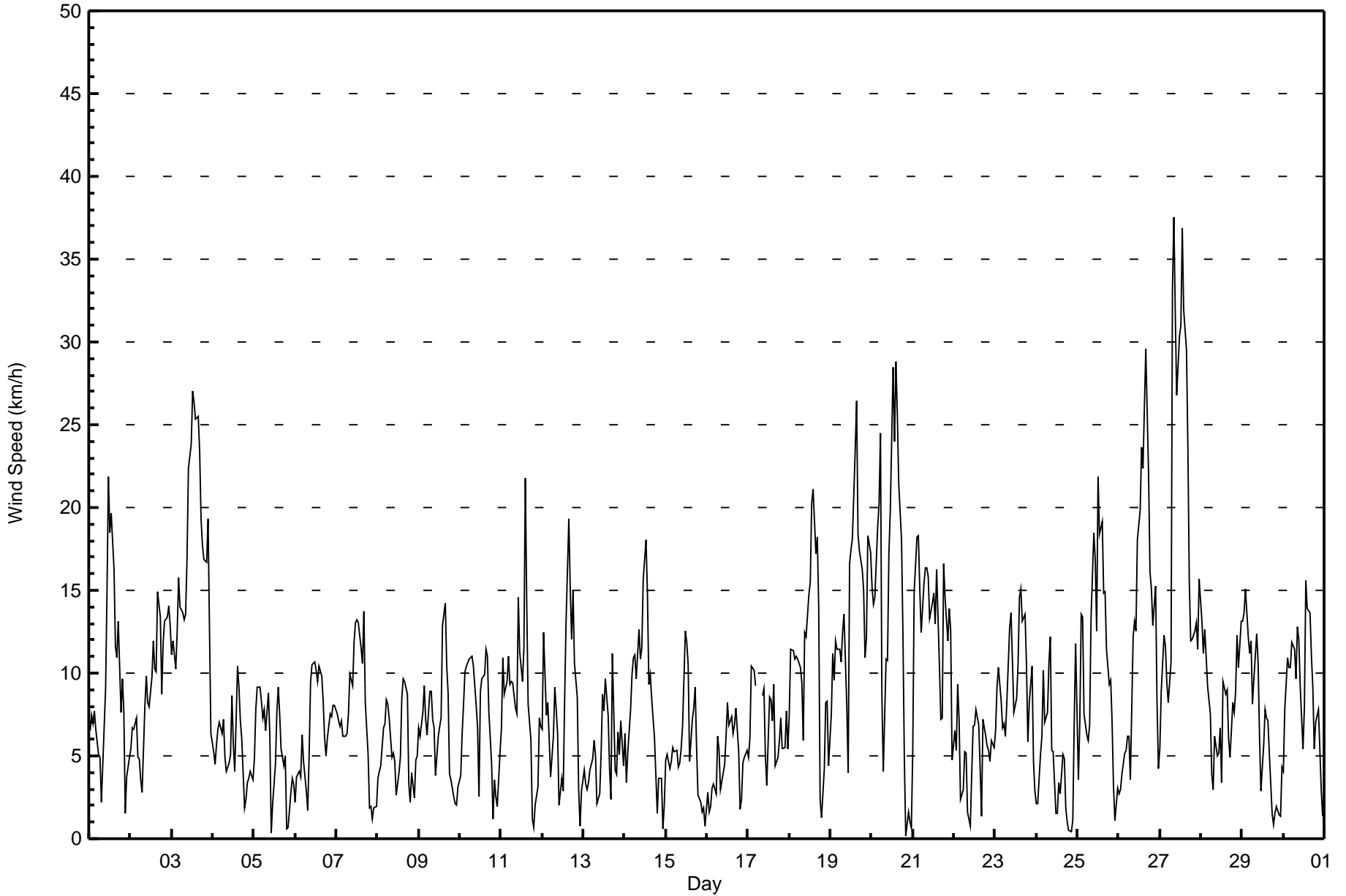


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value:	12 km/h on Sep 19 18:00		Hours of Data:	717
Minimum Value:	1 km/h on Sep 15 04:00		Hours of Missing Data:	3
Percentiles:	P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 P <sub>99</sub> = 8		Hours of Calibration:	0
			Percent Operational Time:	99.6

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

	3	4	4	5	5	4	5	10	9	6	6	7	7	8	7	10	7	12	8	4	3	3	5	4	
	Diurnal Maximum																								

AF - Analyzer Failure





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Athabasca Valley - September 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	231	32.22	32.22
6 - 11	301	41.98	74.20
12 - 19	146	20.36	94.56
20 - 28	28	3.91	98.47
29 - 38	11	1.53	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 717

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Athabasca Valley - September 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	7	6	6	10	29	32	50	24	16	7	15	9	6	6	3	5	231
6 - 11	21	3	0	1	10	18	97	30	3	13	38	18	7	1	6	35	301
12 - 19	5	1	0	0	0	4	17	5	0	2	21	26	17	19	10	19	146
20 - 28	0	0	0	0	0	0	0	0	0	0	1	10	5	8	3	1	28
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	3	3	5	0	11
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>33</b>	<b>10</b>	<b>6</b>	<b>11</b>	<b>39</b>	<b>54</b>	<b>164</b>	<b>59</b>	<b>19</b>	<b>22</b>	<b>75</b>	<b>63</b>	<b>38</b>	<b>37</b>	<b>27</b>	<b>60</b>	<b>717</b>

Total Number of Valid Hours: 717

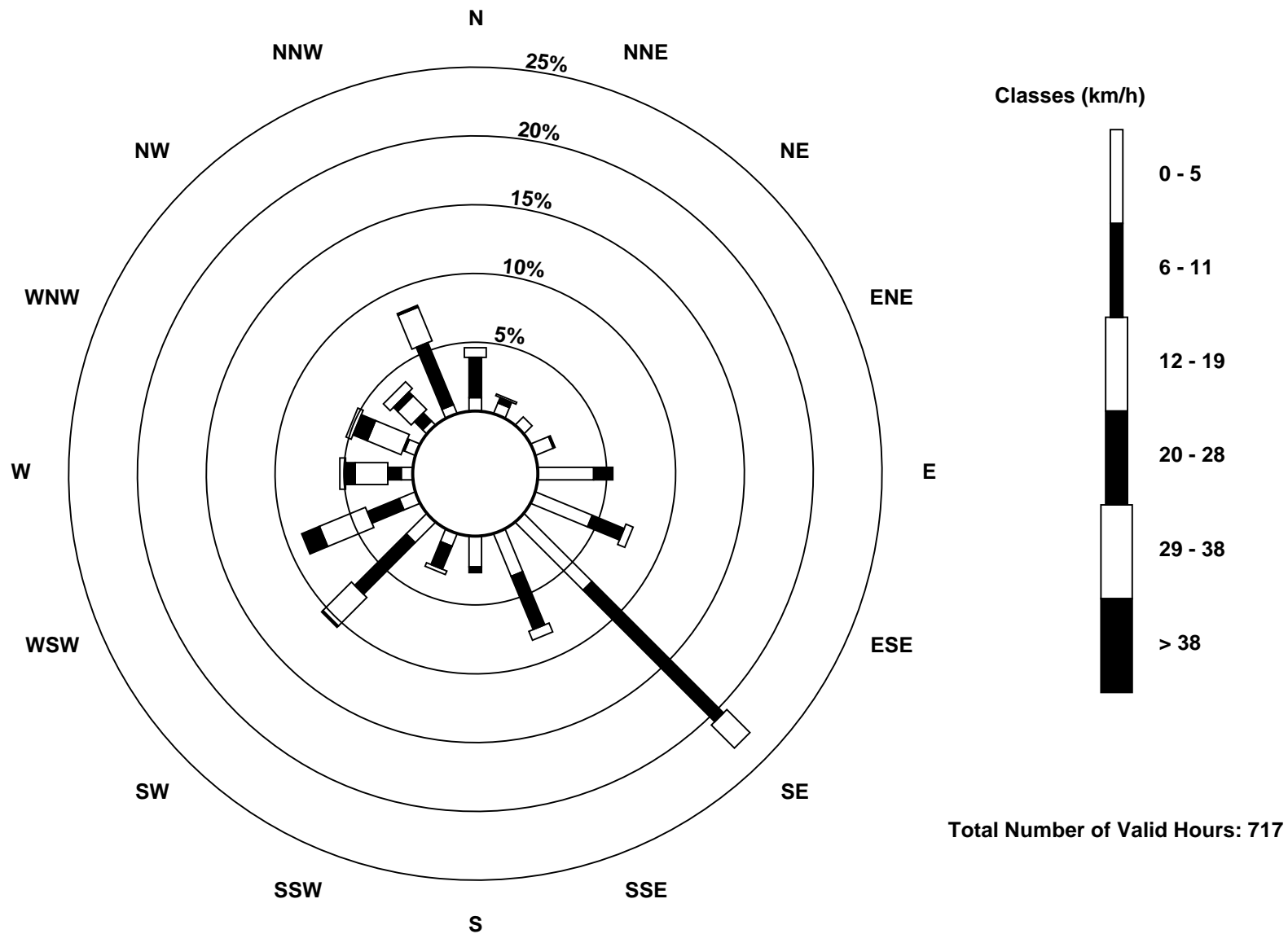
Total Number of Hours: 720





Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Wind Speed (WS) - km/h  
Athabasca Valley (AMS 7)





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Athabasca Valley - September 2015**

Direction of Maximum Speed: 298 deg on Sep 27 09:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 291.4 deg on Sep 27	Hours of Data: 717
Direction of Minimum Speed: 162 deg on Sep 20 21:00	Hours of Missing Data: 3
Direction of Minimum Daily Speed Average: 1.0 deg on Sep 13	Percent Operational Time: 99.6
Monthly Average Direction: 245.2 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-Sep	146	142	140	150	136	129	134	2	19	2	330	340	312	300	284	298	242	245	219	247	254	125	146	130	281.9
2-Sep	129	130	138	140	137	144	147	53	351	339	339	342	344	349	6	11	345	347	15	12	11	6	347	329	3.5
3-Sep	329	339	305	313	303	287	294	322	277	274	276	292	290	292	291	305	306	287	292	284	280	280	270	226	292.5
4-Sep	243	211	239	222	235	234	245	252	345	12	20	348	336	299	351	351	4	338	18	219	97	120	127	128	306.1
5-Sep	135	149	145	151	151	163	140	142	144	137	37	9	124	106	124	135	162	133	98	117	75	86	96	97	134.3
6-Sep	100	108	96	121	132	94	90	46	350	338	343	348	350	9	354	339	351	19	10	346	342	343	342	341	1.0
7-Sep	341	341	352	339	347	342	346	347	349	352	342	345	345	343	348	357	342	33	46	50	220	184	172	137	349.7
8-Sep	124	125	111	132	135	129	128	122	126	116	84	294	300	315	329	315	324	327	264	172	136	104	149	136	112.2
9-Sep	140	147	133	143	143	151	137	137	135	133	116	99	121	233	232	240	265	359	228	168	172	128	132	167	163.2
10-Sep	134	144	143	138	138	141	137	133	136	126	85	156	231	237	230	237	236	237	221	95	131	165	184	143	167.5
11-Sep	146	144	146	150	146	152	141	142	137	153	219	231	240	235	241	237	226	209	142	117	160	148	222	226	191.5
12-Sep	211	230	176	214	200	207	213	219	223	223	172	107	89	241	253	261	243	237	235	209	192	153	247	85	223.8
13-Sep	123	116	105	92	126	124	120	125	261	291	324	347	8	342	341	328	308	276	177	235	242	219	234	255	292.3
14-Sep	232	265	296	316	328	341	338	335	339	357	353	345	346	350	2	343	354	59	68	263	88	83	133	95	345.7
15-Sep	106	119	102	92	100	111	131	89	78	85	124	163	162	128	134	95	99	95	110	109	101	133	98	76	116.2
16-Sep	78	101	77	121	118	104	125	127	90	81	83	152	139	153	135	114	222	226	183	191	105	144	151	139	138.4
17-Sep	127	138	143	144	147	AF	AF	AF	137	134	118	29	241	229	230	276	111	172	186	152	156	140	139	130	158.1
18-Sep	125	135	137	139	133	137	137	136	123	214	213	219	227	274	258	244	255	254	214	89	132	149	149	128	196.5
19-Sep	144	137	138	141	146	144	141	144	139	151	165	230	238	235	235	273	281	281	264	228	204	229	250	257	218.5
20-Sep	250	256	244	244	249	245	234	142	211	221	224	248	265	249	272	282	296	305	307	292	162	225	225	110	257.8
21-Sep	242	267	278	286	290	299	305	317	333	341	340	331	327	322	321	349	323	296	297	285	300	286	280	224	305.1
22-Sep	246	248	231	229	161	142	123	139	219	248	77	154	115	166	109	182	175	118	110	100	108	114	115	123	147.3
23-Sep	135	135	135	133	124	125	115	127	137	142	152	150	113	117	107	112	116	121	124	135	134	143	94	59	126.6
24-Sep	26	62	125	123	133	151	155	148	152	172	245	54	280	223	5	334	354	347	336	281	138	358	146	146	143.8
25-Sep	131	151	149	146	163	201	213	220	234	294	294	264	273	251	256	243	261	244	232	235	237	251	163	154	240.0
26-Sep	157	145	143	144	151	149	147	122	215	223	231	245	247	254	243	258	269	265	266	258	256	255	265	192	243.5
27-Sep	190	208	216	227	245	233	249	284	298	320	311	306	306	313	312	303	289	285	275	259	256	268	320	313	291.4
28-Sep	283	271	257	260	244	273	227	105	91	95	88	97	193	209	217	224	209	177	141	138	138	140	142	143	193.0
29-Sep	141	137	140	143	143	142	145	135	138	135	99	67	225	217	215	228	235	218	204	173	130	208	197	154	153.1
30-Sep	158	142	140	144	149	144	142	136	138	140	135	108	224	225	225	215	176	159	153	133	144	154	146	147	160.6

171.0 169.3 167.5 171.6 168.6 172.7 160.9 153.9 183.2 267.5 294.2 292.4 279.4 271.9 271.8 278.0 279.6 273.6 250.9 238.5 212.9 211.4 213.6 173.0

Diurnal Average

AF - Analyzer Failure

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

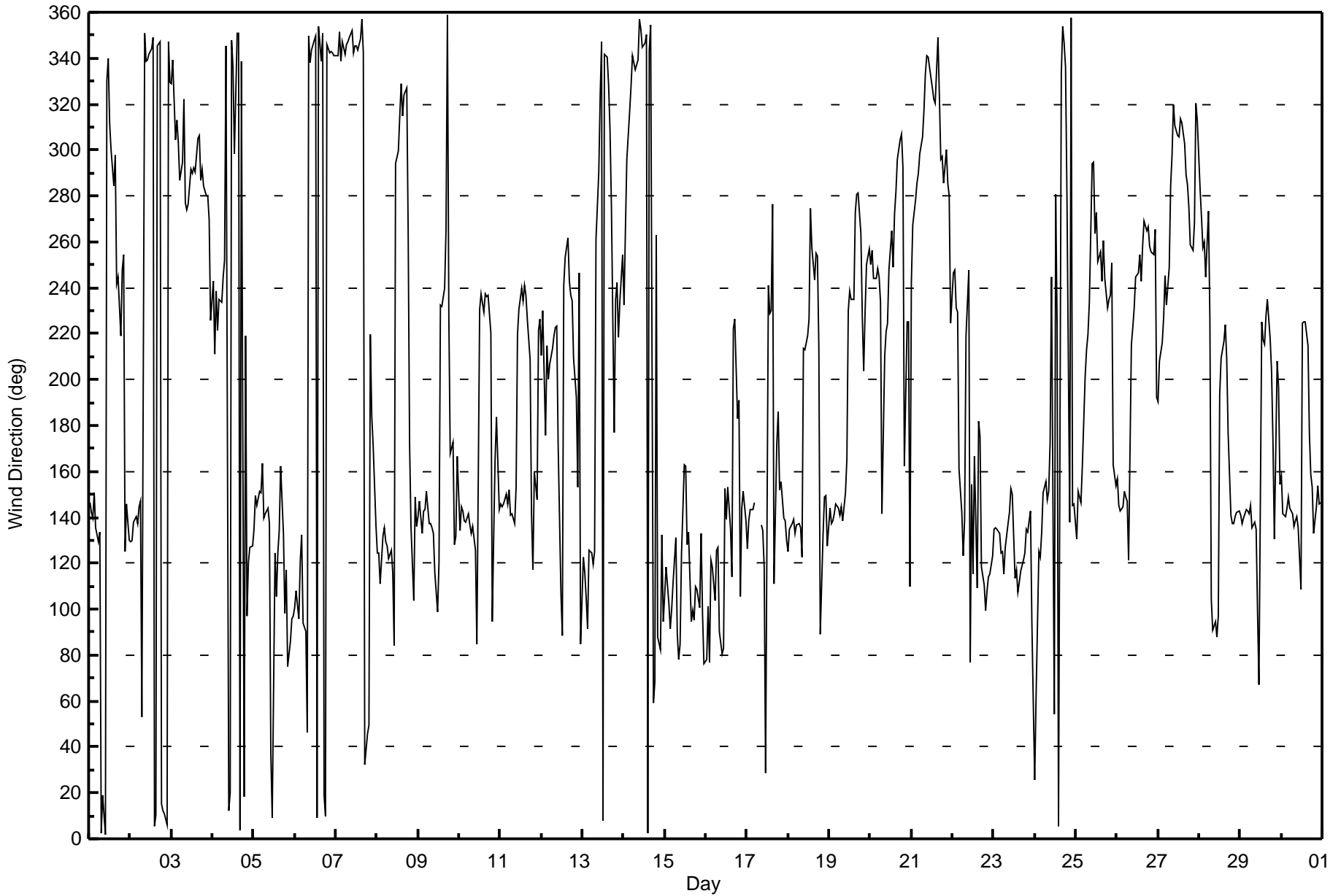
Wind Direction (WD) - deg

Athabasca Valley - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 99 deg on Sep 21 00:00			Hours of Data:	717
Minimum Value: 8 deg on Sep 8 18:00			Hours of Missing Data:	3
			Hours of Calibration:	0
			Percent Operational Time:	99.6
Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 12 Q <sub>1</sub> = 15 Median = 20 Q <sub>3</sub> = 33 P <sub>90</sub> = 56 P <sub>99</sub> = 93				

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	17	17	14	18	30	40	55	76	46	31	24	11	40	25	12	15	23	14	23	30	26	71	28	37	76
2-Sep	24	23	14	12	15	23	47	33	20	16	13	16	16	19	23	19	17	21	19	17	17	18	19	11	47
3-Sep	10	12	20	13	11	12	18	14	16	13	12	12	13	15	14	15	15	13	13	10	11	9	14	31	31
4-Sep	32	27	27	17	15	16	13	36	26	29	45	22	21	55	18	20	23	37	62	71	24	29	30	31	71
5-Sep	30	18	10	17	21	21	19	17	19	29	91	59	48	23	30	36	36	37	17	89	91	21	22	18	91
6-Sep	63	23	17	29	24	14	15	46	34	15	12	15	17	27	23	13	18	17	29	14	14	11	11	14	63
7-Sep	12	16	38	14	19	22	16	14	16	17	15	16	16	13	17	22	12	27	29	34	91	72	75	60	91
8-Sep	26	23	20	12	14	11	9	15	20	24	34	71	23	24	22	21	15	8	50	64	52	48	29	24	71
9-Sep	27	29	22	13	23	21	14	14	12	11	42	21	23	38	17	16	45	37	50	49	56	59	35	45	59
10-Sep	24	16	15	12	11	10	13	12	11	18	12	66	22	17	18	15	16	15	17	80	39	44	45	19	80
11-Sep	15	11	16	16	12	15	12	13	14	35	12	20	20	20	11	13	21	25	65	83	68	35	22	40	83
12-Sep	39	17	40	54	53	54	40	20	13	56	67	55	27	24	19	15	12	12	11	34	27	64	98	42	98
13-Sep	22	29	26	27	22	20	17	28	72	27	25	22	24	11	12	18	54	29	56	31	19	36	12	25	72
14-Sep	14	34	35	19	11	13	11	15	11	21	21	15	16	20	22	15	23	31	39	86	17	49	81	47	86
15-Sep	18	21	20	10	18	21	21	15	16	26	31	18	22	28	75	45	20	15	20	50	69	69	50	31	75
16-Sep	12	59	57	37	40	26	21	22	36	38	34	30	22	33	38	46	23	9	37	82	69	26	31	31	82
17-Sep	28	18	11	12	14	AF	AF	AF	13	12	38	67	30	29	25	43	68	37	41	14	16	15	12	20	68
18-Sep	19	12	10	10	11	11	11	9	31	19	12	14	16	18	18	17	20	15	71	78	45	13	13	37	78
19-Sep	14	13	15	12	14	12	13	16	12	15	61	19	22	17	18	25	17	18	28	18	25	18	11	10	61
20-Sep	11	12	13	9	11	9	49	75	26	30	13	25	18	17	17	14	19	14	8	31	96	79	94	99	99
21-Sep	13	13	11	9	12	11	11	28	11	20	16	16	20	20	16	24	30	24	14	11	15	11	16	31	31
22-Sep	30	26	18	17	54	47	20	21	90	97	50	34	40	56	44	52	94	25	20	17	22	28	27	27	97
23-Sep	23	15	15	18	20	23	30	25	15	14	18	24	30	23	21	22	21	19	18	20	16	14	40	33	40
24-Sep	35	58	24	29	16	32	17	16	15	47	35	89	72	75	52	17	25	33	55	92	80	64	66	13	92
25-Sep	81	42	14	14	28	40	45	36	11	18	17	23	18	19	19	17	16	14	15	19	22	47	96	34	96
26-Sep	61	54	22	17	18	12	18	56	19	17	25	20	21	21	18	22	14	13	13	14	12	12	32	37	61
27-Sep	42	33	16	18	26	26	35	14	15	16	16	16	16	13	15	16	14	10	13	10	9	14	12	11	42
28-Sep	13	11	11	21	15	21	71	42	19	61	47	33	82	34	28	20	24	30	17	45	18	13	15	11	82
29-Sep	12	13	12	13	14	14	18	13	13	15	30	75	64	22	26	17	26	65	85	67	66	79	62	31	85
30-Sep	26	14	12	15	17	16	15	17	14	12	16	27	57	21	21	24	24	17	24	15	10	14	52	72	72
Diurnal Maximum																									
81 59 57 54 54 54 71 76 90 97 91 89 82 75 75 52 94 65 85 92 96 79 98 99																									

AF - Analyzer Failure





# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	September 24, 2015	Last Calibration	August 13, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Removal		
Start Time (MST)	7:40	End Time (MST)	9:05
Gas Cert Reference	S970259A	Station temp.	18 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
ZAG Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-681	-681
Analyzer IP address	192.168.1.103		Lamp voltage	807	811
Calculated slope	1.010933	1.015792	Chamber temp	43.7	43.7
Calculated intercept	-0.357964	-0.227394	Pressure	704.2	707.8
Analyzer Background	10.5	42.8	Flow	0.549	0.552
Analyzer Coefficient	0.829	0.802	Intensity	48500	48813

Analyzer make Thermo 43C Analyzer serial # 6074175781

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.5	----
as found span	5000	60.7	607.0	598.2	1.015
calibrator zero	5000	0.0	0.0	0.5	----
high point	5000	60.7	607.0	598.2	1.015
second point	5000	30.4	304.0	298.5	1.018
third point	5000	15.2	152.0	150.2	1.012
as left zero					
as left span					
Average Correction Factor					1.015

Corrected As found 597.7 Previous response 600.8 % change 0.5%

**Notes:**

removed to put in a Thermo 45C; Analyzer to go back to Alberta Environment

Calibration Performed By: Melissa Lemay



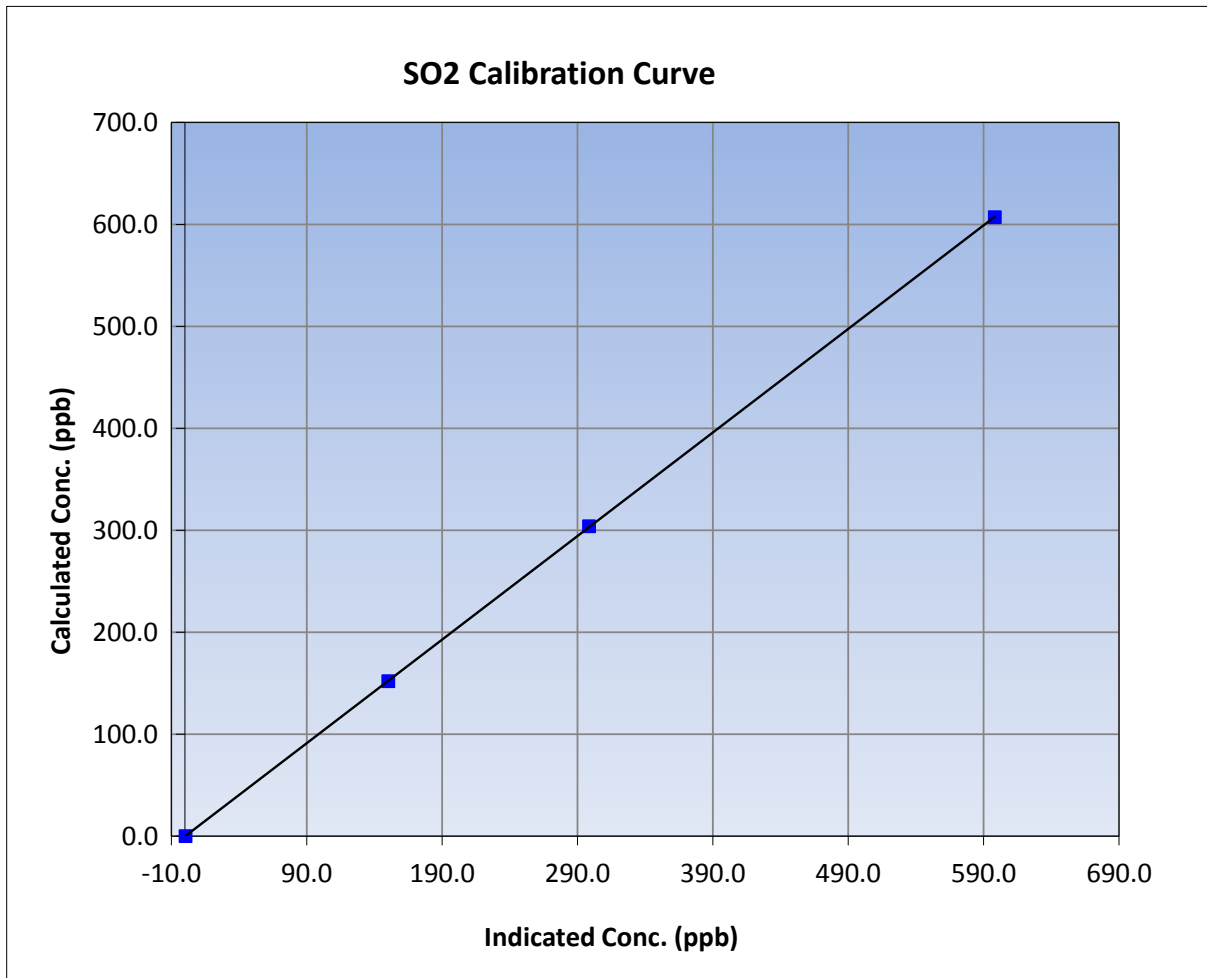
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 13, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:40	End Time (MST)	9:05
Analyzer make	Thermo 43C	Analyzer serial #	6074175781

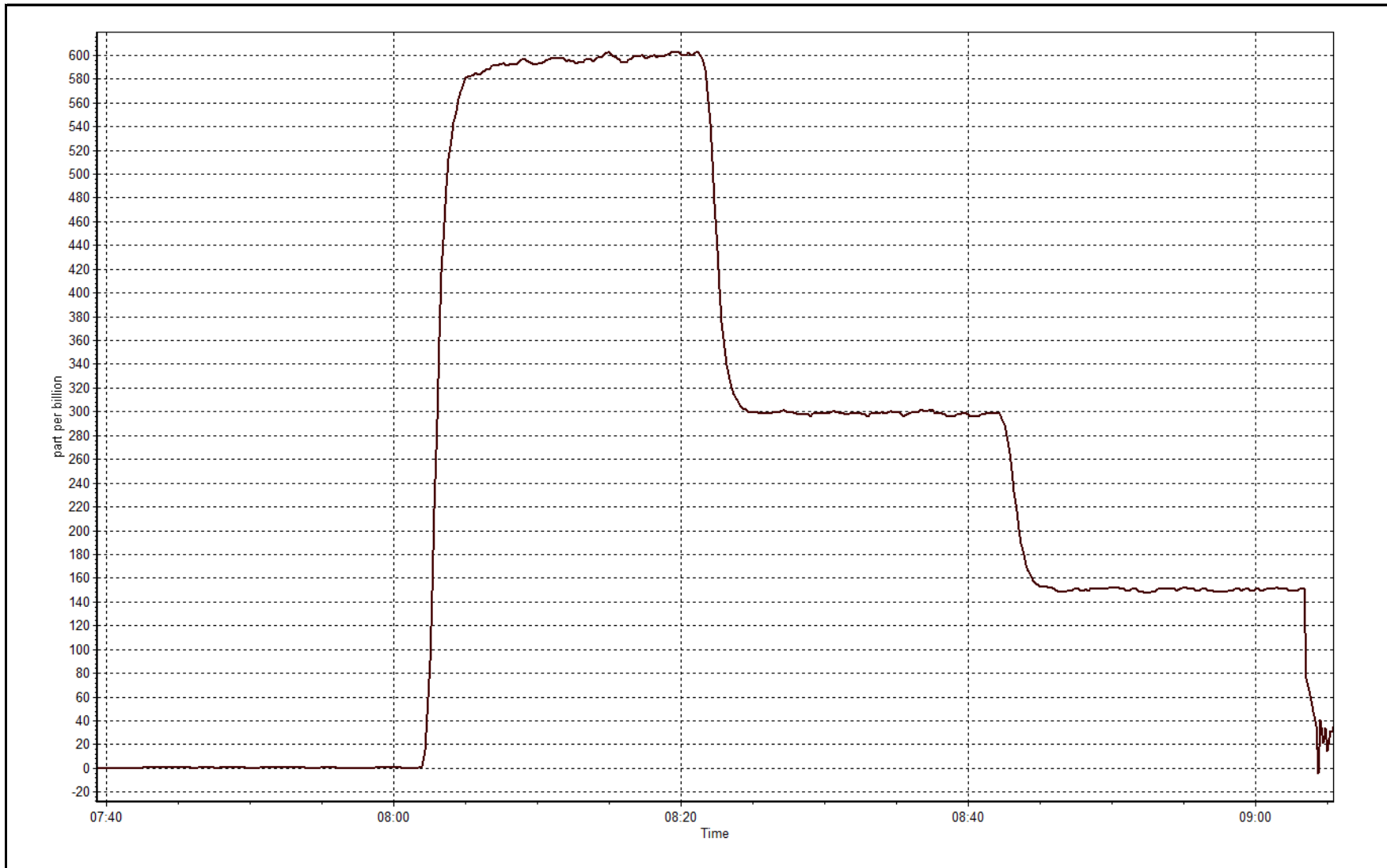
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999993
607.0	598.2	1.0147		
304.0	298.5	1.0184	Slope	1.015792
152.0	150.2	1.0120		
			Intercept	-0.227394



SO2 Calibration Plot

Date: September 24, 2015





# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	September 24, 2015	Last Calibration	
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Install		
Start Time (MST)	11:45	End Time (MST)	13:55
Gas Cert Reference	S970259A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
ZAG Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-619	
Analyzer IP address	192.168.1.103		Lamp voltage	803	
Calculated slope	0.992664		Chamber temp	43.9	
Calculated intercept	0.589501		Pressure	697.5	
Analyzer Background	17.9		Flow	0.479	
Analyzer Coefficient	1.065		Intensity	43818	

Analyzer make Thermo 45C Analyzer serial # 630718530

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	60.7	607.0	611.2	0.993
second point	5000	30.4	304.0	305.0	0.997
third point	5000	15.2	152.0	152.6	0.996
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	60.7	607.0	607.8	0.999
Average Correction Factor					0.995

Corrected As found      NA      Previous response      NA      % change      NA

**Notes:**

Install to return 43C back to Alberta Environment, filter changed out

Calibration Performed By: Melissa Lemay





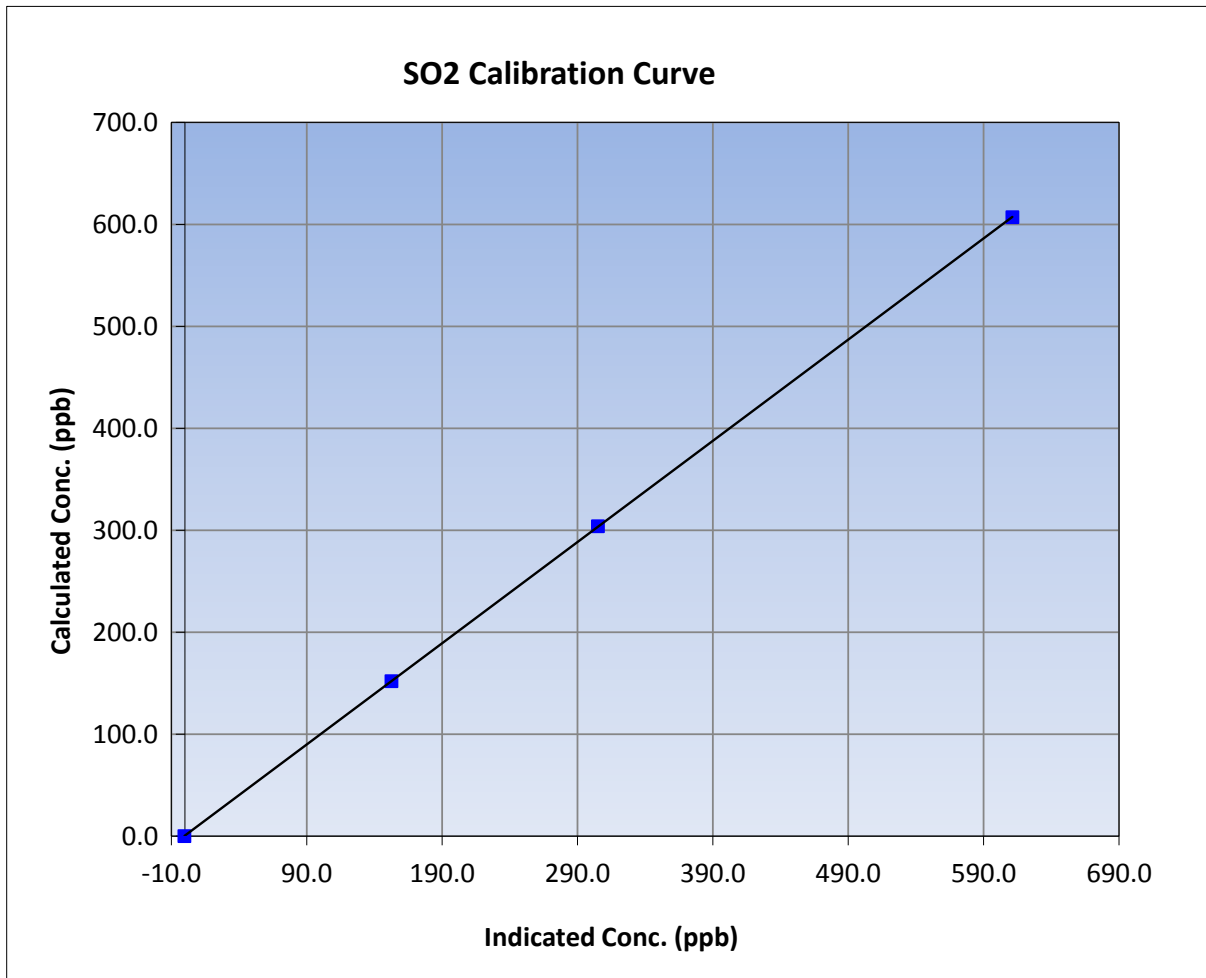
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 24, 2015	Previous Calibration	
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	11:45	End Time (MST)	13:55
Analyzer make	Thermo 45C	Analyzer serial #	630718530

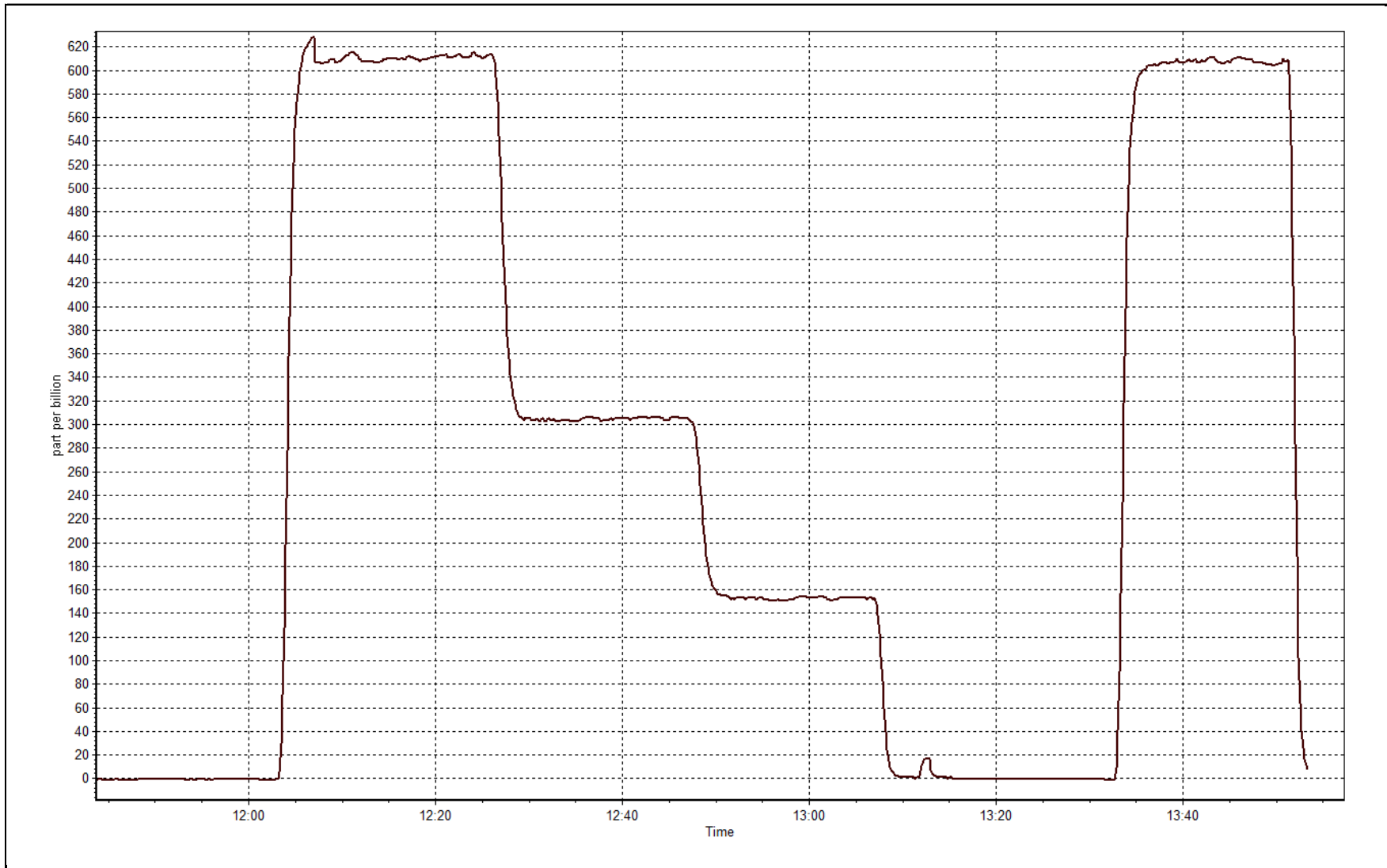
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999997
607.0	611.2	0.9931		
304.0	305.0	0.9967	Slope	0.992664
152.0	152.6	0.9961		
			Intercept	0.589501



SO2 Calibration Plot

Date: September 24, 2015





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	September 24, 2015	Last Calibration	August 14, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Removal		
Start Time (MST)	5:50	End Time (MST)	7:10
Gas Cert Reference	ALM052589	Station temp.	22 Deg C
Cal Gas Concentration	5.02 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564
SO2 gas concentration	50.8 ppm	SO2 gas cert/exp	8400311 9/Sep/17

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-619	-619
Analyzer IP address	192.168.1.42		Lamp voltage	804	804
Calculated slope	0.990032	0.996039	Chamber temp	44	44
Calculated intercept	0.072230	0.186007	Pressure	681.3	681.3
Analyzer Background	19.5		Flow	0.473	0.473
Analyzer Coefficient	1.108		Intensity	43500	43500
			Converter temp.	800	800
Analyzer make/model	Thermo 45C		Analyzer serial #	603718530	
Converter make/model	CDN-101		Converter serial #	503	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	-0.3	----
as found span	6000	89.6	75.0	74.9	1.000
SO2 scrubber check					
calibrator zero	6000	0.0	0.0	-0.3	----
high point	6000	89.6	75.0	74.9	1.001
second point	6000	50.2	42.0	42.3	0.993
third point	6000	29.9	25.0	24.9	1.005
as left zero					
as left span					
Average Correction Factor					0.999

Corrected As found	75.3	Previous response	75.6	% change	0.5%
--------------------	------	-------------------	------	----------	------

Notes:

Removal to put in a Thermo 43i-LT

Calibration Performed By:

Melissa Lemay



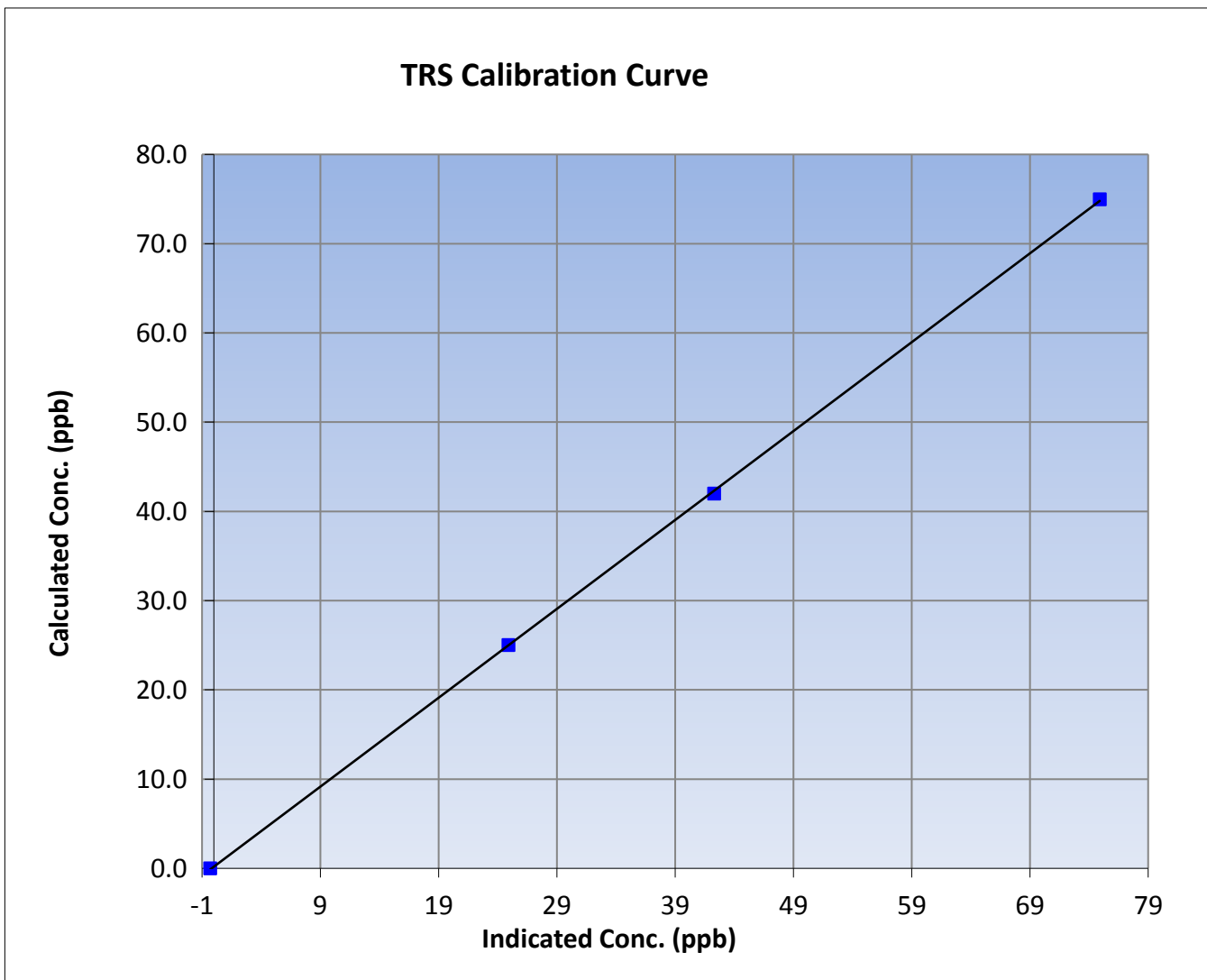
# Wood Buffalo Environmental Association TRS Calibration Report

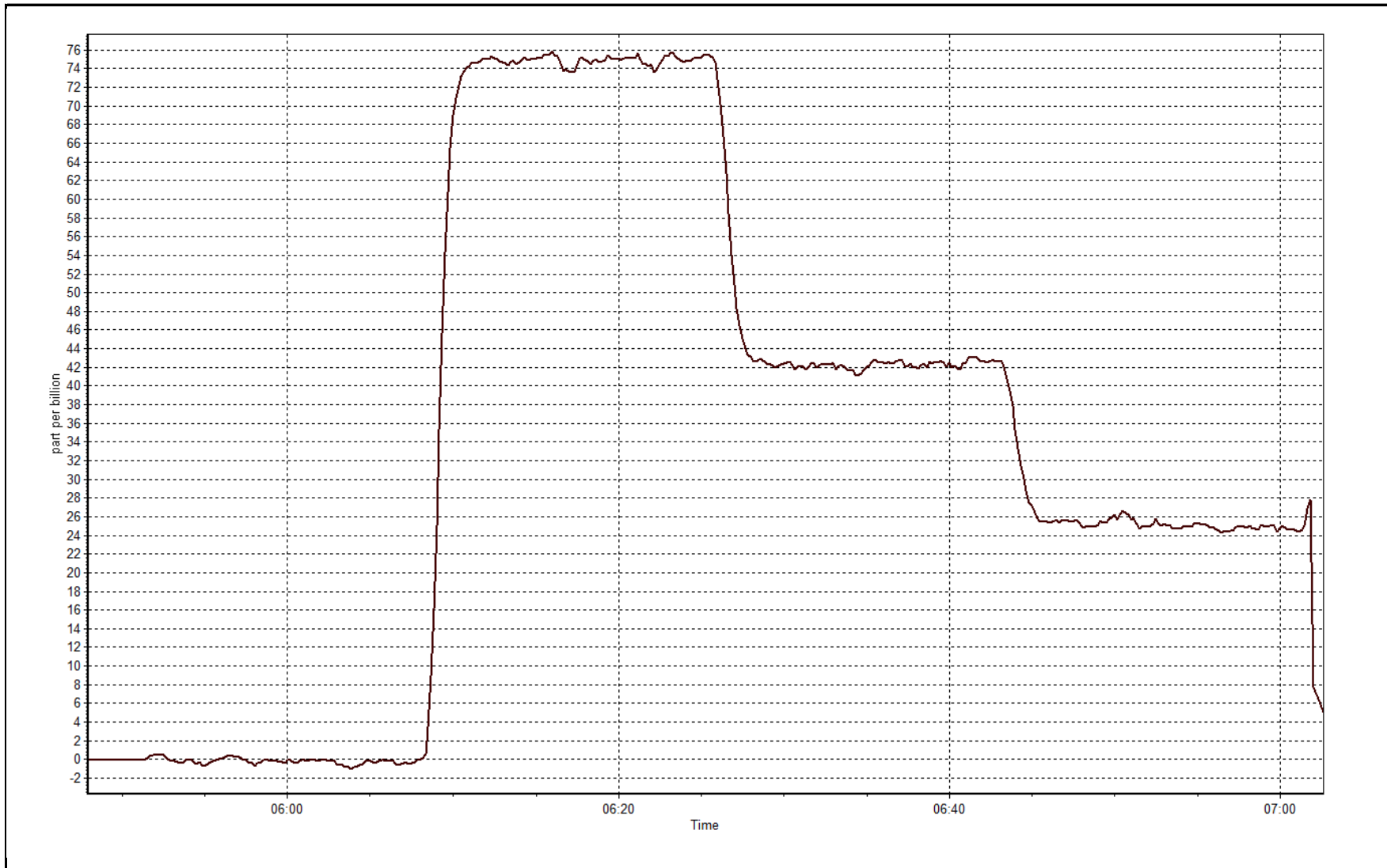
## Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 14, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	5:50	End Time (MST)	7:10
Analyzer make	Thermo 45C	Analyzer serial #	603718530

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999948
75.0	74.9	1.0009		
42.0	42.3	0.9927	Slope	0.996039
25.0	24.9	1.0047		
			Intercept	0.186007







# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	September 24, 2015	Last Calibration	
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Install		
Start Time (MST)	9:05	End Time (MST)	11:45
Gas Cert Reference	ALM052589	Station temp.	22 Deg C
Cal Gas Concentration	5.02 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564
SO2 gas concentration	50.8 ppm	SO2 gas cert/exp	8400311 9/Sep/17

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage		-699
Analyzer IP address	192.168.1.42		Lamp voltage		1094
Calculated slope	1.003768		Chamber temp		45
Calculated intercept	-0.165787		Pressure		735.9
Analyzer Background	2.42		Flow		0.454
Analyzer Coefficient	1.118		Intensity		72
			Converter temp.		800
Analyzer make/model	Thermo 43i-LTE		Analyzer serial #	1507864683	
Converter make/model	CDN-101		Converter serial #	503	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
SO2 scrubber check	5000	15.2	154.4	0.3	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	89.6	75.0	74.8	1.002
second point	6000	50.2	42.0	42.1	0.998
third point	6000	29.9	25.0	25.1	0.997
as left zero	6000	0.0	0.0	0.1	----
as left span	6000	89.6	75.0	75.7	0.990
Average Correction Factor					0.999

Corrected As found      NA      Previous response      NA      % change      NA

**Notes:**

Install for removal of 45C, Filter changed out

Calibration Performed By:

Melissa Lemay



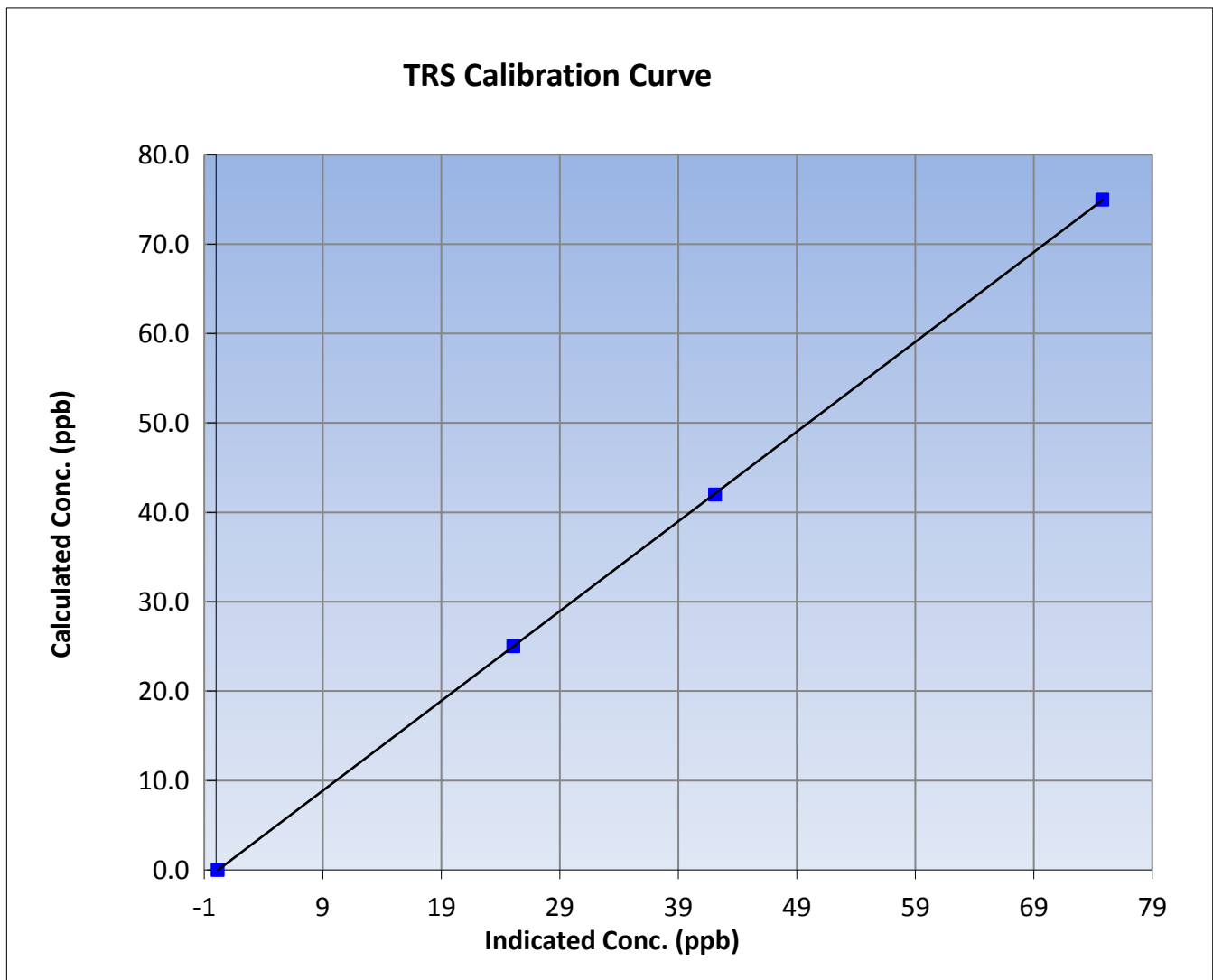
# Wood Buffalo Environmental Association TRS Calibration Report

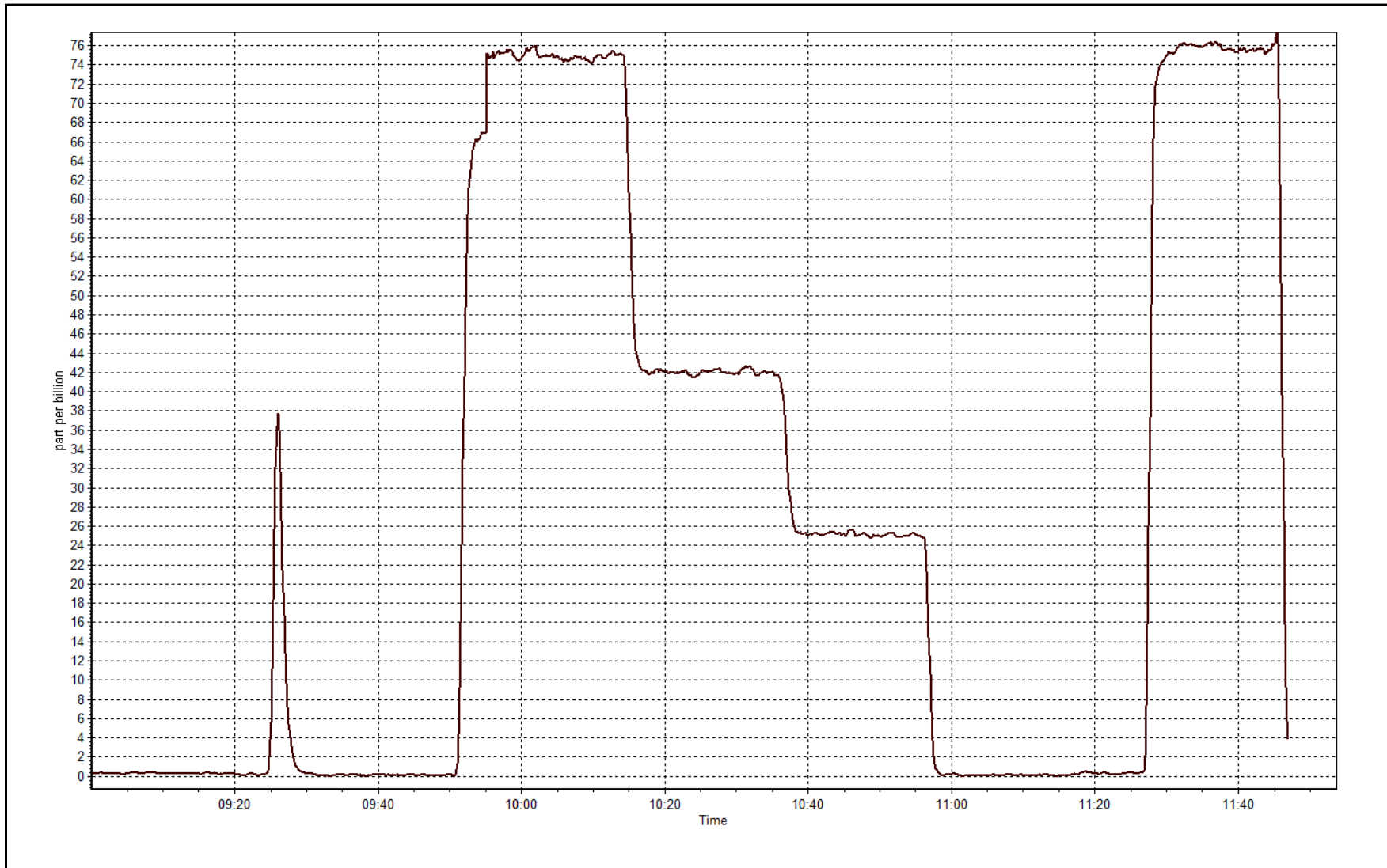
## Station Information

Calibration Date	September 24, 2015	Previous Calibration	
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:05	End Time (MST)	11:45
Analyzer make	Thermo 43i-LTE	Analyzer serial #	1507864683

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999996
75.0	74.8	1.0022		
42.0	42.1	0.9976	Slope	1.003768
25.0	25.1	0.9975		
			Intercept	-0.165787









## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	September-08-15	Last Calibration	August-13-15
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:35	End Time (MST)	13:55
Gas Cert Reference	S970259A	Cal Gas Expiry Date	9/26/2017
CH4 Cal Gas Conc.	490.0 ppm	CH4 Equiv Conc.	1040.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	22 Deg C
Calibrator Model	Sabio 4010	Serial Number	11021107
ZAG make/model	Teledyne API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	Serial Number	5564

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.1
Analyzer IP address	192.168.1.55		Flame Temp	293.0	293.0
THC Calc slope	0.996455	0.992331	Carrier Pressure	36.8	36.8
THC Calc intercept	0.002255	0.010238	Fuel Pressure	42.1	42.1
NMHC Calc slope	0.997070	0.990338	Air Pressure	32.2	32.2
NMHC Calc intercept	-0.015614	-0.005673			

Analyzer make Thermo 55i Analyzer serial # 1426262594

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	60.7	12.63	12.66	0.997
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	12.63	12.73	0.992
second point	5000	30.4	6.32	6.32	1.001
third point	5000	15.2	3.16	3.19	0.991
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	12.63	12.64	0.999
Average Correction Factor					0.994

Corrected As found 12.66 Previous response 12.67 % change 0.1%

**Notes:**

Nitrogen changed out, filter changed out, no adjustments done

Calibration Performed By: Melissa Lemay



## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	60.7	6.68	6.70	0.997
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	6.68	6.75	0.989
second point	5000	30.4	3.34	3.37	0.992
third point	5000	15.2	1.67	1.71	0.978
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	6.68	6.70	0.997
Average Correction Factor					0.986

Corrected As found      6.70      Previous response      6.71      % change      0.2%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	60.7	5.95	5.97	0.996
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	5.95	5.98	0.995
second point	5000	30.4	2.98	2.95	1.010
third point	5000	15.2	1.49	1.48	1.006
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	5.95	5.95	1.000
Average Correction Factor					1.004

Corrected As found      5.97      Previous response      5.96      % change      -0.2%



# Wood Buffalo Environmental Association

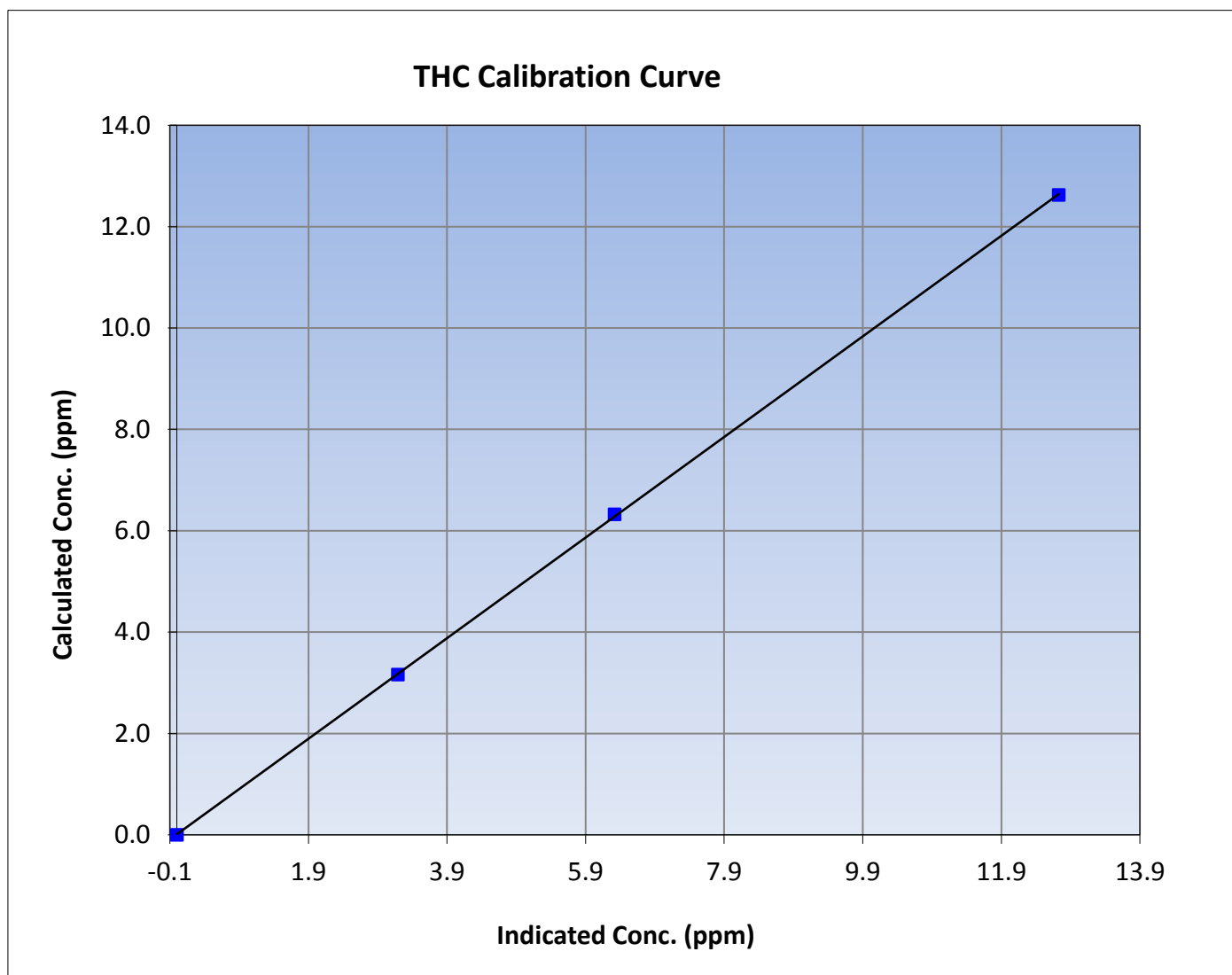
## THC Calibration Summary

### Station Information

Calibration Date	September 8, 2015	Previous Calibration	August 13, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:35	End Time (MST)	13:55
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999973
12.63	12.73	0.9918		
6.32	6.32	1.0005	Slope	0.992331
3.16	3.19	0.9911		
			Intercept	0.010238





# Wood Buffalo Environmental Association

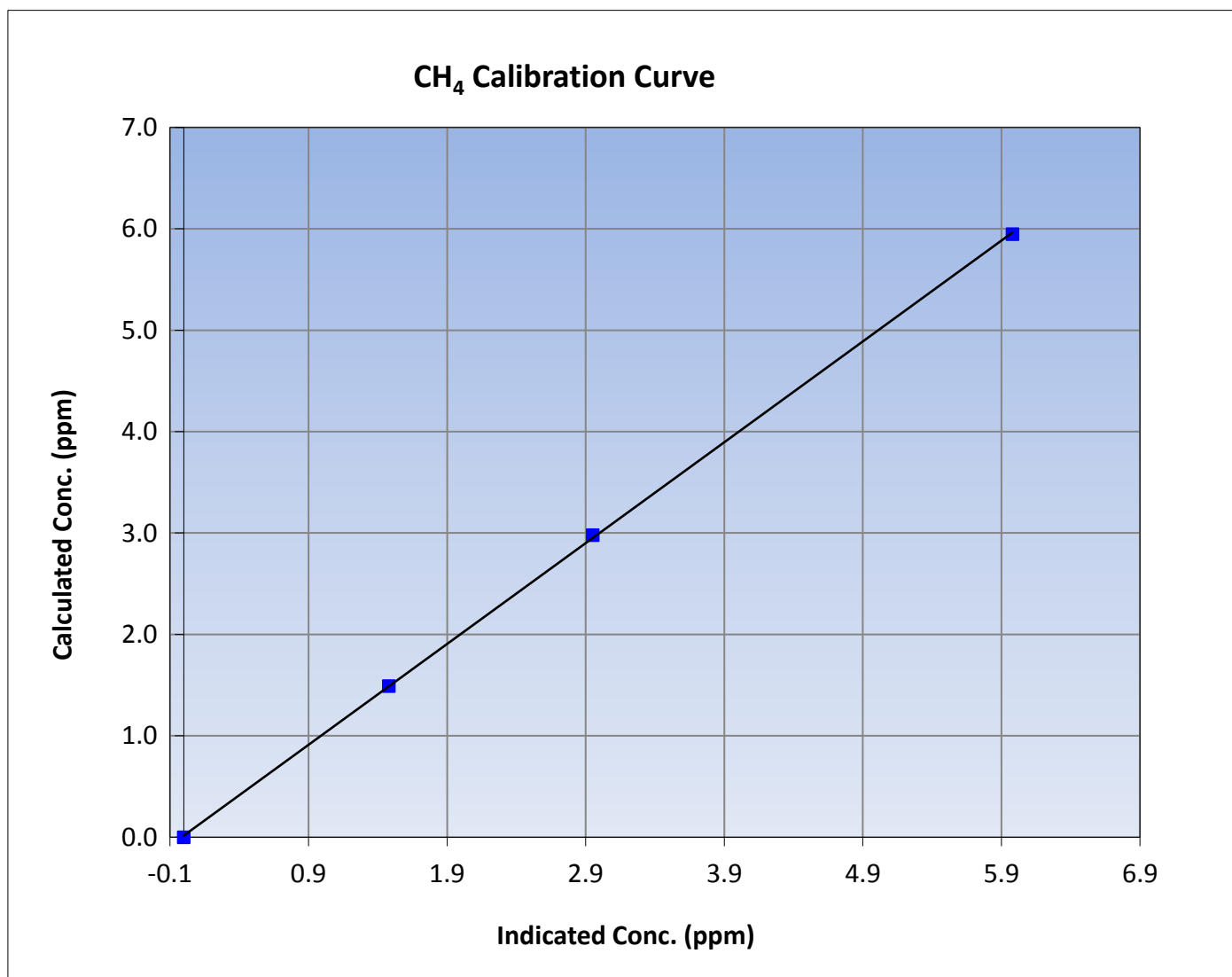
## CH<sub>4</sub> Calibration Summary

### Station Information

Calibration Date	September 8, 2015	Previous Calibration	August 13, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:35	End Time (MST)	13:55
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999931
5.95	5.98	0.9947		
2.98	2.95	1.0099	Slope	0.994546
1.49	1.48	1.0065		
			Intercept	0.016043





# Wood Buffalo Environmental Association

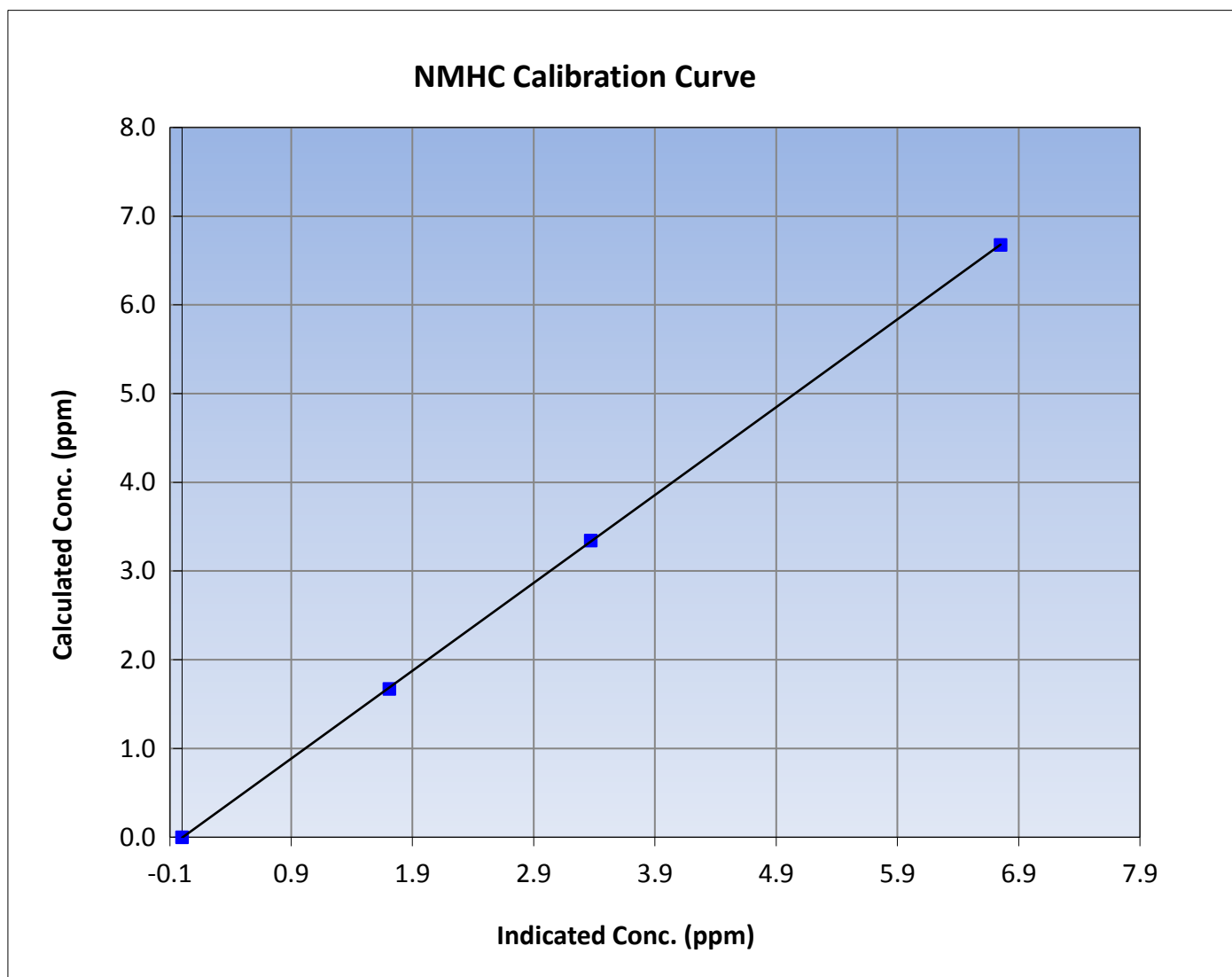
## NMHC Calibration Summary

### Station Information

Calibration Date	September 8, 2015	Previous Calibration	August 13, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:35	End Time (MST)	13:55
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

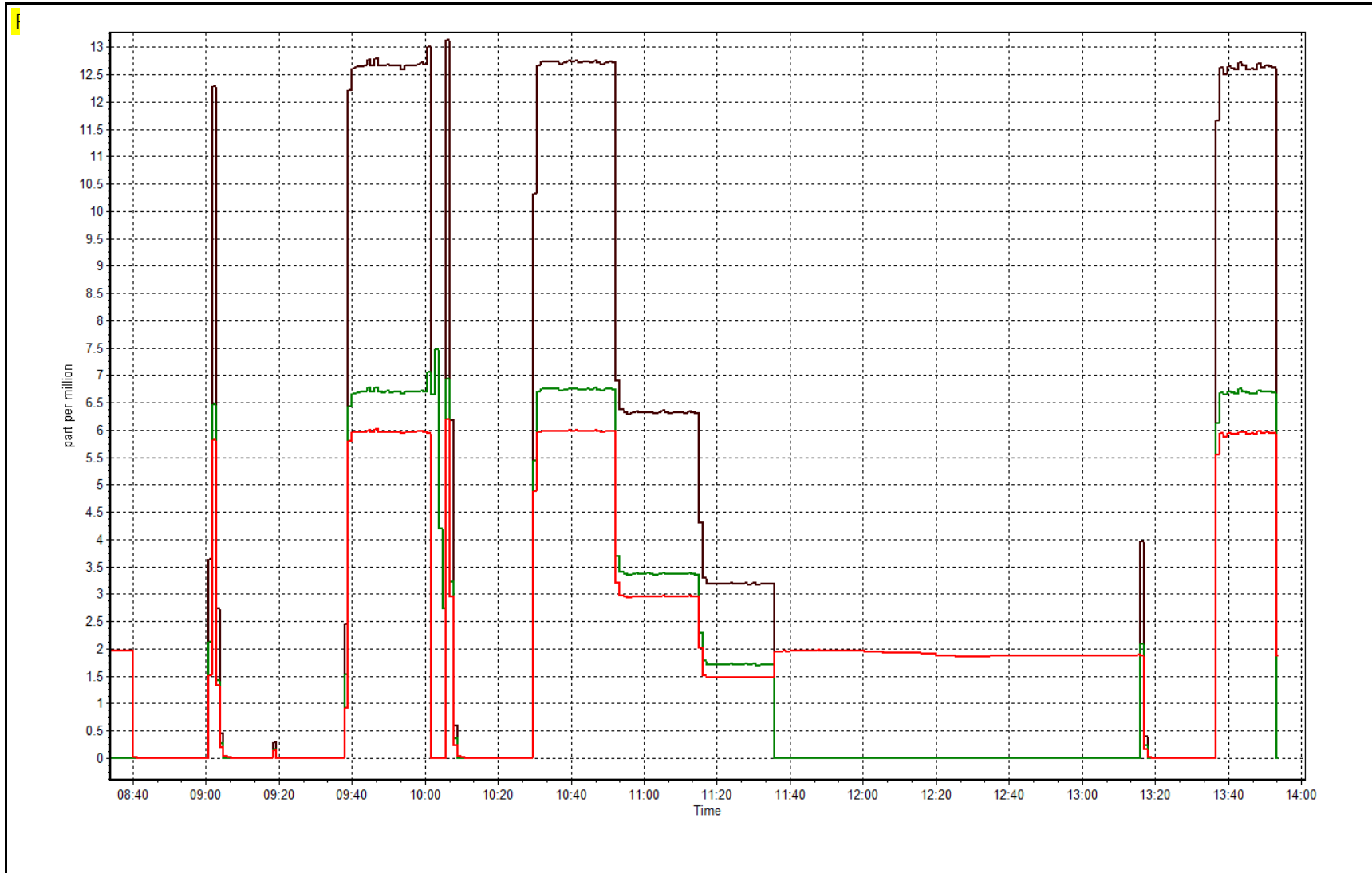
### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999982
6.68	6.75	0.9892		
3.34	3.37	0.9923	Slope	0.990338
1.67	1.71	0.9778		
			Intercept	-0.005673



THC Calibration Plot

Date: September 8, 2015





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	September 11, 2015	Previous Calibration	August 26, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	6:40	End Time (MST)	9:12
NO2 GPT Ref date	September-08-15	Transfer Standard	GPT
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	11021107
DACS make/model	Campbell Scientific CR3000	Serial Number	1864
		Serial Number	5564

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	28.6	28.4
Analyzer IP address	192.168.1.48		Lamp temp.	67.9	67.9
Calculated slope	1.004528	0.998927	Pressure	721.9	712.3
Calculated intercept	0.132515	0.704537	Flow cell A	0.742	0.736
Analyzer Background	0.2	0.2	Flow cell B	0.753	0.747
Analyzer Coefficient	0.925	0.939	Cell A Intensity	91895	91365
			Cell B Intensity	97808	95083

Analyzer make	TEI 49i	Analyzer serial #	1507964700
---------------	---------	-------------------	------------

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.5	----
as found span	5000	1.22	328.7	319.9	1.028
calibrator zero	5000	0.00	0.0	0.5	----
high point	5000	1.22	328.7	329.2	0.998
second point	5000	0.70	165.3	163.4	1.012
third point	5000	0.43	84.4	83.1	1.016
as left zero	5000	0.00	0.0	-0.2	----
as left span	5000	1.22	328.7	316.6	1.038
Average Correction Factor					1.009

Corrected As found	319.4	Previous response	327.1	% change	2.4%
--------------------	-------	-------------------	-------	----------	------

**Notes:**

Filter changed out, span adjusted, no maintenance done

Calibration Performed By:

Melissa Lemay



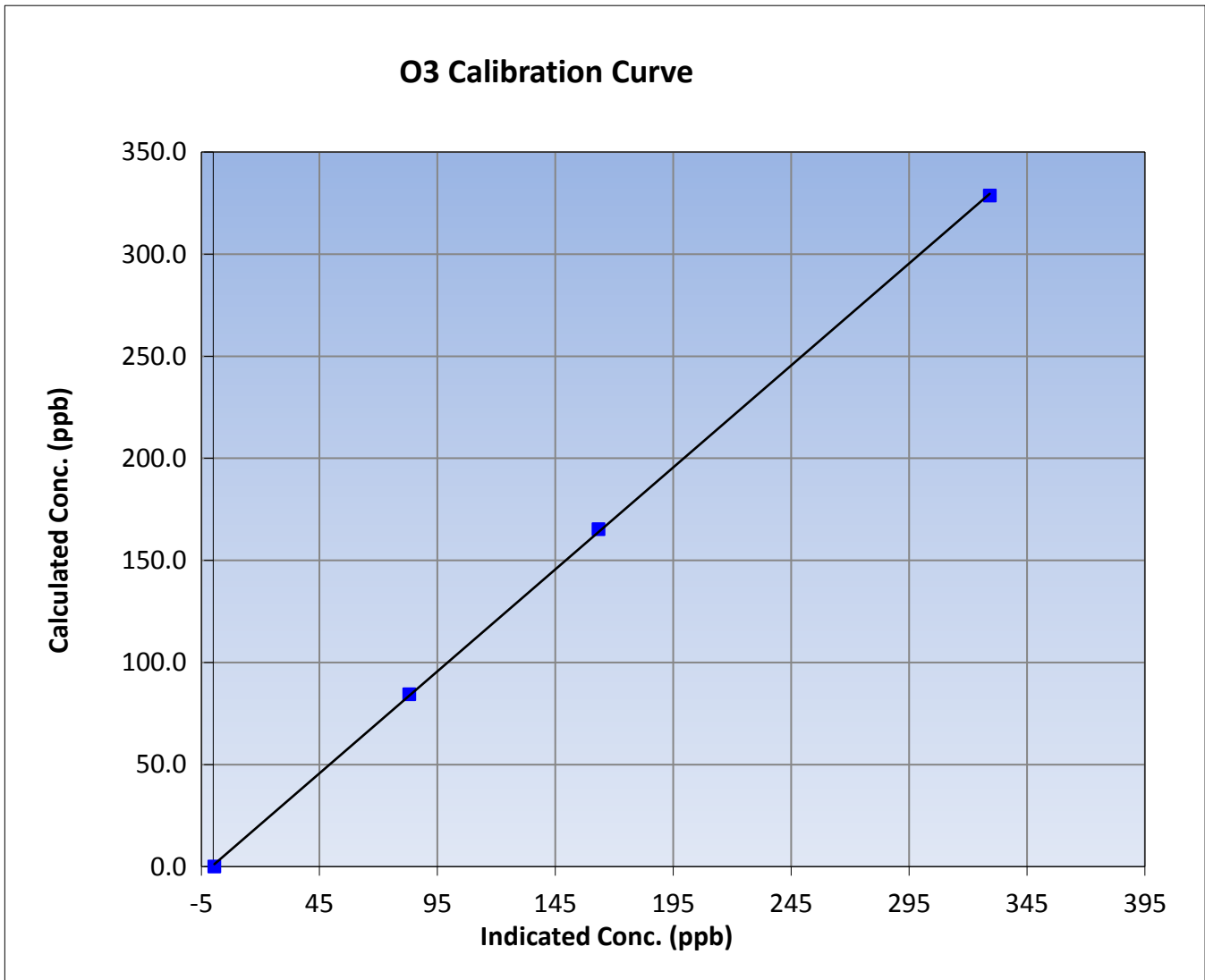
# Wood Buffalo Environmental Association O3 Calibration Report

## Station Information

Calibration Date	September-11-15	Previous Calibration	August 26, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:40	End Time (MST)	9:12
Analyzer make	TEI 49i	Analyzer serial #	1507964700

## Calibration Data

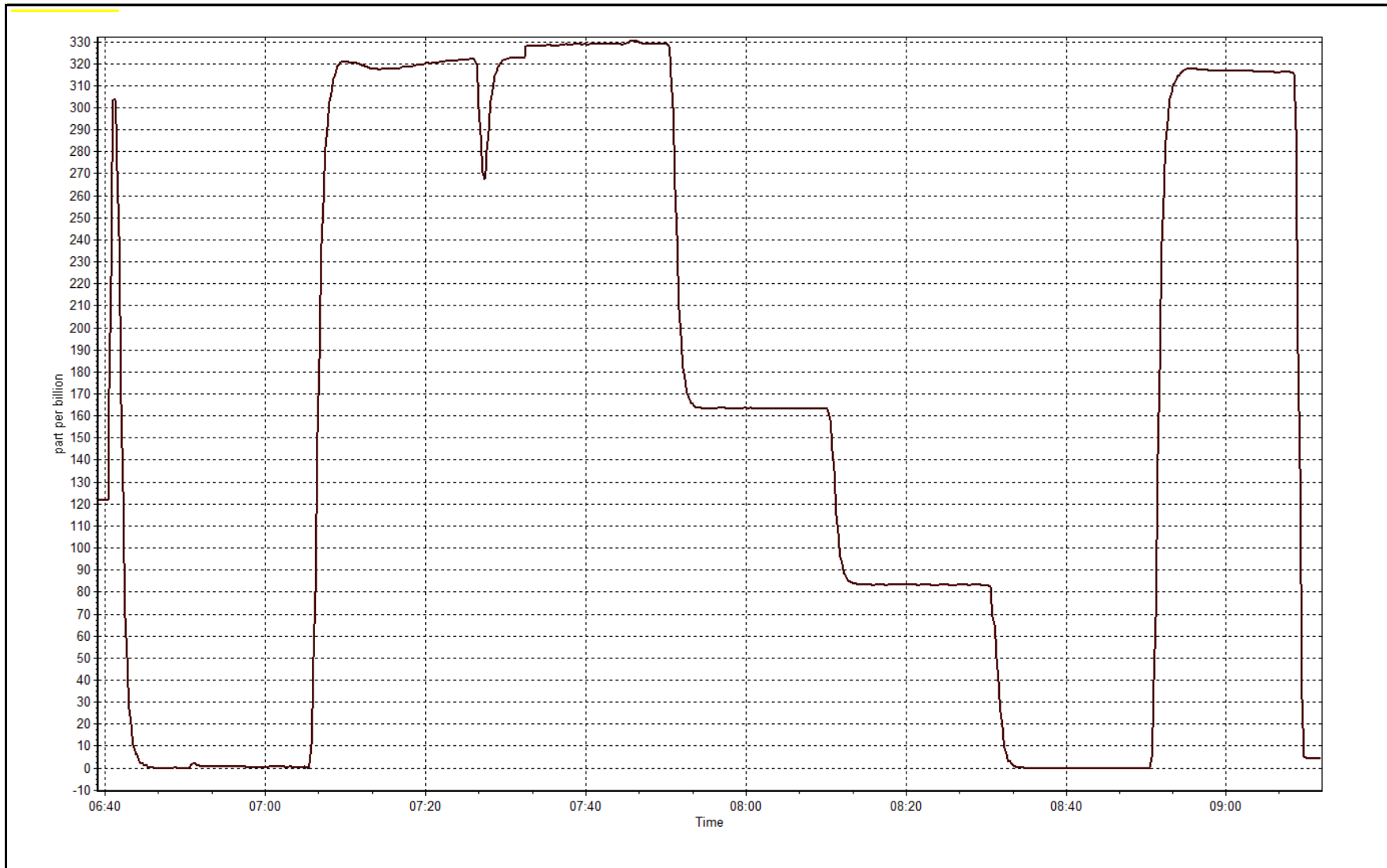
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999923
328.7	329.2	0.9985		
165.3	163.4	1.0116	Slope	0.998927
84.4	83.1	1.0156		
			Intercept	0.704537





O3 Calibration Plot

Date: September 11, 2015





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

## Station Information

Calibration Date	September 8, 2015	Previous Calibration	August 24, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:35	End Time (MST)	13:55
NO Cal Gas Conc	49.4 ppm	Gas Cert Reference	S970259A
NOX Cal Gas Conc	49.4 ppm	Cal Gas Expiry Date	9/26/2017
Calibrator	Sabio 4010	Serial Number	11021107
Zero air Generator	Teledyne API T701	Serial Number	1864

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	5564
-------------------	----------------------------	-----------------	------

## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.001801	1.001978	1.003454
	Data Offset	2.425873	2.660489	-1.724564
Current Calibration	Data Slope	0.997886	0.999493	0.998652
	Data Offset	1.421768	1.555850	-0.581575

## Analyzer Information

Analyzer make/model	Thermo 42C	Analyzer serial #	601114773
---------------------	------------	-------------------	-----------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.103		192.168.1.103	
NO coefficient	0.820		0.790	
NOX coefficient	1.000		0.997	
NO2 coefficient	1.000		1.000	
NO bkgrnd	2.8		2.5	
NOX bkgrnd	2.9		2.7	
Chamber Temp	49.7	Deg C	49.7	Deg C
Moly Temp	323	Deg C	323	Deg C
PMT voltage	-805	V	-805	V
PMT Temp	-3.6	Deg C	-3.6	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	142.8	mmHg	137.2	mmHg
R Cell Press Nox	142.9	mmHg	137.2	mmHg
NO sample flow	0.889	lpm	0.918	lpm
Nox sample Flow	0.888	lpm	0.918	lpm

**Notes:**

No maintenance done, filter changed out, span adjusted,



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date: September 8, 2015 Station Number: AMS 7

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.3	----	----
as found span	5000	60.7	599.7	599.7	0.0	619.9	618.8	1.4	0.9674	0.9692
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.3	----	----
high point	5000	60.7	599.7	599.7	0.0	600.7	599.6	1.5	0.9984	1.0002
second point	5000	30.4	300.4	300.4	0.0	297.5	297.0	0.9	1.0096	1.0113
third point	5000	15.2	150.2	150.2	0.0	148.6	148.0	0.8	1.0106	1.0147
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.3	----	----
as left span	5000	60.7	599.7	268.5	331.2	591.9	276.1	311.8	1.0132	0.9725
Average Correction Factor									1.0062	1.0087

Corrected As found NO<sub>x</sub>= 619.9 NO= 618.9 Percent Change NO<sub>x</sub>= -3.8% NO= -3.7%  
 Previous Response NO<sub>x</sub>= 596.2 NO= 595.9

### GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 60.70 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.3			N/A	
1st NO2 (300)	----	268.5	328.7	597.7	268.5	329.5	0.9913	1.0000	0.9976	100.2%
2nd NO2 (200)	----	431.9	165.3	598.1	431.9	166.5	0.9907	1.0000	0.9928	100.7%
3rd NO2 (100)	----	512.8	84.4	597.8	512.8	85.2	0.9912	1.0000	0.9906	100.9%
4th NO2 (0)	597.2	----	1.5	598.7	597.2	1.7	0.9897	1.0000	N/A	----
Average Correction Factor							0.9907	1.0000	0.9937	100.6%

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

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

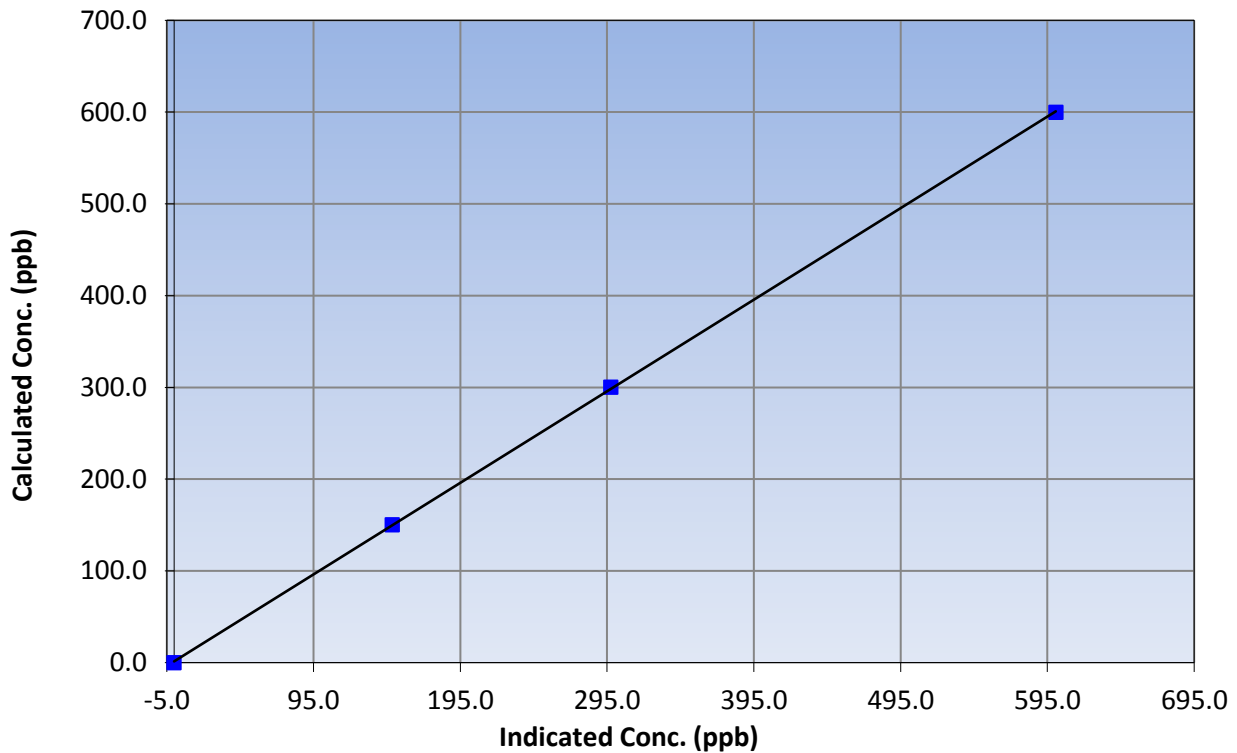
### Station Information

Calibration Date	September 8, 2015	Previous Calibration	August 24, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:35	End Time (MST)	13:55
Analyzer make	Thermo 42C	Analyzer serial #	601114773

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999961
599.7	600.7	0.9984		
300.4	297.5	1.0096	Slope	0.997886
150.2	148.6	1.0106		
			Intercept	1.421768

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

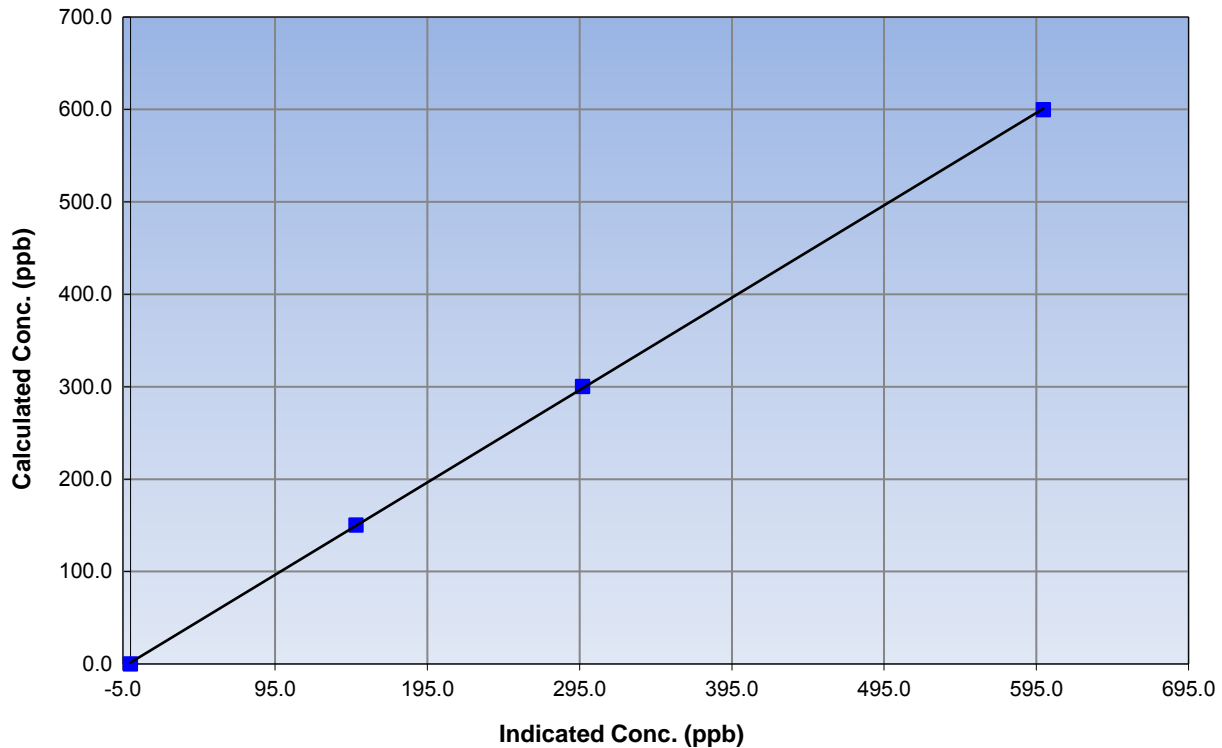
### Station Information

Calibration Date	September 8, 2015	Previous Calibration	August 24, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:35	End Time (MST)	13:55
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	0.999960
599.7	599.6	1.0002		
300.4	297.0	1.0113	Slope	0.999493
150.2	148.0	1.0147		
			Intercept	1.555850

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

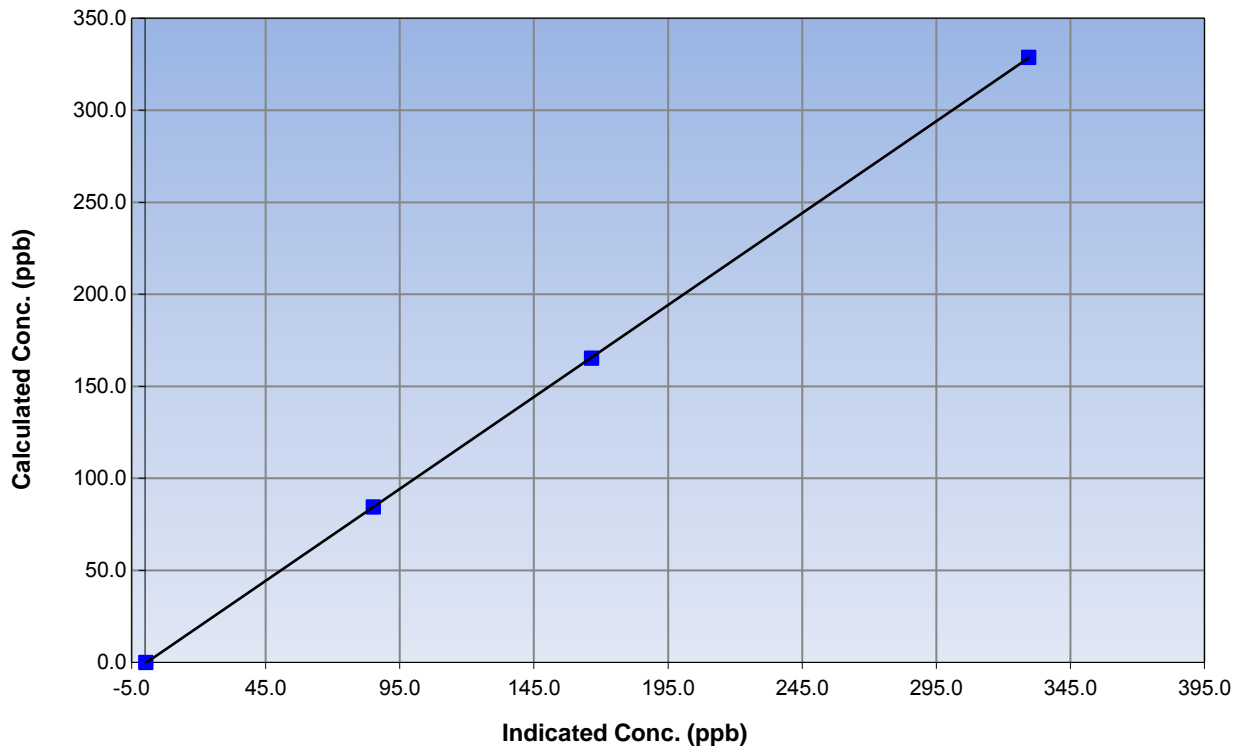
### Station Information

Calibration Date	September 8, 2015	Previous Calibration	August 24, 2015
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:35	End Time (MST)	13:55
Analyzer make	Thermo 42C	Analyzer serial #	601114773

### Calibration Information

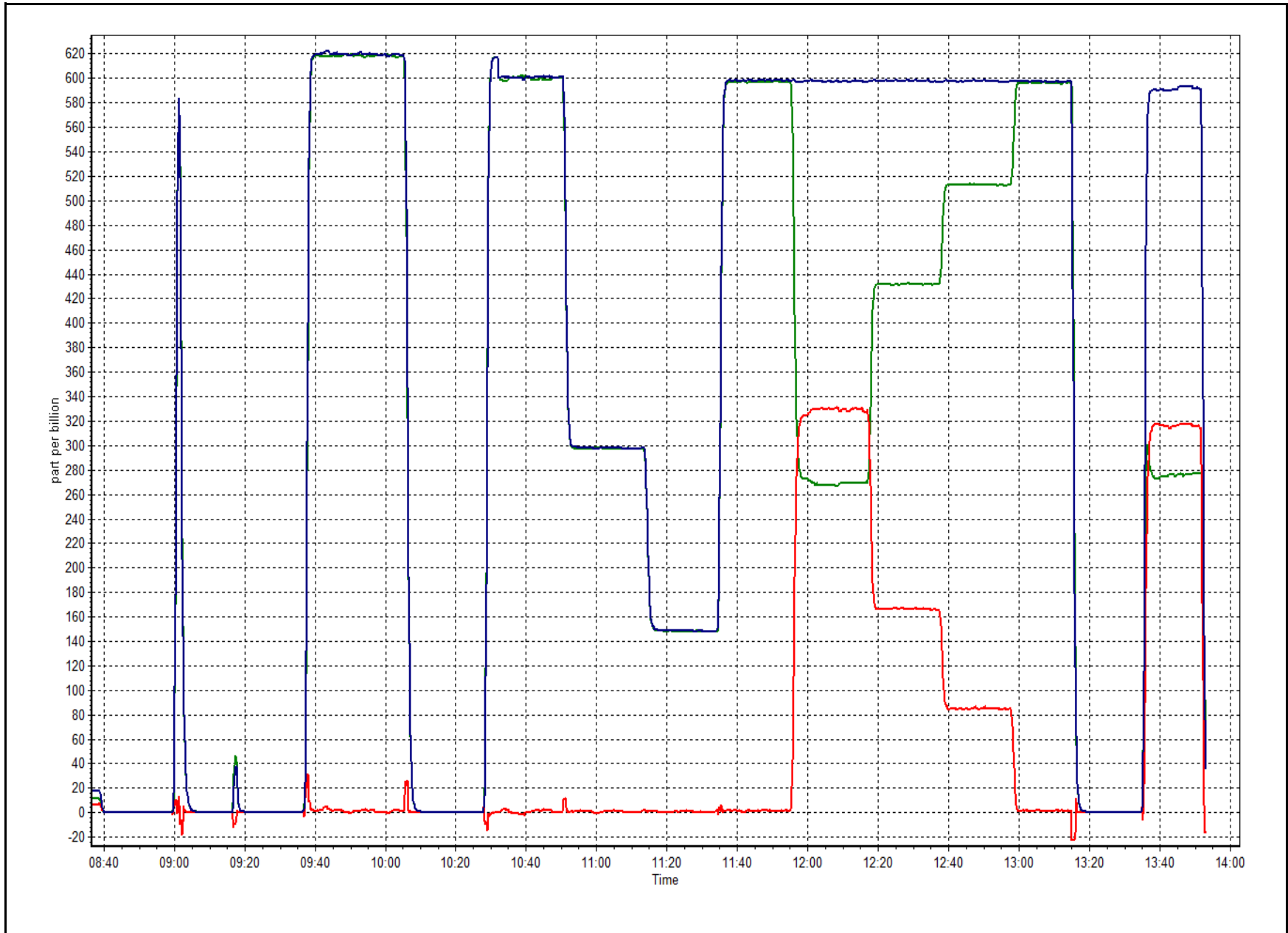
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999995
328.7	329.5	0.9976		
165.3	166.5	0.9928	Slope	0.998652
84.4	85.2	0.9906		
			Intercept	-0.581575

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



NOX Calibration Plot

Date: September 8, 2015





## Wood Buffalo Environmental Association

### SHARP CALIBRATION

#### STATION INFORMATION

Calibration Date:	September 23, 2015	Previous Calibration:	August 26, 2015
Station Name:	Athabasca Valley	Station Number:	AMS 7
Start Time (MST):	11:15	End Time (MST):	12:37
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

#### SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number	E515
C <sub>14</sub> Source SN:	3256
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Parameters Checked:	<input checked="" type="checkbox"/> T1 <input type="checkbox"/> <input type="checkbox"/> T <input type="checkbox"/> T4 <input type="checkbox"/> P3 <input checked="" type="checkbox"/> Main Flow <input type="checkbox"/> Beta <input type="checkbox"/> Neph <input checked="" type="checkbox"/>

#### CALIBRATION DATA

##### Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	12.0	11.0	-1.0	11.0
T2	15.0	na	na	15.0
T3	18.0	na	na	18.0
T4	23.0	na	na	23.0
RH (%)	25.0	na	na	25.0

##### Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	990	986.5	-3.5	990

##### Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1001	1005	4	1005	1001

#### Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	242		240
Neph	4.8		-0.9
C14	19		25.4
Indicated Concentration (ug/m3)	1.7	yes	-0.4
Offset 1	240		240.3
Offset 2	34.7		34.9

#### Leak Check (Quarterly)

Leak Check Date:	September 23, 2015	Previous Leak Check Date:	June 22, 2015
------------------	--------------------	---------------------------	---------------

	<b>Measured</b>	<b>Difference LPM (Limit +/- 0.42 LPM)</b>
Flow without adaptor (LPM):	16.78	
*Flow with adaptor (LPM):	16.66	0.12

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

#### Mass Foil Calibration (Annually)

Foil Calibration Date:	Previous Foil Calibration:
Zeroed?:	
Foil Mass:	<u>Mass foil set S/N:</u>
Previous Correction Factor:	
New Correction Factor:	

#### INSPECTION DATA

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

#### NOTES:

Nephelometer adjusted, sample head cleaned. Leak check done, no other adjustments done.

<b>Calibration Performed By:</b>	<b>Melissa Lemay</b>
----------------------------------	----------------------





# Wood Buffalo Environmental Association

## SHARP CALIBRATION

### STATION INFORMATION

Calibration Date:	September 26, 2015	Previous Calibration:	NA
Station Name:	Athabasca Valley	Station Number:	AMS 7
Start Time (MST):	11:00	End Time (MST):	11:45
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	141229

### SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number:	1486
C <sub>14</sub> Source SN:	5691
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Parameters Checked:	<input checked="" type="checkbox"/> T1 <input type="checkbox"/> T2 <input type="checkbox"/> T3 <input type="checkbox"/> T4 <input checked="" type="checkbox"/> P3           Main Flow <input checked="" type="checkbox"/> Beta <input type="checkbox"/> Neph <input checked="" type="checkbox"/>

### CALIBRATION DATA

#### Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	12.5	13.0	0.5	
T2	24.0	na	na	24.0
T3	21.0	na	na	21.0
T4	23.0	na	na	23.0
RH (%)	45.0	na	na	45.0

#### Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	972	973.0	1.0	972

#### Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1002	1001	-1	1001	1002

### Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	NA	YES	201
Neph	NA	YES	-0.7
C14	NA	YES	-52
Indicated Concentration (ug/m3)	NA	YES	-0.6
Offset 1	NA	YES	204.7
Offset 2	NA	YES	33.9

### Leak Check (Quarterly)

Leak Check Date:	September 26, 2015	Previous Leak Check Date:	NA
------------------	--------------------	---------------------------	----

	<b>Measured</b>	<b>Difference LPM (Limit +/- 0.42 LPM)</b>
Flow without adaptor (LPM):	16.68	
*Flow with adaptor (LPM):	16.54	0.14

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

### Mass Foil Calibration (Annually)

Foil Calibration Date:	September 26, 2015	Previous Foil Calibration:	NA
Zeroed?:	YES		
Foil Mass:	1264		
Previous Correction Factor:	6934	<b>Mass foil set S/N:</b>	5864
New Correction Factor:	6945		

### INSPECTION DATA

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

### NOTES:

Installation audit. Instrument was running in SHOP up until installation with no observed issues. FOIL cal and NEPH zero performed after leak check and diagnostics checked.

Calibration Performed By: Zach Eastman



# Wood Buffalo Environmental Association

## SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	September 28, 2015	Previous Calibration:	NA
Station Name:	Athabasca Valley	Station Number:	AMS 7
Start Time (MST):	7:20	End Time (MST):	7:40
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	141229

SHARP INFORMATION			
Particulate Fraction:		PM2.5	
Make/Model:		Thermo / SHARP 5030	
Serial Number		E-515	
C <sub>14</sub> Source SN:		3255	
Confirmation of Time settings:		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Parameters Checked:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	T <sub>1</sub> <input type="checkbox"/> T <sub>4</sub> <input type="checkbox"/> P <sub>3</sub> <input checked="" type="checkbox"/> Main Flow <input checked="" type="checkbox"/> Beta <input type="checkbox"/> Neph <input checked="" type="checkbox"/>

### CALIBRATION DATA

Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	3.0	2.8	-0.2	3.0
T2	16.0	na	na	16.0
T3	17.0	na	na	17.0
T4	20.0	na	na	20.0
RH (%)	17.0	na	na	17.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	989	987.0	-2.0	989

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
999	1001	2	1001	999

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	NA	YES	247
Neph	NA	YES	-0.1
C14	NA	YES	-21.7
Indicated Concentration (ug/m3)	NA	YES	0
Offset 1	NA	YES	NA
Offset 2	NA	YES	NA

Leak Check (Quarterly)			
Leak Check Date:	September 28, 2015	Previous Leak Check Date:	NA

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	no	
*Flow with adaptor (LPM):	no	

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

Mass Foil Calibration (Annually)			
Foil Calibration Date:	September 28, 2015	Previous Foil Calibration:	NA
Zeroed?:	NO		
Foil Mass:	NA		
Previous Correction Factor:	NA	Mass foil set S/N:	5864
New Correction Factor:	NA		

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

### NOTES:

Returning original Sharp unit to service. LEAK CHECK PERFORMED IN LAB. Passed leak check. MASS FOIL CAL PERORMED IN LAB.

Calibration Performed By:	Zach Eastman
---------------------------	--------------



# Wood Buffalo Environmental Association CO Calibration Report

## Station Information

Calibration Date	September 23, 2015	Last Calibration	August 13, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:15	End Time (MST)	11:10
Gas Cert Reference	CC101396	Station temp.	22 Deg C
Cal Gas Concentration	2970 ppm	Cal Gas Exp Date	02/02/2023
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
ZAG Make/Model	API 701	Serial Number	5564
DACS make/model	Campbell Scientific CR3000	Serial Number	1864

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		Chamber temp.	48.0	47.8
Analyzer IP address	192.168.1.48		Pressure	731.6	737.3
Calculated slope	1.004479	1.008405	Flow	0.484	0.489
Calculated intercept	0.045523	0.051622	Intensity	199431	199635
Analyzer Background	3.248	3.554	S/R ratio	1.176730	1.175694
Analyzer Coefficient	1.040	1.040			

Analyzer make Thermo 48i-TLE      Analyzer serial # 1408761381

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	69.7	41.4	42.0	0.986
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	69.7	41.4	41.0	1.009
second point	5000	35.2	20.9	20.6	1.013
third point	5000	15.2	9.0	8.9	1.016
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	69.7	41.4	40.8	1.015
Average Correction Factor					1.013

Corrected As found    41.7      Previous response    41.2      % change    -1.3%

**Notes:**

zero adjusted, No Maintenance done, Filter changed out

Calibration Performed By:

Melissa Lemay



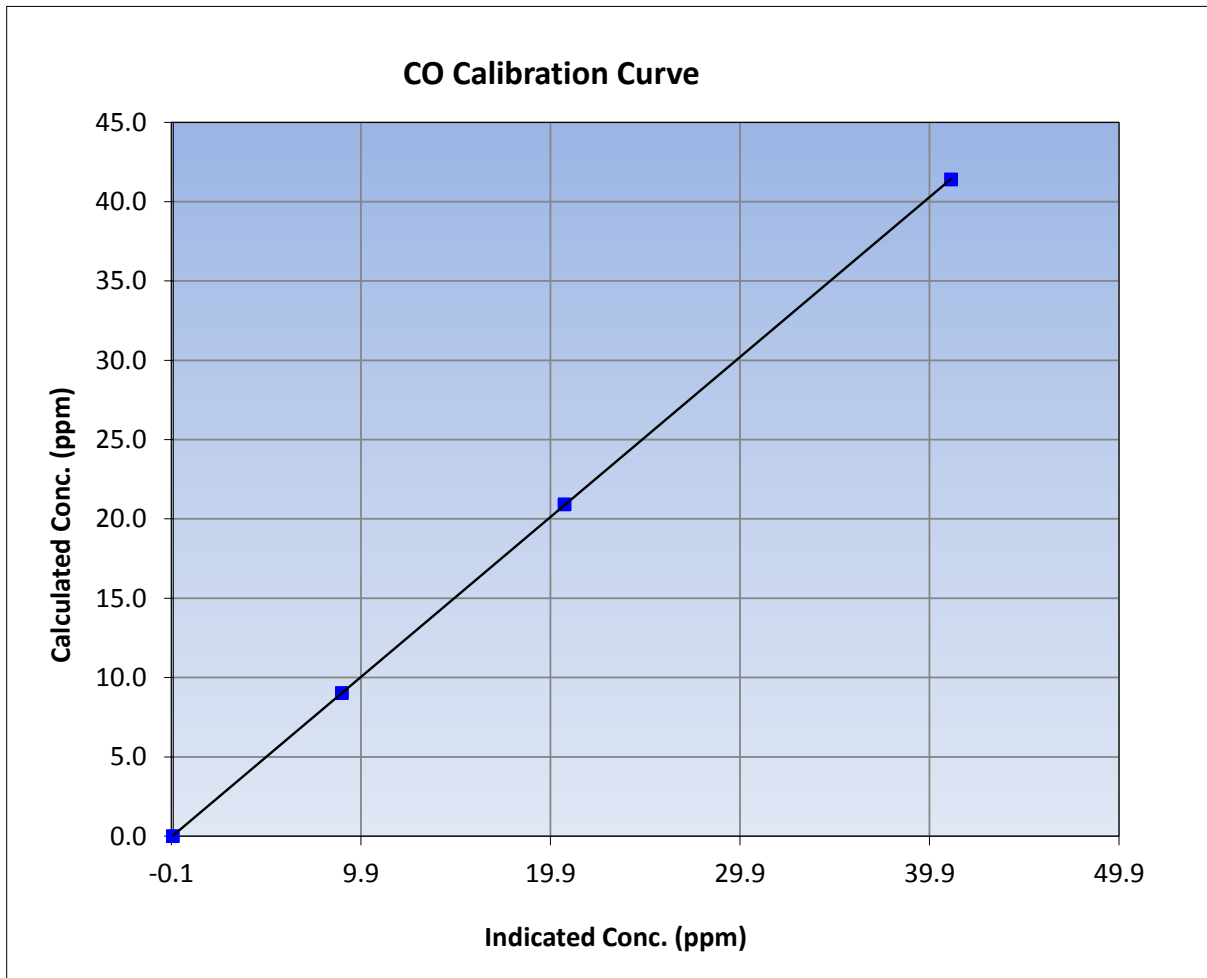
## Wood Buffalo Environmental Association CO Calibration Report

### Station Information

Calibration Date	September 23, 2015	Previous Calibration	August 13, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:15	End Time (MST)	11:10
Analyzer make	Thermo 48i-TLE	Analyzer serial #	1408761381

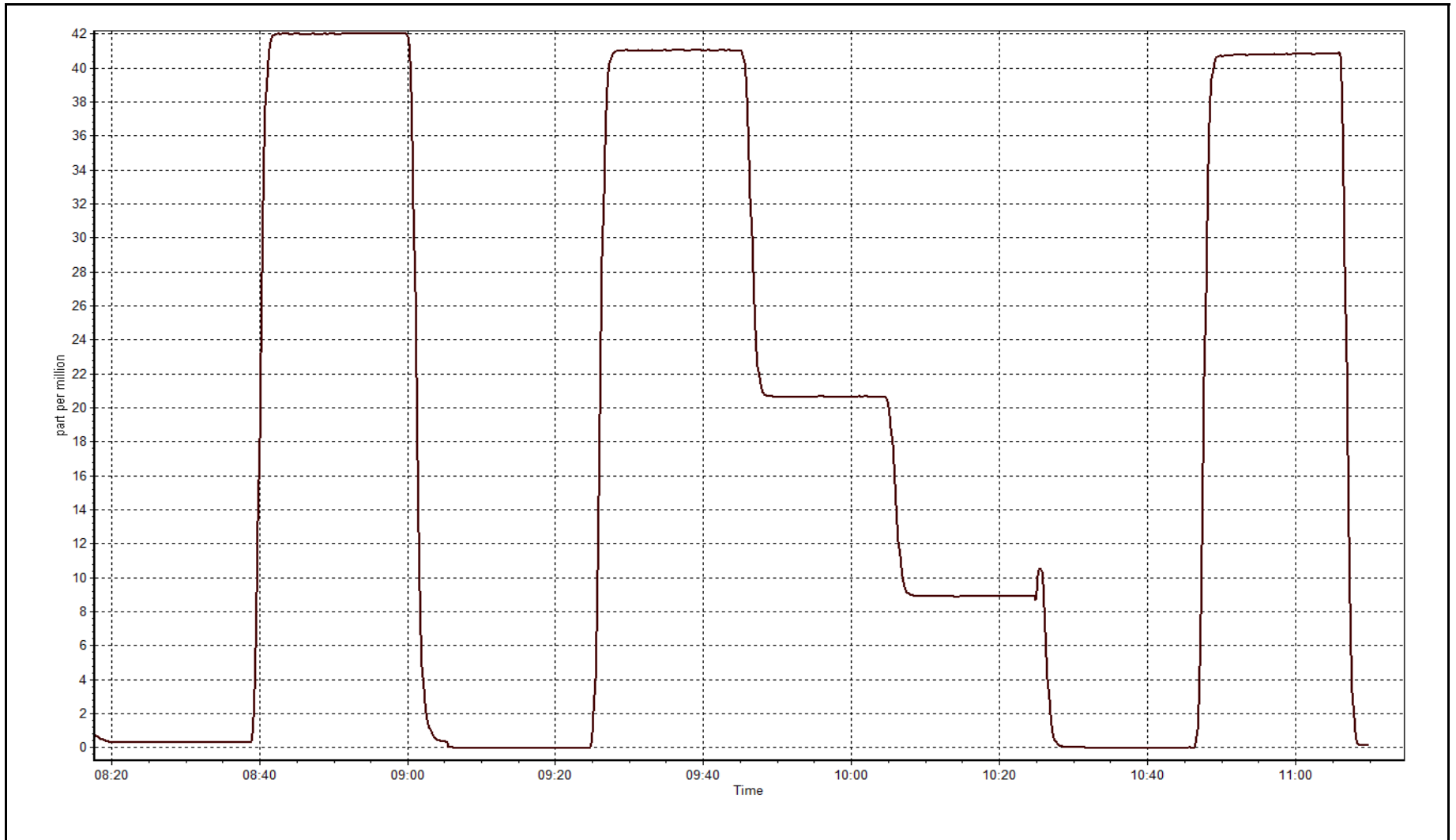
### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999996
41.4	41.0	1.0091		
20.9	20.6	1.0130	Slope	1.008405
9.0	8.9	1.0156		
			Intercept	0.051622



CO Calibration Plot

Date: September 23, 2015





This page intentionally left blank



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 8  
FORT CHIPEWYAN  
SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
 SEPTEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	683	35	37	99.72	2	0	1	0
O3(ppb) Average	685	34	35	99.86	41	0	29	-
NO2(ppb) Average	684	35	36	99.86	8	0	2	-
NO(ppb) Average	684	35	36	99.86	4	-	1	-
NOX(ppb) Average	684	35	36	99.86	10	-	3	-
PM2.5(ug/m3) Average	718	0	2	99.72	46.5	-	15.3	0
Wind Speed 10 m (km/h) Average	719	0	1	99.86	33	-	21	-
Wind Direction 10 m (deg) Average	719	0	1	99.86	-	-	-	-
Temperature 2 m (C) Average	720	0	0	100.00	21.5	-	15.8	-
Relative Humidity (%) Average	720	0	0	100.00	100	-	93	-
Precipitation (mm) Total	720	0	0	100.00	2.8	-	11.9	-
Leaf Wetness (% of range) Average	607	0	113	84.31	36	-	19	-
Global Solar Radiation (W/m2) Average	619	0	101	85.97	682	-	214	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
 SEPTEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2(ppb) Average	683	0.1	0	-	0	0	0	0	0	0	0	2
O3(ppb) Average	685	22.1	6	-	8	14	17	22	27	30	41	
NO2(ppb) Average	684	0.5	1	-	0	0	0	0	1	2	8	
NO(ppb) Average	684	0.1	0	-	0	0	0	0	0	0	4	
NOX(ppb) Average	684	0.7	1	-	0	0	0	0	1	2	10	
PM2.5(ug/m3) Average	718	5.62	4.6	-	0.3	2.3	3.2	4.2	6.1	11.3	46.5	
Wind Speed 10 m (km/h) Average	719	12.5	6	-	1	6	8	11	16	22	33	
Wind Direction 10 m (deg) Average	719	-	-	-	-	-	-	-	-	-	-	
Temperature 2 m (C) Average	720	9.64	4.4	-	-1.5	3.8	6.8	9.7	12.2	15.7	21.5	
Relative Humidity (%) Average	720	72	15	-	27	51	62	73	83	92	100	
Precipitation (mm) Total	720	-	-	21.59	-	-	-	-	-	-	-	
Leaf Wetness (% of range) Average	607	2	6	-	0	0	0	0	0	5	36	
Global Solar Radiation (W/m2) Average	619	139.3	195	-	0	0	0	14	256	478	682	

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
SEPTEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	09 Sep 2015 09:00	09 Sep 2015 10:00	2	Maintenance - tested daily zero and span system
O3	09 Sep 2015 10:00	09 Sep 2015 10:00	1	Maintenance - tested daily zero and span system
NO2, NO, NOX	09 Sep 2015 09:00	09 Sep 2015 09:00	1	Maintenance - tested daily zero and span system
PM2.5	02 Sep 2015 18:00	02 Sep 2015 19:00	2	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	08 Sep 2015 04:00	08 Sep 2015 04:00	1	Flat line in sensor output signal
Surface Leaf Wetness	07 Sep 2015 16:00	07 Sep 2015 17:00	2	Unstable Operation
Surface Leaf Wetness	10 Sep 2015 12:00	10 Sep 2015 12:00	1	Unstable Operation
Surface Leaf Wetness	12 Sep 2015 14:00	12 Sep 2015 15:00	2	Unstable Operation
Surface Leaf Wetness	15 Sep 2015 13:00	15 Sep 2015 14:00	2	Unstable Operation
Surface Leaf Wetness	19 Sep 2015 11:00	19 Sep 2015 11:00	1	Unstable Operation
Surface Leaf Wetness	19 Sep 2015 13:00	19 Sep 2015 14:00	2	Unstable Operation
Surface Leaf Wetness	20 Sep 2015 02:00	21 Sep 2015 11:00	34	Unstable Operation
Surface Leaf Wetness	21 Sep 2015 18:00	21 Sep 2015 19:00	2	Unstable Operation
Surface Leaf Wetness	22 Sep 2015 13:00	22 Sep 2015 18:00	6	Unstable Operation
Surface Leaf Wetness	22 Sep 2015 23:00	22 Sep 2015 23:00	1	Unstable Operation
Surface Leaf Wetness	23 Sep 2015 13:00	23 Sep 2015 20:00	8	Unstable Operation
Surface Leaf Wetness	24 Sep 2015 01:00	24 Sep 2015 01:00	1	Unstable Operation
Surface Leaf Wetness	24 Sep 2015 05:00	24 Sep 2015 07:00	3	Unstable Operation
Surface Leaf Wetness	24 Sep 2015 10:00	24 Sep 2015 15:00	6	Unstable Operation
Surface Leaf Wetness	24 Sep 2015 17:00	25 Sep 2015 14:00	22	Unstable Operation
Surface Leaf Wetness	26 Sep 2015 00:00	26 Sep 2015 06:00	7	Unstable Operation
Surface Leaf Wetness	26 Sep 2015 13:00	26 Sep 2015 13:00	1	Unstable Operation
Surface Leaf Wetness	26 Sep 2015 17:00	26 Sep 2015 18:00	2	Unstable Operation
Surface Leaf Wetness	29 Sep 2015 16:00	29 Sep 2015 21:00	6	Unstable Operation
Surface Leaf Wetness	30 Sep 2015 08:00	30 Sep 2015 10:00	3	Unstable Operation
Surface Leaf Wetness	30 Sep 2015 17:00	30 Sep 2015 17:00	1	Unstable Operation
Solar Global Radiation	02 Sep 2015 14:00	02 Sep 2015 14:00	1	Unstable Operation
Solar Global Radiation	08 Sep 2015 04:00	08 Sep 2015 04:00	1	Unstable Operation
Solar Global Radiation	10 Sep 2015 14:00	10 Sep 2015 14:00	1	Unstable Operation
Solar Global Radiation	12 Sep 2015 15:00	12 Sep 2015 15:00	1	Unstable Operation
Solar Global Radiation	19 Sep 2015 14:00	19 Sep 2015 14:00	1	Unstable Operation
Solar Global Radiation	19 Sep 2015 16:00	19 Sep 2015 16:00	1	Unstable Operation
Solar Global Radiation	20 Sep 2015 02:00	20 Sep 2015 21:00	20	Unstable Operation

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
 SEPTEMBER 2015

OPERATIONAL NOTES

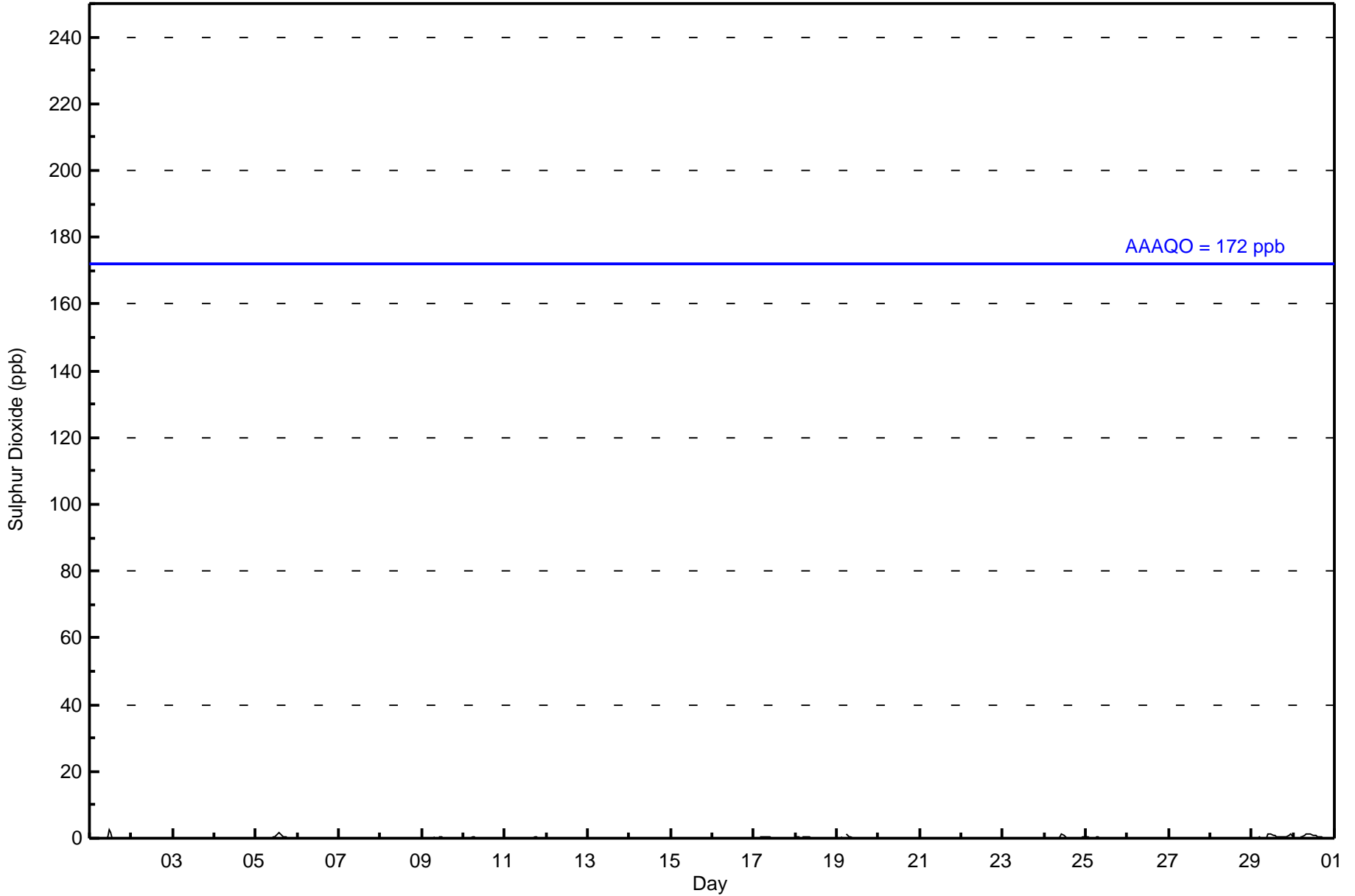
Parameter	Period Start	Period End	Duration (Hours)	Notes
Solar Global Radiation	20 Sep 2015 23:00	20 Sep 2015 23:00	1	Unstable Operation
Solar Global Radiation	21 Sep 2015 02:00	21 Sep 2015 03:00	2	Unstable Operation
Solar Global Radiation	21 Sep 2015 05:00	21 Sep 2015 05:00	1	Unstable Operation
Solar Global Radiation	21 Sep 2015 07:00	21 Sep 2015 10:00	4	Unstable Operation
Solar Global Radiation	22 Sep 2015 13:00	22 Sep 2015 18:00	6	Unstable Operation
Solar Global Radiation	22 Sep 2015 23:00	22 Sep 2015 23:00	1	Unstable Operation
Solar Global Radiation	23 Sep 2015 13:00	23 Sep 2015 20:00	8	Unstable Operation
Solar Global Radiation	24 Sep 2015 01:00	24 Sep 2015 01:00	1	Unstable Operation
Solar Global Radiation	24 Sep 2015 05:00	24 Sep 2015 07:00	3	Unstable Operation
Solar Global Radiation	24 Sep 2015 10:00	24 Sep 2015 15:00	6	Unstable Operation
Solar Global Radiation	24 Sep 2015 17:00	25 Sep 2015 14:00	22	Unstable Operation
Solar Global Radiation	26 Sep 2015 00:00	26 Sep 2015 06:00	7	Unstable Operation
Solar Global Radiation	26 Sep 2015 13:00	26 Sep 2015 13:00	1	Unstable Operation
Solar Global Radiation	26 Sep 2015 17:00	26 Sep 2015 18:00	2	Unstable Operation
Solar Global Radiation	29 Sep 2015 16:00	29 Sep 2015 21:00	6	Unstable Operation
Solar Global Radiation	30 Sep 2015 08:00	30 Sep 2015 10:00	3	Unstable Operation
Solar Global Radiation	30 Sep 2015 17:00	30 Sep 2015 17:00	1	Unstable Operation



Number of Exceedences (AAAO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Sep 1 12:00	Maximum Daily Average: 0.6 ppb on Sep 29		Hours of Data:	683
Minimum Value: 0 ppb on Sep 2 04:00	Minimum Daily Average: 0.0 ppb on Sep 8		Hours of Missing Data:	37
Maximum Diurnal Average: 0.2 ppb at hour 12	Minimum Diurnal Average: 0.1 ppb at hour 20		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 O <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1		Percent Operational Time:	99.7

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

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Chipewyan - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	683	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: 683

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

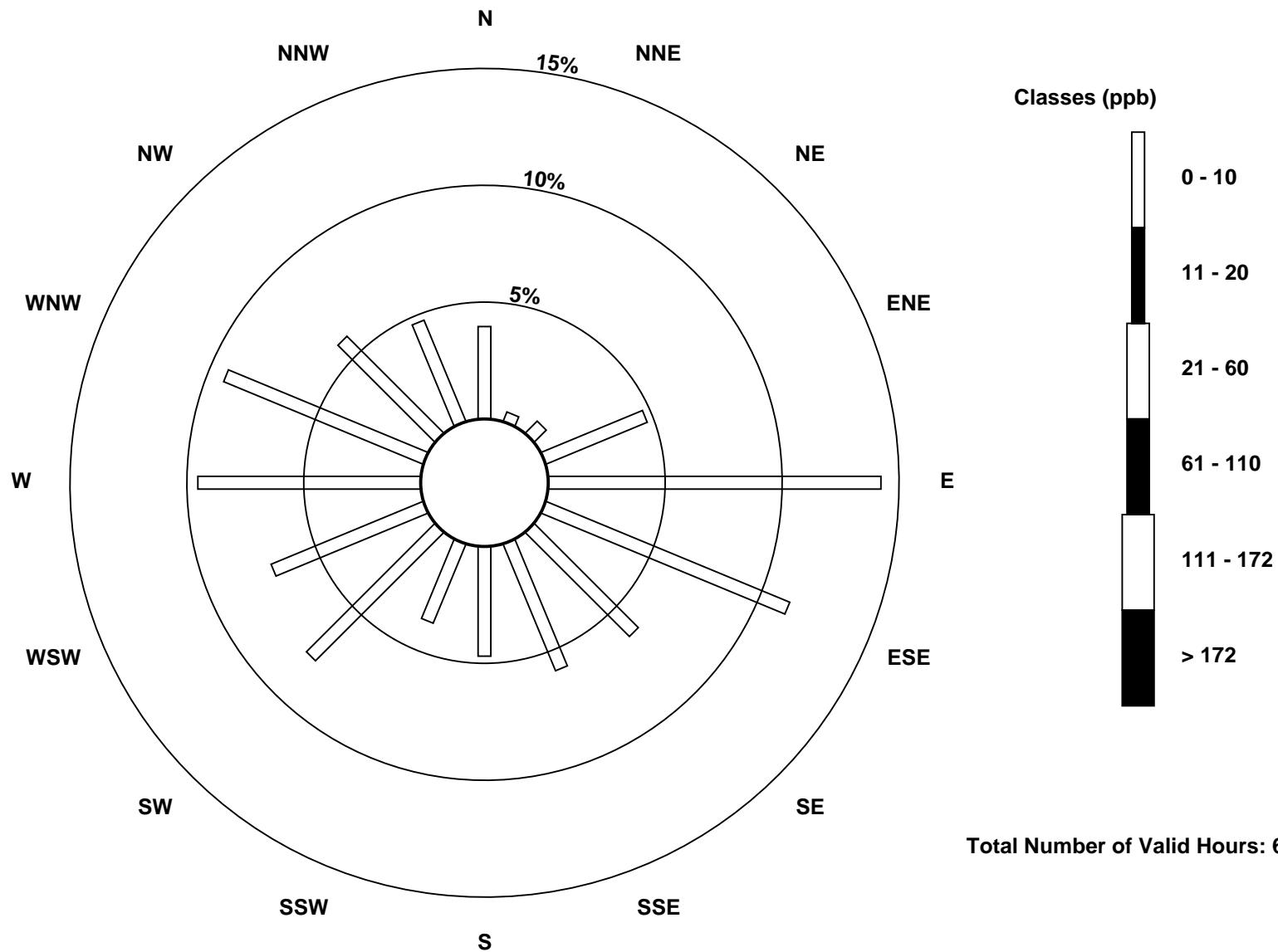
**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Chipewyan - September 2015**

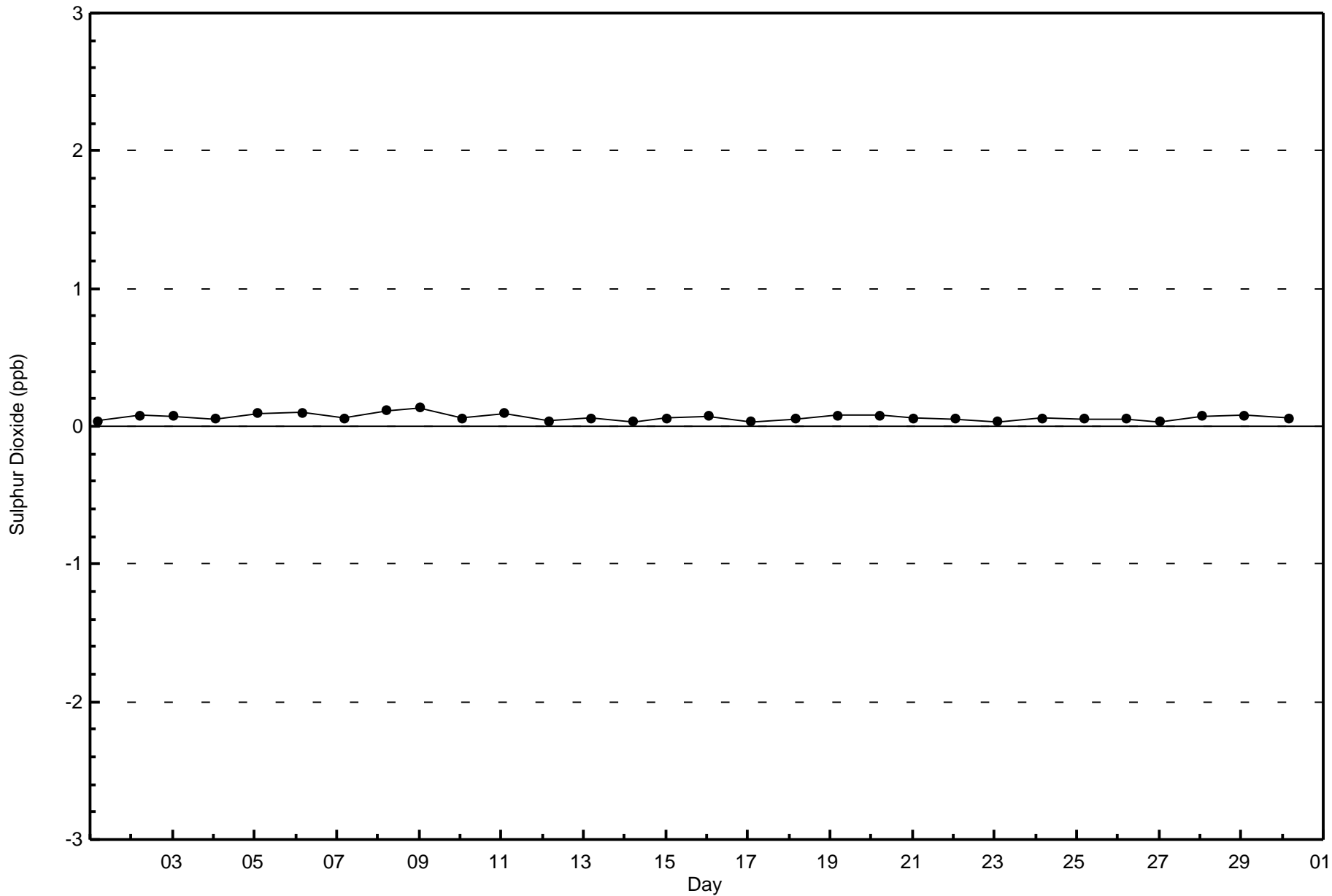
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	27	3	5	32	97	77	43	40	32	25	53	48	65	63	40	32	682
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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>	27	3	5	32	97	77	43	40	32	25	53	48	65	63	40	32	682

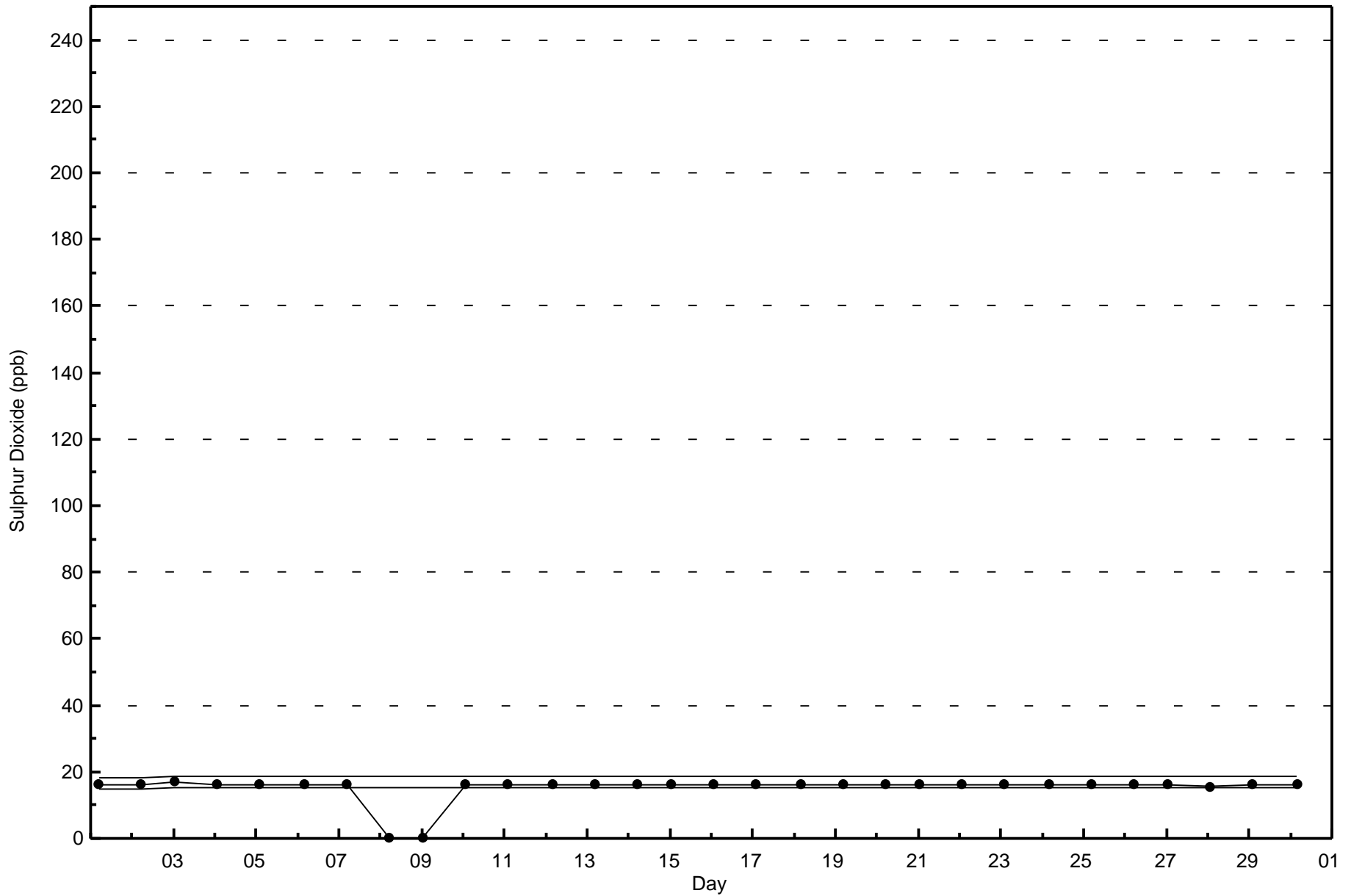
Total Number of Valid Hours: 682

Total Number of Hours: 720



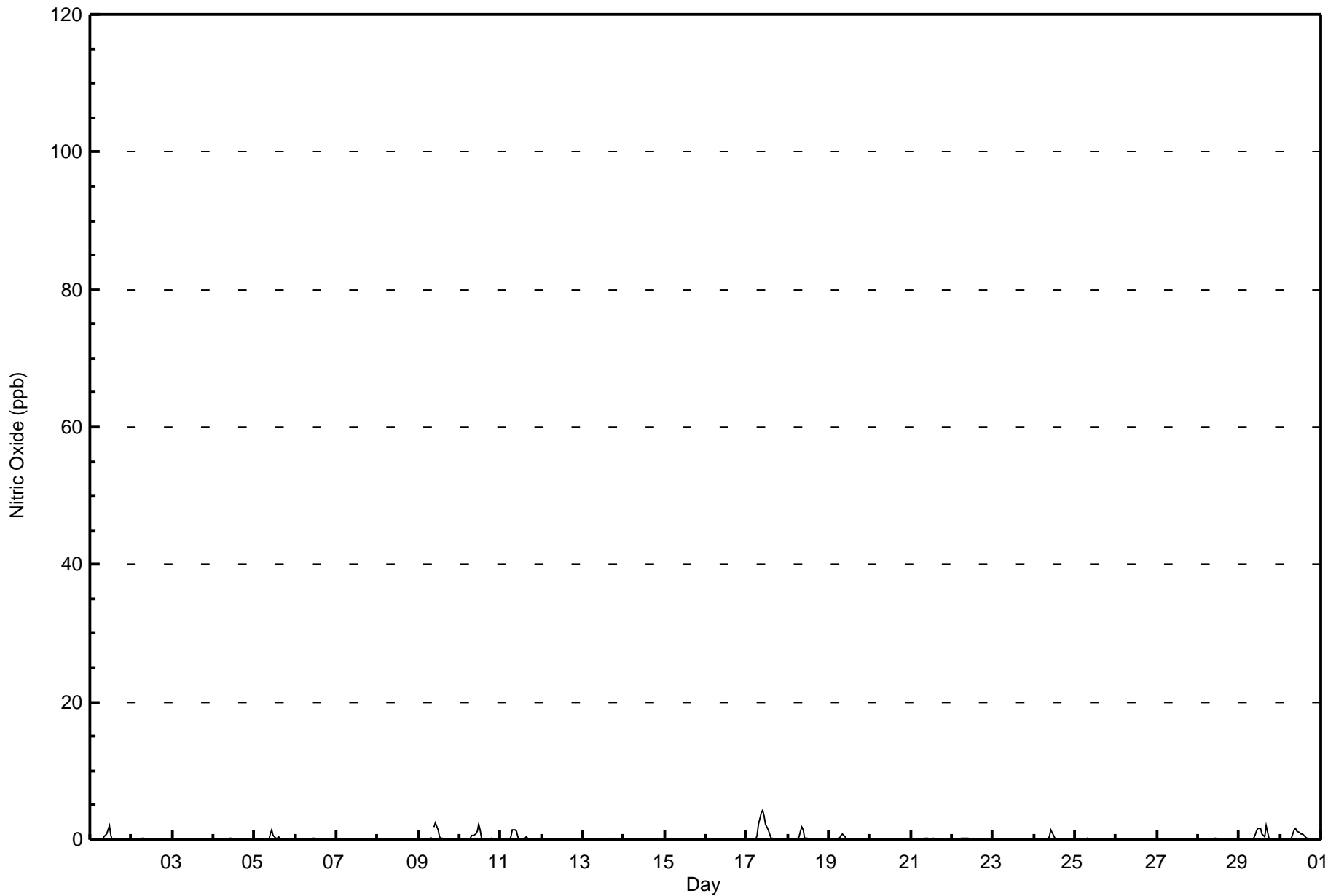








Maximum Value: 4 ppb on Sep 17 10:00																	Maximum Daily Average: 0.8 ppb on Sep 17																	Hours in Service: 720	
Minimum Value: 0 ppb on Sep 1 01:00																	Minimum Daily Average: 0.0 ppb on Sep 15																	Hours of Data: 684	
Maximum Diurnal Average: 0.5 ppb at hour 11																	Minimum Diurnal Average: 0.0 ppb at hour 24																	Hours of Missing Data: 36	
Monthly Average: 0.1 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 2																	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-Sep	0	0	0	0	Z	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2								
2-Sep	0	0	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0.0	0									
3-Sep	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									
4-Sep	0	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-Sep	0	0	Z	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2									
6-Sep	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									
7-Sep	0	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									
8-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
9-Sep	Z	0	0	0	0	0	0	0	0	M	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0.3	2									
10-Sep	0	Z	0	0	0	0	0	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0.3	2									
11-Sep	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1									
12-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
13-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
14-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
15-Sep	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									
16-Sep	0	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-Sep	0	0	Z	0	0	0	1	2	4	4	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0.8	4									
18-Sep	0	0	0	Z	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2									
19-Sep	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
20-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
21-Sep	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									
22-Sep	0	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									
23-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
24-Sep	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
25-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
26-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
27-Sep	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									
28-Sep	0	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-Sep	0	0	Z	0	0	0	0	0	0	1	1	2	2	1	1	0	2	0	0	0	0	0	0	0	0.4	2									
30-Sep	0	0	0	Z	0	0	0	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	2									
																								Diurnal Average											
																								Diurnal Maximum											
Z - zerospan      C - Calibration      M - Maintenance																																			





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort Chipewyan - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	684	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



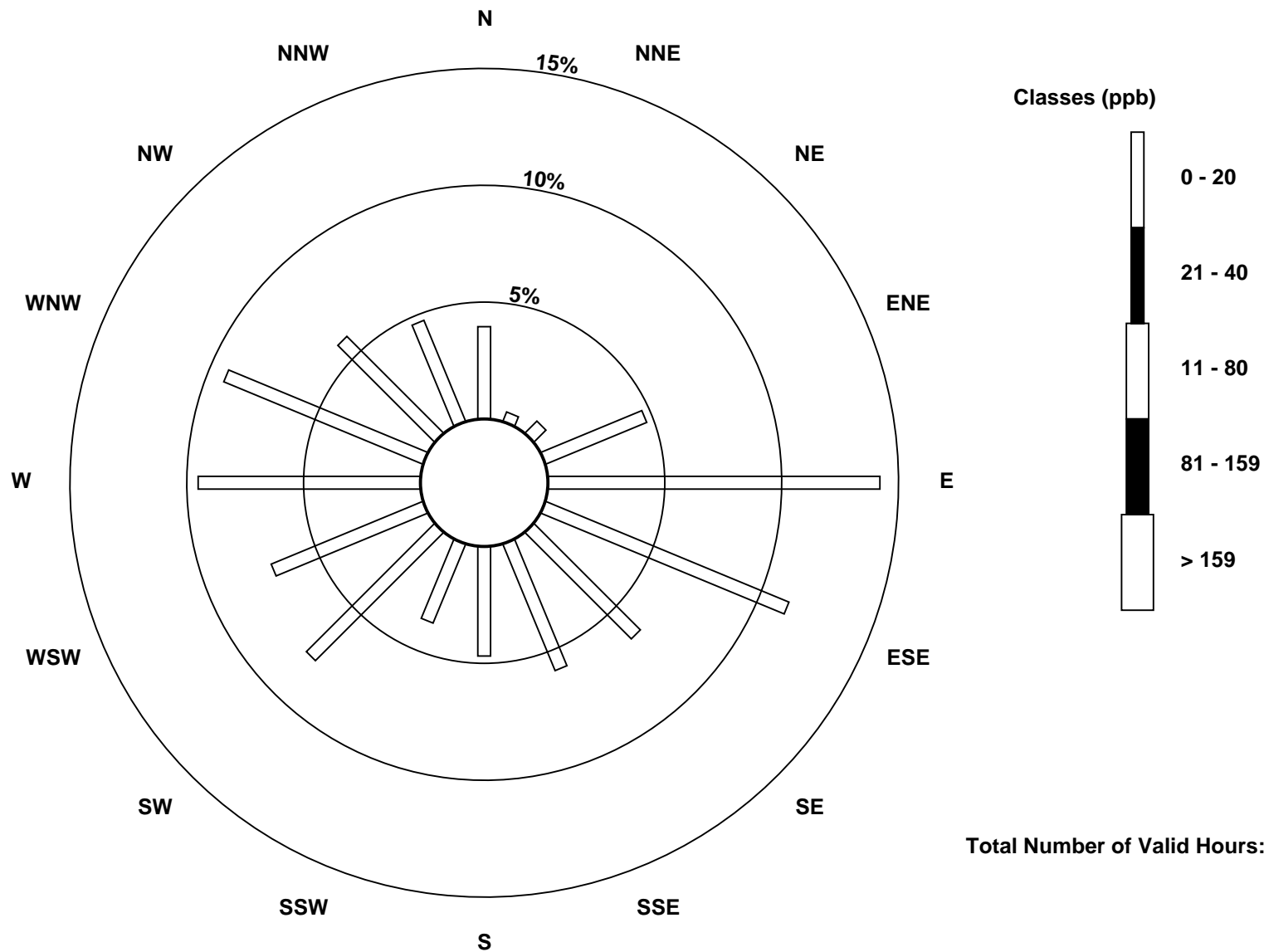
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort Chipewyan - September 2015**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 20	27	3	5	32	97	77	44	40	32	25	53	48	65	63	40	32	683
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>	27	3	5	32	97	77	44	40	32	25	53	48	65	63	40	32	683

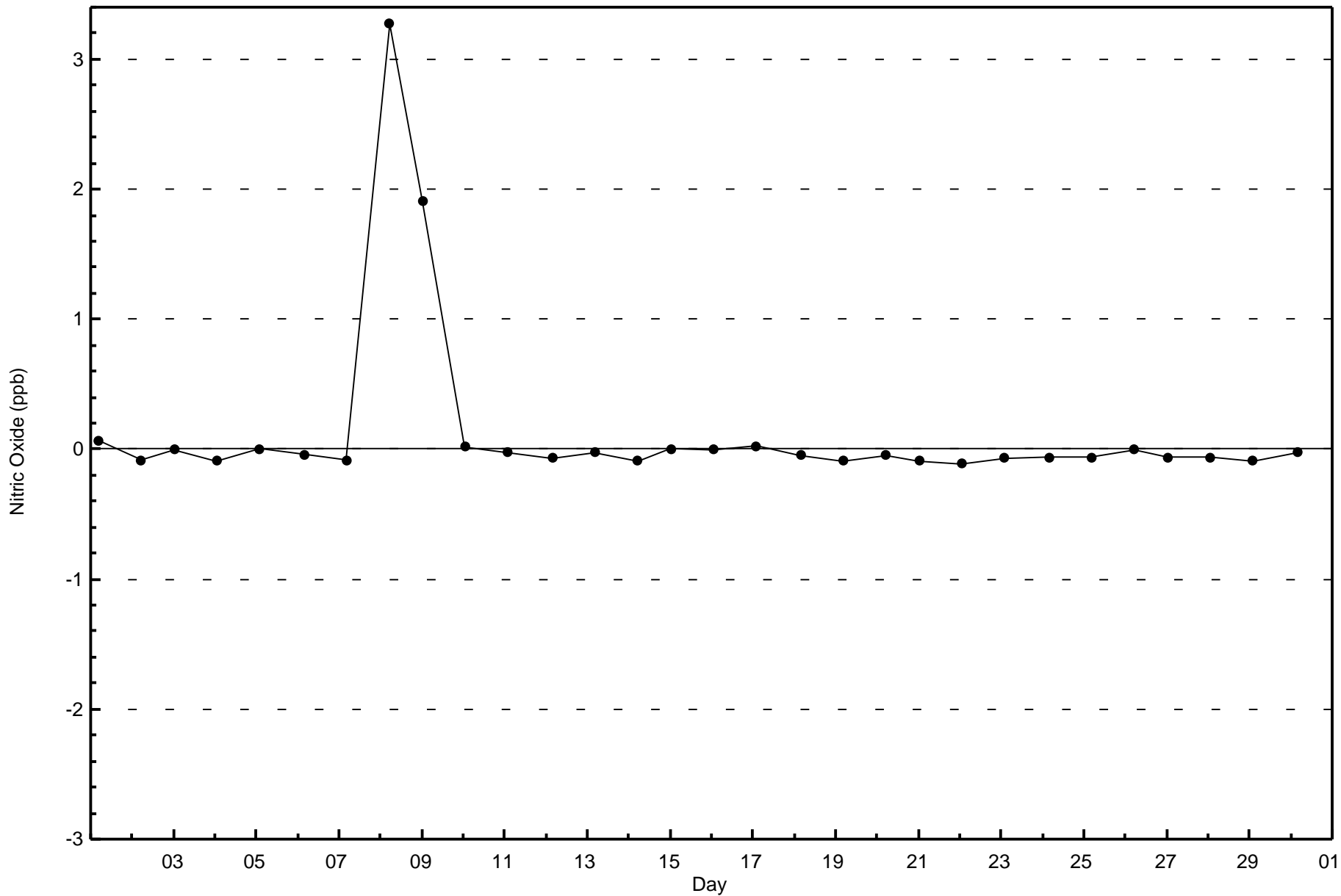
Total Number of Valid Hours: 683

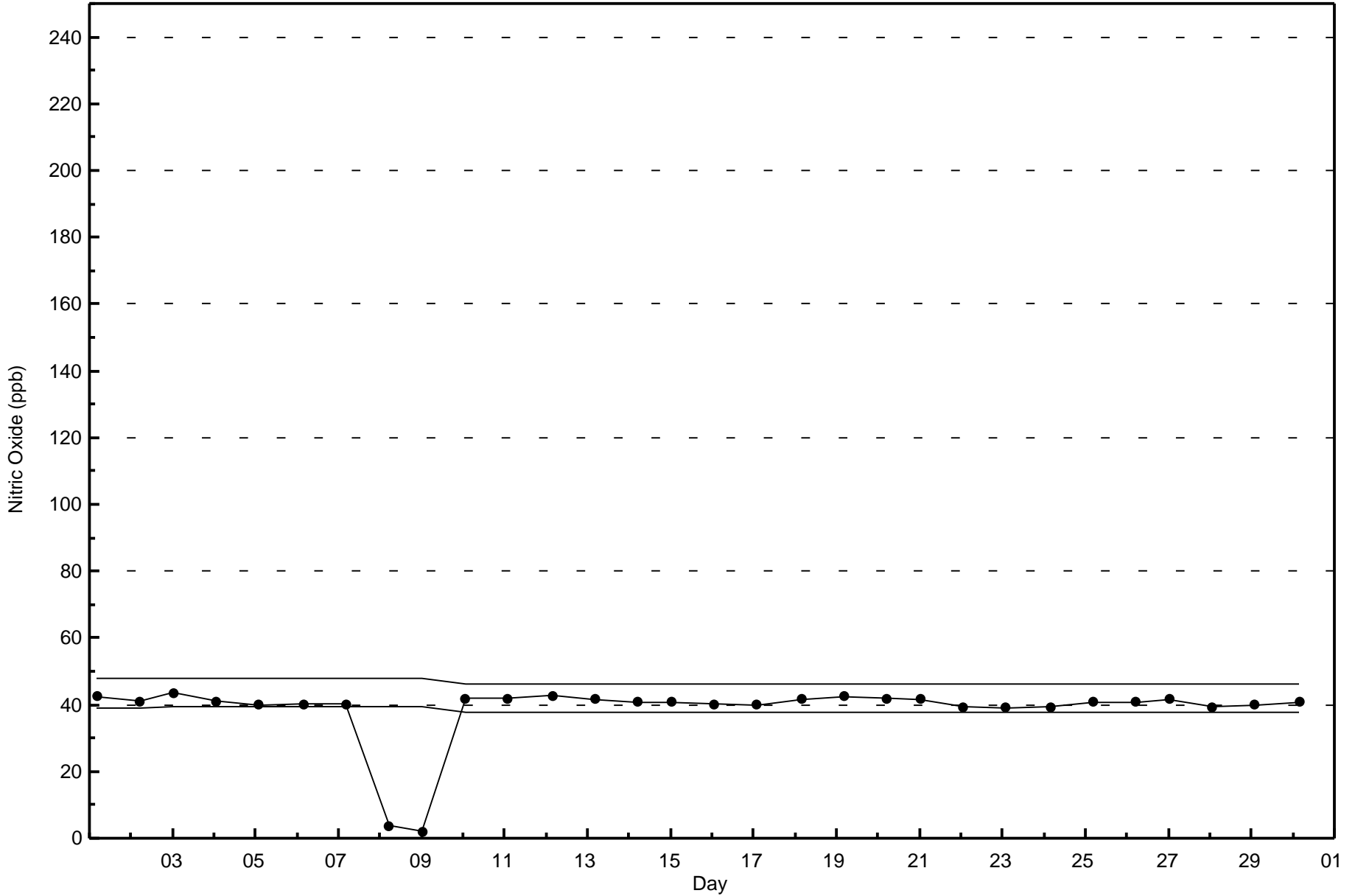
Total Number of Hours: 720



Total Number of Valid Hours: 683







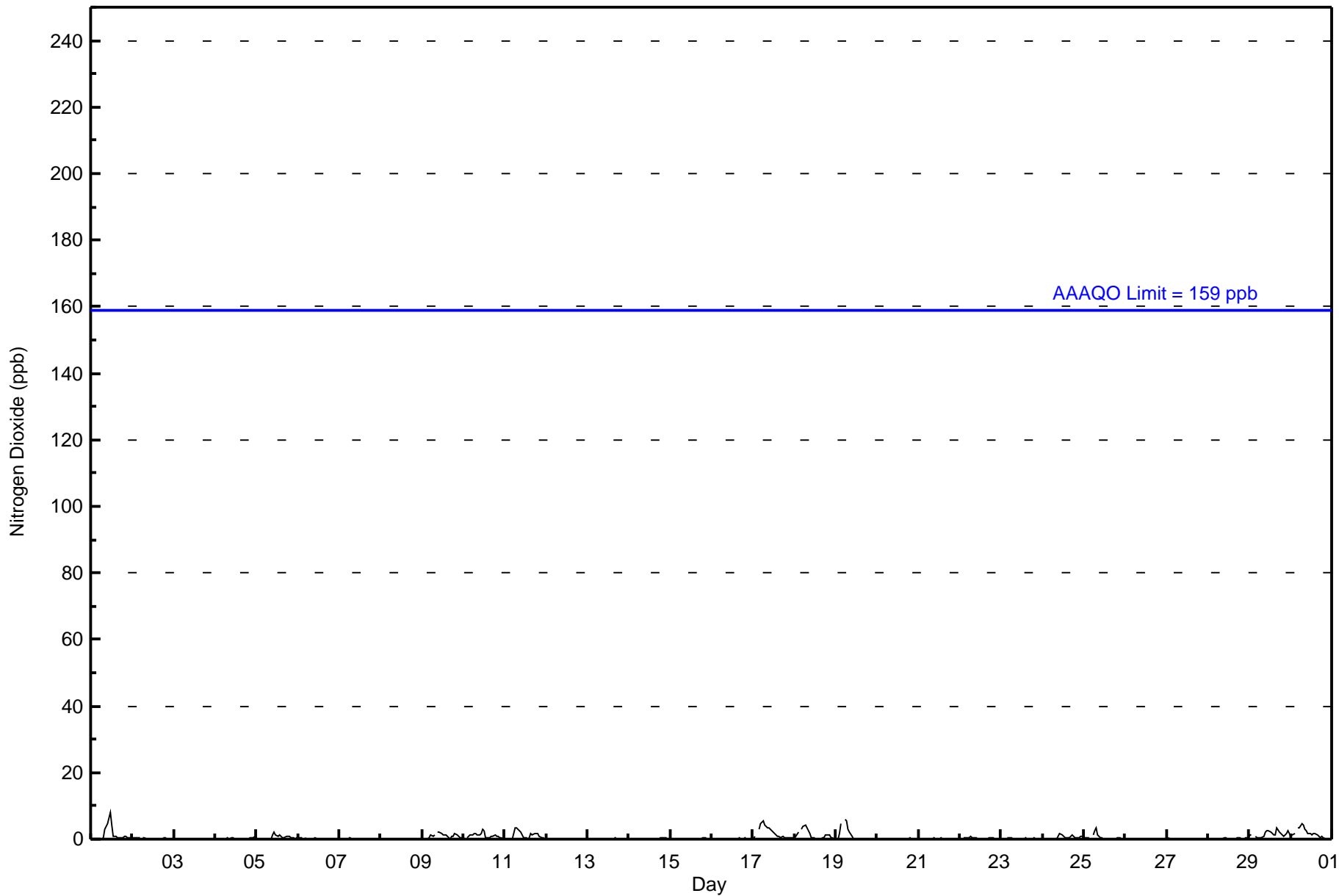


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 8 ppb on Sep 1 12:00	Maximum Daily Average: 1.9 ppb on Sep 17		Hours of Data:	684
Minimum Value: 0 ppb on Sep 2 10:00	Minimum Daily Average: 0.1 ppb on Sep 8		Hours of Missing Data:	36
Maximum Diurnal Average: 1.1 ppb at hour 7	Minimum Diurnal Average: 0.3 ppb at hour 1		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 O <sub>3</sub> = 1 P <sub>90</sub> = 2 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-Sep	0	0	0	0	Z	0	0	0	3	5	6	8	4	1	1	1	0	0	0	1	1	1	0	0	1.4	8
2-Sep	0	0	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0.2	0
3-Sep	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
4-Sep	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
5-Sep	0	0	Z	0	0	0	0	0	0	1	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	2
6-Sep	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
7-Sep	0	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-Sep	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
9-Sep	Z	0	0	0	0	1	1	1	M	2	2	2	1	1	1	1	0	1	1	2	1	1	0	1	0.9	2
10-Sep	0	Z	1	1	1	1	2	2	1	1	2	3	2	1	0	1	1	1	1	1	1	1	0	0	1.1	3
11-Sep	0	0	Z	0	0	2	3	3	3	2	1	0	0	0	1	2	1	2	2	2	1	1	0	0	1.1	3
12-Sep	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
13-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	1
14-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
15-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1
16-Sep	0	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-Sep	0	1	Z	3	5	5	6	4	4	4	3	2	2	1	1	1	1	1	1	0	1	1	0	0	1.9	6
18-Sep	0	1	2	Z	3	4	4	4	3	2	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1.2	4
19-Sep	0	0	2	5	Z	6	6	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	6
20-Sep	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
21-Sep	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
22-Sep	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
23-Sep	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
24-Sep	0	0	0	Z	0	0	0	0	0	1	2	1	1	1	0	1	1	1	1	0	0	1	1	1	0.5	2
25-Sep	1	1	0	0	Z	1	3	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4
26-Sep	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
27-Sep	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
28-Sep	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
29-Sep	1	1	Z	1	1	1	1	1	1	2	3	2	2	2	1	1	3	2	2	1	1	2	3	2	1.5	3
30-Sep	1	1	2	Z	3	4	5	4	3	2	2	2	1	2	2	1	1	1	1	0	0	0	0	0	1.6	5

0.3	0.3	0.4	0.5	0.6	1.1	1.1	0.9	0.8	0.8	0.9	0.8	0.6	0.4	0.3	0.3	0.4	0.4	0.5	0.5	0.4	0.3	0.3	0.3	Diurnal Average	
1	1	2	5	5	6	6	4	4	5	6	8	4	2	2	2	3	2	2	2	1	2	3	2	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort Chipewyan - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	684	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipewyan - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 20	27	3	5	32	97	77	44	40	32	25	53	48	65	63	40	32	683
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>	27	3	5	32	97	77	44	40	32	25	53	48	65	63	40	32	683

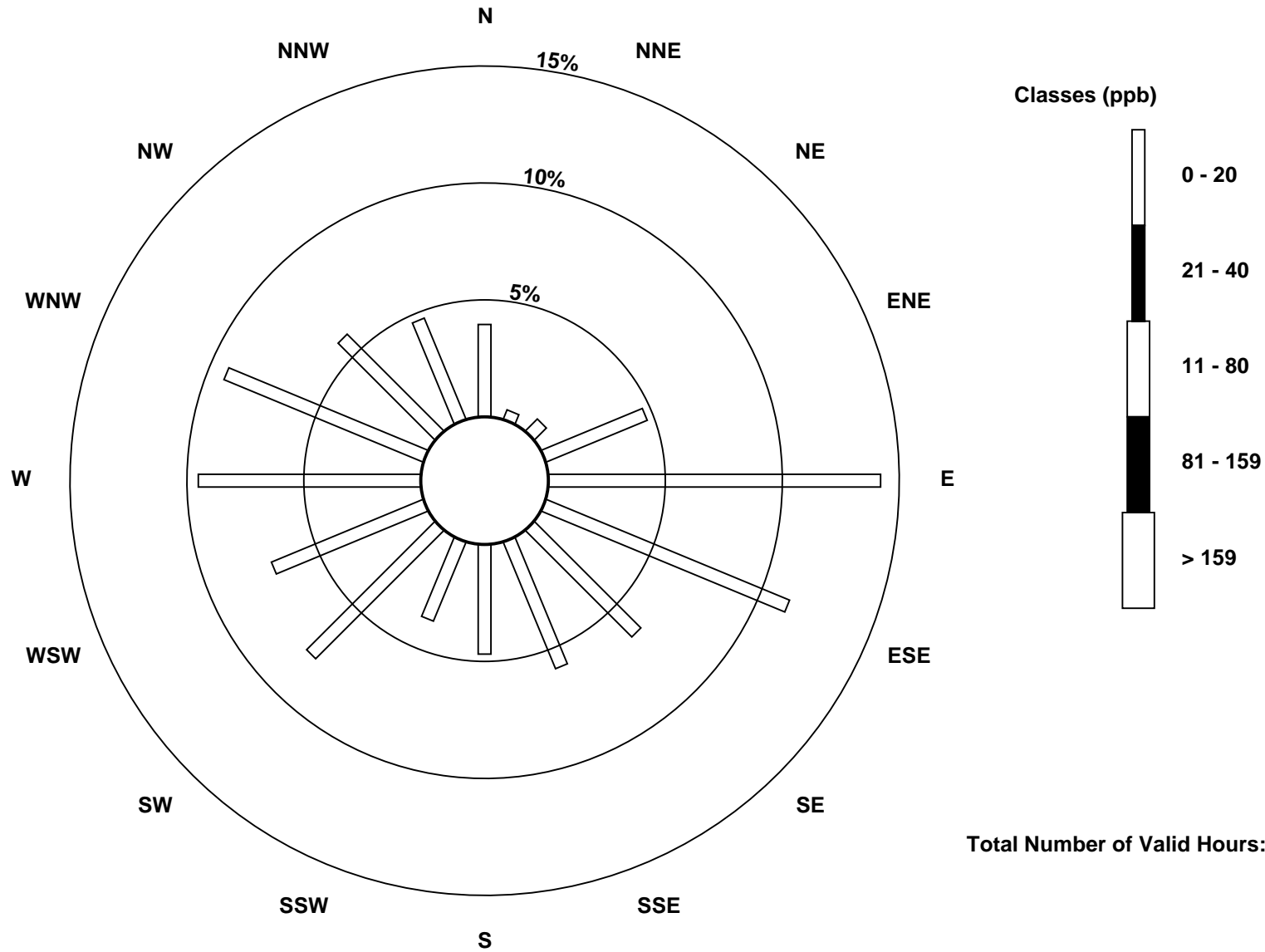
Total Number of Valid Hours: 683

Total Number of Hours: 720

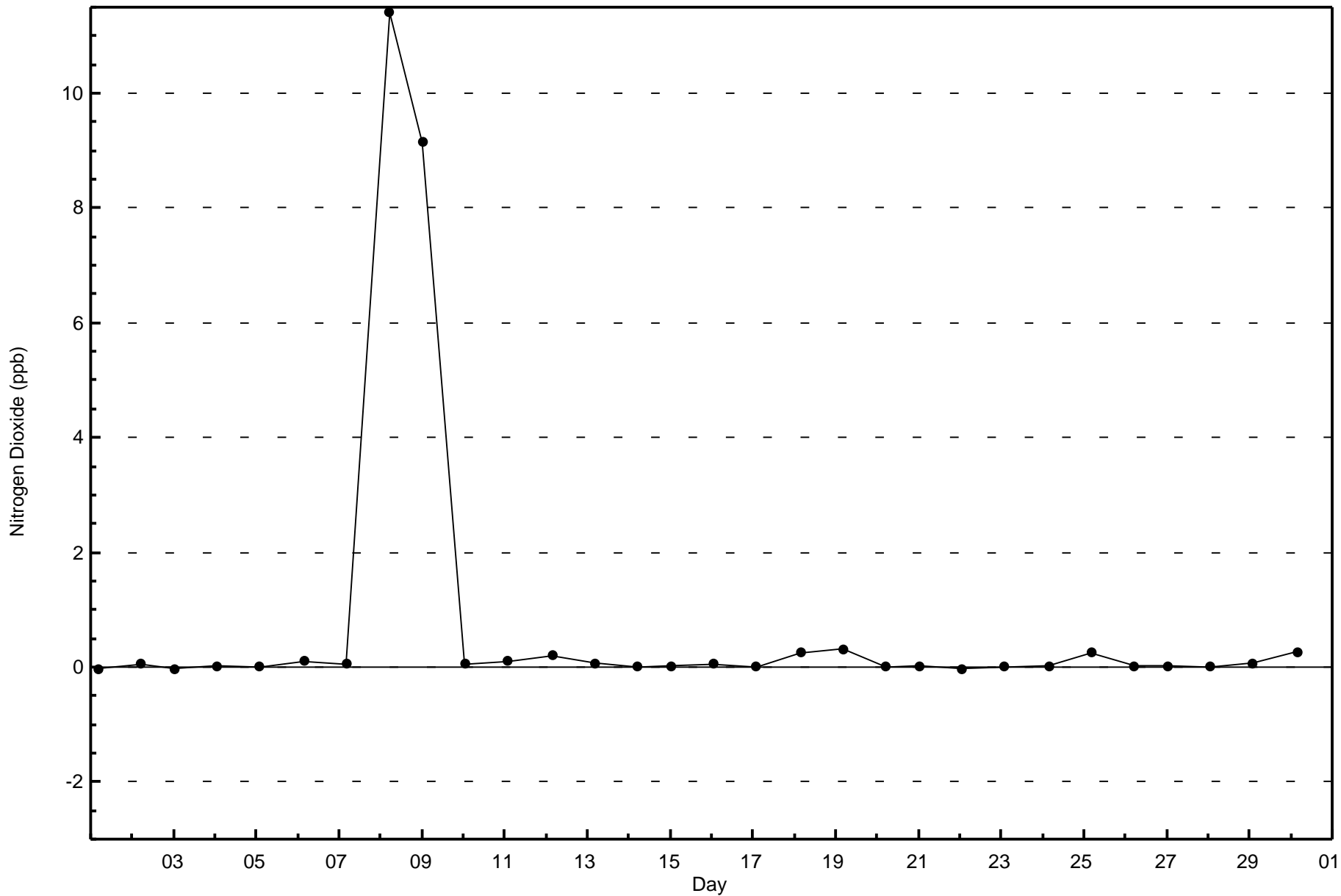


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

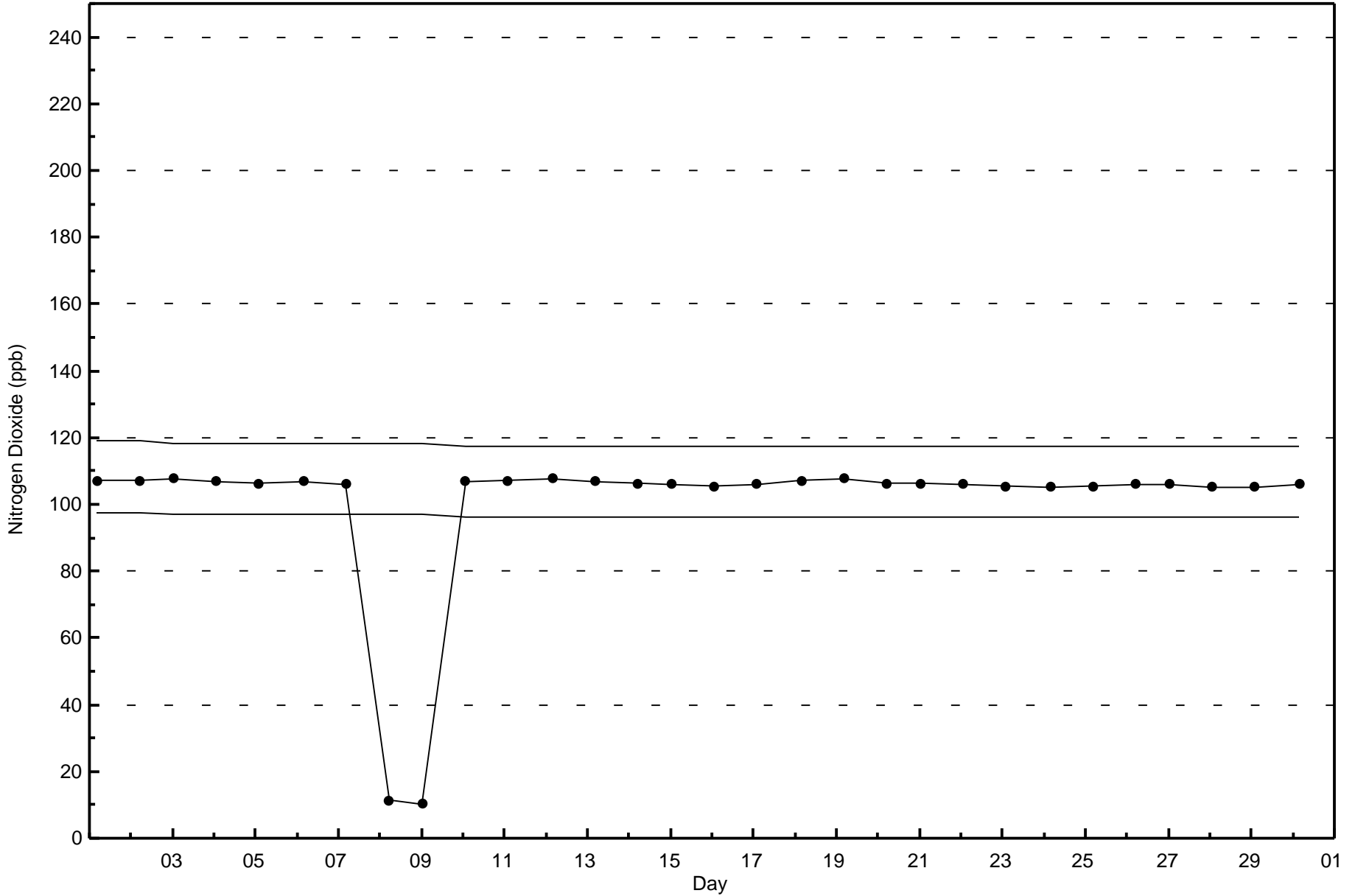
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 683







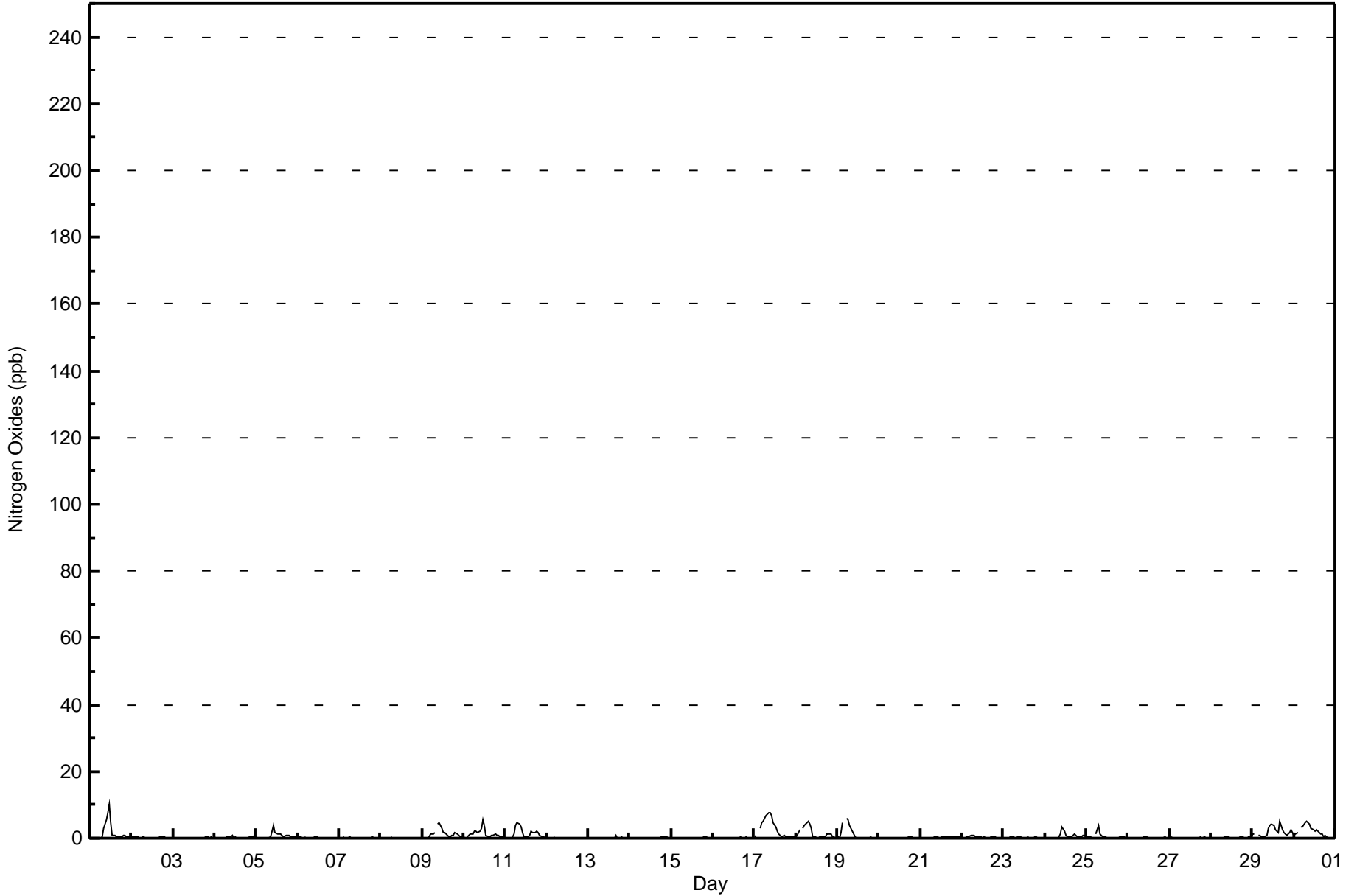


Maximum Value: 10 ppb on Sep 1 12:00																		Maximum Daily Average: 2.8 ppb on Sep 17						Hours in Service: 720		
Minimum Value: 0 ppb on Sep 6 13:00																		Minimum Daily Average: 0.1 ppb on Sep 8						Hours of Data: 684		
Maximum Diurnal Average: 1.4 ppb at hour 11																		Minimum Diurnal Average: 0.3 ppb at hour 1						Hours of Missing Data: 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> = 2 P <sub>99</sub> = 6						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-Sep	0	0	0	0	Z	0	0	0	3	5	8	10	5	1	1	1	0	0	0	1	1	1	0	0	1.7	10
2-Sep	0	0	0	0	0	Z	0	1	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0.3	1
3-Sep	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
4-Sep	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
5-Sep	0	0	Z	0	0	0	0	0	0	2	4	2	1	1	1	1	0	1	1	1	1	0	0	0	0.7	4
6-Sep	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
7-Sep	0	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-Sep	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
9-Sep	Z	0	0	0	0	1	1	2	M	4	5	3	2	2	1	1	0	1	1	2	1	1	0	1	1.2	5
10-Sep	0	Z	1	1	1	1	2	2	2	2	3	5	4	1	0	1	1	1	1	1	1	1	0	0	1.4	5
11-Sep	0	0	Z	0	0	1	4	5	4	3	2	0	0	0	1	2	2	2	2	2	1	1	0	0	1.4	5
12-Sep	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
13-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1
14-Sep	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
15-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1
16-Sep	0	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-Sep	0	1	Z	3	4	5	6	7	7	8	7	5	3	2	1	1	1	1	1	0	1	1	0	0	2.8	8
18-Sep	0	1	2	Z	3	4	4	5	4	3	1	1	0	0	0	0	0	0	1	1	1	1	0	0	1.5	5
19-Sep	0	0	1	5	Z	6	6	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	6
20-Sep	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
21-Sep	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
22-Sep	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
23-Sep	0	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-Sep	0	0	0	Z	0	0	0	0	0	1	3	2	1	1	0	0	1	1	1	0	0	1	1	1	0.7	3
25-Sep	1	0	0	0	Z	1	3	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4
26-Sep	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
27-Sep	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
28-Sep	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
29-Sep	1	1	Z	1	1	1	0	0	1	3	4	4	4	2	2	2	5	2	2	1	1	2	3	2	1.9	5
30-Sep	1	1	2	Z	3	4	5	5	5	4	3	3	2	2	2	1	1	1	1	0	0	0	0	0	2.0	5
																								Diurnal Average		
																								Diurnal Maximum		
																								Z - zerospan      C - Calibration      M - Maintenance		



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Chipewyan - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Chipewyan - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	684	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Chipewyan - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	3	5	32	97	77	44	40	32	25	53	48	65	63	40	32	683
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	27	3	5	32	97	77	44	40	32	25	53	48	65	63	40	32	683

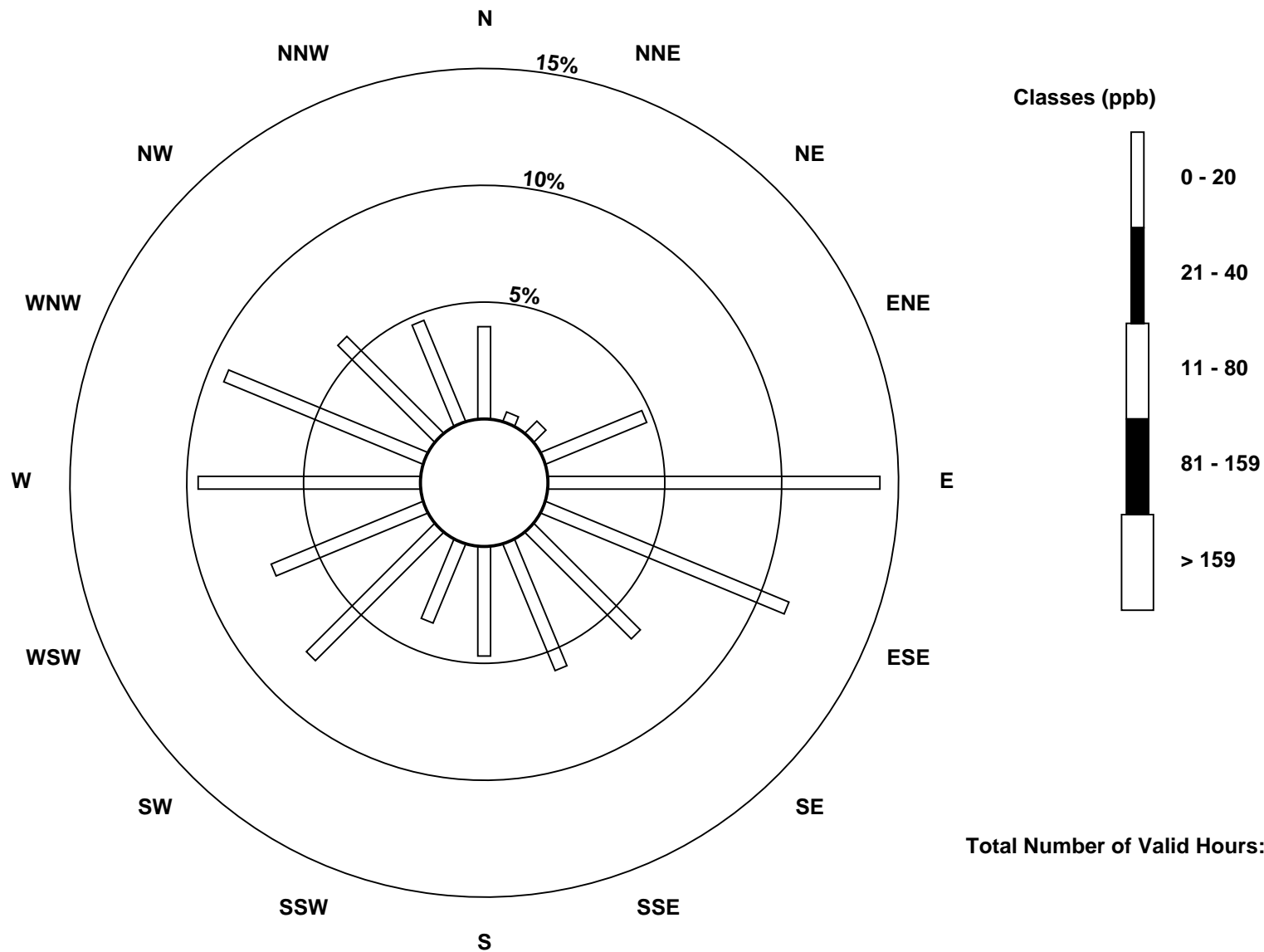
Total Number of Valid Hours: 683

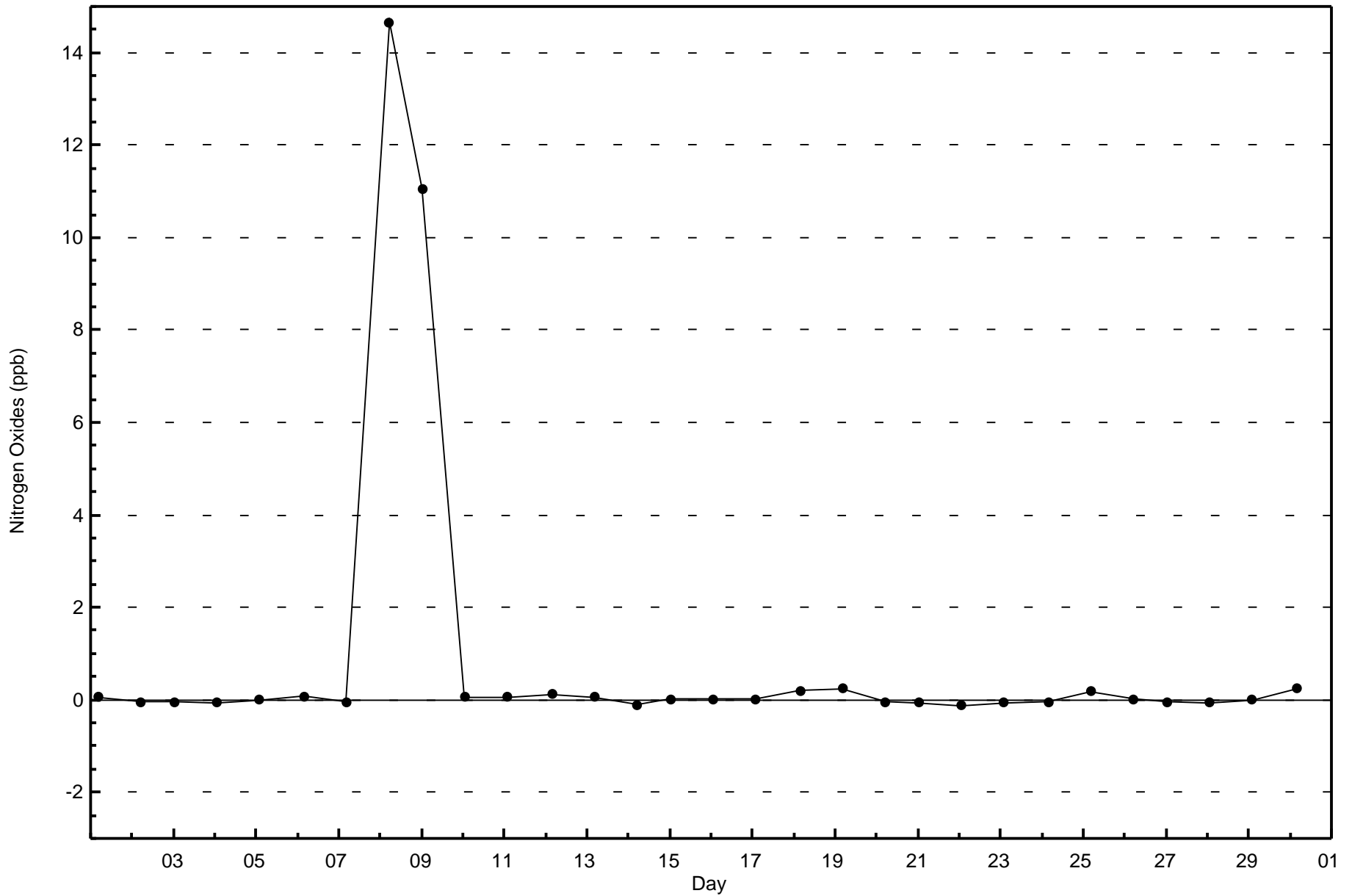
Total Number of Hours: 720

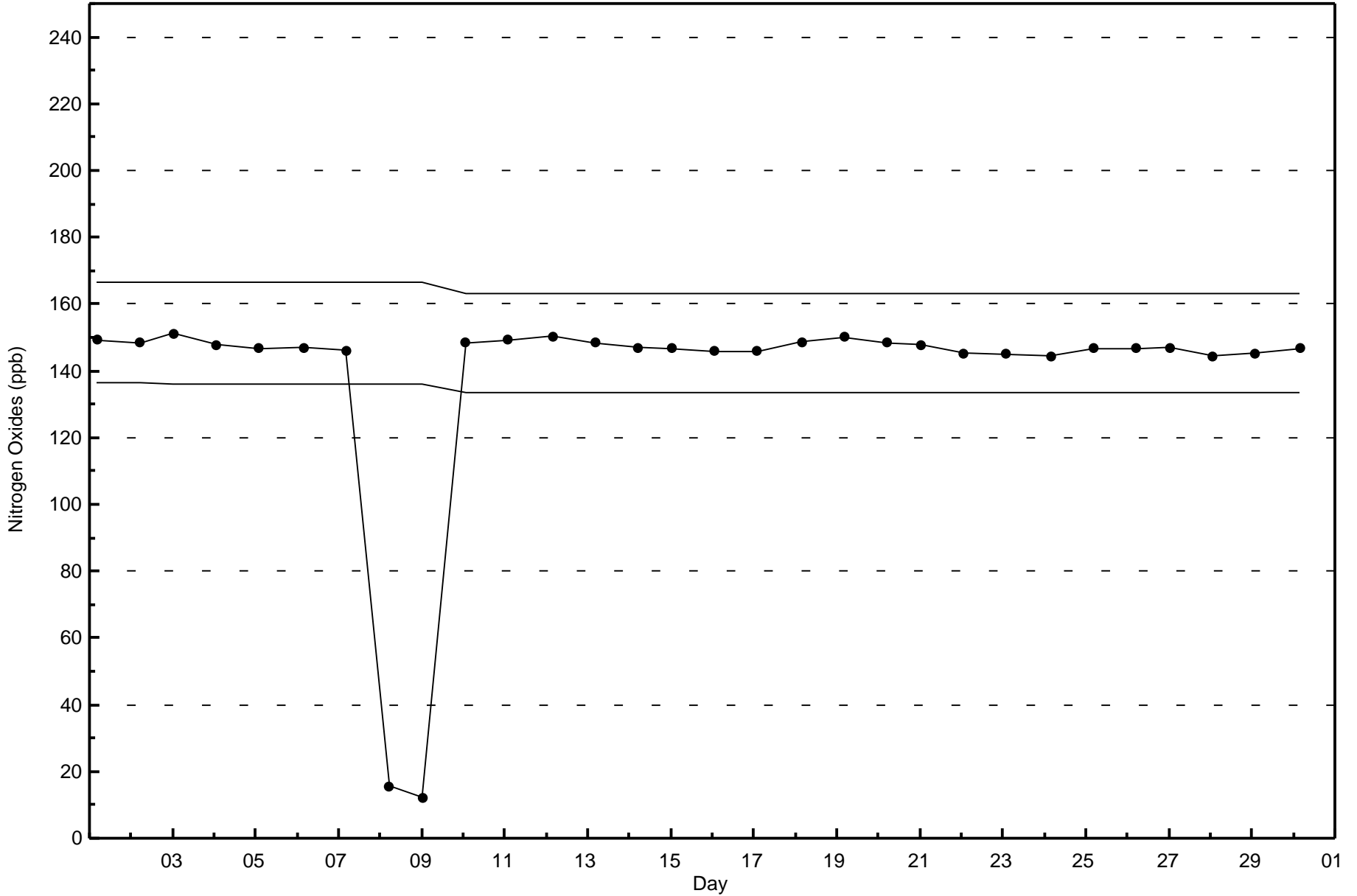


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Chipewyan (AMS 8)









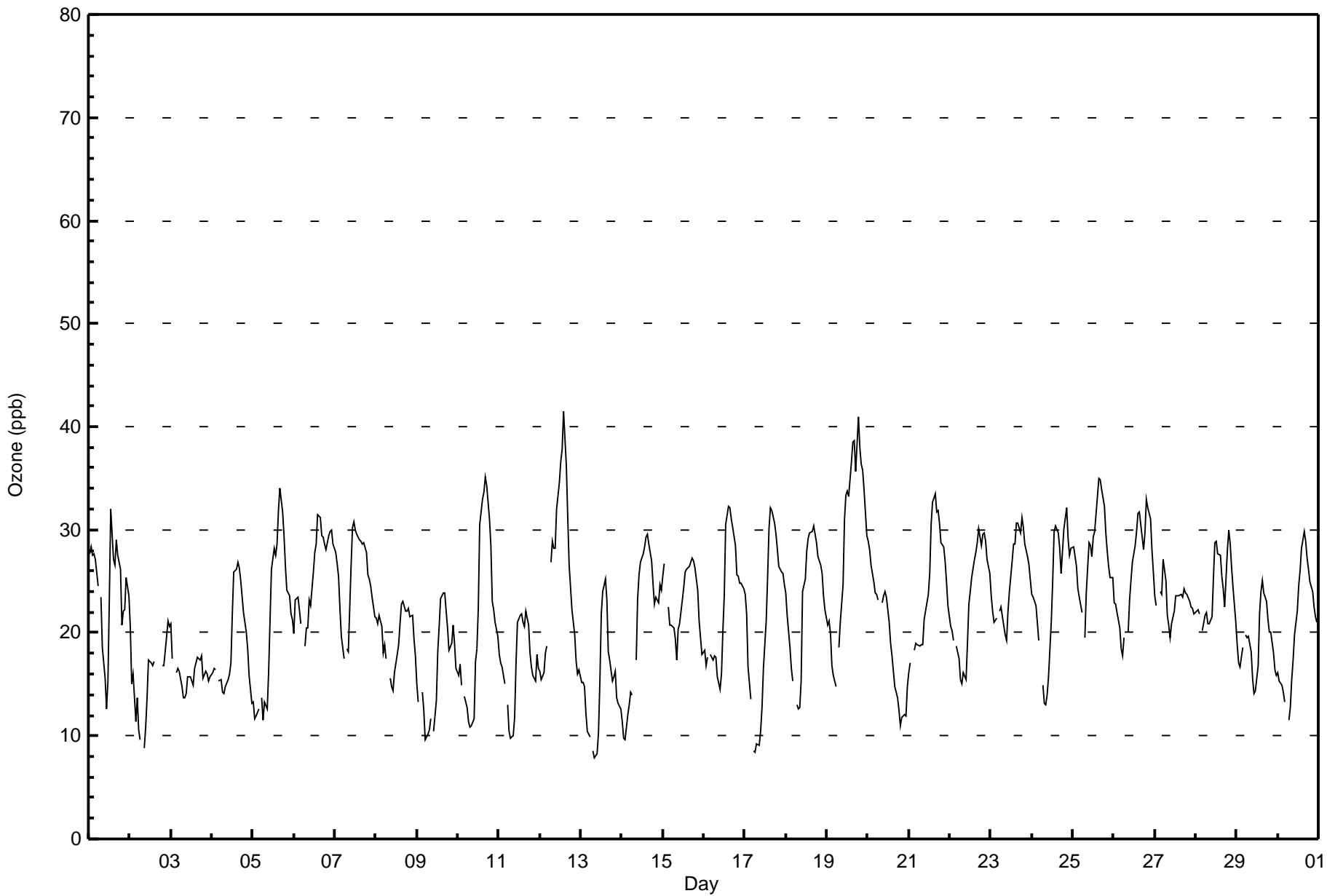


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 41 ppb on Sep 12 15:00	Maximum Daily Average: 29.1 ppb on Sep 19		Hours of Data:	685
Minimum Value: 8 ppb on Sep 13 09:00	Minimum Daily Average: 15.0 ppb on Sep 13		Hours of Missing Data:	35
Maximum Diurnal Average: 28.3 ppb at hour 16	Minimum Diurnal Average: 16.4 ppb at hour 7		Hours of Calibration:	34
Monthly Average: 22.1 ppb	Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 14 Q <sub>1</sub> = 17 Median = 22 Q <sub>3</sub> = 27 P <sub>90</sub> = 30 P <sub>99</sub> = 36		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	28	28	28	28	27	25	Z	23	19	16	13	15	23	32	27	27	29	28	26	21	22	22	25	24	24.1	32	
2-Sep	21	15	16	11	14	11	10	Z	9	11	14	17	17	17	17	C	C	C	C	17	17	20	21	21	15.5	21	
3-Sep	21	18	Z	16	16	16	15	14	14	14	16	16	15	15	17	18	17	17	18	16	16	16	15	16	16.1	21	
4-Sep	16	17	16	Z	15	15	14	14	15	15	16	17	22	26	26	27	26	25	22	21	20	18	16	13	18.9	27	
5-Sep	13	12	12	13	Z	14	11	13	13	16	21	26	28	28	29	32	34	32	29	26	24	24	22	21	21.4	34	
6-Sep	20	23	23	22	21	Z	19	21	21	23	23	26	28	29	31	31	29	29	29	28	29	30	30	29	25.8	31	
7-Sep	28	27	25	22	20	17	Z	18	18	27	30	31	30	30	29	29	29	29	28	26	25	25	23	22	25.5	31	
8-Sep	21	21	22	21	18	19	17	Z	16	15	14	16	18	19	21	23	23	22	22	22	22	22	19	18	19.6	23	
9-Sep	15	13	Z	14	13	10	10	11	12	M	10	13	18	21	23	24	24	22	21	18	19	21	19	17	16.7	24	
10-Sep	16	17	15	Z	14	13	11	11	11	12	17	18	22	30	33	34	35	34	31	29	23	22	21	20	21.3	35	
11-Sep	18	17	17	15	Z	13	10	10	10	12	17	21	22	22	21	21	22	21	18	17	16	15	18	17	16.9	22	
12-Sep	16	15	16	18	19	Z	27	29	28	28	32	35	37	38	41	36	31	27	24	22	20	17	16	16	25.6	41	
13-Sep	15	15	15	12	11	10	Z	9	8	8	10	15	22	24	25	23	18	17	15	16	16	14	13	13	15.0	25	
14-Sep	11	10	10	12	13	14	14	Z	17	23	26	27	28	28	29	30	29	27	25	23	23	23	25	24	21.3	30	
15-Sep	26	27	Z	22	21	21	20	19	17	20	21	23	24	26	26	26	27	27	27	26	24	21	20	18	23.1	27	
16-Sep	18	17	18	Z	18	17	18	18	16	15	16	20	24	30	32	32	31	30	28	26	25	25	25	24	22.7	32	
17-Sep	24	22	17	14	Z	9	8	9	9	10	13	17	21	25	30	32	32	31	30	28	26	26	26	25	21.0	32	
18-Sep	24	22	19	17	15	Z	13	13	13	15	24	25	28	29	30	30	30	30	29	27	27	26	24	22	23.0	30	
19-Sep	21	21	20	17	16	15	Z	19	21	25	31	33	34	33	37	39	39	36	41	38	36	36	34	29	29.1	41	
20-Sep	29	28	27	25	24	24	23	Z	23	24	24	23	21	19	18	16	15	14	12	11	12	12	12	15	19.6	29	
21-Sep	16	17	Z	18	19	19	19	19	19	21	22	24	26	31	33	33	32	32	31	29	28	27	25	23	24.4	33	
22-Sep	21	20	19	Z	19	17	15	15	16	15	19	23	24	25	27	28	29	30	29	30	30	29	27	26	23.2	30	
23-Sep	24	22	21	21	Z	22	22	22	20	19	22	24	27	29	29	31	31	30	31	30	29	27	27	25	25.4	31	
24-Sep	24	23	23	21	19	Z	15	13	13	14	16	21	25	30	30	30	28	26	28	30	32	29	27	28	23.7	32	
25-Sep	28	27	26	24	23	22	Z	20	24	29	29	27	29	30	33	35	35	34	32	30	28	26	25	25	28.0	35	
26-Sep	23	23	22	21	18	18	20	Z	20	23	25	27	28	30	32	32	31	28	30	33	32	31	28	26	26.0	33	
27-Sep	24	23	Z	24	24	27	25	22	21	20	21	22	24	24	24	24	24	24	24	24	24	23	23	22	22	23.1	27
28-Sep	22	22	22	Z	20	22	22	21	21	22	25	29	29	28	27	26	24	22	28	30	29	26	24	21	24.4	30	
29-Sep	19	17	17	19	Z	20	19	20	18	16	14	14	17	22	24	25	24	23	21	20	20	18	16	16	19.1	25	
30-Sep	16	15	15	14	13	Z	11	13	15	17	20	22	24	26	28	30	29	27	26	25	24	22	22	21	20.8	30	

20.5	19.8	19.2	18.5	18.0	17.1	16.4	16.5	16.5	18.1	20.0	22.3	24.5	26.4	27.7	28.3	27.8	26.7	26.0	24.6	24.0	23.1	22.3	21.2	Diurnal Average	
29	28	28	28	27	27	27	29	28	29	32	35	37	38	41	39	39	36	41	38	36	36	34	29	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipewyan - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	270	39.42	39.42
21 - 50	415	60.58	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipewyan - September 2015**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	2	0	1	16	33	27	23	18	6	22	7	17	29	21	26	270
21 - 50	2	2	5	30	82	40	18	17	18	16	33	41	49	33	20	8	414
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>	24	4	5	31	98	73	45	40	36	22	55	48	66	62	41	34	684

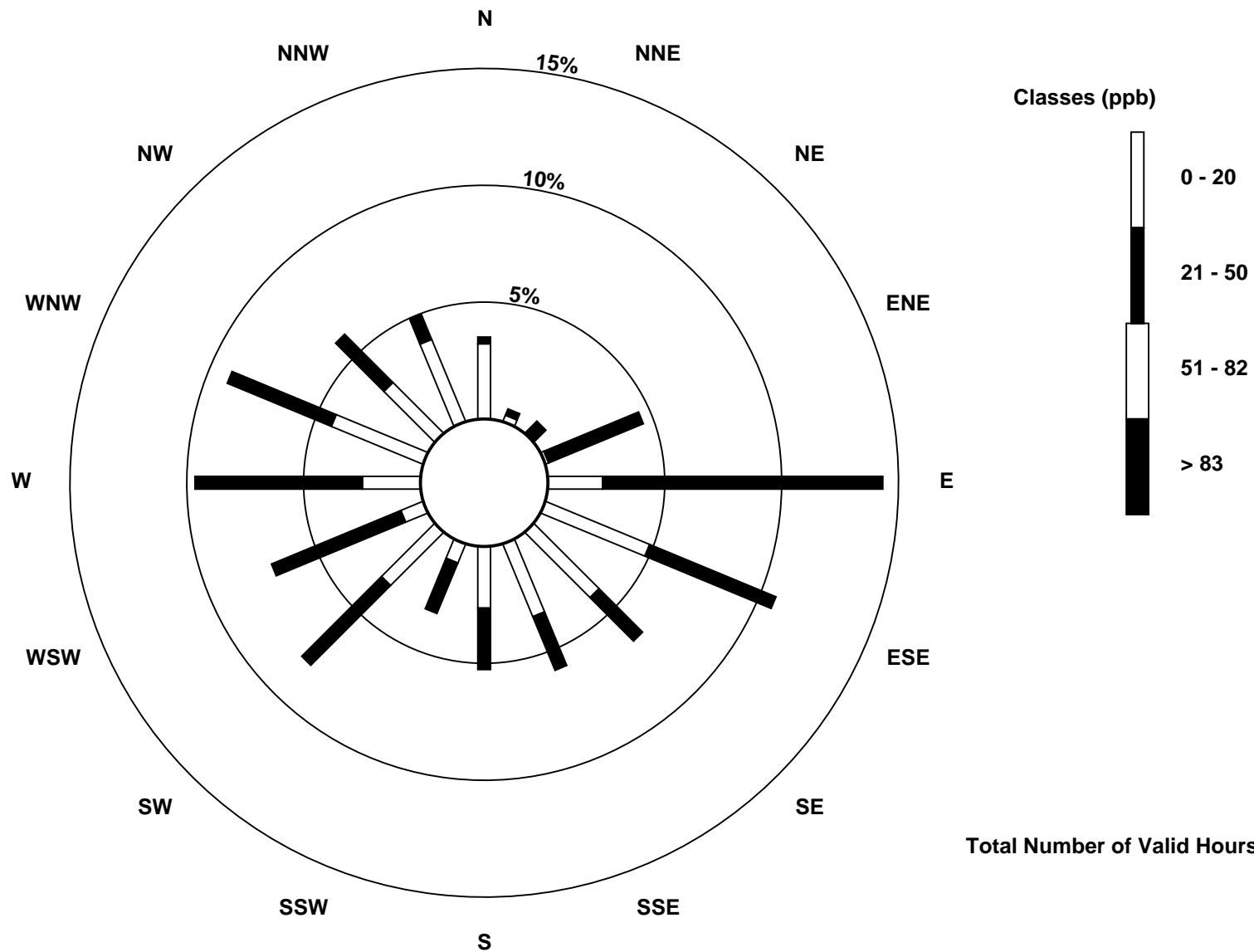
Total Number of Valid Hours: 684

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Ozone (O<sub>3</sub>) - ppb  
Fort Chipewyan (AMS 8)



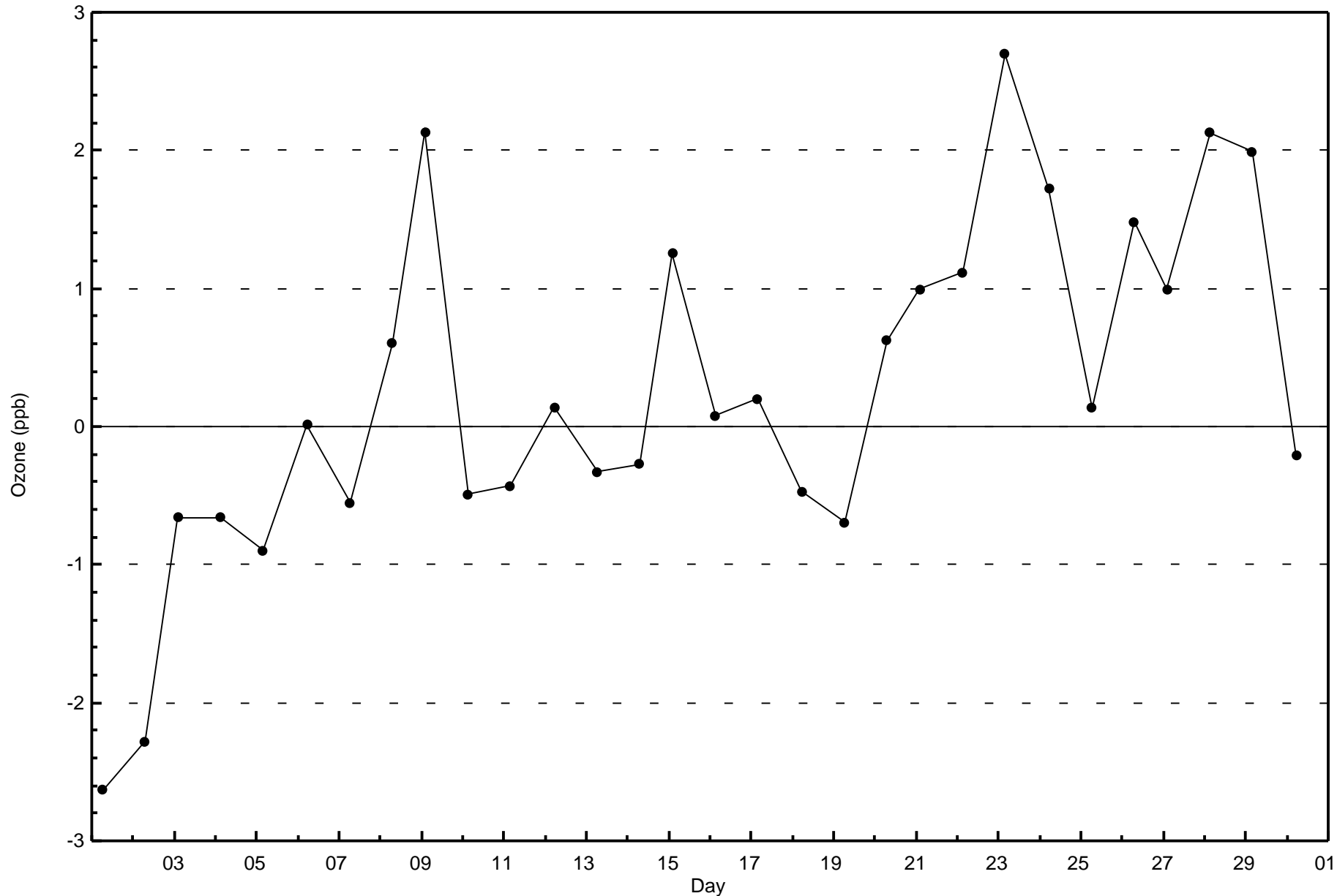


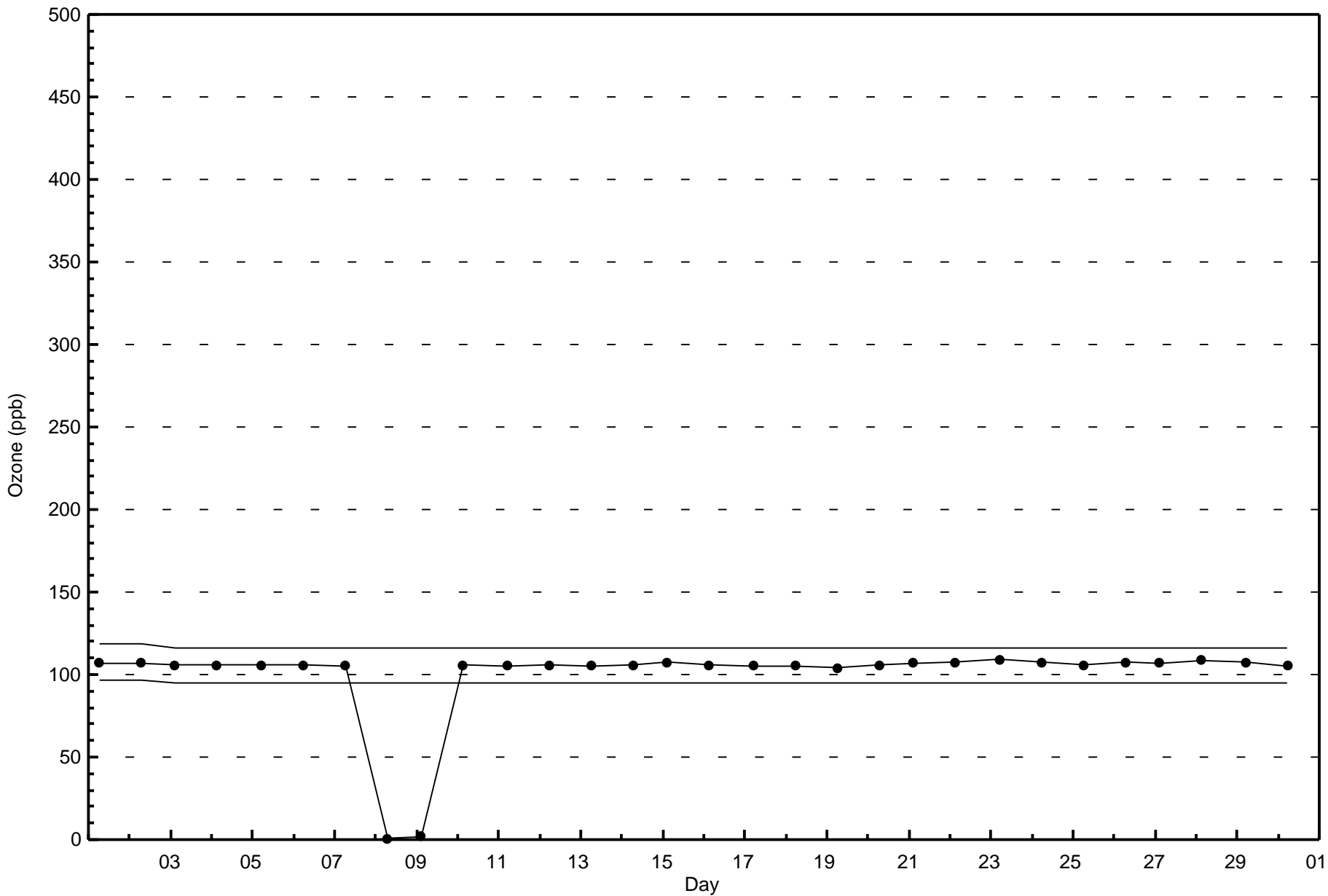
Wood Buffalo Environmental Association

Zero Responses

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

Fort Chipewyan - September 2015







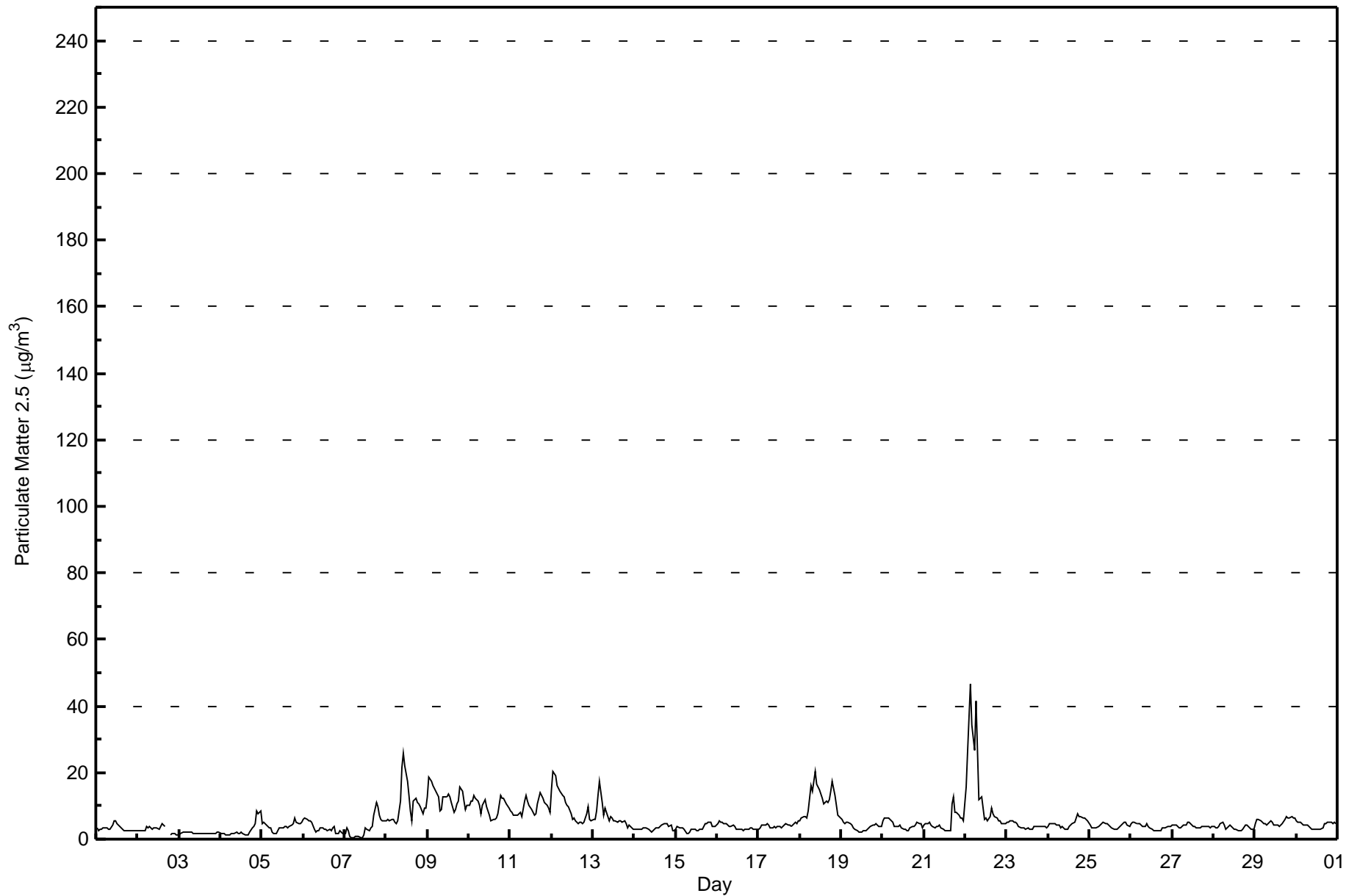
Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 46.5 µg/m <sup>3</sup> on Sep 22 04:00	Maximum Daily Average: 15.3 µg/m <sup>3</sup> on Sep 22	Hours of Data:	718
Minimum Value: 0.3 µg/m <sup>3</sup> on Sep 7 06:00	Minimum Daily Average: 1.8 µg/m <sup>3</sup> on Sep 3	Hours of Missing Data:	2
Maximum Diurnal Average: 7.1 µg/m <sup>3</sup> at hour 4	Minimum Diurnal Average: 4.2 µg/m <sup>3</sup> at hour 16	Hours of Calibration:	0
Monthly Average: 5.62 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 1.0 P <sub>10</sub> = 2.3 Q <sub>1</sub> = 3.2 Median = 4.2 Q <sub>3</sub> = 6.1 P <sub>90</sub> = 11.3 P <sub>99</sub> = 26.1	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-Sep	3.3	2.6	2.8	3.1	3.2	3.5	3.2	2.8	3.0	4.2	5.4	5.6	4.9	4.2	3.5	3.0	2.7	2.6	2.7	2.7	2.7	2.7	2.7	2.7	3.3	5.6
2-Sep	2.7	2.6	2.7	2.6	2.7	3.9	3.4	3.8	3.1	3.3	3.3	3.2	3.1	3.9	4.5	4.2	3.7	M	M	1.1	1.6	1.6	1.3	1.2	2.9	4.5
3-Sep	1.4	1.6	2.1	2.0	2.1	2.2	2.1	2.1	1.9	1.8	1.7	1.7	1.7	1.7	1.8	1.7	1.6	1.6	1.6	1.6	1.6	1.8	2.2	2.3	1.8	2.3
4-Sep	1.9	1.9	1.7	1.4	1.4	1.4	1.5	1.6	1.8	1.9	1.7	1.6	1.9	1.5	1.4	1.2	1.3	2.3	3.5	3.6	4.9	8.7	7.6	8.4	2.7	8.7
5-Sep	4.8	5.1	4.7	3.9	3.6	3.5	1.9	1.5	1.8	2.7	3.3	3.3	3.5	3.9	3.9	3.6	3.7	4.3	4.6	6.2	4.9	4.8	4.7	5.1	3.9	6.2
6-Sep	5.8	6.5	6.0	5.7	5.5	5.0	3.2	1.9	2.6	2.6	3.5	3.3	3.0	2.8	2.5	2.8	2.6	3.3	3.6	1.8	1.9	2.3	2.1	1.8	3.4	6.5
7-Sep	1.6	3.3	2.6	1.0	0.5	0.3	0.7	0.7	0.7	0.6	0.3	1.4	3.4	3.1	2.7	3.2	4.0	7.0	11.1	9.7	7.2	5.8	5.4	5.5	3.4	11.1
8-Sep	5.3	5.9	5.5	6.1	5.7	5.1	4.5	5.6	11.5	21.7	26.0	22.1	17.6	13.3	8.6	5.6	11.4	12.4	10.8	10.5	9.9	7.7	9.3	9.5	10.5	26.0
9-Sep	12.5	18.6	17.5	16.1	15.2	14.3	12.8	8.4	9.1	12.9	12.9	12.7	13.4	12.6	10.9	8.0	8.8	10.8	11.2	15.7	14.6	11.5	9.0	10.2	12.5	18.6
10-Sep	10.1	11.5	11.5	13.2	12.1	11.4	10.2	7.8	10.4	11.7	9.6	8.5	7.3	5.7	5.8	5.9	6.3	7.6	13.2	12.2	12.1	11.4	10.5	9.5	9.8	13.2
11-Sep	8.4	8.1	7.0	7.4	7.2	7.5	8.1	6.7	11.6	13.2	11.3	10.0	8.7	7.9	7.4	7.4	10.8	13.9	13.1	12.3	11.0	10.0	9.1	7.9	9.4	13.9
12-Sep	14.6	20.2	18.9	16.1	15.4	14.2	13.2	12.7	11.0	10.2	9.7	7.4	6.1	6.3	5.5	4.7	4.9	4.9	4.5	5.3	7.5	9.7	5.8	5.7	9.8	20.2
13-Sep	6.0	6.1	8.5	13.0	17.2	10.9	7.2	9.2	8.0	5.3	6.8	6.1	5.6	5.4	5.1	5.3	5.5	5.3	5.4	4.6	3.2	4.4	3.6	2.8	6.7	17.2
14-Sep	2.8	2.9	2.9	2.8	3.1	3.2	3.6	3.6	3.0	2.5	2.3	2.6	3.5	3.2	3.4	3.6	4.1	4.5	4.7	4.5	3.7	4.3	2.7	2.6	3.3	4.7
15-Sep	3.0	4.0	3.5	3.5	3.3	3.0	1.6	1.5	2.1	3.2	3.0	2.8	2.7	2.6	2.8	2.9	3.8	4.6	4.6	5.0	5.0	3.9	3.8	4.0	3.3	5.0
16-Sep	4.8	5.6	5.3	4.9	4.7	4.5	4.0	3.7	3.9	4.1	3.7	3.2	3.2	2.9	2.8	2.7	3.2	3.0	3.0	3.3	3.3	3.1	2.9	3.0	3.7	5.6
17-Sep	3.1	3.3	4.1	4.1	4.3	4.7	4.2	3.5	3.6	3.7	3.5	3.7	3.7	3.5	4.0	4.0	4.6	4.2	4.0	3.9	4.3	5.0	4.5	5.5	4.0	5.5
18-Sep	5.6	6.3	7.0	6.6	6.4	8.5	15.9	14.5	17.6	20.5	16.7	15.0	13.5	12.2	10.7	11.4	11.0	11.8	14.4	17.2	13.3	10.3	7.3	6.8	11.7	20.5
19-Sep	6.1	5.0	4.8	5.3	5.0	4.8	4.1	3.3	2.9	2.3	2.1	2.2	2.3	2.4	2.4	2.9	3.6	3.9	4.1	4.3	4.5	4.2	3.9	4.0	3.8	6.1
20-Sep	5.6	6.4	6.4	6.3	6.1	5.5	5.0	4.0	3.8	3.9	4.0	3.4	3.2	2.8	2.6	2.7	3.6	4.0	3.6	4.2	5.1	4.7	4.7	3.3	4.4	6.4
21-Sep	4.1	4.6	4.9	5.3	4.1	4.0	3.5	3.7	3.9	4.1	3.6	3.0	2.7	2.5	2.5	2.6	10.4	12.7	8.0	7.9	7.0	6.5	6.2	5.6	5.1	12.7
22-Sep	15.5	26.4	36.6	46.5	34.2	26.9	41.5	26.9	12.1	12.6	9.2	5.9	6.3	5.5	6.8	9.3	7.7	6.7	6.2	5.7	5.7	4.7	4.7	4.6	15.3	46.5
23-Sep	5.2	5.3	5.4	5.5	5.2	4.9	4.5	3.7	3.4	3.6	3.3	3.0	3.3	3.0	3.0	3.0	3.6	3.7	3.7	3.8	3.7	3.7	3.6	3.6	3.9	5.5
24-Sep	3.9	4.5	4.6	4.5	4.5	4.4	4.4	3.4	3.6	3.4	3.1	3.2	3.9	4.4	4.6	5.1	6.3	7.7	7.0	6.8	6.2	6.5	6.1	5.5	4.9	7.7
25-Sep	4.3	3.4	3.2	3.4	3.2	3.7	4.3	4.9	5.0	4.7	4.5	4.1	3.9	3.5	3.2	3.1	3.0	3.2	4.2	4.6	5.0	5.1	4.4	3.8	4.0	5.1
26-Sep	4.5	5.2	4.9	4.8	4.7	4.6	4.2	3.8	3.9	4.5	4.0	3.6	3.0	2.7	2.5	2.5	2.5	2.7	3.3	3.2	3.4	3.9	3.9	3.7	3.7	5.2
27-Sep	4.0	4.4	4.1	3.7	3.4	3.3	4.2	4.0	4.3	5.0	4.9	4.3	3.7	3.6	3.5	3.3	3.3	3.8	4.0	4.0	3.9	3.7	3.5	3.9	3.9	5.0
28-Sep	3.6	3.3	3.5	3.7	4.6	5.0	4.1	3.1	3.5	4.4	3.8	3.3	3.0	2.8	2.3	2.4	2.4	3.0	4.0	4.0	3.7	3.2	2.9	2.8	3.4	5.0
29-Sep	4.5	5.9	5.8	5.4	5.1	4.8	4.7	4.4	5.1	5.4	5.0	4.2	4.0	4.2	3.9	4.2	4.9	6.0	6.6	6.6	6.4	6.7	6.5	6.3	5.3	6.7
30-Sep	5.5	5.3	4.9	4.8	4.4	4.4	4.1	3.9	3.6	3.1	3.1	2.8	2.9	3.0	3.0	3.4	4.6	4.8	5.1	5.2	5.1	4.9	5.0	4.8	4.2	5.5

5.5	6.5	6.8	7.1	6.6	6.1	6.3	5.4	5.4	6.1	5.8	5.2	5.0	4.6	4.3	4.2	5.0	5.7	6.1	6.1	5.7	5.6	5.0	4.9	Diurnal Average	
15.5	26.4	36.6	46.5	34.2	26.9	41.5	26.9	17.6	21.7	26.0	22.1	17.6	13.3	10.9	11.4	11.4	13.9	14.4	17.2	14.6	11.5	10.5	10.2	Diurnal Maximum	

M - Maintenance  
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m<sup>3</sup>







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	496	69.08	69.08
6 - 15	190	26.46	95.54
16 - 25	17	2.37	97.91
26 - 80	8	1.11	99.03
> 81.0	0	0.00	99.03

Total Number of Valid Hours: 718

Total Number of Hours: 720



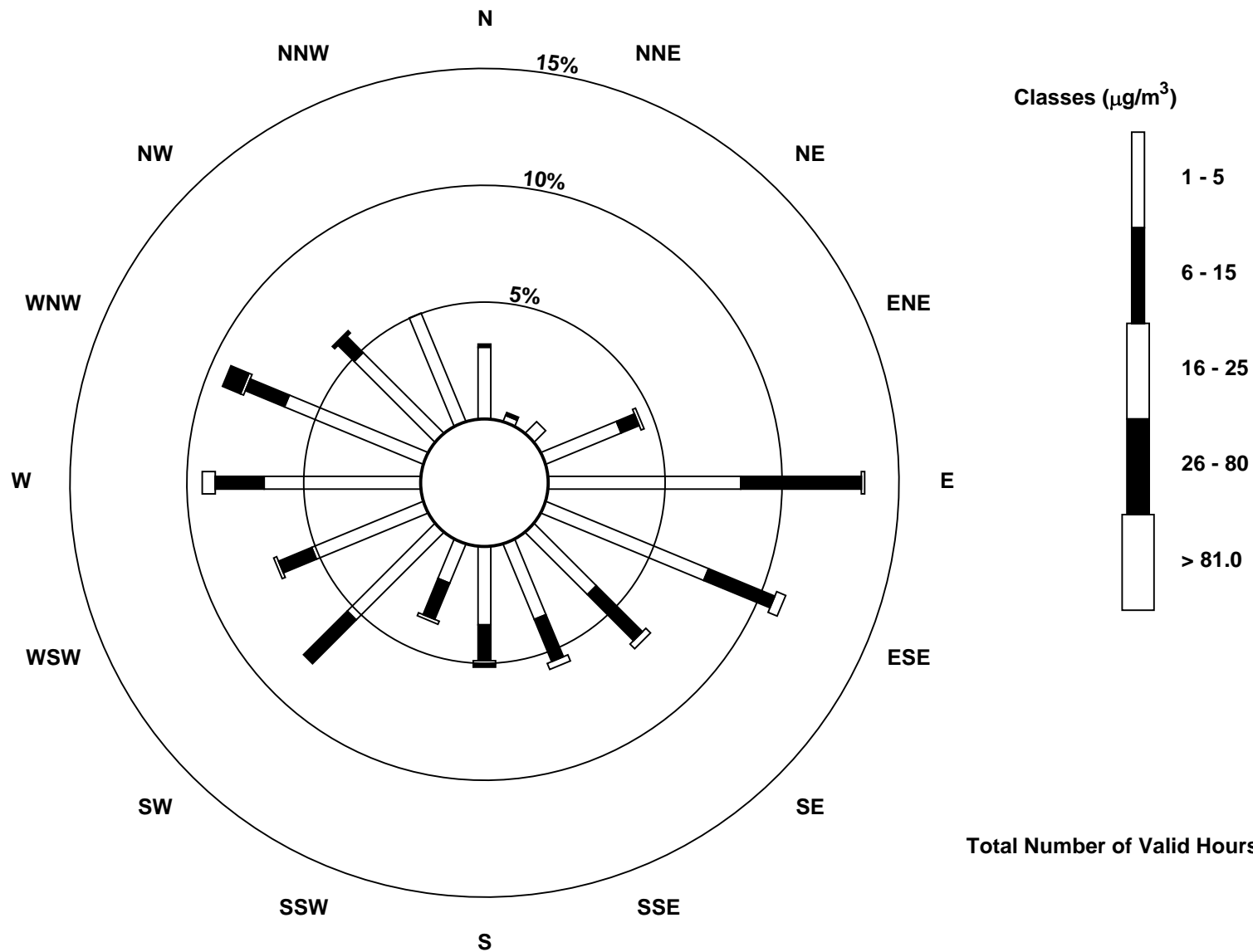
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	22	2	5	25	59	54	27	25	24	13	38	37	48	46	35	36	496
6 - 15	1	1	0	6	37	22	20	14	11	12	19	11	15	13	7	0	189
16 - 25	0	0	0	1	1	3	2	2	1	1	0	1	4	1	0	0	17
26 - 80	0	0	0	0	0	0	0	0	1	0	0	0	0	6	1	0	8
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	23	3	5	32	97	79	49	41	37	26	57	49	67	66	43	36	710

Total Number of Valid Hours: 717

Total Number of Hours: 720



Total Number of Valid Hours: 717

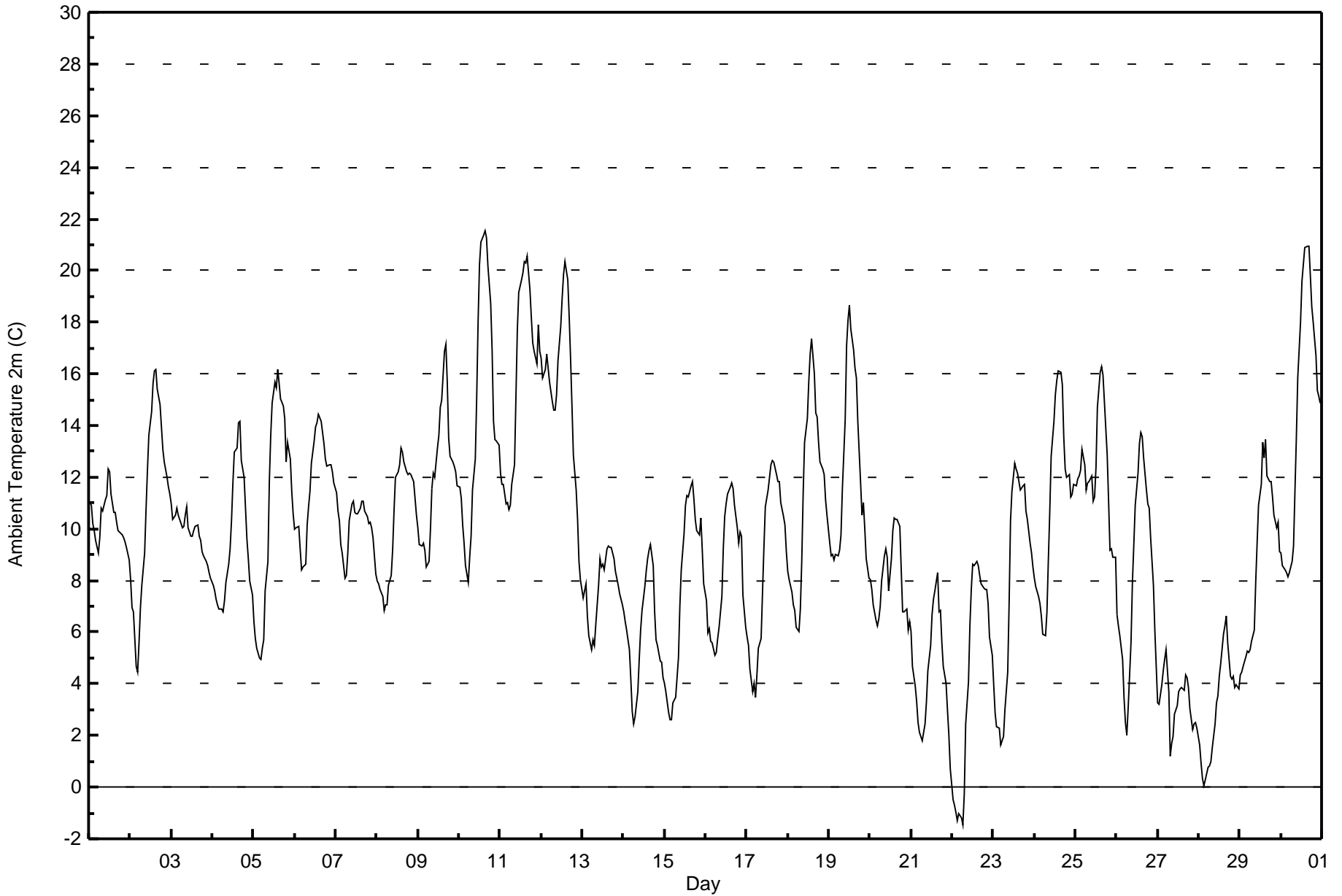


Maximum Value: 21.5 C on Sep 10 16:00		Maximum Daily Average: 15.8 C on Sep 11		Hours in Service: 720																							
Minimum Value: -1.5 C on Sep 22 07:00		Minimum Daily Average: 3.1 C on Sep 28		Hours of Data: 720																							
Maximum Diurnal Average: 13.3 C at hour 16		Minimum Diurnal Average: 6.3 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 9.64 C		Percentiles: P <sub>1</sub> = -0.4 P <sub>10</sub> = 3.8 Q <sub>1</sub> = 6.8 Median = 9.7 Q <sub>3</sub> = 12.2 P <sub>90</sub> = 15.7 P <sub>99</sub> = 20.9		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-Sep	11.0	10.9	10.2	9.9	9.6	9.1	9.7	10.8	10.7	11.1	11.3	12.3	12.2	11.3	10.6	10.6	10.3	9.9	9.8	9.8	9.6	9.5	9.3	8.8	10.4	12.3	
2-Sep	8.0	6.9	6.8	4.7	4.5	5.6	6.9	7.8	9.1	10.8	12.2	13.6	14.5	15.6	16.1	16.2	15.4	14.8	13.9	13.1	12.6	12.0	11.6	11.3	11.0	16.2	
3-Sep	11.0	10.4	10.5	10.8	10.5	10.4	10.0	10.1	10.6	10.9	10.0	9.7	9.7	9.9	10.1	10.2	9.7	9.5	9.1	8.9	8.7	8.6	8.3	8.1	9.8	11.0	
4-Sep	7.8	7.6	7.3	7.0	6.9	6.9	6.8	7.2	7.9	8.6	9.2	10.3	11.8	12.9	13.1	14.1	14.2	12.6	12.0	10.8	9.6	8.8	8.0	7.4	9.5	14.2	
5-Sep	6.4	5.7	5.4	5.0	5.0	5.4	5.7	7.6	8.7	11.8	13.6	14.8	15.7	15.4	16.2	15.6	15.0	14.8	14.3	12.6	13.4	12.7	11.5	10.6	11.0	16.2	
6-Sep	10.0	10.0	10.1	9.2	8.4	8.5	8.6	10.2	10.8	11.4	12.5	13.4	13.9	14.1	14.4	14.2	13.7	13.3	12.7	12.4	12.5	12.5	12.2	11.8	11.7	14.4	
7-Sep	11.4	10.7	10.3	9.4	9.0	8.1	8.2	9.0	10.3	11.0	11.1	10.7	10.6	10.6	10.8	11.1	11.1	10.7	10.5	10.2	10.3	10.1	9.6	8.2	10.1	11.4	
8-Sep	8.0	7.9	7.6	7.4	6.9	7.1	7.1	7.8	8.2	9.2	10.7	12.0	12.2	12.5	13.1	12.9	12.6	12.2	12.1	12.2	12.1	11.9	11.2	10.5	10.2	13.1	
9-Sep	10.1	9.4	9.3	9.4	9.2	8.5	8.7	10.0	11.6	12.2	12.0	13.1	13.6	14.7	15.0	16.9	17.1	15.7	13.5	12.8	12.6	12.4	12.2	11.7	12.2	17.1	
10-Sep	11.6	11.2	10.1	9.4	8.6	7.9	8.9	9.7	11.5	12.7	15.1	18.0	20.2	21.1	21.4	21.5	21.3	20.2	18.7	16.9	14.2	13.5	13.4	13.2	14.6	21.5	
11-Sep	12.2	11.7	11.7	11.0	11.0	10.8	10.9	11.7	12.5	15.1	17.7	19.2	19.6	19.9	20.3	20.3	20.5	19.3	18.2	17.2	16.9	16.4	17.9	16.9	15.8	20.5	
12-Sep	16.6	15.9	16.2	16.8	16.2	15.7	14.9	14.6	14.6	15.2	16.5	17.9	19.0	19.9	20.3	19.6	18.2	16.6	14.7	12.9	11.5	10.4	8.8	8.1	15.5	20.3	
13-Sep	7.3	7.6	7.8	6.6	5.9	5.3	5.7	5.5	6.3	7.8	8.9	8.5	8.6	8.4	9.2	9.3	9.3	8.8	8.4	8.1	7.8	7.5	7.1	7.7	7.7	9.3	
14-Sep	6.8	6.4	6.1	5.3	4.2	2.9	2.4	2.7	3.7	4.9	6.1	6.8	7.8	8.4	8.9	9.2	9.4	8.6	6.8	5.7	5.5	4.9	4.8	4.2	5.9	9.4	
15-Sep	4.0	3.7	2.9	2.6	2.6	3.3	3.5	4.2	5.0	7.0	8.4	9.8	10.9	11.3	11.2	11.7	11.8	11.2	10.4	9.9	9.8	10.4	9.2	7.9	7.6	11.8	
16-Sep	7.2	6.0	6.1	5.6	5.6	5.1	5.2	5.8	6.2	7.4	9.2	10.5	11.0	11.3	11.6	11.8	11.5	10.9	10.0	9.4	9.9	9.7	7.4	6.2	8.4	11.8	
17-Sep	5.8	5.5	4.6	3.7	4.0	3.5	4.3	5.4	5.8	7.5	9.3	10.9	11.5	12.0	12.5	12.7	12.6	12.1	11.8	11.8	11.0	10.5	10.2	9.1	8.7	12.7	
18-Sep	8.3	8.0	7.6	7.1	6.8	6.2	6.0	6.9	8.8	11.3	13.4	14.3	15.7	16.7	17.3	16.0	14.5	14.3	13.3	12.6	12.3	12.1	11.1	10.5	11.3	17.3	
19-Sep	9.4	9.0	9.0	8.8	9.0	9.0	9.2	9.8	11.6	14.2	17.1	18.1	18.7	17.7	16.9	16.2	15.9	14.2	11.8	10.6	11.0	10.0	8.8	8.1	12.2	18.7	
20-Sep	8.1	7.6	7.1	6.4	6.2	6.5	7.0	8.0	9.0	9.3	8.9	7.6	8.9	9.9	10.4	10.3	10.4	10.1	8.4	6.8	6.8	6.9	6.1	6.4	8.0	10.4	
21-Sep	6.0	4.7	3.9	3.3	2.5	2.1	1.8	2.1	2.5	3.3	4.5	5.5	6.7	7.3	7.6	8.3	6.8	6.8	5.6	4.7	4.0	3.0	2.0	0.7	4.4	8.3	
22-Sep	-0.5	-0.7	-1.0	-1.3	-1.0	-1.2	-1.5	-0.3	2.4	4.1	6.3	7.7	8.6	8.6	8.8	8.6	8.2	7.9	7.7	7.6	7.7	7.1	5.8	5.1	4.4	8.8	
23-Sep	3.9	2.9	2.3	2.3	1.6	1.8	2.0	3.0	4.4	7.1	10.3	11.5	12.6	12.3	12.2	11.8	11.5	11.6	11.7	10.7	10.4	9.5	9.0	8.5	7.7	12.6	
24-Sep	8.1	7.8	7.4	7.1	6.6	5.9	5.9	6.8	8.8	10.7	12.8	14.2	15.2	15.7	16.1	16.0	15.5	13.6	12.3	12.0	12.1	11.2	11.4	11.7	11.0	16.1	
25-Sep	11.7	11.9	12.0	12.3	13.1	12.5	11.5	11.8	11.9	12.1	11.0	11.2	12.3	14.7	16.1	16.3	16.0	14.9	12.9	11.1	9.2	9.2	8.9	8.9	12.2	16.3	
26-Sep	6.7	6.3	5.9	4.9	3.5	2.5	2.0	3.1	5.6	7.9	9.4	10.9	12.1	13.3	13.7	13.6	12.7	11.5	11.0	10.8	9.7	7.8	6.1	4.7	8.2	13.7	
27-Sep	3.3	3.2	4.0	4.5	4.9	5.3	3.7	1.2	1.7	2.0	2.8	3.1	3.7	3.8	3.8	3.7	4.3	4.2	3.8	3.0	2.2	2.4	2.5	2.3	3.3	5.3	
28-Sep	1.6	0.9	0.3	0.1	0.3	0.8	0.8	1.0	1.5	2.4	3.3	3.5	4.3	4.8	5.9	6.2	6.6	5.6	4.3	4.2	4.3	3.8	4.0	3.8	3.1	6.6	
29-Sep	4.3	4.5	4.6	5.0	5.3	5.2	5.3	5.7	6.1	7.9	9.4	10.9	11.7	13.3	12.8	13.5	12.0	11.9	11.8	11.2	10.5	10.0	10.2	9.1	8.9	13.5	
30-Sep	9.1	8.6	8.4	8.3	8.1	8.3	8.8	9.3	11.5	13.5	15.8	18.0	19.6	20.2	20.9	21.0	20.9	19.8	18.6	18.0	16.7	15.4	15.1	14.9	14.5	21.0	
		7.8	7.4	7.2	6.8	6.5	6.3	6.3	6.9	8.0	9.3	10.6	11.6	12.4	12.9	13.2	13.3	13.0	12.3	11.4	10.6	10.2	9.7	9.1	8.5	Diurnal Average	
		16.6	15.9	16.2	16.8	16.2	15.7	14.9	14.6	14.6	15.2	17.7	19.2	20.2	21.1	21.4	21.5	21.3	20.2	18.7	18.0	16.9	16.4	17.9	16.9	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature 2m (AT 2m) - C**  
**Fort Chipewyan - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C**  
**Fort Chipewyan - September 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	8	1.11	1.11
0 - 10	372	51.67	52.78
10 - 20	326	45.28	98.06
> 20	14	1.94	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association**

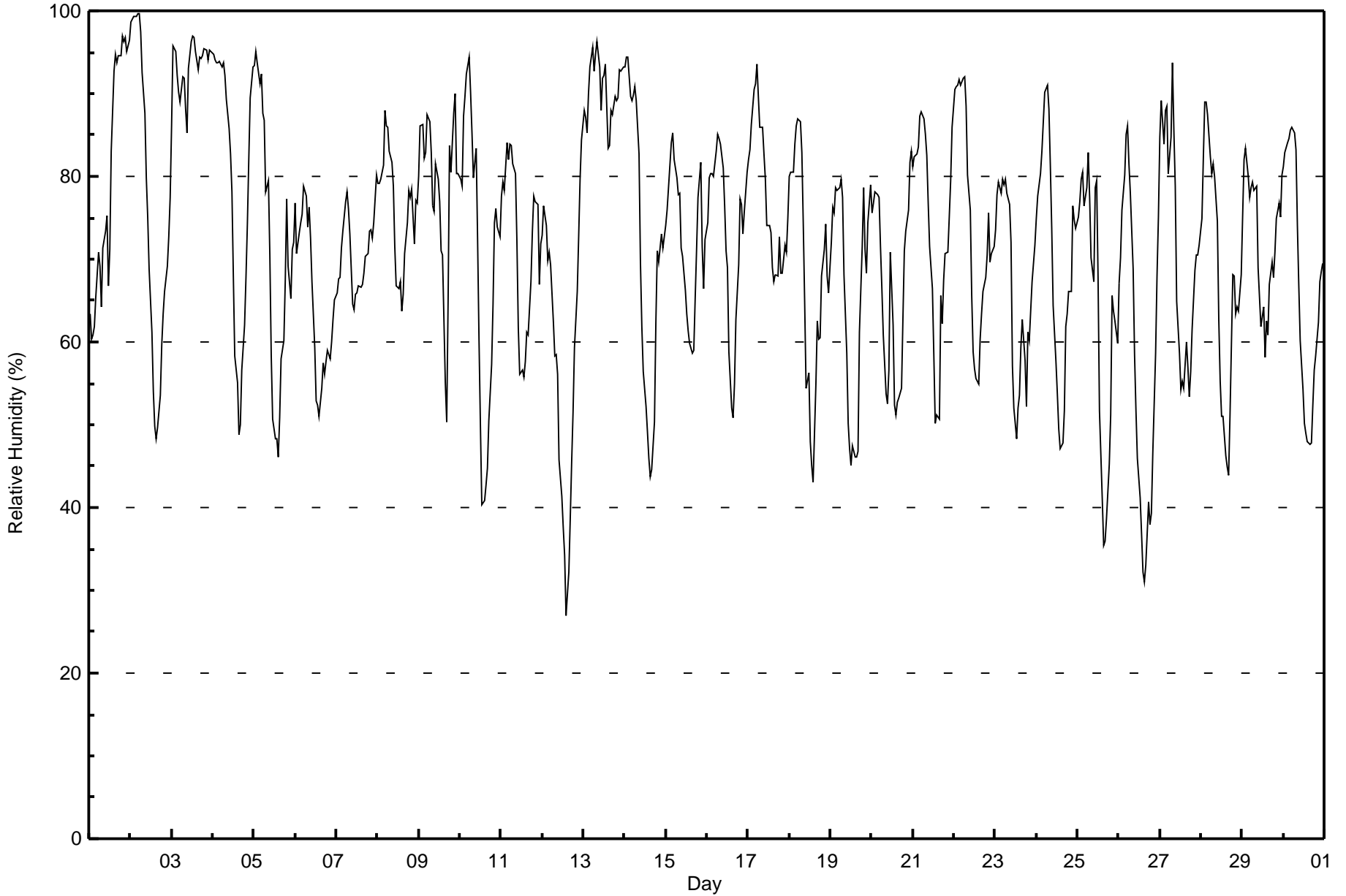
**Summary of Hour Averages**

**Relative Humidity (RH) - %**

**Fort Chipewyan - September 2015**

Maximum Value: 100 % on Sep 2 06:00																			Maximum Daily Average: 93.1 % on Sep 3						Hours in Service: 720			
Minimum Value: 27 % on Sep 12 15:00																			Minimum Daily Average: 57.7 % on Sep 12						Hours of Data: 720			
Maximum Diurnal Average: 84.6 % at hour 6																			Minimum Diurnal Average: 55.3 % at hour 15						Hours of Missing Data: 0			
Monthly Average: 72.0 %																			Percentiles: P <sub>1</sub> = 36 P <sub>10</sub> = 51 Q <sub>1</sub> = 62 Median = 73 O <sub>3</sub> = 83 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-Sep	63	60	61	62	65	71	69	64	71	73	75	67	71	83	93	95	94	95	95	97	96	97	95	96	79.5	97		
2-Sep	99	99	99	99	100	100	98	92	88	80	75	69	61	54	50	48	50	54	60	63	66	69	73	77	75.9	100		
3-Sep	86	96	95	92	90	89	92	92	88	85	93	96	97	97	95	93	94	94	95	95	95	94	95	95	93.1	97		
4-Sep	95	94	94	94	94	93	94	92	89	86	83	78	68	58	55	49	50	57	62	68	74	82	89	93	78.8	95		
5-Sep	93	95	94	91	92	88	87	78	79	71	58	51	48	48	46	51	58	60	67	77	69	65	71	72	71.3	95		
6-Sep	77	71	73	74	75	79	78	74	76	73	67	59	53	52	51	54	57	56	58	59	58	60	63	65	65.1	79		
7-Sep	66	68	68	71	73	77	78	76	73	65	64	66	66	67	67	67	68	70	71	73	74	72	74	80	70.6	80		
8-Sep	79	79	80	81	88	86	86	83	82	79	72	67	66	67	64	66	71	74	78	77	78	72	77	77	76.2	88		
9-Sep	80	86	86	82	83	87	87	83	76	76	82	80	77	71	71	55	50	65	84	80	88	90	80	80	78.3	90		
10-Sep	80	79	87	90	92	94	90	85	80	83	72	60	50	40	41	43	45	50	57	65	74	76	74	73	70.1	94		
11-Sep	78	79	78	84	82	84	84	82	80	72	62	56	57	56	58	61	61	67	73	78	77	77	67	72	71.8	84		
12-Sep	73	76	74	70	71	69	62	58	58	56	46	41	38	34	27	32	39	45	52	59	66	73	80	84	57.7	84		
13-Sep	88	87	85	90	93	96	93	95	96	93	88	92	92	93	83	84	88	87	90	89	89	93	93	93	90.5	96		
14-Sep	93	94	94	90	89	90	91	89	83	70	62	56	52	49	46	44	45	50	62	71	70	73	71	73	71.1	94		
15-Sep	74	76	81	84	85	82	80	78	78	71	70	66	63	61	60	59	59	65	71	77	82	71	67	72	72.3	85		
16-Sep	74	80	80	80	80	83	85	85	84	81	76	71	69	59	52	51	55	63	69	77	77	73	76	80	73.4	85		
17-Sep	82	83	86	91	91	93	90	86	86	83	80	74	74	73	69	67	68	68	73	68	68	72	71	75	78.0	93		
18-Sep	80	80	81	84	86	87	87	83	74	65	54	56	48	45	43	55	63	60	60	68	71	74	68	66	68.3	87		
19-Sep	72	76	76	79	78	79	80	77	68	59	50	47	45	47	46	46	47	61	71	79	71	68	74	79	65.7	80		
20-Sep	76	77	78	78	77	72	66	61	54	52	57	71	62	52	51	53	53	54	63	71	73	76	82	83	66.3	83		
21-Sep	81	82	83	84	87	88	87	85	83	77	72	66	59	50	51	51	66	62	67	71	71	75	80	86	73.4	88		
22-Sep	91	91	91	92	91	92	92	88	80	76	66	59	57	56	55	60	63	66	68	70	76	70	71	71	74.6	92		
23-Sep	74	78	79	78	80	79	80	78	77	72	57	52	48	52	54	59	63	58	52	61	60	67	69	72	66.6	80		
24-Sep	75	78	80	83	87	90	91	88	81	74	64	58	54	49	47	48	52	62	63	66	66	76	75	74	70.0	91		
25-Sep	75	77	80	80	76	79	83	78	70	67	79	68	52	41	35	36	39	45	51	66	64	63	60	60	64.2	83		
26-Sep	67	70	76	80	85	86	81	78	69	59	52	46	41	37	32	31	33	41	38	39	47	59	68	75	57.9	86		
27-Sep	85	89	84	88	89	80	85	94	86	79	65	59	54	55	54	60	57	53	56	61	69	71	71	72	71.4	94		
28-Sep	75	82	89	89	87	82	80	81	80	75	63	55	51	51	46	45	44	51	68	68	63	64	64	68	67.6	89		
29-Sep	75	82	83	80	77	79	79	78	79	69	65	62	64	58	63	61	67	70	68	71	75	77	75	80	72.4	83		
30-Sep	81	83	84	85	86	86	85	83	74	67	60	54	50	49	48	48	48	52	57	58	62	67	68	70	66.9	86		
	79.5	81.6	82.7	83.5	84.4	84.6	83.9	81.5	78.1	72.8	67.6	63.8	60.1	57.3	55.3	55.6	58.1	61.7	66.5	70.4	72.4	73.9	74.7	77.2	Diurnal Average			
	99	99	99	99	100	100	98	95	96	93	93	96	97	97	95	95	94	95	95	97	96	97	95	96	Diurnal Maximum			







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Fort Chipewyan - September 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	14	1.94	1.94
40 - 60	145	20.14	22.08
60 - 80	334	46.39	68.47
80 - 100	227	31.53	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

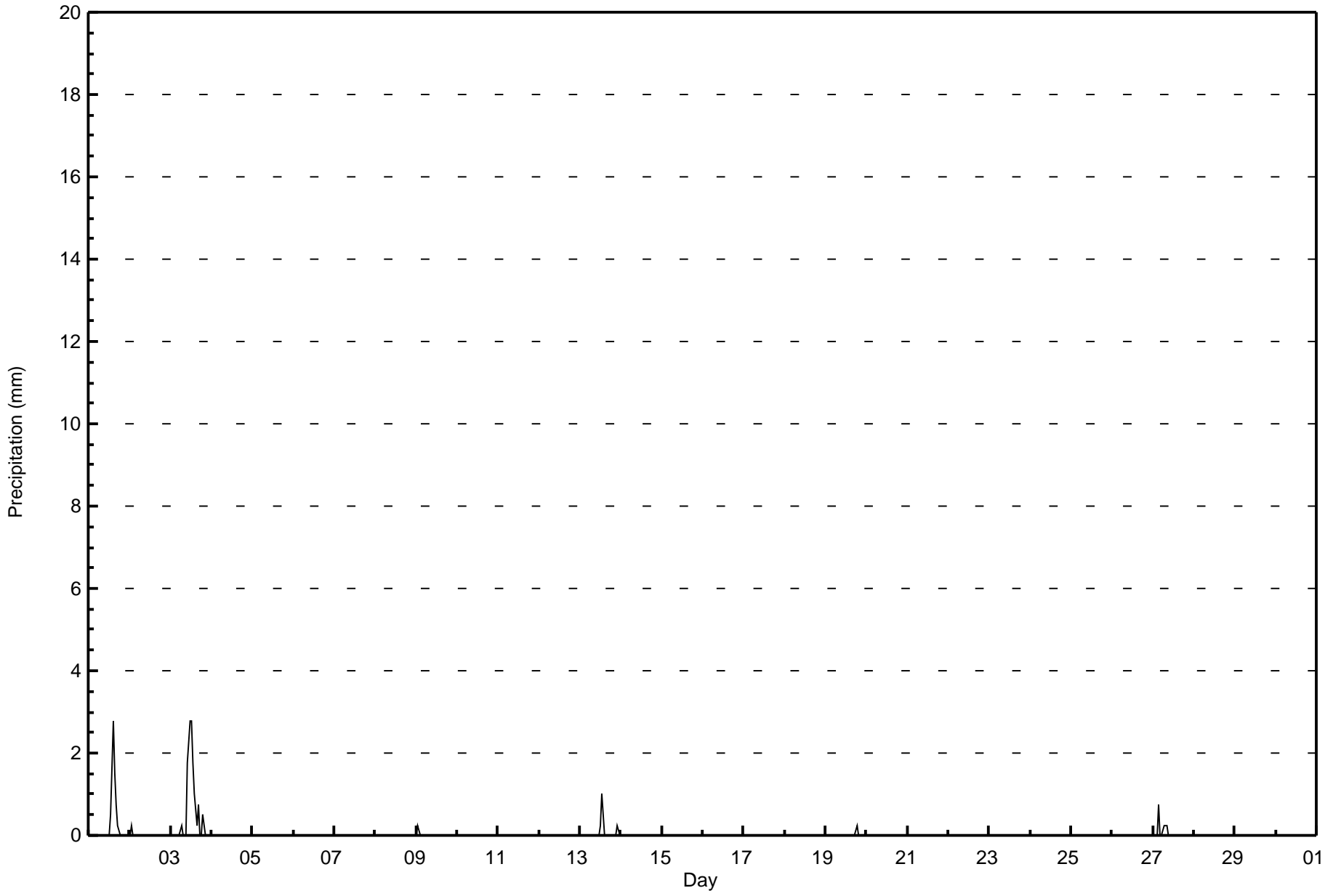


Maximum Value: 2.8 mm on Sep 1 15:00 Minimum Value: 0.0 mm on Sep 1 01:00 Maximum Diurnal Total: 3.8 mm at hour 15 Monthly Total: 21.59 mm		Maximum Daily Total: 11.9 mm on Sep 3 Minimum Daily Total: 0.0 mm on Sep 4 Minimum Diurnal Total: 0.0 mm at hour 1 Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 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> = 0.7		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.8	1.5	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	5.8	2.8
2-Sep	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	0.3	0.3
3-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	1.8	2.8	2.8	1.8	1.0	0.3	0.8	0.0	0.0	0.5	0.0	0.0	0.0	0.0	11.9	2.8
4-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	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	0.3	0.3
10-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	1.5	1.0
14-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.3
20-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.8	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	1.5	0.8
28-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
																								Diurnal Average		
																								Diurnal Maximum		



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Precipitation (PC) - mm**  
**Fort Chipewyan - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Precipitation (PC) - mm**  
**Fort Chipewyan - September 2015**

<b>Concentration Ranges (mm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	707	98.19	98.19
0.4 - 0.5	2	0.28	98.47
0.6 - 0.7	0	0.00	98.47
0.8 - 1.4	5	0.69	99.17
1.5 - 10	6	0.83	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 720

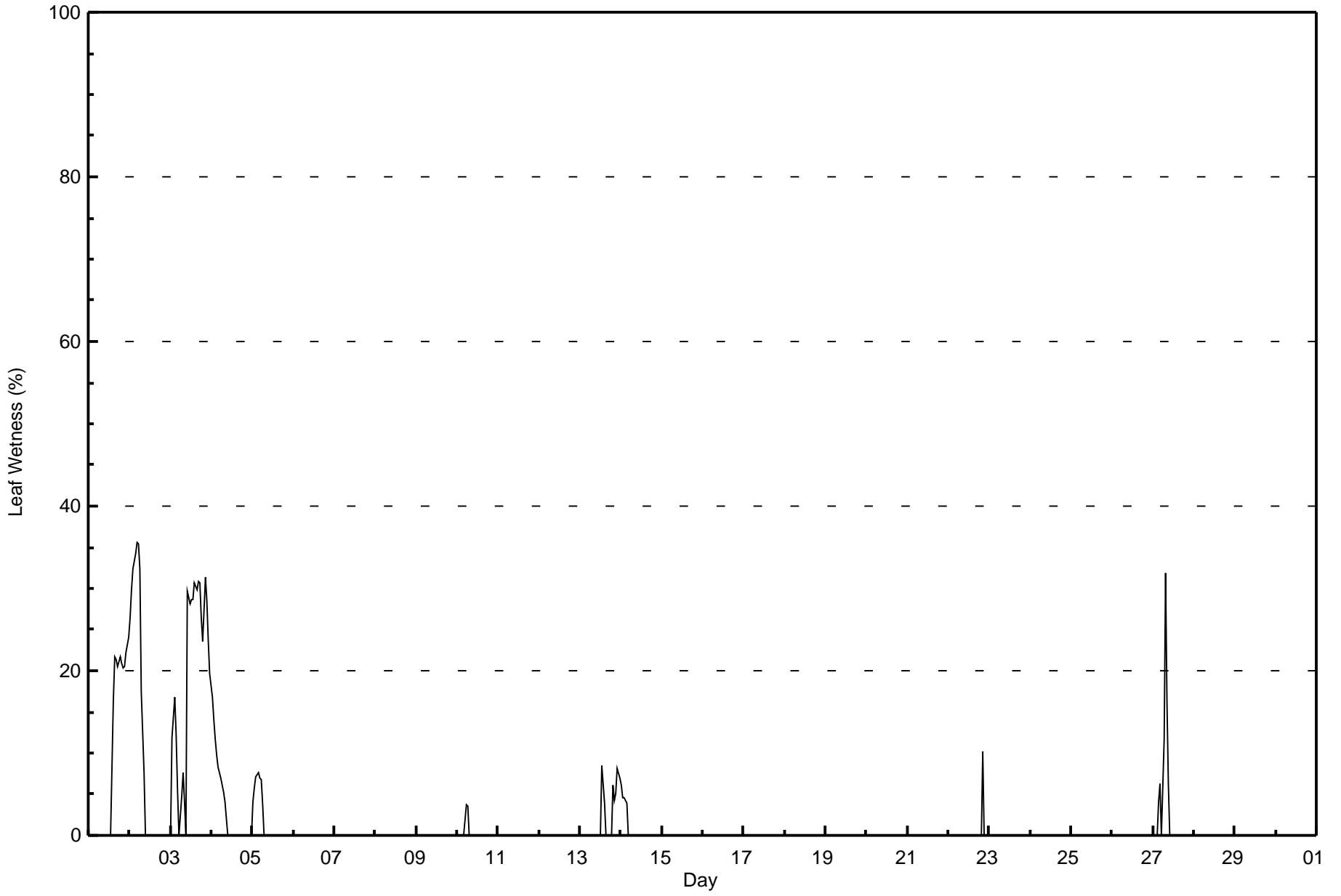
Total Number of Hours: 720



Summary of Hour Averages

Fort Chipewyan - September 2015

Maximum Value: 36 % on Sep 2 05:00		Maximum Daily Average: 18.9 % on Sep 3		Hours in Service: 720																						
Minimum Value: 0 % on Sep 1 01:00		Minimum Daily Average: 0.0 % on Sep 6		Hours of Data: 607																						
Maximum Diurnal Average: 2.8 % at hour 3		Minimum Diurnal Average: 0.3 % at hour 10		Hours of Missing Data: 113																						
Monthly Average: 2.0 %		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> = 5 P <sub>99</sub> = 32		Hours of Calibration: 0																						
				Percent Operational Time: 84.3																						
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-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	22	21	20	22	21	20	20	22	24	8.7	24
2-Sep	26	30	32	34	36	35	32	17	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.5	36
3-Sep	0	12	17	12	5	0	5	8	4	0	30	28	29	29	31	30	31	31	26	24	31	28	24	20	18.9	31
4-Sep	17	14	12	10	8	7	6	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.5	17
5-Sep	4	6	7	8	7	7	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	8
6-Sep	0	0	0	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-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	UO	UO	0	0	0	0	0	0	0	0.0	0
8-Sep	0	0	0	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-Sep	0	0	0	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-Sep	0	0	0	0	0	4	4	0	0	0	0	UO	0	0	0	0	0	0	0	0	0	0	0	0	0.3	4
11-Sep	0	0	0	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-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	UO	UO	0	0	0	0	0	0	0	0	0	0.0	0
13-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	8	4	0	0	0	0	6	4	5	8	7	1.8	8
14-Sep	6	5	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	6
15-Sep	0	0	0	0	0	0	0	0	0	0	0	0	UO	UO	0	0	0	0	0	0	0	0	0	0	0.0	0
16-Sep	0	0	0	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-Sep	0	0	0	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-Sep	0	0	0	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-Sep	0	0	0	0	0	0	0	0	0	0	0	UO	0	UO	UO	0	0	0	0	0	0	0	0	0	0.0	0
20-Sep	0	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	0
21-Sep	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	0	0	0	0	UO	UO	0	0	0	0	0	--	0
22-Sep	0	0	0	0	0	0	0	0	0	0	0	0	UO	UO	UO	UO	UO	UO	0	0	10	0	UO	0	--	10
23-Sep	0	0	0	0	0	0	0	0	0	0	0	0	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	--	0
24-Sep	UO	0	0	0	UO	UO	UO	UO	0	0	UO	UO	UO	UO	UO	0	0	UO	UO	UO	UO	UO	UO	UO	--	0
25-Sep	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	0	0	0	0	0	0	0	--	0
26-Sep	UO	UO	UO	UO	UO	UO	0	0	0	0	0	UO	0	0	0	UO	UO	0	0	0	0	0	0	0	--	0
27-Sep	0	0	0	4	6	0	12	32	16	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.2	32
28-Sep	0	0	0	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-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	UO	UO	UO	UO	UO	UO	UO	UO	0	0.0	0
30-Sep	0	0	0	0	0	0	0	UO	UO	UO	0	0	0	0	0	0	UO	0	0	0	0	0	0	0	0.0	0
																								Diurnal Average		
																								Diurnal Maximum		
UO - Unstable Operation																										





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Leaf Wetness (SW) - %**  
**Fort Chipewyan - September 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	531	87.48	87.48
0.4 - 0.5	0	0.00	87.48
0.6 - 0.7	0	0.00	87.48
0.8 - 1.4	0	0.00	87.48
1.5 - 10	34	5.60	93.08
> 10	42	6.92	100.00

Total Number of Valid Hours: 607

Total Number of Hours: 720



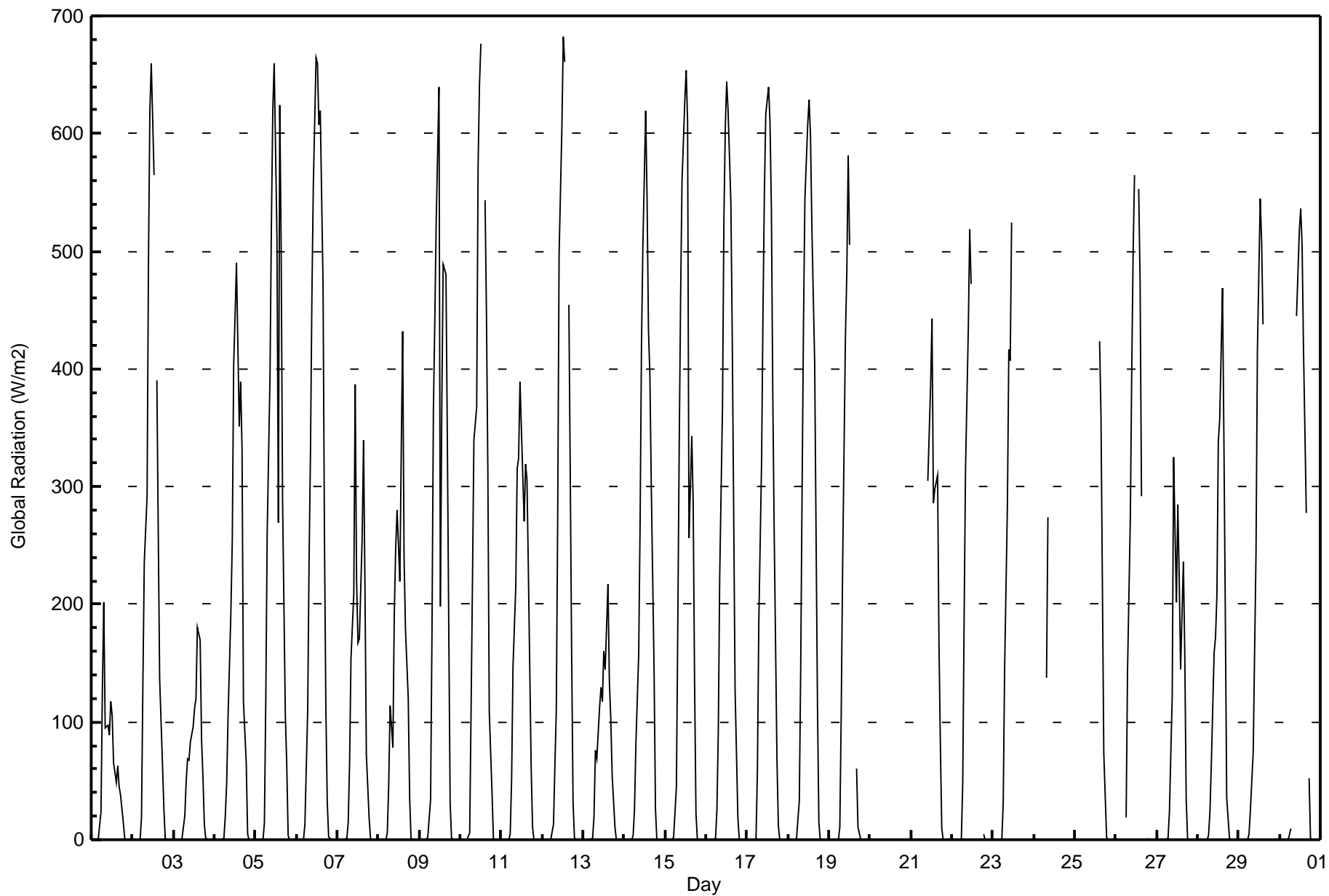


Maximum Value: 682 W/m2 on Sep 12 13:00	Maximum Daily Average: 213.8 W/m2 on Sep 6	Hours in Service: 720
Minimum Value: 0 W/m2 on Sep 1 02:00	Minimum Daily Average: 46.7 W/m2 on Sep 3	Hours of Data: 619
Maximum Diurnal Average: 456.7 W/m2 at hour 12	Minimum Diurnal Average: 0.0 W/m2 at hour 24	Hours of Missing Data: 101
Monthly Average: 139.3 W/m2	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 14 Q <sub>3</sub> = 256 P <sub>90</sub> = 478 P <sub>99</sub> = 659	Hours of Calibration: 0
		Percent Operational Time: 86.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	0	0	0	0	0	23	128	202	95	97	90	118	106	65	49	63	45	38	14	2	0	0	0	0	47.3	202	
2-Sep	0	0	0	0	0	19	132	236	292	492	620	660	565	UO	390	262	136	66	27	1	0	0	0	0	169.5	660	
3-Sep	0	0	0	0	0	1	20	50	68	68	84	96	111	120	180	170	86	54	13	1	0	0	0	0	46.7	180	
4-Sep	0	0	0	0	0	2	20	49	105	193	254	404	445	490	352	389	331	117	65	5	0	0	0	0	134.1	490	
5-Sep	0	0	0	0	0	15	120	262	393	522	620	659	512	269	624	504	290	106	64	3	0	0	0	0	206.7	659	
6-Sep	0	0	0	0	0	13	111	239	329	461	554	664	659	607	619	471	257	112	32	2	0	0	0	0	213.8	664	
7-Sep	0	0	0	0	0	1	14	66	154	209	386	221	167	171	256	339	214	72	18	1	0	0	0	0	95.4	386	
8-Sep	0	0	0	UO	0	6	47	114	78	193	248	280	220	333	431	240	179	119	35	1	0	0	0	0	109.7	431	
9-Sep	0	0	0	0	0	3	35	178	364	440	525	640	198	367	489	481	338	181	31	1	0	0	0	0	177.9	640	
10-Sep	0	0	0	0	0	6	113	221	339	368	572	642	677	UO	543	447	312	109	39	1	0	0	0	0	190.8	677	
11-Sep	0	0	0	0	0	4	51	147	216	316	324	390	310	271	319	306	229	62	11	0	0	0	0	0	123.2	390	
12-Sep	0	0	0	0	0	0	13	63	110	274	497	606	682	660	UO	454	310	155	33	1	0	0	0	0	167.7	682	
13-Sep	0	0	0	0	0	1	20	76	69	113	129	118	160	145	217	134	103	55	11	0	0	0	0	0	56.3	217	
14-Sep	0	0	0	0	0	3	26	82	157	269	421	506	619	544	433	395	302	144	26	0	0	0	0	0	163.6	619	
15-Sep	0	0	0	0	0	2	45	184	335	460	559	627	654	610	257	343	286	135	22	0	0	0	0	0	188.3	654	
16-Sep	0	0	0	0	0	1	25	92	224	368	527	605	644	620	541	425	278	128	19	0	0	0	0	0	187.4	644	
17-Sep	0	0	0	0	0	1	60	185	323	449	551	616	640	610	536	378	262	68	11	0	0	0	0	0	195.4	640	
18-Sep	0	0	0	0	0	1	33	147	300	440	544	607	629	597	519	404	259	115	14	0	0	0	0	0	192.0	629	
19-Sep	0	0	0	0	0	0	11	107	231	426	481	581	506	UO	112	UO	61	11	0	0	0	0	0	0	114.9	581	
20-Sep	0	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
21-Sep	0	UO	UO	0	UO	0	UO	UO	UO	UO	305	385	443	286	297	309	167	81	9	0	0	0	0	0	--	443	
22-Sep	0	0	0	0	0	1	48	188	314	434	519	472	UO	UO	UO	UO	UO	UO	UO	4	0	0	0	UO	--	519	
23-Sep	0	0	0	0	0	0	33	146	285	416	407	525	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	525	
24-Sep	UO	0	0	0	UO	UO	UO	UO	UO	137	274	UO	UO	UO	UO	UO	214	UO	UO	UO	UO	UO	UO	UO	--	274	
25-Sep	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	423	360	218	73	2	0	0	0	0	--	423	
26-Sep	UO	UO	UO	UO	UO	UO	19	143	272	398	498	564	UO	553	474	292	UO	UO	1	0	0	0	0	0	--	564	
27-Sep	0	0	0	0	0	0	2	24	74	123	325	202	285	223	145	236	157	34	2	0	0	0	0	0	76.2	325	
28-Sep	0	0	0	0	0	0	4	24	64	159	172	208	338	357	469	340	195	35	1	0	0	0	0	0	98.6	469	
29-Sep	0	0	0	0	0	0	4	26	74	162	245	417	544	509	438	UO	UO	UO	UO	UO	UO	UO	UO	UO	134.4	544	
30-Sep	0	0	0	0	0	0	9	UO	UO	UO	445	518	537	504	417	277	UO	53	1	0	0	0	0	0	138.0	537	

0.0	0.0	0.0	0.0	0.0	4.0	43.9	130.3	213.1	314.0	403.7	456.7	443.8	405.1	381.3	329.2	218.0	88.4	19.5	0.7	0.0	0.0	0.0	0.0	0.0	Diurnal Average
0	0	0	0	0	23	132	262	393	522	620	664	682	660	624	504	338	181	65	5	0	0	0	0	0	Diurnal Maximum

UO - Unstable Operation





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Global Radiation (GR) - W/m2**  
**Fort Chipewyan - September 2015**

<b>Concentration Ranges (W/m2)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	320	51.70	51.70
21 - 100	61	9.85	61.55
101 - 300	108	17.45	79.00
301 - 600	103	16.64	95.64
601 - 900	27	4.36	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 619

Total Number of Hours: 720



Maximum Speed: 33 km/h on Sep 27 13:00	Maximum Daily Speed Average: 19.2 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 1 km/h on Sep 10 07:00	Minimum Daily Speed Average: 3.2 km/h on Sep 28	Hours of Data: 719
Maximum Diurnal Speed Average: 3.8 km/h at hour 12	Minimum Diurnal Speed Average: 0.3 km/h at hour 16	Hours of Missing Data: 1
Monthly Average Velocity: 1.4 km/h 182.7 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 6 Q <sub>1</sub> = 8 Median = 11 Q <sub>3</sub> = 16 P <sub>90</sub> = 22 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-Sep	SW8	SW10	SW11	SW9	S4	SE7	ESE5	SE5	ESE4	SSE3	SE6	S15	SSW12	SSE8	NW3	NNW5	NNE10	NNW6	W5	W6	W6	W6	WSW6	WSW8	SSW3.2	S15	
2-Sep	WNW5	WNW5	NW7	W8	WNW12	WNW14	WNW13	WNW9	W9	WSW9	W8	NNW11	NNW10	NW9	NNW9	N9	NNW8	N6	NNW6	NNW6	N8	N11	N9	NNW9	NW7.2	WNW14	
3-Sep	NNW12	NNW10	NNW11	N12	N13	N14	N13	NNW13	N14	N11	N12	NNW12	NNW12	NNW12	NNW13	N11	NNW10	N8	NNW8	NNW6	NW7	NW8	NW9	NW9	NNW10.6	N14	
4-Sep	NW9	NW9	NW9	NW8	WNW8	NW9	WNW8	WNW7	NW9	WNW10	WNW11	WNW13	NW12	NNW8	WNW7	W7	WSW12	W12	WSW8	W8	SW5	SW5	SSE1	SSE1	WNW7.2	WNW13	
5-Sep	SW4	SW6	SW7	WSW7	SSW3	SW7	SSW6	SSE7	SE7	SE9	SSE15	SSE15	SSE10	S11	SE11	E17	E18	E11	E12	E9	SE12	SE12	SE8	ENE3	SE6.8	E18	
6-Sep	E7	E9	ESE8	ESE9	E8	ESE13	ESE11	E17	E18	E18	E16	E19	E18	E15	E22	ENE26	ENE22	ENE17	NE15	NE14	ENE17	ENE18	E22	ENE19	E15.2	ENE26	
7-Sep	E16	ENE14	NE12	NE12	NNE6	N7	N8	N8	N6	E11	E15	E12	E12	E10	ESE9	ESE10	ESE11	ESE11	ESE9	ESE11	SE14	SE12	SE9	SSW3	E7.9	E16	
8-Sep	SSW4	S3	SSE4	AF	SW6	SSW6	SSW5	SSW7	S8	SSE8	S7	SSE8	SE10	ESE11	E10	E14	E15	E15	E13	E14	E16	ESE16	ESE12	E10	ESE7.3	ESE16	
9-Sep	SE6	ESE11	ESE10	ESE11	SE7	ESE3	SE3	SSE7	SSE5	SE5	ESE10	ESE13	E11	E9	E12	SW10	W10	E4	ESE4	E7	ENE8	ESE8	SSE2	ESE4	ESE5.6	ESE13	
10-Sep	SE4	SE4	ESE6	SE7	SE6	S4	SE1	SW5	SSE3	ESE10	ESE10	SSE10	S9	SSW12	SSW11	SSW14	S13	SSE10	S14	S12	SW11	SW10	SW10	SW10	S6.9	S14	
11-Sep	SW10	SSW8	S7	SE5	SSE6	SSE4	SSE7	S7	SSW9	SSE3	SW9	WSW14	SW15	SW17	SW15	SSW14	SSW17	SSW12	SW10	SW10	SW11	SW11	WSW14	WSW13	SW9.3	SSW17	
12-Sep	W12	W13	W13	W14	W13	W14	W13	W13	W13	W13	W16	W17	W19	W20	WNW24	NW22	NW22	NNW16	NNW14	NW9	NW7	NW6	W8	WNW8	WNW13.1	WNW24	
13-Sep	WNW10	WNW10	WNW10	W9	W10	WNW9	WNW10	WNW9	W8	NW6	N5	NNE3	SE2	ENE9	ENE5	NE8	N4	N7	NNW8	NNW8	NNW8	NNW9	N9	N8	NW5.3	WNW10	
14-Sep	N9	NNW7	NNW7	N8	NNW9	NNW12	NNW12	N12	N10	N11	NNE9	NNW7	W4	W8	WNW4	W7	NW5	W7	WSW9	SW6	SW5	SSE2	S13	SSE12	NW4.1	S13	
15-Sep	SE18	SE17	SE10	E7	E4	ESE9	SE13	ESE6	ESE9	ESE12	E13	E17	E19	E22	E21	ENE21	ENE20	ENE19	ENE18	ENE16	ENE13	SE16	SSE18	SSE17	E12.7	E22	
16-Sep	SSE16	S12	SSE9	E6	SE6	E6	ESE8	ESE11	ESE11	ESE11	E11	E19	E25	E25	E23	E23	ENE22	ENE21	ENE18	ENE18	ENE17	ESE19	SSE22	SSE16	E13.3	E25	
17-Sep	SSE7	SSE7	SW10	SW8	SW7	SW7	SSE6	ESE7	ESE8	E10	E14	E15	E17	E21	E22	E20	E19	ENE17	E17	SSE9	S8	ESE8	SE12	ESE11	ESE9.0	E22	
18-Sep	ESE10	SE8	SSE3	SE6	SE8	SE8	SE6	SE5	SSW5	S5	WSW5	SSE8	SW12	SSW10	SSW10	ESE8	E14	E10	ENE8	ENE9	E9	ESE6	SW7	SSW5	SE4.7	E14	
19-Sep	ESE10	SSE14	S22	S24	S25	S25	S24	S25	S24	SSW26	SW28	WSW29	WSW30	W24	W22	W17	W12	SW11	SW21	SW18	WSW19	WSW17	WSW15	WSW15	SW16.5	WSW30	
20-Sep	WSW15	WSW14	WSW14	WSW15	WSW15	WSW17	WSW15	WSW16	W21	W20	W24	W23	W26	W25	WNW19	W18	WNW15	WNW12	WNW10	W9	WNW11	WNW12	W11	NW12	W15.5	W26	
21-Sep	NW11	NW13	NW13	NNW11	NNW13	NNW12	NNW13	NW15	NW13	NW15	NW17	NW16	NW19	NW17	NW17	NW19	NW16	NW16	WNW13	WNW12	NW14	NW11	WNW8	WNW7	NW13.5	NW19	
22-Sep	WNW8	WNW9	WNW9	WNW11	WNW10	NW8	WNW8	NW9	NW7	WSW7	W8	SW6	SE7	ESE8	E10	E15	E15	E16	E16	E19	E20	ESE20	ESE17	ESE14	E3.2	E20	
23-Sep	ESE8	ESE9	E9	E9	ENE9	ENE9	ENE8	E11	ESE15	ESE15	SSE21	SE22	SE20	ESE23	ESE23	E23	E23	ESE23	ESE27	ESE24	ESE24	E22	E20	E19	ESE16.4	ESE27	
24-Sep	ESE20	ESE22	E21	E16	ESE15	ESE13	SE10	SE11	SSE18	S21	SW17	SW16	WSW17	WSW18	WSW13	W7	ENE1	ENE7	ENE11	E16	E22	E23	E22	E25	ESE8.4	E25	
25-Sep	E22	E21	E23	ESE14	S20	S19	SSW14	WSW14	WSW16	W17	W6	SW10	SW15	WSW23	WSW25	W24	W21	W15	W12	W9	SW6	WSW8	W9	WSW10	SW8.3	WSW25	
26-Sep	SW6	WSW5	SW5	SW7	SW7	SW8	SW13	SW13	WSW12	WSW17	W21	WSW21	WSW20	WSW23	WSW23	WSW22	WSW17	W13	W17	W23	WNW22	WNW12	W11	W7	WSW13.6	WSW23	
27-Sep	SW7	SSW6	SW13	SW13	WSW15	W20	NW18	NW19	WNW23	WNW25	WNW31	WNW31	WNW31	WNW33	WNW30	WNW28	W28	WNW23	WNW23	WNW19	WNW20	WNW17	WNW18	WNW16	WNW17	WNW19.2	WNW33
28-Sep	WNW15	WNW15	WNW15	WNW14	W13	W13	W11	W12	W11	WNW13	NW11	WNW10	WNW10	WNW7	WSW12	WSW12	WSW7	SSE5	ESE23	ESE24	ESE23	ESE20	ESE15	ESE9	W3.2	ESE24	
29-Sep	SE14	SE15	ESE16	ESE18	ESE17	ESE18	ESE17	ESE16	ESE13	SSE13	S11	SSE9	ESE13	E10	E15	E13	E15	E11	E10	E10	E11	E9	E7	E7	ESE11.8	ESE18	
30-Sep	ESE11	SE10	SE9	SE9	SE9	ESE9	E8	SE10	S20	S20	S20	S23	S25	S27	S26	S26	SSW24	S18	SSW12	SW11	SW15	SW14	SW12	SW11	S13.5	S27	

SSE2.1	SSE2.0	S1.8	S1.6	SSW2.3	SSW2.1	SW1.6	SW1.9	SW2.7	SSW3.1	SW3.4	SSW3.8	SW3.6	SW3.0	SW1.3	NW0.3	NE1.3	ENE2.4	E2.2	E2.0	ESE2.2	SE2.7	SSE2.7	SSE1.9	Diurnal Average
E22	ESE22	E23	S24	S25	S25	S24	S25	S24	SSW26	WNW31	WNW31	WNW33	WNW30	WNW28	SSW24	WNW23	ESE27	ESE24	ESE24	E23	E22	E25	Diurnal Maximum	

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

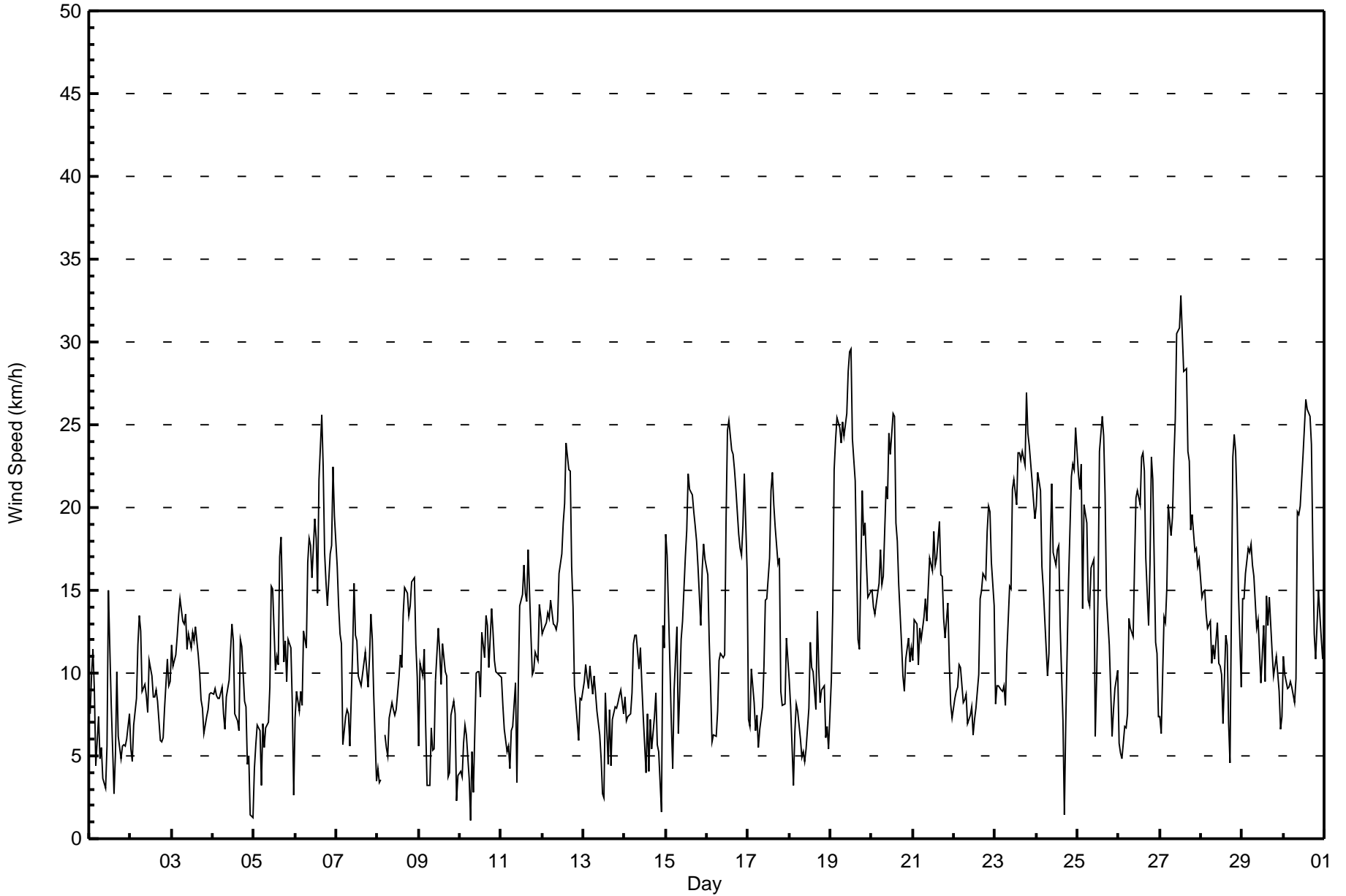
Fort Chipewyan - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 9 km/h on Sep 27 14:00	Hours of Data: 719
Minimum Value: 1 km/h on Sep 1 21:00	Hours of Missing Data: 1
	Hours of Calibration: 0
	Percent Operational Time: 99.9
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> = 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-Sep	2	2	3	2	2	2	3	2	1	2	4	4	4	3	1	2	3	2	2	2	1	1	1	1	4
2-Sep	1	2	1	2	2	3	3	3	2	3	3	3	4	4	3	4	2	2	2	2	2	4	3	3	4
3-Sep	3	3	3	4	4	4	4	4	4	4	4	3	4	4	4	4	3	3	2	2	2	2	2	4	
4-Sep	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	4	4	3	2	1	1	1	1	1	4
5-Sep	2	1	1	1	1	1	1	1	1	1	3	3	2	4	4	3	4	3	2	2	1	2	4	3	4
6-Sep	2	1	1	2	1	2	2	3	3	2	2	2	2	3	4	4	4	4	3	2	3	3	4	4	4
7-Sep	4	2	1	1	3	2	2	1	2	3	2	2	2	2	1	2	1	1	1	3	1	1	1	2	4
8-Sep	1	1	2	AF	2	1	1	2	1	1	2	1	1	1	1	2	2	2	2	2	2	1	2	1	2
9-Sep	2	3	2	2	4	2	1	2	1	1	1	1	1	1	2	5	3	3	2	1	1	1	2	1	5
10-Sep	1	1	1	1	1	1	1	3	2	1	1	2	2	3	4	4	3	2	2	2	2	1	2	2	4
11-Sep	2	2	3	2	2	1	1	2	3	1	4	3	4	3	3	2	3	2	1	2	1	2	4	3	4
12-Sep	3	2	3	3	3	3	3	3	3	3	4	5	5	6	7	7	7	6	5	3	2	1	2	2	7
13-Sep	2	2	3	2	2	2	2	2	1	2	2	3	2	5	1	3	1	2	2	2	2	2	2	2	5
14-Sep	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	2	3	2	1	1	3	2	2	2	3
15-Sep	3	3	2	2	2	2	2	2	1	1	1	2	2	2	3	3	3	3	3	2	1	2	2	2	3
16-Sep	2	4	3	2	1	1	2	2	2	1	1	3	3	2	2	2	3	4	3	2	2	3	3	3	4
17-Sep	3	2	3	2	2	1	2	2	2	1	2	1	2	3	2	3	2	3	3	3	3	3	1	2	3
18-Sep	4	3	2	1	1	1	1	1	1	1	2	2	3	3	3	3	2	2	2	2	1	2	3	3	4
19-Sep	2	6	3	3	4	3	3	3	4	4	6	7	7	6	6	5	3	3	8	5	9	5	4	3	9
20-Sep	3	3	3	3	4	4	4	5	5	6	8	6	7	7	6	5	4	4	3	2	3	3	2	4	8
21-Sep	3	5	5	4	5	4	4	5	4	5	6	6	6	6	6	6	5	5	3	3	4	3	2	1	6
22-Sep	1	1	1	2	2	1	1	2	3	2	3	2	2	2	2	2	2	2	2	3	1	2	2	2	3
23-Sep	3	2	1	2	2	2	1	2	2	1	5	3	3	3	2	3	3	4	2	3	3	2	2	2	5
24-Sep	2	2	3	2	2	2	2	2	5	4	3	4	4	4	5	2	1	2	2	3	3	3	3	3	5
25-Sep	3	2	2	3	3	3	3	3	5	5	2	2	3	6	7	7	5	4	3	3	1	1	2	3	7
26-Sep	3	3	1	1	2	3	2	2	3	4	5	7	5	5	6	6	5	3	4	8	6	4	2	2	8
27-Sep	2	2	4	3	4	5	7	6	6	7	8	8	8	9	8	8	7	6	5	6	4	4	4	4	9
28-Sep	4	4	4	3	3	3	2	2	3	3	3	3	4	2	4	3	3	1	4	2	2	2	3	1	4
29-Sep	2	2	1	2	2	2	1	2	3	2	1	2	2	1	3	2	1	2	1	1	2	1	1	2	3
30-Sep	2	1	2	1	2	2	2	4	4	3	3	4	4	4	4	4	4	2	2	1	2	2	2	2	4

4	6	5	4	5	5	7	6	6	7	8	8	8	9	8	8	7	6	8	8	9	5	4	4	
Diurnal Maximum																								

AF - Analyzer Failure





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort Chipewyan - September 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	60	8.34	8.34
6 - 11	310	43.12	51.46
12 - 19	243	33.80	85.26
20 - 28	100	13.91	99.17
29 - 38	6	0.83	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Fort Chipewyan - September 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	1	0	3	2	5	9	12	4	6	6	2	2	3	2	1	60
6 - 11	19	3	1	10	31	39	28	17	8	10	34	11	26	29	21	23	310
12 - 19	7	0	4	13	42	22	10	10	8	8	15	27	25	21	18	13	243
20 - 28	0	0	0	6	24	13	2	2	17	2	2	7	14	9	2	0	100
29 - 38	0	0	0	0	0	0	0	0	0	0	0	2	0	4	0	0	6
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	28	4	5	32	99	79	49	41	37	26	57	49	67	66	43	37	719

Total Number of Valid Hours: 719

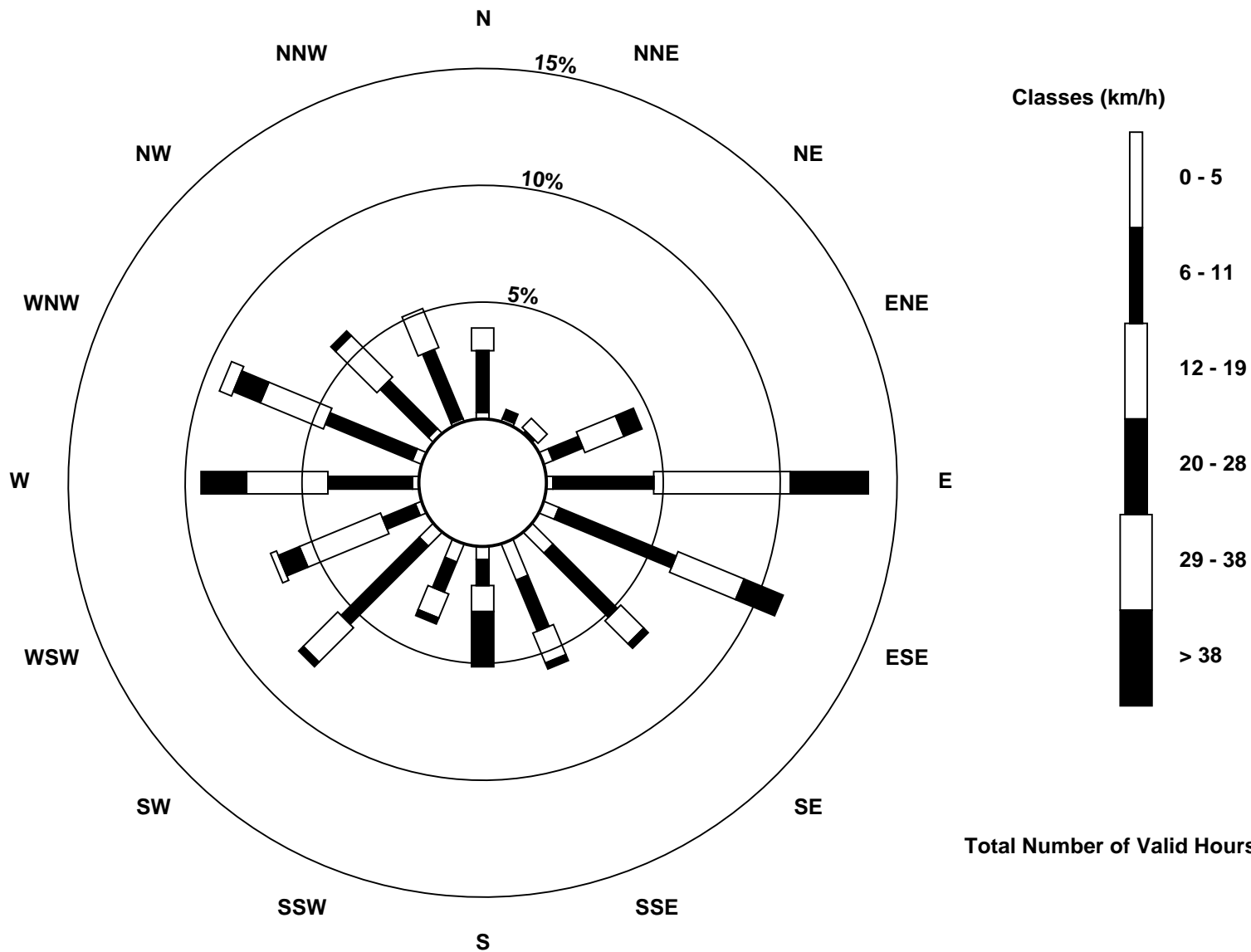
Total Number of Hours: 720





Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Wind Speed (WS) - km/h  
Fort Chipewyan (AMS 8)





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Fort Chipewyan - September 2015**

Direction of Maximum Speed: 289 deg on Sep 27 13:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 283.5 deg on Sep 27		Hours of Data:	719
Direction of Minimum Speed: 143 deg on Sep 10 07:00		Hours of Missing Data:	1
Direction of Minimum Daily Speed Average: 3.2 deg on Sep 28		Percent Operational Time:	99.9
Monthly Average Direction: 266.4 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	215	228	230	216	173	129	122	142	109	153	140	179	197	161	325	348	22	339	261	276	274	274	252	242	210.0
2-Sep	293	294	315	277	286	287	302	299	268	242	273	342	335	324	348	359	348	11	337	342	3	349	353	345	318.6
3-Sep	342	341	347	356	4	3	351	346	349	0	358	346	347	342	347	350	346	358	338	332	310	317	314	305	345.5
4-Sep	306	312	309	308	297	304	290	300	304	300	292	290	305	333	283	273	258	261	252	259	232	232	148	151	288.2
5-Sep	225	215	220	244	208	214	212	162	125	145	150	148	150	190	128	90	93	96	98	86	127	143	135	65	139.1
6-Sep	83	92	106	105	81	114	113	101	87	86	85	85	85	92	85	75	67	58	51	51	66	73	80	78	81.1
7-Sep	79	65	49	44	26	3	357	352	0	81	99	99	95	94	102	105	105	104	112	116	129	134	141	204	87.1
8-Sep	197	182	164	AF	221	194	203	209	185	167	173	153	141	117	92	88	86	84	94	98	100	107	107	100	121.4
9-Sep	127	105	104	104	132	111	136	147	153	141	119	106	93	84	97	236	267	88	105	79	76	105	167	104	112.8
10-Sep	139	130	113	137	128	178	143	215	157	111	123	166	179	206	211	206	188	155	175	188	228	227	224	226	181.6
11-Sep	217	200	180	133	149	148	157	190	206	151	230	237	225	226	216	209	205	211	224	232	229	231	249	254	215.5
12-Sep	265	272	273	268	264	270	277	278	274	278	272	271	261	261	299	311	312	336	333	321	323	316	279	288	286.4
13-Sep	292	286	295	277	279	286	287	282	281	310	350	27	125	74	75	45	349	352	343	348	341	335	352	4	322.0
14-Sep	356	347	347	4	345	342	346	351	357	11	14	339	267	280	293	280	306	264	246	221	222	155	179	150	325.9
15-Sep	144	143	143	87	83	121	135	115	102	105	90	87	87	89	79	76	74	69	67	68	66	127	156	156	100.8
16-Sep	166	174	163	97	133	96	102	117	119	111	96	88	86	86	83	83	74	71	67	66	74	112	148	159	100.3
17-Sep	152	155	217	217	214	218	147	123	103	90	94	92	95	88	85	82	80	77	83	147	174	116	136	121	108.9
18-Sep	108	131	157	125	127	137	137	144	201	174	240	165	219	208	208	114	86	80	71	72	79	107	223	204	139.0
19-Sep	109	166	169	178	170	171	179	182	188	205	231	240	244	265	264	262	266	225	224	229	246	247	256	248	216.3
20-Sep	255	255	246	246	241	244	246	253	261	261	270	265	272	280	287	279	283	303	296	274	283	289	279	309	268.5
21-Sep	323	324	326	331	329	337	333	324	322	313	314	316	310	324	321	317	310	309	299	302	316	309	289	284	316.7
22-Sep	284	285	289	294	297	304	299	309	318	256	270	230	141	120	93	91	87	83	91	91	99	114	112	112	91.0
23-Sep	107	102	80	79	68	65	67	100	111	111	151	146	131	123	120	99	96	113	108	103	108	99	96	100	108.1
24-Sep	106	105	99	100	105	114	141	141	161	183	220	232	239	243	254	267	72	72	75	82	81	83	79	79	120.8
25-Sep	82	85	91	122	179	191	213	237	256	267	270	228	229	239	252	264	267	260	260	274	231	251	264	245	232.4
26-Sep	229	258	226	223	225	225	229	231	239	252	261	248	250	241	251	254	256	259	279	278	283	286	281	272	255.0
27-Sep	230	213	217	226	244	267	312	316	302	285	289	285	289	286	290	281	289	289	291	292	288	287	287	284	283.5
28-Sep	293	294	292	289	277	273	270	274	280	290	306	294	291	303	249	252	257	152	106	106	113	113	108	105	268.8
29-Sep	137	125	114	108	110	107	108	106	113	161	170	151	103	95	92	88	92	93	88	83	90	91	89	79	108.5
30-Sep	122	126	140	124	132	107	95	141	183	180	175	174	173	172	178	186	194	180	202	220	218	226	227	216	176.8
151.1	154.6	170.4	170.8	200.5	212.5	230.3	220.3	220.5	211.2	226.1	212.9	214.8	214.7	224.0	320.2	43.4	65.8	84.7	86.3	105.4	124.5	160.0	160.4		
Diurnal Average																									

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

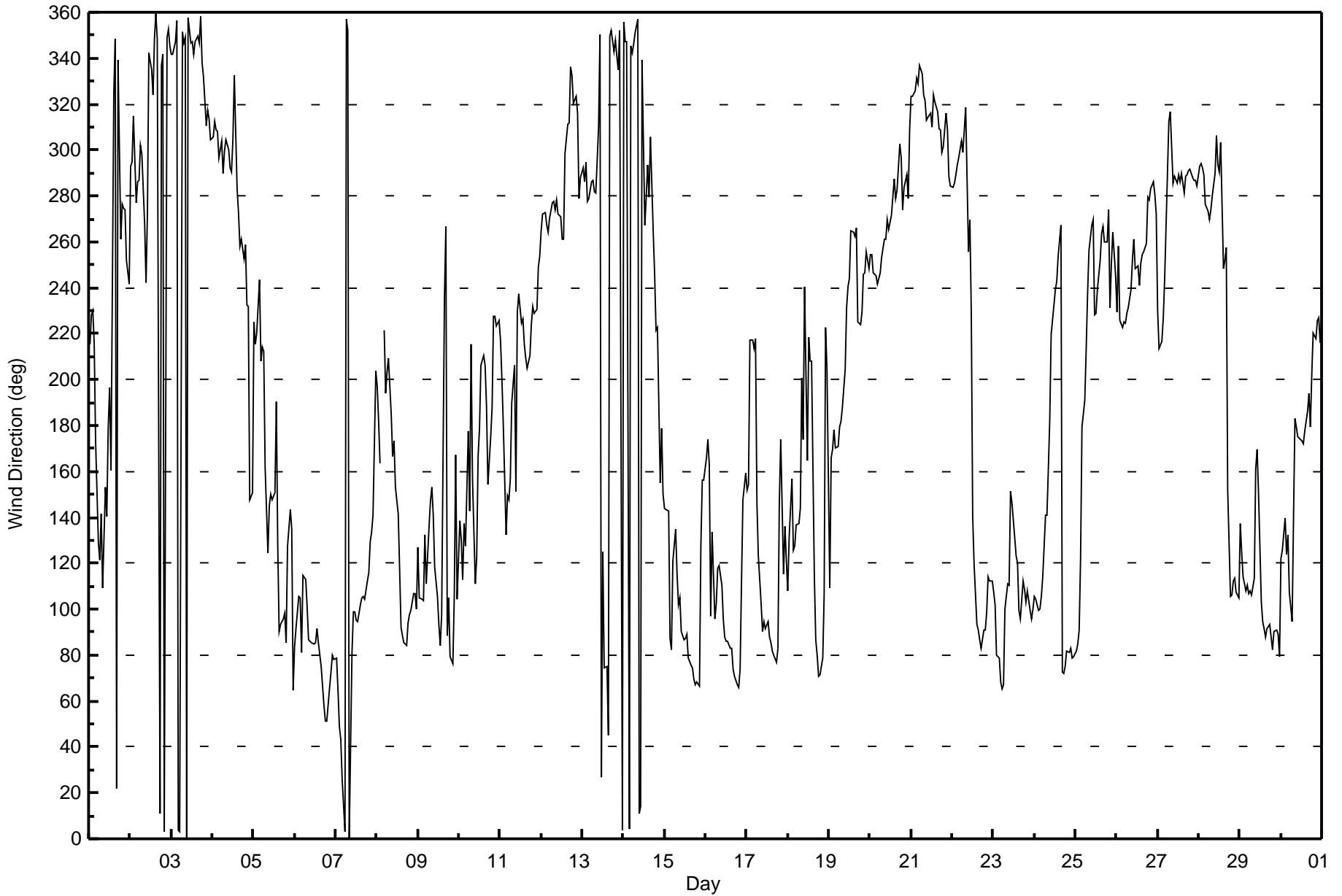
Fort Chipewyan - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 96 deg on Sep 14 22:00	Hours of Data: 719
Minimum Value: 4 deg on Sep 28 20:00	Hours of Missing Data: 1
Percentiles: P <sub>1</sub> = 5 P <sub>10</sub> = 7 Q <sub>1</sub> = 10 Median = 15 Q <sub>3</sub> = 22 P <sub>90</sub> = 31 P <sub>99</sub> = 59	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-Sep	20	14	9	14	35	16	21	29	48	60	34	17	25	31	51	31	20	35	37	19	8	18	10	9	60
2-Sep	29	47	10	10	10	13	18	21	16	28	41	31	38	38	39	32	24	19	21	17	19	21	22	22	47
3-Sep	23	22	22	23	23	23	24	22	24	25	23	25	24	25	23	24	23	24	21	28	16	18	16	15	28
4-Sep	15	16	15	14	13	19	17	17	16	17	18	17	22	38	36	47	20	14	12	12	26	19	63	57	63
5-Sep	13	10	13	27	22	14	15	22	20	37	15	13	28	27	23	9	8	11	16	17	8	9	49	39	49
6-Sep	15	11	8	10	11	9	5	7	6	6	10	8	8	11	7	11	10	12	9	10	10	11	8	10	15
7-Sep	11	10	10	9	39	21	22	19	25	24	10	11	12	11	13	10	12	8	8	14	7	5	10	36	39
8-Sep	19	18	34	AF	21	12	25	13	10	16	16	14	13	9	10	6	6	6	7	6	6	7	11	9	34
9-Sep	24	10	9	10	23	30	14	13	29	24	8	8	14	13	10	53	20	82	28	8	9	23	35	30	82
10-Sep	20	37	15	9	11	30	60	32	48	9	13	24	21	19	25	16	19	9	7	19	10	11	11	10	60
11-Sep	10	14	30	28	25	29	13	28	9	41	21	14	13	10	15	8	9	8	8	12	6	9	13	13	41
12-Sep	14	13	14	15	16	15	14	14	13	15	16	17	16	24	20	19	20	25	24	23	19	29	16	14	29
13-Sep	12	14	17	15	13	14	17	15	13	26	44	68	39	29	31	35	27	20	18	17	19	19	20	19	68
14-Sep	20	20	21	20	19	18	21	21	23	24	29	40	76	45	78	41	59	40	12	14	27	96	7	16	96
15-Sep	6	6	14	20	42	25	8	24	25	9	7	7	8	5	9	9	9	9	8	7	8	11	10	11	42
16-Sep	9	29	41	33	17	19	10	5	7	7	9	6	6	6	7	8	9	8	9	8	8	24	8	8	41
17-Sep	33	33	16	16	20	10	35	13	9	8	6	5	8	6	6	7	7	7	7	31	18	29	9	16	35
18-Sep	12	25	50	12	9	11	13	23	17	33	50	24	16	28	18	56	6	9	11	8	8	37	18	49	56
19-Sep	14	32	8	8	9	9	7	6	8	10	16	15	16	17	15	15	17	16	18	12	18	15	14	13	32
20-Sep	13	13	13	12	12	13	14	15	16	18	16	16	17	16	18	17	17	20	16	15	14	15	14	22	22
21-Sep	22	22	23	29	25	25	23	23	25	20	23	23	20	25	23	23	21	19	16	16	18	16	19	16	29
22-Sep	8	10	11	13	12	15	16	23	36	26	32	46	30	22	10	6	7	6	8	7	6	7	5	10	46
23-Sep	40	17	14	24	15	14	11	16	7	9	18	12	11	6	7	17	12	6	5	5	6	6	5	6	40
24-Sep	6	7	8	10	10	9	23	18	15	10	19	17	18	18	20	23	80	15	11	6	6	7	7	7	80
25-Sep	6	6	8	20	9	7	10	15	15	16	30	16	12	14	18	16	15	15	15	15	15	11	15	24	30
26-Sep	37	36	31	18	16	14	8	11	15	17	17	20	18	16	17	16	15	16	15	18	17	17	13	16	37
27-Sep	11	10	24	13	16	17	37	22	18	15	16	15	16	15	15	15	15	15	16	16	15	15	14	14	37
28-Sep	16	15	16	15	13	13	14	13	15	17	19	30	32	41	28	20	27	37	5	4	6	8	10	12	41
29-Sep	13	9	7	6	6	6	6	6	11	13	12	20	10	9	6	7	7	8	9	9	9	12	20	23	23
30-Sep	12	14	13	14	14	21	19	34	12	8	8	9	9	8	10	13	7	6	17	9	7	9	11	10	34

40	47	50	33	42	30	60	34	48	60	50	68	76	45	78	56	80	82	37	31	27	96	63	57	
Diurnal Maximum																								

AF - Analyzer Failure





# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	September 2, 2015	Last Calibration	August 5, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	10:55	End Time (MST)	15:40
Gas Cert Reference	LL103809	Station temp.	22 Deg C
Cal Gas Concentration	2.45 ppm	Cal Gas Exp Date	16/09/2015
Calibrator Make/Model	Teledyne API T700	Serial Number	747
ZAG Make/Model	Teledyne API T701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-827	-827
Analyzer IP address	192.168.1.43		Lamp voltage	973	974
Calculated slope	1.006687	1.001379	Chamber temp	45.0	45.0
Calculated intercept	-0.058154	-0.032193	Pressure	707.9	704.6
Analyzer Background	1.12	1.12	Flow	0.431	0.429
Analyzer Coefficient	1.004	1.004	Intensity	93	93

Analyzer make Thermo 43i-TLE Analyzer serial # 1136451241

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	44.6	18.2	18.1	1.006
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	44.6	18.2	18.2	0.999
second point	6000	23.8	9.7	9.8	0.995
third point	6000	11.9	4.9	4.8	1.011
as left zero	6000	0.0	0.0	0.1	----
as left span	6000	44.6	18.2	17.9	1.016
Average Correction Factor					1.002

Corrected As found 18.0 Previous response 18.1 % change 0.7%

**Notes:**

Filter change after As Found. Slight adjustment to span

Calibration Performed By: Ryan Power



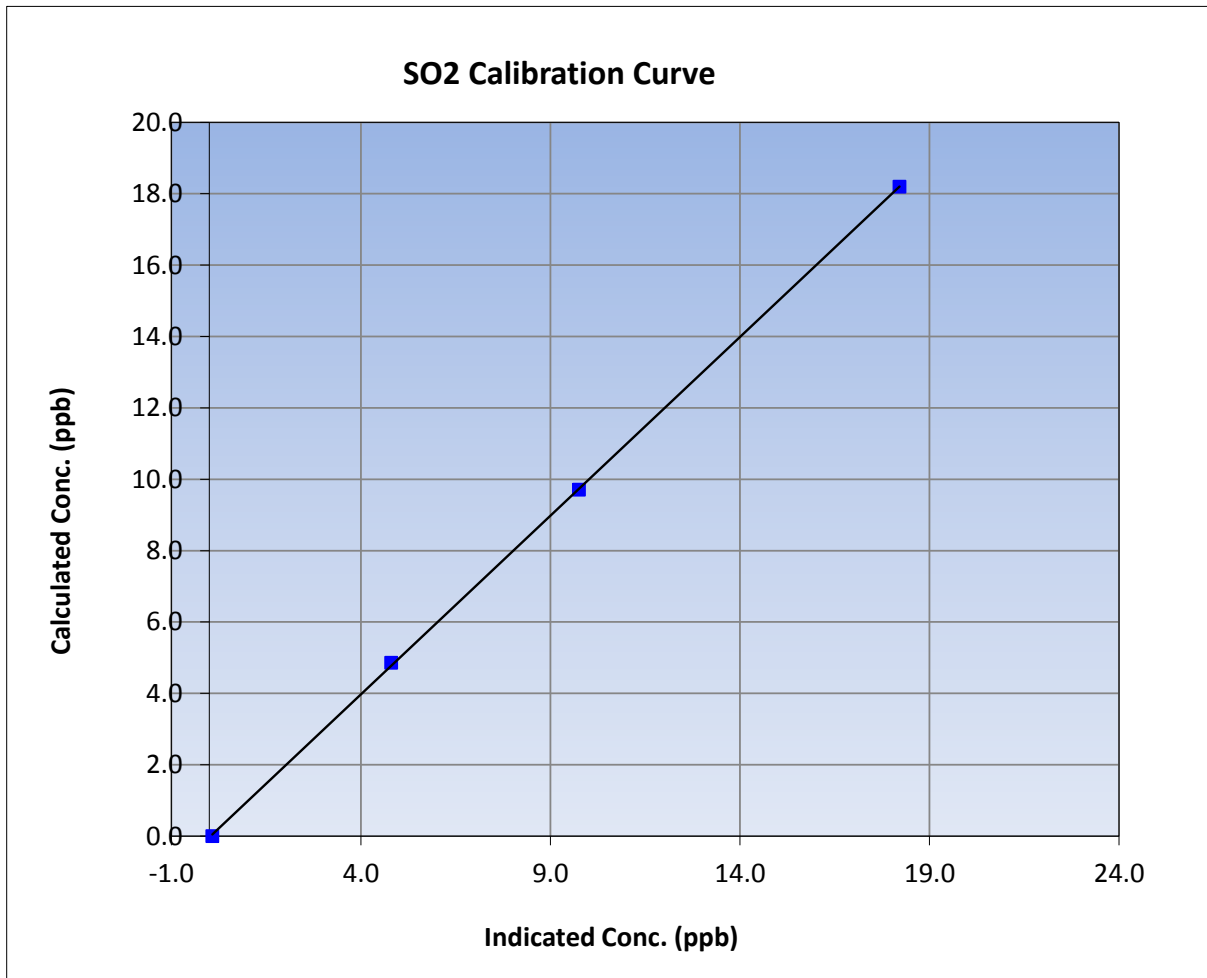
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 2, 2015	Previous Calibration	August 5, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:55	End Time (MST)	15:40
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

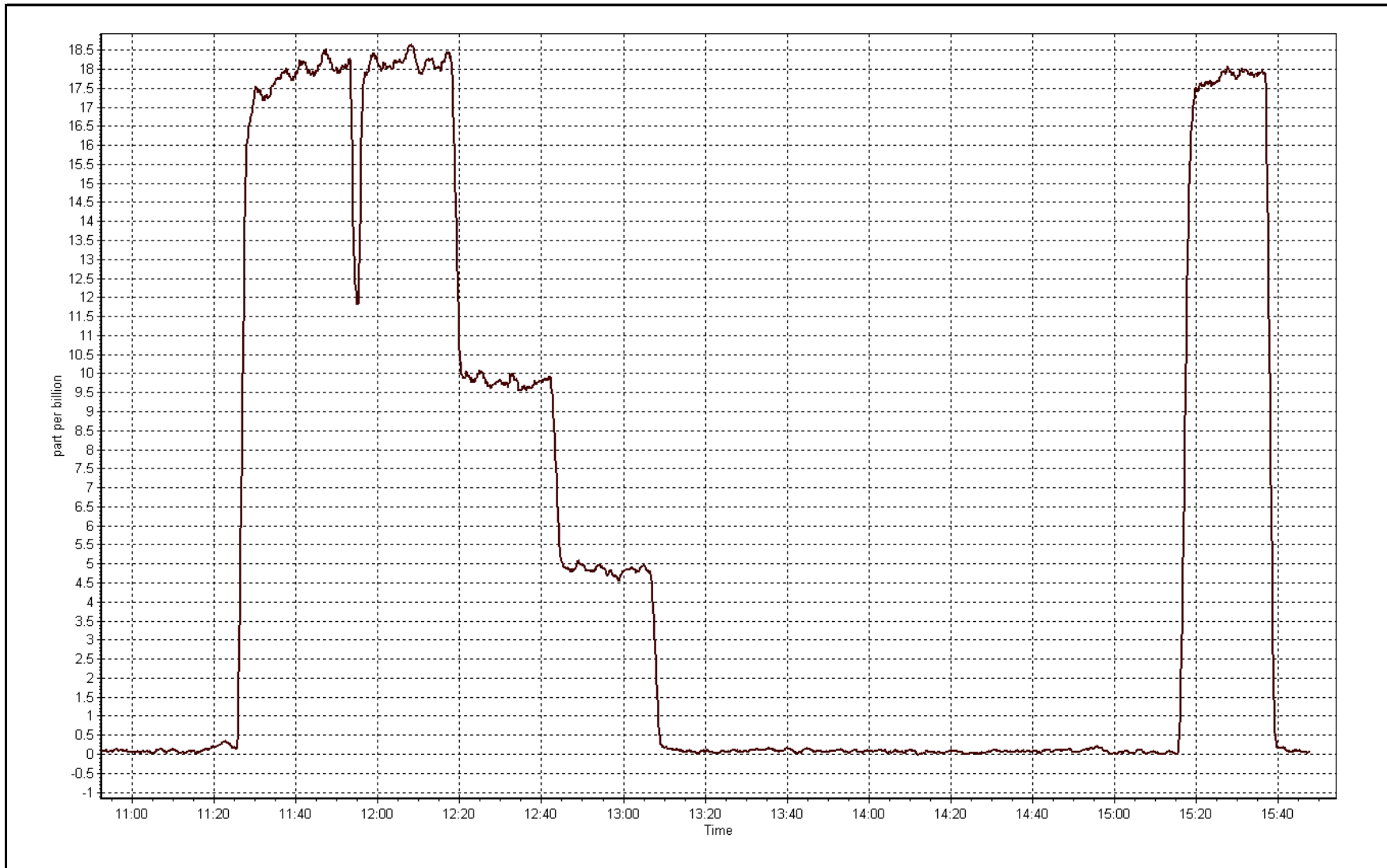
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999947
18.2	18.2	0.9992		
9.7	9.8	0.9955	Slope	1.001379
4.9	4.8	1.0115		
			Intercept	-0.032193



SO2 Calibration Plot

Date: March 4, 2015





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	September 2, 2015	Previous Calibration	August 5, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	15:40	End Time (MST)	18:50
NO2 GPT Ref date	September-02-15	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	735
ZAG make/model	Teledyne API 701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	Serial Number	8205

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	37.2	38.0
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	0.981901	0.988206	Pressure	27.4	27.1
Calculated intercept	-0.151125	0.102207	Flow cell A	0.837	0.819
Analyzer Background	3.0	1.0	Flow cell B	0.837	0.819
Analyzer Coefficient	1.300	1.304	Cell A Intensity	NA	NA
			Cell B Intensity	NA	NA

Analyzer make	Teledyne API T400	Analyzer serial #	1107
---------------	-------------------	-------------------	------

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.00	0.0	-1.8	----
as found span	6000	235.0 - 832.2	105.0	107.3	0.979
calibrator zero	6000	0.00	0.0	0.0	----
high point	6000	235.0 - 832.2	105.0	106.3	0.988
second point	6000	178.2 - 792.9	80.2	80.9	0.992
third point	6000	114.1 - 736.9	53.9	54.4	0.991
as left zero	6000	0.00	0.0	-0.3	----
as left span	6000	235.0 - 832.2	105.0	106.2	0.989
Average Correction Factor					0.990

Corrected As found	109.1	Previous response	107.1	% change	-1.9%
--------------------	-------	-------------------	-------	----------	-------

**Notes:**

Adjusted zero and span.

Calibration Performed By: Ryan Power





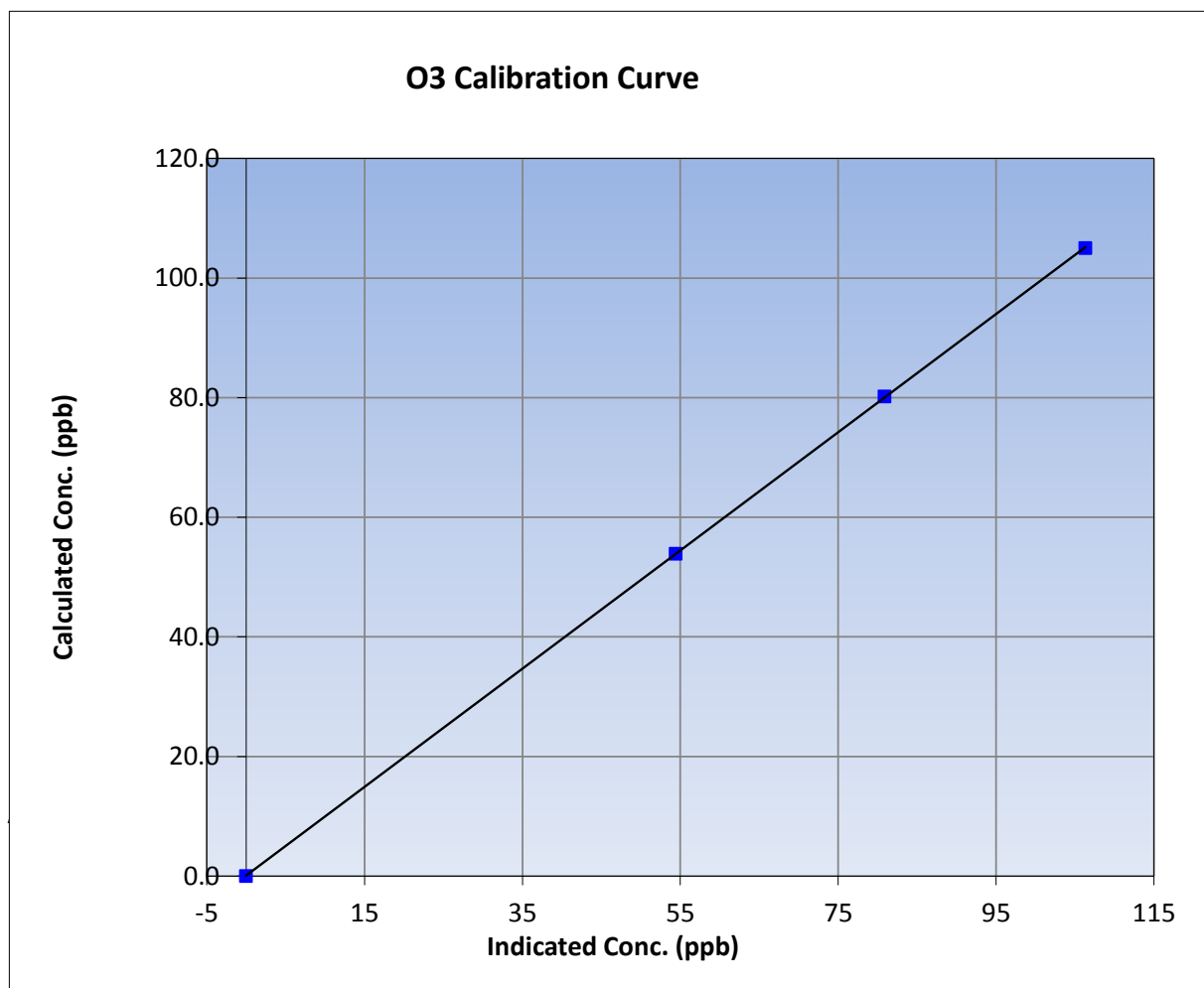
## Wood Buffalo Environmental Association O3 Calibration Report

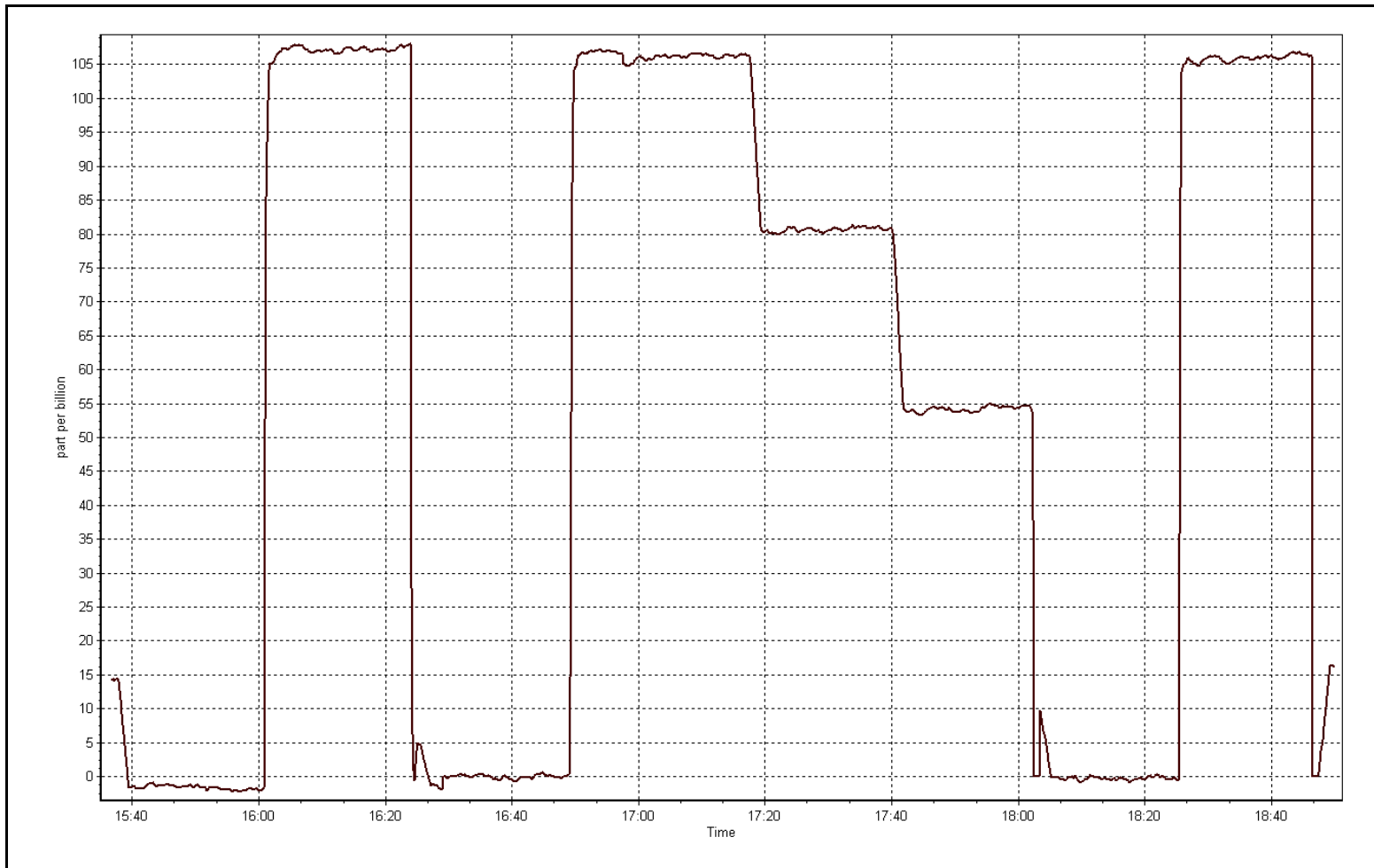
### Station Information

Calibration Date	September-02-15	Previous Calibration	August 5, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	15:40	End Time (MST)	18:50
Analyzer make	Teledyne API T400	Analyzer serial #	1107

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999990
105.0	106.3	0.9877		
80.2	80.9	0.9917	Slope	0.988206
53.9	54.4	0.9908		
			Intercept	0.102207





Adjusted zero and span.



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

### Station Information

Calibration Date	September 2, 2015	Previous Calibration	August 5, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	10:55	End Time (MST)	15:40
NO Cal Gas Conc	20.2 ppm	Gas Cert Reference	LL103809
NOX Cal Gas Conc	20.2 ppm	Cal Gas Expiry Date	16/09/2016
Calibrator	Teledyne API T700	Serial Number	747
Zero air Generator	Teledyne API T701	Serial Number	4698

### DACs Information

DACs make & model	Campbell Scientific CR3000	DACs serial No.	8205
-------------------	----------------------------	-----------------	------

### Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.993844	1.003344	0.989399
	Data Offset	0.595523	0.615494	-0.082995
Current Calibration	Data Slope	0.997428	1.004061	0.994235
	Data Offset	0.606079	0.665139	-0.010864

### Analyzer Information

Analyzer make/model	Teledyne API T200u	Analyzer serial #	172
---------------------	--------------------	-------------------	-----

Test Point	before		after	
		ppb		ppb
Concentration range	0-200		0-200	
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.143		1.150	
NOX coefficient	1.165		1.167	
NO2 coefficient	1.000		1.000	
NO bkgnd	0.1		0.1	
NOX bkgnd	0.2		0.2	
Chamber Temp	40	Deg C	40	Deg C
Moly Temp	314.9	Deg C	315	Deg C
HVPS	502	V	502	V
PMT Temp	5.1	Deg C	5.0	Deg C
O3 flow	88	ccm	88	ccm
R Cell press NO	3.9	"Hg	3.8	"Hg
R Cell Press Nox	3.8	"Hg	3.8	"Hg
NO sample flow	1126	ccm	1117	ccm
Nox sample Flow	1103	ccm	1094	ccm

**Notes:**

Filter changed after As Finds. Span slightly adjusted
---



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

September 2, 2015

Station Number:

AMS 8

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as found span	6000	44.6	150.2	150.2	0.0	149.8	148.6	1.2	1.0021	1.0103
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	6000	44.6	150.2	150.2	0.0	150.3	149.3	1.0	0.9988	1.0058
second point	6000	23.8	80.1	80.1	0.0	79.1	78.6	0.5	1.0125	1.0196
third point	6000	11.9	40.1	40.1	0.0	39.2	38.8	0.4	1.0215	1.0328
as left zero	6000	0.0	0.0	0.0	0.0	-0.6	-0.6	0.0	----	----
as left span	6000	44.6	150.2	44.0	106.2	150.3	44.4	105.9	0.9992	0.9908
Average Correction Factor									1.0109	1.0194

Corrected As found

NO<sub>x</sub>= 149.9

NO= 148.7

Percent Change

NO<sub>x</sub>= 0.4%

NO= 0.2%

Previous Response

NO<sub>x</sub>= 150.5

NO= 149.0

### GPT Calibration Data

Dilution Flow

6000

ccm

Source Gas Flow

44.60

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	44.0	105.0	149.5	44.0	105.6	0.9968	1.0000	0.9943	100.6%
2nd NO2 (200)	----	68.7	80.2	149.4	68.7	80.6	0.9978	1.0000	0.9944	100.6%
3rd NO2 (100)	----	95.0	53.9	149.3	95.0	54.3	0.9981	1.0000	0.9926	100.7%
4th NO2 (0)	148.9	----	0.8	149.7	148.9	0.8	0.9954	1.0000	N/A	----
Average Correction Factor							0.9970	1.0000	0.9938	100.6%

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

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

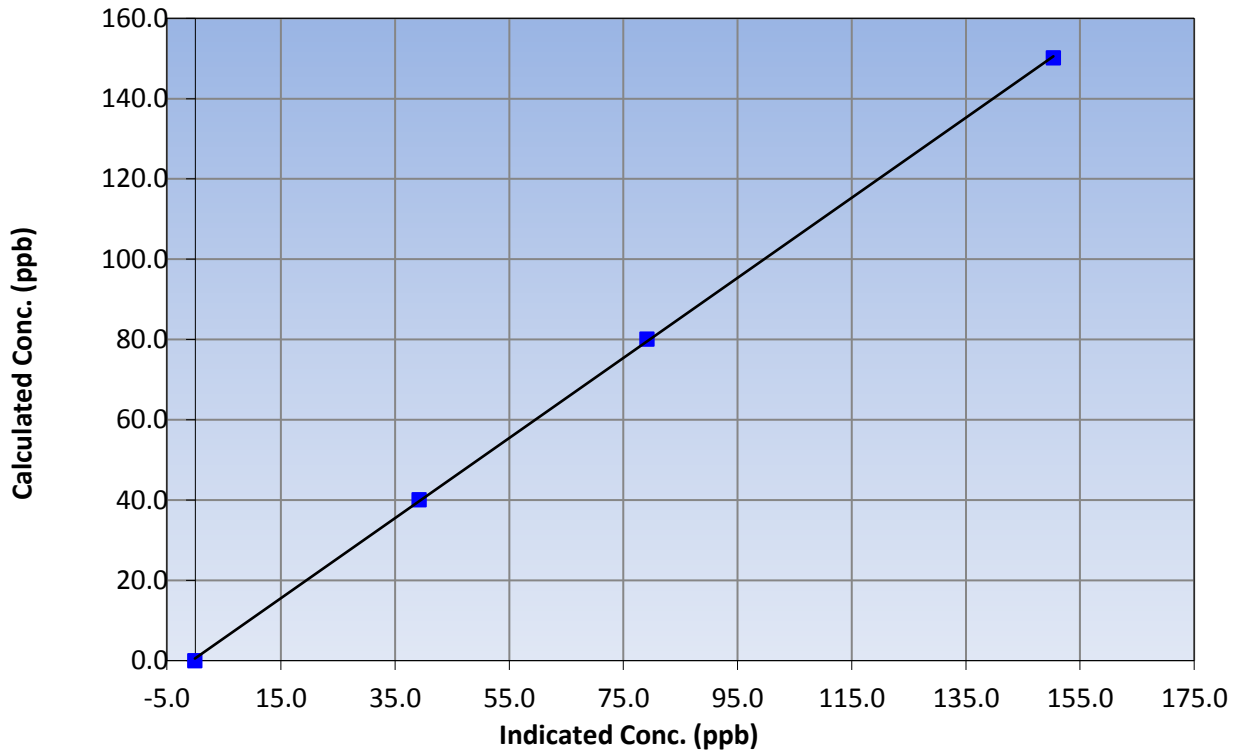
### Station Information

Calibration Date	September 2, 2015	Previous Calibration	August 5, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:55	End Time (MST)	15:40
Analyzer make	Teledyne API T200u	Analyzer serial #	172

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999928
150.2	150.3	0.9988		
80.1	79.1	1.0125	Slope	0.997428
40.1	39.2	1.0215		
			Intercept	0.606079

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

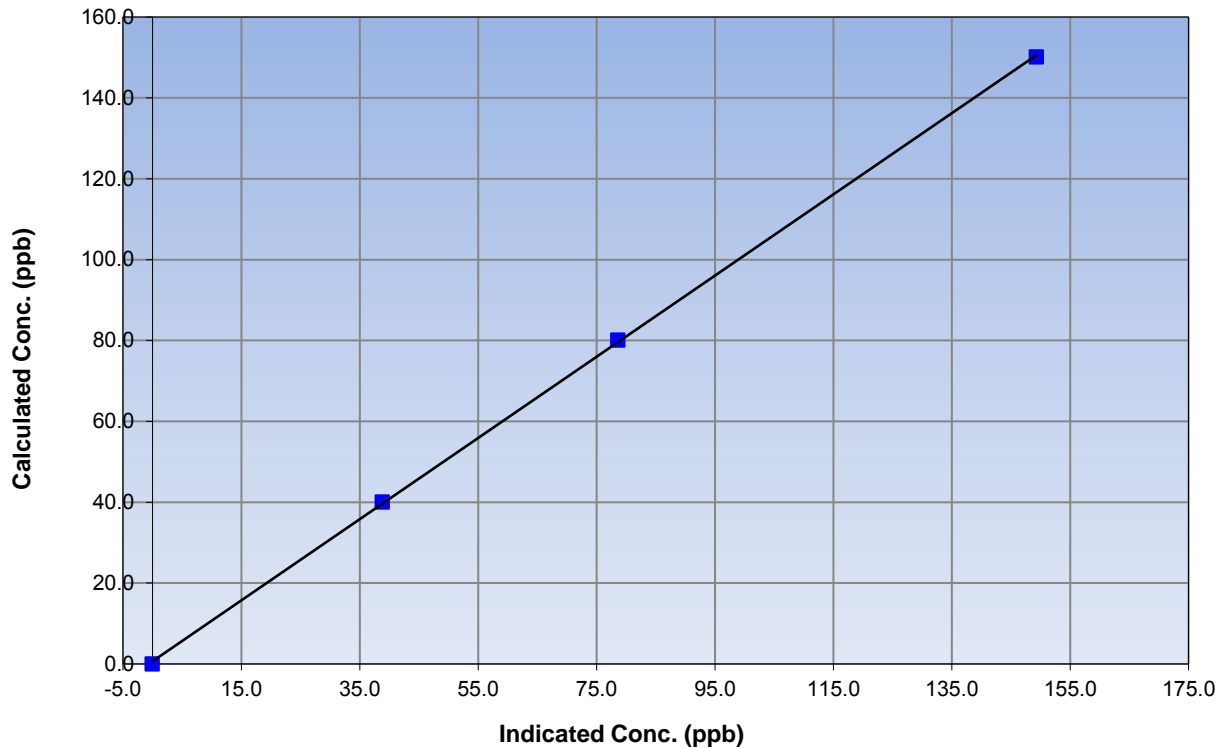
### Station Information

Calibration Date	September 2, 2015	Previous Calibration	August 5, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:55	End Time (MST)	15:40
Analyzer make	Teledyne API T200u	Analyzer serial #	172

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999916
150.2	149.3	1.0058		
80.1	78.6	1.0196	Slope	1.004061
40.1	38.8	1.0328		
			Intercept	0.665139

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

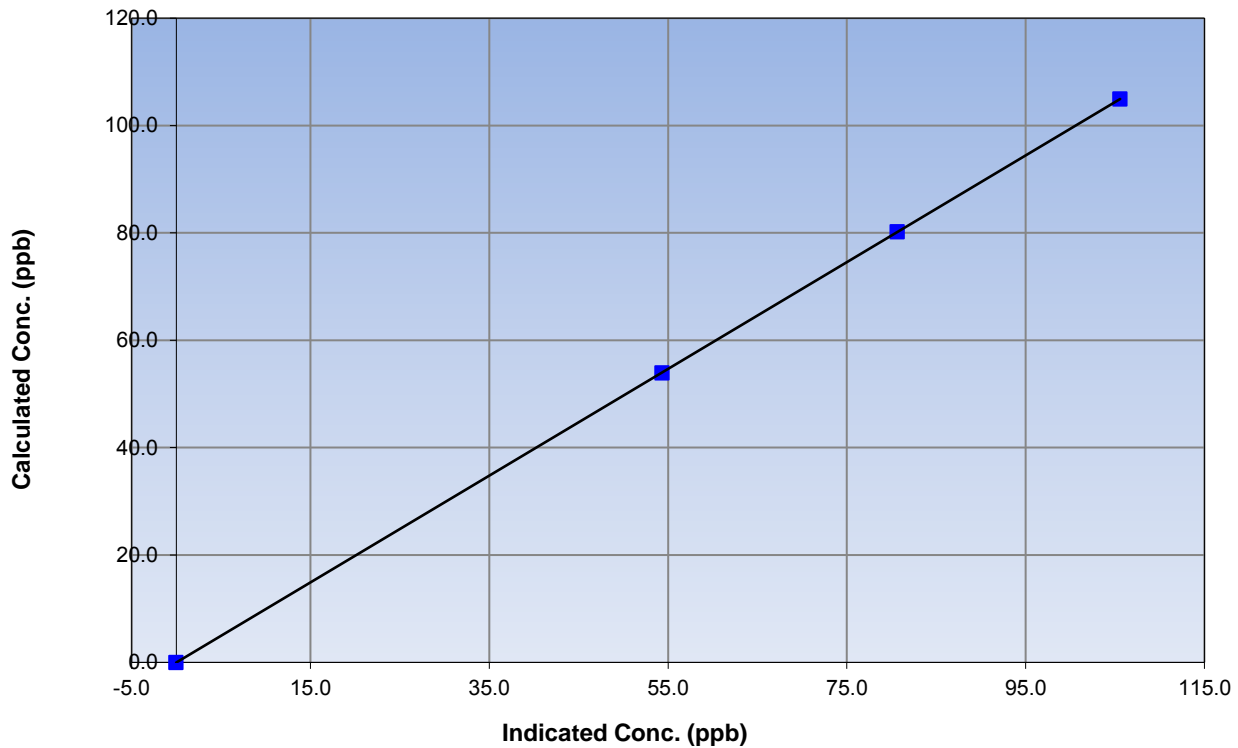
### Station Information

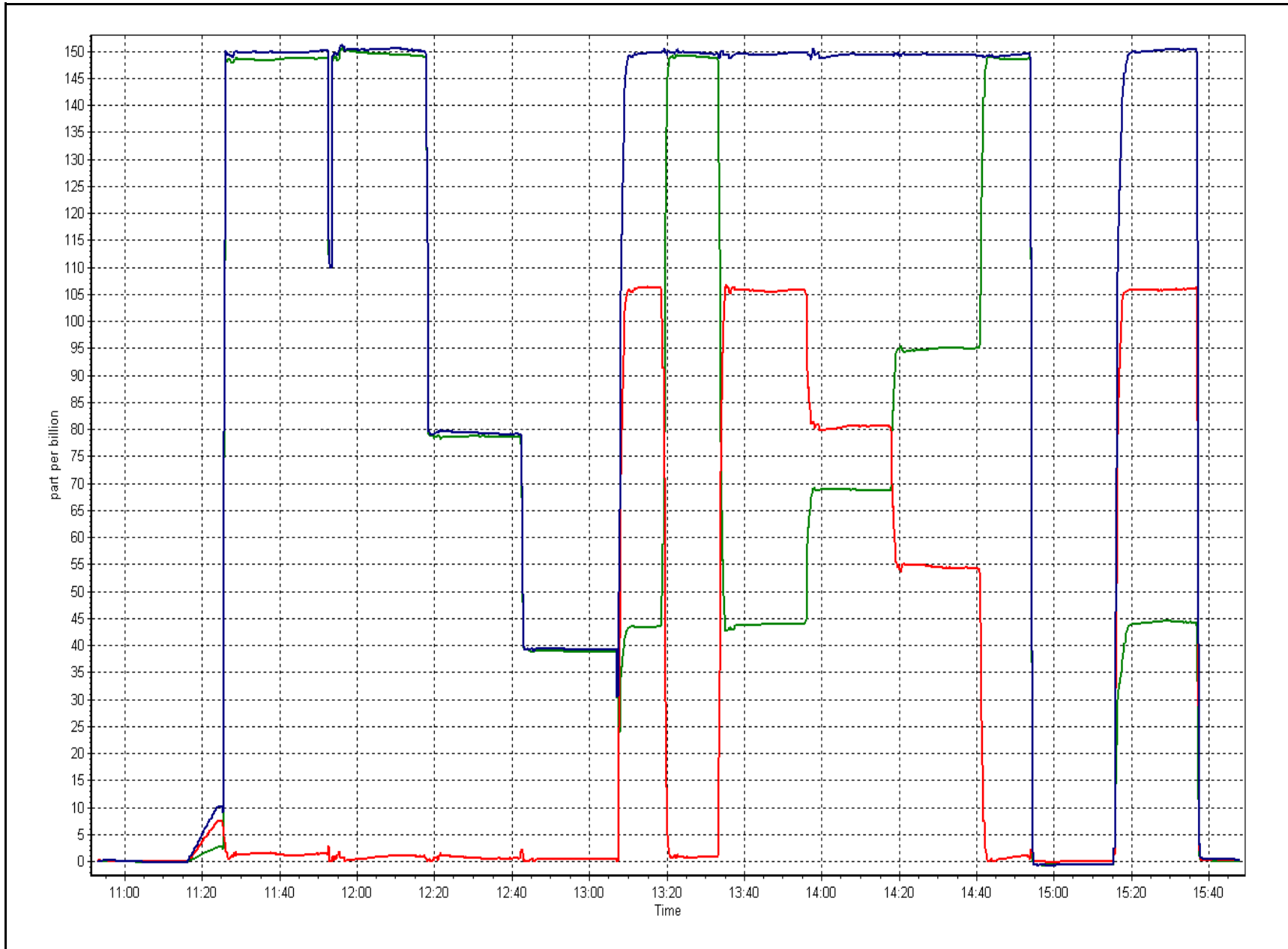
Calibration Date	September 2, 2015	Previous Calibration	August 5, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:55	End Time (MST)	15:40
Analyzer make	Teledyne API T200u	Analyzer serial #	172

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999999
105.0	105.6	0.9943		
80.2	80.6	0.9944	Slope	0.994235
53.9	54.3	0.9926		
			Intercept	-0.010864

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









## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 9  
BARGE LANDING  
SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
 SEPTEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
TRS(ppb) Average	685	34	35	99.86	3	0	1	0
THC(ppm) Average	677	33	43	98.61	3.5	-	2.5	-
Temperature (C) Average	720	0	0	100.00	24.3	-	15.3	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	93	-
Wind Speed 10 m (km/h) Average	712	8	8	100.00	19	-	12	-
Wind Direction 10 m (deg) Average	712	8	8	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
 SEPTEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
TRS(ppb) Average	685	0.3	0	-	0	0	0	0	0	1	3
THC(ppm) Average	677	2.21	0.2	-	2	2	2.1	2.1	2.3	2.5	3.5
Temperature (C) Average	720	9.53	5.1	-	-2.5	3.4	5.8	8.9	13	16.5	24.3
Relative Humidity (%) Average	720	72.7	20	-	30	44	56	74	92	97	99
Wind Speed 10 m (km/h) Average	712	5.7	3	-	0	2	3	5	7	10	19
Wind Direction 10 m (deg) Average	712	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
SEPTEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	04 Sep 2015 13:00	04 Sep 2015 13:00	1	Maintenance - sample manifold cleaned
THC	04 Sep 2015 13:00	04 Sep 2015 18:00	6	Maintenance - rebuilt sample pump and calibration
THC	05 Sep 2015 13:00	05 Sep 2015 13:00	1	Maintenance - reinitiated daily QA check
THC	18 Sep 2015 10:00	18 Sep 2015 12:00	3	Maintenance - replaced fuel cylinder

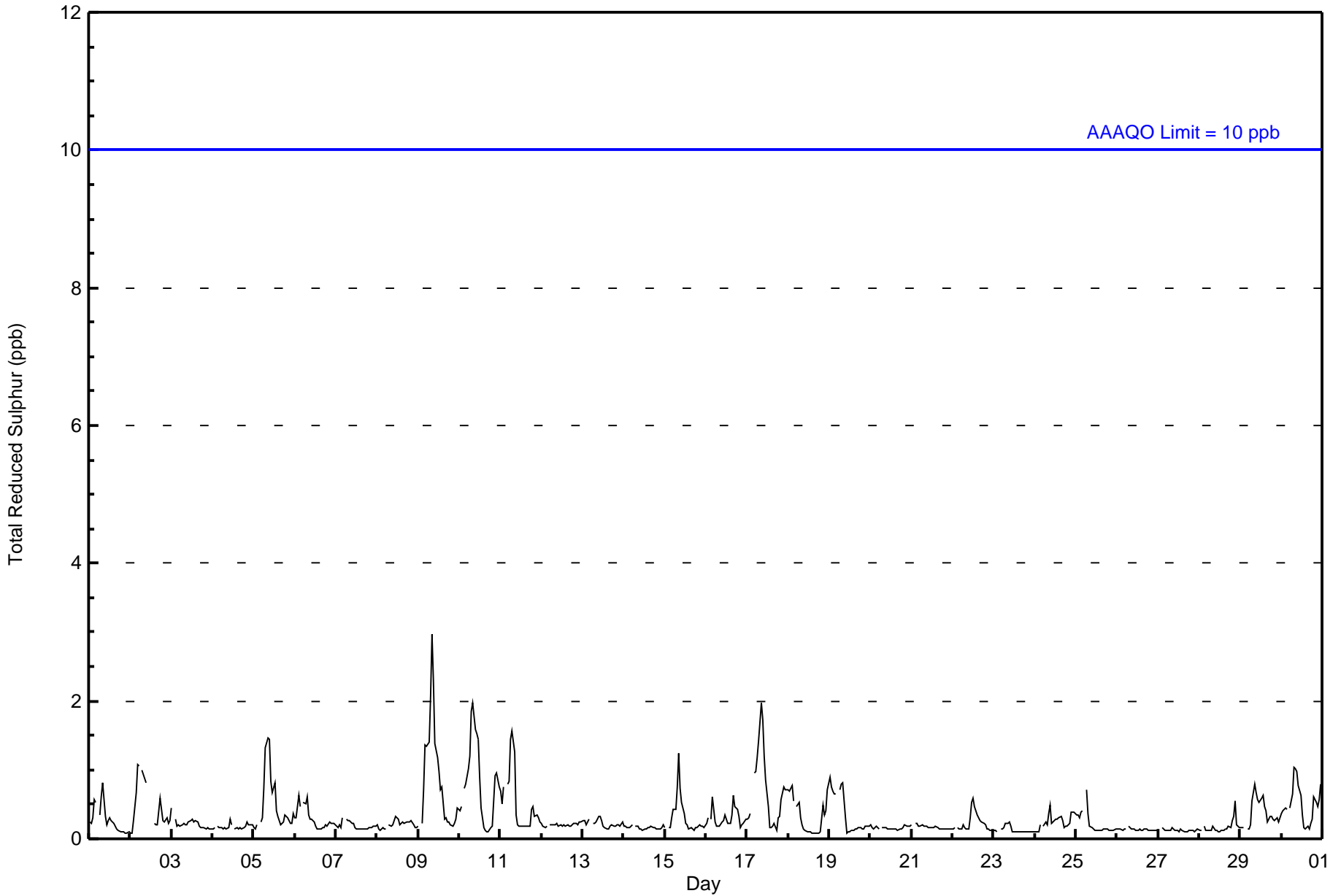


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 3 ppb on Sep 9 09:00	Maximum Daily Average: 0.9 ppb on Sep 9		Hours of Data:	685
Minimum Value: 0 ppb on Sep 2 02:00	Minimum Daily Average: 0.1 ppb on Sep 27		Hours of Missing Data:	35
Maximum Diurnal Average: 0.6 ppb at hour 9	Minimum Diurnal Average: 0.2 ppb at hour 17		Hours of Calibration:	34
Monthly Average: 0.3 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 O <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-Sep	0	0	0	1	1	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
2-Sep	0	0	0	1	1	1	Z	1	1	1	C	C	C	C	0	0	0	1	0	0	0	0	0	0	0.5	1
3-Sep	0	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-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-Sep	0	0	0	Z	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
6-Sep	0	0	1	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Sep	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
8-Sep	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
9-Sep	0	Z	0	1	1	1	1	2	3	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.9	3
10-Sep	0	0	Z	1	1	1	1	2	2	2	2	1	1	0	0	0	0	0	0	0	1	1	1	1	0.8	2
11-Sep	1	1	1	Z	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
12-Sep	0	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-Sep	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-Sep	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
15-Sep	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Sep	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1
17-Sep	0	0	0	Z	1	1	1	1	2	2	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0.7	2
18-Sep	1	1	1	1	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
19-Sep	1	1	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
20-Sep	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
21-Sep	0	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-Sep	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
23-Sep	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
24-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
25-Sep	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
26-Sep	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
27-Sep	0	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
28-Sep	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
29-Sep	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
30-Sep	0	0	0	0	Z	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	1	1	0.5	1

0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.6	0.6	0.5	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	0.3	0.3	Diurnal Average
1	1	1	1	1	1	1	2	3	2	2	1	1	1	1	0	1	1	0	1	1	1	1	1	1	Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	684	99.85	99.85
3 - 4	1	0.15	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	48	17	11	12	14	22	41	78	95	53	43	78	30	30	48	57	677
3 - 4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	48	17	11	12	14	22	41	79	95	53	43	78	30	30	48	57	678

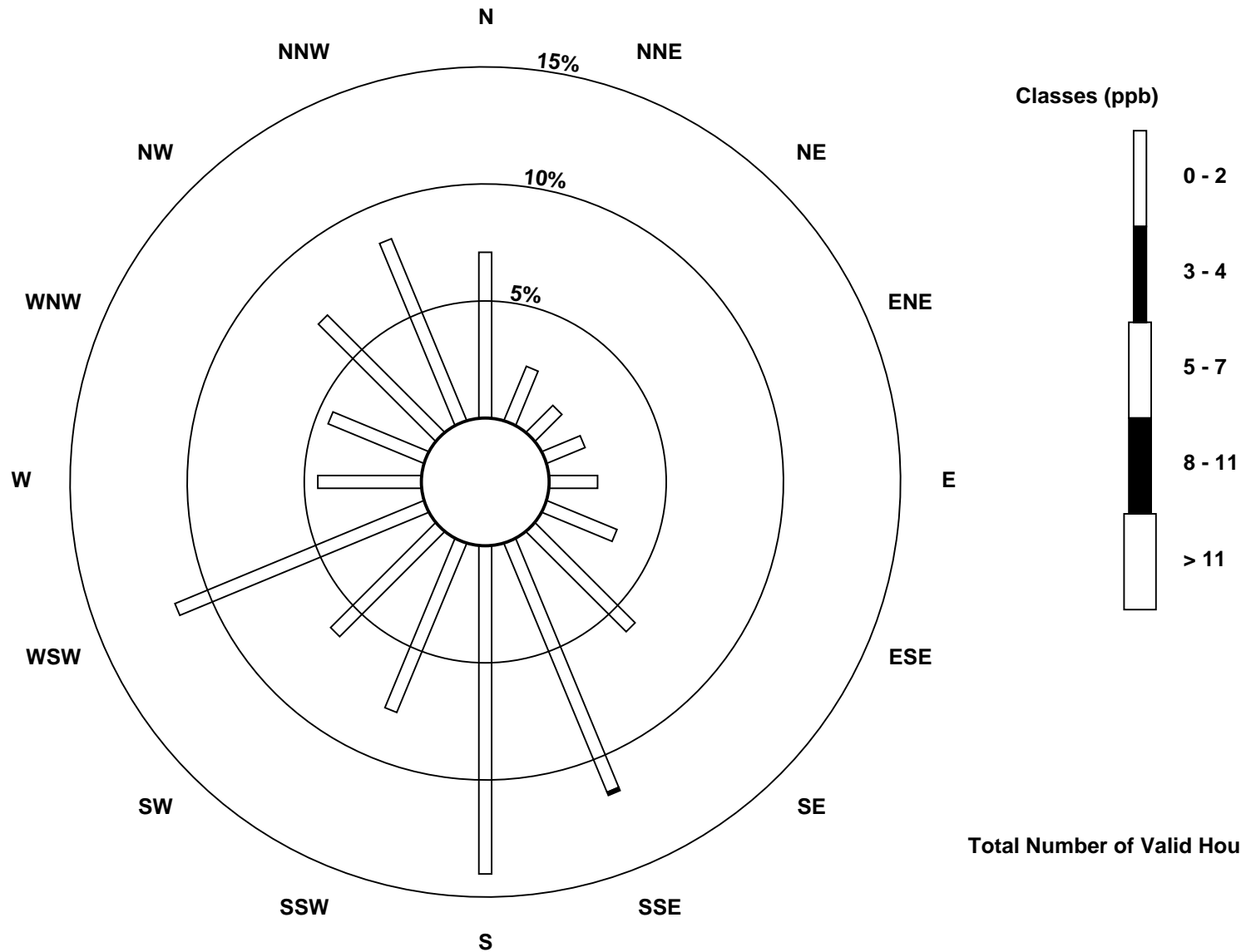
Total Number of Valid Hours: 678

Total Number of Hours: 720

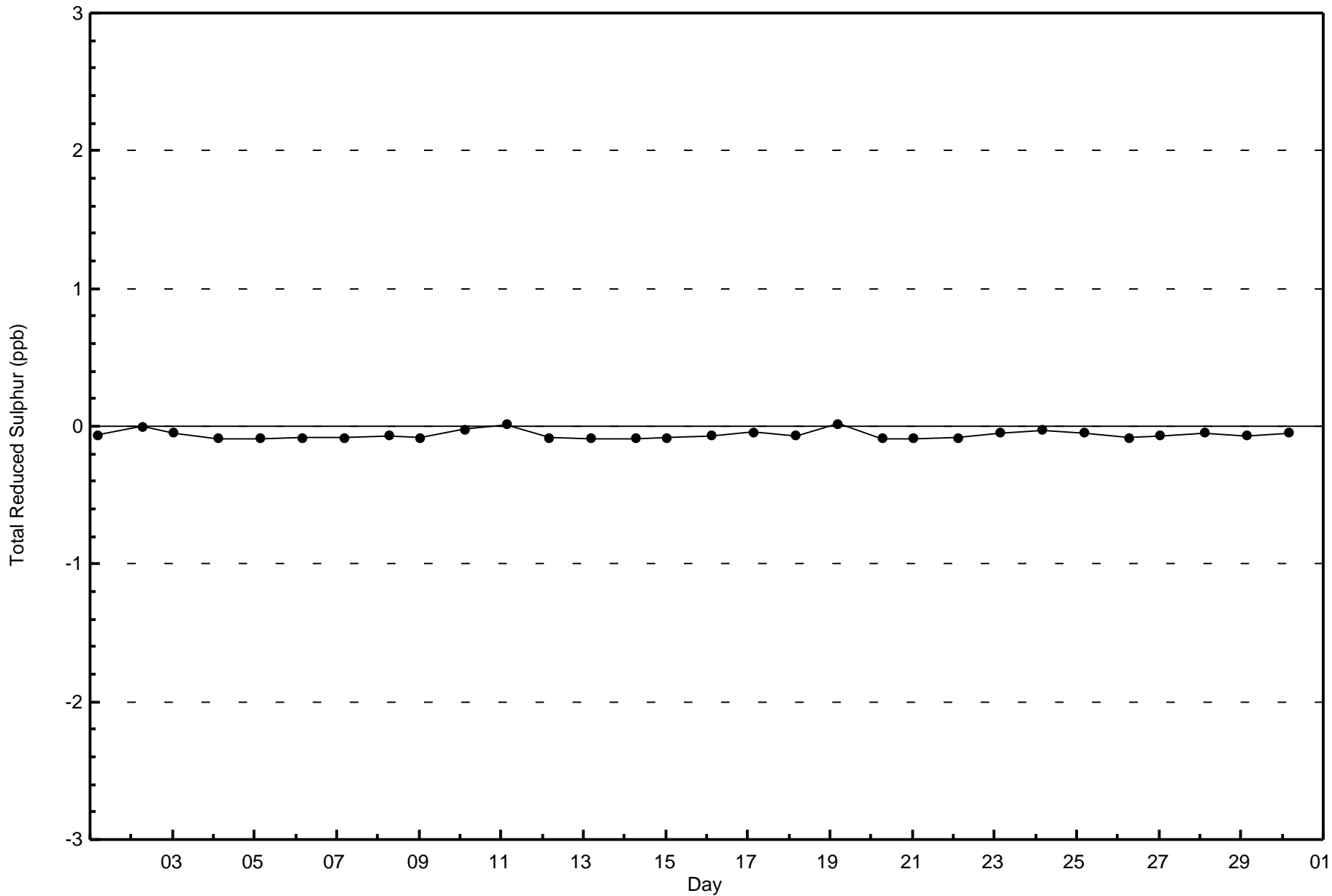


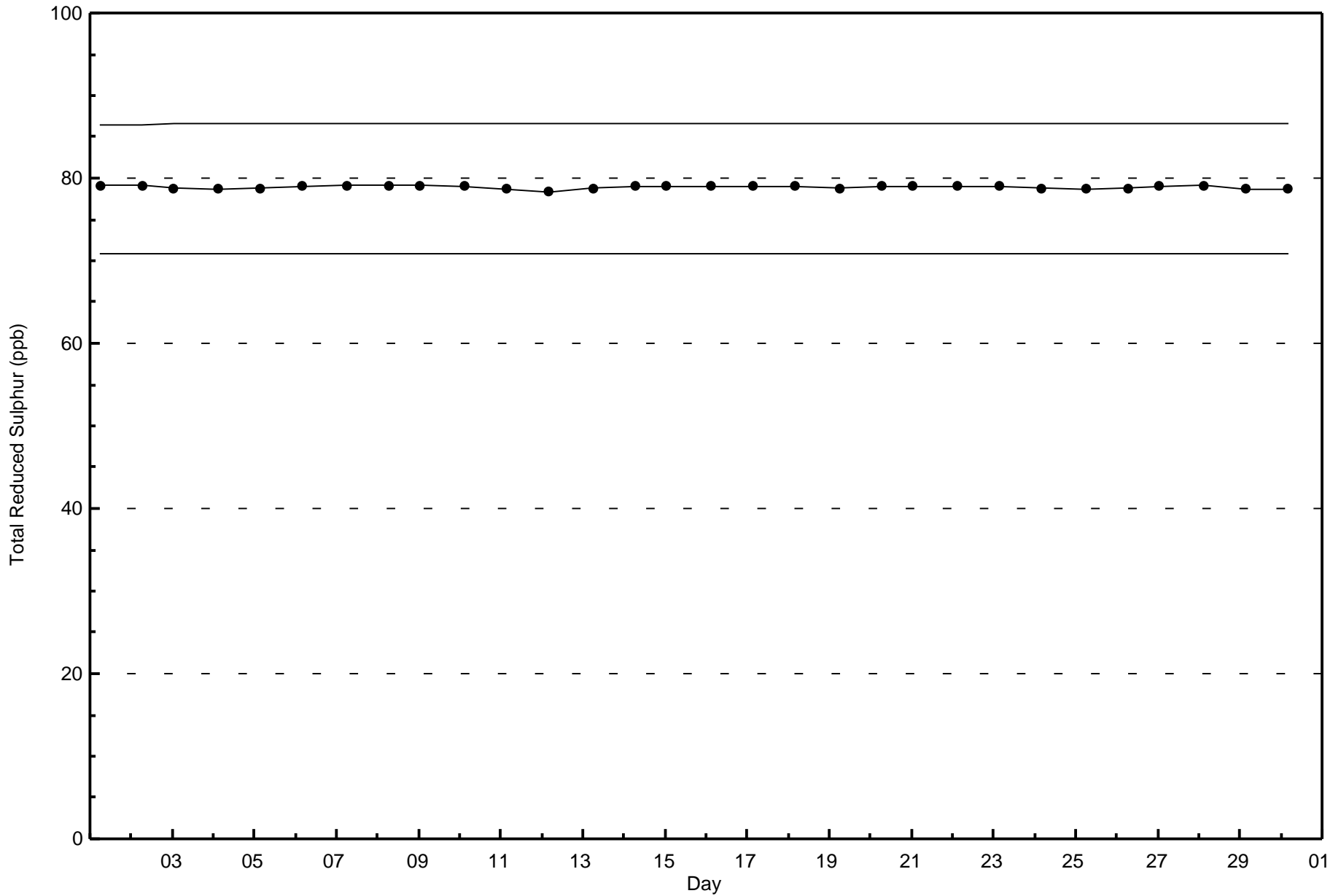
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Total Reduced Sulphur (TRS) - ppb  
Barge Landing (AMS 9)

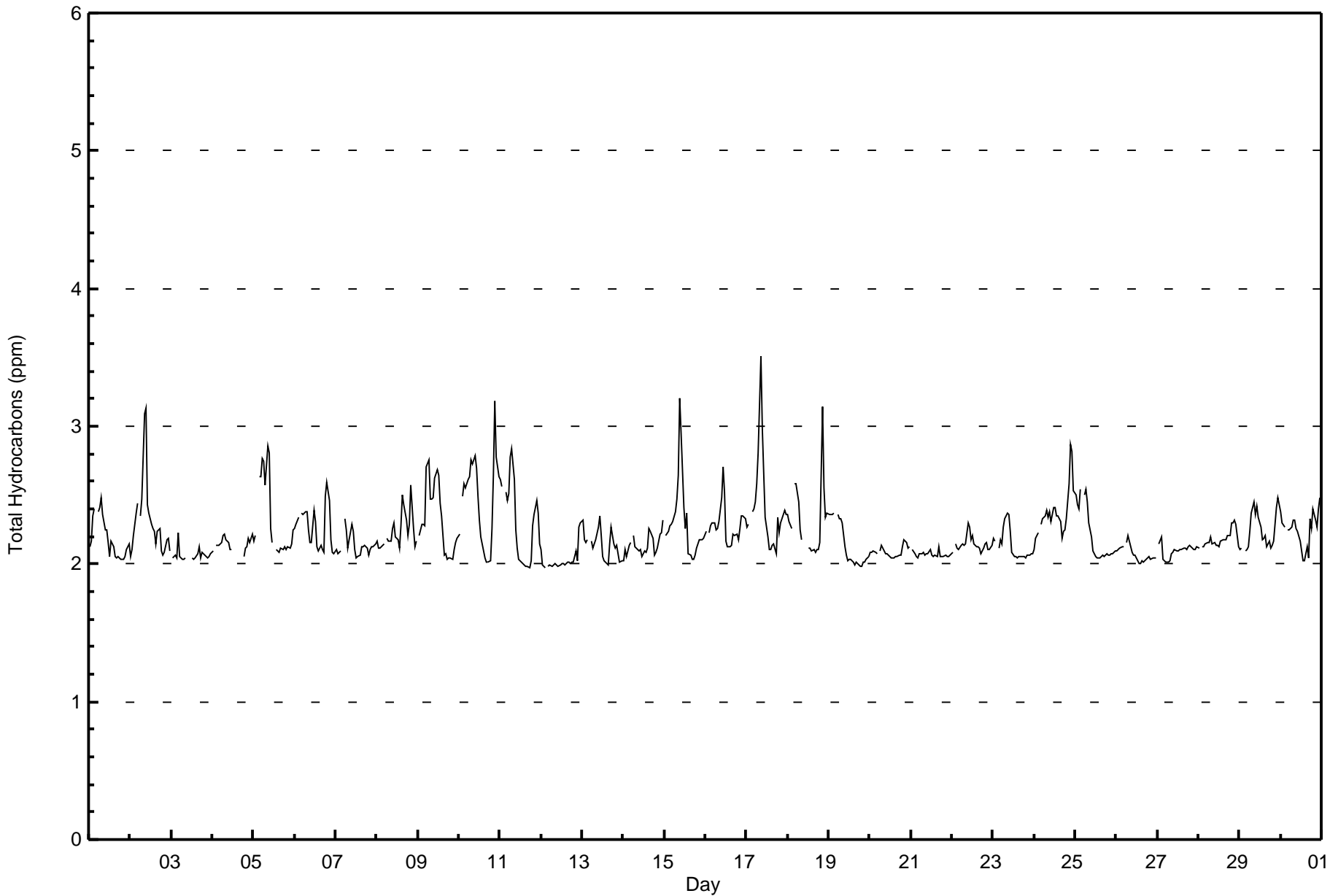


Total Number of Valid Hours: 678











**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	98	14.48	14.48
2.1 - 3.0	573	84.64	99.11
3.1 - 10.0	6	0.89	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 677

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - September 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	3	0	0	1	1	2	3	3	0	12	13	31	11	7	8	3	98
2.1 - 3.0	43	18	15	12	11	19	40	78	87	42	29	44	17	20	43	52	570
3.1 - 10.0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	2	6
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	18	15	13	12	21	43	81	90	54	42	75	28	27	51	57	674

Total Number of Valid Hours: 674

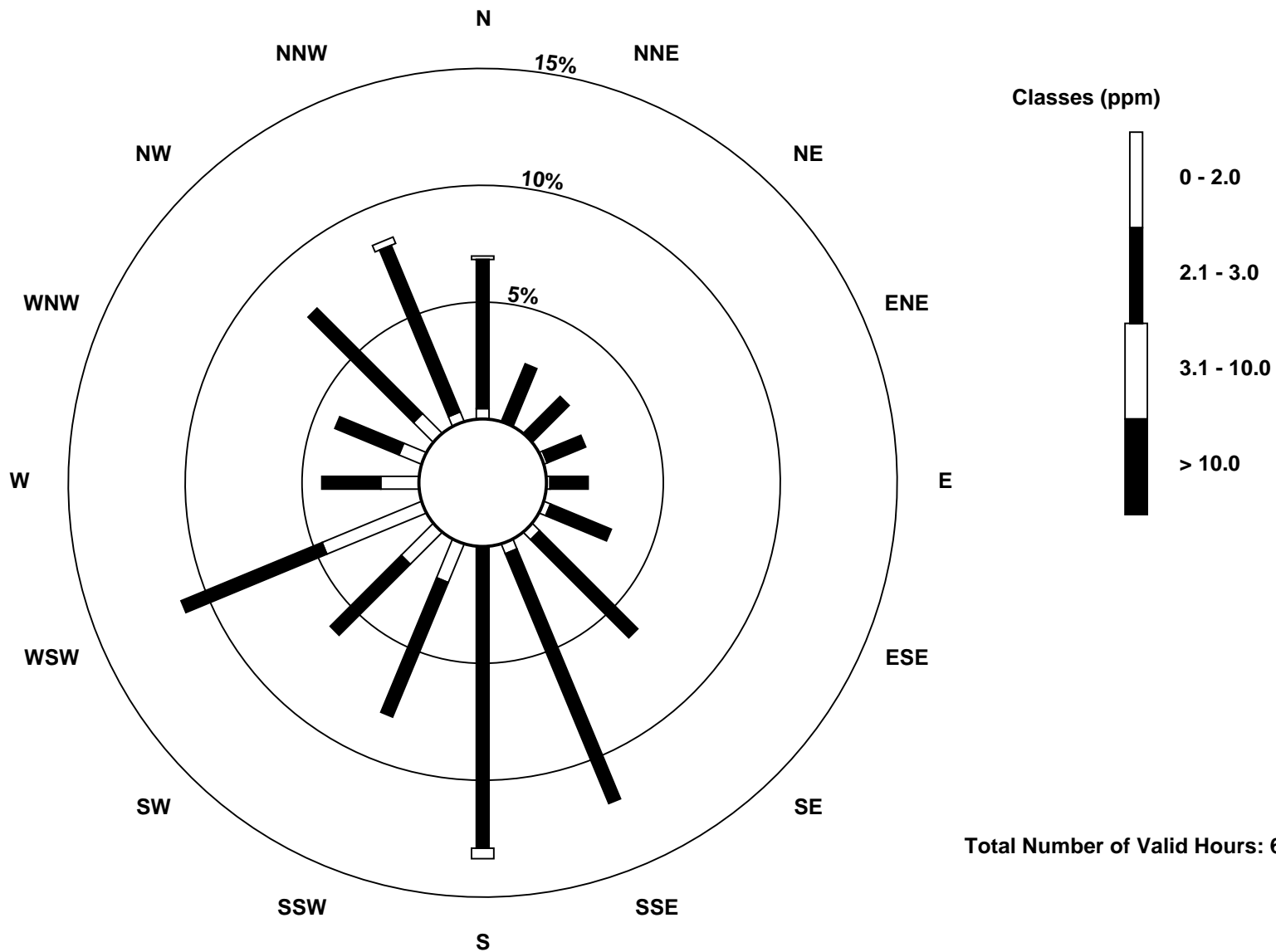
Total Number of Hours: 720



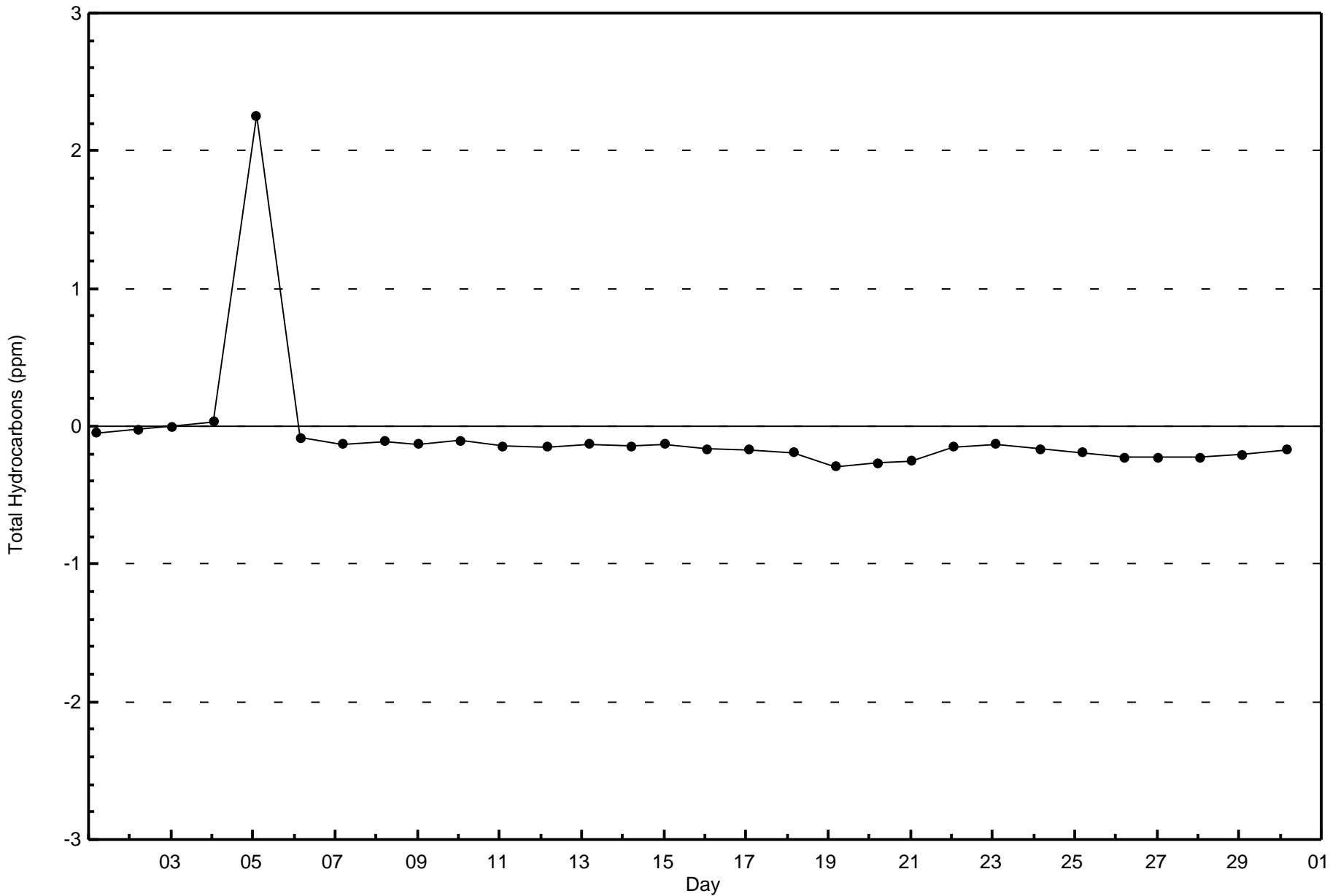


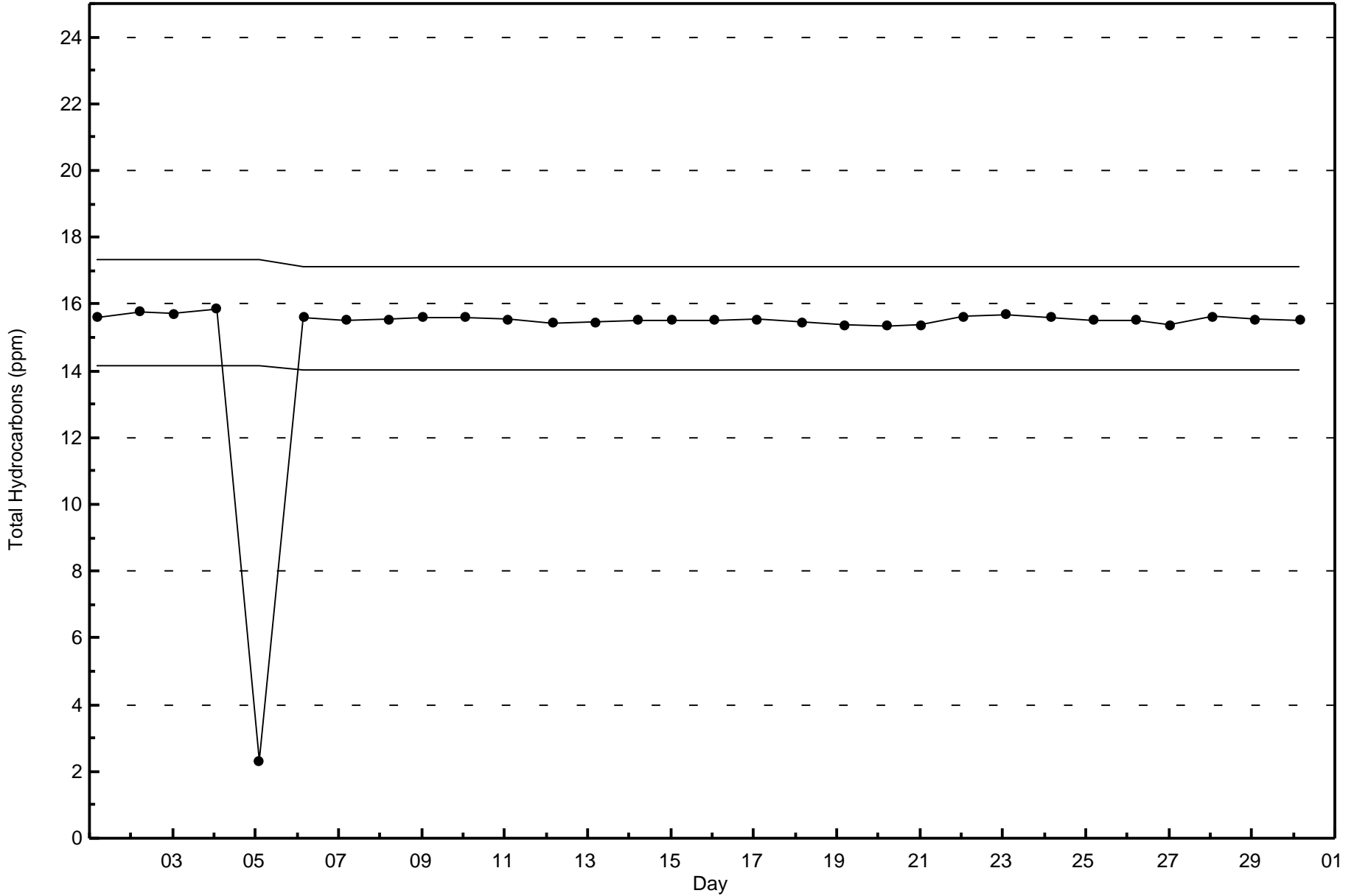
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Total Hydrocarbons (THC) - ppm  
Barge Landing (AMS 9)



Total Number of Valid Hours: 674





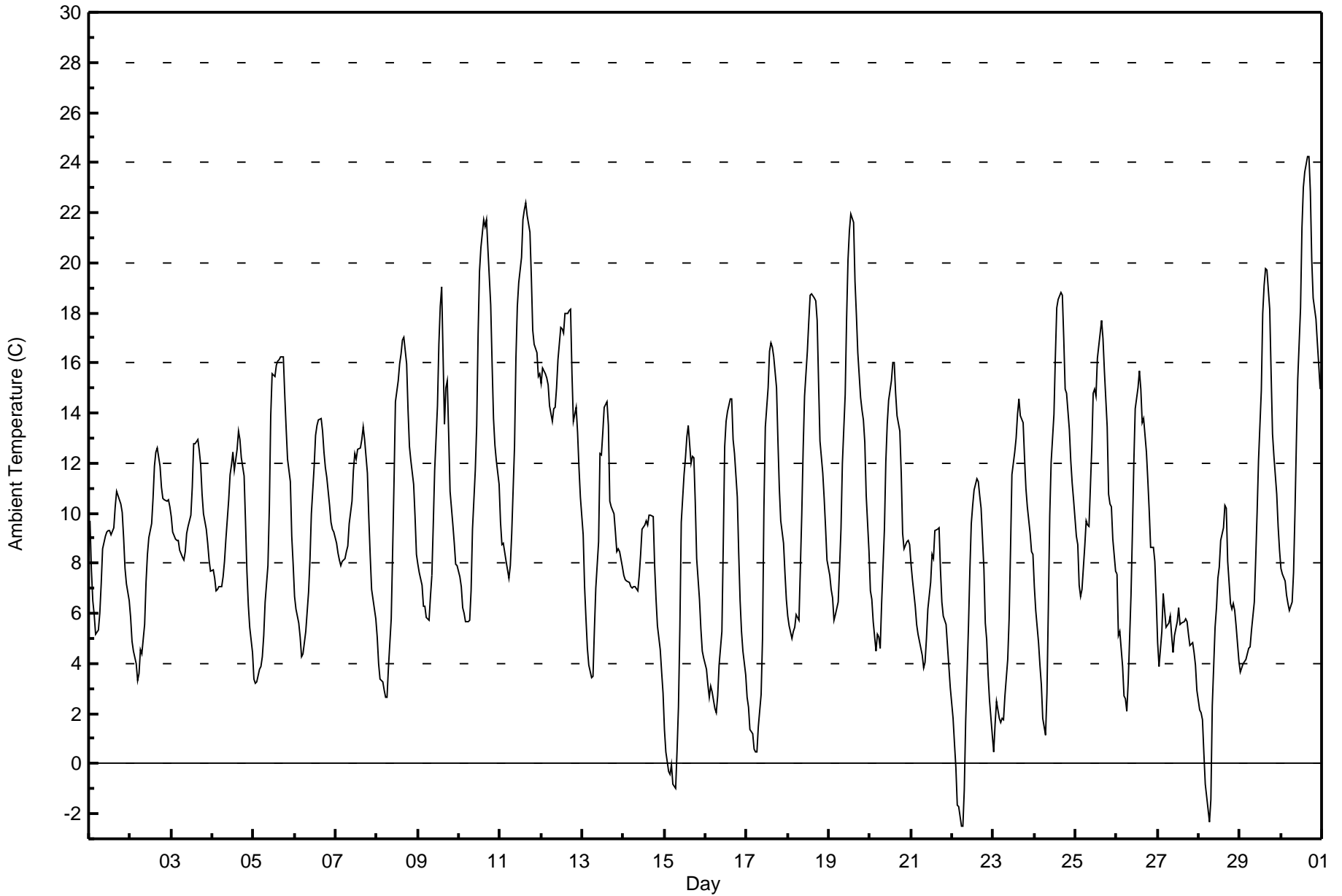


Maximum Value: 24.3 C on Sep 30 16:00		Maximum Daily Average: 15.3 C on Sep 12		Hours in Service: 720																							
Minimum Value: -2.5 C on Sep 22 06:00		Minimum Daily Average: 4.5 C on Sep 22		Hours of Data: 720																							
Maximum Diurnal Average: 15.2 C at hour 15		Minimum Diurnal Average: 4.6 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 9.53 C		Percentiles: P <sub>1</sub> = -1.0 P <sub>10</sub> = 3.4 Q <sub>1</sub> = 5.8 Median = 8.9 Q <sub>3</sub> = 13.0 P <sub>90</sub> = 16.5 P <sub>99</sub> = 22.0		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	9.7	7.8	6.5	5.9	5.1	5.4	6.0	7.2	8.6	9.1	9.3	9.3	9.3	9.1	9.4	10.2	10.9	10.7	10.4	10.0	9.0	7.8	7.2	6.5	8.4	10.9	
2-Sep	5.9	4.9	4.5	4.0	3.3	3.6	4.6	4.4	5.6	7.3	8.3	9.0	9.6	10.6	11.9	12.4	12.6	11.9	11.0	10.6	10.5	10.5	10.5	10.3	8.2	12.6	
3-Sep	9.9	9.3	9.0	8.9	8.9	8.5	8.2	8.1	8.5	9.2	9.4	9.9	11.0	12.7	12.7	12.9	12.5	11.9	10.7	10.0	9.3	8.8	8.1	7.7	9.9	12.9	
4-Sep	7.7	7.4	6.9	7.0	7.1	7.1	7.5	8.1	9.0	10.6	11.5	12.0	12.4	11.7	12.6	13.3	12.9	12.2	11.5	9.6	7.7	6.4	5.4	4.4	9.2	13.3	
5-Sep	3.4	3.2	3.3	3.7	3.9	4.3	5.1	6.5	7.9	10.2	13.9	15.5	15.5	15.9	16.1	16.1	16.3	16.2	14.7	13.4	12.1	11.2	9.1	8.0	10.2	16.3	
6-Sep	6.7	6.2	5.6	5.1	4.3	4.4	5.3	6.1	6.8	8.2	10.0	11.9	13.1	13.5	13.7	13.8	13.3	12.4	11.8	11.4	10.3	9.6	9.4	9.3	9.3	13.8	
7-Sep	8.8	8.4	8.1	7.9	8.1	8.2	8.5	8.7	9.6	10.5	11.7	12.4	12.2	12.6	12.6	12.9	13.4	13.0	11.6	9.8	8.3	6.9	6.6	5.8	9.9	13.4	
8-Sep	5.1	4.0	3.4	3.3	2.9	2.6	2.6	3.8	5.8	8.5	11.2	14.5	15.3	16.0	16.3	16.9	17.0	15.9	14.1	12.6	12.1	11.1	9.8	8.3	9.7	17.0	
9-Sep	8.0	7.6	7.1	6.3	6.3	5.8	5.7	6.7	7.5	9.5	11.7	14.3	16.7	18.2	19.0	13.6	15.0	15.3	13.2	10.9	9.5	8.8	7.9	7.9	10.5	19.0	
10-Sep	7.5	7.1	6.2	6.0	5.7	5.7	5.7	6.9	9.3	11.7	13.5	17.1	19.6	20.6	21.7	21.4	21.7	20.6	18.3	15.9	13.8	12.7	12.1	11.1	13.0	21.7	
11-Sep	9.6	8.8	8.8	8.1	7.7	7.4	7.9	9.2	12.6	16.2	18.2	19.2	20.2	21.7	22.1	22.4	21.9	21.2	19.4	17.3	16.7	16.4	15.5	15.5	15.2	22.4	
12-Sep	15.2	15.8	15.6	15.4	15.1	14.3	13.7	14.2	14.2	15.0	16.1	17.4	17.4	17.2	18.0	18.0	18.1	18.1	15.6	13.7	14.3	13.2	11.8	10.7	15.3	18.1	
13-Sep	9.1	7.1	5.8	4.6	3.9	3.4	3.5	5.3	7.0	8.8	12.4	12.3	13.2	14.2	14.5	13.5	10.5	10.2	10.0	9.2	8.4	8.6	8.4	7.8	8.8	14.5	
14-Sep	7.5	7.3	7.3	7.2	7.1	7.0	7.1	7.1	6.9	7.5	8.4	9.3	9.5	9.7	9.5	9.9	9.9	9.9	7.9	6.6	5.5	4.6	3.7	2.8	7.5	9.9	
15-Sep	1.4	0.5	-0.3	-0.4	0.0	-0.8	-1.0	0.5	2.2	5.4	9.6	11.6	12.2	13.1	13.5	12.0	12.2	12.2	10.4	8.2	6.5	5.4	4.5	4.2	6.0	13.5	
16-Sep	3.8	3.1	2.7	3.1	2.9	2.2	2.0	2.7	3.9	5.3	8.8	12.7	13.7	14.1	14.6	14.6	13.0	12.4	10.7	8.4	6.5	5.3	4.5	3.5	7.3	14.6	
17-Sep	2.7	2.3	1.4	1.2	0.6	0.5	0.5	1.5	2.8	5.0	10.2	13.5	15.0	16.5	16.8	16.6	16.2	15.0	12.9	11.0	9.7	8.8	7.6	6.5	8.1	16.8	
18-Sep	5.9	5.5	5.0	5.3	5.5	5.9	5.8	7.8	9.9	12.6	14.6	16.5	17.7	18.7	18.7	18.6	18.5	17.7	15.2	12.9	11.6	10.6	9.4	8.2	11.6	18.7	
19-Sep	7.5	6.9	6.6	5.7	6.0	6.5	7.8	9.4	12.0	14.7	17.8	20.1	21.2	21.9	21.6	19.2	17.9	16.4	14.6	14.1	13.7	12.8	10.7	8.5	13.1	21.9	
20-Sep	6.9	6.6	5.7	4.5	5.2	5.1	4.6	6.4	9.4	12.1	13.5	14.5	15.3	16.0	16.0	14.8	13.9	13.3	11.6	9.2	8.6	8.9	8.9	8.7	10.0	16.0	
21-Sep	8.0	7.3	6.3	5.5	5.2	4.9	4.3	3.8	4.1	5.0	6.2	7.2	8.3	8.2	9.3	9.3	9.4	7.8	6.5	5.9	5.6	4.7	3.9	3.1	6.2	9.4	
22-Sep	1.8	0.8	-0.2	-1.6	-1.7	-2.5	-2.5	-1.0	1.7	5.5	7.7	9.6	10.3	10.9	11.4	11.2	10.7	10.2	7.8	5.6	5.0	3.5	2.5	1.2	4.5	11.4	
23-Sep	0.5	1.6	2.5	1.8	1.7	1.8	1.8	2.7	4.2	5.8	8.5	11.6	12.5	13.0	14.0	14.6	13.9	13.6	12.2	11.0	10.2	9.2	8.5	8.3	7.7	14.6	
24-Sep	7.1	6.1	4.9	3.9	3.2	1.8	1.2	2.8	6.2	9.9	12.0	14.0	16.2	18.2	18.6	18.8	18.7	17.0	15.0	14.8	13.3	12.1	11.2	10.6	10.7	18.8	
25-Sep	9.1	8.8	7.1	6.7	7.0	8.7	9.7	9.6	9.5	12.6	14.8	14.9	14.7	16.2	17.2	17.7	17.0	15.7	13.4	10.7	10.4	10.3	9.0	7.7	11.6	17.7	
26-Sep	7.6	5.1	5.3	3.9	2.7	2.6	2.1	3.3	6.7	9.3	12.0	14.1	15.0	15.7	15.0	13.6	13.8	12.4	11.3	10.1	8.6	8.6	8.1	6.6	8.9	15.7	
27-Sep	4.8	3.9	5.3	6.8	6.1	5.4	5.6	5.9	5.1	4.4	5.1	5.7	6.2	5.6	5.6	5.7	5.8	5.7	5.2	4.7	4.8	4.5	3.9	2.9	5.2	6.8	
28-Sep	2.2	2.0	1.7	0.4	-0.8	-1.8	-2.3	-1.4	2.3	5.5	6.2	7.4	7.8	8.9	9.4	10.3	10.2	8.1	6.4	6.2	6.4	6.1	5.5	4.1	4.6	10.3	
29-Sep	3.7	3.8	4.0	4.2	4.4	4.6	4.7	5.3	6.5	8.2	10.0	12.1	14.9	18.0	19.1	19.8	19.7	18.1	15.6	13.2	12.3	10.8	9.5	8.5	10.4	19.8	
30-Sep	7.8	7.6	7.3	6.8	6.4	6.1	6.5	7.6	10.0	12.8	15.3	18.2	21.4	23.0	23.6	24.3	24.3	22.9	20.1	18.6	17.7	16.8	15.9	15.0	14.8	24.3	
		6.5	5.9	5.4	5.0	4.8	4.6	4.7	5.6	7.2	9.2	11.3	12.9	13.9	14.7	15.2	15.0	14.7	13.9	12.3	10.9	9.9	9.2	8.3	7.5	Diurnal Average	
		15.2	15.8	15.6	15.4	15.1	14.3	13.7	14.2	14.2	16.2	18.2	20.1	21.4	23.0	23.6	24.3	24.3	22.9	20.1	18.6	17.7	16.8	15.9	15.5	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Barge Landing - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Barge Landing - September 2015**

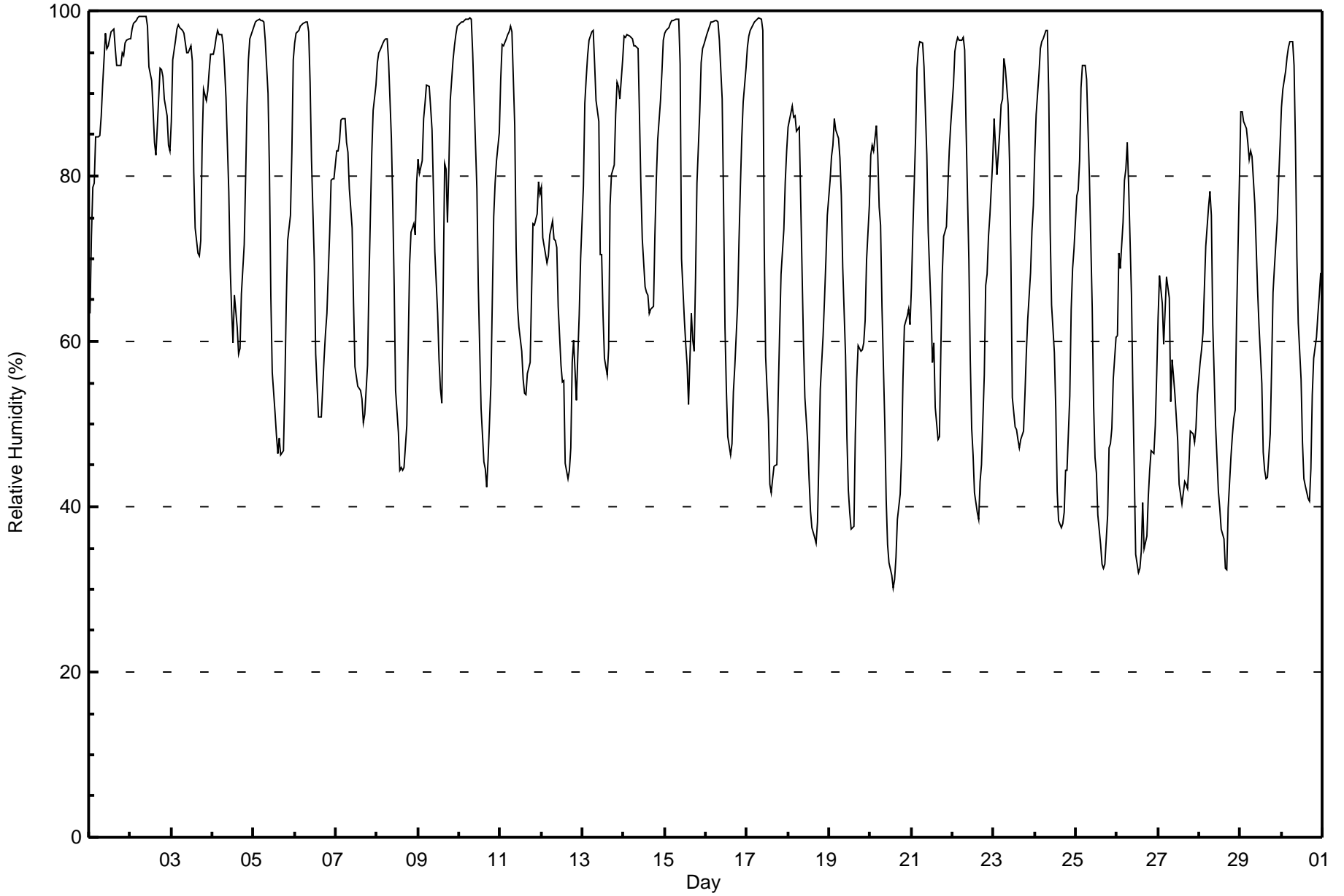
<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	15	2.08	2.08
0 - 10	408	56.67	58.75
10 - 20	275	38.19	96.94
> 20	22	3.06	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 99 % on Sep 2 07:00																		Maximum Daily Average: 93.0 % on Sep 2																		Hours in Service: 720			
Minimum Value: 30 % on Sep 20 14:00																		Minimum Daily Average: 52.8 % on Sep 27																		Hours of Data: 720			
Maximum Diurnal Average: 91.2 % at hour 7																		Minimum Diurnal Average: 49.7 % at hour 15																		Hours of Missing Data: 0			
Monthly Average: 72.7 %																		Percentiles: P <sub>1</sub> = 33 P <sub>10</sub> = 44 Q <sub>1</sub> = 56 Median = 74 Q <sub>3</sub> = 92 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-Sep	63	73	79	79	85	85	85	87	91	97	95	96	97	97	98	95	93	93	93	95	95	96	96	97	90.0	98													
2-Sep	97	98	98	99	99	99	99	99	99	99	98	93	92	88	84	83	86	93	93	92	89	87	84	83	93.0	99													
3-Sep	87	94	96	98	98	98	98	97	96	95	95	96	94	81	74	71	70	72	84	90	89	90	93	95	89.6	98													
4-Sep	95	96	97	98	97	97	96	93	89	78	69	64	60	66	62	58	59	66	72	80	89	94	97	98	82.0	98													
5-Sep	98	99	99	99	99	99	99	96	90	81	65	56	51	49	46	48	46	47	55	65	72	75	83	94	75.5	99													
6-Sep	96	97	98	98	98	99	99	99	97	91	82	70	59	55	51	51	54	58	61	63	73	79	80	80	78.6	99													
7-Sep	83	83	84	87	87	87	84	83	78	74	65	57	56	54	54	53	50	51	57	67	75	83	88	91	72.1	91													
8-Sep	94	95	95	96	96	97	97	94	85	76	67	54	49	44	45	44	45	50	59	69	73	74	73	79	72.9	97													
9-Sep	82	80	82	87	89	91	91	88	86	78	71	63	58	54	53	81	81	74	81	89	94	96	97	98	81.0	98													
10-Sep	98	99	99	99	99	99	99	99	95	84	78	67	59	52	45	45	42	46	55	65	75	79	82	85	76.9	99													
11-Sep	92	96	96	97	97	97	98	97	86	71	64	62	59	55	54	54	56	57	66	74	74	75	79	78	76.5	98													
12-Sep	79	73	71	69	70	73	75	72	72	71	64	57	55	55	45	43	44	47	57	60	53	58	63	70	62.4	79													
13-Sep	79	89	92	95	96	97	98	93	89	87	70	71	63	58	56	59	77	80	81	87	91	91	89	94	82.6	98													
14-Sep	97	97	97	97	97	97	96	96	95	87	79	72	67	66	66	63	64	64	73	79	84	89	93	96	83.8	97													
15-Sep	97	98	98	99	99	99	99	99	99	94	70	63	60	57	52	63	60	59	68	79	88	94	95	96	82.6	99													
16-Sep	97	98	98	99	99	99	99	99	96	89	76	62	54	48	46	48	54	57	64	72	79	85	89	93	79.2	99													
17-Sep	96	97	98	98	99	99	99	99	99	98	72	58	51	43	42	43	45	45	54	61	68	74	79	83	74.9	99													
18-Sep	86	87	88	87	87	85	86	77	69	60	53	48	43	39	37	36	36	38	46	54	61	65	70	75	63.1	88													
19-Sep	79	82	84	87	86	85	82	78	69	58	48	42	39	37	38	49	55	60	59	59	60	63	70	76	64.4	87													
20-Sep	82	84	83	86	83	76	74	64	50	41	35	33	32	30	31	34	38	42	46	56	62	63	64	62	56.3	86													
21-Sep	67	73	85	93	95	96	96	93	88	83	73	64	57	60	52	48	48	59	68	73	74	79	83	86	74.7	96													
22-Sep	91	95	96	97	97	97	97	95	86	70	58	49	46	42	39	38	43	45	56	67	68	73	75	82	70.9	97													
23-Sep	87	84	80	85	89	89	94	93	89	82	70	53	50	49	48	47	48	49	54	59	63	68	73	76	70.0	94													
24-Sep	83	88	92	95	96	97	98	98	90	74	64	59	52	42	38	37	38	39	44	44	53	64	69	71	67.7	98													
25-Sep	78	78	82	91	93	93	92	86	80	64	52	46	44	39	36	33	33	33	39	47	48	49	55	61	60.5	93													
26-Sep	61	71	69	74	80	81	84	79	66	54	44	34	32	33	34	41	35	37	41	44	47	46	50	56	53.8	84													
27-Sep	63	68	65	60	64	68	65	53	58	56	54	48	43	42	40	43	43	42	45	49	49	48	50	54	52.8	68													
28-Sep	58	59	61	66	72	76	78	75	62	50	46	42	40	37	36	33	32	40	46	49	51	52	63	79	54.2	79													
29-Sep	88	88	87	86	84	82	83	82	77	71	66	62	55	47	44	43	43	49	57	66	69	75	80	84	69.5	88													
30-Sep	88	90	93	94	96	96	96	93	84	70	62	55	48	43	42	41	41	45	54	58	61	63	66	68	68.7	96													
	84.6	86.9	88.0	89.8	90.8	91.1	91.2	88.6	83.6	76.1	66.9	59.9	55.4	52.1	49.7	50.9	52.0	54.6	60.9	67.1	70.9	74.3	77.6	81.3	Diurnal Average														
	98	99	99	99	99	99	99	99	99	99	99	98	96	97	97	98	95	93	93	93	95	95	96	97	98	Diurnal Maximum													







Maximum Speed: 19 km/h on Sep 26 17:00	Maximum Daily Speed Average: 9.6 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 9 00:00	Minimum Daily Speed Average: 0.5 km/h on Sep 15	Hours of Data: 712
Maximum Diurnal Speed Average: 4.1 km/h at hour 12	Minimum Diurnal Speed Average: 0.7 km/h at hour 24	Hours of Missing Data: 8
Monthly Average Velocity: 2.0 km/h 231.6 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 3 Median = 5 Q <sub>3</sub> = 7 P <sub>90</sub> = 10 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-Sep	W3	SW2	ESE4	SE3	E1	SSE4	SE3	NNW1	SE3	NE4	N6	N6	NNW7	WNV6	WSW6	WSW7	SSW4	SSW4	SSW4	SSW5	SSW5	SSW4	S7	SSW3	SW1.4	NNW7	
2-Sep	SSW2	S5	SE4	S2	SE5	NNE1	NW2	SE3	N3	NNW2	NNE8	NNE8	NE7	NE7	NNE8	NE6	NNE2	NNW4	NNW10	NNW10	NNW10	N8	N8	N7	NNE3.6	NNW10	
3-Sep	NNW5	NNW7	NNW7	NW6	WNV4	WNV6	NW6	NW6	NW7	WNV7	W7	W8	WNV9	WNV11	NW12	NNW10	NNW9	NW8	NNW4	NW3	WNV3	W3	W3	WSW3	WNV6.1	NW12	
4-Sep	WSW5	W3	W2	W4	NW3	NW3	NW3	WNV3	NW3	WNV3	NW3	C	C	C	C	C	C	C	N4	NNW1	E1	S1	S1	WSW1	SSE1	---	WSW5
5-Sep	SSE2	SE2	SSE2	SSE3	SSE3	SE1	SSE4	S4	SSE5	SSE5	SSE5	SSW7	S7	S5	SSE5	SSE5	ESE3	SSE4	SSE3	SE2	S1	ESE1	NNE1	N2	SSE3.1	SSW7	
6-Sep	N2	NNW3	N4	NNW3	ENE1	N1	NNW2	NNW3	NNW6	NNW6	NNW4	N4	NNE6	NNE6	NNE7	NNE7	ENE7	ENE7	NE6	N5	NNW4	NNW5	NNW4	N3.8	NNE7		
7-Sep	NNW4	NNW5	NW3	NNW3	NNW3	NNW4	NNW5	NNW5	N5	NNE6	NNE6	N8	N8	N8	N8	NNE8	NNE9	NE8	NE5	SE1	WSW1	SW2	WSW3	WSW3	N4.0	NNE9	
8-Sep	W3	W2	SSW3	SW4	SSW2	SSW3	SW2	SW2	S1	SSE2	WSW3	SW4	WNV5	ENE3	E3	NE3	E2	ENE2	E2	N3	ESE2	SE4	SSE4	WNV0	S0.8	WNV5	
9-Sep	ESE3	SE6	SSE5	SSE6	S5	S4	S5	SSE4	SSE5	S6	S7	S8	S8	S8	SSE8	ESE2	SE7	ESE6	SE6	SE4	E2	SSE2	SSE5	SSE4	SSE5.0	S8	
10-Sep	SSE5	S5	S4	S5	S5	S6	SSE5	S6	S7	S8	S8	S8	S8	SSW7	SSW9	SSW8	SW8	SW7	SSW5	S4	SSE4	S5	S4	S3	S5.7	SSW9	
11-Sep	E0	SW2	SSW4	SSE5	SSE5	SSW3	SSW3	S3	SW5	SW8	SW8	SW7	SW9	SW10	SW10	SW9	SW9	SW6	SSE4	S5	S5	SSE5	SSW2	SW4	SSW4.9	SW10	
12-Sep	SSW3	SW3	SW5	WSW5	W6	WSW6	SSE3	SSW3	SSW3	SSW4	WSW6	WSW7	WSW5	WSW6	W9	WSW11	WSW13	WSW10	WSW6	WNV4	N7	N6	N5	N4	WSW4.3	WSW13	
13-Sep	NW2	WSW3	W4	W2	WNV3	NW3	WSW2	SSW2	W2	SW4	NW3	W2	NNW4	ENE3	NW3	W6	NNE7	ESE3	SW2	NW3	W3	NW5	NNW4	NNW6	WNV2.0	NNE7	
14-Sep	N4	N5	N5	N6	N6	N6	N6	N7	N7	N7	N8	N7	NNE6	NNE6	NNE6	NE5	NE4	ENE4	E3	ENE3	ESE3	ENE2	NNE2	ENE1	NNE4.4	N8	
15-Sep	SSE1	NE0	N1	NNW1	ESE1	S1	NNW1	NNW2	NNW3	NNW3	NW5	NNW4	NE4	NE3	S4	SSW3	NW1	SSE5	SSE3	E2	ENE0	NE1	N0	N1	N0.5	NW5	
16-Sep	N1	WNV1	NNW2	NW2	WNV2	SW2	WSW3	WSW2	WSW3	S1	SW2	WSW5	NNW3	E5	ESE2	SSE8	S8	SSE7	SSE5	SSE7	SSE6	SSE5	SE5	SSE2	S2.0	S8	
17-Sep	SE2	S3	S3	SSE4	SSE5	S3	S3	S3	S5	SSE6	S6	S9	SSW8	SSW9	SSW8	S7	S8	SSW6	S6	S7	SSE7	S6	SSE5	SSE5	S5.5	SSW9	
18-Sep	SSE5	SE4	SSE4	SSE4	SSE5	S6	S6	SSW7	SSW7	SW9	SW10	WSW12	WSW13	WSW12	WSW12	WSW12	WSW12	WSW11	SW6	S6	S7	S7	SSE5	SSE4	SW6.2	WSW13	
19-Sep	S5	SSE7	S6	SSE6	S4	SSE5	S8	S7	S9	SSW10	SW13	WSW15	WSW14	SW16	WSW15	W14	WSW10	WSW12	SW14	WSW15	WSW13	W9	WSW3	WNV2	SW8.1	SW16	
20-Sep	SSE3	SSW7	SSW5	SW5	WSW11	WSW11	SSW7	S8	WSW11	WSW12	WSW15	WSW16	WSW17	WSW18	W13	WNV11	NNW9	NW6	NW5	N3	NNW4	NNW4	NNW4	WNV6	WSW6.6	WSW18	
21-Sep	W5	NW4	NW4	WNV4	WNV5	NW5	N8	N7	N6	N6	NNW6	NNW10	NNW11	NNW8	N10	NNW8	NNW9	WNV8	NW7	WNV5	NW5	NNW3	NNW4	NW5	NNW6.0	NNW11	
22-Sep	NW4	WNV4	WNV3	WSW3	WNV2	WSW3	SSW1	SW4	SW3	SW5	S6	S4	SSE1	ESE3	S3	SSW7	S4	SE5	ESE4	SE6	SE6	SE6	SSE5	ESE3	S2.3	SSW7	
23-Sep	E2	ESE4	E3	NE1	E1	ENE1	N2	NNW3	NNW3	NNW4	WNV2	SSE9	SE9	SE8	ESE7	S6	ESE9	ESE10	SE10	SE10	SE9	SSE7	SE7	SSE8	SE4.4	SE10	
24-Sep	SSE6	SE3	NNW1	N3	N3	WNV2	NE1	SE2	S5	SSW9	S8	SSW9	SSW9	SSW9	S9	SE6	SE6	ESE4	E4	E3	N2	NNW3	N3	NNW4	S2.3	SSW9	
25-Sep	NNW4	NNW4	NW2	WSW2	S2	SSW7	SSW5	WSW8	SW3	WSW7	SW5	WSW10	WSW11	WSW12	WSW14	WSW14	WSW12	W9	WSW5	SSW4	SW5	SW6	SW5	WSW8	WSW6.1	WSW14	
26-Sep	SW6	S4	SSW5	S4	S5	SW4	SW5	SSW6	SW8	WSW11	WSW12	WSW14	W16	WSW17	WSW17	WSW18	W19	W15	WSW14	WSW10	WSW8	WSW12	WSW12	WNV4	WSW9.6	W19	
27-Sep	SSE3	SE6	SSW6	WSW11	WSW9	WSW9	W11	WNV16	NW17	NW17	NW16	NW15	NW18	NW17	NW15	NW13	NW11	NW11	NW6	NW6	NW11	NW13	NW10	NW9	WNV9.6	NW18	
28-Sep	WNV7	NW6	NW5	WNV4	W4	W2	W4	W5	WSW3	W3	W4	SW6	WSW3	S5	SSE7	S6	SSE5	SE5	SSE6	SSE6	SSE6	SE4	ESE5	ESE5	SSW2.1	SSE7	
29-Sep	SE5	SE4	SE5	SE5	SE4	SSE4	S5	S4	S6	S5	S5	S5	S6	SSW7	S7	SSE7	S8	SSE6	SSE6	SSE5	SSE5	SE6	SE5	SE5	SSE5.2	S8	
30-Sep	SE5	SSE5	SSE5	SSE6	SSE5	SSE5	SSW5	S7	S8	S9	S10	SSE11	S12	SSW15	SSW14	SSW13	SSW12	S8	S7	S8	S8	S8	S7	SSE7	S8.0	SSW15	

SSW0.9SSW0.9SSW1.2 SW1.5 SW1.6 SW2.0 SW1.6 SW2.0WSW2.0WSW2.8WSW3.2WSW4.1WSW3.9WSW3.7WSW3.8WSW3.7 SW2.8 SW2.1SSW1.6SSW1.5SSW1.6 SW1.3SSW1.0WSW0.7	Diurnal Average
WNV7 SSE7 NNW7 WSW11WSW11WSW11 W11WNV16 NW17 NW17 NW16WSW16 NW18WSW18WSW17WSW18 W19 W15WSW14WSW15WSW13 NW13WSW12 NW9	Diurnal Maximum

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



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

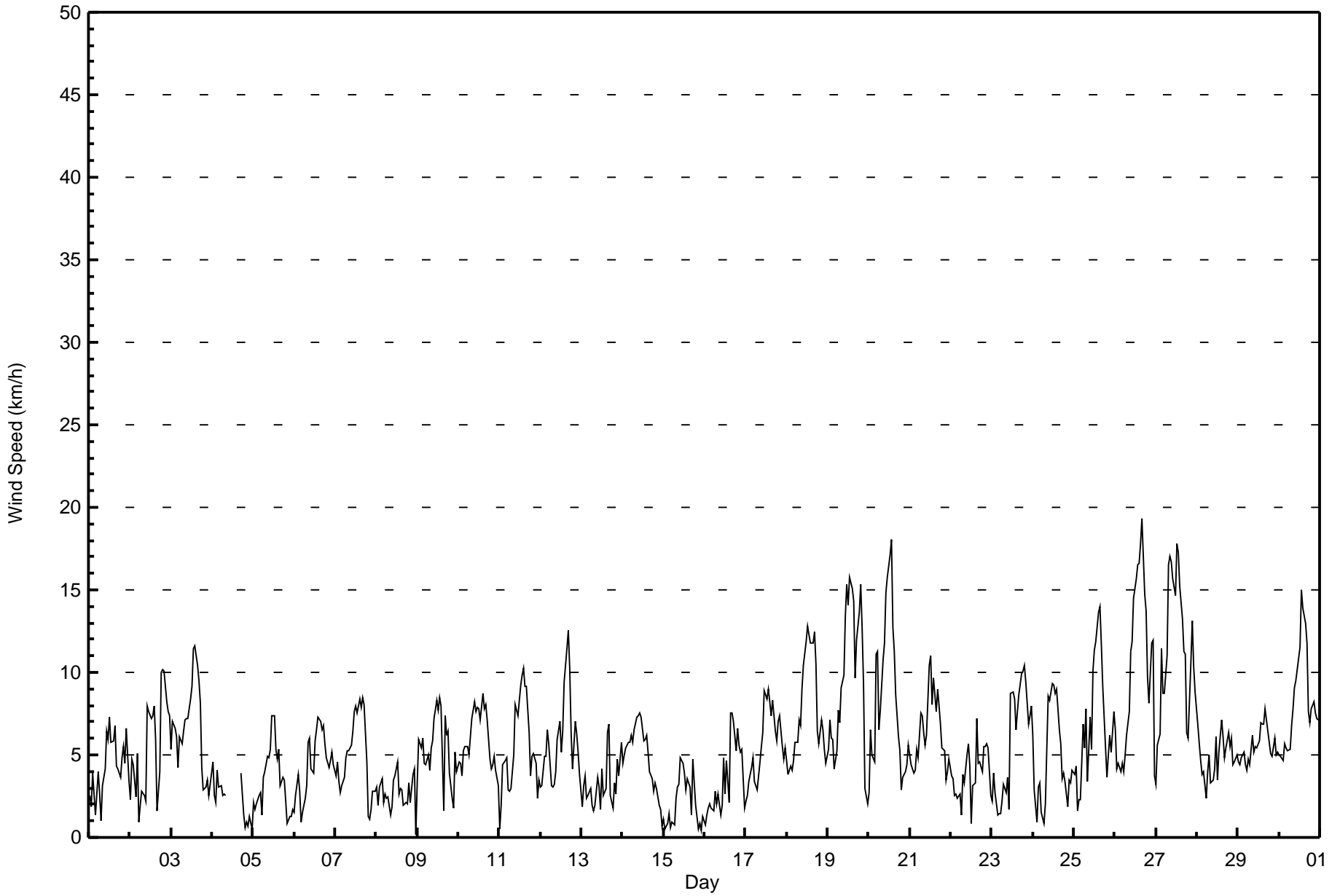
**Wind Speed (WS) - km/h**  
**Barge Landing - September 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 8 km/h on Sep 27 08:00	Hours of Data: 712
Minimum Value: 0 km/h on Sep 23 09:00	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> = 3 P <sub>90</sub> = 4 P <sub>99</sub> = 6	Hours of Calibration: 8
	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-Sep	1	1	1	2	1	2	1	2	2	2	2	2	2	3	2	2	2	1	1	2	2	1	2	2	3
2-Sep	2	2	1	2	2	1	2	1	1	1	3	2	3	3	3	2	1	1	3	3	3	2	2	2	3
3-Sep	1	2	1	2	2	2	2	2	2	3	3	3	4	5	4	4	4	3	3	1	1	1	1	1	5
4-Sep	1	1	1	1	1	1	1	1	1	C	C	C	C	C	C	C	C	2	1	1	1	1	1	1	2
5-Sep	1	1	2	1	2	1	2	1	2	2	2	3	3	2	2	2	2	2	1	1	1	1	1	1	3
6-Sep	1	1	1	2	1	1	1	1	1	2	1	2	2	2	2	2	2	2	2	1	1	1	1	1	2
7-Sep	1	1	1	1	1	1	1	1	1	2	2	2	3	3	3	2	3	3	2	1	1	1	1	2	3
8-Sep	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	2
9-Sep	2	1	1	1	1	2	1	1	1	2	2	3	2	3	3	4	2	2	1	1	1	1	1	1	4
10-Sep	1	1	1	1	2	2	1	2	2	2	3	3	2	3	3	3	3	3	1	1	1	1	1	1	3
11-Sep	1	2	1	1	1	1	1	1	2	3	3	3	3	3	3	3	3	2	1	1	1	1	2	1	3
12-Sep	2	2	2	2	2	2	1	1	2	2	2	2	2	2	4	4	4	3	1	2	2	1	1	1	4
13-Sep	1	2	1	1	1	1	2	1	1	1	2	1	1	2	1	3	3	2	1	1	1	2	2	1	3
14-Sep	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2
15-Sep	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	3	1	1	1	1	1	3
16-Sep	1	1	1	1	1	1	1	1	1	1	2	1	1	2	2	3	3	3	1	1	1	1	1	1	3
17-Sep	1	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	2	1	2	2	2	1	1	3
18-Sep	1	1	1	1	1	1	2	2	2	3	3	4	4	4	4	4	4	4	2	1	2	1	1	1	4
19-Sep	1	2	2	1	1	1	2	3	3	4	6	5	5	5	6	6	3	4	4	5	4	4	2	2	6
20-Sep	2	2	2	2	4	3	2	2	4	4	5	5	5	6	5	4	3	2	2	1	1	1	1	2	6
21-Sep	2	1	2	2	2	2	3	2	2	2	3	3	4	4	3	3	4	3	3	2	2	1	1	1	4
22-Sep	1	1	2	2	1	1	2	2	2	2	2	2	2	2	2	3	2	1	1	2	1	1	1	1	3
23-Sep	2	1	1	1	1	1	1	1	0	1	2	3	3	3	2	3	3	3	3	3	3	1	2	2	3
24-Sep	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3	2	2	1	1	1	1	1	1	1	3
25-Sep	1	1	1	1	1	2	2	3	2	3	2	5	3	4	4	5	4	3	2	1	2	2	1	2	5
26-Sep	3	1	1	1	1	2	1	2	3	4	4	5	6	7	6	6	7	5	4	3	3	4	4	3	7
27-Sep	1	1	2	5	3	3	4	8	6	7	6	6	7	7	6	5	5	4	3	2	5	5	4	3	8
28-Sep	2	2	2	2	2	1	2	1	1	1	3	3	2	2	3	2	2	1	1	1	1	1	1	1	3
29-Sep	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	2	3	1	1	1	1	1	1	1	3
30-Sep	1	1	1	1	1	1	2	2	3	3	3	4	4	5	5	5	4	2	2	2	2	2	2	1	5
	3	2	2	5	4	3	4	8	6	7	6	6	7	7	6	6	7	5	4	5	5	5	4	3	

Diurnal Maximum

C - Calibration





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Barge Landing - September 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	401	56.32	56.32
6 - 11	257	36.10	92.42
12 - 19	54	7.58	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: 712

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Barge Landing - September 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	25	4	10	11	14	18	28	60	45	30	24	23	19	20	25	45	401
6 - 11	25	15	5	2	0	4	16	26	49	22	18	25	8	10	17	15	257
12 - 19	0	0	0	0	0	0	0	0	1	4	3	30	5	1	10	0	54
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>	50	19	15	13	14	22	44	86	95	56	45	78	32	31	52	60	712

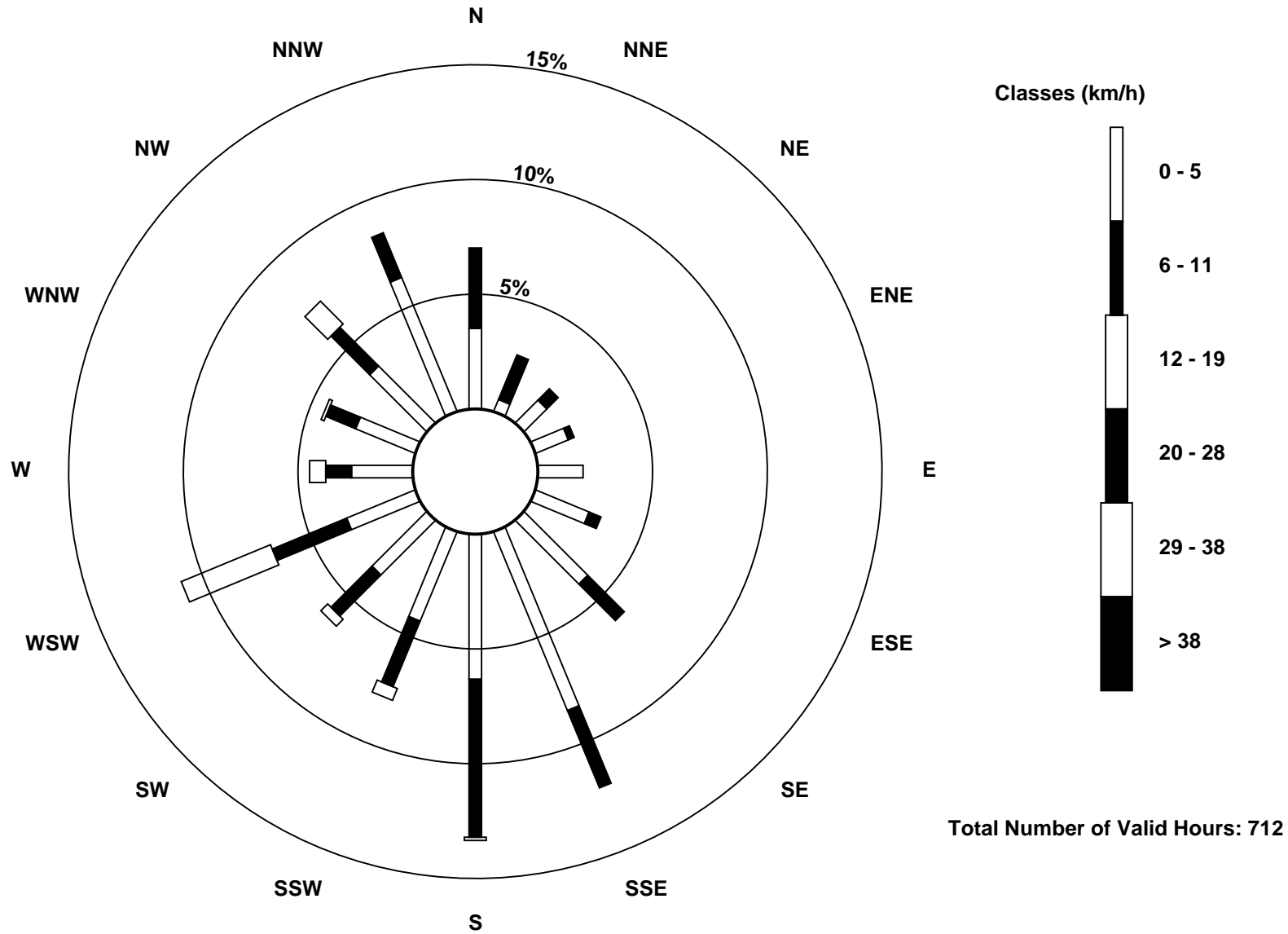
Total Number of Valid Hours: 712

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Wind Speed (WS) - km/h  
Barge Landing (AMS 9)





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Barge Landing - September 2015**

Direction of Maximum Speed: 260 deg on Sep 26 17:00															Hours in Service: 720	
Direction of Maximum Daily Speed Average: 302.3 deg on Sep 27															Hours of Data: 712	
Direction of Minimum Speed: 290 deg on Sep 9 00:00															Hours of Missing Data: 8	
Direction of Minimum Daily Speed Average: 0.5 deg on Sep 15															Percent Operational Time: 100.0	
Monthly Average Direction: 255.4 deg																

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	270	235	120	126	96	150	138	336	137	37	10	354	332	290	257	255	210	209	201	195	204	197	185	213	222.4
2-Sep	204	172	136	172	136	20	311	133	11	333	32	25	37	38	33	40	14	343	348	348	347	356	353	350	14.3
3-Sep	337	333	336	314	297	297	309	306	311	296	280	261	283	302	305	301	310	308	330	321	282	275	270	255	302.0
4-Sep	245	280	266	259	315	314	314	282	315	C	C	C	C	C	C	C	C	3	341	100	184	187	256	153	--
5-Sep	157	130	148	147	147	136	148	177	160	164	164	192	178	169	159	149	110	161	151	138	174	118	19	1	158.5
6-Sep	359	346	350	345	75	351	347	333	334	333	342	3	30	25	21	30	66	61	44	11	337	334	335	335	7.0
7-Sep	328	332	324	331	337	343	342	346	350	14	22	360	352	1	11	33	32	38	40	124	247	229	250	257	0.6
8-Sep	276	267	207	230	197	206	214	214	188	152	249	215	288	67	89	50	82	65	89	358	122	132	155	290	188.8
9-Sep	116	141	150	157	176	182	175	153	148	173	171	171	172	175	167	120	134	120	140	140	92	167	161	154	156.3
10-Sep	151	169	191	179	182	184	168	169	177	179	183	183	188	197	202	211	220	221	194	190	164	175	182	169	186.9
11-Sep	100	232	193	155	155	204	201	185	223	217	223	229	229	234	234	235	225	220	165	169	184	161	203	217	211.2
12-Sep	194	218	222	254	274	249	148	201	198	196	239	242	241	246	264	257	251	244	247	290	351	358	0	358	254.9
13-Sep	322	254	259	270	289	306	253	201	276	225	307	261	344	70	312	268	22	119	220	318	275	325	335	348	302.8
14-Sep	359	1	358	3	356	354	358	359	359	9	0	7	18	20	21	44	43	67	80	77	118	73	23	71	15.4
15-Sep	154	47	2	335	118	188	347	339	331	336	324	336	36	35	190	200	305	168	149	101	68	56	352	5	356.0
16-Sep	351	299	327	325	292	227	254	245	250	170	218	253	331	80	109	159	176	165	166	151	154	162	142	164	175.4
17-Sep	141	172	176	158	150	184	171	191	181	163	186	181	199	200	200	180	183	205	174	171	167	182	166	166	179.8
18-Sep	155	143	147	161	162	170	179	194	208	231	236	243	249	247	244	249	247	245	233	180	184	175	159	159	216.0
19-Sep	172	162	169	156	170	168	172	176	174	210	226	251	237	233	257	262	243	239	226	243	246	267	258	299	226.1
20-Sep	167	192	195	216	252	251	193	188	239	243	244	250	250	258	274	301	318	314	314	3	332	340	340	301	257.8
21-Sep	273	309	315	299	283	319	354	356	4	357	337	328	340	338	350	329	330	303	313	302	311	329	336	326	328.1
22-Sep	305	289	285	246	300	256	206	235	224	215	173	169	148	109	188	202	170	142	113	133	134	129	154	113	178.5
23-Sep	101	104	98	55	98	65	354	342	332	330	290	150	137	131	114	128	120	122	128	132	143	149	146	150	127.7
24-Sep	157	135	338	353	357	294	51	138	190	208	183	195	206	202	181	172	137	116	86	88	358	344	353	347	178.2
25-Sep	346	348	321	242	178	192	193	245	235	254	226	248	245	246	249	246	251	260	243	211	220	224	232	244	242.8
26-Sep	229	175	212	186	191	220	223	213	225	244	238	246	262	248	249	256	260	262	255	255	242	249	252	286	245.4
27-Sep	159	140	194	256	242	239	262	297	323	325	314	311	310	314	307	313	306	315	312	320	317	310	316	309	302.3
28-Sep	302	313	316	290	268	277	260	259	250	272	263	232	244	177	163	178	153	139	152	165	155	130	113	118	207.3
29-Sep	139	137	133	144	143	157	169	175	190	187	190	173	180	192	184	168	180	162	149	152	161	144	135	138	163.6
30-Sep	144	160	165	156	158	159	197	187	180	176	173	164	190	199	192	192	196	191	175	174	176	178	173	167	179.4

209.0 193.4 200.3 217.9 216.8 226.7 219.0 234.6 239.1 241.0 242.2 241.1 253.1 242.3 244.8 243.2 234.7 226.0 200.0 191.5 208.0 220.7 212.1 249.4

Diurnal Average

C - Calibration

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 - September 2015

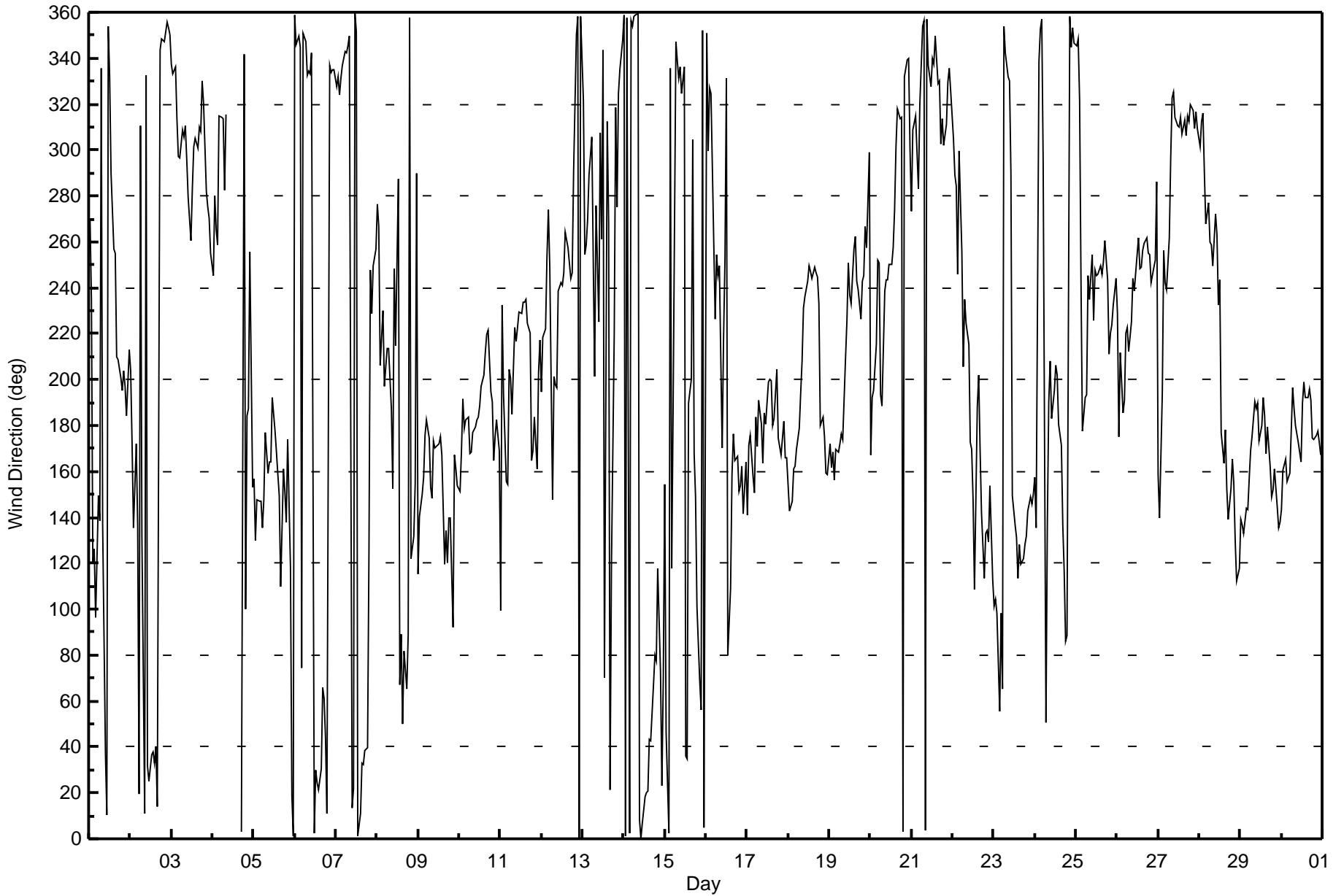
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 104 deg on Sep 22 13:00	Hours of Data: 712
Minimum Value: 9 deg on Sep 29 21:00	Hours of Missing Data: 8
Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 16 Q <sub>1</sub> = 21 Median = 26 Q <sub>3</sub> = 36 P <sub>90</sub> = 59 P <sub>99</sub> = 88	Hours of Calibration: 8
	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-Sep	33	42	15	13	73	30	77	88	70	40	27	30	25	40	30	29	40	31	23	25	31	29	24	52	88
2-Sep	59	23	25	67	44	69	75	67	36	77	25	21	24	23	24	25	42	17	23	23	22	23	22	21	77
3-Sep	19	20	19	17	29	28	27	28	29	30	34	32	36	30	29	31	28	27	49	31	39	40	35	23	49
4-Sep	17	26	42	24	29	26	35	31	49	C	C	C	C	C	C	C	C	28	49	69	70	94	64	91	94
5-Sep	49	61	65	66	52	89	66	32	30	49	42	37	37	42	47	38	54	67	21	37	79	57	13	50	89
6-Sep	39	29	18	24	66	20	15	18	19	20	22	39	28	30	26	24	23	21	23	22	13	14	15	15	66
7-Sep	14	17	19	19	23	20	20	20	24	30	26	33	26	28	26	24	27	25	37	49	89	31	49	14	89
8-Sep	27	49	27	27	30	32	28	33	74	71	55	63	52	76	63	66	79	31	26	30	48	21	18	96	96
9-Sep	28	10	10	14	25	24	24	24	16	30	30	33	36	32	43	81	16	22	14	17	40	50	18	15	81
10-Sep	17	15	30	22	22	24	25	27	24	26	32	36	36	39	34	32	29	24	21	21	15	14	20	26	39
11-Sep	77	52	22	11	14	39	39	36	29	29	28	25	25	25	23	23	25	26	16	17	23	14	57	50	77
12-Sep	63	64	36	48	26	38	30	41	47	36	20	21	26	20	29	24	20	18	15	54	21	20	20	16	64
13-Sep	33	34	22	21	25	17	82	56	50	38	57	79	39	70	59	39	43	62	40	18	30	17	60	20	82
14-Sep	20	23	22	24	23	21	22	22	25	24	24	31	36	34	29	32	39	34	16	20	21	32	48	82	82
15-Sep	62	63	28	16	85	47	44	26	26	28	30	36	32	69	58	61	67	59	20	21	69	42	58	30	85
16-Sep	30	24	24	13	22	57	25	47	42	71	84	36	70	44	90	31	27	23	16	13	15	17	14	60	90
17-Sep	43	34	31	18	15	28	24	47	39	31	37	36	43	39	35	36	29	27	18	18	18	29	24	13	47
18-Sep	17	14	21	23	18	17	22	25	32	26	23	24	24	27	23	23	24	20	20	19	19	19	13	14	32
19-Sep	18	16	20	13	19	23	22	30	22	29	32	25	28	25	26	26	22	23	28	20	22	33	39	71	71
20-Sep	74	24	24	31	20	20	27	27	27	24	22	24	22	25	36	33	25	24	25	21	19	20	19	36	74
21-Sep	30	33	30	35	32	28	23	22	23	25	33	27	25	29	28	33	32	32	30	40	35	25	23	19	40
22-Sep	21	28	50	64	59	25	87	16	59	39	45	55	104	82	74	36	33	22	12	18	13	11	13	15	104
23-Sep	30	12	17	41	41	51	15	13	18	17	67	26	22	21	22	26	17	16	14	14	19	15	17	15	67
24-Sep	15	44	78	15	14	51	65	67	27	30	34	33	31	36	31	29	24	26	16	54	55	22	18	15	78
25-Sep	19	14	70	57	75	20	28	24	52	24	35	26	22	24	25	23	22	23	22	28	25	24	18	18	75
26-Sep	36	36	26	20	19	25	22	22	25	22	24	24	29	27	23	23	25	24	21	20	20	17	19	75	75
27-Sep	46	18	28	22	23	23	26	30	24	24	29	30	30	27	28	26	29	24	23	21	24	27	23	26	46
28-Sep	29	30	28	34	29	52	34	22	36	64	79	46	79	56	41	39	38	11	10	16	19	11	11	13	79
29-Sep	12	12	11	15	15	19	23	32	34	33	38	34	34	36	38	32	26	16	9	11	9	12	9	15	38
30-Sep	18	12	15	13	13	19	34	21	26	27	28	25	37	28	27	28	27	22	17	17	18	19	18	16	37

77	64	78	67	85	89	87	88	74	77	84	79	104	82	90	81	79	67	49	69	89	94	64	96	
Diurnal Maximum																								

C - Calibration







# Wood Buffalo Environmental Association TRS Calibration Report

### Station Information

Calibration Date	September 2, 2015	Last Calibration	August 13, 2015
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	12:50
Gas Cert Reference	CC62993	Station temp.	22 Deg C
Cal Gas Concentration	4.77 ppm	Cal Gas Exp Date	10/06/2014
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
Dil air Make/Model	API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6466
SO2 gas concentration	59 ppm	SO2 gas cert/exp	FF54535 6/Jul/14

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-689	-690
Analyzer IP address	192.168.1.42		Lamp voltage	988	993
Calculated slope	1.003150	1.004010	Chamber temp	45	45
Calculated intercept	-0.158694	-0.183794	Pressure	683.9	683.3
Analyzer Background	1.97	1.97	Flow	0.434	0.435
Analyzer Coefficient	1.033	1.033	Intensity	91	90
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153461	
Converter make/model	CDN-101		Converter serial #	519	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	83.7	79.8	79.6	1.003
SO2 scrubber check	6000	12.2	120.0	0.2	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	83.7	79.8	79.6	1.003
second point	5000	41.9	40.0	40.1	0.997
third point	5000	21.0	20.0	20.3	0.987
as left zero	6000	0.0	0.0	0.0	----
as left span	5000	83.7	79.8	80.0	0.998
Average Correction Factor					0.996

Corrected As found	79.6	Previous response	79.8	% change	0.2%
--------------------	------	-------------------	------	----------	------

**Notes:**

Changed inlet filter and performed scrubber check after as founds. No adjustments.

Calibration Performed By:

Evan Magill



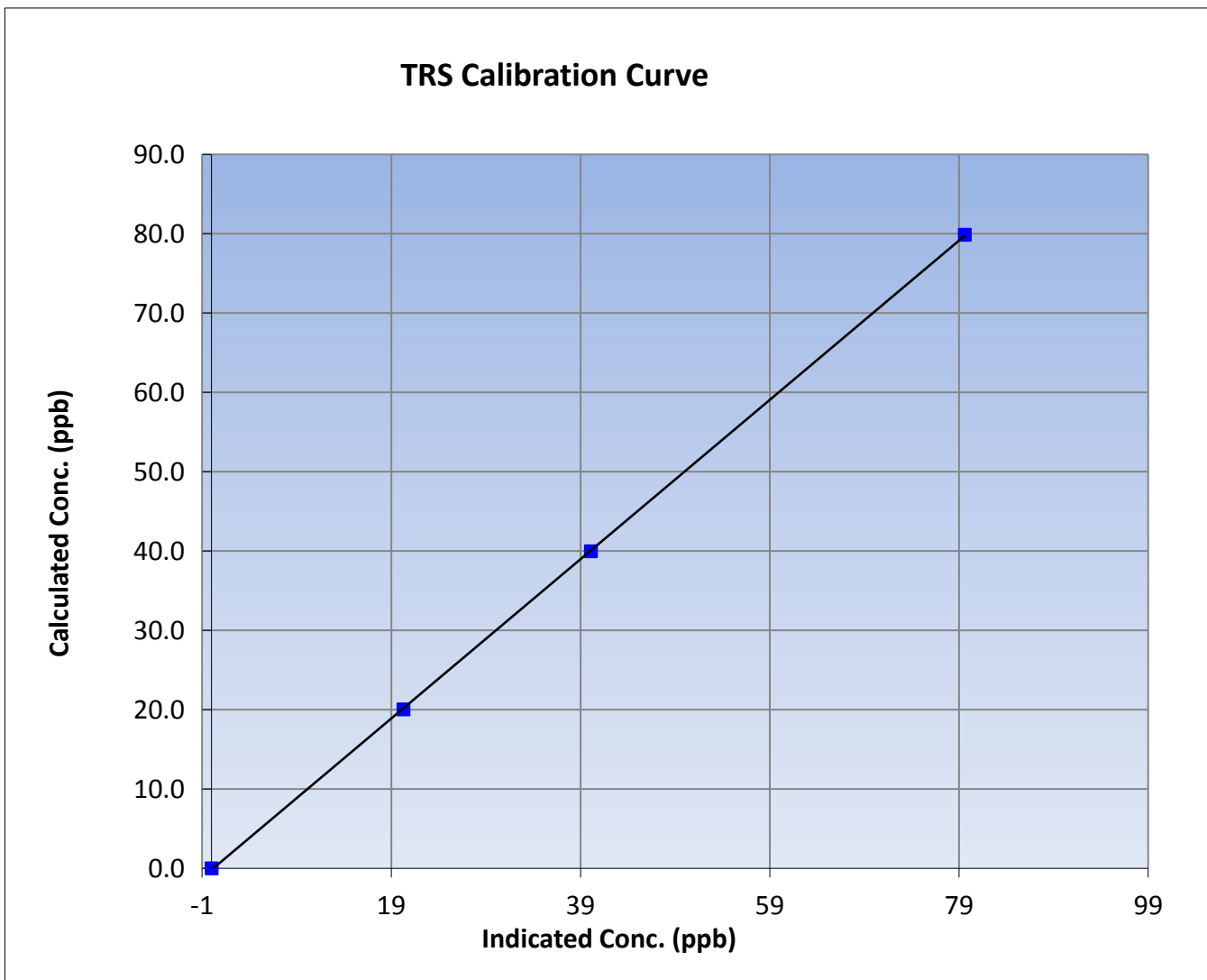
# Wood Buffalo Environmental Association TRS Calibration Report

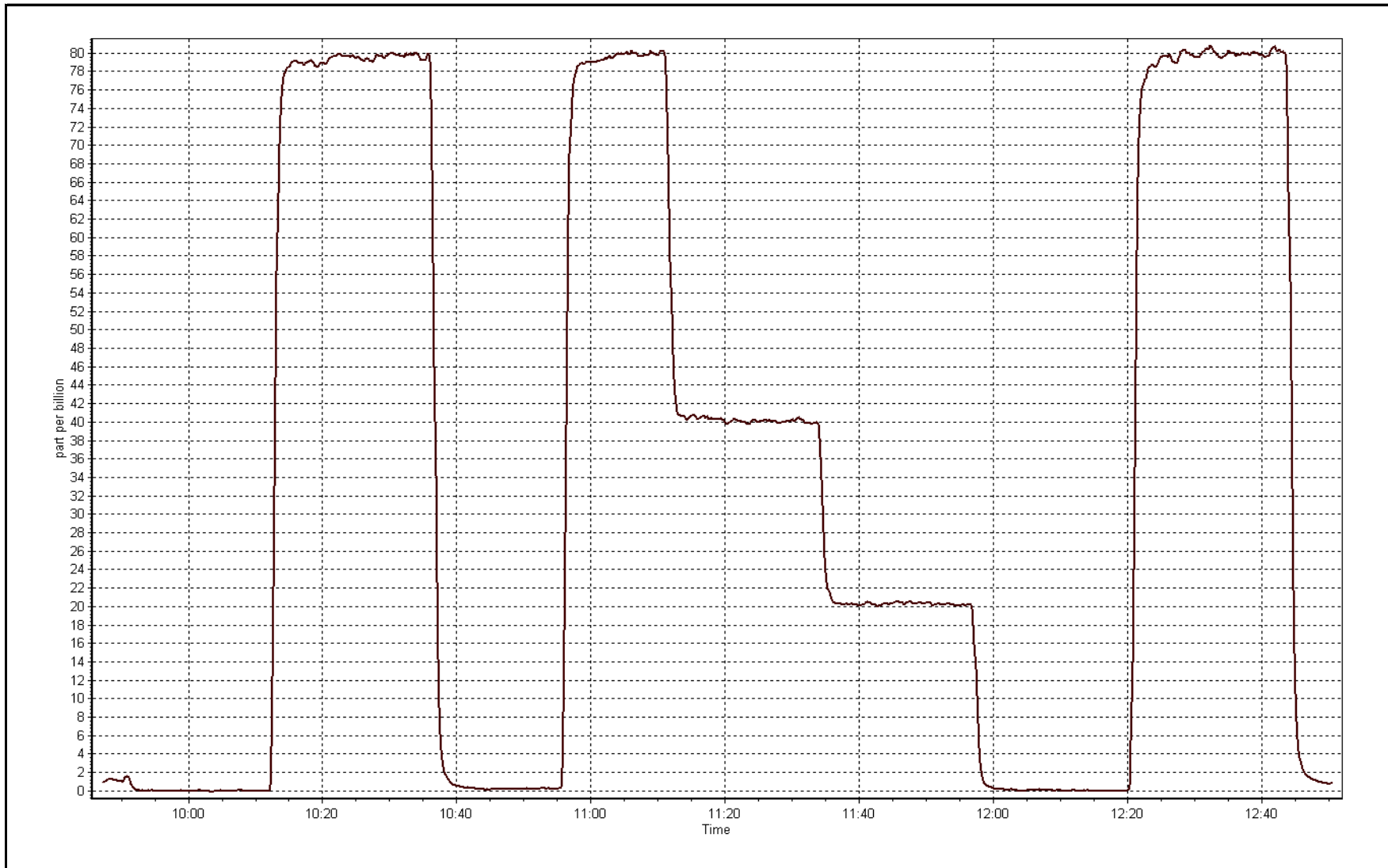
## Station Information

Calibration Date	September 2, 2015	Previous Calibration	August 13, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	9:50	End Time (MST)	12:50
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999978
79.8	79.6	1.0029		
40.0	40.1	0.9968	Slope	1.004010
20.0	20.3	0.9869		
			Intercept	-0.183794







# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	September-03-15	Last Calibration	August-13-15
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	11:35
Gas Cert Reference	LL104180	Cal Gas Expiry Date	12/02/2018
CH4 Cal Gas Conc.	490 ppm	CH4 Equiv Conc.	1023.5 ppm
C3H8 Cal Gas Conc.	194 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
ZAG make/model	Teledyne API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	Serial Number	6466

### Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	9.2	9.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.7	34.7
Calculated slope	1.000137	1.002985	Fuel Pressure	24.1	24.1
Calculated intercept	-0.015397	0.006035	Analyzer Coeff	4.3	4.3
			Analyzer BKG	5.680	5.680

Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296
---------------	---------------	-------------------	------------

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.00	0.05	----
as found span	6000	92.0	15.69	15.68	1.001
calibrator zero	6000	0.0	0.00	0.05	----
high point	6000	92.0	15.69	15.68	1.001
second point	6000	49.2	8.39	8.30	1.011
third point	6000	18.4	3.14	3.09	1.016
as left zero	6000	0.0	0.00	0.05	----
as left span	6000	92.0	15.69	15.69	1.000
Average Correction Factor					1.009

Corrected As found	15.63	Previous response	15.71	% change	0.5%
--------------------	-------	-------------------	-------	----------	------

**Notes:**

Changed inlet filter after as founds. No adjustments.

Calibration Performed By:

Evan Magill



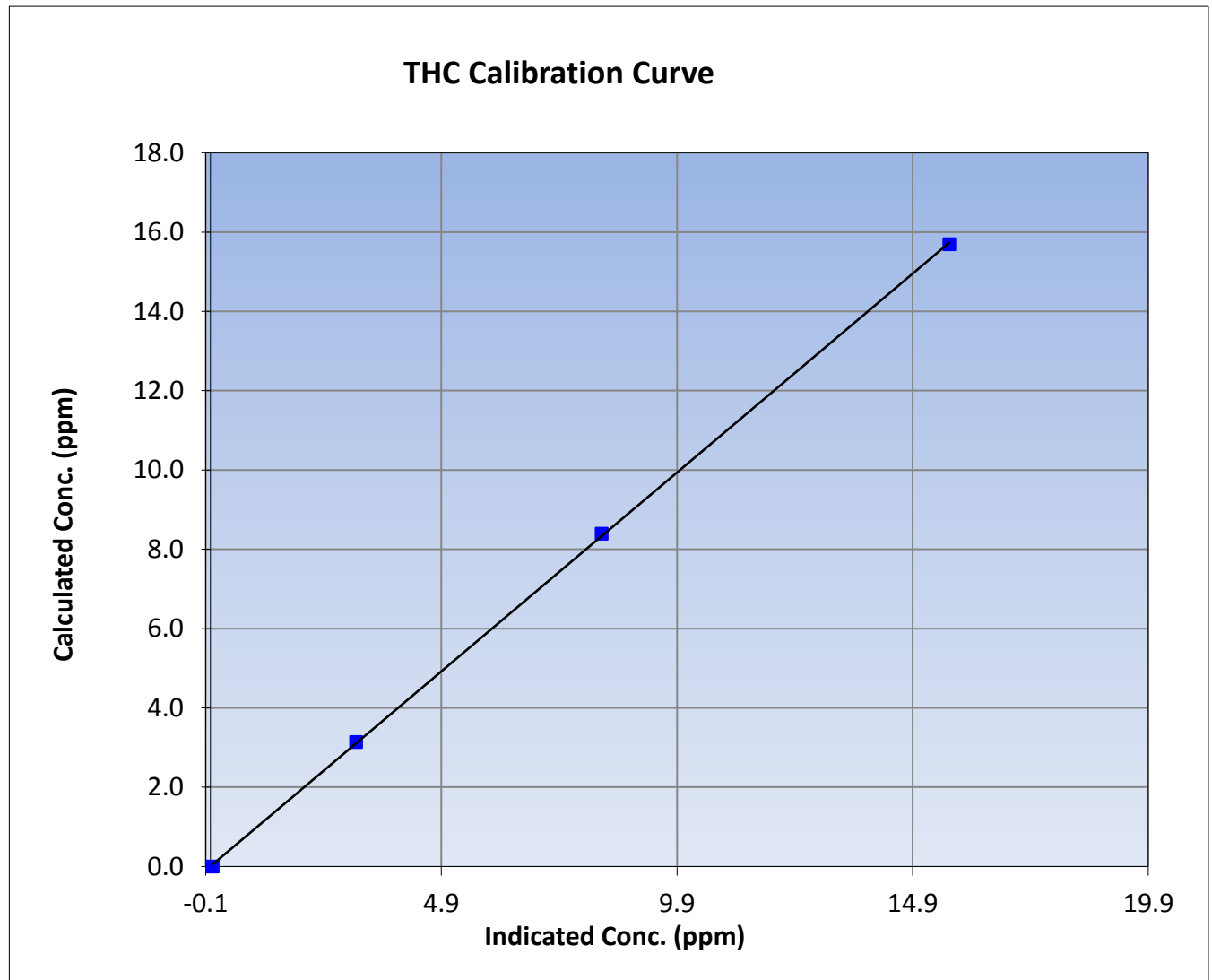
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	September 3, 2015	Previous Calibration	August 13, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	9:00	End Time (MST)	11:35
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

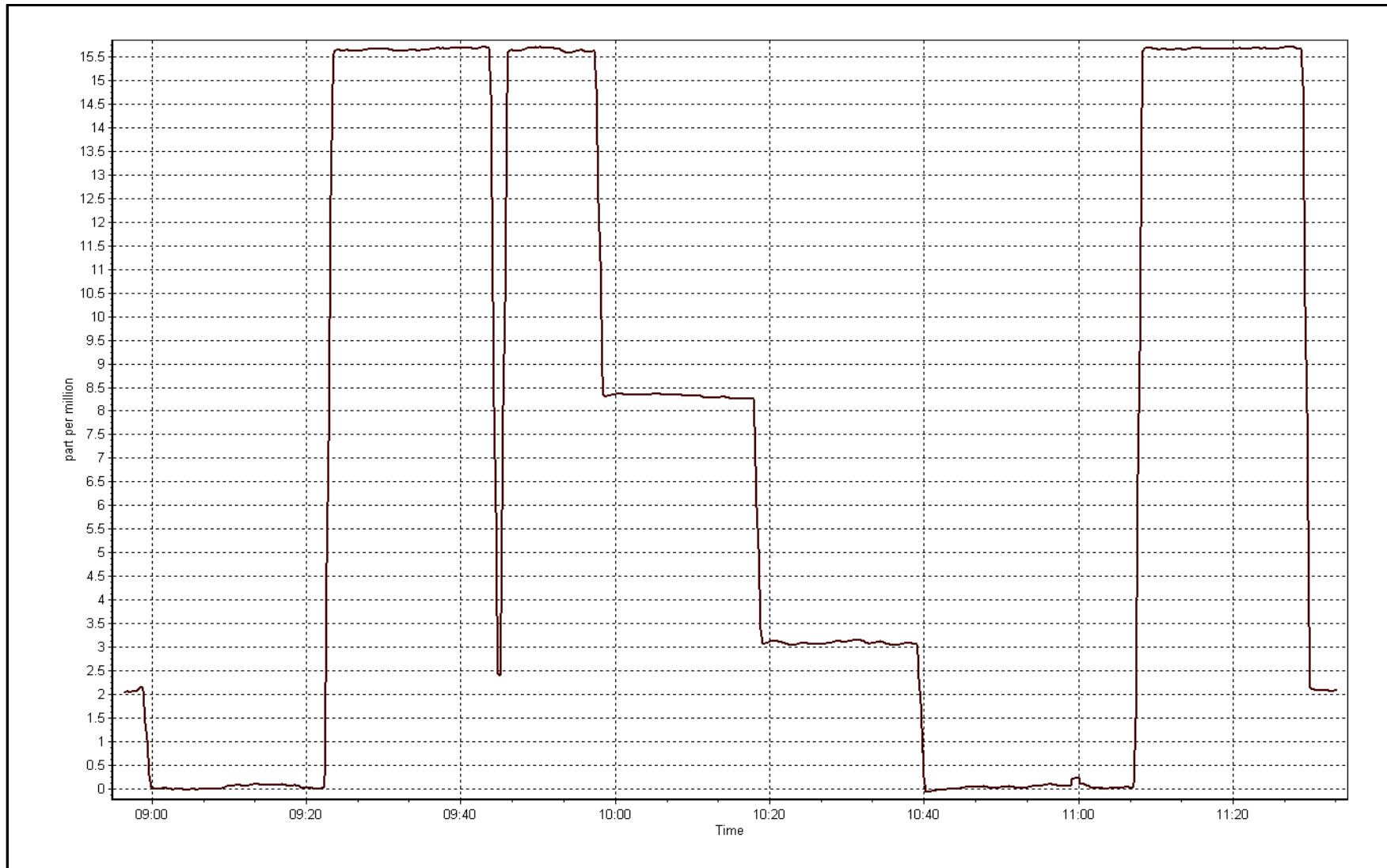
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.05	----	Correlation Coefficient	0.999932
15.69	15.68	1.0009		
8.39	8.30	1.0112	Slope	1.002985
3.14	3.09	1.0158		
			Intercept	0.006035



THC Calibration Plot

Date: September 3, 2015





# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	September-04-15	Last Calibration	September-03-15
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Other:	Repair	
Start Time (MST)	12:20	End Time (MST)	18:00
Gas Cert Reference	LL104180	Cal Gas Expiry Date	12/02/2018
CH4 Cal Gas Conc.	490 ppm	CH4 Equiv Conc.	1023.5 ppm
C3H8 Cal Gas Conc.	194 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
ZAG make/model	Teledyne API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	Serial Number	6466

## Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	9.2	9.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.7	34.7
Calculated slope	1.002985	0.994180	Fuel Pressure	24.1	24.1
Calculated intercept	0.006035	0.018511	Analyzer Coeff	4.3	4.3
			Analyzer BKG	5.680	5.680

Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296
---------------	---------------	-------------------	------------

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.00	-0.02	----
high point	5000	76.6	15.68	15.75	0.996
second point	5000	41.0	8.39	8.43	0.996
third point	5000	15.4	3.15	3.15	1.001
as left zero	5000	0.0	0.00	0.02	----
as left span	5000	76.6	15.68	15.70	0.999
Average Correction Factor					0.997

Corrected As found	NA	Previous response	NA	% change	NA
--------------------	----	-------------------	----	----------	----

**Notes:**

Noticed the THC was very low while at the station. Attempted as founds but analyzer was unresponsive. Rebuilt pump at station, which solved the problem.

Calibration Performed By:

Evan Magill





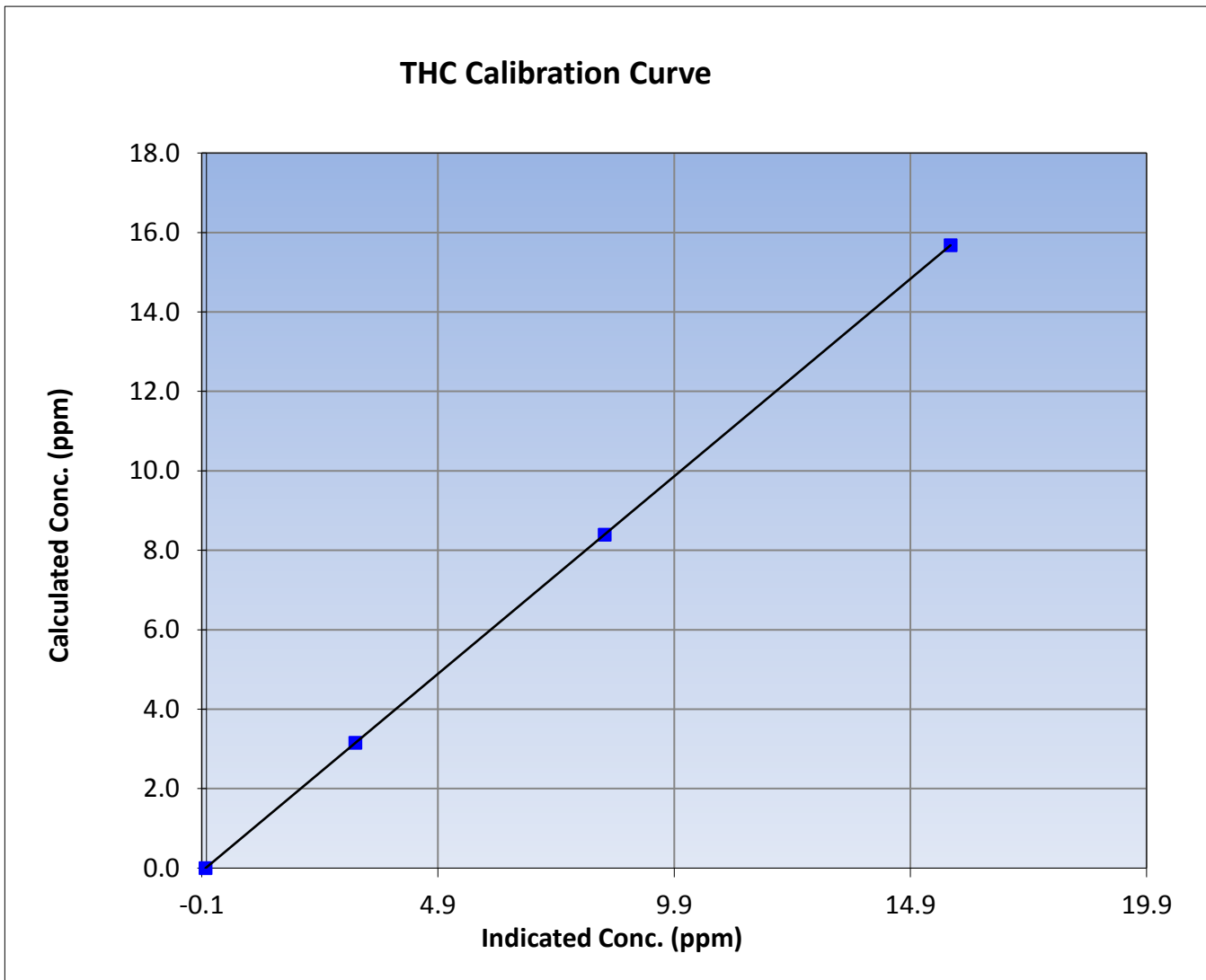
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	September 4, 2015	Previous Calibration	September 3, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	12:20	End Time (MST)	18:00
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

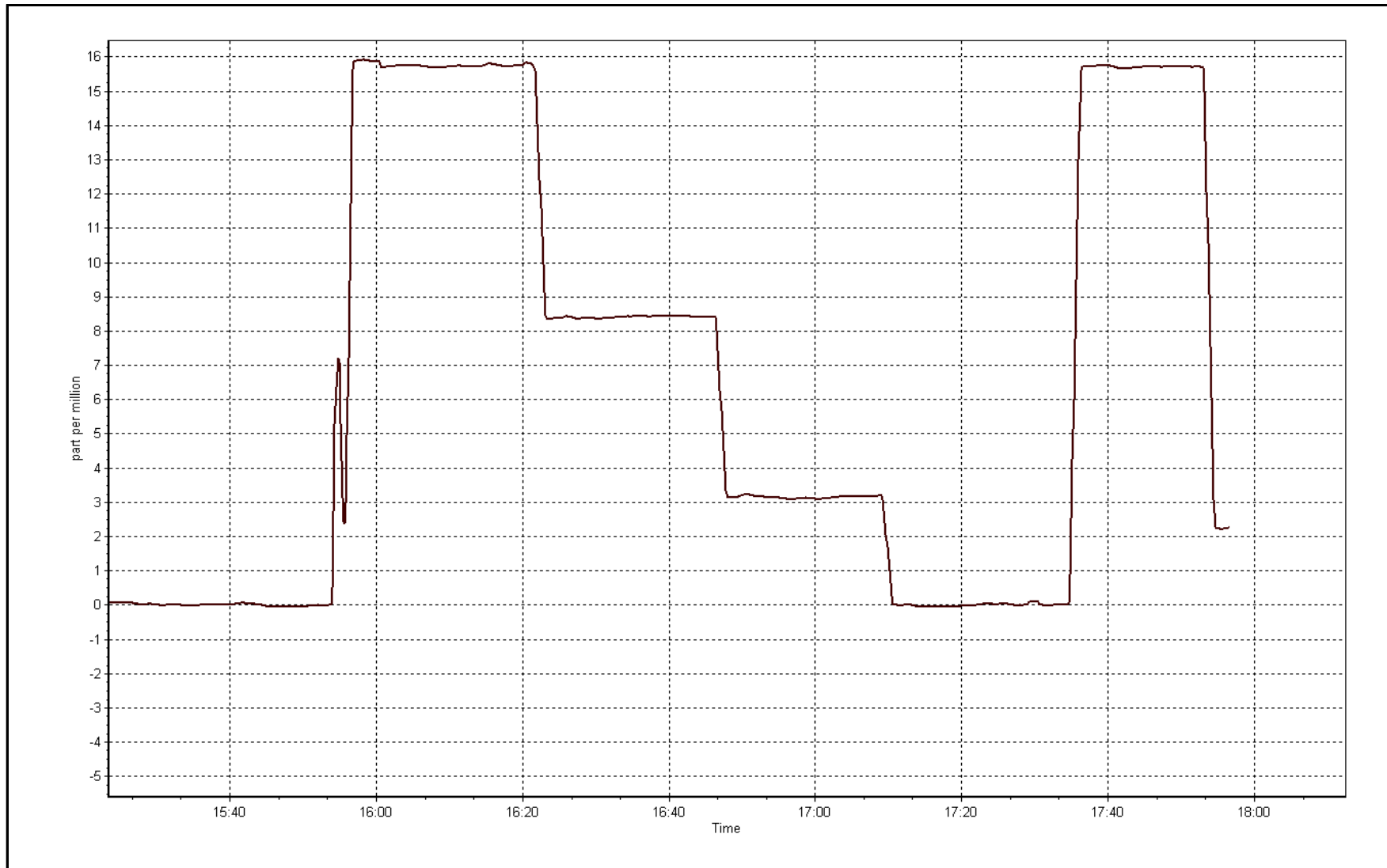
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.02	----	Correlation Coefficient	1.000000
15.68	15.75	0.9956		
8.39	8.43	0.9956		
3.15	3.15	1.0008		
			Slope	0.994180
			Intercept	0.018511



THC Calibration Plot

Date: September 4, 2015





# Wood Buffalo Environmental Association

## WS/WD Calibration Report

### Station Information

Calibration Date	September-04-15	Previous Calibration	September 15, 2014
Station Name	Barge Landing	Station Number	AMS 9
Reason:	<b>Routine</b> Installation Removal		
Start Time (MST)	9:20	End Time (MST)	17:05
Barometric Press	n/a	Station Temp	22 Deg C
WS Calibrator	MetOne 053	Serial Number	P15103

### WIND SPEED

Sensor make/model	Met One 010C-1	Sensor serial #	B4128
DACS make	Campbel Scientific CR3000	DACS serial No.	6466
DACS voltage range	5000	DACS channel #	P1
	<u>Before</u>		<u>After</u>
Calculated slope	0.999609955	Calculated slope	0.998909
Calculated intercept	0.028871038	Calculated intercept	0.030357

### Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0.0	0.0	n/a
200	20.2	20.1	1.0026
400	39.4	39.4	0.9990
600	58.6	58.5	1.0003
800	77.8	77.8	0.9989
Average Correction Factor			1.0002

### WIND DIRECTION

Sensor make/model	Met One 020C-1	Sensor serial #	E4852
DACS make	Campbel Scientific CR3000	DACS serial No.	2579
DACS voltage range	5000	DACS channel #	15-18
	<u>Before</u>		<u>After</u>
Calculated slope	1.024701514	Calculated slope	1.003371
Calculated intercept	-5.245937115	Calculated intercept	-0.605386

As Found Declination (west of North) 15 As Left Declination (west of North) 14

### Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	0.2	n/a
90	90.6	0.9929
180	180.2	0.9988
270	269.8	1.0007
355	354.1	1.0025
Average Correction Factor		0.9987

Notes:	Physical Direction	Indicated Direction	
	0	6.3	<--Old WD sensor AS FOUNDS
Replaced WD sensor	90	93.9	
Replaced Bearings on WS sensor	180	181.9	
	270	272.2	
	355	356.7	

Calibration Performed By: Evan Magill and Asad Hidayat



This page intentionally left blank



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 11  
LOWER CAMP  
SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
 SEPTEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	687	33	33	100.00	50	0	5	0
H2S (ppb) Average	684	34	36	99.72	5	0	1	0
THC (ppm) Average	685	33	35	99.72	5	-	2.6	-
Temperature (C) Average	720	0	0	100.00	24.9	-	15.9	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	92	-
Wind Speed 10 m (km/h) Average	718	2	2	100.00	34	-	20	-
Wind Direction 10 m (deg) Average	718	2	2	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
 SEPTEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	687	2.3	5	-	0	0	0	1	2	6	50
H2S (ppb) Average	684	0.6	1	-	0	0	0	0	1	1	5
THC (ppm) Average	685	2.26	0.3	-	2	2.1	2.1	2.2	2.3	2.5	5
Temperature 2 m (C) Average	720	10.25	4.7	-	-0.7	4.9	6.9	9.8	13	16.7	24.9
Relative Humidity (%) Average	720	72.9	19	-	27	44	57	76	90	97	99
Wind Speed 10 m (km/h) Average	718	9.1	6	-	0	2	4	8	12	17	34
Wind Direction 10 m (deg) Average	718	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
SEPTEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	10 Sep 2015 11:00	10 Sep 2015 12:00	2	Maintenance - sample manifold cleaned
THC	29 Sep 2015 13:00	29 Sep 2015 14:00	2	Maintenance - replaced fuel cylinder

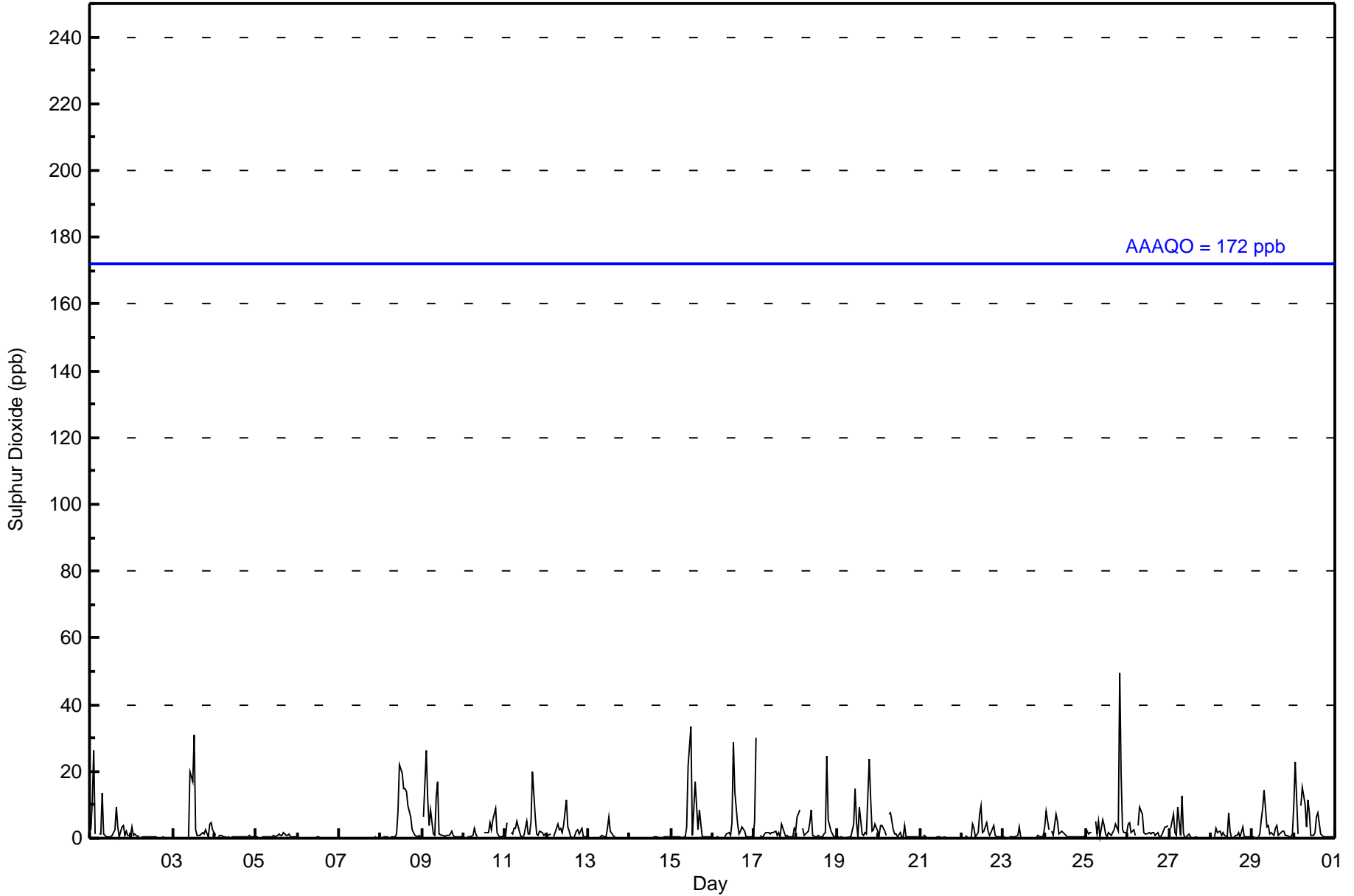


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 50 ppb on Sep 25 20:00	Maximum Daily Average: 5.2 ppb on Sep 8
Minimum Value: 0 ppb on Sep 27 22:00	Hours of Data: 687
Maximum Diurnal Average: 4.3 ppb at hour 2	Hours of Missing Data: 33
Monthly Average: 2.3 ppb	Hours of Calibration: 33
Minimum Daily Average: 0.1 ppb on Sep 6	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.8 ppb at hour 23	
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> = 6 P <sub>99</sub> = 26	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	3	11	26	1	Z	1	1	14	1	0	0	1	0	1	2	9	4	1	3	4	1	2	1	1	3.9	26
2-Sep	4	1	1	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4
3-Sep	Z	0	0	0	0	0	0	0	0	0	20	17	31	3	1	1	1	1	1	3	0	4	5	3	4.0	31
4-Sep	1	Z	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0.4	1
5-Sep	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	2	1	1	1	1	0	0	0	0	0.6	2
6-Sep	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
7-Sep	0	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-Sep	0	0	0	0	0	Z	0	0	0	1	8	22	19	15	15	14	10	6	2	2	1	1	1	1	5.2	22
9-Sep	Z	6	26	12	4	8	1	1	12	17	1	1	1	1	1	1	1	2	1	0	0	0	0	4.3	26	
10-Sep	0	Z	0	0	0	1	3	1	0	C	C	C	2	2	2	5	2	6	9	2	1	0	0	1	1.8	9
11-Sep	0	5	Z	2	1	3	3	5	2	0	0	1	5	1	1	5	20	7	1	1	2	2	1	1	3.1	20
12-Sep	1	1	1	Z	0	2	4	3	3	2	4	12	3	2	0	0	1	2	3	1	3	0	0	0	2.1	12
13-Sep	0	0	0	0	Z	0	0	0	1	0	0	3	6	2	1	0	0	0	0	0	0	0	0	0	0.7	6
14-Sep	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
15-Sep	Z	0	0	0	0	0	0	0	0	4	22	33	1	9	17	3	9	4	1	1	0	0	0	0	4.6	33
16-Sep	0	Z	0	0	0	0	0	0	1	2	1	5	29	14	4	1	2	3	2	0	0	0	0	0	2.9	29
17-Sep	5	30	Z	1	0	0	1	2	2	1	2	2	2	1	2	1	4	2	1	1	0	0	0	3	2.8	30
18-Sep	2	6	8	Z	3	1	2	2	4	8	1	1	0	1	0	0	1	2	24	5	2	1	0	0	3.4	24
19-Sep	0	0	0	0	Z	0	0	0	0	4	15	5	1	9	1	1	2	1	24	12	2	2	4	2	3.8	24
20-Sep	1	4	4	2	1	Z	7	7	3	1	1	0	2	0	0	4	0	0	0	0	0	0	0	0	1.7	7
21-Sep	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
22-Sep	0	Z	1	0	0	0	4	3	0	2	7	10	2	2	4	2	1	2	4	1	0	0	0	0	2.1	10
23-Sep	0	0	Z	1	0	0	0	1	1	4	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.5	4
24-Sep	3	8	3	Z	2	1	7	5	1	2	2	1	1	0	0	0	0	0	0	0	0	1	0	1	1.8	8
25-Sep	2	1	2	2	Z	5	1	5	1	5	4	1	0	2	1	2	2	4	2	50	18	2	2	2	5.1	50
26-Sep	4	5	2	2	1	Z	4	9	7	2	1	1	2	1	2	2	1	2	0	0	1	3	4	4	2.6	9
27-Sep	Z	3	7	2	1	9	1	13	2	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	1.8	13
28-Sep	0	Z	0	3	2	2	1	2	1	0	8	2	0	0	1	1	2	0	3	1	1	0	0	0	1.3	8
29-Sep	0	0	Z	0	1	6	9	15	3	4	1	2	1	3	4	1	1	2	2	1	1	1	1	1	2.6	15
30-Sep	10	23	1	Z	10	15	10	4	11	8	1	1	2	7	8	1	1	0	0	0	0	0	0	0	5.0	23

1.6	4.3	3.5	1.2	1.2	2.3	2.1	3.1	2.0	2.4	3.6	4.2	3.7	2.6	2.3	1.9	2.3	1.7	2.9	2.9	1.3	0.8	0.8	0.8		Diurnal Average
10	30	26	12	10	15	10	15	12	17	22	33	31	15	17	14	20	7	24	50	18	4	5	4		Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Lower Camp - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	653	95.05	95.05
11 - 20	22	3.20	98.25
21 - 60	12	1.75	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: 687

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Lower Camp - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	40	26	12	14	14	49	148	32	11	10	16	57	53	72	52	45	651
11 - 20	0	0	0	0	0	3	9	0	0	0	3	2	3	1	1	0	22
21 - 60	0	0	0	0	0	1	5	0	0	0	3	0	0	1	1	1	12
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	26	12	14	14	53	162	32	11	10	22	59	56	74	54	46	685

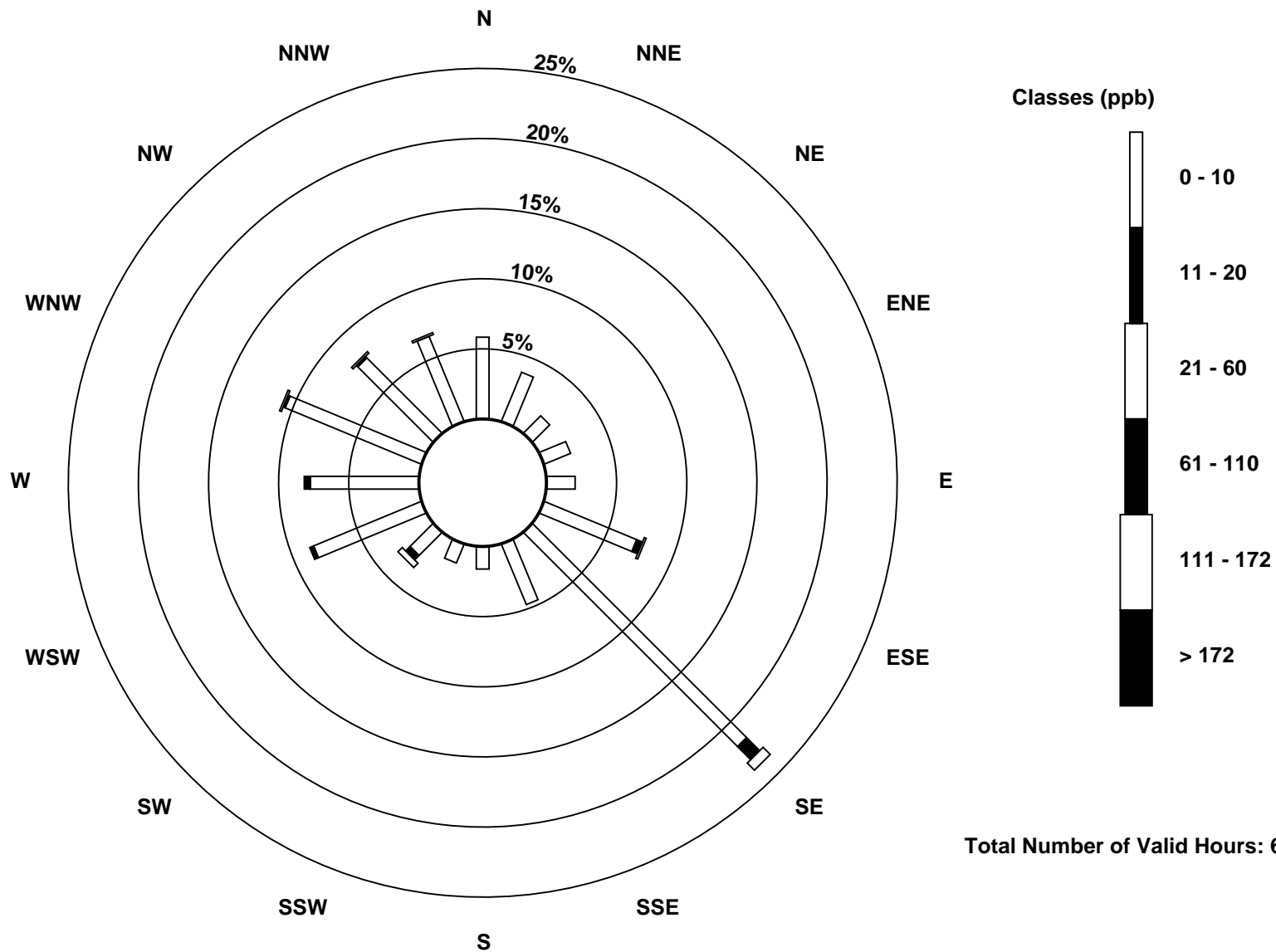
Total Number of Valid Hours: 685

Total Number of Hours: 720

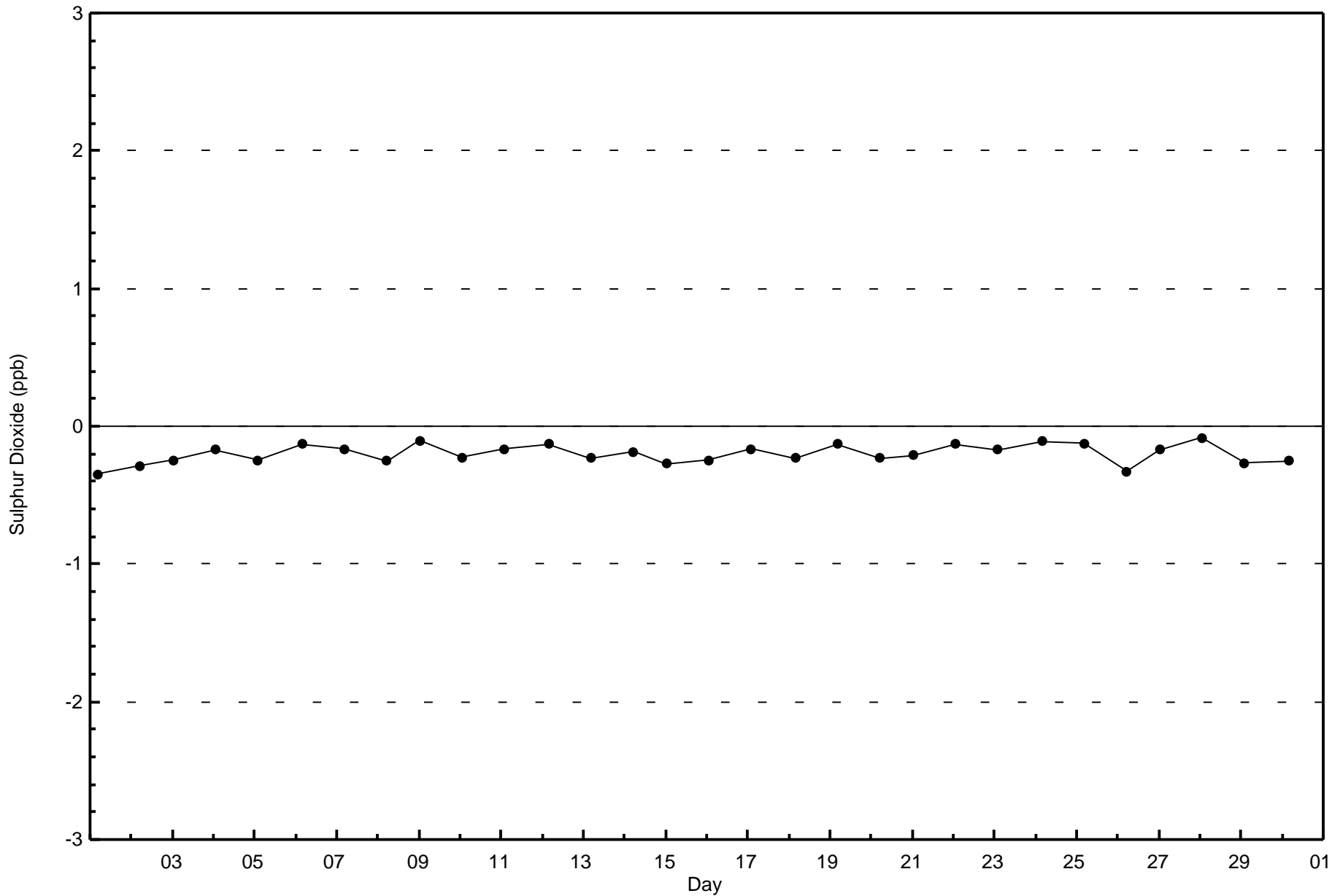


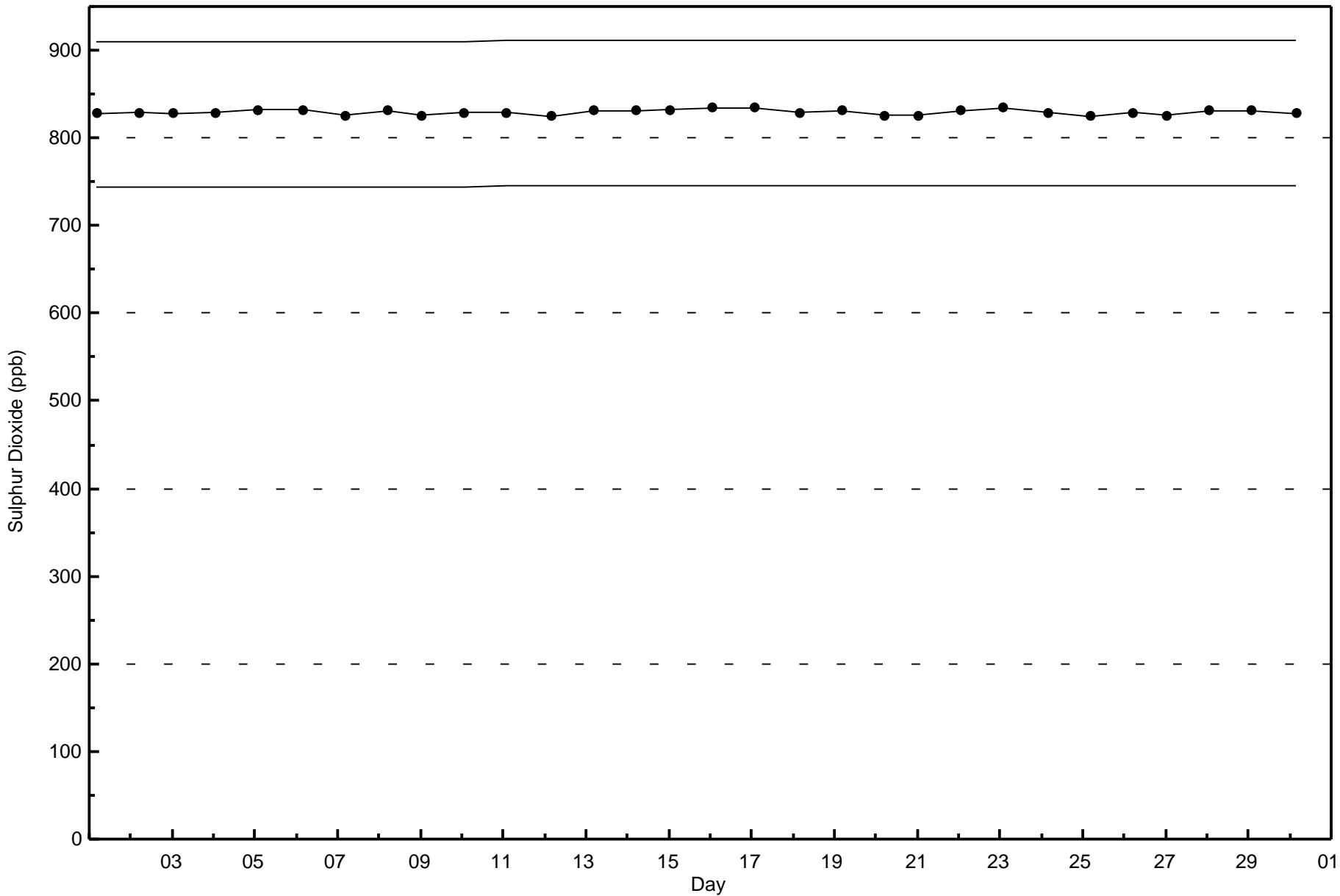
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp (AMS 11)



Total Number of Valid Hours: 685







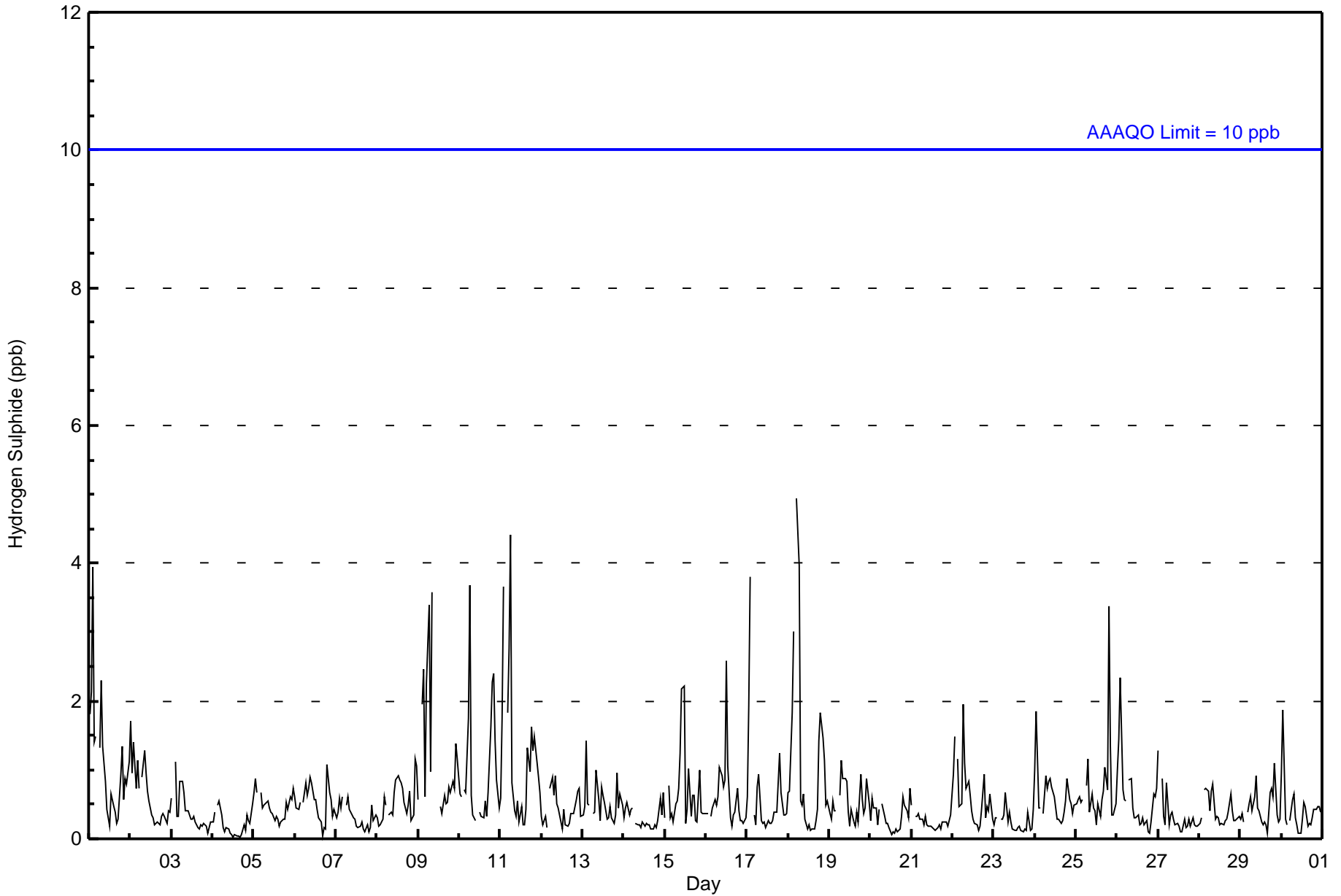


Number of Exceedences (AAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 5 ppb on Sep 18 06:00	Maximum Daily Average: 1.3 ppb on Sep 9		Hours of Data:	684
Minimum Value: 0 ppb on Sep 4 13:00	Minimum Daily Average: 0.2 ppb on Sep 4		Hours of Missing Data:	36
Maximum Diurnal Average: 1.2 ppb at hour 7	Minimum Diurnal Average: 0.3 ppb at hour 16		Hours of Calibration:	34
Monthly Average: 0.6 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 4		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-Sep	2	2	4	1	1	Z	1	2	1	1	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1.1	4
2-Sep	2	1	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
3-Sep	1	Z	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
4-Sep	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
5-Sep	1	1	1	Z	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0.5	1
6-Sep	1	0	0	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0.5	1
7-Sep	0	0	1	0	1	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Sep	0	0	0	0	1	0	Z	0	0	0	1	1	1	1	1	1	1	0	0	1	0	0	1	1	0.6	1
9-Sep	1	Z	2	2	1	2	3	1	4	C	C	C	C	0	0	1	1	1	1	1	1	1	1	1	1.3	4
10-Sep	1	1	Z	1	1	2	4	1	0	0	M	M	0	0	0	1	0	1	2	2	2	1	1	0	1.0	4
11-Sep	1	2	4	Z	2	3	4	1	0	0	1	0	0	0	0	1	1	2	1	1	1	1	1	1	1.2	4
12-Sep	0	0	0	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.4	1
13-Sep	0	0	1	1	0	Z	0	0	1	1	0	1	1	1	0	0	0	0	0	0	1	0	1	0	0.5	1
14-Sep	0	0	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0.3	1
15-Sep	0	Z	1	0	0	0	0	1	1	1	2	2	0	0	1	0	1	1	0	0	1	0	0	0	0.7	2
16-Sep	0	0	Z	0	0	1	0	1	1	1	1	1	3	1	0	0	0	0	1	0	0	0	0	0	0.6	3
17-Sep	1	2	4	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.7	4
18-Sep	1	1	2	3	Z	5	4	1	0	1	0	0	0	0	0	0	0	0	1	2	1	1	0	1	1.1	5
19-Sep	0	0	1	0	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	1	1	0.5	1
20-Sep	0	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.3	1
21-Sep	0	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-Sep	1	1	Z	1	0	1	2	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0.6	2
23-Sep	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
24-Sep	1	2	0	0	Z	0	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0.6	2
25-Sep	1	1	1	1	1	Z	1	1	0	1	0	0	0	1	0	1	1	1	1	1	3	1	0	0	0.7	3
26-Sep	1	1	2	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.6	2
27-Sep	1	Z	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
28-Sep	0	0	Z	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	1
29-Sep	0	0	0	Z	0	1	1	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0.4	1
30-Sep	1	2	0	0	Z	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	2

0.6	0.8	1.2	0.7	0.6	0.9	1.2	0.7	0.7	0.7	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.6	0.7	0.6	0.5	0.5	0.5	Diurnal Average	
2	2	4	3	2	5	4	2	4	1	2	2	3	1	1	1	1	1	1	2	3	2	1	1	1	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Lower Camp - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	671	98.10	98.10
3 - 4	12	1.75	99.85
5 - 7	1	0.15	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Lower Camp - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	40	24	12	14	15	50	148	32	11	9	22	59	57	73	54	49	669
3 - 4	0	0	0	0	0	1	10	0	0	0	1	0	0	0	0	0	12
5 - 7	0	0	0	0	0	0	1	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>	40	24	12	14	15	51	159	32	11	9	23	59	57	73	54	49	682

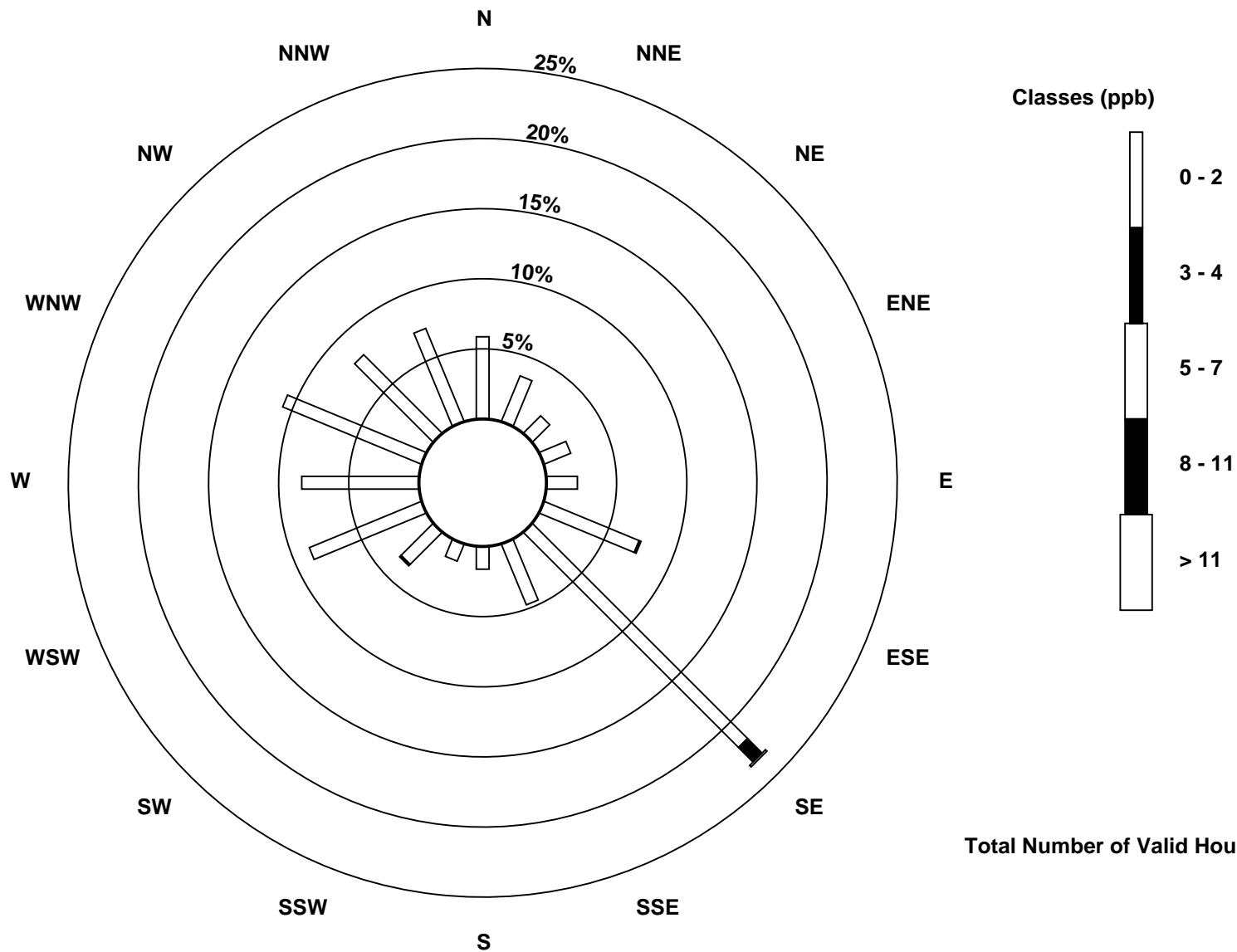
Total Number of Valid Hours: 682

Total Number of Hours: 720

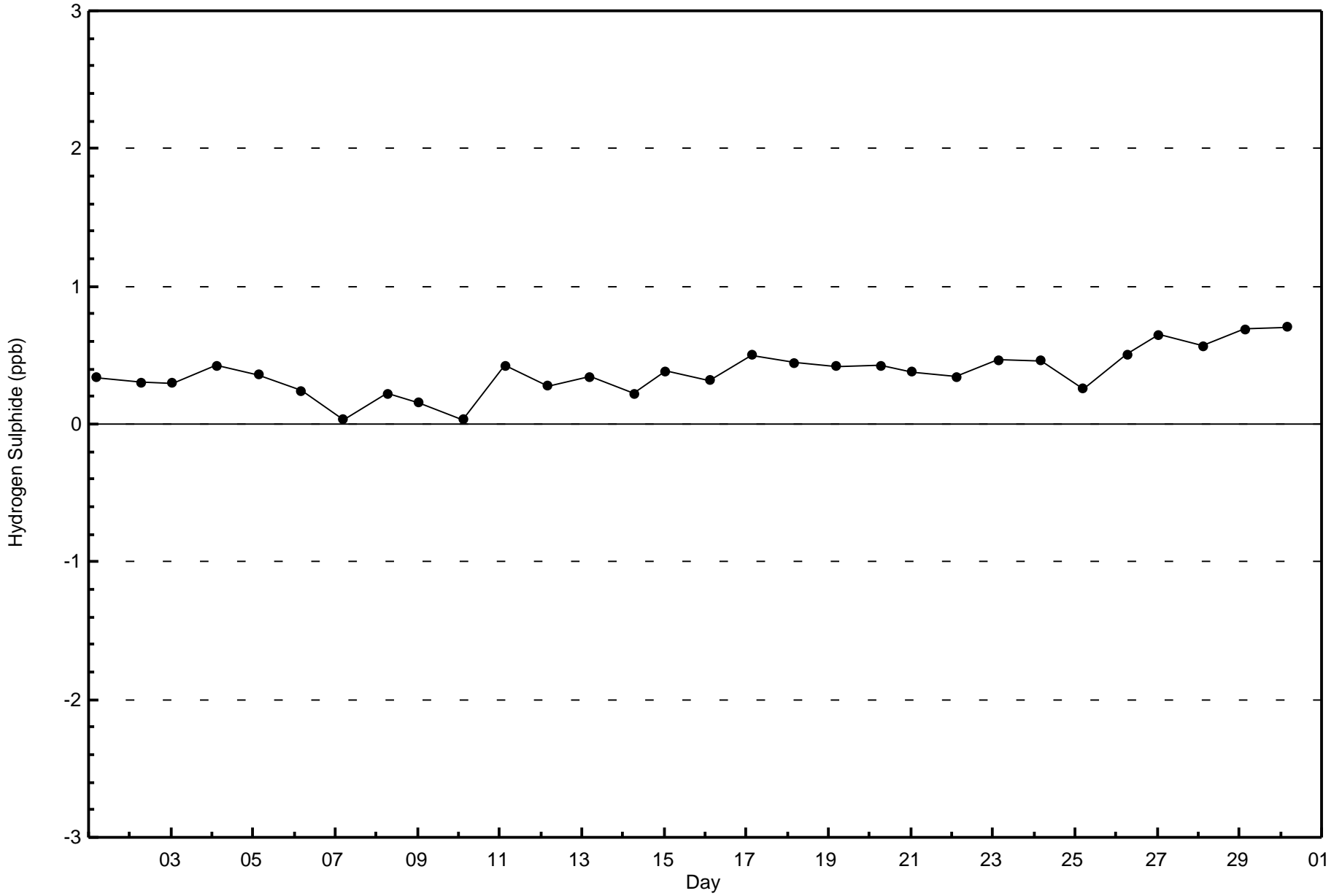


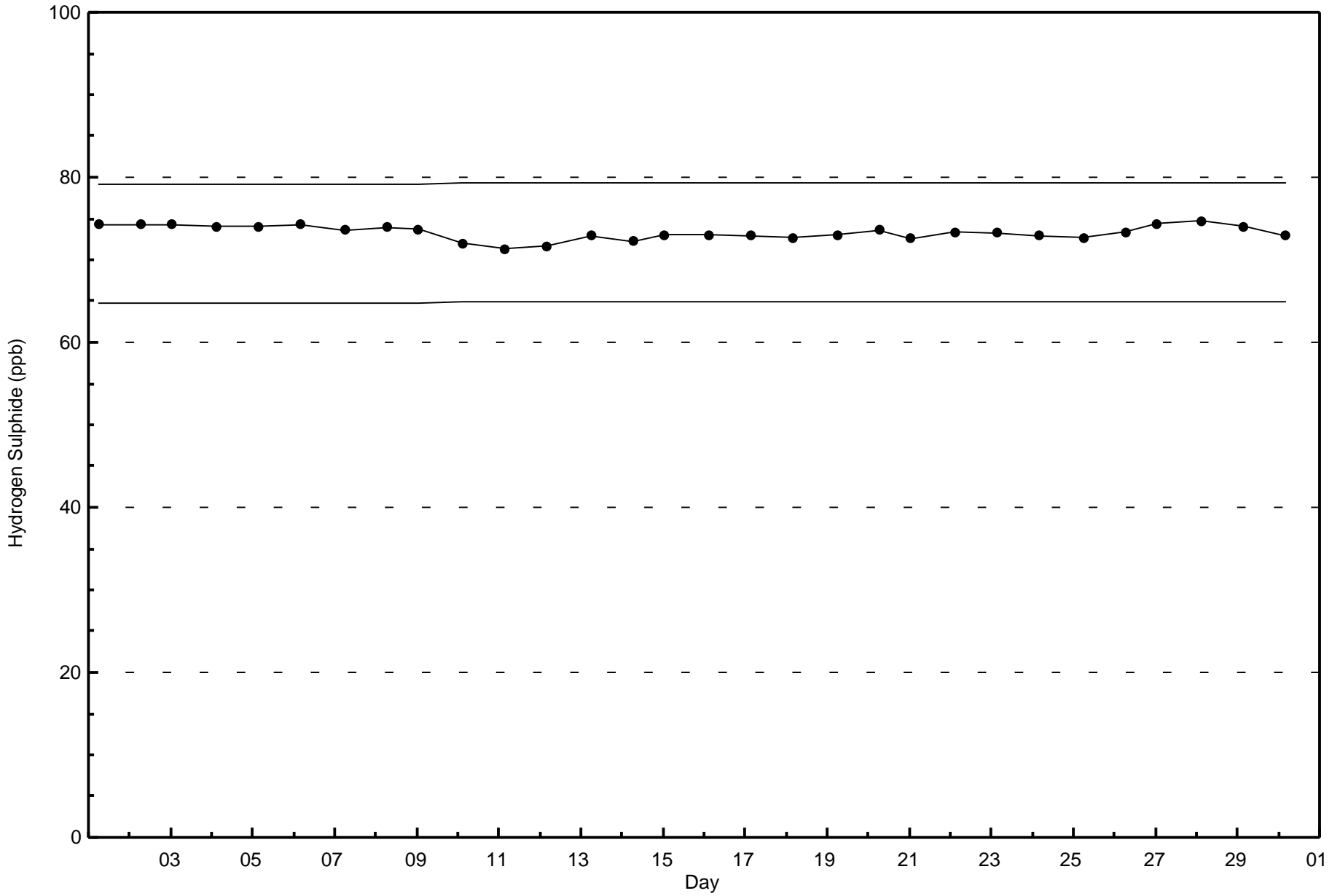
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Lower Camp (AMS 11)



Total Number of Valid Hours: 682

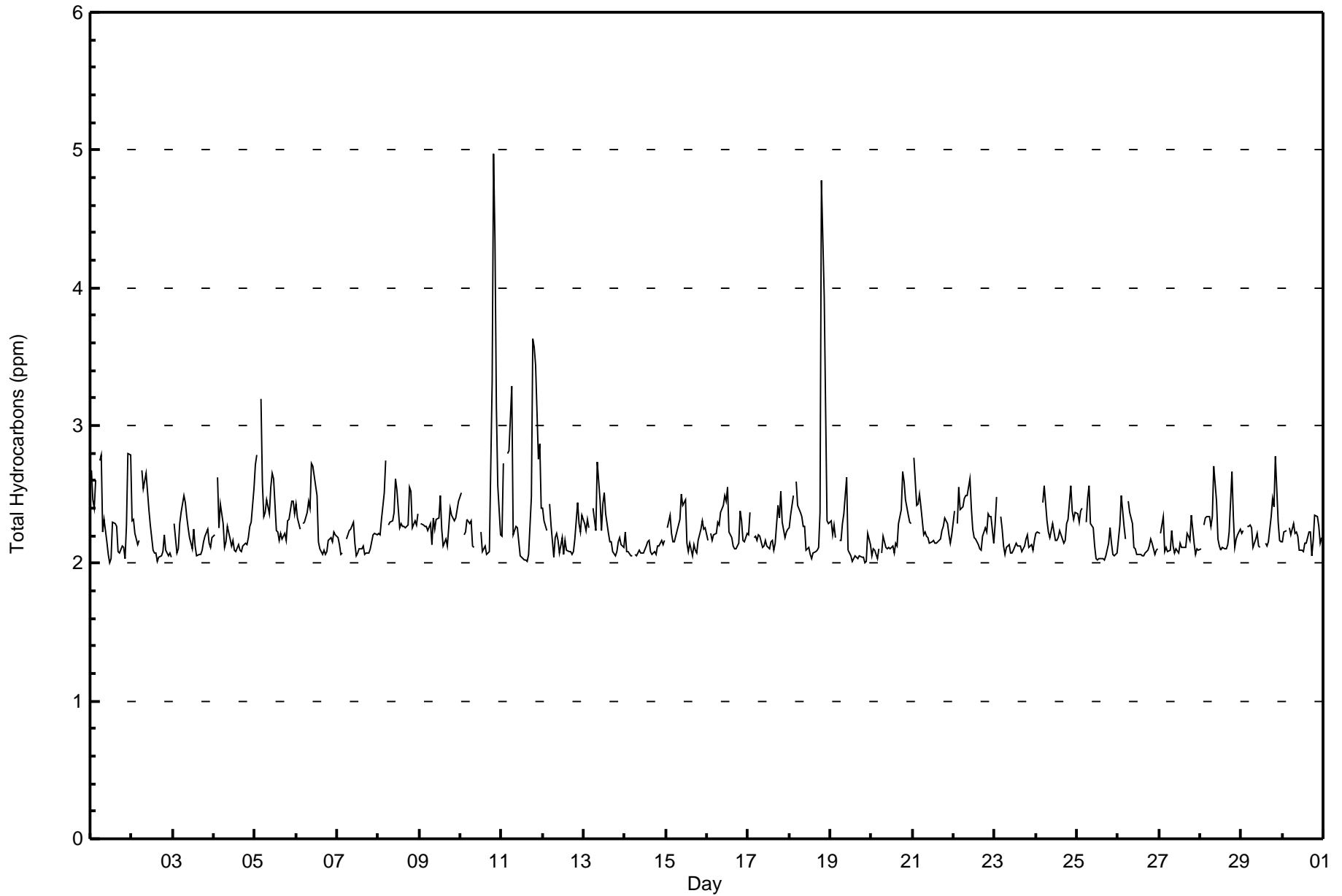






Maximum Value: 5.0 ppm on Sep 10 20:00																				Maximum Daily Average: 2.6 ppm on Sep 11					Hours in Service: 720	
Minimum Value: 2.0 ppm on Sep 19 21:00																				Minimum Daily Average: 2.1 ppm on Sep 14					Hours of Data: 685	
Maximum Diurnal Average: 2.5 ppm at hour 20																				Minimum Diurnal Average: 2.1 ppm at hour 16					Hours of Missing Data: 35	
Monthly Average: 2.26 ppm																				Percentiles: P <sub>1</sub> = 2.0 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.1 Median = 2.2 Q <sub>3</sub> = 2.3 P <sub>90</sub> = 2.5 P <sub>99</sub> = 3.4					Hours of Calibration: 33	
																									Percent Operational Time: 99.7	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	2.7	2.5	2.4	2.6	Z	2.7	2.8	2.2	2.3	2.2	2.1	2.0	2.0	2.3	2.3	2.3	2.1	2.1	2.1	2.1	2.0	2.3	2.8	2.8	2.3	2.8
2-Sep	2.3	2.3	2.2	2.1	2.2	Z	2.7	2.5	2.7	2.5	2.4	2.3	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.1	2.1	2.1	2.0	2.2	2.7
3-Sep	Z	2.3	2.1	2.1	2.3	2.4	2.5	2.4	2.3	2.3	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.5
4-Sep	2.2	Z	2.6	2.3	2.4	2.3	2.1	2.2	2.3	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.5	2.2	2.6
5-Sep	2.7	2.8	Z	3.2	2.6	2.3	2.4	2.5	2.4	2.6	2.7	2.6	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.5	2.5	2.4	3.2
6-Sep	2.4	2.3	2.3	Z	2.3	2.3	2.4	2.5	2.4	2.7	2.7	2.6	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.7
7-Sep	2.2	2.1	2.1	2.1	Z	2.2	2.2	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	2.2	2.2	2.2	2.2	2.2	2.3
8-Sep	2.2	2.2	2.3	2.5	2.7	Z	2.3	2.3	2.3	2.4	2.6	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.6	2.5	2.3	2.3	2.3	2.4	2.7
9-Sep	Z	2.3	2.3	2.3	2.3	2.2	2.3	2.1	2.3	2.2	2.3	2.3	2.5	2.2	2.1	2.2	2.1	2.3	2.4	2.3	2.3	2.3	2.4	2.5	2.3	2.5
10-Sep	2.5	Z	2.2	2.2	2.3	2.3	2.3	2.1	2.1	C	C	C	2.2	2.1	2.1	2.1	2.1	2.1	3.3	5.0	4.4	3.1	2.6	2.2	5.0	2.6
11-Sep	2.2	2.7	Z	2.8	2.8	3.1	3.3	2.2	2.3	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.1	2.5	3.6	3.6	3.4	2.8	2.9	2.4	3.6	2.6
12-Sep	2.4	2.3	2.2	Z	2.4	2.3	2.0	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.3	2.2	2.4	2.4	2.4
13-Sep	2.3	2.2	2.3	2.3	Z	2.4	2.3	2.2	2.7	2.5	2.2	2.4	2.5	2.4	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.7
14-Sep	2.2	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2
15-Sep	Z	2.3	2.4	2.2	2.2	2.2	2.2	2.3	2.3	2.5	2.4	2.5	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.5
16-Sep	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.5	2.6	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.4	2.3	2.2	2.2	2.2	2.6
17-Sep	2.2	2.4	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.1	2.2	2.4	2.3	2.5	2.3	2.2	2.2	2.2	2.2	2.5
18-Sep	2.3	2.4	2.5	Z	2.6	2.4	2.4	2.3	2.3	2.3	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.4	4.8	3.9	3.1	2.3	2.3	4.8
19-Sep	2.3	2.2	2.3	2.2	Z	2.2	2.2	2.3	2.4	2.6	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.2	2.1	2.2	2.6
20-Sep	2.1	2.1	2.1	2.0	2.1	Z	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.4	2.7	2.6	2.5	2.3	2.3	2.3	2.7	2.2
21-Sep	Z	2.8	2.4	2.4	2.5	2.4	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.1	2.2	2.2	2.8
22-Sep	2.4	Z	2.3	2.6	2.4	2.4	2.5	2.5	2.5	2.6	2.4	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.4	2.3	2.3	2.1	2.6
23-Sep	2.3	2.5	Z	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.5
24-Sep	2.2	2.2	2.2	Z	2.4	2.6	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.3	2.3	2.6	2.4	2.3	2.4	2.3	2.6
25-Sep	2.4	2.3	2.4	2.4	Z	2.3	2.5	2.6	2.3	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.1	2.1	2.1	2.1	2.6
26-Sep	2.2	2.3	2.5	2.3	2.2	Z	2.5	2.4	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.5
27-Sep	Z	2.2	2.3	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.1	2.1	2.1	2.3
28-Sep	2.1	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.7	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.7	2.3	2.1	2.2	2.2	2.2	2.7
29-Sep	2.2	2.2	Z	2.3	2.3	2.3	2.3	2.1	2.2	2.2	2.1	2.1	M	M	2.1	2.1	2.2	2.3	2.5	2.4	2.8	2.3	2.2	2.2	2.8	2.3
30-Sep	2.2	2.2	2.2	Z	2.3	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.3	2.3	2.3	2.1	2.2	2.3
																								Diurnal Average		
																								Diurnal Maximum		
																								Z - zerospan C - Calibration M - Maintenance		







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	26	3.80	3.80
2.1 - 3.0	646	94.31	98.10
3.1 - 10.0	13	1.90	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - September 2015**

Concentration Ranges (ppm)	Wind Direction																Totals	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
0 - 2.0	2	1	0	0	0	0	0	0	0	0	0	5	15	1	0	1	1	26
2.1 - 3.0	38	23	11	14	14	51	156	31	9	9	17	44	55	74	53	45	644	
3.1 - 10.0	0	2	1	0	0	2	4	1	2	1	0	0	0	0	0	0	13	
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Totals</b>	40	26	12	14	14	53	160	32	11	10	22	59	56	74	54	46	683	

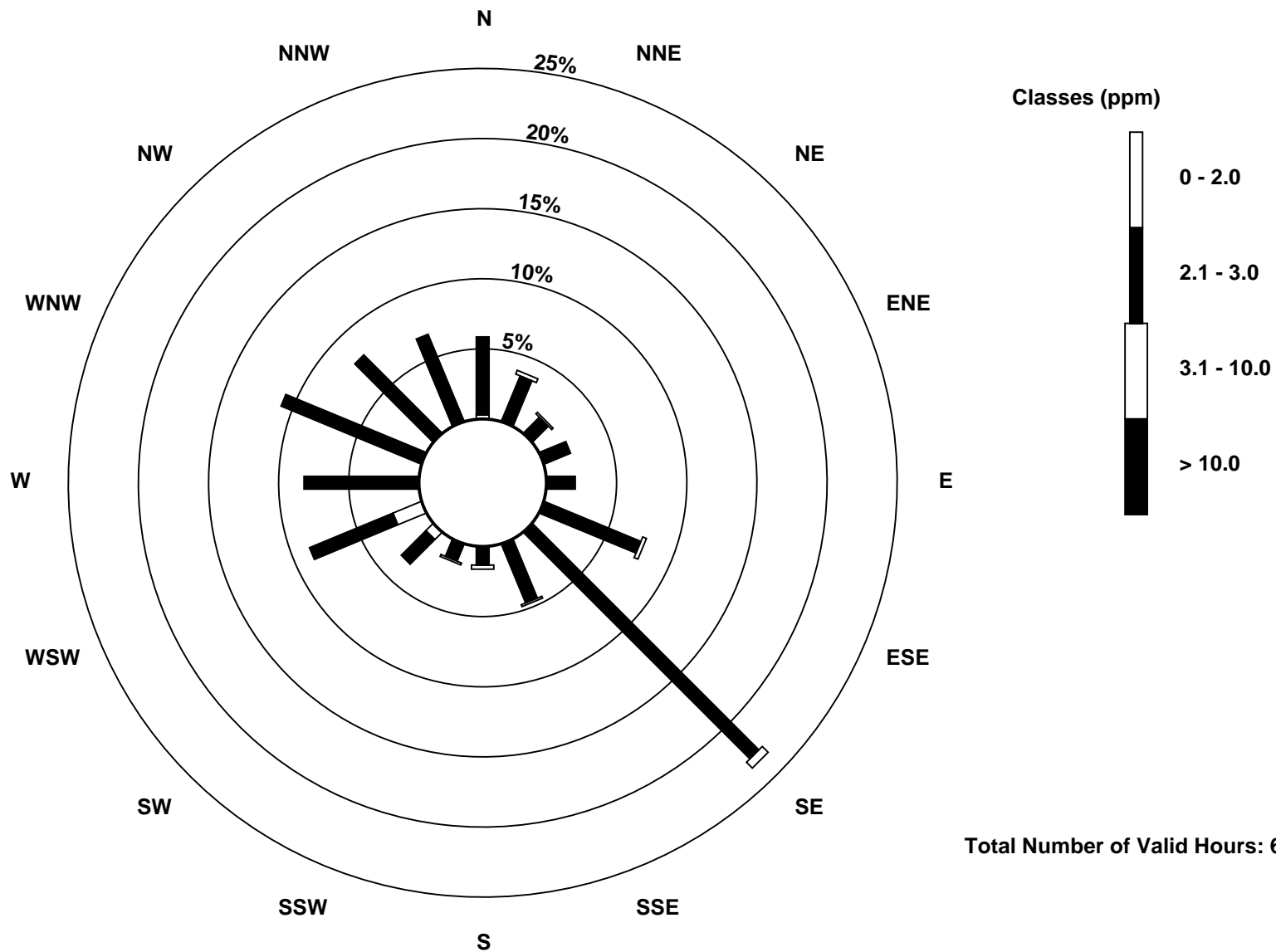
Total Number of Valid Hours: 683

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Total Hydrocarbons (THC) - ppm  
Lower Camp (AMS 11)



Total Number of Valid Hours: 683

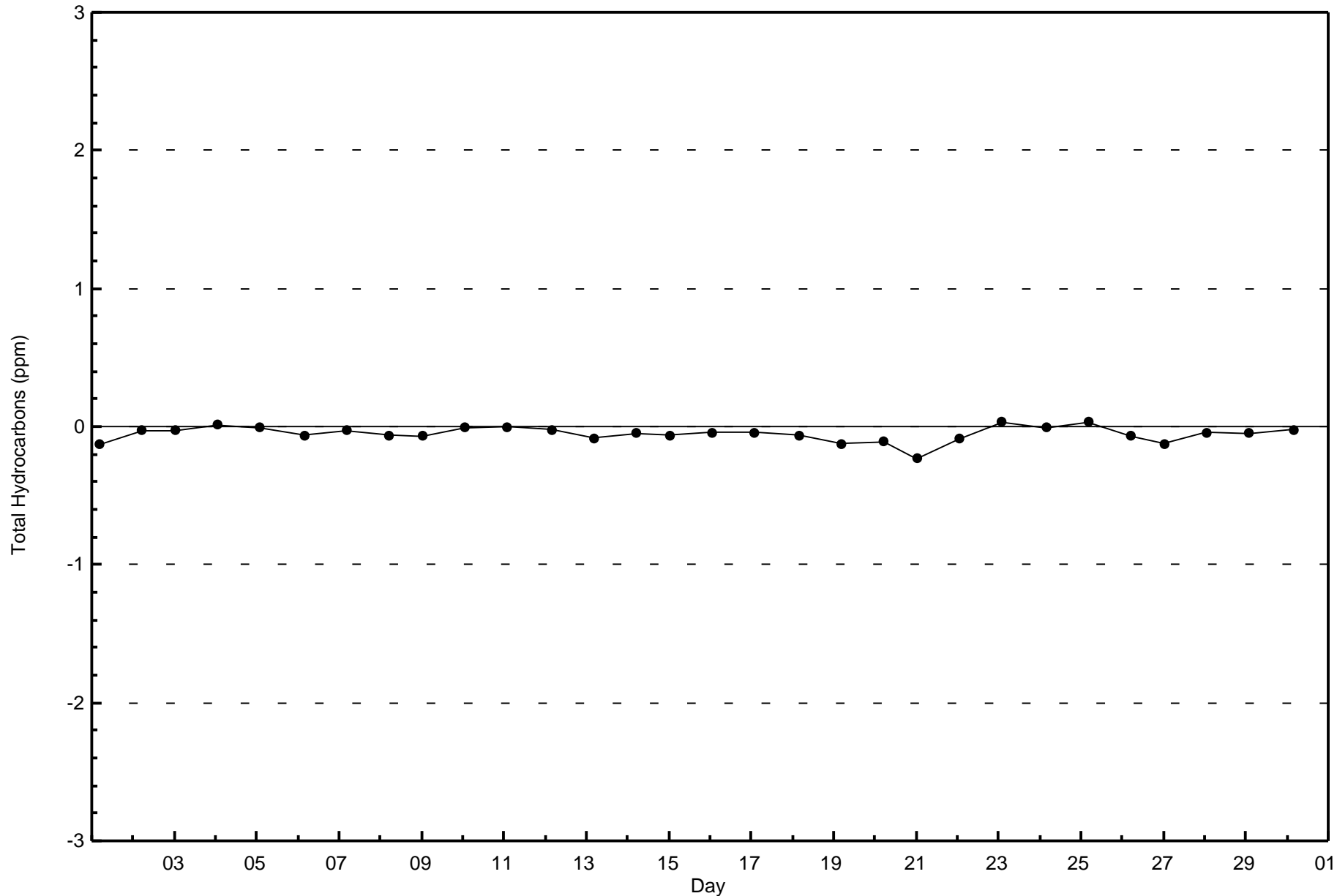


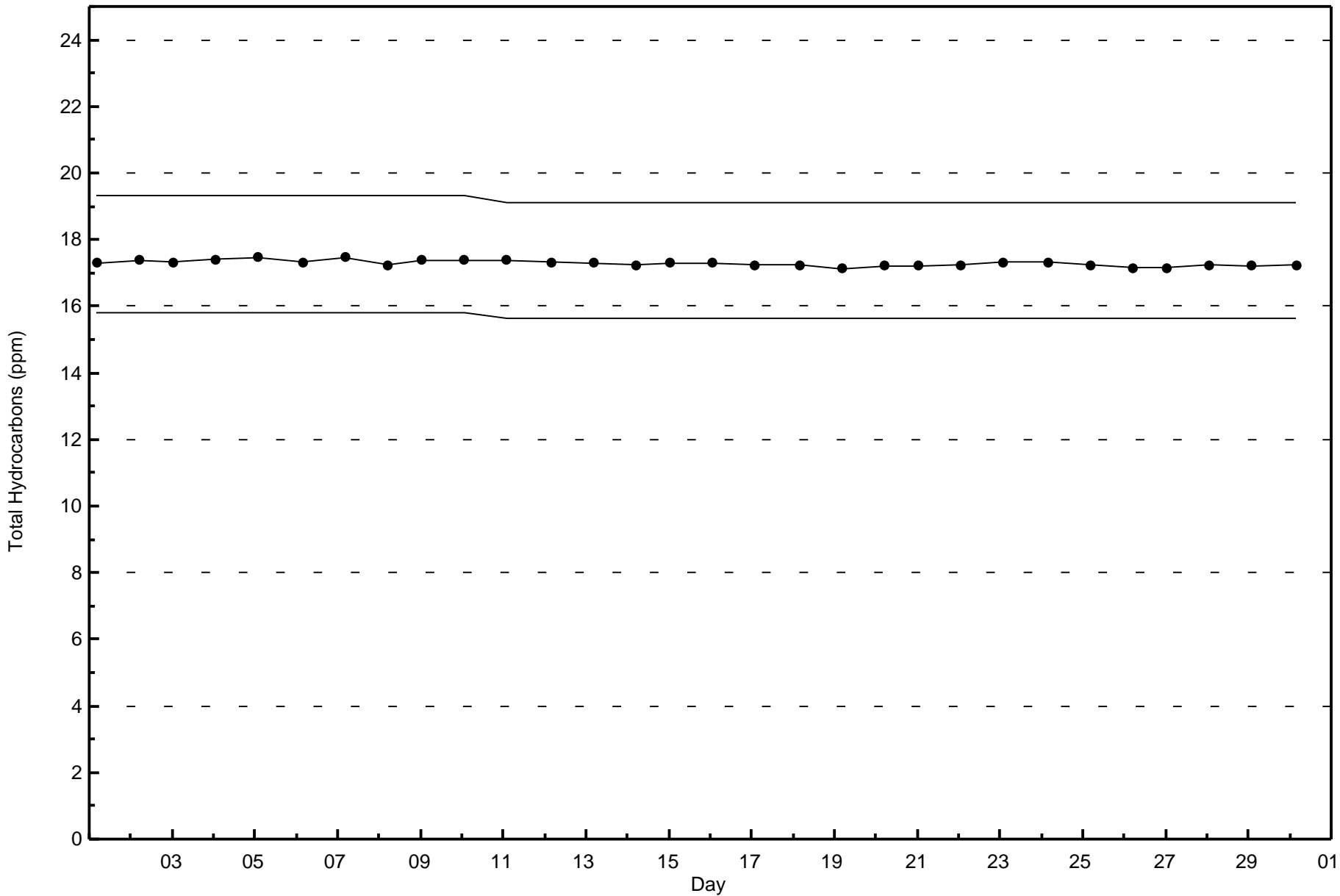
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Lower Camp - September 2015







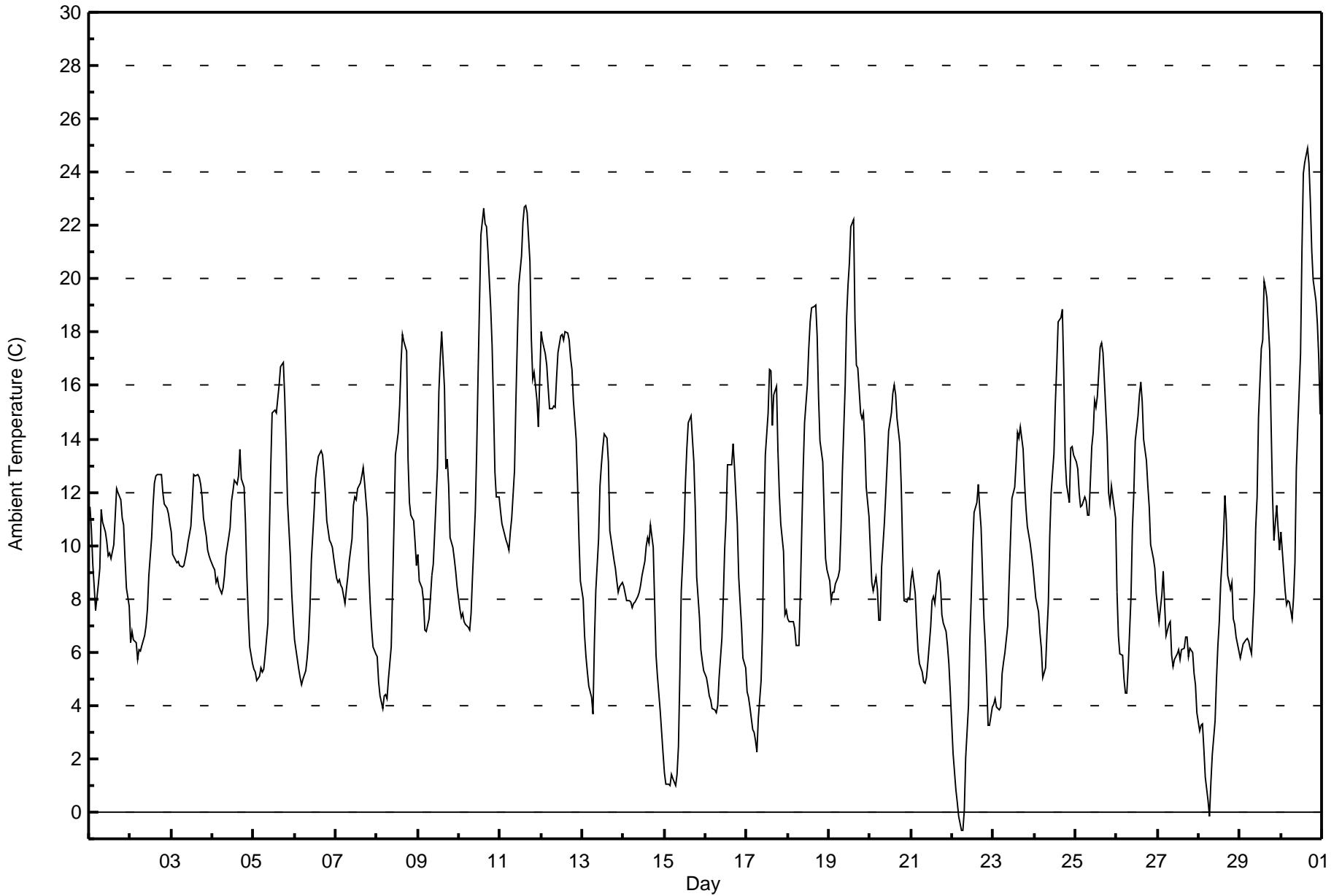
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

**Lower Camp - September 2015**

Maximum Value: 24.9 C on Sep 30 16:00		Maximum Daily Average: 15.9 C on Sep 12		Hours in Service: 720																						
Minimum Value: -0.7 C on Sep 22 07:00		Minimum Daily Average: 5.0 C on Sep 22		Hours of Data: 720																						
Maximum Diurnal Average: 15.3 C at hour 15		Minimum Diurnal Average: 6.3 C at hour 6		Hours of Missing Data: 0																						
Monthly Average: 10.25 C		Percentiles: P <sub>1</sub> = 0.8 P <sub>10</sub> = 4.9 Q <sub>1</sub> = 6.9 Median = 9.8 Q <sub>3</sub> = 13.0 P <sub>90</sub> = 16.7 P <sub>99</sub> = 22.7		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	11.5	10.6	9.3	8.5	7.6	8.5	9.1	11.3	10.9	10.5	10.1	9.6	9.7	9.5	10.0	11.1	12.1	12.0	11.7	11.1	10.8	9.5	8.4	7.7	10.1	12.1
2-Sep	6.4	6.8	6.4	6.4	5.7	6.1	6.0	6.3	6.6	7.0	7.6	8.9	10.3	11.5	12.4	12.6	12.7	12.7	12.7	12.0	11.6	11.4	11.2	10.8	9.2	12.7
3-Sep	10.5	9.7	9.4	9.4	9.4	9.3	9.2	9.2	9.5	9.8	10.1	10.7	11.7	12.6	12.6	12.7	12.6	12.3	11.8	11.0	10.4	9.8	9.6	9.4	10.5	12.7
4-Sep	9.2	9.1	8.6	8.8	8.5	8.2	8.4	8.9	9.6	10.3	10.7	11.7	12.0	12.4	12.3	12.6	13.6	12.5	12.2	10.8	8.9	7.3	6.2	5.6	9.9	13.6
5-Sep	5.3	5.2	4.9	5.1	5.4	5.2	5.4	5.9	7.1	10.3	12.9	15.0	15.1	15.0	15.5	16.0	16.7	16.9	15.5	13.7	11.6	9.6	8.2	7.2	10.4	16.9
6-Sep	6.5	6.1	5.4	5.0	4.8	5.0	5.3	5.8	6.5	7.7	9.5	11.3	12.5	13.0	13.4	13.5	13.4	12.8	11.9	10.9	10.2	10.1	9.9	9.5	9.2	13.5
7-Sep	8.8	8.6	8.7	8.5	8.4	7.9	8.4	8.8	9.4	10.2	11.5	11.8	11.7	12.1	12.3	12.6	12.9	12.3	11.0	9.1	7.8	6.9	6.2	6.0	9.7	12.9
8-Sep	5.8	4.9	4.3	3.9	4.4	4.4	4.3	5.0	6.2	8.5	10.8	13.4	14.2	15.2	16.8	17.9	17.6	17.3	13.2	11.6	11.1	10.9	10.1	9.2	10.1	17.9
9-Sep	9.7	8.7	8.4	7.9	6.8	6.8	7.2	8.0	8.9	9.3	10.5	12.9	15.8	17.0	18.0	15.9	12.8	13.2	12.3	10.3	9.9	9.5	9.0	8.5	10.7	18.0
10-Sep	7.6	7.3	7.4	7.1	7.0	6.9	6.8	7.5	8.8	11.3	13.6	16.4	19.1	21.6	22.6	22.1	22.0	21.1	18.9	17.5	15.3	12.8	11.8	11.8	13.5	22.6
11-Sep	11.3	10.8	10.6	10.2	10.0	9.8	10.5	11.0	12.8	15.4	17.7	19.7	20.9	22.1	22.7	22.8	22.5	20.6	17.8	16.2	16.5	15.4	14.5	16.2	15.8	22.8
12-Sep	18.0	17.7	17.2	16.8	15.9	15.1	15.1	15.3	15.2	16.3	17.2	17.9	17.9	17.7	18.0	18.0	17.7	17.0	16.6	15.4	14.0	12.3	10.3	8.7	15.9	18.0
13-Sep	8.0	6.6	5.9	5.2	4.7	4.3	3.7	6.3	8.3	10.3	12.3	13.0	13.7	14.2	14.0	13.2	10.6	10.2	9.5	9.1	8.7	8.2	8.5	8.6	9.0	14.2
14-Sep	8.4	8.2	7.9	7.9	7.9	7.7	7.8	7.9	8.1	8.3	8.5	8.9	9.4	10.0	10.3	10.1	10.8	9.9	7.9	5.9	5.1	3.8	3.0	2.2	7.7	10.8
15-Sep	1.5	1.1	1.1	1.0	1.4	1.3	1.0	1.4	2.4	5.1	8.3	10.5	12.4	13.7	14.6	14.9	14.0	13.1	11.4	8.8	7.3	6.1	5.7	5.3	6.8	14.9
16-Sep	5.0	4.7	4.3	4.2	3.9	3.8	3.7	4.0	5.0	6.5	8.0	9.9	11.0	13.0	13.0	13.0	13.8	12.9	10.8	8.8	7.9	7.0	5.8	5.4	7.7	13.8
17-Sep	4.5	4.3	4.0	3.1	3.0	2.7	2.3	3.5	5.0	6.9	10.7	13.4	15.0	16.6	16.6	14.5	15.7	16.0	13.5	11.9	10.8	9.8	7.4	7.5	9.1	16.6
18-Sep	7.3	7.1	7.1	7.2	6.9	6.3	6.2	8.2	10.6	12.8	14.6	16.0	17.4	18.4	18.9	18.9	19.0	17.9	15.5	13.9	13.2	11.3	9.5	9.1	12.2	19.0
19-Sep	8.7	8.0	8.3	8.3	8.6	8.8	9.1	10.6	12.8	16.0	18.6	19.8	20.6	22.0	22.2	18.4	16.7	16.7	15.0	14.7	15.0	13.9	12.2	11.1	14.0	22.2
20-Sep	9.8	8.6	8.3	8.8	8.3	7.2	7.2	9.2	10.9	12.0	13.1	14.3	14.9	15.7	16.0	15.7	14.7	13.8	12.2	9.9	7.9	7.9	8.1	8.0	10.9	16.0
21-Sep	8.7	9.0	8.2	7.0	6.0	5.5	5.2	4.9	4.8	5.0	5.6	6.9	7.9	8.1	7.8	9.0	9.0	8.6	7.4	7.1	6.8	6.2	5.6	4.5	6.9	9.0
22-Sep	2.2	1.5	0.8	0.4	-0.2	-0.7	-0.7	0.1	2.0	4.0	6.5	8.1	10.0	11.2	11.6	12.3	11.4	10.7	7.3	6.3	4.9	3.3	3.3	4.0	5.0	12.3
23-Sep	4.1	4.3	4.0	3.8	3.9	5.2	5.6	6.0	7.0	8.6	10.3	11.7	12.2	13.1	14.2	14.1	14.4	13.6	12.4	11.4	10.7	10.1	9.7	9.2	9.2	14.4
24-Sep	8.6	8.1	7.5	6.7	6.2	5.1	5.4	6.7	7.8	10.4	12.0	13.5	15.3	16.7	18.4	18.5	18.9	16.5	13.3	12.3	11.6	13.6	13.7	13.4	11.7	18.9
25-Sep	13.1	12.9	12.0	11.5	11.5	11.8	11.7	11.1	11.1	13.7	14.2	15.5	15.2	15.6	17.4	17.6	17.2	16.2	13.9	12.0	11.5	12.2	11.8	11.0	13.4	17.6
26-Sep	8.3	6.6	5.9	5.9	5.0	4.5	4.5	5.5	8.1	10.7	12.0	13.9	14.9	15.7	16.1	15.4	14.0	13.2	12.3	11.4	10.0	9.5	9.1	8.2	10.0	16.1
27-Sep	7.7	7.1	8.2	9.1	7.8	6.6	7.0	7.1	5.9	5.5	5.7	5.9	6.1	5.7	6.1	6.2	6.6	6.5	5.8	6.1	6.0	5.2	4.8	3.8	6.4	9.1
28-Sep	3.0	3.3	3.3	2.4	1.3	0.4	-0.2	1.1	2.2	3.4	5.0	6.2	7.2	8.5	10.4	11.9	10.9	8.9	8.3	8.6	7.2	7.0	6.6	6.0	5.5	11.9
29-Sep	5.8	6.0	6.3	6.4	6.5	6.4	6.2	5.9	8.2	10.7	11.8	14.8	17.4	17.7	19.9	19.7	19.3	17.3	14.5	11.9	10.2	11.5	10.6	9.8	11.4	19.9
30-Sep	10.5	9.8	8.3	7.8	7.9	7.9	7.3	8.0	9.4	12.9	14.4	17.2	21.1	23.9	24.4	24.9	24.3	22.9	21.1	20.0	19.2	18.3	17.0	14.9	15.6	24.9
																								Diurnal Average		
																								Diurnal Maximum		







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Lower Camp - September 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	4	0.56	0.56
0 - 10	370	51.39	51.94
10 - 20	325	45.14	97.08
> 20	21	2.92	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

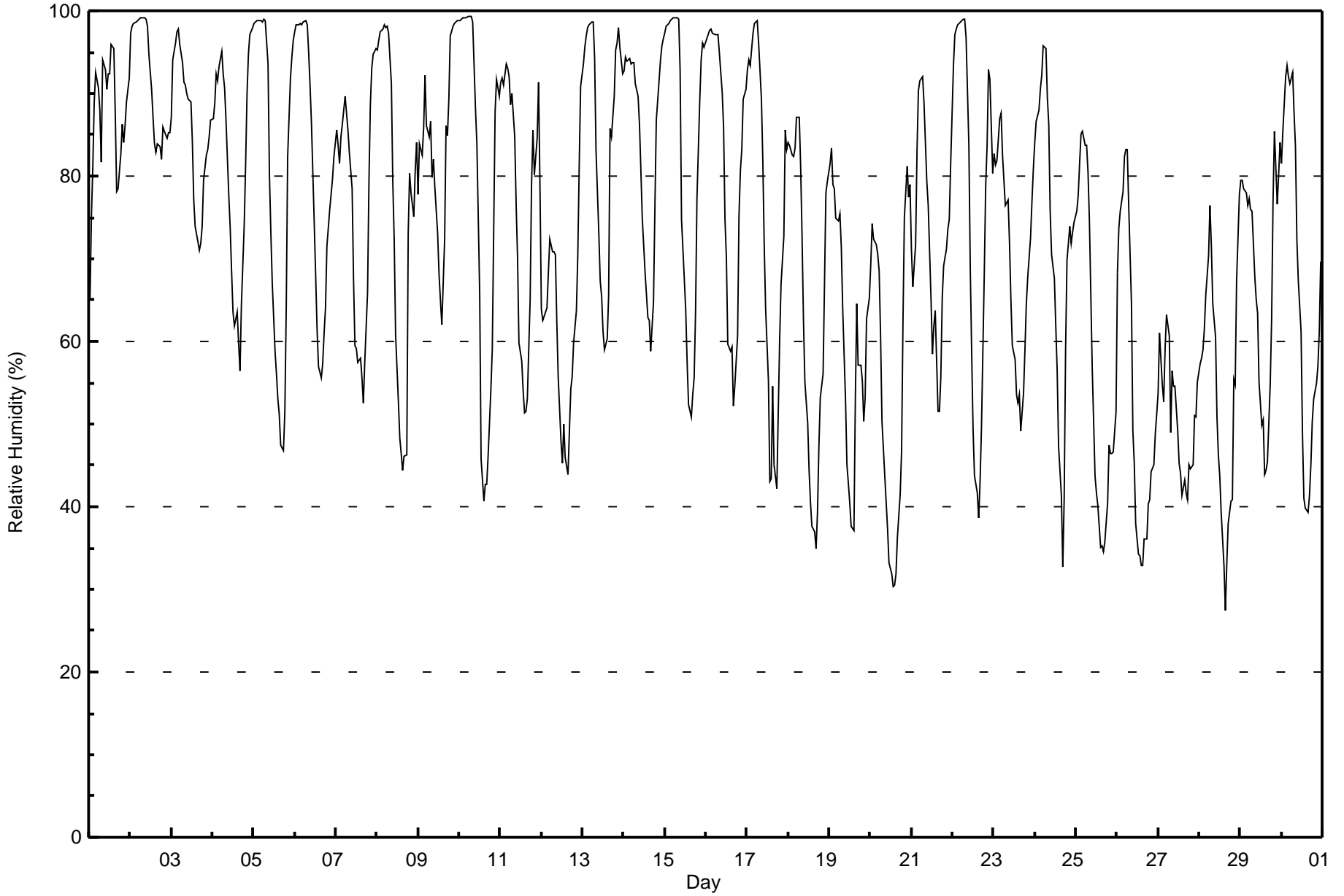


**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %  
Lower Camp - September 2015**

Maximum Value: 99 % on Sep 10 07:00														Maximum Daily Average: 91.7 % on Sep 2														Hours in Service: 720	
Minimum Value: 27 % on Sep 28 16:00														Minimum Daily Average: 50.7 % on Sep 27														Hours of Data: 720	
Maximum Diurnal Average: 89.0 % at hour 6														Minimum Diurnal Average: 51.4 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 72.9 %														Percentiles: P <sub>1</sub> = 33 P <sub>10</sub> = 44 Q <sub>1</sub> = 57 Median = 76 O <sub>3</sub> = 90 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-Sep	65	75	81	89	93	91	88	82	94	93	90	92	92	96	95	88	78	79	83	86	84	86	89	92	86.7	96			
2-Sep	97	98	98	99	99	99	99	99	99	99	98	95	90	87	84	83	84	84	82	86	85	85	85	85	91.7	99			
3-Sep	87	94	96	97	98	96	94	91	91	90	89	89	84	77	74	72	71	72	74	80	83	83	85	87	85.6	98			
4-Sep	87	89	92	92	93	95	92	91	87	78	74	68	64	62	64	60	56	64	74	81	90	95	97	98	80.9	98			
5-Sep	98	99	99	99	99	99	99	99	99	94	80	73	67	59	56	53	51	48	47	52	64	82	92	94	79.1	99			
6-Sep	97	98	98	98	98	99	99	98	95	91	86	74	68	61	57	56	57	61	64	71	76	78	80	82	81.0	99			
7-Sep	86	84	82	85	86	90	88	86	83	79	67	59	59	57	58	56	53	58	66	79	89	93	95	95	76.3	95			
8-Sep	95	97	97	98	98	98	98	97	91	79	72	61	53	48	46	44	46	46	73	80	78	75	81	84	76.6	98			
9-Sep	78	84	83	86	92	86	85	87	80	82	79	73	68	65	62	72	86	85	89	97	98	99	99	99	83.8	99			
10-Sep	99	99	99	99	99	99	99	99	99	99	88	84	75	66	46	41	43	43	46	54	59	74	88	92	90	78.3	99		
11-Sep	91	92	91	94	93	92	89	90	85	77	70	60	58	54	51	51	53	65	79	86	80	85	91	79	77.3	94			
12-Sep	64	63	64	64	68	72	71	71	71	62	56	48	45	50	46	44	49	54	56	60	64	71	81	91	61.8	91			
13-Sep	94	96	97	98	98	99	99	94	83	73	67	65	61	59	60	66	86	85	90	95	96	98	96	92	85.3	99			
14-Sep	93	94	94	94	94	94	94	91	90	86	81	75	68	66	63	63	59	65	76	87	89	94	96	97	83.4	97			
15-Sep	97	98	99	99	99	99	99	99	99	99	93	75	67	64	57	52	51	54	56	63	77	89	94	96	96	82.2	99		
16-Sep	97	97	98	98	97	97	97	97	95	90	86	75	70	60	59	59	52	55	61	75	81	83	89	90	81.6	98			
17-Sep	93	94	93	97	98	99	99	96	89	82	72	64	55	43	43	55	45	42	51	60	67	73	86	83	74.2	99			
18-Sep	84	84	83	82	83	87	87	81	73	63	55	50	44	41	38	37	35	39	47	53	56	67	78	79	63.6	87			
19-Sep	82	83	79	78	75	75	75	71	64	53	45	43	40	38	37	53	65	57	57	55	50	53	63	65	60.7	83			
20-Sep	69	74	72	72	71	69	61	50	44	41	37	33	32	30	30	32	36	42	47	63	75	81	78	79	54.9	81			
21-Sep	71	67	72	83	90	92	92	89	84	79	76	65	58	62	64	51	51	56	65	69	71	74	75	81	72.4	92			
22-Sep	93	97	98	98	99	99	99	99	97	84	69	59	49	44	42	39	43	50	68	79	84	93	92	80	77.2	99			
23-Sep	83	81	82	87	88	83	80	76	77	72	65	60	58	53	54	49	54	59	65	68	73	77	81	81	69.8	88			
24-Sep	84	87	88	91	92	96	95	90	86	76	71	68	62	56	47	41	33	41	59	70	74	72	73	74	71.9	96			
25-Sep	76	78	82	85	85	84	84	81	75	57	50	44	42	40	35	35	35	36	40	47	46	47	47	51	57.5	85			
26-Sep	68	74	76	78	82	83	83	77	65	49	45	38	34	34	33	33	36	36	40	41	44	45	49	51	54.0	83			
27-Sep	54	61	55	53	59	63	61	49	56	55	55	49	45	44	41	43	42	41	45	45	45	51	51	55	50.7	63			
28-Sep	57	58	59	61	66	70	76	71	65	61	51	46	44	39	33	27	33	38	41	41	55	55	67	78	53.9	78			
29-Sep	79	79	78	78	76	77	76	76	68	65	63	55	50	51	44	44	45	55	63	77	85	77	80	84	67.8	85			
30-Sep	82	85	92	93	92	91	93	88	84	72	67	61	49	41	40	39	41	45	50	53	55	57	61	70	66.8	93			
83.4														85.3														Diurnal Average	
99														99														Diurnal Maximum	





Maximum Speed: 34 km/h on Sep 27 08:00	Maximum Daily Speed Average: 17.6 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 7 23:00	Minimum Daily Speed Average: 0.9 km/h on Sep 15	Hours of Data: 718
Maximum Diurnal Speed Average: 5.1 km/h at hour 14	Minimum Diurnal Speed Average: 0.9 km/h at hour 10	Hours of Missing Data: 2
Monthly Average Velocity: 1.9 km/h 245.0 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 8 Q <sub>3</sub> = 12 P <sub>90</sub> = 17 P <sub>99</sub> = 29	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	SE6	SE8	SE6	SE2	NNW1	E3	NW1	SE13	E5	NNW11	NNW11	N13	NW14	WNW18	W14	WNW12	W12	W10	SW5	SW10	WSW14	SW5	SSE4	S1	W3.2	WNW18	
2-Sep	SSE2	SE7	SE5	ESE7	SE5	NE3	NNE5	NNW4	N5	NW8	WNW7	NW3	N10	N15	NNE16	NNE17	N17	NW10	NNW8	NNW10	NNW7	N10	NNW8	NNW9	N5.8	N17	
3-Sep	NW8	NW9	NW10	NW10	WNW10	WNW10	WNW16	WNW17	NW17	NW15	WNW18	WNW19	W21	WNW20	WNW21	WNW21	WNW19	WNW16	WNW15	WNW17	NW14	WNW15	W14	W14	WNW6	WNW14.7	WNW21
4-Sep	WNW7	NNW4	NW1	WNW4	WNW5	NNW4	NNW4	N5	N6	NW9	NNW7	NNE5	N10	N10	N8	N4	WNW4	WNW3	ENE3	NE1	W2	ENE1	ENE1	ENE1	NNW3.7	NNW10	
5-Sep	NE2	NW2	ESE2	SE6	SE6	SE10	ESE9	SE9	ESE10	SE11	SE8	SE8	ENE1	NE3	SE5	ESE6	ESE7	SSE6	WSW4	SW1	N1	WNW2	NNE1	N1	SE4.0	SE11	
6-Sep	WNW3	WNW5	W5	WNW5	WNW2	NW3	WNW4	NW5	NW7	NW7	NW5	NNW7	NNW9	NNW11	N13	NNE12	NNE10	NNE9	NNE6	NNW5	WNW4	NNW6	NNW6	NW4	NNW5.4	NNE13	
7-Sep	WNW4	WNW5	NW6	NW5	NNW4	N1	NNW4	NW6	NNW7	N8	N10	N11	N12	NNW11	N12	N12	N13	NE14	ENE5	N0	ENE1	N1	N0	N1	N5.7	NE14	
8-Sep	N0	ENE1	ENE2	E2	SE6	ESE6	ESE6	SE8	SE8	SE7	SE7	SE6	ESE4	NW4	SE2	WSW3	WNW4	WNW2	NW1	W3	SE2	SE5	SE6	ENE2	SE2.6	SE8	
9-Sep	SSE4	SSW0	SE7	ESE6	ESE9	SE9	SE9	SE10	SE4	SE10	SE11	SE9	SE8	SE9	SE9	NE4	SSW3	SE7	E2	ESE1	ESE2	ESE2	E1	ENE1	SE5.4	SE11	
10-Sep	ESE2	E2	SE6	SE7	SE7	SE10	SE8	SE11	SE12	SE12	SE9	SE10	SE8	SSW6	C	C	SW12	SW10	S5	SSW7	ESE1	NNE3	SE4	SE8	SSE5.7	SE12	
11-Sep	SE8	SE8	SE8	SE10	SE9	SE7	SE10	SE12	SE12	SE11	SE9	WSW10	SW9	WSW12	WSW13	SW16	SW10	SE2	ESE3	NE4	NNE2	NE2	E2	WSW8	S4.7	SW16	
12-Sep	W18	W17	W14	W19	W12	WNW6	WSW11	W10	WSW9	WSW10	WSW10	W12	W13	W11	W16	W20	WSW21	WSW20	WSW20	W17	W11	NW4	W2	NNE1	W12.3	WSW21	
13-Sep	ENE2	NNE2	NW1	NNE2	W3	NNE2	NE2	E2	ESE4	NE1	NNW3	W8	WNW4	SW1	NNE5	NNW8	NNW4	NNW4	SW1	N0	NW1	NW2	NNW5	NNW7	NNW2.0	NNW8	
14-Sep	NNW9	NNW7	NNW8	NNW9	NNW7	NNW9	N10	N8	N10	N12	N13	N13	N8	N12	NNW11	NNE9	NNE5	NE7	NNE2	W2	NNW2	WNW2	NNE2	NNW1	N7.0	N13	
15-Sep	N1	NE1	WNW2	WNW4	NW4	W3	NW2	W3	W5	WNW4	NNW4	NW2	ESE7	ESE12	SE10	SE9	SE10	SE8	ESE9	ENE1	WNW3	WNW2	WNW4	WNW4	SE0.9	ESE12	
16-Sep	W5	WNW4	WNW4	W4	WNW3	N2	NW3	N2	NW3	N3	N5	ENE2	ESE2	ESE7	ESE13	SE10	SSE6	SSE5	SSE5	SE7	SE6	SE7	SE10	SE7	SE2.2	ESE13	
17-Sep	SE8	SE8	SE7	ESE10	ESE10	SE9	SSE6	SE6	SE12	SE12	SE9	SE12	SE9	S7	S6	SE6	SW8	SSW4	SSE7	SSE8	SSE10	ESE6	ESE8	SE10	SE7.5	SE12	
18-Sep	SE11	SE10	SE10	SE10	SE10	SE10	SE10	SE11	SE8	S4	WSW12	W15	WSW18	WSW17	W15	W16	WSW21	WSW15	SW7	SSE5	S6	SE8	E5	ESE9	SSW5.9	WSW21	
19-Sep	ESE12	E12	E10	E10	SE8	SE9	SE11	SSE11	SSE10	SSW10	SW16	WSW21	WSW23	SW21	WSW23	WSW28	WSW14	WSW24	SW15	SW19	WSW19	WSW18	W12	WSW15	SW9.9	WSW28	
20-Sep	W9	WSW4	SW10	WSW14	W23	WSW19	WSW12	SW8	SW14	WSW19	WSW20	W24	W25	W26	W24	W21	WNW20	WNW13	NW9	NNW3	WNW3	NW1	WNW3	NW2	W12.8	W26	
21-Sep	NW9	WNW16	WNW17	WNW18	WNW15	WNW15	NW13	N14	NNW14	N13	NNW9	NW14	NW16	NW17	N12	NW15	NW10	WNW16	WNW17	WNW18	WNW15	NNW8	NNW6	NNW5	NW12.5	WNW18	
22-Sep	NW1	N2	NNW1	NW2	W3	NW1	WSW2	E3	SE6	SE4	SE7	SE7	SE8	SE9	SE9	SSE6	S5	S4	ESE2	E3	E3	NNE1	SE3	SE7	SE2.8	SE9	
23-Sep	ESE3	NE5	E2	SE4	SE7	SE14	SE14	SE14	SE16	SE18	SE21	SE16	SE15	ESE16	ESE16	ESE16	ESE18	ESE19	ESE17	ESE15	SE15	SE14	SE15	SE15	SE13.3	SE21	
24-Sep	SE13	SE14	SE10	SE8	ESE6	NW2	SSE3	SE6	SE7	SE6	SSE7	SE10	SE10	SE12	SE10	SE11	SE8	SSE1	WNW2	NNE3	WNW2	SE7	ESE10	SE9	SE6.6	SE14	
25-Sep	SE9	SE6	SE12	SE14	SE8	SSE8	SSE7	W11	W15	WNW18	W12	WSW15	W20	WSW17	WSW20	WSW19	WSW16	WSW14	WSW10	SW3	WSW10	WSW12	WSW12	W12	WSW8.7	W20	
26-Sep	S2	SE9	SE7	SE8	SE8	SE9	SE10	SE7	SSE6	WSW13	WSW16	WSW17	WSW21	WSW26	WSW27	WSW29	W29	WSW26	W20	W21	WSW12	WSW15	WSW18	WSW15	WSW11.7	WSW29	
27-Sep	SW7	SE9	SSW8	WSW22	WSW14	SW9	W21	W34	WNW31	NW25	WNW26	WNW32	WNW31	NW29	WNW27	NW22	WNW24	WNW17	NW9	WNW15	NW17	NW14	WNW19	NW15	WNW17.6	W34	
28-Sep	WNW12	WNW16	WNW16	W14	WNW9	W8	NNW2	W2	NE4	NNE5	WNW2	W8	WNW6	NW7	W4	WSW8	SSE4	SSE6	SSE6	SSE8	ESE8	ESE10	SE12	ESE12	W2.3	WNW16	
29-Sep	SE10	ESE12	ESE12	ESE11	SE8	SE8	SSE7	SE9	ESE10	SE9	SE8	SE6	SE10	SE11	SE9	ESE7	ESE3	SSW1	SE5	ESE2	ESE2	SE6	SE7	SE9	SE7.5	ESE12	
30-Sep	SE11	SE9	SE9	SE11	ESE11	SE9	SE6	SE13	SE15	SE14	SE17	SE14	S10	SSW12	SSW13	S9	SSE8	SSE8	SSE9	SSE9	SSE10	SSE10	SE9	E6	SSE9.5	SE17	

S1.1 SSE1.1 SSE1.3 SSW1.7 SSW1.8 S1.9 S1.6 SSE1.7 SE1.0 W0.9 WSW2.2 W3.9 W4.8 W5.1 W4.3 W4.9 W4.9 W4.0 WSW2.7 WSW2.7 WSW2.6 SW1.2 SSW0.9 SSW0.9 W18 W17 WNW17 WSW22 W23 WSW19 W21 W34 WNW31 NW25 WNW26 WNW32 WNW31 NW29 WNW27 WSW29 W29 WSW26 WSW20 W21 WSW19 WSW18 WNW19 SE15	Diurnal Average
	Diurnal Maximum

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

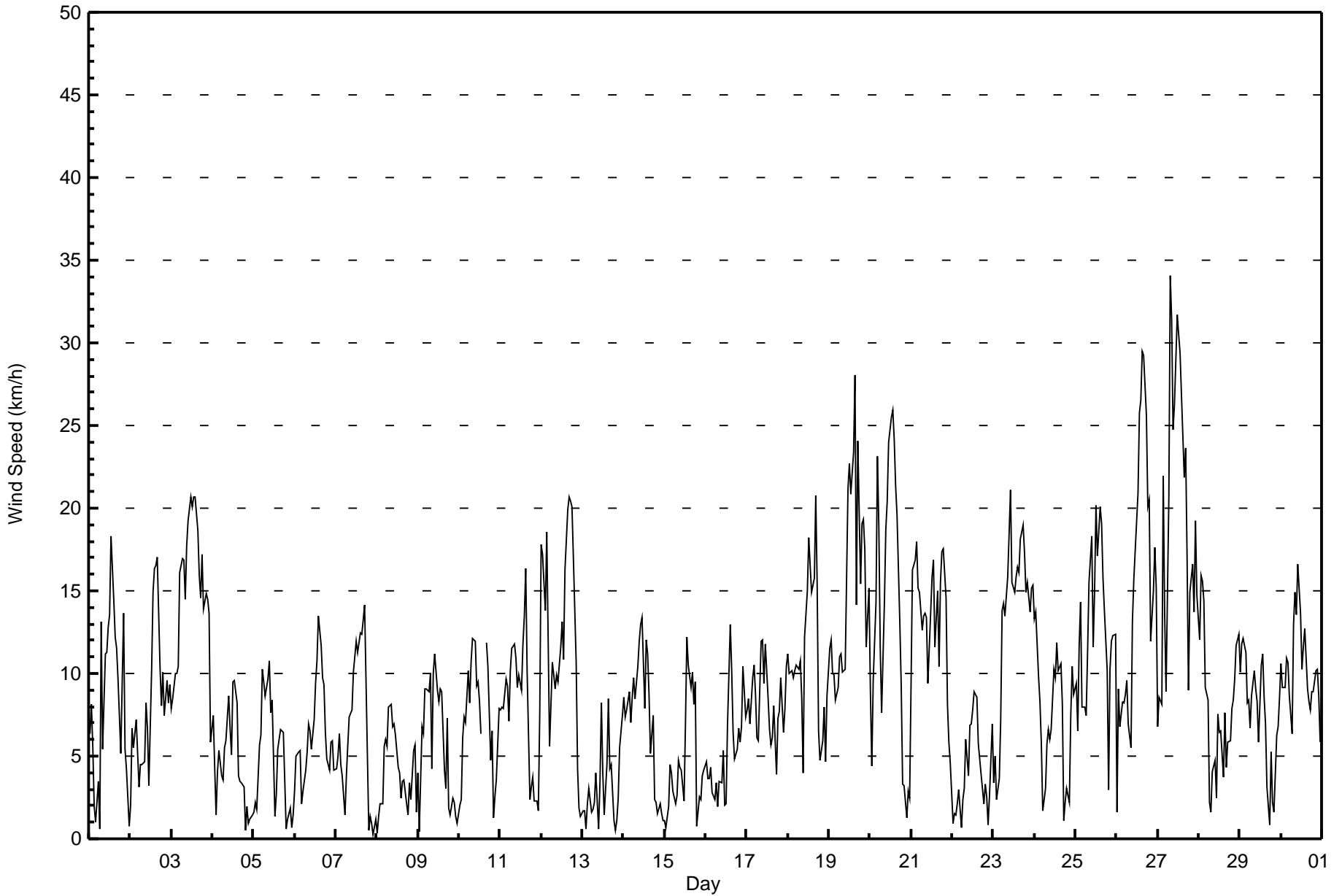


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 9 km/h on Sep 19 18:00	Hours of Data: 718
Minimum Value: 1 km/h on Sep 13 02:00	Hours of Missing Data: 2
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 3 P <sub>90</sub> = 5 P <sub>99</sub> = 7	Hours of Calibration: 2
	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-Sep	2	2	2	2	1	3	3	7	4	2	3	4	4	6	3	4	2	2	2	3	3	3	2	2	7
2-Sep	1	2	3	3	3	2	1	1	1	2	3	1	3	3	4	3	3	3	2	3	2	2	2	2	4
3-Sep	2	2	2	2	3	3	4	4	3	4	4	4	4	5	4	4	4	4	4	5	3	3	3	5	
4-Sep	3	1	2	2	1	1	1	1	1	3	2	2	3	3	2	1	1	1	1	1	1	1	1	3	
5-Sep	1	1	2	3	2	3	3	3	2	3	2	2	3	2	2	2	2	2	1	2	1	2	1	3	
6-Sep	2	1	1	1	2	1	2	1	2	2	1	2	2	3	3	3	2	1	1	1	2	2	1	3	
7-Sep	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	4	3	2	1	1	1	1	4	
8-Sep	1	1	1	1	2	2	2	2	2	2	1	1	2	2	1	2	3	1	2	1	1	2	2	3	
9-Sep	2	2	3	2	2	3	3	4	2	4	3	3	2	3	3	4	5	2	2	1	1	1	1	5	
10-Sep	1	2	2	2	3	3	3	3	4	3	3	3	2	3	C	C	3	3	1	2	1	1	2	4	
11-Sep	2	2	2	2	3	3	2	3	3	3	3	3	3	3	3	4	3	1	1	1	2	2	2	6	
12-Sep	3	4	3	3	4	2	4	2	2	2	2	4	3	2	4	4	4	4	4	3	7	1	2	7	
13-Sep	1	1	1	1	1	1	1	2	1	1	1	2	2	2	2	5	3	1	1	2	2	1	1	5	
14-Sep	3	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	1	1	1	1	1	3	
15-Sep	1	1	2	1	1	1	1	1	1	1	1	2	2	4	4	3	4	2	4	2	1	1	1	4	
16-Sep	1	1	1	1	1	1	1	1	1	1	1	2	1	3	5	4	2	1	2	2	2	2	3	5	
17-Sep	2	2	3	3	3	3	3	3	3	3	3	4	4	3	3	3	4	2	2	2	2	3	3	4	
18-Sep	3	2	2	2	2	2	3	3	3	3	3	4	4	4	3	4	4	4	3	2	2	3	2	4	
19-Sep	3	2	4	4	3	3	4	3	3	5	5	6	5	5	6	9	5	9	6	6	5	3	3	9	
20-Sep	7	3	3	5	5	4	5	4	4	4	4	5	6	5	6	5	5	4	3	1	2	1	1	7	
21-Sep	6	3	4	3	3	3	4	3	5	4	3	4	4	5	4	5	3	6	4	4	4	3	1	6	
22-Sep	1	1	1	2	1	1	1	3	1	1	2	1	2	2	3	2	2	1	1	1	2	1	3	3	
23-Sep	2	1	1	2	3	4	4	4	4	5	6	5	5	4	5	5	4	4	4	4	4	4	4	6	
24-Sep	4	5	4	4	3	2	2	2	2	2	3	3	3	2	2	2	2	1	2	2	2	2	3	5	
25-Sep	3	2	4	7	3	3	3	8	3	5	4	5	4	4	4	5	4	3	2	2	3	3	3	8	
26-Sep	3	2	2	3	2	2	2	2	3	4	4	4	5	6	7	7	6	6	5	4	3	3	4	7	
27-Sep	4	2	6	5	5	3	5	8	8	7	6	7	7	6	7	7	5	5	2	5	6	3	5	8	
28-Sep	3	4	4	3	4	4	2	2	1	2	3	2	2	2	3	3	2	2	2	3	3	2	3	5	
29-Sep	3	3	3	3	3	3	2	3	4	2	2	2	2	2	1	2	1	1	1	2	2	2	2	4	
30-Sep	3	2	2	2	2	3	2	4	4	3	4	3	4	5	6	4	3	2	2	2	3	3	3	6	

7	5	6	7	5	4	5	8	8	7	6	7	7	6	7	9	6	9	6	6	6	7	4	5	6
Diurnal Maximum																								

C - Calibration





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Lower Camp - September 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	222	30.92	30.92
6 - 11	287	39.97	70.89
12 - 19	163	22.70	93.59
20 - 28	39	5.43	99.03
29 - 38	7	0.97	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 718

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Lower Camp - September 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	17	18	11	14	12	16	14	9	6	4	6	4	14	32	25	20	222
6 - 11	11	4	1	0	3	26	129	24	5	4	10	9	9	7	16	29	287
12 - 19	14	4	1	0	1	14	29	0	0	2	6	30	21	28	12	1	163
20 - 28	0	0	0	0	0	0	1	0	0	0	1	16	12	7	2	0	39
29 - 38	0	0	0	0	0	0	0	0	0	0	0	1	2	3	1	0	7
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	42	26	13	14	16	56	173	33	11	10	23	60	58	77	56	50	718

Total Number of Valid Hours: 718

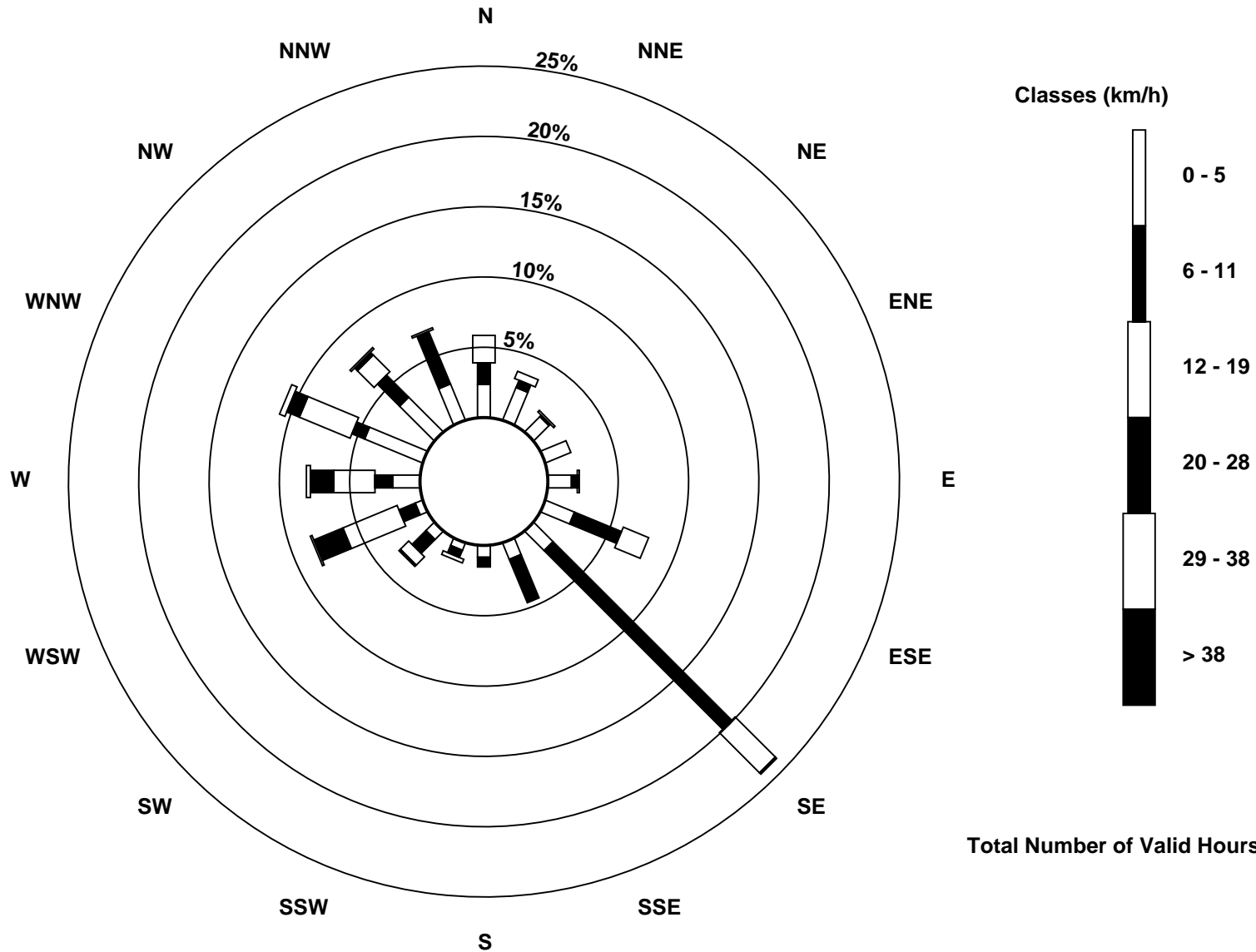
Total Number of Hours: 720





Wood Buffalo Environmental Association  
 Wind Rose Sep 2015

Wind Speed (WS) - km/h  
 Lower Camp (AMS 11)



Total Number of Valid Hours: 718



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg  
Lower Camp - September 2015**

Direction of Maximum Speed: 280 deg on Sep 27 08:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 292.6 deg on Sep 27	Hours of Data: 718
Direction of Minimum Speed: 5 deg on Sep 7 23:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 0.9 deg on Sep 15	Percent Operational Time: 100.0
Monthly Average Direction: 283.0 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-Sep	136	136	128	140	345	90	323	142	88	332	334	350	317	290	274	294	262	260	217	235	244	216	155	186	272.0
2-Sep	153	134	129	122	141	39	23	335	4	316	296	306	6	9	21	12	354	320	329	342	346	3	335	329	357.8
3-Sep	324	309	319	308	298	292	300	307	308	303	285	277	288	295	298	295	303	297	292	305	294	274	269	293	295.7
4-Sep	285	336	309	302	291	327	336	7	351	325	344	31	349	349	356	357	295	287	64	51	272	65	61	71	338.3
5-Sep	34	326	105	131	138	125	123	128	119	125	136	136	71	36	128	115	121	148	237	223	10	292	22	3	125.1
6-Sep	302	282	273	287	292	322	296	308	310	319	316	345	332	335	11	21	23	25	13	328	293	333	334	326	336.6
7-Sep	294	300	323	324	334	9	328	319	335	350	350	355	350	348	359	357	4	51	68	6	64	351	5	354	353.1
8-Sep	11	72	63	84	129	121	121	126	126	132	138	139	114	326	131	245	283	295	324	281	135	136	133	77	128.6
9-Sep	147	195	144	123	105	143	131	130	144	127	127	134	137	134	129	39	200	135	84	109	121	117	101	76	129.1
10-Sep	102	99	137	139	138	136	140	132	130	131	133	133	140	211	C	C	236	231	182	192	122	31	132	146	150.3
11-Sep	132	133	128	132	137	142	141	134	134	132	139	246	234	246	241	229	222	138	109	43	33	48	80	245	169.9
12-Sep	261	261	267	266	278	300	251	262	253	245	250	274	268	261	263	262	255	252	255	266	279	311	274	32	263.0
13-Sep	60	32	321	16	280	18	46	95	111	53	346	267	297	215	22	330	337	344	234	352	306	305	327	332	333.7
14-Sep	346	335	333	346	337	338	359	4	7	7	357	6	355	353	347	26	33	35	20	270	329	289	19	328	356.2
15-Sep	354	36	299	287	304	265	308	265	280	298	328	308	108	120	136	134	126	132	107	66	300	289	292	288	139.0
16-Sep	280	287	283	280	292	355	312	1	321	360	3	69	116	112	109	132	151	158	158	132	140	126	125	139	126.9
17-Sep	132	145	132	122	121	130	148	144	126	125	133	131	141	186	178	136	228	203	162	159	148	122	114	137	140.9
18-Sep	139	139	137	141	143	140	142	137	135	184	248	262	258	253	259	260	251	245	219	167	174	139	95	112	200.3
19-Sep	105	82	94	101	145	141	146	151	157	192	217	248	254	231	252	256	248	252	227	227	244	253	262	250	226.0
20-Sep	267	237	236	256	260	255	255	216	235	252	250	259	275	265	263	279	298	303	308	333	287	312	292	319	265.3
21-Sep	305	297	291	295	294	293	318	350	343	352	328	319	318	316	350	324	313	299	289	295	301	329	334	342	313.1
22-Sep	314	350	340	313	278	308	256	88	135	138	126	131	134	128	132	161	170	184	118	100	89	28	124	141	135.2
23-Sep	111	42	93	132	124	128	130	136	128	129	127	131	126	115	123	118	115	118	119	123	132	128	128	128	123.8
24-Sep	127	124	125	132	114	309	167	141	135	145	147	131	130	124	131	128	136	150	282	17	301	125	120	133	129.7
25-Sep	129	140	124	124	141	166	155	260	263	289	270	254	259	249	251	250	251	249	248	236	251	240	252	273	241.7
26-Sep	180	137	135	139	143	140	133	124	159	246	258	253	251	255	245	255	260	258	267	261	254	252	257	252	243.5
27-Sep	236	141	204	254	256	234	261	280	301	319	300	292	298	304	302	309	300	303	319	301	308	315	301	307	292.6
28-Sep	301	299	298	279	283	268	343	277	34	31	282	268	295	313	262	247	164	153	168	156	122	119	126	119	264.3
29-Sep	128	121	113	119	131	137	147	128	110	130	126	131	133	130	135	123	112	193	137	102	102	129	126	131	126.8
30-Sep	140	138	133	136	114	125	131	139	129	134	128	133	173	200	205	170	163	158	158	158	155	157	141	98	146.4

175.7 150.5 164.2 198.3 196.2 172.3 179.6 164.8 143.8 274.9 252.1 262.0 273.3 272.0 267.6 274.0 265.5 259.0 244.1 252.1 251.7 228.7 207.8 197.9

Diurnal Average

**C - Calibration**

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

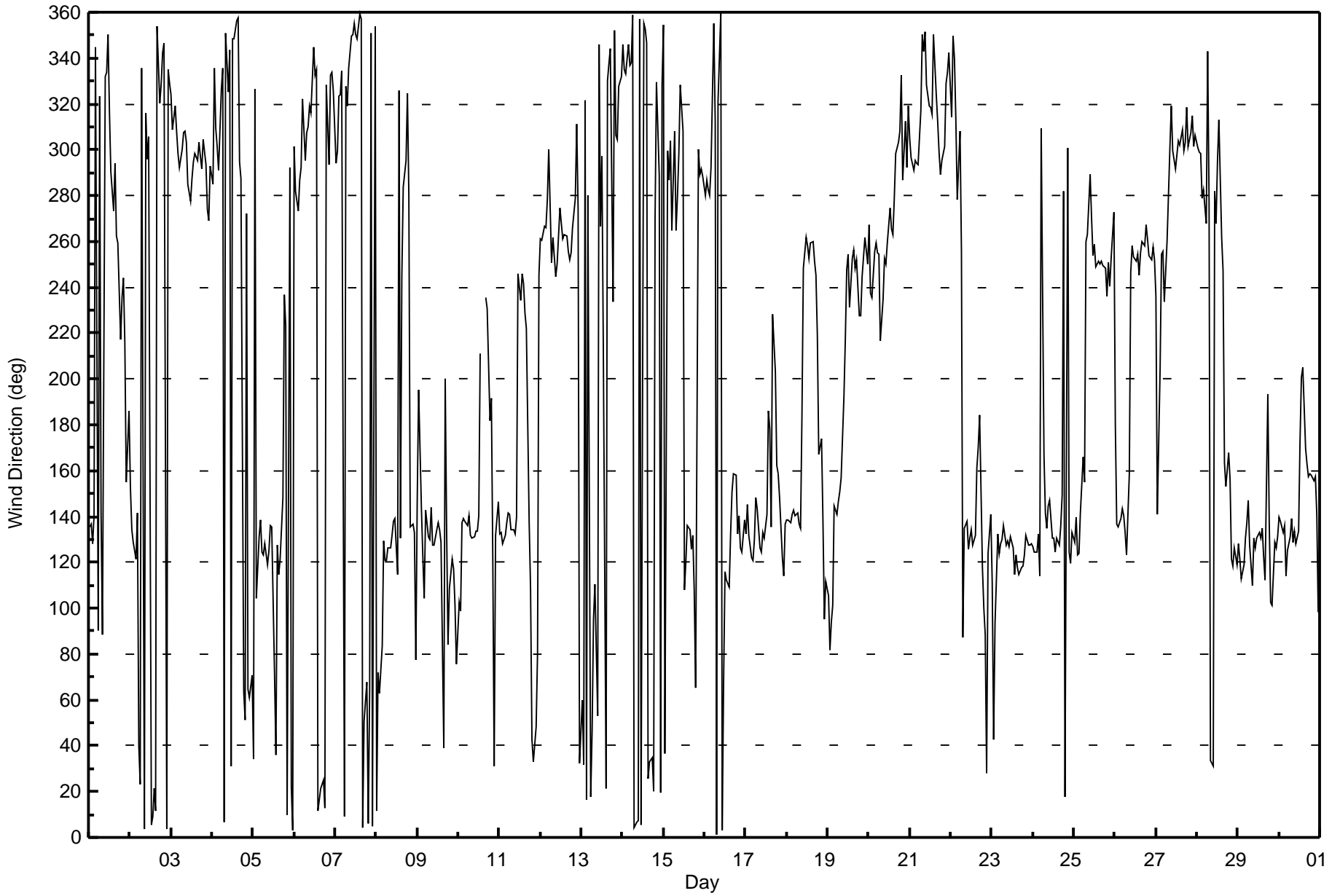
Wind Direction (WD) - deg  
Lower Camp - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 107 deg on Sep 1 07:00	Hours of Data: 718
Minimum Value: 10 deg on Sep 29 15:00	Hours of Missing Data: 2
Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 13 Q <sub>1</sub> = 17 Median = 23 Q <sub>3</sub> = 39 P <sub>90</sub> = 65 P <sub>99</sub> = 94	Hours of Calibration: 2
	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-Sep	21	22	30	82	90	60	107	33	62	19	21	20	26	19	15	20	15	18	26	16	13	52	33	99	107
2-Sep	82	20	47	33	38	78	34	35	36	19	32	51	15	16	16	14	19	21	19	21	20	19	19	14	82
3-Sep	19	15	14	13	15	12	13	14	15	13	14	12	12	14	13	13	16	14	11	25	13	14	13	30	30
4-Sep	29	24	75	53	32	37	46	26	22	23	28	30	23	23	26	50	63	37	98	42	95	80	58	98	98
5-Sep	35	48	82	55	39	24	27	21	17	21	26	25	83	67	31	26	25	29	54	79	82	78	63	67	83
6-Sep	49	19	17	28	54	37	29	22	17	18	24	20	20	29	17	16	12	17	18	15	27	17	15	45	54
7-Sep	36	25	16	21	41	65	45	21	21	20	23	22	21	20	21	24	23	14	20	74	81	39	95	61	95
8-Sep	82	83	41	55	25	27	25	22	19	21	22	26	46	58	66	74	77	49	80	47	51	24	29	74	83
9-Sep	48	94	29	31	19	19	26	31	53	34	18	27	25	24	20	65	75	23	72	79	50	46	71	77	94
10-Sep	49	54	31	32	35	26	28	28	23	21	30	26	31	58	C	C	15	17	24	24	87	59	39	15	87
11-Sep	16	19	19	20	21	53	20	20	21	24	35	37	26	17	15	14	21	49	21	34	100	74	59	60	100
12-Sep	12	12	14	11	21	40	21	16	15	12	19	16	12	13	12	12	13	12	12	12	26	28	88	55	88
13-Sep	32	49	87	38	44	50	64	64	37	82	49	31	59	80	35	36	64	35	91	90	90	41	32	19	91
14-Sep	21	29	18	22	19	20	18	18	19	18	18	20	30	22	27	29	46	23	68	42	74	71	42	54	74
15-Sep	73	71	55	19	28	48	66	32	24	22	31	73	24	27	29	25	20	21	20	82	47	43	25	21	82
16-Sep	12	29	22	39	83	48	35	57	30	35	22	65	33	19	24	25	32	28	35	20	23	31	25	33	83
17-Sep	23	22	32	31	23	30	42	52	21	21	28	24	37	53	47	23	66	54	25	23	19	50	28	17	66
18-Sep	20	18	15	16	18	15	19	20	32	65	20	15	14	14	14	14	13	14	35	38	45	29	43	27	65
19-Sep	22	14	36	43	45	38	28	23	27	36	21	20	14	19	15	15	16	16	22	21	14	14	13	15	45
20-Sep	50	59	20	15	12	12	28	39	16	15	15	13	14	14	14	15	13	12	15	26	48	60	52	41	60
21-Sep	28	11	12	11	12	11	31	20	23	21	28	25	20	17	20	21	21	28	12	12	15	21	13	23	31
22-Sep	72	85	68	62	43	83	46	74	21	29	22	20	20	23	25	44	31	33	48	39	74	70	82	22	85
23-Sep	66	23	65	51	35	20	20	20	17	16	15	19	18	14	17	14	13	13	15	16	18	16	16	16	66
24-Sep	20	22	38	38	48	72	65	36	28	44	45	19	22	12	14	15	17	93	52	43	84	28	19	26	93
25-Sep	27	32	22	32	28	32	34	34	13	15	20	15	13	14	15	13	13	12	13	87	17	14	18	15	87
26-Sep	73	15	18	20	19	17	18	26	49	19	15	16	14	15	16	14	12	13	12	12	17	13	13	13	73
27-Sep	45	20	42	13	20	19	14	12	21	17	15	13	13	14	14	19	13	14	13	13	15	12	13	11	45
28-Sep	12	12	15	13	29	37	82	86	20	23	91	32	39	31	90	24	61	21	23	24	21	14	18	16	91
29-Sep	20	17	13	17	31	35	29	33	30	16	17	26	11	10	10	14	28	78	20	61	69	29	19	12	78
30-Sep	16	16	12	12	17	33	39	17	14	15	13	15	41	33	33	31	28	23	20	18	18	19	30	28	41

82	94	87	82	90	83	107	86	62	82	91	73	83	80	90	74	77	93	91	98	100	95	95	99	
Diurnal Maximum																								

C - Calibration





# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	September 10, 2015	Last Calibration	August 5, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	12:05
Gas Cert Reference	LL110099	Station temp.	Deg C
Cal Gas Concentration	51.3 ppm	Cal Gas Exp Date	25/03/2016
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-675	-675
Analyzer IP address	192.168.1.43		Lamp voltage	800	798
Calculated slope	0.994614	1.000005	Chamber temp	44.8	44.8
Calculated intercept	2.074679	2.635228	Pressure	708.1	716.9
Analyzer Background	11.1	11.0	Flow	0.489	0.498
Analyzer Coefficient	1.013	1.013	Intensity	90	90
Analyzer make	TEI 43i		Analyzer serial #	100841398	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	80.9	830.0	828.8	1.002
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	80.9	830.0	828.8	1.001
second point	5000	40.9	419.6	415.2	1.011
third point	5000	20.5	210.3	205.6	1.023
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	80.9	830.0	829.6	1.001
Average Correction Factor					1.012

Corrected As found      829.0      Previous response      832.5      % change      0.4%

**Notes:**

Changed inlet filter after as founds. No adjustments. During the As Left span, the first 'dip' occurred because the venting point was moved to the correct position. The second 'dip' occurred because the calibrator moved on to the second point automatically.

Calibration Performed By:

Evan Magill



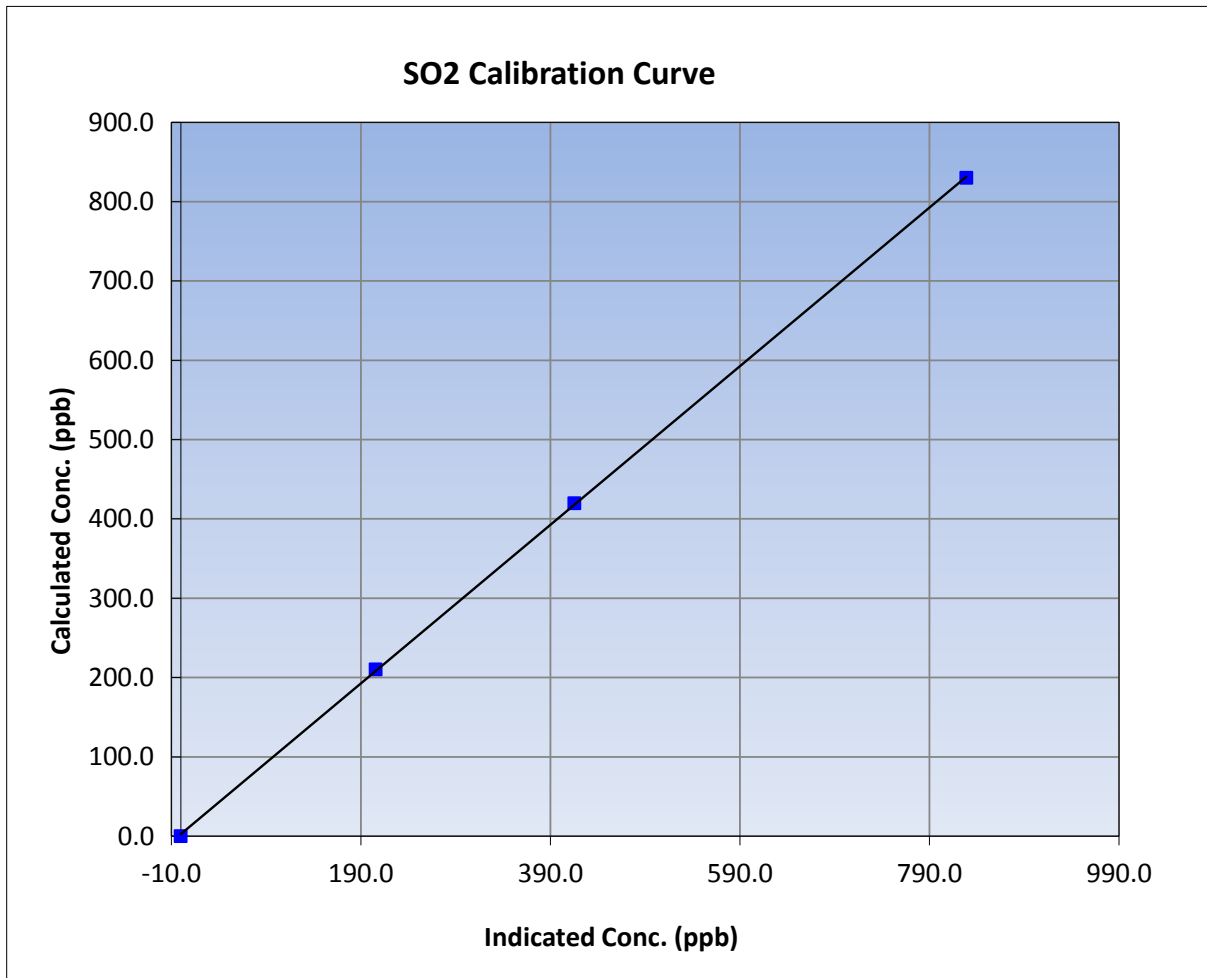
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 10, 2015	Previous Calibration	August 5, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	8:50	End Time (MST)	12:05
Analyzer make	TEI 43i	Analyzer serial #	100841398

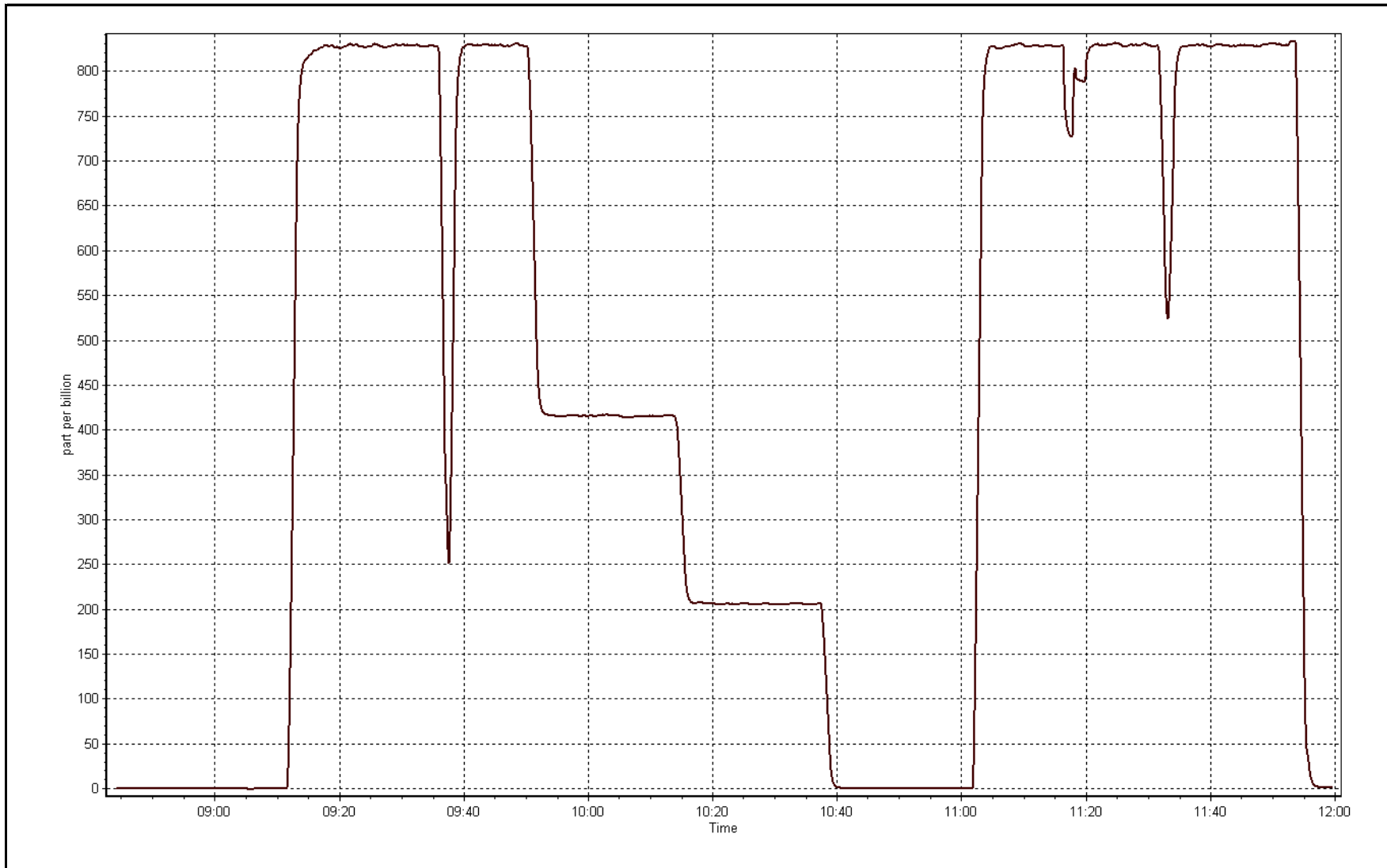
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999959
830.0	828.8	1.0015		
419.6	415.2	1.0107	Slope	1.000005
210.3	205.6	1.0228		
			Intercept	2.635228



SO2 Calibration Plot

Date: September 10, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	September 9, 2015	Last Calibration	August 5, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	12:40
Gas Cert Reference	ALM061435	Station temp.	22 Deg C
Cal Gas Concentration	5.15 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG air Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	3492
SO2 gas concentration	51.4 ppm	SO2 gas cert/exp	LL110099 25/03/2016

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-633	-633
Analyzer IP address	192.168.1.42		Lamp voltage	885	894
Calculated slope	0.999411	0.996820	Chamber temp	45	45
Calculated intercept	-0.142539	-0.277348	Pressure	576.1	576.8
Analyzer Background	21	20.7	Flow	1.119	1.116
Analyzer Coefficient	1.214	1.194	Intensity	60	60
			Converter temp.	340	342

Analyzer make/model	Thermo 450i	Analyzer serial #	922436966
Converter make/model	NA	Converter serial #	NA

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	72.9	75.1	75.2	0.998
SO2 scrubber check	5000	20.5	210.7	1.7	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	72.9	75.1	75.6	0.994
second point	5000	38.9	40.1	40.5	0.989
third point	5000	19.4	20.0	20.4	0.980
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	72.8	75.0	76.5	0.980
Average Correction Factor					0.988

Corrected As found	75.0	Previous response	75.3	% change	0.4%
--------------------	------	-------------------	------	----------	------

**Notes:**

Changed inlet filter and performed scrubber check after as founds. Adjusted span.

Calibration Performed By: Evan Magill





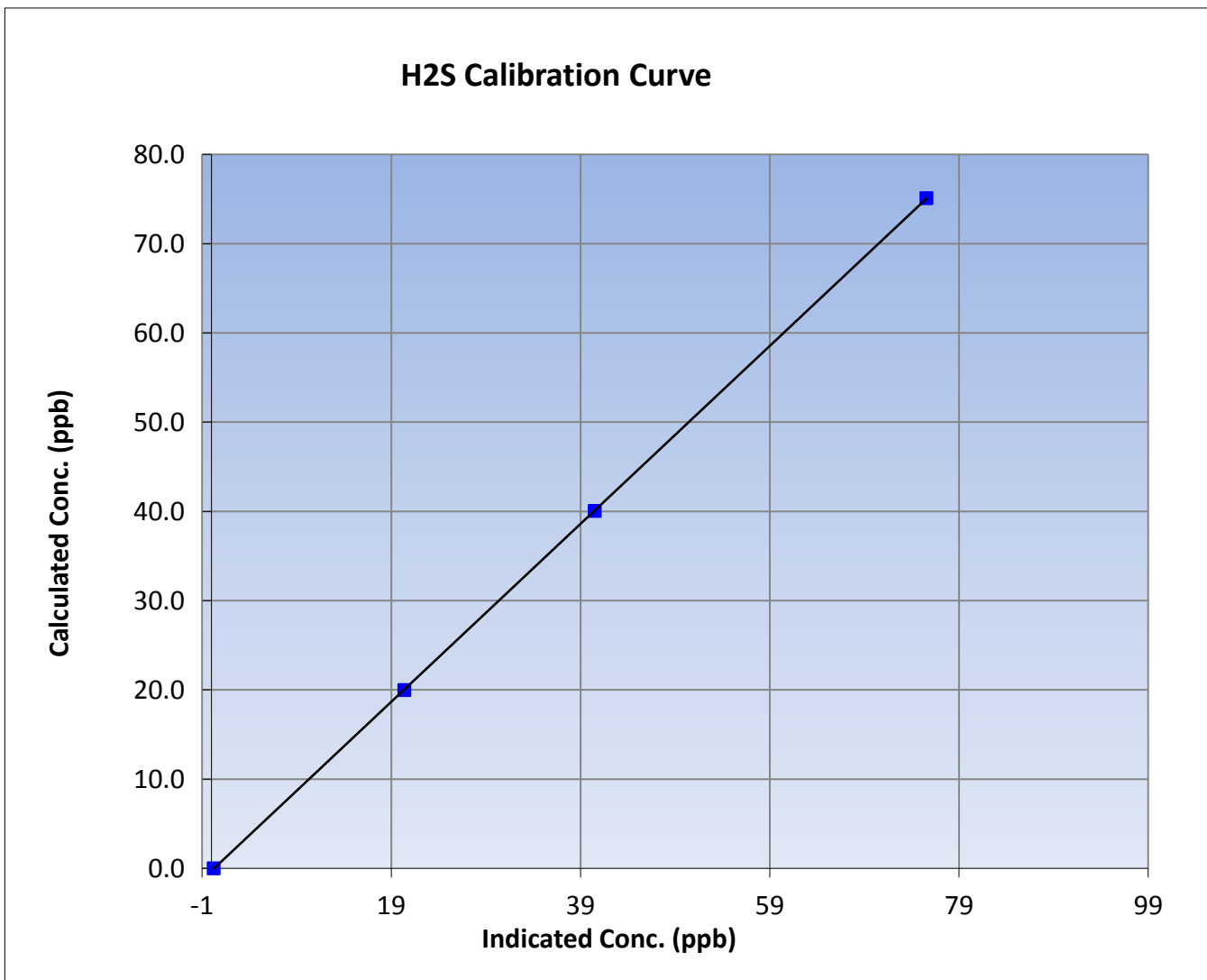
# Wood Buffalo Environmental Association H2S Calibration Report

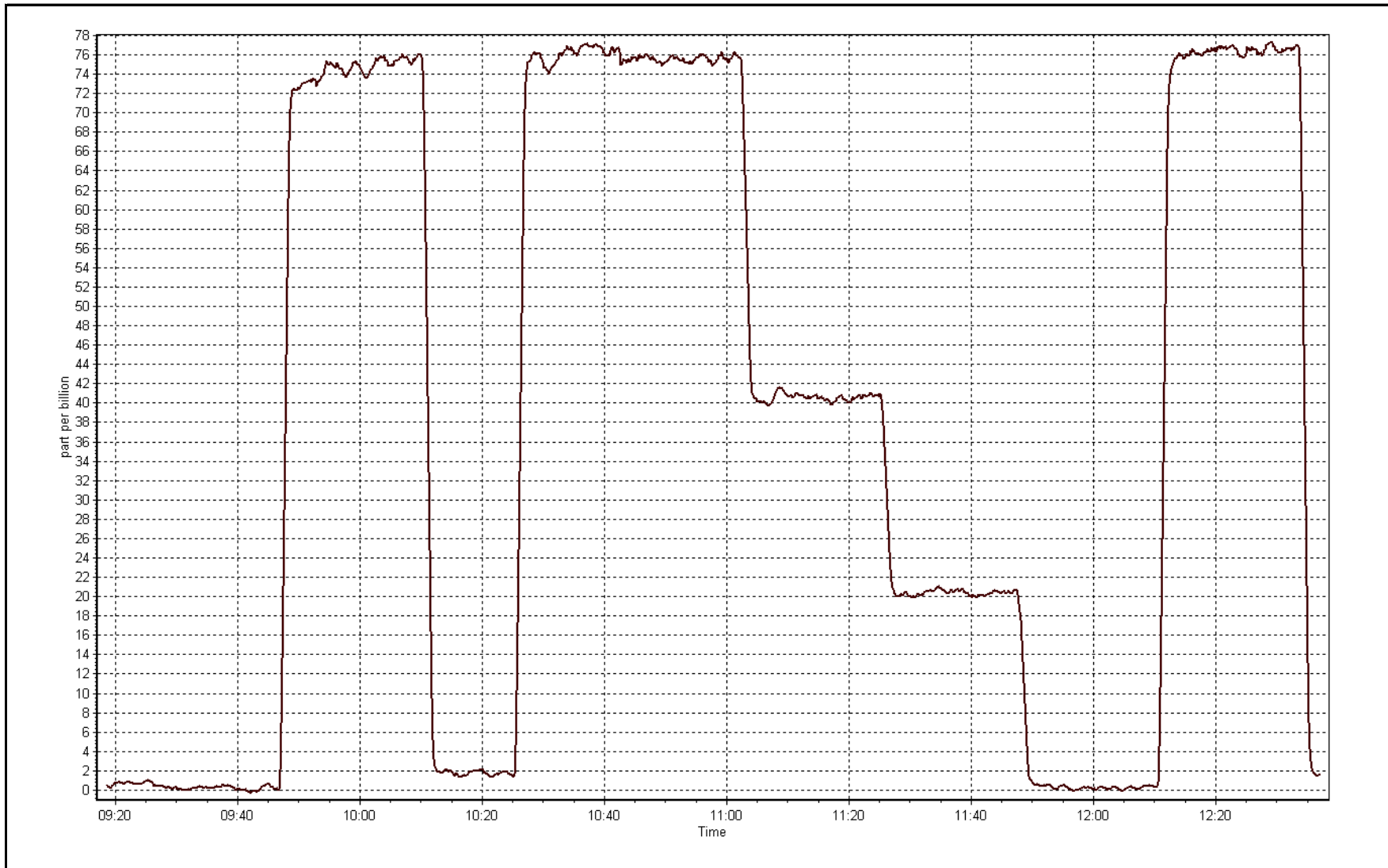
## Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 5, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:25	End Time (MST)	12:40
Analyzer make	Thermo 450i	Analyzer serial #	922436966

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999997
75.1	75.6	0.9936		
40.1	40.5	0.9891	Slope	0.996820
20.0	20.4	0.9805		
			Intercept	-0.277348







# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	September-10-15	Last Calibration	August-05-15
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	12:05
Gas Cert Reference	LL110099	Cal Gas Expiry Date	25/03/2016
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1070.5 ppm
C3H8 Cal Gas Conc.	202 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG make/model	Teledyne API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	3492

### Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	37.4	37.3
Calculated slope	0.994832	0.996885	Fuel Pressure	24.0	24.0
Calculated intercept	0.031017	0.012870	Analyzer Coeff	4.2	4.2
			Analyzer BKG	6.290	6.290

Analyzer make	51i-LT	Analyzer serial #	1410661326
---------------	--------	-------------------	------------

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.02	----
as found span	5000	80.9	17.32	17.39	0.996
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	80.9	17.32	17.39	0.996
second point	5000	40.9	8.76	8.72	1.004
third point	5000	20.5	4.39	4.38	1.002
as left zero	5000	0.0	0.00	-0.01	----
as left span	5000	80.9	17.32	17.39	0.996
Average Correction Factor					1.001

Corrected As found	17.37	Previous response	17.38	% change	0.1%
--------------------	-------	-------------------	-------	----------	------

**Notes:**

Changed inlet filter after as founds. No adjustments. During the As Left span, the first 'dip' occurred because the venting point was moved to the correct position. The second 'dip' occurred because the calibrator moved on to the second point automatically.

Calibration Performed By:

\_\_\_\_\_ Evan Magill



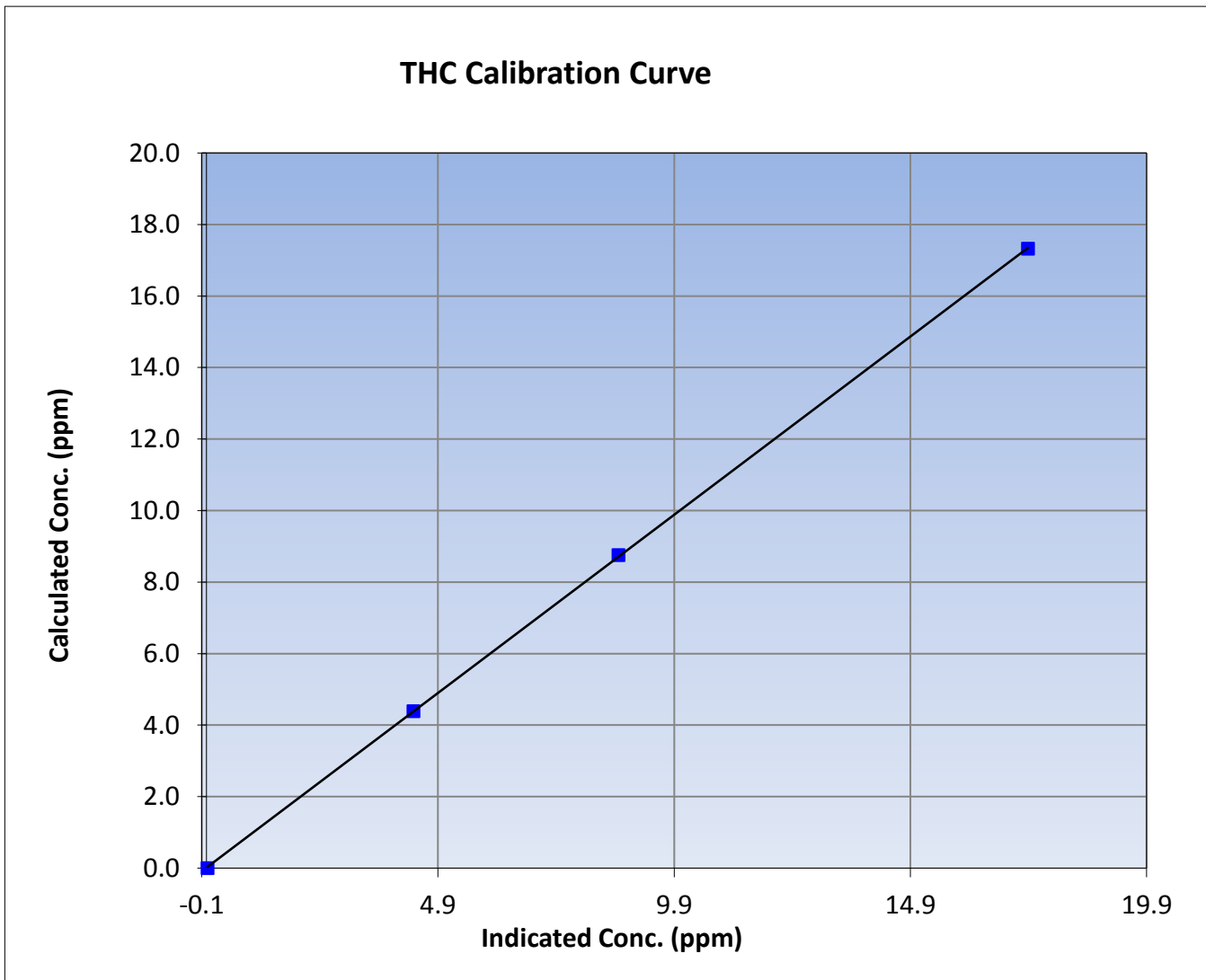
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	September 10, 2015	Previous Calibration	August 5, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	8:50	End Time (MST)	12:05
Analyzer make	51i-LT	Analyzer serial #	1410661326

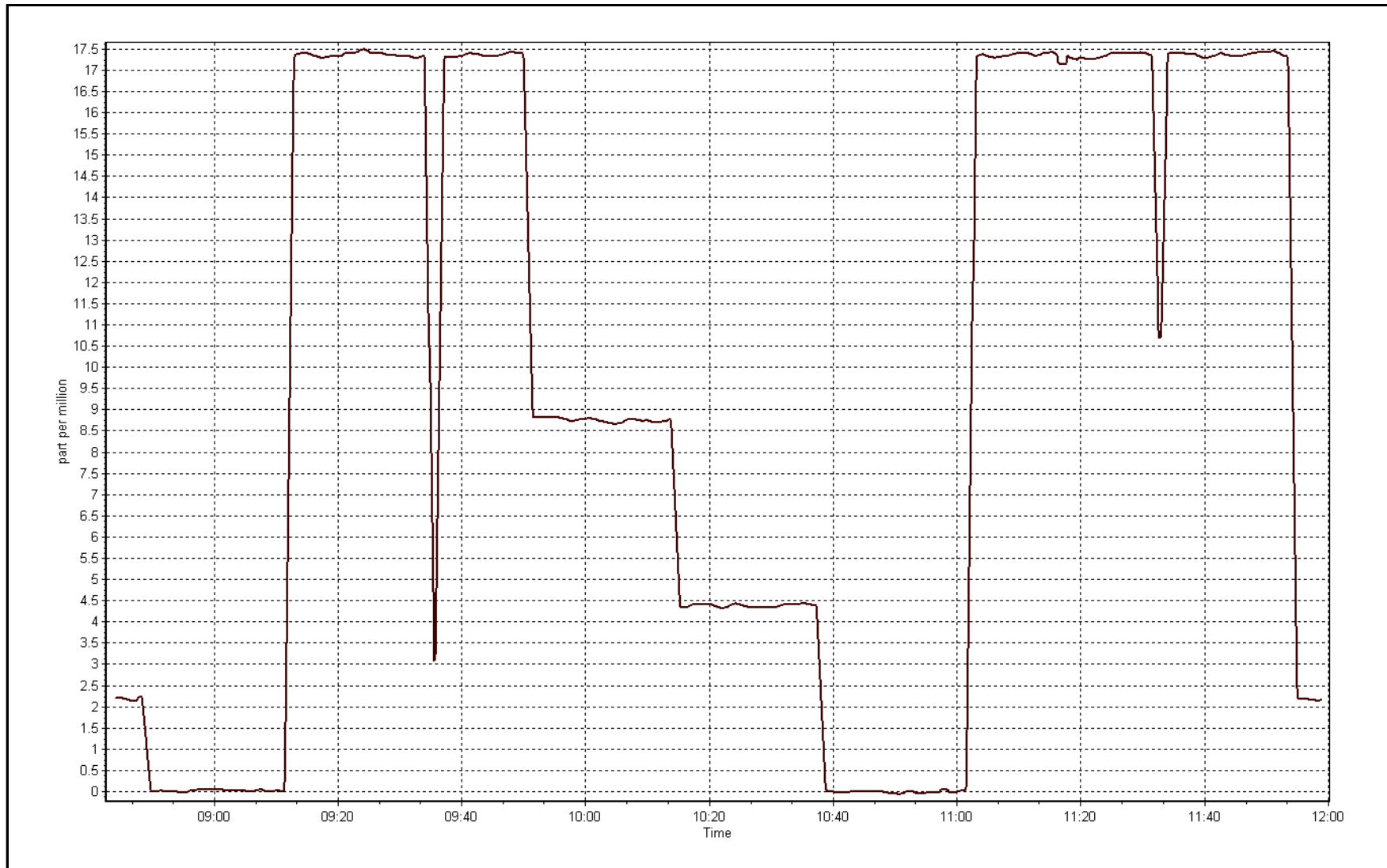
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999972
17.32	17.39	0.9960		
8.76	8.72	1.0042	Slope	0.996885
4.39	4.38	1.0021		
			Intercept	0.012870



THC Calibration Plot

Date: September 10, 2015





# Wood Buffalo Environmental Association

## WS/WD Calibration Report

### Station Information

Calibration Date	September-10-15	Previous Calibration	September-15-14
Station Name	Lower Camp	Station Number	AMS 11
Reason:	<input checked="" type="checkbox"/> Routine	<input type="checkbox"/> Installation	<input type="checkbox"/> Removal
Start Time (MST)	14:20	End Time (MST)	16:10
Barometric Press	739.5 mmHG	Station Temp	22 Deg C
WS Calibrator	MetOne 053	Serial Number	K13090

### WIND SPEED

Sensor make/model	Met One 010C-1	Sensor serial #	P19838
DACS make	Campbel Scientific CR3000	DACS serial No.	2632
DACS voltage range	5000	DACS channel #	
<u>Before</u>		<u>After</u>	
Calculated slope	1.000264778	Calculated slope	0.999615
Calculated intercept	-0.026916408	Calculated intercept	-0.025296

### Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0.0	0.0	n/a
200	20.2	20.3	0.9957
400	39.4	39.4	0.9990
600	58.6	58.5	1.0003
800	77.8	77.8	0.9989
Average Correction Factor			0.9984

### WIND DIRECTION

Sensor make/model	Met One 020C-1	Sensor serial #	P19941
DACS make	Campbel Scientific CR3000	DACS serial No.	2634
DACS voltage range	5000	DACS channel #	
<u>Before</u>		<u>After</u>	
Calculated slope	1.001796	Calculated slope	1.005187
Calculated intercept	-2.010512114	Calculated intercept	-1.119574

As Found Declination (west of North) 14 As Left Declination (west of North) 14

### Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	1.1	n/a
90	90.4	0.9961
180	180.2	0.9987
270	270.5	0.9983
357	355.8	1.0035
Average Correction Factor		0.9992

Notes: Annual audit  
 Solar noon declination verified yesterday (Sept 9, 2015), seemed to be perfectly aligned.  
 Confirmed with compass today (Sept 10, 2015).

Calibration Performed By: Evan Magill



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 13  
FORT MCKAY SOUTH  
SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)  
 SEPTEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	682	35	38	99.58	26	0	4	0
TRS(ppb) Average	682	34	38	99.44	2	0	1	0
THC(ppm) Average	681	35	39	99.44	4.6	-	2.7	-
O3(ppb) Average	684	33	36	99.58	34	0	24	-
NO2(ppb) Average	679	35	41	99.17	11	0	5	-
NO(ppb) Average	679	35	41	99.17	22	-	6	-
NOX(ppb) Average	679	35	41	99.17	24	-	9	-
PM2.5(ug/m3) Average	682	1	38	94.86	20.4	-	6.6	0
ET(C) Average	719	0	1	99.86	24.8	-	14.7	-
RH(%) Average	719	0	1	99.86	99	-	94	-
WS(km/h) Average	714	0	6	99.17	15	-	8	-
WD(deg) Average	714	0	6	99.17	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)  
 SEPTEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	682	0.7	2	-	0	0	0	0	0	1	26
TRS(ppb) Average	682	0.2	0	-	0	0	0	0	0	0	2
THC(ppm) Average	681	2.18	0.3	-	1.9	2	2	2.1	2.2	2.4	4.6
O3(ppb) Average	684	11.6	9	-	0	1	2	10	20	24	34
NO2(ppb) Average	679	1.7	2	-	0	0	0	1	3	5	11
NO(ppb) Average	679	1.1	3	-	0	0	0	0	1	4	22
NOX(ppb) Average	679	2.8	4	-	0	0	0	1	4	8	24
PM2.5(ug/m3) Average	682	4.28	2.7	-	0.4	1.4	2.2	3.9	5.4	8	20.4
Temperature 2 m (C) Average	719	8.14	5.9	-	-4.3	0.6	3.7	7.8	12.3	16.2	24.8
Relative Humidity (%) Average	719	76.7	20	-	32	45	60	83	95	97	99
Wind Speed 10 m (km/h) Average	714	4.5	3	-	0	1	2	4	6	9	15
Wind Direction 10 m (deg) Average	714	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)  
 SEPTEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	20 Sep 2015 17:00	20 Sep 2015 17:00	1	Maintenance - data logger replacement
SO2	15 Sep 2015 13:00	15 Sep 2015 14:00	2	Maintenance - Internal WBEA Audit
TRS	02 Sep 2015 08:00	02 Sep 2015 08:00	1	Maintenance - cleaned glass manifold
TRS	15 Sep 2015 12:00	15 Sep 2015 13:00	2	Maintenance - Internal WBEA Audit
THC	15 Sep 2015 10:00	15 Sep 2015 11:00	2	Maintenance - Internal WBEA Audit
THC	21 Sep 2015 11:00	21 Sep 2015 11:00	1	Maintenance - replaced fuel cylinder
O3	16 Sep 2015 10:00	16 Sep 2015 11:00	2	Maintenance - Internal WBEA Audit
NO2	16 Sep 2015 11:00	16 Sep 2015 11:00	1	Maintenance - Internal WBEA Audit
NO2	17 Sep 2015 09:00	17 Sep 2015 12:00	4	Maintenance - Internal WBEA Audit
PM2.5	03 Sep 2015 12:00	03 Sep 2015 15:00	4	Unstable Operation - negative baseline
PM2.5	26 Sep 2015 16:00	26 Sep 2015 20:00	5	Analyzer Failure - filter tape failed to advance
PM2.5	27 Sep 2015 08:00	28 Sep 2015 10:00	27	Analyzer Failure - filter tape depleted and replaced
Wind Speed, Wind Direction	15 Sep 2015 04:00	15 Sep 2015 08:00	5	Flat line in sensor output signal

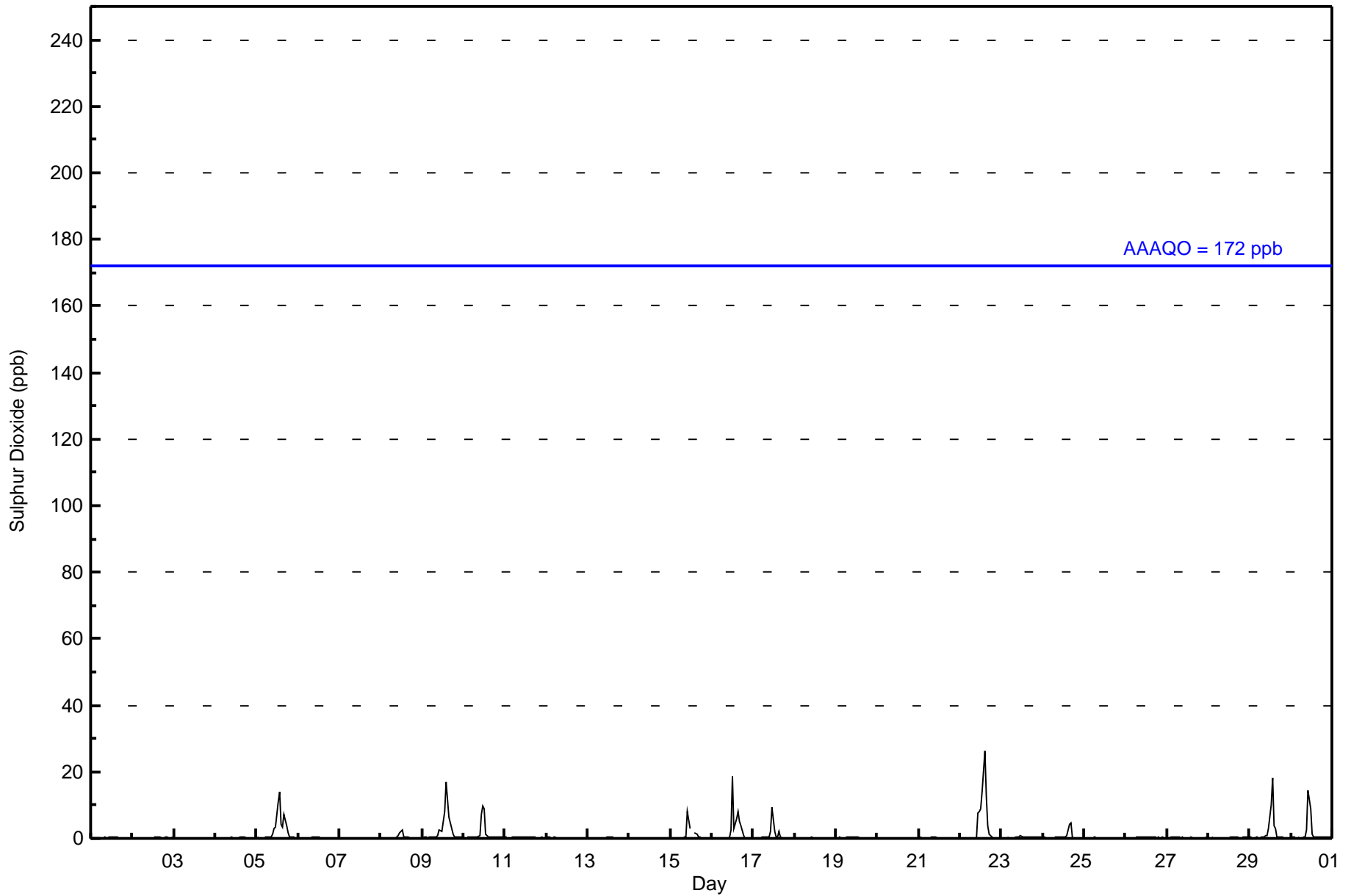


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 26 ppb on Sep 22 15:00	Maximum Daily Average: 3.7 ppb on Sep 22		Hours of Data:	682
Minimum Value: 0 ppb on Sep 1 02:00	Minimum Daily Average: 0.0 ppb on Sep 14		Hours of Missing Data:	38
Maximum Diurnal Average: 2.5 ppb at hour 13	Minimum Diurnal Average: 0.1 ppb at hour 22		Hours of Calibration:	35
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> = 14		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-Sep	0	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-Sep	0	0	0	0	0	Z	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Sep	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
4-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
5-Sep	0	0	Z	0	0	0	0	0	0	1	3	4	11	14	4	4	7	4	2	1	0	0	0	0	2.5	14
6-Sep	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
7-Sep	0	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
8-Sep	0	0	0	0	0	Z	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0.3	2
9-Sep	Z	0	0	0	0	0	0	0	0	1	3	2	5	8	17	6	5	3	1	0	0	0	0	0	2.4	17
10-Sep	0	Z	0	0	1	1	1	0	0	1	7	10	9	1	0	0	0	0	0	0	0	0	0	0	1.5	10
11-Sep	0	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
12-Sep	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
13-Sep	0	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
14-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-Sep	Z	0	0	0	0	0	0	0	0	0	8	3	M	M	2	1	0	0	0	0	0	0	0	0	0.8	8
16-Sep	0	Z	0	0	0	0	0	0	0	0	0	3	19	3	6	8	5	4	1	0	0	0	0	0	2.2	19
17-Sep	0	0	Z	0	0	0	0	0	1	0	2	9	2	0	0	2	0	0	0	0	0	0	0	0	0.8	9
18-Sep	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
19-Sep	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
20-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0.1	0
21-Sep	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
22-Sep	0	Z	0	0	0	0	0	0	0	0	8	8	9	14	26	13	4	1	0	0	0	0	0	0	3.7	26
23-Sep	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1
24-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	4	5	1	0	0	0	0	0	0	0	0.7	5
25-Sep	0	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
26-Sep	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
27-Sep	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
28-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
29-Sep	0	0	Z	0	0	0	0	0	0	1	1	3	10	18	4	3	0	1	0	0	0	0	0	0	1.9	18
30-Sep	0	0	0	Z	0	0	0	0	0	3	14	9	1	1	0	0	0	0	0	0	0	0	0	1	1.5	14

0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.4	1.8	1.9	2.5	2.2	2.2	1.5	1.1	0.6	0.3	0.2	0.1	0.1	0.1	0.1	0.1	Diurnal Average
0	0	0	0	1	1	1	0	1	3	14	10	19	18	26	13	7	4	2	1	0	0	0	0	1	Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	673	98.68	98.68
11 - 20	8	1.17	99.85
21 - 60	1	0.15	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	40	26	5	7	3	14	29	29	69	81	111	95	52	40	38	29	668
11 - 20	0	0	0	0	0	1	4	3	0	0	0	0	0	0	0	0	8
21 - 60	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	26	5	7	3	15	33	33	69	81	111	95	52	40	38	29	677

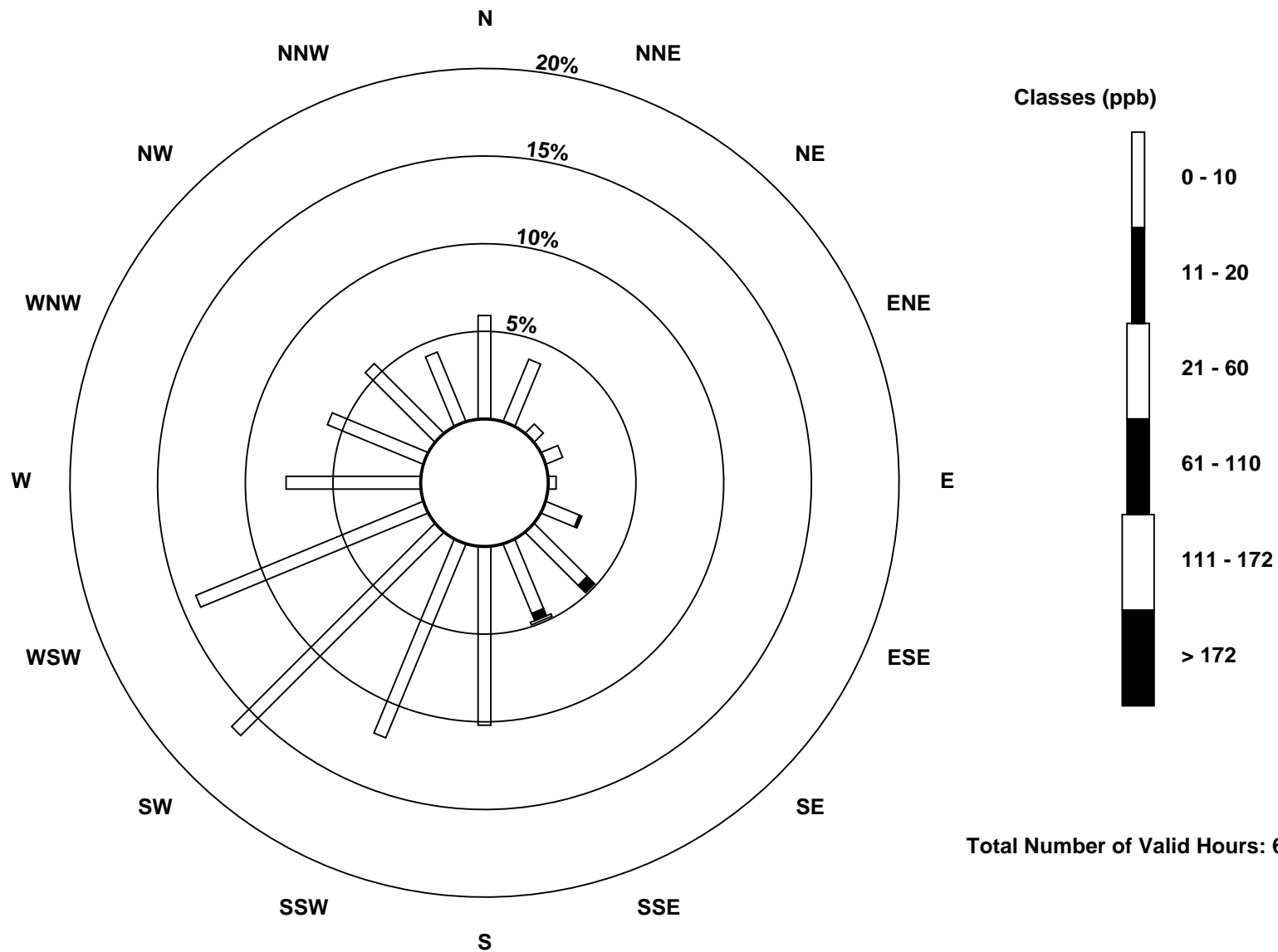
Total Number of Valid Hours: 677

Total Number of Hours: 720



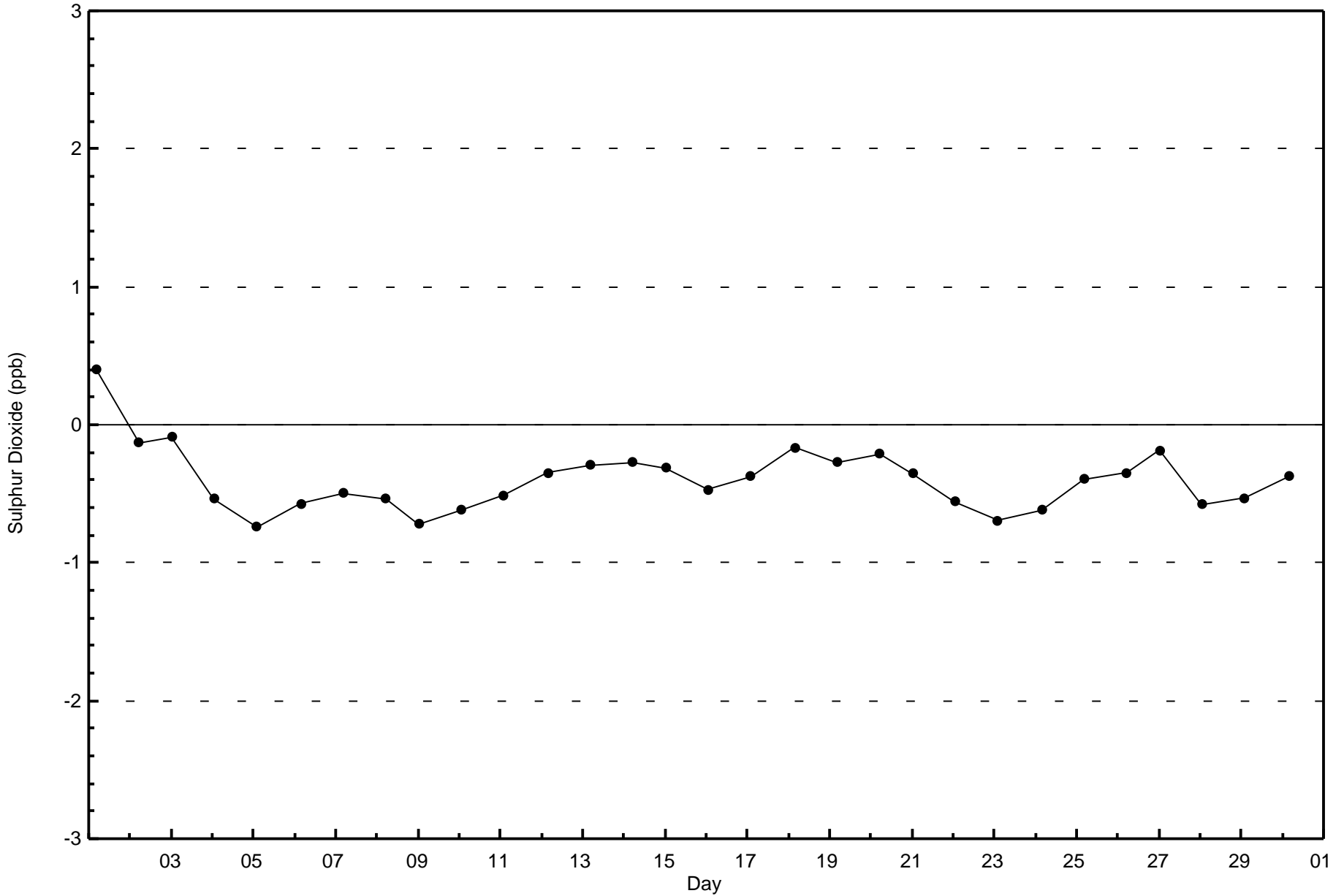
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

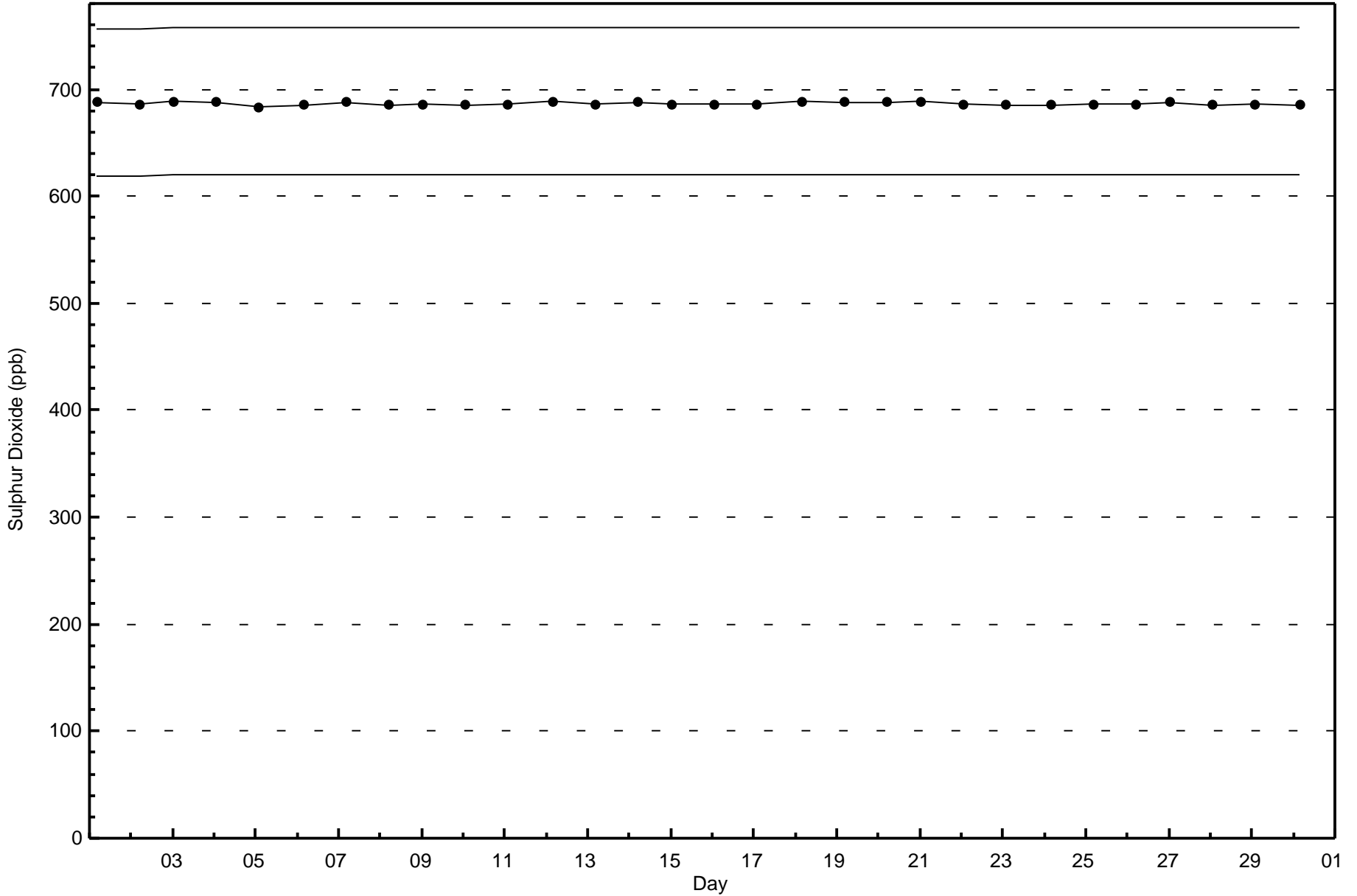
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South (AMS 13)



Total Number of Valid Hours: 677





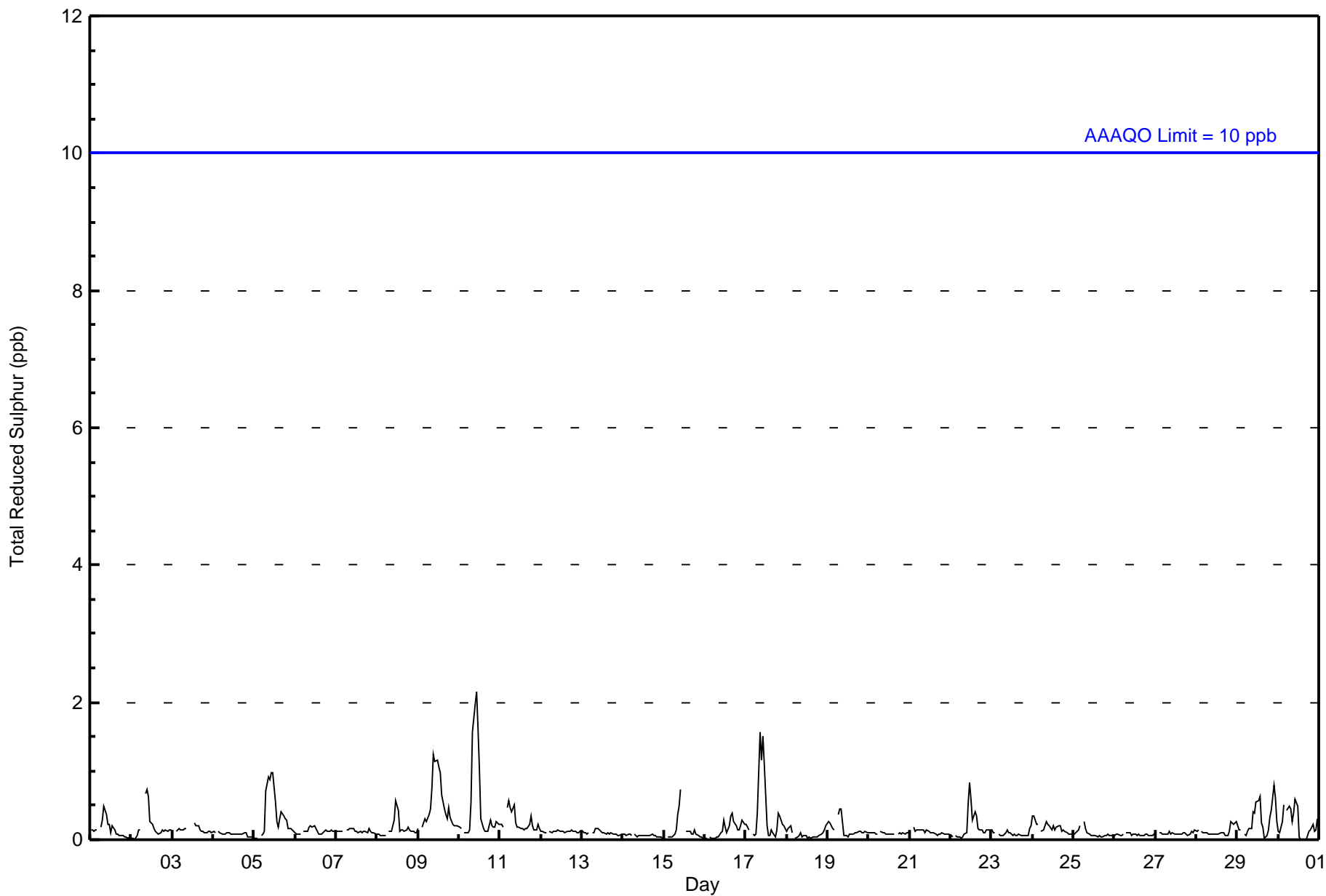






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	682	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb  
Fort McKay South - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	44	27	5	7	2	16	33	31	66	83	110	96	49	40	40	28	677
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>	44	27	5	7	2	16	33	31	66	83	110	96	49	40	40	28	677

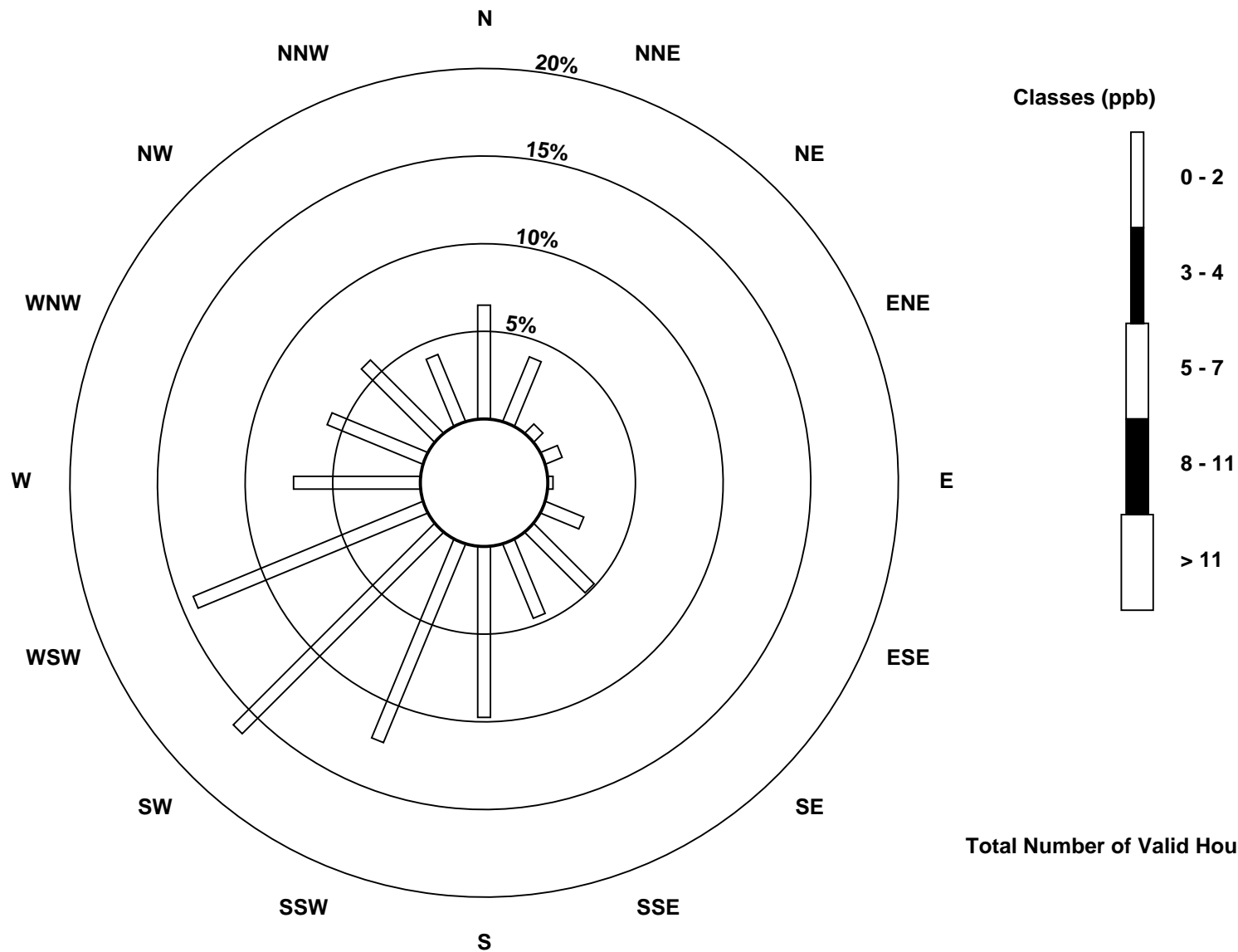
Total Number of Valid Hours: 677

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Total Reduced Sulphur (TRS) - ppb  
Fort McKay South (AMS 13)

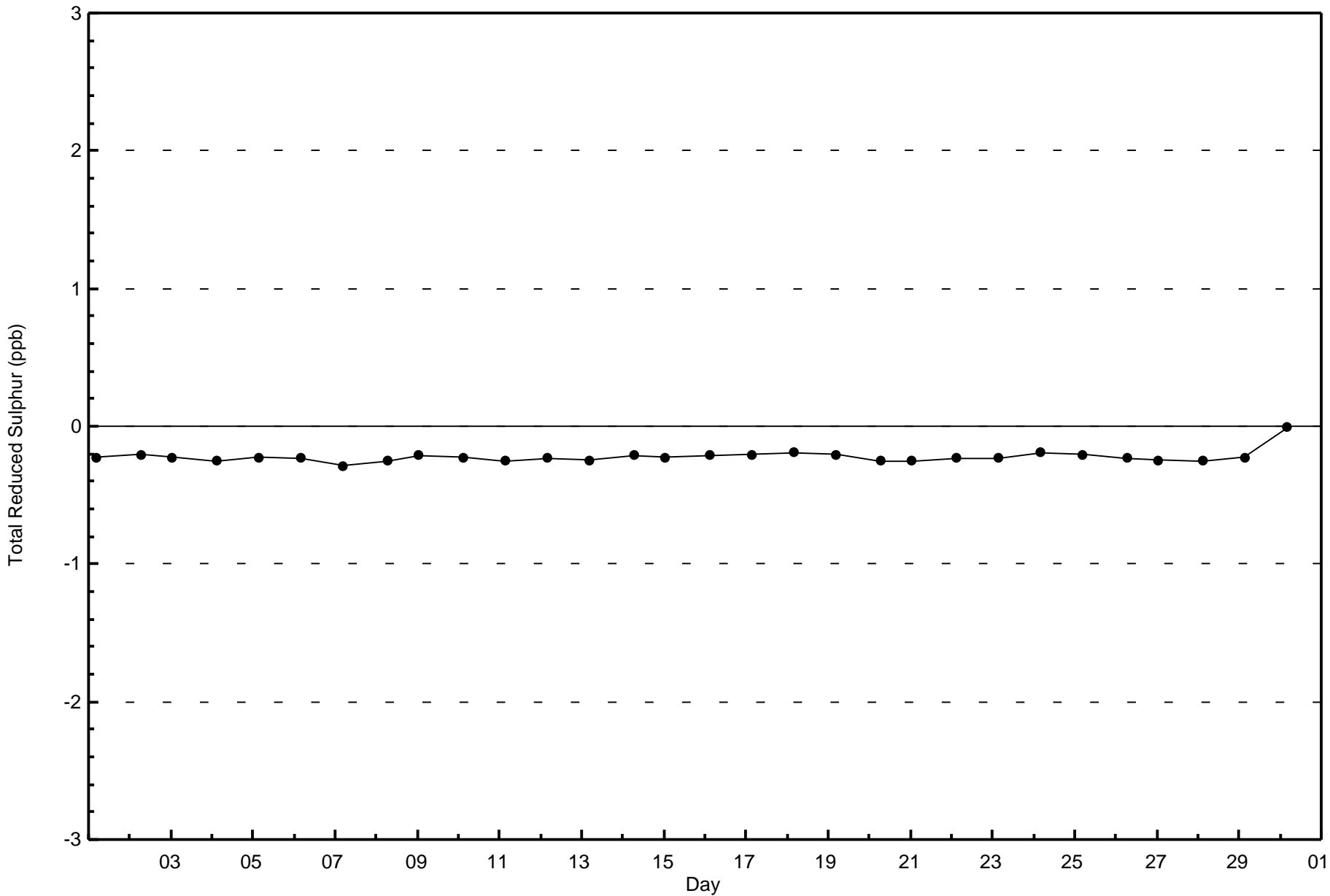


Total Number of Valid Hours: 677

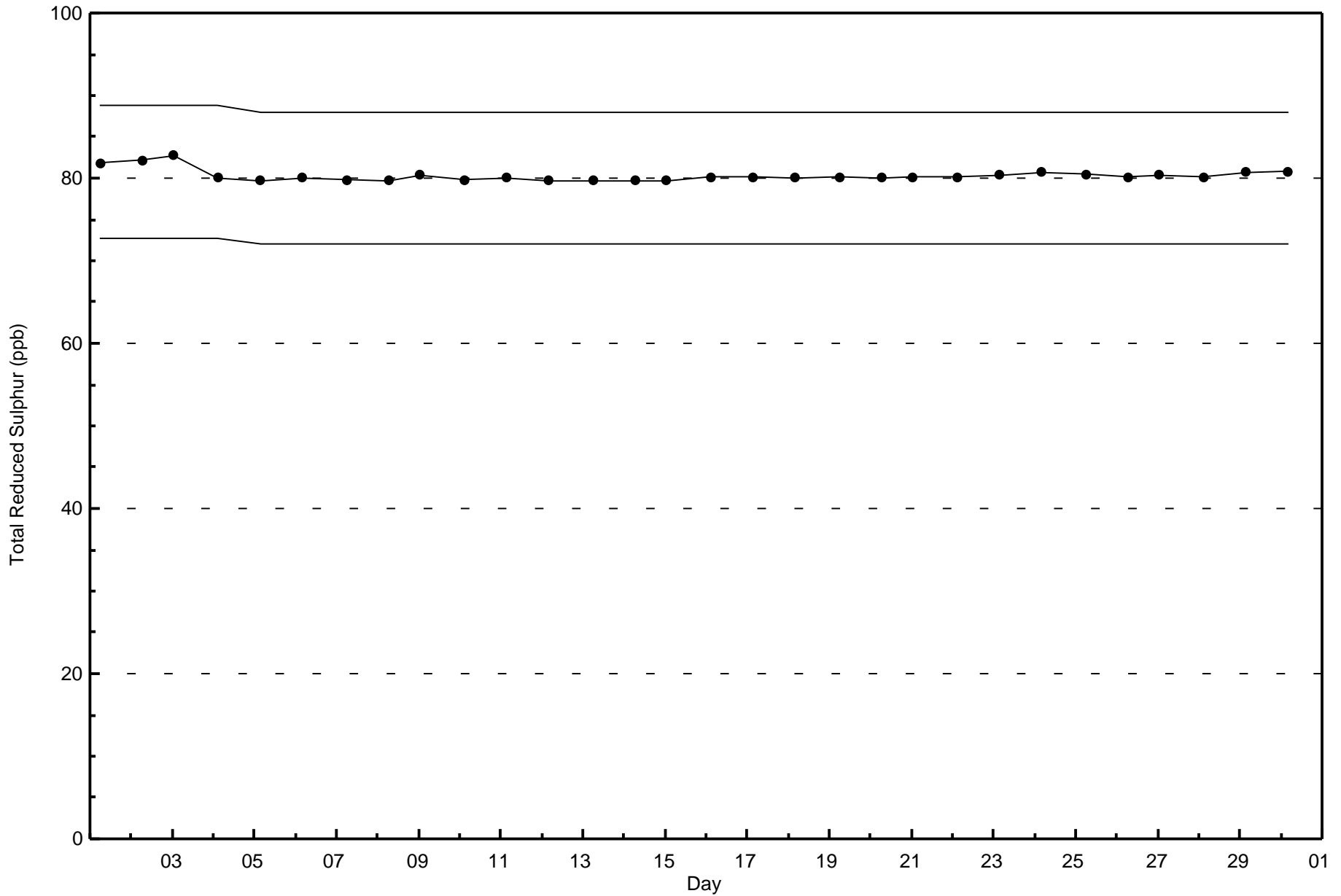


Wood Buffalo Environmental Association  
Zero Responses

Total Reduced Sulphur (TRS) - ppb  
Fort McKay South - September 2015







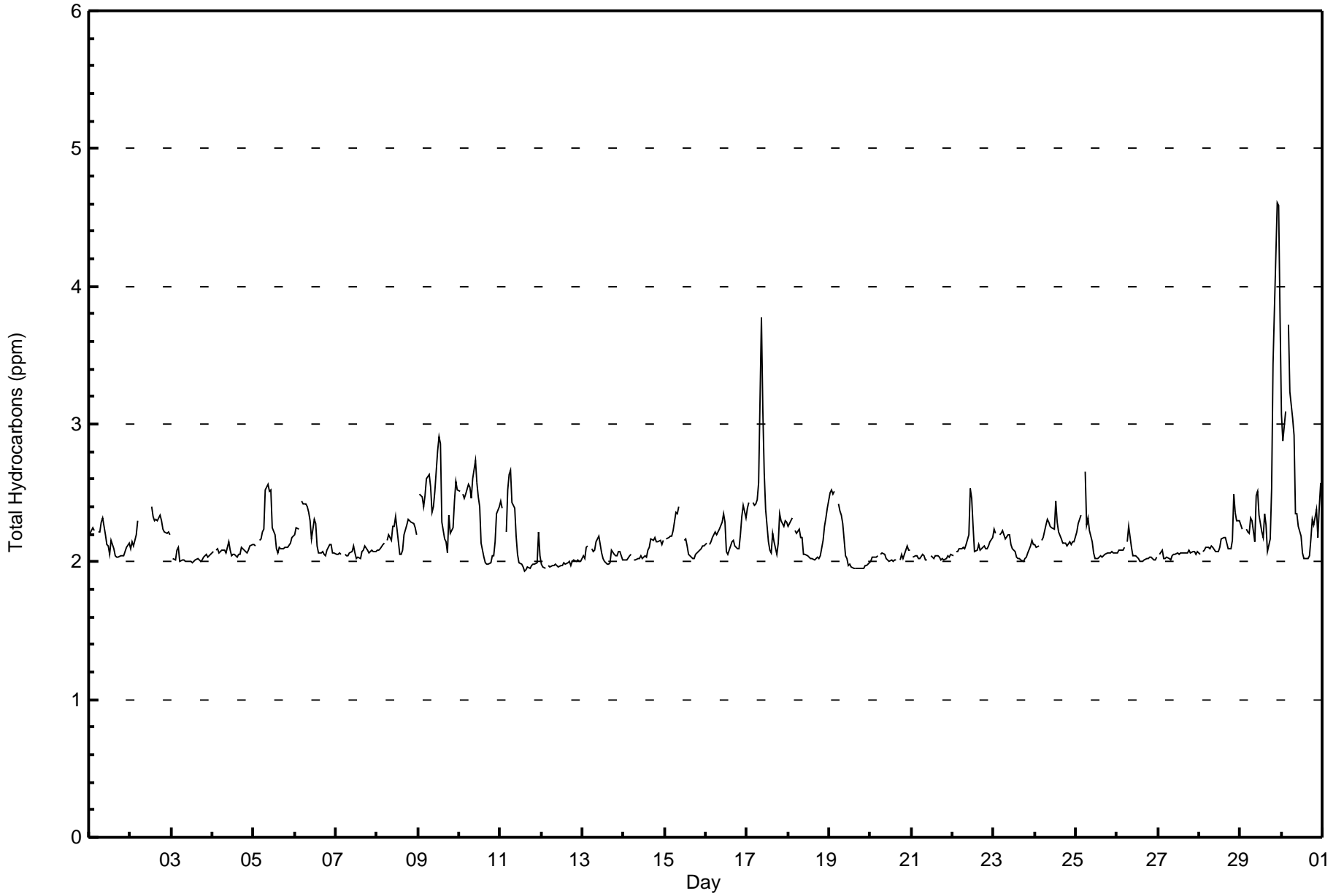


Maximum Value: 4.6 ppm on Sep 29 22:00		Maximum Daily Average: 2.7 ppm on Sep 29		Hours in Service:	720																								
Minimum Value: 1.9 ppm on Sep 11 15:00		Minimum Daily Average: 2.0 ppm on Sep 12		Hours of Data:	681																								
Maximum Diurnal Average: 2.3 ppm at hour 6		Minimum Diurnal Average: 2.1 ppm at hour 17		Hours of Missing Data:	39																								
Monthly Average: 2.18 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> = 2.2 P <sub>90</sub> = 2.4 P <sub>99</sub> = 3.4		Hours of Calibration:	35																								
				Percent Operational Time:	99.4																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Sep	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.3	2.3	2.2	2.1	2.1	2.0	2.2	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	2.3	2.4
2-Sep	2.1	2.1	2.1	2.2	2.3	Z	2.4	C	C	C	C	C	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4
3-Sep	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	2.1	2.0	2.0	2.1	2.0	2.1	2.0	2.1	2.1
4-Sep	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
5-Sep	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.5	2.6	2.5	2.5	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	2.2	2.2	2.6
6-Sep	2.2	2.2	2.2	Z	2.4	2.4	2.4	2.4	2.4	2.3	2.2	2.3	2.3	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	2.2	2.4
7-Sep	2.1	2.1	2.1	2.1	Z	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
8-Sep	2.1	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3
9-Sep	Z	2.5	2.5	2.4	2.5	2.6	2.6	2.5	2.4	2.4	2.5	2.8	2.9	2.9	2.3	2.2	2.1	2.1	2.3	2.2	2.3	2.4	2.6	2.5	2.5	2.5	2.5	2.5	2.9
10-Sep	2.5	Z	2.5	2.5	2.5	2.6	2.5	2.5	2.6	2.7	2.6	2.5	2.4	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4	2.4	2.3	2.3	2.3	2.3	2.7
11-Sep	2.4	2.4	Z	2.2	2.5	2.6	2.7	2.4	2.4	2.2	2.1	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.0	2.2	2.0	2.2	2.7	2.7
12-Sep	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
13-Sep	2.0	2.0	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.1	2.0	2.1	2.2	2.2
14-Sep	2.0	2.0	2.0	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.1	2.2	2.1	2.2	2.2
15-Sep	Z	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.4	M	M	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4
16-Sep	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.3	2.2	2.2	2.2	2.4
17-Sep	2.4	2.4	Z	2.4	2.4	2.4	2.4	2.6	3.8	3.1	2.6	2.4	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.4	3.8	3.8
18-Sep	2.3	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.3	2.3	2.4	2.1	2.1	2.1	2.1	2.4
19-Sep	2.5	2.5	2.5	2.5	Z	2.4	2.4	2.3	2.3	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.5
20-Sep	2.0	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	M	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
21-Sep	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	M	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
22-Sep	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5	2.5	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	2.5
23-Sep	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2
24-Sep	2.1	2.1	2.1	Z	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	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	2.4
25-Sep	2.2	2.3	2.3	2.3	Z	2.7	2.3	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.7
26-Sep	2.1	2.1	2.1	2.1	2.1	Z	2.1	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	2.0	2.3
27-Sep	Z	2.0	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
28-Sep	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	2.2	2.1	2.1	2.1	2.1	2.2	2.5	2.4	2.3	2.3	2.2	2.2	2.5
29-Sep	2.3	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.1	2.5	2.5	2.3	2.2	2.2	2.3	2.3	2.1	2.2	2.5	3.4	3.8	4.6	4.6	3.8	2.7	2.7	2.7	4.6	4.6
30-Sep	3.1	2.9	3.1	Z	3.7	3.2	3.0	2.9	2.4	2.3	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.4	2.2	2.4	2.6	2.5	2.5	3.7	3.7
																								Diurnal Average					
																								Diurnal Maximum					
Z - zerospan      C - Calibration      M - Maintenance																													



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	202	29.66	29.66
2.1 - 3.0	468	68.72	98.38
3.1 - 10.0	11	1.62	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - September 2015**

<b>Concentration</b> <b>Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	13	5	2	1	0	2	5	2	5	17	41	45	27	13	11	13	202
2.1 - 3.0	27	19	3	6	4	14	28	30	62	60	67	49	25	27	27	15	463
3.1 - 10.0	0	0	0	0	0	0	0	1	2	4	3	1	0	0	0	0	11
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	24	5	7	4	16	33	33	69	81	111	95	52	40	38	28	676

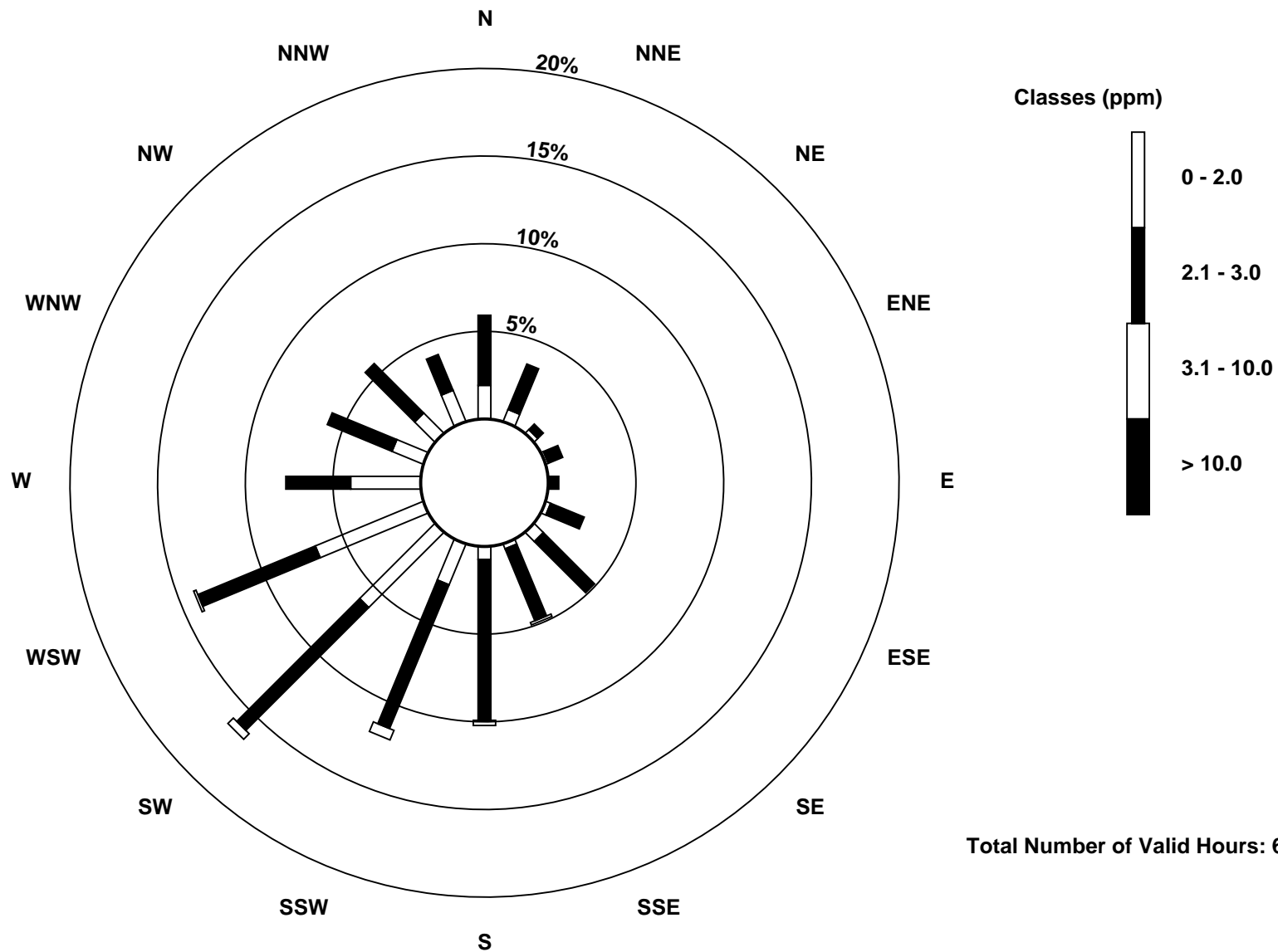
Total Number of Valid Hours: 676

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

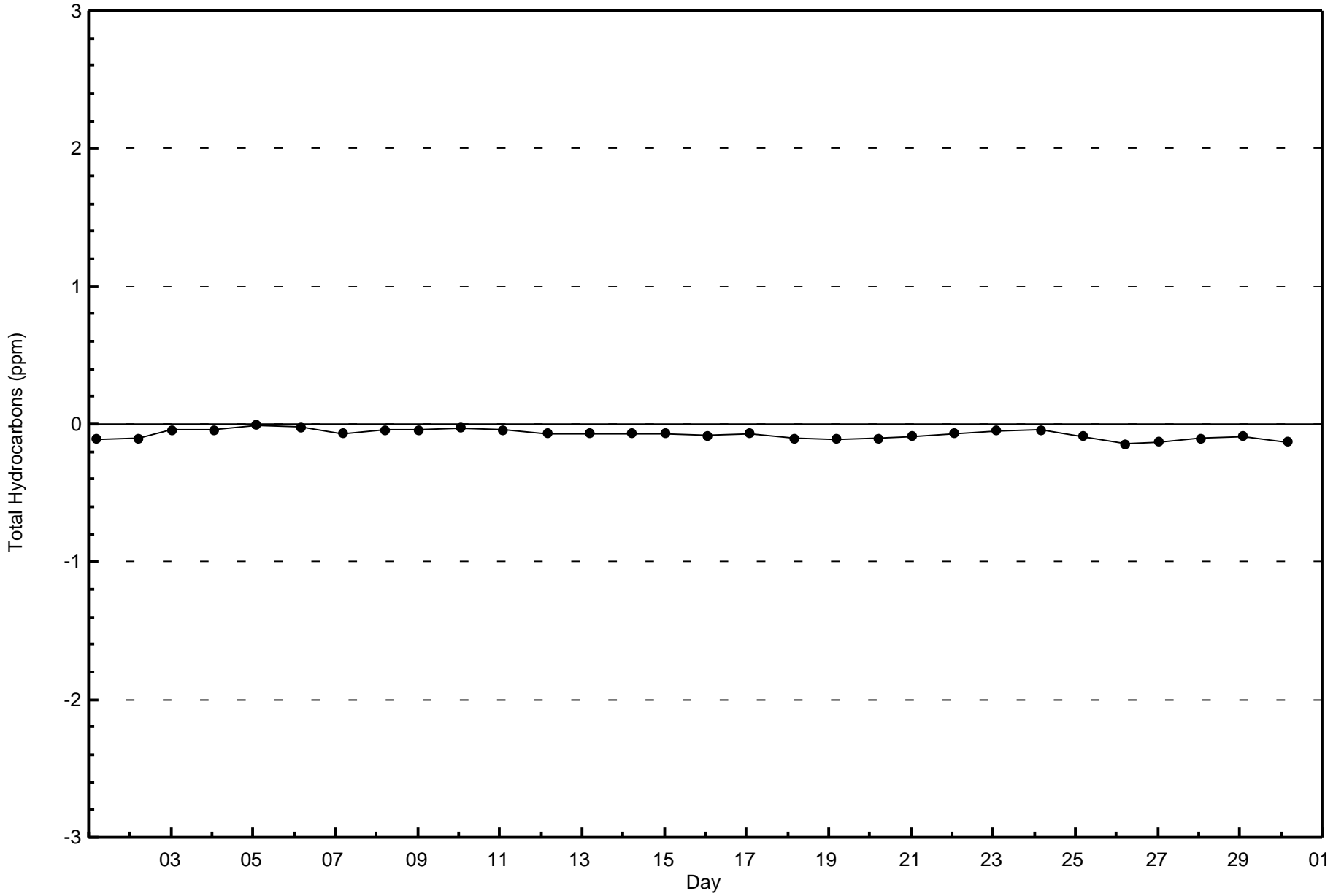
Total Hydrocarbons (THC) - ppm  
Fort McKay South (AMS 13)

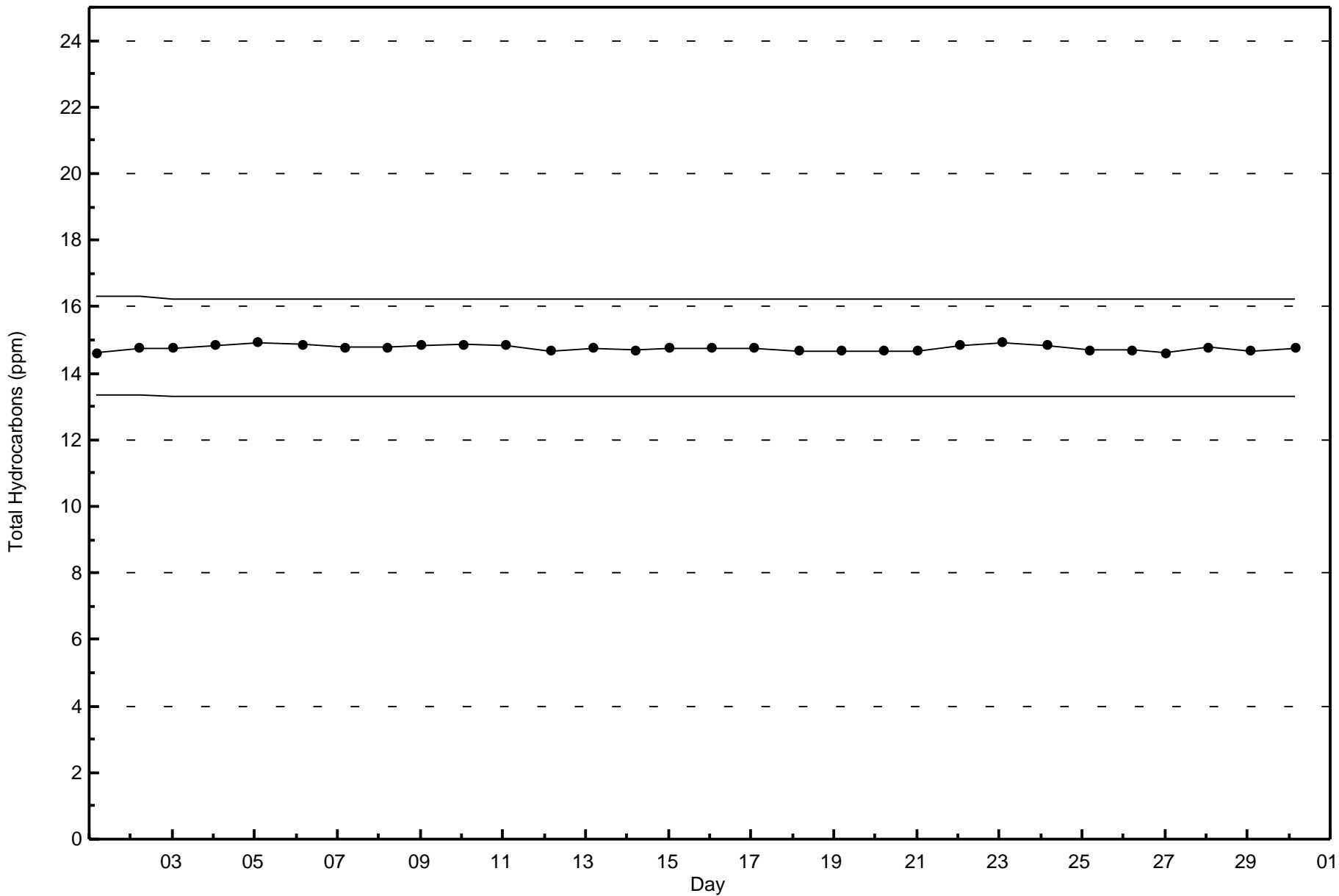




Wood Buffalo Environmental Association  
Zero Responses

Total Hydrocarbons (THC) - ppm  
Fort McKay South - September 2015









Summary of Hour Averages

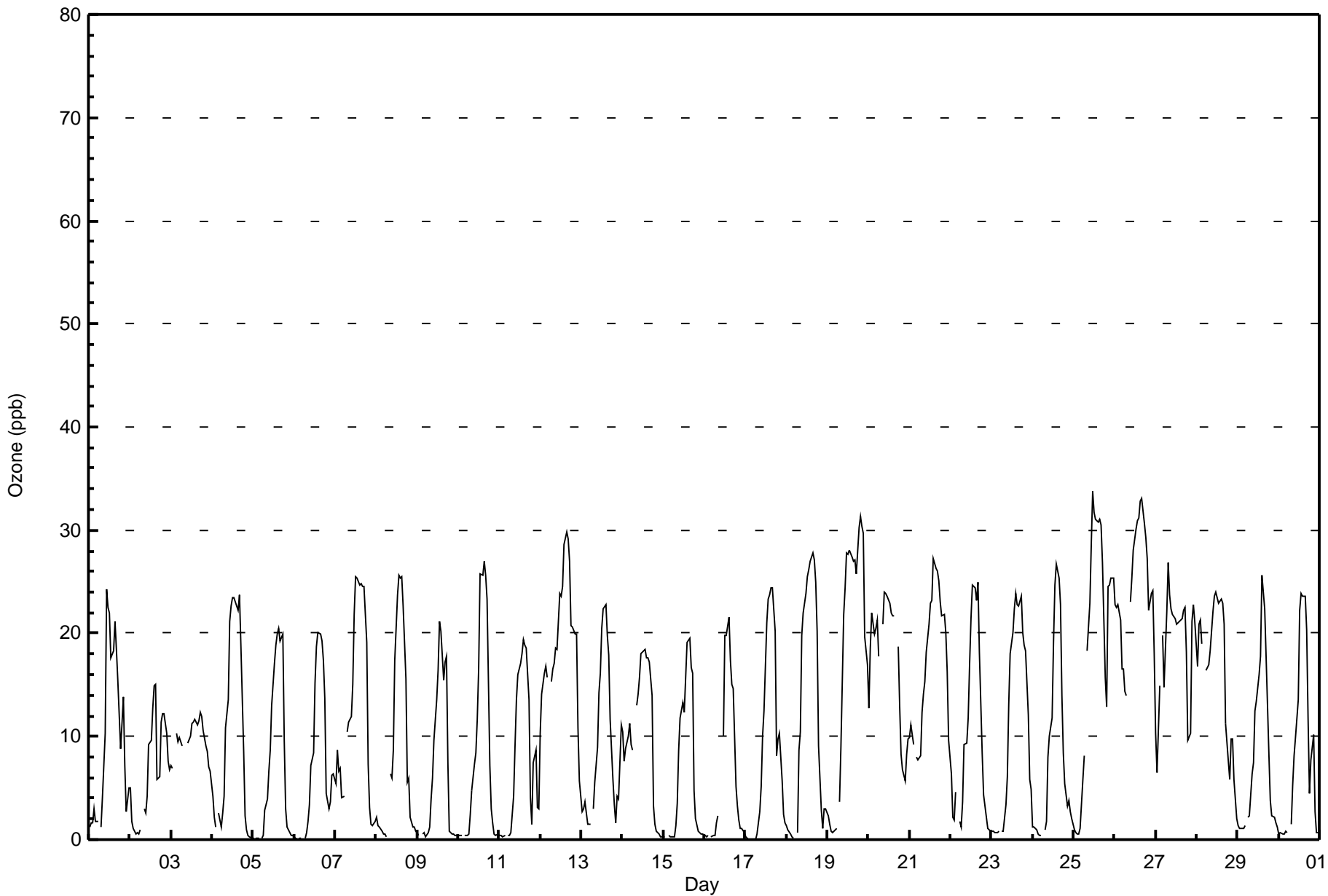
Fort McKay South - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 34 ppb on Sep 25 12:00	Maximum Daily Average: 24.4 ppb on Sep 26		Hours of Data:	684
Minimum Value: 0 ppb on Sep 5 02:00	Minimum Daily Average: 6.5 ppb on Sep 15		Hours of Missing Data:	36
Maximum Diurnal Average: 23.0 ppb at hour 15	Minimum Diurnal Average: 4.6 ppb at hour 2		Hours of Calibration:	33
Monthly Average: 11.6 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 10 Q <sub>3</sub> = 20 P <sub>90</sub> = 24 P <sub>99</sub> = 31		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-Sep	1	2	2	3	2	2	Z	1	4	10	24	22	22	18	18	21	18	16	9	11	14	7	3	5	10.2	24
2-Sep	5	2	1	0	1	1	1	Z	3	3	4	9	10	13	15	15	6	6	11	12	12	10	8	7	6.7	15
3-Sep	7	7	Z	10	10	10	9	C	C	C	9	10	11	11	12	11	12	12	11	9	9	7	7	9.8	12	
4-Sep	4	2	1	Z	3	1	3	4	11	14	21	23	23	23	22	24	19	9	2	1	0	0	0	10.2	24	
5-Sep	0	0	0	0	Z	0	0	3	4	7	9	13	17	19	20	20	19	20	10	3	1	1	0	0	7.3	20
6-Sep	0	0	0	0	0	Z	0	1	2	3	7	8	15	19	20	20	19	17	14	4	3	4	6	6	7.4	20
7-Sep	5	9	7	7	4	4	Z	10	11	12	15	22	25	25	25	25	24	25	19	7	3	1	1	2	12.6	25
8-Sep	2	1	1	1	1	0	0	Z	6	6	9	17	24	26	25	25	23	16	6	6	2	1	1	1	8.7	26
9-Sep	1	0	Z	0	1	0	1	1	4	6	10	14	16	21	20	15	17	18	7	1	1	1	0	0	6.8	21
10-Sep	0	0	0	Z	0	0	1	2	5	7	8	12	16	26	26	27	26	23	7	3	2	0	0	1	8.4	27
11-Sep	0	0	0	0	Z	0	0	1	4	9	14	16	17	18	19	19	19	14	4	1	7	9	3	3	7.8	19
12-Sep	10	14	16	17	16	Z	15	17	17	19	18	24	24	25	29	30	29	27	21	21	20	20	11	6	19.3	30
13-Sep	3	3	4	3	2	1	Z	3	6	9	14	16	21	22	23	20	18	12	6	3	2	4	4	11	9.0	23
14-Sep	10	8	9	10	11	9	9	Z	13	14	16	18	18	18	18	17	14	3	2	1	1	0	0	10.3	18	
15-Sep	0	0	Z	0	0	0	0	1	3	9	12	13	12	16	19	20	17	16	5	2	1	1	1	0	6.5	20
16-Sep	0	0	0	Z	0	0	0	2	2	M	M	10	20	20	22	17	15	15	5	3	2	1	1	1	6.6	22
17-Sep	0	0	0	0	Z	0	0	1	3	5	10	12	21	23	24	24	24	20	8	10	10	6	2	2	9.0	24
18-Sep	1	1	1	0	0	Z	1	9	10	20	22	24	25	26	27	28	27	25	20	9	3	1	3	3	12.4	28
19-Sep	2	1	1	1	1	1	Z	4	9	22	24	28	28	28	27	27	27	26	30	31	30	30	20	17	18.0	31
20-Sep	13	19	22	20	20	21	18	Z	21	24	24	24	23	22	22	22	M	19	13	8	7	6	8	10	17.4	24
21-Sep	10	11	9	Z	8	8	8	12	14	15	18	21	23	23	27	26	26	25	23	22	22	20	16	10	17.3	27
22-Sep	6	2	2	5	Z	2	1	4	9	9	12	17	21	25	24	23	25	18	8	4	3	2	1	1	9.8	25
23-Sep	1	1	1	1	1	Z	1	1	3	6	13	18	20	22	24	23	23	24	20	19	18	12	6	5	11.4	24
24-Sep	1	1	1	1	0	0	Z	1	2	8	10	12	19	25	27	25	23	14	8	5	3	4	3	2	8.5	27
25-Sep	1	1	1	1	1	6	8	Z	18	23	29	34	32	31	31	31	31	30	27	16	13	24	25	25	18.8	34
26-Sep	23	23	23	21	17	17	14	14	Z	23	25	28	30	31	31	33	33	31	29	27	22	24	24	18	24.4	33
27-Sep	10	6	15	Z	20	15	22	27	24	22	22	21	21	21	21	21	22	22	18	10	10	21	23	21	19.0	27
28-Sep	17	21	21	19	Z	16	17	17	18	22	24	24	23	23	23	23	21	11	8	6	10	10	6	2	16.6	24
29-Sep	1	1	1	1	1	Z	2	2	6	7	13	13	16	18	26	24	22	13	8	4	2	2	2	1	8.2	26
30-Sep	1	1	1	1	1	1	Z	1	5	8	10	14	22	24	24	24	20	12	5	8	10	3	1	1	8.4	24

4.6	4.6	5.2	4.9	4.8	4.7	5.5	5.8	8.5	12.2	15.4	17.9	20.6	22.0	23.0	22.7	21.6	18.5	12.1	9.0	8.6	7.8	6.2	5.6	Diurnal Average	
23	23	23	21	20	21	22	27	24	24	29	34	32	31	31	33	33	31	30	31	30	30	25	25	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	519	75.88	75.88
21 - 50	165	24.12	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	35	20	1	5	4	12	26	27	53	67	84	57	42	25	33	23	514
21 - 50	8	7	3	1	0	4	7	6	13	13	30	36	9	14	9	5	165
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>	43	27	4	6	4	16	33	33	66	80	114	93	51	39	42	28	679

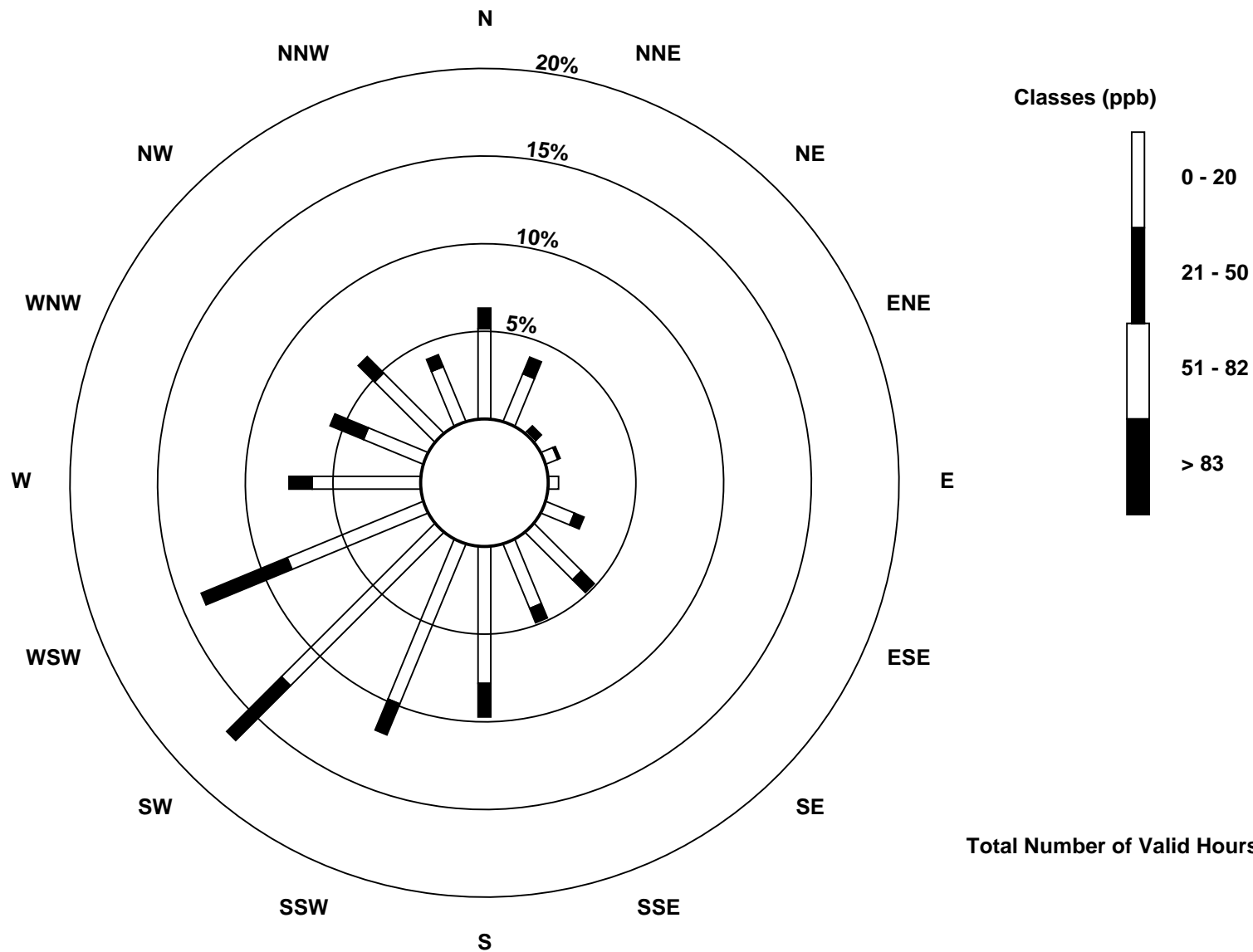
Total Number of Valid Hours: 679

Total Number of Hours: 720

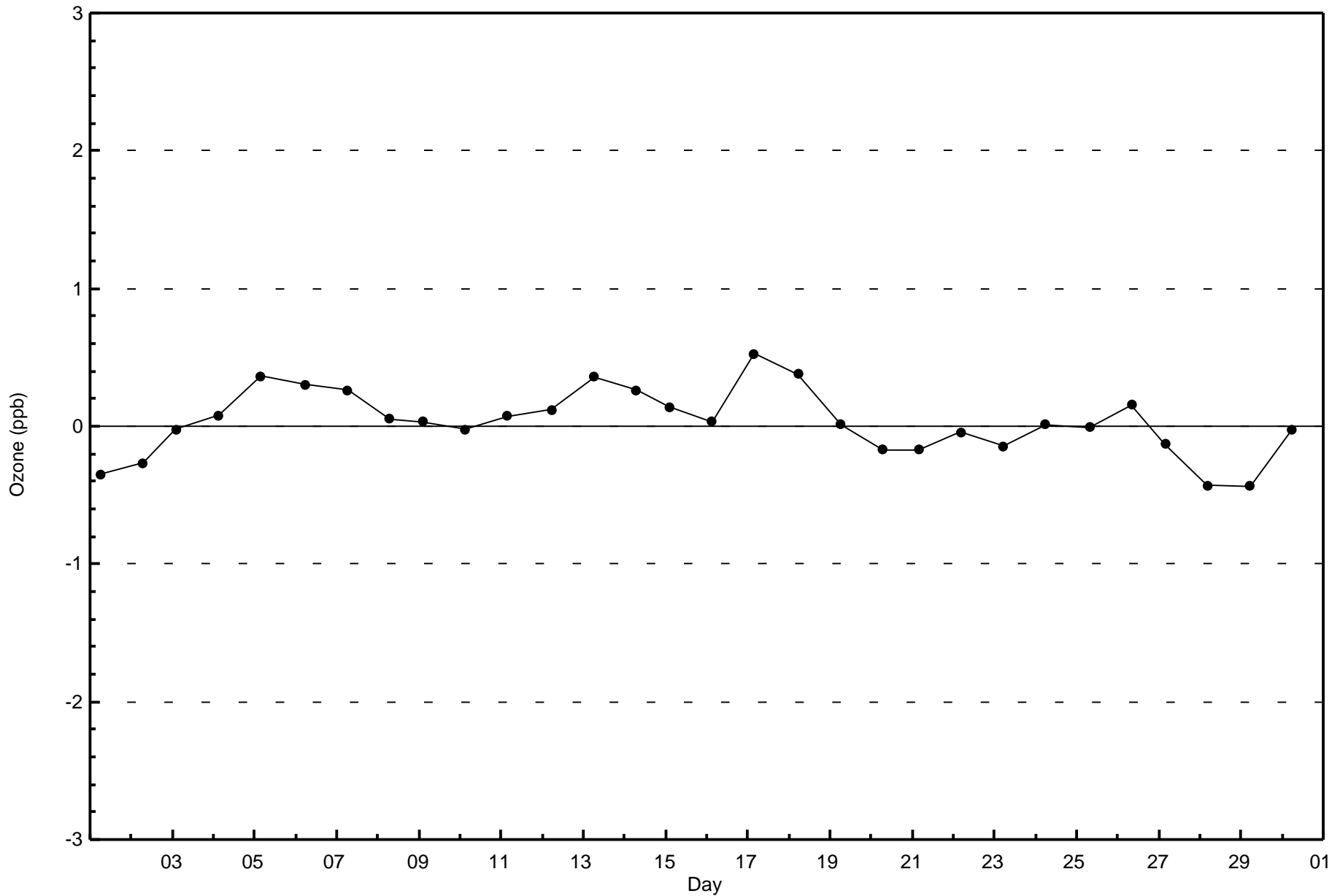


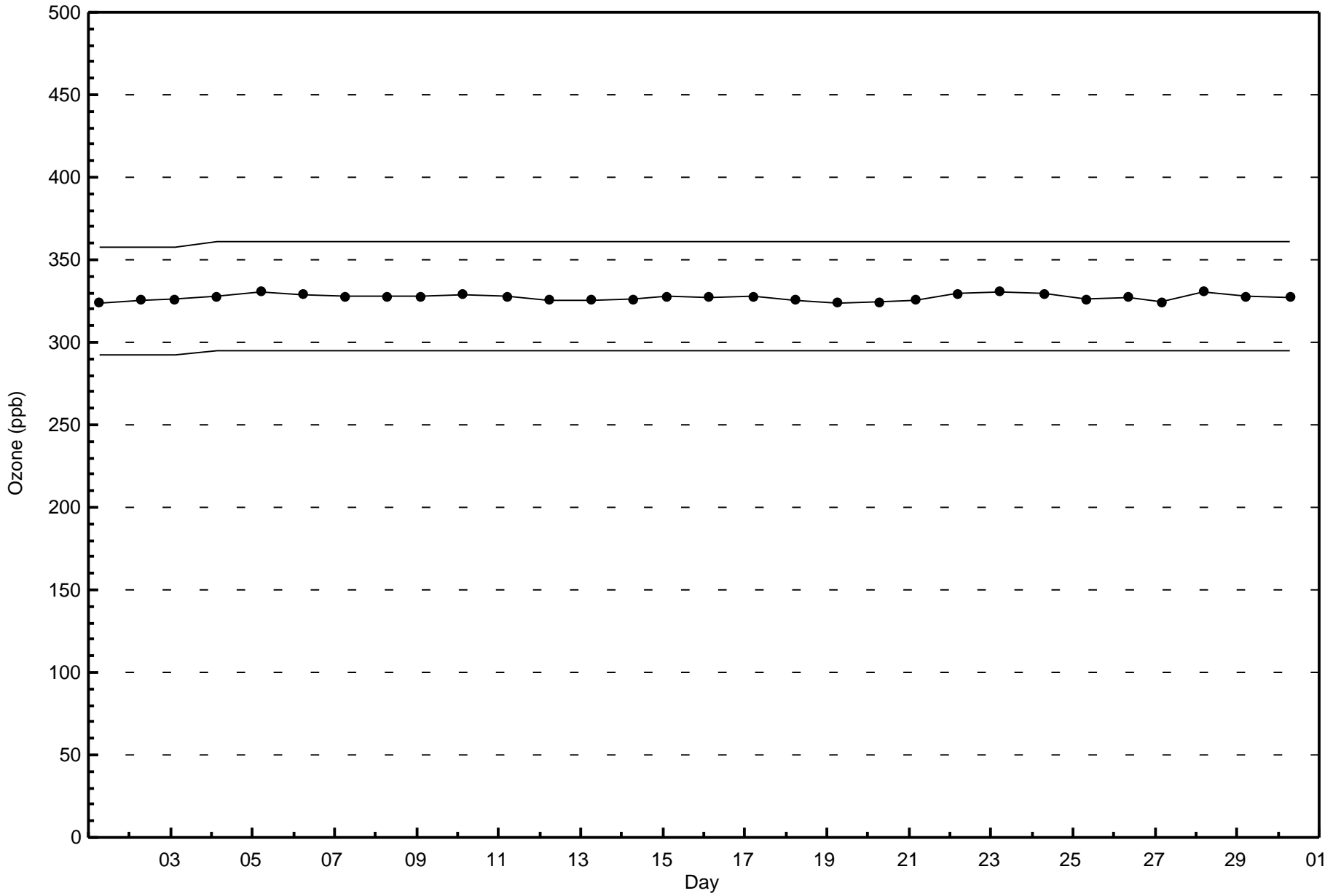
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Ozone (O<sub>3</sub>) - ppb  
Fort McKay South (AMS 13)



Total Number of Valid Hours: 679

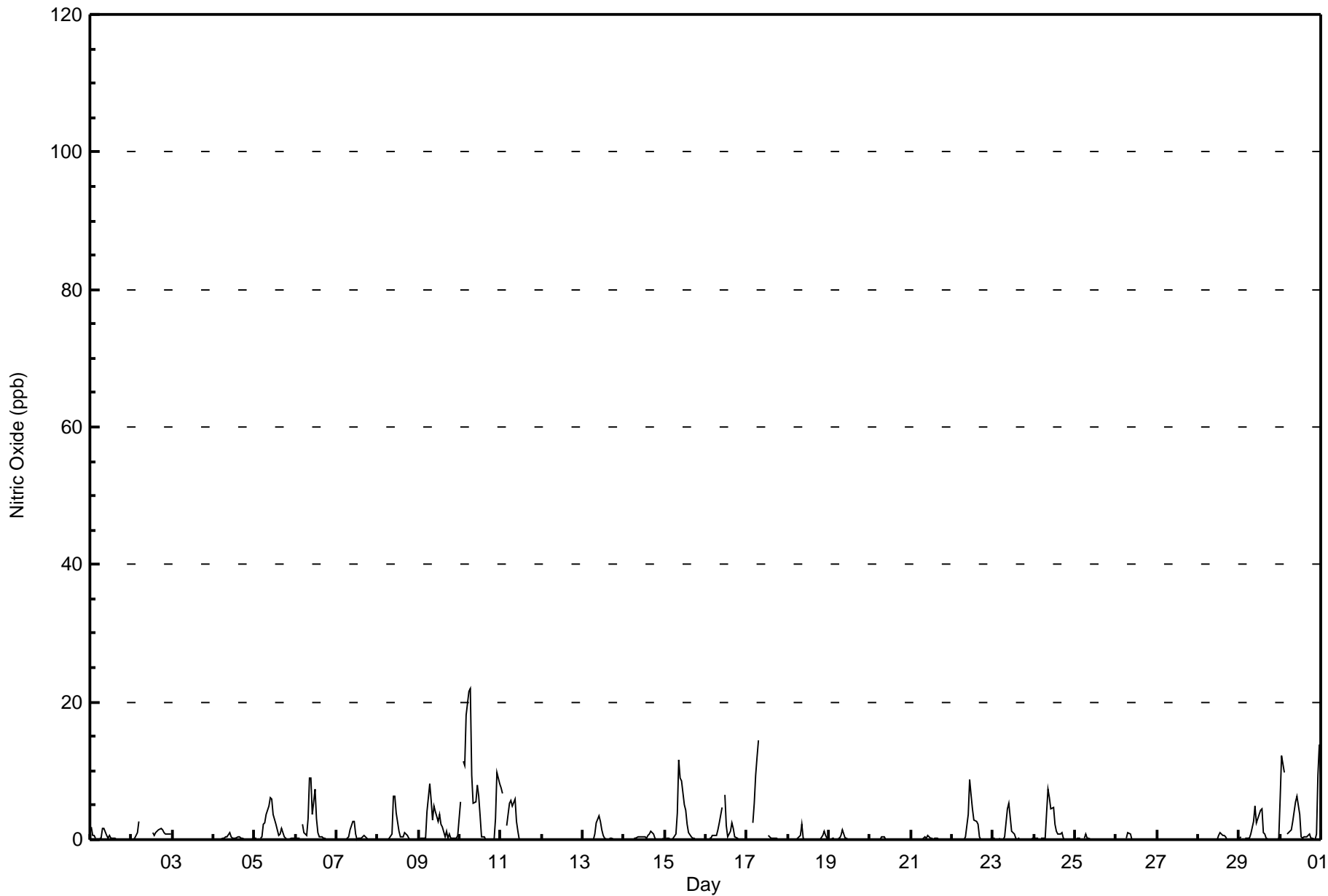






Maximum Value: 22 ppb on Sep 10 07:00														Maximum Daily Average: 6.5 ppb on Sep 10														Hours in Service: 720	
Minimum Value: 0 ppb on Sep 3 02:00														Minimum Daily Average: 0.0 ppb on Sep 3														Hours of Data: 679	
Maximum Diurnal Average: 3.0 ppb at hour 10														Minimum Diurnal Average: 0.1 ppb at hour 20														Hours of Missing Data: 41	
Monthly Average: 1.1 ppb														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 4 P <sub>99</sub> = 12														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-Sep	2	1	1	0	Z	0	0	2	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2			
2-Sep	0	0	0	1	3	Z	6	C	C	C	C	C	1	1	1	1	1	2	1	1	1	1	1	1.2	6				
3-Sep	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-Sep	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				
5-Sep	0	0	Z	0	0	2	2	4	5	6	6	4	2	1	1	1	2	0	0	0	0	0	0	1.6	6				
6-Sep	0	0	0	Z	2	1	1	3	9	9	4	7	3	1	0	0	0	0	0	0	0	0	0	1.8	9				
7-Sep	0	0	0	0	Z	0	0	0	1	3	3	1	0	0	0	0	1	0	0	0	0	0	0	0.4	3				
8-Sep	0	0	0	0	0	Z	0	0	1	6	6	4	1	0	0	1	1	0	0	0	0	0	0	1.0	6				
9-Sep	Z	0	0	0	0	4	8	6	3	5	4	3	4	2	2	0	1	0	1	0	0	0	1	1.9	8				
10-Sep	6	Z	11	11	18	22	22	9	5	6	8	6	3	0	0	0	0	0	0	0	0	3	10	8	6.5	22			
11-Sep	7	7	Z	2	4	5	6	5	6	3	1	0	0	0	0	0	0	0	0	0	0	0	0	2.0	7				
12-Sep	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				
13-Sep	0	0	0	0	Z	0	0	1	2	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0.5	3				
14-Sep	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0.3	1				
15-Sep	Z	0	0	0	0	0	1	4	12	9	8	5	4	2	1	0	0	0	0	0	0	0	0	2.1	12				
16-Sep	0	Z	0	0	1	1	1	1	2	5	M	6	2	0	1	2	2	0	0	0	0	0	0	1.2	6				
17-Sep	0	0	Z	2	5	9	12	14	M	M	M	M	1	0	0	0	0	0	0	0	0	0	0	2.4	14				
18-Sep	0	0	0	Z	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	2				
19-Sep	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1				
20-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0.0	0				
21-Sep	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				
22-Sep	0	Z	0	0	0	0	0	0	0	4	9	7	4	3	3	2	0	0	0	0	0	0	0	1.4	9				
23-Sep	0	0	Z	0	0	0	0	0	4	5	3	1	1	0	0	0	0	0	0	0	0	0	0	0.7	5				
24-Sep	0	0	0	Z	0	0	0	4	7	6	4	5	2	1	1	1	0	0	0	0	0	0	0	1.5	7				
25-Sep	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1				
26-Sep	0	0	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1				
27-Sep	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-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.2	1				
29-Sep	0	0	Z	0	0	0	0	1	3	5	2	3	4	4	1	1	0	0	0	0	0	0	0	1.1	5				
30-Sep	6	12	10	Z	1	1	1	3	4	5	6	4	0	0	0	0	1	1	0	0	0	1	9	14	3.5	14			
																												Diurnal Average	
																												Diurnal Maximum	
Z - zerospan														C - Calibration														M - Maintenance	







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	677	99.71	99.71
21 - 40	2	0.29	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 679

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	40	26	4	7	4	14	33	32	67	80	111	95	52	40	38	29	672
21 - 40	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	26	4	7	4	14	33	32	68	81	111	95	52	40	38	29	674

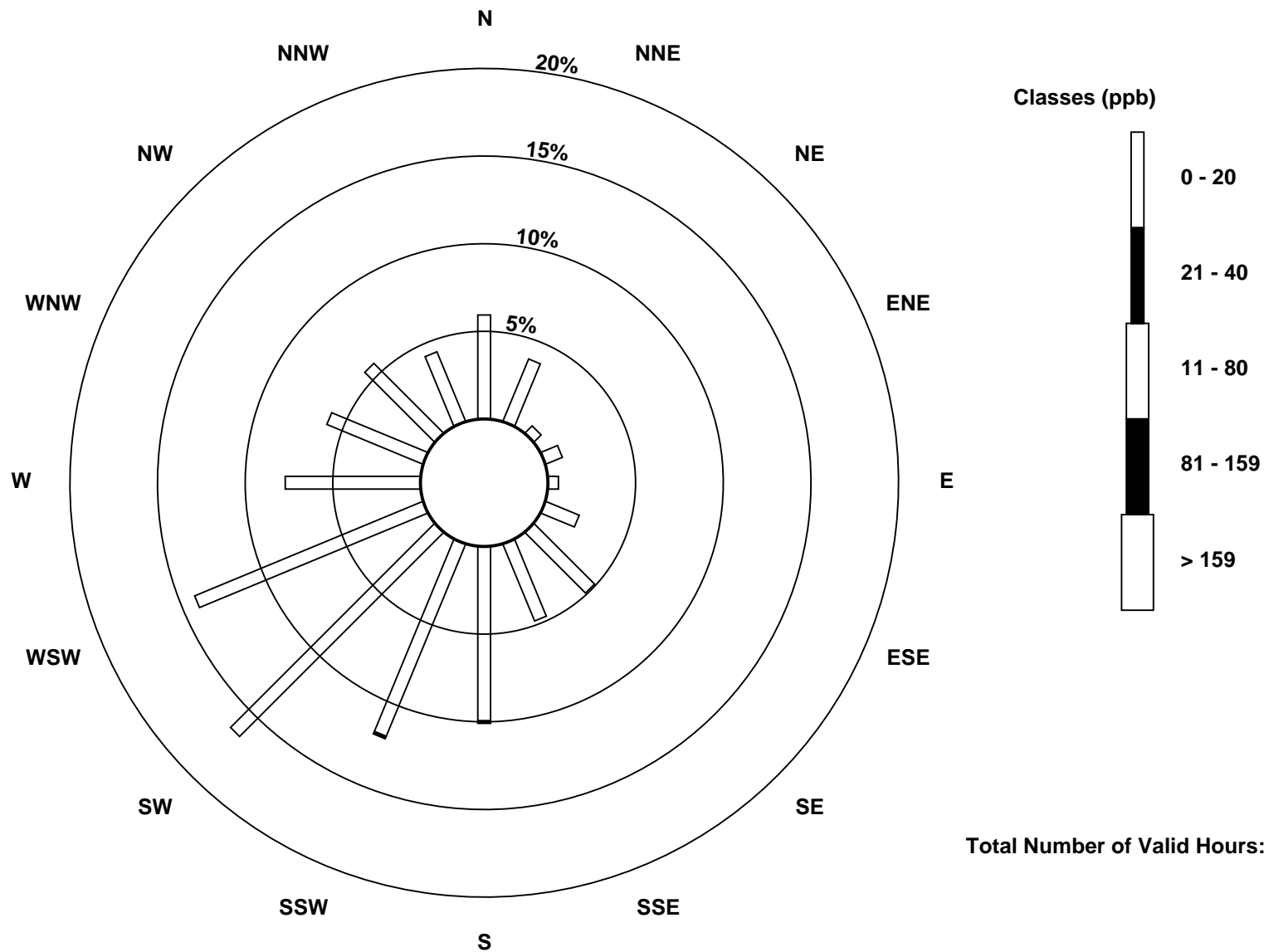
Total Number of Valid Hours: 674

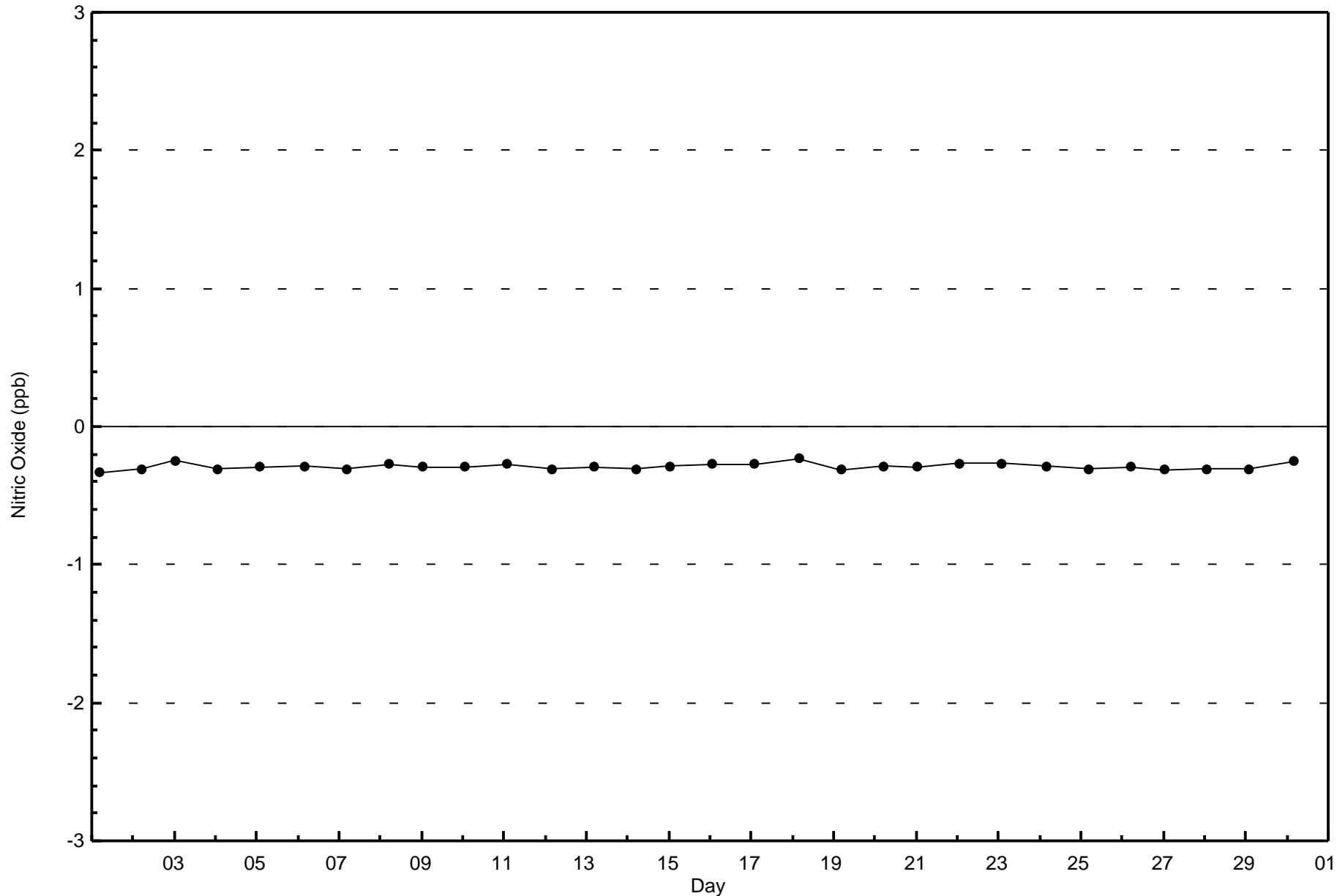
Total Number of Hours: 720

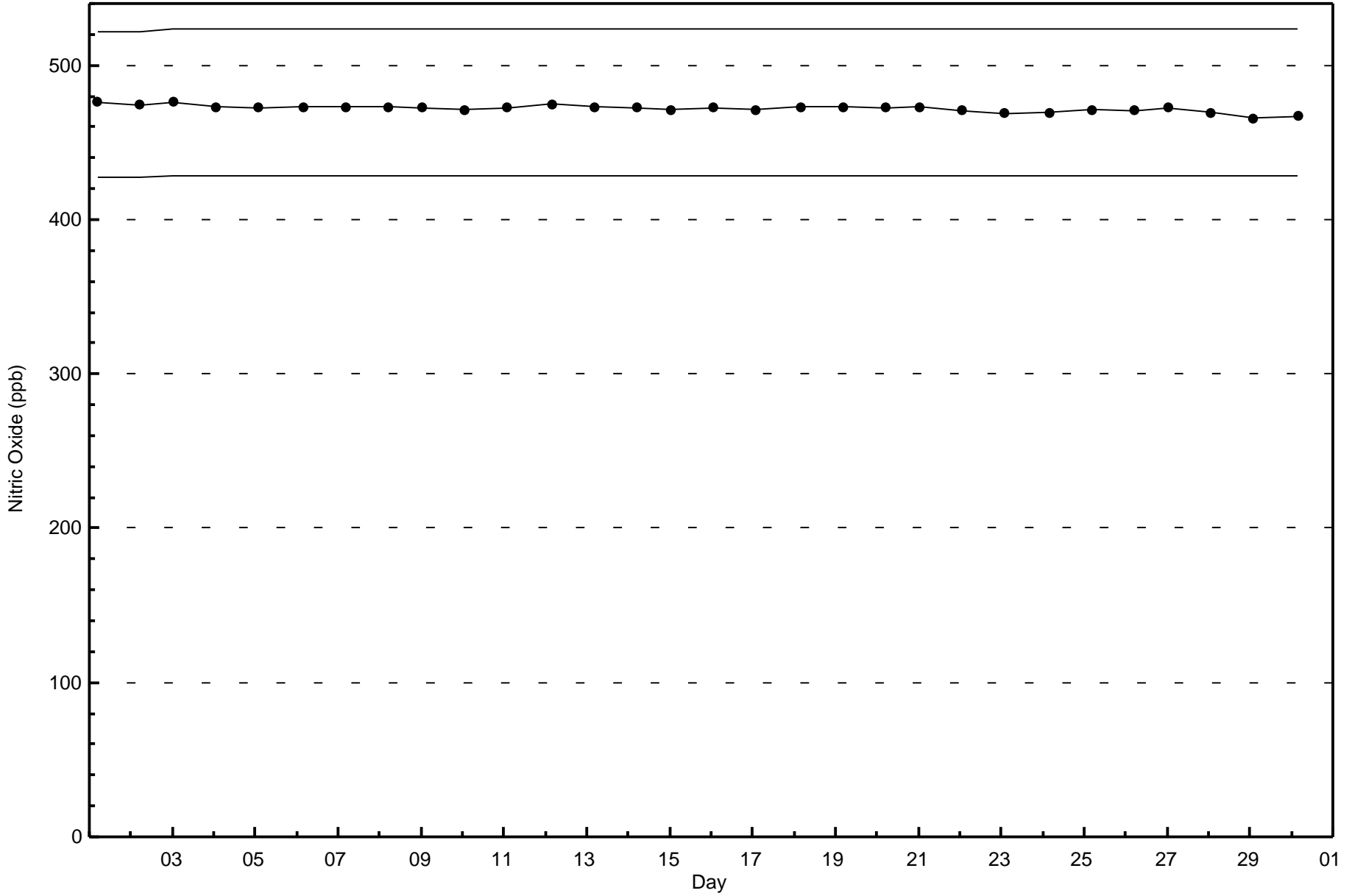


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitric Oxide (NO) - ppb  
Fort McKay South (AMS 13)









Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 11 ppb on Sep 30 23:00	Maximum Daily Average: 5.0 ppb on Sep 30
Minimum Value: 0 ppb on Sep 2 02:00	Minimum Daily Average: 0.2 ppb on Sep 27
Maximum Diurnal Average: 3.1 ppb at hour 11	Minimum Diurnal Average: 0.8 ppb at hour 6
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> = 3 P <sub>90</sub> = 5 P <sub>99</sub> = 8
	Hours of Data: 679
	Hours of Missing Data: 41
	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-Sep	11	8	6	2	Z	1	1	3	5	4	4	5	3	4	1	0	0	0	0	0	0	1	1	2.6	11	
2-Sep	0	0	1	2	2	Z	2	C	C	C	C	C	6	4	4	4	3	3	4	3	2	3	3	2.6	6	
3-Sep	Z	1	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2	
4-Sep	0	Z	0	0	0	0	0	1	1	3	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	3	
5-Sep	0	0	Z	0	1	1	1	4	5	4	5	5	5	3	2	3	5	3	3	1	1	2	1	2.3	5	
6-Sep	0	0	0	Z	1	0	0	2	5	5	4	8	5	3	2	2	2	2	1	1	2	2	1	2.1	8	
7-Sep	0	1	0	0	Z	2	2	2	3	5	4	2	0	1	1	2	2	2	2	1	1	0	0	1.5	5	
8-Sep	0	0	0	0	0	Z	0	0	1	4	4	5	3	1	1	2	4	5	3	3	2	1	1	1.8	5	
9-Sep	Z	1	1	1	1	1	3	4	5	5	5	5	6	5	5	3	3	2	2	1	1	1	0	2.6	6	
10-Sep	1	Z	0	0	1	1	1	3	4	5	8	7	6	2	2	1	1	0	0	1	1	2	4	2.3	8	
11-Sep	4	2	Z	1	1	1	1	1	3	3	2	0	0	0	0	0	0	0	0	0	0	0	2	1.1	4	
12-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1	
13-Sep	1	1	1	0	Z	0	0	1	3	4	3	3	1	1	0	0	1	2	1	1	0	1	1	1.2	4	
14-Sep	1	2	1	1	1	Z	2	2	2	2	1	1	1	1	2	2	3	4	2	1	0	0	1	1.4	4	
15-Sep	Z	1	0	0	0	1	1	2	4	6	7	5	6	4	3	2	1	2	1	1	0	0	0	2.0	7	
16-Sep	0	Z	0	0	0	0	0	1	1	2	M	5	3	1	3	6	7	3	2	1	1	1	1	1.8	7	
17-Sep	1	0	Z	1	1	1	1	2	M	M	M	M	2	1	1	1	2	2	2	1	1	1	3	1.3	3	
18-Sep	3	1	1	Z	1	1	1	2	4	1	0	0	0	0	0	0	0	0	0	0	4	7	6	1.4	7	
19-Sep	2	2	2	2	Z	1	3	2	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.9	4	
20-Sep	0	1	1	1	0	Z	1	1	1	0	0	0	0	0	0	0	M	0	0	0	1	1	1	0.5	1	
21-Sep	Z	0	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0.4	1	
22-Sep	0	Z	0	0	0	0	0	0	1	3	8	8	8	5	7	7	3	1	1	1	1	1	1	2.5	8	
23-Sep	2	1	Z	1	1	0	0	0	4	6	6	4	3	1	1	2	1	1	1	1	2	4	7	2.4	8	
24-Sep	6	5	3	Z	2	1	1	2	2	5	4	5	4	4	3	4	7	4	3	2	2	2	1	3.1	7	
25-Sep	2	3	2	3	Z	4	7	4	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1.3	7	
26-Sep	0	1	1	1	2	Z	5	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	6	
27-Sep	Z	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2	
28-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	2	2	2	0	1	3	3	3	3	1.1	3	
29-Sep	4	4	Z	3	2	1	2	2	6	9	6	7	7	8	4	4	2	2	3	3	4	3	3	3.9	9	
30-Sep	5	5	4	Z	2	2	2	2	5	6	7	5	1	1	2	2	4	10	10	7	5	8	11	5.0	11	

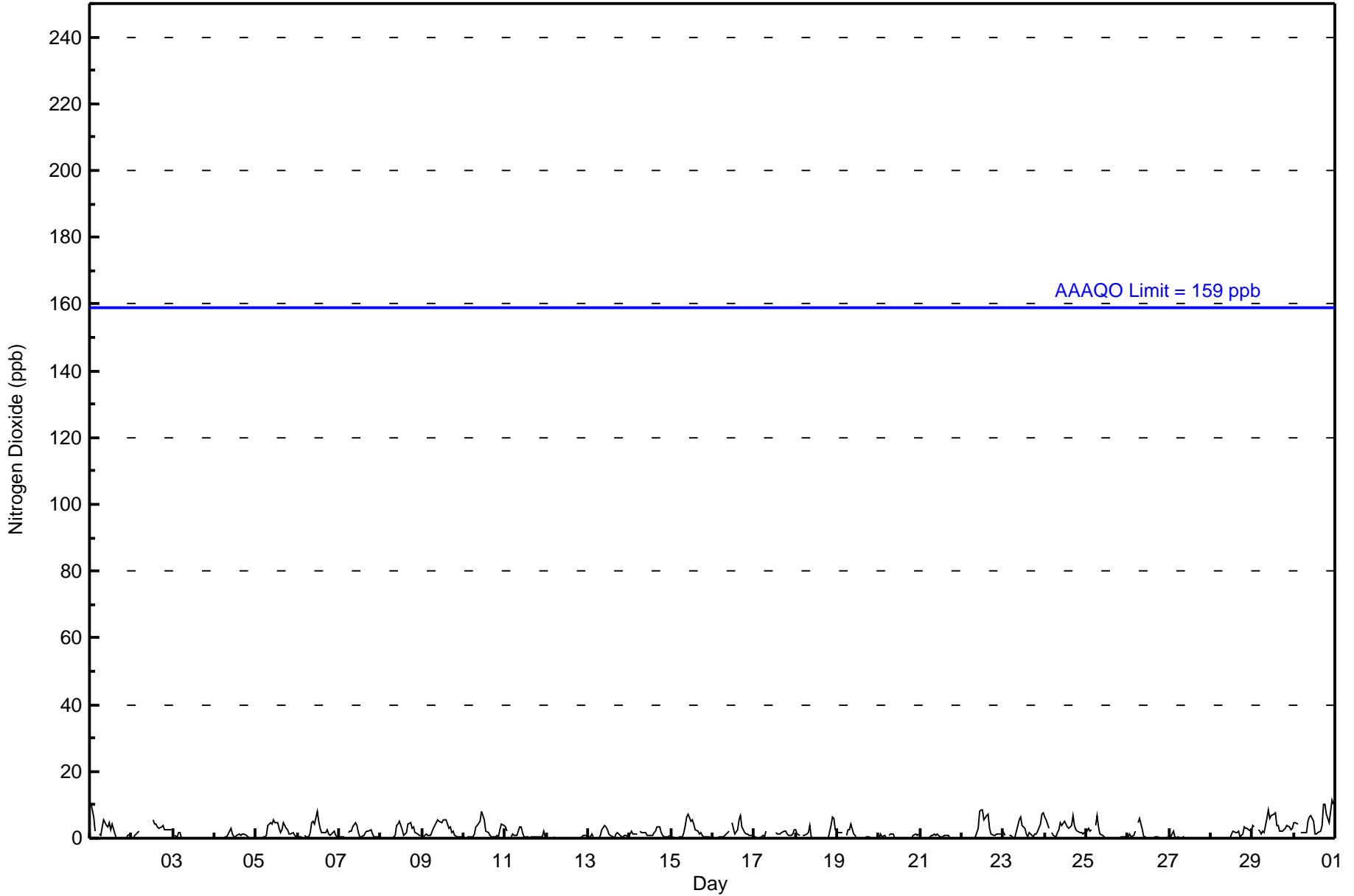
1.7	1.6	1.1	0.8	0.8	0.8	1.2	1.7	2.6	3.0	3.1	2.9	2.4	1.8	1.5	1.7	1.9	1.7	1.5	1.2	1.2	1.5	1.7	1.6	Diurnal Average
11	8	6	3	2	4	7	6	6	9	8	8	8	8	7	7	7	10	10	7	5	8	11	10	Diurnal Maximum

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



Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - September 2015







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay South - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	679	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: 679

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	40	26	4	7	4	14	33	32	68	81	111	95	52	40	38	29	674
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>	40	26	4	7	4	14	33	32	68	81	111	95	52	40	38	29	674

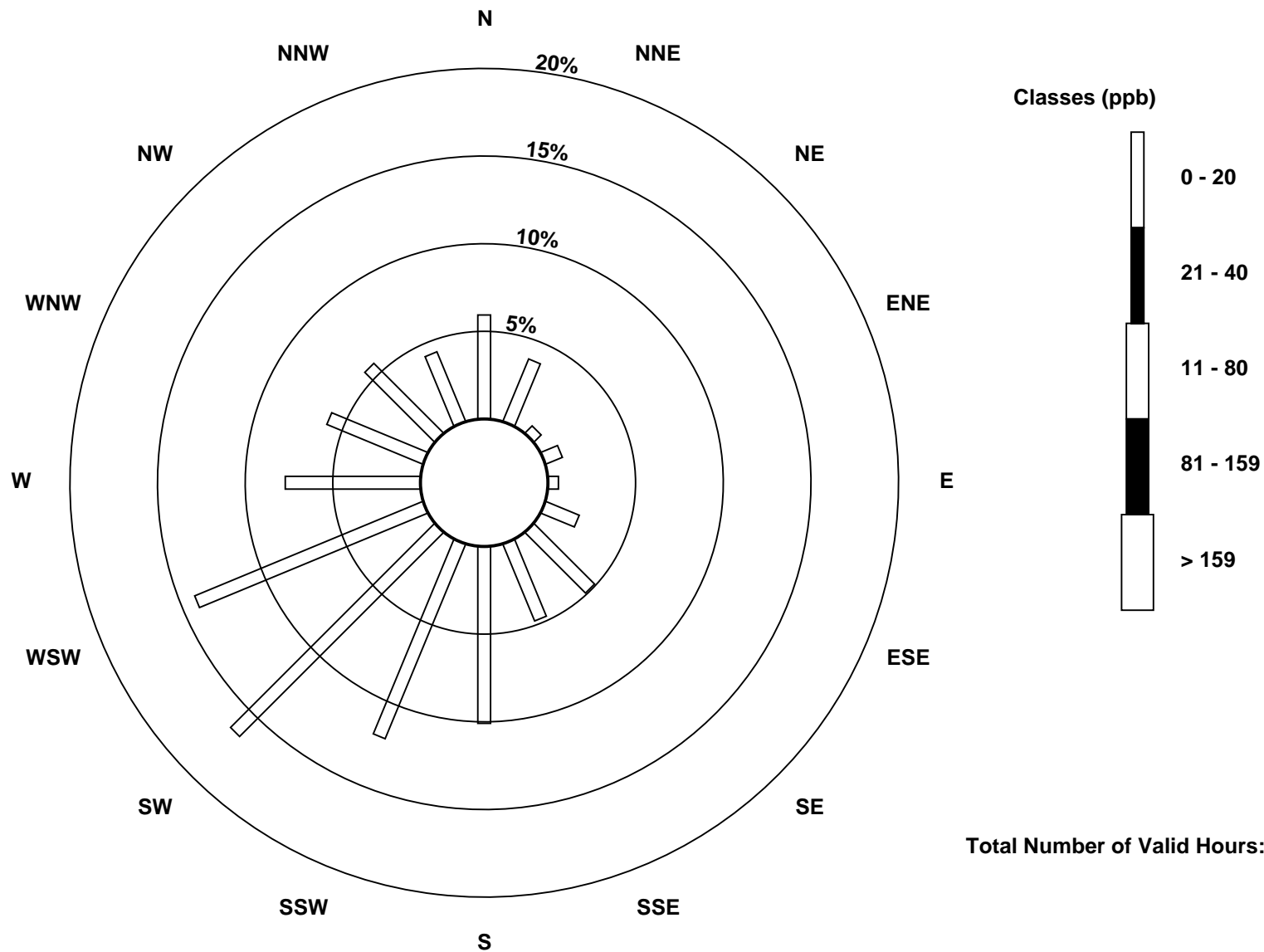
Total Number of Valid Hours: 674

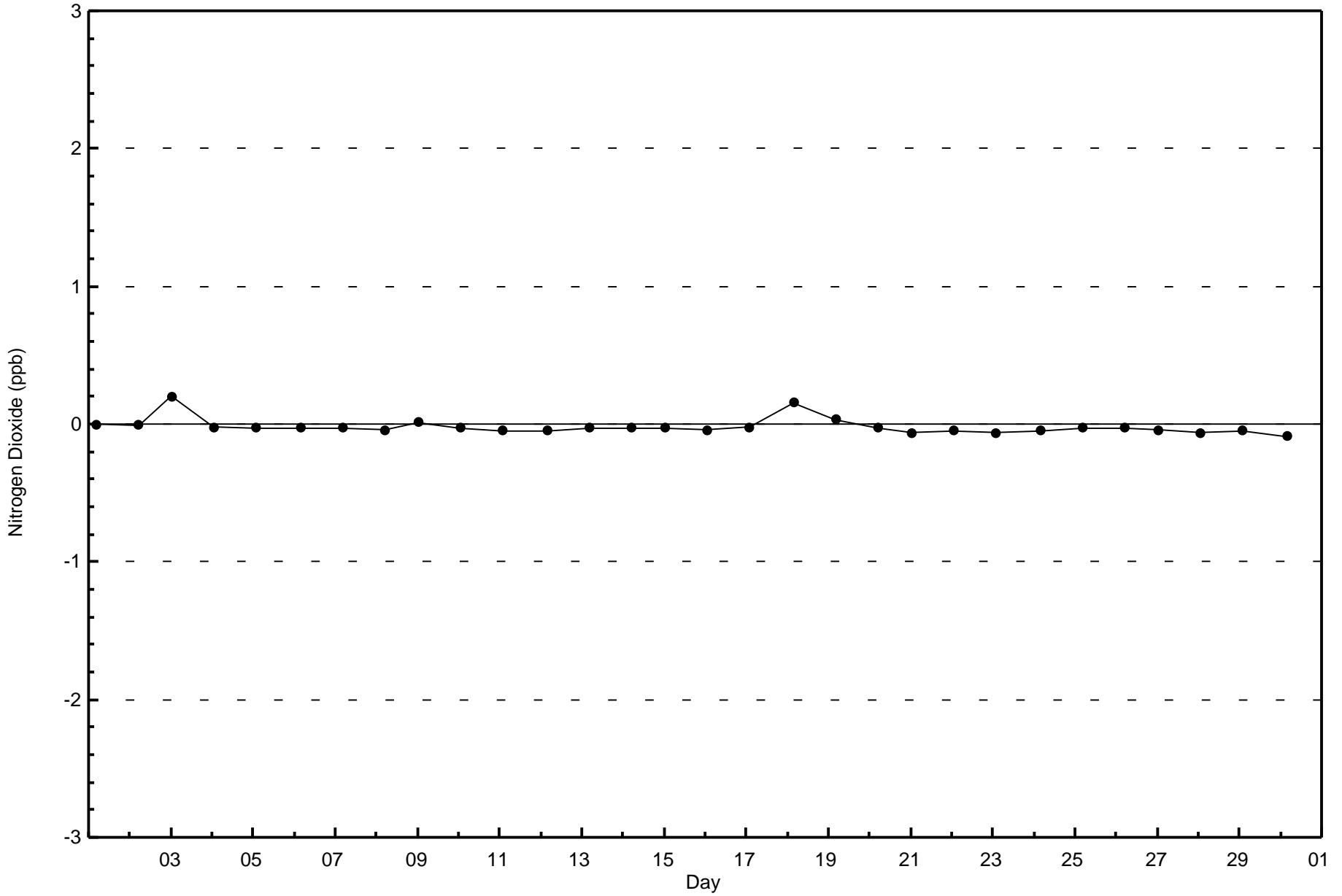
Total Number of Hours: 720

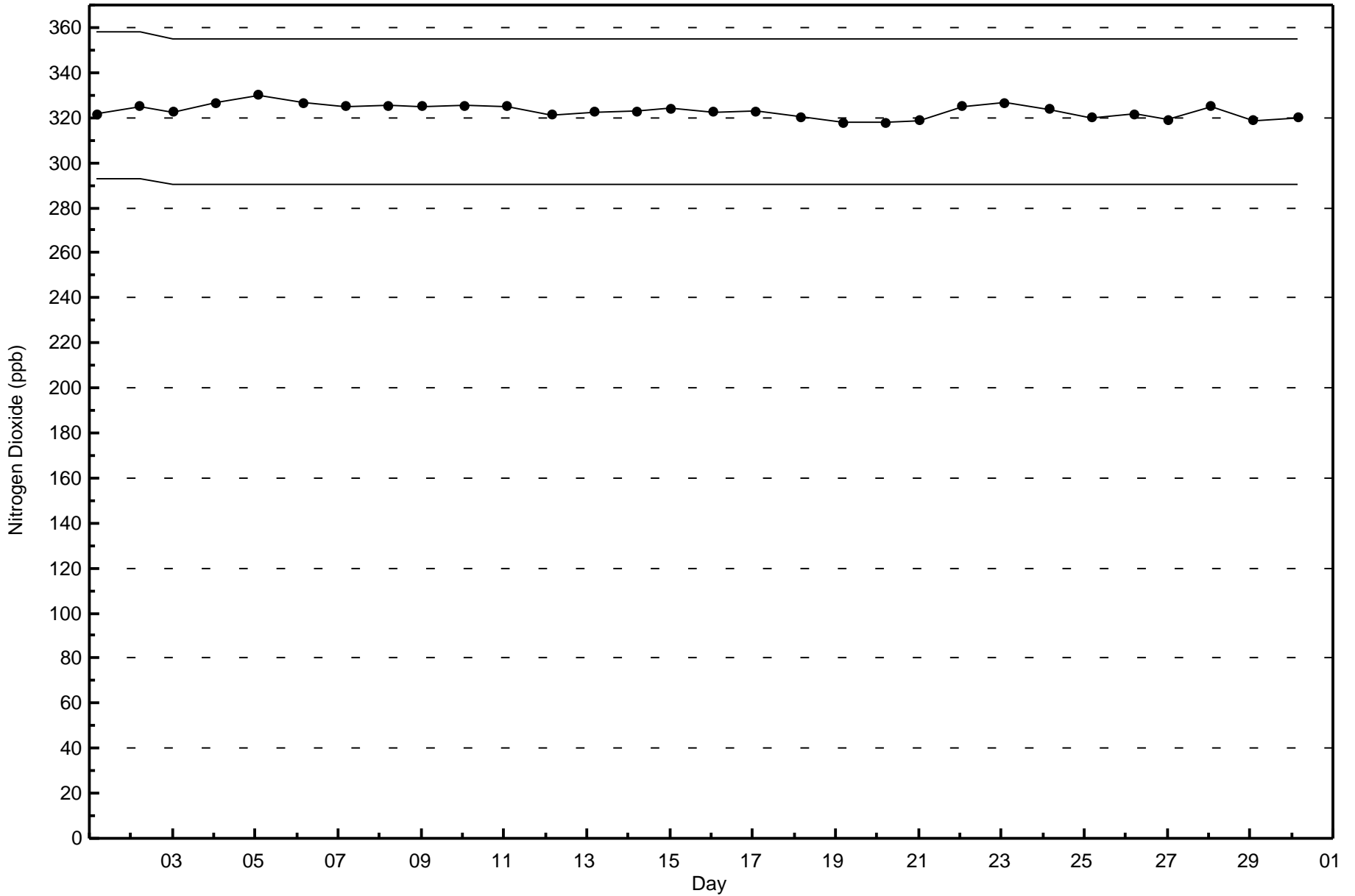


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South (AMS 13)







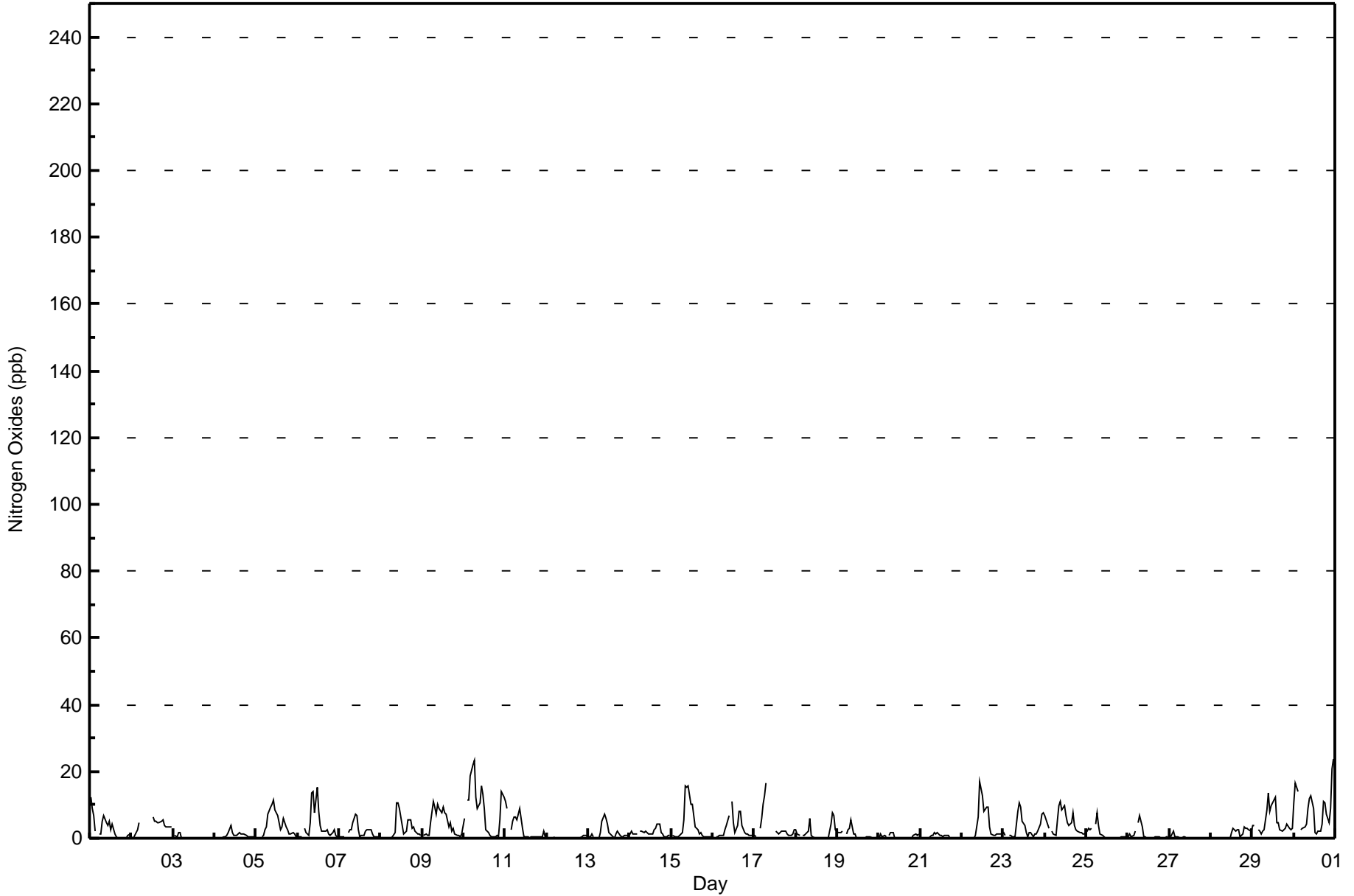


Maximum Value: 24 ppb on Oct 1 00:00																	Maximum Daily Average: 8.8 ppb on Sep 10																	Hours in Service: 720	
Minimum Value: 0 ppb on Sep 18 14:00																	Minimum Daily Average: 0.2 ppb on Sep 12																	Hours of Data: 679	
Maximum Diurnal Average: 6.0 ppb at hour 10																	Minimum Diurnal Average: 1.2 ppb at hour 20																	Hours of Missing Data: 41	
Monthly Average: 2.8 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> = 8 P <sub>99</sub> = 17																	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-Sep	12	9	7	2	Z	1	1	5	7	5	4	5	3	4	1	0	0	0	0	0	0	1	1		3.0	12									
2-Sep	0	0	1	3	5	Z	7	C	C	C	C	C	7	5	5	5	5	5	5	4	3	3	3	3	3.8	7									
3-Sep	Z	1	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2									
4-Sep	0	Z	0	0	0	0	0	1	2	4	2	1	1	1	2	1	1	1	1	0	0	0	0	0	0.9	4									
5-Sep	0	0	Z	0	1	3	3	7	10	10	11	8	7	4	3	3	6	4	3	1	1	2	1	1	3.9	11									
6-Sep	0	0	1	Z	3	2	1	5	14	14	8	15	8	4	2	2	2	3	1	1	2	2	1	1	3.9	15									
7-Sep	0	0	0	0	Z	2	2	3	5	7	7	3	0	1	1	2	2	3	2	1	1	0	0	0	1.9	7									
8-Sep	0	0	0	0	0	Z	0	0	2	10	11	9	4	1	2	2	5	5	3	3	2	1	1	1	2.8	11									
9-Sep	Z	1	1	1	1	5	11	9	7	10	9	8	9	8	7	4	5	2	3	1	1	1	1	1	4.6	11									
10-Sep	6	Z	12	11	19	22	23	12	9	11	16	13	9	2	2	1	1	0	0	1	1	5	14	12	8.8	23									
11-Sep	11	9	Z	3	5	6	7	6	9	6	3	0	0	0	0	0	0	0	0	0	0	0	2	0	3.0	11									
12-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.2	1									
13-Sep	1	1	1	0	Z	0	0	2	5	7	6	4	2	1	0	0	1	2	1	1	0	1	1	1	1.7	7									
14-Sep	1	2	1	1	1	Z	2	2	2	2	1	1	1	1	2	3	4	4	2	1	1	1	1	1	1.7	4									
15-Sep	Z	1	0	0	0	1	1	5	16	15	16	10	10	7	3	2	1	2	1	1	1	0	0	0	4.1	16									
16-Sep	0	Z	0	1	1	1	1	3	4	7	M	11	5	2	4	8	8	4	2	1	1	1	1	1	3.0	11									
17-Sep	1	1	Z	3	6	10	13	17	M	M	M	M	2	2	1	2	2	2	2	1	1	1	1	3	3.7	17									
18-Sep	2	1	1	Z	1	1	2	2	6	1	0	0	0	0	0	0	0	0	0	0	4	8	7	3	1.7	8									
19-Sep	2	2	2	2	Z	1	3	3	6	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	6									
20-Sep	0	1	1	1	0	Z	1	2	2	0	0	0	0	0	0	0	M	0	0	0	1	1	1	1	0.6	2									
21-Sep	Z	0	0	0	0	0	1	1	2	1	2	1	1	0	1	1	1	0	0	0	0	0	0	0	0.5	2									
22-Sep	0	Z	0	0	0	0	0	0	1	7	17	15	13	8	9	9	3	1	1	1	1	1	1	1	4.0	17									
23-Sep	2	1	Z	1	1	0	0	1	8	11	10	5	4	2	1	2	1	1	1	1	2	4	7	8	3.1	11									
24-Sep	7	6	3	Z	2	1	1	5	10	11	8	10	7	5	4	5	8	4	3	2	2	2	1	1	4.6	11									
25-Sep	2	3	2	3	Z	4	7	4	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1.4	7									
26-Sep	0	1	1	1	2	Z	5	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	7									
27-Sep	Z	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2									
28-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	2	3	2	3	2	0	1	3	3	3	3	2	1.3	3									
29-Sep	4	4	Z	3	2	1	2	3	8	13	8	10	11	12	5	5	3	2	2	3	4	3	2	3	5.0	13									
30-Sep	11	17	14	Z	2	3	3	4	9	12	13	9	2	1	2	2	4	11	10	7	4	9	21	24	8.5	24									
																	Diurnal Average																		
																	Diurnal Maximum																		
Z - zerospan																	C - Calibration																	M - Maintenance	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	675	99.41	99.41
21 - 40	4	0.59	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 679

Total Number of Hours: 720





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay South - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	40	26	4	7	4	14	33	32	67	78	111	95	52	40	38	29	670
21 - 40	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	4
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	26	4	7	4	14	33	32	68	81	111	95	52	40	38	29	674

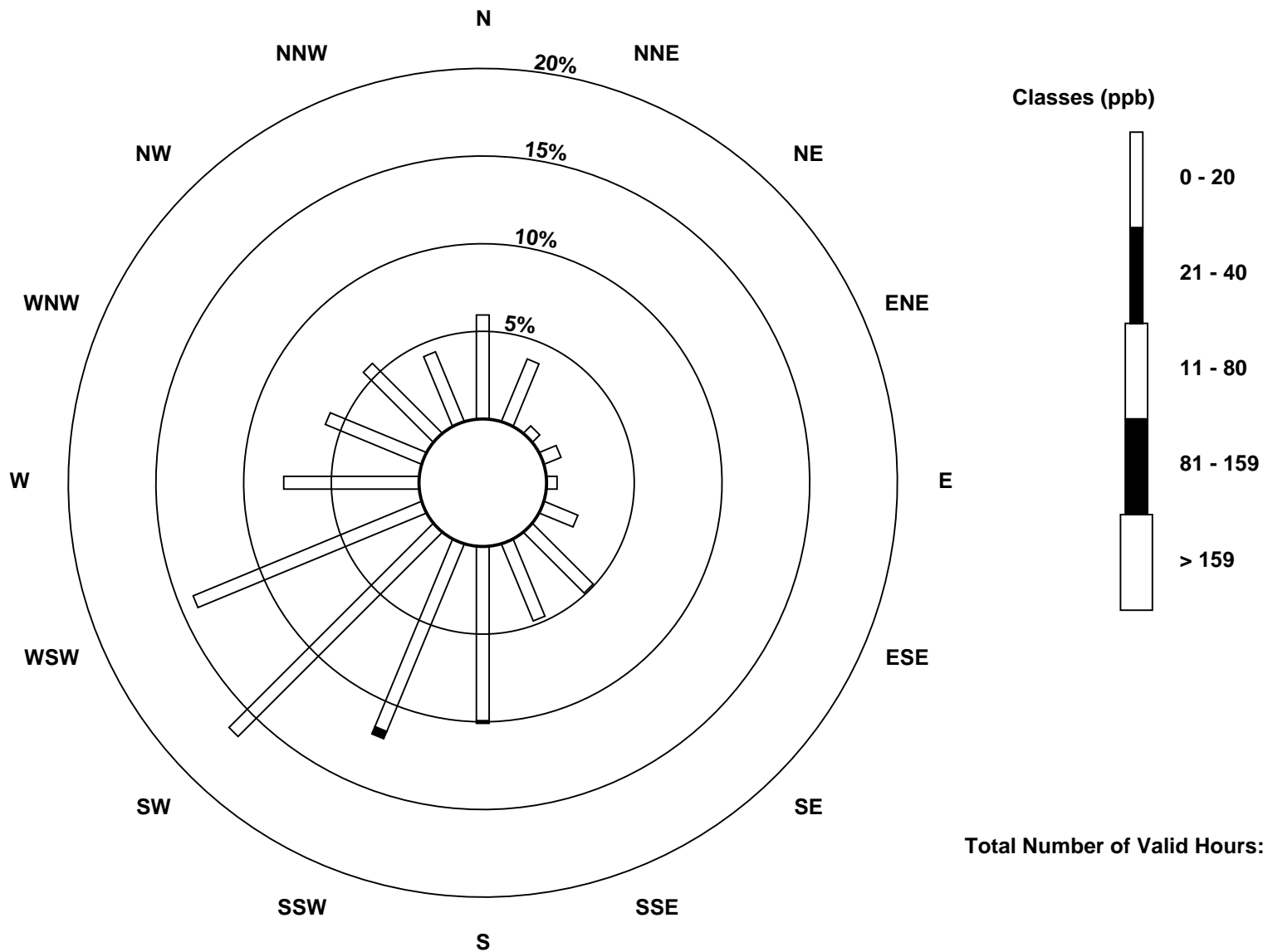
Total Number of Valid Hours: 674

Total Number of Hours: 720

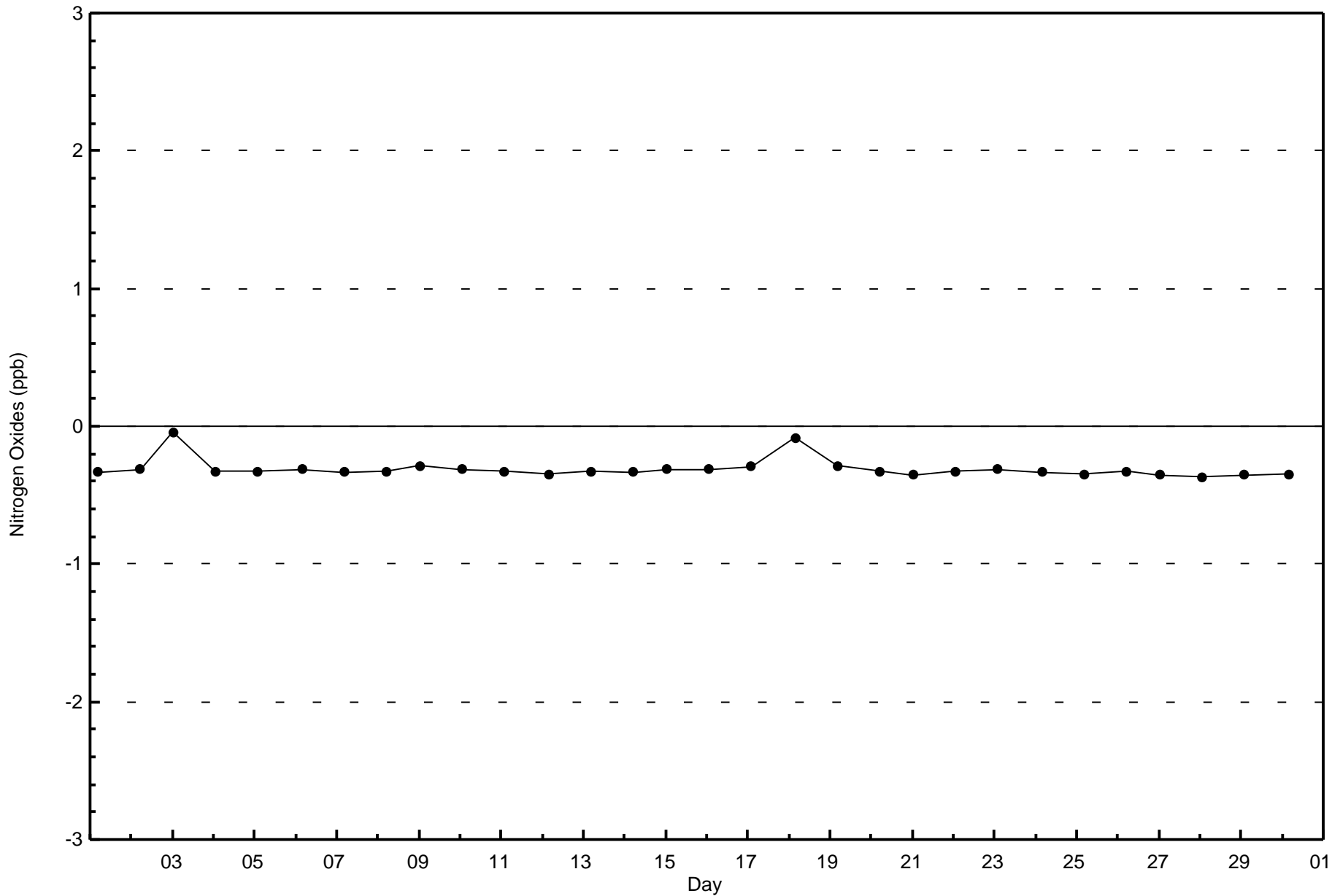


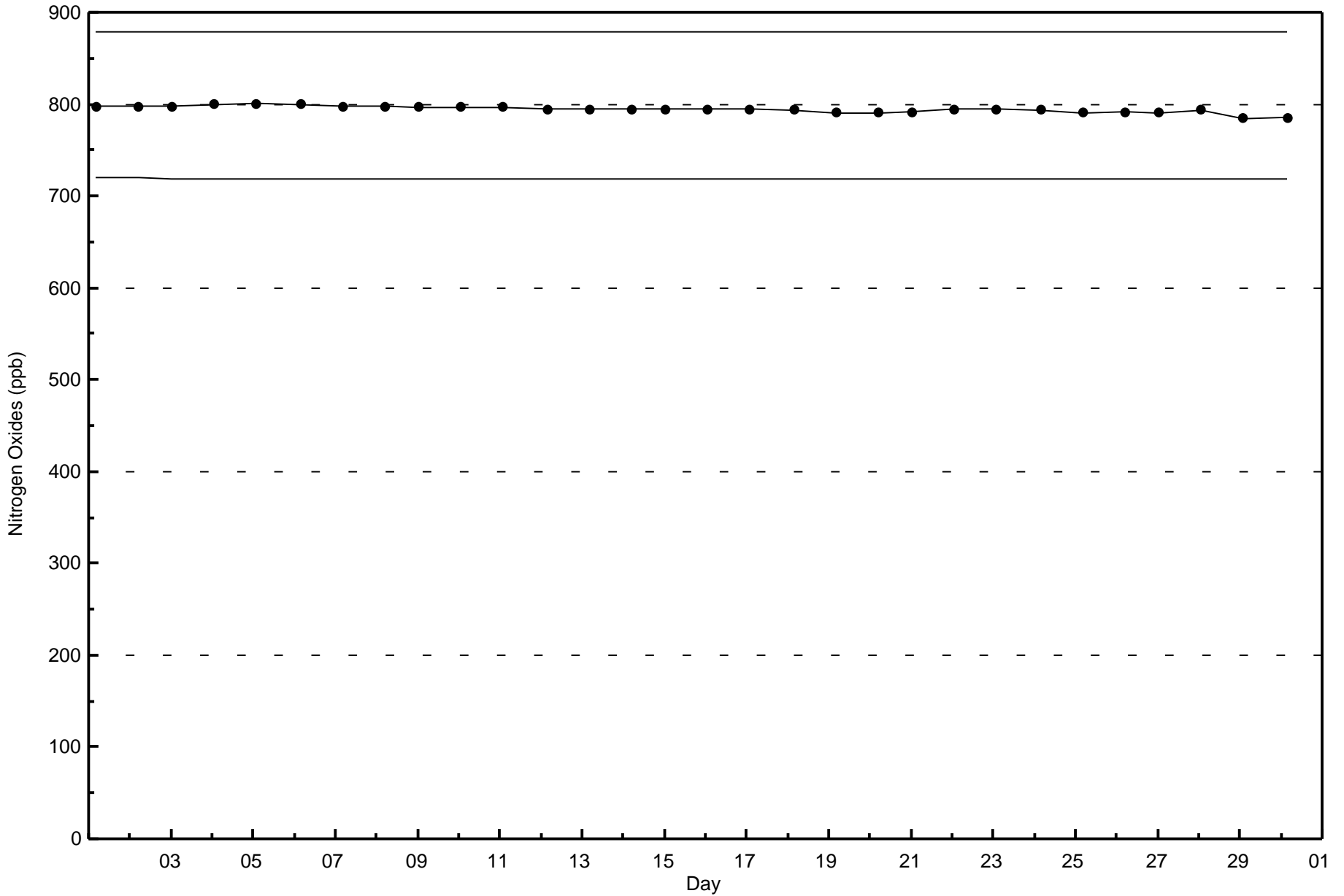
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay South (AMS 13)



Total Number of Valid Hours: 674







Wood Buffalo Environmental Association

Summary of Hour Averages

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

Fort McKay South - September 2015

Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 20.4 µg/m <sup>3</sup> on Sep 10 09:00	Maximum Daily Average: 6.6 µg/m <sup>3</sup> on Sep 6	Hours of Data:	682
Minimum Value: 0.4 µg/m <sup>3</sup> on Sep 20 14:00	Minimum Daily Average: 2.2 µg/m <sup>3</sup> on Sep 20	Hours of Missing Data:	38
Maximum Diurnal Average: 6.5 µg/m <sup>3</sup> at hour 9	Minimum Diurnal Average: 2.0 µg/m <sup>3</sup> at hour 14	Hours of Calibration:	1
Monthly Average: 4.28 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 0.4 P <sub>10</sub> = 1.4 Q <sub>1</sub> = 2.2 Median = 3.9 Q <sub>3</sub> = 5.4 P <sub>90</sub> = 8.0 P <sub>99</sub> = 14.1	Percent Operational Time:	94.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	7.4	6.4	6.1	4.6	3.9	3.9	3.9	3.8	4.6	3.3	1.5	1.1	1.0	1.5	2.0	1.2	0.9	0.8	1.8	1.6	2.1	3.4	3.9	5.2	3.2	7.4	
2-Sep	5.1	5.0	4.5	5.2	5.4	5.4	4.8	5.1	6.1	4.9	3.9	2.9	3.0	2.7	2.3	2.0	1.8	1.5	1.0	0.9	2.1	3.7	4.7	4.5	3.7	6.1	
3-Sep	5.3	4.7	2.1	1.9	2.6	1.7	2.6	C	0.9	0.7	0.4	UO	UO	UO	UO	0.7	1.3	2.0	2.6	2.1	2.5	3.2	4.1	5.2	2.4	5.3	
4-Sep	6.9	5.0	3.6	4.6	4.4	3.5	3.7	3.0	2.3	2.0	1.6	1.5	1.5	1.6	2.1	2.2	2.3	3.3	4.3	2.9	1.9	2.0	2.5	3.7	3.0	6.9	
5-Sep	3.9	4.7	5.4	5.1	4.9	5.2	6.5	10.6	7.0	3.5	3.6	3.9	3.0	2.0	2.4	4.1	4.8	5.0	8.3	5.8	2.7	2.1	3.2	4.8	4.7	10.6	
6-Sep	7.0	8.0	8.2	9.7	10.5	10.7	10.5	12.5	14.6	8.6	3.3	3.5	2.6	2.1	1.9	2.3	3.5	4.3	4.3	6.7	7.0	6.9	5.4	5.1	6.6	14.6	
7-Sep	5.1	4.9	4.8	5.0	4.4	4.5	4.6	4.2	4.6	4.7	3.1	1.8	1.4	1.6	1.9	1.8	1.8	1.8	3.1	4.7	5.0	5.2	4.7	4.2	3.7	5.2	
8-Sep	3.7	4.2	4.2	3.9	3.4	3.4	3.3	3.1	3.3	3.7	3.3	3.1	2.2	1.6	2.2	2.7	3.5	5.3	4.4	3.3	3.0	3.8	5.5	6.8	3.6	6.8	
9-Sep	8.1	8.1	8.4	7.3	6.8	7.8	9.2	11.1	11.3	6.7	5.6	8.5	9.0	4.9	3.7	6.0	6.1	2.6	1.8	1.6	2.7	4.9	6.9	9.3	6.6	11.3	
10-Sep	10.2	10.3	8.9	9.1	9.3	8.8	8.8	14.2	20.4	10.5	2.8	1.6	1.2	0.5	0.4	0.5	0.6	1.0	1.5	1.2	1.0	1.0	2.5	3.5	5.4	20.4	
11-Sep	4.7	5.7	5.7	6.0	7.6	7.1	6.9	10.0	9.7	2.8	2.0	1.5	1.3	1.1	0.9	1.1	1.2	1.2	1.8	2.1	1.9	1.7	2.8	2.2	3.7	10.0	
12-Sep	2.3	2.6	3.9	6.1	4.7	3.4	5.1	5.0	3.4	3.3	2.6	1.9	2.1	2.9	2.4	3.3	5.7	7.2	8.7	6.6	6.1	6.2	6.9	7.2	4.6	8.7	
13-Sep	6.4	5.2	5.8	5.1	4.6	4.1	3.8	5.8	4.4	2.8	2.0	2.1	1.9	2.0	1.8	3.2	2.8	2.2	2.0	1.6	1.9	3.6	4.6	5.2	3.5	6.4	
14-Sep	5.4	3.8	3.8	4.0	3.7	4.2	5.2	5.7	5.3	4.0	2.7	2.1	2.3	2.9	3.4	4.4	4.4	5.2	6.0	5.3	4.9	4.5	4.7	4.7	4.3	6.0	
15-Sep	5.1	4.4	4.2	3.6	3.8	4.0	3.8	5.2	7.1	5.3	4.0	2.4	2.0	2.4	2.5	2.2	3.2	3.9	4.3	4.6	4.7	4.4	4.1	4.8	4.0	7.1	
16-Sep	5.4	5.2	4.6	4.5	4.2	5.3	5.2	5.7	6.7	6.4	6.0	3.7	1.6	1.2	1.7	3.7	7.1	7.4	7.7	8.0	7.0	6.0	5.1	4.8	5.2	8.0	
17-Sep	4.6	4.2	4.1	4.2	4.6	4.3	4.3	7.7	18.4	19.5	6.8	5.6	2.6	1.9	2.2	2.3	2.2	2.2	4.3	5.8	5.9	5.3	4.6	4.2	5.5	19.5	
18-Sep	4.0	4.4	4.5	4.4	4.1	3.8	4.1	4.3	2.3	1.2	1.0	1.0	0.9	0.8	0.8	0.9	1.0	1.3	1.7	2.5	4.2	4.6	3.7	3.5	2.7	4.6	
19-Sep	3.9	4.0	4.1	4.2	3.6	3.5	3.5	3.8	3.5	1.3	1.0	0.8	0.9	0.9	1.1	1.9	2.1	1.5	0.9	0.9	1.2	1.4	1.7	2.3	2.2	4.2	
20-Sep	3.4	3.6	3.1	2.8	2.9	2.3	2.3	2.4	1.6	0.9	0.9	0.4	0.4	0.4	0.4	0.6	M	1.6	2.2	3.1	4.8	4.2	2.9	2.3	2.2	4.8	
21-Sep	2.2	2.2	2.5	3.1	3.3	3.6	2.6	2.6	2.4	2.2	1.8	1.5	1.3	1.0	1.4	1.5	1.5	1.5	1.7	2.7	2.9	2.9	2.9	5.1	2.3	5.1	
22-Sep	6.8	5.7	5.2	4.6	4.5	4.3	5.2	5.4	4.4	3.0	9.4	5.6	3.1	1.5	2.0	2.7	3.0	3.9	5.1	5.7	5.9	5.5	5.2	5.2	4.7	9.4	
23-Sep	5.4	5.1	5.4	5.2	5.3	4.9	5.1	6.6	9.5	8.6	5.8	3.6	2.4	2.2	2.0	2.2	2.8	3.2	4.5	4.9	4.5	5.3	7.0	6.1	4.9	9.5	
24-Sep	5.7	5.6	5.2	5.2	4.9	4.8	5.1	6.1	8.4	6.5	2.5	3.7	5.0	3.6	4.3	5.5	6.2	8.5	7.1	7.2	7.2	8.0	8.0	7.8	5.9	8.5	
25-Sep	7.5	8.3	9.3	9.6	9.6	10.5	7.5	2.7	1.8	2.0	1.6	1.0	1.1	1.2	1.1	1.0	1.2	1.7	3.0	3.9	3.1	2.2	2.2	2.3	4.0	10.5	
26-Sep	3.2	3.9	3.6	3.6	3.7	3.7	3.6	3.4	2.6	1.5	1.2	0.8	0.6	0.9	1.0	AF	AF	AF	AF	AF	1.5	1.7	2.1	1.9	2.3	3.9	
27-Sep	2.2	2.5	2.7	2.1	1.9	2.0	2.3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	2.7
28-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3.0	3.5	4.2	5.0	4.6	4.5	5.6	8.6	14.5	19.0	14.0	9.4	9.2	9.5	--	19.0	
29-Sep	9.5	8.5	8.1	7.3	6.4	5.9	5.4	4.9	5.9	6.9	3.5	5.1	5.7	5.2	4.2	5.0	4.8	5.0	3.2	4.6	7.2	8.0	7.7	8.0	6.1	9.5	
30-Sep	8.6	9.1	9.3	9.0	8.4	8.6	8.4	7.5	7.6	4.3	2.5	3.1	2.8	1.8	2.3	2.9	3.5	4.0	4.7	4.8	6.0	8.5	9.2	10.4	6.1	10.4	

5.5	5.4	5.2	5.2	5.1	5.0	5.1	6.0	6.5	4.7	3.1	2.8	2.4	2.0	2.1	2.6	3.1	3.5	4.1	4.4	4.3	4.5	4.8	5.2	Diurnal Average	
10.2	10.3	9.3	9.7	10.5	10.7	10.5	14.2	20.4	19.5	9.4	8.5	9.0	5.2	4.6	6.0	7.1	8.6	14.5	19.0	14.0	9.4	9.2	10.4	Diurnal Maximum	

C - Calibration      M - Maintenance      AF - Analyzer Failure      UO - Unstable Operation  
 Alberta Ambient Air Quality Objectives (AAAQO):      24-hr 30 µg/m<sup>3</sup>

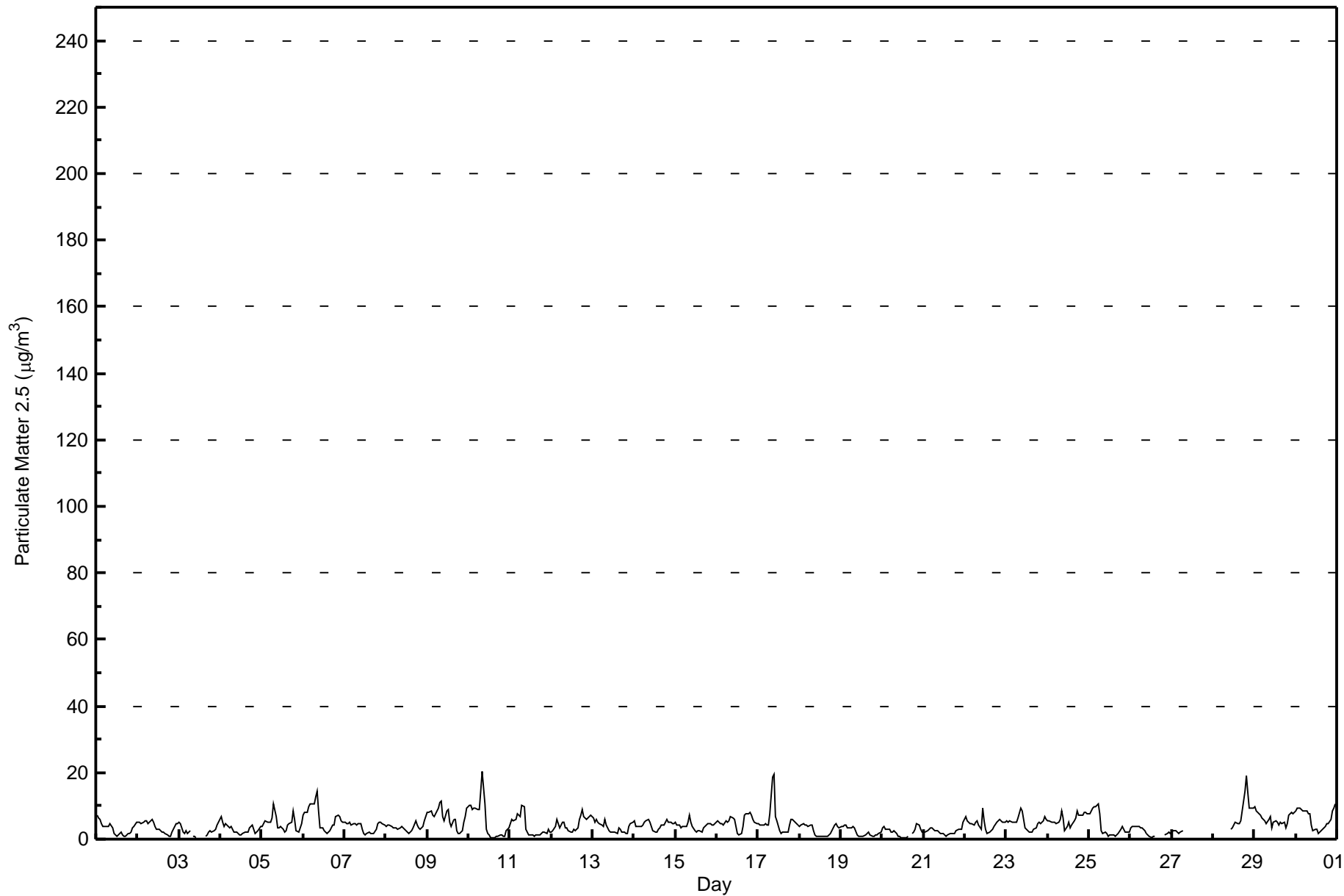


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$

Fort McKay South - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	481	70.53	70.53
6 - 15	156	22.87	93.40
16 - 25	4	0.59	93.99
26 - 80	0	0.00	93.99
> 81.0	0	0.00	93.99

Total Number of Valid Hours: 682

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

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

Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	33	26	4	4	3	12	24	22	41	53	81	67	35	17	28	26	476
6 - 15	9	1	1	3	1	4	8	9	27	32	21	13	9	7	7	4	156
16 - 25	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	4
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>	42	27	5	7	4	16	33	32	69	86	102	80	44	24	35	30	636

Total Number of Valid Hours: 677

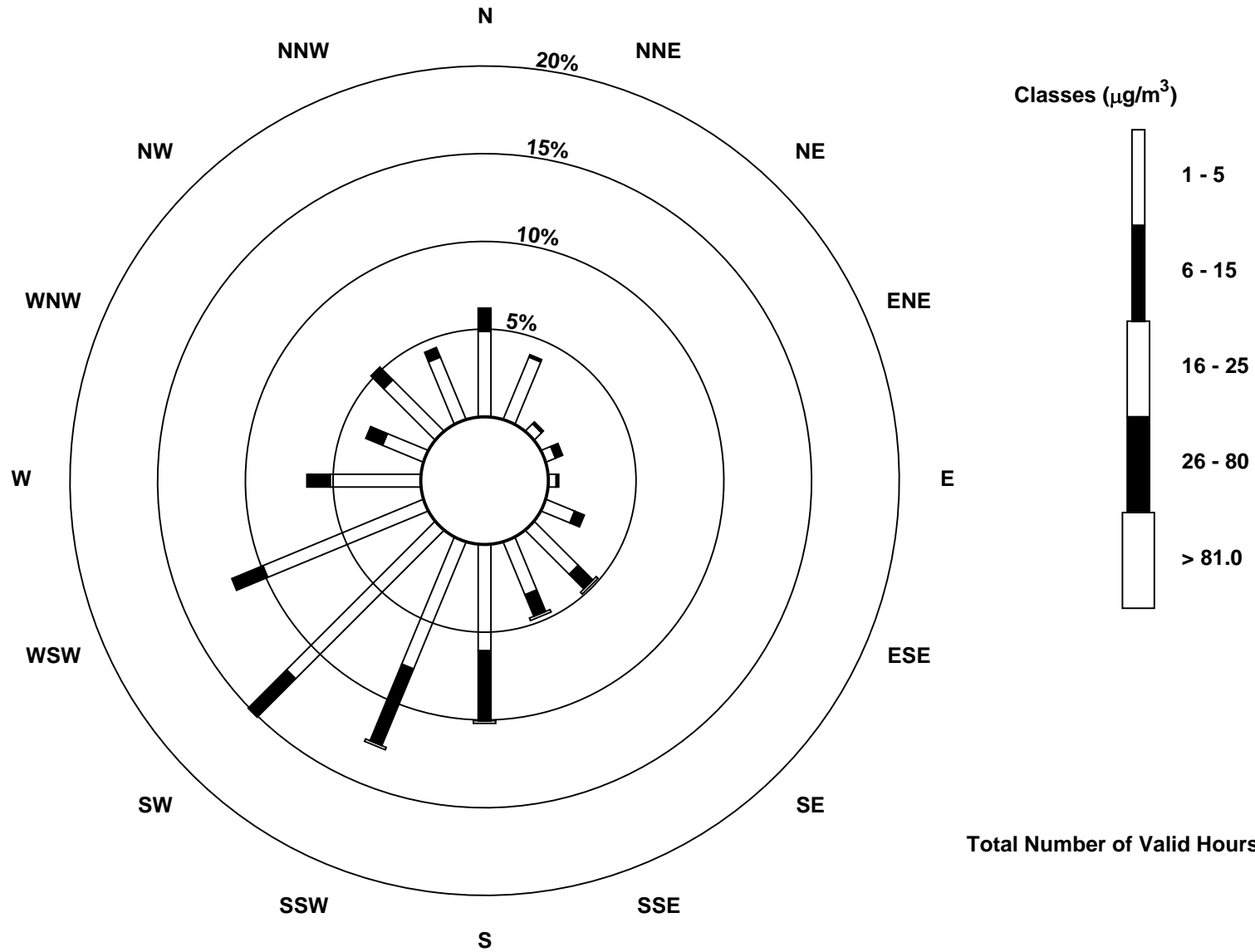
Total Number of Hours: 720





Wood Buffalo Environmental Association  
Wind Rose Sep 2015

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: 677



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Fort McKay South - September 2015

Maximum Value: 24.8 C on Sep 30 16:00	Maximum Daily Average: 14.7 C on Sep 12	Hours in Service: 720
Minimum Value: -4.3 C on Sep 22 07:00	Minimum Daily Average: 2.7 C on Sep 22	Hours of Data: 719
Maximum Diurnal Average: 15.3 C at hour 15	Minimum Diurnal Average: 2.4 C at hour 6	Hours of Missing Data: 1
Monthly Average: 8.14 C	Percentiles: P <sub>1</sub> = -3.2 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 3.7 Median = 7.8 Q <sub>3</sub> = 12.3 P <sub>90</sub> = 16.2 P <sub>99</sub> = 22.0	Hours of Calibration: 0
		Percent Operational Time: 99.9

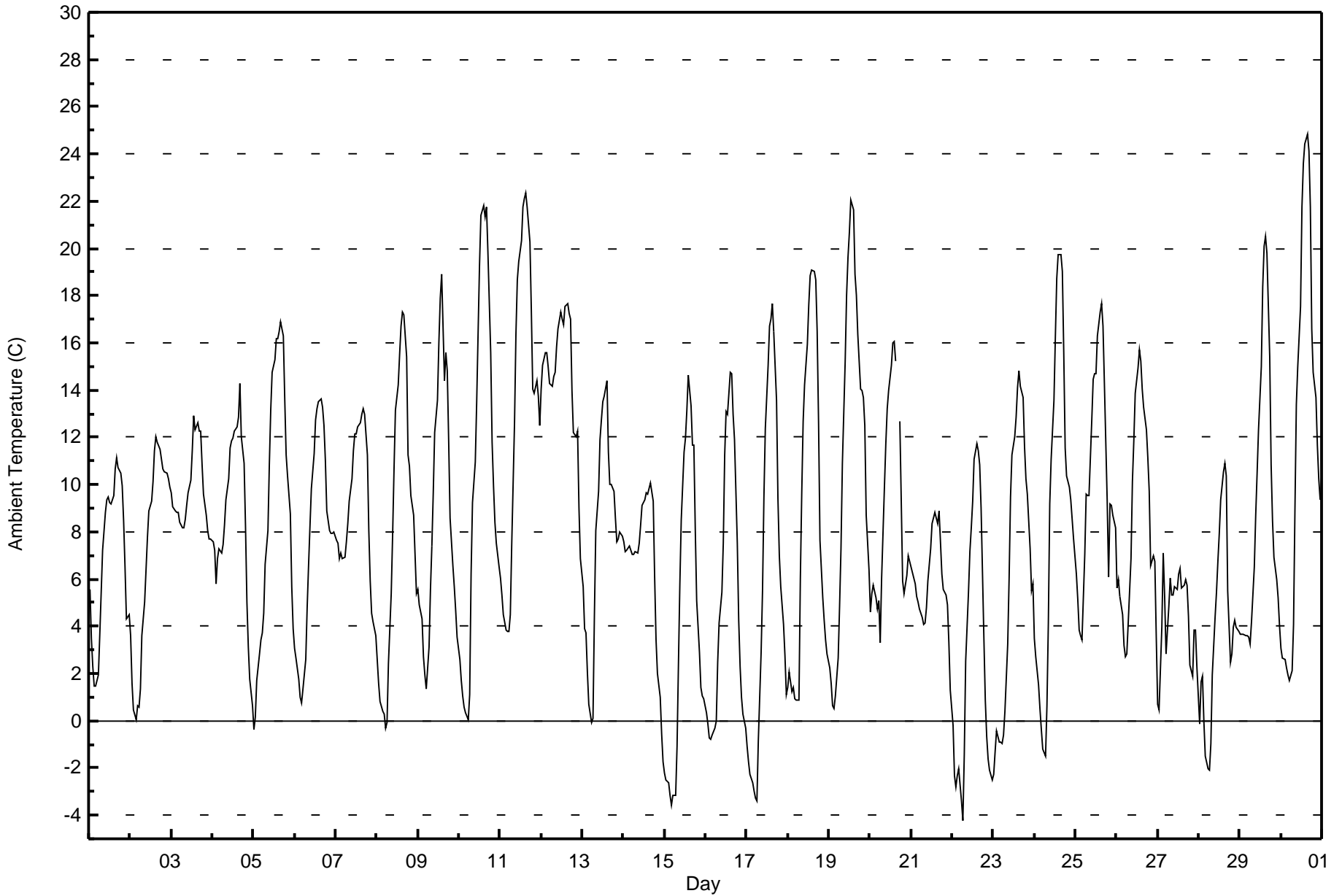
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Sep	5.6	3.5	2.3	1.4	1.5	2.0	3.7	5.4	7.2	8.8	9.3	9.5	9.3	9.2	9.5	10.6	11.1	10.7	10.5	10.0	8.5	6.5	4.3	4.5	6.9	11.1																						
2-Sep	3.6	1.6	0.4	0.0	0.7	0.6	1.3	3.6	5.0	6.4	7.8	8.9	9.3	10.1	11.4	12.0	11.8	11.5	11.1	10.6	10.6	10.5	10.3	9.9	7.0	12.0																						
3-Sep	9.6	9.1	8.9	8.8	8.8	8.4	8.2	8.1	8.5	9.1	9.6	10.2	11.5	12.9	12.4	12.6	12.2	12.3	10.8	9.6	8.7	8.1	7.7	7.7	9.7	12.9																						
4-Sep	7.6	7.2	5.8	6.8	7.3	7.1	7.4	8.3	9.4	10.3	11.5	11.9	12.0	12.3	12.5	12.9	14.3	12.0	10.9	8.2	5.0	3.1	1.7	0.6	8.6	14.3																						
5-Sep	-0.4	0.2	1.7	2.8	3.4	3.7	4.6	6.6	8.0	10.8	13.2	14.7	15.3	16.2	16.2	16.5	16.9	16.3	13.6	11.3	10.4	8.8	5.7	3.9	9.2	16.9																						
6-Sep	3.1	2.7	1.7	1.0	0.7	1.3	2.6	4.8	6.6	8.2	9.8	11.3	12.7	13.2	13.5	13.6	13.3	12.5	11.0	8.9	8.0	7.9	7.9	8.0	7.7	13.6																						
7-Sep	7.7	7.5	6.8	7.1	6.9	6.9	7.5	8.3	9.3	10.3	11.5	12.2	12.1	12.4	12.6	13.0	13.2	12.9	11.3	8.0	5.9	4.6	4.2	3.6	9.0	13.2																						
8-Sep	2.6	1.6	0.8	0.4	0.3	-0.3	-0.1	2.4	5.4	7.9	10.7	13.2	14.2	15.5	16.7	17.3	17.2	15.4	11.3	10.8	9.6	8.7	7.0	5.4	8.1	17.3																						
9-Sep	5.6	4.9	4.3	2.7	2.0	1.4	3.1	5.6	7.4	9.6	12.2	13.6	16.0	17.9	18.9	14.4	15.6	14.8	11.8	8.6	6.6	5.7	4.7	3.6	8.8	18.9																						
10-Sep	2.6	1.7	1.0	0.6	0.3	0.0	1.1	6.2	9.3	10.9	13.5	16.4	19.3	21.4	21.8	21.3	21.8	19.9	15.6	11.8	10.0	8.4	7.5	6.5	10.4	21.8																						
11-Sep	6.0	5.3	4.5	3.8	3.8	3.8	4.5	7.5	12.6	16.3	18.6	19.4	20.3	21.8	22.1	22.3	21.8	20.3	17.4	14.1	13.9	14.4	13.8	12.5	13.4	22.3																						
12-Sep	14.0	15.0	15.6	15.6	15.0	14.3	14.2	14.6	14.7	15.8	16.6	17.3	17.0	16.7	17.6	17.7	17.3	17.0	14.0	12.2	12.0	12.3	9.0	6.9	14.7	17.7																						
13-Sep	5.7	3.9	3.7	2.1	0.7	-0.1	0.1	4.4	8.0	9.7	11.9	12.8	13.5	13.8	14.4	11.4	10.0	10.0	9.7	8.6	7.6	7.7	8.0	7.8	7.7	14.4																						
14-Sep	7.6	7.2	7.2	7.4	7.2	7.1	7.1	7.2	7.1	7.5	8.3	9.1	9.3	9.7	9.6	9.9	10.1	9.3	6.1	3.4	2.0	1.0	-0.5	-1.7	6.6	10.1																						
15-Sep	-2.2	-2.5	-2.7	-3.2	-3.6	-3.1	-3.1	-1.1	2.4	5.8	8.5	11.4	12.0	13.1	14.6	13.4	11.6	11.7	8.1	5.1	2.9	1.4	1.0	0.9	4.3	14.6																						
16-Sep	0.4	-0.2	-0.8	-0.8	-0.6	-0.3	0.0	2.5	4.1	5.5	7.5	11.3	13.1	13.0	14.7	14.7	13.0	11.9	7.5	4.2	2.3	1.0	0.3	-0.3	5.2	14.7																						
17-Sep	-1.1	-1.7	-2.2	-2.6	-3.0	-3.3	-3.4	-0.9	2.9	5.5	9.5	12.4	15.0	16.7	17.0	17.7	16.5	13.6	9.4	7.0	5.7	4.1	2.8	1.1	5.8	17.7																						
18-Sep	1.4	2.1	1.2	1.4	0.9	0.9	0.9	6.0	9.7	12.7	14.2	15.9	17.6	18.9	19.1	19.0	18.7	16.5	12.6	7.6	5.2	4.2	3.4	2.8	8.9	19.1																						
19-Sep	2.2	1.6	0.6	0.5	1.0	2.6	4.8	7.3	10.9	15.2	18.0	19.6	20.7	22.0	21.6	18.9	18.0	16.4	14.0	14.0	13.7	12.5	8.7	6.4	11.3	22.0																						
20-Sep	4.6	5.4	5.8	5.2	4.7	5.1	3.3	6.0	9.9	11.7	13.2	14.0	15.0	16.0	16.1	15.2	M	12.7	9.4	5.9	5.4	6.2	7.0	6.8	8.9	16.1																						
21-Sep	6.5	6.3	5.8	5.3	5.0	4.7	4.4	4.1	4.1	4.8	5.9	7.3	8.3	8.6	8.8	8.3	8.9	7.6	6.2	5.5	5.3	4.9	3.3	1.3	5.9	8.9																						
22-Sep	-0.2	-2.3	-2.8	-2.3	-2.0	-3.4	-4.3	-1.4	2.6	5.5	7.2	8.1	9.3	11.1	11.7	11.4	10.8	9.0	3.5	0.9	-0.7	-1.6	-2.1	-2.5	2.7	11.7																						
23-Sep	-2.3	-1.4	-0.4	-0.9	-0.9	-1.0	-0.6	0.4	3.3	6.1	9.5	11.2	12.0	12.8	14.1	14.8	14.1	13.7	11.6	10.3	9.6	7.3	5.5	5.8	6.4	14.8																						
24-Sep	3.5	2.7	1.5	0.5	-0.4	-1.2	-1.5	0.7	4.2	9.2	11.1	13.6	16.2	18.7	19.8	19.7	19.0	15.6	11.5	10.4	9.9	9.4	8.5	7.7	8.8	19.8																						
25-Sep	6.2	5.2	3.8	3.6	3.4	7.0	9.6	9.6	9.6	12.7	14.5	14.7	14.7	16.3	17.3	17.7	16.7	14.3	9.3	6.1	9.1	9.1	8.7	8.2	10.3	17.7																						
26-Sep	5.6	6.0	5.2	4.5	3.2	2.7	2.8	4.1	6.9	10.1	11.9	13.9	14.9	15.7	15.2	14.1	13.3	12.3	11.1	9.7	6.6	7.0	6.8	3.6	8.6	15.7																						
27-Sep	0.7	0.5	3.9	7.1	5.3	2.8	4.8	6.0	5.3	5.3	5.7	5.6	6.2	6.4	5.6	5.7	6.0	5.8	4.5	2.4	1.9	3.9	3.9	2.3	4.5	7.1																						
28-Sep	-0.1	1.6	1.9	0.0	-1.5	-2.1	-2.1	-1.0	1.9	4.4	5.4	6.7	7.9	9.3	10.5	10.9	10.4	5.5	2.5	2.8	4.0	4.2	3.9	3.8	3.8	10.9																						
29-Sep	3.7	3.7	3.7	3.6	3.6	3.6	3.2	4.2	6.5	8.7	10.5	12.3	15.0	18.4	20.1	20.5	19.8	15.4	10.9	8.4	6.9	6.0	5.2	4.0	9.1	20.5																						
30-Sep	3.1	2.7	2.6	2.3	2.0	1.7	2.1	4.1	8.9	13.4	15.0	17.6	21.7	23.6	24.4	24.8	24.1	21.7	16.6	14.7	13.7	11.7	10.3	9.3	12.2	24.8																						
																								3.8	3.4	3.1	2.8	2.5	2.4	2.9	4.8	7.1	9.3	11.1	12.5	13.7	14.8	15.3	15.1	14.7	13.3	10.5	8.4	7.3	6.6	5.6	4.7	Diurnal Average
																								14.0	15.0	15.6	15.6	15.0	14.3	14.2	14.6	14.7	16.3	18.6	19.6	21.7	23.6	24.4	24.8	24.1	21.7	17.4	14.7	13.9	14.4	13.8	12.5	Diurnal Maximum

M - Maintenance



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Fort McKay South - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Fort McKay South - September 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	57	7.93	7.93
0 - 10	403	56.05	63.98
10 - 20	238	33.10	97.08
> 20	21	2.92	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

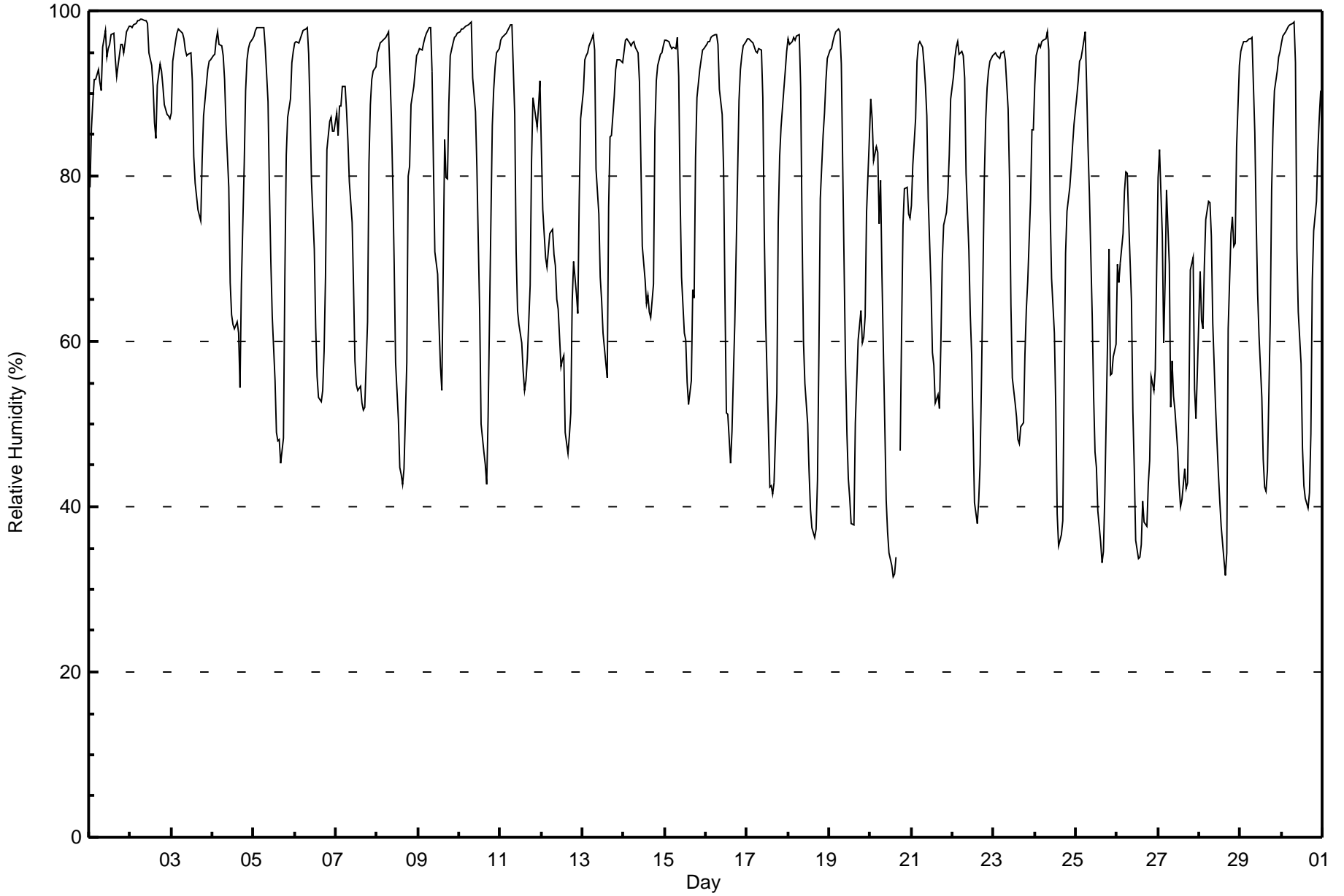
Fort McKay South - September 2015

Maximum Value: 99 % on Sep 2 08:00																		Maximum Daily Average: 93.9 % on Sep 2																		Hours in Service: 720							
Minimum Value: 32 % on Sep 20 14:00																		Minimum Daily Average: 55.5 % on Sep 26																		Hours of Data: 719							
Maximum Diurnal Average: 93.2 % at hour 6																		Minimum Diurnal Average: 50.0 % at hour 15																		Hours of Missing Data: 1							
Monthly Average: 76.7 %																		Percentiles: P <sub>1</sub> = 34 P <sub>10</sub> = 45 Q <sub>1</sub> = 60 Median = 83 Q <sub>3</sub> = 95 P <sub>90</sub> = 97 P <sub>99</sub> = 99																		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-Sep	79	86	89	92	92	93	91	90	96	98	94	95	96	97	97	94	92	93	96	96	95	96	97	98	93.5	98																	
2-Sep	98	98	98	99	99	99	99	99	99	99	98	95	93	91	86	85	91	94	93	91	89	87	87	87	93.9	99																	
3-Sep	88	94	96	97	98	98	97	97	95	95	95	95	92	82	79	76	75	75	82	87	91	93	94	94	90.2	98																	
4-Sep	94	95	97	97	96	96	95	92	86	79	67	63	62	62	62	61	54	67	81	90	94	95	96	97	82.4	97																	
5-Sep	97	98	98	98	98	98	98	96	89	78	70	63	55	49	48	48	45	48	68	83	87	89	94	95	78.7	98																	
6-Sep	96	96	96	97	97	98	98	98	95	88	79	71	62	56	53	53	54	59	68	83	87	87	85	85	80.9	98																	
7-Sep	88	85	88	88	91	91	88	84	79	74	67	58	55	54	55	53	52	52	62	81	89	92	93	93	75.5	93																	
8-Sep	95	96	96	97	97	97	97	98	87	79	69	57	50	45	44	43	45	58	80	81	89	91	93	95	78.2	98																	
9-Sep	95	95	95	96	97	97	98	98	93	81	71	68	62	57	54	84	80	80	89	95	96	97	97	97	86.4	98																	
10-Sep	97	98	98	98	98	98	98	99	92	88	81	72	63	50	47	45	43	51	75	86	91	93	95	95	81.3	99																	
11-Sep	96	97	97	97	98	98	98	98	87	71	64	62	60	56	54	55	58	67	82	90	88	86	88	91	80.8	98																	
12-Sep	83	76	70	69	71	73	74	71	69	65	64	57	58	58	49	46	49	51	65	70	66	63	77	87	65.9	87																	
13-Sep	90	94	95	95	96	97	97	95	81	75	68	65	61	59	56	76	85	85	90	93	94	94	94	94	84.5	97																	
14-Sep	95	96	97	96	96	96	96	96	95	91	82	72	67	65	66	64	63	67	85	92	93	95	95	96	85.6	97																	
15-Sep	96	97	96	96	95	96	96	97	92	77	68	61	60	55	52	55	66	65	82	89	93	94	95	96	82.1	97																	
16-Sep	96	96	96	97	97	97	97	96	91	87	81	65	51	51	45	49	56	62	80	89	93	95	96	96	81.7	97																	
17-Sep	97	97	96	96	96	95	95	95	95	89	74	63	49	42	43	41	43	54	74	82	86	91	93	95	78.4	97																	
18-Sep	97	96	96	97	96	97	97	91	74	60	55	50	44	40	37	36	37	43	58	77	85	88	92	94	72.4	97																	
19-Sep	95	95	96	97	97	98	97	94	81	57	49	43	41	38	38	50	55	60	64	60	60	63	76	85	70.4	98																	
20-Sep	89	87	82	84	83	74	80	68	50	41	37	34	33	32	32	34	M	47	61	74	78	79	75	75	62.1	89																	
21-Sep	76	81	87	94	96	96	96	94	91	87	77	67	59	57	52	53	52	60	70	74	76	78	83	89	76.9	96																	
22-Sep	92	94	96	96	95	95	95	92	80	71	63	58	49	40	38	41	45	55	80	87	91	93	94	95	76.4	96																	
23-Sep	95	95	95	94	95	95	95	94	88	80	64	56	53	51	48	48	50	50	58	64	67	77	86	86	74.3	95																	
24-Sep	91	95	96	96	96	96	97	98	95	76	68	61	52	39	35	37	38	56	71	76	79	81	84	86	74.9	98																	
25-Sep	90	92	94	94	95	98	91	84	78	63	53	47	45	39	36	33	35	42	61	71	56	56	58	60	65.4	98																	
26-Sep	69	67	69	73	78	81	80	75	65	52	45	36	34	34	35	41	38	38	43	46	56	54	57	69	55.5	81																	
27-Sep	80	83	73	60	67	78	69	52	58	53	52	47	43	40	41	45	42	43	53	69	70	54	51	56	57.4	83																	
28-Sep	68	63	61	69	75	77	77	73	62	52	48	44	41	38	34	32	34	61	73	75	72	72	84	93	61.5	93																	
29-Sep	95	96	96	96	96	97	97	97	85	75	66	61	53	46	42	42	44	62	78	86	90	93	94	95	78.5	97																	
30-Sep	96	97	98	98	98	98	99	99	94	71	64	57	47	42	41	40	42	49	67	73	77	83	87	90	75.3	99																	
																		90.5	91.1	91.3	91.7	92.6	93.2	92.7	90.2	84.1	75.1	67.7	61.4	56.4	52.2	50.0	52.0	53.9	59.8	72.9	80.3	82.5	83.6	86.3	88.8	Diurnal Average	
																		98	98	98	99	99	99	99	99	99	99	98	95	96	97	97	94	92	94	96	96	96	97	97	98	Diurnal Maximum	
M - Maintenance																																											



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Fort McKay South - September 2015**





Maximum Speed: 15 km/h on Sep 26 14:00	Maximum Daily Speed Average: 8.1 km/h on Sep 26	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 8 01:00	Minimum Daily Speed Average: 0.1 km/h on Sep 8	Hours of Data: 714
Maximum Diurnal Speed Average: 2.6 km/h at hour 15	Minimum Diurnal Speed Average: 1.2 km/h at hour 11	Hours of Missing Data: 6
Monthly Average Velocity: 2.0 km/h 242.3 deg	Percentiles: P <sub>1</sub> = 0 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> = 14	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-Sep	N1	WSW2	SW1	SW2	W1	SSW2	SSW1	NW1	SSE3	N4	N7	N6	NW7	W5	WSW5	W4	SW4	SW3	SSW2	SW4	SW6	SSW2	S4	WSW2	W1.8	N7
2-Sep	S1	SSW2	WSW2	SW2	SW2	W1	W1	SW1	N3	N2	N6	NNE7	NNE7	NNE8	NNE9	NNE7	NNW2	NNW5	N10	N11	N11	N10	N6	N6	N4.1	N11
3-Sep	NNW6	NNW6	NNW6	WNW5	W5	W7	WNW7	WNW8	WNW8	W9	W8	W8	W9	WNW9	WNW9	WNW8	WNW7	W6	W6	W5	W4	W6	W5	W5	WNNW6.3	WNW9
4-Sep	WSW5	WNW2	WSW4	W5	WNW2	NW1	NNE2	WNW2	NNW3	NW2	NNW7	NW6	NW6	N7	NE6	NNE4	S1	N3	NW1	SW1	SW2	SW2	SW1	SW2	NNW2.0	N7
5-Sep	SW2	WSW1	SSW1	SW1	SSW1	WSW1	SSW2	S3	SSE4	ESE4	SSE6	SE5	SSE6	SE5	ESE4	SE5	SE5	ESE4	SSE1	SW2	SW1	WSW1	SW2	WSW2	SSE2.2	SSE6
6-Sep	WSW1	W1	NNW2	NW1	W1	W1	NW1	NNW1	NNW4	N5	N4	N6	N7	N9	N8	NNE7	NNE5	NNE5	N4	NW2	NW2	NW3	NW3	NNW3	N3.2	N9
7-Sep	NW2	NW4	NW3	NW3	NW3	NNW5	NNW5	N7	N6	N8	N9	N10	N10	NNE9	NNE9	NNE9	NNE8	NNE3	WSW2	SW2	S2	S1	WSW1	N4.3	N10	
8-Sep	NNE0	S1	S2	SSW1	WSW1	WSW1	SW1	S1	ENE0	SE2	ESE3	SE4	ENE3	NE4	NNE3	N2	N3	NW2	WSW1	NW1	WSW2	SW1	W1	SW1	ESE0.1	ESE4
9-Sep	W1	SSW2	SSW1	WSW1	SW3	SSW2	S4	SSW2	S2	SSE4	SE5	SSE5	SE6	SE7	SE8	WNW1	SE4	SSE5	SSE2	WSW1	WSW1	WSW2	SW2	SSW2	SSE2.3	SE8
10-Sep	SSW2	SSW2	SW2	SSW1	SW2	SSW2	S3	S4	SE4	SE5	SE5	SE6	SE6	S8	SSW7	SSW8	SW8	SW6	SW3	SW4	SW3	SSE1	SSE2	S2	S3.4	S8
11-Sep	WSW1	SW1	SSW2	S2	SSW2	WSW2	SW2	SSW2	S4	S8	SSW6	SW6	SW7	SW8	SW9	SW8	SSW7	SSW4	SSW3	SSW4	SSW5	SSW4	W1	SW3	SSW4.0	SW9
12-Sep	SW4	WSW7	WSW5	WSW8	W8	WSW7	WSW7	WSW7	WSW6	SW5	SW3	WSW5	SW4	WSW4	W6	WSW7	WSW9	WSW8	WSW6	WSW6	NW4	N6	NW2	W2	WSW5.1	WSW9
13-Sep	W2	SW2	S1	WSW1	W1	E0	S1	E1	ENE2	SE2	NNW1	N4	NNE4	NE2	W1	W6	N4	NNW1	WNW1	WNW2	NW0	NNW3	NNW2	N5	NNW0.9	W6
14-Sep	N4	N4	NNW5	N6	NNW6	N5	NNW5	N7	N8	N7	N9	NNE10	NNE8	NNE6	NNE5	NNE5	NE2	WSW1	W2	WSW2	WSW1	WSW1	SW2	N4.3	NNE10	
15-Sep	SSW2	SW1	SSW1	AF	AF	AF	AF	AF	NNE3	NNE4	NNE3	SSE2	E4	ESE3	S7	ENE3	NW2	SSE4	SW1	WSW1	WSW2	SW1	WSW2	WSW1	SSE0.6	S7
16-Sep	SW2	SW2	SSW1	SW2	SW2	SW1	WSW1	SSW1	ENE0	ENE1	NE2	E4	ESE3	S2	ESE4	SE6	SSE5	S4	SW2	SW2	SSW2	SSW2	SW2	SW2	SSE1.4	SE6
17-Sep	WSW2	SW1	SW2	SW2	SW2	SW2	SW1	S2	S3	SSE4	ESE4	ESE6	SSW8	SSW8	S7	S9	SSW8	SSW5	SSW4	S4	S3	SSW3	W1	SSW2	S3.4	S9
18-Sep	SSW2	SSW2	SW2	SW2	SW2	SSW2	S3	S4	S4	SW7	SW9	SW11	WSW9	WSW10	WSW9	WSW10	SW10	WSW6	SW5	SSW2	SSW4	S3	SSW2	SW2	SW4.8	SW11
19-Sep	WSW3	SW2	WSW2	SW2	SW2	SSW3	S4	SE1	S3	SSW10	SW12	WSW14	SW14	SW14	SW14	WSW12	SW6	SW9	SSW11	SW12	SW10	WSW7	SW3	WSW2	SW6.8	SW14
20-Sep	SW5	SSW6	SW9	SW7	WSW9	SW7	S7	S7	SW6	SW10	WSW11	SW14	WSW12	WSW12	W11	W10	M	NW4	WNW3	WNW2	WNW3	WNW3	WNW3	WNW4	WSW6.3	SW14
21-Sep	WSW5	WSW4	W4	W4	W4	WNW5	NW6	NNW7	NNW5	NNW5	NNW8	NNW9	NNW10	NW10	NNW11	NNW7	NW7	WNW7	W6	W5	W6	W5	W4	W4	NNW5.4	NNW11
22-Sep	WNW2	SW1	SSW2	WSW3	W1	NW1	SSW1	SSE1	ESE1	SE3	ESE5	ESE6	ESE5	SSE5	SSE5	SSE5	SSE4	SSE2	WSW2	SW2	WSW2	SW2	SW2	SW1	SSE1.7	ESE6
23-Sep	NW1	NW1	NW1	W0	WSW1	WSW1	NW1	NNW2	N2	ENE2	SSE7	SSE7	SSE6	SE5	ESE5	SE5	ESE6	SE6	SE4	SE5	SSE6	SSE3	S3	SSE3	SE2.5	SSE7
24-Sep	SSW2	SW1	W1	NW1	NW1	SW2	WSW1	N2	S3	SSW8	S6	S9	S9	S8	S8	SSE5	SE4	S1	WNW1	WSW1	NW2	SW1	WNW0	W1	SSW2.5	S9
25-Sep	W1	WNW1	SW1	N2	SSW2	S6	SSW6	WSW8	WSW7	WSW6	SW5	WSW8	WSW9	WSW10	WSW12	WSW12	WSW8	WSW4	SW4	SSW5	SSW6	SW6	SW8	SW8	WSW5.6	WSW12
26-Sep	SW7	SW9	SW8	SW7	SSW4	SW5	SW7	SSW8	SSW8	SW7	SW10	WSW10	WSW11	WSW15	WSW13	SW14	WSW12	WSW11	WSW8	WSW6	SSW5	SSW6	SW6	SSW2	SW8.1	WSW15
27-Sep	SSW2	SSE2	SSW6	WSW9	SW5	SSW5	WSW7	WNW12	NW14	NW15	WNW12	WNW13	WNW14	WNW13	WNW11	WNW8	WNW8	NW7	NW2	WSW2	NW3	WNW8	WNW8	NW4	WNW6.7	NW15
28-Sep	W4	W5	WNW5	W6	W4	WSW7	W7	W6	W4	WNW3	WNW4	SSW3	SSW5	SSE6	S5	SE3	SE2	SSW2	SSE2	SSW3	S3	S2	SE0	SW1	WSW2.7	W7
29-Sep	S1	WNW0	SSW1	S1	SSW1	SW1	S4	SSW2	S4	S3	SSE3	SE5	SE6	SE5	S6	S5	S6	S3	SW2	SW3	S3	SSW2	WSW2	SW2	S2.6	S6
30-Sep	SW2	SSW3	SSW2	S3	SSW2	SSW2	SSW3	SSW4	S5	SSE6	SE7	SE8	SSW12	S13	S13	S12	S10	S7	S4	S5	S4	S3	SSW2	SSW2	S5.3	S13

WSW1.7	WSW1.8	WSW1.9	WSW2.3	WSW2.1	WSW2.1	WSW2.2	WSW2.0	WSW1.4	WSW1.2	SW1.6	WSW2.3	SW2.6	SW2.6	SW2.3	SW2.2	SW2.0	WSW1.9	WSW2.4	SW2.2	WSW1.8	WSW1.8	WSW1.7	Diurnal Average				
SW7	SW9	SW9	WSW9	WSW9	SW7	WSW7	WNW12	NW14	NW15	WNW12	SW14	WNW14	WSW15	WSW14	SW14	WSW12	WSW11	SSW11	SW12	N11	N10	WNW8	SW8	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 - September 2015

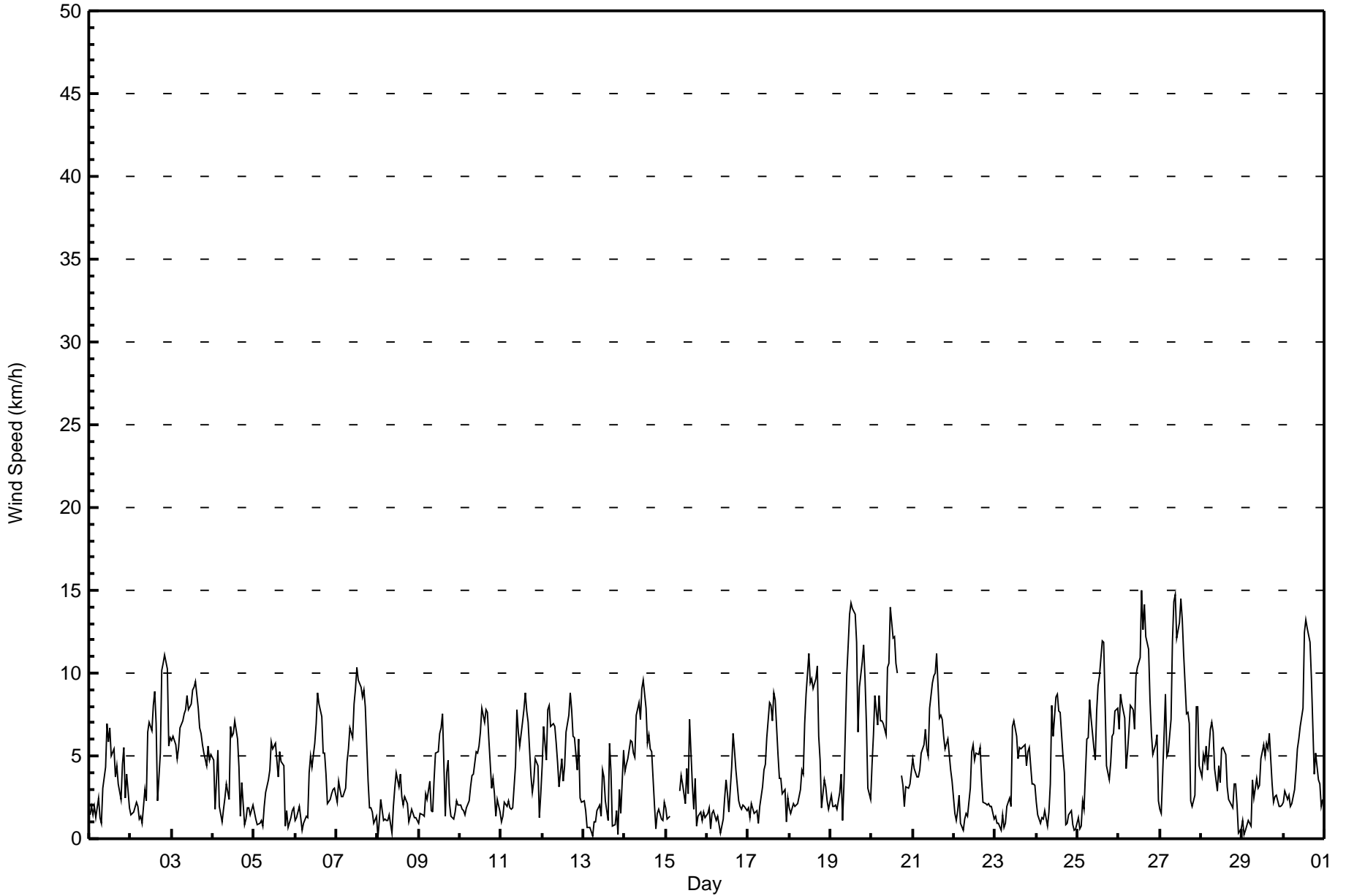
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 7 km/h on Sep 27 10:00	Hours of Data: 714
Minimum Value: 0 km/h on Sep 29 20:00	Hours of Missing Data: 6
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 2 P <sub>90</sub> = 4 P <sub>99</sub> = 6	Hours of Calibration: 0
	Percent Operational Time: 99.2

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

Diurnal Maximum

M - Maintenance AF - Analyzer Failure







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort McKay South - September 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	477	66.81	66.81
6 - 11	210	29.41	96.22
12 - 19	27	3.78	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: 714

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort McKay South - September 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	18	13	4	7	4	13	23	25	50	71	81	54	39	23	33	19	477
6 - 11	26	14	1	0	0	3	10	8	17	17	31	34	18	13	7	11	210
12 - 19	0	0	0	0	0	0	0	0	3	1	6	10	0	5	2	0	27
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	44	27	5	7	4	16	33	33	70	89	118	98	57	41	42	30	714

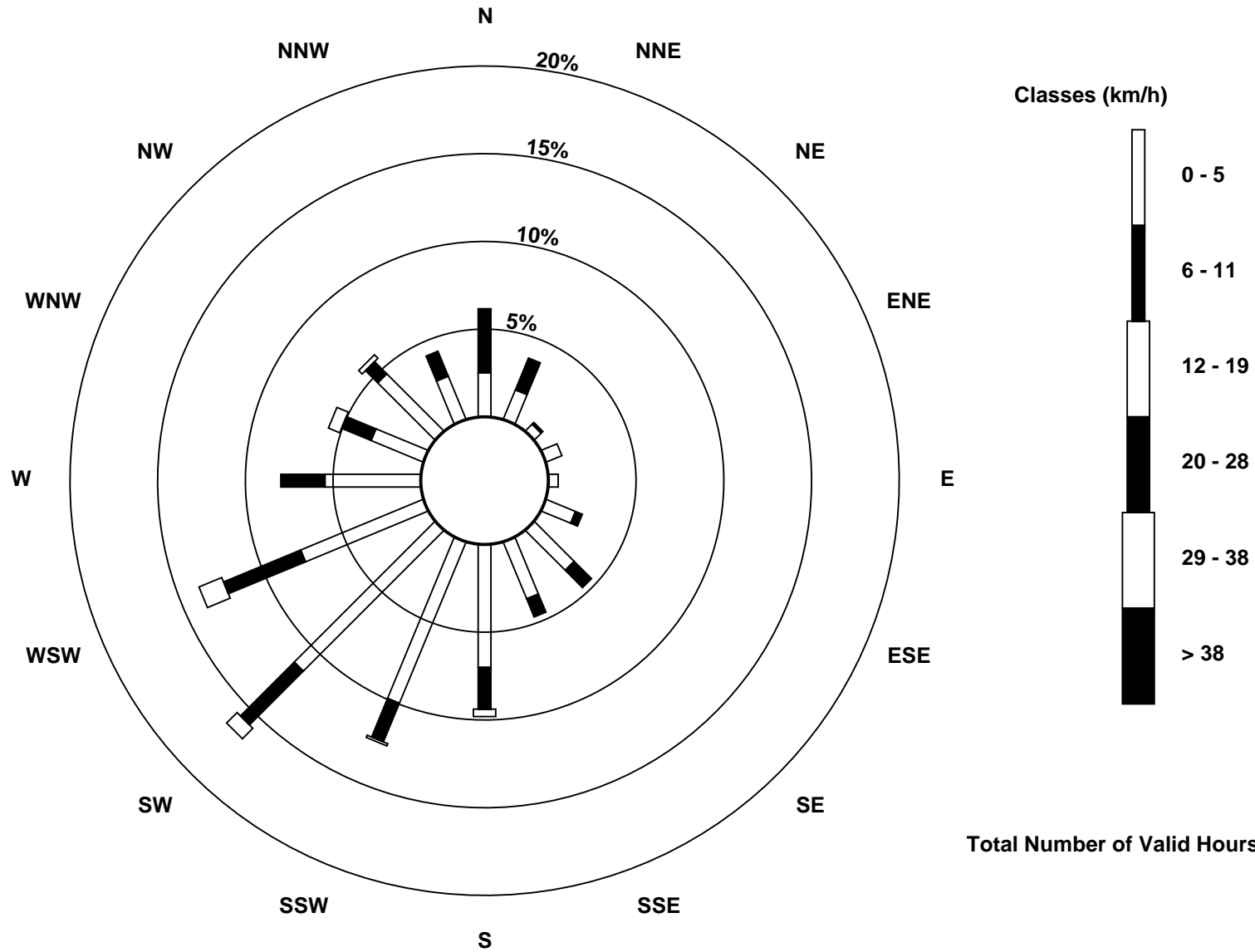
Total Number of Valid Hours: 714

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Wind Speed (WS) - km/h  
Fort McKay South (AMS 13)





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Fort McKay South - September 2015**

Direction of Maximum Speed: 237 deg on Sep 26 14:00															Hours in Service: 720											
Direction of Maximum Daily Speed Average: 231.8 deg on Sep 26															Hours of Data: 714											
Direction of Minimum Speed: 26 deg on Sep 8 01:00															Hours of Missing Data: 6											
Direction of Minimum Daily Speed Average: 0.1 deg on Sep 8															Percent Operational Time: 99.2											
Monthly Average Direction: 247.3 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-Sep	2	244	226	231	264	201	200	318	148	349	9	350	321	280	247	271	232	219	209	221	219	208	190	246	258.9
2-Sep	187	199	245	222	216	278	272	233	7	2	10	25	32	20	22	22	341	342	354	357	354	358	1	353	1.4
3-Sep	343	334	338	301	278	280	283	285	289	280	268	266	277	283	294	299	296	281	279	274	262	261	263	262	285.9
4-Sep	257	294	257	259	291	325	15	299	333	308	333	322	318	11	38	29	183	1	309	234	224	226	228	220	316.4
5-Sep	221	237	212	233	195	239	207	178	153	115	147	143	162	145	123	128	134	111	166	222	215	243	236	247	156.6
6-Sep	248	277	335	320	262	278	325	341	341	351	2	7	355	9	9	17	33	33	8	304	313	314	318	332	355.4
7-Sep	315	324	321	320	325	326	330	340	357	9	8	11	6	11	12	30	17	22	18	241	235	183	184	249	0.1
8-Sep	26	189	183	194	256	250	226	186	68	144	114	124	58	46	26	357	349	323	254	312	243	219	259	236	121.3
9-Sep	276	193	200	239	228	212	190	194	171	159	142	162	131	126	146	299	138	154	162	247	243	240	223	202	167.9
10-Sep	195	201	215	210	217	211	186	178	143	137	129	139	145	183	195	207	216	215	217	228	214	162	161	183	184.7
11-Sep	250	223	203	188	195	244	230	208	184	190	207	229	221	224	228	217	203	197	212	194	209	201	271	214	211.5
12-Sep	231	246	242	254	265	258	255	252	245	223	224	246	232	255	264	256	248	245	248	258	307	350	326	260	255.1
13-Sep	260	225	187	240	271	92	179	91	63	145	339	11	14	53	270	261	360	331	283	283	306	340	327	6	335.5
14-Sep	352	353	343	352	348	350	348	352	355	360	3	13	23	14	18	23	20	38	256	266	246	241	251	229	359.1
15-Sep	212	229	212	AF	AF	AF	AF	AF	25	18	30	148	85	114	178	76	316	167	236	245	237	235	247	238	149.4
16-Sep	223	226	209	215	227	218	242	202	63	58	46	83	110	174	117	135	156	170	215	223	209	209	221	230	168.5
17-Sep	242	221	214	223	231	214	224	189	175	156	113	122	203	196	189	174	195	198	197	189	173	192	261	201	186.9
18-Sep	200	213	230	225	222	192	189	176	187	236	229	223	243	240	238	241	233	238	221	200	192	183	209	232	224.7
19-Sep	244	224	242	221	219	200	177	135	174	202	219	243	219	221	236	240	233	223	208	226	228	242	233	248	224.0
20-Sep	232	213	227	231	247	234	188	183	234	236	238	235	248	254	264	281	M	304	289	299	287	295	292	285	244.9
21-Sep	258	257	275	273	276	283	320	339	343	348	330	334	327	313	341	342	322	285	277	280	278	280	277	277	308.2
22-Sep	293	236	202	242	268	320	200	167	115	135	121	102	103	164	165	162	148	148	239	227	246	232	235	234	165.9
23-Sep	319	312	323	269	242	256	318	332	354	76	156	157	159	127	108	138	117	130	135	143	156	165	175	161	143.4
24-Sep	194	226	261	324	314	217	242	356	186	200	190	186	182	188	182	149	128	180	282	258	323	231	284	259	191.7
25-Sep	265	300	221	357	196	189	195	244	249	254	219	241	241	243	242	240	239	239	215	207	210	215	222	233	232.1
26-Sep	233	232	232	231	208	218	214	212	213	233	226	237	246	237	238	236	249	253	244	237	213	205	216	209	231.8
27-Sep	199	159	200	243	216	199	254	283	317	320	297	295	293	298	302	302	294	311	304	256	306	303	298	308	289.8
28-Sep	277	267	290	259	259	257	259	261	278	293	301	212	194	163	190	139	140	208	166	194	180	178	136	221	236.4
29-Sep	188	290	206	187	213	224	187	202	185	172	162	141	133	143	173	178	186	189	221	225	187	211	239	234	180.2
30-Sep	224	209	198	184	196	199	213	195	174	158	139	143	192	189	187	188	190	189	180	185	178	183	210	192	183.8

252.5 247.5 244.8 251.8 249.7 241.4 237.9 252.1 264.4 242.6 242.1 235.1 238.4 236.1 235.4 235.3 228.2 235.8 241.5 237.8 235.4 247.0 249.2 253.0

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

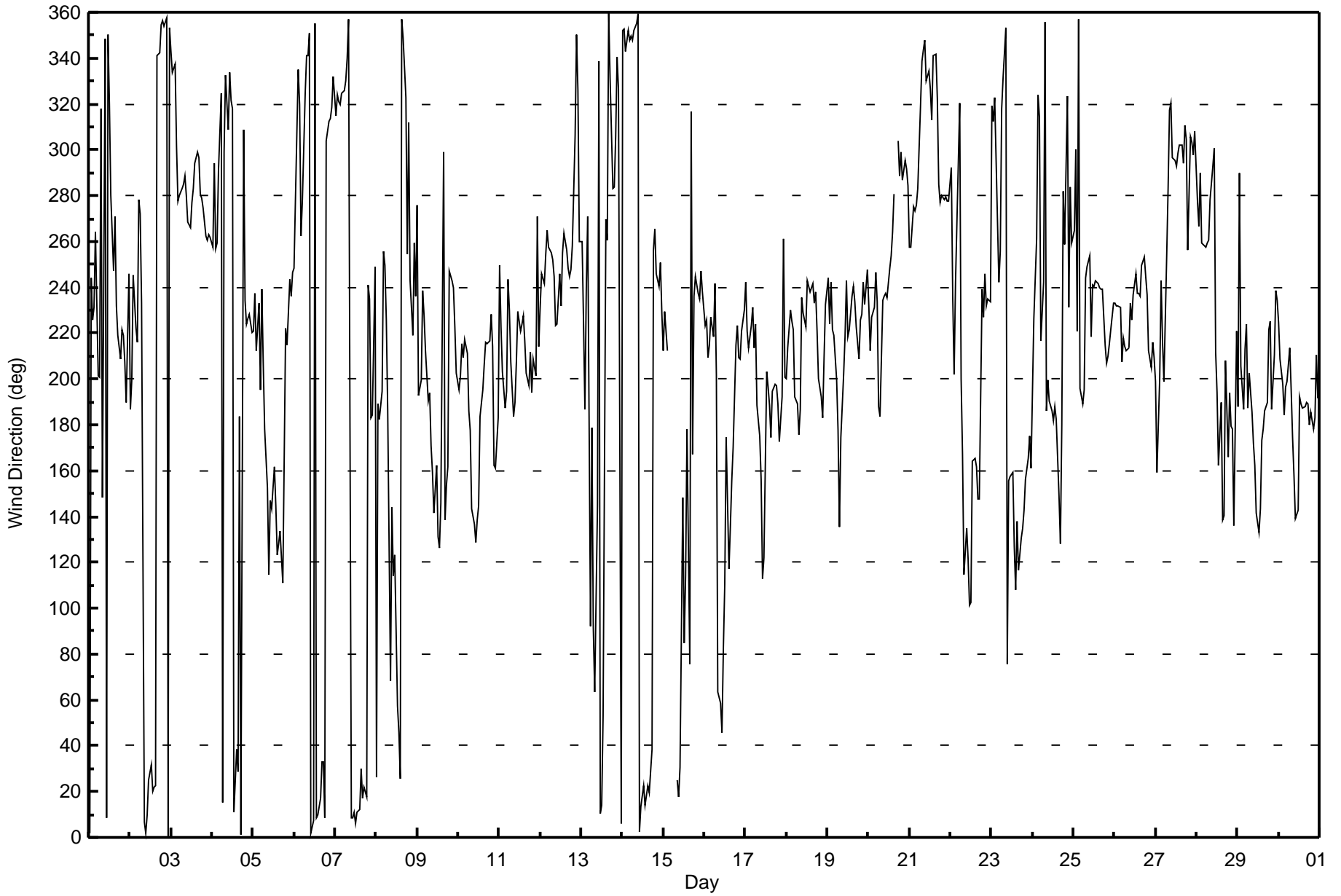
Fort McKay South - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 101 deg on Sep 22 05:00	Hours of Data: 714
Minimum Value: 8 deg on Sep 30 19:00	Hours of Missing Data: 6
Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 20 Q <sub>1</sub> = 25 Median = 32 Q <sub>3</sub> = 46 P <sub>90</sub> = 66 P <sub>99</sub> = 89	Hours of Calibration: 0
	Percent Operational Time: 99.2

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	48	55	70	17	66	31	56	98	51	37	30	28	35	40	26	50	34	24	58	28	20	65	26	73	98
2-Sep	62	75	51	57	54	75	60	55	34	79	24	31	36	28	30	26	47	22	28	26	26	24	24	25	79
3-Sep	26	27	28	32	30	32	33	33	41	34	32	30	40	39	39	39	36	39	34	30	23	22	22	23	41
4-Sep	21	65	46	23	75	66	87	49	50	69	44	44	43	36	32	48	79	30	34	47	26	46	31	27	87
5-Sep	39	60	77	82	69	73	36	34	41	45	41	43	43	50	49	40	46	34	78	18	79	52	10	36	82
6-Sep	44	54	23	44	72	47	50	59	23	29	31	28	33	30	26	27	35	33	26	16	29	21	29	24	72
7-Sep	56	23	23	29	34	39	25	26	27	29	32	30	28	31	32	35	31	33	57	17	10	36	78	54	78
8-Sep	98	46	17	73	56	53	40	39	87	70	55	52	77	67	88	84	66	32	46	68	51	32	35	57	98
9-Sep	52	29	26	39	28	26	14	17	53	30	37	36	40	39	35	89	41	29	39	40	53	47	25	25	89
10-Sep	39	37	28	28	16	19	11	23	34	31	32	36	36	31	32	27	30	22	18	11	30	33	24	34	39
11-Sep	55	58	23	20	27	16	26	30	26	23	33	35	32	34	27	26	23	21	15	11	15	13	64	30	64
12-Sep	23	19	39	27	28	26	25	24	22	24	37	30	28	32	33	30	27	25	17	23	40	24	42	34	42
13-Sep	28	56	78	86	67	85	59	59	55	65	96	53	69	84	94	28	49	82	65	36	73	47	46	24	96
14-Sep	31	22	26	24	26	25	27	27	28	26	30	32	40	32	40	34	70	64	34	41	38	54	28	70	
15-Sep	34	42	31	AF	AF	AF	AF	AF	29	39	54	79	55	60	39	73	67	40	64	19	49	60	28	42	79
16-Sep	17	21	79	32	14	48	38	54	86	72	46	58	74	89	68	42	29	30	22	26	44	26	23	33	89
17-Sep	19	50	23	21	17	23	66	41	23	35	41	45	40	34	33	25	26	17	12	18	19	40	51	21	66
18-Sep	28	35	10	19	29	25	23	20	32	39	29	31	38	35	31	30	30	23	16	25	15	18	26	23	39
19-Sep	9	26	25	19	27	23	18	70	67	24	35	29	30	29	29	32	32	27	24	27	25	25	45	61	70
20-Sep	16	21	20	21	20	28	15	24	57	35	34	30	39	38	43	38	M	30	19	54	26	20	30	26	57
21-Sep	19	19	27	24	31	28	34	29	31	31	38	39	40	41	36	33	36	33	29	31	31	29	29	34	41
22-Sep	63	68	45	61	101	71	45	35	70	57	41	47	51	54	69	45	34	58	22	34	17	10	8	34	101
23-Sep	31	41	30	44	10	45	22	30	20	65	37	36	34	44	50	38	39	37	35	29	27	21	20	20	65
24-Sep	22	59	64	47	46	52	84	62	24	28	43	31	26	32	31	41	32	74	47	50	38	72	57	57	84
25-Sep	63	61	84	31	56	17	20	25	26	38	39	32	31	35	29	30	26	24	18	14	17	17	19	18	84
26-Sep	15	18	18	20	28	24	20	20	26	40	30	34	39	32	28	31	29	32	26	28	21	26	23	79	79
27-Sep	42	67	22	29	30	21	40	40	38	37	41	39	41	41	44	49	43	41	30	29	38	37	41	37	67
28-Sep	26	31	42	21	24	21	21	26	48	80	69	84	60	56	46	78	61	24	28	18	16	20	91	67	91
29-Sep	31	54	75	46	52	68	13	27	32	37	41	37	33	47	39	43	22	25	19	15	12	22	36	23	75
30-Sep	21	17	24	17	34	32	25	15	21	28	28	32	29	26	25	24	20	16	8	11	8	11	25	21	34

98	75	84	86	101	85	87	98	87	80	96	84	77	89	94	89	79	82	78	68	79	72	91	79	
Diurnal Maximum																								

M - Maintenance      AF - Analyzer Failure





# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	September 2, 2015	Last Calibration	August 6, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:48	End Time (MST)	12:00
Gas Cert Reference	S980455A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG Make/Model	API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		HVPS voltage	547	547
Analyzer IP address	192.168.1.44		Lamp voltage	1814	1799
Calculated slope	0.999724	1.001658	Chamber temp	50.0	43.0
Calculated intercept	0.944753	0.642086	Pressure	26.1	26.0
Analyzer Background	42.1	42.1	Flow	689	686
Analyzer Coefficient	1.022	1.022	Lamp Ratio	61	61

Analyzer make API T100 Analyzer serial # 599

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	----
as found span	5000	70.3	703.0	701.0	1.003
calibrator zero	5000	0.0	0.0	-0.4	----
high point	5000	70.3	703.0	701.0	1.003
second point	5000	35.1	351.0	350.6	1.001
third point	5000	17.6	176.0	174.2	1.010
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	70.3	703.0	694.1	1.013
Average Correction Factor					1.005

Corrected As found 701.4 Previous response 702.2 % change 0.1%

**Notes:**

No adjustments or maintenance done, filter changed out

Calibration Performed By: Melissa Lemay





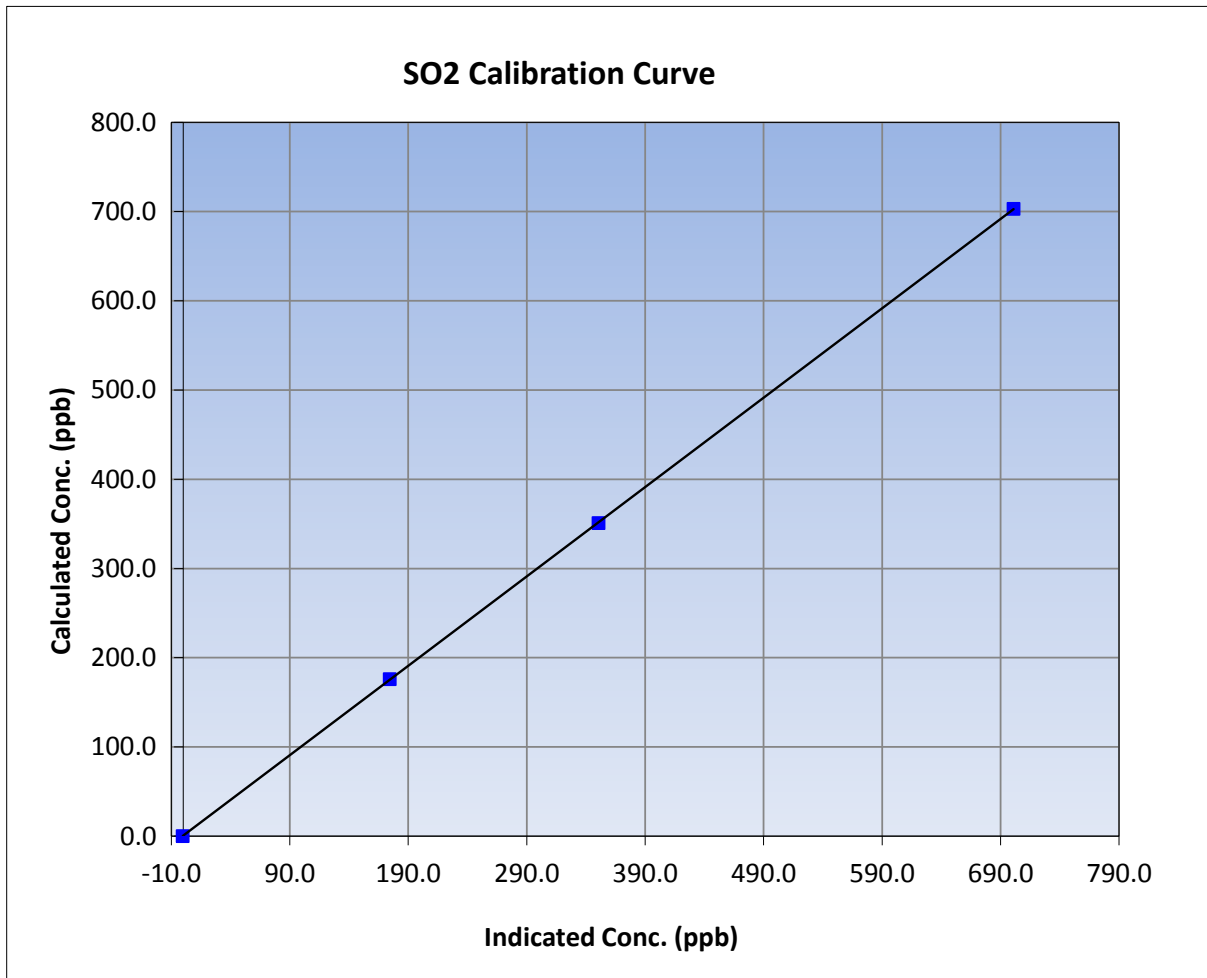
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 2, 2015	Previous Calibration	August 6, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:48	End Time (MST)	12:00
Analyzer make	API T100	Analyzer serial #	599

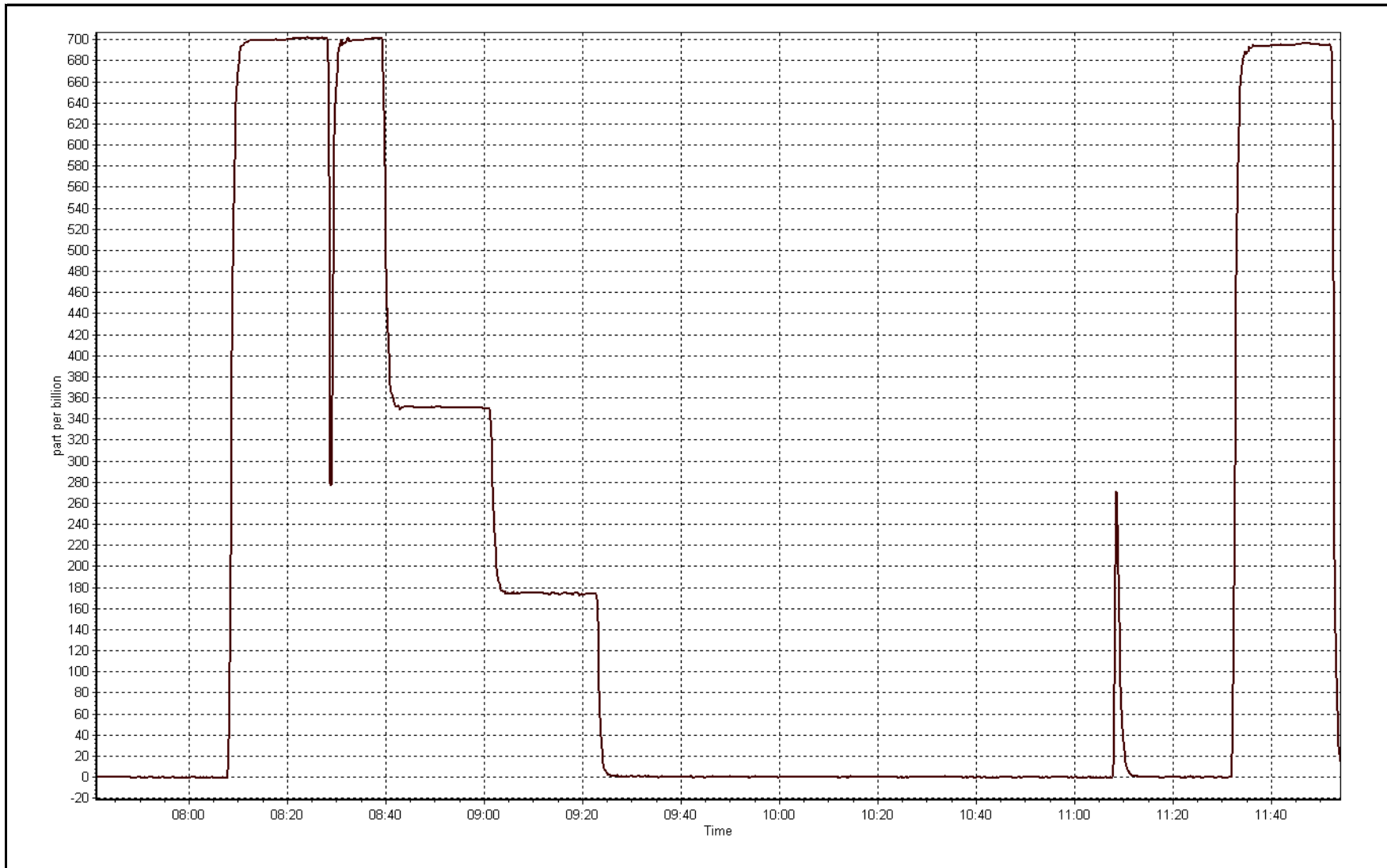
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999994
703.0	701.0	1.0029		
351.0	350.6	1.0011	Slope	1.001658
176.0	174.2	1.0103		
			Intercept	0.642086



SO2 Calibration Plot

Date: September 2, 2015





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	September 3, 2015	Last Calibration	August 7, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	12:20
Gas Cert Reference	CC178364	Station temp.	22 Deg C
Cal Gas Concentration	5.07 ppm	Cal Gas Exp Date	30/05/2013
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
Dil air Make/Model	API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
SO2 gas concentration	51.1 ppm	SO2 gas cert/exp	S980455A 26/Sep/17

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-727	-859
Analyzer IP address	192.168.1.44		Lamp voltage	994	1169
Calculated slope	1.006490	0.996086	Chamber temp	45	45
Calculated intercept	0.299342	0.418811	Pressure	685.9	678.1
Analyzer Background	2.24	2.13	Flow	0.447	0.419
Analyzer Coefficient	1.080	1.038	Intensity	90	80
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153359	
Converter make/model	CDN-101		Converter serial #	456	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	----
as found span	5000	78.9	80.0	82.9	0.965
SO2 scrubber check	5000	17.6	179.9	0.2	----
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	78.9	80.0	79.9	1.001
second point	5000	39.4	40.0	39.8	1.004
third point	5000	19.7	20.0	19.4	1.030
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	78.9	80.0	79.6	1.005
Average Correction Factor					1.012

Corrected As found	83.2	Previous response	79.2	% change	-4.8%
--------------------	------	-------------------	------	----------	-------

Notes:

Span adjusted, filter changed out, third point 3% out while high and second point less than 1%

Calibration Performed By:

Melissa Lemay



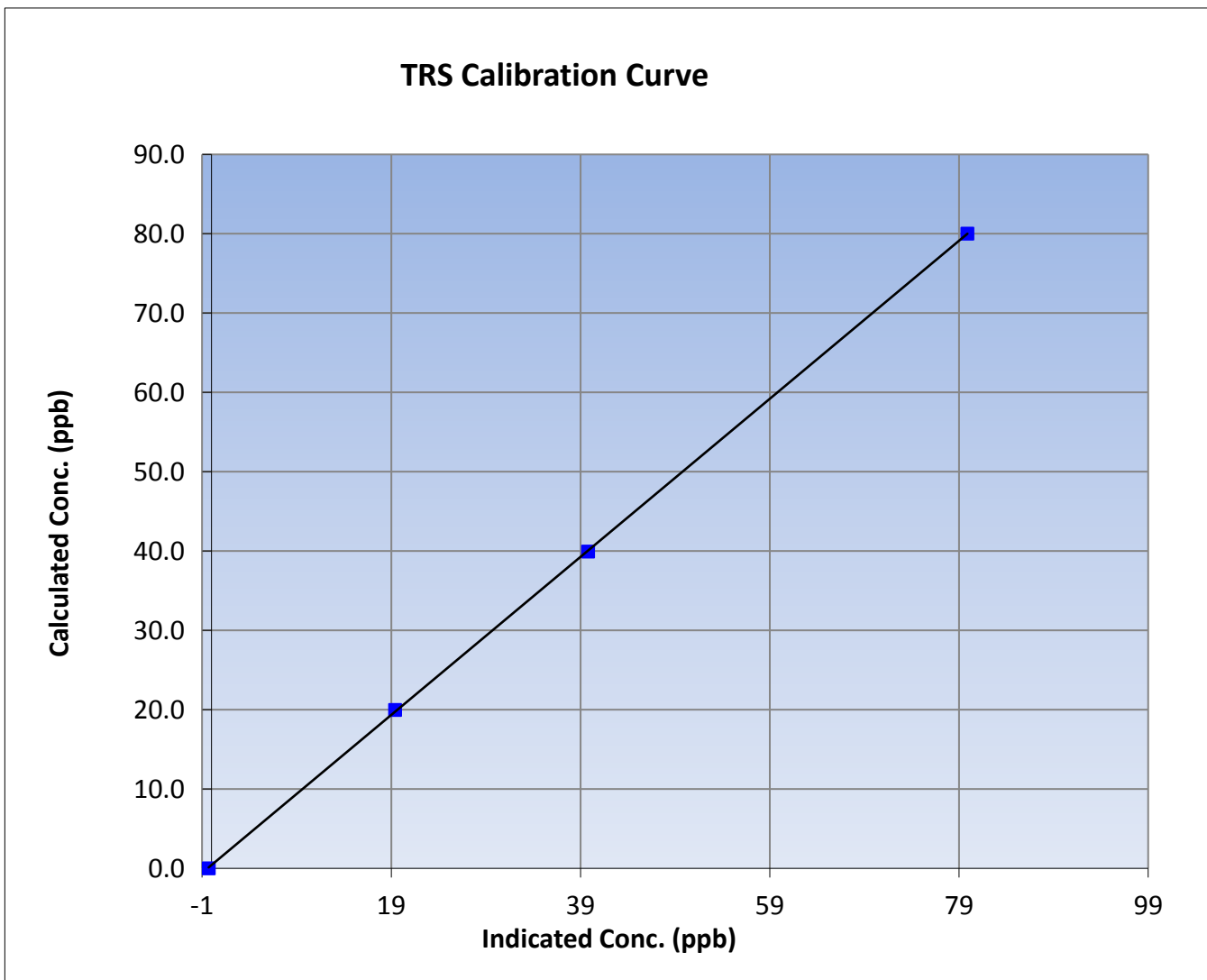
# Wood Buffalo Environmental Association TRS Calibration Report

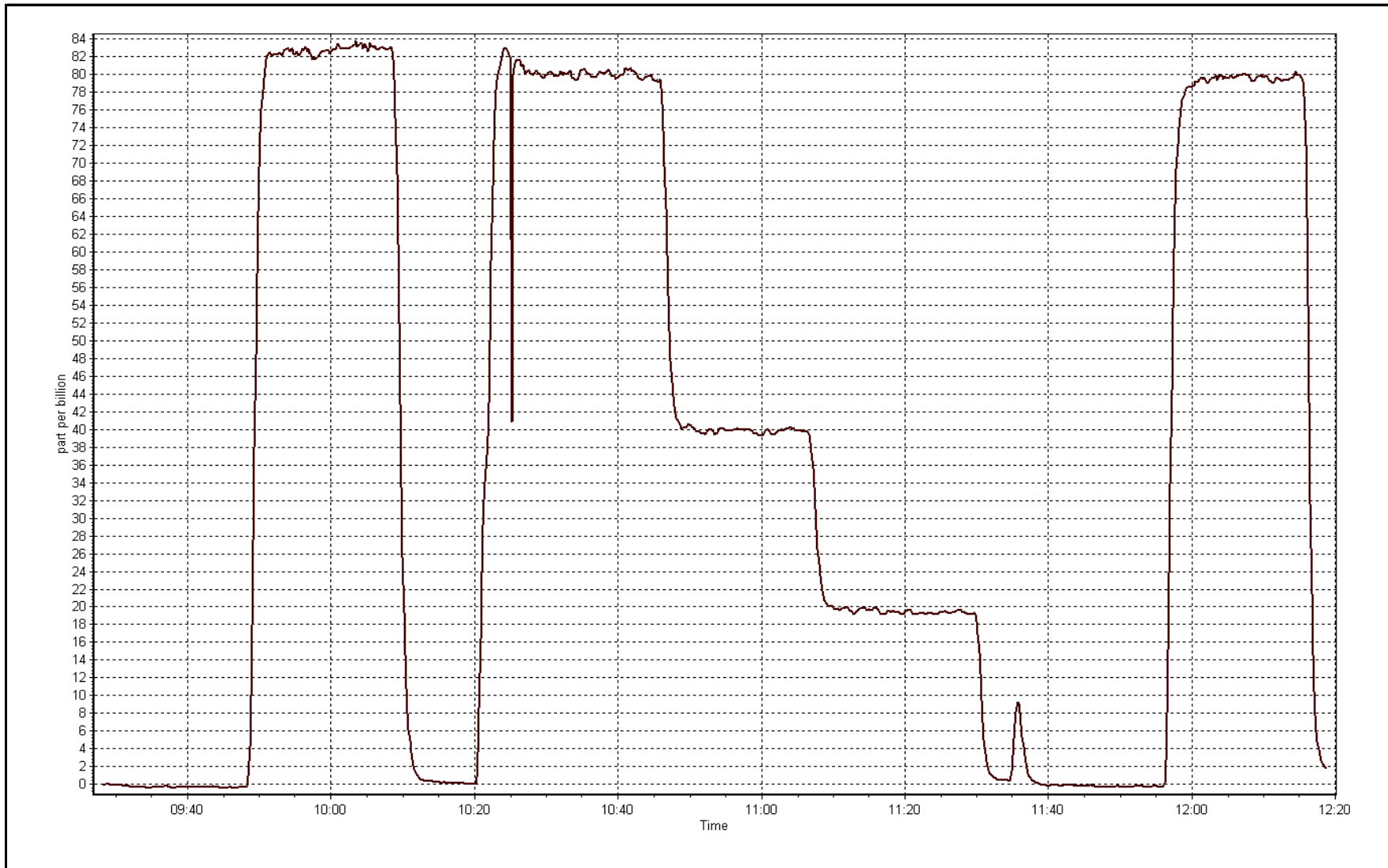
## Station Information

Calibration Date	September 3, 2015	Previous Calibration	August 7, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:30	End Time (MST)	12:20
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153359

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999977
80.0	79.9	1.0013		
40.0	39.8	1.0038	Slope	0.996086
20.0	19.4	1.0297		
			Intercept	0.418811







# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	September 2, 2015	Last Calibration	August 5, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:48	End Time (MST)	12:00
Gas Cert Reference	S980455A	Cal Gas Expiry Date	26/09/2017
CH4 Cal Gas Conc.	497 ppm	CH4 Equiv Conc.	1033.3 ppm
C3H8 Cal Gas Conc.	195 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG make/model	Teledyne API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	Serial Number	1850

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.2	9.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.2	34.2
Calculated slope	0.988046	0.990354	Fuel Pressure	23.1	23.1
Calculated intercept	0.023359	0.033341	Analyzer Coeff	2.998	2.998
			Analyzer BKG	1.500	1.500

Analyzer make	51i-LT	Analyzer serial #	1505164380
---------------	--------	-------------------	------------

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.03	----
as found span	5000	70.3	14.53	14.64	0.992
calibrator zero	5000	0.0	0.00	-0.03	----
high point	5000	70.3	14.53	14.64	0.992
second point	5000	35.1	7.25	7.28	0.996
third point	5000	17.5	3.62	3.62	0.999
as left zero	5000	0.0	0.00	-0.04	----
as left span	5000	70.3	14.53	14.72	0.987
Average Correction Factor					0.996

Corrected As found	14.67	Previous response	14.68	% change	0.1%
--------------------	-------	-------------------	-------	----------	------

Notes:

No maintenance or adjustments done, filter changed out

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association THC Calibration Report

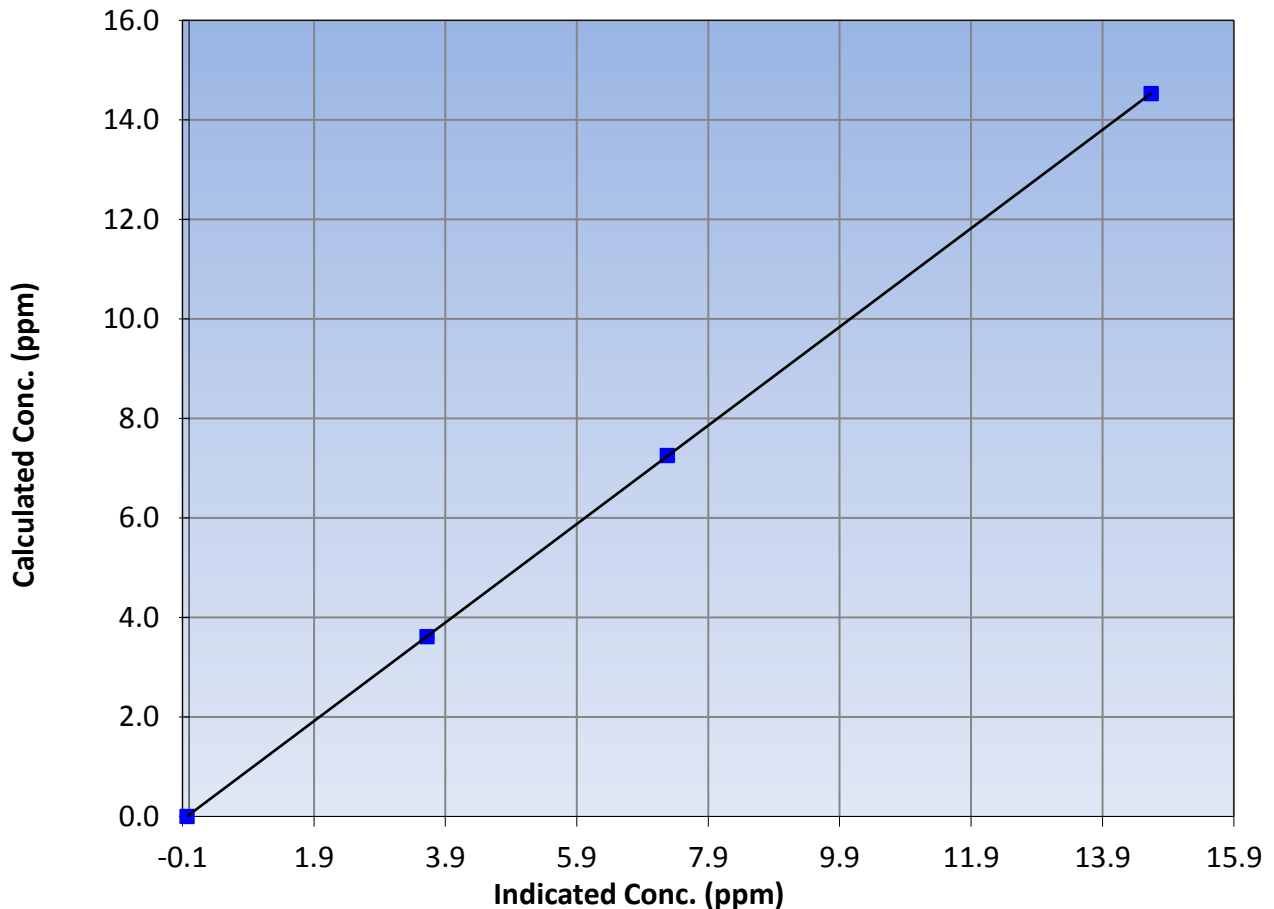
## Station Information

Calibration Date	September 2, 2015	Previous Calibration	August 5, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:48	End Time (MST)	12:00
Analyzer make	51i-LT	Analyzer serial #	1505164380

## Calibration Data

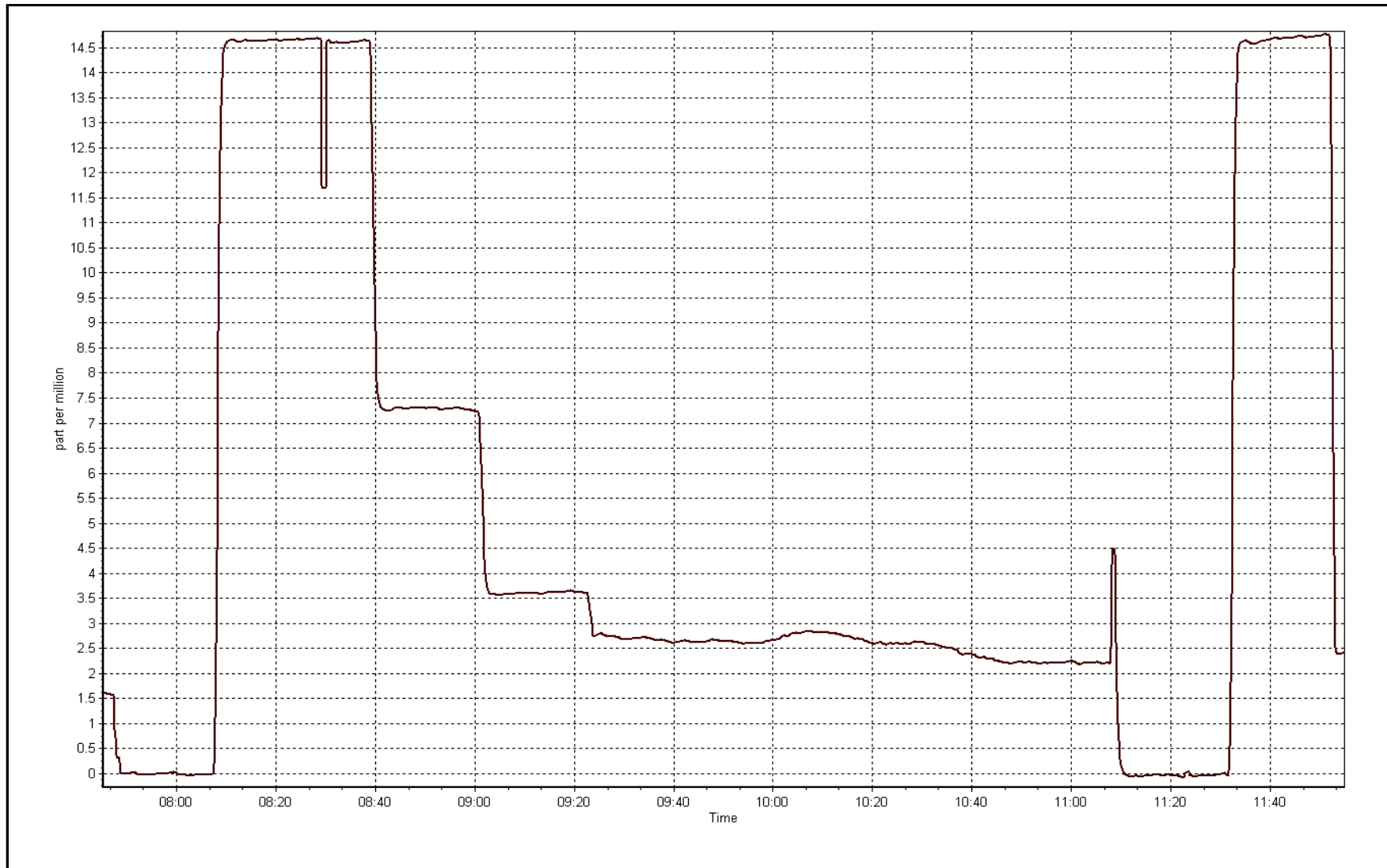
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	----	Correlation Coefficient	0.999999
14.53	14.64	0.9923		
7.25	7.28	0.9963		
3.62	3.62	0.9990		
			Slope	0.990354
			Intercept	0.033341

**THC Calibration Curve**



THC Calibration Plot

Date: September 2, 2015







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	September 3, 2015	Previous Calibration	August 6, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:00	End Time (MST)	9:35
NO2 GPT Ref date	September-02-15	Transfer Standard	Sabio 4010
		Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG make/model	Teledyne API 701	Serial Number	3410
DACS make/model	Campbell Scientific CR3000	Serial Number	1850

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Box temp.	23.5	25.1
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	1.000445	0.992351	Pressure	26.4	26.3
Calculated intercept	0.324578	-0.561569	Flow	753.0	745.0
Analyzer Background	0.2	0.2	Intensity	2878.0	2740.0
Analyzer Coefficient	0.916	0.916			

Analyzer make	API T400	Analyzer serial #	825
---------------	----------	-------------------	-----

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.1	----
as found span	5000	0.89	317.2	319.6	0.992
calibrator zero	5000	0.00	0.0	0.1	----
high point	5000	0.89	317.2	319.6	0.992
second point	5000	0.47	187.8	190.8	0.984
third point	5000	0.36	99.1	100.5	0.986
as left zero	5000	0.00	0.0	0.4	----
as left span	5000	0.89	317.2	326.8	0.971
Average Correction Factor					0.988

Corrected As found	319.5	Previous response	316.7	% change	-0.9%
--------------------	-------	-------------------	-------	----------	-------

Notes:

Calibration Performed By:

Melissa Lemay



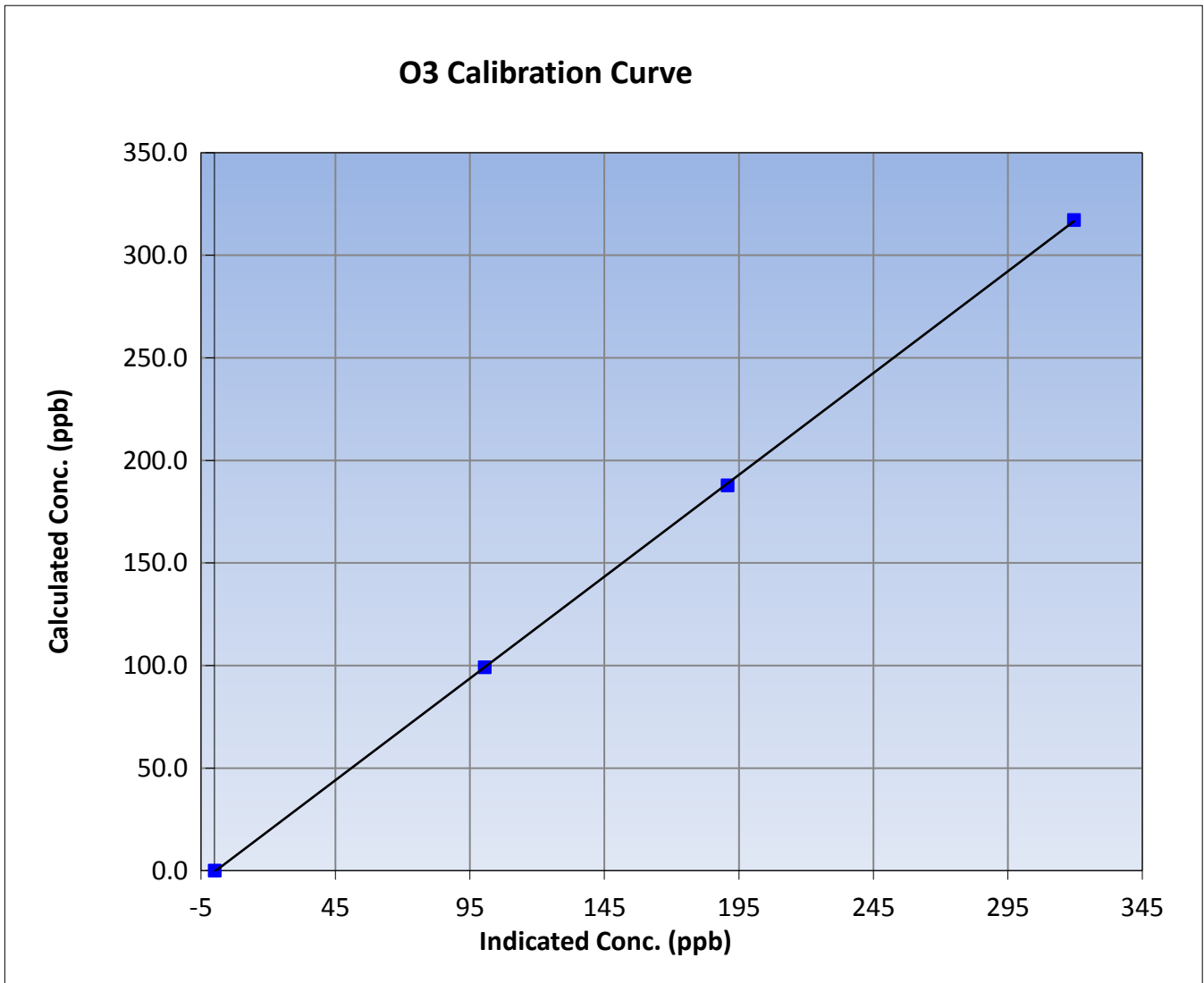
# Wood Buffalo Environmental Association O3 Calibration Report

## Station Information

Calibration Date	September-03-15	Previous Calibration	August 6, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:00	End Time (MST)	9:35
Analyzer make	API T400	Analyzer serial #	825

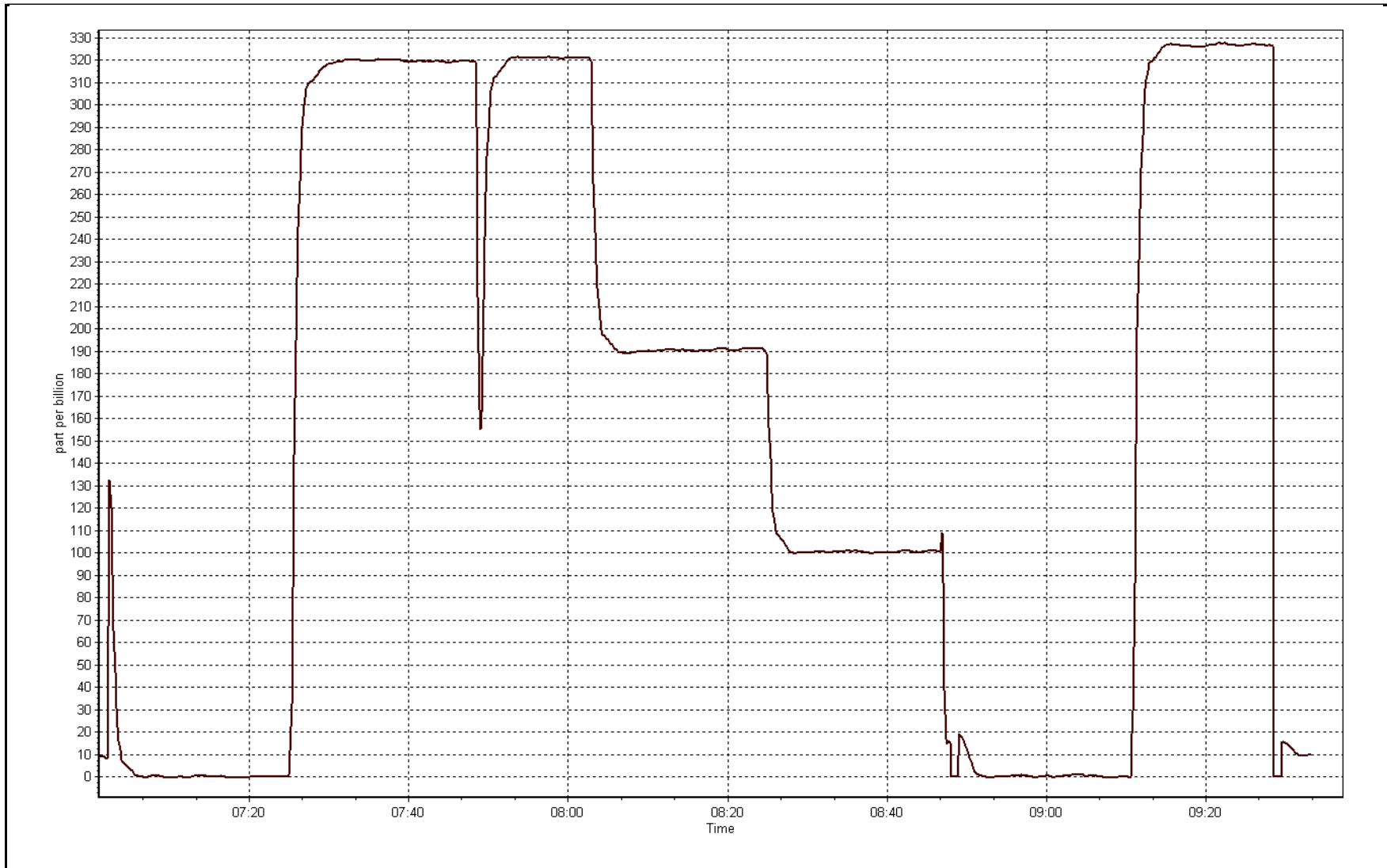
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999972
317.2	319.6	0.9925		
187.8	190.8	0.9843	Slope	0.992351
99.1	100.5	0.9861		
			Intercept	-0.561569



O3 Calibration Plot

Date: September 3, 2015





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

### Station Information

Calibration Date	September 2, 2015	Previous Calibration	August 5, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:48	End Time (MST)	11:57
NO Cal Gas Conc	56.9 ppm	Gas Cert Reference	S980455A
NOX Cal Gas Conc	56.9 ppm	Cal Gas Expiry Date	26/9/17
Calibrator	Sabio 4010	Serial Number	11041107
Zero air Generator	Teledyne API T701	Serial Number	5613

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	1850
-------------------	----------------------------	-----------------	------

### Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.006949	1.008807	0.995993
	Data Offset	0.450607	0.252158	-0.126180
Current Calibration	Data Slope	1.008016	1.009393	0.994835
	Data Offset	0.688075	0.519647	-0.194905

### Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661329
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.726		0.726	
NOX coefficient	0.998		0.998	
NO2 coefficient	0.999		0.999	
NO bkgrnd	6.4		6.4	
NOX bkgrnd	6.5		6.5	
Chamber Temp	50.2	Deg C	50.1	Deg C
Moly Temp	325.8	Deg C	325.5	Deg C
PMT voltage	-846.2	V	-846.2	V
PMT Temp	-3	Deg C	-2.9	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	180.9	mmHg	179.4	mmHg
R Cell Press Nox	180.6	mmHg	179.7	mmHg
NO sample flow	0.889	lpm	0.886	lpm
Nox sample Flow	0.888	lpm	0.888	lpm

**Notes:**

No adjustments or maintenance done, filter changed out



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

September 2, 2015

Station Number:

AMS 13

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.3	-0.1	----	----
as found span	5000	70.2	798.9	798.9	0.0	792.0	791.0	0.9	1.0087	1.0100
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.3	-0.1	----	----
high point	5000	70.2	798.9	798.9	0.0	792.0	791.0	0.9	1.0087	1.0100
second point	5000	35.1	399.4	399.4	0.0	395.4	395.2	0.2	1.0102	1.0107
third point	5000	17.5	199.2	199.2	0.0	196.6	196.5	0.1	1.0130	1.0135
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
as left span	5000	70.2	798.9	472.2	326.7	799.4	476.2	323.2	0.9993	0.9916
Average Correction Factor									1.0106	1.0114

Corrected As found

NO<sub>x</sub>= 792.4

NO= 791.3

Percent Change

NO<sub>x</sub>= 0.1%

NO= 0.0%

Previous Response

NO<sub>x</sub>= 792.9

NO= 791.6

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

70.20

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO2 (300)	----	472.2	317.2	790.9	472.2	318.7	0.9961	1.0000	0.9953	100.5%
2nd NO2 (200)	----	601.6	187.8	791.0	601.6	189.5	0.9960	1.0000	0.9910	100.9%
3rd NO2 (100)	----	690.3	99.1	790.3	690.3	99.9	0.9969	1.0000	0.9920	100.8%
4th NO2 (0)	789.4	----	0.6	790.0	789.4	0.6	0.9972	1.0000	N/A	----
Average Correction Factor							0.9965	1.0000	0.9928	100.7%

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

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

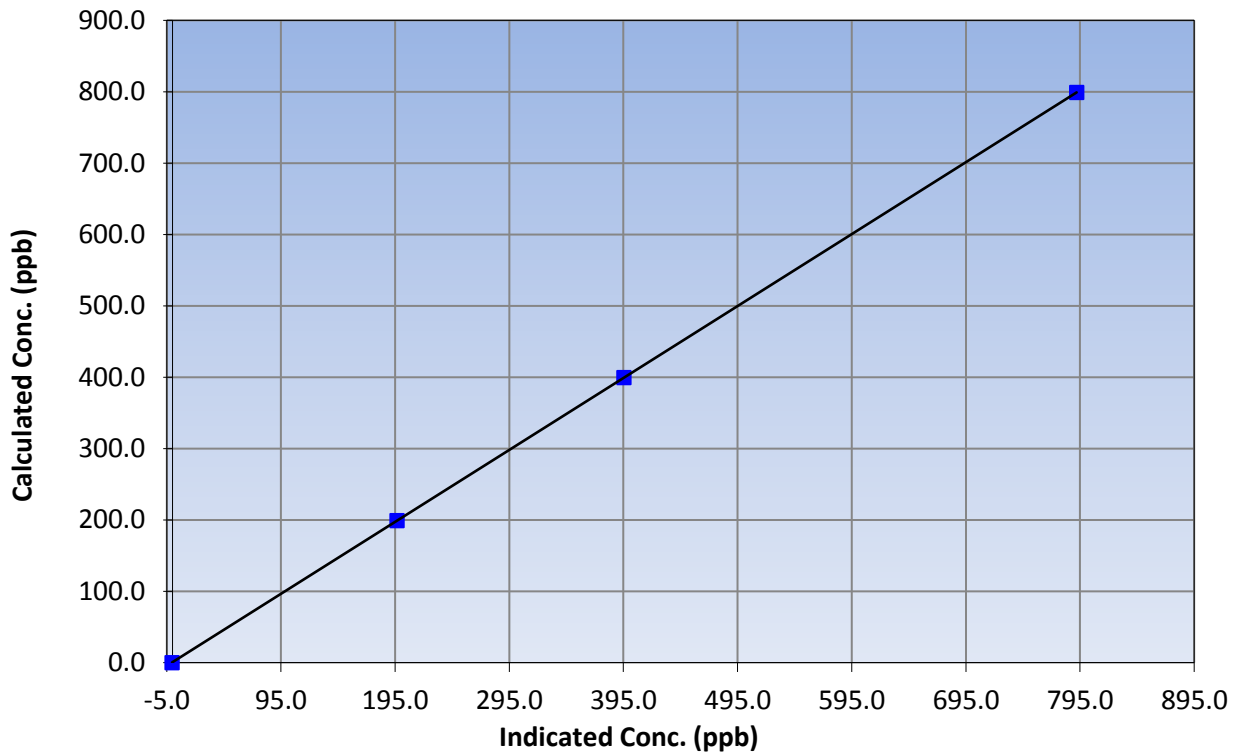
### Station Information

Calibration Date	September 2, 2015	Previous Calibration	August 5, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:48	End Time (MST)	11:57
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999999
798.9	792.0	1.0087		
399.4	395.4	1.0102	Slope	1.008016
199.2	196.6	1.0130		
			Intercept	0.688075

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

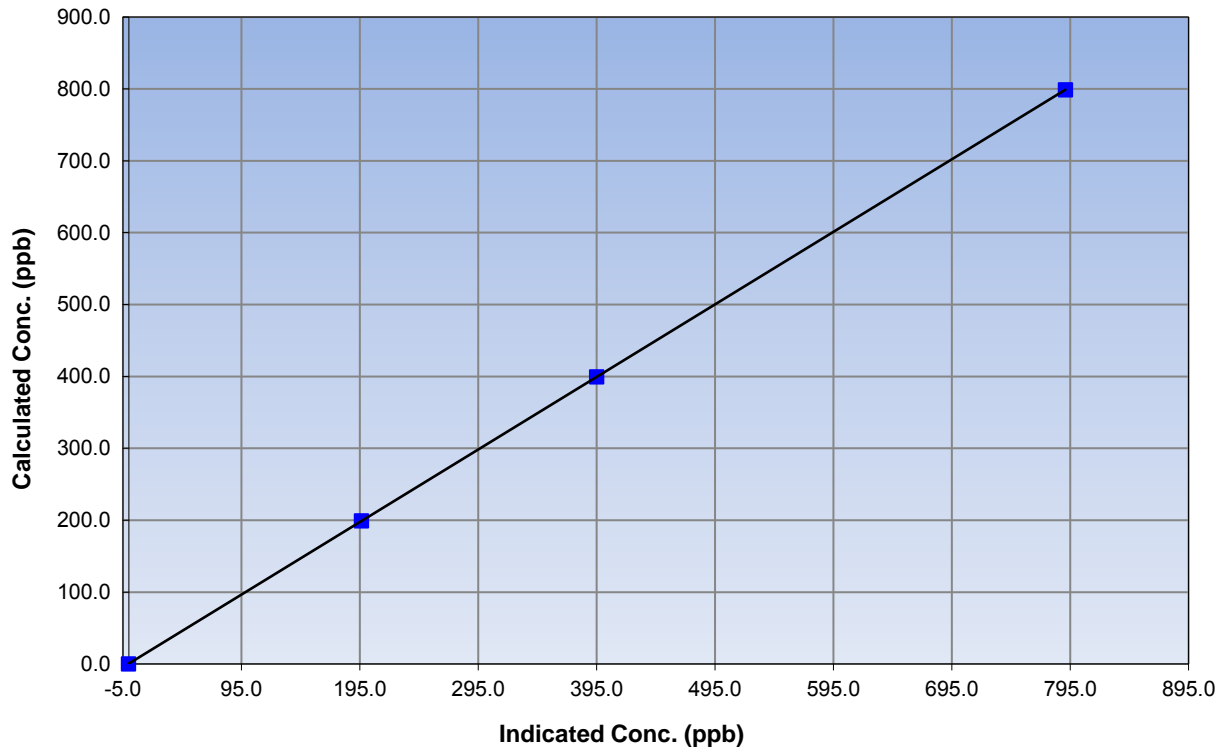
### Station Information

Calibration Date	September 2, 2015	Previous Calibration	August 5, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:48	End Time (MST)	11:57
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	1.000000
798.9	791.0	1.0100		
399.4	395.2	1.0107	Slope	1.009393
199.2	196.5	1.0135		
			Intercept	0.519647

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

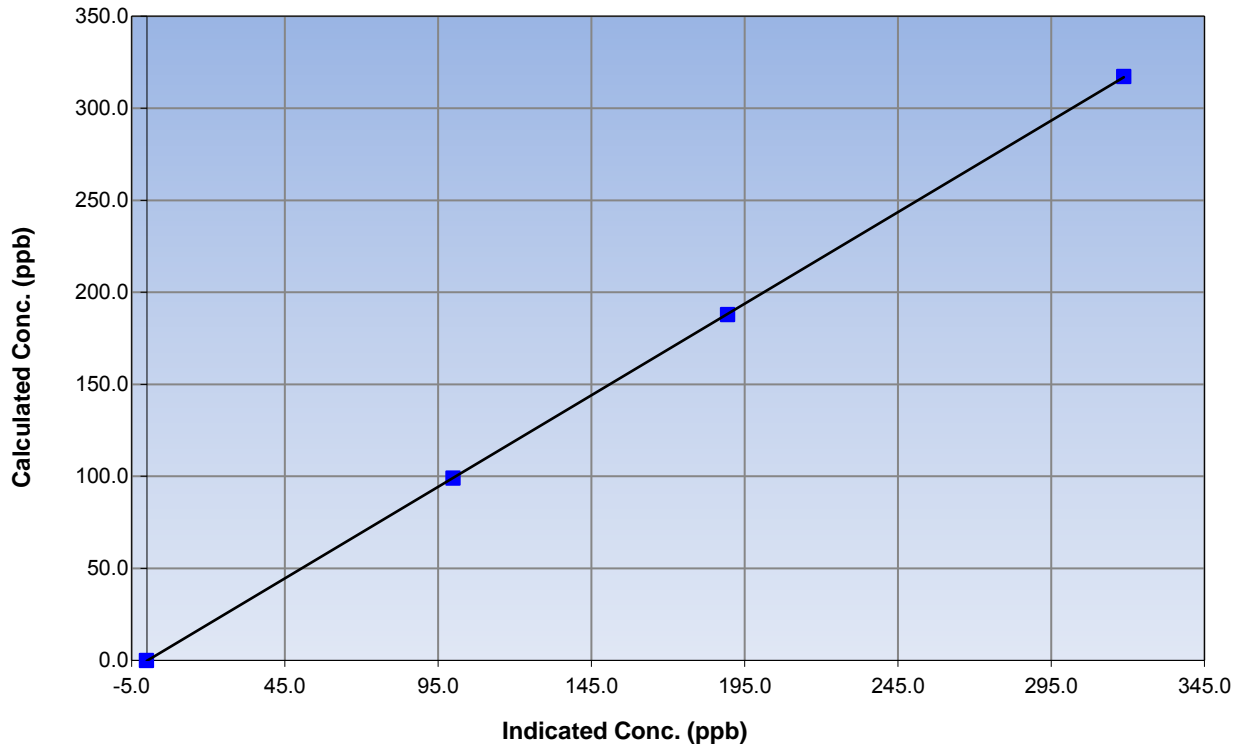
### Station Information

Calibration Date	September 2, 2015	Previous Calibration	August 5, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:48	End Time (MST)	11:57
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

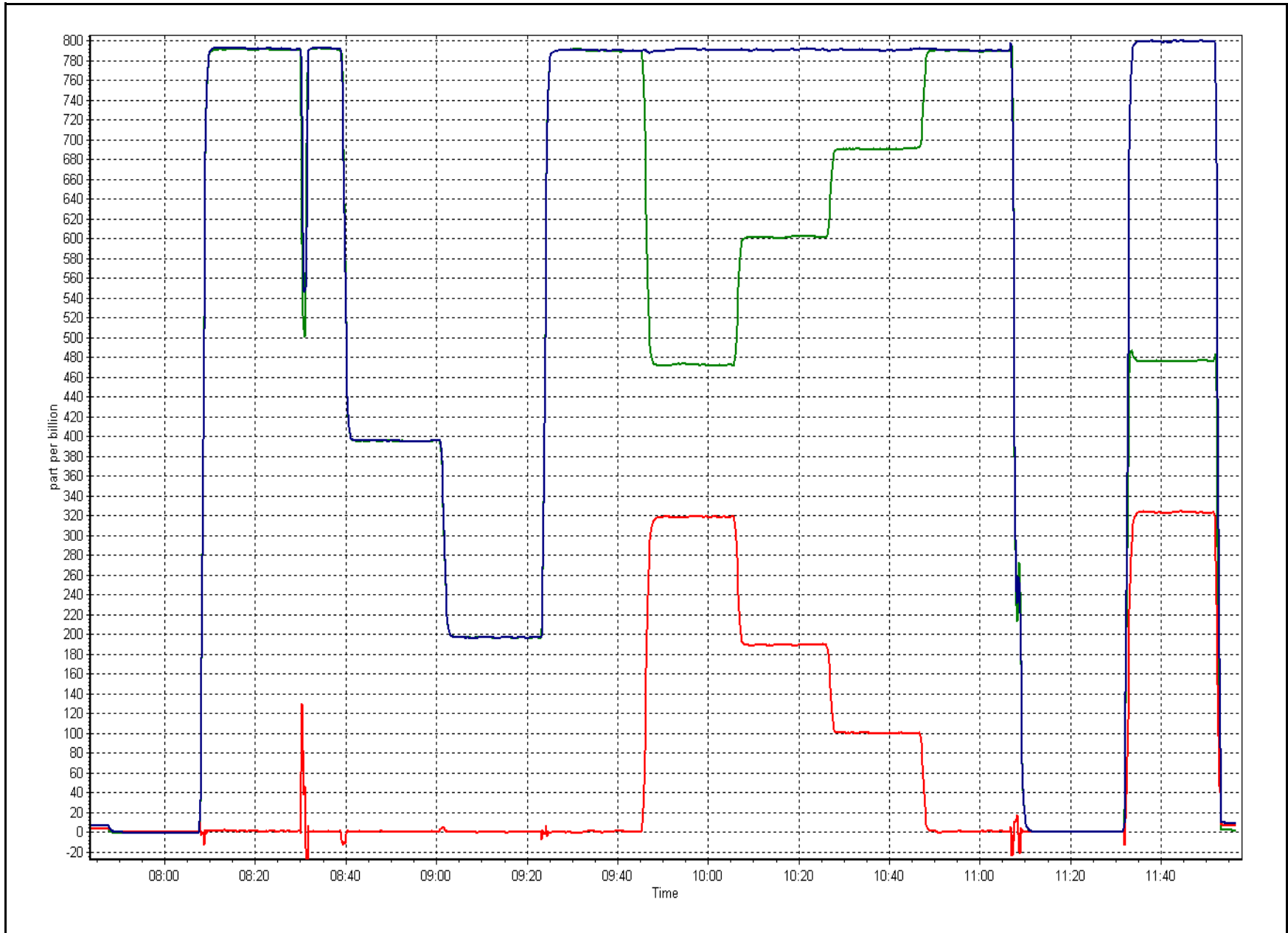
### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999991
317.2	318.7	0.9953		
187.8	189.5	0.9910	Slope	0.994835
99.1	99.9	0.9920		
			Intercept	-0.194905

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









# Wood Buffalo Environmental Association

## SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	September 3, 2015	Previous Calibration:	August 7, 2015
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	7:11	End Time (MST):	7:31
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION			
Particulate Fraction:		PM2.5	
Make/Model:		Thermo / SHARP 5030	
Serial Number		E-803	
C <sub>14</sub> Source SN:		4066	
Confirmation of Time settings:		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Parameters Checked:	<input checked="" type="checkbox"/> T1	<input type="checkbox"/> T2 <input type="checkbox"/> T3 <input type="checkbox"/> T4	<input type="checkbox"/> P3 <input checked="" type="checkbox"/> Main Flow <input type="checkbox"/> Beta <input type="checkbox"/> Neph <input checked="" type="checkbox"/>

### CALIBRATION DATA

Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	8.0	8.1	0.1	8.0
T2	24.0	na	na	24.0
T3	24.0	na	na	24.0
T4	27.0	na	na	27.0
RH (%)	36.0	na	na	36.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	974	975.0	1.0	974

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1010	10	1010	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	391		386
Neph	3.8		-0.5
C14	17.7		20.2
Indicated Concentration (ug/m3)	2.5	Yes	-0.4
Offset 1	386.6		388.9
Offset 2	51.1		50.6

### Leak Check (Quarterly)

Leak Check Date:	July 14, 2015	Previous Leak Check Date:	
	Measured	Difference LPM (Limit +/- 0.42 LPM)	
Flow without adaptor (LPM):	16.80		
*Flow with adaptor (LPM):	16.70	0.10	

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

Mass Foil Calibration (Annually)			
Foil Calibration Date:	July 14, 2015	Previous Foil Calibration:	
Zeroed?:	Yes		
Foil Mass:	1337		Mass foil set S/N:
Previous Correction Factor:	6970		
New Correction Factor:	7080		

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

### NOTES:

Nephelometer zeroed Sample head cleaned

Calibration Performed By:	Melissa Lemay
---------------------------	---------------



# Wood Buffalo Environmental Association

## SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	September 28, 2015	Previous Calibration:	September 3, 2015
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:05	End Time (MST):	9:52
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION			
Particulate Fraction:		PM2.5	
Make/Model:		Thermo / SHARP 5030	
Serial Number		E-803	
C <sub>14</sub> Source SN:		4066	
Confirmation of Time settings:		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Parameters Checked:	<input checked="" type="checkbox"/> T1	<input type="checkbox"/> T2	<input type="checkbox"/> T3
	<input type="checkbox"/> T4	<input checked="" type="checkbox"/> P3	<input checked="" type="checkbox"/> Main Flow
		<input type="checkbox"/> Beta	<input type="checkbox"/> Neph

### CALIBRATION DATA

Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	5.0	4.7	-0.3	5.0
T2	25.0	na	na	25.0
T3	24.0	na	na	24.0
T4	24.0	na	na	24.0
RH (%)	22.0	na	na	22.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	983	984.5	1.5	983

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1002	2	1002	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	383		383
Neph	0.5		0.5
C14	7.4		7.4
Indicated Concentration (ug/m3)	0.8	No	0.8
Offset 1			
Offset 2			

### Leak Check (Quarterly)

Leak Check Date:	September 28, 2015	Previous Leak Check Date:	July 14, 2015
	<b>Measured</b>		<b>Difference LPM (Limit +/- 0.42 LPM)</b>
Flow without adaptor (LPM):	16.74		0.10
*Flow with adaptor (LPM):	16.64		

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

Mass Foil Calibration (Annually)			
Foil Calibration Date:	July 14, 2015	Previous Foil Calibration:	
Zeroed?:	Yes		
Foil Mass:	1337		<b>Mass foil set S/N:</b>
Previous Correction Factor:	6970		
New Correction Factor:	7080		

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

### NOTES:

Tape was done, added new roll, no adjustments made

Calibration Performed By: Melissa Lemay



This page intentionally left blank



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 14  
ANZAC  
SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
 SEPTEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	678	35	42	99.03	14	0	2	0
TRS(ppb) Average	677	34	43	98.75	2	0	0	0
THC(ppm) Average	669	35	51	97.78	2.3	-	1.9	-
NMHC(ppm) Average	669	35	51	97.78	0.188	-	0.027	-
CH4(ppm) Average	669	35	51	97.78	2.3	-	1.9	-
NO2(ppb) Average	678	34	42	98.89	8	0	2	-
NO(ppb) Average	678	34	42	98.89	10	-	1	-
NOX(ppb) Average	678	34	42	98.89	12	-	3	-
O3(ppb) Average	652	36	68	95.56	43	0	33	-
PM2.5(ug/m3) Average	719	1	1	100.00	37.6	-	7.9	0
AT 2m(C) Average	720	0	0	100.00	23.1	-	15.1	-
RH(%) Average	720	0	0	100.00	98	-	94	-
Leaf Wetness (% of range) Average	720	0	0	100.00	67	-	25	-
WS(km/h) Average	717	0	3	99.58	20	-	15	-
WD(deg) Average	717	0	3	99.58	-	-	-	-
PC(mm) Total	720	0	0	100.00	4.1	-	9.9	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
 SEPTEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	678	0.3	1	-	0	0	0	0	0	1	14
TRS(ppb) Average	677	0.2	0	-	0	0	0	0	0	0	2
THC(ppm) Average	669	1.89	0.1	-	1.8	1.8	1.9	1.9	1.9	1.9	2.3
NMHC (ppm) Average	669	0.002	0.011	-	0	0	0	0	0	0	0.188
CH4(ppm) Average	669	1.88	0.1	-	1.8	1.8	1.9	1.9	1.9	1.9	2.3
NO2(ppb) Average	678	0.8	1	-	0	0	0	1	1	2	8
NO(ppb) Average	678	0.3	1	-	0	0	0	0	0	0	10
NOX(ppb) Average	678	1.1	1	-	0	0	0	1	1	2	12
O3(ppb) Average	652	21.8	9	-	5	9	15	22	29	33	43
PM2.5(ug/m3) Average	719	3.64	3.4	-	0	1	1.7	2.7	4.5	7	37.6
Temperature 2 m (C) Average	720	8.68	5	-	-1.6	2.8	5.1	8.1	11.9	15.8	23.1
Relative Humidity (%) Average	720	74.6	19	-	30	46	58	78	93	96	98
Leaf Wetness (% of range) Average	720	8.7	16	-	0	0	0	0	11	32	67
Wind Speed 20 m (km/h) Average	717	7.1	4	-	0	3	4	6	9	13	20
Wind Direction 20 m (deg) Average	717	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	720	-	-	19.81	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
SEPTEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	12 Sep 2015 13:00	12 Sep 2015 14:00	2	Maintenance - reinitiated daily QA check
SO2	11 Sep 2015 08:00	11 Sep 2015 09:00	2	Maintenance - reinitiated daily QA check
SO2	11 Sep 2015 11:00	11 Sep 2015 13:00	3	Maintenance - Internal WBEA Audit
TRS	10 Sep 2015 11:00	10 Sep 2015 15:00	5	Maintenance - Internal WBEA Audit
TRS	11 Sep 2015 09:00	11 Sep 2015 10:00	2	Maintenance - reinitiated daily QA check
CH4, NMHC, THC	11 Sep 2015 08:00	11 Sep 2015 11:00	4	Maintenance - Internal WBEA Audit
CH4, NMHC, THC	30 Sep 2015 11:00	30 Sep 2015 12:00	2	Maintenance - replaced fuel cylinder
CH4, NMHC, THC	30 Sep 2015 17:00	01 Oct 2015 00:00	8	Analyzer Failure - fuel cylinder not opened completely
NO2, NO, NOX	11 Sep 2015 08:00	11 Sep 2015 09:00	2	Maintenance - reinitiated daily QA check
NO2, NO, NOX	12 Sep 2015 04:00	12 Sep 2015 04:00	1	Unstable operation - automated zero/span malfunction
NO2, NO, NOX	14 Sep 2015 09:00	14 Sep 2015 11:00	3	Maintenance - Internal WBEA Audit
O3	11 Sep 2015 10:00	11 Sep 2015 10:00	1	Maintenance - reinitiated daily QA check
O3	14 Sep 2015 12:00	14 Sep 2015 13:00	2	Maintenance - Internal WBEA Audit
O3	23 Sep 2015 07:00	24 Sep 2015 09:00	27	Analyzer failure - sample pump replacement
Wind Speed, Wind Direction	05 Sep 2015 21:00	05 Sep 2015 21:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	16 Sep 2015 03:00	16 Sep 2015 03:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	16 Sep 2015 05:00	16 Sep 2015 05:00	1	Flat line in sensor output signal



Summary of Hour Averages

Anzac - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 14 ppb on Sep 13 13:00	Maximum Daily Average: 1.9 ppb on Sep 13		Hours of Data:	678
Minimum Value: 0 ppb on Sep 1 06:00	Minimum Daily Average: 0.0 ppb on Sep 11		Hours of Missing Data:	42
Maximum Diurnal Average: 0.8 ppb at hour 13	Minimum Diurnal Average: 0.1 ppb at hour 23		Hours of Calibration:	35
Monthly Average: 0.3 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 3		Percent Operational Time:	99.0

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

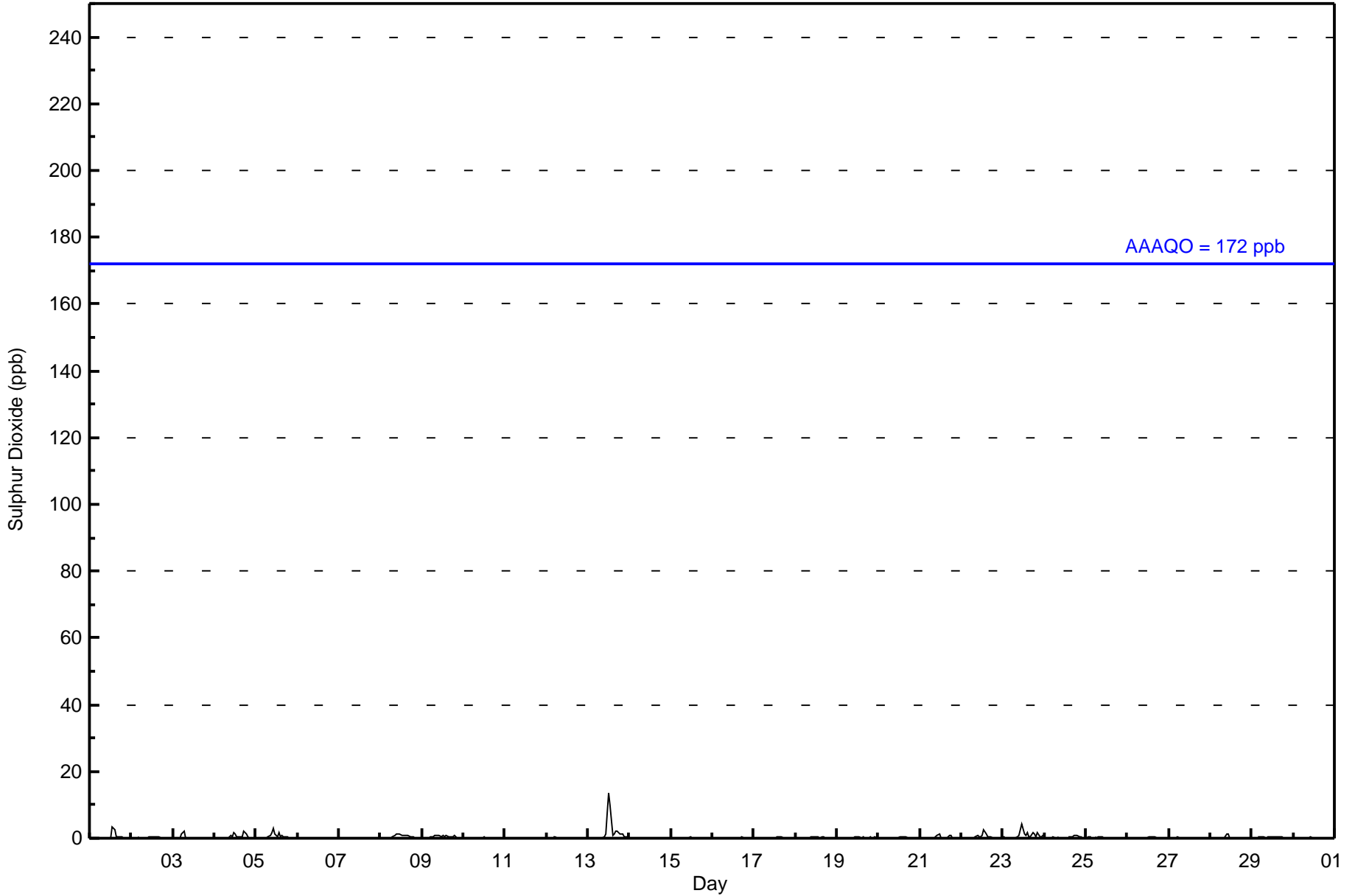
0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.4	0.5	0.8	0.8	0.8	0.4	0.3	0.3	0.4	0.3	0.2	0.2	0.1	0.1	0.1	Diurnal Average		
0	0	0	0	0	1	2	1	1	2	3	8	14	10	2	1	2	2	2	1	1	2	0	0	1	Diurnal Maximum	

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



Wood Buffalo Environmental Association  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Anzac - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Anzac - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	677	99.85	99.85
11 - 20	1	0.15	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: 678

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Anzac - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	31	20	13	9	12	22	54	60	38	47	47	48	77	83	73	40	674
11 - 20	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	31	21	13	9	12	22	54	60	38	47	47	48	77	83	73	40	675

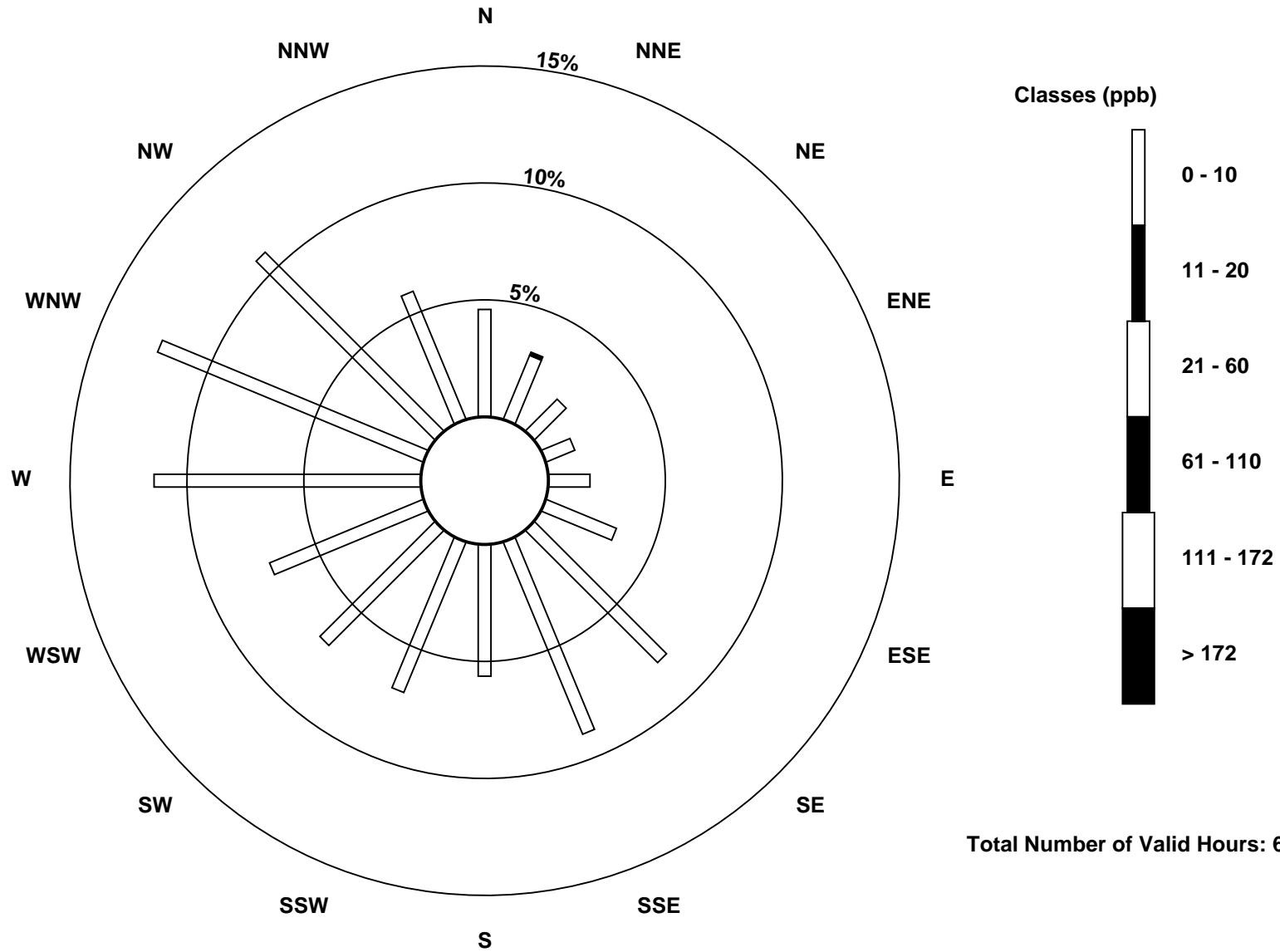
Total Number of Valid Hours: 675

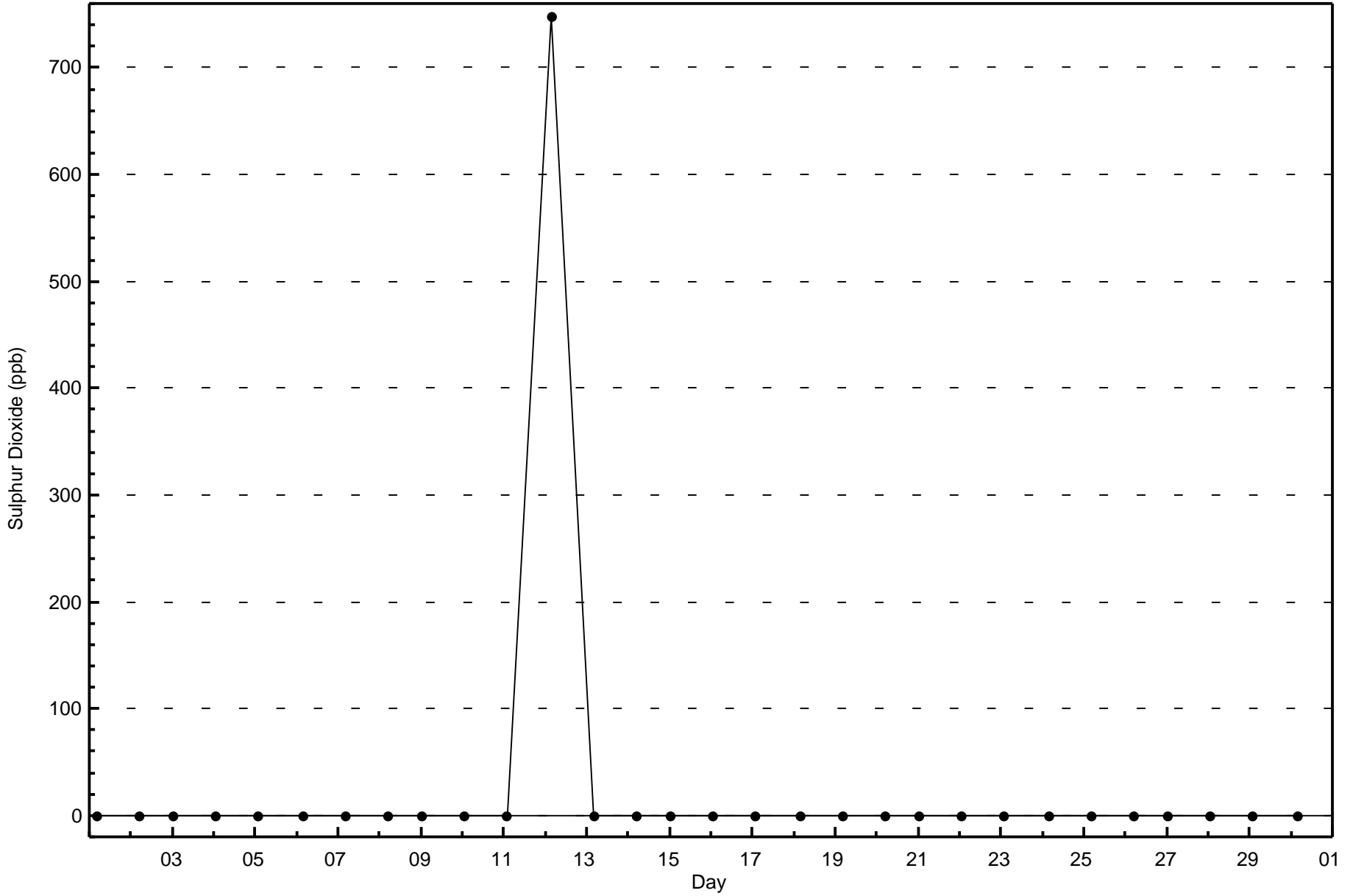
Total Number of Hours: 720

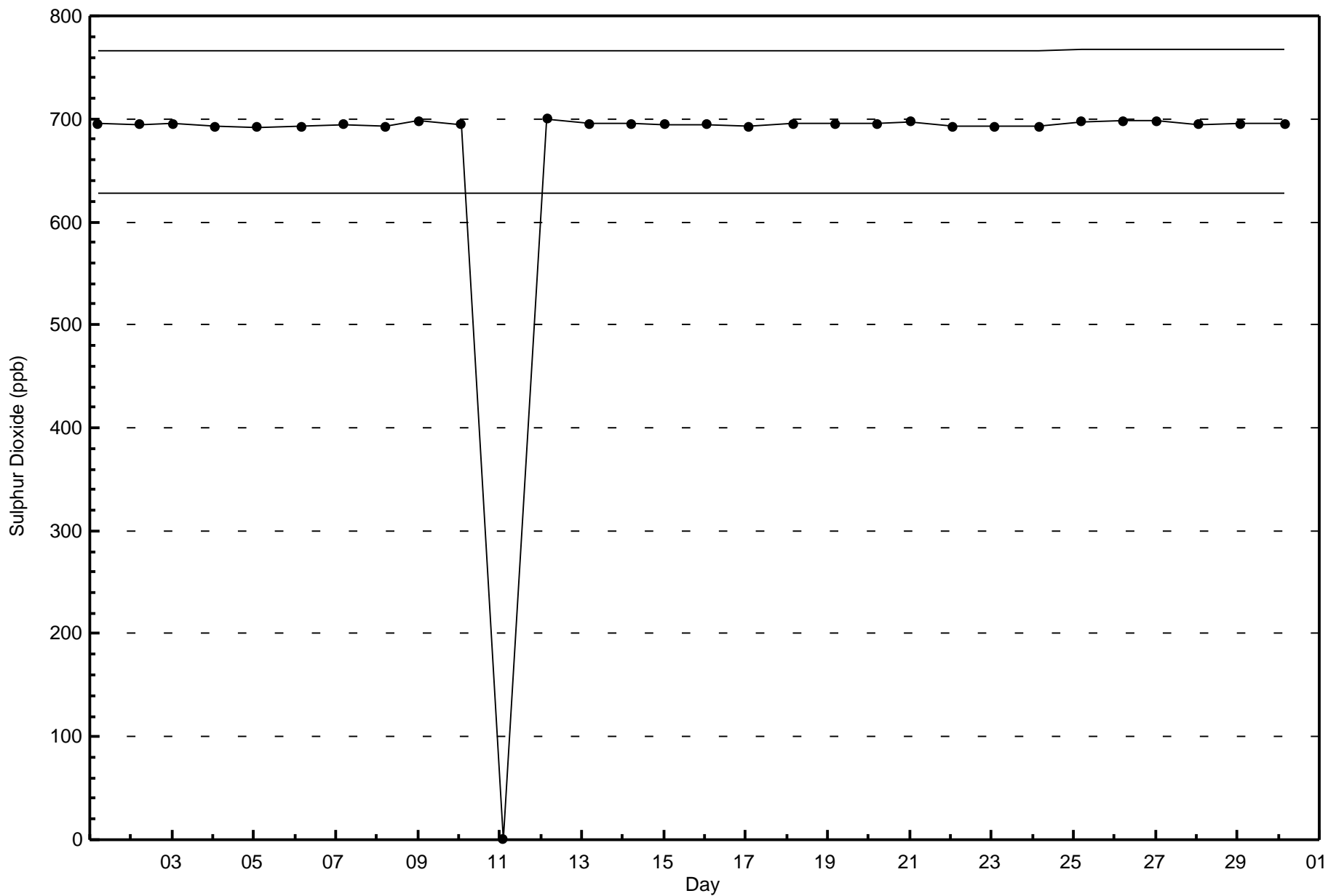


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Anzac (AMS 14)

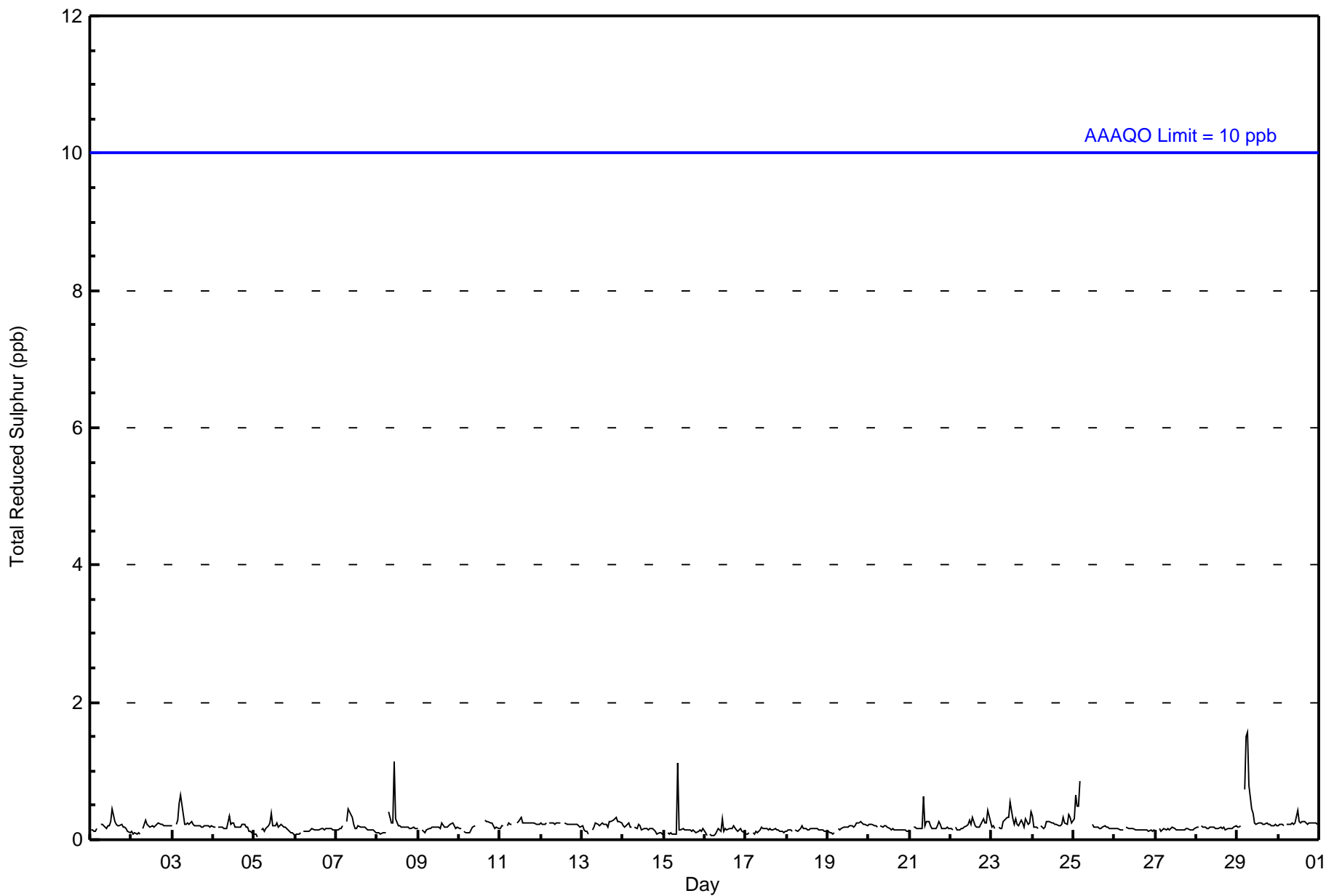














**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	677	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: 677

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - September 2015**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	30	22	13	9	12	22	52	62	38	47	50	49	76	80	73	40	675
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	30	22	13	9	12	22	52	62	38	47	50	49	76	80	73	40	675

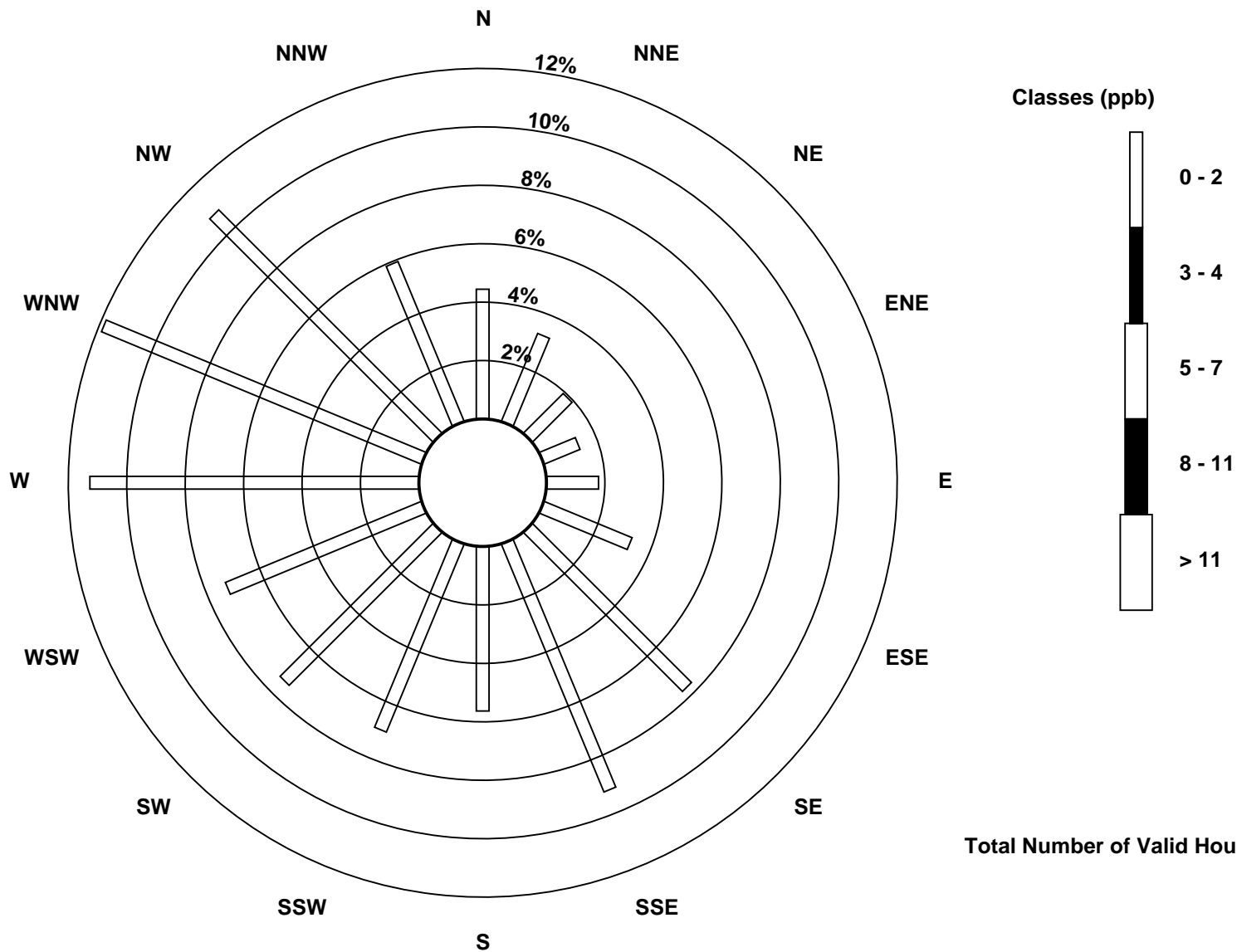
Total Number of Valid Hours: 675

Total Number of Hours: 720

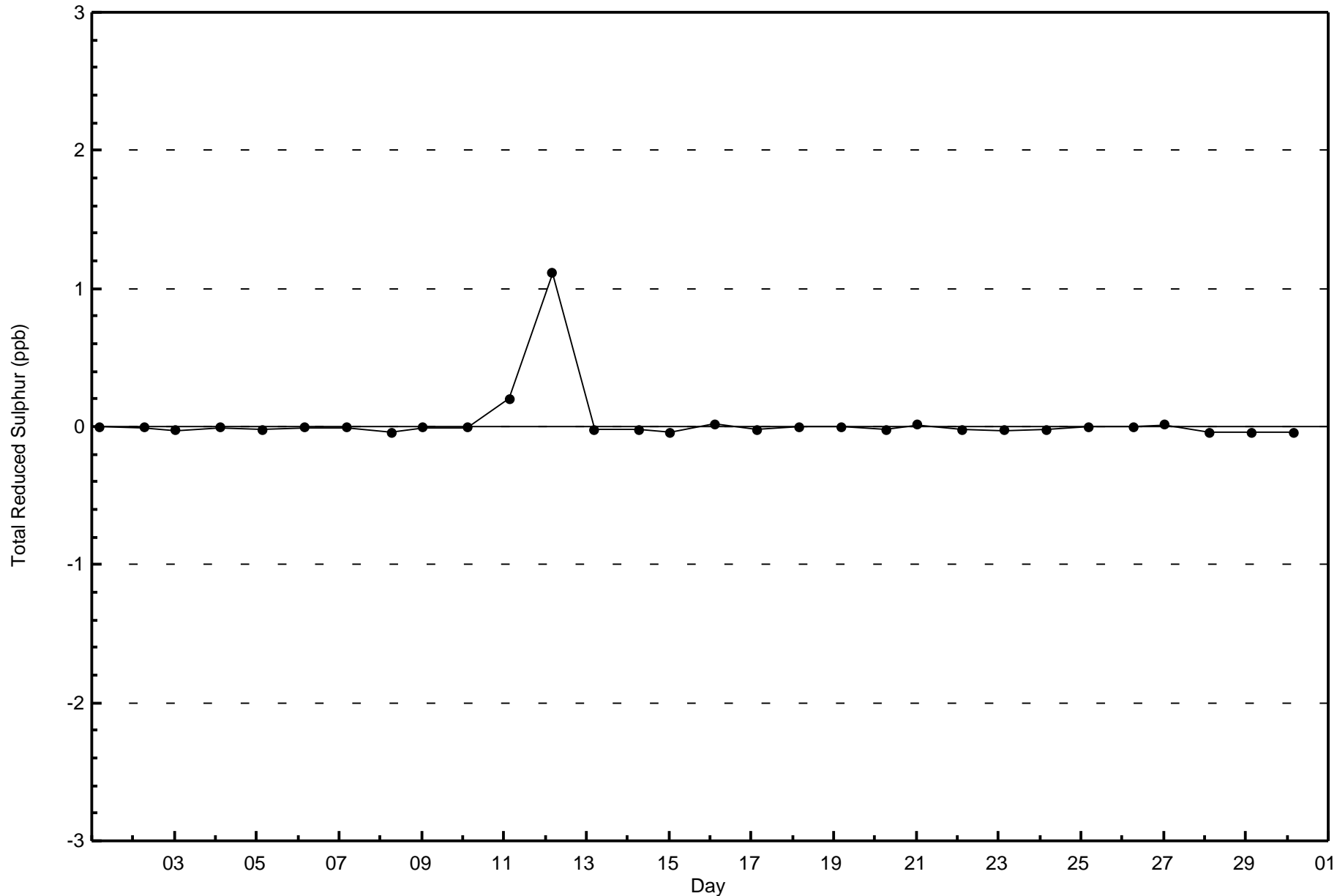


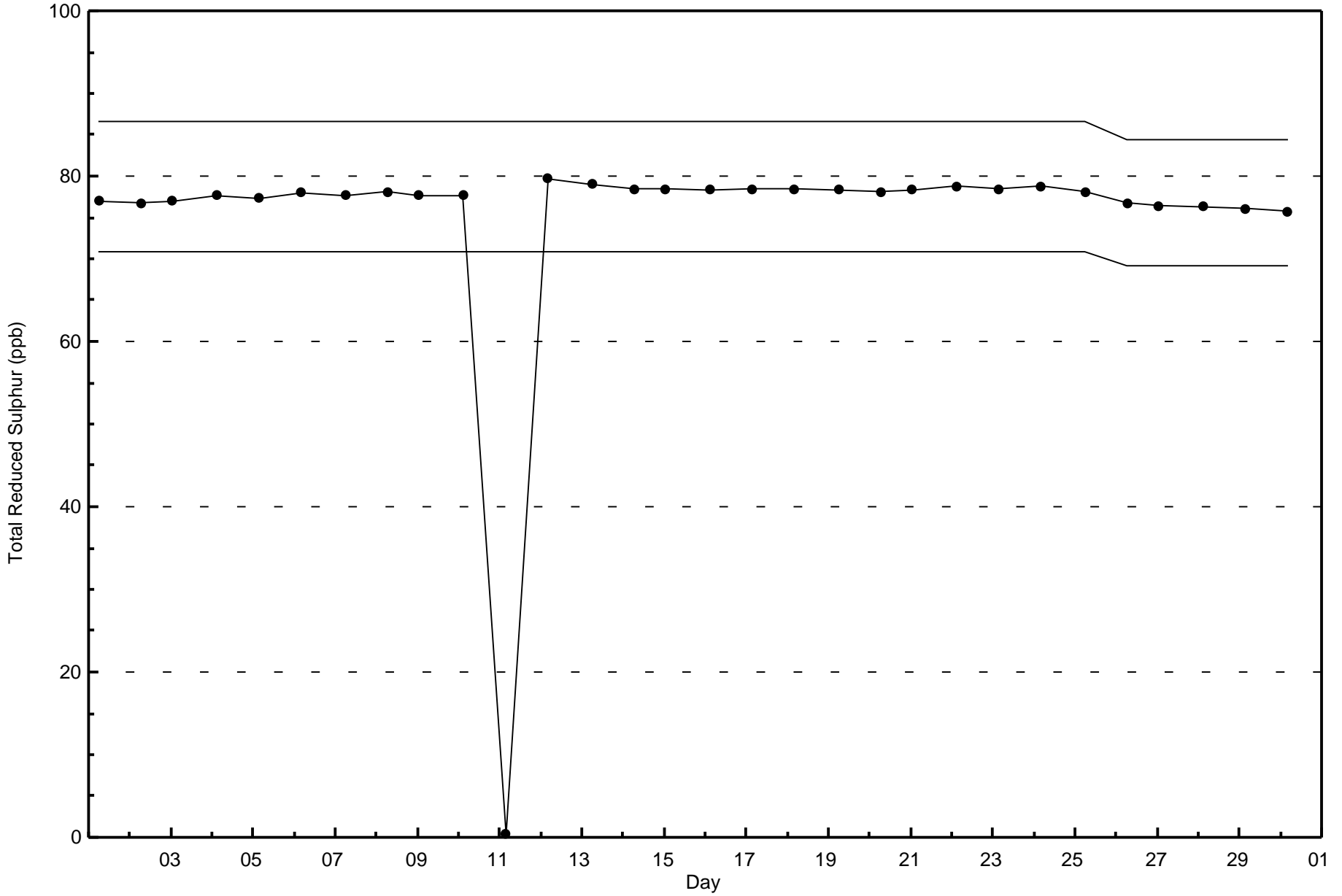
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Total Reduced Sulphur (TRS) - ppb  
Anzac (AMS 14)



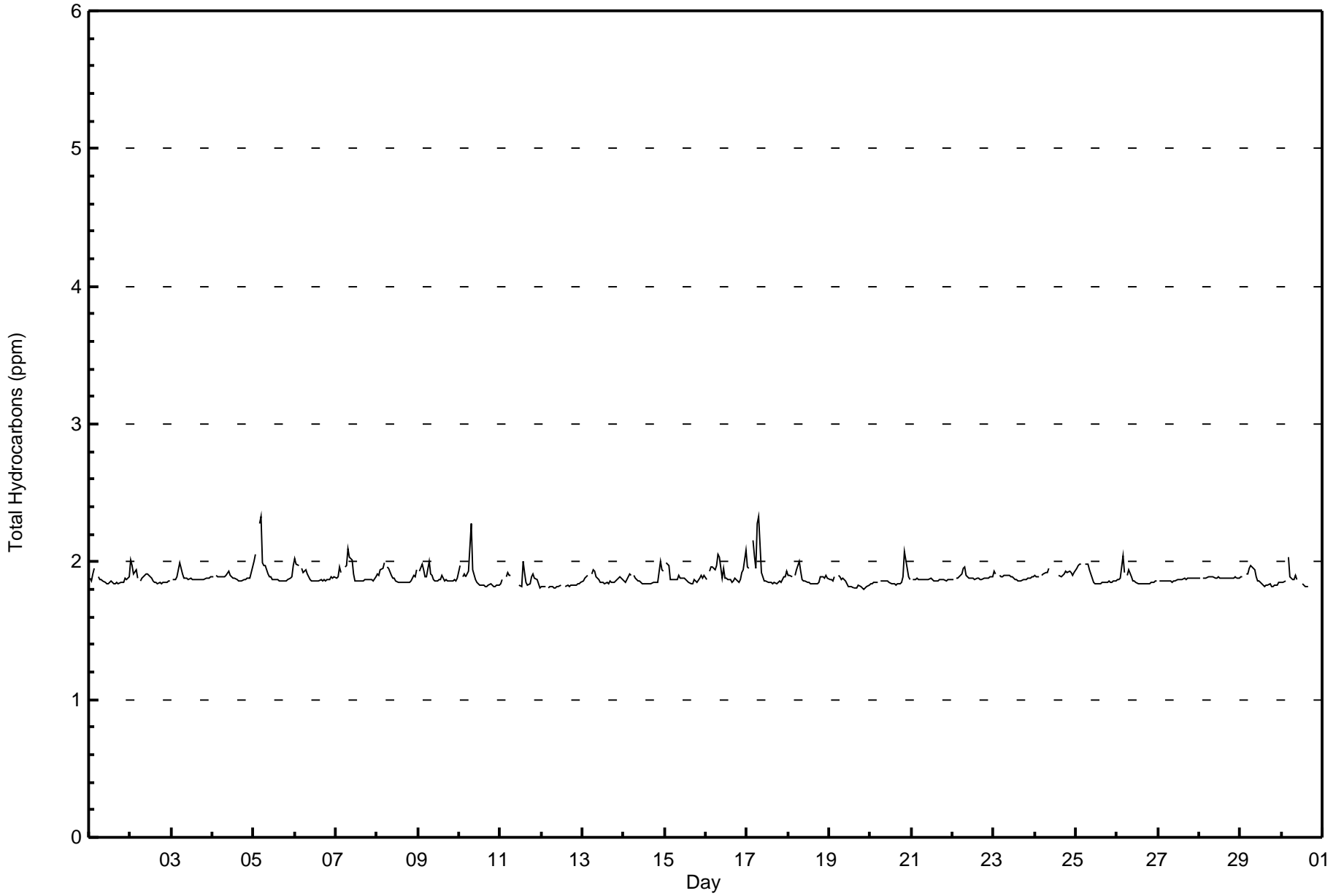
Total Number of Valid Hours: 675













**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Anzac - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	657	98.21	98.21
2.1 - 3.0	12	1.79	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 669

Total Number of Hours: 720



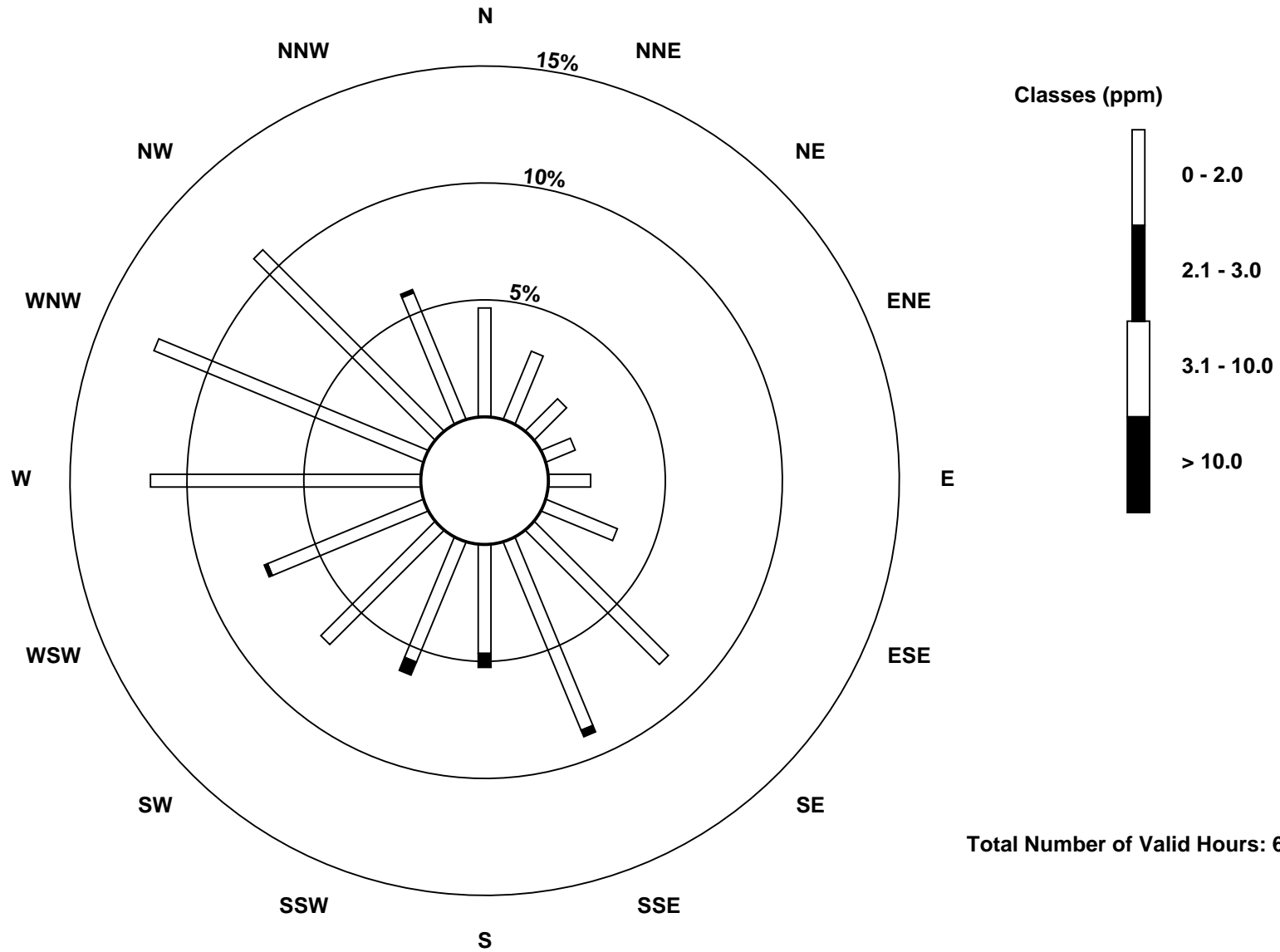
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

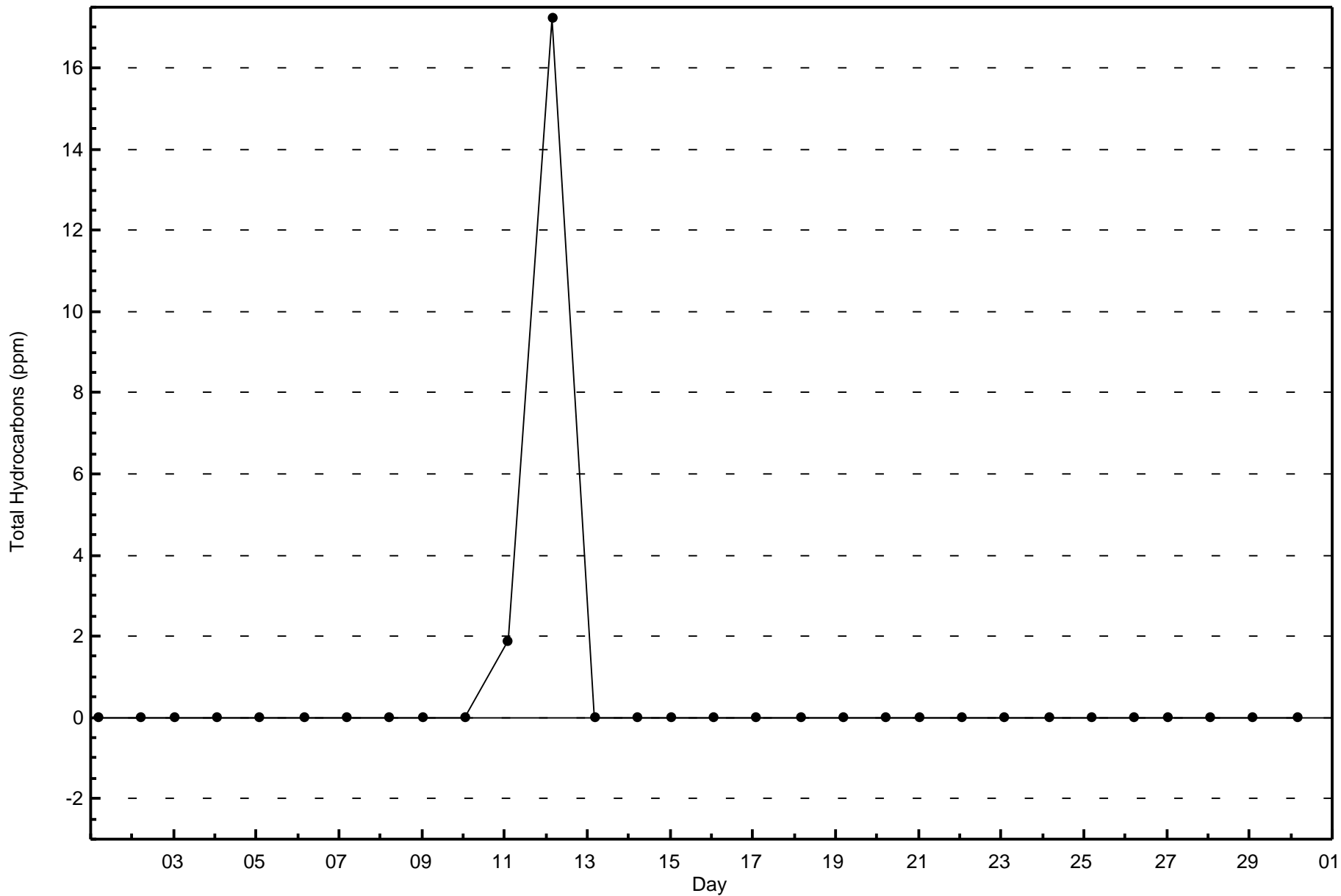
**Total Hydrocarbons (THC) - ppm**  
**Anzac - September 2015**

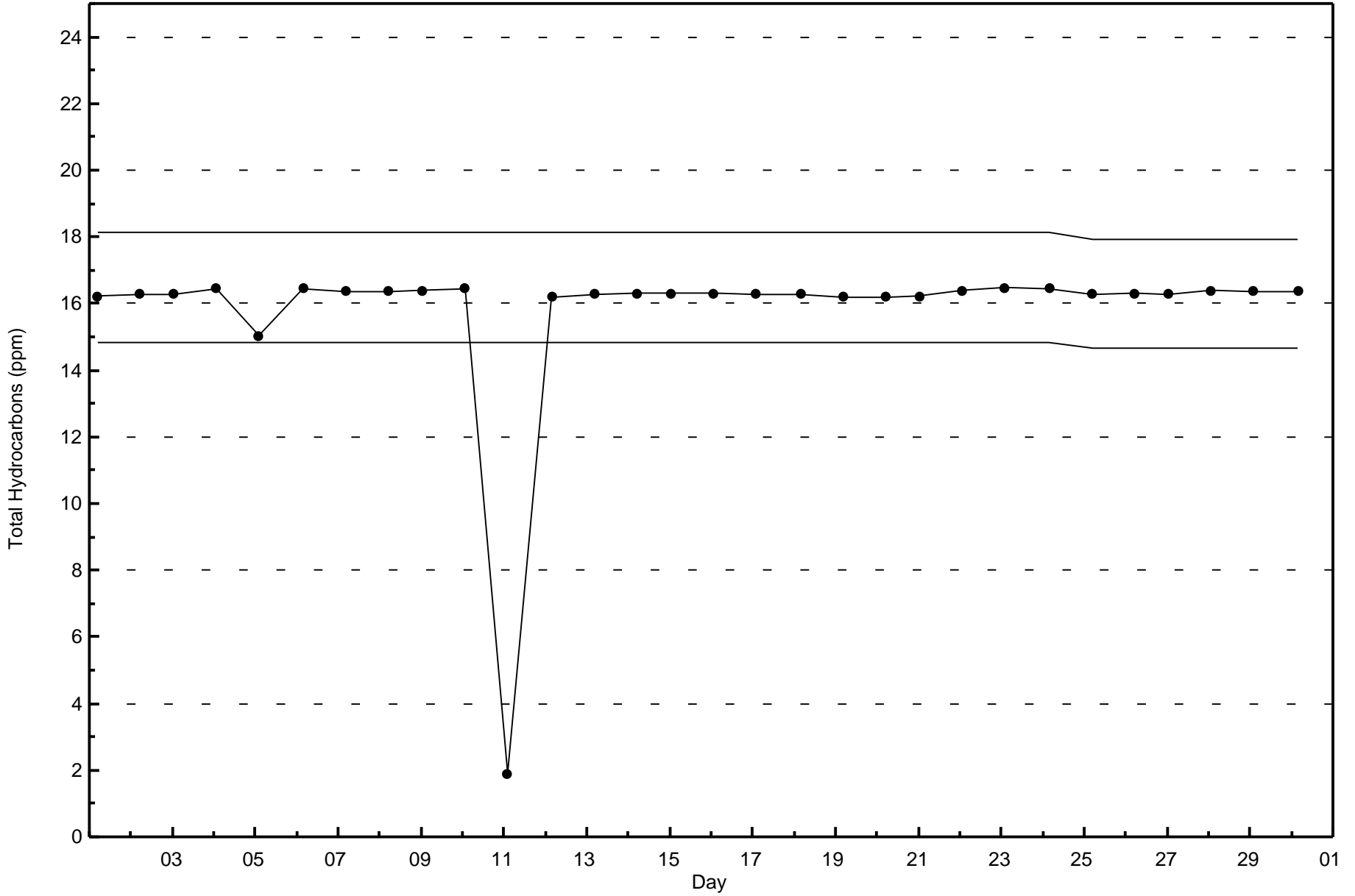
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	31	21	13	9	12	22	54	58	31	37	46	48	77	83	73	39	654
2.1 - 3.0	0	0	0	0	0	0	0	2	4	4	0	1	0	0	0	1	12
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	31	21	13	9	12	22	54	60	35	41	46	49	77	83	73	40	666

Total Number of Valid Hours: 666

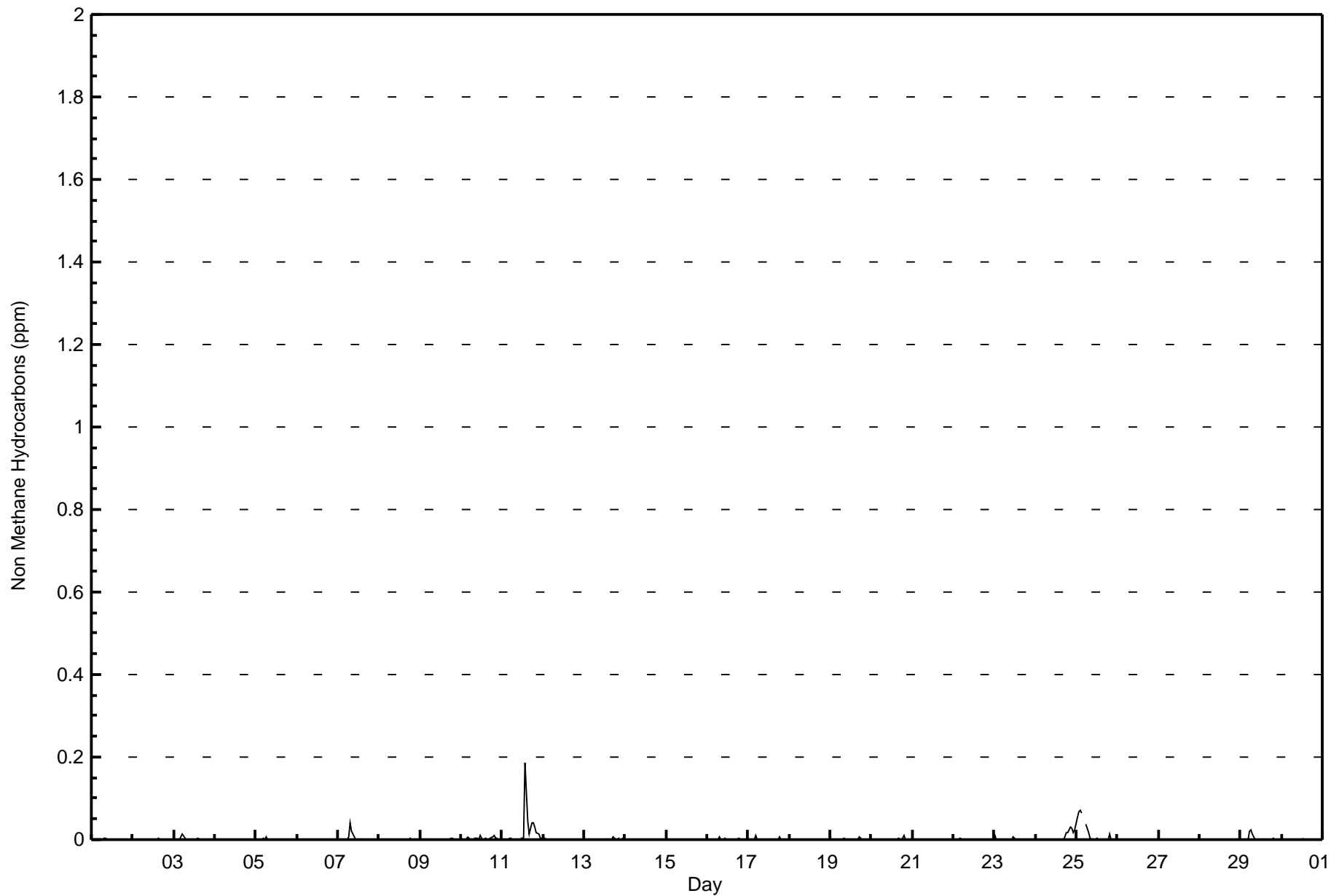
Total Number of Hours: 720















**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Anzac - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	626	93.57	93.57
0.006 - 0.05	38	5.68	99.25
0.06 - 0.1	4	0.60	99.85
> 0.1	1	0.15	100.00

Total Number of Valid Hours: 669

Total Number of Hours: 720



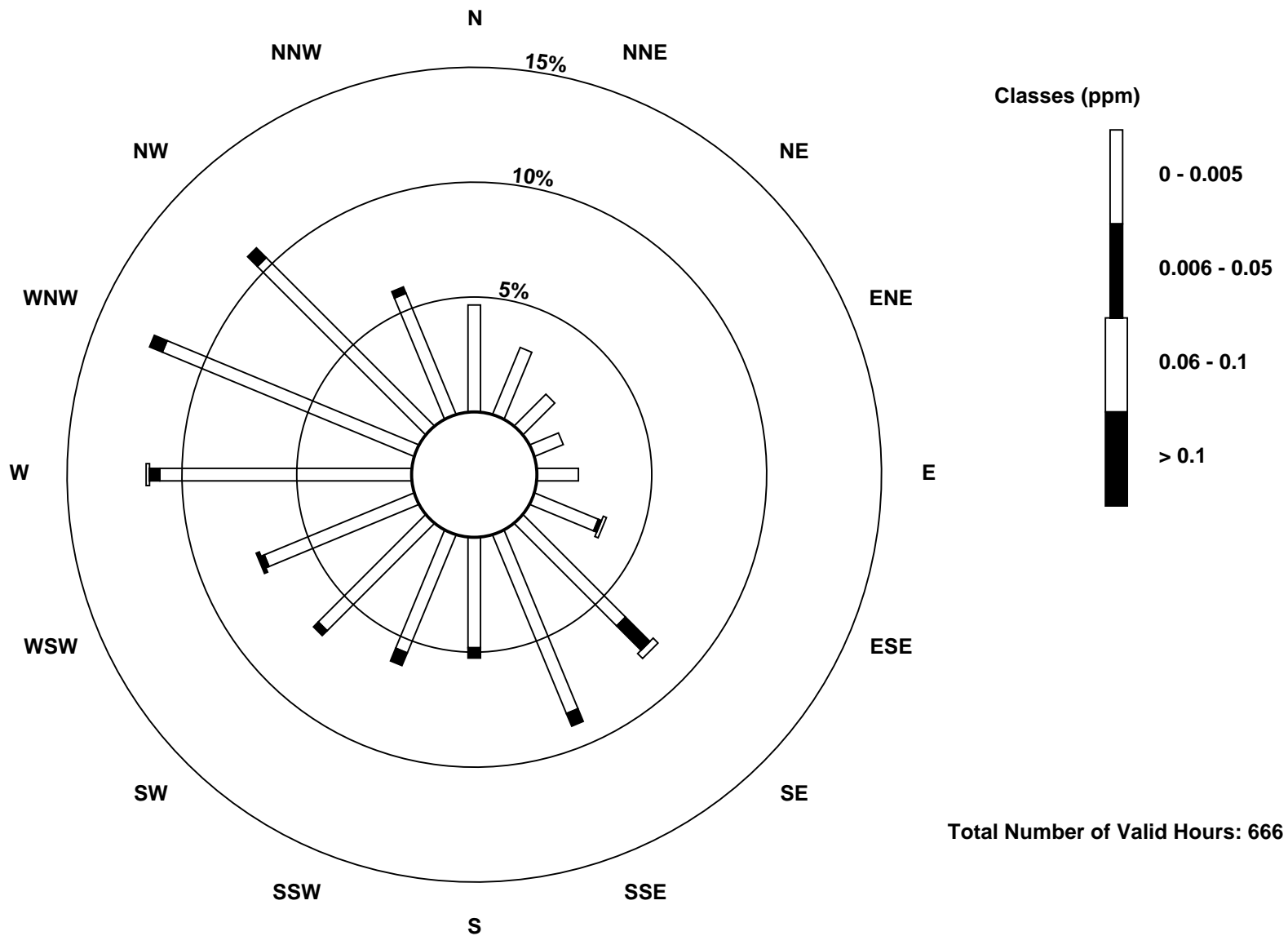
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

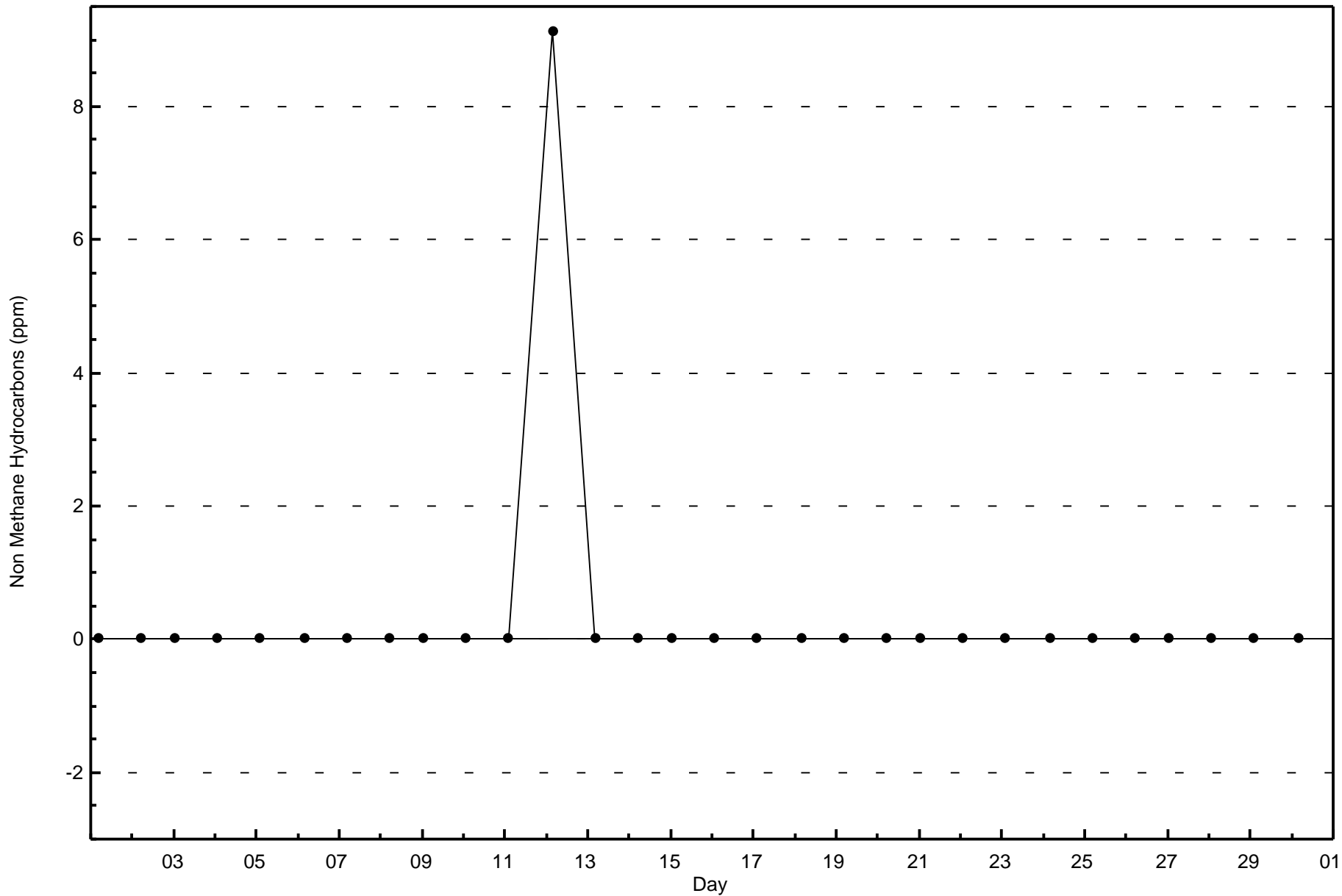
**Non Methane Hydrocarbons (NMHC) - ppm**  
**Anzac - September 2015**

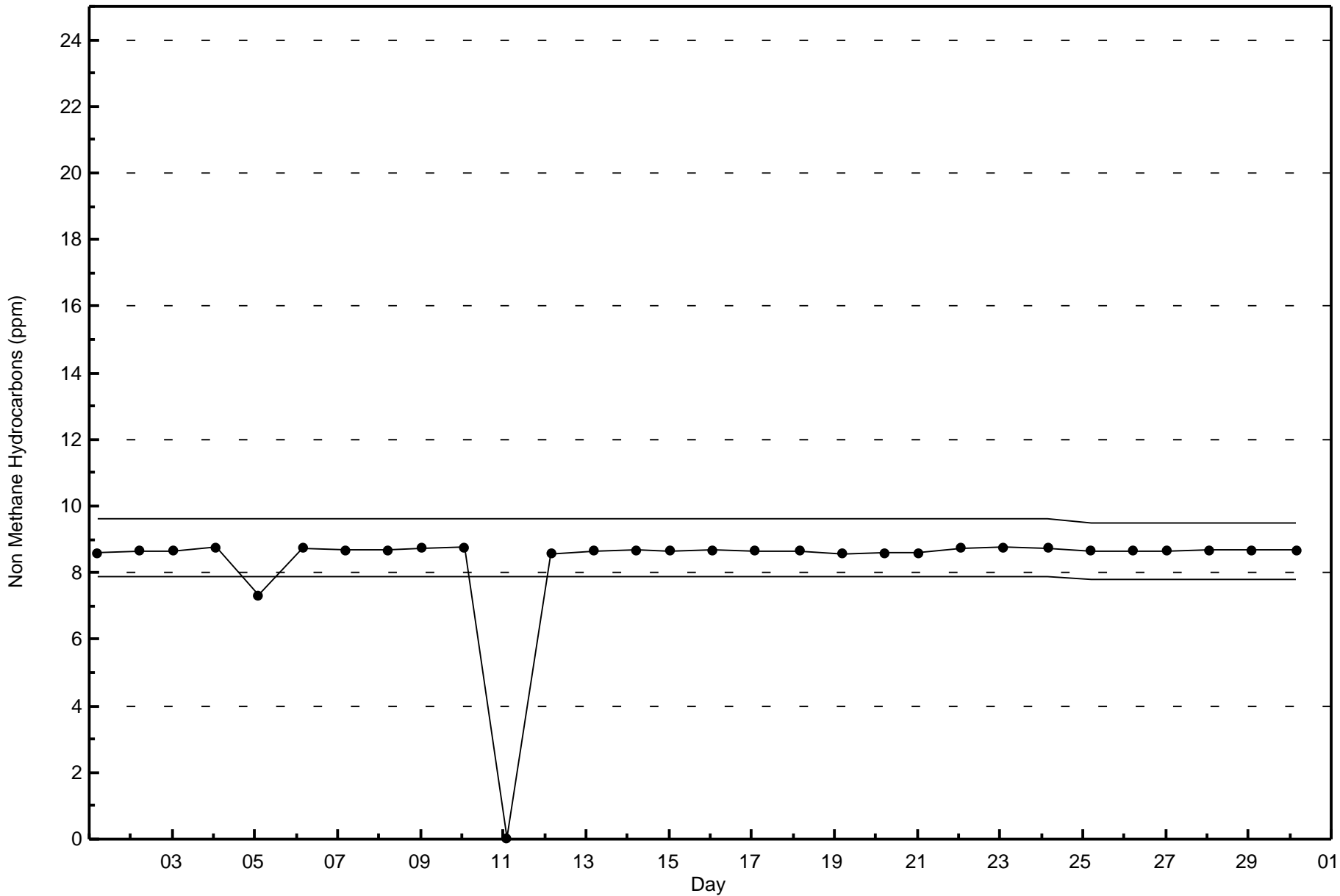
<b>Concentration</b> <b>Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	31	21	13	9	12	20	42	56	32	37	44	47	73	79	69	38	623
0.006 - 0.05	0	0	0	0	0	1	10	4	3	4	2	1	3	4	4	2	38
0.06 - 0.1	0	0	0	0	0	1	2	0	0	0	0	0	1	0	0	0	4
> 0.1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
<b>Totals</b>	31	21	13	9	12	22	54	60	35	41	46	49	77	83	73	40	666

Total Number of Valid Hours: 666

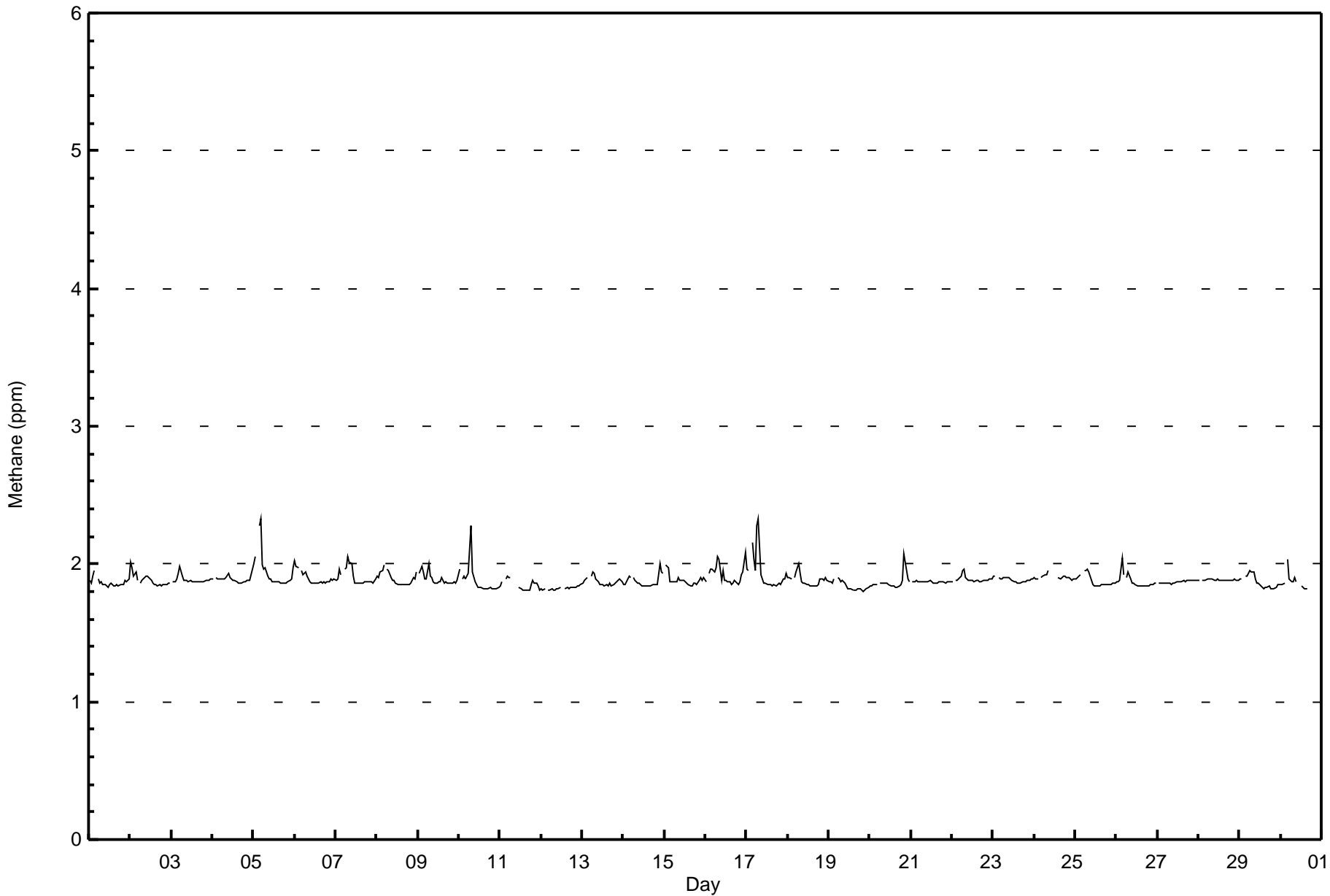
Total Number of Hours: 720













**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Anzac - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	657	98.21	98.21
2.1 - 3.0	12	1.79	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 669

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Anzac - September 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	31	21	13	9	12	22	54	58	31	37	46	48	77	83	73	39	654
2.1 - 3.0	0	0	0	0	0	0	0	2	4	4	0	1	0	0	0	1	12
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>	31	21	13	9	12	22	54	60	35	41	46	49	77	83	73	40	666

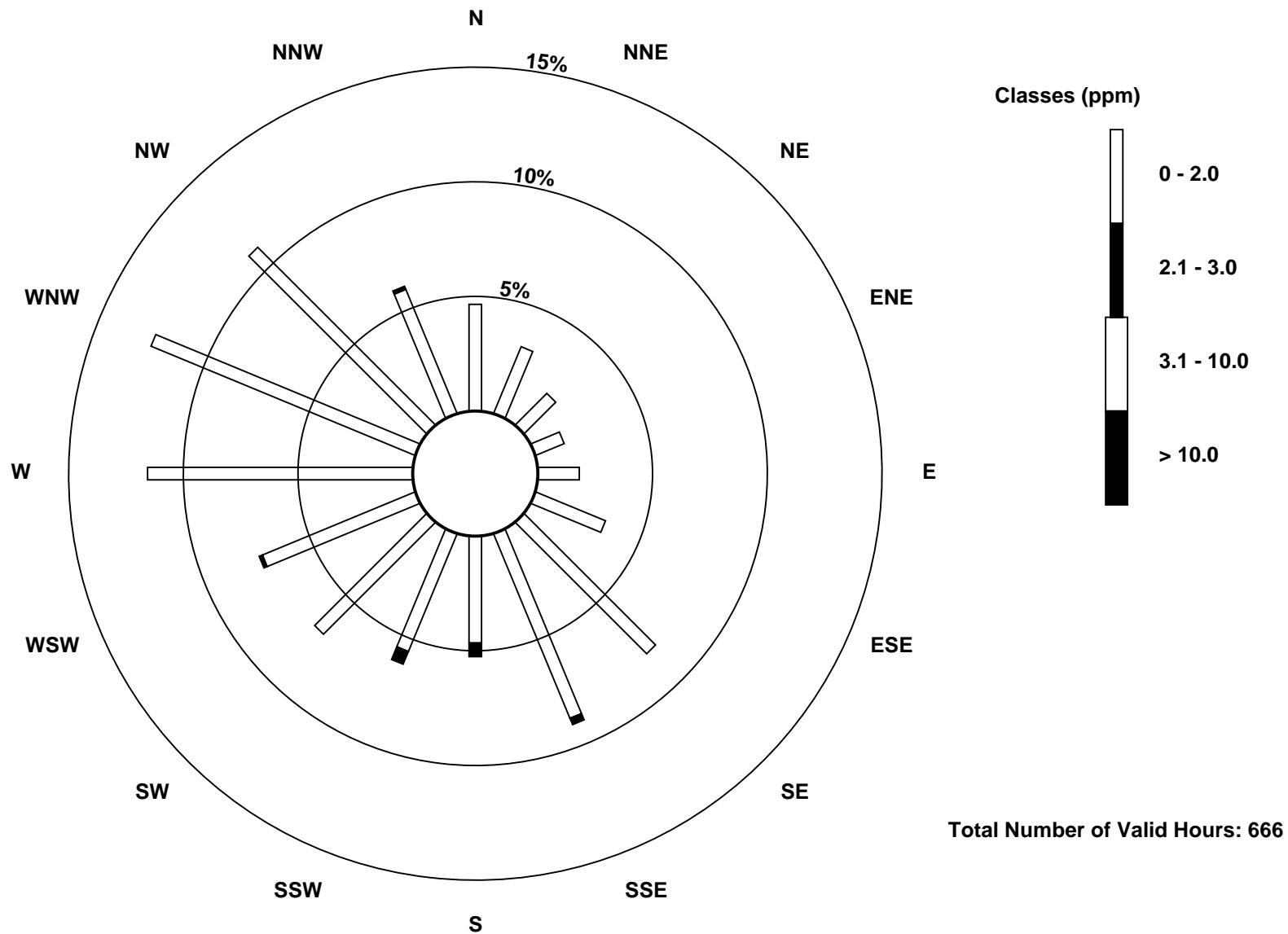
Total Number of Valid Hours: 666

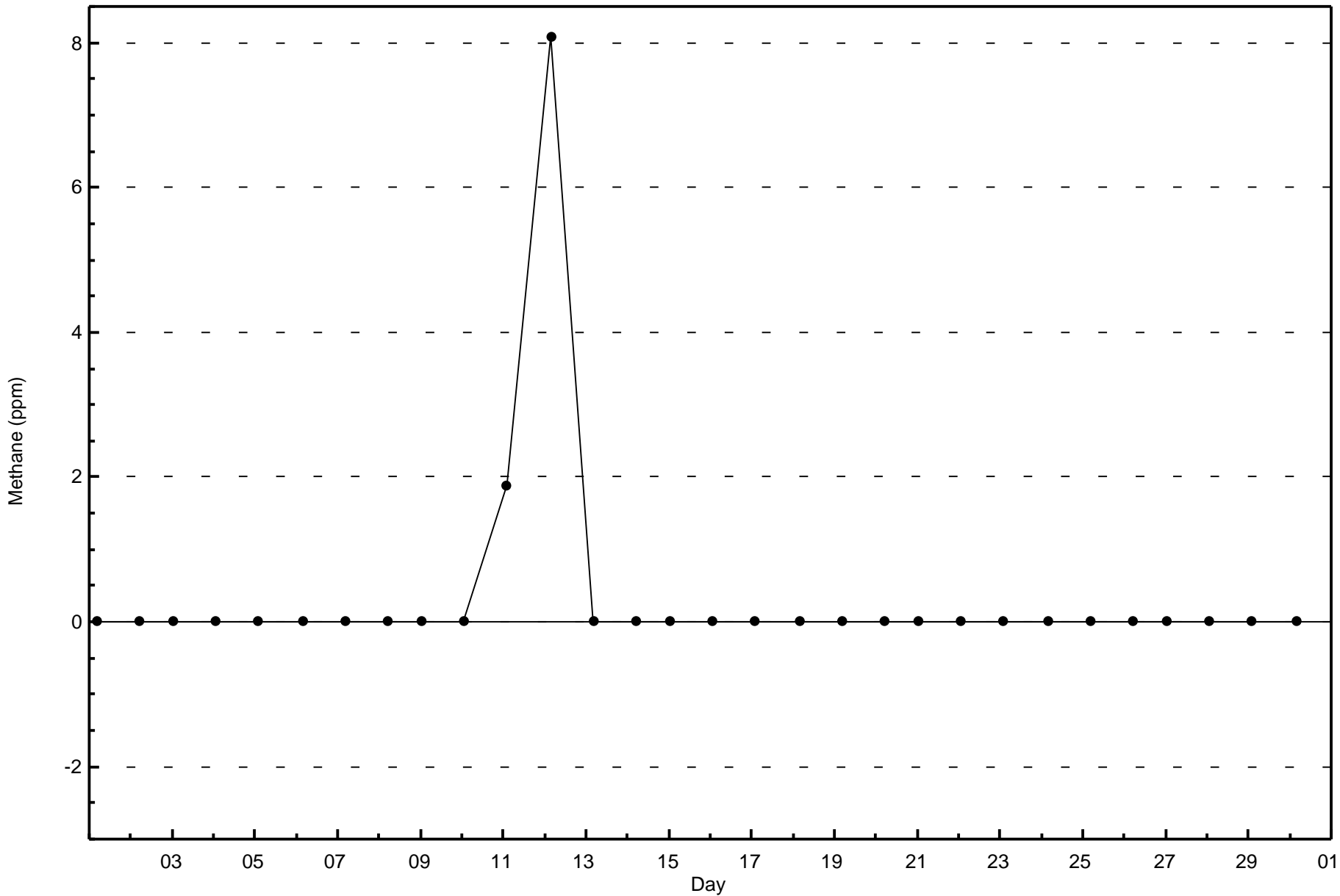
Total Number of Hours: 720

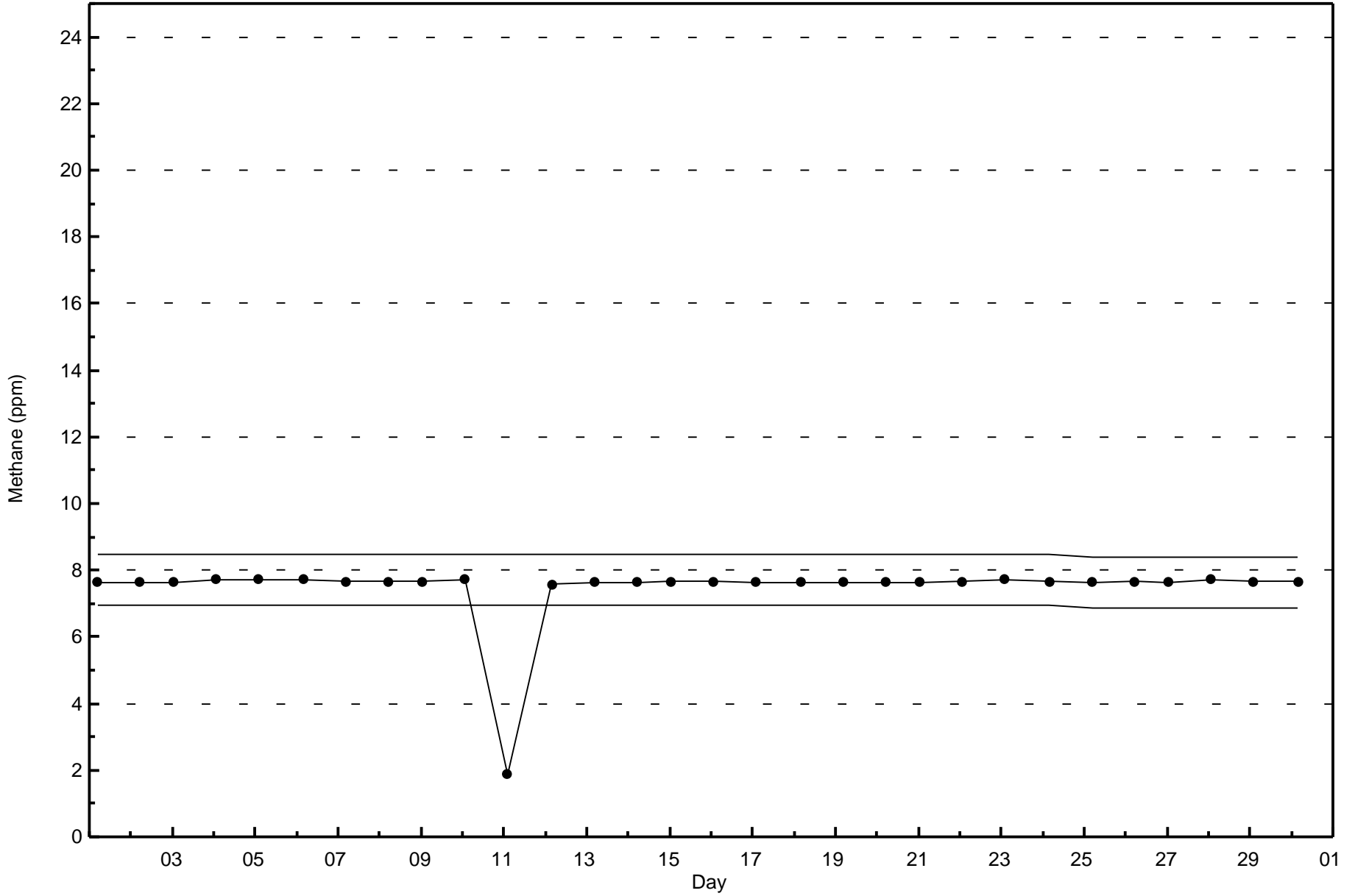


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Methane (CH<sub>4</sub>) - ppm  
Anzac (AMS 14)

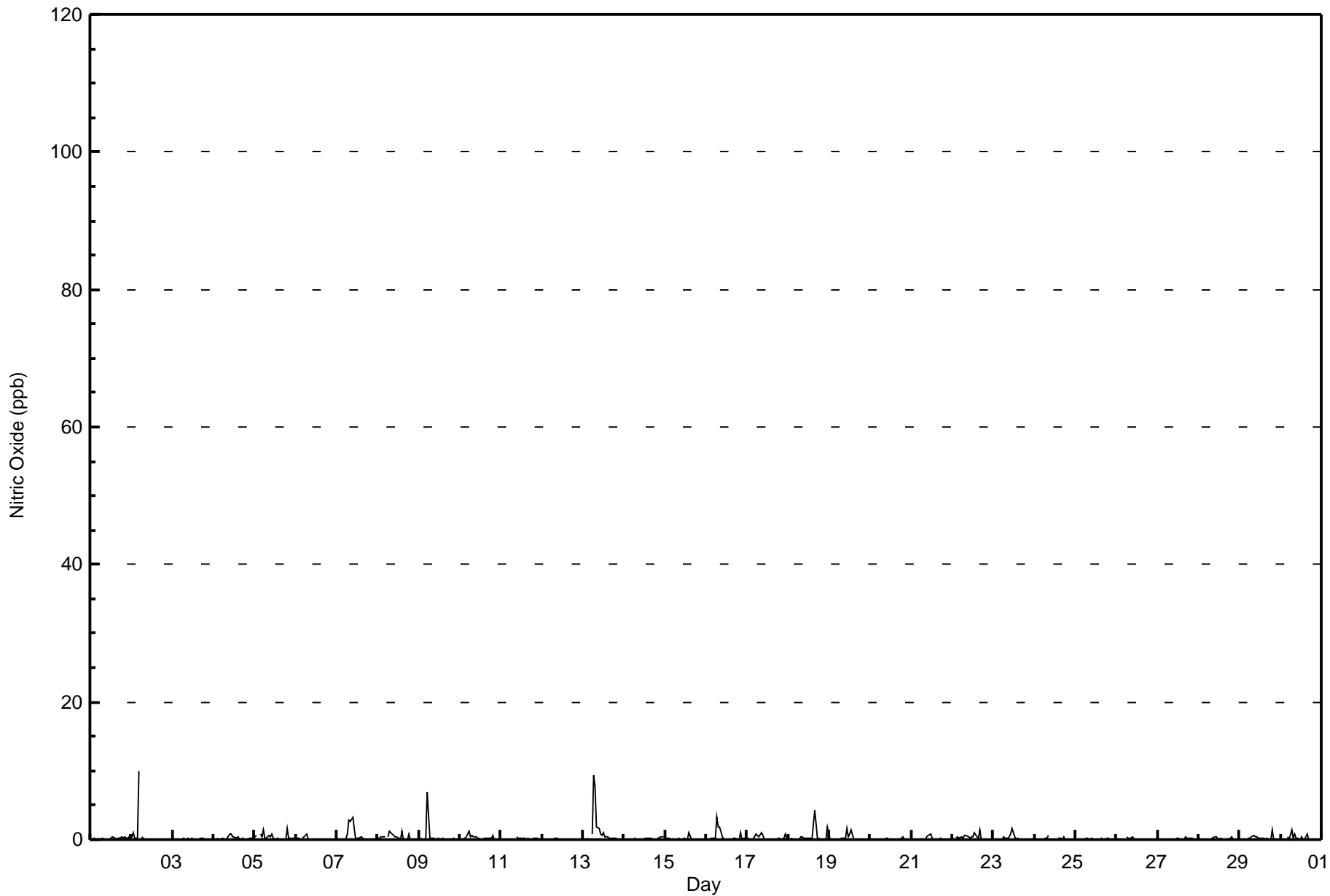








Maximum Value: 10 ppb on Sep 2 05:00																	Maximum Daily Average: 1.1 ppb on Sep 13																	Hours in Service: 720	
Minimum Value: 0 ppb on Sep 2 22:00																	Minimum Daily Average: 0.1 ppb on Sep 12																	Hours of Data: 678	
Maximum Diurnal Average: 0.7 ppb at hour 7																	Minimum Diurnal Average: 0.1 ppb at hour 22																	Hours of Missing Data: 42	
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> = 3																	Hours of Calibration: 34	
																	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-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1									
2-Sep	0	1	0	0	10	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	10									
3-Sep	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									
4-Sep	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
5-Sep	0	1	Z	1	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0.4	2									
6-Sep	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
7-Sep	0	0	0	0	Z	0	1	3	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3									
8-Sep	0	0	0	0	1	Z	0	1	1	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0.3	1									
9-Sep	Z	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	7									
10-Sep	0	Z	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1									
11-Sep	0	0	Z	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
12-Sep	0	0	0	UO	0	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0.1	0									
13-Sep	0	0	0	0	Z	1	9	8	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1.1	9									
14-Sep	0	0	0	0	0	Z	0	0	M	M	M	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1									
15-Sep	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									
16-Sep	0	Z	0	0	0	0	3	2	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	3									
17-Sep	0	0	Z	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1									
18-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0	0	2	0.5	4									
19-Sep	0	0	0	0	Z	0	0	0	0	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0.2	2									
20-Sep	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									
21-Sep	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
22-Sep	0	Z	0	0	0	0	0	1	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0.3	1									
23-Sep	0	0	Z	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2									
24-Sep	0	0	0	Z	0	0	0	0	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	1									
25-Sep	0	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									
26-Sep	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									
27-Sep	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									
28-Sep	0	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									
29-Sep	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1									
30-Sep	0	0	0	Z	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1									
																	Diurnal Average		Diurnal Maximum																
																	0.1		0																
																	0.1		1																
																	0.1		0																
																	0.1		1																
																	0.5		10																
																	0.6		7																
																	0.7		9																
																	0.6		8																
																	0.5		3																
																	0.4		3																
																	0.3		2																
																	0.3		2																
																	0.2		1																
																	0.2		1																
																	0.2		1																
																	0.2		4																
																	0.2		2																
																	0.1		0																
																	0.1		1																
																	0.2		2																
																	0.1		1																
																	0.1		1																
																	0.1		1																
																	0.1		2																
																	Z - zerospan		C - Calibration																
																	M - Maintenance		UO - Unstable Operation																





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Anzac - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	678	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: 678

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Anzac - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 20	29	21	13	9	12	22	54	60	38	47	47	49	79	83	73	39	675
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	29	21	13	9	12	22	54	60	38	47	47	49	79	83	73	39	675

Total Number of Valid Hours: 675

Total Number of Hours: 720





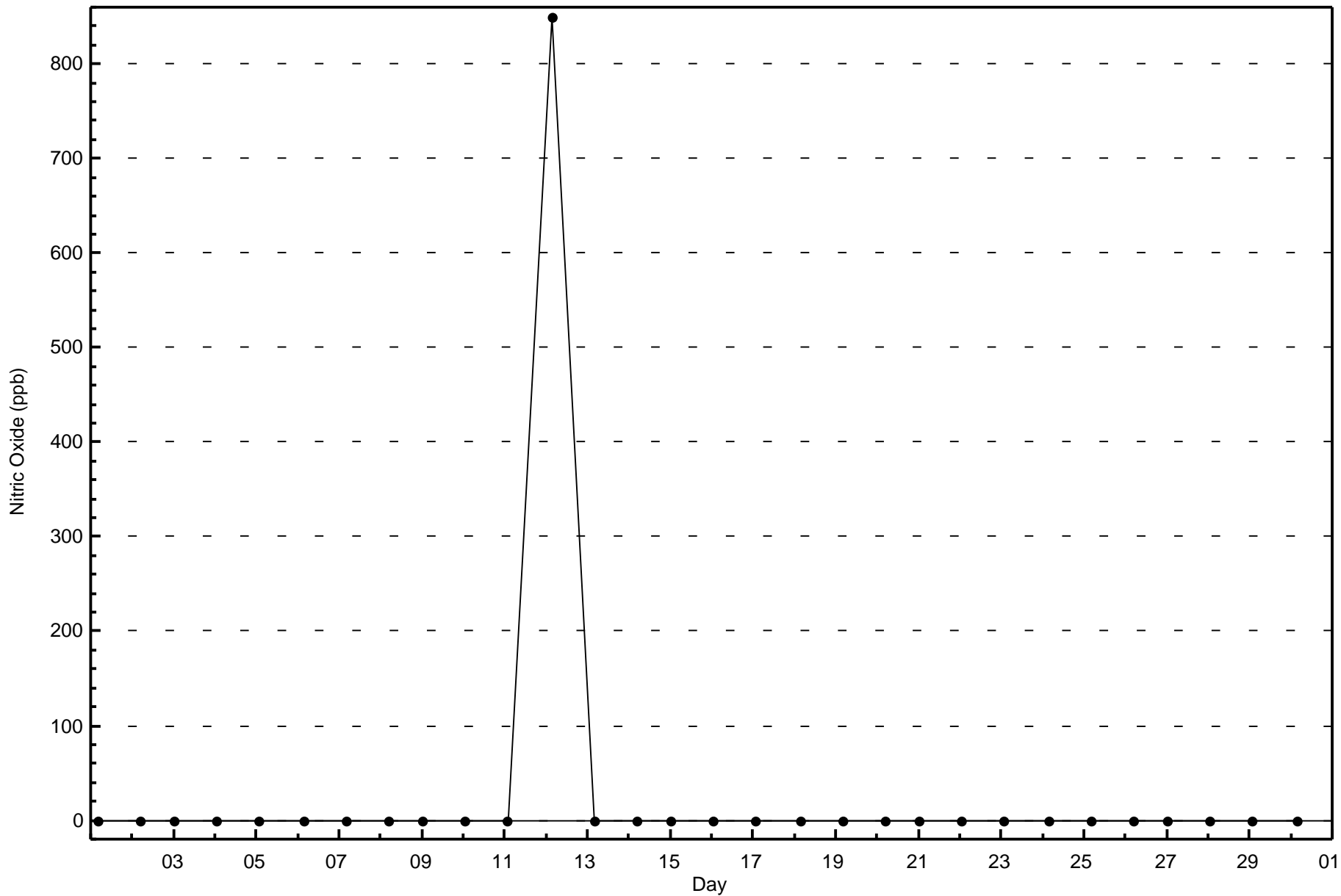


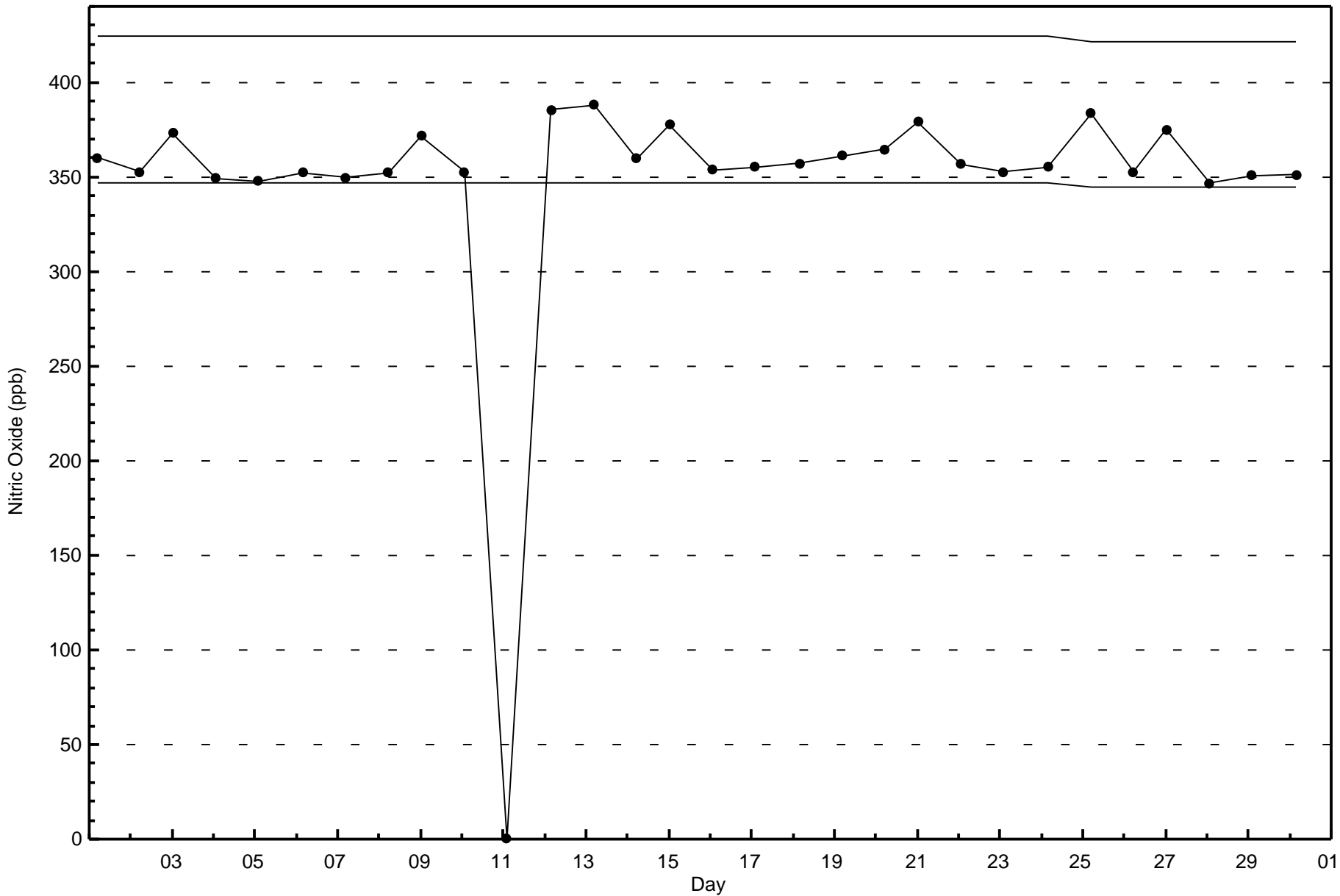
Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Anzac - September 2015







Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 8 ppb on Sep 7 08:00	Maximum Daily Average: 2.1 ppb on Sep 7		Hours of Data:	678
Minimum Value: 0 ppb on Sep 2 07:00	Minimum Daily Average: 0.2 ppb on Sep 6		Hours of Missing Data:	42
Maximum Diurnal Average: 1.2 ppb at hour 9	Minimum Diurnal Average: 0.5 ppb at hour 3		Hours of Calibration:	34
Monthly Average: 0.8 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 O <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 5		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-Sep	0	0	1	0	Z	1	2	1	0	0	0	0	1	3	1	1	1	1	2	1	1	1	0	0	0.8	3
2-Sep	0	1	0	0	1	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
3-Sep	Z	1	1	3	4	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	4
4-Sep	0	Z	0	0	0	0	0	0	0	2	2	2	2	1	1	1	1	1	1	1	1	0	0	0	0.7	2
5-Sep	0	0	Z	0	1	2	1	1	1	1	2	1	1	1	1	0	1	0	0	0	1	0	0	0	0.6	2
6-Sep	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1
7-Sep	0	1	2	3	Z	5	5	8	6	6	3	0	1	1	2	1	1	1	1	0	0	0	0	0	2.1	8
8-Sep	0	0	0	1	1	Z	0	2	3	2	1	1	1	0	2	1	1	1	4	1	1	0	0	1	0.9	4
9-Sep	Z	1	1	1	0	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.9	4
10-Sep	1	Z	1	0	0	0	0	1	1	1	1	1	0	0	1	1	1	1	3	1	0	0	0	0	0.6	3
11-Sep	0	0	Z	1	1	1	1	M	M	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	1
12-Sep	0	1	0	UO	1	1	1	1	1	1	1	1	M	M	0	1	1	1	0	0	0	0	0	0	0.5	1
13-Sep	1	0	0	0	Z	1	3	4	4	3	2	2	2	2	2	2	3	2	1	2	2	1	1	1	1.7	4
14-Sep	1	0	1	5	4	Z	3	1	M	M	M	0	1	0	1	1	1	0	0	0	1	0	1	0	1.0	5
15-Sep	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.2	1
16-Sep	1	Z	0	0	0	0	2	2	3	1	0	0	0	0	0	0	0	1	1	0	3	2	1	1	0.8	3
17-Sep	1	1	Z	1	0	1	1	0	1	1	0	0	0	0	1	1	1	0	1	1	1	1	3	2	0.7	3
18-Sep	1	1	1	Z	1	1	1	2	2	1	1	1	0	0	0	7	3	1	1	1	1	0	1	4	1.3	7
19-Sep	4	1	0	0	Z	1	1	1	1	1	1	1	2	2	0	0	0	1	1	0	0	0	0	0	0.8	4
20-Sep	0	0	0	1	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	1	6	4	1	1	1	0.9	6
21-Sep	Z	0	0	0	0	0	0	0	0	2	2	2	1	0	0	0	1	2	2	0	0	0	0	0	0.7	2
22-Sep	0	Z	1	1	0	1	1	1	1	1	1	1	1	2	1	1	2	1	1	1	1	0	1	1	0.9	2
23-Sep	1	1	Z	1	0	1	1	1	1	1	1	2	1	1	1	0	1	1	1	0	1	1	1	2	0.9	2
24-Sep	1	0	0	Z	1	1	1	1	1	1	C	C	C	C	C	1	1	1	2	2	1	1	1	1	1.1	2
25-Sep	1	2	1	2	Z	1	1	1	1	1	0	0	0	0	0	0	0	1	2	1	1	1	1	1	0.9	2
26-Sep	1	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0.6	1
27-Sep	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0.4	1
28-Sep	0	Z	0	0	0	0	1	0	1	1	1	1	0	0	0	0	1	1	1	2	2	2	1	1	0.7	2
29-Sep	1	1	Z	2	2	3	3	2	2	1	1	1	1	1	1	0	1	1	1	4	2	1	1	1	1.4	4
30-Sep	1	1	1	Z	1	1	3	1	2	1	1	0	1	1	0	1	0	0	0	0	1	0	1	0	0.7	3

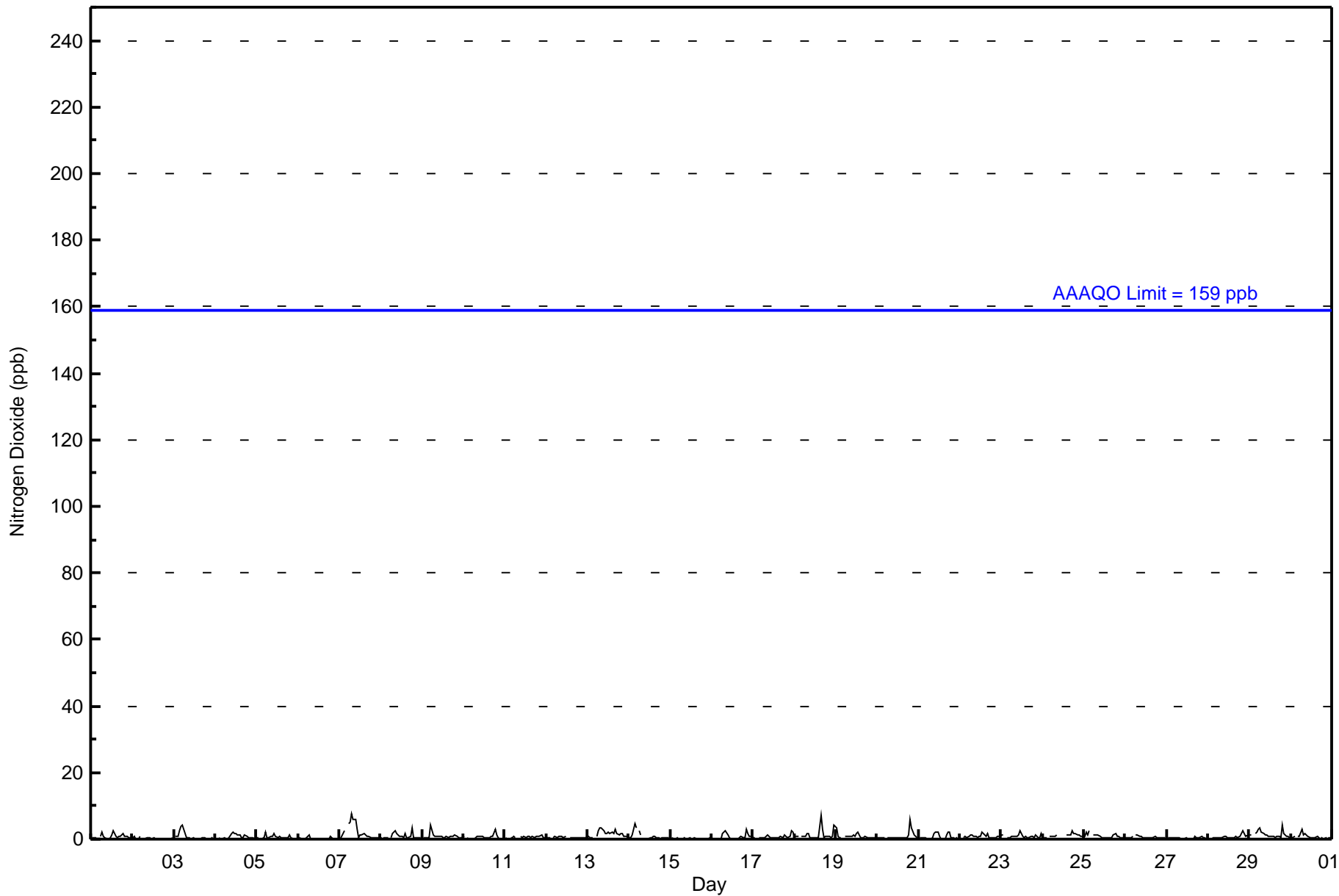
0.6	0.6	0.5	0.9	0.8	1.2	1.2	1.2	1.2	1.1	0.9	0.7	0.7	0.7	0.7	0.7	0.8	0.8	1.0	1.0	0.9	0.6	0.5	0.7	Diurnal Average	
4	2	2	5	4	5	5	8	6	6	3	2	2	3	2	7	3	2	4	6	4	2	3	4	Diurnal Maximum	

Z - zeronspan      C - Calibration      M - Maintenance      UO - Unstable Operation  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Anzac - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	678	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: 678

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Anzac - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	29	21	13	9	12	22	54	60	38	47	47	49	79	83	73	39	675
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	29	21	13	9	12	22	54	60	38	47	47	49	79	83	73	39	675

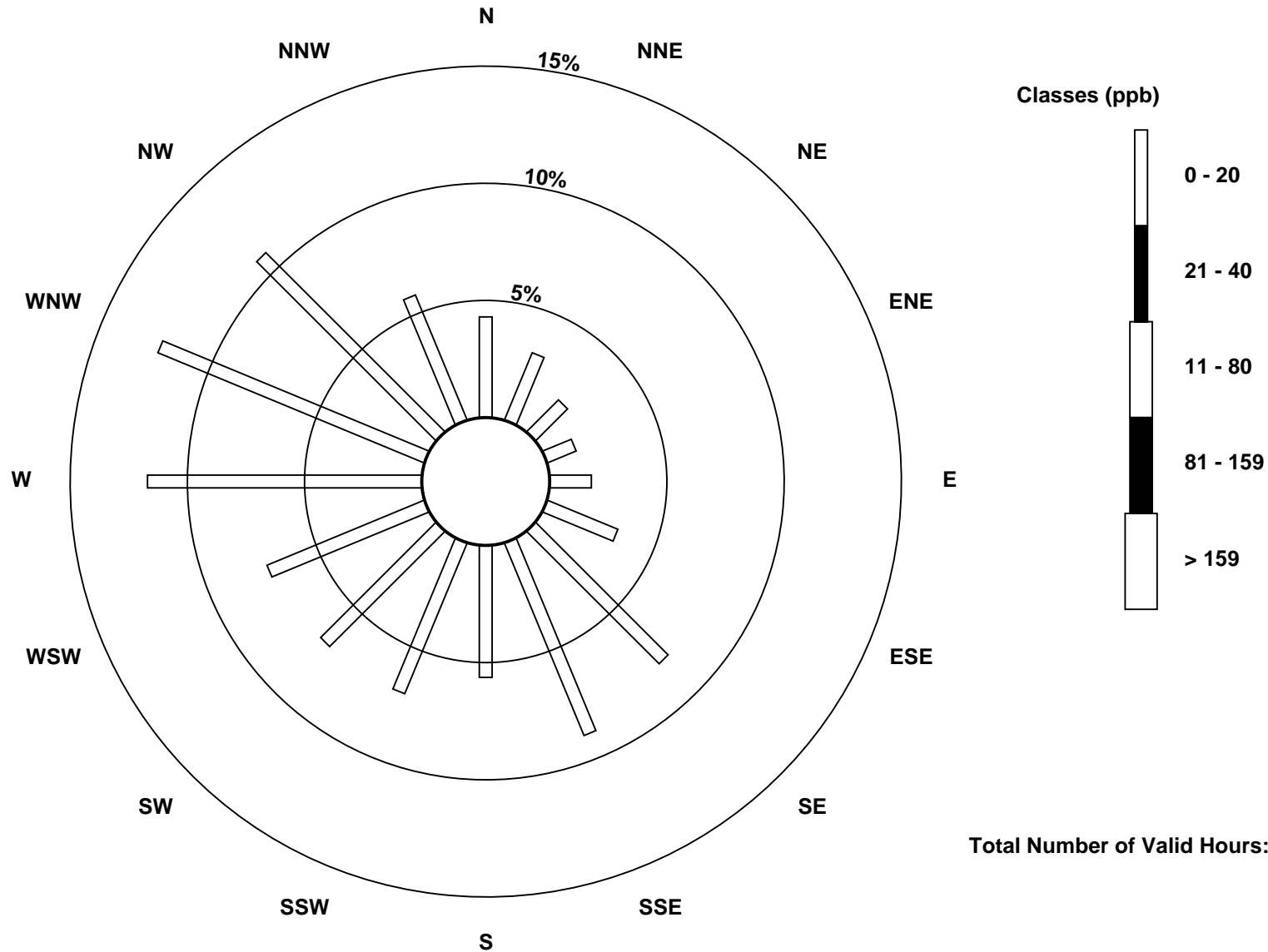
Total Number of Valid Hours: 675

Total Number of Hours: 720



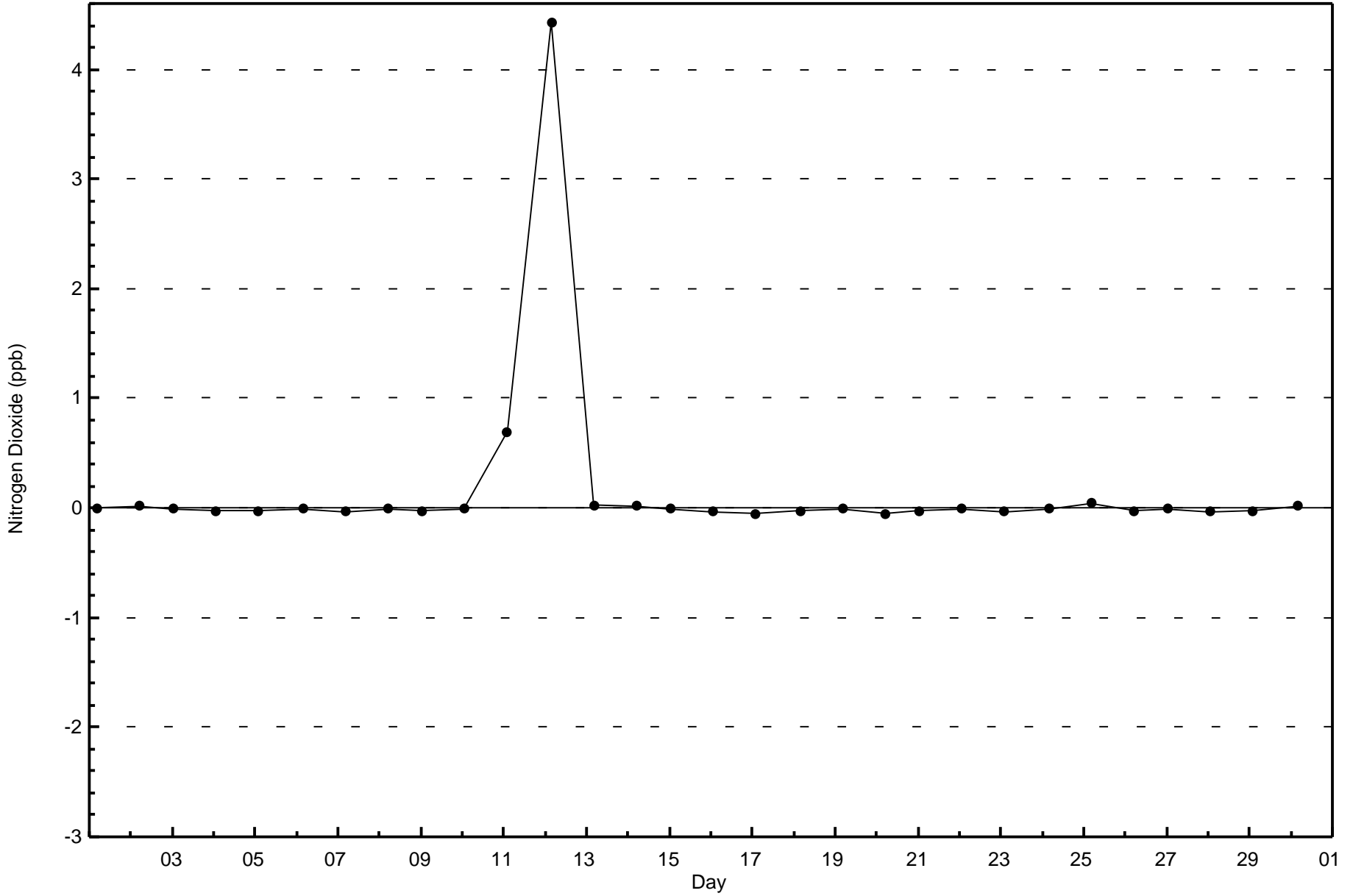
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

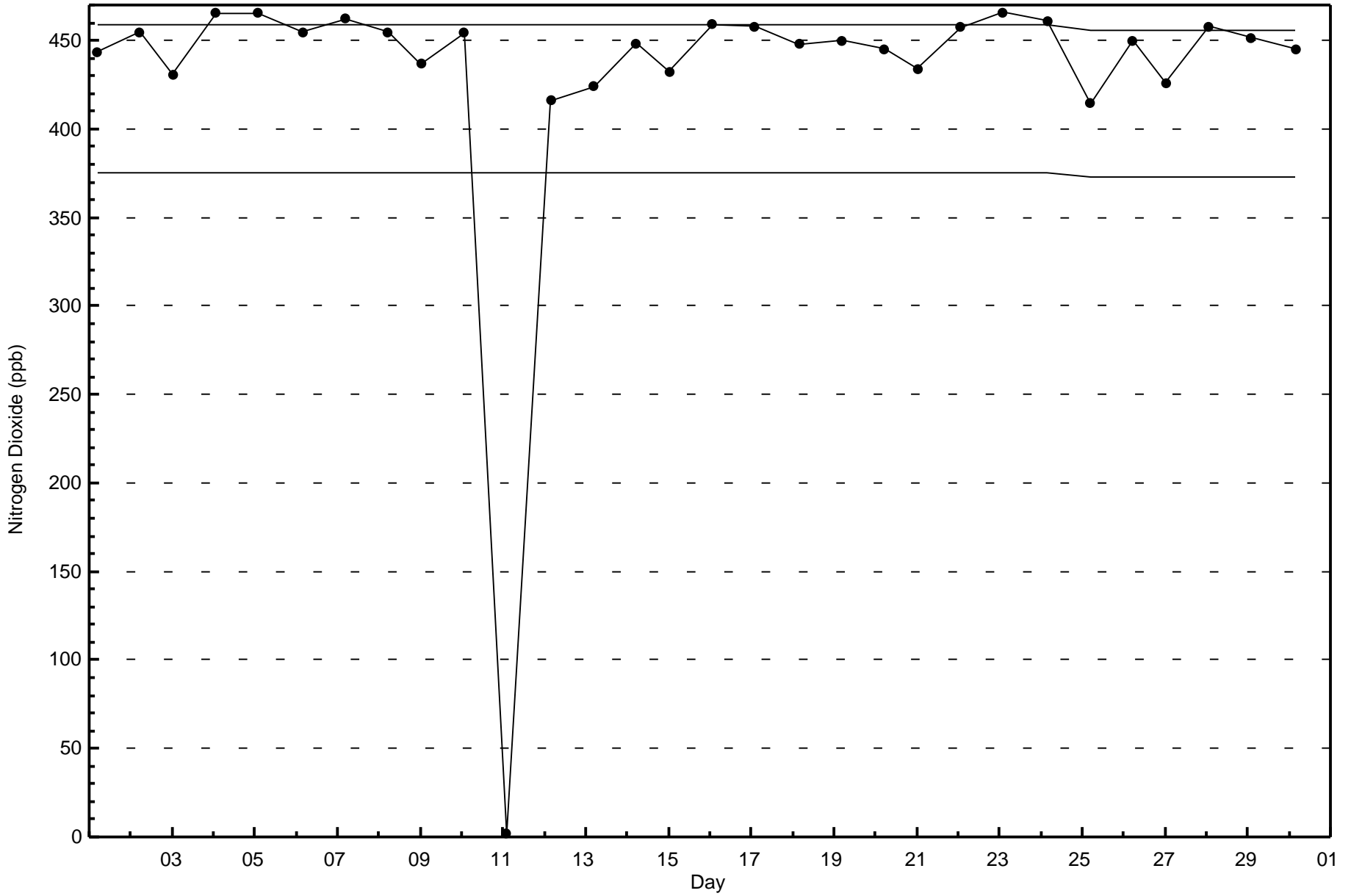
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac (AMS 14)



Total Number of Valid Hours: 675







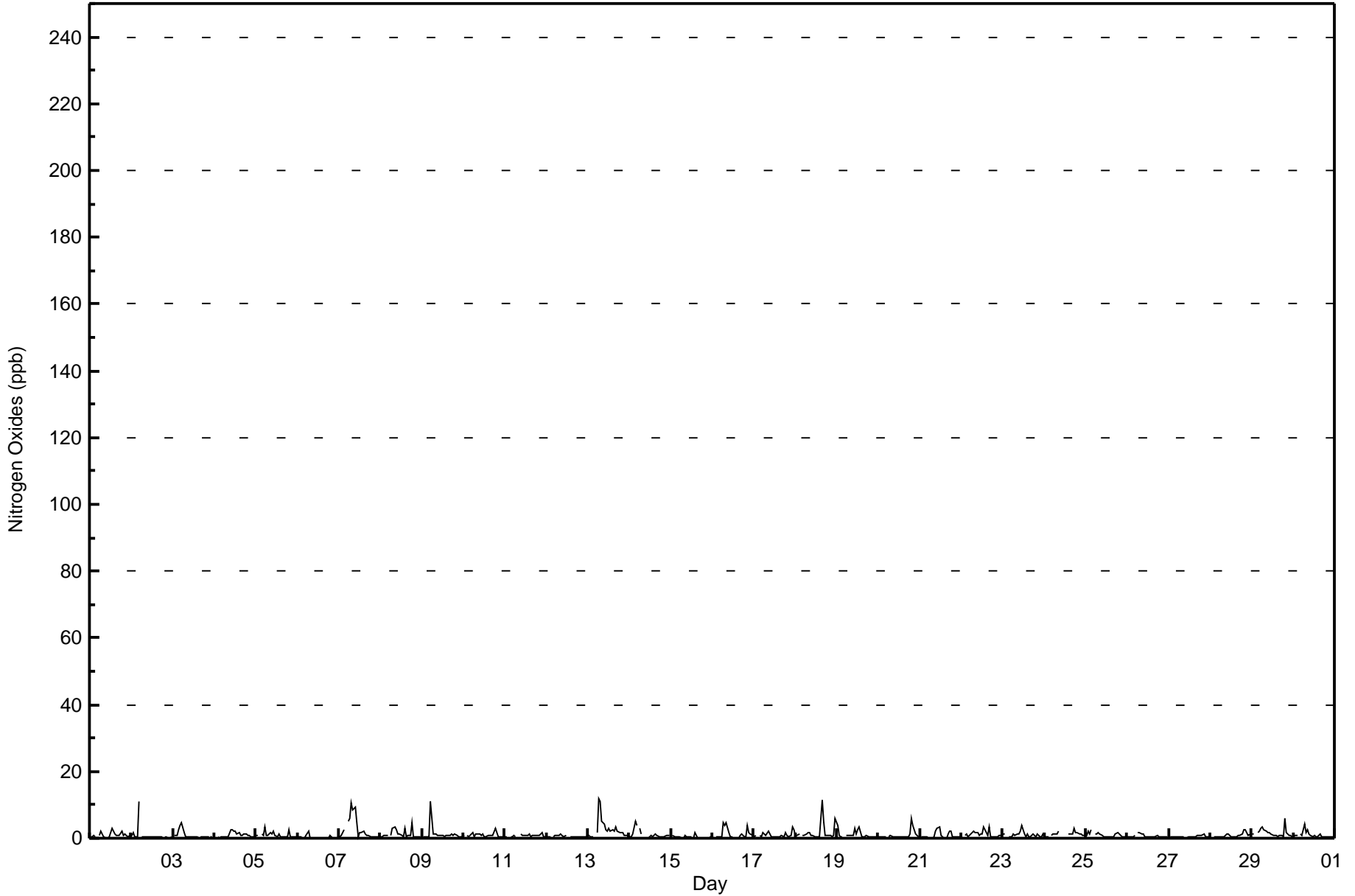


Maximum Value: 12 ppb on Sep 13 07:00	Maximum Daily Average: 2.8 ppb on Sep 13	Hours in Service: 720
Minimum Value: 0 ppb on Sep 6 13:00	Minimum Daily Average: 0.3 ppb on Sep 6	Hours of Data: 678
Maximum Diurnal Average: 1.9 ppb at hour 7	Minimum Diurnal Average: 0.6 ppb at hour 3	Hours of Missing Data: 42
Monthly Average: 1.1 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 9	Hours of Calibration: 34
		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-Sep	0	0	1	0	Z	1	2	1	0	0	0	0	2	3	1	1	1	1	2	1	1	1	0	1	0.9	3
2-Sep	1	2	0	0	11	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	11
3-Sep	Z	1	1	3	4	4	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.8	4
4-Sep	0	Z	0	0	0	1	0	0	0	2	3	2	2	1	1	1	1	1	1	1	1	0	1	1	0.9	3
5-Sep	1	1	Z	1	1	3	1	1	2	1	2	1	1	1	0	1	0	0	0	3	0	0	0	0	1.0	3
6-Sep	1	1	0	Z	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	2
7-Sep	0	1	2	3	Z	5	6	10	8	9	5	1	2	2	2	1	1	1	1	0	0	0	0	0	2.6	10
8-Sep	1	0	1	1	1	Z	1	3	4	2	1	1	1	1	3	1	1	1	5	0	0	0	0	1	1.3	5
9-Sep	Z	1	0	0	0	11	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1.3	11
10-Sep	1	Z	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	3	2	1	0	0	0	0.9	3
11-Sep	0	0	Z	0	1	1	1	M	M	1	1	1	1	1	1	1	1	1	1	1	1	2	0	0	0.8	2
12-Sep	0	0	0	UO	1	1	1	1	1	1	0	1	M	M	1	0	1	0	0	0	0	0	0	0	0.6	1
13-Sep	1	0	0	1	Z	2	12	11	5	4	3	2	3	2	3	2	3	2	2	2	2	1	1	1	2.8	12
14-Sep	0	0	1	5	4	Z	3	1	M	M	M	0	1	1	1	1	1	0	0	0	1	1	1	1	1.2	5
15-Sep	Z	1	0	0	0	0	0	0	1	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0.3	2
16-Sep	1	Z	0	0	0	0	5	4	4	2	0	0	0	0	0	0	1	1	1	0	4	2	1	1	1.2	5
17-Sep	1	1	Z	1	1	2	1	1	2	1	0	0	0	0	1	1	1	0	1	1	0	1	3	2	1.0	3
18-Sep	1	1	1	Z	1	1	1	2	2	1	1	1	1	1	0	12	5	1	1	1	0	1	0	6	1.8	12
19-Sep	4	1	0	0	Z	1	1	1	1	1	3	1	2	4	1	0	0	1	1	0	0	0	0	0	1.1	4
20-Sep	0	0	0	1	0	Z	0	1	1	1	1	0	0	0	0	0	0	0	1	6	4	1	1	1	0.9	6
21-Sep	Z	0	0	0	0	0	0	0	1	2	3	3	1	0	0	0	1	2	2	0	0	0	0	0	0.8	3
22-Sep	0	Z	1	1	1	1	2	2	2	2	1	1	1	3	2	1	3	1	1	1	1	0	1	1	1.2	3
23-Sep	1	1	Z	1	0	0	1	1	1	1	2	4	1	1	1	0	0	1	1	0	1	1	1	1	1.1	4
24-Sep	1	0	0	Z	1	1	1	1	2	C	C	C	C	C	1	1	1	3	2	2	1	1	1	1	1.2	3
25-Sep	1	2	1	2	Z	1	1	2	1	1	0	0	0	0	0	0	0	1	2	1	1	1	0	1	1.0	2
26-Sep	1	1	1	1	1	Z	2	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0.7	2
27-Sep	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0.4	1
28-Sep	0	Z	0	0	0	0	1	1	1	1	1	1	0	0	0	0	1	1	1	2	2	2	1	1	0.8	2
29-Sep	1	1	Z	2	2	3	3	2	2	2	2	1	1	1	1	1	1	1	1	6	2	1	1	1	1.6	6
30-Sep	1	1	1	Z	1	1	4	2	3	1	1	1	1	1	0	1	0	0	0	0	0	0	1	0	0.9	4

0.7	0.8	0.6	1.0	1.3	1.8	1.9	1.8	1.7	1.5	1.2	1.0	0.9	0.9	0.9	1.0	1.0	0.8	1.1	1.2	0.9	0.6	0.6	0.8		Diurnal Average
4	2	2	5	11	11	12	11	8	9	5	4	3	4	3	12	5	3	5	6	4	2	3	6		Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Anzac - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	678	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: 678

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Anzac - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	29	21	13	9	12	22	54	60	38	47	47	49	79	83	73	39	675
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	29	21	13	9	12	22	54	60	38	47	47	49	79	83	73	39	675

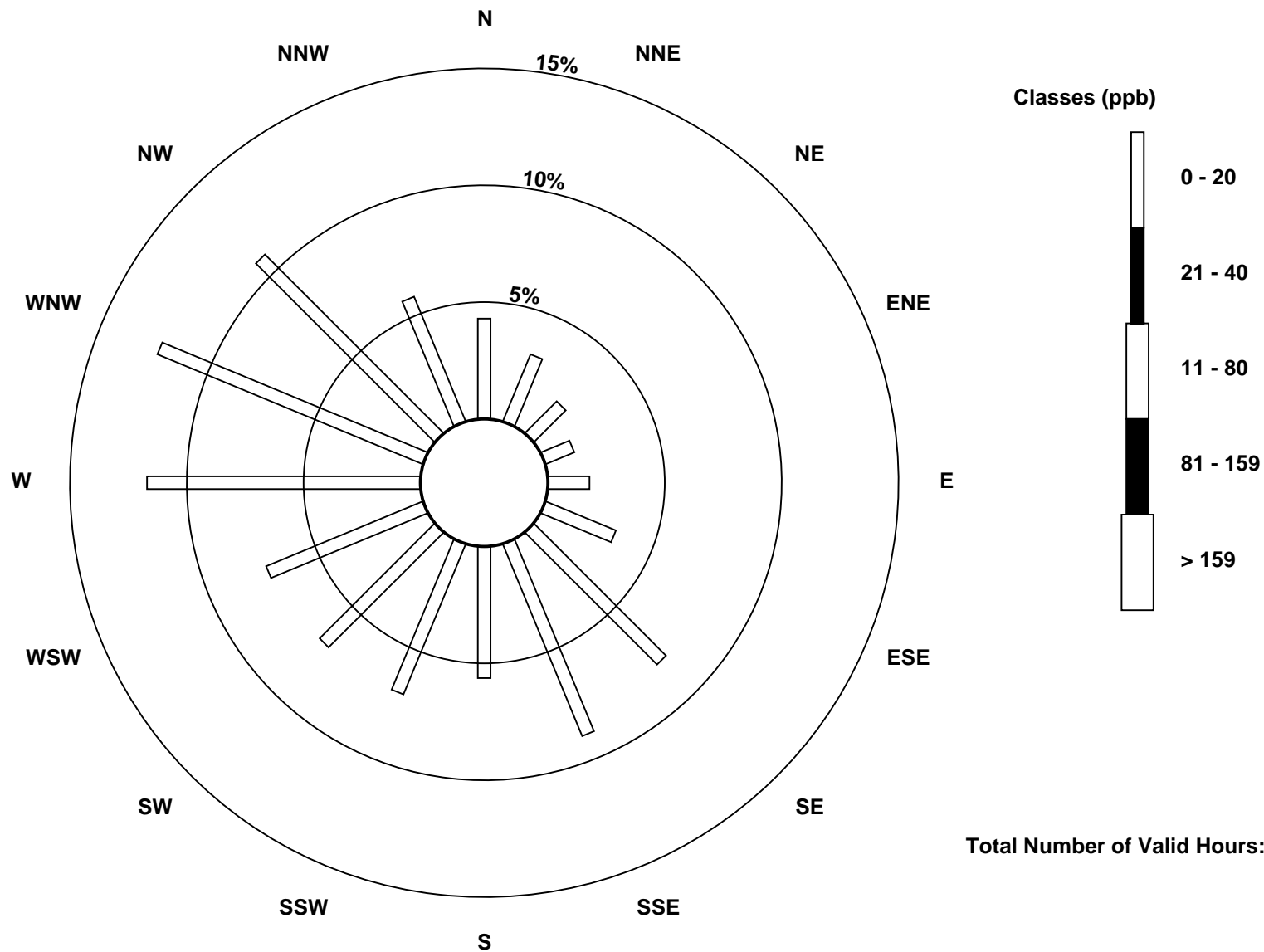
Total Number of Valid Hours: 675

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Anzac (AMS 14)

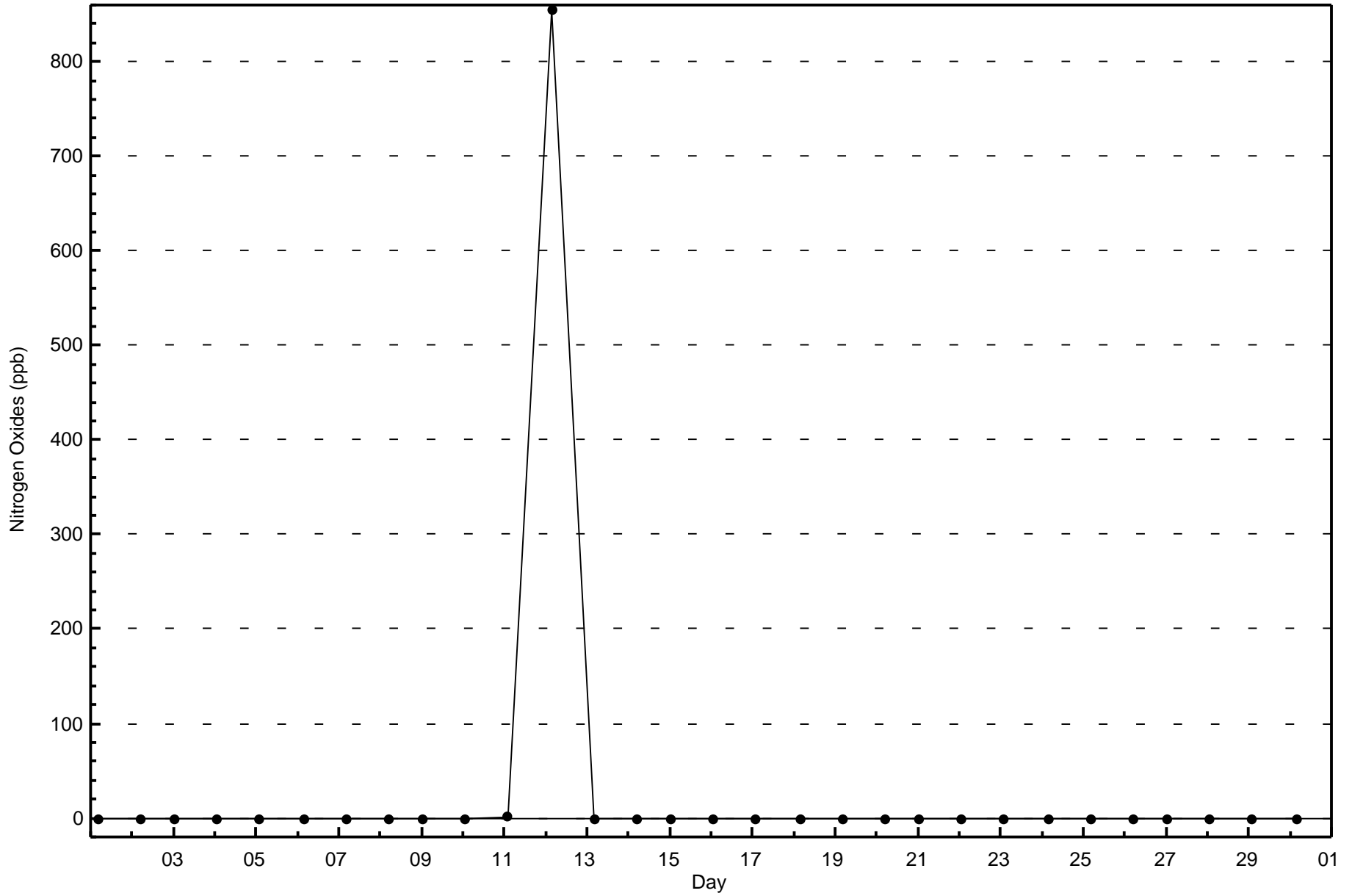


Total Number of Valid Hours: 675

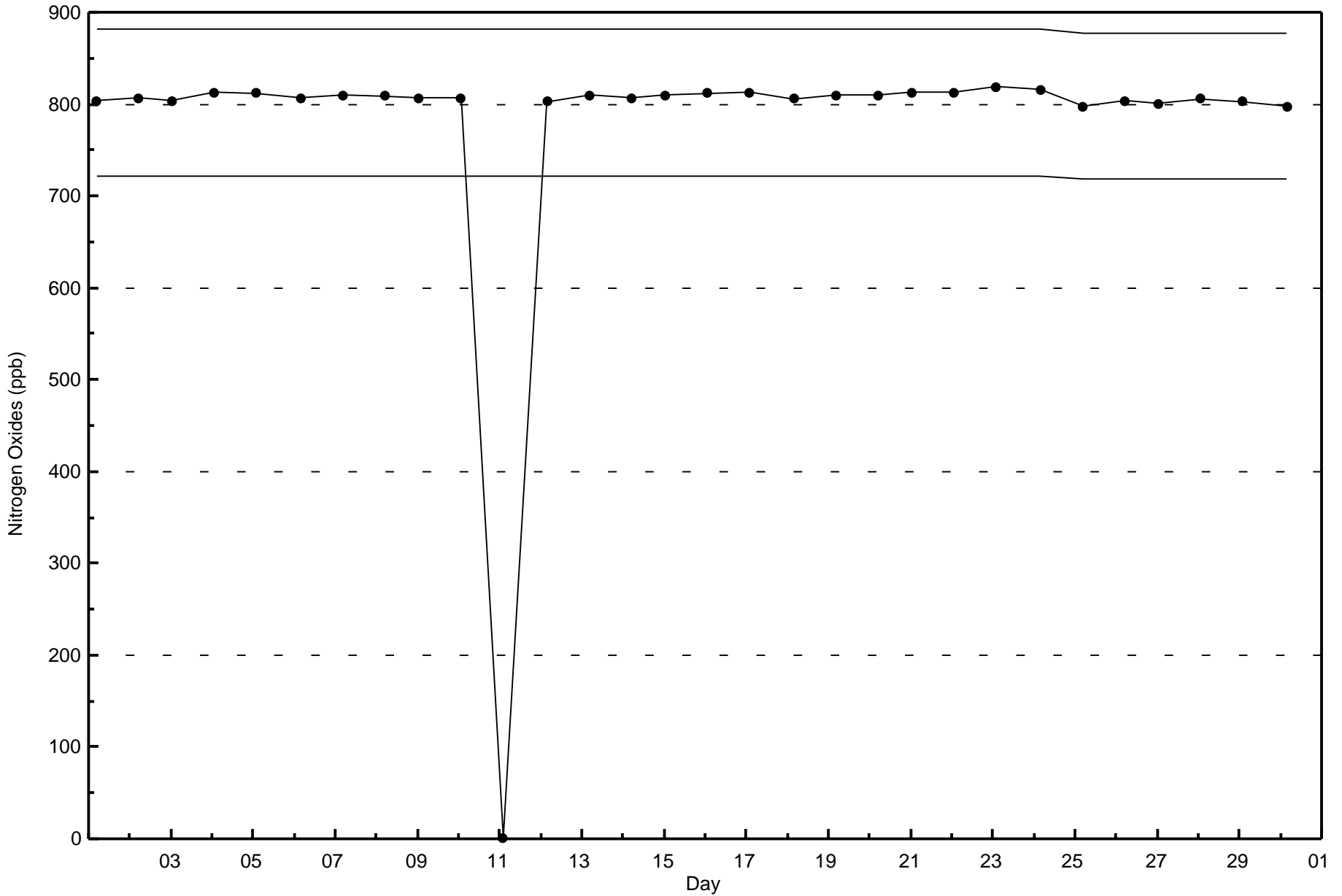


**Wood Buffalo Environmental Association**  
**Zero Responses**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Anzac - September 2015**









Wood Buffalo Environmental Association

Summary of Hour Averages

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

Anzac - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 43 ppb on Sep 25 14:00	Maximum Daily Average: 33.4 ppb on Sep 26		Hours of Data:	652
Minimum Value: 5 ppb on Sep 5 03:00	Minimum Daily Average: 14.8 ppb on Sep 6		Hours of Missing Data:	68
Maximum Diurnal Average: 29.7 ppb at hour 16	Minimum Diurnal Average: 14.5 ppb at hour 6		Hours of Calibration:	36
Monthly Average: 21.8 ppb	Percentiles: P <sub>1</sub> = 5 P <sub>10</sub> = 9 Q <sub>1</sub> = 15 Median = 22 Q <sub>3</sub> = 29 P <sub>90</sub> = 33 P <sub>99</sub> = 40		Percent Operational Time:	95.6

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-Sep	17	16	12	12	25	20	Z	21	28	28	28	27	27	31	33	32	30	29	24	26	26	16	9	6	22.7	33
2-Sep	9	6	7	7	5	5	5	Z	15	15	17	17	18	21	22	21	22	22	21	20	23	24	21	18	15.7	24
3-Sep	14	15	Z	15	13	12	17	19	18	18	18	17	19	20	19	20	20	21	18	16	15	15	16	14	17.0	21
4-Sep	12	11	10	Z	11	10	10	11	12	16	20	23	24	25	26	27	28	26	20	12	10	6	6	5	15.7	28
5-Sep	5	5	5	5	Z	11	9	13	18	24	24	25	26	26	28	28	26	20	16	10	9	7	6	6	15.3	28
6-Sep	5	5	6	6	6	Z	9	11	14	17	19	20	21	23	23	20	18	16	17	18	17	16	15	14	14.8	23
7-Sep	14	12	11	10	9	8	Z	9	13	14	20	27	26	27	27	28	27	23	17	14	11	12	14	8	16.6	28
8-Sep	7	6	6	6	6	7	6	Z	21	25	30	32	32	32	32	33	33	32	21	15	15	17	12	16	19.1	33
9-Sep	18	22	Z	11	11	11	17	22	26	30	31	27	28	25	30	32	32	27	21	27	21	13	14	18	22.4	32
10-Sep	16	11	7	Z	6	5	6	13	20	26	29	32	35	36	36	36	33	31	20	18	10	9	9	9	19.7	36
11-Sep	10	15	16	16	Z	19	17	17	20	M	25	26	27	27	28	28	27	19	17	14	19	20	24	30	21.0	30
12-Sep	29	28	28	27	26	Z	23	23	23	27	32	32	M	M	37	39	40	40	37	34	33	31	28	22	30.4	40
13-Sep	18	9	8	8	6	6	Z	9	19	23	26	27	27	28	26	27	24	27	23	23	20	10	12	18	18.4	28
14-Sep	19	18	15	12	11	11	11	Z	15	16	18	M	M	22	23	23	24	23	18	11	7	6	5	6	15.0	24
15-Sep	6	5	Z	6	7	8	7	7	17	18	17	17	19	22	25	25	25	24	20	14	14	14	18	16	15.3	25
16-Sep	15	9	8	Z	6	6	5	7	11	18	21	22	24	25	27	28	25	24	15	12	15	14	10	8	15.4	28
17-Sep	6	7	10	8	Z	6	6	8	17	22	29	29	30	30	31	34	32	30	21	19	17	14	9	14	18.7	34
18-Sep	21	21	24	22	19	Z	20	23	27	30	31	34	33	33	34	32	33	34	32	26	19	23	22	14	26.3	34
19-Sep	13	12	13	12	21	26	Z	29	29	30	32	35	34	34	35	35	33	30	29	33	38	39	38	36	29.0	39
20-Sep	35	32	32	31	31	30	30	Z	29	29	30	30	31	31	31	31	31	29	20	15	13	11	13	17	26.6	35
21-Sep	16	19	Z	17	16	15	15	14	16	19	21	22	24	27	28	28	27	23	23	23	24	24	24	24	21.2	28
22-Sep	23	22	21	Z	14	10	10	12	20	28	29	29	30	29	29	29	28	27	24	17	15	13	16	14	21.2	30
23-Sep	18	20	20	Z	21	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	21
24-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	C	C	C	C	39	39	38	40	36	34	31	--	40
25-Sep	30	27	27	20	19	Z	24	30	33	40	41	43	43	43	41	39	37	34	33	34	36	36	35	35	32.9	43
26-Sep	35	35	34	27	28	23	25	Z	28	33	34	36	37	37	37	37	40	39	37	35	34	33	33	32	33.4	40
27-Sep	31	30	Z	30	29	29	28	30	33	29	28	27	27	27	26	26	26	27	27	27	27	26	26	26	28.1	33
28-Sep	26	26	25	Z	25	24	24	24	25	27	27	28	28	29	29	30	29	23	21	22	23	25	27	27	25.8	30
29-Sep	26	24	24	23	Z	20	18	16	20	27	28	29	32	33	33	33	32	26	22	13	14	14	16	16	23.4	33
30-Sep	16	16	16	15	12	Z	17	17	21	26	28	30	31	32	33	33	32	30	30	29	23	22	27	22	24.3	33

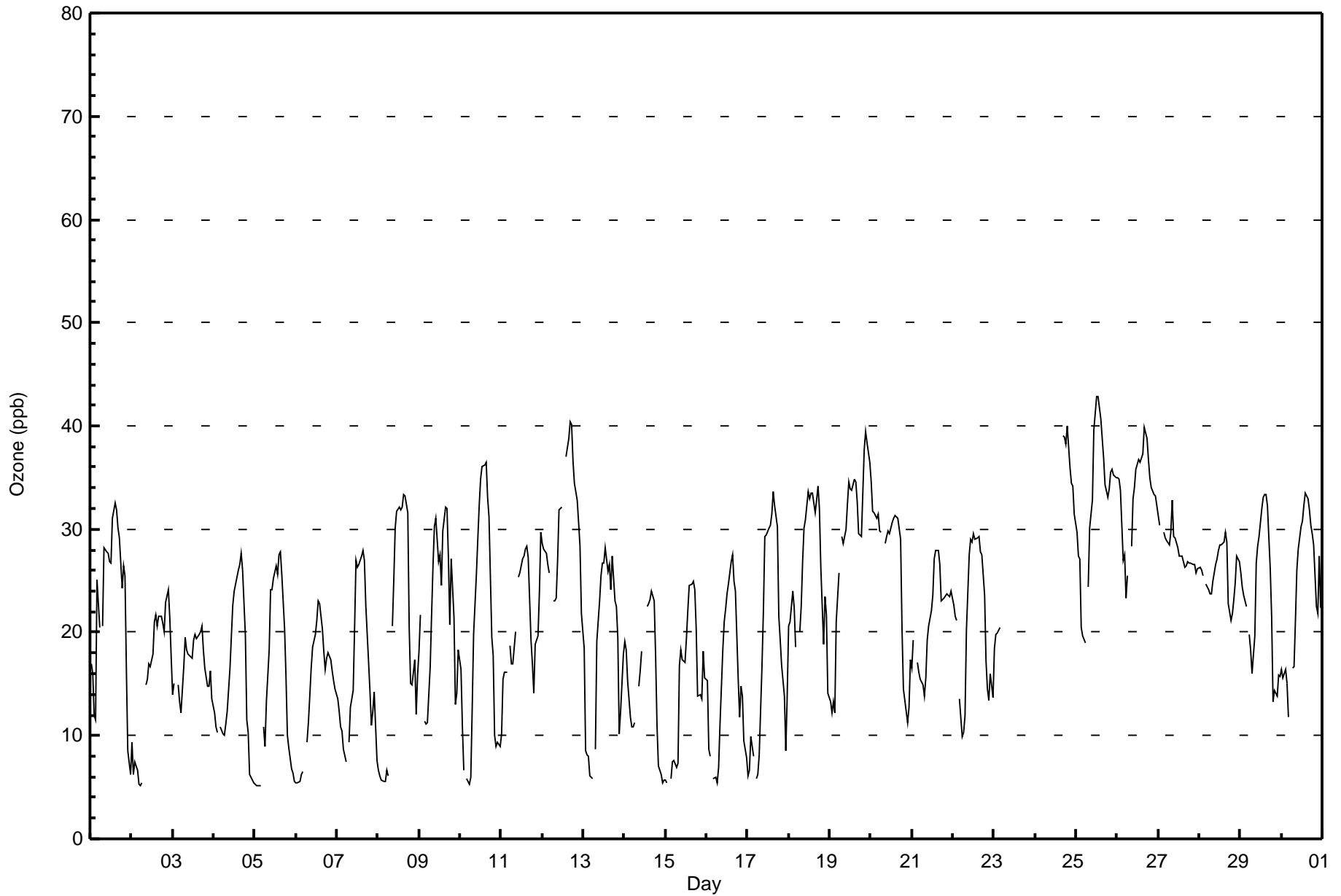
17.7	16.7	16.0	15.3	15.1	14.5	14.6	16.5	20.9	24.1	26.2	27.5	28.2	28.7	29.6	29.7	29.4	27.5	23.5	21.3	20.0	18.8	18.7	18.0	Diurnal Average	
35	35	34	31	31	30	30	30	33	33	40	41	43	43	41	39	40	40	38	40	38	39	38	36	Diurnal Maximum	

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



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Anzac - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Anzac - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	288	44.17	44.17
21 - 50	364	55.83	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 652

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Anzac - September 2015**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	9	8	4	8	10	15	33	27	28	28	12	8	27	33	19	285
21 - 50	14	12	5	3	4	12	19	20	13	18	19	37	70	58	40	20	364
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	21	13	7	12	22	34	53	40	46	47	49	78	85	73	39	649

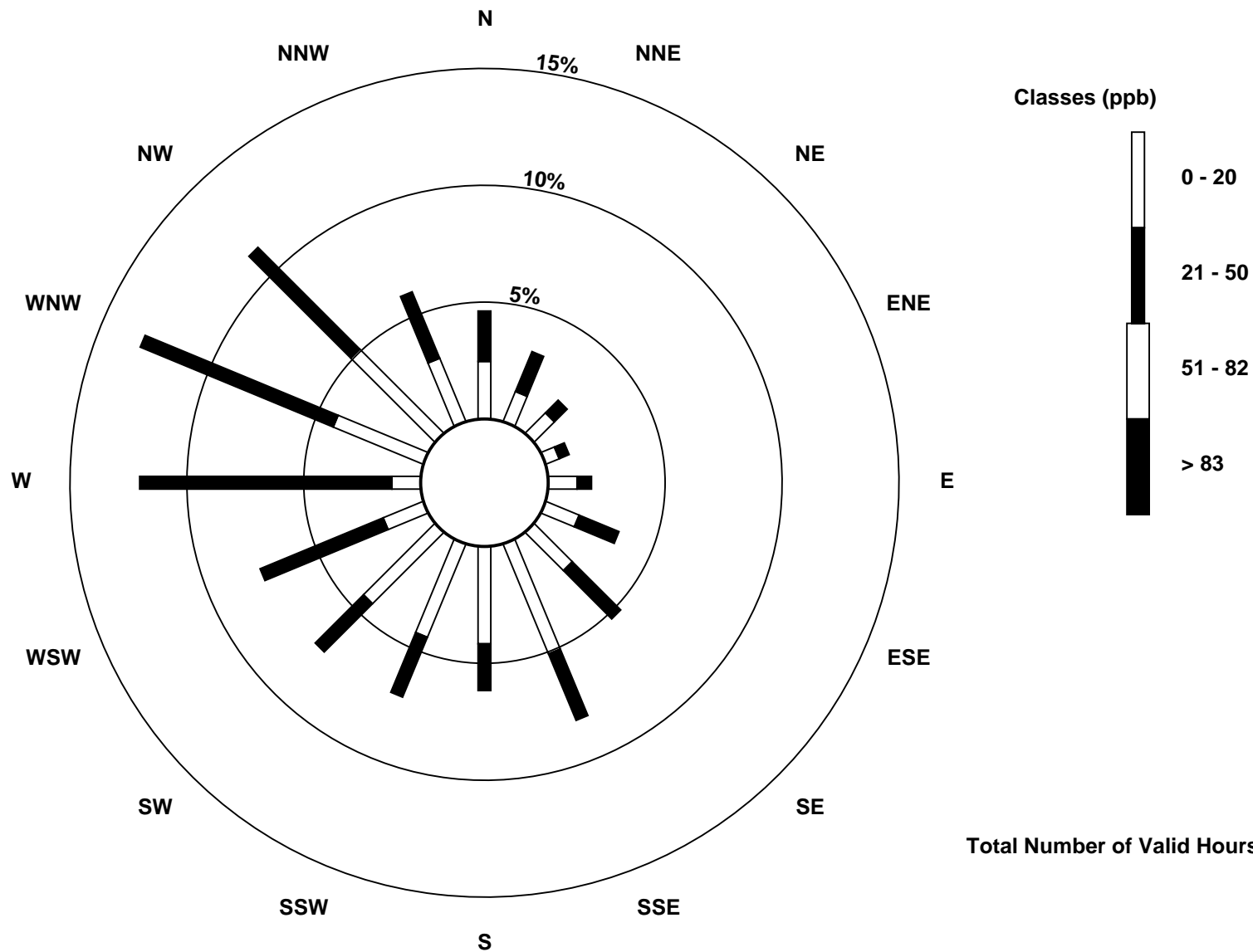
Total Number of Valid Hours: 649

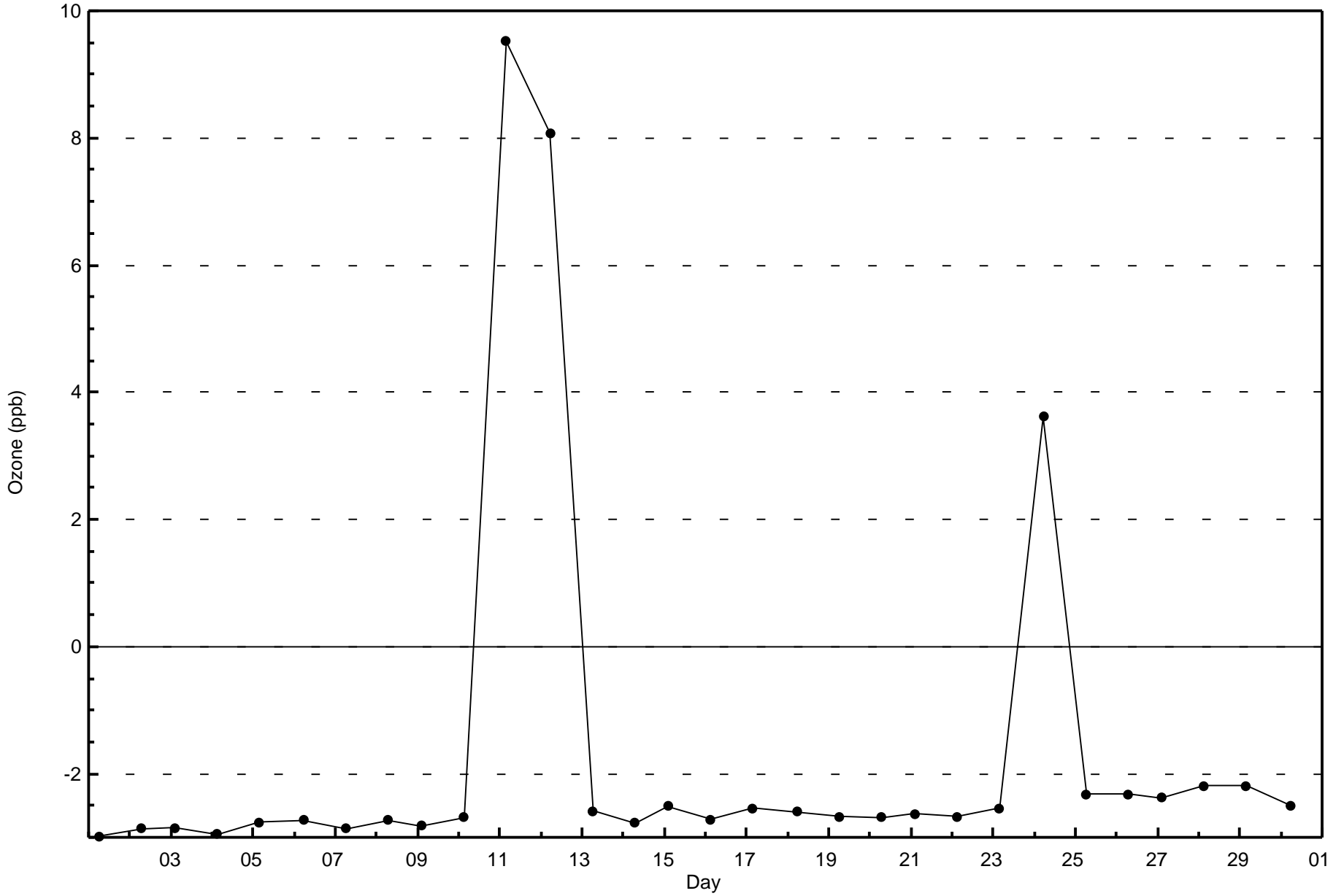
Total Number of Hours: 720

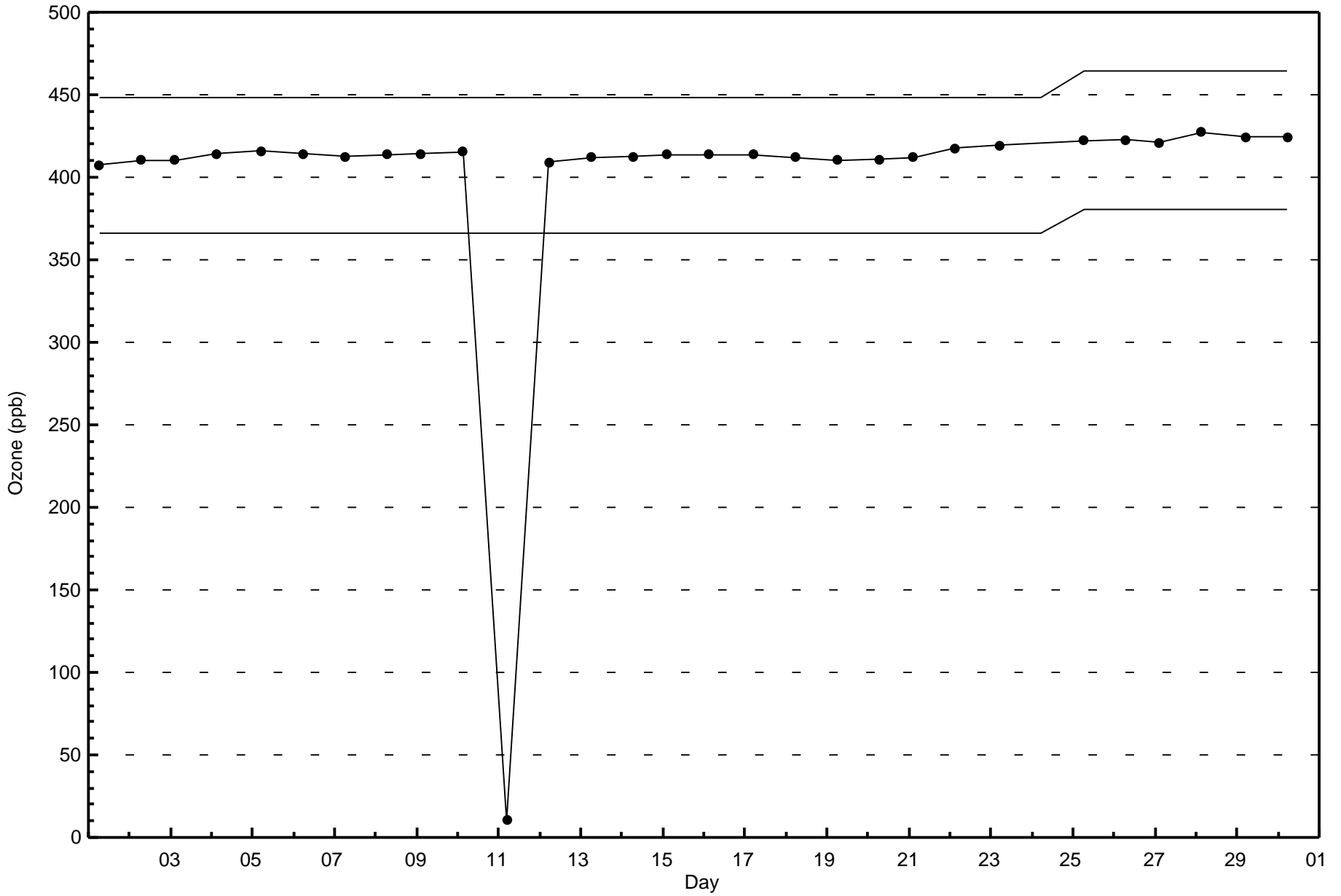


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Ozone (O<sub>3</sub>) - ppb  
Anzac (AMS 14)











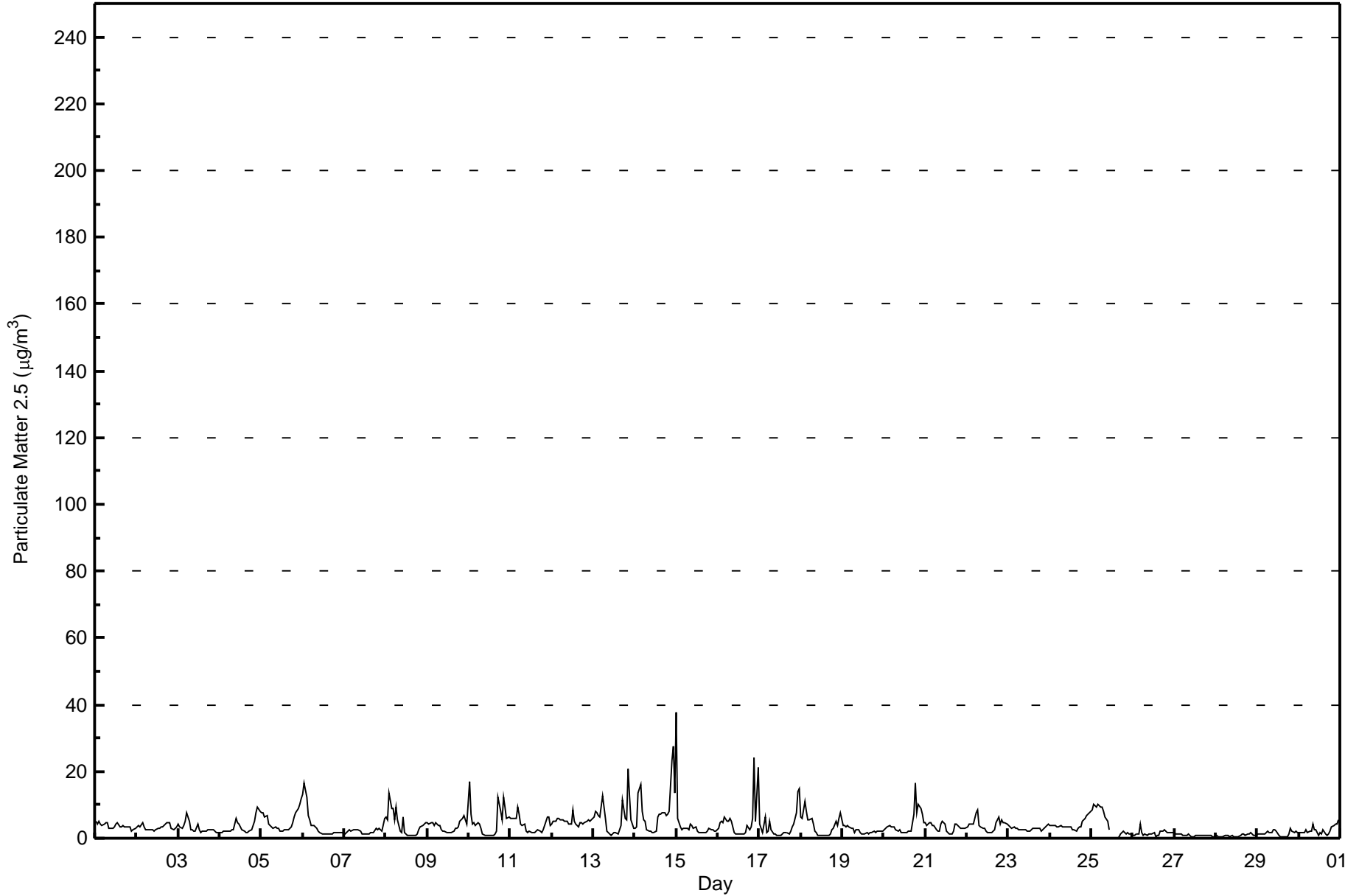
Summary of Hour Averages

Anzac - September 2015

Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 37.6 µg/m <sup>3</sup> on Sep 15 01:00	Maximum Daily Average: 7.9 µg/m <sup>3</sup> on Sep 14	Hours of Data:	719
Minimum Value: 0.0 µg/m <sup>3</sup> on Sep 25 13:00	Minimum Daily Average: 0.8 µg/m <sup>3</sup> on Sep 28	Hours of Missing Data:	1
Maximum Diurnal Average: 5.8 µg/m <sup>3</sup> at hour 22	Minimum Diurnal Average: 1.9 µg/m <sup>3</sup> at hour 14	Hours of Calibration:	1
Monthly Average: 3.64 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 0.4 P <sub>10</sub> = 1.0 Q <sub>1</sub> = 1.7 Median = 2.7 Q <sub>3</sub> = 4.5 P <sub>90</sub> = 7.0 P <sub>99</sub> = 14.3	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-Sep	5.2	4.1	4.9	4.4	3.6	4.1	4.7	4.5	3.1	3.0	3.1	3.4	4.4	4.7	3.5	3.3	3.8	3.5	3.6	3.4	3.3	2.3	2.6	3.0	3.7	5.2																							
2-Sep	3.3	3.9	3.6	4.5	3.2	2.7	2.4	2.4	2.4	2.4	2.3	2.4	2.8	2.9	3.2	3.4	3.7	4.5	4.8	4.7	3.1	2.7	2.9	3.6	3.2	4.8																							
3-Sep	4.4	3.2	3.0	4.0	5.0	7.6	5.2	2.5	2.4	2.1	2.3	4.1	2.7	1.9	2.0	2.0	2.2	2.7	2.5	2.4	2.7	2.1	1.8	1.9	3.0	7.6																							
4-Sep	1.9	1.8	1.9	2.0	2.1	2.3	2.3	2.4	5.8	4.8	4.2	3.3	2.7	2.1	1.5	1.7	2.2	2.5	3.8	5.2	7.7	9.2	8.2	3.5	9.2																								
5-Sep	7.6	7.7	6.4	6.9	4.1	3.8	3.5	3.0	3.4	3.1	2.9	2.1	2.0	2.8	2.5	2.5	3.5	4.5	6.1	7.5	9.1	10.3	11.7	5.0	11.7																								
6-Sep	13.0	16.4	12.3	7.0	5.3	4.0	3.9	3.2	2.9	2.1	1.6	1.5	1.4	1.3	1.3	1.2	1.4	1.7	1.9	1.8	1.9	1.7	1.5	3.8	16.4																								
7-Sep	1.4	1.6	2.3	2.5	2.2	2.4	2.4	2.6	2.4	2.2	1.4	1.1	1.2	1.3	1.5	1.5	1.5	1.8	2.9	2.7	3.0	2.6	2.3	5.8	2.2	5.8																							
8-Sep	6.5	5.4	13.7	8.8	8.8	5.5	9.3	5.3	2.0	1.8	6.2	1.8	0.8	0.7	0.8	0.8	0.9	0.9	1.3	2.7	3.5	3.6	4.4	4.7	4.2	13.7																							
9-Sep	4.6	4.2	4.8	4.6	4.0	4.7	4.0	3.8	2.6	2.0	1.9	1.8	1.7	1.7	1.8	2.1	3.0	2.9	3.6	5.2	6.0	6.6	5.5	4.3	3.6	6.6																							
10-Sep	16.9	7.1	4.2	4.7	3.7	4.9	4.1	3.1	1.4	0.7	0.8	1.0	0.8	0.9	1.0	1.4	2.3	12.2	8.1	5.5	12.3	9.2	6.0	6.4	4.9	16.9																							
11-Sep	5.7	5.8	5.8	5.9	9.3	7.0	4.2	3.9	4.0	2.1	1.8	2.1	1.8	1.7	1.8	2.0	2.6	2.3	1.7	2.5	3.7	6.5	6.3	3.8	3.9	9.3																							
12-Sep	4.3	4.9	5.1	5.9	5.7	5.5	5.6	5.1	5.3	5.0	4.3	4.4	8.3	4.9	4.1	3.5	4.7	4.7	4.4	4.7	5.0	5.3	5.1	5.6	5.1	8.3																							
13-Sep	6.2	8.0	7.8	6.8	6.2	12.8	9.4	5.9	2.0	1.1	1.0	1.3	1.6	1.6	1.4	2.4	3.9	11.5	5.9	5.7	20.6	12.6	5.4	3.2	6.0	20.6																							
14-Sep	3.0	3.2	13.6	16.2	7.9	5.3	5.2	2.5	1.9	2.1	1.7	1.5	2.0	6.5	7.3	7.4	7.8	7.5	6.9	7.4	8.2	23.2	27.6	13.4	7.9	27.6																							
15-Sep	37.6	6.0	3.6	2.7	2.8	2.8	2.8	2.7	4.2	3.8	3.1	3.4	2.0	1.9	1.9	1.9	1.9	1.8	2.2	3.1	2.3	2.7	2.2	2.3	4.2	37.6																							
16-Sep	2.8	4.8	4.9	4.9	6.5	5.1	5.1	6.1	4.9	1.6	1.3	1.1	1.2	1.3	1.3	1.2	1.8	3.8	2.3	3.5	6.0	24.1	4.9	21.4	5.1	24.1																							
17-Sep	4.2	3.0	1.7	6.2	1.7	2.0	5.3	2.5	1.1	1.1	0.9	1.0	0.9	1.1	1.5	1.7	1.5	1.3	2.3	3.3	4.4	7.7	14.2	14.7	3.5	14.7																							
18-Sep	6.2	6.1	11.0	7.8	5.4	5.5	5.9	4.3	1.9	1.5	0.9	0.7	0.8	0.8	0.9	1.0	0.8	1.1	2.7	2.8	5.2	3.6	6.0	7.5	3.8	11.0																							
19-Sep	3.9	3.6	3.3	3.9	3.2	2.8	3.0	1.8	2.4	2.7	1.8	1.4	1.4	1.3	1.5	1.3	1.7	1.5	2.0	1.8	2.0	2.1	2.2	2.2	2.3	3.9																							
20-Sep	2.5	3.2	3.3	3.7	3.6	3.4	3.4	2.7	2.2	2.5	1.9	1.8	1.9	1.9	1.9	1.9	1.9	7.2	16.5	7.6	10.3	9.0	7.4	4.5	4.4	16.5																							
21-Sep	4.8	3.9	4.5	4.6	4.0	3.7	2.5	1.9	2.3	4.3	4.9	4.0	2.2	1.7	1.4	1.5	2.3	4.4	4.4	3.8	3.0	3.1	2.8	2.8	3.3	4.9																							
22-Sep	3.5	4.4	4.4	4.3	4.2	7.8	8.5	3.9	3.3	3.1	2.9	2.2	1.7	1.9	1.8	2.0	2.4	4.7	6.4	4.3	5.4	4.8	4.5	4.4	4.0	8.5																							
23-Sep	3.8	3.3	3.0	3.2	2.9	2.9	2.7	2.4	2.5	2.7	2.4	2.0	2.2	2.6	2.9	3.1	3.0	3.1	2.9	2.2	2.7	3.3	4.0	4.2	2.9	4.2																							
24-Sep	3.9	3.7	3.6	3.6	3.3	3.3	3.7	3.2	3.5	3.2	3.5	3.6	3.4	2.6	2.4	2.2	3.0	3.5	3.3	4.9	6.0	6.9	7.2	7.4	4.0	7.4																							
25-Sep	8.6	10.1	9.6	9.4	10.0	9.4	9.5	8.1	6.2	5.2	2.7	C	0.0	0.0	0.0	0.0	0.5	1.2	2.1	1.9	1.3	1.6	1.2	1.2	4.3	10.1																							
26-Sep	1.0	0.9	1.1	1.1	4.1	1.6	0.8	1.4	1.1	1.1	1.3	1.2	1.5	0.3	0.6	0.8	2.0	2.0	2.6	2.2	1.8	1.7	1.6	1.8	1.5	4.1																							
27-Sep	1.6	1.5	1.3	1.1	1.1	1.0	1.0	1.1	1.2	1.0	0.5	0.5	0.7	0.8	0.7	0.9	0.9	0.6	0.9	1.0	0.8	0.8	0.6	0.6	0.9	1.6																							
28-Sep	0.7	0.6	0.5	0.5	0.4	0.7	0.8	0.9	0.6	0.9	0.6	0.4	0.4	0.5	0.7	1.1	1.3	0.9	1.1	1.4	1.5	1.1	1.0	1.0	0.8	1.5																							
29-Sep	1.1	1.2	1.3	1.3	1.5	1.7	1.9	1.6	1.6	2.5	2.7	2.2	0.9	0.6	0.4	0.4	0.6	0.5	1.4	3.0	2.2	1.8	2.0	1.8	1.5	3.0																							
30-Sep	1.6	1.7	1.5	1.8	2.5	1.9	2.2	2.0	4.1	2.5	2.4	0.6	1.5	1.3	2.7	1.5	0.8	1.1	2.1	3.5	4.0	4.4	4.1	5.6	2.4	5.6																							
																								5.7	4.5	4.9	4.8	4.3	4.3	4.2	3.2	2.7	2.5	2.3	2.0	1.9	1.9	1.9	1.9	2.3	3.3	3.6	3.6	4.8	5.8	5.2	5.3	Diurnal Average	
																								37.6	16.4	13.7	16.2	10.0	12.8	9.5	8.1	6.2	5.8	6.2	4.4	8.3	6.5	7.3	7.4	7.8	12.2	16.5	7.6	20.6	24.1	27.6	21.4	Diurnal Maximum	

C - Calibration	
Alberta Ambient Air Quality Objectives (AAAQO):	24-hr 30 µg/m <sup>3</sup>





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Anzac - September 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	531	73.85	73.85
6 - 15	107	14.88	88.73
16 - 25	8	1.11	89.85
26 - 80	2	0.28	90.13
> 81.0	0	0.00	90.13

Total Number of Valid Hours: 719

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Anzac - September 2015**

Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	28	17	10	8	11	20	47	58	28	39	32	38	57	54	48	35	530
6 - 15	2	3	1	2	1	2	9	5	9	8	13	11	8	16	8	7	105
16 - 25	0	0	1	0	0	0	0	0	3	0	2	0	0	1	1	0	8
26 - 80	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	30	20	12	10	12	22	56	63	40	48	48	49	65	71	57	42	645

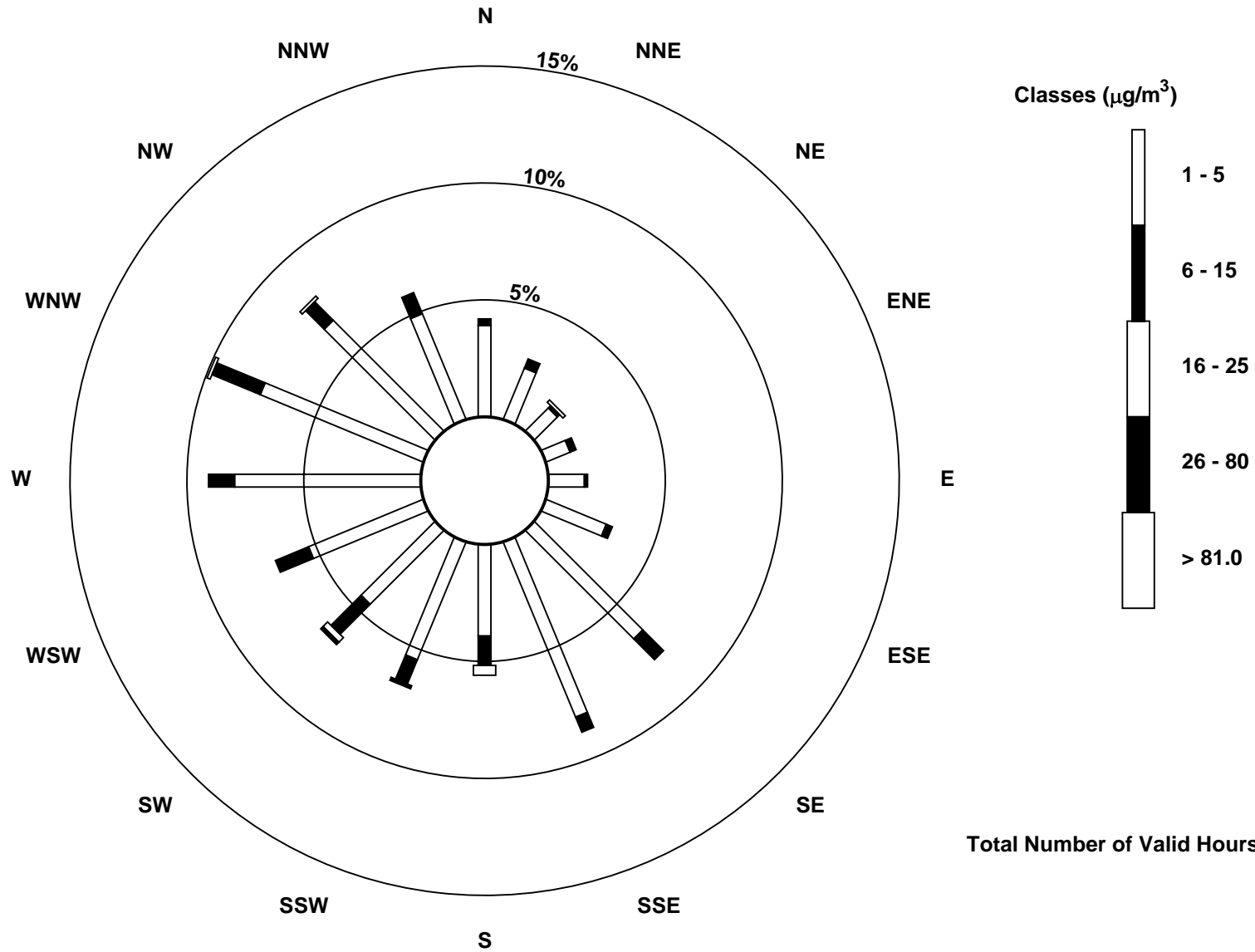
Total Number of Valid Hours: 716

Total Number of Hours: 720



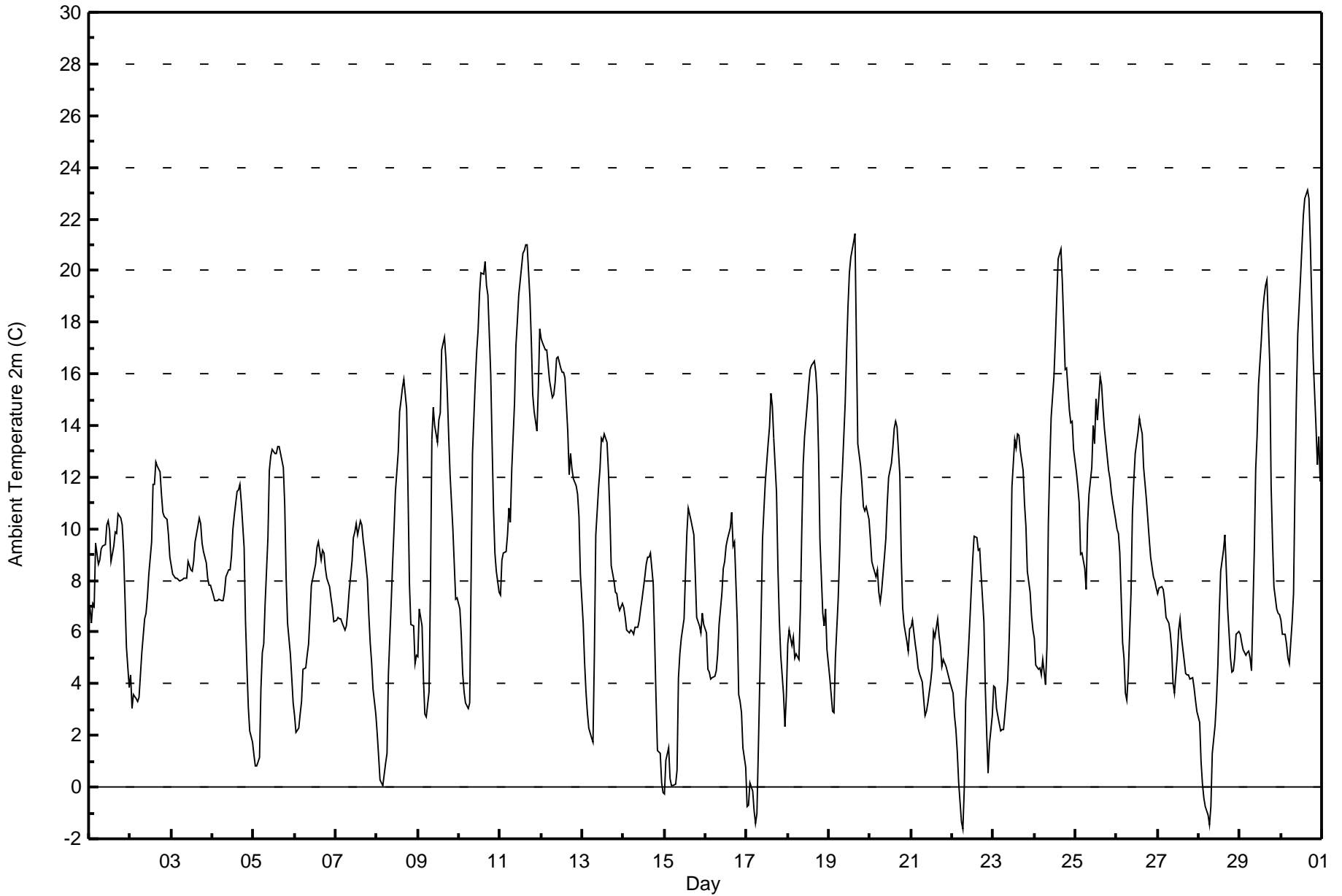
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Anzac (AMS 14)





Maximum Value: 23.1 C on Sep 30 16:00		Maximum Daily Average: 15.1 C on Sep 11		Hours in Service: 720																							
Minimum Value: -1.6 C on Sep 22 07:00		Minimum Daily Average: 3.8 C on Sep 28		Hours of Data: 720																							
Maximum Diurnal Average: 13.7 C at hour 16		Minimum Diurnal Average: 4.8 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 8.68 C		Percentiles: P <sub>1</sub> = -0.8 P <sub>10</sub> = 2.8 Q <sub>1</sub> = 5.1 Median = 8.1 Q <sub>3</sub> = 11.9 P <sub>90</sub> = 15.8 P <sub>99</sub> = 21.0		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-Sep	7.0	6.4	7.1	7.0	9.4	8.6	8.8	9.2	9.3	9.4	10.1	10.3	9.9	8.7	9.3	9.9	9.8	10.6	10.4	10.2	9.1	7.3	5.4	3.9	8.6	10.6	
2-Sep	4.3	3.0	3.6	3.4	3.3	3.5	4.3	5.2	6.5	6.8	7.4	8.2	9.5	11.7	11.7	12.6	12.4	12.2	11.3	10.7	10.5	10.4	9.7	8.9	8.0	12.6	
3-Sep	8.6	8.2	8.1	8.1	8.0	8.0	8.0	8.1	8.1	8.1	8.7	8.4	8.4	8.7	9.5	10.1	10.4	10.2	9.4	9.1	8.7	8.1	7.8	7.8	8.6	10.4	
4-Sep	7.4	7.2	7.2	7.2	7.3	7.2	7.2	7.5	8.1	8.4	8.4	8.9	10.0	10.5	11.5	11.5	11.7	11.0	9.3	6.4	4.7	3.1	2.2	1.7	7.7	11.7	
5-Sep	1.2	0.8	0.8	1.2	3.8	5.2	5.5	7.1	9.7	12.2	12.8	13.1	12.9	12.9	13.2	13.2	12.9	12.4	10.9	8.1	6.3	5.1	4.2	3.3	7.9	13.2	
6-Sep	2.8	2.1	2.3	2.8	3.3	4.5	4.6	5.1	5.6	6.6	7.8	8.4	8.6	9.3	9.5	8.8	9.2	9.1	8.5	8.1	7.7	7.3	6.9	6.4	6.5	9.5	
7-Sep	6.5	6.5	6.5	6.5	6.4	6.1	6.3	6.8	7.6	8.7	9.6	9.9	10.2	9.7	10.3	10.1	9.6	9.1	8.0	6.7	5.6	4.8	3.8	2.8	7.4	10.3	
8-Sep	2.1	1.2	0.3	0.1	0.5	0.9	1.3	4.4	7.1	8.7	10.0	11.5	13.0	14.6	15.0	15.5	15.8	14.7	11.4	7.9	6.3	6.2	4.8	5.1	7.4	15.8	
9-Sep	5.0	6.9	6.2	4.2	2.8	2.7	3.7	7.8	13.5	14.7	14.0	13.4	14.2	14.5	16.9	17.4	16.6	15.3	13.6	12.1	10.0	8.6	7.3	7.4	10.4	17.4	
10-Sep	6.9	5.9	4.4	3.7	3.3	3.1	3.3	8.0	12.9	15.7	16.9	17.7	19.1	19.9	19.9	20.3	19.4	19.1	16.0	13.3	10.7	9.1	8.3	7.5	11.8	20.3	
11-Sep	7.5	8.8	9.1	9.1	9.8	10.8	10.2	12.3	14.9	17.1	18.0	19.1	20.1	20.7	20.8	21.0	21.0	19.0	17.3	15.2	14.5	13.8	15.5	17.8	15.1	21.0	
12-Sep	17.4	17.2	16.9	16.9	16.3	15.7	15.1	15.2	15.7	16.6	16.7	16.2	16.0	16.1	15.8	13.8	12.1	12.9	12.3	11.9	11.7	11.3	10.5	8.3	14.5	17.4	
13-Sep	6.3	4.8	3.7	2.9	2.3	1.9	1.8	5.1	9.8	11.6	12.3	13.5	13.4	13.7	13.3	12.3	10.7	8.6	8.0	7.5	7.5	7.0	6.8	7.1	8.0	13.7	
14-Sep	7.0	6.6	6.1	6.0	6.1	6.0	5.9	6.2	6.2	6.5	6.9	7.3	8.2	8.6	8.9	8.9	9.0	7.9	5.7	3.4	1.4	1.3	0.2	-0.2	5.8	9.0	
15-Sep	-0.3	1.0	1.5	0.3	0.1	0.1	0.1	0.7	4.2	5.1	5.7	6.5	8.3	9.8	10.8	10.3	10.1	9.8	8.2	6.6	6.3	6.0	6.7	6.3	5.2	10.8	
16-Sep	6.0	4.6	4.4	4.2	4.3	4.3	4.5	5.2	6.3	7.5	8.4	8.7	9.3	9.6	10.0	10.7	9.3	9.5	6.4	3.6	3.3	2.9	1.5	0.7	6.1	10.7	
17-Sep	-0.7	-0.7	0.2	-0.2	-0.9	-1.4	-1.0	1.4	6.6	9.6	10.8	11.8	13.3	14.0	15.2	14.8	13.5	11.4	8.5	6.5	5.1	3.6	2.3	3.5	6.1	15.2	
18-Sep	5.5	6.1	5.5	5.8	5.0	5.1	5.0	6.9	9.9	12.5	13.6	14.9	15.6	16.2	16.3	16.5	16.1	15.2	12.9	9.6	6.7	6.2	6.9	5.3	10.0	16.5	
19-Sep	4.3	3.6	2.9	2.9	5.0	7.3	9.0	11.2	12.2	14.9	16.9	18.6	19.9	20.5	21.1	21.4	17.3	13.3	12.4	11.7	10.8	10.7	10.8	10.4	12.1	21.4	
20-Sep	9.6	8.7	8.5	8.2	8.4	7.5	7.2	7.6	8.9	9.6	11.0	12.0	12.5	13.1	13.9	14.1	13.9	12.1	9.0	7.0	6.3	5.7	5.3	6.2	9.4	14.1	
21-Sep	6.2	6.5	5.5	5.2	4.6	4.4	4.1	3.4	2.8	2.9	3.2	4.1	4.6	6.0	5.8	6.5	5.9	5.4	4.7	4.9	4.7	4.5	4.2	4.0	4.8	6.5	
22-Sep	3.6	2.8	2.3	1.4	0.2	-1.3	-1.6	0.0	3.3	5.3	6.5	7.6	8.8	9.7	9.6	9.2	9.2	8.3	6.4	3.9	2.1	0.6	1.7	2.8	4.3	9.7	
23-Sep	3.9	3.8	3.1	2.4	2.2	2.2	2.2	2.8	4.1	5.7	7.8	11.6	13.4	13.1	13.6	13.6	13.0	12.3	11.0	10.1	8.4	7.5	6.6	6.1	7.5	13.6	
24-Sep	5.8	4.7	4.6	4.6	4.4	4.9	4.0	5.4	10.2	12.5	14.3	15.9	17.3	18.9	20.5	20.8	19.5	17.9	16.1	16.2	14.6	14.1	14.2	13.1	12.3	20.8	
25-Sep	12.2	11.7	11.0	9.0	9.1	8.5	7.7	10.2	11.3	12.4	14.0	13.3	15.0	14.2	15.9	15.6	14.6	13.9	12.8	12.2	11.9	11.4	11.0	10.4	12.1	15.9	
26-Sep	10.0	9.8	9.1	5.6	5.0	3.7	3.4	4.3	7.5	10.6	11.9	12.9	13.7	14.3	14.0	13.7	12.4	11.1	10.4	9.6	8.9	8.1	8.0	7.7	9.4	14.3	
27-Sep	7.5	7.7	7.8	7.6	7.2	6.6	6.3	6.0	5.3	4.0	3.7	5.0	6.1	6.5	5.8	4.9	4.4	4.3	4.2	4.2	3.9	3.4	2.9	2.9	5.4	7.8	
28-Sep	2.5	1.0	0.1	-0.4	-0.8	-1.1	-1.4	-0.7	1.3	2.4	3.4	4.7	6.8	8.3	9.2	9.8	8.4	6.9	5.0	4.4	4.5	5.0	5.9	6.0	3.8	9.8	
29-Sep	5.9	5.6	5.3	5.1	5.2	5.2	5.0	4.5	9.2	12.3	13.6	15.6	17.3	18.4	19.0	19.4	19.6	16.5	11.7	9.5	7.8	6.9	6.8	6.7	10.5	19.6	
30-Sep	6.5	5.9	5.9	5.5	5.0	4.8	6.4	7.5	11.6	15.0	17.5	19.8	20.9	22.1	22.8	23.1	22.8	21.1	18.8	16.6	14.0	12.5	13.6	11.8	13.8	23.1	
		5.9	5.6	5.3	4.9	4.9	4.8	4.9	6.1	8.3	9.8	10.7	11.6	12.6	13.2	13.6	13.7	13.0	12.0	10.4	8.9	7.8	7.1	6.7	6.4	Diurnal Average	
		17.4	17.2	16.9	16.9	16.3	15.7	15.1	15.2	15.7	17.1	18.0	19.8	20.9	22.1	22.8	23.1	22.8	21.1	18.8	16.6	14.6	14.1	15.5	17.8	Diurnal Maximum	





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C**  
**Anzac - September 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	16	2.22	2.22
0 - 10	455	63.19	65.42
10 - 20	232	32.22	97.64
> 20	17	2.36	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

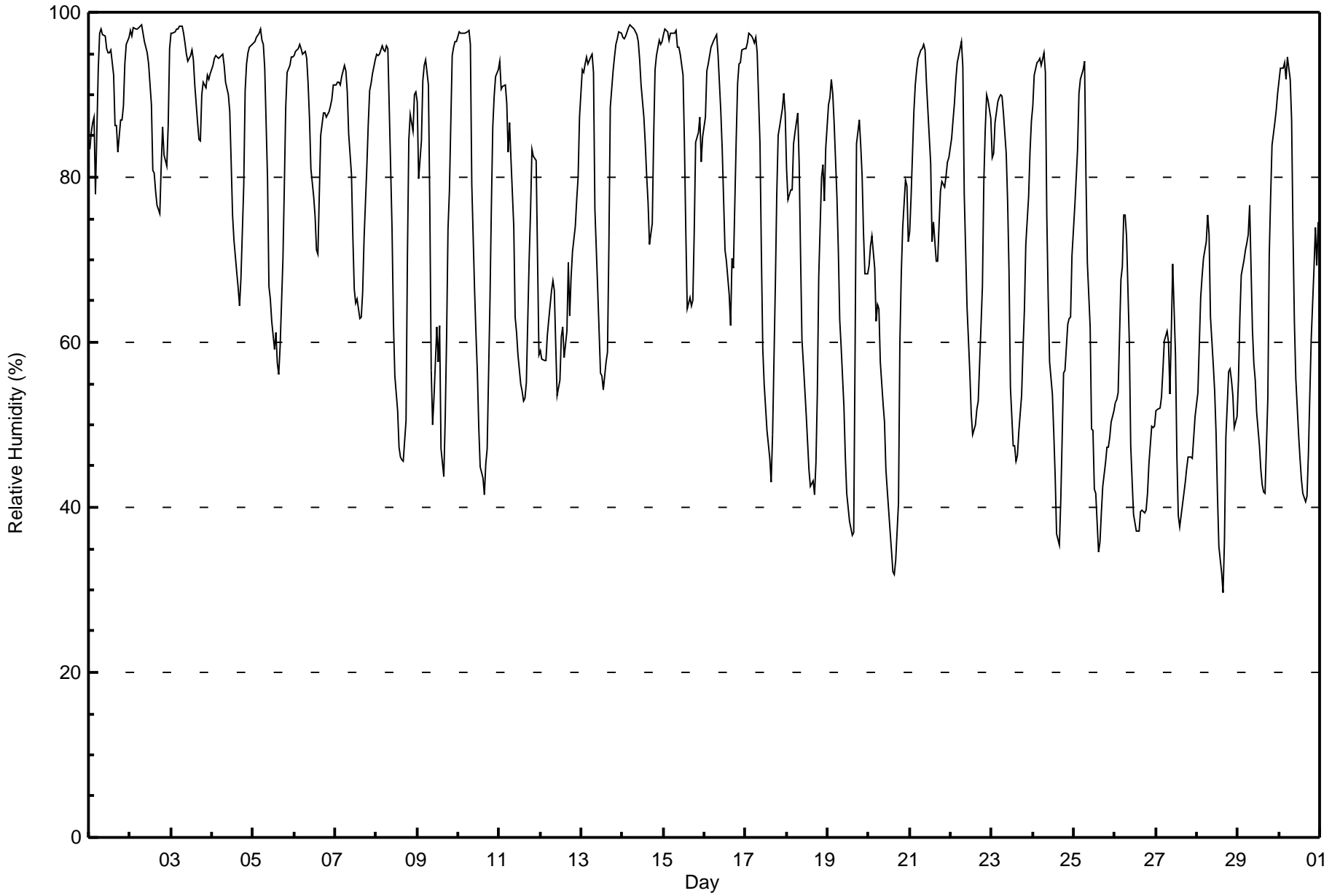
**Anzac - September 2015**

Maximum Value: 98 % on Sep 2 08:00      Maximum Daily Average: 93.7 % on Sep 3																		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0									
Minimum Value: 30 % on Sep 28 16:00      Minimum Daily Average: 50.7 % on Sep 26 Maximum Diurnal Average: 88.9 % at hour 7      Minimum Diurnal Average: 53.9 % at hour 16 Monthly Average: 74.6 %      Percentiles: P <sub>1</sub> = 35 P <sub>10</sub> = 46 Q <sub>1</sub> = 58 Median = 78 Q <sub>3</sub> = 93 P <sub>90</sub> = 96 P <sub>99</sub> = 98																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	83	85	87	87	78	93	97	98	97	97	96	95	95	95	92	86	86	83	87	87	89	94	96	97	90.9	98	
2-Sep	98	97	98	98	98	98	98	98	98	96	96	95	94	89	81	80	78	77	76	81	86	83	81	86	96	90.0	98
3-Sep	97	97	98	98	98	98	98	98	98	96	95	94	95	94	91	87	85	84	90	91	91	92	92	93	93.7	98	
4-Sep	93	94	95	95	94	95	95	93	91	90	88	82	75	72	68	67	64	68	79	91	94	95	96	96	86.3	96	
5-Sep	96	96	97	97	98	97	96	93	80	67	65	63	59	61	57	56	60	70	79	89	93	93	95	95	81.3	98	
6-Sep	95	95	96	96	96	95	95	94	91	87	81	78	75	71	71	85	86	88	88	87	88	89	90	91	87.8	96	
7-Sep	91	91	92	91	92	94	93	90	85	80	73	67	65	65	63	63	66	73	81	87	91	91	92	94	82.1	94	
8-Sep	95	95	95	96	95	95	96	96	81	74	62	56	52	47	46	46	46	50	70	85	88	86	90	90	76.3	96	
9-Sep	89	80	84	92	94	94	91	76	57	50	53	62	58	62	47	44	51	61	74	78	95	96	96	96	74.2	96	
10-Sep	98	98	97	97	97	98	98	96	79	66	61	56	50	45	44	41	45	47	65	76	86	90	92	93	75.7	98	
11-Sep	94	91	91	91	89	83	87	82	74	63	61	58	55	54	53	53	55	70	76	83	82	82	70	59	73.2	94	
12-Sep	59	58	58	58	61	63	66	67	66	60	54	55	61	62	58	61	70	63	68	71	74	77	80	87	64.9	87	
13-Sep	93	93	94	95	94	95	95	93	76	66	61	56	56	54	58	59	72	89	93	95	96	97	98	97	82.2	98	
14-Sep	97	97	97	98	98	98	98	98	97	96	94	91	87	84	80	77	72	74	85	93	95	97	96	96	91.5	98	
15-Sep	97	98	98	97	97	98	97	98	96	96	95	92	84	73	64	65	64	65	73	84	85	87	82	85	86.3	98	
16-Sep	87	93	94	95	96	97	97	97	95	88	83	77	71	70	66	62	70	69	85	91	94	94	95	96	85.9	97	
17-Sep	96	96	97	97	97	96	97	95	84	71	59	55	49	48	46	43	49	67	78	85	86	88	90	88	77.4	97	
18-Sep	81	77	78	79	84	85	88	82	70	60	57	51	48	45	43	43	42	45	54	68	80	81	77	84	66.8	88	
19-Sep	89	90	92	90	87	78	71	63	59	52	46	42	40	38	37	37	60	84	87	84	80	73	68	68	67.3	92	
20-Sep	69	72	73	69	63	65	64	58	53	50	45	42	37	35	32	32	33	41	60	68	74	80	79	72	56.8	80	
21-Sep	73	78	88	91	93	94	95	96	96	95	91	85	82	72	75	70	70	74	78	79	79	80	82	82	83.3	96	
22-Sep	85	87	89	92	94	96	96	93	78	64	60	56	51	49	50	52	53	58	67	79	86	90	89	87	75.0	96	
23-Sep	82	83	87	89	90	90	90	88	83	77	69	55	47	48	46	46	49	54	59	64	72	78	83	87	71.4	90	
24-Sep	89	92	94	94	94	94	95	93	76	65	58	54	49	44	37	36	41	48	56	57	62	63	63	70	67.6	95	
25-Sep	77	80	83	90	92	93	94	80	70	62	49	49	42	42	35	36	39	42	45	47	47	49	50	52	60.3	94	
26-Sep	53	53	54	68	69	75	75	73	60	47	43	39	37	37	37	40	40	39	40	42	45	50	50	50	50.7	75	
27-Sep	52	52	52	53	57	60	61	60	54	61	69	58	46	39	38	40	42	43	45	46	46	46	48	51	50.9	69	
28-Sep	54	60	65	68	70	72	75	73	63	57	54	49	41	35	32	30	36	48	56	57	55	53	50	51	54.5	75	
29-Sep	55	63	68	70	71	72	73	77	62	57	55	52	47	45	43	42	42	53	70	78	84	87	88	90	64.3	90	
30-Sep	92	93	93	94	92	95	92	87	73	62	56	49	46	43	42	41	41	46	54	60	69	74	69	75	68.2	95	
83.6 84.4 86.1 87.5 87.6 88.5 88.9 86.2 78.0 71.8 67.7 63.8 59.7 57.0 54.3 53.9 56.8 62.4 70.8 76.3 79.6 81.1 81.1 82.3																								Diurnal Average			
98 98 98 98 98 98 98 98 97 97 96 95 95 95 92 87 86 89 93 95 96 97 98 97																								Diurnal Maximum			



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Anzac - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Anzac - September 2015**

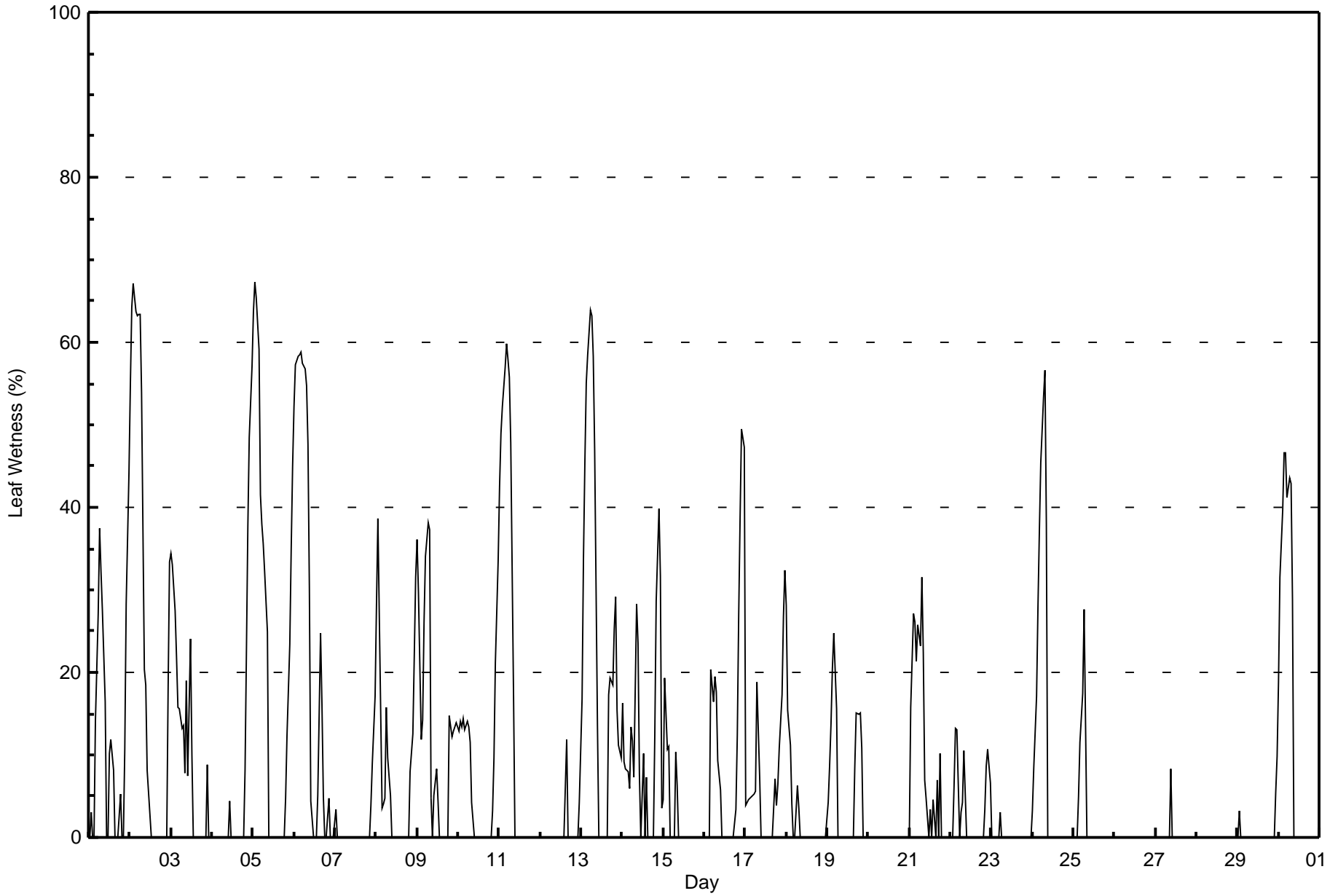
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	28	3.89	3.89
40 - 60	167	23.19	27.08
60 - 80	178	24.72	51.81
80 - 100	347	48.19	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 67 % on Sep 5 02:00      Maximum Daily Average: 25.1 % on Sep 13																	Hours in Service: 720 Hours of Data: 720									
Minimum Value: 0 % on Sep 1 01:00      Minimum Daily Average: 0.0 % on Sep 20 Maximum Diurnal Average: 19.6 % at hour 7      Minimum Diurnal Average: 0.4 % at hour 14 Monthly Average: 8.7 %      Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 11 P <sub>90</sub> = 32 P <sub>99</sub> = 64																	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-Sep	0	3	0	0	14	27	37	32	27	16	0	0	10	12	8	0	0	0	5	0	0	11	28	44	11.5	44
2-Sep	55	64	67	64	63	63	63	54	20	18	8	6	0	0	0	0	0	0	0	0	0	18	33	24.9	67	
3-Sep	34	33	27	22	16	16	13	13	8	19	7	24	10	0	0	0	0	0	0	0	9	0	0	10.5	34	
4-Sep	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	8	23	38	49	57	7.4	57
5-Sep	64	67	65	59	41	38	36	32	25	0	0	0	0	0	0	0	0	0	0	5	12	23	35	45	22.8	67
6-Sep	52	57	58	58	59	57	57	55	48	30	4	0	0	0	5	25	16	5	0	0	5	0	0	0	24.7	59
7-Sep	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	9	17	1.4	17
8-Sep	28	39	27	4	4	5	16	10	5	0	0	0	0	0	0	0	0	0	0	8	13	22	31	8.8	39	
9-Sep	36	30	12	14	26	34	38	37	5	0	5	8	4	0	0	0	0	0	0	15	12	13	13	14	13.2	38
10-Sep	13	14	13	14	13	14	13	12	4	0	0	0	0	0	0	0	0	0	0	0	3	10	21	34	7.4	34
11-Sep	42	49	52	57	60	58	56	48	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18.3	60
12-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	4	0.7	12
13-Sep	17	34	45	55	58	64	63	58	47	14	0	0	0	0	0	0	17	19	18	25	29	15	11	10	25.1	64
14-Sep	16	9	8	8	6	13	12	7	28	24	8	0	10	0	7	0	0	0	0	12	29	40	32	4	11.4	40
15-Sep	5	19	11	11	0	0	0	10	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.6	19
16-Sep	0	0	0	0	20	16	20	18	9	6	0	0	0	0	0	0	0	0	3	12	27	39	49	47	11.2	49
17-Sep	4	4	5	5	5	5	6	19	7	0	0	0	0	0	0	0	0	7	4	7	11	17	27	32	6.8	32
18-Sep	28	16	11	4	0	0	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.9	28
19-Sep	4	9	14	21	25	16	0	0	0	0	0	0	0	0	0	0	8	15	15	15	11	0	0	0	6.3	25
20-Sep	0	0	0	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-Sep	0	16	27	26	21	26	23	31	22	7	5	0	3	0	5	0	7	0	10	0	0	0	0	0	9.6	31
22-Sep	0	0	6	13	13	0	3	4	10	0	0	0	0	0	0	0	0	0	0	0	3	9	11	7	3.3	13
23-Sep	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	3
24-Sep	3	8	17	28	37	45	53	57	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12.0	57
25-Sep	0	0	0	5	12	18	28	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.2	28
26-Sep	0	0	0	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-Sep	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	8
28-Sep	0	0	0	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-Sep	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	0.8	10
30-Sep	19	32	40	47	47	41	44	43	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14.2	47
																	Diurnal Average									
																	Diurnal Maximum									
																	14.1		64							
																	16.9		67							
																	16.9		67							
																	17.2		64							
																	18.0		63							
																	18.7		64							
																	19.6		63							
																	18.6		58							
																	11.9		48							
																	4.7		30							
																	1.4		8							
																	1.3		24							
																	1.3		10							
																	0.4		12							
																	0.8		8							
																	1.2		25							
																	1.6		17							
																	1.6		19							
																	1.9		18							
																	3.3		25							
																	5.8		29							
																	8.0		40							
																	11.0		49							
																	13.0		57							





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Leaf Wetness (SW) - %**  
**Anzac - September 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	445	61.81	61.81
0.4 - 0.5	0	0.00	61.81
0.6 - 0.7	0	0.00	61.81
0.8 - 1.4	0	0.00	61.81
1.5 - 10	83	11.53	73.33
> 10	192	26.67	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 20 km/h on Sep 26 17:00	Maximum Daily Speed Average: 13.9 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 5 19:00	Minimum Daily Speed Average: 1.5 km/h on Sep 8	Hours of Data: 717
Maximum Diurnal Speed Average: 4.7 km/h at hour 15	Minimum Diurnal Speed Average: 1.9 km/h at hour 19	Hours of Missing Data: 3
Monthly Average Velocity: 2.9 km/h 263.4 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 4 Median = 6 Q <sub>3</sub> = 9 P <sub>90</sub> = 13 P <sub>99</sub> = 19	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-Sep	SW4	SSW2	SSW3	SSE4	SSE9	S1	N2	ENE2	ENE6	NE8	N6	NNW6	NW8	NW13	NW14	WVW8	WSW7	WSW8	WSW6	W10	WSW8	WSW5	SSE3	SSE3	WNW2.6	NW14	
2-Sep	S6	SW3	SSE5	SSE3	SSE2	SSE2	SE3	ENE2	E4	ENE3	NE3	NE5	NE9	NE9	NE7	NNE8	NNE7	NNE7	NNE8	NNE8	NE10	NNE7	N5	NW5	NE3.4	NE10	
3-Sep	NNW4	N7	NNW5	NNW6	NW7	NW8	NW8	NW9	NW10	NNW12	NNW13	NNW12	NNW12	NNW13	NNW13	NNW10	NNW8	NNW11	NNW10	NNW10	NW9	NW9	NNW9	NW10	NNW9.0	NNW13	
4-Sep	NW10	NNW9	NNW8	NW8	NW7	NW6	NW6	NW6	NW6	NNW7	N6	N6	N5	NW5	NNW5	NNW5	N4	NE1	E1	S2	SSW1	SSE1	S4	NW4.1	NW10		
5-Sep	S3	S2	S5	SSE5	SSE7	SSE6	SSE3	S5	SSE7	SSE8	ESE8	SSE7	SE6	SE6	ESE5	E4	ENE3	E3	ESE0	E2	AF	NNE1	SW1	WSW1	SE3.6	SSE8	
6-Sep	WNW1	NE2	NNE2	ENE3	ENE6	ENE5	NE4	NNE4	NNE4	NE5	NNE5	N5	N7	N8	N8	N5	N5	N5	N5	N6	N5	N4	NNW4	NNW4	NNE4.2	N8	
7-Sep	NNW3	NNW2	NW3	NW2	NNW3	NNW4	NNW4	NNW4	NNW4	NNW5	NW6	N7	NNW10	NNW9	NNW9	NNW10	NNW8	N7	N4	N3	NNW3	NNW3	NNW2	NNE1	W2	NNW4.6	NNW10
8-Sep	WSW3	W3	W3	NNW3	NNW5	NNW3	W3	WSW3	W4	NNW4	WSW5	WSW7	W6	NNE5	N5	NNE4	W4	NE0	NNE1	E3	ESE5	SSE6	SSE6	SSE6	W1.5	WSW7	
9-Sep	S6	S6	S4	SSW3	SSE2	S5	SSW6	SSW5	S5	WSW7	WSW8	SW3	SSE4	ESE3	SSE2	WNW4	W5	WNW2	NNE2	SSW3	SSW6	SW4	WSW6	SW5	SSW3.2	WSW8	
10-Sep	SW5	WSW4	SSW3	SW4	SSW3	SSW5	SSW5	SSW5	SSW4	S3	WNW4	WNW6	WNW8	WNW7	W7	WSW8	WSW8	SW10	SSW4	S5	S5	SSW4	S4	SSW3	SW4.0	SW10	
11-Sep	SW5	SW7	SW6	SW7	SW8	SW9	SW6	SSW6	WSW7	W9	W11	W12	WSW14	WSW13	W11	W9	W6	S1	SSW5	SW5	SW6	W6	WNW7	WNW9	WSW6.8	WSW14	
12-Sep	WNW9	WNW9	NNW10	NNW10	WNW9	WNW9	WNW8	WNW9	WNW7	WNW6	WNW7	WNW7	W5	W6	WNW8	W12	W11	WNW14	WNW12	W11	WNW10	NNW10	NW9	NW5	WNW8.8	WNW14	
13-Sep	WNW3	NW3	NNW3	NW4	NNW4	W3	NNW1	NNW2	N2	SSW2	NNW5	N4	NNE6	NNE6	N6	N6	NNW5	WSW8	NW7	WNW4	SW2	N1	NNW4	NNW5	NNW2.9	WSW8	
14-Sep	NW5	NW3	NW4	NW5	NNW4	NW4	NNW5	NNW5	NNW5	N5	N6	NNE5	NE3	NNW7	NNW6	NNW7	NNW6	N7	NNE2	ENE2	NE1	S2	SW2	ESE3	NNW3.6	NNW7	
15-Sep	SSW2	SE4	SE3	SE4	SSE5	SSE6	SSE5	ESE4	SE5	ESE9	SE9	SE9	ESE9	ESE9	ESE9	E9	E8	ESE6	E5	E4	ESE4	SE5	SE6	SSE4	ESE5.5	ESE9	
16-Sep	SSE4	NNE2	AF	ENE1	AF	E2	SSE1	S1	SSW3	S1	ESE6	ESE7	ESE5	ESE5	SSE4	ESE5	SSE4	SSW4	SSE2	SE4	SSE7	S5	S6	S5	SE3.1	SSE7	
17-Sep	S3	SW3	SW5	SSW4	SSW4	SSW4	SSW5	S4	S5	SSW8	SW13	SSW10	SW9	W4	WSW6	NNE3	SSE2	E2	SSE4	SSE5	S5	S5	SSW5	SW7	SSW4.4	SW13	
18-Sep	WSW6	WSW6	WSW7	SW7	WSW7	SW6	SW7	WSW6	W7	W9	NNW10	W14	W14	W13	W14	NNW10	W13	W10	WSW8	SW5	SW6	SW5	WSW7	SW6	WSW7.9	W14	
19-Sep	SSW5	SSW5	SSW4	SW6	S7	S7	SSW8	SSW11	SSW12	SW13	SW18	W17	WSW17	WSW18	WSW20	WSW17	W12	W8	W7	W15	WSW15	W15	W15	W12	WSW10.5	WSW20	
20-Sep	W10	WSW7	W9	WSW8	W14	NNW15	NNW13	WSW8	SW9	W11	W11	W14	W17	W17	W17	W15	NNW12	WNW6	WNW4	WNW3	WSW5	W4	NW5	WNW4	W9.5	W17	
21-Sep	NW6	NW7	NW7	NW9	NW9	NW8	NW10	NW9	NNW10	NNW11	NNW11	NNW10	NW9	NW10	NNW8	NNW7	NNW7	NNW5	NW5	NW8	NW8	NW7	NW8	WNW9	NW8.1	NNW11	
22-Sep	WNW8	NW7	NNW6	NNW6	NNW4	W3	WSW4	SW4	SW4	S2	SSW3	SE1	SE5	SE8	SSE9	SSE9	SSE7	SE6	SE6	ESE5	SE5	SE5	SE6	SSE5	S2.4	SSE9	
23-Sep	SSE7	SSE10	SSE9	SSE10	SSE10	SE10	SE9	SE8	SE9	SE13	SE15	SE17	SE18	SE18	SE17	SE14	SE12	SE11	SE10	SE8	SE8	SE7	SE7	SE11.3	SE18		
24-Sep	SSE7	SSE7	SSE10	SSE11	SE7	SSE9	SSE5	SSE5	SSW6	SSW4	SW3	W5	NNW5	NW3	SSE2	SE5	SE9	SE7	SE8	SE9	SSE7	SE9	SE11	SE11	SSE5.5	SE11	
25-Sep	SE10	SE11	SE8	ESE7	SE7	S6	SSE2	NNW12	NNW14	NNW15	NNW15	NNW10	NNW13	W11	W12	W12	W10	WSW8	WSW7	WSW8	W11	W9	W8	W8	W5.6	NNW15	
26-Sep	W8	W8	WSW7	SW7	WSW8	SW7	SW6	SW6	WSW8	W11	W13	W14	W14	W16	WSW17	W16	W20	W14	W15	W15	W13	NNW16	W13	W15	W11.5	W20	
27-Sep	W15	W15	W16	WSW16	W16	W17	W19	NNW19	NNW18	NNW19	NNW16	NNW18	NNW20	NNW19	NNW17	NNW16	NNW13	NNW11	NNW10	NNW10	NNW10	NNW10	NNW10	NNW9	WNW13.9	NNW20	
28-Sep	NW9	NW8	NNW10	NNW11	NNW11	NNW10	NW8	NW7	NW7	NW5	NNW7	W9	NNW7	NNW7	NNW7	NNW6	W4	S3	S5	SSE6	SSE7	SSE8	SSE9	SSE8	WNW3.9	NNW11	
29-Sep	SSE8	SE6	SE7	SE6	SE7	SE6	SE6	SE4	SSE3	WSW3	SW4	S5	NNW6	NNW7	W5	NNW5	NW4	WSW2	S3	S5	SSW3	SW5	SW6	WSW5	SSW2.6	SSE8	
30-Sep	WSW5	WSW5	SW4	S5	SSW5	S5	SSE7	SSE6	SSW5	SSW7	S7	SSW10	SW10	SW12	SW12	SW13	SW13	SSW9	S8	S7	SSW5	SSW5	SSW6	SSW5	SSW6.9	SW13	

WSW2.8	WSW2.9	WSW3.0	WSW2.6	WSW2.7	WSW2.8	WSW2.6	WSW2.7	W2.8	W3.3	W3.9	W4.2	W4.7	NNW4.3	NNW4.7	NNW4.0	W3.8	W2.6	WSW1.9	WSW2.0	WSW2.6	WSW2.4	WSW2.7	WSW2.7	Diurnal Average		
W15	W15	W16	WSW16	W16	W17	W19	NNW19	NNW18	NNW19	SW18	NNW18	NNW20	NNW19	WSW20	WSW17	W20	W14	W15	W15	W15	WSW15	NNW16	W15	W15	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 - September 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Sep 26 17:00	Hours in Service: 720 Hours of Data: 717 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6
Minimum Value: 0 km/h on Sep 7 21:00	
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 3 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-Sep	1	2	1	2	3	2	1	2	3	4	2	3	7	6	6	4	3	2	2	4	3	2	2	2	7
2-Sep	1	1	2	2	1	1	1	3	2	1	1	2	3	4	3	3	3	3	3	3	4	3	2	1	4
3-Sep	1	3	2	2	3	3	3	4	4	5	5	5	6	6	5	5	4	4	4	4	4	4	4	4	6
4-Sep	4	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	4
5-Sep	1	0	1	1	2	1	1	2	2	2	3	2	2	2	2	1	1	1	1	1	AF	1	1	1	3
6-Sep	1	1	1	2	1	2	1	1	1	2	2	2	3	3	3	2	1	2	2	2	1	1	1	1	3
7-Sep	1	1	1	1	1	1	1	1	2	2	3	4	4	3	4	3	3	2	1	0	0	0	1	1	4
8-Sep	1	1	1	1	1	1	1	1	1	2	2	2	3	3	2	2	2	1	1	2	2	1	1	1	3
9-Sep	2	1	2	1	1	2	1	1	1	3	3	2	1	1	2	3	2	1	3	4	2	2	2	1	4
10-Sep	1	1	1	1	1	1	1	1	1	1	2	3	3	3	3	4	3	3	2	1	1	1	1	1	4
11-Sep	1	2	1	2	2	2	1	1	3	4	4	4	5	5	5	3	4	2	1	2	1	1	3	3	5
12-Sep	3	3	4	4	4	4	3	3	3	3	3	3	2	2	4	5	4	6	4	4	4	4	4	2	6
13-Sep	1	1	1	1	1	1	1	1	1	2	2	2	3	3	2	2	3	3	2	2	1	1	2	2	3
14-Sep	2	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	1	1	1	1	1	2	3
15-Sep	1	1	1	1	1	1	1	1	2	3	3	3	3	3	4	3	3	2	1	1	1	1	1	1	4
16-Sep	1	1	AF	1	AF	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	2	1	1	1	2
17-Sep	1	1	1	1	1	1	1	1	1	4	4	4	4	3	4	3	3	4	1	1	2	2	1	2	4
18-Sep	2	2	2	2	2	2	2	2	3	4	5	5	5	5	6	5	5	4	2	2	2	2	2	2	6
19-Sep	1	2	2	2	2	2	2	3	4	4	6	6	6	6	8	7	8	4	4	7	5	6	6	5	8
20-Sep	4	3	4	3	6	6	5	2	3	4	4	5	7	7	7	6	5	3	1	1	1	1	1	1	7
21-Sep	2	3	3	4	4	3	5	4	4	4	5	4	4	4	3	3	3	2	3	3	3	3	3	3	5
22-Sep	3	3	2	2	1	1	1	2	1	2	2	2	3	3	3	3	2	2	1	1	1	1	1	1	3
23-Sep	2	3	2	3	2	2	2	2	3	4	5	6	6	6	6	5	4	4	4	3	3	2	2	2	6
24-Sep	2	2	2	3	2	4	2	2	2	2	2	1	2	2	2	2	2	2	2	3	2	2	3	3	4
25-Sep	3	3	3	3	2	2	2	6	6	7	6	4	5	4	5	4	4	3	2	4	4	4	3	3	7
26-Sep	3	3	2	1	1	1	1	1	3	5	5	5	6	7	7	7	9	6	6	6	5	6	5	7	9
27-Sep	6	6	6	6	7	6	8	8	8	9	6	7	8	9	8	7	5	5	4	4	4	4	4	3	9
28-Sep	3	3	4	4	4	4	3	3	2	2	3	3	2	3	3	2	2	1	1	2	2	2	2	2	4
29-Sep	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2	2	2	1	2	1	1	2	1	1	2
30-Sep	1	1	1	1	1	1	2	2	2	2	3	3	3	4	4	5	4	3	2	2	2	2	2	2	5
	6	6	6	6	7	6	8	8	8	9	6	7	8	9	8	7	9	6	6	7	5	6	6	7	

Diurnal Maximum

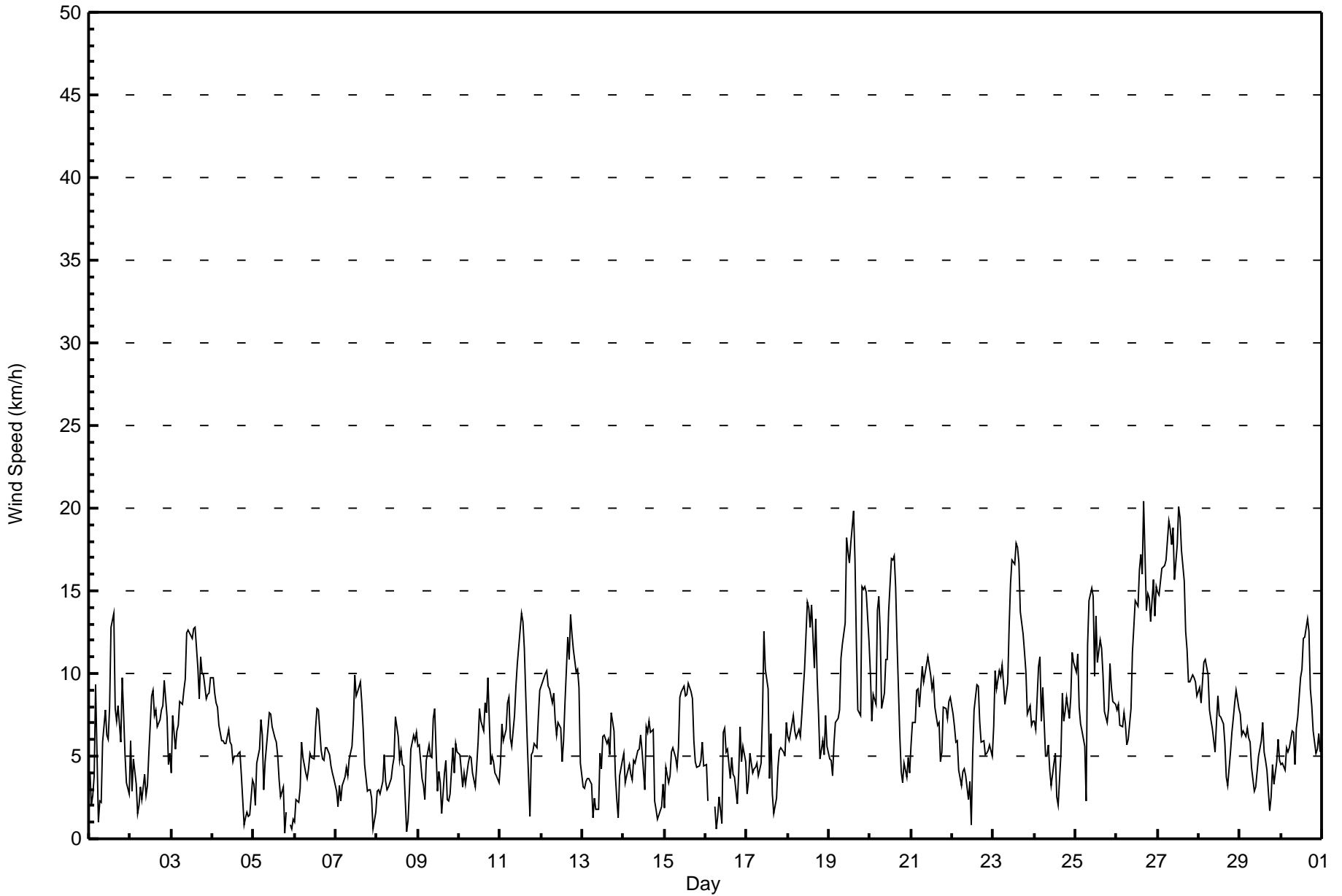
AF - Analyzer Failure





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Anzac - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Anzac - September 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	295	41.14	41.14
6 - 11	328	45.75	86.89
12 - 19	91	12.69	99.58
20 - 28	3	0.42	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 717

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Anzac - September 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	17	14	8	8	10	12	12	30	32	37	22	13	15	23	19	23	295
6 - 11	14	8	5	2	2	10	35	34	10	12	23	29	30	50	45	19	328
12 - 19	0	0	0	0	0	0	9	0	0	1	7	8	37	16	13	0	91
20 - 28	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	3
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>	31	22	13	10	12	22	56	64	42	50	52	51	83	89	78	42	717

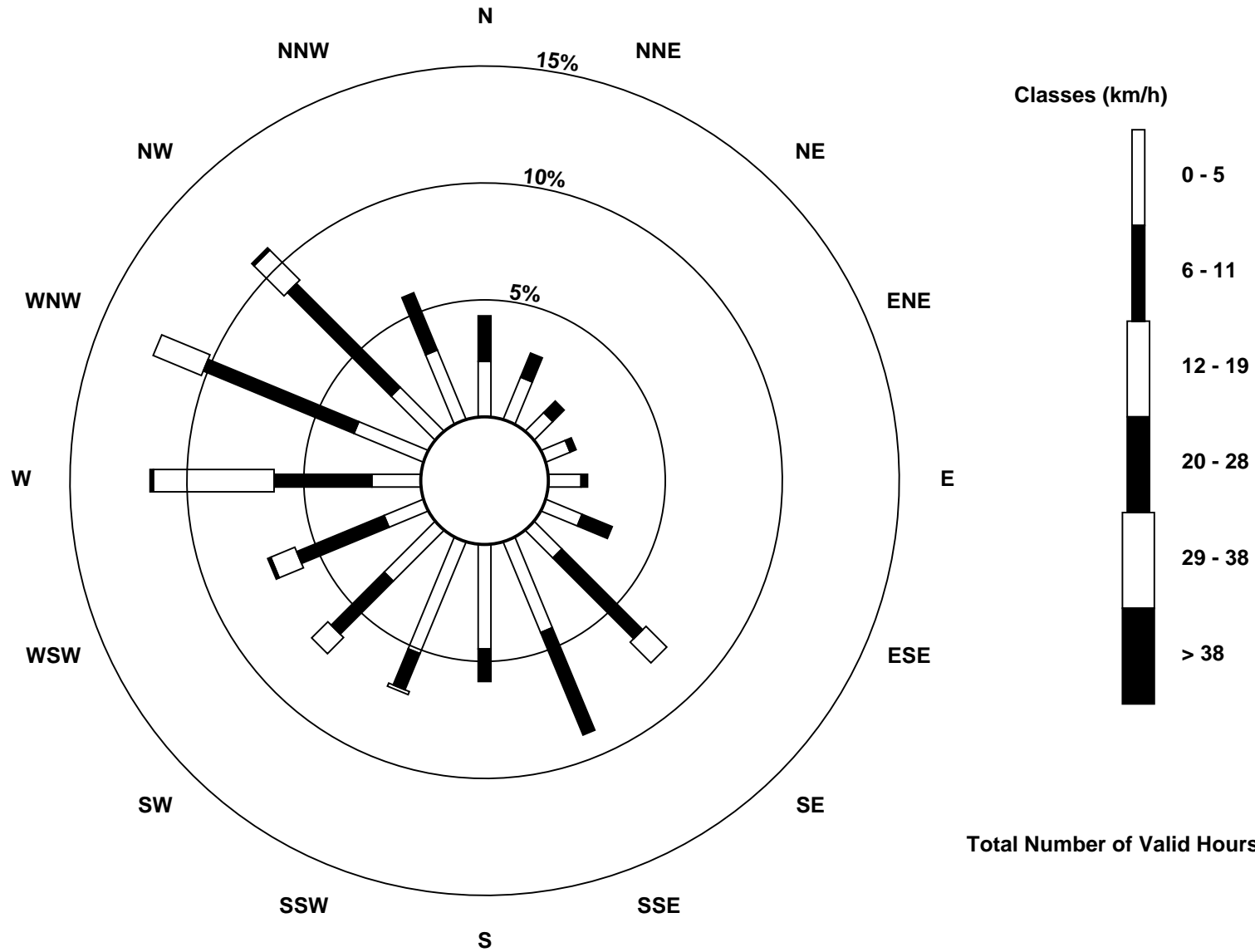
Total Number of Valid Hours: 717

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Wind Speed (WS) - km/h  
Anzac (AMS 14)





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

**Wind Direction (WD) - deg**  
**Anzac - September 2015**

Direction of Maximum Speed: 264 deg on Sep 26 17:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 294.4 deg on Sep 27	Hours of Data: 717
Direction of Minimum Speed: 109 deg on Sep 5 19:00	Direction of Minimum Daily Speed Average: 1.5 deg on Sep 8
Direction of Minimum Speed: 109 deg on Sep 5 19:00	Hours of Missing Data: 3
Monthly Average Direction: 270.8 deg	Percent Operational Time: 99.6

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	232	205	206	157	157	188	6	73	57	45	353	335	309	313	311	301	254	238	238	276	255	252	165	151	281.6
2-Sep	183	221	168	167	154	147	135	74	92	78	53	35	40	43	36	20	27	21	18	19	35	30	353	312	39.8
3-Sep	332	360	334	334	326	322	318	309	307	285	298	293	294	297	293	302	297	286	290	303	310	308	302	304	304.7
4-Sep	308	301	300	309	314	309	313	315	317	338	6	355	349	309	290	333	342	4	36	87	174	201	156	179	319.3
5-Sep	184	178	171	163	158	161	164	171	153	149	116	153	143	125	120	81	78	99	109	93	AF	21	217	241	144.5
6-Sep	296	51	14	60	69	57	41	32	19	36	32	9	358	5	4	358	353	9	8	358	354	352	348	348	14.2
7-Sep	346	331	305	313	330	339	332	327	326	325	352	347	343	347	333	335	352	1	352	337	335	337	16	271	338.2
8-Sep	254	265	269	289	292	283	270	242	269	296	253	253	259	31	6	21	270	34	12	95	112	151	160	168	260.1
9-Sep	169	177	181	207	164	190	193	199	184	244	249	229	163	114	165	294	281	287	31	198	193	222	243	214	208.9
10-Sep	233	237	208	222	195	197	211	210	204	191	290	297	299	293	271	247	256	236	205	181	182	194	176	196	233.1
11-Sep	225	220	214	217	219	217	219	210	238	268	281	260	254	248	262	269	274	187	192	220	234	260	287	297	246.8
12-Sep	297	291	291	294	295	294	296	293	293	296	299	282	261	271	302	280	266	286	283	279	286	295	306	322	289.3
13-Sep	303	316	287	305	295	260	292	335	3	199	291	358	15	18	10	5	331	245	307	291	224	356	299	301	316.9
14-Sep	311	318	315	319	330	324	335	336	347	4	0	14	312	344	342	341	347	359	13	78	38	175	227	103	343.5
15-Sep	207	131	135	134	150	155	148	119	144	116	125	127	118	118	110	79	88	103	85	91	121	136	132	154	120.8
16-Sep	147	31	AF	78	AF	98	152	183	207	191	102	102	115	121	159	117	161	199	163	138	164	178	170	176	143.0
17-Sep	189	219	219	205	205	211	195	184	188	208	228	207	226	260	238	29	163	83	165	167	172	187	205	231	206.6
18-Sep	241	246	246	235	237	225	231	239	259	281	289	270	272	280	269	286	265	263	239	226	226	219	239	232	256.7
19-Sep	196	195	192	215	184	186	197	210	209	221	233	259	252	246	253	247	276	262	278	278	249	259	272	279	243.9
20-Sep	268	256	265	253	278	285	283	250	236	272	274	272	264	281	273	269	282	296	286	301	249	272	313	300	272.9
21-Sep	310	307	305	304	310	316	313	322	326	330	332	333	322	323	328	339	335	329	312	315	314	310	305	302	318.7
22-Sep	302	308	291	295	303	262	241	232	216	183	204	141	133	130	157	166	150	140	129	115	134	124	131	155	172.9
23-Sep	155	159	154	154	153	146	141	143	142	139	141	143	138	134	134	127	126	140	132	133	138	137	134	138	139.9
24-Sep	151	149	155	153	140	160	158	164	195	209	227	280	302	316	156	127	143	134	124	131	148	127	144	140	151.5
25-Sep	132	139	136	107	146	170	166	301	305	308	312	297	296	277	278	279	268	253	252	254	267	280	279	280	273.8
26-Sep	279	276	256	221	237	223	224	234	251	270	274	273	278	273	256	262	264	270	264	272	275	282	272	276	265.4
27-Sep	273	266	260	255	265	271	276	282	305	316	310	311	304	308	318	321	309	303	296	299	301	310	311	320	294.4
28-Sep	324	307	306	307	304	308	307	308	314	310	285	270	294	294	301	299	265	183	169	158	154	148	153	152	285.2
29-Sep	150	141	143	133	143	143	146	143	148	250	224	182	292	300	276	282	309	239	184	191	193	233	231	238	193.9
30-Sep	240	237	215	177	192	187	168	164	205	195	188	212	223	218	225	230	221	206	182	180	197	205	198	195	205.4

249.8 249.4 241.9 237.8 238.4 237.8 249.0 255.2 263.7 277.3 280.7 277.4 280.5 289.9 281.7 289.8 277.7 264.1 254.3 253.9 236.9 248.8 246.5 248.5

Diurnal Average

AF - Analyzer Failure

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

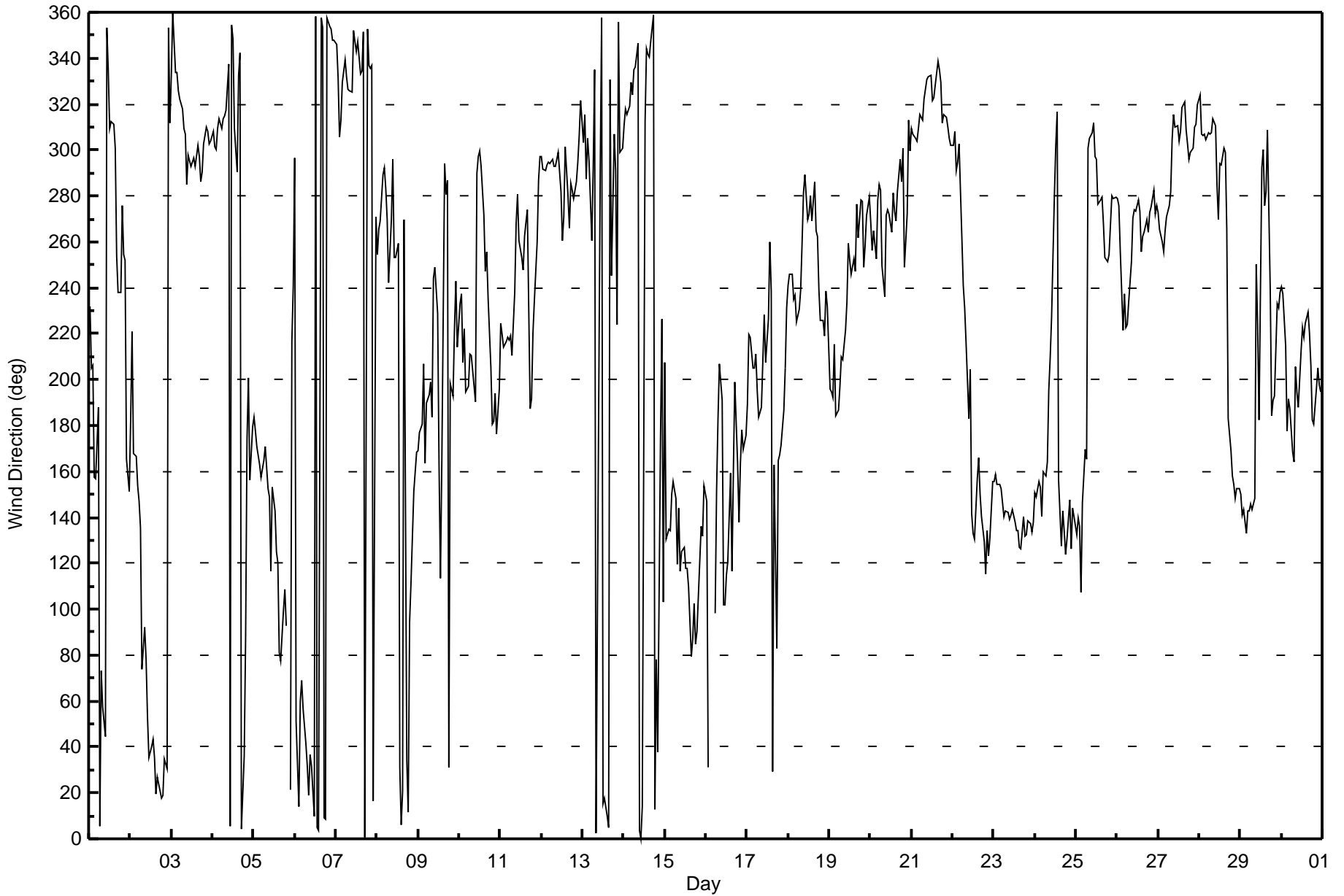
Anzac - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 104 deg on Sep 22 12:00	Hours of Data: 717
Minimum Value: 10 deg on Sep 5 03:00	Hours of Missing Data: 3
Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 17 Q <sub>1</sub> = 21 Median = 27 Q <sub>3</sub> = 32 P <sub>90</sub> = 45 P <sub>99</sub> = 89	Hours of Calibration: 0
	Percent Operational Time: 99.6

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	18	81	28	33	21	88	37	78	64	39	32	26	42	27	27	36	31	19	23	29	28	24	35	48	88
2-Sep	15	32	11	37	55	42	28	80	42	62	37	30	30	33	29	31	35	28	23	25	28	28	32	22	80
3-Sep	26	26	25	26	28	24	27	29	30	30	31	32	34	31	29	32	37	29	31	29	27	27	31	28	37
4-Sep	29	30	31	28	26	32	27	26	25	24	32	27	46	37	48	29	34	29	66	36	22	55	44	11	66
5-Sep	20	24	10	13	13	20	48	29	17	29	42	31	36	30	37	39	32	16	68	31	AF	53	90	37	90
6-Sep	47	36	26	50	17	23	24	21	22	29	30	34	24	26	24	23	21	24	22	22	21	20	17	18	50
7-Sep	18	27	22	24	21	17	21	31	22	27	30	25	27	24	26	24	25	22	19	12	10	11	50	29	50
8-Sep	17	17	22	20	21	29	30	18	35	40	41	39	55	66	56	62	56	93	35	24	20	15	14	17	93
9-Sep	21	18	18	22	34	25	14	18	29	35	33	61	23	30	84	42	33	34	56	104	19	26	21	18	104
10-Sep	15	12	14	12	21	11	14	15	19	53	60	38	33	35	40	38	30	22	26	17	19	18	22	25	60
11-Sep	27	16	15	14	14	16	17	20	23	34	32	30	30	29	31	31	41	71	17	20	16	17	31	26	71
12-Sep	27	27	28	32	32	31	26	27	27	33	32	32	35	37	30	31	30	29	26	27	29	30	29	27	37
13-Sep	45	29	30	24	21	19	49	30	72	89	59	63	40	35	34	21	42	27	27	35	21	63	32	27	89
14-Sep	24	29	21	21	21	23	23	22	25	27	26	31	57	31	28	28	36	24	37	38	54	41	33	38	57
15-Sep	52	15	12	15	12	13	17	19	27	25	27	27	30	32	32	32	29	24	21	21	22	18	14	18	52
16-Sep	19	45	AF	45	AF	23	89	60	29	74	31	28	48	46	53	39	28	21	31	12	14	15	14	14	89
17-Sep	16	16	15	12	11	13	11	16	27	32	23	37	40	68	54	77	95	61	32	22	20	22	23	18	95
18-Sep	23	29	23	23	21	17	17	18	30	38	33	30	33	32	31	34	32	31	24	22	18	21	20	23	38
19-Sep	24	57	35	24	22	23	29	23	25	21	22	31	30	30	32	29	39	35	43	34	28	32	33	34	57
20-Sep	32	27	32	32	31	31	32	30	24	32	35	32	33	30	31	32	31	29	31	40	15	23	18	30	40
21-Sep	21	25	27	26	27	26	25	25	23	22	24	22	24	26	23	26	24	21	31	25	25	31	29	27	31
22-Sep	28	25	30	27	26	45	20	19	22	68	63	104	58	39	35	28	23	19	13	16	13	22	19	15	104
23-Sep	16	18	18	18	16	18	18	20	21	22	23	23	27	24	25	25	26	24	21	21	18	19	18	17	27
24-Sep	21	18	15	17	22	22	27	25	27	61	61	46	31	80	85	44	20	17	16	22	16	18	19	20	85
25-Sep	21	20	29	37	33	27	83	26	26	26	27	31	30	37	34	30	29	28	25	26	29	30	30	29	83
26-Sep	33	29	25	13	13	15	20	23	29	32	31	31	31	35	31	30	31	31	30	29	30	28	29	32	35
27-Sep	30	29	31	28	33	31	29	31	28	25	27	26	27	26	26	24	26	28	32	31	30	25	23	20	33
28-Sep	20	26	24	25	25	25	24	24	31	42	39	33	35	34	37	35	46	28	13	14	14	16	18	17	46
29-Sep	17	21	21	23	18	18	20	27	24	67	52	37	53	26	44	46	25	53	52	16	23	19	19	23	67
30-Sep	19	20	18	15	18	22	21	35	29	30	31	32	31	26	23	23	24	22	22	26	22	26	25	35	35

52	81	35	50	55	88	89	80	72	89	63	104	58	80	85	77	95	93	68	104	54	63	90	48	
Diurnal Maximum																								

AF - Analyzer Failure





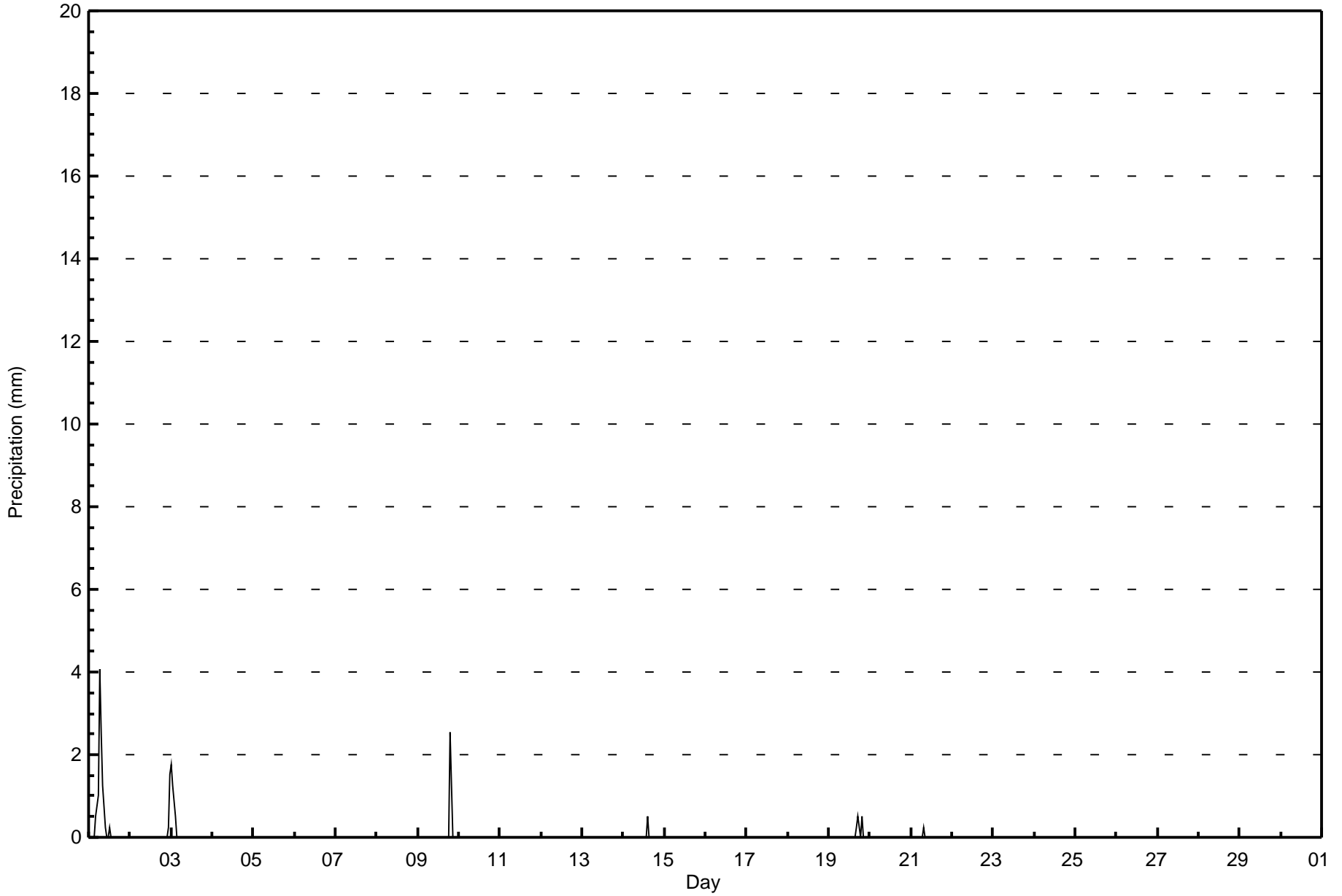
Maximum Value: 4.1 mm on Sep 1 07:00		Maximum Daily Total: 9.9 mm on Sep 1		Hours in Service: 720																							
Minimum Value: 0.0 mm on Sep 1 01:00		Minimum Daily Total: 0.0 mm on Sep 4		Hours of Data: 720																							
Maximum Diurnal Total: 4.1 mm at hour 7		Minimum Diurnal Total: 0.0 mm at hour 4		Hours of Missing Data: 0																							
Monthly Total: 19.81 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: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	0.0	0.0	0.0	0.0	0.5	1.0	4.1	2.5	1.3	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	0.0	0.0	9.9	4.1	
2-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.5	1.8	1.5	
3-Sep	1.8	1.3	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	0.0	0.0	3.6	1.8	
4-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	2.5	2.5
10-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	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	0.5	0.5
15-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	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	0.0	0.5	0.0	0.0	0.0	0.0	1.3	0.5	
20-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3
22-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	1.3	0.5	0.0	0.5	1.0	4.1	2.8	1.3	0.3	0.0	0.0	0.3	0.0	0.5	0.0	0.3	0.5	0.0	3.0	0.0	0.0	0.3	1.5	Diurnal Average	
		1.8	1.3	0.5	0.0	0.5	1.0	4.1	2.5	1.3	0.3	0.0	0.0	0.3	0.0	0.5	0.0	0.3	0.5	0.0	2.5	0.0	0.0	0.3	1.5	Diurnal Maximum	





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Precipitation (PC) - mm**  
**Anzac - September 2015**





# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	September 24, 2015	Last Calibration	August 17, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	13:35
Gas Cert Reference	SA130026A	Station temp.	22 Deg C
Cal Gas Concentration	47.2 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
ZAG Make/Model	API 701	Serial Number	764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790

## Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	524	524
Analyzer IP address	192.168.1.43		Lamp voltage	2784	2722
Calculated slope	0.995309	1.001711	Chamber temp	50.0	50.0
Calculated intercept	-0.145161	-0.305412	Pressure	25.1	25.2
Analyzer Background	19.4	19.4	Flow	654.000	656.000
Analyzer Coefficient	1.011	1.011	Intensity	69	67

Analyzer make API T100 Analyzer serial # 723

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	74.9	707.1	703.1	1.006
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	74.9	707.1	706.2	1.001
second point	5000	37.5	354.0	353.1	1.003
third point	5000	18.7	176.5	177.5	0.995
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	74.9	707.1	699.4	1.011
Average Correction Factor					0.999

Corrected As found 703.2 Previous response 710.5 % change 1.0%

**Notes:**

Filter changed after as founds. No adjustments made.

Calibration Performed By: Devin Russell



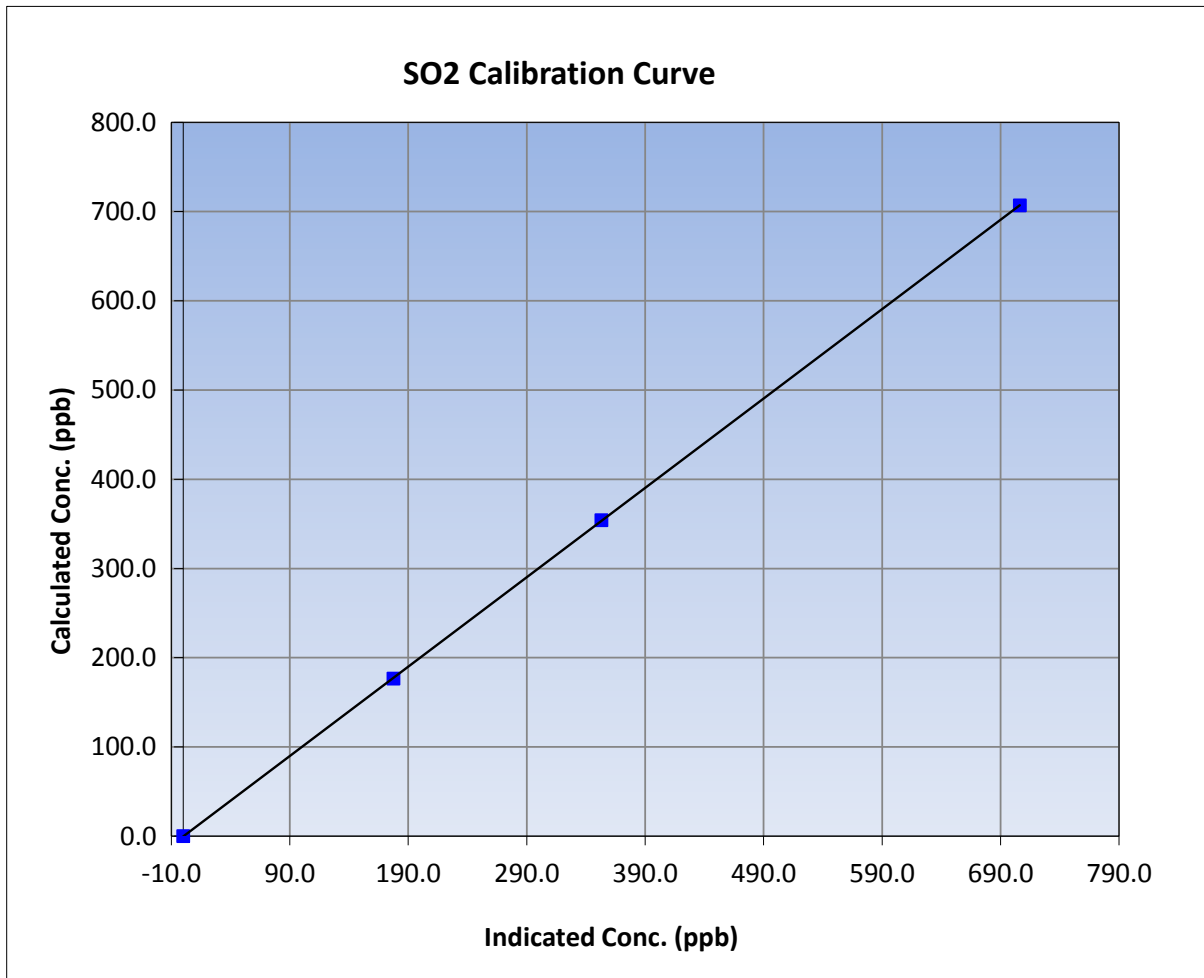
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 17, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:35
Analyzer make	API T100	Analyzer serial #	723

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999994
707.1	706.2	1.0012		
354.0	353.1	1.0026	Slope	1.001711
176.5	177.5	0.9945		
			Intercept	-0.305412







# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	September 25, 2015	Last Calibration	August 14, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	7:40	End Time (MST)	10:38
Gas Cert Reference	56532297-003	Station temp.	22 Deg C
Cal Gas Concentration	5.05 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790
SO2 gas concentration	47.2 ppm	SO2 gas cert/exp	SA130026A 12/Dec/16

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-731	-731
Analyzer IP address	192.168.1.42		Lamp voltage	973	982
Calculated slope	0.994989	0.998388	Chamber temp	45	45
Calculated intercept	0.041567	-0.131042	Pressure	656.8	655.3
Analyzer Background	1.77	1.63	Flow	0.390	0.387
Analyzer Coefficient	1.225	0.976	Intensity	98	98
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1300156232	
Converter make/model	CDN-101		Converter serial #	510	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	74.3	75.0	78.8	0.952
SO2 scrubber check	5000	18.7	176.5	0.4	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	74.3	75.0	75.2	0.998
second point	5000	39.6	40.0	40.3	0.992
third point	5000	19.8	20.0	20.3	0.985
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	74.3	75.0	75.1	0.999
Average Correction Factor					0.992

Corrected As found	78.8	Previous response	75.4	% change	-4.4%
--------------------	------	-------------------	------	----------	-------

Notes:

Span adjusted. Diagonstic similar to last month, Filter changed out, no maintenance done.

Calibration Performed By:

Melissa Lemay



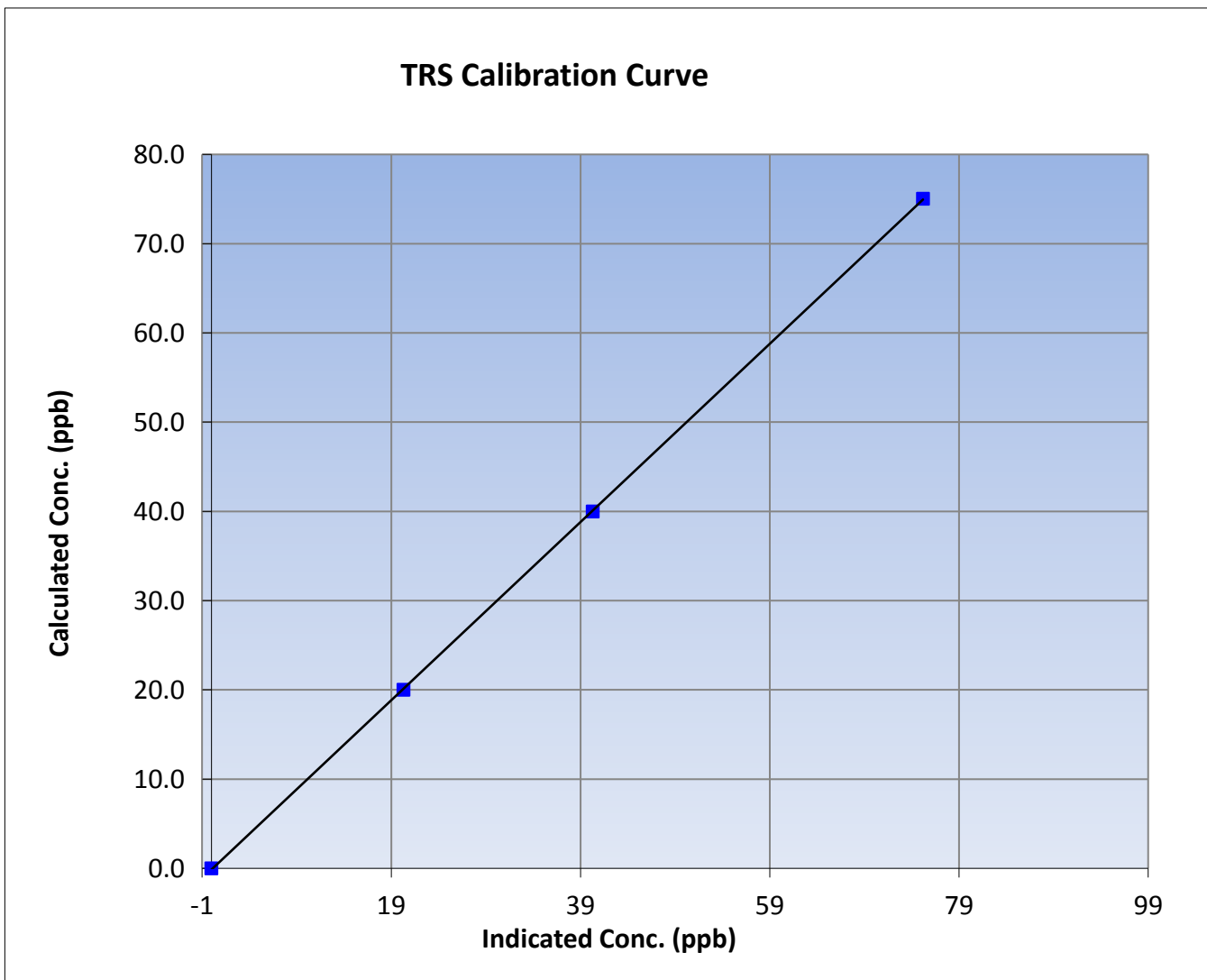
# Wood Buffalo Environmental Association TRS Calibration Report

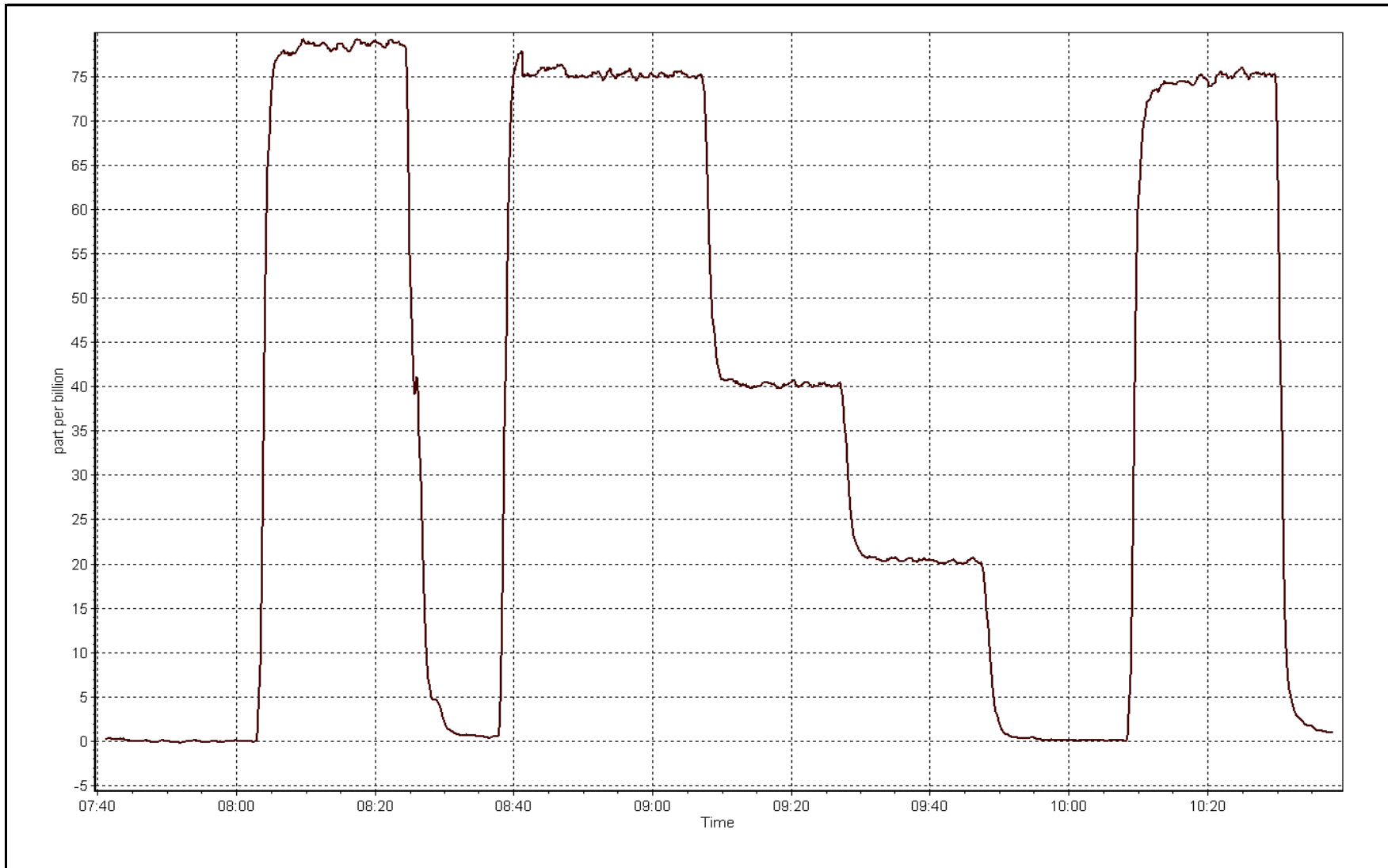
## Station Information

Calibration Date	September 25, 2015	Previous Calibration	August 14, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:40	End Time (MST)	10:38
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1300156232

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999980
75.0	75.2	0.9979		
40.0	40.3	0.9925	Slope	0.998388
20.0	20.3	0.9851		
			Intercept	-0.131042







# Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	September-24-15	Last Calibration	August-17-15
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	13:35
Gas Cert Reference	SA130026A	Cal Gas Expiry Date	December-12-16
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211.0 ppm	Station temp.	22 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	394.0	392.1
THC Calc slope	0.999234	1.001046	Carrier Pressure	31.9	31.8
THC Calc intercept	0.020174	0.022238	Fuel Pressure	41.4	41.3
NMHC Calc slope	0.999736	1.003428	Air Pressure	32.6	32.6
NMHC Calc intercept	0.002043	-0.001963			

Analyzer make Thermo 55i Analyzer serial # 1218153355

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	74.9	16.36	16.36	1.000
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	16.36	16.35	1.001
second point	5000	37.5	8.19	8.10	1.011
third point	5000	18.7	4.09	4.07	1.004
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	16.36	16.27	1.006
Average Correction Factor					1.005

Corrected As found 16.36 Previous response 16.35 % change 0.0%

**Notes:**

Filter changed after as founds. No adjustments made.

Calibration Performed By: Devin Russell





## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	74.9	8.69	8.68	1.001
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	8.69	8.67	1.003
second point	5000	37.5	4.35	4.32	1.007
third point	5000	18.7	2.17	2.18	0.995
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	8.69	8.63	1.007
Average Correction Factor					1.002

Corrected As found      8.68      Previous response      8.69      % change      0.1%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	74.9	7.67	7.68	0.999
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	7.67	7.67	1.000
second point	5000	37.5	3.84	3.79	1.013
third point	5000	18.7	1.91	1.90	1.008
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	7.67	7.64	1.004
Average Correction Factor					1.007

Corrected As found      7.68      Previous response      7.66      % change      -0.2%



# Wood Buffalo Environmental Association

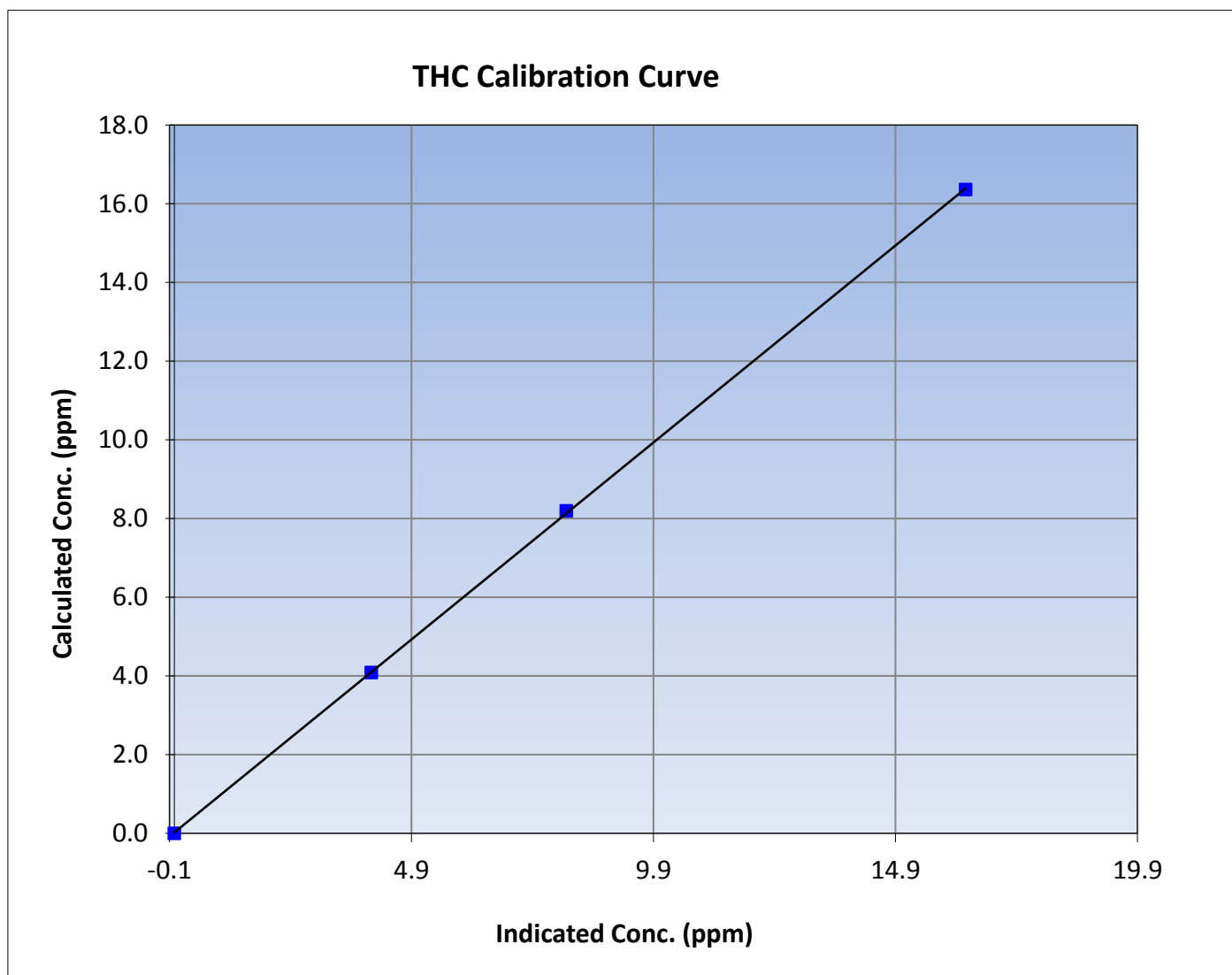
## THC Calibration Summary

### Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 17, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:35
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999965
16.36	16.35	1.0007		
8.19	8.10	1.0113	Slope	1.001046
4.09	4.07	1.0037		
			Intercept	0.022238





# Wood Buffalo Environmental Association

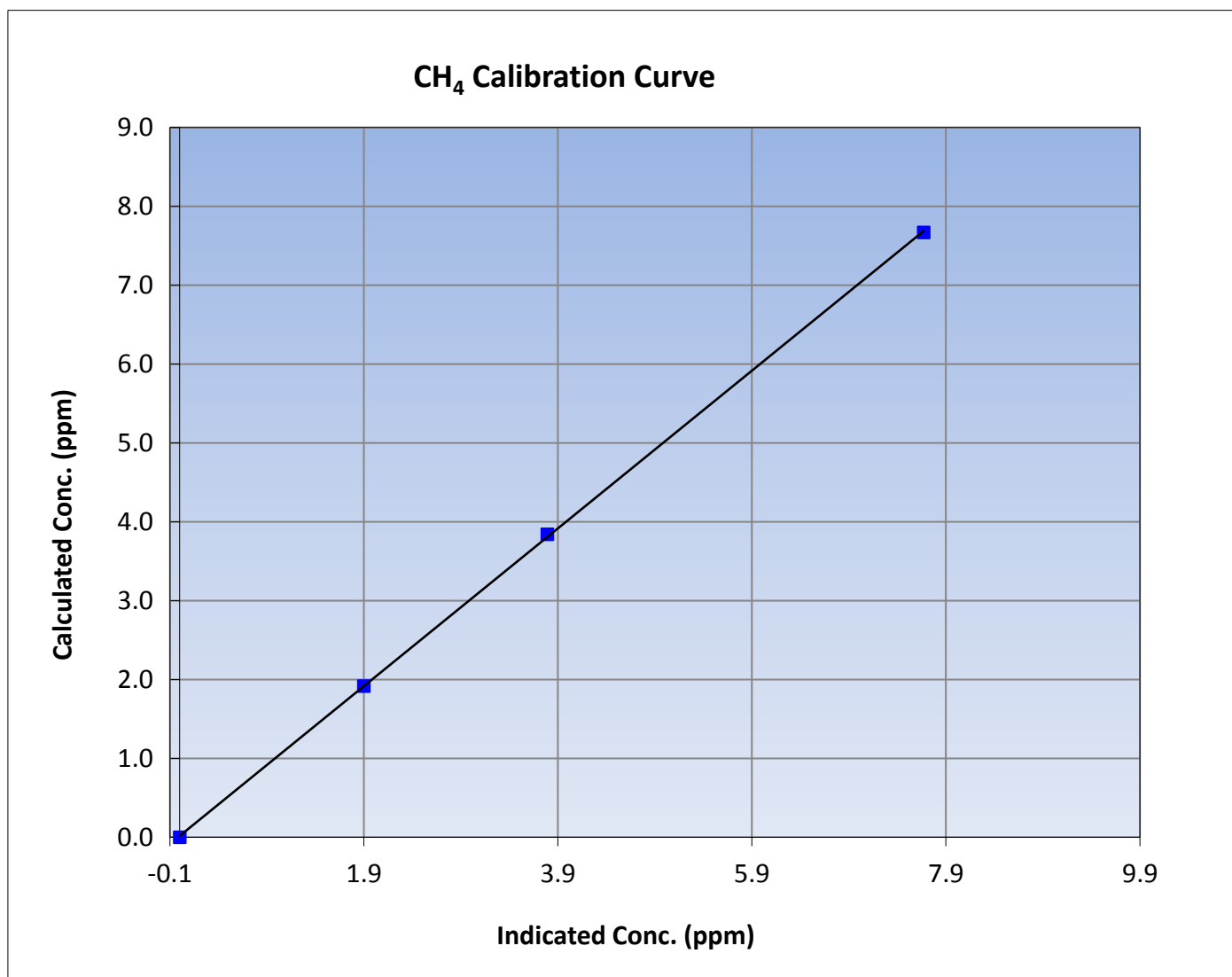
## CH<sub>4</sub> Calibration Summary

### Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 17, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:35
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999948
7.67	7.67	1.0000		
3.84	3.79	1.0132	Slope	1.000001
1.91	1.90	1.0078		
			Intercept	0.016157





# Wood Buffalo Environmental Association

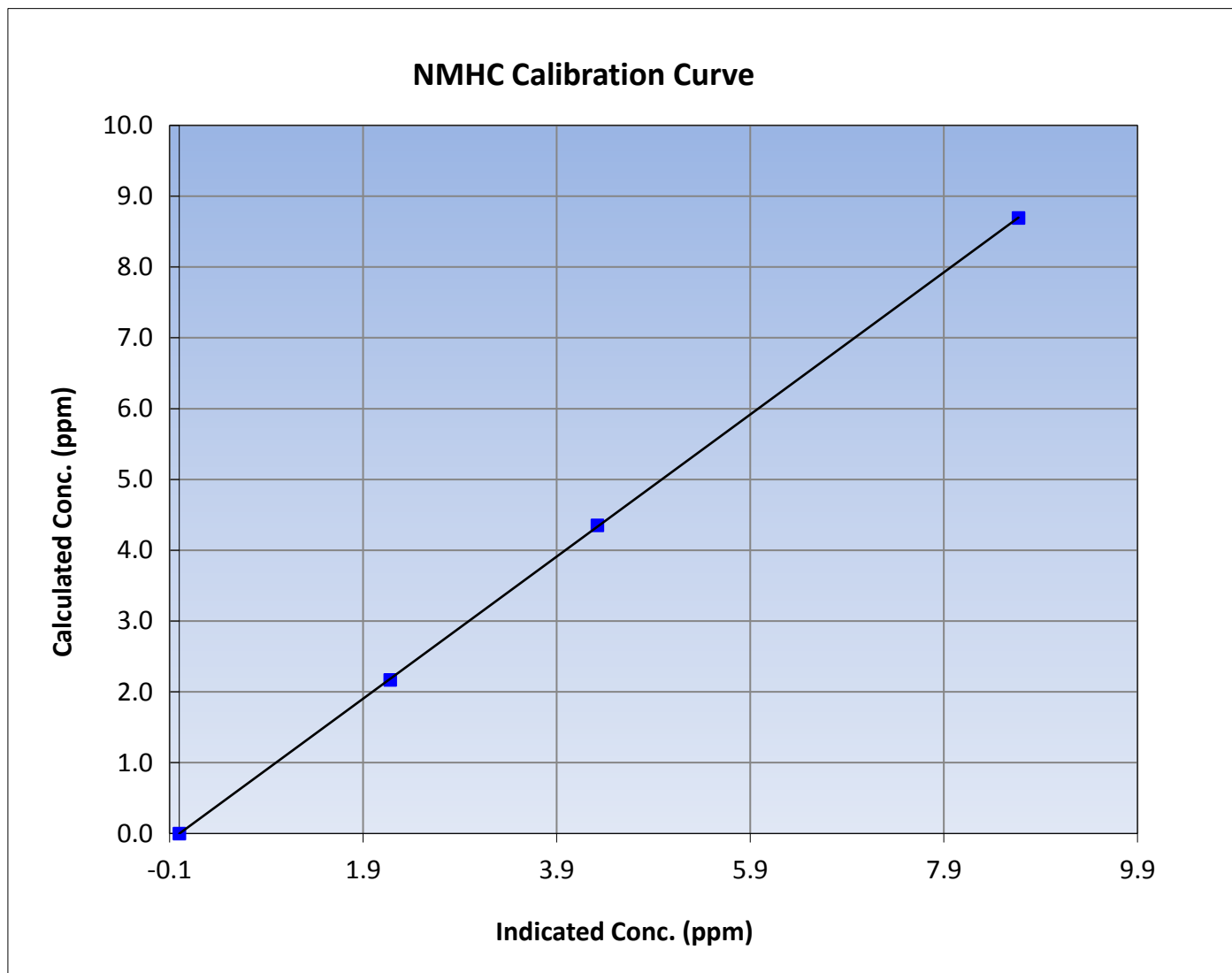
## NMHC Calibration Summary

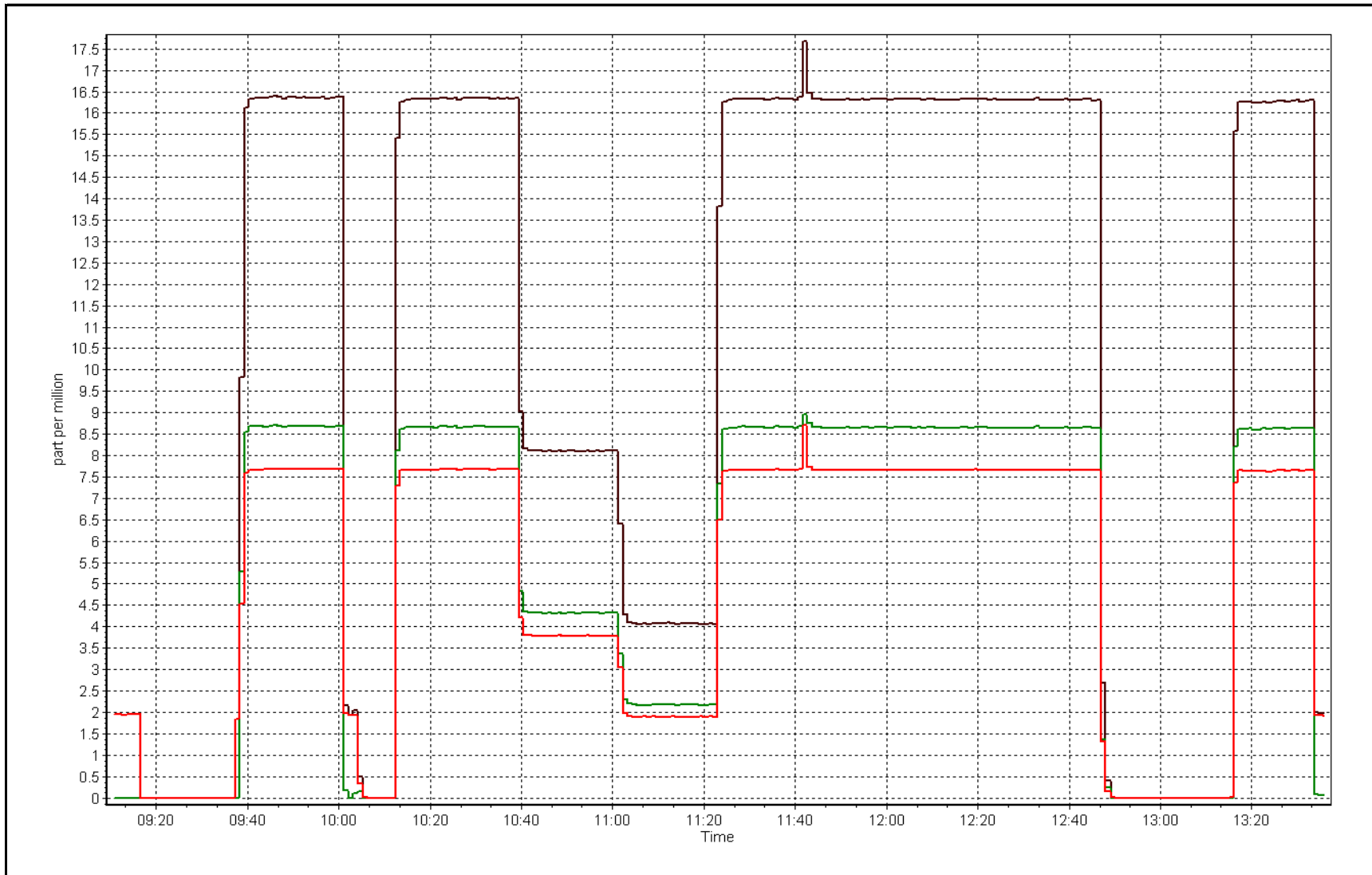
### Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 17, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:35
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999985
8.69	8.67	1.0026		
4.35	4.32	1.0074	Slope	1.003428
2.17	2.18	0.9955		
			Intercept	-0.001963







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 18, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	12:45	End Time (MST)	15:40
NO2 GPT Ref date	September-24-15	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.2	27.3
Analyzer IP address	192.168.1.48		Lamp temp.	53.8	53.8
Calculated slope	0.999747	0.994915	Pressure	654.9	658.9
Calculated intercept	-0.971684	-0.431671	Flow cell A	0.701	0.707
Analyzer Background	-2.0	-2.0	Flow cell B	0.703	0.711
Analyzer Coefficient	0.961	0.980	Cell A Intensity	127000	124348
			Cell B Intensity	129000	126514

Analyzer make	Thermo 49i	Analyzer serial #	1426262596
---------------	------------	-------------------	------------

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.00	0.0	-0.4	----
high point	5000	1.19	417.9	419.8	0.995
second point	5000	0.85	286.8	289.1	0.992
third point	5000	0.51	149.3	151.7	0.984
as left zero	5000	0.00	0.0	0.6	----
as left span	5000	1.19	417.9	426.3	0.980
Average Correction Factor					0.991

Corrected As found	NA	Previous response	NA	% change	NA
--------------------	----	-------------------	----	----------	----

**Notes:**

Exhaust pump died. Pump replaced before calibration started. Inlet filter changed at the same time. Zero was completed during as left zero of Nox calibration. Span was adjusted.

Calibration Performed By: Devin Russell



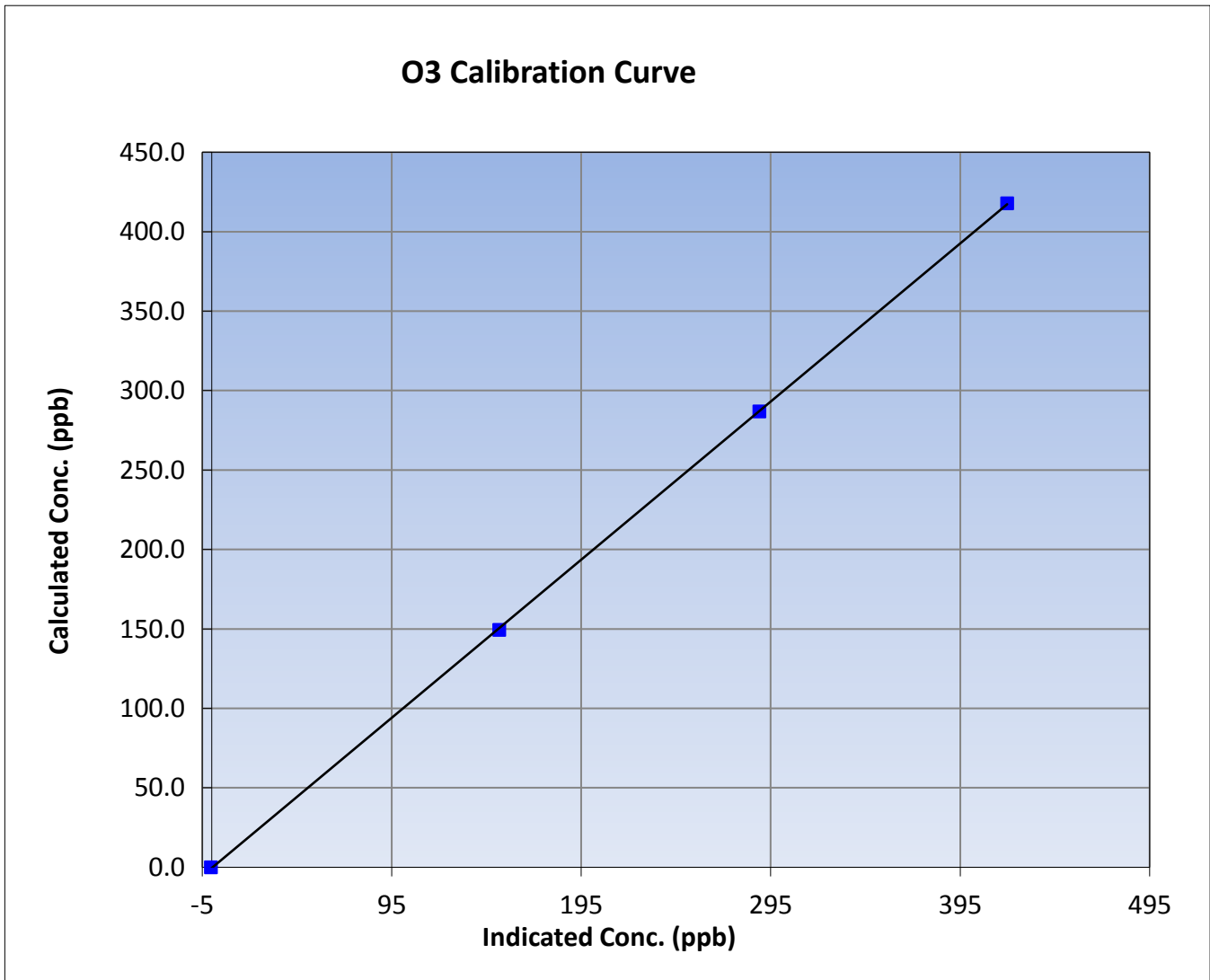
# Wood Buffalo Environmental Association O3 Calibration Report

## Station Information

Calibration Date	September-24-15	Previous Calibration	August 18, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	12:45	End Time (MST)	15:40
Analyzer make	Thermo 49i	Analyzer serial #	1426262596

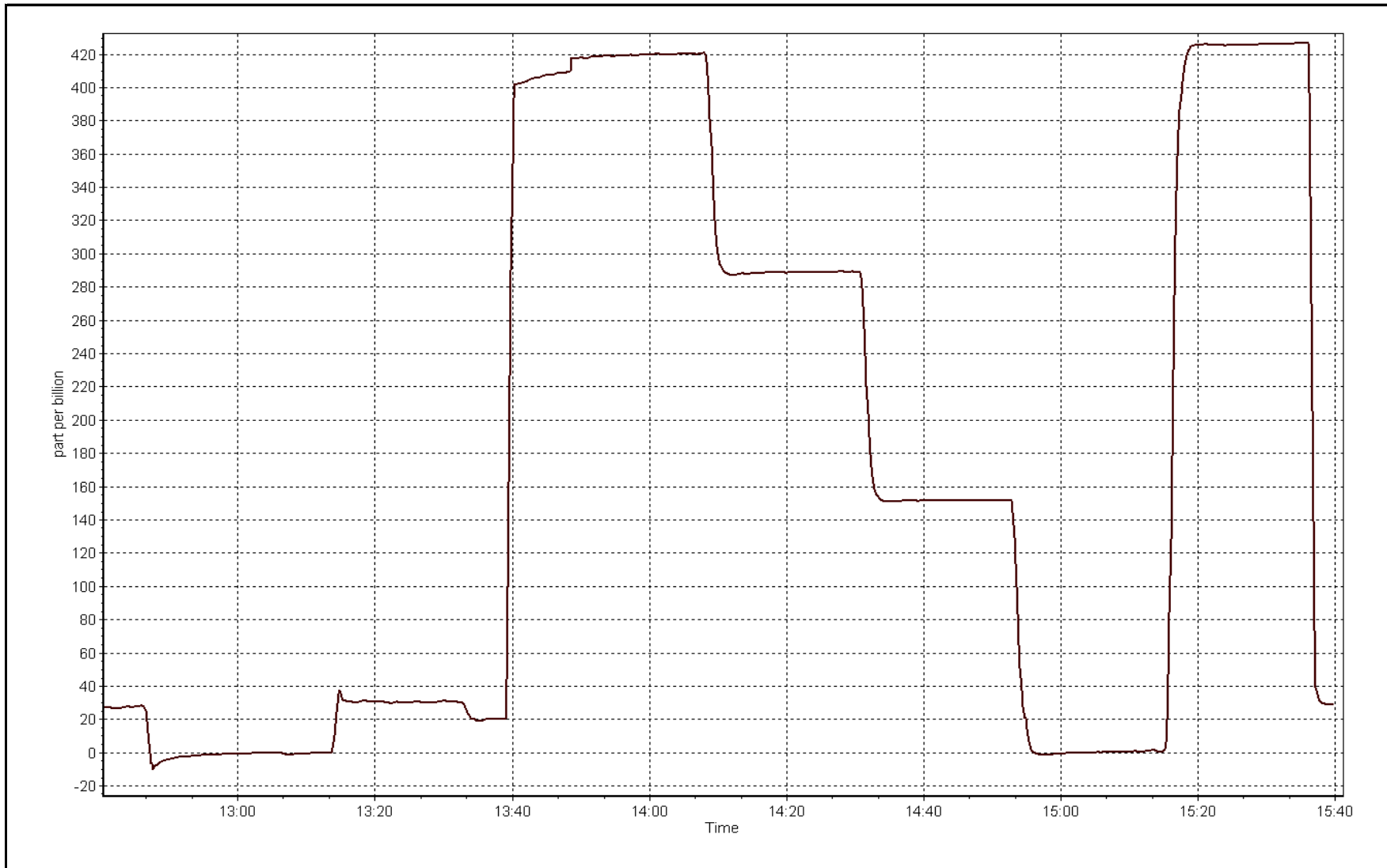
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999972
417.9	419.8	0.9955		
286.8	289.1	0.9922	Slope	0.994915
149.3	151.7	0.9843		
			Intercept	-0.431671



O3 Calibration Plot

Date: September 24, 2015







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

## Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 17, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Install		
Start Time (MST)	9:10	End Time (MST)	13:35
NO Cal Gas Conc	53.4 ppm	Gas Cert Reference	SA130026A
NOX Cal Gas Conc	53.4 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	Sabio 4010	Serial Number	8400311
Zero air Generator	Teledyne API T701	Serial Number	4764

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8790
-------------------	----------------------------	-----------------	------

## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997035	0.998579	0.996146
	Data Offset	-0.358479	-0.186985	-0.618463
Current Calibration	Data Slope	0.997058	0.998338	0.998959
	Data Offset	-0.196965	-0.185031	-0.604405

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262592
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.989		0.976	
NOX coefficient	1.000		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.2		3.2	
NOX bkgrnd	3.3		3.3	
Chamber Temp	49.9	Deg C	49.9	Deg C
Moly Temp	325	Deg C	321.8	Deg C
PMT voltage	-802.9	V	-802.5	V
PMT Temp	-3	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	156.1	mmHg	144.8	mmHg
R Cell Press Nox	156.4	mmHg	144.8	mmHg
NO sample flow	0.825	lpm	0.827	lpm
Nox sample Flow	0.827	lpm	0.827	lpm

**Notes:**

As found span around 2% high. Chamber pressure down to 143 mmHg from 156 mmHG last calibration. Span adjusted.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

September 24, 2015

Station Number:

AMS 14

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
as found span	5000	74.9	799.9	799.9	0.0	813.9	811.7	2.2	0.9828	0.9855
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
high point	5000	74.9	799.9	799.9	0.0	802.6	801.6	1.0	0.9966	0.9979
second point	5000	37.5	400.5	400.5	0.0	401.2	400.6	0.6	0.9982	0.9997
third point	5000	18.7	199.7	199.7	0.0	201.2	201.1	0.2	0.9925	0.9934
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.1	----	----
as left span	5000	74.9	799.9	384.4	415.6	802.0	381.6	420.5	0.9974	1.0073
Average Correction Factor									0.9958	0.9970

Corrected As found

NO<sub>x</sub>= 813.9

NO= 811.8

Percent Change

NO<sub>x</sub>= -1.4%

NO= -1.3%

Previous Response

NO<sub>x</sub>= 802.7

NO= 801.3

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

74.90

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO2 (300)	----	384.4	417.9	802.7	384.4	418.4	0.9818	1.0000	0.9987	100.1%
2nd NO2 (200)	----	515.4	286.8	803.5	515.4	288.1	0.9809	1.0000	0.9956	100.4%
3rd NO2 (100)	----	652.9	149.3	803.7	652.9	150.8	0.9807	1.0000	0.9904	101.0%
4th NO2 (0)	802.2	----	0.7	802.9	802.2	0.7	0.9816	1.0000	N/A	----
Average Correction Factor							0.9812	1.0000	0.9949	100.5%

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

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

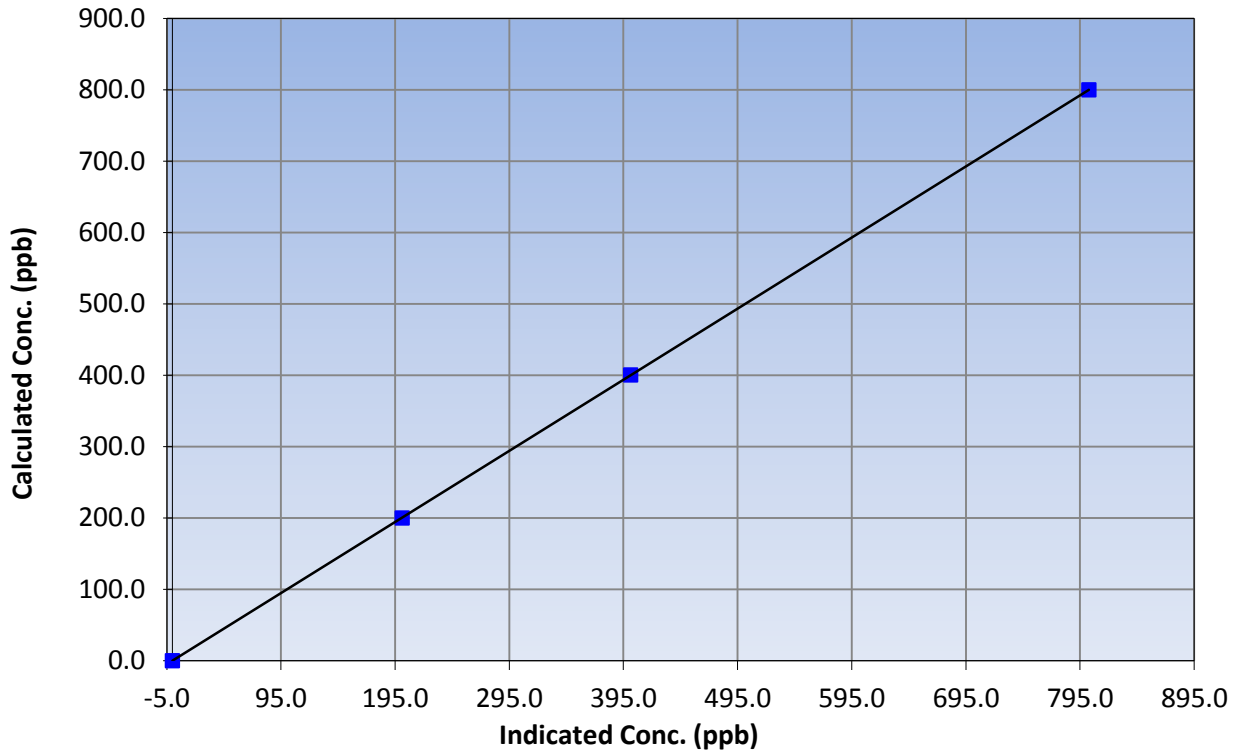
### Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 17, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999997
799.9	802.6	0.9966		
400.5	401.2	0.9982	Slope	0.997058
199.7	201.2	0.9925		
			Intercept	-0.196965

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

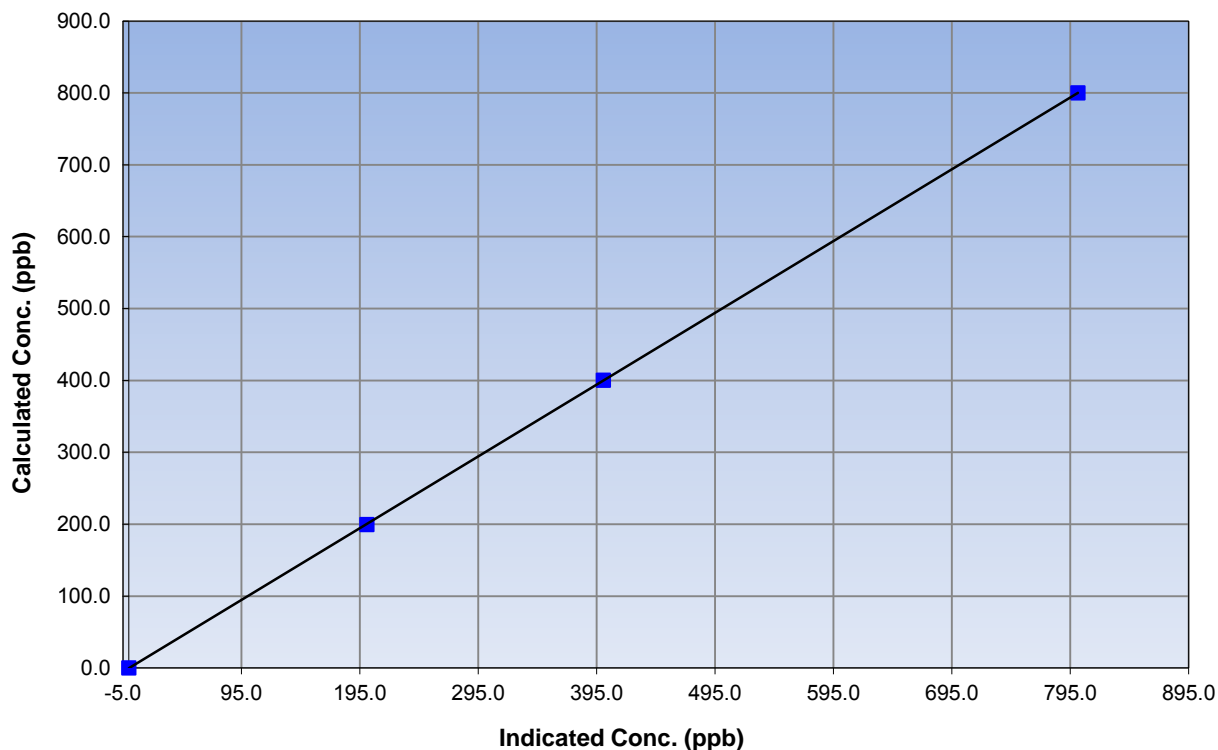
### Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 17, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999996
799.9	801.6	0.9979		
400.5	400.6	0.9997	Slope	0.998338
199.7	201.1	0.9934		
			Intercept	-0.185031

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

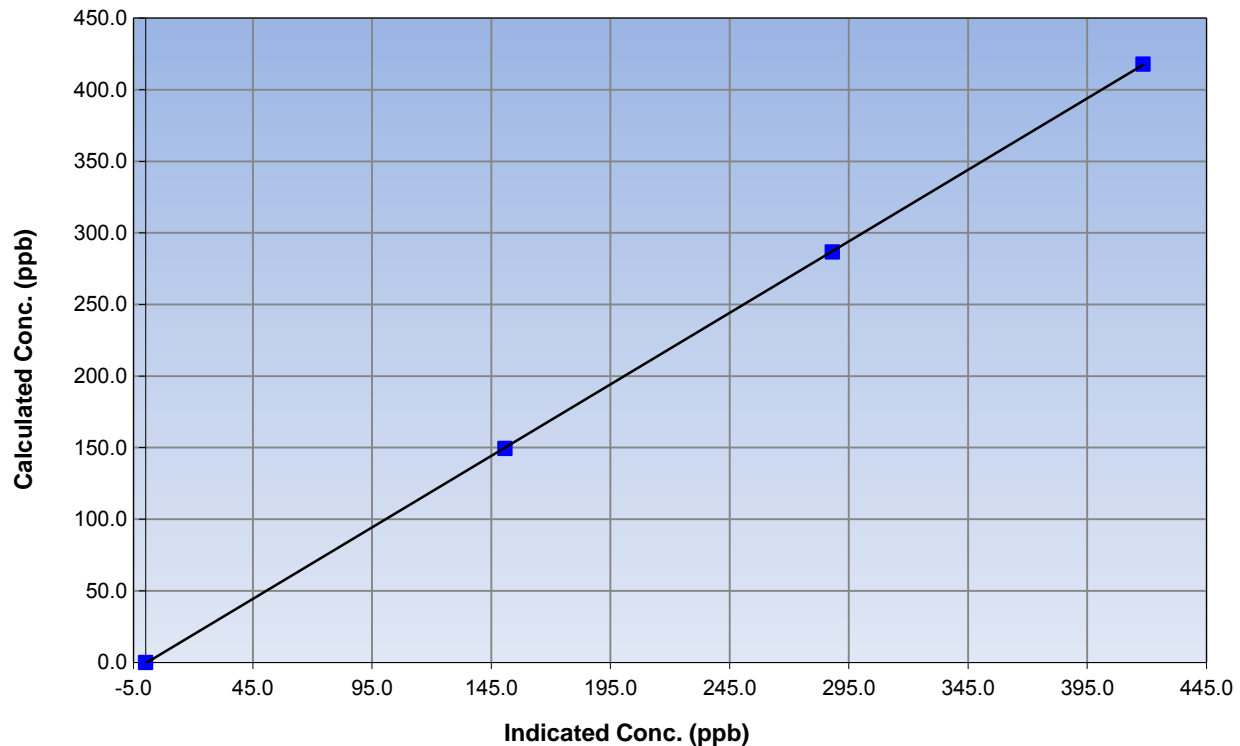
### Station Information

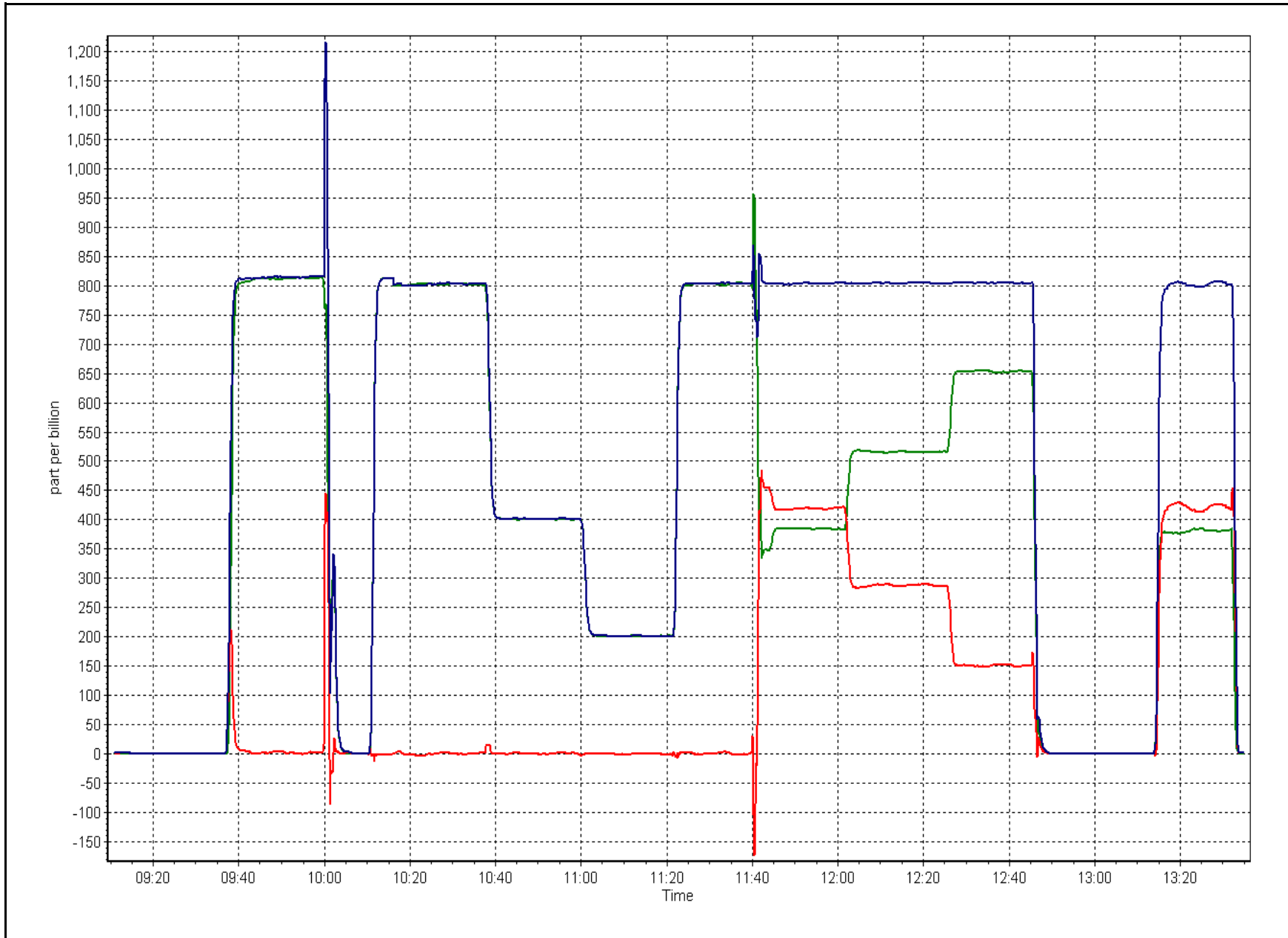
Calibration Date	September 24, 2015	Previous Calibration	August 17, 2015
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999988
417.9	418.4	0.9987		
286.8	288.1	0.9956	Slope	0.998959
149.3	150.8	0.9904		
			Intercept	-0.604405

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







# Wood Buffalo Environmental Association

## SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	September 25, 2015	Previous Calibration:	August 18, 2015
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	10:50	End Time (MST):	11:25
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION			
Particulate Fraction:		PM2.5	
Make/Model:		Thermo / SHARP 5030	
Serial Number		E1093	
C <sub>14</sub> Source SN:		4933	
Confirmation of Time settings:		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Parameters Checked:	<input checked="" type="checkbox"/> T1	<input type="checkbox"/> T2	<input type="checkbox"/> T3
	<input type="checkbox"/> T4	<input type="checkbox"/> P3	<input checked="" type="checkbox"/> P3
	<input checked="" type="checkbox"/> Main Flow	<input type="checkbox"/> Beta	<input type="checkbox"/> Neph
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

### CALIBRATION DATA

Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	13.0	13.0	0.0	13.0
T2	29.0	na	na	29.0
T3	26.0	na	na	26.0
T4	23.0	na	na	23.0
RH (%)	22.0	na	na	22.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	950	949.0	-1.0	950

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1023	23	1023	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	191		191
Neph	1.2		-0.1
C14	2.4		8
Indicated Concentration (ug/m3)	1	Yes	-0.1
Offset 1	189.7		191.1
Offset 2	31.9		31.8

### Leak Check (Quarterly)

Leak Check Date:	August 18, 2015	Previous Leak Check Date:	
	Measured	Difference LPM (Limit +/- 0.42 LPM)	
Flow without adaptor (LPM):	16.82	0.13	
*Flow with adaptor (LPM):	16.69		

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

Mass Foil Calibration (Annually)			
Foil Calibration Date:	June 17, 2015	Previous Foil Calibration:	
Zeroed?:			
Foil Mass:	1278	Mass foil set S/N:	2520
Previous Correction Factor:	7020		
New Correction Factor:	6936		

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

### NOTES:

Nephelometer adjusted, Sample head cleaned

Calibration Performed By: Melissa Lemay



This page intentionally left blank





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 15  
CNRL HORIZON  
SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)  
 SEPTEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	685	35	35	100.00	20	0	3	0
TRS (ppb) Average	683	35	37	99.72	1	0	0	0
THC (ppm) Average	683	35	37	99.72	5	-	2.6	-
NO2 (ppb) Average	685	35	35	100.00	25	0	8	-
NO (ppb) Average	685	35	35	100.00	54	-	7	-
NOX (ppb) Average	685	35	35	100.00	62	-	15	-
PM2.5 (ug/m3) Average	718	2	2	100.00	22.7	-	7.8	0
Temperature 2 m (C) Average	720	0	0	100.00	24.7	-	15.5	-
Wind Speed 10 m (km/h) Average	715	0	5	99.31	29	-	16	-
Wind Direction 10 m (deg) Average	715	0	5	99.31	-	-	-	-
Precipitation (mm) Total	720	0	0	100.00	3.8	-	19.1	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	90	-
Global Solar Radiation (W/m2) Average	720	0	0	100.00	652	-	187	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)  
 SEPTEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	685	0.6	2	-	0	0	0	0	0	1	20
TRS (ppb) Average	683	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	683	2.16	0.3	-	1.9	2	2	2.1	2.2	2.4	5
NO2 (ppb) Average	685	3	4	-	0	0	0	2	4	8	25
NO (ppb) Average	685	1.6	5	-	0	0	0	0	1	3	54
NOX (ppb) Average	685	4.7	8	-	0	0	1	2	6	11	62
PM2.5 (ug/m3) Average	718	3.16	2.9	-	0	0.5	1.3	2.3	4.2	6.7	22.7
Temperature 2 m (C) Average	720	8.75	5.6	-	-4.4	2	4.7	8.4	12.4	16.3	24.7
Wind Speed 10 m (km/h) Average	715	8.1	4	-	0	3	5	8	10	13	29
Wind Direction 10 m (deg) Average	715	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	720	-	-	44.2	-	-	-	-	-	-	-
Relative Humidity (%) Average	720	72.7	20	-	27	43	55	76	92	96	99
Global Solar Radiation (W/m2) Average	720	126.1	175	-	0	0	0	13	226	420	652

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)  
 SEPTEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	03 Sep 2015 10:00	03 Sep 2015 10:00	1	Maintenance - verified operation of the daily QA checks
TRS	18 Sep 2015 11:00	18 Sep 2015 11:00	1	Maintenance - cleaned glass manifold
THC	14 Sep 2015 11:00	14 Sep 2015 12:00	2	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	04 Sep 2015 21:00	04 Sep 2015 21:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	15 Sep 2015 02:00	15 Sep 2015 02:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	16 Sep 2015 03:00	16 Sep 2015 03:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	23 Sep 2015 00:00	23 Sep 2015 01:00	2	Flat line in sensor output signal

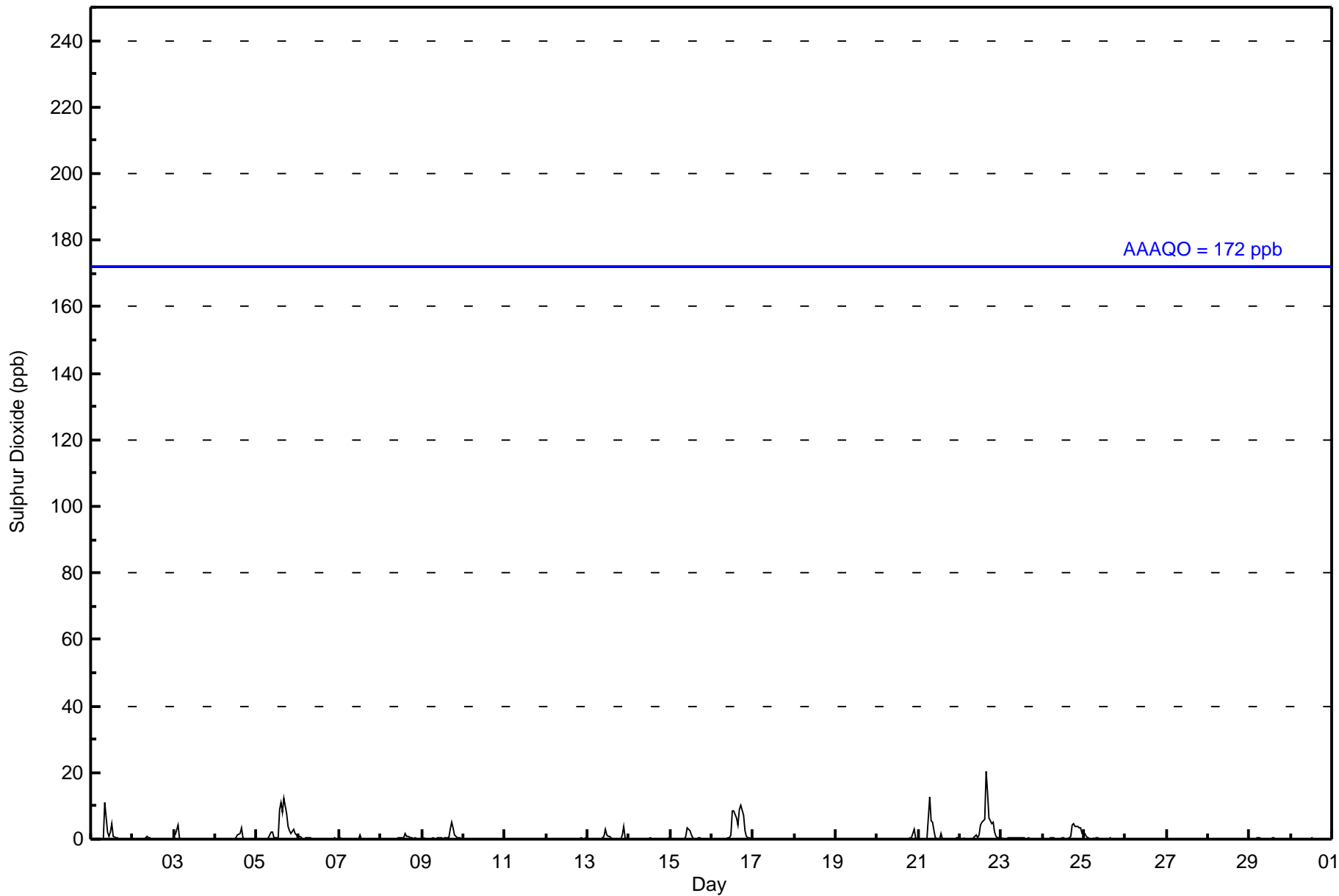


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 20 ppb on Sep 22 16:00	Maximum Daily Average: 3.2 ppb on Sep 22		Hours of Data:	685
Minimum Value: 0 ppb on Sep 1 01:00	Minimum Daily Average: 0.0 ppb on Sep 18		Hours of Missing Data:	35
Maximum Diurnal Average: 1.4 ppb at hour 17	Minimum Diurnal Average: 0.1 ppb at hour 4		Hours of Calibration:	35
Monthly Average: 0.6 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 10		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	0	0	0	Z	0	0	0	11	2	1	2	5	1	1	0	0	0	0	0	0	0	0	0	1.0	11
2-Sep	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
3-Sep	Z	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	4
4-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	4	1	0	0	0	0	0	0	0	0	0.4	4
5-Sep	0	0	Z	0	0	0	0	0	2	2	0	1	0	9	11	8	12	8	4	3	2	3	2	1	3.0	12
6-Sep	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
7-Sep	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
8-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1
9-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	5	3	1	1	0	0	0	0	0.8	5
10-Sep	0	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
11-Sep	0	0	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-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-Sep	0	0	0	0	Z	0	0	0	0	1	3	1	1	1	0	0	0	0	0	0	1	4	0	0	0.6	4
14-Sep	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
15-Sep	Z	0	0	0	0	0	0	0	0	1	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0.4	3
16-Sep	0	Z	0	0	0	0	0	0	0	0	1	1	9	9	6	4	9	10	7	3	1	0	0	0	2.6	10
17-Sep	0	0	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-Sep	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.0	0
19-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
20-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0.2	3
21-Sep	Z	0	0	0	0	0	13	5	5	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1.3	13
22-Sep	0	Z	0	0	0	0	0	0	0	1	1	1	4	5	6	20	14	6	5	5	2	1	0	0	3.2	20
23-Sep	0	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-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	4	5	4	4	3	2	1.3	5	
25-Sep	2	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
26-Sep	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
27-Sep	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
28-Sep	0	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-Sep	0	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-Sep	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1

0.2	0.2	0.3	0.1	0.1	0.1	0.5	0.3	0.7	0.4	0.4	0.4	0.4	0.8	1.1	1.0	1.3	1.4	1.2	0.8	0.6	0.4	0.5	0.2	0.2	Diurnal Average
2	1	4	0	0	0	13	5	11	2	3	3	3	9	9	11	20	14	10	7	5	4	4	3	2	Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**CNRL Horizon - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	679	99.12	99.12
11 - 20	6	0.88	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: 685

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**CNRL Horizon - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	58	34	14	4	11	19	15	36	123	115	75	39	36	39	33	23	674
11 - 20	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	1	6
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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>	58	34	14	4	11	19	15	41	123	115	75	39	36	39	33	24	680

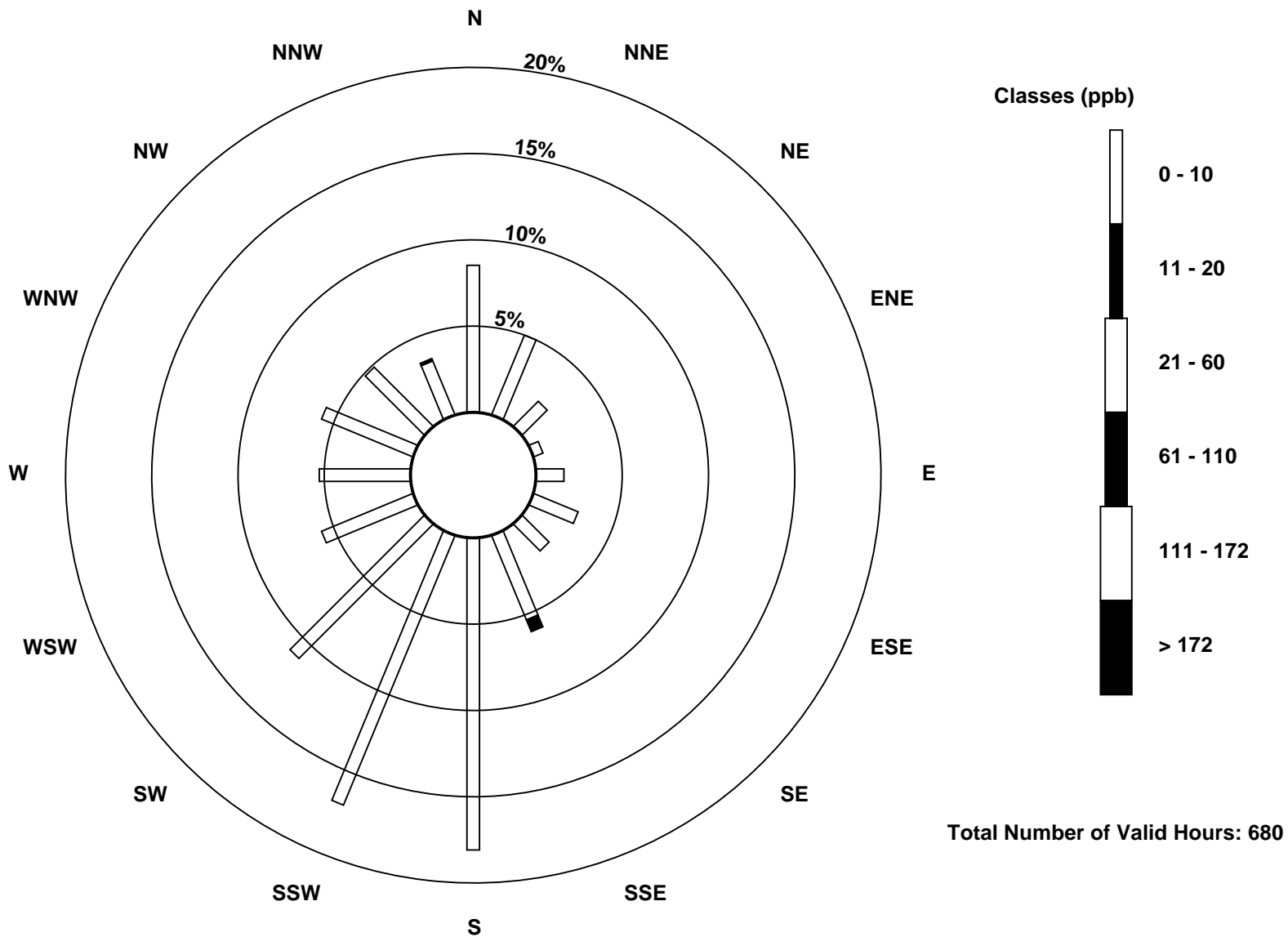
Total Number of Valid Hours: 680

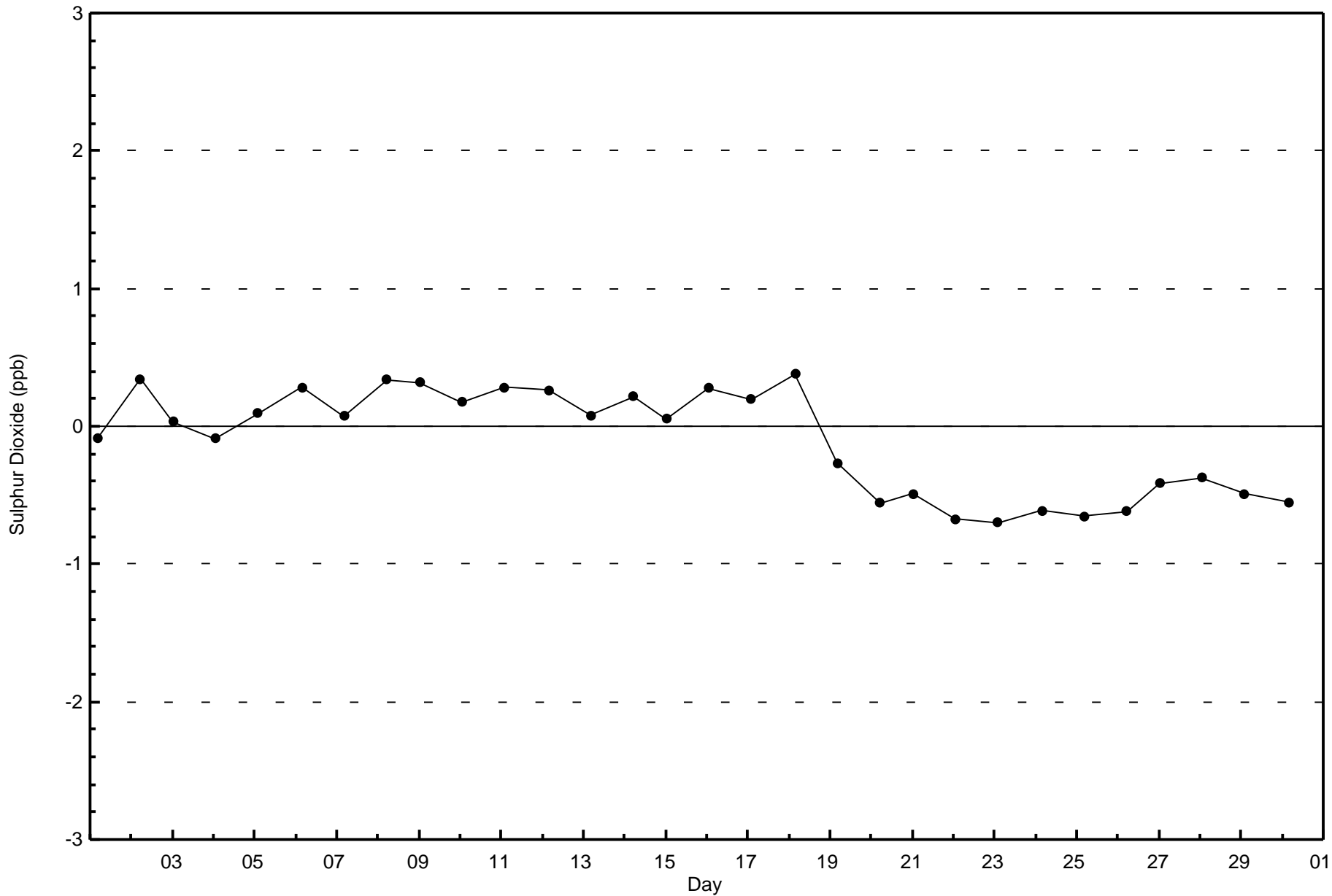
Total Number of Hours: 720

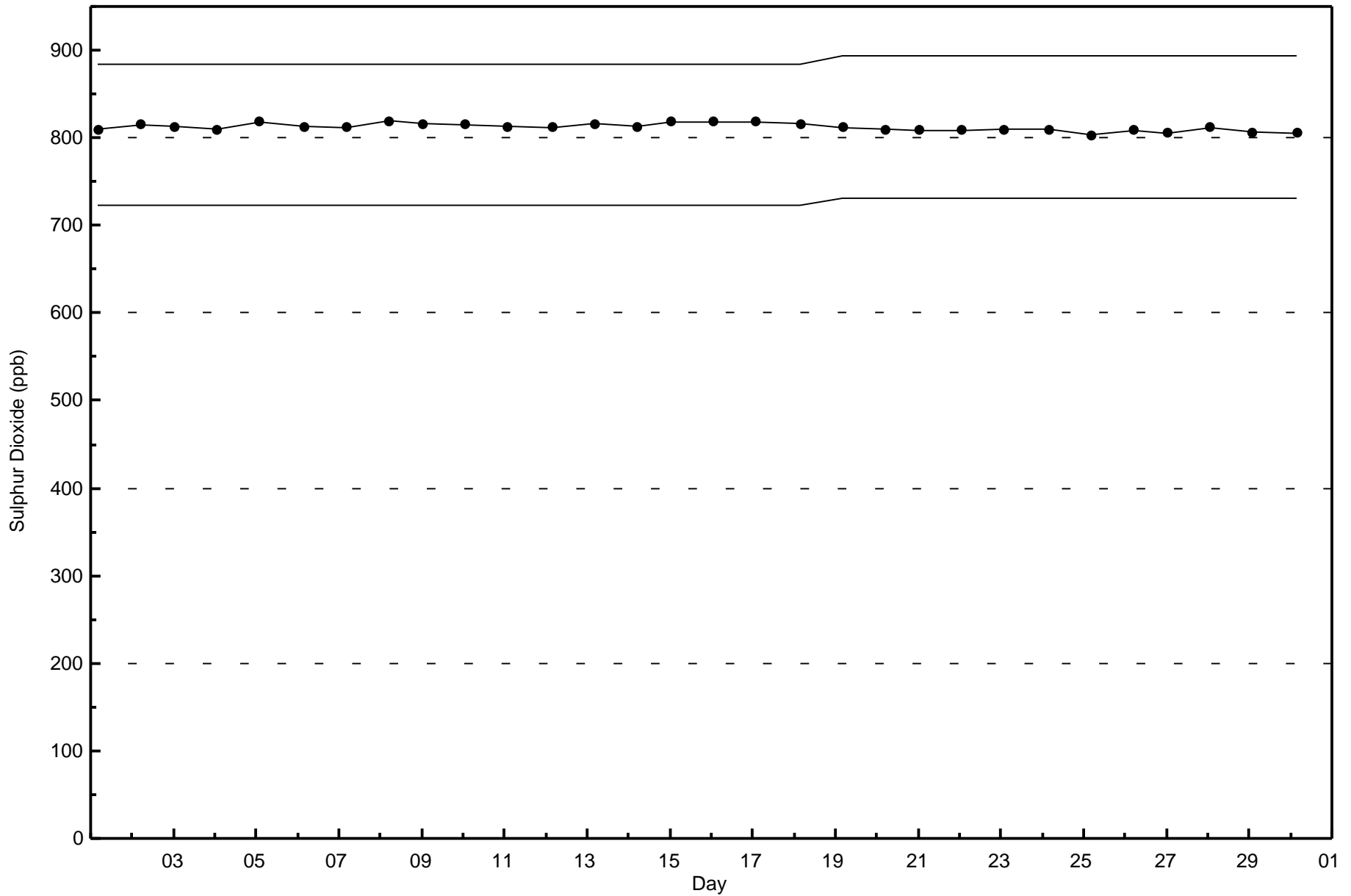


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
CNRL Horizon (AMS 15)









Summary of Hour Averages

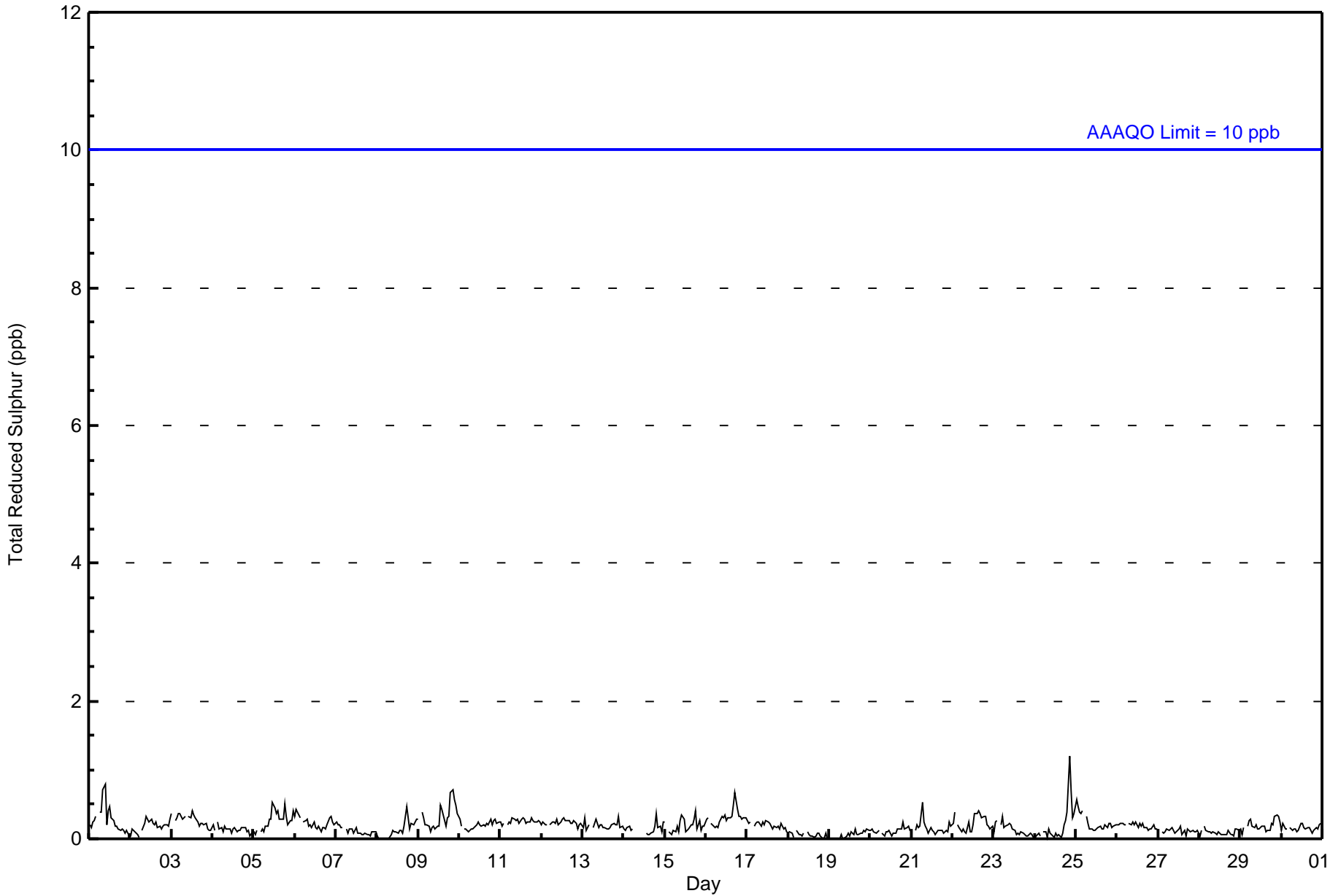
CNRL Horizon - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 1 ppb on Sep 24 21:00	Maximum Daily Average: 0.3 ppb on Sep 9
Minimum Value: 0 ppb on Sep 8 02:00	Hours of Data: 683
Maximum Diurnal Average: 0.2 ppb at hour 21	Hours of Missing Data: 37
Monthly Average: 0.2 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.1 ppb on Sep 18	Percent Operational Time: 99.7
Minimum Diurnal Average: 0.2 ppb at hour 16	
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	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
2-Sep	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-Sep	0	Z	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
4-Sep	0	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-Sep	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
6-Sep	0	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
7-Sep	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
8-Sep	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
9-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.3	1
10-Sep	0	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
11-Sep	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
12-Sep	0	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-Sep	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-Sep	0	0	0	0	0	0	Z	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Sep	0	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-Sep	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
17-Sep	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
18-Sep	0	0	0	0	Z	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Sep	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
20-Sep	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
21-Sep	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
22-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-Sep	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
24-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.2	1
25-Sep	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
26-Sep	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
27-Sep	0	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
28-Sep	0	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-Sep	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-Sep	0	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	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	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	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**CNRL Horizon - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	683	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: 683

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb  
CNRL Horizon - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	57	30	14	4	11	19	16	41	124	115	77	40	35	39	34	24	680
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	57	30	14	4	11	19	16	41	124	115	77	40	35	39	34	24	680

Total Number of Valid Hours: 680

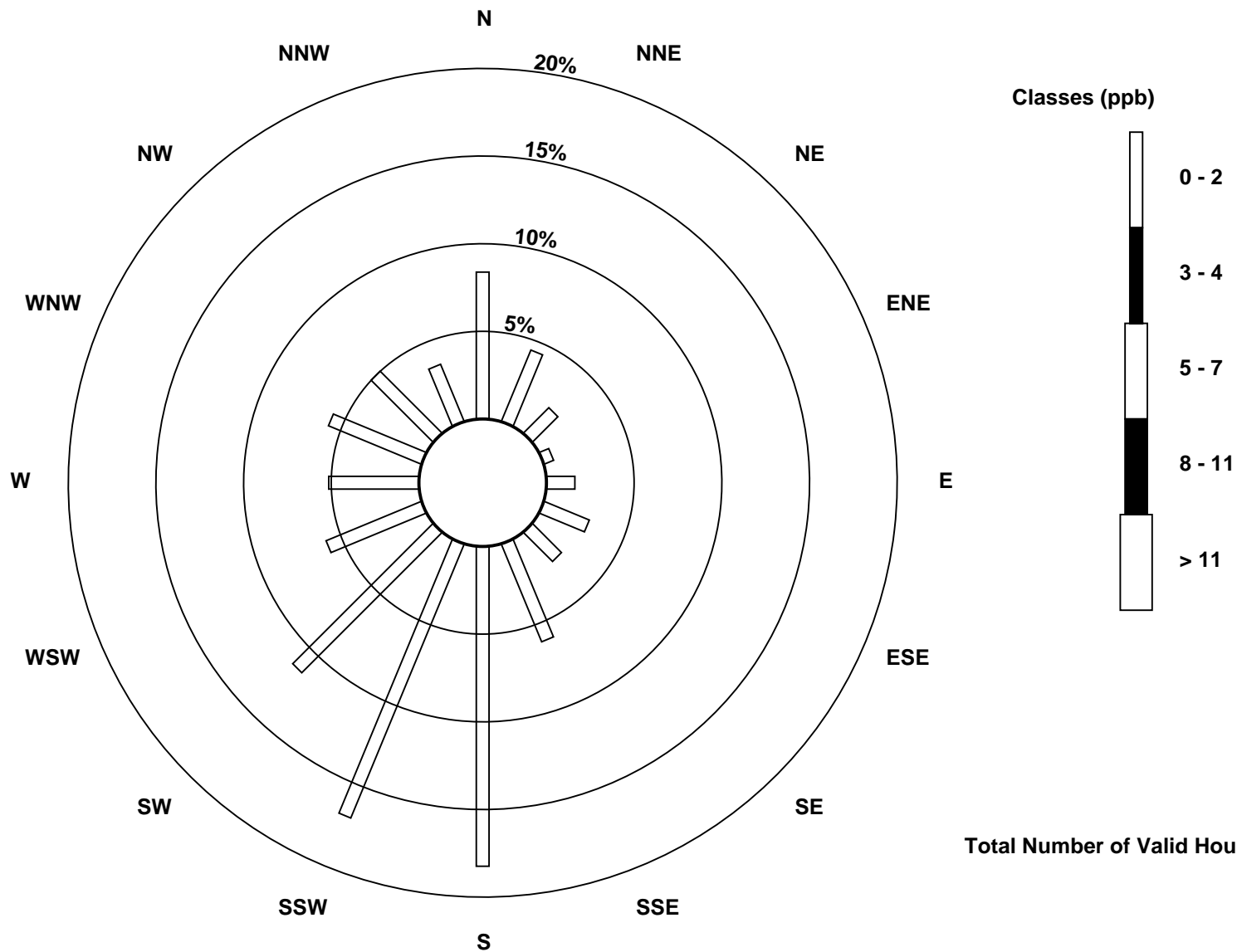
Total Number of Hours: 720

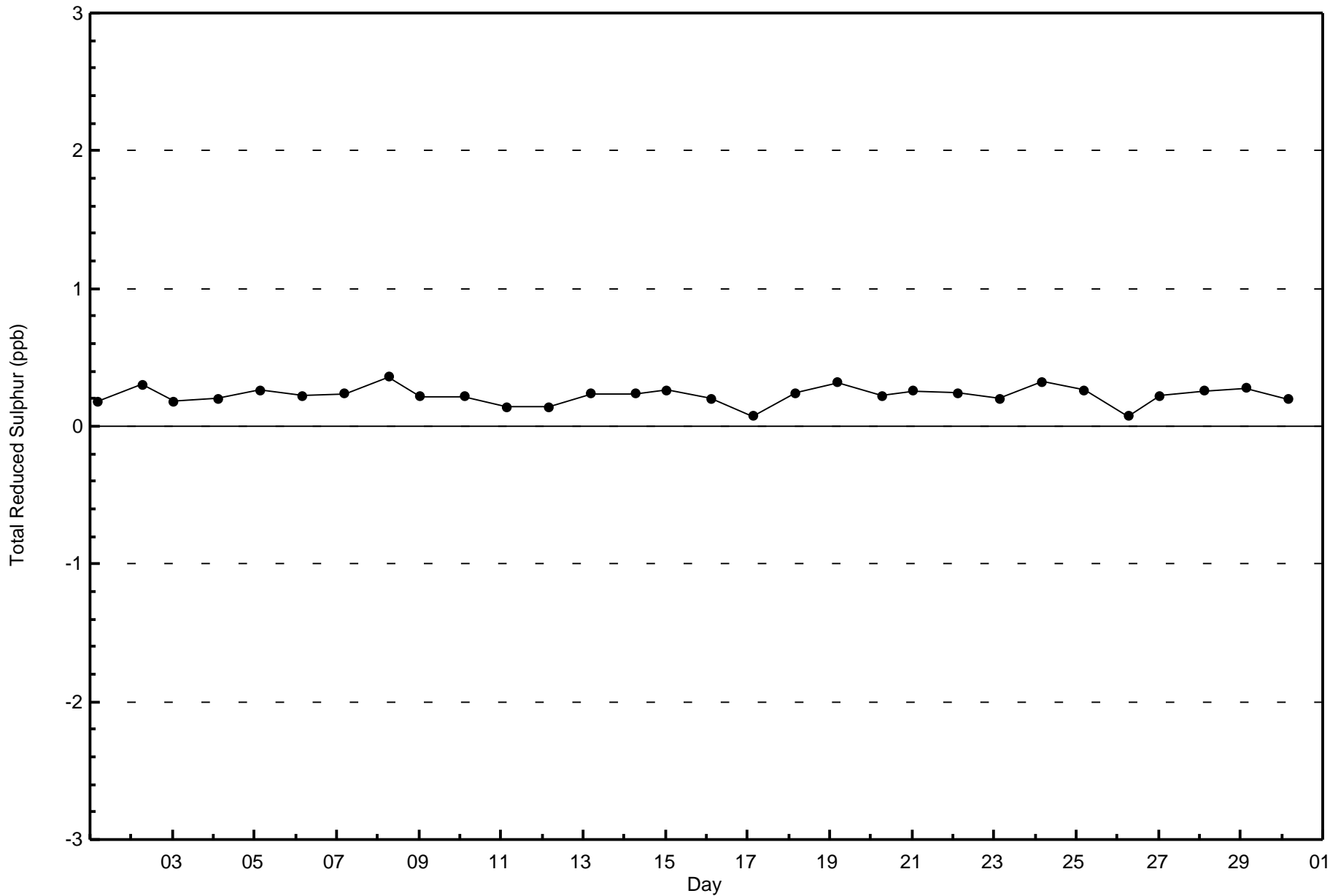


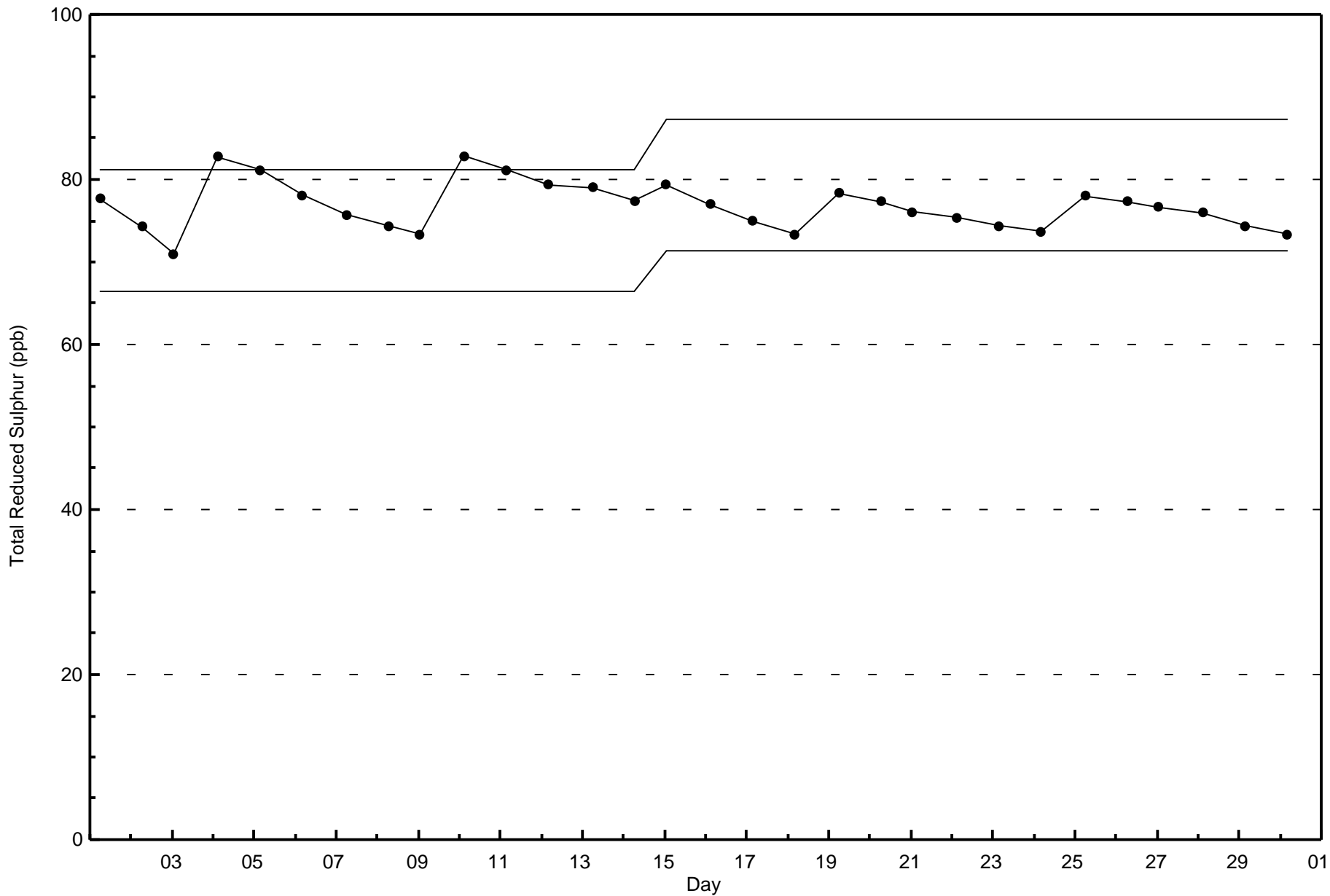


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Total Reduced Sulphur (TRS) - ppb  
CNRL Horizon (AMS 15)

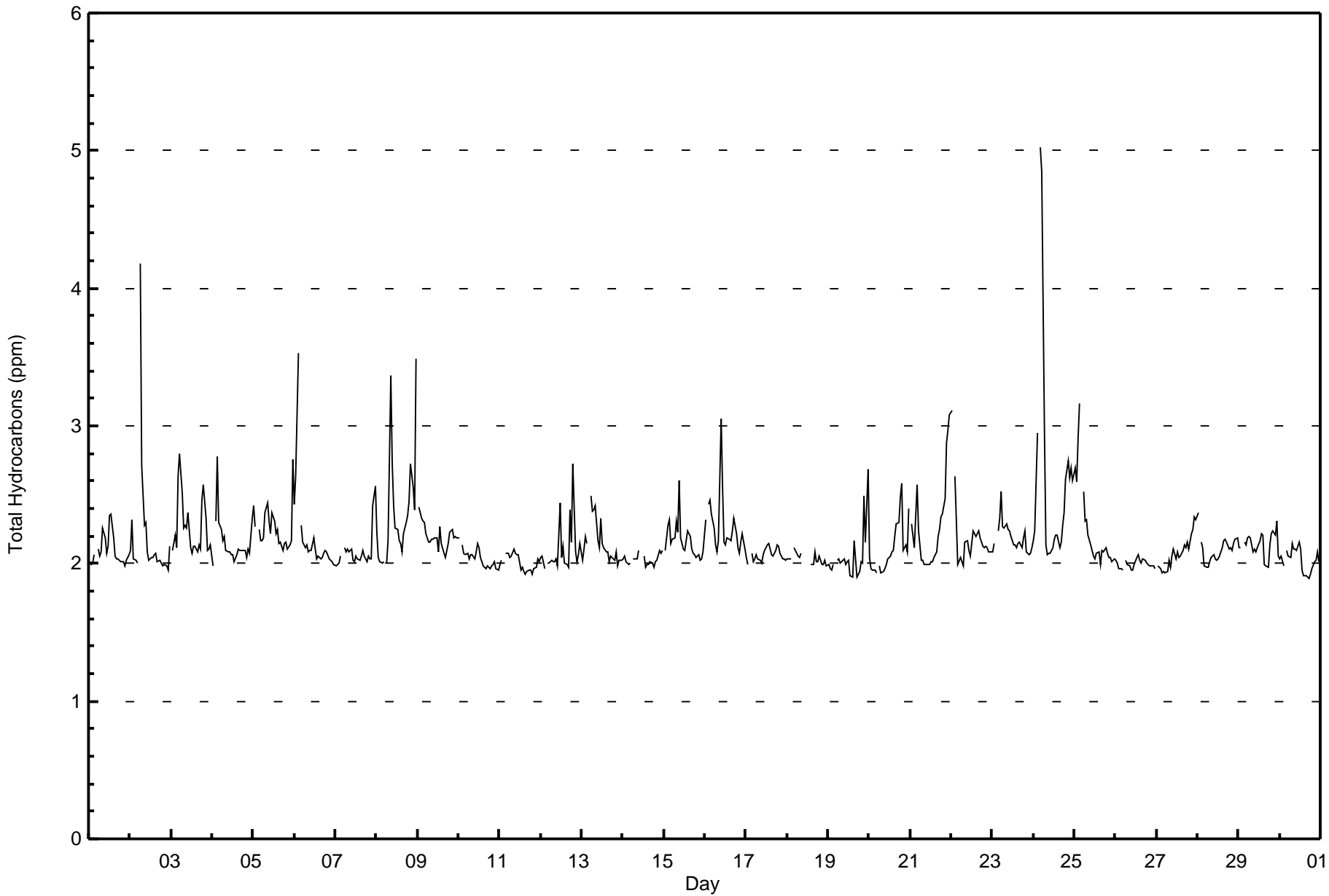








Maximum Value: 5.0 ppm on Sep 24 05:00		Maximum Daily Average: 2.6 ppm on Sep 24		Hours in Service: 720																						
Minimum Value: 1.9 ppm on Sep 30 18:00		Minimum Daily Average: 2.0 ppm on Sep 26		Hours of Data: 683																						
Maximum Diurnal Average: 2.3 ppm at hour 6		Minimum Diurnal Average: 2.1 ppm at hour 16		Hours of Missing Data: 37																						
Monthly Average: 2.16 ppm		Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 2.0 Median = 2.1 Q <sub>3</sub> = 2.2 P <sub>90</sub> = 2.4 P <sub>99</sub> = 3.1		Hours of Calibration: 35																						
				Percent Operational Time: 99.7																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	2.0	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.3	2.2	2.1	2.1	2.4	2.4	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.4
2-Sep	2.1	2.3	2.0	2.0	2.0	Z	4.2	2.7	2.3	2.3	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	4.2
3-Sep	Z	2.1	2.2	2.1	2.6	2.8	2.5	2.3	2.3	2.3	2.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5	2.6	2.3	2.1	2.1	2.1	2.3	2.8
4-Sep	2.0	Z	2.3	2.8	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.8
5-Sep	2.4	2.3	Z	2.2	2.2	2.2	2.2	2.4	2.4	2.3	2.2	2.4	2.3	2.2	2.3	2.1	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.8	2.3	2.8
6-Sep	2.4	2.6	3.5	Z	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.2	3.5
7-Sep	2.0	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.4	2.6	2.1	2.6
8-Sep	2.2	2.0	2.0	2.0	2.0	Z	2.0	2.2	3.4	2.7	2.4	2.3	2.2	2.2	2.1	2.1	2.2	2.3	2.3	2.5	2.7	2.6	2.4	3.5	2.4	3.5
9-Sep	Z	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.3	2.1	2.1	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.4
10-Sep	2.2	Z	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
11-Sep	2.0	2.0	Z	2.1	2.1	2.1	2.0	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	2.0	2.0	2.0	2.0	2.1
12-Sep	2.0	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.4	2.0	2.1	2.0	2.0	2.0	2.4	2.2	2.7	2.1	2.0	2.1	2.1	2.1	2.7
13-Sep	2.0	2.1	2.2	2.1	Z	2.5	2.4	2.4	2.4	2.2	2.1	2.3	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.5
14-Sep	2.0	2.1	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	UO	UO	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1
15-Sep	Z	2.1	2.3	2.3	2.1	2.2	2.2	2.3	2.2	2.6	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.2	2.6
16-Sep	2.3	Z	2.4	2.5	2.4	2.3	2.1	2.1	2.2	3.1	2.6	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.2	2.2	2.1	2.3	3.1
17-Sep	2.0	2.0	Z	2.1	2.0	2.0	2.1	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	2.0	2.0	2.0	2.1	2.1
18-Sep	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.0	2.1	C	C	C	C	C	2.0	2.0	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1
19-Sep	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.2	2.0	1.9	1.9	2.0	2.0	2.5	2.2	2.7	2.1	2.7
20-Sep	2.0	2.0	2.0	2.0	1.9	Z	2.0	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.3	2.3	2.5	2.6	2.1	2.1	2.1	2.4	2.1	2.6
21-Sep	Z	2.3	2.1	2.4	2.6	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.3	2.4	2.5	2.9	3.0	3.1	2.3	3.1
22-Sep	3.1	Z	2.6	2.3	2.0	2.0	2.0	2.0	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	3.1
23-Sep	2.1	2.1	Z	2.2	2.3	2.5	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.5
24-Sep	2.2	2.2	3.0	Z	5.0	4.9	2.9	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.3	2.4	2.6	2.7	2.6	2.7	2.6	2.6	5.0
25-Sep	2.7	2.6	2.9	3.2	Z	2.5	2.3	2.3	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.2	3.2
26-Sep	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
27-Sep	Z	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.3	2.3	2.1	2.3
28-Sep	2.4	Z	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.4
29-Sep	2.1	2.1	Z	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.3	2.1	2.3
30-Sep	2.0	2.1	2.0	Z	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.1	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.2
																								Diurnal Average		
																								Diurnal Maximum		
																								2.2 2.1 2.2 2.2 2.3 2.3 2.2 2.1 2.2 2.2 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.2 2.1 2.1 2.2 2.3 2.3 2.0 2.0		
																								3.1 2.6 3.5 3.2 5.0 4.9 4.2 2.7 3.4 3.1 2.6 2.4 2.4 2.4 2.3 2.2 2.3 2.4 2.5 2.7 2.7 2.9 3.0 3.5 2.0 2.2		
																								Z - zerospan C - Calibration UO - Unstable Operation		





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**CNRL Horizon - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	245	35.87	35.87
2.1 - 3.0	428	62.66	98.54
3.1 - 10.0	10	1.46	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**CNRL Horizon - September 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	26	13	6	1	2	0	0	5	40	63	45	20	5	3	10	5	244
2.1 - 3.0	32	19	8	2	9	19	14	36	82	51	29	19	30	35	22	17	424
3.1 - 10.0	0	0	0	1	0	0	1	0	1	1	1	0	1	1	1	2	10
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	58	32	14	4	11	19	15	41	123	115	75	39	36	39	33	24	678

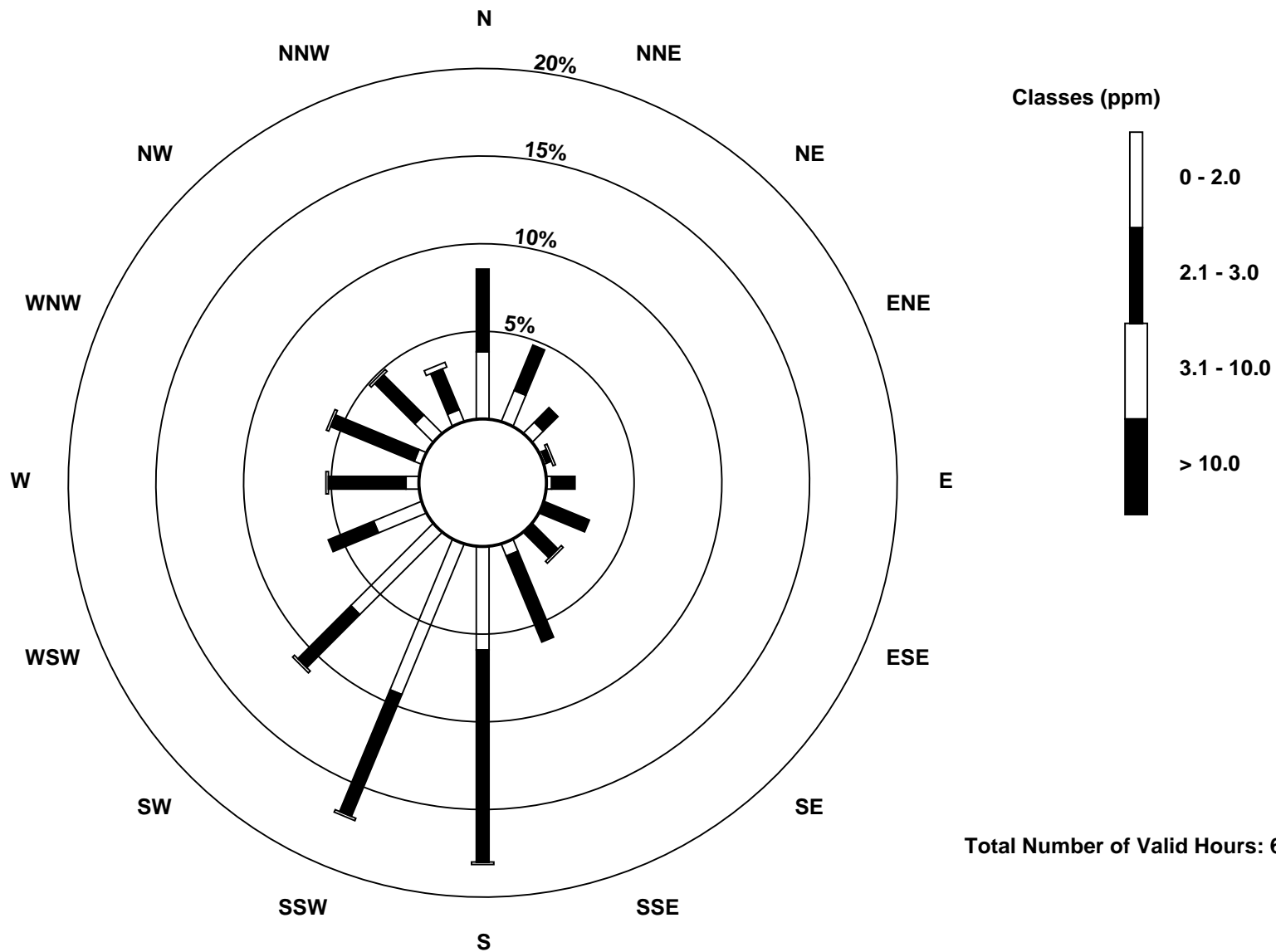
Total Number of Valid Hours: 678

Total Number of Hours: 720

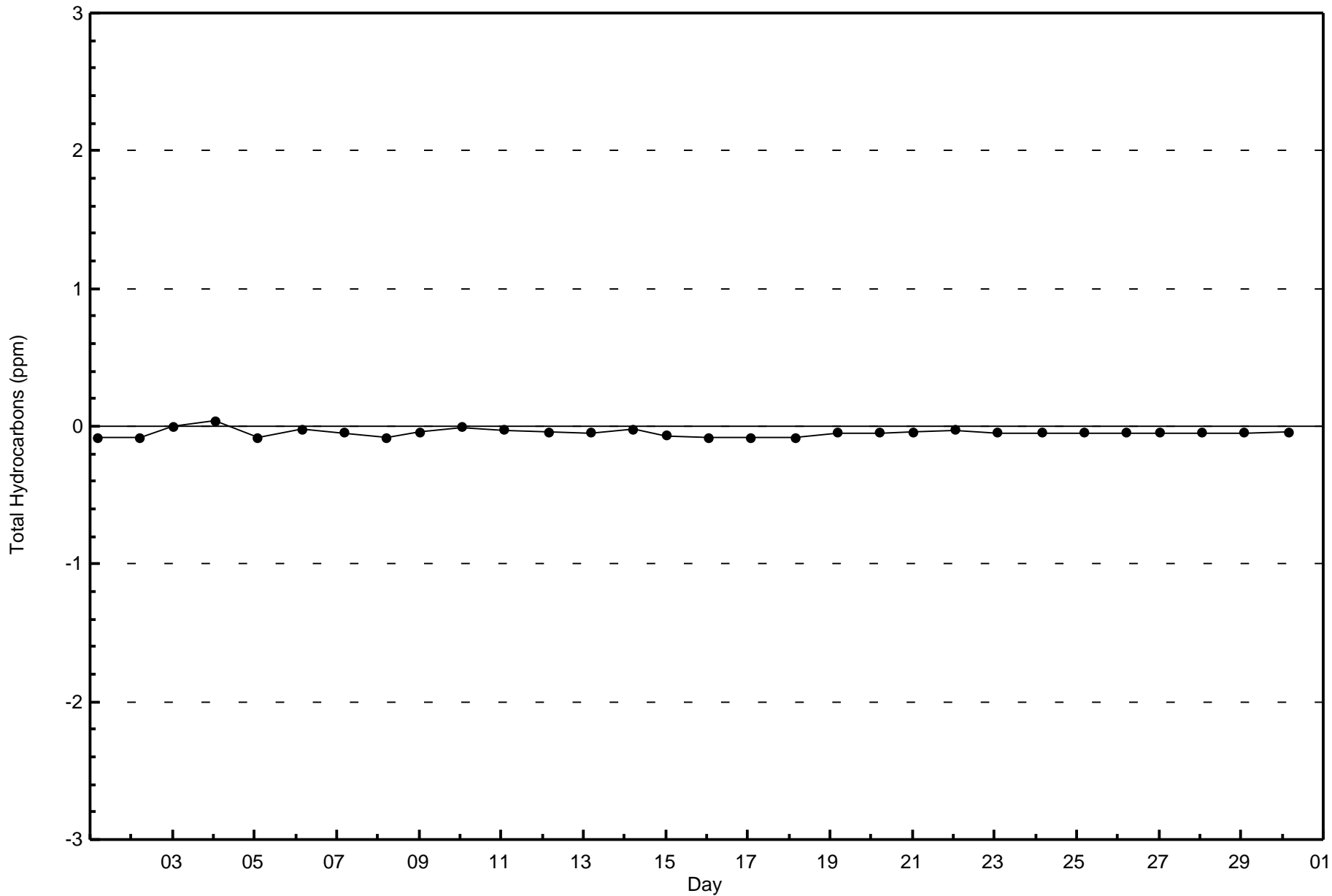


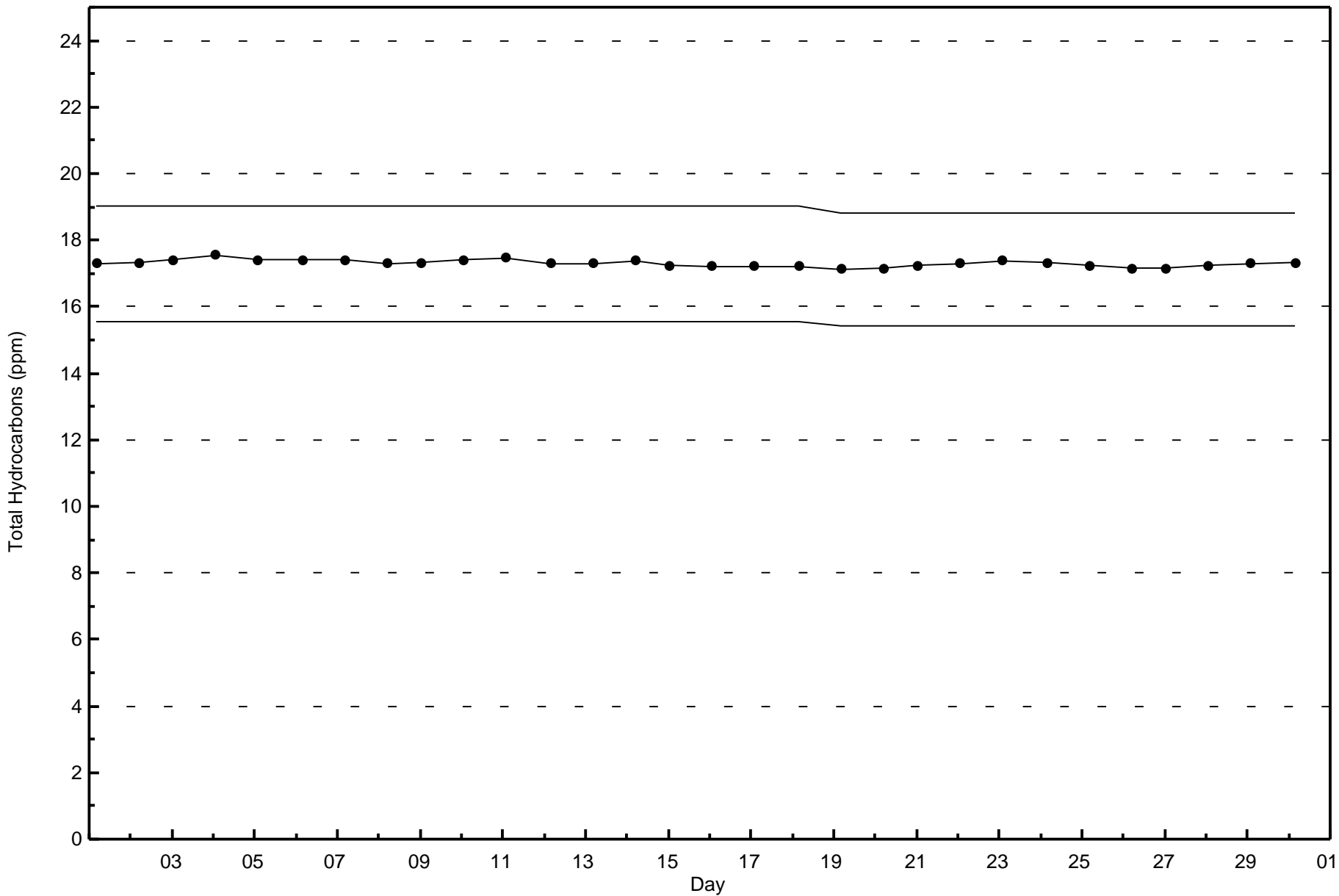
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Total Hydrocarbons (THC) - ppm  
CNRL Horizon (AMS 15)



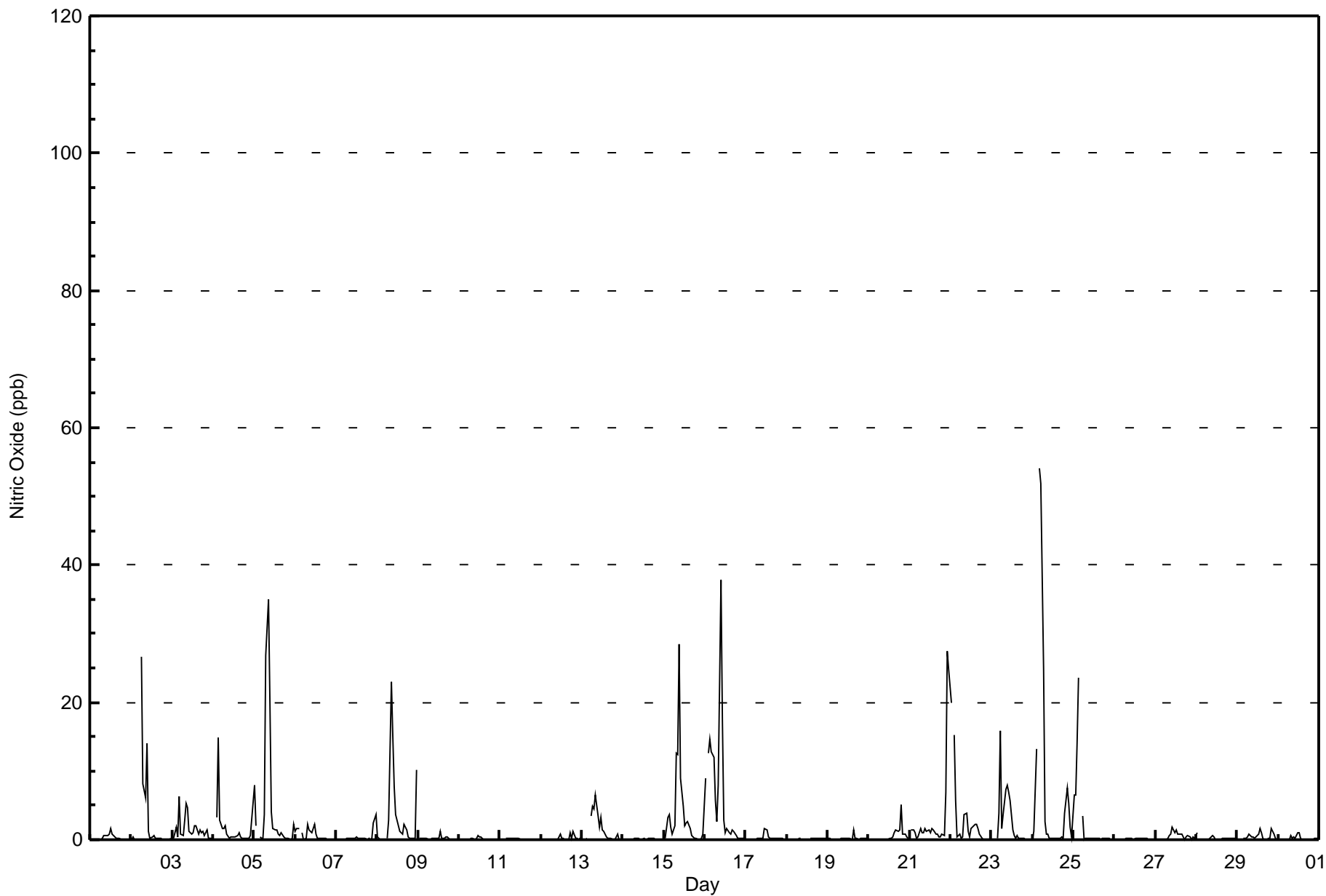








Maximum Value: 54 ppb on Sep 24 05:00																		Maximum Daily Average: 7.4 ppb on Sep 24						Hours in Service: 720			
Minimum Value: 0 ppb on Sep 1 01:00																		Minimum Daily Average: 0.1 ppb on Sep 14						Hours of Data: 685			
Maximum Diurnal Average: 5.0 ppb at hour 10																		Minimum Diurnal Average: 0.3 ppb at hour 19						Hours of Missing Data: 35			
Monthly Average: 1.6 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 3 P <sub>99</sub> = 27						Hours of Calibration: 35			
																		Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	0	0	0	0	Z	0	0	0	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0.3	2	
2-Sep	0	0	0	0	0	Z	27	8	6	14	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2.6	27	
3-Sep	Z	0	2	0	6	1	1	3	5	5	1	1	1	2	2	1	1	1	1	1	1	0	0	1.6	6		
4-Sep	0	Z	3	15	3	2	2	2	1	0	0	0	0	0	1	1	0	0	0	0	0	1	6	1.6	15		
5-Sep	8	2	Z	0	0	0	4	27	35	20	4	2	1	1	1	1	0	0	0	0	0	0	2	4.8	35		
6-Sep	1	2	2	Z	1	0	0	2	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0.7	2		
7-Sep	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	4		
8-Sep	0	0	0	0	0	Z	0	3	23	15	8	4	2	1	1	1	2	1	0	0	0	0	10	3.2	23		
9-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1		
10-Sep	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1		
11-Sep	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-Sep	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0.2	1		
13-Sep	0	0	0	0	Z	3	5	5	6	4	2	3	2	1	0	0	0	0	0	0	1	1	0	1.5	6		
14-Sep	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		
15-Sep	Z	0	3	4	2	1	2	13	12	28	9	5	2	2	3	2	1	0	0	0	0	0	1	3.9	28		
16-Sep	9	Z	13	15	13	12	6	3	8	38	17	3	1	2	1	1	1	1	1	0	0	0	0	6.3	38		
17-Sep	0	0	Z	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0.3	2		
18-Sep	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.1	0		
19-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1		
20-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	5	1	1	0.6	5		
21-Sep	Z	2	2	1	0	0	2	1	1	2	1	1	1	2	1	1	1	0	0	1	1	7	27	3.4	27		
22-Sep	20	Z	15	6	0	1	0	0	4	4	1	0	2	2	2	2	2	1	0	0	0	0	0	2.7	20		
23-Sep	0	0	Z	0	4	16	2	4	7	8	7	6	2	1	0	1	0	0	0	0	0	0	0	2.5	16		
24-Sep	0	1	13	Z	54	52	25	3	1	1	0	0	0	0	0	0	0	0	0	4	7	5	2	7.4	54		
25-Sep	7	6	14	24	Z	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.5	24		
26-Sep	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		
27-Sep	Z	0	0	0	0	0	0	0	1	1	2	1	1	1	1	1	0	0	0	1	0	0	0	0.5	2		
28-Sep	1	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1		
29-Sep	0	0	Z	0	0	0	0	1	0	0	0	0	1	2	1	0	0	0	0	0	2	1	0	0.4	2		
30-Sep	0	0	0	Z	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1		
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**CNRL Horizon - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	673	98.25	98.25
21 - 40	10	1.46	99.71
41 - 80	2	0.29	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**CNRL Horizon - September 2015**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 20	57	34	14	3	11	19	14	41	121	114	73	39	34	39	32	23	668
21 - 40	1	0	0	1	0	0	1	0	2	1	1	0	2	0	1	0	10
41 - 80	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	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>	<b>58</b>	<b>34</b>	<b>14</b>	<b>4</b>	<b>11</b>	<b>19</b>	<b>15</b>	<b>41</b>	<b>123</b>	<b>115</b>	<b>75</b>	<b>39</b>	<b>36</b>	<b>39</b>	<b>33</b>	<b>24</b>	<b>680</b>

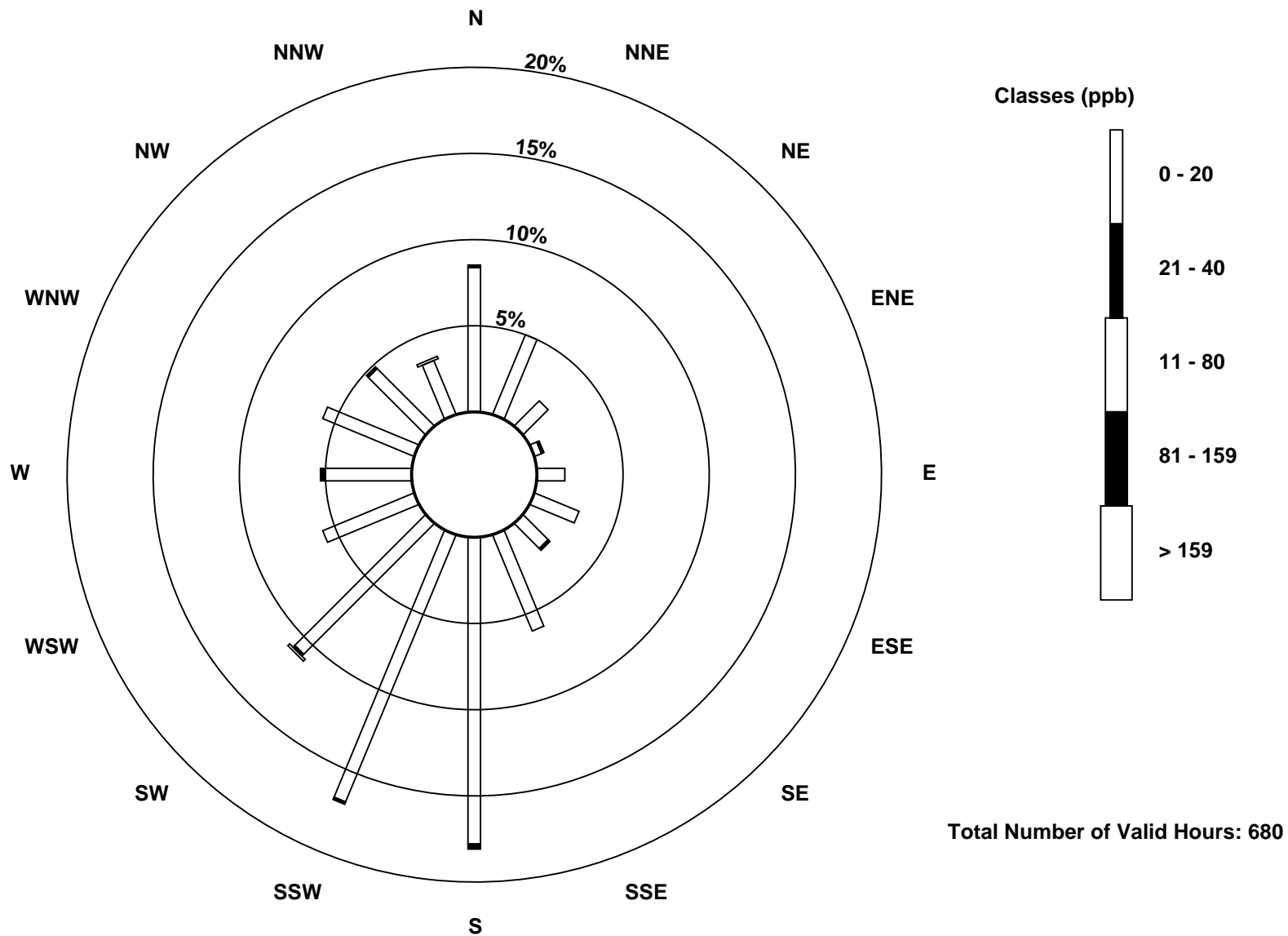
Total Number of Valid Hours: 680

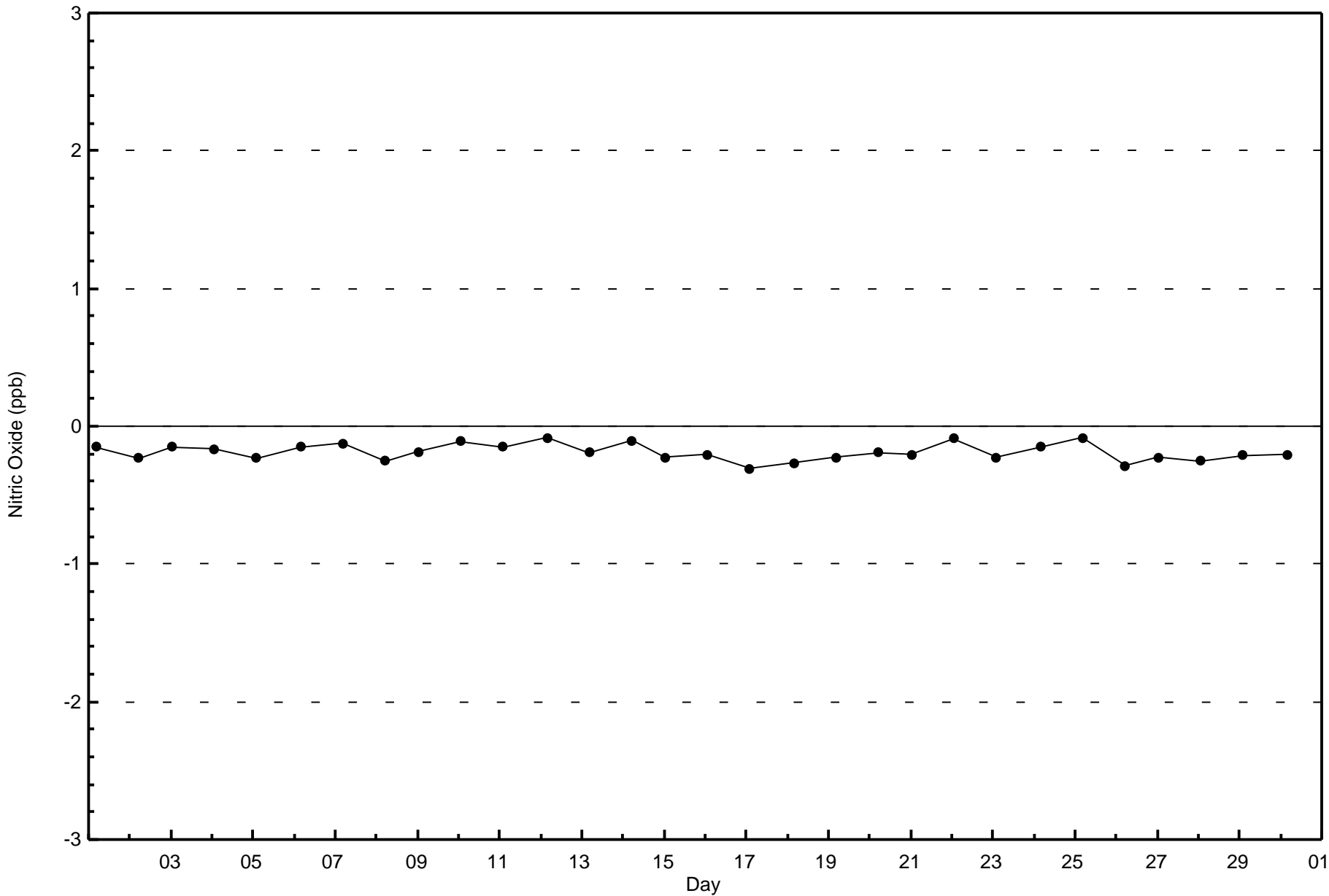
Total Number of Hours: 720



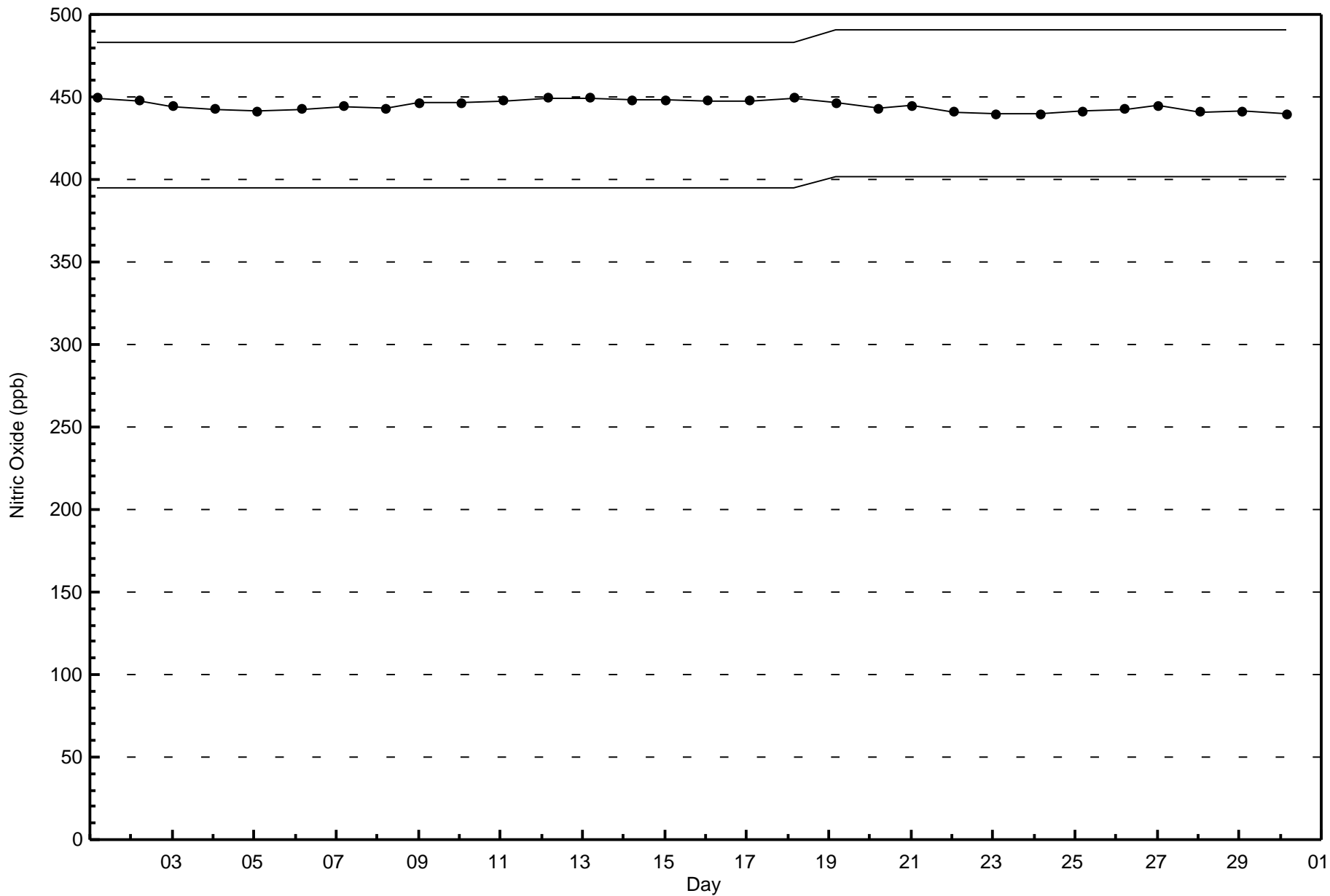
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitric Oxide (NO) - ppb  
CNRL Horizon (AMS 15)









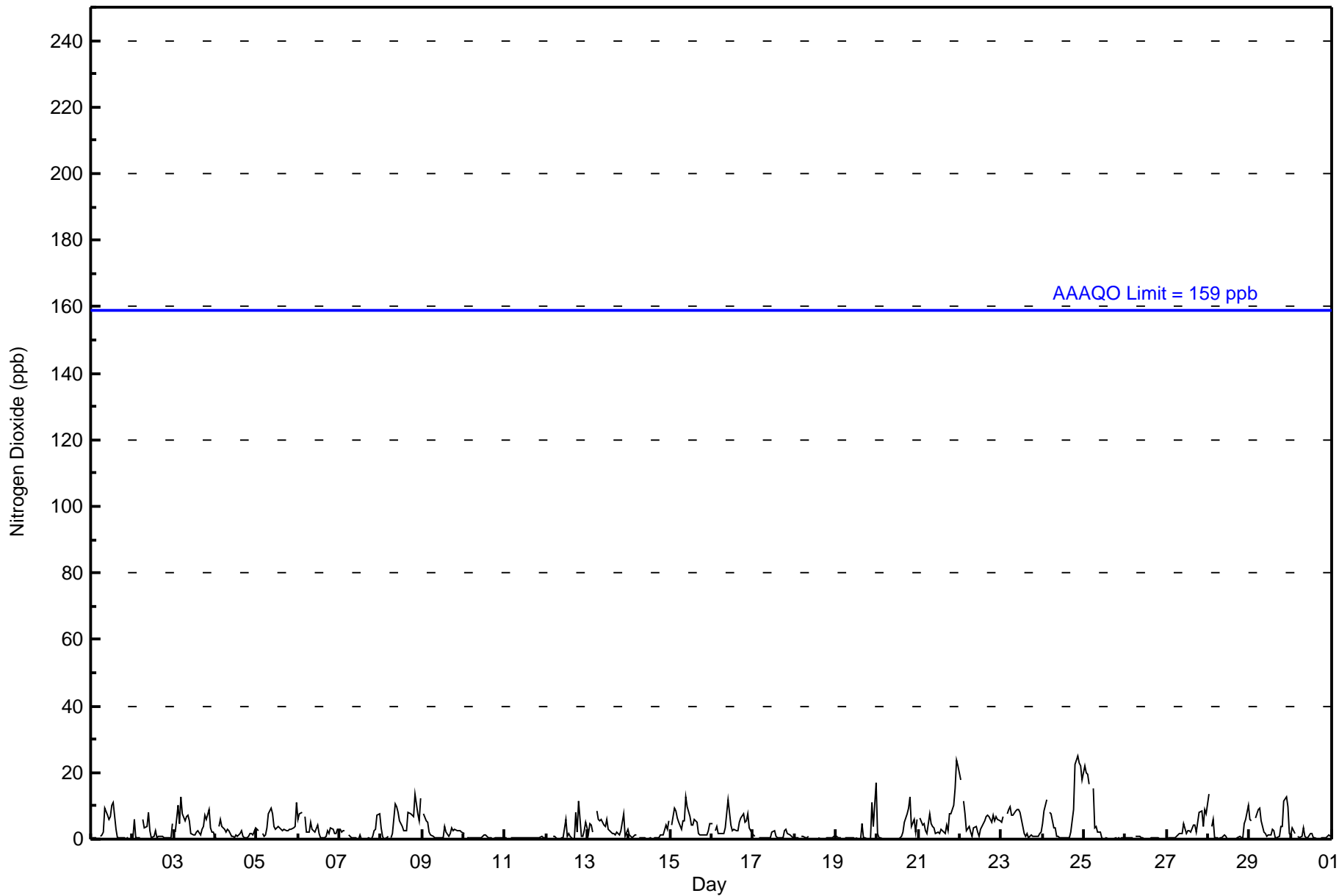


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 25 ppb on Sep 24 21:00	Maximum Daily Average: 7.8 ppb on Sep 24		Hours of Data:	685
Minimum Value: 0 ppb on Sep 7 11:00	Minimum Daily Average: 0.4 ppb on Sep 26		Hours of Missing Data:	35
Maximum Diurnal Average: 5.3 ppb at hour 24	Minimum Diurnal Average: 1.5 ppb at hour 15		Hours of Calibration:	35
Monthly Average: 3.0 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 8 P <sub>99</sub> = 22		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	0	0	0	1	Z	1	1	2	9	7	6	7	10	11	3	0	0	0	0	0	0	0	0	0	2.7	11	
2-Sep	1	6	0	0	0	Z	6	4	4	8	2	1	1	3	1	1	1	1	0	0	1	1	1	5	2.0	8	
3-Sep	Z	2	10	5	13	8	6	7	7	6	2	1	1	2	3	1	3	4	7	6	9	3	2	2	4.7	13	
4-Sep	0	Z	4	6	4	3	2	3	2	1	1	1	1	1	2	3	1	0	0	1	2	2	1	3	1.9	6	
5-Sep	3	3	Z	2	1	1	3	8	10	8	4	3	4	4	3	3	3	0	3	3	3	4	4	11	3.9	11	
6-Sep	6	8	8	Z	7	2	2	5	3	2	2	4	2	1	0	0	1	2	2	4	3	2	2	3	3.0	8	
7-Sep	3	2	3	3	Z	1	1	1	1	0	0	0	1	0	0	0	0	0	0	1	3	3	7	8	1.6	8	
8-Sep	4	1	0	0	1	Z	0	2	10	10	8	5	4	3	3	3	8	8	7	7	14	8	6	12	5.3	14	
9-Sep	Z	8	5	5	2	1	1	0	0	0	1	1	0	4	2	1	2	4	3	3	3	3	3	2	2.3	8	
10-Sep	2	Z	0	0	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0.5	2	
11-Sep	0	0	Z	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0.4	1	
12-Sep	0	0	0	Z	1	1	0	0	0	0	1	6	1	2	1	0	0	8	2	12	1	1	3	5	1.9	12	
13-Sep	2	5	4	2	Z	8	6	6	6	4	4	6	3	3	2	2	1	2	1	2	5	8	1	3	3.6	8	
14-Sep	1	1	1	1	1	Z	0	1	1	0	0	0	0	0	0	0	0	1	1	1	1	4	3	6	1.1	6	
15-Sep	Z	4	9	8	6	5	3	5	5	13	10	7	4	4	6	5	2	1	1	1	1	1	2	5	4.8	13	
16-Sep	5	Z	2	4	2	2	2	2	3	12	8	4	3	3	2	3	5	7	8	5	6	8	3	2	4.2	12	
17-Sep	1	1	Z	1	0	0	0	0	0	0	0	2	3	1	0	0	0	1	3	3	2	1	1	1	0.9	3	
18-Sep	0	0	0	Z	1	1	1	1	1	C	C	C	C	C	0	0	0	0	0	0	0	0	1	1	0.5	1	
19-Sep	1	1	0	1	Z	1	1	0	0	0	0	0	0	0	0	5	0	0	0	0	0	11	4	17	1.9	17	
20-Sep	2	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	5	8	9	13	4	6	2	6	2.6	13	
21-Sep	Z	6	4	5	3	2	8	5	4	4	2	2	2	3	3	2	4	3	8	8	10	15	24	22	6.3	24	
22-Sep	18	Z	12	8	2	4	2	1	4	4	2	1	3	4	5	7	7	7	5	7	6	7	6	5	5.5	18	
23-Sep	5	7	Z	8	9	10	7	7	9	9	9	8	4	2	1	2	1	1	1	1	1	2	2	2	4.5	10	
24-Sep	5	8	12	Z	8	8	3	3	1	1	1	1	1	1	0	0	2	5	9	22	25	23	22	18	7.8	25	
25-Sep	22	20	20	17	Z	15	4	4	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.7	22
26-Sep	0	0	0	0	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
27-Sep	Z	0	0	0	0	0	1	2	2	2	5	2	3	3	2	4	4	2	5	8	8	4	9	8	3.3	9	
28-Sep	14	Z	4	6	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	5	6	10	2.2	14	
29-Sep	6	5	Z	6	8	9	9	5	2	2	1	1	1	3	3	0	0	1	4	4	12	13	10	2	4.7	13	
30-Sep	1	3	2	Z	1	1	1	3	1	1	1	2	2	0	0	0	0	0	0	0	0	1	1	1	1	1.0	3

4.1	3.7	4.1	3.5	2.9	3.4	2.4	2.6	3.0	3.4	2.5	2.3	1.9	2.0	1.5	1.5	1.8	2.3	2.7	3.8	4.0	4.5	4.2	5.3	Diurnal Average	
22	20	20	17	13	15	9	8	10	13	10	8	10	11	6	7	8	8	9	22	25	23	24	22	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**CNRL Horizon - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	678	98.98	98.98
21 - 40	7	1.02	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: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
CNRL Horizon - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	56	34	14	4	11	19	15	41	123	115	75	39	34	39	33	21	673
21 - 40	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	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>	58	34	14	4	11	19	15	41	123	115	75	39	36	39	33	24	680

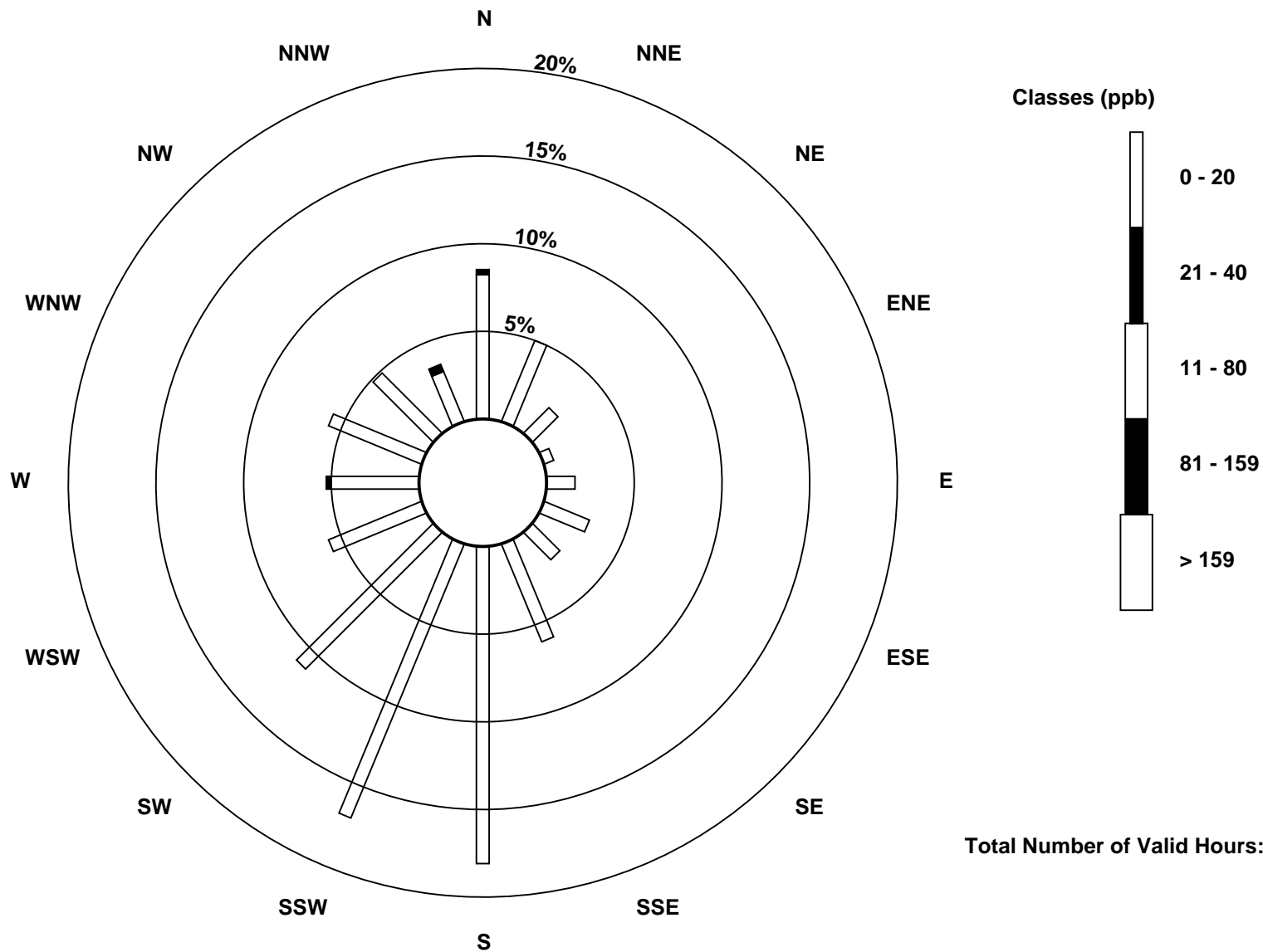
Total Number of Valid Hours: 680

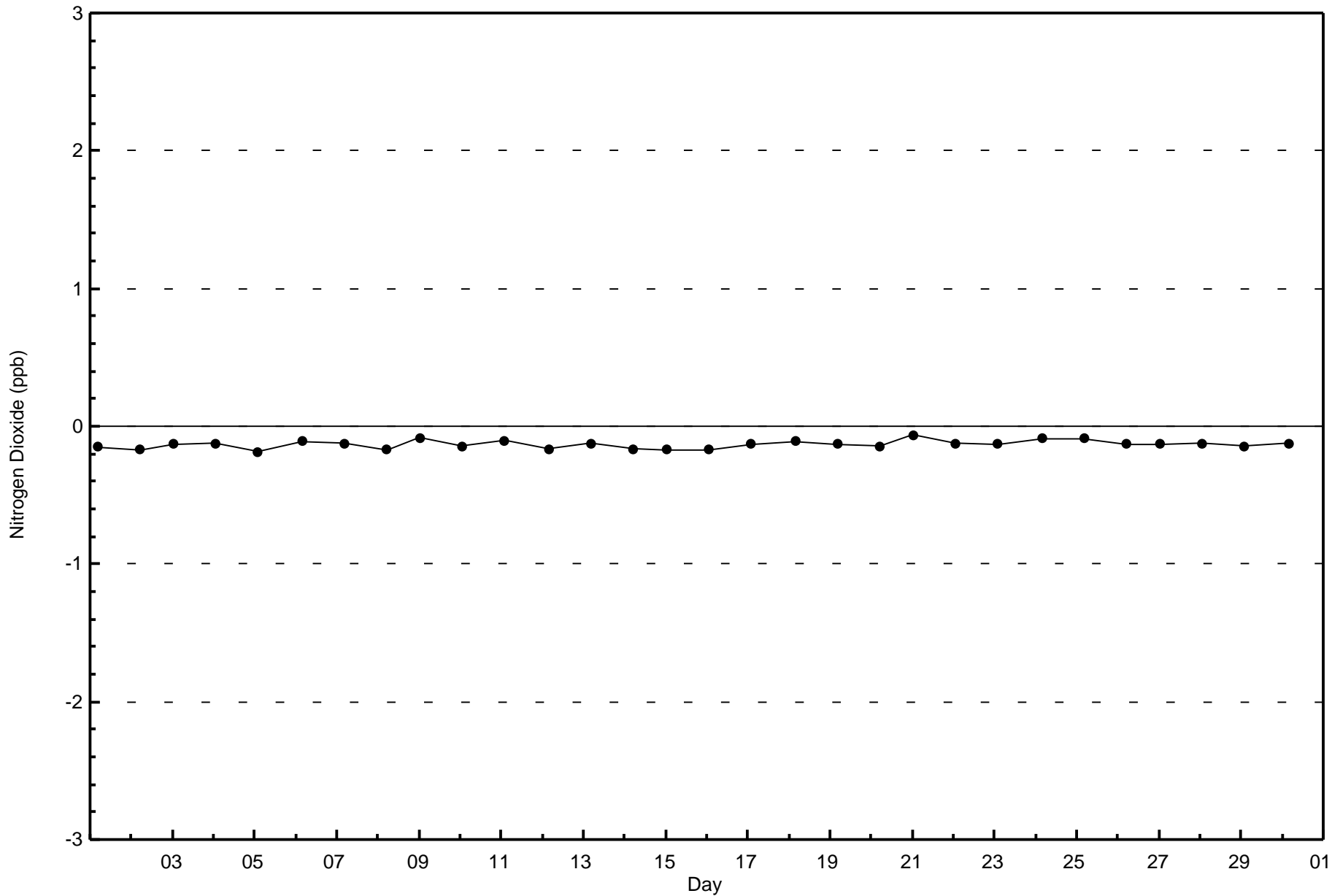
Total Number of Hours: 720

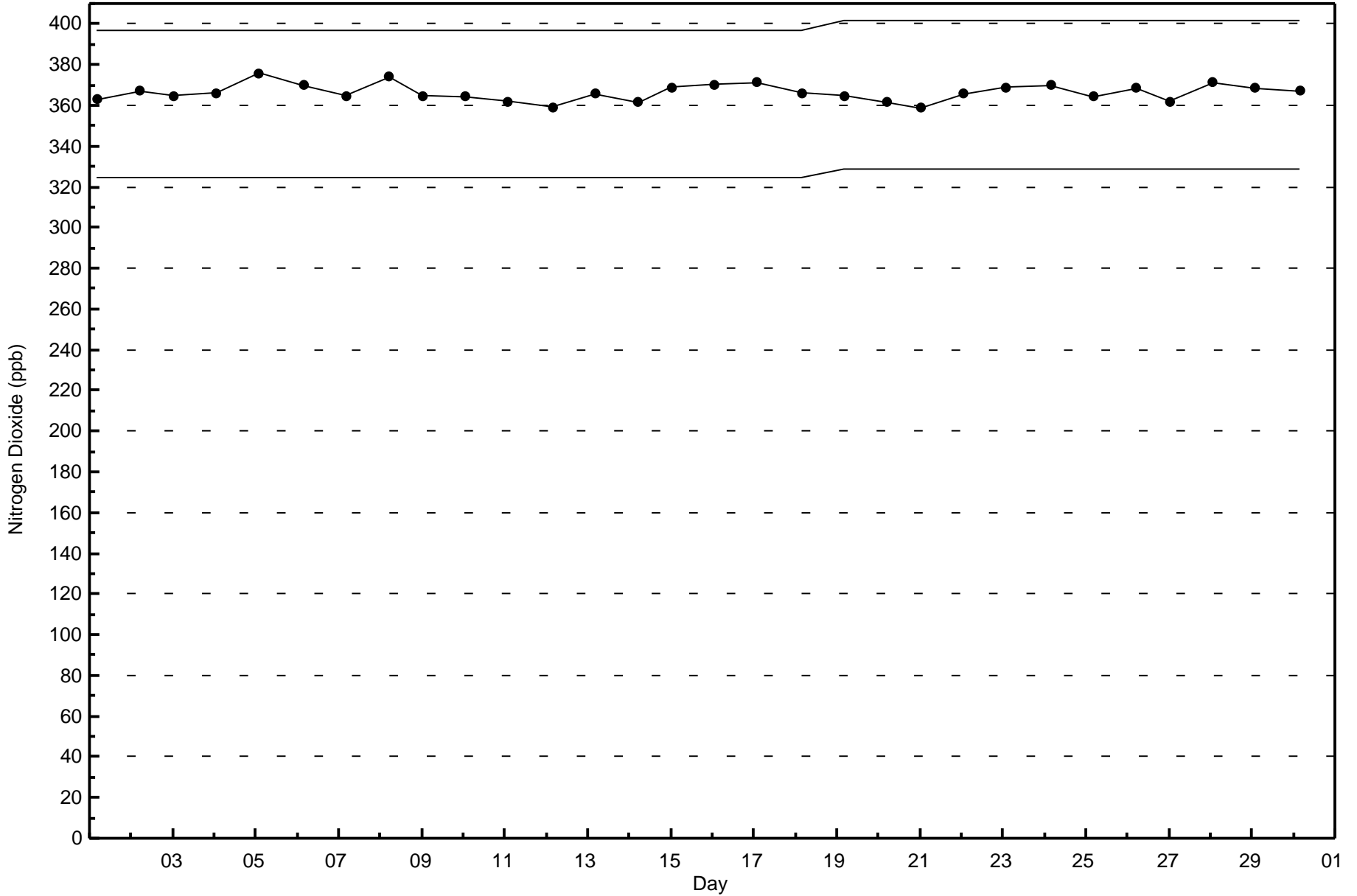


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
CNRL Horizon (AMS 15)



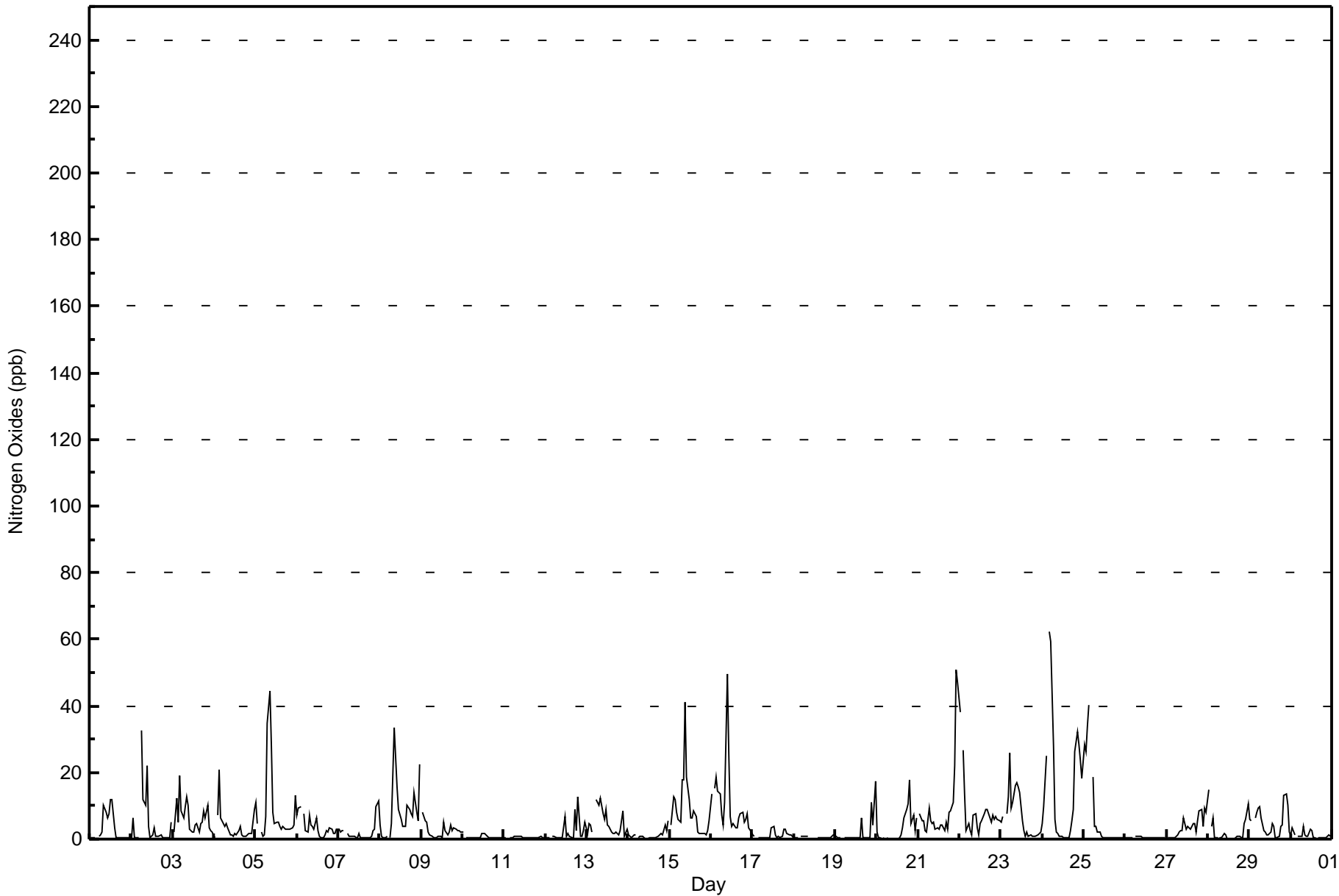








Maximum Value: 62 ppb on Sep 24 05:00		Maximum Daily Average: 15.2 ppb on Sep 24		Hours in Service: 720																																													
Minimum Value: 0 ppb on Sep 28 13:00		Minimum Daily Average: 0.5 ppb on Sep 26		Hours of Data: 685																																													
Maximum Diurnal Average: 8.3 ppb at hour 10		Minimum Diurnal Average: 2.0 ppb at hour 16		Hours of Missing Data: 35																																													
Monthly Average: 4.7 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 6 P <sub>90</sub> = 11 P <sub>99</sub> = 40		Hours of Calibration: 35																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Sep	0	0	0	0	Z	1	1	2	10	8	6	8	12	12	3	1	0	0	0	0	0	0	0	0	2.9	12																							
2-Sep	1	6	0	0	0	Z	33	12	10	22	4	1	1	3	1	1	1	1	0	0	1	1	1	5	4.6	33																							
3-Sep	Z	2	12	5	19	8	6	10	13	10	3	2	2	4	5	2	4	5	9	6	10	3	2	2	6.4	19																							
4-Sep	0	Z	7	21	7	5	4	5	3	1	1	1	2	1	2	4	1	1	1	1	2	2	2	9	3.5	21																							
5-Sep	11	5	Z	2	1	1	7	35	44	28	8	5	5	5	4	3	4	3	3	3	3	4	4	13	8.7	44																							
6-Sep	7	9	10	Z	8	2	2	7	4	4	3	6	3	1	0	0	1	3	2	4	3	2	2	3	3.7	10																							
7-Sep	3	2	3	3	Z	2	1	1	1	1	0	0	2	0	0	0	0	0	0	1	3	3	10	11	2.0	11																							
8-Sep	4	1	0	0	1	Z	0	5	33	25	16	9	6	4	4	4	10	9	8	7	14	8	6	22	8.5	33																							
9-Sep	Z	8	6	5	2	1	1	1	1	1	1	1	1	5	2	1	2	4	3	3	3	3	3	2	2.5	8																							
10-Sep	2	Z	0	0	0	0	0	1	1	0	1	2	2	2	1	0	0	0	0	0	1	1	0	0	0.6	2																							
11-Sep	0	0	Z	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0.5	1																							
12-Sep	0	0	0	Z	1	1	0	0	0	0	1	7	1	2	1	0	0	9	2	13	1	1	3	5	2.1	13																							
13-Sep	2	5	4	2	Z	12	11	10	12	8	6	9	4	4	2	2	2	2	1	3	5	9	1	3	5.1	12																							
14-Sep	1	1	1	1	1	Z	1	1	1	0	0	1	0	0	0	0	0	1	1	2	1	4	3	6	1.2	6																							
15-Sep	Z	4	13	12	8	6	5	18	18	41	19	12	6	7	9	7	2	2	2	1	2	1	3	5	8.7	41																							
16-Sep	14	Z	15	18	15	14	7	4	11	50	25	7	4	5	3	3	6	8	8	5	6	8	4	2	10.5	50																							
17-Sep	1	1	Z	0	0	0	0	1	1	0	0	4	4	1	1	1	1	1	3	3	2	1	1	1	1.2	4																							
18-Sep	1	0	0	Z	1	1	1	1	1	C	C	C	C	C	0	0	0	0	0	1	0	0	1	1	0.6	1																							
19-Sep	1	1	1	0	Z	1	1	1	1	0	0	0	0	0	0	6	0	0	0	0	0	11	4	17	2.1	17																							
20-Sep	2	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	3	6	9	11	18	5	7	2	6	3.2	18																							
21-Sep	Z	8	6	6	3	2	9	6	5	5	3	3	3	4	4	2	5	3	8	8	11	22	51	47	9.7	51																							
22-Sep	38	Z	27	14	3	5	2	1	7	8	3	1	5	6	8	9	9	8	5	7	6	7	6	5	8.2	38																							
23-Sep	5	7	Z	8	13	26	9	11	16	17	16	14	6	2	1	2	1	1	1	1	1	2	2	2	7.0	26																							
24-Sep	5	10	25	Z	62	59	28	6	2	2	1	1	1	1	1	1	2	6	9	26	32	28	24	18	15.2	62																							
25-Sep	29	26	34	40	Z	19	4	4	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	7.2	40																							
26-Sep	1	0	0	0	1	Z	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.5	1																							
27-Sep	Z	0	0	0	0	0	1	2	2	3	6	3	4	3	3	5	5	2	6	9	9	4	10	8	3.7	10																							
28-Sep	15	Z	4	6	0	0	0	0	1	2	1	0	0	0	0	0	0	1	1	1	0	5	6	10	2.4	15																							
29-Sep	6	6	Z	6	8	9	10	6	2	2	1	1	2	4	4	1	0	1	4	4	13	14	10	2	5.1	14																							
30-Sep	1	3	1	Z	1	1	1	4	1	1	1	3	3	0	0	0	0	0	0	0	1	1	1	1	1.2	4																							
																								5.9	4.3	6.8	6.1	6.2	7.1	4.9	5.1	6.8	8.3	4.5	3.5	2.7	2.7	2.1	2.0	2.3	2.7	3.0	4.3	4.5	5.0	5.3	7.0	Diurnal Average	
																								38	26	34	40	62	59	33	35	44	50	25	14	12	12	9	9	10	9	11	26	32	28	51	47	Diurnal Maximum	
Z - zerospan																								C - Calibration																									





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**CNRL Horizon - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	655	95.62	95.62
21 - 40	23	3.36	98.98
41 - 80	7	1.02	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**CNRL Horizon - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	54	33	14	3	10	18	14	41	119	113	70	39	33	38	31	20	650
21 - 40	3	1	0	1	1	1	0	0	3	2	4	0	1	1	2	3	23
11 - 80	1	0	0	0	0	0	1	0	1	0	1	0	2	0	0	1	7
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	58	34	14	4	11	19	15	41	123	115	75	39	36	39	33	24	680

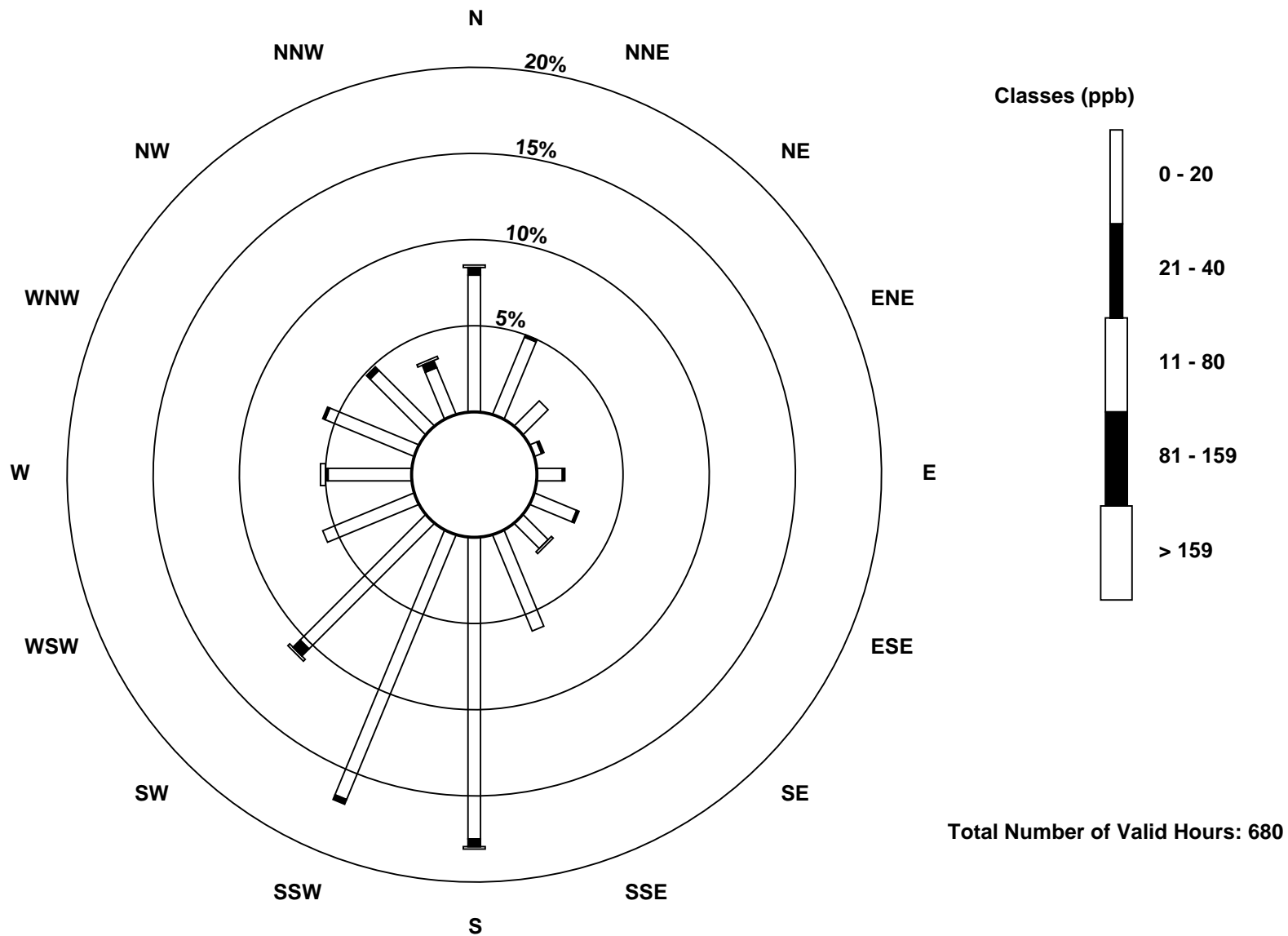
Total Number of Valid Hours: 680

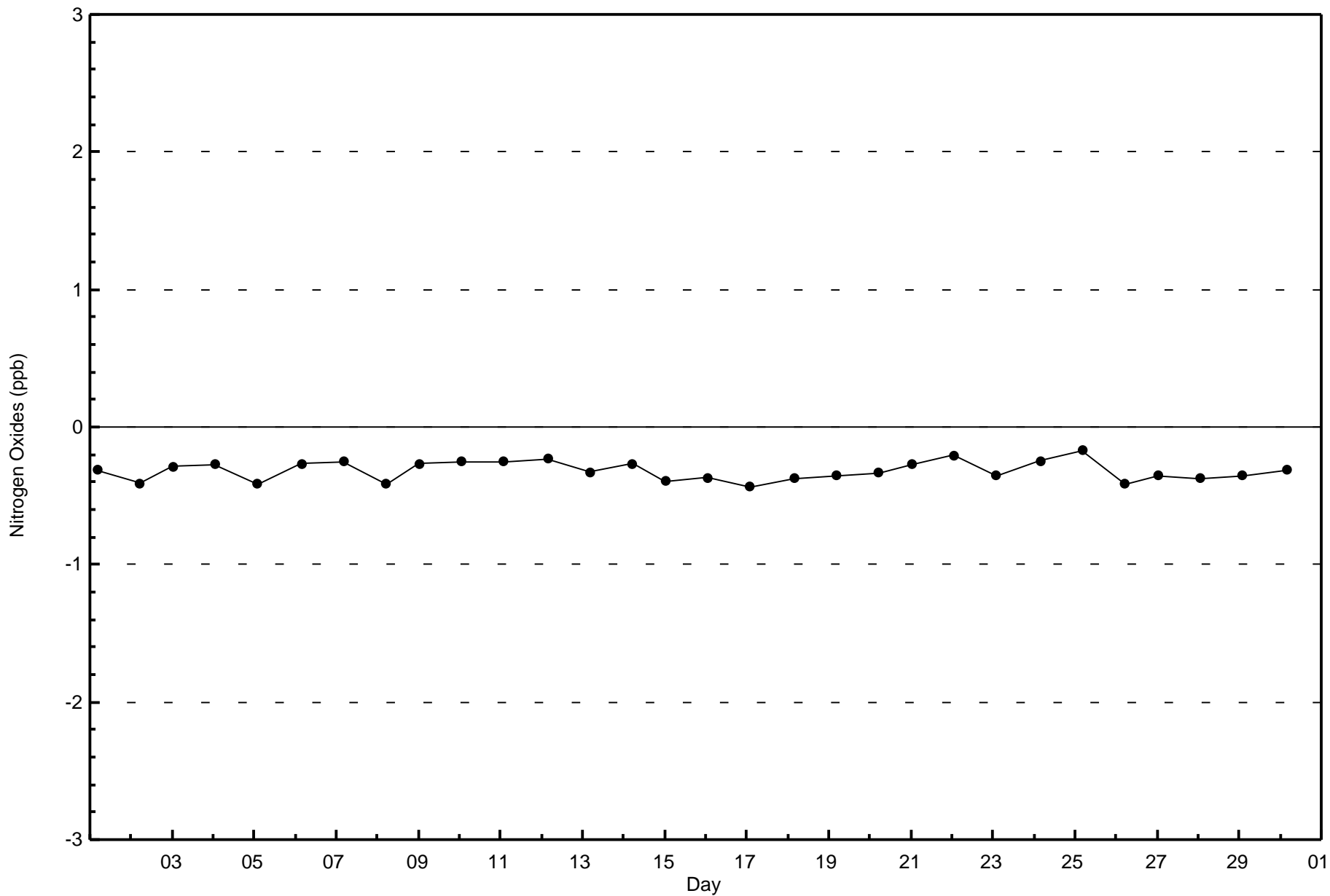
Total Number of Hours: 720

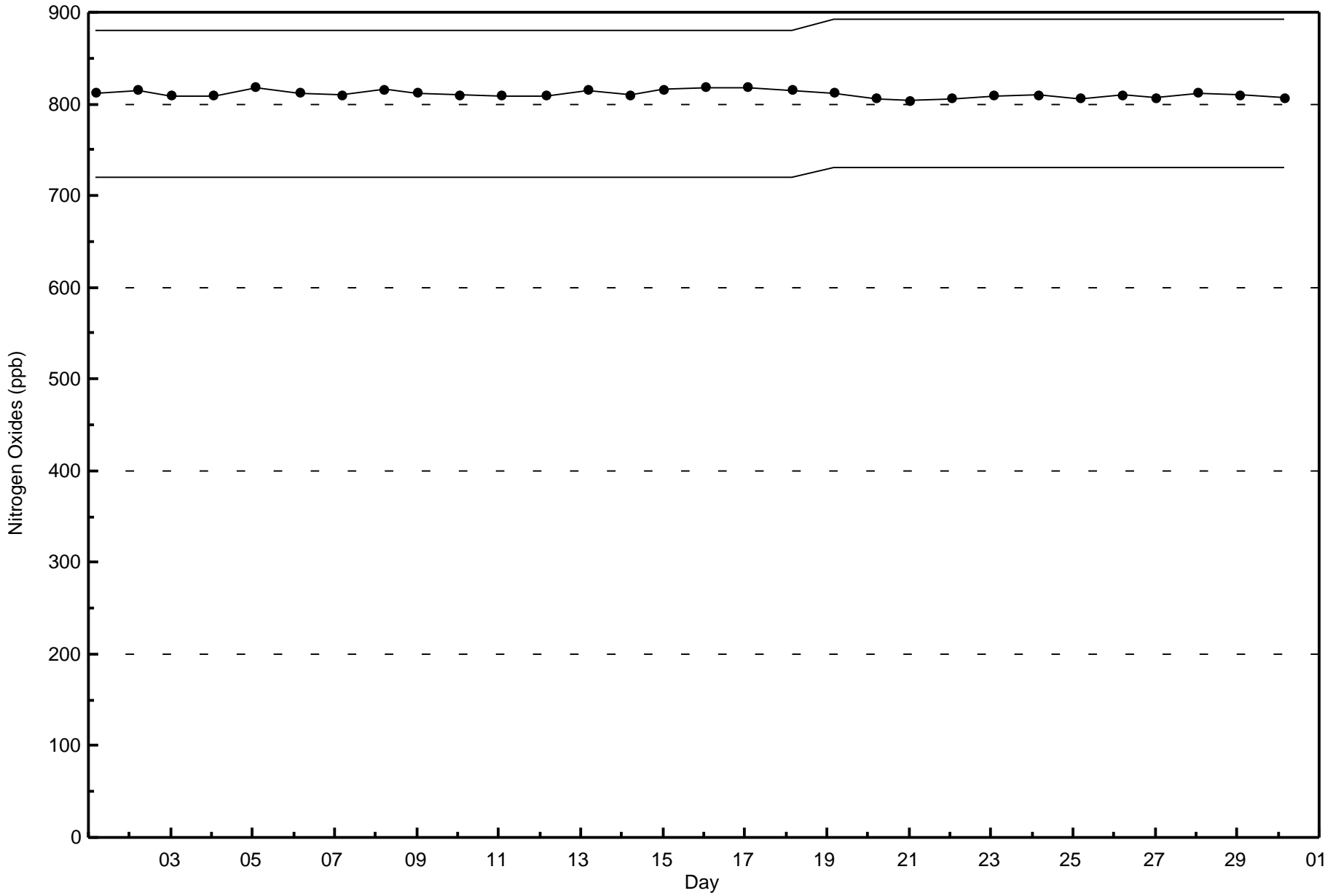


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
CNRL Horizon (AMS 15)









Summary of Hour Averages

CNRL Horizon - September 2015

Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 22.7 µg/m <sup>3</sup> on Sep 24 21:00	Maximum Daily Average: 7.8 µg/m <sup>3</sup> on Sep 24	Hours of Data:	718
Minimum Value: 0.0 µg/m <sup>3</sup> on Sep 1 23:00	Minimum Daily Average: 0.7 µg/m <sup>3</sup> on Sep 3	Hours of Missing Data:	2
Maximum Diurnal Average: 4.3 µg/m <sup>3</sup> at hour 20	Minimum Diurnal Average: 2.6 µg/m <sup>3</sup> at hour 12	Hours of Calibration:	2
Monthly Average: 3.16 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 1.3 Median = 2.3 Q <sub>3</sub> = 4.2 P <sub>90</sub> = 6.7 P <sub>99</sub> = 13.4	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-Sep	0.5	0.6	0.6	0.6	0.6	0.6	1.2	1.0	4.2	3.4	2.9	3.5	3.6	3.1	2.6	1.4	1.2	1.2	1.0	1.0	1.0	0.2	0.0	0.0	1.5	4.2																							
2-Sep	0.0	0.1	0.0	0.0	0.0	0.0	1.6	1.0	1.4	4.0	1.8	2.2	4.1	3.6	2.7	1.8	1.1	1.2	1.0	1.1	1.0	0.8	0.9	1.1	1.4	4.1																							
3-Sep	1.1	0.9	1.5	1.7	2.4	1.3	0.8	0.4	0.0	0.7	0.5	0.5	0.4	0.4	0.4	0.3	0.4	0.4	0.7	0.7	0.8	0.3	0.0	0.0	0.7	2.4																							
4-Sep	0.0	0.0	0.8	1.6	0.8	0.0	0.0	0.3	1.1	0.9	0.9	0.9	0.9	0.9	1.3	1.5	1.3	1.3	1.3	1.5	1.3	0.5	0.8	1.0	0.9	1.6																							
5-Sep	1.2	0.8	0.6	0.6	0.5	0.5	1.0	3.7	5.5	3.7	1.9	2.0	2.1	2.1	2.5	2.0	2.5	3.1	4.1	5.1	6.4	4.7	5.2	7.6	2.9	7.6																							
6-Sep	6.7	8.8	9.8	9.3	9.6	7.8	8.7	12.0	10.2	8.5	4.3	4.4	2.5	1.9	1.6	1.5	1.8	4.8	2.3	5.3	4.4	3.1	2.4	3.0	5.6	12.0																							
7-Sep	2.8	1.6	1.2	2.8	2.5	2.5	2.9	3.1	2.1	1.8	1.5	1.6	2.3	1.8	1.7	1.7	1.8	1.8	1.7	2.1	6.9	5.9	4.9	3.6	2.6	6.9																							
8-Sep	2.5	1.7	1.3	1.3	1.4	1.3	1.3	1.8	9.4	5.6	4.0	3.2	2.8	2.8	2.9	4.4	6.8	6.7	7.5	5.6	7.4	6.6	5.7	8.9	4.3	9.4																							
9-Sep	5.2	4.8	5.6	6.4	5.4	5.7	6.1	5.3	5.4	5.8	6.2	5.1	3.4	6.8	5.9	2.7	3.6	4.7	4.0	6.5	6.8	6.5	6.8	5.5	5.4	6.8																							
10-Sep	5.3	4.0	3.0	2.9	4.1	4.0	3.3	3.3	3.5	4.2	4.4	3.8	2.6	2.3	1.6	1.1	1.0	1.0	1.1	1.3	1.4	1.5	1.5	0.8	2.6	5.3																							
11-Sep	0.7	0.8	1.2	2.0	2.1	2.1	2.2	2.1	1.7	1.8	1.9	2.0	2.0	2.0	1.9	1.8	1.8	2.0	2.0	2.1	2.1	2.2	2.3	2.3	1.9	2.3																							
12-Sep	2.7	3.2	3.7	3.9	3.8	3.9	4.1	4.3	5.1	5.1	5.9	7.8	5.0	3.6	3.4	2.4	2.6	5.9	5.8	9.0	2.9	3.1	3.4	3.8	4.3	9.0																							
13-Sep	1.7	1.4	1.2	0.7	1.4	1.5	1.4	1.7	2.8	3.1	2.1	2.9	2.4	2.5	2.4	2.0	1.6	1.2	1.1	1.5	2.4	0.8	0.3	0.4	1.7	3.1																							
14-Sep	0.1	0.0	0.5	2.1	2.4	2.7	2.4	1.3	1.6	2.1	1.5	0.8	1.4	1.8	2.3	2.0	2.2	2.5	2.5	1.3	1.1	1.9	1.5	2.2	1.7	2.7																							
15-Sep	2.4	2.2	3.3	4.4	2.5	3.4	3.3	5.2	2.9	4.1	2.0	1.9	1.4	1.8	1.8	1.8	1.8	2.2	2.8	2.8	1.7	1.7	2.6	3.6	2.7	5.2																							
16-Sep	6.6	7.1	6.6	8.4	7.8	6.2	3.7	2.9	4.3	11.4	5.4	3.1	2.6	4.2	3.0	2.5	4.5	6.2	7.9	8.9	8.5	5.5	4.0	5.2	5.7	11.4																							
17-Sep	6.2	5.6	3.8	2.8	2.1	1.8	1.8	1.7	1.7	1.5	2.1	4.3	4.3	3.7	3.7	4.1	4.3	4.0	4.4	5.1	5.6	4.3	4.5	3.6	3.6	6.2																							
18-Sep	3.5	3.2	3.0	3.2	3.4	3.4	3.2	2.8	3.0	3.4	3.0	2.6	C	C	3.5	2.7	2.3	2.4	2.4	2.4	2.2	1.8	0.4	0.5	2.7	3.5																							
19-Sep	0.2	0.3	0.1	0.3	0.2	0.6	0.6	0.5	0.5	1.3	1.5	1.6	1.7	1.5	1.6	15.4	1.8	1.7	1.8	1.9	1.9	5.8	3.8	8.4	2.3	15.4																							
20-Sep	2.4	0.5	0.2	0.4	0.5	0.4	0.5	0.8	0.6	1.8	2.3	2.1	2.0	3.0	4.1	4.8	4.4	4.3	12.7	13.1	4.6	5.3	2.5	2.1	3.1	13.1																							
21-Sep	3.8	2.7	2.3	2.3	0.2	0.0	0.8	0.0	0.0	0.1	0.0	0.0	1.5	2.0	2.9	2.9	3.8	2.9	3.2	3.3	2.9	2.2	5.3	6.3	2.1	6.3																							
22-Sep	7.4	10.7	6.6	5.8	3.7	4.2	4.7	3.9	5.1	4.6	2.6	3.3	7.1	12.7	8.9	5.6	4.9	4.9	5.7	5.1	5.4	5.6	4.8	3.8	5.7	12.7																							
23-Sep	3.8	5.7	5.9	7.0	7.8	10.1	6.8	8.6	6.7	7.3	7.4	3.8	2.0	1.9	1.9	2.1	2.2	3.2	3.6	3.7	3.4	3.0	1.9	2.2	4.7	10.1																							
24-Sep	2.5	4.6	8.2	8.8	9.1	7.9	8.6	5.2	3.4	3.4	3.5	3.9	2.8	2.3	1.8	1.9	4.7	9.2	11.7	19.9	22.7	16.6	14.2	11.5	7.8	22.7																							
25-Sep	17.2	15.9	13.7	11.2	9.3	8.4	7.2	7.5	8.3	2.5	1.5	1.4	1.4	1.4	1.4	1.4	1.5	1.6	1.5	1.5	1.5	1.3	1.3	0.1	5.0	17.2																							
26-Sep	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.3	0.4	0.4	1.4	1.4	1.7	1.8	2.3	2.4	2.2	2.3	2.1	1.9	0.5	0.4	0.6	1.0	2.4																							
27-Sep	1.2	1.1	1.1	0.9	0.5	0.3	0.9	2.3	13.8	7.2	2.0	1.3	4.1	4.3	1.9	1.1	2.4	1.5	2.5	2.9	1.3	0.7	1.4	1.0	2.4	13.8																							
28-Sep	1.0	0.5	0.6	1.2	0.1	0.6	0.8	1.0	2.6	1.9	0.4	0.0	0.0	0.9	1.2	1.4	1.8	2.5	2.8	2.3	1.8	3.6	4.0	4.3	1.6	4.3																							
29-Sep	2.1	1.8	1.8	2.1	2.9	3.7	2.8	1.8	1.1	1.0	1.1	2.0	3.1	3.9	4.4	2.5	3.3	5.9	8.4	8.1	9.6	8.6	5.9	2.1	3.7	9.6																							
30-Sep	2.1	2.5	1.8	1.6	1.5	1.6	1.6	2.5	2.2	3.9	4.7	5.4	5.7	3.7	2.7	2.6	3.6	3.8	3.6	3.2	4.3	4.7	4.9	4.8	3.3	5.7																							
																								3.1	3.1	3.0	3.2	3.0	2.9	2.8	2.9	3.7	3.6	2.7	2.6	2.6	2.9	2.7	2.7	2.6	3.2	3.8	4.3	4.2	3.6	3.3	3.3	Diurnal Average	
																								17.2	15.9	13.7	11.2	9.6	10.1	8.7	12.0	13.8	11.4	7.4	7.8	7.1	12.7	8.9	15.4	6.8	9.2	12.7	19.9	22.7	16.6	14.2	11.5	Diurnal Maximum	

C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m<sup>3</sup>



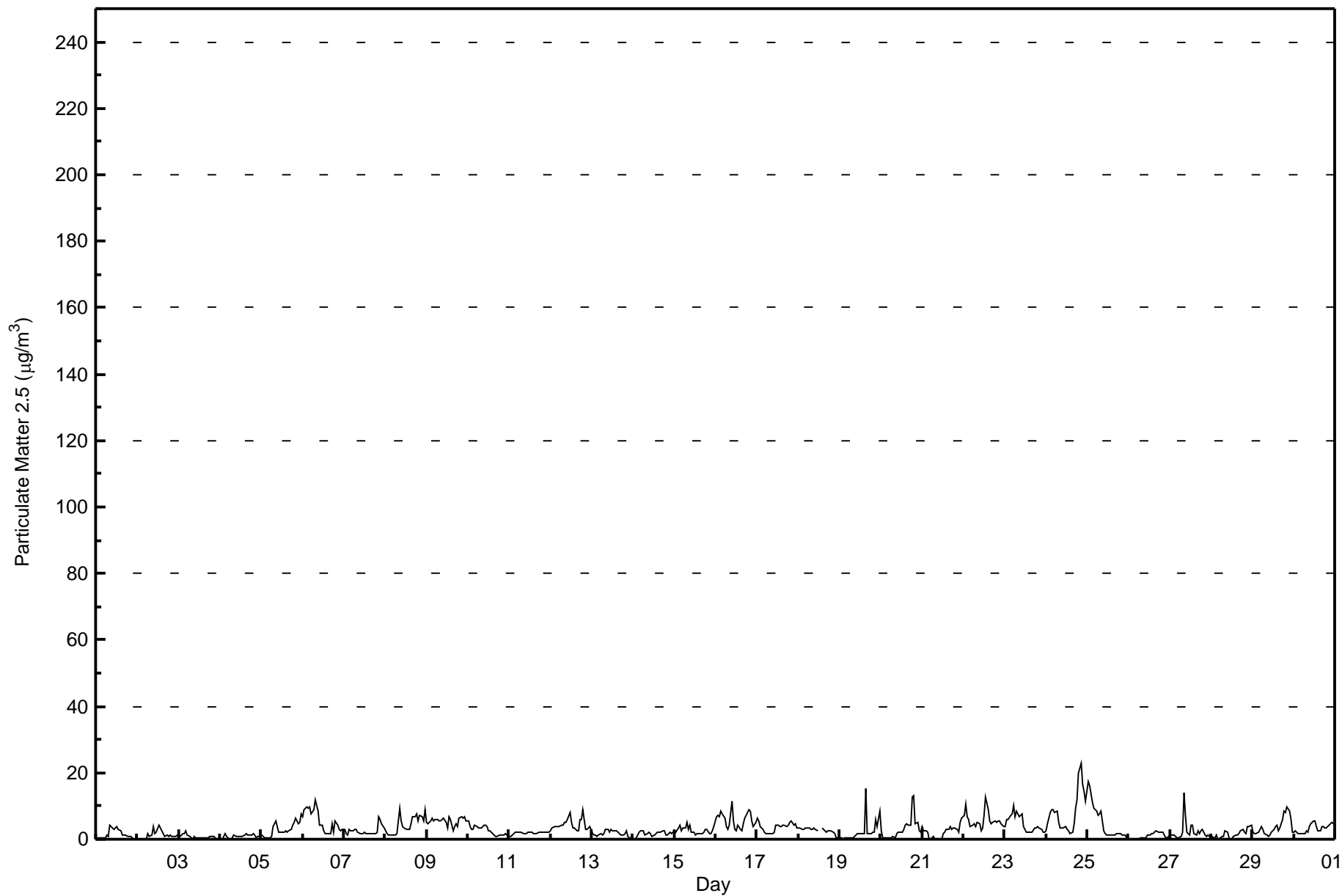


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$

CNRL Horizon - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**CNRL Horizon - September 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	477	66.43	66.43
6 - 15	107	14.90	81.34
16 - 25	5	0.70	82.03
26 - 80	0	0.00	82.03
> 81.0	0	0.00	82.03

Total Number of Valid Hours: 718

Total Number of Hours: 720



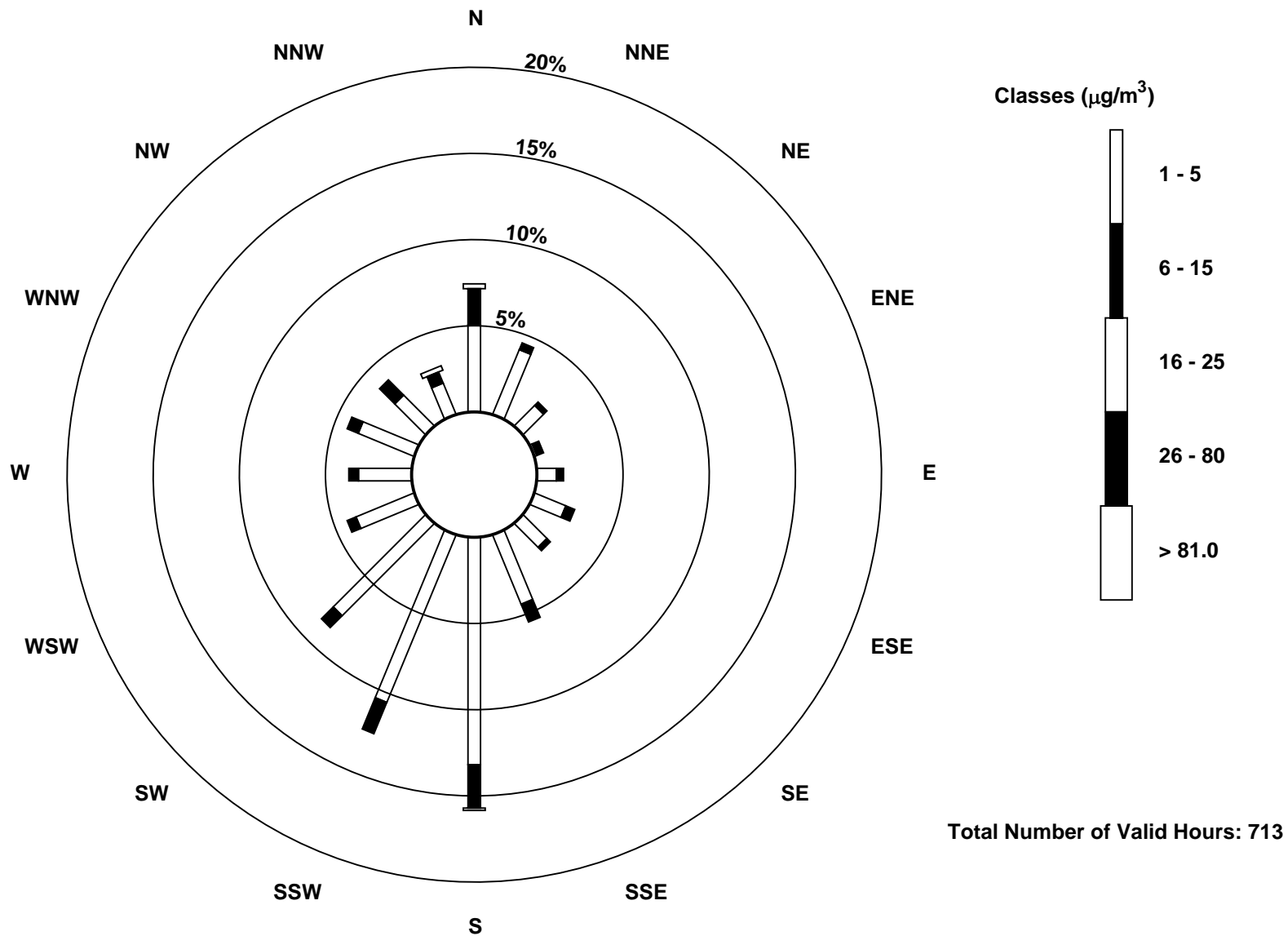
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**CNRL Horizon - September 2015**

Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	36	29	12	1	8	14	14	31	94	75	54	26	22	25	18	14	473
6 - 15	15	3	2	3	3	4	2	8	18	14	7	4	4	5	9	5	106
16 - 25	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	5
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	53	32	14	4	11	18	16	39	113	89	61	30	26	30	27	21	584

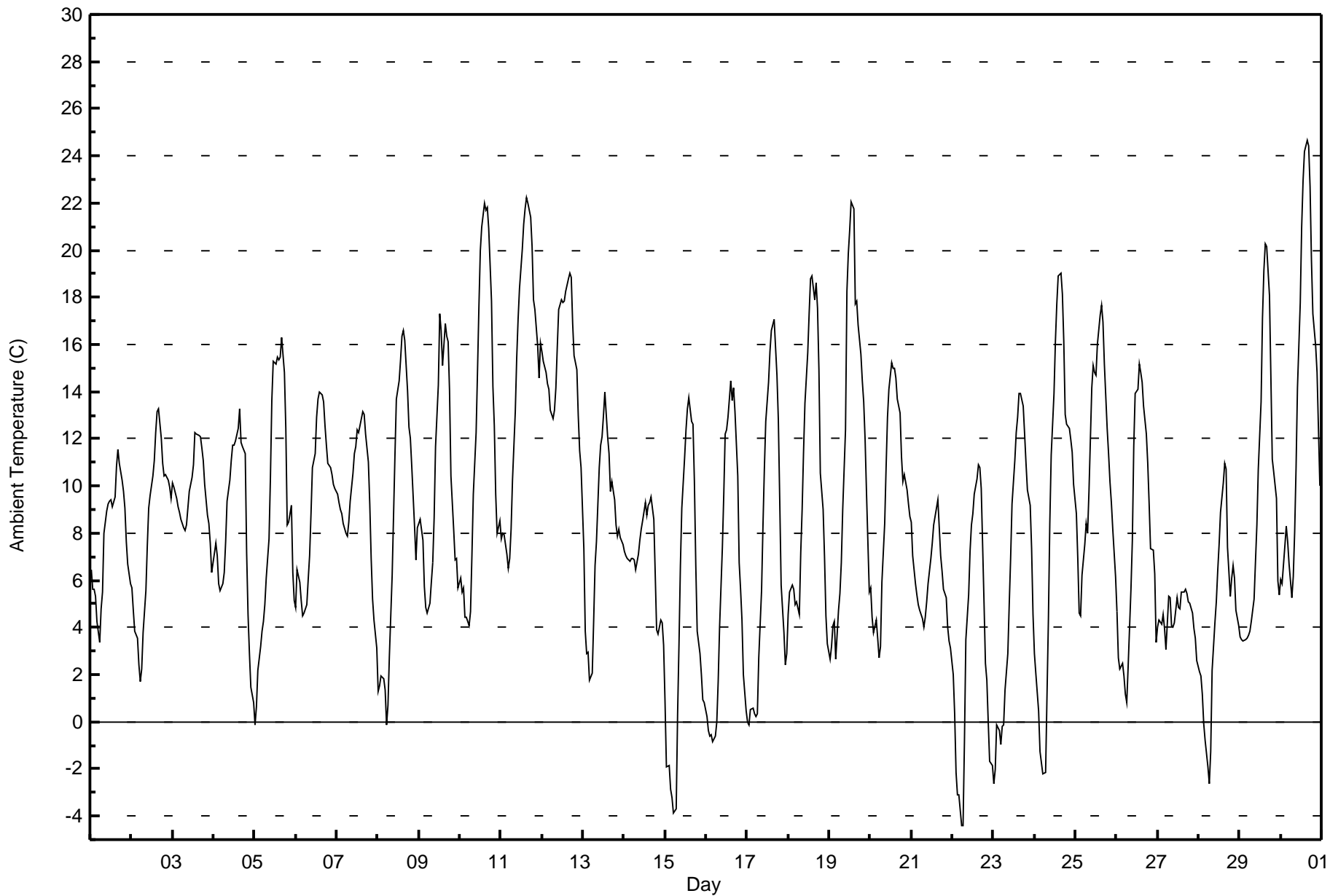
Total Number of Valid Hours: 713

Total Number of Hours: 720





Maximum Value: 24.7 C on Sep 30 16:00		Maximum Daily Average: 15.5 C on Sep 12		Hours in Service: 720																						
Minimum Value: -4.4 C on Sep 22 06:00		Minimum Daily Average: 3.1 C on Sep 22		Hours of Data: 720																						
Maximum Diurnal Average: 15.0 C at hour 16		Minimum Diurnal Average: 3.3 C at hour 6		Hours of Missing Data: 0																						
Monthly Average: 8.75 C		Percentiles: P <sub>1</sub> = -3.0 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 4.7 Median = 8.4 Q <sub>3</sub> = 12.4 P <sub>90</sub> = 16.3 P <sub>99</sub> = 21.9		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	6.5	5.6	5.6	5.3	4.3	3.3	4.8	5.5	8.0	8.9	9.2	9.3	9.4	9.1	9.6	10.8	11.5	10.9	10.2	9.8	9.1	7.6	6.7	5.8	7.8	11.5
2-Sep	5.7	4.7	3.8	3.5	2.4	1.7	2.3	3.8	5.6	7.5	9.1	9.6	10.4	11.1	12.3	13.1	13.3	12.0	11.0	10.4	10.5	10.2	9.9	9.5	8.1	13.3
3-Sep	10.1	9.9	9.5	9.1	8.9	8.6	8.2	8.1	8.4	9.1	9.7	10.3	10.9	12.2	12.2	12.1	12.1	11.6	11.1	10.1	8.8	8.4	7.6	6.3	9.7	12.2
4-Sep	7.2	7.6	7.0	5.8	5.5	5.9	6.3	7.6	9.3	10.3	11.1	11.7	11.7	11.9	12.4	13.3	11.8	11.7	11.4	7.2	4.5	2.9	1.5	0.8	8.2	13.3
5-Sep	-0.1	0.6	2.2	3.2	3.8	4.2	5.0	6.1	7.8	10.3	13.6	15.3	15.2	15.5	15.3	15.5	16.3	14.8	12.4	8.4	8.5	9.2	6.3	5.2	8.9	16.3
6-Sep	4.8	6.4	5.9	5.1	4.5	4.6	4.9	6.0	7.0	8.8	10.8	11.3	12.9	13.7	14.0	13.9	13.6	12.5	11.7	10.9	10.8	10.5	10.1	9.9	9.4	14.0
7-Sep	9.7	9.3	9.0	8.8	8.4	8.0	7.9	8.4	9.4	10.5	11.3	11.7	12.4	12.3	12.8	13.1	13.1	12.2	11.0	9.3	6.9	5.2	4.3	3.1	9.5	13.1
8-Sep	1.3	1.5	2.0	1.8	1.4	-0.1	0.7	2.7	6.2	8.8	11.3	13.7	14.5	15.4	16.3	16.6	16.2	14.0	12.5	12.0	10.8	8.3	6.9	8.2	8.5	16.6
9-Sep	8.4	8.6	7.7	5.7	4.8	4.6	5.0	5.9	6.7	8.6	11.7	14.3	17.3	16.6	15.1	16.9	16.4	16.1	14.0	10.4	8.1	6.9	6.9	5.7	10.1	17.3
10-Sep	6.1	5.5	5.7	4.4	4.5	4.1	4.7	7.0	9.6	12.3	14.9	17.6	20.0	21.0	22.0	21.7	21.8	20.9	17.8	14.2	12.5	9.6	8.0	8.5	12.3	22.0
11-Sep	7.8	8.0	7.9	7.1	6.5	6.9	8.2	10.3	13.1	15.4	17.0	18.4	20.0	21.1	21.7	22.2	22.0	21.4	20.1	17.9	17.5	16.0	14.6	16.1	14.9	22.2
12-Sep	15.7	15.3	14.8	14.3	14.1	13.2	12.9	13.2	14.1	15.9	17.5	17.9	17.8	17.8	18.3	18.8	19.0	18.8	16.9	15.5	15.0	12.9	11.5	10.8	15.5	19.0
13-Sep	7.4	3.8	2.9	2.9	1.8	2.0	4.2	6.6	7.7	10.8	11.8	12.1	13.0	14.0	12.1	11.4	9.8	10.2	9.4	8.4	7.9	8.1	7.8	7.5	8.1	14.0
14-Sep	7.2	7.1	6.9	6.8	6.9	6.9	6.8	6.5	7.1	7.7	8.2	8.6	9.3	8.8	9.2	9.3	9.5	8.6	6.2	3.9	3.7	4.3	4.2	3.2	7.0	9.5
15-Sep	0.9	-1.9	-1.8	-2.9	-3.2	-3.9	-3.7	0.4	3.3	6.6	9.1	11.2	12.4	13.3	13.7	12.7	12.6	10.2	6.6	3.8	2.9	2.0	0.9	0.8	4.4	13.7
16-Sep	0.2	-0.3	-0.6	-0.5	-0.9	-0.6	0.0	1.7	4.0	7.4	9.7	12.2	12.4	12.9	14.4	13.6	14.1	13.2	10.4	6.8	5.6	4.3	2.0	0.5	5.9	14.4
17-Sep	0.0	-0.2	0.5	0.6	0.3	0.2	0.3	2.7	5.6	8.3	10.7	12.7	14.4	15.7	16.6	16.8	17.1	14.7	12.8	9.4	5.8	3.8	2.4	2.9	7.3	17.1
18-Sep	4.6	5.5	5.8	5.6	5.0	5.1	4.6	7.2	9.0	11.4	13.5	15.7	17.3	18.8	18.9	17.9	18.6	17.6	14.9	10.6	9.0	7.0	4.5	3.3	10.5	18.9
19-Sep	2.7	3.2	4.1	4.3	2.7	4.7	5.4	6.8	9.0	12.4	18.3	19.9	20.9	22.0	21.8	17.7	17.8	16.8	15.6	14.5	13.5	12.0	9.7	5.5	11.7	22.0
20-Sep	5.7	4.4	3.8	4.3	3.6	2.7	3.2	5.9	8.4	10.8	12.9	14.1	15.2	15.0	15.0	14.6	13.7	13.1	11.3	10.2	10.5	9.8	9.2	8.7	9.4	15.2
21-Sep	8.5	7.0	5.8	5.4	5.0	4.7	4.3	4.0	4.4	5.1	5.9	6.9	7.6	8.3	8.7	9.4	8.2	7.0	6.4	5.6	5.3	4.0	3.4	3.1	6.0	9.4
22-Sep	2.0	0.3	-2.2	-3.1	-3.1	-4.4	-4.4	-0.8	3.5	5.4	7.2	8.3	8.8	9.7	10.3	10.9	10.8	9.9	5.0	2.5	1.7	0.0	-1.7	-1.8	3.1	10.9
23-Sep	-2.6	-2.0	-0.1	-0.4	-1.0	-0.2	-0.2	1.4	2.9	5.0	7.0	9.3	11.1	12.3	12.9	13.9	14.0	13.4	12.2	10.9	9.8	9.2	7.3	4.5	6.3	14.0
24-Sep	2.9	2.1	0.5	-1.3	-1.7	-2.2	-2.1	1.1	4.3	8.4	11.3	13.9	16.1	17.7	18.9	19.0	18.2	16.1	13.0	12.6	12.4	12.0	11.4	10.1	9.0	19.0
25-Sep	8.8	6.9	4.6	4.5	6.2	7.5	8.4	8.0	9.8	14.1	15.1	14.8	14.7	16.0	17.2	17.7	17.0	15.2	12.4	11.4	10.2	9.3	8.2	6.1	11.0	17.7
26-Sep	4.7	2.7	2.3	2.5	1.9	1.2	0.8	2.3	5.6	7.7	11.7	13.9	14.1	15.2	14.8	14.4	13.4	12.2	11.0	9.2	7.3	7.3	6.2	3.4	7.7	15.2
27-Sep	4.0	4.3	4.1	4.6	4.0	3.0	5.3	5.3	4.1	4.0	4.2	5.3	4.9	4.8	5.5	5.5	5.6	5.5	5.1	5.0	4.6	4.0	3.5	2.6	4.5	5.6
28-Sep	2.1	2.0	1.1	-0.1	-0.8	-1.9	-2.6	-1.3	2.2	4.2	5.1	6.4	7.5	8.9	10.1	10.9	10.7	7.4	5.3	6.1	6.6	6.1	4.7	4.1	4.4	10.9
29-Sep	3.6	3.5	3.4	3.5	3.6	3.6	3.8	4.3	5.2	6.8	8.4	10.7	13.6	17.1	19.2	20.3	20.1	18.1	14.6	11.1	10.6	9.5	6.0	5.4	9.4	20.3
30-Sep	6.0	5.8	7.5	8.3	7.7	6.7	5.3	6.2	8.0	10.8	14.2	17.8	21.0	22.9	24.2	24.7	24.4	22.7	19.6	17.3	16.0	14.8	12.4	10.0	13.9	24.7
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**CNRL Horizon - September 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	40	5.56	5.56
0 - 10	397	55.14	60.69
10 - 20	260	36.11	96.81
> 20	23	3.19	100.00

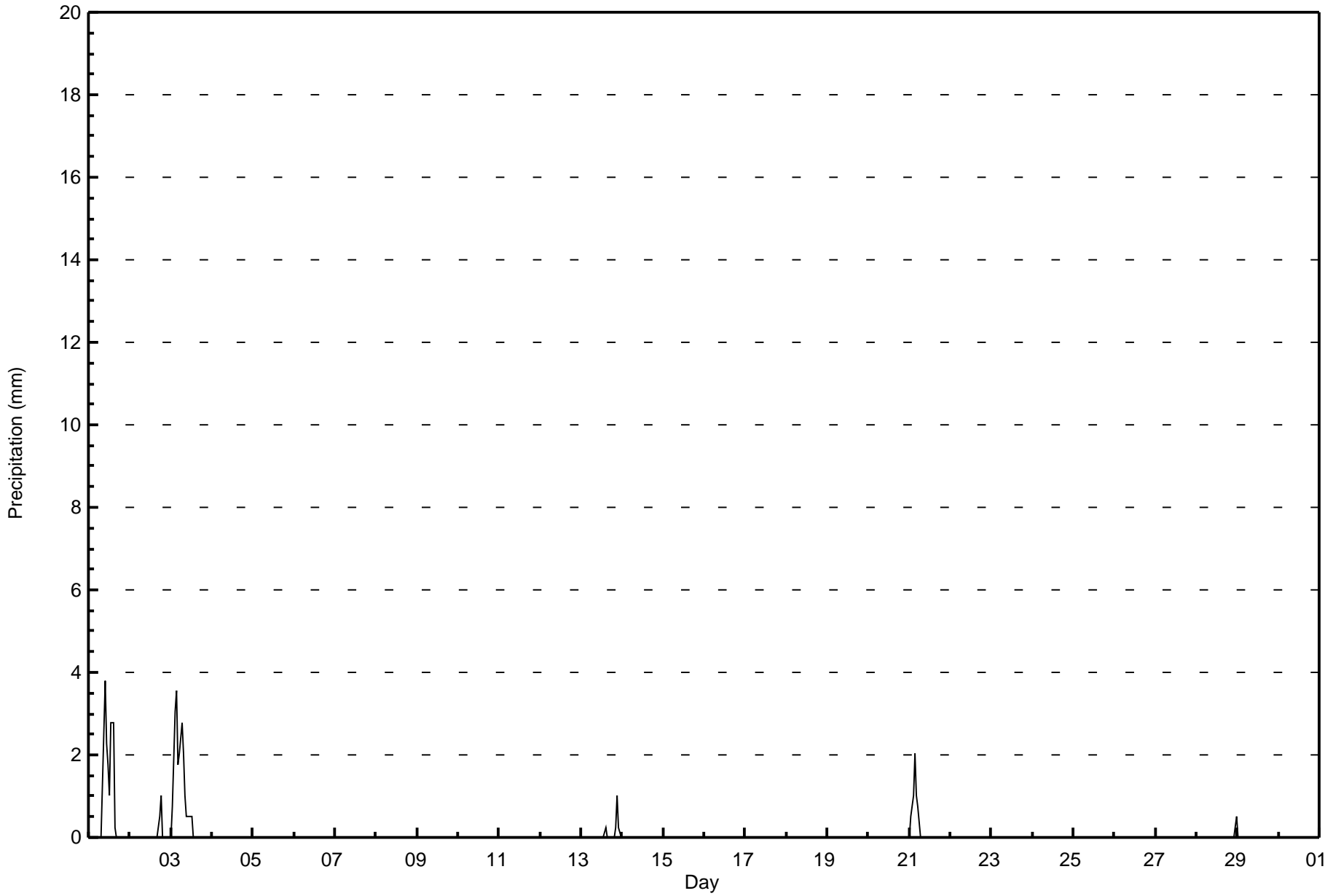
Total Number of Valid Hours: 720

Total Number of Hours: 720



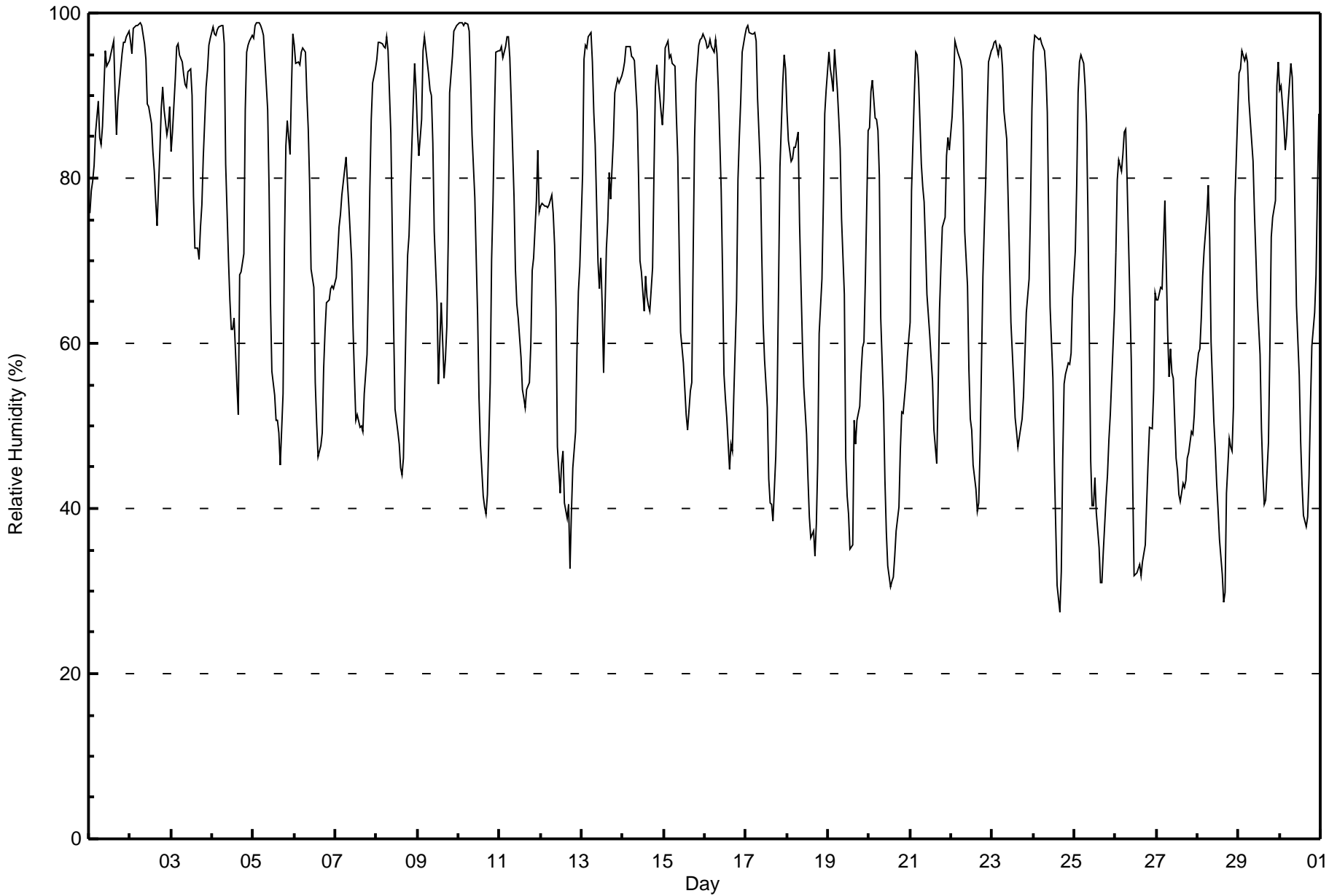
Maximum Value: 3.8 mm on Sep 1 10:00		Maximum Daily Total: 19.1 mm on Sep 3		Hours in Service: 720																																													
Minimum Value: 0.0 mm on Sep 1 01:00		Minimum Daily Total: 0.0 mm on Sep 4		Hours of Data: 720																																													
Maximum Diurnal Total: 5.6 mm at hour 4		Minimum Diurnal Total: 0.0 mm at hour 1		Hours of Missing Data: 0																																													
Monthly Total: 44.20 mm		Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 O <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 1.9		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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	3.8	2.3	1.8	1.0	2.8	2.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	3.8																							
2-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0	0.0	0.0	0.0	0.0	0.0	1.5	1.0																							
3-Sep	0.0	0.8	3.0	3.6	1.8	2.0	2.8	2.0	1.0	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.1	3.6																							
4-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	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	0.3	1.0	0.3	0.0	1.8	1.0																							
14-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.5	1.0	2.0	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	0.0	0.0	0.0	0.0	5.3	2.0																							
22-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.5	0.5																						
29-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	4.1	5.6	2.8	2.8	2.8	2.0	2.3	4.3	2.8	2.3	1.5	2.8	3.0	0.3	0.0	0.5	1.0	0.0	0.3	1.0	0.3	0.5	Diurnal Average	
																								0.0	0.8	3.0	3.6	1.8	2.0	2.8	2.0	1.3	3.8	2.3	1.8	1.0	2.8	2.8	0.3	0.0	0.5	1.0	0.0	0.3	1.0	0.3	0.5	Diurnal Maximum	







Maximum Value: 99 % on Sep 10 01:00																		Maximum Daily Average: 90.2 % on Sep 2																		Hours in Service: 720														
Minimum Value: 27 % on Sep 24 16:00																		Minimum Daily Average: 54.3 % on Sep 27																		Hours of Data: 720														
Maximum Diurnal Average: 91.8 % at hour 6																		Minimum Diurnal Average: 48.2 % at hour 16																		Hours of Missing Data: 0														
Monthly Average: 72.7 %																		Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 43 Q <sub>1</sub> = 55 Median = 76 O <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-Sep	76	78	80	81	85	89	85	84	86	96	93	94	94	95	97	90	85	89	93	95	96	96	97	98	89.8	98																								
2-Sep	97	95	98	98	98	99	99	98	96	94	89	89	87	83	81	77	74	83	88	91	88	85	86	89	90.2	99																								
3-Sep	83	86	92	96	96	95	94	93	91	91	93	93	90	78	72	72	70	74	77	82	91	93	96	97	87.3	97																								
4-Sep	98	98	97	98	98	99	98	96	82	70	65	62	62	63	55	51	68	69	71	88	95	96	97	97	82.3	99																								
5-Sep	97	98	99	99	98	98	97	94	88	79	65	57	54	51	51	49	45	54	72	84	87	83	91	97	78.6	99																								
6-Sep	96	94	94	94	95	96	95	90	86	79	69	67	55	50	46	48	49	57	61	65	65	67	67	67	73.0	96																								
7-Sep	68	71	74	76	78	81	83	79	77	70	62	56	51	51	50	50	49	54	59	68	79	87	92	93	69.0	93																								
8-Sep	94	96	96	96	96	96	97	95	85	74	62	52	49	48	45	44	46	64	71	73	79	89	94	91	76.4	97																								
9-Sep	86	83	87	96	97	96	93	91	90	84	74	65	55	60	65	56	58	62	72	90	95	98	98	99	81.2	99																								
10-Sep	99	99	99	98	99	99	98	92	85	78	70	63	53	48	42	40	39	42	55	70	77	87	95	95	76.0	99																								
11-Sep	95	96	95	96	97	97	95	89	78	69	65	63	58	54	53	52	54	55	60	69	70	77	83	76	74.9	97																								
12-Sep	77	77	77	77	76	77	78	76	72	64	48	42	45	47	41	39	41	33	39	45	49	59	66	69	58.9	78																								
13-Sep	81	94	96	96	97	98	94	88	84	70	67	70	65	56	71	75	81	77	85	90	91	92	92	92	83.4	98																								
14-Sep	93	94	96	96	96	95	95	94	88	80	70	69	64	68	66	65	64	69	81	91	94	90	88	87	82.9	96																								
15-Sep	90	96	97	95	95	94	93	87	82	72	61	58	55	51	50	54	55	71	85	92	96	97	97	97	80.0	97																								
16-Sep	97	96	96	97	96	95	97	95	91	79	68	56	53	51	45	48	47	54	65	80	85	89	95	97	78.0	97																								
17-Sep	98	98	98	97	97	98	97	90	81	71	62	58	52	44	41	40	38	46	53	67	81	92	95	93	74.5	98																								
18-Sep	88	85	82	82	84	84	86	74	67	60	55	49	44	39	36	37	34	38	46	61	68	77	88	91	64.8	91																								
19-Sep	95	93	92	90	96	91	87	84	75	66	46	41	39	35	36	51	48	51	52	56	60	60	68	86	66.6	96																								
20-Sep	86	90	92	87	87	86	80	63	53	43	37	33	30	31	32	34	37	40	47	52	52	55	58	61	57.0	92																								
21-Sep	63	78	90	95	95	92	82	79	77	72	66	61	58	55	50	45	54	64	69	74	75	83	85	83	72.8	95																								
22-Sep	87	91	97	96	95	94	93	86	73	67	57	51	49	45	42	40	41	47	68	74	80	88	94	95	73.0	97																								
23-Sep	96	96	97	95	96	96	93	88	85	78	70	63	55	51	49	47	49	51	54	59	64	68	76	88	73.5	97																								
24-Sep	95	97	97	97	97	96	96	93	88	75	64	56	46	38	31	27	32	46	55	56	58	58	59	65	67.6	97																								
25-Sep	71	79	90	94	95	94	91	87	76	46	40	40	44	39	35	31	31	35	41	44	48	51	56	64	59.3	95																								
26-Sep	71	80	82	81	83	86	86	80	65	58	43	32	32	33	33	32	34	36	41	46	50	50	54	66	56.3	86																								
27-Sep	65	65	67	67	72	77	61	56	59	56	56	46	45	42	41	43	43	43	46	47	49	49	51	56	54.3	77																								
28-Sep	59	59	63	68	71	76	79	73	60	50	47	43	40	36	32	29	30	42	48	47	47	52	77	88	54.9	88																								
29-Sep	93	93	95	94	95	94	89	87	82	76	71	65	59	50	44	41	41	48	59	73	75	77	91	94	74.4	95																								
30-Sep	91	91	87	83	85	89	94	92	86	75	65	56	48	43	39	38	39	44	52	60	64	68	78	88	68.9	94																								
	86.1		88.3		90.0		90.5		91.6		91.8		90.2		85.8		79.7		71.4		63.4		58.3		54.4		51.2		49.0		48.2		49.2		54.6		62.2		69.7		73.6		77.2		82.2		85.3		Diurnal Average	
	99		99		99		99		99		99		98		96		96		93		94		94		95		97		90		85		89		93		95		96		98		98		99		Diurnal Maximum			





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**CNRL Horizon - September 2015**

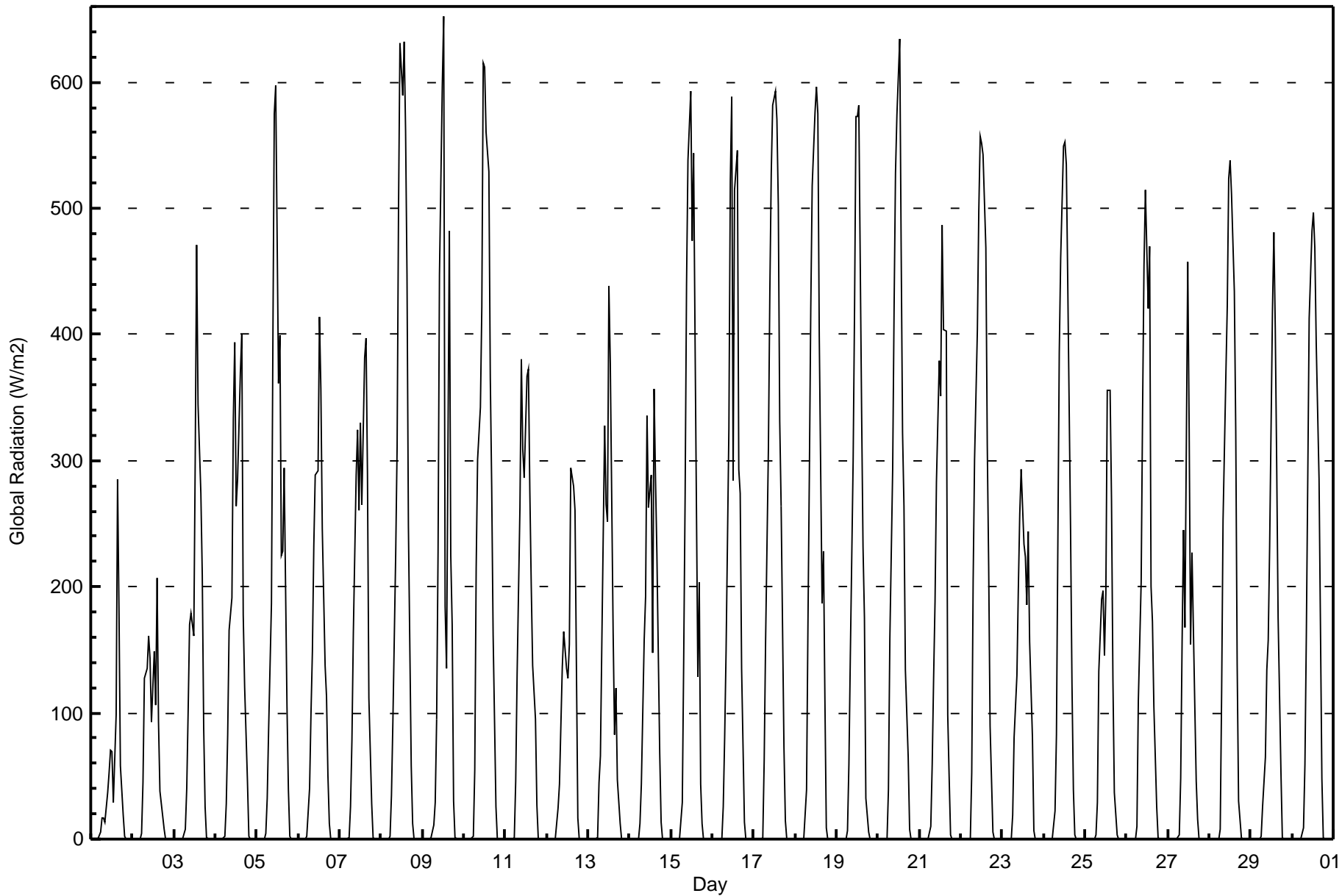
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	45	6.25	6.25
40 - 60	179	24.86	31.11
60 - 80	176	24.44	55.56
80 - 100	320	44.44	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 652 W/m2 on Sep 9 13:00		Maximum Daily Average: 186.9 W/m2 on Sep 10		Hours in Service: 720																						
Minimum Value: 0 W/m2 on Sep 1 01:00		Minimum Daily Average: 39.8 W/m2 on Sep 1		Hours of Data: 720																						
Maximum Diurnal Average: 408.9 W/m2 at hour 12		Minimum Diurnal Average: 0.0 W/m2 at hour 1		Hours of Missing Data: 0																						
Monthly Average: 126.1 W/m2		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 13 Q <sub>3</sub> = 226 P <sub>90</sub> = 420 P <sub>99</sub> = 588		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	0	0	0	0	5	16	16	13	37	53	70	69	29	98	285	182	58	19	2	0	0	0	0	39.8	285
2-Sep	0	0	0	0	0	5	45	127	136	161	143	92	149	106	207	93	38	17	8	0	0	0	0	55.3	207	
3-Sep	0	0	0	0	0	0	8	40	101	170	179	161	301	471	344	274	209	88	26	1	0	0	0	98.8	471	
4-Sep	0	0	0	0	0	2	28	82	165	191	334	394	264	285	370	400	178	120	46	3	0	0	0	119.3	400	
5-Sep	0	0	0	0	0	5	33	87	187	391	575	598	362	399	225	229	295	105	40	2	0	0	0	147.2	598	
6-Sep	0	0	0	0	0	2	40	99	149	232	288	292	414	357	246	138	113	51	12	0	0	0	0	101.4	414	
7-Sep	0	0	0	0	0	1	26	78	163	289	325	261	330	265	382	397	290	112	28	1	0	0	0	122.8	397	
8-Sep	0	0	0	0	0	2	35	93	226	311	499	631	589	632	561	447	248	58	12	0	0	0	0	181.1	632	
9-Sep	0	0	0	0	0	1	11	29	95	227	448	597	652	185	136	482	224	170	30	1	0	0	0	137.1	652	
10-Sep	0	0	0	0	0	2	55	214	301	342	422	615	612	561	529	365	279	162	26	0	0	0	0	186.9	615	
11-Sep	0	0	0	0	0	1	46	131	263	380	309	287	367	373	277	201	137	95	27	0	0	0	0	120.5	380	
12-Sep	0	0	0	0	0	0	24	44	91	137	165	135	127	155	294	280	260	137	17	0	0	0	0	77.7	294	
13-Sep	0	0	0	0	0	1	45	66	155	328	266	251	438	377	164	83	120	47	13	0	0	0	0	98.0	438	
14-Sep	0	0	0	0	0	0	12	44	158	192	336	262	289	147	357	286	226	69	14	0	0	0	0	99.7	357	
15-Sep	0	0	0	0	0	0	29	144	273	440	539	593	475	544	401	128	203	43	12	0	0	0	0	159.3	593	
16-Sep	0	0	0	0	0	0	25	80	149	325	521	588	284	514	546	294	274	136	13	0	0	0	0	156.2	588	
17-Sep	0	0	0	0	0	1	63	158	311	434	528	582	593	570	502	332	263	73	15	0	0	0	0	184.3	593	
18-Sep	0	0	0	0	0	0	40	171	291	422	517	576	596	575	399	186	228	110	9	0	0	0	0	171.7	596	
19-Sep	0	0	0	0	0	0	6	59	144	299	421	573	573	582	339	231	176	32	6	0	0	0	0	143.5	582	
20-Sep	0	0	0	0	0	0	39	159	293	421	528	573	635	470	323	264	135	64	8	0	0	0	0	163.0	635	
21-Sep	0	0	0	0	0	0	10	60	127	188	283	380	351	486	403	402	98	49	3	0	0	0	0	118.4	486	
22-Sep	0	0	0	0	0	0	53	204	301	403	498	557	552	543	469	312	216	90	5	0	0	0	0	175.1	557	
23-Sep	0	0	0	0	0	0	19	80	130	197	258	293	234	224	186	244	156	80	7	0	0	0	0	87.9	293	
24-Sep	0	0	0	0	0	0	22	83	235	386	461	550	553	535	442	245	123	40	3	0	0	0	0	153.1	553	
25-Sep	0	0	0	0	0	0	3	29	133	190	197	145	195	356	355	269	126	37	3	0	0	0	0	84.9	356	
26-Sep	0	0	0	0	0	0	10	109	204	338	454	515	421	470	201	173	105	26	2	0	0	0	0	126.1	515	
27-Sep	0	0	0	0	0	0	3	49	156	245	168	457	325	154	227	105	46	16	0	0	0	0	0	81.3	457	
28-Sep	0	0	0	0	0	0	8	116	252	368	423	523	538	511	434	324	138	31	1	0	0	0	0	152.8	538	
29-Sep	0	0	0	0	0	0	2	26	65	134	158	232	418	481	404	296	176	54	2	0	0	0	0	102.0	481	
30-Sep	0	0	0	0	0	0	9	60	163	286	412	483	497	469	393	285	168	48	1	0	0	0	0	136.3	497	
		0.0	0.0	0.0	0.0	0.0	1.0	25.5	91.3	180.9	282.1	356.9	408.9	406.7	394.2	340.4	268.4	181.0	73.9	13.6	0.4	0.0	0.0	0.0	Diurnal Average	
		0	0	0	0	0	5	63	214	311	440	575	631	652	632	561	482	295	170	46	3	0	0	0	Diurnal Maximum	





Maximum Speed: 29 km/h on Sep 27 09:00	Maximum Daily Speed Average: 13.3 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 24 04:00	Minimum Daily Speed Average: 0.3 km/h on Sep 15	Hours of Data: 715
Maximum Diurnal Speed Average: 4.9 km/h at hour 15	Minimum Diurnal Speed Average: 2.5 km/h at hour 22	Hours of Missing Data: 5
Monthly Average Velocity: 3.4 km/h 230.1 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 8 Q <sub>3</sub> = 10 P <sub>90</sub> = 13 P <sub>99</sub> = 20	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-Sep	SSW8	SW9	S9	SSW8	SSW5	S5	SW3	ESE0	SSE8	SE8	NNE7	NNW8	NW9	W6	SW6	WSW6	SW6	SSW8	SSW7	S8	SSW8	SSW8	SW7	SSW8	SSW4.7	S9
2-Sep	WSW8	S6	SSE7	SSW7	S4	WSW3	NW2	S3	ESE2	NNE5	NNE11	NNE12	NE10	NE8	NE9	NNE6	NNE3	N10	N11	N14	N13	NNE9	N8	NNW5	NNE4.0	N14
3-Sep	N11	N13	NNW11	NW8	W7	W8	W10	NNW14	WNW14	W12	W9	W8	W12	WNW15	WNW18	WNW14	WNW13	WNW11	WNW10	WNW9	WSW6	W3	WSW3	SSW4	WNW9.0	WNW18
4-Sep	SSW6	WSW5	W4	SW3	WSW3	SW4	SSE2	SW2	NW9	NW12	NW13	NW9	NW9	N6	NNW6	NW5	NNE7	NE4	ESE4	SSE3	AF	SW3	WSW4	SW4	WNW3.2	NW13
5-Sep	SSW4	SSW5	SSW4	S4	S5	S4	S2	S6	S6	SSW5	SSE4	S9	S8	SSE9	SSE6	SSE7	SSE6	SE4	SSE3	SSW4	SSW4	W2	NNW2	N4	S4.0	S9
6-Sep	N5	NW6	NNW5	N6	N5	N6	N6	N7	N7	N8	NNE7	NNE7	NNE8	NNE10	NNE10	NNE10	NE10	NE7	NNE6	N6	N8	N8	N9	N9	N6.9	NNE10
7-Sep	N8	N8	N7	N7	N7	N7	N6	N9	NNE9	NNE11	N10	N11	N13	NNE13	NNE12	NNE12	NNE12	NNE11	NNE7	N5	NW3	WSW3	WSW5	WSW5	N7.4	NNE13
8-Sep	SW5	SSW6	SSW6	SW6	SSW5	SSW4	SSW5	SSW1	ENE3	E3	ESE4	ESE4	E5	ESE8	E6	ESE6	ENE6	SSE2	W6	ESE2	NE1	WSW3	SSW3	S1	SSE2.0	ESE8
9-Sep	S6	S6	S6	SSW6	SSW7	S10	S12	S9	S9	S7	SSE7	SSE8	SSE8	E8	S7	SSE8	E7	E8	SSE7	SSE2	ENE1	SSW5	SSW3	SSW6	SSE5.7	S12
10-Sep	SSW8	S7	S9	S7	SSW9	S8	S9	S9	S10	S11	S10	S10	S10	S9	S12	SW11	SSW10	SW11	SSW6	S7	SSW7	SSW5	SSW5	SSW6	SSW8.4	S12
11-Sep	S6	S9	S9	S7	S7	S8	S8	S9	SSW11	SSW13	SSW12	SSW13	SSW13	SW16	SW14	SW13	SSW12	SW11	SSW10	SSW10	SW10	SSE1	SSW7	SW9	SSW9.6	SW16
12-Sep	SW11	SW13	SW13	SW12	WSW9	SW9	SW10	SW8	SSW8	SSW8	WSW8	W10	WSW6	W7	WSW12	WSW12	SW12	WNW12	WSW9	WNW7	N13	N10	NNW6	NNW7	WSW7.0	SW13
13-Sep	N3	SW4	SSW6	SSW5	W4	SW1	S3	SSE1	S3	NE2	NW3	SSW6	SW6	W3	WSW5	NW3	E7	SE4	WNW3	NNW3	NW6	NNW9	N6	N6	W1.2	NNW9
14-Sep	N7	N8	N9	N9	N9	N10	N10	N12	NNE10	N12	NNE12	NNE10	N10	NE9	NNE10	NE7	NE7	NNE5	N5	NNE4	NNE4	NNW5	N5	NNW6	NNE7.8	N12
15-Sep	N4	AF	NW4	NNE3	N3	NNW2	NW1	N3	NE2	N4	NNW6	NW3	ESE3	SE5	SE4	SSE5	SSE9	S3	S4	W1	WNW2	NW3	E1	WNW2	N0.3	SSE9
16-Sep	S1	S1	AF	NW2	S1	S2	SSW5	SSW4	SSW2	SE1	ESE5	SE5	SSE4	NE6	SSE4	SE8	SSE8	SSE10	SSE7	S7	S8	S7	WSW3	SSW4	SSE3.6	SSE10
17-Sep	SSW6	S8	SSW9	S11	SSW10	S10	S10	S11	S11	S10	S9	S8	SSE9	S12	SSW12	S9	SSW10	S9	S8	S5	SSW3	SSE4	S5	S8	S8.5	SSW12
18-Sep	S7	S7	S8	S9	S8	S9	S10	SSW11	SSW11	SSW12	SSW14	SW14	SW14	SW12	SSW13	SW14	SW13	SW11	SW9	S8	S9	S7	S7	S7	SSW9.7	SSW14
19-Sep	S7	S7	S9	S7	S6	SSW7	SSW5	SSW4	SSW4	SW3	SW15	WSW17	SW16	SW17	WSW18	WNW18	W11	SW12	SSW16	SW14	SW12	W11	W6	S3	SW8.8	WSW18
20-Sep	SSW9	SW7	SW8	SW8	WSW7	SSW9	SSW11	SSW11	SSW11	SSW13	SW14	SW16	WSW18	W18	W18	WNW18	WNW16	WNW11	WNW10	NW9	NW10	NNW8	WNW10	WNW9	WSW9.1	W18
21-Sep	WNW10	WNW10	WNW7	WSW5	W7	NW9	NNW18	NNW13	NNW9	NW12	NW12	NW15	NW18	NW18	NW17	NW15	NW14	W12	W10	W9	WNW9	W8	W8	W8	NW10.5	NNW18
22-Sep	WNW6	NW3	SW2	SSW5	WSW4	S3	SW3	SSW6	S3	S6	SSE7	SSE3	ESE5	ESE8	SE8	SSE9	SSE8	SE5	E5	SE4	SSE6	SSW3	WSW2	AF	S3.3	SSE9
23-Sep	AF	N3	N3	N3	NNW4	N3	NNE6	N5	N3	N4	NNW4	N3	ESE4	ESE6	E7	E9	ESE10	ESE9	ESE9	ESE9	SE8	SE8	SSE5	SSW2	E3.0	ESE10
24-Sep	SW1	NW3	NW3	NW0	NNW1	SW2	SW5	SSW6	SSW8	S12	S10	S12	SSW13	SSW12	SSW10	S9	SE5	ESE5	NE4	N5	N6	NNW6	NNW6	N5	SSW2.9	SSW13
25-Sep	NNW5	S1	SW2	SSW6	S8	SSW9	SSW8	SW12	SW10	W16	WSW10	WSW13	SW11	SW14	SW15	SW15	WSW12	SW8	SW7	SW8	SSW8	SSW9	SW7	SW6	SW8.4	W16
26-Sep	WSW6	SSW8	SSW11	SSW10	SSW9	SSW8	SSW10	SSW11	SSW13	SW14	SW14	WSW14	WSW18	SW18	WSW16	WSW20	WSW20	WSW16	SW14	SW9	SSW8	SW9	SW7	S9	SW11.6	WSW20
27-Sep	S10	S10	SSW9	SSW7	SSW8	S9	W15	W24	NW29	NW24	WNW21	WNW21	WNW26	WNW23	WNW24	WNW18	WNW16	WNW14	WNW10	WNW13	WNW13	WNW15	W16	W10	W13.3	NW29
28-Sep	W12	W12	W8	W8	WSW8	SW7	SW8	SW9	WSW8	NNW5	W6	WSW4	SSW7	SSW8	SSW11	SW9	SW6	S6	S7	S7	S7	S3	E2	SE5	SW5.6	W12
29-Sep	SSE3	SSE3	SE2	SSW4	SSW4	SW4	SSW5	SSW7	S7	S10	S12	S10	SSE9	SSE9	S10	SSW11	S11	SSE7	SSE7	S6	SSW8	SSW5	SW3	S8	S6.6	S12
30-Sep	S8	S9	S10	S12	S11	S10	SSW8	S10	S11	S13	S14	S13	S12	SSW17	SSW17	SSW17	SSW13	S9	S9	S8	S9	S9	SSW5	SSE5	S10.5	SSW17

SW3.0 SW3.3 SW3.6 SW3.9 SW3.7	SSW3.8 SW3.8 SW4.0 SW3.4	WSW3.4 SW3.2	SSW4.2 SW4.2 SW3.7	SW4.9	WSW4.9 SW3.5 SW3.0 SW3.0	SW2.6	WSW2.6	WSW2.5	W2.6	WSW2.6	Diurnal Average								
W12 N13 SW13 SW12 S11 S10	NNW18 W24 NW29	NW24	WNW21	WNW21	WNW26	WNW23	WNW24	WNW18	WNW16	WNW14	WNW10	WNW13	WNW13	WNW15	W16 W10	Diurnal Maximum			

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

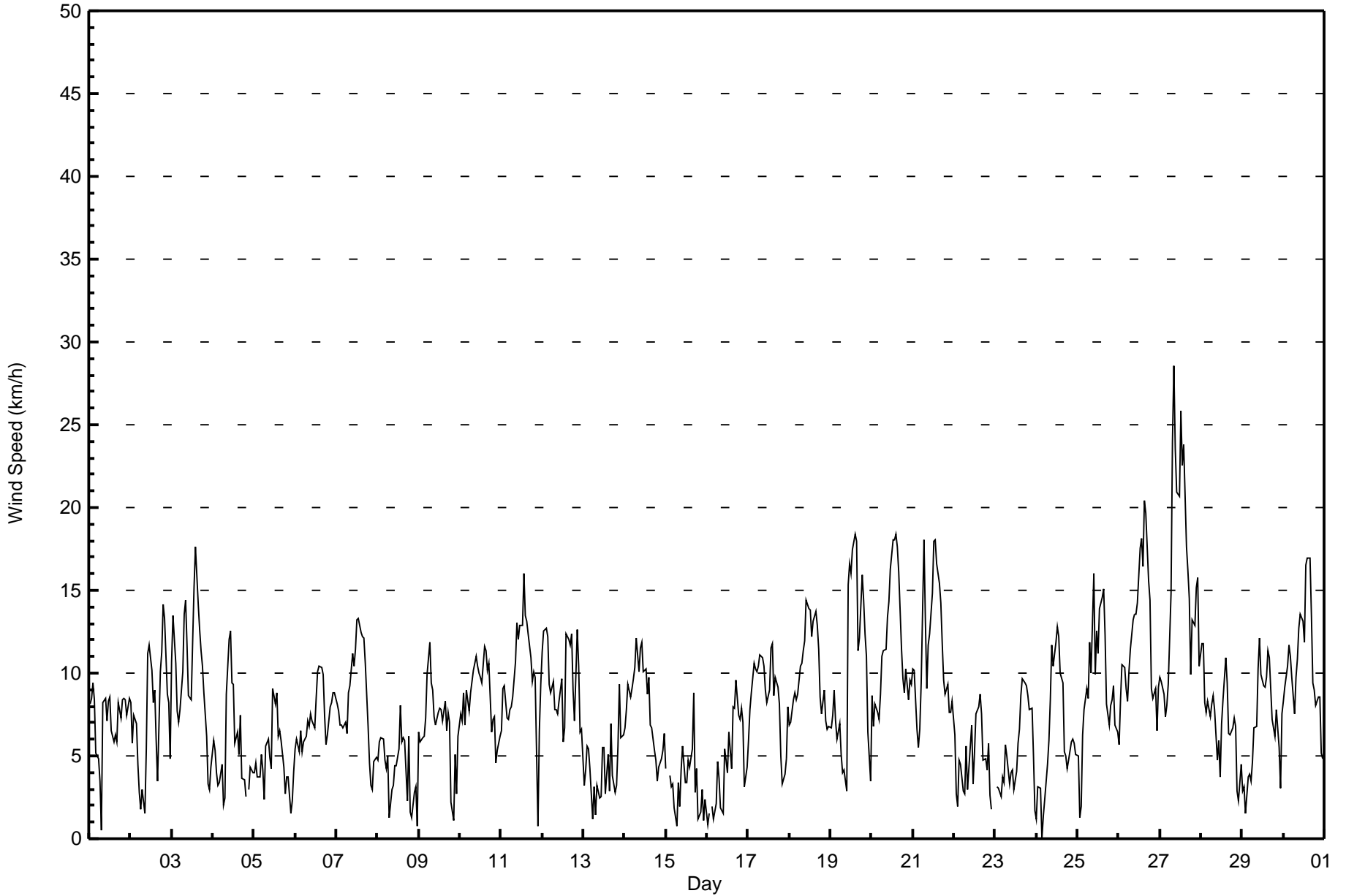


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 9 km/h on Sep 27 08:00	Hours of Data: 715
Minimum Value: 0 km/h on Sep 16 07:00	Hours of Missing Data: 5
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 P <sub>99</sub> = 7	Hours of Calibration: 0
	Percent Operational Time: 99.3

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

AF - Analyzer Failure







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**CNRL Horizon - September 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	202	28.25	28.25
6 - 11	384	53.71	81.96
12 - 19	119	16.64	98.60
20 - 28	9	1.26	99.86
29 - 38	1	0.14	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 715

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**CNRL Horizon - September 2015**

<b>Wind Speed</b> <b>Ranges (km/h)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	19	8	5	2	5	11	11	17	23	34	18	15	6	5	13	10	202
6 - 11	37	20	9	2	6	8	5	24	98	70	34	13	21	14	10	13	384
12 - 19	7	6	0	0	0	0	0	0	11	19	27	11	10	16	10	2	119
20 - 28	0	0	0	0	0	0	0	0	0	0	0	2	1	5	1	0	9
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	63	34	14	4	11	19	16	41	132	123	79	41	38	40	35	25	715

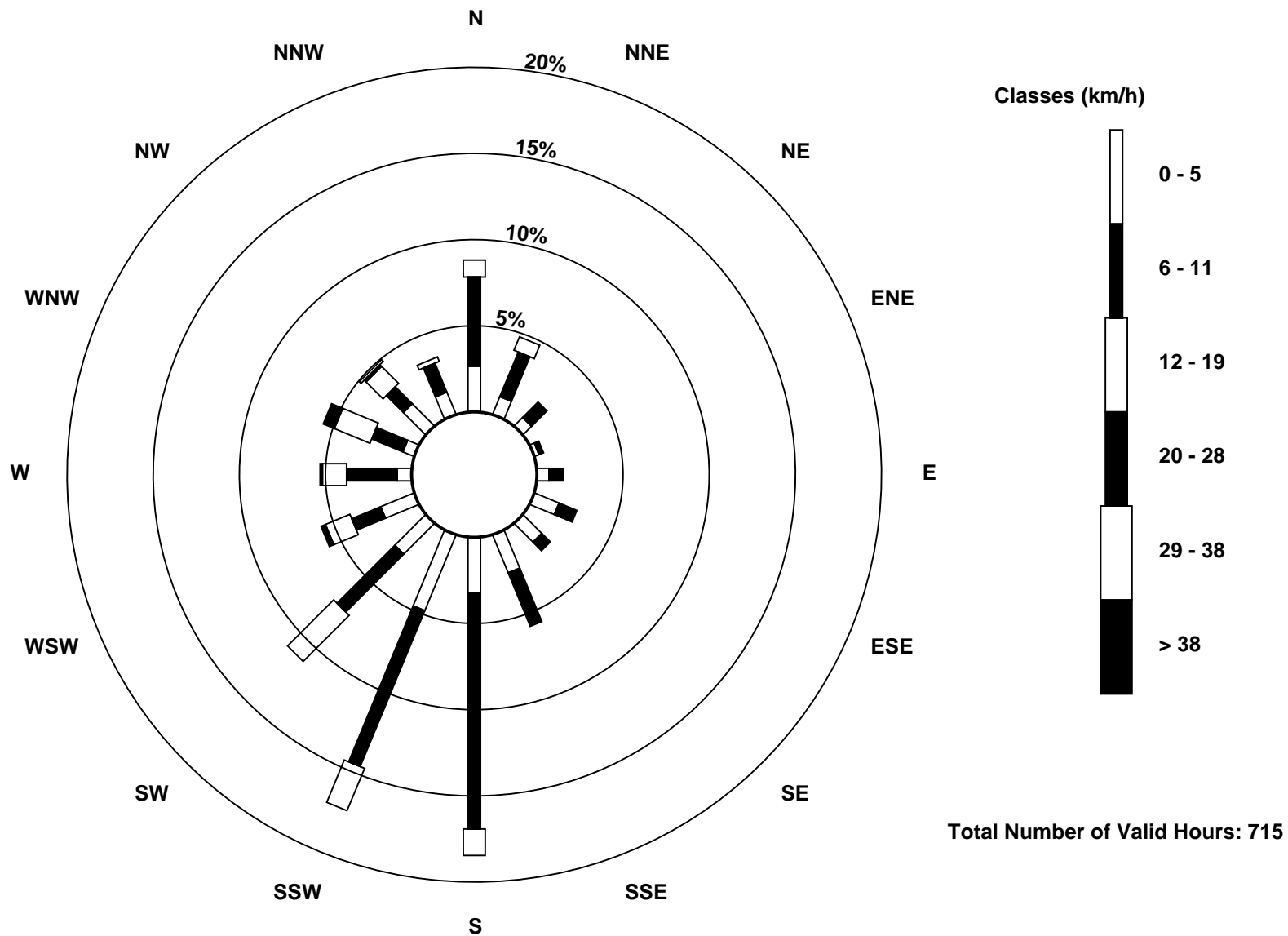
Total Number of Valid Hours: 715

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Wind Speed (WS) - km/h  
CNRL Horizon (AMS 15)





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg  
CNRL Horizon - September 2015

Direction of Maximum Speed: 313 deg on Sep 27 09:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 281.2 deg on Sep 27		Hours of Data:	715
Direction of Minimum Speed: 318 deg on Sep 24 04:00		Hours of Missing Data:	5
Direction of Minimum Daily Speed Average: 0.3 deg on Sep 15		Percent Operational Time:	99.3
Monthly Average Direction: 234.8 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	207	216	184	195	197	186	220	115	162	128	32	340	317	271	231	244	236	199	202	191	198	203	224	198	208.4
2-Sep	251	189	161	200	186	248	304	172	121	21	18	23	39	45	35	33	16	356	4	4	357	14	356	327	11.6
3-Sep	349	355	338	309	276	273	274	283	286	279	266	261	269	288	293	300	296	291	293	294	251	265	255	207	290.8
4-Sep	209	238	266	229	244	232	152	224	314	312	317	311	316	6	329	306	12	49	107	164	AF	228	248	223	295.8
5-Sep	195	196	206	190	172	191	172	170	180	192	160	173	182	152	150	147	163	136	166	192	210	260	331	7	174.4
6-Sep	8	317	339	357	11	357	353	358	360	359	17	30	26	28	29	20	41	55	25	351	351	352	353	359	9.4
7-Sep	357	3	2	5	6	9	358	1	12	13	8	6	357	12	16	31	27	31	23	353	316	243	238	241	6.9
8-Sep	226	209	212	221	208	201	212	195	74	88	110	117	97	108	99	108	73	159	262	112	40	247	213	180	159.3
9-Sep	171	175	185	195	193	188	188	182	178	183	158	159	159	88	179	165	79	100	149	152	71	197	198	199	168.4
10-Sep	204	186	191	187	198	189	178	184	180	175	174	173	188	183	187	217	212	214	197	190	198	212	203	208	191.9
11-Sep	191	189	187	184	181	182	184	188	197	206	210	207	211	223	225	220	211	217	207	211	224	148	202	227	206.0
12-Sep	229	232	228	230	237	221	226	221	208	210	244	277	239	261	254	239	231	286	255	297	0	3	348	348	251.7
13-Sep	355	236	208	206	265	225	186	164	176	37	312	209	217	269	248	304	79	135	289	341	315	347	8	359	278.1
14-Sep	7	2	8	3	6	8	1	6	15	9	21	15	9	35	32	42	49	16	9	32	25	343	353	341	12.7
15-Sep	351	AF	309	19	3	348	324	2	44	357	346	305	111	142	124	164	168	169	185	259	285	309	92	300	9.2
16-Sep	175	182	AF	312	187	187	206	210	196	143	106	136	152	55	154	138	160	159	168	184	183	191	238	195	166.5
17-Sep	198	189	195	190	192	188	188	181	182	187	175	174	166	183	195	189	195	185	173	178	204	153	188	187	185.1
18-Sep	177	171	181	188	191	189	185	208	212	211	200	218	216	215	208	217	224	225	221	181	180	178	172	183	201.6
19-Sep	189	173	173	171	185	195	193	194	192	229	225	240	216	221	238	284	261	219	200	214	225	280	271	181	222.3
20-Sep	203	221	230	236	238	206	192	209	203	213	218	235	250	265	268	284	289	291	298	319	316	328	303	292	254.7
21-Sep	303	301	300	258	269	308	337	327	348	318	319	322	320	320	324	312	305	272	275	278	284	271	271	275	306.5
22-Sep	291	322	223	211	246	183	234	202	175	177	168	162	109	120	138	168	158	144	99	135	161	208	238	AF	169.2
23-Sep	AF	352	1	0	333	359	14	11	4	350	348	10	113	108	93	94	106	104	117	121	134	146	155	204	86.6
24-Sep	229	323	307	318	348	235	218	206	207	189	181	184	195	201	198	186	133	106	55	357	352	337	339	354	200.9
25-Sep	336	171	218	203	190	199	202	226	234	274	244	237	228	226	234	240	232	218	215	196	209	221	227	227.3	
26-Sep	242	212	204	206	206	210	203	202	209	218	215	237	241	231	244	240	257	248	234	227	206	218	220	181	225.0
27-Sep	182	179	194	213	197	188	261	278	313	305	299	284	292	292	287	288	282	284	291	300	294	296	281	280	281.2
28-Sep	280	272	268	259	249	234	226	232	250	286	271	237	203	205	202	217	218	179	175	185	177	187	81	139	228.2
29-Sep	160	162	133	194	195	215	211	199	190	185	181	188	162	165	177	192	184	167	164	191	197	207	217	179	183.9
30-Sep	187	178	174	172	173	182	198	183	182	183	180	187	186	192	202	205	206	189	183	190	185	187	208	156	187.3

235.9 223.4 215.3 213.9 215.5 211.4 222.2 227.9 227.2 239.4 233.8 238.5 235.4 230.4 235.6 237.0 232.0 222.0 217.4 230.7 239.5 257.4 261.6 236.8

Diurnal Average

AF - Analyzer Failure

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

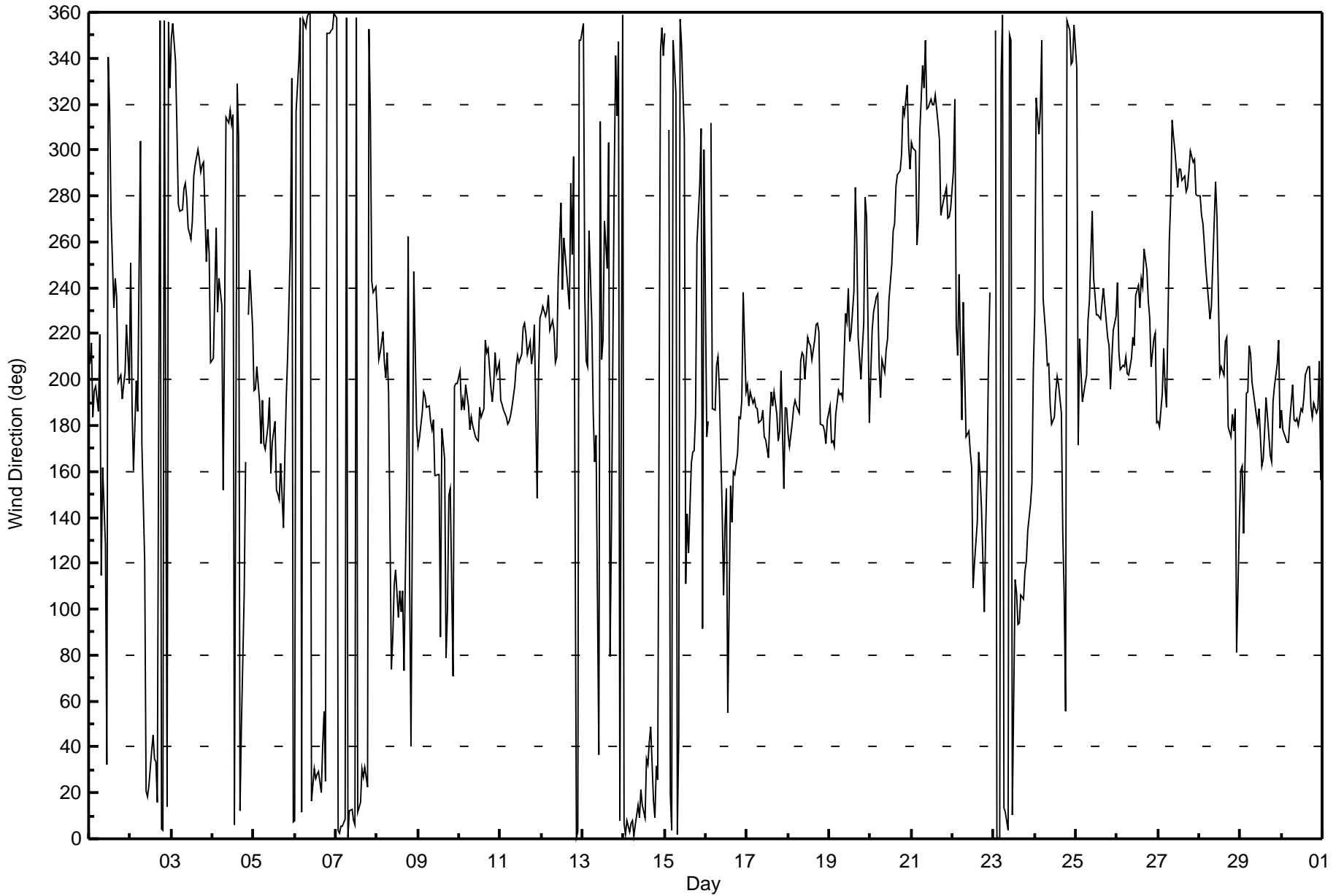
Wind Direction (WD) - deg  
CNRL Horizon - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 94 deg on Sep 9 00:00	Hours of Data: 715
Minimum Value: 8 deg on Sep 18 20:00	Hours of Missing Data: 5
Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 13 Q <sub>1</sub> = 17 Median = 21 Q <sub>3</sub> = 29 P <sub>90</sub> = 49 P <sub>99</sub> = 85	Hours of Calibration: 0
	Percent Operational Time: 99.3

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-Sep	8	19	16	14	26	25	48	92	70	35	27	20	25	22	32	34	30	20	18	15	17	18	28	16	92
2-Sep	28	43	31	28	52	53	91	27	46	24	21	20	21	19	20	38	24	19	17	19	19	19	17	23	91
3-Sep	19	20	19	19	18	19	19	19	18	20	21	21	21	20	19	20	20	19	16	21	17	49	29	27	49
4-Sep	23	14	60	36	38	19	57	52	20	22	19	23	36	31	35	46	26	25	22	42	AF	21	14	33	60
5-Sep	32	19	44	57	22	42	58	21	27	40	61	29	29	30	33	29	39	17	28	17	20	76	49	11	76
6-Sep	21	14	21	14	22	15	14	17	18	20	23	24	31	26	23	20	20	17	16	13	16	17	17	18	31
7-Sep	19	19	18	19	18	17	19	21	22	20	24	24	27	23	22	24	24	19	18	39	25	33	18	20	39
8-Sep	14	11	11	13	17	24	9	85	28	52	44	60	53	37	48	44	27	40	31	81	80	31	45	94	94
9-Sep	9	10	13	19	15	14	15	18	16	21	32	33	36	39	44	31	47	36	18	55	65	45	78	16	78
10-Sep	13	16	15	14	15	16	13	17	16	17	22	25	30	36	30	27	28	22	14	9	9	15	10	10	36
11-Sep	9	12	15	13	12	11	16	18	22	23	26	23	24	23	23	23	22	20	17	16	21	86	19	18	86
12-Sep	18	17	19	20	18	14	18	18	19	22	23	21	22	37	24	26	27	21	17	45	19	18	23	28	45
13-Sep	66	20	16	22	49	79	46	63	31	71	72	34	45	77	36	70	32	44	46	30	34	19	17	18	79
14-Sep	19	20	19	19	19	19	19	21	23	22	22	27	23	27	24	37	26	19	10	18	21	20	17	8	37
15-Sep	11	AF	36	12	13	11	71	18	48	38	37	76	73	68	67	22	27	26	14	62	42	22	82	17	82
16-Sep	90	50	AF	52	76	17	10	23	37	71	44	58	71	39	78	22	30	20	11	9	11	12	49	14	90
17-Sep	11	10	13	13	15	14	15	15	17	24	25	36	32	32	32	33	27	17	14	25	34	19	18	11	36
18-Sep	11	11	14	15	15	16	16	20	24	25	23	28	27	30	27	22	26	23	21	8	9	9	8	9	30
19-Sep	9	10	10	14	13	17	17	23	28	69	27	30	27	27	28	28	25	35	23	23	22	21	33	66	69
20-Sep	17	29	18	24	23	18	18	23	26	25	26	28	28	26	24	22	19	18	19	22	19	21	25	17	29
21-Sep	17	17	15	24	20	17	19	19	24	21	22	21	19	20	22	22	25	19	22	23	21	17	16	16	25
22-Sep	33	68	67	37	47	58	63	14	61	31	39	81	70	43	43	28	31	21	11	17	13	65	46	AF	81
23-Sep	AF	17	9	20	19	15	10	15	25	28	31	64	52	32	30	27	26	20	19	19	20	19	17	40	64
24-Sep	60	18	15	92	16	51	16	14	19	21	23	24	25	24	26	19	22	16	26	25	13	9	11	14	92
25-Sep	21	79	86	19	14	16	19	21	24	22	28	25	26	26	25	25	22	20	15	16	14	17	28	17	86
26-Sep	22	9	10	15	15	16	15	17	21	24	24	29	28	27	26	24	24	25	22	20	15	17	21	12	29
27-Sep	13	13	16	21	22	16	30	22	18	19	19	23	19	21	21	19	21	20	27	22	18	19	18	21	30
28-Sep	18	19	19	19	14	19	17	16	25	50	56	77	56	40	33	30	31	15	9	11	14	76	43	17	77
29-Sep	15	16	55	17	15	23	32	25	33	17	15	19	23	29	24	21	17	18	12	9	8	26	28	13	55
30-Sep	8	8	13	12	13	13	16	13	15	17	18	19	33	23	23	23	24	15	10	15	9	9	16	21	33

90	79	86	92	76	79	91	92	70	71	72	81	73	77	78	70	47	44	46	81	80	86	82	94	
Diurnal Maximum																								

AF - Analyzer Failure





# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	September 18, 2015	Last Calibration	August 25, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	14:00
Gas Cert Reference	S0002486	Station temp.	21 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG Make/Model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-622	-622
Analyzer IP address	192.168.1.43		Lamp voltage	840	840
Calculated slope	0.997714	0.995017	Chamber temp	45.0	45.0
Calculated intercept	1.411385	1.170751	Pressure	708.1	701.8
Analyzer Background	18.0	18.8	Flow	0.430	0.426
Analyzer Coefficient	0.992	0.982	Intensity	91	91
Analyzer make	Thermo 43i		Analyzer serial #	710321322	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.5	----
as found span	5000	81.5	815.0	825.1	0.988
calibrator zero	5000	0.0	0.0	-0.4	----
high point	5000	81.5	815.0	818.3	0.996
second point	5000	40.6	406.0	406.4	0.999
third point	5000	20.2	202.0	201.1	1.005
as left zero	5000	0.0	0.0	0.5	----
as left span	5000	81.5	815.0	820.3	0.994
Average Correction Factor					1.000

Corrected As found      824.6      Previous response      815.5      % change      -1.1%

**Notes:**

Inlet filter replaced after as founds. Adjusted both zero and span. As left points began at 13:12 MST.

Calibration Performed By:

Asad Hidayat





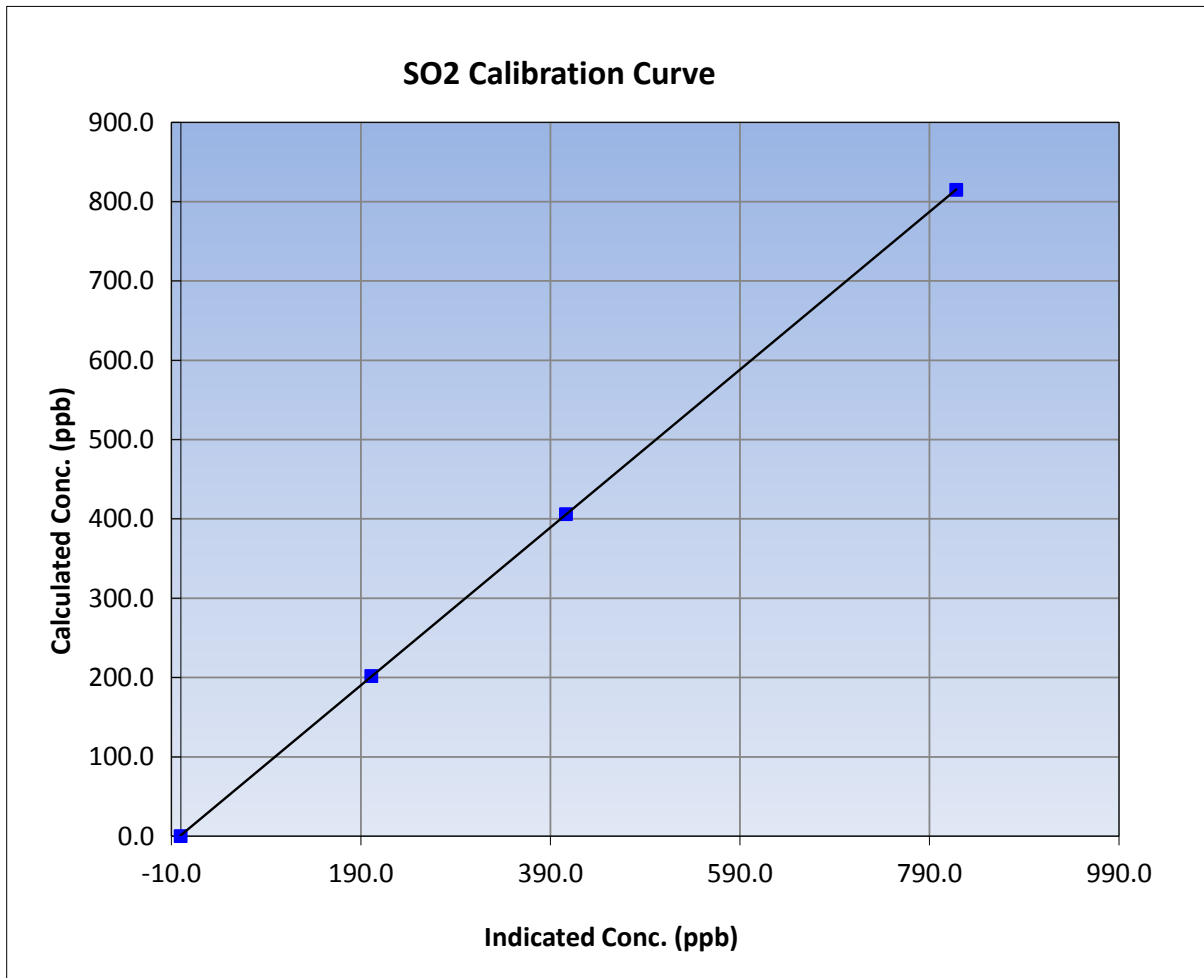
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 18, 2015	Previous Calibration	August 25, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:00	End Time (MST)	14:00
Analyzer make	Thermo 43i	Analyzer serial #	710321322

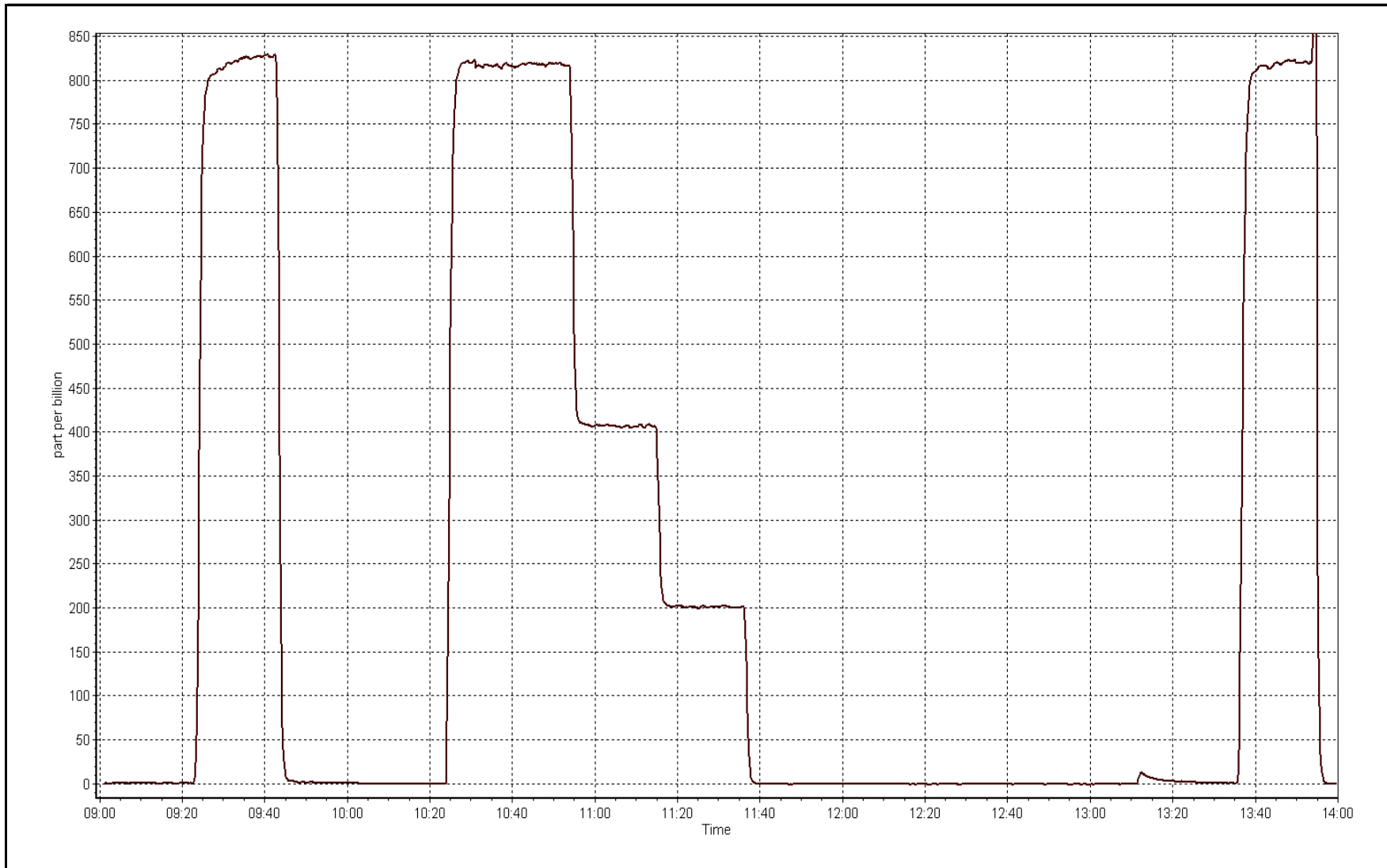
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999995
815.0	818.3	0.9959		
406.0	406.4	0.9990	Slope	0.995017
202.0	201.1	1.0047		
			Intercept	1.170751



SO2 Calibration Plot

Date: September 18, 2015





# Wood Buffalo Environmental Association TRS Calibration Report

## Station Information

Calibration Date	September 14, 2015	Last Calibration	August 26, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	8:35	End Time (MST)	12:50
Gas Cert Reference	LL82745	Station temp.	22 Deg C
Cal Gas Concentration	9.6 ppm	Cal Gas Exp Date	2/22/16
Calibrator Make/Model	API T700	Serial Number	1223
Dil air Make/Model	API 701	Serial Number	1005
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S0002486 26/Sep/17

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-672	-672
Analyzer IP address	192.168.1.42		Lamp voltage	755	756
Calculated slope	1.022132	0.990618	Chamber temp	45	45
Calculated intercept	0.071204	-0.177008	Pressure	690.6	693.9
Analyzer Background	10.5	9.5	Flow	0.420	0.423
Analyzer Coefficient	1.030	0.939	Intensity	90	93
			Converter temp.	809	800
Analyzer make/model	Thermo 43i		Analyzer serial #	0710321323	
Converter make/model	CDN-101		Converter serial #	363	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.2	----
as found span	6000	49.7	79.5	78.1	1.018
SO2 scrubber check	6000	23.7	197.5	0.4	----
calibrator zero	6000	0.0	0.0	0.2	----
high point	6000	49.7	79.5	80.5	0.988
second point	6000	24.8	39.7	40.1	0.989
third point	6000	12.3	19.7	20.0	0.982
as left zero	6000	0.0	0.0	0.2	----
as left span	5000	41.4	79.5	78.7	1.010
Average Correction Factor					0.986

Corrected As found	77.9	Previous response	77.7	% change	-0.2%
--------------------	------	-------------------	------	----------	-------

**Notes:**

Scrubber check done after as founds. Inlet filter replaced after scrubber check. Cylinder regulator was purged after the scrubber check. Analyzer pulling in room air from 9:37-10:40 MST. Adjusted span.

Calibration Performed By:

Asad Hidayat



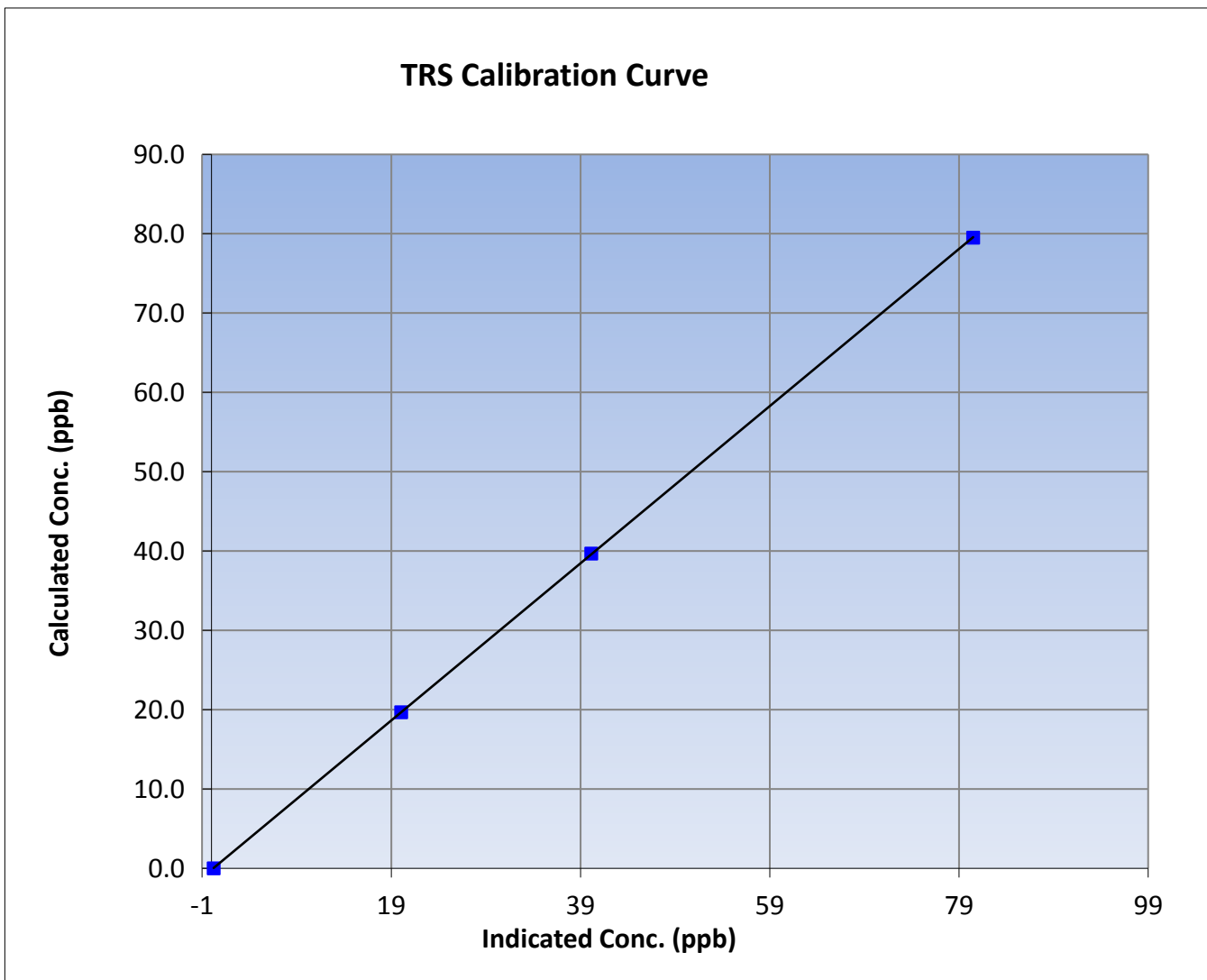
# Wood Buffalo Environmental Association TRS Calibration Report

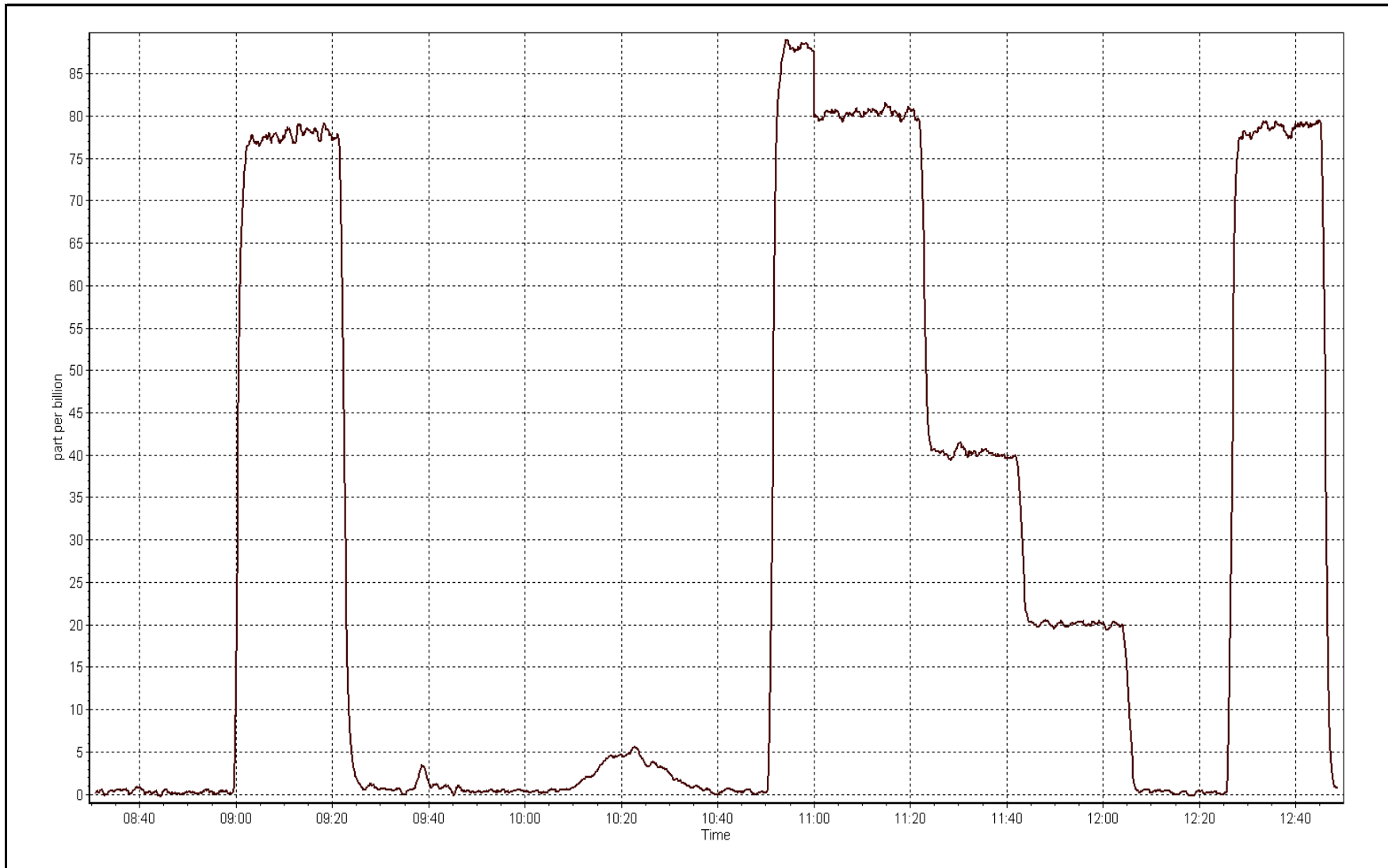
## Station Information

Calibration Date	September 14, 2015	Previous Calibration	August 26, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	8:35	End Time (MST)	12:50
Analyzer make	Thermo 43i	Analyzer serial #	0710321323

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999996
79.5	80.5	0.9878		
39.7	40.1	0.9885	Slope	0.990618
19.7	20.0	0.9820		
			Intercept	-0.177008







# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	September-18-15	Last Calibration	August-25-15
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	14:00
Gas Cert Reference	S0002486	Cal Gas Expiry Date	26-Sep-17
CH4 Cal Gas Conc.	505 ppm	CH4 Equiv Conc.	1046.8 ppm
C3H8 Cal Gas Conc.	197 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG make/model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	Serial Number	2580

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.8	8.8
Analyzer IP address	192.168.1.51		Air or Bypass Press	38.0	37.1
Calculated slope	0.999203	0.998666	Fuel Pressure	26.3	26.3
Calculated intercept	0.047930	0.025040	Analyzer Coeff	3.1	3.1
			Analyzer BKG	0.080	0.005

Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295
---------------	---------------	-------------------	------------

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.08	----
as found span	5000	81.5	17.06	17.12	0.997
calibrator zero	5000	0.0	0.00	-0.04	----
high point	5000	81.5	17.06	17.06	1.000
second point	5000	40.6	8.50	8.47	1.003
third point	5000	20.2	4.23	4.24	0.997
as left zero	5000	0.0	0.00	-0.05	----
as left span	5000	81.5	17.06	17.10	0.998
Average Correction Factor					1.000

Corrected As found	17.20	Previous response	17.03	% change	-1.0%
--------------------	-------	-------------------	-------	----------	-------

**Notes:**

Inlet filter replaced after as founds. Adjusted zero. Span did not require an adjustment, used the 20 min average after adjusted zero. As lefts began at 13:12 MST.

Calibration Performed By:

Asad Hidayat



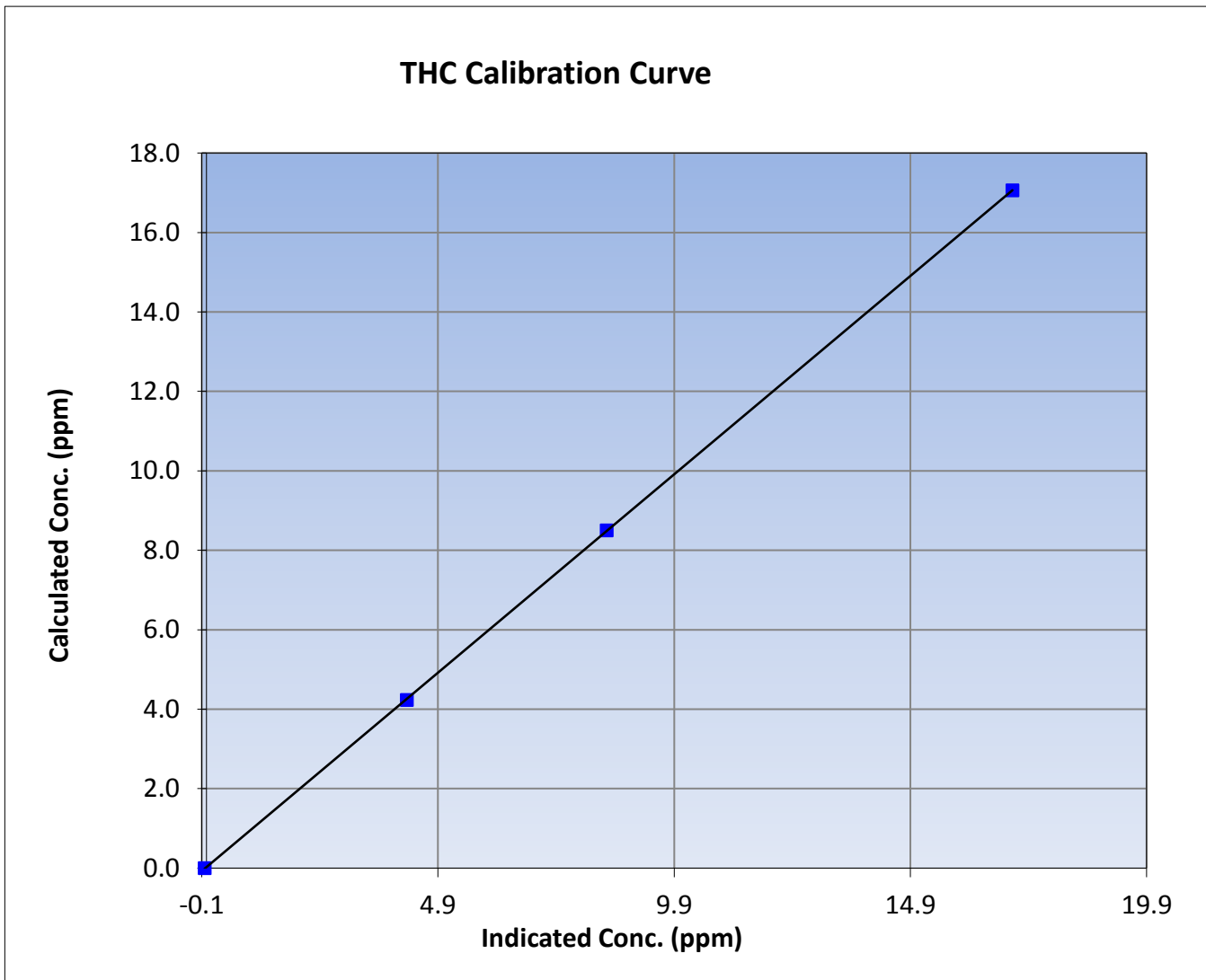
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	September 18, 2015	Previous Calibration	August 25, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:00	End Time (MST)	14:00
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295

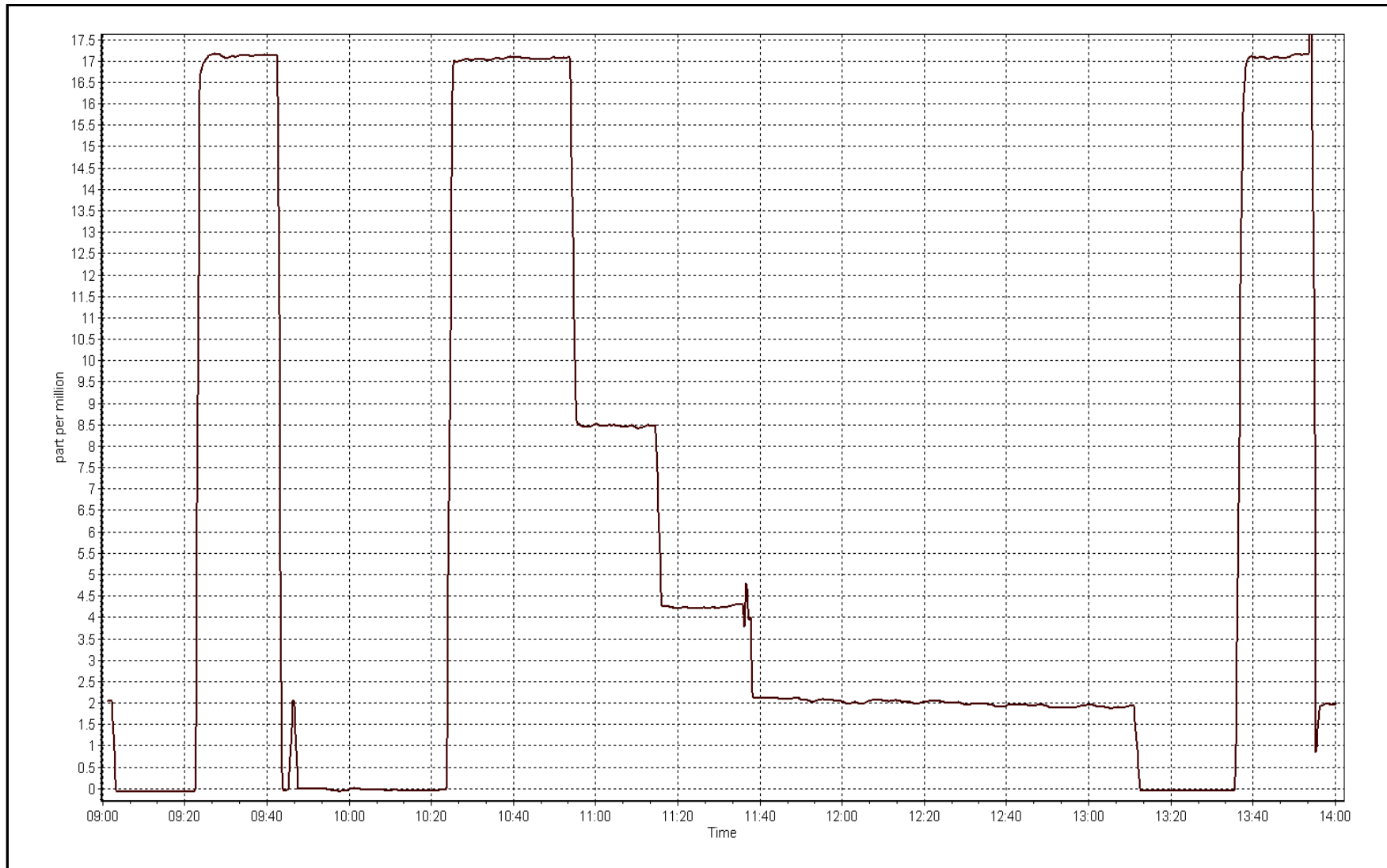
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	----	Correlation Coefficient	0.999991
17.06	17.06	1.0001		
8.50	8.47	1.0035	Slope	0.998666
4.23	4.24	0.9974		
			Intercept	0.025040



THC Calibration Plot

Date: September 18, 2015







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

## Station Information

Calibration Date	September 18, 2015	Previous Calibration	August 25, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	14:00
NO Cal Gas Conc	48.9 ppm	Gas Cert Reference	S0002486
NOX Cal Gas Conc	48.9 ppm	Cal Gas Expiry Date	26/09/2017
Calibrator	Teledyne API T700	Serial Number	1223
Zero air Generator	Teledyne API T701	Serial Number	1004

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2580
-------------------	----------------------------	-----------------	------

## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000442	1.000163	0.995775
	Data Offset	1.182998	1.187550	-0.304535
Current Calibration	Data Slope	0.998924	0.998246	1.006544
	Data Offset	0.495365	0.568917	-2.605182

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	710321429
---------------------	------------	-------------------	-----------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.776		0.767	
NOX coefficient	0.999		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	9.8		9.7	
NOX bkgrnd	10.0		9.9	
Chamber Temp	49.7	Deg C	50	Deg C
Moly Temp	325	Deg C	326.3	Deg C
PMT voltage	-784.4	V	-784.4	V
PMT Temp	-3.1	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	160.5	mmHg	158.4	mmHg
R Cell Press Nox	161.8	mmHg	158.7	mmHg
NO sample flow	0.686	lpm	0.681	lpm
Nox sample Flow	0.688	lpm	0.679	lpm

**Notes:**

Inlet filter replaced after as founds. Adjusted span slightly.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

September 18, 2015

Station Number:

AMS 15

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
as found span	5000	81.5	797.1	797.1	0.0	815.3	815.3	-0.1	0.9777	0.9777
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	0.1	----	----
high point	5000	81.5	797.1	797.1	0.0	797.3	797.9	-0.6	0.9997	0.9990
second point	5000	40.6	397.1	397.1	0.0	397.6	397.7	-0.1	0.9986	0.9984
third point	5000	20.2	197.6	197.6	0.0	196.7	196.5	0.1	1.0046	1.0052
as left zero	5000	0.0	0.0	0.0	0.0	1.5	0.6	-0.1	----	----
as left span	5000	81.5	797.1	447.8	349.3	801.8	447.3	354.5	0.9941	1.0011
Average Correction Factor									1.0010	1.0009

Corrected As found  
Previous Response

NO<sub>x</sub>= 815.6  
NO<sub>x</sub>= 795.5

NO= 815.5  
NO= 795.8

Percent Change

NO<sub>x</sub>= -2.5%

NO= -2.4%

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

81.50

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO2 (300)	----	447.8	344.2	791.0	447.8	343.2	0.9915	1.0000	1.0029	99.7%
2nd NO2 (200)	----	555.3	236.7	792.8	555.3	237.5	0.9892	1.0000	0.9966	100.3%
3rd NO2 (100)	----	671.1	120.9	797.9	671.1	126.8	0.9830	1.0000	0.9536	104.9%
4th NO2 (0)	792.0	----	1.5	793.5	792.0	1.5	0.9884	1.0000	N/A	----
Average Correction Factor							0.9880	1.0000	0.9844	101.6%

Calibration Performed By:

Asad Hidayat



# Wood Buffalo Environmental Association

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

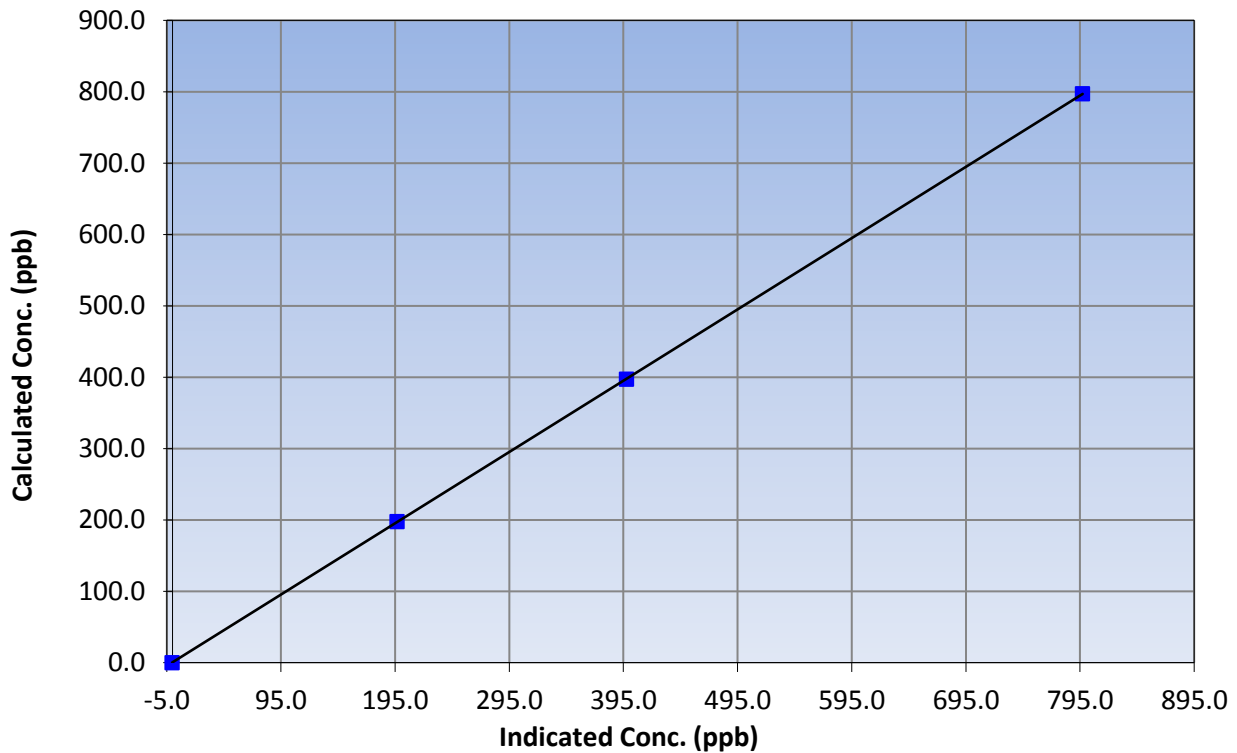
### Station Information

Calibration Date	September 18, 2015	Previous Calibration	August 25, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:00	End Time (MST)	14:00
Analyzer make	Thermo 42i	Analyzer serial #	710321429

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999998
797.1	797.3	0.9997		
397.1	397.6	0.9986	Slope	0.998924
197.6	196.7	1.0046		
			Intercept	0.495365

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

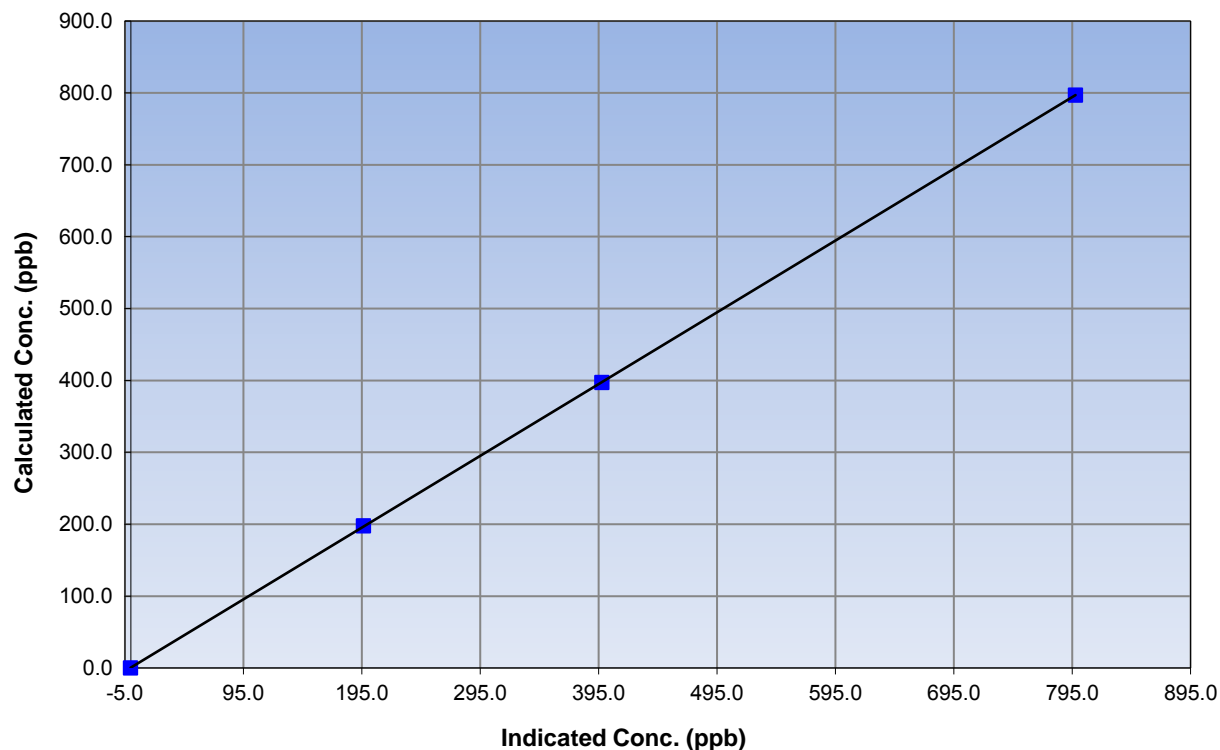
### Station Information

Calibration Date	September 18, 2015	Previous Calibration	August 25, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:00	End Time (MST)	14:00
Analyzer make	Thermo 42i	Analyzer serial #	710321429

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999997
797.1	797.9	0.9990		
397.1	397.7	0.9984	Slope	0.998246
197.6	196.5	1.0052		
			Intercept	0.568917

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

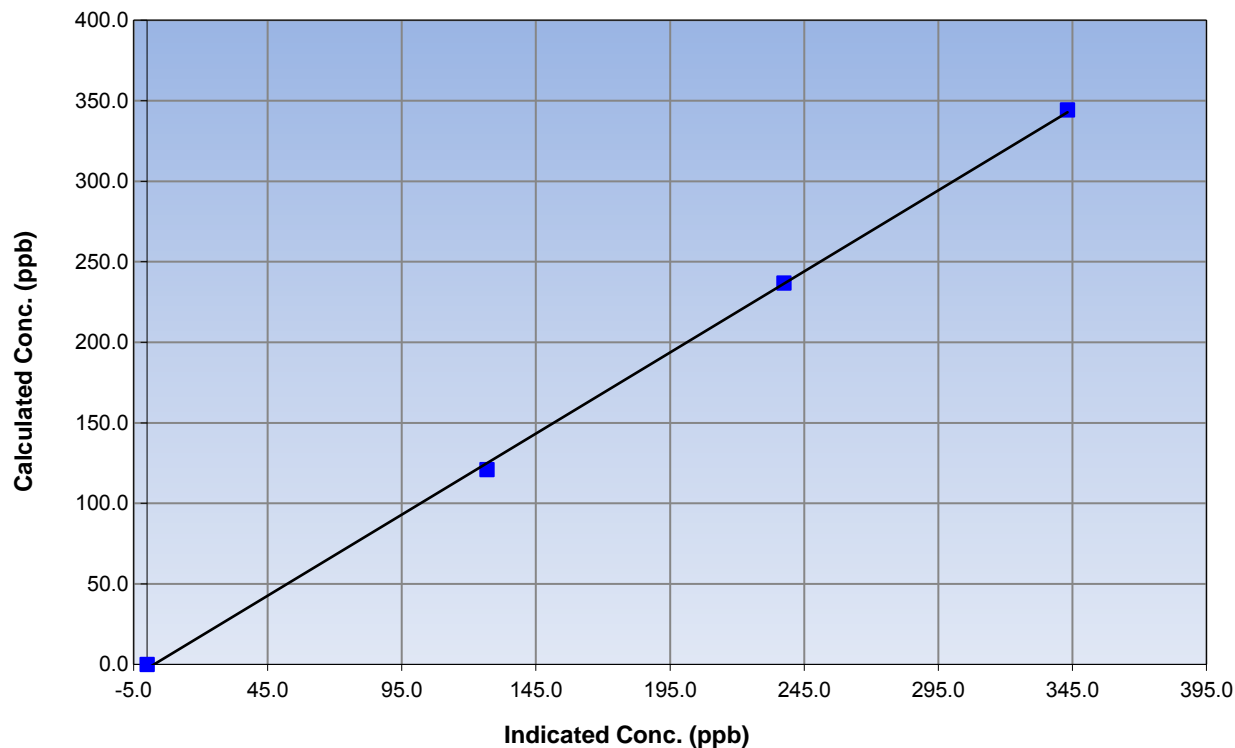
### Station Information

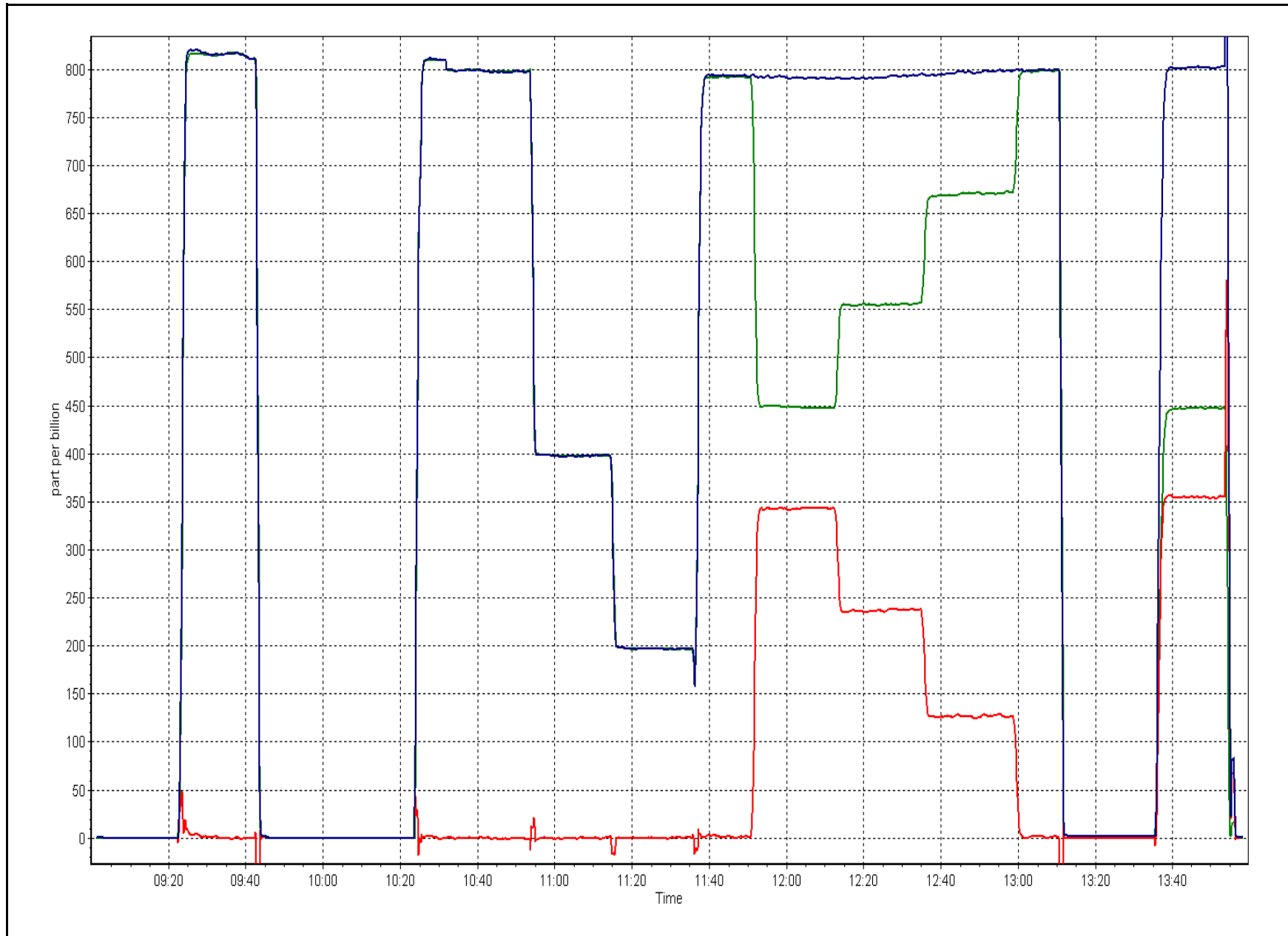
Calibration Date	September 18, 2015	Previous Calibration	August 25, 2015
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:00	End Time (MST)	14:00
Analyzer make	Thermo 42i	Analyzer serial #	710321429

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999620
344.2	343.2	1.0029		
236.7	237.5	0.9966	Slope	1.006544
120.9	126.8	0.9536		
			Intercept	-2.605182

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







## Wood Buffalo Environmental Association

### SHARP CALIBRATION

#### STATION INFORMATION

Calibration Date:	<u>September 18, 2015</u>	Previous Calibration:	<u>August 26, 2015</u>
Station Name:	<u>CNRL Horizon</u>	Station Number:	<u>AMS 15</u>
Start Time (MST):	<u>12:00</u>	End Time (MST):	<u>13:15</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>1451</u>

#### SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number:	<u>E-2020</u>
C <sub>14</sub> Source SN:	<u>7409</u>
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Parameters Checked:	<input checked="" type="checkbox"/> T1 <input checked="" type="checkbox"/> T2 <input checked="" type="checkbox"/> T3 <input checked="" type="checkbox"/> T4 <input checked="" type="checkbox"/> P3            Main Flow <input checked="" type="checkbox"/> Beta <input checked="" type="checkbox"/> Neph <input checked="" type="checkbox"/>

#### CALIBRATION DATA

##### Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	17.0	17.2	0.2	17.0
T2	26.0	na	na	26.0
T3	25.0	na	na	24.0
T4	23.2	na	na	23.2
RH (%)	28.0	na	na	28.0

##### Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	964	965.3	1.3	964

##### Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1003	3	1003	1000

##### Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	166		166
Neph	0.2		0.2
C14	60.1		60.1
Indicated Concentration (ug/m3)	0.1	no	0.1
Offset 1			
Offset 2			

#### Leak Check (Quarterly)

Leak Check Date:	<u>August 26, 2015</u>	Previous Leak Check Date:	<u>May 14, 2015</u>
------------------	------------------------	---------------------------	---------------------

	<b>Measured</b>		<b>Difference LPM (Limit +/- 0.42 LPM)</b>
Flow without adaptor (LPM):	16.72		
*Flow with adaptor (LPM):	16.68		0.04

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

#### Mass Foil Calibration (Annually)

Foil Calibration Date:	<u>June 22, 2015</u>	Previous Foil Calibration:	NA
Zeroed?:	<u>Yes</u>		
Foil Mass:	<u>1507</u>		
Previous Correction Factor:	<u>7091</u>	<b>Mass foil set S/N:</b>	2022
New Correction Factor:	<u>7029</u>		

#### INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	18/09/2015
Pump	Good	09/06/2014
Filter Tape	Good	09/06/2014
Mass Foil Cal Set	Good	NA
HEPA filter	Good	09/06/2014

#### NOTES:

No adjustments. Cleaned cyclone head.

<b>Calibration Performed By:</b>	<b>Asad Hidayat</b>
----------------------------------	---------------------



This page intentionally left blank





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 16**  
**SHELL MUSKEG RIVER**  
**SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
 SEPTEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	681	39	39	100.00	18	0	3	0
THC (ppm) Average	670	37	50	98.19	4.4	-	2.5	-
NO2 (ppb) Average	681	39	39	100.00	29	0	11	-
NO (ppb) Average	681	39	39	100.00	100	-	29	-
NOX (ppb) Average	681	39	39	100.00	121	-	36	-
PM2.5 (ug/m3) Average	719	1	1	100.00	25.1	-	8	0
Temperature 2 m (C) Average	720	0	0	100.00	23.9	-	14.9	-
Relative Humidity (%) Average	720	0	0	100.00	100	-	91	-
Barometric Pressure (inHg) Average	720	0	0	100.00	29.1	-	29.1	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	35	-	19	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
 SEPTEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	681	0.9	2	-	0	0	0	0	1	2	18
THC (ppm) Average	670	2.3	0.3	-	1.9	2	2.1	2.2	2.4	2.6	4.4
NO2 (ppb) Average	681	5.9	5	-	0	1	2	5	9	13	29
NO (ppb) Average	681	6.2	12	-	0	0	0	1	7	18	100
NOX (ppb) Average	681	12	16	-	0	1	2	6	17	30	121
PM2.5 (ug/m3) Average	719	5.35	3.1	-	0.8	2.1	3.2	4.9	6.6	8.8	25.1
Temperature 2 m (C) Average	720	8.94	5.3	-	-3.6	2.2	4.9	8.7	12.7	15.8	23.9
Relative Humidity (%) Average	720	74.4	19	-	32	47	57	78	92	97	100
Barometric Pressure (inHg) Average	720	28.77	0.2	-	28.2	28.5	28.7	28.8	28.9	29	29.1
Wind Speed 10 m (km/h) Average	720	9.7	6	-	0	4	6	8	12	18	35
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
SEPTEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	23 Sep 2015 11:00	23 Sep 2015 11:00	1	Maintenance - zero air supply interrupted
THC	24 Sep 2015 10:00	24 Sep 2015 18:00	9	Maintenance - re-calibration due to analyzer drift
THC	29 Sep 2015 08:00	29 Sep 2015 10:00	3	Maintenance - replaced fuel cylinder

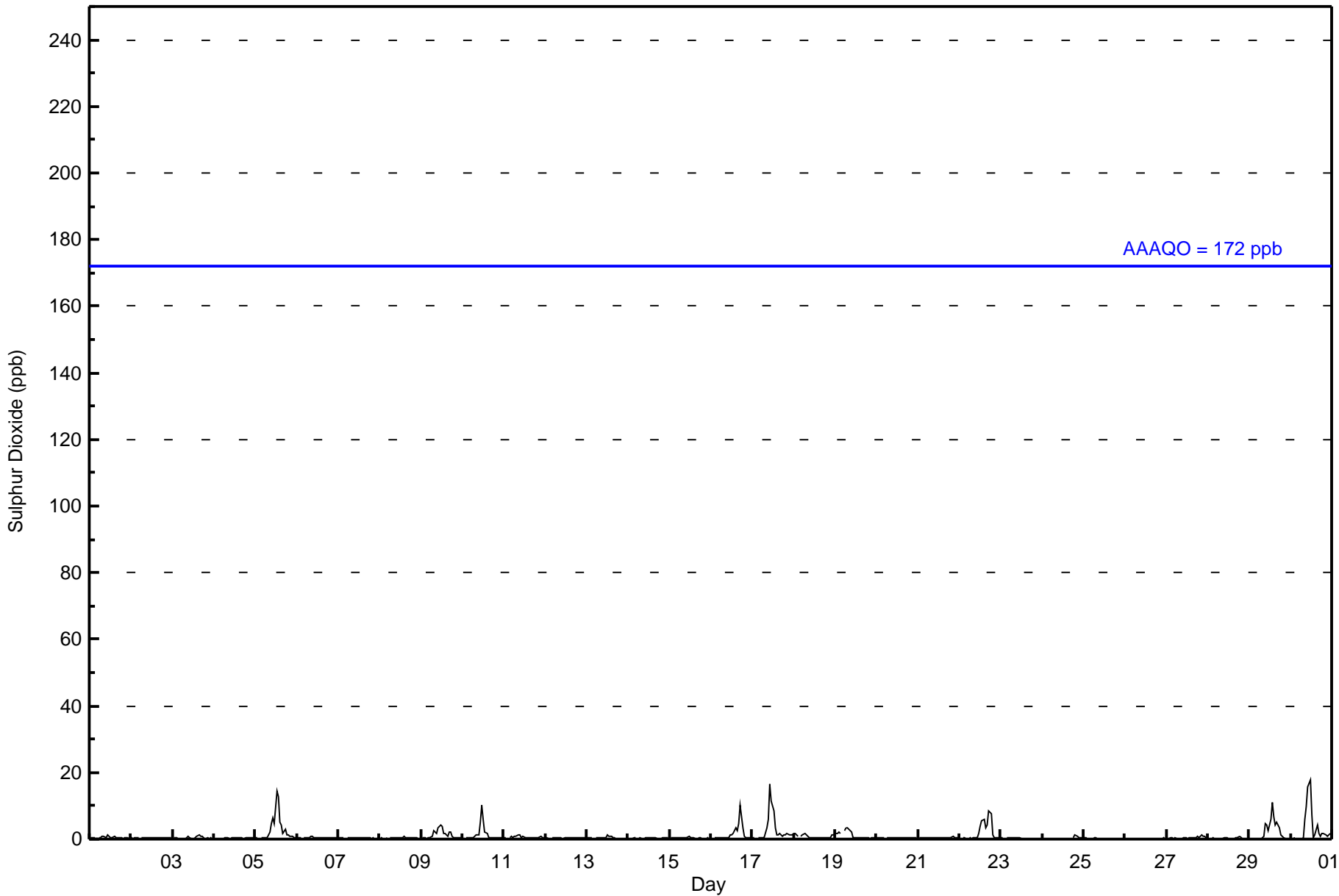


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 18 ppb on Sep 30 12:00	Maximum Daily Average: 3.2 ppb on Sep 30		Hours of Data:	681
Minimum Value: 0 ppb on Sep 25 14:00	Minimum Daily Average: 0.1 ppb on Sep 25		Hours of Missing Data:	39
Maximum Diurnal Average: 2.1 ppb at hour 12	Minimum Diurnal Average: 0.3 ppb at hour 5		Hours of Calibration:	39
Monthly Average: 0.9 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 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-Sep	0	0	0	1	Z	0	0	1	1	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0.5	1
2-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
3-Sep	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0.4	1
4-Sep	0	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-Sep	0	0	Z	0	0	0	0	1	2	5	7	5	15	13	5	4	2	3	1	1	1	1	1	0	2.9	15
6-Sep	1	1	1	Z	0	0	0	0	1	1	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0.4	1
7-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.3	1
8-Sep	0	0	0	0	0	Z	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0.3	1
9-Sep	Z	0	0	0	0	0	1	3	2	2	3	4	4	2	1	1	2	2	1	0	0	0	0	0	1.3	4
10-Sep	0	Z	0	0	0	0	0	1	1	1	5	10	6	2	2	0	0	0	0	0	0	1	0	0	1.5	10
11-Sep	1	0	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0.6	1
12-Sep	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
13-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
14-Sep	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
15-Sep	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Sep	0	Z	0	0	0	1	0	0	0	0	0	1	1	2	3	2	5	10	4	1	0	0	0	0	1.5	10
17-Sep	0	0	Z	0	1	0	0	0	3	6	17	11	8	3	1	1	2	1	1	1	2	1	1	1	2.8	17
18-Sep	2	2	1	Z	1	1	2	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0.7	2
19-Sep	2	2	2	2	Z	3	3	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	3
20-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
21-Sep	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0.4	1
22-Sep	0	Z	0	0	0	0	0	0	0	0	2	4	5	6	3	4	9	7	1	0	0	0	0	0	2.0	9
23-Sep	0	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-Sep	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	C	C	C	0	1	1	0	0	0	--	1
25-Sep	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
26-Sep	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
27-Sep	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	1	0	0.4	1
28-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.2	1
29-Sep	0	0	Z	0	0	0	0	0	1	5	4	2	6	11	7	4	5	3	1	1	0	0	0	0	2.2	11
30-Sep	0	0	0	Z	0	0	0	0	6	10	16	18	7	0	1	4	2	1	2	2	1	1	1	2	3.2	18

0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.5	0.9	1.3	2.1	2.1	2.0	1.5	1.2	1.0	1.0	1.2	0.8	0.5	0.4	0.4	0.4	0.4	0.4	Diurnal Average
2	2	2	2	1	3	3	3	6	10	17	18	15	13	7	4	5	10	7	2	2	1	1	2	2	Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Shell Muskeg River - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	674	98.97	98.97
11 - 20	7	1.03	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: 681

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Shell Muskeg River - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	35	27	22	21	18	12	26	35	174	88	62	40	20	37	33	24	674
11 - 20	0	0	0	0	0	0	0	0	3	4	0	0	0	0	0	0	7
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	35	27	22	21	18	12	26	35	177	92	62	40	20	37	33	24	681

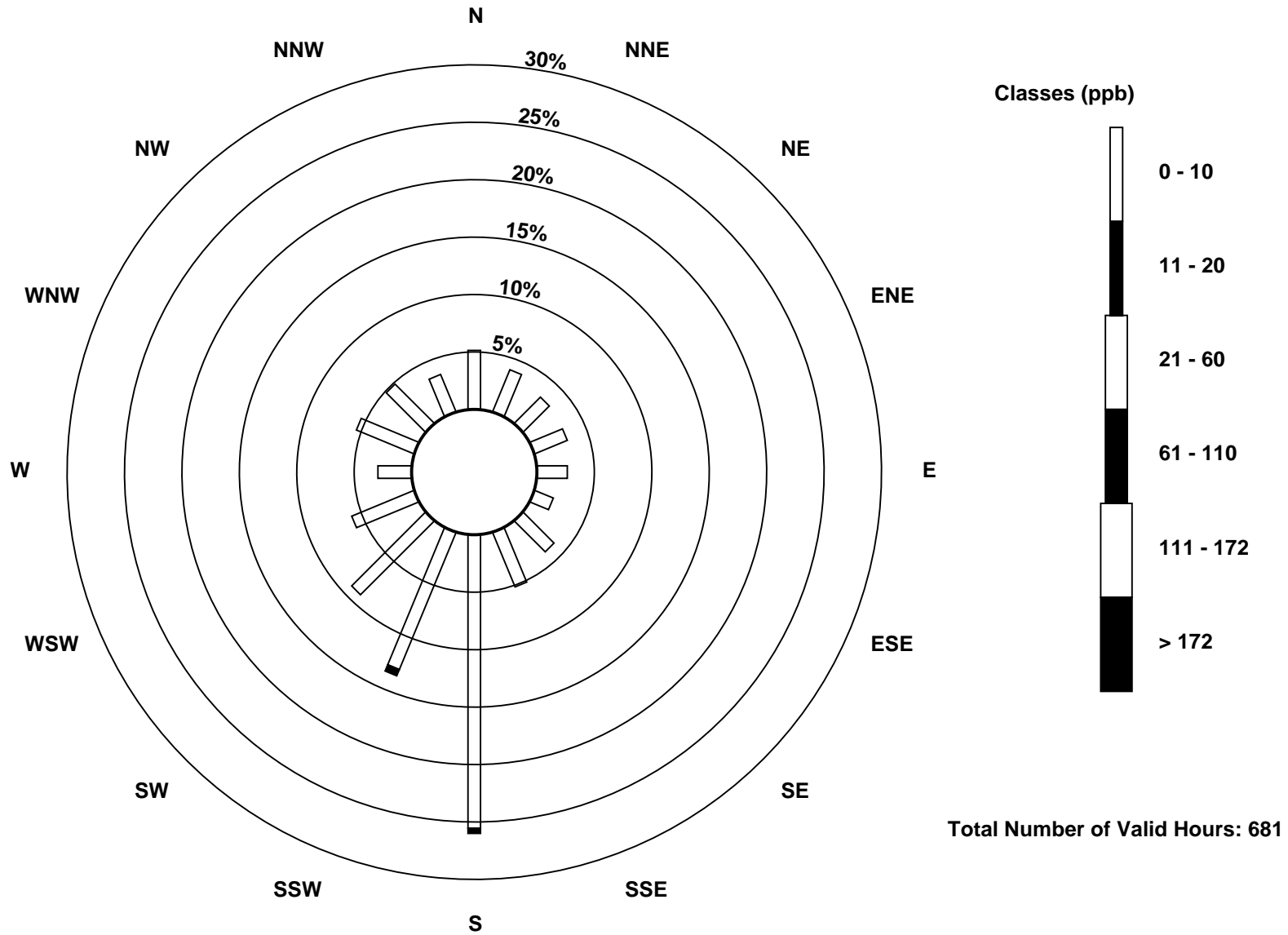
Total Number of Valid Hours: 681

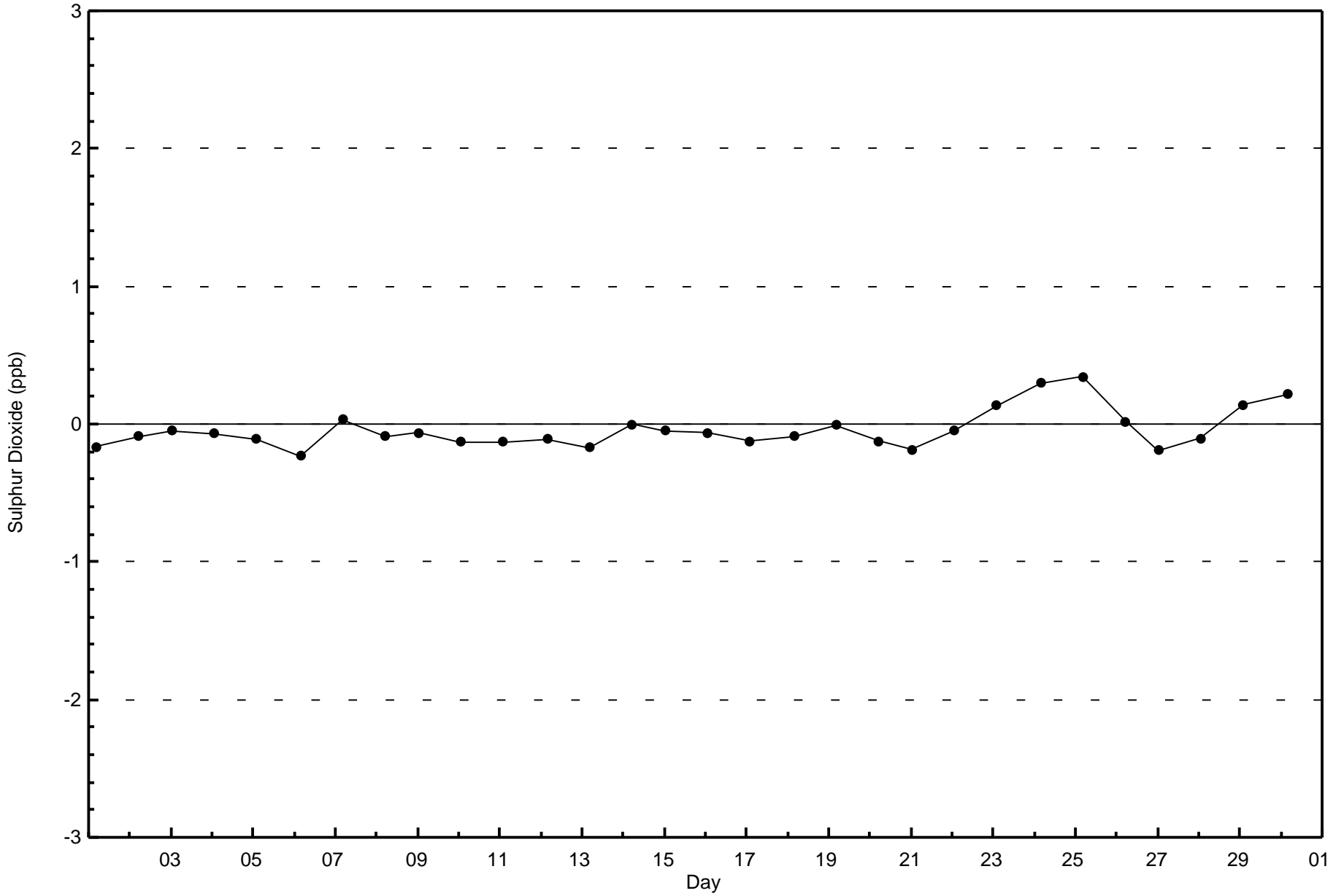
Total Number of Hours: 720

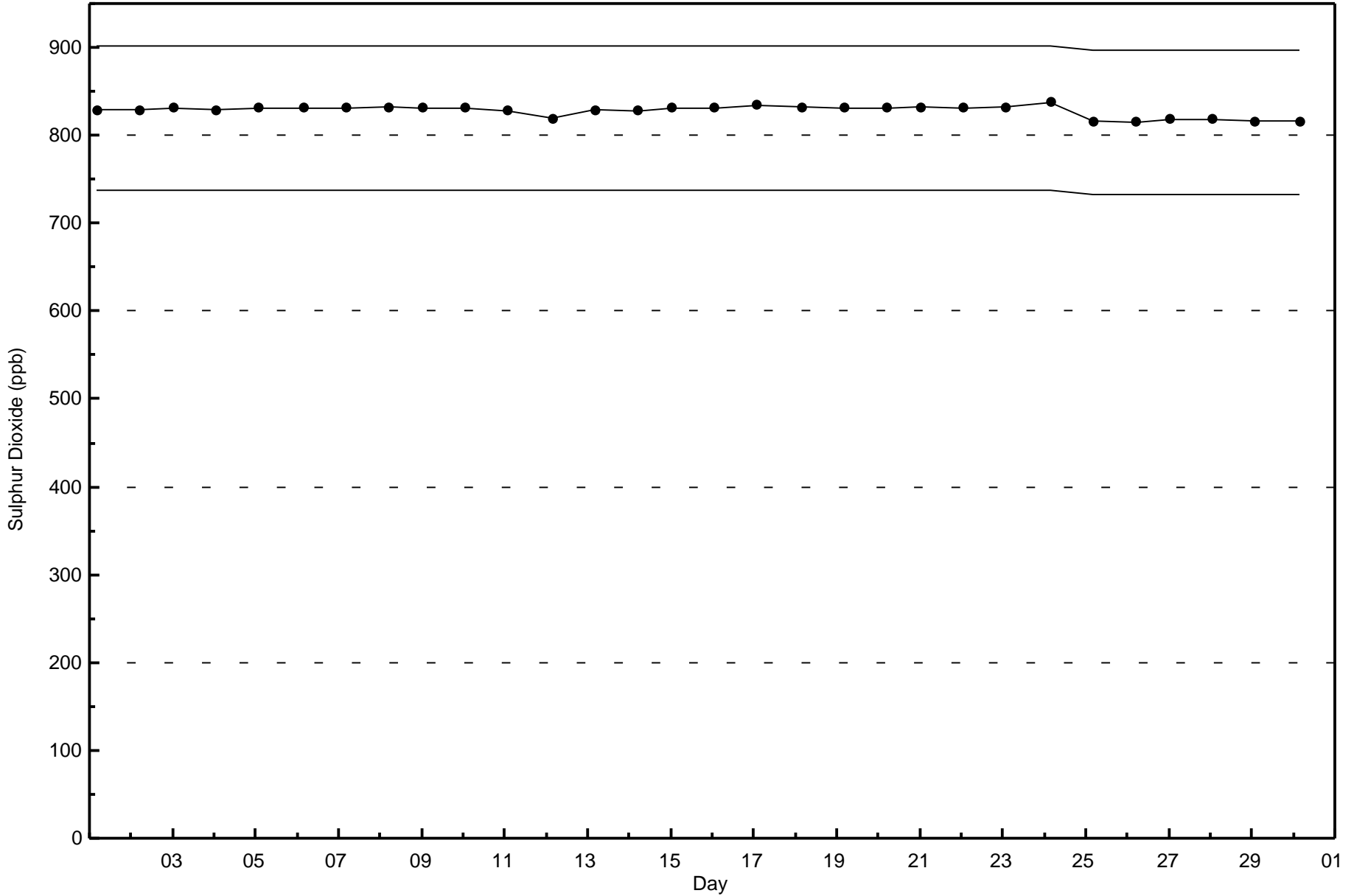


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Shell Muskeg River (AMS 16)









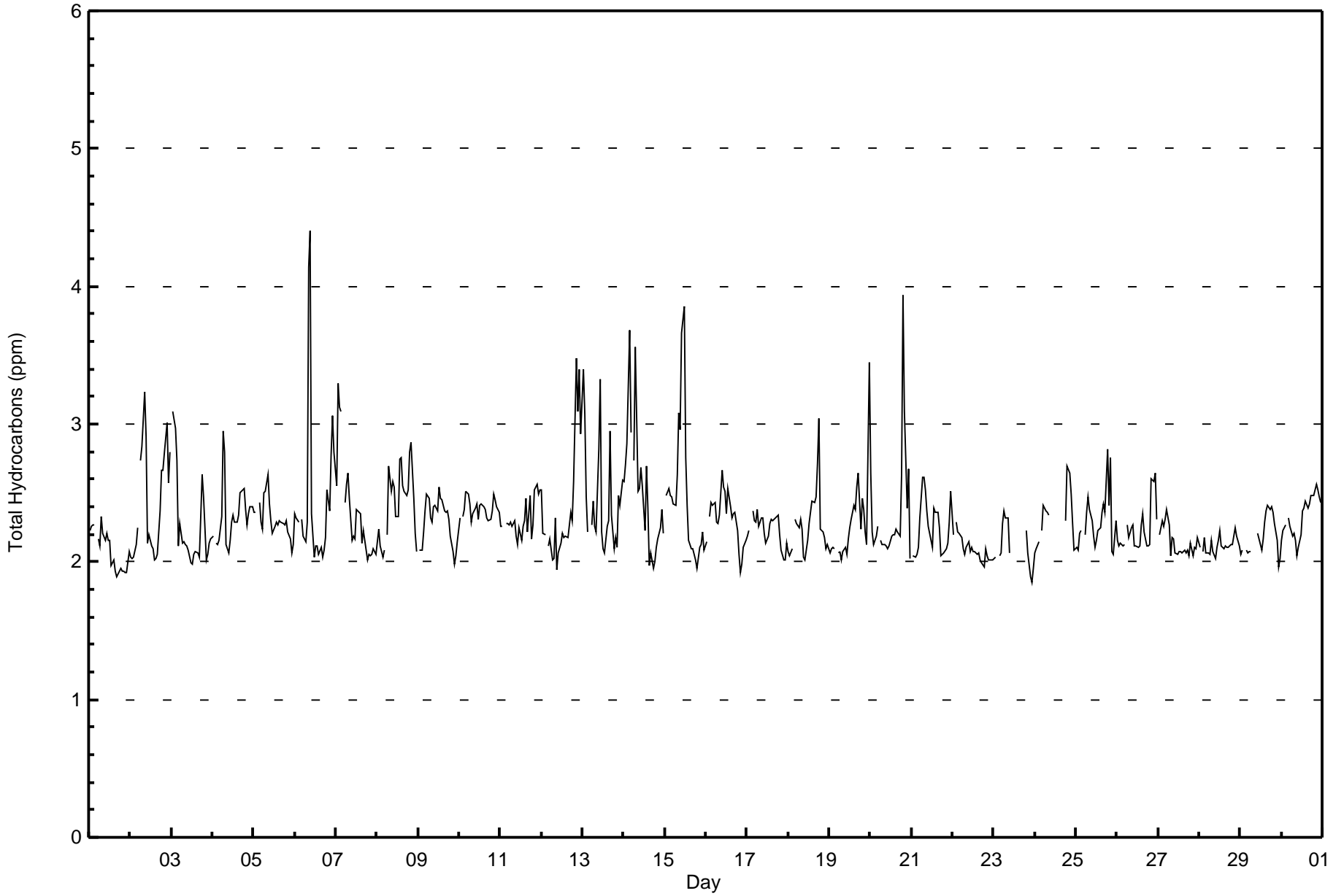
# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Total Hydrocarbons (THC) - ppm

## Shell Muskeg River - September 2015

Maximum Value: 4.4 ppm on Sep 6 10:00															Maximum Daily Average: 2.5 ppm on Sep 14										Hours in Service: 720				
Minimum Value: 1.9 ppm on Sep 23 23:00															Minimum Daily Average: 2.1 ppm on Sep 1										Hours of Data: 670				
Maximum Diurnal Average: 2.4 ppm at hour 9															Minimum Diurnal Average: 2.2 ppm at hour 13										Hours of Missing Data: 50				
Monthly Average: 2.30 ppm															Percentiles: $P_1 = 1.9$ $P_{10} = 2.0$ $Q_1 = 2.1$ Median = 2.2 $Q_3 = 2.4$ $P_{90} = 2.6$ $P_{99} = 3.5$										Hours of Calibration: 37				
																									Percent Operational Time: 98.2				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Sep	2.2	2.3	2.3	2.3	Z	2.2	2.1	2.3	2.2	2.2	2.2	2.2	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.3				
2-Sep	2.0	2.0	2.0	2.1	2.3	Z	2.7	2.8	3.2	2.9	2.1	2.2	2.1	2.1	2.0	2.0	2.1	2.4	2.7	2.7	2.8	3.0	2.6	2.8	2.4	3.2			
3-Sep	Z	3.1	3.0	2.7	2.1	2.3	2.1	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.3	2.6	2.5	2.0	2.1	2.1	2.2	2.3	3.1				
4-Sep	2.2	Z	2.1	2.1	2.2	2.3	3.0	2.8	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.5	2.5	2.5	2.4	2.3	2.3	2.4	2.4	2.3	3.0				
5-Sep	2.4	2.4	Z	2.4	2.3	2.2	2.5	2.5	2.6	2.4	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.3	2.6				
6-Sep	2.3	2.3	2.3	Z	2.3	2.2	2.1	2.3	4.1	4.4	2.4	2.0	2.1	2.1	2.1	2.0	2.1	2.2	2.5	2.4	2.8	3.1	2.8	2.5	4.4				
7-Sep	2.6	3.3	3.1	3.1	Z	2.4	2.6	2.6	2.5	2.2	2.2	2.2	2.4	2.4	2.3	2.1	2.2	2.2	2.0	2.1	2.0	2.1	2.1	2.4	3.3				
8-Sep	2.1	2.2	2.1	2.0	2.1	Z	2.2	2.7	2.5	2.6	2.5	2.3	2.3	2.7	2.8	2.6	2.5	2.5	2.5	2.8	2.9	2.5	2.2	2.1	2.9				
9-Sep	Z	2.1	2.1	2.2	2.4	2.5	2.5	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.5	2.4	2.4	2.4	2.3	2.2	2.1	2.0	2.0	2.1	2.5				
10-Sep	2.3	Z	2.3	2.4	2.5	2.5	2.4	2.3	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.5	2.5	2.4	2.4	2.5				
11-Sep	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.2	2.2	2.3	2.3	2.5	2.2	2.5	2.2	2.3	2.5	2.6	2.5	2.5	2.6				
12-Sep	2.5	2.2	2.2	Z	2.1	2.2	2.0	2.0	2.3	1.9	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.6	3.5	3.1	3.4	2.9	3.5				
13-Sep	3.4	3.1	2.5	2.2	Z	2.3	2.4	2.3	2.2	2.8	3.3	2.2	2.1	2.1	2.3	2.3	2.9	2.3	2.1	2.2	2.1	2.5	2.4	2.6	3.4				
14-Sep	2.6	2.7	2.9	3.7	2.9	Z	2.7	3.6	2.5	2.5	2.7	2.6	2.2	2.7	2.4	2.0	2.1	2.0	2.0	2.1	2.2	2.2	2.4	2.2	3.7				
15-Sep	Z	2.5	2.5	2.5	2.5	2.4	2.4	2.6	3.1	3.0	3.7	3.9	2.8	2.4	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.1	3.9				
16-Sep	2.1	Z	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.7	2.5	2.5	2.3	2.5	2.4	2.3	2.3	2.4	2.2	2.1	1.9	2.0	2.1	2.2	2.7				
17-Sep	2.2	2.2	Z	2.4	2.3	2.3	2.4	2.3	2.3	2.3	2.2	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.0	2.0	2.1	2.1	2.4				
18-Sep	2.1	2.0	2.1	Z	2.3	2.3	2.2	2.3	2.2	2.0	2.0	2.2	2.3	2.4	2.4	2.4	2.5	2.7	3.0	2.2	2.2	2.2	2.1	2.1	3.0				
19-Sep	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.0	2.1	2.1	2.0	2.2	2.2	2.3	2.4	2.4	2.5	2.6	2.2	2.5	2.4	2.2	2.1	3.5	3.5				
20-Sep	2.6	2.2	2.1	2.2	2.3	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.6	3.9	3.1	2.4	2.7	2.0	3.9				
21-Sep	Z	2.0	2.0	2.1	2.1	2.3	2.6	2.6	2.5	2.4	2.3	2.2	2.1	2.4	2.4	2.4	2.2	2.0	2.1	2.1	2.1	2.1	2.3	2.5	2.6				
22-Sep	2.2	Z	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.3				
23-Sep	2.0	2.0	Z	2.0	2.1	2.3	2.4	2.3	2.3	2.1	M	M	C	C	C	C	C	C	C	2.2	2.1	1.9	1.9	2.0	2.4				
24-Sep	2.1	2.1	2.1	Z	2.2	2.4	2.4	2.4	2.3	M	M	M	M	M	M	M	M	M	M	2.3	2.7	2.6	2.5	2.3	2.7				
25-Sep	2.1	2.1	2.2	2.2	Z	2.2	2.4	2.5	2.4	2.3	2.2	2.1	2.2	2.2	2.4	2.4	2.4	2.4	2.8	2.4	2.8	2.1	2.1	2.3	2.8				
26-Sep	2.2	2.1	2.1	2.1	2.1	Z	2.3	2.2	2.2	2.3	2.1	2.1	2.1	2.1	2.3	2.4	2.2	2.1	2.1	2.1	2.6	2.6	2.6	2.3	2.6				
27-Sep	Z	2.2	2.3	2.3	2.3	2.4	2.3	2.0	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.2	2.4				
28-Sep	2.1	Z	2.1	2.2	2.1	2.1	2.1	2.2	2.1	2.0	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	2.1	2.2				
29-Sep	2.1	2.1	Z	2.1	2.1	2.1	2.1	M	M	M	2.2	2.2	2.1	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.2	2.0	2.0	2.4				
30-Sep	2.2	2.2	2.3	Z	2.3	2.3	2.2	2.2	2.2	2.0	2.1	2.2	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.6	2.5	2.5	2.4	2.6				
															Diurnal Average														
															Diurnal Maximum														
Z - zerspan															C - Calibration					M - Maintenance									





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Shell Muskeg River - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	69	10.30	10.30
2.1 - 3.0	579	86.42	96.72
3.1 - 10.0	22	3.28	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 670

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Shell Muskeg River - September 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	4	3	2	0	2	7	20	11	3	3	4	6	4	0	69
2.1 - 3.0	28	24	17	17	16	11	18	27	156	79	59	36	16	31	26	18	579
3.1 - 10.0	7	3	1	1	0	0	0	0	0	0	0	1	0	0	3	6	22
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	35	27	22	21	18	11	20	34	176	90	62	40	20	37	33	24	670

Total Number of Valid Hours: 670

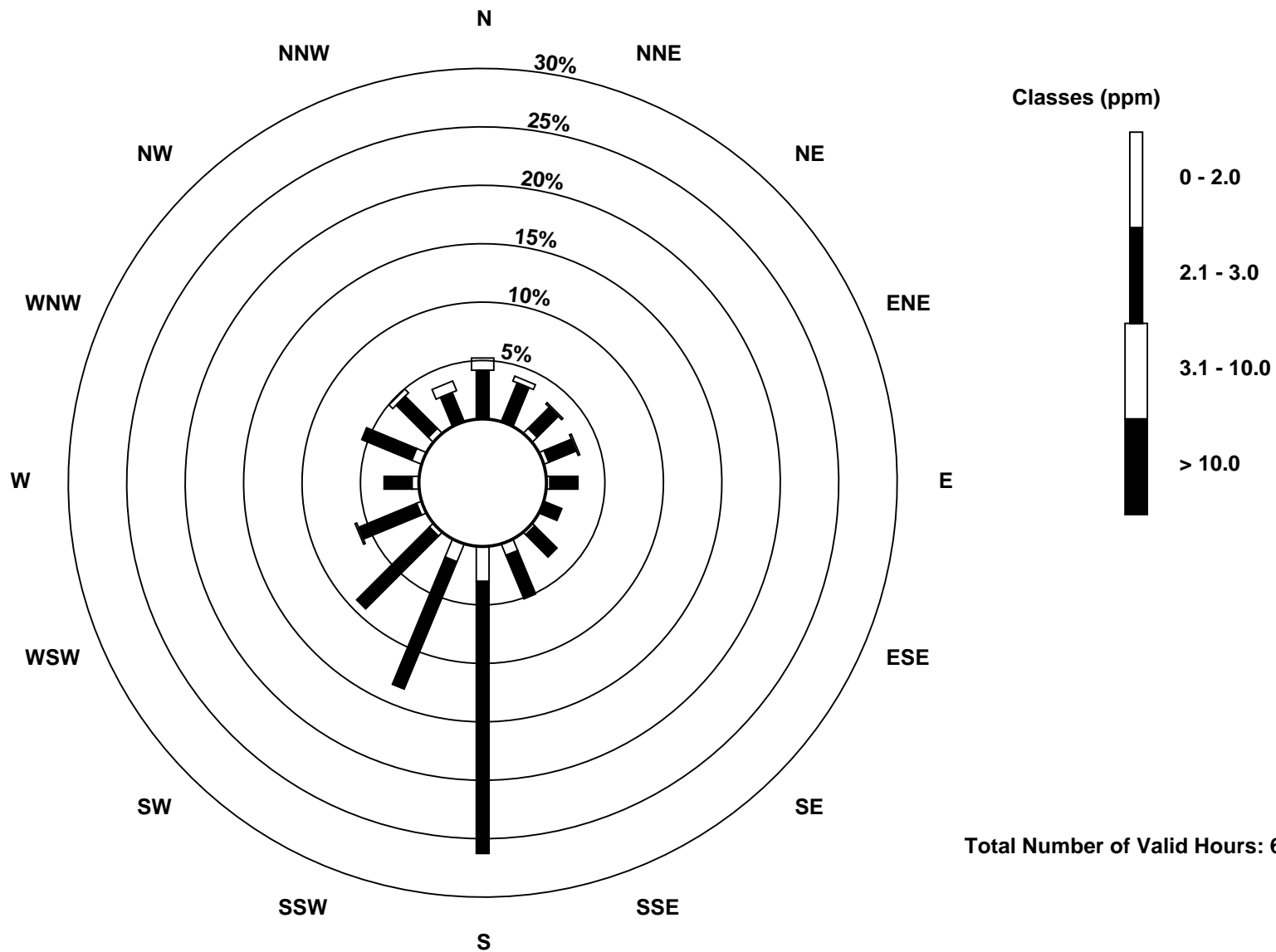
Total Number of Hours: 720

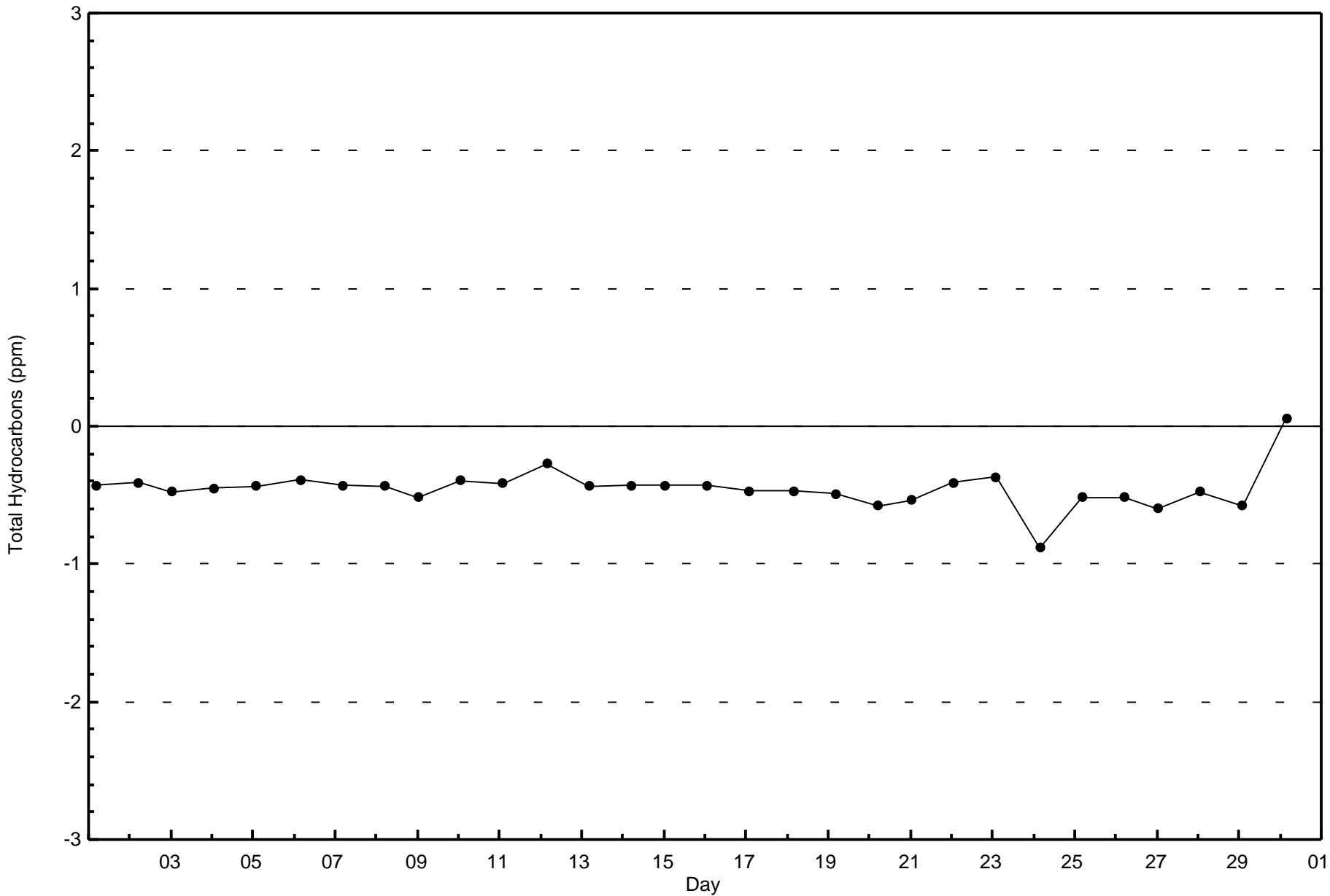


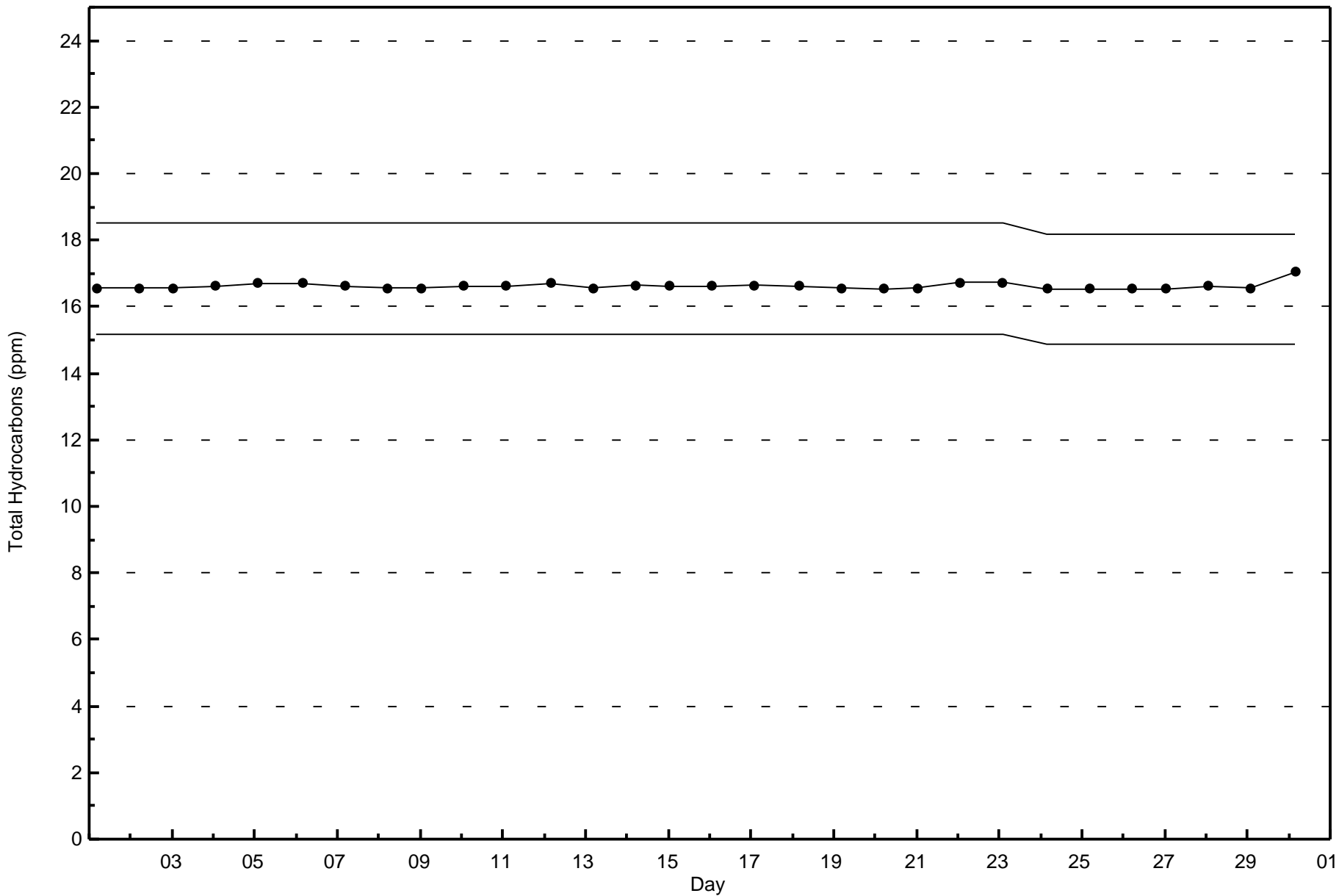


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Total Hydrocarbons (THC) - ppm  
Shell Muskeg River (AMS 16)

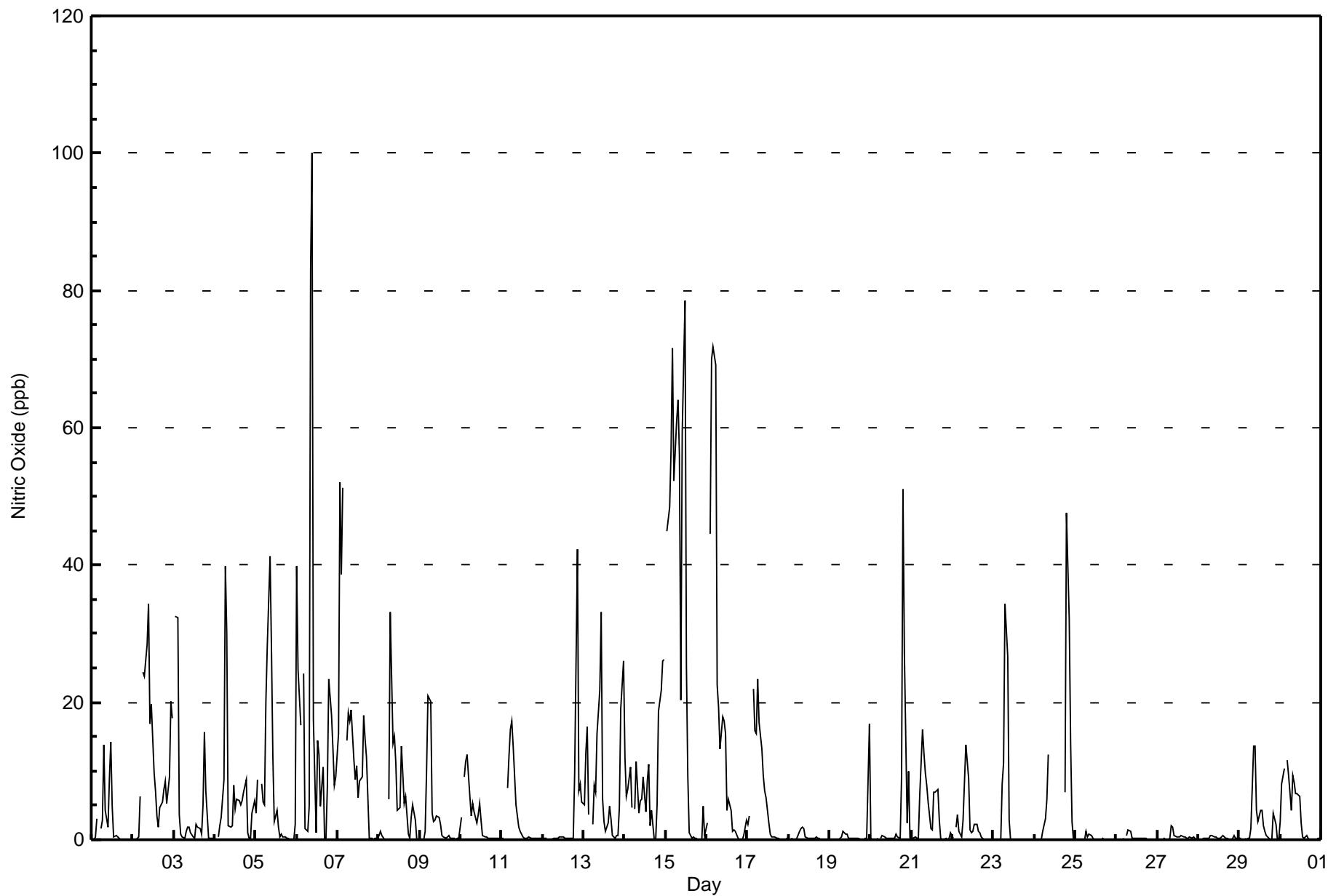








Maximum Value: 100 ppb on Sep 6 10:00		Maximum Daily Average: 28.5 ppb on Sep 15		Hours in Service: 720																							
Minimum Value: 0 ppb on Sep 23 23:00		Minimum Daily Average: 0.2 ppb on Sep 25		Hours of Data: 681																							
Maximum Diurnal Average: 13.3 ppb at hour 9		Minimum Diurnal Average: 1.2 ppb at hour 18		Hours of Missing Data: 39																							
Monthly Average: 6.2 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 7 P <sub>90</sub> = 18 P <sub>99</sub> = 69		Hours of Calibration: 39																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	0	0	0	3	Z	2	3	14	4	2	9	14	5	0	1	0	0	0	0	0	0	0	0	0	2.5	14	
2-Sep	0	0	0	0	6	Z	24	24	29	34	17	20	10	7	3	2	5	5	7	9	5	9	20	18	11.1	34	
3-Sep	Z	32	32	4	1	0	0	1	2	2	1	0	0	2	2	2	1	5	16	7	0	0	0	0	4.8	32	
4-Sep	0	Z	0	2	3	9	40	30	2	2	8	5	6	6	5	6	7	9	1	0	0	4	6	6.6	40		
5-Sep	4	9	Z	8	5	5	20	28	41	28	12	3	4	2	0	1	0	0	0	0	0	0	2	7.6	41		
6-Sep	40	25	17	Z	24	2	1	5	83	100	18	1	14	12	5	11	0	0	8	23	18	13	8	9	19.0	100	
7-Sep	15	52	39	51	Z	14	18	17	19	12	9	11	6	9	9	18	15	12	0	0	0	0	0	0	14.2	52	
8-Sep	1	1	1	0	0	Z	6	33	14	15	11	4	5	14	9	5	6	1	0	3	5	3	0	0	6.0	33	
9-Sep	Z	0	0	1	10	21	20	4	3	3	3	3	2	1	0	0	0	1	0	0	0	0	0	0	3.2	21	
10-Sep	3	Z	9	11	12	6	3	5	4	3	4	5	3	1	0	0	0	0	0	0	0	0	0	0	3.1	12	
11-Sep	0	0	Z	8	12	16	17	14	5	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	3.5	17	
12-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	42	7	8	5	3.3	42	
13-Sep	5	13	17	4	Z	2	8	7	15	22	33	6	3	1	2	5	3	1	0	1	1	5	19	26	8.6	33	
14-Sep	12	6	7	11	5	Z	4	11	4	6	6	9	4	9	11	2	4	0	0	5	19	22	26	26	9.1	26	
15-Sep	Z	45	48	57	72	52	61	64	56	20	59	79	25	9	1	0	0	0	0	0	0	0	5	1	28.5	79	
16-Sep	2	Z	44	70	72	69	23	19	13	18	17	15	4	6	4	1	1	1	0	0	0	0	1	3	16.8	72	
17-Sep	2	3	Z	22	16	15	23	17	13	9	7	6	2	1	0	0	0	0	0	0	0	0	0	0	6.1	23	
18-Sep	0	0	0	Z	0	0	1	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
19-Sep	0	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	17	1.0	17	
20-Sep	0	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	1	0	0	9	51	27	2	10	0	4.5	51	
21-Sep	Z	0	0	0	0	7	16	13	10	8	5	2	1	7	7	7	3	0	0	0	0	0	0	1	3.8	16	
22-Sep	0	Z	2	4	1	0	3	8	14	9	1	1	1	2	2	1	1	0	0	0	0	0	0	0	2.3	14	
23-Sep	0	0	Z	0	0	8	11	34	27	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.6	34	
24-Sep	0	0	0	Z	0	1	3	6	12	C	C	C	C	C	C	C	C	C	7	48	32	14	3	0	--	48	
25-Sep	0	0	0	0	Z	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
26-Sep	0	0	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
27-Sep	Z	0	0	0	0	0	0	0	2	2	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0.4	2	
28-Sep	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0.3	1	
29-Sep	0	0	Z	0	0	0	0	2	14	14	4	3	4	4	2	1	1	0	0	0	4	2	0	0	2.4	14	
30-Sep	3	8	10	Z	12	9	4	9	8	7	7	6	2	0	0	1	0	0	0	0	0	0	0	0	3.8	12	
		3.5	7.8	9.1	10.2	10.1	9.6	10.5	12.4	13.3	11.2	8.0	6.9	3.6	3.3	2.4	2.3	1.7	1.2	2.0	5.3	5.2	2.7	3.5	3.9	Diurnal Average	
		40	52	48	70	72	69	61	64	83	100	59	79	25	14	11	18	15	12	16	51	42	22	26	26	Diurnal Maximum	
Z - zerospan		C - Calibration																									





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Shell Muskeg River - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	628	92.22	92.22
21 - 40	31	4.55	96.77
41 - 80	20	2.94	99.71
81 - 159	2	0.29	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Shell Muskeg River - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	29	26	18	12	14	8	24	34	168	90	62	40	20	37	29	17	628
21 - 40	3	1	4	5	2	2	0	0	6	2	0	0	0	0	3	3	31
11 - 80	2	0	0	4	2	2	2	1	3	0	0	0	0	0	1	3	20
81 - 159	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	35	27	22	21	18	12	26	35	177	92	62	40	20	37	33	24	681

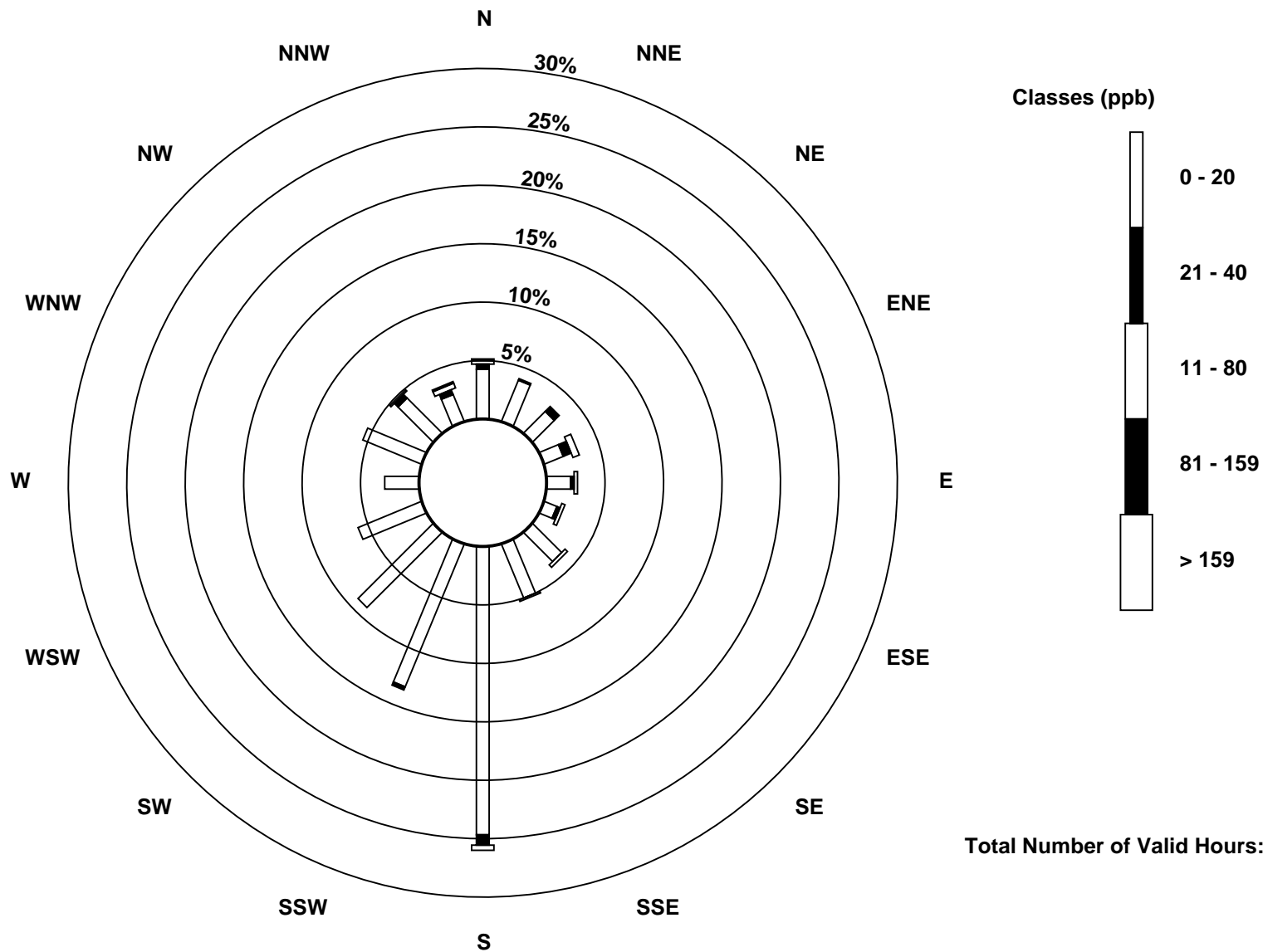
Total Number of Valid Hours: 681

Total Number of Hours: 720



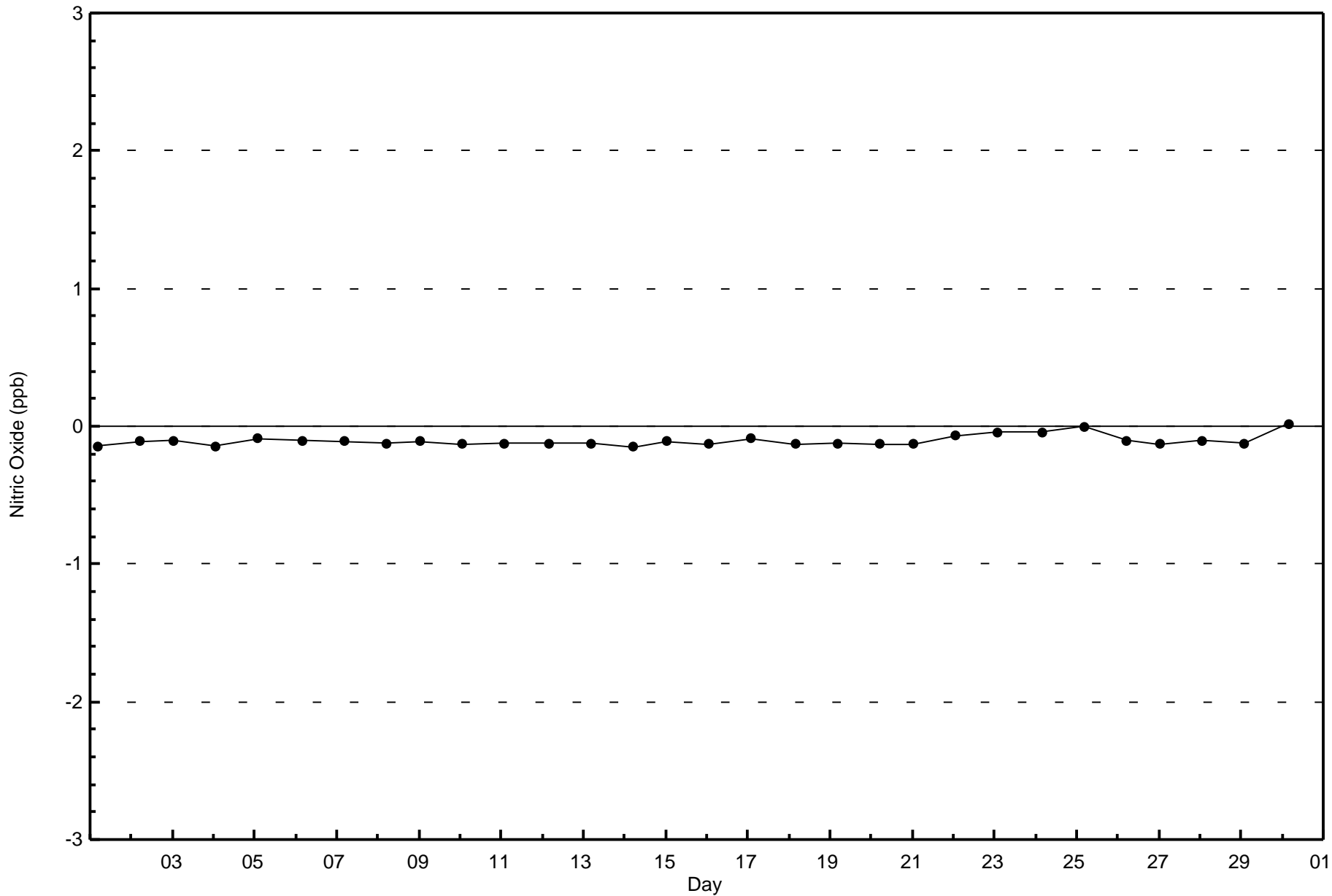
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

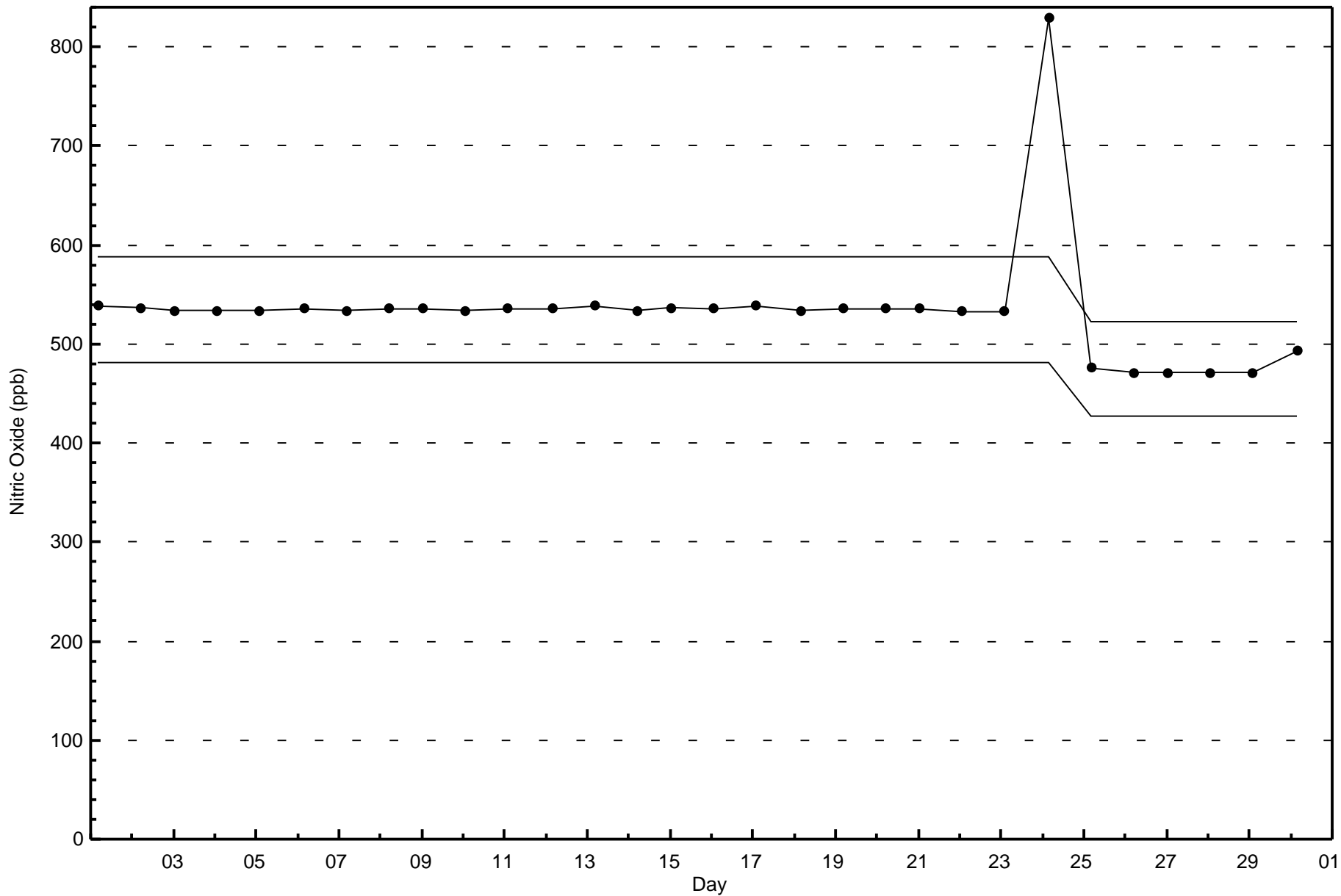
Nitric Oxide (NO) - ppb  
Shell Muskeg River (AMS 16)



Total Number of Valid Hours: 681







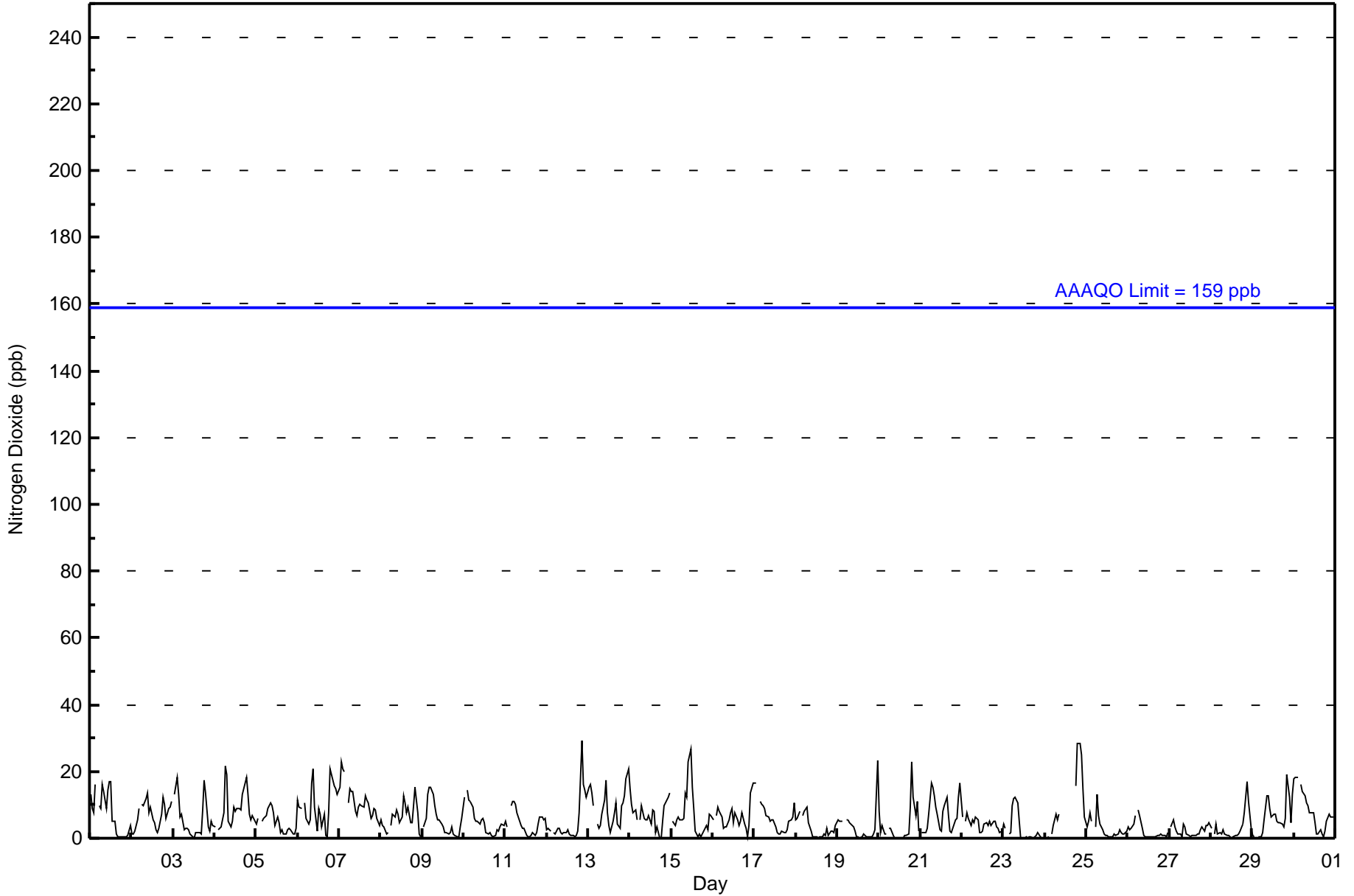


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 29 ppb on Sep 12 21:00	Maximum Daily Average: 11.3 ppb on Sep 7		Hours of Data:	681
Minimum Value: 0 ppb on Sep 14 18:00	Minimum Daily Average: 2.1 ppb on Sep 26		Hours of Missing Data:	39
Maximum Diurnal Average: 7.6 ppb at hour 7	Minimum Diurnal Average: 3.0 ppb at hour 18		Hours of Calibration:	39
Monthly Average: 5.9 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> = 13 P <sub>99</sub> = 23		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	13	9	8	16	Z	10	9	16	14	9	14	17	17	5	5	1	1	1	0	1	0	0	1	4	7.4	17
2-Sep	1	1	2	5	9	Z	10	10	12	14	8	10	6	5	2	2	3	7	12	10	6	9	9	11	7.1	14
3-Sep	Z	13	18	13	6	7	3	3	3	3	1	0	0	2	2	2	1	8	17	13	3	2	5	4	5.7	18
4-Sep	3	Z	2	3	3	8	22	19	5	4	5	9	8	9	9	13	15	18	13	7	6	7	5	8.7	22	
5-Sep	4	6	Z	5	6	6	7	9	11	10	8	4	7	5	2	3	1	1	2	3	2	1	1	3	4.6	11
6-Sep	11	10	9	Z	11	6	4	5	17	21	9	2	9	7	3	7	1	1	8	21	18	16	15	13	9.7	21
7-Sep	15	23	21	20	Z	11	15	14	14	8	7	9	10	10	9	13	11	11	6	7	9	8	6	4	11.3	23
8-Sep	6	4	3	1	2	Z	4	7	6	8	7	5	6	13	10	8	9	5	5	10	15	8	1	1	6.2	15
9-Sep	Z	3	6	13	15	15	13	10	7	6	5	4	4	2	2	1	2	3	1	1	0	1	4	6	5.4	15
10-Sep	12	Z	14	12	11	9	6	5	5	4	5	6	5	2	1	2	1	1	1	2	2	3	4	4	5.1	14
11-Sep	5	4	Z	10	11	11	10	8	5	4	3	3	1	1	1	1	2	1	2	4	7	7	6	6	4.7	11
12-Sep	3	3	2	Z	2	1	3	3	2	1	2	2	3	1	1	1	1	1	2	8	29	16	14	12	4.8	29
13-Sep	15	16	14	10	Z	4	3	4	7	12	18	8	4	2	5	8	11	4	3	10	11	13	18	21	9.5	21
14-Sep	15	10	8	9	6	Z	5	10	6	6	6	7	4	9	8	2	3	0	0	5	10	11	12	14	7.1	15
15-Sep	Z	5	4	5	6	6	5	6	14	12	23	27	15	9	2	1	1	0	1	2	4	3	7	7	7.2	27
16-Sep	5	Z	7	10	8	7	3	3	4	6	8	9	5	8	6	4	5	8	4	3	1	4	14	17	6.3	17
17-Sep	17	17	Z	11	10	10	9	7	6	5	6	6	4	2	1	1	2	2	2	3	5	5	7	11	6.3	17
18-Sep	6	6	8	Z	7	8	9	5	3	2	1	0	0	0	0	0	1	1	3	1	2	2	2	4	3.1	9
19-Sep	6	5	5	5	Z	5	6	5	4	4	2	0	0	0	0	1	1	1	0	0	0	1	3	23	3.4	23
20-Sep	8	2	4	1	1	Z	3	3	1	0	0	0	0	0	0	1	1	1	9	23	12	7	11	2	4.0	23
21-Sep	Z	2	2	2	3	7	17	15	13	10	7	3	2	8	10	12	7	2	2	3	6	6	12	16	7.2	17
22-Sep	6	Z	5	8	6	4	5	5	6	6	2	2	2	4	5	4	5	4	5	5	4	3	2	2	4.3	8
23-Sep	4	3	Z	1	2	10	12	12	11	5	0	0	0	0	0	0	0	0	1	1	2	0	0	0	2.8	12
24-Sep	0	0	1	Z	1	4	7	5	7	C	C	C	C	C	C	C	C	C	16	29	28	25	15	6	--	29
25-Sep	3	5	8	5	Z	4	13	7	4	3	1	1	1	0	0	1	1	1	1	2	2	1	1	2	3.0	13
26-Sep	4	3	3	4	7	Z	8	7	3	1	1	0	0	0	0	0	1	1	1	1	1	1	1	2	2.1	8
27-Sep	Z	4	6	4	2	1	1	0	4	3	1	1	1	1	1	1	1	1	2	3	2	4	4	5	2.3	6
28-Sep	3	Z	1	4	1	2	1	3	1	1	1	0	0	0	1	1	1	2	4	8	12	17	11	3	3.4	17
29-Sep	1	1	Z	1	1	1	2	6	13	13	9	7	7	7	5	5	5	4	4	6	19	12	5	13	6.2	19
30-Sep	18	18	18	Z	16	14	13	11	10	8	8	8	5	1	1	3	1	1	2	5	7	6	6	6	8.0	18

7.3	6.9	7.1	7.1	6.1	6.8	7.6	7.4	7.2	6.4	5.7	5.1	4.3	3.8	3.2	3.2	3.2	3.0	4.5	6.8	7.6	6.6	6.8	7.5	Diurnal Average	
18	23	21	20	16	15	22	19	17	21	23	27	17	13	10	13	13	15	18	29	29	25	18	23	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Shell Muskeg River - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	667	97.94	97.94
21 - 40	14	2.06	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Shell Muskeg River - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	31	26	22	19	18	12	26	34	177	92	62	39	20	37	32	20	667
21 - 40	4	1	0	2	0	0	0	1	0	0	0	1	0	0	1	4	14
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	35	27	22	21	18	12	26	35	177	92	62	40	20	37	33	24	681

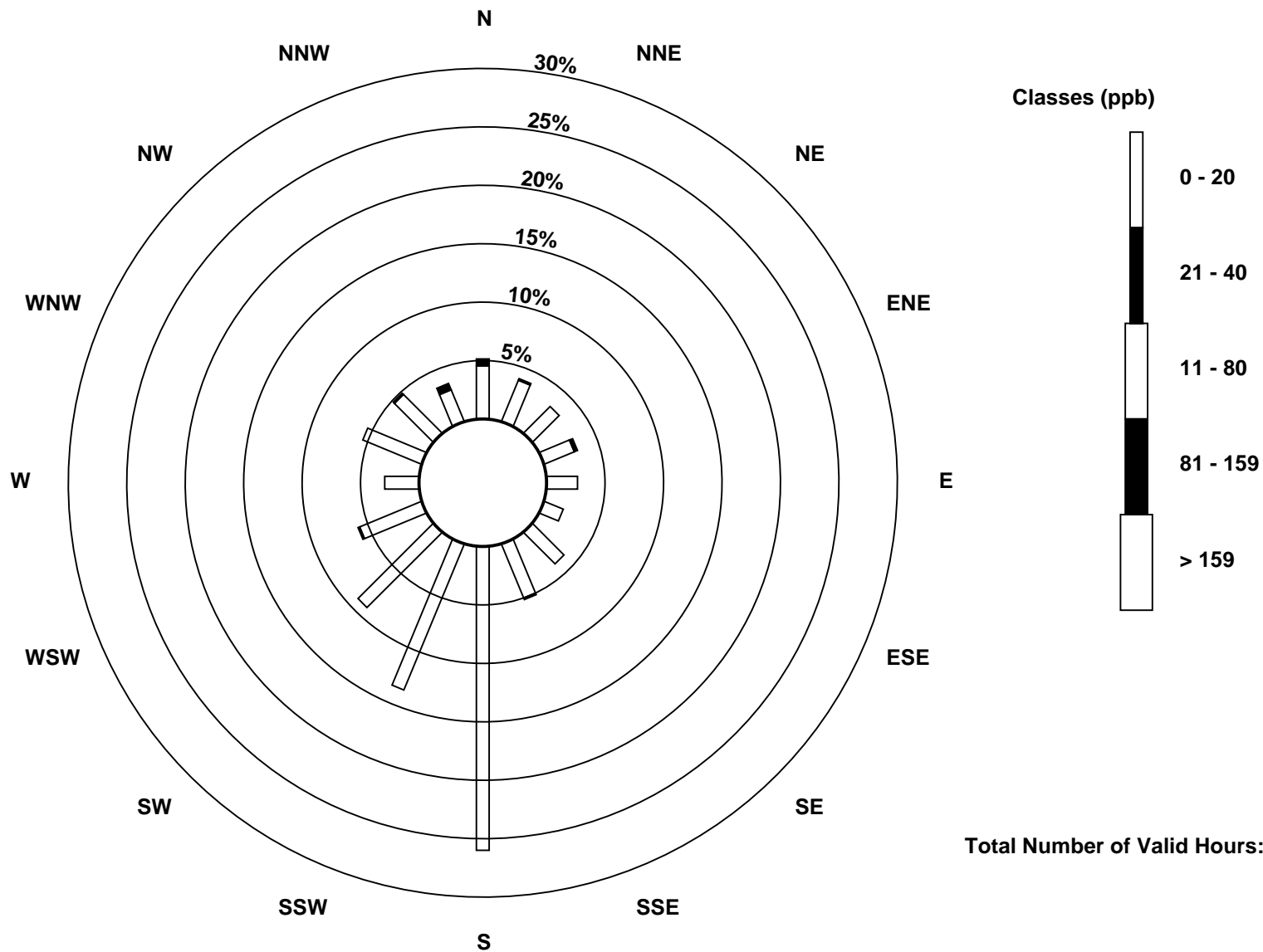
Total Number of Valid Hours: 681

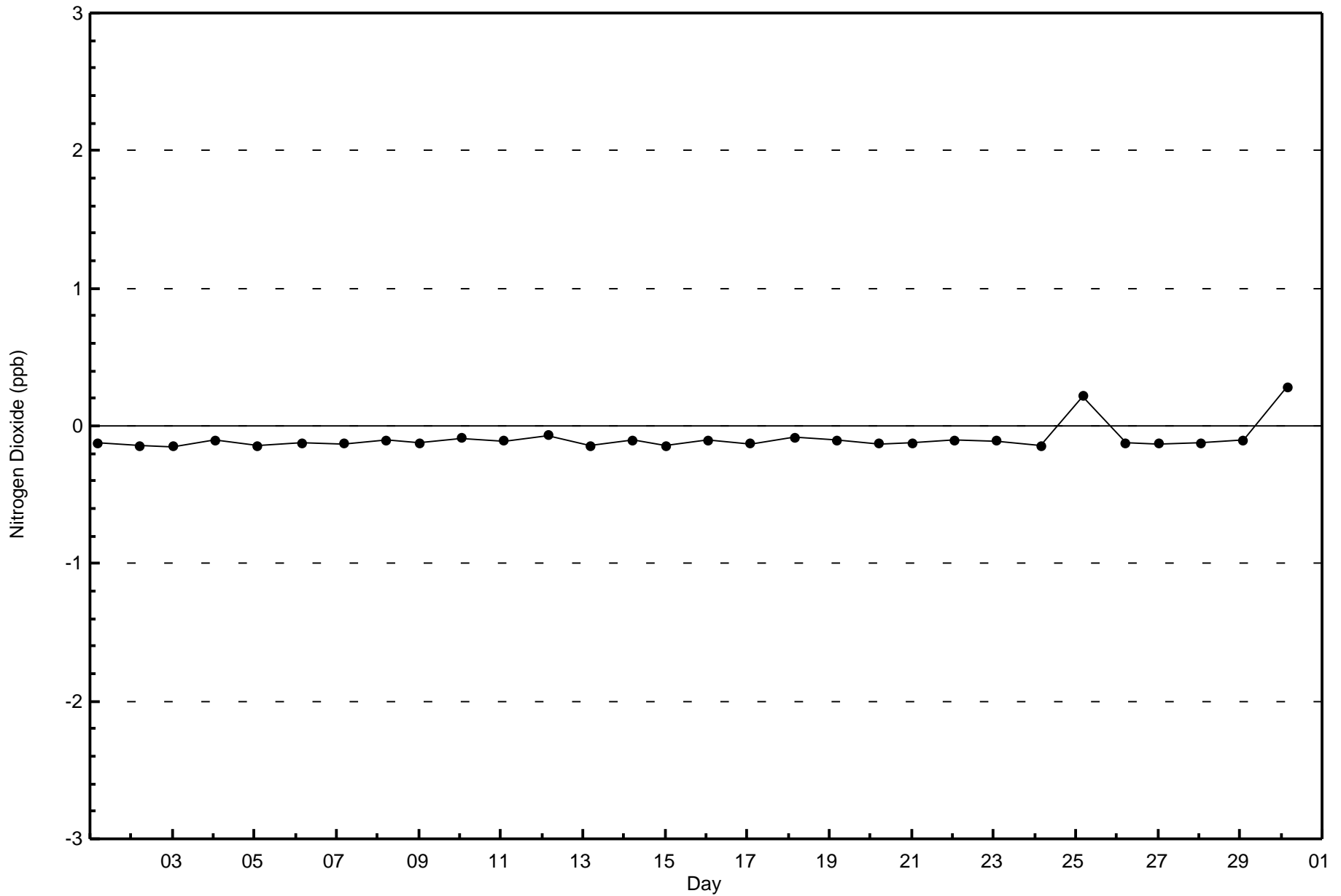
Total Number of Hours: 720



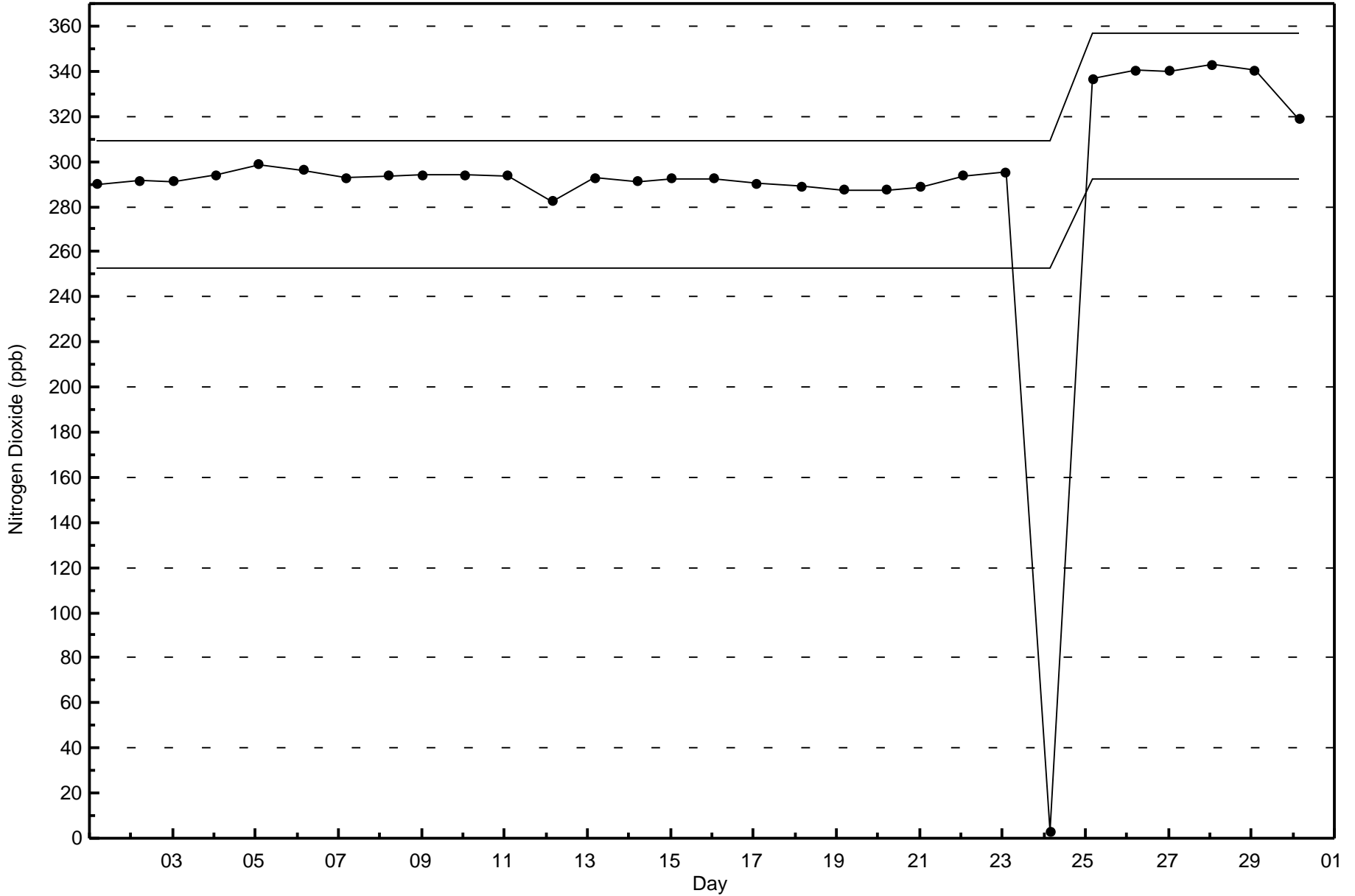
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Shell Muskeg River (AMS 16)











Maximum Value: 121 ppb on Sep 6 10:00	Maximum Daily Average: 35.7 ppb on Sep 15	Hours in Service: 720
Minimum Value: 0 ppb on Sep 24 01:00	Minimum Daily Average: 2.4 ppb on Sep 26	Hours of Data: 681
Maximum Diurnal Average: 20.6 ppb at hour 9	Minimum Diurnal Average: 4.3 ppb at hour 18	Hours of Missing Data: 39
Monthly Average: 12.0 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 6 Q <sub>3</sub> = 17 P <sub>90</sub> = 30 P <sub>99</sub> = 77	Hours of Calibration: 39
		Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	13	9	8	19	Z	11	12	30	18	11	23	31	22	5	6	1	1	1	0	1	0	0	1	4	9.9	31
2-Sep	1	1	2	6	15	Z	34	34	40	48	25	29	15	12	6	4	8	13	20	19	11	18	30	29	18.2	48
3-Sep	Z	46	51	17	7	8	3	4	5	4	2	1	0	4	4	4	2	13	33	21	3	3	5	4	10.5	51
4-Sep	3	Z	3	5	6	16	61	49	7	5	7	17	12	15	15	14	19	22	27	14	7	6	10	11	15.3	61
5-Sep	8	15	Z	13	11	11	27	37	52	38	20	7	11	6	2	4	1	2	3	3	3	1	1	5	12.2	52
6-Sep	51	34	26	Z	35	8	6	10	100	121	27	3	23	20	8	18	1	1	16	44	36	29	23	23	28.7	121
7-Sep	31	75	59	71	Z	25	33	31	33	20	16	20	16	18	18	31	26	23	6	7	9	8	6	4	25.5	75
8-Sep	6	5	4	1	2	Z	10	40	20	23	19	9	11	26	20	13	16	5	5	13	21	11	2	1	12.3	40
9-Sep	Z	3	6	14	25	36	33	14	10	8	9	8	6	2	2	1	2	4	1	1	1	1	4	6	8.6	36
10-Sep	15	Z	24	23	24	16	9	10	9	7	9	11	7	2	2	2	1	1	1	3	2	3	4	4	8.2	24
11-Sep	5	4	Z	17	23	27	27	21	10	8	5	4	1	1	1	1	2	1	2	4	7	7	6	6	8.2	27
12-Sep	3	3	2	Z	2	1	3	3	2	1	2	2	3	1	1	1	1	1	2	17	72	23	22	18	8.2	72
13-Sep	20	29	30	14	Z	6	11	11	23	33	51	14	7	3	7	13	14	5	3	10	11	18	37	47	18.1	51
14-Sep	27	17	15	19	10	Z	10	21	10	11	11	16	8	17	19	4	7	0	0	10	28	33	38	40	16.2	40
15-Sep	Z	50	52	62	78	58	67	70	70	33	82	105	40	18	3	1	2	0	1	2	4	3	12	7	35.7	105
16-Sep	8	Z	51	79	80	76	26	23	17	23	25	24	9	13	10	5	7	9	4	3	1	4	14	20	23.0	80
17-Sep	19	20	Z	33	26	25	32	24	19	14	13	12	6	2	1	2	2	2	2	3	5	5	7	11	12.4	33
18-Sep	6	6	8	Z	7	8	10	6	5	4	1	1	1	0	0	0	2	1	3	1	2	2	2	4	3.5	10
19-Sep	6	5	5	5	Z	6	6	5	6	4	3	1	0	0	0	2	1	1	0	0	1	1	3	40	4.4	40
20-Sep	8	2	4	1	1	Z	3	3	1	0	0	1	0	0	0	2	1	2	19	74	40	9	21	2	8.5	74
21-Sep	Z	2	2	2	3	14	33	28	23	17	12	4	4	15	17	19	10	2	2	3	6	6	13	17	11.0	33
22-Sep	6	Z	7	11	7	4	8	13	20	14	3	3	4	7	7	5	6	4	5	5	4	3	2	2	6.5	20
23-Sep	4	3	Z	1	2	18	23	47	37	8	0	0	0	0	0	0	0	0	0	1	2	0	0	0	6.5	47
24-Sep	0	0	1	Z	1	5	10	11	19	C	C	C	C	C	C	C	C	C	23	76	60	39	18	6	--	76
25-Sep	3	5	8	5	Z	4	14	7	5	3	2	1	1	1	1	1	1	1	1	2	2	1	1	2	3.1	14
26-Sep	4	3	3	4	7	Z	9	8	4	1	1	0	0	0	1	1	1	1	1	1	1	1	1	2	2.4	9
27-Sep	Z	4	6	4	2	1	1	1	6	5	2	1	1	1	2	1	2	1	3	4	2	4	4	5	2.7	6
28-Sep	3	Z	2	4	1	2	2	3	2	1	1	1	0	1	1	1	1	2	4	8	13	18	11	3	3.7	18
29-Sep	1	1	Z	1	1	1	2	7	26	26	13	9	11	11	7	6	5	5	4	6	23	14	5	13	8.6	26
30-Sep	20	26	28	Z	28	23	17	20	18	14	14	14	7	1	1	3	1	1	2	5	7	6	7	6	11.9	28

10.9	14.7	16.3	17.3	16.2	16.4	18.1	19.8	20.6	17.5	13.7	12.0	7.9	7.1	5.6	5.4	4.9	4.3	6.4	12.1	12.7	9.3	10.3	11.4	Diurnal Average	
51	75	59	79	80	76	67	70	100	121	82	105	40	26	20	31	26	23	33	76	72	39	38	47	Diurnal Maximum	

Z - zerospan      C - Calibration

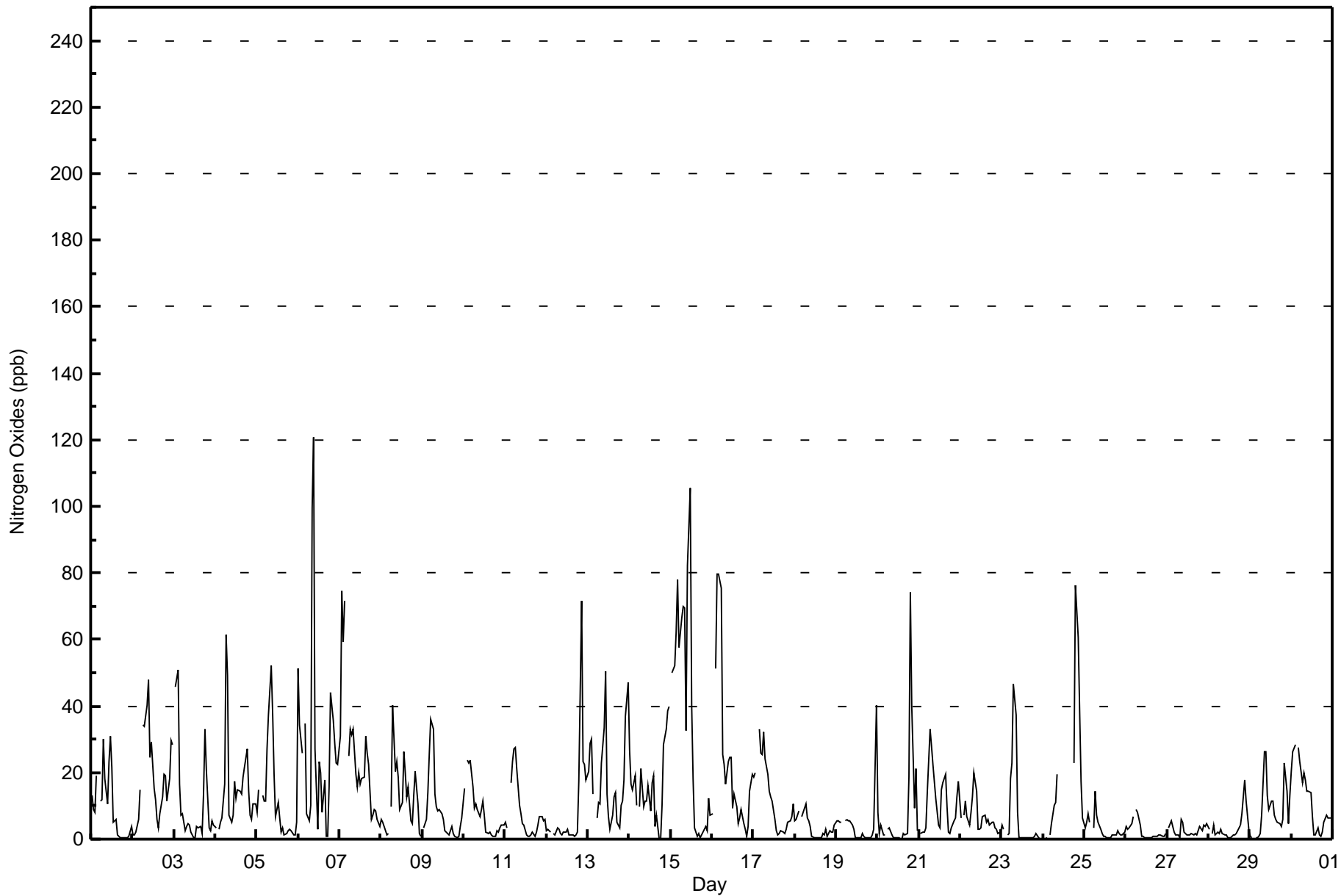


Wood Buffalo Environmental Association

Hourly Averages

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

Shell Muskeg River - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Shell Muskeg River - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	556	81.64	81.64
21 - 40	91	13.36	95.01
41 - 80	30	4.41	99.41
81 - 159	4	0.59	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Shell Muskeg River - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	18	12	14	10	11	8	21	32	151	83	62	39	20	37	26	12	556
21 - 40	12	14	6	6	4	2	3	2	23	9	0	1	0	0	4	5	91
11 - 80	4	1	2	5	3	2	2	1	3	0	0	0	0	0	2	5	30
81 - 159	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	35	27	22	21	18	12	26	35	177	92	62	40	20	37	33	24	681

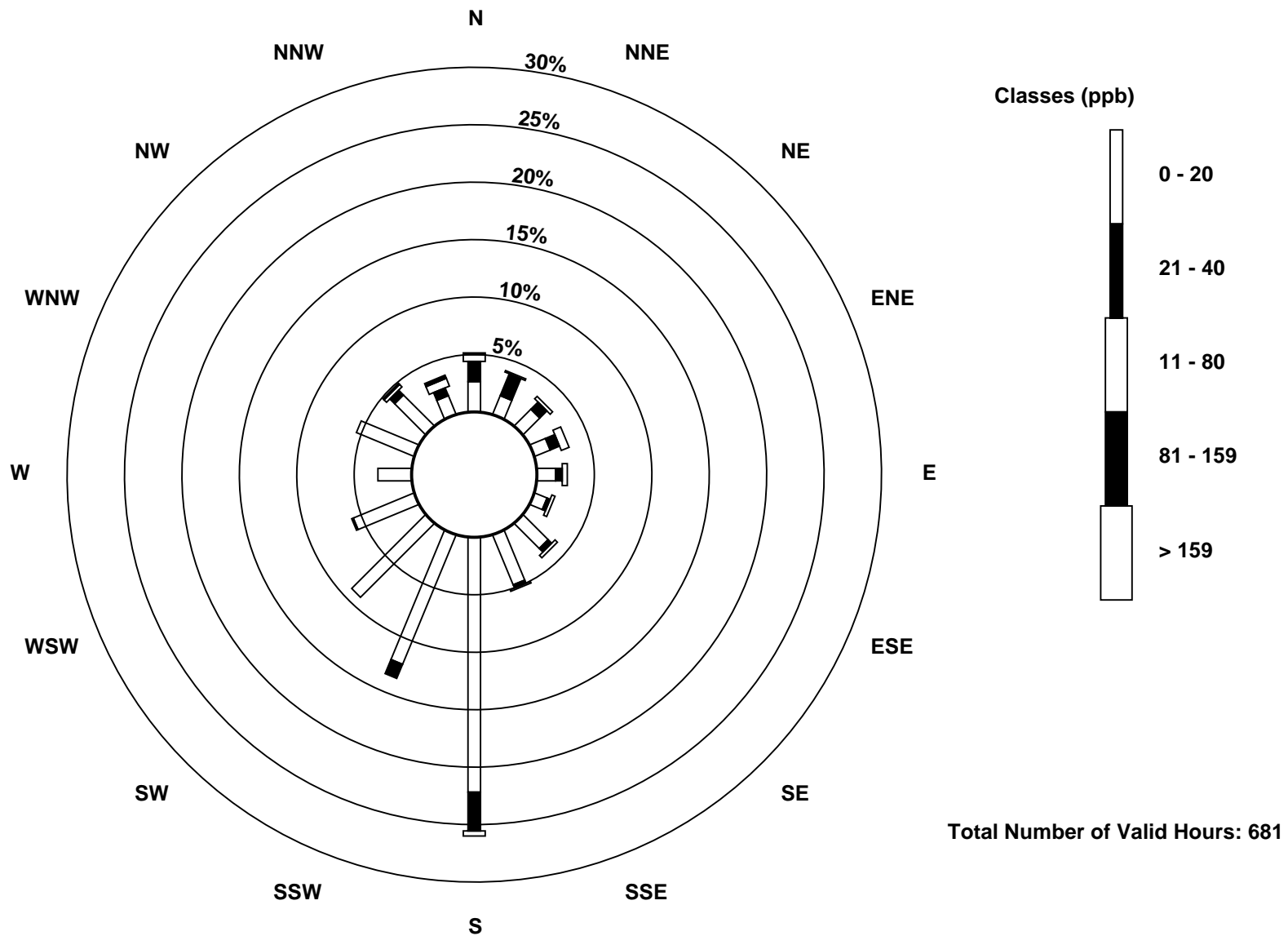
Total Number of Valid Hours: 681

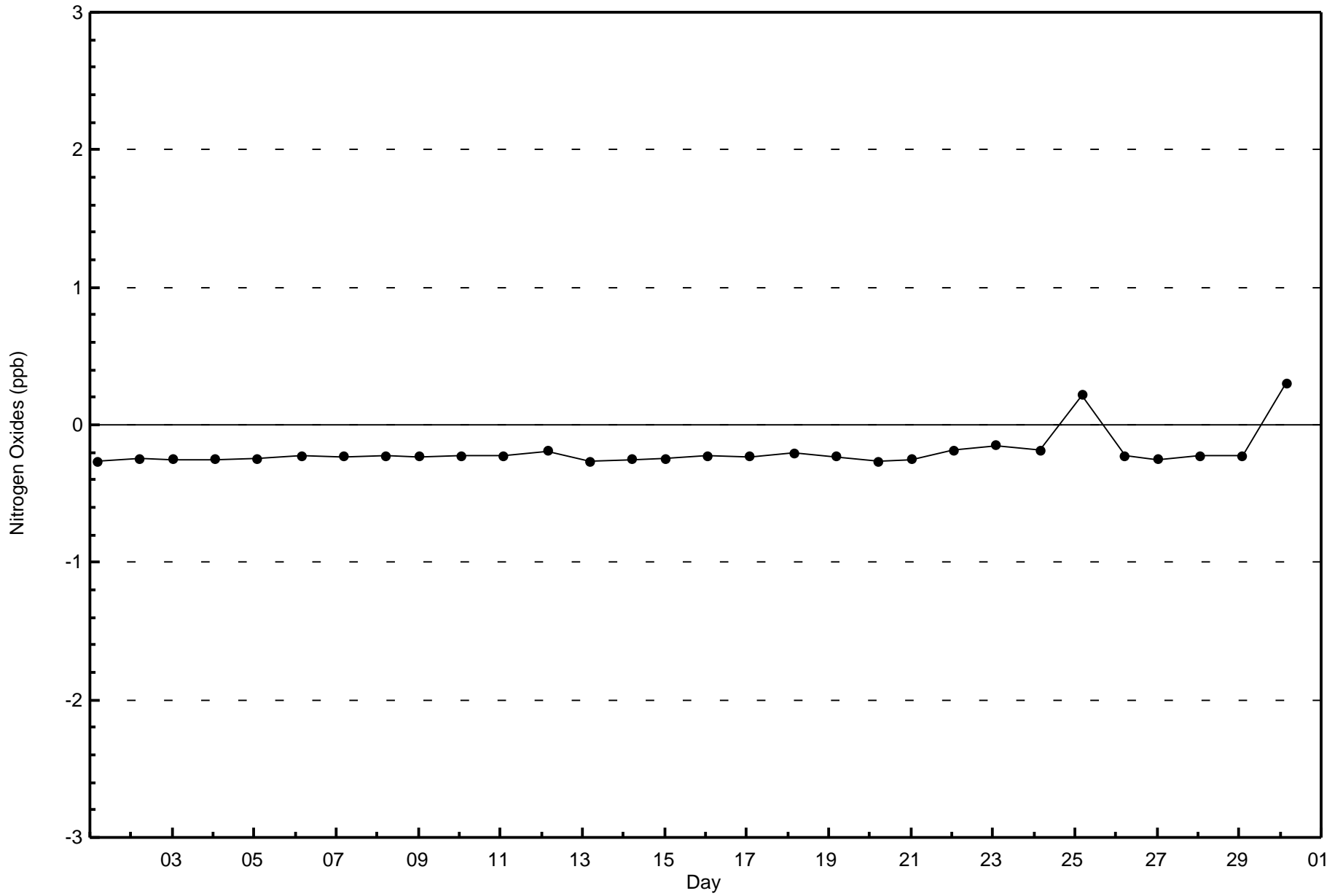
Total Number of Hours: 720

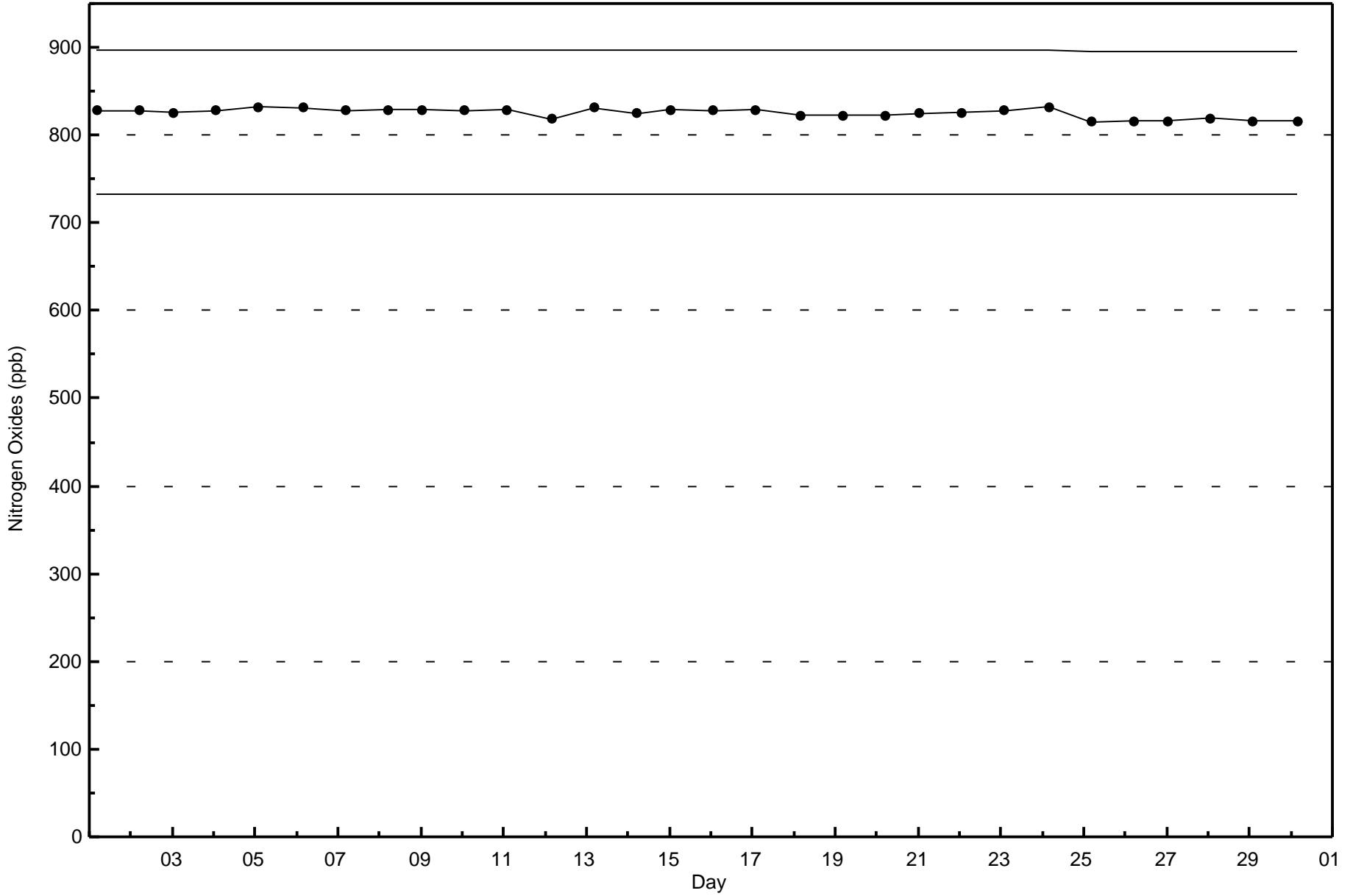


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Shell Muskeg River (AMS 16)











Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 25.1 µg/m <sup>3</sup> on Sep 26 16:00	Maximum Daily Average: 8.0 µg/m <sup>3</sup> on Sep 6	Hours of Data:	719
Minimum Value: 0.8 µg/m <sup>3</sup> on Sep 1 11:00	Minimum Daily Average: 2.4 µg/m <sup>3</sup> on Sep 3	Hours of Missing Data:	1
Maximum Diurnal Average: 7.2 µg/m <sup>3</sup> at hour 20	Minimum Diurnal Average: 3.1 µg/m <sup>3</sup> at hour 11	Hours of Calibration:	1
Monthly Average: 5.35 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 1.1 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 3.2 Median = 4.9 Q <sub>3</sub> = 6.6 P <sub>90</sub> = 8.8 P <sub>99</sub> = 17.8	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-Sep	12.2	13.3	12.0	10.0	8.6	8.9	5.4	3.6	1.8	1.3	0.8	1.0	2.6	2.7	1.3	1.3	1.2	1.4	1.0	1.6	3.3	4.3	5.2	6.0	4.6	13.3
2-Sep	6.4	4.1	3.8	5.7	7.0	10.2	10.9	6.7	4.1	3.9	2.6	5.7	7.6	4.1	1.9	2.4	2.8	2.4	2.1	1.4	2.8	4.5	4.9	3.3	4.6	10.9
3-Sep	2.8	2.7	2.2	1.7	2.4	1.7	1.6	2.7	3.7	2.1	1.4	1.4	1.3	1.1	1.0	2.1	3.3	5.2	3.8	2.1	1.8	3.0	4.4	3.1	2.4	5.2
4-Sep	2.5	3.7	2.1	2.4	3.2	2.3	3.3	3.5	4.2	5.1	4.4	4.2	3.1	2.3	2.1	2.3	2.6	3.5	4.3	2.6	2.6	3.9	5.4	5.9	3.4	5.9
5-Sep	7.0	8.4	8.5	8.2	7.0	6.1	2.6	2.6	3.0	2.4	1.9	2.7	4.3	4.7	4.0	5.1	4.5	4.5	5.6	8.1	9.8	10.0	8.1	10.5	5.8	10.5
6-Sep	17.1	18.4	19.3	18.1	16.4	10.6	4.8	5.7	11.4	5.0	2.4	3.4	4.1	4.7	6.0	6.4	4.5	6.1	5.7	5.7	5.3	5.0	2.8	2.0	8.0	19.3
7-Sep	3.6	6.5	6.6	7.5	3.7	2.1	3.8	4.6	6.4	4.2	2.8	2.4	4.3	3.9	3.8	3.6	4.6	5.0	5.4	5.5	7.2	9.5	8.3	4.3	5.0	9.5
8-Sep	4.7	6.3	6.3	6.4	5.8	5.7	6.2	7.3	4.2	2.6	2.6	3.4	4.6	6.4	7.0	5.9	5.4	6.4	10.2	15.0	12.8	9.7	8.9	7.0	6.7	15.0
9-Sep	5.8	3.0	2.9	4.1	5.4	7.1	7.6	7.1	6.1	2.6	2.2	2.2	2.9	3.2	4.3	5.6	2.5	1.9	3.5	5.1	6.7	7.7	10.2	6.1	4.8	10.2
10-Sep	2.4	4.5	7.1	8.4	10.9	10.8	11.2	6.9	2.4	2.1	3.7	5.5	5.5	4.8	5.5	6.7	6.2	5.4	6.6	9.5	9.2	6.4	3.7	5.1	6.3	11.2
11-Sep	6.1	5.8	8.1	6.8	4.0	5.5	5.0	2.1	1.9	1.8	3.2	4.6	2.0	3.2	7.3	10.1	11.2	4.0	6.3	9.1	10.0	8.7	8.9	6.3	5.9	11.2
12-Sep	4.4	5.5	6.5	6.6	4.5	4.0	3.6	5.0	5.0	2.7	1.7	2.4	10.9	8.6	8.6	7.8	12.7	8.2	5.3	13.6	13.6	6.6	4.9	4.6	6.6	13.6
13-Sep	5.2	5.1	6.7	5.5	6.0	8.8	13.6	7.0	3.7	2.4	3.3	4.5	4.3	4.4	4.4	4.8	6.5	3.8	1.1	1.6	3.2	5.1	7.0	6.9	5.2	13.6
14-Sep	4.0	2.3	3.9	5.5	6.7	6.1	5.0	2.9	3.5	4.1	4.1	4.7	4.4	4.5	5.2	4.4	3.5	3.5	4.3	6.0	6.6	6.1	6.6	5.3	4.7	6.7
15-Sep	6.0	8.3	7.1	7.9	7.7	6.5	6.3	7.8	5.5	1.9	2.4	3.3	2.9	2.6	2.2	2.6	2.6	2.5	4.0	6.1	8.0	8.1	8.0	5.3	5.2	8.3
16-Sep	6.2	11.2	8.2	7.2	6.6	6.0	4.8	6.3	5.4	5.2	5.3	5.6	3.4	4.4	4.5	3.8	5.9	6.9	7.5	7.4	5.9	6.5	7.1	7.0	6.2	11.2
17-Sep	7.3	8.3	8.0	8.5	7.8	7.0	7.1	7.5	7.4	3.1	2.3	1.7	1.9	2.1	2.5	3.2	4.9	6.0	6.9	8.5	11.9	12.0	11.0	10.2	6.6	12.0
18-Sep	10.3	10.2	8.8	8.4	8.1	7.8	7.3	6.1	2.4	1.7	1.8	2.2	2.5	2.0	2.2	3.3	11.4	5.1	5.7	6.2	5.7	6.5	6.4	6.1	5.8	11.4
19-Sep	6.0	6.1	5.5	4.2	4.4	4.2	2.7	1.7	1.8	2.1	2.0	5.7	3.7	3.8	5.3	8.8	3.1	1.8	2.4	3.5	3.8	4.6	5.8	10.2	4.3	10.2
20-Sep	8.2	6.6	6.3	6.0	5.1	4.1	4.2	3.5	2.9	2.7	2.2	2.6	2.6	1.9	1.6	2.1	4.1	3.0	7.2	14.6	8.2	5.8	5.3	5.1	4.8	14.6
21-Sep	5.2	4.2	4.1	2.2	1.4	2.2	3.1	3.7	3.7	4.1	3.5	2.9	2.0	2.1	2.8	2.8	4.0	4.8	4.8	5.0	5.4	5.2	5.4	5.9	3.8	5.9
22-Sep	4.8	4.8	5.0	5.6	5.7	4.7	4.4	4.7	5.1	3.3	1.7	1.7	2.4	2.4	1.9	1.4	2.4	2.9	5.3	11.0	7.7	6.0	8.9	7.9	4.7	11.0
23-Sep	7.5	4.4	3.6	2.9	4.3	4.3	4.0	3.6	3.3	2.1	1.4	1.3	1.3	1.4	1.5	1.4	3.5	3.6	4.4	4.8	5.3	5.3	5.4	4.8	3.5	7.5
24-Sep	4.5	5.9	5.9	5.3	5.4	9.2	6.9	6.4	3.8	2.2	2.1	3.0	C	3.2	4.4	6.5	8.5	12.8	19.7	20.0	16.0	12.8	11.2	7.1	7.9	20.0
25-Sep	3.5	6.0	8.6	8.1	4.3	4.8	7.8	4.5	4.0	6.4	5.9	3.9	8.3	5.7	6.8	4.7	5.6	4.0	4.1	5.1	3.7	4.1	4.7	5.0	5.4	8.6
26-Sep	6.4	4.4	4.0	4.0	4.2	4.0	4.8	4.0	2.5	2.7	1.5	1.7	3.4	2.7	5.8	25.1	19.8	6.0	5.0	5.2	5.3	5.2	5.3	6.2	5.8	25.1
27-Sep	7.8	5.3	5.0	5.1	6.5	3.7	7.0	12.1	9.2	7.4	5.5	4.4	6.8	5.6	7.6	5.8	7.6	5.5	5.2	5.0	3.3	3.9	4.5	5.1	6.0	12.1
28-Sep	4.4	4.0	4.7	4.8	5.3	4.7	5.5	6.2	4.0	2.9	1.7	1.6	1.3	1.1	1.1	1.1	1.5	4.6	6.3	6.8	7.6	6.3	4.3	3.9	4.0	7.6
29-Sep	3.5	3.4	3.4	3.2	2.9	2.8	2.8	2.6	4.4	7.0	7.7	6.2	9.2	3.0	2.2	3.0	5.0	7.8	11.6	12.5	13.3	9.7	7.0	3.9	5.8	13.3
30-Sep	4.5	6.3	6.0	5.0	5.8	6.5	6.8	3.9	1.8	2.5	7.8	11.0	8.5	7.1	7.4	8.9	7.9	8.5	9.1	7.7	7.3	7.1	7.2	7.5	6.8	11.0

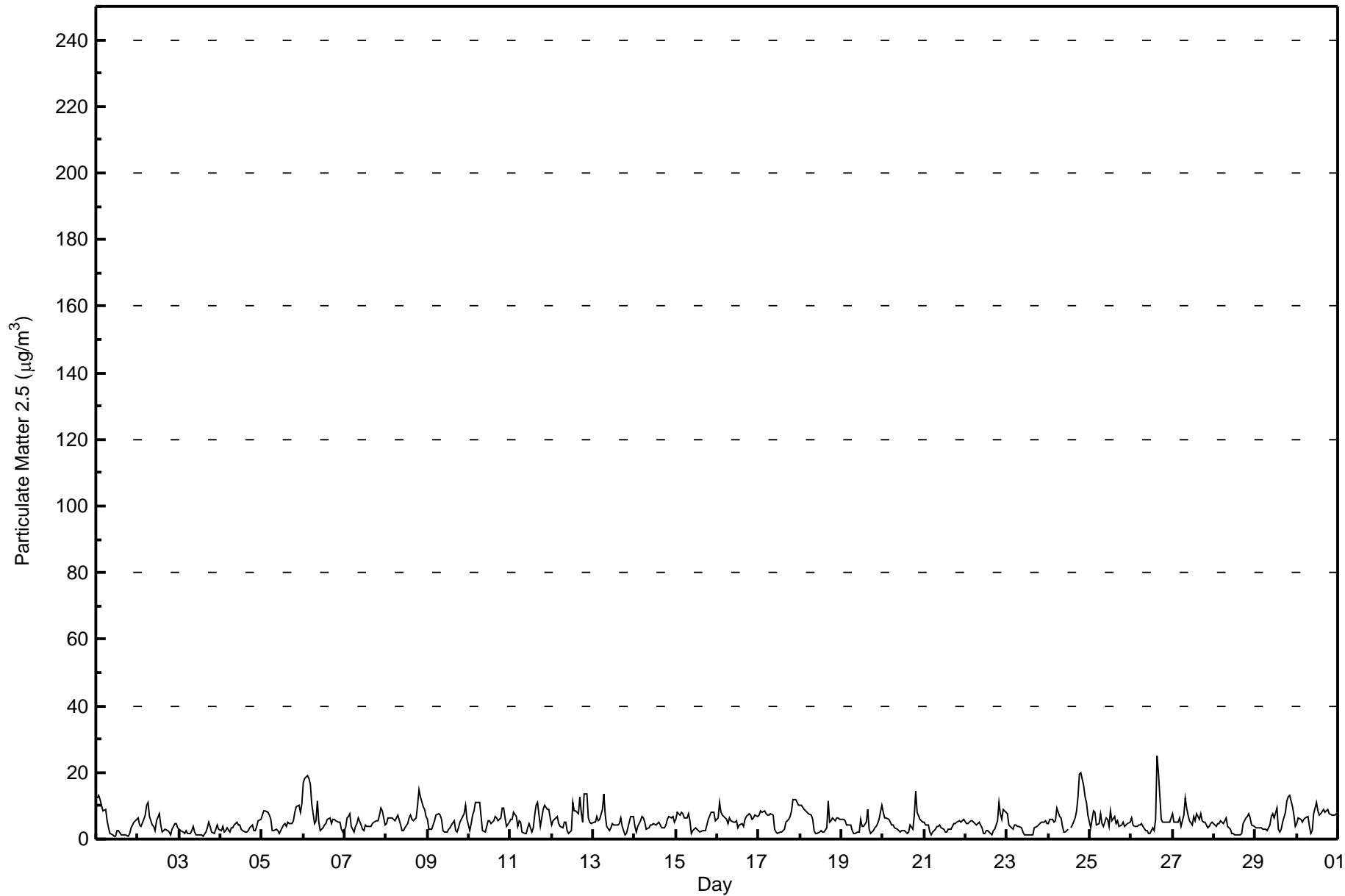
6.0	6.3	6.3	6.2	5.9	5.8	5.7	5.1	4.3	3.3	3.1	3.6	4.2	3.7	4.1	5.1	5.7	4.9	5.8	7.2	7.1	6.7	6.6	5.9	Diurnal Average	
17.1	18.4	19.3	18.1	16.4	10.8	13.6	12.1	11.4	7.4	7.8	11.0	10.9	8.6	8.6	25.1	19.8	12.8	19.7	20.0	16.0	12.8	11.2	10.5	Diurnal Maximum	

C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m<sup>3</sup>



Wood Buffalo Environmental Association  
Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Shell Muskeg River - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Shell Muskeg River - September 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	427	59.39	59.39
6 - 15	280	38.94	98.33
16 - 25	10	1.39	99.72
26 - 80	0	0.00	99.72
> 81.0	0	0.00	99.72

Total Number of Valid Hours: 719

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Shell Muskeg River - September 2015**

Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	29	21	16	10	6	7	18	18	82	57	49	19	19	29	28	19	427
6 - 15	8	5	6	6	11	7	11	20	106	39	17	20	3	9	7	5	280
16 - 25	0	0	0	6	2	0	0	0	0	0	0	2	0	0	0	0	10
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	37	26	22	22	19	14	29	38	188	96	66	41	22	38	35	24	717

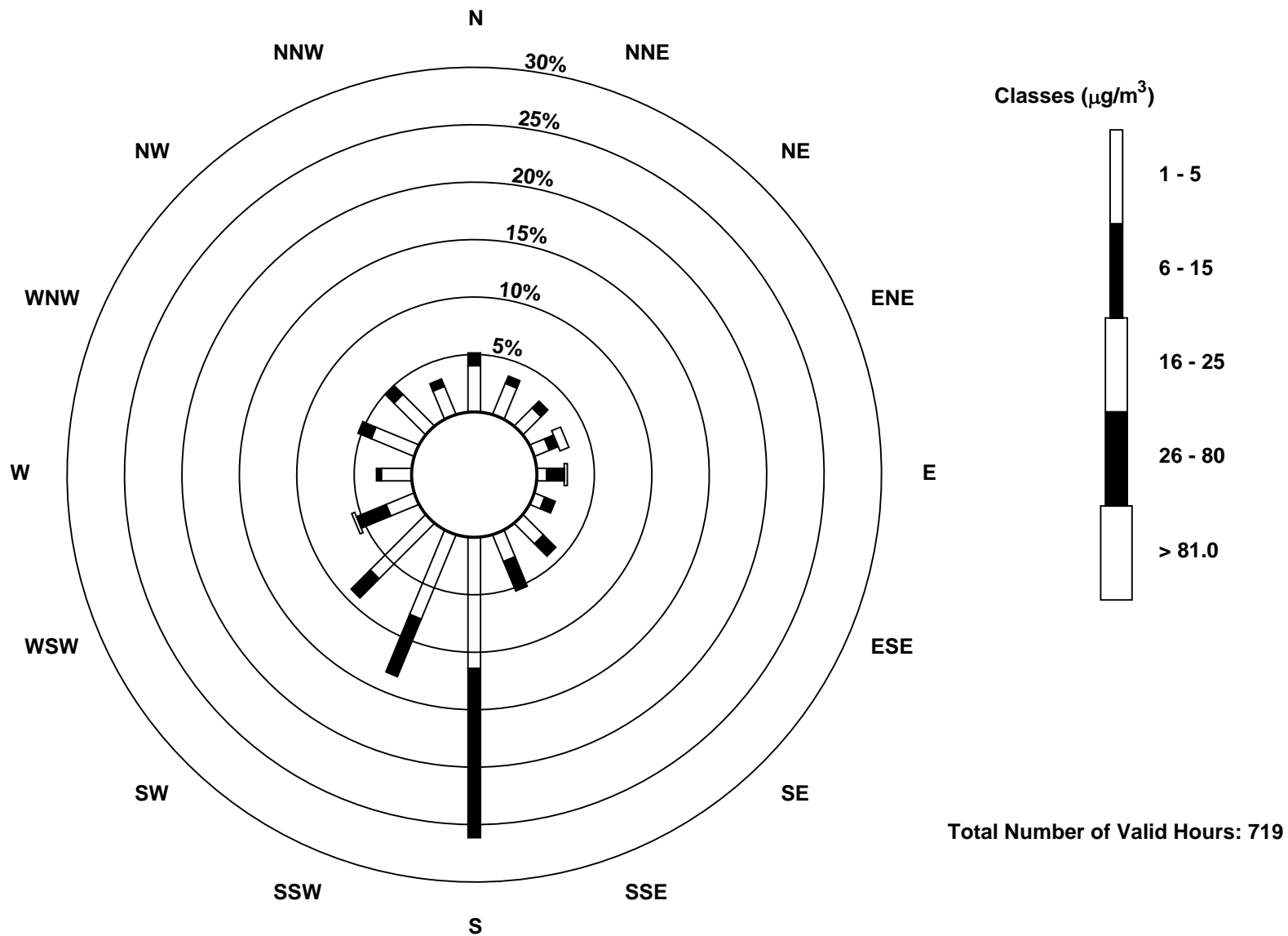
Total Number of Valid Hours: 719

Total Number of Hours: 720



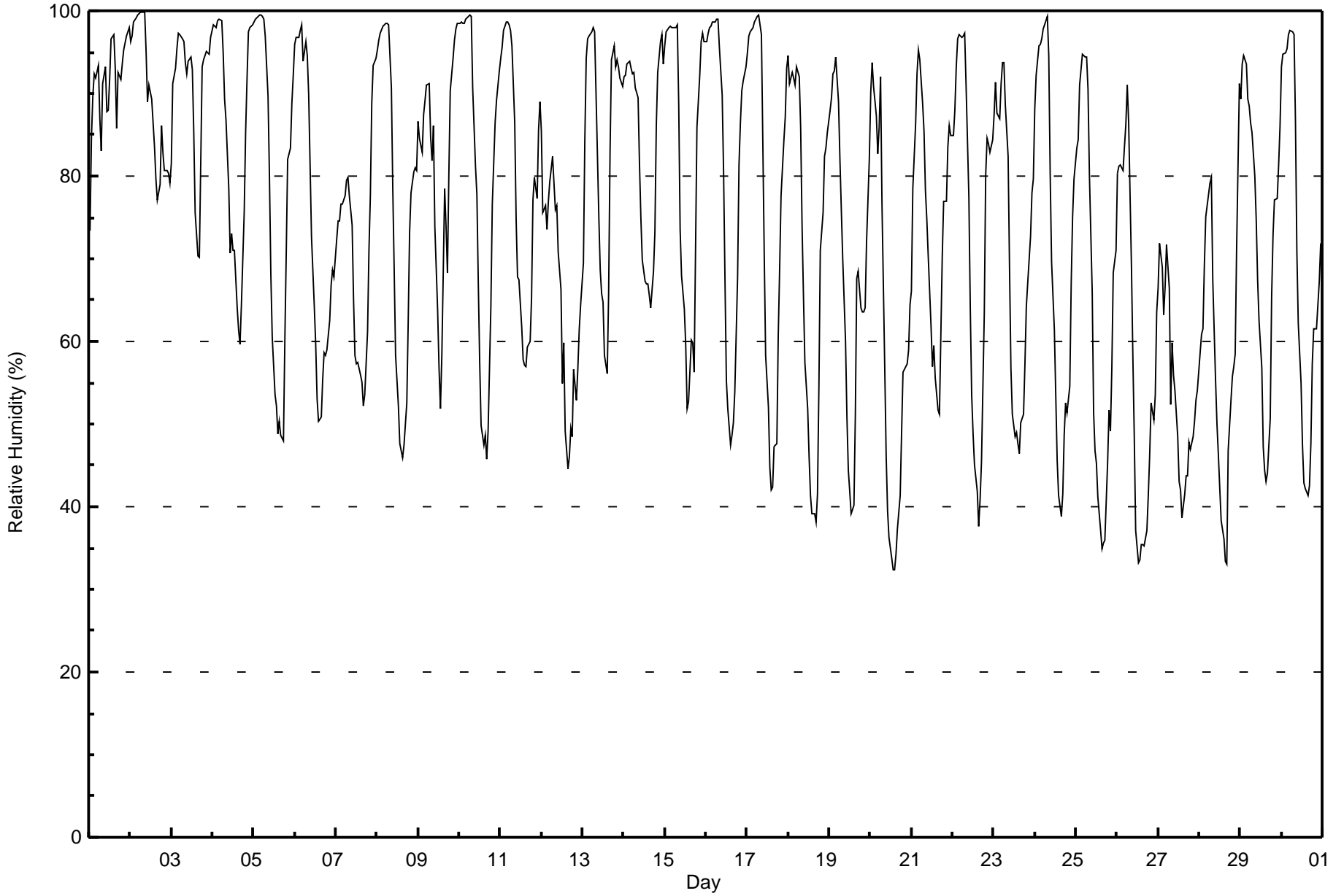
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Shell Muskeg River (AMS 16)





Maximum Value: 100 % on Sep 2 08:00														Maximum Daily Average: 91.0 % on Sep 1														Hours in Service: 720	
Minimum Value: 32 % on Sep 20 15:00														Minimum Daily Average: 54.1 % on Sep 27														Hours of Data: 720	
Maximum Diurnal Average: 92.6 % at hour 6														Minimum Diurnal Average: 51.0 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 74.4 %														Percentiles: P <sub>1</sub> = 34 P <sub>10</sub> = 47 Q <sub>1</sub> = 57 Median = 78 O <sub>3</sub> = 92 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-Sep	73	85	90	92	92	93	87	83	91	93	88	88	92	97	97	93	86	92	92	94	95	96	97	98	91.0	98			
2-Sep	96	97	99	99	99	100	100	100	100	95	89	91	89	86	84	80	77	79	86	83	81	81	80	79	89.6	100			
3-Sep	81	91	93	95	97	97	97	96	94	92	94	93	86	76	70	70	82	93	94	95	95	95	97	90.3	97				
4-Sep	98	98	98	99	99	99	95	89	87	79	71	73	71	64	61	60	64	76	85	92	97	98	98	84.3	99				
5-Sep	99	99	99	99	99	99	99	97	90	80	68	61	54	52	49	50	49	48	60	71	82	83	89	92	77.9	99			
6-Sep	96	97	97	98	98	94	96	95	90	81	73	64	60	53	50	51	55	59	58	59	63	67	69	68	74.6	98			
7-Sep	72	75	75	77	77	78	79	80	78	74	65	58	57	58	56	55	52	54	61	71	78	89	93	94	71.0	94			
8-Sep	95	96	97	98	98	98	99	98	91	78	69	58	52	48	47	46	47	52	62	73	78	81	81	81	76.0	99			
9-Sep	87	85	83	87	89	91	91	85	82	86	74	64	57	52	58	78	74	68	80	90	94	96	98	98	81.2	98			
10-Sep	99	99	99	98	99	99	100	99	91	81	78	67	57	50	47	49	46	49	64	77	82	87	89	93	79.1	100			
11-Sep	94	96	98	99	99	98	98	96	86	75	68	67	62	58	57	57	59	60	65	77	80	77	86	89	79.2	99			
12-Sep	86	76	76	74	77	79	82	79	76	76	71	66	55	60	49	45	46	50	48	57	53	57	61	64	65.1	86			
13-Sep	69	84	94	97	97	98	98	98	90	75	69	66	65	58	56	66	83	94	96	93	94	93	92	91	84.0	98			
14-Sep	92	92	94	94	93	92	92	91	90	81	75	70	67	67	66	64	68	73	86	93	96	97	93	93	83.1	97			
15-Sep	96	98	98	98	98	98	98	98	89	74	68	64	59	52	53	60	60	56	71	86	92	96	97	96	81.5	98			
16-Sep	96	97	98	98	99	99	99	99	96	90	81	68	55	52	47	49	50	54	68	81	86	90	92	93	80.7	99			
17-Sep	95	97	98	98	99	99	99	99	97	84	70	58	52	45	42	42	47	48	61	69	78	84	87	93	76.7	99			
18-Sep	95	91	92	92	91	93	92	86	74	65	57	52	46	41	39	39	38	42	54	71	76	82	83	85	69.9	95			
19-Sep	88	89	92	93	94	89	82	76	70	60	51	44	42	39	40	51	68	69	64	64	64	64	72	82	68.6	94			
20-Sep	90	94	91	87	83	86	92	77	57	46	39	36	34	32	32	34	37	41	49	56	57	57	59	64	59.6	94			
21-Sep	66	78	86	92	95	94	89	85	78	75	70	62	57	60	56	52	51	61	70	77	77	83	86	85	74.4	95			
22-Sep	85	88	93	97	97	97	97	97	91	77	64	54	49	45	42	38	41	45	63	80	85	84	83	84	74.0	97			
23-Sep	87	91	88	87	91	94	94	89	82	69	57	51	48	49	46	50	51	57	64	67	73	78	80	80	70.5	94			
24-Sep	88	92	96	96	97	98	99	99	95	80	70	61	53	46	41	39	42	49	53	51	55	67	75	80	71.7	99			
25-Sep	83	84	91	93	95	94	94	91	80	66	51	47	45	41	37	35	36	36	45	52	49	57	68	71	64.3	95			
26-Sep	80	81	81	81	84	86	91	86	69	58	48	37	33	34	35	35	35	37	41	46	52	51	54	63	58.4	91			
27-Sep	66	72	69	63	67	72	66	52	60	56	54	48	43	42	39	42	44	44	48	47	48	50	53	54	54.1	72			
28-Sep	59	61	62	69	75	78	79	80	67	55	50	46	42	38	36	33	33	47	53	56	57	58	71	91	58.2	91			
29-Sep	89	94	95	94	89	88	86	85	80	75	68	62	57	47	44	43	44	51	66	73	77	77	81	86	73.0	95			
30-Sep	93	95	95	95	97	98	97	97	87	71	62	55	48	43	42	41	43	48	57	62	61	64	67	72	70.4	98			
																												Diurnal Average	
86.5														89.0														Diurnal Maximum	
99														99															





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Shell Muskeg River - September 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	29	4.03	4.03
40 - 60	174	24.17	28.19
60 - 80	178	24.72	52.92
80 - 100	339	47.08	100.00

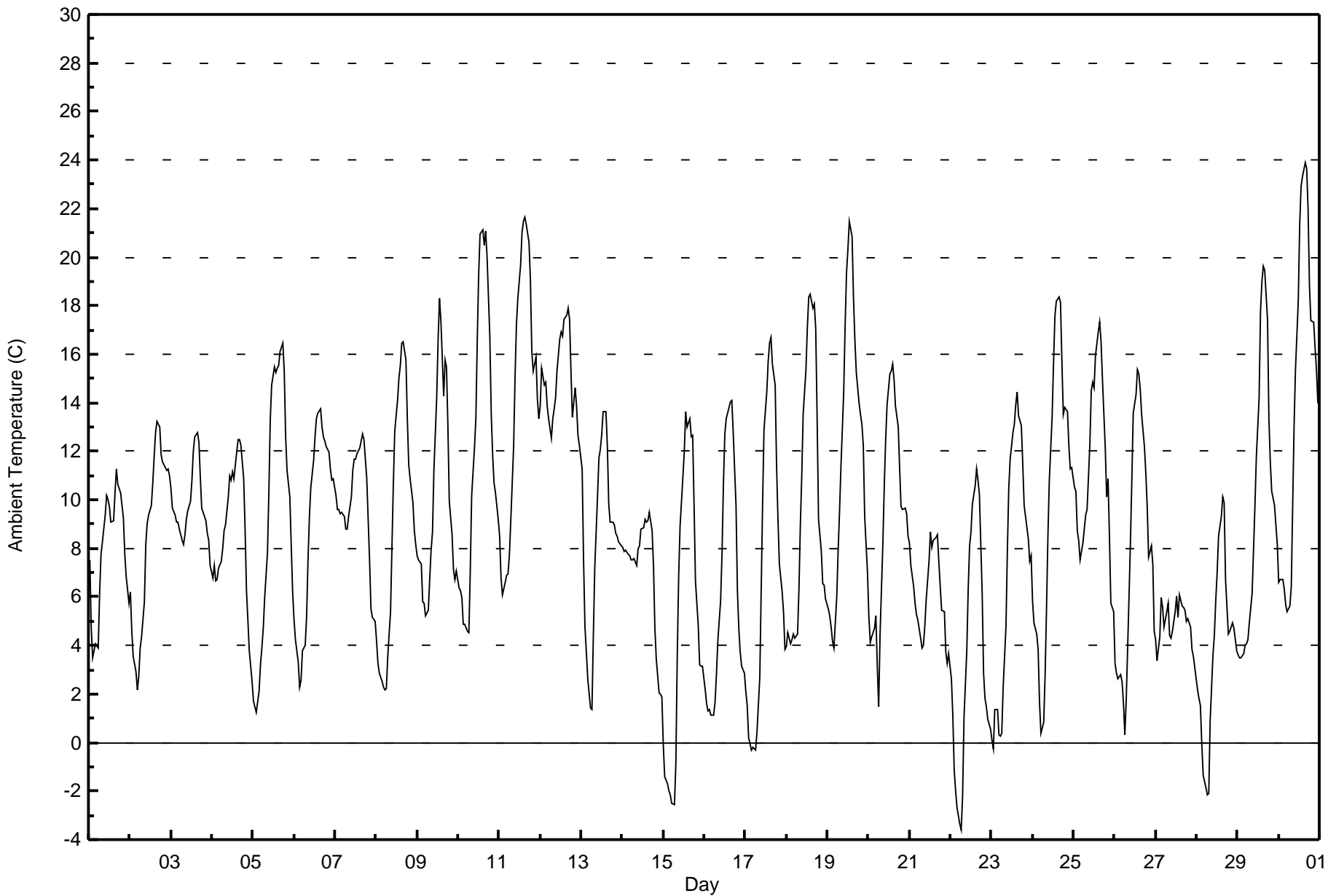
Total Number of Valid Hours: 720

Total Number of Hours: 720





Maximum Value: 23.9 C on Sep 30 16:00		Maximum Daily Average: 14.9 C on Sep 12		Hours in Service: 720																						
Minimum Value: -3.6 C on Sep 22 07:00		Minimum Daily Average: 3.5 C on Sep 22		Hours of Data: 720																						
Maximum Diurnal Average: 14.7 C at hour 15		Minimum Diurnal Average: 3.9 C at hour 6		Hours of Missing Data: 0																						
Monthly Average: 8.94 C		Percentiles: P <sub>1</sub> = -2.2 P <sub>10</sub> = 2.2 Q <sub>1</sub> = 4.9 Median = 8.7 Q <sub>3</sub> = 12.7 P <sub>90</sub> = 15.8 P <sub>99</sub> = 21.4		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	7.5	4.8	3.5	3.8	4.1	3.9	6.2	7.8	8.3	9.4	10.2	10.0	9.7	9.1	9.2	10.3	11.3	10.6	10.3	9.7	9.2	7.7	6.8	5.8	7.9	11.3
2-Sep	6.2	4.6	3.5	2.9	2.2	2.7	3.9	4.4	5.8	8.2	9.0	9.4	9.8	10.7	11.8	12.8	13.2	13.0	11.8	11.6	11.4	11.2	11.3	11.0	8.4	13.2
3-Sep	10.5	9.6	9.4	9.1	9.1	8.8	8.3	8.2	8.6	9.2	9.5	9.9	10.8	12.0	12.6	12.8	12.4	10.9	9.7	9.5	9.1	8.6	8.3	7.3	9.8	12.8
4-Sep	6.8	7.3	6.7	6.7	7.2	7.5	8.0	8.8	9.0	10.1	11.0	10.8	11.1	10.8	12.0	12.5	12.5	12.2	10.9	8.8	6.3	5.0	3.8	2.5	8.7	12.5
5-Sep	1.7	1.5	1.2	2.1	3.2	3.9	4.7	6.0	7.8	10.3	13.3	14.7	15.5	15.3	15.4	15.6	16.1	16.4	15.3	12.6	11.2	10.1	8.1	6.2	9.5	16.4
6-Sep	5.1	4.2	3.3	2.3	2.6	3.8	4.0	5.2	7.5	9.3	10.5	11.6	12.6	13.3	13.6	13.7	13.0	12.6	12.4	12.2	12.0	11.3	10.8	10.8	9.1	13.7
7-Sep	10.2	9.6	9.6	9.4	9.5	9.3	8.8	8.8	9.3	10.1	11.2	11.7	11.6	11.9	12.1	12.4	12.7	12.5	10.9	9.2	7.5	5.5	5.1	5.0	9.7	12.7
8-Sep	4.2	3.3	2.9	2.5	2.3	2.2	2.2	3.5	5.4	8.0	10.6	12.8	14.1	15.0	15.6	16.4	16.5	15.8	13.4	11.5	10.9	9.9	8.7	8.2	9.0	16.5
9-Sep	7.7	7.5	7.4	5.8	5.7	5.2	5.5	6.7	7.9	8.7	11.2	14.2	16.6	18.3	17.4	14.3	15.8	15.5	13.1	10.0	8.5	7.1	6.7	7.1	10.2	18.3
10-Sep	6.4	6.3	5.9	4.9	4.9	4.6	4.5	7.1	10.2	12.1	13.4	16.5	19.3	20.9	21.1	20.5	21.1	20.1	16.7	13.5	11.9	10.7	10.3	9.2	12.2	21.1
11-Sep	8.5	6.8	6.1	6.6	6.9	7.0	7.7	9.2	12.2	15.0	17.2	18.3	19.7	21.0	21.5	21.6	21.3	20.6	19.1	16.1	15.3	15.9	14.2	13.4	14.2	21.6
12-Sep	13.9	15.4	14.7	14.8	13.9	13.3	12.5	13.3	13.8	14.2	15.3	16.6	16.9	16.7	17.5	17.6	17.9	17.4	15.3	13.4	14.6	13.9	12.7	12.2	14.9	17.9
13-Sep	11.3	7.5	4.8	3.7	2.7	1.4	1.3	4.4	7.2	10.2	11.7	12.1	12.7	13.6	13.6	12.3	9.8	9.1	9.1	9.0	8.6	8.5	8.3	8.1	8.4	13.6
14-Sep	8.1	7.9	7.9	7.8	7.7	7.6	7.5	7.6	7.3	8.0	8.1	8.8	8.8	9.2	9.1	9.1	9.5	8.7	7.3	4.7	3.4	2.1	2.0	1.9	7.1	9.5
15-Sep	-0.1	-1.4	-1.7	-2.0	-2.2	-2.5	-2.5	-0.8	3.6	6.8	8.9	10.9	12.0	13.6	13.0	13.3	12.6	12.7	9.8	6.7	4.8	3.2	3.1	3.1	5.2	13.6
16-Sep	2.2	1.6	1.3	1.3	1.1	1.1	1.6	2.8	4.2	5.9	7.8	10.6	12.7	13.3	13.8	14.1	14.1	12.8	9.8	6.3	4.7	3.7	3.1	2.8	6.4	14.1
17-Sep	2.1	1.5	0.2	-0.3	-0.2	-0.3	-0.3	0.5	2.7	6.2	9.8	12.9	14.5	15.7	16.5	16.7	15.6	14.7	11.4	9.2	7.4	6.2	5.4	3.9	7.2	16.7
18-Sep	3.9	4.5	4.1	4.3	4.5	4.3	4.5	6.3	8.9	11.0	13.5	15.4	17.1	18.4	18.5	17.9	18.1	17.0	13.3	9.2	7.9	6.5	6.5	5.9	10.1	18.5
19-Sep	5.5	5.2	4.7	4.2	3.9	6.0	7.9	9.5	11.4	14.4	17.1	19.3	20.3	21.5	20.8	18.3	16.6	15.3	14.0	13.5	13.1	12.3	9.3	7.0	12.1	21.5
20-Sep	5.2	4.1	4.3	4.7	5.2	3.2	1.5	4.5	8.2	10.6	12.5	13.9	15.2	15.3	15.6	14.9	13.9	13.0	11.2	9.7	9.6	9.7	9.4	8.5	9.3	15.6
21-Sep	8.2	7.3	6.4	5.7	5.3	5.1	4.3	3.9	4.0	4.8	5.9	7.5	8.7	8.1	8.3	8.4	8.6	7.5	6.4	5.5	5.4	3.7	3.3	3.7	6.1	8.7
22-Sep	2.6	1.1	-1.1	-2.0	-2.7	-3.4	-3.6	-2.2	1.0	3.8	6.3	8.1	8.7	9.8	10.6	11.3	10.8	10.2	6.1	2.9	1.8	1.5	0.9	0.6	3.5	11.3
23-Sep	0.1	-0.3	1.4	1.3	0.3	0.3	0.4	2.3	4.8	7.9	10.4	11.7	12.8	13.1	13.9	14.4	13.5	13.1	11.5	9.8	9.3	8.4	7.5	7.7	7.3	14.4
24-Sep	5.8	4.9	4.5	3.9	1.6	0.4	0.8	2.8	5.5	8.5	10.8	13.4	15.6	17.6	18.2	18.4	18.1	15.7	13.5	13.8	13.7	12.2	11.3	11.3	10.1	18.4
25-Sep	10.5	10.4	8.7	8.3	7.5	8.2	8.8	9.3	9.6	12.3	14.5	14.8	14.6	16.0	16.9	17.3	16.5	15.0	12.2	10.1	10.9	8.5	5.7	5.4	11.3	17.3
26-Sep	3.2	2.9	2.6	2.8	2.5	1.7	0.3	1.8	6.0	8.3	10.8	13.6	14.3	15.4	15.2	14.5	13.5	12.2	11.1	9.7	7.7	8.1	7.3	4.6	7.9	15.4
27-Sep	4.2	3.4	4.4	6.0	5.5	4.8	5.4	5.7	4.4	4.3	4.6	5.4	6.0	5.1	6.1	5.6	5.6	5.5	5.0	5.1	4.8	3.8	3.5	3.1	4.9	6.1
28-Sep	2.1	1.8	1.6	0.0	-1.4	-1.9	-2.2	-2.1	0.9	3.6	4.4	5.9	7.0	8.5	9.3	10.1	9.9	6.7	4.5	4.6	4.7	4.9	4.7	3.8	3.8	10.1
29-Sep	3.6	3.5	3.5	3.7	4.0	4.1	4.3	4.9	6.2	7.9	9.7	11.7	14.2	17.8	19.0	19.6	19.4	17.4	13.3	11.6	10.4	9.8	9.0	8.2	9.9	19.6
30-Sep	6.6	6.7	6.7	6.3	5.7	5.4	5.6	6.4	9.7	13.0	15.4	18.2	21.3	22.9	23.3	23.9	23.7	22.0	18.8	17.4	17.3	16.3	15.4	14.0	14.3	23.9
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Shell Muskeg River - September 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	23	3.19	3.19
0 - 10	410	56.94	60.14
10 - 20	268	37.22	97.36
> 20	19	2.64	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

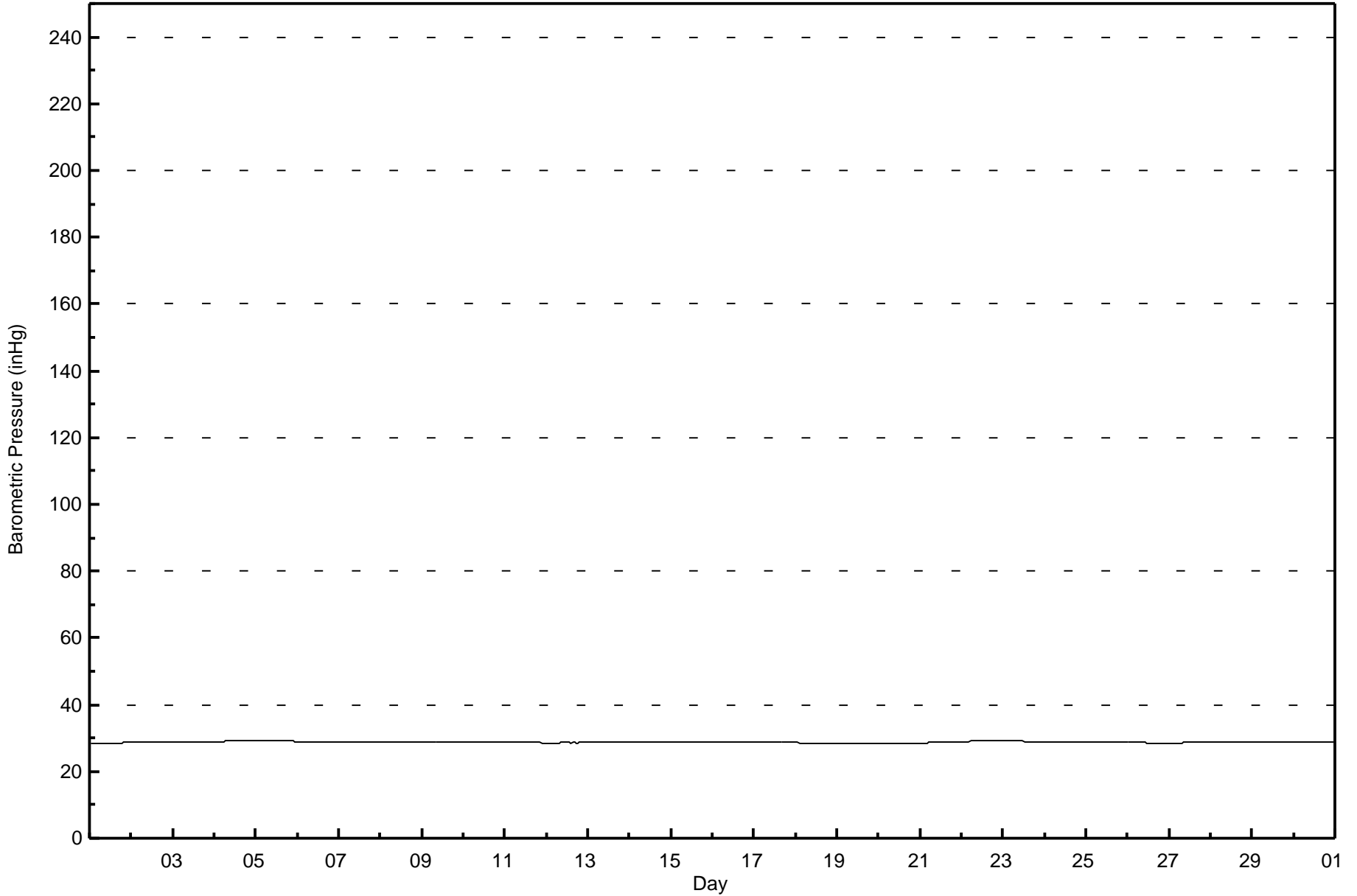


Maximum Value: 29.1 inHg on Sep 5 02:00      Maximum Daily Average: 29.1 inHg on Sep 5																						Hours in Service: 720 Hours of Data: 720						
Minimum Value: 28.2 inHg on Sep 19 19:00      Minimum Daily Average: 28.3 inHg on Sep 19 Maximum Diurnal Average: 28.8 inHg at hour 10      Minimum Diurnal Average: 28.8 inHg at hour 16 Monthly Average: 28.77 inHg      Percentiles: P <sub>1</sub> = 28.3 P <sub>10</sub> = 28.5 Q <sub>1</sub> = 28.7 Median = 28.8 Q <sub>3</sub> = 28.9 P <sub>90</sub> = 29.0 P <sub>99</sub> = 29.1																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Sep	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	28.6	28.6	28.6	28.6	28.6	28.7	28.5	28.7	
2-Sep	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7
3-Sep	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.9	
4-Sep	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
5-Sep	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1
6-Sep	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.9	29.0
7-Sep	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.8	28.9	28.9
8-Sep	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	28.9	28.9	28.8	28.9
9-Sep	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
10-Sep	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0
11-Sep	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.9
12-Sep	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.6	28.7
13-Sep	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	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7
14-Sep	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
15-Sep	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	28.8	28.8
16-Sep	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	28.8	28.8
17-Sep	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.8
18-Sep	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	28.6	28.6
19-Sep	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.2	28.3	28.3	28.3	28.3	28.4	28.3	28.5
20-Sep	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	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	28.4	28.5
21-Sep	28.5	28.5	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	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.7	28.9
22-Sep	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	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.1
23-Sep	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.1
24-Sep	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.9	28.9
25-Sep	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7
26-Sep	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	28.5	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	28.7
27-Sep	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	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	28.7	28.9
28-Sep	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.9	29.0
29-Sep	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	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8
30-Sep	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.7	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	28.7	28.8
																								Diurnal Average				
																								Diurnal Maximum				



Wood Buffalo Environmental Association  
Hourly Averages

Barometric Pressure (BP) - inHg  
Shell Muskeg River - September 2015





Maximum Speed: 35 km/h on Sep 27 08:00	Maximum Daily Speed Average: 17.1 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 2 09:00	Minimum Daily Speed Average: 1.9 km/h on Sep 15	Hours of Data: 720
Maximum Diurnal Speed Average: 6.2 km/h at hour 15	Minimum Diurnal Speed Average: 2.2 km/h at hour 1	Hours of Missing Data: 0
Monthly Average Velocity: 3.6 km/h 230.7 deg	Percentiles: P <sub>1</sub> = 1 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> = 28	Percent Operational Time: 100.0

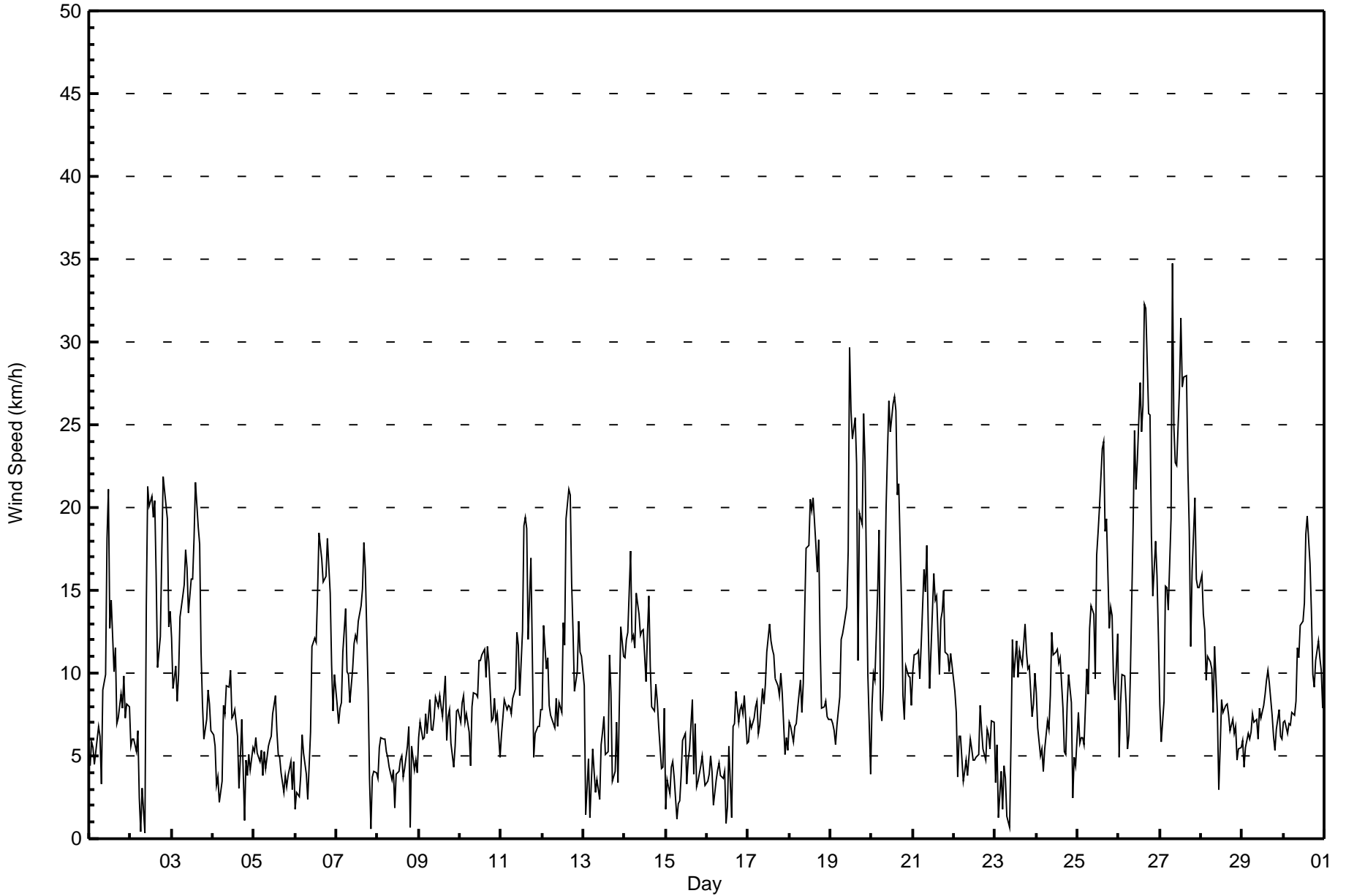
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	SE4	SSE6	S6	S4	SSW5	S7	SSW6	S3	S9	NE10	NNE18	NNE21	N13	WNW14	W10	WSW12	WSW7	SSW7	SW9	SSW8	SSW10	S7	S8	SSW8	SW2.4	NNE21
2-Sep	WSW6	SSE6	S6	S5	S7	WNW2	N0	S3	NE0	NE14	NE21	NE20	NE21	NE19	NE20	NE16	NE10	NNE12	N17	N22	N21	N19	NNE13	N14	NNE9.2	N22
3-Sep	N12	NNW9	NNW10	NNW8	NW10	WNW13	W15	WNW15	WNW17	WNW16	W14	W16	W16	WNW18	WNW21	WNW19	WNW18	NW11	NNW8	NW6	WNW7	WNW9	WNW8	W6	WNW11.7	WNW21
4-Sep	WSW6	WSW6	SSW3	SSW4	S2	NNW3	NNW8	NW8	NW9	NW9	NNW10	NNE7	NNW7	NNE8	NNW6	NNW3	NW5	NNW7	NW1	S5	S4	SSW5	SSW4	S5	NW2.8	NNW10
5-Sep	S5	SSE6	SSE5	S5	SSW5	S4	S5	S4	S6	S6	S6	SSW8	SSW9	SSW6	S5	SE5	SE4	SSE3	SSE4	SSE3	S4	SSW5	SE3	E5	S4.5	SSW9
6-Sep	E2	ENE3	ENE3	ENE4	ENE6	ENE5	ENE4	ESE2	NNW4	N6	NNE12	NE12	NNE12	NE15	NE19	NE17	ENE15	NE16	NE16	NNE18	NNE15	NNE11	N8	NNE10	NE9.1	NE19
7-Sep	NNE8	N7	N8	N8	NNE11	NNE14	N10	N10	NNW8	NNE10	N12	N12	N12	N13	N14	NNE15	NNE18	NE16	ENE9	ENE4	SSW1	SSW4	SSW4	SW4	NNE8.2	NNE18
8-Sep	S4	S6	S6	SSW6	SSW6	S5	SSE5	S4	SSW4	SE4	SSW2	ESE4	NW4	NNE5	NNE5	E4	ENE4	E6	E7	E1	E6	SE4	S5	SSW4	SSE2.4	E7
9-Sep	SE6	SSE7	S6	S6	S8	S6	S8	S7	S7	S7	S9	SSW8	S9	SSW8	SW7	S10	SE6	ESE7	SSE8	S6	S4	S6	S8	S8	S6.6	S10
10-Sep	S7	S8	S9	S7	SSW8	S6	S4	S8	S9	S9	SSW9	SSW11	SSW11	SSW11	S11	SSW10	SW12	SW11	SSW7	S7	S8	S7	S8	S5	SSW8.2	SW12
11-Sep	S6	S7	SSW8	S8	S8	S8	SSW8	S8	S9	SSW12	SSW12	S9	SSW13	SW19	SW19	SW19	SW12	SW17	SSW11	S5	SSE6	SSW7	SSW7	SW8	SSW9.7	SW19
12-Sep	SW8	WSW13	SW10	SW11	SW8	SSW7	S7	SSW7	SW8	S7	SW8	SW8	WSW13	SW12	WSW19	WSW21	WSW21	WSW15	W12	WNW9	NNW10	N13	N11	N11	WSW7.8	WSW21
13-Sep	NNE9	NNW1	S3	S5	W1	WNW5	S4	S3	S4	ESE2	NW6	WNW6	W7	W5	NW5	ENE11	N9	ESE3	SW4	NW7	NW3	NNW8	NNW13	N11	NNW2.6	NNW13
14-Sep	N11	N12	NNE12	NNE17	NNE12	N12	N12	NNE15	N14	N12	N13	N13	NNE10	NNE12	NNE15	NE10	ENE8	E8	ENE9	ENE8	E7	ESE4	ENE4	ENE8	NNE9.5	NNE17
15-Sep	ESE2	S4	ESE3	ENE4	E5	ESE4	SE1	SE2	ENE2	NE4	NNW6	NW6	NE3	SW5	S5	SSE8	S4	SSE7	SSW3	SSE3	SE4	ESE5	SE4	SE3	SE1.9	SSE8
16-Sep	E4	E4	E5	ENE4	S2	SSE4	SSW4	SSE5	SSW4	SE4	SSW4	SE1	E2	NNW6	NE1	SE7	SE7	SSW9	S7	SSE8	S8	S8	S9	S6	SSE3.6	SSW9
17-Sep	S6	S7	S7	S7	S8	S8	SSW6	SSW7	SSW9	SSW8	SSW9	SSW11	SSW13	SSW12	SSW11	SSW11	S10	SSW9	S9	S10	S9	S5	SSE6	SSE5	SSW8.2	SSW13
18-Sep	S7	S7	S6	S7	S7	S8	S10	S8	SSW9	SW14	SW18	SW18	WSW21	SW20	SW21	SW18	WSW16	SW18	SW12	SSW8	S8	S8	S7	S7	SSW10.8	SW21
19-Sep	S7	S7	S6	S6	S7	S9	S12	S12	S13	SSW14	SSW17	WSW30	SW26	SW24	WSW25	W23	SW11	SW20	SW19	SW26	SW23	W16	W10	WSW4	SW13.7	WSW30
20-Sep	SW8	SSW10	SW10	SW15	WSW19	SW8	S7	SSW9	SW20	SW23	SW26	WSW25	WSW26	WSW27	W26	WNW21	WNW21	WNW14	NW9	NNW7	NW10	NW10	NW10	NW8	WSW12.4	WSW27
21-Sep	NW10	NW11	NW11	WNW11	W10	NW12	N16	N15	N18	NNW13	NNW9	NW14	NW16	NNW14	NNW15	N10	NW13	WNW14	WNW15	W11	WNW11	W10	WNW11	NW10	NW11.2	N18
22-Sep	NW9	NW8	NW4	SSW6	WSW6	S3	S4	S5	SSE4	SW6	S5	SSW5	E5	ESE5	SSE5	SSW8	SSW7	S5	SE5	SE7	SSE6	SSE5	S7	S7	S3.4	NW9
23-Sep	S3	S6	SSE1	E4	ESE2	E4	ENE4	NE1	E1	SSE6	SSE12	SE10	SE12	SE10	SE11	SE11	ESE10	SE13	SE11	SE10	SE10	SSE7	S8	S10	SE6.8	SE13
24-Sep	S9	S7	SW5	SW5	SSW4	SSW5	S7	S7	SSW9	SSW12	S11	SSW11	SSW11	S11	S11	S8	SE5	ESE5	E8	ENE10	ENE8	SSE2	S5	S4	S5.7	SSW12
25-Sep	S8	SSW6	SSW6	SSW6	S6	SSW10	SSW9	SW13	WSW14	WSW10	SW17	SW19	SW20	SW24	SW24	WSW19	WSW19	SW13	SW14	SW14	SSW10	SSW8	SW12	SW12.4	SW24	
26-Sep	SSE5	SSE8	S10	S10	S8	SE5	SSE6	SSW10	SW19	SW25	SW21	SW23	WSW28	WSW25	WSW26	SW32	WSW32	WSW26	WSW26	WSW18	SW15	SW18	SW16	SW12	SW15.9	WSW32
27-Sep	SW8	S6	SSW8	WSW15	WSW15	SW14	WSW19	WNW35	NW25	NW23	NW23	WNW27	WNW31	WNW27	WNW28	WNW28	WNW22	WNW19	WNW12	WNW16	NW21	NW16	WNW15	WNW15	WNW17.1	WNW35
28-Sep	W16	W14	WNW13	WNW10	W11	W11	WSW10	SW8	WSW12	W8	WSW3	SW6	SW8	SSW8	S8	S8	S7	SSE7	SSE7	S6	S7	SSE5	SSE5	SSE5	SW5.7	W16
29-Sep	S6	S4	SSE6	S6	S6	S6	S8	S7	SSW7	SSW6	S8	SSW7	S8	S9	SSW10	S10	S9	S7	S6	SSW5	S7	S8	S6	SSW6	S6.9	S10
30-Sep	S7	S7	SSW6	S7	S7	S8	S7	S8	S12	S11	S13	S13	S14	SSW18	SSW19	S17	S14	S10	S9	SSW11	S12	S11	S10	S8	S10.7	SSW19

SSW2.2	SSW3.2	SSW3.0	SSW3.4	SW3.8	SSW2.9	SSW3.2	SW3.5	WSW4.0	WSW3.8	WSW4.1	WSW4.8	WSW6.0	WSW5.9	WSW6.2	WSW5.1	WSW4.0	SW3.9	SW2.9	SW2.5	SW2.5	SW2.8	SW2.8	SW2.4	Diurnal Average
W16	W14	WNW13	NNE17	WSW19	NNE14	WSW19	WNW35	NW25	SW25	SW26	WSW30	WNW31	WNW27	WNW28	WSW32	WSW32	WSW26	WSW26	SW26	SW23	N19	SW16	WNW15	Diurnal Maximum

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



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Sep 27 09:00																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 1 km/h on Sep 15 21:00																									
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> = 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-Sep	1	1	2	1	1	2	2	3	3	5	5	5	5	5	2	2	2	2	3	2	3	2	3	2	5
2-Sep	3	2	1	2	2	2	2	2	1	5	3	4	4	3	3	4	4	4	5	5	5	5	4	4	5
3-Sep	4	3	3	3	2	3	3	3	4	4	3	4	3	5	5	4	4	4	3	2	1	2	1	1	5
4-Sep	1	1	1	2	1	2	2	2	3	3	4	4	5	4	3	2	3	3	2	1	2	1	1	1	5
5-Sep	1	1	1	1	1	2	1	1	2	2	2	3	3	2	2	2	2	1	1	1	1	1	2	2	3
6-Sep	2	2	2	2	4	4	2	1	2	2	3	3	4	3	3	3	3	3	3	3	4	4	3	3	4
7-Sep	4	2	3	3	4	4	3	3	3	4	4	4	4	4	5	5	4	5	4	4	1	2	1	1	5
8-Sep	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	2	2	2	1	2	2	1	2	2	3
9-Sep	2	1	1	1	2	2	2	2	2	2	3	3	3	3	3	4	2	2	3	1	1	2	1	1	4
10-Sep	2	1	2	1	1	1	2	2	3	3	2	3	3	4	4	3	4	3	1	1	1	1	1	1	4
11-Sep	1	1	1	1	1	2	2	2	3	4	4	3	5	6	4	4	4	4	3	2	2	1	2	3	6
12-Sep	4	3	4	3	2	2	1	1	3	2	3	2	2	4	5	4	3	3	2	2	3	4	3	3	5
13-Sep	3	3	1	2	2	2	2	1	1	2	3	2	2	3	3	3	5	2	2	2	2	5	4	4	5
14-Sep	4	4	4	5	4	4	4	5	4	4	4	4	4	4	3	4	3	2	2	2	1	2	3	3	5
15-Sep	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	4	1	2	1	1	1	1	1	1	4
16-Sep	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	2	3	3	1	2	2	2	2	2	3
17-Sep	1	1	1	1	1	1	1	1	2	3	3	4	4	4	4	3	3	3	2	2	2	3	1	1	4
18-Sep	1	1	2	2	2	2	2	2	3	4	5	5	4	4	5	4	3	5	3	2	1	2	2	2	5
19-Sep	2	2	1	1	1	2	3	4	4	5	6	5	6	7	6	7	3	6	6	6	4	5	2	2	7
20-Sep	1	3	4	5	3	4	2	3	7	5	5	5	6	6	6	5	5	3	3	2	3	3	3	2	7
21-Sep	3	3	3	2	2	4	5	6	6	5	4	5	6	6	6	4	5	3	4	2	3	2	2	2	6
22-Sep	3	2	2	2	2	2	1	1	1	2	2	3	2	3	2	3	2	2	1	1	1	2	2	2	3
23-Sep	2	1	1	1	1	1	1	1	1	4	4	4	4	4	4	4	4	4	3	3	3	2	2	3	4
24-Sep	2	2	1	1	1	2	1	2	3	4	4	4	4	4	3	3	2	1	1	2	2	1	1	1	4
25-Sep	2	1	1	1	2	2	2	4	3	4	4	2	6	4	4	5	4	4	4	3	2	4	2	3	6
26-Sep	1	2	2	2	2	1	1	3	7	4	5	5	6	7	7	7	7	5	5	4	2	3	3	4	7
27-Sep	4	2	2	7	3	3	5	8	10	8	7	7	7	7	7	7	7	6	5	6	6	6	4	3	10
28-Sep	3	2	3	2	1	1	2	2	3	2	2	3	3	3	3	3	2	1	2	1	1	1	1	1	3
29-Sep	2	1	1	2	1	2	2	2	2	2	3	2	2	3	3	3	3	2	2	1	2	2	1	1	3
30-Sep	1	1	1	1	1	1	2	2	3	4	4	4	5	6	6	5	4	2	2	3	3	3	3	2	6
Diurnal Maximum																									
4 4 4 7 4 4 5 8 10 8 7 7 7 7 7 7 7 7 6 6 6 6 6 4 4																									







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Shell Muskeg River - September 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	163	22.64	22.64
6 - 11	354	49.17	71.81
12 - 19	149	20.69	92.50
20 - 28	49	6.81	99.31
29 - 38	5	0.69	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Shell Muskeg River - September 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	2	5	12	13	12	15	19	42	21	5	2	2	2	6	4	163
6 - 11	13	9	3	9	6	2	12	18	136	66	18	7	10	9	20	16	354
12 - 19	21	16	10	1	0	0	2	1	10	10	27	17	8	17	5	4	149
20 - 28	2	1	4	0	0	0	0	0	0	0	16	12	2	8	4	0	49
29 - 38	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	5
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	37	28	22	22	19	14	29	38	188	97	66	41	22	38	35	24	720

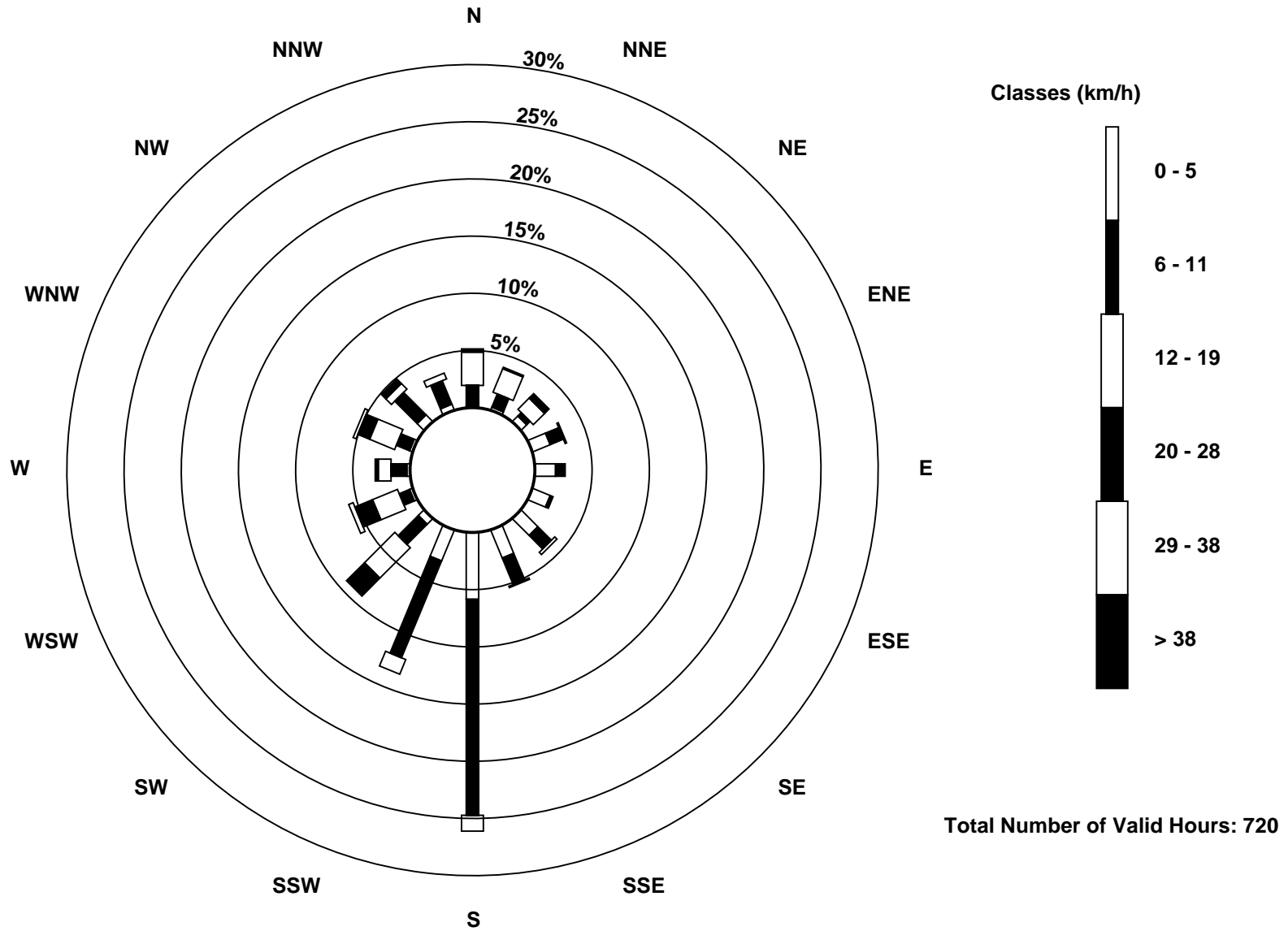
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Wind Speed (WS) - km/h  
Shell Muskeg River (AMS 16)





Direction of Maximum Speed: 285 deg on Sep 27 08:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 289.2 deg on Sep 27		Hours of Data:	720
Direction of Minimum Speed: 42 deg on Sep 2 09:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 1.9 deg on Sep 15		Percent Operational Time:	100.0
Monthly Average Direction: 222.7 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	146	153	175	181	199	186	195	179	172	46	27	27	356	298	265	255	247	202	216	212	212	188	191	197	217.8
2-Sep	243	160	181	182	177	293	1	170	42	41	41	37	42	42	44	44	43	27	6	2	1	3	18	8	28.3
3-Sep	356	330	343	332	307	285	281	285	293	290	273	268	279	296	293	303	297	318	345	317	284	282	294	262	297.4
4-Sep	248	245	194	210	183	333	336	316	314	311	330	18	332	14	337	339	314	336	320	171	172	202	201	171	308.1
5-Sep	172	166	150	170	193	173	187	183	179	188	180	197	202	204	173	135	138	154	155	160	186	204	125	89	174.3
6-Sep	79	69	62	60	63	61	65	110	330	354	32	52	31	34	43	46	66	46	38	26	27	19	3	15	37.9
7-Sep	20	359	358	1	12	24	357	359	344	24	10	10	356	7	7	26	31	36	72	67	212	201	196	224	14.8
8-Sep	185	170	188	198	201	180	162	171	211	139	204	117	323	12	19	95	75	99	94	83	86	131	178	204	148.6
9-Sep	140	167	185	181	184	186	174	175	177	187	186	198	188	193	214	189	139	103	160	185	187	180	179	182	178.0
10-Sep	182	185	188	182	192	179	174	174	182	184	204	204	197	204	191	193	221	217	201	186	181	188	187	175	192.4
11-Sep	175	188	198	184	184	190	197	188	187	201	205	185	209	223	226	227	214	225	211	172	153	199	204	214	204.4
12-Sep	230	241	231	234	233	194	185	212	226	189	221	219	245	232	251	249	241	247	270	293	342	1	10	9	248.7
13-Sep	17	333	186	185	259	303	173	180	175	111	311	294	269	263	323	59	2	112	235	307	310	332	347	351	326.4
14-Sep	359	6	15	26	15	8	9	23	3	2	9	9	32	12	33	50	66	83	72	75	83	120	75	75	28.2
15-Sep	115	177	114	76	79	104	144	131	63	36	328	316	50	220	182	159	191	166	210	160	128	117	141	132	137.8
16-Sep	99	93	86	72	172	158	196	154	202	142	203	131	101	344	36	145	143	197	180	160	181	180	181	185	161.5
17-Sep	174	182	172	175	178	183	192	205	212	207	213	201	213	208	203	193	172	206	188	184	182	188	168	165	192.4
18-Sep	183	178	176	177	187	186	181	181	196	215	221	223	238	234	230	233	238	236	226	197	186	186	187	187	213.3
19-Sep	187	181	190	178	183	185	185	185	181	197	213	238	230	220	237	270	223	228	214	229	234	266	272	256	223.1
20-Sep	218	209	214	231	241	229	181	193	231	230	235	237	237	257	262	283	296	295	315	338	319	324	322	310	254.1
21-Sep	310	306	312	286	276	325	355	356	356	348	331	318	321	347	342	358	321	292	286	281	293	280	288	305	318.8
22-Sep	318	312	305	207	256	191	180	185	163	214	191	196	84	112	156	209	192	174	125	139	147	153	187	177	186.3
23-Sep	177	171	156	89	122	79	73	37	93	157	154	141	130	132	124	128	118	124	129	128	146	160	173	171	136.5
24-Sep	172	179	229	216	203	193	183	185	201	202	190	194	193	187	185	181	140	122	82	63	61	151	184	183	177.4
25-Sep	183	204	197	199	180	195	210	228	251	250	239	234	236	234	235	232	239	246	232	231	230	210	212	236	229.1
26-Sep	148	167	177	180	171	137	148	202	224	234	222	231	242	247	237	236	248	253	248	247	234	235	235	233	230.6
27-Sep	219	175	206	240	237	224	246	285	314	324	306	295	295	301	296	295	300	293	299	301	308	314	300	285	289.2
28-Sep	279	278	283	285	265	264	254	233	258	278	245	228	234	195	188	173	172	147	164	182	173	165	151	150	233.2
29-Sep	169	171	163	174	188	190	184	182	194	195	190	193	183	185	206	181	177	170	170	192	191	190	185	196	184.7
30-Sep	184	188	192	189	184	175	191	183	182	182	187	183	181	201	193	182	180	182	187	192	188	183	183	184	186.2

211.8 204.3 205.4 207.1 214.4 207.7 208.6 222.3 237.9 238.8 240.9 244.0 248.2 251.4 247.7 237.7 241.4 232.8 219.7 228.2 224.8 231.7 224.6 222.6

Diurnal Average

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



**Wood Buffalo Environmental Association**

**Summary of Hour Standard Deviations**

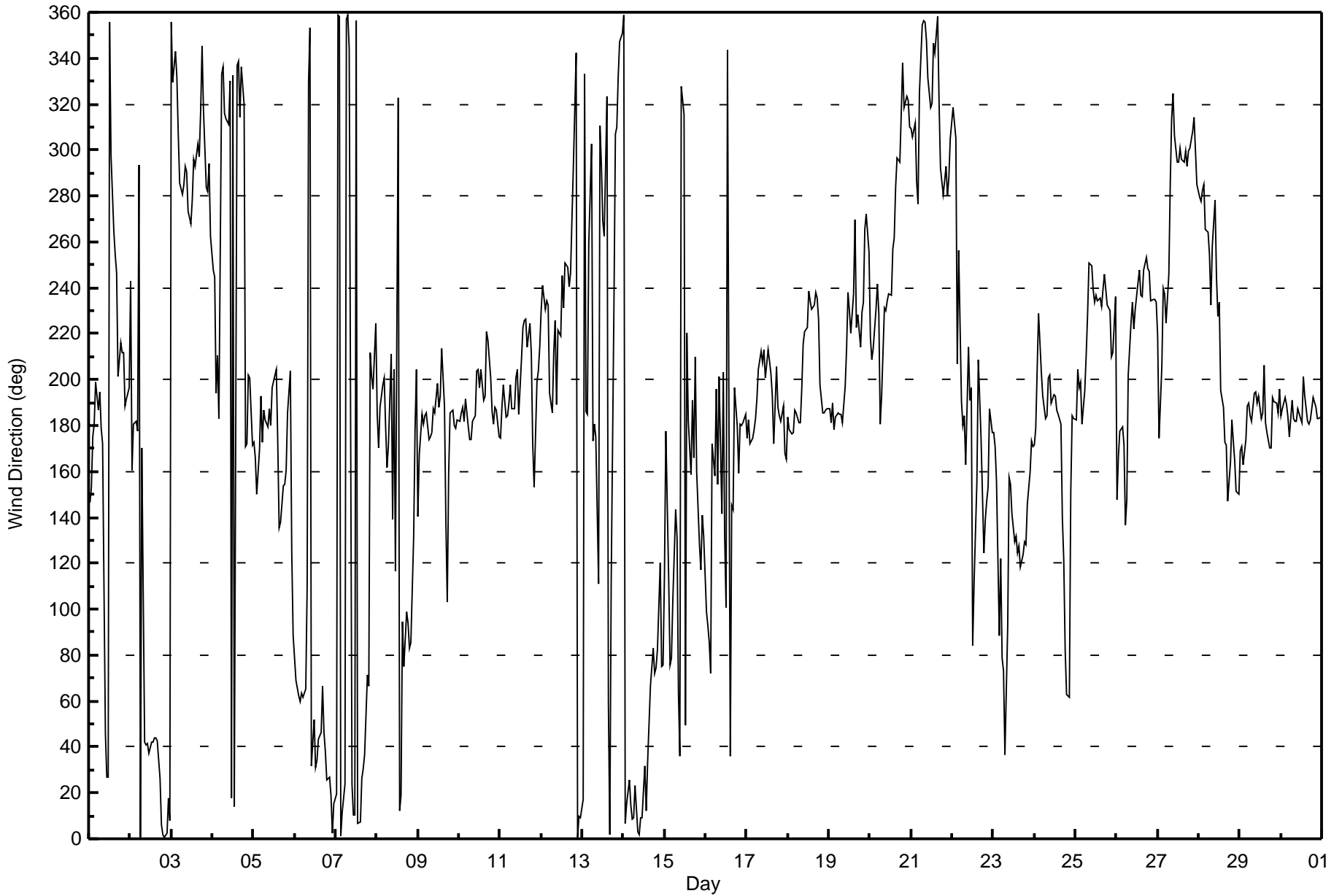
**Wind Direction (WD) - deg**

**Shell Muskeg River - September 2015**

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 112 deg on Sep 16 15:00			Hours of Data:	720
Minimum Value: 7 deg on Sep 28 06:00			Hours of Missing Data:	0
Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 12 Q <sub>1</sub> = 16 Median = 20 Q <sub>3</sub> = 27 P <sub>90</sub> = 41 P <sub>99</sub> = 91			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-Sep	33	12	20	23	19	15	25	59	24	42	14	12	28	21	18	15	31	22	21	19	20	17	20	24	59
2-Sep	63	38	19	32	24	58	91	66	101	12	10	14	10	9	8	12	17	18	23	19	19	20	22	20	101
3-Sep	22	20	21	26	21	11	12	12	14	17	14	13	14	16	14	17	15	36	27	26	16	16	9	17	36
4-Sep	12	14	42	36	60	53	20	21	23	28	29	47	47	41	41	75	46	25	91	10	24	12	16	23	91
5-Sep	18	10	18	32	25	30	30	31	33	35	39	37	33	34	37	38	50	41	29	25	24	17	66	20	66
6-Sep	93	46	55	36	26	47	37	43	36	34	16	20	23	15	11	17	13	11	13	10	14	21	25	24	93
7-Sep	35	28	25	24	24	18	25	22	27	31	28	30	27	25	29	23	21	22	21	74	96	26	24	18	96
8-Sep	16	12	20	20	15	14	23	24	36	36	83	57	57	66	60	62	60	30	13	101	28	30	37	49	101
9-Sep	21	16	17	16	17	16	15	21	20	20	23	32	30	42	26	35	37	29	20	21	18	9	15	12	42
10-Sep	16	15	15	19	14	16	34	23	24	26	26	23	28	28	27	23	24	17	18	14	12	13	14	23	34
11-Sep	15	13	15	15	15	15	17	16	24	23	24	24	24	18	13	11	20	11	18	47	21	22	17	25	47
12-Sep	30	15	22	18	16	21	15	27	20	22	19	19	10	12	12	11	10	14	11	36	26	21	23	22	36
13-Sep	23	82	39	15	75	22	14	34	29	75	41	38	29	60	58	23	48	64	33	27	86	42	22	22	86
14-Sep	24	20	22	15	24	25	25	20	24	25	25	30	37	27	23	20	25	13	12	16	20	36	40	18	40
15-Sep	62	26	24	12	27	25	80	18	56	35	34	37	74	55	31	25	36	28	21	18	10	18	25	29	80
16-Sep	26	10	23	15	45	33	21	14	31	34	44	90	91	44	112	31	36	22	20	18	16	18	17	21	112
17-Sep	12	13	12	15	15	13	14	17	15	27	25	28	25	26	30	27	24	22	18	17	17	50	15	24	50
18-Sep	14	14	16	20	19	18	18	22	21	21	19	19	14	13	14	16	10	10	12	16	11	16	19	17	22
19-Sep	20	16	19	20	19	19	20	21	22	25	21	11	17	17	16	21	18	14	20	10	10	20	20	59	59
20-Sep	26	18	19	16	8	33	22	23	16	13	12	15	14	16	16	17	14	13	25	22	20	25	27	15	33
21-Sep	20	13	16	13	12	32	25	25	24	23	33	25	30	34	30	35	26	15	12	12	15	10	9	14	35
22-Sep	16	17	55	15	27	39	20	21	31	30	45	69	60	64	63	31	25	15	22	16	17	20	28	18	69
23-Sep	36	14	44	21	52	11	16	31	64	47	21	24	20	23	22	23	18	19	17	16	19	21	17	17	64
24-Sep	14	17	21	11	14	15	15	18	21	22	24	28	28	27	25	24	22	23	14	10	12	53	20	22	53
25-Sep	17	22	20	19	27	18	19	18	9	14	25	19	13	12	13	14	10	8	9	10	15	17	17	12	27
26-Sep	28	27	17	15	14	19	19	22	17	10	15	17	15	19	12	11	12	12	10	9	9	9	12	20	28
27-Sep	35	18	19	18	13	15	16	14	27	26	21	17	15	18	18	14	15	14	17	23	15	19	14	16	35
28-Sep	11	11	12	21	7	7	10	18	17	38	82	58	33	44	35	29	20	13	18	18	16	17	17	19	82
29-Sep	17	17	14	20	19	20	18	20	29	27	25	26	29	29	28	23	19	17	16	15	17	18	17	15	29
30-Sep	12	15	16	16	18	16	20	19	21	25	24	24	25	23	23	23	19	18	16	18	19	18	19	19	25

	93	82	55	36	75	58	91	66	101	75	83	90	91	66	112	75	60	64	91	101	96	53	66	59	
	Diurnal Maximum																								





# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	September 24, 2015	Last Calibration	August 11, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	18:00
Gas Cert Reference	LL104193	Station temp.	22 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	12-Feb-18
Calibrator Make/Model	API T700	Serial Number	493
ZAG Make/Model	API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2632

### Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-710	-710
Analyzer IP address	192.168.1.43		Lamp voltage	789	798
Calculated slope	0.996167	0.997446	Chamber temp	45.0	45.0
Calculated intercept	1.130565	1.327575	Pressure	702.1	711.4
Analyzer Background	6.1	6.1	Flow	0.442	0.447
Analyzer Coefficient	1.243	1.222	Intensity	90	91

Analyzer make Thermo 43i Analyzer serial # 1118148498

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	83.5	806.6	838.0	0.963
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	83.5	806.6	807.7	0.999
second point	5000	41.9	404.8	404.5	1.001
third point	5000	21.1	203.8	201.4	1.012
as left zero	6000	0.0	0.0	0.5	----
as left span	5000	83.5	806.6	808.5	0.998
Average Correction Factor					1.004

Corrected As found      837.9      Previous response      808.6      % change      -3.5%

**Notes:**

Installed new API calibrator yesterday. Changed inlet filter after as founds. Adjusted span. Re-did the As Found span because I needed to change it to a GPT point for the Nox calibration.

Calibration Performed By:

Evan Magill



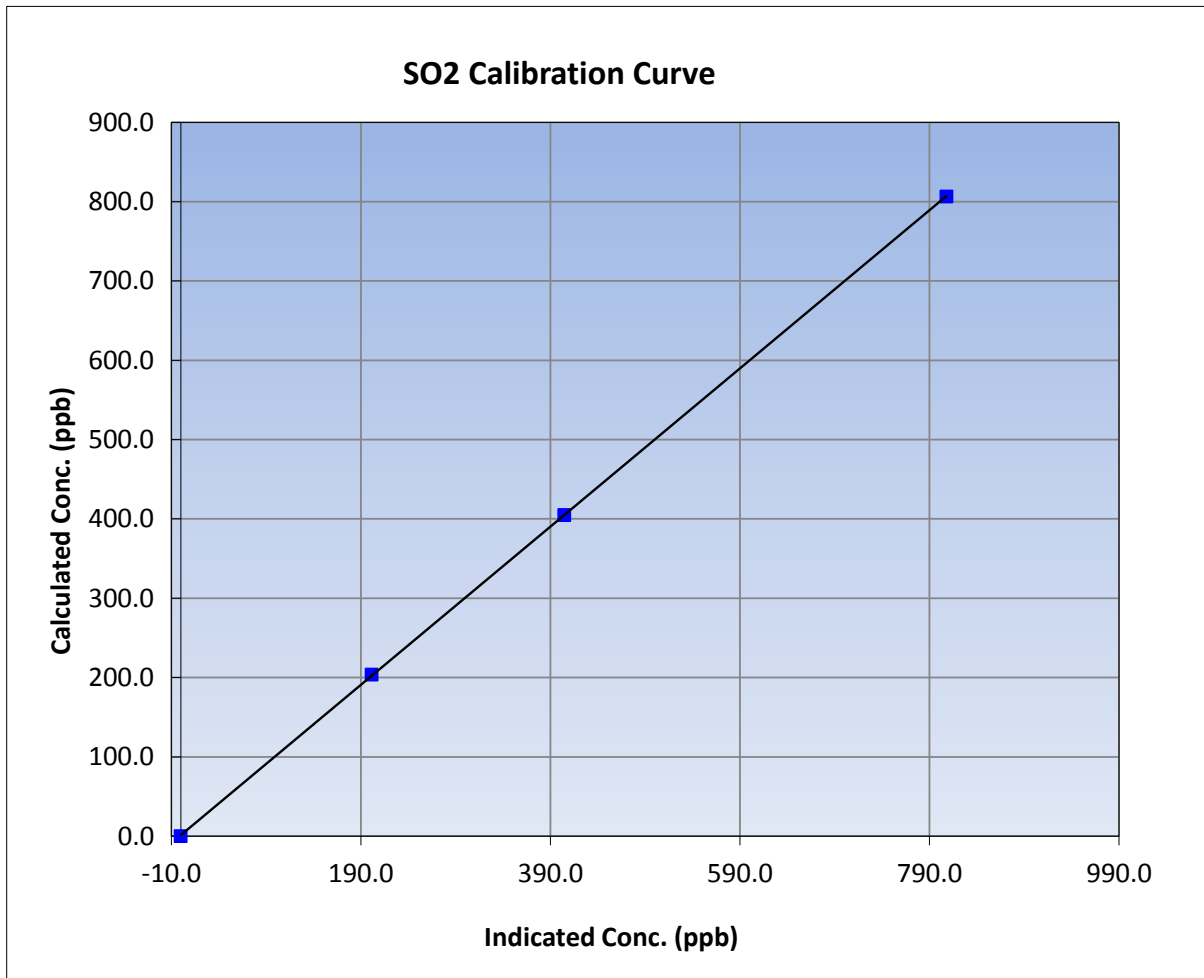
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 11, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:30	End Time (MST)	18:00
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

### Calibration Data

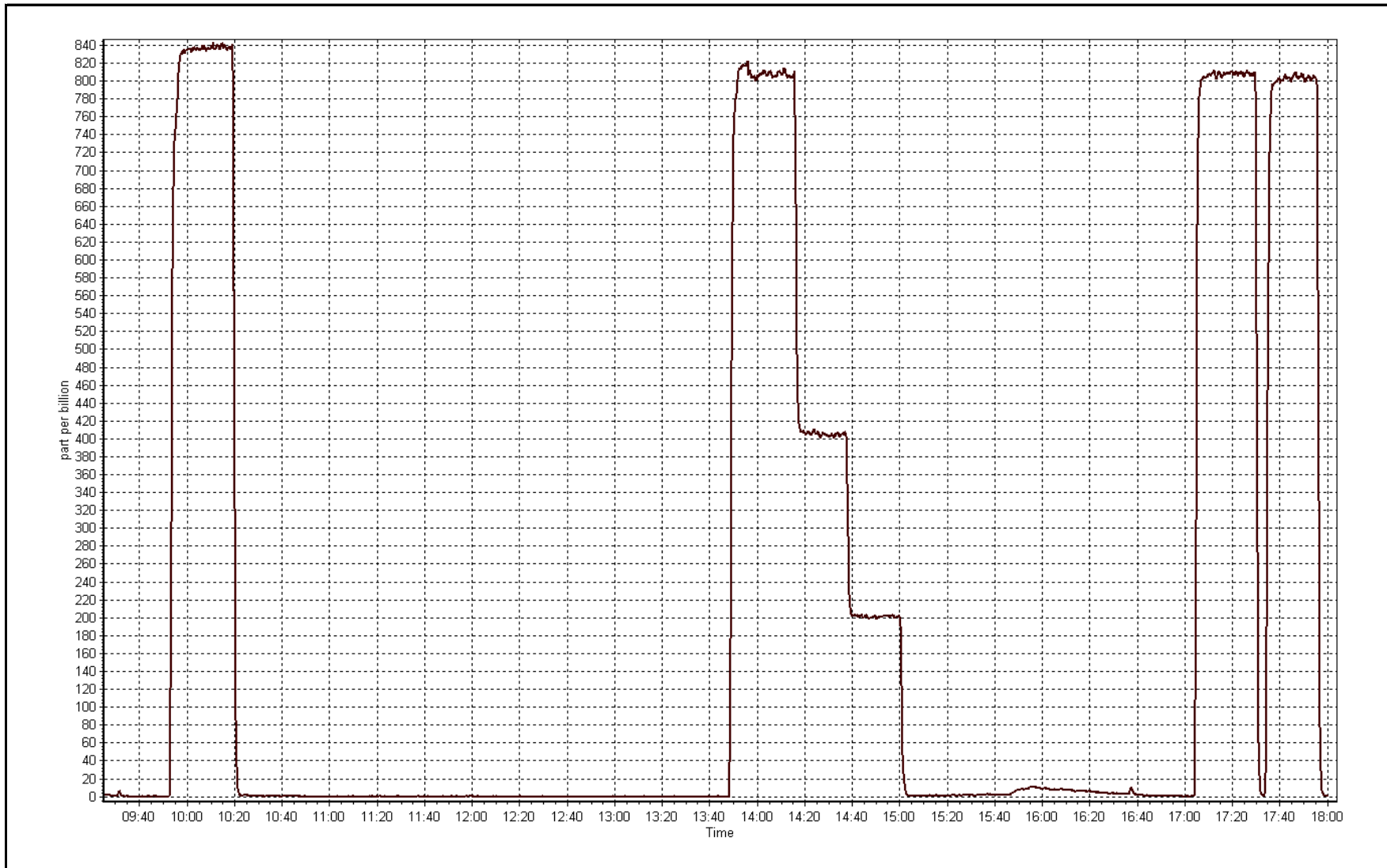
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999988
806.6	807.7	0.9986		
404.8	404.5	1.0006	Slope	0.997446
203.8	201.4	1.0122		
			Intercept	1.327575





SO2 Calibration Plot

Date: September 24, 2015





# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	September-23-15	Last Calibration	August-11-15
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	As Found		
Start Time (MST)	12:25	End Time (MST)	13:55
Gas Cert Reference	LL104193	Cal Gas Expiry Date	12-Feb-18
CH4 Cal Gas Conc.	487 ppm	CH4 Equiv Conc.	1017.8 ppm
C3H8 Cal Gas Conc.	193 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	493
ZAG make/model	Teledyne API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	Serial Number	2632

### Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	1.004019	0.989021	Fuel Pressure	24.2	24.2
Calculated intercept	-0.066184	0.319229	Analyzer Coeff	4.3	4.3
			Analyzer BKG	2.820	2.820

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458
---------------	---------------	-------------------	------------

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.33	----
as found span	5000	83.5	17.00	16.85	1.009
calibrator zero	5000	0.0	0.00	-0.33	----
high point	5000	83.5	17.00	16.85	1.009
second point	5000	41.9	8.53	8.33	1.024
third point	5000	21.1	4.29	4.01	1.071
as left zero					
as left span					
Average Correction Factor					1.035

Corrected As found	17.18	Previous response	16.99	% change	-1.1%
--------------------	-------	-------------------	-------	----------	-------

**Notes:**

Installed new API calibrator prior to this calibration. 3-point As found calibration before pump change.

Calibration Performed By: Evan Magill



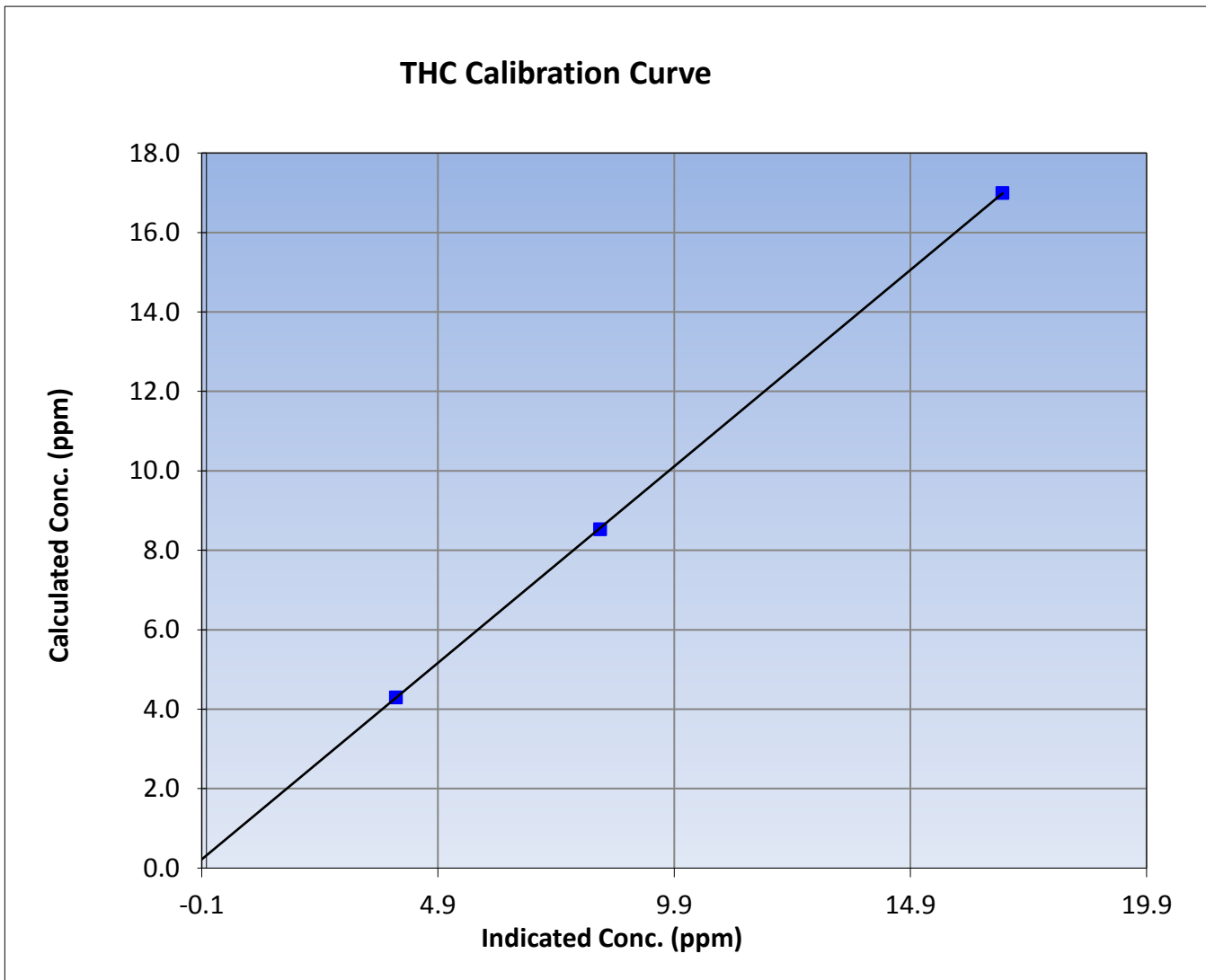
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	September 23, 2015	Previous Calibration	August 11, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	12:25	End Time (MST)	13:55
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

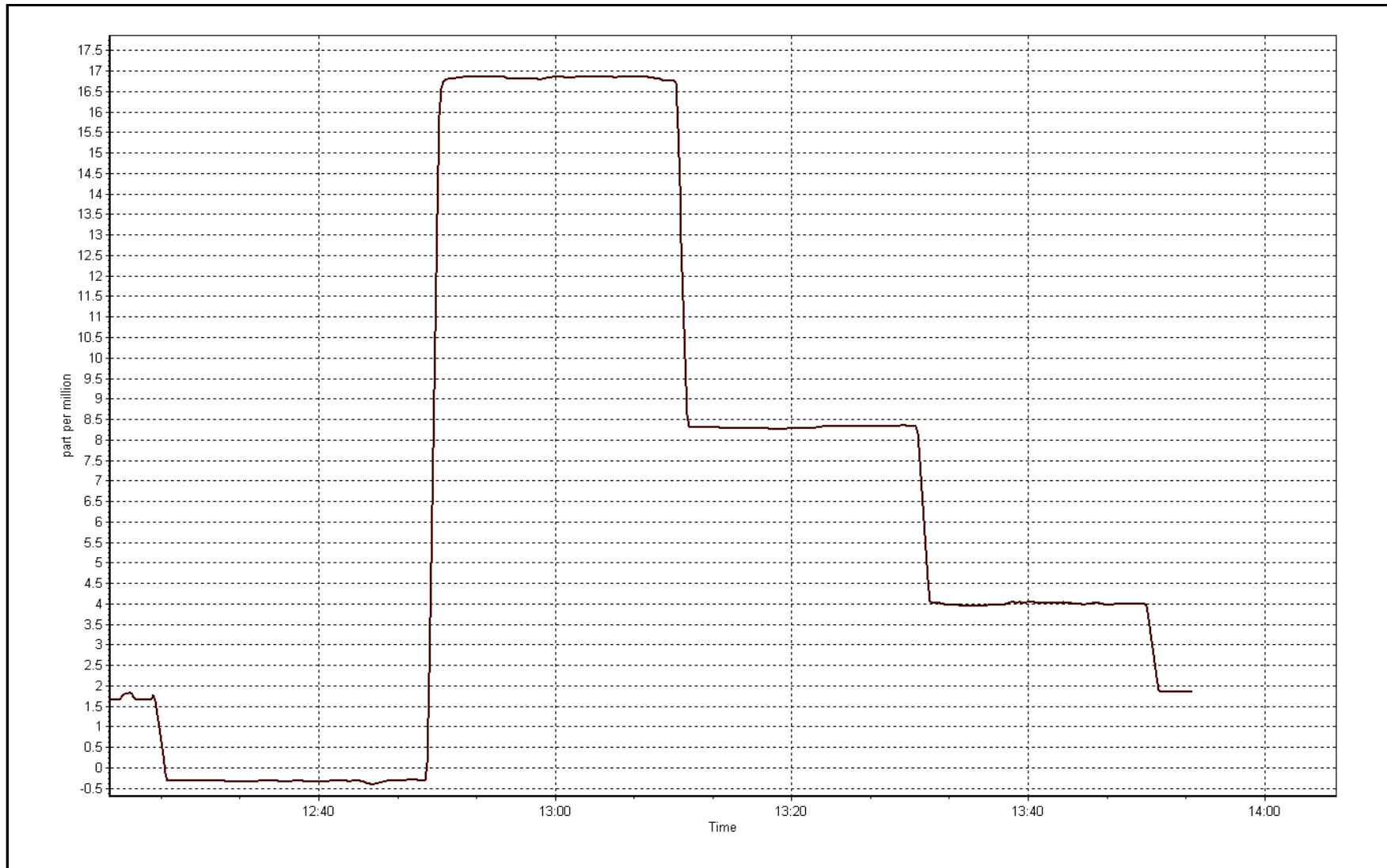
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.33	----	Correlation Coefficient	0.999993
17.00	16.85	1.0087		
8.53	8.33	1.0239	Slope	0.989021
4.29	4.01	1.0710		
			Intercept	0.319229



THC Calibration Plot

Date: September 23, 2015





# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	September-23-15	Last Calibration	August-11-15
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	15:20	End Time (MST)	19:00
Gas Cert Reference	LL104193	Cal Gas Expiry Date	12-Feb-18
CH4 Cal Gas Conc.	487 ppm	CH4 Equiv Conc.	1017.8 ppm
C3H8 Cal Gas Conc.	193 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	493
ZAG make/model	Teledyne API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	Serial Number	2632

### Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	7.0
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.8
Calculated slope	1.004019	0.996716	Fuel Pressure	24.2	24.2
Calculated intercept	-0.066184	0.036960	Analyzer Coeff	4.3	5.9
			Analyzer BKG	2.820	2.760

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458
---------------	---------------	-------------------	------------

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.00	0.04	----
high point	5000	83.5	17.00	17.04	0.997
second point	5000	41.9	8.53	8.52	1.001
third point	5000	21.1	4.29	4.17	1.030
as left zero	6000	0.0	0.00	-0.04	----
as left span	5000	83.5	17.00	16.99	1.000
<b>Average Correction Factor</b>					<b>1.009</b>

Corrected As found	NA	Previous response	NA	% change	NA
--------------------	----	-------------------	----	----------	----

**Notes:**

Changed pump and inlet filter after As found calibration. Adjusted zero initially, went to span but was very low. After consultation with senior tech, sample pressure and ignite pressure was then lowered. Went back to zero and adjusted again. Then a large adjustment on the span was made. During the As Left zero, the lid to the analyzer was placed back on the analyzer, resulting it to drift to 0.55 ppm because of the temperature difference. Since the analyzer lid was taken off before the as left, it will stay off overnight until tomorrow when I return.

Calibration Performed By:

Evan Magill



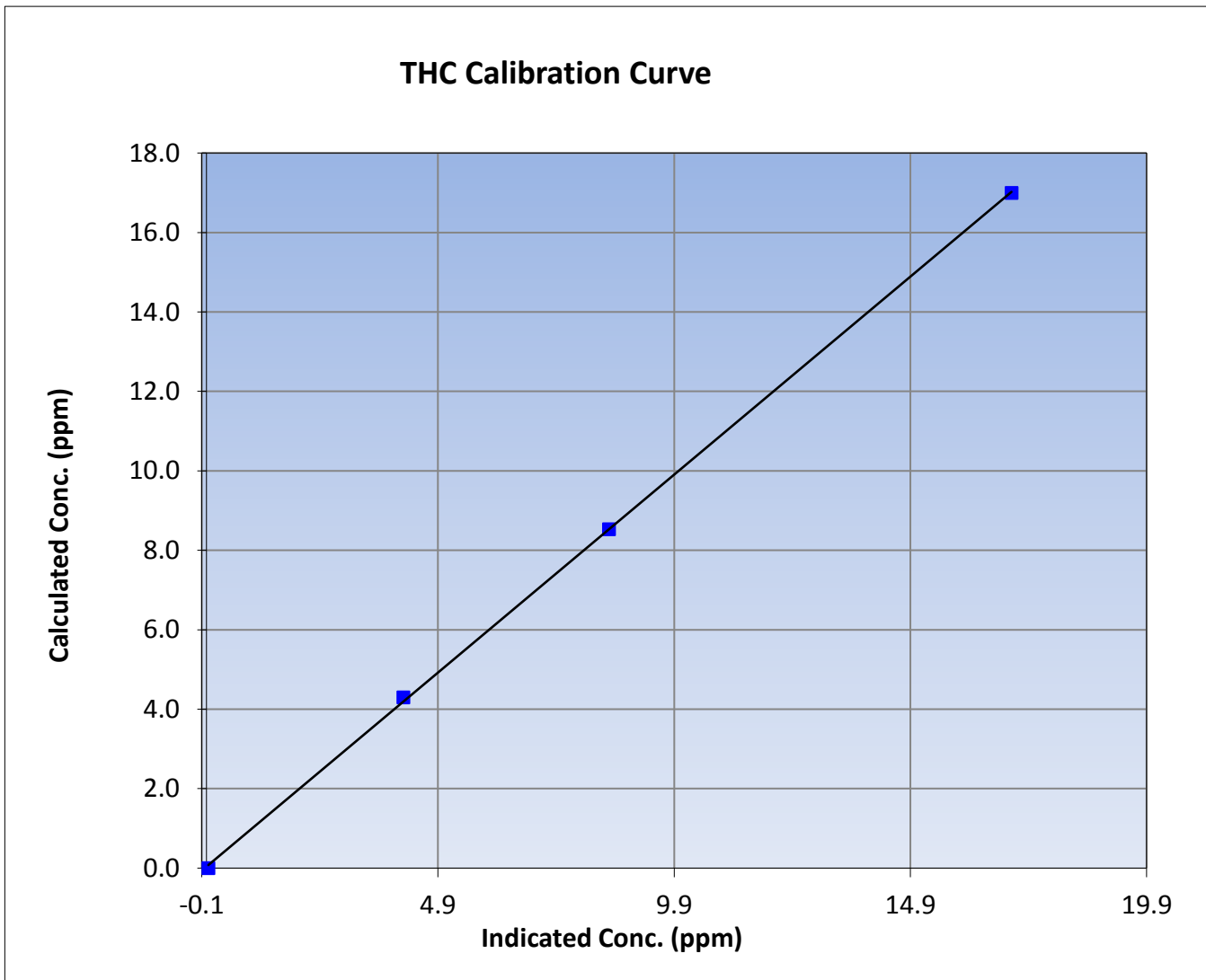
# Wood Buffalo Environmental Association THC Calibration Report

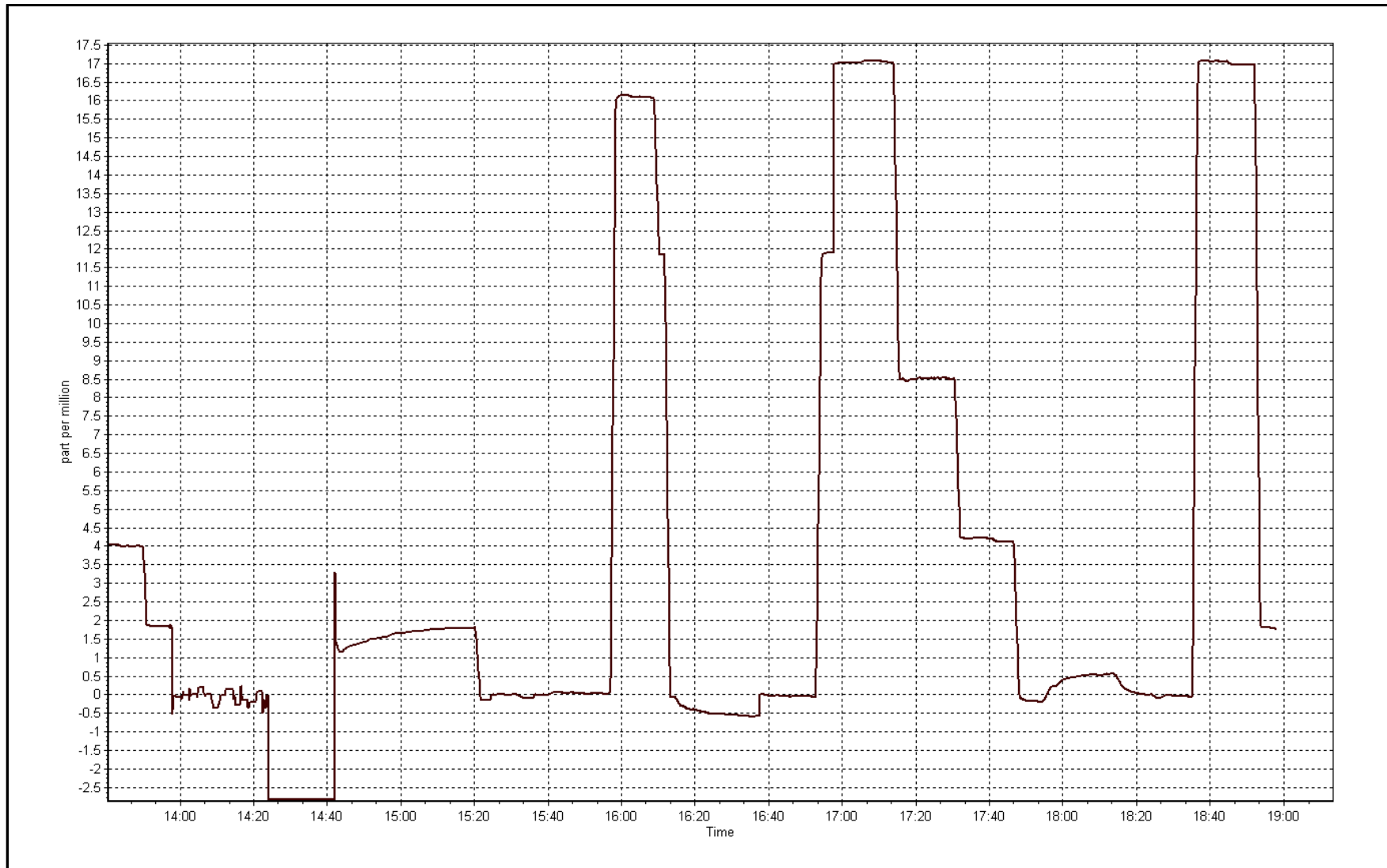
## Station Information

Calibration Date	September 23, 2015	Previous Calibration	August 11, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	15:20	End Time (MST)	19:00
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.04	----	Correlation Coefficient	0.999893
17.00	17.04	0.9974		
8.53	8.52	1.0010	Slope	0.996716
4.29	4.17	1.0300		
			Intercept	0.036960







# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	September-24-15	Last Calibration	September-23-15
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Other:	repair	
Start Time (MST)	9:30	End Time (MST)	18:00
Gas Cert Reference	LL104193	Cal Gas Expiry Date	12-Feb-18
CH4 Cal Gas Conc.	487 ppm	CH4 Equiv Conc.	1017.8 ppm
C3H8 Cal Gas Conc.	193 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	493
ZAG make/model	Teledyne API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	Serial Number	2632

## Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	7.0	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.8	34.8
Calculated slope	0.996716	1.002831	Fuel Pressure	24.2	24.2
Calculated intercept	0.036960	0.026550	Analyzer Coeff	5.9	4.5
			Analyzer BKG	2.760	2.910

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458
---------------	---------------	-------------------	------------

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.76	----
as found span	5000	83.5	17.00	16.58	1.025
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	83.5	17.00	16.93	1.004
second point	5000	41.9	8.53	8.49	1.005
third point	5000	21.1	4.29	4.20	1.023
as left zero	6000	0.0	0.00	-0.01	----
as left span	5000	83.5	17.00	17.00	1.000
Average Correction Factor					1.010

Corrected As found	17.34	Previous response	17.02	% change	-1.9%
--------------------	-------	-------------------	-------	----------	-------

**Notes:**

Lid to analyzer was placed back on after the as founds and allowed the internal temperature to settle for a significant amount of time. Reset the air pressure settings back to factory set values once the internal temperature had stabilized. Adjusted zero and span. Re-did As Found span because I needed to change it to a GPT point for the NOx calibration.

Calibration Performed By:

Evan Magill





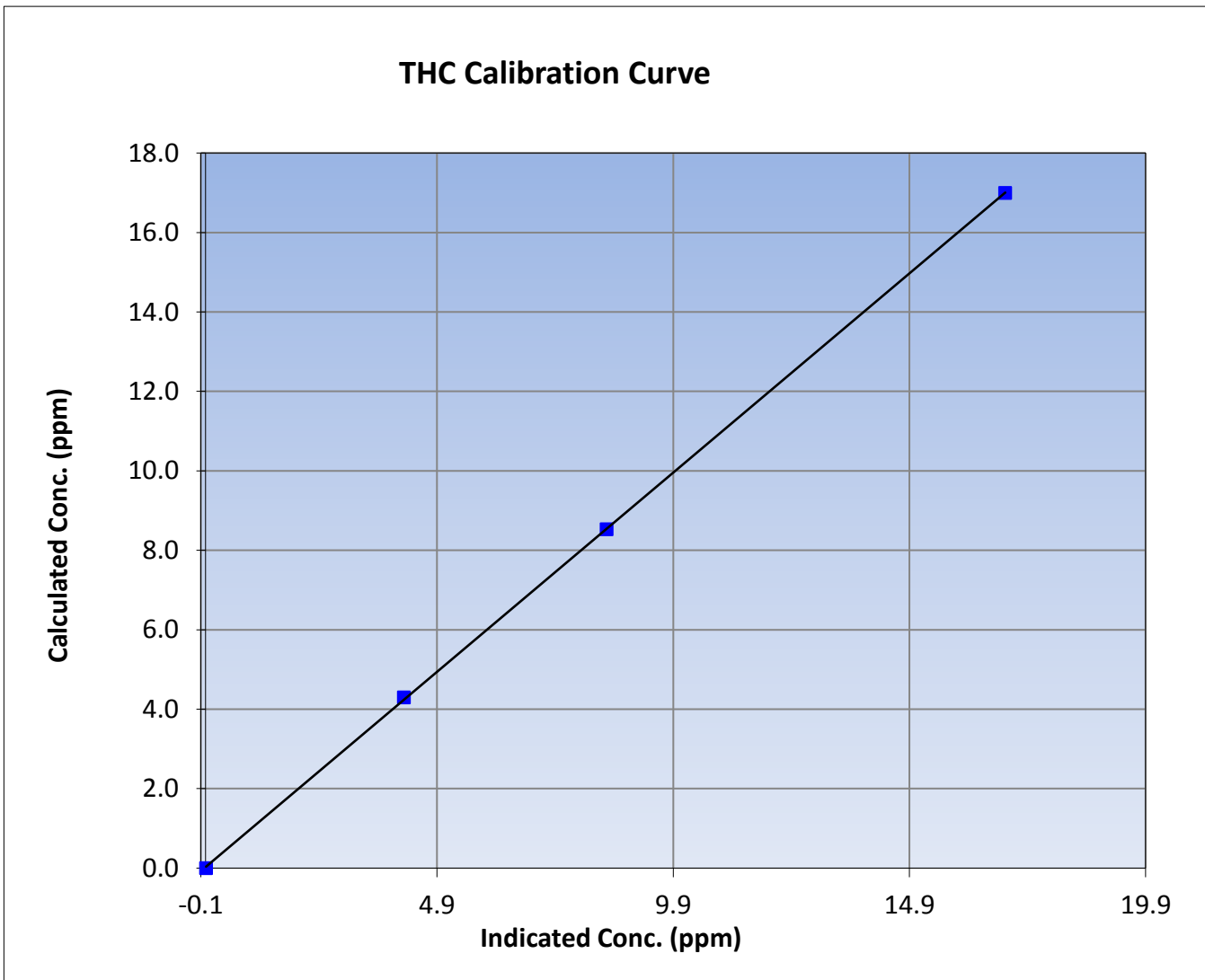
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	September 24, 2015	Previous Calibration	September 23, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:30	End Time (MST)	18:00
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

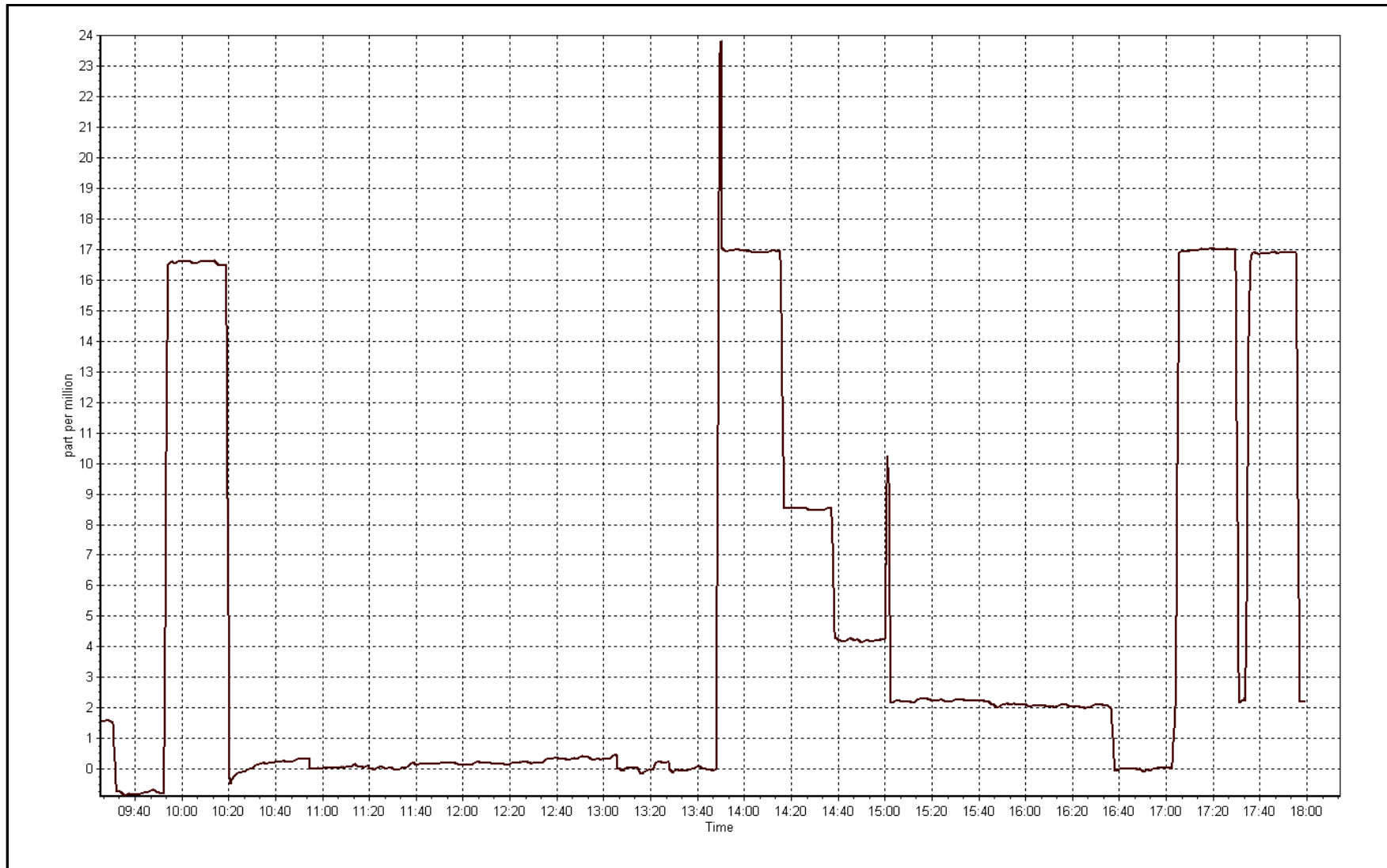
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999970
17.00	16.93	1.0039		
8.53	8.49	1.0046	Slope	1.002831
4.29	4.20	1.0226		
			Intercept	0.026550



THC Calibration Plot

Date: September 24, 2015





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

### Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 11, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	18:00
NO Cal Gas Conc	48 ppm	Gas Cert Reference	LL104193
NOx Cal Gas Conc	48 ppm	Cal Gas Expiry Date	February 12, 2018
Calibrator	API T700	Serial Number	493
Zero air Generator	Teledyne API T701	Serial Number	2155

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2632
-------------------	----------------------------	-----------------	------

### Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.990121	0.989387	1.011243
	Data Offset	-0.034388	0.524573	-0.629259
Current Calibration	Data Slope	0.999009	0.998610	1.002759
	Data Offset	0.655648	0.997919	0.983547

### Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262593
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.788		0.779	
NOx coefficient	0.997		0.997	
NO2 coefficient	1.000		1.000	
NO bkgnd	8.7		8.6	
NOx bkgnd	9.0		8.9	
Chamber Temp	50.2	Deg C	50.2	Deg C
Moly Temp	322	Deg C	323.9	Deg C
PMT voltage	-775	V	-774	V
PMT Temp	-3	Deg C	-3.3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	173.7	mmHg	173.7	mmHg
R Cell Press Nox	173.4	mmHg	173.4	mmHg
NO sample flow	0.855	lpm	0.871	lpm
Nox sample Flow	0.858	lpm	0.874	lpm

**Notes:**

Installed new API calibrator yesterday. Changed inlet filter after as founds. Adjusted span. Used 2nd GPT reference points. Re-did the As found span because I needed to change it to a GPT point instead of just an NO point.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

September 24, 2015

Station Number:

AMS 16

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.3	----	----
as found span	5000	83.5	801.6	801.6	0.0	830.2	829.8	0.4	0.9656	0.9660
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.2	----	----
high point	5000	83.5	801.6	801.6	0.0	801.4	801.6	-0.2	1.0003	1.0000
second point	5000	41.9	402.2	402.2	0.0	403.4	403.0	0.4	0.9972	0.9982
third point	5000	21.1	202.6	202.6	0.0	200.7	199.8	0.9	1.0093	1.0138
as left zero	6000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as left span	5000	83.5	801.6	486.7	314.9	799.6	486.4	313.1	1.0026	1.0006
Average Correction Factor									1.0023	1.0040

Corrected As found

NO<sub>x</sub>= 830.5

NO= 829.9

Percent Change

NO<sub>x</sub>= -2.5%

NO= -2.4%

Previous Response

NO<sub>x</sub>= 809.6

NO= 809.7

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

83.50

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.2			N/A	
1st NO2 (300)	----	486.7	310.9	796.2	486.7	309.5	0.9902	1.0000	1.0044	99.6%
2nd NO2 (200)	----	584.7	212.8	795.9	584.7	211.1	0.9907	1.0000	1.0081	99.2%
3rd NO2 (100)	----	686.4	111.2	795.2	686.4	108.8	0.9915	1.0000	1.0219	97.9%
4th NO2 (0)	797.6	----	-1.3	796.3	797.6	-1.3	0.9902	1.0000	N/A	----
Average Correction Factor							0.9906	1.0000	1.0114	98.9%

Calibration Performed By:

Evan Magill



# Wood Buffalo Environmental Association

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

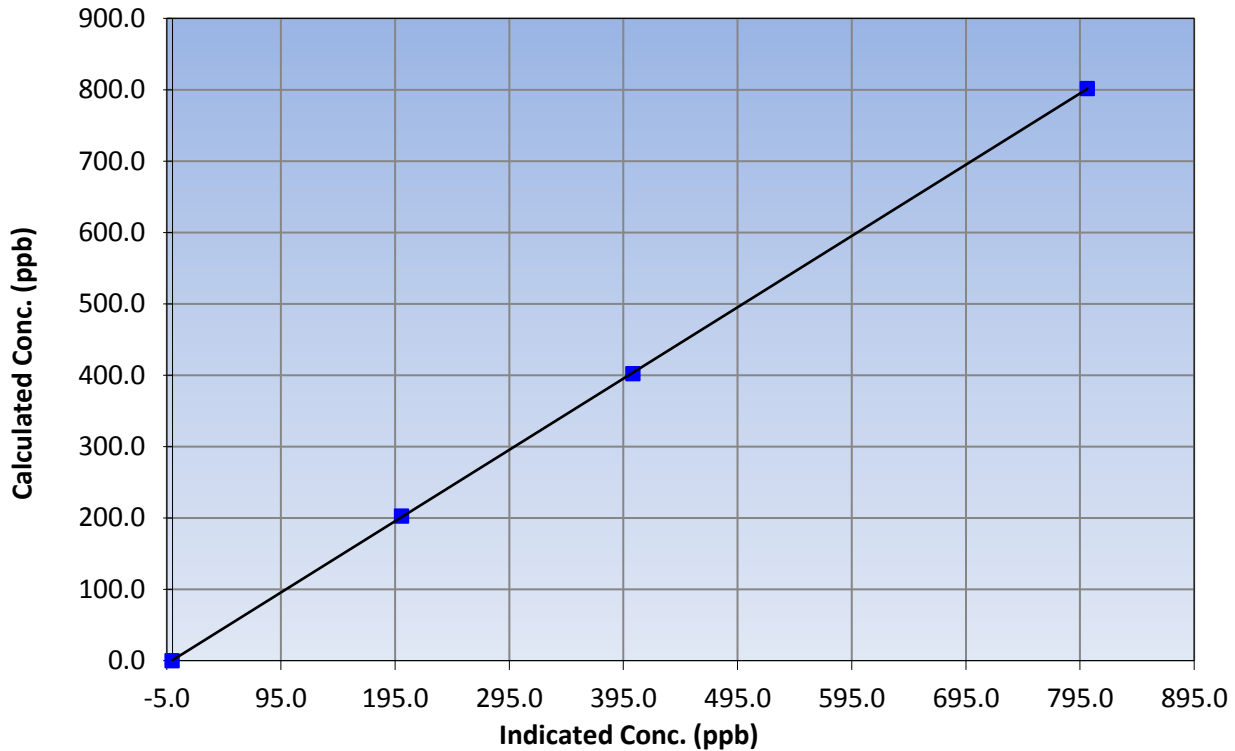
### Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 11, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:30	End Time (MST)	18:00
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999988
801.6	801.4	1.0003		
402.2	403.4	0.9972	Slope	0.999009
202.6	200.7	1.0093		
			Intercept	0.655648

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

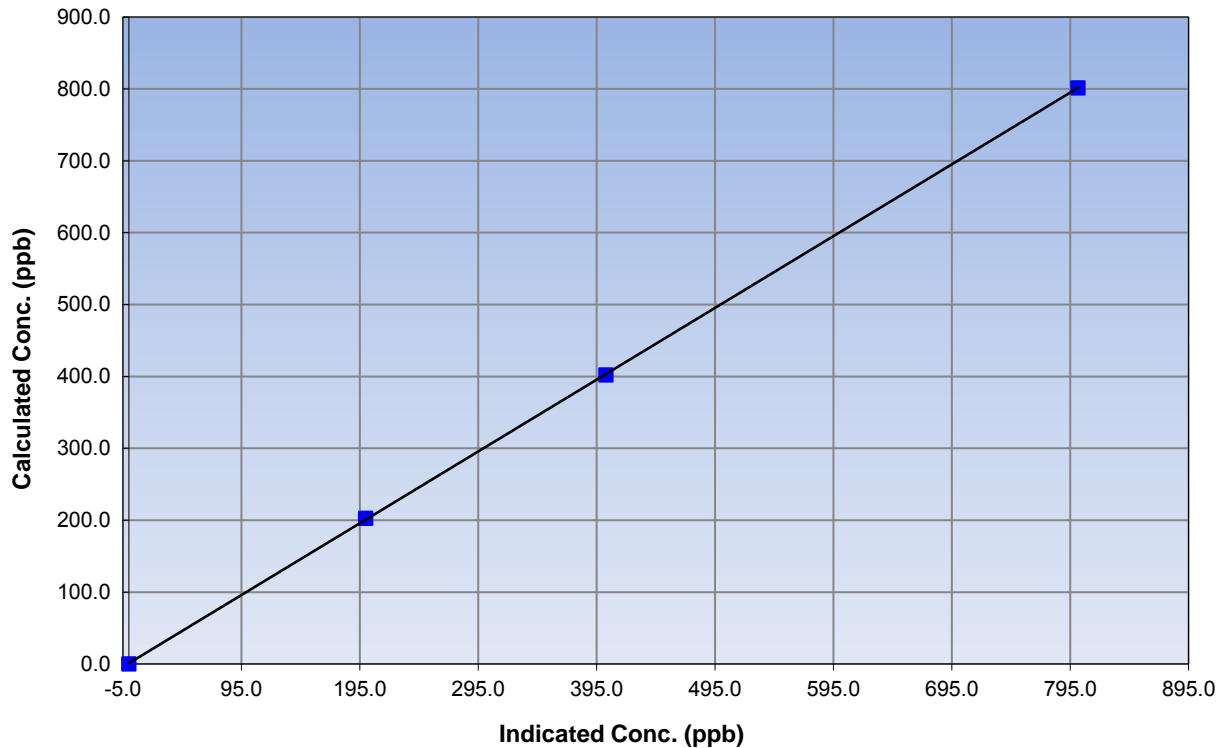
### Station Information

Calibration Date	September 24, 2015	Previous Calibration	August 11, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:30	End Time (MST)	18:00
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999982
801.6	801.6	1.0000		
402.2	403.0	0.9982	Slope	0.998610
202.6	199.8	1.0138		
			Intercept	0.997919

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

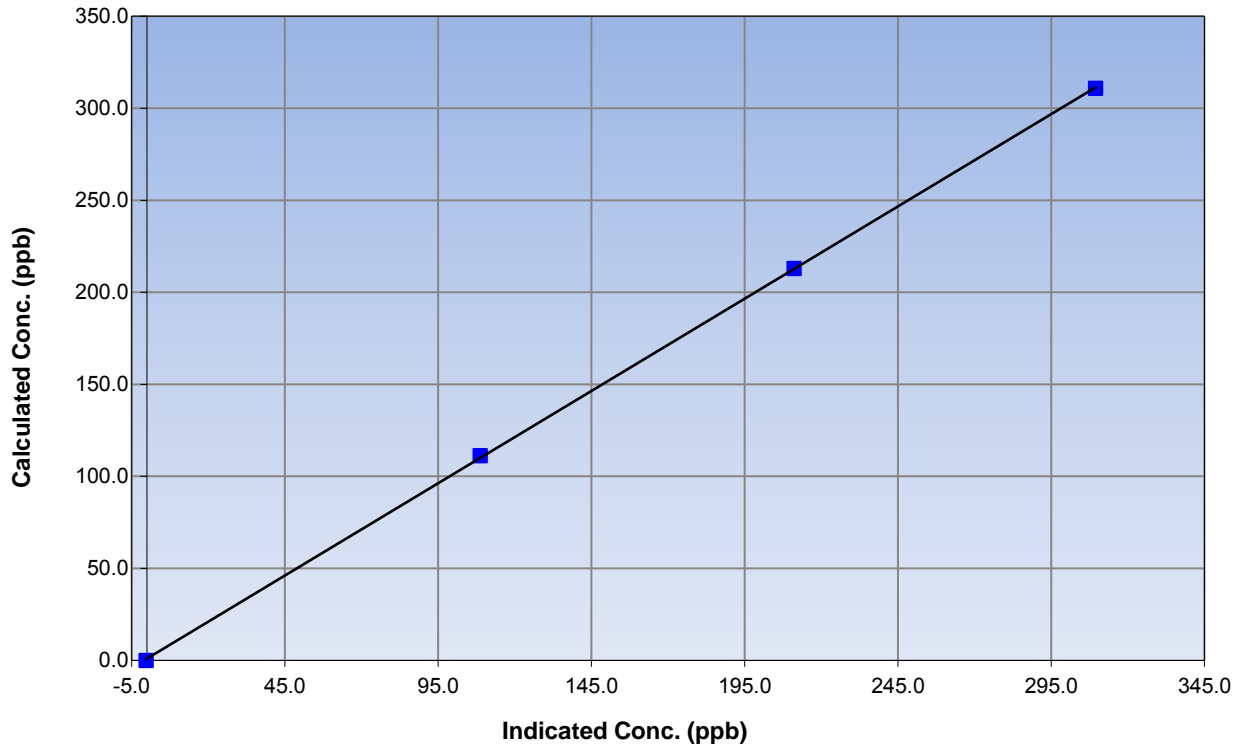
### Station Information

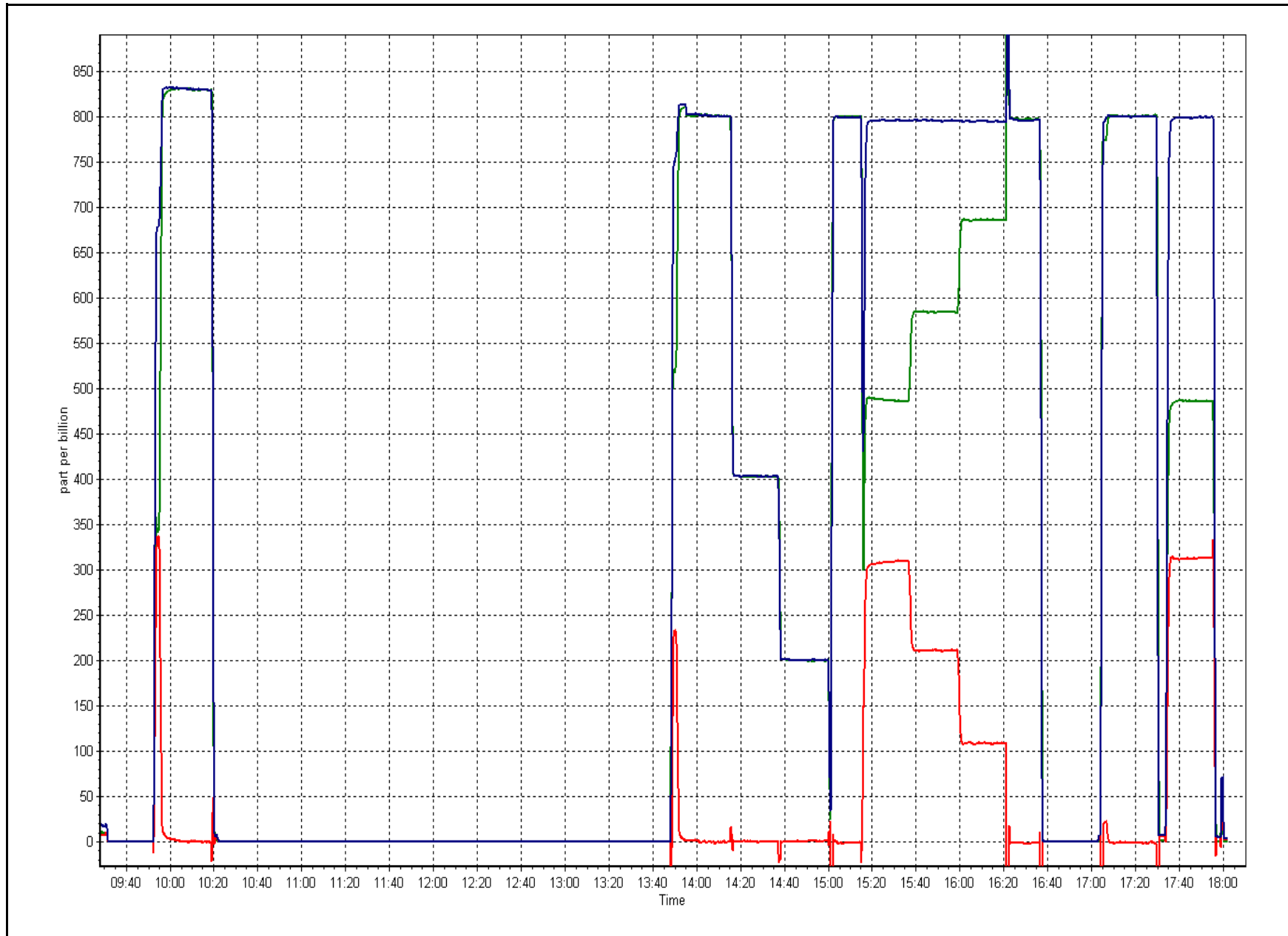
Calibration Date	September 24, 2015	Previous Calibration	August 11, 2015
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:30	End Time (MST)	18:00
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999962
310.9	309.5	1.0044		
212.8	211.1	1.0081	Slope	1.002759
111.2	108.8	1.0219		
			Intercept	0.983547

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









# Wood Buffalo Environmental Association

## SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	September 24, 2015	Previous Calibration:	August 11, 2015
Station Name:	Shell Muskeg River	Station Number:	AMS 16
Start Time (MST):	12:10	End Time (MST):	12:52
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1450

SHARP INFORMATION			
Particulate Fraction:		PM2.5	
Make/Model:		Thermo / SHARP 5030	
Serial Number		E-798	
C <sub>14</sub> Source SN:		4142	
Confirmation of Time settings:		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Parameters Checked:	<input checked="" type="checkbox"/> T1 <input type="checkbox"/> T2 <input type="checkbox"/> T3 <input type="checkbox"/> T4 <input type="checkbox"/> P3 <input checked="" type="checkbox"/> Main Flow <input checked="" type="checkbox"/> Beta <input type="checkbox"/> Neph <input checked="" type="checkbox"/>		

### CALIBRATION DATA

Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	17.0	15.1	-1.9	17.0
T2		na	na	
T3		na	na	
T4		na	na	
RH (%)		na	na	

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	979	981.0	2.0	979

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	988	-12	988	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	542		542
Neph	4.2		4.2
C14	30.1		30.1
Indicated Concentration (ug/m3)	0.7	no	0.7
Offset 1	na		na
Offset 2	na		na

### Leak Check (Quarterly)

Leak Check Date:	August 11, 2015	Previous Leak Check Date:	May 25, 2015
	<b>Measured</b>		<b>Difference LPM (Limit +/- 0.42 LPM)</b>
Flow without adaptor (LPM):	16.67		0.10
*Flow with adaptor (LPM):	16.57		

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

Mass Foil Calibration (Annually)			
Foil Calibration Date:	May 25, 2015	Previous Foil Calibration:	na
Zeroed?:	yes		
Foil Mass:	1337		Mass foil set S/N: 2518
Previous Correction Factor:	7029		
New Correction Factor:	7067		

### INSPECTION DATA

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

### NOTES:

No adjustments, replaced cyclone head.

Calibration Performed By: Evan Magill



This page intentionally left blank



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 17  
WAPASU  
SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
 SEPTEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	682	33	38	99.31	24	0	8	0
H2S (ppb) Average	682	35	38	99.58	1	0	0	0
THC (ppm) Average	685	33	35	99.72	3.1	-	2.2	-
O3 (ppb) Average	685	33	35	99.72	35	0	25	-
NO2 (ppb) Average	680	36	40	99.44	16	0	5	-
NO (ppb) Average	680	36	40	99.44	5	-	1	-
NOX (ppb) Average	680	36	40	99.44	18	-	5	-
PM2.5 (ug/m3) Average	714	2	6	99.44	18.7	-	6.8	0
Temperature 2 m (C) Average	720	0	0	100.00	21.7	-	15	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	97	-
Wind Speed 10 m (km/h) Average	717	3	3	100.00	21	-	14	-
Wind Direction 10 m (deg) Average	717	3	3	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
 SEPTEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	682	1.1	2	-	0	0	0	0	1	3	24
H2S (ppb) Average	682	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	685	2.11	0.1	-	2	2	2.1	2.1	2.2	2.2	3.1
O3 (ppb) Average	685	18.9	7	-	1	11	15	19	24	27	35
NO2 (ppb) Average	680	1.6	2	-	0	0	0	1	2	4	16
NO (ppb) Average	680	0.3	1	-	0	0	0	0	0	1	5
NOX (ppb) Average	680	2	3	-	0	0	0	1	3	5	18
PM2.5 (ug/m3) Average	714	2.83	2.4	-	0	0.4	1.4	2.1	3.6	6.7	18.7
Temperature 2 m (C) Average	720	8.29	4.9	-	-6.3	2.4	4.8	8	11.4	15.1	21.7
Relative Humidity (%) Average	720	73	18	-	25	48	60	74	88	97	99
Wind Speed 10 m (km/h) Average	717	8.3	4	-	0	4	6	8	10	14	21
Wind Direction 10 m (deg) Average	717	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
 SEPTEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	09 Sep 2015 13:00	09 Sep 2015 17:00	5	Maintenance - Internal WBEA Audit
H2S	09 Sep 2015 10:00	09 Sep 2015 12:00	3	Maintenance - Internal WBEA Audit
THC	09 Sep 2015 12:00	09 Sep 2015 13:00	2	Maintenance - Internal WBEA Audit
O3	08 Sep 2015 15:00	08 Sep 2015 16:00	2	Maintenance - Internal WBEA Audit
NO2, NO, NOX	08 Sep 2015 12:00	08 Sep 2015 15:00	4	Maintenance - Internal WBEA Audit
PM2.5	09 Sep 2015 17:00	09 Sep 2015 17:00	1	Maintenance - Internal WBEA Audit
PM2.5	13 Sep 2015 09:00	13 Sep 2015 11:00	3	Analyzer Failure - Filter tape failed to advance



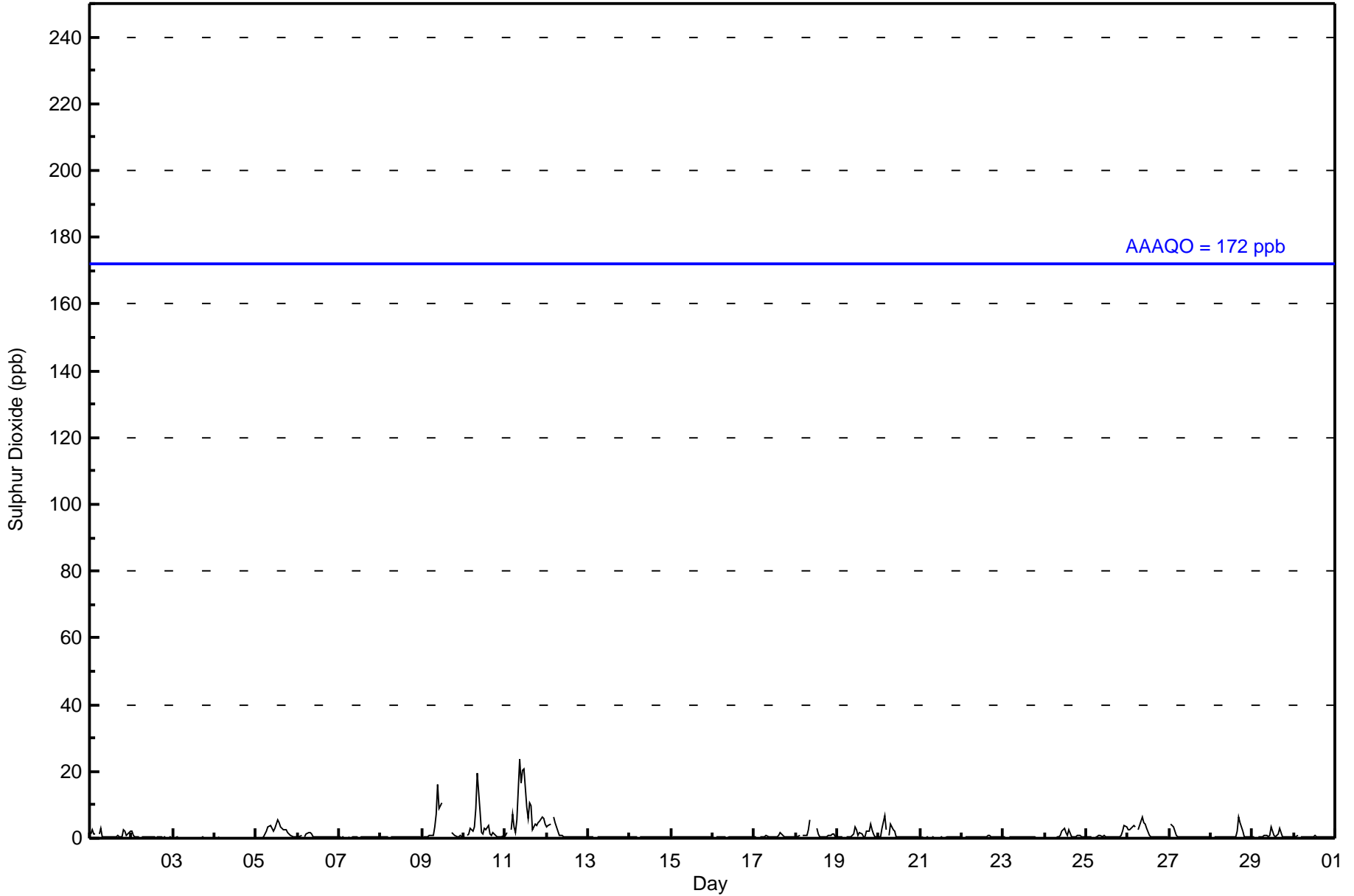
Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 24 ppb on Sep 11 09:00	Maximum Daily Average: 7.7 ppb on Sep 11		Hours of Data:	682
Minimum Value: 0 ppb on Sep 4 16:00	Minimum Daily Average: 0.1 ppb on Sep 4		Hours of Missing Data:	38
Maximum Diurnal Average: 2.6 ppb at hour 9	Minimum Diurnal Average: 0.6 ppb at hour 24		Hours of Calibration:	33
Monthly Average: 1.1 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 3 P <sub>99</sub> = 9		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-Sep	1	3	1	1	Z	1	3	1	0	0	0	0	0	0	0	0	1	0	0	2	2	1	1	2	1.1	3
2-Sep	2	1	1	0	1	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
3-Sep	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
4-Sep	0	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-Sep	0	0	Z	0	0	1	2	3	4	3	2	3	5	5	3	3	2	2	2	1	1	1	0	0	2.0	5
6-Sep	0	0	1	Z	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
7-Sep	0	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
8-Sep	0	0	0	0	0	Z	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1
9-Sep	Z	0	0	0	1	1	1	3	7	16	9	10	M	M	M	M	M	2	1	1	1	1	0	1	3.1	16
10-Sep	0	Z	1	1	3	2	3	9	19	8	2	1	3	3	4	1	1	2	1	1	0	0	0	1	2.9	19
11-Sep	1	2	Z	2	7	3	2	6	24	16	20	21	10	6	11	10	3	4	4	4	5	6	6	4	7.7	24
12-Sep	3	4	4	Z	6	5	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1.5	6
13-Sep	0	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
14-Sep	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
15-Sep	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
16-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0.3	1
17-Sep	0	0	Z	0	1	0	1	1	0	0	0	1	1	1	1	2	1	0	0	0	0	0	0	0	0.5	2
18-Sep	1	1	1	Z	1	1	1	3	6	C	C	C	3	1	0	0	0	0	0	1	1	1	1	0	1.2	6
19-Sep	0	0	0	0	Z	0	0	0	0	1	3	3	1	2	1	0	0	2	2	4	3	1	0	0	1.2	4
20-Sep	0	0	3	7	3	Z	1	4	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	7
21-Sep	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
22-Sep	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0.4	1
23-Sep	0	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
24-Sep	0	0	0	Z	0	0	0	0	0	1	2	3	2	1	3	1	0	0	0	1	1	0	0	0	0.7	3
25-Sep	0	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	2	4	3	0.8	4
26-Sep	2	2	3	4	3	Z	3	4	6	5	4	3	1	0	0	1	0	0	0	0	0	0	0	0	2.0	6
27-Sep	Z	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	4
28-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	2	6	5	2	0	0	0	0	0	1.0	6
29-Sep	0	0	Z	0	1	1	1	1	1	1	1	3	1	0	1	1	3	0	0	0	0	0	0	0	0.7	3
30-Sep	0	0	1	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1

0.6	0.9	0.9	1.0	1.2	0.8	0.8	1.4	2.6	2.1	1.8	1.9	1.1	0.9	1.0	1.0	0.8	0.8	0.6	0.7	0.7	0.7	0.7	0.6	Diurnal Average	
3	4	4	7	7	5	3	9	24	16	20	21	10	6	11	10	6	5	4	4	5	6	6	4	Diurnal Maximum	

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







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Wapasu - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	675	98.97	98.97
11 - 20	5	0.73	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: 682

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Wapasu - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	24	31	12	11	16	49	124	86	41	57	53	40	23	45	35	26	673
11 - 20	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	4
21 - 60	0	0	0	0	0	0	0	0	1	1	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>	24	31	12	11	16	49	124	86	44	59	54	40	23	45	35	26	679

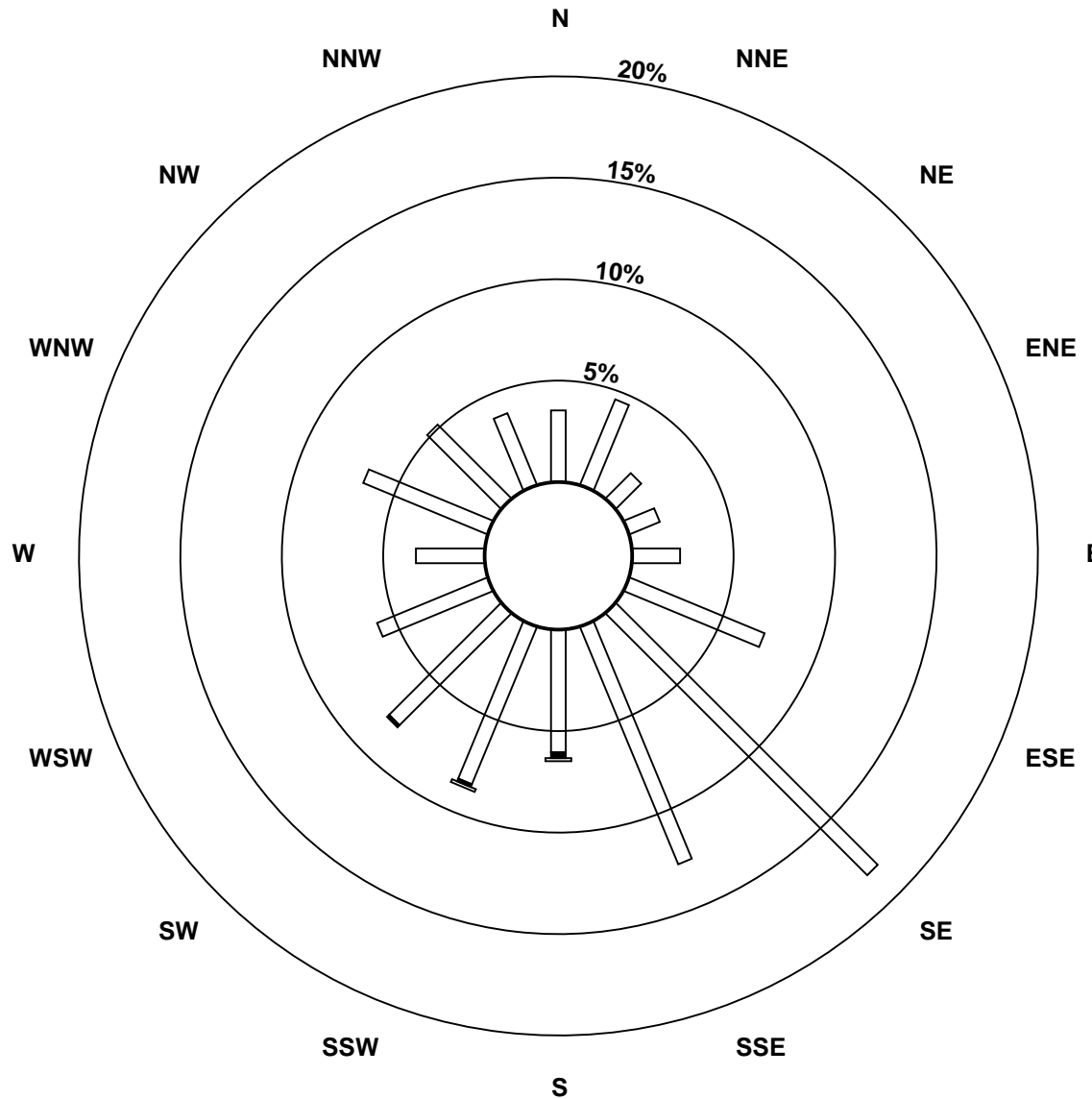
Total Number of Valid Hours: 679

Total Number of Hours: 720

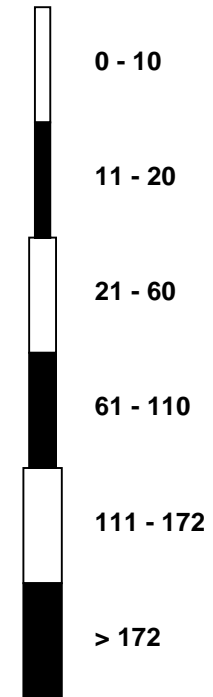


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

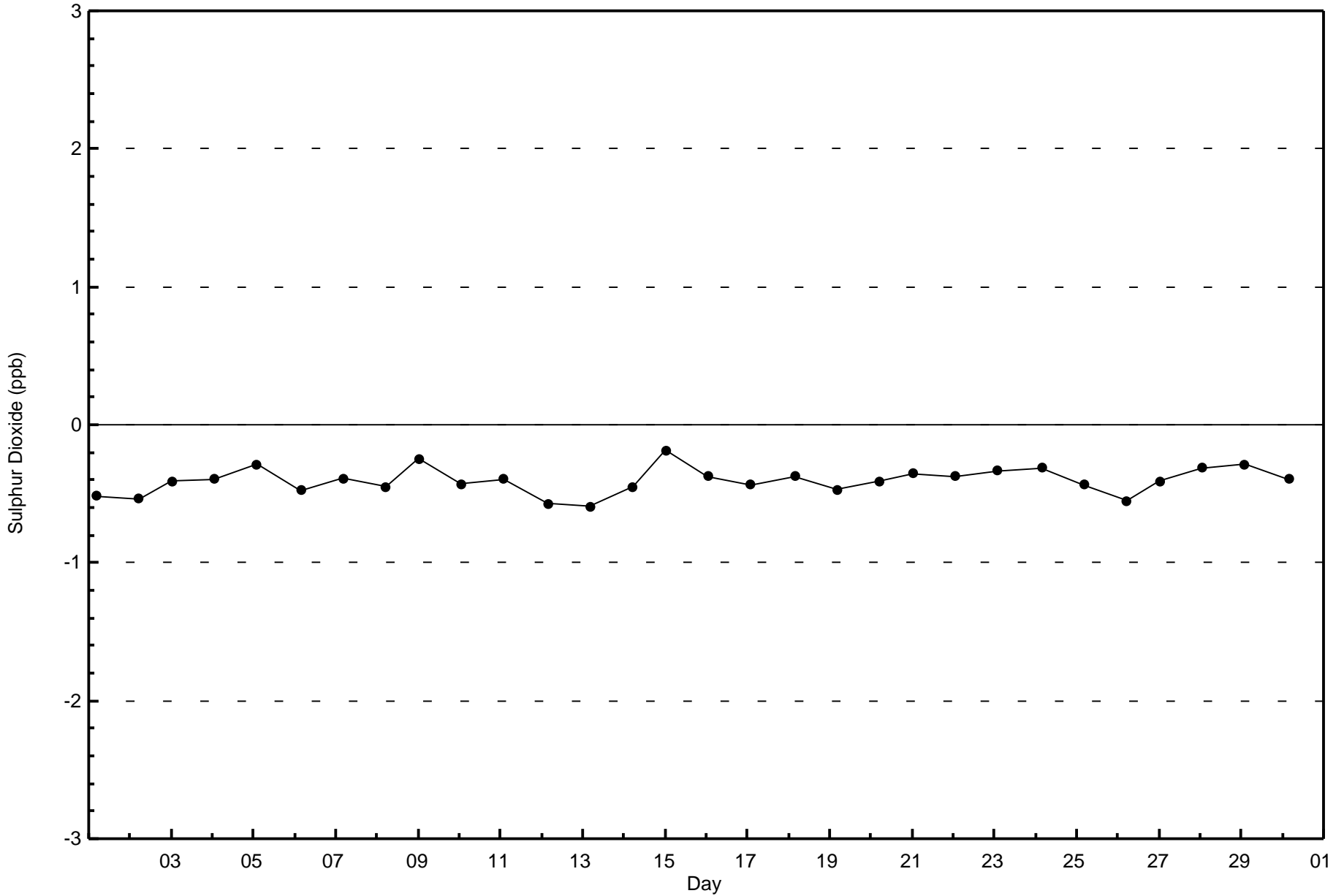
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu (AMS 17)

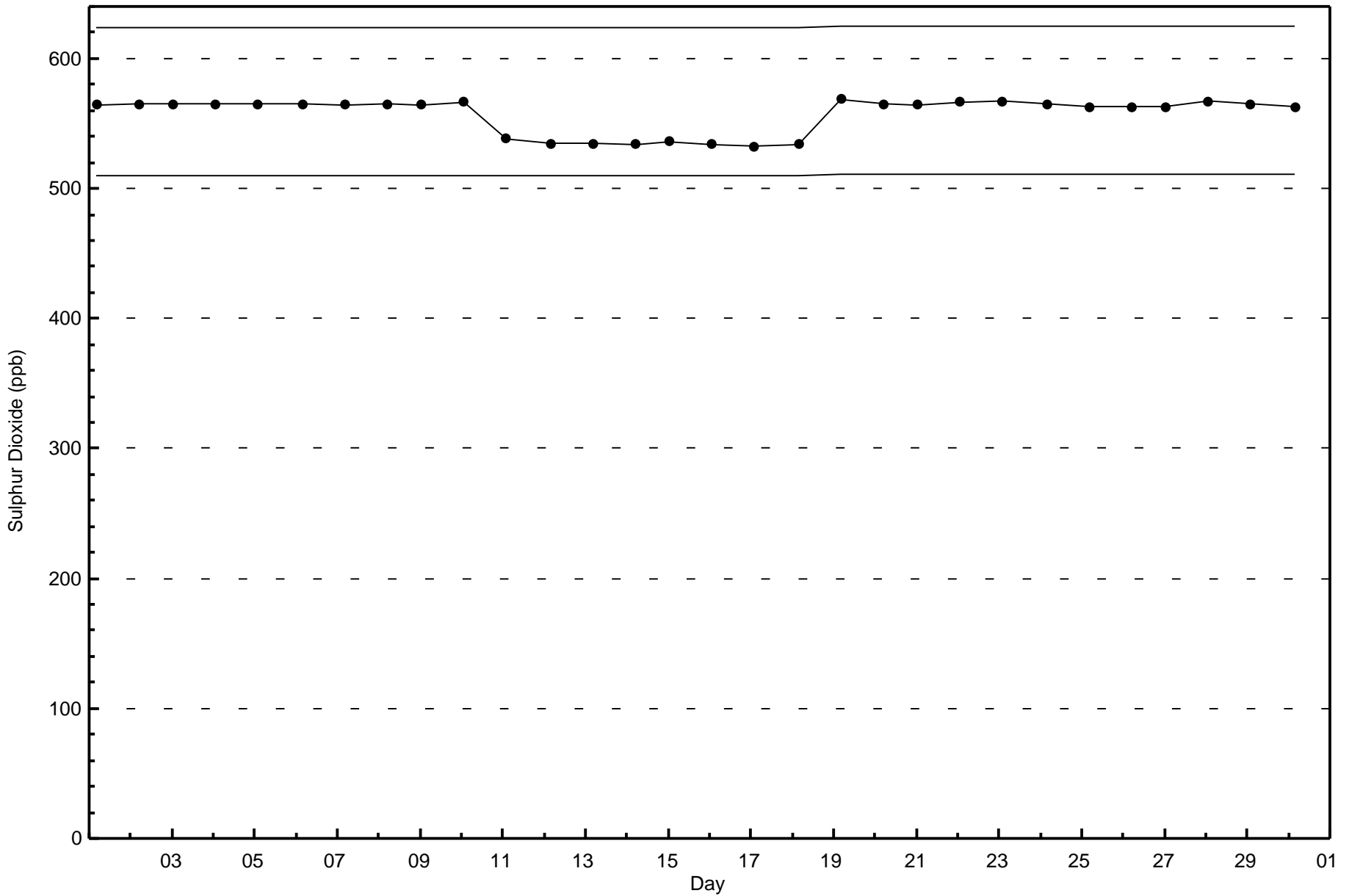


Classes (ppb)



Total Number of Valid Hours: 679





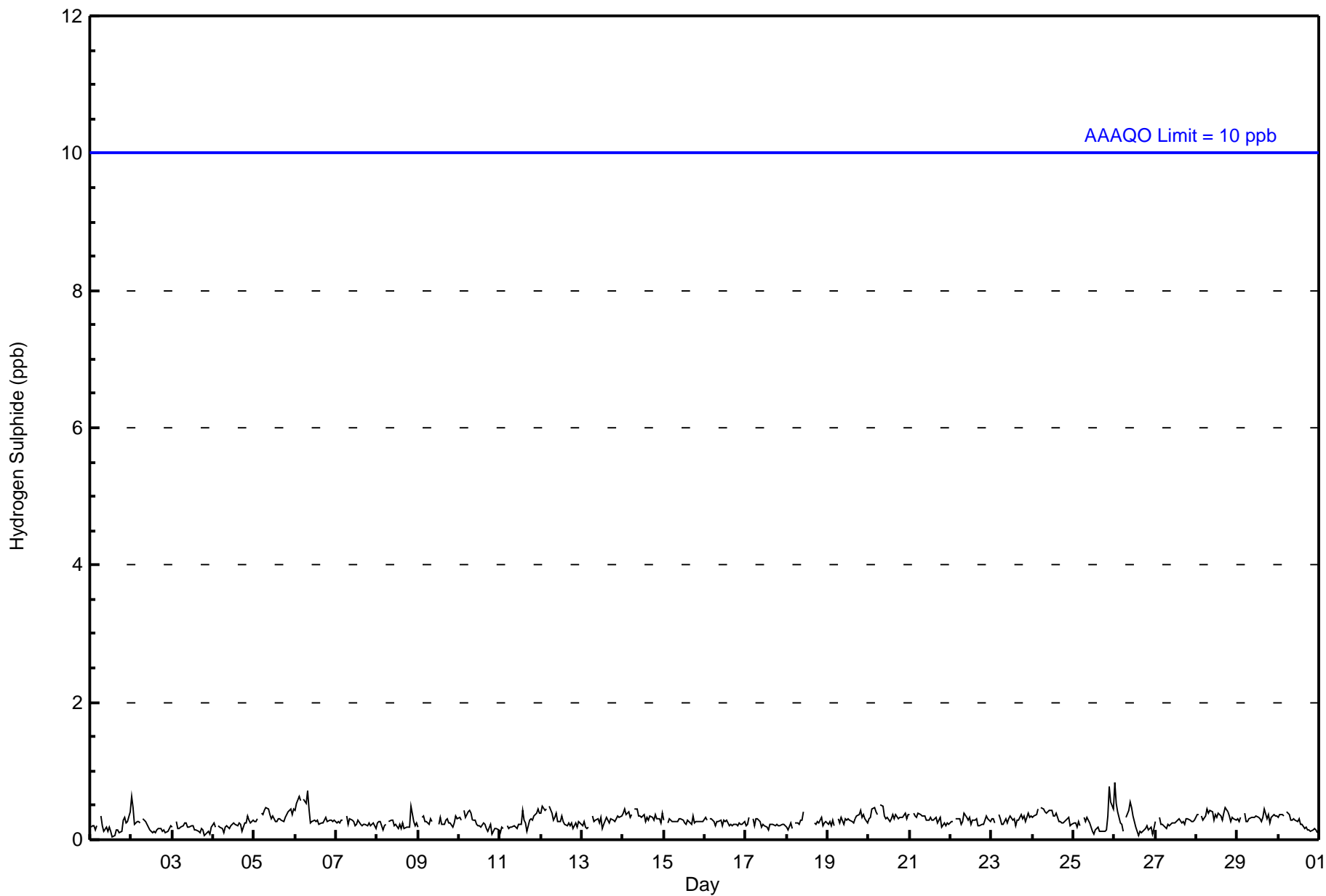


Number of Exceedences (AAAO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 1 ppb on Sep 26 01:00	Maximum Daily Average: 0.4 ppb on Sep 6		Hours of Data:	682
Minimum Value: 0 ppb on Sep 1 14:00	Minimum Daily Average: 0.2 ppb on Sep 3		Hours of Missing Data:	38
Maximum Diurnal Average: 0.3 ppb at hour 9	Minimum Diurnal Average: 0.2 ppb at hour 17		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:	99.6

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-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
2-Sep	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
3-Sep	0	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	
4-Sep	0	0	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-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
6-Sep	0	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
7-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
8-Sep	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
9-Sep	0	Z	0	0	0	0	0	0	0	M	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
10-Sep	0	0	Z	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
11-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
12-Sep	0	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	
13-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
14-Sep	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
15-Sep	0	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	
16-Sep	0	0	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-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
18-Sep	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.2	0	
19-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
20-Sep	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	0.4	1	
21-Sep	0	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	
22-Sep	0	0	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	
23-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
24-Sep	0	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-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	1
26-Sep	1	1	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	
27-Sep	0	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-Sep	0	0	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	
29-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
30-Sep	0	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	

0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	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	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	Diurnal Maximum	

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







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Wapasu - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	682	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



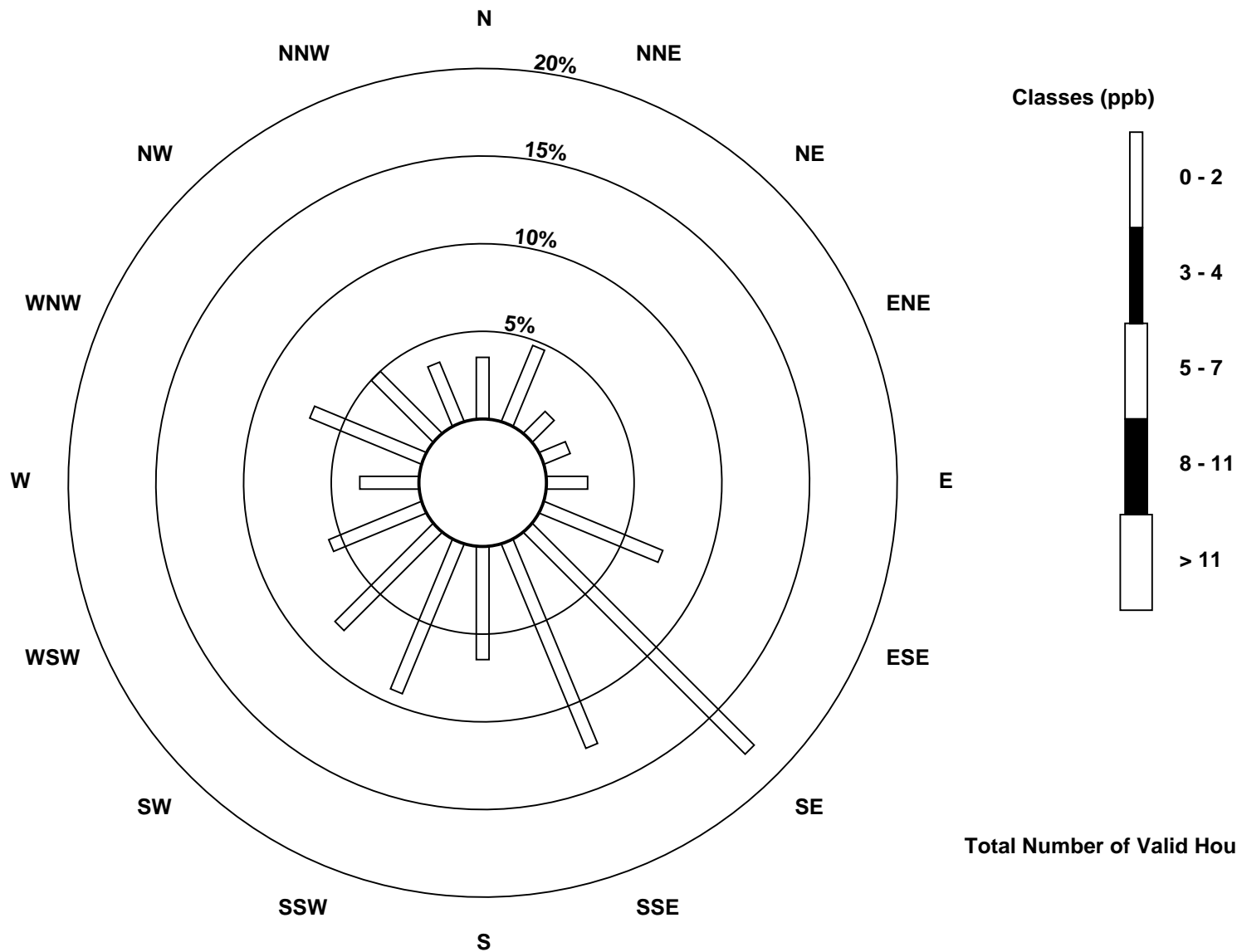
**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu - September 2015**

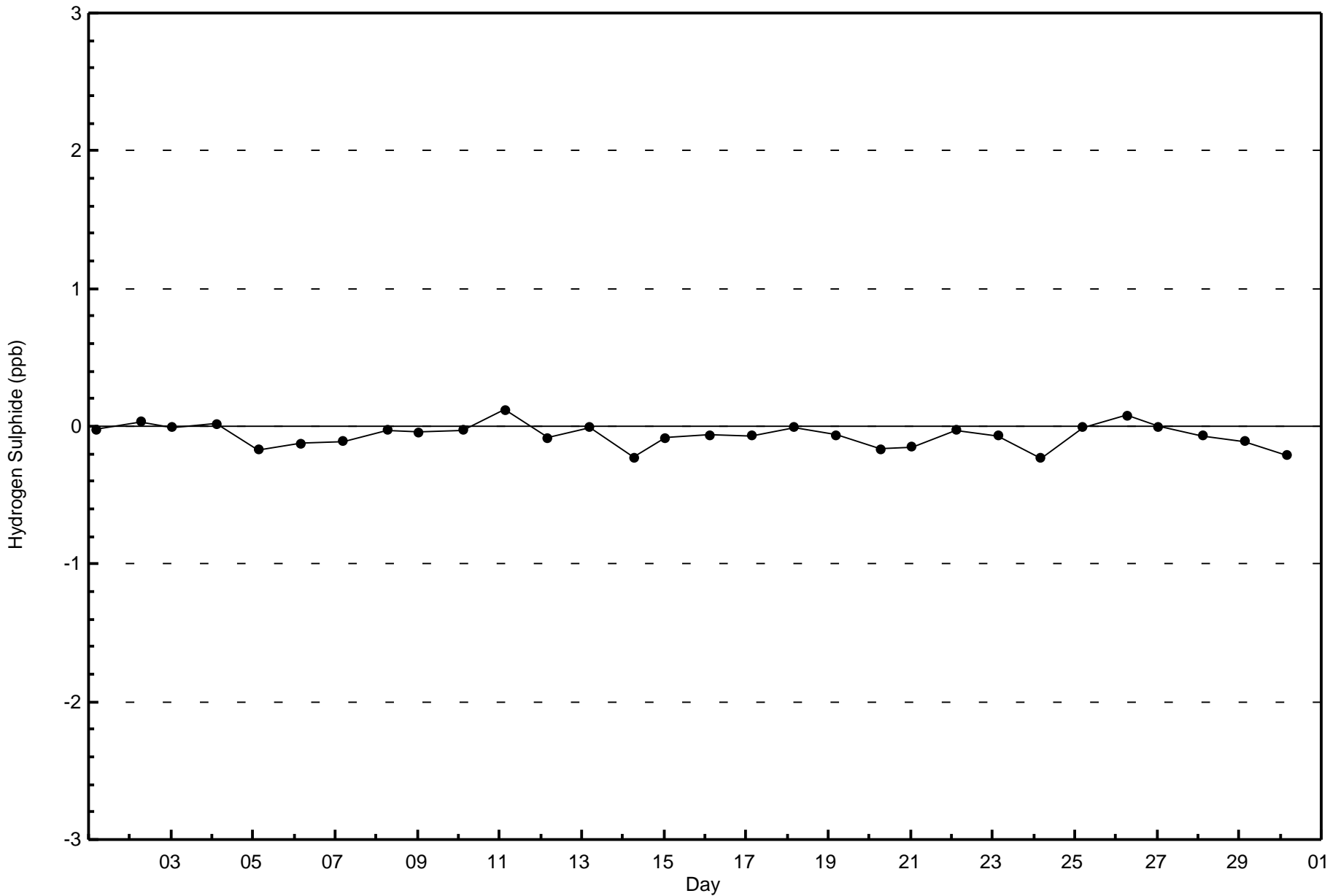
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	24	32	12	11	16	50	122	86	44	63	54	39	23	47	34	25	682
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	24	32	12	11	16	50	122	86	44	63	54	39	23	47	34	25	682

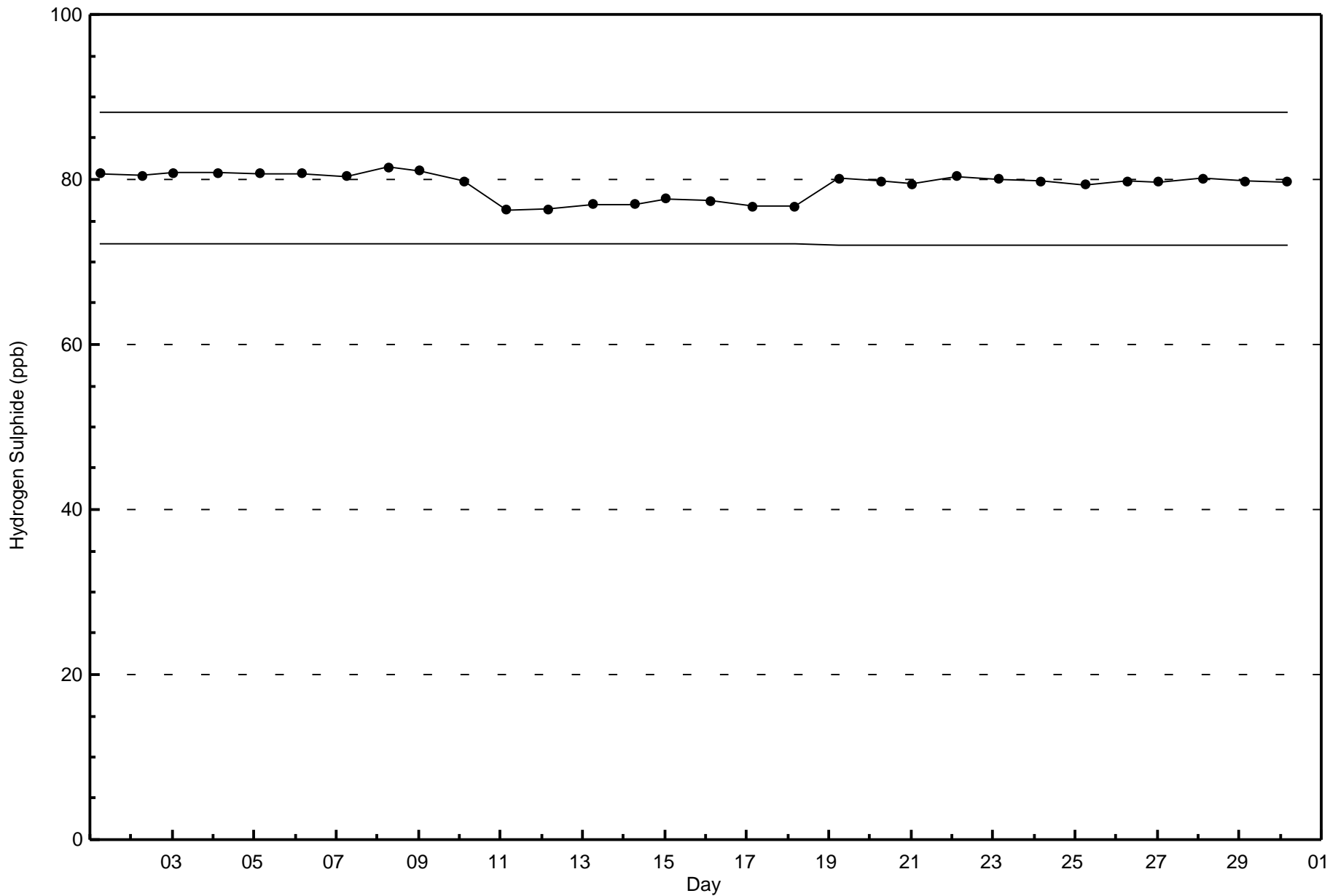
Total Number of Valid Hours: 682

Total Number of Hours: 720



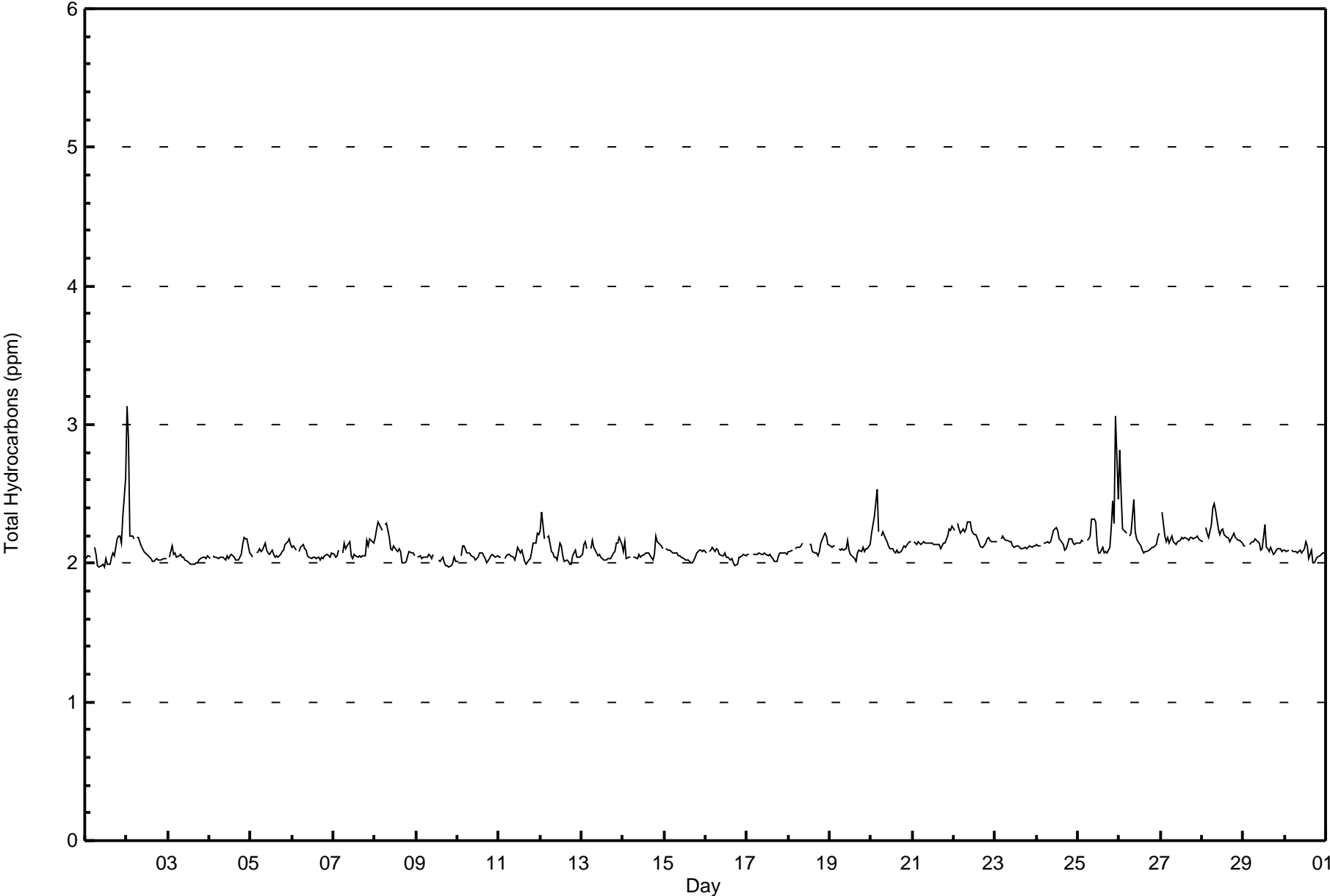
Total Number of Valid Hours: 682







Maximum Value: 3.1 ppm on Sep 2 01:00      Maximum Daily Average: 2.2 ppm on Sep 25																				Hours in Service: 720 Hours of Data: 685 Hours of Missing Data: 35 Hours of Calibration: 33 Percent Operational Time: 99.7						
Minimum Value: 2.0 ppm on Sep 1 12:00      Minimum Daily Average: 2.0 ppm on Sep 9 Maximum Diurnal Average: 2.2 ppm at hour 2      Minimum Diurnal Average: 2.1 ppm at hour 17 Monthly Average: 2.11 ppm      Percentiles: P <sub>1</sub> = 2.0 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 2.1 Median = 2.1 Q <sub>3</sub> = 2.2 P <sub>90</sub> = 2.2 P <sub>99</sub> = 2.5																										
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-Sep	2.0	2.1	2.1	2.0	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.1	2.3	2.6	2.1	2.6
2-Sep	3.1	2.9	2.2	2.2	2.2	Z	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	3.1
3-Sep	Z	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1
4-Sep	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.1	2.2
5-Sep	2.1	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2
6-Sep	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.1
7-Sep	2.1	2.0	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.2
8-Sep	2.2	2.2	2.3	2.3	2.2	Z	2.3	2.3	2.2	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	2.3
9-Sep	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	M	M	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
10-Sep	2.0	Z	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	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.1
11-Sep	2.0	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.1	2.2
12-Sep	2.2	2.4	2.2	Z	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.4
13-Sep	2.1	2.1	2.2	2.1	Z	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	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2
14-Sep	2.1	2.2	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.2	2.1	2.1	2.1	2.2
15-Sep	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1
16-Sep	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1
17-Sep	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
18-Sep	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	C	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2
19-Sep	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
20-Sep	2.2	2.3	2.3	2.5	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.5
21-Sep	Z	2.2	2.1	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.3
22-Sep	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3
23-Sep	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
24-Sep	2.1	2.1	2.1	Z	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.3
25-Sep	2.1	2.1	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.5	2.3	3.1	2.2	3.1
26-Sep	2.8	2.5	2.2	2.2	2.2	Z	2.2	2.2	2.5	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.8
27-Sep	Z	2.4	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4
28-Sep	2.2	Z	2.3	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.4
29-Sep	2.1	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3
30-Sep	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.2
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance																										





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Wapasu - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	164	23.94	23.94
2.1 - 3.0	519	75.77	99.71
3.1 - 10.0	2	0.29	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Wapasu - September 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	12	19	4	5	3	5	22	12	9	9	14	7	4	19	12	7	163
2.1 - 3.0	12	12	8	6	13	44	102	74	34	50	43	33	19	26	23	19	518
3.1 - 10.0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	24	31	12	11	16	49	124	86	44	60	57	40	23	45	35	26	683

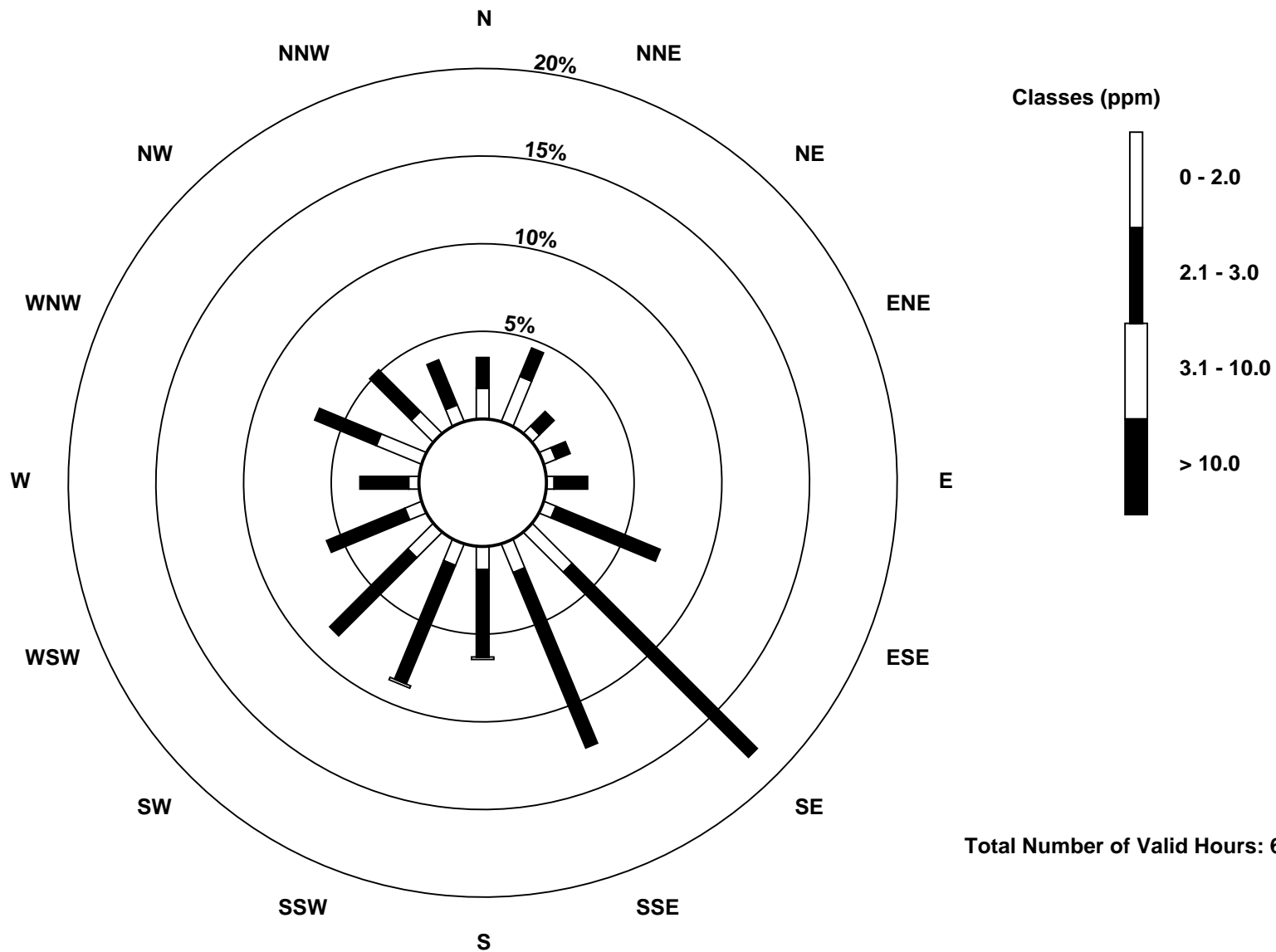
Total Number of Valid Hours: 683

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Total Hydrocarbons (THC) - ppm  
Wapasu (AMS 17)



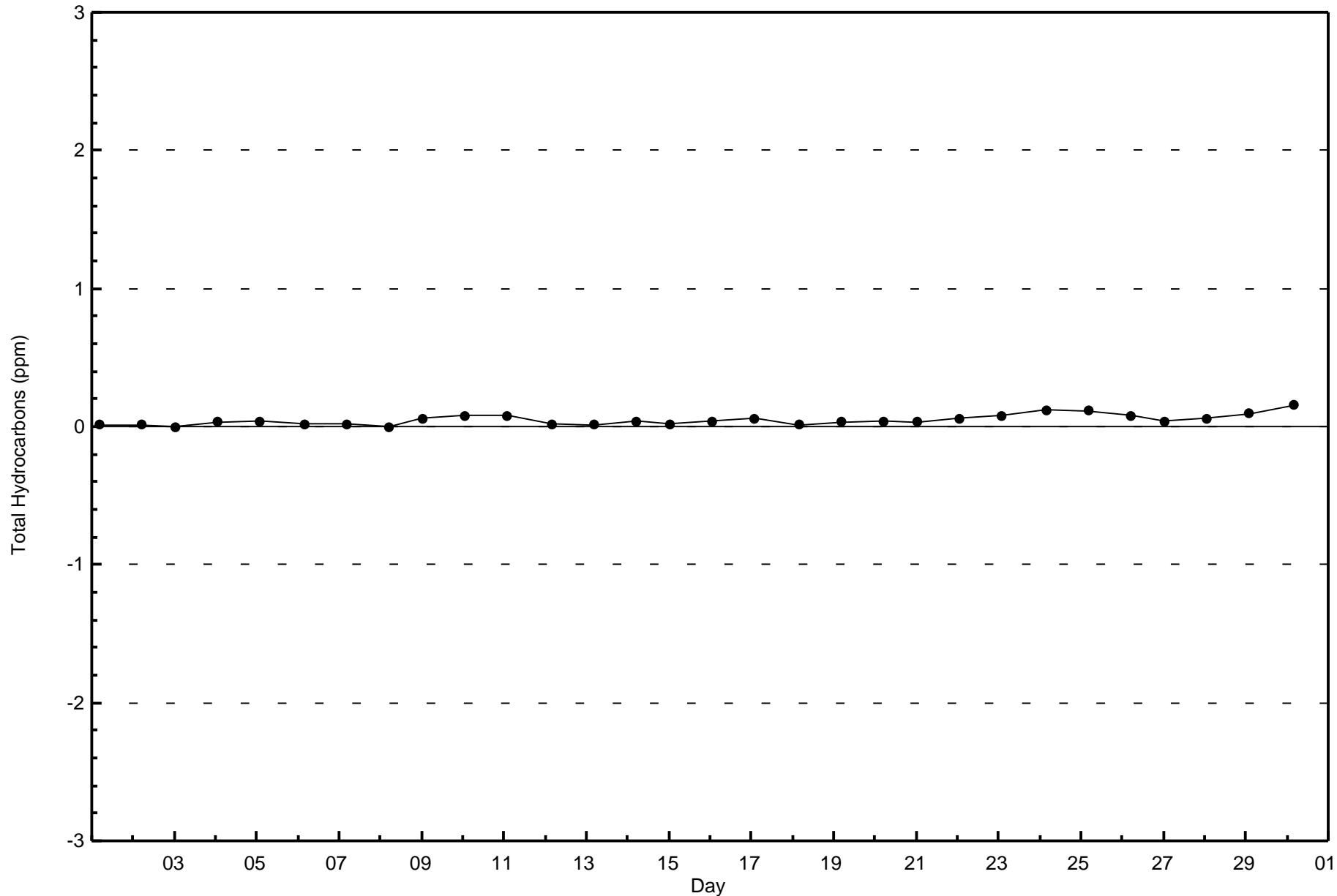


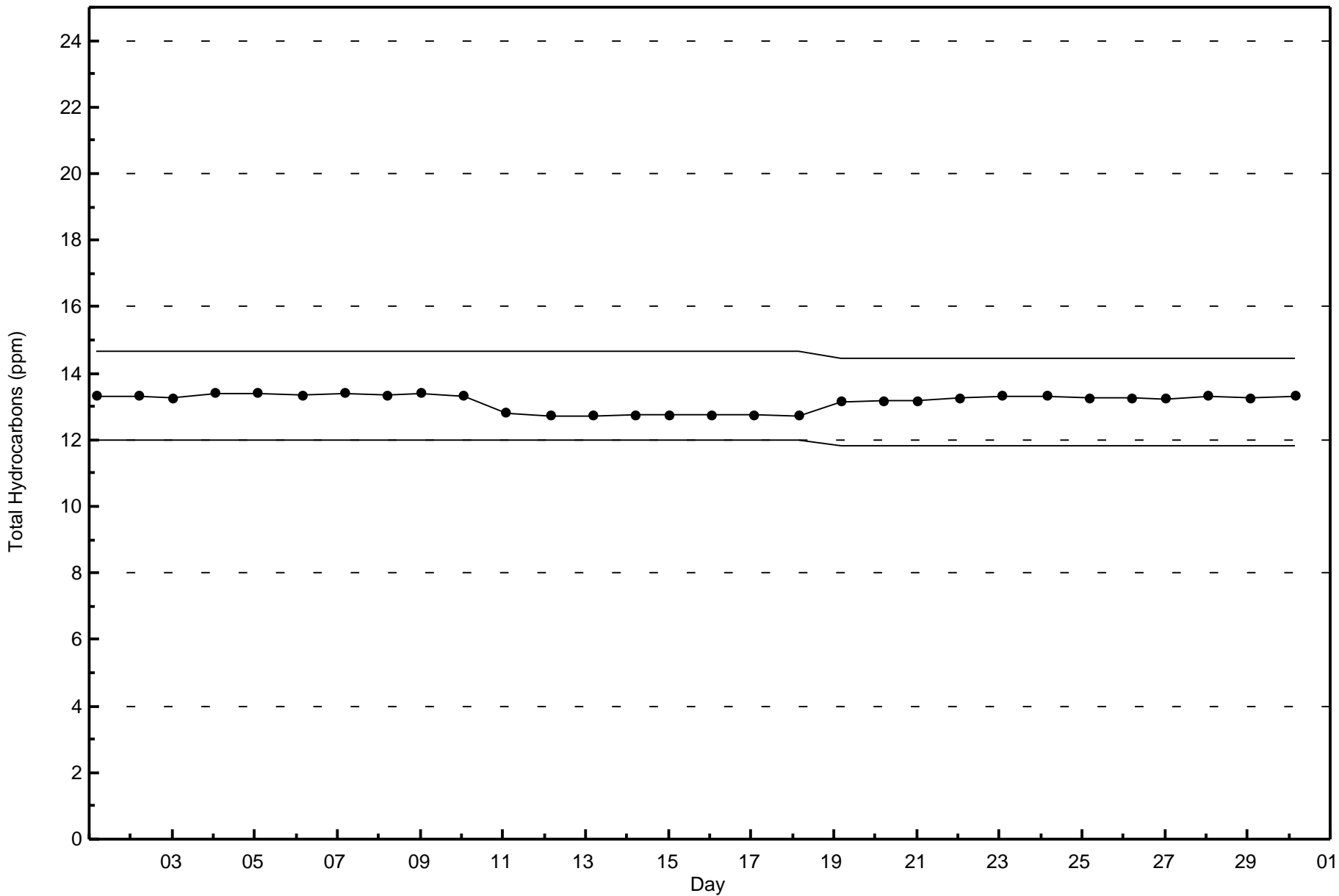
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Wapasu - September 2015





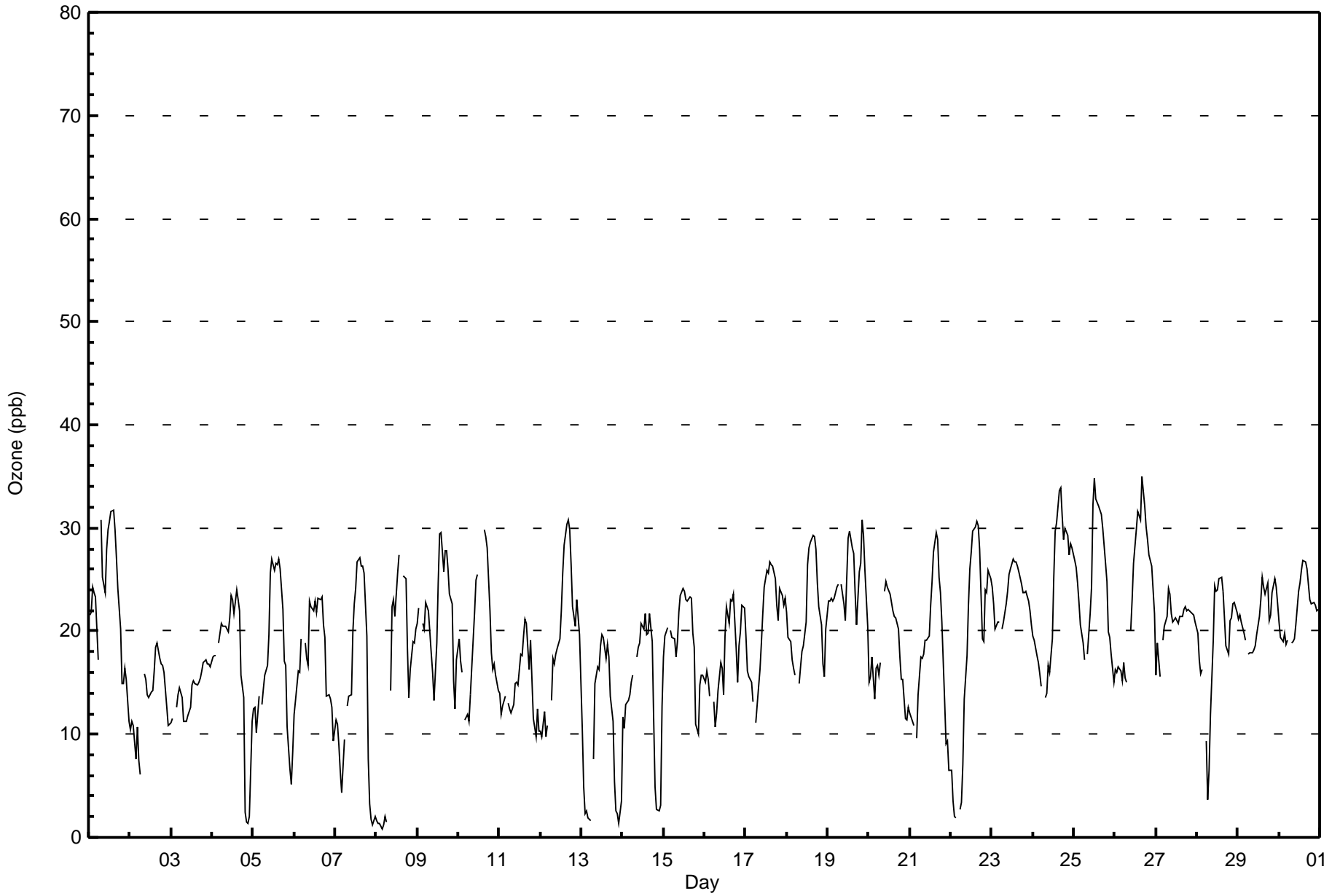


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 35 ppb on Sep 26 17:00	Maximum Daily Average: 25.0 ppb on Sep 19		Hours of Data:	685
Minimum Value: 1 ppb on Sep 8 04:00	Minimum Daily Average: 10.0 ppb on Sep 13		Hours of Missing Data:	35
Maximum Diurnal Average: 25.5 ppb at hour 16	Minimum Diurnal Average: 14.2 ppb at hour 6		Hours of Calibration:	33
Monthly Average: 18.9 ppb	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 11 Q <sub>1</sub> = 15 Median = 19 Q <sub>3</sub> = 24 P <sub>90</sub> = 27 P <sub>99</sub> = 32		Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	22	22	24	24	23	17	Z	31	25	24	28	30	31	32	32	30	27	24	20	15	15	16	15	11	23.4	32	
2-Sep	10	11	11	8	11	7	6	Z	16	15	14	14	14	14	16	18	19	17	17	17	16	13	11	11	13.3	19	
3-Sep	11	11	Z	13	14	14	14	11	11	11	12	13	15	15	15	15	15	15	16	17	17	17	17	16	14.2	17	
4-Sep	17	18	18	Z	19	21	20	20	20	20	21	23	23	22	24	23	22	16	14	2	1	1	2	11	16.5	24	
5-Sep	12	13	10	14	Z	13	14	16	17	20	26	27	26	27	26	27	26	22	17	17	11	7	5	8	17.4	27	
6-Sep	12	13	16	16	19	Z	19	17	17	23	22	22	23	22	23	23	23	21	19	14	14	13	13	9	18.0	23	
7-Sep	11	11	9	6	4	10	Z	13	14	14	20	23	24	27	27	26	26	26	20	8	3	2	1	2	14.2	27	
8-Sep	2	1	1	1	1	2	2	Z	14	22	23	21	26	27	M	M	25	25	18	14	16	19	19	20	14.3	27	
9-Sep	21	22	Z	21	20	23	22	20	18	16	13	19	25	29	30	26	28	28	26	24	23	15	12	17	21.6	30	
10-Sep	19	17	16	Z	11	12	11	14	17	22	25	25	C	C	C	30	29	28	22	18	16	17	16	14	19.0	30	
11-Sep	14	12	13	14	Z	13	13	12	13	15	15	15	18	18	19	21	21	16	19	15	11	10	12	10	14.7	21	
12-Sep	10	10	12	10	11	Z	13	17	17	18	18	19	22	26	28	30	31	30	26	22	20	23	21	20	19.8	31	
13-Sep	10	5	2	3	2	2	Z	8	15	17	16	19	20	19	17	19	18	14	11	5	3	2	1	4	10.0	20	
14-Sep	12	11	13	13	14	15	16	Z	17	18	19	21	20	22	20	20	22	19	11	5	3	3	3	13	14.3	22	
15-Sep	18	20	20	Z	20	19	19	17	19	22	23	24	24	23	23	23	23	20	18	11	10	15	16	16	19.3	24	
16-Sep	15	16	15	14	Z	13	11	12	14	17	16	14	19	22	21	23	23	24	18	15	19	20	22	22	17.7	24	
17-Sep	19	16	16	15	13	Z	11	13	16	19	22	24	26	26	27	26	26	25	23	21	24	23	23	23	20.7	27	
18-Sep	22	19	19	17	16	16	Z	15	17	18	19	21	26	28	29	29	29	28	25	22	21	17	16	20	21.2	29	
19-Sep	23	23	23	23	23	24	25	Z	25	23	21	25	29	30	28	27	24	21	26	27	31	29	26	20	25.0	31	
20-Sep	15	16	18	13	16	17	16	17	Z	24	25	24	24	23	22	21	21	20	18	15	15	11	11	13	18.1	25	
21-Sep	12	12	11	Z	10	14	17	17	18	19	19	19	22	25	28	30	29	25	24	21	13	9	9	7	17.8	30	
22-Sep	6	3	2	2	Z	3	3	7	13	18	23	26	28	30	30	31	30	28	19	19	24	24	26	25	18.3	31	
23-Sep	24	23	20	21	21	Z	20	21	23	24	25	26	27	27	27	26	26	25	24	24	24	23	22	21	23.6	27	
24-Sep	20	19	18	17	16	15	Z	14	14	17	16	19	25	30	31	34	34	31	29	30	29	27	28	28	23.5	34	
25-Sep	27	26	25	23	21	19	17	Z	18	22	24	32	35	33	32	32	32	31	30	27	25	20	19	18	15	24.7	35
26-Sep	16	16	17	16	15	17	15	15	Z	20	23	27	30	32	31	31	35	32	30	29	27	26	24	22	23.7	35	
27-Sep	16	19	16	Z	19	20	21	24	24	22	21	21	21	21	21	21	22	22	22	22	22	22	21	20.9	24		
28-Sep	20	17	16	16	Z	9	4	7	12	19	24	24	24	25	25	24	21	19	18	21	21	23	23	22	18.8	25	
29-Sep	21	22	21	20	19	Z	18	18	18	18	19	20	21	23	25	24	24	25	21	22	24	25	24	23	21.4	25	
30-Sep	21	19	19	20	19	19	Z	19	19	19	21	24	25	26	27	27	26	24	23	23	23	23	22	22	22.1	27	

16.0	15.4	15.0	14.3	15.1	14.2	14.5	15.8	17.1	19.1	20.4	22.0	23.9	24.9	25.1	25.5	25.2	23.3	20.7	17.9	17.2	16.5	16.0	16.2	Diurnal Average	
27	26	25	24	23	24	25	31	25	24	28	32	35	33	32	34	35	32	30	30	31	29	28	28	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Wapasu - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	381	55.62	55.62
21 - 50	304	44.38	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Wapasu - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	12	28	8	5	14	35	64	58	24	31	15	6	16	23	23	16	378
21 - 50	10	4	3	6	3	15	58	30	18	32	40	33	9	21	12	10	304
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>	22	32	11	11	17	50	122	88	42	63	55	39	25	44	35	26	682

Total Number of Valid Hours: 682

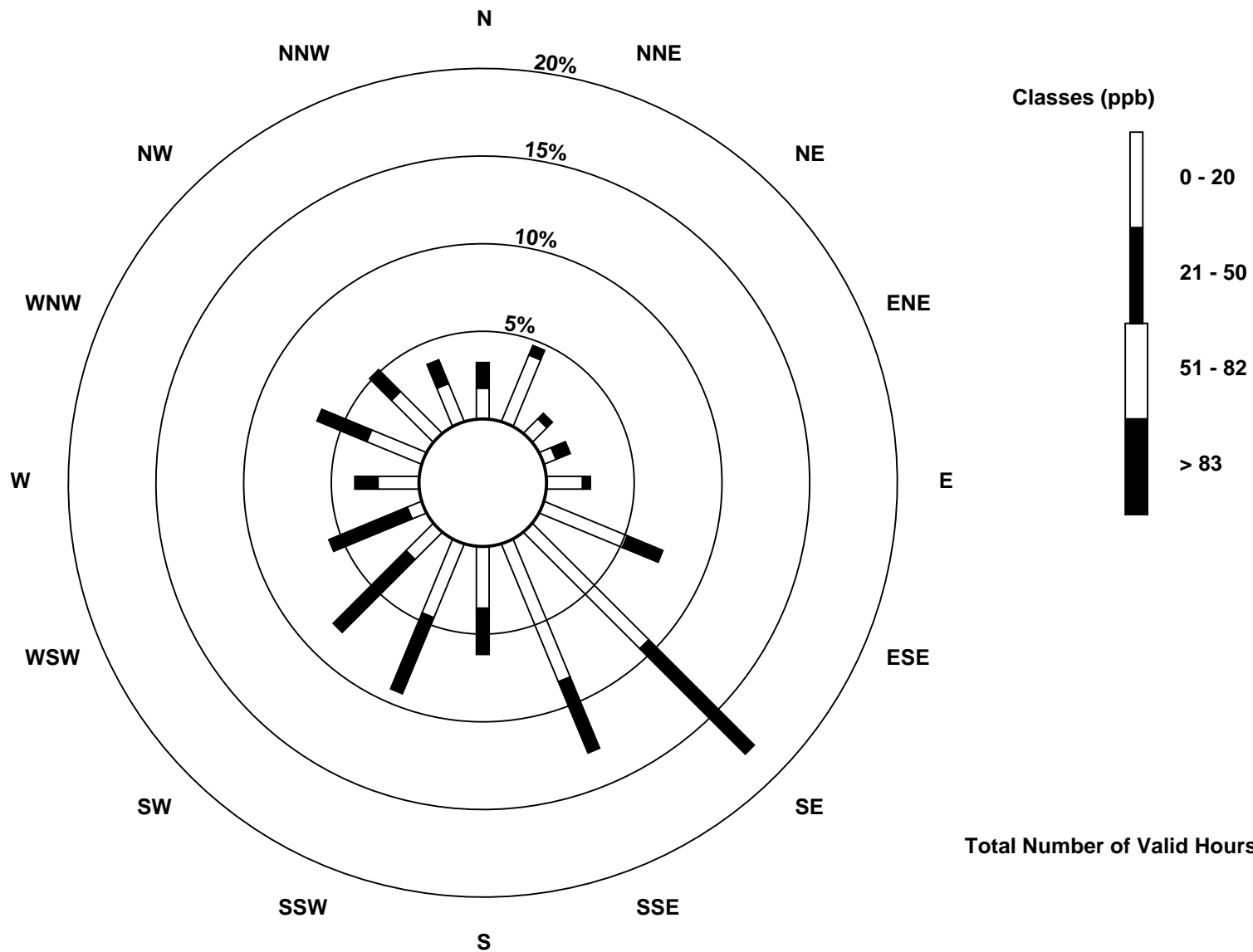
Total Number of Hours: 720



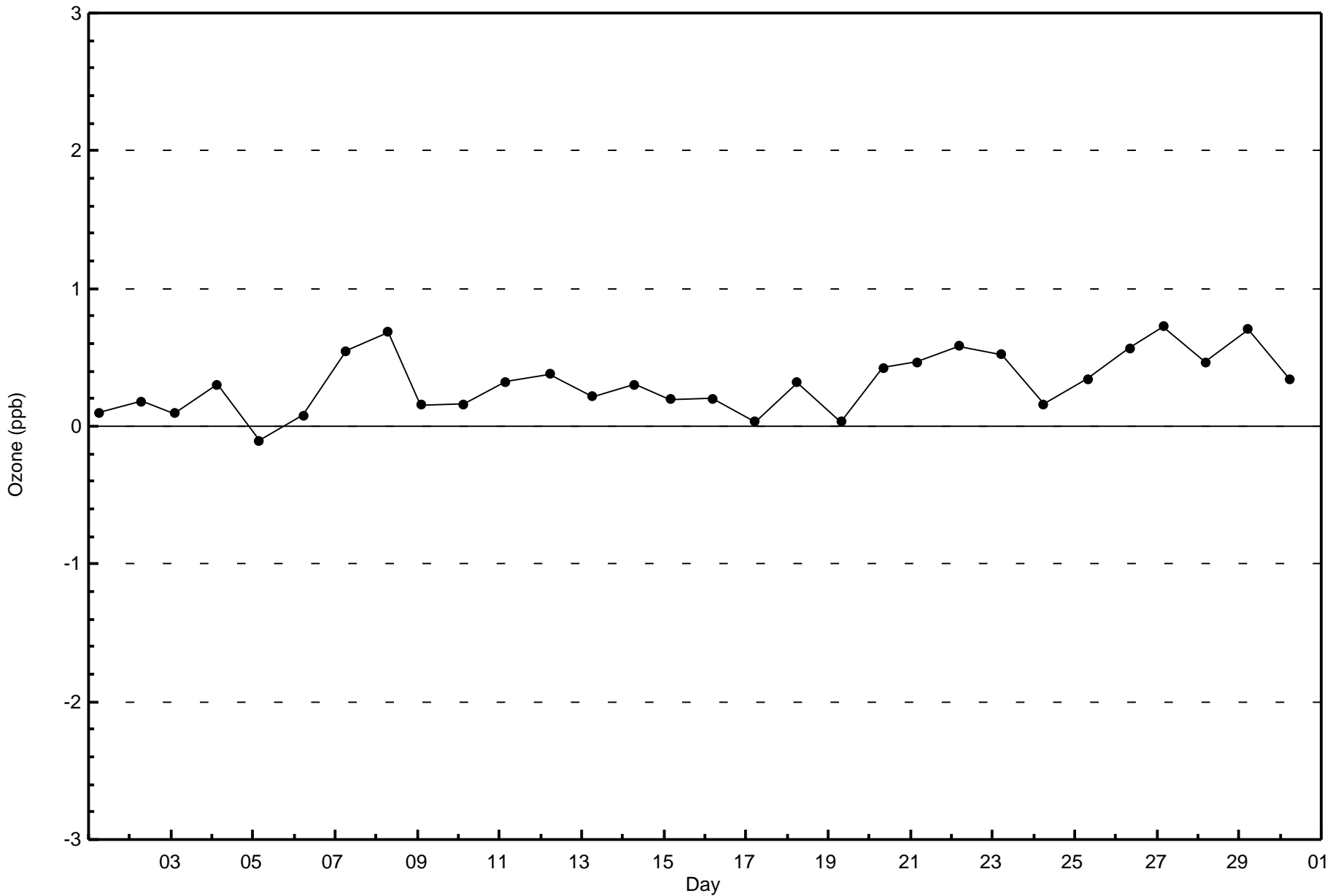


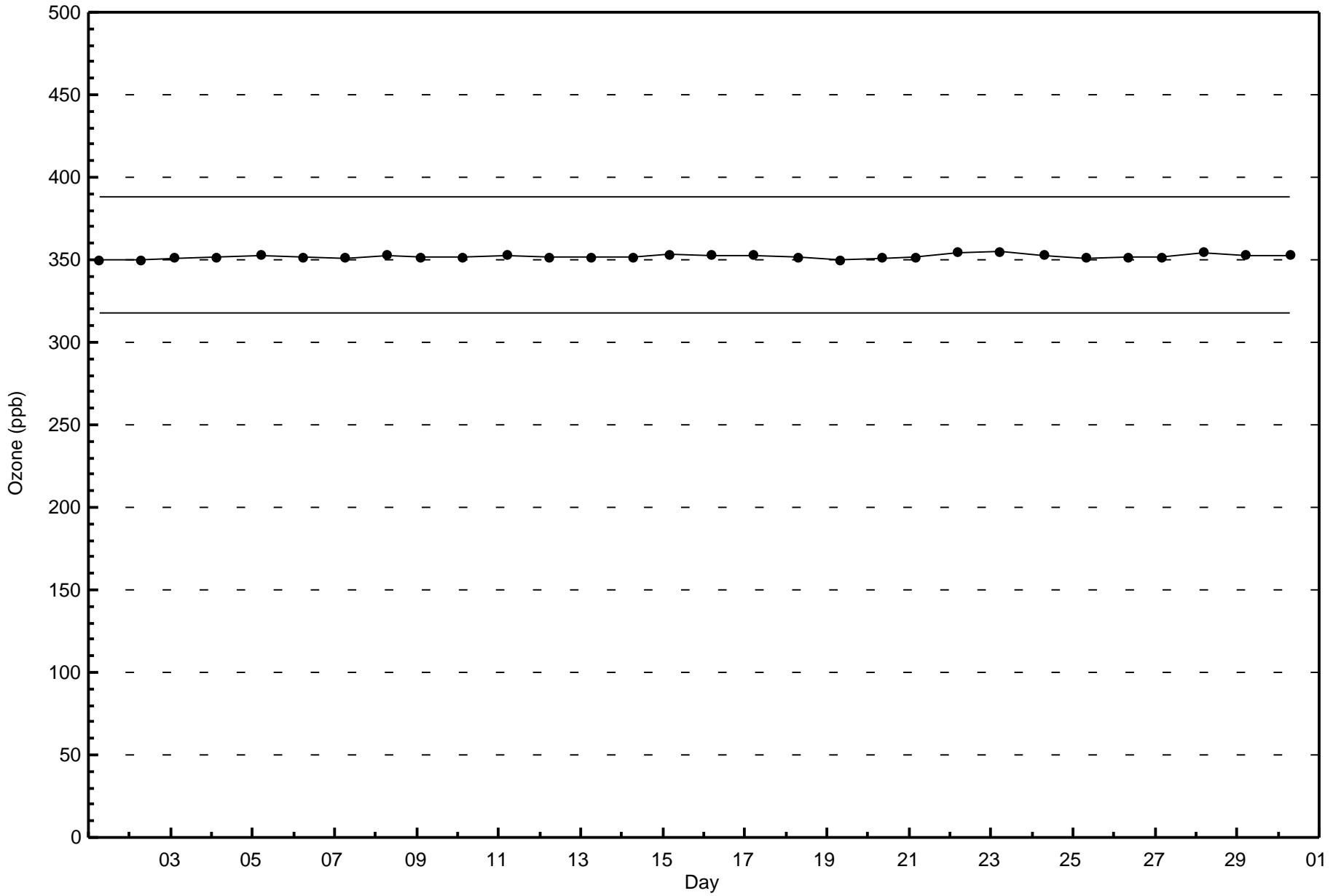
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Ozone (O<sub>3</sub>) - ppb  
Wapasu (AMS 17)



Total Number of Valid Hours: 682

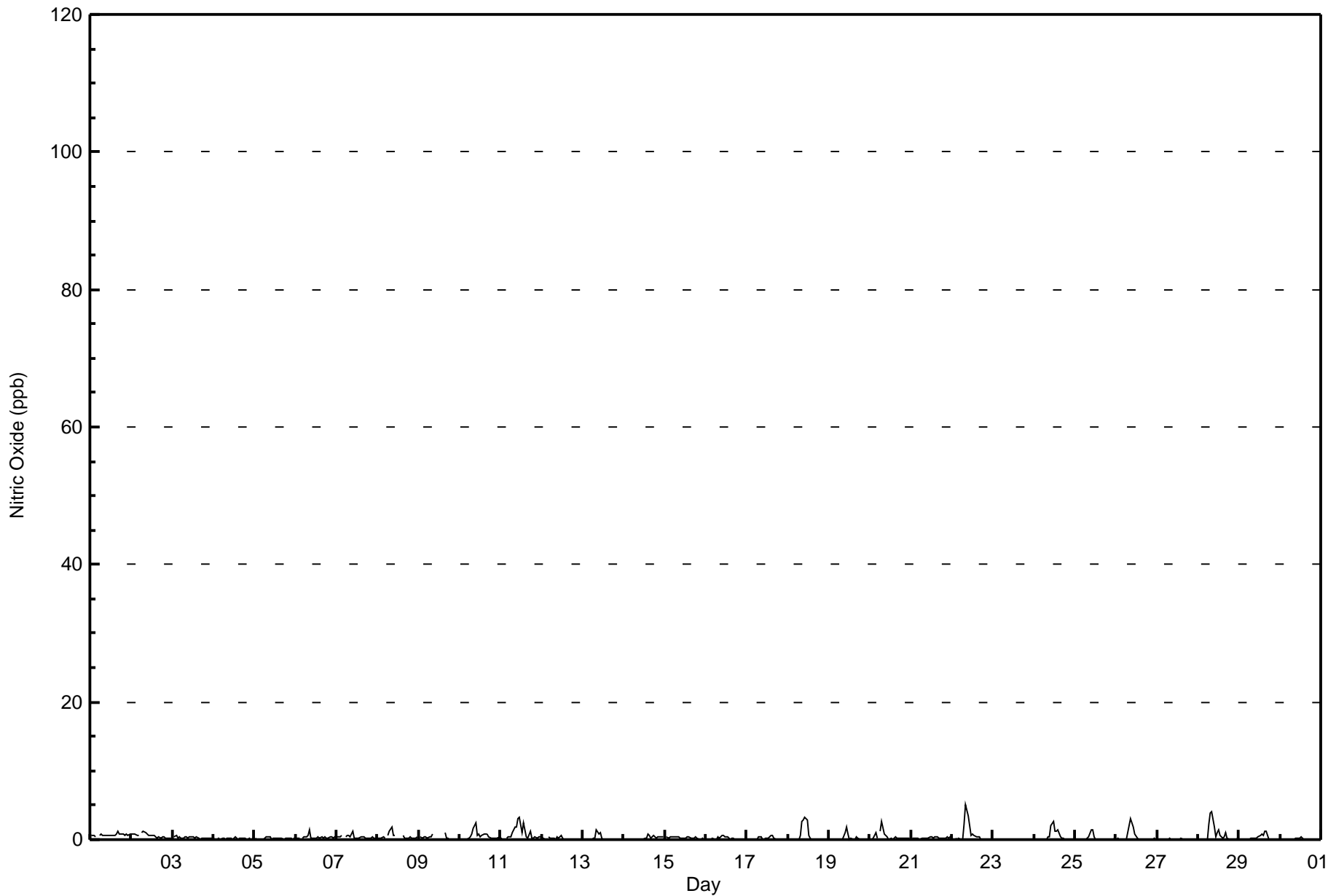






Maximum Value: 5 ppb on Sep 22 09:00																	Maximum Daily Average: 0.9 ppb on Sep 11																	Hours in Service: 720	
Minimum Value: 0 ppb on Sep 5 06:00																	Minimum Daily Average: 0.0 ppb on Sep 23																	Hours of Data: 680	
Maximum Diurnal Average: 1.0 ppb at hour 9																	Minimum Diurnal Average: 0.1 ppb at hour 20																	Hours of Missing Data: 40	
Monthly Average: 0.3 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 3																	Hours of Calibration: 36	
																	Percent Operational Time: 99.4																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Sep	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1									
2-Sep	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.6	1									
3-Sep	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1									
4-Sep	0	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-Sep	0	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-Sep	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1									
7-Sep	0	0	0	1	Z	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1									
8-Sep	0	0	0	0	0	Z	1	1	2	1	1	M	M	M	M	1	0	0	0	0	0	0	0	0	0.5	2									
9-Sep	Z	0	0	0	0	0	0	0	1	C	C	C	C	C	C	1	0	0	0	0	0	0	0	0	--	1									
10-Sep	0	Z	0	0	0	0	0	1	2	2	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0.5	2									
11-Sep	0	0	Z	0	0	0	0	1	2	2	3	3	1	2	1	0	0	1	0	0	0	0	0	0	0.9	3									
12-Sep	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
13-Sep	0	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
14-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0.2	1									
15-Sep	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									
16-Sep	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
17-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.1	1									
18-Sep	0	0	0	Z	0	0	0	1	3	3	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0.6	3									
19-Sep	0	0	0	0	Z	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2									
20-Sep	0	0	0	1	0	Z	1	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3									
21-Sep	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									
22-Sep	0	Z	0	0	0	0	0	2	5	4	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	5									
23-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
24-Sep	0	0	0	Z	0	0	0	0	0	0	2	3	1	1	1	0	0	0	0	0	0	0	0	0	0.4	3									
25-Sep	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
26-Sep	0	0	0	0	0	Z	0	1	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3									
27-Sep	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									
28-Sep	0	Z	0	0	0	0	2	4	4	2	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0.8	4									
29-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0.2	1									
30-Sep	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									
																	Diurnal Average		Diurnal Maximum																
																	0.1		1																
																	0.2		1																
																	0.2		1																
																	0.2		1																
																	0.2		1																
																	0.1		1																
																	0.3		2																
																	0.7		4																
																	1.0		5																
																	0.9		4																
																	0.8		3																
																	0.6		3																
																	0.4		1																
																	0.4		2																
																	0.3		1																
																	0.3		1																
																	0.3		1																
																	0.2		1																
																	0.2		1																
																	0.1		1																
																	0.1		1																
																	0.1		1																
																	0.1		1																
																	0.2		1																

Z - zerospan      C - Calibration      M - Maintenance





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Wapasu - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	680	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Wapasu - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	23	31	12	11	16	49	124	86	44	62	56	40	23	45	34	24	680
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>	23	31	12	11	16	49	124	86	44	62	56	40	23	45	34	24	680

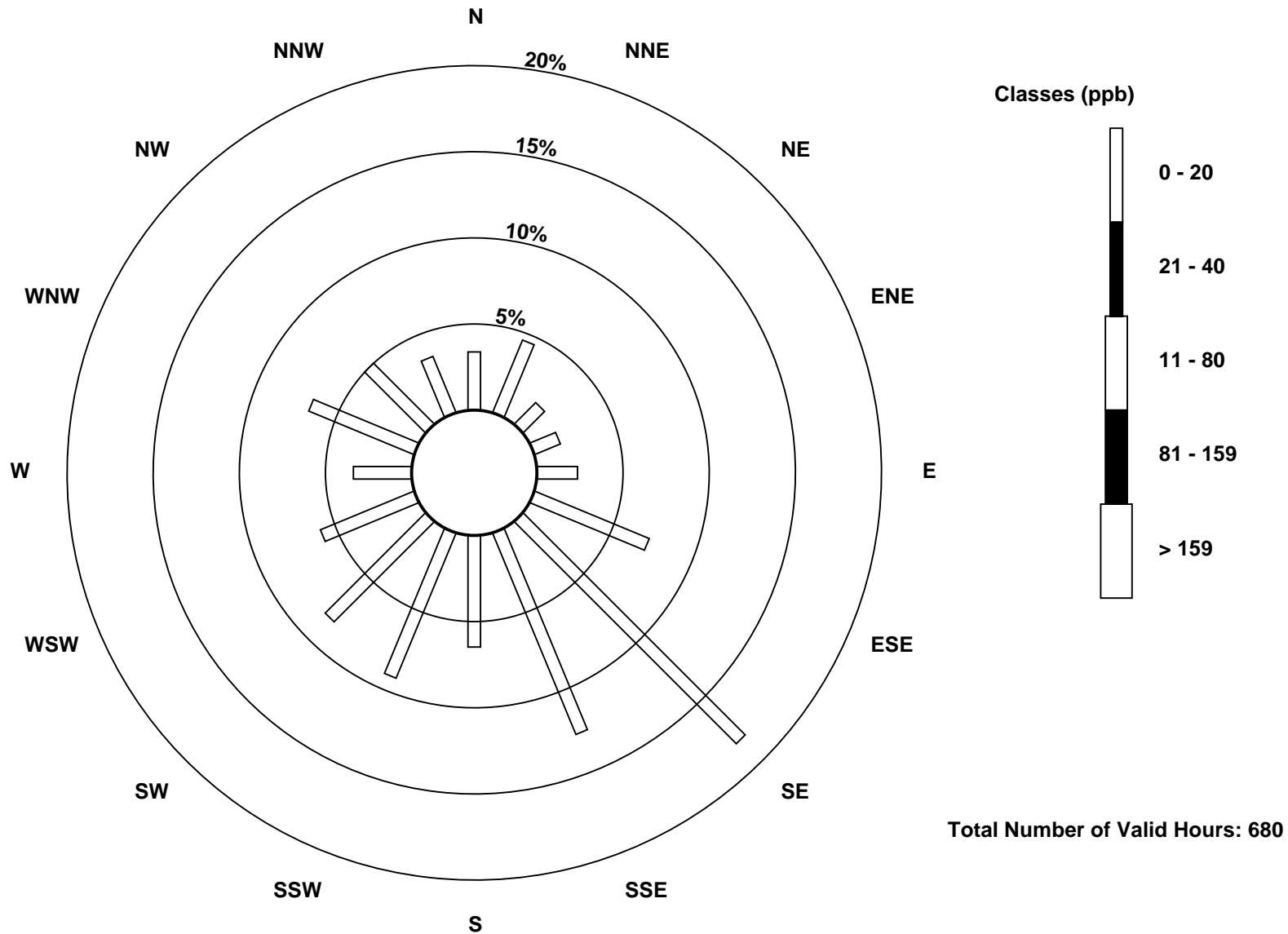
Total Number of Valid Hours: 680

Total Number of Hours: 720

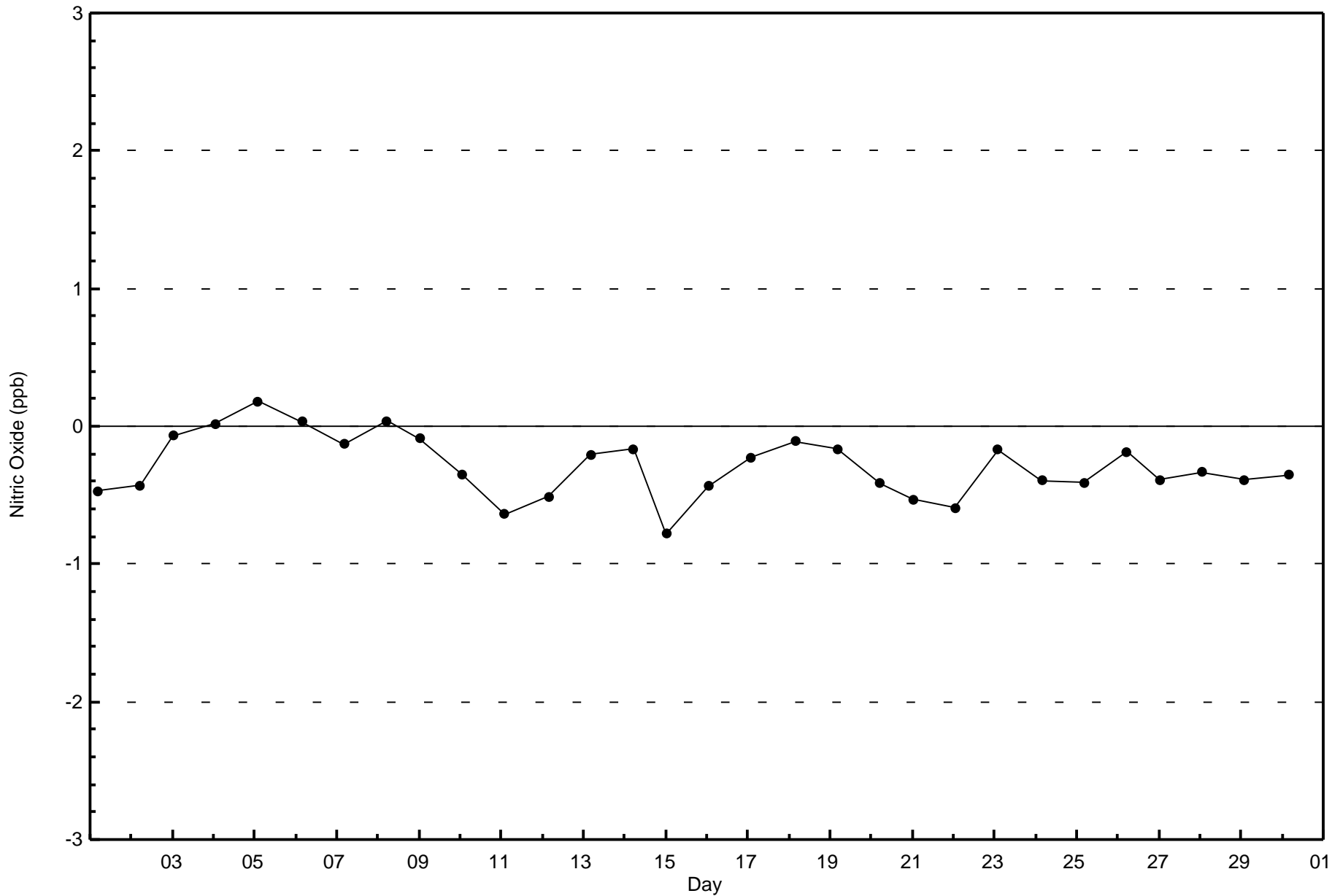


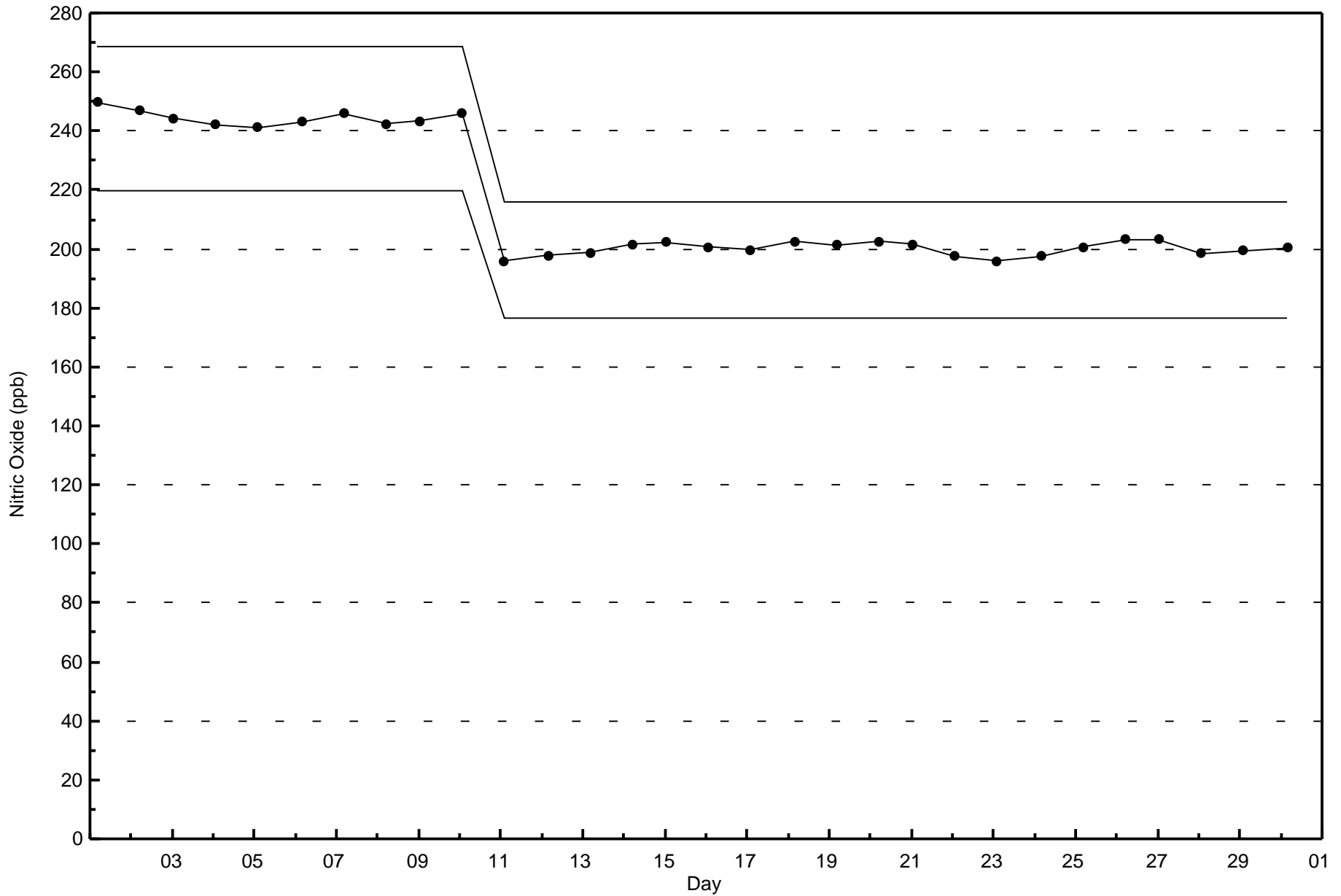
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitric Oxide (NO) - ppb  
Wapasu (AMS 17)









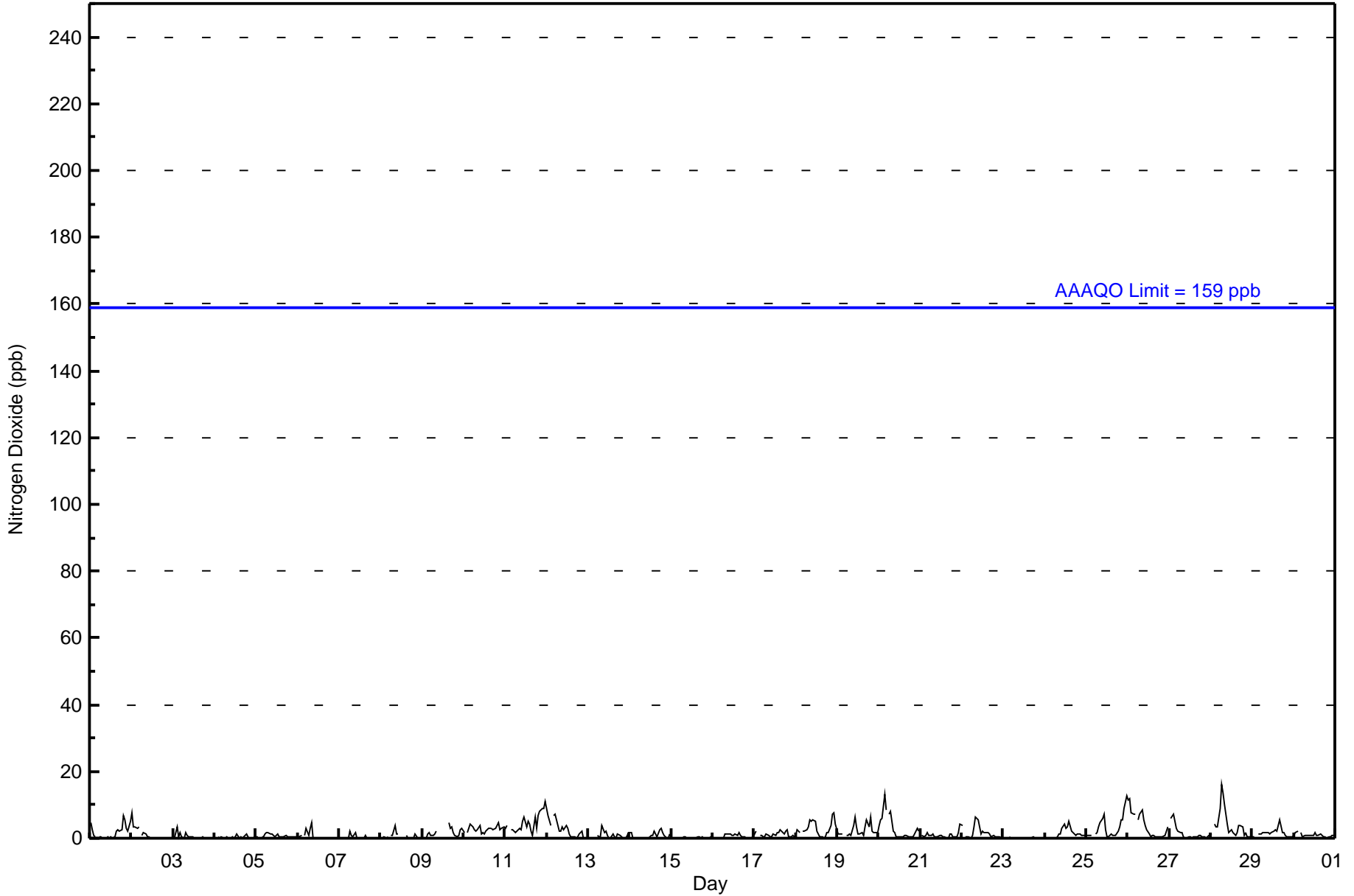


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 16 ppb on Sep 28 07:00	Maximum Daily Average: 4.5 ppb on Sep 11
Minimum Value: 0 ppb on Sep 1 08:00	Hours of Data: 680
Maximum Diurnal Average: 2.4 ppb at hour 9	Hours of Missing Data: 40
Monthly Average: 1.6 ppb	Hours of Calibration: 36
Minimum Daily Average: 0.1 ppb on Sep 23	Percent Operational Time: 99.4
Minimum Diurnal Average: 1.1 ppb at hour 14	
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> = 11	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	5	3	1	1	Z	1	1	0	0	0	1	0	1	0	0	2	3	2	3	7	6	3	2	5	1.9	7
2-Sep	8	3	3	3	3	Z	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	8
3-Sep	Z	0	3	1	2	0	0	2	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.5	3
4-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0.3	1
5-Sep	0	0	Z	0	1	1	2	2	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0.7	2
6-Sep	0	1	1	Z	1	3	1	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	5
7-Sep	0	0	0	0	Z	0	2	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	2
8-Sep	0	0	1	0	1	Z	1	1	4	1	1	M	M	M	M	1	0	0	0	0	1	0	0	0	0.6	4
9-Sep	Z	0	0	1	2	1	1	1	2	C	C	C	C	C	C	5	3	3	2	1	0	1	2	3	--	5
10-Sep	2	Z	2	3	4	3	3	2	3	4	1	2	1	2	3	3	3	3	3	4	5	3	3	4	2.8	5
11-Sep	3	4	Z	3	3	2	2	2	3	3	5	6	3	5	4	2	1	6	3	7	8	9	9	11	4.5	11
12-Sep	9	7	4	Z	7	7	4	2	2	3	3	4	3	1	0	1	0	0	0	1	2	0	0	0	2.7	9
13-Sep	0	0	0	0	Z	1	1	0	4	2	2	1	0	0	1	0	0	1	1	0	0	0	0	2	0.7	4
14-Sep	2	2	0	0	0	Z	0	0	0	0	0	0	1	1	2	1	1	3	3	2	1	0	0	1	0.8	3
15-Sep	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
16-Sep	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	2	1	0	0	0	0	0	0	0	1	0.7	2
17-Sep	1	2	Z	1	1	0	1	1	1	0	1	1	1	2	2	3	2	1	2	3	0	0	1	1	1.2	3
18-Sep	1	2	2	Z	2	2	3	3	6	5	5	5	2	1	0	1	0	0	2	2	4	7	8	4	2.9	8
19-Sep	1	1	1	1	Z	1	1	1	1	4	6	4	1	1	2	1	3	5	3	7	2	2	2	2	2.3	7
20-Sep	4	5	6	13	9	Z	7	8	2	2	0	0	0	0	1	1	1	0	1	1	1	2	3	2	3.0	13
21-Sep	Z	1	1	1	2	1	1	1	0	0	1	1	1	1	0	0	0	1	1	1	1	0	2	4	0.9	4
22-Sep	4	Z	1	1	0	0	1	4	6	5	4	1	2	2	2	2	1	1	1	1	1	0	0	0	1.6	6
23-Sep	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
24-Sep	0	0	0	Z	0	0	0	1	1	1	3	4	3	3	5	2	2	1	1	1	1	1	1	1	1.4	5
25-Sep	1	1	1	1	Z	1	2	4	5	6	7	3	1	1	1	1	1	1	2	3	6	6	9	13	3.1	13
26-Sep	12	12	8	7	7	Z	6	7	8	6	4	3	1	1	1	1	0	1	1	0	0	1	2	4	4.0	12
27-Sep	Z	6	7	5	3	2	2	2	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	1	1.4	7
28-Sep	1	Z	4	4	3	9	16	14	10	4	2	2	3	2	1	2	4	4	3	1	2	0	0	1	3.9	16
29-Sep	1	1	Z	1	1	1	2	2	2	2	1	2	2	2	2	4	6	2	2	1	1	0	1	0	1.6	6
30-Sep	1	2	2	Z	2	1	1	1	1	1	1	1	2	1	1	1	1	1	0	0	0	0	1	1	0.9	2

2.2	2.1	1.9	1.9	2.2	1.5	1.9	2.3	2.4	1.9	1.8	1.5	1.1	1.1	1.1	1.2	1.1	1.3	1.2	1.4	1.4	1.2	1.6	2.0	Diurnal Average	
12	12	8	13	9	9	16	14	10	6	7	6	3	5	5	5	6	6	3	7	8	9	9	13	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Wapasu - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	680	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	23	31	12	11	16	49	124	86	44	62	56	40	23	45	34	24	680
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>	23	31	12	11	16	49	124	86	44	62	56	40	23	45	34	24	680

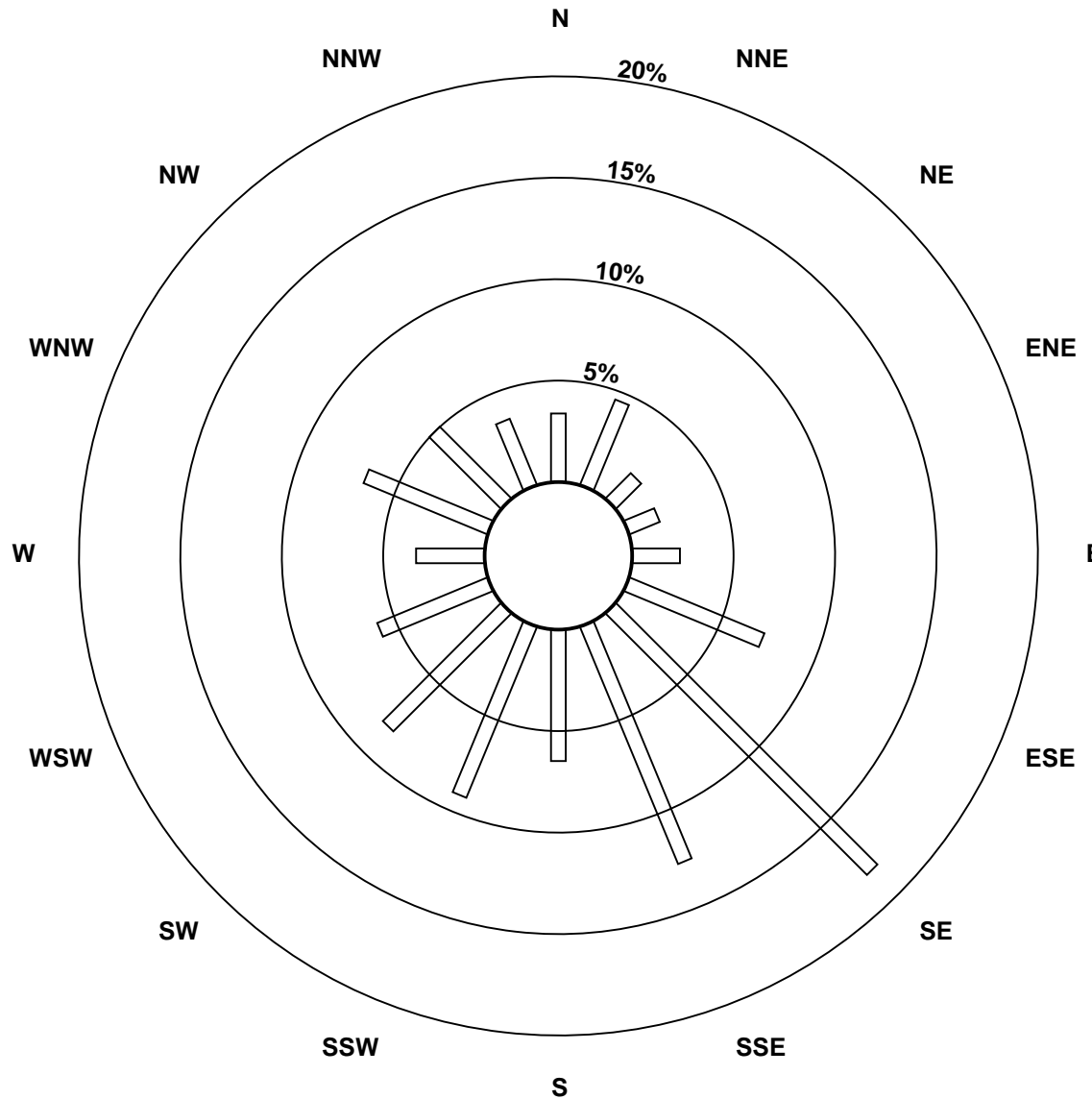
Total Number of Valid Hours: 680

Total Number of Hours: 720

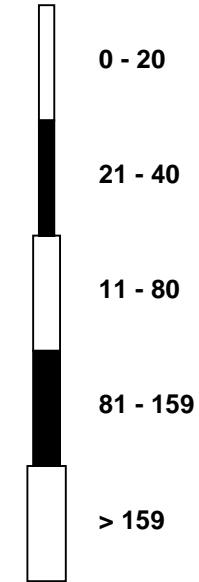


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

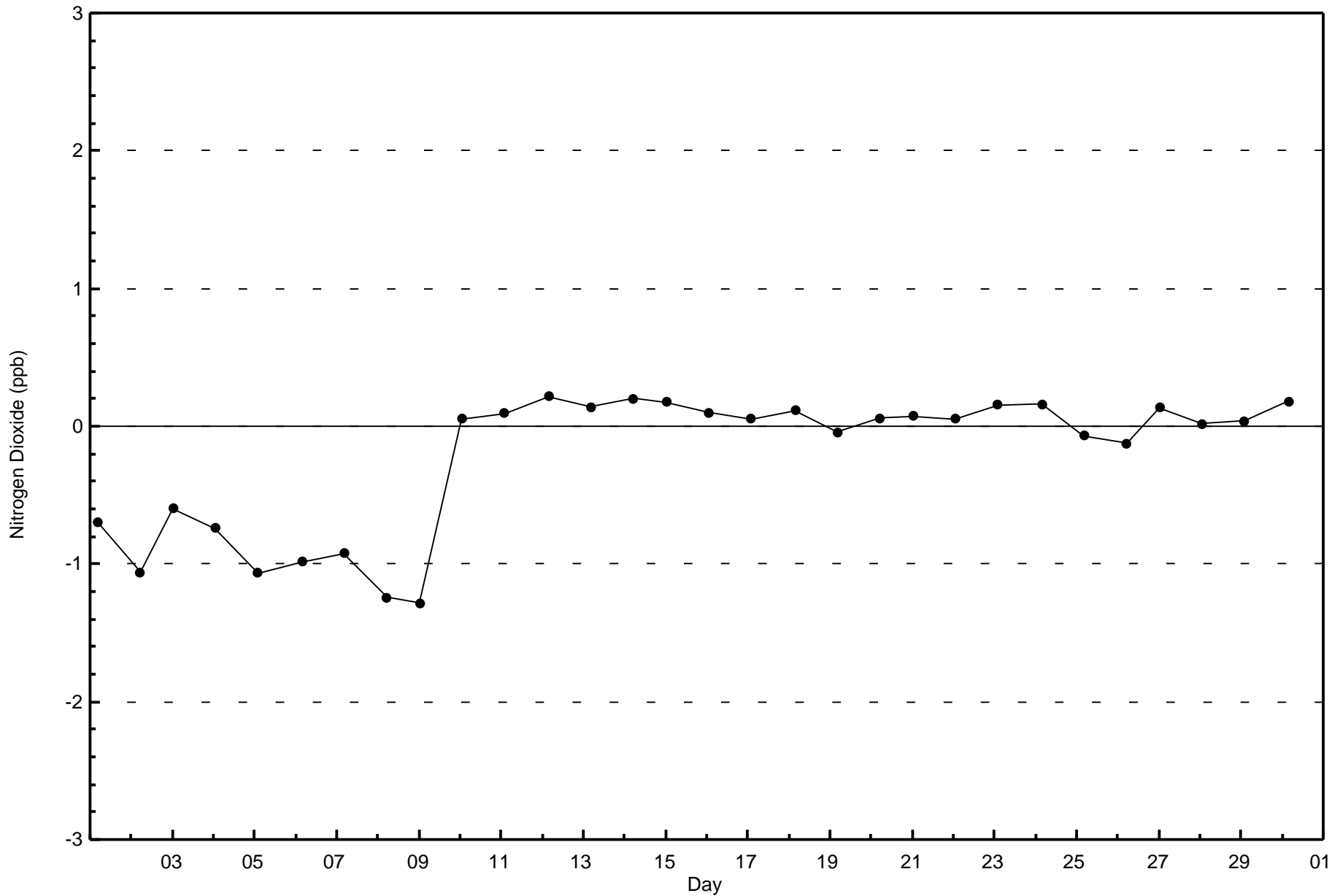
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu (AMS 17)



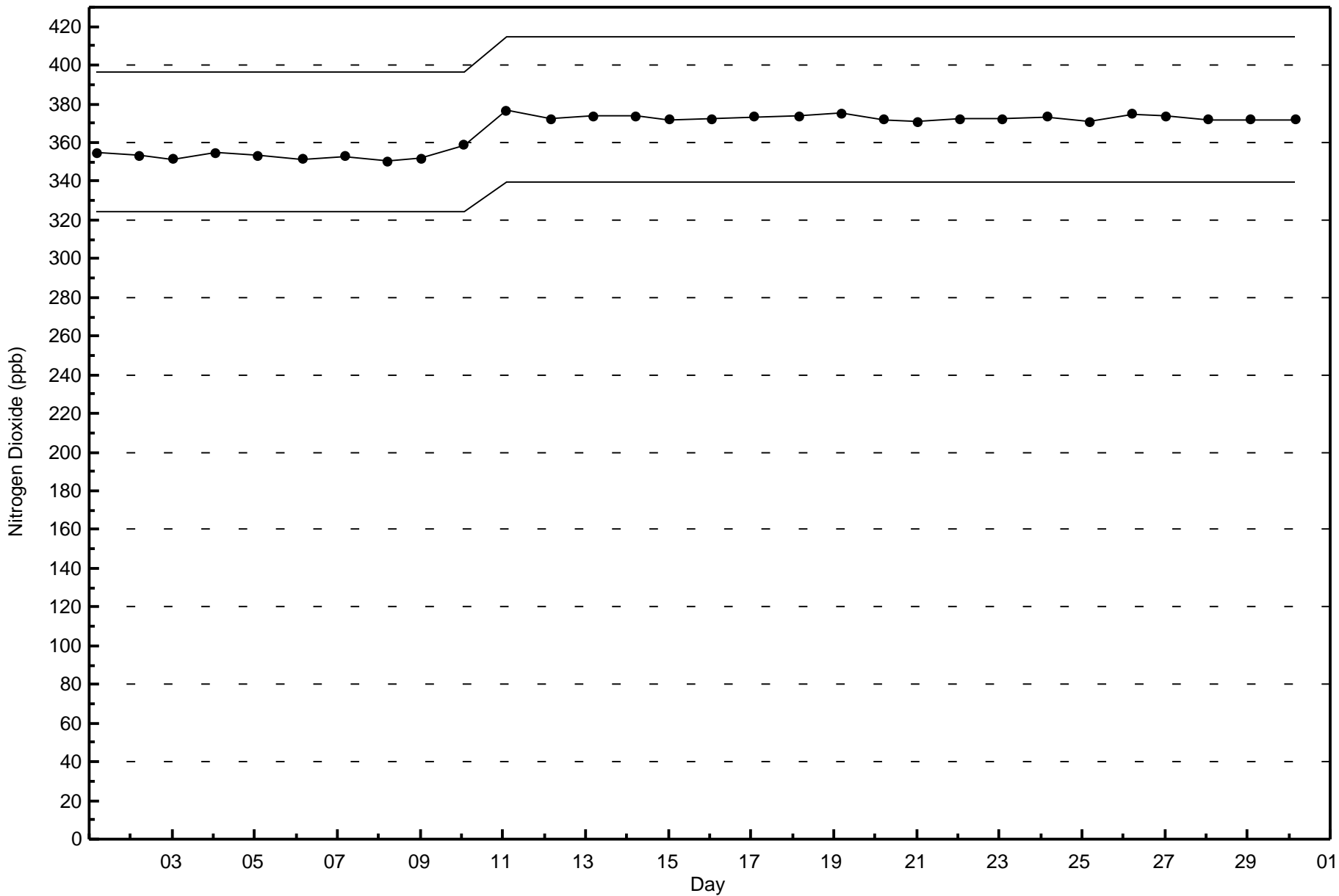
Classes (ppb)



Total Number of Valid Hours: 680

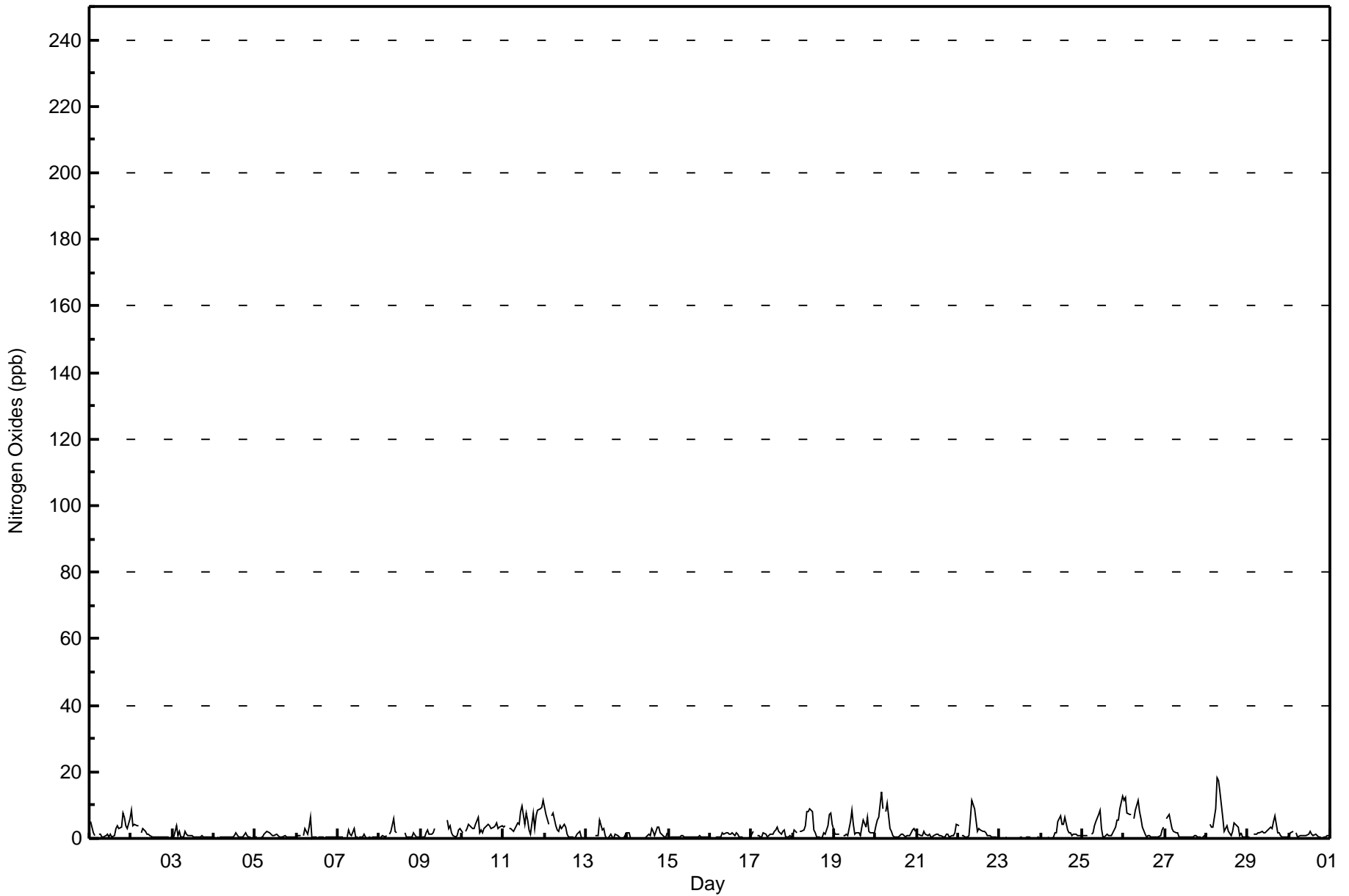








Maximum Value: 18 ppb on Sep 28 07:00																		Maximum Daily Average: 5.4 ppb on Sep 11																		Hours in Service: 720	
Minimum Value: 0 ppb on Sep 13 02:00																		Minimum Daily Average: 0.1 ppb on Sep 23																		Hours of Data: 680	
Maximum Diurnal Average: 3.4 ppb at hour 9																		Minimum Diurnal Average: 1.4 ppb at hour 19																		Hours of Missing Data: 40	
Monthly Average: 2.0 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 3 P <sub>90</sub> = 5 P <sub>99</sub> = 11																		Hours of Calibration: 36	
																																				Percent Operational Time: 99.4	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Sep	5	3	1	1	Z	1	1	1	1	1	1	1	1	1	3	4	3	3	8	6	4	3	6	2.6	8												
2-Sep	9	4	4	4	4	Z	2	3	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1.7	9												
3-Sep	Z	0	4	1	2	1	0	2	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0.8	4												
4-Sep	0	Z	0	0	0	0	0	0	0	0	0	1	2	0	0	0	1	1	1	0	0	0	0	0.5	2												
5-Sep	0	0	Z	0	1	1	2	2	2	1	1	1	1	1	1	0	1	1	0	1	0	1	1	0.8	2												
6-Sep	0	1	1	Z	1	3	1	3	6	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1.0	6												
7-Sep	0	0	0	1	Z	0	3	1	1	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0.6	3												
8-Sep	0	0	1	1	1	Z	1	2	6	2	2	M	M	M	M	2	0	0	0	0	2	0	1	0	1.1	6											
9-Sep	Z	0	0	2	2	1	1	2	3	C	C	C	C	C	C	6	3	4	2	1	0	1	2	3	--	6											
10-Sep	2	Z	2	3	4	3	3	3	4	6	2	2	2	3	4	4	4	3	3	4	5	3	3	4	3.3	6											
11-Sep	3	4	Z	3	3	3	2	3	5	4	8	10	4	8	6	2	1	8	3	7	8	9	9	12	5.4	12											
12-Sep	9	7	4	Z	7	8	4	2	2	4	3	4	3	1	0	0	0	0	0	1	2	0	0	0	2.8	9											
13-Sep	0	0	0	0	Z	1	1	1	5	3	3	1	0	0	1	0	0	1	1	0	0	0	2	0.9	5												
14-Sep	2	2	0	0	0	Z	0	0	0	0	0	0	1	1	3	2	1	3	3	2	1	1	0	2	1.0	3											
15-Sep	Z	1	0	0	1	1	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0.5	1											
16-Sep	0	Z	0	0	0	0	0	2	1	2	2	1	1	2	1	2	1	0	0	0	0	0	1	0.8	2												
17-Sep	1	2	Z	1	1	0	1	2	1	0	1	1	1	2	3	3	2	1	2	3	0	0	1	0	1.4	3											
18-Sep	1	2	2	Z	2	2	3	4	8	8	9	8	3	2	0	0	0	0	2	1	4	7	8	4	3.5	9											
19-Sep	1	1	1	1	Z	1	1	1	1	5	8	4	1	2	2	1	4	6	3	7	2	2	2	2	2.5	8											
20-Sep	4	5	6	14	9	Z	8	11	3	2	1	1	0	0	1	1	1	1	1	1	1	2	3	2	3.4	14											
21-Sep	Z	1	1	1	2	1	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	1	2	4	1.1	4											
22-Sep	4	Z	1	1	1	0	1	6	11	9	5	2	3	2	2	2	2	1	1	1	0	0	0	0	2.4	11											
23-Sep	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1											
24-Sep	0	0	0	Z	0	0	0	1	2	2	5	7	4	4	6	3	2	2	1	1	1	1	1	1	1.9	7											
25-Sep	1	1	1	1	Z	1	2	4	5	7	9	3	1	1	1	1	1	1	2	3	6	6	9	13	3.4	13											
26-Sep	12	12	8	7	7	Z	6	8	11	8	6	3	1	1	1	1	0	1	1	0	0	1	2	4	4.4	12											
27-Sep	Z	6	7	5	3	2	2	2	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	1.5	7											
28-Sep	1	Z	4	4	3	9	18	17	14	6	2	3	4	2	1	2	5	4	3	1	2	0	0	1	4.7	18											
29-Sep	1	1	Z	1	1	1	2	2	2	2	2	2	3	3	3	5	7	2	2	1	1	0	0	0	1.9	7											
30-Sep	1	2	2	Z	2	0	1	1	1	1	1	1	2	1	1	1	1	1	0	0	0	0	1	1	1.0	2											
																		Diurnal Average		Diurnal Maximum																	
																		2.3		12																	
																		2.3		8																	
																		2.1		14																	
																		2.0		9																	
																		2.3		9																	
																		1.7		9																	
																		2.3		18																	
																		2.9		17																	
																		3.4		14																	
																		2.8		9																	
																		2.5		9																	
																		2.1		10																	
																		1.5		4																	
																		1.5		8																	
																		1.4		6																	
																		1.5		6																	
																		1.4		7																	
																		1.5		8																	
																		1.4		3																	
																		1.5		8																	
																		1.5		8																	
																		1.4		9																	
																		1.7		9																	
																		2.1		13																	
																		Diurnal Average		Diurnal Maximum																	
																		Z - zerospan		C - Calibration																	
																		M - Maintenance																			





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Wapasu - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	680	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Wapasu - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	23	31	12	11	16	49	124	86	44	62	56	40	23	45	34	24	680
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>	23	31	12	11	16	49	124	86	44	62	56	40	23	45	34	24	680

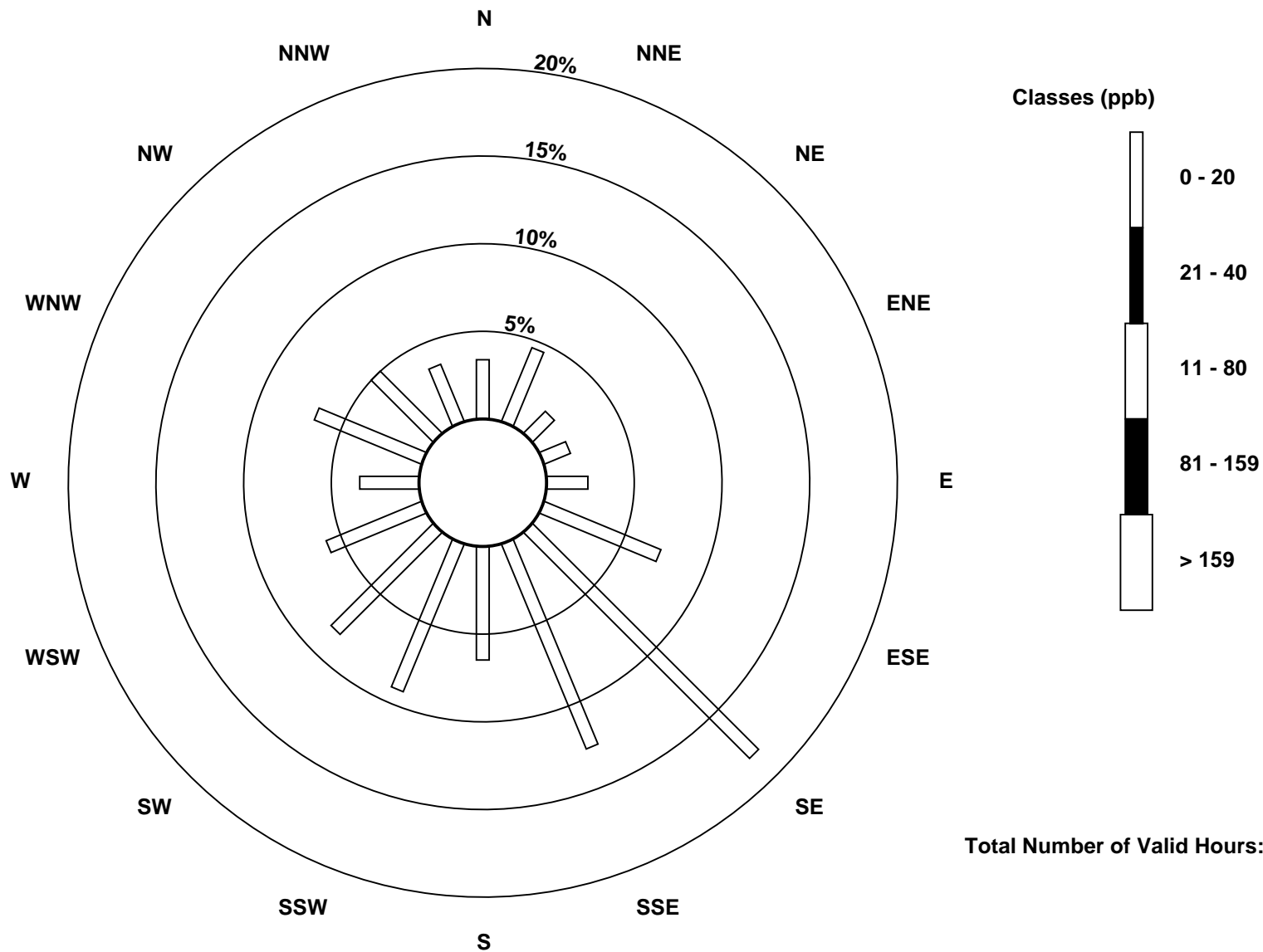
Total Number of Valid Hours: 680

Total Number of Hours: 720

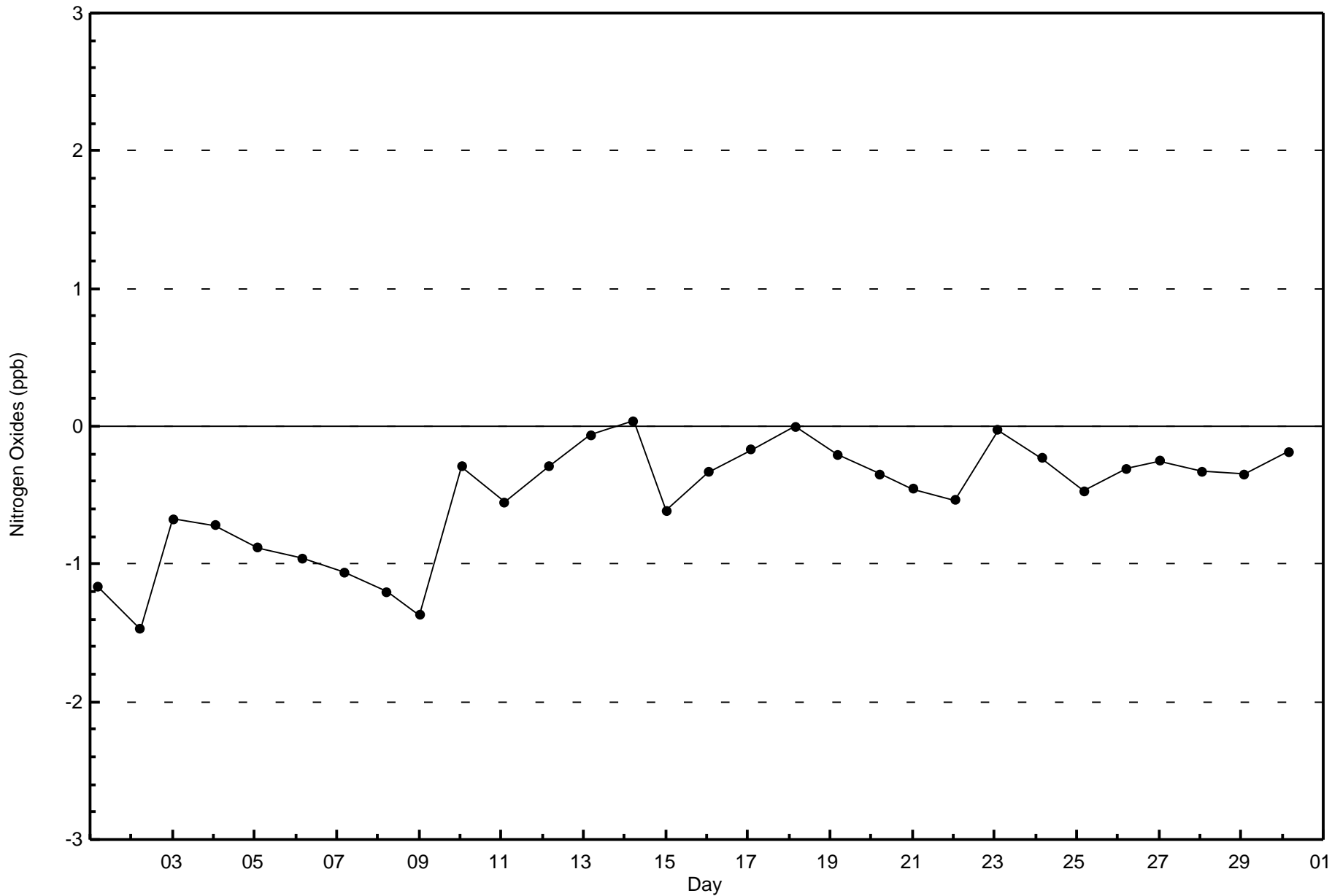


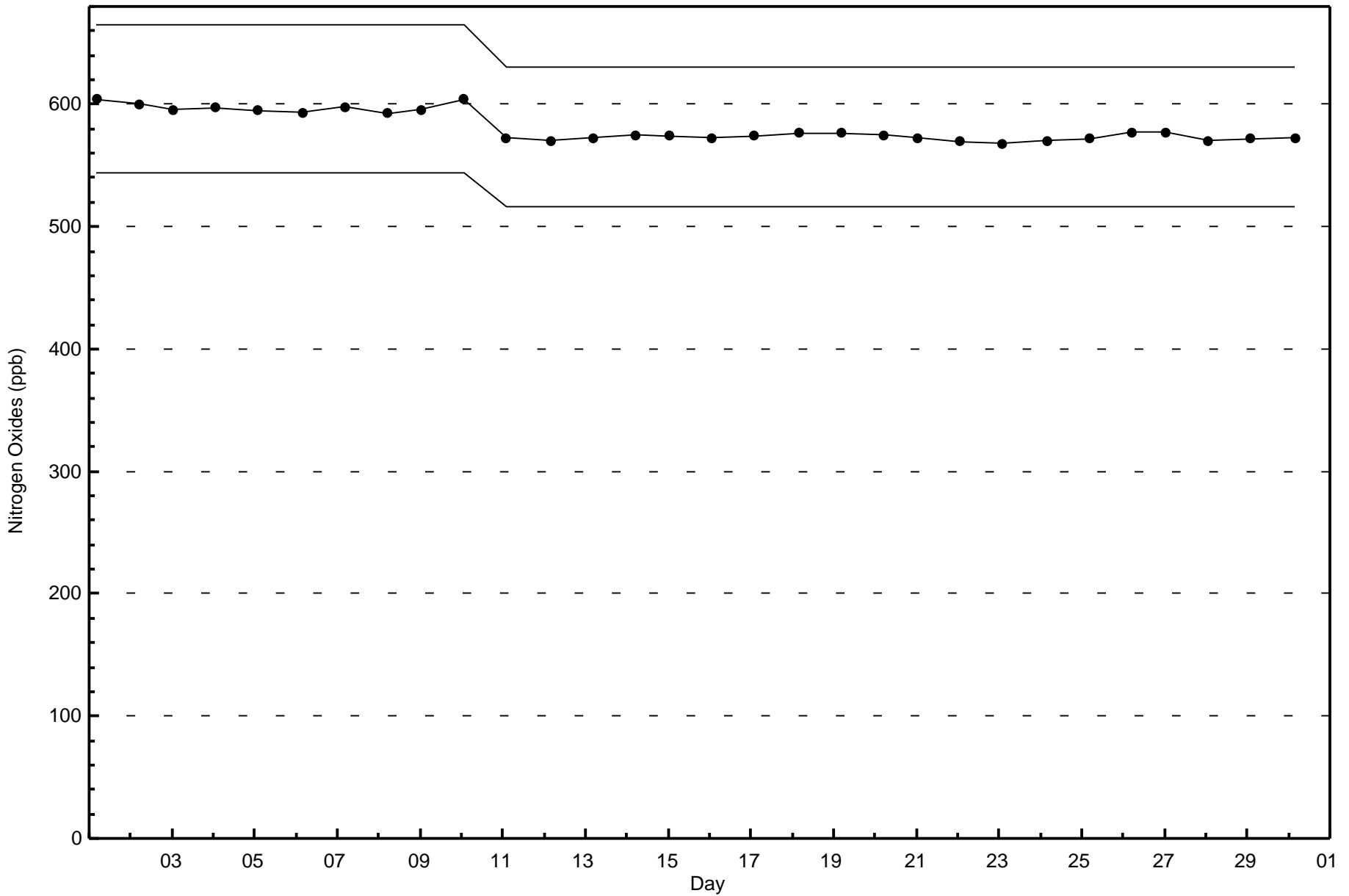
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Wapasu (AMS 17)



Total Number of Valid Hours: 680









Summary of Hour Averages

Wapasu - September 2015

Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 18.7 µg/m <sup>3</sup> on Sep 19 17:00	Maximum Daily Average: 6.8 µg/m <sup>3</sup> on Sep 11	Hours of Data:	714
Minimum Value: 0.0 µg/m <sup>3</sup> on Sep 21 00:00	Minimum Daily Average: 0.2 µg/m <sup>3</sup> on Sep 21	Hours of Missing Data:	6
Maximum Diurnal Average: 3.2 µg/m <sup>3</sup> at hour 9	Minimum Diurnal Average: 2.5 µg/m <sup>3</sup> at hour 14	Hours of Calibration:	2
Monthly Average: 2.83 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.4 Q <sub>1</sub> = 1.4 Median = 2.1 Q <sub>3</sub> = 3.6 P <sub>90</sub> = 6.7 P <sub>99</sub> = 10.5	Percent Operational Time:	99.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	2.7	2.7	2.3	2.3	2.2	2.5	2.5	2.0	4.2	5.1	4.4	3.1	3.0	2.6	2.4	3.7	4.5	4.9	4.5	6.5	6.8	4.5	4.1	6.0	3.7	6.8
2-Sep	7.4	4.8	5.8	6.2	7.6	5.7	3.2	2.6	8.4	9.7	9.2	9.1	8.8	6.5	4.6	2.8	1.8	1.8	1.9	1.9	1.9	1.7	1.9	1.9	4.9	9.7
3-Sep	2.0	2.3	3.2	2.4	2.2	1.4	1.4	1.8	1.6	1.5	1.6	1.7	1.7	1.5	1.6	1.6	1.6	1.7	1.8	1.7	1.9	2.0	2.0	1.9	1.8	3.2
4-Sep	1.9	2.1	1.9	1.9	2.1	2.0	2.2	2.2	2.3	2.3	2.2	2.0	2.0	2.1	1.9	1.9	2.1	2.2	2.4	2.6	2.4	2.3	2.2	2.1	2.1	2.6
5-Sep	2.1	2.1	2.1	2.1	2.6	3.6	4.0	3.3	2.0	2.5	2.3	3.2	4.8	5.1	5.1	5.6	6.6	8.7	10.6	11.1	10.5	10.9	10.3	9.7	5.5	11.1
6-Sep	7.9	7.3	7.0	5.2	4.1	3.3	2.7	2.5	2.2	1.8	1.5	1.4	1.5	1.6	1.5	1.4	1.4	1.5	1.5	1.6	1.9	1.9	1.9	1.9	2.8	7.9
7-Sep	1.9	2.0	2.0	2.1	2.1	2.1	2.5	2.2	2.3	2.3	1.6	1.5	1.4	1.5	1.6	1.7	1.4	1.4	1.4	1.6	1.6	1.6	1.6	1.6	1.8	2.5
8-Sep	1.5	1.6	1.6	1.6	2.0	2.4	2.3	1.9	1.6	1.1	1.2	1.6	1.6	2.4	4.1	3.2	3.0	4.2	4.2	5.8	4.6	3.5	3.1	2.9	2.6	5.8
9-Sep	3.0	2.8	2.9	3.0	3.2	3.7	4.1	4.3	6.8	10.1	15.2	8.2	5.4	4.0	4.1	5.7	M	8.3	7.1	5.7	5.3	5.1	5.7	5.5	5.6	15.2
10-Sep	6.1	7.5	7.7	7.6	8.1	7.4	6.7	6.8	5.5	3.1	2.3	2.5	2.7	3.1	3.8	4.0	5.9	4.3	4.8	5.7	6.5	4.9	4.4	4.2	5.2	8.1
11-Sep	5.0	5.9	5.9	5.9	6.2	5.7	5.4	5.5	7.6	7.6	8.7	9.9	7.4	7.0	7.3	7.6	6.7	6.2	6.8	7.0	8.1	7.4	6.2	6.7	6.8	9.9
12-Sep	6.9	7.2	7.1	7.4	7.4	7.2	6.7	6.4	6.7	7.2	6.2	5.6	5.2	3.9	3.1	3.0	2.2	1.8	2.9	3.4	3.4	2.3	2.0	2.0	4.9	7.4
13-Sep	2.3	2.4	2.4	2.4	2.3	2.6	2.4	1.7	AF	AF	AF	0.8	0.8	0.9	1.2	1.3	1.2	1.5	1.5	1.7	1.6	1.6	1.5	1.7	1.7	2.6
14-Sep	1.7	1.5	1.5	2.3	2.2	2.1	1.8	1.7	1.7	1.6	1.6	1.5	1.8	1.8	1.9	2.4	2.6	3.0	3.4	4.1	3.9	3.6	3.1	2.4	2.3	4.1
15-Sep	2.1	2.2	2.2	2.3	2.3	2.3	2.4	2.5	2.0	1.8	1.6	1.5	1.4	1.4	1.5	1.6	1.6	1.8	1.9	1.9	2.0	2.0	2.1	2.3	1.9	2.5
16-Sep	2.1	2.1	2.3	2.4	2.4	2.2	2.1	2.2	2.1	2.0	2.0	2.4	2.0	1.9	1.9	2.4	2.2	2.0	1.9	2.1	2.2	2.3	2.5	2.2	2.2	2.5
17-Sep	2.8	3.3	3.3	3.1	2.8	2.7	2.7	2.5	2.0	1.7	2.0	2.0	2.2	3.5	3.2	4.0	5.7	6.5	8.1	6.0	5.0	4.9	4.8	4.2	3.7	8.1
18-Sep	5.7	7.3	7.3	7.1	6.5	6.3	5.9	5.4	5.8	C	C	4.3	3.2	2.8	2.0	2.2	1.4	1.9	2.5	2.1	2.5	3.3	2.8	1.3	4.1	7.3
19-Sep	0.3	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.2	1.1	1.9	4.5	4.5	5.0	5.9	3.3	18.7	3.2	1.3	1.4	1.3	1.4	0.4	0.5	2.4	18.7
20-Sep	0.9	1.0	1.4	2.0	2.1	1.1	0.6	1.4	1.0	0.7	0.1	0.6	1.2	1.5	1.2	1.3	0.6	0.1	0.6	0.8	0.2	0.4	0.2	0.0	0.9	2.1
21-Sep	0.0	0.0	0.0	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	0.0	0.7	0.7	0.1	0.3	0.2	0.4	1.1	0.2	1.1
22-Sep	1.1	0.9	0.8	0.9	0.9	0.9	1.0	1.9	1.8	1.1	0.6	0.4	0.4	1.1	1.3	1.2	0.4	0.7	0.5	0.4	0.5	0.5	0.5	0.5	0.9	1.9
23-Sep	0.5	0.6	0.6	0.5	0.3	0.3	0.3	0.3	0.4	0.3	0.2	0.3	0.3	0.4	0.5	0.5	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.5	0.9
24-Sep	1.0	1.0	1.0	0.9	1.0	1.0	1.1	1.3	2.1	2.9	3.2	4.6	4.8	3.3	2.8	2.1	1.5	1.5	1.4	3.0	4.8	6.1	6.4	6.8	2.7	6.8
25-Sep	7.3	7.9	8.5	9.0	10.0	10.7	11.1	9.7	8.8	5.3	3.6	1.5	0.2	0.3	1.4	2.0	1.8	0.9	1.0	0.9	1.6	2.2	2.1	3.0	4.6	11.1
26-Sep	2.9	3.4	2.9	2.1	1.4	1.0	1.2	1.5	3.6	5.2	4.2	3.0	2.1	2.7	2.2	2.8	1.6	9.4	3.4	2.0	1.1	1.8	2.1	2.3	2.7	9.4
27-Sep	5.3	7.2	3.7	2.1	2.0	0.6	0.8	3.1	3.2	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.2	0.8	0.6	0.1	0.0	0.0	0.0	0.0	1.3	7.2
28-Sep	0.0	0.1	0.4	0.3	0.0	1.0	2.9	3.8	3.6	1.5	0.4	0.8	1.2	0.7	0.1	0.9	3.2	1.7	1.0	0.0	0.0	0.0	0.0	0.0	1.0	3.8
29-Sep	0.0	0.0	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	2.1	3.0	3.7	3.4	2.9	2.0	1.6	1.7	2.0	1.8	1.7	1.4	3.7
30-Sep	1.7	1.8	1.8	1.7	1.9	1.8	1.8	1.8	1.8	1.9	3.2	3.3	4.2	4.5	4.5	4.0	3.5	3.6	4.3	3.6	2.3	2.4	2.5	2.6	2.8	4.5

2.9	3.0	3.0	2.9	3.0	2.8	2.8	2.8	3.2	2.9	2.9	2.8	2.6	2.5	2.5	2.6	3.0	3.0	2.9	2.9	2.9	2.8	2.6	2.7	Diurnal Average	
7.9	7.9	8.5	9.0	10.0	10.7	11.1	9.7	8.8	10.1	15.2	9.9	8.8	7.0	7.3	7.6	18.7	9.4	10.6	11.1	10.5	10.9	10.3	9.7	Diurnal Maximum	

C - Calibration      M - Maintenance      AF - Analyzer Failure  
 Alberta Ambient Air Quality Objectives (AAAQO):      24-hr 30 µg/m<sup>3</sup>

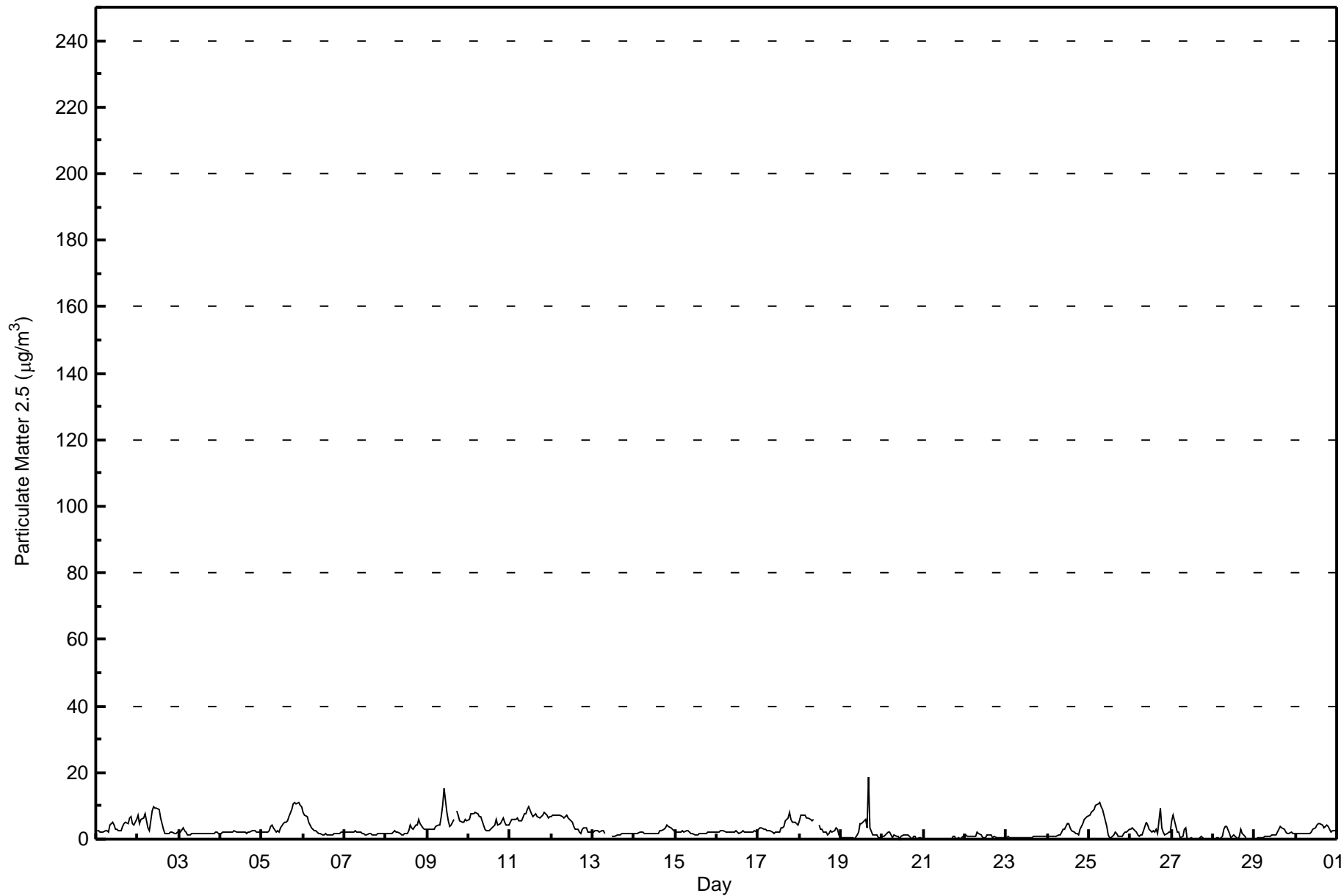


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$

Wapasu - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Wapasu - September 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	464	64.99	64.99
6 - 15	108	15.13	80.11
16 - 25	1	0.14	80.25
26 - 80	0	0.00	80.25
> 81.0	0	0.00	80.25

Total Number of Valid Hours: 714

Total Number of Hours: 720



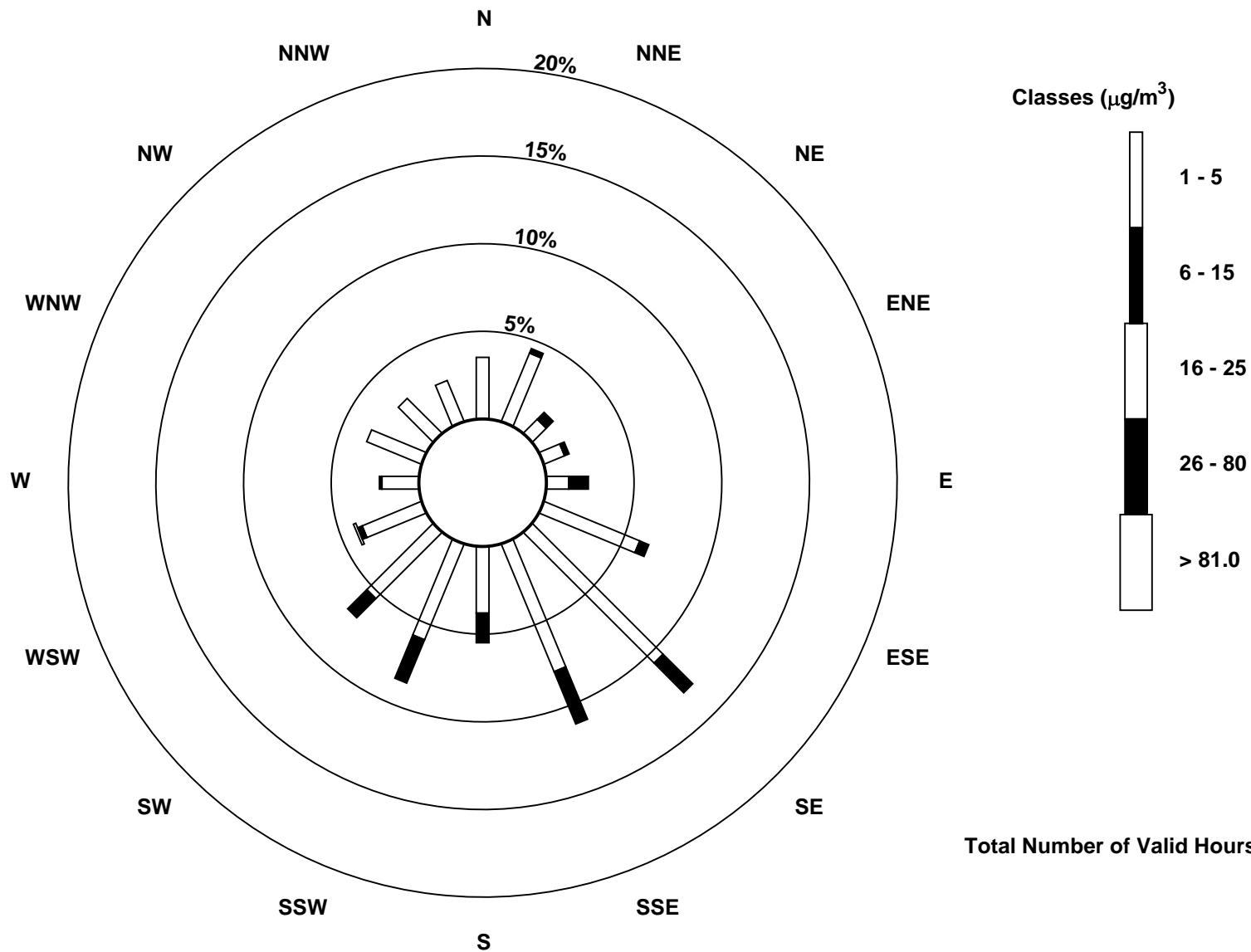
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Wapasu - September 2015**

Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	25	30	8	9	9	42	75	56	27	42	38	26	15	24	20	18	464
6 - 15	0	2	4	2	8	4	17	23	12	19	11	2	1	0	0	0	105
16 - 25	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	25	32	12	11	17	46	92	79	39	61	49	29	16	24	20	18	570

Total Number of Valid Hours: 711

Total Number of Hours: 720



Total Number of Valid Hours: 711

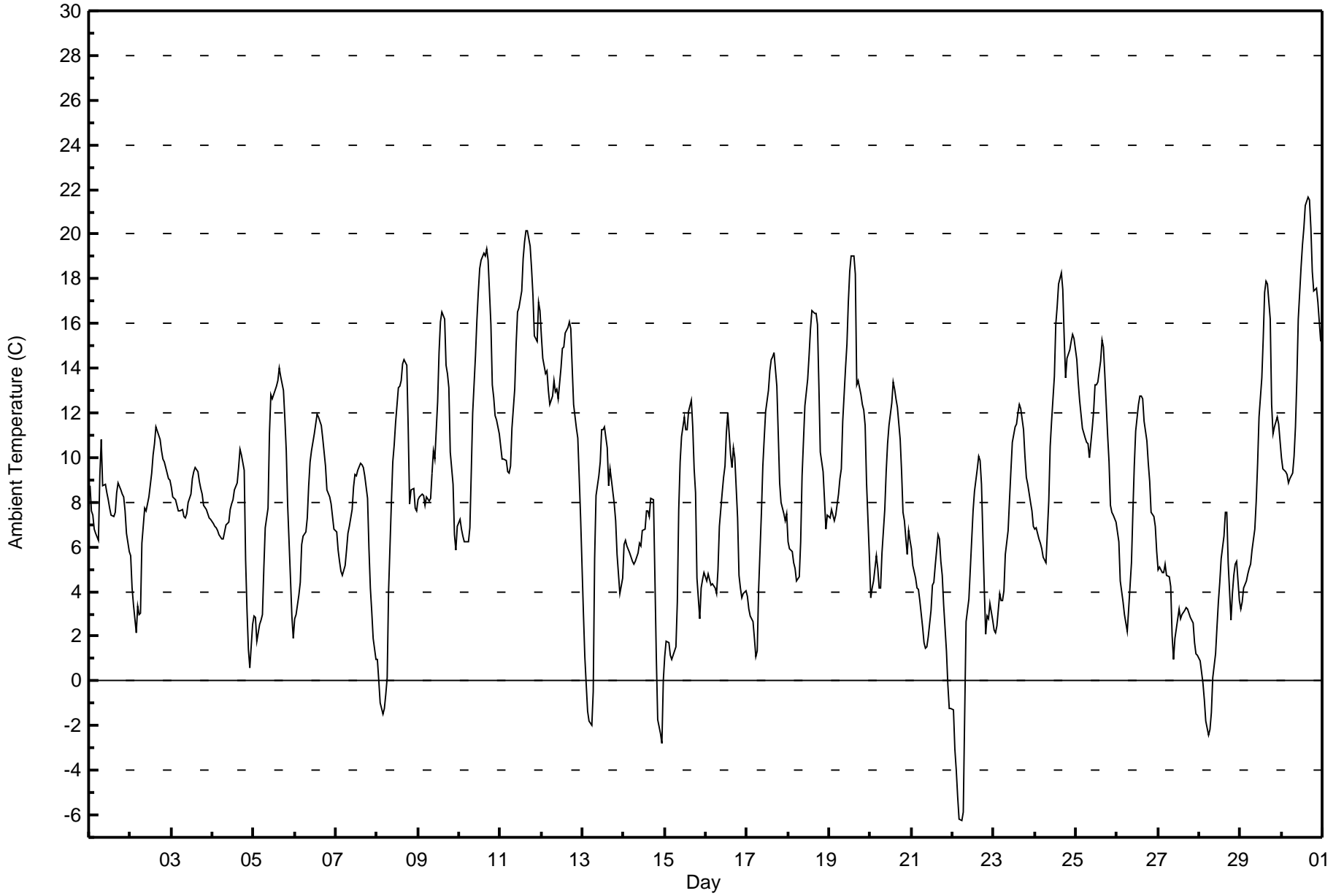


Maximum Value: 21.7 C on Sep 30 16:00		Maximum Daily Average: 15.0 C on Sep 30		Hours in Service: 720																						
Minimum Value: -6.3 C on Sep 22 06:00		Minimum Daily Average: 2.4 C on Sep 22		Hours of Data: 720																						
Maximum Diurnal Average: 12.8 C at hour 16		Minimum Diurnal Average: 4.6 C at hour 6		Hours of Missing Data: 0																						
Monthly Average: 8.29 C		Percentiles: P <sub>1</sub> = -2.5 P <sub>10</sub> = 2.4 Q <sub>1</sub> = 4.8 Median = 8.0 Q <sub>3</sub> = 11.4 P <sub>90</sub> = 15.1 P <sub>99</sub> = 20.2		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-Sep	8.7	7.6	7.4	6.8	6.6	6.3	9.2	10.8	8.7	8.8	8.5	8.1	7.7	7.4	7.4	7.6	8.4	8.8	8.5	8.4	8.2	7.6	6.6	5.8	7.9	10.8
2-Sep	5.6	4.1	3.4	2.1	3.4	3.0	3.0	6.2	7.7	7.6	7.9	8.3	9.3	10.1	10.6	11.4	11.2	10.8	10.3	9.9	9.8	9.3	9.0	9.0	7.6	11.4
3-Sep	8.7	8.3	8.1	7.9	7.6	7.6	7.7	7.3	7.3	7.5	8.0	8.4	9.0	9.4	9.6	9.4	8.9	8.6	8.4	7.9	7.7	7.5	7.3	7.2	8.1	9.6
4-Sep	7.0	6.9	6.9	6.7	6.5	6.4	6.4	6.7	7.0	7.1	7.7	7.9	8.1	8.5	8.8	9.6	10.4	10.1	9.4	5.4	3.2	1.4	0.6	2.5	6.7	10.4
5-Sep	2.9	2.9	1.8	2.5	2.7	3.0	5.0	6.9	7.7	11.0	12.8	12.6	13.0	13.2	13.5	14.0	13.6	13.0	11.8	10.3	7.9	4.6	2.9	1.9	8.0	14.0
6-Sep	2.8	3.0	3.9	4.4	6.1	6.5	6.7	7.3	8.7	9.8	10.3	11.0	11.5	11.9	11.8	11.5	10.9	10.2	9.6	8.6	8.2	7.9	7.4	6.8	8.2	11.9
7-Sep	6.6	5.9	5.3	4.9	4.7	5.2	5.8	6.6	6.9	7.7	8.7	9.3	9.2	9.4	9.8	9.7	9.5	9.2	8.2	5.9	4.2	3.1	1.9	1.0	6.6	9.8
8-Sep	1.0	0.0	-1.0	-1.5	-1.3	-0.6	0.1	4.0	8.0	9.8	10.6	11.6	13.2	13.2	13.5	14.2	14.4	14.1	11.3	8.0	8.5	8.6	7.7	7.6	7.3	14.4
9-Sep	8.1	8.2	8.3	8.3	7.9	8.2	8.1	8.1	9.3	10.3	9.9	12.5	14.7	16.1	16.5	16.2	14.1	13.7	13.1	10.3	8.8	6.6	5.8	6.9	10.4	16.5
10-Sep	7.2	6.8	6.5	6.2	6.2	6.3	6.8	9.4	12.0	14.6	16.1	17.4	18.4	18.9	19.2	19.0	19.3	18.9	15.9	13.3	12.7	11.9	11.7	11.1	12.7	19.3
11-Sep	10.5	9.9	9.9	9.9	9.4	9.3	9.6	11.3	13.1	15.1	16.5	16.7	17.5	18.9	19.6	20.2	20.2	19.4	18.5	17.2	15.4	15.2	17.0	16.6	14.9	20.2
12-Sep	15.4	14.4	13.7	13.9	13.0	12.4	12.8	13.5	13.0	13.1	12.6	14.0	14.9	15.0	15.6	15.9	16.1	15.8	14.0	12.4	11.3	10.8	9.1	7.3	13.3	16.1
13-Sep	3.0	1.1	-0.2	-1.4	-1.8	-2.0	-0.5	5.5	8.3	9.2	9.8	11.2	11.3	11.4	10.4	8.7	9.5	9.0	7.9	7.1	5.7	4.8	3.9	4.6	5.7	11.4
14-Sep	6.1	6.3	6.1	5.7	5.5	5.4	5.2	5.3	5.7	6.2	6.0	6.7	6.8	7.6	7.6	7.4	8.1	8.1	4.7	1.1	-1.7	-2.4	-2.8	0.0	4.8	8.1
15-Sep	1.1	1.8	1.7	1.1	0.9	1.2	1.6	3.6	7.6	9.8	10.9	11.8	11.3	11.2	12.0	12.6	11.4	9.5	8.4	4.6	2.8	4.2	4.6	4.9	6.3	12.6
16-Sep	4.5	4.8	4.6	4.3	4.4	4.2	3.9	5.0	6.9	8.4	9.1	9.6	11.1	12.0	10.1	9.6	10.4	10.0	7.3	4.7	4.2	3.7	3.9	4.1	6.7	12.0
17-Sep	3.8	3.2	2.9	2.7	1.9	1.1	1.3	4.1	7.6	9.6	10.9	12.1	13.0	13.9	14.4	14.5	14.7	13.2	11.1	8.9	8.0	7.5	7.2	7.5	8.1	14.7
18-Sep	6.3	5.9	5.8	5.3	5.1	4.5	4.7	6.2	9.2	10.8	12.3	13.5	14.6	15.8	16.6	16.5	16.4	15.9	13.2	10.2	9.4	8.1	6.8	7.4	10.0	16.6
19-Sep	7.3	7.7	7.4	7.1	7.4	8.3	9.0	9.5	11.6	14.0	15.1	17.0	18.3	19.1	19.0	18.2	13.3	13.5	12.8	12.4	12.1	11.5	8.9	5.6	11.9	19.1
20-Sep	3.7	4.2	4.5	5.6	5.1	4.2	4.2	5.7	7.7	9.4	10.6	11.4	12.4	13.4	13.1	12.6	12.2	10.8	9.4	7.5	7.2	5.7	6.7	6.3	8.1	13.4
21-Sep	5.9	5.1	4.6	4.2	4.1	3.6	2.4	1.7	1.5	1.5	2.0	3.2	4.3	4.4	5.2	6.5	6.4	5.4	4.7	3.4	1.3	-0.2	-1.2	-1.2	3.3	6.5
22-Sep	-1.3	-3.0	-4.0	-5.2	-6.2	-6.3	-5.9	-1.5	2.7	3.6	5.0	6.3	7.6	8.5	9.5	10.1	9.9	8.8	4.1	2.1	2.9	2.8	3.4	2.7	2.4	10.1
23-Sep	2.3	2.2	2.4	3.9	3.6	3.6	4.0	5.7	6.7	8.1	9.4	10.7	11.4	11.5	12.0	12.4	12.2	11.3	10.1	9.1	8.8	8.0	7.6	6.9	7.7	12.4
24-Sep	6.8	6.9	6.4	6.2	5.9	5.5	5.3	6.7	8.0	10.5	11.6	13.6	15.9	16.8	17.8	18.3	17.5	15.4	13.6	14.5	14.8	15.2	15.5	15.3	11.8	18.3
25-Sep	14.4	13.4	12.6	11.9	11.3	10.9	10.7	10.6	10.0	11.3	12.1	13.2	13.3	13.4	14.3	15.2	14.9	13.7	11.0	9.8	7.9	7.6	7.4	7.1	11.6	15.2
26-Sep	6.7	6.2	4.5	3.5	3.0	2.6	2.2	3.2	5.3	7.6	9.6	11.2	12.4	12.7	12.7	12.7	11.6	10.7	9.7	8.9	7.6	7.4	6.9	5.8	7.7	12.7
27-Sep	5.0	5.1	4.8	4.8	5.2	4.7	4.6	4.2	2.0	1.0	1.9	2.8	3.2	2.8	3.0	3.2	3.3	3.2	3.0	2.9	2.6	1.7	1.2	1.1	3.2	5.2
28-Sep	0.9	0.4	-0.1	-0.8	-1.8	-2.4	-2.1	-1.4	0.1	1.2	2.4	3.5	4.4	5.5	6.5	7.5	7.6	5.3	2.7	3.9	4.7	5.2	5.3	3.6	2.6	7.6
29-Sep	3.2	3.6	4.2	4.5	4.8	5.0	5.2	5.8	6.8	8.1	9.8	11.8	13.5	15.3	17.4	17.9	17.8	16.2	12.4	11.0	11.4	11.8	11.5	10.7	10.0	17.9
30-Sep	10.0	9.5	9.4	9.2	8.9	9.0	9.3	10.1	11.4	13.5	16.2	18.5	19.5	20.3	21.3	21.7	21.5	20.3	18.3	17.4	17.6	16.9	16.1	15.2	15.0	21.7
																								Diurnal Average		
																								Diurnal Maximum		



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Wapasu - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Wapasu - September 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	30	4.17	4.17
0 - 10	448	62.22	66.39
10 - 20	235	32.64	99.03
> 20	7	0.97	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

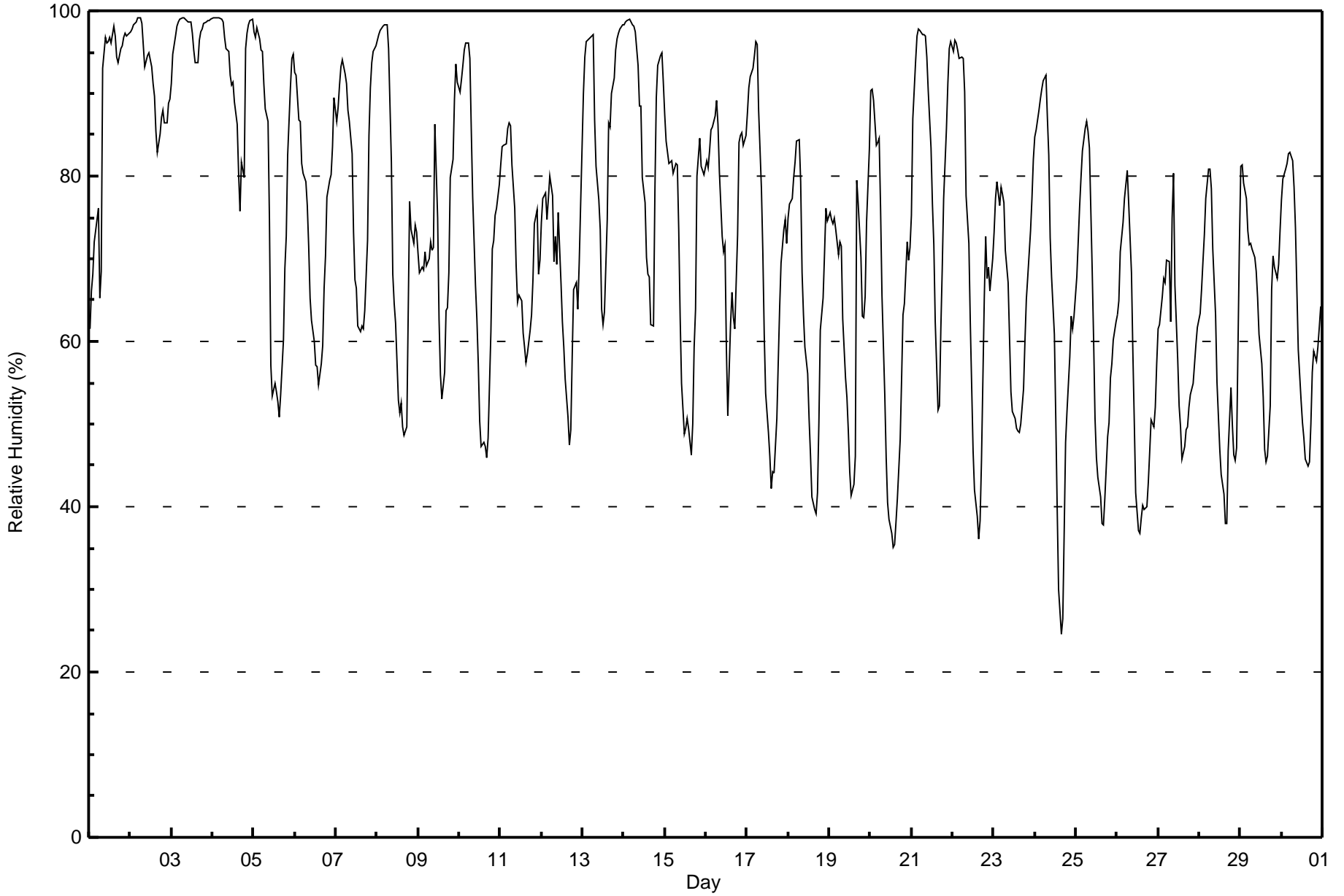
**Wapasu - September 2015**

Maximum Value: 99 % on Sep 4 02:00																		Maximum Daily Average: 97.4 % on Sep 3																		Hours in Service: 720			
Minimum Value: 25 % on Sep 24 16:00																		Minimum Daily Average: 55.7 % on Sep 26																		Hours of Data: 720			
Maximum Diurnal Average: 86.7 % at hour 6																		Minimum Diurnal Average: 54.6 % at hour 16																		Hours of Missing Data: 0			
Monthly Average: 73.0 %																		Percentiles: P <sub>1</sub> = 37 P <sub>10</sub> = 48 Q <sub>1</sub> = 60 Median = 74 Q <sub>3</sub> = 88 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-Sep	61	66	68	72	73	76	65	69	93	97	96	96	97	96	98	97	94	94	95	96	97	97	97	97	87.0	98													
2-Sep	98	98	98	99	99	99	99	98	93	94	95	95	93	91	90	85	83	85	87	88	86	86	89	89	92.4	99													
3-Sep	91	95	97	98	99	99	99	99	99	99	99	99	97	95	94	94	97	98	98	98	99	99	99	99	97.4	99													
4-Sep	99	99	99	99	99	99	99	97	95	95	92	91	91	89	86	80	76	82	80	95	97	98	99	99	93.2	99													
5-Sep	97	97	98	97	95	95	91	88	87	75	57	53	55	54	53	51	54	60	69	73	83	91	94	95	77.5	98													
6-Sep	93	92	87	87	82	80	79	76	71	65	63	60	57	57	55	57	60	66	70	77	80	80	84	90	73.7	93													
7-Sep	87	88	91	93	94	92	91	88	87	83	73	67	66	62	61	62	62	64	72	85	91	94	95	96	81.0	96													
8-Sep	96	97	98	98	98	98	98	95	82	68	65	62	53	51	53	50	49	50	63	77	74	72	74	73	74.8	98													
9-Sep	71	68	69	69	71	69	70	72	71	71	86	75	63	56	53	56	64	64	68	80	82	89	94	91	71.8	94													
10-Sep	90	92	93	95	96	96	94	86	77	67	63	57	50	47	48	47	46	48	61	71	72	75	76	79	72.0	96													
11-Sep	81	84	84	84	86	87	86	81	76	69	65	66	65	61	59	58	59	61	63	67	74	76	68	70	72.1	87													
12-Sep	74	77	78	75	77	80	78	70	73	69	76	67	62	59	55	51	47	49	58	66	67	64	70	76	67.5	80													
13-Sep	90	94	96	96	97	97	97	87	81	77	74	64	62	63	75	86	86	90	92	95	97	97	98	98	87.1	98													
14-Sep	98	99	99	99	99	98	98	98	93	89	80	77	70	68	68	62	62	78	89	93	95	95	91	91	86.9	99													
15-Sep	87	84	82	82	82	80	81	81	74	63	55	49	50	51	49	46	50	59	64	80	85	81	81	80	69.8	87													
16-Sep	82	81	83	86	86	87	89	86	80	73	71	72	59	51	62	66	63	62	73	84	85	85	84	85	76.4	89													
17-Sep	88	91	92	93	95	96	96	88	79	71	61	54	49	46	42	44	44	51	57	64	69	74	75	72	70.4	96													
18-Sep	75	77	77	80	82	84	84	79	68	63	59	56	51	46	41	40	39	42	50	61	65	71	76	75	64.2	84													
19-Sep	76	75	74	75	74	71	72	71	63	56	53	49	44	41	43	46	80	77	70	63	63	65	74	83	64.9	83													
20-Sep	90	91	89	84	84	85	76	66	54	46	40	38	37	35	35	38	41	48	55	63	65	72	70	71	61.4	91													
21-Sep	75	87	94	97	98	98	97	97	97	94	90	83	77	72	62	52	52	62	69	77	86	91	96	96	83.3	98													
22-Sep	95	96	96	95	94	94	94	90	78	72	62	55	47	42	39	36	38	46	65	73	68	69	66	70	70.0	96													
23-Sep	73	77	79	76	79	78	77	71	67	60	54	52	51	50	49	49	50	54	60	65	68	73	77	82	65.5	82													
24-Sep	85	86	88	89	91	92	92	87	82	73	68	61	51	40	30	25	27	37	48	52	58	63	62	63	64.4	92													
25-Sep	68	72	76	80	83	86	87	85	83	68	60	51	46	44	41	38	38	41	48	50	56	57	60	62	61.7	87													
26-Sep	63	65	71	74	77	79	81	77	68	59	50	42	37	37	39	40	40	40	43	47	50	50	52	57	55.7	81													
27-Sep	62	62	65	68	67	70	70	62	75	80	67	58	52	50	46	47	49	50	52	54	55	57	60	62	59.9	80													
28-Sep	63	66	70	73	77	81	81	79	71	63	55	51	47	44	42	38	38	47	54	50	46	46	47	72	58.4	81													
29-Sep	81	81	79	77	73	72	72	71	70	69	65	61	57	53	47	45	46	52	66	70	69	68	69	73	66.2	81													
30-Sep	77	80	81	82	83	83	82	79	74	66	59	53	50	48	46	45	45	50	56	59	58	59	62	64	64.2	83													
	82.3	83.9	85.1	85.7	86.3	86.7	85.9	82.5	78.7	73.1	68.7	63.8	59.8	56.7	55.4	54.6	55.9	59.6	66.3	72.4	74.5	76.5	78.0	80.4	Diurnal Average														
	99	99	99	99	99	99	99	99	99	99	99	99	97	96	98	97	97	98	98	98	99	99	99	99	Diurnal Maximum														



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Wapasu - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Wapasu - September 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	23	3.19	3.19
40 - 60	155	21.53	24.72
60 - 80	261	36.25	60.97
80 - 100	281	39.03	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

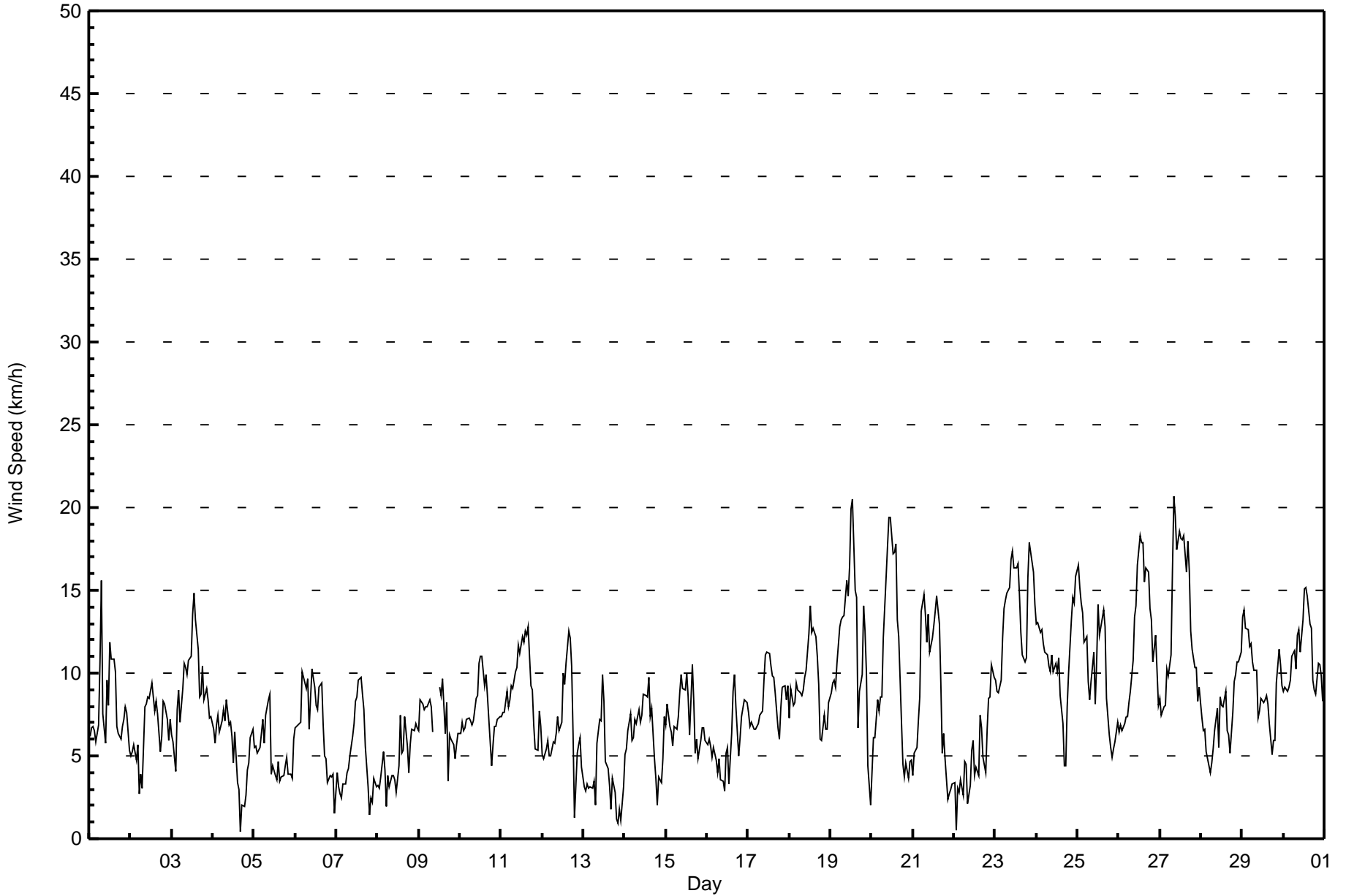


Maximum Speed: 21 km/h on Sep 27 09:00	Maximum Daily Speed Average: 13.7 km/h on Sep 23	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 4 17:00	Minimum Daily Speed Average: 1.4 km/h on Sep 13	Hours of Data: 717
Maximum Diurnal Speed Average: 5.4 km/h at hour 13	Minimum Diurnal Speed Average: 2.2 km/h at hour 19	Hours of Missing Data: 3
Monthly Average Velocity: 3.0 km/h 186.8 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 8 Q <sub>3</sub> = 10 P <sub>90</sub> = 14 P <sub>99</sub> = 18	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	SE6	SE7	SE7	SE7	SE6	SE7	SE11	SE16	ESE8	N6	N10	NNW8	NNW12	NNW11	WNW11	WNW10	W7	SW6	SSW6	SSW7	SSW7	SSW8	S8	S5	S1.7	SE16
2-Sep	SSW5	S5	SE6	SE5	SE6	E3	ENE4	NE3	NNE8	NE8	NE9	NE8	NE9	NNE9	NNE8	NNE8	NNE8	N5	NNE6	NNE8	NNE8	NNE7	NNE6	NNE7	NE4.8	NE9
3-Sep	NNE6	NNW6	WNW4	NW8	NW9	NW7	WNW9	W11	WNW10	WNW10	W11	WNW11	WNW14	WNW15	WNW13	NW11	WNW9	WNW9	NW10	NW8	WNW9	WNW8	WNW7	NW7	WNW8.9	WNW15
4-Sep	WNW7	WNW6	NW7	WNW7	WNW6	NW7	NW8	NW7	NW8	WNW7	WNW7	NW6	NW5	WNW6	WNW3	SW3	W0	NW2	NW2	SE3	SE4	SE5	SE6	SE7	WNW3.3	NW8
5-Sep	SE5	SE6	SE5	SE6	SE6	SE7	SE6	SSE7	SE8	SSE9	S4	SSW4	SSW4	SSE4	SSE5	E3	ENE4	ENE4	ESE4	E5	ESE4	ESE4	E6	SE4.5	SSE9	
6-Sep	E7	E7	E7	ESE7	ESE10	ESE10	ESE9	ESE10	E7	ENE8	ENE10	NE9	NE8	NNE8	NNE9	NE9	NNE7	NNE5	NNE5	NNE3	NNE4	NNE4	NE4	NNE2	ENE5.8	ENE10
7-Sep	NNE4	NNE3	NE3	NE2	N3	N3	N4	NNW4	N5	NNW6	N7	N8	N9	NNW10	N10	NNW9	NNW8	N6	NNE3	ESE1	ESE2	SE2	SE4	ESE3	N4.0	N10
8-Sep	SE3	SE3	ESE4	SE5	SE4	ENE2	SE4	ESE3	SE4	SE4	WSW4	NW3	NNW4	NNW7	N5	NNE5	ENE7	ENE6	ENE4	E6	ESE7	ESE7	SE7	SE7	E2.6	NNW7
9-Sep	SE7	SE8	SSE8	SSE8	SSE8	SSE8	SSE8	SSE8	S6	C	C	C	SSW9	SSW9	SW10	SW6	SW8	W3	SSE6	SE6	SE6	SE5	SE6	SE6	S5.9	SW10
10-Sep	SSE6	SSE7	SE6	SE7	SE7	SSE7	SSE7	S7	S7	S8	SSW9	SSW11	SW11	SW11	SSW9	SSW10	SSW9	SW7	S4	SSE6	SSE7	SSE7	SSE7	SSE7	S6.6	SW11
11-Sep	SSE7	SE8	SSE8	SSE9	SSE8	SSE8	SSE9	S9	S10	S10	SSW12	SSW11	SSW12	SSW12	SW13	SW12	SW13	SSW9	SW9	SSW7	SSE5	S5	SSW8	SSW7	S8.2	SW13
12-Sep	S5	S5	S5	SSW6	SSW5	S5	SW6	SW6	SW6	SW7	SSW6	SW7	WSW10	WSW9	WSW11	WSW13	WSW12	WSW10	SW6	WSW1	N5	N6	N6	NNE4	SW4.8	WSW13
13-Sep	NNE3	ENE3	SE3	ESE3	E3	E3	SE4	NNW2	NNW6	NW7	NNW7	NW10	NW8	WNW5	NNW4	E3	SE2	W4	SSE3	NNE1	SE1	E2	SSE1	NNE3	N1.4	NW10
14-Sep	N5	NNW5	N7	N8	N6	NNE6	NNE7	N7	NNE8	N7	N7	N9	NNW9	N9	NNW10	NNW7	NW8	NNW5	NE4	SE2	E4	E3	ENE5	ESE7	N5.1	NNW10
15-Sep	ESE7	ESE8	ESE7	ESE6	ESE6	ESE7	ESE7	ESE7	SE9	SE10	ESE9	ESE9	SE10	SE9	SE6	E11	E8	ESE5	SE6	ESE5	E6	ESE7	ESE7	ESE6	ESE7.1	E11
16-Sep	ESE6	ESE6	ESE6	ESE5	SE6	ESE5	ESE4	SE5	SE4	SSW3	W3	NW5	WSW6	WSW3	ESE6	SE9	SE10	SE8	SE5	SE6	SE7	SE8	SE8	SSE8	SE4.6	SE10
17-Sep	SSE8	SSE7	SSE7	SSE7	SE7	SE7	SE7	SSE8	S10	S11	SSW11	SSW11	SSW10	SSW10	SW10	SSW9	S7	SSE6	SSE8	SE9	SSE9	SSE8	SSE9	SSE9	S7.6	SSW11
18-Sep	SSE7	SSE9	SSE8	SSE8	SSE9	SSE9	SSE9	S9	SSW9	SSW10	SSW10	SSW12	SW14	SW12	WSW13	SW12	WSW11	SW9	SSW6	S6	SSE7	SSE7	SSE7	SSE8	SSW7.7	SW14
19-Sep	SSE9	SSE9	SSE10	SSE9	SSE11	SSE13	S13	SSE13	S14	SSW16	SSW15	SW16	SW20	SW20	SW15	WSW15	WSW7	SSW9	SSW10	SW14	SW13	WSW10	WSW4	WSW2	SSW10.3	SW20
20-Sep	S4	SSE6	S6	SSW8	SW8	SW9	SW9	SW12	SW16	SW18	WSW19	WSW19	WSW17	WSW17	WSW18	W13	WNW12	WNW7	WNW4	NNW4	NW5	NNE4	NW5	WNW5	WSW8.1	WSW19
21-Sep	WNW4	W5	WNW5	WNW7	W9	NW14	NNW15	NNW14	NW12	NW14	NW11	NNW12	NNW13	NW14	NNW15	NW13	NW9	W5	WNW6	NW5	SW2	WSW3	WSW3	WSW3	NW8.2	NNW15
22-Sep	WNW3	W1	SE3	SE3	ENE4	SSE3	SE5	SE4	SSW2	SSW3	SW5	SW6	SSW4	ESE4	SSE4	SSE7	S7	S5	SE4	SE7	SE8	SE9	SE10	SE10	SSE3.8	SE10
23-Sep	SE10	ESE9	SE9	SE10	SE12	SE14	SE14	SE15	SE15	SE17	SE17	SE16	ESE16	ESE17	ESE15	ESE12	ESE11	ESE11	SE11	SE16	SE18	SE17	SE16	SE14	SE13.7	SE18
24-Sep	SE13	SE13	SE12	SE13	SE12	SE11	SE11	SE10	SE10	SSW11	SSW11	SSW10	SW11	SW11	SSW9	S7	SSE4	SE4	ESE8	ESE10	ESE13	SE15	SE14	SE16	SSE9.1	SE16
25-Sep	SE17	SE15	SE14	SE14	SE12	SSE12	SSE10	SSW8	WSW9	W11	WSW8	WSW11	WSW10	SW12	SW13	SW14	SW13	SW8	SW6	SSW6	S5	S5	S6	SSW7	SSW7.5	SE17
26-Sep	SSW6	SSW7	S6	SSE7	SSE7	SSE7	SSE8	S9	SSW11	SW13	SW14	SW16	WSW18	WSW18	SW18	SW16	WSW16	WSW16	WSW14	WSW13	WSW11	SW12	SW10	SW8	SW10.6	WSW18
27-Sep	SSW8	SSW7	S8	S8	SW10	SW10	WSW11	W16	NW21	NW20	NW17	WNW19	WNW18	WNW18	WNW16	WNW16	WNW11	WNW11	WNW13	WNW11	WNW10	WNW10	WNW8	WNW9	W11.2	NW21
28-Sep	W7	W7	W7	W5	WSW5	W4	W5	W5	W7	W8	WNW6	W9	W8	WSW8	WSW9	SSW7	SSW6	SSE5	SE8	SSE9	SSE10	SE11	SE11	SE11	SW3.8	SE11
29-Sep	SE13	SE14	SE13	SE13	SE12	SE12	SE11	SSE10	SSE10	S7	SSE8	S8	SSW8	SSW8	SW9	SW8	SSW7	S5	SE6	SE6	SE9	SE11	SE10	SE9	SSE8.6	SE14
30-Sep	SSE9	SSE9	SSE9	SSE9	SSE10	SSE11	SSE11	SSE10	SSE12	S13	S11	SSW13	SSW15	SSW15	S15	SSW13	S13	S10	SSE9	SSE9	S11	S10	S10	S8	S10.6	SSW15

SSE4.1 SSE4.6 SSE4.7 SSE4.5 SSE4.4 SSE4.3 SSE4.2	S4.0 SSW3.2 SW3.7 SW3.7 WSW4.5 WSW5.4 WSW5.3 WSW5.0 WSW4.1 WSW3.7 SW2.8	S2.2 SSE2.8 SSE3.6 SSE3.7 SSE4.1 SSE4.0	Diurnal Average
SE17 SE15 SE14 SE14 SE12 SE14 NNW15	W16 NW21 NW20 WSW19 WSW19 SW20 SW20 WNW18 WNW16 WNW18 WNW16 WSW14	SE16 SE18 SE17 SE16 SE16	Diurnal Maximum

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





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Wapasu - September 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	168	23.43	23.43
6 - 11	423	59.00	82.43
12 - 19	122	17.02	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: 717

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Wapasu - September 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	15	5	8	8	17	30	10	13	8	3	9	11	8	8	7	168
6 - 11	17	18	7	4	9	31	68	78	27	48	30	15	12	27	19	13	423
12 - 19	0	0	0	0	0	5	33	5	4	10	23	16	2	12	6	6	122
20 - 28	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	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>	25	33	12	12	17	53	131	93	44	66	58	40	25	47	35	26	717

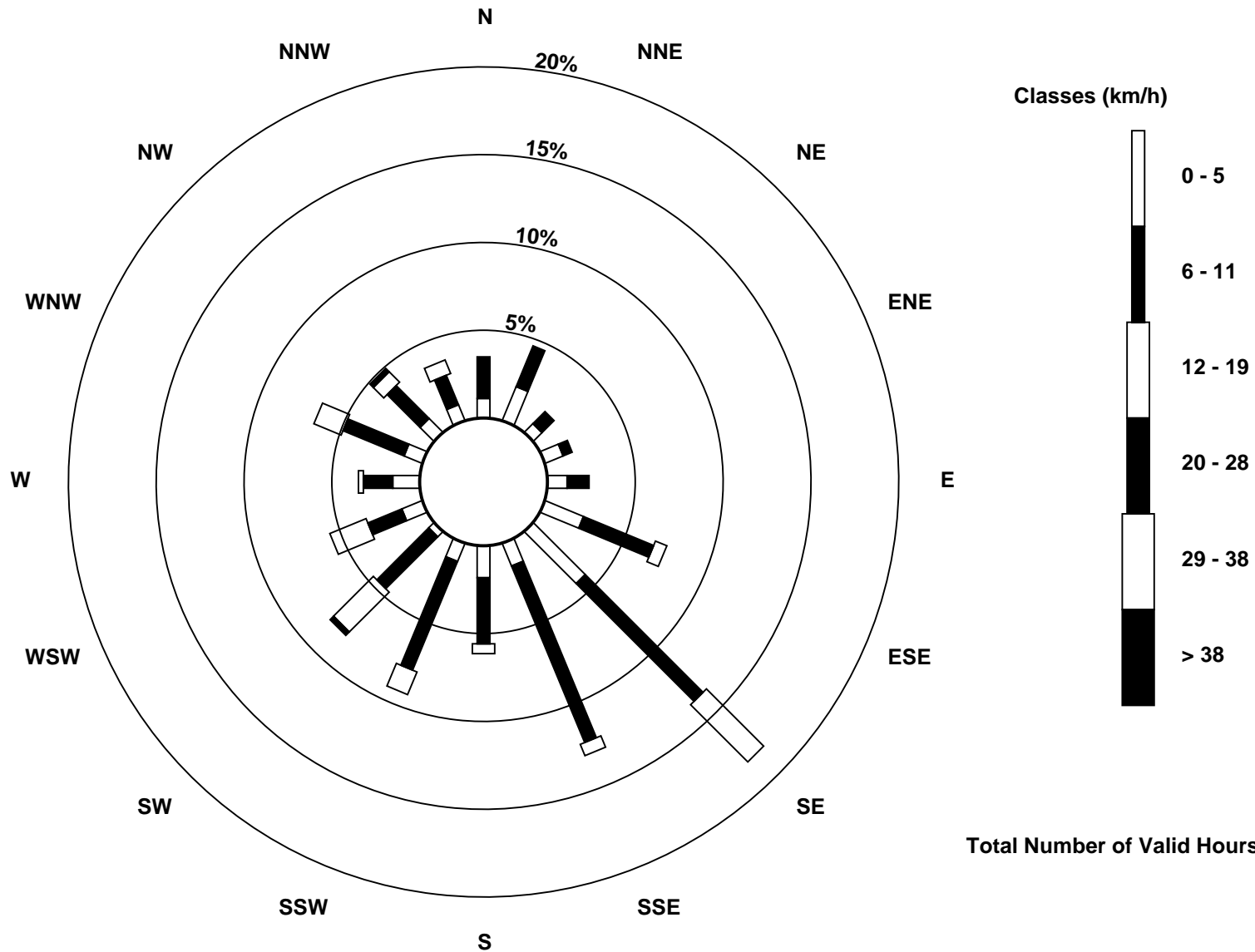
Total Number of Valid Hours: 717

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Wind Speed (WS) - km/h  
Wapasu (AMS 17)



Total Number of Valid Hours: 717





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

**Wind Speed (WS) - km/h**  
**Wapasu - September 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Sep 27 08:00	Hours in Service: 720 Hours of Data: 717 Hours of Missing Data: 3 Hours of Calibration: 3 Percent Operational Time: 100.0
Minimum Value: 0 km/h on Sep 8 02:00	
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> = 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-Sep	1	1	1	1	1	3	2	6	4	2	3	3	4	4	4	4	2	2	2	2	2	3	2	2	6
2-Sep	2	2	1	2	1	1	1	1	4	2	3	3	3	3	3	3	3	2	2	3	3	2	2	2	4
3-Sep	2	2	1	3	2	3	3	4	3	3	3	3	4	4	4	4	3	3	3	2	3	2	2	4	
4-Sep	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	1	2	1	2	1	1	1	1	3	
5-Sep	1	0	1	1	1	1	2	2	2	3	2	2	2	3	2	2	2	1	1	1	1	1	1	3	
6-Sep	1	1	1	2	2	2	2	3	2	3	3	3	3	3	3	3	2	1	2	1	1	1	1	3	
7-Sep	1	1	1	1	1	1	1	2	2	2	3	3	3	3	4	4	3	2	1	1	1	1	1	4	
8-Sep	1	0	1	0	1	1	1	1	1	2	2	2	3	3	2	2	3	2	1	2	2	1	1	3	
9-Sep	1	2	2	2	2	2	2	2	2	C	C	C	3	3	4	3	4	2	3	2	1	1	1	4	
10-Sep	1	1	1	1	1	2	1	2	2	3	3	3	4	4	4	4	3	3	1	1	1	1	1	4	
11-Sep	1	1	2	2	2	2	2	3	3	4	4	4	4	4	4	4	4	3	3	2	1	1	2	4	
12-Sep	1	1	2	2	1	1	2	2	2	2	2	2	3	3	3	4	4	3	2	2	2	2	2	4	
13-Sep	1	1	1	1	0	1	1	2	2	3	3	3	3	3	2	2	1	2	1	1	1	1	2	3	
14-Sep	2	2	2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	2	1	1	1	1	0	3	
15-Sep	2	2	2	1	1	2	1	2	2	3	3	4	3	3	3	4	2	1	1	1	1	1	1	4	
16-Sep	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	1	1	1	2	2	3	
17-Sep	2	1	2	2	1	1	1	2	3	3	4	4	4	3	3	4	3	2	1	2	2	2	3	4	
18-Sep	3	2	2	2	2	2	2	3	3	3	3	4	5	4	4	4	3	3	2	1	1	2	1	5	
19-Sep	2	3	3	3	3	4	4	4	4	6	5	7	7	7	6	5	4	4	4	5	4	3	1	7	
20-Sep	1	1	2	3	2	2	3	4	5	5	6	7	6	6	6	5	4	2	1	1	1	1	2	7	
21-Sep	2	2	2	2	3	5	5	4	4	4	4	4	4	5	5	4	4	2	2	2	1	1	1	5	
22-Sep	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	2	2	1	1	2	2	2	3	
23-Sep	2	2	2	2	3	3	3	4	4	5	5	5	5	5	5	4	4	3	3	4	5	4	4	5	
24-Sep	3	3	3	3	3	3	3	3	4	4	4	4	4	3	3	3	1	1	2	2	3	4	4	4	
25-Sep	5	4	4	3	3	3	3	3	4	4	4	3	3	4	4	4	4	3	2	2	1	2	1	5	
26-Sep	2	2	2	2	2	2	2	3	4	4	4	6	6	6	6	6	5	5	4	4	3	4	3	6	
27-Sep	3	2	3	3	3	3	3	7	7	7	7	5	6	7	6	6	6	7	6	4	4	3	4	7	
28-Sep	2	2	2	2	1	1	1	2	2	2	3	3	3	4	4	3	2	1	1	2	3	3	3	4	
29-Sep	3	3	3	3	3	3	3	3	4	2	2	3	3	3	3	3	3	1	1	1	2	3	3	4	
30-Sep	2	2	2	2	3	3	3	3	4	4	4	5	5	5	6	5	5	3	3	3	3	3	3	6	
	5	4	4	3	3	5	5	7	7	7	6	7	7	7	6	6	7	6	4	5	5	4	4	4	

Diurnal Maximum

C - Calibration



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Wapasu - September 2015**

Direction of Maximum Speed: 308 deg on Sep 27 09:00															Hours in Service: 720	
Direction of Maximum Daily Speed Average: 127.9 deg on Sep 23															Hours of Data: 717	
Direction of Minimum Speed: 265 deg on Sep 4 17:00															Hours of Missing Data: 3	
Direction of Minimum Daily Speed Average: 1.4 deg on Sep 13															Percent Operational Time: 100.0	
Monthly Average Direction: 219.0 deg																

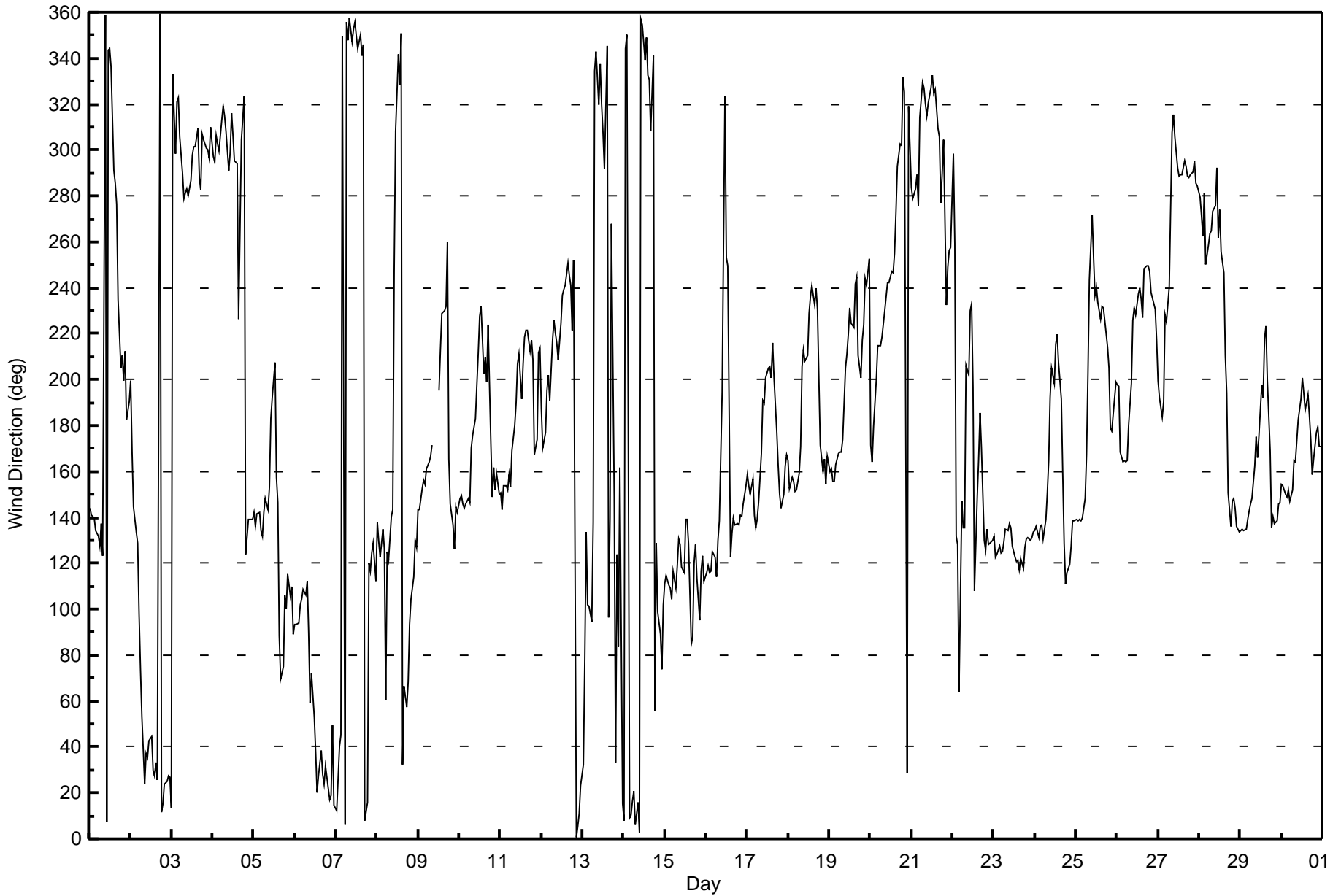
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	144	141	140	140	134	132	128	137	123	359	7	343	344	336	291	286	276	235	205	211	199	213	183	190	184.9
2-Sep	199	169	145	134	129	97	74	53	24	37	35	43	44	30	28	33	26	359	12	15	24	25	28	27	40.9
3-Sep	13	333	299	321	323	306	290	279	282	283	280	287	298	302	301	309	288	282	307	305	301	300	297	310	299.7
4-Sep	297	295	306	303	299	313	319	315	308	291	299	316	306	295	294	227	265	305	324	124	131	139	139	139	299.1
5-Sep	142	136	141	142	134	132	142	148	144	153	183	192	207	158	147	89	70	75	106	100	115	105	110	89	133.5
6-Sep	93	94	94	102	105	109	106	112	90	59	72	53	38	20	28	38	28	24	32	27	17	19	49	15	66.1
7-Sep	12	26	40	45	349	6	356	348	358	347	353	356	349	344	350	341	346	8	16	120	117	125	129	112	1.9
8-Sep	138	129	122	135	126	60	125	121	140	144	247	308	342	328	351	32	67	58	68	93	104	114	130	127	96.2
9-Sep	143	144	153	156	154	161	164	167	172	C	C	C	195	213	229	230	232	260	165	146	137	126	144	142	171.9
10-Sep	148	149	146	144	146	149	147	170	176	183	198	212	227	232	202	210	199	224	172	149	162	152	159	150	179.5
11-Sep	151	143	154	154	152	159	153	169	180	190	207	211	192	207	218	222	221	212	217	209	167	174	212	213	190.7
12-Sep	187	171	177	195	202	191	217	226	220	216	209	224	237	239	241	251	246	241	222	252	0	5	11	23	229.6
13-Sep	32	78	134	102	101	95	138	334	343	320	337	320	307	292	346	96	140	268	150	33	124	84	161	16	354.1
14-Sep	8	344	350	9	10	17	21	6	16	2	357	355	339	349	333	331	308	341	55	129	99	89	74	102	4.5
15-Sep	111	115	111	109	105	117	109	119	130	128	118	116	139	139	129	85	88	120	128	113	95	116	123	112	116.0
16-Sep	116	119	116	117	125	122	114	130	138	195	261	324	253	250	123	133	140	136	137	137	141	140	146	154	138.9
17-Sep	159	154	150	157	141	135	139	146	168	191	190	201	205	206	201	216	201	177	163	150	144	150	162	167	172.9
18-Sep	165	152	158	156	151	152	159	171	206	213	208	210	229	236	241	232	240	231	201	172	160	165	155	166	194.1
19-Sep	160	161	156	155	163	168	169	168	174	205	211	220	231	225	223	242	245	211	200	217	224	244	241	253	203.1
20-Sep	171	164	179	200	215	215	215	218	230	236	242	242	247	247	255	273	293	303	302	332	325	29	319	302	245.1
21-Sep	284	279	283	289	276	314	330	327	321	315	321	327	333	324	327	309	306	277	290	304	233	249	257	258	310.4
22-Sep	298	259	132	128	64	147	136	136	206	202	230	233	197	108	149	165	186	170	130	125	135	128	129	130	150.3
23-Sep	132	123	124	127	124	125	129	135	134	138	135	128	123	121	121	117	122	118	127	130	131	130	131	133	127.9
24-Sep	134	136	131	136	136	131	139	151	165	192	205	198	216	219	207	191	159	129	111	116	119	128	138	138	151.4
25-Sep	139	138	139	138	140	148	167	202	244	272	253	237	241	233	226	232	231	226	214	205	179	177	185	199	196.6
26-Sep	198	197	169	164	165	164	165	180	198	226	232	228	237	240	235	227	248	250	249	247	238	233	231	217	223.7
27-Sep	199	192	184	191	228	225	240	274	308	315	305	292	289	289	289	295	293	289	288	289	291	295	285	284	280.9
28-Sep	279	271	262	281	250	259	264	265	273	276	292	262	274	256	246	211	194	151	136	147	148	144	136	133	222.1
29-Sep	134	135	134	135	139	143	146	148	162	175	166	176	198	192	218	223	199	169	136	141	137	139	146	146	155.1
30-Sep	155	154	150	149	152	147	152	165	164	173	182	192	201	194	187	193	184	174	159	165	177	179	171	171	172.6

148.3 146.7 146.5 147.4 148.8 149.1 153.3 171.2 193.6 223.5 233.4 241.2 245.7 248.2 245.4 241.3 237.6 227.4 183.9 164.1 151.7 150.5 152.5 149.6

Diurnal Average

C - Calibration

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**  
**Wapasu - September 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 103 deg on Sep 4 17:00	Hours of Data: 717
Minimum Value: 2 deg on Sep 8 04:00	Hours of Missing Data: 3
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 15 Q <sub>1</sub> = 21 Median = 26 Q <sub>3</sub> = 33 P <sub>90</sub> = 40 P <sub>99</sub> = 76	Hours of Calibration: 3
	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-Sep	11	11	11	10	16	18	16	24	50	34	36	43	32	39	32	27	28	31	30	32	33	30	30	31	50
2-Sep	29	22	15	27	36	49	17	36	33	31	28	28	28	34	34	34	39	30	34	35	35	30	32	32	49
3-Sep	36	27	28	25	21	26	26	26	29	27	26	27	23	22	24	21	29	25	24	22	23	21	26	23	36
4-Sep	24	25	23	23	23	24	24	22	23	28	29	28	51	31	62	52	103	46	75	15	27	7	4	7	103
5-Sep	8	6	7	8	9	10	26	23	22	31	67	49	52	65	49	71	31	32	16	21	14	24	17	9	71
6-Sep	9	11	12	14	15	16	17	18	31	26	29	31	41	44	34	33	33	31	30	23	22	23	19	33	44
7-Sep	19	22	18	33	20	20	35	41	32	38	43	38	37	34	35	39	37	40	21	47	14	16	8	15	47
8-Sep	22	24	20	2	15	58	22	20	24	45	73	81	76	38	54	56	34	33	24	16	17	16	11	15	81
9-Sep	18	19	23	22	22	25	26	28	41	C	C	C	38	37	36	36	33	46	41	21	10	10	10	11	46
10-Sep	13	10	12	15	14	19	16	29	36	34	40	36	32	33	37	35	40	28	23	12	17	13	17	14	40
11-Sep	13	13	17	21	18	20	23	29	32	36	34	33	35	35	33	29	30	33	30	33	22	25	28	29	36
12-Sep	30	34	25	27	34	26	27	28	28	26	30	29	22	23	24	24	24	23	25	97	43	24	23	24	97
13-Sep	30	28	19	19	19	21	17	72	42	32	38	30	31	73	44	71	29	46	32	56	72	54	75	61	75
14-Sep	36	33	39	35	39	39	36	36	38	43	38	37	35	38	37	34	37	48	17	43	23	17	10	13	48
15-Sep	14	16	15	15	12	14	16	16	21	24	39	35	23	24	50	40	22	17	12	12	9	12	10	12	50
16-Sep	11	13	14	13	17	13	19	14	32	57	73	55	57	90	39	24	22	18	11	12	15	16	20	23	90
17-Sep	23	18	18	21	16	11	12	20	29	37	38	36	37	38	37	33	38	30	22	19	21	23	33	27	38
18-Sep	37	21	22	23	21	23	22	33	38	33	37	31	33	29	27	27	26	28	32	22	17	21	16	23	38
19-Sep	22	25	25	25	26	27	28	29	32	34	33	31	28	28	32	26	47	34	36	28	29	32	28	59	59
20-Sep	14	18	28	34	29	30	32	31	24	23	26	25	30	28	28	27	27	22	23	27	26	27	30	31	34
21-Sep	25	28	26	26	27	26	27	27	25	21	26	30	34	29	26	29	24	25	25	25	25	30	32	30	34
22-Sep	25	76	15	26	26	45	10	13	57	62	50	56	81	73	73	42	42	30	17	11	14	12	15	13	81
23-Sep	13	14	15	15	16	18	18	20	21	21	22	24	22	22	25	25	24	21	21	19	18	18	18	17	25
24-Sep	18	19	17	19	17	18	20	24	29	37	37	38	37	32	36	39	27	23	15	17	18	19	21	20	39
25-Sep	21	20	21	19	21	22	29	35	28	28	30	25	24	26	28	26	25	24	26	28	22	27	27	30	35
26-Sep	29	30	28	19	21	22	23	30	34	26	29	27	25	26	25	25	28	26	26	23	22	23	22	30	34
27-Sep	32	36	33	35	23	27	25	29	25	23	25	26	27	24	26	24	27	25	24	26	25	25	27	27	36
28-Sep	27	24	23	29	24	35	29	29	29	32	69	45	49	45	35	48	39	17	13	22	23	21	20	18	69
29-Sep	18	17	18	18	20	21	23	25	31	34	30	35	40	35	37	34	36	25	10	13	15	16	21	21	40
30-Sep	23	23	24	21	24	23	24	30	32	32	39	38	36	36	36	37	35	32	26	31	31	32	31	29	39

37	76	39	35	39	58	36	72	57	62	73	81	81	90	73	71	103	48	75	97	72	54	75	61	
Diurnal Maximum																								

C - Calibration



# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	September 18, 2015	Last Calibration	August 13, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	12:10
Gas Cert Reference	SA130010A	Station temp.	Deg C
Cal Gas Concentration	47.8 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	493
ZAG Make/Model	API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-702	-702
Analyzer IP address	192.168.1.43		Lamp voltage	860	861
Calculated slope	0.998427	0.993613	Chamber temp	45.3	44.9
Calculated intercept	0.734287	1.470468	Pressure	690.1	692.8
Analyzer Background	8.4	8.9	Flow	0.453	0.455
Analyzer Coefficient	0.808	0.853	Intensity	82	82
Analyzer make	Thermo 43i		Analyzer serial #	1218153459	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	----
as found span	5000	60.4	577.4	546.8	1.056
calibrator zero	5000	0.0	0.0	-0.4	----
high point	5000	60.4	577.4	579.9	0.996
second point	5000	30.2	288.7	289.3	0.998
third point	5000	15.2	145.3	143.2	1.015
as left zero	5000	0.0	0.0	-0.3	----
as left span	5000	60.4	577.4	579.7	0.996
Average Correction Factor					1.003

Corrected As found      547.2      Previous response      577.6      % change      5.6%

**Notes:**

As found span 5.6% low. Calibrator MFC was calibrated September 10. Span adjusted.

Calibration Performed By:

Devin Russell



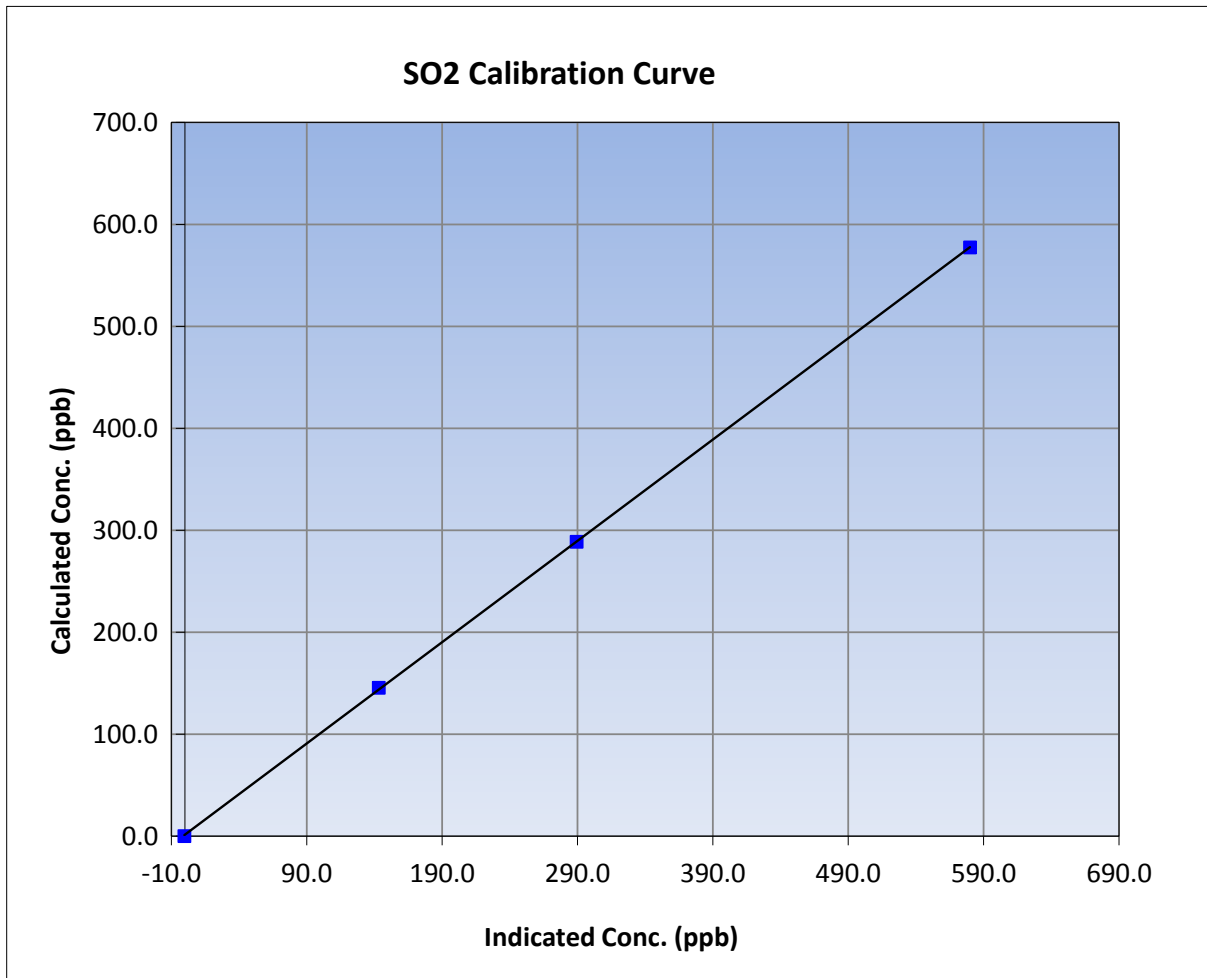
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 18, 2015	Previous Calibration	August 13, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:10	End Time (MST)	12:10
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

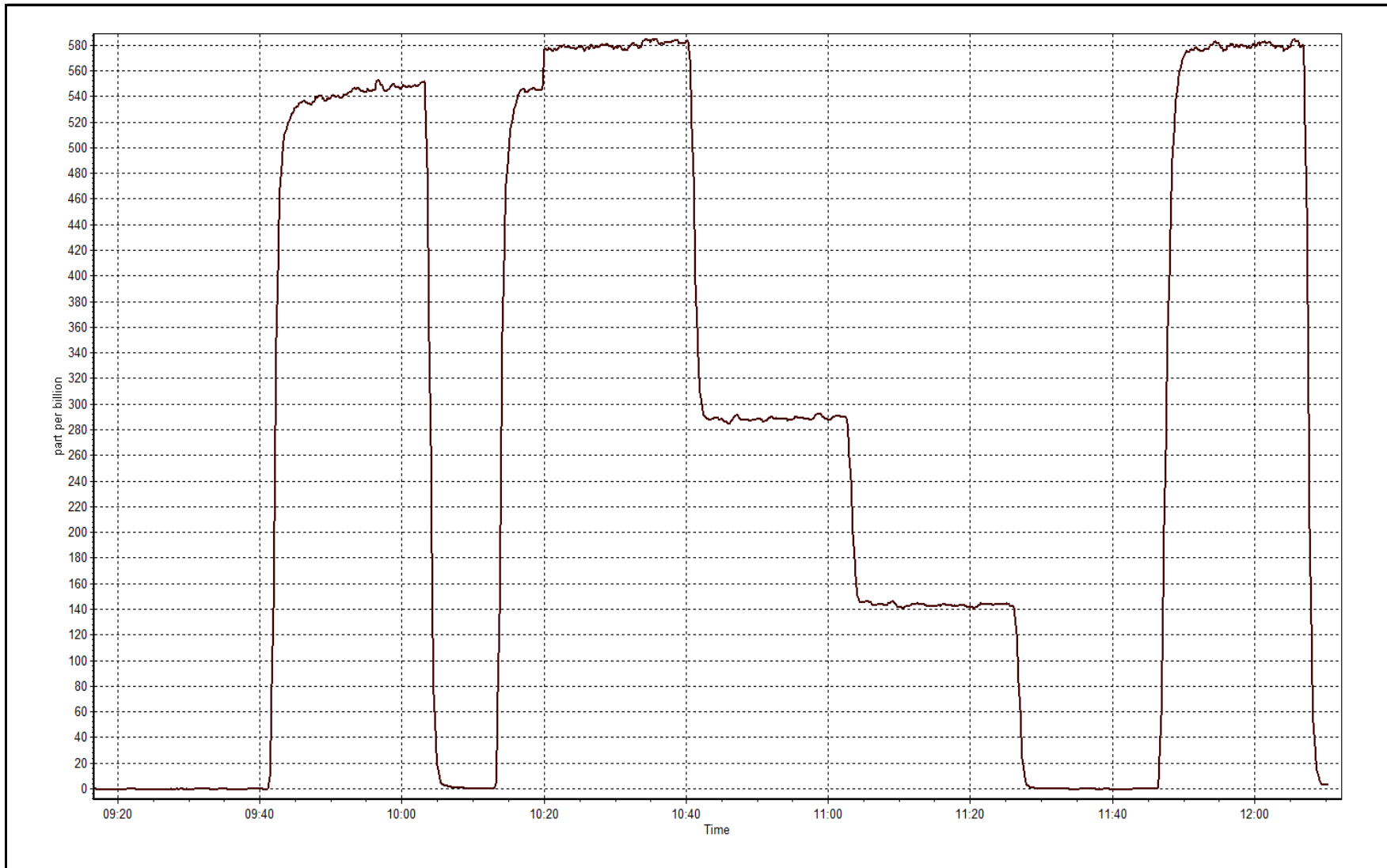
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999980
577.4	579.9	0.9957		
288.7	289.3	0.9978	Slope	0.993613
145.3	143.2	1.0148		
			Intercept	1.470468



SO2 Calibration Plot

Date: September 18, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	September 18, 2015	Last Calibration	August 14, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	11:25	End Time (MST)	14:55
Gas Cert Reference	CC107167	Station temp.	21 Deg C
Cal Gas Concentration	5.1 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	API T700	Serial Number	997
ZAG air Make/Model	API 701	Serial Number	4227
DACS make/model	Campbell Scientific CR3000	Serial Number	6894
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	SA130010A 12-Dec-16

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-651	-651
Analyzer IP address	192.168.1.42		Lamp voltage	790	794
Calculated slope	0.995883	0.988418	Chamber temp	45	45
Calculated intercept	-0.039872	-0.026334	Pressure	563.6	551.3
Analyzer Background	13.9	14.7	Flow	0.934	0.931
Analyzer Coefficient	1.150	1.191	Intensity	112	113
			Converter temp.	338	342

Analyzer make/model	Thermo 450i	Analyzer serial #	1218153583
Converter make/model	n/a	Converter serial #	n/a

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	78.5	80.1	76.8	1.043
SO2 scrubber check	5000	20.9	199.8	1.7	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	78.5	80.1	81.1	0.988
second point	5000	39.3	40.1	40.5	0.990
third point	5000	19.7	20.1	20.4	0.987
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	78.5	80.1	81.0	0.988
Average Correction Factor					0.988

Corrected As found	76.7	Previous response	80.4	% change	4.9%
--------------------	------	-------------------	------	----------	------

**Notes:**

AS found span 4.3% low. Calibrator MFC calibrated on September 10. Span adjusted.

Calibration Performed By: Devin Russell





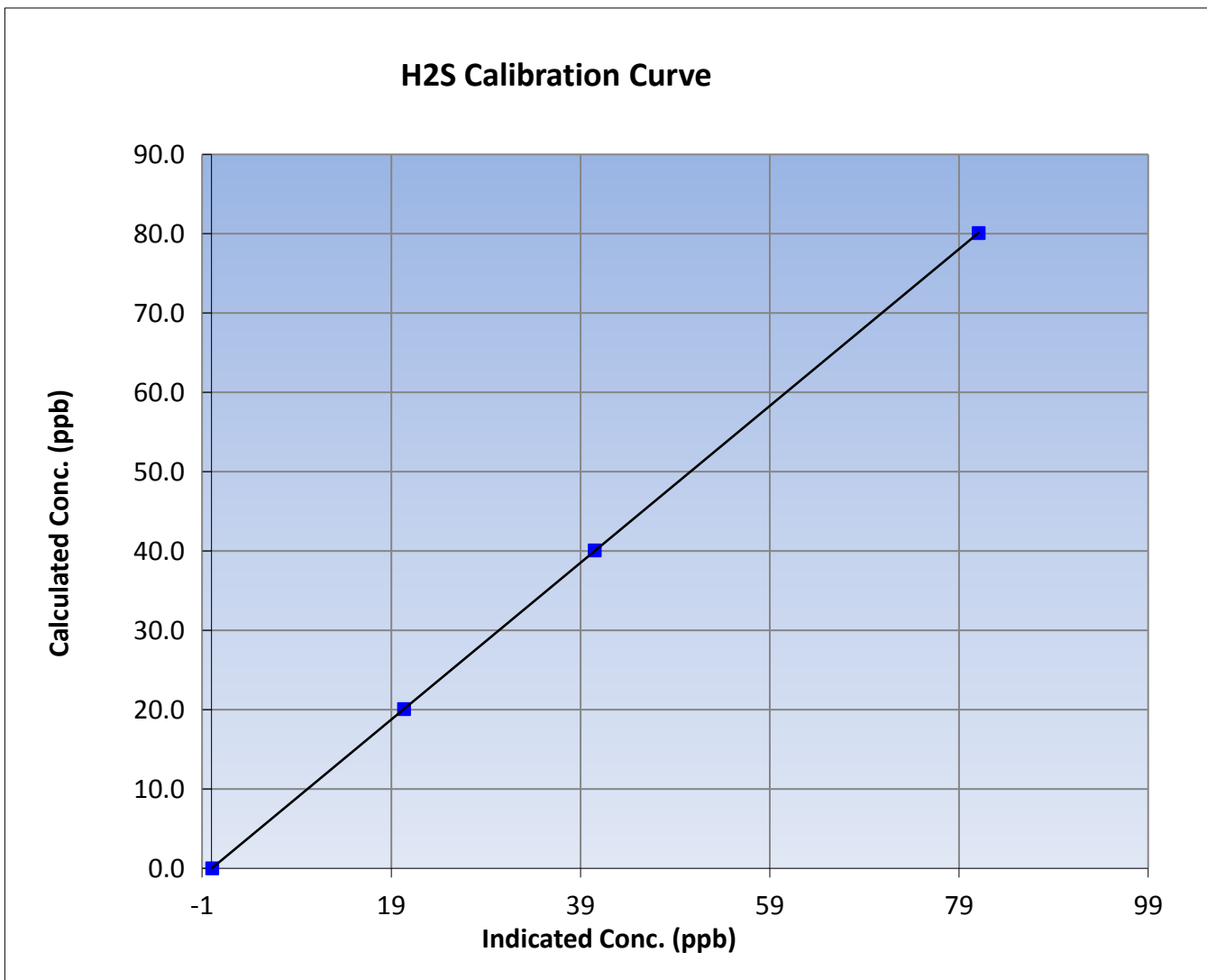
# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	September 18, 2015	Previous Calibration	August 14, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	11:25	End Time (MST)	14:55
Analyzer make	Thermo 450i	Analyzer serial #	1218153583

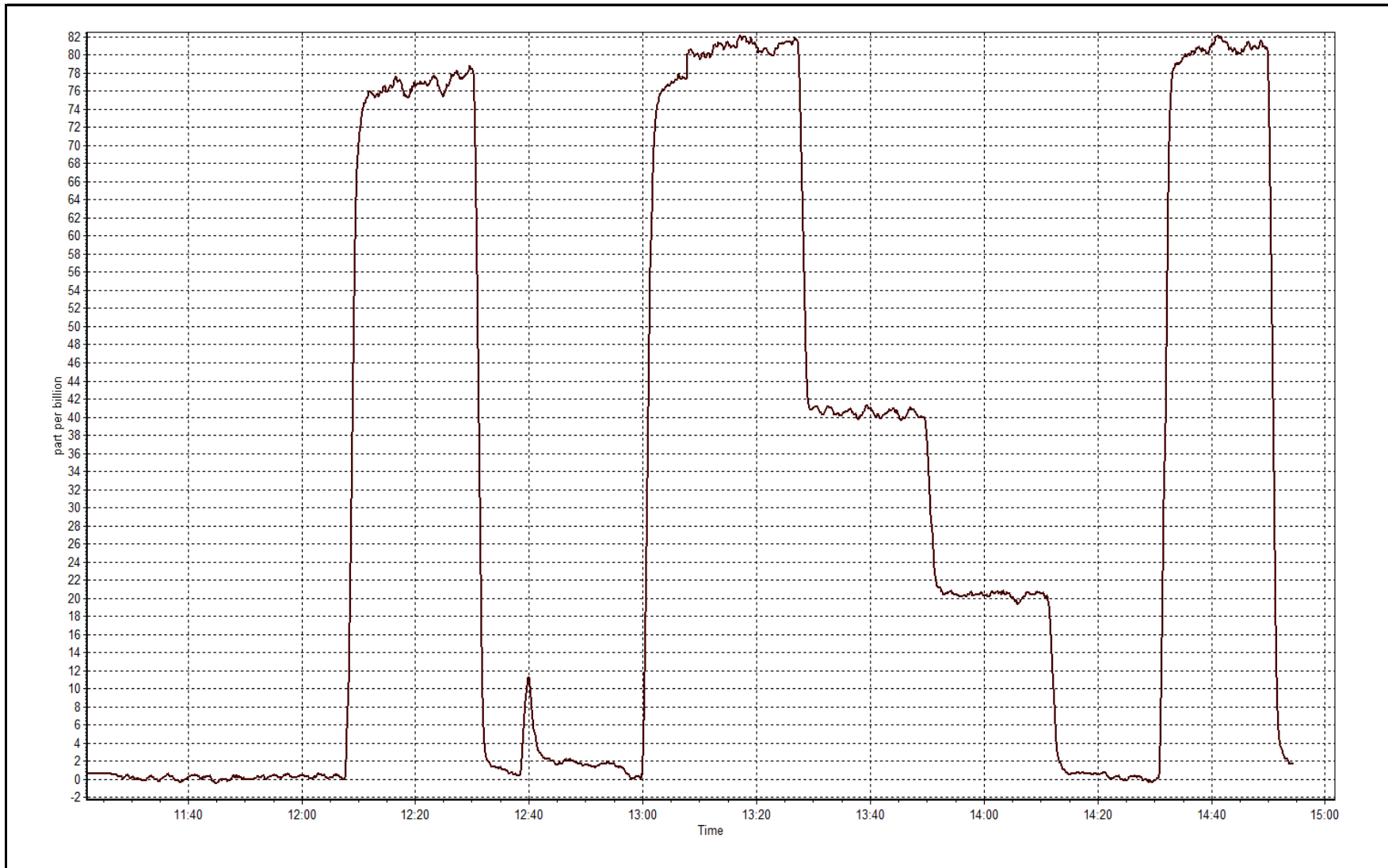
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999997
80.1	81.1	0.9875		
40.1	40.5	0.9900	Slope	0.988418
20.1	20.4	0.9869		
			Intercept	-0.026334



H2S Calibration Plot

Date: September 18, 2015





# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	September-18-15	Last Calibration	August-13-15
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	12:10
Gas Cert Reference	SA130010A	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	493
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

## Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	41.1	40.1
Calculated slope	0.999595	1.001602	Fuel Pressure	24.8	24.8
Calculated intercept	-0.057133	-0.011255	Analyzer Coeff	4.2	4.3
			Analyzer BKG	2.550	2.650

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	0.00	----
as found span	5000	60.4	13.19	12.66	1.042
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.4	13.19	13.18	1.001
second point	5000	30.2	6.60	6.60	1.000
third point	5000	15.2	3.32	3.34	0.994
as left zero	5000	0.0	0.00	0.03	----
as left span	5000	60.4	13.19	13.23	0.997
Average Correction Factor					0.998

Corrected As found	12.66	Previous response	13.26	% change	4.7%
--------------------	-------	-------------------	-------	----------	------

**Notes:**

As found span 4.2% low. Calibrator MFC was calibrated September 10. Span adjusted.

Calibration Performed By:

\_\_\_\_\_  
Devin Russell



# Wood Buffalo Environmental Association THC Calibration Report

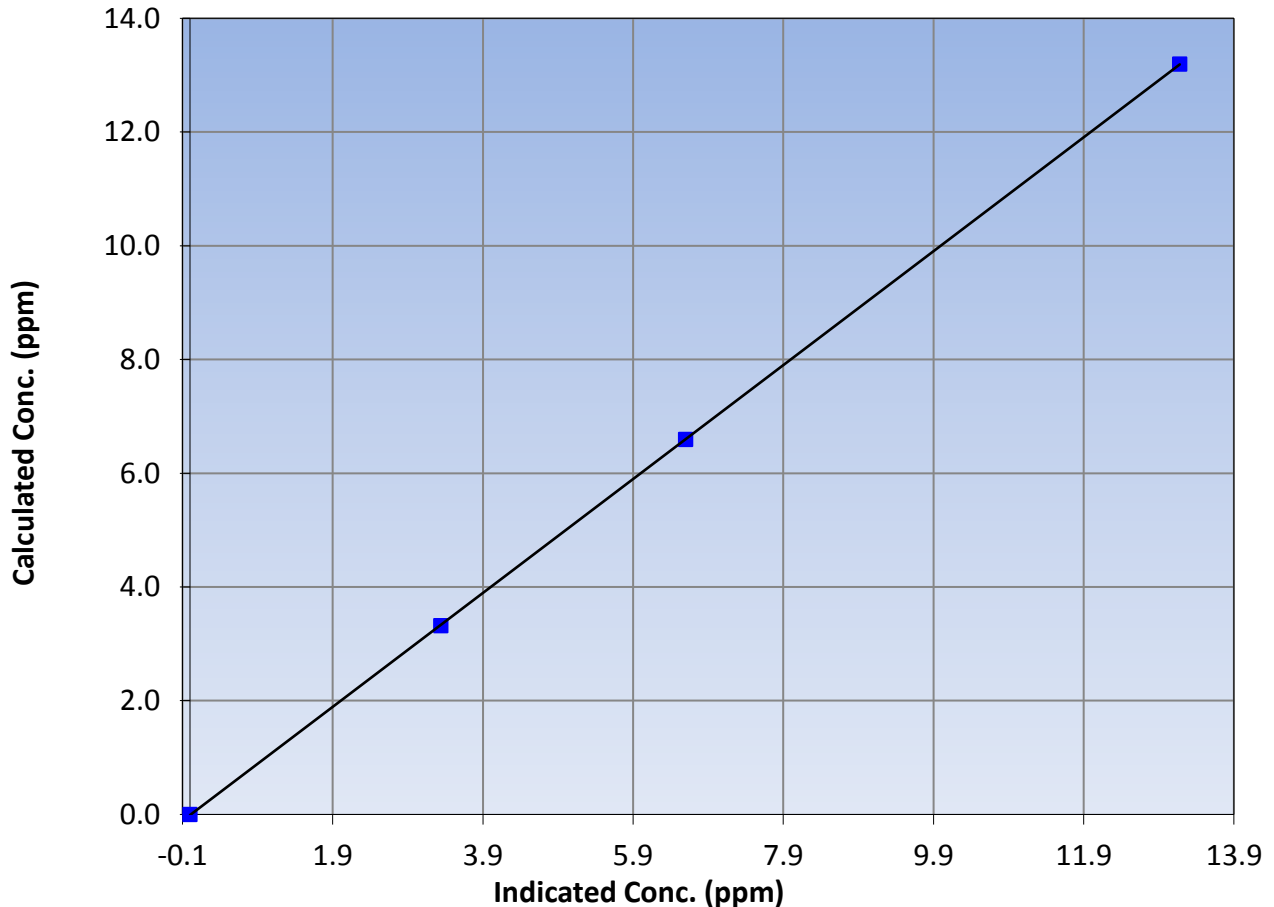
## Station Information

Calibration Date	September 18, 2015	Previous Calibration	August 13, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:10	End Time (MST)	12:10
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

## Calibration Data

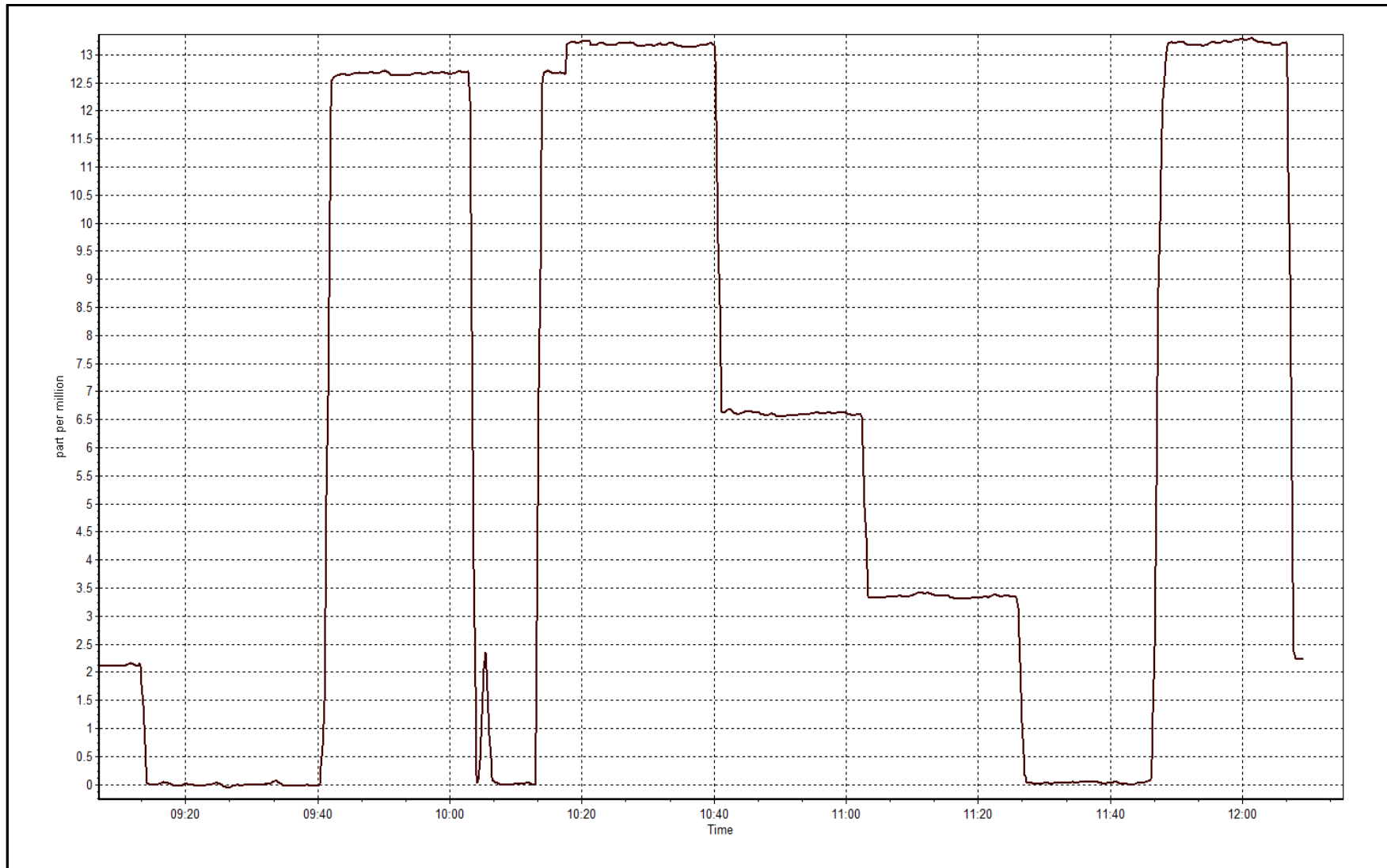
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999996
13.19	13.18	1.0011		
6.60	6.60	0.9996	Slope	1.001602
3.32	3.34	0.9941		
			Intercept	-0.011255

**THC Calibration Curve**



THC Calibration Plot

Date: September 18, 2015





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	September 10, 2015	Previous Calibration	August 14, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	11:45	End Time (MST)	14:20
NO2 GPT Ref date	September-09-15	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	997
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.3	27.0
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	0.997278	0.994970	Pressure	26.0	26.0
Calculated intercept	-1.067615	-0.106231	Flow cell A	0.722	0.737
Analyzer Background	5.2	4.9	Flow cell B	0.708	0.722
Analyzer Coefficient	0.958	0.913	Cell A Intensity		
			Cell B Intensity		

Analyzer make	Teledyne API T400	Analyzer serial #	824
---------------	-------------------	-------------------	-----

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	193.1/800	0.0	0.4	----
as found span	5000	713.6/1082.0	350.8	368.6	0.952
calibrator zero	5000	193.1/800	0.0	0.2	----
high point	5000	713.6/1082.0	350.8	352.9	0.994
second point	5000	496.5/973.6	237.9	238.8	0.996
third point	5000	260.3/849.3	122.0	122.9	0.993
as left zero	5000	193.1/800	0.0	0.2	----
as left span	5000	713.9/1083.6	350.8	354.5	0.989
Average Correction Factor					0.994

Corrected As found	368.1	Previous response	352.8	% change	-4.2%
--------------------	-------	-------------------	-------	----------	-------

**Notes:**

Filter changed after as founds. High point 4.8% high due to MFC calibration just before O3 calibration. Span adjusted.

Calibration Performed By:

Devin Russell



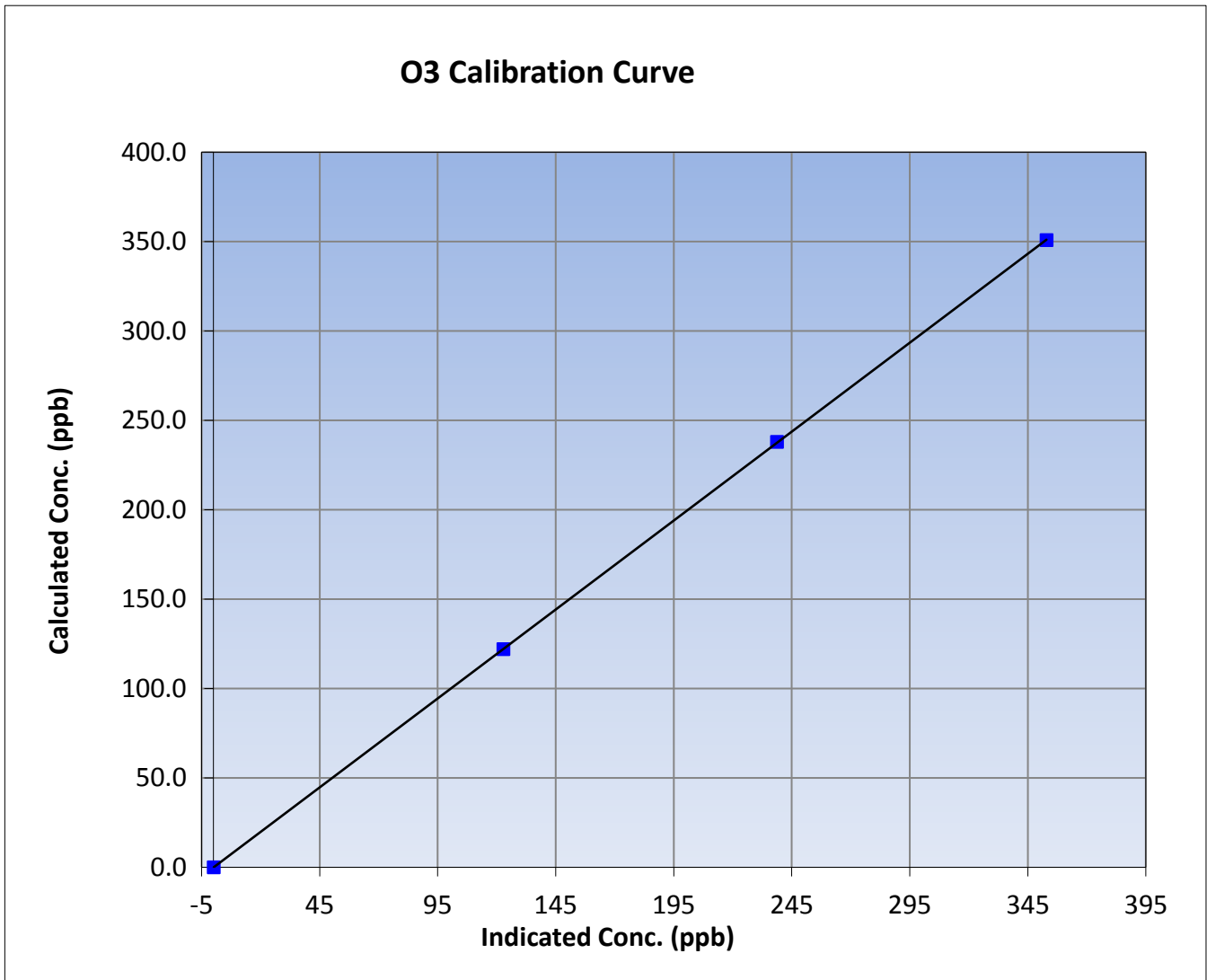
# Wood Buffalo Environmental Association O3 Calibration Report

## Station Information

Calibration Date	September-10-15	Previous Calibration	August 14, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	11:45	End Time (MST)	14:20
Analyzer make	Teledyne API T400	Analyzer serial #	824

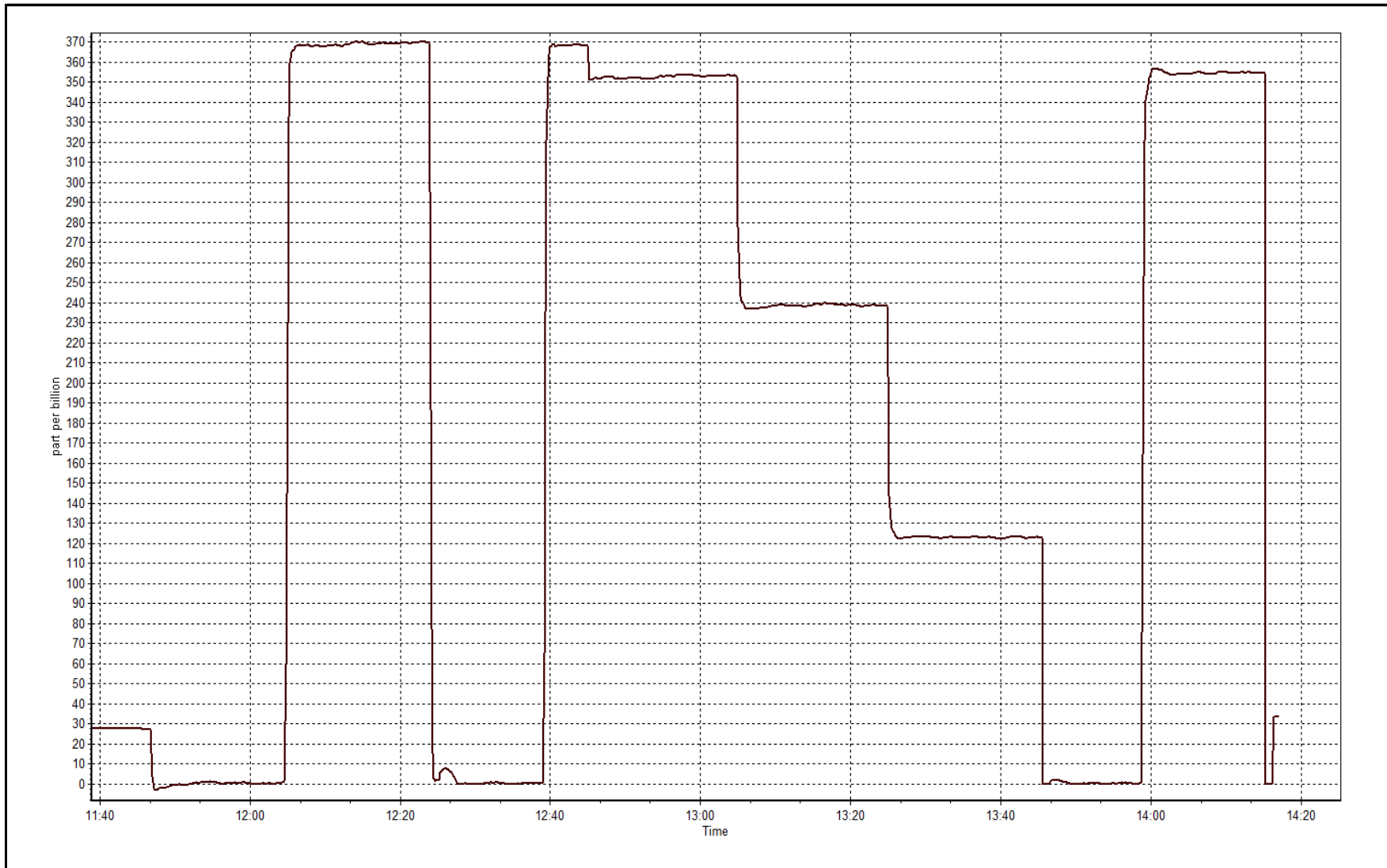
## Calibration Data

Calculated concentration (ppb) (Cc)	09-Sep-15	Correction factor (Cc/lc)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999996
350.8	352.9	0.9940		
237.9	238.8	0.9963	Slope	0.994970
122.0	122.9	0.9931		
			Intercept	-0.106231



O3 Calibration Plot

Date: September 10, 2015







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

### Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 13, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	14:20
NO Cal Gas Conc	49.7 ppm	Gas Cert Reference	SA130010A
NOx Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	December 12, 2016
Calibrator	API T700	Serial Number	997
Zero air Generator	Teledyne API T701	Serial Number	4427

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894
-------------------	----------------------------	-----------------	------

### Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998440	1.001139	0.995717
	Data Offset	1.800858	1.052682	0.076879
Current Calibration	Data Slope	0.997652	0.995700	1.000398
	Data Offset	0.892136	1.287719	0.374388

### Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	833
---------------------	----------	-------------------	-----

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.906		0.913	
NOx coefficient	0.909		0.911	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.0		0.6	
NOx bkgrnd	2.9		1.1	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	316.2	Deg C	316.4	Deg C
PMT voltage	781	V	781	mV
PMT Temp	7	Deg C	7	Deg C
O3 flow	71	ccm	71	ccm
R Cell press NO	4.5	mmHg	4.5	mmHg
R Cell Press Nox	4.5	mmHg	4.5	mmHg
NO sample flow	0.439	lpm	0.444	lpm
Nox sample Flow	0.439	lpm	0.444	lpm

**Notes:**

Filter changed after as founds. Zero and Span adjusted.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date: September 9, 2015 Station Number: AMS 17

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-1.1	-0.1	-1.0	----	----
as found span	5000	60.4	600.4	600.4	0.0	595.7	593.7	2.0	1.0079	1.0112
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.3	0.0	----	----
high point	5000	60.4	600.4	600.4	0.0	600.8	602.0	-1.2	0.9993	0.9973
second point	5000	30.2	300.2	300.2	0.0	300.8	300.2	0.5	0.9980	0.9998
third point	5000	15.2	151.1	151.1	0.0	149.3	149.1	0.2	1.0121	1.0132
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	----	----
as left span	5000	60.4	600.4	249.5	350.9	598.5	249.0	349.5	1.0032	1.0020
Average Correction Factor									1.0031	1.0035

Corrected As found NO<sub>x</sub>= 596.8 NO= 593.8 Percent Change NO<sub>x</sub>= 0.5% NO= 0.8%  
 Previous Response NO<sub>x</sub>= 599.5 NO= 598.6

### GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 60.40 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	249.5	350.8	600.4	249.5	351.0	0.9880	1.0000	0.9995	100.0%
2nd NO2 (200)	----	362.4	237.9	598.9	362.4	236.4	0.9905	1.0000	1.0061	99.4%
3rd NO2 (100)	----	478.3	122.0	599.8	478.3	121.5	0.9890	1.0000	1.0040	99.6%
4th NO2 (0)	600.3	----	0.8	601.0	600.3	0.7	0.9870	1.0000	N/A	----
Average Correction Factor							0.9886	1.0000	1.0032	99.7%

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

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

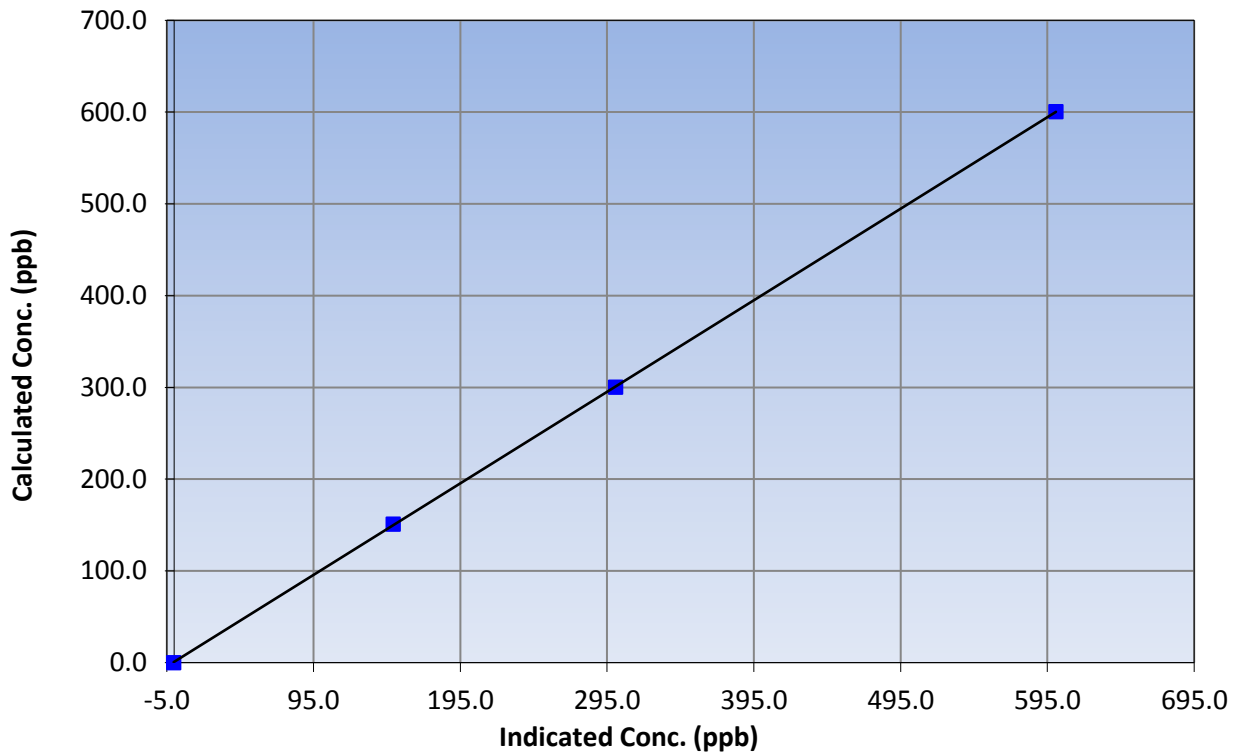
### Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 13, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:15	End Time (MST)	14:20
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	-0.3	----	Correlation Coefficient	0.999987
600.4	600.8	0.9993		
300.2	300.8	0.9980	Slope	0.997652
151.1	149.3	1.0121		
			Intercept	0.892136

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





# Wood Buffalo Environmental Association

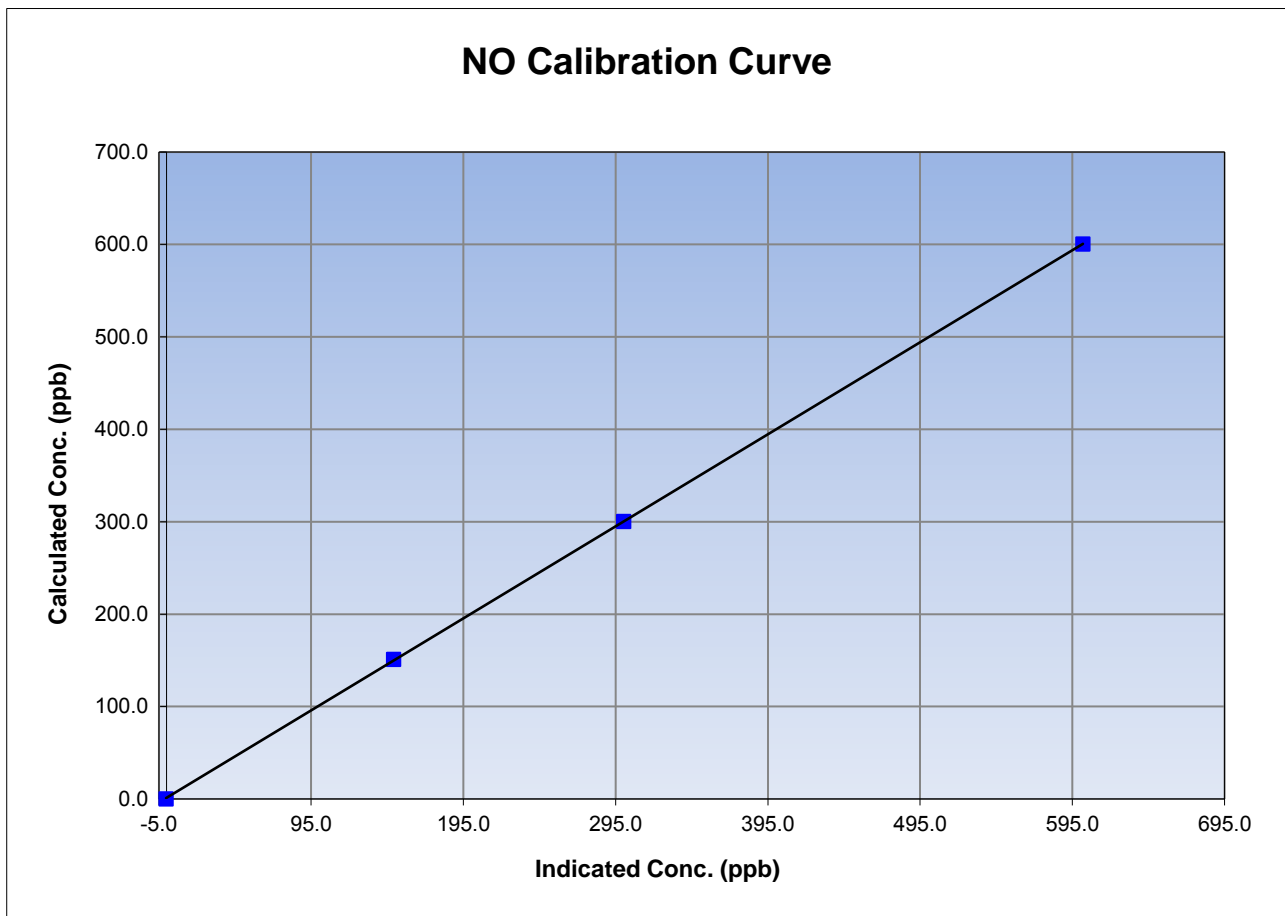
## NO Calibration Summary

### Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 13, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:15	End Time (MST)	14:20
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	-0.3	N/A	Correlation Coefficient	0.999986
600.4	602.0	0.9973		
300.2	300.2	0.9998	Slope	0.995700
151.1	149.1	1.0132		
			Intercept	1.287719





# Wood Buffalo Environmental Association

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

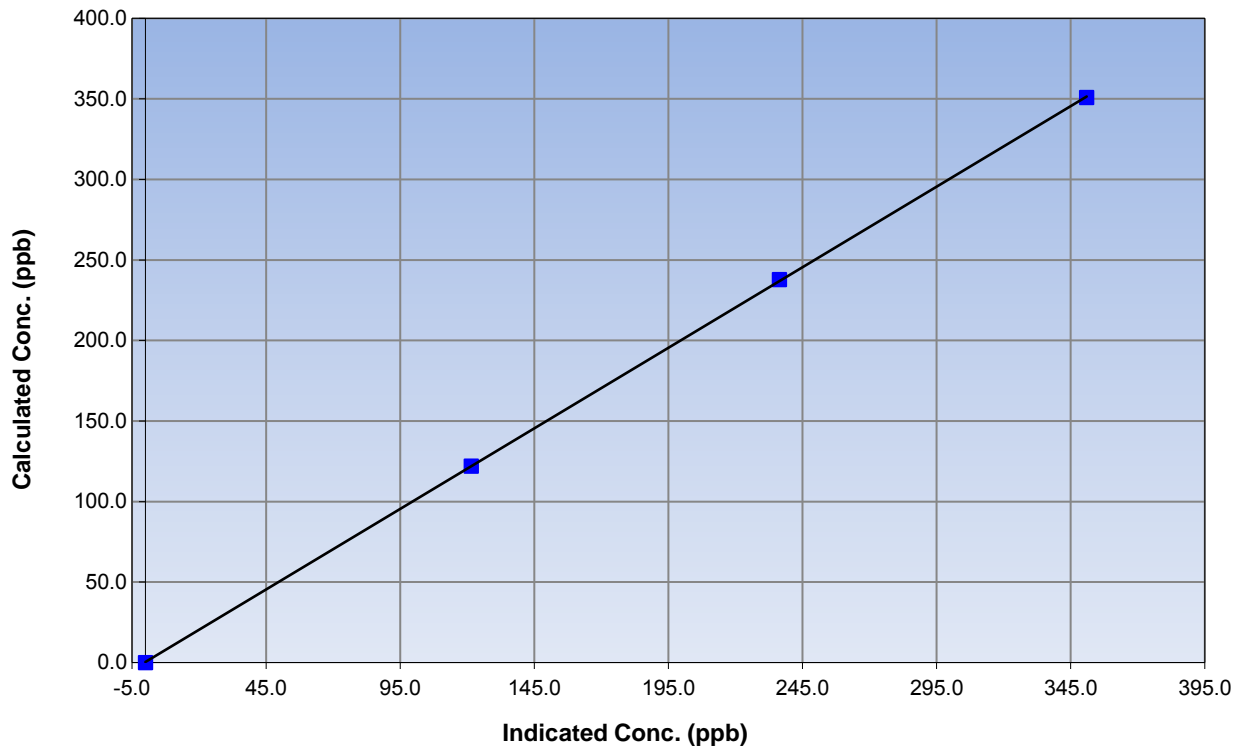
### Station Information

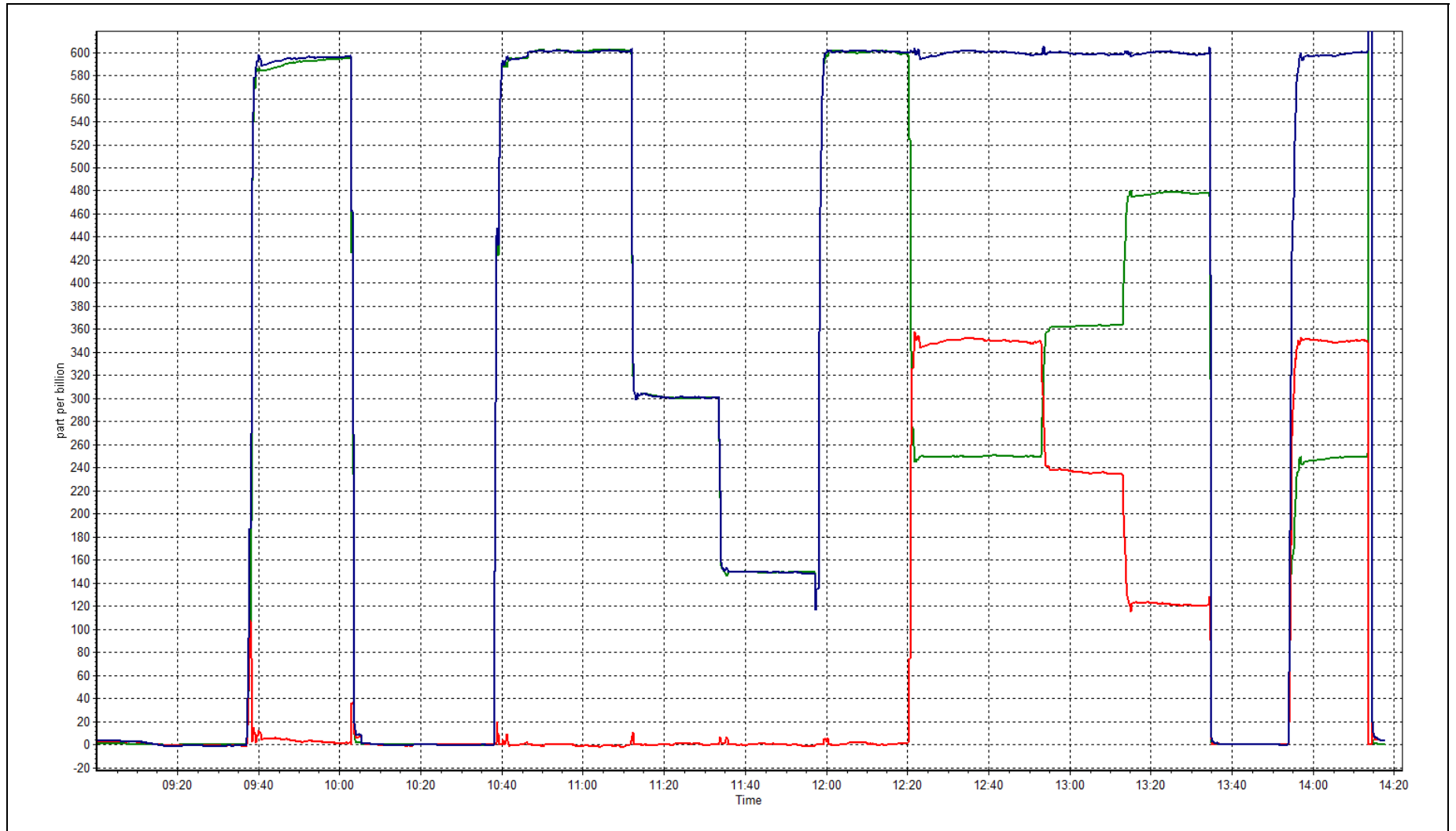
Calibration Date	September 9, 2015	Previous Calibration	August 13, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:15	End Time (MST)	14:20
Analyzer make	API T200	Analyzer serial #	833

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999978
350.8	351.0	0.9995		
237.9	236.4	1.0061	Slope	1.000398
122.0	121.5	1.0040		
			Intercept	0.374388

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







# Wood Buffalo Environmental Association

## SHARP CALIBRATION

### STATION INFORMATION

Calibration Date:	<u>September 18, 2015</u>	Previous Calibration:	<u>August 14, 2015</u>
Station Name:	<u>Wapasu</u>	Station Number:	<u>AMS 1</u>
Start Time (MST):	<u>9:25</u>	End Time (MST):	<u>10:40</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>954</u>

### SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number:	<u>E-1107</u>
C <sub>14</sub> Source SN:	<u>2518</u>
Confirmation of Time settings:	Yes <input type="checkbox"/> No <input type="checkbox"/>
Parameters Checked:	<input checked="" type="checkbox"/> T1 <input type="checkbox"/> P2 <input type="checkbox"/> T3 <input type="checkbox"/> T4 <input type="checkbox"/> P3 <input checked="" type="checkbox"/> P3 <input type="checkbox"/> Main Flow <input checked="" type="checkbox"/> Beta <input type="checkbox"/> Neph <input checked="" type="checkbox"/>

### CALIBRATION DATA

#### Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	10.0	11.1	1.1	10.0
T2	22.0	na	na	
T3	22.0	na	na	
T4	24.0	na	na	
RH (%)	26.0	na	na	

#### Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	943	944.6	1.6	943

#### Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	993	-7	993	1000

### Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	197		198
Neph	0.6		0
C14	8.4		8.4
Indicated Concentration (ug/m3)		yes	
Offset 1			198.3
Offset 2			32.2

### Leak Check (Quarterly)

Leak Check Date: \_\_\_\_\_ Previous Leak Check Date: June 10, 2015

#### Measured

#### Difference LPM (Limit +/- 0.42 LPM)

Flow without adaptor (LPM): \_\_\_\_\_ 0.00

\*Flow with adaptor (LPM): \_\_\_\_\_

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

### Mass Foil Calibration (Annually)

Foil Calibration Date:	Previous Foil Calibration:
Zeroed?:	
Foil Mass:	<u>Mass foil set S/N:</u>
Previous Correction Factor:	
New Correction Factor:	

### INSPECTION DATA

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

### NOTES:

Nephelometer zeroed. Cyclone head changed with clean head. Filter tape has about 1/4 left on the roll.

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

## WS/WD Calibration Report

### Station Information

Calibration Date	September-09-15	Previous Calibration	June-24-14
Station Name	Wapasu	Station Number	AMS 17
Reason:	<input checked="" type="checkbox"/> Routine	<input type="checkbox"/> Installation	<input type="checkbox"/> Removal
Start Time (MST)	9:20	End Time (MST)	12:00
Barometric Press	n/a	Station Temp	22 Deg C
WS Calibrator	MetOne 053	Serial Number	J6774

### WIND SPEED

Sensor make/model	Met One 010C-1	Sensor serial #	P10039
DACS make	Campbel Scientific CR3000	DACS serial No.	6894
DACS voltage range	5000	DACS channel #	P2
<u>Before</u>		<u>After</u>	
Calculated slope	1.001578426	Calculated slope	0.999594
Calculated intercept	-0.029895259	Calculated intercept	-0.028064

### Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0.0	0.0	n/a
200	20.2	20.3	0.9954
400	39.4	39.4	0.9989
600	58.6	58.6	1.0001
800	77.8	77.8	0.9989
1000	96.9	97.0	0.9996
Average Correction Factor			0.9986

### WIND DIRECTION

Sensor make/model	Met One 020C-1	Sensor serial #	P19942
DACS make	Campbel Scientific CR3000	DACS serial No.	6894
DACS voltage range	5000	DACS channel #	SE 24
<u>Before</u>		<u>After</u>	
Calculated slope	1.007723423	Calculated slope	0.994896
Calculated intercept	-2.471503382	Calculated intercept	-0.990917
As Found Declination (west of North)	17.0	As Left Declination (west of North)	17.0

### Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	1.3	n/a
90	91.7	0.9812
180	181.4	0.9921
270	271.3	0.9951
357	360.8	0.9895
Average Correction Factor		0.9895

**Notes:**

Wiped down sensors with kim wipes. Checked bearings. No maintenace required.

Calibration Performed By: Devin Russell





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 18  
CONKLIN LOOKOUT  
SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)  
 SEPTEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	685	35	35	100.00	13	0	2	0
TRS(ppb) Average	686	34	34	100.00	0	0	0	0
THC(ppm) Average	685	35	35	100.00	2.2	-	2	-
NMHC(ppm) Average	685	35	35	100.00	0.052	-	0.017	-
CH4(ppm) Average	685	35	35	100.00	2.1	-	2	-
O3 (ppb) Average	684	36	36	100.00	46	0	35	-
NO2 (ppb) Average	685	35	35	100.00	4	0	2	-
NO (ppb) Average	685	35	35	100.00	1	-	0	-
NOX (ppb) Average	685	35	35	100.00	5	-	2	-
PM2.5 (ug/m3) Average	688	1	32	95.69	8.8	-	5.4	0
Wind Speed 10 m (km/h) Average	720	0	0	100.00	20	-	13	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	720	0	0	100.00	23.8	-	16.8	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	96.0	-
Global Solar Radiation (W/m2) Average	720	0	0	100.00	786	-	221.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)  
 SEPTEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	685	0.3	1	-	0	0	0	0	0	1	13
TRS (ppb) Average	686	0.2	0	-	0	0	0	0	0	0	0
THC (ppm) Average	685	1.92	0	-	1.8	1.9	1.9	1.9	1.9	2	2.2
NMHC(ppm) Average	685	0.003	0.007	-	0	0	0	0	0	0	0.052
CH4(ppm) Average	685	1.91	0	-	1.8	1.9	1.9	1.9	1.9	2	2.1
O3 (ppb) Average	684	25.9	7	-	7	16	20	26	31	35	46
NO2 (ppb) Average	685	0.7	1	-	0	0	0	1	1	1	4
NO (ppb) Average	685	0.1	0	-	0	0	0	0	0	0	1
NOX (ppb) Average	685	0.7	1	-	0	0	0	0	1	2	5
PM2.5 (ug/m3) Average	688	2.13	1.5	-	0.1	0.6	1	1.7	2.8	4.4	8.8
Wind Speed 10 m (km/h) Average	720	7.5	3	-	1	3	5	7	10	12	20
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	720	8.7	4.7	-	-2.1	3.5	5.7	7.9	11.3	15.7	23.8
Relative Humidity (%) Average	720	74.5	19	-	28	46	59	77	93	98	99
Global Solar Radiation (W/m2) Average	720	134.6	194	-	0	0	0	12	238	459	786

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)  
 SEPTEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	13 Sep 2015 11:00	13 Sep 2015 12:00	2	Unstable Operation - negative baseline
PM2.5	18 Sep 2015 13:00	18 Sep 2015 18:00	6	Unstable Operation - negative baseline
PM2.5	19 Sep 2015 15:00	19 Sep 2015 17:00	3	Unstable Operation - negative baseline
PM2.5	19 Sep 2015 23:00	19 Sep 2015 23:00	1	Unstable Operation - negative baseline
PM2.5	21 Sep 2015 09:00	21 Sep 2015 17:00	9	Unstable Operation - negative baseline
PM2.5	22 Sep 2015 12:00	22 Sep 2015 12:00	1	Unstable Operation - negative baseline
PM2.5	25 Sep 2015 12:00	25 Sep 2015 18:00	7	Unstable Operation - negative baseline
PM2.5	28 Sep 2015 13:00	28 Sep 2015 13:00	1	Unstable Operation - negative baseline
PM2.5	29 Sep 2015 09:00	29 Sep 2015 09:00	1	Maintenance - Flow and zero check

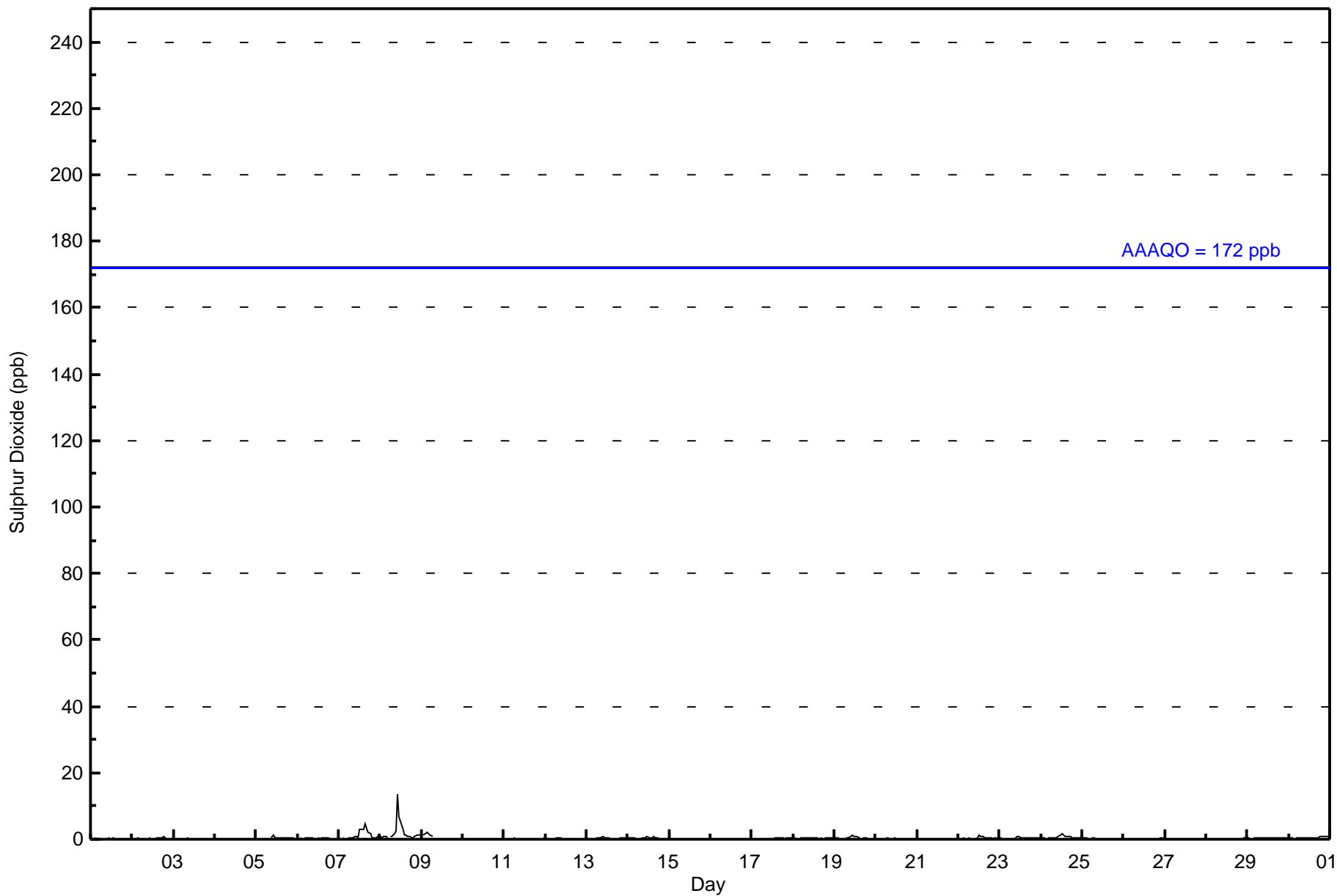


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 13 ppb on Sep 8 11:00	Maximum Daily Average: 2.0 ppb on Sep 8		Hours of Data:	685
Minimum Value: 0 ppb on Sep 1 07:00	Minimum Daily Average: 0.0 ppb on Sep 4		Hours of Missing Data:	35
Maximum Diurnal Average: 0.8 ppb at hour 11	Minimum Diurnal Average: 0.2 ppb at hour 1		Hours of Calibration:	35
Monthly Average: 0.3 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 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-Sep	0	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
2-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1
3-Sep	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
4-Sep	0	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-Sep	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0.3	1
6-Sep	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
7-Sep	0	0	0	0	Z	0	0	0	1	1	1	1	3	3	3	5	3	2	2	1	1	0	0	1	1.3	5
8-Sep	1	0	1	1	0	Z	1	1	1	3	13	7	4	3	1	1	1	1	1	1	1	1	1	1	2.0	13
9-Sep	Z	1	2	2	2	1	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
10-Sep	0	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
11-Sep	0	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-Sep	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
13-Sep	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
14-Sep	0	0	0	0	0	Z	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0.3	1
15-Sep	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
16-Sep	0	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-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.2	1
18-Sep	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
19-Sep	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
20-Sep	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
21-Sep	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
22-Sep	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
23-Sep	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0.4	1
24-Sep	0	0	0	Z	0	0	0	0	1	0	1	2	1	1	1	1	1	1	1	1	0	0	1	1	0.6	2
25-Sep	0	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-Sep	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
27-Sep	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
28-Sep	0	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
29-Sep	0	0	Z	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
30-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1	0.5	1

0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.8	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3	Diurnal Average
1	1	2	2	2	1	1	1	1	1	3	13	7	4	3	3	5	3	2	2	1	1	1	1	1	Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Conklin Lookout - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	684	99.85	99.85
11 - 20	1	0.15	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: 685

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Conklin Lookout - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	15	49	32	33	20	18	15	24	18	57	134	60	70	88	38	13	684
11 - 20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	16	49	32	33	20	18	15	24	18	57	134	60	70	88	38	13	685

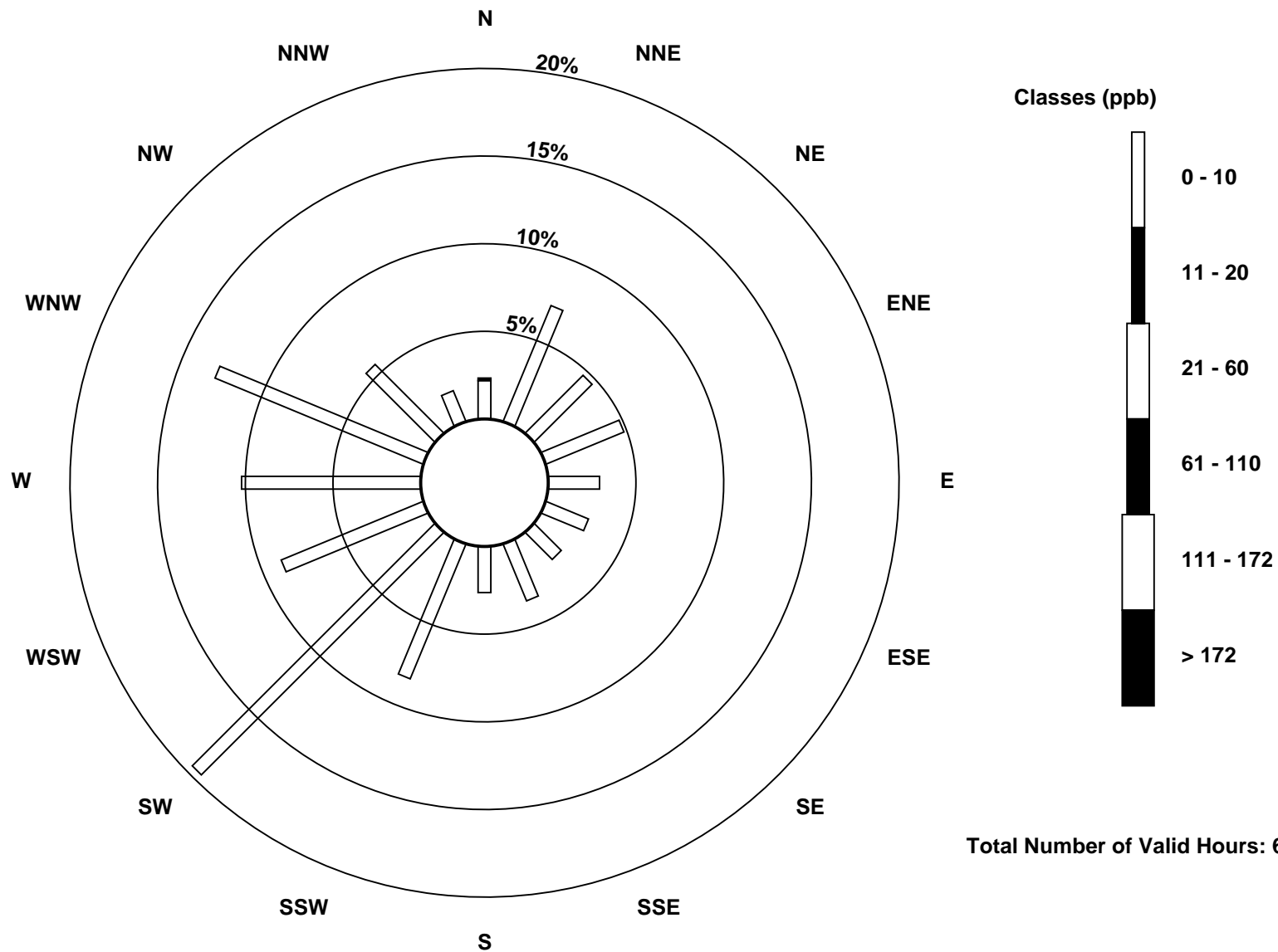
Total Number of Valid Hours: 685

Total Number of Hours: 720

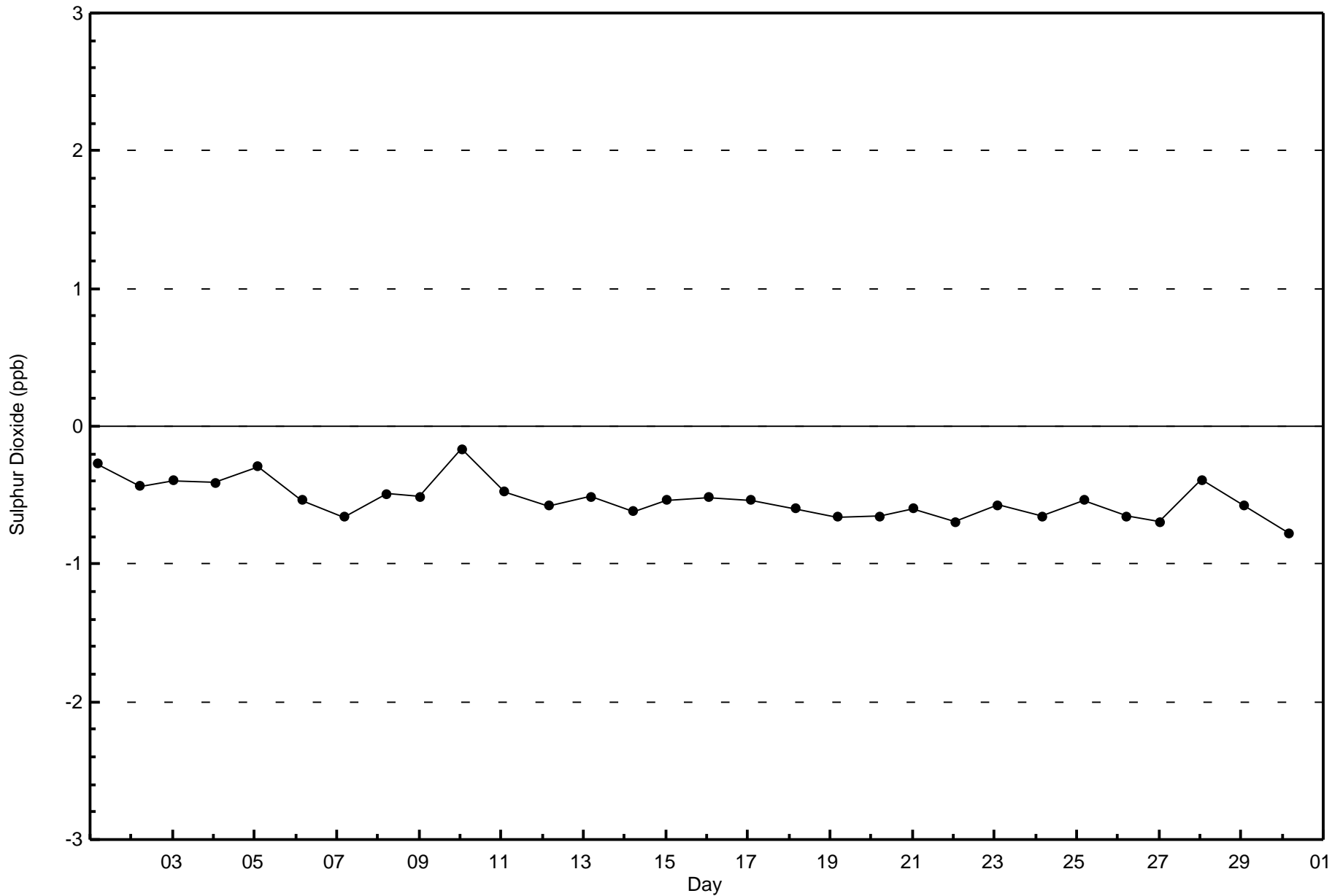


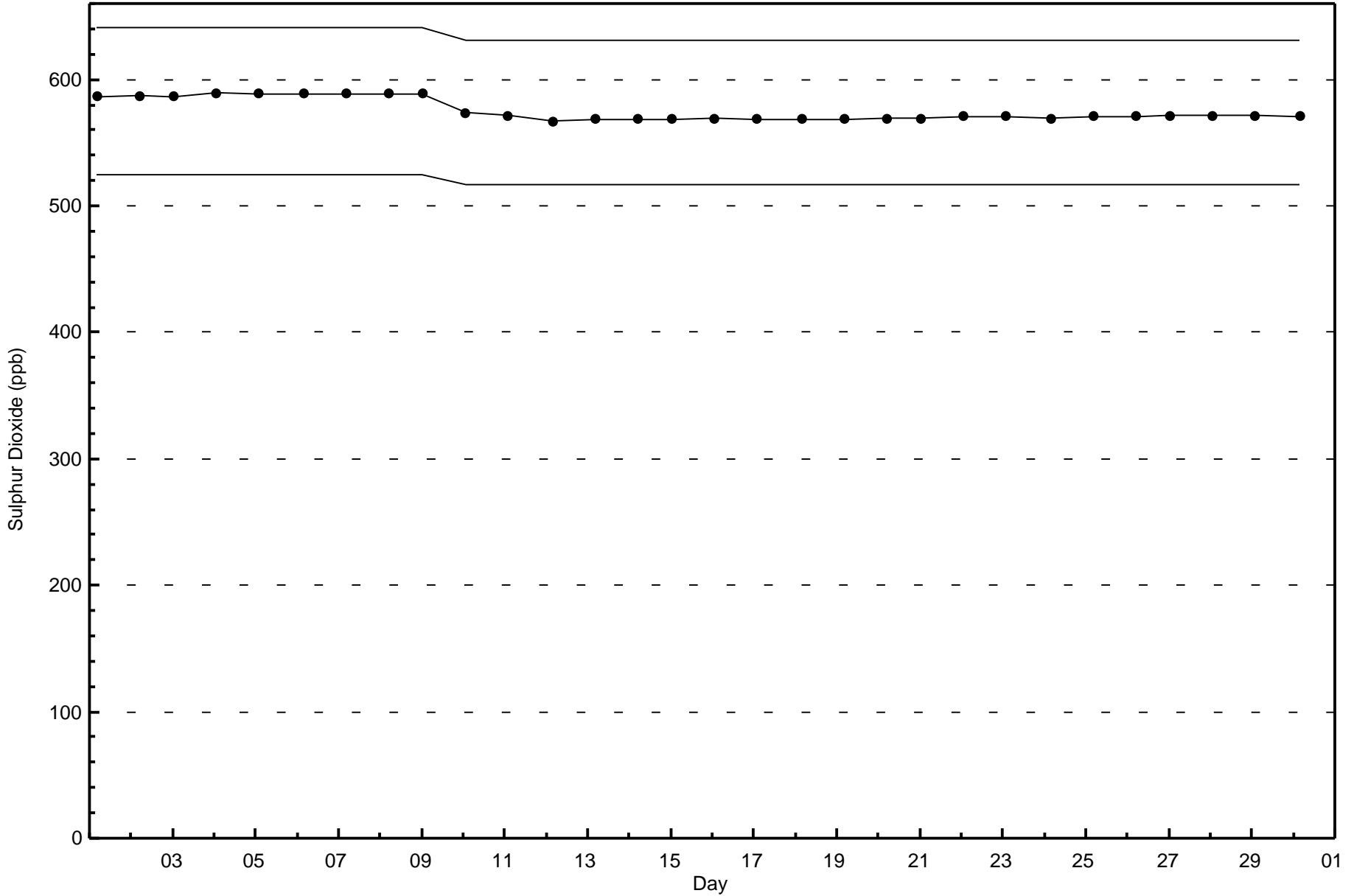
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Conklin Lookout (AMS 18)

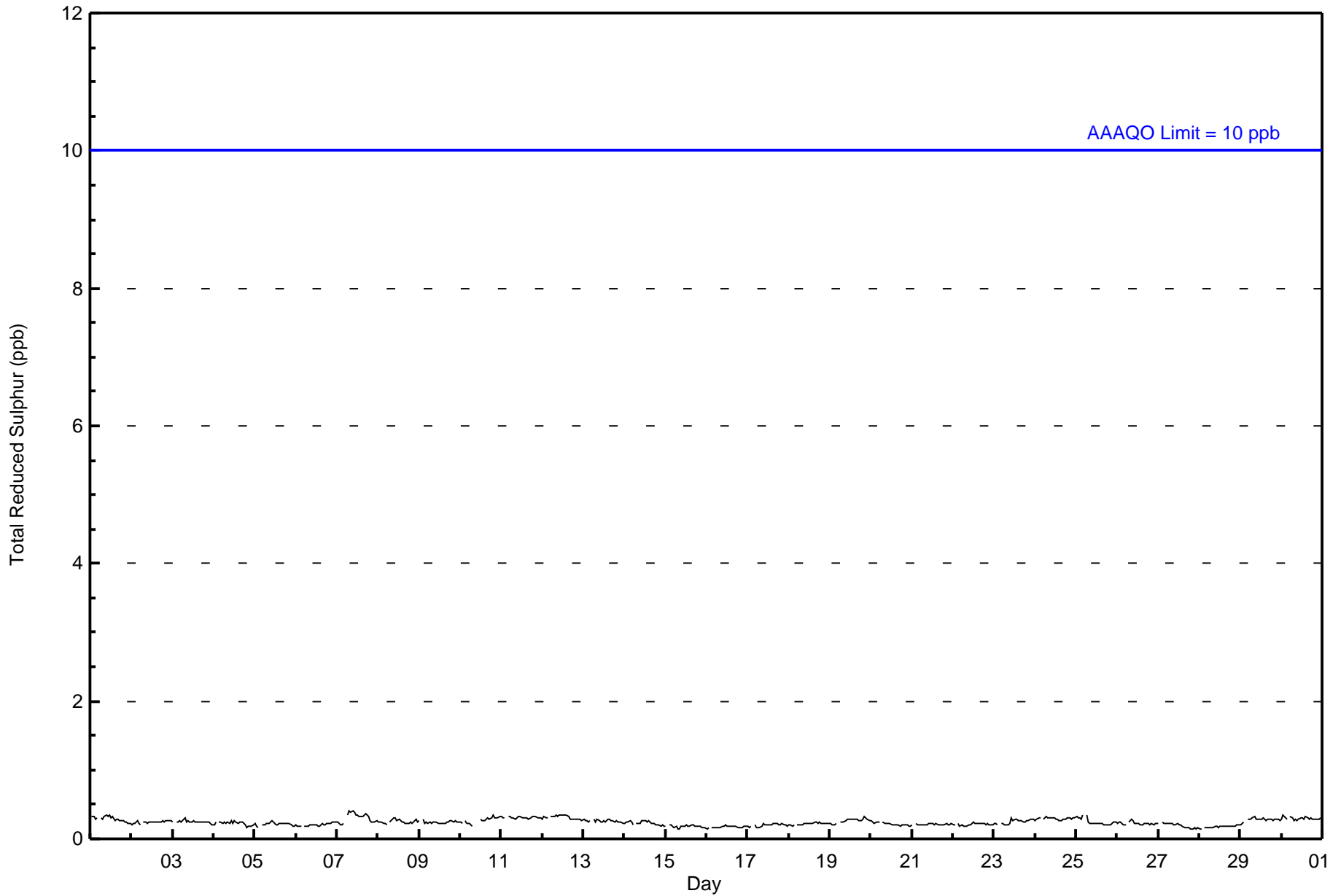


Total Number of Valid Hours: 685











**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Conklin Lookout - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	686	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb  
Conklin Lookout - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	16	48	32	34	20	18	15	24	19	56	136	58	70	88	38	14	686
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	16	48	32	34	20	18	15	24	19	56	136	58	70	88	38	14	686

Total Number of Valid Hours: 686

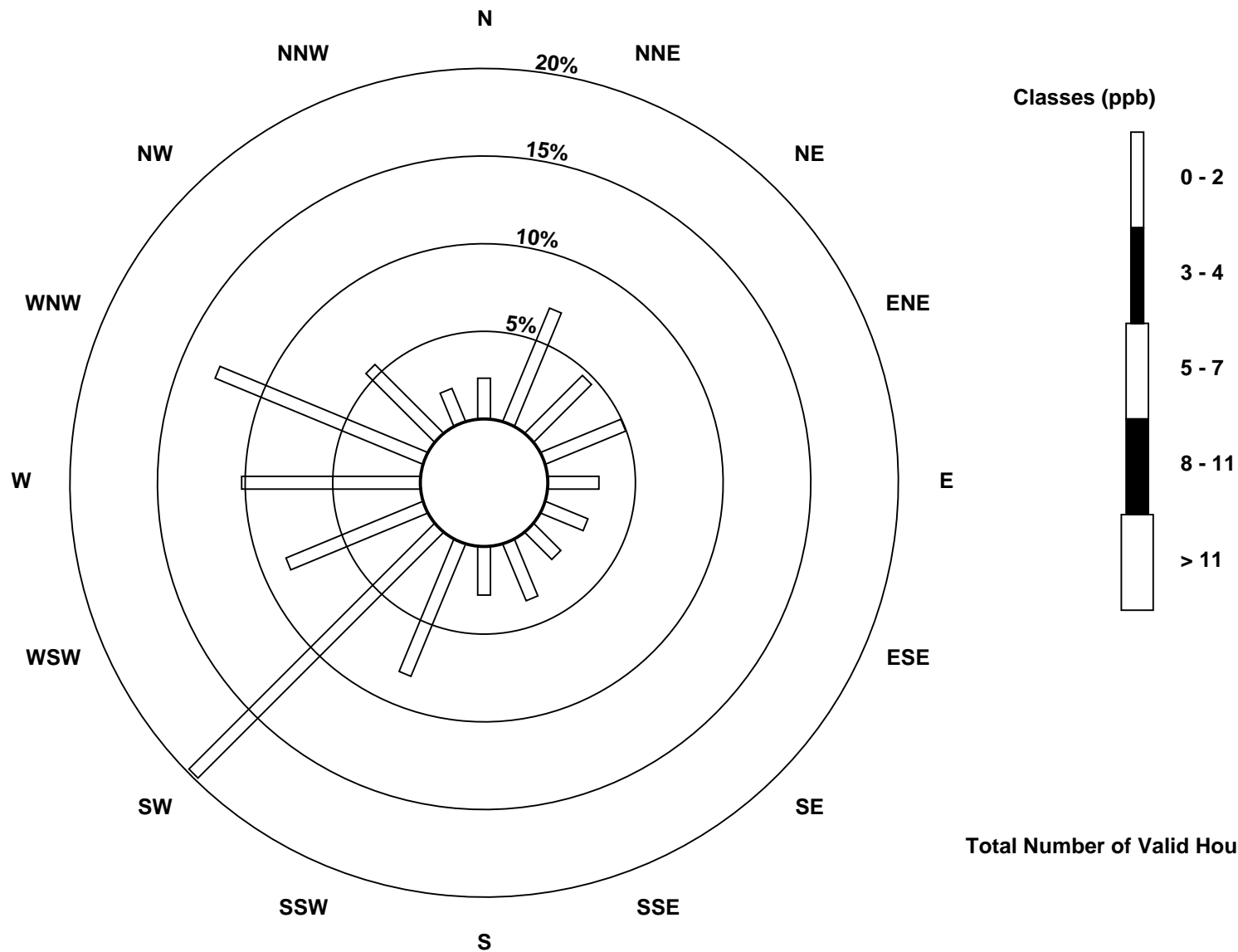
Total Number of Hours: 720





Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Total Reduced Sulphur (TRS) - ppb  
Conklin Lookout (AMS 18)

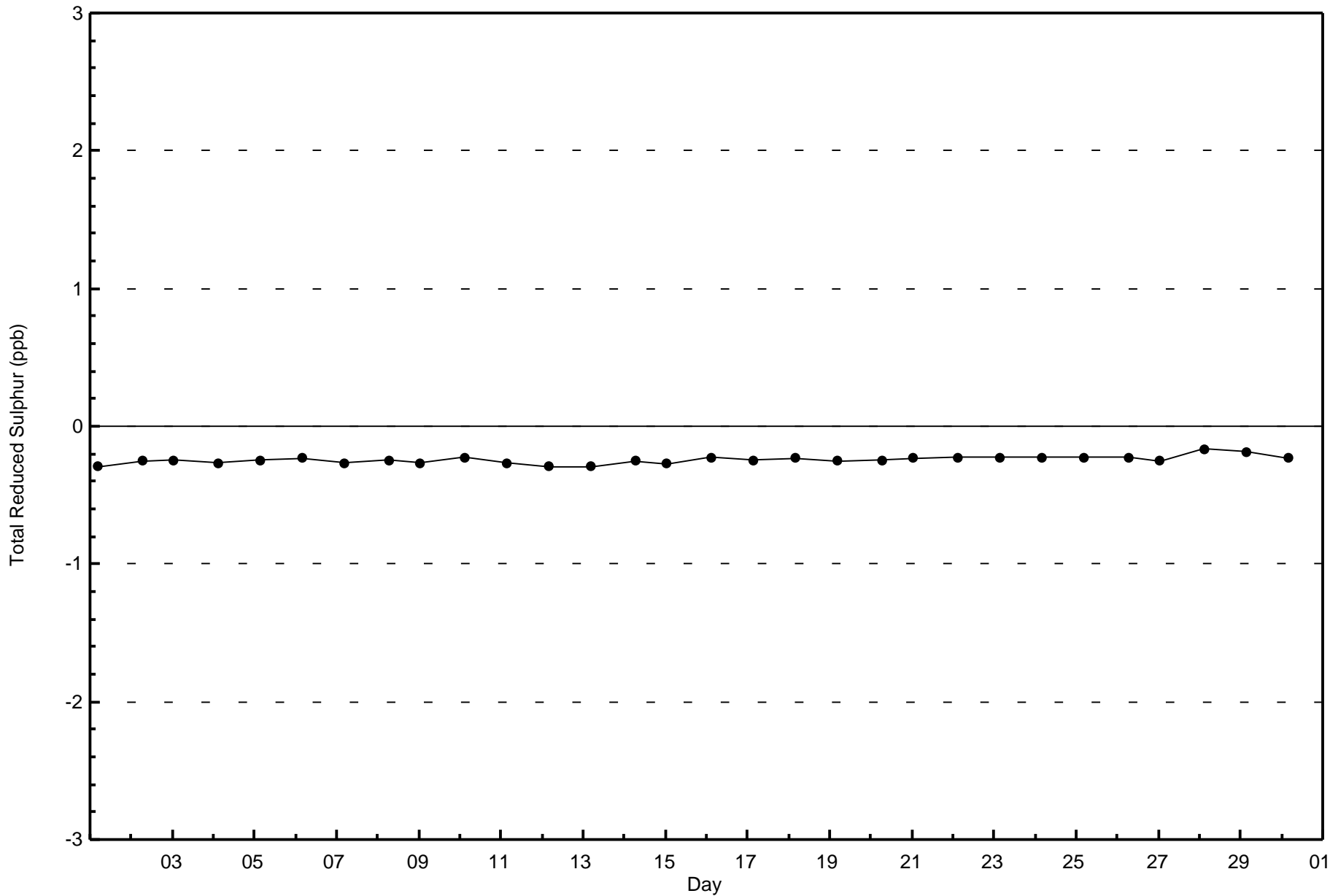


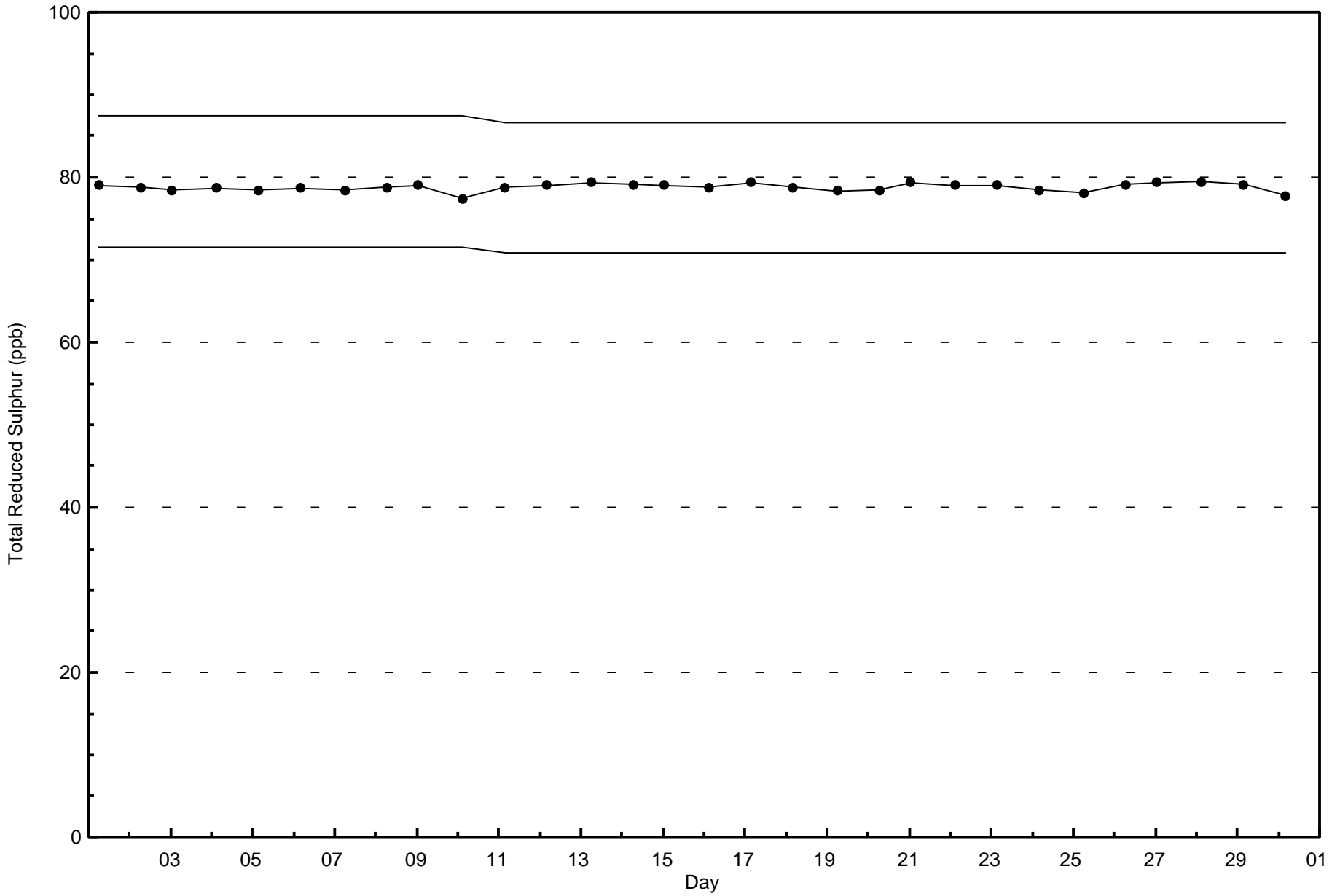
Total Number of Valid Hours: 686



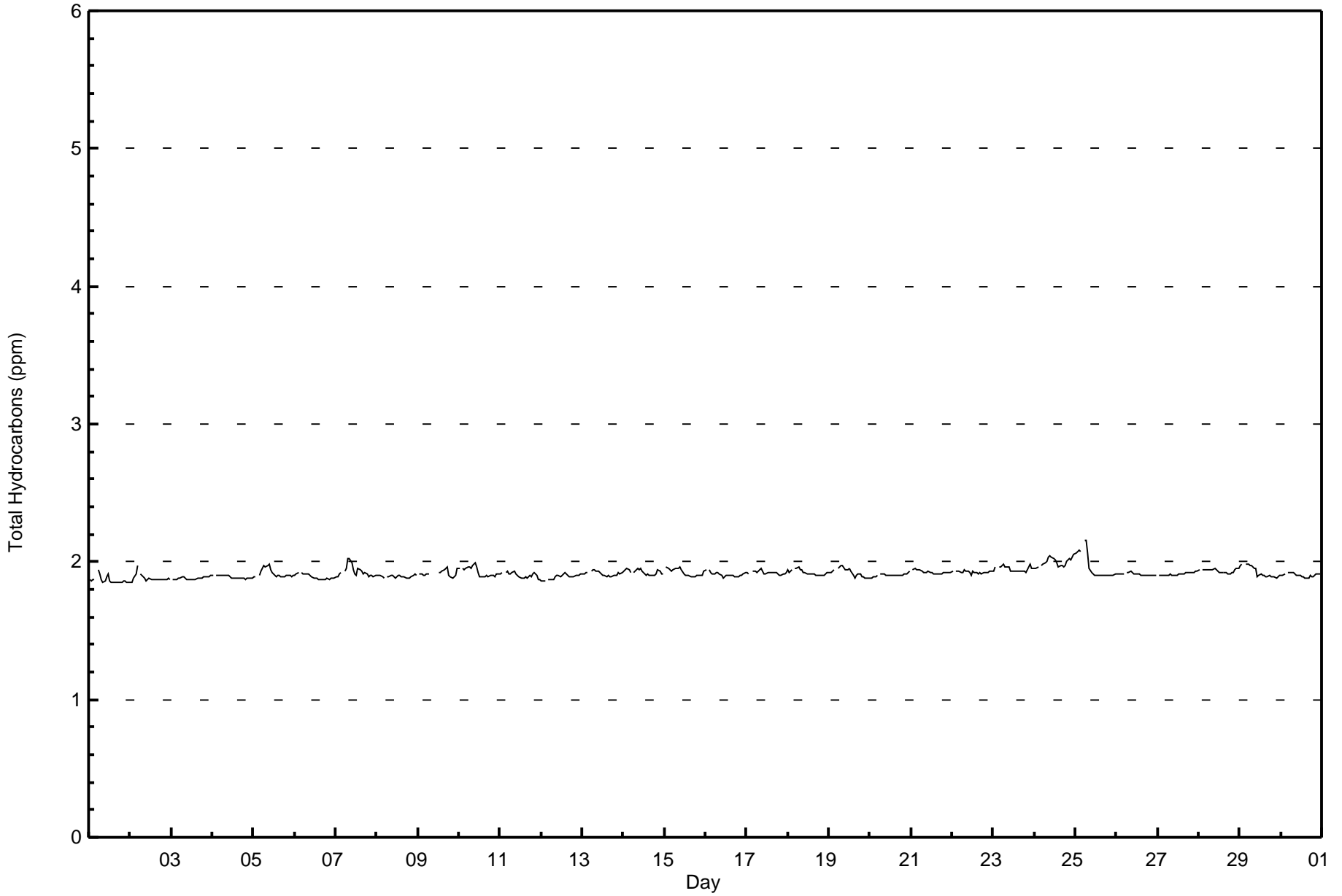
Wood Buffalo Environmental Association  
Zero Responses

Total Reduced Sulphur (TRS) - ppb  
Conklin Lookout - September 2015











**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Conklin Lookout - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	677	98.83	98.83
2.1 - 3.0	8	1.17	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Conklin Lookout - September 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	16	49	32	33	20	18	15	22	15	57	134	58	70	87	38	13	677
2.1 - 3.0	0	0	0	0	0	0	0	2	3	0	0	2	0	1	0	0	8
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	16	49	32	33	20	18	15	24	18	57	134	60	70	88	38	13	685

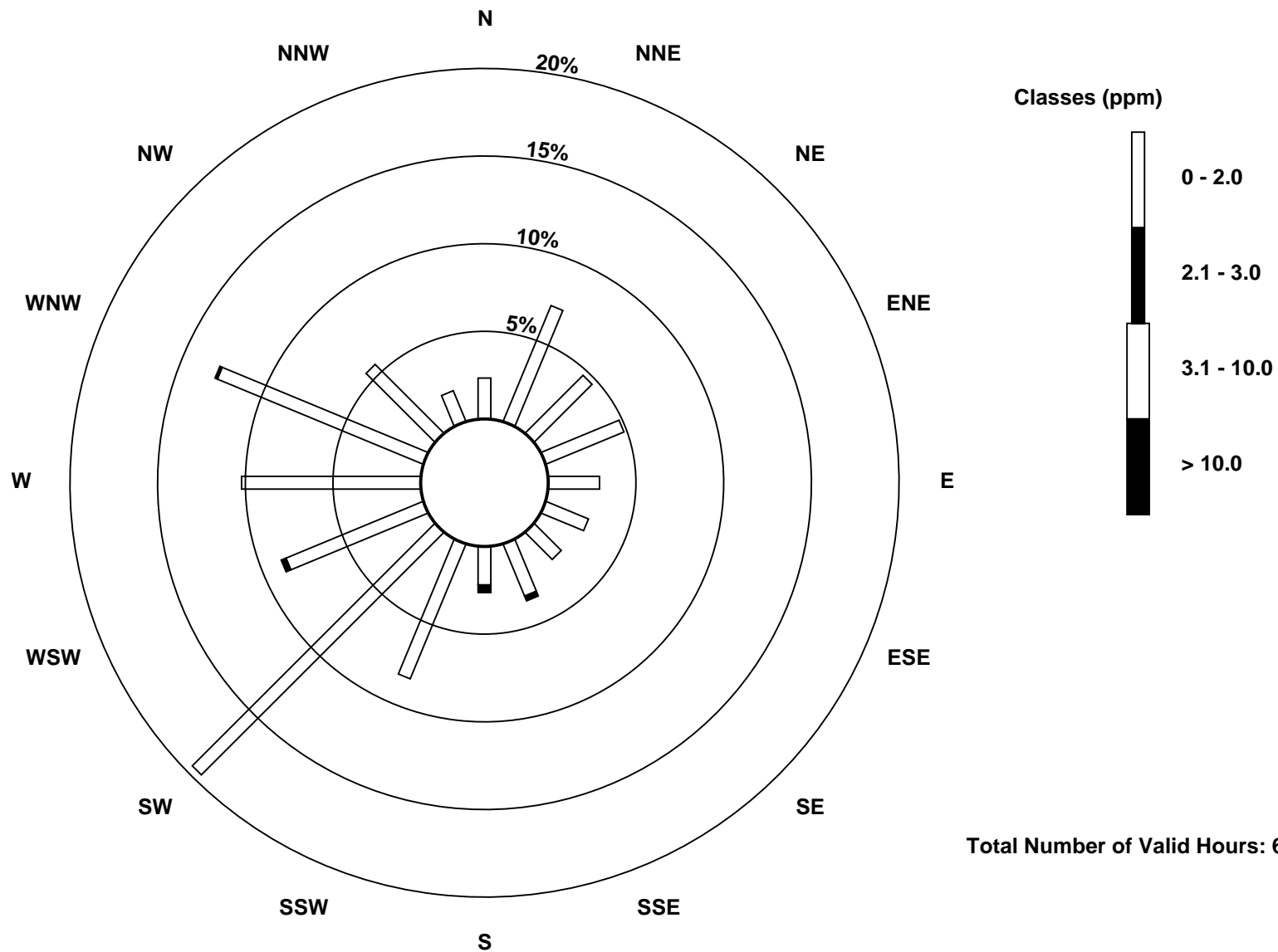
Total Number of Valid Hours: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Total Hydrocarbons (THC) - ppm  
Conklin Lookout (AMS 18)

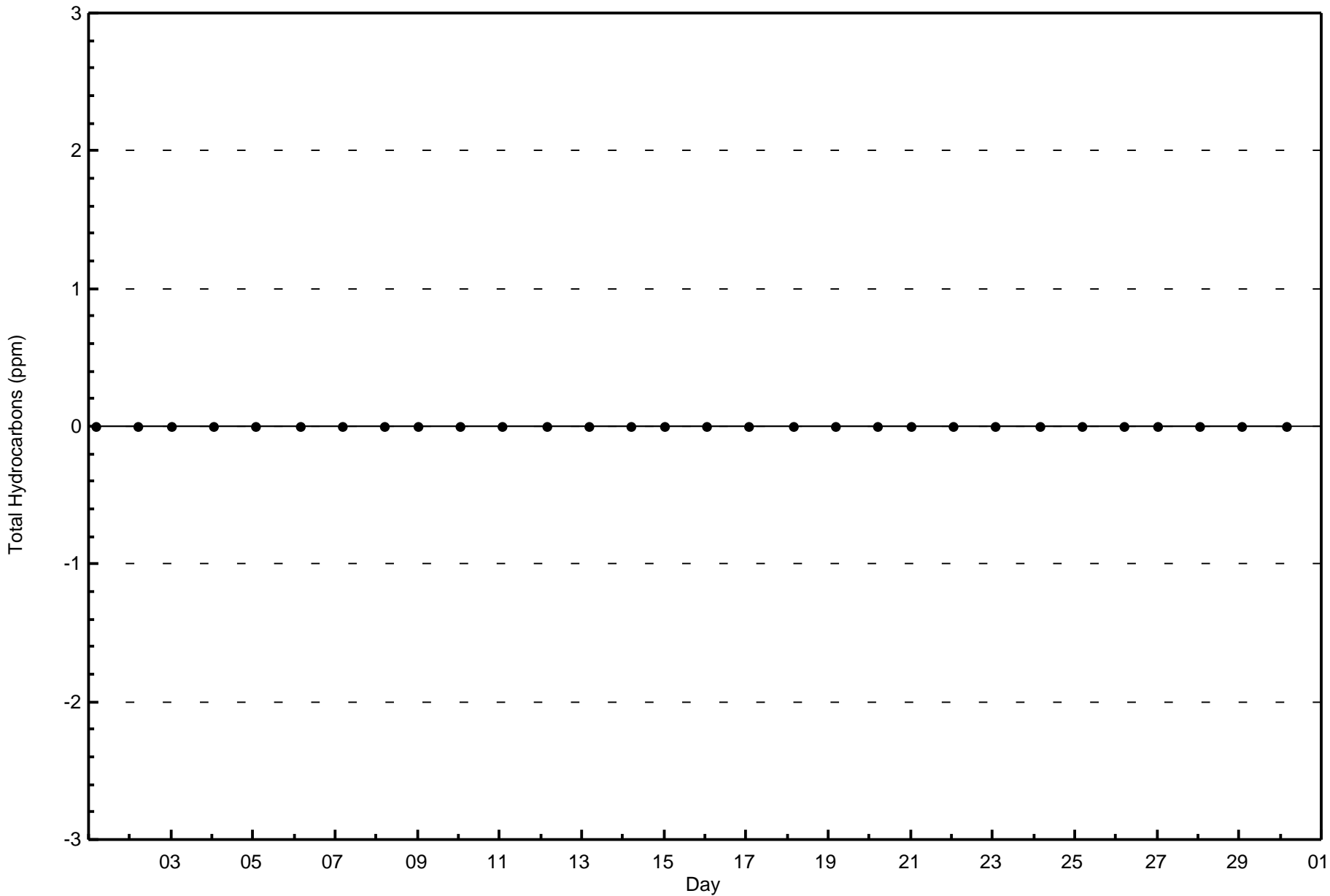


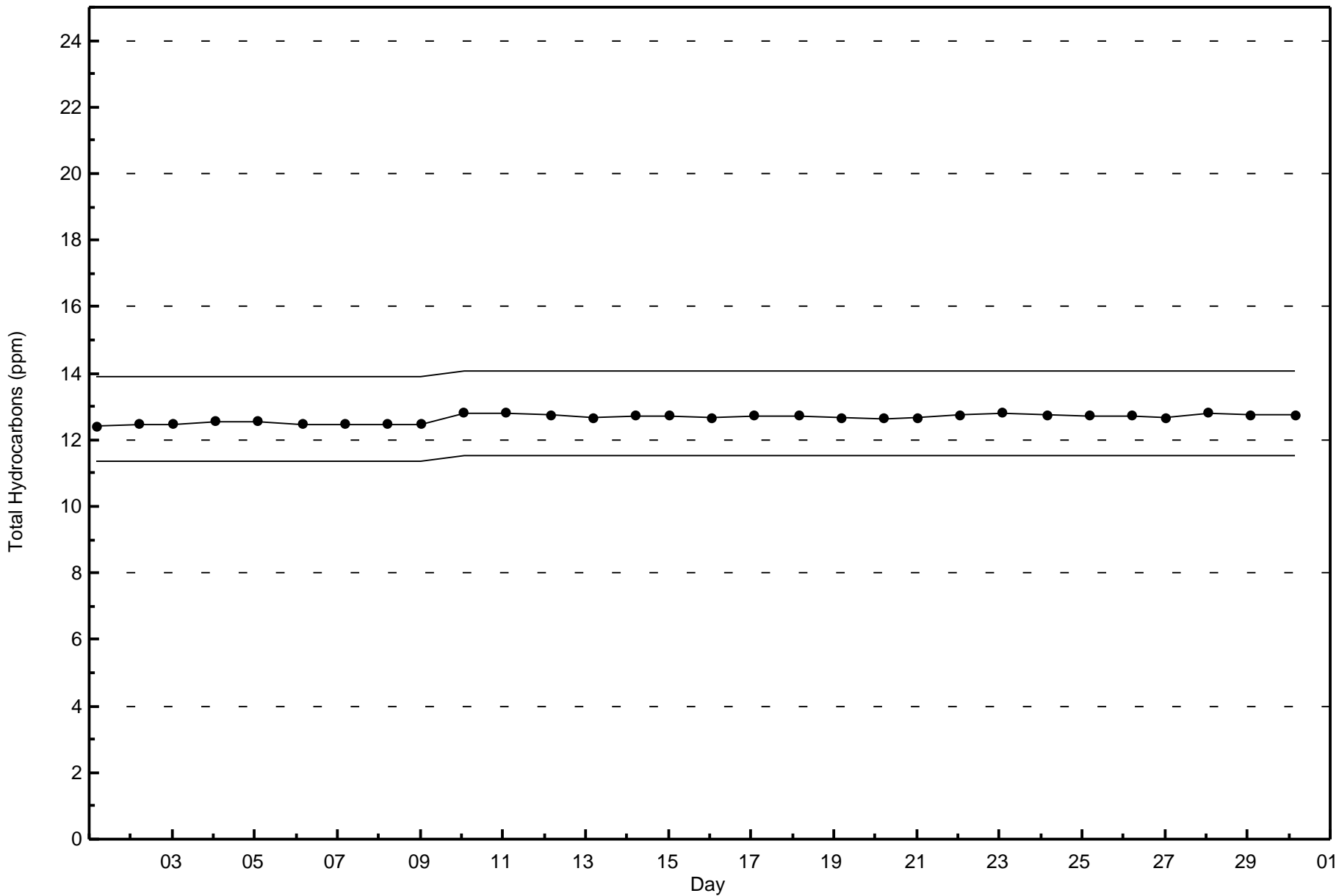




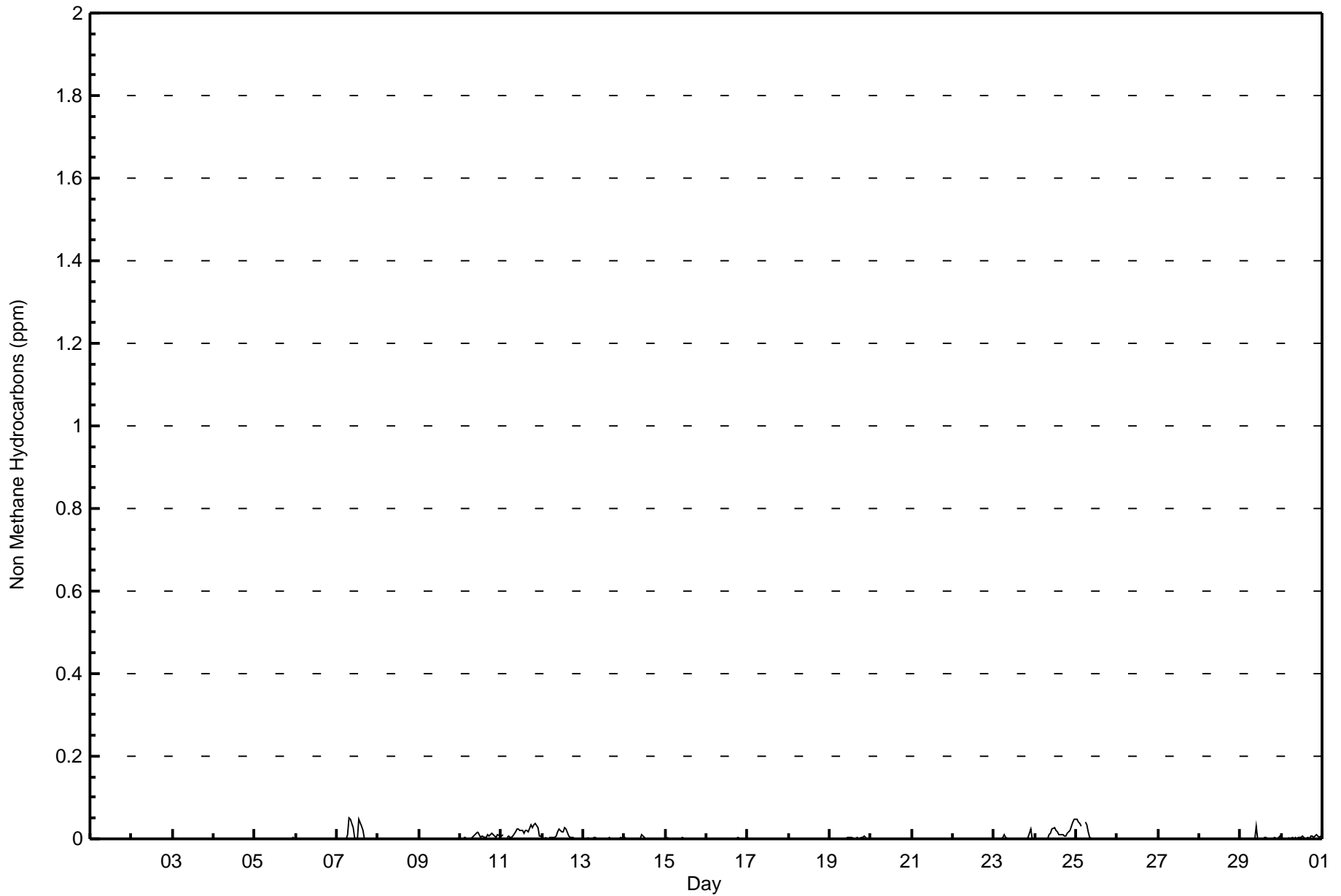
Wood Buffalo Environmental Association  
Zero Responses

Total Hydrocarbons (THC) - ppm  
Conklin Lookout - September 2015











**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Conklin Lookout - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	607	88.61	88.61
0.006 - 0.05	78	11.39	100.00
0.06 - 0.1	0	0.00	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



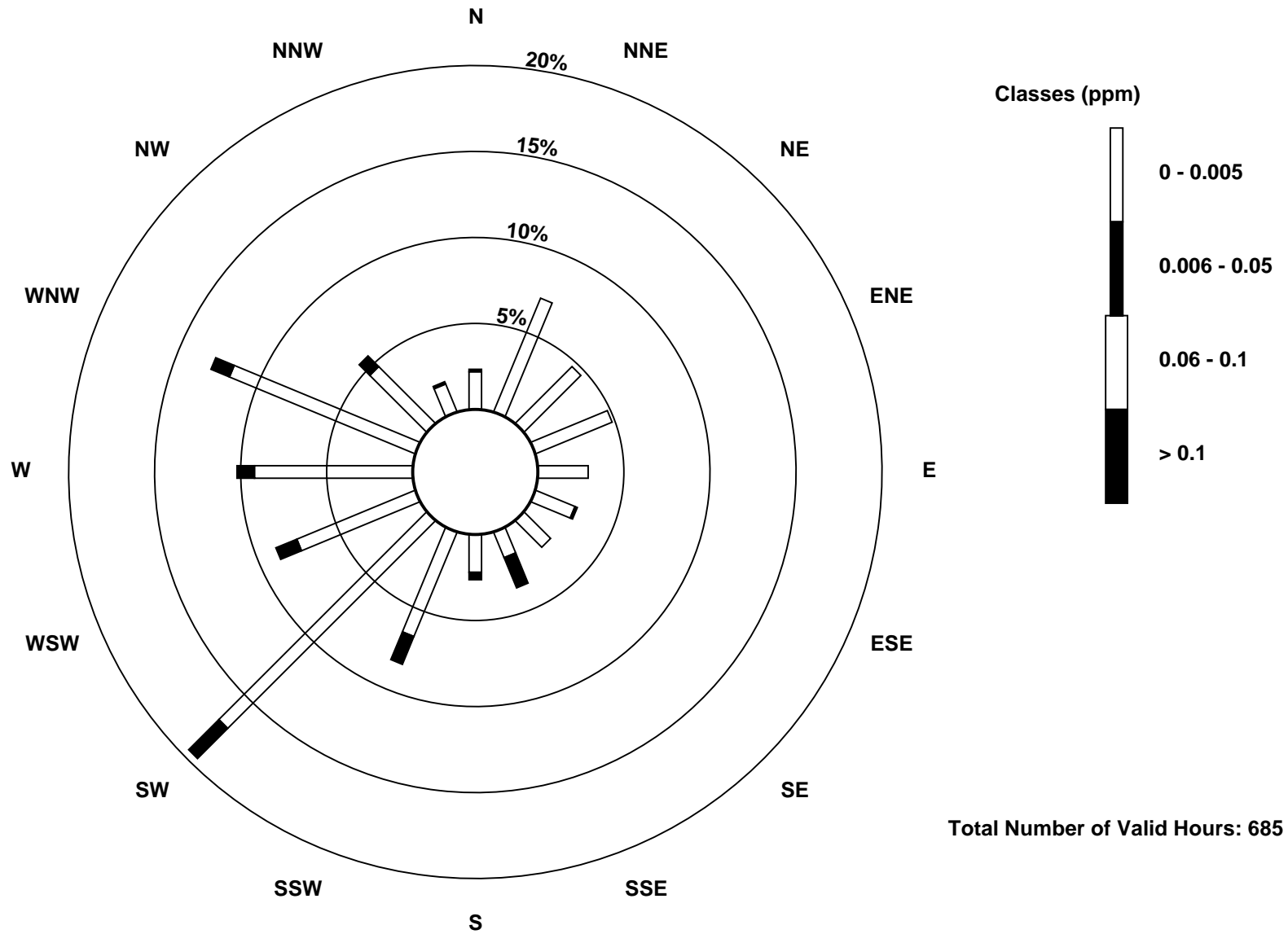
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Conklin Lookout - September 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	15	49	32	33	20	17	15	11	15	45	117	51	63	80	32	12	607
0.006 - 0.05	1	0	0	0	0	1	0	13	3	12	17	9	7	8	6	1	78
0.06 - 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	16	49	32	33	20	18	15	24	18	57	134	60	70	88	38	13	685

Total Number of Valid Hours: 685

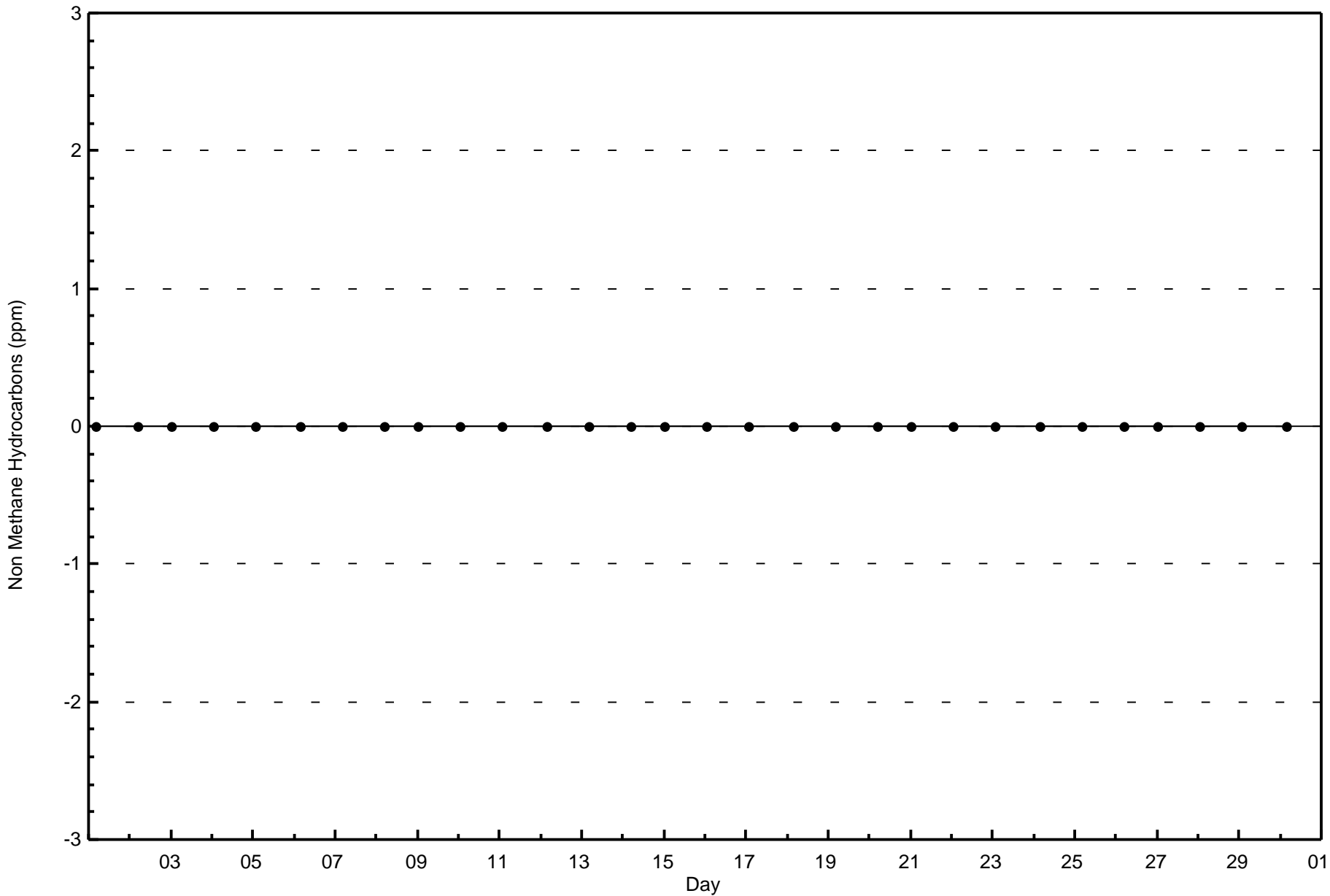
Total Number of Hours: 720



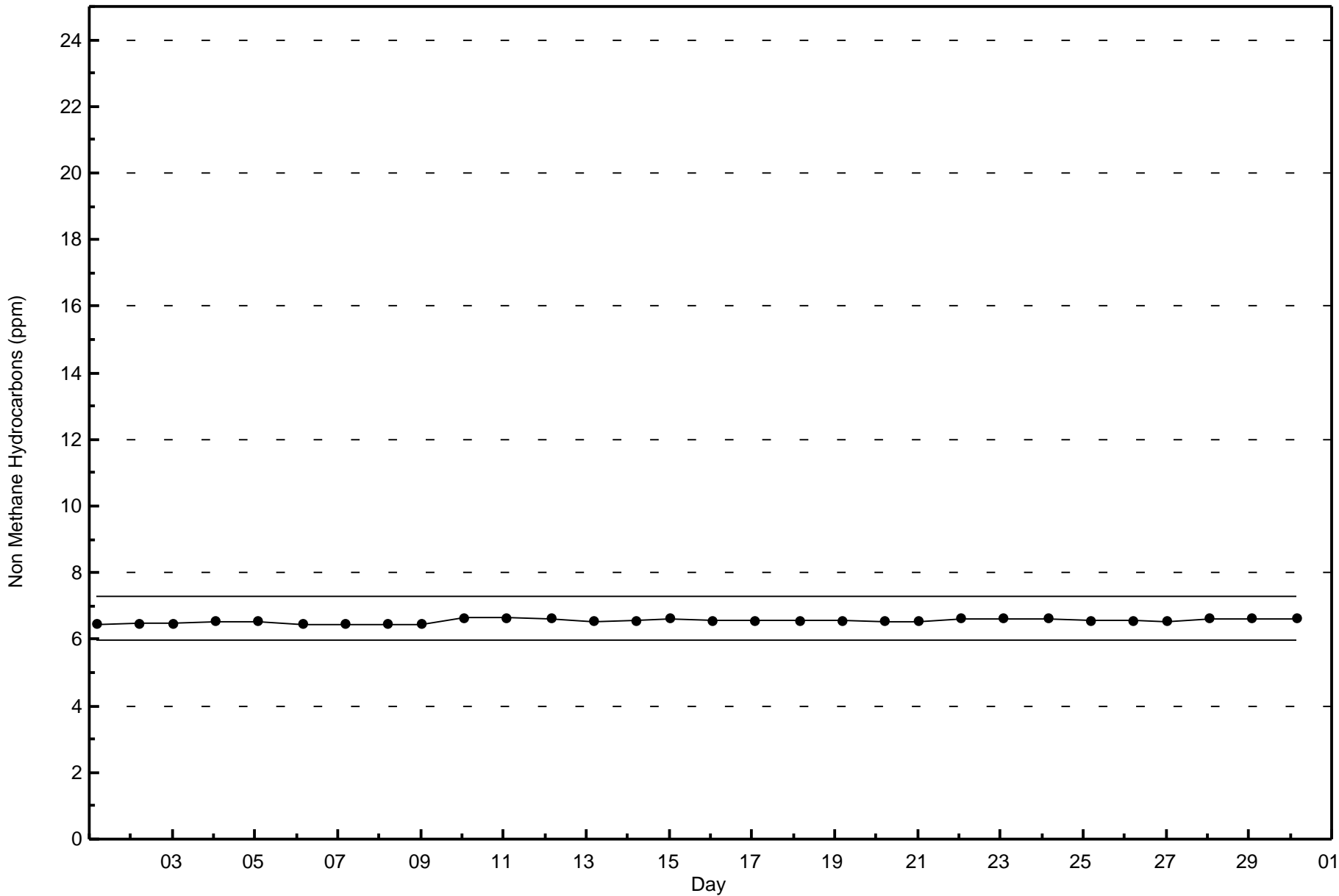


Wood Buffalo Environmental Association  
Zero Responses

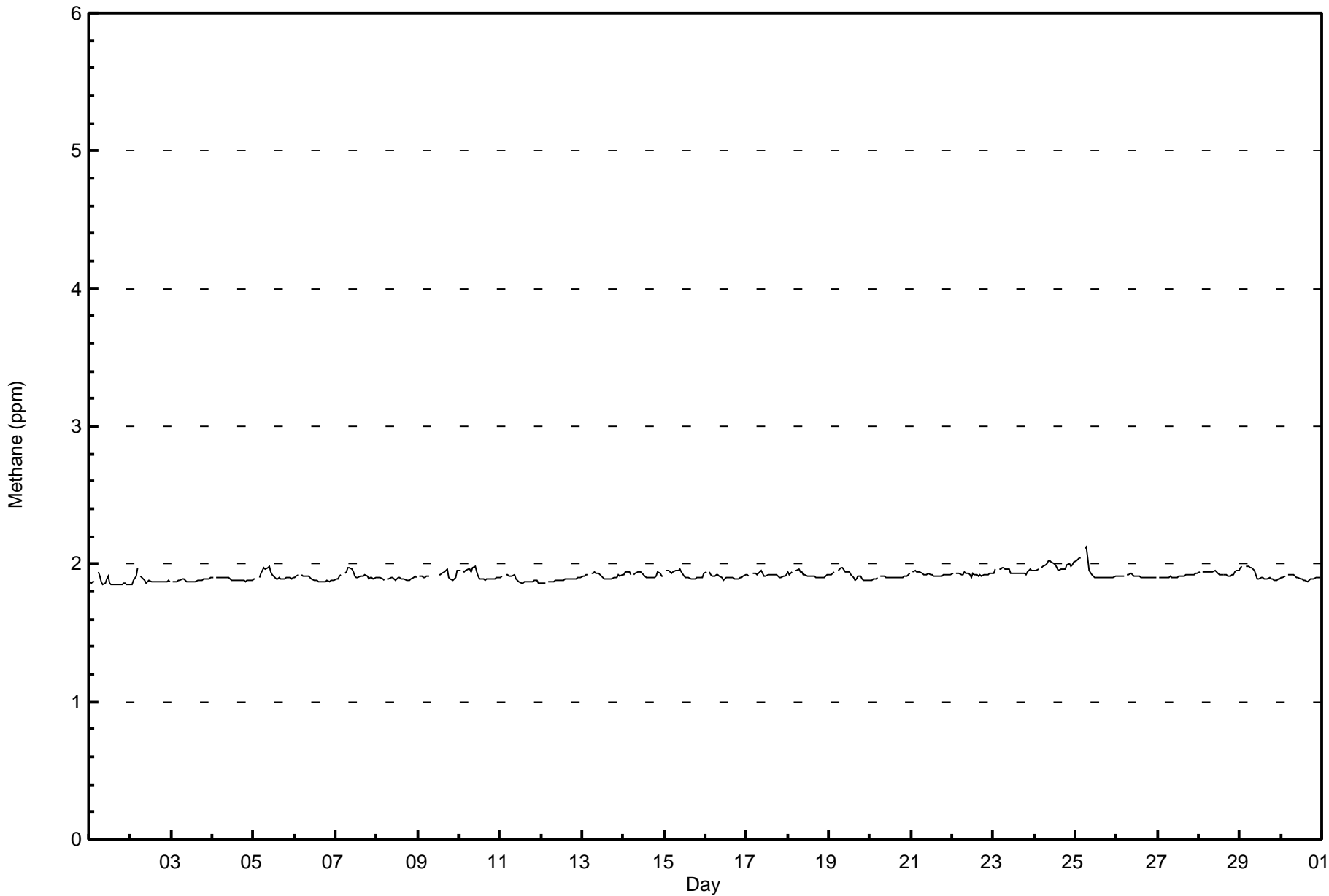
Non Methane Hydrocarbons (NMHC) - ppm  
Conklin Lookout - September 2015













**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Conklin Lookout - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	683	99.71	99.71
2.1 - 3.0	2	0.29	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Conklin Lookout - September 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	16	49	32	33	20	18	15	24	18	57	134	58	70	88	38	13	683
2.1 - 3.0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
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>	16	49	32	33	20	18	15	24	18	57	134	60	70	88	38	13	685

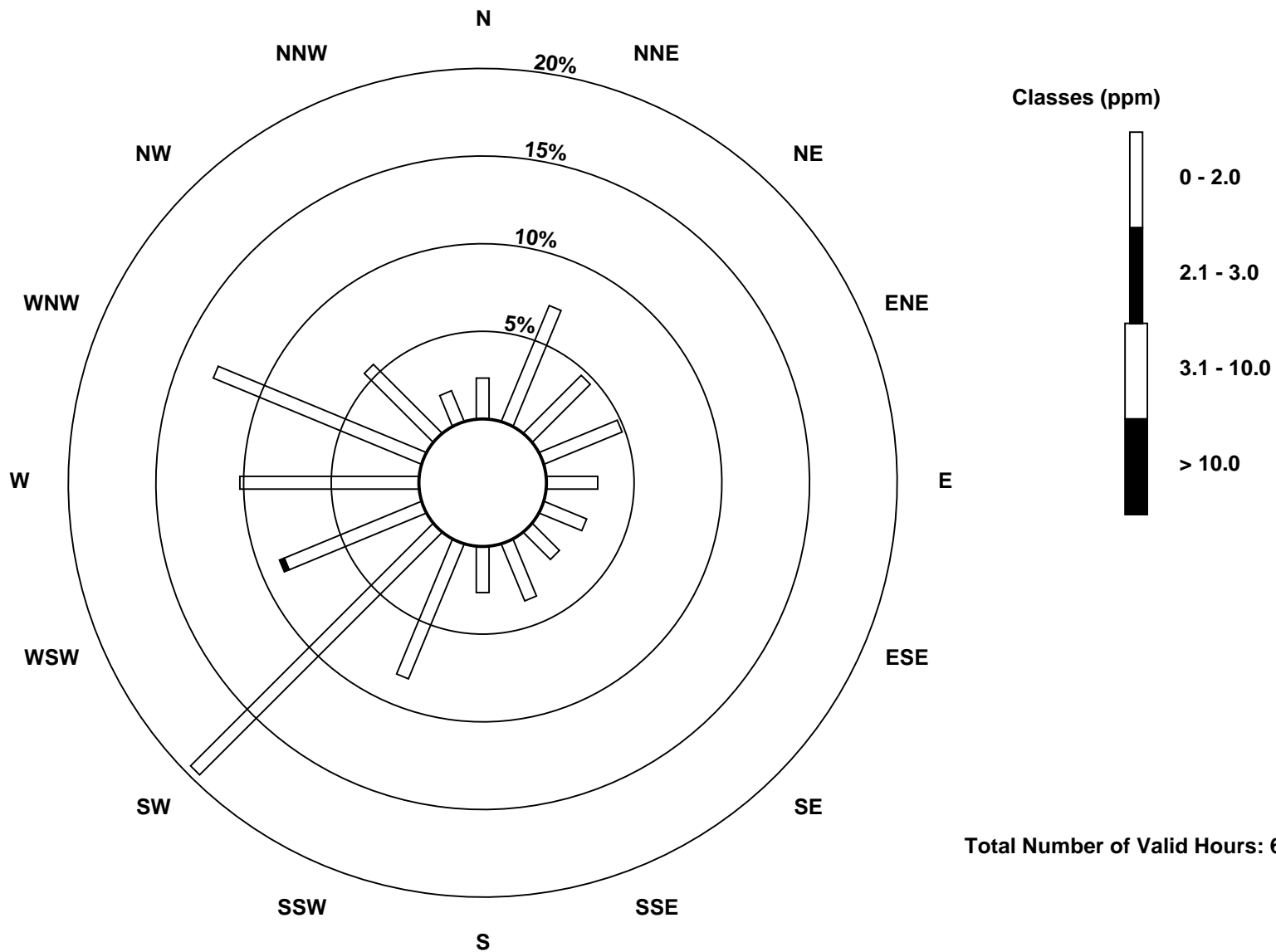
Total Number of Valid Hours: 685

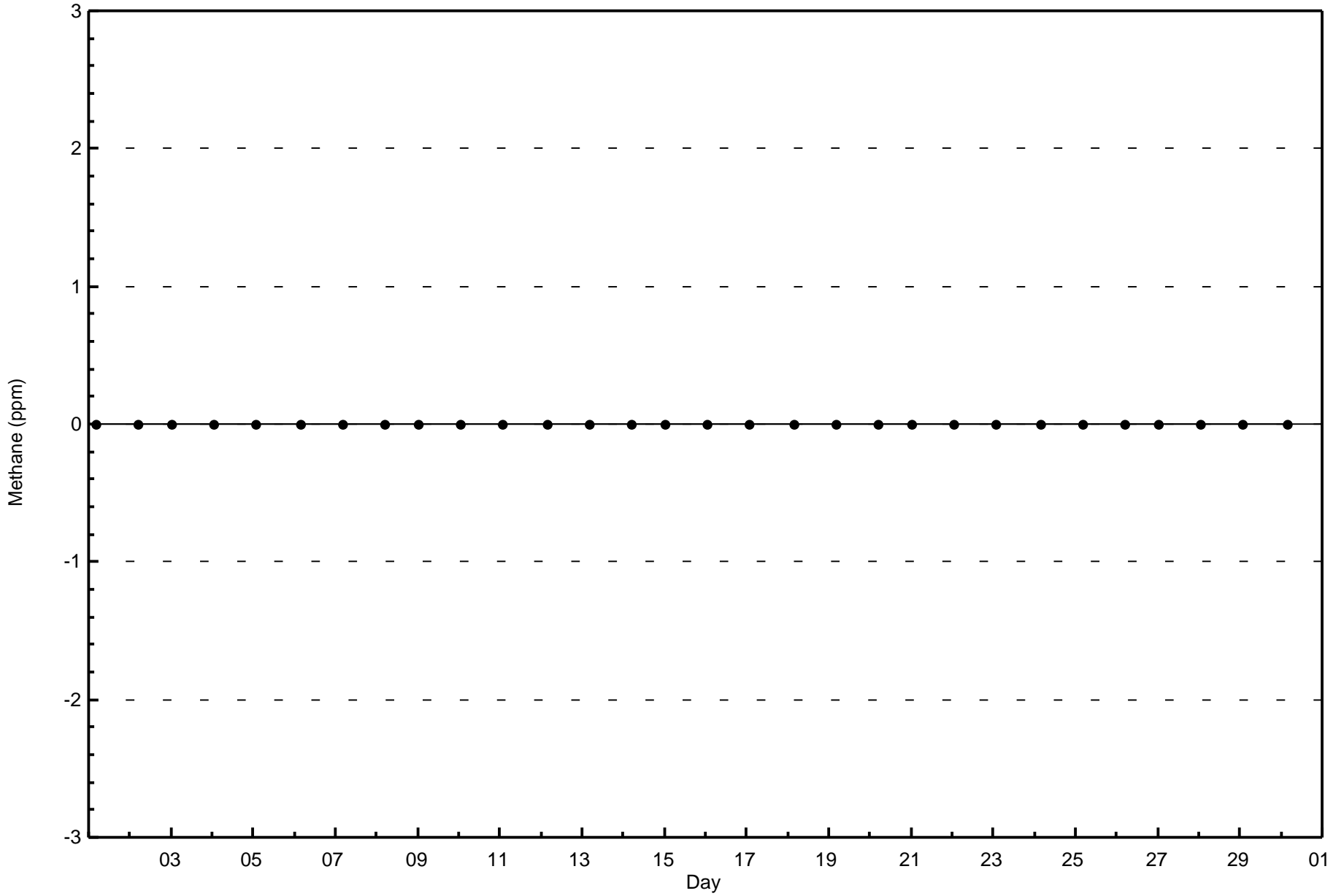
Total Number of Hours: 720

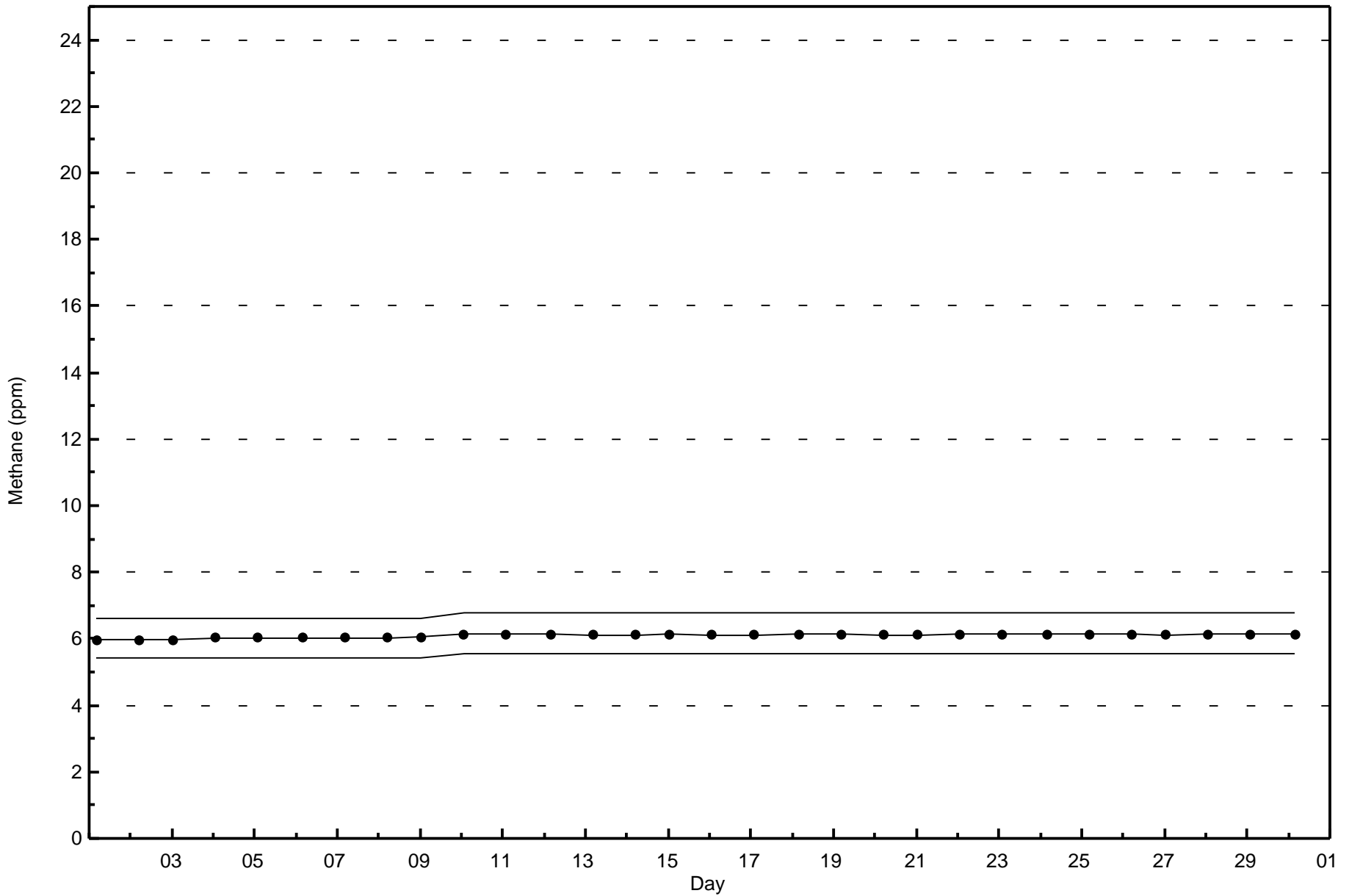


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Methane (CH<sub>4</sub>) - ppm  
Conklin Lookout (AMS 18)











Maximum Value: 1 ppb on Sep 7 09:00																	Maximum Daily Average: 0.3 ppb on Sep 7																	Hours in Service: 720																
Minimum Value: 0 ppb on Sep 1 01:00																	Minimum Daily Average: 0.0 ppb on Sep 20																	Hours of Data: 685																
Maximum Diurnal Average: 0.3 ppb at hour 10																	Minimum Diurnal Average: 0.0 ppb at hour 1																	Hours of Missing Data: 35																
Monthly Average: 0.1 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 O <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1																	Hours of Calibration: 35																
																																		Percent Operational Time: 100.0																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Sep	0	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																							
2-Sep	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																							
3-Sep	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																							
4-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
5-Sep	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
6-Sep	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																							
7-Sep	0	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1																							
8-Sep	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	0.1	1																							
9-Sep	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
10-Sep	0	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																							
11-Sep	0	0	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																							
12-Sep	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																							
13-Sep	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
14-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
15-Sep	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
16-Sep	0	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																							
17-Sep	0	0	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																							
18-Sep	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																							
19-Sep	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
20-Sep	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																							
21-Sep	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																							
22-Sep	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
23-Sep	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	0.1	1																							
24-Sep	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
25-Sep	0	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																							
26-Sep	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																							
27-Sep	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																							
28-Sep	0	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																							
29-Sep	0	0	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																							
30-Sep	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	0.1	0.2	0.3	0.2	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	Diurnal Average
																								0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum
Z - zerospan C - Calibration																																																		

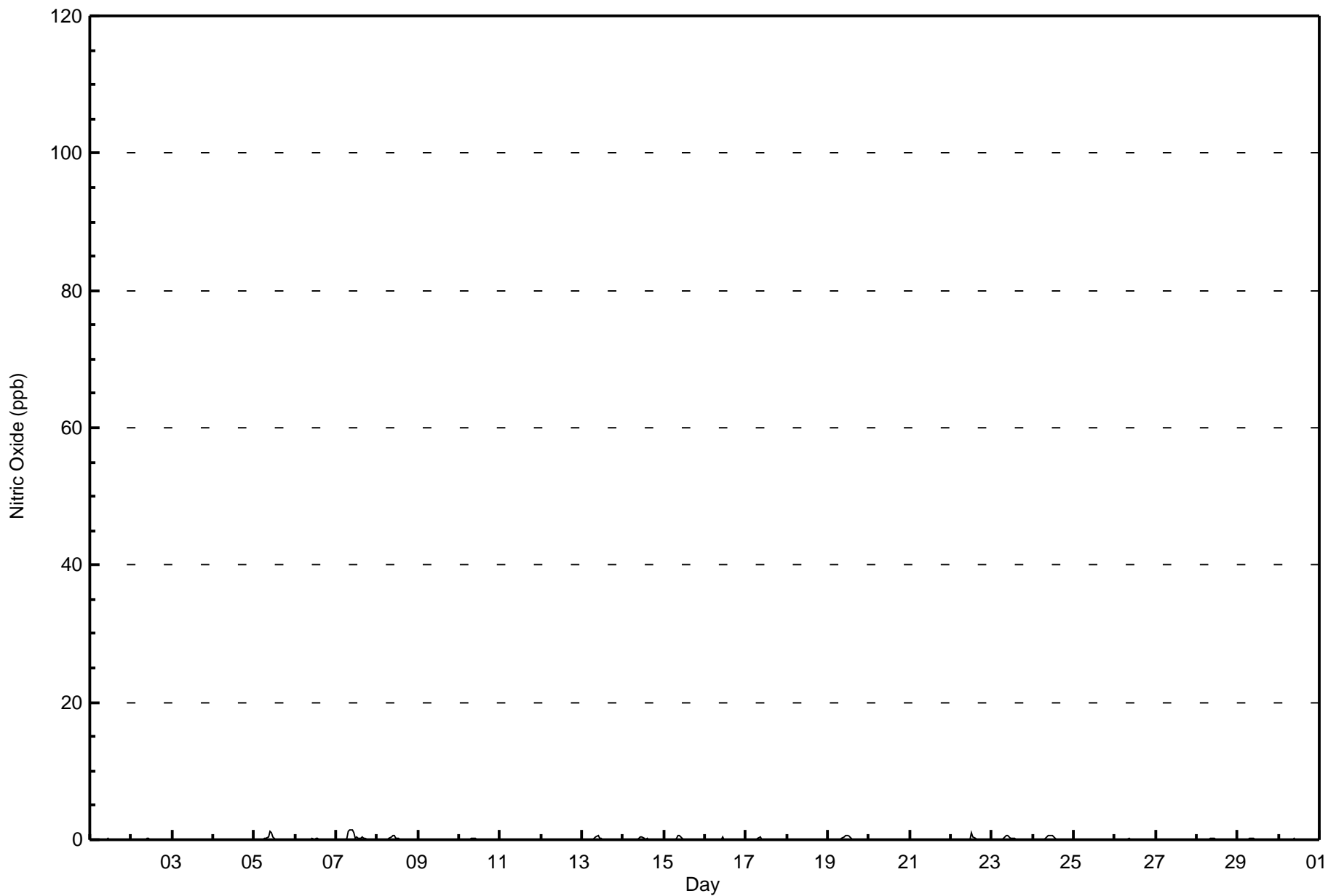


Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Conklin Lookout - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Conklin Lookout - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	685	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: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Conklin Lookout - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	49	32	33	20	18	15	24	18	57	134	60	70	88	38	13	685
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>	16	49	32	33	20	18	15	24	18	57	134	60	70	88	38	13	685

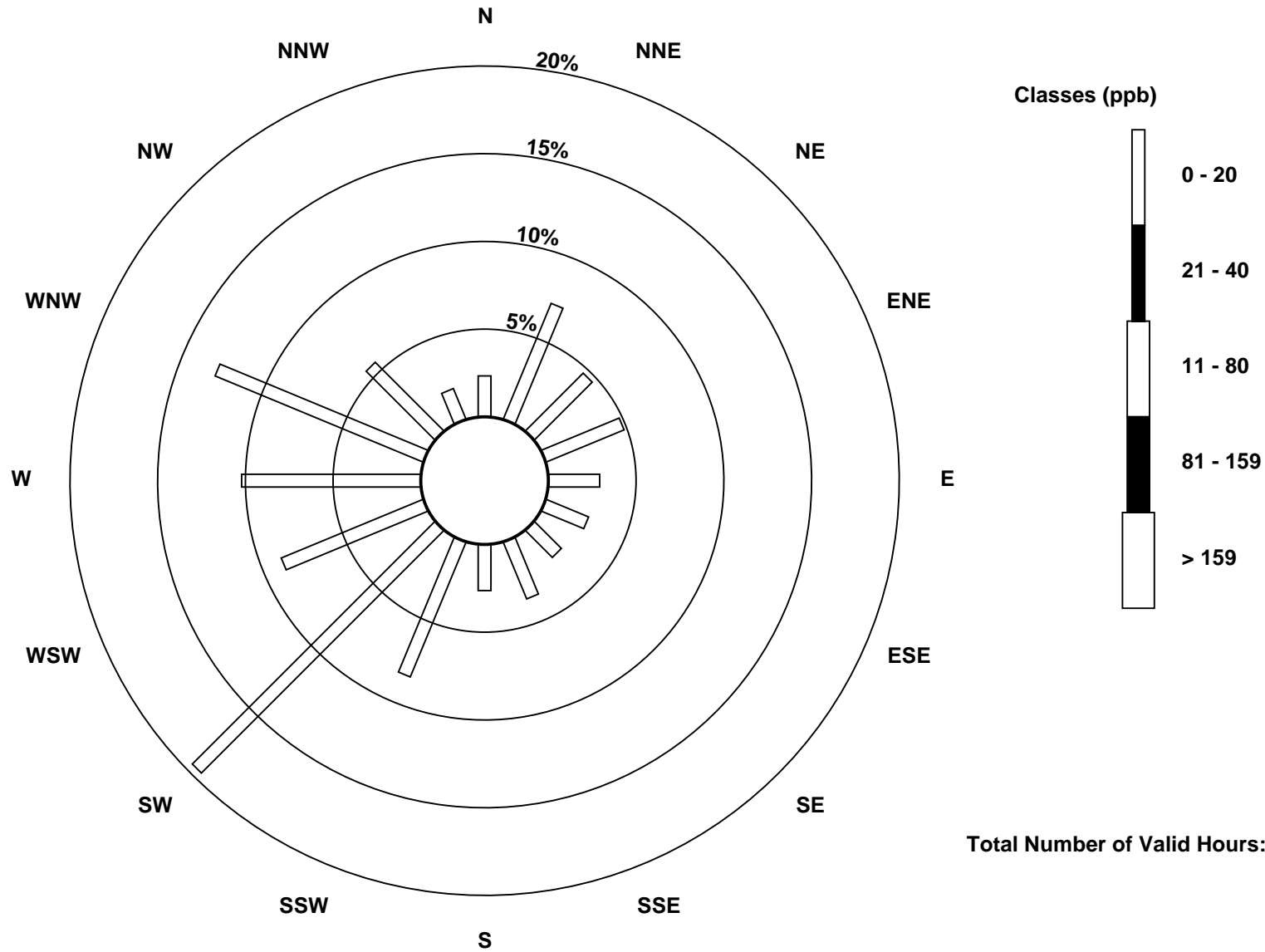
Total Number of Valid Hours: 685

Total Number of Hours: 720

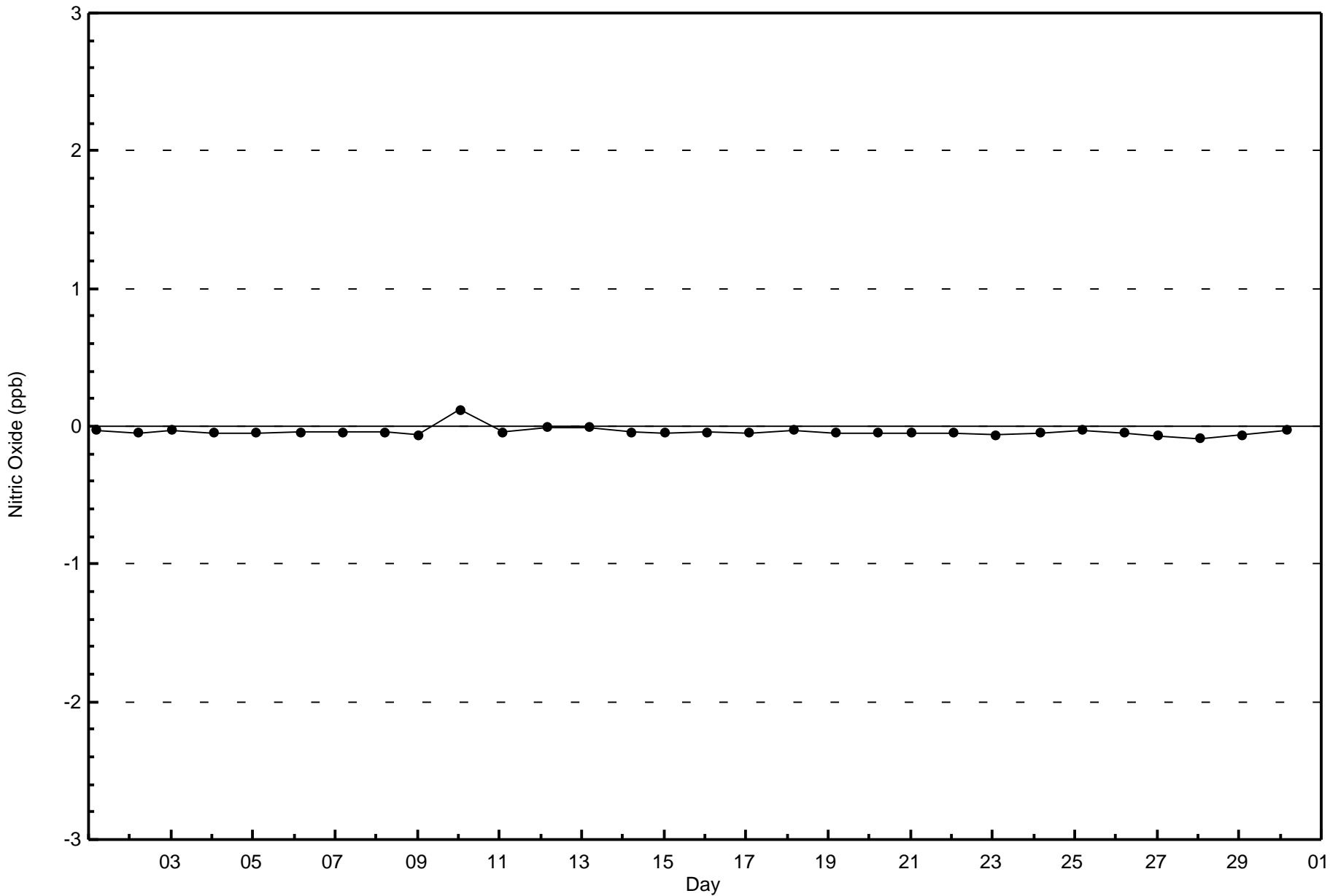


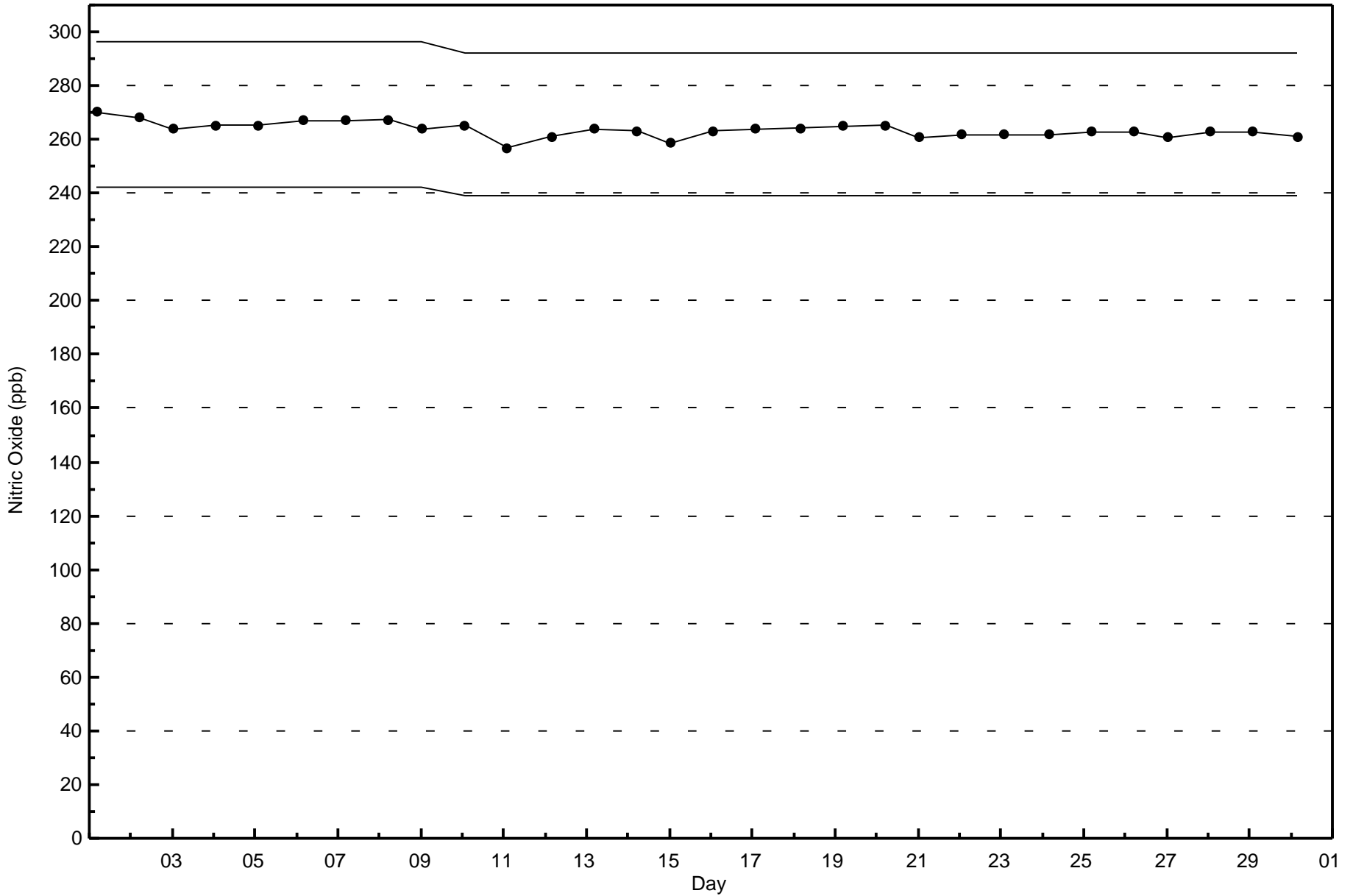
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitric Oxide (NO) - ppb  
Conklin Lookout (AMS 18)



Total Number of Valid Hours: 685







Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4 ppb on Sep 7 08:00	Maximum Daily Average: 1.7 ppb on Sep 24		Hours of Data:	685
Minimum Value: 0 ppb on Sep 3 10:00	Minimum Daily Average: 0.2 ppb on Sep 21		Hours of Missing Data:	35
Maximum Diurnal Average: 1.0 ppb at hour 6	Minimum Diurnal Average: 0.4 ppb at hour 15		Hours of Calibration:	35
Monthly Average: 0.7 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 O <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 3		Percent Operational Time:	100.0

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

0.7	0.8	0.8	1.0	0.8	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.6	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.7	0.7	Diurnal Average	
3	2	2	3	2	3	3	4	3	3	2	2	2	2	1	2	2	2	2	2	2	2	2	3	Diurnal Maximum	

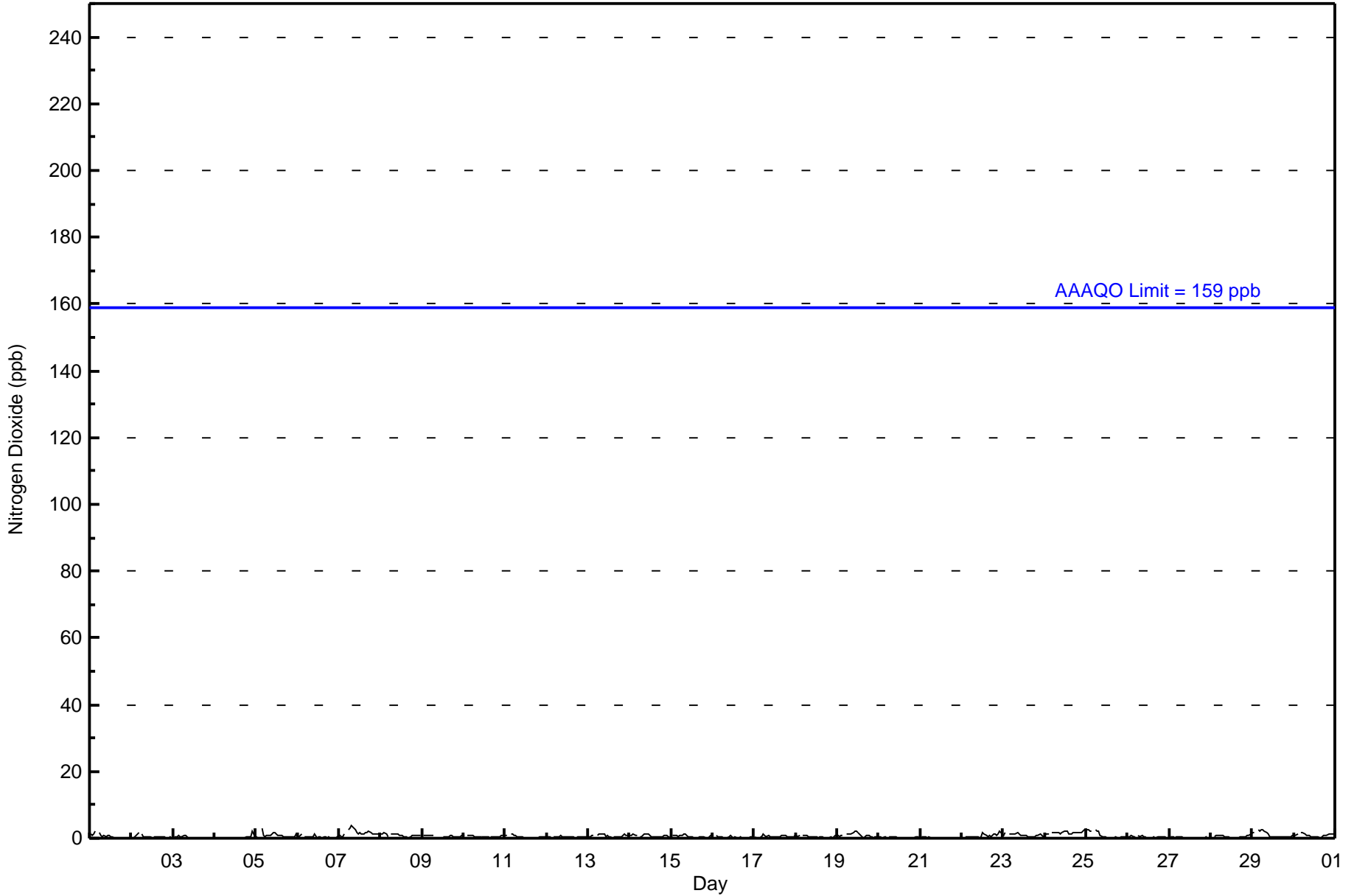
Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb





Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Conklin Lookout - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Conklin Lookout - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	685	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: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Conklin Lookout - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	49	32	33	20	18	15	24	18	57	134	60	70	88	38	13	685
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>	16	49	32	33	20	18	15	24	18	57	134	60	70	88	38	13	685

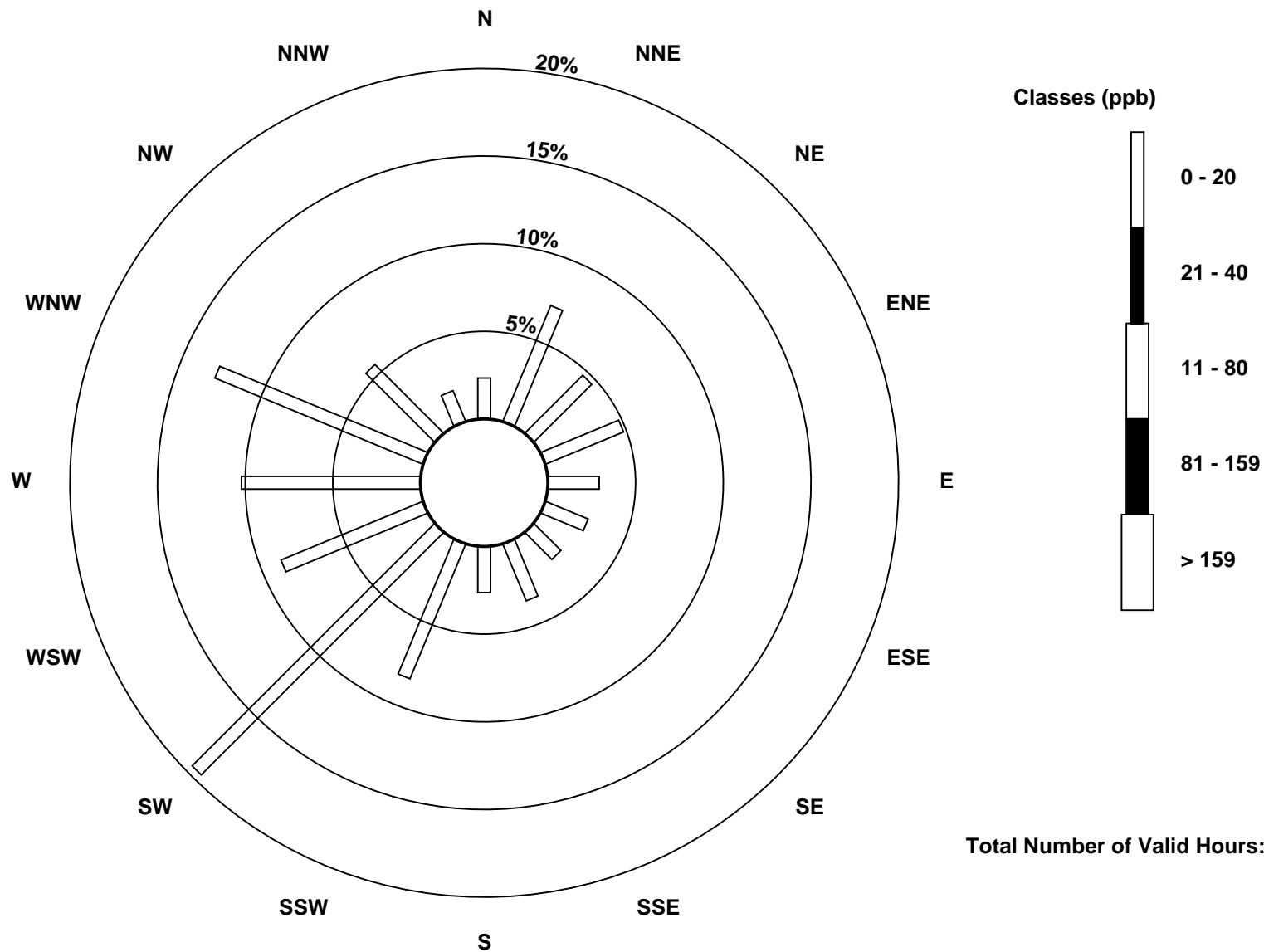
Total Number of Valid Hours: 685

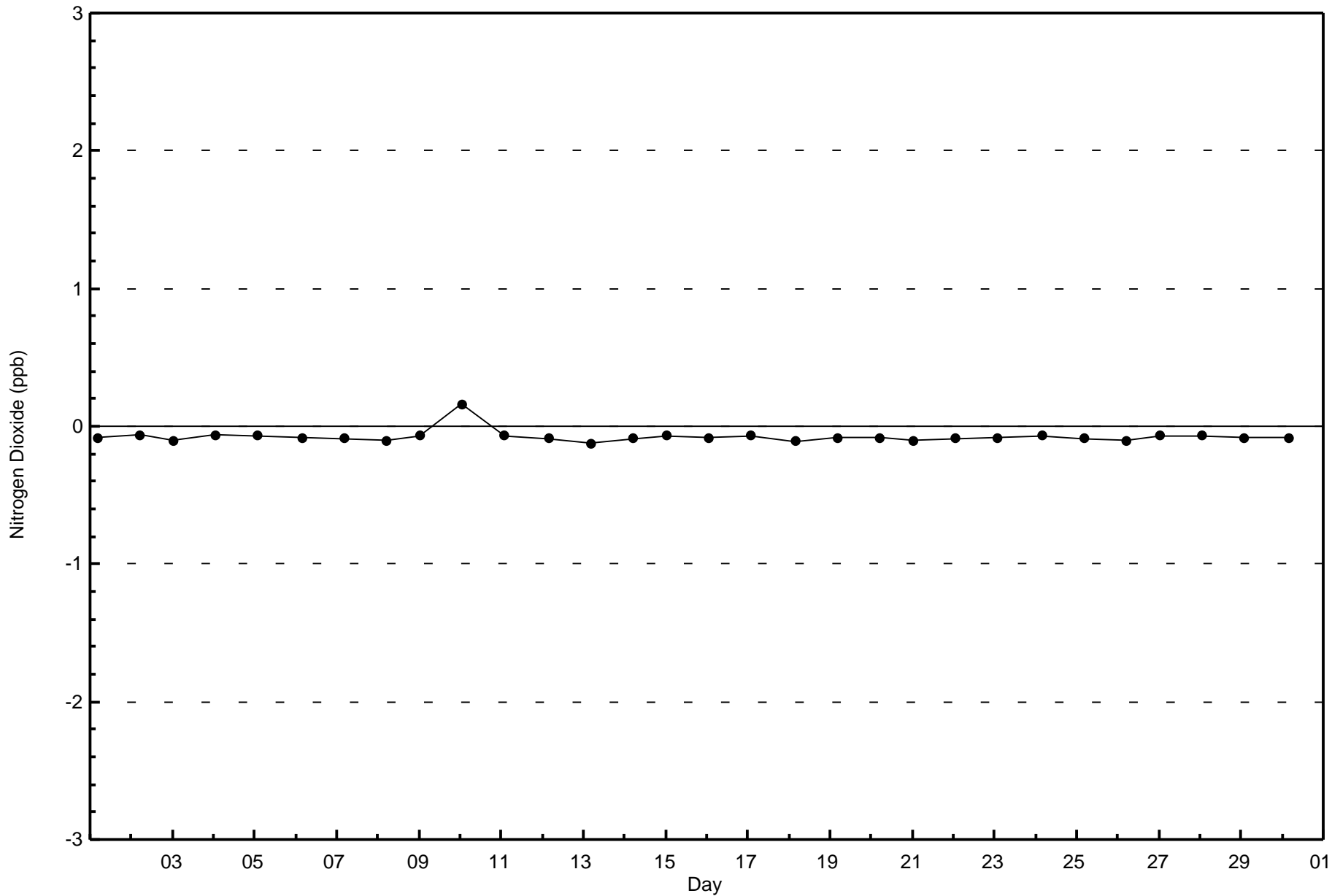
Total Number of Hours: 720

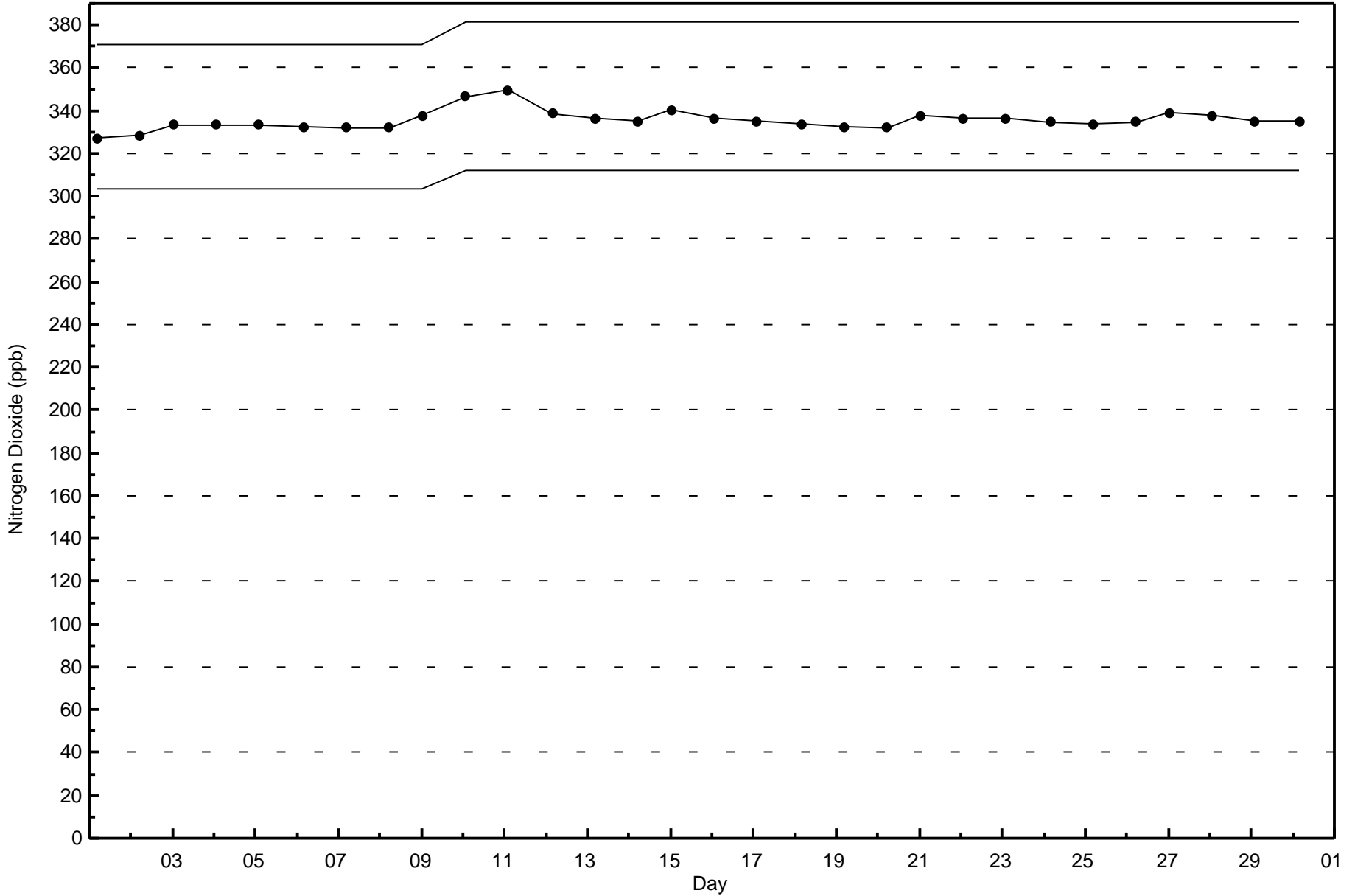


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Conklin Lookout (AMS 18)









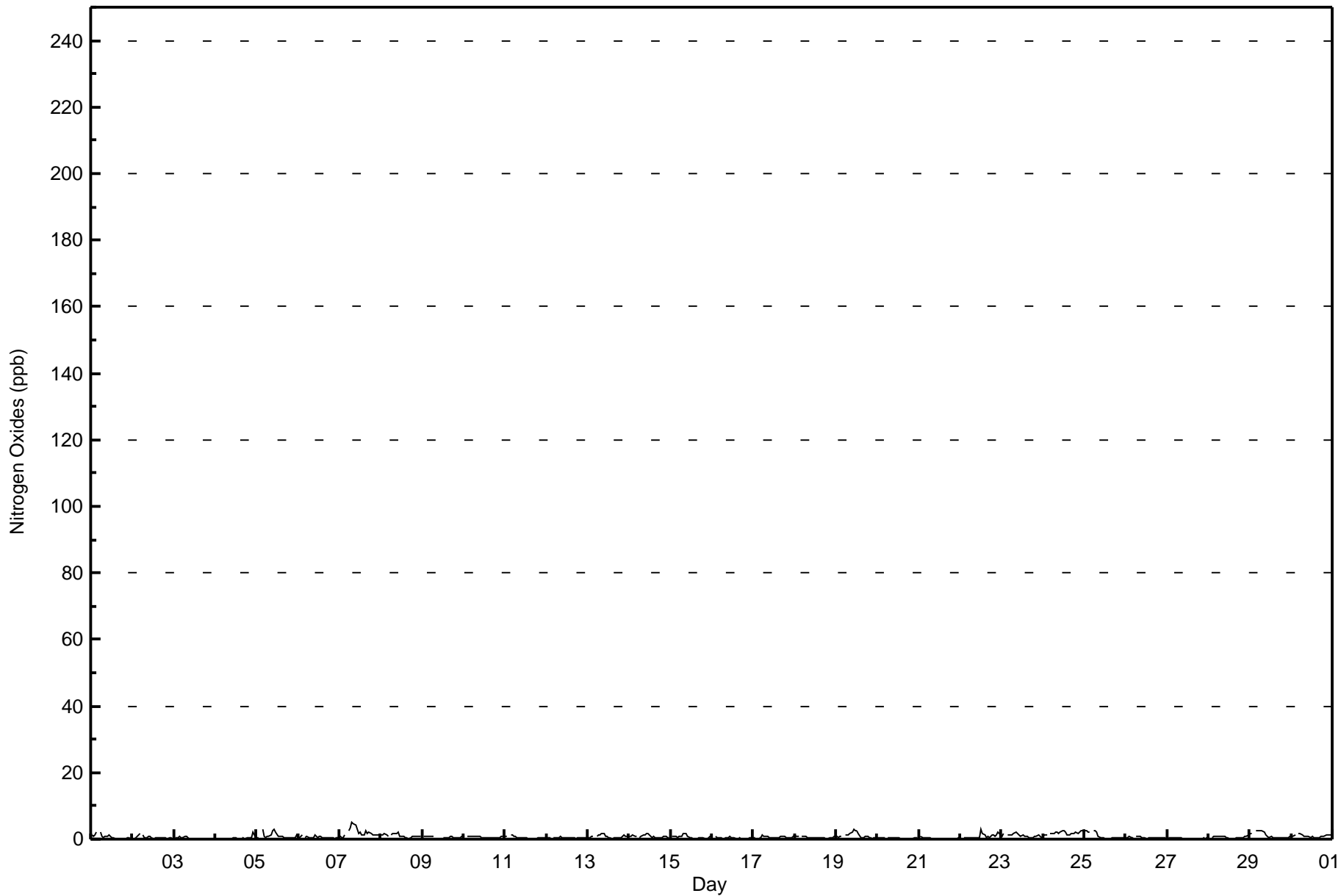
Maximum Value: 5 ppb on Sep 7 08:00																	Maximum Daily Average: 2.0 ppb on Sep 7							Hours in Service: 720		
Minimum Value: 0 ppb on Sep 21 19:00																	Minimum Daily Average: 0.2 ppb on Sep 27							Hours of Data: 685		
Maximum Diurnal Average: 1.0 ppb at hour 9																	Minimum Diurnal Average: 0.4 ppb at hour 15							Hours of Missing Data: 35		
Monthly Average: 0.7 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 O <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 3							Hours of Calibration: 35		
																	Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	1	1	1	2	Z	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
2-Sep	0	0	1	1	2	Z	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
3-Sep	Z	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	1	0.3	2
5-Sep	0	0	Z	3	1	0	1	1	1	3	3	2	1	1	1	1	0	0	1	1	0	1	1	1	1.0	3
6-Sep	0	0	1	Z	1	1	0	1	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0.5	1
7-Sep	1	0	0	1	Z	3	3	5	5	4	3	2	2	1	1	2	2	2	2	1	1	1	1	1	2.0	5
8-Sep	1	1	2	1	1	Z	1	2	2	2	2	1	1	1	0	0	0	0	1	1	1	1	1	1	1.0	2
9-Sep	Z	1	1	1	1	1	1	C	C	C	C	C	0	0	0	1	1	1	1	0	0	0	0	1	0.6	1
10-Sep	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0.5	1
11-Sep	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Sep	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
13-Sep	0	0	1	1	Z	1	1	1	2	2	1	1	0	0	1	0	0	1	1	1	1	1	1	1	0.8	2
14-Sep	1	1	1	1	1	Z	0	1	1	1	2	2	1	1	1	1	1	1	0	0	1	1	0	0	0.8	2
15-Sep	Z	1	1	1	1	1	1	1	2	2	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0.6	2
16-Sep	1	Z	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
17-Sep	0	0	Z	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	0	0	0	1	0.6	1
18-Sep	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
19-Sep	1	1	1	1	Z	1	1	1	2	2	3	3	3	2	1	0	0	1	1	0	0	0	0	0	1.1	3
20-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
21-Sep	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
22-Sep	0	Z	0	1	1	0	0	1	0	0	0	0	3	2	1	0	1	1	1	1	1	1	2	1	0.9	3
23-Sep	1	2	Z	1	1	1	1	1	2	2	1	1	1	1	1	0	1	0	1	1	1	1	0	1	1.1	2
24-Sep	1	1	1	Z	2	2	2	2	2	2	3	3	2	1	1	2	2	2	1	2	2	2	3	3	1.8	3
25-Sep	3	2	2	2	Z	3	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1.0	3
26-Sep	0	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
27-Sep	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
28-Sep	0	Z	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.5	1
29-Sep	1	2	Z	3	2	2	2	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1.1	3
30-Sep	1	1	1	Z	2	2	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	0.9	2
																	Diurnal Average									
																	Diurnal Maximum									
Z - zerospan																	C - Calibration									



Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Conklin Lookout - September 2015







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Conklin Lookout - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	685	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: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Conklin Lookout - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	49	32	33	20	18	15	24	18	57	134	60	70	88	38	13	685
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>	16	49	32	33	20	18	15	24	18	57	134	60	70	88	38	13	685

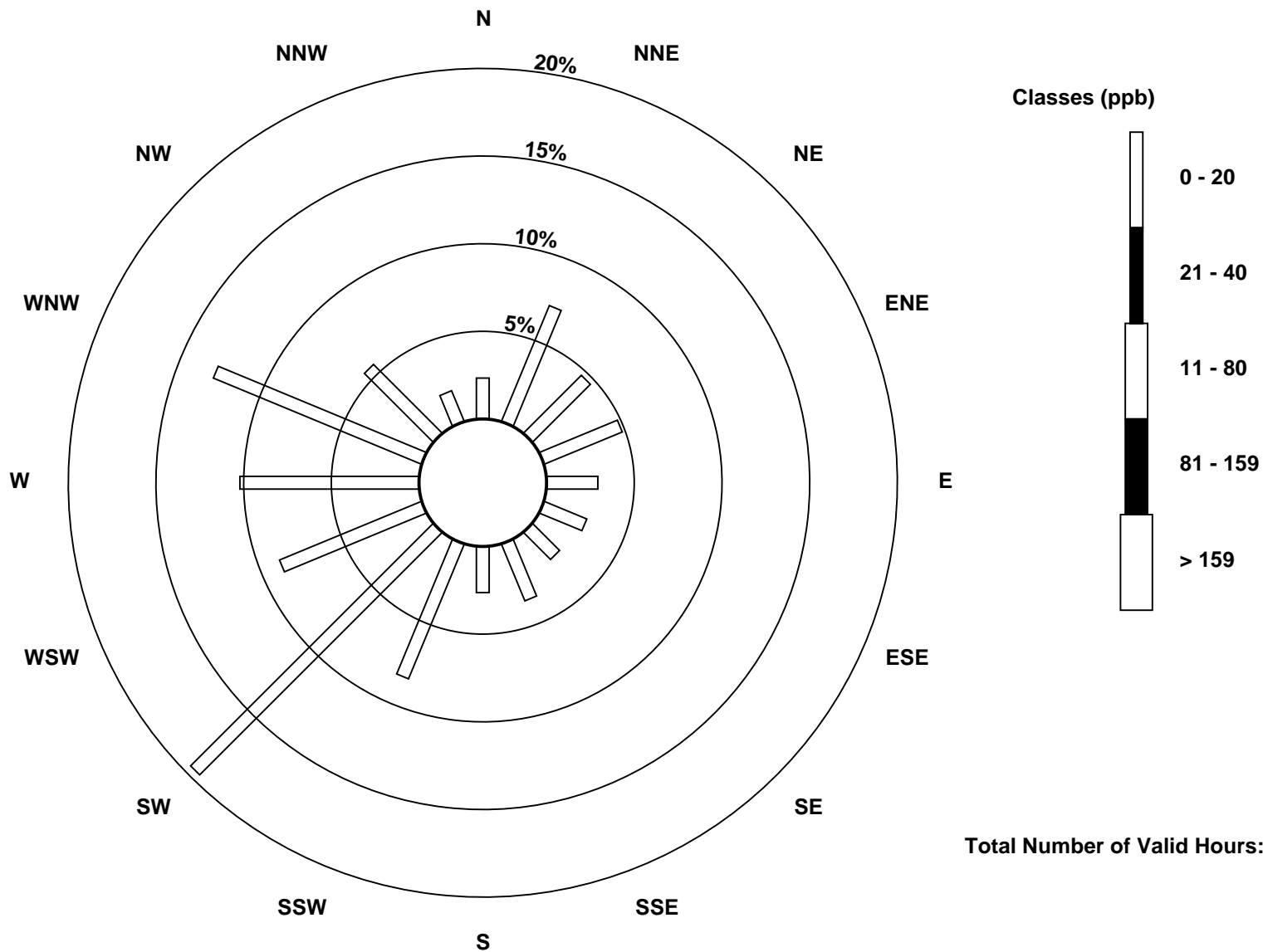
Total Number of Valid Hours: 685

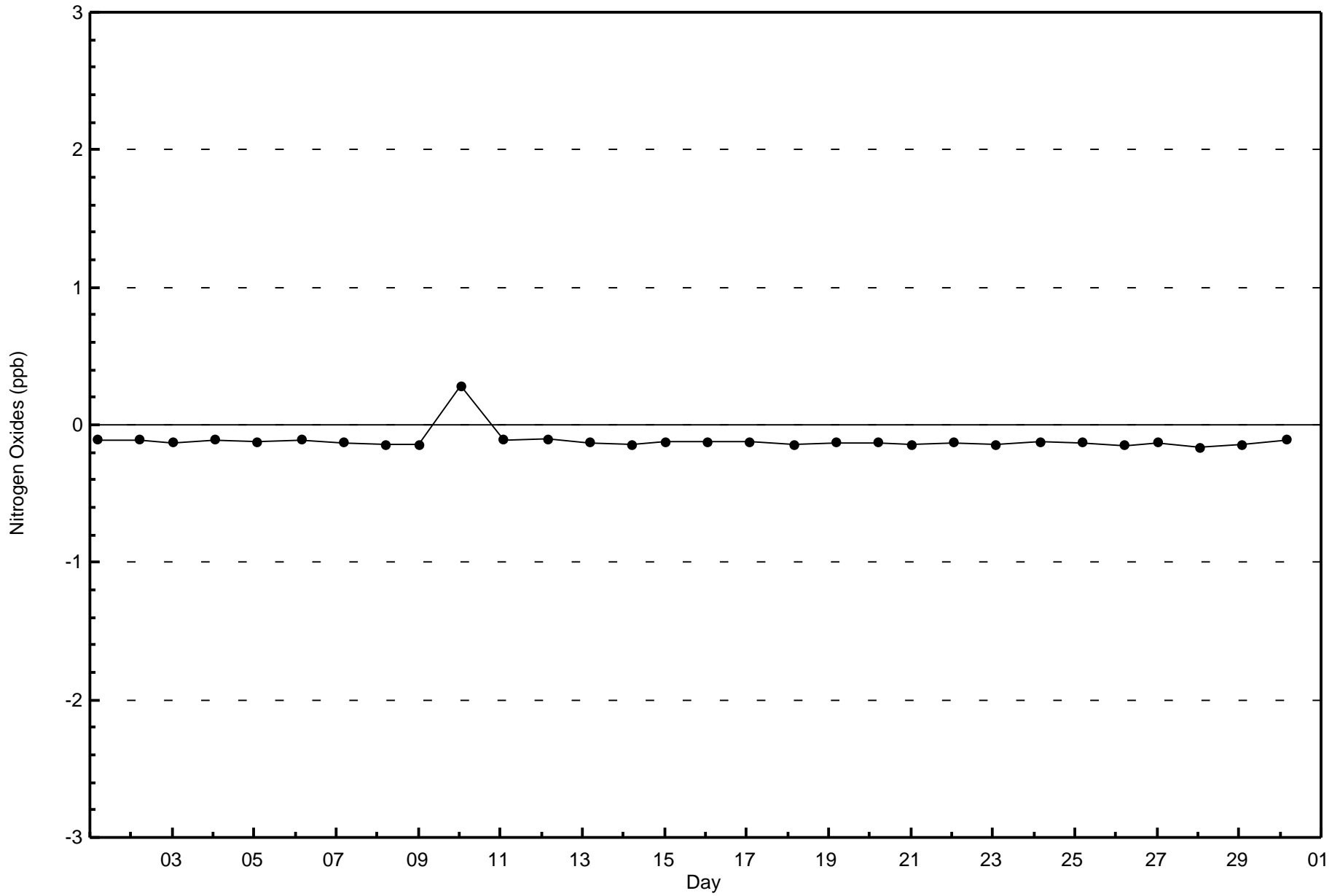
Total Number of Hours: 720

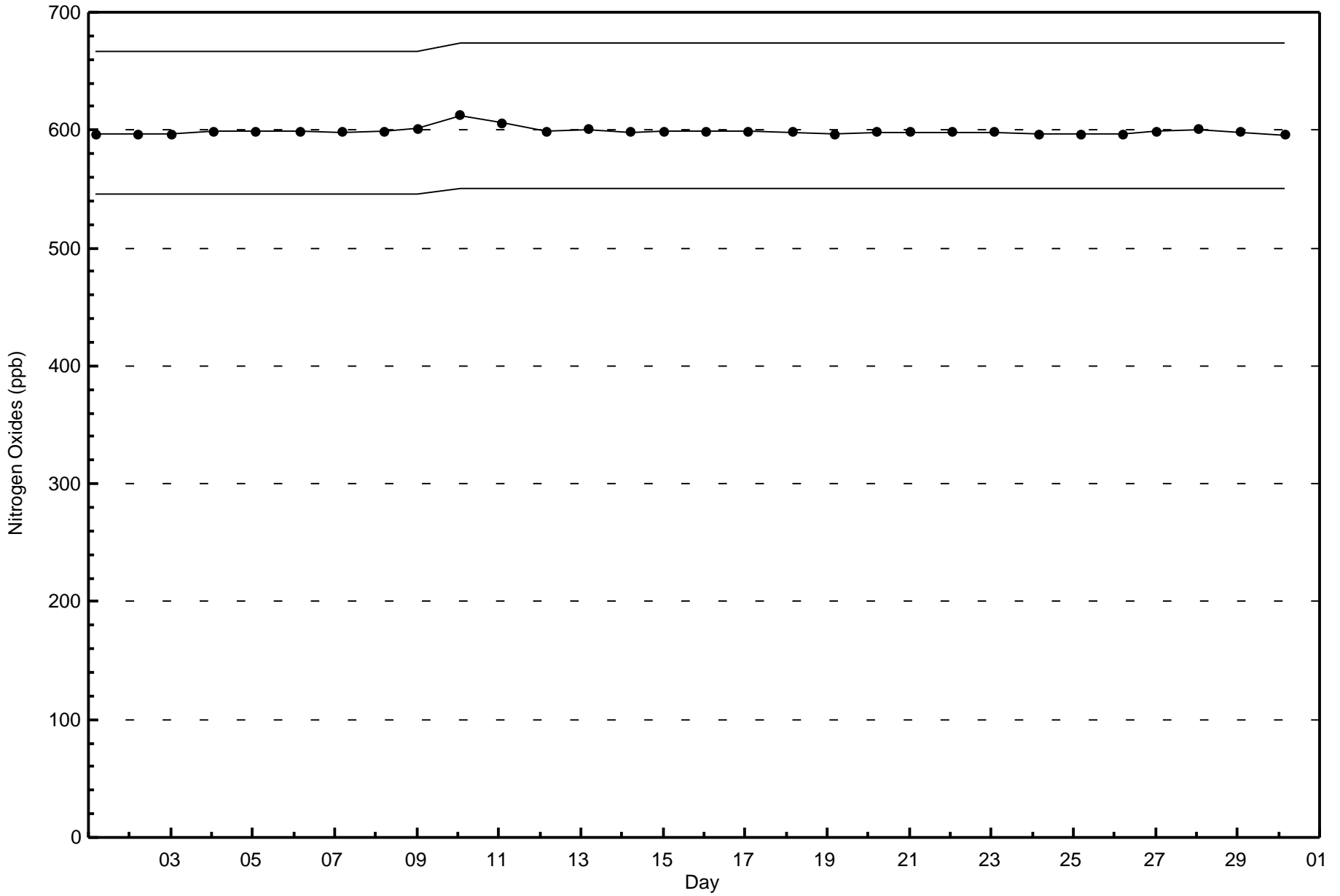


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Conklin Lookout (AMS 18)







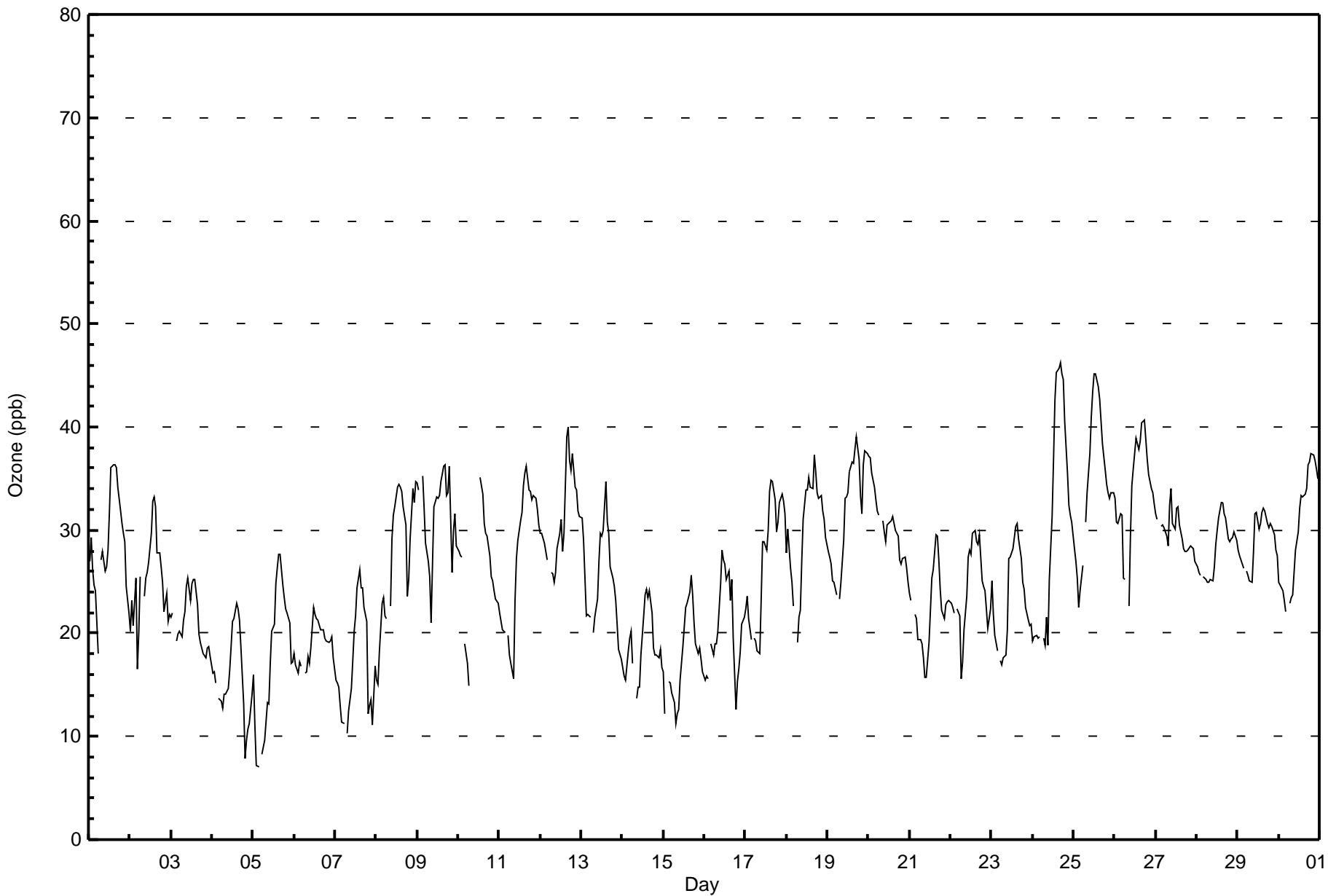


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 46 ppb on Sep 24 17:00	Maximum Daily Average: 34.8 ppb on Sep 25		Hours of Data:	684
Minimum Value: 7 ppb on Sep 5 04:00	Minimum Daily Average: 15.7 ppb on Sep 4		Hours of Missing Data:	36
Maximum Diurnal Average: 31.4 ppb at hour 15	Minimum Diurnal Average: 20.3 ppb at hour 8		Hours of Calibration:	36
Monthly Average: 25.9 ppb	Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 16 Q <sub>1</sub> = 20 Median = 26 Q <sub>3</sub> = 31 P <sub>90</sub> = 35 P <sub>99</sub> = 44		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	27	29	26	25	24	18	Z	27	28	26	26	28	32	36	36	36	36	34	32	31	30	29	25	22	28.8	36	
2-Sep	20	23	21	25	17	20	25	Z	24	25	26	27	30	33	33	32	28	28	26	25	22	24	21	22	25.1	33	
3-Sep	22	22	Z	19	20	20	20	21	22	25	25	23	25	25	23	20	19	19	18	18	19	19	18	18	21.1	25	
4-Sep	16	16	15	Z	14	13	13	14	14	15	16	19	21	21	23	22	21	19	13	8	10	11	11	14	15.7	23	
5-Sep	16	11	7	7	Z	8	9	10	13	13	17	20	21	25	26	28	28	25	23	22	22	21	17	17	17.7	28	
6-Sep	18	17	16	17	17	Z	16	16	18	17	19	23	22	21	21	20	20	20	19	19	19	19	20	18	18.8	23	
7-Sep	16	15	15	13	11	11	Z	10	12	15	17	20	22	24	26	24	24	23	21	12	13	14	11	17	16.9	26	
8-Sep	15	15	18	23	23	22	21	Z	23	29	32	32	34	34	34	34	32	31	24	25	29	34	33	35	27.5	35	
9-Sep	35	34	Z	35	32	29	27	25	21	27	32	33	33	33	35	36	36	33	34	36	26	30	32	28	31.4	36	
10-Sep	28	28	27	Z	19	17	15	C	C	C	C	C	C	C	35	34	31	30	29	28	25	25	24	23	23	--	35
11-Sep	22	21	20	20	Z	20	18	17	16	23	27	29	31	32	34	36	36	34	34	33	33	33	32	30	27.5	36	
12-Sep	30	30	29	28	27	Z	26	26	25	26	28	30	31	28	30	39	40	37	36	37	34	34	32	31	31.0	40	
13-Sep	31	29	25	22	22	22	Z	20	22	23	27	30	29	30	35	31	30	26	25	25	23	21	18	18	25.3	35	
14-Sep	17	16	15	18	20	20	17	Z	14	15	15	18	22	24	24	23	24	22	19	18	18	18	17	17	18.7	24	
15-Sep	16	12	Z	15	15	14	13	11	12	13	15	19	21	23	23	24	26	24	21	19	18	19	18	16	17.7	26	
16-Sep	16	16	16	Z	19	18	19	19	20	25	28	27	27	25	26	23	25	20	13	15	17	18	21	22	20.6	28	
17-Sep	22	24	21	19	Z	19	19	18	18	23	29	29	28	30	34	35	35	33	30	31	33	34	33	32	27.3	35	
18-Sep	28	30	26	25	23	Z	19	22	22	27	31	34	34	35	34	34	37	36	34	33	33	32	31	29	30.0	37	
19-Sep	28	27	27	25	25	24	Z	23	25	29	33	33	34	36	37	37	38	39	37	33	32	36	38	37	31.8	39	
20-Sep	37	37	36	34	33	32	31	Z	31	30	29	31	31	31	31	31	30	29	27	27	27	27	26	25	30.6	37	
21-Sep	24	23	Z	22	21	19	19	19	18	16	16	19	22	25	26	30	29	27	24	22	21	23	23	23	22.3	30	
22-Sep	23	23	22	Z	22	22	16	17	20	24	27	28	28	30	30	29	29	30	25	25	24	22	21	22	24.2	30	
23-Sep	25	22	20	18	Z	17	17	18	18	20	27	27	28	29	30	31	29	27	25	24	23	21	21	21	23.5	31	
24-Sep	19	20	20	20	20	Z	19	19	22	19	25	31	37	43	45	46	46	45	45	41	36	32	32	31	30.9	46	
25-Sep	28	27	25	23	24	27	Z	31	34	37	41	43	45	45	44	43	40	38	36	34	34	33	34	34	34.8	45	
26-Sep	33	31	31	32	31	25	25	Z	23	29	34	36	39	38	38	39	40	41	39	37	35	34	34	33	33.8	41	
27-Sep	32	31	Z	30	30	30	29	28	32	34	31	30	32	32	31	29	28	28	28	28	28	28	27	27	29.9	34	
28-Sep	26	26	26	Z	25	25	25	25	25	25	26	29	30	31	33	33	32	31	29	29	29	29	30	29	28.2	33	
29-Sep	28	27	27	26	Z	26	26	25	25	28	32	32	30	31	32	32	32	31	30	31	30	30	28	28	28.9	32	
30-Sep	25	25	24	23	22	Z	23	23	24	26	28	30	32	33	33	34	34	36	37	37	37	37	36	35	30.2	37	

24.1	23.5	22.2	22.6	22.3	20.8	20.3	20.3	21.3	23.6	26.2	27.9	29.3	30.7	31.4	31.4	31.2	29.8	27.7	26.7	26.0	26.2	25.4	25.1	Diurnal Average	
37	37	36	35	33	32	31	31	34	37	41	43	45	45	45	46	46	45	45	41	37	37	38	37	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Conklin Lookout - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	174	25.44	25.44
21 - 50	510	74.56	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Conklin Lookout - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 20	8	24	14	12	6	11	2	1	6	15	14	1	3	37	15	5	174
21 - 50	7	26	19	20	15	7	13	22	14	40	119	59	67	53	21	8	510
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>	15	50	33	32	21	18	15	23	20	55	133	60	70	90	36	13	684

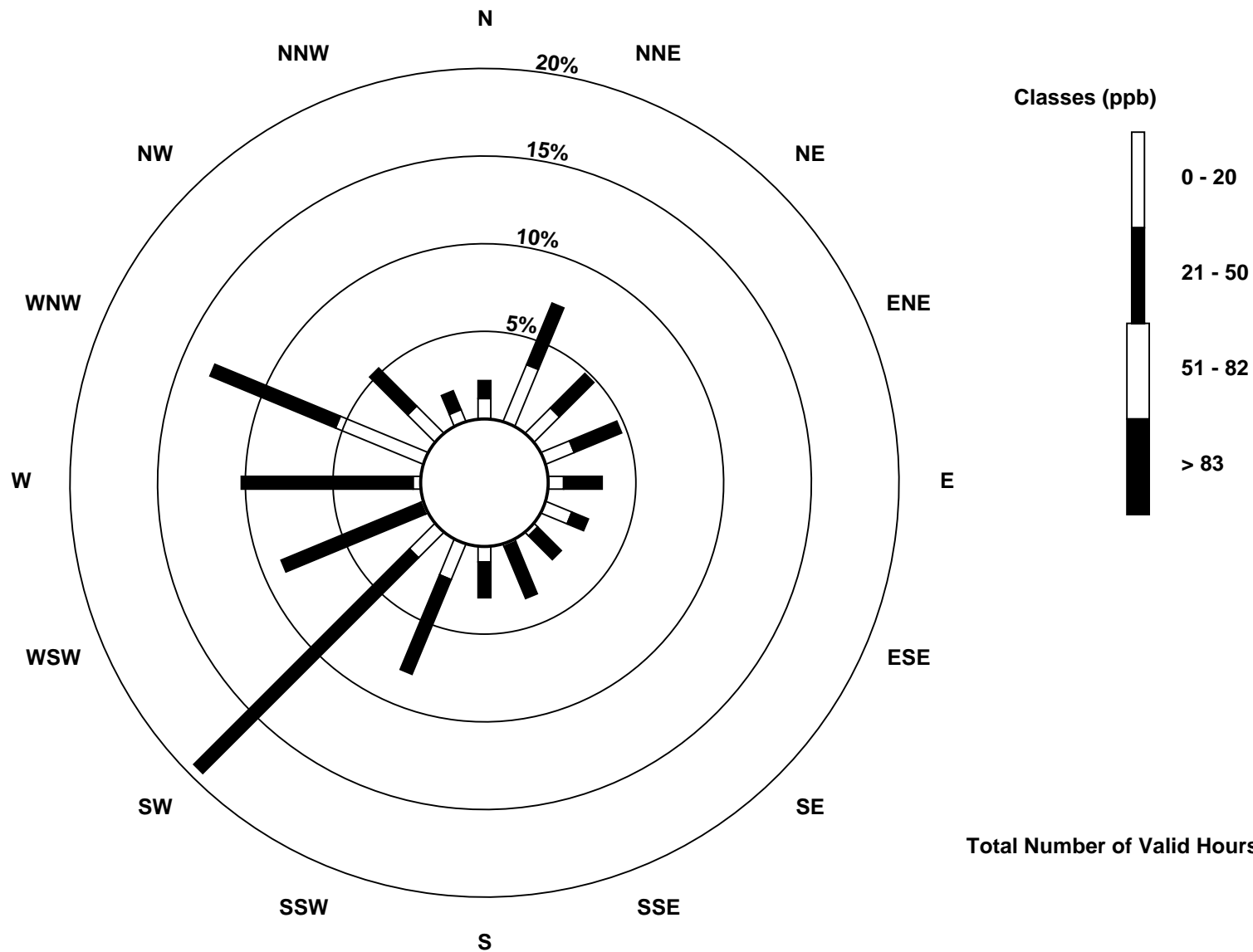
Total Number of Valid Hours: 684

Total Number of Hours: 720

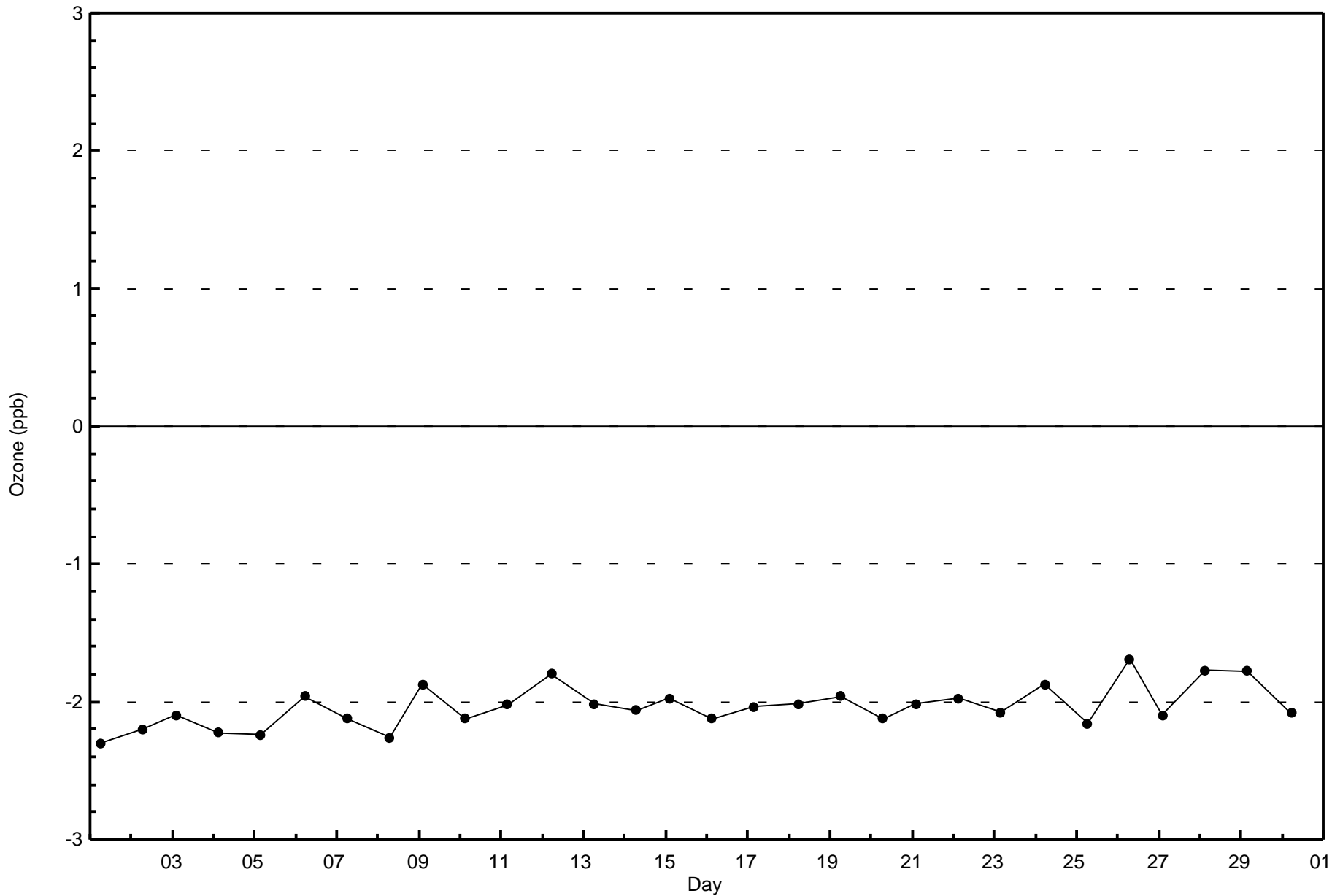


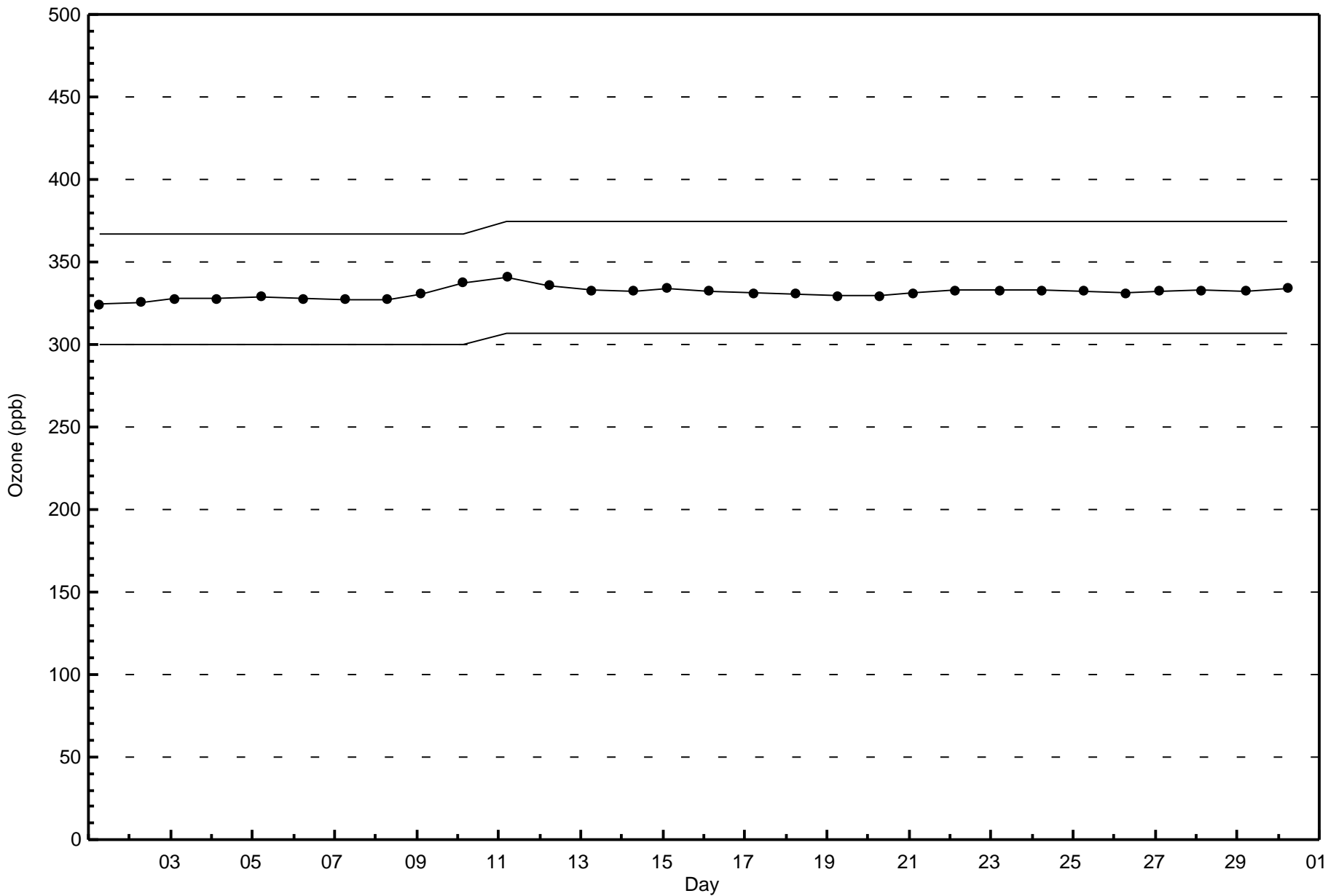
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Ozone (O<sub>3</sub>) - ppb  
Conklin Lookout (AMS 18)



Total Number of Valid Hours: 684







Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 8.8 µg/m <sup>3</sup> on Sep 24 21:00	Maximum Daily Average: 5.4 µg/m <sup>3</sup> on Sep 24	Hours of Data:	688
Minimum Value: 0.1 µg/m <sup>3</sup> on Sep 27 21:00	Minimum Daily Average: 0.6 µg/m <sup>3</sup> on Sep 28	Hours of Missing Data:	32
Maximum Diurnal Average: 2.4 µg/m <sup>3</sup> at hour 3	Minimum Diurnal Average: 1.7 µg/m <sup>3</sup> at hour 14	Hours of Calibration:	1
Monthly Average: 2.13 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 1.0 Median = 1.7 Q <sub>3</sub> = 2.8 P <sub>90</sub> = 4.4 P <sub>99</sub> = 6.3	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-Sep	0.9	1.0	1.2	1.3	1.4	1.6	1.7	1.5	1.6	1.8	1.5	1.5	0.5	0.4	0.4	0.4	0.3	0.5	1.1	1.3	1.3	1.3	1.3	1.3	1.1	1.8
2-Sep	1.5	1.8	1.7	1.7	1.9	1.9	1.9	1.7	1.7	1.6	1.7	1.7	1.4	1.1	1.1	1.2	1.5	1.7	2.8	3.1	3.6	3.9	3.6	2.9	2.0	3.9
3-Sep	2.4	2.1	2.0	2.0	1.9	1.9	2.0	2.0	2.0	1.8	1.7	2.0	2.2	1.6	1.4	1.4	1.5	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.8	2.4
4-Sep	2.2	2.4	2.4	2.6	2.5	2.3	2.6	2.3	2.0	1.7	1.7	1.6	1.6	1.6	1.6	1.7	2.0	2.4	2.7	2.2	1.9	1.9	2.1	2.2	2.1	2.7
5-Sep	2.5	3.0	2.8	2.6	2.6	2.5	2.4	3.1	3.9	3.4	4.3	5.1	4.5	3.6	5.3	5.7	4.9	5.3	5.0	5.2	5.7	4.4	3.9	4.1	4.0	5.7
6-Sep	4.2	4.7	4.6	3.7	3.6	2.9	2.6	2.7	2.2	1.9	1.4	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	2.0	4.7
7-Sep	1.1	1.8	2.2	2.8	2.8	2.5	2.9	3.2	2.8	2.5	2.0	1.8	2.2	2.6	2.9	3.2	3.2	4.2	5.2	5.5	3.7	3.2	3.2	3.6	3.0	5.5
8-Sep	3.1	2.6	2.7	2.2	1.9	2.0	2.6	2.5	2.2	1.5	1.7	2.4	2.7	2.3	1.9	1.7	1.7	2.3	4.1	4.4	4.4	3.6	3.3	2.6	2.6	4.4
9-Sep	4.8	5.8	6.5	6.2	5.9	5.8	5.3	4.6	4.1	3.2	2.9	2.9	2.5	2.3	2.6	4.5	5.4	7.4	8.6	5.1	3.8	3.4	2.3	3.2	4.5	8.6
10-Sep	5.7	6.0	5.5	3.2	3.9	4.7	4.4	4.2	C	0.8	1.0	0.9	0.7	0.6	0.6	0.6	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.1	2.2	6.0
11-Sep	1.1	1.1	1.1	1.3	1.3	1.3	1.5	2.2	1.4	1.5	1.3	1.1	1.1	1.0	1.1	1.1	1.2	1.5	1.4	1.6	1.7	1.6	1.3	1.4	1.3	2.2
12-Sep	1.3	1.3	1.3	1.4	1.5	1.9	2.2	2.8	3.2	2.7	2.2	2.4	3.1	4.6	2.9	1.9	1.7	1.8	2.3	2.8	2.4	2.3	2.3	2.2	2.3	4.6
13-Sep	2.7	3.6	3.3	3.5	3.1	3.2	3.1	3.1	2.2	1.2	UO	UO	0.5	0.7	0.8	2.6	2.8	2.0	2.3	3.0	3.1	3.2	3.0	2.8	2.5	3.6
14-Sep	2.4	2.4	2.7	3.2	2.9	1.7	2.0	3.6	4.7	4.1	3.1	2.5	2.1	2.3	2.3	3.7	2.6	2.3	1.8	1.4	1.1	1.1	0.9	1.0	2.4	4.7
15-Sep	1.0	0.7	0.6	0.5	0.5	0.4	0.3	0.3	0.7	1.5	1.6	0.9	0.8	0.8	0.8	0.8	0.9	1.0	1.0	1.0	1.0	0.9	1.0	1.0	0.8	1.6
16-Sep	1.2	1.3	1.3	1.0	0.9	0.7	0.5	0.6	0.9	0.9	1.0	1.0	0.9	0.9	0.6	1.1	0.8	1.0	1.1	0.7	0.6	0.5	0.6	0.7	0.9	1.3
17-Sep	0.7	0.7	0.7	0.6	0.8	0.7	0.5	0.4	1.0	1.1	0.2	0.4	0.5	1.1	1.5	1.4	1.6	2.4	2.8	2.8	2.6	2.4	2.5	3.0	1.4	3.0
18-Sep	4.6	4.2	5.4	5.8	5.6	5.7	4.8	3.8	3.3	2.6	1.9	1.4	UO	UO	UO	UO	UO	UO	0.8	1.5	1.4	1.7	1.8	2.1	3.2	5.8
19-Sep	2.4	2.5	2.8	2.9	3.0	3.4	3.9	3.9	3.8	3.0	2.6	1.9	1.2	0.9	UO	UO	UO	UO	0.9	1.3	1.2	1.6	0.7	UO	2.2	3.9
20-Sep	1.4	1.5	1.7	1.9	1.9	1.9	1.6	1.4	1.3	1.4	1.4	1.1	1.3	0.8	0.8	0.8	0.8	1.0	1.3	1.3	1.1	1.0	0.9	1.1	1.3	1.9
21-Sep	1.2	1.3	1.4	1.5	1.0	0.9	0.6	0.3	UO	UO	UO	UO	UO	UO	UO	UO	UO	0.2	0.4	0.4	0.4	0.5	0.7	0.8	--	1.5
22-Sep	0.8	0.9	0.8	0.8	0.9	0.9	0.6	0.7	0.8	0.6	0.2	UO	0.7	0.9	0.6	0.7	1.0	1.5	1.4	1.6	1.5	1.4	1.3	1.1	0.9	1.6
23-Sep	1.3	1.5	1.5	1.4	1.6	1.7	1.6	1.9	2.5	2.3	2.1	2.5	3.2	2.6	2.6	2.9	2.8	2.9	4.8	4.8	4.1	3.7	3.8	3.7	2.7	4.8
24-Sep	3.9	4.4	4.5	4.4	4.2	4.3	4.3	4.7	5.7	4.2	4.6	4.1	4.2	5.1	5.6	6.2	6.0	6.1	6.1	7.1	8.8	8.3	7.5	5.8	5.4	8.8
25-Sep	4.1	4.7	5.3	5.2	5.5	6.2	5.0	3.9	2.4	1.3	0.9	UO	UO	UO	UO	UO	UO	0.8	0.8	0.9	1.1	1.0	1.0	--	6.2	
26-Sep	1.0	1.1	1.1	1.1	1.1	1.3	1.3	1.3	1.3	0.9	0.8	0.7	0.2	0.4	0.6	0.6	0.5	0.5	0.9	1.0	1.1	1.2	1.2	1.1	0.9	1.3
27-Sep	1.2	1.1	1.2	1.1	1.0	1.0	1.0	1.0	1.0	0.7	0.6	0.6	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.6	1.2
28-Sep	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.4	0.1	UO	0.2	0.2	0.3	0.5	0.5	0.7	0.9	1.0	1.2	1.0	1.1	0.6	1.2
29-Sep	1.2	1.4	1.6	1.9	2.3	2.7	2.9	3.0	M	2.1	2.0	2.1	2.7	2.0	1.8	1.8	2.1	2.2	2.4	3.2	2.5	2.1	2.2	2.3	2.2	3.2
30-Sep	2.2	2.3	2.5	2.5	2.7	2.9	2.8	2.7	2.4	2.1	2.0	2.1	2.8	4.2	4.4	3.3	3.5	4.5	4.2	3.6	3.2	3.1	3.3	3.0	3.0	4.5

2.1	2.3	2.4	2.4	2.4	2.4	2.3	2.3	2.3	1.9	1.7	1.8	1.7	1.7	1.8	2.0	2.0	2.1	2.4	2.4	2.3	2.1	2.1	2.0	Diurnal Average	
5.7	6.0	6.5	6.2	5.9	6.2	5.3	4.7	5.7	4.2	4.6	5.1	4.5	5.1	5.6	6.2	6.0	7.4	8.6	7.1	8.8	8.3	7.5	5.8	Diurnal Maximum	

C - Calibration      M - Maintenance      UO - Unstable Operation  
 Alberta Ambient Air Quality Objectives (AAAQO):      24-hr 30 µg/m<sup>3</sup>

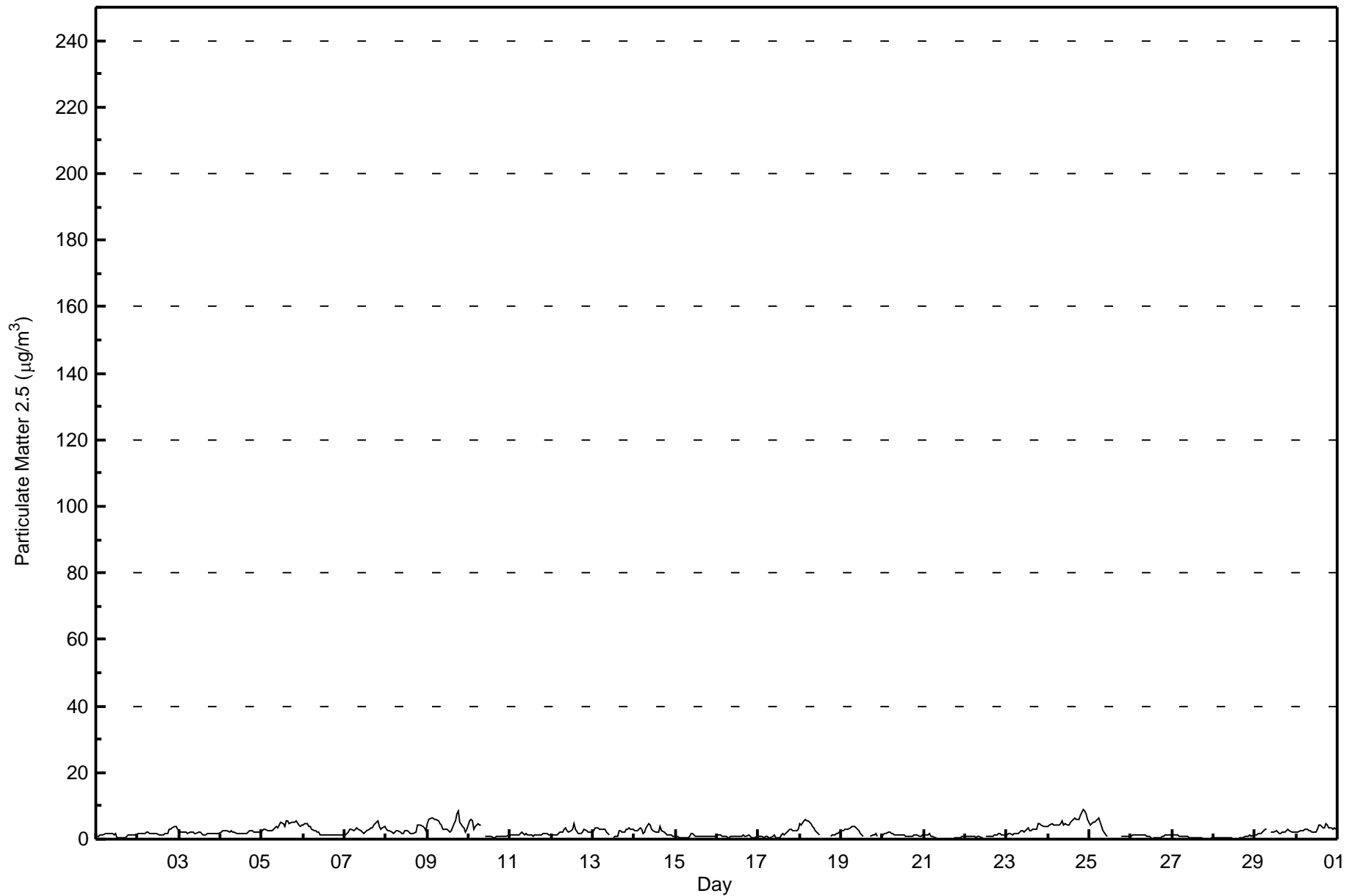


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$

Conklin Lookout - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Conklin Lookout - September 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	500	72.67	72.67
6 - 15	26	3.78	76.45
16 - 25	0	0.00	76.45
26 - 80	0	0.00	76.45
> 81.0	0	0.00	76.45

Total Number of Valid Hours: 688

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Conklin Lookout - September 2015**

Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	17	41	26	23	10	17	13	14	12	52	97	41	29	66	29	13	500
6 - 15	0	0	1	0	1	0	0	9	1	0	12	1	0	0	1	0	26
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	17	41	27	23	11	17	13	23	13	52	109	42	29	66	30	13	526

Total Number of Valid Hours: 688

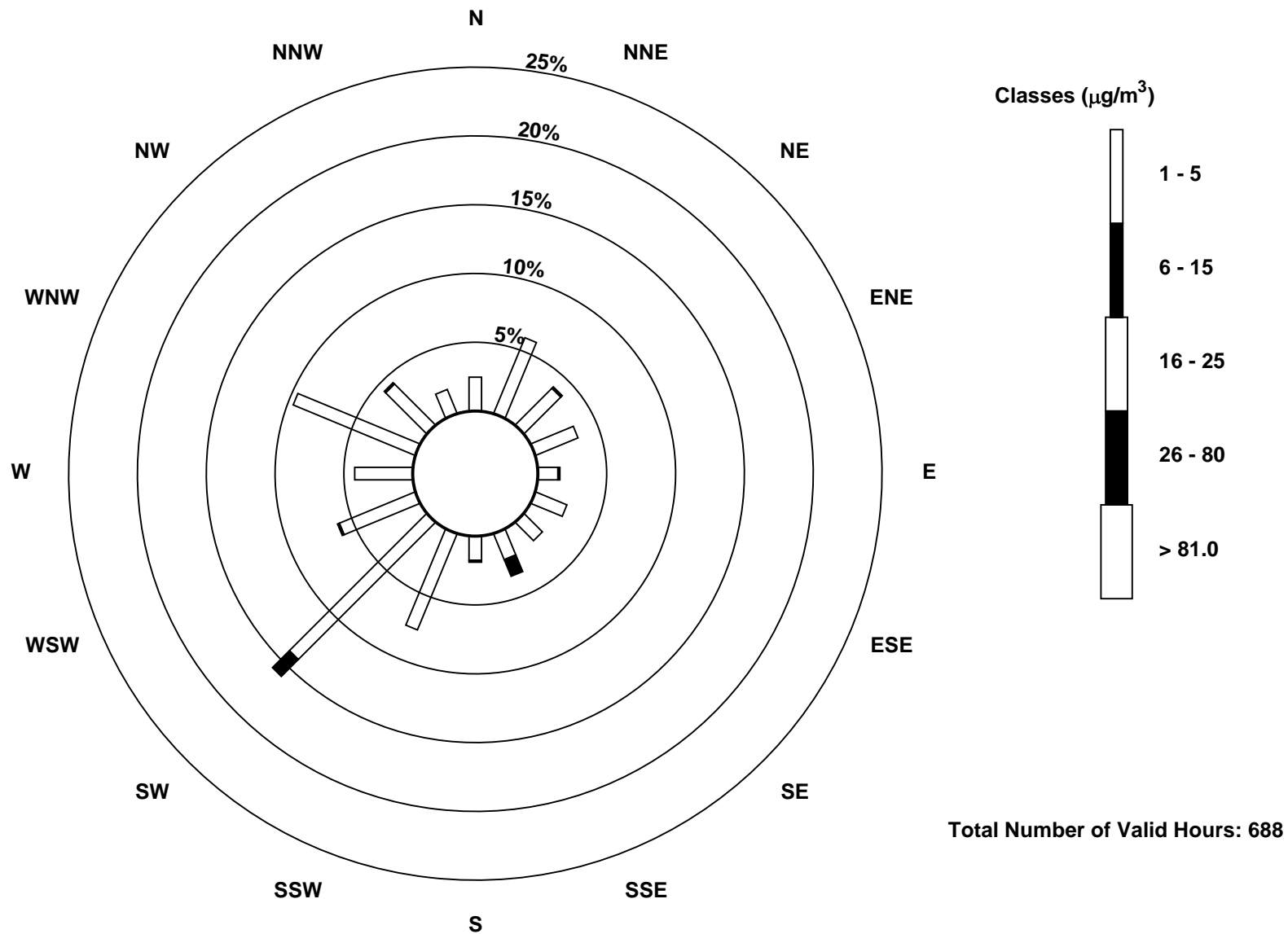
Total Number of Hours: 720





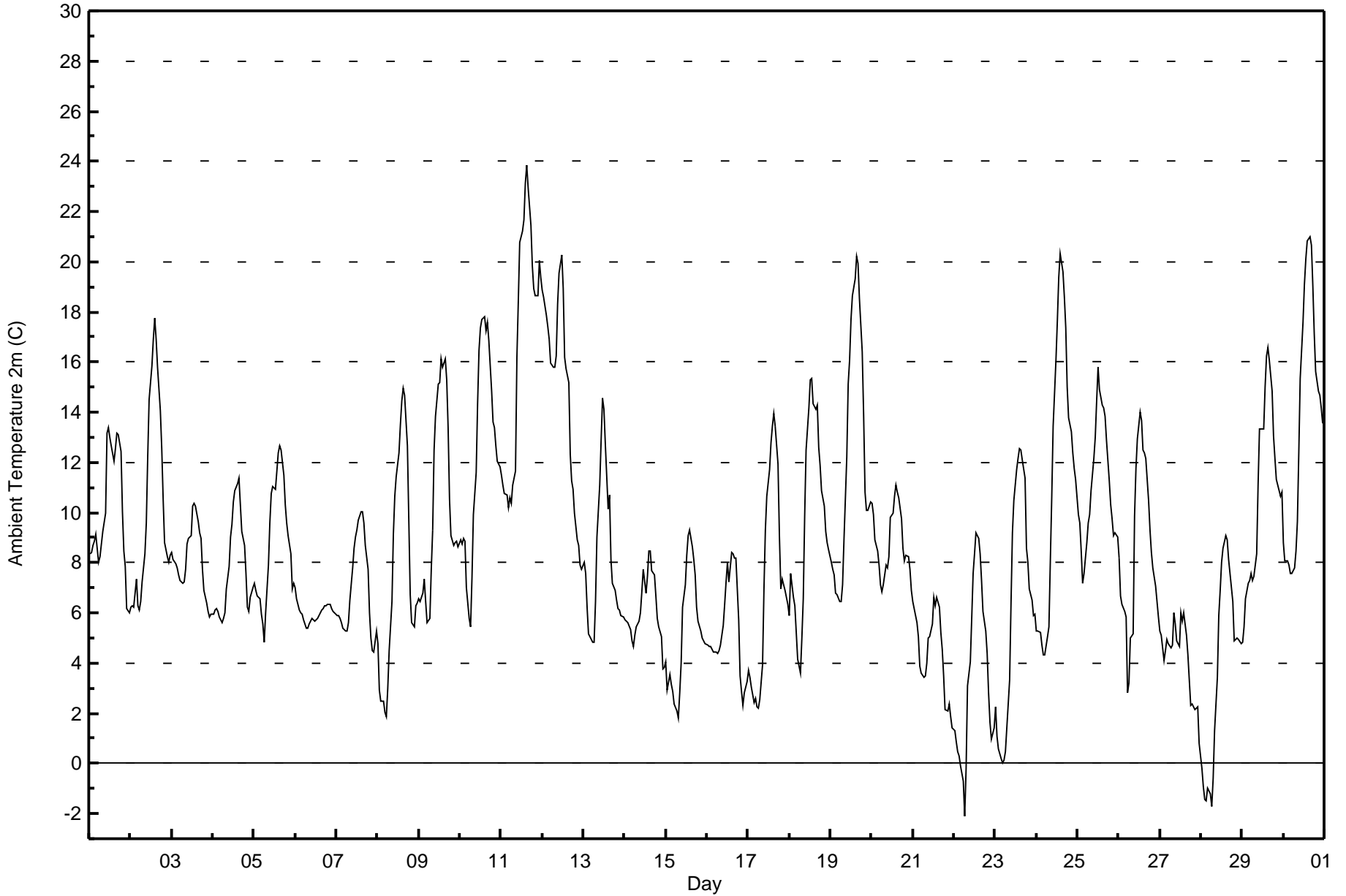
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Conklin Lookout (AMS 18)





Maximum Value: 23.8 C on Sep 11 16:00 Minimum Value: -2.1 C on Sep 22 07:00 Maximum Diurnal Average: 12.9 C at hour 15 Monthly Average: 8.70 C		Maximum Daily Average: 16.8 C on Sep 11 Minimum Daily Average: 3.5 C on Sep 22 Minimum Diurnal Average: 5.2 C at hour 7 Percentiles: P <sub>1</sub> = -0.7 P <sub>10</sub> = 3.5 Q <sub>1</sub> = 5.7 Median = 7.9 Q <sub>3</sub> = 11.3 P <sub>90</sub> = 15.7 P <sub>99</sub> = 20.9		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Sep	8.3	8.4	8.7	8.8	9.1	8.0	8.2	8.8	9.3	10.0	13.1	13.4	13.0	12.7	12.0	12.5	13.1	13.1	12.4	10.0	8.4	7.8	6.2	6.0	10.1	13.4																						
2-Sep	6.3	6.3	6.2	7.4	6.3	6.1	6.5	7.2	8.4	9.6	12.2	14.5	15.8	16.9	17.8	16.9	15.8	14.1	12.6	10.5	8.8	8.2	8.0	8.3	10.4	17.8																						
3-Sep	8.4	8.1	7.9	7.8	7.5	7.3	7.2	7.3	7.8	8.7	9.0	9.1	10.2	10.4	10.2	9.6	9.2	9.0	7.8	6.9	6.4	6.1	5.8	6.0	8.1	10.4																						
4-Sep	5.9	6.1	6.2	6.1	5.9	5.6	5.8	6.0	6.9	7.9	9.0	9.5	10.4	10.9	11.1	11.4	10.3	9.2	8.7	7.6	6.2	6.1	6.6	7.0	7.8	11.4																						
5-Sep	7.2	6.9	6.7	6.5	6.0	5.5	4.9	6.0	7.9	9.6	10.8	11.0	10.9	11.6	12.4	12.6	12.5	11.5	10.3	9.6	9.1	8.4	6.9	7.2	8.8	12.6																						
6-Sep	7.0	6.6	6.1	6.0	5.9	5.7	5.4	5.4	5.5	5.7	5.8	5.7	5.7	5.8	5.9	6.1	6.2	6.3	6.3	6.3	6.3	6.2	6.1	6.0	6.0	7.0																						
7-Sep	5.9	5.9	5.8	5.6	5.4	5.3	5.3	5.6	6.5	7.8	8.6	9.1	9.3	9.7	10.0	10.1	9.6	8.7	7.8	6.0	5.0	4.5	4.4	5.3	7.0	10.1																						
8-Sep	4.7	3.0	2.5	2.5	2.0	1.9	3.0	4.5	6.5	9.2	10.6	11.4	12.4	13.5	14.5	15.0	14.7	12.7	9.7	6.7	5.6	5.4	6.3	6.4	7.7	15.0																						
9-Sep	6.5	6.5	6.8	7.3	6.5	5.6	5.8	7.7	9.3	12.5	13.8	15.1	15.2	16.1	15.8	16.1	15.3	13.4	10.6	9.1	8.7	8.8	8.9	8.6	10.4	16.1																						
10-Sep	8.9	8.8	9.0	8.9	7.0	5.8	5.4	7.4	9.9	11.6	14.3	16.5	17.4	17.7	17.8	17.3	17.6	16.8	14.8	13.6	13.4	12.6	12.0	11.8	12.3	17.8																						
11-Sep	11.5	11.1	10.8	10.7	10.2	10.6	10.4	11.1	11.6	16.2	18.4	20.8	21.2	21.7	23.1	23.8	23.0	21.4	19.8	18.9	18.6	18.7	20.1	19.4	16.8	23.8																						
12-Sep	18.9	18.6	17.9	17.4	16.9	16.0	15.8	15.8	16.2	18.3	19.6	20.2	18.9	16.2	15.7	15.2	12.3	11.3	10.9	10.0	8.9	8.7	7.9	7.8	14.8	20.2																						
13-Sep	8.0	7.6	6.2	5.2	5.1	4.9	4.8	6.4	9.0	11.1	12.9	14.6	14.1	12.7	10.2	10.7	8.2	7.2	6.9	6.5	6.2	6.1	5.9	5.8	8.2	14.6																						
14-Sep	5.7	5.7	5.6	5.4	4.9	4.6	5.1	5.4	5.7	6.0	6.9	7.8	6.8	7.4	8.5	8.5	7.7	7.5	6.7	5.8	5.5	5.1	3.8	3.8	6.1	8.5																						
15-Sep	4.0	2.9	3.5	3.2	2.9	2.4	2.1	1.8	2.8	4.0	6.2	7.1	8.3	9.1	9.3	8.6	8.2	7.5	6.2	5.7	5.3	5.0	4.9	4.8	5.2	9.3																						
16-Sep	4.7	4.7	4.7	4.5	4.5	4.4	4.4	4.5	4.7	5.5	6.3	7.2	8.0	7.2	8.4	8.4	8.2	8.2	5.7	3.5	2.9	2.3	2.8	3.3	5.4	8.4																						
17-Sep	3.7	3.4	3.0	2.4	2.6	2.3	2.2	2.5	3.9	6.9	9.3	10.6	11.7	12.8	13.4	14.0	13.4	12.0	9.1	6.9	7.3	6.9	6.6	6.4	7.2	14.0																						
18-Sep	5.9	7.6	6.6	6.3	5.2	4.1	3.6	5.0	6.6	9.9	12.5	14.2	15.3	15.3	14.4	14.1	14.3	12.6	11.9	10.8	10.3	9.2	8.8	8.5	9.7	15.3																						
19-Sep	8.0	7.7	7.5	6.8	6.7	6.4	6.5	7.1	8.9	12.2	15.1	16.1	17.7	18.6	19.3	20.2	19.9	18.5	16.4	13.9	10.8	10.1	10.1	10.4	12.3	20.2																						
20-Sep	10.4	9.9	8.9	8.5	7.9	7.1	6.9	7.1	7.9	7.8	8.2	9.8	10.0	10.6	11.1	10.8	10.6	9.8	8.6	8.1	8.3	8.3	7.7	6.9	8.8	11.1																						
21-Sep	6.5	6.2	5.6	5.0	3.9	3.6	3.4	3.5	4.0	5.0	5.0	5.6	6.6	6.3	6.6	6.2	5.2	4.5	3.5	2.1	2.1	2.4	1.9	1.4	4.4	6.6																						
22-Sep	1.3	0.9	0.5	0.3	-0.1	-0.7	-2.1	-0.2	3.1	4.0	5.8	7.6	8.3	9.2	9.0	8.4	7.3	6.1	5.3	4.4	2.8	1.6	1.0	1.4	3.5	9.2																						
23-Sep	2.3	1.1	0.6	0.2	0.0	0.1	0.5	1.4	3.3	6.4	9.2	10.5	11.7	12.2	12.6	12.5	12.1	11.4	8.6	8.0	7.0	6.5	5.9	6.0	6.2	12.6																						
24-Sep	5.3	5.3	5.2	4.7	4.3	4.3	5.1	5.4	8.1	10.6	13.4	16.1	17.6	19.4	20.3	19.6	18.6	17.3	15.0	13.8	13.2	12.4	11.8	11.3	11.6	20.3																						
25-Sep	9.9	9.6	8.5	7.2	7.6	8.8	9.6	9.9	10.8	12.1	13.0	14.4	15.8	14.9	14.3	14.2	13.9	12.9	11.3	10.3	9.7	9.1	9.2	9.0	11.1	15.8																						
26-Sep	8.2	6.7	6.3	6.0	5.9	2.8	3.2	5.0	5.1	9.9	11.8	12.9	14.0	13.7	12.5	12.4	12.2	10.5	9.3	8.4	7.8	7.1	6.5	5.8	8.5	14.0																						
27-Sep	5.3	5.1	4.1	4.5	4.9	4.8	4.6	4.7	6.0	5.6	4.9	4.7	6.0	5.7	6.0	5.1	4.3	3.3	2.3	2.4	2.1	2.2	2.2	0.8	4.2	6.0																						
28-Sep	-0.2	-0.9	-1.4	-1.5	-1.0	-1.2	-1.7	-0.6	1.3	3.4	5.9	6.9	8.0	8.6	9.1	8.9	8.1	7.6	6.4	4.9	4.9	5.0	5.0	4.8	3.8	9.1																						
29-Sep	4.8	5.5	6.5	7.2	7.3	7.6	7.3	7.5	8.4	11.1	13.3	13.3	13.4	15.0	16.2	16.6	16.1	14.9	13.1	12.2	11.3	10.9	10.6	10.8	10.9	16.6																						
30-Sep	8.8	8.1	8.1	7.9	7.6	7.6	7.8	8.5	9.6	12.4	15.3	17.6	19.1	20.1	20.8	21.0	20.7	19.1	17.1	15.7	14.9	14.7	14.2	13.5	13.7	21.0																						
																								6.7	6.4	6.2	6.0	5.6	5.2	5.2	5.9	7.2	9.0	10.7	11.8	12.4	12.7	12.9	12.9	12.3	11.3	9.8	8.6	7.9	7.5	7.3	7.1	Diurnal Average
																								18.9	18.6	17.9	17.4	16.9	16.0	15.8	15.8	16.2	18.3	19.6	20.8	21.2	21.7	23.1	23.8	23.0	21.4	19.8	18.9	18.6	18.7	20.1	19.4	Diurnal Maximum





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C  
Conklin Lookout - September 2015**

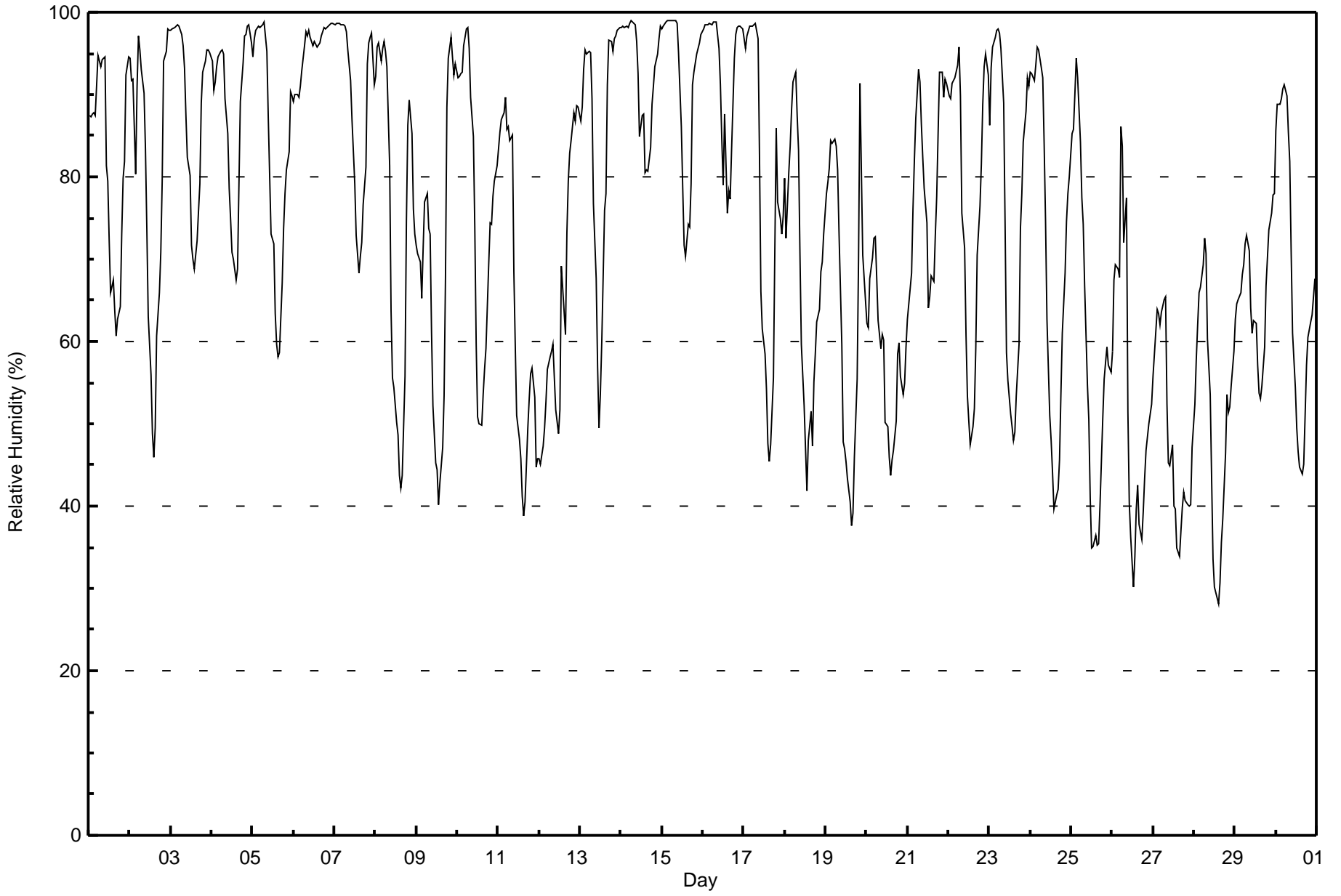
<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	12	1.67	1.67
0 - 10	475	65.97	67.64
10 - 20	218	30.28	97.92
> 20	15	2.08	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

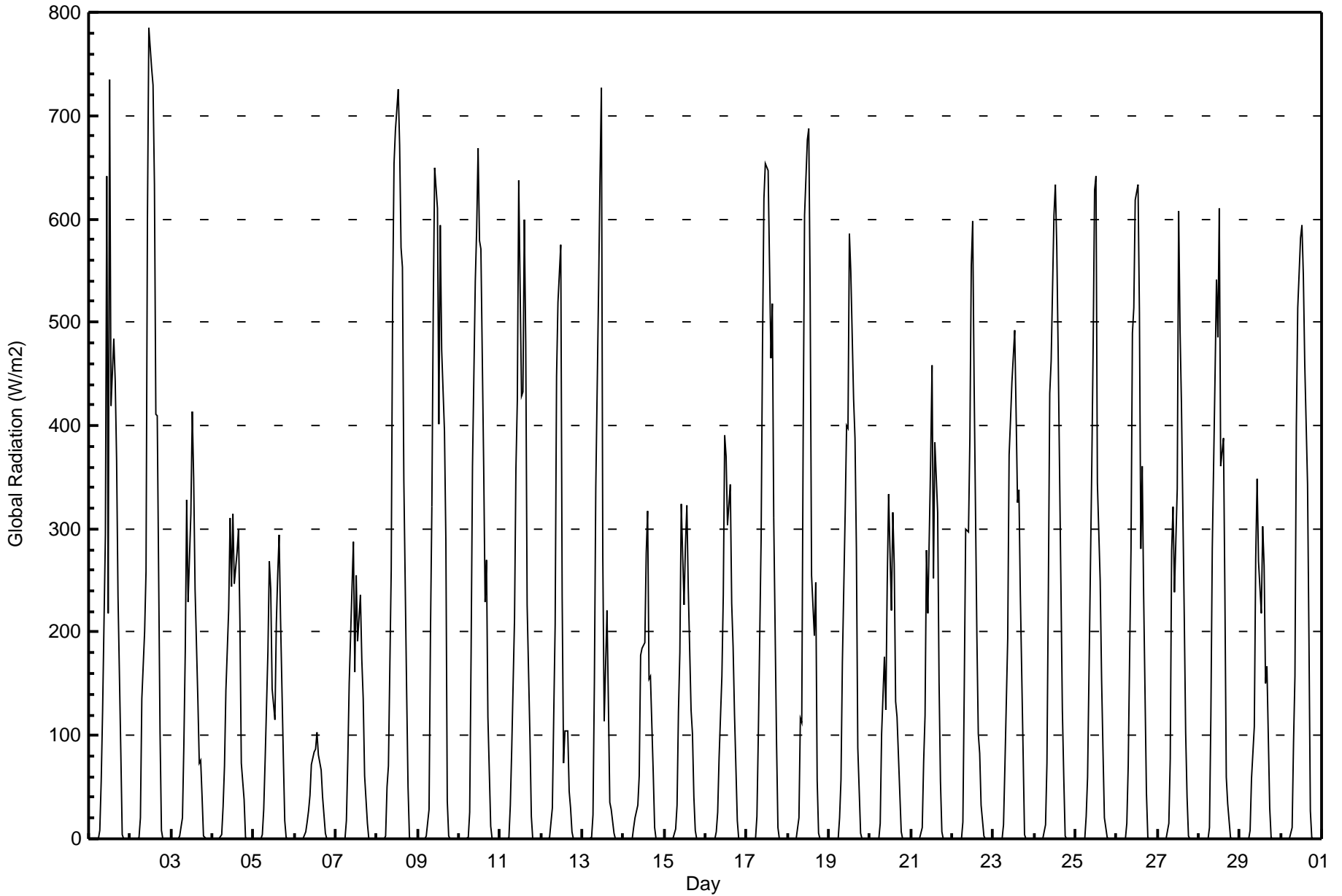


Maximum Value: 99 % on Sep 15 08:00																		Maximum Daily Average: 95.5 % on Sep 6																		Hours in Service: 720			
Minimum Value: 28 % on Sep 28 15:00																		Minimum Daily Average: 48.4 % on Sep 27																		Hours of Data: 720			
Maximum Diurnal Average: 88.9 % at hour 6																		Minimum Diurnal Average: 54.7 % at hour 15																		Hours of Missing Data: 0			
Monthly Average: 74.5 %																		Percentiles: P <sub>1</sub> = 34 P <sub>10</sub> = 46 Q <sub>1</sub> = 59 Median = 77 Q <sub>3</sub> = 93 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-Sep	87	87	88	88	87	95	94	93	94	95	81	79	72	66	67	64	61	63	64	73	80	82	92	95	81.2	95													
2-Sep	94	92	92	80	91	97	95	93	90	83	74	63	56	49	46	49	61	66	71	80	94	95	98	98	79.5	98													
3-Sep	98	98	98	98	98	98	97	96	93	87	82	80	72	70	69	72	76	79	89	93	94	95	96	95	88.5	98													
4-Sep	94	91	92	93	95	95	95	95	89	85	79	75	71	70	67	69	79	89	94	97	97	98	98	96	87.7	98													
5-Sep	95	97	98	98	98	98	98	99	95	87	80	73	72	63	60	58	59	67	74	78	81	83	90	90	83.0	99													
6-Sep	89	90	90	90	91	93	96	98	97	98	97	96	96	96	96	96	97	98	98	98	98	99	99	99	95.5	99													
7-Sep	99	99	99	99	99	98	98	98	98	95	92	87	83	79	73	68	70	72	77	81	94	96	97	98	91	89.2	99												
8-Sep	92	96	96	94	96	96	95	93	81	64	56	54	50	49	44	42	44	56	75	86	89	85	76	73	74.3	96													
9-Sep	72	71	70	65	71	77	78	74	73	61	52	45	44	40	43	47	53	68	88	94	97	95	92	94	69.4	97													
10-Sep	92	92	93	93	96	98	98	96	90	85	74	60	51	50	50	54	57	59	69	74	74	78	80	81	76.7	98													
11-Sep	83	85	87	88	90	86	86	84	85	68	60	51	48	46	41	39	40	49	53	56	57	53	45	46	63.6	90													
12-Sep	46	45	47	50	53	57	58	59	60	56	52	49	52	69	66	61	73	80	83	84	88	87	89	88	64.6	89													
13-Sep	87	89	93	95	95	95	95	89	77	68	57	50	54	60	76	78	91	97	96	95	97	97	98	98	84.4	98													
14-Sep	98	98	98	98	98	99	99	99	99	99	96	93	85	87	88	81	81	83	89	91	93	95	97	98	92.7	99													
15-Sep	98	98	99	99	99	99	99	99	99	99	95	86	79	72	70	74	74	79	91	93	95	96	96	97	91.0	99													
16-Sep	98	98	98	98	99	99	99	99	99	96	91	85	79	88	76	78	77	83	94	97	98	98	98	98	92.7	99													
17-Sep	97	96	97	98	98	98	99	99	97	83	66	61	58	54	48	45	48	56	71	86	77	75	73	75	77.3	99													
18-Sep	80	72	81	84	88	92	93	87	83	71	60	52	47	42	48	51	47	55	58	62	64	68	70	73	67.9	93													
19-Sep	78	79	81	84	84	85	84	81	73	60	48	47	45	43	41	38	39	46	55	70	91	81	71	65	65.4	91													
20-Sep	62	62	68	70	73	73	68	63	59	61	60	50	50	46	44	46	47	50	58	60	56	54	55	59	58.0	73													
21-Sep	63	65	68	76	82	87	93	91	86	82	79	74	64	65	68	67	73	78	85	93	93	90	92	91	79.4	93													
22-Sep	90	90	91	92	92	94	96	90	76	71	61	53	50	47	50	52	59	71	76	81	89	93	95	92	77.1	96													
23-Sep	86	93	96	97	98	98	97	96	89	74	59	55	51	50	48	49	53	60	74	78	84	88	92	91	77.3	98													
24-Sep	93	93	92	94	96	95	93	92	84	75	63	51	48	44	40	41	42	46	53	61	68	75	78	80	70.7	96													
25-Sep	85	86	90	94	92	84	77	74	67	55	50	41	35	35	36	35	35	40	51	55	58	59	57	56	60.4	94													
26-Sep	59	67	69	69	68	86	84	72	77	51	40	36	30	34	40	42	38	36	39	43	47	50	51	52	53.5	86													
27-Sep	56	58	64	63	62	63	65	65	52	45	45	47	40	40	35	34	37	40	42	41	40	40	40	47	48.4	65													
28-Sep	52	58	62	66	67	69	73	71	60	54	43	34	30	29	28	31	36	39	46	54	51	52	55	59	50.7	73													
29-Sep	63	65	65	66	68	69	72	73	71	64	61	62	62	57	54	53	55	59	67	70	74	76	78	78	65.9	78													
30-Sep	86	89	89	89	91	91	90	85	82	71	61	54	49	47	45	44	45	51	57	61	62	63	65	68	68.1	91													
	82.4	83.3	85.0	85.7	87.1	88.9	88.8	86.8	82.5	74.5	66.8	61.1	57.4	56.0	54.7	55.4	58.3	63.9	71.5	76.6	79.4	79.9	80.4	80.8	Diurnal Average														
	99	99	99	99	99	99	99	99	99	99	97	96	96	96	96	96	97	98	98	98	98	99	99	99	Diurnal Maximum														





Maximum Value: 786 W/m2 on Sep 2 12:00		Maximum Daily Average: 221.1 W/m2 on Sep 8		Hours in Service: 720																						
Minimum Value: 0 W/m2 on Sep 1 01:00		Minimum Daily Average: 27.3 W/m2 on Sep 6		Hours of Data: 720																						
Maximum Diurnal Average: 459.2 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 3		Hours of Missing Data: 0																						
Monthly Average: 134.6 W/m2		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 12 Q <sub>3</sub> = 238 P <sub>90</sub> = 459 P <sub>99</sub> = 661		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	0	0	0	0	0	9	55	123	294	641	219	735	419	484	443	367	234	84	4	0	0	0	0	171.3	735
2-Sep	0	0	0	0	0	1	20	136	201	259	600	786	746	729	633	411	410	102	8	1	0	0	0	0	210.1	786
3-Sep	0	0	0	0	0	2	20	91	181	328	229	314	414	348	242	134	73	76	40	3	0	0	0	0	104.0	414
4-Sep	0	0	0	0	0	4	31	71	144	223	311	244	314	247	278	300	212	74	38	2	0	0	0	0	103.8	314
5-Sep	0	0	0	0	0	4	28	76	182	268	241	145	115	209	256	294	213	79	18	1	0	0	0	0	88.7	294
6-Sep	0	0	0	0	0	0	6	17	28	42	72	84	87	103	82	67	41	23	6	0	0	0	0	0	27.3	103
7-Sep	0	0	0	0	0	1	18	75	150	243	287	161	255	191	236	174	135	61	15	1	0	0	0	0	83.5	287
8-Sep	0	0	0	0	0	2	50	70	260	520	653	686	726	672	572	553	347	142	51	1	0	0	0	0	221.1	726
9-Sep	0	0	0	0	0	3	29	198	322	514	649	611	401	594	474	394	288	36	3	0	0	0	0	0	188.1	649
10-Sep	0	0	0	0	0	2	26	179	361	539	591	669	579	571	360	230	270	118	13	0	0	0	0	0	187.8	669
11-Sep	0	0	0	0	0	1	33	87	214	359	424	637	429	433	599	480	226	99	22	0	0	0	0	0	168.5	637
12-Sep	0	0	0	0	0	1	30	121	208	447	519	574	234	74	105	104	46	30	7	0	0	0	0	0	104.1	574
13-Sep	0	0	0	0	0	1	24	152	340	532	638	727	273	114	221	131	36	28	5	0	0	0	0	0	134.3	727
14-Sep	0	0	0	0	0	0	11	20	32	62	177	185	190	277	317	155	158	64	11	0	0	0	0	0	69.1	317
15-Sep	0	0	0	0	0	0	9	33	123	181	325	226	284	323	243	125	102	40	8	0	0	0	0	0	84.3	325
16-Sep	0	0	0	0	0	0	6	26	78	158	236	391	370	304	343	228	185	121	18	0	0	0	0	0	102.7	391
17-Sep	0	0	0	0	0	0	21	101	290	478	620	654	646	556	465	518	310	93	11	0	0	0	0	0	198.5	654
18-Sep	0	0	0	0	0	0	21	117	113	387	603	677	688	529	255	197	248	57	5	0	0	0	0	0	162.4	688
19-Sep	0	0	0	0	0	0	20	57	171	316	399	397	586	549	426	387	280	88	5	0	0	0	0	0	153.5	586
20-Sep	0	0	0	0	0	0	16	102	177	125	247	333	221	316	266	133	117	43	6	0	0	0	0	0	87.6	333
21-Sep	0	0	0	0	0	0	10	74	119	279	218	366	458	253	384	316	152	56	6	0	0	0	0	0	112.1	458
22-Sep	0	0	0	0	0	0	17	148	300	297	387	554	599	443	195	101	82	32	2	0	0	0	0	0	131.6	599
23-Sep	0	0	0	0	0	0	14	70	194	371	406	442	492	411	326	337	237	83	4	0	0	0	0	0	141.1	492
24-Sep	0	0	0	0	0	0	14	73	238	431	463	604	633	573	471	243	125	59	2	0	0	0	0	0	163.8	633
25-Sep	0	0	0	0	0	0	21	60	159	360	480	628	641	344	250	155	85	20	1	0	0	0	0	0	133.5	641
26-Sep	0	0	0	0	0	0	15	71	280	490	514	618	633	510	281	361	238	45	2	0	0	0	0	0	169.1	633
27-Sep	0	0	0	0	0	0	15	77	280	322	239	339	607	492	421	215	103	40	2	0	0	0	0	0	131.4	607
28-Sep	0	0	0	0	0	0	10	120	281	450	541	485	611	361	387	237	60	34	1	0	0	0	0	0	149.1	611
29-Sep	0	0	0	0	0	0	8	58	108	271	349	269	218	302	265	150	167	30	1	0	0	0	0	0	91.5	349
30-Sep	0	0	0	0	0	0	10	94	157	399	514	582	593	545	460	343	194	27	1	0	0	0	0	0	163.3	593
		0.0	0.0	0.0	0.0	0.0	0.8	18.7	87.6	193.8	331.5	419.1	453.6	459.2	393.0	343.2	263.9	183.7	67.8	13.2	0.4	0.0	0.0	0.0	0.0	Diurnal Average
		0	0	0	0	0	4	50	198	361	539	653	786	746	729	633	553	410	234	84	4	0	0	0	0	Diurnal Maximum







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Global Radiation (GR) - W/m2**  
**Conklin Lookout - September 2015**

<b>Concentration Ranges (W/m2)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	377	52.36	52.36
21 - 100	76	10.56	62.92
101 - 300	130	18.06	80.97
301 - 600	107	14.86	95.83
601 - 900	30	4.17	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

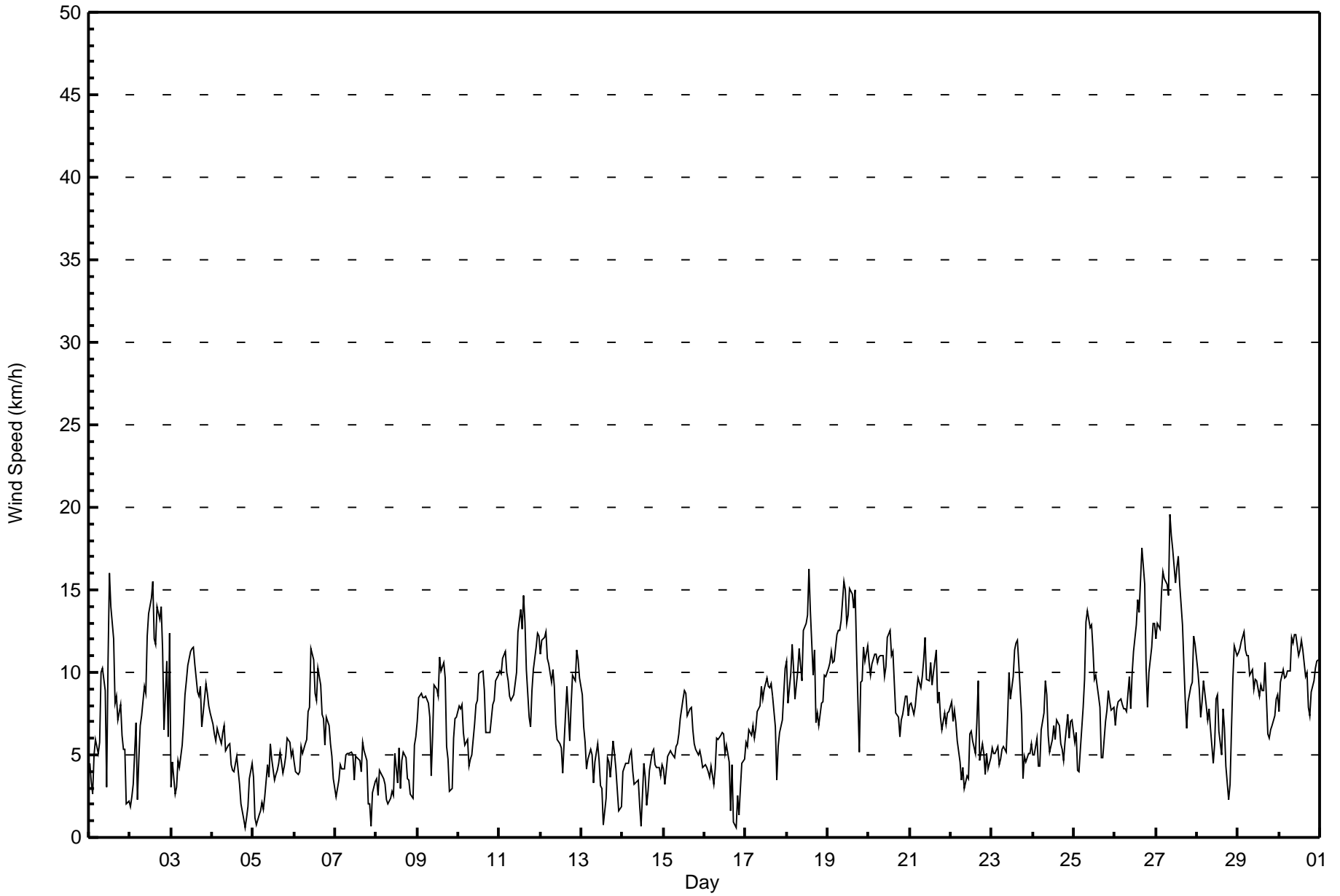


Maximum Speed: 20 km/h on Sep 27 09:00	Maximum Daily Speed Average: 12.3 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 1 km/h on Sep 4 20:00	Minimum Daily Speed Average: 1.3 km/h on Sep 8	Hours of Data: 720
Maximum Diurnal Speed Average: 4.5 km/h at hour 23	Minimum Diurnal Speed Average: 1.8 km/h at hour 19	Hours of Missing Data: 0
Monthly Average Velocity: 3.6 km/h 250.6 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> = 12 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-Sep	S4	SSE3	NNW3	E5	NNE6	N5	N6	NNE10	NE10	ENE9	S3	W11	W16	WNW14	W12	W8	W9	WSW7	W8	W6	WSW5	WNW5	WNW2	SSW2	WNW3.3	W16		
2-Sep	NE2	SE2	SSE3	ESE7	NNE2	ENE5	E7	ENE7	ENE9	ENE9	ENE12	ENE14	ENE15	ENE16	ENE12	ENE12	NE14	NE13	NE14	NNE11	NNE7	NE11	N6	NE12	ENE8.4	ENE16		
3-Sep	NNW3	NNE5	NNW3	NW3	NW5	WNW4	WNW6	WNW7	WNW9	WNW9	WNW10	WNW11	WNW11	WNW11	WNW10	WNW9	WNW9	WNW9	WNW7	W8	WNW9	WNW9	WNW8	WNW8	WNW7.3	WNW11		
4-Sep	WNW7	WNW6	WNW6	W7	WNW6	WNW6	WNW6	WNW7	NW5	NW6	WNW6	WNW4	NW4	NW4	WNW5	N4	NNW3	NNW2	ESE1	W1	SSE1	SSW2	SSW4	SW5	WNW3.6	WNW7		
5-Sep	SW4	E1	NE1	S1	SSE2	ESE2	ESE2	SE2	SE4	ESE4	ENE6	E5	ENE3	E4	E4	N5	E5	ENE4	NE4	NE5	NE6	NE6	NNE5	NNE5	ENE2.8	NE6		
6-Sep	N5	N4	N4	N4	NNE6	N5	NNE6	NNE6	NNE8	NNE8	NNE11	NNE11	NNE9	NNE8	NNE10	NNE9	NNE7	NNE7	NNE6	NNE7	NNE7	NNE6	NNE5	N4	NNE6.6	NNE11		
7-Sep	NNW2	NW3	NW3	NW4	WNW4	WNW4	WNW5	WNW5	WNW5	NW5	NW5	NNW3	NW5	NW5	NNW5	N4	NNE6	NNE5	NNE5	NNE2	N2	WSW1	WNW3	WNW3	NW3.3	NNE6		
8-Sep	WNW4	WNW3	WNW4	WNW4	WNW4	WNW3	WNW2	NW2	N2	NNW3	N3	NNE5	N3	NE5	NNE3	NNE5	NE5	ENE5	ENE4	E3	SSE3	S2	SW6	SW6	NNW1.3	SW6		
9-Sep	SW7	SW8	SW9	SW8	SW9	SW9	SW8	SW7	SSW4	SSW6	SSW9	SSW9	SSW9	SW11	SW10	SW11	SW10	SW5	NW5	NNE3	S3	SW6	SW7	SW7	SW6.9	SW11		
10-Sep	SW8	SW8	WSW8	SW6	SW6	SSW6	SSW4	SSW5	SSW5	SSW7	SSW8	SW8	SW10	SW10	SW10	SW9	SW6	SW6	SW6	SW7	SW8	SW8	SW9	SW10	SW7.4	WSW10		
11-Sep	SW10	SW10	SW11	SW11	SW10	SW9	SW9	SW8	SSW9	WSW9	WSW10	W12	W14	W13	W15	WSW13	W10	WSW7	WSW7	SW9	SW10	SW12	WSW12	W12	WSW9.9	W15		
12-Sep	WSW11	WSW12	WSW12	WSW12	WSW11	WSW10	WSW9	W10	W9	WNW7	NW6	NW6	NW5	WNW4	WNW6	WNW9	WNW8	W6	W8	W10	WNW10	W11	WNW11	WNW10	W8.4	WSW12		
13-Sep	WNW9	NW7	NW6	NW4	NW5	NW5	NW5	NNW3	NE5	NE6	E5	E3	E3	NNW1	NNE2	NE5	WNW5	N4	NNE6	NE5	ENE4	N3	NNW2	NW2	N2.6	WNW9		
14-Sep	NW4	WNW4	WNW5	WNW4	WNW5	WNW5	WNW4	NW3	N3	NNE3	NW2	NE1	NNE4	NNE4	NNW2	NNW3	NNE4	NNE5	NE5	NE4	ENE4	ENE4	E4	ESE4	N2.3	NE5		
15-Sep	E4	NE3	NE5	ENE5	ENE5	ENE5	NE5	NNE6	NE6	NE6	ENE7	E8	E9	E9	ENE7	ENE8	E8	ENE7	ENE6	ENE5	ENE5	ENE5	ENE4	ENE4	ENE5.8	E9		
16-Sep	NE4	NE4	NE4	NE4	NE4	NNE3	NNE4	NNE6	NNE6	NE6	NE6	NE6	ENE5	NNE6	NNE5	NE2	NNE4	NW1	S1	SW3	SW1	SSW3	SW5	SW5	NE2.6	NE6		
17-Sep	SW6	SW5	SW7	SW6	SW7	SW6	SSW7	SSW8	SSW8	SSW9	SSW8	SW9	SW10	SW9	SW9	SW9	SW9	SW7	W3	SW5	SW6	SW7	SW9	SW10	SW7.4	SW10		
18-Sep	SW11	SW8	SSW10	SW12	SW10	SW8	SW10	SW11	SW10	SW10	SW13	WSW13	W13	W16	W14	WSW10	WSW11	WSW7	SW8	SW7	SW8	SW8	SW10	SW10	SW9.7	W16		
19-Sep	SSW10	SSW11	SW11	SW11	SW11	SSW12	SSW13	SSW13	SSW13	SSW15	SSW15	SW13	SW13	SW15	SW15	WSW14	SW15	SSW11	WSW5	WNW9	WNW9	W12	W11	WSW12	SW10.9	SSW15		
20-Sep	W11	WSW10	WSW10	WSW11	WSW11	WSW11	WSW11	WSW11	W11	WSW10	SW10	SW12	SW13	WSW11	WSW11	WSW9	SW8	SW7	SW6	SW7	WSW7	W9	W9	W7	WSW9.5	SW13		
21-Sep	W8	W8	WNW7	WNW8	W9	W10	WNW9	WNW10	WNW11	WNW12	NW10	NW9	NW11	WNW9	WNW10	WNW11	WNW8	W9	W7	W7	W8	WNW7	W8	W8	WNW8.7	WNW12		
22-Sep	W8	W7	W8	W7	WNW6	W5	SW3	SSW4	S3	S4	SE4	E6	E6	ESE6	SE5	S7	SSW9	SSE5	SSE6	S5	SE4	SE5	SSE4	SSE5	S2.7	SSW9		
23-Sep	SE5	ESE5	ESE5	ESE5	ESE4	E5	ESE5	ESE5	ESE5	ESE7	SE10	ESE8	ESE10	ESE11	ESE12	SE12	SE11	SE7	SE4	SE5	SE5	SSE5	SSE6	SSE6	SE6.6	SE12		
24-Sep	S5	S5	SSW6	S4	SSW4	SSW6	SSW8	SSW9	SW9	SSW6	SSW5	SSW6	SSW7	SSE6	SSE7	SSE7	SSE6	SSE5	SSE5	SSE6	SSE7	SSE7	S7	S7	S5.8	SSW9		
25-Sep	S6	S6	SSE4	SSE4	S5	WSW8	WSW10	WNW13	NW14	NW13	NW13	NW11	WNW10	WNW10	WNW9	W8	W5	SW5	SW7	SW8	SW9	SW8	WSW8	WSW8	W5.9	NW14		
26-Sep	WSW7	SW8	SW8	SW8	SW8	SW8	SW8	SW10	WSW8	WSW10	W11	W13	W14	WSW14	SW16	WSW18	W15	W10	W8	W10	W12	WSW13	WSW13	WSW10.2	WSW18			
27-Sep	WSW12	WSW13	SW13	WSW15	WSW16	WSW16	WSW15	W15	WNW20	WNW18	WNW17	NW15	WNW16	WNW17	WNW15	NW13	NW10	NW8	WNW7	W8	W9	WSW9	W12	W12	W12.3	WNW20		
28-Sep	W10	W9	W7	W8	W9	W8	W7	W8	W7	WNW5	WNW6	WNW8	WNW9	WNW6	W5	WSW8	SW7	SSW4	S2	S3	S7	SSW10	SSW12	SSW11	WSW5.9	SSW12		
29-Sep	SSW11	SSW11	SSW12	SSW12	SW11	SW11	SW11	SW10	SW10	SW9	W10	WSW10	SW9	WSW9	WSW9	SW9	WSW11	SW6	SW6	SW7	SW7	SW7	SW8	SW9	SW9.0	SSW12		
30-Sep	SW8	SW9	SW10	SW10	SW10	SSW10	SSW10	SSW12	SSW12	SSW12	SSW12	SSW12	SSW12	SSW12	SSW11	SW11	SW12	SW11	SW10	SW10	SSW8	SSW7	SSW9	SSW9	SSW10	SSW11	SW10.1	SSW12

WSW4.9	WSW4.2	WSW4.9	WSW4.4	WSW4.4	WSW4.4	WSW4.2	WSW3.9	WSW3.1	WSW2.9	W3.1	W3.3	W3.8	W4.0	W4.2	WSW3.6	WSW3.4	WSW2.4	W1.8	WSW2.1	WSW2.8	WSW3.6	WSW4.5	WSW4.5	Diurnal Average	
WSW12	WSW13	SW13	WSW15	WSW16	WSW16	WSW15	W15	WNW20	WNW18	WNW17	NW15	WNW16	WNW17	WNW15	SW16	WSW18	W15	NE14	NNE11	SW10	SW12	WSW13	WSW13	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Conklin Lookout - September 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	239	33.19	33.19
6 - 11	393	54.58	87.78
12 - 19	87	12.08	99.86
20 - 28	1	0.14	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Conklin Lookout - September 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	16	22	20	18	14	12	11	14	15	12	11	3	5	28	24	14	239
6 - 11	1	28	10	10	7	6	3	10	5	37	120	41	50	55	10	0	393
12 - 19	0	0	4	6	0	1	1	0	0	13	12	19	18	8	5	0	87
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	17	50	34	34	21	19	15	24	20	62	143	63	73	92	39	14	720

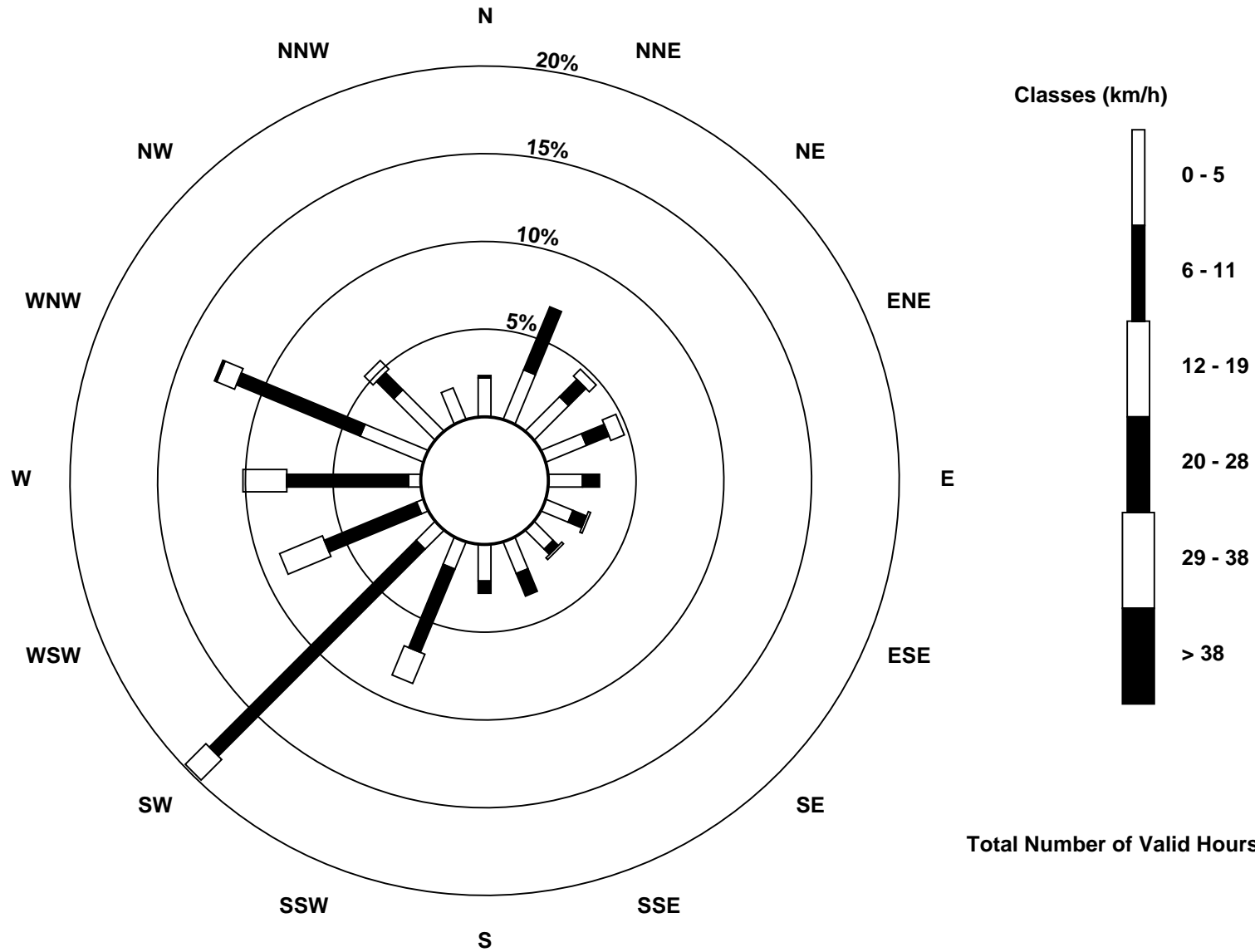
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Wind Speed (WS) - km/h  
Conklin Lookout (AMS 18)





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 8 km/h on Sep 27 09:00	Hours of Data: 720
Minimum Value: 1 km/h on Sep 14 00:00	Hours of Missing Data: 0
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 P <sub>99</sub> = 6	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-Sep	1	1	2	2	2	3	2	3	4	4	2	5	6	5	5	3	3	3	3	2	1	2	1	1	6
2-Sep	1	1	1	2	2	2	2	2	3	3	4	5	5	6	5	4	5	4	5	4	4	4	3	5	6
3-Sep	2	2	1	1	2	2	2	3	3	4	4	4	5	4	3	3	3	2	2	3	3	3	2	5	
4-Sep	2	2	2	2	2	2	2	3	2	2	2	2	2	2	1	2	1	1	1	1	1	1	1	3	
5-Sep	2	1	1	1	1	1	1	1	1	1	2	3	1	1	2	2	2	1	1	1	1	1	1	3	
6-Sep	2	1	1	1	2	2	2	2	2	3	4	4	3	3	4	3	3	3	2	3	2	2	2	4	
7-Sep	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	
8-Sep	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	2	
9-Sep	1	2	2	2	2	2	2	2	1	2	3	3	3	4	3	3	3	2	2	2	1	1	1	4	
10-Sep	2	2	2	1	1	1	1	1	1	2	2	3	3	3	3	3	3	2	1	2	2	2	2	3	
11-Sep	2	2	3	2	2	2	2	2	2	3	4	5	5	5	5	5	4	2	1	2	2	3	4	5	
12-Sep	4	4	4	4	4	3	3	4	3	3	2	3	2	2	2	4	3	2	3	3	3	4	3	4	
13-Sep	3	2	1	1	1	1	1	1	2	2	2	2	1	2	3	2	3	2	2	2	1	1	1	3	
14-Sep	1	1	1	2	2	1	1	1	1	1	1	3	2	2	1	1	1	1	1	1	1	1	1	3	
15-Sep	1	1	1	2	2	1	1	1	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	3	
16-Sep	1	1	1	1	1	1	2	2	2	2	2	2	3	2	2	2	2	1	1	1	1	2	1	3	
17-Sep	1	1	1	1	1	1	1	2	2	3	3	3	3	4	4	4	3	2	5	3	1	1	2	5	
18-Sep	3	3	3	3	3	2	3	3	3	3	4	5	5	7	5	4	4	2	2	2	2	2	2	7	
19-Sep	2	3	3	3	3	3	3	3	4	5	5	4	5	5	5	5	5	4	2	4	4	4	3	5	
20-Sep	4	3	3	4	3	4	3	4	4	3	4	4	4	5	4	3	3	3	1	2	2	3	3	5	
21-Sep	2	3	2	3	3	4	3	3	4	5	4	4	4	4	4	4	3	3	2	3	2	2	2	5	
22-Sep	2	2	2	2	2	1	1	1	1	1	2	3	3	3	2	3	4	2	2	2	1	1	1	4	
23-Sep	2	1	1	1	1	1	2	2	2	2	4	4	4	5	5	4	4	3	2	1	1	2	1	5	
24-Sep	2	1	2	2	2	1	2	2	2	2	2	2	3	3	3	2	2	2	2	2	2	2	3	3	
25-Sep	2	2	2	1	2	3	4	4	4	5	5	5	5	4	4	3	3	2	2	2	2	2	2	5	
26-Sep	2	2	2	2	2	2	2	2	3	3	4	5	5	5	6	5	7	5	4	3	4	4	5	7	
27-Sep	4	4	4	5	6	5	5	5	8	7	7	6	6	6	6	5	5	3	2	3	3	3	4	8	
28-Sep	3	3	2	3	3	2	2	2	2	2	2	3	4	3	3	3	2	2	1	1	2	3	3	4	
29-Sep	3	3	3	3	3	3	3	3	2	3	4	3	3	3	3	3	4	2	1	2	1	2	2	4	
30-Sep	2	2	2	2	2	2	2	3	3	4	4	4	4	4	4	4	3	2	2	2	2	2	3	4	

Diurnal Maximum



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Conklin Lookout - September 2015**

Direction of Maximum Speed: 287 deg on Sep 27 09:00															Hours in Service: 720	
Direction of Maximum Daily Speed Average: 278.3 deg on Sep 27															Hours of Data: 720	
Direction of Minimum Speed: 279 deg on Sep 4 20:00															Hours of Missing Data: 0	
Direction of Minimum Daily Speed Average: 1.3 deg on Sep 8															Percent Operational Time: 100.0	
Monthly Average Direction: 256.5 deg																

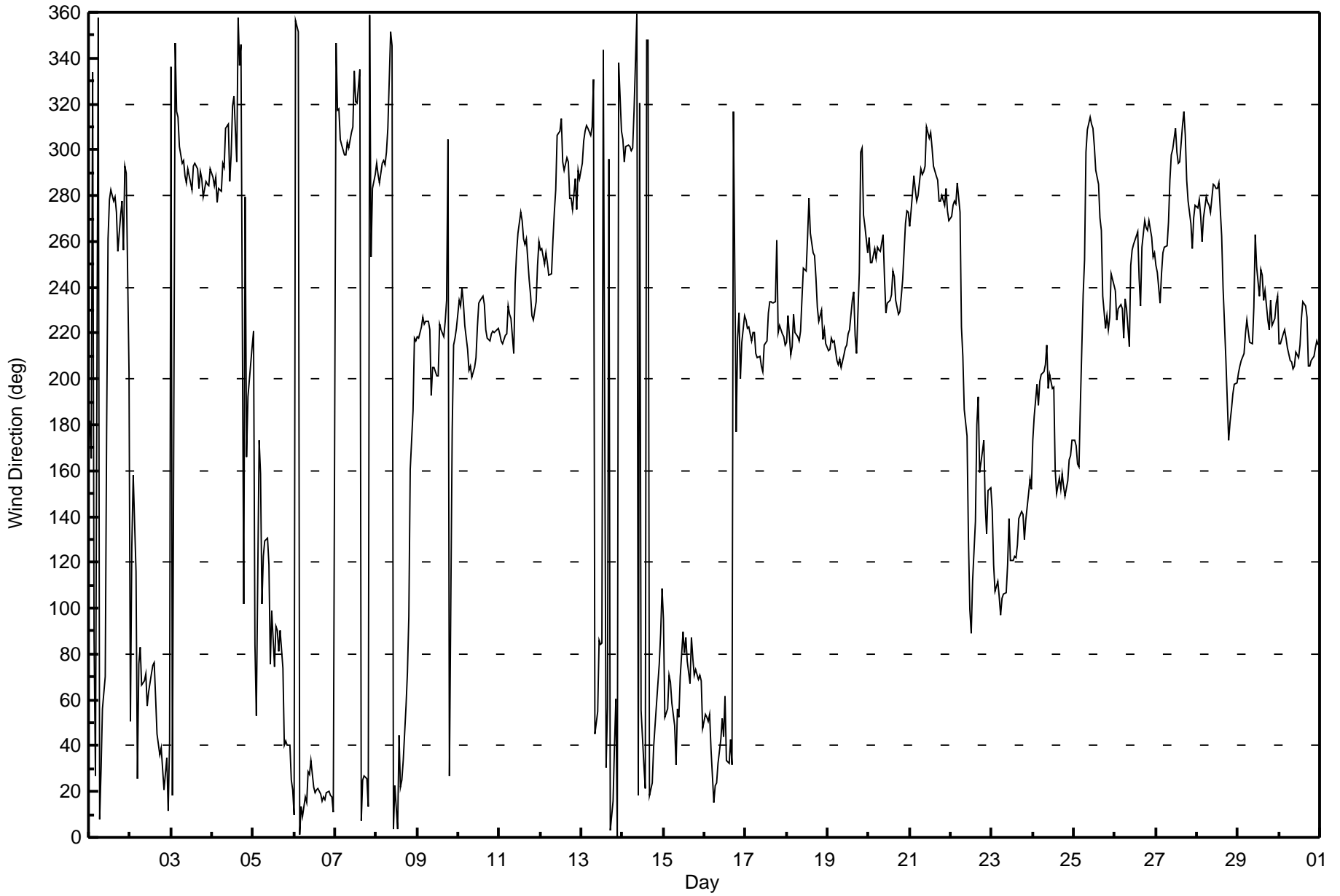
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	182	165	334	87	27	358	8	30	56	70	178	261	278	283	277	280	273	256	272	278	257	293	290	203	293.3
2-Sep	51	127	158	116	26	76	83	66	68	71	58	64	71	75	76	61	45	36	39	30	21	35	11	42	57.5
3-Sep	336	18	346	317	314	301	294	296	289	286	292	286	283	293	294	292	283	290	287	280	286	285	284	292	292.7
4-Sep	288	285	288	277	283	282	294	292	309	311	286	298	319	324	295	357	337	346	102	279	166	192	200	214	291.5
5-Sep	221	84	53	173	159	102	123	130	130	119	75	99	74	92	90	81	91	74	40	42	40	40	25	21	76.2
6-Sep	9	357	352	1	14	9	18	15	29	27	33	22	19	21	22	19	16	18	16	20	20	18	18	11	18.4
7-Sep	347	317	318	304	302	298	298	303	301	308	310	335	321	320	335	7	25	27	25	14	359	253	283	289	325.8
8-Sep	294	290	285	294	295	293	299	309	351	345	4	23	3	44	22	25	34	57	72	96	160	186	218	217	346.7
9-Sep	218	218	223	227	224	225	225	222	193	205	205	201	201	224	222	219	225	234	305	27	177	215	218	222	219.3
10-Sep	234	232	240	233	223	213	204	206	201	205	209	223	233	234	236	232	222	218	217	220	221	220	221	222	223.2
11-Sep	220	217	216	219	220	232	228	226	211	242	255	263	273	269	261	258	261	244	237	227	226	234	249	260	241.6
12-Sep	256	257	250	255	251	245	246	260	273	283	306	308	314	295	291	296	295	279	279	274	288	274	291	287	273.1
13-Sep	294	304	308	311	310	306	310	331	45	55	86	84	85	343	30	56	296	3	16	40	60	0	338	308	352.2
14-Sep	304	295	302	302	301	299	301	317	360	18	320	56	32	21	348	348	18	24	40	49	58	76	89	109	359.5
15-Sep	95	52	56	71	68	58	49	31	56	53	70	90	81	87	77	67	87	78	71	73	69	71	68	47	69.7
16-Sep	54	53	51	54	38	15	23	24	32	43	52	44	62	33	32	43	32	317	177	218	229	200	216	228	40.6
17-Sep	226	222	223	216	220	220	211	209	210	206	203	215	216	229	234	234	233	234	261	220	223	220	219	215	220.5
18-Sep	216	228	211	214	228	220	219	217	221	235	248	247	262	279	264	255	254	244	231	225	230	217	221	216	235.5
19-Sep	212	213	218	216	217	208	206	209	205	210	213	215	220	222	234	238	219	211	247	299	301	272	266	255	226.4
20-Sep	262	251	251	257	252	257	256	256	263	244	229	233	235	237	247	245	234	228	229	236	243	268	274	273	248.5
21-Sep	267	273	289	282	278	280	292	289	291	293	310	305	307	301	293	289	287	278	278	280	276	283	274	269	286.9
22-Sep	271	276	278	277	286	273	223	210	187	175	131	99	89	112	138	180	192	159	168	173	145	132	151	153	187.9
23-Sep	143	119	108	111	105	97	104	106	107	119	139	121	121	122	122	127	139	142	141	130	138	150	157	152	126.3
24-Sep	174	184	198	188	199	202	203	206	215	196	202	196	197	160	150	157	152	158	153	149	155	165	167	173	180.1
25-Sep	173	171	163	162	189	237	252	299	309	314	311	309	301	291	285	270	265	236	222	228	221	227	246	241	264.0
26-Sep	239	226	231	233	231	218	235	231	214	249	256	259	262	264	244	232	257	269	266	265	269	262	253	255	248.9
27-Sep	249	246	233	246	255	258	258	269	287	298	300	310	299	294	295	310	317	306	287	277	268	257	270	276	278.3
28-Sep	275	278	271	260	270	280	277	276	273	285	284	283	283	286	262	240	224	209	173	182	186	193	198	198	252.0
29-Sep	203	205	208	211	219	226	221	216	216	231	263	249	236	248	246	235	239	225	221	234	224	226	233	236	226.9
30-Sep	215	215	220	222	218	213	208	208	205	205	211	209	215	227	234	232	227	206	206	208	210	213	216	215	215.0

240.3 239.1 240.9 237.8 248.7 248.2 246.9 253.8 254.2 258.5 259.9 262.5 267.1 268.1 262.1 257.7 255.4 253.8 262.5 253.7 242.6 240.5 242.2 240.0

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**

**Conklin Lookout - September 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 99 deg on Sep 14 12:00	Hours of Data: 720
Minimum Value: 10 deg on Sep 16 20:00	Hours of Missing Data: 0
Percentiles: P <sub>1</sub> = 12 P <sub>10</sub> = 18 Q <sub>1</sub> = 22 Median = 30 Q <sub>3</sub> = 35 P <sub>90</sub> = 47 P <sub>99</sub> = 75	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-Sep	24	29	78	25	41	38	40	25	28	40	72	36	33	37	35	44	35	32	33	31	22	19	46	28	78
2-Sep	73	48	27	26	64	24	27	27	29	26	25	30	30	30	33	30	25	22	24	29	37	24	41	28	73
3-Sep	66	32	42	55	56	52	34	36	31	37	32	32	35	33	36	37	33	29	32	26	25	30	29	28	66
4-Sep	28	32	31	30	31	35	35	34	55	57	49	59	68	58	40	63	51	60	91	49	41	22	11	13	91
5-Sep	16	54	70	56	54	35	28	25	27	39	32	45	28	30	46	44	31	24	18	15	17	17	18	16	70
6-Sep	24	29	31	24	24	26	25	27	23	25	23	29	34	37	32	34	42	37	45	38	37	38	38	37	45
7-Sep	57	55	52	34	29	29	27	35	39	46	54	75	62	64	73	65	33	21	17	42	38	40	21	22	75
8-Sep	18	18	19	16	13	15	19	24	40	69	75	59	85	52	71	59	50	18	19	21	36	24	12	12	85
9-Sep	13	17	18	19	17	18	16	18	38	40	31	40	34	30	29	28	24	37	47	62	36	14	15	17	62
10-Sep	22	20	24	21	15	12	11	11	18	22	27	37	31	34	30	27	26	21	14	17	19	18	19	19	37
11-Sep	19	19	19	18	19	21	18	19	20	34	35	35	33	33	34	34	30	25	21	18	21	25	30	31	35
12-Sep	31	32	30	32	31	28	29	32	35	39	53	57	47	38	34	40	38	33	29	32	27	28	27	28	57
13-Sep	29	29	22	22	21	19	19	29	39	32	55	87	51	94	75	30	61	37	28	29	30	38	39	27	94
14-Sep	30	24	29	41	23	26	36	50	66	36	72	99	46	34	72	52	36	21	18	19	17	23	20	17	99
15-Sep	23	38	20	23	22	23	20	20	28	21	31	30	31	34	31	29	33	27	29	27	27	24	24	21	38
16-Sep	20	26	22	24	22	27	30	25	27	28	28	31	52	45	46	76	35	39	66	10	58	39	12	13	76
17-Sep	14	14	15	14	15	13	15	19	21	23	37	36	32	37	42	41	29	27	61	38	16	14	17	18	61
18-Sep	20	27	19	21	21	18	18	20	20	30	34	34	38	34	33	32	33	27	23	20	22	17	20	20	38
19-Sep	20	20	21	19	20	21	20	20	20	23	24	25	30	27	31	32	27	23	52	32	33	32	32	31	52
20-Sep	32	30	32	31	30	33	31	32	33	30	25	29	27	32	32	31	28	25	21	22	27	30	30	31	33
21-Sep	30	28	28	29	30	33	31	33	32	33	48	43	44	40	38	30	33	35	31	47	31	31	29	31	48
22-Sep	29	27	28	28	23	24	40	15	35	40	58	45	48	51	39	37	32	34	37	29	25	16	28	29	58
23-Sep	24	18	19	20	21	24	25	24	28	30	34	37	35	32	31	31	30	31	27	16	18	26	26	24	37
24-Sep	30	22	17	25	23	11	15	19	20	25	35	43	43	47	43	36	39	37	32	30	34	36	35	32	47
25-Sep	26	31	25	25	22	26	34	29	30	38	35	41	41	36	36	34	34	25	18	22	21	21	27	28	41
26-Sep	27	19	20	20	22	16	29	26	20	36	37	39	39	36	34	28	32	30	31	29	30	32	31	31	39
27-Sep	29	30	24	30	32	29	30	29	31	31	32	35	31	29	32	38	44	39	31	29	30	30	29	27	44
28-Sep	28	27	30	30	31	29	25	25	33	48	44	37	48	50	64	34	27	34	31	27	20	20	18	18	64
29-Sep	18	18	20	20	22	23	19	20	19	28	35	33	29	35	38	31	31	20	16	19	18	18	22	21	38
30-Sep	17	16	18	19	20	19	18	20	20	23	24	32	31	36	33	33	30	21	17	17	18	19	20	19	36

73	55	78	56	64	52	40	50	66	69	75	99	85	94	75	76	61	60	91	62	58	40	46	37	
Diurnal Maximum																								



# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	September 9, 2015	Last Calibration	August 11, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	7:10	End Time (MST)	11:50
Gas Cert Reference	EY0000368	Station temp.	22 Deg C
Cal Gas Concentration	49 ppm	Cal Gas Exp Date	10/06/2016
Calibrator Make/Model	API T700	Serial Number	1222
ZAG Make/Model	API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9035

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-601	-601
Analyzer IP address	192.168.1.43		Lamp voltage	878	885
Calculated slope	0.985015	1.001414	Chamber temp	45.2	45.0
Calculated intercept	-1.901961	-1.304051	Pressure	658.7	659.6
Analyzer Background	24.5	23.1	Flow	0.436	0.429
Analyzer Coefficient	0.965	0.928	Intensity	86	86

Analyzer make Thermo 43i Analyzer serial # JC1501301453

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.5	----
as found span	5000	58.6	574.3	596.5	0.963
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	58.6	574.3	574.2	1.000
second point	5000	29.3	287.1	288.2	0.996
third point	5000	14.6	143.1	146.1	0.979
as left zero	5000	0.0	0.0	-0.4	----
as left span	5000	58.6	574.3	574.7	0.999
Average Correction Factor					0.992

Corrected As found 597.0 Previous response 584.9 % change -2.0%

Notes:

Filter changed out, Span adjusted, No maintenance done

Calibration Performed By: Melissa Lemay



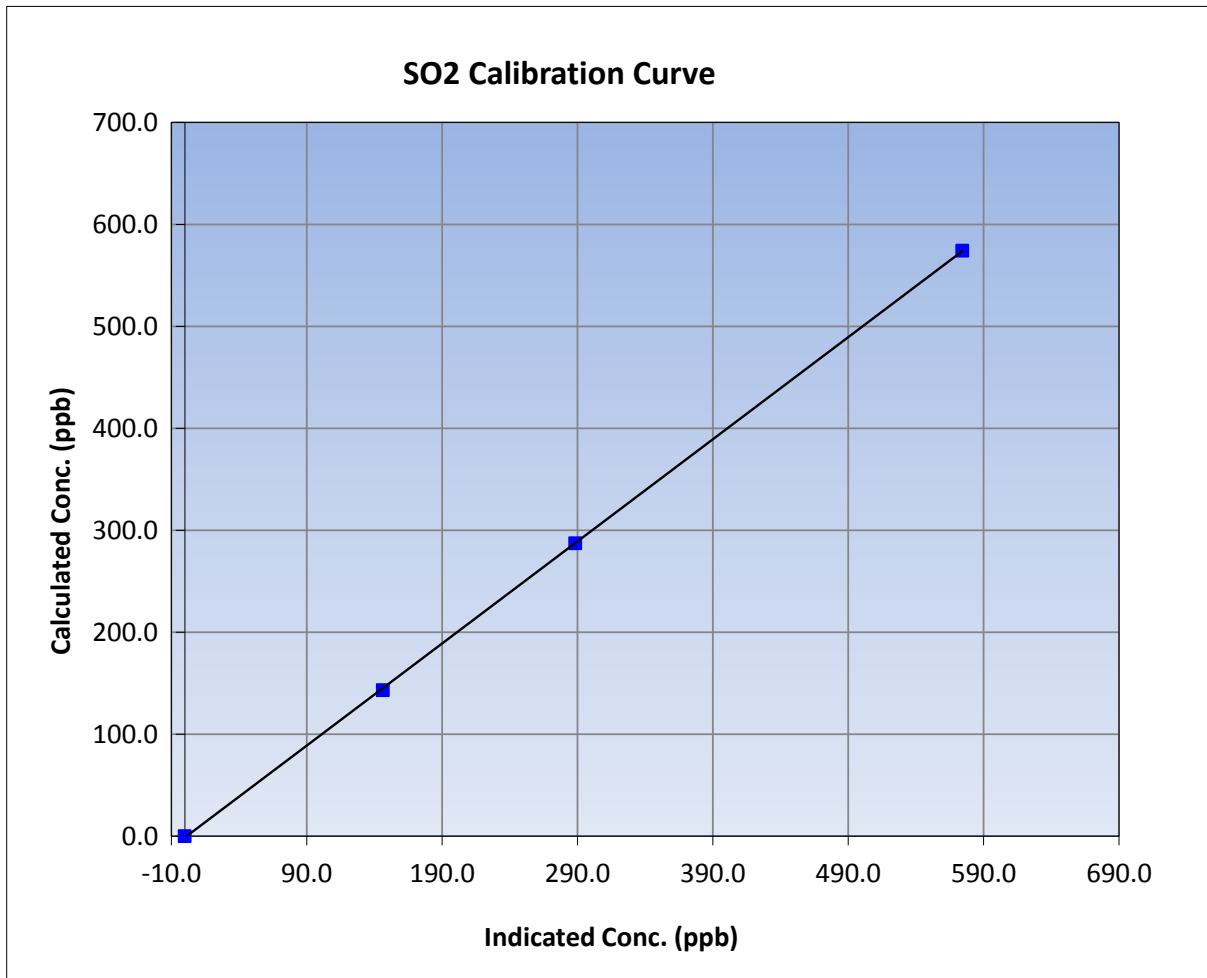
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 11, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:10	End Time (MST)	11:50
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301453

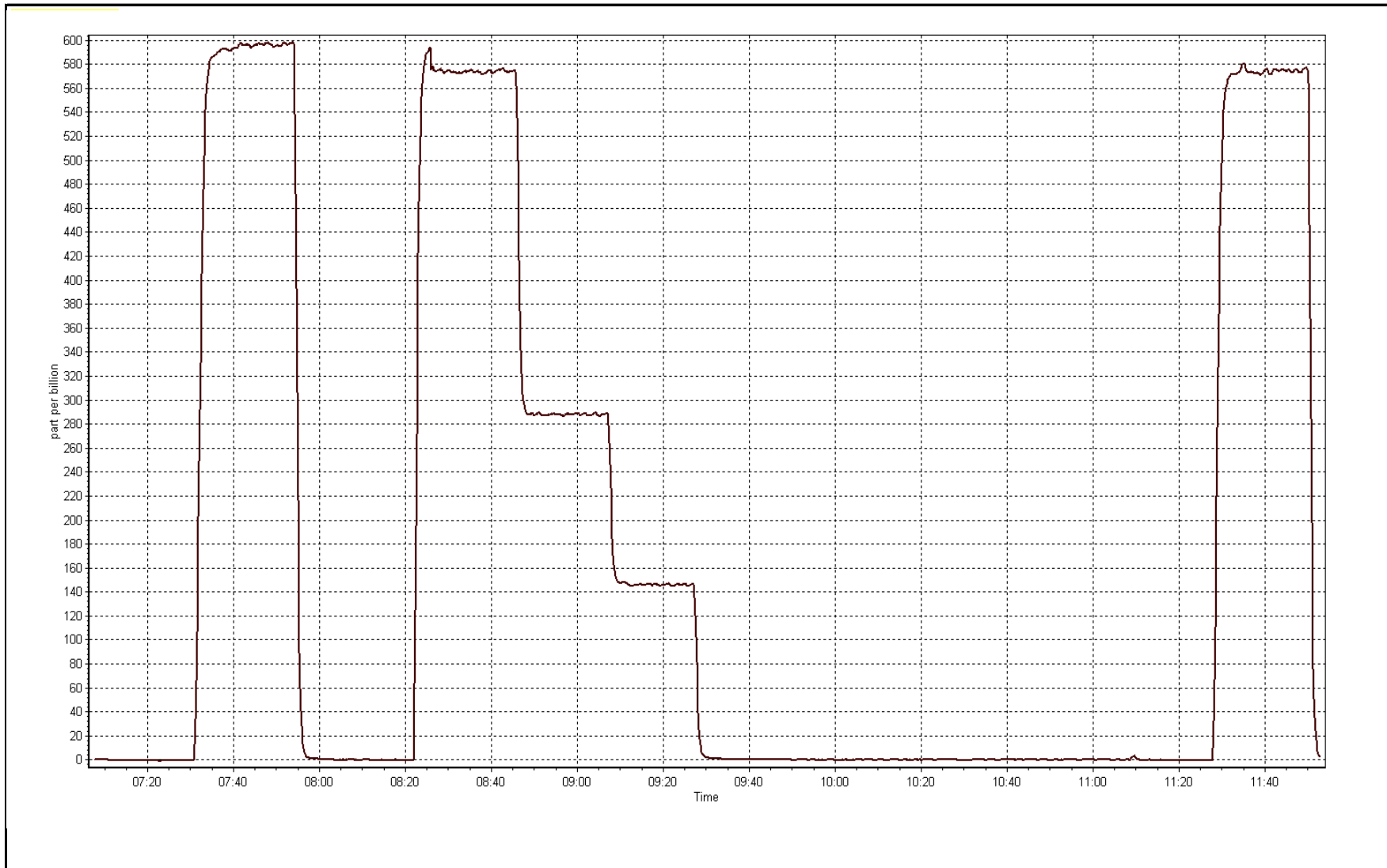
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999965
574.3	574.2	1.0001		
287.1	288.2	0.9963	Slope	1.001414
143.1	146.1	0.9793		
			Intercept	-1.304051



SO2 Calibration Plot

Date: September 9, 2015





# Wood Buffalo Environmental Association TRS Calibration Report

## Station Information

Calibration Date	September 10, 2015	Last Calibration	August 26, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	8:16	End Time (MST)	11:14
Gas Cert Reference	CC233389	Station temp.	22 Deg C
Cal Gas Concentration	4.88 ppm	Cal Gas Exp Date	06/10/2014
Calibrator Make/Model	API 700	Serial Number	1222
Dil air Make/Model	API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9035
SO2 gas concentration	49 ppm	SO2 gas cert/exp	EY0000368 10/Jun/15

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-700	-699
Analyzer IP address	192.168.1.42		Lamp voltage	999	1007
Calculated slope	0.992749	1.000518	Chamber temp	45	45
Calculated intercept	-0.092080	-0.079167	Pressure	633.0	639.0
Analyzer Background	2.86	1.63	Flow	0.409	0.411
Analyzer Coefficient	1.092	0.976	Intensity	89	89
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1336160090	
Converter make/model	CDN-101		Converter serial #	522	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	82.0	80.0	78.9	1.014
SO2 scrubber check	5000	19.5	191.1	0.8	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	82.0	80.0	80.1	0.999
second point	5000	41.0	40.0	39.9	1.003
third point	5000	20.5	20.0	20.3	0.986
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	82.0	80.0	80.4	0.995
Average Correction Factor					0.996

Corrected As found	78.9	Previous response	80.7	% change	2.3%
--------------------	------	-------------------	------	----------	------

**Notes:**

no maintenance or adjustments done, filter changed out

Calibration Performed By:

Melissa Lemay



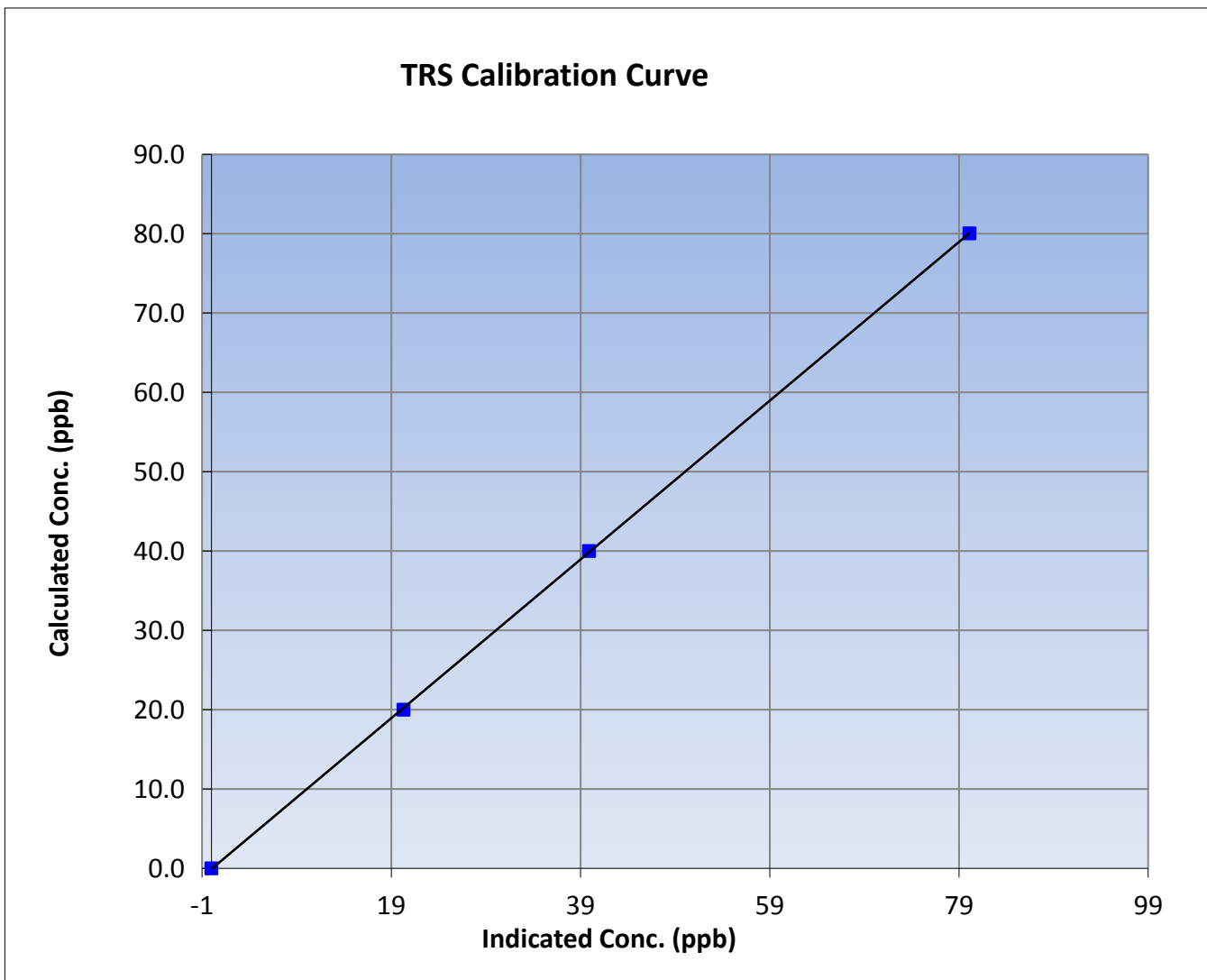
# Wood Buffalo Environmental Association TRS Calibration Report

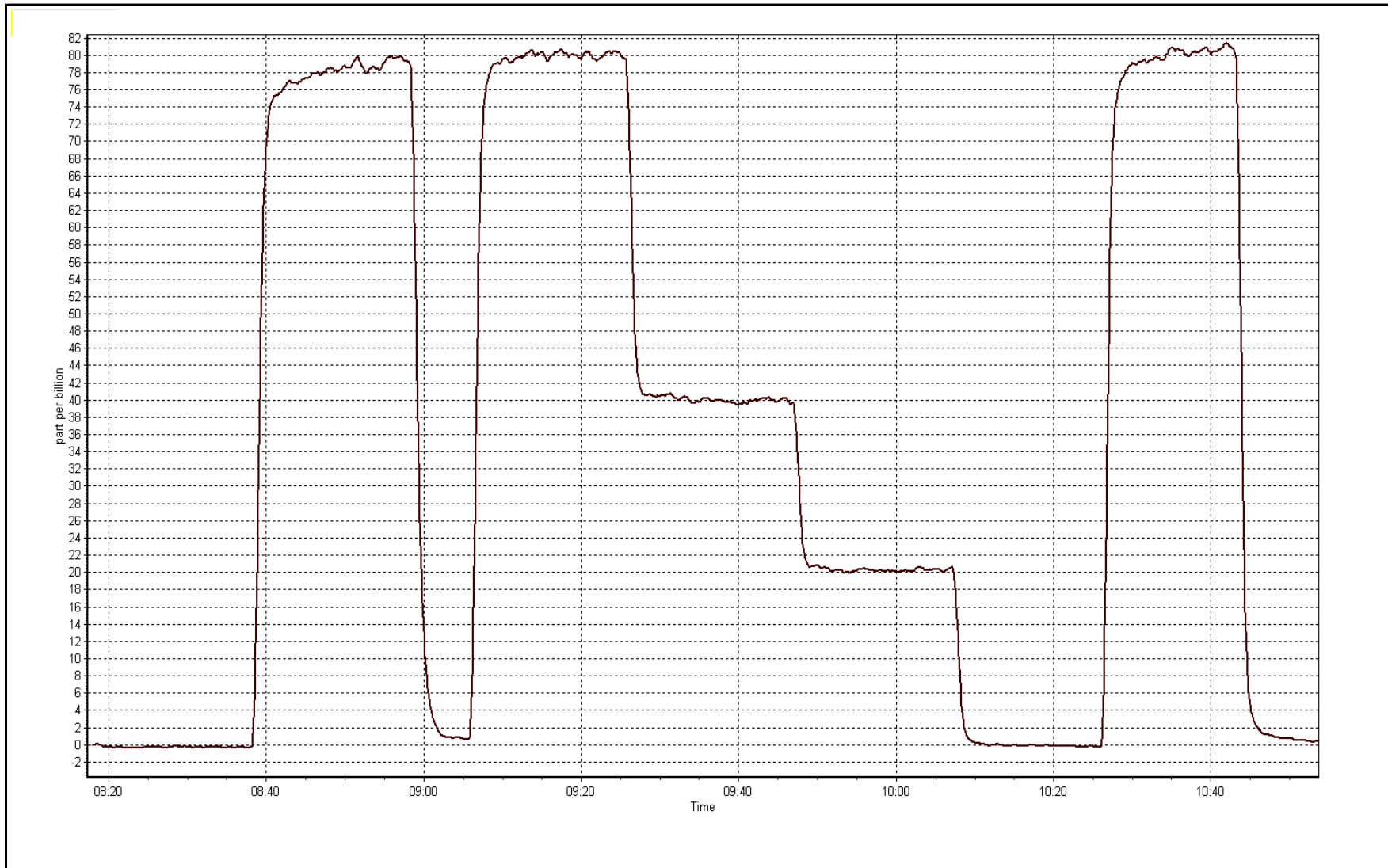
## Station Information

Calibration Date	September 10, 2015	Previous Calibration	August 26, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:16	End Time (MST)	11:14
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1336160090

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999975
80.0	80.1	0.9992		
40.0	39.9	1.0029	Slope	1.000518
20.0	20.3	0.9856		
			Intercept	-0.079167









# Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	September-09-15	Last Calibration	August-25-15
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	7:10	End Time (MST)	11:50
Gas Cert Reference	EY0000368	Cal Gas Expiry Date	June-10-16
CH4 Cal Gas Conc.	518.0 ppm	CH4 Equiv Conc.	1076.3 ppm
C3H8 Cal Gas Conc.	203.0 ppm	Station temp.	22 Deg C
Calibrator Model	API T700	Serial Number	1222
ZAG make/model	Teledyne API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	Serial Number	9035

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.3
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	364.7	405.0
THC Calc slope	1.007942	1.002327	Carrier Pressure	32.1	31.7
THC Calc intercept	-0.128438	-0.042121	Fuel Pressure	41.3	42.2
NMHC Calc slope	1.014106	1.002658	Air Pressure	32.6	32.5
NMHC Calc intercept	-0.107765	-0.024117			

Analyzer make Thermo 55i Analyzer serial # 1218153354

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.02	----
as found span	5000	58.6	12.61	12.27	1.028
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	12.61	12.61	1.000
second point	5000	29.3	6.31	6.34	0.995
third point	5000	14.6	3.14	3.23	0.973
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	12.61	12.80	0.985
Average Correction Factor					0.989

Corrected As found 12.25 Previous response 12.64 % change 3.2%

**Notes:**

Zero and span adjusted, No maintenance done, filter changed out

Calibration Performed By: Melissa Lemay



## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	58.6	6.54	6.34	1.032
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	6.54	6.54	1.000
second point	5000	29.3	3.27	3.29	0.994
third point	5000	14.6	1.63	1.68	0.970
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	6.54	6.62	0.988
Average Correction Factor					0.988

Corrected As found      6.34      Previous response      6.56      % change      3.5%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.02	----
as found span	5000	58.6	6.07	5.92	1.026
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	6.07	6.07	1.000
second point	5000	29.3	3.04	3.05	0.995
third point	5000	14.6	1.51	1.55	0.976
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	6.07	6.17	0.984
Average Correction Factor					0.990

Corrected As found      5.90      Previous response      6.08      % change      3.1%



# Wood Buffalo Environmental Association

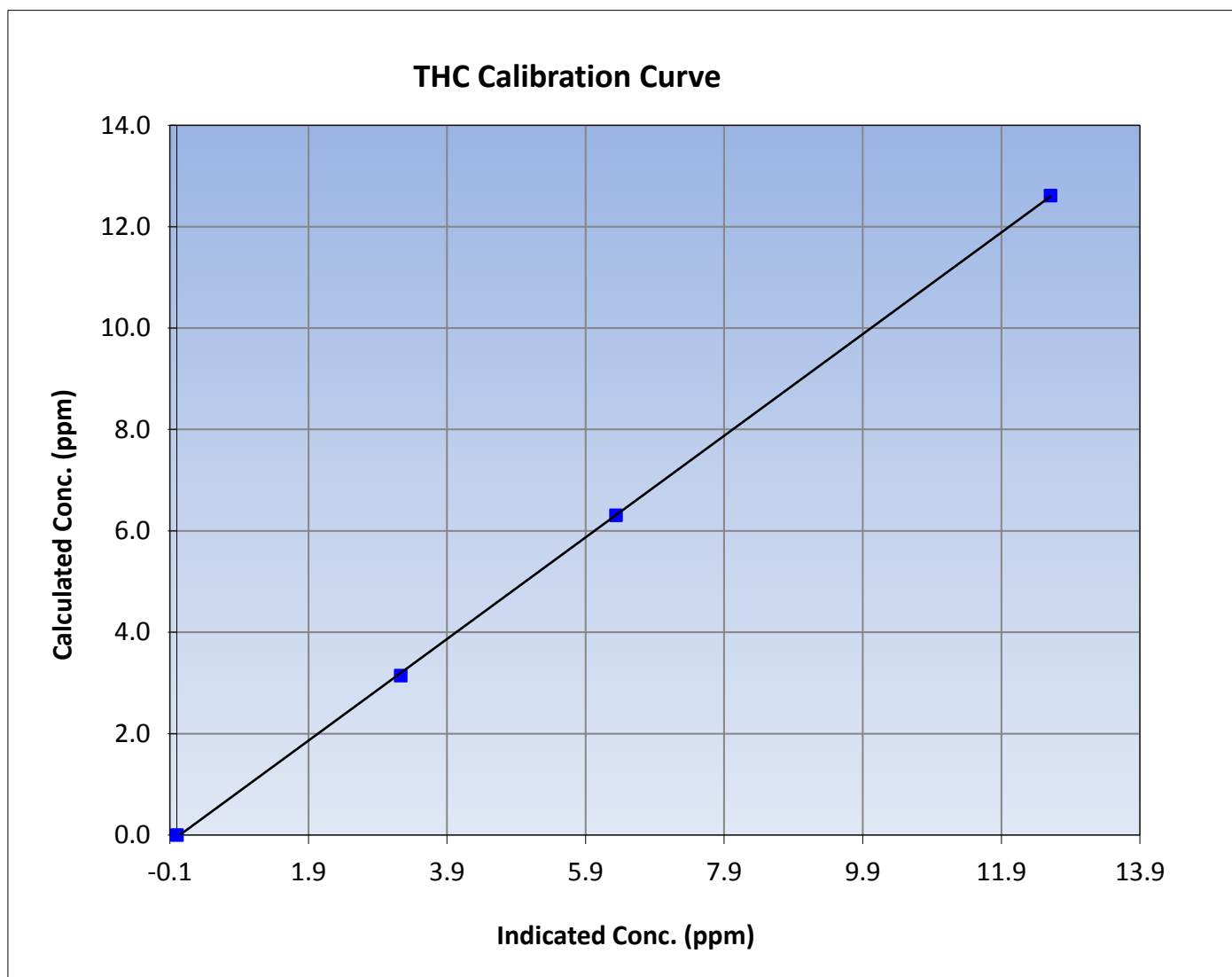
## THC Calibration Summary

### Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 25, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:10	End Time (MST)	11:50
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999944
12.61	12.61	1.0003		
6.31	6.34	0.9948	Slope	1.002327
3.14	3.23	0.9730		
			Intercept	-0.042121





# Wood Buffalo Environmental Association

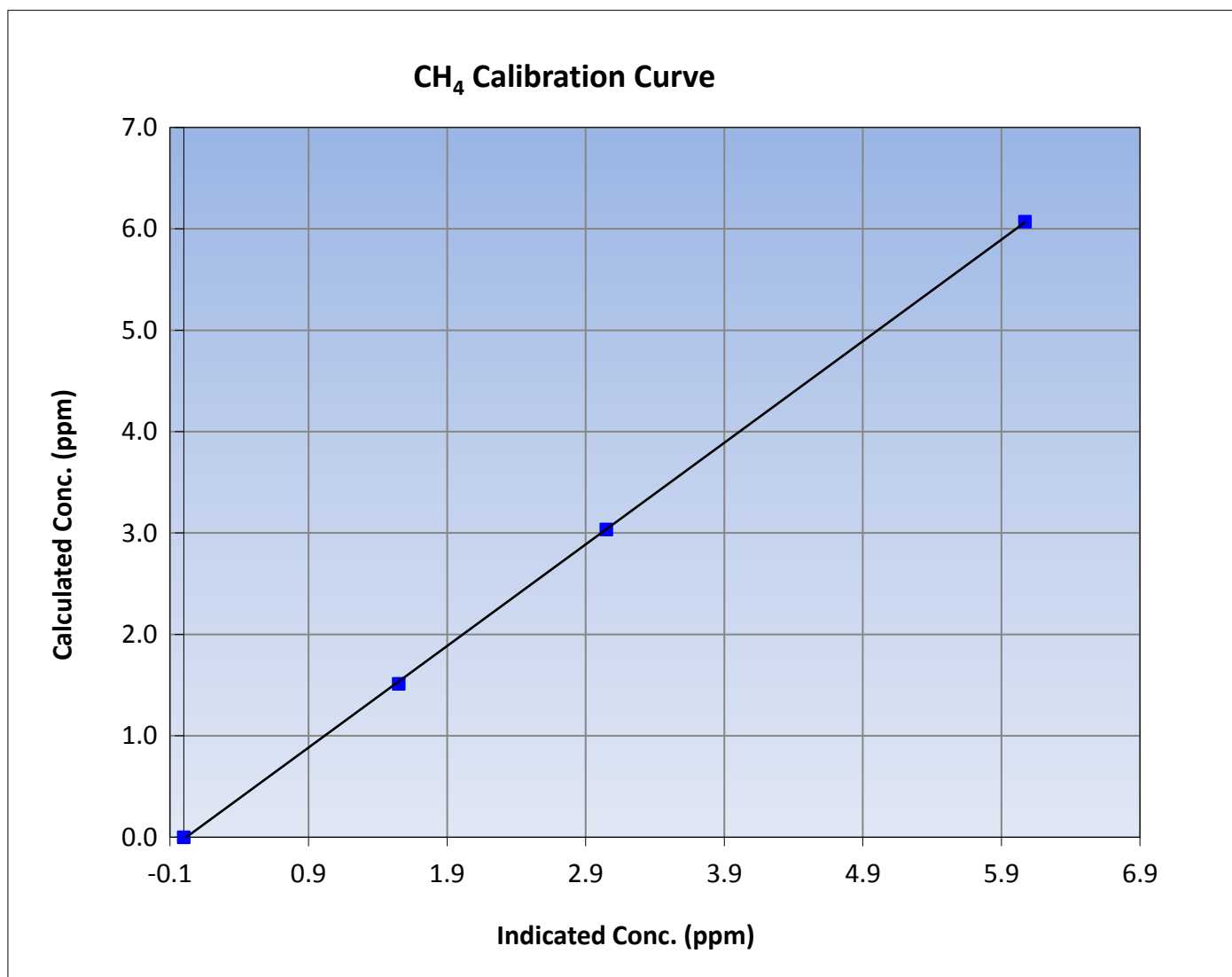
## CH<sub>4</sub> Calibration Summary

### Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 25, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:10	End Time (MST)	11:50
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999956
6.07	6.07	1.0002		
3.04	3.05	0.9952	Slope	1.001969
1.51	1.55	0.9758		
			Intercept	-0.018002





# Wood Buffalo Environmental Association

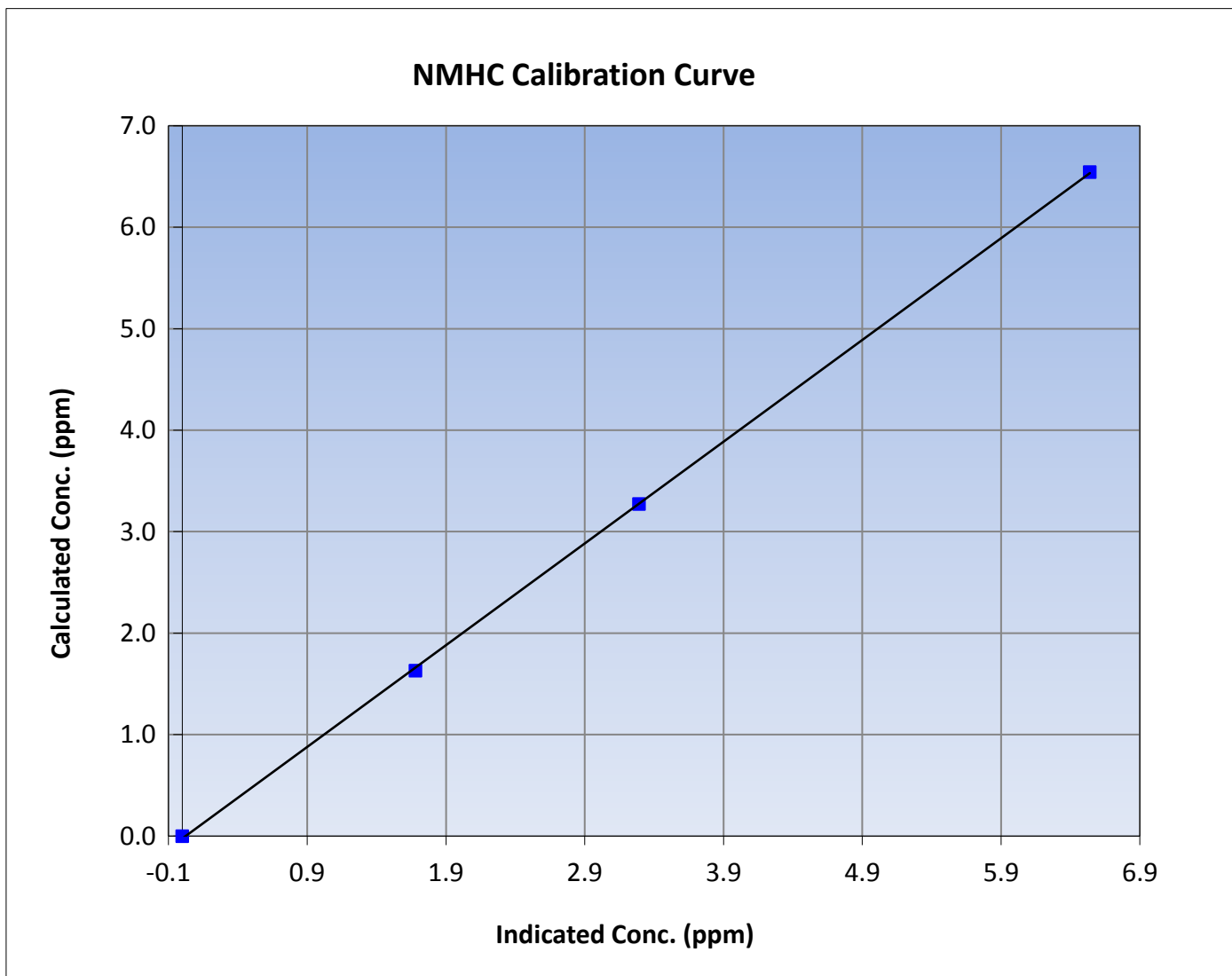
## NMHC Calibration Summary

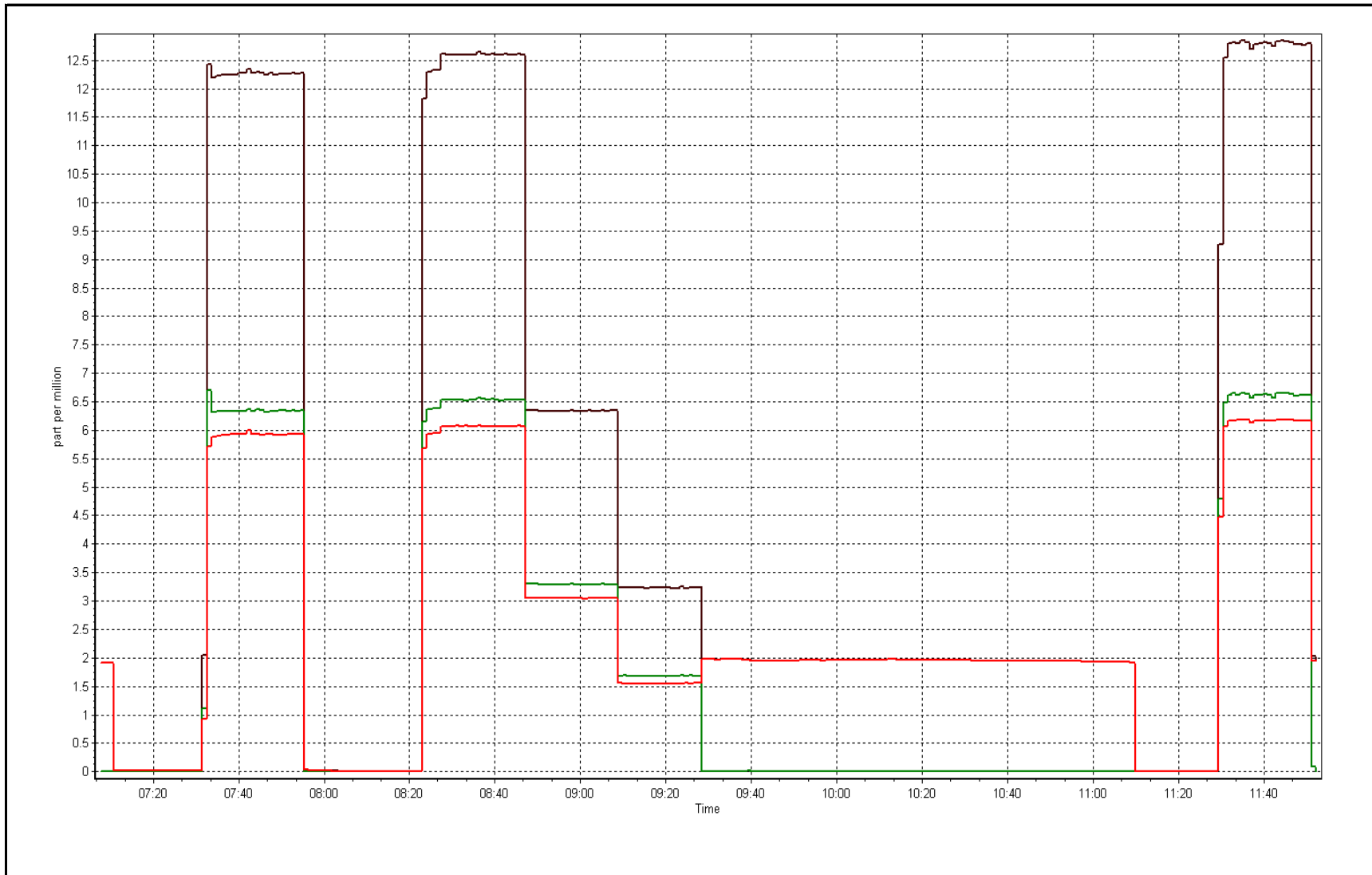
### Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 25, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:10	End Time (MST)	11:50
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999932
6.54	6.54	1.0004		
3.27	3.29	0.9943	Slope	1.002658
1.63	1.68	0.9703		
			Intercept	-0.024117







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	September 10, 2015	Previous Calibration	August 12, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	7:15	End Time (MST)	12:49
NO2 GPT Ref date	September-09-15	Transfer Standard	GPT
		Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	1222
ZAG make/model	Teledyne API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	Serial Number	9305

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.9	26.8
Analyzer IP address	192.168.1.48		Lamp temp.	53.2	53.3
Calculated slope	1.000866	1.008085	Pressure	612.8	614.0
Calculated intercept	-1.836335	0.039818	Flow cell A	0.691	0.693
Analyzer Background	-0.9	-1.6	Flow cell B	0.691	0.691
Analyzer Coefficient	1.001	1.001	Cell A Intensity	93323	92730
			Cell B Intensity	89865	84737

Analyzer make	Thermo 49i	Analyzer serial #	1501663733
---------------	------------	-------------------	------------

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.2	----
as found span	5000	757.00	343.0	337.6	1.016
calibrator zero	5000	0.00	0.0	0.1	----
high point	5000	757.00	343.0	340.4	1.008
second point	5000	520.00	234.2	232.1	1.009
third point	5000	270.00	121.3	120.1	1.010
as left zero	5000	0.00	0.0	0.9	----
as left span	5000	757.00	343.0		
Average Correction Factor					1.009

Corrected As found	337.8	Previous response	344.5	% change	2.0%
--------------------	-------	-------------------	-------	----------	------

**Notes:**

scrubber changed out, no leak, continued calibration at 10:43MST, zero adjusted, filter changed out

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association O3 Calibration Report

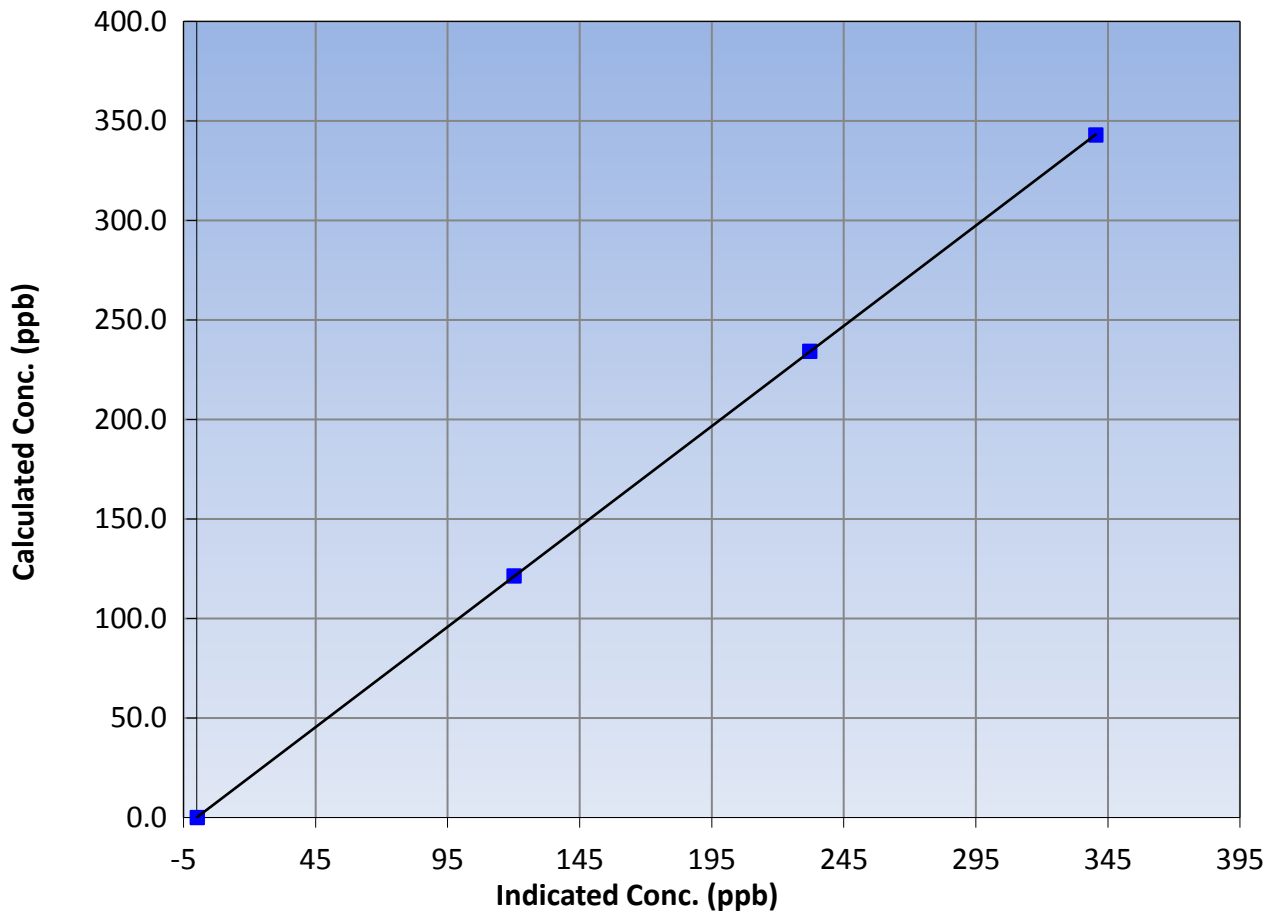
## Station Information

Calibration Date	September-10-15	Previous Calibration	August 12, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:15	End Time (MST)	12:49
Analyzer make	Thermo 49i	Analyzer serial #	1501663733

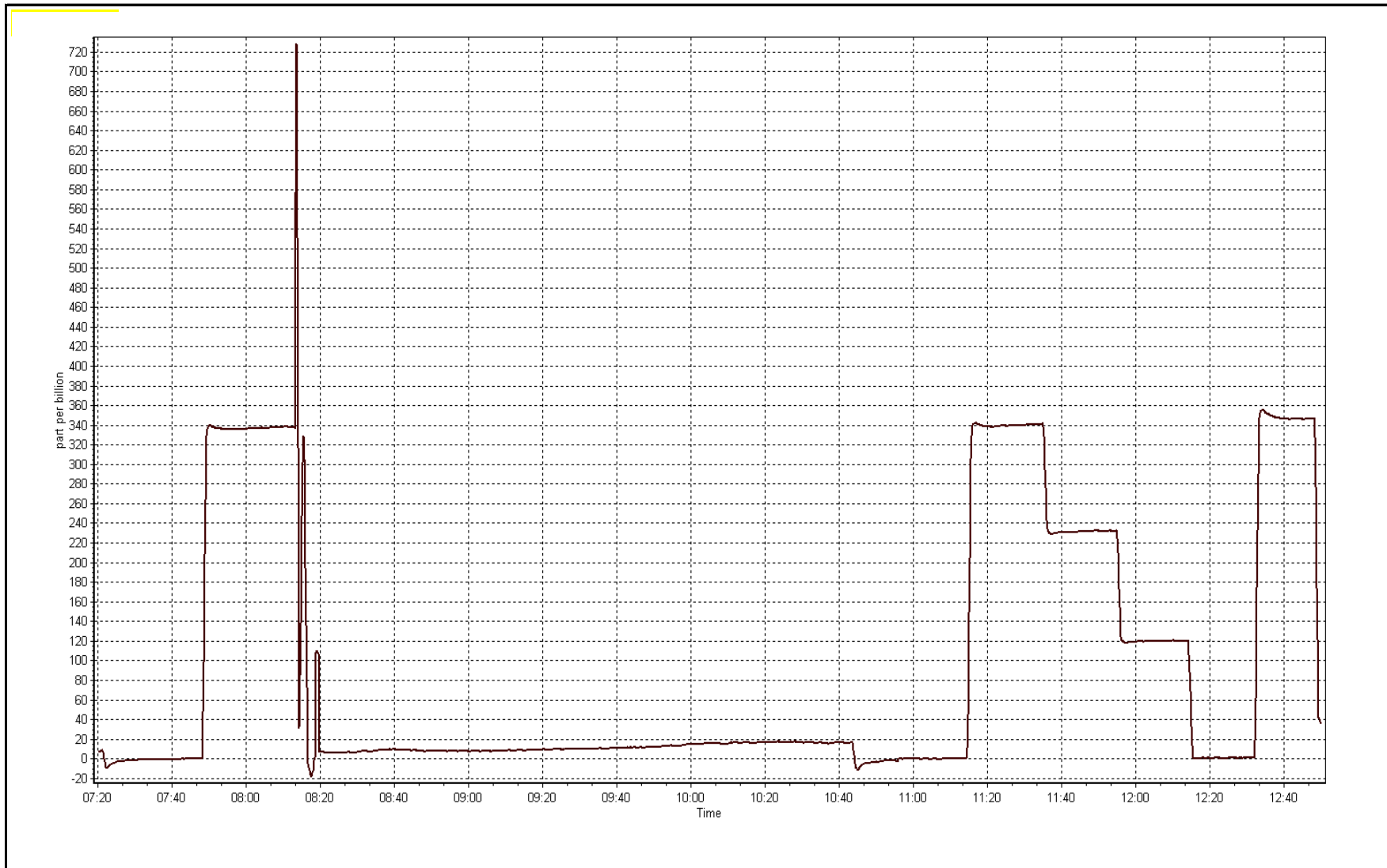
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999998
343.0	340.4	1.0076		
234.2	232.1	1.0090	Slope	1.008085
121.3	120.1	1.0100		
			Intercept	0.039818

### O3 Calibration Curve









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

## Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 11, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	7:10	End Time (MST)	11:50
NO Cal Gas Conc	51.2 ppm	Gas Cert Reference	EY0000368
NOX Cal Gas Conc	51.2 ppm	Cal Gas Expiry Date	10/06/2016
Calibrator	API T700	Serial Number	1222
Zero air Generator	Teledyne API T701	Serial Number	5610

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9035
-------------------	----------------------------	-----------------	------

## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.014580	1.012207	0.993377
	Data Offset	-2.859492	-2.458819	-1.499080
Current Calibration	Data Slope	0.991157	0.988180	0.999200
	Data Offset	-2.345485	-1.970193	0.064725

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1336160088
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.764		0.764	
NOX coefficient	0.995		0.995	
NO2 coefficient	0.999		0.999	
NO bkgrnd	1.6		1.6	
NOX bkgrnd	1.7		1.7	
Chamber Temp	50.4	Deg C	50	Deg C
Moly Temp	323.4	Deg C	326.3	Deg C
PMT voltage	-842.5	V	-842.5	V
PMT Temp	-2.9	Deg C	-2.7	Deg C
O3 flow	ok	ccm	151.2	ccm
R Cell press NO	150.3	mmHg	151.2	mmHg
R Cell Press Nox	150.3	mmHg	164.7	mmHg
NO sample flow	0.999	lpm	0.989	lpm
Nox sample Flow	0.998	lpm	0.983	lpm

**Notes:**

Filter changed out no maintenance or adjustments made



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

September 9, 2015

Station Number:

AMS 18

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	----	----
as found span	5000	58.6	600.1	600.1	0.0	604.9	605.5	-0.6	0.9920	0.9910
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
high point	5000	58.6	600.1	600.1	0.0	606.6	608.3	-1.8	0.9892	0.9865
second point	5000	29.3	300.0	300.0	0.0	306.1	306.4	-0.3	0.9802	0.9792
third point	5000	14.6	149.5	149.5	0.0	155.8	155.4	0.4	0.9596	0.9621
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	----	----
as left span	5000	58.6	600.1	269.6	330.5	614.6	261.7	352.8	0.9763	1.0302
Average Correction Factor									0.9763	0.9759

Corrected As found  
Previous Response

NO<sub>x</sub>= 605.0  
NO<sub>x</sub>= 594.3

NO= 605.6  
NO= 595.3

Percent Change

NO<sub>x</sub>= -1.8%

NO= -1.7%

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

58.60

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO2 (300)	----	269.6	343.0	612.7	269.6	343.1	0.9680	1.0000	0.9997	100.0%
2nd NO2 (200)	----	378.4	234.2	612.9	378.4	234.5	0.9677	1.0000	0.9987	100.1%
3rd NO2 (100)	----	491.3	121.3	612.6	491.3	121.3	0.9682	1.0000	1.0000	100.0%
4th NO2 (0)	612.6	----	-2.2	610.4	612.6	-2.2	0.9717	1.0000	N/A	----
Average Correction Factor							0.9689	1.0000	0.9995	100.1%

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

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

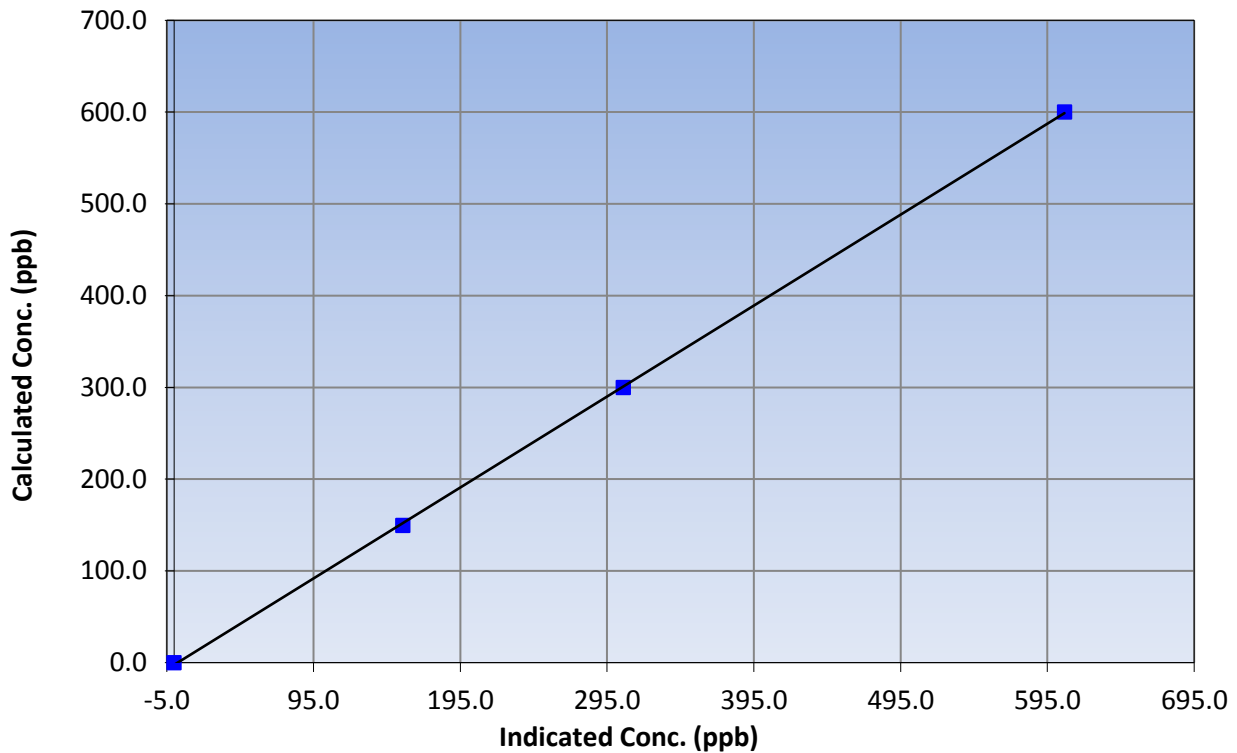
### Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 11, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:10	End Time (MST)	11:50
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999925
600.1	606.6	0.9892		
300.0	306.1	0.9802	Slope	0.991157
149.5	155.8	0.9596		
			Intercept	-2.345485

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





# Wood Buffalo Environmental Association

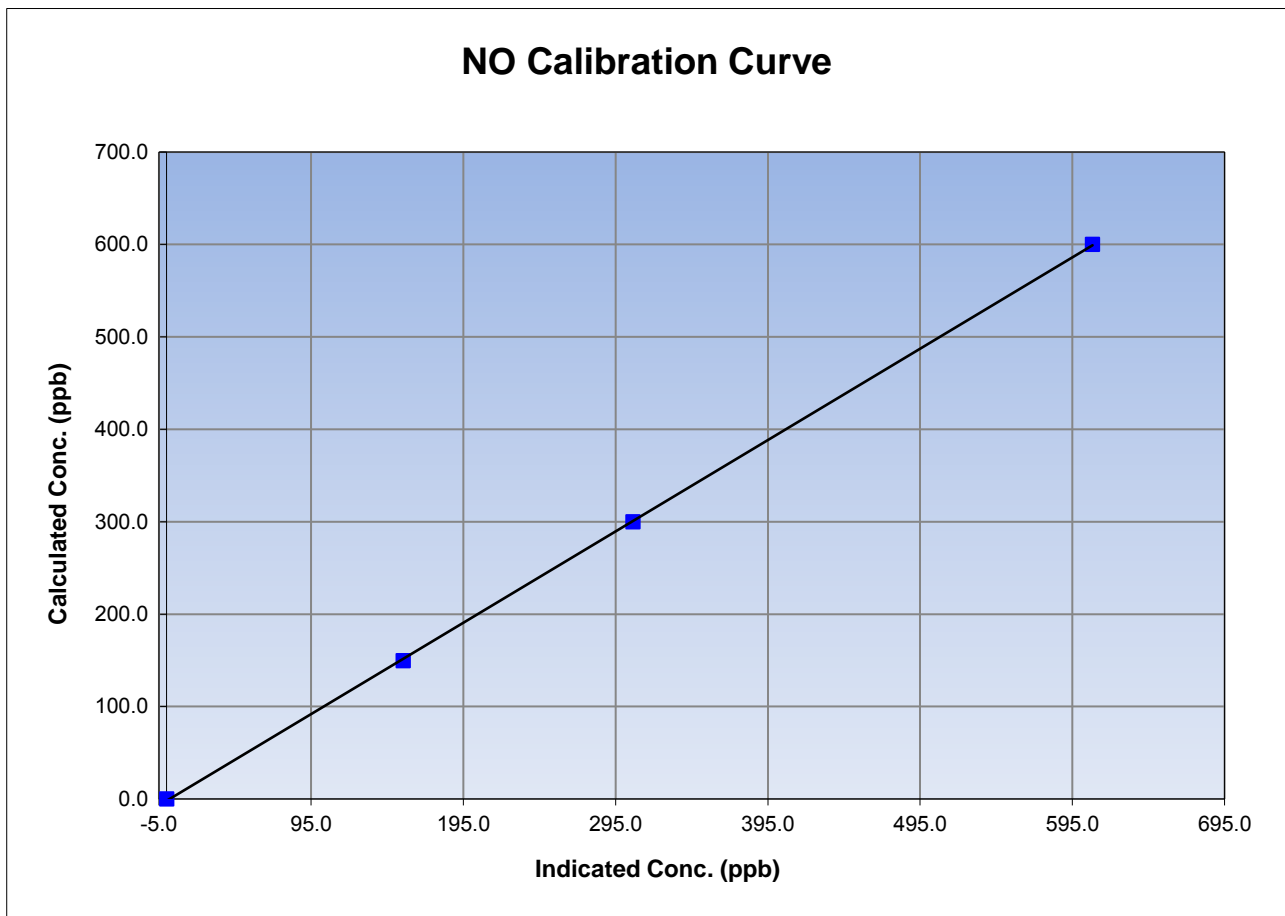
## NO Calibration Summary

### Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 11, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:10	End Time (MST)	11:50
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999951
600.1	608.3	0.9865		
300.0	306.4	0.9792	Slope	0.988180
149.5	155.4	0.9621		
			Intercept	-1.970193





# Wood Buffalo Environmental Association

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

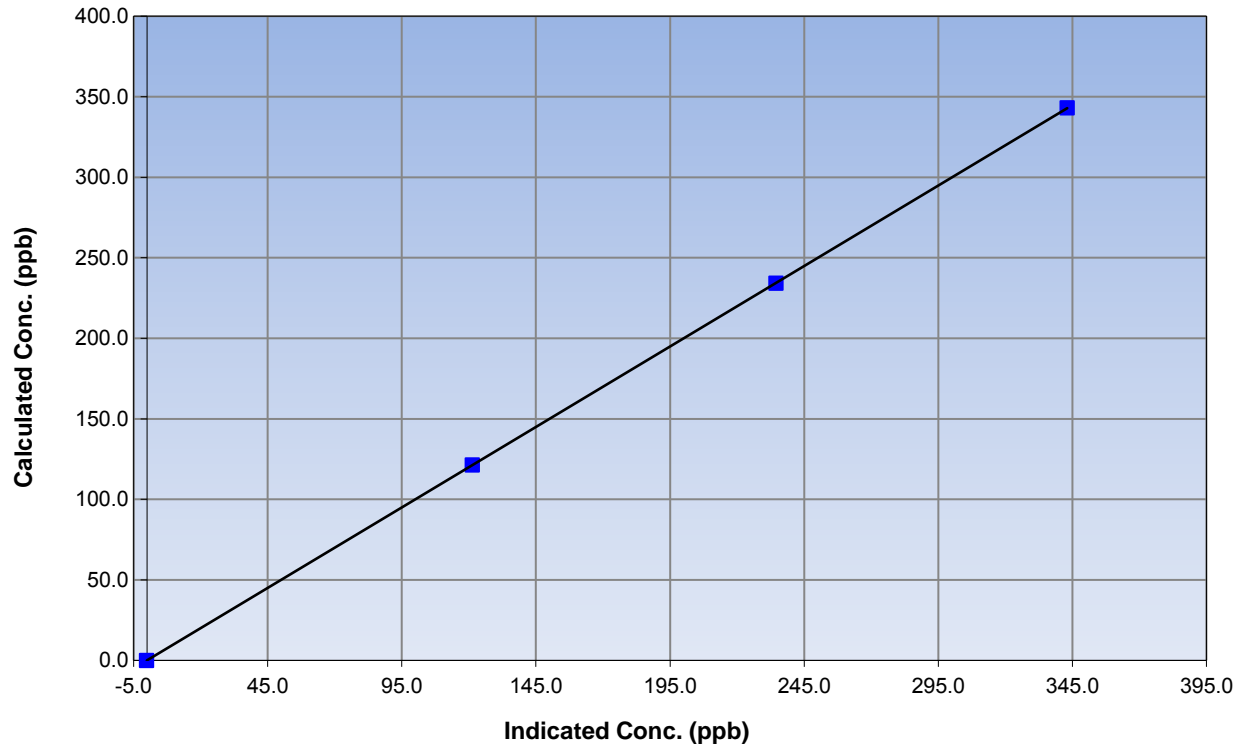
### Station Information

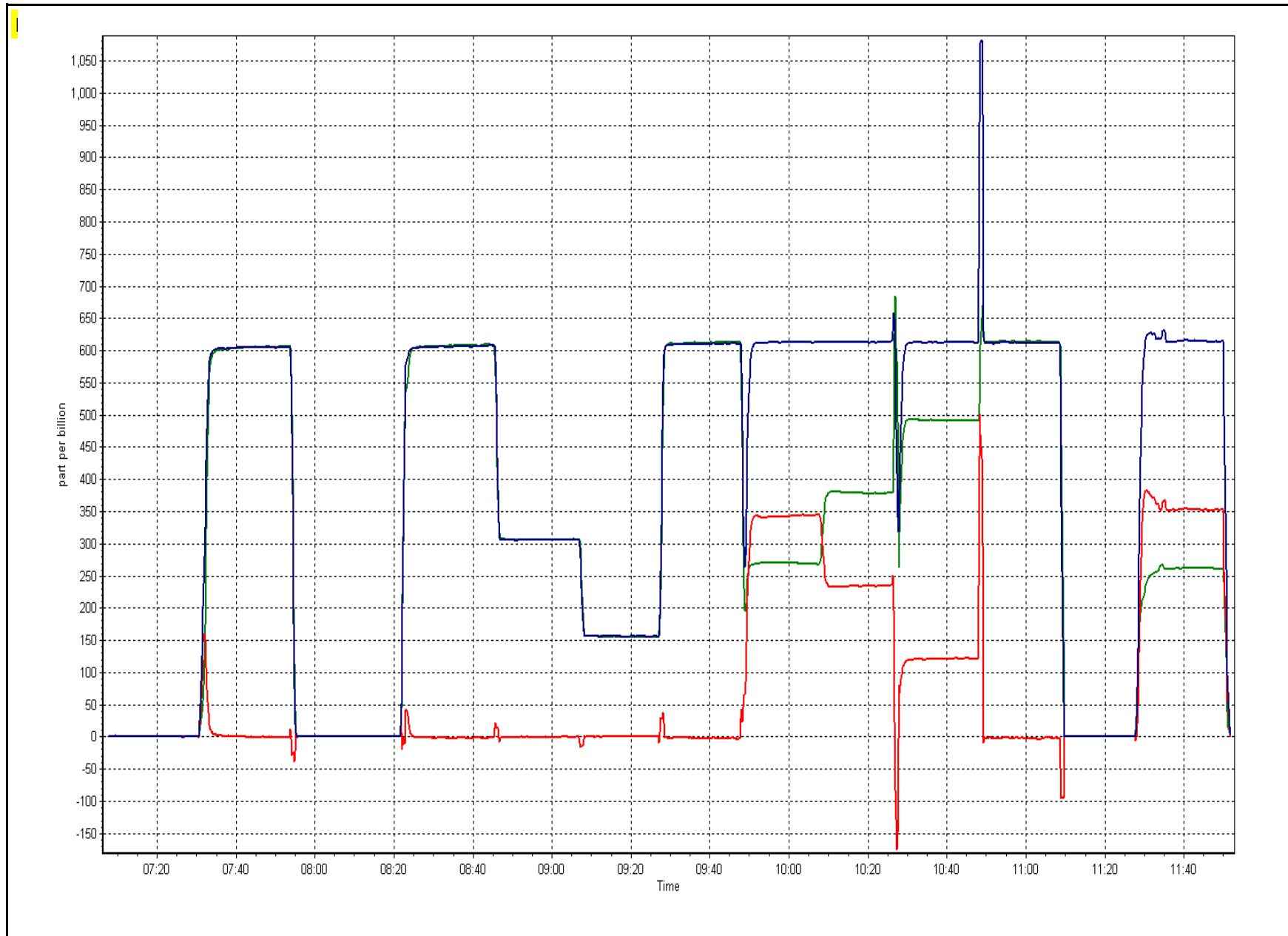
Calibration Date	September 9, 2015	Previous Calibration	August 11, 2015
Station Number	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:10	End Time (MST)	11:50
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999999
343.0	343.1	0.9997		
234.2	234.5	0.9987	Slope	0.999200
121.3	121.3	1.0000		
			Intercept	0.064725

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







# Wood Buffalo Environmental Association

## SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	<u>September 10, 2015</u>	Previous Calibration:	<u>August 12, 2015</u>
Station Name:	<u>Conklin Lookout</u>	Station Number:	<u>AMS 18</u>
Start Time (MST):	<u>8:19</u>	End Time (MST):	<u>8:45</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>1097</u>

SHARP INFORMATION			
Particulate Fraction:	<u>PM2.5</u>		
Make/Model:	<u>Thermo / SHARP 5030</u>		
Serial Number	<u>E-781</u>		
C <sub>14</sub> Source SN:			
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Parameters Checked:	<input checked="" type="checkbox"/> T1	<input type="checkbox"/> T2	<input type="checkbox"/> T3
	<input type="checkbox"/> T4	<input type="checkbox"/> P3	<input checked="" type="checkbox"/> P3
	<input checked="" type="checkbox"/> Main Flow	<input type="checkbox"/> Beta	<input type="checkbox"/> Neph

### CALIBRATION DATA

Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	11.0	9.6	-1.4	11.0
T2	23.0	na	na	23.0
T3	29.0	na	na	29.0
T4	31.0	na	na	31.0
RH (%)	39.0	na	na	39.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	942	940.0	-2.0	942

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1002	2	1002	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	291		282
Neph	1.6		-1.7
C14	-44.2		-44.6
Indicated Concentration (ug/m3)	0.9	Yes	-0.4
Offset 1	293		292.4
Offset 2	41.9		42.1

### Leak Check (Quarterly)

Leak Check Date:	<u>June 30, 2015</u>	Previous Leak Check Date:	
	<b>Measured</b>	<b>Difference LPM (Limit +/- 0.42 LPM)</b>	
Flow without adaptor (LPM):	16.81		
*Flow with adaptor (LPM):	16.79	0.02	

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

Mass Foil Calibration (Annually)			
Foil Calibration Date:	<u>June 30, 2015</u>	Previous Foil Calibration:	
Zeroed?:	<u>Yes</u>		
Foil Mass:	<u>1337</u>		
Previous Correction Factor:	<u>6983</u>	<b>Mass foil set S/N:</b>	12111
New Correction Factor:	<u>7050</u>		

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

### NOTES:

Nephelometer adjusted, Sample Head cleaned

Calibration Performed By: Melissa Lemay





# Wood Buffalo Environmental Association

## SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	September 29, 2015	Previous Calibration:	September 10, 2015
Station Name:	Conklin Lookout	Station Number:	AMS 18
Start Time (MST):	8:22	End Time (MST):	8:55
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION			
Particulate Fraction:		PM2.5	
Make/Model:		Thermo / SHARP 5030	
Serial Number:		E-781	
C <sub>14</sub> Source SN:			
Confirmation of Time settings:		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Parameters Checked:	<input checked="" type="checkbox"/> T1 <input type="checkbox"/> T2 <input type="checkbox"/> T3 <input type="checkbox"/> T4 <input type="checkbox"/> P3 <input checked="" type="checkbox"/> Main Flow <input checked="" type="checkbox"/> Beta <input type="checkbox"/> Neph <input checked="" type="checkbox"/>		

### CALIBRATION DATA

Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	8.0	9.0	1.0	8.0
T2	21.0	na	na	21.0
T3	28.0	na	na	28.0
T4	21.0	na	na	21.0
RH (%)	27.0	na	na	27.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	933	928.0	-5.0	933

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1000	0	1000	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	292		292
Neph	0.7		0.7
C14	9.5		9.5
Indicated Concentration (ug/m3)	0.5	No	0.5
Offset 1			
Offset 2			

### Leak Check (Quarterly)

Leak Check Date:	September 29, 2015	Previous Leak Check Date:	June 30, 2015
	Measured	Difference LPM (Limit +/- 0.42 LPM)	
Flow without adaptor (LPM):	16.72	0.20	
*Flow with adaptor (LPM):	16.52		
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

Mass Foil Calibration (Annually)			
Foil Calibration Date:	June 30, 2015	Previous Foil Calibration:	
Zeroed?:	Yes		
Foil Mass:	1337	Mass foil set S/N:	12111
Previous Correction Factor:	6983		
New Correction Factor:	7050		

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

### NOTES:

No adjustments made, checked due to negative readings

Calibration Performed By: Melissa Lemay



This page intentionally left blank



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 19  
SUNCOR FIREBAG  
SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
 SEPTEMBER 2015  
 MONTHLY SUMMARY for  
 AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	685	34	35	99.86	34	0	4	0
H2S (ppb) Average	683	35	37	99.72	2	0	1	0
THC (ppm) Average	684	34	36	99.72	2.7	-	2.3	-
NO2 (ppb) Average	683	34	37	99.58	19	0	6	-
NO (ppb) Average	683	34	37	99.58	20	-	5	-
NOX (ppb) Average	683	34	37	99.58	36	-	11	-
Temperature 2 m (C) Average	720	0	0	100.00	20.6	-	14.5	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	97	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	34	-	22	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
 SEPTEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	685	0.9	2	-	0	0	0	0	1	2	34
H2S (ppb) Average	683	0.2	0	-	0	0	0	0	0	0	2
THC (ppm) Average	684	2.14	0.1	-	2	2.1	2.1	2.1	2.2	2.2	2.7
NO2 (ppb) Average	683	2.2	3	-	0	0	1	1	3	6	19
NO (ppb) Average	683	1	3	-	0	0	0	0	1	2	20
NOX (ppb) Average	683	3.2	5	-	0	0	1	2	3	7	36
Temperature 2 m (C) Average	720	8.16	4.4	-	-2.8	3	5.1	8	10.8	14.1	20.6
Relative Humidity (%) Average	720	72.5	17	-	21	50	60	73	87	94	99
Wind Speed 10 m (km/h) Average	720	13.5	6	-	1	6	9	13	17	22	34
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
SEPTEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	02 Sep 2015 16:00	02 Sep 2015 16:00	1	Maintenance - Internal WBEA Audit
H2S	02 Sep 2015 14:00	02 Sep 2015 15:00	2	Maintenance - Internal WBEA Audit
THC	02 Sep 2015 17:00	02 Sep 2015 18:00	2	Maintenance - Internal WBEA Audit
NO2, NO, NOX	02 Sep 2015 12:00	02 Sep 2015 14:00	3	Maintenance - Internal WBEA Audit



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 34 ppb on Sep 10 08:00	Maximum Daily Average: 4.2 ppb on Sep 11
Minimum Value: 0 ppb on Sep 3 08:00	Hours of Data: 685
Maximum Diurnal Average: 2.2 ppb at hour 8	Hours of Missing Data: 35
Monthly Average: 0.9 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.1 ppb on Sep 13	Percent Operational Time: 99.9
Minimum Diurnal Average: 0.5 ppb at hour 21	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 12	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	1	1	2	Z	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	3	0.7	3
2-Sep	4	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0.4	4
3-Sep	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
4-Sep	0	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-Sep	0	0	Z	0	0	2	5	5	5	3	2	2	4	5	5	3	3	2	2	3	2	1	1	1	2.5	5
6-Sep	2	2	1	Z	1	2	4	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	10
7-Sep	0	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-Sep	0	0	0	0	0	Z	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
9-Sep	Z	0	0	0	1	1	1	1	6	15	8	3	0	10	20	12	5	1	1	0	0	0	1	0	3.8	20
10-Sep	0	Z	1	2	6	7	15	34	10	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	3.5	34
11-Sep	0	1	Z	0	1	1	0	3	14	12	C	C	C	C	3	6	3	4	8	6	4	5	4	5	4.2	14
12-Sep	4	5	8	Z	10	6	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	10
13-Sep	0	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
14-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.2	1
15-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1
16-Sep	0	Z	0	0	0	0	0	0	0	0	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0.4	2
17-Sep	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.4	1
18-Sep	0	0	1	Z	0	0	0	1	4	5	4	4	4	2	0	0	0	1	0	1	0	1	0	0	1.3	5
19-Sep	0	0	0	0	Z	0	0	0	0	0	1	1	2	1	2	1	0	2	3	2	3	2	0	0	1.0	3
20-Sep	0	1	2	2	2	Z	1	4	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	4
21-Sep	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
22-Sep	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1
23-Sep	0	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
24-Sep	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0.4	1
25-Sep	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	2	2	2	1	1	1	1	2	2	2	0.9	2
26-Sep	2	2	2	2	2	Z	2	3	5	7	5	3	2	1	2	1	0	0	0	0	0	1	5	2.1	7	
27-Sep	Z	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4
28-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	2	6	5	1	0	0	0	0	0	0.7	6
29-Sep	0	0	Z	0	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1
30-Sep	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

0.6	0.8	0.8	0.5	1.1	1.0	1.2	2.2	1.8	1.7	1.0	0.7	0.6	0.9	1.3	1.1	0.8	0.7	0.7	0.6	0.5	0.6	0.6	0.7	Diurnal Average	
4	5	8	2	10	7	15	34	14	15	8	4	4	10	20	12	6	5	8	6	4	5	4	5	Diurnal Maximum	

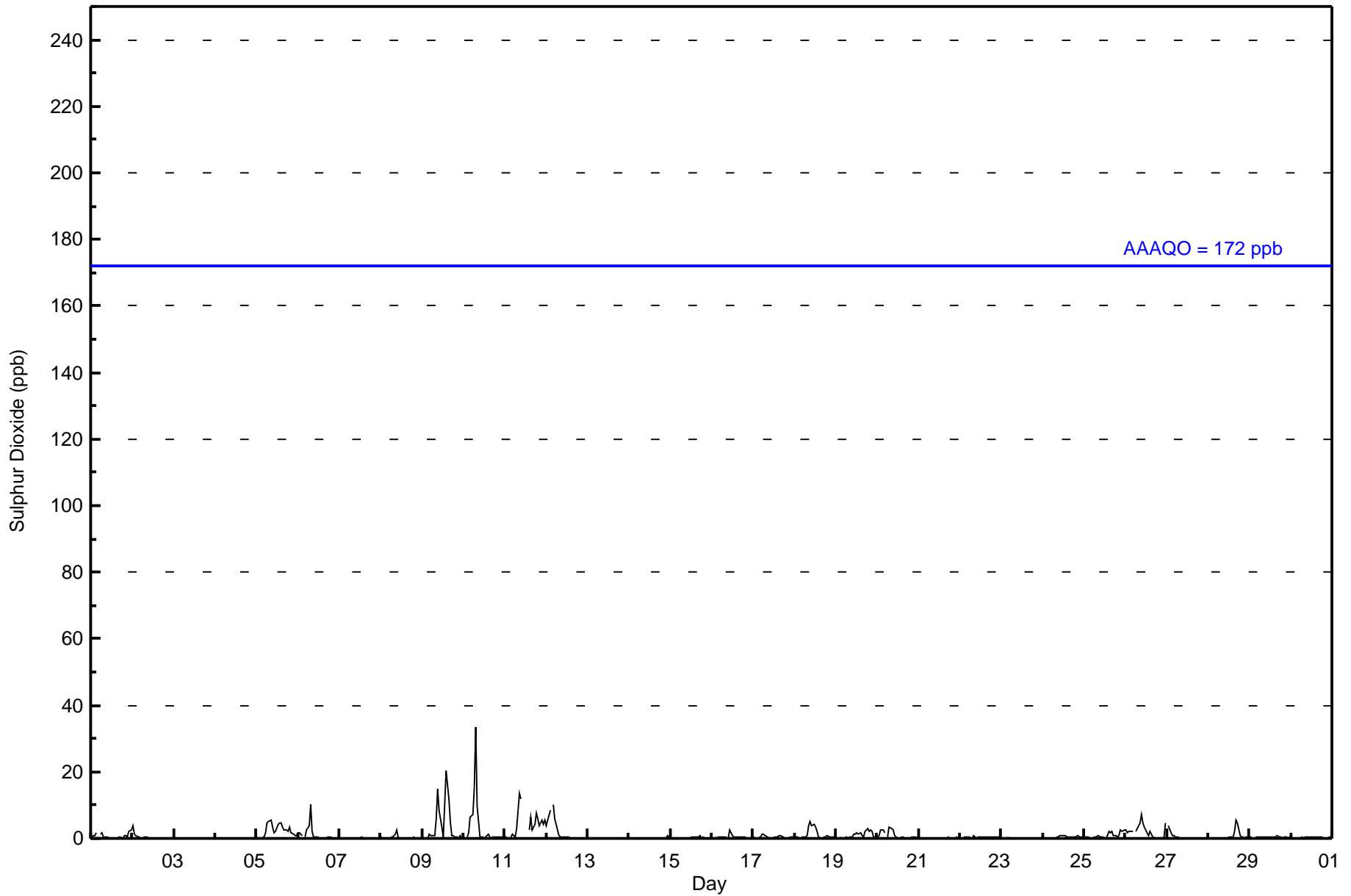
Z - zerospan      C - Calibration      M - Maintenance  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb      24-hr 48 ppb





Wood Buffalo Environmental Association  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Firebag - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	678	98.98	98.98
11 - 20	6	0.88	99.85
21 - 60	1	0.15	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Firebag - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	35	35	19	10	6	20	49	43	57	83	88	63	37	39	51	43	678
11 - 20	0	0	0	0	0	0	0	0	0	1	3	2	0	0	0	0	6
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>	35	35	19	10	6	20	49	43	57	84	92	65	37	39	51	43	685

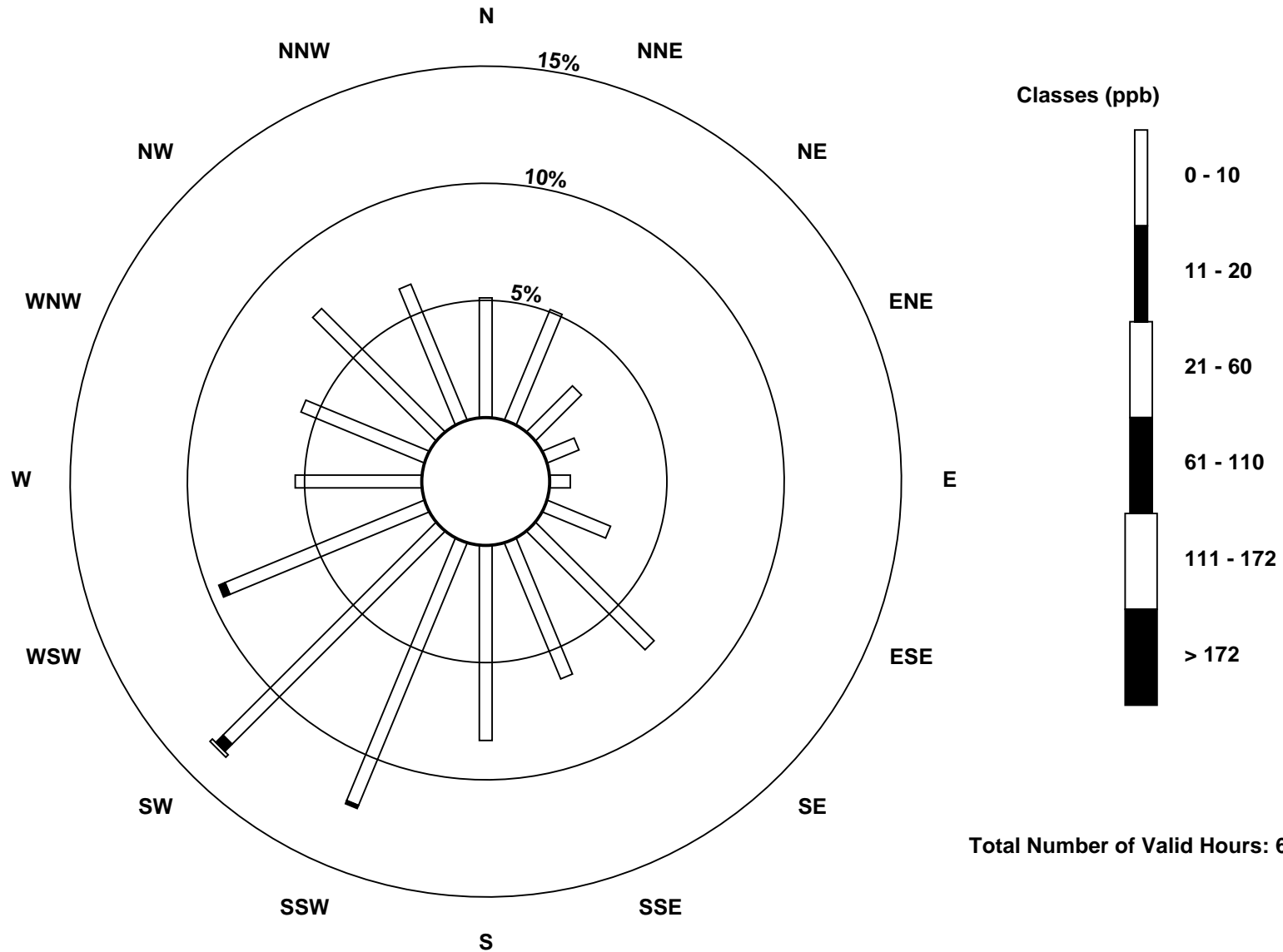
Total Number of Valid Hours: 685

Total Number of Hours: 720

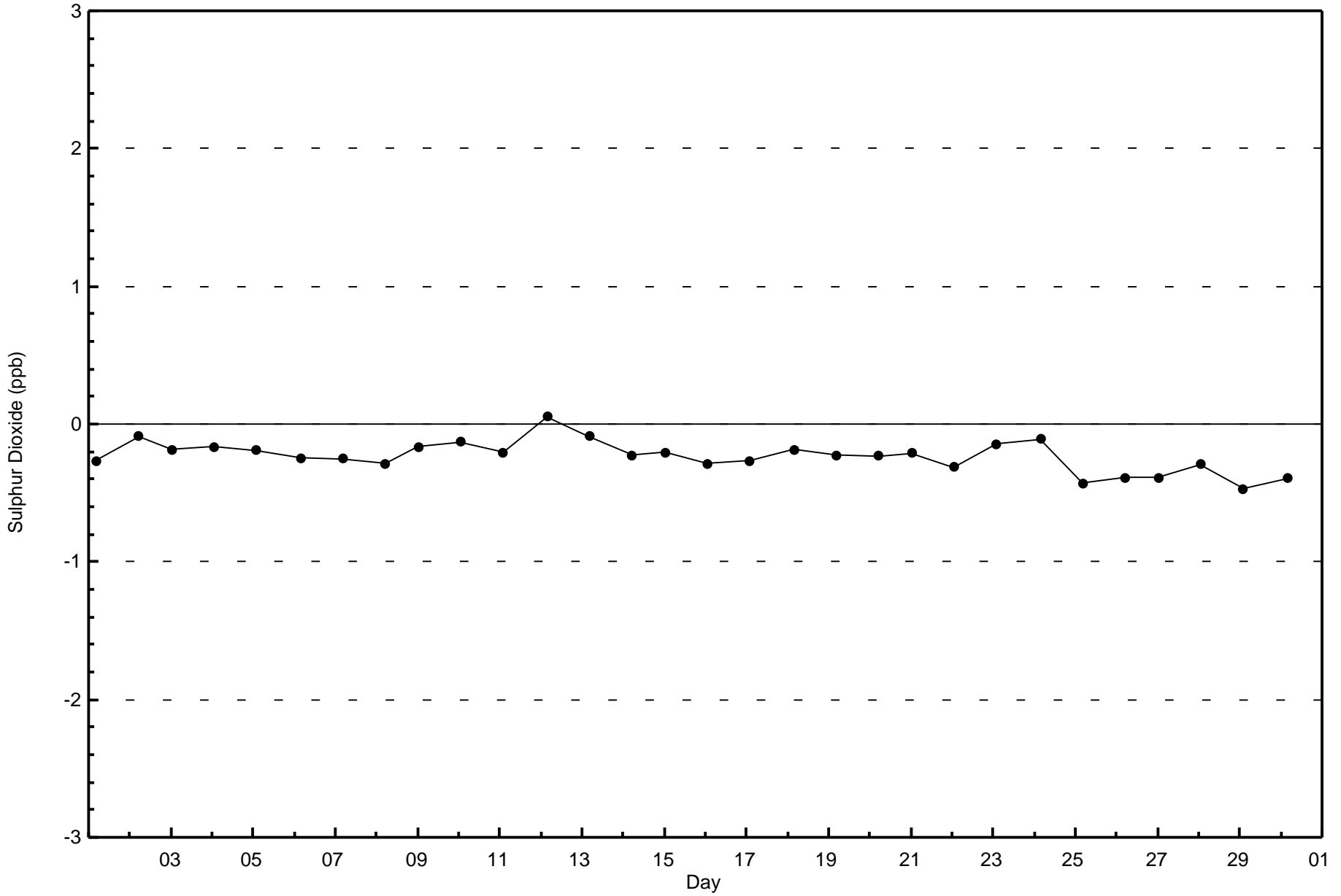


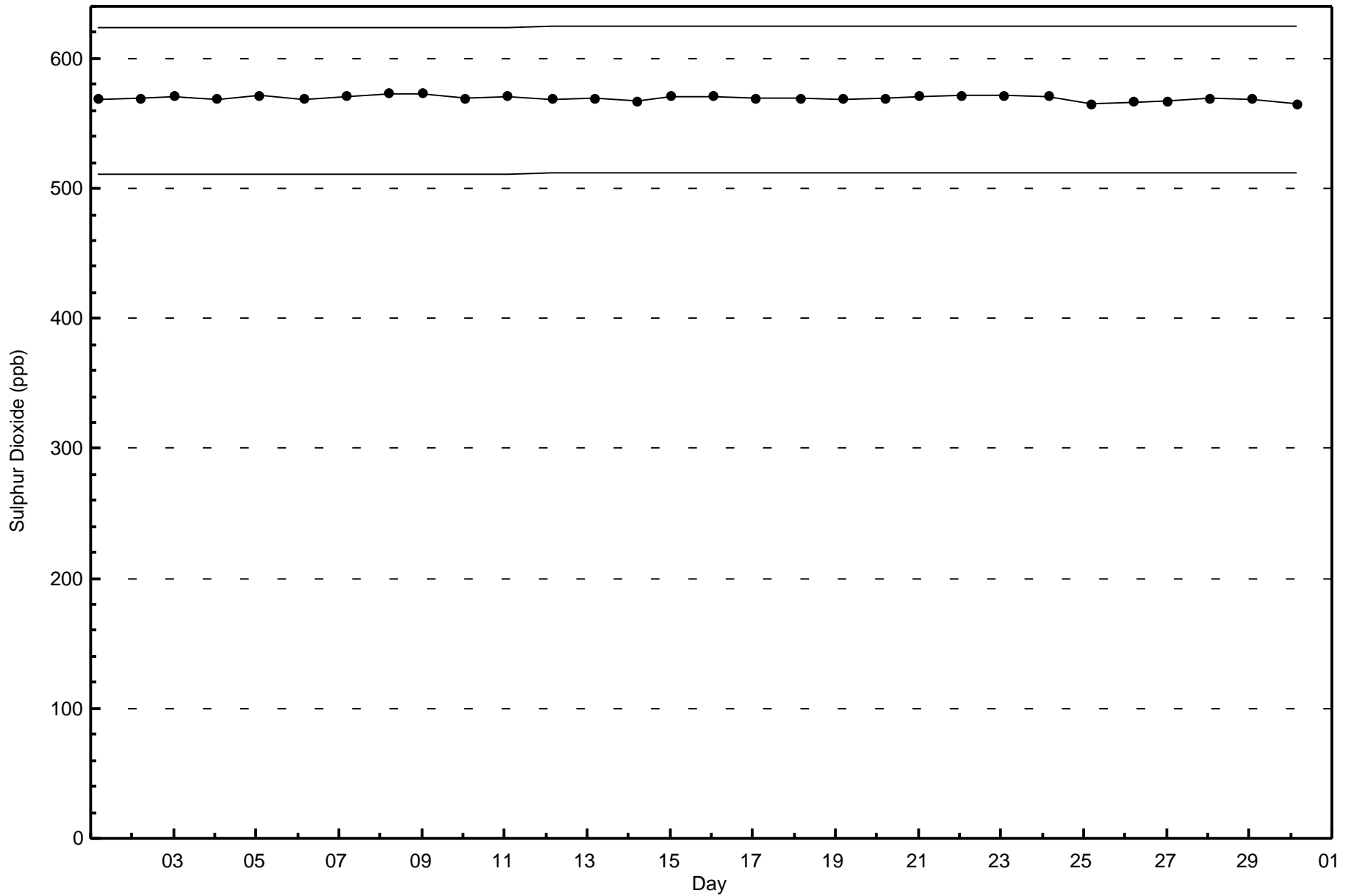
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag (AMS 19)



Total Number of Valid Hours: 685







Summary of Hour Averages

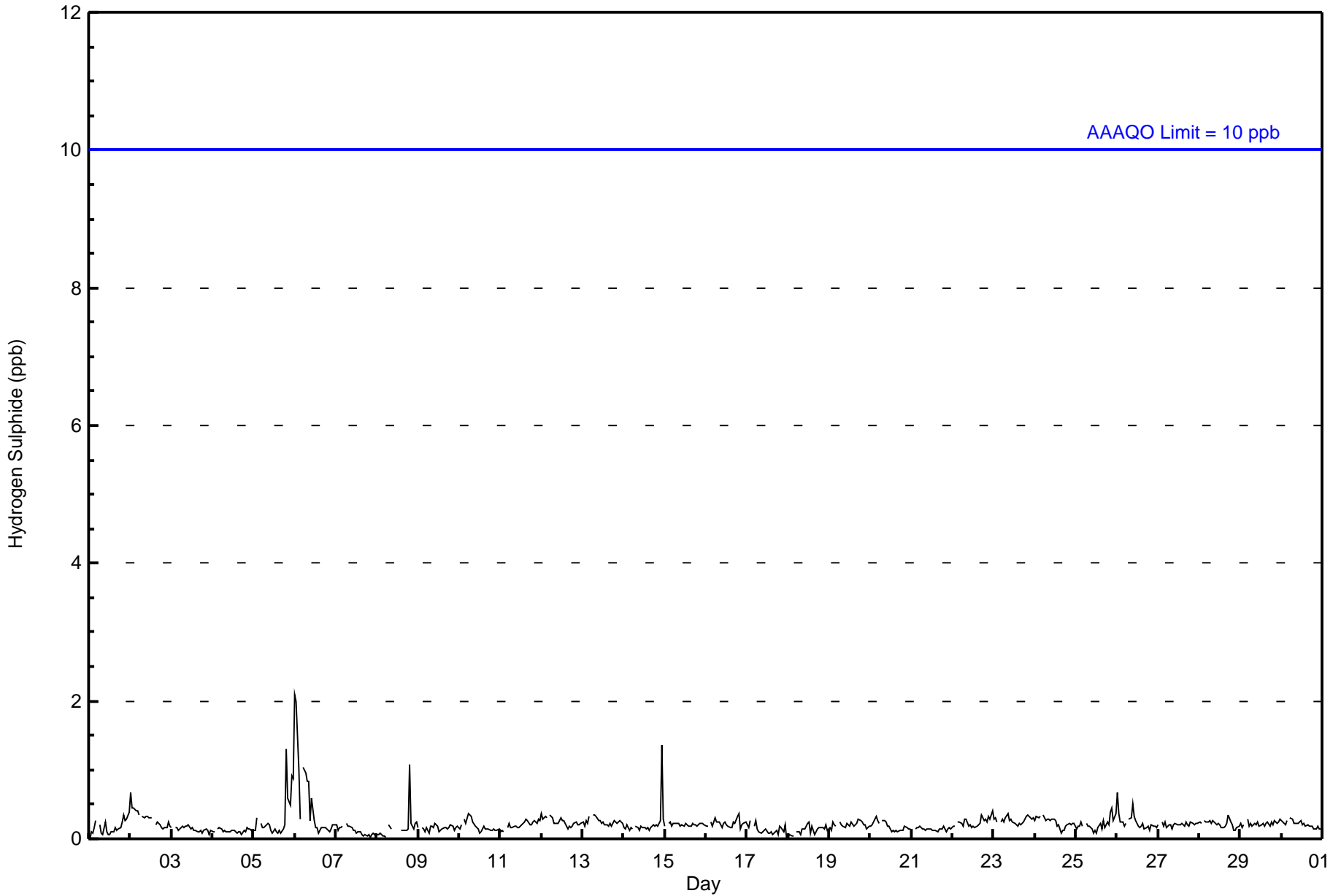
Firebag - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Sep 6 01:00	Maximum Daily Average: 0.5 ppb on Sep 6		Hours of Data:	683
Minimum Value: 0 ppb on Sep 1 01:00	Minimum Daily Average: 0.1 ppb on Sep 7		Hours of Missing Data:	37
Maximum Diurnal Average: 0.3 ppb at hour 1	Minimum Diurnal Average: 0.2 ppb at hour 16		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 O <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1		Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	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-Sep	1	0	0	0	0	0	Z	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0.3	1
3-Sep	0	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-Sep	0	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-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0.3	1
6-Sep	2	2	1	0	Z	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
7-Sep	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
8-Sep	0	0	0	0	0	0	Z	0	0	C	C	C	C	C	0	0	0	0	0	0	1	0	0	0	0.2	1
9-Sep	0	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-Sep	0	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
11-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Sep	0	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-Sep	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-Sep	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1
15-Sep	0	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-Sep	0	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-Sep	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
18-Sep	0	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
19-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Sep	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
21-Sep	0	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-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-Sep	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
24-Sep	0	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-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Sep	1	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Sep	0	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-Sep	0	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-Sep	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-Sep	0	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

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

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







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Firebag - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	683	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: 683

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	33	35	20	8	6	20	48	43	57	84	96	65	37	37	52	42	683
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>	33	35	20	8	6	20	48	43	57	84	96	65	37	37	52	42	683

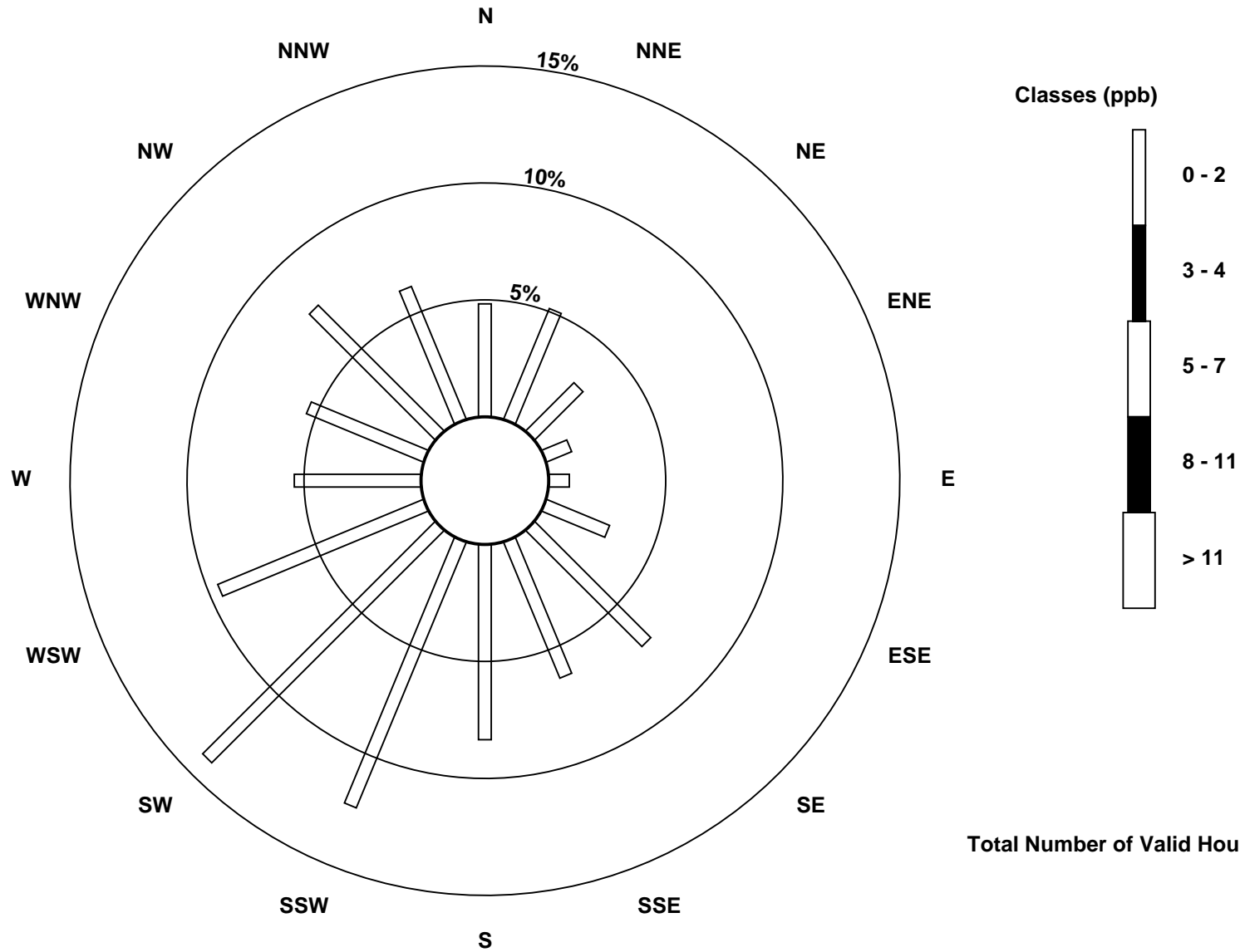
Total Number of Valid Hours: 683

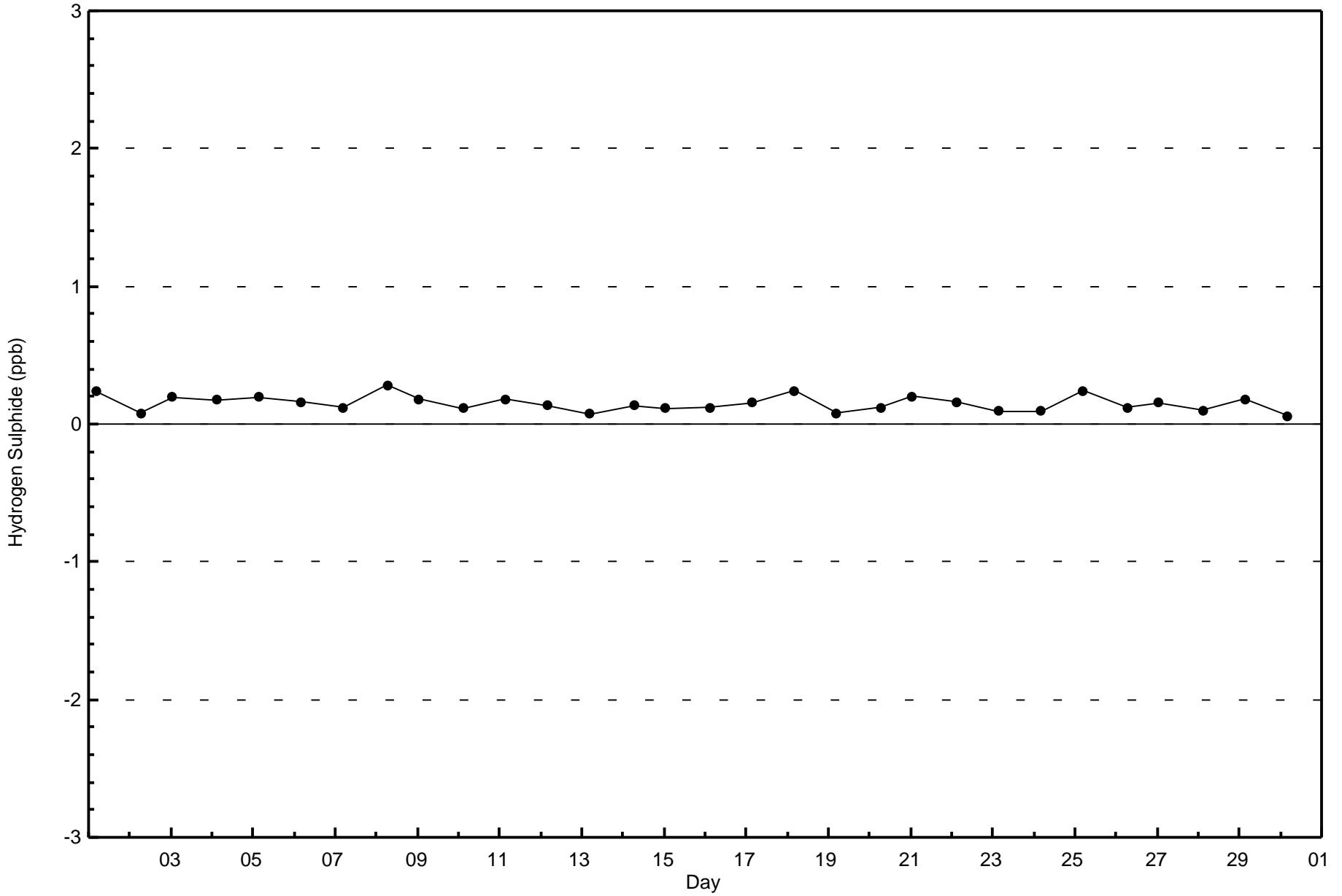
Total Number of Hours: 720

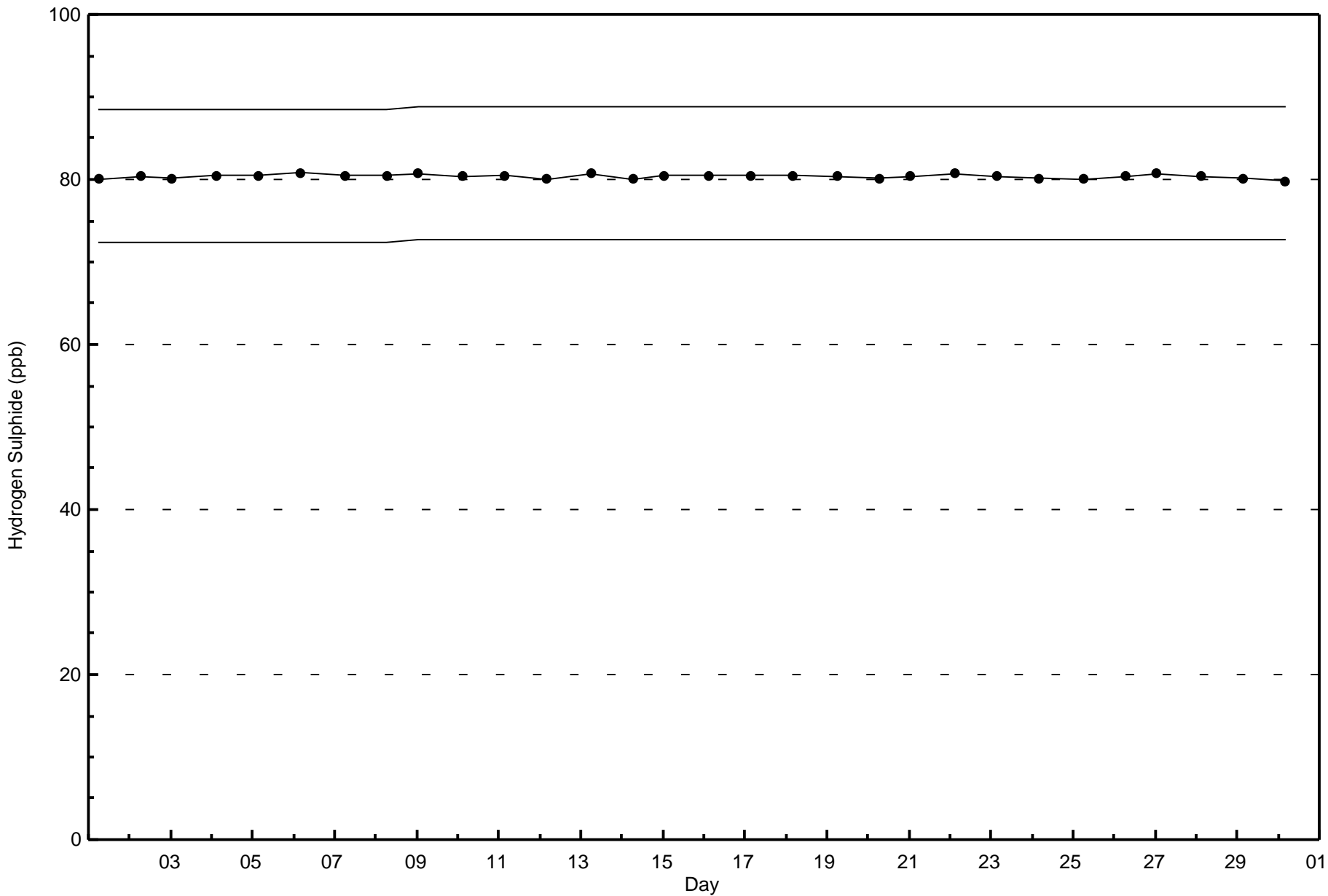


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag (AMS 19)





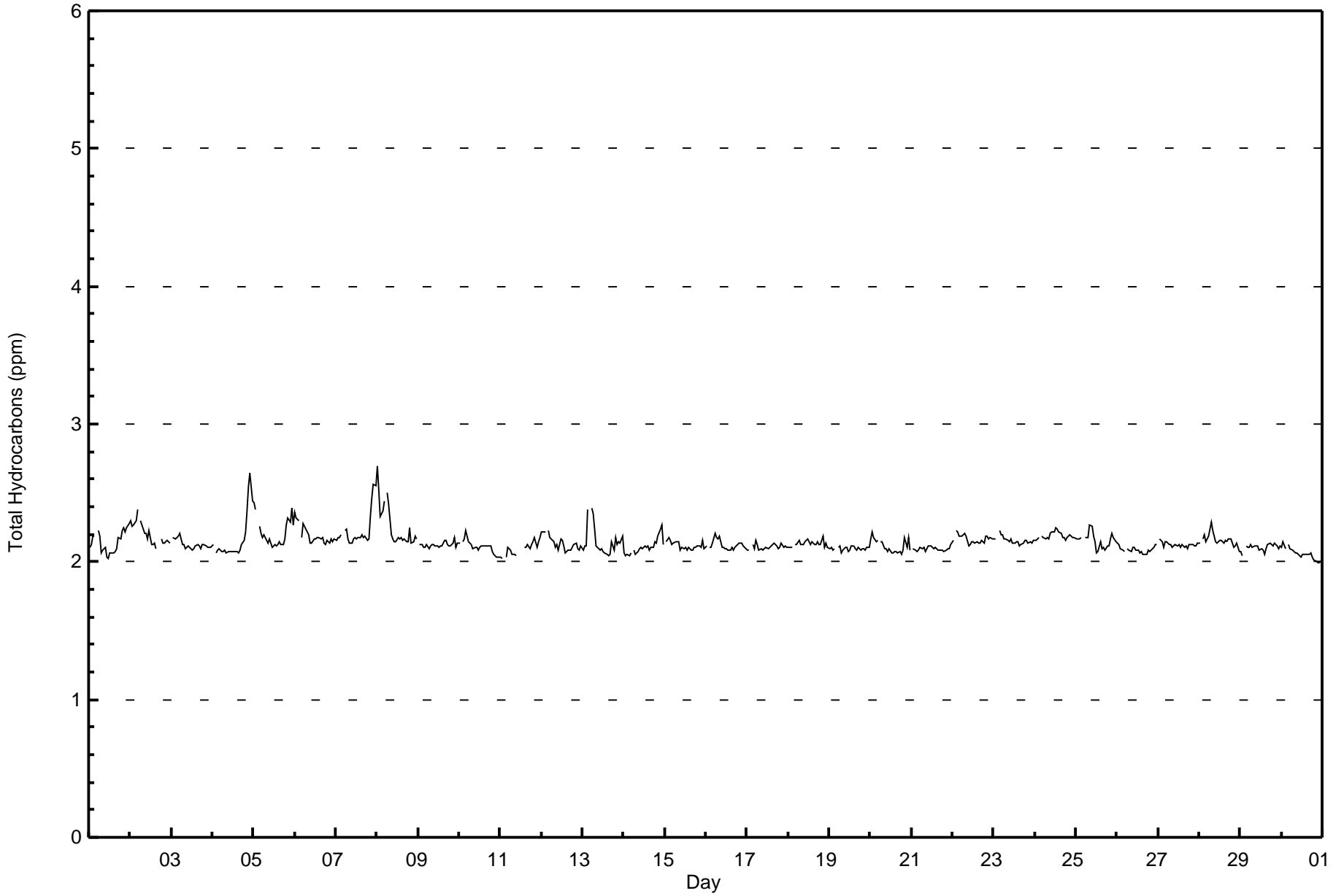




Summary of Hour Averages

Firebag - September 2015

Maximum Value: 2.7 ppm on Sep 8 01:00		Maximum Daily Average: 2.3 ppm on Sep 8		Hours in Service: 720																						
Minimum Value: 2.0 ppm on Sep 30 22:00		Minimum Daily Average: 2.1 ppm on Sep 30		Hours of Data: 684																						
Maximum Diurnal Average: 2.2 ppm at hour 1		Minimum Diurnal Average: 2.1 ppm at hour 14		Hours of Missing Data: 36																						
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> = 2.5		Hours of Calibration: 34																						
				Percent Operational Time: 99.7																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	2.1	2.1	2.2	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.1	2.3	
2-Sep	2.3	2.3	2.3	2.3	2.4	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	M	M	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.4
3-Sep	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
4-Sep	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	2.4	2.5	2.6	2.4	2.2	2.6
5-Sep	2.4	2.4	Z	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.4	2.3	2.2	2.2	2.4
6-Sep	2.4	2.3	2.3	Z	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.1	2.2	2.2	2.4
7-Sep	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.6	2.6	2.2	2.6
8-Sep	2.7	2.5	2.3	2.4	2.4	Z	2.5	2.4	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.3	2.7
9-Sep	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2
10-Sep	2.1	Z	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	2.0	2.0	2.0	2.1	2.2
11-Sep	2.0	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.0	C	C	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.2
12-Sep	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
13-Sep	2.1	2.1	2.1	2.4	Z	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.1	2.4
14-Sep	2.1	2.0	2.1	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.1	2.1	2.3
15-Sep	Z	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	2.2	2.1	2.1	2.2
16-Sep	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
17-Sep	2.1	2.1	Z	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
18-Sep	2.1	2.1	2.1	Z	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2
19-Sep	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
20-Sep	2.2	2.2	2.2	2.1	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.2
21-Sep	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
22-Sep	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2
23-Sep	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2
24-Sep	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
25-Sep	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.3
26-Sep	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
27-Sep	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	2.1	2.1	2.1	2.1	2.2
28-Sep	2.1	Z	2.2	2.2	2.1	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3
29-Sep	2.1	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
30-Sep	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan		C - Calibration						M - Maintenance																		





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Firebag - September 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	21	3.07	3.07
2.1 - 3.0	663	96.93	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Firebag - September 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	2	2	0	0	0	0	0	1	0	12	3	0	0	0	0	1	21
2.1 - 3.0	33	31	20	10	6	20	49	42	57	72	89	65	37	39	51	42	663
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>	35	33	20	10	6	20	49	43	57	84	92	65	37	39	51	43	684

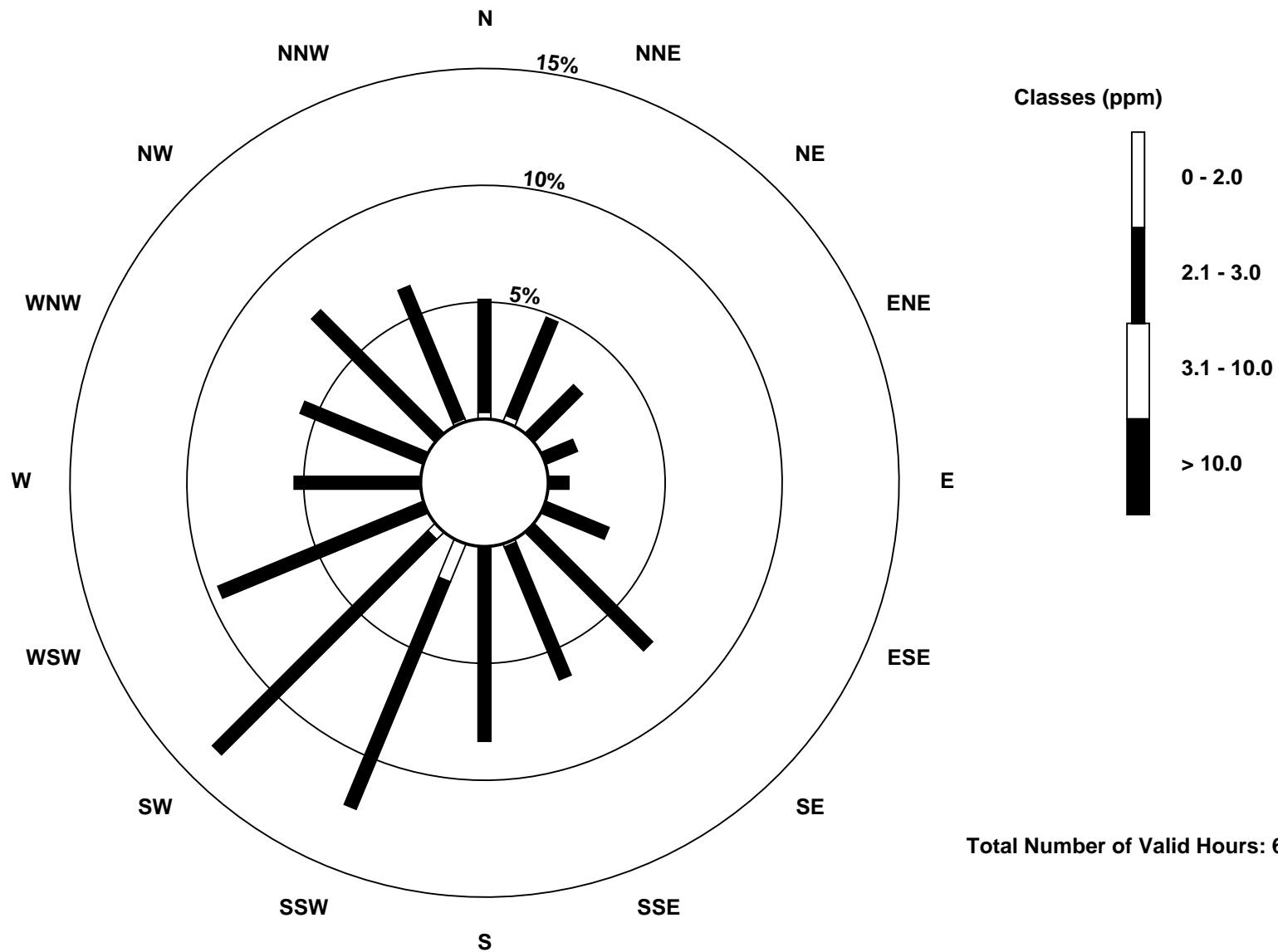
Total Number of Valid Hours: 684

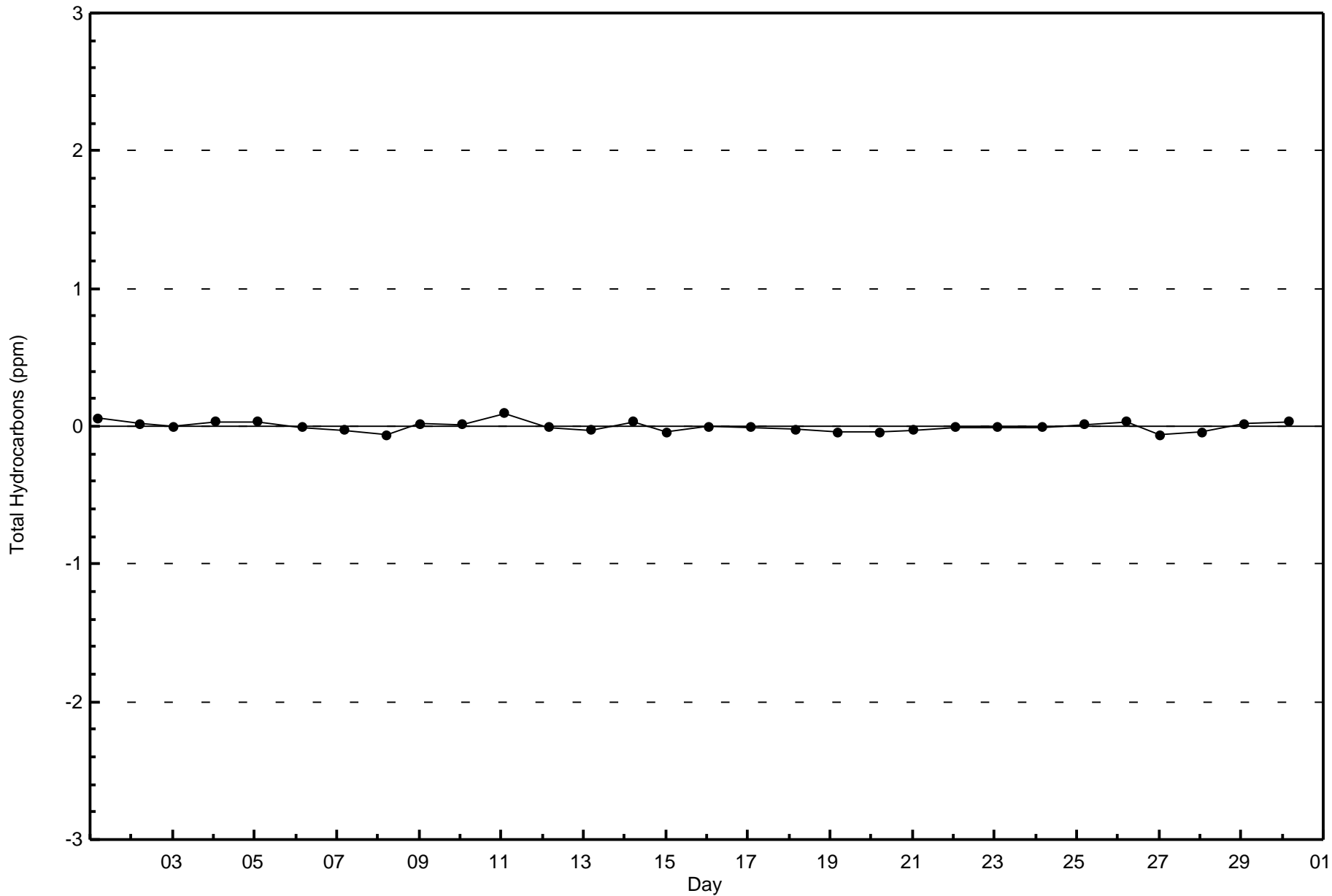
Total Number of Hours: 720

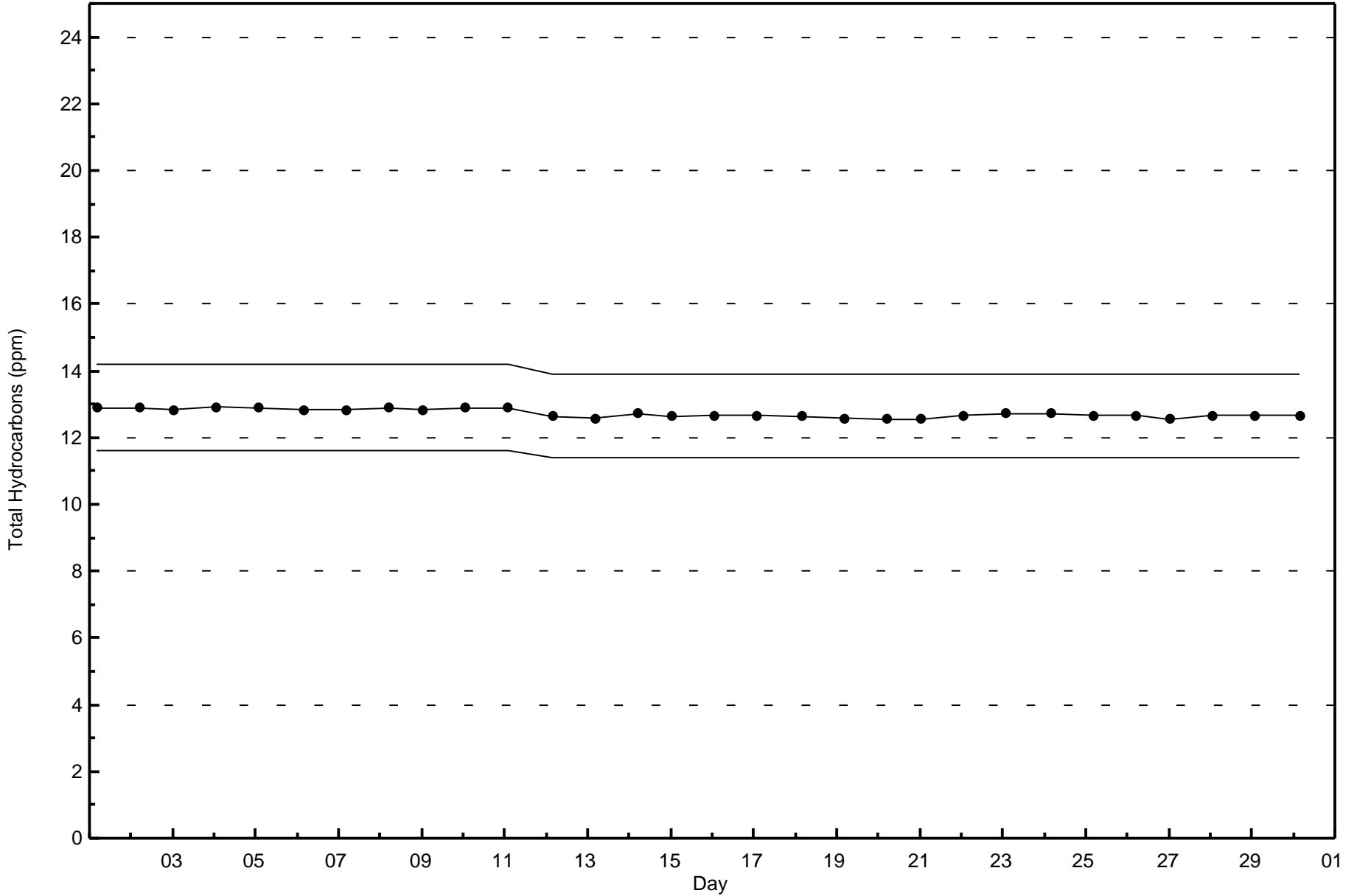


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Total Hydrocarbons (THC) - ppm  
Firebag (AMS 19)







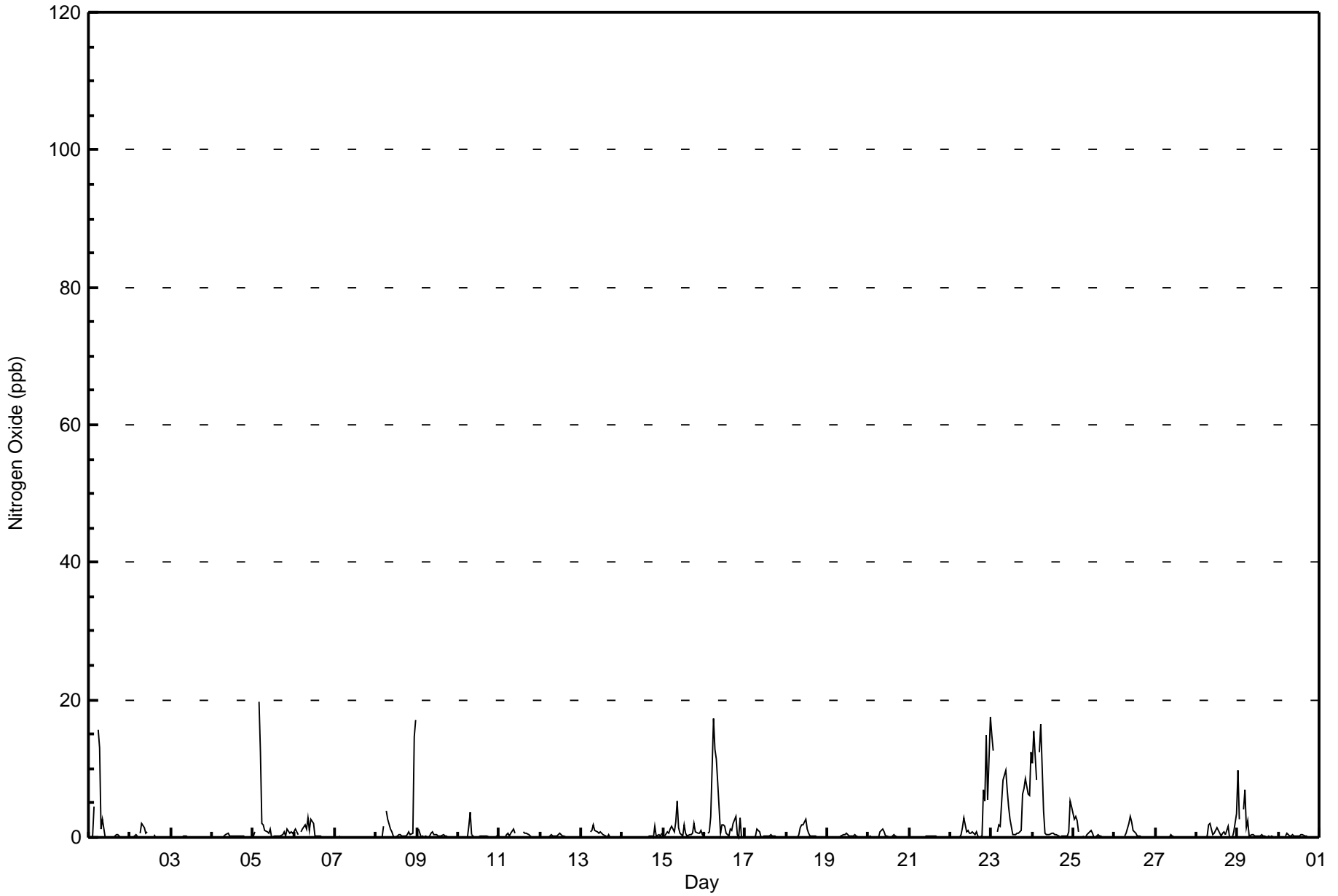


Maximum Value: 20 ppb on Sep 5 04:00																	Maximum Daily Average: 5.2 ppb on Sep 23																	Hours in Service: 720	
Minimum Value: 0 ppb on Sep 26 21:00																	Minimum Daily Average: 0.0 ppb on Sep 7																	Hours of Data: 683	
Maximum Diurnal Average: 2.4 ppb at hour 6																	Minimum Diurnal Average: 0.2 ppb at hour 18																	Hours of Missing Data: 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> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 15																	Hours of Calibration: 34	
																																		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-Sep	0	0	0	4	Z	16	13	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	16									
2-Sep	0	0	0	0	0	Z	1	2	1	1	1	M	M	M	0	0	0	0	0	0	0	0	0	0	0.4	2									
3-Sep	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									
4-Sep	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									
5-Sep	0	1	Z	20	12	2	2	1	1	1	1	0	0	0	0	0	0	0	0	1	0	1	1	1	2.0	20									
6-Sep	1	1	0	Z	1	1	2	1	3	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0.7	3									
7-Sep	0	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									
8-Sep	0	0	0	0	2	Z	4	3	1	1	0	0	0	0	0	0	0	0	0	1	0	1	15	17	2.0	17									
9-Sep	Z	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1									
10-Sep	0	Z	0	0	0	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	4									
11-Sep	0	0	Z	0	0	1	0	1	1	1	C	C	C	C	1	1	1	0	0	0	0	0	0	0	0.4	1									
12-Sep	0	0	0	Z	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
13-Sep	0	0	0	0	Z	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2									
14-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0.2	2									
15-Sep	Z	0	1	1	1	2	1	2	5	1	1	0	2	1	0	0	0	1	2	1	1	1	1	0	1.1	5									
16-Sep	1	Z	1	1	3	17	13	11	8	1	2	2	2	1	0	1	1	2	3	0	0	3	0	0	3.1	17									
17-Sep	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
18-Sep	0	0	0	Z	0	0	0	0	2	2	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0.5	3									
19-Sep	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
20-Sep	0	0	0	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
21-Sep	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									
22-Sep	0	Z	0	0	0	0	0	1	3	1	1	1	1	1	0	1	0	0	0	7	5	15	5	17	2.6	17									
23-Sep	15	13	Z	1	2	2	5	8	10	7	4	3	0	0	0	1	1	1	6	7	9	6	6	12	5.2	15									
24-Sep	11	15	8	Z	12	17	4	1	0	0	0	1	1	0	0	0	0	0	0	0	1	5	4	3.6	17										
25-Sep	3	3	2	1	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3									
26-Sep	0	0	0	0	0	Z	0	1	2	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	3									
27-Sep	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									
28-Sep	0	Z	0	0	0	0	0	2	2	0	1	1	1	1	0	1	1	0	2	0	0	0	1	3	0.7	3									
29-Sep	10	3	Z	4	7	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	10									
30-Sep	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
																	Diurnal Average																		
																	Diurnal Maximum																		
Z - zerospan																	C - Calibration																	M - Maintenance	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxide (NO) - ppb**  
**Firebag - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**Firebag - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	683	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb  
Firebag - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	35	35	20	7	6	20	49	43	57	84	92	65	37	39	51	43	683
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	35	35	20	7	6	20	49	43	57	84	92	65	37	39	51	43	683

Total Number of Valid Hours: 683

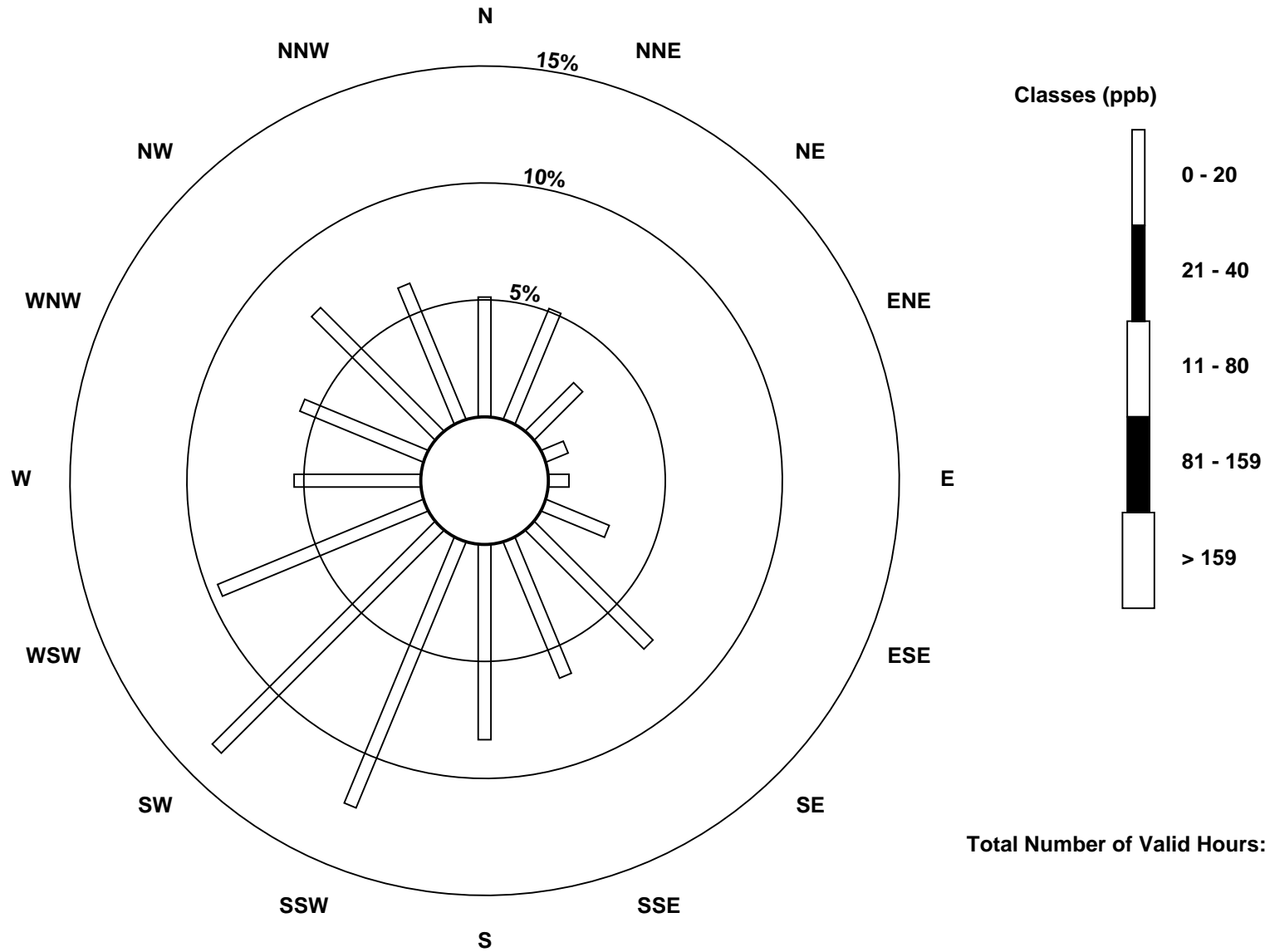
Total Number of Hours: 720

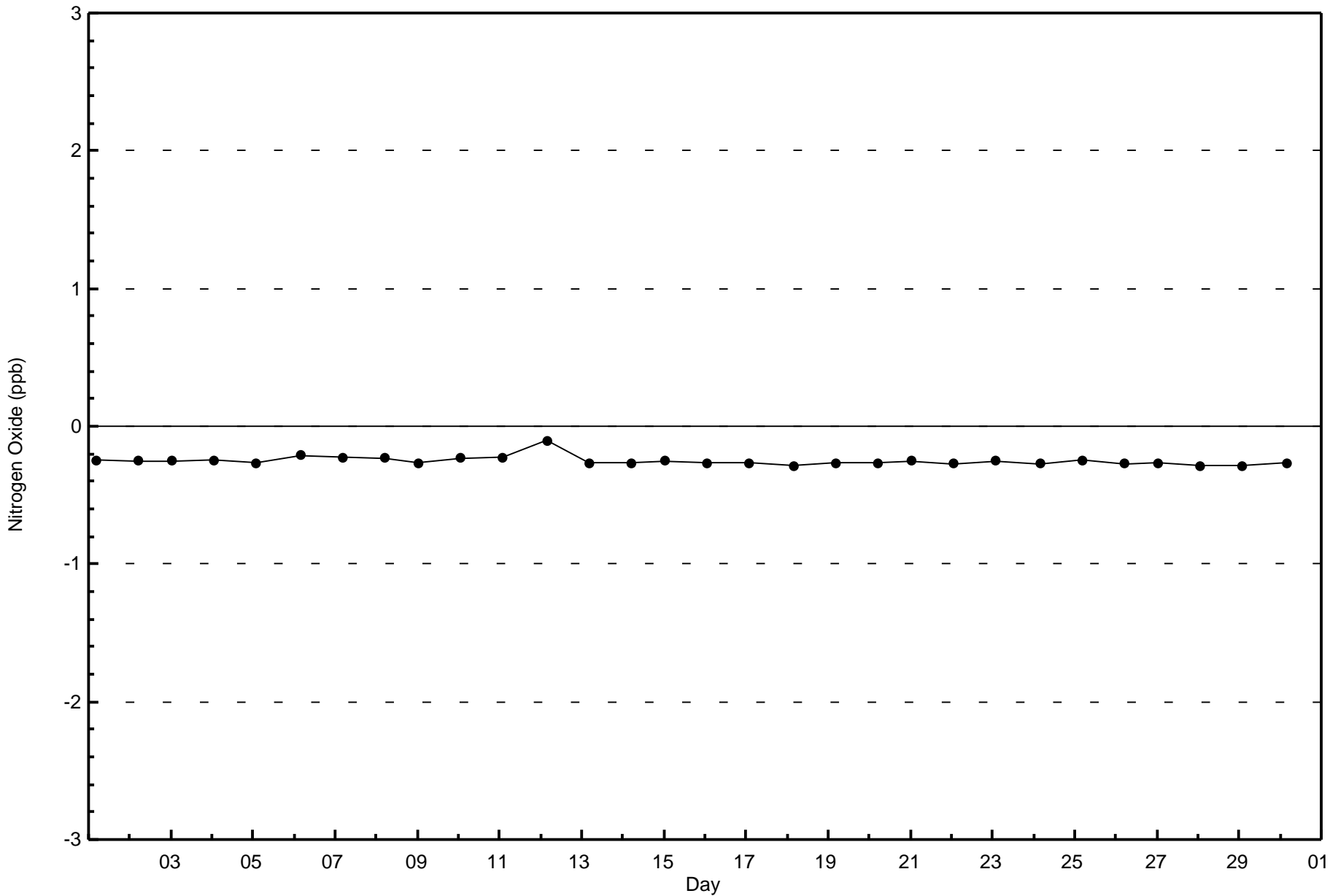


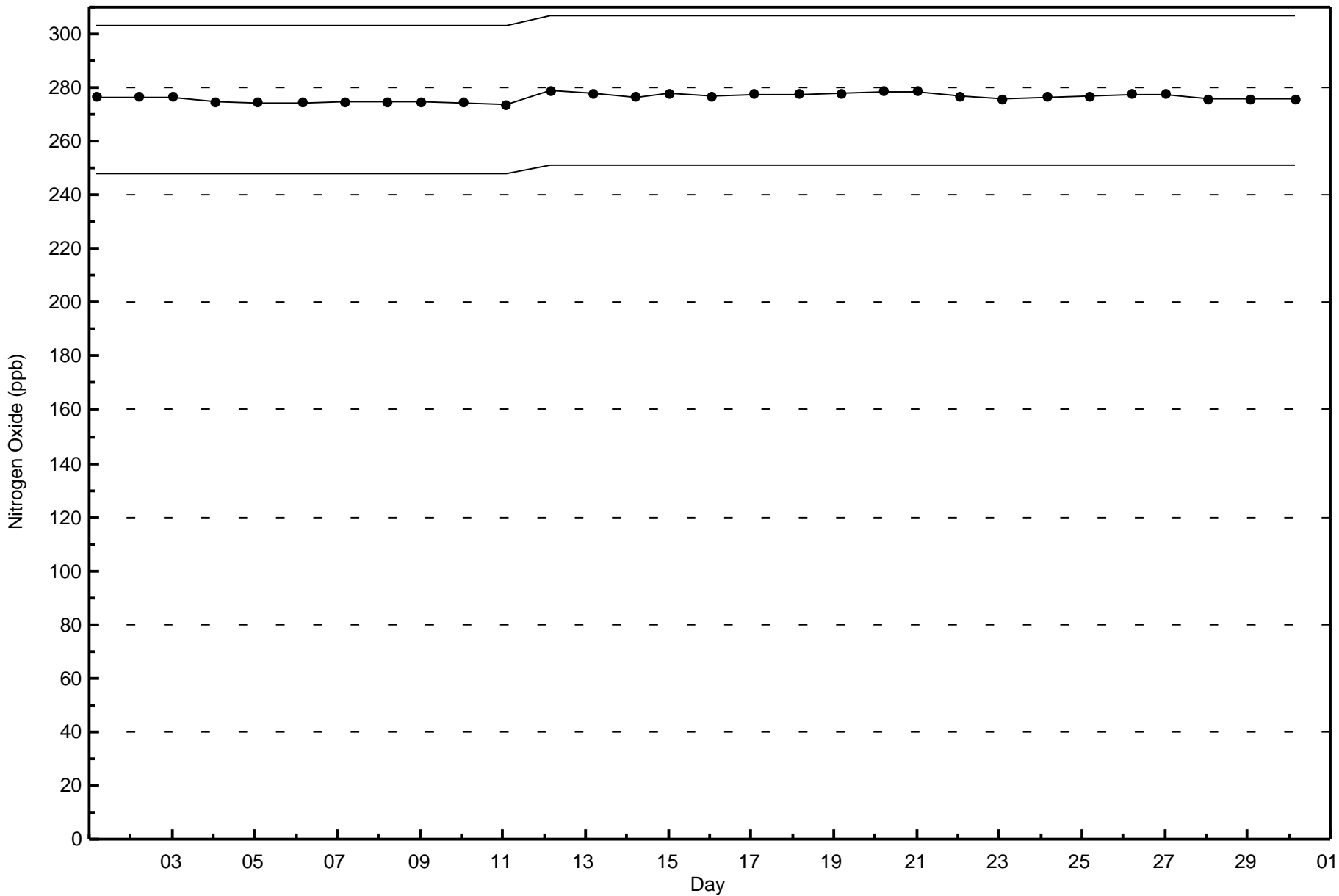


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Oxide (NO) - ppb  
Firebag (AMS 19)







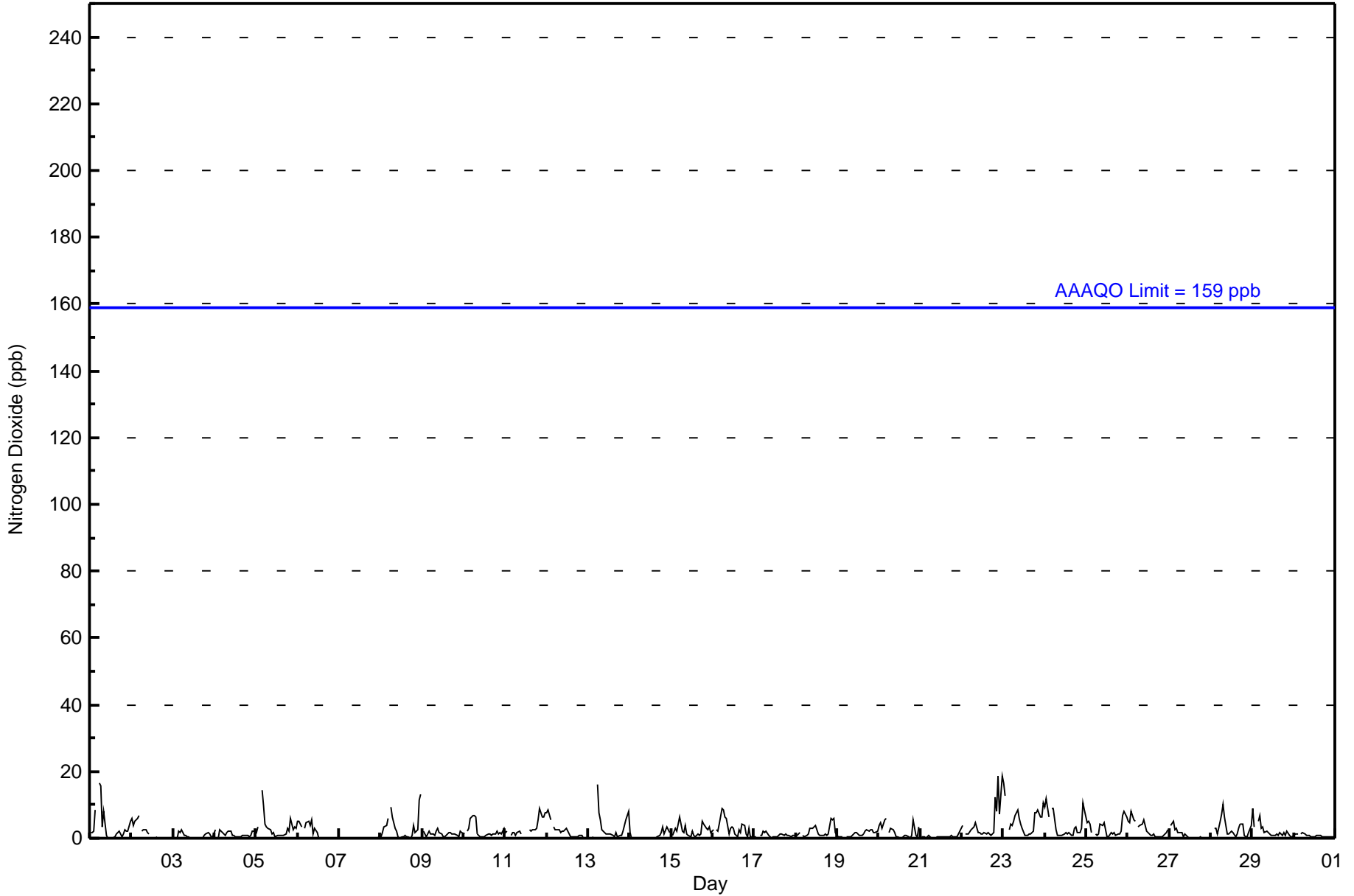


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 19 ppb on Sep 23 00:00	Maximum Daily Average: 5.6 ppb on Sep 23
Minimum Value: 0 ppb on Sep 1 12:00	Hours of Data: 683
Maximum Diurnal Average: 4.2 ppb at hour 6	Hours of Missing Data: 37
Monthly Average: 2.2 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.1 ppb on Sep 7	Percent Operational Time: 99.6
Minimum Diurnal Average: 0.7 ppb at hour 14	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 1 Q <sub>3</sub> = 3 P <sub>90</sub> = 6 P <sub>99</sub> = 14	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	2	2	2	9	Z	17	16	3	8	1	0	0	0	0	1	1	2	2	1	1	3	2	2	5	3.4	17	
2-Sep	6	4	5	6	7	Z	2	3	3	2	1	M	M	M	1	0	0	0	0	0	0	0	0	0	2.0	7	
3-Sep	Z	0	0	2	2	3	1	1	1	0	0	0	0	0	0	0	0	0	1	1	2	1	0	1	0.7	3	
4-Sep	2	Z	0	2	2	1	1	2	2	2	1	1	1	1	0	1	1	1	1	1	1	1	2	2	1.2	2	
5-Sep	2	3	Z	14	10	4	4	3	3	1	2	0	1	1	1	1	1	1	3	2	6	3	3	3	3.1	14	
6-Sep	5	5	3	Z	3	5	5	4	6	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	1.9	6	
7-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	1	
8-Sep	0	2	4	4	6	Z	9	7	3	2	0	0	0	1	1	1	1	0	1	4	2	2	11	13	3.2	13	
9-Sep	Z	2	0	1	2	1	1	1	2	3	2	1	1	1	1	2	2	1	1	1	1	1	2	2	1.4	3	
10-Sep	1	Z	2	3	6	7	7	7	1	0	0	0	0	1	1	1	1	1	1	2	1	2	1	3	2.2	7	
11-Sep	2	2	Z	1	2	2	1	2	2	1	C	C	C	C	3	2	3	3	3	6	9	6	7	8	3.3	9	
12-Sep	8	8	6	Z	3	3	3	3	2	2	2	3	2	1	1	0	0	0	0	1	1	0	0	0	2.2	8	
13-Sep	0	0	0	1	Z	16	8	5	3	2	1	1	1	1	1	0	2	0	1	1	2	4	5	8	2.7	16	
14-Sep	2	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	2	3	1	4	3	2	0.8	4	
15-Sep	Z	1	3	2	4	6	2	2	4	1	1	0	2	1	0	0	1	1	1	5	4	3	2	4	2	2.3	6
16-Sep	3	Z	3	2	4	9	8	6	6	1	3	3	3	1	1	3	2	4	4	1	0	3	0	0	3.1	9	
17-Sep	0	1	Z	1	1	2	2	2	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.9	2	
18-Sep	1	1	2	Z	1	1	1	1	3	3	3	4	3	1	1	1	1	1	1	1	6	5	6	2	2.1	6	
19-Sep	1	1	1	1	Z	1	1	1	1	1	2	2	1	1	1	1	2	3	2	3	3	2	2	2	1.3	3	
20-Sep	4	5	3	5	6	Z	2	3	3	2	1	0	0	0	1	1	1	0	0	1	6	1	1	4	2.0	6	
21-Sep	Z	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	1	2	0.5	2	
22-Sep	4	Z	1	1	1	3	3	3	5	2	2	1	1	2	1	2	1	1	2	12	8	19	7	19	4.4	19	
23-Sep	17	13	Z	3	4	4	5	7	9	6	4	3	1	1	1	1	1	2	8	8	8	6	6	11	5.6	17	
24-Sep	9	12	6	Z	9	9	3	1	1	1	1	2	1	2	1	1	3	3	2	2	3	11	9	9	4.0	12	
25-Sep	5	5	4	2	Z	1	1	1	4	4	5	3	0	0	2	1	2	1	1	2	7	8	6	6	2.9	8	
26-Sep	5	5	8	5	5	Z	4	4	4	5	4	2	1	1	1	1	1	1	1	1	1	1	2	3	2.8	8	
27-Sep	Z	4	5	3	3	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	5	
28-Sep	0	Z	3	3	1	5	7	10	6	1	1	2	2	2	1	1	3	4	4	1	0	0	2	4	2.8	10	
29-Sep	9	4	Z	5	7	3	4	2	2	2	1	1	1	1	1	1	2	1	2	1	2	1	1	1	2.3	9	
30-Sep	1	1	1	Z	1	2	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	0.7	2	

3.5	3.2	2.5	3.0	3.6	4.2	3.4	2.8	2.8	1.6	1.4	1.2	0.9	0.7	0.8	0.9	1.0	1.2	1.7	2.0	2.4	2.6	2.9	3.7	Diurnal Average	
17	13	8	14	10	17	16	10	9	6	5	4	3	2	3	3	3	4	8	12	9	19	11	19	Diurnal Maximum	

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Firebag - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	683	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	35	35	20	7	6	20	49	43	57	84	92	65	37	39	51	43	683
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	35	35	20	7	6	20	49	43	57	84	92	65	37	39	51	43	683

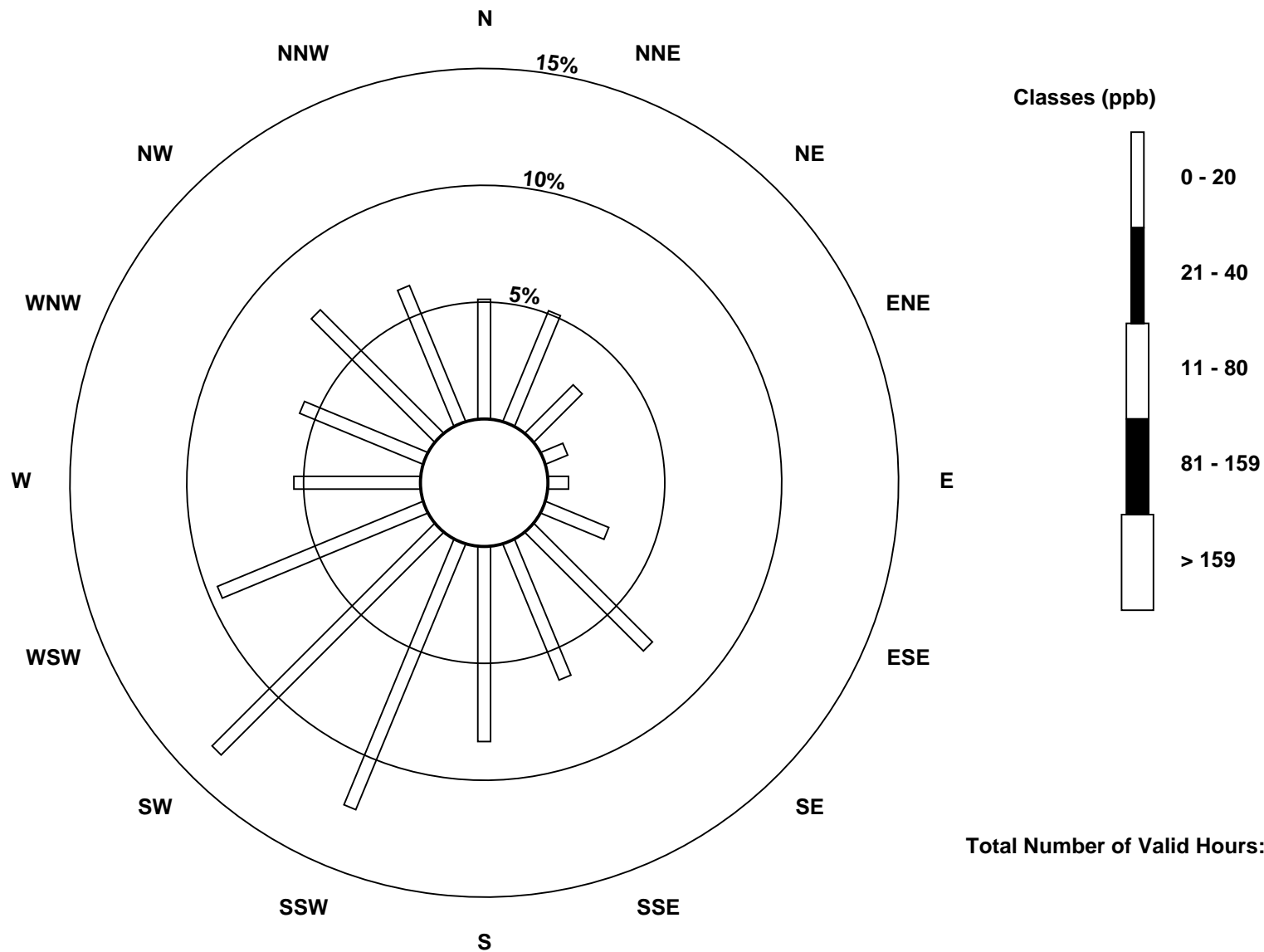
Total Number of Valid Hours: 683

Total Number of Hours: 720



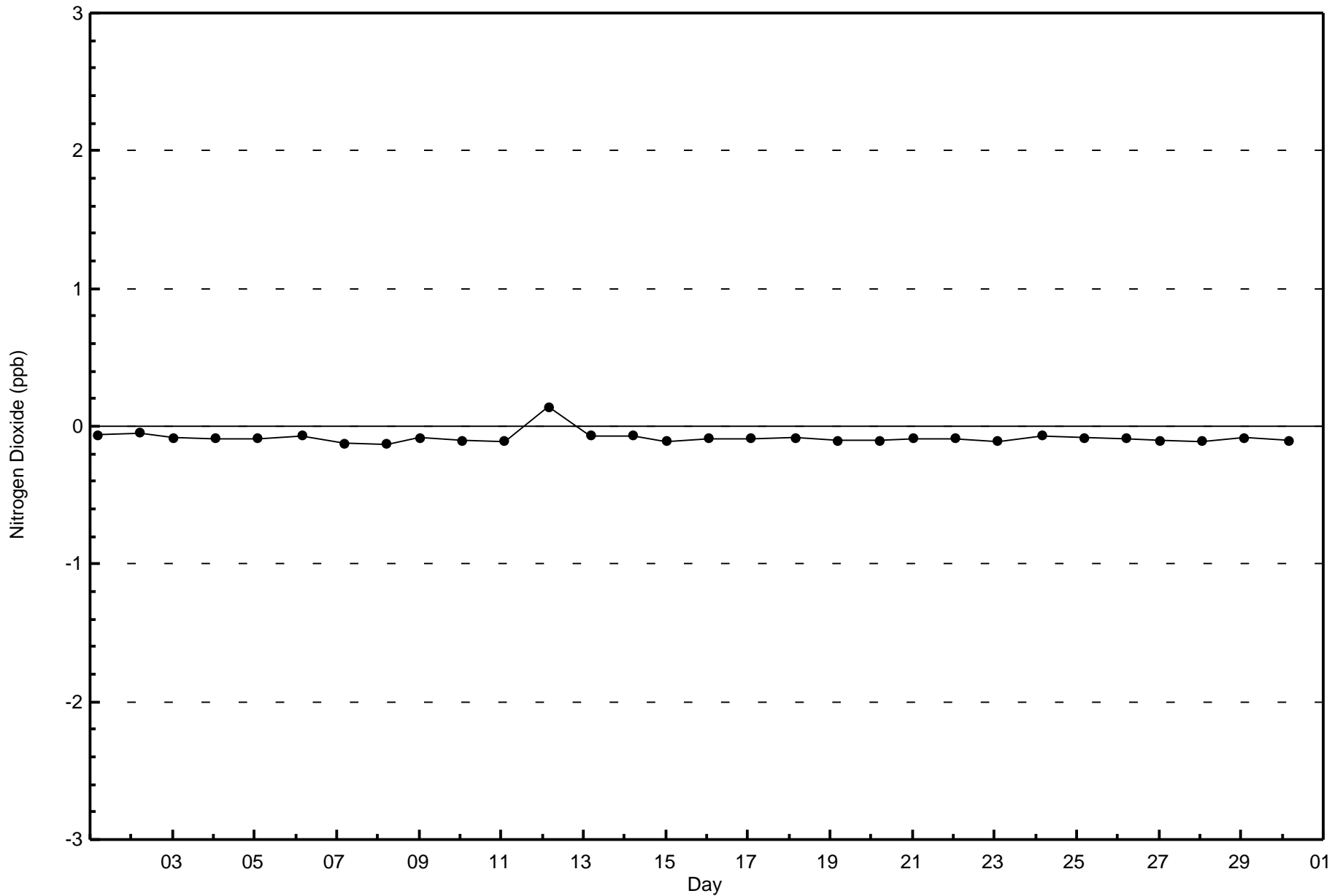
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

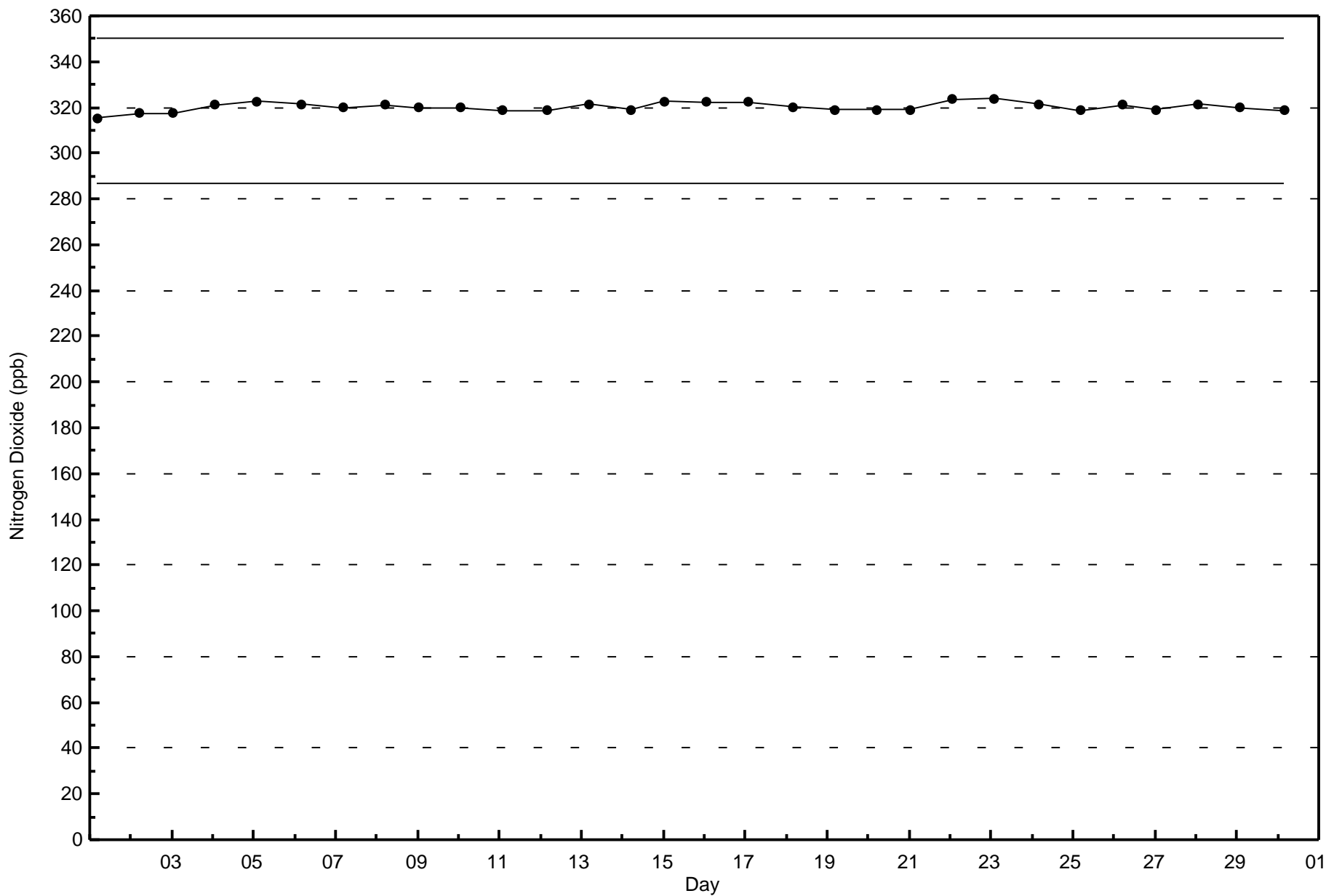
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag (AMS 19)



Total Number of Valid Hours: 683

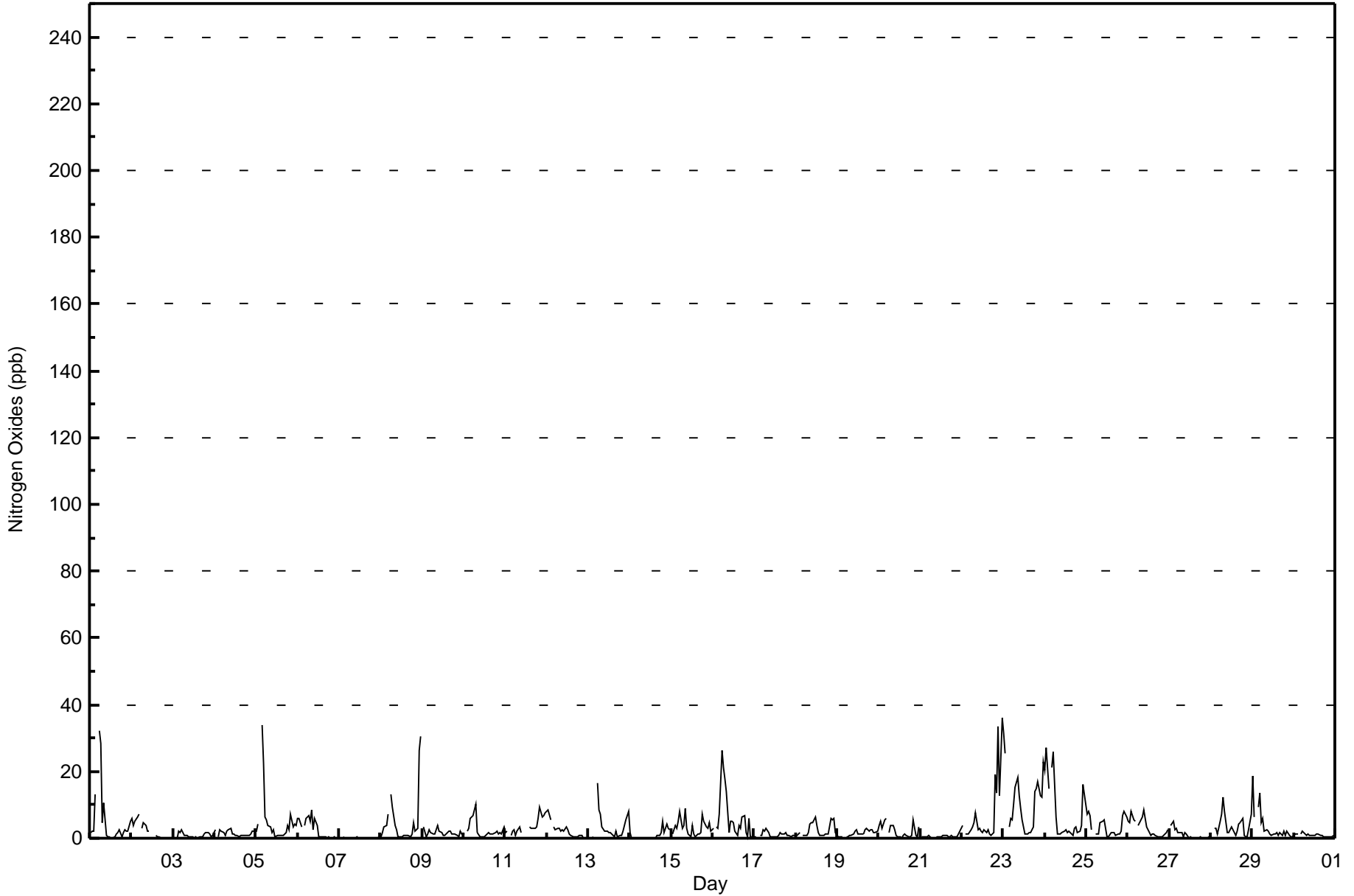








Maximum Value: 36 ppb on Sep 23 00:00		Maximum Daily Average: 10.7 ppb on Sep 23		Hours in Service: 720																																													
Minimum Value: 0 ppb on Sep 14 04:00		Minimum Daily Average: 0.2 ppb on Sep 7		Hours of Data: 683																																													
Maximum Diurnal Average: 6.6 ppb at hour 6		Minimum Diurnal Average: 1.0 ppb at hour 14		Hours of Missing Data: 37																																													
Monthly Average: 3.2 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 7 P <sub>99</sub> = 28		Hours of Calibration: 34																																													
				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-Sep	2	2	2	13	Z	32	28	4	11	1	0	0	0	0	1	1	2	3	1	1	3	2	2	5	5.1	32																							
2-Sep	6	4	5	6	7	Z	3	5	4	2	2	M	M	M	1	0	0	0	0	0	0	0	0	0	2.3	7																							
3-Sep	Z	0	0	2	2	3	1	1	1	1	0	0	0	0	0	0	0	0	1	2	2	1	0	1	0.8	3																							
4-Sep	2	Z	0	2	2	2	1	2	2	3	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1.4	3																							
5-Sep	2	4	Z	34	22	6	5	4	3	2	3	1	1	1	1	1	1	1	2	4	3	7	3	4	5.1	34																							
6-Sep	6	6	4	Z	4	6	7	5	8	2	6	4	0	0	0	0	0	0	0	0	0	0	0	0	2.6	8																							
7-Sep	0	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-Sep	0	1	3	4	7	Z	13	9	4	3	0	0	0	1	1	1	1	0	1	5	2	3	26	30	5.1	30																							
9-Sep	Z	3	0	1	2	2	1	1	2	4	2	2	1	1	1	2	2	1	1	1	1	0	2	1	1.6	4																							
10-Sep	1	Z	2	3	6	7	8	10	2	0	0	0	1	1	2	1	1	1	2	2	1	2	1	3	2.5	10																							
11-Sep	2	2	Z	1	2	2	1	2	3	2	C	C	C	C	4	3	3	3	3	6	9	6	7	8	3.6	9																							
12-Sep	8	8	6	Z	3	3	3	3	2	2	2	3	3	1	1	1	0	0	0	1	1	0	0	0	2.3	8																							
13-Sep	0	0	0	1	Z	17	9	7	3	2	2	2	2	1	1	0	2	1	1	1	2	4	5	8	3.1	17																							
14-Sep	2	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	2	5	2	4	3	2	1.0	5																							
15-Sep	Z	1	4	3	5	8	3	4	9	3	1	1	4	1	1	1	1	2	7	5	3	3	5	2	3.4	9																							
16-Sep	3	Z	3	3	7	26	21	18	14	2	5	5	5	2	1	4	3	6	7	2	0	6	0	0	6.3	26																							
17-Sep	0	1	Z	1	1	2	2	3	2	0	0	0	0	1	1	2	1	1	1	1	1	1	1	1	1.1	3																							
18-Sep	1	1	2	Z	1	1	1	2	4	5	5	7	4	2	1	1	1	1	1	1	6	5	6	2	2.6	7																							
19-Sep	0	1	1	1	Z	1	1	1	1	1	2	2	1	1	1	1	2	3	2	3	3	2	2	2	1.5	3																							
20-Sep	4	5	3	5	6	Z	2	4	4	3	1	1	0	0	1	1	1	0	0	1	6	1	1	4	2.2	6																							
21-Sep	Z	0	0	0	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	0	0	1	2	0.5	2																							
22-Sep	4	Z	1	1	1	3	3	5	8	3	3	2	2	2	2	3	1	1	2	19	13	33	13	36	7.0	36																							
23-Sep	31	25	Z	3	6	5	10	15	18	13	9	5	1	1	1	2	2	3	14	15	17	13	12	23	10.7	31																							
24-Sep	20	27	15	Z	21	26	6	1	1	1	2	2	2	2	2	1	1	3	4	2	2	4	16	13	7.6	27																							
25-Sep	7	8	7	3	Z	1	1	1	4	5	6	3	0	1	2	2	2	2	1	1	2	7	8	6	3.5	8																							
26-Sep	5	5	8	5	5	Z	4	5	6	8	6	3	2	1	1	1	1	1	1	1	1	1	2	3	3.2	8																							
27-Sep	Z	4	5	3	3	1	2	2	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	5																							
28-Sep	0	Z	3	3	1	5	7	12	8	2	2	3	4	3	1	2	4	5	6	1	0	1	3	7	3.6	12																							
29-Sep	19	6	Z	9	14	5	6	2	3	2	1	1	1	1	2	1	2	1	2	1	2	1	1	1	3.6	19																							
30-Sep	1	1	1	Z	1	2	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	0.9	2																							
																								5.1	4.7	3.0	4.3	5.3	6.6	5.1	4.3	4.4	2.4	2.2	1.8	1.3	1.0	1.0	1.2	1.3	1.4	2.2	2.7	2.9	3.5	4.1	5.6	Diurnal Average	
																								31	27	15	34	22	32	28	18	18	13	9	7	5	3	4	4	4	6	14	19	17	33	26	36	Diurnal Maximum	
Z - zerospan																								C - Calibration				M - Maintenance																					





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Firebag - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	667	97.66	97.66
21 - 40	16	2.34	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Firebag - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	35	35	20	7	6	20	47	30	56	84	92	65	37	39	51	43	667
21 - 40	0	0	0	0	0	0	2	13	1	0	0	0	0	0	0	0	16
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>	35	35	20	7	6	20	49	43	57	84	92	65	37	39	51	43	683

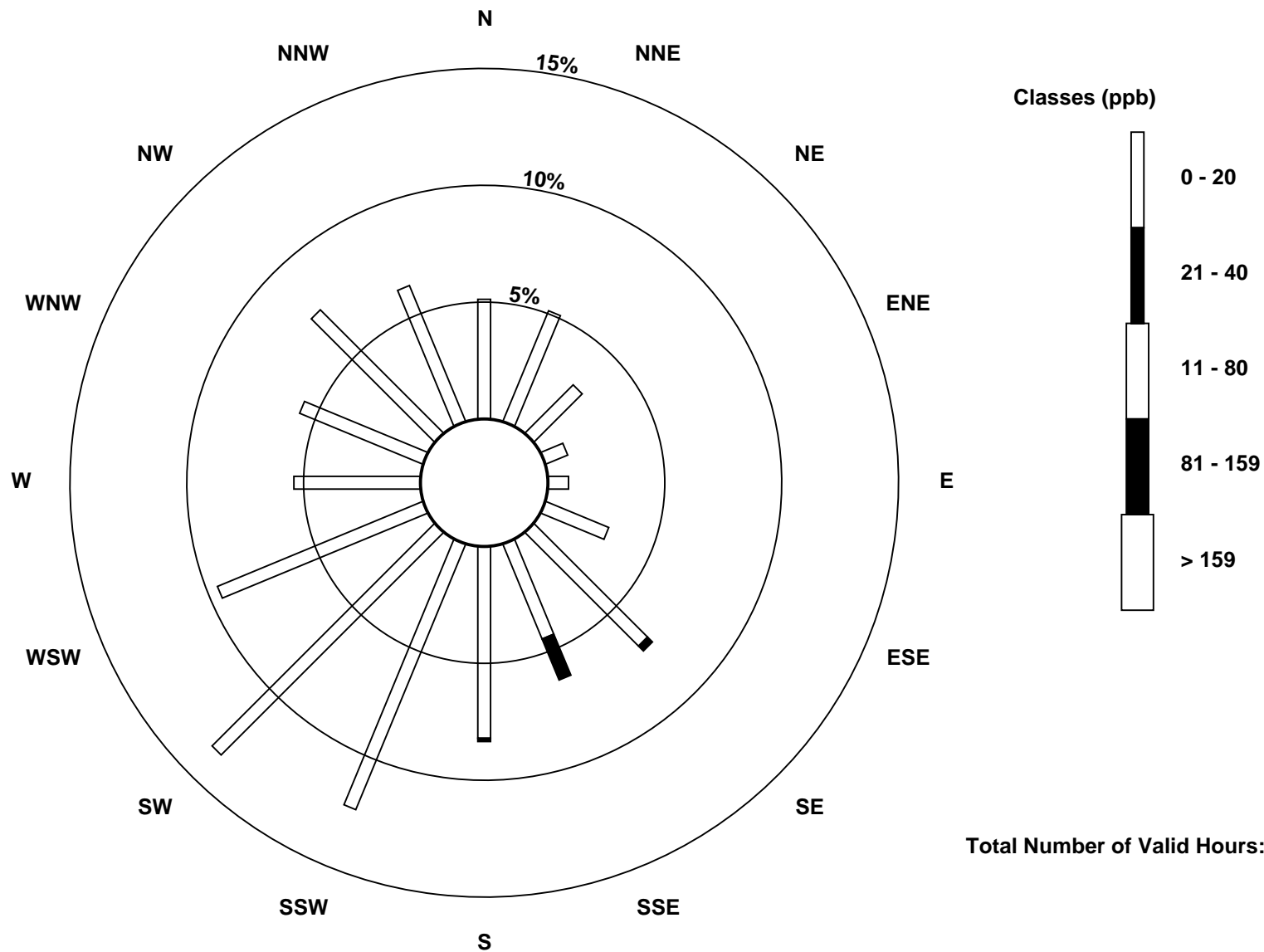
Total Number of Valid Hours: 683

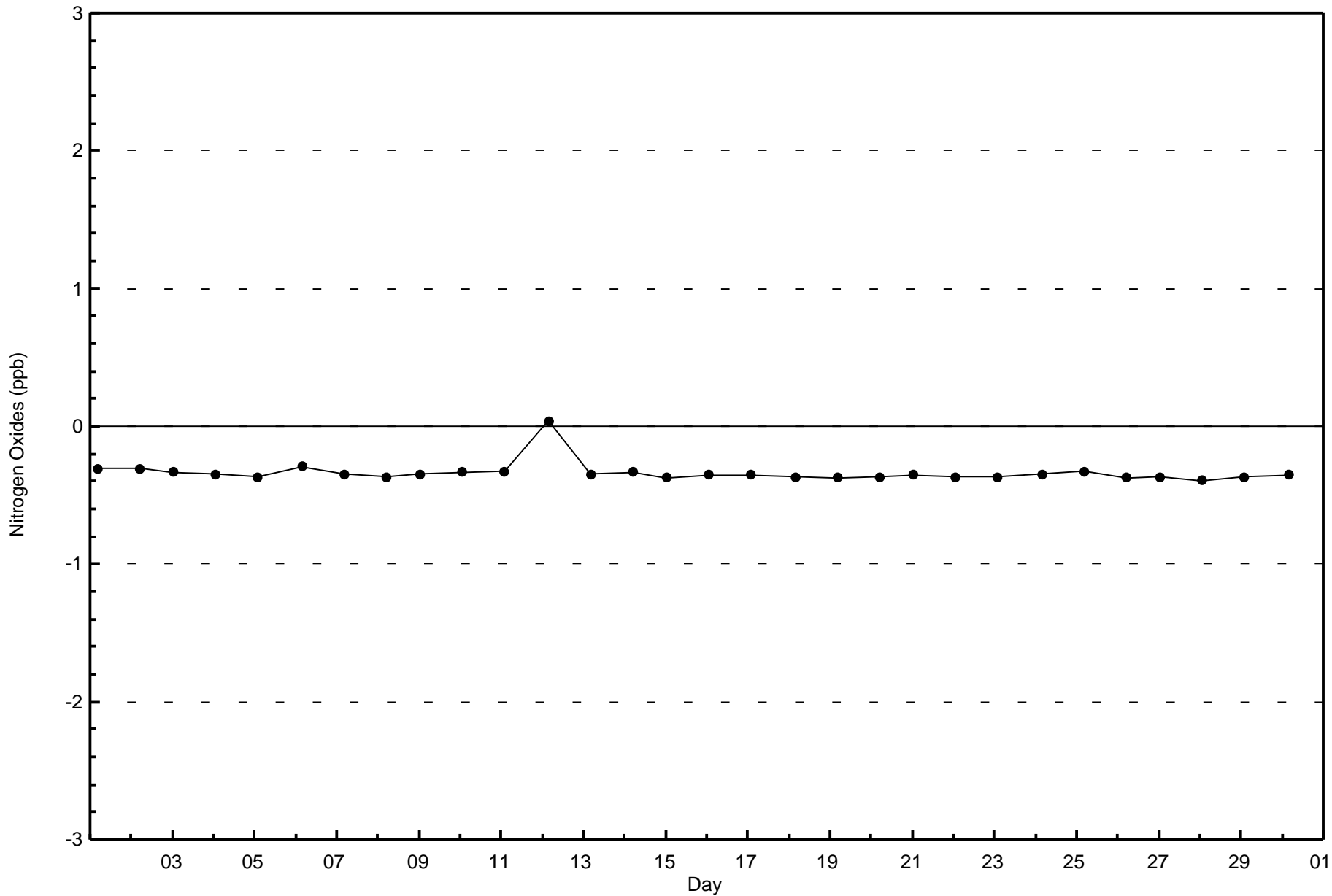
Total Number of Hours: 720



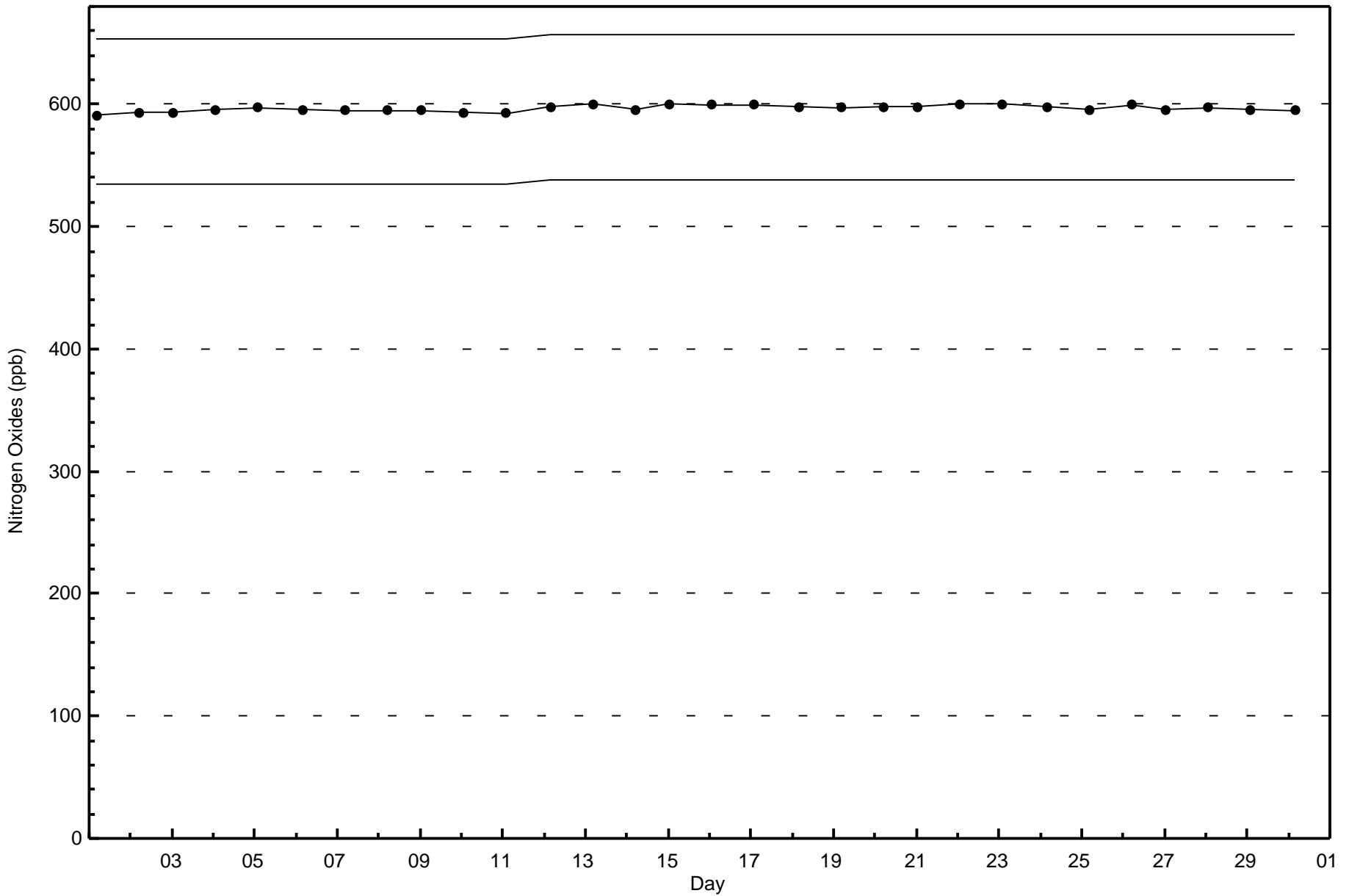
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Firebag (AMS 19)



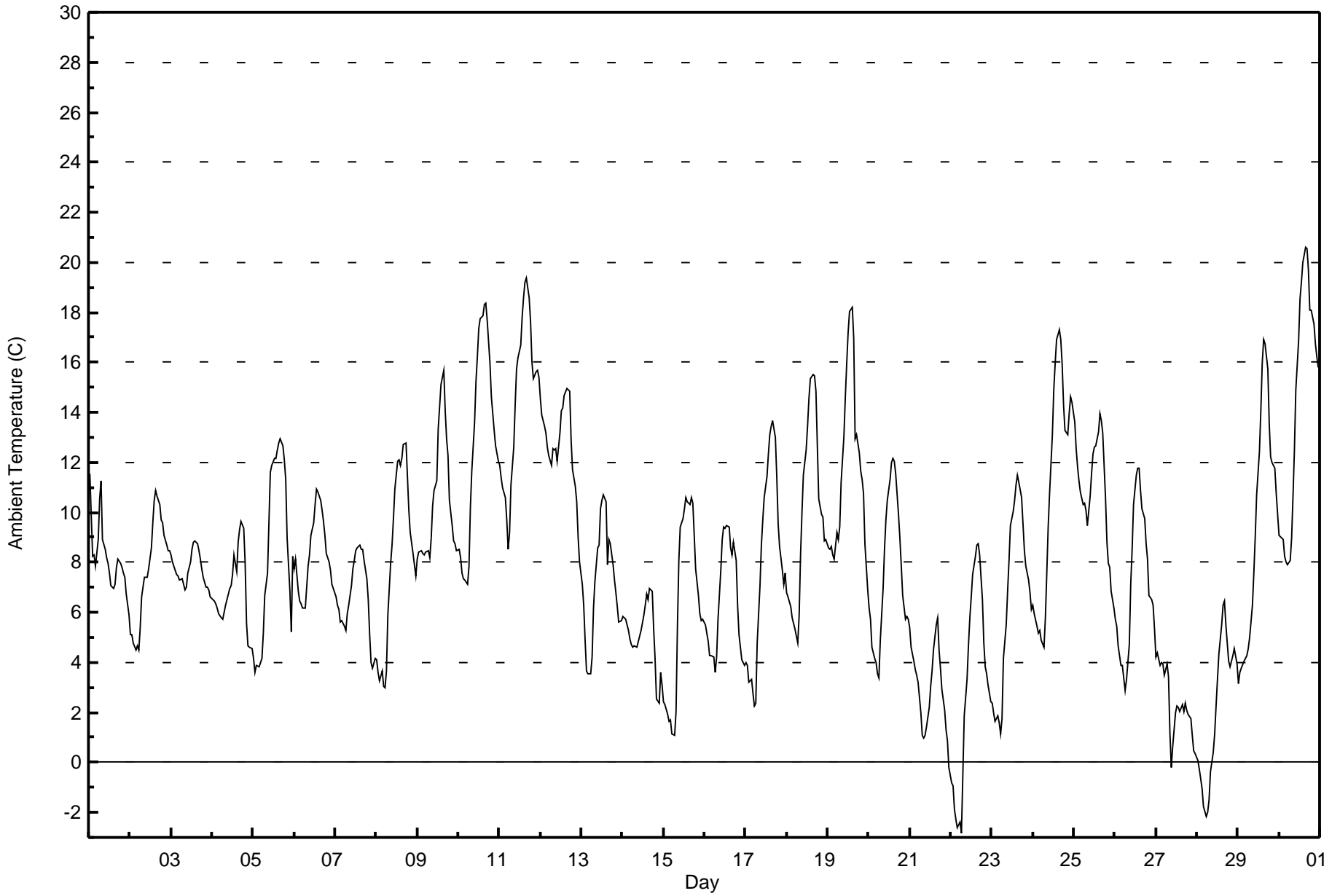








Maximum Value: 20.6 C on Sep 30 16:00		Maximum Daily Average: 14.5 C on Sep 11		Hours in Service: 720																						
Minimum Value: -2.8 C on Sep 22 07:00		Minimum Daily Average: 2.1 C on Sep 28		Hours of Data: 720																						
Maximum Diurnal Average: 11.8 C at hour 16		Minimum Diurnal Average: 5.0 C at hour 6		Hours of Missing Data: 0																						
Monthly Average: 8.16 C		Percentiles: P <sub>1</sub> = -1.8 P <sub>10</sub> = 3.0 Q <sub>1</sub> = 5.1 Median = 8.0 Q <sub>3</sub> = 10.8 P <sub>90</sub> = 14.1 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-Sep	11.5	9.9	8.3	8.3	7.8	8.9	10.5	11.3	8.9	8.5	8.2	8.0	7.6	7.1	6.9	7.2	7.8	8.1	8.0	7.8	7.6	7.4	6.7	5.9	8.3	11.5
2-Sep	5.1	5.1	4.7	4.5	4.7	4.5	5.4	6.6	7.4	7.4	7.4	7.8	8.6	9.6	10.5	10.9	10.7	10.3	9.7	9.6	9.1	8.7	8.5	8.5	7.7	10.9
3-Sep	8.3	8.0	7.7	7.5	7.5	7.3	7.3	7.1	6.9	7.0	7.6	8.0	8.5	8.8	8.9	8.7	8.4	8.2	7.8	7.4	7.0	7.0	6.9	6.6	7.7	8.9
4-Sep	6.5	6.4	6.4	6.2	6.0	5.8	5.7	6.0	6.3	6.7	6.9	7.1	7.5	8.3	7.6	8.8	9.3	9.7	9.3	7.9	5.5	4.7	4.6	4.6	6.8	9.7
5-Sep	4.2	3.6	3.9	3.8	4.0	4.2	5.2	6.7	7.6	9.6	11.6	11.9	12.2	12.1	12.5	12.8	12.9	12.7	12.1	11.3	9.0	6.8	5.2	8.3	8.5	12.9
6-Sep	7.7	8.1	6.8	6.5	6.3	6.2	6.2	7.0	7.9	8.3	9.1	9.6	10.3	10.9	10.8	10.5	10.1	9.6	9.1	8.4	8.0	7.7	7.1	7.0	8.3	10.9
7-Sep	6.6	6.3	6.1	5.6	5.7	5.4	5.3	5.9	6.3	7.1	7.8	8.1	8.5	8.6	8.7	8.5	8.5	8.1	7.3	6.5	5.1	4.0	3.8	4.2	6.6	8.7
8-Sep	4.1	3.6	3.3	3.6	3.0	3.0	3.7	5.9	8.0	8.7	9.7	10.9	12.0	12.1	11.9	12.1	12.7	12.8	11.5	10.1	9.2	8.4	7.9	7.5	8.1	12.8
9-Sep	8.1	8.4	8.5	8.4	8.3	8.4	8.5	8.2	9.0	10.2	10.9	11.3	13.3	14.2	15.1	15.7	14.1	12.9	12.3	10.5	9.4	8.9	8.8	8.5	10.5	15.7
10-Sep	8.5	8.2	7.6	7.4	7.3	7.1	7.9	10.2	11.6	13.6	15.3	16.2	17.3	17.8	17.9	18.3	18.4	17.7	16.0	14.6	14.0	13.3	12.6	12.0	12.9	18.4
11-Sep	11.9	11.4	11.0	10.6	9.7	8.5	9.2	11.1	12.6	14.3	15.8	16.2	16.7	17.8	18.6	19.2	19.4	18.6	17.7	16.0	15.3	15.6	15.7	15.4	14.5	19.4
12-Sep	14.6	13.9	13.4	13.2	12.6	12.3	11.9	12.6	12.5	12.6	12.1	13.2	14.1	14.2	14.7	15.0	14.9	14.8	12.9	11.7	11.1	10.4	9.0	8.0	12.7	15.0
13-Sep	7.1	6.3	4.9	3.6	3.5	3.6	4.2	6.2	7.2	8.6	8.7	10.2	10.5	10.7	10.4	7.9	8.9	8.7	7.9	7.3	6.8	6.2	5.6	5.7	7.1	10.7
14-Sep	5.8	5.8	5.7	5.3	4.9	4.7	4.6	4.7	4.6	4.8	5.0	5.3	5.9	6.3	6.7	6.5	7.0	6.8	5.4	4.1	2.5	2.4	3.6	3.1	5.1	7.0
15-Sep	2.4	2.3	1.9	1.6	1.7	1.1	1.1	2.0	5.4	8.1	9.4	9.7	10.2	10.6	10.4	10.3	10.6	10.4	9.1	7.7	6.7	5.9	5.6	5.7	6.3	10.6
16-Sep	5.5	5.2	4.8	4.3	4.2	4.2	3.6	4.2	5.7	7.7	8.9	9.4	9.4	9.5	9.4	8.6	8.3	8.8	8.1	6.3	5.1	4.6	4.1	3.9	6.4	9.5
17-Sep	4.0	3.9	3.2	3.3	2.7	2.2	2.4	4.8	7.1	8.7	9.7	10.6	11.5	12.3	13.1	13.5	13.7	13.0	11.4	9.5	8.6	7.7	7.1	7.6	8.0	13.7
18-Sep	6.8	6.6	6.2	5.8	5.6	5.3	4.8	5.9	8.3	10.0	11.5	12.5	13.4	14.6	15.3	15.5	15.4	14.8	12.7	10.6	9.9	9.8	8.9	8.9	10.0	15.5
19-Sep	8.6	8.5	8.6	8.3	8.1	9.2	8.9	9.4	11.2	13.0	14.6	16.0	17.2	18.0	18.2	17.0	12.9	13.1	12.4	11.6	11.3	10.8	8.8	6.9	11.8	18.2
20-Sep	6.1	5.7	4.6	4.2	4.0	3.5	3.4	4.9	7.0	8.5	9.7	10.5	11.3	12.0	12.2	12.1	11.5	9.9	9.0	7.8	6.7	5.7	5.8	5.7	7.6	12.2
21-Sep	5.4	4.6	4.0	3.7	3.5	3.2	2.0	1.1	1.0	1.1	1.4	2.2	3.0	3.6	4.5	5.5	5.8	4.5	3.7	2.9	2.1	1.3	0.8	-0.2	3.0	5.8
22-Sep	-0.8	-1.0	-1.9	-2.3	-2.6	-2.4	-2.8	-0.5	1.9	3.3	4.7	5.8	6.6	7.5	8.2	8.7	8.8	8.3	6.5	4.8	3.9	3.5	3.1	2.4	3.1	8.8
23-Sep	2.4	2.0	1.7	1.8	1.6	1.2	1.8	4.1	5.5	6.9	8.1	9.5	10.1	10.5	11.1	11.5	11.2	10.6	9.6	8.5	7.8	7.3	6.8	6.1	6.6	11.5
24-Sep	6.3	6.0	5.4	5.2	5.3	4.9	4.6	5.8	7.6	9.4	10.8	13.1	14.9	16.0	16.9	17.3	16.9	15.9	14.3	13.3	13.1	14.0	14.6	14.4	11.1	17.3
25-Sep	13.6	12.5	11.8	11.3	10.8	10.3	10.4	10.1	9.5	10.7	11.6	12.4	12.6	12.6	13.2	14.0	13.7	13.2	10.5	8.8	8.0	7.8	6.8	6.2	10.9	14.0
26-Sep	5.7	5.4	4.7	3.9	3.9	3.4	2.9	3.3	4.7	7.1	8.5	10.3	11.5	11.8	11.8	10.9	10.2	9.7	8.7	8.1	6.7	6.5	6.3	5.3	7.1	11.8
27-Sep	4.2	4.4	3.9	4.0	3.9	3.5	3.9	3.5	1.2	-0.2	0.6	2.0	2.2	2.2	2.0	2.3	2.0	2.4	2.1	1.9	1.8	1.1	0.4	0.3	2.3	4.4
28-Sep	0.1	-0.2	-0.6	-1.1	-1.8	-2.1	-2.0	-1.5	-0.4	0.4	1.1	2.3	3.3	4.3	5.5	6.3	6.5	5.5	4.1	3.8	4.1	4.3	4.6	4.0	2.1	6.5
29-Sep	3.2	3.6	3.8	4.1	4.2	4.3	4.6	5.0	6.3	7.5	9.0	10.7	12.4	14.0	16.0	16.9	16.8	15.7	13.5	12.2	12.0	11.7	10.8	9.9	9.5	16.9
30-Sep	9.1	9.0	8.9	8.2	8.0	7.9	8.1	9.0	10.7	12.5	14.9	16.9	18.5	19.2	20.0	20.6	20.5	19.7	18.1	18.1	17.5	16.8	16.2	15.8	14.3	20.6
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Firebag - September 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	18	2.50	2.50
0 - 10	480	66.67	69.17
10 - 20	220	30.56	99.72
> 20	2	0.28	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

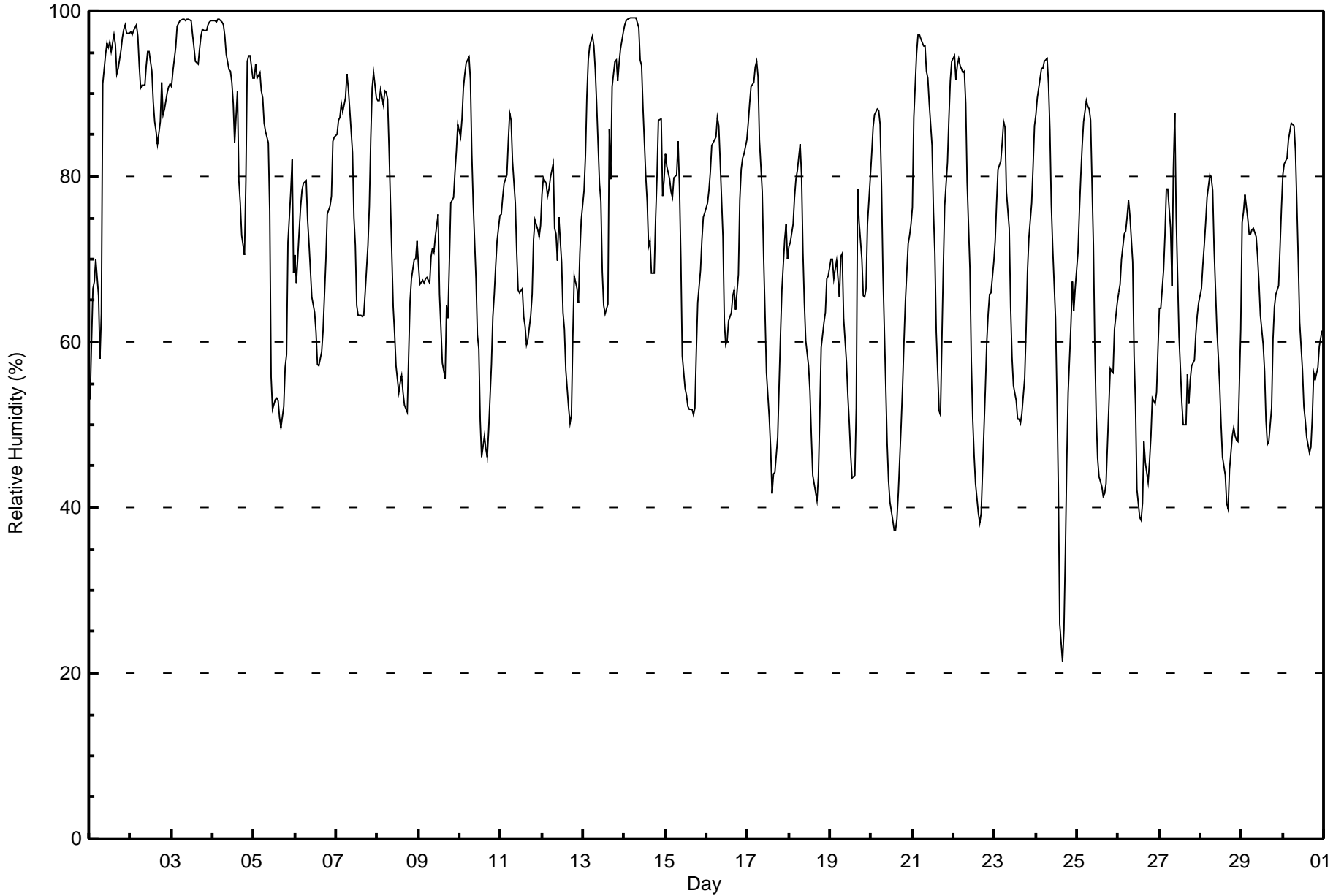
**Firebag - September 2015**

Maximum Value: 99 % on Sep 14 07:00      Maximum Daily Average: 97.1 % on Sep 3																			Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 21 % on Sep 24 16:00      Minimum Daily Average: 56.9 % on Sep 26 Maximum Diurnal Average: 85.8 % at hour 6      Minimum Diurnal Average: 56.1 % at hour 16 Monthly Average: 72.5 %      Percentiles: P <sub>1</sub> = 38 P <sub>10</sub> = 50 Q <sub>1</sub> = 60 Median = 73 O <sub>3</sub> = 87 P <sub>90</sub> = 94 P <sub>99</sub> = 99																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	53	60	66	67	70	66	58	63	91	95	96	96	96	95	97	96	92	93	95	97	98	98	97	97	84.7	98	
2-Sep	97	97	98	98	97	93	91	91	91	93	95	95	93	89	87	85	84	87	91	88	88	90	91	91	91.7	98	
3-Sep	91	93	96	98	99	99	99	99	99	99	99	99	97	96	94	93	95	97	98	98	98	98	99	99	97.1	99	
4-Sep	99	99	99	99	99	99	99	98	97	95	93	93	91	89	84	90	79	77	73	71	80	94	95	95	92	90.7	99
5-Sep	92	94	92	93	90	89	86	86	84	76	56	52	53	53	53	51	50	52	57	58	72	78	82	68	71.5	94	
6-Sep	71	67	73	76	78	79	79	75	72	69	65	64	61	57	57	59	61	66	70	76	76	78	84	85	70.7	85	
7-Sep	85	87	87	89	88	90	92	91	88	83	75	72	64	63	63	63	63	66	72	76	84	91	93	89	79.8	93	
8-Sep	89	89	91	89	90	90	89	84	71	64	61	57	54	55	56	54	52	52	58	65	68	70	70	72	70.4	91	
9-Sep	69	67	67	67	68	68	67	70	71	71	73	75	66	62	57	56	64	63	70	77	77	80	83	86	69.8	86	
10-Sep	85	87	91	92	94	94	92	83	77	68	61	59	51	46	49	47	46	49	57	63	66	69	72	75	69.7	94	
11-Sep	75	78	79	80	84	88	87	82	77	71	66	66	66	63	62	60	60	63	66	72	75	74	73	74	72.5	88	
12-Sep	78	80	79	78	79	80	81	74	73	70	75	70	63	62	57	52	50	51	61	68	66	65	71	75	69.0	81	
13-Sep	78	82	90	94	96	97	96	93	89	79	77	68	64	63	65	86	80	91	94	94	92	94	95	97	85.6	97	
14-Sep	98	99	99	99	99	99	99	99	98	94	93	88	80	77	71	72	68	68	75	80	87	87	78	79	87.0	99	
15-Sep	83	81	80	78	77	80	80	84	79	70	58	54	54	52	52	52	51	52	59	65	69	72	75	76	68.0	84	
16-Sep	77	78	80	84	84	85	87	86	82	73	62	60	60	62	64	66	66	64	68	77	81	82	83	84	74.8	87	
17-Sep	87	89	91	91	93	94	92	84	78	70	63	56	51	47	42	44	44	48	55	61	66	72	74	70	69.3	94	
18-Sep	72	72	74	77	80	81	84	80	71	65	60	57	54	49	44	42	41	44	51	59	62	64	68	68	63.3	84	
19-Sep	70	70	68	69	70	65	70	71	63	58	53	50	46	44	44	52	79	75	70	66	65	66	74	80	64.1	80	
20-Sep	83	86	88	88	88	86	79	68	55	48	43	41	38	37	37	39	42	50	55	60	65	72	73	74	62.3	88	
21-Sep	76	87	95	97	97	97	96	96	93	92	89	84	76	71	61	52	51	60	69	77	82	87	92	94	82.0	97	
22-Sep	95	92	93	94	93	92	93	89	79	69	58	51	46	43	39	38	39	44	54	60	63	66	66	70	67.8	95	
23-Sep	72	77	81	82	84	87	86	78	74	64	58	55	53	51	51	50	51	56	61	68	72	77	81	86	69.0	87	
24-Sep	87	90	92	93	93	94	94	91	86	77	71	63	53	43	26	21	25	34	45	54	62	67	64	66	66.4	94	
25-Sep	71	76	80	84	87	89	88	88	87	72	59	51	46	44	43	41	42	43	52	57	56	56	62	65	64.1	89	
26-Sep	66	67	70	73	73	75	77	75	70	58	52	42	39	38	41	48	45	43	46	49	53	53	54	59	56.9	77	
27-Sep	64	64	69	73	79	78	74	67	81	88	75	61	57	53	50	50	56	53	55	57	58	61	63	65	64.5	88	
28-Sep	66	69	72	74	77	80	80	78	71	62	58	55	50	46	44	41	40	45	49	50	49	48	48	62	58.9	80	
29-Sep	74	76	78	75	73	73	74	74	73	70	67	63	60	56	51	48	48	52	60	64	66	67	71	76	66.2	78	
30-Sep	80	82	82	84	85	86	86	83	77	70	62	57	52	50	48	47	47	51	56	55	57	59	61	61	65.9	86	
	79.4	81.1	83.3	84.6	85.5	85.8	85.2	82.6	79.7	74.3	69.2	65.0	61.1	58.4	56.4	56.1	57.1	59.4	64.7	69.0	72.3	74.6	76.3	77.9	Diurnal Average		
	99	99	99	99	99	99	99	99	99	99	99	99	97	96	97	96	95	97	98	98	98	98	99	99	Diurnal Maximum		



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Firebag - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Firebag - September 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	14	1.94	1.94
40 - 60	163	22.64	24.58
60 - 80	290	40.28	64.86
80 - 100	253	35.14	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



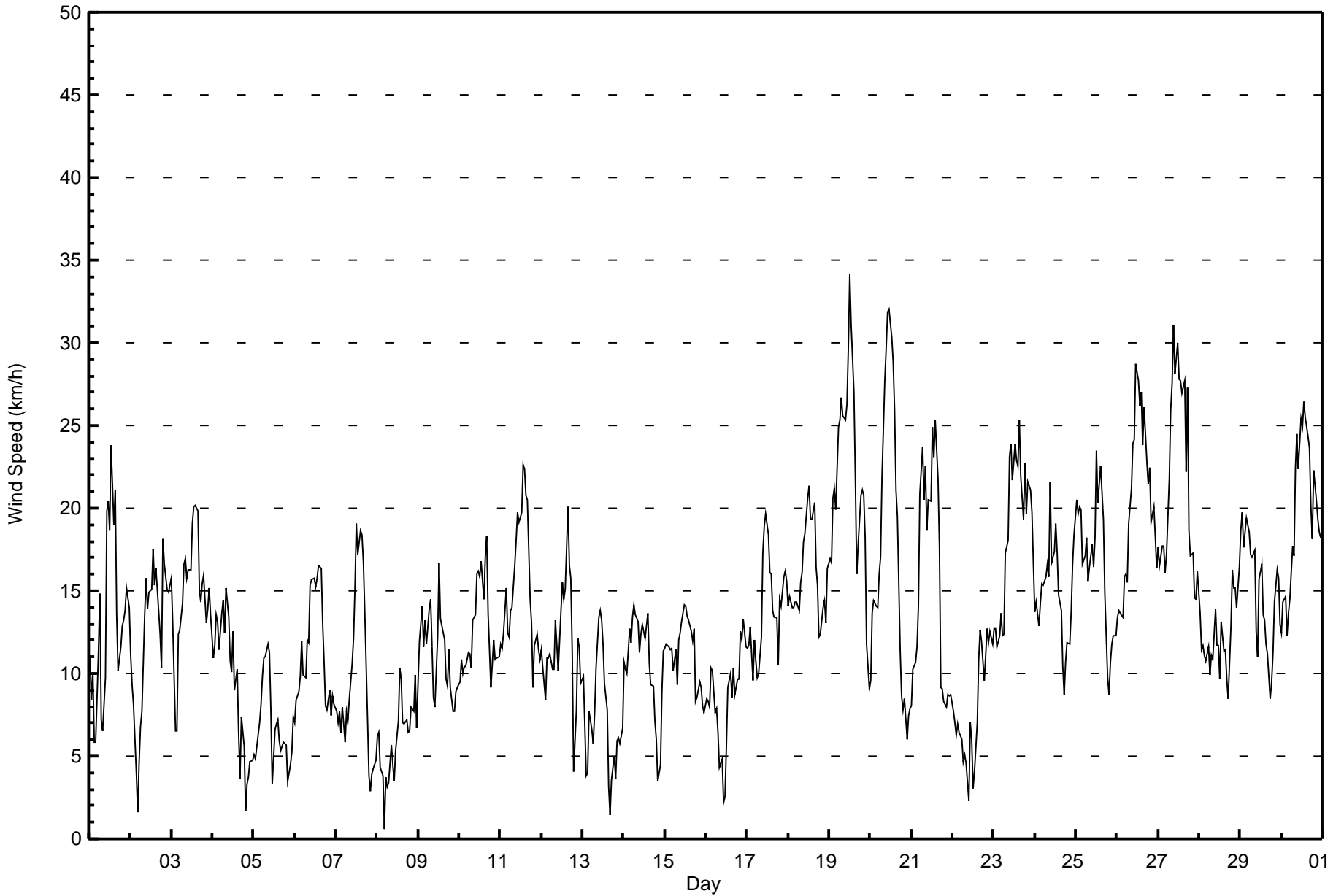
Maximum Speed: 34 km/h on Sep 19 13:00	Maximum Daily Speed Average: 20.3 km/h on Sep 19	Hours in Service: 720
Minimum Speed Value: 1 km/h on Sep 8 05:00	Minimum Daily Speed Average: 2.3 km/h on Sep 8	Hours of Data: 720
Maximum Diurnal Speed Average: 8.2 km/h at hour 15	Minimum Diurnal Speed Average: 4.3 km/h at hour 20	Hours of Missing Data: 0
Monthly Average Velocity: 5.3 km/h 233.2 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> = 30	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	SSW11	S8	S10	SSE6	SSE6	SSE11	SSE15	S7	SE7	NNE10	NNE20	N20	N19	N24	NW19	NW21	WNW14	W10	SW12	SW13	SW13	WSW14	SW15	WSW14	W3.6	N24
2-Sep	WSW11	SW9	SW8	SW4	SW2	NNE5	NE7	NE8	NE14	ENE16	NE14	ENE15	ENE15	ENE18	NE15	NE16	NNE15	NNE12	NNE10	NNE18	NNE17	NNE15	NNE15	NNE15	NE9.0	NNE18
3-Sep	NNE16	NNE13	NNW6	NNW7	NNW12	NW13	NW14	WNW17	WNW17	WNW16	WNW16	NW16	NW19	NW20	NW20	NW20	NW15	NW14	NW15	NW16	NW13	NW14	NW15	NNW14	NW14.0	NW20
4-Sep	NW11	NW12	NW14	NW13	NW11	NW14	NNW14	NNW12	NW15	NNW13	NW11	NNW10	N13	NW9	NW10	NW6	WNW4	WNW7	NNW6	W2	WSW3	SW4	SW5	S5	NW8.2	NW15
5-Sep	S5	S5	SSE6	SSE7	S8	S10	S11	S11	S12	S11	S8	SW3	SSW7	S7	S7	ESE6	E5	E6	ESE6	ESE6	SE3	E4	ESE5	E7	SSE5.6	S12
6-Sep	ESE7	ESE8	ESE9	ESE10	ESE12	ESE10	ESE10	ESE12	E12	ENE15	E16	ENE16	NE15	NE16	NE17	NE16	NE13	NE11	NE8	N8	NNE9	NNE7	NNE9	NNE8	ENE9.2	NE17
7-Sep	NNE8	NNE7	NNE8	NE6	NE8	N6	NNW8	N7	N8	N11	NNE12	NNE15	N19	N17	N19	N18	N17	NNE14	NNE7	NNE4	NNE3	NW4	WNW4	WNW5	N9.2	N19
8-Sep	WNW6	W6	W4	W4	NE1	NE4	ENE3	SE3	ESE6	SE4	NNW3	NW5	N7	NNE10	NE10	NE7	NE7	NE7	ENE6	ESE6	ESE8	SE8	SSE10	SSE7	ENE2.3	NNE10
9-Sep	S9	S12	S14	SSW12	SSW13	SSW12	SSW14	SSW14	SSW12	SW9	SW8	SSW12	SW17	SW13	WSW13	WSW12	W10	WSW9	SSW11	S9	SSW8	SW8	SW9	SSW9	SSW10.3	SW17
10-Sep	SSW9	SSW11	SSW10	SSW10	SSW10	SSW11	SSW11	SW10	SW13	SW14	SW16	SW16	SW16	WSW17	SW14	SW17	SW18	SW14	SSW9	SSW11	SSW12	SSW11	SSW11	SSW11	SW12.3	SW18
11-Sep	SSW12	SSW12	SSW12	SSW15	S12	S12	SSW14	SSW14	SW17	SW18	SW20	SW19	SW20	SW23	SW22	WSW21	WSW21	SW14	WSW13	SW9	SW12	SW12	SW11	SW11	SW14.6	SW23
12-Sep	SW11	SW10	SW8	WSW11	WSW11	WSW11	WSW10	W10	W13	WSW12	WSW10	WSW14	W15	W14	W15	W20	W17	W16	WSW11	W4	N8	N12	N12	N9	W9.4	W20
13-Sep	N10	N7	NNW4	NNW4	NNW8	NNW7	NNW6	NNW8	N10	NNW13	NNW14	NNW13	NNW12	NNW9	NNW8	NNW3	NNE1	W4	WNW5	NNW4	N6	N6	NW6	NNW7	NNW6.9	NNW14
14-Sep	N11	N10	N10	NNE13	NNE12	NNE13	NNE14	NNE14	NNE13	NNE11	N12	N13	N12	N13	NNW14	N11	NNW9	NNW9	N7	NE6	ENE3	ESE4	ESE9	SE11	NNE8.9	NNE14
15-Sep	SE12	SE12	SE12	SE11	SE11	SE10	ESE11	SE9	SSE12	SE12	SE13	SE14	SE14	ESE13	ESE13	ESE13	SE12	SE13	SE8	SE9	SE9	SE9	SE8	SE8	SE11.1	SE14
16-Sep	SE8	SE8	SE8	SE10	SE10	SE8	SE8	SE6	SSE4	SSE5	SE2	NNE3	ENE6	SSW9	SW10	SSW9	S10	S9	S10	S10	S13	S12	S13	SSW12	SSE7.0	S13
17-Sep	SSW11	SSW12	SSW13	SSW10	SSW12	SSW11	SSW10	SSW10	SSW12	SSW17	SW19	SW20	SW18	SW16	SW16	SW14	SW13	SW13	SSW11	SSW15	S14	S16	S16	SSW16	SSW13.6	SW20
18-Sep	SSW14	SSW15	SSW14	SSW14	SSW14	SSW14	SSW16	SW16	WSW18	SW18	WSW21	WSW21	WSW19	W19	WSW20	W16	WSW15	WSW12	SW12	SW14	SW14	SW13	SSW16	SW15.1	WSW21	
19-Sep	SSW17	SSW17	SSW21	SSW21	SSW20	SSW25	SSW25	SSW27	SSW26	SW25	SW26	WSW30	WSW34	WSW31	WSW27	WSW22	W16	WSW18	SW21	WSW21	WSW21	W18	W12	WNW9	SW20.3	WSW34
20-Sep	WSW10	SW14	SW14	SW14	WSW14	WSW16	WSW17	WSW22	WSW28	WSW30	WSW32	W32	W30	W29	W26	WNW21	NW20	NW11	NW9	NNW8	NNW8	NNE6	NNW7	NW8	W15.1	W32
21-Sep	NW8	WNW10	WNW11	NW12	WNW14	NNW21	N24	N20	N23	N19	NNW21	NNW20	NNW25	NNW23	NNW25	NNW22	NW18	WNW9	NW9	NW8	WNW8	WNW9	WNW9	WNW9	NNW14.7	NNW25
22-Sep	WNW8	NW7	WNW6	NW7	NNW6	NNW6	WSW5	SW5	W5	WSW2	WSW7	SW6	S3	SSE4	SE7	S11	SSW13	S12	S10	SSE11	SSE13	SSE12	SE13	SSE12	SSW4.2	SSE13
23-Sep	SSE13	SSE13	SE12	SE12	SE14	SE12	SE12	SSE17	SSE18	SSE23	SSE24	SE22	SE24	SE23	SE23	SE25	SE22	SE19	SSE23	SSE20	SSE22	SSE21	SSE20	SSE17	SE18.5	SE25
24-Sep	SSE14	SSE14	SSE13	SSE14	SSE15	SSE15	S16	S17	S16	SSW22	SW17	SW17	SW19	SW17	SW15	SW14	SSW10	SSE9	SE11	SE12	SE12	SE14	SSE17	SSE18	S12.6	SSW22
25-Sep	SSE20	SSE20	SSE20	S20	S17	S17	SSW18	SW16	W16	WNW18	WNW16	W18	W23	WSW20	WSW23	WSW21	WSW19	WSW15	WSW10	SW9	SW11	SW12	SW12	WSW12	SW12.9	W23
26-Sep	SW13	SW14	SW14	SW13	SW16	SW16	SW16	SW19	SW21	WSW24	WSW24	WSW29	W28	WSW26	WSW27	WSW24	W26	W23	W21	W22	W19	W20	WSW18	WSW16	WSW19.6	WSW29
27-Sep	SW18	SW16	SW18	SW18	WSW16	WSW17	W22	WNW26	NW28	NNW31	NNW28	NW30	NW28	NW28	NW27	NW28	NW22	NW27	WNW19	WNW17	NW17	NW15	WNW14	WNW16	NNW18.8	NNW31
28-Sep	WNW14	WNW11	WNW12	WNW11	WNW11	WNW12	WNW10	WNW11	NW11	NW14	NW12	WNW12	WNW10	W13	WSW11	WSW11	SW10	SSW8	S13	S16	S15	S15	S14	SSE16	WSW7.0	SSE16
29-Sep	SSE19	SSE20	SSE18	SSE19	SSE19	S19	SSE17	S17	S17	SSW13	SSW11	SSW16	SSW17	SW14	SW13	WSW12	SW11	SW8	S10	S11	S14	S16	S16	S13	S13.8	SSE20
30-Sep	S12	SSW14	SSW15	S12	S14	S14	S18	S17	SSW22	SSW24	SSW22	SSW25	SW25	SW26	SW26	SW24	SSW24	SSW20	SSW18	SSW22	SSW20	SSW19	SW19	SSW18	SSW19.2	SW26

SSW5.2	SSW5.8	SSW6.3	SSW5.9	SSW5.4	SSW5.2	SSW5.5	SW6.0	WSW5.7	WSW5.9	WSW6.4	W7.5	W7.9	W7.9	W8.2	W7.9	W6.8	WSW5.5	SW4.5	SSW4.3	SSW4.6	SSW4.6	SSW4.9	SSW5.0	Diurnal Average	
SSE20	SSE20	SSW21	SSW21	SSW20	SSW25	SSW25	SSW27	WSW28	NNW31	WSW32	W32	WSW34	WSW31	WSW27	NW28	W26	NW27	SSE23	W22	SSE22	SSE21	SSE20	SSE18	Diurnal Maximum	

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







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Firebag - September 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	50	6.94	6.94
6 - 11	231	32.08	39.03
12 - 19	324	45.00	84.03
20 - 28	104	14.44	98.47
29 - 38	11	1.53	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Firebag - September 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	0	5	2	2	2	2	4	3	4	0	6	3	6	4	2	5	50
6 - 11	18	13	11	2	2	14	23	9	21	29	19	13	4	18	16	19	231
12 - 19	12	19	9	6	2	5	19	24	34	44	60	26	14	16	23	11	324
20 - 28	5	1	0	0	0	0	6	11	1	16	13	19	10	2	12	8	104
29 - 38	0	0	0	0	0	0	0	0	0	0	0	6	3	0	1	1	11
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	35	38	22	10	6	21	52	47	60	89	98	67	37	40	54	44	720

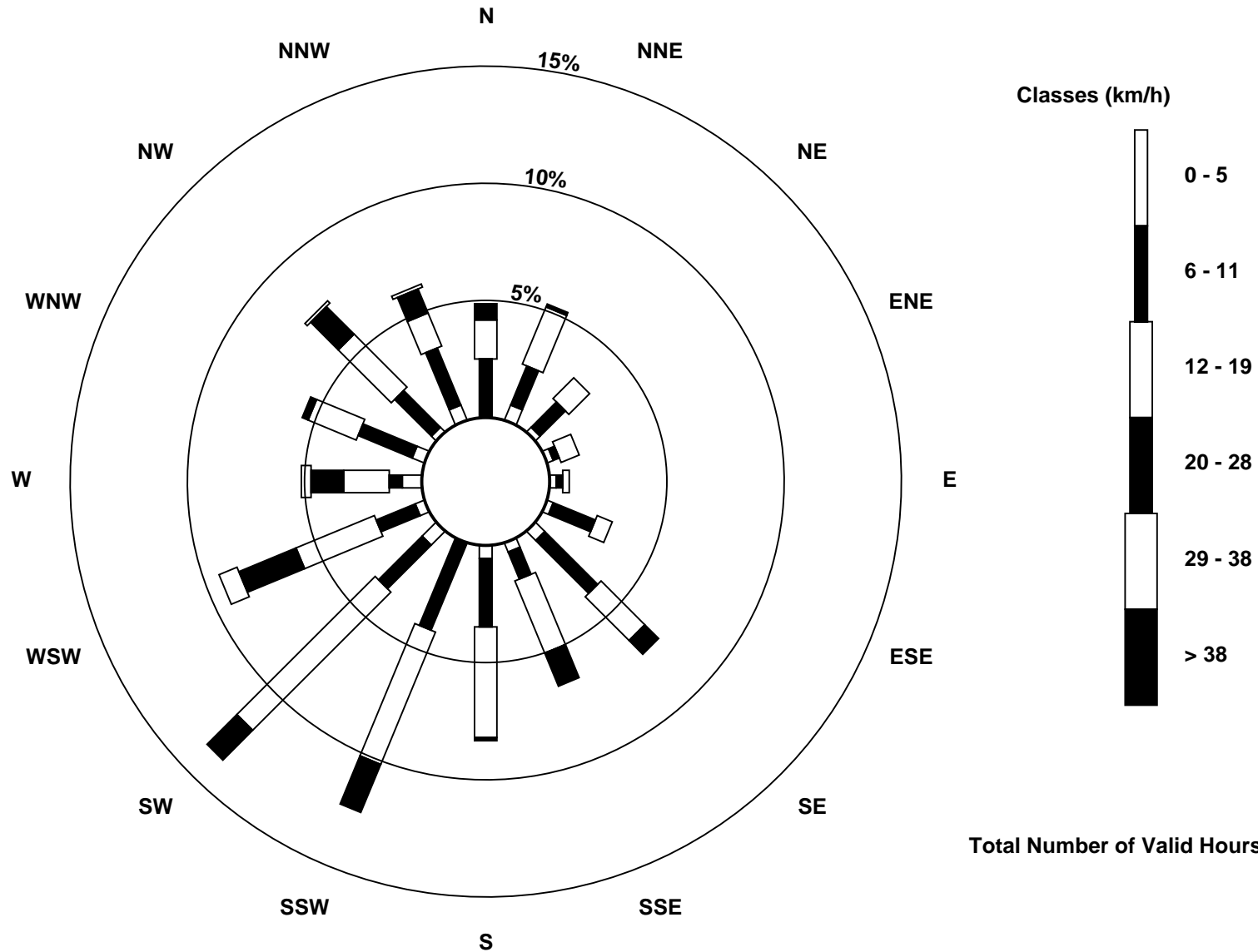
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Wind Speed (WS) - km/h  
Firebag (AMS 19)



Total Number of Valid Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Firebag - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 10 km/h on Sep 27 08:00	Hours of Data: 720
Minimum Value: 0 km/h on Sep 5 01:00	Hours of Missing Data: 0
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 5 P <sub>99</sub> = 7	Hours of Calibration: 0
	Percent Operational Time: 100.0

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

Diurnal Maximum



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Firebag - September 2015**

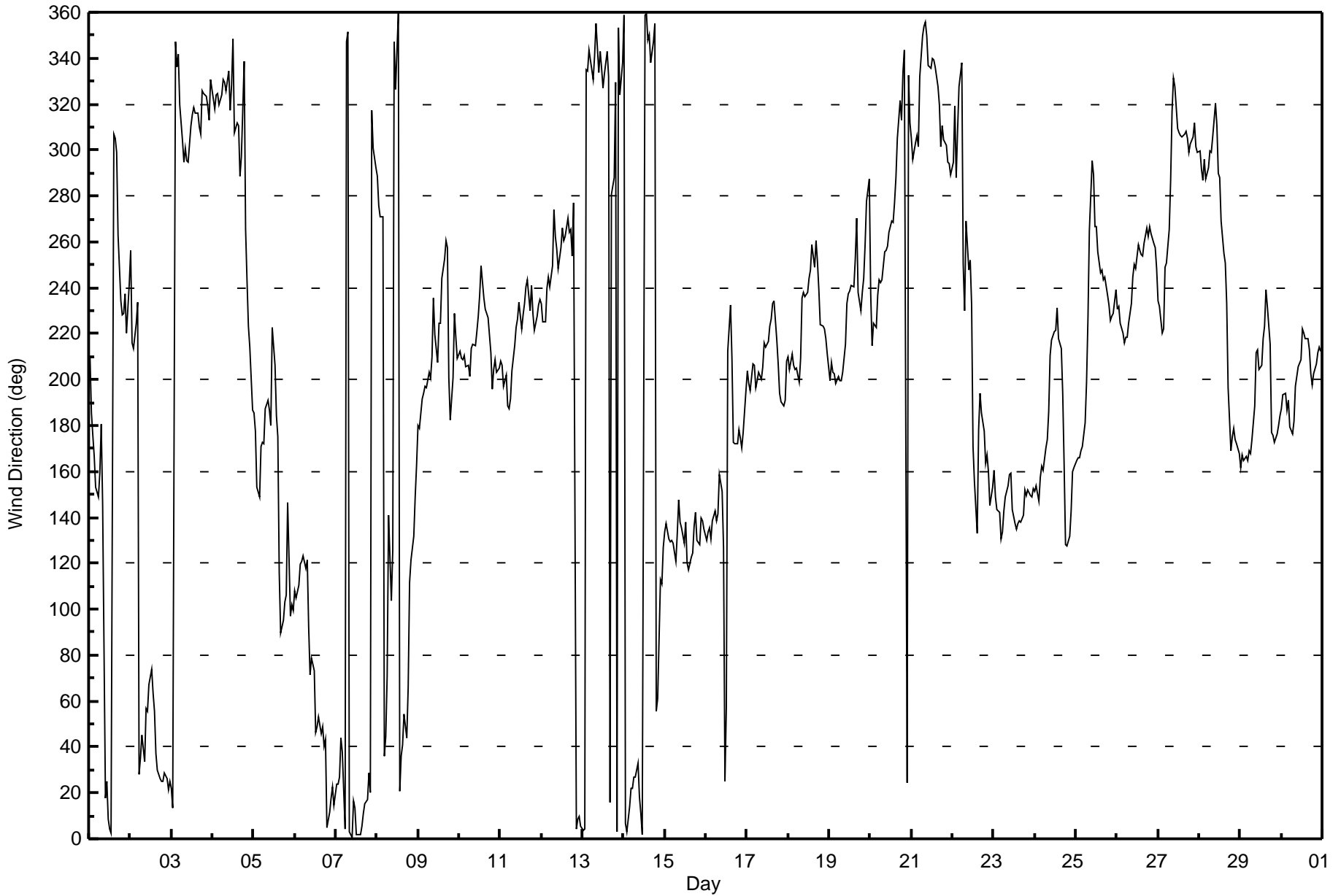
Direction of Maximum Speed: 239 deg on Sep 19 13:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 227.0 deg on Sep 19	Hours of Data: 720
Direction of Minimum Speed: 36 deg on Sep 8 05:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 2.3 deg on Sep 8	Percent Operational Time: 100.0
Monthly Average Direction: 248.1 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	210	186	176	167	153	149	159	180	146	18	25	9	4	3	307	305	299	263	235	228	229	237	220	241	266.1
2-Sep	256	216	214	225	234	28	35	45	34	57	56	67	74	63	56	37	30	26	25	25	29	26	22	25	39.3
3-Sep	22	13	347	336	342	320	304	295	301	296	295	311	315	319	316	316	310	307	326	325	323	319	313	331	319.1
4-Sep	322	318	324	325	320	324	331	330	326	335	317	328	349	307	312	311	288	297	339	265	243	223	214	187	318.8
5-Sep	186	177	153	149	171	173	172	188	191	187	180	223	206	184	175	116	90	95	103	106	146	97	102	99	159.7
6-Sep	108	105	110	120	121	123	118	122	92	71	79	73	46	49	53	46	49	40	44	5	12	18	22	15	68.4
7-Sep	24	24	27	44	38	4	347	351	3	0	16	13	2	2	2	5	11	15	17	29	20	317	301	292	7.3
8-Sep	289	276	271	271	36	45	70	141	104	126	347	326	360	21	36	41	54	44	66	112	121	132	149	163	64.5
9-Sep	180	179	191	194	197	196	203	201	210	235	220	208	224	225	244	253	261	257	201	183	201	229	218	209	212.3
10-Sep	212	209	209	211	206	206	201	214	215	215	221	228	236	250	235	230	229	227	212	196	205	209	203	205	218.2
11-Sep	208	206	197	202	189	187	192	204	215	223	226	234	222	228	233	241	243	230	241	229	221	227	232	235	221.3
12-Sep	233	225	225	240	245	240	250	274	263	257	248	258	266	261	262	270	264	266	254	277	4	8	10	6	264.9
13-Sep	4	4	335	334	344	335	331	341	355	334	343	335	327	333	343	332	16	281	288	329	3	353	324	338	339.1
14-Sep	359	7	3	14	22	22	27	27	33	18	11	2	359	359	348	350	338	347	355	56	61	113	111	127	15.8
15-Sep	134	137	130	129	130	129	121	133	148	138	135	129	138	120	117	123	124	136	142	130	128	140	138	135	131.5
16-Sep	130	134	136	131	139	143	139	142	159	151	127	25	57	212	232	210	173	172	172	178	175	170	177	195	164.0
17-Sep	204	198	195	207	206	196	199	203	200	206	216	214	217	224	227	233	235	217	207	194	190	189	191	208	208.0
18-Sep	210	204	211	206	204	205	199	210	236	238	236	238	244	248	259	249	261	251	239	224	223	222	218	211	228.8
19-Sep	200	207	203	202	198	202	200	199	203	215	233	237	239	241	240	253	270	238	230	238	244	259	277	287	227.0
20-Sep	237	215	224	222	237	244	242	243	256	257	258	264	269	268	277	288	305	322	313	334	344	25	332	312	265.8
21-Sep	305	296	303	307	301	332	350	354	356	350	337	335	340	339	336	328	320	301	310	304	302	295	294	289	328.1
22-Sep	295	319	288	308	328	338	250	230	269	248	252	233	171	156	133	178	194	185	178	164	167	160	145	153	196.5
23-Sep	160	149	144	142	131	134	143	149	154	159	159	144	137	135	137	138	138	141	152	150	152	149	149	153	145.9
24-Sep	151	154	147	157	163	160	170	174	186	210	217	221	221	231	218	214	194	163	128	127	132	143	160	162	178.2
25-Sep	165	166	166	169	171	181	199	226	265	295	289	267	267	256	246	248	244	245	237	232	226	227	229	239	227.6
26-Sep	231	232	224	220	216	219	219	225	233	245	250	248	259	256	255	254	259	266	263	267	264	259	258	249	247.4
27-Sep	234	232	220	222	249	251	266	287	317	332	328	309	308	306	306	307	308	305	299	303	306	312	302	299	294.4
28-Sep	300	292	287	296	287	292	299	299	306	320	311	290	288	269	255	251	233	196	169	175	179	174	172	168	255.9
29-Sep	162	167	165	166	164	169	168	174	189	212	213	204	206	218	224	239	232	216	177	176	172	177	180	184	185.9
30-Sep	187	194	194	187	191	180	176	182	197	201	206	209	222	220	218	218	213	203	198	202	207	211	214	212	203.9

208.2 201.3 199.6 198.9 199.7 204.7 206.3 218.6 236.6 251.2 258.5 260.2 266.0 266.7 265.8 266.4 261.8 250.7 227.1 213.2 210.7 211.6 209.8 213.2

Diurnal Average

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





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Firebag - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value:	93 deg on Sep 16 11:00		Hours of Data:	720
Minimum Value:	4 deg on Sep 8 01:00		Hours of Missing Data:	0
Percentiles: P <sub>1</sub> = 5 P <sub>10</sub> = 7 Q <sub>1</sub> = 9 Median = 12 Q <sub>3</sub> = 15 P <sub>90</sub> = 24 P <sub>99</sub> = 71			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-Sep	8	10	7	18	15	16	10	69	48	32	13	15	14	18	19	14	18	21	10	9	9	11	8	14	69
2-Sep	11	12	18	34	70	49	24	12	11	12	10	11	12	13	13	12	10	11	9	10	10	11	10	12	70
3-Sep	17	14	30	33	11	14	13	13	13	13	12	15	13	13	12	17	14	13	12	12	12	12	14	33	
4-Sep	12	13	11	12	13	14	11	13	13	13	18	22	14	24	25	37	70	24	25	56	37	15	9	12	70
5-Sep	6	15	9	11	11	7	7	15	9	13	42	65	51	27	33	34	35	19	18	14	31	21	14	9	65
6-Sep	11	14	8	8	9	11	14	12	13	12	14	17	17	17	13	16	12	11	21	10	9	19	12	11	21
7-Sep	7	10	10	12	7	13	7	14	14	15	19	16	16	14	15	15	16	12	11	12	32	9	13	20	32
8-Sep	4	7	8	12	83	25	40	16	46	42	65	59	58	29	23	28	31	30	21	11	14	13	9	14	83
9-Sep	16	12	7	6	6	10	7	7	15	17	17	13	16	17	15	21	19	18	14	12	11	7	9	8	21
10-Sep	9	6	6	7	6	6	5	10	10	12	14	19	22	16	19	16	12	14	12	4	7	7	6	7	22
11-Sep	7	7	5	5	5	9	6	12	9	11	12	12	11	12	12	11	10	10	9	9	7	8	8	10	12
12-Sep	10	10	18	12	9	8	13	10	10	13	19	11	10	11	11	12	12	11	9	61	34	13	10	9	61
13-Sep	11	11	19	11	5	5	10	16	15	17	16	24	25	28	36	83	73	19	18	30	20	10	21	15	83
14-Sep	12	12	13	11	11	11	10	13	17	13	14	16	16	21	17	18	22	19	15	23	24	29	11	10	29
15-Sep	11	10	10	11	9	10	9	13	10	20	21	16	25	21	13	11	15	14	11	10	10	9	10	12	25
16-Sep	10	11	11	10	10	14	14	17	29	27	93	84	43	36	21	35	9	11	10	10	6	7	9	6	93
17-Sep	8	6	5	9	5	5	6	6	7	12	15	14	15	19	20	24	19	11	8	6	7	6	9	13	24
18-Sep	10	6	8	7	6	7	6	10	13	12	14	14	13	17	17	14	11	12	9	7	7	8	9	9	17
19-Sep	7	8	8	9	8	7	7	8	10	15	11	12	12	14	14	14	18	11	15	10	10	13	17	22	22
20-Sep	13	9	7	8	11	11	8	10	10	11	13	14	14	16	14	15	17	14	10	13	13	17	13	12	17
21-Sep	10	12	11	12	14	18	13	15	16	15	13	15	13	14	15	15	15	16	14	11	10	7	8	7	18
22-Sep	12	7	16	18	21	18	34	16	24	72	40	52	71	80	42	27	17	12	8	8	8	9	10	9	80
23-Sep	9	9	10	10	11	11	13	10	10	11	12	15	13	14	13	12	12	13	11	10	10	11	10	10	15
24-Sep	11	11	12	9	9	9	8	8	9	11	11	14	14	15	14	15	14	20	11	10	11	11	9	11	20
25-Sep	10	10	8	8	10	11	7	17	14	14	17	11	13	14	12	13	10	10	7	7	7	7	8	9	17
26-Sep	9	8	8	8	8	7	8	9	11	12	11	13	14	18	13	13	15	12	11	10	10	10	10	10	18
27-Sep	8	8	9	13	9	9	11	14	14	12	14	15	15	14	14	12	14	12	12	12	12	13	12	11	15
28-Sep	12	11	11	11	13	12	12	13	15	21	29	30	34	29	26	27	25	12	7	7	8	8	9	10	34
29-Sep	9	8	10	8	9	7	7	8	6	17	13	11	11	16	18	17	16	13	10	5	6	7	8	7	18
30-Sep	8	5	5	7	7	8	8	8	7	8	10	11	14	13	14	11	11	9	6	6	8	9	8	9	14

	17	15	30	34	83	49	40	69	48	72	93	84	71	80	42	83	73	30	25	61	37	29	21	22	
	Diurnal Maximum																								





# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	September 11, 2015	Last Calibration	August 7, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	13:50
Gas Cert Reference	SA130123A	Station temp.	Deg C
Cal Gas Concentration	49.3 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	996
ZAG Make/Model	API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-605	-606
Analyzer IP address	192.168.1.43		Lamp voltage	787	787
Calculated slope	0.999356	0.998337	Chamber temp	45.5	45.0
Calculated intercept	-0.954139	-0.434052	Pressure	680.7	679.8
Analyzer Background	8.0	8.0	Flow	0.446	0.445
Analyzer Coefficient	0.964	0.960	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	-0.2	----
as found span	5000	58.3	574.8	576.4	0.997
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	58.3	574.8	575.9	0.998
second point	5000	29.2	287.9	289.2	0.996
third point	5000	14.7	144.9	146.2	0.991
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	58.3	574.8	572.5	1.004
Average Correction Factor					0.995

Corrected As found 576.6 Previous response 576.2 % change -0.1%

Notes:

Span adjusted.

Calibration Performed By: Devin Russell



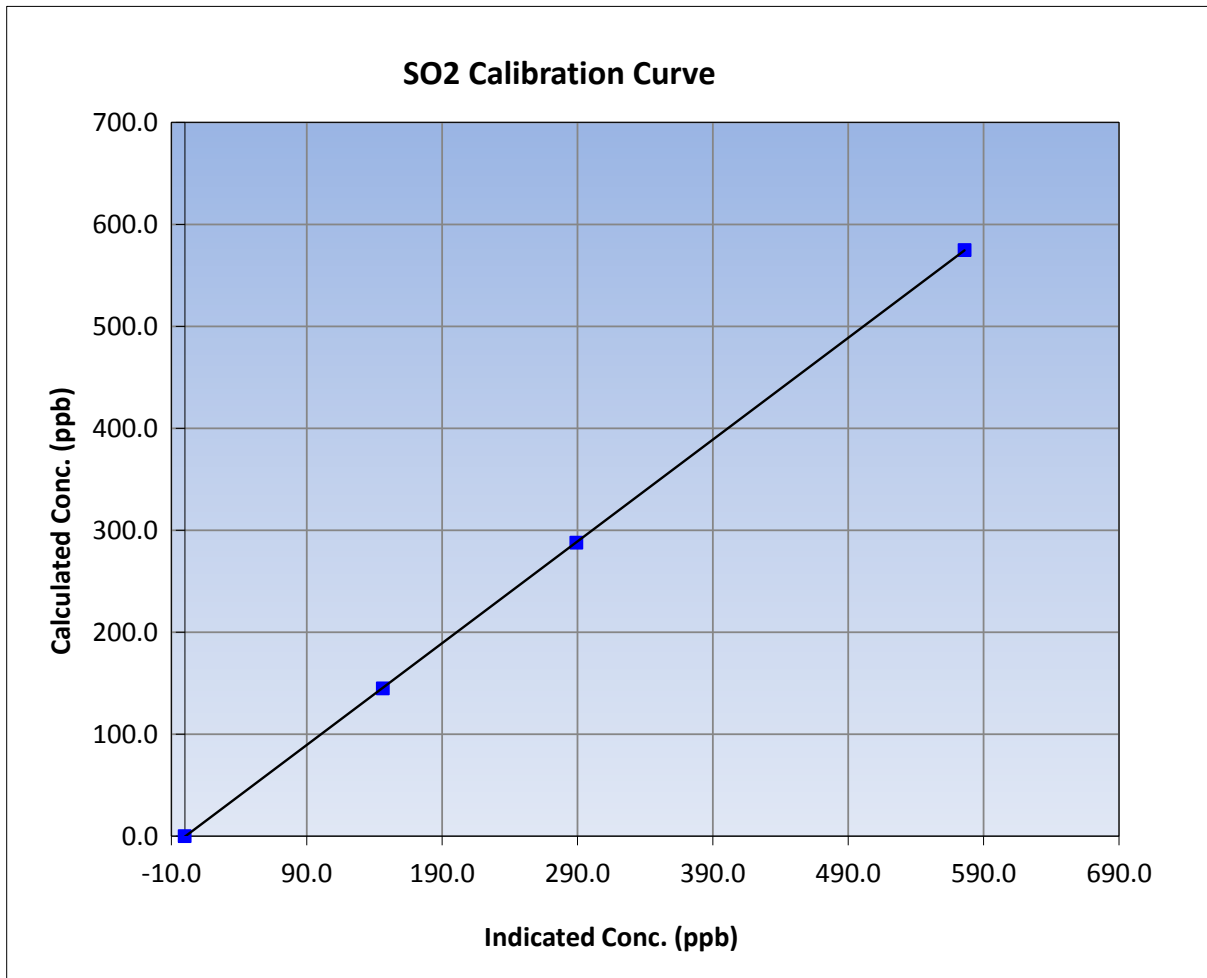
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 11, 2015	Previous Calibration	August 7, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:50	End Time (MST)	13:50
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

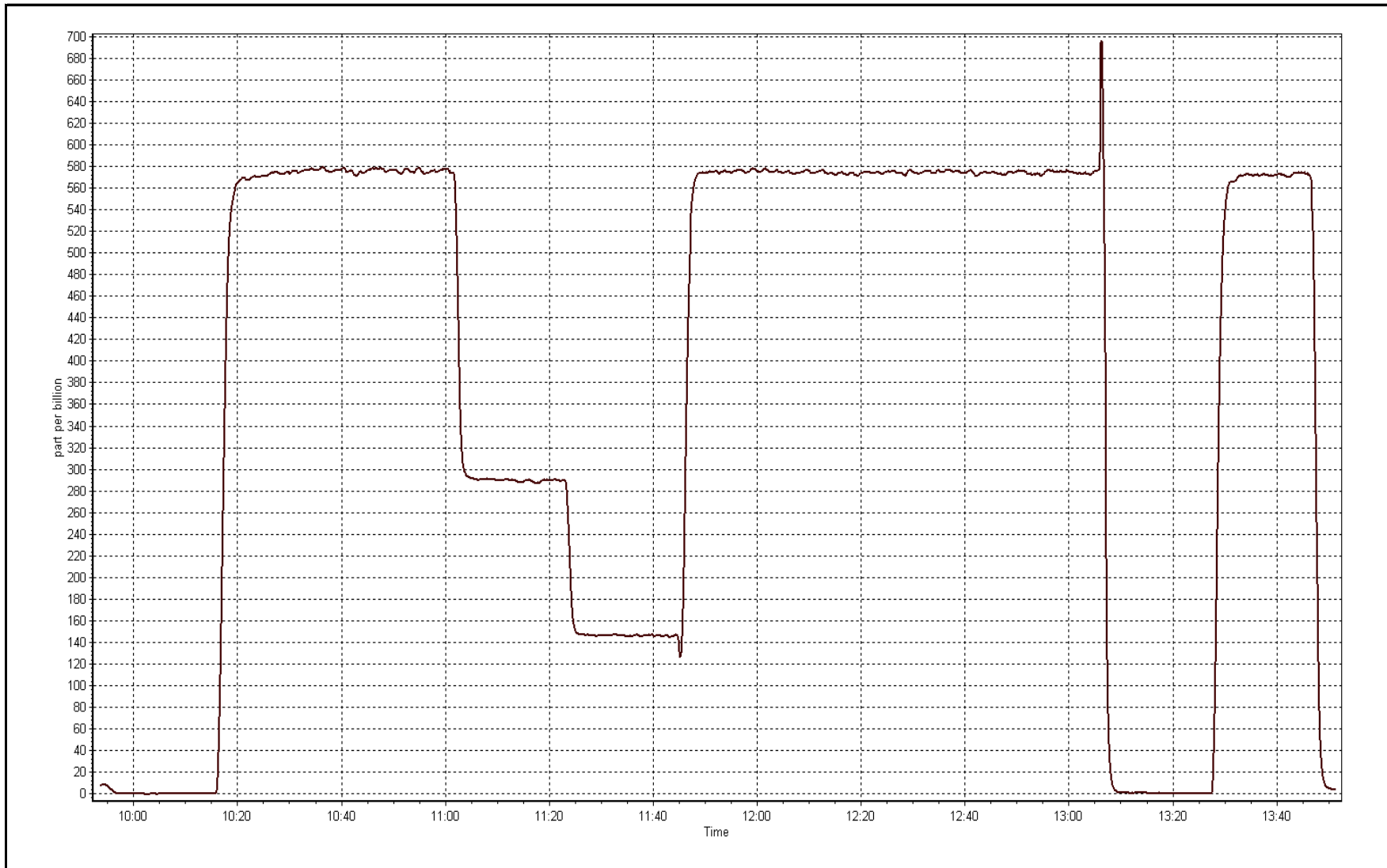
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999995
574.8	575.9	0.9982		
287.9	289.2	0.9955	Slope	0.998337
144.9	146.2	0.9914		
			Intercept	-0.434052



SO2 Calibration Plot

Date: September 11, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	September 8, 2015	Last Calibration	August 6, 2015	
Station Name	Firebag	Station Number	AMS 19	
Reason:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Routine</td> </tr> </table>			Routine
Routine				
Start Time (MST)	9:35	End Time (MST)	13:25	
Gas Cert Reference	ALM066720	Station temp.	22 Deg C	
Cal Gas Concentration	4.85 ppm	Cal Gas Exp Date	10/06/2014	
Calibrator Make/Model	API T700	Serial Number	996	
ZAG air Make/Model	API 701	Serial Number	4891	
DACS make/model	Campbell Scientific CR3000	Serial Number	9037	
SO2 gas concentration	49.3 ppm	SO2 gas cert/exp	SA130123A December-12-16	

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-574	-574
Analyzer IP address	192.168.1.42		Lamp voltage	923	922
Calculated slope	0.996633	0.998275	Chamber temp	45	45
Calculated intercept	-0.324302	-0.303998	Pressure	543.1	543.4
Analyzer Background	12	12	Flow	0.959	0.963
Analyzer Coefficient	1.073	1.073	Intensity	86	85
			Converter temp.	334	335

Analyzer make/model	Thermo 450i	Analyzer serial #	815129098
Converter make/model		Converter serial #	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	83.4	80.9	81.3	0.995
SO2 scrubber check	5000	15.2	149.9	1.3	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	83.4	80.9	81.2	0.996
second point	5000	41.7	40.4	41.1	0.984
third point	5000	21.0	20.4	20.7	0.984
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	83.4	80.9	81.5	0.993
Average Correction Factor					0.988

Corrected As found	81.2	Previous response	81.5	% change	0.4%
--------------------	------	-------------------	------	----------	------

**Notes:**

Filter changed after as founds. Scrubber check completed after as founds. No adjustments.

Calibration Performed By: Devin Russell



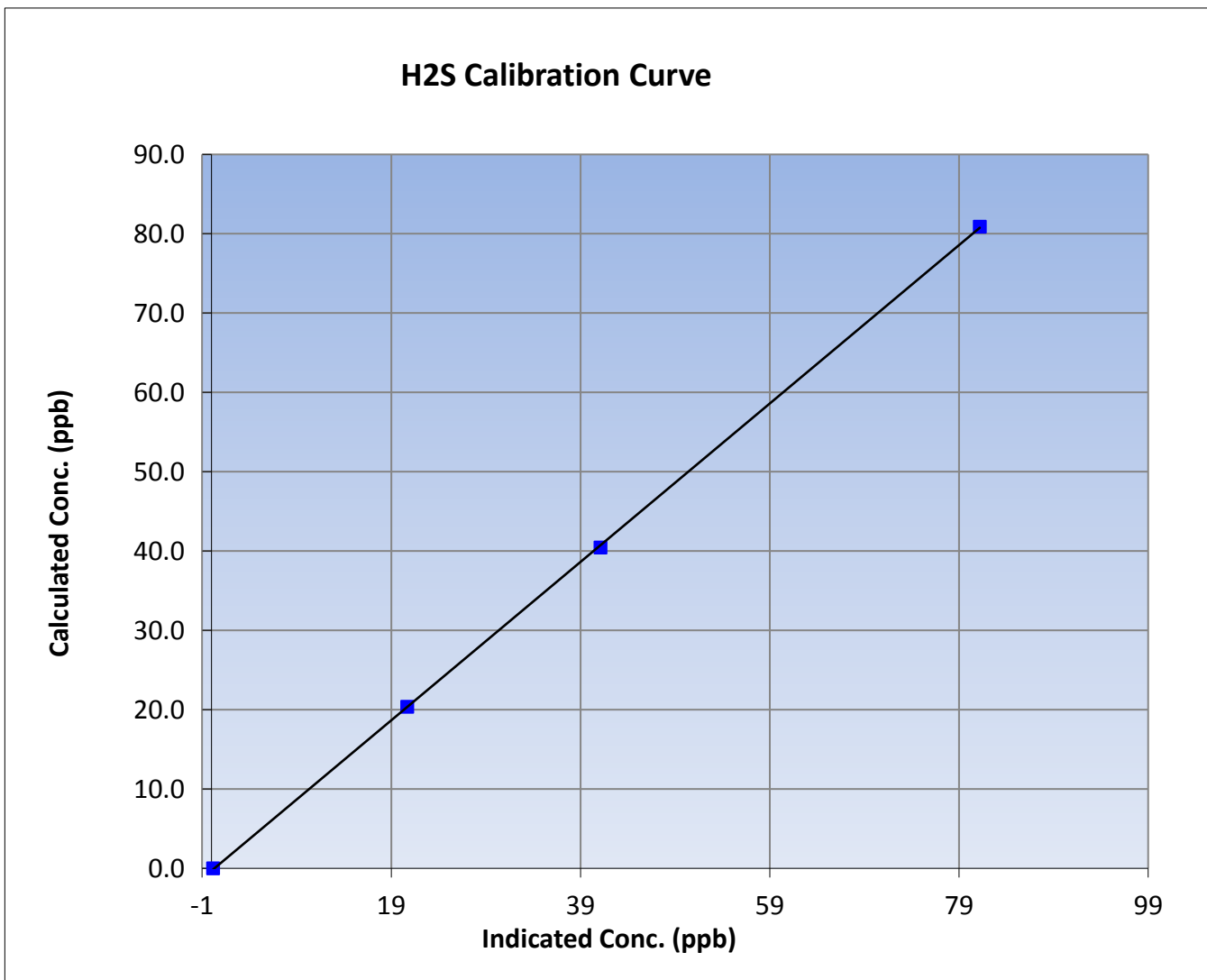
# Wood Buffalo Environmental Association H2S Calibration Report

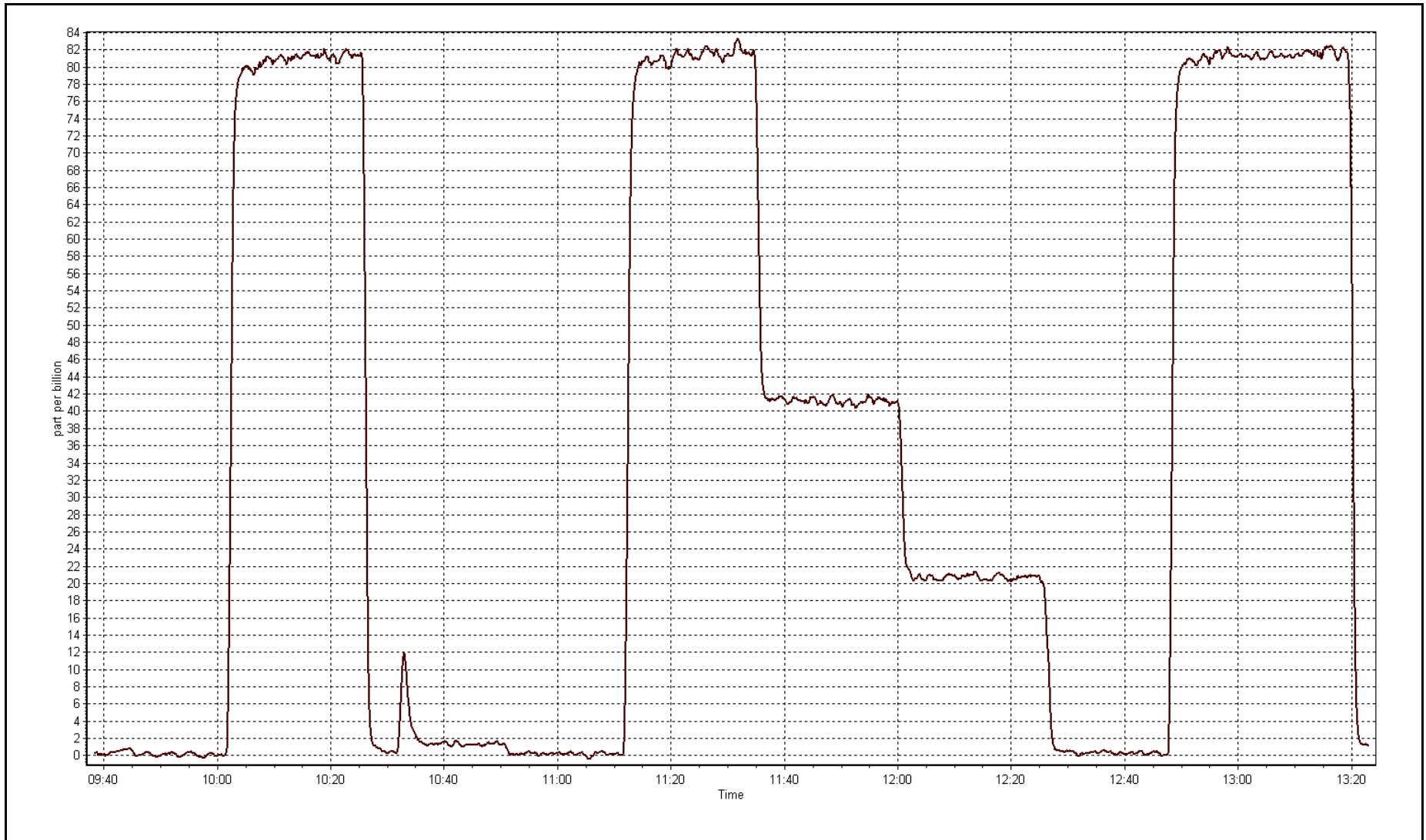
## Station Information

Calibration Date	September 8, 2015	Previous Calibration	August 6, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:35	End Time (MST)	13:25
Analyzer make	Thermo 450i	Analyzer serial #	815129098

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999966
80.9	81.2	0.9963		
40.4	41.1	0.9839	Slope	0.998275
20.4	20.7	0.9841		
			Intercept	-0.303998







# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	September-11-15	Last Calibration	August-07-15
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	13:50
Gas Cert Reference	SA130123A	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
ZAG make/model	Teledyne API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	Serial Number	9037

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.6	8.6
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	0.989715	1.003953	Fuel Pressure	23.0	23.0
Calculated intercept	0.009301	-0.070859	Analyzer Coeff	3.6	3.5
			Analyzer BKG	4.850	4.800

Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089
---------------	---------------	-------------------	------------

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.03	----
as found span	5000	58.3	12.74	12.86	0.990
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	58.3	12.74	12.73	1.000
second point	5000	29.2	6.38	6.46	0.987
third point	5000	14.7	3.21	3.30	0.973
as left zero	5000	0.0	0.00	0.06	----
as left span	5000	58.3	12.74	12.74	1.000
Average Correction Factor					0.987

Corrected As found	12.83	Previous response	12.86	% change	0.2%
--------------------	-------	-------------------	-------	----------	------

Notes:

Span adjusted.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association THC Calibration Report

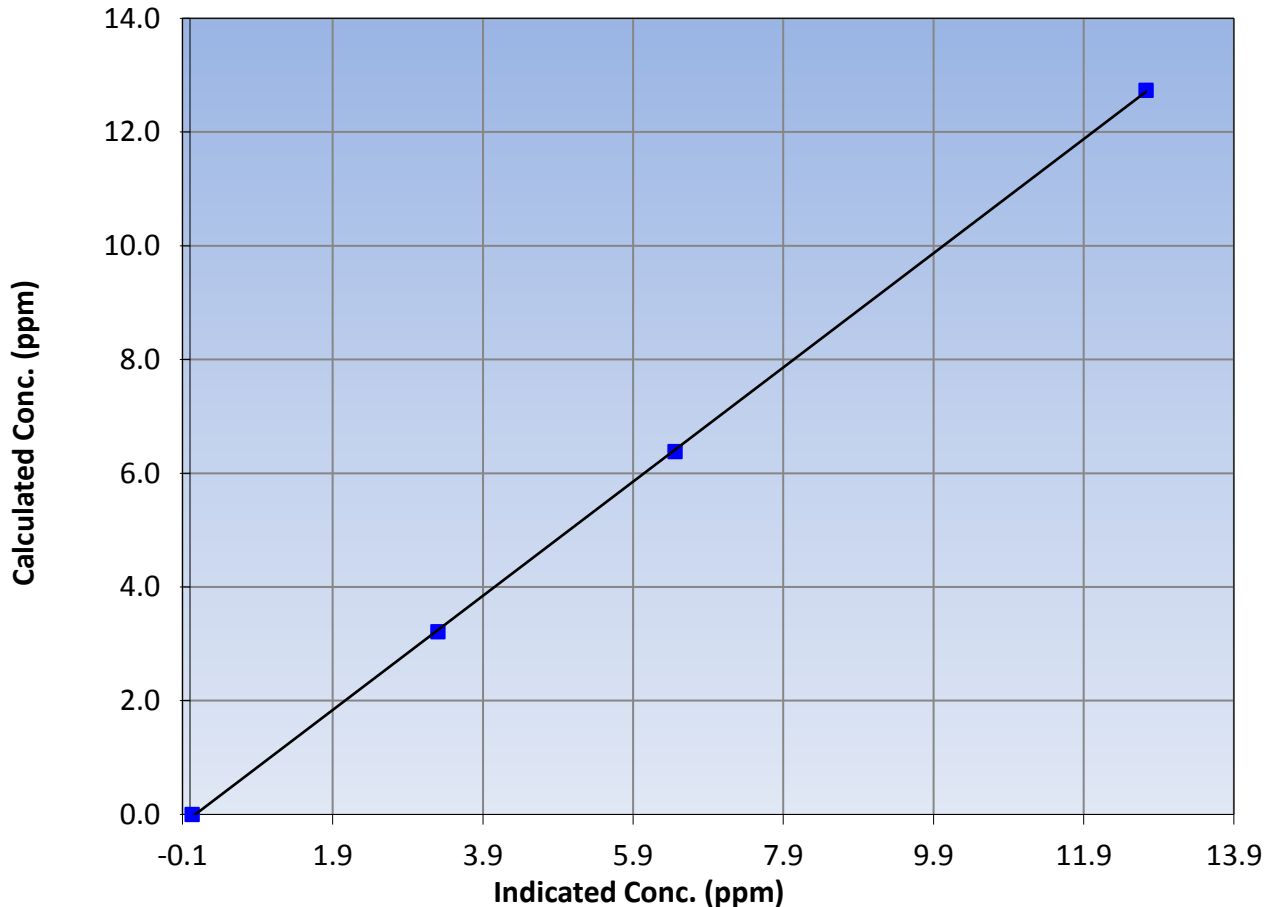
## Station Information

Calibration Date	September 11, 2015	Previous Calibration	August 7, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:50	End Time (MST)	13:50
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999948
12.74	12.73	1.0004		
6.38	6.46	0.9874	Slope	1.003953
3.21	3.30	0.9731		
			Intercept	-0.070859

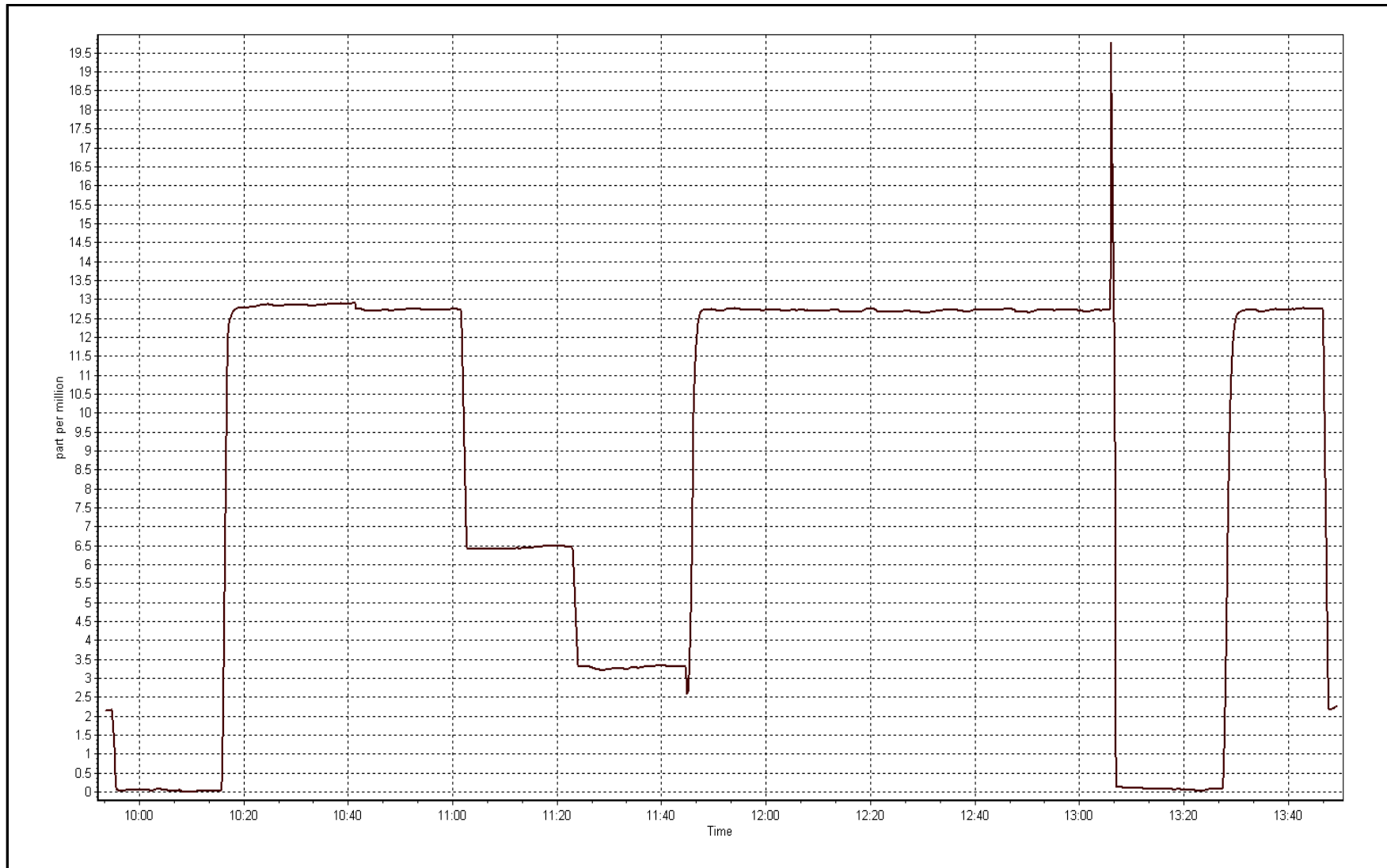
**THC Calibration Curve**





THC Calibration Plot

Date: September 11, 2015





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

## Station Information

Calibration Date	September 11, 2015	Previous Calibration	August 7, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	13:50
NO Cal Gas Conc	51.5 ppm	Gas Cert Reference	SA130123A
NOX Cal Gas Conc	51.5 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	API T700	Serial Number	996
Zero air Generator	Teledyne API T701	Serial Number	4891

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9037
-------------------	----------------------------	-----------------	------

## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000273	1.000403	0.995635
	Data Offset	-1.012062	-0.743927	-0.390351
Current Calibration	Data Slope	1.002017	1.000952	0.999775
	Data Offset	-0.999247	-0.768575	0.208272

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.859		0.869	
NOX coefficient	1.000		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.9		3.9	
NOX bkgrnd	4.0		4.0	
Chamber Temp	50.4	Deg C	50.7	Deg C
Moly Temp	325.5	Deg C	325.5	Deg C
PMT voltage	-780	V	-780	V
PMT Temp	-2.7	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	158.6	mmHg	159.3	mmHg
R Cell Press Nox	158.6	mmHg	158.9	mmHg
NO sample flow	0.644	lpm	0.633	lpm
Nox sample Flow	0.644	lpm	0.633	lpm

Notes:

Span adjusted.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

September 11, 2015

Station Number:

AMS 19

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.3	-0.1	----	----
as found span	5000	58.3	600.5	600.5	0.0	592.8	591.6	1.3	1.0130	1.0151
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.3	-0.1	----	----
high point	5000	58.3	600.5	600.5	0.0	599.3	599.9	-0.6	1.0020	1.0010
second point	5000	29.2	300.8	300.8	0.0	302.8	302.6	0.1	0.9934	0.9939
third point	5000	14.7	151.4	151.4	0.0	152.8	152.5	0.3	0.9908	0.9929
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
as left span	5000	58.3	600.5	284.0	316.5	598.7	282.3	316.4	1.0030	1.0058
Average Correction Factor									0.9954	0.9959

Corrected As found

NO<sub>x</sub>= 593.1

NO= 591.8

Percent Change

NO<sub>x</sub>= 1.4%

NO= 1.6%

Previous Response

NO<sub>x</sub>= 601.3

NO= 601.0

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

58.30

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO2 (300)	----	284.0	315.4	599.3	284.0	315.3	0.9905	1.0000	1.0003	100.0%
2nd NO2 (200)	----	386.7	212.7	599.3	386.7	212.6	0.9905	1.0000	1.0005	99.9%
3rd NO2 (100)	----	490.3	109.1	599.0	490.3	108.7	0.9910	1.0000	1.0039	99.6%
4th NO2 (0)	599.4	----	0.6	600.0	599.4	0.6	0.9893	1.0000	N/A	----
Average Correction Factor							0.9903	1.0000	1.0016	99.8%

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

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

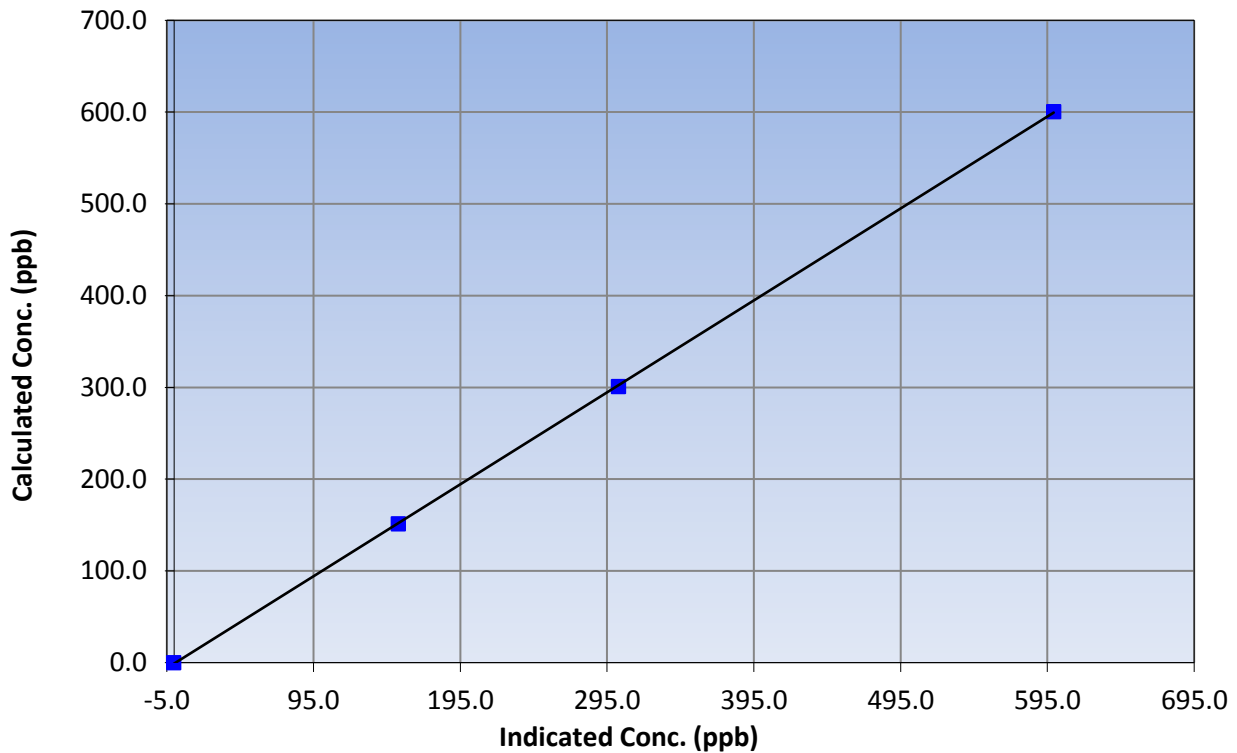
### Station Information

Calibration Date	September 11, 2015	Previous Calibration	August 7, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:50	End Time (MST)	13:50
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999971
600.5	599.3	1.0020		
300.8	302.8	0.9934	Slope	1.002017
151.4	152.8	0.9908		
			Intercept	-0.999247

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

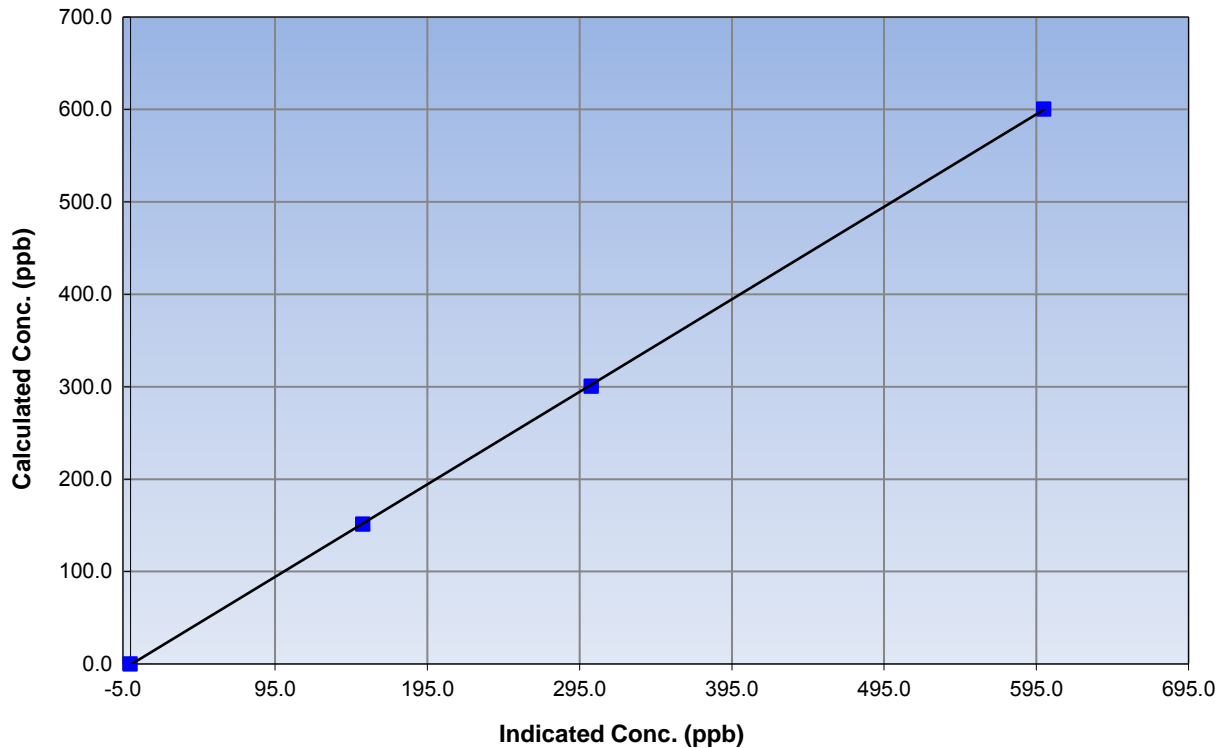
### Station Information

Calibration Date	September 11, 2015	Previous Calibration	August 7, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:50	End Time (MST)	13:50
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999981
600.5	599.9	1.0010		
300.8	302.6	0.9939	Slope	1.000952
151.4	152.5	0.9929		
			Intercept	-0.768575

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

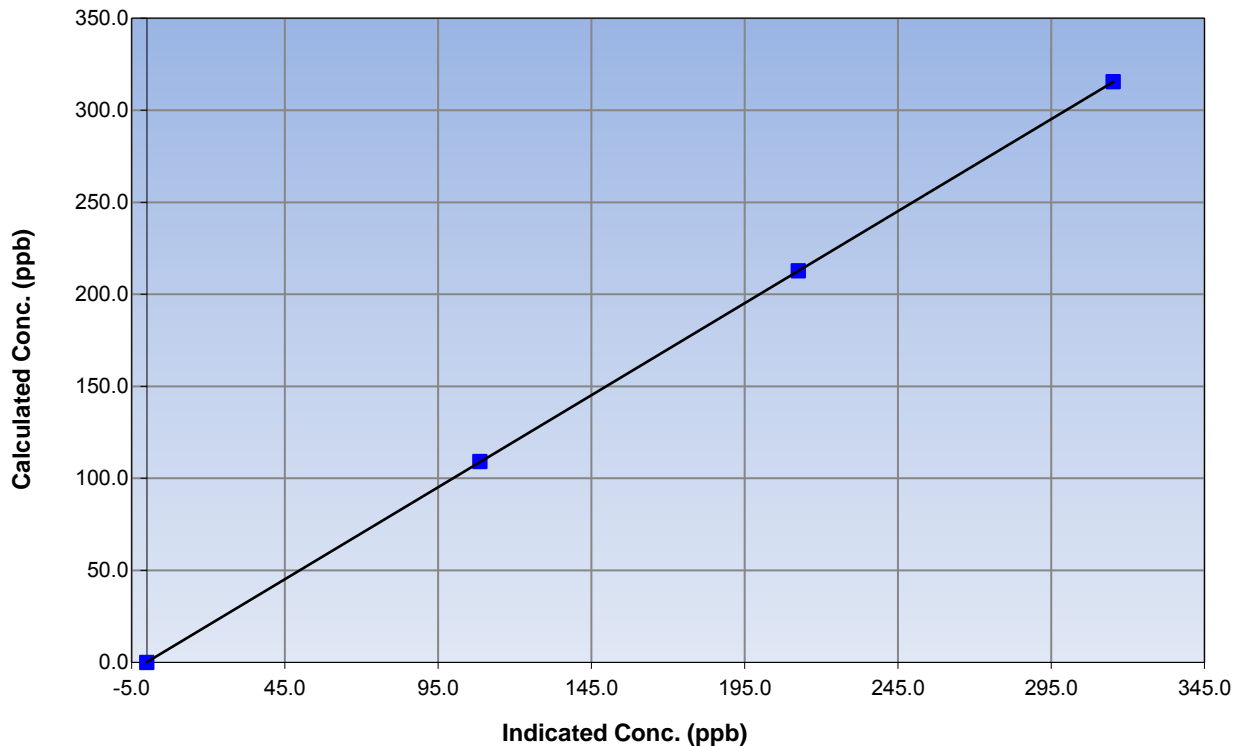
### Station Information

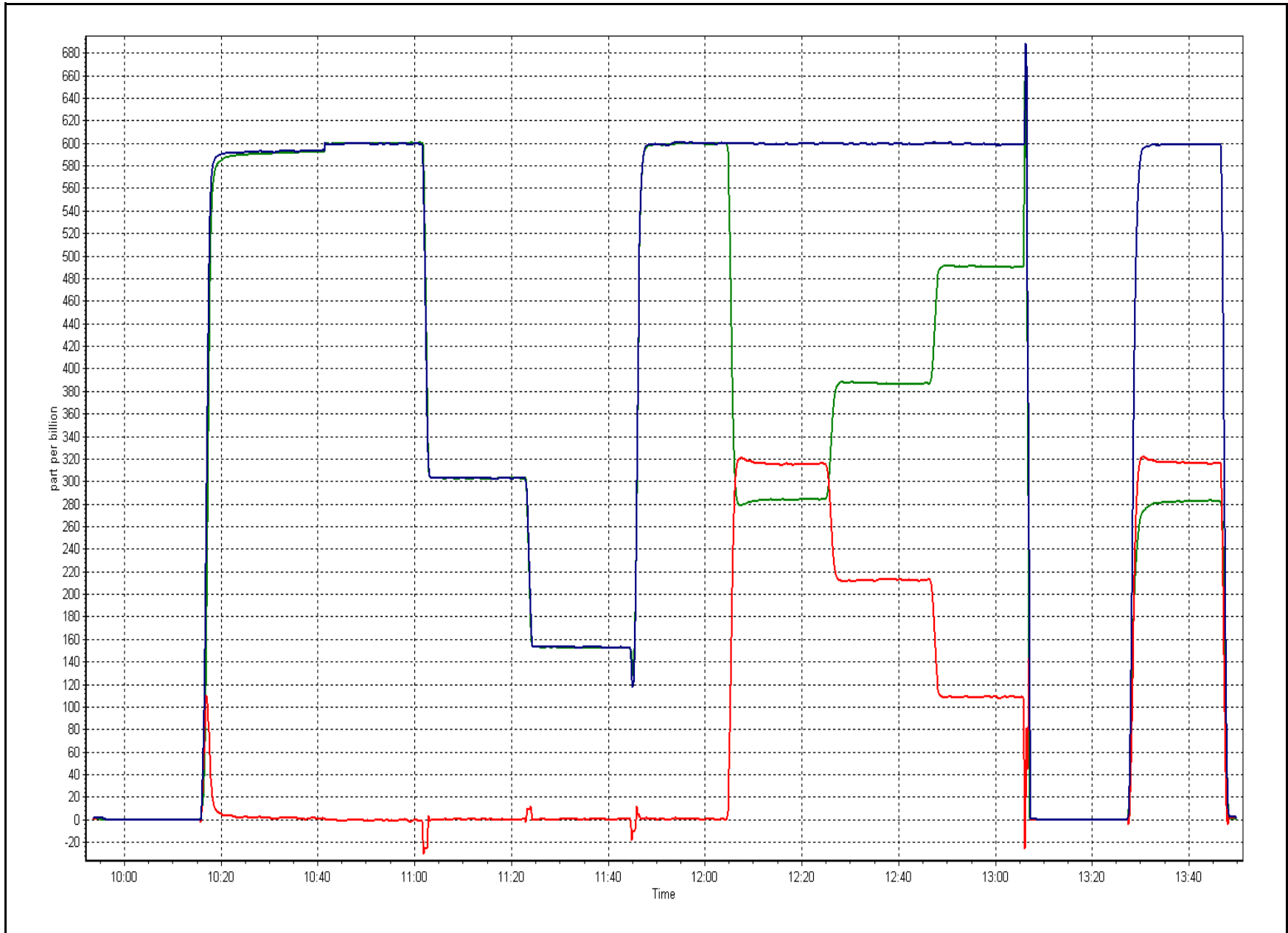
Calibration Date	September 11, 2015	Previous Calibration	August 7, 2015
Station Number	Firebag	Station Number	AMS 19
Start Time (MST)	9:50	End Time (MST)	13:50
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999999
315.4	315.3	1.0003		
212.7	212.6	1.0005	Slope	0.999775
109.1	108.7	1.0039		
			Intercept	0.208272

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







This page intentionally left blank





## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 502  
CONOCOPHILLIPS  
SURMONT  
SEPTEMBER 2015**

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

October 28, 2015



*This page intentionally left blank*

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
 SEPTEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	684	35	36	99.86	12	0	3	0
H2S (ppb) Average	683	34	37	99.58	3	0	1	0
NO2 (ppb) Average	684	35	36	99.86	13	0	3	-
NO (ppb) Average	684	35	36	99.86	19	-	4	-
NOX (ppb) Average	684	35	36	99.86	25	-	6	-
Temperature 2 m (C) Average	720	0	0	100.00	21.3	-	16.5	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	91	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	38	-	25	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
 SEPTEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	684	0.7	1	-	0	0	0	0	1	1	12
H2S (ppb) Average	683	0.3	0	-	0	0	0	0	0	1	3
NO2 (ppb) Average	684	1.2	1	-	0	0	0	1	2	3	13
NO (ppb) Average	684	0.9	2	-	0	0	0	0	1	2	19
NOX (ppb) Average	684	2.1	3	-	0	0	0	1	2	4	25
Temperature 2 m (C) Average	720	9.11	4.3	-	-1.8	4.1	6.4	8.3	11.5	15.6	21.3
Relative Humidity (%) Average	720	71.5	17	-	31	47	57	73	86	93	99
Wind Speed 10 m (km/h) Average	720	13	6	-	0	6	9	12	17	21	38
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
SEPTEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	11 Sep 2015 12:00	11 Sep 2015 12:00	1	Maintenance - sample manifold cleaned
H2S	08 Sep 2015 23:00	09 Sep 2015 00:00	2	Unstable operation - excessive baseline drift
H2S	25 Sep 2015 07:00	25 Sep 2015 07:00	1	Power spike
NO2, NO, NOX	11 Sep 2015 12:00	11 Sep 2015 12:00	1	Maintenance - sample manifold cleaned



Summary of Hour Averages

ConocoPhillips - Surmont - September 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 12 ppb on Sep 27 14:00	Maximum Daily Average: 3.0 ppb on Sep 27
Minimum Value: 0 ppb on Sep 10 11:00	Hours of Data: 684
Maximum Diurnal Average: 1.7 ppb at hour 11	Hours of Missing Data: 36
Monthly Average: 0.7 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.2 ppb on Sep 20	Percent Operational Time: 99.9
Minimum Diurnal Average: 0.3 ppb at hour 20	
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> = 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-Sep	0	0	0	0	Z	0	0	0	0	0	0	1	1	7	6	4	1	1	0	0	0	0	0	0	1.0	7
2-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.3	1
3-Sep	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.5	1
4-Sep	0	Z	0	0	0	0	0	0	0	1	2	1	0	1	1	3	1	1	0	0	0	1	1	1	0.7	3
5-Sep	1	1	Z	0	2	2	3	3	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1.0	3
6-Sep	1	1	1	Z	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0.4	1
7-Sep	0	0	0	1	Z	0	0	1	1	0	1	1	1	2	1	1	3	1	0	0	0	0	0	0	0.8	3
8-Sep	0	0	0	0	0	Z	1	1	1	1	10	5	2	2	3	2	2	1	1	1	0	0	0	0	1.5	10
9-Sep	Z	1	1	1	1	1	1	1	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.7	1
10-Sep	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
11-Sep	0	0	Z	0	0	0	0	0	0	0	1	M	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1
12-Sep	0	0	0	Z	0	0	0	0	0	0	3	5	1	0	1	0	0	0	0	0	0	0	0	1	0.6	5
13-Sep	1	1	1	0	Z	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	3	2	1.0	3
14-Sep	1	1	1	1	1	Z	1	1	0	0	1	1	1	2	1	0	0	1	0	0	0	0	0	1	0.7	2
15-Sep	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
16-Sep	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
17-Sep	0	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-Sep	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
19-Sep	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
20-Sep	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
21-Sep	Z	1	0	0	0	0	0	2	4	3	5	5	3	6	6	5	1	2	1	0	0	0	0	0	2.0	6
22-Sep	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
23-Sep	0	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
24-Sep	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
25-Sep	0	0	1	1	Z	1	1	1	5	5	9	9	4	0	0	0	0	0	0	0	0	0	1	0	1.7	9
26-Sep	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Sep	Z	0	0	0	0	0	0	0	1	11	7	5	12	9	11	8	1	0	0	0	0	0	1	1	3.0	12
28-Sep	0	Z	0	0	1	0	0	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
29-Sep	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.7	1
30-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.5	1

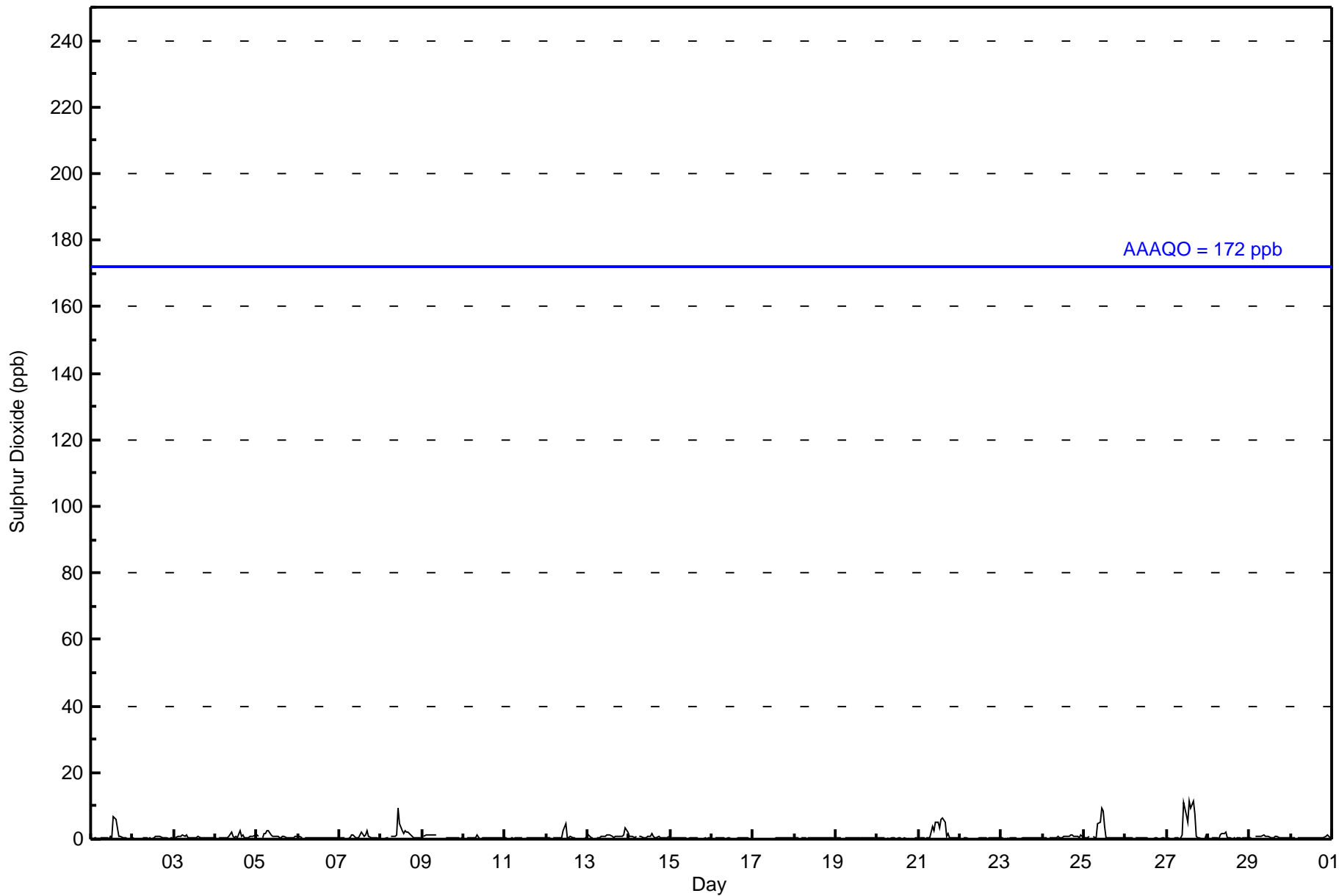
0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.8	0.8	1.7	1.4	0.9	1.4	1.3	1.1	0.9	0.5	0.4	0.3	0.3	0.4	0.5	0.5	Diurnal Average
1	1	1	1	2	2	3	3	5	5	11	9	5	12	9	11	8	2	1	1	1	1	3	2	Diurnal Maximum

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



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surrmont - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	681	99.56	99.56
11 - 20	3	0.44	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	13	5	10	16	15	46	11	14	34	50	130	115	92	34	42	54	681
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	13	5	10	16	15	46	11	14	34	50	130	115	92	37	42	54	684

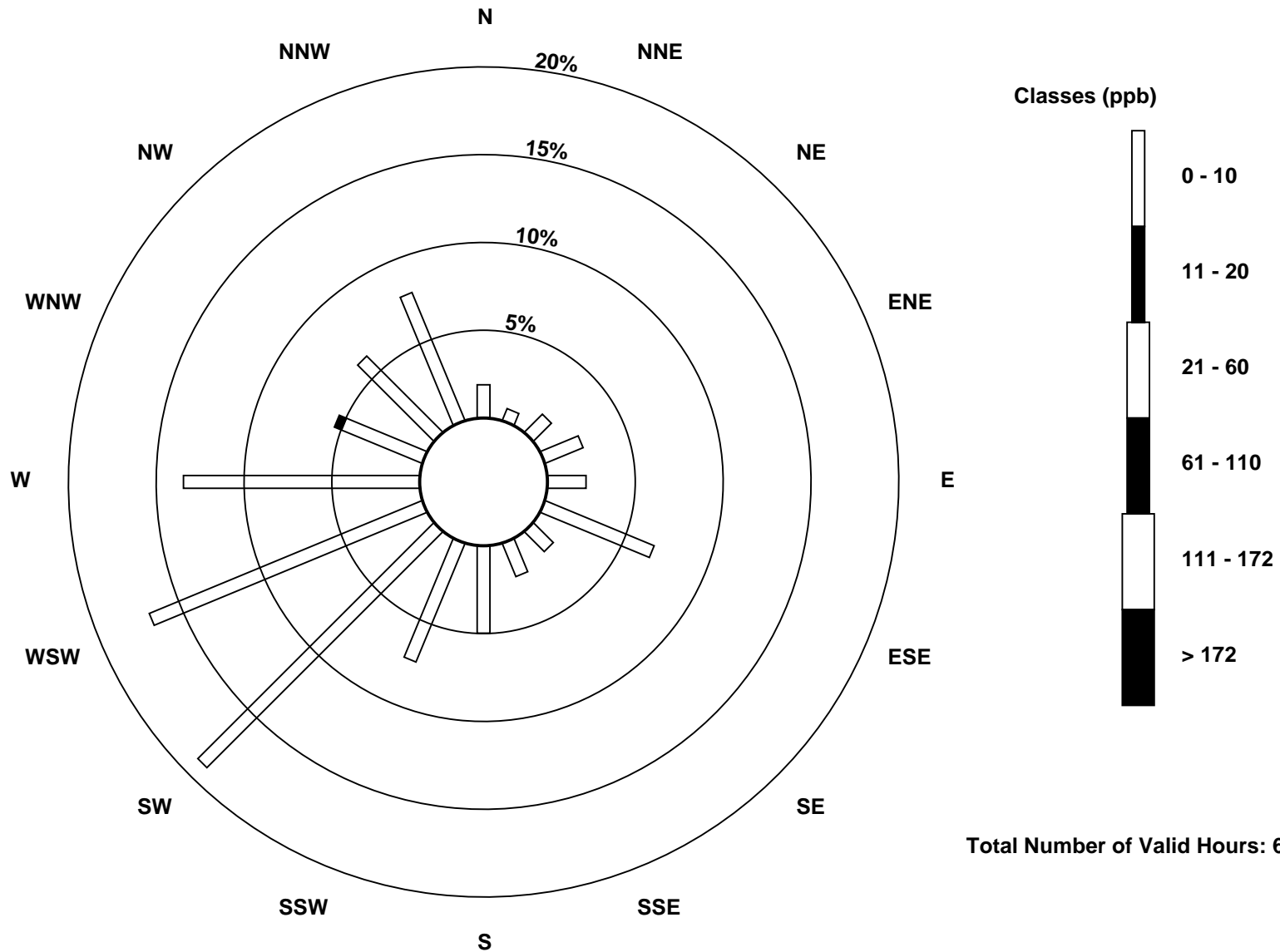
Total Number of Valid Hours: 684

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont (AMS502)

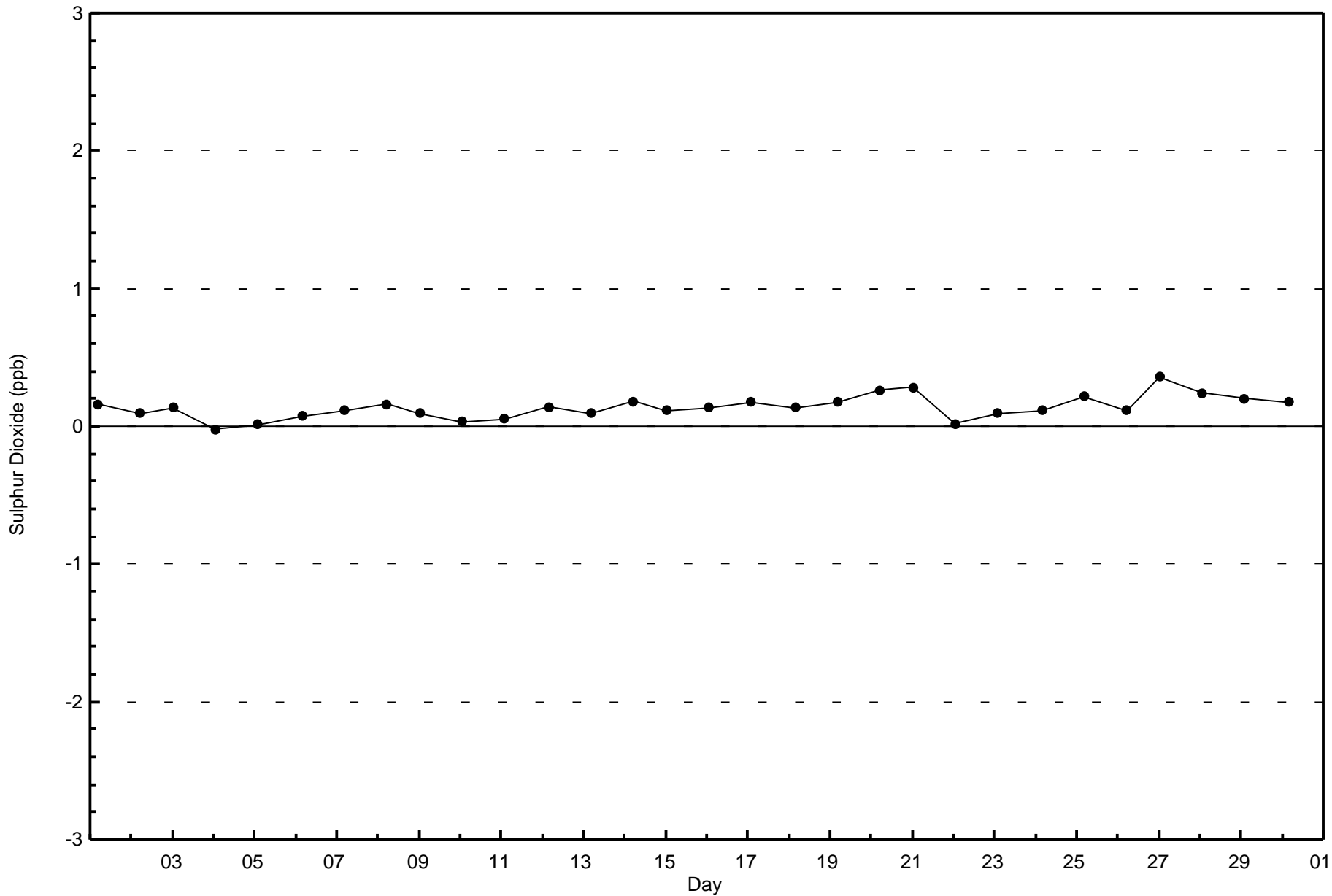


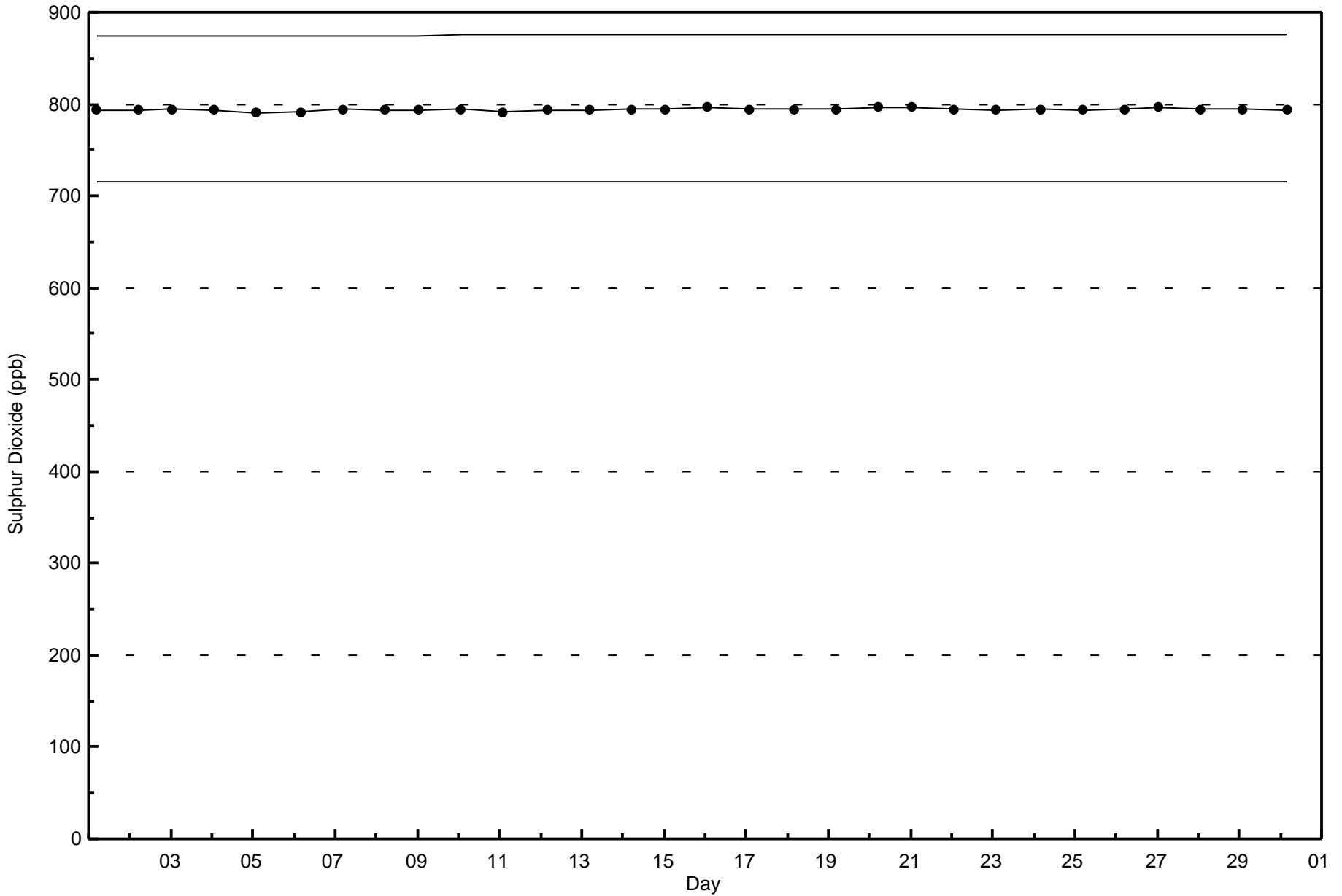
Total Number of Valid Hours: 684



Wood Buffalo Environmental Association  
Zero Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
ConocoPhillips - Surrmont - September 2015





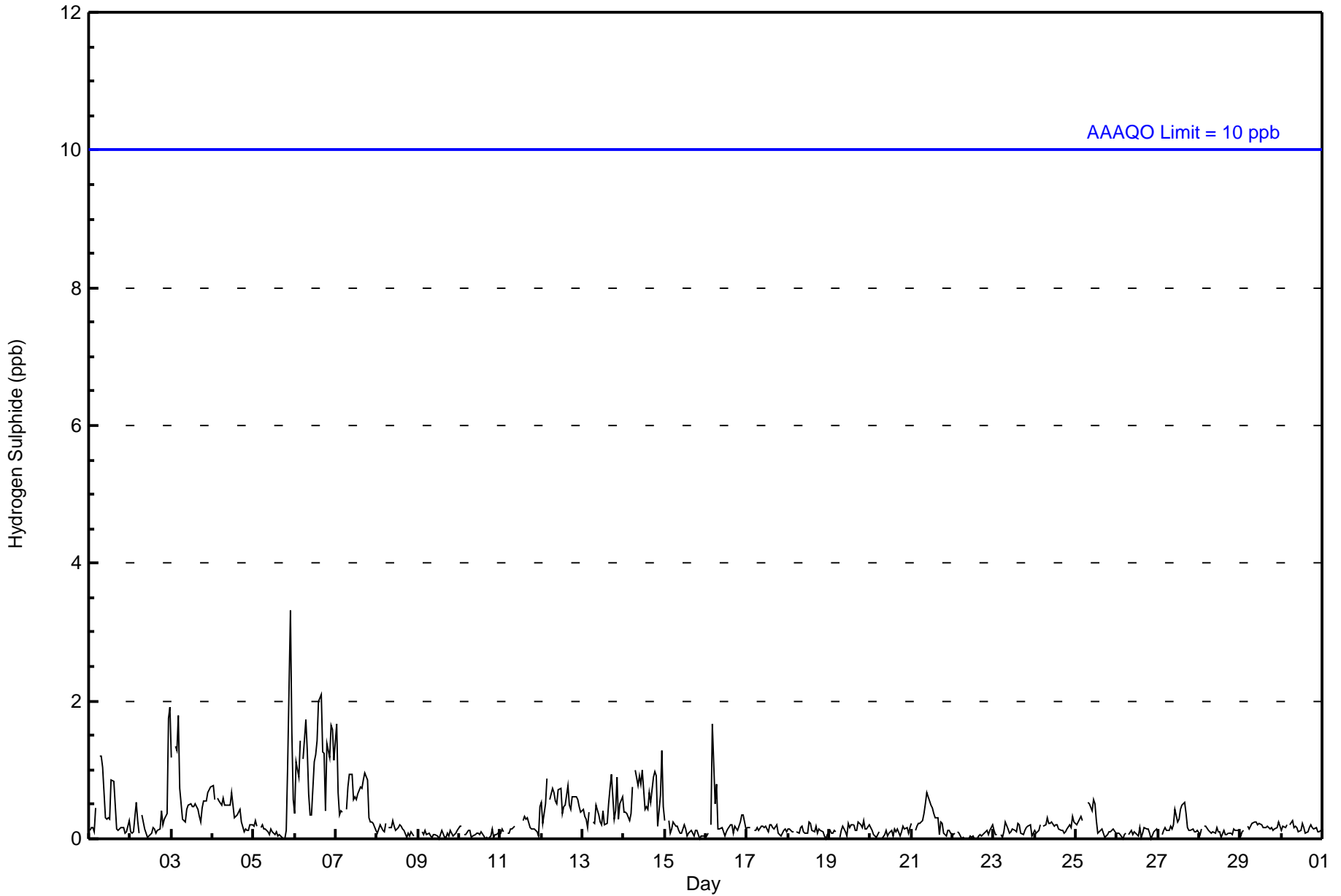


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 3 ppb on Sep 5 22:00	Maximum Daily Average: 1.2 ppb on Sep 6
Minimum Value: 0 ppb on Sep 5 19:00	Hours of Data: 683
Maximum Diurnal Average: 0.4 ppb at hour 23	Hours of Missing Data: 37
Monthly Average: 0.3 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.1 ppb on Sep 22	Percent Operational Time: 99.6
Minimum Diurnal Average: 0.2 ppb at hour 19	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 O <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 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-Sep	0	0	0	0	0	Z	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
2-Sep	0	0	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0.3	2	
3-Sep	1	Z	1	1	2	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	0.6	2	
4-Sep	1	1	Z	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
5-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	2	1	0.4	3	
6-Sep	0	1	1	1	Z	1	2	1	1	0	0	1	1	1	2	2	1	1	0	1	1	2	2	1	1.2	2	
7-Sep	2	1	0	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	2	
8-Sep	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	UO	UO	0.1	0	
9-Sep	0	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-Sep	0	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	
11-Sep	0	0	0	Z	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
12-Sep	1	0	1	1	Z	1	1	1	1	1	1	1	0	0	0	1	0	0	1	1	1	1	1	0	0.6	1	
13-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0	1	1	0.4	1	
14-Sep	0	0	0	0	0	1	Z	1	1	1	1	1	0	0	0	1	1	1	1	1	0	1	1	0	0.6	1	
15-Sep	0	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-Sep	0	0	Z	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2	
17-Sep	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	
18-Sep	0	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	
19-Sep	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	
20-Sep	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	
21-Sep	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
22-Sep	0	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-Sep	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	
24-Sep	0	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-Sep	0	0	0	0	0	Z	PF	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
26-Sep	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	
27-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1	
28-Sep	0	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-Sep	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-Sep	0	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	

0.3	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	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.3	Diurnal Average
2	1	1	1	2	1	2	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	3	2	2	Diurnal Maximum

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





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**ConocoPhillips - Surmont - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	682	99.85	99.85
3 - 4	1	0.15	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: 683

Total Number of Hours: 720



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
ConocoPhillips - Surmont - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	13	5	10	16	14	47	12	14	33	51	131	112	91	38	42	53	682
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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>	13	5	10	16	14	47	12	14	33	51	131	112	91	38	42	54	683

Total Number of Valid Hours: 683

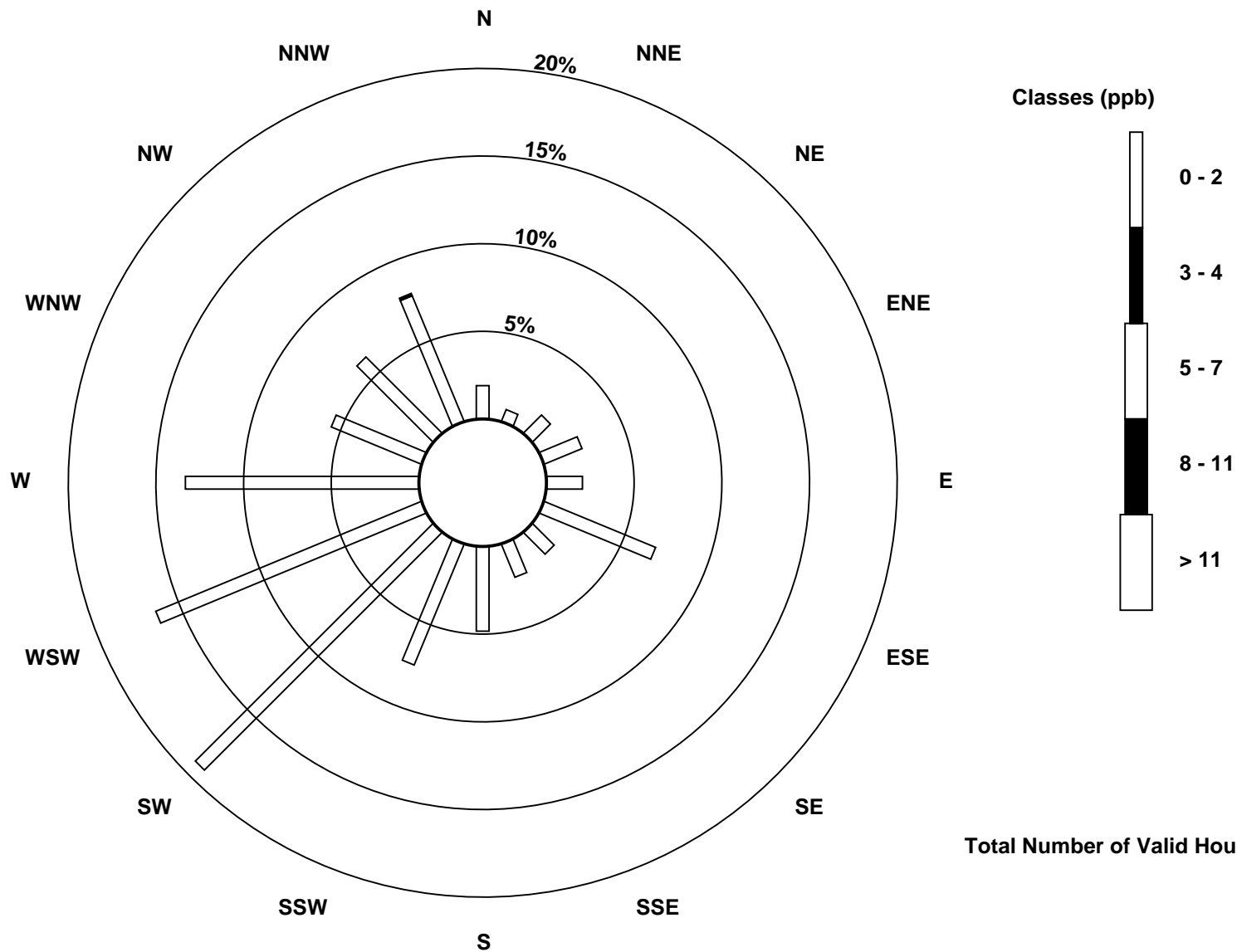
Total Number of Hours: 720



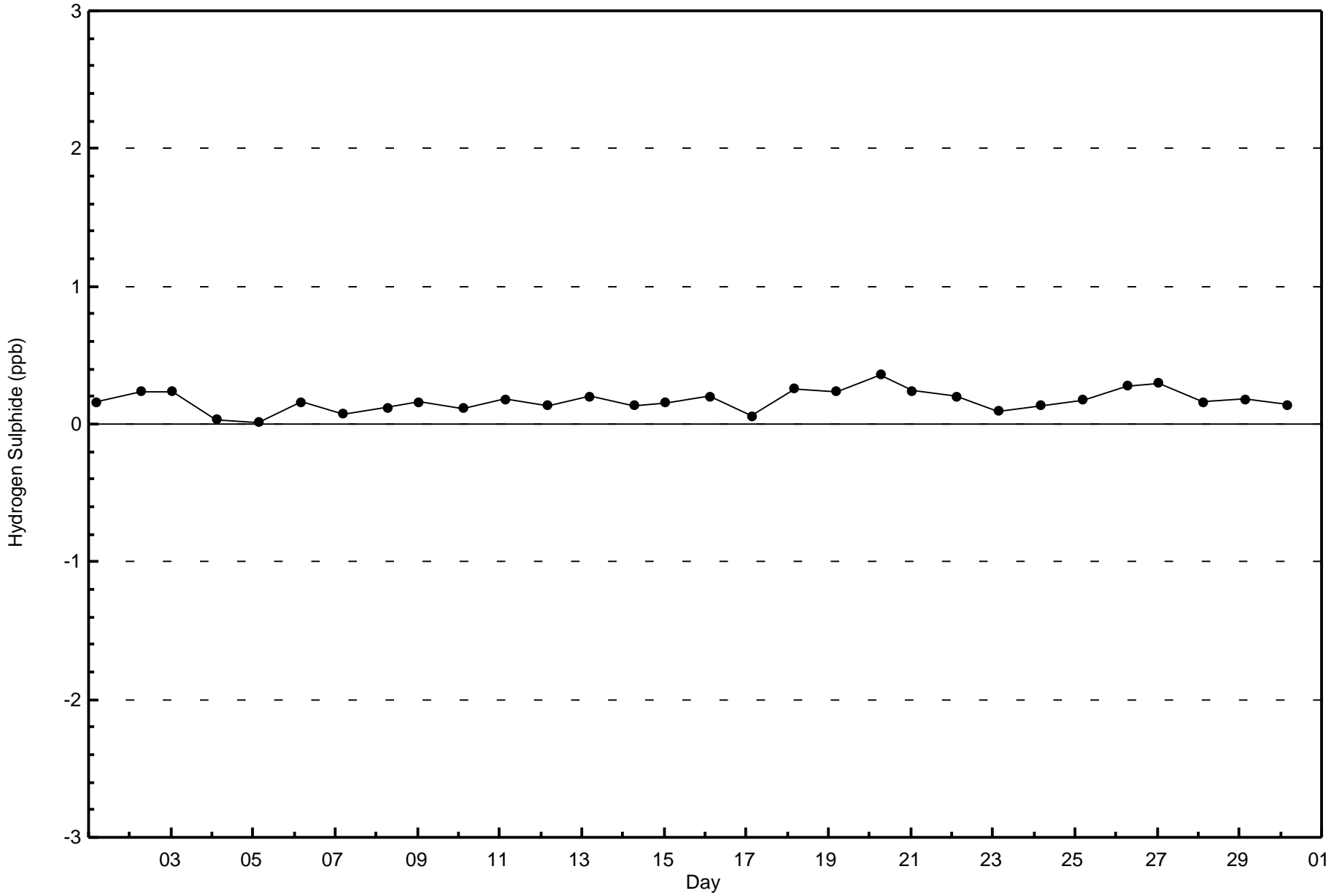


Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 683



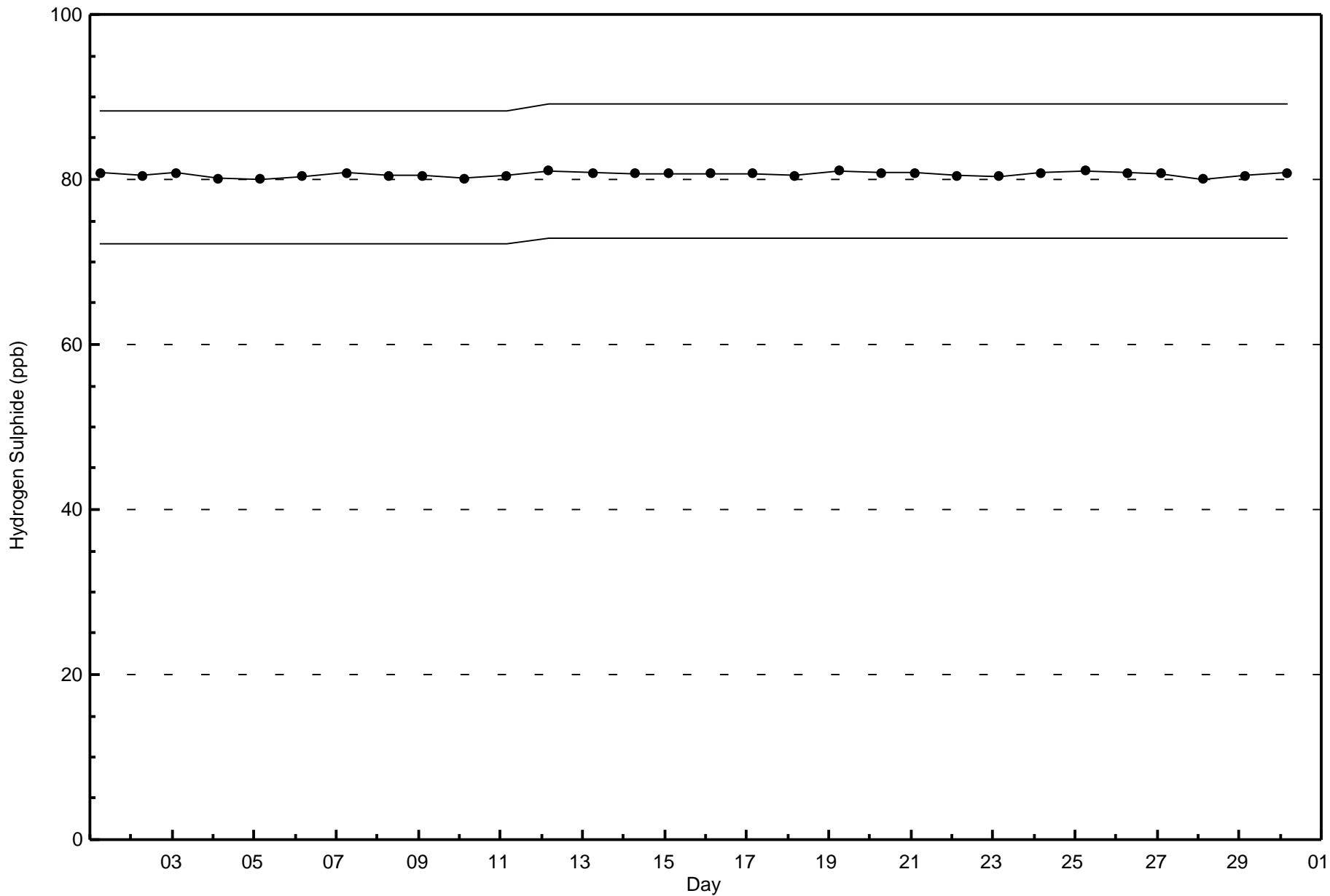


Wood Buffalo Environmental Association

Span Responses

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

ConocoPhillips - Surmont - September 2015





Summary of Hour Averages

ConocoPhillips - Surmont - September 2015

Maximum Value: 19 ppb on Sep 27 14:00																		Maximum Daily Average: 4.4 ppb on Sep 21																		Hours in Service: 720																															
Minimum Value: 0 ppb on Sep 1 01:00																		Minimum Daily Average: 0.0 ppb on Sep 10																		Hours of Data: 684																															
Maximum Diurnal Average: 2.5 ppb at hour 11																		Minimum Diurnal Average: 0.1 ppb at hour 20																		Hours of Missing Data: 36																															
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> = 14																		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-Sep	0	0	0	0	Z	0	0	0	0	0	0	1	1	9	7	4	0	0	0	0	0	0	1	0	1.1	9																																									
2-Sep	0	0	0	0	0	Z	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0.5	2																																									
3-Sep	Z	0	3	1	3	4	2	1	0	0	0	0	0	0	2	0	0	0	0	0	0	2	1	0	0.9	4																																									
4-Sep	0	Z	0	0	0	0	0	2	3	5	2	1	2	1	6	2	3	0	0	0	0	0	0	0	1.1	6																																									
5-Sep	0	0	Z	0	1	0	0	2	1	1	1	1	1	2	1	1	1	1	1	1	0	0	0	0	0.7	2																																									
6-Sep	0	0	0	Z	0	0	0	0	1	0	1	0	1	1	1	1	1	0	1	0	1	0	0	0	0.4	1																																									
7-Sep	0	2	2	4	Z	2	2	7	5	2	3	2	4	6	1	3	1	1	0	1	1	1	1	0	2.2	7																																									
8-Sep	0	0	0	0	0	Z	0	1	1	2	2	2	3	1	2	1	1	1	1	1	0	0	0	0	0.8	3																																									
9-Sep	Z	0	0	0	0	0	0	0	2	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	2																																									
10-Sep	0	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																																									
11-Sep	0	0	Z	0	0	0	0	0	0	0	1	M	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																																									
12-Sep	0	0	0	Z	0	0	0	0	0	0	3	4	0	0	1	0	0	0	0	0	0	0	0	1	0.5	4																																									
13-Sep	2	1	1	0	Z	0	0	2	4	2	1	1	1	2	1	0	0	0	0	1	0	1	1	1	0.9	4																																									
14-Sep	0	1	2	0	2	Z	0	1	0	0	0	1	1	2	1	1	1	1	1	0	0	0	0	1	0.6	2																																									
15-Sep	Z	0	0	0	1	2	1	5	1	2	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0.8	5																																									
16-Sep	0	Z	0	0	0	0	0	2	0	1	2	1	1	1	0	2	1	1	0	0	0	0	0	0	0.6	2																																									
17-Sep	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	1																																									
18-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																																									
19-Sep	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																																									
20-Sep	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																																									
21-Sep	Z	0	0	0	0	0	1	9	14	7	15	11	7	12	12	9	1	2	0	0	0	0	0	0	4.4	15																																									
22-Sep	0	Z	0	0	0	1	0	0	2	0	0	1	0	0	1	1	1	1	0	0	0	0	1	0	0.4	2																																									
23-Sep	0	0	Z	1	0	3	2	6	3	1	1	2	2	1	10	1	0	1	0	0	0	0	0	0	1.6	10																																									
24-Sep	0	0	1	Z	0	0	1	1	1	1	3	3	2	1	1	1	1	1	0	0	1	1	7	2	1.3	7																																									
25-Sep	0	1	0	0	Z	0	0	0	9	9	16	13	5	0	0	0	0	0	0	0	0	0	0	0	2.3	16																																									
26-Sep	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																																									
27-Sep	Z	0	0	0	0	0	0	0	0	2	14	7	7	19	15	17	11	1	0	0	0	0	0	2	4.1	19																																									
28-Sep	0	Z	0	0	1	0	0	2	2	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3																																									
29-Sep	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																																									
30-Sep	0	0	0	Z	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																																									
																		0.1		0.3		0.3		0.3		0.3		0.5		0.4		1.5		1.8		1.4		2.5		1.9		1.3		2.1		2.1		1.4		0.8		0.4		0.2		0.1		0.2		0.2		0.4		0.3		Diurnal Average	
																		2		2		3		4		3		4		2		9		14		9		16		13		7		19		15		17		11		2		1		1		2		7		2		Diurnal Maximum			
Z - zerospan																		C - Calibration						M - Maintenance																																											

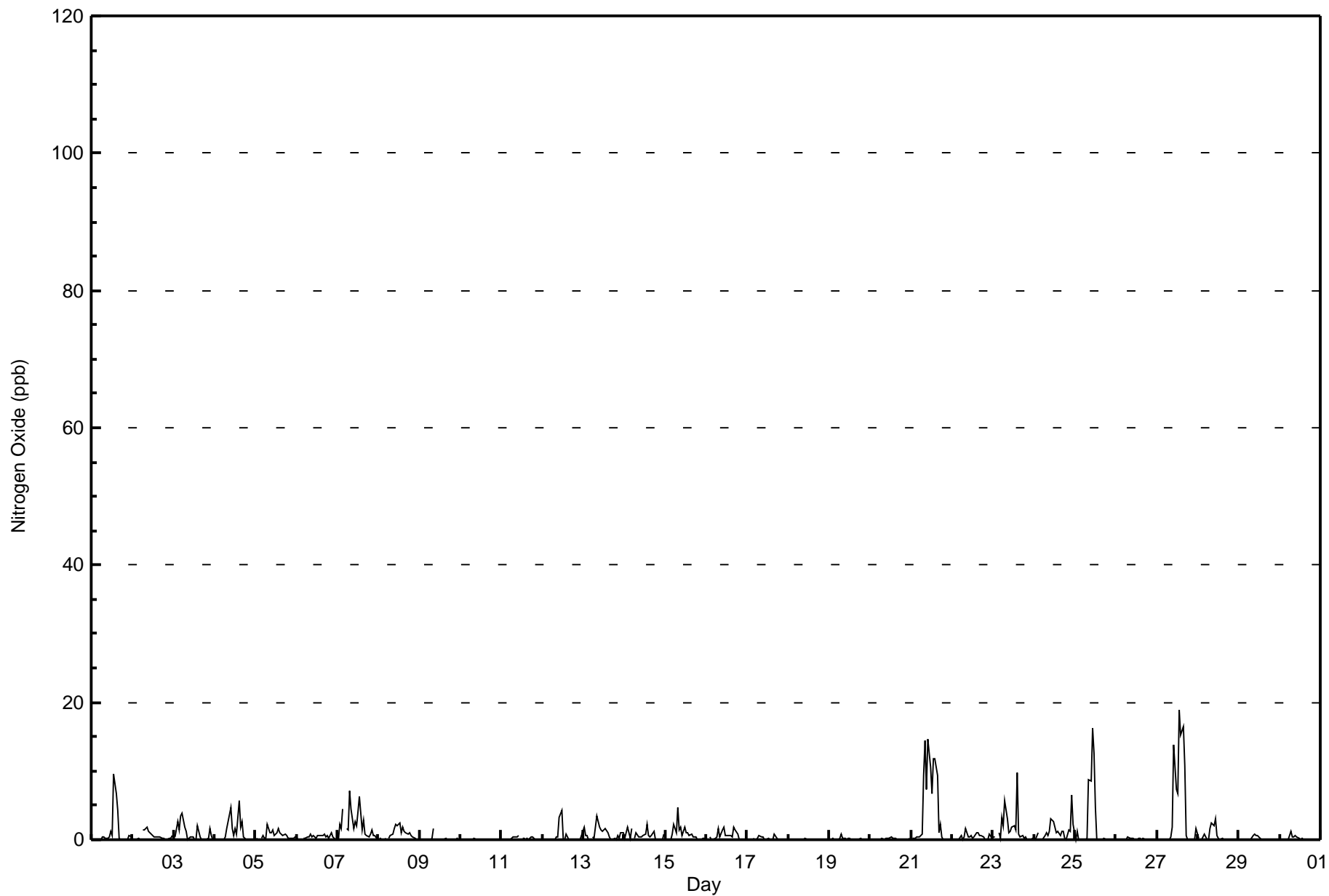


Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**ConocoPhillips - Surmont - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	684	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**ConocoPhillips - Surmont - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 20	13	5	10	16	15	46	11	14	34	50	130	115	92	37	42	54	684
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>	<b>13</b>	<b>5</b>	<b>10</b>	<b>16</b>	<b>15</b>	<b>46</b>	<b>11</b>	<b>14</b>	<b>34</b>	<b>50</b>	<b>130</b>	<b>115</b>	<b>92</b>	<b>37</b>	<b>42</b>	<b>54</b>	<b>684</b>

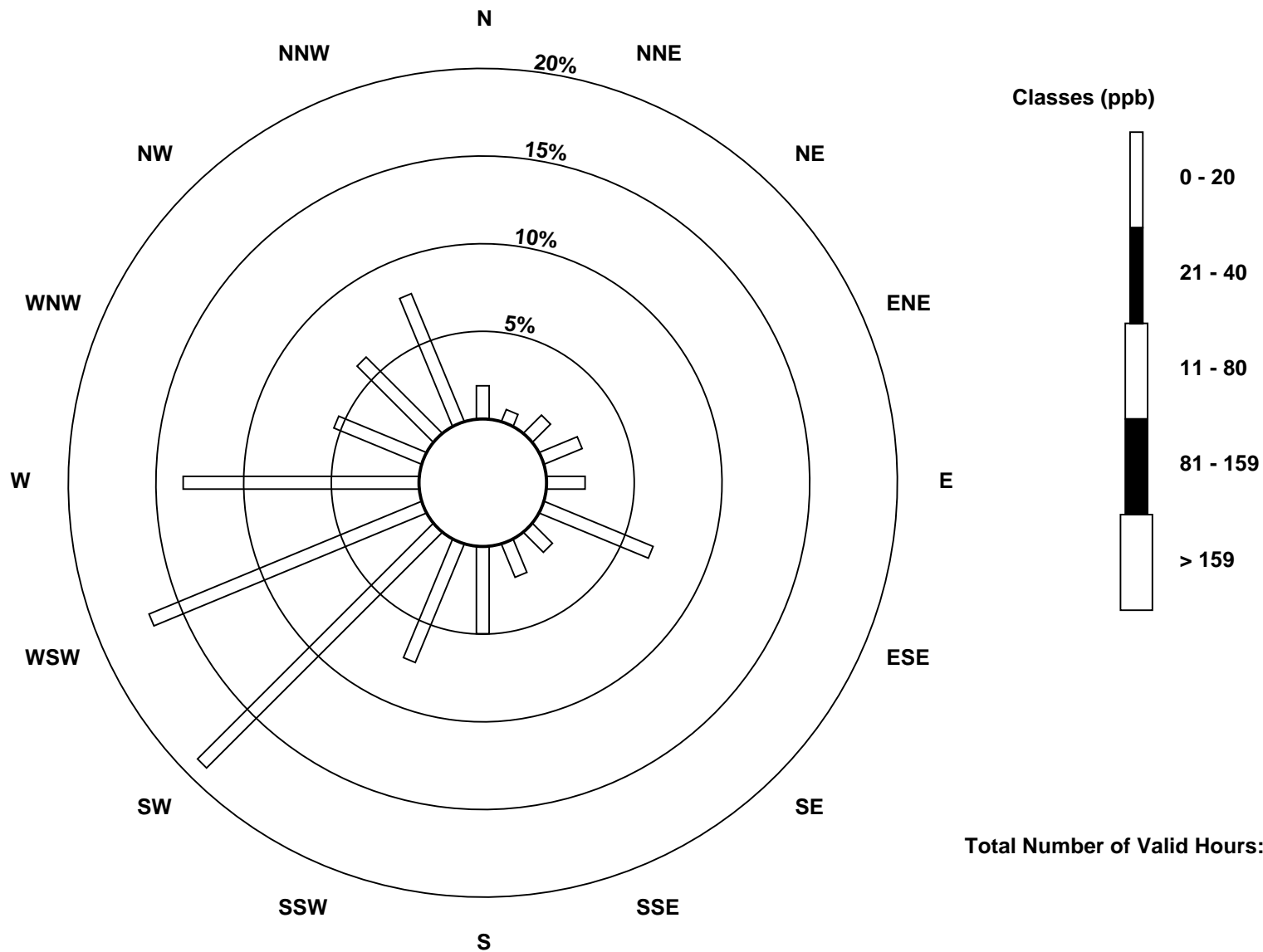
Total Number of Valid Hours: 684

Total Number of Hours: 720

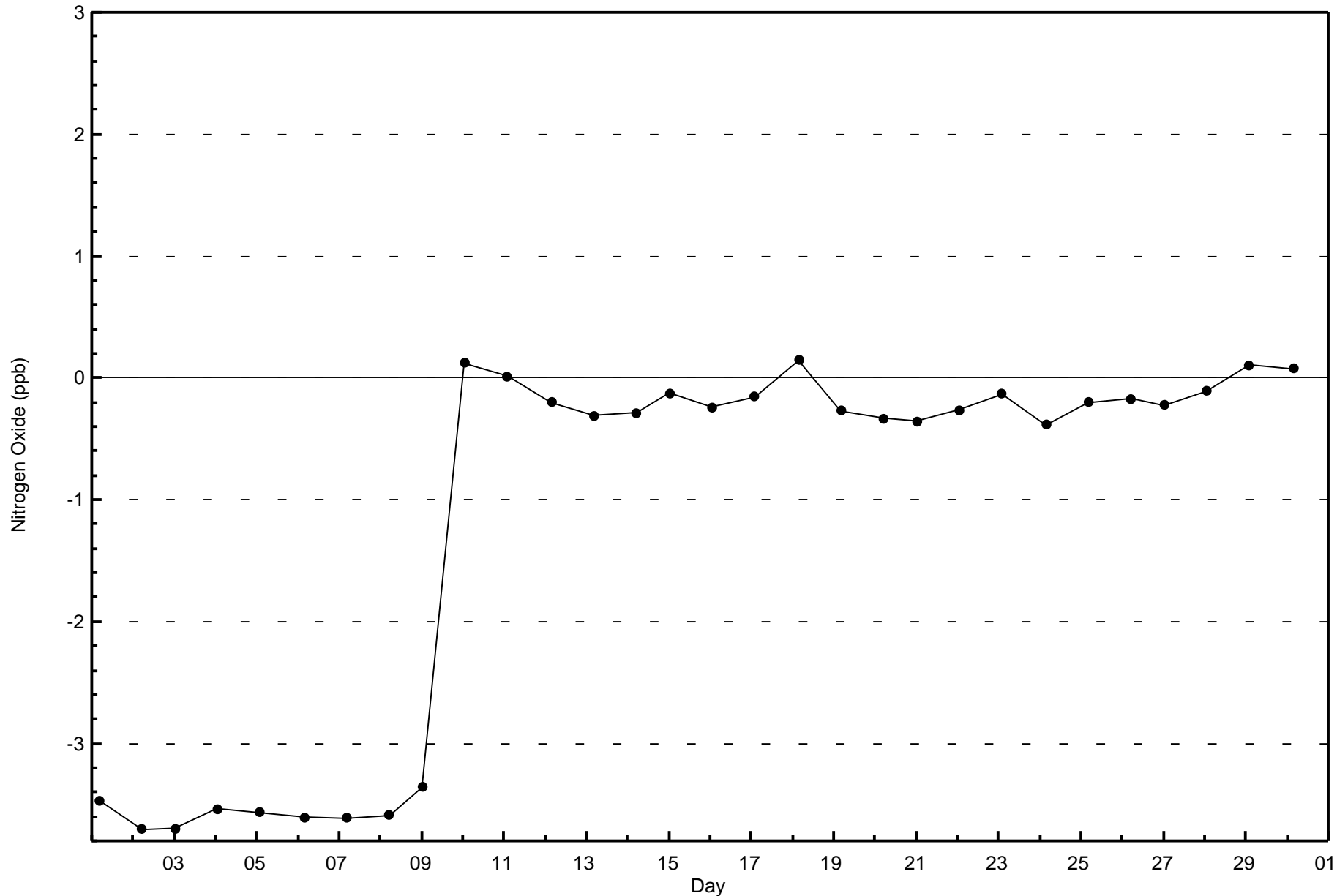


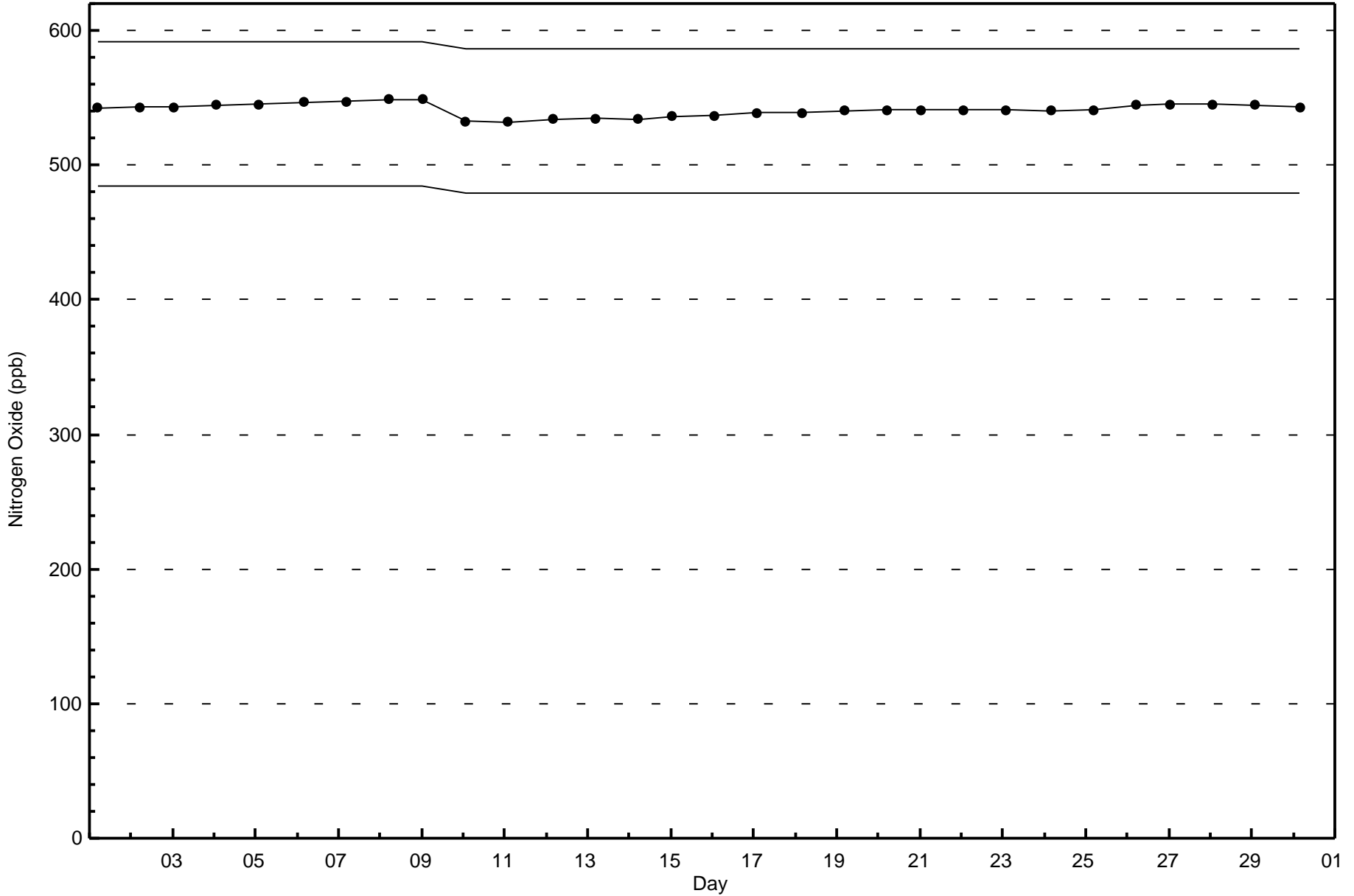
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Oxide (NO) - ppb  
ConocoPhillips - Surmont (AMS502)











Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 13 ppb on Sep 24 23:00	Maximum Daily Average: 3.0 ppb on Sep 24
Minimum Value: 0 ppb on Sep 3 20:00	Hours of Data: 684
Maximum Diurnal Average: 1.8 ppb at hour 11	Hours of Missing Data: 36
Monthly Average: 1.2 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.3 ppb on Sep 20	Percent Operational Time: 99.9
Minimum Diurnal Average: 0.7 ppb at hour 1	
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> = 3 P <sub>99</sub> = 6	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	1	1	1	Z	1	2	2	2	1	1	1	2	5	4	3	0	0	0	0	0	0	1	1	1.3	5
2-Sep	1	0	0	1	2	Z	7	4	6	2	2	1	0	1	1	1	1	1	0	0	0	0	0	1	1.4	7
3-Sep	Z	2	2	1	3	3	2	1	0	0	1	1	0	0	1	0	0	0	0	0	0	1	0	0	0.8	3
4-Sep	0	Z	0	0	0	0	0	1	1	2	1	1	1	2	3	1	2	1	0	1	1	1	1	2	1.0	3
5-Sep	2	1	Z	1	3	2	2	4	2	1	1	1	1	2	1	1	1	1	1	2	2	1	2	2	1.6	4
6-Sep	2	1	1	Z	1	1	1	1	1	1	1	0	1	1	1	1	0	1	0	0	1	1	1	1	0.8	2
7-Sep	0	2	2	4	Z	3	3	5	3	3	3	3	3	5	2	3	3	3	2	4	4	4	3	2	2.8	5
8-Sep	1	1	1	1	1	Z	1	2	2	2	3	2	2	1	2	2	2	2	3	4	3	1	2	1	1.8	4
9-Sep	Z	1	1	1	1	1	1	1	2	C	C	C	C	C	0	1	0	0	1	0	0	1	1	1	0.8	2
10-Sep	1	Z	1	1	1	1	1	1	1	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0.5	1
11-Sep	0	1	Z	1	1	1	1	1	1	1	1	M	0	0	0	1	1	1	0	0	0	0	1	1	0.5	1
12-Sep	0	0	0	Z	0	0	0	1	1	1	3	4	0	0	1	0	0	0	0	0	0	0	0	1	0.7	4
13-Sep	2	2	2	1	Z	2	1	3	4	3	2	2	3	4	2	1	1	2	1	1	1	1	3	2	1.9	4
14-Sep	1	1	1	0	1	Z	3	2	1	1	1	1	1	2	1	1	1	2	1	1	1	1	2	3	1.3	3
15-Sep	Z	1	2	2	3	4	2	6	2	2	1	0	1	1	1	1	1	1	1	0	0	0	0	1	1.4	6
16-Sep	1	Z	2	0	1	1	2	3	2	2	2	1	1	1	1	2	1	3	1	0	0	1	0	1.2	3	
17-Sep	1	2	Z	1	0	0	1	1	1	1	1	0	1	0	0	0	2	1	1	1	1	1	1	1	0.7	2
18-Sep	1	1	1	Z	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1
19-Sep	0	1	1	1	Z	1	1	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0.5	1
20-Sep	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
21-Sep	Z	1	0	0	0	0	1	2	3	2	5	6	4	5	4	4	1	1	1	0	0	0	0	0	1.8	6
22-Sep	0	Z	0	0	0	1	0	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	3	2	0.9	3
23-Sep	1	1	Z	0	2	3	2	2	1	1	1	1	2	2	6	1	1	1	1	1	0	0	0	0	1.3	6
24-Sep	0	1	3	Z	1	1	2	2	2	2	3	2	3	3	2	4	4	2	1	7	4	13	5	3.0	13	
25-Sep	2	3	2	3	Z	3	2	2	5	5	9	7	4	1	0	0	0	1	0	1	0	0	1	1	2.3	9
26-Sep	1	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0.5	1
27-Sep	Z	0	0	0	0	0	1	0	0	1	6	3	3	6	6	7	5	1	0	0	0	0	0	1	1.8	7
28-Sep	0	Z	0	0	1	0	0	1	2	1	2	1	1	0	0	0	0	1	2	1	1	1	0	1	0.8	2
29-Sep	1	2	Z	2	2	2	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	1.1	2
30-Sep	1	0	1	Z	1	1	5	2	1	2	1	1	1	0	0	0	1	1	1	1	2	2	1	2	1.1	5

0.7	1.1	1.0	1.0	1.1	1.3	1.5	1.7	1.7	1.4	1.8	1.5	1.2	1.5	1.4	1.2	1.0	0.9	0.8	0.8	1.0	0.8	1.3	1.1	Diurnal Average	
2	3	3	4	3	4	7	6	6	5	9	7	4	6	6	7	5	4	3	4	7	4	13	5	Diurnal Maximum	

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

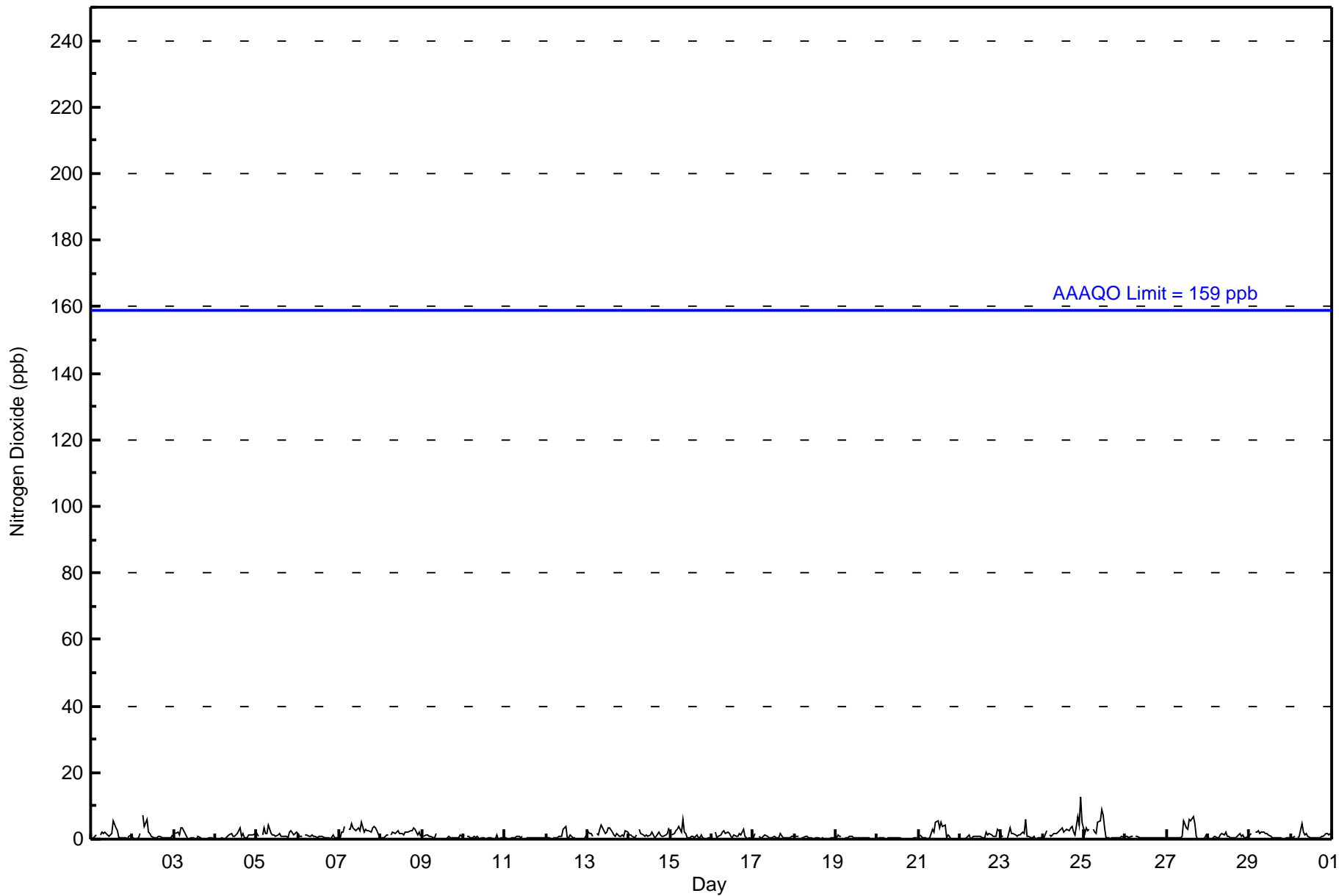


Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb

ConocoPhillips - Surmont - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	684	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	13	5	10	16	15	46	11	14	34	50	130	115	92	37	42	54	684
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>	13	5	10	16	15	46	11	14	34	50	130	115	92	37	42	54	684

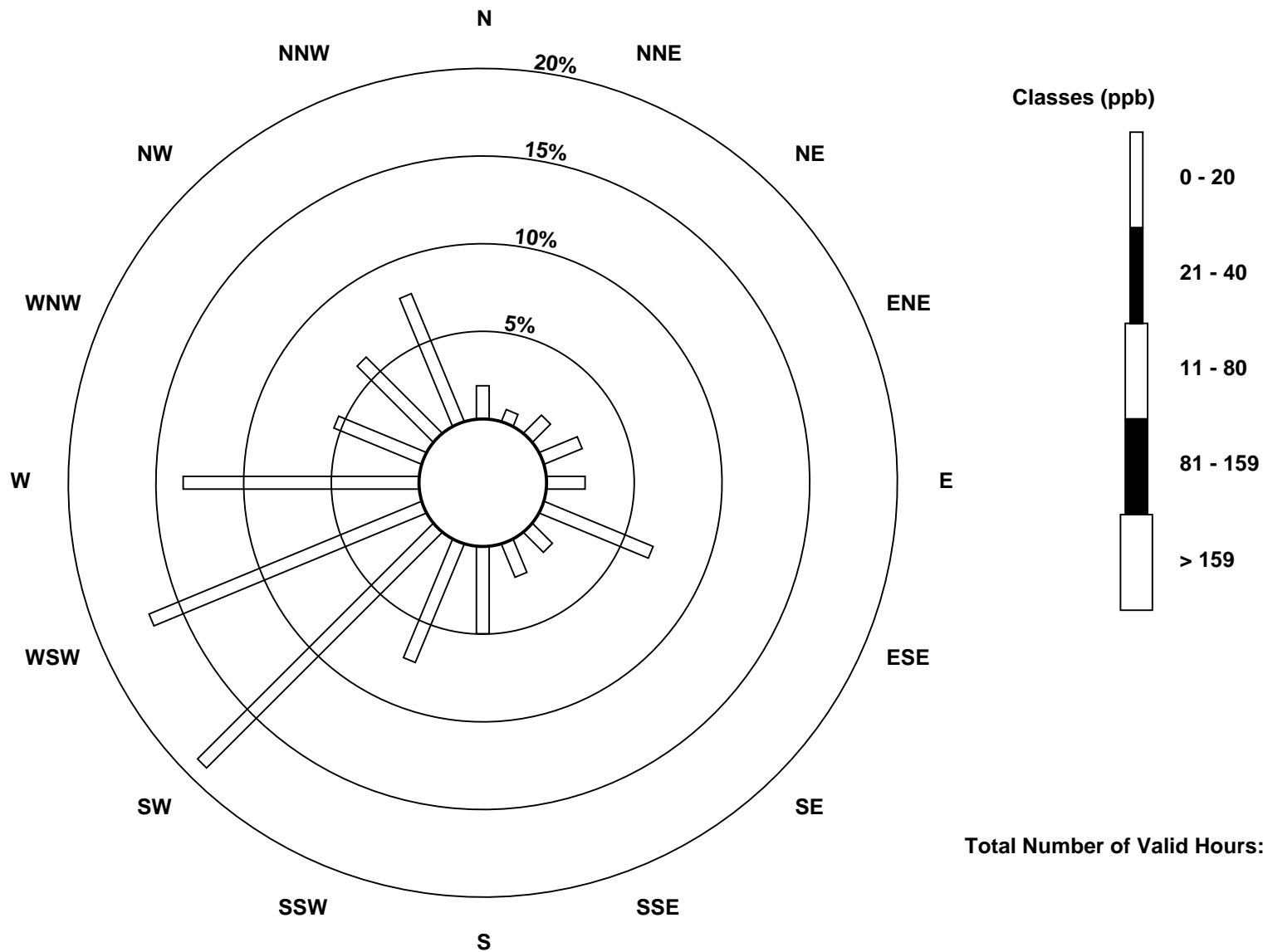
Total Number of Valid Hours: 684

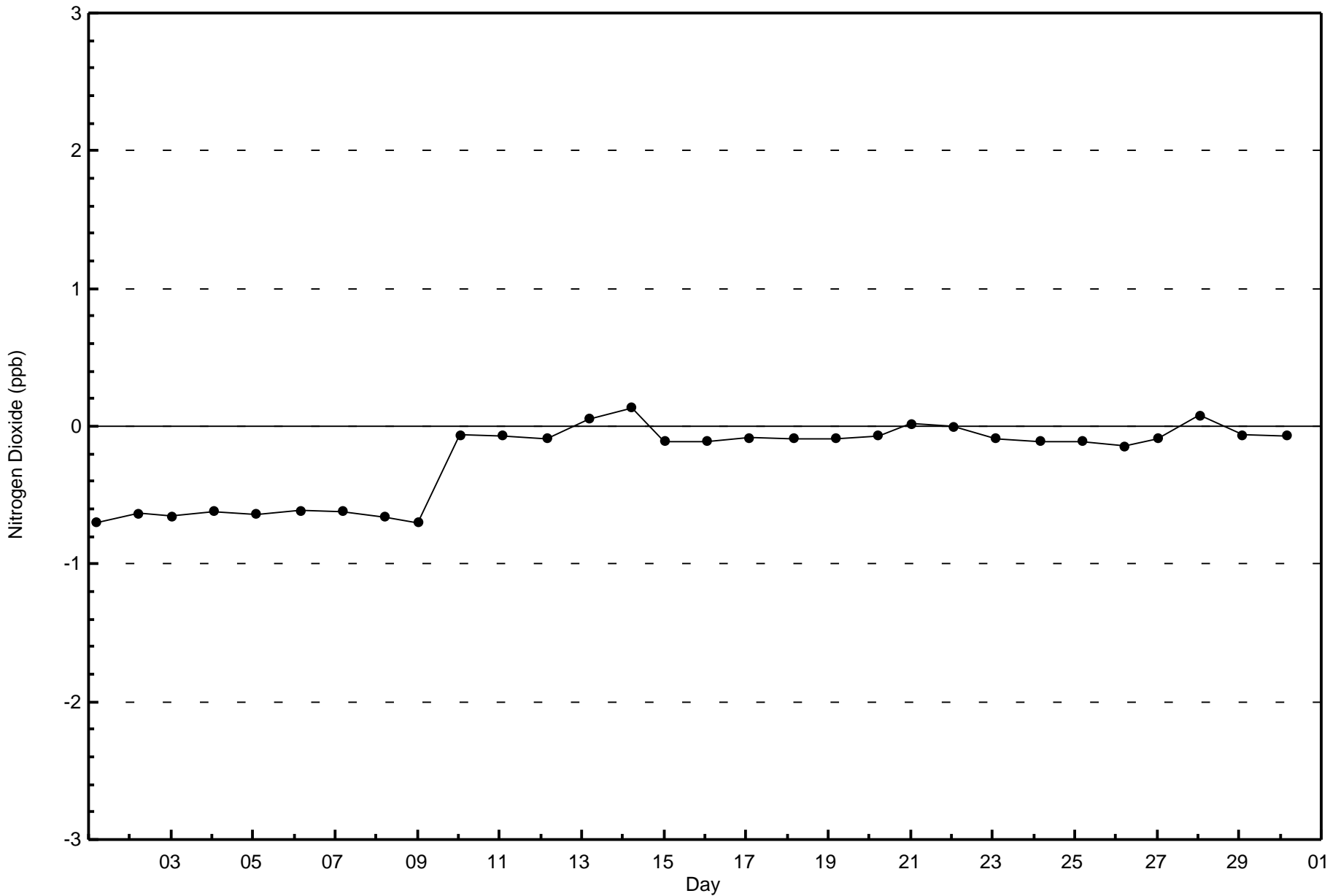
Total Number of Hours: 720



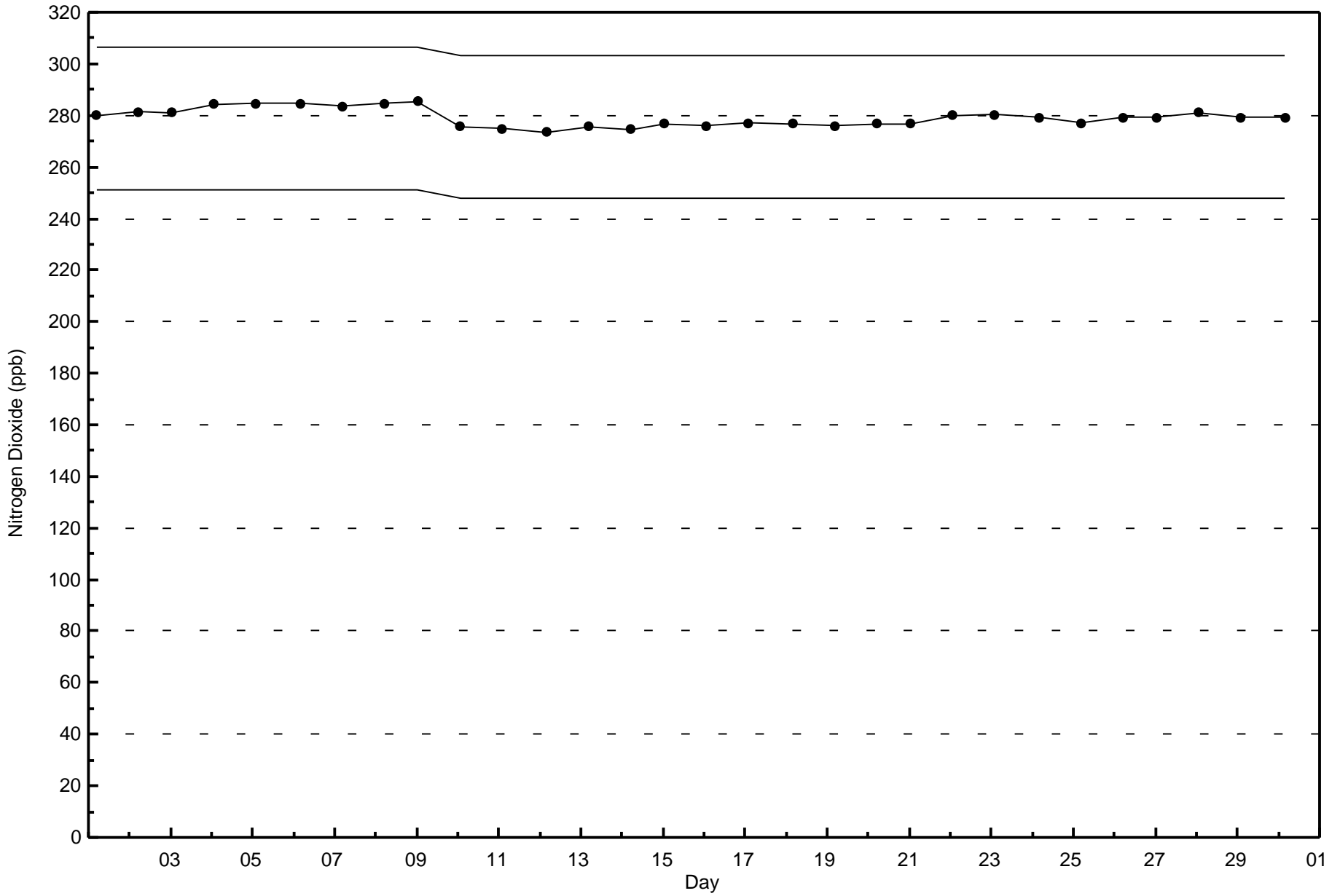
Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont (AMS502)









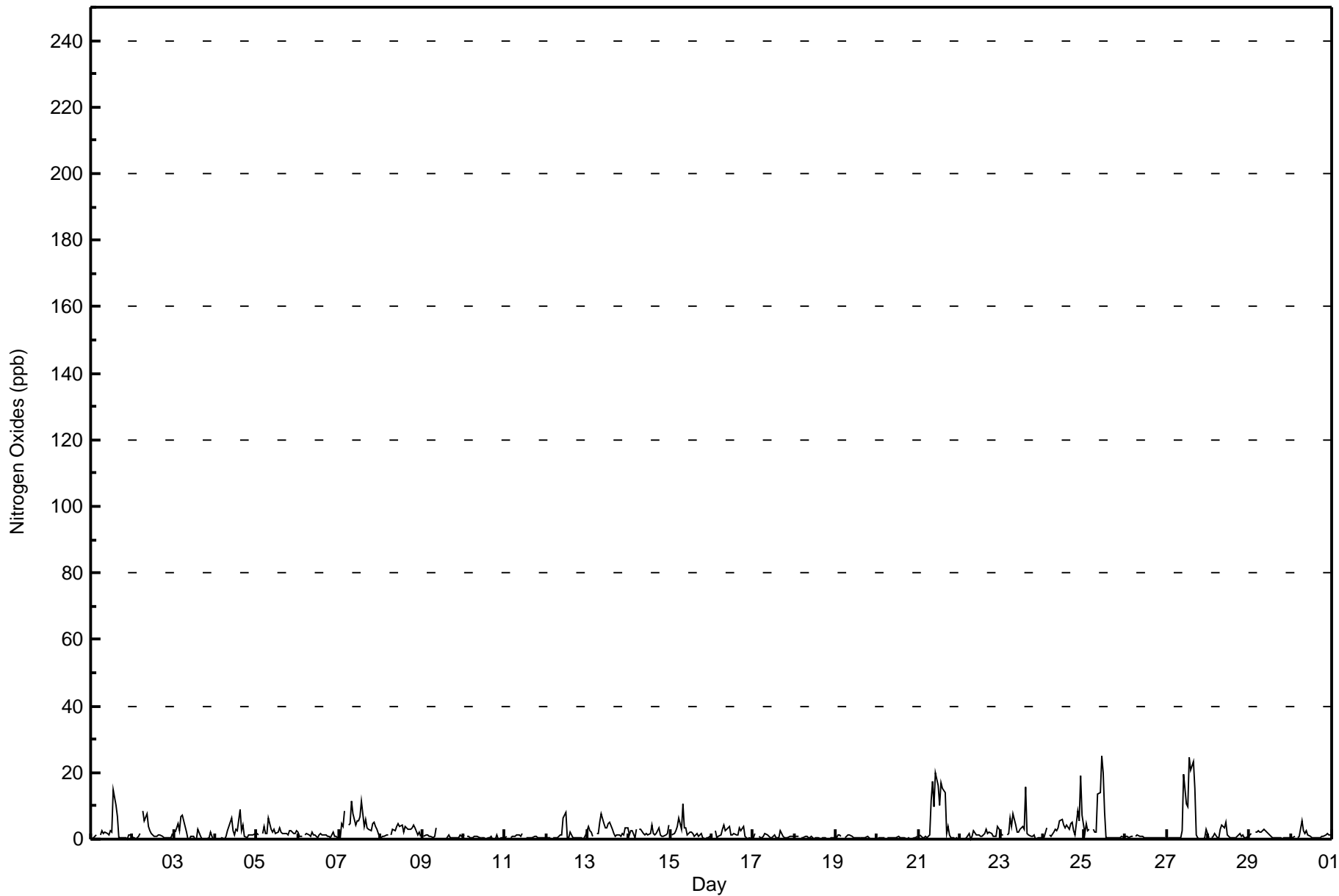


Maximum Value: 25 ppb on Sep 25 11:00																		Maximum Daily Average: 6.2 ppb on Sep 21																		Hours in Service: 720			
Minimum Value: 0 ppb on Sep 4 00:00																		Minimum Daily Average: 0.4 ppb on Sep 20																		Hours of Data: 684			
Maximum Diurnal Average: 4.3 ppb at hour 11																		Minimum Diurnal Average: 0.9 ppb at hour 20																		Hours of Missing Data: 36			
Monthly Average: 2.1 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 4 P <sub>99</sub> = 19																		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-Sep	0	1	1	1	Z	1	2	2	2	2	1	3	2	15	10	7	0	0	0	0	0	0	1	1	2.4	15													
2-Sep	0	0	0	1	2	Z	9	5	8	4	3	2	1	1	1	1	1	1	1	0	0	0	0	2	1.9	9													
3-Sep	Z	2	5	3	7	7	4	2	0	0	1	1	0	0	3	1	0	0	0	0	1	2	1	0	1.7	7													
4-Sep	0	Z	0	0	0	0	1	2	4	6	2	1	3	2	9	3	4	1	1	1	1	1	1	2	2.1	9													
5-Sep	2	1	Z	2	4	2	2	6	3	2	3	2	2	3	2	2	2	2	1	2	3	2	2	3	2.3	6													
6-Sep	2	1	1	Z	1	2	1	1	2	1	1	1	1	2	1	1	1	1	1	0	2	1	1	0	1.2	2													
7-Sep	1	5	4	8	Z	4	5	12	8	4	6	5	7	11	4	6	3	3	3	5	5	4	3	1	5.0	12													
8-Sep	0	1	1	1	1	Z	1	3	3	4	5	4	4	2	4	3	3	3	4	4	3	1	2	1	2.6	5													
9-Sep	Z	1	1	1	1	1	1	1	3	C	C	C	C	C	0	1	0	0	0	0	0	1	1	1	0.9	3													
10-Sep	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0.5	1													
11-Sep	0	1	Z	1	1	1	1	1	1	1	2	M	0	0	0	1	0	1	1	1	0	0	0	1	0.7	2													
12-Sep	0	0	0	Z	0	1	0	1	1	1	6	8	0	0	2	0	0	0	0	0	0	0	0	1	1.2	8													
13-Sep	4	2	2	1	Z	2	2	5	8	5	3	3	5	5	3	2	1	1	1	1	2	1	3	3	2.8	8													
14-Sep	1	2	3	0	3	Z	3	3	2	1	2	1	2	4	2	1	2	3	1	1	1	1	2	4	1.9	4													
15-Sep	Z	1	2	2	4	6	3	11	3	3	1	2	2	2	1	2	1	2	1	2	0	0	0	1	2.3	11													
16-Sep	1	Z	3	0	1	1	3	4	2	4	4	1	1	2	1	1	3	3	4	1	0	0	1	0	1.8	4													
17-Sep	1	2	Z	1	0	0	1	2	1	1	1	1	1	0	0	0	2	1	1	0	1	1	1	1	0.8	2													
18-Sep	1	1	1	Z	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0.5	1													
19-Sep	0	1	1	1	Z	0	1	1	1	1	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0.6	1													
20-Sep	0	0	0	0	0	Z	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0.4	1													
21-Sep	Z	1	1	1	1	1	1	11	17	10	20	16	10	17	15	14	2	4	1	0	0	0	0	0	6.2	20													
22-Sep	0	Z	0	0	0	2	0	1	2	1	1	1	1	1	2	3	2	2	2	1	1	1	4	2	1.3	4													
23-Sep	1	1	Z	1	2	7	4	8	4	2	2	3	4	3	16	2	1	1	1	1	0	0	0	0	2.8	16													
24-Sep	0	1	3	Z	1	1	2	3	2	3	5	6	4	4	3	5	5	2	1	8	6	19	7	4.3	19														
25-Sep	2	4	2	3	Z	3	2	2	14	14	25	20	8	1	0	0	0	1	1	1	0	0	1	1	4.5	25													
26-Sep	1	1	1	1	1	Z	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0.6	1													
27-Sep	Z	0	0	0	0	1	0	0	1	3	19	11	10	25	21	23	15	1	0	0	0	0	0	3	5.9	25													
28-Sep	1	Z	0	1	2	1	0	3	4	3	5	1	1	0	1	0	0	1	2	1	1	0	0	1	1.3	5													
29-Sep	1	2	Z	2	2	2	2	2	3	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	1.2	3													
30-Sep	0	0	1	Z	1	1	6	3	2	2	1	1	1	1	1	0	0	1	1	1	1	2	1	1	1.2	6													
																		0.9 1.4 1.3 1.3 1.4 1.9 2.0 3.3 3.5 2.9 4.3 3.5 2.6 3.6 3.5 2.7 1.8 1.3 1.0 0.9 1.2 0.9 1.6 1.4																		Diurnal Average			
																		4 5 5 8 7 7 9 12 17 14 25 20 10 25 21 23 15 5 4 5 8 6 19 7																		Diurnal Maximum			
Z - zerospan																		C - Calibration						M - Maintenance															



Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
ConocoPhillips - Surmont - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**ConocoPhillips - Surmont - September 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	680	99.42	99.42
21 - 40	4	0.58	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**ConocoPhillips - Surmont - September 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	13	5	10	16	15	46	11	14	34	50	130	115	92	33	42	54	680
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	13	5	10	16	15	46	11	14	34	50	130	115	92	37	42	54	684

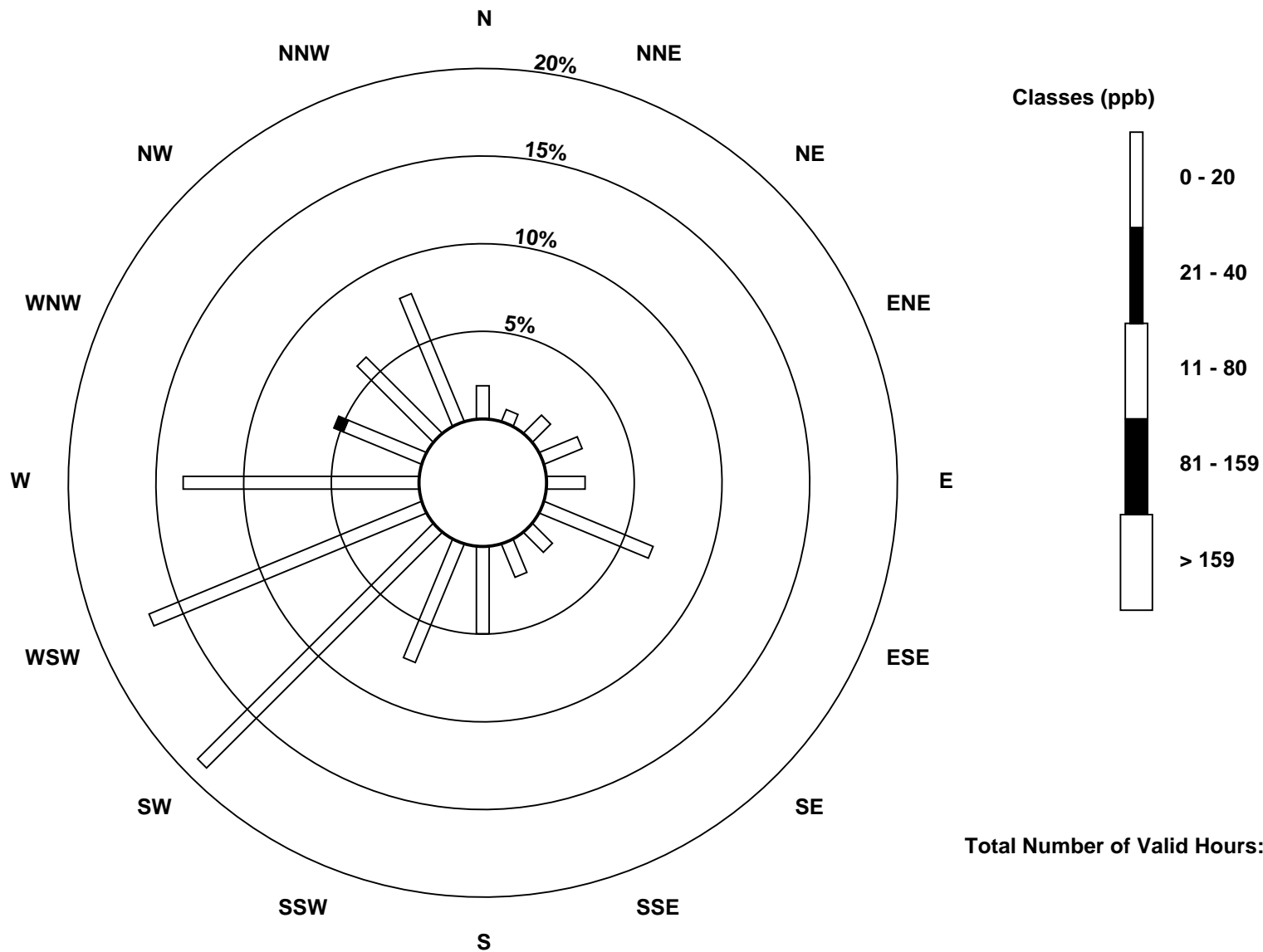
Total Number of Valid Hours: 684

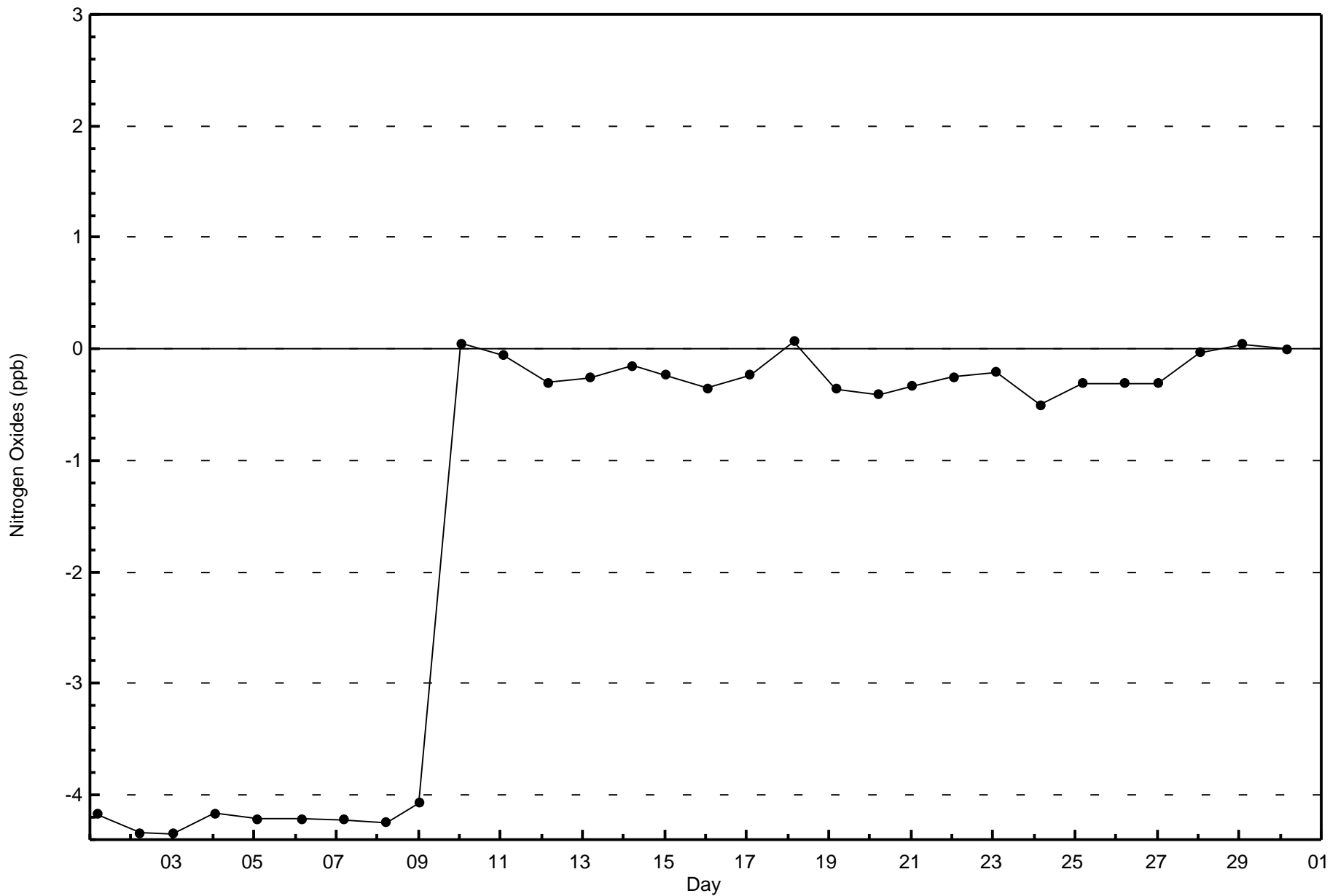
Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
ConocoPhillips - Surmont (AMS502)

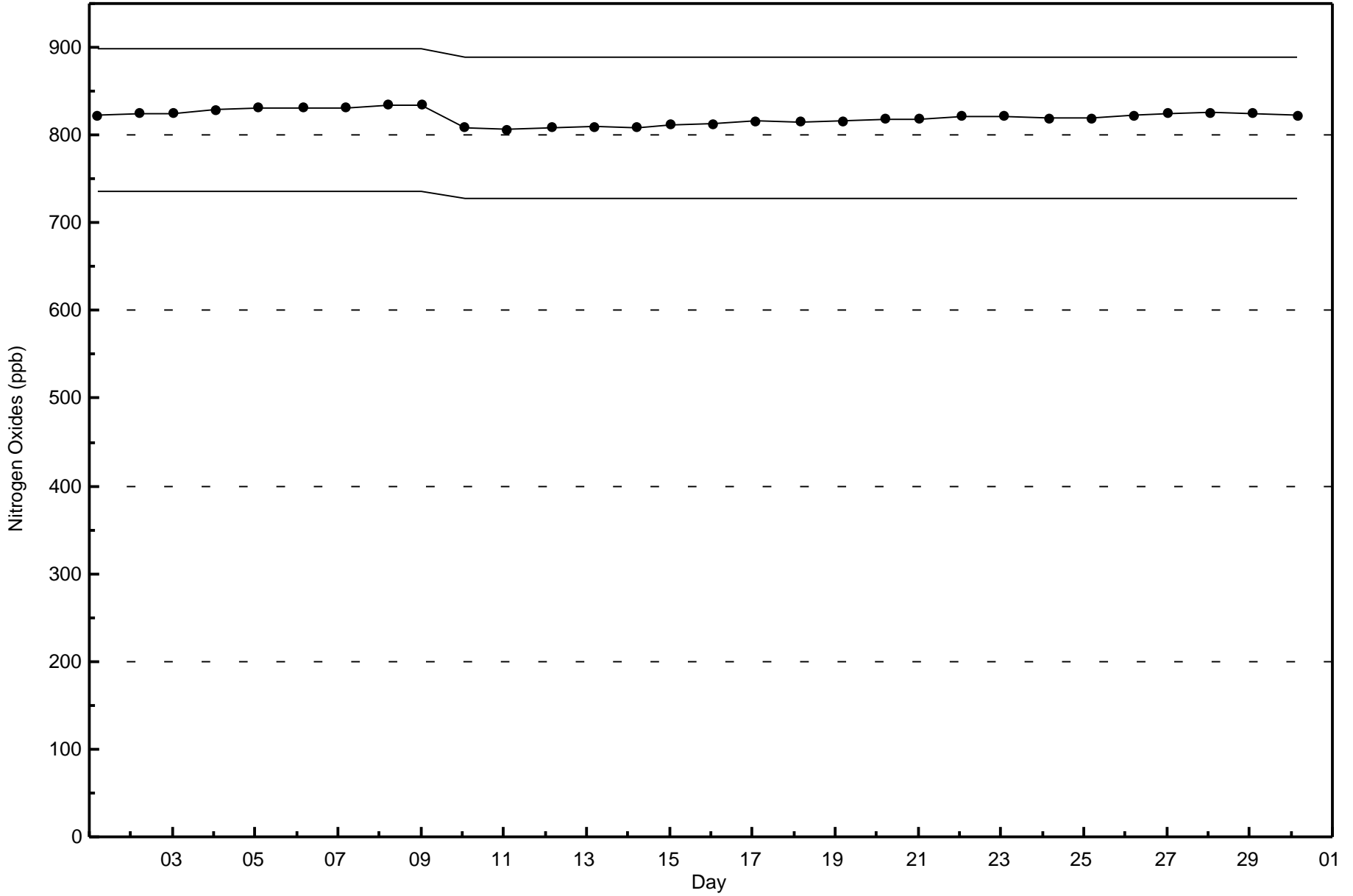






**Wood Buffalo Environmental Association**  
**Span Responses**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**ConocoPhillips - Surmont - September 2015**





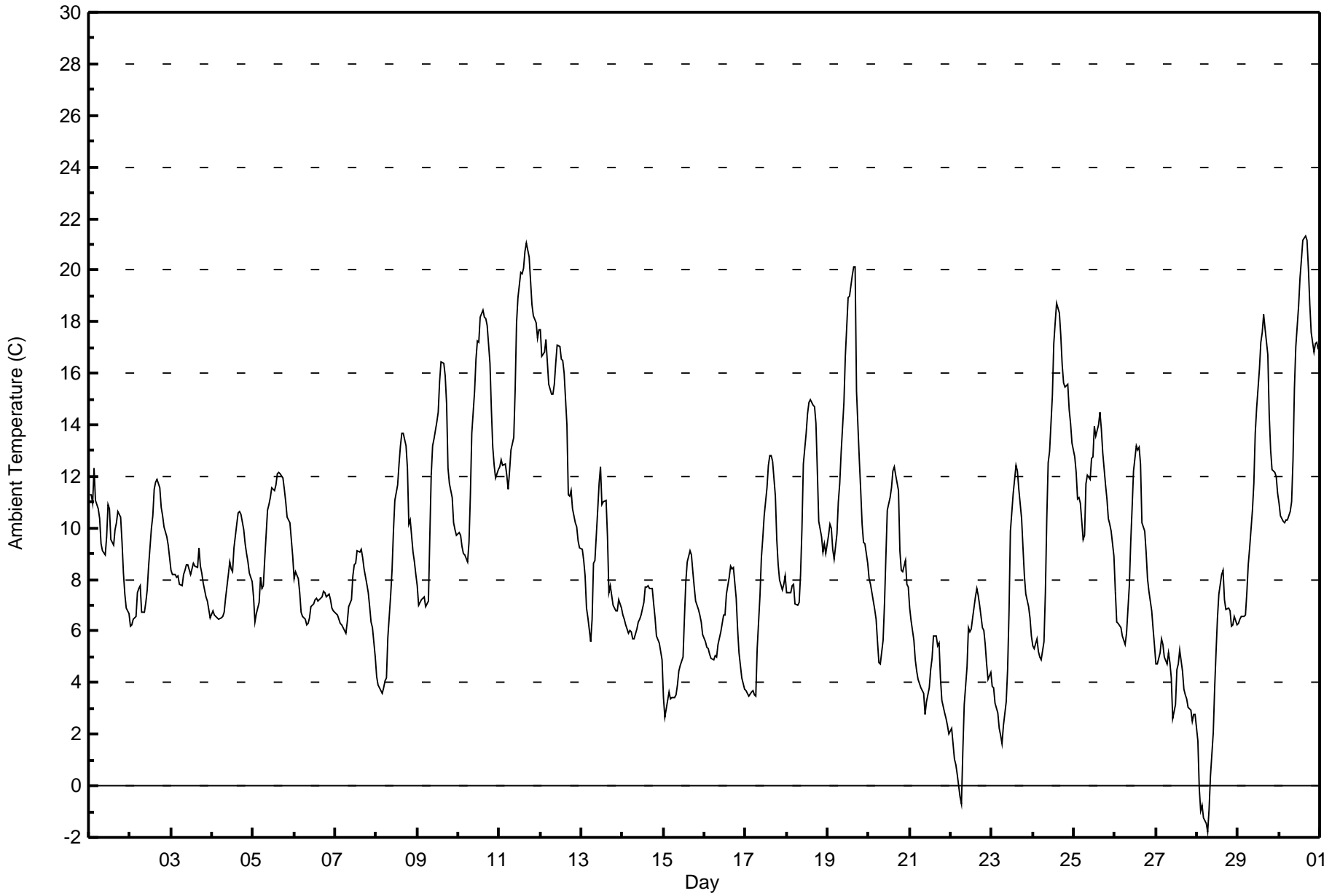


Maximum Value: 21.3 C on Sep 30 16:00		Maximum Daily Average: 16.5 C on Sep 11		Hours in Service: 720																																												
Minimum Value: -1.8 C on Sep 28 07:00		Minimum Daily Average: 3.7 C on Sep 28		Hours of Data: 720																																												
Maximum Diurnal Average: 12.4 C at hour 15		Minimum Diurnal Average: 6.4 C at hour 6		Hours of Missing Data: 0																																												
Monthly Average: 9.11 C		Percentiles: P <sub>1</sub> = -0.5 P <sub>10</sub> = 4.1 Q <sub>1</sub> = 6.4 Median = 8.3 Q <sub>3</sub> = 11.5 P <sub>90</sub> = 15.6 P <sub>99</sub> = 20.4		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-Sep	11.3	11.3	10.9	12.3	11.1	10.7	10.4	9.4	9.1	9.0	9.6	10.9	10.7	9.6	9.3	9.9	10.2	10.6	10.4	9.5	8.3	7.5	6.9	6.7	9.8	12.3																						
2-Sep	6.2	6.2	6.5	6.6	7.5	7.6	7.7	6.7	6.7	7.1	7.6	8.5	10.0	10.5	11.5	11.8	11.9	11.6	10.8	10.5	10.1	9.6	9.3	8.9	8.8	11.9																						
3-Sep	8.4	8.2	8.2	8.1	8.1	7.8	7.8	8.2	8.4	8.5	8.6	8.2	8.4	8.6	8.5	8.5	9.2	8.5	8.3	7.8	7.3	7.2	6.8	6.5	8.1	9.2																						
4-Sep	6.8	6.6	6.6	6.5	6.5	6.5	6.5	6.7	7.3	8.2	8.7	8.4	8.3	9.3	10.2	10.6	10.7	10.5	9.9	9.4	9.0	8.7	8.2	7.9	8.3	10.7																						
5-Sep	7.3	6.4	6.7	7.1	8.1	7.6	7.8	8.8	10.7	10.9	11.2	11.6	11.5	11.7	12.1	12.2	12.1	11.9	11.5	11.0	10.4	10.2	9.6	8.9	9.9	12.2																						
6-Sep	8.1	8.3	8.1	7.5	6.7	6.6	6.4	6.2	6.3	6.5	6.9	7.1	7.2	7.3	7.2	7.3	7.3	7.5	7.5	7.3	7.4	7.2	6.9	6.8	7.2	8.3																						
7-Sep	6.7	6.6	6.5	6.3	6.3	6.0	5.9	6.4	7.0	7.2	8.2	8.6	8.7	9.1	9.1	9.2	8.9	8.4	7.8	7.5	7.0	6.4	6.1	5.0	7.3	9.2																						
8-Sep	4.2	3.9	3.8	3.6	3.8	4.1	4.2	5.8	7.4	8.3	9.9	11.1	11.7	12.5	13.2	13.7	13.7	13.2	12.3	10.2	10.3	9.0	8.7	8.2	8.6	13.7																						
9-Sep	7.8	7.0	7.2	7.3	7.3	6.9	7.2	9.7	12.0	13.2	13.4	14.1	14.5	15.7	16.5	16.4	15.9	14.8	12.3	11.7	11.2	10.2	9.9	9.7	11.3	16.5																						
10-Sep	9.8	9.7	9.3	9.0	9.0	8.7	9.4	11.3	13.7	15.3	16.5	17.2	17.2	18.2	18.5	18.2	18.1	17.8	16.4	14.6	13.1	12.5	11.9	12.2	13.6	18.5																						
11-Sep	12.4	12.6	12.4	12.5	12.0	11.5	12.2	13.0	13.5	15.4	18.0	18.9	19.9	19.9	20.1	20.7	21.1	20.5	19.6	18.7	18.2	18.0	17.3	17.7	16.5	21.1																						
12-Sep	17.7	16.7	16.8	17.3	16.4	15.6	15.2	15.2	15.5	16.4	17.1	17.0	16.6	16.5	16.0	14.0	11.3	11.2	11.5	10.7	10.2	10.0	9.5	9.2	14.3	17.7																						
13-Sep	9.2	8.7	8.2	6.9	6.5	5.6	6.5	8.6	8.7	10.7	11.7	12.3	10.9	11.0	11.1	9.6	7.5	7.7	7.0	6.9	6.8	6.8	7.2	6.9	8.5	12.3																						
14-Sep	6.6	6.5	6.2	5.9	6.0	6.0	5.7	5.7	6.1	6.4	6.5	6.6	7.1	7.7	7.7	7.8	7.7	7.6	7.1	6.5	5.8	5.5	5.2	4.9	6.4	7.8																						
15-Sep	3.4	2.6	3.3	3.7	3.4	3.4	3.4	3.6	3.9	4.5	4.7	5.0	6.5	7.9	8.7	9.1	8.9	8.3	7.7	7.2	6.8	6.6	6.3	5.9	5.6	9.1																						
16-Sep	5.6	5.4	5.3	5.1	4.9	4.9	5.0	5.0	5.5	6.0	6.3	6.6	6.6	7.5	8.1	8.5	8.4	8.5	7.3	6.1	5.1	4.7	4.2	3.8	6.0	8.5																						
17-Sep	3.7	3.6	3.5	3.7	3.7	3.6	3.5	5.3	7.4	8.8	9.6	10.5	11.6	12.4	12.8	12.8	12.6	11.3	9.5	8.6	8.0	7.6	7.8	8.1	7.9	12.8																						
18-Sep	7.5	7.5	7.5	7.8	7.8	7.1	7.0	7.1	8.2	10.0	12.5	13.7	14.4	14.8	15.0	14.7	14.7	14.1	12.2	10.3	9.7	9.1	9.4	9.0	10.5	15.0																						
19-Sep	9.7	10.1	10.0	9.2	8.8	9.8	11.0	11.7	12.9	14.9	16.6	17.8	18.9	19.0	19.8	20.1	20.1	15.3	12.7	11.4	10.1	9.4	9.4	8.6	13.2	20.1																						
20-Sep	8.0	7.8	7.5	6.8	6.5	5.6	4.8	4.7	5.7	7.0	8.9	10.7	11.2	11.5	12.2	12.4	12.1	11.4	9.1	8.4	8.3	8.7	7.8	7.7	8.5	12.4																						
21-Sep	6.9	6.4	5.7	4.9	4.4	4.1	3.8	3.7	3.6	2.8	3.2	3.8	4.5	4.9	5.8	5.8	5.4	5.5	4.2	3.3	2.8	2.6	2.3	2.0	4.3	6.9																						
22-Sep	2.2	1.6	1.0	0.8	0.4	-0.4	-0.7	1.4	3.2	4.6	6.1	6.0	6.1	6.5	7.3	7.6	7.4	7.0	6.1	6.0	5.5	4.8	4.1	4.4	4.1	7.6																						
23-Sep	3.8	3.8	3.2	2.8	2.3	2.0	1.6	2.4	3.2	4.5	6.7	9.9	11.3	11.9	12.4	12.2	11.5	10.4	9.2	8.2	7.4	6.9	6.5	5.8	6.7	12.4																						
24-Sep	5.4	5.3	5.7	5.2	5.0	4.9	5.6	7.5	10.4	12.5	13.0	15.1	17.2	18.0	18.7	18.3	17.5	16.3	15.7	15.5	14.6	14.0	13.3	12.1	18.7	18.7																						
25-Sep	12.8	12.1	11.1	11.2	11.0	9.6	9.7	11.7	12.0	11.9	12.7	12.8	13.9	13.6	14.0	14.5	13.9	12.9	11.7	11.1	10.4	10.2	9.9	8.9	11.8	14.5																						
26-Sep	7.6	6.4	6.3	6.1	5.8	5.6	5.5	5.9	7.8	9.5	10.8	12.2	13.2	13.0	13.1	12.5	10.2	9.9	9.0	8.0	7.6	6.8	6.1	5.4	8.5	13.2																						
27-Sep	4.7	4.7	5.1	5.7	5.5	5.0	4.7	5.2	4.8	4.2	2.6	3.1	4.5	4.8	5.3	4.5	3.7	3.5	3.4	3.1	3.0	2.5	2.8	2.8	4.1	5.7																						
28-Sep	1.8	-0.1	-0.9	-0.7	-1.2	-1.4	-1.8	-0.9	0.4	2.1	3.8	5.2	6.5	7.4	8.2	8.4	7.2	6.8	6.9	6.8	6.2	6.3	6.6	6.3	3.7	8.4																						
29-Sep	6.3	6.5	6.6	6.6	6.6	7.5	8.6	9.2	10.7	11.7	13.7	14.7	16.2	17.2	17.6	18.3	17.7	16.7	14.4	13.0	12.3	12.1	12.0	11.4	12.0	18.3																						
30-Sep	11.0	10.5	10.3	10.2	10.3	10.3	10.6	11.0	12.6	15.4	17.0	18.6	19.7	20.4	21.1	21.3	21.1	20.1	18.7	17.6	16.8	17.2	17.2	16.9	15.7	21.3																						
																								7.4	7.1	6.9	6.9	6.7	6.4	6.5	7.2	8.2	9.1	10.1	10.9	11.5	11.9	12.4	12.4	11.9	11.3	10.3	9.6	9.0	8.6	8.3	8.0	Diurnal Average
																								17.7	16.7	16.8	17.3	16.4	15.6	15.2	15.2	15.5	16.4	18.0	18.9	19.9	20.4	21.1	21.3	21.1	20.5	19.6	18.7	18.2	18.0	17.3	17.7	Diurnal Maximum



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**ConocoPhillips - Surrmont - September 2015**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**ConocoPhillips - Surmont - September 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	9	1.25	1.25
0 - 10	450	62.50	63.75
10 - 20	250	34.72	98.47
> 20	11	1.53	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

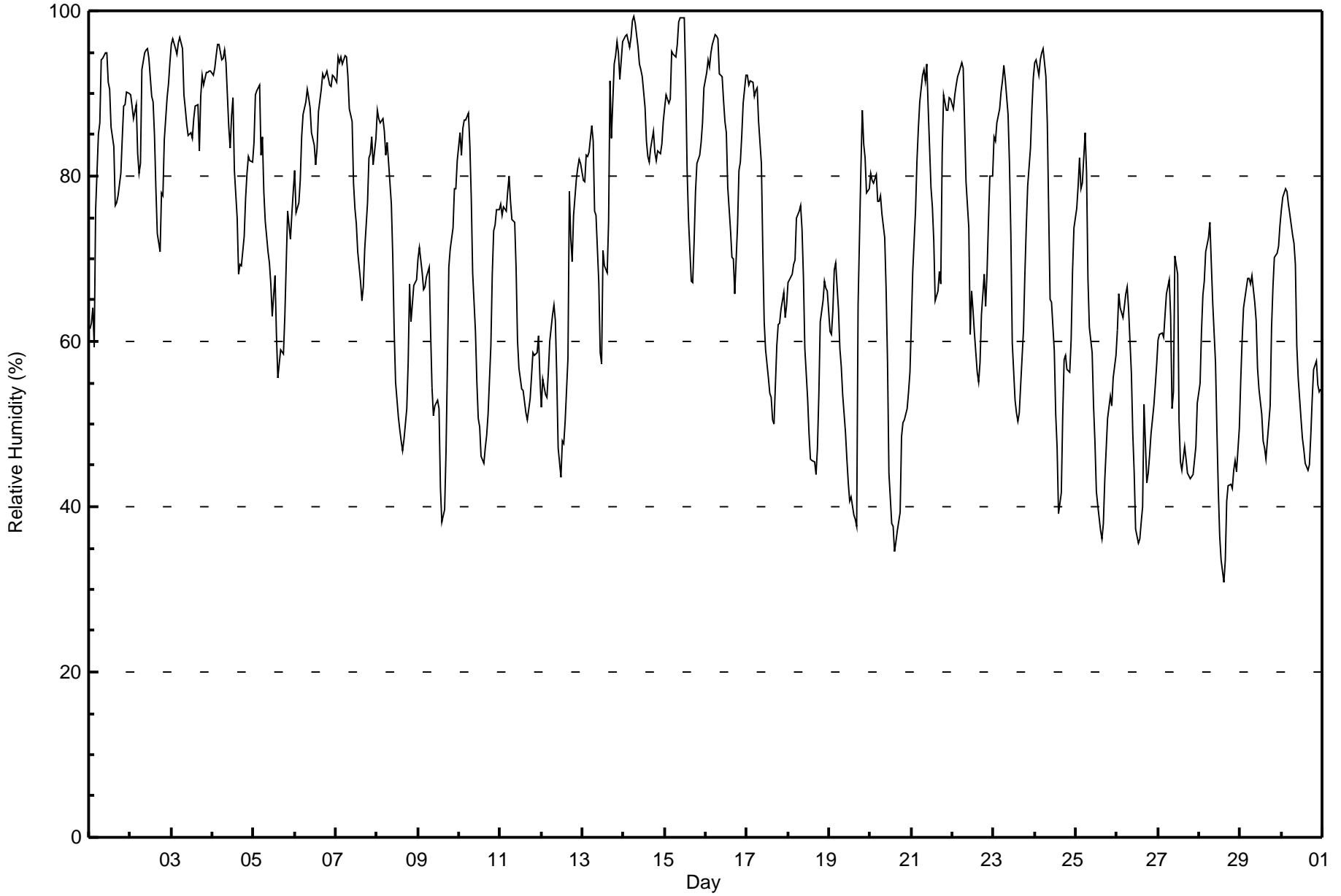


Maximum Value: 99 % on Sep 14 07:00																			Maximum Daily Average: 90.9 % on Sep 3						Hours in Service: 720																								
Minimum Value: 31 % on Sep 28 15:00																			Minimum Daily Average: 51.5 % on Sep 28						Hours of Data: 720																								
Maximum Diurnal Average: 82.9 % at hour 6																			Minimum Diurnal Average: 56.4 % at hour 16						Hours of Missing Data: 0																								
Monthly Average: 71.5 %																			Percentiles: P <sub>1</sub> = 36 P <sub>10</sub> = 47 Q <sub>1</sub> = 57 Median = 73 O <sub>3</sub> = 86 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-Sep	61	62	64	59	76	85	86	94	94	95	95	91	91	86	84	76	77	78	80	85	88	89	90	90	82.4	95																							
2-Sep	90	88	87	89	83	80	81	93	95	95	95	94	90	89	85	78	73	71	78	78	84	89	91	94	86.3	95																							
3-Sep	96	97	95	95	96	97	95	90	88	86	85	85	87	89	89	83	90	92	91	93	92	93	93	93	90.9	97																							
4-Sep	92	93	95	96	96	94	94	95	94	86	83	87	90	81	75	68	69	69	73	77	80	82	82	82	84.7	96																							
5-Sep	84	90	90	91	83	85	78	75	71	69	67	63	68	61	56	57	59	59	63	69	76	72	75	78	72.4	91																							
6-Sep	81	76	77	79	85	87	89	91	89	88	85	84	81	83	88	91	92	92	92	93	91	91	92	92	87.0	93																							
7-Sep	91	94	94	94	93	94	94	92	88	87	79	76	74	71	67	65	67	71	77	82	83	85	81	85	82.7	94																							
8-Sep	88	87	87	87	86	83	84	82	77	70	61	55	51	49	48	47	48	52	57	67	62	67	67	67	67.8	88																							
9-Sep	70	71	68	66	67	68	69	61	54	51	52	53	52	42	38	40	47	57	69	71	74	79	78	82	61.6	82																							
10-Sep	85	82	86	87	87	88	84	77	68	61	55	51	50	46	45	47	49	51	59	68	73	74	76	76	67.7	88																							
11-Sep	77	75	76	76	78	80	77	75	74	69	60	57	54	54	53	51	50	53	56	59	58	59	61	56	64.1	80																							
12-Sep	52	55	53	53	56	60	63	64	63	56	47	44	48	48	50	58	78	73	70	75	80	81	82	81	62.1	82																							
13-Sep	79	79	83	82	83	86	84	76	75	67	59	57	71	69	68	75	92	85	93	95	96	95	92	96	80.7	96																							
14-Sep	97	97	97	96	97	99	99	99	96	94	93	92	88	84	82	82	83	85	83	82	83	83	84	87	90.0	99																							
15-Sep	88	90	89	89	95	95	94	96	99	99	99	99	92	81	75	67	67	72	78	82	82	84	86	91	87.1	99																							
16-Sep	93	94	93	95	96	97	97	97	92	92	89	87	85	79	73	70	70	66	74	81	82	85	89	92	86.1	97																							
17-Sep	92	91	92	91	90	90	91	87	81	71	62	59	56	54	53	50	50	60	62	62	64	66	63	64	70.9	92																							
18-Sep	67	68	68	69	70	75	76	76	74	68	59	53	49	46	46	46	44	47	54	62	65	67	66	66	61.7	76																							
19-Sep	61	61	64	69	70	64	59	57	54	49	46	43	41	41	39	38	38	64	81	88	84	82	78	79	60.4	88																							
20-Sep	80	80	79	80	77	77	78	75	73	66	57	44	38	38	35	36	37	39	48	50	51	52	54	56	58.3	80																							
21-Sep	62	68	76	82	86	89	92	93	92	94	88	79	76	72	65	66	69	67	83	90	88	88	89	89	80.9	94																							
22-Sep	88	90	91	92	93	94	93	86	79	74	61	66	64	61	56	55	58	63	68	64	68	74	80	80	74.9	94																							
23-Sep	85	84	87	88	90	92	93	92	87	82	73	60	53	51	50	51	55	61	68	74	79	83	88	92	75.8	93																							
24-Sep	94	94	92	94	95	95	92	87	76	65	65	59	51	47	39	42	51	58	58	57	56	60	69	74	69.5	95																							
25-Sep	76	79	82	79	79	85	81	68	62	59	52	48	42	40	37	36	38	43	51	52	53	52	56	58	58.6	85																							
26-Sep	61	66	64	63	64	66	67	64	56	49	44	37	36	36	38	40	52	43	44	46	49	52	55	57	52.0	67																							
27-Sep	60	61	61	61	63	66	67	63	52	54	70	68	50	45	44	47	46	44	44	43	44	46	47	53	54.2	70																							
28-Sep	55	61	66	67	71	73	74	70	65	57	49	42	36	34	31	34	41	43	43	42	44	46	44	50	51.5	74																							
29-Sep	55	60	64	66	68	68	67	68	65	62	57	54	51	48	47	46	48	52	62	67	70	71	71	74	60.9	74																							
30-Sep	76	77	78	78	77	75	73	72	69	60	56	51	48	47	45	44	45	49	53	57	58	55	54	54	60.4	78																							
																								77.9	79.0	79.9	80.5	81.6	82.9	82.4	80.4	76.7	72.5	68.2	64.6	62.0	59.0	56.7	56.4	59.1	61.9	67.1	70.3	72.0	73.4	74.5	76.3	Diurnal Average	
																								97	97	97	96	97	99	99	99	99	99	99	99	92	89	89	91	92	92	93	95	96	95	93	96	Diurnal Maximum	



Wood Buffalo Environmental Association  
Hourly Averages

Relative Humidity (RH) - %  
ConocoPhillips - Surmont - September 2015





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**ConocoPhillips - Surmont - September 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	23	3.19	3.19
40 - 60	180	25.00	28.19
60 - 80	243	33.75	61.94
80 - 100	274	38.06	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

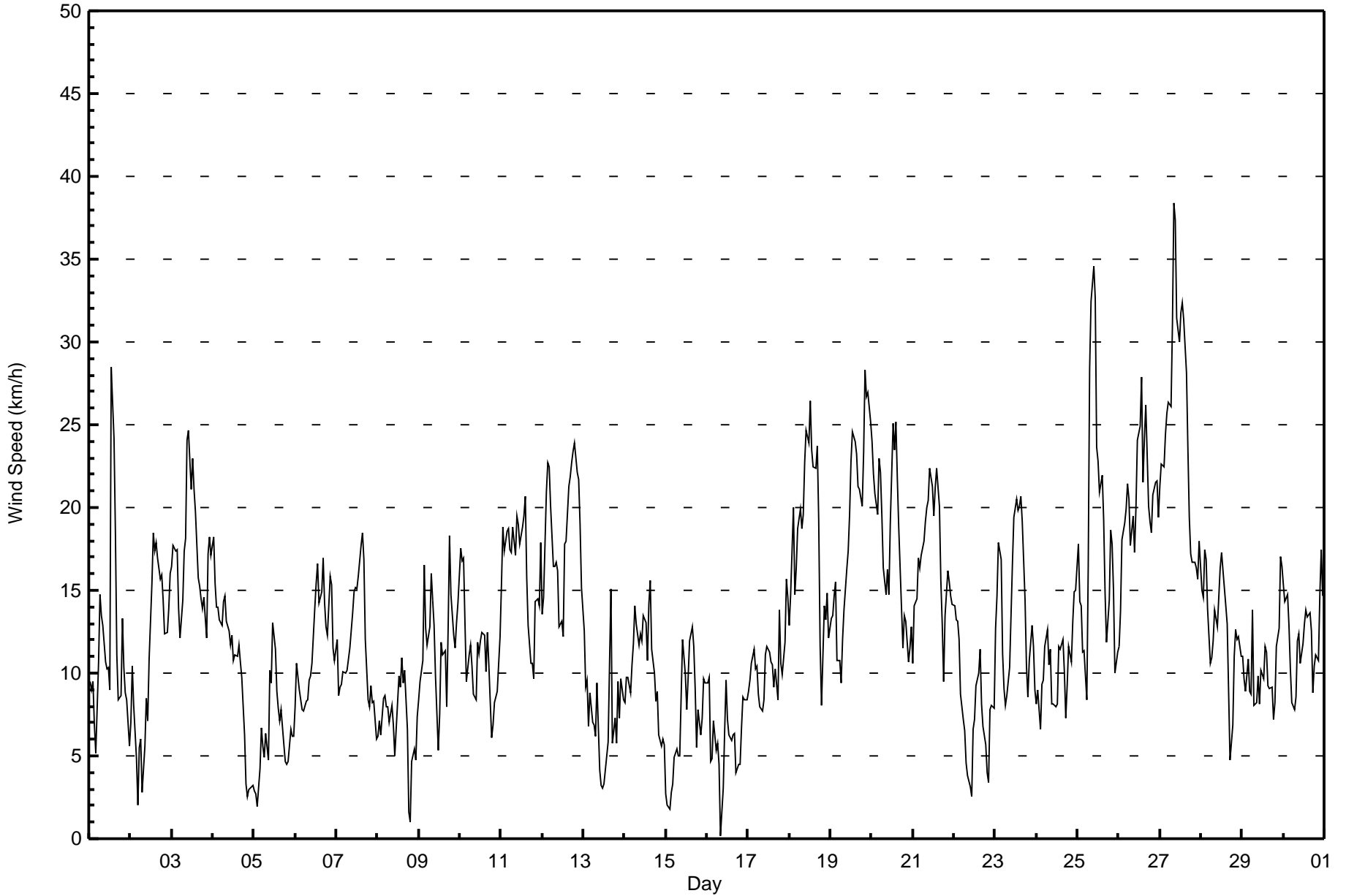


Maximum Speed: 38 km/h on Sep 27 09:00	Maximum Daily Speed Average: 23.9 km/h on Sep 27	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 16 09:00	Minimum Daily Speed Average: 1.6 km/h on Sep 16	Hours of Data: 720
Maximum Diurnal Speed Average: 9.8 km/h at hour 3	Minimum Diurnal Speed Average: 5.7 km/h at hour 18	Hours of Missing Data: 0
Monthly Average Velocity: 7.9 km/h 249.4 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 6 Q <sub>1</sub> = 9 Median = 12 Q <sub>3</sub> = 17 P <sub>90</sub> = 21 P <sub>99</sub> = 31	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	SSW10	SSW9	SW9	S7	WSW5	WNW11	NW15	NNW13	NNW13	N11	NNW10	WNW10	WNW9	WNW28	W24	W18	WSW11	SW8	SW9	WSW13	WSW10	SW9	WSW8	WSW6	W8.4	WNW28
2-Sep	SSW7	SSW10	SW8	W5	ENE2	ESE6	E6	N3	NE6	ENE8	ENE7	NNE11	N15	N18	N17	N18	N17	NNW16	NNW16	NNW14	NNW12	NNW12	NW14	NW16	N7.4	N18
3-Sep	NNW16	NW18	NW17	NW17	NW14	WNW12	W14	W17	W18	W24	W25	W21	W23	W21	W20	W16	W15	WSW15	WSW14	WSW15	W12	W17	W18	W17	W16.1	W25
4-Sep	W18	W15	W14	W14	W13	W13	W14	W15	W13	WNW13	NNW12	NNW12	NNW11	NNW11	NW11	NW12	NNW11	NNW10	N6	NE3	ENE3	S3	S3	S3	WNW8.0	W18
5-Sep	S3	SW3	SSW2	SSE4	SSE7	S6	S5	SE6	S5	ESE10	ESE9	ESE13	ESE11	ESE9	ESE8	ESE7	ENE8	NE6	NE5	N4	NNW5	NNW7	NW6	WNW6	ESE3.0	ESE13
6-Sep	WNW8	NW11	NW9	NW8	NNW8	NNW8	NW8	NW8	NNW10	NNW10	NNW11	NW14	NNW15	NW17	NW14	NW15	NW17	NNW14	NNW13	NW12	NW16	NW15	NW12	NW11	NW11.7	NW17
7-Sep	NW12	WNW9	W9	W9	WNW10	W10	W10	WNW11	NW12	NNW14	NW15	NNW15	NW15	NW16	NW18	NW18	NW17	NNW12	NW8	WNW8	WNW9	W8	W8	W6	NW10.9	NW18
8-Sep	WSW6	WSW7	WSW6	WSW9	WSW9	WSW8	WSW8	W7	W8	W7	NNW5	NNW7	NNW10	NNW9	NNW11	N9	N10	NNE7	NNW2	SSE1	ESE5	SE5	S5	S7	WNW3.3	NNW11
9-Sep	SSW8	SSW10	SSW11	SW17	SW13	SW12	SW13	SW16	SW14	SW13	SW10	S5	SSE8	S12	SSW11	SW11	SW8	SW13	SW18	SW15	SW12	SW11	SW13	SW14	SW11.5	SW18
10-Sep	SW18	WSW17	SW17	SW13	SW9	SW11	SW12	SW10	SW9	SSW8	SW12	SW11	SW12	SW12	SW12	SW10	SW12	SW11	SSW6	SSW7	SSW8	SW9	SW9	SW12	SW11.0	SW18
11-Sep	SW15	SW19	SW17	SW19	SW19	SW17	SW17	SW19	SW17	WSW19	WSW19	WSW18	WSW19	WSW19	WSW21	WSW16	WSW13	SW11	SW11	SW10	SW14	SW14	SW14	WSW18	SW16.3	WSW21
12-Sep	WSW14	SW15	WSW21	WSW23	WSW22	WSW20	W16	W16	W17	W16	WNW13	W13	WSW12	WSW18	W18	W21	WSW22	WSW23	WSW23	WSW24	WSW22	WSW22	WSW19	W15	WSW18.2	WSW24
13-Sep	WNW13	WNW9	WNW10	W7	WNW9	WSW7	W7	WNW6	NNW9	NNW4	NE3	NNE3	NNW3	E4	SSE6	WSW11	W15	NNW6	WSW7	NW6	WNW9	W7	NW10	WNW8	WNW5.7	W15
14-Sep	W8	W10	W10	W9	WNW10	NW12	NW14	NNW13	NNW12	NNW12	NNW13	NNW13	NNW11	NNW14	NNW16	NNW11	NNW10	NNW8	NW9	NNW6	NNW6	NW6	WNW6	WNW6	NW9.7	NNW16
15-Sep	W3	W2	NNE2	NE3	E3	ESE5	ESE5	E5	ENE5	E9	ESE12	ENE10	ENE8	ENE10	NE12	ENE13	ENE12	ENE9	E6	E8	E6	ESE7	ESE10	SE9	E6.2	ENE13
16-Sep	SE9	SE10	SSE5	NW5	NNW7	NNW5	NNW6	N4	N0	E3	ENE7	NE10	NE7	ENE6	ENE6	NNE6	NE6	ENE4	SE4	SSW4	SSW7	SSW9	SSW8	SSW8	E1.6	SE10
17-Sep	SSW9	SSW10	SSW11	SW11	SW10	SW10	SSW9	SW8	SSW8	SSW8	SSW11	SSW12	S11	SSW11	SSW10	SSW9	S10	SSW8	SW14	SW11	SW10	SW12	SW16	SW15	SSW10.2	SW16
18-Sep	SW13	SW15	SW20	SW15	SW16	SW19	SW20	SW19	WSW20	WSW23	SW25	WSW24	WSW26	WSW23	WSW22	WSW22	WSW24	WSW19	WSW12	SW8	SW14	SW13	SW15	SW12	SW18.0	WSW26
19-Sep	SW13	SW13	SW15	SW15	SW11	SW11	SSW9	SSW12	SSW14	SW16	SW17	SW20	SW23	SW25	SW24	SW23	SW21	W21	W20	W23	WSW28	WSW27	WSW27	WSW25	SW18.1	WSW28
20-Sep	WSW24	WSW22	SW21	SW20	WSW23	WSW22	WSW19	SW16	SW15	WSW16	SW15	SW19	WSW25	WSW23	WSW25	WSW22	WSW19	WSW14	WSW12	WSW13	WSW13	W11	WSW12	W13	WSW17.9	WSW25
21-Sep	W11	W14	W14	W17	W16	W17	W18	WNW19	WNW20	NW20	NW22	WNW21	NW19	WNW21	WNW22	WNW20	W16	WNW13	WNW9	WSW13	WSW16	WSW15	WSW15	WSW14	W16.0	WNW22
22-Sep	WSW14	WSW13	WSW13	W12	WSW9	SW7	SW7	SW5	SSE4	SSE3	SSW3	ENE7	E7	E9	ESE10	ESE11	E8	E7	E6	SE4	S3	SSW8	SSW8	S8	S3.1	WSW14
23-Sep	ESE13	SE15	SE18	SE17	ESE11	ESE9	ESE8	ESE9	ESE10	ESE13	ESE17	ESE19	ESE21	ESE20	ESE20	ESE21	ESE19	ESE14	ESE10	ESE9	ESE11	ESE13	ESE12	ESE9	ESE13.9	ESE21
24-Sep	ESE8	ESE9	SSE7	S9	S10	S12	S13	SSW10	SW11	SW8	ESE8	SE8	SE8	E12	ESE11	ESE12	ESE10	ESE7	ESE9	ESE12	SSE11	SE13	SSE15	SSE15	SE8.6	SSE15
25-Sep	SSE18	SSE14	S14	S11	SSE11	S8	WSW16	W28	WNW32	W35	WNW33	WNW24	W23	WSW21	W22	WSW19	WSW15	SW12	SW14	SW19	WSW18	WSW15	WSW10	SW11	WSW14.6	W35
26-Sep	SW12	SW14	SW18	SW19	SW20	WSW21	WSW21	SW18	WSW19	WSW17	WSW20	WSW24	WSW25	WSW28	SW22	SW24	WSW26	WSW20	WSW19	WSW18	WSW21	WSW22	WSW22	WSW19	WSW20.1	WSW28
27-Sep	SW21	SW23	SW22	WSW24	WSW26	WSW26	WSW26	WSW31	W38	W37	WNW31	W30	W32	WNW32	WNW31	WNW28	WNW24	W19	W17	WSW17	WSW17	WSW16	W16	W18	W23.9	W38
28-Sep	W15	WSW15	WSW17	W17	W14	W11	W11	W12	W14	W13	W15	W16	WSW17	W16	WSW14	W13	WSW9	SSW5	S7	S11	S13	S12	S12	S11	WSW10.4	WSW17
29-Sep	S11	S10	S9	S11	S9	SSW9	SW14	W8	W8	WSW10	SW8	SW10	SW10	WSW12	WSW11	SW9	WSW9	SW9	SSW7	SSW8	SW12	SW13	SW17	SW16	SW9.4	SW17
30-Sep	SW15	SW14	SW15	SW13	SW10	SSW8	SSW8	S9	SSW12	S12	SSW11	SSW12	SSW13	SSW14	SSW13	SSW14	SSW13	S9	SSE10	S11	SSW11	SSW15	SW17	SW15	SSW11.7	SW17

SW8.3	SW8.9	SW9.8	WSW9.5	WSW8.5	WSW8.8	WSW9.0	WSW9.0	W9.1	W7.9	W6.9	W7.0	W7.8	W8.5	W8.4	W7.9	W7.1	W5.7	WSW5.8	WSW6.5	WSW7.8	WSW8.1	WSW8.7	WSW8.7	WSW8.7	Diurnal Average
WSW24	WSW23	WSW22	WSW24	WSW26	WSW26	WSW26	WSW31	W38	W37	WNW33	W30	W32	WNW32	WNW31	WNW28	WSW26	WSW23	WSW23	WSW24	WSW28	WSW27	WSW27	WSW25	WSW25	Diurnal Maximum

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







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**ConocoPhillips - Surmont - September 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	55	7.64	7.64
6 - 11	273	37.92	45.56
12 - 19	288	40.00	85.56
20 - 28	93	12.92	98.47
29 - 38	11	1.53	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**ConocoPhillips - Surmont - September 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	2	4	4	4	3	3	5	9	4	2	1	3	0	2	5	55
6 - 11	4	3	5	10	10	28	6	7	21	37	42	20	23	19	13	25	273
12 - 19	5	0	1	2	1	12	4	4	8	11	78	54	50	6	27	25	288
20 - 28	0	0	0	0	0	4	0	0	0	0	16	48	14	9	2	0	93
29 - 38	0	0	0	0	0	0	0	0	0	0	0	1	5	5	0	0	11
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	13	5	10	16	15	47	13	16	38	52	138	124	95	39	44	55	720

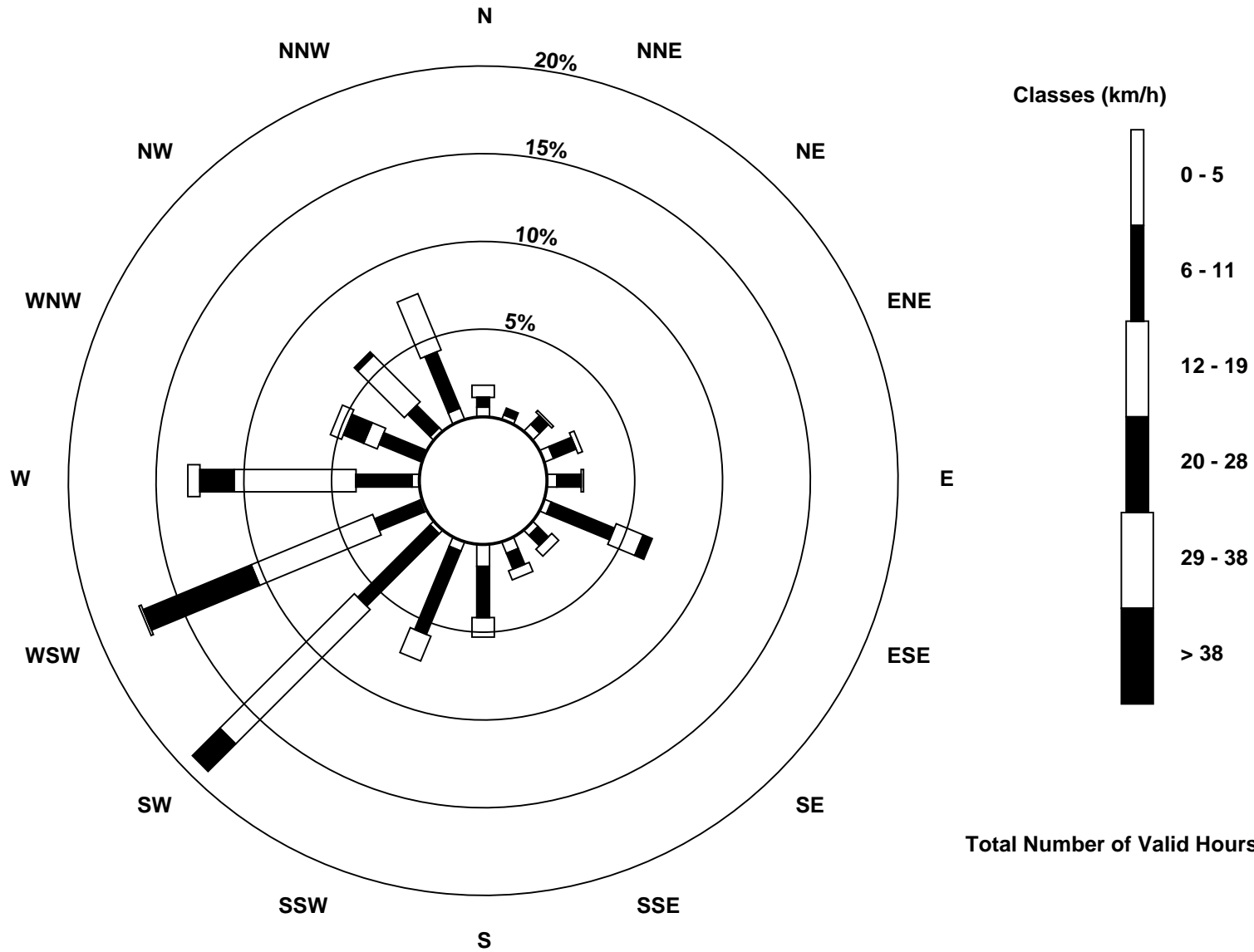
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Sep 2015

Wind Speed (WS) - km/h  
ConocoPhillips - Surmont (AMS502)





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

Diurnal Maximum



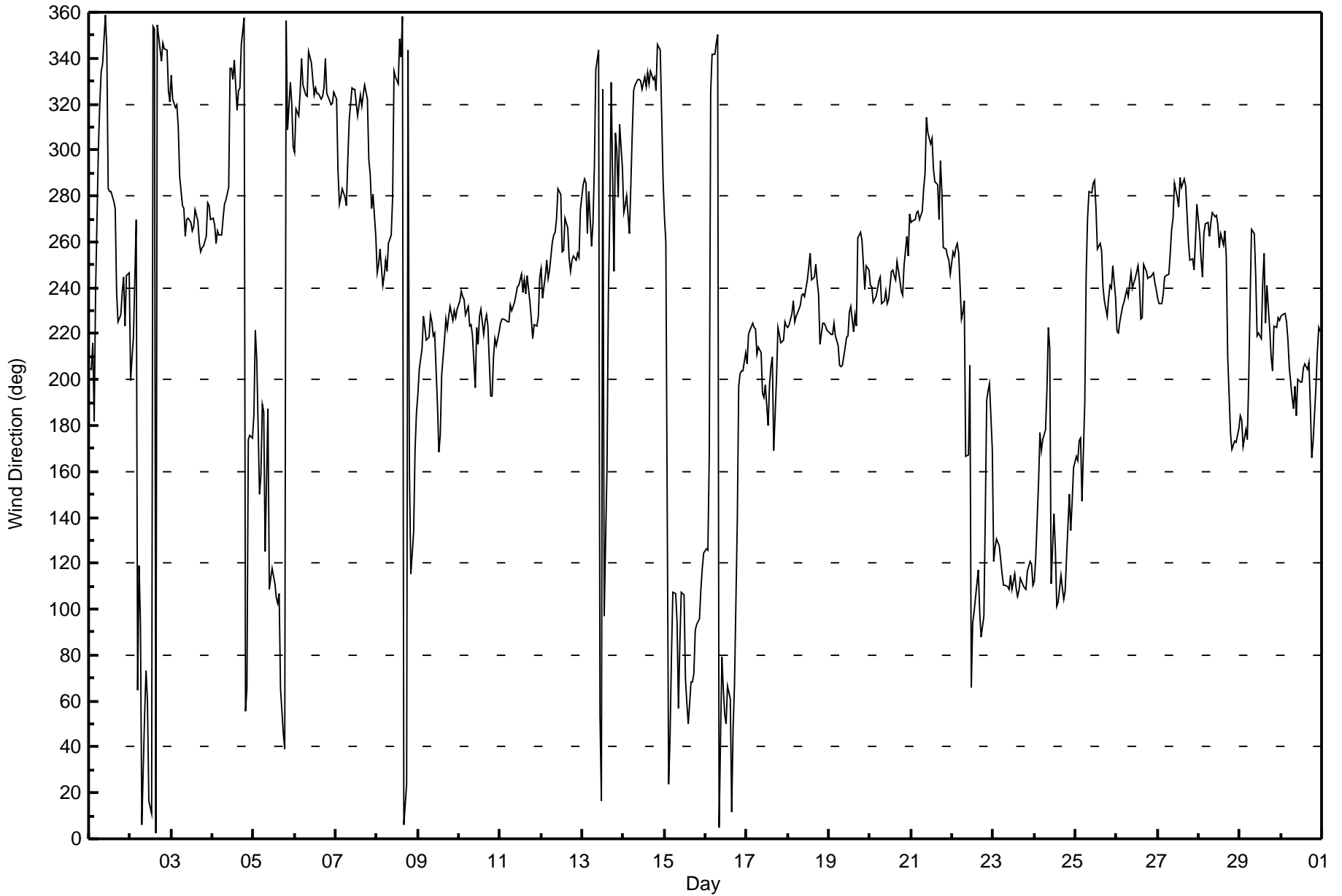
Direction of Maximum Speed: 265 deg on Sep 27 09:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 263.2 deg on Sep 27		Hours of Data:	720
Direction of Minimum Speed: 5 deg on Sep 16 09:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 1.6 deg on Sep 16		Percent Operational Time:	100.0
Monthly Average Direction: 257.7 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	205	204	216	182	238	301	321	334	337	359	344	283	282	282	277	275	238	225	228	238	245	223	245	246	270.3
2-Sep	200	209	218	270	65	119	94	6	54	73	61	17	11	354	353	2	354	344	339	347	344	344	326	321	352.6
3-Sep	333	322	319	320	310	288	276	275	262	269	270	269	265	267	274	269	260	256	258	258	263	277	276	270	278.3
4-Sep	270	267	259	265	263	263	271	276	278	283	336	335	331	339	317	326	327	346	358	56	66	174	176	175	293.4
5-Sep	185	221	209	150	159	189	186	125	187	109	114	118	111	105	102	107	65	46	39	356	309	329	320	301	112.0
6-Sep	299	318	315	326	340	329	324	323	343	340	338	324	327	325	324	322	323	327	340	324	321	320	321	325	325.6
7-Sep	322	291	276	279	283	280	276	295	313	327	326	327	320	315	324	319	324	329	322	296	289	275	281	263	307.2
8-Sep	246	250	257	241	245	252	247	260	263	279	335	332	329	348	340	358	6	24	343	159	115	133	169	186	289.1
9-Sep	193	204	213	227	223	217	219	228	225	219	220	189	168	176	202	217	226	222	228	232	226	230	227	231	218.2
10-Sep	234	238	236	235	228	232	223	224	219	196	223	216	228	231	220	225	228	223	193	193	210	218	215	221	223.9
11-Sep	225	226	226	226	225	225	233	230	234	237	240	241	246	238	243	238	245	234	226	218	224	223	228	245	232.9
12-Sep	248	235	245	252	244	248	260	263	264	270	283	281	256	257	270	266	253	247	252	254	252	255	253	274	256.5
13-Sep	285	288	285	263	282	258	268	293	335	344	54	16	327	97	161	237	275	330	247	308	300	279	311	292	287.3
14-Sep	273	276	280	264	285	307	326	328	331	331	330	327	332	328	334	329	334	331	332	326	346	344	316	288	318.8
15-Sep	271	260	24	45	79	108	107	94	57	85	107	106	69	59	50	69	68	72	91	93	96	109	118	124	85.6
16-Sep	126	126	168	325	342	341	347	350	5	79	65	54	50	66	61	12	48	67	138	197	202	204	204	212	83.4
17-Sep	207	220	221	225	223	222	211	214	212	194	192	198	180	198	206	210	169	201	223	220	216	217	225	224	210.3
18-Sep	223	224	229	234	225	228	231	233	237	237	236	244	249	255	243	245	250	243	238	215	225	224	223	221	236.0
19-Sep	220	219	220	225	219	215	206	206	206	214	218	219	229	232	221	228	224	262	264	261	250	239	250	248	232.5
20-Sep	241	241	234	236	239	243	245	233	234	238	233	235	247	248	245	243	252	244	238	237	250	263	254	272	242.8
21-Sep	269	269	270	273	274	270	273	283	290	314	308	303	305	292	286	285	270	296	282	257	257	254	252	246	280.3
22-Sep	255	254	258	259	255	226	229	234	166	167	206	66	94	99	111	117	99	88	97	141	191	195	198	169	189.0
23-Sep	121	127	130	128	121	115	111	110	110	109	115	109	115	110	106	108	114	111	109	109	116	121	120	111	114.8
24-Sep	112	123	155	177	169	174	178	196	223	214	111	142	126	101	103	115	109	104	108	123	150	134	147	162	143.6
25-Sep	166	165	173	175	147	190	246	270	282	281	286	287	275	257	259	256	240	234	228	235	241	240	249	235	249.3
26-Sep	221	220	225	232	233	237	239	236	246	240	243	244	249	242	226	227	250	247	244	245	245	246	242	239	239.2
27-Sep	235	233	233	237	244	245	246	255	265	270	286	280	275	288	284	287	284	272	259	252	253	248	260	276	263.2
28-Sep	263	253	245	264	268	269	262	268	273	271	271	267	258	264	258	265	253	210	177	170	171	174	173	179	246.6
29-Sep	184	183	171	178	174	200	234	265	264	245	219	220	218	242	255	225	241	222	210	204	224	222	227	226	219.8
30-Sep	228	228	229	225	217	205	192	187	197	185	200	199	199	205	207	205	207	188	166	174	197	212	223	221	206.2

235.0 233.9 234.9 239.2 240.2 240.9 247.1 255.4 260.7 260.6 265.2 264.2 263.2 264.7 263.3 262.1 262.4 260.9 246.5 241.1 241.4 236.9 239.3 240.4

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

ConocoPhillips - Surmont - September 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 96 deg on Sep 16 09:00			Hours of Data:	720
Minimum Value: 6 deg on Sep 20 19:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 9 Q <sub>1</sub> = 11 Median = 14 Q <sub>3</sub> = 19 P <sub>90</sub> = 29 P <sub>99</sub> = 67				

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	14	15	9	52	67	21	15	22	25	22	17	31	58	12	13	15	13	19	16	11	10	19	24	47	67
2-Sep	20	11	14	25	53	18	25	66	25	16	26	17	18	16	17	16	16	14	13	15	15	14	11	10	66
3-Sep	18	11	12	12	15	15	10	10	11	11	12	14	11	12	12	11	14	11	11	10	12	9	9	9	18
4-Sep	9	13	9	10	11	11	9	9	11	20	22	17	25	22	30	22	23	16	15	17	41	30	32	26	41
5-Sep	40	57	72	47	19	27	39	20	37	21	20	15	16	21	28	27	20	15	10	24	16	11	13	18	72
6-Sep	16	9	13	23	22	15	14	21	18	17	16	10	11	10	9	9	8	12	12	11	9	9	9	13	23
7-Sep	7	22	9	11	12	11	8	18	21	9	15	16	19	15	11	13	11	11	23	18	14	11	13	10	23
8-Sep	11	8	9	11	6	8	9	12	10	31	59	53	35	38	24	30	23	16	67	85	20	22	28	22	85
9-Sep	16	13	14	8	11	13	13	10	13	15	18	46	35	24	29	21	16	17	11	8	10	11	9	10	46
10-Sep	8	7	7	7	9	7	9	10	16	25	23	23	17	25	18	20	17	16	20	16	11	12	14	12	25
11-Sep	10	8	8	8	9	10	8	9	11	12	13	13	12	13	13	13	13	11	13	13	10	11	12	8	13
12-Sep	13	9	9	8	9	10	11	10	10	11	17	15	13	13	14	10	13	10	9	9	10	10	9	10	17
13-Sep	12	14	13	15	14	20	11	36	17	69	76	82	92	32	40	29	10	18	20	49	26	16	18	24	92
14-Sep	8	21	20	12	13	22	9	12	12	12	14	12	15	23	15	13	15	17	16	10	13	14	22	22	23
15-Sep	31	44	30	31	25	11	11	16	22	19	15	15	29	21	22	19	16	20	14	12	9	11	10	10	44
16-Sep	10	11	37	47	19	13	16	12	96	67	22	22	23	31	35	34	21	39	29	21	18	9	11	12	96
17-Sep	11	13	12	10	10	10	12	14	19	26	31	27	29	29	24	25	26	28	14	13	15	15	10	11	31
18-Sep	12	11	8	14	11	9	8	10	10	10	13	15	14	17	14	13	12	12	16	13	10	10	11	13	17
19-Sep	14	15	14	11	14	16	16	17	19	20	20	20	20	16	17	15	17	16	11	11	12	9	10	9	20
20-Sep	9	9	9	9	8	9	9	12	12	13	17	16	14	14	14	15	11	11	6	9	8	10	7	9	17
21-Sep	9	9	10	9	9	10	11	11	14	16	16	19	22	18	19	17	13	34	39	9	9	11	9	9	39
22-Sep	9	9	9	10	18	36	16	29	33	60	69	37	33	26	23	16	14	10	9	38	34	16	14	33	69
23-Sep	11	12	9	10	9	9	10	11	12	13	14	15	18	14	15	14	13	12	14	10	10	10	9	10	18
24-Sep	14	12	19	17	16	16	18	17	19	39	30	28	37	16	19	12	10	8	8	13	20	14	14	16	39
25-Sep	14	19	16	19	21	33	15	10	11	12	13	15	16	15	14	13	12	12	11	8	10	14	19	11	33
26-Sep	13	13	9	8	8	8	8	9	10	13	15	16	17	14	18	19	13	12	11	11	10	9	9	10	19
27-Sep	8	9	9	9	10	10	11	11	12	13	17	13	13	15	15	15	16	12	11	9	9	9	13	10	17
28-Sep	10	8	9	14	13	10	8	16	11	16	19	20	21	18	23	16	13	16	16	16	15	17	17	18	23
29-Sep	19	18	17	18	18	26	17	21	25	20	26	28	35	27	19	25	22	14	11	12	11	11	9	9	35
30-Sep	8	7	8	10	14	17	13	19	19	21	26	27	25	27	29	24	20	22	14	17	18	16	11	13	29

	40	57	72	52	67	36	39	66	96	69	76	82	92	38	40	34	26	39	67	85	41	30	32	47	
	Diurnal Maximum																								



# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	September 9, 2015	Last Calibration	August 18, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	13:28
Gas Cert Reference	LL104215	Station temp.	21 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	12-Feb-18
Calibrator Make/Model	API T700	Serial Number	622
ZAG Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	726	709
Analyzer IP address	192.168.1.43		Lamp voltage	2358	2314
Calculated slope	1.001567	1.003413	Chamber temp	50.0	50.0
Calculated intercept	-0.351569	-1.033109	Pressure	22.1	22.0
Analyzer Background	19.3	19.3	Flow	0.554	0.551
Analyzer Coefficient	1.015	1.015	Intensity	58	57

Analyzer make API T100 Analyzer serial # 598

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	83.2	803.7	801.4	1.003
calibrator zero	5000	0.0	0.0	0.5	----
high point	5000	83.2	803.7	801.4	1.003
second point	5000	41.6	401.9	402.8	0.998
third point	5000	20.8	200.9	201.1	0.999
as left zero	5000	0.0	0.0	0.1	----
as left span	6000	99.9	804.2	798.7	1.007
Average Correction Factor					1.000

Corrected As found 801.3 Previous response 802.8 % change 0.2%

**Notes:**

Inlet filter replaced after as founds. No Adjustments.

Calibration Performed By: Asad Hidayat





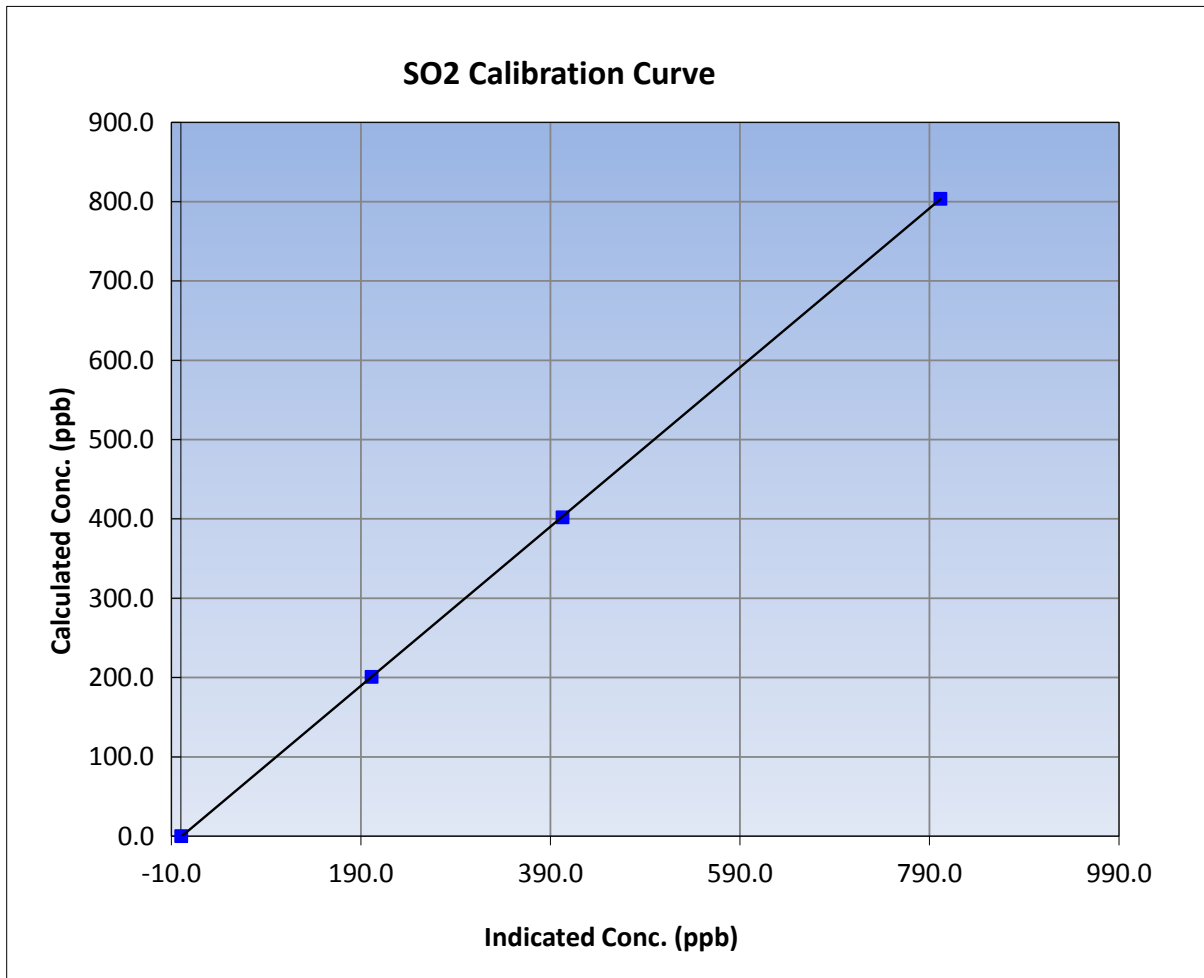
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 18, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Start Time (MST)	9:15	End Time (MST)	13:28
Analyzer make	API T100	Analyzer serial #	598

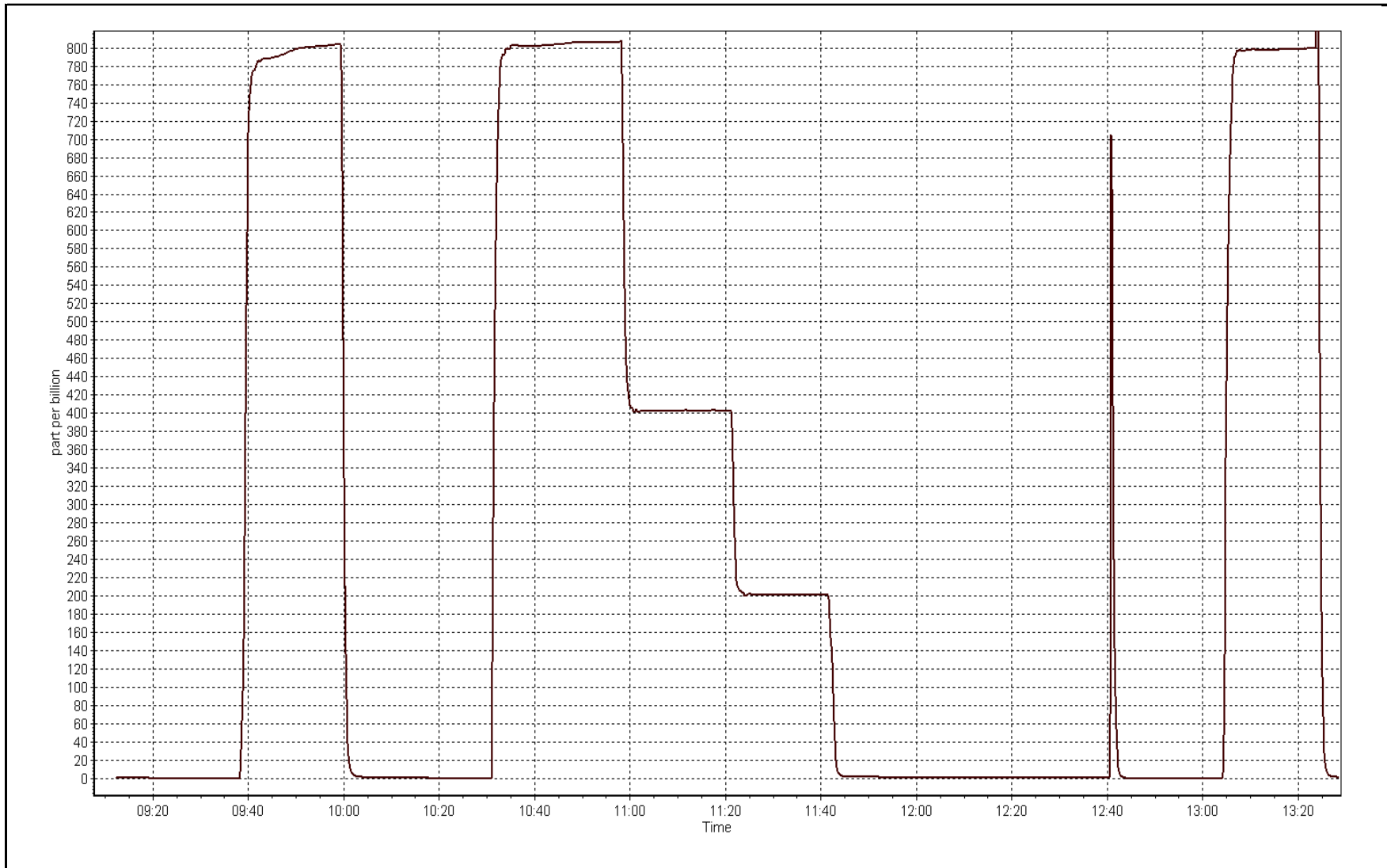
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999993
803.7	801.4	1.0029		
401.9	402.8	0.9976	Slope	1.003413
200.9	201.1	0.9991		
			Intercept	-1.033109



SO2 Calibration Plot

Date: September 9, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	September 11, 2015	Last Calibration	August 17, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:15
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	51.1 ppm	SO2 gas cert/exp	LL110503 April-1-2016

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	81	80
Analyzer IP address	192.168.1.75		Lamp voltage	2267	2218
Calculated slope	0.999826	0.992310	Chamber temp	50	50
Calculated intercept	0.021809	-0.166537	Pressure	22.9	22.8
Analyzer Background	20.6	20.6	Flow	0.579	0.565
Analyzer Coefficient	0.930	0.93	Intensity	50	49
			Converter temp.	315	315

Analyzer make/model	API T101	Analyzer serial #	197
Converter make/model	N/A	Converter serial #	N/A

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	38.5	80.1	80.9	0.989
SO2 scrubber check	5000	20.7	211.6	3.5	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	38.5	80.1	80.9	0.989
second point	5000	19.3	40.1	40.5	0.991
third point	5000	12.1	25.2	25.5	0.986
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	38.5	80.1	80.4	0.997
Average Correction Factor					0.989

Corrected As found	80.7	Previous response	80.1	% change	-0.8%
--------------------	------	-------------------	------	----------	-------

Notes:

Scrubber check done after as founds. Inlet filter replaced after sox scrubber check. No adjustments.

Calibration Performed By: Asad Hidayat



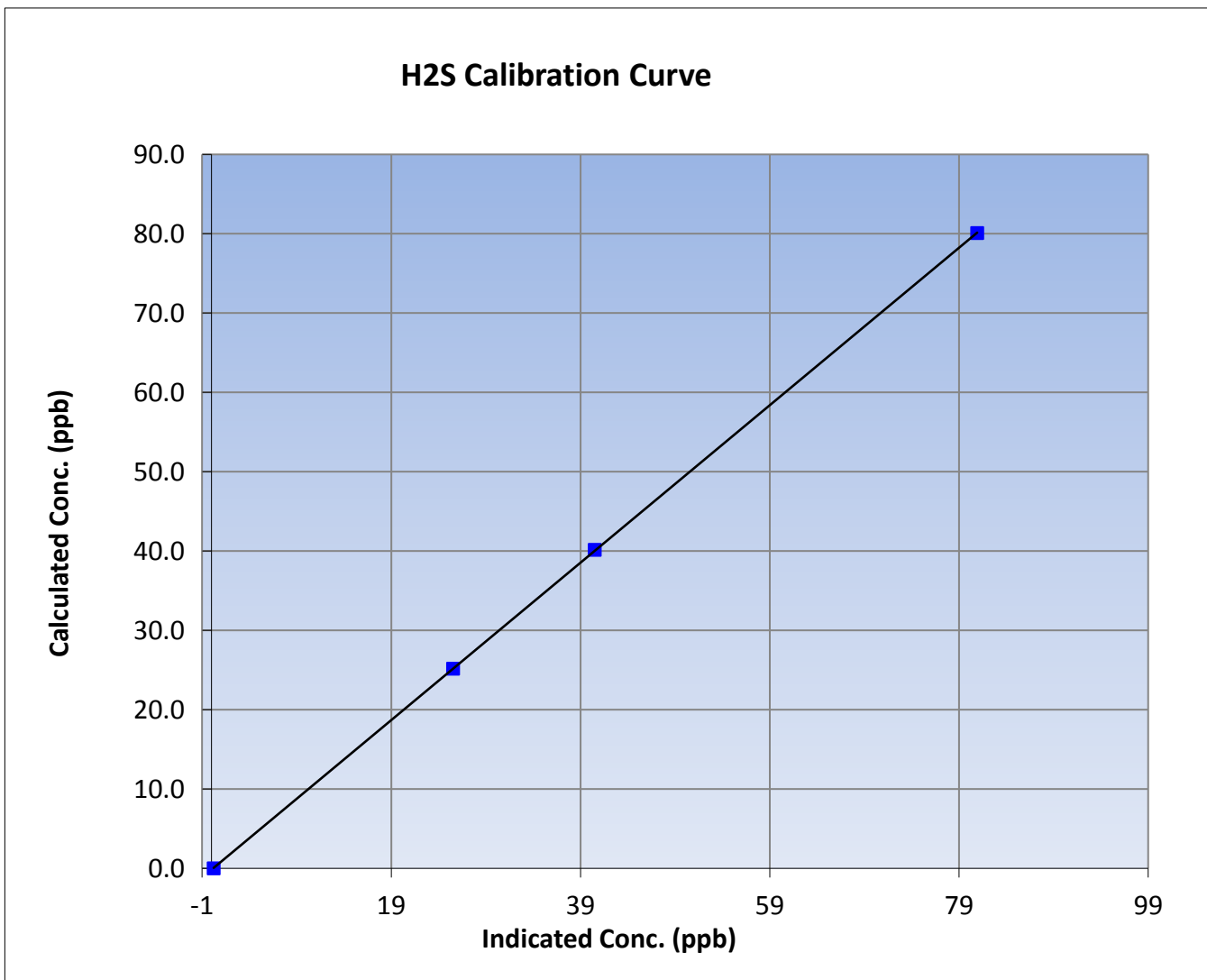
# Wood Buffalo Environmental Association H2S Calibration Report

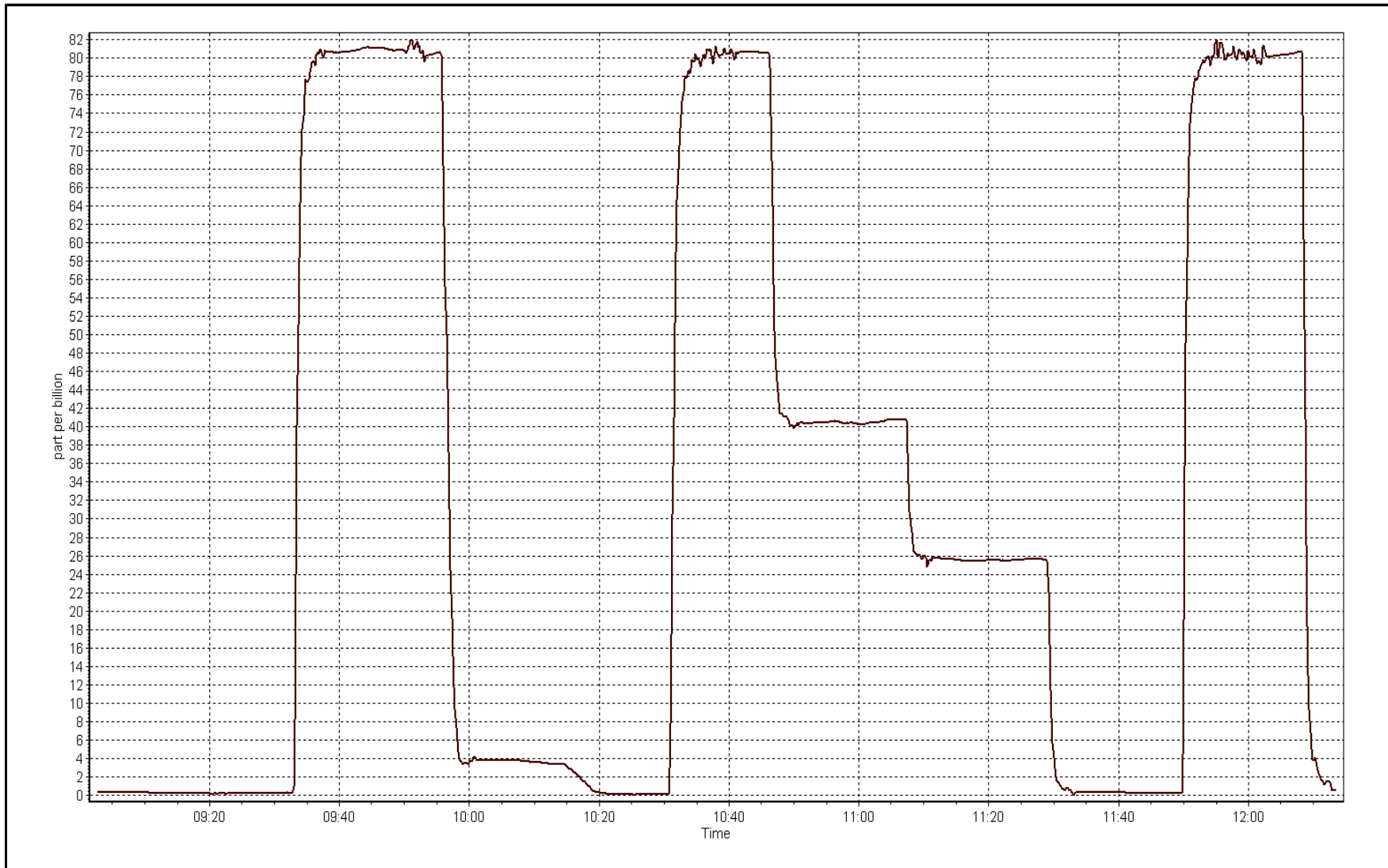
## Station Information

Calibration Date	September 11, 2015	Previous Calibration	August 17, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:00	End Time (MST)	12:15
Analyzer make	API T101	Analyzer serial #	197

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999993
80.1	80.9	0.9895		
40.1	40.5	0.9912	Slope	0.992310
25.2	25.5	0.9858		
			Intercept	-0.166537







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

## Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 21, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	13:28
NO Cal Gas Conc	48.1 ppm	Gas Cert Reference	LL104215
NOx Cal Gas Conc	48.1 ppm	Cal Gas Expiry Date	12-Feb-18
Calibrator	API T700	Serial Number	622
Zero air Generator	Teledyne API T701	Serial Number	4865

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882
-------------------	----------------------------	-----------------	------

## Calibration Statistics

Parameter	NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998923	0.999138
	Data Offset	0.243572	-0.034023
Current Calibration	Data Slope	0.997950	0.996803
	Data Offset	0.291575	0.576786

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356
---------------------	------------	-------------------	------------

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.024		0.988	
NOX coefficient	1.001		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	7.3		4.0	
NOX bkgrnd	8.1		4.1	
Chamber Temp	50.3	Deg C	50.4	Deg C
Moly Temp	322.4	Deg C	322.6	Deg C
PMT voltage	-866.3	V	-866.5	V
PMT Temp	-2.7	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	161.8	mmHg	162.1	mmHg
R Cell Press Nox	162.4	mmHg	162.4	mmHg
NO sample flow	0.662	lpm	0.664	lpm
Nox sample Flow	0.661	lpm	0.660	lpm

**Notes:**

Inlet filter replaced after as founds. Adjusted both zero and span.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

September 9, 2015

Station Number:

AMS 502

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-4.0	-3.3	-0.6	----	----
as found span	5000	83.2	800.4	800.4	0.0	828.3	826.9	1.4	0.9663	0.9680
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
high point	5000	83.2	800.4	800.4	0.0	801.9	802.7	-0.8	0.9981	0.9971
second point	5000	41.6	400.2	400.2	0.0	400.6	400.5	0.1	0.9991	0.9994
third point	5000	20.8	200.1	200.1	0.0	200.0	199.8	0.2	1.0006	1.0014
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	-0.1	----	----
as left span	6000	99.9	800.9	528.2	272.7	806.9	533.5	273.4	0.9926	0.9900
Average Correction Factor									0.9993	0.9993

Corrected As found

NO<sub>x</sub>= 832.2

NO= 830.2

Percent Change

NO<sub>x</sub>= -3.8%

NO= -3.5%

Previous Response

NO<sub>x</sub>= 801.0

NO= 801.1

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

83.20

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO2 (300)	----	528.2	273.3	802.1	528.2	273.9	0.9815	1.0000	0.9976	100.2%
2nd NO2 (200)	----	612.8	188.7	801.8	612.8	189.1	0.9818	1.0000	0.9981	100.2%
3rd NO2 (100)	----	700.8	100.7	801.6	700.8	100.8	0.9821	1.0000	0.9983	100.2%
4th NO2 (0)	801.5	----	1.4	802.9	801.5	1.5	0.9806	1.0000	N/A	----
Average Correction Factor							0.9815	1.0000	0.9980	100.2%

Calibration Performed By:

Asad Hidayat



# Wood Buffalo Environmental Association

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

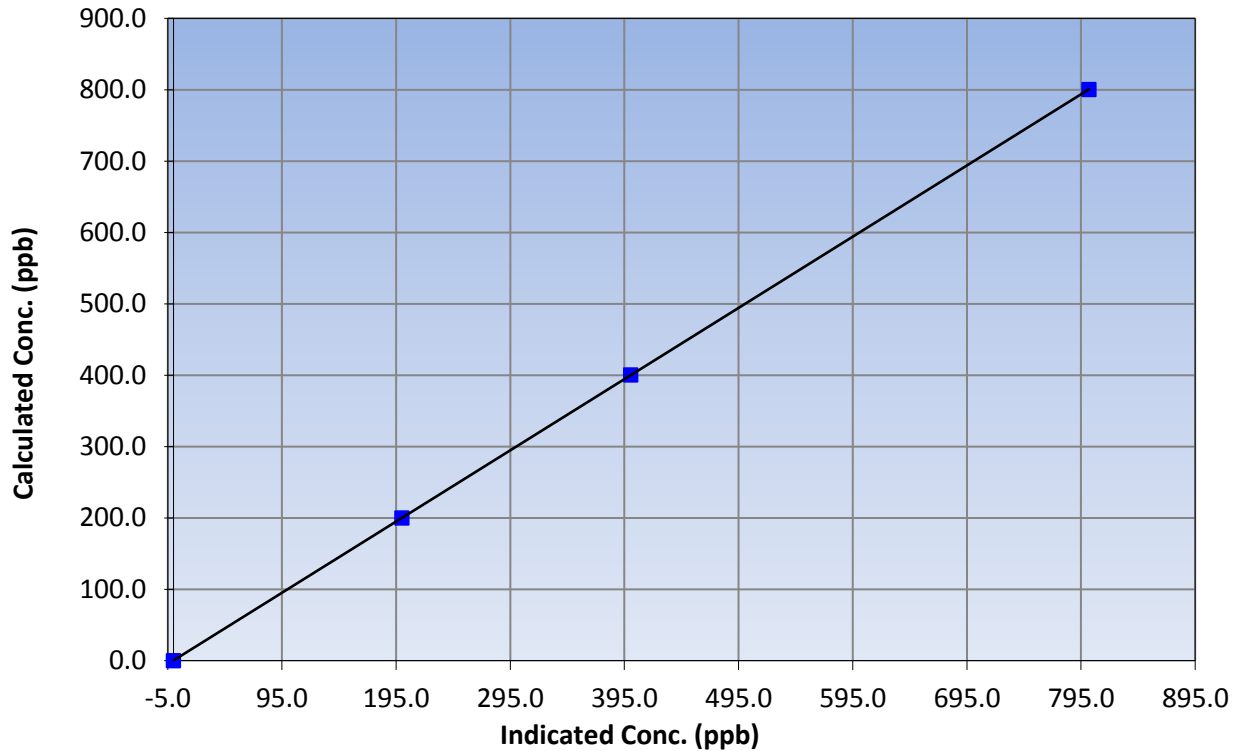
### Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 21, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:15	End Time (MST)	13:28
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	1.000000
800.4	801.9	0.9981		
400.2	400.6	0.9991	Slope	0.997950
200.1	200.0	1.0006		
			Intercept	0.291575

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







# Wood Buffalo Environmental Association

## NO Calibration Summary

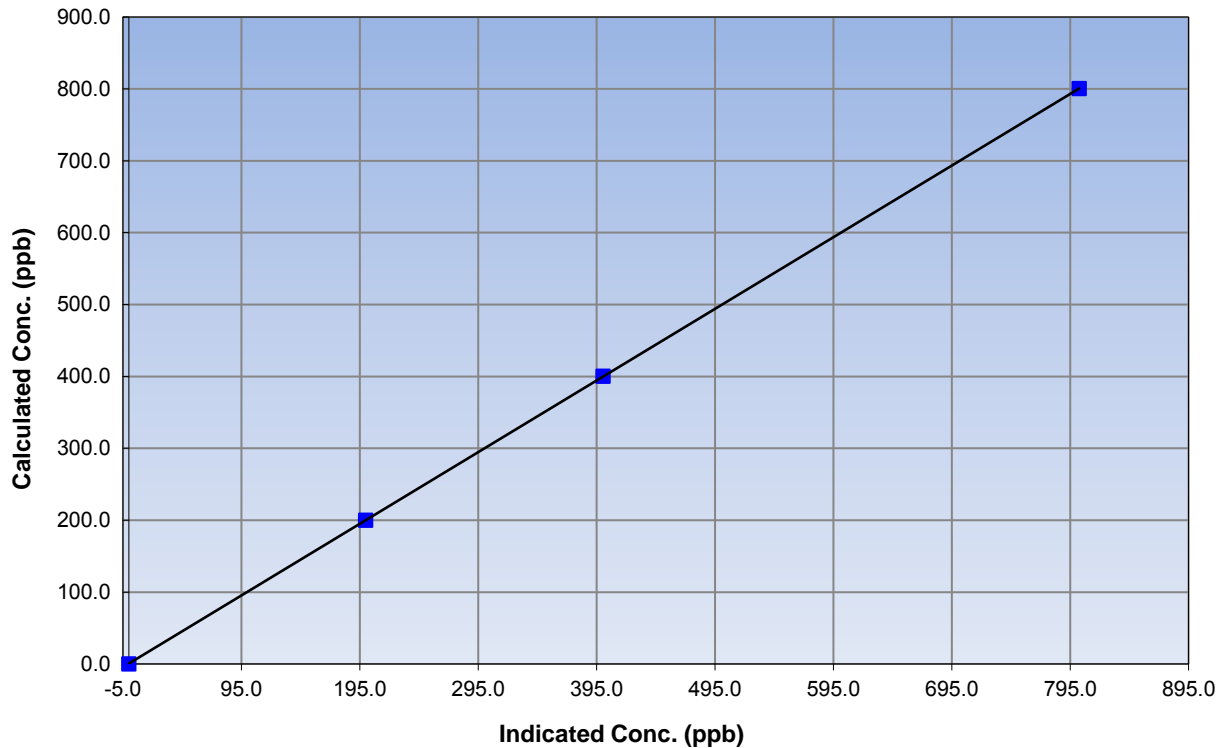
### Station Information

Calibration Date	September 9, 2015	Previous Calibration	August 21, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:15	End Time (MST)	13:28
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999998
800.4	802.7	0.9971		
400.2	400.5	0.9994	Slope	0.996803
200.1	199.8	1.0014		
			Intercept	0.576786

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

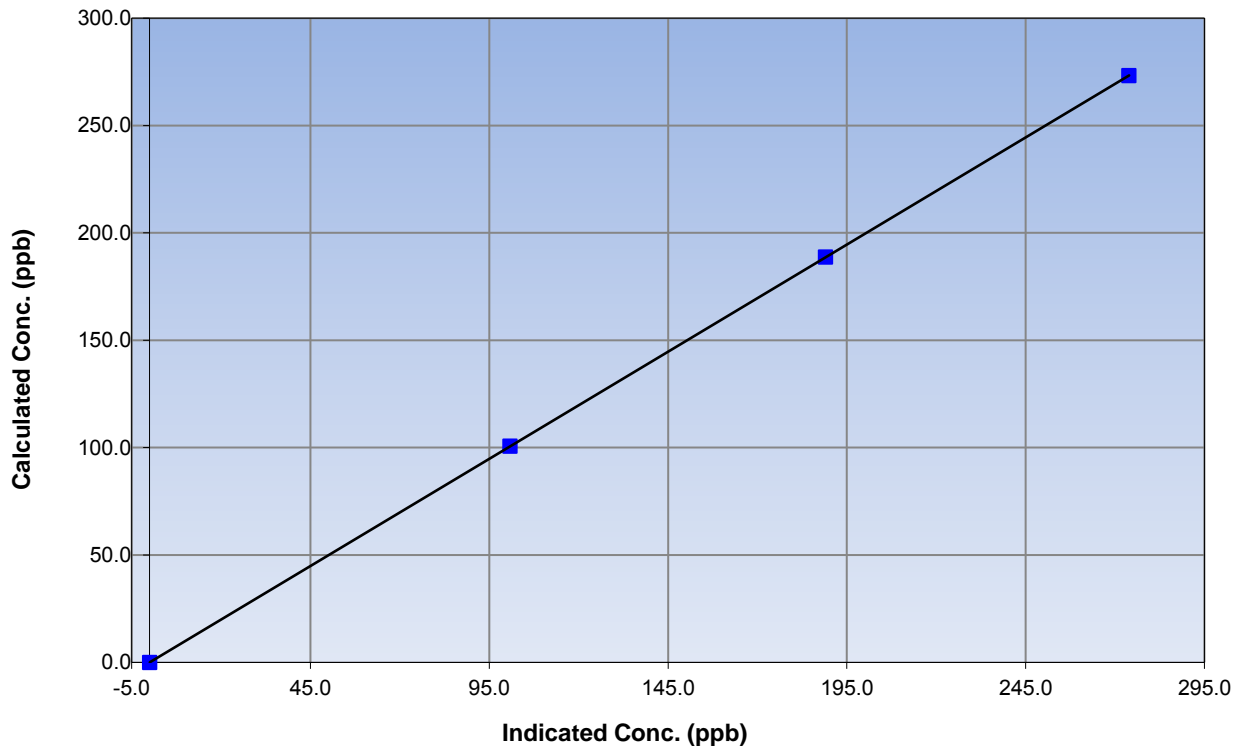
### Station Information

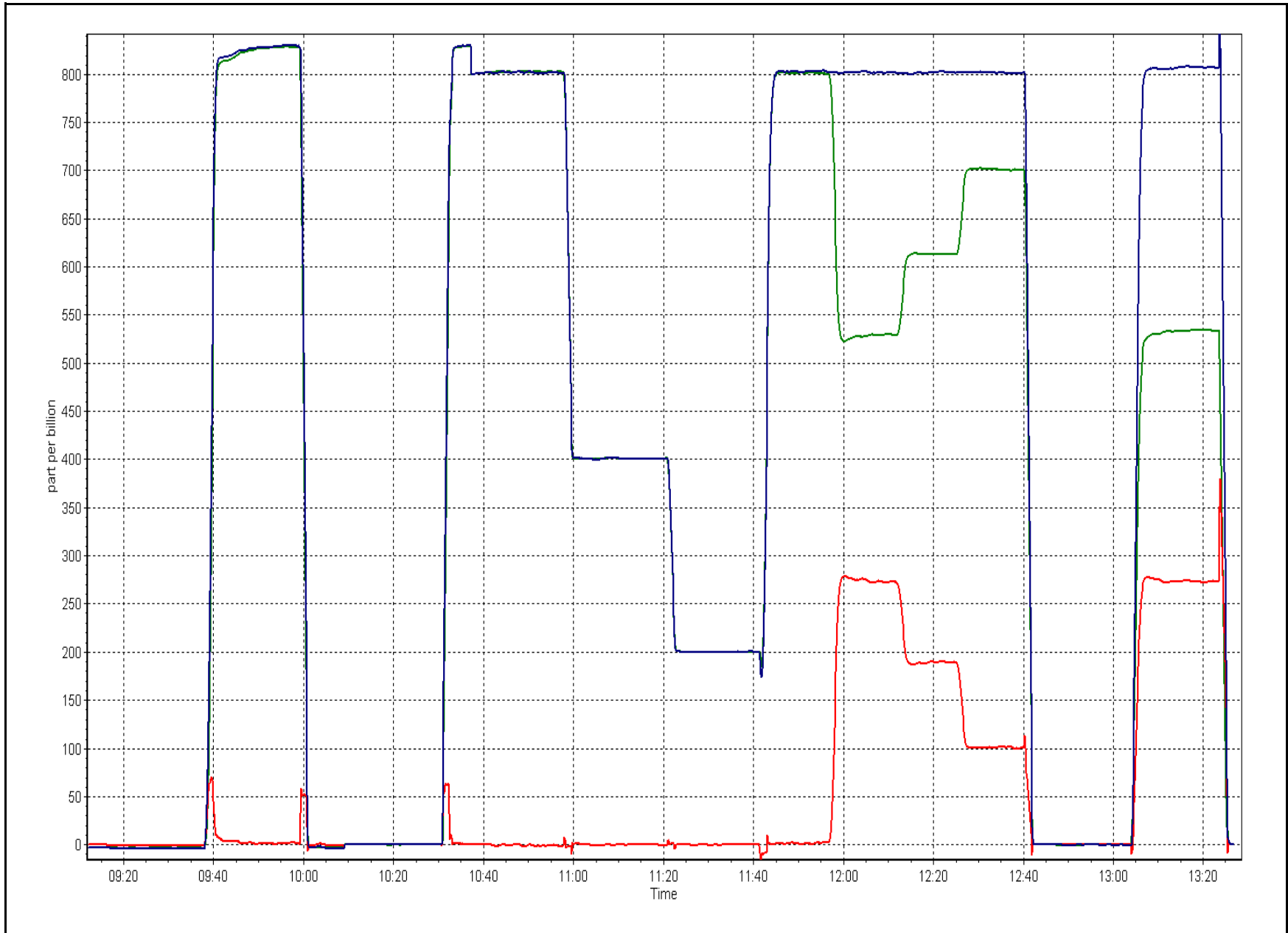
Calibration Date	September 9, 2015	Previous Calibration	August 21, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:15	End Time (MST)	13:28
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	1.000000
273.3	273.9	0.9976		
188.7	189.1	0.9981	Slope	0.997900
100.7	100.8	0.9983		
			Intercept	-0.016491

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







This page intentionally left blank



# Wood Buffalo Environmental Association

## ADDENDUM: AUGUST 2015 MONTHLY AIR MONITORING SUMMARY

September 28, 2015  
Revision 1 – October 28, 2015

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

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

AUGUST 2015

page 1 of 2

Prepared: Oct 27 2015 16:32


APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	8	2015					
254465-00-00							
149968-00-01							
48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00							
224816-00-03							
189942-00-02				ONE-HOUR AVERAGE		24-HOUR AVERAGE	
206355-00-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
46586-00-00							
216466-00-04	SO2(ppm)	1	97.31	0.040	0	0.005	0
137467-00-00	SO2(ppm)	2	99.33	0.040	0	0.013	0
20809-01-00	SO2(ppm)	4	93.55	0.014	0	0.002	0
241311-00-00	SO2(ppm)	5	100.00	0.034	0	0.002	0
094-02-00	SO2(ppm)	6	99.46	0.012	0	0.003	0
305529-00-00	SO2(ppm)	7	98.79	0.011	0	0.002	0
026-02-00	SO2(ppm)	8	99.87	0.002	0	0.000	0
228044-00-00	SO2(ppm)	11	100.00	0.146	0	0.017	0
73203-01-00	SO2(ppm)	12	88.71	0.020	0	0.004	0
	SO2(ppm)	13	95.43	0.034	0	0.005	0
	SO2(ppm)	14	99.87	0.014	0	0.001	0
	SO2(ppm)	15	100.00	0.034	0	0.003	0
	SO2(ppm)	16	100.00	0.031	0	0.005	0
	SO2(ppm)	17	100.00	0.060	0	0.006	0
	SO2(ppm)	18	99.60	0.004	0	0.001	0
	SO2(ppm)	19	100.00	0.025	0	0.004	0
	SO2(ppm)	502	100.00	0.007	0	0.002	0
	H2S(ppm)	2	99.33	0.006	0	0.002	0
	H2S(ppm)	4	93.28	0.006	0	0.001	0
	H2S(ppm)	5	98.25	0.036	7	0.006	1
	H2S(ppm)	11	99.33	0.008	0	0.001	0
	H2S(ppm)	17	99.60	0.002	0	0.000	0
	H2S(ppm)	19	100.00	0.003	0	0.001	0
	H2S(ppm)	502	99.46	0.005	0	0.003	0
	TRS(ppm)	1	95.70	0.003	0	0.001	0
	TRS(ppm)	6	99.46	0.002	0	0.001	0
	TRS(ppm)	7	99.60	0.001	0	0.001	0
	TRS(ppm)	9	100.00	0.003	0	0.001	0
	TRS(ppm)	12	88.44	0.005	0	0.001	0
	TRS(ppm)	13	96.24	0.003	0	0.001	0
	TRS(ppm)	14	99.87	0.007	0	0.001	0
	TRS(ppm)	15	99.87	0.002	0	0.001	0
	TRS(ppm)	18	99.87	0.000	0	0.000	0
	THC(ppm)	1	97.45	2.7	-	2.0	-
	THC(ppm)	2	99.33	5.5	-	2.9	-
	THC(ppm)	4	93.41	5.0	-	3.3	-
	THC(ppm)	5	99.87	3.6	-	2.6	-
	THC(ppm)	6	99.19	2.6	-	2.0	-
	THC(ppm)	7	98.92	2.6	-	2.1	-
	THC(ppm)	9	100.00	3.9	-	2.4	-
	THC(ppm)	11	100.00	4.7	-	2.7	-
	THC(ppm)	12	88.84	6.0	-	2.9	-
	THC(ppm)	13	96.10	4.1	-	2.4	-
	THC(ppm)	14	99.33	2.5	-	2.0	-
	THC(ppm)	15	100.00	5.3	-	2.6	-
	THC(ppm)	16	100.00	5.5	-	2.8	-
	THC(ppm)	17	100.00	2.6	-	2.2	-
	THC(ppm)	19	100.00	3.1	-	2.4	-
	O3(ppm)	1	97.72	0.055	0	0.031	-
	O3(ppm)	6	99.60	0.043	0	0.030	-
	O3(ppm)	7	99.60	0.039	0	0.025	-
	O3(ppm)	8	98.92	0.047	0	0.035	-
	O3(ppm)	13	96.24	0.041	0	0.023	-
	O3(ppm)	14	99.73	0.047	0	0.033	-

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

AUGUST 2015

page 2 of 2

Prepared: Oct 27 2015 16:32

APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	8	2015					
254465-00-00							
149968-00-01							
48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
224816-00-03	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
189942-00-02	O3(ppm)	17	100.00	0.044	0	0.030	-
206355-00-00	O3(ppm)	18	100.00	0.054	0	0.037	-
46586-00-00	NO2(ppm)	1	97.31	0.018	0	0.006	-
216466-00-04	NO2(ppm)	6	99.46	0.019	0	0.005	-
137467-00-00	NO2(ppm)	7	98.92	0.018	0	0.007	-
20809-01-00	NO2(ppm)	8	99.87	0.007	0	0.001	-
241311-00-02	NO2(ppm)	12	87.50	0.027	0	0.011	-
094-02-00	NO2(ppm)	13	96.24	0.024	0	0.005	-
305529-00-00	NO2(ppm)	14	99.87	0.009	0	0.002	-
026-02-00	NO2(ppm)	15	100.00	0.026	0	0.008	-
228044-00-00	NO2(ppm)	16	100.00	0.038	0	0.012	-
73203-01-00	NO2(ppm)	17	100.00	0.015	0	0.007	-
	NO2(ppm)	18	99.46	0.005	0	0.001	-
	NO2(ppm)	19	100.00	0.018	0	0.005	-
	NO2(ppm)	502	98.92	0.015	0	0.004	-
	CO(ppm)	7	100.00	0.3	0	0.1	-
	NH3(ppm)	1	91.94	0	-	0	0
	NH3(ppm)	6	93.15	14	-	1	0
	PM2.5(ug/m <sup>3</sup> )	1	99.60	29.6	-	13.4	0
	PM2.5(ug/m <sup>3</sup> )	6	99.73	22.9	-	9.3	0
	PM2.5(ug/m <sup>3</sup> )	7	99.60	26.6	-	10.4	0
	PM2.5(ug/m <sup>3</sup> )	8	99.73	20	-	7.5	0
	PM2.5(ug/m <sup>3</sup> )	12	88.31	38.8	-	14.6	0
	PM2.5(ug/m <sup>3</sup> )	13	96.24	21.7	-	9.1	0
	PM2.5(ug/m <sup>3</sup> )	14	100.00	63.3	-	8.5	0
	PM2.5(ug/m <sup>3</sup> )	15	100.00	198.1	-	22.4	0
	PM2.5(ug/m <sup>3</sup> )	16	100.00	45.6	-	15	0
	PM2.5(ug/m <sup>3</sup> )	17	100.00	33.1	-	9	0
	PM2.5(ug/m <sup>3</sup> )	18	99.87	26	-	10.7	0
	WIND	1	99.19	-	-	-	-
	WIND	2	100.00	-	-	-	-
	WIND	4	99.87	-	-	-	-
	WIND	5	100.00	-	-	-	-
	WIND	6	99.87	-	-	-	-
	WIND	7	100.00	-	-	-	-
	WIND	8	99.60	-	-	-	-
	WIND	9	99.73	-	-	-	-
	WIND	11	100.00	-	-	-	-
	WIND	12	89.38	-	-	-	-
	WIND	13	97.98	-	-	-	-
	WIND	14	99.87	-	-	-	-
	WIND	15	99.87	-	-	-	-
	WIND	16	98.66	-	-	-	-
	WIND	17	100.00	-	-	-	-
	WIND	18	100.00	-	-	-	-
	WIND	19	99.73	-	-	-	-
	WIND	502	100.00	-	-	-	-
							
SIGNATURE OF ASSOCIATION REPRESENTATIVE				FOR ALBERTA ENVIRONMENT USE ONLY			