



*WOOD BUFFALO
ENVIRONMENTAL
ASSOCIATION*

**SEPTEMBER 2014
MONTHLY REPORT**



CONTINUOUS MONITORING
INTEGRATED MONITORING
October 30, 2014

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

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

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October 30, 2014

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

**RE: Monthly Ambient Air Quality Monitoring Report September 2014
Wood Buffalo Environmental Association**

Enclosed is the September 2014 ambient air quality monitoring report for the continuous ambient air quality monitoring stations of the Wood Buffalo Environmental Association regional air quality monitoring network.

The continuous ambient air quality monitoring network stations are:

AMS 1 - Fort McKay – Bertha Ganter
AMS 2 - Mildred Lake
AMS 3 - Lower Camp B (meteorology)
AMS 4 - Buffalo Viewpoint
AMS 5 - Mannix
AMS 6 - Patricia McInnes
AMS 7 - Athabasca Valley
AMS 8 - Fort Chipewyan
AMS 9 - Barge Landing
AMS 11 - Lower Camp (air quality)
AMS 12 - Millennium Mine
AMS 13 - Fort McKay South
AMS 14 - Anzac
AMS 15 - CNRL Horizon
AMS 16 - Shell Muskeg River
AMS 17 - Wapasu
AMS 19 - Firebag
AMS 501 - Statoil Leismer
AMS 502 - ConocoPhillips Surmont

WBEA commenced ambient air quality monitoring surveys at the Statoil Leismer and ConocoPhillips facilities on July 1, 2014. The survey at the Statoil Leismer facility will be conducted from July 1 to September 30, 2014 to fulfill EPEA approval number 241311-00-02. The survey at the ConocoPhillips Surmont facility will be conducted from July 1, 2014 to June 30, 2015 to fulfill EPEA approval number 48263-00-00.

These two stations are equipped with ambient air quality analyzers for SO₂, H₂S, NO, NO₂, NO_x and meteorological sensors for ambient temperature, relative humidity, and wind speed and direction.

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

1.0 Concentrations in Excess of Alberta Ambient Air Quality Objectives

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

There were 12 ambient ground level concentrations of H₂S and TRS in excess of the H₂S air quality objectives reported to Alberta Environment in real time. After data processing to account for analyzer drift with baseline correction, there were 7 hourly average concentrations in excess of the H₂S air quality objectives. There were 3 1-hour and 2 24-hour objective exceedences reported in real-time that were found not to be in exceedance after data processing.

The reported and final concentrations and status after data processing are summarized as follows:

<u>Site</u>	<u>parameter</u>	<u>date/time</u>	<u>reference</u>	<u>period</u>	<u>concentration (ppb or ug/m³ for PM_{2.5})</u>		<u>status*</u>
					<u>reported</u>	<u>final</u>	
AMS 1 Fort McKay	TRS	22Sep14:11:00	289802	1-hour	10	9	rec
AMS 2 Mildred Lake	H ₂ S	04Sep14:05:00	289086	1-hour	12	12	exc
AMS 2 Mildred Lake	H ₂ S	04Sep14:06:00	289086	1-hour	11	11	exc
AMS 2 Mildred Lake	H ₂ S	04Sep14:24:00	289145	24-hour	3	3.4	rec
AMS 5 Mannix	H ₂ S	07Sep14:24:00	289228	24-hour	3	2.7	rec
AMS 5 Mannix	H ₂ S	16Sep14:01:00	289518	1-hour	13	13	exc
AMS 5 Mannix	H ₂ S	16Sep14:02:00	289518	1-hour	17	17	exc
AMS 5 Mannix	H ₂ S	16Sep14:04:00	289518	1-hour	10	10	nae
AMS 5 Mannix	H ₂ S	23Sep14:07:00	289841	1-hour	12	11	exc
AMS 13 Syncrude UE-1	TRS	23Sep14:24:00	289887	1-hour	11	11	exc
AMS 13 Syncrude UE-1	TRS	24Sep14:01:00	289888	1-hour	16	16	exc
AMS 13 Syncrude UE-1	TRS	24Sep14:02:00	289888	1-hour	10	10	nae

*status legend:

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

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

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

2.0 Operational Status

2.1 Continuous Monitoring

In September 2014, there were two incidents resulting in a compliance monitoring instruments operating less than 90 % of the time.

1. The air quality analyzers at AMS 4 (Buffalo Viewpoint) operated less than 90% of the time in September 2014. During the AEMERA audit of the station on September 19, it was discovered that the sample blower was unplugged from the sample inlet manifold. Upon review of the operational notes at the station, data for all analyzers were flagged September 4, the date maintenance was performed on the glass manifold to September 19, day of the audit. This resulted in 360 hours of data being invalidated. During this reporting period, the air quality analyzers at AMS 4 operated for only 50 % of the time. Operational times less than 90% were reported to Alberta Environment, (Megan, reference 291332) on October 28, 2014.
2. The air quality analyzers at AMS 502 (ConocoPhillips Surmont) operated less than 90% of the time in September 2014. The current EPEA Approval for the ConocoPhillips Surmont Phase 1 project requires ambient air monitoring at the facility for 3 months per calendar year. The ambient air monitoring station was deployed early this year to account for any disruptions in the monitoring activities due to instrument malfunctions, power interruptions due to plant maintenance periods or the construction of Phase 2 of the Surmont Project.

In September, during scheduled plant maintenance, power adjacent to the monitoring station was interrupted resulting in a temporary shutdown of the station. The less than 90 percent operational time requirement for this station during this reporting period was reported to AESRD on September 13, 2014 (AESRD reference number 289438). The temporary shutdown of the station was from September 6 to 20, 2014. The air monitoring station resumed normal operations

following start-up calibrations on September 20, 2014. During this reporting period, the air quality parameters were operational for only 50% of the time.

The air monitoring station will continue to be deployed at its current location until June 30, 2015. It will sample ambient air quality for 3 calendar months this year and 6 months the following year pending normal operations at Surmont Phase 1 and construction of Phase 2.

2.2 Intermittent Monitoring

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

3.0 Monitoring Notes

General Network Notes

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

During the weeks of September 15 to 24, the ambient monitoring network was audited by AEMERA. As a result, two calibration periods were reported this month for all analyzers that were audited; one for the AEMERA audit and another for the monthly multi-point calibration.

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

Station 1, Fort McKay

The NH₃ analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily span period. Additional time for stabilization after spanning is an inherent behavior in the NH₃ analyzer operations resulting from the properties of the NH₃ gas. Data for one hour following the daily spans have been reported as invalid for a total of 30 hours this month.

Maintenance and cleaning of the sample manifold on September 14 interrupted the normal operations of all air quality analyzers for 1 to 2 hours.

Maintenance and investigation of O₃ analyzer responses at the station on September 14 interrupted normal operations of the analyzer for 6 hours.

There were two issues associated with operation of the PM_{2.5} analyzer resulting in 12 hours of invalid data. Maintenance to the sample inlet, flow audits and zero reference checks on September 11 and 14 interrupted the normal operations of the PM_{2.5} analyzer for 4 hours. The analyzer experienced three episodes of unstable operations this reporting period, resulting in 8 hours of invalid data.

Depletion and replacement of the fuel cylinder at the station on September 30 affected the normal operations of the THC analyzer for 1 hour.

A power spike at the station on September 30 affected the normal operations of NH₃ analyzer for 1 hour.

The relative humidity sensor recorded intermittent periods of values exceeding the normal sensor operating range this reporting period. This resulted in 13 hours of invalidated data.

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

Maintenance and audit of the tipping bucket precipitation collector on September 16 resulted in 1 hour of invalid data.

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

Station 2, Mildred Lake

A data collection program revision upload to the data logger on September 6 interrupted the normal data collection of all parameters for 16 hours.

Depletion and replacement of the fuel cylinder at the station on September 1 affected the normal operations of the THC analyzer for 4 hours.

On September 23, replacement of the sample pump and a follow-up calibration of the THC analyzer affected the normal operations for 8 hours.

Station 3, Lower Camp B - Meteorology

A data collection program revision upload to the data logger on September 24 interrupted the normal data collection of all parameters for 26 hours.

A flat line in the output signals of the 45 m elevation wind sensor on September 7 resulted in 6 hours of downtime.

The meteorological sensors at the 167 m elevation failed following a lightning storm on July 30 resulting in invalid data for a majority of this reporting period. All meteorological sensors were replaced on the tower on September 25, 2014 and data from these sensors will continue to be monitored.

Station 4, Buffalo Viewpoint

The manifold blower was left unplugged from September 4 to 19. This resulted in less than 90 percent operational time for this reporting period.

Station 5, Mannix

Maintenance and cleaning of the sample manifold on September 17 interrupted the normal operations of the SO₂ and THC analyzers for 1 hour.

A spike in the output signals of the 90 m elevation wind sensor on September 12 resulted in 1 hour of downtime.

Depletion and replacement of the fuel cylinder at the station on September 26 affected the normal operations of the THC analyzer for 2 hours.

Station 6, Patricia McInnes

The NH₃ analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily span period. Additional time for stabilization after spanning is an inherent behavior in the NH₃ analyzer operations resulting from the properties of the NH₃ gas. Data for one hour following the daily span have been reported as invalid for a total of 29 hours this month.

Maintenance and cleaning of the sample manifold on September 6 interrupted the normal operations of all air quality analyzers for 1 hour.

There were three issues associated with operation of the PM_{2.5} analyzer resulting in 14 hours of invalid data. Cleaning of the sample inlet, flow audits and zero reference checks on September 8 interrupted the normal operations of the PM_{2.5} analyzer for 1 hour. Maintenance and replacement of the analyzer on September 15 interrupted the normal operations of the analyzer for 11 hours. The analyzer experienced two episodes of unstable operations this reporting period, resulting in 2 hours of invalid data.

Flat-line in the output signals of the wind sensor resulted in 24 hours of invalid data this reporting period.

Station 7, Athabasca Valley

Maintenance and cleaning of the sample manifold on September 3 interrupted the normal operations of the O₃ analyzer for 1 hour.

Maintenance to the sample inlet, flow audits and zero reference checks on September 5 interrupted the normal operations of the PM_{2.5} analyzer for 1 hour.

Station operator activities on September 24 affected the normal operations of the PM_{2.5} analyzer for 1 hour.

Station 8, Fort Chipewyan

Maintenance to the sample inlet and flow and zero reference checks on September 4 interrupted the normal operations of the PM_{2.5} analyzer for 2 hours.

Maintenance and audit of the tipping bucket precipitation collector on September 16 resulted in 1 hour of invalid data.

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

Station 9, Barge Landing

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

Calibration of the wind speed and direction sensors at the station on September 15 interrupted the normal operations of these parameters for 2 hours.

Station 11, Lower Camp

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

Calibration of the wind speed and direction sensors at the station on September 15 interrupted the normal operations of these parameters for 2 hours.

Station 12, Millennium Mine

Maintenance and cleaning of the sample manifold on September 24 affected the normal operations of the NO₂ analyzer for 1 hour.

Maintenance to the sample inlet, flow audits and zero reference checks on September 24 interrupted the normal operations of the PM_{2.5} analyzer for 1 hour.

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

Station 13, Syncrude UE 1

There were two issues associated with operation of the THC analyzer resulting in 24 hours of invalid data. A communications error between the analyzer and the on-site calibrator interrupted

the normal operations of the analyzer for 17 hours. The analyzer experienced three episodes of unstable operations this reporting period, resulting in 7 hours of invalid data.

Maintenance to the sample inlet, flow audits and zero reference checks on September 11 interrupted the normal operations of the PM_{2.5} analyzer for 2 hours.

The PM_{2.5} analyzer experienced a single episode of unstable operations this reporting period, resulting in 1 hour of invalid data.

A flat line in the output signals of the wind sensor resulted in 6 hours of invalid data this reporting period.

Station 14, Anzac

A flat line in the output signals of the wind sensor on September 9 resulted in 3 hours of invalid data.

Maintenance and cleaning of the sample manifold on September 10 affected the normal operations of the TRS and O₃ analyzers for 2 hours.

Maintenance to the sample inlet, flow audits and zero reference checks on September 10 interrupted the normal operations of the PM_{2.5} analyzer for 1 hour.

Replacement of the sample pump and a follow-up calibration of the THC analyzer on September 11 affected the normal operation for 5 hours.

Maintenance and replacement of the fuel gas cylinder at the station on September 30 interrupted the normal operations of the THC analyzer for 2 hours.

Station 15, CNRL Horizon

Maintenance to the sample inlet, flow audits and zero reference checks on September 8 interrupted the normal operations of the PM_{2.5} analyzer for 1 hour.

The SO₂ analyzer experienced multiple episodes of intermittent unstable operations due to baseline drift this reporting period. This resulted in 11 hours of invalid data.

A flat line in the output signals of the wind sensor on September 13 resulted in 2 hours of invalid data.

Station 16, Albian Muskeg River

A power spike at the station on September 8 interrupted the normal operations of the THC analyzer for 1 hour.

Depletion and replacement of the fuel cylinder at the station on September 26 affected the normal operations of the THC analyzer for 2 hours.

There were two issues associated with operation of the PM_{2.5} analyzer resulting in 2 hours of invalid data. The daily advancement of filter tape in the analyzer on September 25 affected the normal operations of the analyzer for 1 hour. Maintenance to the sample inlet, flow audits and zero reference checks on September 6 interrupted the normal operations of the analyzer for 1 hour.

Station 17, Wapasu

There were two issues associated with operation of the THC analyzer resulting in 3 hours of invalid data. Remote activation of the auto daily zero and span systems and verification of analyzer response on September 22 interrupted the normal operations of the THC analyzer for 1 hour. A communications error between the analyzer and the on-site calibrator on September 30 interrupted the normal operations of the analyzer for 2 hours.

Maintenance to the sample inlet, flow audits and zero reference checks on September 4 interrupted the normal operations of the PM_{2.5} analyzer for 1 hour.

The PM_{2.5} analyzer experienced five episodes of intermittent unstable operations due to excessive baseline drift resulting in 14 hours of invalid data.

A flat-line in the output signals of the wind sensor on September 13 resulted in 4 hours of invalid data.

Station 19, Firebag

The H₂S analyzer experienced three episodes of intermittent unstable operations due to excessive baseline drift resulting in 6 hours of invalid data.

Replacement of the fuel gas cylinder at the station on September 30 interrupted the normal operations of the THC analyzer for 2 hours.

Station 501, Statoil Leismer

WBEA commissioned an ambient air quality survey at the Statoil Leismer facility. The survey at this location was conducted from July 1 to October 14, 2014 to fulfill Alberta Environment's Environmental Protection and Enhancement Act facility approval number 241311-00-02. This station was equipped with ambient air quality analyzers for SO₂, H₂S, NO, NO₂, NO_x and meteorological sensors for ambient temperature, relative humidity, and wind speed and direction.

The SO₂ analyzer experienced extended stabilization periods after the daily span checks this reporting month, resulting in 19 hours of invalid data.

The SO₂ and H₂S analyzers experienced intermittent periods of unstable operations due to excessive baseline drift resulting in 5 and 6 hours of invalid data, respectively.

Flat-lines in the output signals of the wind sensor resulted in 17 hours of invalid data this reporting period.

Station 502, ConocoPhillips Surrmont

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

The SO₂ analyzer experienced extended stabilization periods after the daily span checks this reporting month, resulting in 15 hours of invalid data.

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

Station 101, Portable

Not in operation during this reporting period.

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

Yours sincerely,

Aurora Atmospheric Inc.

Sanjay Prasad
Air Quality Scientist

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

SEPTEMBER 2014

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APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	9	2014					
254465-00-00							
149968-00-01							
48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00							
224816-00-03							
189942-00-02							
206355-00-00							
46586-00-00							
216466-00-04							
137467-00-00							
20809-01-00							
241311-00-00							
094-02-00							
305529-00-00							
026-02-00							
228044-00-00							
73203-01-00							
			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	
SO2(ppm)	1	99.86	0.047	0	0.005	0	
SO2(ppm)	2	97.78	0.082	0	0.010	0	
SO2(ppm)	4	50.00	0.043	0	0.005	0	
SO2(ppm)	5	99.86	0.084	0	0.011	0	
SO2(ppm)	6	99.86	0.015	0	0.004	0	
SO2(ppm)	7	100.00	0.013	0	0.002	0	
SO2(ppm)	8	100.00	0.006	0	0.001	0	
SO2(ppm)	11	100.00	0.030	0	0.006	0	
SO2(ppm)	12	100.00	0.107	0	0.012	0	
SO2(ppm)	13	100.00	0.036	0	0.007	0	
SO2(ppm)	14	100.00	0.009	0	0.001	0	
SO2(ppm)	15	98.47	0.053	0	0.007	0	
SO2(ppm)	16	100.00	0.031	0	0.004	0	
SO2(ppm)	17	100.00	0.015	0	0.004	0	
SO2(ppm)	19	100.00	0.021	0	0.003	0	
SO2(ppm)	501	96.67	0.005	0	0.001	0	
SO2(ppm)	502	50.42	0.004	0	0.001	0	
H2S(ppm)	2	97.78	0.012	2	0.003	0	
H2S(ppm)	4	50.42	0.003	0	0.001	0	
H2S(ppm)	5	100.00	0.017	3	0.003	0	
H2S(ppm)	11	100.00	0.007	0	0.002	0	
H2S(ppm)	17	100.00	0.002	0	0.001	0	
H2S(ppm)	19	99.17	0.003	0	0.001	0	
H2S(ppm)	501	99.17	0.001	0	0.000	0	
H2S(ppm)	502	51.81	0.002	0	0.001	0	
TRS(ppm)	1	99.86	0.009	0	0.002	0	
TRS(ppm)	6	100.00	0.002	0	0.001	0	
TRS(ppm)	7	100.00	0.002	0	0.001	0	
TRS(ppm)	9	100.00	0.003	0	0.001	0	
TRS(ppm)	12	100.00	0.003	0	0.001	0	
TRS(ppm)	13	100.00	0.016	2	0.002	0	
TRS(ppm)	14	99.86	0.002	0	0.001	0	
TRS(ppm)	15	100.00	0.001	0	0.001	0	
THC(ppm)	1	99.72	2.7	-	2.0	-	
THC(ppm)	2	96.67	6.1	-	2.8	-	
THC(ppm)	4	50.00	3.6	-	2.6	-	
THC(ppm)	5	99.58	5.1	-	2.8	-	
THC(ppm)	6	99.86	2.4	-	2.1	-	
THC(ppm)	7	100.00	2.3	-	2.1	-	
THC(ppm)	9	100.00	3.3	-	2.5	-	
THC(ppm)	11	100.00	4.1	-	2.7	-	
THC(ppm)	12	100.00	5.0	-	2.9	-	
THC(ppm)	13	96.67	4.2	-	2.5	-	
THC(ppm)	14	99.72	8.6	-	2.9	-	
THC(ppm)	15	100.00	6.1	-	2.7	-	
THC(ppm)	16	99.58	6.0	-	2.8	-	
THC(ppm)	17	99.58	2.8	-	2.3	-	
THC(ppm)	19	99.72	3.1	-	2.4	-	
O3(ppm)	1	99.17	0.049	0	0.026	-	
O3(ppm)	6	99.86	0.041	0	0.028	-	

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240008-00-03							
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	O3(ppm)	7	99.86	0.040	0	0.022	-
216466-00-04	O3(ppm)	8	100.00	0.038	0	0.032	-
137467-00-00	O3(ppm)	13	100.00	0.044	0	0.023	-
20809-01-00	O3(ppm)	14	99.86	0.048	0	0.028	-
241311-00-02	O3(ppm)	17	100.00	0.042	0	0.029	-
094-02-00	NO2(ppm)	1	99.72	0.023	0	0.011	-
305529-00-00	NO2(ppm)	6	100.00	0.017	0	0.007	-
026-02-00	NO2(ppm)	7	100.00	0.033	0	0.012	-
228044-00-00	NO2(ppm)	8	100.00	0.011	0	0.003	-
73203-01-00	NO2(ppm)	12	99.86	0.035	0	0.016	-
	NO2(ppm)	13	100.00	0.026	0	0.010	-
	NO2(ppm)	14	99.31	0.013	0	0.004	-
	NO2(ppm)	15	100.00	0.027	0	0.011	-
	NO2(ppm)	16	100.00	0.029	0	0.016	-
	NO2(ppm)	17	100.00	0.016	0	0.006	-
	NO2(ppm)	19	100.00	0.027	0	0.008	-
	NO2(ppm)	501	100.00	0.014	0	0.003	-
	NO2(ppm)	502	52.50	0.019	0	0.007	-
	CO(ppm)	7	100.00	0.4	0	0.2	-
	NH3(ppm)	1	95.56	0	0	0	-
	NH3(ppm)	6	95.83	0	0	0	-
	PM2.5(ug/m ³)	1	98.33	31.2	-	11.5	0
	PM2.5(ug/m ³)	6	98.06	33.8	-	10.3	0
	PM2.5(ug/m ³)	7	99.72	42.8	-	12.4	0
	PM2.5(ug/m ³)	8	99.72	15.8	-	9.7	0
	PM2.5(ug/m ³)	12	99.86	31.6	-	10.4	0
	PM2.5(ug/m ³)	13	99.58	22.6	-	10.2	0
	PM2.5(ug/m ³)	14	99.86	36	-	9.4	0
	PM2.5(ug/m ³)	15	99.86	26.9	-	10.2	0
	PM2.5(ug/m ³)	16	99.72	40.1	-	14.3	0
	PM2.5(ug/m ³)	17	97.92	41.6	-	9.5	0
	WIND	1	99.44	-	-	-	-
	WIND	2	97.78	-	-	-	-
	WIND	4	100.00	-	-	-	-
	WIND	5	100.00	-	-	-	-
	WIND	6	96.67	-	-	-	-
	WIND	7	100.00	-	-	-	-
	WIND	8	99.86	-	-	-	-
	WIND	9	99.17	-	-	-	-
	WIND	11	99.58	-	-	-	-
	WIND	12	99.72	-	-	-	-
	WIND	13	99.17	-	-	-	-
	WIND	14	99.58	-	-	-	-
	WIND	15	99.72	-	-	-	-
	WIND	16	100.00	-	-	-	-
	WIND	17	99.44	-	-	-	-
	WIND	19	100.00	-	-	-	-
	WIND	501	97.64	-	-	-	-
	WIND	502	52.50	-	-	-	-
SIGNATURE OF ASSOCIATION REPRESENTATIVE				FOR ALBERTA ENVIRONMENT USE ONLY			

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 1
BERTHA GANTER FORT MCKAY
SEPTEMBER 2014

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

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

October 30, 2014

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	681	38	39	99.86	47	0	5	0
TRS(ppb) Average	680	39	40	99.86	9	0	2	0
THC(ppm) Average	679	39	41	99.72	2.7	-	2	-
NMHC(ppm) Average	679	39	41	99.72	0.126	-	0.015	-
CH4(ppm) Average	679	39	41	99.72	2.7	-	2	-
O3 (ppb) Average	678	36	42	99.17	49	0	26	-
NO2 (ppb) Average	678	40	42	99.72	23	0	11	-
NO (ppb) Average	678	40	42	99.72	66	-	10	-
NOX (ppb) Average	678	40	42	99.72	86	-	19	-
NH3 (ppb) Average	635	53	85	95.56	0	0	0	-
PM2.5 (ug/m3) Average	708	0	12	98.33	31.2	-	11.5	0
Wind Speed 10 m (km/h) Average	716	0	4	99.44	21	-	-	-
Wind Direction 10 m (deg) Average	716	0	4	99.44	-	-	-	-
Temperature 2 m (C) Average	720	0	0	100.00	33.3	-	21.0	-
Temperature 10 m (C) Average	720	0	0	100.00	33	-	22.4	-
Relative Humidity (%) Average	707	0	13	98.19	100	-	-	-
Precipitation (mm) Total	719	0	1	99.86	3.8	0	25.1	0
Surface Wetness (% of range) Average	720	0	0	100.00	65	-	-	-
Global Solar Radiation (W/m2) Average	720	0	0	100.00	417	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	681	1.7	4	-	0	0	0	1	1	2	47
TRS (ppb) Average	680	0.6	1	-	0	0	0	0	1	1	9
THC (ppm) Average	679	1.89	0.1	-	1.7	1.8	1.8	1.9	1.9	2.1	2.7
NMHC(ppm) Average	679	0.001	0.01	-	0	0	0	0	0	0	0.126
CH4(ppm) Average	679	1.89	0.1	-	1.7	1.8	1.8	1.9	1.9	2.1	2.7
O3 (ppb) Average	678	17.7	10	-	3	5	9	17	25	32	49
NO2 (ppb) Average	678	4.6	4	-	0	1	1	3	7	10	23
NO (ppb) Average	678	2.5	6	-	0	0	0	0	2	6	66
NOX (ppb) Average	678	7.1	9	-	0	1	1	4	9	16	86
NH3 (ppb) Average	635	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	708	5.2	4.1	-	0.3	1.8	2.3	4	6.9	10.9	31.2
Wind Speed 10 m (km/h) Average	716	6.2	4	-	0	2	3	5	8	11	21
Wind Direction 10 m (deg) Average	716	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	720	12.56	6.3	-	-1.4	4.3	8.2	12	16.6	20.7	33.3
Temperature 10 m (C) Average	720	12.9	6	-	-0.1	5.4	8.5	12.5	16.7	20.7	33
Relative Humidity (%) Average	707	75.4	19	-	26	48	63	79	92	97	100
Precipitation (mm) Total	342	-	-	15.75	0	0	0	0	0	0	2.3
Surface Wetness (% of range) Average	720	7	14	-	0	0	0	0	7	27	65
Global Solar Radiation (W/m2) Average	720	75.2	106	-	0	0	0	7	140	258	417

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	14 Sep 2014 14:00	14 Sep 2014 14:00	1	Maintenance - manifold cleaning
TRS	14 Sep 2014 14:00	14 Sep 2014 14:00	1	Maintenance - manifold cleaning
NMHC, CH4, THC	14 Sep 2014 14:00	14 Sep 2014 14:00	1	Maintenance - manifold cleaning
NMHC, CH4, THC	30 Sep 2014 11:00	30 Sep 2014 11:00	1	Maintenance - replace carrier gas
O3	14 Sep 2014 10:00	14 Sep 2014 15:00	6	Maintenance - verify analyzer response to a primary standard
NO2, NO, NOX	14 Sep 2014 14:00	14 Sep 2014 15:00	2	Maintenance - manifold cleaning
NH3	01 Sep 2014 03:00	30 Sep 2014 03:00	30	Stabilization after daily span
NH3	14 Sep 2014 14:00	14 Sep 2014 14:00	1	Maintenance - manifold cleaning
NH3	30 Sep 2014 05:00	30 Sep 2014 05:00	1	Power spike
PM2.5	11 Sep 2014 18:00	11 Sep 2014 19:00	2	Maintenance - Flow and zero check
PM2.5	14 Sep 2014 14:00	14 Sep 2014 15:00	2	Maintenance - sample head cleaning
PM2.5	19 Sep 2014 19:00	19 Sep 2014 21:00	3	Intermittent unstable operation - excessive baseline drift
PM2.5	20 Sep 2014 00:00	20 Sep 2014 02:00	3	Intermittent unstable operation - excessive baseline drift
PM2.5	23 Sep 2014 12:00	23 Sep 2014 13:00	2	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	13 Sep 2014 06:00	13 Sep 2014 07:00	2	Flatline in sensor output signal
Wind Speed, Wind Direction	14 Sep 2014 01:00	14 Sep 2014 01:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	22 Sep 2014 01:00	22 Sep 2014 01:00	1	Flatline in sensor output signal
Relative Humidity	13 Sep 2014 04:00	13 Sep 2014 07:00	4	Unstable operation - data exceeds range maximum
Relative Humidity	14 Sep 2014 04:00	14 Sep 2014 04:00	1	Unstable operation - data exceeds range maximum
Relative Humidity	14 Sep 2014 06:00	14 Sep 2014 08:00	3	Unstable operation - data exceeds range maximum
Relative Humidity	18 Sep 2014 06:00	18 Sep 2014 06:00	1	Unstable operation - data exceeds range maximum
Relative Humidity	28 Sep 2014 01:00	28 Sep 2014 04:00	4	Unstable operation - data exceeds range maximum
Precipitation Collector	16 Sep 2014 15:00	16 Sep 2014 15:00	1	Maintenance - tipping bucket cleaned

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Summary of Hour Averages

Fort McKay - Bertha Ganter - September 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 47 ppb on Sep 23 19:00	Maximum Daily Average: 5.5 ppb on Sep 23		Hours of Data:	681
Minimum Value: 0 ppb on Sep 2 01:00	Minimum Daily Average: 0.4 ppb on Sep 26		Hours of Missing Data:	39
Maximum Diurnal Average: 4.4 ppb at hour 14	Minimum Diurnal Average: 0.6 ppb at hour 7		Hours of Calibration:	38
Monthly Average: 1.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 23		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	1	Z	1	0	1	1	0	0	0	1	0	0	6	32	5	1	1	2	2	1	0	0	0	0	2.4	32
2-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0.4	1
3-Sep	1	Z	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	1	2	1	1	0	0	0.6	2	
4-Sep	0	Z	1	1	1	1	1	1	1	1	1	1	1	3	3	1	1	1	0	0	1	0	0	0	0.9	3
5-Sep	0	Z	1	0	1	1	0	0	0	3	18	19	16	15	5	2	1	2	3	1	1	1	1	1	4.1	19
6-Sep	1	Z	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	0	1	0.6	1
7-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	0.4	1
8-Sep	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
9-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	1.1	1
10-Sep	1	Z	1	1	1	1	1	1	C	C	C	C	C	C	1	1	1	1	1	1	1	1	1	1	--	1
11-Sep	1	Z	1	0	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2
12-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
13-Sep	1	Z	1	1	1	1	1	1	1	1	1	7	8	9	6	10	12	2	1	1	1	1	1	1	3.2	12
14-Sep	1	Z	1	1	1	1	1	1	1	1	2	13	7	M	1	1	1	1	1	1	1	1	1	1	1.6	13
15-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
16-Sep	1	Z	1	1	1	1	1	1	1	C	C	1	1	1	1	1	6	3	1	1	1	1	1	1	1.2	6
17-Sep	1	Z	1	1	1	1	4	4	6	7	4	5	4	4	1	1	1	1	2	8	10	2	1	1	3.0	10
18-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1.0	2
19-Sep	1	Z	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2
20-Sep	1	Z	1	1	1	1	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
21-Sep	1	Z	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.5	1
22-Sep	1	Z	0	0	1	1	1	1	1	2	2	17	22	30	22	4	1	1	1	1	1	1	1	1	4.9	30
23-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	39	47	15	5	4	2	1	1	5.5	47
24-Sep	1	Z	1	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	0.7	2
25-Sep	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.4	1
26-Sep	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
27-Sep	0	Z	0	0	0	0	0	1	1	1	0	1	1	1	1	2	21	29	11	4	2	1	1	1	3.4	29
28-Sep	1	Z	1	1	1	1	1	1	1	10	8	4	16	9	1	1	1	1	11	17	8	2	1	1	4.2	17
29-Sep	1	Z	1	1	1	1	0	5	24	24	10	4	7	11	1	1	1	1	1	1	1	1	1	1	4.3	24
30-Sep	1	Z	1	1	1	1	1	0	1	1	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0.5	1

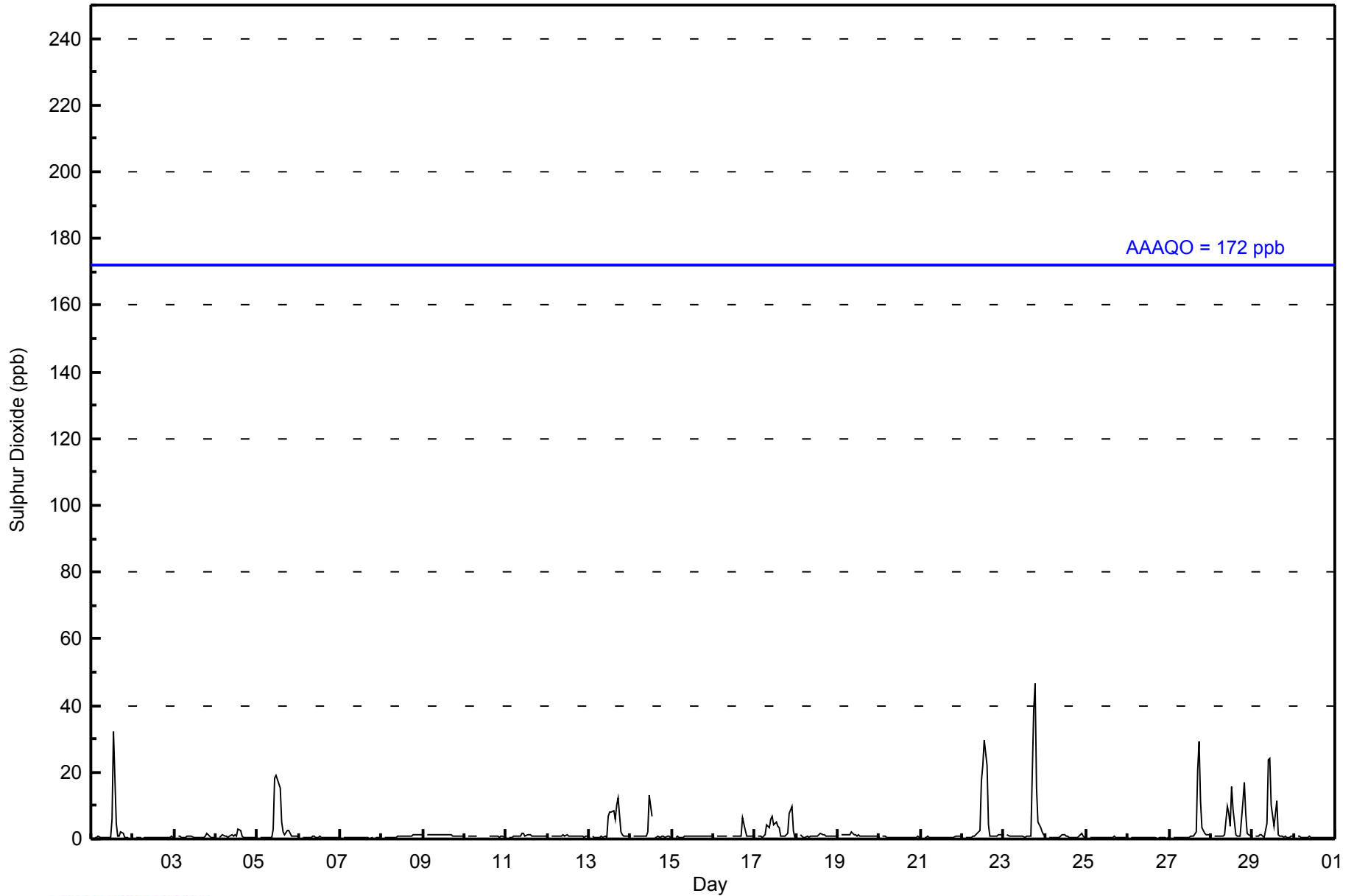
0.7	--	0.7	0.7	0.7	0.7	0.6	0.8	1.0	2.2	2.8	3.1	3.4	4.4	2.5	1.1	1.7	3.5	3.1	1.9	1.3	1.2	0.8	0.7	Diurnal Average	
1	--	1	1	1	1	1	4	5	24	24	19	22	32	22	6	21	39	47	17	8	10	2	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	658	96.62	96.62
11 - 20	13	1.91	98.53
21 - 60	10	1.47	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - September 2014

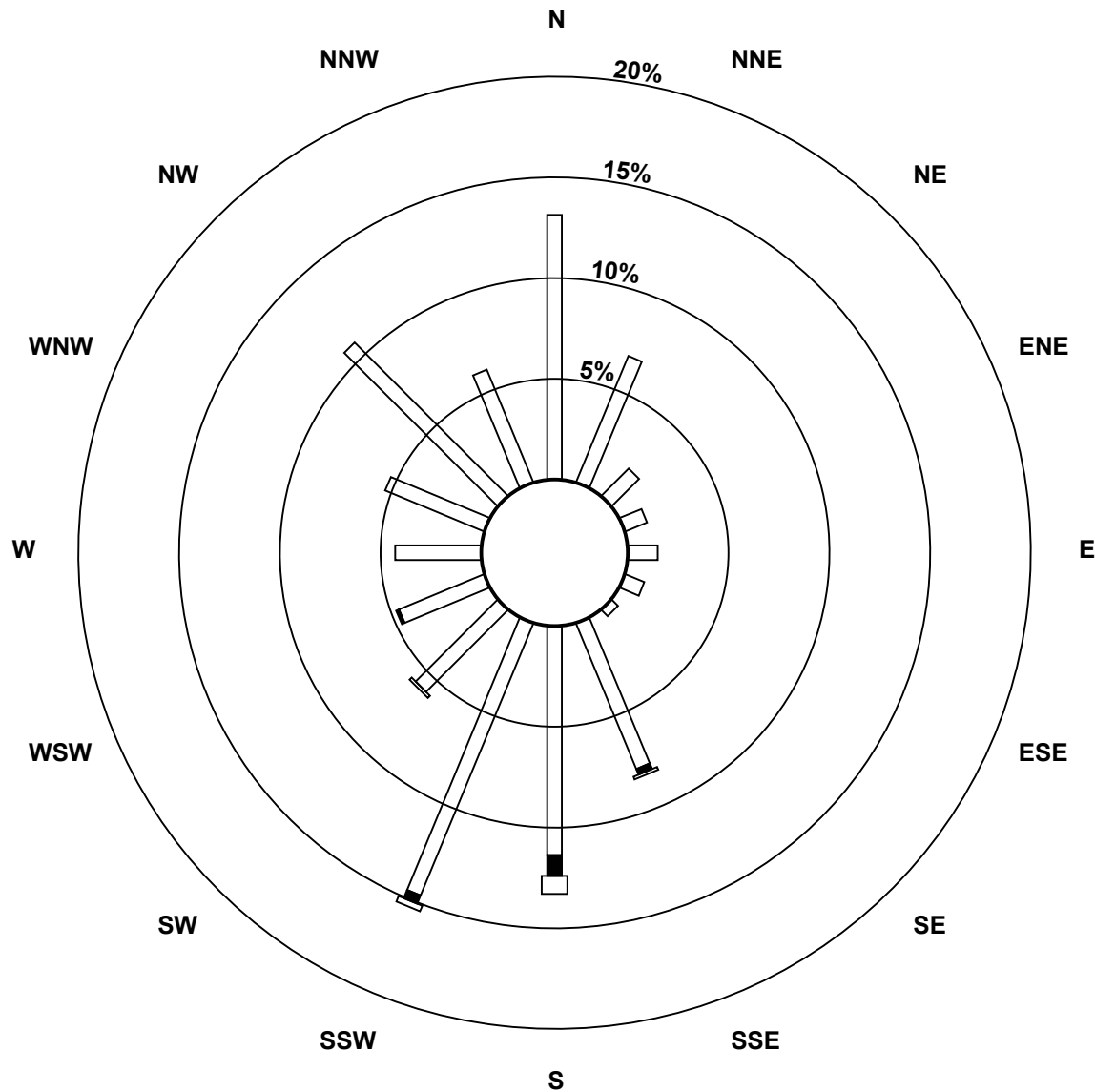
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	89	46	13	8	10	7	3	53	77	99	39	31	29	36	73	41	654
11 - 20	0	0	0	0	0	0	0	2	7	3	0	1	0	0	0	0	13
21 - 60	0	0	0	0	0	0	0	1	6	2	1	0	0	0	0	0	10
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	46	13	8	10	7	3	56	90	104	40	32	29	36	73	41	677

Total Number of Valid Hours: 677

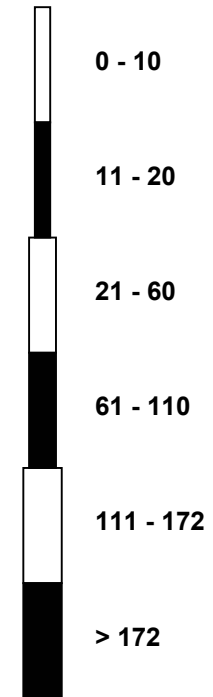
Total Number of Hours: 720

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

**Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter (AMS 1)**



Classes (ppb)

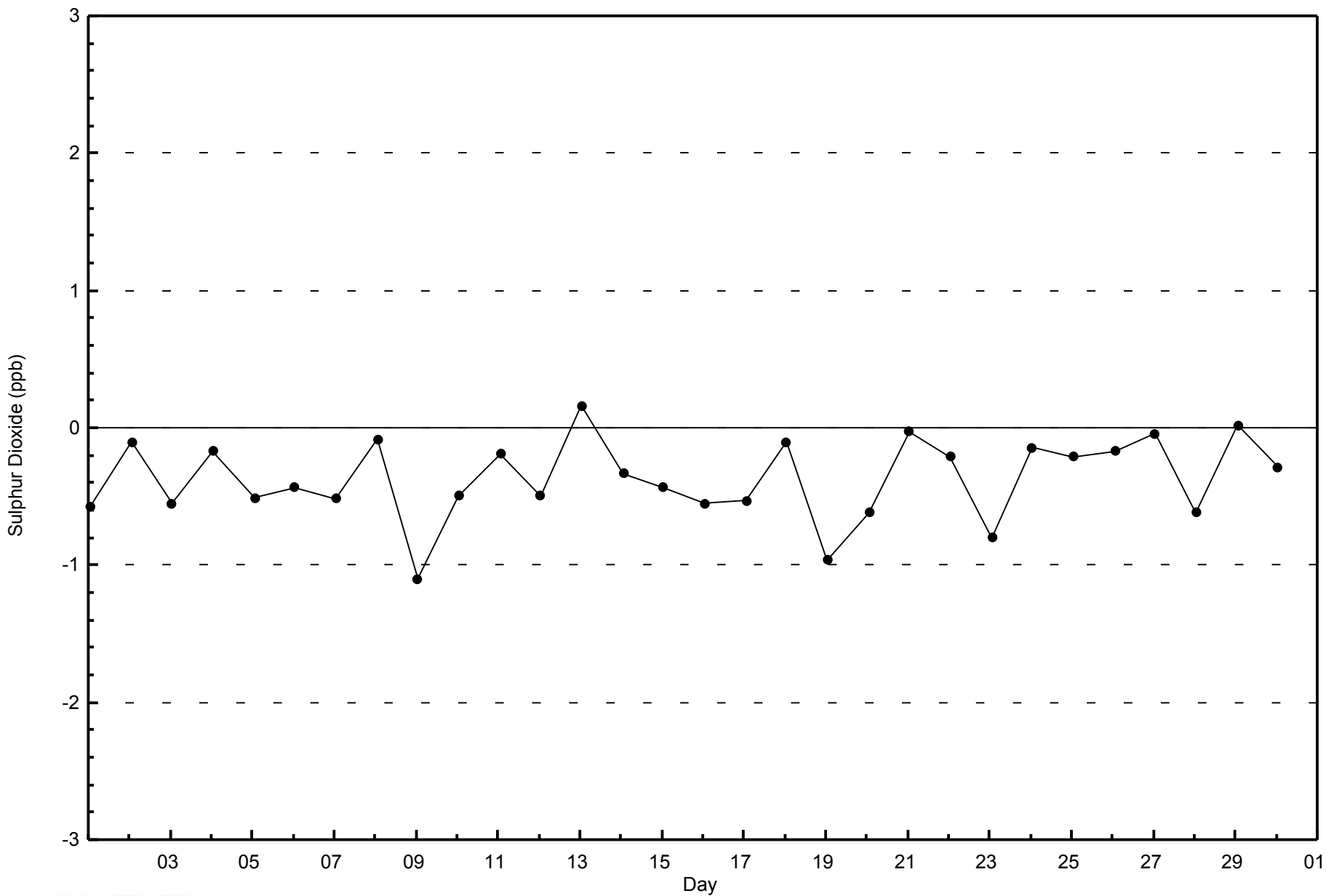


Total Number of Valid Hours: 677



WBEA
Zero Responses

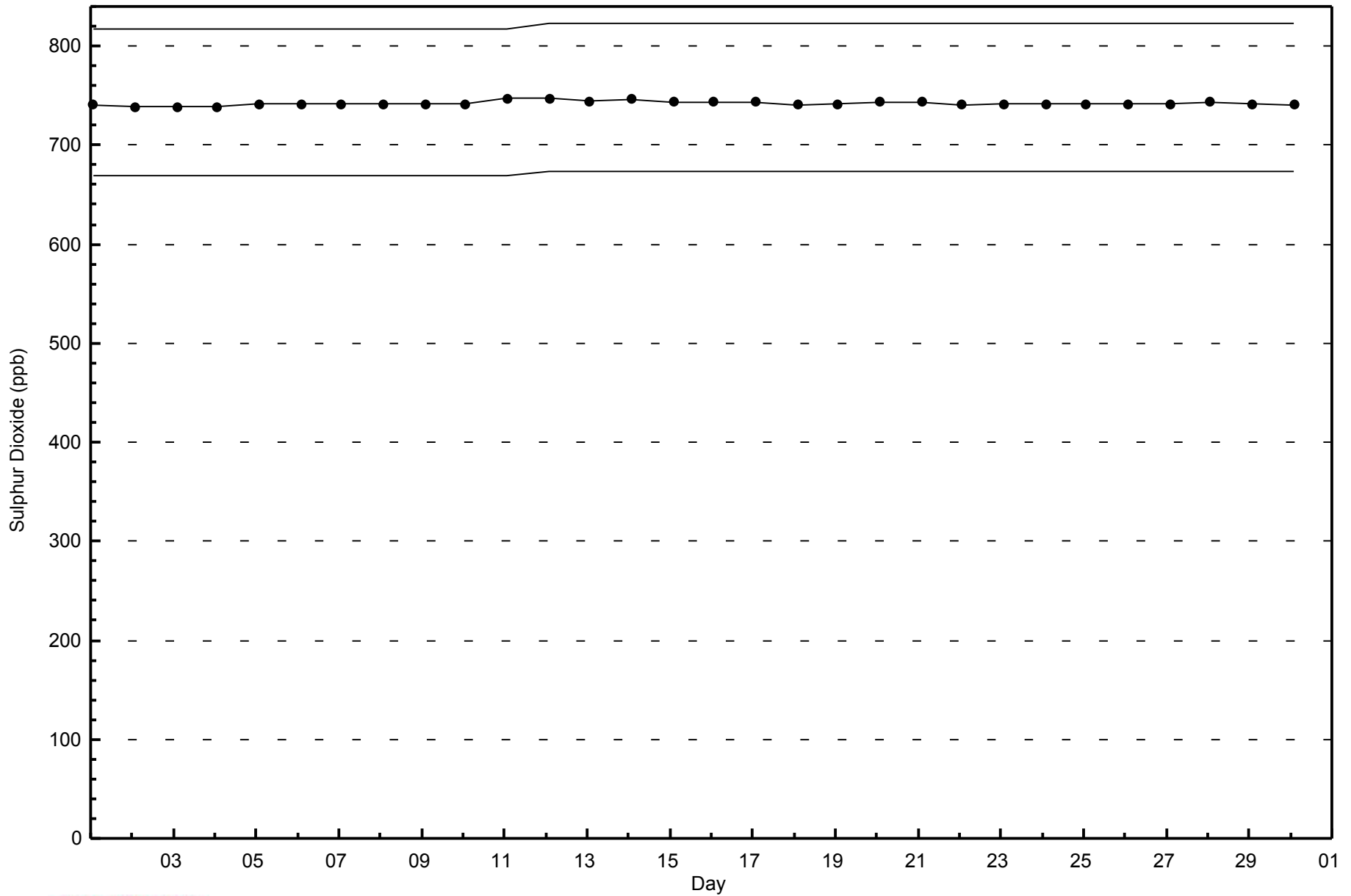
Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 9 ppb on Sep 22 11:00	Maximum Daily Average: 1.8 ppb on Sep 4		Hours of Data:	680
Minimum Value: 0 ppb on Sep 3 04:00	Minimum Daily Average: 0.3 ppb on Sep 8		Hours of Missing Data:	40
Maximum Diurnal Average: 0.9 ppb at hour 11	Minimum Diurnal Average: 0.4 ppb at hour 16		Hours of Calibration:	39
Monthly Average: 0.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 3		Percent Operational Time:	99.9

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	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0	0	0	0.4	1
2-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
3-Sep	0	0	Z	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0.6	2
4-Sep	2	2	Z	4	5	5	3	4	3	4	2	1	1	1	1	0	0	1	0	0	0	0	0	0	1.8	5
5-Sep	0	0	Z	0	0	0	0	0	0	1	2	1	1	1	1	1	1	1	1	1	1	1	0	0	0.6	2
6-Sep	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0.4	1
7-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
8-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
9-Sep	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
10-Sep	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	1	0	0	--	1
11-Sep	0	0	Z	0	0	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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
13-Sep	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
14-Sep	0	0	Z	0	0	0	0	1	1	1	1	2	M	0	0	0	0	0	0	0	0	0	0	0	0.6	2
15-Sep	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0.6	1
16-Sep	0	0	Z	0	0	0	0	0	C	C	C	1	1	1	0	0	0	1	1	0	0	0	0	0	0.4	1
17-Sep	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	2	0.8	2
18-Sep	1	1	Z	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0.6	1
19-Sep	0	0	Z	1	1	1	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
20-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
21-Sep	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3	3	0.7	3
22-Sep	3	2	Z	1	1	1	1	2	1	1	9	1	2	2	2	1	0	0	0	0	0	0	0	0	1.5	9
23-Sep	0	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.6	1
24-Sep	1	1	Z	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0.6	1
25-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	0.4	0
26-Sep	0	0	Z	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
27-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0.5	1
28-Sep	1	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0.6	1
29-Sep	1	1	Z	2	1	0	0	0	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0.7	2
30-Sep	0	0	Z	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1

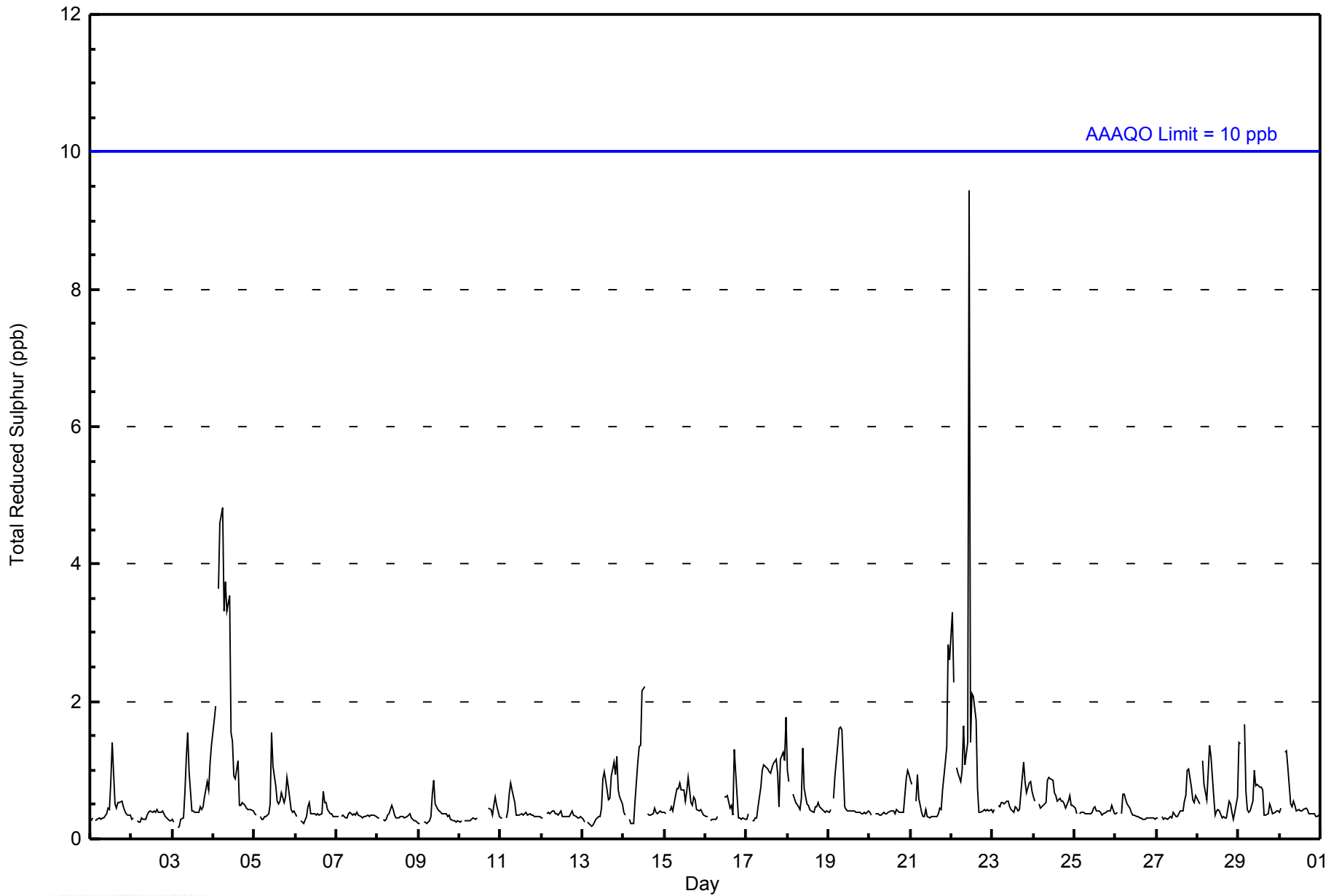
0.6	0.5	--	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.9	0.6	0.6	0.6	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	Diurnal Average	
3	2	--	4	5	5	3	4	3	4	3	4	9	2	2	2	1	1	1	1	1	1	1	1	1	3	3	Diurnal Maximum

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	669	98.38	98.38
3 - 4	8	1.18	99.56
5 - 7	2	0.29	99.85
8 - 11	1	0.15	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

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

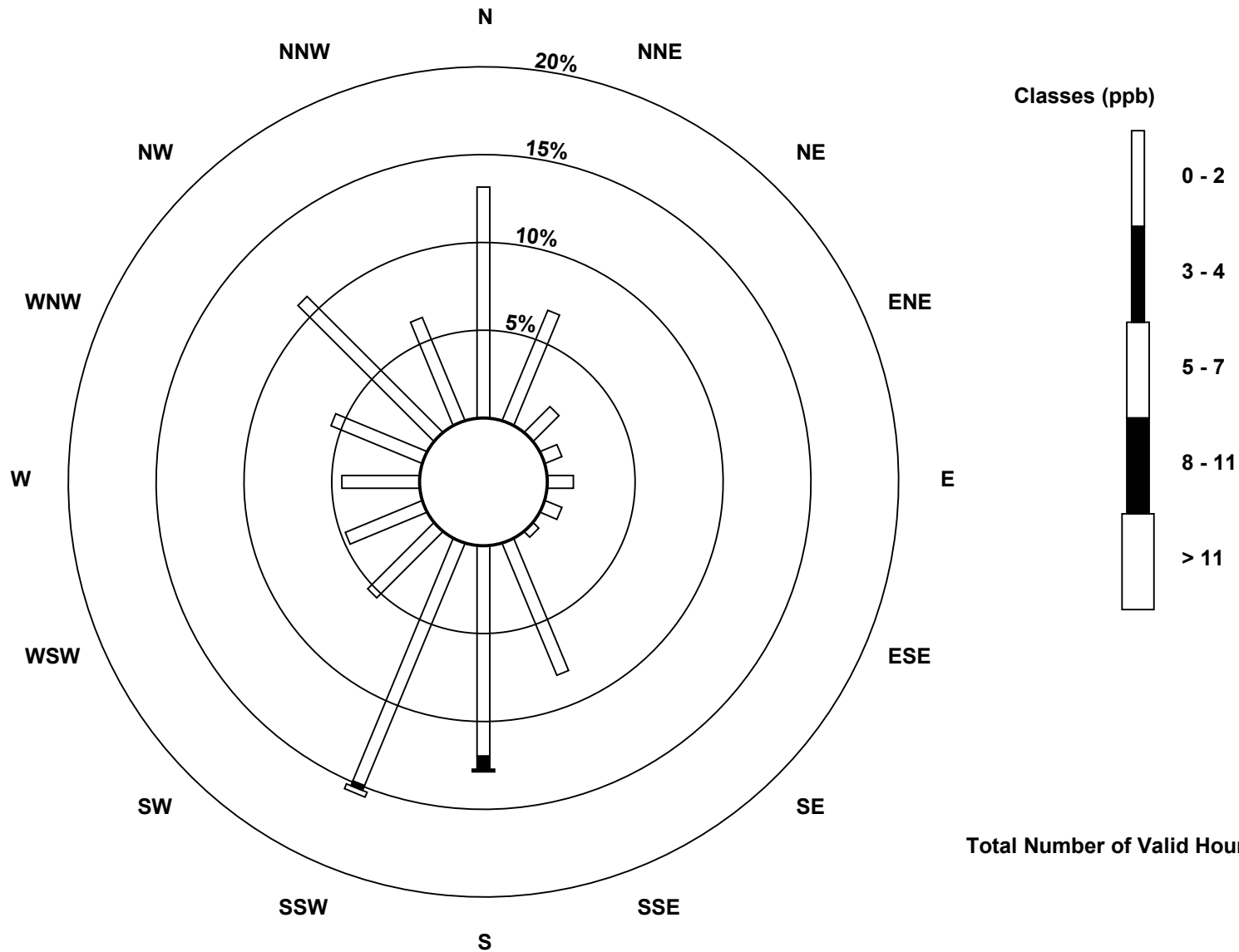
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	89	46	14	7	10	7	3	55	81	101	36	32	30	38	74	43	666
3 - 4	0	0	0	0	0	0	0	0	5	2	0	0	0	0	0	0	7
5 - 7	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
8 - 11	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	46	14	7	10	7	3	55	87	105	36	32	30	38	74	43	676

Total Number of Valid Hours: 676

Total Number of Hours: 720

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

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

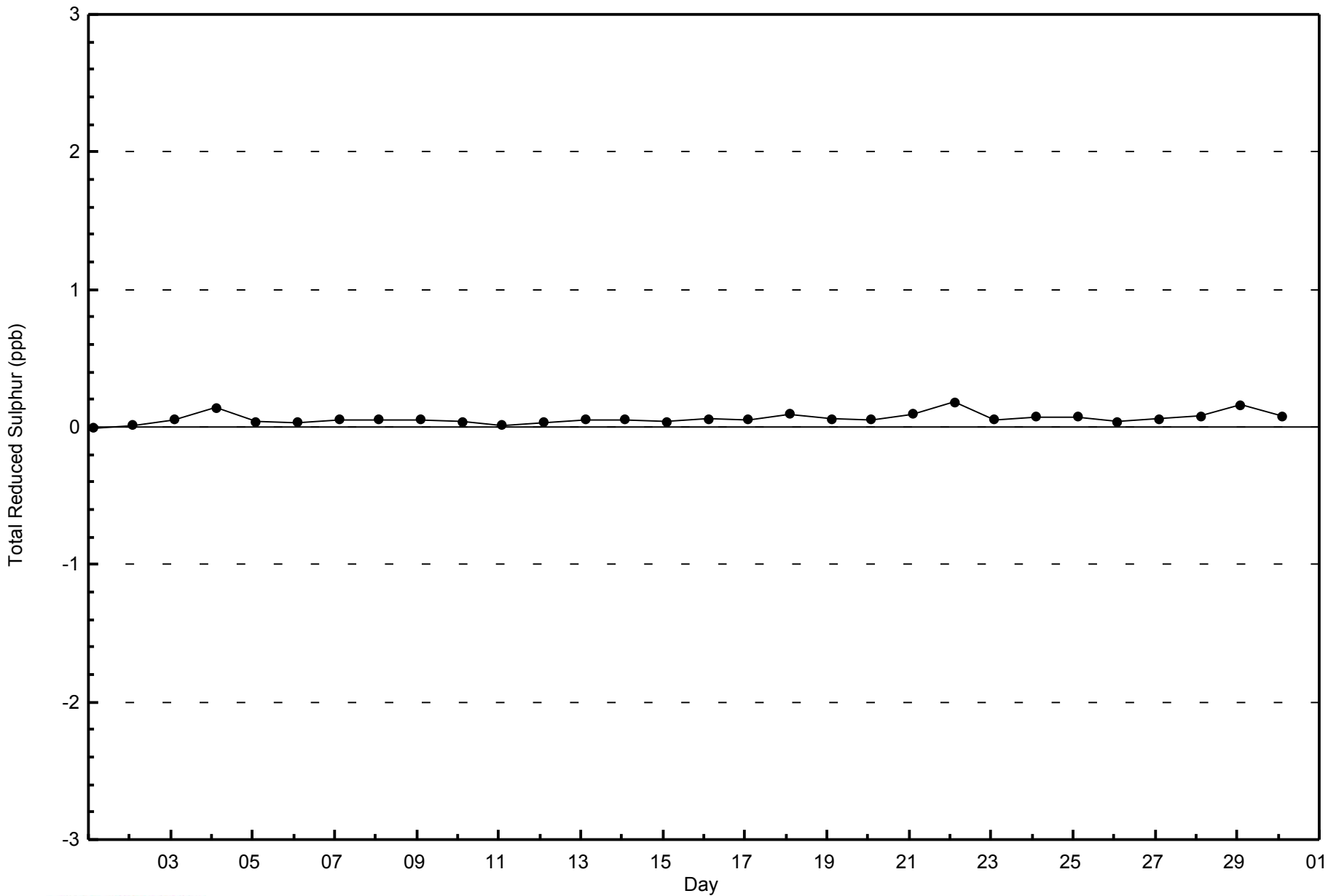


Total Number of Valid Hours: 676



WBEA
Zero Responses

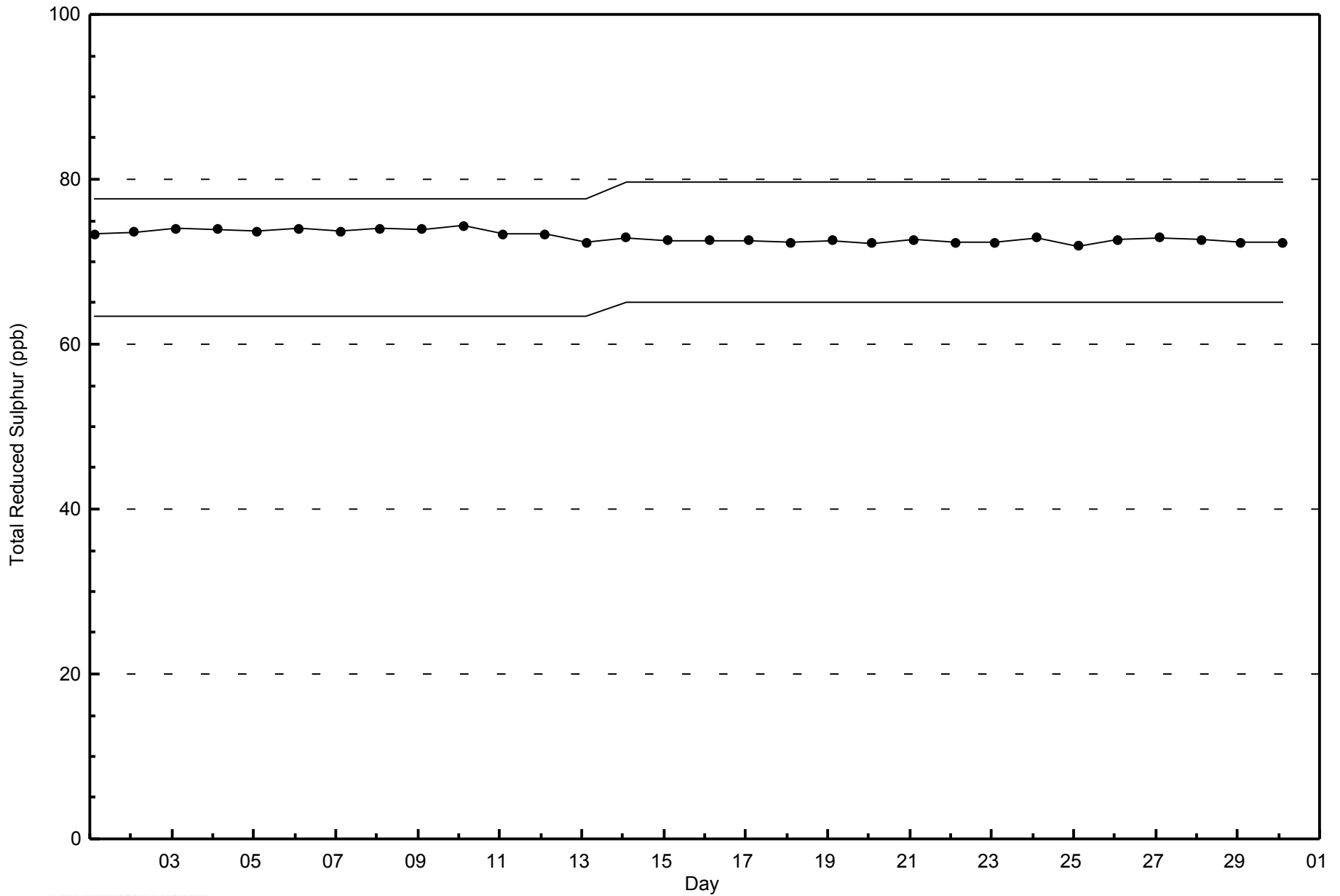
Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - September 2014





WBEA
Span Responses

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



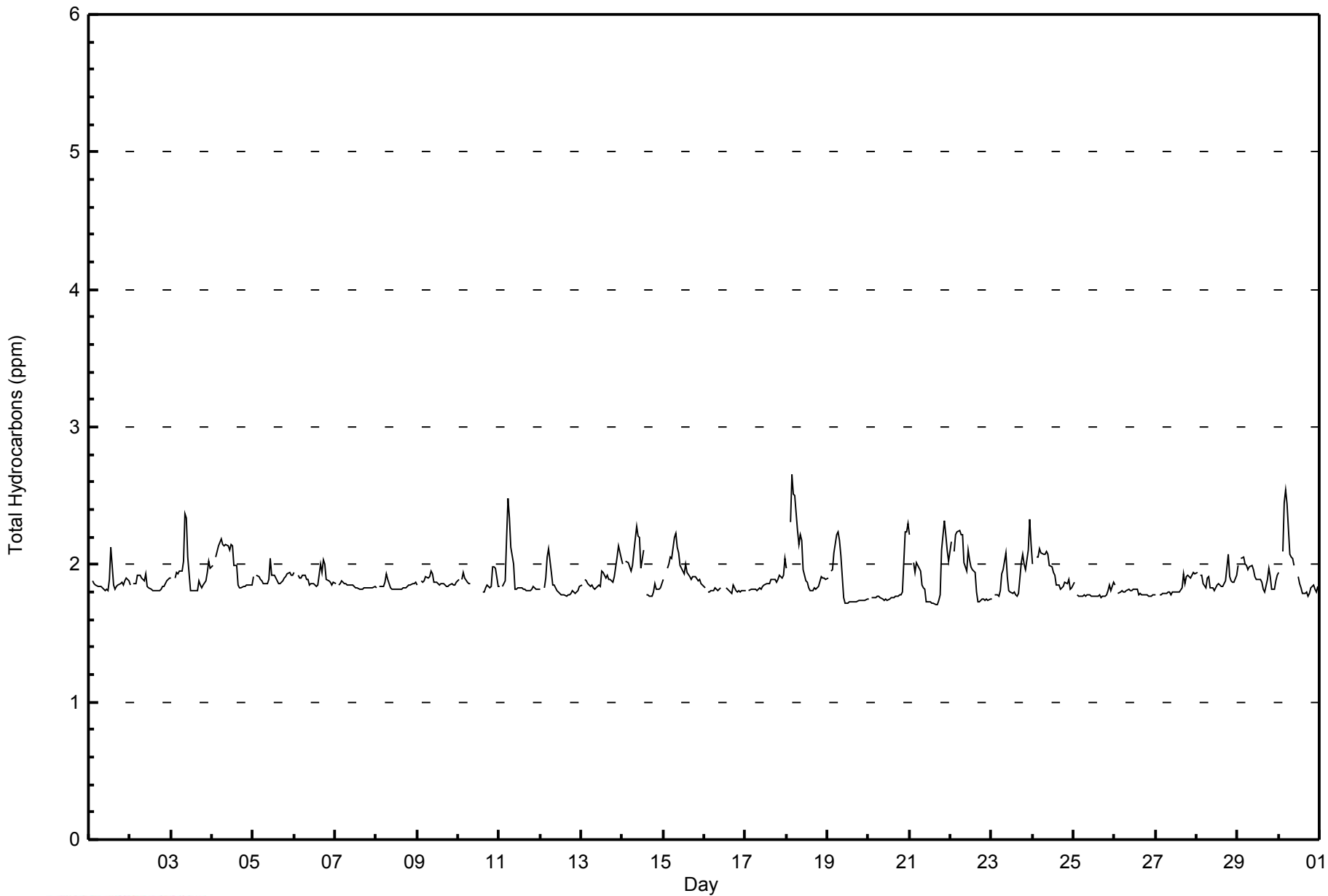


Maximum Value: 2.7 ppm on Sep 18 04:00		Maximum Daily Average: 2.0 ppm on Sep 18		Hours in Service: 720																											
Minimum Value: 1.7 ppm on Sep 21 17:00		Minimum Daily Average: 1.8 ppm on Sep 25		Hours of Data: 679																											
Maximum Diurnal Average: 2.0 ppm at hour 6		Minimum Diurnal Average: 1.8 ppm at hour 17		Hours of Missing Data: 41																											
Monthly Average: 1.89 ppm		Percentiles: P ₁ = 1.7 P ₁₀ = 1.8 Q ₁ = 1.8 Median = 1.9 Q ₃ = 1.9 P ₉₀ = 2.1 P ₉₉ = 2.4		Hours of Calibration: 39																											
				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	1.8	Z	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.1	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1					
2-Sep	1.8	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9					
3-Sep	1.9	Z	1.9	1.9	1.9	2.0	2.0	2.0	2.4	2.3	2.1	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.9	1.9	2.0	2.0	1.9	2.4						
4-Sep	2.0	Z	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.2						
5-Sep	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0						
6-Sep	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.8	1.9	1.9	2.0					
7-Sep	1.9	Z	1.8	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9						
8-Sep	1.8	Z	1.8	1.8	1.8	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.9					
9-Sep	1.9	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	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.0					
10-Sep	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	C	C	C	C	C	C	1.8	1.8	1.8	1.9	1.8	1.8	2.0	2.0	2.0	1.8	--	2.0					
11-Sep	1.8	Z	1.8	1.9	2.2	2.5	2.3	2.1	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.5						
12-Sep	1.8	Z	1.8	1.9	2.1	2.1	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.1						
13-Sep	1.9	Z	1.9	1.9	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.0	1.9	2.1					
14-Sep	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.2	2.2	2.0	2.1	M	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.9	2.0	2.3					
15-Sep	1.9	Z	2.0	2.0	2.1	2.0	2.2	2.2	2.1	2.1	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	2.2						
16-Sep	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	C	C	C	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8						
17-Sep	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0						
18-Sep	2.0	Z	2.3	2.7	2.5	2.5	2.3	2.1	2.2	2.2	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.7						
19-Sep	1.9	Z	2.0	2.0	2.1	2.2	2.2	2.2	2.1	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.9	2.2						
20-Sep	1.7	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.2	2.2	2.3	1.8	2.3					
21-Sep	2.2	Z	2.0	1.9	2.0	2.0	2.0	1.9	1.8	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	2.1	2.3	2.2	2.1	2.0	1.9	2.3					
22-Sep	2.2	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.0	2.0	2.1	2.0	2.0	2.0	1.9	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	2.0	2.2					
23-Sep	1.7	Z	1.8	1.8	1.8	1.8	1.9	2.0	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	2.1	2.0	2.1	2.3	2.1	1.9	2.3						
24-Sep	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	2.0	2.1					
25-Sep	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.8	1.9					
26-Sep	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9						
27-Sep	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9						
28-Sep	1.9	Z	1.9	1.9	1.9	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.9	1.9	2.1	1.9	1.9	1.9	1.9	1.9	2.1						
29-Sep	2.0	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	2.0	1.9	1.8	1.8	1.9	1.9	1.9	2.1					
30-Sep	1.9	Z	2.1	2.4	2.5	2.4	2.1	2.1	2.0	2.0	M	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	2.0	2.5						
	1.9	--	1.9	2.0	2.0	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	Diurnal Average							
	2.2	--	2.3	2.7	2.5	2.5	2.3	2.2	2.4	2.3	2.2	2.1	2.1	2.1	2.0	2.0	1.9	2.0	2.1	2.1	2.3	2.2	2.3	2.3	Diurnal Maximum						
Z - zerospan		C - Calibration			M - Maintenance																										



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	597	87.92	87.92
2.1 - 3.0	82	12.08	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 679

Total Number of Hours: 720



WBEA
Frequency Distribution

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

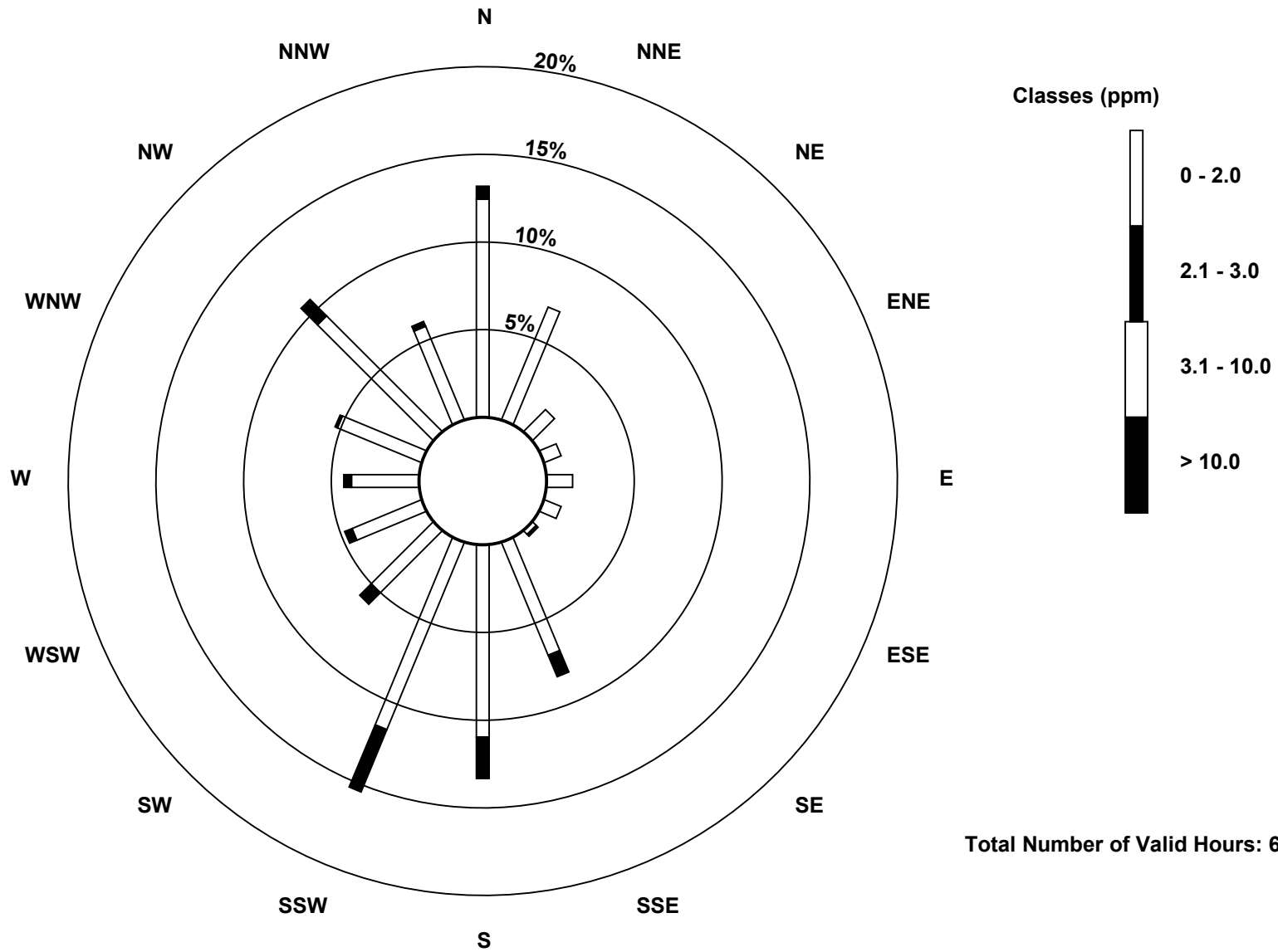
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	84	47	12	7	10	7	2	47	74	78	34	29	26	35	63	39	594
2.1 - 3.0	5	0	0	0	0	0	1	9	16	26	6	3	3	1	9	2	81
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	47	12	7	10	7	3	56	90	104	40	32	29	36	72	41	675

Total Number of Valid Hours: 675

Total Number of Hours: 720

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

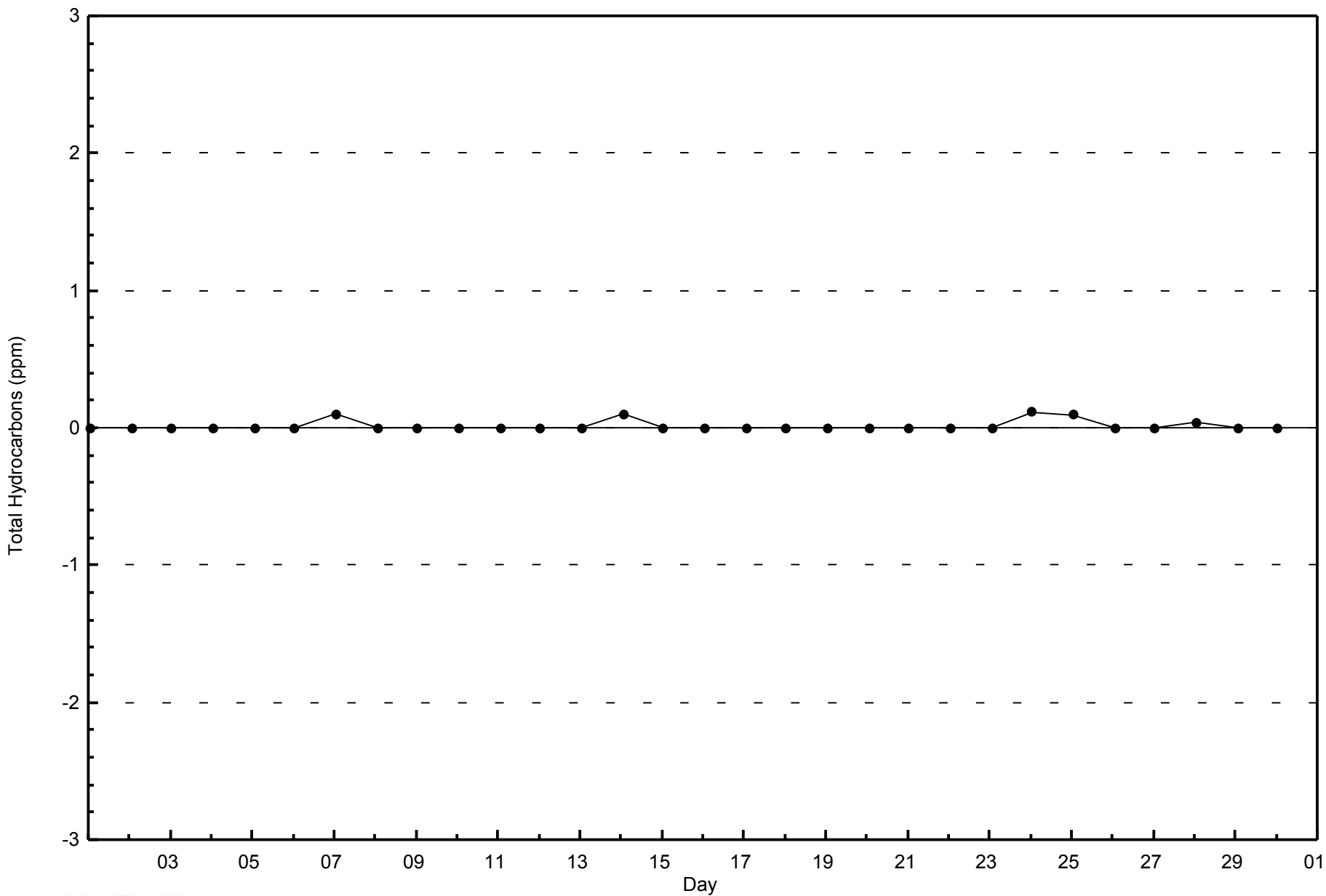
**Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter (AMS 1)**





WBEA
Zero Responses

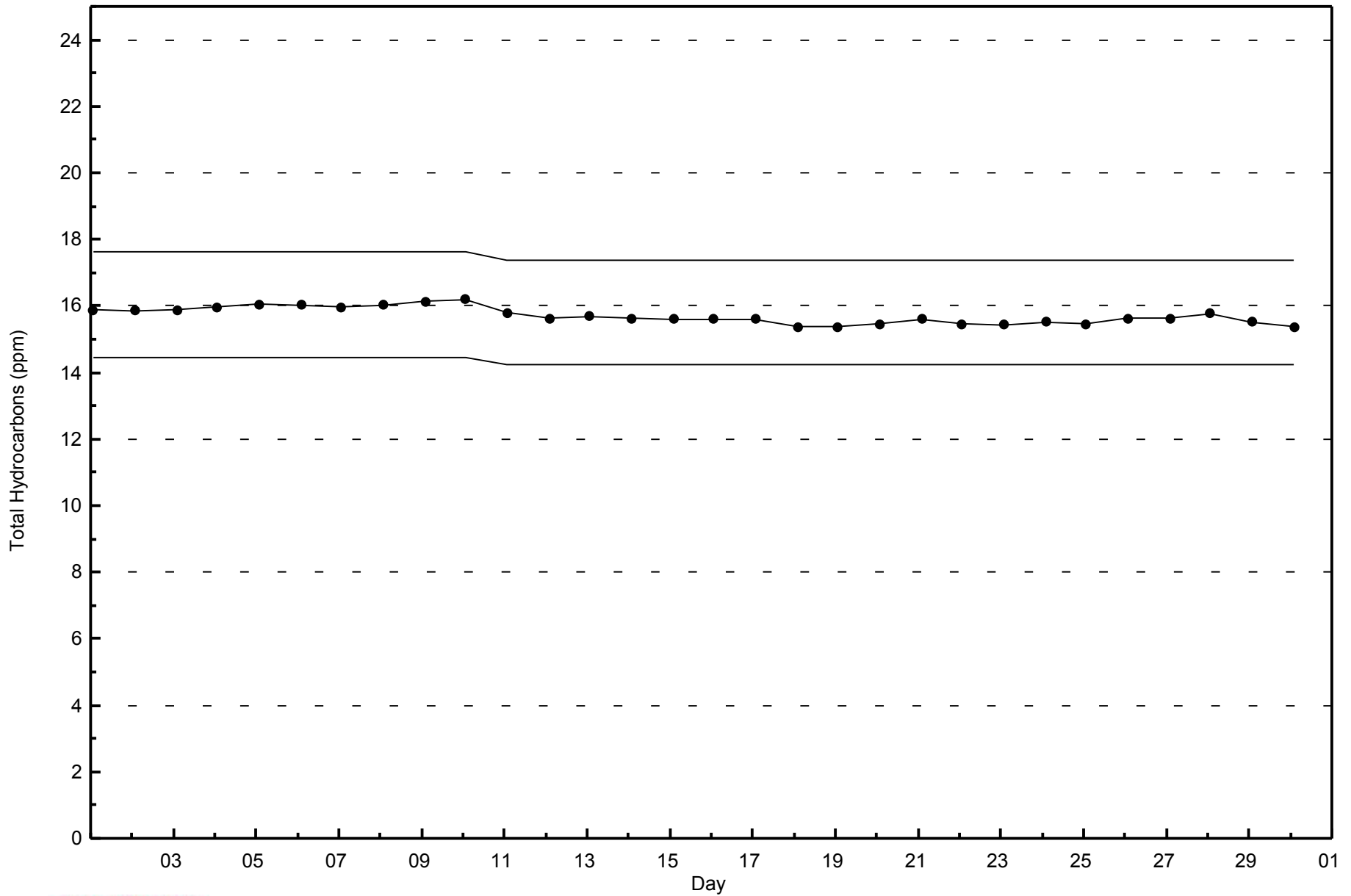
Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - September 2014





WBEA
Span Responses

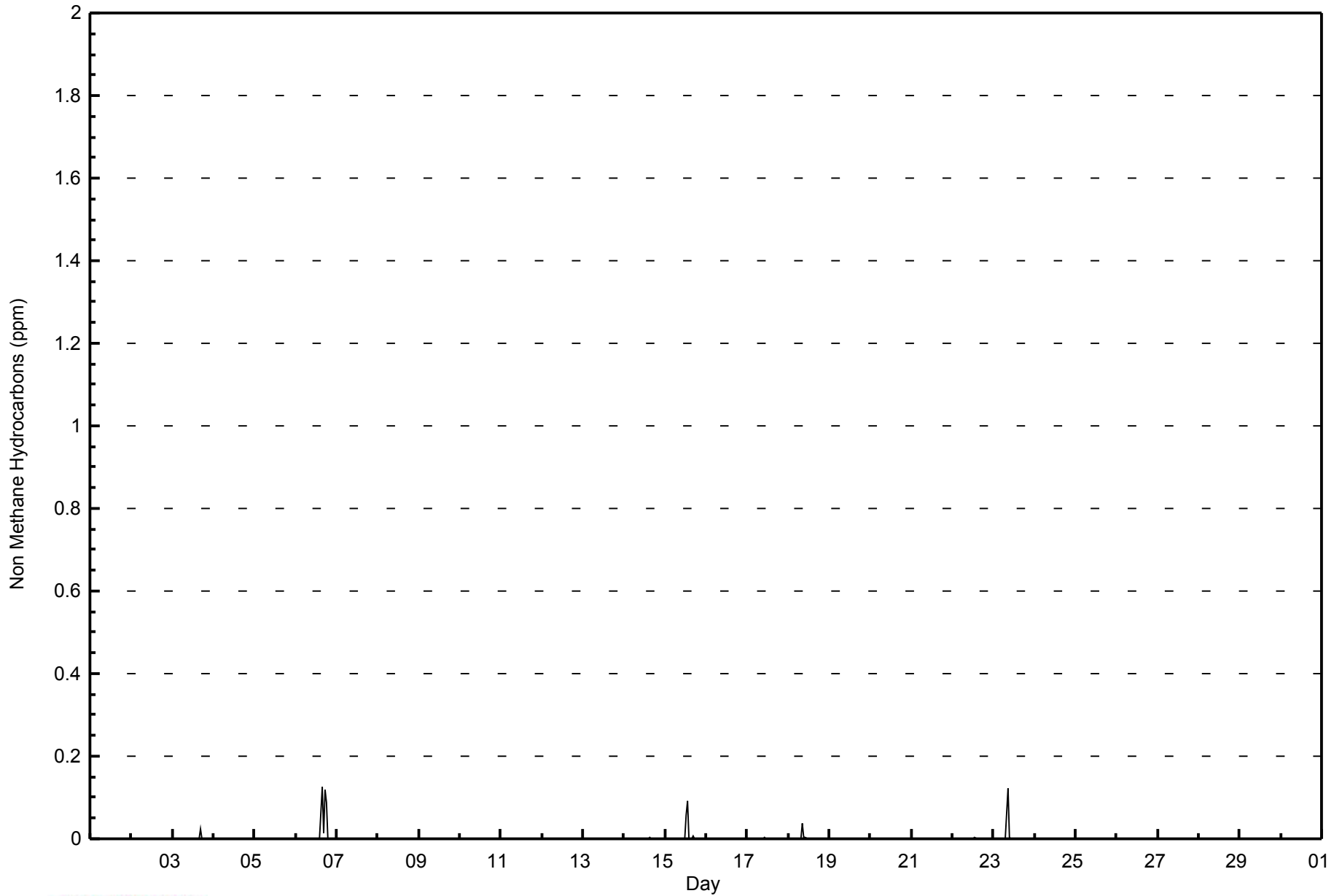
Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - September 2014





WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	669	98.53	98.53
0.006 - 0.05	4	0.59	99.12
0.06 - 0.1	6	0.88	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 679

Total Number of Hours: 720



WBEA
Frequency Distribution

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

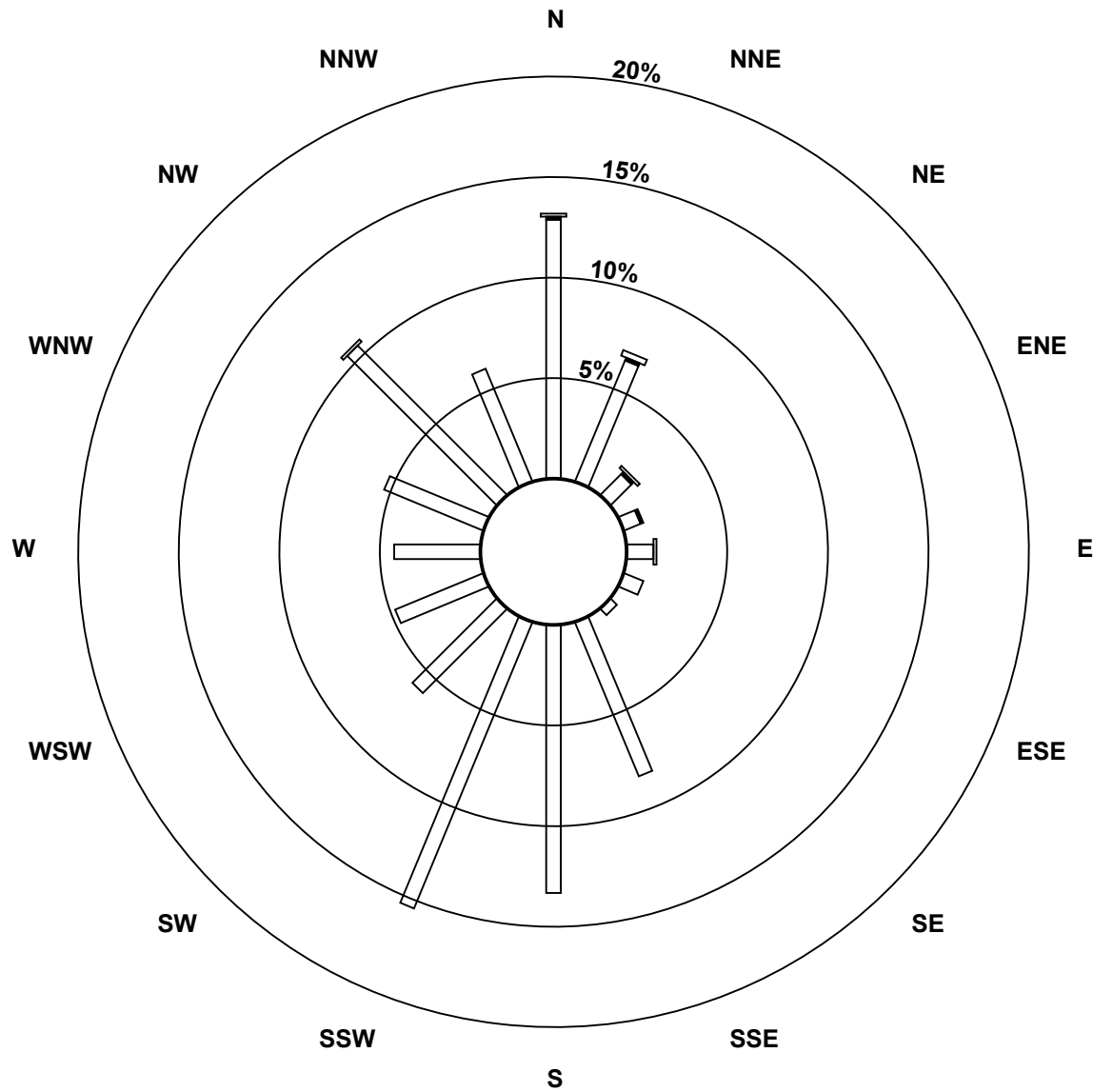
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	87	44	10	6	9	7	3	56	90	104	40	32	29	36	71	41	665
0.006 - 0.05	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	4
0.06 - 0.1	1	2	1	0	1	0	0	0	0	0	0	0	0	0	1	0	6
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	47	12	7	10	7	3	56	90	104	40	32	29	36	72	41	675

Total Number of Valid Hours: 675

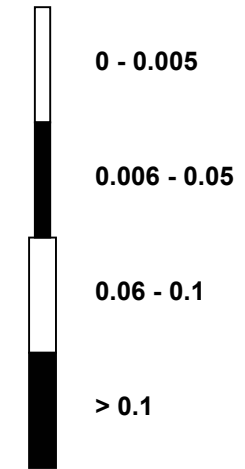
Total Number of Hours: 720

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

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



Classes (ppm)

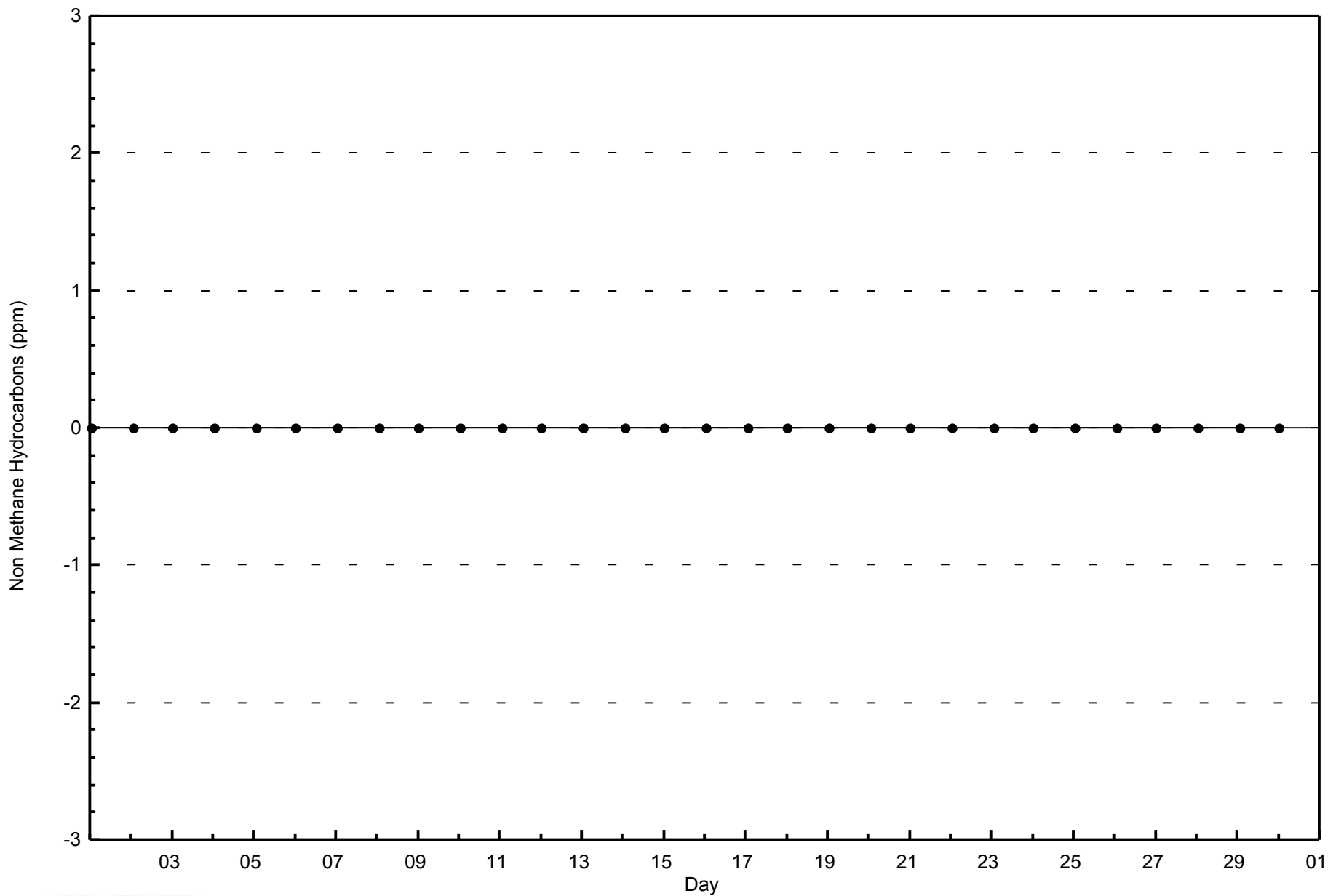


Total Number of Valid Hours: 675



WBEA
Zero Responses

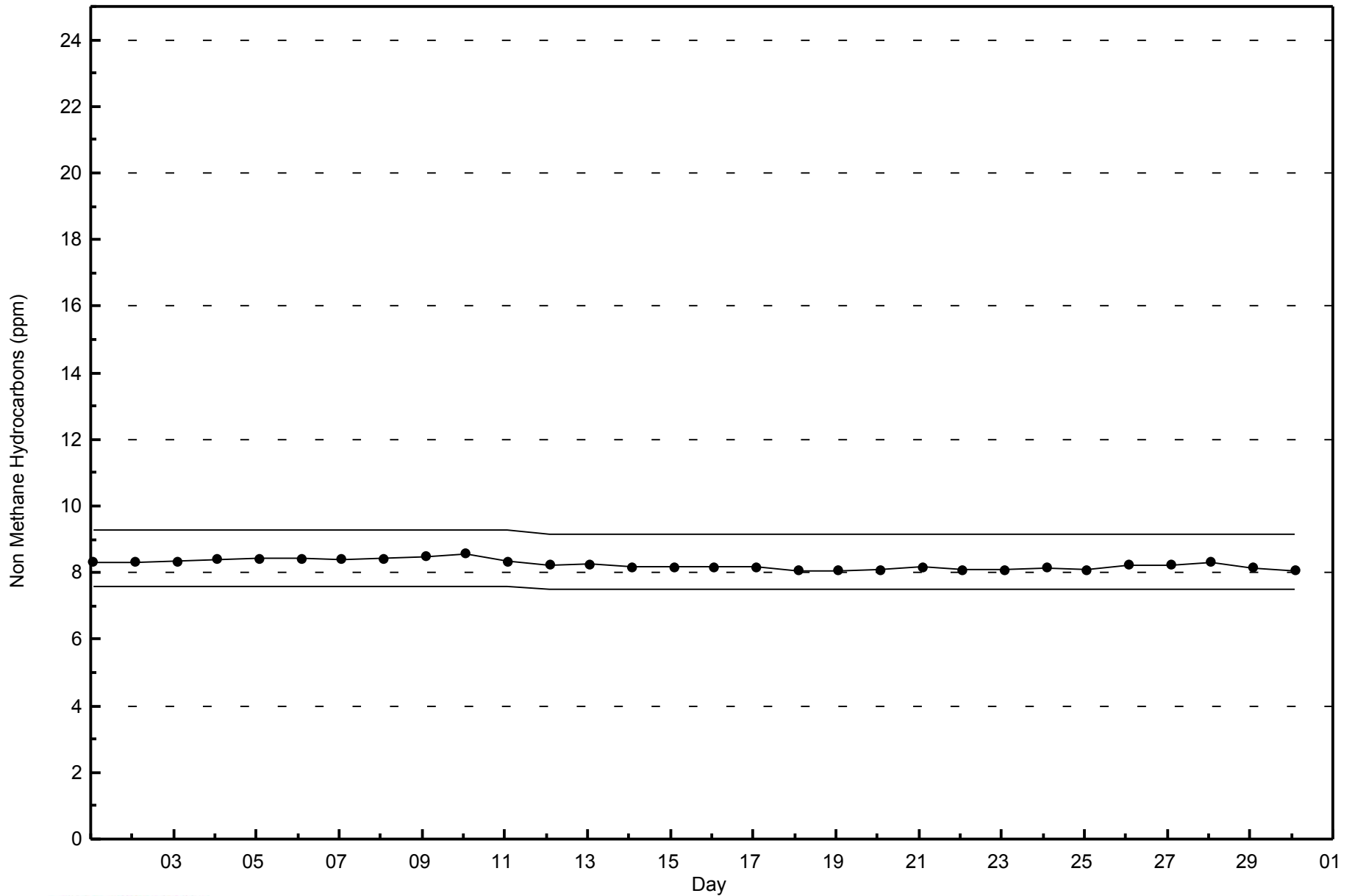
Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - September 2014





WBEA
Span Responses

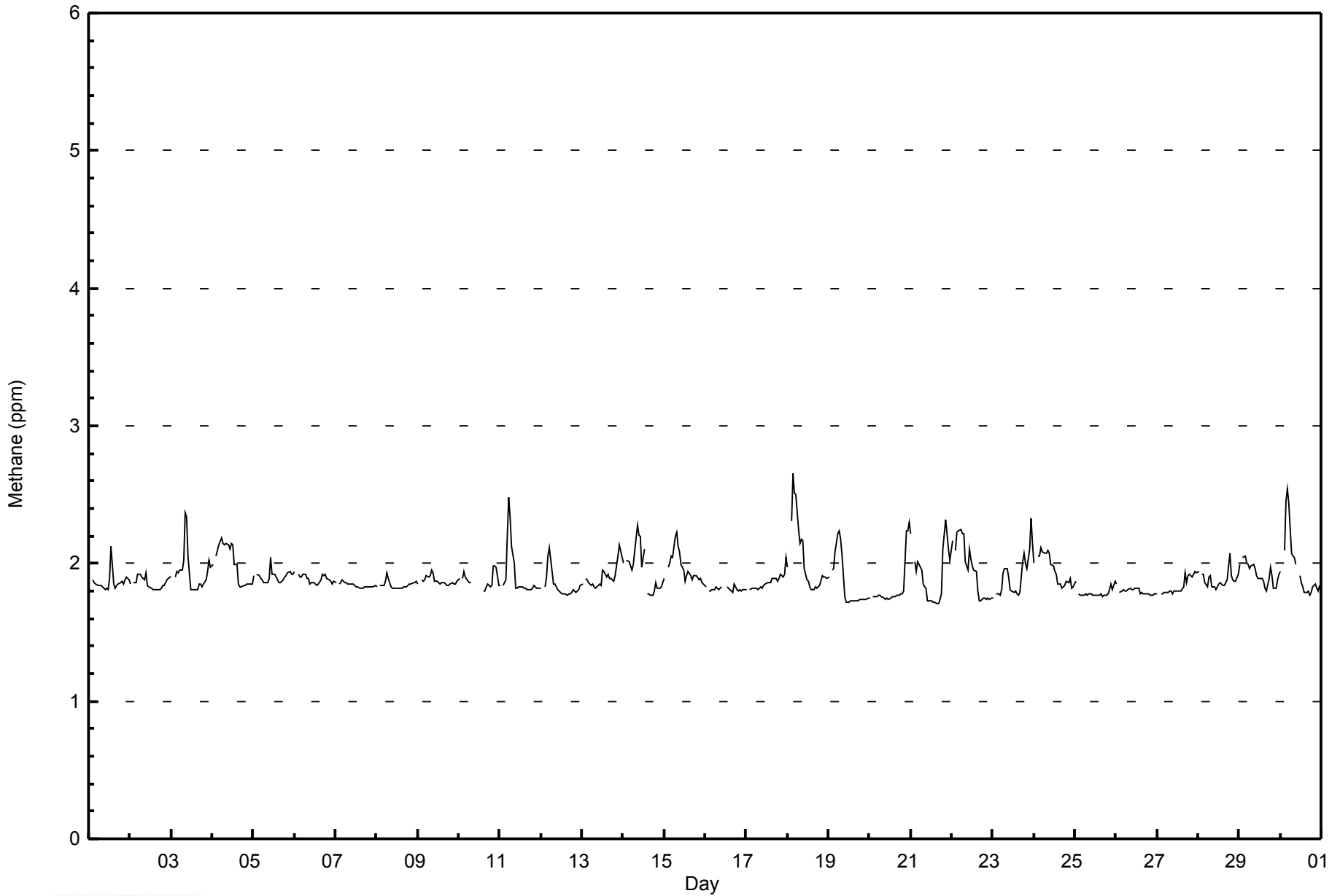
Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - September 2014





WBEA
Hourly Averages

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - September 2014





WBEA
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	598	88.07	88.07
2.1 - 3.0	81	11.93	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 679

Total Number of Hours: 720



WBEA
Frequency Distribution

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - September 2014

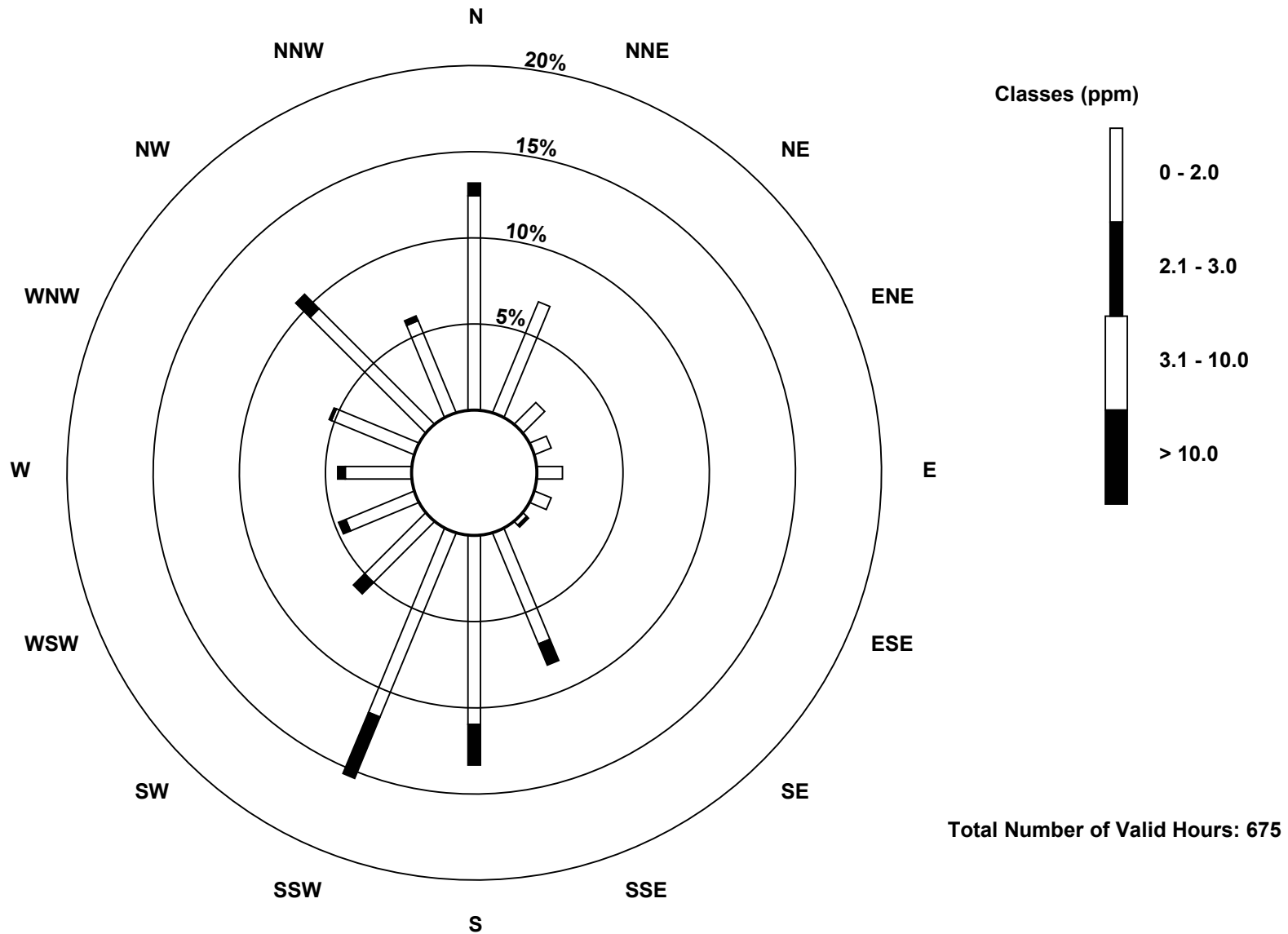
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	84	47	12	7	10	7	2	47	74	78	34	29	26	35	64	39	595
2.1 - 3.0	5	0	0	0	0	0	1	9	16	26	6	3	3	1	8	2	80
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	47	12	7	10	7	3	56	90	104	40	32	29	36	72	41	675

Total Number of Valid Hours: 675

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

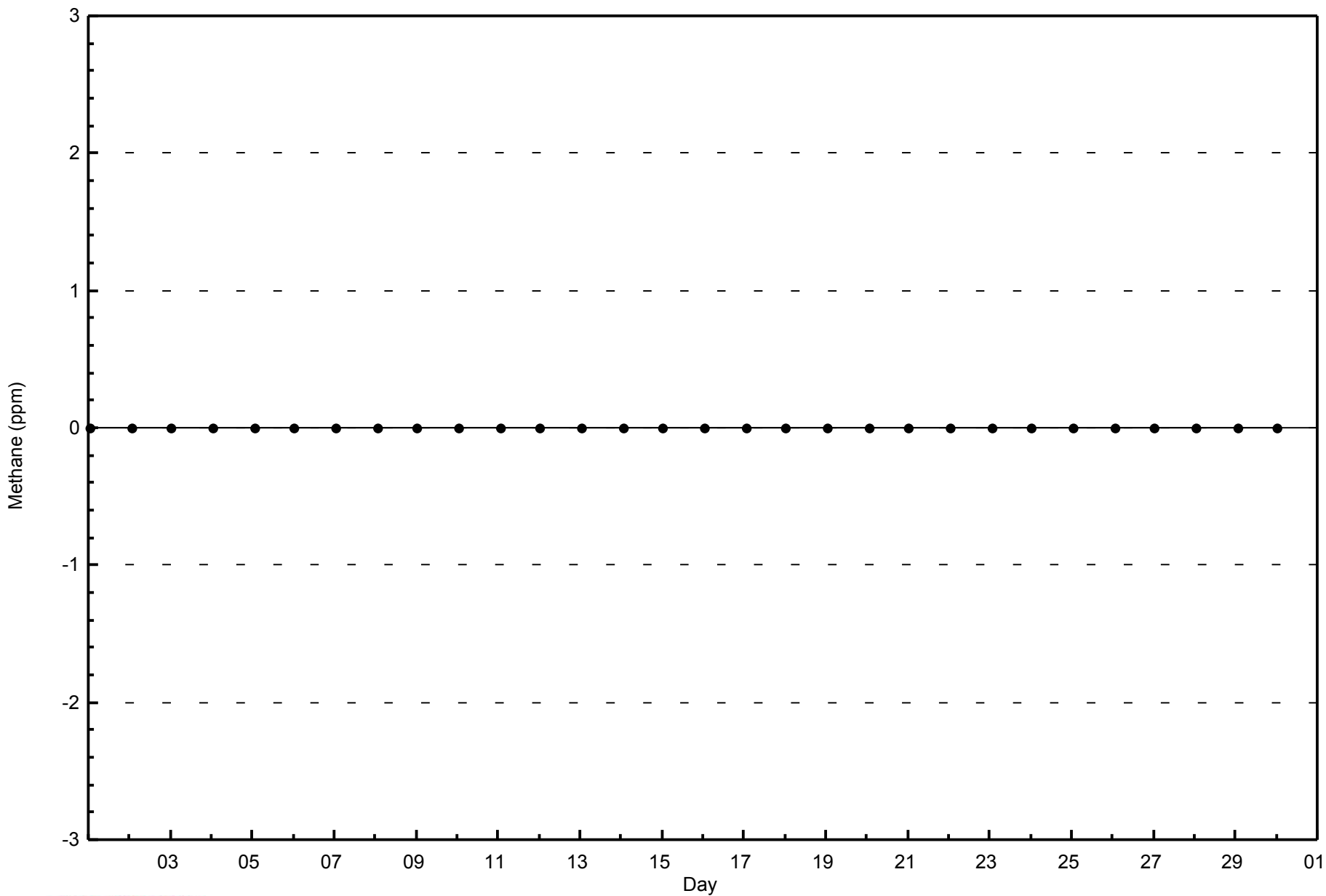
Methane (CH₄) - ppm
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

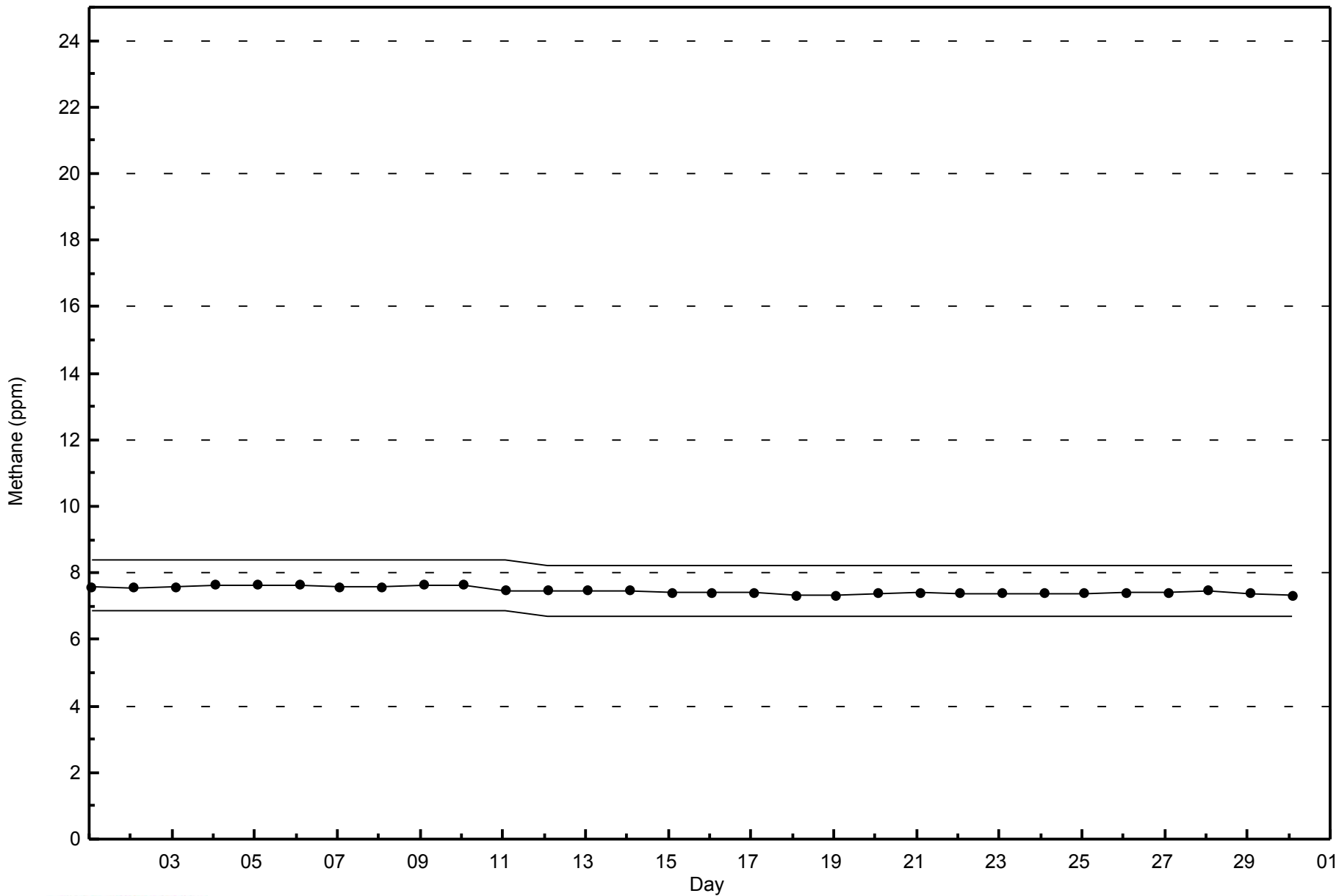
Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - September 2014





WBEA
Span Responses

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - September 2014





Summary of Hour Averages

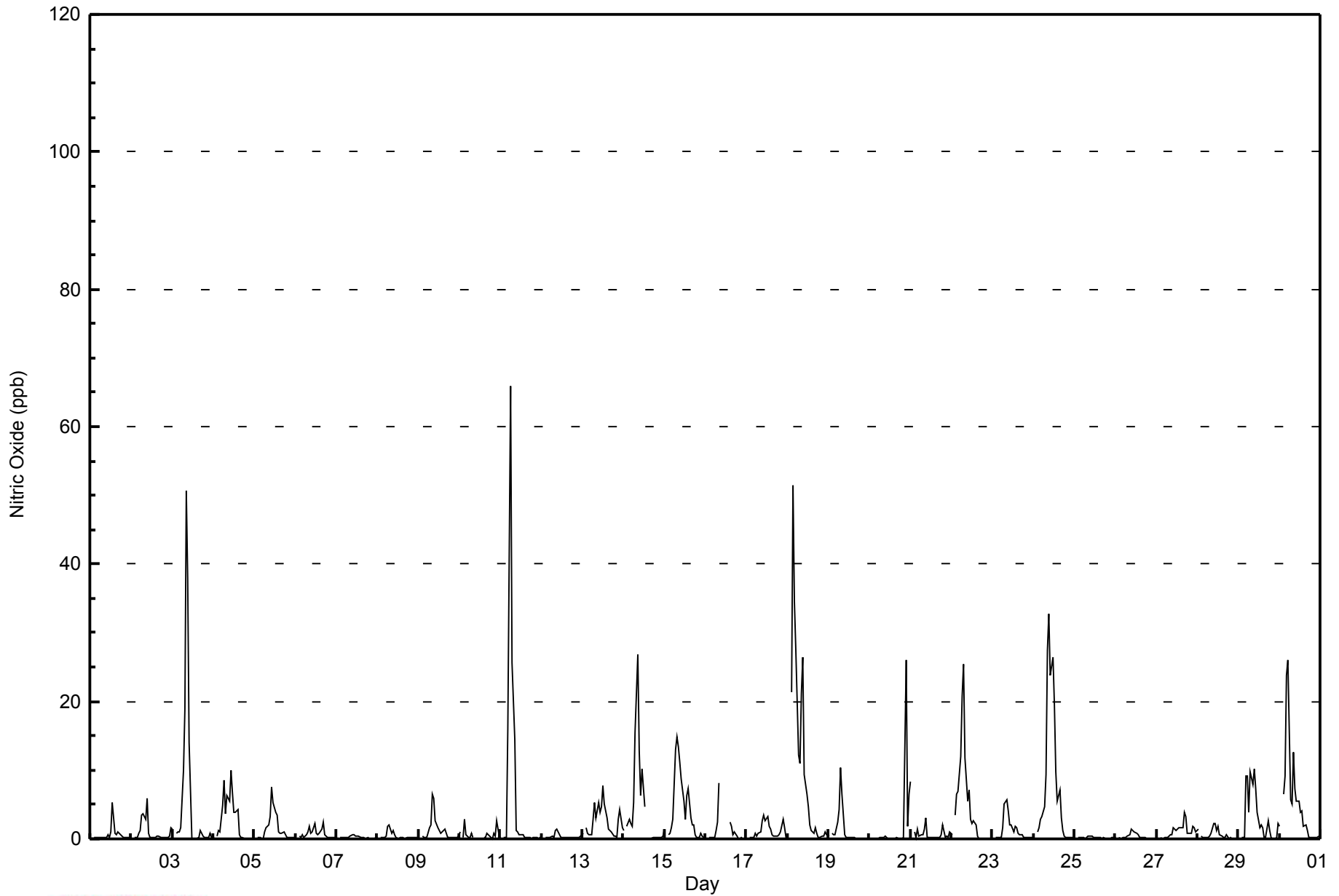
Fort McKay - Bertha Ganter - September 2014

Maximum Value: 66 ppb on Sep 11 07:00		Maximum Daily Average: 10.3 ppb on Sep 18		Hours in Service: 720																							
Minimum Value: 0 ppb on Sep 20 19:00		Minimum Daily Average: 0.2 ppb on Sep 25		Hours of Data: 678																							
Maximum Diurnal Average: 7.9 ppb at hour 9		Minimum Diurnal Average: 0.2 ppb at hour 21		Hours of Missing Data: 42																							
Monthly Average: 2.5 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 2 P ₉₀ = 6 P ₉₉ = 32		Hours of Calibration: 40																							
				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	Z	0	0	0	0	0	0	0	0	1	0	1	5	1	1	1	1	0	0	0	0	0	0	0.6	5	
2-Sep	0	Z	0	0	1	1	3	4	3	6	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1.0	6	
3-Sep	1	Z	1	1	1	2	10	19	51	38	14	0	0	0	0	0	1	1	0	0	0	0	1	0	6.2	51	
4-Sep	0	Z	0	1	1	5	8	4	6	5	10	7	4	4	4	1	0	0	0	0	0	0	0	0	2.7	10	
5-Sep	0	Z	0	0	0	0	1	2	2	3	8	5	4	3	1	1	1	1	1	0	0	0	0	0	1.5	8	
6-Sep	0	Z	0	0	1	0	1	1	2	1	1	2	1	1	1	1	2	1	0	0	0	0	0	0	0.7	2	
7-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	
8-Sep	0	Z	0	0	0	0	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
9-Sep	0	Z	0	0	0	0	2	2	6	6	3	2	1	1	1	1	1	0	0	0	0	0	0	0	1.2	6	
10-Sep	1	Z	0	3	1	0	0	1	0	C	C	C	C	C	0	0	1	1	0	0	1	1	3	0	0.7	3	
11-Sep	0	Z	0	0	16	41	66	26	14	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	7.3	66	
12-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	
13-Sep	1	Z	2	1	1	1	3	5	3	5	4	5	8	5	3	1	1	1	0	0	0	3	4	2	2.6	8	
14-Sep	1	Z	2	3	2	2	5	16	27	13	6	10	5	M	M	0	0	0	0	0	0	0	0	0	4.4	27	
15-Sep	1	Z	1	1	2	3	13	15	13	11	9	6	3	6	7	3	2	2	1	0	0	1	0	0	4.3	15	
16-Sep	0	Z	0	0	0	0	1	3	8	C	C	C	C	C	2	2	1	1	0	0	0	0	0	0	1.1	8	
17-Sep	0	Z	0	0	0	1	0	1	1	3	3	3	3	3	2	1	1	0	0	0	1	1	3	2	1.2	3	
18-Sep	0	Z	21	51	34	28	12	11	21	26	9	6	5	2	1	1	2	1	0	0	0	0	1	1	10.3	51	
19-Sep	0	Z	1	1	1	2	4	10	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	10	
20-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	2	1.6	26	
21-Sep	8	Z	1	0	1	0	1	1	1	3	0	0	0	0	0	0	0	0	1	2	0	0	0	1	1.0	8	
22-Sep	1	Z	4	6	7	12	21	25	12	5	7	3	2	3	2	0	0	0	0	0	0	0	0	0	4.8	25	
23-Sep	0	Z	0	0	0	0	2	5	6	4	2	2	1	2	2	1	1	1	0	0	0	0	0	0	1.2	6	
24-Sep	0	Z	1	2	3	3	5	9	27	33	24	26	20	10	6	7	3	1	0	0	0	0	0	0	7.9	33	
25-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	
26-Sep	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1	
27-Sep	0	Z	0	0	0	0	0	0	1	1	2	1	1	2	2	2	4	3	1	1	1	2	2	1	1.1	4	
28-Sep	1	Z	1	0	0	0	0	0	1	2	2	1	2	1	0	0	0	1	0	0	0	0	0	0	0.6	2	
29-Sep	0	Z	0	0	9	9	4	10	8	10	7	4	2	2	2	0	0	3	1	0	0	0	0	2	3.2	10	
30-Sep	2	Z	7	9	24	26	6	5	13	7	6	5	4	4	2	2	1	0	0	0	0	0	0	0	5.4	26	
		0.7	--	1.4	2.7	3.5	4.6	5.7	5.9	7.9	6.8	4.4	3.3	2.5	2.0	1.4	0.9	0.8	0.6	0.3	0.2	0.2	1.3	0.6	0.6	Diurnal Average	
		8	--	21	51	34	41	66	26	51	38	24	26	20	10	7	7	4	3	1	2	1	26	4	6	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																					



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	657	96.90	96.90
21 - 40	17	2.51	99.41
41 - 80	4	0.59	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



WBEA
Frequency Distribution

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

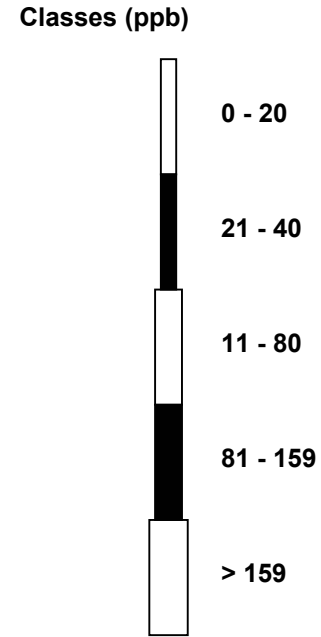
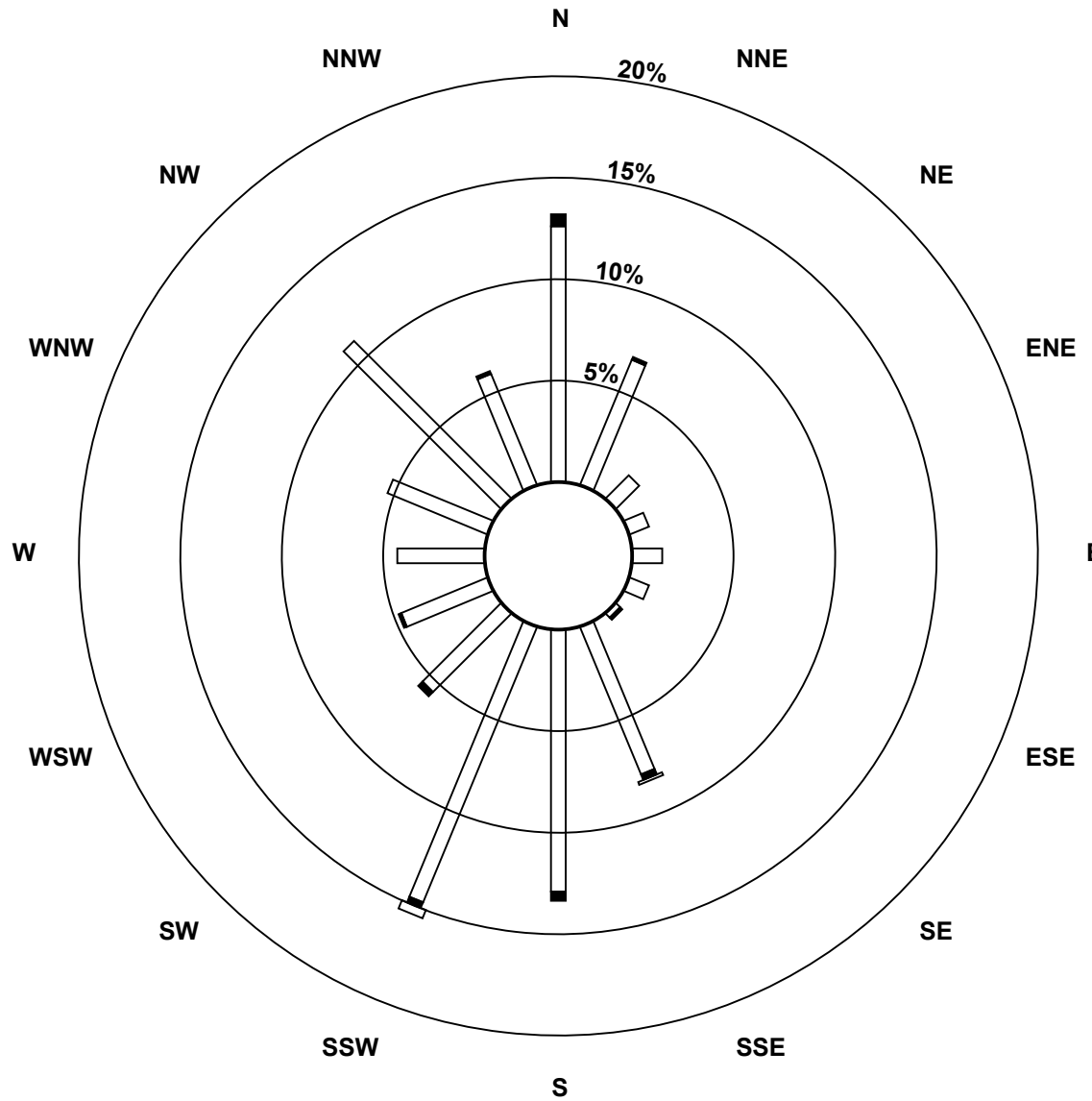
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	85	45	11	7	10	7	2	53	87	99	37	31	29	36	74	40	653
21 - 40	4	1	0	0	0	0	1	2	3	2	2	1	0	0	0	1	17
11 - 80	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	4
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	46	11	7	10	7	3	56	90	104	39	32	29	36	74	41	674

Total Number of Valid Hours: 674

Total Number of Hours: 720

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

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

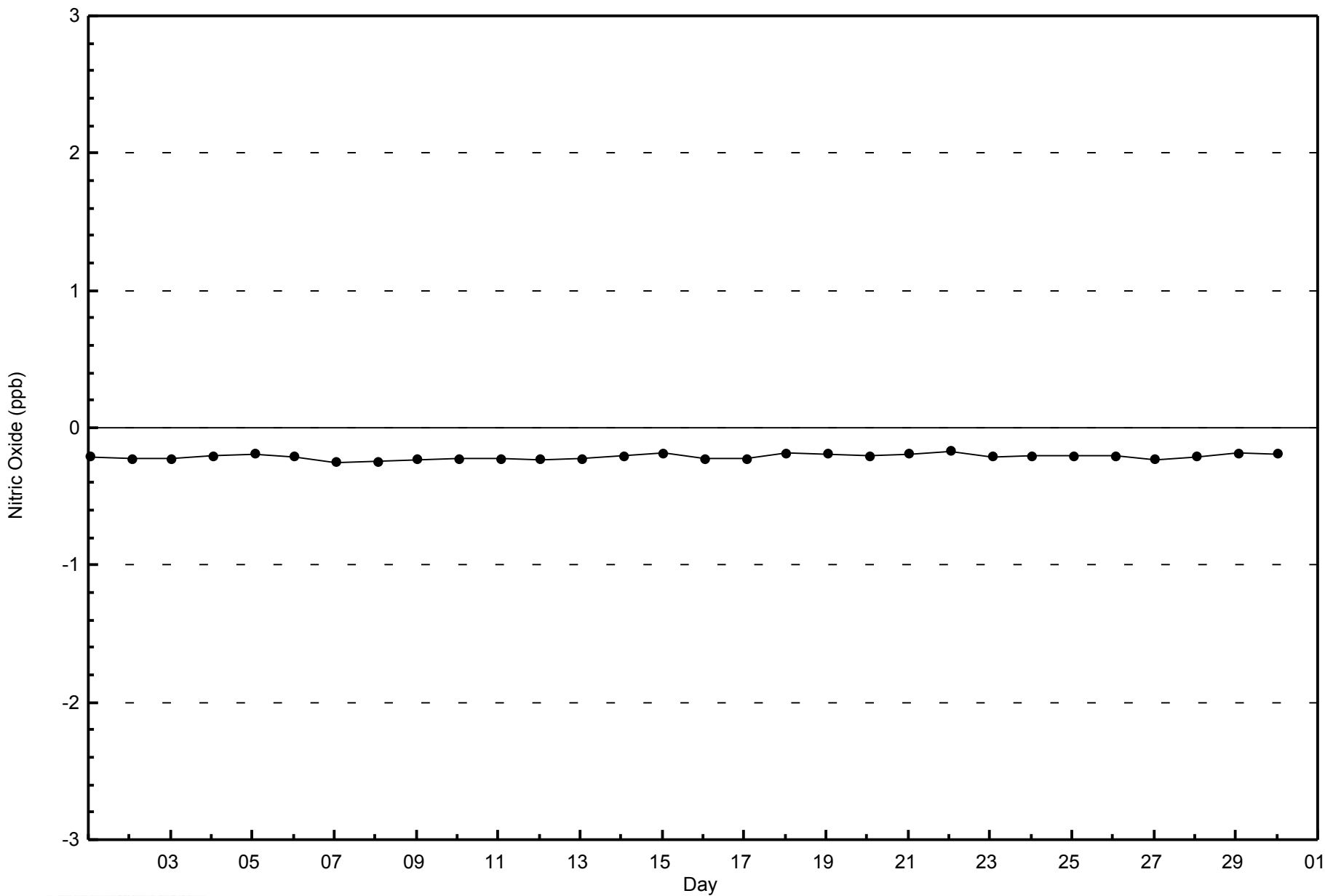


Total Number of Valid Hours: 674



WBEA
Zero Responses

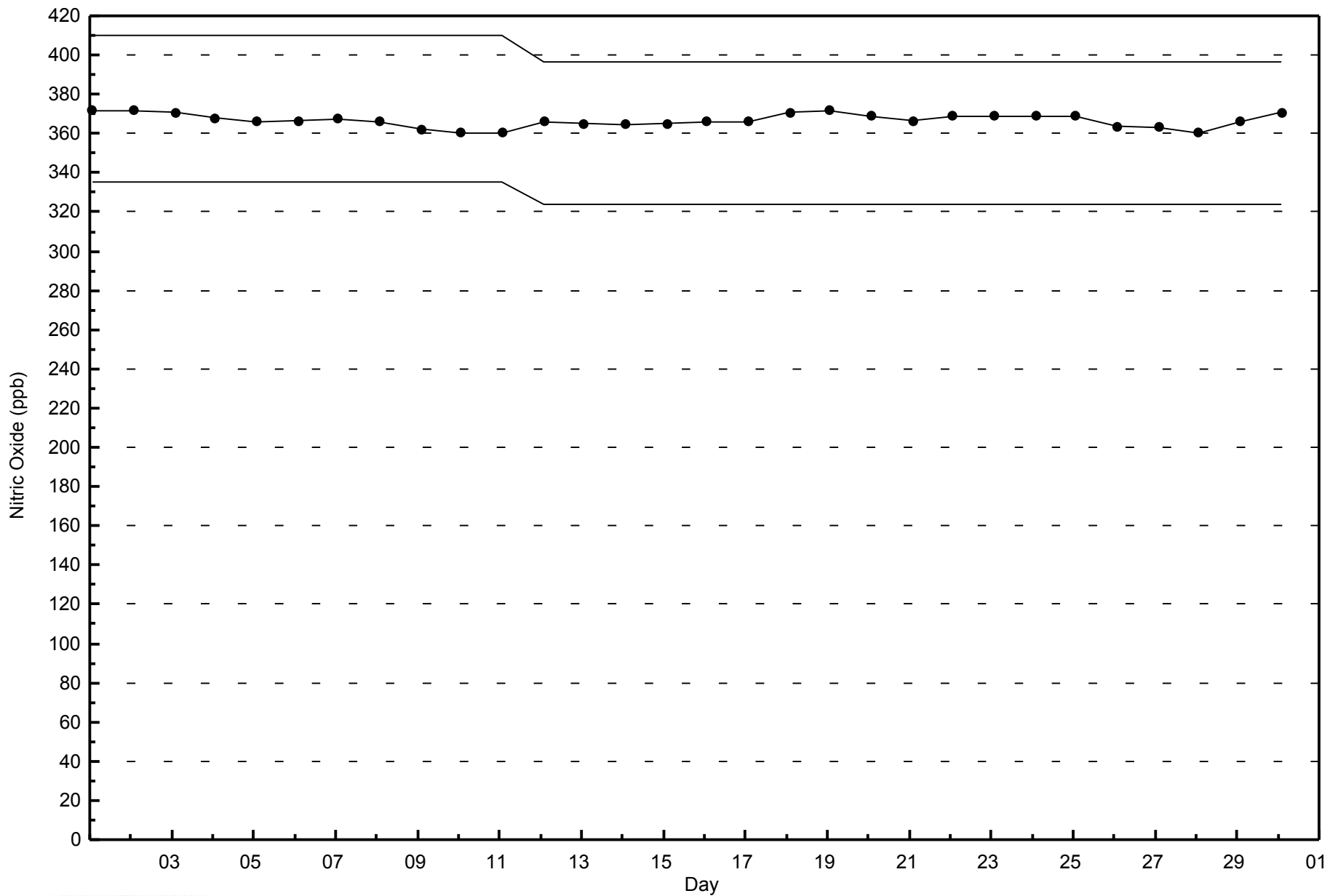
Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter - September 2014





WBEA
Span Responses

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





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 23 ppb on Sep 20 22:00	Maximum Daily Average: 11.0 ppb on Sep 24		Hours of Data:	678
Minimum Value: 0 ppb on Sep 19 23:00	Minimum Daily Average: 1.2 ppb on Sep 7		Hours of Missing Data:	42
Maximum Diurnal Average: 5.4 ppb at hour 9	Minimum Diurnal Average: 3.1 ppb at hour 16		Hours of Calibration:	40
Monthly Average: 4.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 3 Q ₃ = 7 P ₉₀ = 10 P ₉₉ = 19		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	1	Z	1	1	1	1	1	1	1	1	1	1	5	12	4	2	4	5	4	2	2	1	1	1	2.2	12	
2-Sep	1	Z	1	1	1	1	2	2	2	3	2	1	1	1	1	1	1	1	1	1	1	3	2	6	1.4	6	
3-Sep	5	Z	2	1	1	2	3	4	9	10	7	1	1	0	0	1	5	5	4	7	6	8	11	6	4.3	11	
4-Sep	7	Z	9	11	10	12	11	8	8	6	5	6	8	8	7	3	1	2	1	2	3	2	2	2	5.6	12	
5-Sep	3	Z	5	3	2	1	2	2	3	4	10	8	8	8	5	4	4	6	7	6	5	5	4	3	4.7	10	
6-Sep	5	Z	4	2	2	2	3	4	6	3	3	7	2	3	3	7	12	9	8	5	4	4	2	3	4.5	12	
7-Sep	2	Z	1	2	3	2	2	1	2	2	2	1	1	1	1	1	1	0	0	1	1	1	1	1	1.2	3	
8-Sep	0	Z	0	1	1	3	5	4	2	2	1	1	0	1	1	2	1	1	1	3	3	4	3	3	1.8	5	
9-Sep	1	Z	3	2	2	2	4	4	8	9	7	5	4	4	5	6	5	1	1	1	1	1	1	1	3.4	9	
10-Sep	4	Z	3	10	5	2	1	2	1	C	C	C	C	C	1	1	3	4	3	2	11	10	14	1	4.2	14	
11-Sep	1	Z	1	2	15	20	21	16	12	3	2	2	2	2	1	1	1	1	1	3	3	1	1	1	4.9	21	
12-Sep	1	Z	1	4	6	6	3	2	4	3	2	1	1	1	1	1	1	1	2	2	1	1	1	3	2.0	6	
13-Sep	4	Z	4	3	3	2	2	3	2	4	4	5	8	8	7	6	7	9	10	13	8	12	11	8	6.1	13	
14-Sep	5	Z	4	4	3	3	3	5	9	9	8	13	12	M	M	1	1	1	6	8	2	4	6	6	5.2	13	
15-Sep	7	Z	3	4	6	5	7	6	6	7	8	7	6	15	18	12	9	11	10	9	8	12	11	8	8.5	18	
16-Sep	6	Z	3	3	5	5	5	5	9	C	C	C	C	C	4	4	2	6	4	1	2	2	3	2	3.9	9	
17-Sep	2	Z	3	3	4	5	5	5	4	4	4	3	3	2	2	1	1	2	5	8	9	11	9	6	4.3	11	
18-Sep	4	Z	7	9	5	3	2	2	5	9	7	6	6	4	4	4	8	7	7	7	8	5	5	5	5.6	9	
19-Sep	4	Z	9	7	8	12	12	13	9	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	3.4	13	
20-Sep	0	Z	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	1	2	23	11	15	2.5	23
21-Sep	18	Z	11	6	10	7	5	2	2	3	1	0	1	1	0	0	1	3	9	13	8	9	9	15	5.8	18	
22-Sep	10	Z	9	7	7	6	7	12	9	9	11	9	12	14	12	3	1	1	3	3	1	3	1	1	6.5	14	
23-Sep	1	Z	2	1	1	4	11	10	10	6	4	5	3	6	6	4	4	15	19	14	10	8	8	9	7.0	19	
24-Sep	10	Z	8	9	7	7	6	6	14	18	19	21	22	18	15	15	12	10	7	7	6	8	3	4	11.0	22	
25-Sep	7	Z	1	1	1	1	0	1	1	1	1	0	0	1	1	1	0	3	2	3	5	6	5	8	2.1	8	
26-Sep	8	Z	1	4	7	6	8	8	6	9	7	5	4	4	2	2	2	1	1	1	1	1	1	1	3.8	9	
27-Sep	1	Z	1	1	1	0	1	2	2	1	4	3	3	3	3	4	12	17	15	13	10	7	7	7	5.0	17	
28-Sep	6	Z	6	4	2	2	4	3	2	4	3	2	3	1	1	1	1	5	4	7	5	3	2	2	3.1	7	
29-Sep	3	Z	5	7	18	18	14	12	9	10	8	5	3	4	5	1	1	17	16	6	2	2	7	11	8.0	18	
30-Sep	8	Z	8	9	9	7	5	4	6	5	4	4	5	5	5	7	6	2	3	6	4	3	3	6	5.3	9	

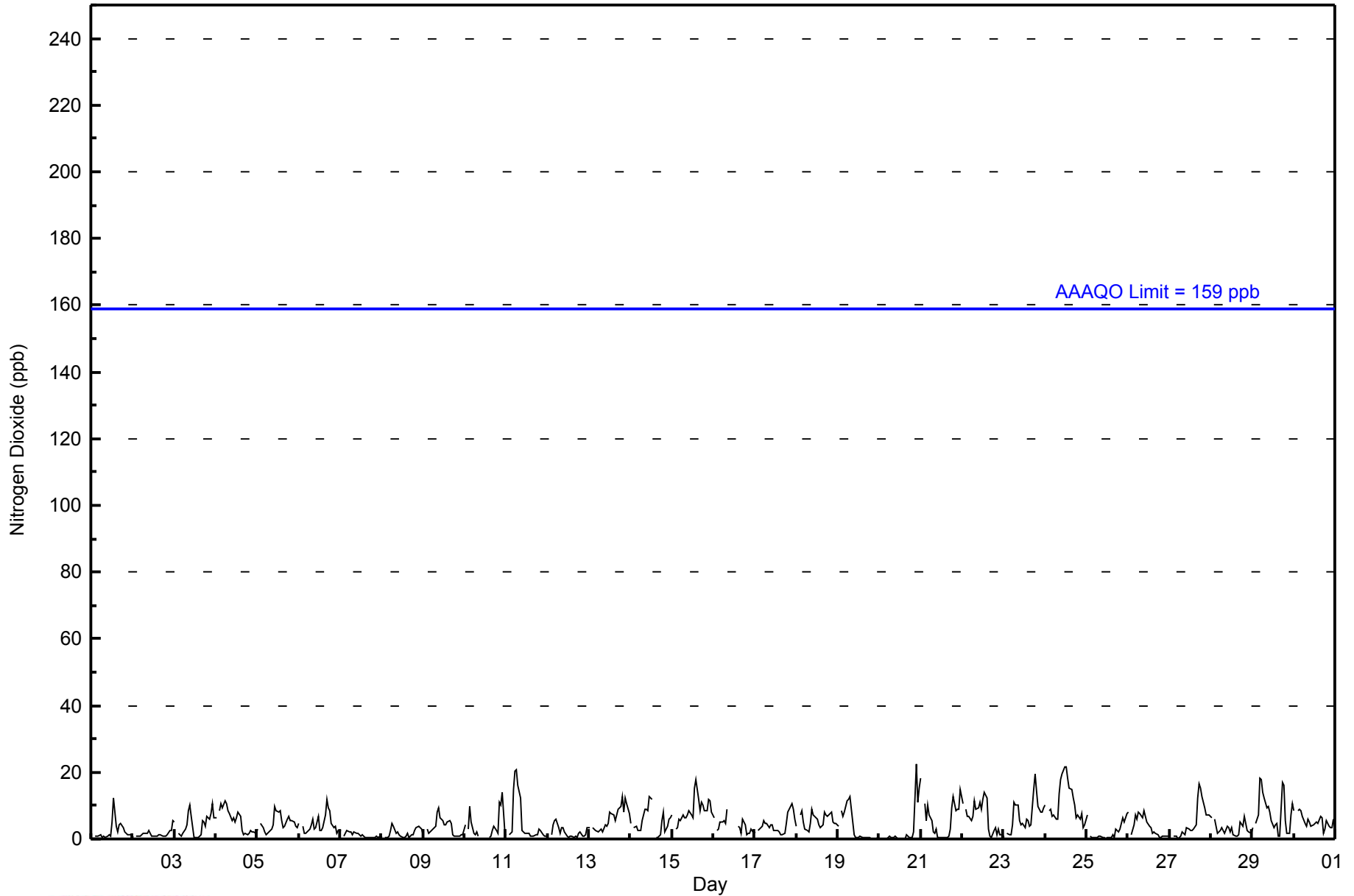
4.5	--	3.7	4.0	4.7	4.9	5.1	4.9	5.4	5.2	4.9	4.3	4.3	4.7	3.9	3.1	3.6	4.8	5.1	5.0	4.3	5.2	4.9	4.8	Diurnal Average	
18	--	11	11	18	20	21	16	14	18	19	21	22	18	18	15	12	17	19	14	11	23	14	15	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	674	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: 678

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - September 2014

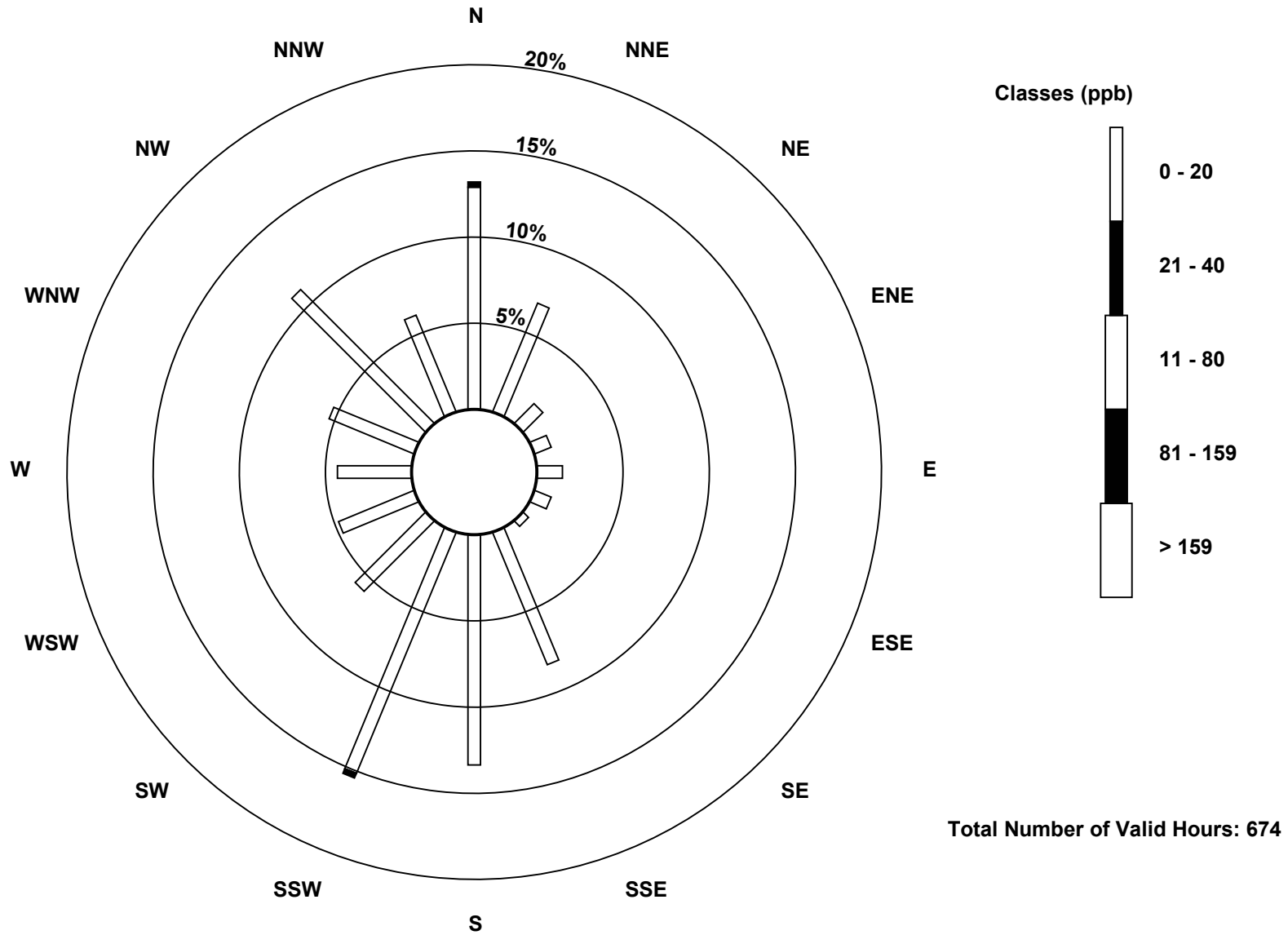
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	87	46	11	7	10	7	3	56	90	102	39	32	29	36	74	41	670
21 - 40	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	4
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	46	11	7	10	7	3	56	90	104	39	32	29	36	74	41	674

Total Number of Valid Hours: 674

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

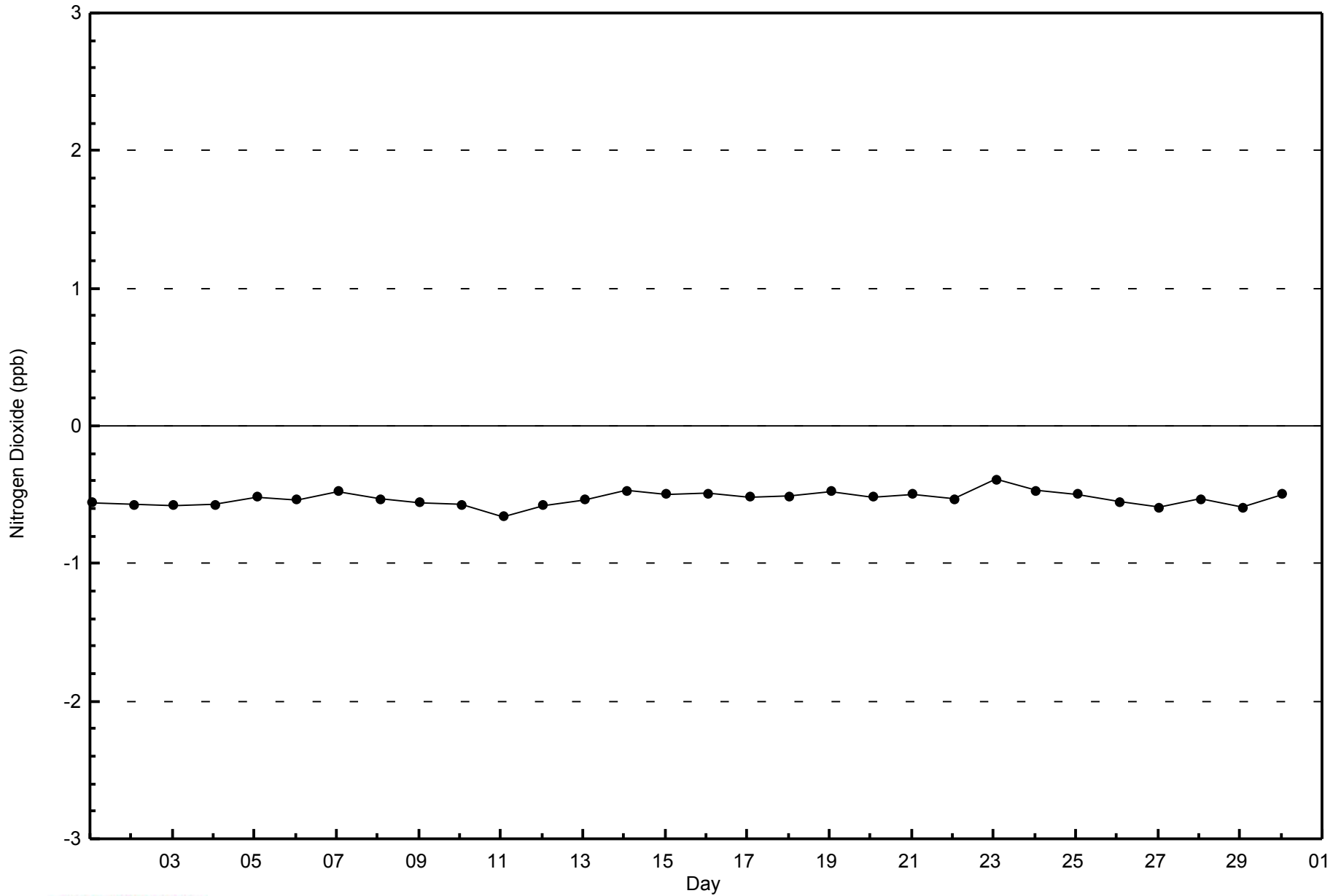
Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

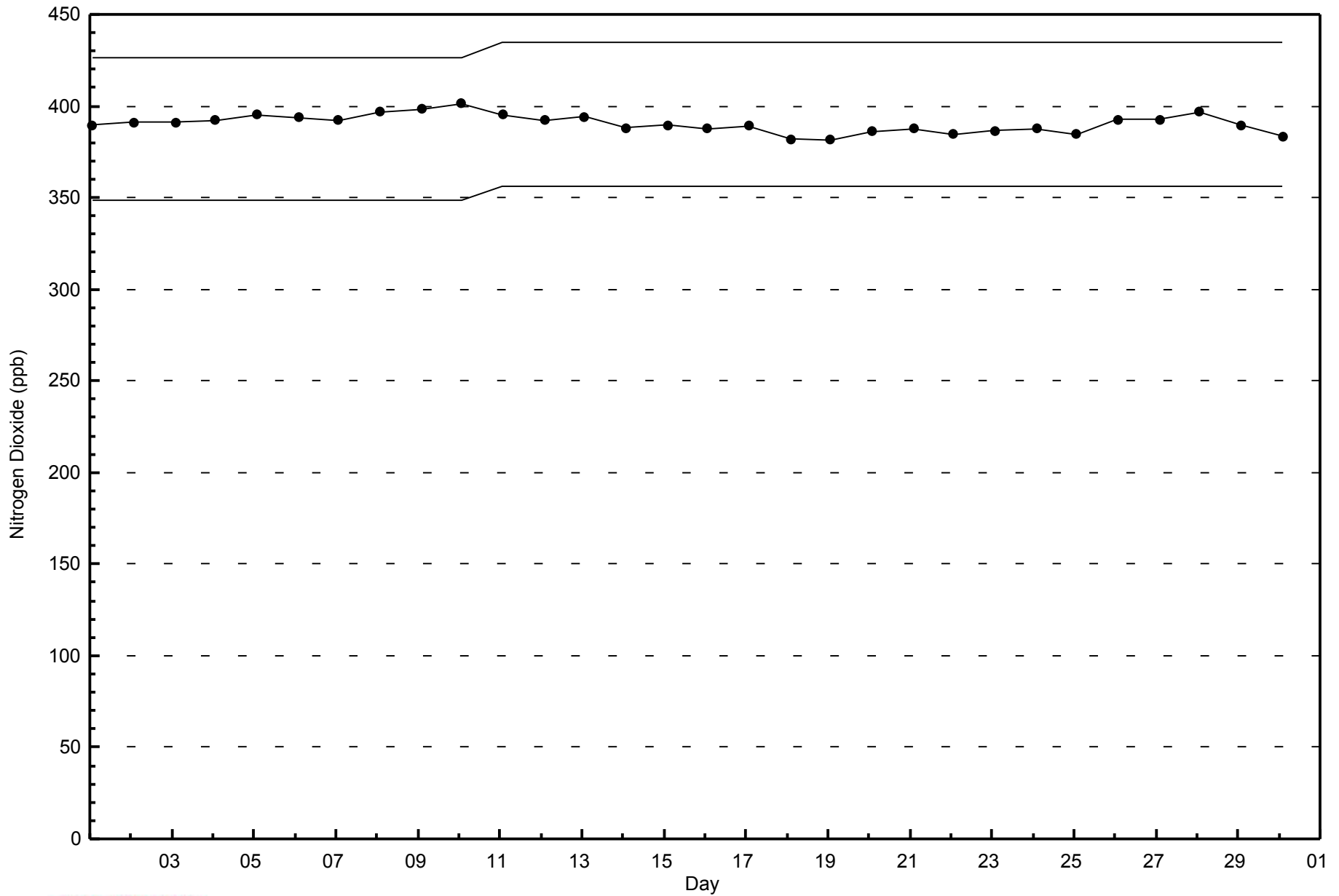
Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - September 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - September 2014



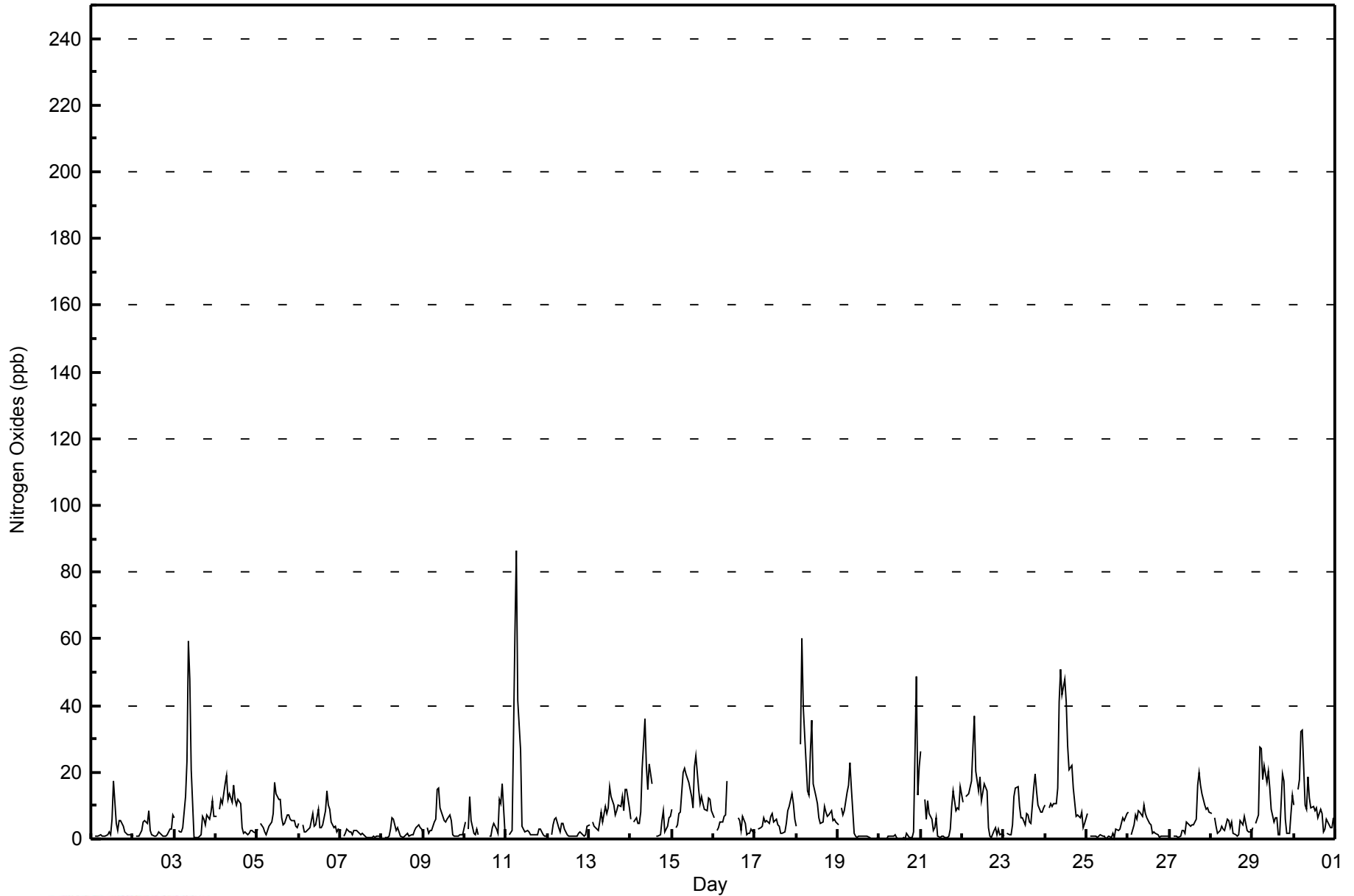


Maximum Value: 86 ppb on Sep 11 07:00																		Maximum Daily Average: 18.8 ppb on Sep 24						Hours in Service: 720			
Minimum Value: 0 ppb on Sep 19 22:00																		Minimum Daily Average: 1.4 ppb on Sep 7						Hours of Data: 678			
Maximum Diurnal Average: 13.3 ppb at hour 9																		Minimum Diurnal Average: 4.0 ppb at hour 16						Hours of Missing Data: 42			
Monthly Average: 7.1 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 4 Q ₃ = 9 P ₉₀ = 16 P ₉₉ = 48						Hours of Calibration: 40			
																		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	1	Z	1	1	1	1	1	1	1	1	2	1	6	18	5	3	5	5	4	2	2	1	1	1	2.8	18	
2-Sep	1	Z	1	1	2	2	5	5	5	9	2	1	1	1	1	2	2	1	1	1	1	3	3	7	2.5	9	
3-Sep	7	Z	3	2	2	4	13	23	59	48	21	1	1	1	1	7	6	4	7	6	8	12	7	10.5	59		
4-Sep	7	Z	9	12	11	17	19	12	14	11	16	12	10	12	11	3	2	2	1	2	3	2	2	8.3	19		
5-Sep	3	Z	5	3	2	1	3	4	5	7	17	14	12	12	6	4	5	7	7	6	6	5	4	3	6.2	17	
6-Sep	5	Z	4	2	2	3	3	5	8	4	4	9	3	3	4	9	14	10	9	5	4	4	2	3	5.2	14	
7-Sep	2	Z	1	2	3	2	2	1	3	2	2	2	1	2	1	1	1	1	0	1	1	1	1	1	1.4	3	
8-Sep	1	Z	1	1	1	3	6	6	3	4	2	1	0	1	1	2	1	1	1	3	3	4	3	3	2.2	6	
9-Sep	2	Z	4	2	2	3	5	6	15	15	9	7	5	5	6	7	5	1	1	1	1	1	1	1	4.6	15	
10-Sep	5	Z	3	13	6	2	1	3	1	C	C	C	C	C	1	1	3	4	3	2	12	10	16	1	4.9	16	
11-Sep	1	Z	1	2	31	61	86	41	27	4	3	2	2	2	1	1	1	1	1	3	3	1	1	1	12.2	86	
12-Sep	1	Z	1	4	6	6	3	2	5	5	3	1	1	1	1	1	1	1	2	2	1	1	1	4	2.3	6	
13-Sep	4	Z	5	4	3	3	5	8	5	10	8	9	16	13	10	7	9	10	10	13	8	15	15	9	8.7	16	
14-Sep	6	Z	5	6	5	5	8	21	36	22	15	23	16	M	M	1	1	1	6	8	2	4	6	7	9.6	36	
15-Sep	9	Z	3	4	7	8	20	21	20	18	17	13	9	21	25	15	10	13	11	9	9	12	12	8	12.9	25	
16-Sep	6	Z	3	3	5	5	7	7	17	C	C	C	C	C	6	5	2	7	5	1	2	2	3	2	4.9	17	
17-Sep	2	Z	3	3	4	6	5	5	5	7	8	5	6	4	4	2	2	2	5	9	10	13	11	6	5.5	13	
18-Sep	4	Z	29	60	40	31	15	13	26	36	17	13	11	6	5	5	10	8	7	7	8	5	6	5	15.9	60	
19-Sep	4	Z	9	7	9	14	16	23	15	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	4.6	23	
20-Sep	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	0	0	2	1	0	1	2	49	13	22	4.1	49	
21-Sep	26	Z	12	6	11	8	6	3	3	6	1	1	1	1	0	1	1	3	10	15	8	9	9	16	6.8	26	
22-Sep	11	Z	13	13	14	18	28	37	21	15	18	12	14	17	14	3	1	1	3	4	1	3	1	2	11.3	37	
23-Sep	1	Z	2	1	1	4	13	15	16	10	6	7	4	8	7	5	5	15	20	14	10	8	8	9	8.3	20	
24-Sep	10	Z	9	11	10	11	11	15	41	51	43	48	41	28	21	22	15	11	7	7	6	8	3	5	18.8	51	
25-Sep	8	Z	1	1	1	1	0	1	1	1	1	0	0	1	1	2	0	3	2	3	5	6	5	8	2.2	8	
26-Sep	8	Z	1	4	7	6	8	8	7	10	8	6	5	4	2	2	2	1	1	1	1	1	1	1	4.1	10	
27-Sep	1	Z	1	1	1	0	1	2	2	2	5	4	4	4	4	6	16	20	16	14	10	9	9	8	6.1	20	
28-Sep	8	Z	6	4	2	3	4	3	3	6	6	3	5	2	1	1	1	6	4	7	5	3	2	2	3.7	8	
29-Sep	3	Z	5	7	27	27	18	22	17	20	15	9	5	6	6	1	1	19	17	6	2	2	7	13	11.2	27	
30-Sep	10	Z	15	18	32	33	10	9	19	12	9	10	9	9	6	9	7	2	3	6	4	3	3	6	10.7	33	
		5.2	--	5.1	6.6	8.2	9.6	10.8	10.9	13.3	12.0	9.3	7.6	6.8	6.7	5.3	4.0	4.4	5.5	5.4	5.2	4.5	6.5	5.4	5.4	Diurnal Average	
		26	--	29	60	40	61	86	41	59	51	43	48	41	28	25	22	16	20	20	15	12	49	16	22	Diurnal Maximum	
Z - zerospan		C - Calibration					M - Maintenance																				



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	636	93.81	93.81
21 - 40	30	4.42	98.23
41 - 80	11	1.62	99.85
81 - 159	1	0.15	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 678

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - September 2014

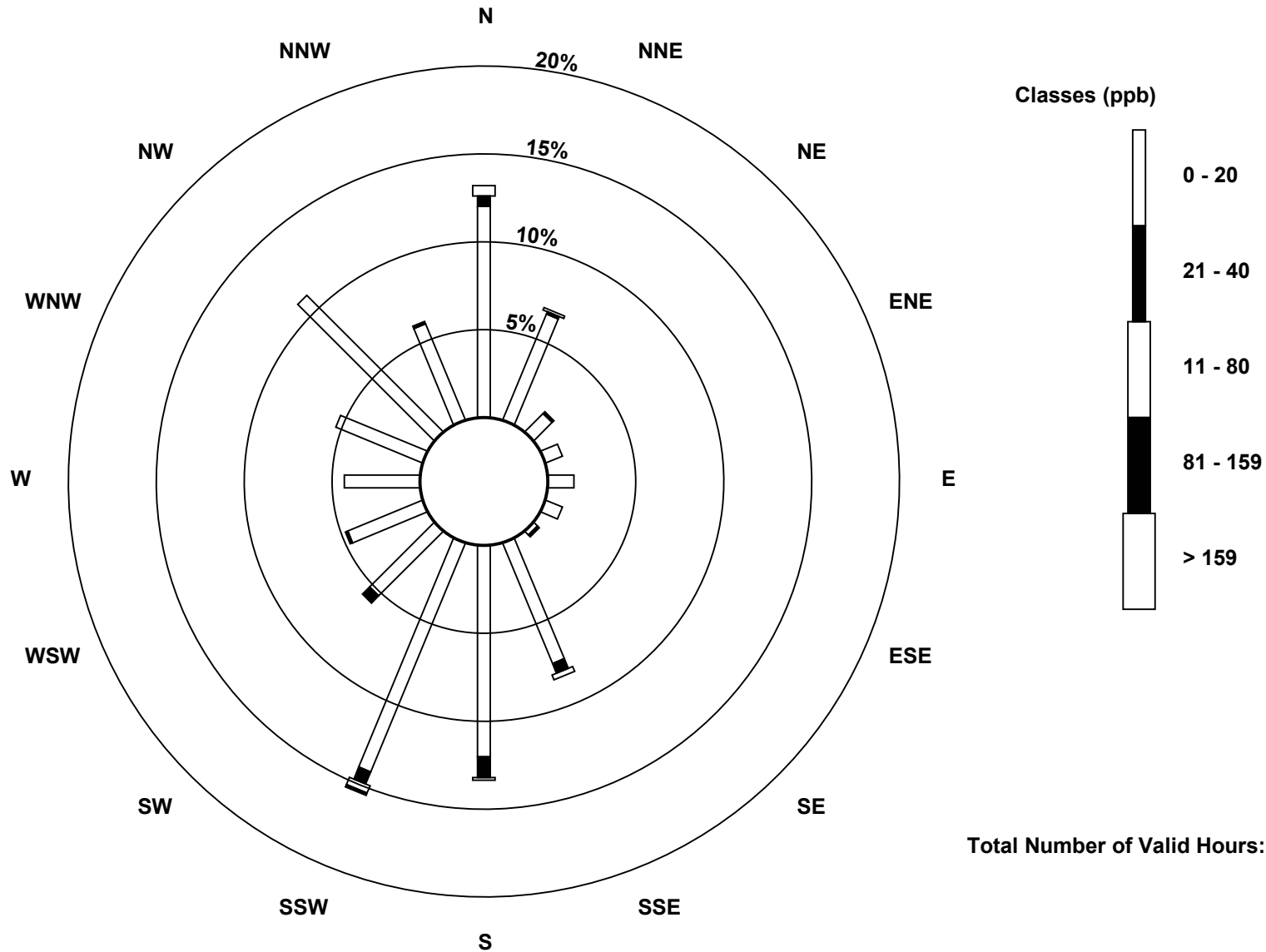
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	81	44	10	7	10	7	2	50	81	95	35	31	29	36	74	40	632
21 - 40	4	1	1	0	0	0	1	4	8	5	4	1	0	0	0	1	30
11 - 80	4	1	0	0	0	0	0	2	1	3	0	0	0	0	0	0	11
81 - 159	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	46	11	7	10	7	3	56	90	104	39	32	29	36	74	41	674

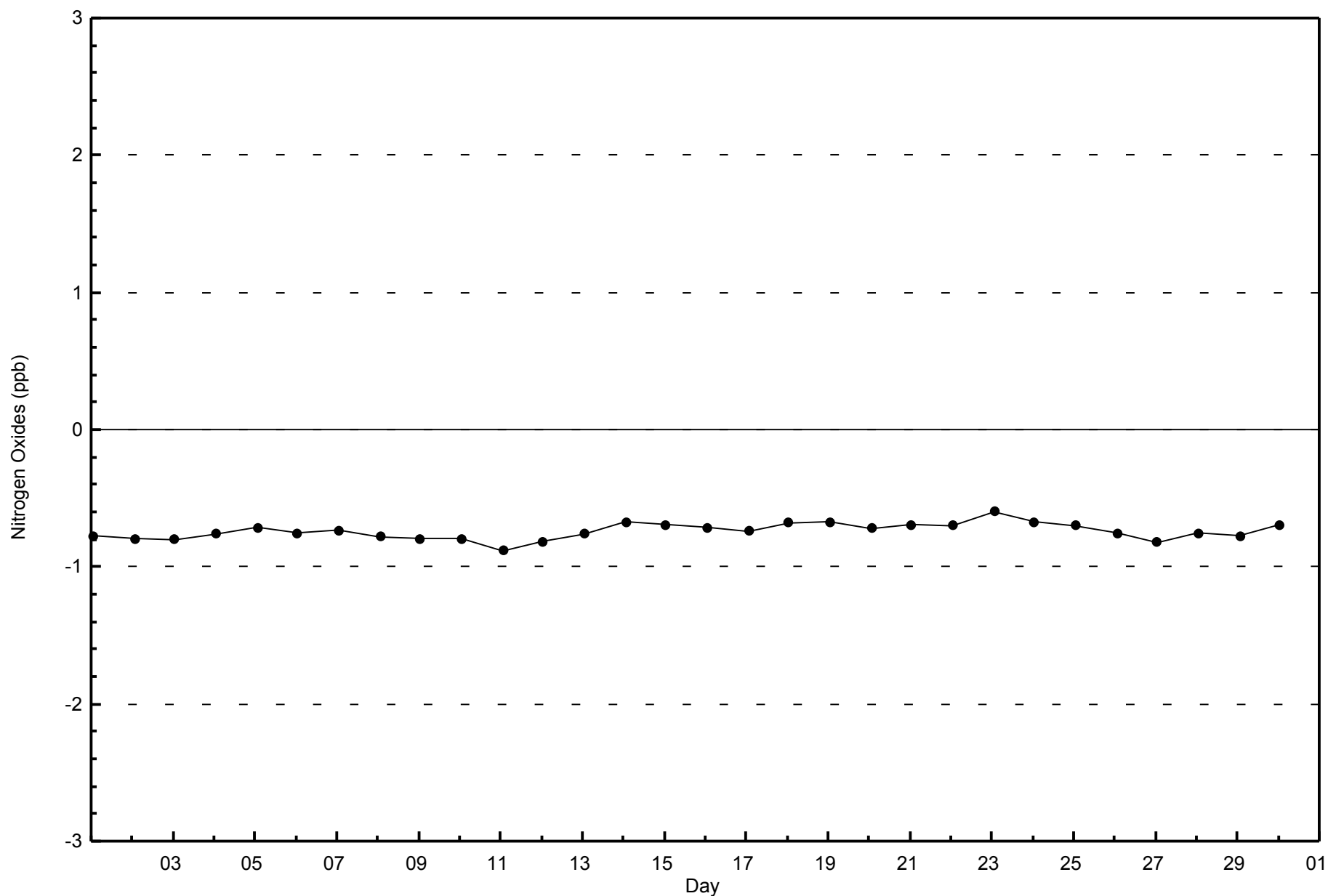
Total Number of Valid Hours: 674

Total Number of Hours: 720

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

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

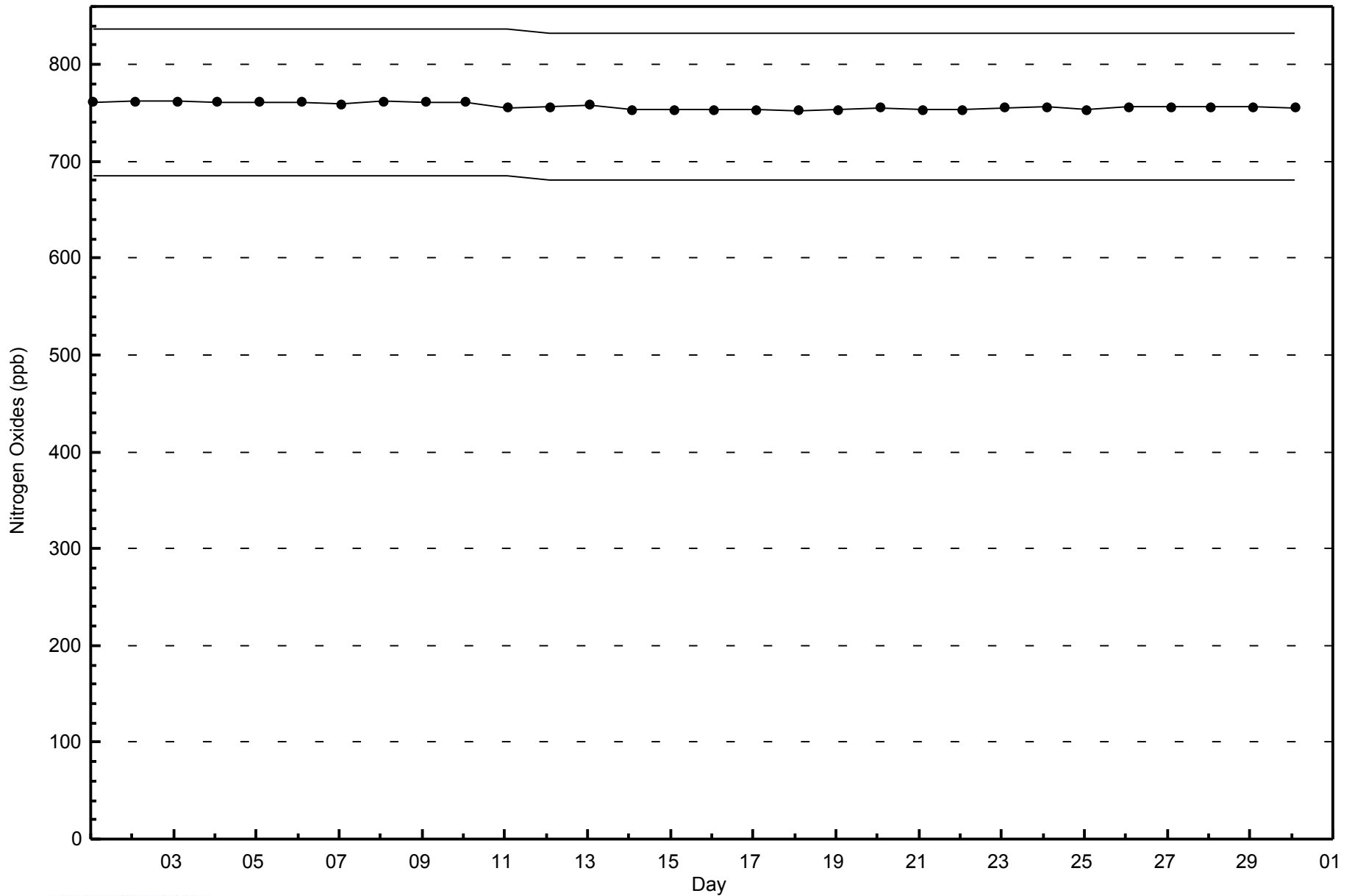






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - September 2014





Summary of Hour Averages

Fort McKay - Bertha Ganter - September 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 49 ppb on Sep 22 15:00	Maximum Daily Average: 26.4 ppb on Sep 7		Hours of Data:	678
Minimum Value: 3 ppb on Sep 13 23:00	Minimum Daily Average: 8.2 ppb on Sep 30		Hours of Missing Data:	42
Maximum Diurnal Average: 28.8 ppb at hour 16	Minimum Diurnal Average: 8.9 ppb at hour 7		Hours of Calibration:	36
Monthly Average: 17.7 ppb	Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 9 Median = 17 Q ₃ = 25 P ₉₀ = 32 P ₉₉ = 45		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	11	Z	11	11	12	9	11	12	20	27	35	32	27	31	33	28	27	17	17	12	7	5	8	17.9	35
2-Sep	7	6	Z	5	3	3	4	5	6	9	24	27	31	32	28	26	22	22	15	10	9	5	5	4	13.4	32
3-Sep	4	5	Z	3	3	3	4	4	5	6	16	29	29	29	30	29	25	23	23	16	11	8	7	11	14.0	30
4-Sep	10	9	Z	5	5	4	4	6	6	12	11	14	16	13	15	21	19	17	18	16	18	19	18	19	12.8	21
5-Sep	13	9	Z	8	8	9	10	14	17	21	21	24	24	22	23	25	23	18	13	8	7	6	8	10	14.7	25
6-Sep	6	5	Z	6	5	4	7	16	18	26	26	23	27	24	23	19	11	14	13	18	23	25	27	28	17.1	28
7-Sep	27	29	Z	29	27	25	25	25	20	21	25	29	28	30	32	32	31	29	28	25	25	24	23	18	26.4	32
8-Sep	19	21	Z	22	16	11	6	16	20	24	28	29	31	32	32	31	31	30	27	21	15	10	10	10	21.4	32
9-Sep	9	8	Z	10	9	7	6	7	10	19	24	27	28	27	27	27	27	29	18	13	13	14	14	15	16.9	29
10-Sep	9	8	Z	4	9	13	13	14	16	19	20	26	32	34	35	35	33	31	30	29	14	15	13	26	20.8	35
11-Sep	21	22	Z	21	8	3	4	8	14	25	27	31	32	35	40	39	C	C	C	C	26	28	28	26	23.0	40
12-Sep	24	20	Z	16	10	6	9	15	19	21	23	28	29	31	32	31	29	23	14	15	19	11	12	8	19.3	32
13-Sep	6	5	Z	5	5	4	3	5	10	12	15	17	18	25	29	33	33	29	24	13	11	5	3	5	13.6	33
14-Sep	4	3	Z	3	3	3	3	4	6	M	M	M	M	M	M	37	37	35	23	16	15	16	11	9	--	37
15-Sep	5	6	Z	6	4	4	3	4	8	11	16	21	28	21	15	19	23	17	13	9	9	8	7	9	11.6	28
16-Sep	10	12	Z	12	10	9	6	8	6	C	C	11	16	17	21	22	23	16	15	17	17	19	18	18	14.4	23
17-Sep	18	17	Z	15	14	12	12	11	12	11	11	13	15	15	15	18	17	15	11	5	4	3	4	6	12.0	18
18-Sep	7	4	Z	3	3	3	3	4	5	7	13	16	20	26	29	30	26	24	18	14	10	9	6	5	12.5	30
19-Sep	5	5	Z	7	8	5	5	5	13	28	32	33	34	35	38	39	38	37	38	47	46	39	33	27	26.0	47
20-Sep	23	23	Z	24	23	21	21	24	25	27	30	32	34	36	36	37	33	33	32	30	26	5	14	9	25.9	37
21-Sep	4	9	Z	17	13	15	15	15	16	16	23	23	24	25	25	25	23	20	11	9	12	11	9	6	15.9	25
22-Sep	6	4	Z	4	4	4	4	6	11	22	24	37	46	46	49	45	41	38	32	31	34	31	32	29	25.1	49
23-Sep	30	26	Z	15	11	9	8	10	11	12	22	32	41	41	42	45	45	39	26	19	17	17	13	10	23.5	45
24-Sep	10	6	Z	4	4	4	4	5	6	7	9	10	10	10	11	10	12	10	7	9	15	18	20	19	9.5	20
25-Sep	21	26	Z	23	23	22	19	26	21	19	18	19	20	25	30	29	32	31	31	28	26	23	24	19	24.1	32
26-Sep	19	21	Z	25	20	21	16	15	16	14	14	14	15	15	18	19	20	21	25	27	27	29	27	25	20.1	29
27-Sep	25	26	Z	26	21	20	18	14	17	23	23	23	25	27	28	28	22	15	10	8	8	5	5	5	18.4	28
28-Sep	5	4	Z	10	16	18	19	22	27	25	25	28	28	32	33	33	31	25	25	22	23	24	24	23	22.7	33
29-Sep	21	17	Z	14	4	4	5	7	12	13	18	23	28	30	32	35	32	13	11	19	21	20	11	6	17.2	35
30-Sep	6	5	Z	4	4	4	5	5	5	6	6	8	14	15	19	15	11	13	10	8	7	8	7	6	8.2	19

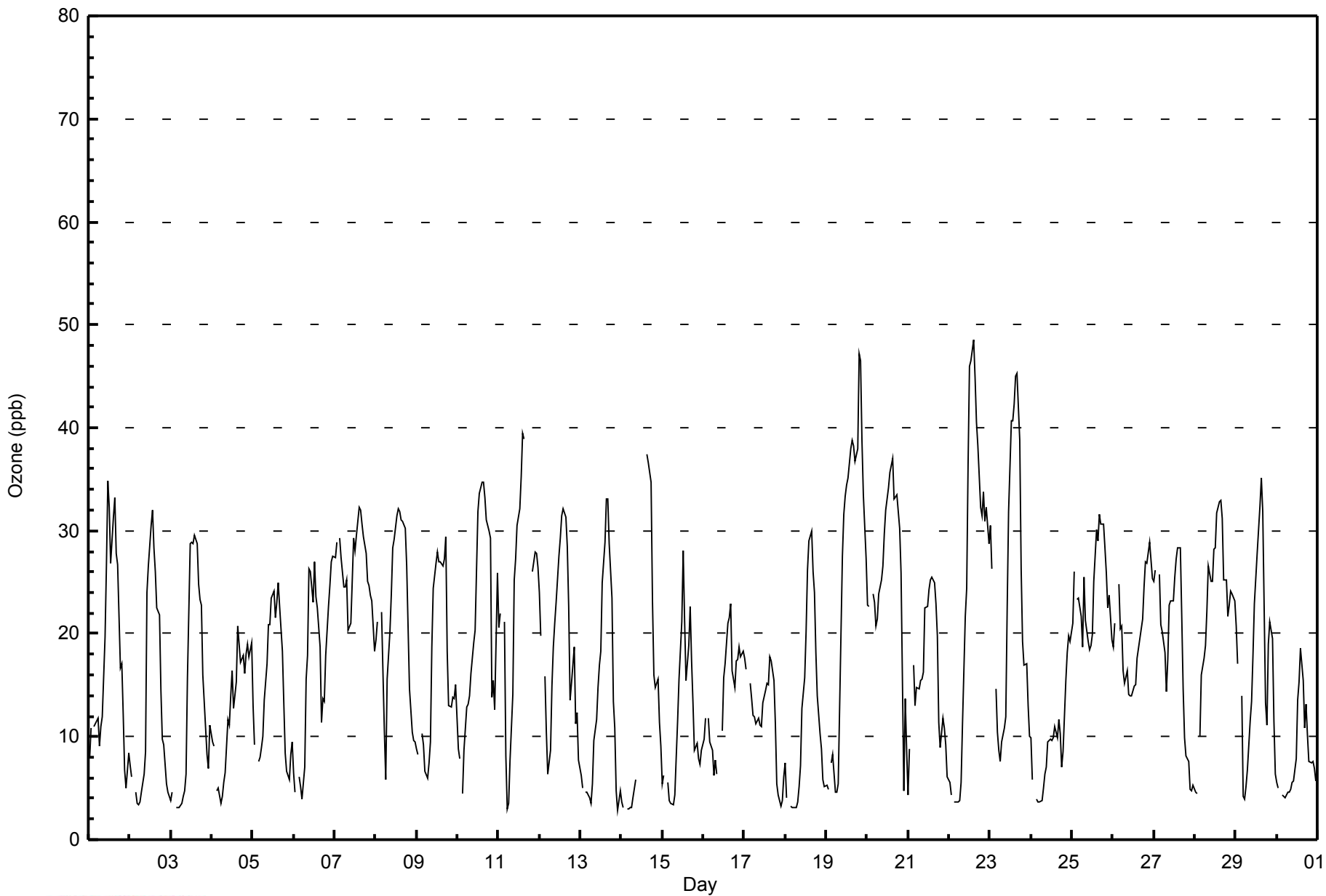
12.7	12.4	--	11.9	10.2	9.3	8.9	11.0	13.0	17.0	20.4	23.4	26.1	26.8	28.2	28.8	26.7	24.0	19.9	18.0	17.3	15.3	14.6	14.0	Diurnal Average	
30	29	--	29	27	25	25	26	27	28	32	37	46	46	49	45	45	39	38	47	46	39	33	29	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - September 2014





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	405	59.73	59.73
21 - 50	273	40.27	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 678

Total Number of Hours: 720



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - September 2014

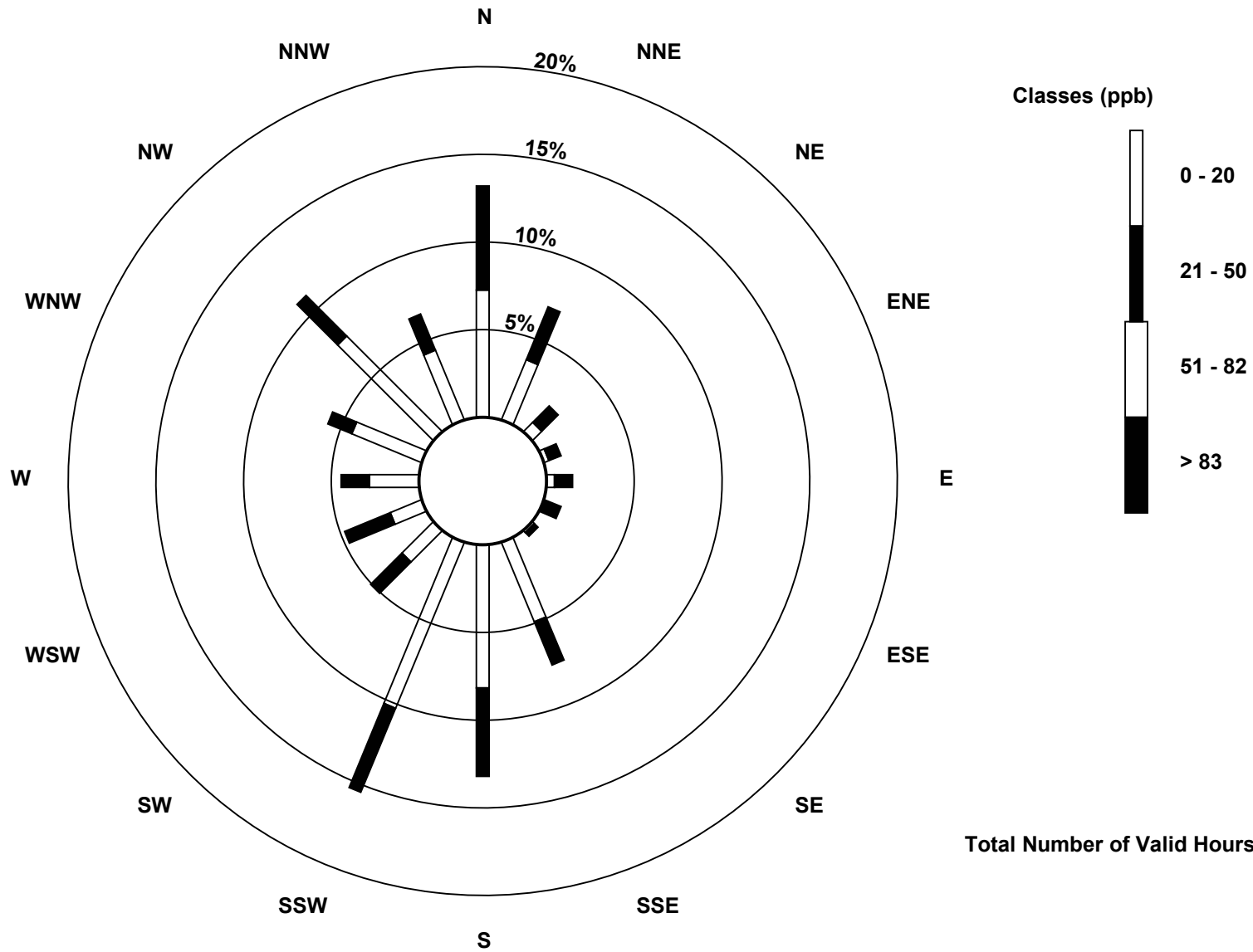
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	49	25	5	2	3	0	1	33	55	69	17	13	19	29	52	29	401
21 - 50	40	22	9	5	7	7	2	18	34	35	17	19	11	10	22	15	273
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	47	14	7	10	7	3	51	89	104	34	32	30	39	74	44	674

Total Number of Valid Hours: 674

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

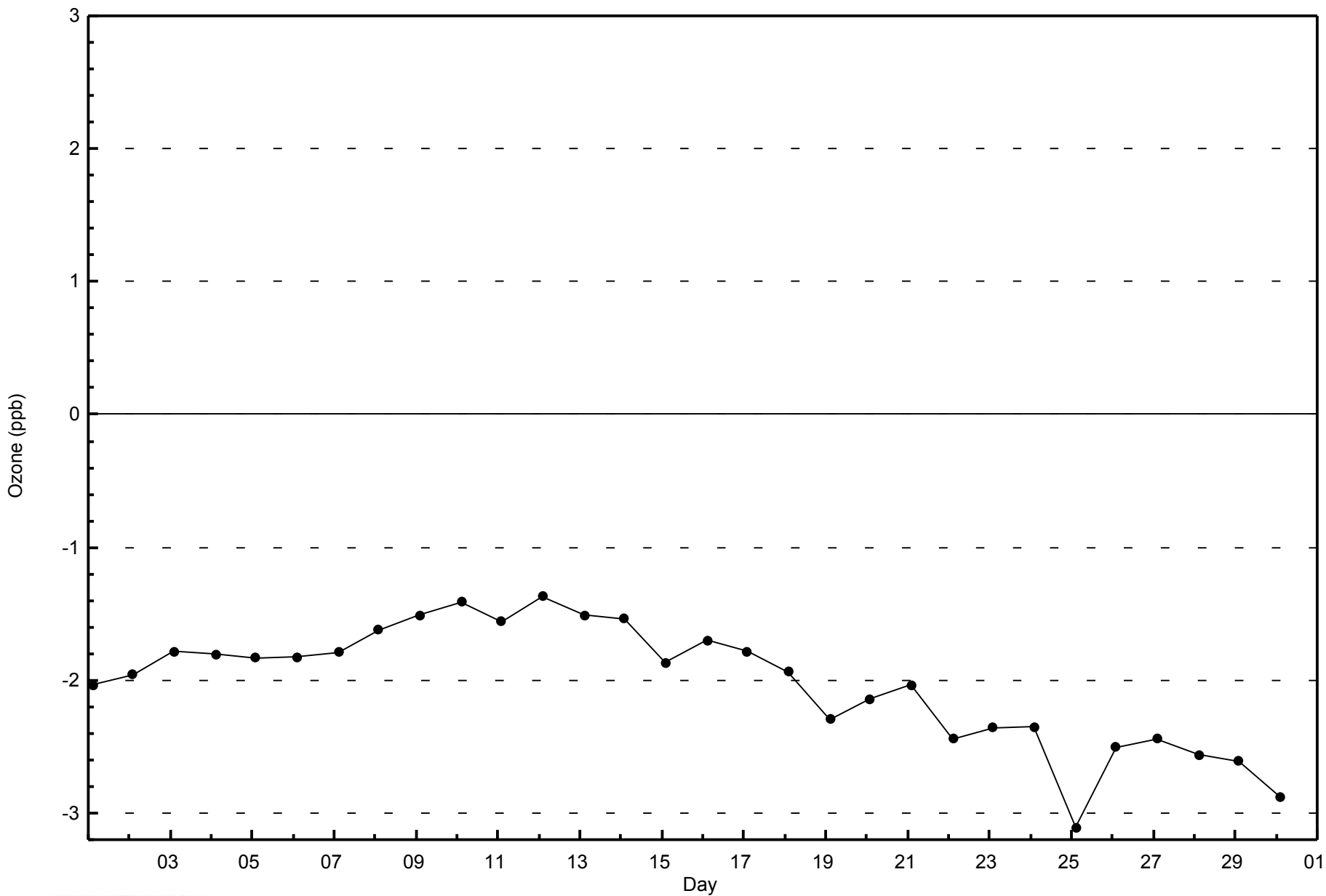
Ozone (O₃) - ppb
 Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

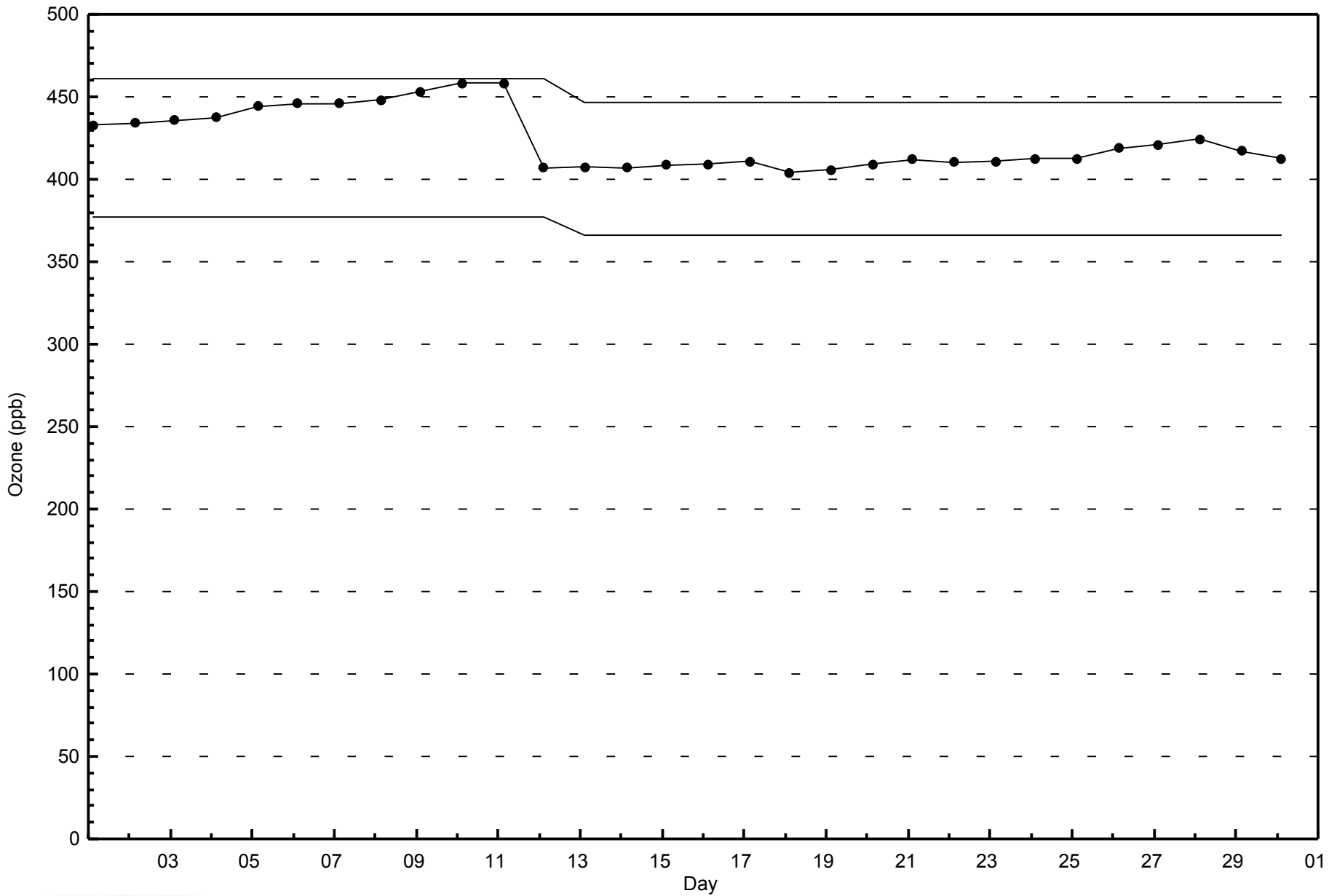
Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - September 2014





WBEA
Span Responses

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - September 2014



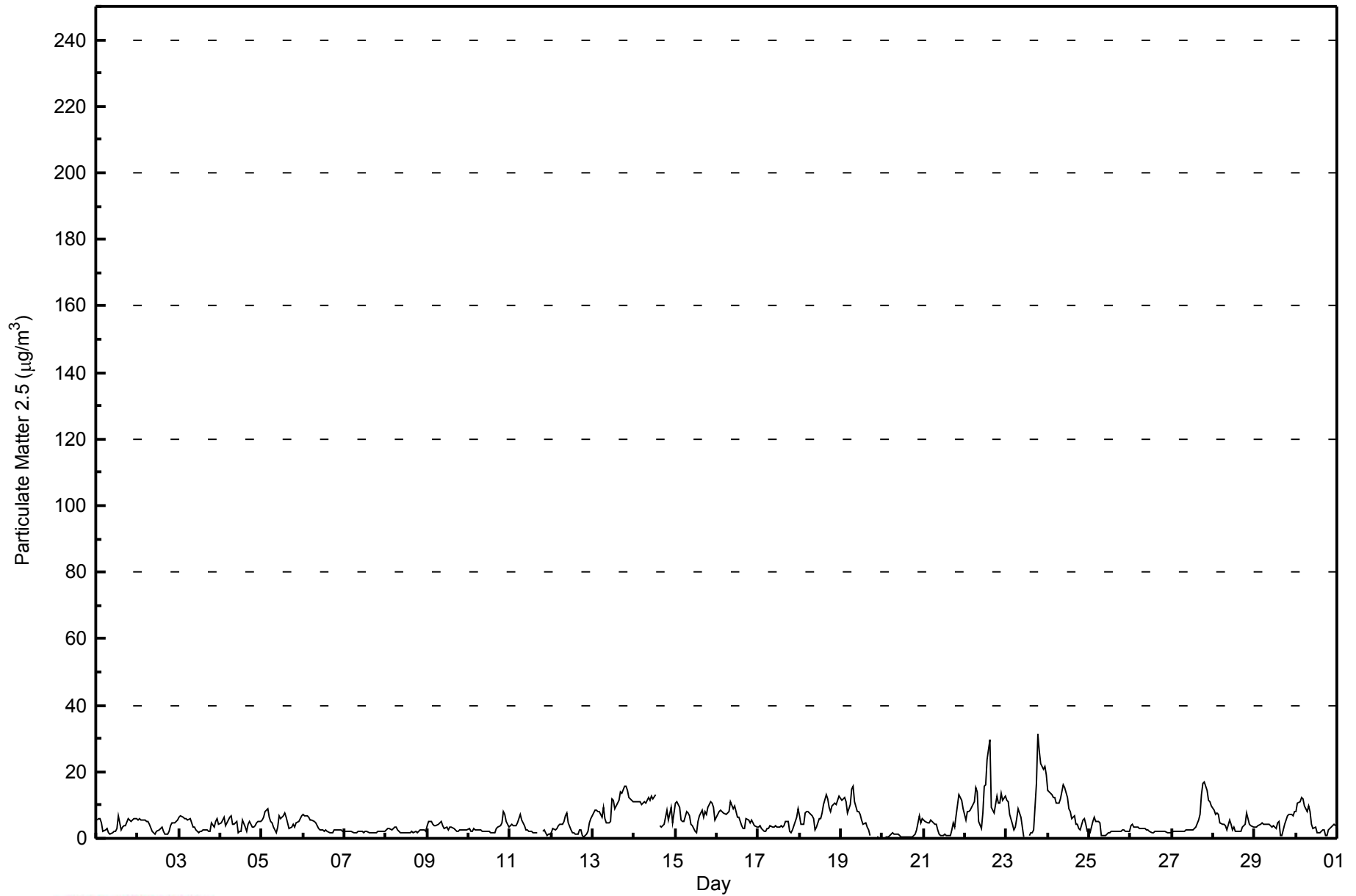


Number of Exceedences (AAAQO):		24-hr: 0		Hours in Service:																	720																												
Maximum Value: 31.2 µg/m ³ on Sep 23 19:00		Maximum Daily Average: 11.5 µg/m ³ on Sep 22																	Hours of Data:		708																												
Minimum Value: 0.3 µg/m ³ on Sep 19 22:00		Minimum Daily Average: 1.6 µg/m ³ on Sep 20																	Hours of Missing Data:		12																												
Maximum Diurnal Average: 6.3 µg/m ³ at hour 2		Minimum Diurnal Average: 3.7 µg/m ³ at hour 16																	Hours of Calibration:		0																												
Monthly Average: 5.20 µg/m ³		Percentiles: P ₁ = 0.5 P ₁₀ = 1.8 Q ₁ = 2.3 Median = 4.0 Q ₃ = 6.9 P ₉₀ = 10.9 P ₉₉ = 20.5																	Percent Operational Time:		98.3																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Sep	5.4	6.1	5.8	4.6	2.0	2.5	3.1	1.9	1.4	1.5	2.2	2.0	3.1	6.6	2.4	3.5	3.6	3.8	5.8	5.7	5.2	5.4	6.1	5.8	4.0	6.6																							
2-Sep	5.4	6.0	5.5	5.4	5.5	4.9	4.9	4.4	1.9	1.8	1.3	2.1	2.6	3.0	3.5	2.1	1.2	1.1	2.1	3.9	4.5	4.8	4.9	5.5	3.7	6.0																							
3-Sep	6.4	6.8	6.4	6.0	5.9	5.3	5.8	4.6	3.4	3.5	2.4	1.6	2.1	2.2	2.5	2.6	2.6	1.9	2.3	4.7	3.4	5.2	6.0	4.1	4.1	6.8																							
4-Sep	4.5	5.4	6.4	3.7	4.7	6.2	7.0	4.1	4.2	4.9	1.8	2.2	2.1	5.7	3.2	2.2	4.2	5.1	3.5	3.4	3.9	4.6	5.1	4.9	4.3	7.0																							
5-Sep	5.6	6.5	8.0	8.8	6.2	4.9	4.7	3.3	1.9	3.3	7.0	6.0	6.9	7.6	6.3	4.6	3.2	3.5	4.1	3.5	4.8	5.2	5.9	7.0	5.4	8.8																							
6-Sep	7.0	6.9	6.9	6.3	5.6	5.4	5.2	4.5	3.6	2.9	2.7	2.5	2.3	2.4	2.3	1.8	1.8	1.9	2.4	2.5	2.7	2.7	2.6	2.3	3.6	7.0																							
7-Sep	2.2	2.1	2.1	2.2	1.9	1.8	1.8	1.8	2.1	2.1	1.9	1.9	2.2	2.1	1.9	1.8	1.8	1.8	1.9	1.9	2.0	2.1	2.2	2.1	2.0	2.2																							
8-Sep	2.6	2.9	2.8	2.5	2.8	3.5	3.5	2.4	1.8	1.8	1.7	1.6	1.6	1.7	1.9	2.1	1.8	2.0	1.9	2.2	2.3	2.4	2.3	2.2	2.3	3.5																							
9-Sep	3.9	5.1	4.9	4.1	4.0	4.0	4.2	4.5	5.2	3.9	3.1	3.3	2.7	3.5	3.2	3.0	2.7	2.1	2.0	2.5	2.7	2.6	2.4	2.5	3.4	5.2																							
10-Sep	2.8	2.3	2.2	2.9	2.6	2.5	2.6	2.5	2.1	2.0	2.1	2.3	2.2	1.9	1.7	1.7	2.8	3.3	3.8	4.7	8.0	7.3	5.1	3.5	3.1	8.0																							
11-Sep	3.8	4.1	3.9	3.8	4.8	5.8	7.0	5.5	3.7	2.6	2.4	2.2	1.9	1.8	1.7	1.8	1.7	M	M	2.1	2.7	1.0	1.1	1.3	3.0	7.0																							
12-Sep	1.6	3.1	2.7	3.0	3.6	4.4	4.2	5.0	6.8	7.5	4.8	2.4	1.6	1.6	1.5	1.3	2.6	2.3	1.0	0.5	1.3	2.1	4.5	6.1	3.1	7.5																							
13-Sep	7.5	8.4	8.4	8.0	7.9	6.4	9.2	5.7	4.8	4.9	5.2	11.8	11.6	8.8	10.5	11.4	13.9	13.4	15.8	15.8	14.6	12.1	11.9	11.2	10.0	15.8																							
14-Sep	10.9	11.1	11.0	10.9	10.0	10.5	10.9	10.7	12.3	11.4	12.7	12.0	13.1	M	M	3.7	3.5	4.4	6.4	8.4	5.3	9.5	4.8	7.7	9.1	13.1																							
15-Sep	10.5	11.0	9.3	5.7	5.2	5.0	8.1	7.7	6.7	4.3	3.7	2.2	1.8	5.0	6.9	8.5	6.2	8.0	7.4	9.3	10.9	10.7	9.4	5.6	7.0	11.0																							
16-Sep	7.2	7.8	8.4	8.2	7.8	7.3	7.5	7.9	10.9	8.9	9.5	8.2	6.5	6.3	3.9	3.1	2.8	5.9	5.4	4.8	5.5	4.8	4.0	3.2	6.5	10.9																							
17-Sep	3.2	3.8	2.8	2.1	2.1	2.9	2.8	3.8	3.3	3.5	3.6	3.4	3.6	3.7	3.4	4.0	5.0	5.2	2.0	1.7	2.5	5.1	6.5	9.0	3.7	9.0																							
18-Sep	6.9	4.4	4.0	7.5	8.0	8.0	7.2	6.8	6.1	2.7	3.2	5.9	5.9	7.5	10.3	13.0	11.8	9.4	8.1	9.8	10.5	10.3	11.6	12.7	8.0	13.0																							
19-Sep	11.3	12.0	12.4	11.1	7.7	10.2	14.8	15.6	10.8	8.1	8.2	7.2	5.4	4.4	4.8	3.6	2.6	1.0	UO	UO	UO	0.3	0.4	UO	7.6	15.6																							
20-Sep	UO	UO	0.4	0.6	0.9	1.2	1.5	1.5	1.3	1.2	0.7	0.6	0.5	0.5	0.5	0.4	0.5	0.6	0.8	1.3	2.4	6.7	4.7	6.1	1.6	6.7																							
21-Sep	5.7	5.1	4.6	4.7	5.4	4.9	4.3	4.3	2.7	1.4	0.9	1.0	1.3	0.8	0.8	0.8	2.4	4.6	3.3	7.0	13.2	12.1	11.6	8.7	4.7	13.2																							
22-Sep	5.4	7.8	8.1	8.4	9.5	11.1	15.2	13.9	5.1	3.1	7.5	15.9	16.0	23.6	29.5	9.3	8.4	7.7	12.7	10.5	10.6	13.4	11.3	12.6	11.5	29.5																							
23-Sep	11.5	10.9	7.2	4.4	2.5	3.2	6.0	8.9	6.4	3.6	0.6	UO	UO	1.0	1.5	1.7	2.7	16.7	31.2	26.3	22.5	20.9	21.7	18.9	10.5	31.2																							
24-Sep	14.6	13.8	13.2	12.5	12.1	10.6	10.6	11.8	13.8	16.3	15.3	12.3	8.9	8.0	6.0	6.8	4.2	4.1	3.0	2.7	5.4	6.0	4.2	2.2	9.1	16.3																							
25-Sep	1.8	3.3	5.2	6.5	5.3	4.9	4.6	0.9	0.7	1.0	1.1	1.6	1.6	2.1	2.3	2.1	2.0	2.2	2.2	2.4	2.4	2.3	2.1	2.3	2.6	6.5																							
26-Sep	3.6	4.3	3.4	3.2	3.2	2.9	3.1	3.1	2.9	2.6	2.4	2.2	1.9	1.9	2.0	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.5	4.3																							
27-Sep	1.9	2.0	2.0	2.1	2.2	2.2	2.2	2.3	2.4	2.6	2.4	2.4	2.6	3.0	3.2	5.7	7.3	13.0	16.3	16.9	14.6	11.5	11.1	9.9	5.9	16.9																							
28-Sep	8.5	7.2	7.8	7.0	4.9	4.0	4.1	3.6	2.7	5.7	4.1	2.6	3.4	2.0	2.2	2.2	2.3	3.3	4.4	7.6	5.8	4.1	4.0	3.4	4.5	8.5																							
29-Sep	3.4	3.6	3.9	4.1	4.7	4.4	4.0	4.1	4.1	3.8	3.2	3.7	2.9	4.5	5.1	1.0	0.9	4.1	5.7	6.7	7.3	7.4	6.7	8.0	4.5	8.0																							
30-Sep	8.3	10.4	10.9	12.3	11.8	9.7	8.1	9.6	8.2	4.0	2.9	3.2	1.5	1.5	1.5	2.7	2.4	0.8	1.0	2.3	3.4	3.8	4.3	3.7	5.3	12.3																							
																								6.0	6.3	6.0	5.8	5.4	5.4	5.9	5.6	4.8	4.2	4.0	4.4	4.1	4.3	4.4	3.7	3.7	4.7	5.7	6.0	6.3	6.3	6.0	6.0	Diurnal Average	
																								14.6	13.8	13.2	12.5	12.1	11.1	15.2	15.6	13.8	16.3	15.3	15.9	16.0	23.6	29.5	13.0	13.9	16.7	31.2	26.3	22.5	20.9	21.7	18.9	Diurnal Maximum	
M - Maintenance																								UO - Unstable Operation																									
Alberta Ambient Air Quality Objectives (AAAQO):																								24-hr		30 µg/m ³																							



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - September 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - September 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	441	62.29	62.29
6 - 15	223	31.50	93.79
16 - 25	14	1.98	95.76
26 - 80	3	0.42	96.19
> 81.0	0	0.00	96.19

Total Number of Valid Hours: 708

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort McKay - Bertha Ganter - September 2014

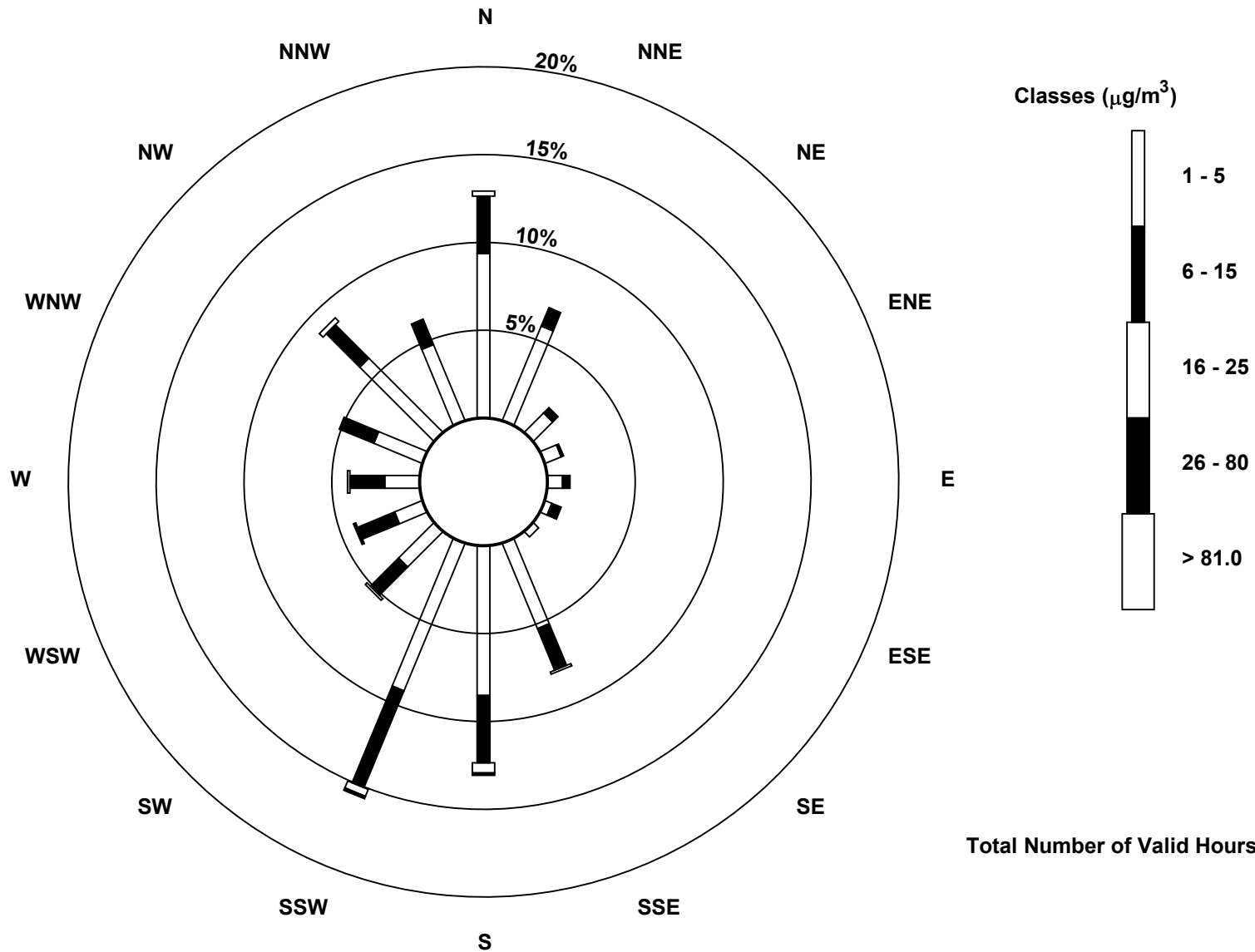
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	66	41	11	7	6	3	3	37	60	64	20	12	14	21	42	33	440
6 - 15	23	8	3	1	3	4	0	18	27	42	16	16	14	15	19	11	220
16 - 25	2	0	0	0	0	0	0	1	4	3	1	0	1	0	2	0	14
26 - 80	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	3
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	49	14	8	9	7	3	56	92	110	37	29	29	36	63	44	677

Total Number of Valid Hours: 704

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort McKay - Bertha Ganter (AMS 1)



Total Number of Valid Hours: 704



Summary of Hour Averages

Fort McKay - Bertha Ganter - September 2014

Number of Exceedences (AAAQO):	1-hr: 0	Hours in Service:	720
Maximum Value: 0 ppb on Sep 1 01:00	Maximum Daily Average: 0.0 ppb on Sep 1	Hours of Data:	635
Minimum Value: 0 ppb on Sep 1 01:00	Minimum Daily Average: 0.0 ppb on Sep 1	Hours of Missing Data:	85
Maximum Diurnal Average: 0.0 ppb at hour 1	Minimum Diurnal Average: 0.0 ppb at hour 1	Hours of Calibration:	53
Monthly Average: 0.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 0	Percent Operational Time:	95.6

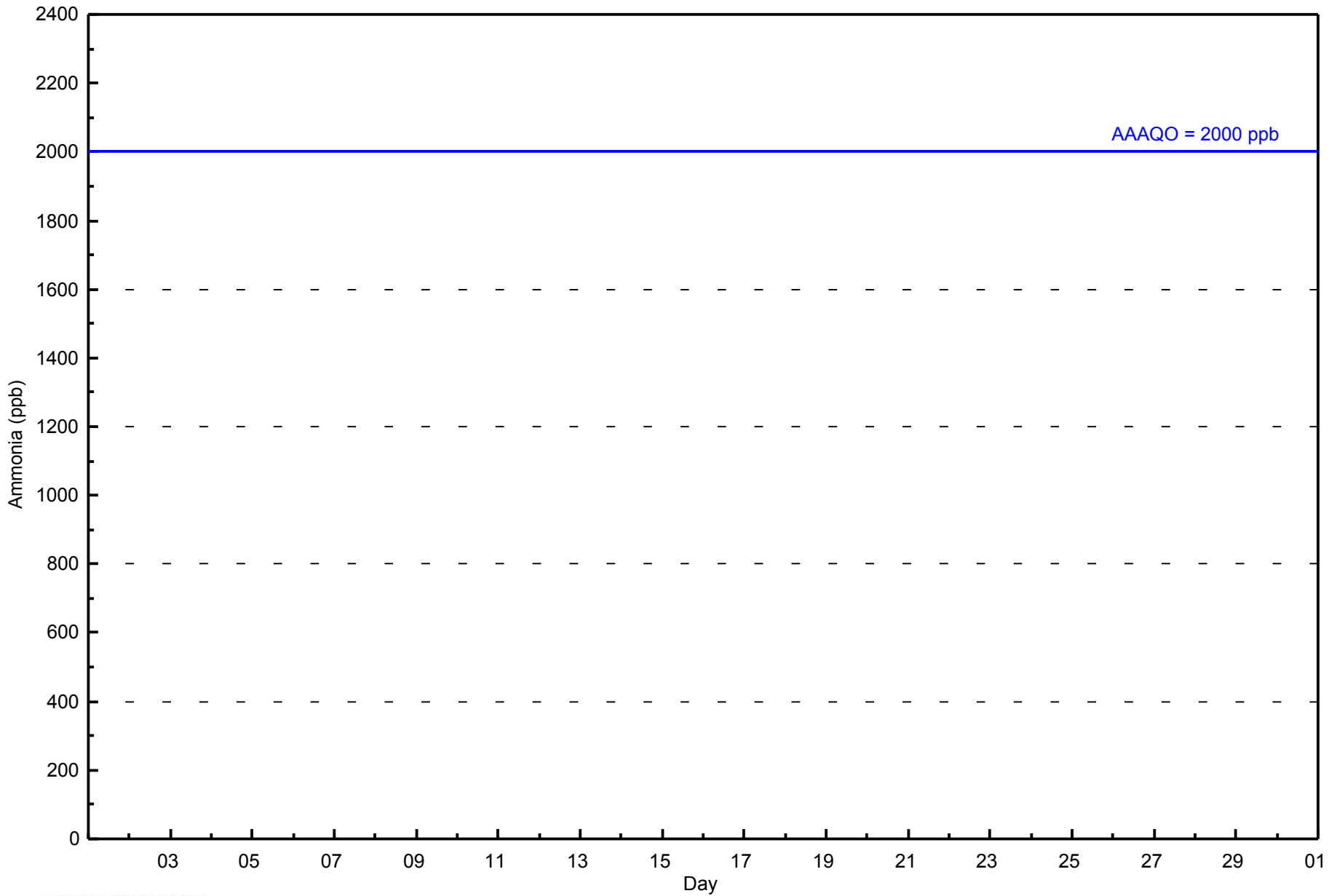
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Sep	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Sep	0	Z	RE	0	0	0	0	0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

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



WBEA
Hourly Averages

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - September 2014





WBEA
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	635	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: 635

Total Number of Hours: 720



WBEA
Frequency Distribution

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - September 2014

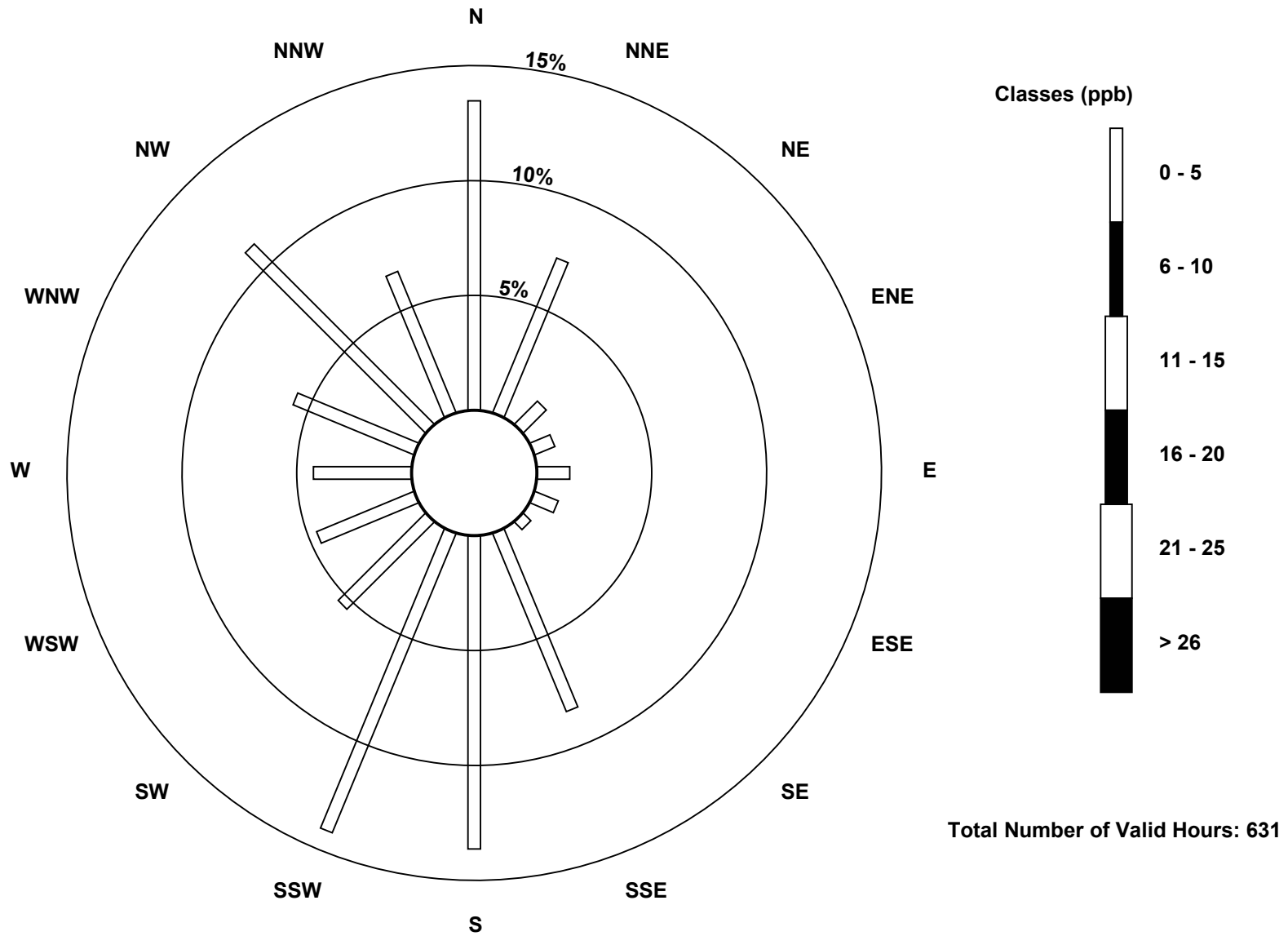
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	85	46	9	6	9	7	3	53	86	89	34	29	27	36	70	42	631
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	85	46	9	6	9	7	3	53	86	89	34	29	27	36	70	42	631

Total Number of Valid Hours: 631

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

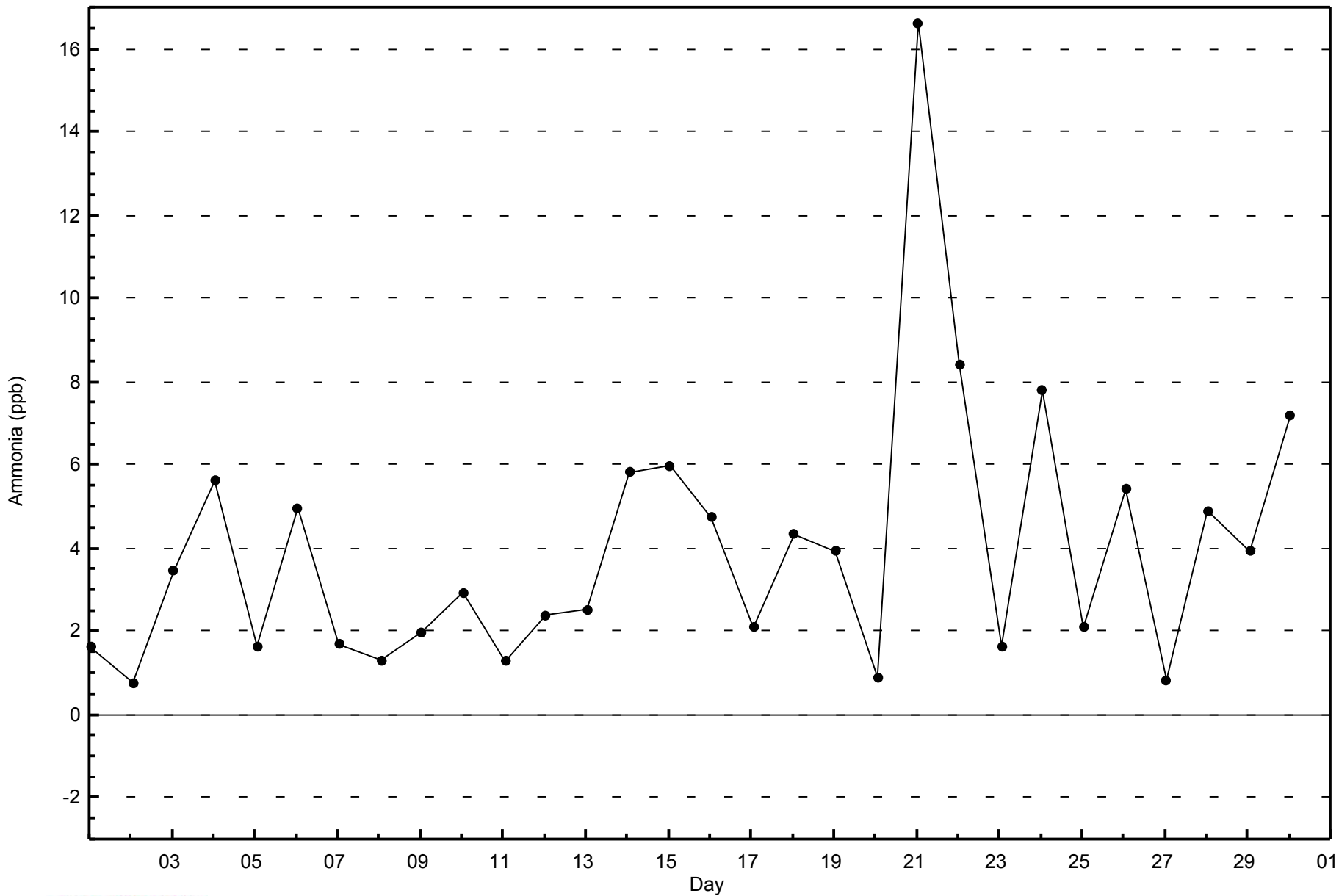
Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

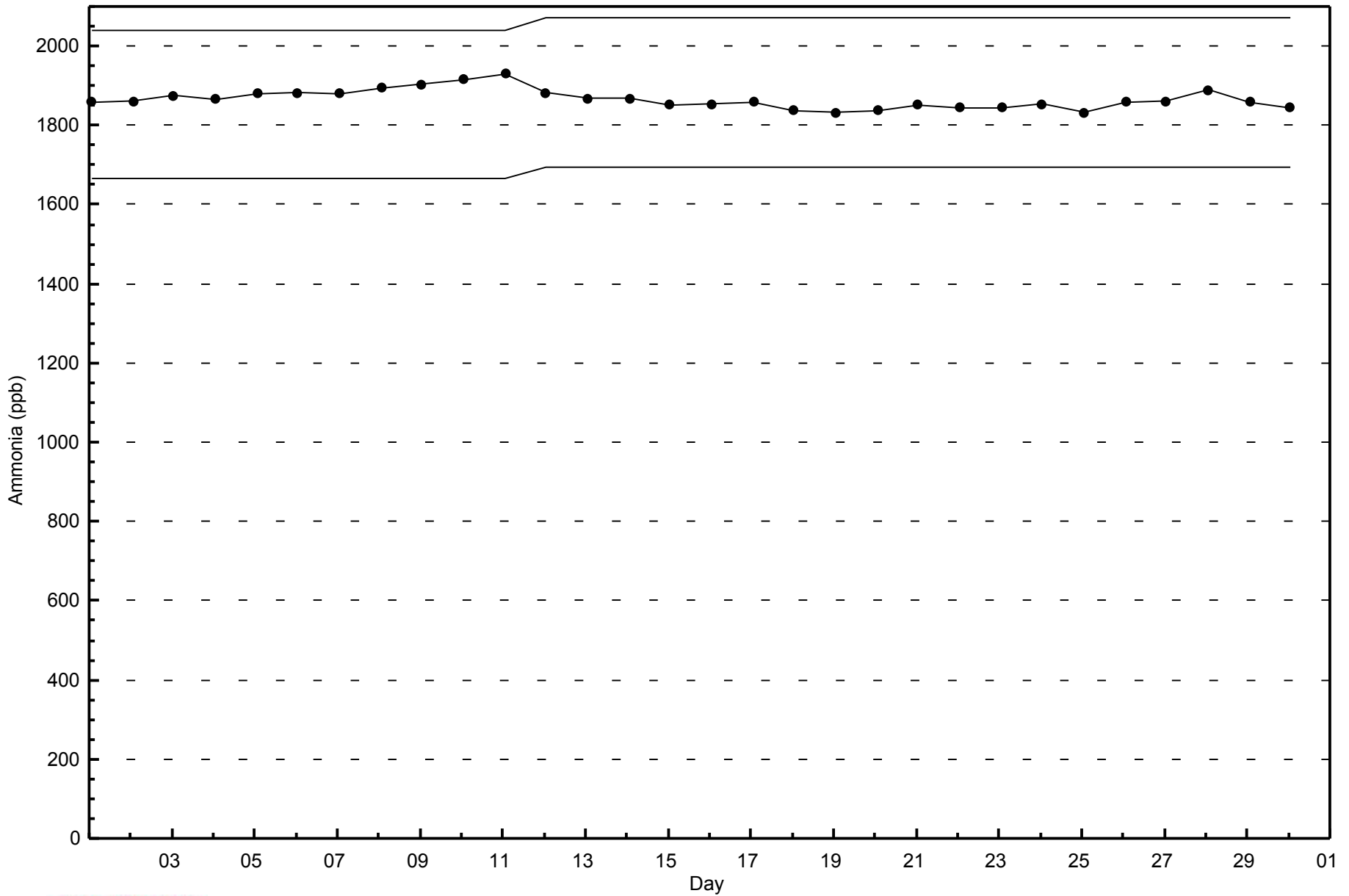
Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - September 2014





WBEA
Span Responses

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - September 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

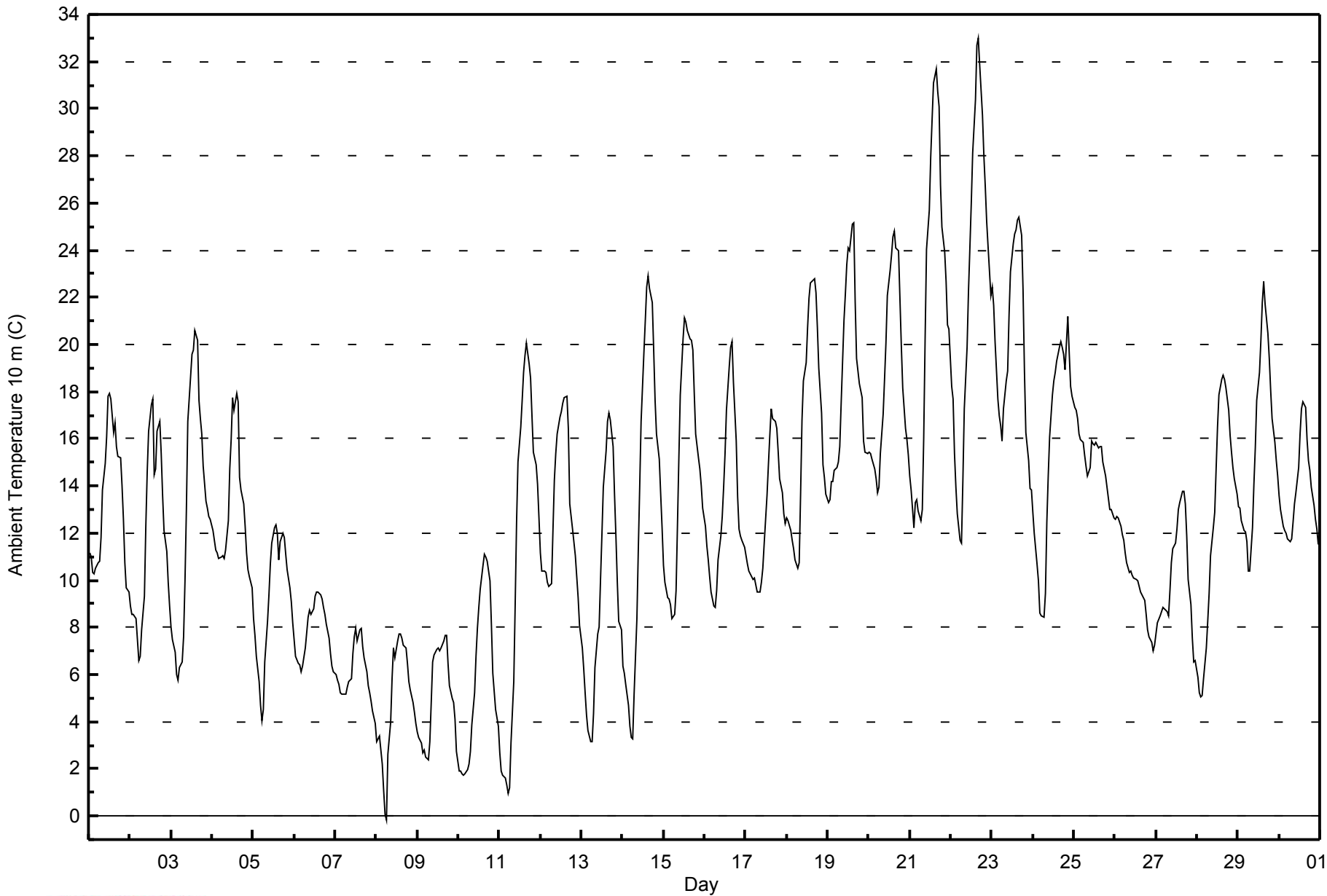
Ambient Temperature 10 m (AT 10m) - C
Fort McKay - Bertha Ganter - September 2014

Summary table containing:
- Maximum Value: 33.0 C on Sep 22 17:00
- Maximum Daily Average: 22.4 C on Sep 22
- Minimum Value: -0.1 C on Sep 8 07:00
- Minimum Daily Average: 4.8 C on Sep 8
- Monthly Average: 12.90 C
- Percentiles: P1=1.7 P10=5.4 Q1=8.5 Median=12.5 Q3=16.7 P90=20.7 P99=30.1
- Hours in Service: 720
- Hours of Data: 720
- Hours of Missing Data: 0
- Hours of Calibration: 0
- Percent Operational Time: 100.0
- Grid of hourly data for each day from 1-Sep to 30-Sep, including daily averages and maximums.



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	1	0.14	0.14
0 - 10	241	33.47	33.61
10 - 20	391	54.31	87.92
> 20	87	12.08	100.00

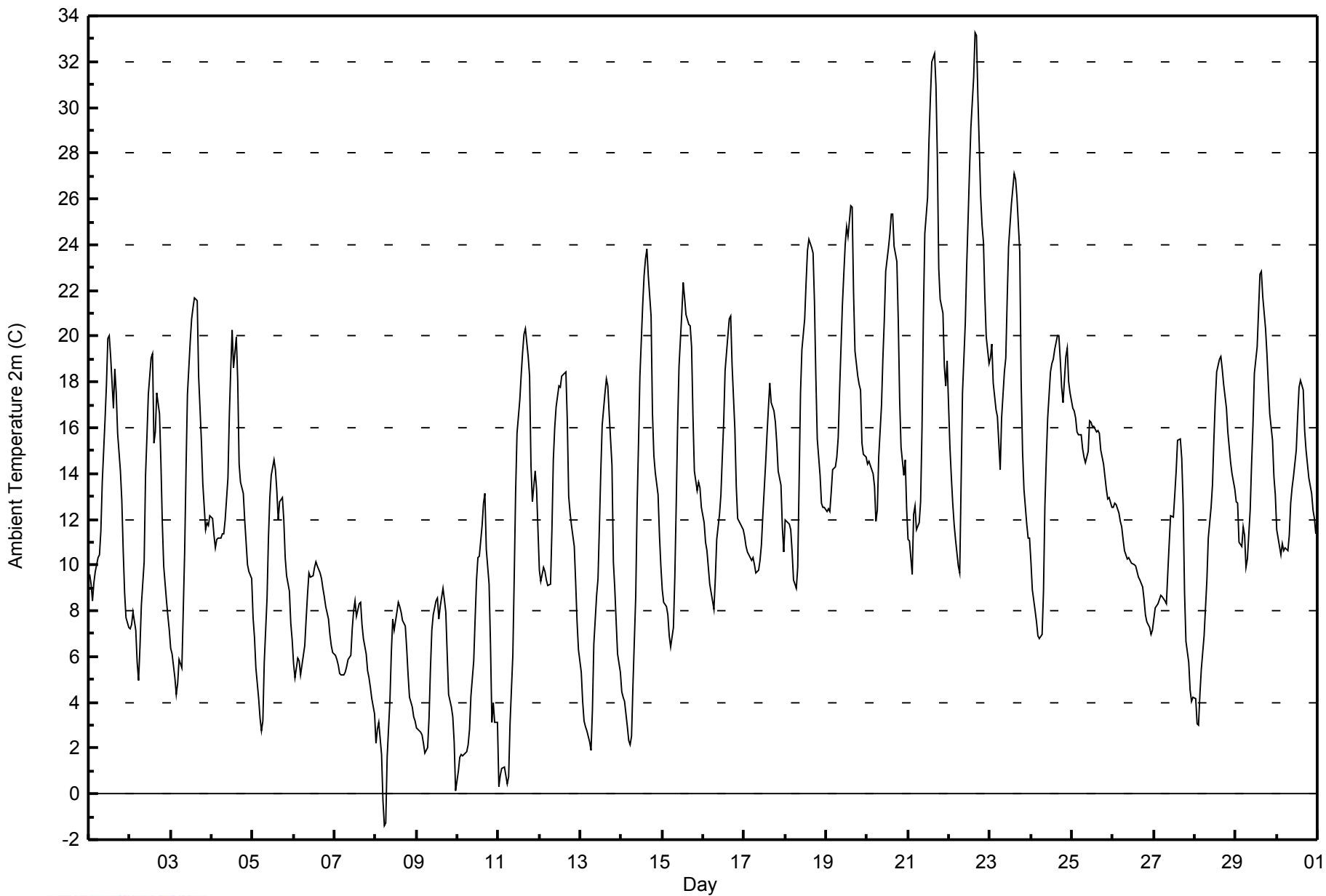
Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	3	0.42	0.42
0 - 10	261	36.25	36.67
10 - 20	369	51.25	87.92
> 20	87	12.08	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 100 % on Sep 13 03:00	Maximum Daily Average: 93.0 % on Sep 30	Hours in Service: 720
Minimum Value: 26 % on Sep 23 16:00	Minimum Daily Average: 55.4 % on Sep 11	Hours of Data: 707
Maximum Diurnal Average: 91.5 % at hour 7	Minimum Diurnal Average: 55.7 % at hour 16	Hours of Missing Data: 13
Monthly Average: 75.4 %	Percentiles: P ₁ = 30 P ₁₀ = 48 Q ₁ = 63 Median = 79 Q ₃ = 92 P ₉₀ = 97 P ₉₉ = 100	Hours of Calibration: 0
		Percent Operational Time: 98.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	94	96	96	96	93	92	93	90	83	76	71	58	61	65	68	68	78	77	76	83	87	93	96	97	82.8	97
2-Sep	98	99	98	98	98	99	100	100	97	87	75	68	60	57	75	81	74	68	80	86	88	87	93	95	85.9	100
3-Sep	97	97	98	98	100	100	100	100	97	86	67	50	48	47	45	48	61	65	70	79	86	86	89	88	79.1	100
4-Sep	91	91	92	92	93	91	91	94	94	91	81	79	72	80	75	70	90	89	88	88	87	85	86	85	86.4	94
5-Sep	88	90	92	94	96	96	93	86	79	75	72	66	64	66	72	83	82	83	84	87	89	92	92	93	83.8	96
6-Sep	95	97	97	97	97	96	94	88	82	73	77	79	79	83	88	92	95	95	97	97	95	96	98	98	90.9	98
7-Sep	99	99	98	97	95	97	97	94	93	89	80	68	68	71	61	58	60	63	68	72	74	76	77	80	80.6	99
8-Sep	82	79	73	75	81	87	90	79	76	67	51	49	43	43	44	46	48	47	53	60	62	68	72	78	64.7	90
9-Sep	80	82	84	84	80	84	87	86	77	60	54	51	50	52	51	51	48	47	59	62	65	62	63	68	66.1	87
10-Sep	81	80	81	82	81	79	79	77	73	66	59	51	48	42	39	37	40	41	44	51	65	70	66	66	62.4	82
11-Sep	71	75	75	76	80	84	84	75	62	53	49	44	40	36	33	33	32	35	40	44	49	50	53	58	55.4	84
12-Sep	64	70	70	74	79	82	82	72	63	59	55	46	43	45	43	43	52	84	90	90	97	99	96	98	70.7	99
13-Sep	99	99	100	UO	UO	UO	UO	99	95	95	94	86	81	66	58	53	50	55	61	72	78	85	91	93	80.5	100
14-Sep	98	99	99	UO	100	UO	UO	UO	93	83	70	61	51	45	36	36	39	41	50	59	66	71	78	84	67.9	100
15-Sep	92	95	98	97	98	99	99	98	88	76	66	57	52	52	53	56	55	60	67	73	76	77	81	84	77.1	99
16-Sep	86	88	89	91	93	94	95	93	90	86	82	76	71	66	61	58	56	64	70	77	82	83	83	84	79.9	95
17-Sep	87	88	89	91	93	93	93	92	90	87	84	80	71	68	66	64	67	70	75	78	83	85	90	94	82.5	94
18-Sep	94	95	96	96	98	UO	100	99	87	77	71	68	63	59	56	56	55	57	63	70	77	87	90	93	78.5	100
19-Sep	94	94	89	91	91	92	92	91	85	66	57	52	49	47	41	40	54	64	67	58	61	79	87	89	72.1	94
20-Sep	88	86	83	82	80	81	79	73	66	59	52	46	40	36	32	31	34	36	41	46	53	63	66	69	59.2	88
21-Sep	73	73	80	79	79	81	86	86	78	67	54	51	45	39	34	33	36	39	48	52	56	60	68	68	61.0	86
22-Sep	76	80	88	92	94	96	97	90	81	69	58	55	51	47	41	30	28	30	36	39	41	44	45	52	60.8	97
23-Sep	50	55	68	93	98	97	97	95	93	91	66	47	30	29	28	26	27	33	40	52	61	64	71	70	61.8	98
24-Sep	74	79	85	90	93	94	94	92	85	78	72	66	64	66	67	69	68	71	76	77	72	79	93	97	79.3	97
25-Sep	94	93	91	89	86	85	87	79	79	77	72	71	71	69	69	69	68	70	72	74	76	77	78	79	78.2	94
26-Sep	80	81	79	79	80	81	84	90	95	95	97	98	98	99	99	99	99	99	98	98	98	99	99	99	92.6	99
27-Sep	100	99	99	99	99	99	98	98	96	90	82	80	73	67	64	62	62	66	73	83	88	92	97	99	86.1	100
28-Sep	UO	UO	UO	UO	96	92	88	85	77	72	70	64	58	54	52	52	53	57	61	65	68	70	72	75	69.1	96
29-Sep	77	78	81	83	84	85	89	88	82	74	66	61	58	55	52	52	54	60	65	68	72	75	80	83	71.7	89
30-Sep	86	91	95	96	96	96	95	95	94	96	97	98	91	81	74	78	92	99	98	97	99	98	98	95	93.0	99

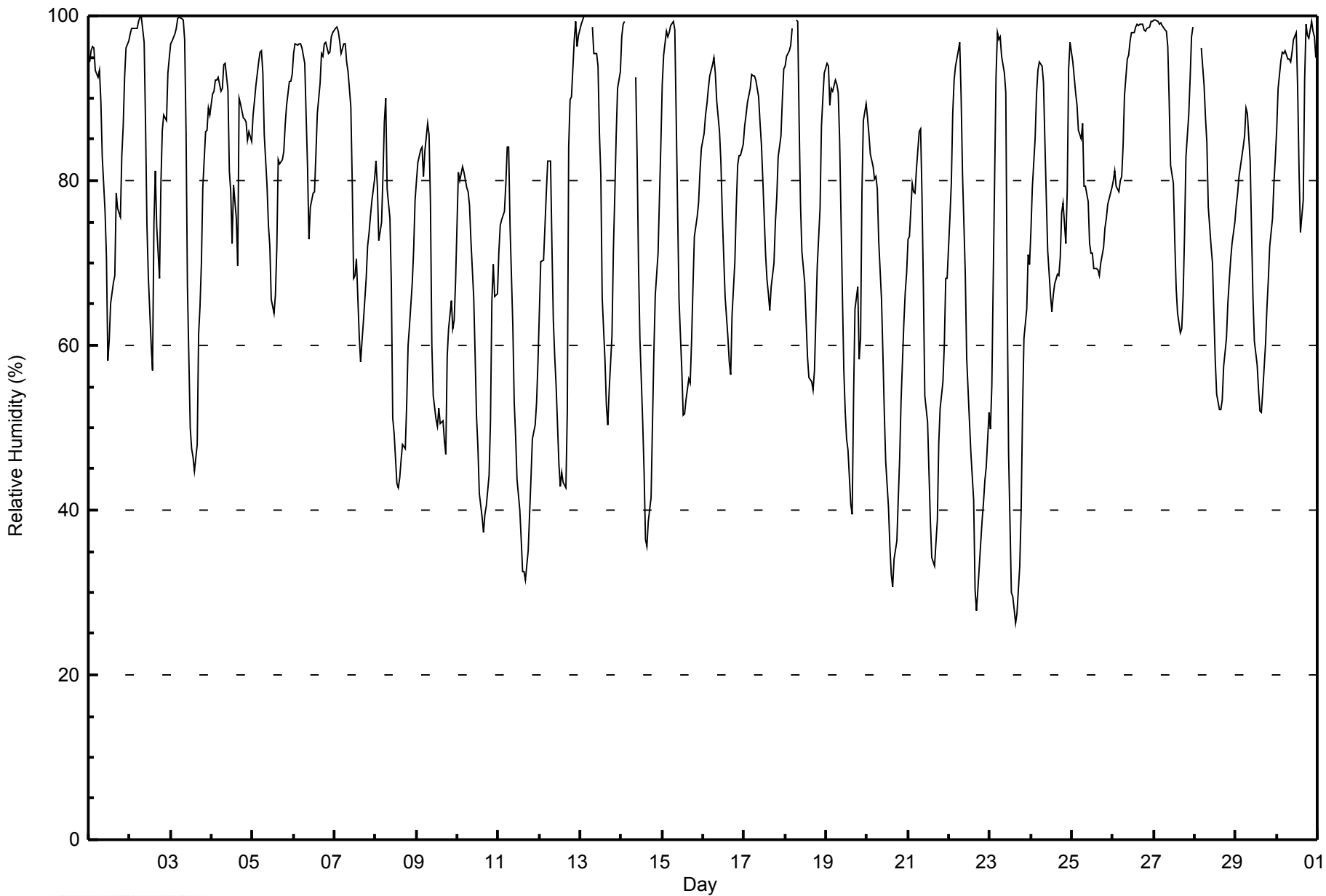
85.7	87.2	88.4	89.4	90.7	90.8	91.5	89.1	84.3	77.3	70.0	64.1	59.7	57.6	55.9	55.7	58.7	62.2	67.0	71.2	75.0	78.4	81.6	83.7	Diurnal Average		
100	99	100	99	100	100	100	100	100	97	96	97	98	98	99	99	99	99	99	98	98	99	99	99	99	Diurnal Maximum	

UO - Unstable Operation



WBEA
Hourly Averages

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



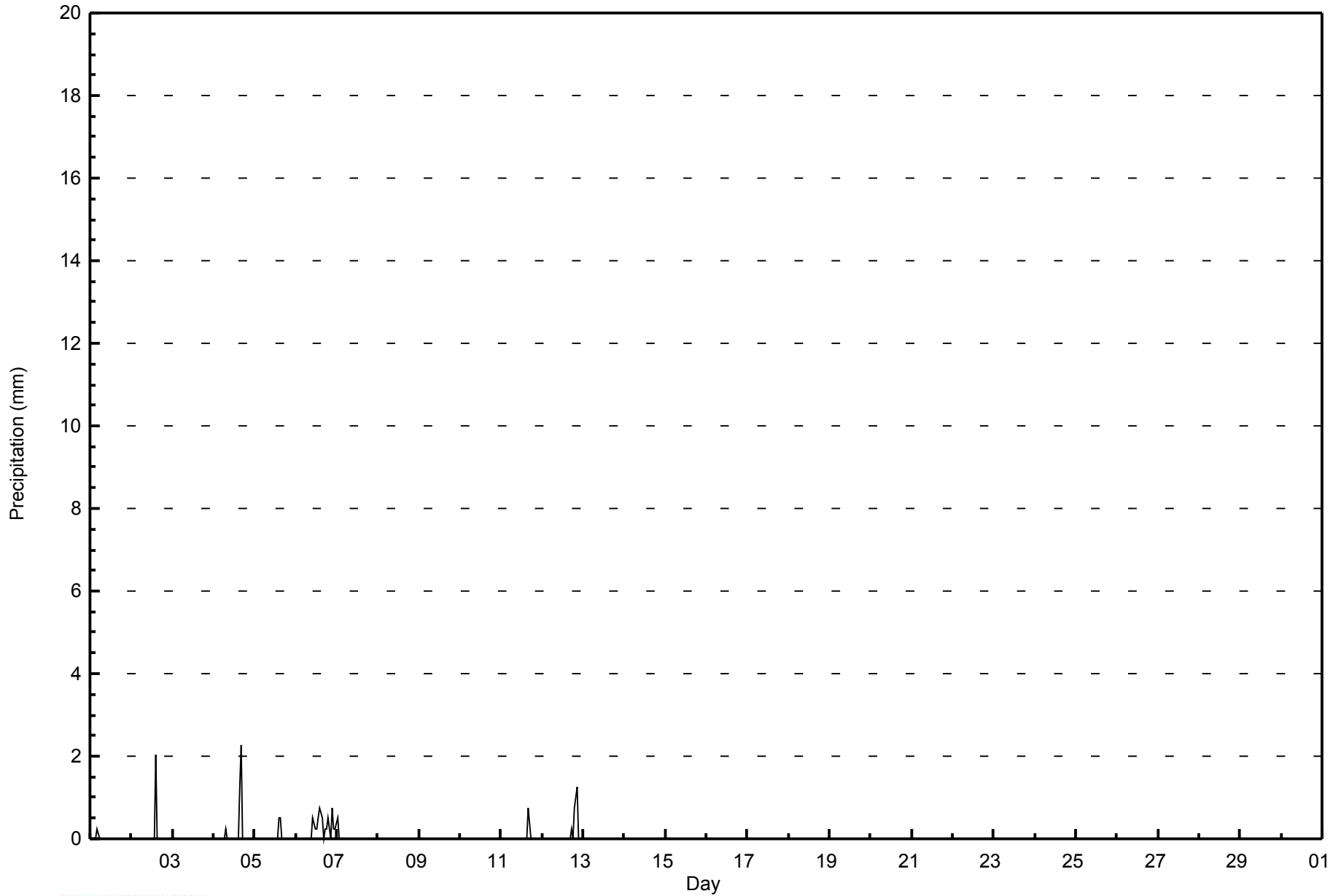


Maximum Value: 2.3 mm on Sep 4 17:00		Maximum Daily Total: 5.1 mm on Sep 6		Hours in Service: 720																							
Minimum Value: 0.0 mm on Sep 1 01:00		Minimum Daily Total: 0.0 mm on Sep 3		Hours of Data: 342																							
Maximum Diurnal Total: 3.3 mm at hour 15		Minimum Diurnal Total: 0.0 mm at hour 2		Hours of Missing Data: 378																							
Monthly Total: 15.75 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.6		Hours of Calibration: 0																							
				Percent Operational Time: 47.5																							
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	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	
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	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0
3-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
4-Sep	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	1.3	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	2.3
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	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5
6-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.3	0.5	0.8	0.5	0.0	0.3	0.3	0.5	0.0	0.8	0.3	0.3	5.1	0.8	
7-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	0.5	0.5	
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	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	
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	0.3	0.0	0.8	1.3	0.0	0.0	0.0	2.3	1.3	
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	0.0	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	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	0.0	
16-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
17-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
18-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
19-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
20-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
21-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
22-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
23-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
24-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
25-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
26-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
27-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
28-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
29-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
30-Sep	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--	--	
		0.5	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.5	0.3	0.3	0.5	3.3	2.3	3.0	0.5	0.3	1.3	1.3	0.8	0.3	0.3	Diurnal Average	
		0.5	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.5	0.3	0.3	0.5	2.0	1.3	2.3	0.3	0.3	0.8	1.3	0.8	0.3	0.3	Diurnal Maximum	
NF - Not Flagged																											



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Fort McKay - Bertha Ganter - September 2





WBEA
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort McKay - Bertha Ganter - September 2014

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	327	95.61	95.61
0.4 - 0.5	7	2.05	97.66
0.6 - 0.7	0	0.00	97.66
0.8 - 1.4	6	1.75	99.42
1.5 - 10	2	0.58	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 342

Total Number of Hours: 720

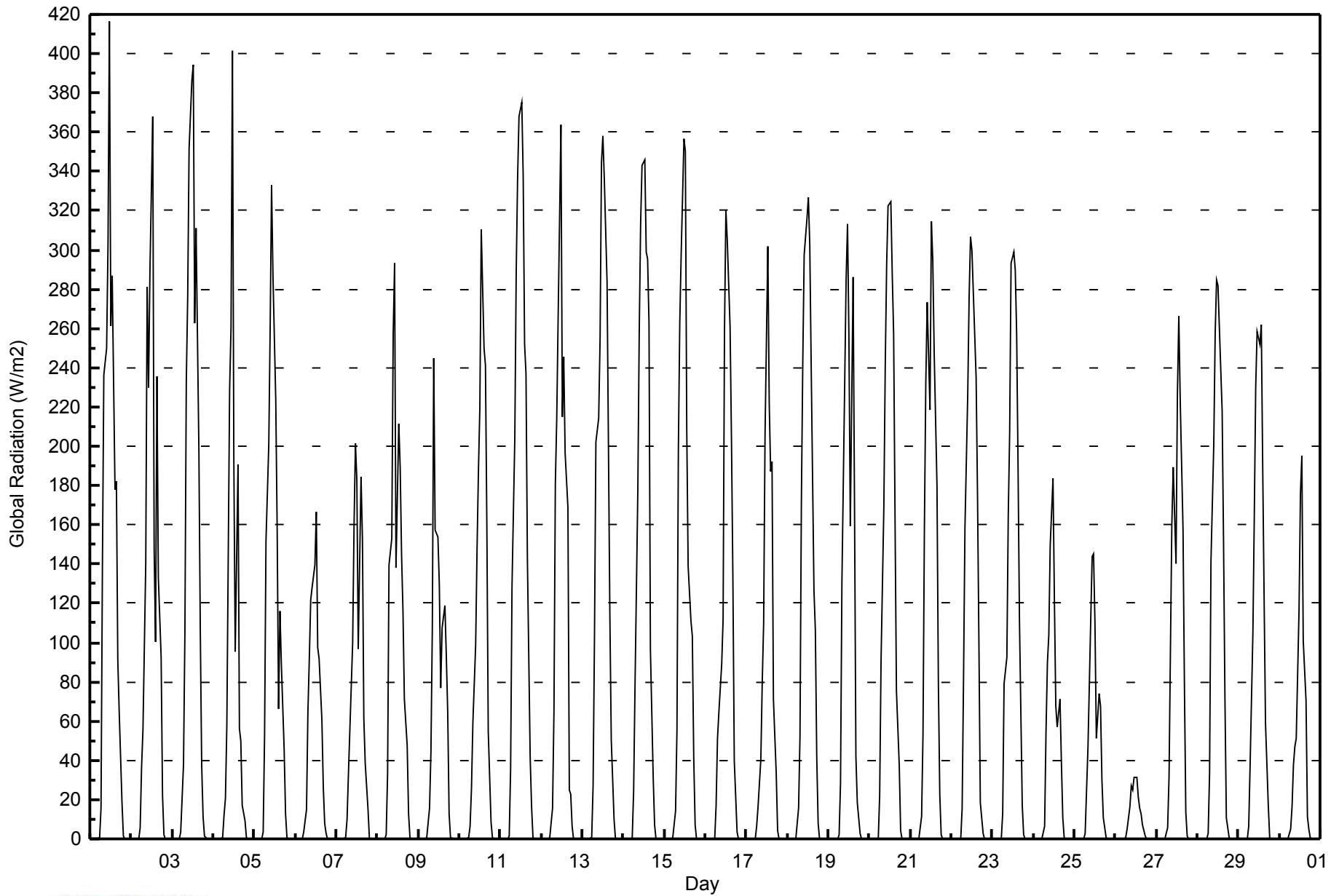


Maximum Value: 417 W/m2 on Sep 1 12:00																			Maximum Daily Average: 115.3 W/m2 on Sep 11						Hours in Service: 720	
Minimum Value: 0 W/m2 on Sep 1 02:00																			Minimum Daily Average: 8.2 W/m2 on Sep 26						Hours of Data: 720	
Maximum Diurnal Average: 259.1 W/m2 at hour 12																			Minimum Diurnal Average: 0.0 W/m2 at hour 21						Hours of Missing Data: 0	
Monthly Average: 75.2 W/m2																			Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 7 Q ₃ = 140 P ₉₀ = 258 P ₉₉ = 368						Hours of Calibration: 0	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	1	16	139	236	250	303	417	262	287	178	182	91	65	19	2	0	0	0	0	101.9	417
2-Sep	0	0	0	0	0	6	36	56	140	281	230	290	368	148	100	236	133	92	22	2	0	0	0	0	89.1	368
3-Sep	0	0	0	0	0	4	38	105	233	276	352	386	394	262	311	199	108	38	12	1	0	0	0	0	113.3	394
4-Sep	0	0	0	0	0	1	12	21	58	230	260	402	194	95	191	56	50	17	9	0	0	0	0	0	66.5	402
5-Sep	0	0	0	0	0	3	52	152	200	261	333	287	224	158	66	116	89	46	13	1	0	0	0	0	83.4	333
6-Sep	0	0	0	0	0	3	15	65	92	122	128	140	167	98	92	60	26	8	3	0	0	0	0	0	42.4	167
7-Sep	0	0	0	0	0	0	10	34	55	100	160	201	183	97	184	153	61	38	15	0	0	0	0	0	53.8	201
8-Sep	0	0	0	0	0	2	33	140	153	257	293	138	212	189	144	116	71	48	13	0	0	0	0	0	75.4	293
9-Sep	0	0	0	0	0	1	16	44	108	245	157	154	129	77	108	119	93	65	13	0	0	0	0	0	55.4	245
10-Sep	0	0	0	0	0	0	6	26	59	99	148	188	220	310	250	241	160	55	9	1	0	0	0	0	73.8	310
11-Sep	0	0	0	0	0	1	36	129	204	289	337	368	375	337	252	237	143	42	16	1	0	0	0	0	115.3	375
12-Sep	0	0	0	0	0	1	15	64	181	214	265	364	215	246	196	169	25	23	7	0	0	0	0	0	82.7	364
13-Sep	0	0	0	0	0	1	27	103	202	214	255	344	358	336	283	200	114	51	10	0	0	0	0	0	104.2	358
14-Sep	0	0	0	0	0	1	24	78	177	258	313	343	346	299	296	263	97	31	7	0	0	0	0	0	105.6	346
15-Sep	0	0	0	0	0	1	14	56	198	262	298	357	350	208	139	111	103	41	7	0	0	0	0	0	89.4	357
16-Sep	0	0	0	0	0	0	17	51	65	89	111	259	321	305	261	203	133	40	4	0	0	0	0	0	77.4	321
17-Sep	0	0	0	0	0	0	7	16	40	79	110	206	302	222	187	192	71	34	4	0	0	0	0	0	61.2	302
18-Sep	0	0	0	0	0	0	16	52	172	242	298	316	326	302	242	127	106	41	8	0	0	0	0	0	93.7	326
19-Sep	0	0	0	0	0	0	2	28	131	233	284	313	256	160	286	171	42	19	3	0	0	0	0	0	80.4	313
20-Sep	0	0	0	0	0	0	22	91	169	241	293	322	325	288	257	163	75	38	4	0	0	0	0	0	95.4	325
21-Sep	0	0	0	0	0	0	12	54	158	232	273	218	315	294	248	180	79	23	2	0	0	0	0	0	87.0	315
22-Sep	0	0	0	0	0	0	16	82	158	226	276	307	300	278	235	175	100	19	3	0	0	0	0	0	90.6	307
23-Sep	0	0	0	0	0	0	13	79	93	165	207	293	299	290	257	189	112	17	2	0	0	0	0	0	84.0	299
24-Sep	0	0	0	0	0	0	6	55	90	104	150	183	122	67	57	71	39	11	1	0	0	0	0	0	39.8	183
25-Sep	0	0	0	0	0	0	3	25	46	112	143	145	110	51	74	68	30	11	1	0	0	0	0	0	34.1	145
26-Sep	0	0	0	0	0	0	1	5	16	27	25	31	31	21	16	13	7	2	0	0	0	0	0	0	8.2	31
27-Sep	0	0	0	0	0	0	5	31	96	160	189	140	227	266	224	158	79	14	1	0	0	0	0	0	66.3	266
28-Sep	0	0	0	0	0	0	3	34	141	201	257	285	282	261	218	151	71	10	1	0	0	0	0	0	79.8	285
29-Sep	0	0	0	0	0	0	6	38	105	165	230	258	252	262	190	124	59	17	0	0	0	0	0	0	71.1	262
30-Sep	0	0	0	0	0	0	5	16	37	47	51	116	176	195	101	70	12	5	0	0	0	0	0	0	34.7	195
																			0.0 0.0 0.0 0.0 0.0 0.9 16.2 62.2 127.2 189.4 224.4 259.1 254.6 213.7 188.1 150.5 79.3 32.0 7.0 0.3 0.0 0.0 0.0 0.0 0.0						Diurnal Average	
																			0 0 0 0 0 6 52 152 236 289 352 417 394 337 311 263 160 92 22 2 0 0 0 0 0						Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	401	55.69	55.69
21 - 100	105	14.58	70.28
101 - 300	180	25.00	95.28
301 - 600	34	4.72	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 21 km/h on Sep 28 16:00	Maximum Daily Speed Average: 13.3 km/h on Sep 28	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 9 09:00	Minimum Daily Speed Average: 0.5 km/h on Sep 27	Hours of Data: 716
Maximum Diurnal Speed Average: 2.4 km/h at hour 11	Minimum Diurnal Speed Average: 1.2 km/h at hour 3	Hours of Missing Data: 4
Monthly Average Velocity: 1.3 km/h 234.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 P ₉₀ = 11 P ₉₉ = 19	Percent Operational Time: 99.4

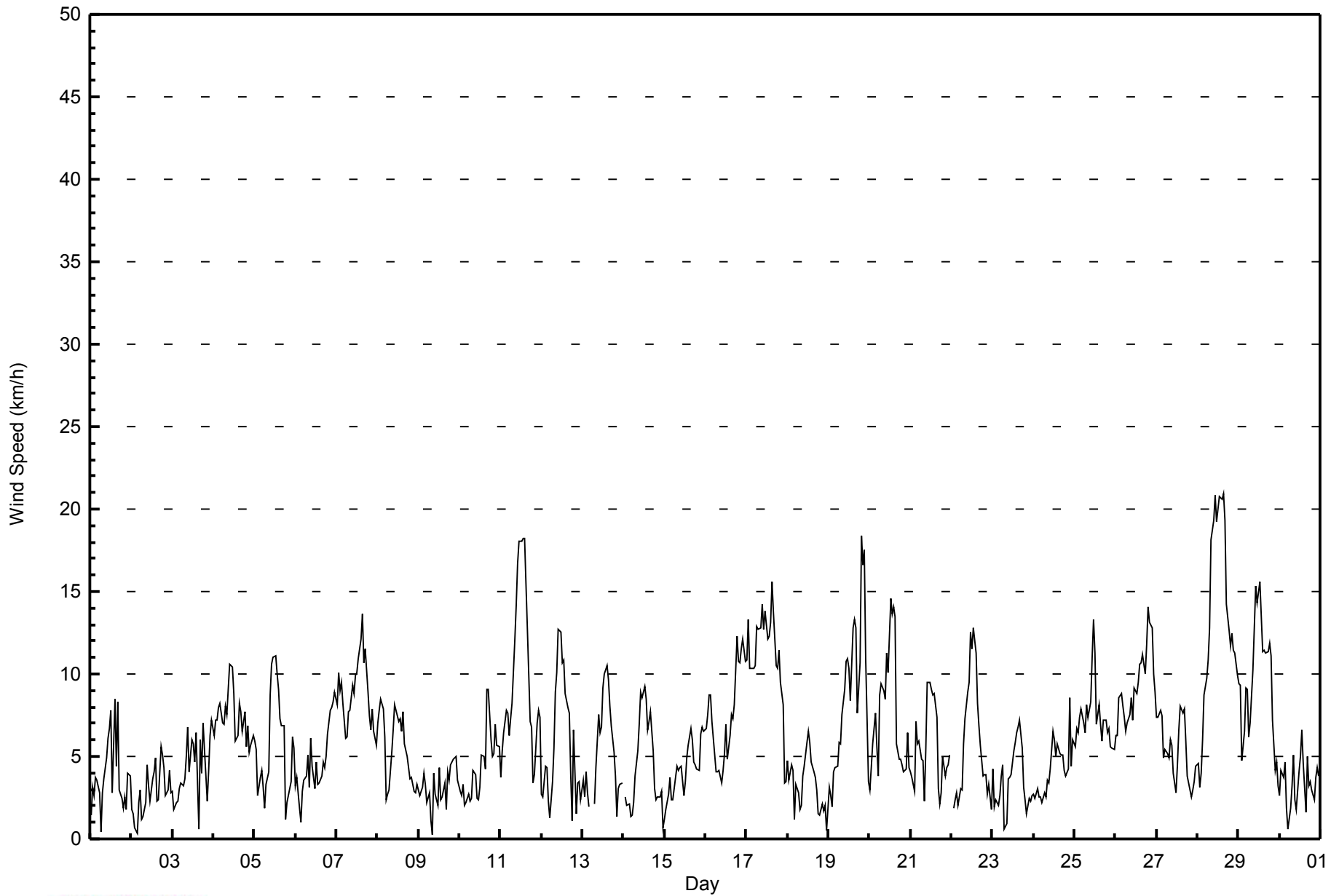
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	WNW1	SSW3	S3	SSW4	SW4	SW3	SSW0	SW3	S4	S5	S6	SSE7	SSW8	SW3	N8	SSE4	SSW8	S3	NW2	NW2	WNW3	WNW2	W4	WNW4	SSW2.2	N8	
2-Sep	NW2	W2	SSE1	W0	W2	WSW3	SSW1	SSW1	S2	SSE5	NNW3	SSE2	SW4	SSE4	NNE5	SW2	WSW2	NW6	NW5	WNW4	NW3	NNW3	WNW4	WNW3	W1.3	NW6	
3-Sep	NNW3	NW2	SW2	WSW2	SW3	SSW3	S3	SSE4	SSE5	SSE7	SSW4	WSW6	WSW6	SW5	WNW6	NNW1	ENE6	ESE4	SSE7	S5	NW2	SSW4	SSW6	SSW7	SSW2.5	SSW7	
4-Sep	S6	SSW7	S7	SSW8	SSW8	SSW7	S7	S8	S8	S11	S11	SSE10	S9	S6	SSE6	N8	N8	N6	N8	N6	NNE7	N5	N6	N6	S2.4	S11	
5-Sep	NNW6	NW5	NW3	WNW4	WNW4	WNW3	W2	WNW3	S4	SSE9	SSE11	S11	S11	S10	S9	SSE7	SSE7	S7	SSW1	SSW2	W3	NNW4	NNW6	NW6	SSW2.5	S11	
6-Sep	NW3	WNW4	W2	NW1	WNW3	NW4	N4	N5	NNE3	E6	ESE4	E3	ENE5	E3	NE3	NNE4	NNE5	NNE4	N5	NNE6	NNE8	NNE8	N8	NNE9	NNE3.4	NNE9	
7-Sep	N8	NNE10	N9	NNE9	NNE8	N6	N6	N8	N8	N9	NNE9	NNE10	N10	N11	N12	N14	N11	N12	N9	NNW7	N7	NNW8	NNW7	NNW6	N8.7	N14	
8-Sep	NNW7	N8	N8	NNW8	NNW6	WNW2	WNW3	N3	NNE5	NNE7	NNE8	N8	N7	N7	NNE7	NNE8	N6	NNE5	N4	NNW4	NW4	NW3	NW3	WNW3	N5.0	N8	
9-Sep	WNW3	NNW3	W3	NW4	NNW3	NW2	W3	NW1	NW0	NNE4	ENE3	SSE2	SE4	ESE2	SSW3	S3	N2	N4	NW4	NW4	NW5	NNW5	NNW5	NW4	NNW1.6	NNW5	
10-Sep	W3	NW3	NW3	NW2	NW2	NW3	NW2	NW2	NW4	NW4	W2	S2	WNW3	NNW5	WSW5	SW4	S9	S9	SSW6	SSW5	S5	SSW7	SSW6	SW6	SW2.6	S9	
11-Sep	SSW4	SSW5	SSW6	SSW8	S8	SSW6	SSW7	S8	SSW12	SSW14	SSW17	SSW18	SSW18	SSW18	SSW18	SSW15	SW13	WSW7	SSW7	SW3	WSW4	WNW7	NW8	NW7	SSW8.8	SSW18	
12-Sep	WSW3	SW3	SSW4	SSW4	SSW2	SSW1	NW3	NNW6	NNW9	NNW10	NNW13	N13	N11	N11	N9	N8	N8	NNW4	NW1	N7	WNW2	NW3	NNW4	WNW2	NNW4.4	NNW13	
13-Sep	NW4	WNW3	W4	W3	SW2	AF	AF	SSE2	SSE4	SSE8	SSE6	SSE7	SSE9	SSE10	SSE10	SSE10	S8	S7	S5	SW4	NW1	W3	WSW3	W3	S3.7	SSE10	
14-Sep	AF	W3	WSW2	WSW2	WSW1	SW1	SW2	S4	S5	SSE7	SSE9	SSE9	SSE9	SW7	SW7	SW8	SSW5	WSW3	W2	NW3	WNW3	NW3	WSW1	SSW3.2	SSE9		
15-Sep	SSW1	SSW2	SSW3	SSW4	SSW2	SSW4	SSW4	SSW4	SSE4	SSE4	SSE4	ENE3	E3	NE5	NNE6	NNE7	NE6	NNE5	N4	NNW4	N4	N6	N7	N7	NNE1.1	N7	
16-Sep	N7	N8	N9	N9	N7	N5	N4	N4	NNE4	NNE3	NNE4	ENE5	NE7	NE5	NE6	NE8	E7	S8	S12	SSE11	SSE11	SSE11	SSE12	SSE11	ENE2.4	S12	
17-Sep	SSE11	SSE13	SSE10	SSE10	SSE10	SSE10	SSE13	SSE13	S13	S14	S13	S14	SSW12	S12	S13	S16	S14	S10	S10	S11	S9	SSW8	SSW3	SSW3	S10.9	S16	
18-Sep	SSW5	SSW4	SW4	SSW4	SSW1	NNW3	NW3	NW2	N2	SE4	E4	E6	E7	ESE6	ESE5	ESE4	E4	ESE3	SSE1	SSW1	W2	NNW2	WNW2	WSW1	SE1.2	E7	
19-Sep	NNE3	N3	SSW2	SSW4	SW4	SSW4	SSW6	SSW6	S8	SW9	WSW11	WSW11	WSW10	W8	W13	W13	WNW13	W8	WNW11	NW18	NW17	NW18	NW11	W3	W6.9	NW18	
20-Sep	SW3	WNW4	NW6	NW8	NW6	SSW4	NW9	NW9	NW9	NW8	NW11	NW10	NW15	NW14	NW14	NW13	NW6	WSW5	WSW5	SW4	SSW4	SSW4	SSW6	SW4	WNW6.0	NW15	
21-Sep	SW4	W4	SW3	SSW7	SSW6	SW6	WSW5	WSW5	SSW2	S5	WSW10	WSW9	WSW9	W9	W9	W7	S3	S2	SSW3	SSW5	S4	SSW4	S4	SSW5	SW4.7	WSW10	
22-Sep	AF	NW2	NW2	WNW3	W2	W3	SW3	S6	S7	S9	S10	S13	SSE12	S13	S11	SSW8	WSW7	SW6	SW4	W4	W4	WSW3	WNW3	WNW2	SSW4.4	S13	
23-Sep	NW4	WSW2	NW2	NW2	N3	N4	N5	SSE1	NW1	NNW4	NW4	SSE4	E5	SE6	SSE6	S7	S7	SSW5	SSW3	WSW2	W2	N2	NW2	NW3	SW0.5	S7	
24-Sep	NNW3	NW2	WNW3	NW3	WSW3	NW2	NW3	NNW3	N4	N3	NNE4	N7	N6	N5	N6	N5	N5	N5	NNW4	WNW4	SW4	WNW9	S4	S6	NNW2.7	WNW9	
25-Sep	SSW6	WSW7	SW6	SW7	SW8	W7	NW6	WNW8	WNW7	WNW8	WNW11	NW13	NW11	N7	N8	NNW7	N6	NNE7	NNE7	N6	NNE7	NNE6	NE6	NNE5	NW4.6	NW13	
26-Sep	N6	NE6	ENE9	ENE9	NE8	NE7	NE7	NNE7	NNE8	NNE9	NE7	NNE9	NNE9	NNE9	NNE9	NNE11	NNE11	N11	NNE10	NNE12	N14	N13	N13	N10	N9	NNE8.9	N14
27-Sep	N7	N7	N8	N7	NNW5	NNW5	NNW5	NNW5	NNW6	NNE6	NE4	NNW3	S4	S7	SSE8	SSE8	S8	S6	SSW4	S3	SSW3	SW3	SSW3	SSW4	WNW0.5	SSE8	
28-Sep	S5	S3	S4	SSW6	S9	SSW10	SSW11	S13	S18	S19	S21	S19	S20	SSW21	SSW21	SSW21	SSW19	SSW14	SSW13	SSW12	SSW12	SSW11	S11	SSW10	S13.3	SSW21	
29-Sep	SSW9	SSW9	SW5	SSW6	S9	S9	SSE6	S7	S10	S13	S15	S14	S16	S14	S11	SW11	SW11	SSW11	SSW12	SW11	SSW7	SW4	S5	SSW3	SSW9.2	S16	
30-Sep	WSW3	SSW4	SSW4	SSW5	WSW2	SSE1	N2	S3	SSE5	W2	NW2	NW4	N5	N7	ENE5	SSE2	NW5	N3	N3	NNE3	N2	NNW4	N4	NNE4	NNW0.9	N7	
WNW1.4 W1.3WSW1.2WSW1.4 SW1.6 SW1.7WSW1.3 SW1.4 S1.7 S2.4SSW2.4 S2.2SSW2.3SSW1.8 SW1.3 SW1.5 SW1.4 SW1.3WSW1.4 W1.7WNW1.7WNW2.2WNW1.6 W1.5																								Diurnal Average			
SSE11 SSE13 SSE10 SSE10 SSE10 SSE10 SSE13 S13 S18 SSW19 S21 S19 S20 SSW21 SSW21 SSW21 SSW19 SSW14 SSW13 NW18 NW17 NW18 SSE12 SSE11																								Diurnal Maximum			

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	362	50.56	50.56
6 - 11	288	40.22	90.78
12 - 19	61	8.52	99.30
20 - 28	5	0.70	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 716

Total Number of Hours: 720



WBEA
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	31	17	4	5	6	6	2	19	27	56	28	23	25	31	54	28	362
6 - 11	55	31	10	3	4	1	1	34	44	36	12	11	6	8	17	15	288
12 - 19	7	1	0	0	0	0	0	5	19	16	1	0	2	1	8	1	61
20 - 28	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	5
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	93	49	14	8	10	7	3	58	92	111	41	34	33	40	79	44	716

Total Number of Valid Hours: 716

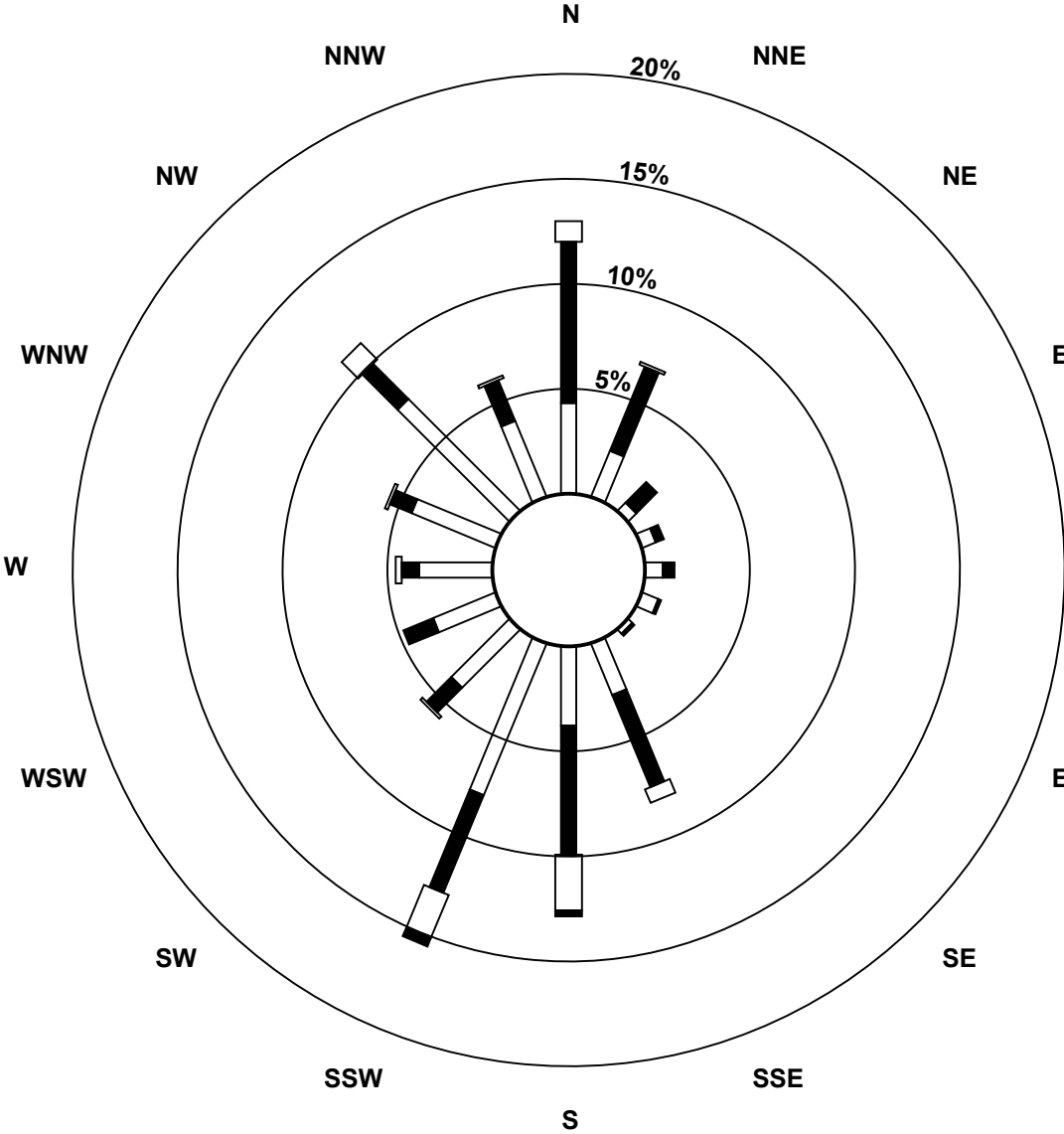
Total Number of Hours: 720

Wood Buffalo Environmental Association

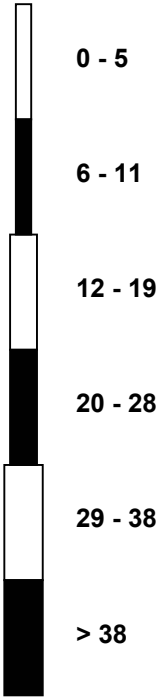
Wind Rose Sep 2014

Wind Speed (WS) - km/h

Fort McKay - Bertha Ganter (AMS 1)



Classes (km/h)



Total Number of Valid Hours: 716



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 7 km/h on Sep 19 20:00	Hours of Data: 716
Minimum Value: 0 km/h on Sep 13 20:00	Hours of Missing Data: 4
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	Hours of Calibration: 0
	Percent Operational Time: 99.4

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

AF - Analyzer Failure



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Fort McKay - Bertha Ganter - September 2014

Direction of Maximum Speed: 196 deg on Sep 28 16:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 190.8 deg on Sep 28		Hours of Data:	716
Direction of Minimum Speed: 316 deg on Sep 9 09:00		Hours of Missing Data:	4
Direction of Minimum Daily Speed Average: 0.5 deg on Sep 27		Percent Operational Time:	99.4
Monthly Average Direction: 265.7 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	303	199	183	195	215	219	211	220	169	170	190	161	212	216	8	152	194	188	322	314	298	302	270	283	209.2
2-Sep	309	279	164	269	260	244	201	196	180	157	334	156	223	160	31	220	258	317	321	299	320	329	288	301	277.3
3-Sep	332	326	232	251	220	213	190	156	160	157	195	254	257	227	290	346	70	121	157	173	310	203	196	194	201.2
4-Sep	191	197	191	194	192	193	181	190	184	172	175	163	171	173	165	11	3	5	6	8	15	7	358	349	177.8
5-Sep	328	311	315	295	298	289	278	292	179	164	164	170	178	172	174	162	168	173	202	213	281	336	337	323	200.1
6-Sep	317	289	278	325	288	312	359	6	27	96	104	79	75	101	52	27	12	14	9	14	17	14	10	17	19.0
7-Sep	11	13	9	12	14	9	5	10	0	4	13	20	6	3	3	4	2	1	356	342	349	343	346	336	3.2
8-Sep	343	349	357	337	335	282	292	352	16	25	17	359	359	360	18	24	353	20	354	333	315	306	309	293	353.0
9-Sep	292	329	281	322	345	316	277	305	316	32	76	161	131	105	208	169	352	357	325	318	322	336	328	317	327.7
10-Sep	268	308	307	309	308	318	322	311	307	311	264	181	288	348	237	233	188	184	206	211	189	199	197	217	235.9
11-Sep	199	205	201	195	190	200	192	190	194	213	202	202	206	211	213	211	231	238	211	229	254	297	306	306	213.7
12-Sep	258	214	197	198	192	213	324	330	343	339	335	352	356	353	359	11	357	347	309	355	285	310	336	282	339.1
13-Sep	304	286	271	271	225	AF	AF	167	147	160	155	160	151	159	159	162	174	179	182	226	310	280	258	262	180.6
14-Sep	AF	264	241	251	258	218	236	171	176	156	163	158	161	166	228	223	222	205	248	272	326	298	312	241	199.3
15-Sep	201	206	198	208	202	211	203	195	162	159	166	74	90	35	29	30	51	13	354	339	358	3	357	0	31.2
16-Sep	357	357	3	3	356	360	357	4	14	13	24	59	53	50	42	46	83	175	170	162	164	152	158	155	78.3
17-Sep	154	159	150	152	150	158	155	168	172	172	181	179	198	171	171	182	181	176	177	174	186	196	211	198	172.0
18-Sep	200	213	215	197	210	337	324	319	349	126	91	97	96	114	108	104	99	110	152	202	259	335	295	251	129.1
19-Sep	16	11	210	200	216	209	197	205	191	228	239	248	250	269	272	273	302	273	288	306	304	304	312	276	271.6
20-Sep	227	300	304	309	305	203	307	315	314	314	314	316	310	309	309	314	309	248	242	226	204	200	198	224	295.6
21-Sep	224	262	234	194	206	221	242	240	210	178	239	243	251	272	262	265	170	183	204	195	188	202	185	194	226.7
22-Sep	AF	319	316	283	259	261	225	190	170	169	179	171	168	176	175	210	240	225	232	263	281	256	294	286	201.3
23-Sep	305	239	315	315	3	356	349	166	310	339	323	147	99	129	147	171	189	198	210	257	277	350	315	312	229.4
24-Sep	331	322	296	324	257	308	314	329	7	10	15	6	6	0	2	11	1	1	327	300	226	302	183	190	335.4
25-Sep	204	250	234	223	225	260	308	293	294	284	298	323	315	353	354	343	9	12	15	10	20	16	40	13	317.9
26-Sep	7	45	67	60	39	46	40	28	24	32	35	22	19	17	17	12	9	14	13	9	10	8	7	6	22.0
27-Sep	359	357	358	359	336	332	328	327	347	20	51	338	178	190	155	166	173	171	203	188	210	229	194	196	300.9
28-Sep	191	169	181	192	188	200	197	182	182	191	180	178	186	196	196	196	199	200	195	192	192	192	190	197	190.8
29-Sep	199	196	214	199	187	180	161	172	177	180	181	176	178	175	185	229	223	204	208	214	213	217	183	213	192.5
30-Sep	246	192	195	193	244	162	354	187	156	278	325	310	359	11	69	166	310	10	6	27	354	346	7	23	342.7
281.4 272.5 258.4 240.9 236.1 234.6 251.3 225.3 190.1 180.0 196.6 187.3 198.7 193.2 215.2 227.9 229.8 218.1 246.7 272.8 286.6 300.5 293.1 277.8																									
Diurnal Average																									

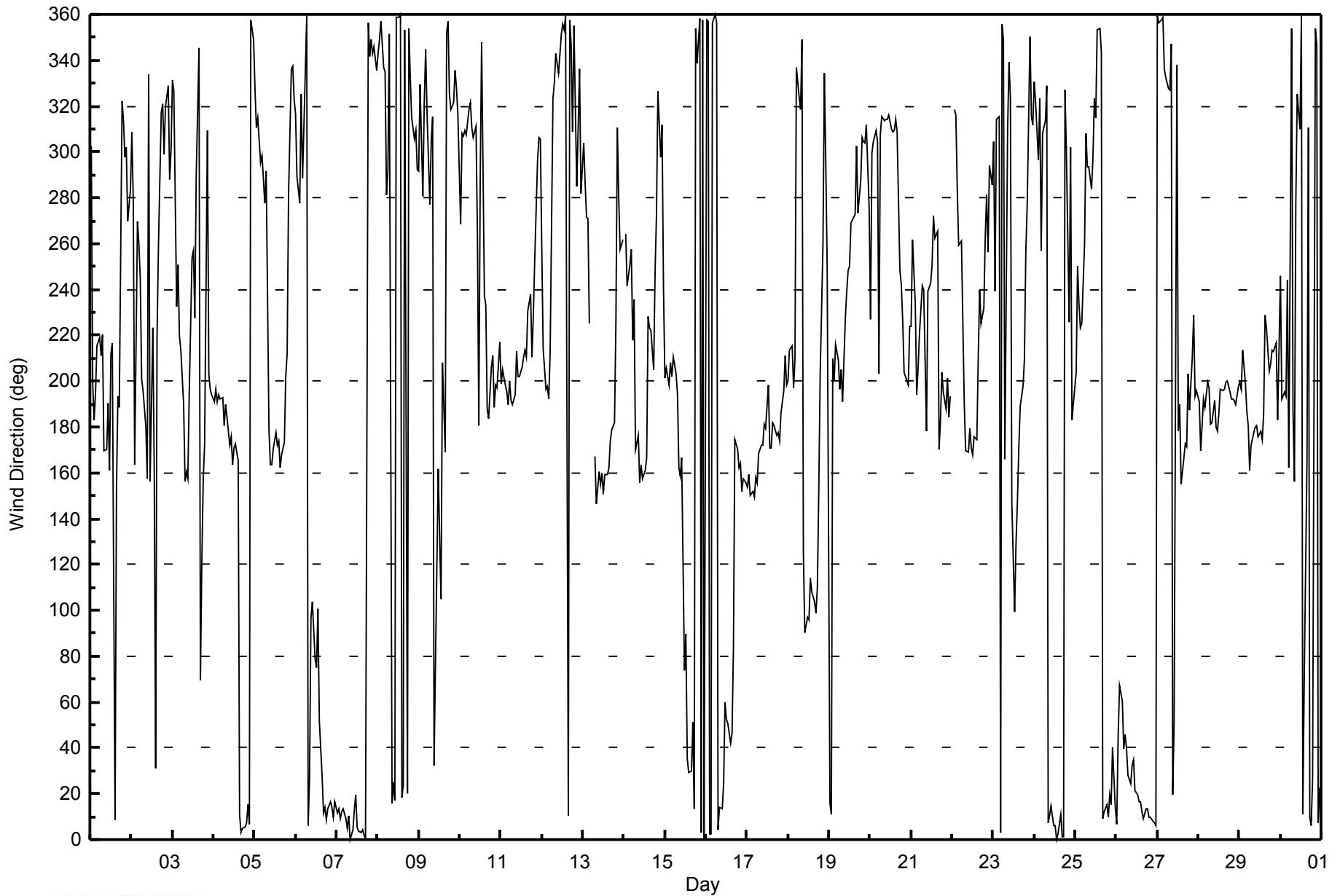
AF - Analyzer Failure

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



WBEA
Hourly Averages

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 100 deg on Sep 3 16:00	Hours of Data: 716
Minimum Value: 7 deg on Sep 1 23:00	Hours of Missing Data: 4
Percentiles: P ₁ = 12 P ₁₀ = 16 Q ₁ = 19 Median = 28 Q ₃ = 41 P ₉₀ = 56 P ₉₉ = 89	Hours of Calibration: 0
	Percent Operational Time: 99.4

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	83	20	34	18	23	53	92	45	38	29	30	38	39	92	40	50	17	39	53	74	36	64	7	17	92
2-Sep	46	51	83	75	50	27	75	76	45	22	78	87	69	63	73	63	48	19	20	16	27	30	15	33	87
3-Sep	34	60	37	30	21	20	25	32	18	14	55	56	58	63	51	100	47	65	19	14	79	22	17	15	100
4-Sep	14	15	14	14	14	25	19	17	17	17	21	19	20	22	20	75	31	27	30	32	34	33	27	25	75
5-Sep	18	16	28	16	19	42	59	34	56	22	20	22	22	24	19	26	21	26	98	32	46	32	19	19	98
6-Sep	21	19	52	63	24	23	21	36	60	30	39	53	51	46	46	40	30	39	28	35	31	34	34	37	63
7-Sep	33	33	34	34	33	31	30	35	33	31	37	38	39	31	30	32	29	27	26	21	22	22	20	18	39
8-Sep	16	22	24	18	15	53	12	47	38	51	47	35	40	42	41	42	32	43	33	30	16	18	33	17	53
9-Sep	21	44	38	32	26	38	29	39	99	66	72	89	58	65	85	45	86	26	9	9	11	10	12	35	99
10-Sep	51	56	34	55	39	31	32	57	39	35	57	88	78	49	56	84	28	18	17	19	16	12	14	29	88
11-Sep	18	14	16	14	13	14	14	16	18	28	23	22	25	25	27	25	37	38	20	21	40	31	24	20	40
12-Sep	48	57	12	12	61	67	31	22	28	30	26	33	30	34	38	39	27	48	54	37	66	28	33	60	67
13-Sep	28	28	8	43	50	AF	AF	64	22	21	26	22	19	17	18	17	21	16	15	21	68	48	15	22	68
14-Sep	AF	29	59	41	73	59	36	19	25	19	14	17	20	26	51	48	30	12	26	14	44	38	27	69	73
15-Sep	62	48	15	13	15	23	40	29	30	30	45	84	80	46	42	41	48	38	19	13	30	19	23	21	84
16-Sep	19	23	25	28	24	30	20	26	39	56	52	65	48	74	56	47	45	20	18	19	17	17	19	19	74
17-Sep	16	17	17	17	17	16	16	17	20	19	20	19	26	19	18	18	16	15	14	18	16	18	18	14	26
18-Sep	17	17	16	22	80	27	27	20	53	49	56	52	41	46	48	37	34	24	13	27	27	30	27	71	80
19-Sep	79	63	48	22	23	20	16	19	18	36	42	49	43	49	46	44	38	45	43	25	32	26	25	49	79
20-Sep	42	37	35	28	32	34	21	21	23	36	30	28	30	27	27	26	22	41	35	17	32	17	13	19	42
21-Sep	18	42	48	19	19	20	27	22	56	34	37	42	47	48	50	46	35	40	24	17	26	20	29	15	56
22-Sep	AF	20	40	15	25	14	16	18	15	18	20	15	14	14	16	40	40	24	20	31	24	28	33	55	55
23-Sep	28	77	65	74	74	55	15	95	89	27	48	45	48	37	27	23	19	14	18	12	38	49	51	38	95
24-Sep	26	16	17	40	13	33	21	36	28	40	40	29	32	30	23	21	23	18	26	26	54	31	36	20	54
25-Sep	28	42	31	25	28	44	22	31	32	37	30	22	22	36	26	28	31	32	37	33	36	32	49	34	49
26-Sep	26	48	44	42	47	46	47	41	40	43	49	33	38	34	32	33	30	32	32	28	28	30	27	29	49
27-Sep	27	27	26	26	22	17	17	18	23	49	57	70	43	22	20	18	15	15	30	18	20	19	23	17	70
28-Sep	13	17	14	13	18	16	16	16	16	19	16	17	18	19	20	17	16	16	14	14	15	16	16	14	20
29-Sep	14	13	15	12	15	16	12	14	16	17	14	18	15	17	23	27	25	17	19	20	19	23	18	30	30
30-Sep	41	26	20	13	63	90	39	71	28	65	31	25	42	37	47	45	32	38	27	47	44	25	27	41	90
	83	77	83	75	80	90	92	95	99	66	78	89	80	92	85	100	86	65	98	74	79	64	51	71	

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 7, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	13:49
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
Cal Gas Concentration	51 ppm	Cal Gas Expiry Date	May 29th 2014
Gas Cert Reference	LL107923		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2403
DACS voltage range		DACS channel #	SE1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-689	-689
Analyzer Range (mv)	5000	5000	Lamp voltage	733	733
Calculated slope	0.998650	1.001254	Chamber temp.	43.0	43.0
Calculated intercept	1.070742	0.697760	Pressure (mmHg)	723.0	723.0
Analyzer Background	38.9	38.2	Flow (lpm)	0.498	0.498
Analyzer Coefficient	0.754	0.753	Intensity	357xx	357xx

Analyzer make	Thermo 43C	Analyzer serial #	50911
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.0	-0.4	NA
as found span	5500	81.5	755.7	755.8	1.000
calibrator zero	5500	0.0	0.0	-0.4	NA
high point	5500	81.5	755.7	754.4	1.002
second point	5500	45.7	423.8	422.0	1.004
third point	5500	22.8	211.4	210.4	1.005
calibrator zero	5500	0.0	0.0	-0.4	NA
as left zero	5500	0.0	0.0	0.1	NA
as left span	5500	81.5	755.7	755.4	1.000
Average Correction Factor					1.004

Corrected As found	756.2	Previous response	755.7	% change	-0.1%
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Notes:

Span adjusted slightly.

Calibration Performed By: Zack Eastman



Wood Buffalo Environmental Association

SO₂ Calibration Summary

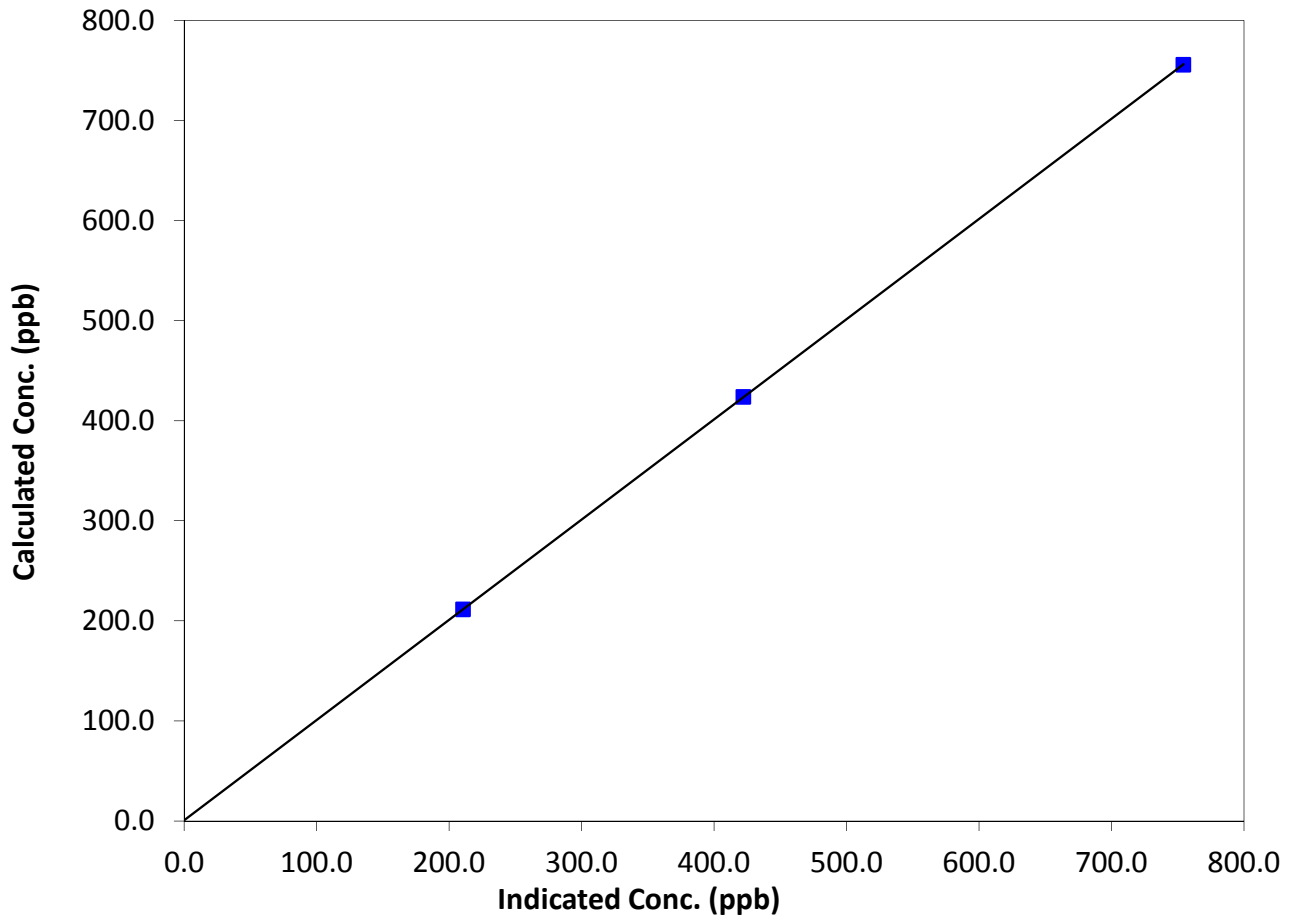
Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 7, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:45	End Time (MST)	13:49
Analyzer make	Thermo 43C	Analyzer serial #	50911

Calibration Data

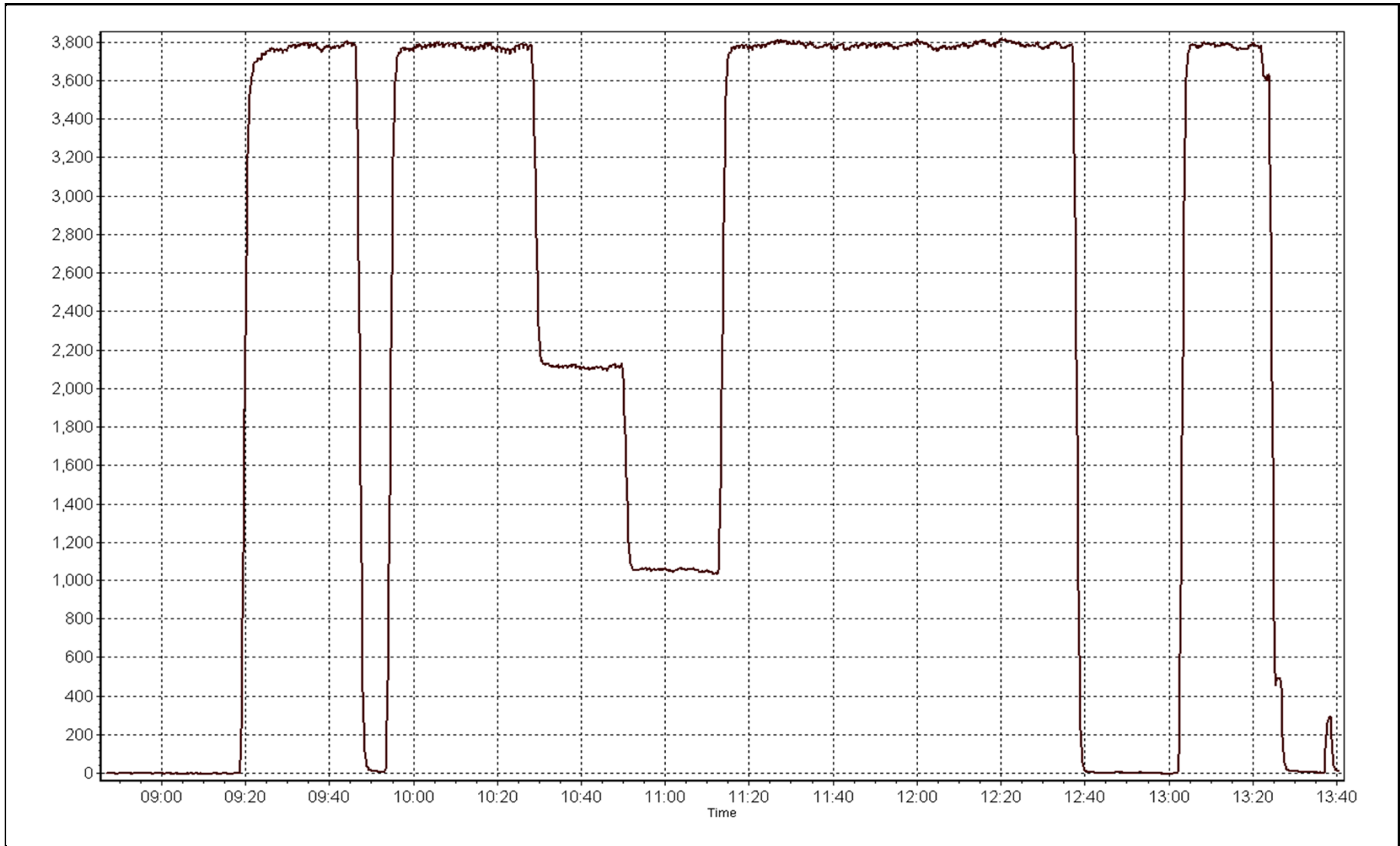
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999998
755.7	754.4	1.0018		
423.8	422.0	1.0042	Slope	1.001254
211.4	210.4	1.0048		
			Intercept	0.697760

SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 10, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 13, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	12:40	End Time (MST)	16:40
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	1730512
Cal Gas Concentration	10.6 ppm H2S	Cal Gas Expiry Date	Dec 21 2012
Gas Cert Reference	LL27480	SO2 gas conc.	51.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2403
DACS voltage range	5000	DACS channel #	2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-839	-839
Analyzer Range (input)	5000	5000	Lamp voltage	1134	1134
Calculated slope	0.995069	1.005123	Chamber temp.	45	45
Calculated intercept	0.022056	-0.038756	Pressure	685.0	685.0
Analyzer Background	1.60	1.53	Flow	0.428	0.428
Analyzer Coefficient	0.989	0.969	Intensity	81	81
			Converter temp.	800	800

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6500	0.0	0.0	0.00	NA
as found span	6500	46.0	75.0	75.6	0.993
SO2 scrubber check	5500	22.8	211.4	0.4	NA
calibrator zero	6500	0.0	0.0	0.0	NA
high point	6500	46.0	75.0	74.7	1.005
second point	6500	24.6	40.1	39.9	1.004
third point	6500	12.3	20.1	20.1	1.000
calibrator zero	6500	0.0	0.0	0.0	NA
as left zero	6500	0.0	0.0	0.2	NA
as left span	6500	46.0	75.0	74.9	1.001
Average Correction Factor					1.003

Corrected As found	75.6	Previous response	75.4	% change	-0.3%
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Notes:

Span adjusted slightly after new filter was conditioned. No performance issues noted with instrument.

Calibration Performed By:

Zack Eastman



Wood Buffalo Environmental Association

TRS Calibration Summary

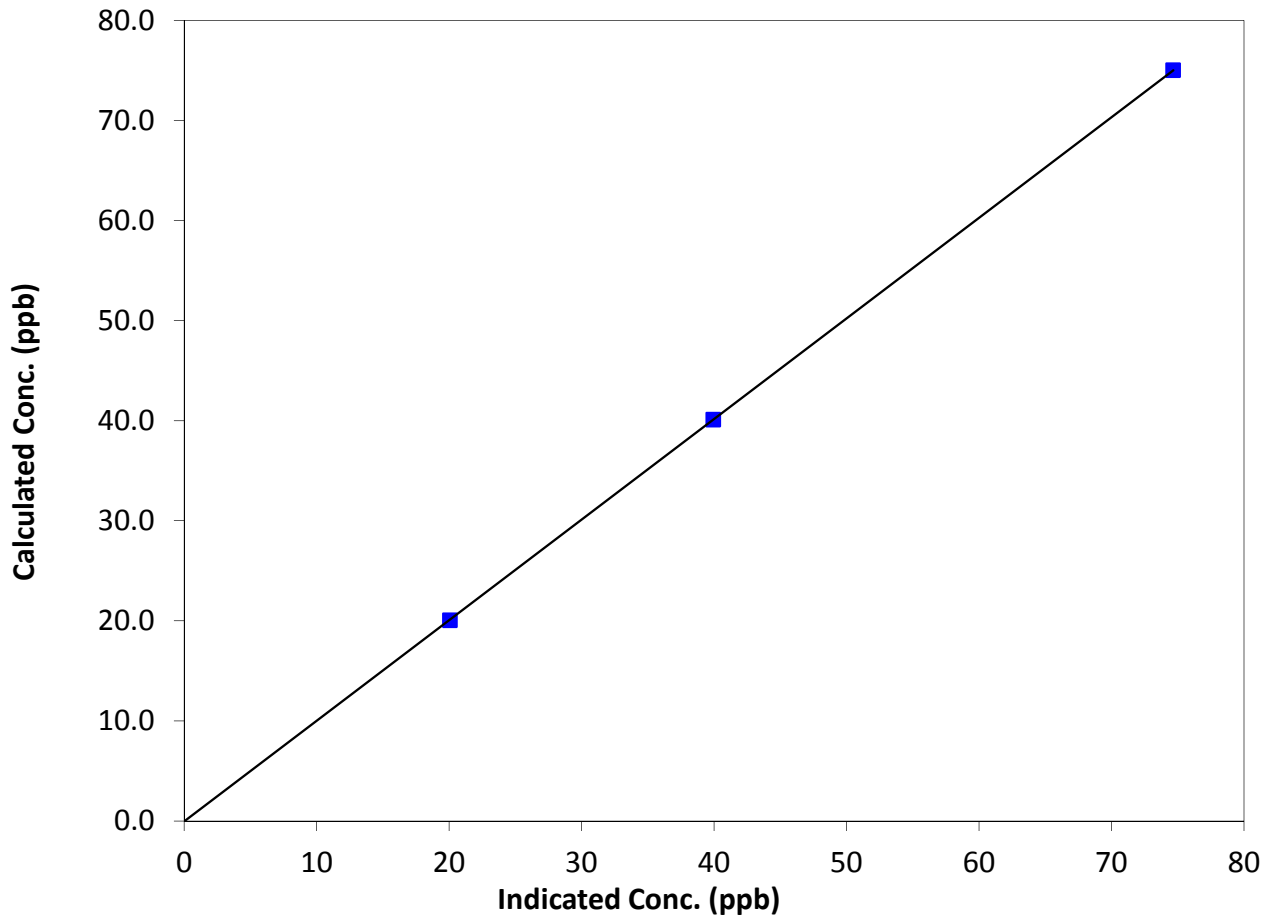
Station Information

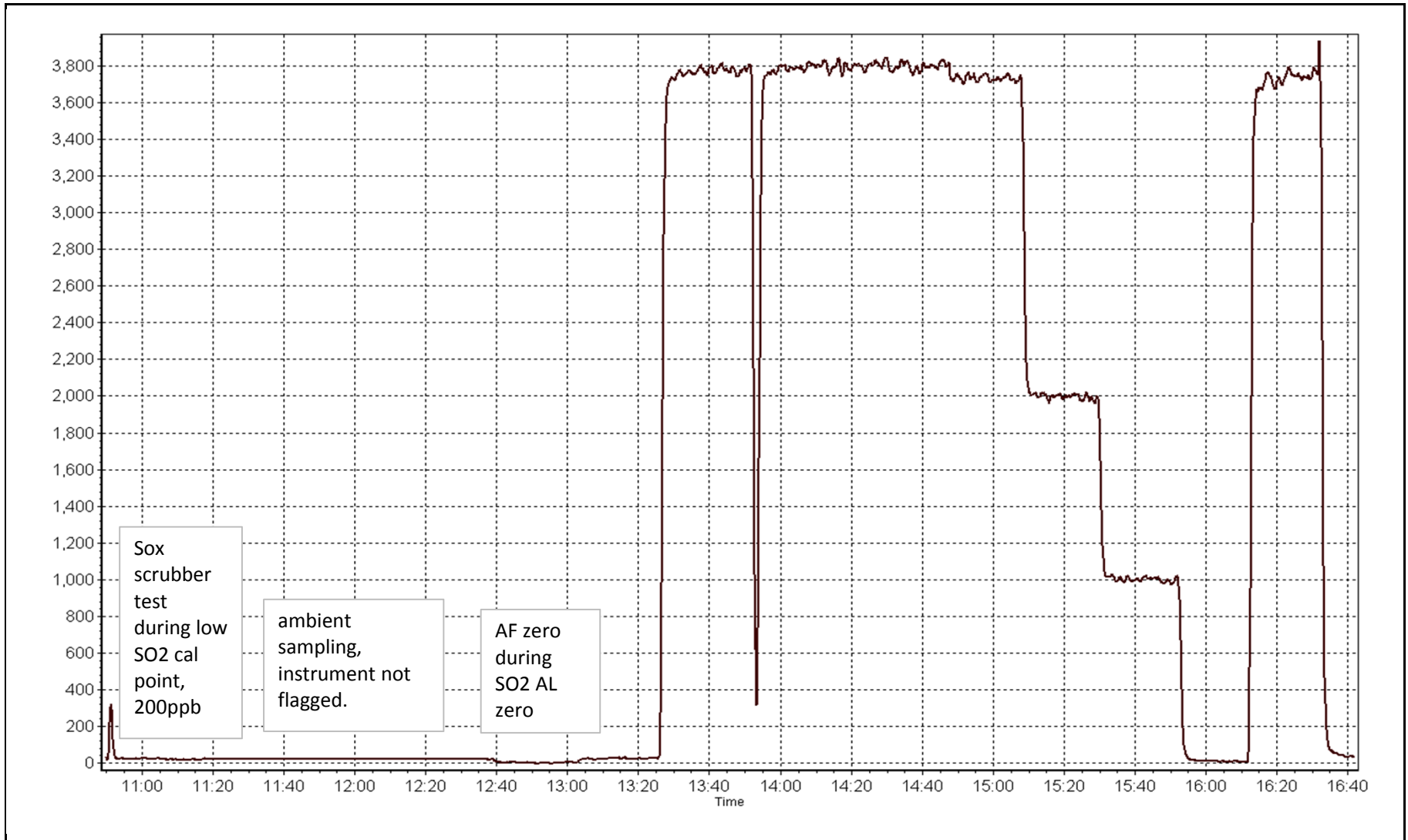
Calibration Date	September 10, 2014	Previous Calibration	August 13, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:40	End Time (MST)	16:40
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999998
75.0	74.7	1.0048		
40.1	39.9	1.0044	Slope	1.005123
20.1	20.1	0.9999		
			Intercept	-0.038756

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Wednesday, September 10, 2014	Prev Calibration	Thursday, August 07, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	13:39
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
Gas Cert Reference	LL107923	Cal Gas Expiry Date	May 29th 2014
CH4 Cal Gas Conc.	510.0 ppm	CH4 Equiv Conc.	1076.5 ppm
C3H8 Cal Gas Conc.	206.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2403

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	32.9	32.9
THC Range (input)	50	50	Flame Temp	405.0	405.0
NMHC Range (ppm)	50	50	Carrier Pressure	40.4	40.4
NMHC Range (input)	50	50	Fuel Pressure	42.6	42.6
THC Calc slope	1.001202	1.002564	Air Pressure	32.3	32.3
THC Calc intercept	0.023487	0.021052	Det Temp	175.0	175.0
NMHC Calc slope	1.002363	1.002363	Filter Temp	175.0	175.0
NMHC Calc intercept	0.000895	0.000895	Column Temp	75.0	75.0

Analyzer make Thermo 55i Analyzer serial # 1331259520

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	N/A
as found span	5500	81.5	15.95	16.29	0.979
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	81.5	15.95	15.91	1.003
second point	5500	45.7	8.94	8.87	1.008
third point	5500	22.8	4.46	4.42	1.010
calibrator zero	5500	0.0	0.00	0.00	N/A
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	81.5	15.95	15.89	1.004
Average Correction Factor					1.007

Corrected As found 16.29 Previous response 15.91 % change -2.3%

Notes:

Span adjusted slightly.

Calibration Performed By: Zack Eastman



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	N/A
as found span	5500	81.5	8.39	8.58	0.978
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	81.5	8.39	8.38	1.002
second point	5500	45.7	4.71	4.68	1.006
third point	5500	22.8	2.35	2.35	0.999
calibrator zero	5500	0.0	0.00	0.00	N/A
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	81.5	8.39	8.36	1.004
Average Correction Factor					1.002

Corrected As found 8.58 Previous response 8.37 % change -2.4%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	N/A
as found span	5500	81.5	7.56	7.71	0.980
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	81.5	7.56	7.53	1.004
second point	5500	45.7	4.24	4.19	1.011
third point	5500	22.8	2.11	2.08	1.016
calibrator zero	5500	0.0	0.00	0.00	N/A
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	81.5	7.56	7.53	1.004
Average Correction Factor					1.010

Corrected As found 7.71 Previous response 7.54 % change -2.3%



Wood Buffalo Environmental Association

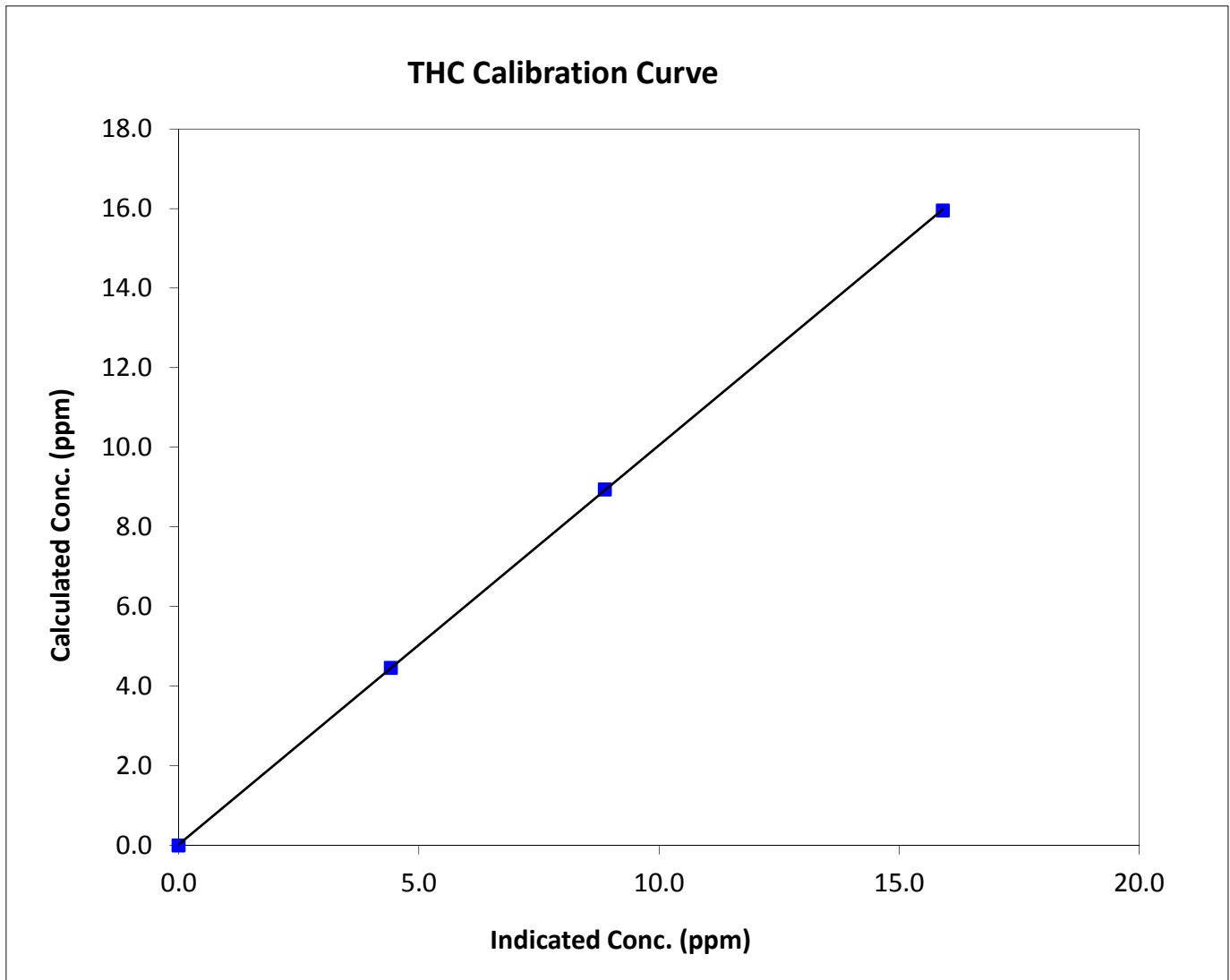
THC Calibration Summary

Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 7, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:45	End Time (MST)	13:39
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999986
15.95	15.91	1.0026		
8.94	8.87	1.0084	Slope	1.002564
4.46	4.42	1.0096		
			Intercept	0.021052





Wood Buffalo Environmental Association

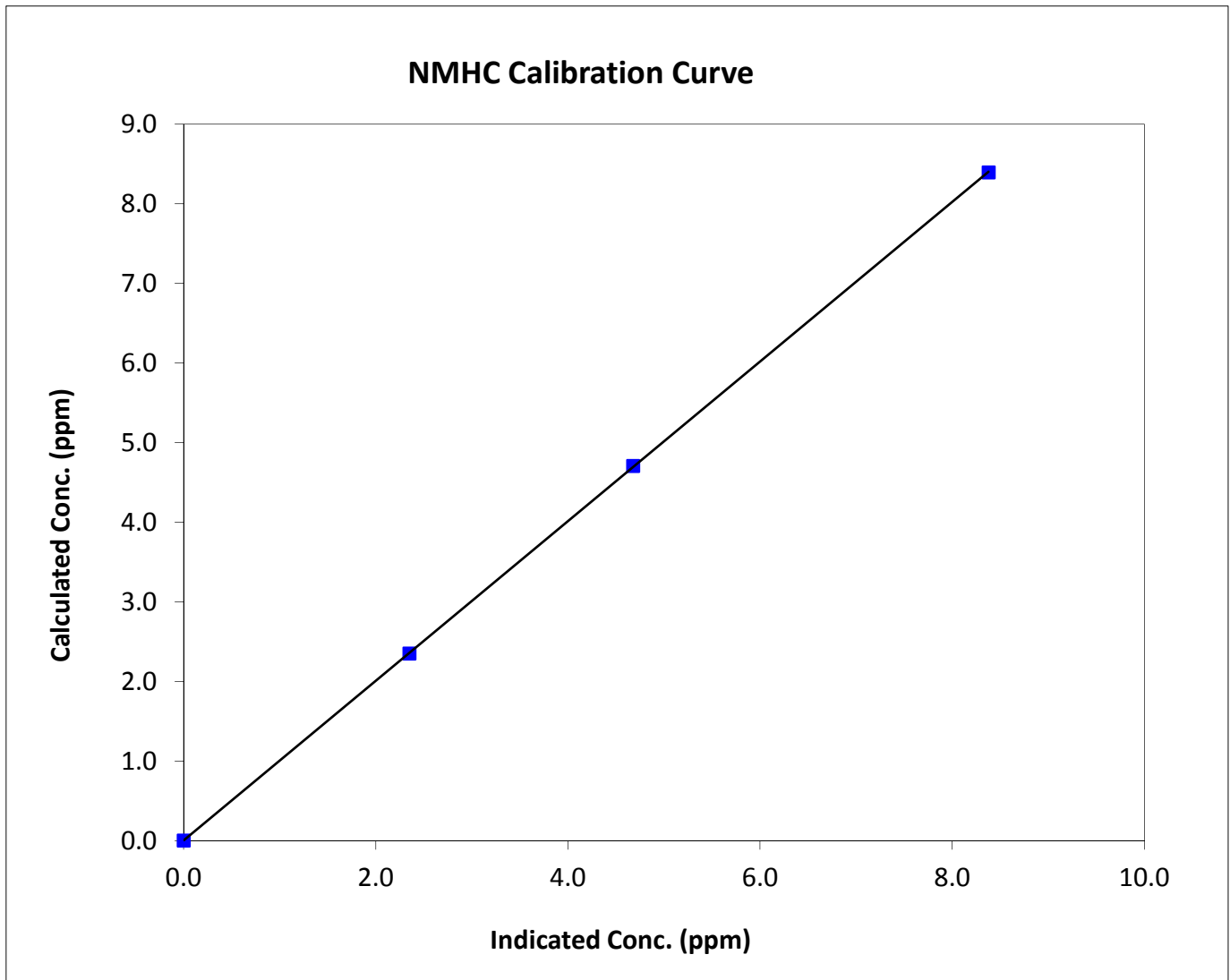
NMHC Calibration Summary

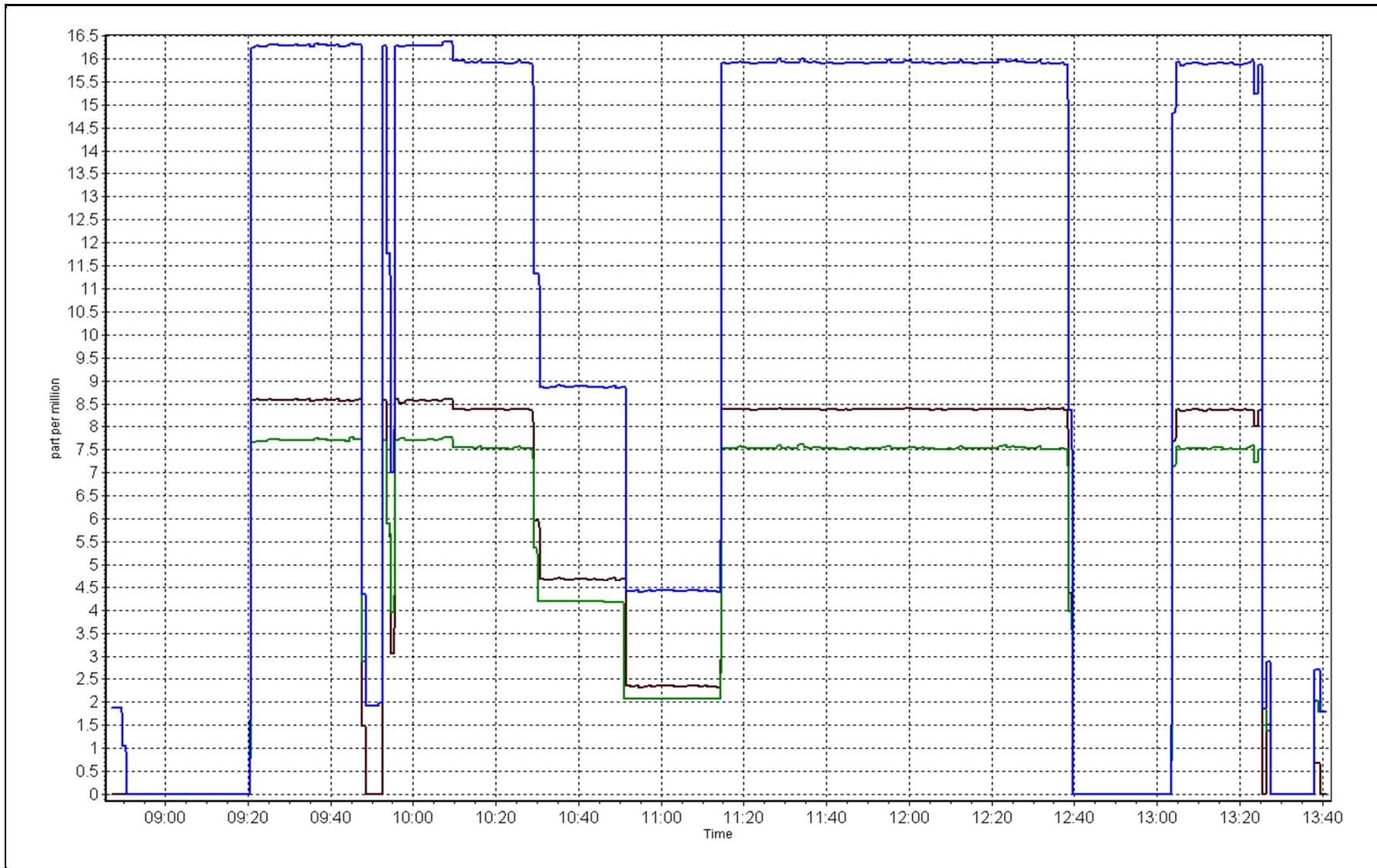
Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 7, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:45	End Time (MST)	13:39
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999991
8.39	8.38	1.0017		
4.71	4.68	1.0058	Slope	1.002363
2.35	2.35	0.9993		
			Intercept	0.000895







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	September 11, 2014	Previous Calibration	August 8, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	16:00	End Time (MST)	19:07
Barometric Pressure	N/A mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
NO2 calibration used	Wednesday, September 10, 2014	Transfer Standard	na
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2403
DACS voltage range	5000	DACS channel #	Diff 7

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	25.0	25.0
Analyzer Range (input)	5000	5000	Lamp temp.	53.0	53.0
Calculated slope	0.992506	0.998659	Pressure	669.0	669.0
Calculated intercept	-1.814116	-1.354428	Flow cell A	0.727	0.727
Analyzer Background	-0.9	-0.8	Flow cell B	0.725	0.725
Analyzer Coefficient	1.222	1.089	Cell A Intensity	81xxx	81xxx
			Cell B Intensity	83xxx	83xxx

Analyzer make Thermo 49i Analyzer serial # 1300156233

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.00	0.0	0.0	N/A
as found span	5000	1.10	399.0	448.7	0.889
calibrator zero	5500	0.00	0.0	-0.1	N/A
high point	5000	1.10	399.0	399.8	0.998
second point	5000	0.60	206.0	209.2	0.985
third point	5000	0.35	106.0	108.5	0.977
calibrator zero	5500	0.00	0.0	-0.1	N/A
as left zero	N/A	0.00	0.0	-0.1	N/A
as left span	N/A	1.10	399.0	408.4	0.977
Average Correction Factor					0.987

Corrected As found 448.7 Previous response 403.8 % change -10.0%
Average Correction

Notes:

The only noted issue is diagnostics is the gradual decline of intensity in cell A from 85xxx during install to 81xxx. No other issues noted.

Calibration Performed By:

Zack Eastman



Wood Buffalo Environmental Association

O₃ Calibration Summary

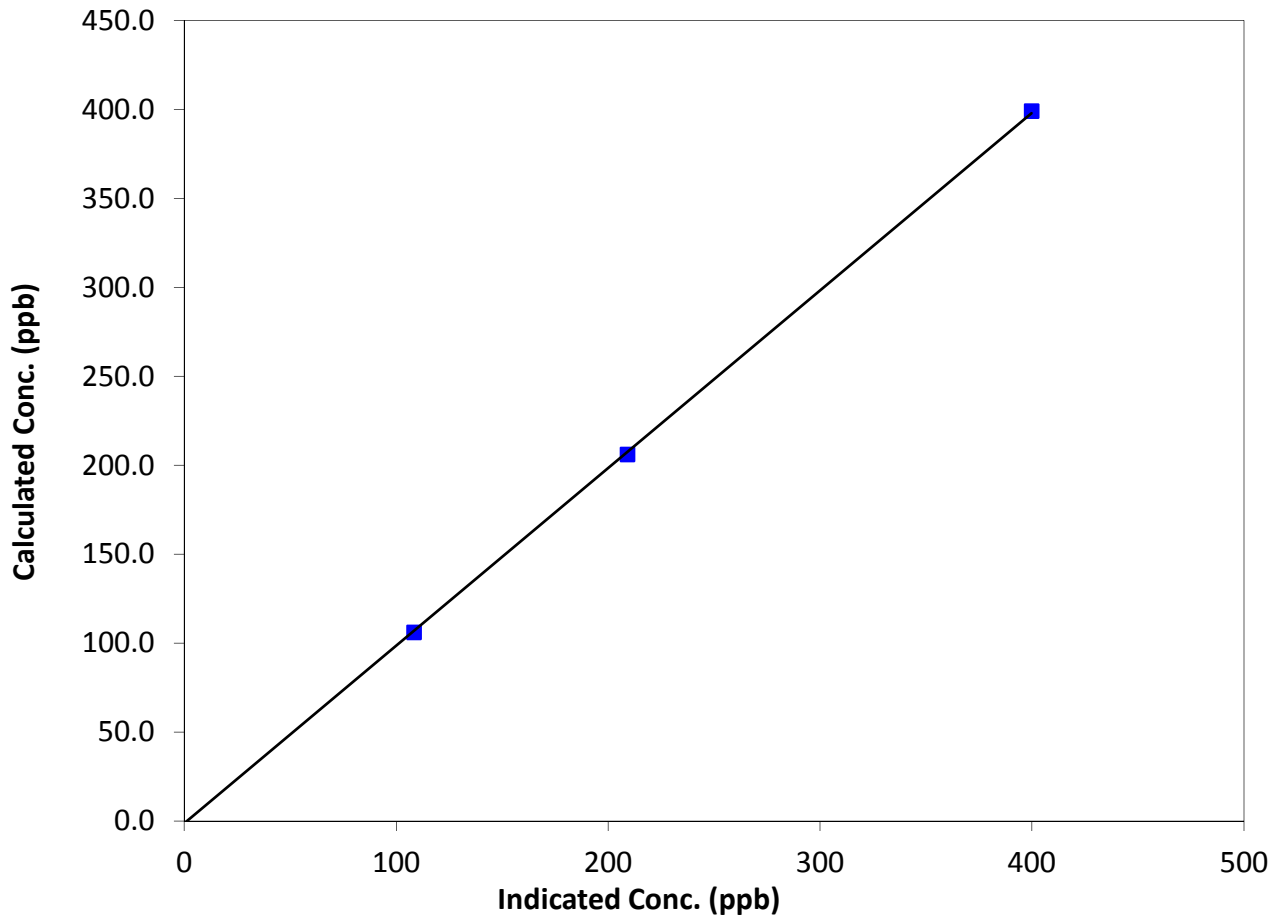
Station Information

Calibration Date	Thursday, September 11, 2014	Previous Calibration	August 8, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	16:00	End Time (MST)	19:07
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

Calibration Data

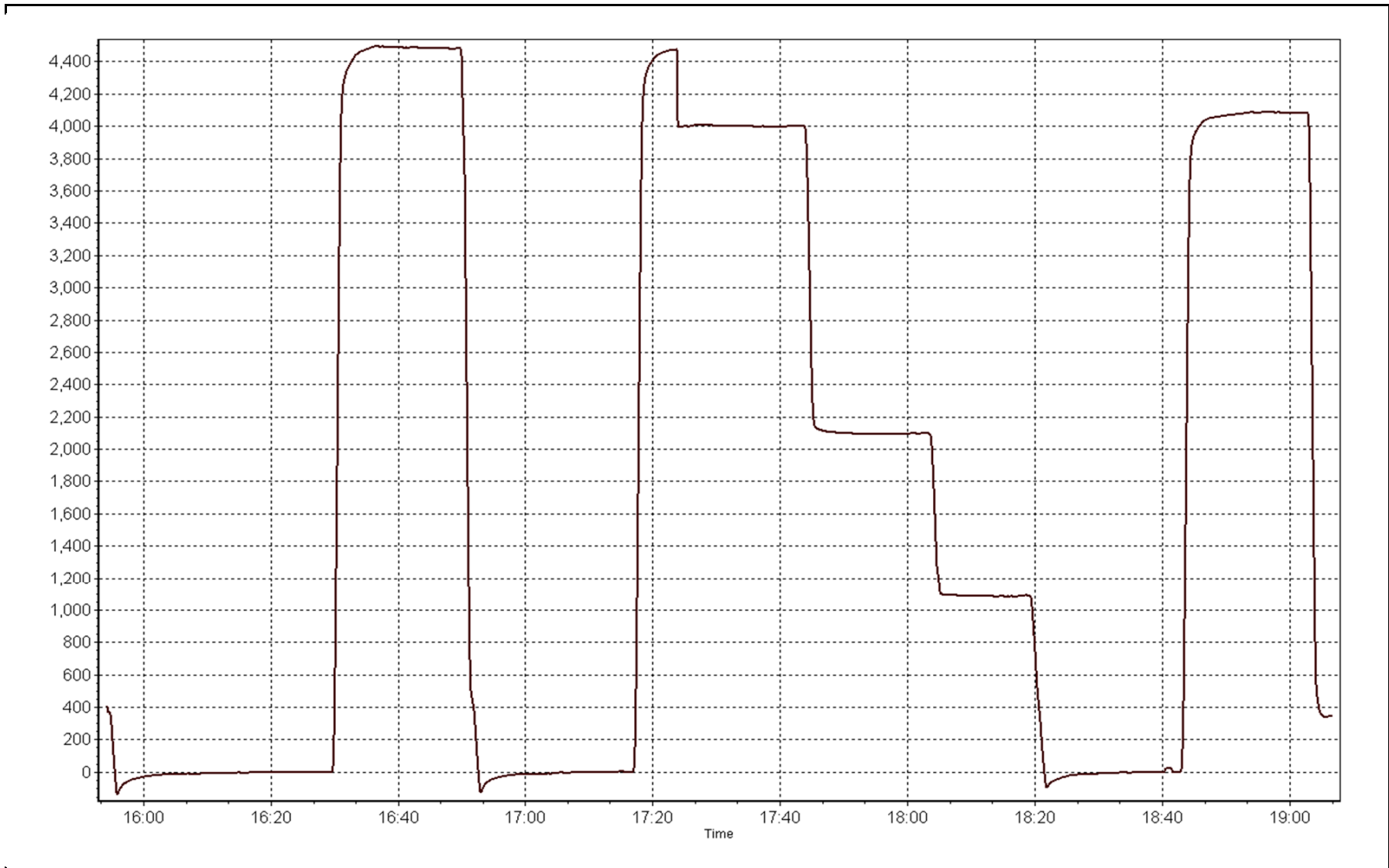
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999921
399.0	399.8	0.9980		
206.0	209.2	0.9847	Slope	0.998659
106.0	108.5	0.9770		
			Intercept	-1.354428

O₃ Calibration Curve



O3 Calibration Plot

Date: September 11, 2014





Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Wednesday, September 10, 2014	Prev Calibration	Thursday, August 07, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	13:39
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
Gas Cert Reference	LL107923	Cal Gas Expiry Date	May 29th 2014
CH4 Cal Gas Conc.	510.0 ppm	CH4 Equiv Conc.	1076.5 ppm
C3H8 Cal Gas Conc.	206.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2403

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	32.9	32.9
THC Range (input)	50	50	Flame Temp	405.0	405.0
NMHC Range (ppm)	50	50	Carrier Pressure	40.4	40.4
NMHC Range (input)	50	50	Fuel Pressure	42.6	42.6
THC Calc slope	1.001202	1.002564	Air Pressure	32.3	32.3
THC Calc intercept	0.023487	0.021052	Det Temp	175.0	175.0
NMHC Calc slope	1.002363	1.002363	Filter Temp	175.0	175.0
NMHC Calc intercept	0.000895	0.000895	Column Temp	75.0	75.0

Analyzer make Thermo 55i Analyzer serial # 1331259520

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	N/A
as found span	5500	81.5	15.95	16.29	0.979
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	81.5	15.95	15.91	1.003
second point	5500	45.7	8.94	8.87	1.008
third point	5500	22.8	4.46	4.42	1.010
calibrator zero	5500	0.0	0.00	0.00	N/A
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	81.5	15.95	15.89	1.004
Average Correction Factor					1.007

Corrected As found 16.29 Previous response 15.91 % change -2.3%

Notes:

Span adjusted slightly.

Calibration Performed By: Zack Eastman



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	N/A
as found span	5500	81.5	8.39	8.58	0.978
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	81.5	8.39	8.38	1.002
second point	5500	45.7	4.71	4.68	1.006
third point	5500	22.8	2.35	2.35	0.999
calibrator zero	5500	0.0	0.00	0.00	N/A
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	81.5	8.39	8.36	1.004
Average Correction Factor					1.002

Corrected As found 8.58 Previous response 8.37 % change -2.4%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	N/A
as found span	5500	81.5	7.56	7.71	0.980
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	81.5	7.56	7.53	1.004
second point	5500	45.7	4.24	4.19	1.011
third point	5500	22.8	2.11	2.08	1.016
calibrator zero	5500	0.0	0.00	0.00	N/A
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	81.5	7.56	7.53	1.004
Average Correction Factor					1.010

Corrected As found 7.71 Previous response 7.54 % change -2.3%



Wood Buffalo Environmental Association

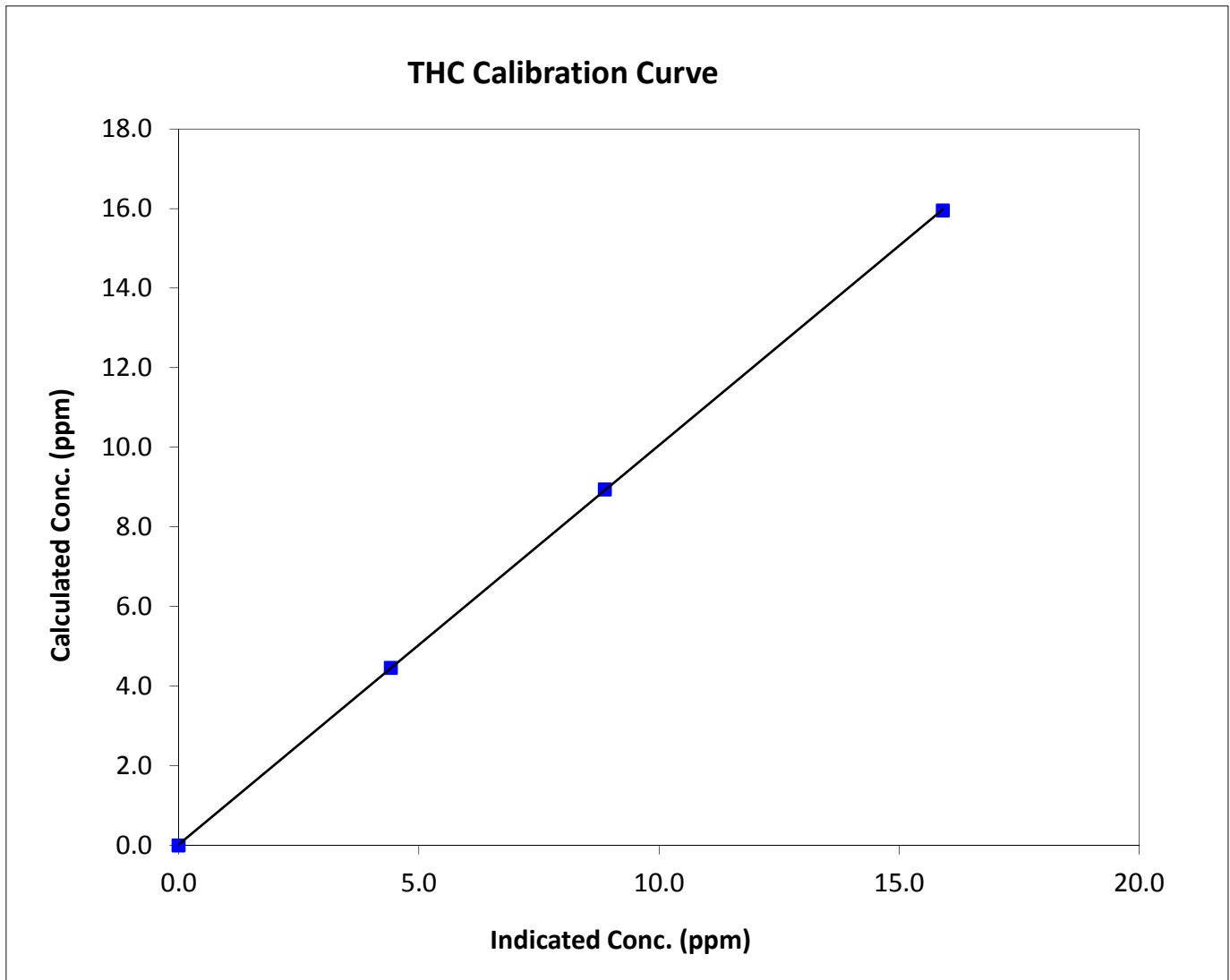
THC Calibration Summary

Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 7, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:45	End Time (MST)	13:39
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999986
15.95	15.91	1.0026		
8.94	8.87	1.0084	Slope	1.002564
4.46	4.42	1.0096		
			Intercept	0.021052





Wood Buffalo Environmental Association

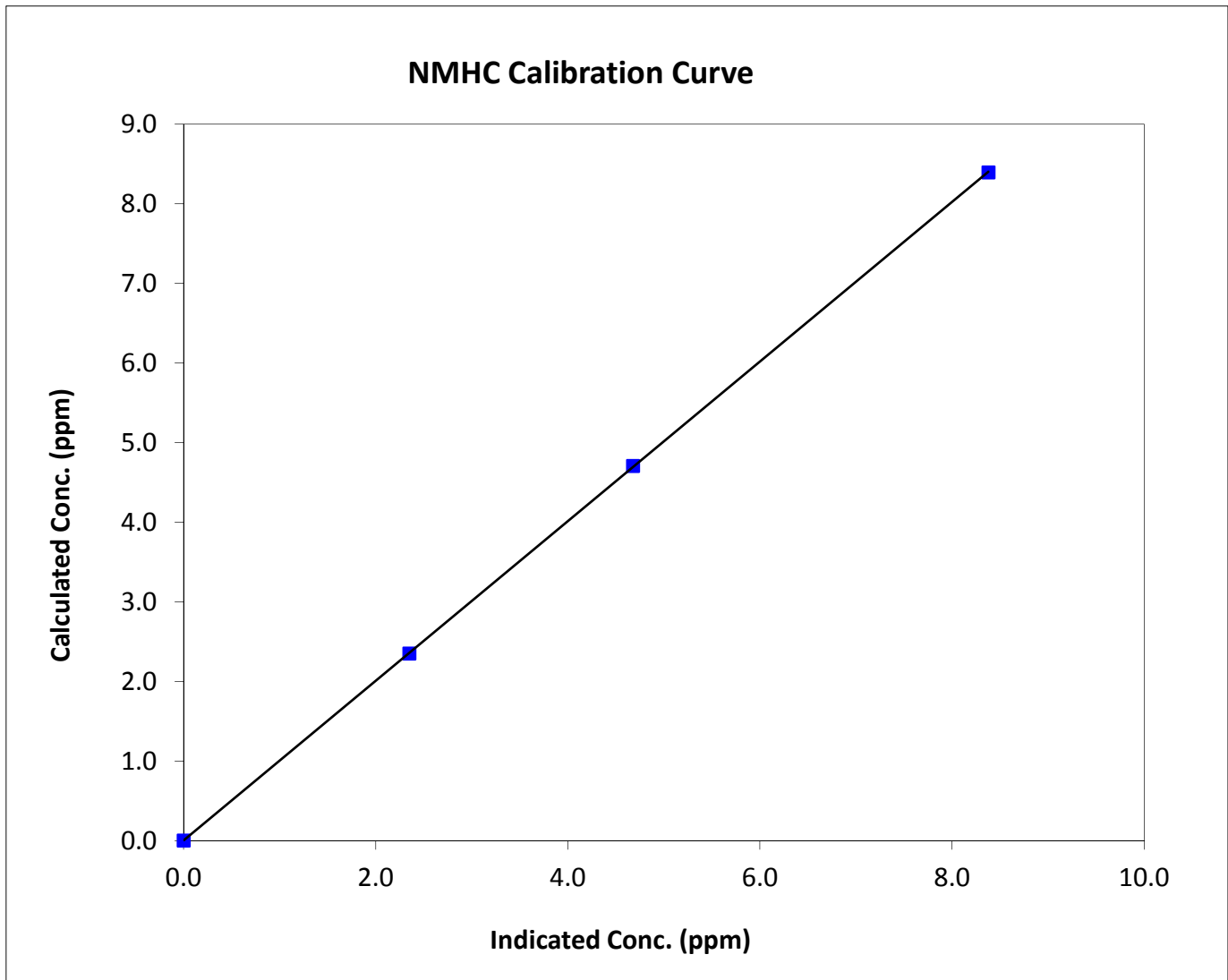
NMHC Calibration Summary

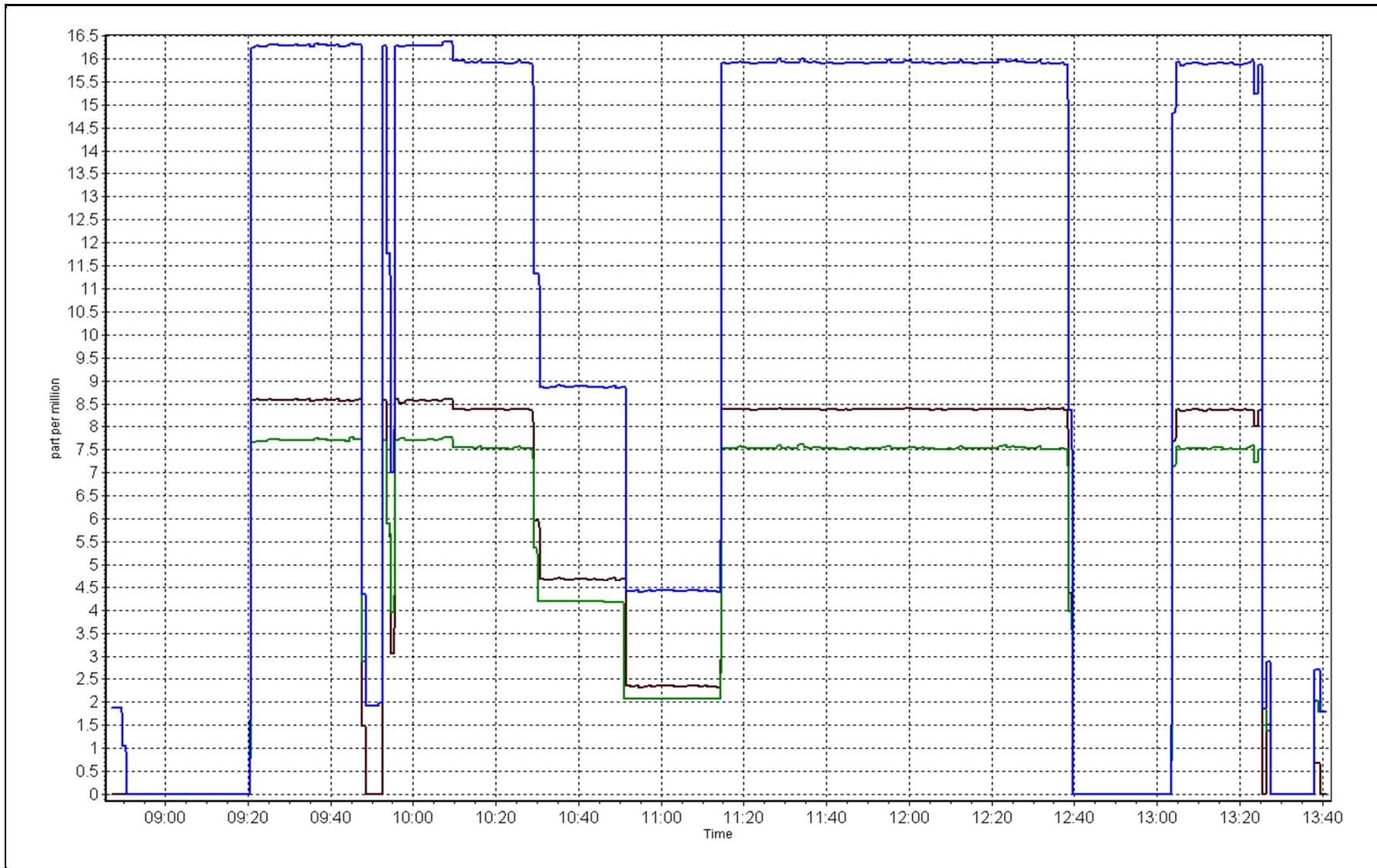
Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 7, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:45	End Time (MST)	13:39
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999991
8.39	8.38	1.0017		
4.71	4.68	1.0058	Slope	1.002363
2.35	2.35	0.9993		
			Intercept	0.000895







Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date	September 11, 2014	Previous Calibration	August 6, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	14:55
Barometric Pressure	N/A mmHg	Station Temperature	21.0 Deg C
Calibrator	Sabio 4010	Serial Number	1730512
NH3 Cal Gas Conc	192 ppm	Cal Gas Expiry Date	March 3rd 2012
NOx Cal Gas Conc	50.6 ppm	Cal Gas Serial #	LL156612

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2403
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Parameter		Nt	NOx	NH3
MV conversion	Analyzer Range (ppb)	2500	1000	2500
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	1.004796	1.009016	1.015560
	Data Offset	-5.272499	-0.100902	-4.582480
After	Data Slope	0.989181	1.001750	1.001509
	Data Offset	-4.215264	0.487692	-3.069688
Channel #		NA	6	7
Voltage Range		NA	0-5000mv	0-5000mv

Analyzer Information

Analyzer make/model	<u>API T201</u>	Analyzer serial #	<u>152</u>
		Converter serial #	<u>147</u>

Test Point	before		after	
Concentration range	0-2500	ppb	0-2500	ppb
Nt Slope	1.198		1.180	
NOX Slope	1.183		1.150	
NH3 Conv coeff	0.960		0.990	
NO slope	1.150		0.107	
No bkgnd	0.0	mV	0.0	mV
Nt bkgnd	0.1	mV	0.1	mV
NOX bkgnd	0.0	mV	0.0	
NhH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.0	Deg C	314.0	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	85.0	ccm	85.0	ccm
R Cell Press	5.6	mmHg	5.6	mmHg
PMT Voltage	614.0	v	614.0	v
Sample Flow 1 NO	525.0	ccm	525.0	ccm
Sample Flow 2 Nox	511.0	ccm	511.0	ccm

Notes:

Small adjustments performed.



Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date:

September 11, 2014

Station Number:

AMS 1

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NO _x conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-0.4	-0.3	-0.4	NA	NA
as found NO	5500	81.5	749.8	749.8	NA	767.4	770.0	-6.5	0.977	NA
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.4	-0.5	0.3	NA	NA
high NO point	5500	81.5	749.8	749.8	NA	748.8	749.6	-2.0	1.001	NA
NO/O ₃ point	5500	81.5	749.8	749.8	NA	746.0	746.4	-1.0	1.005	NA
as found NH ₃	6500	67.7	1999.8	NA	1999.8	2049.0	9.6	2025.0	0.976	0.988
first NH ₃	6500	67.7	1999.8	NA	1999.8	2024.0	9.8	1999.5	0.988	1.000
second NH ₃	6500	33.9	1001.4	NA	1001.4	1017.5	6.6	1001.0	0.984	1.000
third NH ₃	6500	16.9	499.2	NA	499.2	514.5	3.2	506.5	0.970	0.986
as left zero						0.0				
as left span						0.0				
Average Correction Factor									1.0032	0.9954

Corrected As found

Nt = 767.8 ppb

NH₃ = 2025.4 ppb

Previous response

Nt = 751.5 ppb

NH₃ = 1973.7 ppb

Nt percent change -2.1%

NH₃ percent change -2.6%

Converter efficiency 99.0%

Calibration Performed By:

Zach Eastman



Wood Buffalo Environmental Association

NH3 Calibration Summary

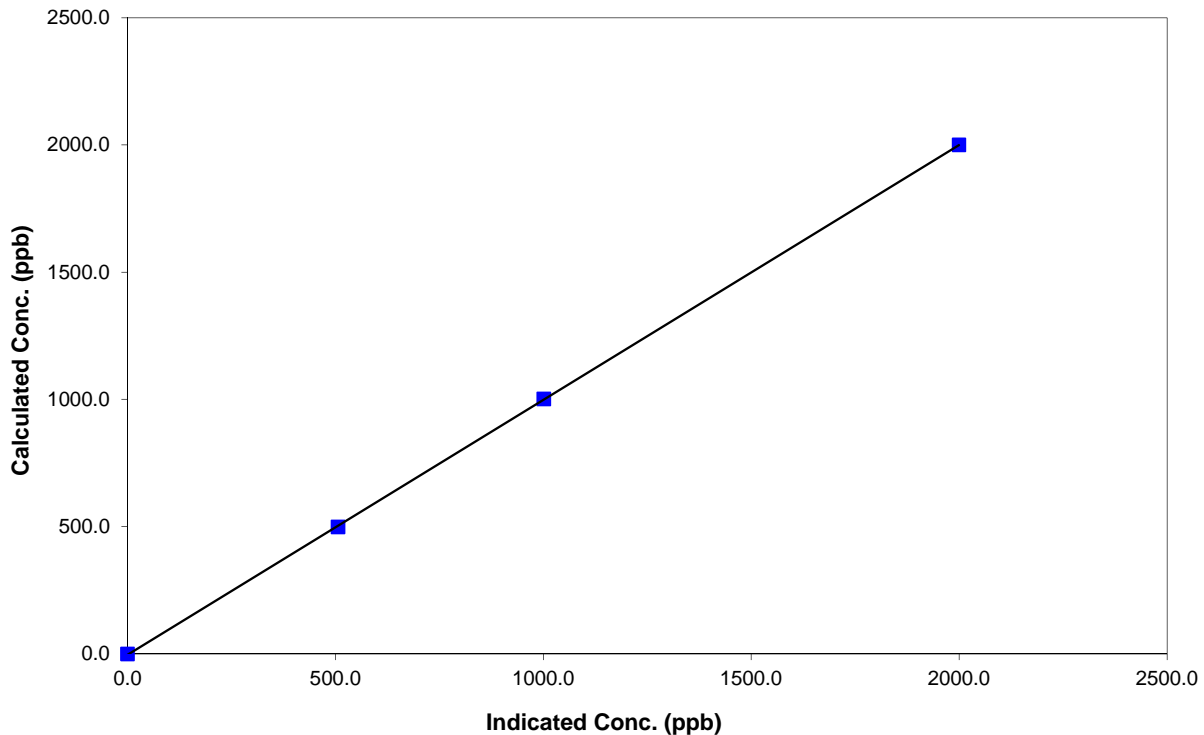
Station Information

Calibration Date	September 11, 2014	Previous Calibration	August 6, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:50	End Time (MST)	14:55
Analyzer make	API T201	Analyzer serial #	152

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999983
1999.8	1999.5	1.0001		
1001.4	1001.0	1.0004	Slope	1.001509
499.2	506.5	0.9856		
			Intercept	-3.069688

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

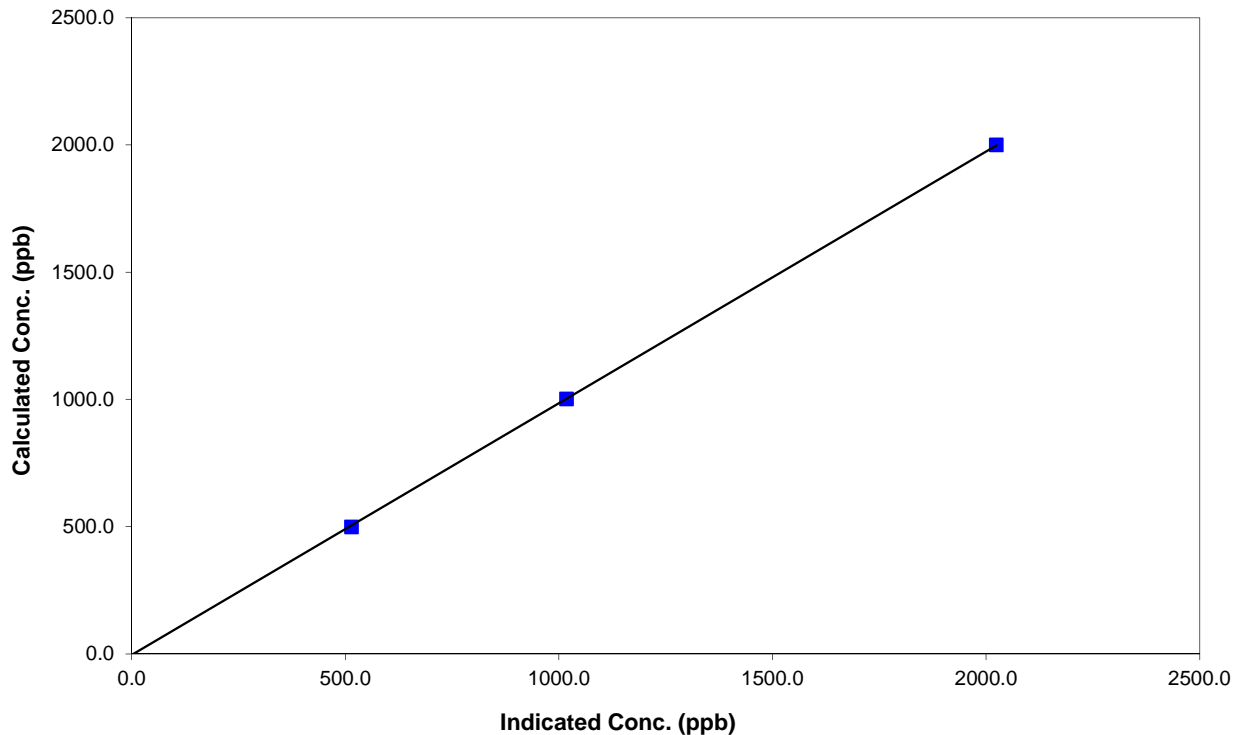
Station Information

Calibration Date	September 11, 2014	Previous Calibration	August 6, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:50	End Time (MST)	14:55
Analyzer make	API T201	Analyzer serial #	152

Nt (NH₃) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999975
1999.8	2024.0	0.9880		
1001.4	1017.5	0.9841	Slope	0.989181
499.2	514.5	0.9703		
	0.0		Intercept	-4.215264

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

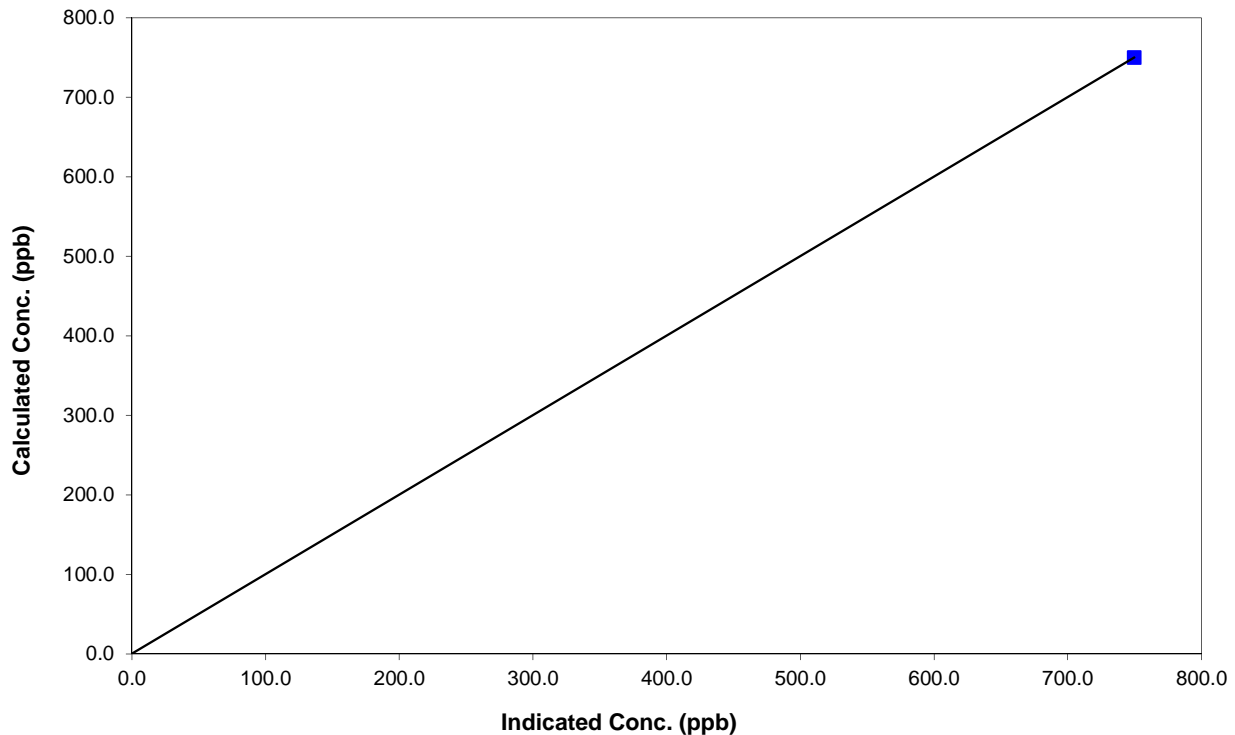
Station Information

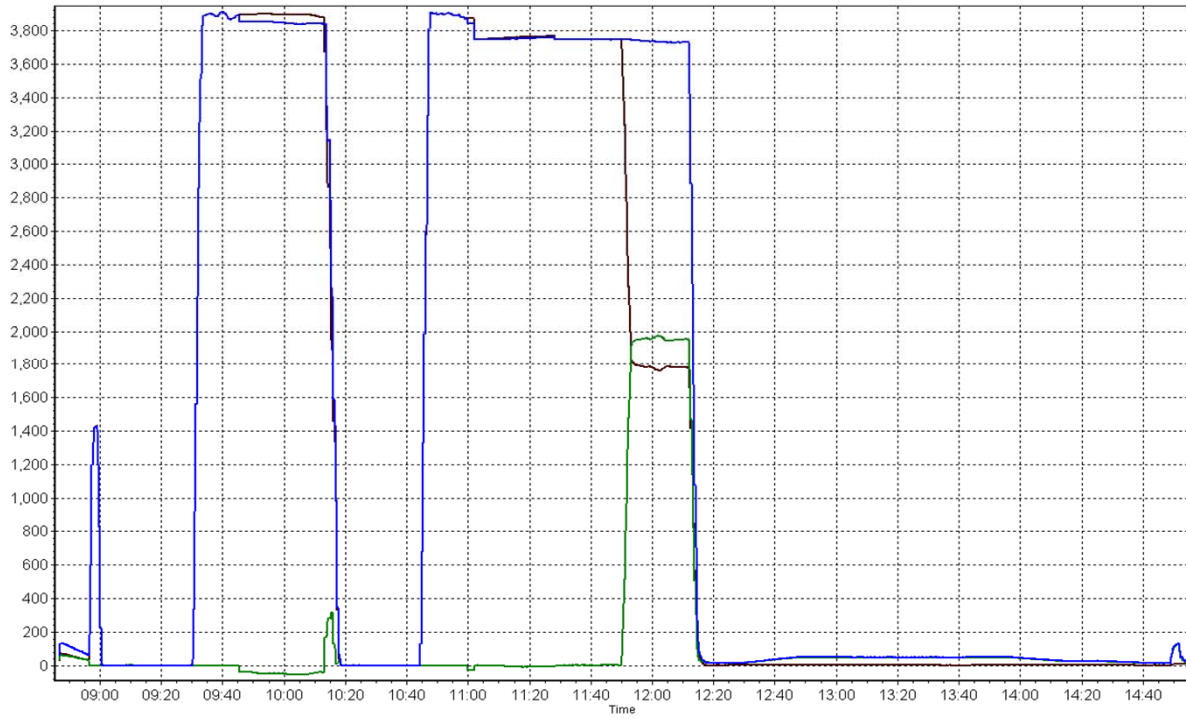
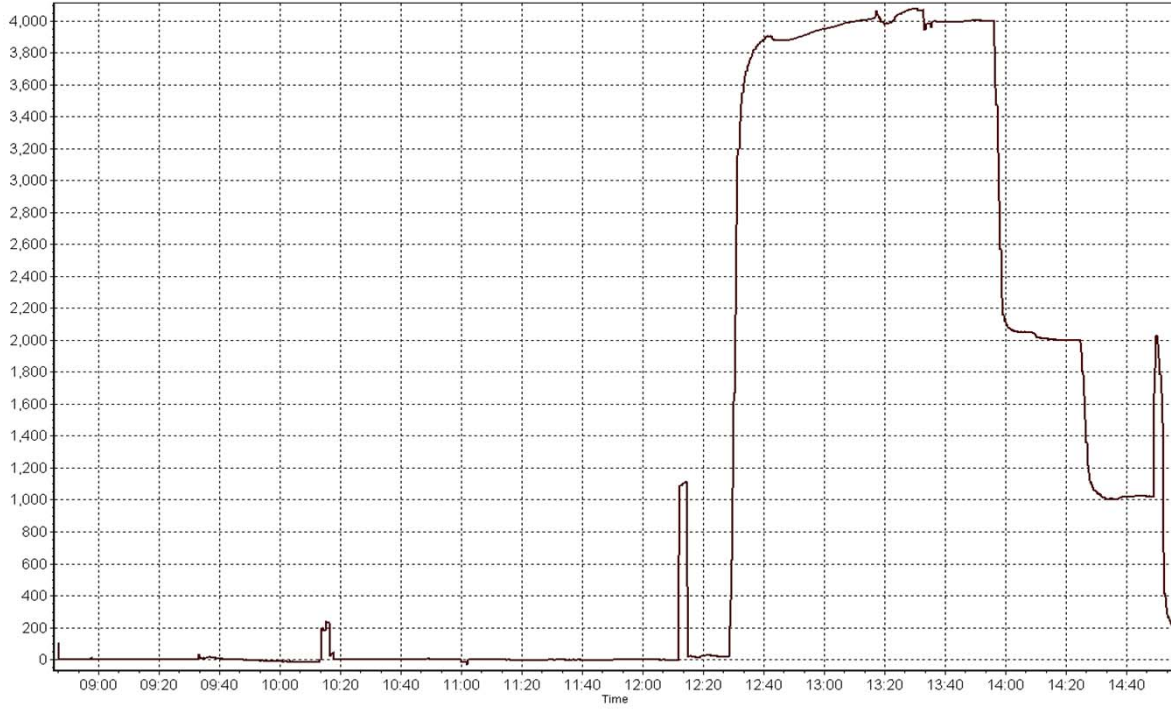
Calibration Date	September 11, 2014	Previous Calibration	August 6, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:50	End Time (MST)	14:55
Analyzer make	API T201	Analyzer serial #	152

NO_x Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	N/A	Correlation Coefficient	0.999986
749.8	749.6	1.0003		
749.8	746.4	1.0046	Slope	1.001750
			Intercept	0.487692

NO_x Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 2
MILDRED LAKE
SEPTEMBER 2014**

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

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

October 30, 2014

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	669	35	51	97.78	82	0	10	0
H2S (ppb) Average	670	34	50	97.78	12	2	3	0
THC (ppm) Average	660	36	60	96.67	6.1	-	2.8	-
Temperature (C) Average	700	0	20	97.22	30.1	-	19.9	-
Wind Speed 10 m (km/h) Average	704	0	16	97.78	25	-	-	-
Wind Direction 10 m (deg) Average	704	0	16	97.78	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	669	2.5	7	-	0	0	0	1	1	5	82
H2S (ppb) Average	670	0.9	1	-	0	0	0	0	1	2	12
THC (ppm) Average	660	2.36	0.5	-	1.9	2	2.1	2.2	2.4	2.9	6.1
Temperature 2 m (C) Average	700	10.3	5.7	-	-0.6	3.3	6	9.9	13.5	18.5	30.1
Wind Speed 10 m (km/h) Average	704	8.8	5	-	1	3	5	8	12	16	25
Wind Direction 10 m (deg) Average	704	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	05 Sep 2014 21:00	06 Sep 2014 12:00	16	DAS collection error - data not recorded
THC	23 Sep 2014 06:00	23 Sep 2014 13:00	8	Analyzer failure - replaced sample pump
Temperature 2 m	01 Sep 2014 15:00	01 Sep 2014 18:00	4	Analyzer failure - expired fuel cylinder

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Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Mildred Lake - September 2014

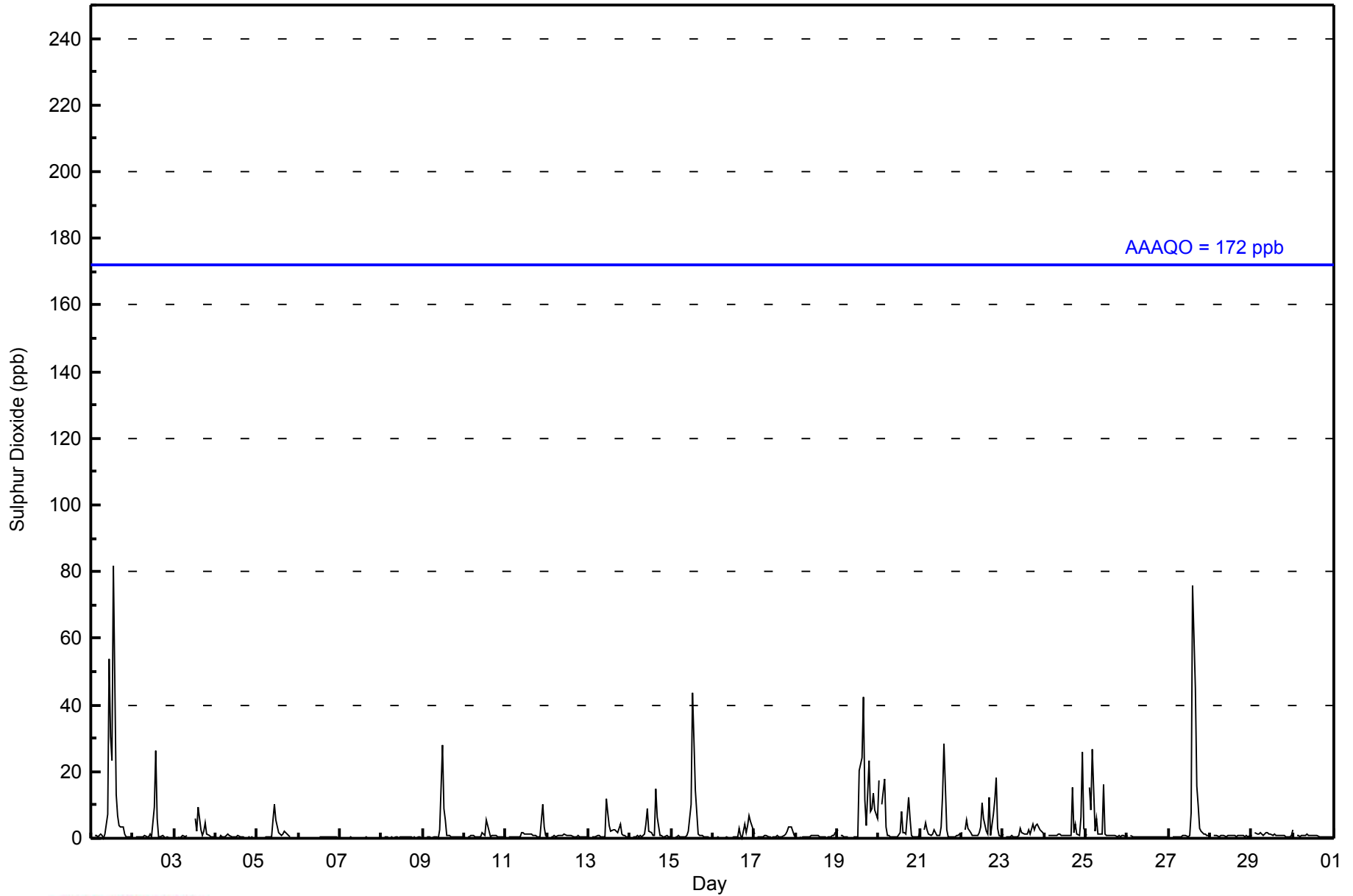
Number of Exceedences (AAAO): 1-hr: 0 24-hr: 0										Hours in Service: 720			
Maximum Value: 82 ppb on Sep 1 14:00										Maximum Daily Average: 10.4 ppb on Sep 1		Hours of Data: 669	
Minimum Value: 0 ppb on Sep 3 00:00										Minimum Daily Average: 0.2 ppb on Sep 7		Hours of Missing Data: 51	
Maximum Diurnal Average: 7.4 ppb at hour 14										Minimum Diurnal Average: 0.6 ppb at hour 8		Hours of Calibration: 35	
Monthly Average: 2.5 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 5 P ₉₉ = 28		Percent Operational Time: 97.8	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Sep	4	Z	1	1	0	1	1	0	1	7	54	30	23	82	13	7	4	3	3	1	0	0	0	0	10.4	82																						
2-Sep	0	Z	0	0	0	1	1	1	1	0	1	1	9	26	6	0	0	1	0	0	0	0	0	0	2.2	26																						
3-Sep	0	Z	0	0	0	1	0	1	C	C	C	C	6	2	9	3	1	2	5	1	1	1	0	1.8	9																							
4-Sep	0	Z	0	1	0	0	1	1	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0.4	1																							
5-Sep	0	Z	0	0	0	0	0	0	1	6	10	6	2	1	1	1	2	1	1	0	MS	MS	MS	MS	1.8	10																						
6-Sep	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	0	0	0	0	0	0	0	0	0	0	0	0	--	0																						
7-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																						
8-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.3	1																						
9-Sep	0	Z	0	0	0	0	0	0	0	0	2	28	9	5	1	1	0	0	0	0	1	0	0	0	2.2	28																						
10-Sep	0	Z	0	0	1	1	0	0	0	0	2	1	1	5	2	0	1	1	1	1	0	0	0	0	0.9	5																						
11-Sep	0	Z	0	0	0	0	0	0	0	2	1	1	1	1	1	1	1	1	0	0	1	10	3	1	1.3	10																						
12-Sep	1	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0	0	0	0	0.6	1																						
13-Sep	0	Z	0	0	0	1	1	0	0	0	12	7	4	2	3	2	2	1	4	1	1	1	0	0	2.0	12																						
14-Sep	1	Z	1	1	1	0	1	1	1	4	9	2	2	1	1	15	6	1	1	1	0	1	1	0	2.1	15																						
15-Sep	1	Z	0	0	1	0	0	0	1	1	2	10	44	30	14	1	1	1	1	1	0	0	0	0	4.8	44																						
16-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	3	1	0	4	2	4	7	5	3	1.3	7																							
17-Sep	1	Z	1	0	0	0	1	1	0	0	0	0	1	1	0	0	0	1	1	2	3	3	2	1	1.0	3																						
18-Sep	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	2	0.6	2																						
19-Sep	2	Z	1	1	1	0	0	C	C	1	0	0	0	20	24	42	11	4	23	8	9	14	9	6	8.4	42																						
20-Sep	17	Z	10	18	3	1	1	1	1	0	0	0	2	8	2	2	1	12	6	1	0	0	0	0	3.8	18																						
21-Sep	2	Z	2	5	3	1	1	1	3	2	1	1	3	13	28	2	1	0	0	0	0	1	1	1	3.2	28																						
22-Sep	2	Z	2	6	3	2	1	1	1	1	2	3	11	6	2	1	12	1	7	11	18	3	1	1	4.2	18																						
23-Sep	1	Z	0	0	0	1	0	0	1	1	3	2	1	1	2	1	4	3	4	4	3	2	1	1	1.7	4																						
24-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	15	2	4	1	1	6	26	3	3.2	26																							
25-Sep	1	Z	15	9	27	2	6	1	1	1	16	1	1	1	1	1	1	1	1	1	1	1	1	1	3.9	27																						
26-Sep	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	1																						
27-Sep	1	Z	0	0	1	0	1	1	1	1	1	1	1	7	76	45	16	10	3	2	1	1	1	1	7.4	76																						
28-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	0.7	1																						
29-Sep	1	Z	2	1	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1.1	2																						
30-Sep	3	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	0	0	0	0	0.7	3																						
																								1.5	--	1.5	1.7	1.7	0.7	0.8	0.6	0.8	1.3	4.4	3.7	4.2	7.4	6.4	4.5	2.8	1.7	2.4	1.4	1.7	1.9	2.0	0.9	Diurnal Average
																								17	--	15	18	27	2	6	1	3	7	54	30	44	82	76	45	16	12	23	11	18	14	26	6	Diurnal Maximum
Z - zerospan C - Calibration MS - Missing																																																
Alberta Ambient Air Quality Objectives (AAAO): 1-hr 172 ppb 24-hr 48 ppb																																																



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	634	94.77	94.77
11 - 20	19	2.84	97.61
21 - 60	14	2.09	99.70
61 - 110	2	0.30	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 669

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - September 2014

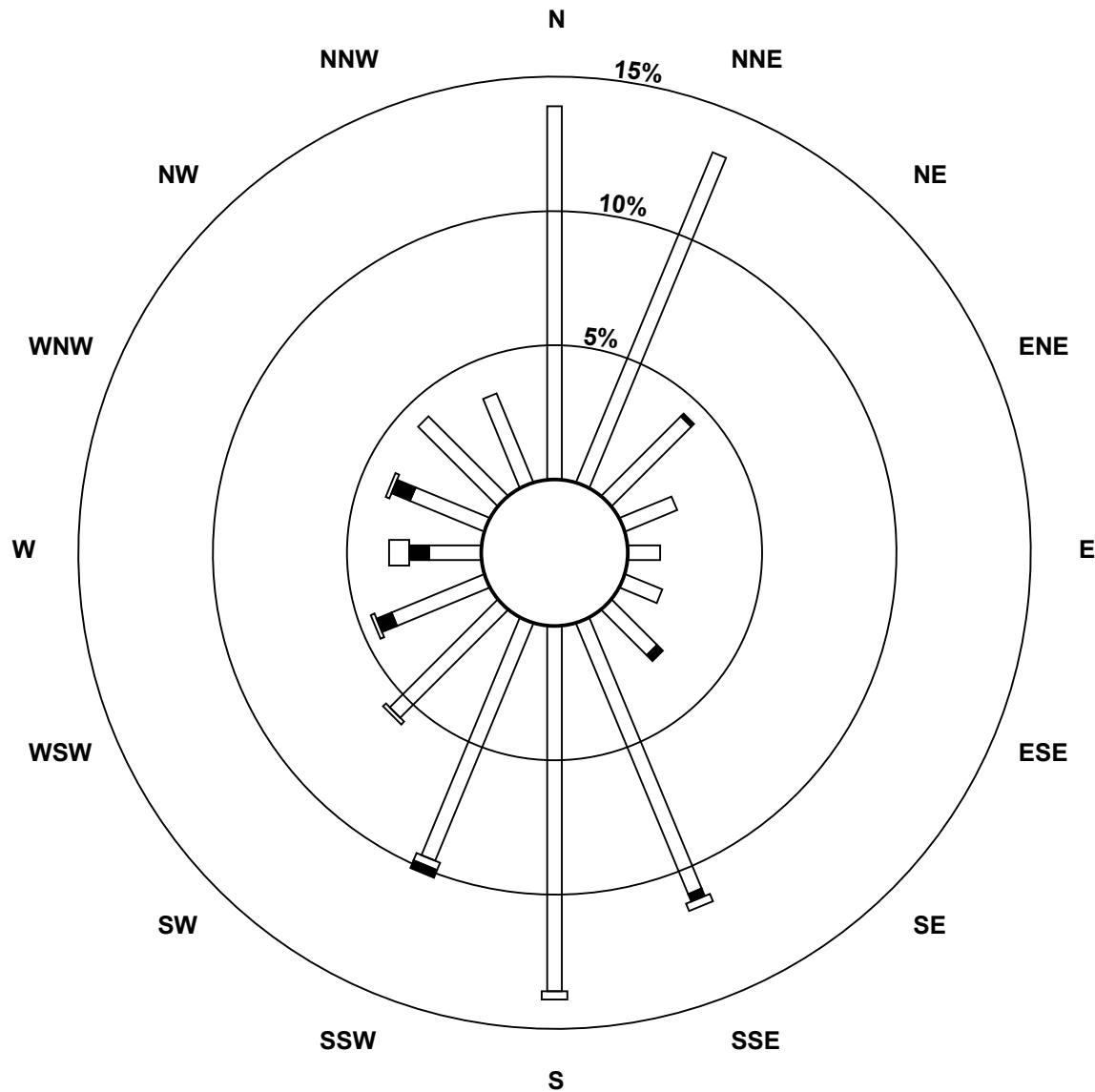
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	93	89	28	14	8	10	16	73	91	64	38	25	13	20	28	24	634
11 - 20	0	0	1	0	0	0	2	2	0	0	0	4	5	5	0	0	19
21 - 60	0	0	0	0	0	0	0	2	2	2	1	1	5	1	0	0	14
61 - 110	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	93	89	29	14	8	10	18	77	93	68	39	30	23	26	28	24	669

Total Number of Valid Hours: 669

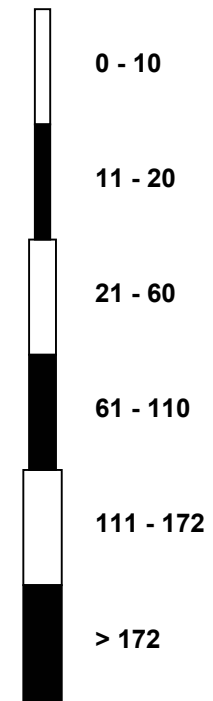
Total Number of Hours: 720

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

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



Classes (ppb)

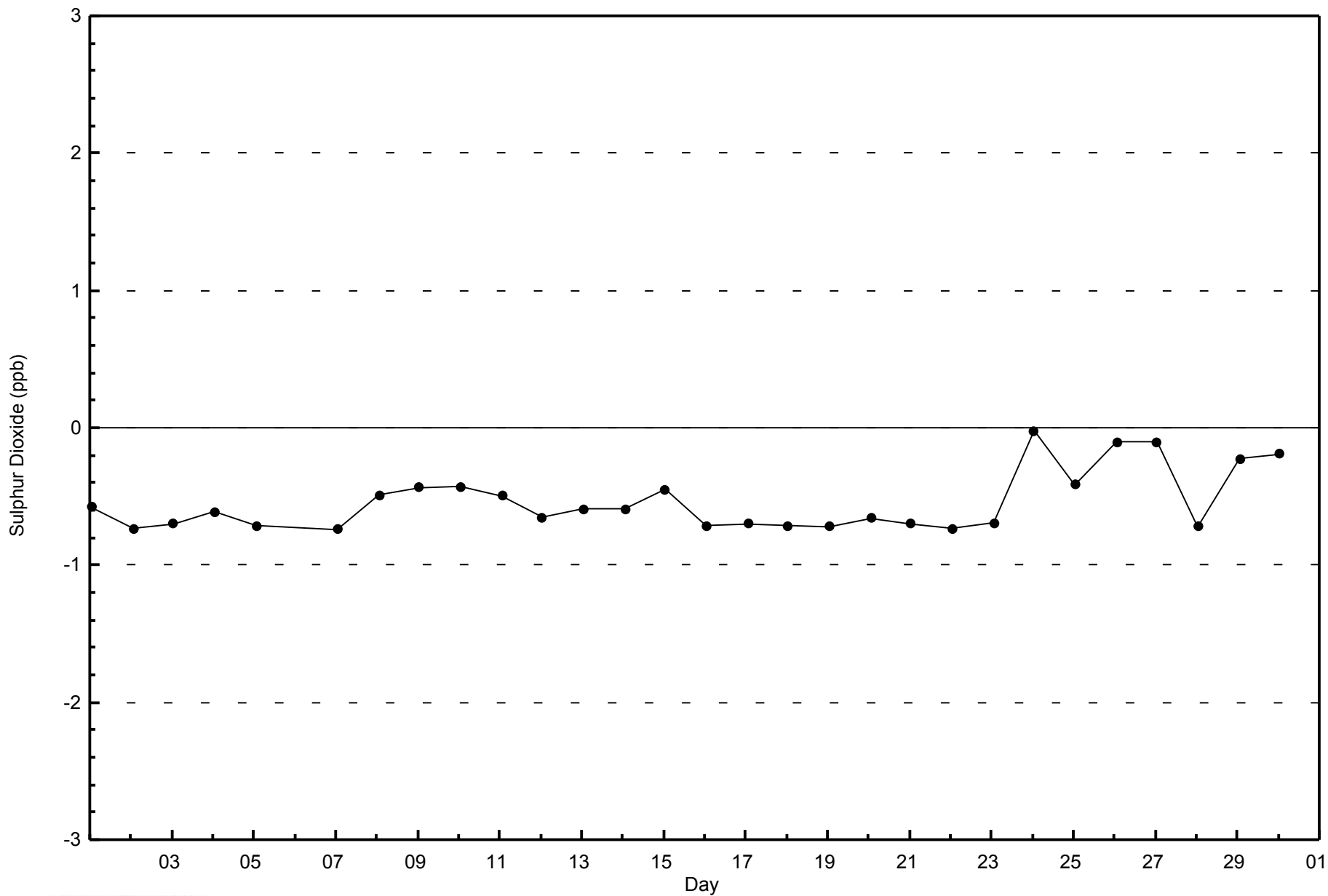


Total Number of Valid Hours: 669



WBEA
Zero Responses

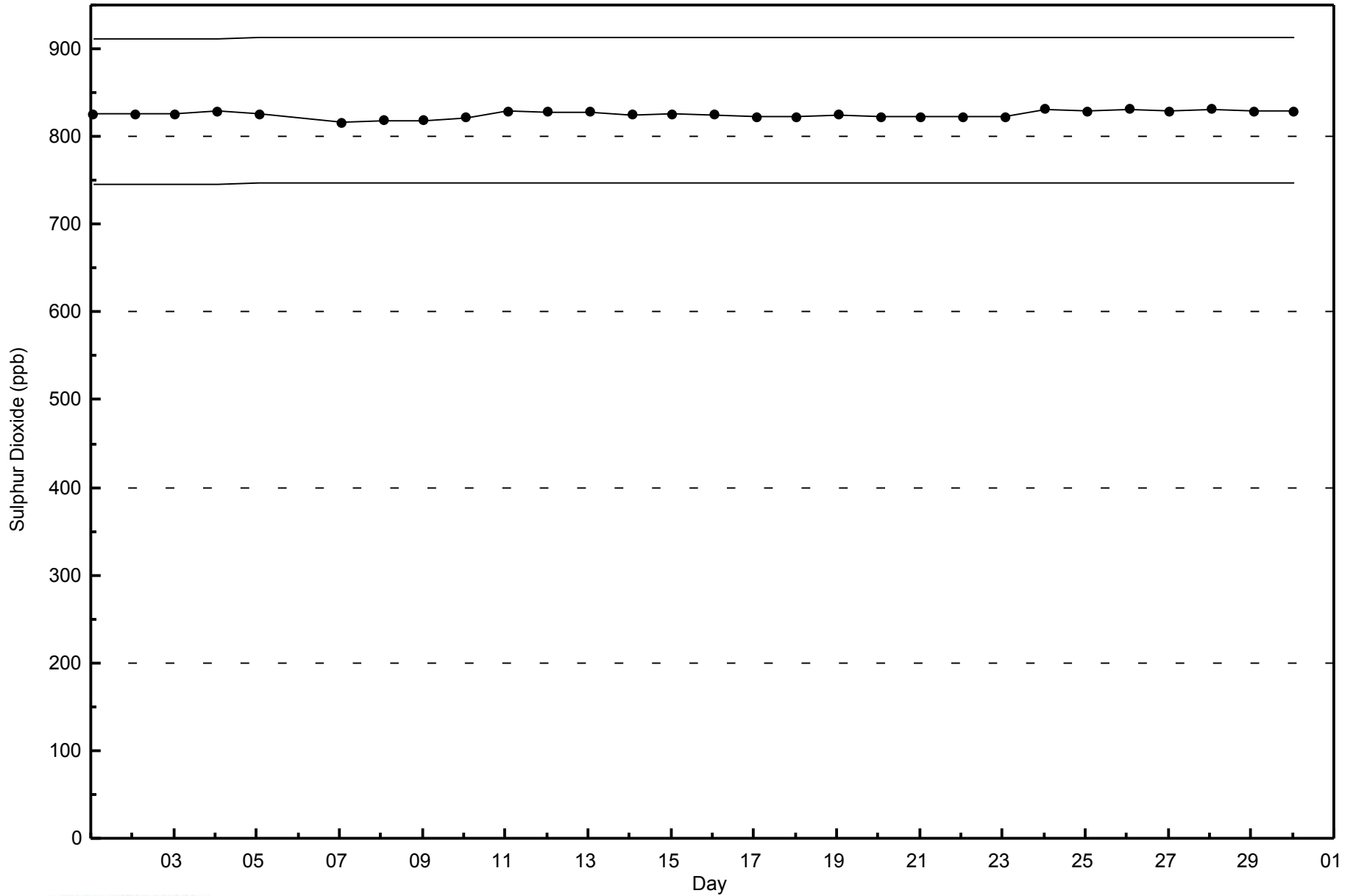
Sulphur Dioxide (SO₂) - ppb
Mildred Lake - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - September 2014



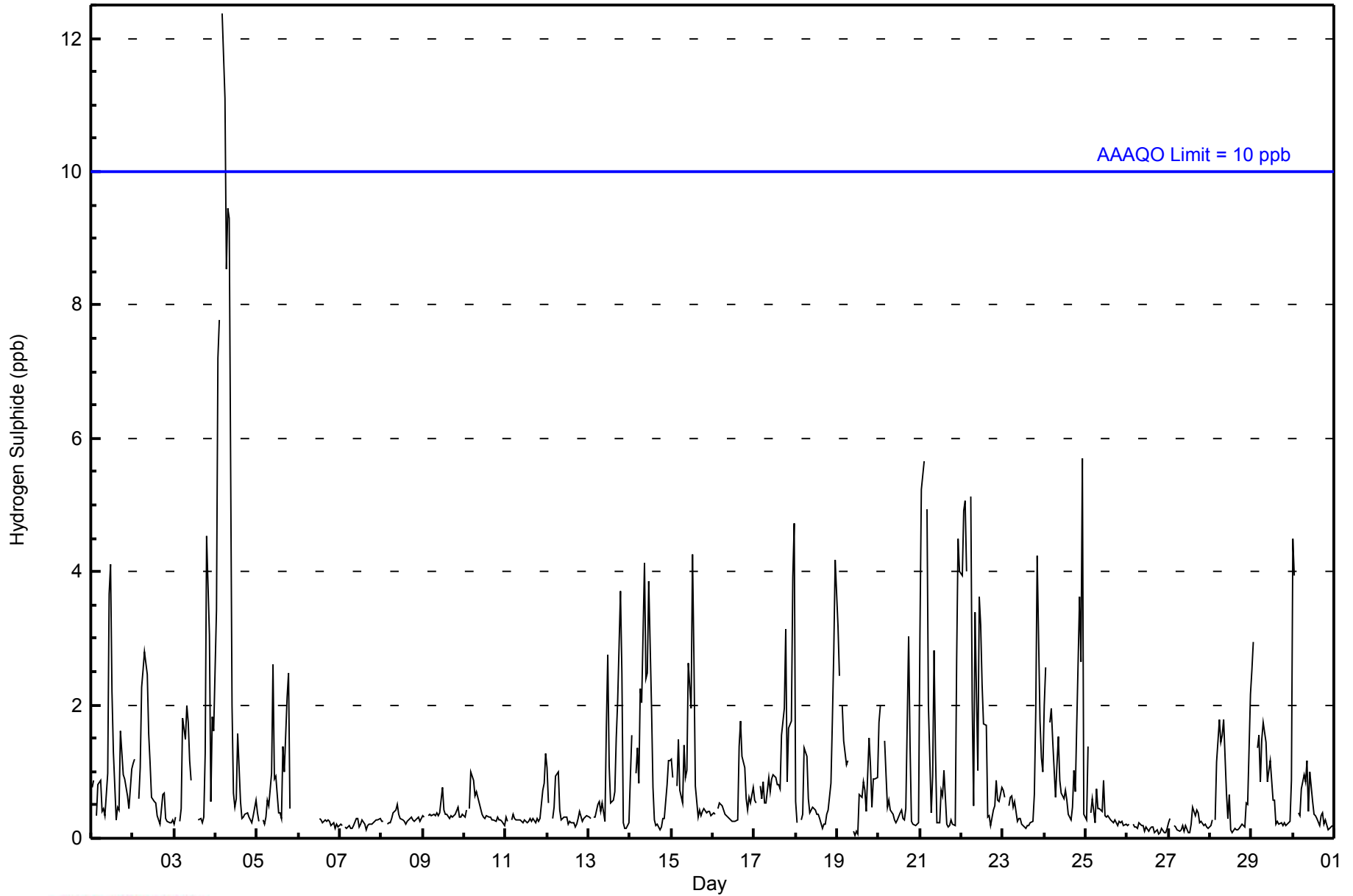


Number of Exceedences (AAAQO): 1-hr: 2 24-hr: 0										Hours in Service: 720																
Maximum Value: 12 ppb on Sep 4 05:00										Maximum Daily Average: 3.4 ppb on Sep 4										Hours of Data: 670						
Minimum Value: 0 ppb on Sep 19 11:00										Minimum Daily Average: 0.1 ppb on Sep 26										Hours of Missing Data: 50						
Maximum Diurnal Average: 6.2 ppb at hour 3										Minimum Diurnal Average: 0.4 ppb at hour 16										Hours of Calibration: 34						
Monthly Average: 0.9 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 7										Percent Operational Time: 97.8						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	1	1	Z	0	1	1	0	0	0	1	4	4	2	1	0	0	0	2	1	1	1	1	0	1	1.1	4
2-Sep	1	1	Z	1	1	2	3	3	2	2	1	1	1	1	0	0	0	1	1	0	0	0	0	0	1.0	3
3-Sep	0	0	Z	0	0	2	1	2	2	1	1	C	C	C	0	0	0	0	1	5	3	1	2	2	1.2	5
4-Sep	3	7	8	Z	12	11	9	9	9	2	1	0	1	2	1	0	0	0	0	0	0	0	0	1	3.4	12
5-Sep	0	0	Z	0	0	0	1	0	1	3	1	1	0	0	0	1	1	2	2	0	MS	MS	MS	MS	0.9	3
6-Sep	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	0	0	0	0	0	0	0	0	0	0	0	0	--	0
7-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
8-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	0.3	1
9-Sep	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
10-Sep	0	0	Z	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
11-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
12-Sep	1	1	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
13-Sep	0	0	Z	0	0	1	1	0	1	0	1	0	2	3	1	1	1	2	4	2	0	0	0	0	0.9	4
14-Sep	1	2	Z	1	1	1	2	2	4	2	2	4	2	1	0	0	0	0	0	0	1	1	1	1	1.3	4
15-Sep	1	1	Z	1	1	1	1	1	1	1	3	2	4	3	1	0	0	0	0	0	0	0	0	0	1.1	4
16-Sep	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	1	2	1	1	1	1	0	1	1	1	0.6	2
17-Sep	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	1	2	2	4	5	1.3	5
18-Sep	1	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	4	0.8	4
19-Sep	3	2	Z	2	1	1	1	C	C	0	0	0	0	1	1	1	1	0	2	1	0	1	1	1	1.0	3
20-Sep	2	2	Z	1	1	0	1	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0.7	3
21-Sep	3	5	6	Z	5	2	0	1	3	1	0	0	1	1	1	0	0	0	0	0	0	3	4	4	1.8	6
22-Sep	4	5	5	4	Z	5	2	0	3	1	4	3	2	2	2	0	0	0	0	0	1	1	1	1	2.0	5
23-Sep	1	1	Z	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	2	4	2	1	1	0.7	4
24-Sep	2	3	Z	2	2	1	1	1	2	1	1	1	1	1	0	0	0	1	1	2	4	3	6	0	1.4	6
25-Sep	0	1	Z	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
26-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
27-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
28-Sep	0	0	Z	0	1	2	1	2	2	1	0	1	0	0	0	0	0	0	0	0	0	1	1	2	0.6	2
29-Sep	3	3	Z	1	2	1	1	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0.9	3
30-Sep	5	4	Z	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.8	5
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration MS - Missing																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - September 2014





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	616	91.94	91.94
3 - 4	37	5.52	97.46
5 - 7	11	1.64	99.10
8 - 11	4	0.60	99.70
> 11	2	0.30	100.00

Total Number of Valid Hours: 670

Total Number of Hours: 720



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - September 2014

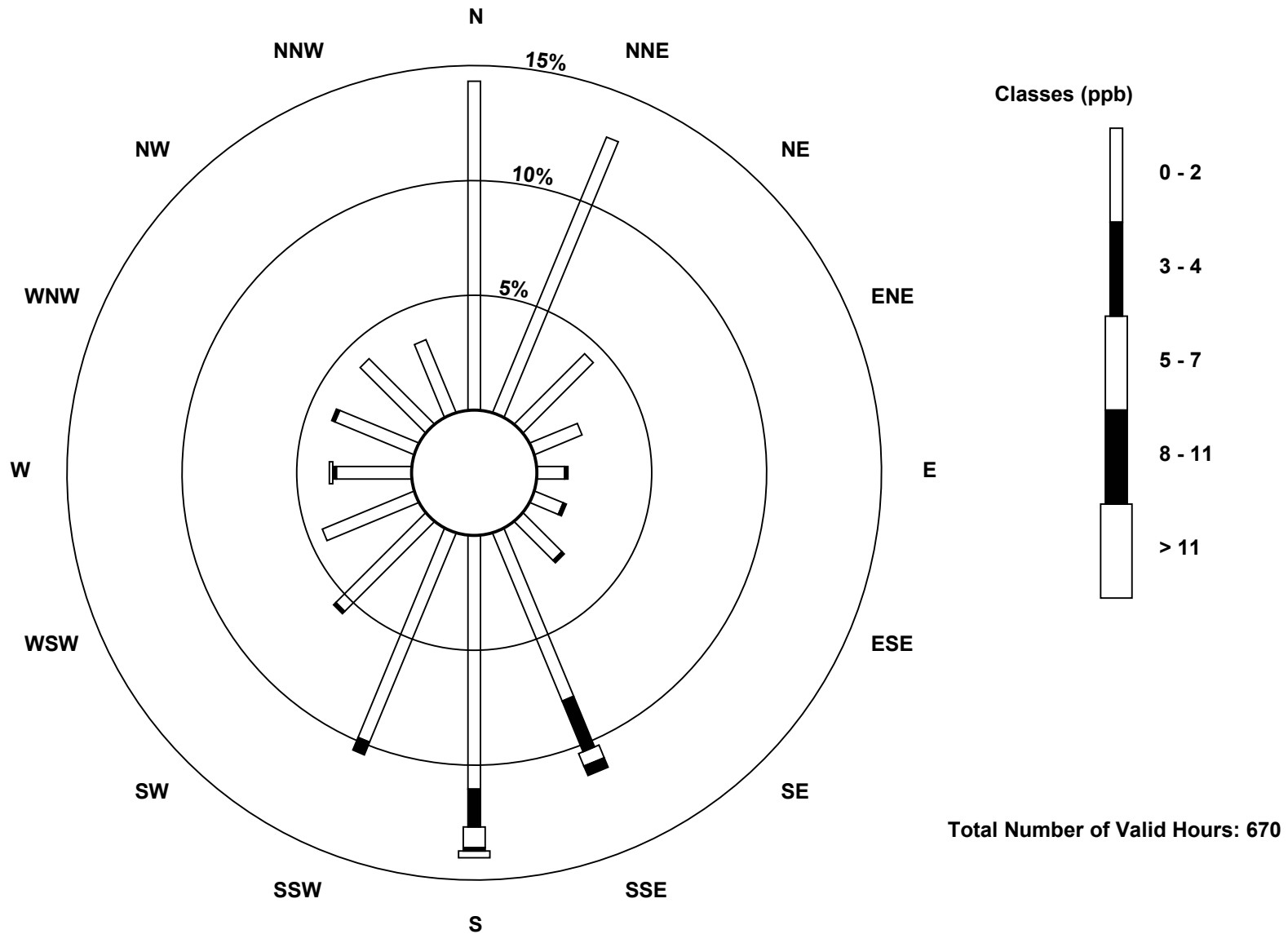
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	96	87	29	15	8	9	16	53	74	66	37	29	22	25	27	23	616
3 - 4	0	0	0	0	1	1	1	16	11	4	1	0	1	1	0	0	37
5 - 7	0	0	0	0	0	0	0	4	6	0	0	0	1	0	0	0	11
8 - 11	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	4
> 11	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Totals	96	87	29	15	9	10	17	76	94	70	38	29	24	26	27	23	670

Total Number of Valid Hours: 670

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

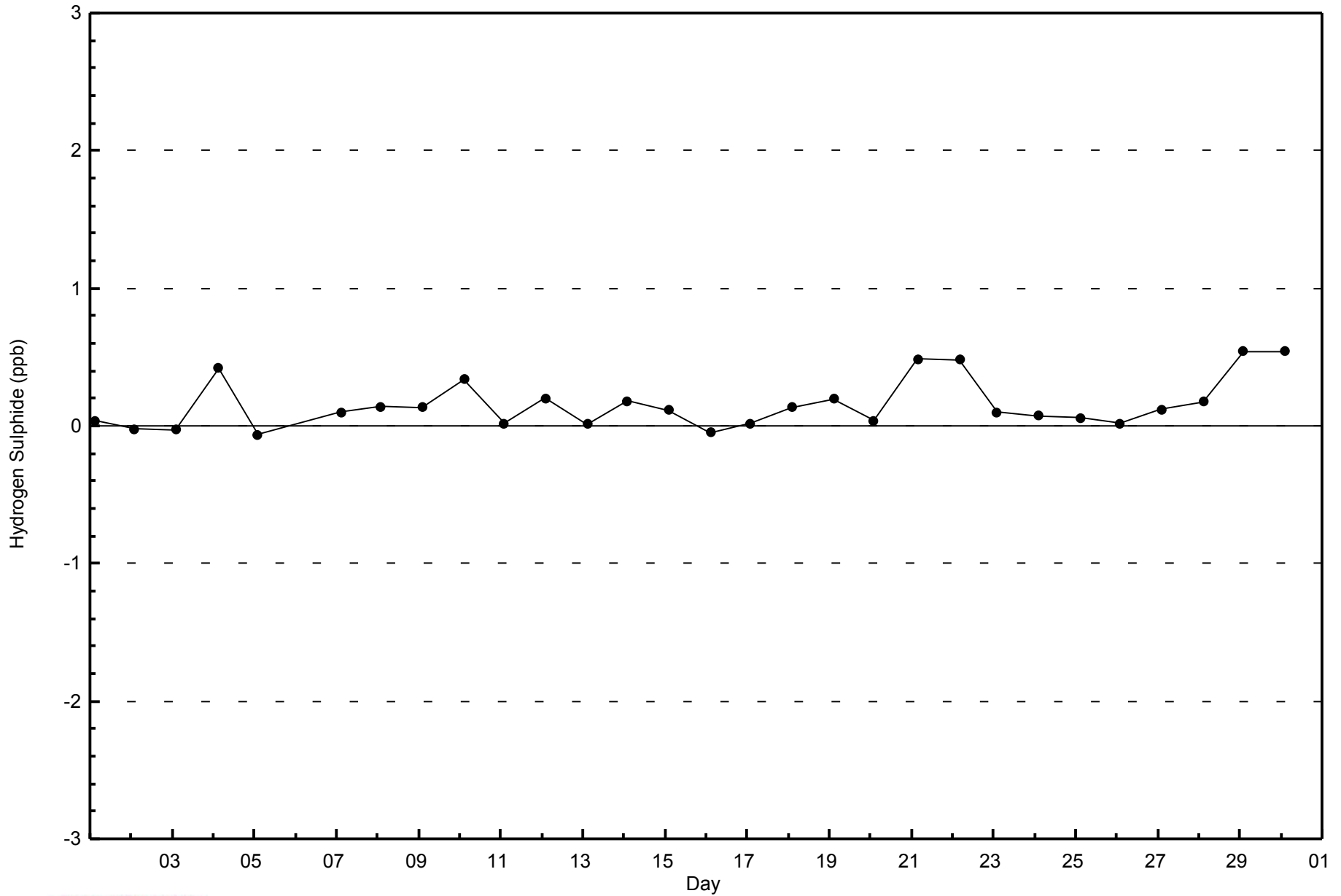
Hydrogen Sulphide (H₂S) - ppb
 Mildred Lake (AMS 2)





WBEA
Zero Responses

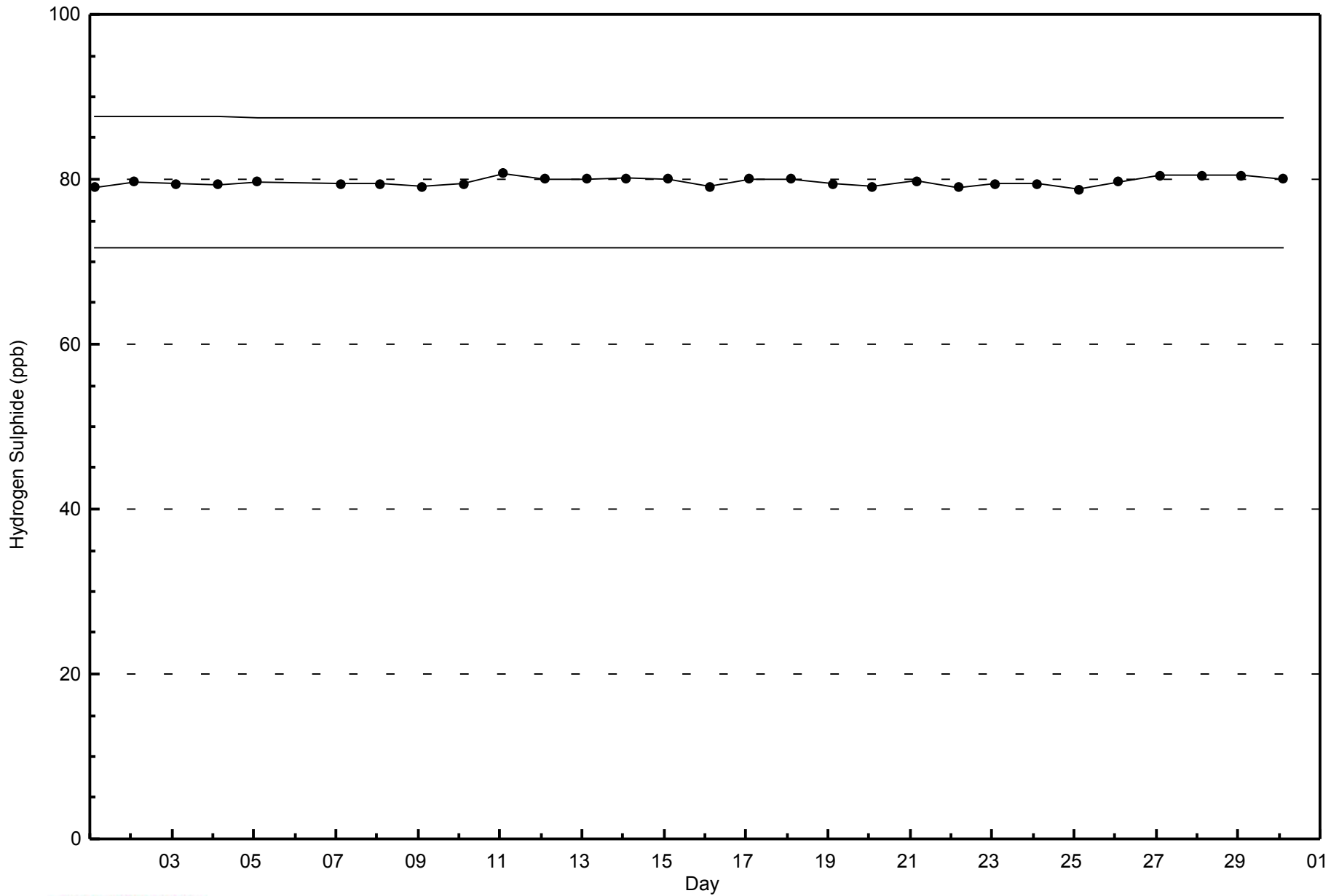
Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - September 2014





WBEA
Span Responses

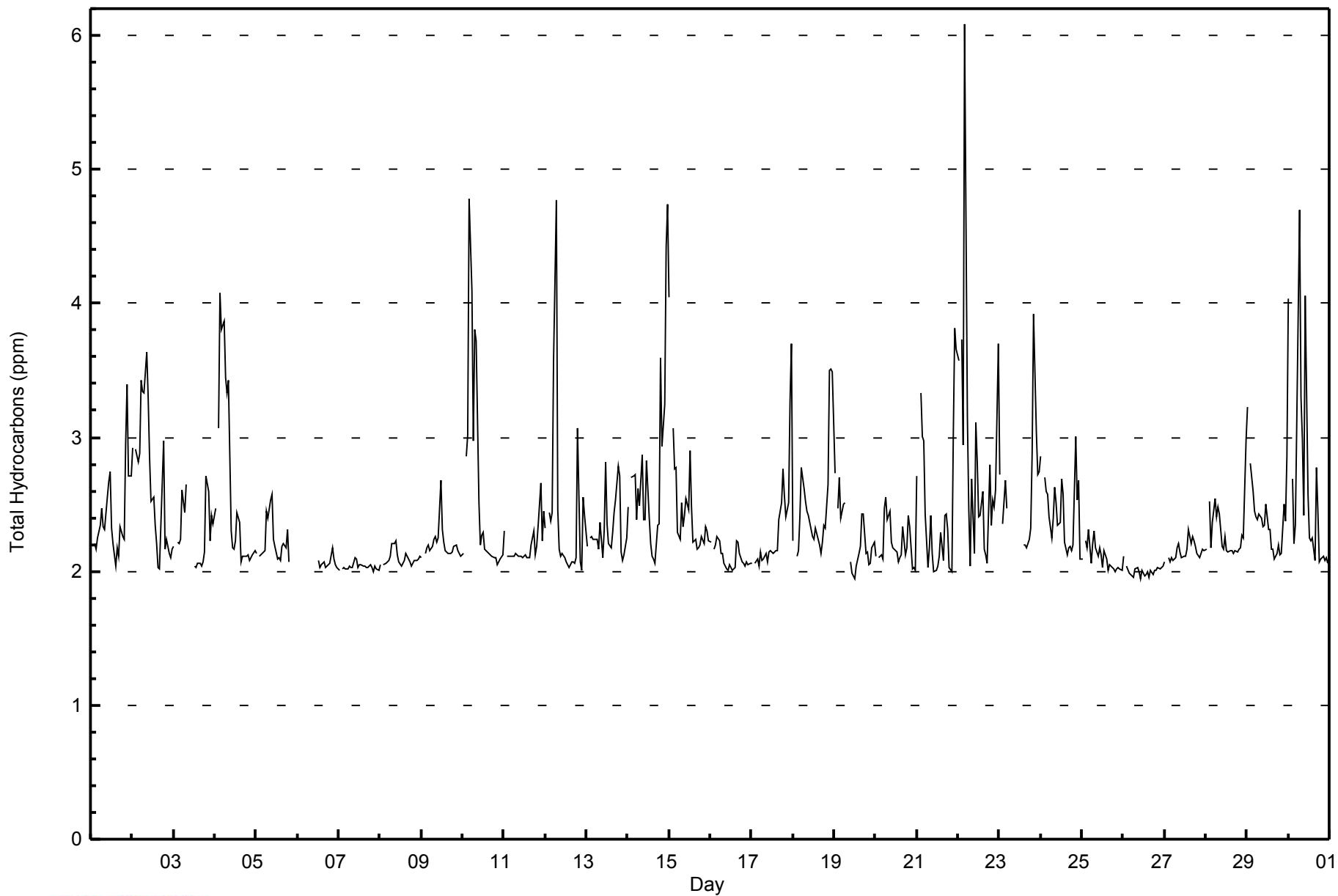
Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - September 2014





WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	94	14.24	14.24
2.1 - 3.0	519	78.64	92.88
3.1 - 10.0	47	7.12	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 720



WBEA
Frequency Distribution

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

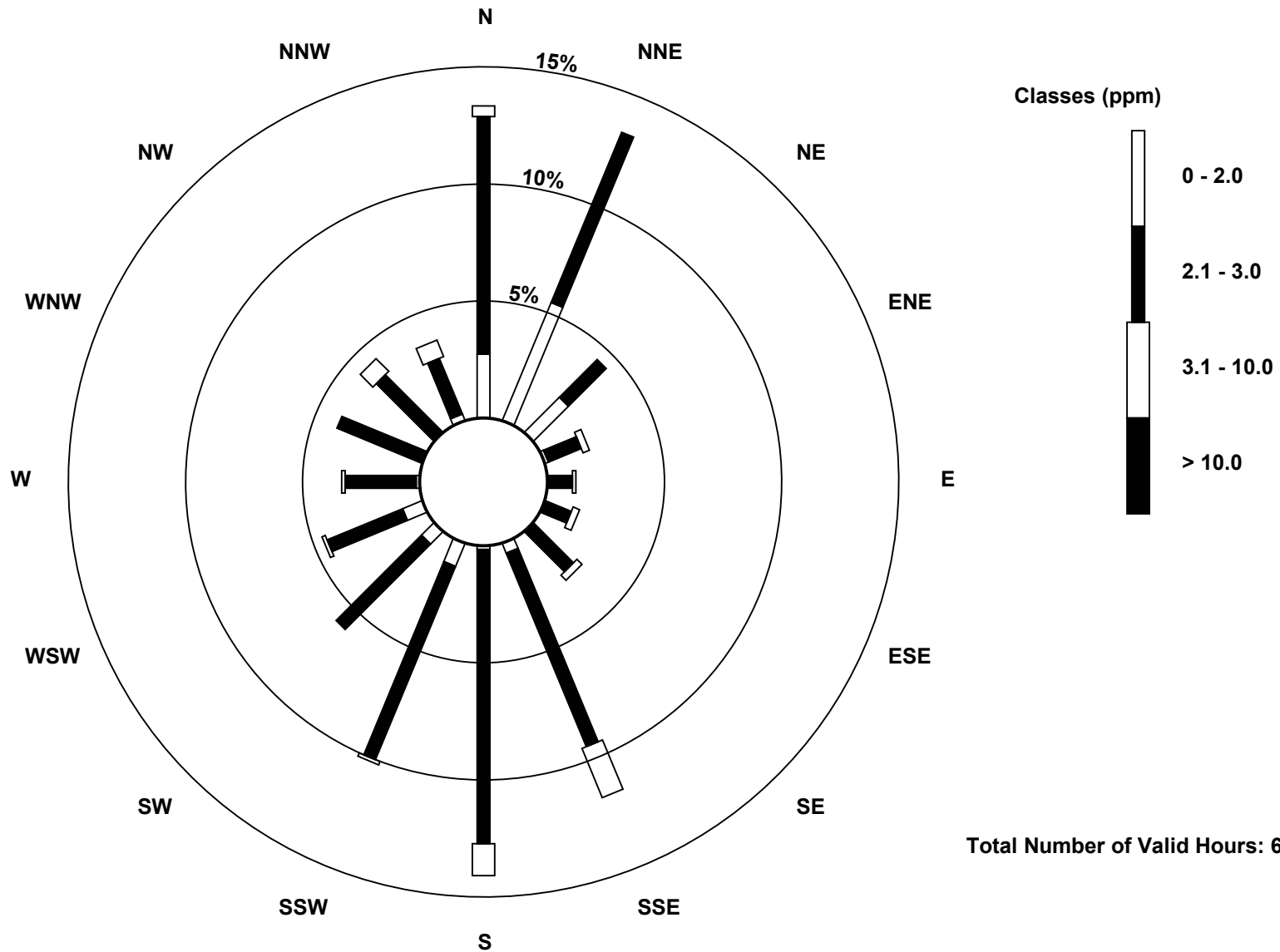
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	18	36	14	1	0	0	0	3	1	7	5	6	1	0	0	2	94
2.1 - 3.0	67	52	15	10	7	8	16	59	83	59	34	23	20	26	23	17	519
3.1 - 10.0	3	0	0	2	1	2	2	15	9	1	0	1	1	0	5	5	47
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	88	29	13	8	10	18	77	93	67	39	30	22	26	28	24	660

Total Number of Valid Hours: 660

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

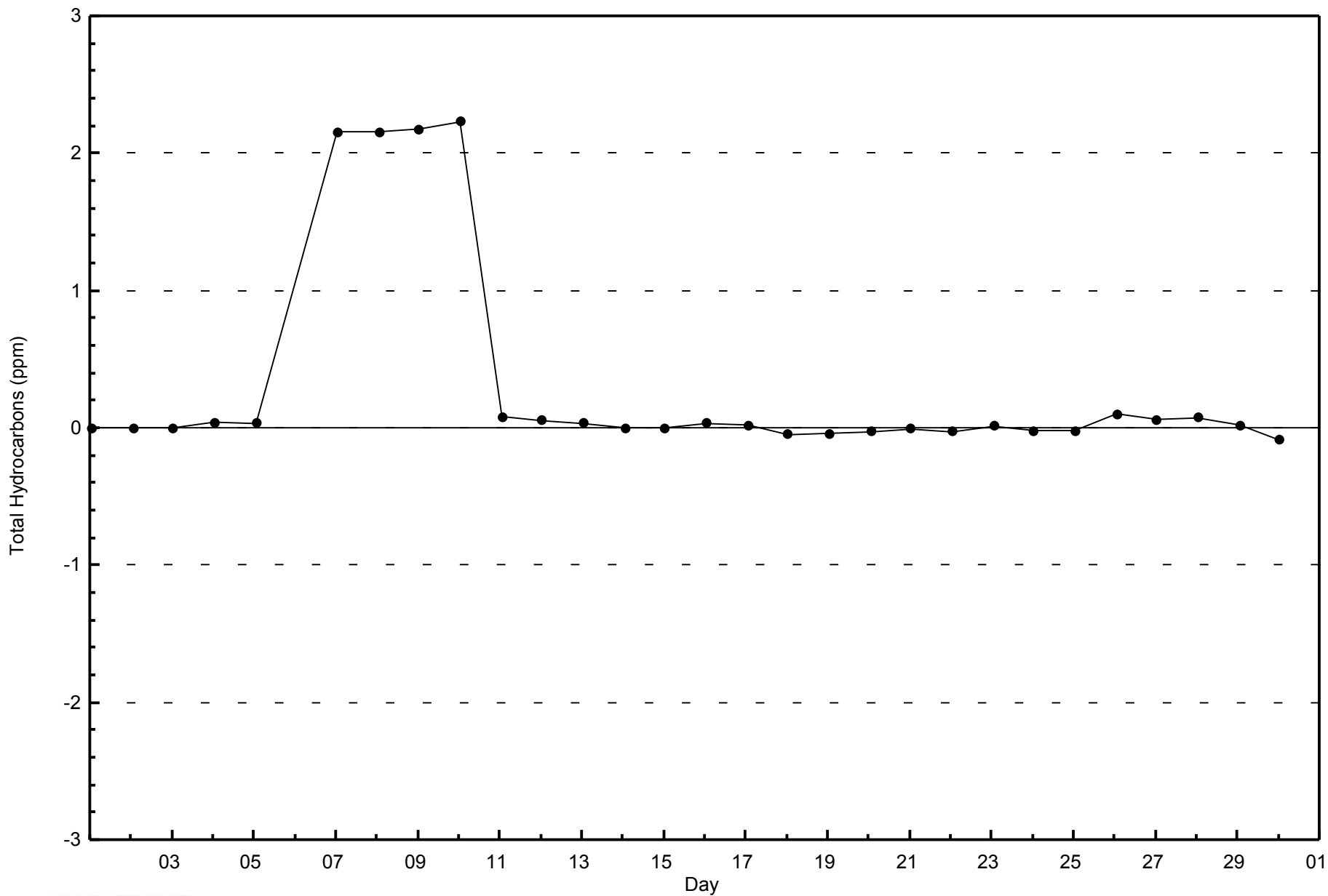
Total Hydrocarbons (THC) - ppm
Mildred Lake (AMS 2)





WBEA
Zero Responses

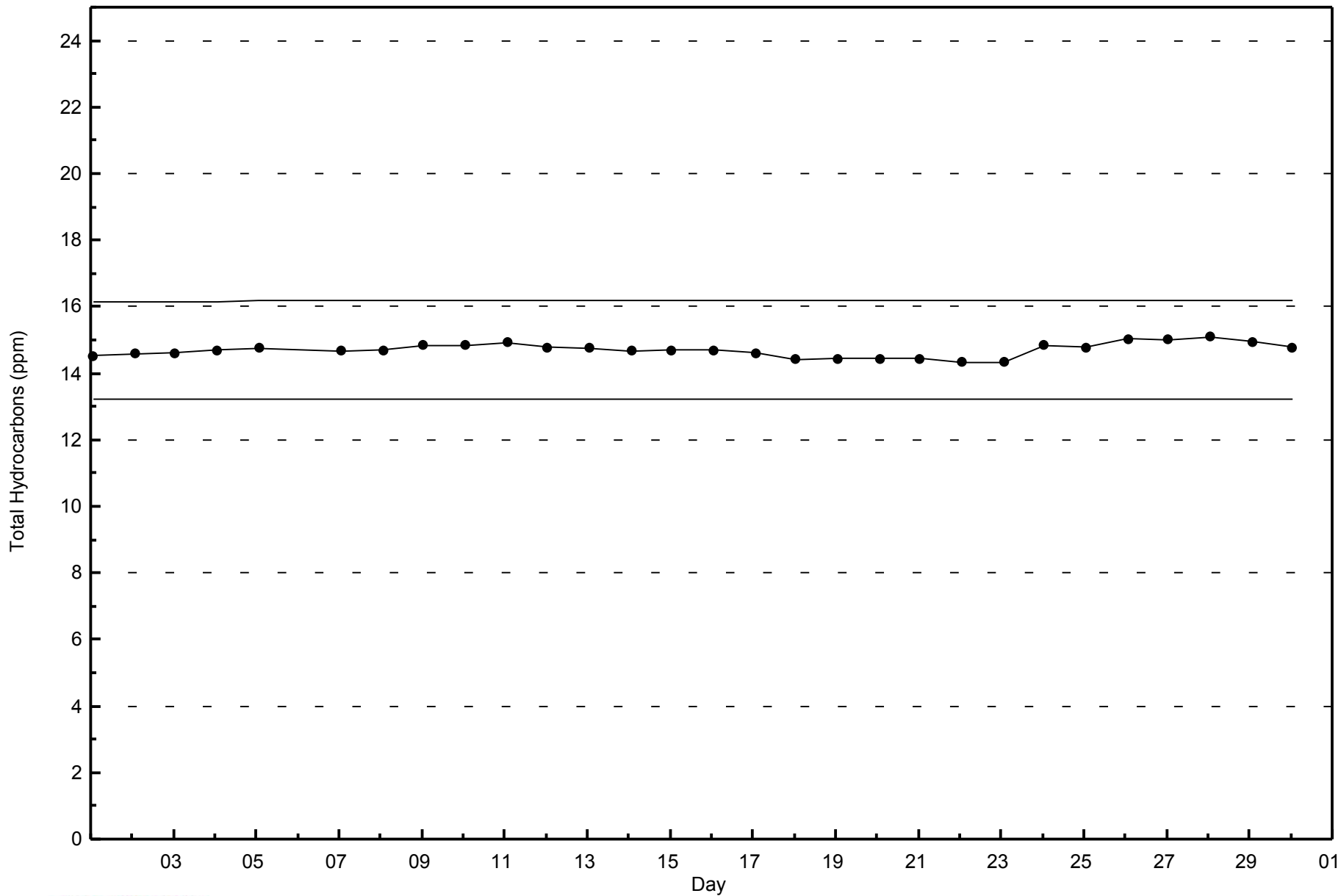
Total Hydrocarbons (THC) - ppm
Mildred Lake - September 2014





WBEA
Span Responses

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





Wood Buffalo Environmental Association
Summary of Hour Averages

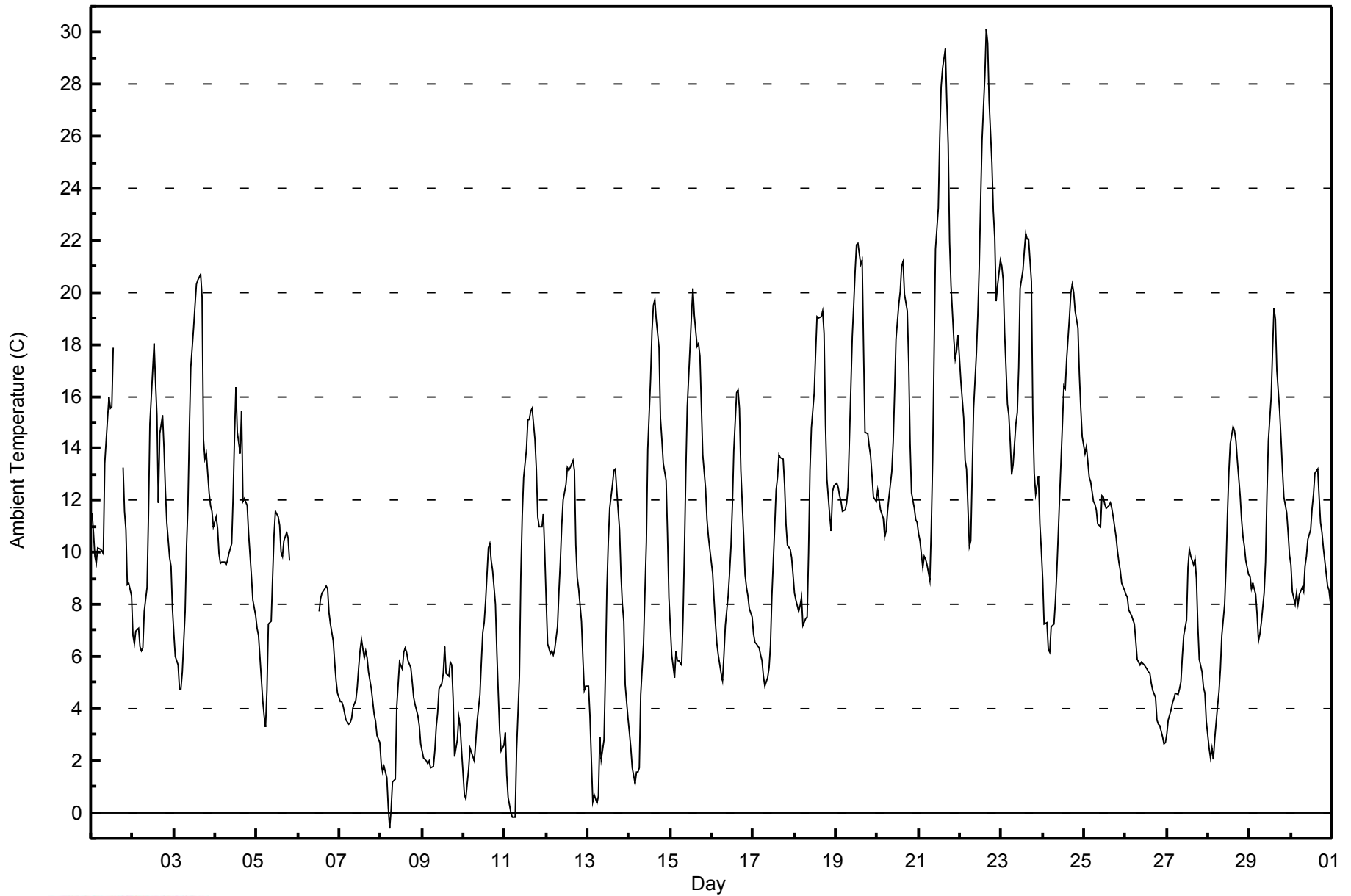
Ambient Temperature (AT) - C
Mildred Lake - September 2014

Maximum Value: 30.1 C on Sep 22 16:00 Maximum Daily Average: 19.9 C on Sep 22		Hours in Service: 720 Hours of Data: 700 Hours of Missing Data: 20 Hours of Calibration: 0 Percent Operational Time: 97.2																									
Minimum Value: -0.6 C on Sep 8 06:00 Maximum Diurnal Average: 15.2 C at hour 16 Monthly Average: 10.30 C		Minimum Daily Average: 3.4 C on Sep 8 Minimum Diurnal Average: 6.2 C at hour 6 Percentiles: P ₁ = 0.3 P ₁₀ = 3.3 Q ₁ = 6.0 Median = 9.9 Q ₃ = 13.5 P ₉₀ = 18.5 P ₉₉ = 27.1																									
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	11.5	10.8	9.9	9.6	10.2	10.1	10.1	10.0	13.4	15.2	16.0	15.6	15.6	17.9	AF	AF	AF	AF	13.2	11.6	10.9	8.8	8.8	8.3	11.9	17.9	
2-Sep	6.8	6.5	7.0	7.1	6.4	6.2	6.3	7.7	8.7	11.4	14.9	16.0	18.0	16.6	15.3	11.9	14.6	15.3	14.0	12.4	11.1	9.8	9.5	7.8	10.9	18.0	
3-Sep	6.9	6.0	5.6	4.7	4.8	5.4	7.7	10.2	11.8	14.7	17.1	18.6	19.5	20.3	20.5	20.7	19.8	14.4	13.6	13.8	12.3	11.8	11.6	11.0	12.6	20.7	
4-Sep	11.4	10.9	9.9	9.6	9.6	9.7	9.5	9.7	10.0	10.4	12.1	14.4	16.3	14.6	13.8	15.4	12.0	12.1	11.8	10.7	9.9	9.1	8.2	7.6	11.2	16.3	
5-Sep	7.1	6.8	6.0	4.3	3.7	3.3	4.7	7.2	7.3	9.0	10.7	11.6	11.4	11.0	10.0	9.9	10.4	10.8	10.6	9.7	MS	MS	MS	MS	8.3	11.6	
6-Sep	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	7.7	8.2	8.5	8.6	8.7	8.6	7.7	7.3	6.6	5.8	5.1	4.6	--	8.7
7-Sep	4.3	4.2	4.1	3.8	3.5	3.4	3.5	3.6	4.1	4.3	4.8	5.6	6.2	6.6	5.9	6.2	5.9	5.4	4.7	4.2	3.8	3.5	3.0	2.7	4.5	6.6	
8-Sep	1.9	1.5	1.8	1.3	0.2	-0.6	0.1	1.2	1.3	4.1	4.9	5.8	5.5	6.1	6.3	6.2	5.8	5.6	5.0	4.4	4.1	3.7	3.3	2.7	3.4	6.3	
9-Sep	2.4	2.1	2.0	1.9	2.0	1.7	1.8	2.4	3.3	3.8	4.8	5.0	5.4	6.4	5.4	5.3	5.8	5.7	4.4	2.1	2.8	3.7	3.3	2.4	3.6	6.4	
10-Sep	0.7	0.5	1.1	1.7	2.5	2.1	2.0	2.7	3.5	4.5	5.8	6.9	7.3	8.1	10.1	10.3	9.7	9.3	8.0	6.2	4.6	3.1	2.4	2.6	4.8	10.3	
11-Sep	3.1	1.4	0.6	0.0	-0.2	-0.2	-0.2	2.4	5.2	9.1	11.4	12.9	14.0	15.1	15.1	15.4	15.6	14.4	13.2	11.4	11.0	11.0	11.5	9.9	8.5	15.6	
12-Sep	8.1	6.5	6.1	6.2	6.1	6.3	7.1	8.5	9.7	11.0	12.0	12.6	13.3	13.1	13.3	13.5	13.2	10.3	9.0	8.6	7.3	5.9	4.7	4.8	9.1	13.5	
13-Sep	4.8	3.7	2.0	0.4	0.7	0.4	0.6	2.9	2.0	2.8	5.5	8.5	10.4	11.7	12.6	13.1	13.2	12.4	10.9	9.1	8.0	7.3	4.9	3.6	6.3	13.2	
14-Sep	3.1	2.5	1.7	1.1	1.6	1.6	1.7	4.5	6.5	8.5	10.4	14.0	16.7	18.5	19.5	19.7	18.9	17.9	15.1	14.4	13.4	12.8	10.7	8.3	10.1	19.7	
15-Sep	7.1	6.1	5.2	6.2	5.9	5.8	5.6	7.5	10.1	13.1	15.6	17.9	19.1	20.2	19.1	17.9	18.1	17.5	15.7	13.7	12.4	11.3	10.6	10.1	12.2	20.2	
16-Sep	9.2	8.2	7.2	6.5	6.1	5.3	5.1	6.1	7.2	8.3	9.2	10.2	11.8	13.9	16.2	16.3	15.6	13.1	10.6	9.1	8.7	8.3	7.8	7.5	9.5	16.3	
17-Sep	6.8	6.6	6.5	6.3	6.1	5.8	5.3	4.9	5.2	5.6	6.4	8.3	11.0	12.4	12.9	13.7	13.7	13.6	12.6	11.1	10.3	10.1	9.8	9.1	8.9	13.7	
18-Sep	8.4	8.2	7.7	7.9	8.3	7.2	7.5	7.5	10.0	13.2	14.8	16.2	17.7	19.1	19.0	19.1	19.3	18.4	14.9	12.8	11.4	10.8	12.3	12.6	12.7	19.3	
19-Sep	12.7	12.5	12.2	12.0	11.6	11.7	11.9	12.5	14.4	18.3	19.5	20.8	21.9	21.9	21.1	21.3	17.9	14.6	14.6	14.1	13.7	12.9	12.1	11.9	15.3	21.9	
20-Sep	12.4	12.0	11.7	11.3	10.6	10.8	11.6	12.1	13.1	14.2	16.1	18.2	19.6	20.0	21.0	21.2	19.9	19.3	17.3	14.2	12.3	11.7	11.3	11.2	14.7	21.2	
21-Sep	10.7	10.4	9.4	9.9	9.7	9.5	9.0	10.9	13.6	17.7	21.7	23.3	25.9	27.9	28.6	29.4	27.3	25.7	21.9	20.3	18.2	17.4	17.8	18.4	18.1	29.4	
22-Sep	16.6	15.9	15.2	13.6	13.2	10.2	10.4	13.0	15.5	17.7	19.1	21.0	23.5	25.8	28.3	30.1	29.6	27.4	25.0	23.2	22.1	19.7	20.3	21.3	19.9	30.1	
23-Sep	21.0	20.5	18.5	15.7	15.3	14.2	13.0	13.4	14.9	15.4	17.1	20.2	20.8	21.6	22.3	22.0	22.0	20.5	15.3	13.1	12.2	12.9	11.1	10.1	16.8	22.3	
24-Sep	9.0	7.2	7.3	6.3	6.2	7.2	7.3	8.1	9.3	10.7	12.1	15.0	16.4	16.3	17.4	19.0	20.0	20.3	20.0	19.3	18.6	16.8	15.6	14.4	13.3	20.3	
25-Sep	13.8	14.1	13.5	12.9	12.7	12.0	11.8	11.6	11.1	11.0	12.2	12.1	11.8	11.7	11.8	11.9	11.7	11.4	10.6	10.1	9.6	9.3	8.8	8.5	11.5	14.1	
26-Sep	8.4	8.3	7.8	7.6	7.4	7.2	6.6	5.9	5.7	5.8	5.7	5.7	5.5	5.4	5.3	5.0	4.7	4.4	3.6	3.4	3.3	2.9	2.6	2.7	5.4	8.4	
27-Sep	3.0	3.5	4.0	4.2	4.4	4.6	4.6	4.7	5.0	6.0	6.8	7.4	9.4	10.1	9.9	9.5	9.7	9.0	7.2	5.9	5.4	4.8	4.6	3.5	6.1	10.1	
28-Sep	2.5	2.1	2.5	2.0	2.8	4.1	4.6	5.5	6.8	8.0	9.5	11.5	13.1	14.2	14.9	14.7	14.3	13.5	12.2	11.3	10.6	10.2	9.7	9.1	8.7	14.9	
29-Sep	9.1	8.6	8.8	8.4	7.6	6.6	6.8	7.3	8.4	9.6	12.3	14.3	16.0	17.8	19.4	19.0	17.0	15.4	14.3	13.1	12.1	11.5	10.8	9.9	11.8	19.4	
30-Sep	9.5	8.5	8.0	8.4	8.0	8.4	8.7	8.5	9.5	9.8	10.5	10.9	11.7	12.3	13.1	13.2	12.1	11.2	10.8	10.2	9.2	8.7	8.6	8.1	9.9	13.2	
	8.0	7.5	7.0	6.6	6.4	6.2	6.4	7.3	8.5	10.1	11.7	13.1	14.1	14.8	15.0	15.2	14.7	13.7	12.3	11.0	10.2	9.5	9.0	8.4	Diurnal Average		
	21.0	20.5	18.5	15.7	15.3	14.2	13.0	13.4	15.5	18.3	21.7	23.3	25.9	27.9	28.6	30.1	29.6	27.4	25.0	23.2	22.1	19.7	20.3	21.3	Diurnal Maximum		
AF - Analyzer Failure		MS - Missing																									



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Mildred Lake - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Mildred Lake - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	5	0.71	0.71
0 - 10	353	50.43	51.14
10 - 20	297	42.43	93.57
> 20	45	6.43	100.00

Total Number of Valid Hours: 700

Total Number of Hours: 720



Maximum Speed: 25 km/h on Sep 28 16:00		Maximum Daily Speed Average: 17.2 km/h on Sep 28		Hours in Service: 720																																													
Minimum Speed Value: 1 km/h on Sep 24 07:00		Minimum Daily Speed Average: 0.4 km/h on Sep 18		Hours of Data: 704																																													
Maximum Diurnal Speed Average: 2.6 km/h at hour 14		Minimum Diurnal Speed Average: 0.3 km/h at hour 1		Hours of Missing Data: 16																																													
Monthly Average Velocity: 1.0 km/h 228.9 deg		Percentiles: $P_1 = 1$ $P_{10} = 3$ $Q_1 = 5$ Median = 8 $Q_3 = 12$ $P_{90} = 16$ $P_{99} = 23$		Percent Operational Time: 97.8																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Sep	NW6	W2	SW4	WSW5	WSW6	SW4	SW2	SSW5	SSW5	S4	SSW6	S7	SSE3	SSW9	WSW6	E8	SE4	SSE4	ENE2	NNW2	NW5	ENE4	W2	WNW3	SSW2.2	SSW9																							
2-Sep	NE2	ENE3	E1	E1	SE2	E3	ESE1	SE2	ESE2	ENE1	WSW3	WNW3	WSW5	S3	NE8	NNE7	N4	NW6	NNW6	NNW7	N8	N7	N6	N2	N2.0	NE8																							
3-Sep	NW2	NE1	NE3	ENE3	ESE2	S3	SSW5	S5	SSE5	SSW4	SW5	W6	WSW7	SW7	WSW6	WSW7	WSW4	E7	SE8	SSE9	SSW5	S7	S6	S7	SSW3.2	SSE9																							
4-Sep	S8	S8	S7	SSE8	S8	S8	SSE6	SSE7	SSE7	S9	S9	SSW10	S8	SSW6	WSW4	SW6	NNE9	NNE8	N11	NNE8	NNE9	NNE11	NNE10	SSE1.9	N11																								
5-Sep	NNE8	N9	NNW6	NNW5	NNW5	NNW5	N3	ENE3	SE6	SSE8	S10	S11	S12	S12	S7	SE9	SSE12	SSE13	S7	SSW4	MS	MS	MS	MS	S3.2	SSE13																							
6-Sep	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	NE6	NE4	ENE5	NE4	NE5	NNE6	NNE8	NNE10	NNE12	N14	NNE16	NNE16	---	NNE16																						
7-Sep	NNE17	NNE16	NNE15	NNE14	NNE12	NNE12	NNE11	NE11	NNE10	NNE10	NNE11	NNE10	NNE13	NNE16	N18	N18	N20	N18	N15	N10	N8	N11	N9	N9	NNE12.8	N20																							
8-Sep	N7	N11	N12	N11	N8	N7	N6	N8	N7	N10	N12	N13	N13	N9	N11	NNE10	NNE10	N9	NNE5	NNE5	NE6	NNE6	NNE4	NNE3	N8.3	N13																							
9-Sep	ENE1	N3	NNE3	N1	N7	N6	NNE2	NE4	NE5	ENE2	SW4	WSW3	S2	WSW3	N8	E5	ENE3	NE2	NNE1	N4	NNW7	N7	N7	N6	N2.7	N8																							
10-Sep	N5	W3	NNE6	NW8	N4	N3	N3	NW4	NNW6	NNW10	NNW7	NW5	NW6	NW6	SW8	SW9	SSW9	SSW10	SSW10	SSW11	SSW12	SW8	SW6	SW6	W3.3	SSW12																							
11-Sep	SW7	SSW7	SSW9	SSW9	SSW8	SSW12	SSW13	SSW14	SSW15	SW14	SW15	SW17	SW19	SW19	SW18	SW17	SW14	SW9	SSW10	SW7	WSW6	W9	WNW17	WNW13	SW11.2	SW19																							
12-Sep	W6	WSW5	WSW6	WSW7	WSW2	NNW3	NNW5	N10	NNW13	N17	N16	NNW19	N16	N15	N16	N13	N11	N13	N5	N5	N9	NNW2	NNW4	NNW8	NNW8.0	NNW19																							
13-Sep	N9	N6	NW1	NNE2	NNE2	ENE2	E3	ESE6	SE7	ESE5	SE4	S5	S7	S5	S5	S8	SSE11	SSE9	SSE7	S6	SSW4	SSW4	ENE3	E4	SE2.9	SSE11																							
14-Sep	SE4	E2	SE2	SSE4	SSE5	SSE5	SSE6	SSW9	SSE7	SE7	SSE8	SSE10	SSE9	S8	SSW9	W7	W6	SSW8	WSW3	W4	SW5	NW4	NW3	WSW2	S3.8	SSE10																							
15-Sep	SSW3	SSW2	SSE4	SSW4	S3	SSW6	S4	S4	S5	SW4	SSW3	SSW5	SW1	SSW3	NE7	NNE10	NE9	NNE8	N8	NNE8	NNE5	N6	N7	N10	NNE1.0	NNE10																							
16-Sep	N11	N12	N12	N12	N9	NNE8	NNE4	N6	NNE7	NNE8	NE9	NNE9	NNE7	ENE5	SSW5	S9	S12	SSE18	SSE15	SE15	SSE14	SSE17	SSE17	SSE16	ESE3.1	SSE18																							
17-Sep	SSE16	SSE16	S16	SSE14	SSE14	S15	SSE15	SSE16	S18	SSE17	SSE17	SSE15	SSE15	S16	S15	S19	S17	S15	SSE15	SSE17	SSE14	SSE12	S8	S8	SSE14.8	S19																							
18-Sep	SSW8	SSW8	SSW8	SSW6	S3	NE2	NNE6	N4	NNE4	NNE8	NNW6	NNE5	NNE1	W3	N6	N5	NNE3	SE2	ESE4	ESE5	S3	SSE4	S7	SSE8	SE0.4	SSW8																							
19-Sep	SSE13	S12	S11	S8	S7	S6	SSW8	S7	S8	WSW11	WSW15	WSW14	WSW15	W16	W15	W16	WNW22	WNW19	W18	WNW19	WNW23	WNW24	WNW19	WNW17	W10.3	WNW24																							
20-Sep	WNW17	WNW16	WNW18	WNW16	WNW15	NW13	WNW14	NW16	NW17	NW16	NW15	NW12	WNW15	WNW13	NW14	WNW16	WNW11	W9	W7	WSW3	SSW3	SW6	SSW8	S7	WNW11.0	WNW18																							
21-Sep	SSE8	S8	SSE5	S5	S7	SSW8	SSW7	S6	SSE10	S9	SW11	SW12	SW9	WSW8	W10	SW7	SW7	SW7	SSW6	SSW6	SSW7	S6	S9	S10	SSW6.7	SW12																							
22-Sep	SSE6	S9	SSE5	SSE7	SSE7	S3	SSW6	SSW8	S11	S9	SSE10	SSE10	SSE12	SSE10	SSE10	SW10	WSW9	WSW5	W5	WSW6	W6	SW5	NW9	NW12	SSW5.2	SSE12																							
23-Sep	NW11	NW9	NW3	W1	S3	NNE6	N9	N8	N8	N4	N5	ENE4	SSW1	W4	SW5	SSW4	SSW4	SSE3	ESE3	S2	SSE3	SE6	SSW4	NNE3	NNW1.3	NW11																							
24-Sep	NNE4	E2	W2	ESE2	SE3	SSW4	WNW1	N3	N6	N6	NNE6	NNE8	NE6	NNE7	ENE6	ESE12	SE15	SSE18	SSE20	SSE19	S13	WNW15	W9	SSW8	SE2.5	SSE20																							
25-Sep	SW9	W15	W12	W13	W13	WSW12	W11	NW13	WNW16	WNW16	WNW16	NW19	NNW19	NW10	N11	N13	N10	NNE8	NNE9	NE8	NE8	NE7	NE10	NE6	NW7.8	NNW19																							
26-Sep	NNE5	NE6	NE10	NE10	NE10	NE11	NE9	NNE9	NNE11	NE11	NE12	NNE13	NNE12	NNE10	NNE13	NNE17	NNE16	NNE16	NNE19	NNE20	NNE18	NNE15	NNE16	NNE14	NNE12.4	NNE20																							
27-Sep	N10	N11	N11	N11	N10	N12	NNW11	N10	N9	NNE7	N9	N5	SE2	WSW6	SSW6	SSE5	SSE8	S7	S6	S6	SSW7	S7	S10	S9	N1.6	N12																							
28-Sep	S7	S8	S13	S13	S16	S16	S17	S19	S22	S23	S22	S21	S23	SSW24	SSW24	SSW25	SSW24	SSW22	S14	S12	S14	S14	S14	SSE13	S17.2	SSW25																							
29-Sep	SSE13	SSE12	SSE14	SSE14	SSE10	SSE9	SSE15	SSE17	SSE17	SSE17	SSE15	SSE15	S17	S12	SSW17	SSW19	SSW19	SSW12	SW14	SSW12	SSW9	SW6	SSW6	SSE6	S12.2	SSW19																							
30-Sep	SSE4	S2	S5	SSW8	SW4	NW2	NNW5	SE4	S4	WSW3	NNW5	NNW8	N12	N11	N6	NNE5	NW6	N7	NNE5	NNE6	NE7	NNE6	NNE7	NE9	N2.8	N12																							
W0.3		WSW0.7		SW0.8		SSW1.2		SSW1.0		SW0.7		SSW0.7		S0.9		SSE1.4		SSW1.0		SSW1.7		WSW1.7		SSW1.7		SSW2.6		W2.1		SW1.7		SW1.6		SSW1.5		S1.2		S1.0		SSW0.7		WNW1.1		NW1.4		NNW0.6		Diurnal Average	
NNE17		NNE16		WNW18		WNW16		S16		S16		S17		S19		S22		S23		S22		S21		S23		SSW24		SSW24		SSW25		SSW24		SSW22		SSE20		NNE20		WNW23		WNW24		WNW19		WNW17		Diurnal Maximum	

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



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 9 km/h on Sep 19 18:00			Hours of Data:	704
Minimum Value: 1 km/h on Sep 18 19:00			Hours of Missing Data:	16
			Hours of Calibration:	0
			Percent Operational Time:	97.8
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 7				

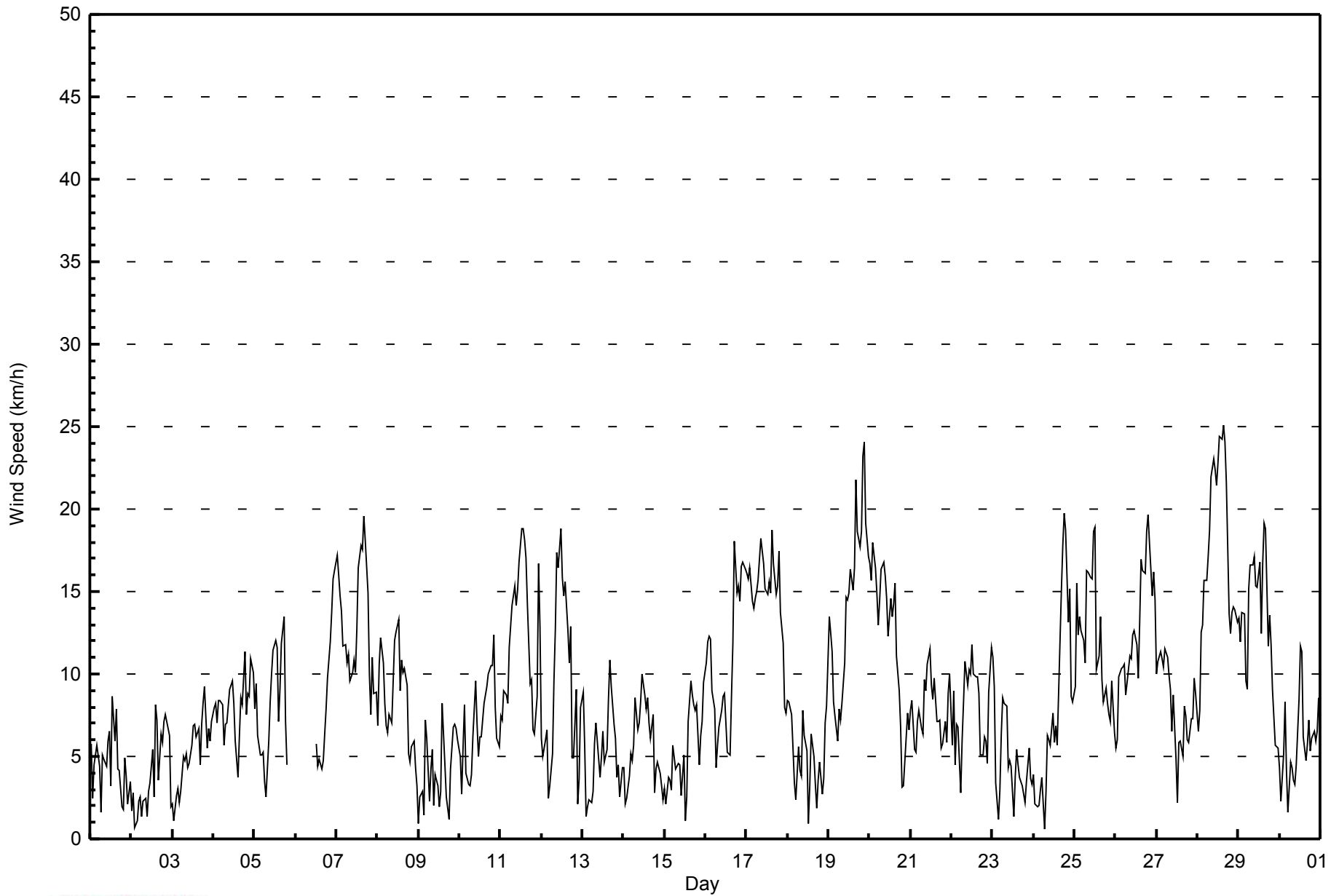
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	2	2	2	2	2	2	2	2	2	2	2	2	2	4	4	2	1	1	1	3	1	1	1	2	4	
2-Sep	1	1	1	1	1	1	1	1	1	1	1	2	2	2	8	5	2	2	2	1	1	1	1	1	8	
3-Sep	1	1	1	1	1	1	1	1	1	2	2	3	2	3	3	3	3	4	2	2	2	1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

MS - Missing



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	200	28.41	28.41
6 - 11	313	44.46	72.87
12 - 19	175	24.86	97.73
20 - 28	16	2.27	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 720



WBEA
Frequency Distribution

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

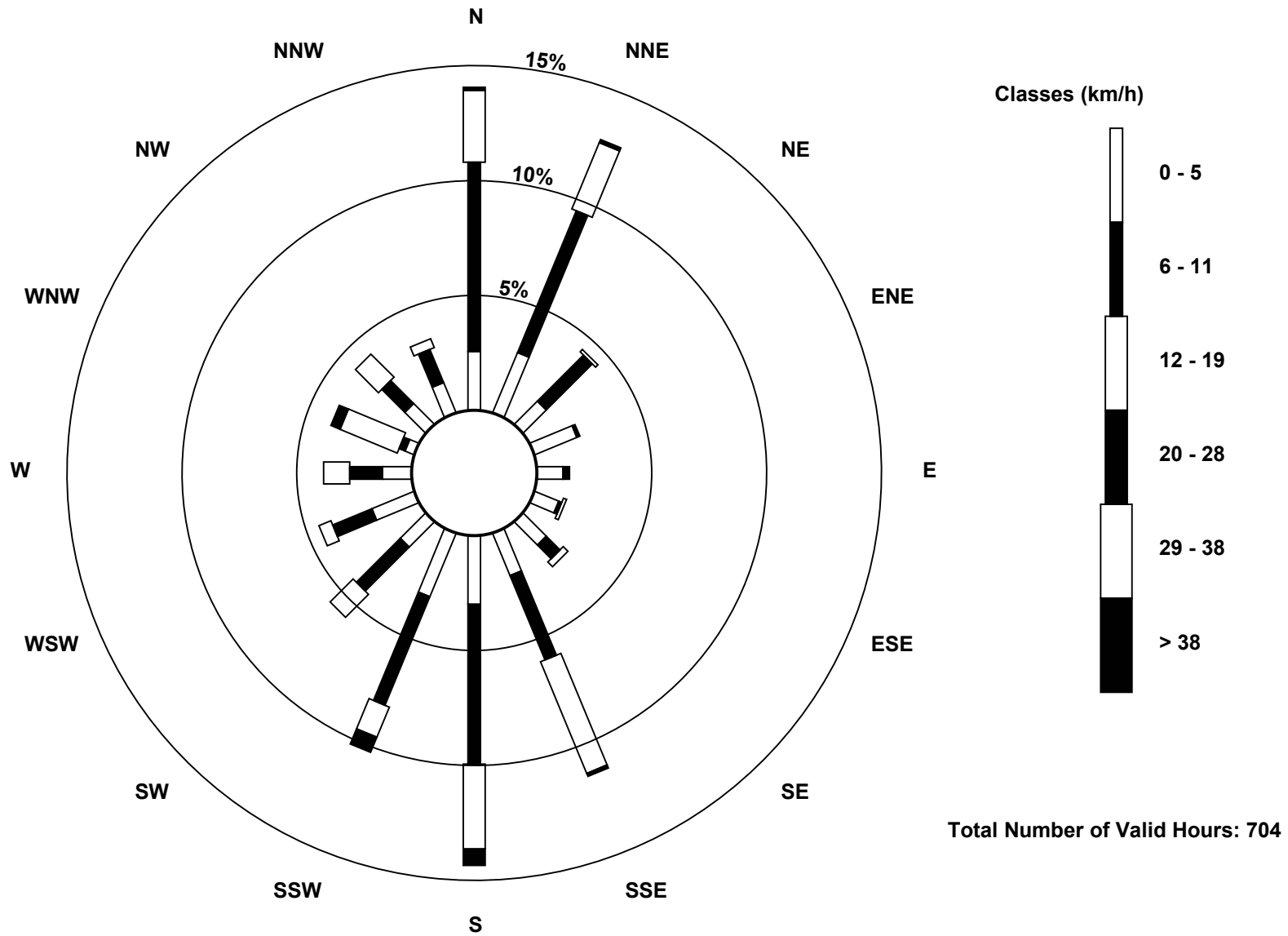
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	18	20	10	14	8	8	10	14	21	21	11	14	9	3	9	10	200
6 - 11	58	47	20	1	2	1	6	28	49	36	19	13	10	2	10	11	313
12 - 19	22	22	1	0	0	1	2	37	26	10	10	4	8	19	10	3	175
20 - 28	1	1	0	0	0	0	0	1	5	5	0	0	0	3	0	0	16
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	99	90	31	15	10	10	18	80	101	72	40	31	27	27	29	24	704

Total Number of Valid Hours: 704

Total Number of Hours: 720

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

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





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

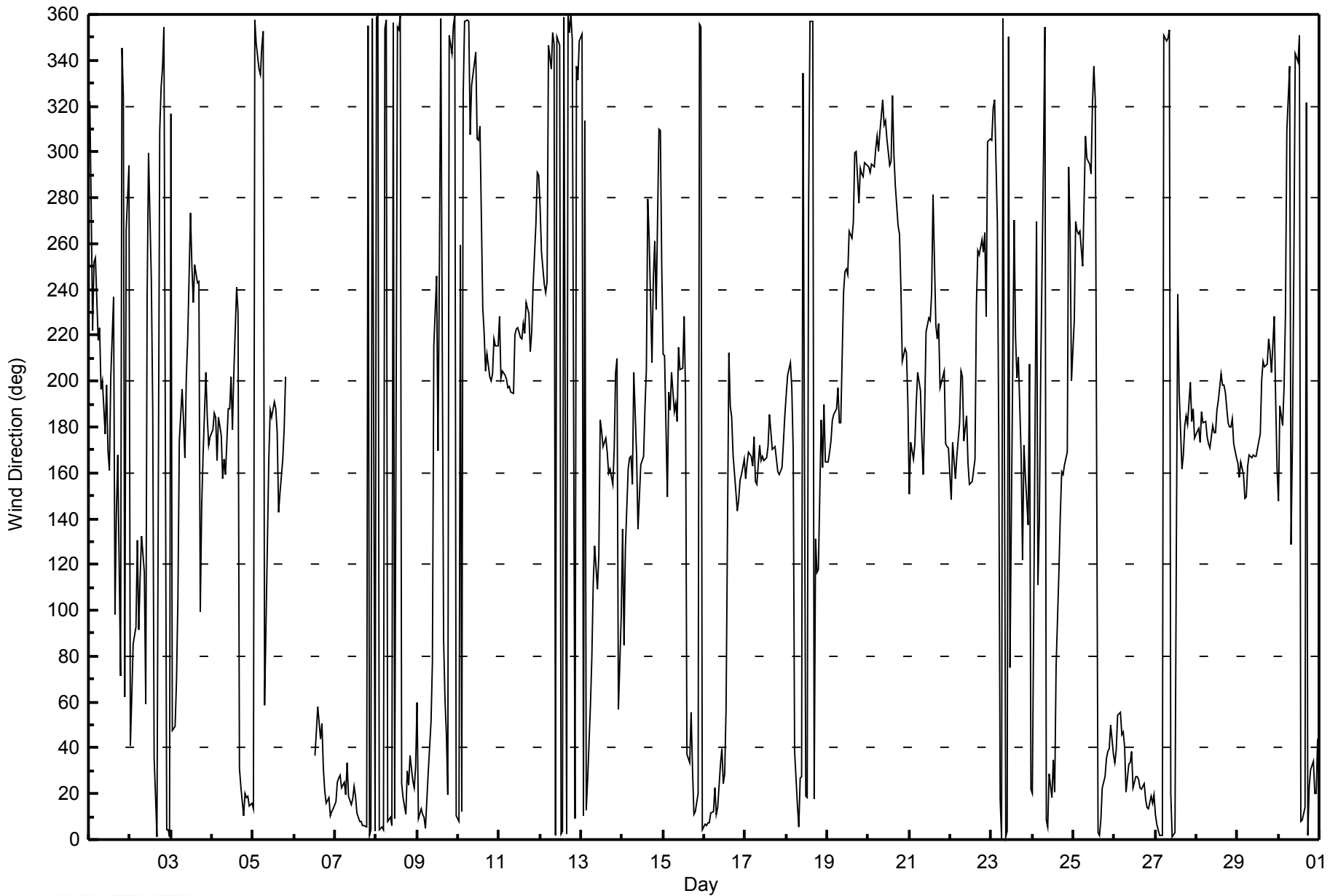
Wind Direction (WD) - deg
Mildred Lake - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Sep 15 13:00																			Hours in Service: 720 Hours of Data: 704 Hours of Missing Data: 16 Hours of Calibration: 0 Percent Operational Time: 97.8						
Minimum Value: 6 deg on Sep 2 23:00																									
Percentiles: P ₁ = 8 P ₁₀ = 12 Q ₁ = 15 Median = 19 Q ₃ = 30 P ₉₀ = 50 P ₉₉ = 84																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Sep	32	76	42	21	25	35	80	24	35	59	33	25	35	33	66	26	31	38	74	82	22	18	39	40	82
2-Sep	54	41	75	47	45	39	59	46	43	86	72	66	34	68	44	34	35	31	23	10	9	8	6	83	86
3-Sep	36	82	26	22	43	43	23	23	27	47	57	57	48	43	55	53	72	60	18	13	26	19	23	12	82
4-Sep	12	13	16	14	15	16	39	22	31	18	19	17	21	35	66	34	43	16	14	22	17	16	13	14	66
5-Sep	15	13	18	12	9	10	16	50	28	24	21	23	19	21	27	20	21	14	33	25	MS	MS	MS	MS	50
6-Sep	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	22	28	22	21	26	19	14	15	13	11	12	12	28
7-Sep	13	15	16	18	17	16	16	19	18	18	16	20	19	16	12	14	13	11	11	13	12	11	13	10	20
8-Sep	12	11	10	10	9	8	9	12	13	26	20	25	17	25	21	21	19	15	22	23	20	16	18	21	26
9-Sep	65	19	30	66	14	8	62	27	25	72	31	56	83	74	18	23	67	44	47	9	9	9	8	12	83
10-Sep	20	50	29	18	24	62	49	26	18	10	22	44	39	50	37	28	22	21	13	12	15	21	19	30	62
11-Sep	29	15	12	14	17	16	14	15	14	25	22	23	20	21	25	23	28	25	17	51	31	24	19	19	51
12-Sep	54	28	23	20	85	45	19	18	12	16	20	18	17	19	16	19	14	21	16	22	61	27	22	9	85
13-Sep	8	13	43	31	25	17	18	11	18	33	52	54	40	62	40	23	16	12	14	12	37	56	47	14	62
14-Sep	34	43	50	28	18	30	30	17	19	22	21	20	23	28	26	45	38	15	60	24	21	40	38	31	60
15-Sep	27	31	26	21	37	15	19	20	42	34	79	58	101	75	38	18	21	17	11	11	30	9	9	7	101
16-Sep	8	8	8	9	16	11	20	13	13	22	25	26	33	65	72	27	19	13	19	19	19	16	17	16	72
17-Sep	16	16	17	17	17	16	18	18	15	14	16	19	17	18	18	16	14	14	12	13	14	14	16	17	19
18-Sep	14	13	14	33	50	66	12	16	38	28	29	52	94	71	47	27	42	50	15	15	41	35	13	15	94
19-Sep	10	14	13	17	15	20	18	19	17	28	26	26	27	26	26	23	24	33	27	19	19	19	20	19	33
20-Sep	19	19	18	20	19	18	20	19	16	19	21	23	21	23	21	20	29	28	34	57	84	21	16	23	84
21-Sep	14	16	43	22	20	14	19	20	12	25	23	23	27	35	30	25	19	22	12	15	15	12	13	13	43
22-Sep	23	21	61	22	53	32	13	13	14	21	18	18	18	19	17	31	30	45	26	28	20	20	26	16	61
23-Sep	18	19	62	84	68	18	11	11	19	28	59	66	98	58	34	44	38	28	33	51	30	18	35	38	98
24-Sep	17	47	56	47	44	23	88	28	12	13	17	16	24	21	36	17	22	14	15	13	16	20	28	19	88
25-Sep	31	22	23	25	26	24	29	18	18	19	22	17	14	16	24	13	13	17	17	19	18	18	18	16	31
26-Sep	17	22	16	17	18	18	20	15	16	18	17	16	16	18	17	15	16	16	14	13	13	17	14	16	22
27-Sep	15	12	11	11	10	10	10	11	12	30	33	49	84	39	37	61	23	18	14	17	17	14	15	18	84
28-Sep	18	18	13	14	16	16	14	13	14	16	16	16	16	16	15	13	12	13	14	14	14	14	11	10	18
29-Sep	11	13	11	13	17	14	12	11	12	14	13	15	16	20	16	18	13	14	16	15	13	24	45	22	45
30-Sep	33	70	21	16	39	79	18	40	41	29	18	13	18	15	32	19	30	20	20	16	20	16	13	18	79
Diurnal Maximum																									
MS - Missing																									



WBEA
Hourly Averages

Wind Direction (WD) - deg
Mildred Lake - September 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 25, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	11:10
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11541008
Cal Gas Concentration	59.4 ppm	Cal Gas Expiry Date	3/26/2012
Gas Cert Reference	cc307191		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2589
DACS voltage range	0-5v	DACS channel #	SE1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-616	-616
Analyzer Range (mv)	5000	5000	Lamp voltage	900	901
Calculated slope	0.997219	1.001103	Chamber temp.	44.4	44.7
Calculated intercept	1.267389	1.189961	Pressure (mmHg)	700.9	700.1
Analyzer Background	27.9	27.9	Flow (lpm)	0.518	0.518
Analyzer Coefficient	0.902	0.902	Intensity	29000	29000

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.7	NA
as found span	5000	69.9	830.4	828.7	1.002
calibrator zero	5000	0.0	0.0	-0.7	0.000
high point	5000	69.9	830.4	828.7	1.002
second point	5000	35.4	420.6	418.3	1.005
third point	5000	17.7	210.3	208.7	1.008
calibrator zero	5000	0.0	0.0	-0.7	NA
as left zero	5000	0.0	0.0	-0.1	NA
as left span	5000	69.9	830.4	832.2	0.998
Average Correction Factor					1.005

Corrected As found 829.4 Previous response 831.5 % change 0.2%

Notes:

No adjustments made.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

SO₂ Calibration Summary

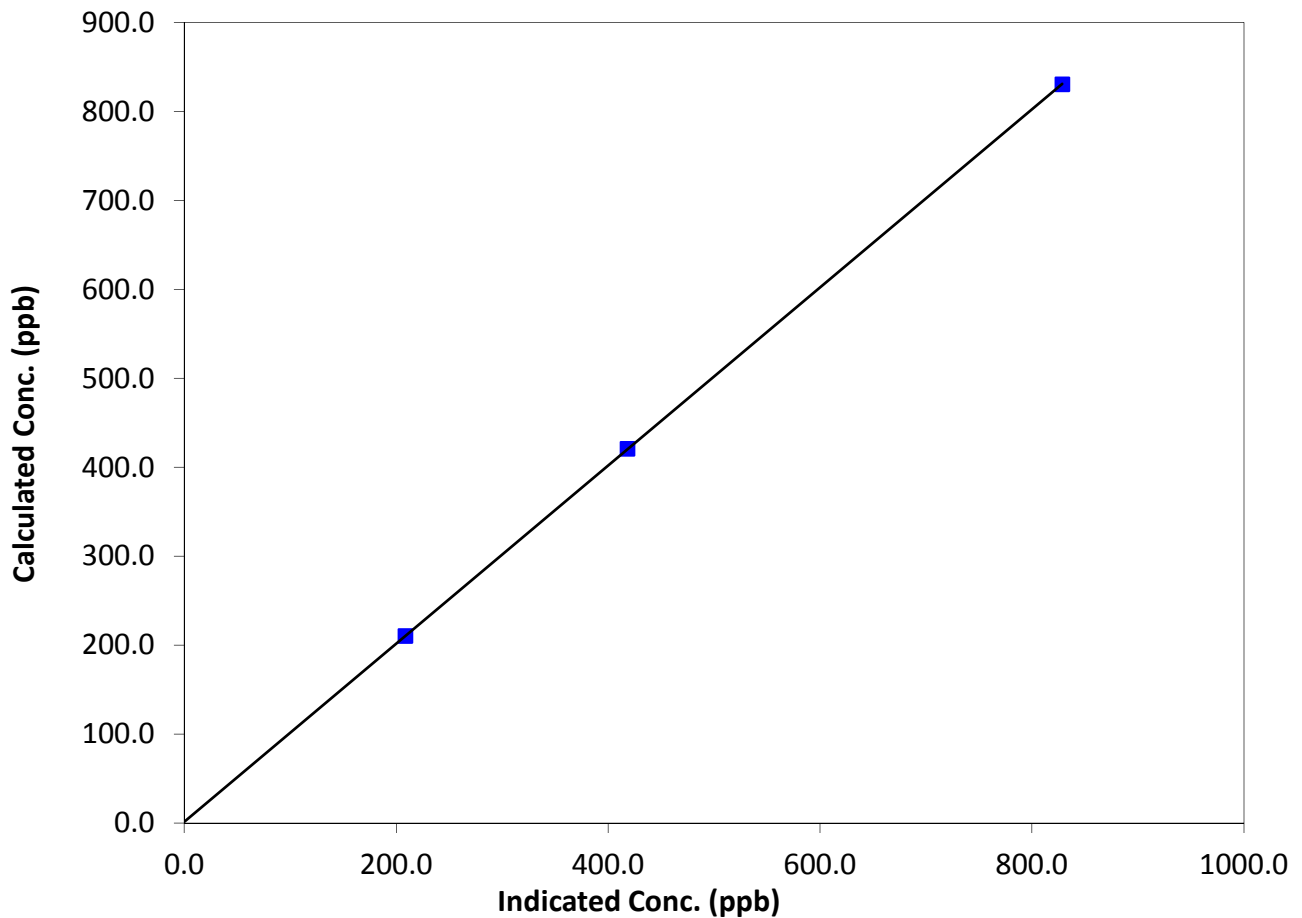
Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 25, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	8:25	End Time (MST)	11:10
Analyzer make	TEI 43c	Analyzer serial #	43c-77879-387

Calibration Data

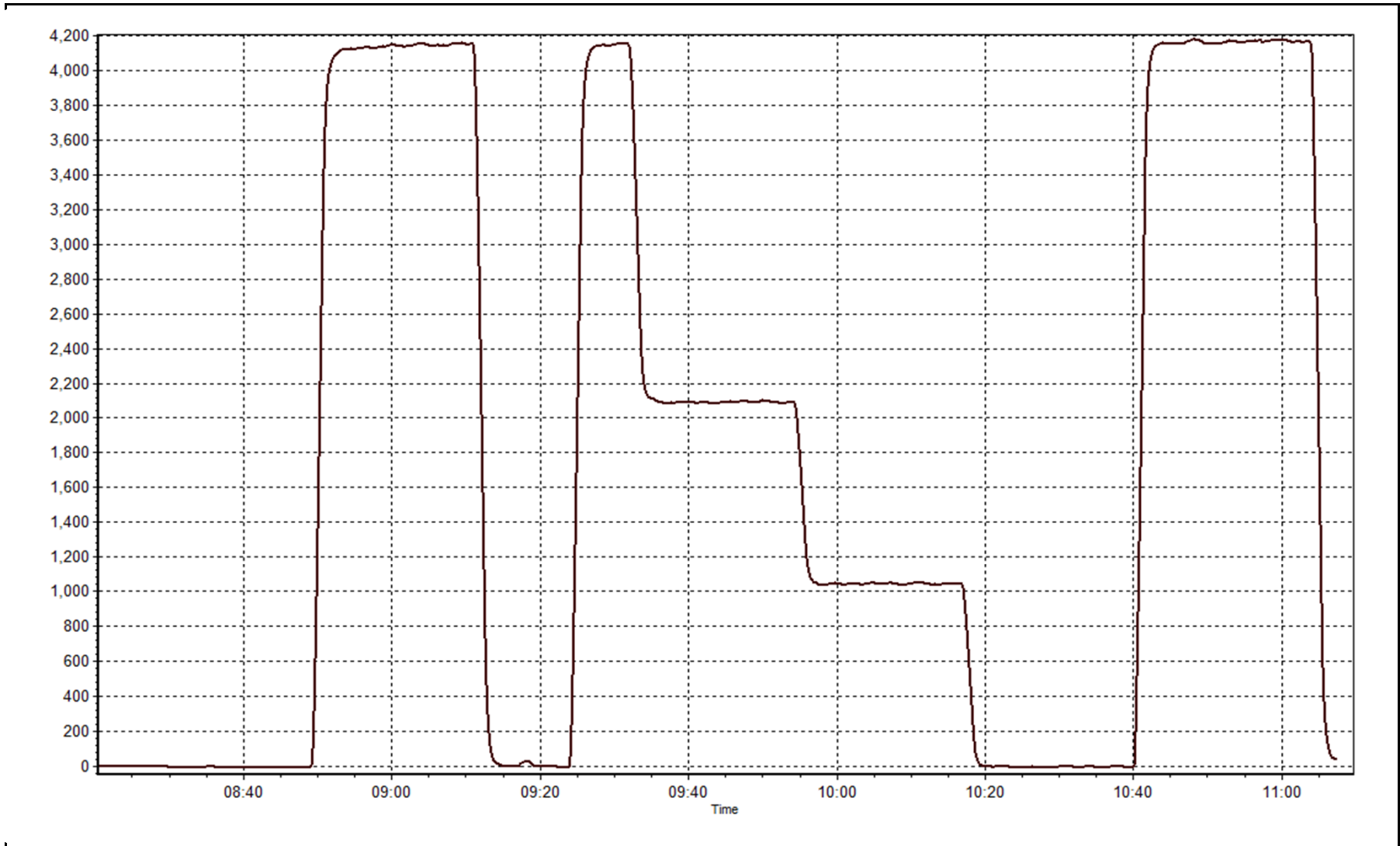
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.7	N/A	Correlation Coefficient	0.999998
830.4	828.7	1.0021		
420.6	418.3	1.0055	Slope	1.001103
210.3	208.7	1.0077		
			Intercept	1.189961

SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 3, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 26, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	11:05	End Time (MST)	13:40
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11541008
Cal Gas Concentration	5.59 ppm H2S	Cal Gas Expiry Date	3/11/2009
Gas Cert Reference	cc243460	SO2 gas conc.	59.4 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2589
DACS voltage range	0-5v	DACS channel #	SE2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-601	-601
Analyzer Range (mv)	5000	5000	Lamp voltage	773	773
Calculated slope	0.997554	1.000387	Chamber temp.	45	45
Calculated intercept	-0.102971	-0.142500	Pressure	543.6	545.7
Analyzer Background	12.9	12.9	Flow	1.006	1.010
Analyzer Coefficient	0.886	0.886	Intensity	87	87
			Converter temp.	324	325

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	4000	0.0	0.0	0.0	NA
as found span	4000	57.2	79.9	79.9	1.000
SO2 scrubber check	5000	17.7	210.3	-0.1	NA
calibrator zero	4000	0.0	0.0	0.0	NA
high point	4000	57.2	79.9	79.9	1.000
second point	4000	28.6	40.0	40.3	0.991
third point	4000	14.3	20.0	20.1	0.994
calibrator zero	4000	0.0	0.0	0.0	NA
as left zero	5000	0.0	0.0	-0.1	NA
as left span	4000	57.2	79.9	80.8	0.989
Average Correction Factor					0.995

Corrected As found	79.9	Previous response	80.2	% change	0.4%
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Notes:

Scrubber checked completed after as found zero. No adjustments.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

H2S Calibration Summary

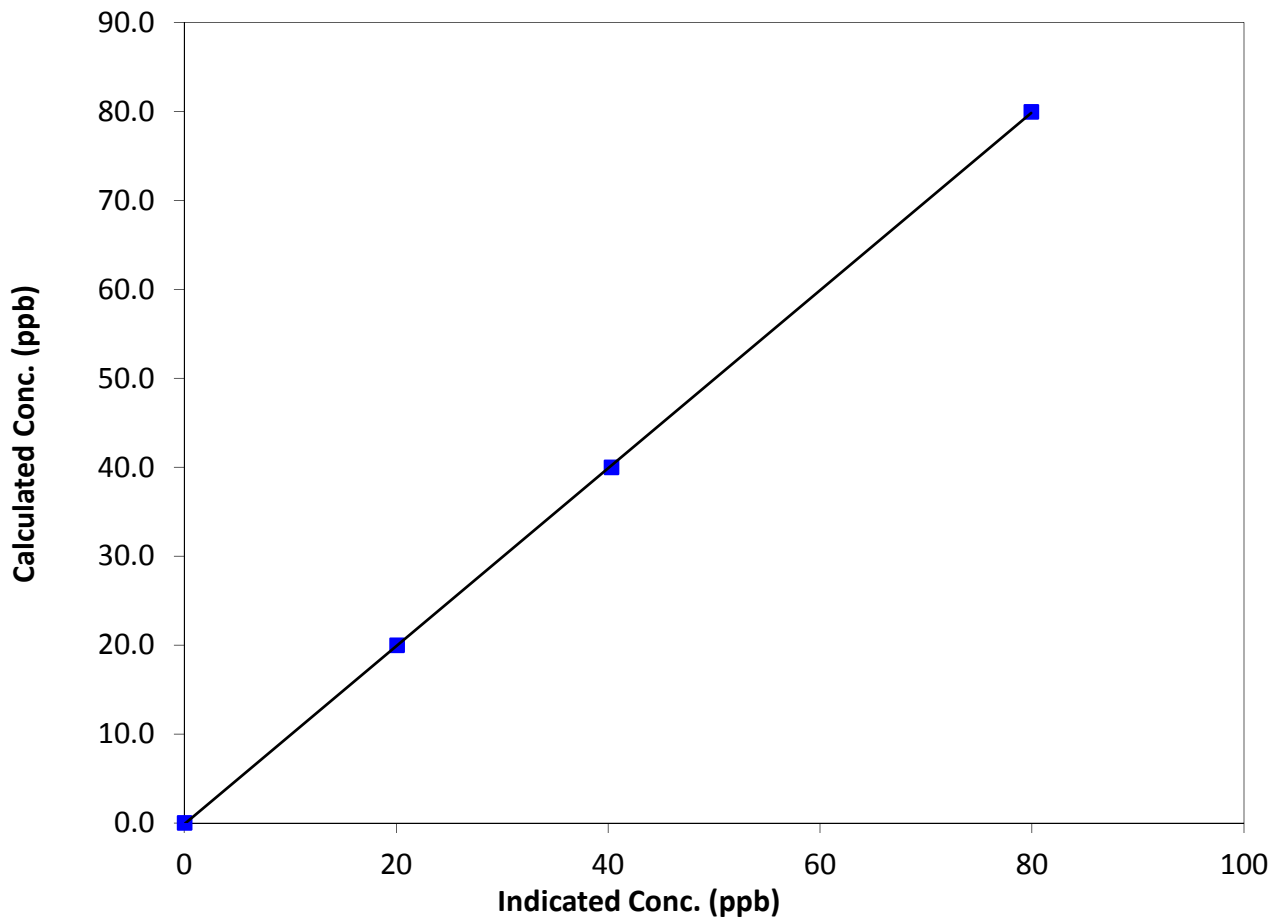
Station Information

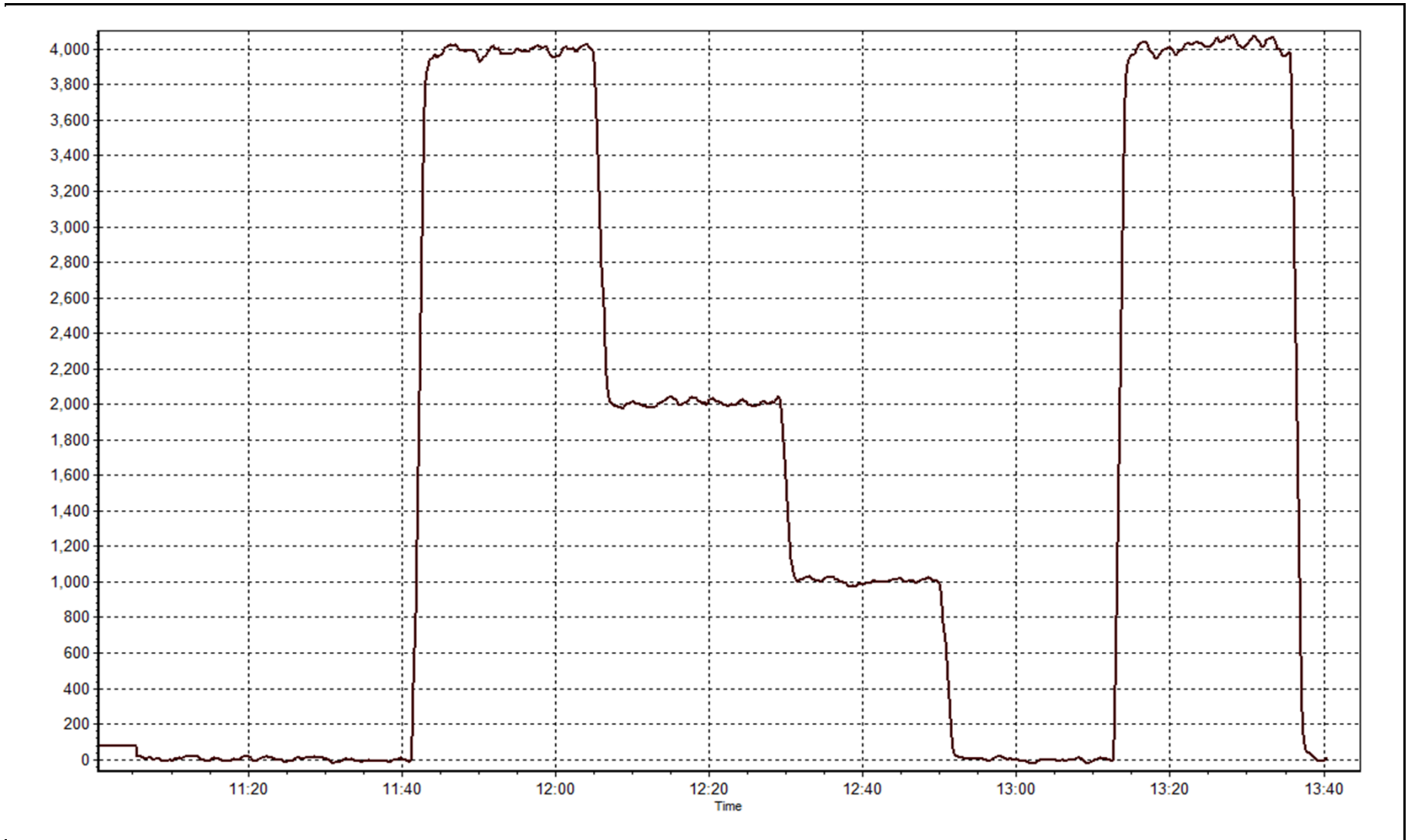
Calibration Date	September 3, 2014	Previous Calibration	August 26, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	11:05	End Time (MST)	13:40
Analyzer make	TEI 450i	Analyzer serial #	815129107

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999978
79.9	79.9	1.0000		
40.0	40.3	0.9912	Slope	1.000387
20.0	20.1	0.9941		
			Intercept	-0.142500

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 25, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	11:10
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11541008
Gas Cert Reference	cc307191	Cal Gas Expiry Date	3/26/2012
CH4 Cal Gas Conc.	505 ppm	CH4 Equiv Conc.	1060.5 ppm
C3H8 Cal Gas Conc.	202 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2589
DACS voltage range	0-5v	DACS channel #	SE3

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.2	8.2
Analyzer Range (mv)	5000	5000	Air or Bypass press	39.8	39.8
Calculated slope	1.002998	1.006781	Fuel Pressure	25.7	25.7
Calculated intercept	0.006562	0.024477			
BKG	2.62	2.62			
COEF	4.983	4.983			

Analyzer make 51i-LT Analyzer serial # 1300156231

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	N/A
as found span	5000	69.9	14.83	14.71	1.008
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	69.9	14.83	14.71	1.008
second point	5000	35.4	7.51	7.44	1.009
third point	5000	17.7	3.75	3.66	1.025
calibrator zero					
as left zero	5000	0.0	0.00	0.03	N/A
as left span	5000	69.9	14.83	14.74	1.006
Average Correction Factor					1.014

Corrected As found 14.71 Previous response 14.77 % change 0.5%

Notes:

H2 cylinder changed after as founds. No adjustments made.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

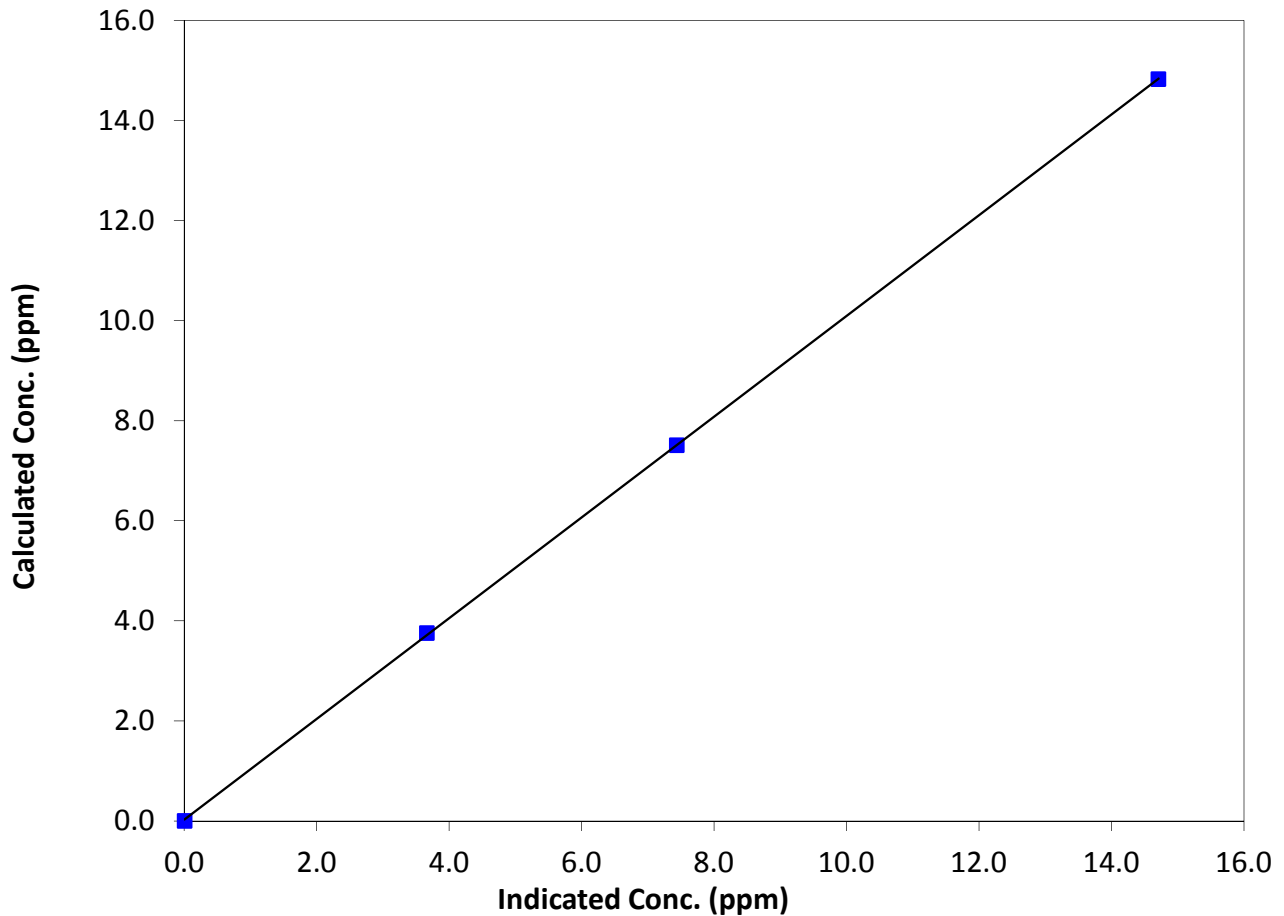
Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 25, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	8:25	End Time (MST)	11:10
Analyzer make	51i-LT	Analyzer serial #	1300156231

Calibration Data

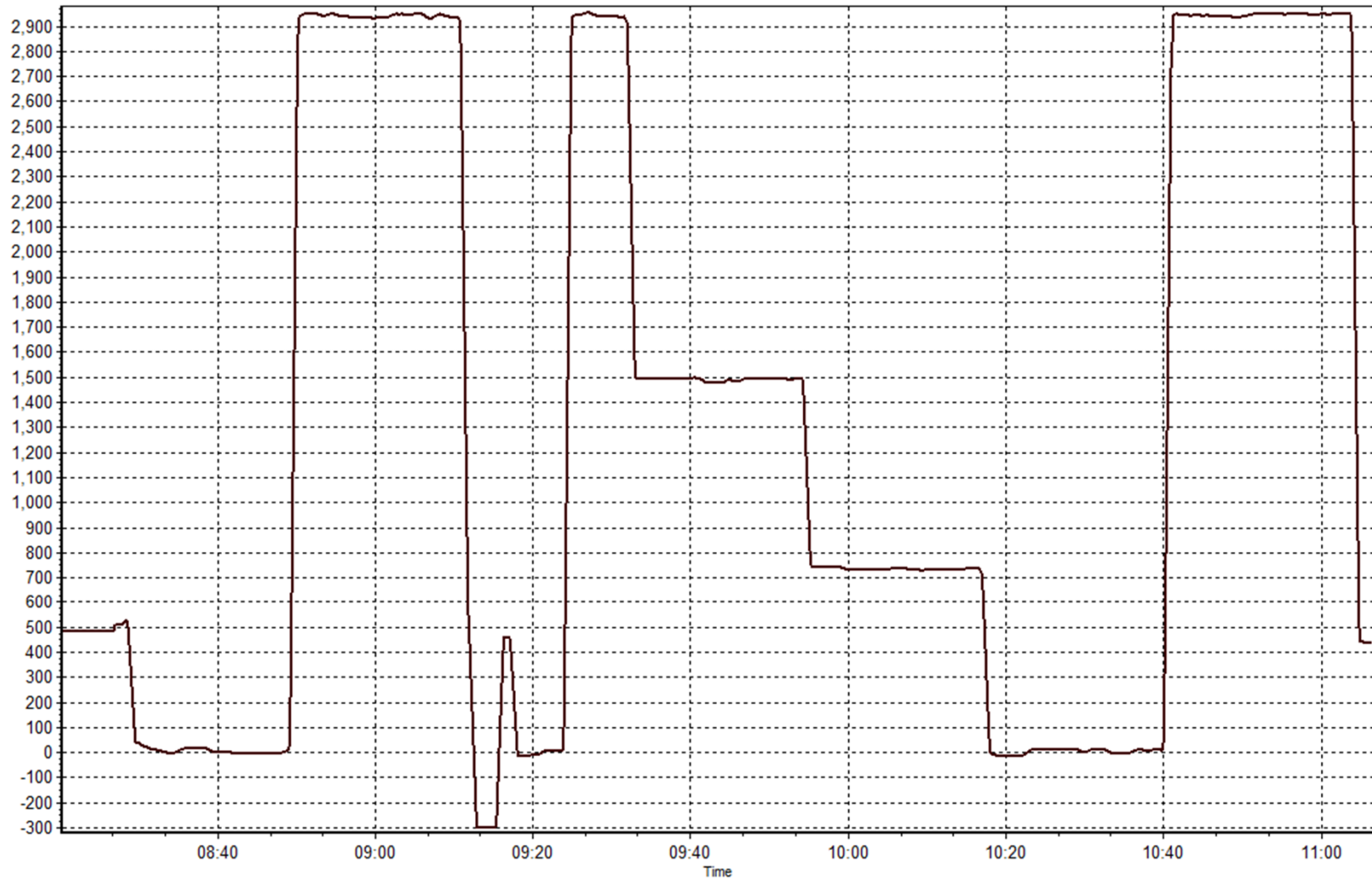
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999978
14.83	14.71	1.0079		
7.51	7.44	1.0094	Slope	1.006781
3.75	3.66	1.0249		
			Intercept	0.024477

THC Calibration Curve



THC Calibration Plot

Date: September 3, 2014



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 3
LOWER CAMP METEOROLOGY
SEPTEMBER 2014**

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

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

October 30, 2014

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
Temperature 20 m (C) Average	693	0	27	96.25	29.5	-	19.1	-
Temperature 45 m (C) Average	694	0	26	96.39	29.4	-	19.4	-
Temperature 100 m (C) Average	694	0	26	96.39	29.4	-	20.5	-
Temperature 167 m (C) Average	162	0	558	22.50	20.1	-	15.7	-
Relative Humidity 20 m (%) Average	693	0	27	96.25	98	-	-	-
Relative Humidity 45 m (%) Average	694	0	26	96.39	99	-	-	-
Relative Humidity 100 m (%) Average	694	0	26	96.39	98	-	-	-
Relative Humidity 167 m (%) Average	162	0	558	22.50	96	-	-	-
Wind Speed 20 m (km/h) Average	694	0	26	96.39	27	-	-	-
Wind Speed 45 m (km/h) Average	688	0	32	95.56	33	-	-	-
Wind Speed 100 m (km/h) Average	694	0	26	96.39	47	-	-	-
Wind Speed 167 m (km/h) Average	162	0	558	22.50	41	-	-	-
Wind Direction 20 m (deg) Average	694	0	26	96.39	-	-	-	-
Wind Direction 45 m (deg) Average	688	0	32	95.56	-	-	-	-
Wind Direction 100 m (deg) Average	694	0	26	96.39	-	-	-	-
Wind Direction 167 m (deg) Average	162	0	558	22.50	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	694	0	26	96.39	1	-	-	-
Vertical Wind Speed 45 m (km/h) Average	688	0	32	95.56	1.5	-	-	-
Vertical Wind Speed 100 m (km/h) Average	694	0	26	96.39	2.7	-	-	-
Vertical Wind Speed 167 m (km/h) Average	162	0	558	22.50	2.4	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
Temperature 20 m (C) Average	693	10.17	5.4	-	-0.4	3.6	6.1	9.6	13.3	18	29.5
Temperature 45 m (C) Average	694	10.15	5.4	-	-0.2	3.6	6.2	9.6	13.2	17.9	29.4
Temperature 100 m (C) Average	694	10.18	5.5	-	-0.1	3.5	6	9.7	13.3	17.7	29.4
Temperature 167 m (C) Average	162	9.35	4.2	-	1.9	3.9	6	9.3	11.7	14.9	20.1
Relative Humidity 20 m (%) Average	693	73.4	18	-	28	45	61	77	89	96	98
Relative Humidity 45 m (%) Average	694	72.8	18	-	28	44	60	76	88	94	99
Relative Humidity 100 m (%) Average	694	69.7	18	-	26	43	57	72	84	92	98
Relative Humidity 167 m (%) Average	162	75.3	13	-	49	58	65	75	85	95	96
Wind Speed 20 m (km/h) Average	694	7.5	5	-	0	2	3	6	11	15	27
Wind Speed 45 m (km/h) Average	688	9.9	7	-	0	2	5	9	14	19	33
Wind Speed 100 m (km/h) Average	694	14.2	9	-	0	4	7	13	20	27	47
Wind Speed 167 m (km/h) Average	162	20.9	9	-	2	8	14	21	28	33	41
Wind Direction 20 m (deg) Average	694	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	688	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	694	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	162	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	694	-0.17	0.3	-	-1.2	-0.6	-0.4	-0.1	0.1	0.2	1
Vertical Wind Speed 45 m (km/h) Average	688	0.01	0.5	-	-1.9	-0.6	-0.3	-0.1	0.4	0.8	1.5
Vertical Wind Speed 100 m (km/h) Average	694	0.24	0.6	-	-1.1	-0.3	-0.1	0.1	0.4	1	2.7
Vertical Wind Speed 167 m (km/h) Average	162	0.58	0.7	-	-1.1	-0.1	0.1	0.4	0.9	1.6	2.4

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Temperature, Relative Humidity 20 m	23 Sep 2014 05:00	24 Sep 2014 06:00	26	DAS collection error - invalid program uploaded
Temperature, Relative Humidity 20 m	26 Sep 2014 22:00	26 Sep 2014 22:00	1	Unstable operation - spike in output signal
Temperature, Relative Humidity 45 m	23 Sep 2014 05:00	24 Sep 2014 06:00	26	DAS collection error - invalid program uploaded
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	23 Sep 2014 05:00	24 Sep 2014 06:00	26	DAS collection error - invalid program uploaded
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	01 Sep 2014 01:00	24 Sep 2014 06:00	558	sensor failure - sensor replaced
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	23 Sep 2014 05:00	24 Sep 2014 06:00	26	DAS collection error - invalid program uploaded
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	07 Sep 2014 04:00	07 Sep 2014 09:00	6	Flatline in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	23 Sep 2014 05:00	24 Sep 2014 06:00	26	DAS collection error - invalid program uploaded
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	23 Sep 2014 05:00	24 Sep 2014 06:00	26	DAS collection error - invalid program uploaded
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	01 Sep 2014 01:00	24 Sep 2014 06:00	558	sensor failure - sensor replaced

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Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 20 m (AT20m) - C

Lower Camp Met Tower - September 2014

Maximum Value: 29.5 C on Sep 22 16:00	Maximum Daily Average: 19.1 C on Sep 22	Hours in Service: 720
Minimum Value: -0.4 C on Sep 8 06:00	Minimum Daily Average: 3.6 C on Sep 9	Hours of Data: 693
Maximum Diurnal Average: 14.7 C at hour 15	Minimum Diurnal Average: 6.0 C at hour 6	Hours of Missing Data: 27
Monthly Average: 10.17 C	Percentiles: $P_1 = 0.6$ $P_{10} = 3.6$ $Q_1 = 6.1$ Median = 9.6 $Q_3 = 13.3$ $P_{90} = 18.0$ $P_{99} = 27.7$	Hours of Calibration: 0
		Percent Operational Time: 96.3

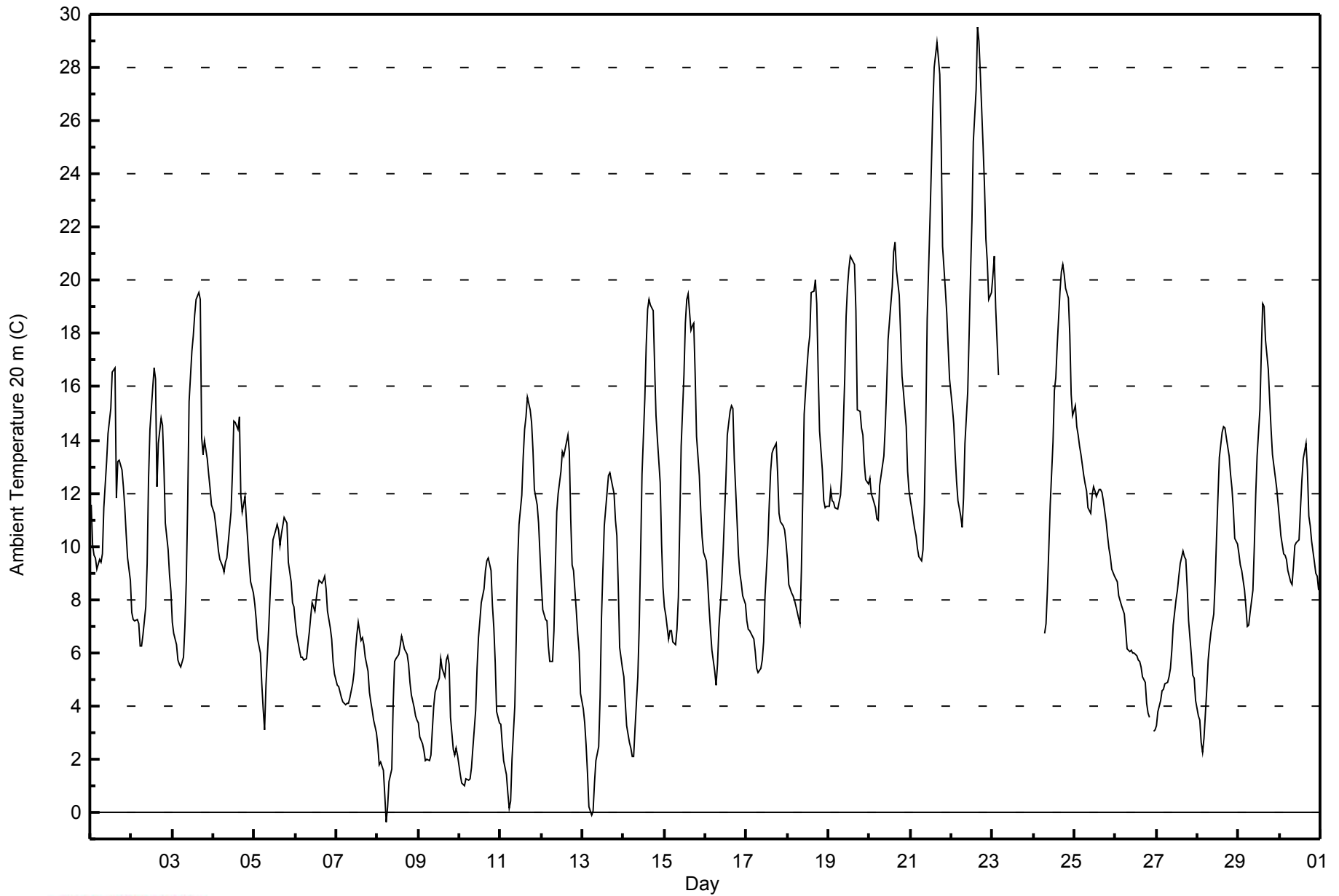
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Sep	11.5	10.1	9.7	9.6	9.1	9.5	9.4	9.7	11.5	13.2	14.2	14.7	15.2	16.6	16.7	11.8	13.2	13.2	12.9	12.3	11.4	10.4	9.5	8.7	11.8	16.7																							
2-Sep	7.5	7.3	7.2	7.2	7.1	6.2	6.3	6.7	7.7	9.3	12.5	14.4	16.0	16.7	16.3	12.2	13.9	14.8	14.5	13.0	10.9	9.9	8.9	8.3	10.6	16.7																							
3-Sep	7.1	6.7	6.3	5.7	5.6	5.4	5.9	7.0	8.7	11.6	15.4	17.3	17.9	18.7	19.3	19.6	19.3	14.1	13.4	14.0	13.3	12.7	12.2	11.6	12.0	19.6																							
4-Sep	11.2	10.8	10.3	9.8	9.5	9.3	9.0	9.4	9.6	10.7	11.3	12.8	14.7	14.7	14.4	14.9	11.9	11.3	11.9	11.0	11.0	10.2	9.3	8.7	8.2	11.0	14.9																						
5-Sep	7.8	7.2	6.5	6.0	4.8	3.9	3.1	4.8	7.0	8.2	9.4	10.3	10.6	10.8	10.6	10.1	10.5	11.1	11.0	10.9	9.4	8.6	7.9	7.7	8.3	11.1																							
6-Sep	7.2	6.7	6.1	5.8	5.8	5.7	5.8	6.3	6.8	7.4	7.9	7.6	8.0	8.5	8.7	8.6	8.7	8.9	8.4	7.6	6.9	6.5	5.7	5.2	7.1	8.9																							
7-Sep	4.8	4.7	4.5	4.3	4.1	4.0	4.1	4.1	4.3	4.8	5.3	6.0	6.7	7.1	6.5	6.6	6.3	5.8	5.3	4.5	4.1	3.8	3.5	3.0	4.9	7.1																							
8-Sep	2.5	1.8	1.9	1.6	0.6	-0.4	0.2	1.1	1.6	4.1	5.7	5.8	6.0	6.2	6.6	6.4	6.1	5.9	5.6	4.9	4.4	3.9	3.6	3.5	3.7	6.6																							
9-Sep	3.4	2.8	2.6	2.3	1.9	2.0	1.9	2.1	3.1	4.0	4.5	4.9	5.1	5.8	5.4	5.1	5.7	5.9	5.5	3.6	2.3	2.2	2.4	2.2	3.6	5.9																							
10-Sep	1.4	1.1	1.1	1.0	1.3	1.2	1.3	1.7	2.4	3.8	5.4	6.5	7.2	7.9	8.4	9.1	9.5	9.6	9.1	7.8	6.9	5.6	3.8	3.3	4.8	9.6																							
11-Sep	3.3	2.6	1.9	1.4	0.7	0.2	0.4	2.0	4.0	6.4	9.4	10.8	11.9	13.4	14.4	14.9	15.6	15.1	14.7	13.6	12.1	11.6	10.9	9.7	8.4	15.6																							
12-Sep	8.6	7.6	7.3	7.2	6.3	5.7	5.7	6.8	9.2	11.3	12.0	12.8	13.5	13.4	13.6	14.2	13.5	11.0	9.3	9.1	7.5	6.7	6.1	4.5	9.3	14.2																							
13-Sep	3.9	3.3	2.5	1.5	0.2	-0.1	0.0	1.1	1.9	2.4	4.3	7.3	9.1	10.8	12.0	12.6	12.7	12.5	12.0	11.0	10.4	8.5	6.2	5.4	6.3	12.7																							
14-Sep	5.1	4.2	3.3	2.6	2.4	2.1	2.1	3.1	5.1	7.0	9.7	12.7	15.6	17.5	18.9	19.3	19.1	18.9	16.8	14.9	14.0	12.4	10.1	8.5	10.2	19.3																							
15-Sep	7.7	7.4	6.5	6.8	6.9	6.4	6.3	6.9	8.1	10.9	13.8	16.4	18.4	19.3	19.5	18.1	18.3	18.4	16.5	14.2	12.7	11.4	10.4	9.8	12.1	19.5																							
16-Sep	9.4	8.6	7.7	6.9	6.1	5.3	4.8	5.6	6.9	8.5	9.8	11.2	12.5	14.2	15.1	15.3	15.2	13.3	10.9	9.7	9.0	8.6	8.1	7.8	9.6	15.3																							
17-Sep	7.2	6.9	6.9	6.6	6.5	6.0	5.4	5.3	5.4	5.7	6.4	8.1	10.1	11.6	12.8	13.5	13.7	13.9	12.8	11.2	10.9	10.8	10.6	10.1	9.1	13.9																							
18-Sep	9.5	8.5	8.3	8.1	8.0	7.8	7.3	7.1	9.1	11.9	15.0	16.7	17.4	17.9	19.5	19.6	20.0	19.1	16.6	14.4	12.9	11.7	11.4	11.5	12.9	20.0																							
19-Sep	11.5	12.1	11.7	11.7	11.5	11.4	11.7	11.9	12.9	16.3	18.7	19.8	20.5	20.9	20.7	20.6	18.9	15.2	15.1	14.5	14.2	13.2	12.5	12.4	15.0	20.9																							
20-Sep	12.5	12.0	11.8	11.5	11.1	11.0	12.3	12.7	13.4	14.5	16.0	17.7	19.1	19.8	21.0	21.4	20.4	19.4	18.0	16.4	15.8	14.5	12.8	12.1	15.3	21.4																							
21-Sep	11.7	11.4	10.7	10.4	9.9	9.6	9.5	9.9	11.6	14.6	18.6	22.3	24.3	26.4	28.0	28.9	28.4	27.8	25.2	21.3	19.6	18.8	17.5	16.3	18.0	28.9																							
22-Sep	15.2	14.6	13.5	12.4	11.7	11.1	10.7	11.8	13.8	15.8	17.9	20.2	22.2	25.2	27.2	29.5	29.0	27.8	25.0	23.5	21.6	20.7	19.3	19.5	19.1	29.5																							
23-Sep	20.2	20.9	19.0	16.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	20.9																							
24-Sep	AF	AF	AF	AF	AF	AF	6.7	7.1	8.4	9.9	11.6	13.9	15.8	16.3	17.5	19.6	20.3	20.6	20.2	19.7	19.3	18.0	15.7	14.9	15.3	20.6																							
25-Sep	15.3	14.5	14.2	13.8	13.4	12.7	12.3	12.1	11.5	11.3	11.9	12.3	12.1	11.9	12.1	12.1	12.0	11.7	11.0	10.4	9.9	9.6	9.1	8.9	11.9	15.3																							
26-Sep	8.7	8.7	8.2	7.8	7.6	7.5	6.9	6.1	6.1	6.1	6.0	6.0	5.9	5.7	5.7	5.5	5.1	4.9	4.1	3.7	3.6	AF	3.1	3.1	5.9	8.7																							
27-Sep	3.3	3.8	4.2	4.5	4.6	4.8	4.9	5.1	5.4	6.1	7.0	8.0	8.3	8.9	9.4	9.8	9.6	9.5	8.5	7.2	5.9	5.2	5.1	4.2	6.4	9.8																							
28-Sep	3.6	3.5	2.6	2.3	2.8	4.6	5.7	6.3	6.8	7.4	8.6	10.4	11.8	13.3	14.3	14.5	14.5	14.1	13.4	12.7	12.2	11.4	10.3	10.1	9.1	14.5																							
29-Sep	9.7	9.3	9.1	8.3	7.7	7.0	7.0	7.5	8.4	10.0	11.9	13.4	15.1	17.3	19.1	19.0	17.8	16.6	15.5	14.4	13.4	12.6	12.2	11.6	12.2	19.1																							
30-Sep	11.0	10.4	9.7	9.7	9.5	9.1	8.7	8.6	9.3	10.1	10.2	10.2	11.4	12.5	13.3	13.8	12.9	11.1	10.8	10.2	9.4	9.0	8.9	8.3	10.3	13.8																							
																								8.4	7.9	7.4	7.0	6.3	6.0	6.0	6.5	7.6	9.1	10.7	12.1	13.2	14.1	14.7	14.7	14.6	13.8	12.9	11.8	10.8	10.3	9.2	8.6	Diurnal Average	
																								20.2	20.9	19.0	16.4	13.4	12.7	12.3	12.7	13.8	16.3	18.7	22.3	24.3	26.4	28.0	29.5	29.0	27.8	25.2	23.5	21.6	20.7	19.3	19.5	Diurnal Maximum	

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	2	0.29	0.29
0 - 10	365	52.67	52.96
10 - 20	293	42.28	95.24
> 20	33	4.76	100.00

Total Number of Valid Hours: 693

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 45 m (AT45m) - C

Lower Camp Met Tower - September 2014

Maximum Value: 29.4 C on Sep 22 16:00	Maximum Daily Average: 19.4 C on Sep 22	Hours in Service: 720
Minimum Value: -0.2 C on Sep 8 06:00	Minimum Daily Average: 3.6 C on Sep 8	Hours of Data: 694
Maximum Diurnal Average: 14.5 C at hour 16	Minimum Diurnal Average: 6.1 C at hour 7	Hours of Missing Data: 26
Monthly Average: 10.15 C	Percentiles: P ₁ = 0.6 P ₁₀ = 3.6 Q ₁ = 6.2 Median = 9.6 Q ₃ = 13.2 P ₉₀ = 17.9 P ₉₉ = 27.5	Hours of Calibration: 0
		Percent Operational Time: 96.4

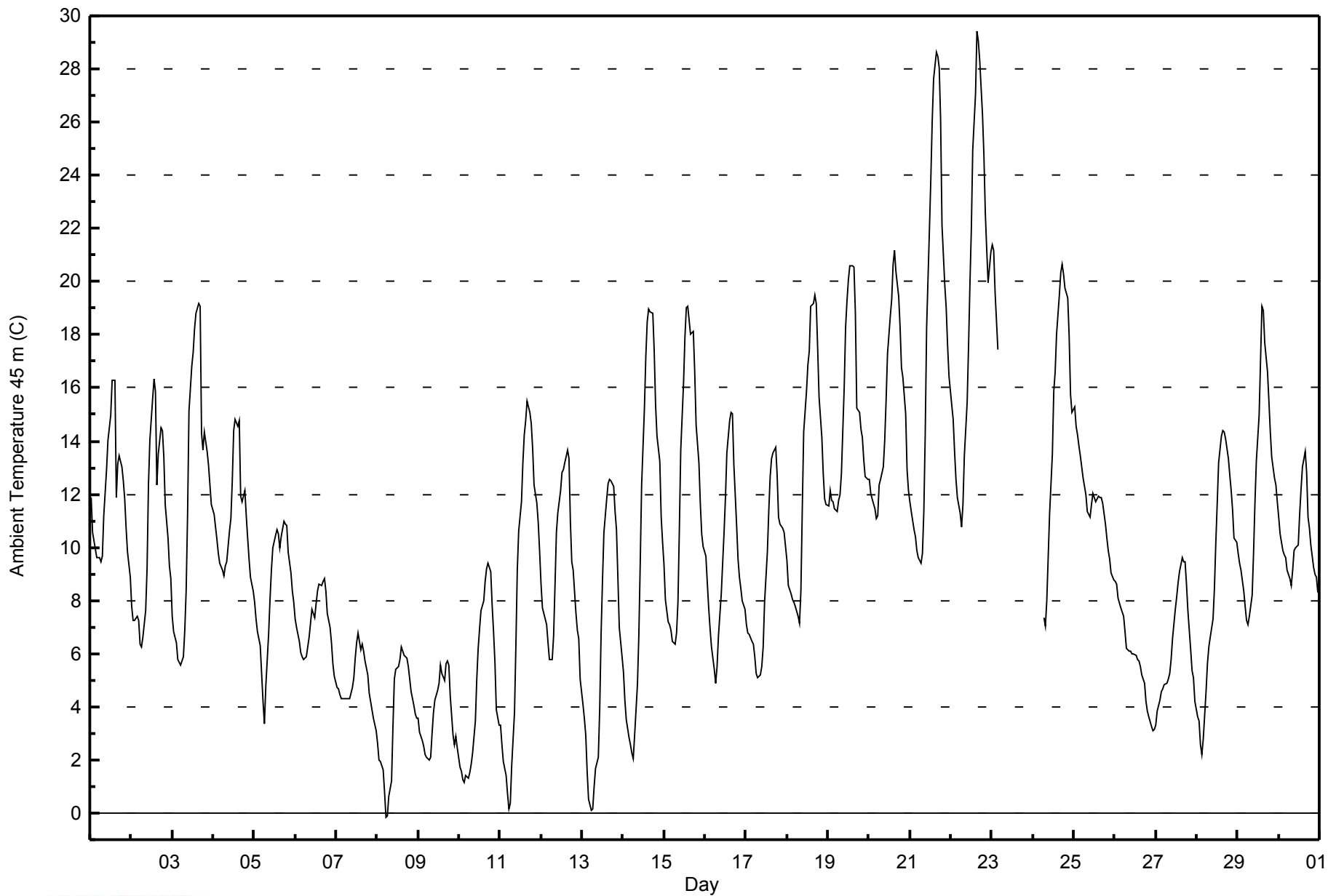
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Sep	11.9	10.6	10.3	9.9	9.6	9.6	9.4	9.7	11.2	12.9	14.0	14.5	15.0	16.3	16.3	11.9	13.1	13.5	13.0	12.5	11.8	10.7	9.8	8.9	11.9	16.3																						
2-Sep	7.8	7.3	7.2	7.4	7.3	6.4	6.2	6.6	7.6	9.2	12.4	14.0	15.6	16.3	15.9	12.3	13.5	14.5	14.4	13.4	11.6	10.4	9.3	8.9	10.6	16.3																						
3-Sep	7.4	6.8	6.4	5.8	5.7	5.6	5.9	6.9	8.4	11.3	15.1	16.8	17.3	18.2	18.8	19.2	19.0	14.3	13.7	14.3	13.6	13.1	12.3	11.6	12.0	19.2																						
4-Sep	11.2	10.8	10.3	9.8	9.4	9.1	8.9	9.3	9.4	10.6	11.1	12.5	14.4	14.8	14.6	14.8	11.9	11.7	12.1	11.2	10.3	9.6	8.9	8.4	11.0	14.8																						
5-Sep	7.9	7.3	6.8	6.3	5.3	4.2	3.4	4.8	6.7	8.0	9.1	10.0	10.4	10.7	10.5	10.0	10.4	11.0	10.9	10.8	9.8	9.1	8.3	7.9	8.3	11.0																						
6-Sep	7.3	7.0	6.5	6.0	5.9	5.8	5.9	6.3	6.6	7.2	7.7	7.3	7.9	8.4	8.6	8.6	8.7	8.8	8.4	7.5	7.0	6.4	5.6	5.2	7.1	8.8																						
7-Sep	4.7	4.7	4.5	4.3	4.3	4.3	4.3	4.3	4.3	4.7	5.1	5.8	6.4	6.8	6.2	6.3	6.1	5.7	5.2	4.5	4.2	3.9	3.6	3.1	4.9	6.8																						
8-Sep	2.6	2.0	2.0	1.6	0.8	-0.2	-0.1	0.6	1.2	3.3	5.0	5.4	5.5	5.8	6.2	6.1	5.9	5.8	5.5	5.1	4.6	4.0	3.7	3.6	3.6	6.2																						
9-Sep	3.6	3.0	2.7	2.5	2.2	2.1	2.0	2.1	3.0	3.8	4.2	4.6	4.9	5.6	5.3	5.0	5.6	5.7	5.5	4.4	2.9	2.6	2.9	2.5	3.7	5.7																						
10-Sep	1.7	1.6	1.2	1.1	1.4	1.3	1.5	1.9	2.2	3.5	5.0	6.2	6.9	7.6	8.0	8.7	9.2	9.4	9.1	7.8	6.8	5.7	3.9	3.3	4.8	9.4																						
11-Sep	3.3	2.6	2.0	1.4	0.7	0.2	0.4	1.8	3.8	6.3	9.1	10.6	11.7	13.2	14.3	14.8	15.5	15.1	14.7	13.7	12.4	11.7	10.9	9.8	8.3	15.5																						
12-Sep	8.6	7.7	7.3	7.1	6.4	5.8	5.8	6.7	8.5	10.5	11.3	12.1	12.8	12.9	13.2	13.6	13.4	11.0	9.4	9.1	7.5	6.9	6.6	5.0	9.1	13.6																						
13-Sep	4.1	3.5	2.9	1.6	0.5	0.1	0.1	1.0	1.7	2.1	3.9	6.8	8.8	10.5	11.8	12.4	12.6	12.5	12.3	11.4	10.6	8.9	7.0	5.9	6.4	12.6																						
14-Sep	5.3	4.3	3.5	2.9	2.6	2.3	2.1	2.9	4.8	6.7	9.4	12.4	15.2	17.2	18.5	19.0	18.9	18.8	17.4	15.3	14.2	13.2	11.1	10.2	10.3	19.0																						
15-Sep	9.4	8.0	7.2	7.1	6.9	6.5	6.4	6.8	7.9	10.7	13.6	16.2	17.9	19.0	19.1	18.0	18.1	18.1	16.6	14.6	13.2	11.7	10.5	10.0	12.2	19.1																						
16-Sep	9.7	8.7	7.7	6.9	6.2	5.4	4.9	5.5	6.7	8.2	9.4	10.6	11.9	13.6	14.8	15.1	15.0	13.1	10.8	9.5	8.9	8.5	8.0	7.7	9.4	15.1																						
17-Sep	7.1	6.8	6.7	6.5	6.4	5.9	5.2	5.1	5.2	5.5	6.2	7.9	9.8	11.3	12.7	13.3	13.5	13.8	12.7	11.2	10.9	10.7	10.5	10.1	9.0	13.8																						
18-Sep	9.5	8.6	8.3	8.0	7.9	7.8	7.4	7.1	8.4	11.5	14.3	15.9	16.9	17.4	19.1	19.2	19.5	19.2	17.5	15.6	14.1	12.8	11.8	11.6	12.9	19.5																						
19-Sep	11.5	12.1	11.7	11.7	11.4	11.4	11.8	12.0	12.7	16.0	18.3	19.3	20.1	20.6	20.6	20.6	18.8	15.2	15.1	14.5	14.2	13.3	12.7	12.6	14.9	20.6																						
20-Sep	12.6	12.0	11.8	11.5	11.1	11.2	12.4	12.5	13.0	14.0	15.5	17.3	18.7	19.4	20.6	21.2	20.4	19.5	18.3	16.8	16.4	15.0	12.9	12.2	15.3	21.2																						
21-Sep	11.7	11.4	10.7	10.4	9.9	9.6	9.4	9.8	11.3	14.3	18.3	22.0	23.9	26.1	27.6	28.6	28.5	28.0	26.1	22.1	19.8	19.0	17.6	16.4	18.0	28.6																						
22-Sep	15.3	14.8	13.6	12.5	11.9	11.3	10.8	11.6	13.5	15.5	17.6	19.9	22.0	24.9	27.1	29.4	29.1	28.3	26.3	24.8	22.6	21.2	20.0	21.1	19.4	29.4																						
23-Sep	21.4	21.2	19.6	17.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	21.4																						
24-Sep	AF	AF	AF	AF	AF	AF	7.4	7.1	8.0	9.6	11.2	13.5	15.9	16.6	18.0	19.5	20.3	20.6	20.3	19.8	19.4	18.0	15.8	15.1	15.3	20.6																						
25-Sep	15.3	14.6	14.3	13.8	13.4	12.6	12.3	12.0	11.3	11.1	11.6	12.0	11.9	11.7	11.9	11.9	11.8	11.6	10.9	10.3	9.9	9.6	9.0	8.8	11.8	15.3																						
26-Sep	8.7	8.6	8.1	7.7	7.6	7.4	6.8	6.2	6.1	6.1	6.0	6.0	5.9	5.8	5.7	5.5	5.2	4.9	4.2	3.8	3.6	3.3	3.1	3.1	5.8	8.7																						
27-Sep	3.3	3.8	4.3	4.6	4.6	4.9	4.9	5.0	5.2	5.8	6.6	7.7	8.1	8.6	9.1	9.6	9.5	9.4	8.6	7.6	6.1	5.4	5.1	4.2	6.3	9.6																						
28-Sep	3.6	3.5	2.6	2.2	2.8	4.5	5.6	6.2	6.6	7.3	8.5	10.2	11.7	13.2	14.2	14.4	14.4	14.1	13.4	12.7	12.1	11.4	10.4	10.2	9.0	14.4																						
29-Sep	9.8	9.4	9.1	8.4	7.8	7.2	7.1	7.4	8.2	9.7	11.6	13.2	14.9	17.0	19.1	18.9	17.7	16.6	15.5	14.4	13.4	12.6	12.3	11.7	12.2	19.1																						
30-Sep	11.1	10.5	9.9	9.7	9.6	9.1	8.8	8.6	9.1	9.9	10.0	10.1	11.3	12.2	13.0	13.6	12.8	11.1	10.7	10.1	9.3	9.0	8.9	8.3	10.3	13.6																						
																								8.5	8.0	7.6	7.1	6.4	6.1	6.1	6.5	7.3	8.8	10.4	11.8	12.9	13.9	14.5	14.5	14.4	13.8	13.1	12.0	11.1	10.3	9.4	8.9	Diurnal Average
																								21.4	21.2	19.6	17.4	13.4	12.6	12.4	12.5	13.5	16.0	18.3	22.0	23.9	26.1	27.6	29.4	29.1	28.3	26.3	24.8	22.6	21.2	20.0	21.1	Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	2	0.29	0.29
0 - 10	367	52.88	53.17
10 - 20	293	42.22	95.39
> 20	32	4.61	100.00

Total Number of Valid Hours: 694

Total Number of Hours: 720

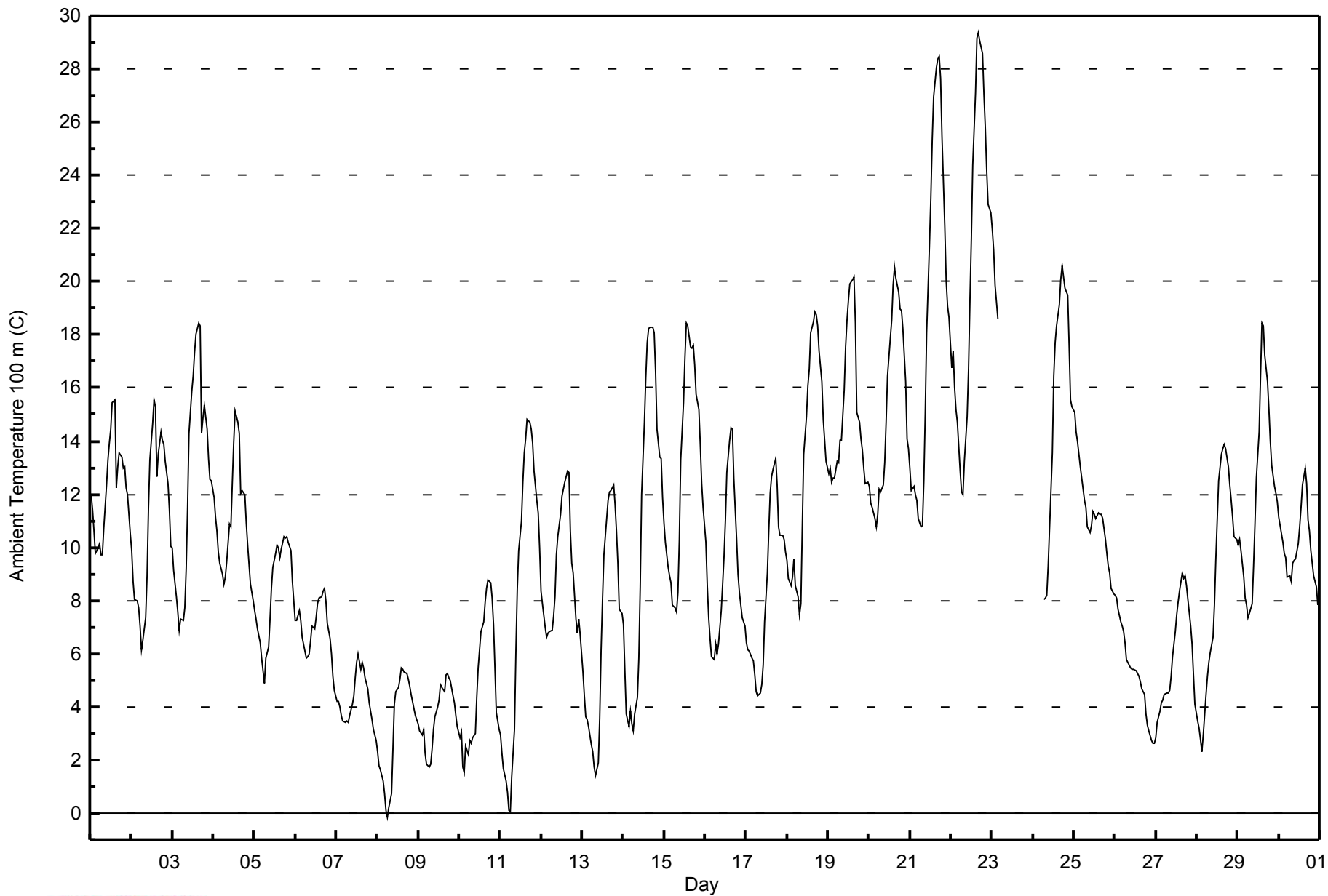


Maximum Value: 29.4 C on Sep 22 17:00		Maximum Daily Average: 20.5 C on Sep 22		Hours in Service: 720																						
Minimum Value: -0.1 C on Sep 8 07:00		Minimum Daily Average: 3.2 C on Sep 8		Hours of Data: 694																						
Maximum Diurnal Average: 14.0 C at hour 16		Minimum Diurnal Average: 6.5 C at hour 7		Hours of Missing Data: 26																						
Monthly Average: 10.18 C		Percentiles: P ₁ = 0.5 P ₁₀ = 3.5 Q ₁ = 6.0 Median = 9.7 Q ₃ = 13.3 P ₉₀ = 17.7 P ₉₉ = 27.9		Hours of Calibration: 0																						
				Percent Operational Time: 96.4																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	12.0	11.4	10.6	9.8	9.9	10.1	9.7	9.7	10.7	12.3	13.3	13.9	14.4	15.5	15.6	12.2	13.0	13.6	13.4	13.0	13.0	12.2	12.0	10.5	12.2	15.6
2-Sep	9.9	8.7	8.0	8.0	7.7	7.0	6.1	6.5	7.4	8.9	11.5	13.3	14.6	15.5	15.3	12.7	13.5	14.3	14.0	13.9	13.2	12.4	11.4	10.1	11.0	15.5
3-Sep	10.0	9.1	8.2	7.6	6.9	7.3	7.3	7.7	9.2	11.5	14.3	15.9	16.5	17.4	18.0	18.5	18.3	14.3	14.9	15.4	14.4	13.3	12.6	12.5	12.5	18.5
4-Sep	11.9	11.2	10.6	9.8	9.4	9.0	8.6	8.9	9.5	10.9	10.8	12.4	13.9	15.1	14.7	14.3	12.0	12.2	12.0	10.9	10.1	9.3	8.6	8.0	11.0	15.1
5-Sep	7.6	7.3	6.9	6.4	5.8	5.3	4.9	5.8	6.2	7.3	8.4	9.2	9.8	10.1	10.0	9.6	9.9	10.4	10.4	10.4	10.2	9.9	8.7	8.0	8.3	10.4
6-Sep	7.3	7.2	7.6	7.3	6.6	6.3	5.8	5.9	6.0	6.4	7.0	7.0	7.4	7.9	8.1	8.1	8.4	8.4	8.0	7.1	6.6	6.0	5.1	4.6	6.9	8.4
7-Sep	4.2	4.2	4.0	3.7	3.5	3.4	3.5	3.4	3.7	4.1	4.4	5.1	5.7	6.0	5.4	5.7	5.5	5.1	4.7	4.1	3.8	3.5	3.2	2.7	4.3	6.0
8-Sep	2.3	1.8	1.6	1.2	0.7	0.1	-0.1	0.2	0.7	2.4	4.1	4.6	4.7	5.1	5.5	5.4	5.3	5.2	5.1	4.8	4.5	3.9	3.7	3.5	3.2	5.5
9-Sep	3.4	3.1	2.9	3.1	2.3	1.9	1.7	1.8	2.4	3.1	3.6	4.0	4.3	4.9	4.7	4.6	5.2	5.2	5.1	5.0	4.4	4.1	3.7	3.2	3.7	5.2
10-Sep	2.9	3.1	1.7	1.5	2.5	2.2	2.8	2.6	2.8	3.0	4.4	5.5	6.2	6.8	7.2	7.9	8.5	8.8	8.7	8.1	7.1	5.5	3.8	3.1	4.9	8.8
11-Sep	2.9	2.3	1.7	1.2	0.8	0.1	0.0	1.4	3.2	6.0	8.4	9.9	11.0	12.5	13.6	14.1	14.8	14.7	14.5	13.9	12.9	11.8	11.3	10.0	8.0	14.8
12-Sep	8.4	7.9	7.0	6.6	6.8	6.8	6.9	7.4	8.2	9.7	10.4	11.2	11.9	12.2	12.5	12.9	12.8	10.6	9.4	9.0	7.3	6.8	7.3	6.7	9.0	12.9
13-Sep	5.3	4.4	3.6	3.5	3.3	2.6	2.3	1.8	1.4	1.9	3.6	6.1	8.1	9.7	11.1	11.8	12.1	12.2	12.3	11.6	10.6	9.4	7.7	7.5	6.8	12.3
14-Sep	7.1	5.3	3.7	3.3	3.8	3.4	3.1	3.7	4.4	5.8	8.5	12.0	14.7	16.4	17.7	18.2	18.3	18.3	18.1	16.6	14.4	13.4	13.4	11.8	10.6	18.3
15-Sep	10.9	10.2	9.3	8.9	8.7	7.8	7.7	7.5	8.3	10.3	13.3	15.5	17.1	18.5	18.3	17.5	17.5	17.6	16.9	15.8	15.2	13.9	12.4	11.5	12.9	18.5
16-Sep	10.2	8.6	7.4	6.6	5.9	5.8	6.3	6.0	6.3	7.6	8.6	9.7	11.0	12.8	14.0	14.5	14.5	12.6	10.3	9.0	8.3	7.8	7.4	7.0	9.1	14.5
17-Sep	6.4	6.1	6.1	5.8	5.7	5.2	4.5	4.4	4.5	4.8	5.6	7.2	9.0	10.6	12.0	12.7	12.9	13.3	12.3	10.8	10.4	10.4	10.3	9.8	8.4	13.3
18-Sep	9.5	8.8	8.6	8.9	9.5	8.5	8.1	7.5	7.9	10.7	13.5	14.9	16.1	16.7	18.1	18.5	18.8	18.8	18.4	17.4	16.2	14.8	14.0	13.3	13.2	18.8
19-Sep	12.8	13.0	12.5	12.6	12.6	13.2	13.2	14.0	14.0	15.9	17.5	18.5	19.3	19.9	20.1	20.2	18.4	15.1	14.7	14.1	13.7	13.0	12.4	12.5	15.1	20.2
20-Sep	12.3	11.7	11.5	11.1	10.8	11.2	12.2	12.1	12.4	13.2	14.7	16.4	17.8	18.5	19.9	20.5	20.1	19.6	19.0	18.9	18.2	16.2	14.1	13.7	15.3	20.5
21-Sep	13.0	12.1	12.3	12.0	11.8	11.1	10.8	10.8	12.5	15.0	18.1	21.3	23.1	25.3	27.0	28.0	28.4	28.5	27.6	25.4	22.1	20.0	19.1	18.7	18.9	28.5
22-Sep	16.7	17.4	16.0	15.2	14.7	12.9	12.1	12.0	13.2	14.9	16.7	19.3	21.6	24.4	27.1	29.2	29.4	29.1	28.6	27.1	25.8	24.1	22.9	22.6	20.5	29.4
23-Sep	21.9	21.2	19.8	18.6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	21.9
24-Sep	AF	AF	AF	AF	AF	AF	8.0	8.1	8.2	9.3	10.7	13.6	16.4	17.7	18.3	19.1	20.1	20.6	20.2	19.7	19.5	17.6	15.5	15.3	15.4	20.6
25-Sep	15.1	14.4	14.0	13.5	13.0	12.2	11.8	11.5	10.8	10.6	10.8	11.4	11.2	11.1	11.3	11.2	11.3	11.1	10.3	9.8	9.3	9.0	8.5	8.2	11.3	15.1
26-Sep	8.2	8.1	7.7	7.2	7.0	6.9	6.4	5.8	5.5	5.5	5.4	5.4	5.2	5.1	5.0	4.7	4.5	3.7	3.3	3.1	2.8	2.6	2.6	2.6	5.3	8.2
27-Sep	2.8	3.4	3.9	4.1	4.3	4.5	4.5	4.5	4.6	5.1	5.9	6.8	7.4	7.9	8.4	9.0	8.8	8.9	8.5	8.0	7.0	6.4	5.2	4.1	6.0	9.0
28-Sep	3.5	3.2	2.8	2.3	3.0	4.4	5.2	5.7	6.0	6.6	7.8	9.5	11.0	12.5	13.5	13.7	13.9	13.7	13.0	12.4	11.8	11.1	10.4	10.3	8.6	13.9
29-Sep	10.1	10.3	9.9	8.9	8.1	7.8	7.3	7.5	7.9	9.3	10.9	12.6	14.4	16.4	18.5	18.3	17.2	16.3	15.2	14.0	13.1	12.3	12.0	11.7	12.1	18.5
30-Sep	11.2	10.8	10.2	9.8	9.6	8.9	8.9	8.7	9.4	9.5	9.5	10.2	10.7	11.5	12.3	13.0	12.4	11.0	10.6	9.9	8.9	8.7	8.5	7.8	10.1	13.0
																								Diurnal Average		
																								Diurnal Maximum		
																								9.0 8.5 7.9 7.5 7.0 6.6 6.5 6.7 7.1 8.3 9.7 11.1 12.2 13.2 13.9 14.0 14.0 13.6 13.1 12.4 11.6 10.7 9.9 9.4		
																								21.9 21.2 19.8 18.6 14.7 13.2 13.2 14.0 14.0 15.9 18.1 21.3 23.1 25.3 27.1 29.2 29.4 29.1 28.6 27.1 25.8 24.1 22.9 22.6		
AF - Analyzer Failure																										



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	1	0.14	0.14
0 - 10	362	52.16	52.31
10 - 20	299	43.08	95.39
> 20	32	4.61	100.00

Total Number of Valid Hours: 694

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 167 m (AT167m) - C

Lower Camp Met Tower - September 2014

Maximum Value: 20.1 C on Sep 24 18:00	Maximum Daily Average: 15.7 C on Sep 24	Hours in Service: 720
Minimum Value: 1.9 C on Sep 26 23:00	Minimum Daily Average: 4.8 C on Sep 26	Hours of Data: 162
Maximum Diurnal Average: 12.2 C at hour 16	Minimum Diurnal Average: 7.3 C at hour 8	Hours of Missing Data: 558
Monthly Average: 9.35 C	Percentiles: $P_1 = 2.0$ $P_{10} = 3.9$ $Q_1 = 6.0$ Median = 9.3 $Q_3 = 11.7$ $P_{90} = 14.9$ $P_{99} = 19.6$	Hours of Calibration: 0
		Percent Operational Time: 22.5

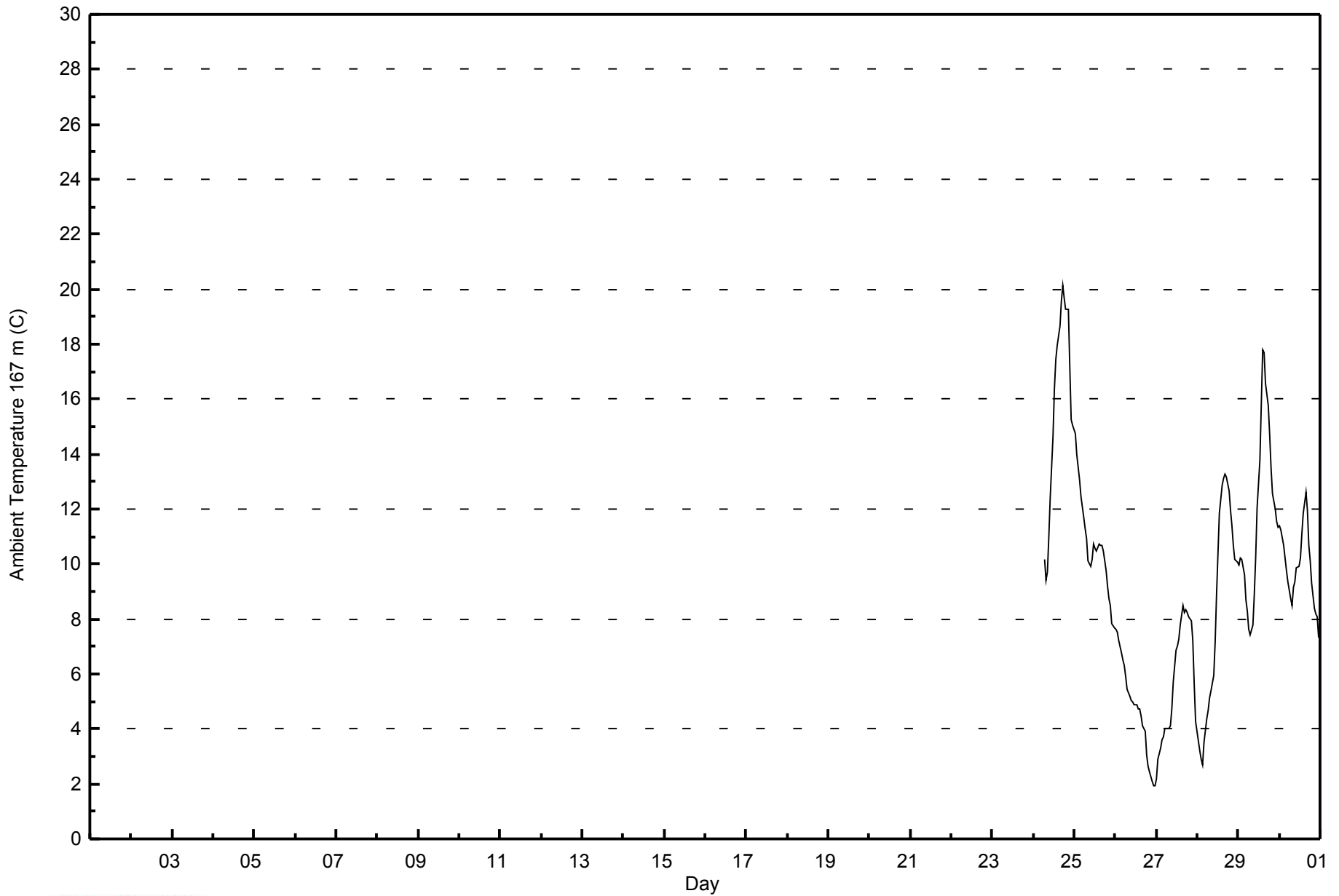
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--																							
2-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	--	--																							
3-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	--	--																							
4-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	--	--																							
5-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	--	--																							
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	AF	AF	AF	AF	AF	AF	--	--																							
8-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	--	--																							
9-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	--	--																							
10-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	--	--																							
11-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	--	--																							
12-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	--	--																							
13-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	--	--																							
14-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	--	--																							
15-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	--	--																							
16-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	--	--																							
17-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	--	--																							
18-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	--	--																							
19-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	--	--																							
20-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	--	--																							
21-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	--	--																							
22-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	--	--																							
23-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	--	--																							
24-Sep	AF	AF	AF	AF	AF	AF	AF	9.4	9.7	11.0	12.4	14.7	16.4	17.4	17.9	18.7	19.6	20.1	19.7	19.3	19.3	17.2	15.2	15.1	15.7	20.1																							
25-Sep	14.8	14.0	13.5	13.0	12.5	11.7	11.3	10.9	10.1	9.9	10.2	10.7	10.6	10.5	10.7	10.7	10.5	10.5	9.7	9.2	8.8	8.5	7.9	7.7	10.7	14.8																							
26-Sep	7.6	7.5	7.2	6.8	6.5	6.3	5.9	5.4	5.2	5.1	5.0	4.9	4.9	4.7	4.7	4.5	4.1	3.9	3.1	2.7	2.4	2.1	1.9	1.9	4.8	7.6																							
27-Sep	2.2	2.9	3.3	3.6	3.7	4.0	4.0	4.0	4.1	4.7	5.7	6.8	7.0	7.3	7.8	8.5	8.2	8.3	8.2	8.1	8.0	7.2	5.7	4.3	5.7	8.5																							
28-Sep	3.6	3.2	2.9	2.7	3.5	4.4	4.7	5.1	5.4	6.0	7.2	8.9	10.4	11.8	12.8	13.1	13.3	13.2	12.6	11.9	11.4	10.7	10.2	10.1	8.3	13.3																							
29-Sep	9.9	10.2	10.2	9.6	8.7	8.3	7.6	7.4	7.8	8.9	10.3	12.0	13.8	15.8	17.8	17.7	16.6	15.8	14.7	13.5	12.6	12.0	11.6	11.3	11.8	17.8																							
30-Sep	11.4	11.2	10.7	10.2	9.8	9.3	8.8	8.5	9.2	9.4	9.9	9.9	10.2	11.1	11.8	12.6	12.0	10.7	10.1	9.3	8.4	8.2	8.1	7.3	9.9	12.6																							
																									8.2	8.2	8.0	7.7	7.5	7.3	7.5	7.3	7.3	7.8	8.6	9.7	10.5	11.2	11.9	12.2	12.1	11.8	11.2	10.6	10.1	9.4	8.6	8.2	Diurnal Average
																									14.8	14.0	13.5	13.0	12.5	11.7	11.3	10.9	10.1	11.0	12.4	14.7	16.4	17.4	17.9	18.7	19.6	20.1	19.7	19.3	19.3	17.2	15.2	15.1	Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	90	55.56	55.56
10 - 20	71	43.83	99.38
> 20	1	0.62	100.00

Total Number of Valid Hours: 162

Total Number of Hours: 720



Summary of Hour Averages

Lower Camp Met Tower - September 2014

Maximum Value: 98 % on Sep 2 09:00	Maximum Daily Average: 92.9 % on Sep 6	Hours in Service: 720
Minimum Value: 28 % on Sep 20 16:00	Minimum Daily Average: 50.5 % on Sep 11	Hours of Data: 693
Maximum Diurnal Average: 88.1 % at hour 7	Minimum Diurnal Average: 54.4 % at hour 15	Hours of Missing Data: 27
Monthly Average: 73.4 %	Percentiles: P ₁ = 32 P ₁₀ = 45 Q ₁ = 61 Median = 77 Q ₃ = 89 P ₉₀ = 96 P ₉₉ = 98	Hours of Calibration: 0
		Percent Operational Time: 96.3

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	82	94	94	90	94	94	95	94	86	78	74	71	68	60	60	89	82	82	89	93	96	97	98	98	85.7	98
2-Sep	98	98	98	98	98	98	98	98	98	98	85	75	62	53	56	78	74	70	67	76	92	96	96	97	85.7	98
3-Sep	97	97	98	98	98	98	98	98	97	84	65	49	47	43	41	41	44	73	80	74	79	81	83	84	77.0	98
4-Sep	85	85	87	89	87	87	88	88	88	86	87	84	79	83	78	73	89	97	93	89	88	87	86	84	86.1	97
5-Sep	85	89	90	89	96	97	97	97	86	75	66	61	62	63	72	81	79	70	68	71	85	90	94	91	81.4	97
6-Sep	91	92	96	97	97	97	97	93	87	82	81	88	93	91	91	95	95	92	94	97	97	95	95	95	92.9	97
7-Sep	96	96	97	95	95	93	92	92	92	91	87	76	69	63	65	59	57	59	63	69	73	74	76	80	79.5	97
8-Sep	82	85	81	78	82	89	88	82	79	68	54	47	46	43	41	43	44	45	48	57	62	65	66	70	64.5	89
9-Sep	70	80	82	86	87	81	80	80	72	69	64	61	56	50	53	59	50	45	48	76	86	87	84	89	70.7	89
10-Sep	88	90	88	83	82	84	83	82	80	73	64	52	45	41	40	38	37	37	41	48	49	54	62	63	62.7	90
11-Sep	63	65	68	70	73	75	75	67	62	58	44	39	37	33	30	30	29	32	34	38	42	45	48	52	50.5	75
12-Sep	57	63	61	61	71	78	79	77	65	53	52	47	38	39	42	39	42	61	77	78	90	95	96	97	64.9	97
13-Sep	97	97	97	97	97	97	97	98	97	97	92	80	67	57	51	49	51	54	56	62	61	69	86	87	79.0	98
14-Sep	87	89	93	94	93	93	92	87	79	72	65	57	44	39	35	34	35	36	44	52	56	64	81	85	66.9	94
15-Sep	89	91	92	90	89	90	90	89	84	73	62	55	48	44	45	50	52	55	63	74	79	85	88	89	73.6	92
16-Sep	85	86	88	91	93	94	95	93	89	84	78	73	68	63	60	59	59	65	72	76	78	79	80	81	78.7	95
17-Sep	83	85	85	87	87	88	88	85	84	82	79	72	67	64	62	61	63	65	71	76	79	80	82	84	77.4	88
18-Sep	87	92	93	93	93	94	96	97	88	79	69	63	61	59	53	51	50	52	67	77	84	88	87	87	77.3	97
19-Sep	85	81	84	84	86	87	88	88	84	69	55	50	46	42	41	41	48	65	63	65	62	68	77	81	68.2	88
20-Sep	76	75	73	72	72	71	64	61	58	55	51	45	41	38	34	28	32	38	41	44	46	51	61	66	53.9	76
21-Sep	66	68	71	74	78	81	82	80	75	67	58	47	43	37	33	32	33	32	38	52	59	61	66	70	58.5	82
22-Sep	74	75	80	85	86	87	89	82	74	66	59	53	49	44	40	30	30	33	40	42	48	48	53	50	59.0	89
23-Sep	47	45	53	70	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	70
24-Sep	AF	AF	AF	AF	AF	AF	96	96	89	80	75	69	65	66	63	52	53	56	58	61	63	68	83	89	71.2	96
25-Sep	81	85	81	80	78	80	80	70	70	70	68	66	65	66	65	64	64	67	68	72	73	73	77	78	72.5	85
26-Sep	77	80	83	81	80	80	87	94	96	95	96	96	96	96	97	97	97	97	96	96	95	AF	95	94	91.2	97
27-Sep	94	94	94	93	94	94	94	92	91	88	80	70	63	61	57	57	57	58	65	73	84	88	86	89	79.8	94
28-Sep	90	85	91	92	90	83	76	73	71	68	65	59	56	52	49	49	50	52	55	57	60	63	69	70	67.7	92
29-Sep	71	74	75	78	79	82	82	78	74	68	61	58	53	49	47	48	50	55	60	63	67	70	72	76	66.2	82
30-Sep	80	83	87	87	85	87	90	92	89	87	91	96	91	83	77	72	79	96	97	93	92	93	95	89	88.0	97

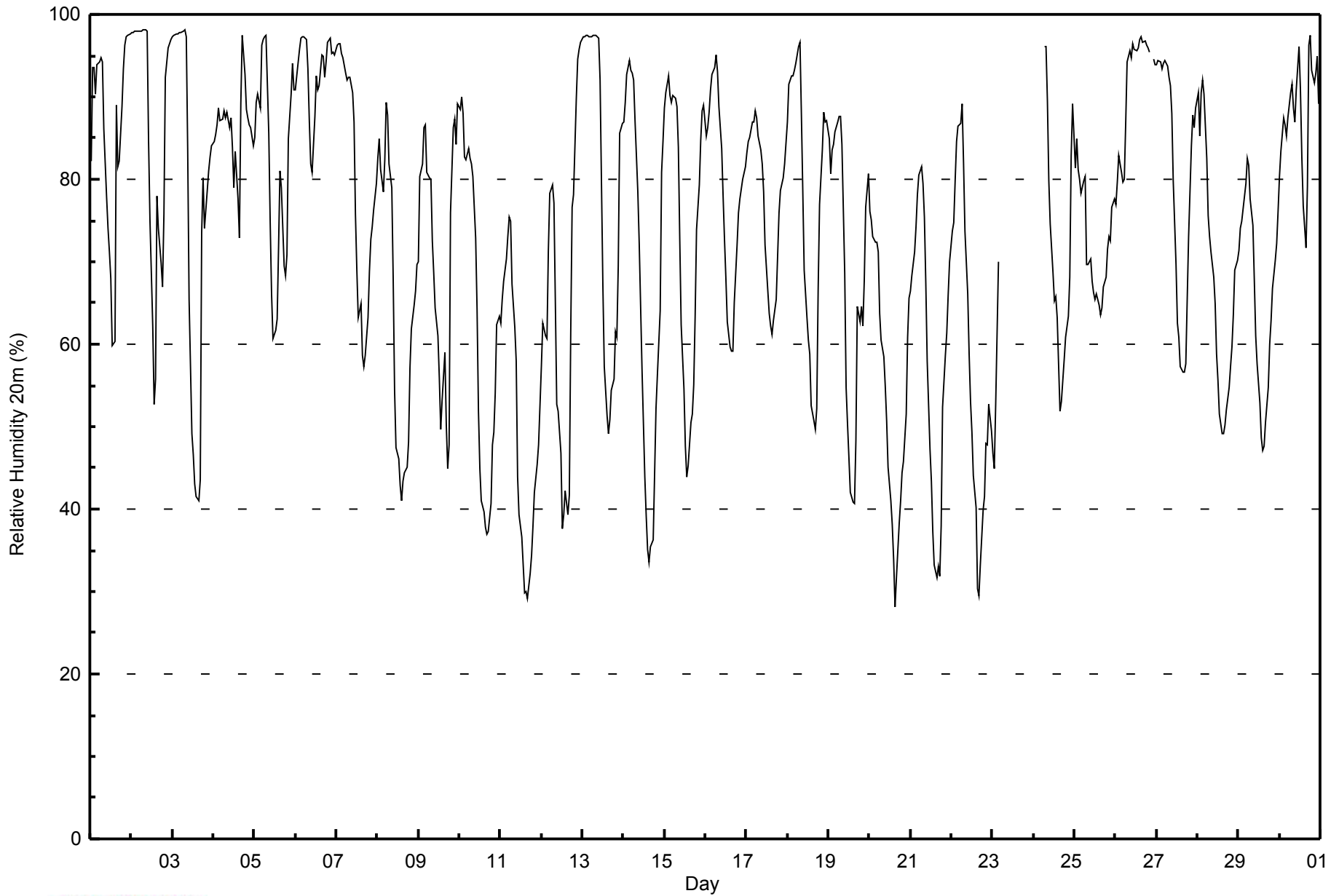
81.6	83.5	84.8	85.6	87.2	87.9	88.1	86.3	82.3	76.3	69.9	64.0	59.4	55.9	54.4	55.1	56.0	60.0	64.0	68.9	73.3	75.5	80.0	81.5		Diurnal Average	
98	98	98	98	98	98	98	98	98	98	98	96	96	96	96	97	97	97	97	97	97	97	97	98	98		Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	36	5.19	5.19
40 - 60	134	19.34	24.53
60 - 80	214	30.88	55.41
80 - 100	309	44.59	100.00

Total Number of Valid Hours: 693

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 45m (RH45m) - %

Lower Camp Met Tower - September 2014

Maximum Value: 99 % on Sep 2 09:00	Maximum Daily Average: 92.4 % on Sep 6	Hours in Service: 720
Minimum Value: 28 % on Sep 20 16:00	Minimum Daily Average: 50.2 % on Sep 11	Hours of Data: 694
Maximum Diurnal Average: 87.7 % at hour 7	Minimum Diurnal Average: 54.3 % at hour 15	Hours of Missing Data: 26
Monthly Average: 72.8 %	Percentiles: P ₁ = 31 P ₁₀ = 44 Q ₁ = 60 Median = 76 Q ₃ = 88 P ₉₀ = 94 P ₉₉ = 98	Hours of Calibration: 0
		Percent Operational Time: 96.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	80	91	90	88	92	94	94	94	87	79	75	72	68	60	61	87	81	78	86	93	96	97	98	98	85.0	98	
2-Sep	98	98	98	98	98	98	99	99	99	99	99	84	76	63	53	56	75	75	70	67	73	90	96	97	98	85.7	99
3-Sep	98	98	98	98	98	98	99	99	99	98	86	66	50	47	44	42	41	44	71	77	71	76	78	81	84	76.8	99
4-Sep	84	86	87	89	88	88	89	88	89	86	88	85	80	81	74	72	89	94	89	86	86	84	84	83	85.4	94	
5-Sep	84	88	88	87	95	97	98	97	83	76	67	61	62	63	72	80	79	70	69	70	80	88	92	89	80.5	98	
6-Sep	90	91	94	97	98	98	97	93	87	83	82	86	91	90	91	94	94	92	94	96	96	95	95	94	92.4	98	
7-Sep	96	96	96	96	96	96	96	96	94	90	87	75	69	64	65	59	57	58	63	68	72	73	75	79	79.8	96	
8-Sep	82	84	80	78	81	89	89	83	80	71	56	48	46	43	41	43	44	44	47	53	59	63	65	69	64.1	89	
9-Sep	67	76	81	85	85	81	80	80	73	70	65	61	56	50	53	59	50	45	47	65	82	85	83	85	69.3	85	
10-Sep	85	87	84	80	82	83	79	78	80	74	65	52	45	41	40	38	37	37	40	46	49	53	62	63	61.7	87	
11-Sep	62	64	67	70	73	75	75	68	63	58	44	39	37	33	30	30	29	32	34	37	41	44	47	52	50.2	75	
12-Sep	57	62	60	61	70	76	79	75	67	54	53	48	38	40	43	40	41	61	75	78	89	93	93	96	64.5	96	
13-Sep	97	98	98	98	98	98	98	98	98	98	94	81	68	58	52	50	51	54	53	58	58	68	78	85	78.6	98	
14-Sep	86	89	92	94	93	93	93	89	80	73	65	58	44	40	36	34	35	36	41	50	55	59	73	77	66.0	94	
15-Sep	82	88	91	90	89	90	90	89	85	74	63	55	48	44	46	50	52	56	62	70	75	82	88	87	72.8	91	
16-Sep	83	86	88	91	92	93	95	93	90	85	79	75	70	65	61	60	60	65	72	76	78	79	81	82	79.2	95	
17-Sep	84	86	86	88	88	89	89	86	85	83	79	73	67	64	63	62	63	66	71	76	79	81	82	85	78.1	89	
18-Sep	87	92	93	93	94	95	96	97	91	81	71	66	62	60	54	51	51	52	61	67	73	81	84	87	76.7	97	
19-Sep	85	80	84	84	86	87	87	87	85	69	55	51	47	42	41	40	48	63	63	65	62	66	75	79	68.0	87	
20-Sep	75	75	73	72	72	70	63	61	59	56	51	46	41	39	34	28	31	38	39	42	43	49	60	65	53.5	75	
21-Sep	66	68	71	74	78	81	82	80	76	68	59	48	44	38	33	32	32	31	35	49	58	60	65	69	58.3	82	
22-Sep	73	74	79	84	85	86	89	83	75	67	60	54	50	45	40	30	29	31	36	38	43	46	49	43	57.9	89	
23-Sep	42	44	50	65	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	65	
24-Sep	AF	AF	AF	AF	AF	AF	90	95	90	80	75	69	64	63	60	51	52	54	57	60	62	67	81	87	70.0	95	
25-Sep	80	83	80	79	77	79	79	69	69	70	68	66	65	66	64	63	64	66	67	71	72	72	76	77	71.8	83	
26-Sep	76	79	82	80	79	79	85	92	93	93	94	93	93	93	94	95	93	94	93	92	93	92	92	92	89.2	95	
27-Sep	92	92	92	91	92	93	92	91	91	88	80	69	62	61	57	56	56	57	64	70	82	86	85	88	78.7	93	
28-Sep	89	84	89	91	89	81	75	72	71	68	64	58	55	51	48	48	49	51	54	56	59	62	68	68	66.8	91	
29-Sep	70	72	73	76	78	80	80	76	74	67	61	57	52	48	46	47	50	54	59	62	66	69	71	75	65.2	80	
30-Sep	78	82	85	85	84	86	88	91	88	87	90	95	89	82	77	71	78	95	97	92	91	92	94	87	86.8	97	

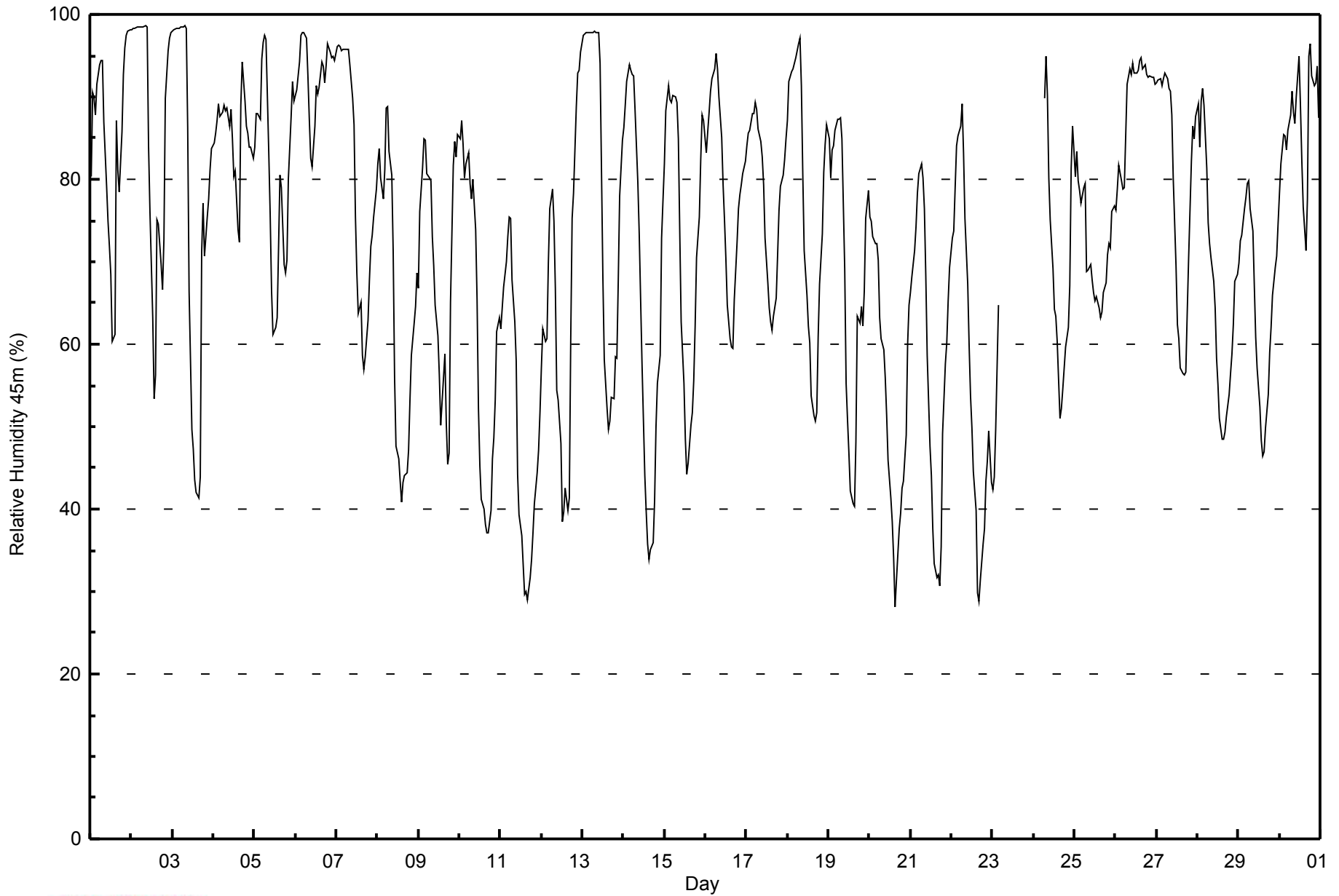
80.4	82.5	83.8	84.9	86.8	87.6	87.7	86.2	82.8	76.9	70.4	64.4	59.6	55.9	54.3	54.8	55.7	59.1	62.5	66.7	71.2	74.5	78.4	80.0	Diurnal Average	
98	98	98	98	98	98	99	99	99	99	99	94	95	93	93	94	95	94	95	97	96	96	97	98	98	Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	40	5.76	5.76
40 - 60	133	19.16	24.93
60 - 80	223	32.13	57.06
80 - 100	298	42.94	100.00

Total Number of Valid Hours: 694

Total Number of Hours: 720

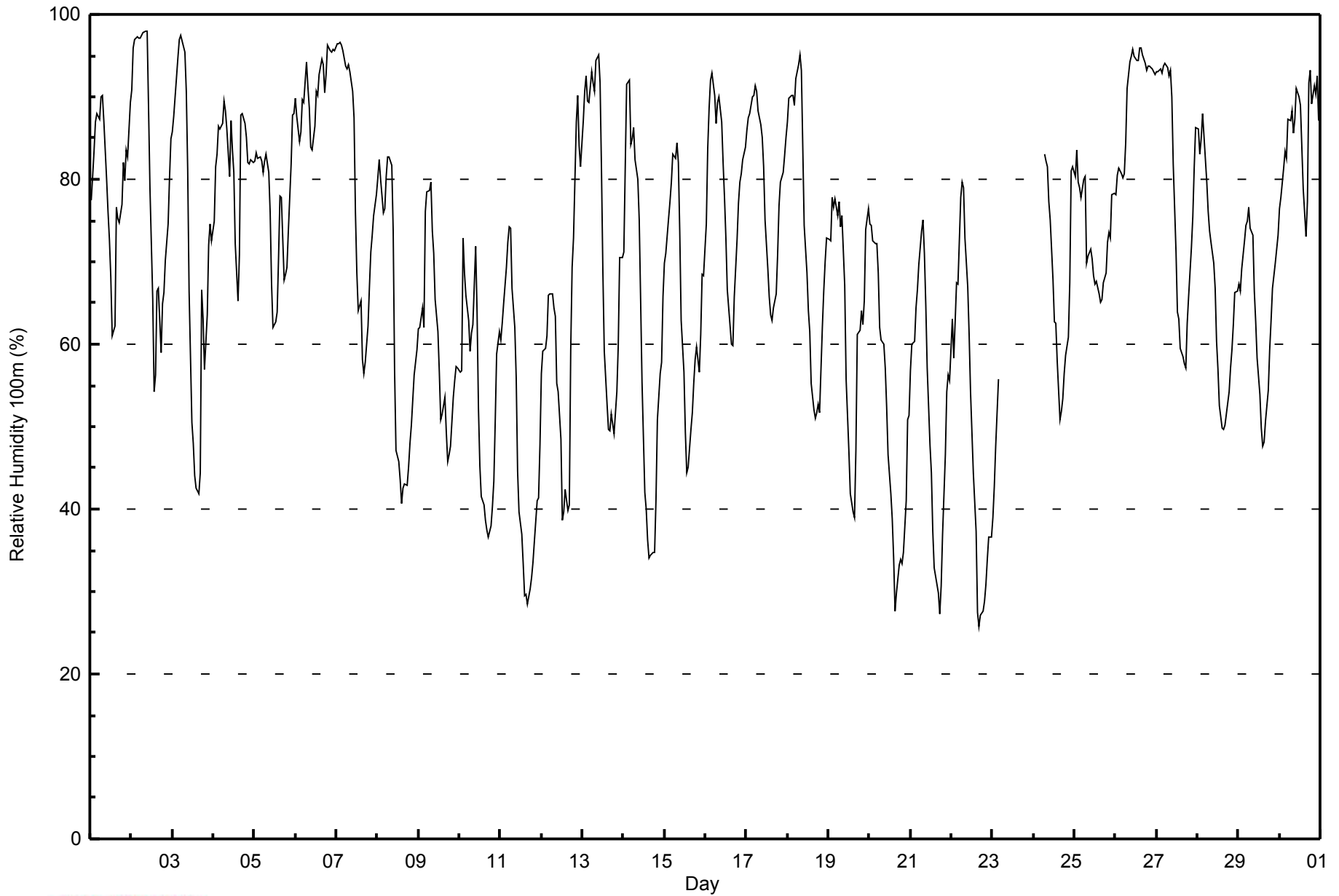


Maximum Value: 98 % on Sep 2 10:00																			Maximum Daily Average: 90.8 % on Sep 6						Hours in Service: 720																								
Minimum Value: 26 % on Sep 22 17:00																			Minimum Daily Average: 48.6 % on Sep 11						Hours of Data: 694																								
Maximum Diurnal Average: 83.1 % at hour 7																			Minimum Diurnal Average: 54.0 % at hour 16						Hours of Missing Data: 26																								
Monthly Average: 69.7 %																			Percentiles: P ₁ = 29 P ₁₀ = 43 Q ₁ = 57 Median = 72 Q ₃ = 84 P ₉₀ = 92 P ₉₉ = 97						Hours of Calibration: 0																								
																									Percent Operational Time: 96.4																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Sep	77	80	83	87	88	87	90	90	87	80	76	73	68	61	62	77	75	75	77	82	80	84	83	89	79.7	90																							
2-Sep	91	96	97	97	97	97	97	98	98	98	89	79	65	54	56	66	67	59	65	66	70	75	80	85	80.9	98																							
3-Sep	86	88	92	95	97	97	96	95	91	81	66	51	48	44	43	42	44	67	63	57	64	72	75	73	71.9	97																							
4-Sep	75	82	83	86	86	87	89	88	86	80	87	84	81	72	65	71	88	88	87	85	82	82	82	82	82.4	89																							
5-Sep	82	83	83	83	82	81	82	83	81	76	67	62	63	64	71	78	78	68	68	69	74	82	88	88	76.5	88																							
6-Sep	90	88	85	86	90	89	94	91	89	84	83	87	91	90	93	95	94	90	93	96	96	95	96	96	90.8	96																							
7-Sep	96	96	97	96	96	94	93	94	93	91	88	76	69	64	65	58	56	58	62	67	71	73	76	78	79.5	97																							
8-Sep	80	82	80	76	76	80	83	83	82	74	57	47	46	44	41	42	43	43	45	48	50	56	58	59	61.5	83																							
9-Sep	62	62	64	62	76	79	79	80	74	71	65	62	57	51	51	54	49	46	47	48	54	56	57	57	60.9	80																							
10-Sep	57	57	73	69	66	63	59	61	62	72	64	52	45	42	40	39	37	37	38	40	43	51	59	62	53.6	73																							
11-Sep	61	62	65	69	72	74	74	67	62	56	45	40	37	33	29	30	28	30	32	34	36	41	41	48	48.6	74																							
12-Sep	56	59	60	61	66	66	66	64	63	55	54	48	39	40	42	40	41	59	69	73	87	90	84	82	61.0	90																							
13-Sep	87	91	92	89	89	93	92	91	94	95	92	81	69	59	53	50	50	52	49	52	54	60	70	70	73.9	95																							
14-Sep	71	82	92	92	84	85	86	82	80	75	65	55	42	40	36	34	34	35	35	41	51	56	58	66	61.6	92																							
15-Sep	70	71	75	77	80	83	83	84	82	74	63	57	49	44	45	50	52	55	58	60	57	61	68	68	65.2	84																							
16-Sep	75	84	89	92	93	90	87	89	90	87	82	78	73	67	62	60	60	66	73	77	80	81	82	84	79.1	93																							
17-Sep	86	88	88	90	90	91	91	88	87	85	82	75	69	66	64	63	64	66	71	77	80	81	83	85	79.5	91																							
18-Sep	87	90	90	90	89	92	94	95	93	84	74	69	64	62	55	52	51	52	53	52	62	66	70	73	73.3	95																							
19-Sep	73	73	78	77	78	76	77	74	76	67	56	51	47	42	40	39	47	61	62	64	62	65	74	77	63.9	78																							
20-Sep	75	74	73	72	72	69	62	61	60	57	52	47	42	39	34	28	30	33	34	33	35	41	51	51	51.0	75																							
21-Sep	57	60	60	64	67	70	74	75	71	65	57	48	44	37	33	31	30	27	31	37	47	54	56	56	52.1	75																							
22-Sep	63	58	63	68	67	78	80	79	73	67	61	54	49	44	37	27	26	27	28	29	31	34	37	37	50.7	80																							
23-Sep	39	43	48	56	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	56																							
24-Sep	AF	AF	AF	AF	AF	AF	83	82	82	77	75	68	63	63	58	51	52	53	56	59	61	67	81	82	67.4	83																							
25-Sep	80	84	80	79	78	80	80	70	71	71	70	68	67	68	66	65	65	67	69	72	74	73	78	78	73.1	84																							
26-Sep	78	80	81	81	80	81	84	91	94	95	96	95	94	94	96	96	95	94	93	94	94	93	93	93	90.3	96																							
27-Sep	93	93	93	93	94	94	94	93	93	90	82	71	64	63	60	59	58	57	63	66	72	75	81	86	78.5	94																							
28-Sep	86	83	85	88	85	80	76	74	72	70	67	60	57	53	50	50	50	52	54	57	59	62	66	66	66.8	88																							
29-Sep	67	66	69	73	74	75	77	74	73	66	63	58	54	50	48	48	51	54	59	63	67	70	71	73	64.3	77																							
30-Sep	77	78	81	83	83	87	87	88	86	87	91	90	89	84	79	73	77	92	93	89	91	90	93	87	85.7	93																							
																								75.0	77.0	79.3	80.4	82.0	82.8	83.1	82.3	80.8	76.9	71.3	65.0	60.2	56.3	54.3	54.0	54.9	57.3	59.5	61.6	64.9	68.5	72.1	73.4	Diurnal Average	
																								96	96	97	97	97	97	97	98	98	98	96	95	94	94	96	96	95	94	93	96	96	95	96	96	Diurnal Maximum	
AF - Analyzer Failure																																																	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	50	7.20	7.20
40 - 60	153	22.05	29.25
60 - 80	248	35.73	64.99
80 - 100	243	35.01	100.00

Total Number of Valid Hours: 694

Total Number of Hours: 720



Maximum Value: 96 % on Sep 26 16:00	Maximum Daily Average: 91.0 % on Sep 26	Hours in Service: 720
Minimum Value: 49 % on Sep 29 15:00	Minimum Daily Average: 64.6 % on Sep 29	Hours of Data: 162
Maximum Diurnal Average: 82.3 % at hour 6	Minimum Diurnal Average: 64.2 % at hour 16	Hours of Missing Data: 558
Monthly Average: 75.3 %	Percentiles: P ₁ = 51 P ₁₀ = 58 Q ₁ = 65 Median = 75 Q ₃ = 85 P ₉₀ = 95 P ₉₉ = 96	Hours of Calibration: 0
		Percent Operational Time: 22.5

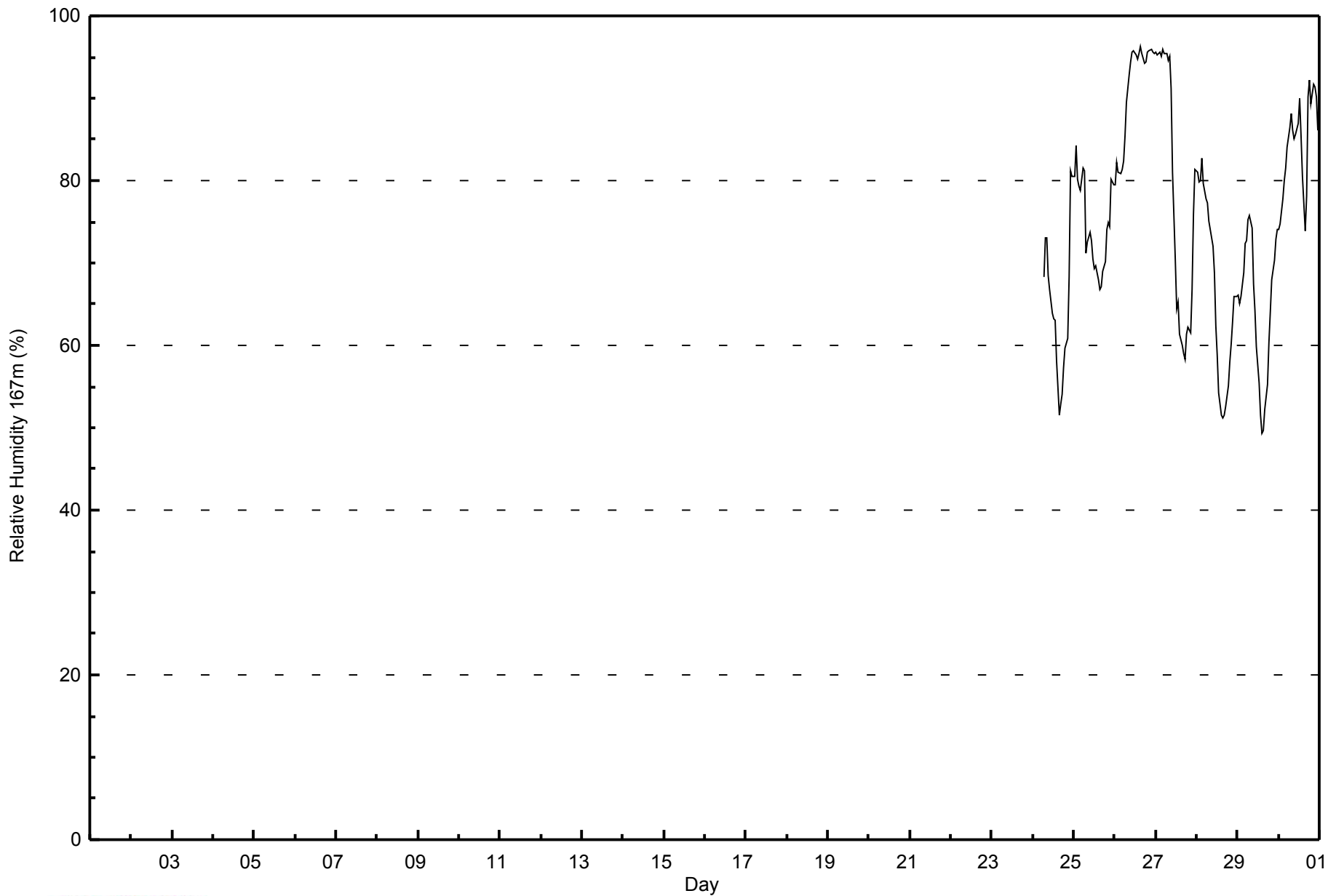
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
2-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
3-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	AF	--	--
4-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	AF	--	--
5-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	AF	--	--
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	AF	--	--
7-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	AF	--	--
8-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	AF	--	--
9-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	AF	--	--
10-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	AF	--	--
11-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	AF	--	--
12-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	AF	--	--
13-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	AF	--	--
14-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	AF	--	--
15-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	AF	--	--
16-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	AF	--	--
17-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	AF	--	--
18-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	AF	--	--
19-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	AF	--	--
20-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	AF	--	--
21-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	AF	--	--
22-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	AF	--	--
23-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	AF	--	--
24-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	AF	--	--
25-Sep	80	84	80	79	79	81	81	73	73	69	67	64	63	63	58	52	53	54	57	60	61	68	81	81	64.7	81	
26-Sep	80	82	81	81	81	82	85	89	93	94	96	96	95	95	95	96	95	94	94	96	96	96	96	95	91.0	96	
27-Sep	96	95	96	95	96	95	95	95	95	91	81	70	64	65	61	60	59	58	61	62	62	67	76	81	78.2	96	
28-Sep	81	80	80	83	80	78	77	75	74	72	69	62	59	54	51	51	52	53	55	58	60	63	66	66	66.6	83	
29-Sep	66	65	66	69	72	73	75	76	74	67	64	60	55	51	49	50	52	55	60	64	68	70	73	74	64.6	76	
30-Sep	74	75	78	80	81	84	86	88	86	85	86	87	90	85	81	74	78	90	92	89	92	91	90	86	84.6	92	
	79.4	80.3	80.1	81.1	81.6	82.3	81.3	81.0	81.1	78.9	76.4	72.8	70.9	69.1	66.3	64.2	65.2	67.7	70.1	71.8	73.3	75.7	80.3	80.4		Diurnal Average	
	96	95	96	95	96	95	95	95	95	94	96	96	95	95	95	96	95	94	94	96	96	96	96	95		Diurnal Maximum	

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	24	14.81	14.81
60 - 80	74	45.68	60.49
80 - 100	64	39.51	100.00

Total Number of Valid Hours: 162

Total Number of Hours: 720



Maximum Speed: 27 km/h on Sep 28 10:00		Maximum Daily Speed Average: 17.8 km/h on Sep 28		Hours in Service:	720																						
Minimum Speed Value: 0 km/h on Sep 5 08:00		Minimum Daily Speed Average: 0.7 km/h on Sep 9		Hours of Data:	694																						
Maximum Diurnal Speed Average: 3.2 km/h at hour 14		Minimum Diurnal Speed Average: 0.0 km/h at hour 23		Hours of Missing Data:	26																						
Monthly Average Velocity: 1.5 km/h 185.0 deg		Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 6 Q ₃ = 11 P ₉₀ = 15 P ₉₉ = 23		Percent Operational Time: 96.4																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	NW3	SE2	SE4	SE5	SE6	SE8	ESE5	SE7	SE4	SE4	SSE7	SSE7	SSE3	SSE7	WSW7	E2	SSE5	ESE4	NNW1	NW1	N1	NW1	NNE1	NNE1	SE2.8	SE8	
2-Sep	NW3	NNW1	NE1	E2	SE1	ENE3	E1	E2	E1	SE2	ENE2	NNE2	SW4	WSW6	NW6	NNW6	WNW3	NW4	NW4	N3	NNW1	NW2	NW1	NNW2	NNW1.2	NW6	
3-Sep	NNW2	NNW1	NNW2	ENE1	NW2	ESE3	SE5	SE6	SE7	SE6	S3	WSW7	WSW9	WSW10	WSW8	WSW8	SSW8	E2	SE6	SE8	ESE2	ESE3	SSE4	SSE13	S2.9	SSE13	
4-Sep	SSE16	SSE12	SSE11	SSE11	SSE10	SSE10	SE8	SE9	SE10	SSE7	SE9	SE10	SSE9	SE5	SW2	SSW3	N4	WNW3	NNW6	NNW4	N5	NNW6	NNW7	NNW9	SE4.0	SSE16	
5-Sep	N6	NNW5	NW4	WNW3	NNW2	NNE1	WNW2	NW0	ESE2	SE6	S7	SSE11	S10	S13	S7	SE6	SE12	SE10	SSE6	SSW3	N2	NNW3	NW5	NNW8	SSE2.0	S13	
6-Sep	NW4	NW1	N3	NW3	NW1	N1	NW2	N2	NNE3	NE3	NE1	NW3	NW1	NNW1	NNW1	NW3	N3	NNE3	NNW5	N8	N9	NNW9	N11	N12	NNW3.7	N12	
7-Sep	N13	N10	N11	N10	N8	N9	N7	N8	N8	N9	N9	N8	N9	N13	N13	N13	NNW14	N15	NNW11	NNW6	NNW5	NNW7	NNW7	NNW5	N9.3	N15	
8-Sep	N5	NNW5	NNW5	NNW5	N3	N2	NNW3	NW3	NW4	NNW6	N8	N6	NNW9	NNW6	NNW6	N7	N9	N7	NNE3	N2	N3	N3	NNW2	NNW1	NNW4.6	NNW9	
9-Sep	ESE0	N2	NE0	N3	NW3	NW2	ENE2	ENE1	ESE1	WNW1	W2	W4	ESE2	SSW3	ENE4	ESE2	E1	WNW1	WNW2	N3	N2	NNW2	NW2	NNE1	NNW0.7	ENE4	
10-Sep	WNW1	NE1	NNW3	N1	ENE2	NNW1	NW4	NNW4	NNW3	N3	N4	N4	W5	WSW5	WSW10	WSW6	SW6	SSW8	S8	S10	S12	SSE8	E3	ESE6	SW1.8	S12	
11-Sep	SSE8	SSE10	SE10	SE10	ESE12	ESE8	SE7	SSE14	SSE16	SSE14	SSW17	SSW17	SSW19	SSW19	SW22	SSW20	SW24	SW12	SSW8	SSW8	SW7	W10	W15	WNW8	SSW9.8	SW24	
12-Sep	NW2	SSW2	S5	S6	SE6	SE5	S0	NW0	NNW6	NNW12	NNW13	NNW11	NNW13	NNW11	NNW11	NNW11	NNW8	NNW9	NNW3	WNW2	NNW7	WNW2	N2	NW2	NNW4.3	NNW13	
13-Sep	E1	NW2	WNW2	NW1	WNW3	WNW2	WSW0	SE1	ESE4	NNE2	NE2	E3	SE6	ESE5	SE4	SE7	SSE11	SE7	SE7	SE5	SSE6	SE2	ENE1	SE4	SE2.6	SSE11	
14-Sep	ESE6	ESE4	E2	E2	SE5	ESE7	SE7	ESE6	SE8	SE8	SSE9	SE9	SE6	SW3	WSW6	WSW8	SW7	SW3	NW2	W1	SSW1	SSE1	SE2	SE2	SSE3.4	SE9	
15-Sep	SE4	SE3	SE4	SE6	SE6	SE6	SE6	SE7	SE6	SSE4	SSE2	SSE2	NE3	WNW0	N6	NNE7	NNE5	N5	NNW4	N6	NNW4	NNW5	NW3	NNW4	ENE1.5	NNE7	
16-Sep	NNW4	NNW7	NNW6	NNW5	N3	NNW4	NNW2	NNW5	NNW4	N6	NNE6	N6	N5	WSW4	S6	SSE11	SSE16	SSE20	SE19	SE16	SE14	SE21	SE18	SE14	SE4.1	SE21	
17-Sep	SE17	SE15	SE13	SE12	SSE13	SSE15	SE17	SSE17	SSE17	SSE15	S16	S15	SSE15	SSE16	S15	S19	SSE18	SSE16	SSE15	SE13	SSE11	SSE9	SSE9	SSE8	SSE14.1	S19	
18-Sep	S6	SE4	SE5	SE9	SE8	SE1	NNW3	WNW3	NW2	WSW3	NW3	NNW4	WSW4	WSW7	N3	WNW3	WNW3	SSE3	ESE1	WSW1	SSE0	S1	SE3	SE4	S0.8	SE9	
19-Sep	SSE6	SSE11	SSE7	SSE11	SE11	SE11	SE10	SE14	SE13	SSW7	WSW16	WSW16	WSW16	WSW20	WSW17	WSW18	NNW21	WNW15	WSW19	W15	W23	W24	WNW17	W13	WSW8.5	W24	
20-Sep	W15	W15	W16	W16	WNW9	WNW8	WNW18	WNW20	NW14	NW14	WNW13	WNW13	WNW14	W13	WNW9	WNW15	WNW12	WSW12	WSW9	WSW9	SW8	SE6	SE9	SE12	W9.8	WNW20	
21-Sep	SE13	SSE14	SE11	SE10	SE9	SE11	SE14	SE14	SE13	SE12	SSE5	SW13	WSW7	WSW9	WSW9	WSW7	WSW8	SW7	S5	ESE6	SE6	SE3	SE4	ESE5	SSE6.2	SSE14	
22-Sep	SE3	SE5	SE4	SE4	SE5	ESE4	SE4	SE5	SE4	SE7	SE9	SE9	SE11	SE8	SE9	SW6	WSW13	WSW8	W5	WSW9	W11	W5	W4	WNW4	S3.4	WSW13	
23-Sep	WNW8	NW8	NW0	ESE1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	NW8
24-Sep	AF	AF	AF	AF	AF	AF	AF	NNW4	N5	NNW4	N3	N5	N5	N7	ENE3	SE8	SSE15	SSE13	SSE15	SSE18	SSE18	W14	WSW4	SE6	SSE2.8	SSE18	
25-Sep	SW9	W12	W13	W13	W12	WSW12	W16	NW18	WNW13	WNW13	WNW14	NNW15	NNW13	NNW9	NNW8	N10	N8	NNE7	NNE7	NNE6	NNE5	NE6	NE7	NNE5	NW7.4	NW18	
26-Sep	NNE3	N3	NE7	NE6	NNE6	NNE6	NNE5	NNE8	NNE8	NNE7	NNE7	N10	NNE9	NNE7	NNE9	N12	N11	NNE10	N14	N15	N13	N12	N11	N11	NNE8.6	N15	
27-Sep	N8	NNW6	NNW7	NNW7	NNW6	NNW7	NNW7	NNW7	NNW6	NNW5	N5	NE4	SE5	SSW4	WSW4	SSE3	SSE7	S5	SE4	SE4	SE2	SE5	SSE8	SE9	N0.9	SE9	
28-Sep	SSE10	SSE13	SSE10	SSE9	SSE11	SSE16	SSE22	SSE22	S24	S27	S23	S24	S24	S24	S23	SSW20	S23	S21	S16	S17	SSE17	S19	SSE19	SSE12	SSE11	S17.8	S27
29-Sep	SSE11	SSE14	SSE13	SSE11	SE11	SE7	SSE10	SSE11	SE12	SSE14	SSE13	SSE16	S14	S11	SSW16	SSW18	SW16	SSW9	SSW9	SSW9	SSW5	S5	SE8	SSE7	S10.1	SSW18	
30-Sep	SSE6	SSE6	SE5	SE5	SSW3	NNW1	NW1	SE4	SE2	NW1	NNW3	NNW3	NNW6	N7	N3	NNW3	NW5	N4	N3	N4	NNE3	NW1	N3	NNE5	NNE1.1	N7	
SSE1.5 SSE1.7 SSE1.4 SE1.9 SE2.4 SE2.4 SSE2.0 SE2.1 SE2.5 SSE1.9 SSW1.6 SW1.9 SSW2.4 SW3.2 WSW3.0 SW2.9 SW3.2 SSW2.1 S2.1 S1.5 SSW1.3 WSW1.0 NNW0.0 ESE0.9																								Diurnal Average			
SE17 SE15 W16 W16 SSE13 SSE16 SSE22 SSE22 S24 S27 S23 S24 S24 S23 SW22 S23 SW24 SSE20 WSW19 SSE18 W23 W24 SE18 SE14																								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: 10 km/h on Sep 19 21:00	Hours of Data: 694
Minimum Value: 0 km/h on Sep 9 19:00	Hours of Missing Data: 26
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8	Hours of Calibration: 0
	Percent Operational Time: 96.4

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

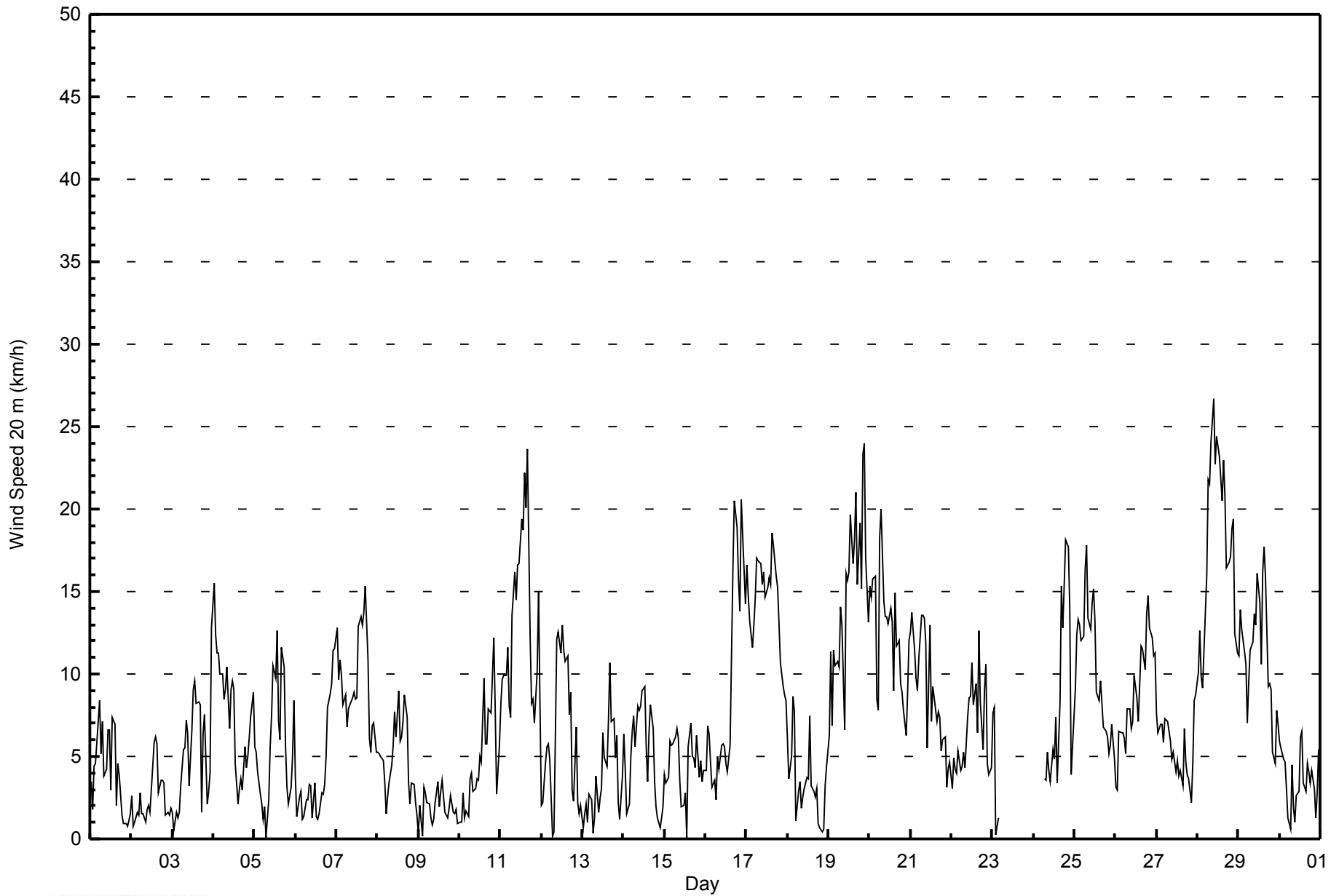
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

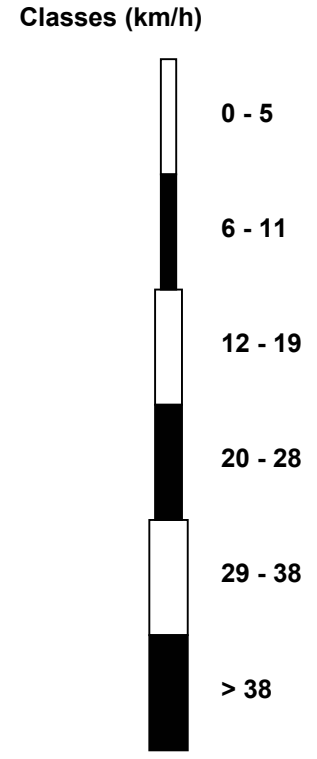
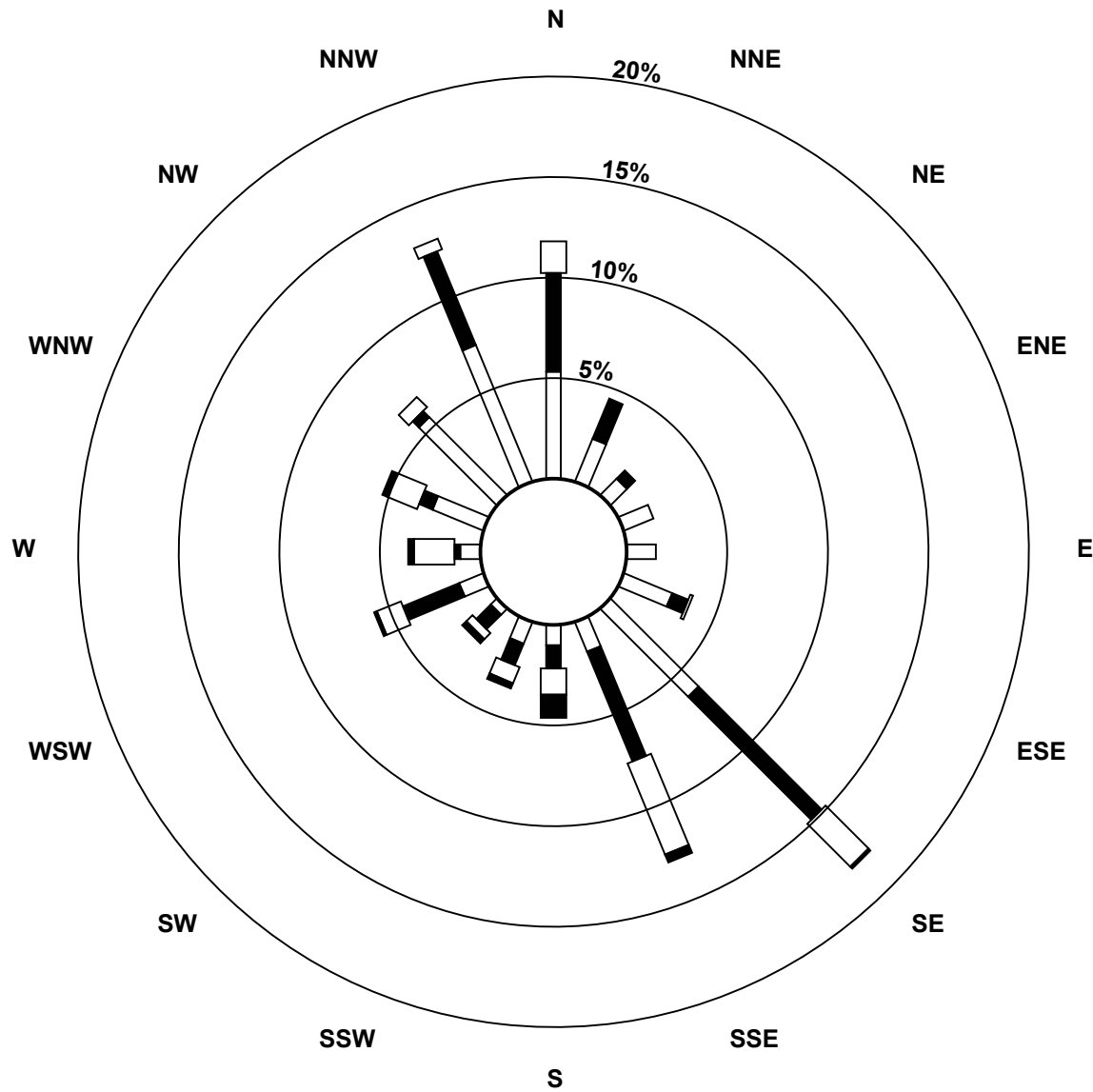
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	296	42.65	42.65
6 - 11	249	35.88	78.53
12 - 19	128	18.44	96.97
20 - 28	21	3.03	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 694

Total Number of Hours: 720

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

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



Total Number of Valid Hours: 694



Wood Buffalo Environmental Association
Summary of Hour Averages

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

Maximum Speed: 33 km/h on Sep 19 22:00	Maximum Daily Speed Average: 19.9 km/h on Sep 28	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 12 07:00	Minimum Daily Speed Average: 1.1 km/h on Sep 9	Hours of Data: 688
Maximum Diurnal Speed Average: 3.8 km/h at hour 14	Minimum Diurnal Speed Average: 0.6 km/h at hour 23	Hours of Missing Data: 32
Monthly Average Velocity: 1.7 km/h 191.5 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 5 Median = 9 Q ₃ = 14 P ₉₀ = 19 P ₉₉ = 28	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	NW5	SE3	SE6	SE5	SE6	SE10	ESE7	SE8	SE4	SE4	SSE7	SSE7	SSE4	SSE9	WSW9	E3	SSE6	ESE5	NNW1	NW2	N1	NW0	NNE1	NNE1	SE3.3	SE10	
2-Sep	NW2	NNW1	NE1	E2	SE2	ENE4	E2	E1	E1	SE2	ENE3	NNE1	SW5	WSW7	NW9	NNW8	WNW3	NW5	NW5	N6	NNW3	NW3	NW1	NNW1	NNW1.6	NW9	
3-Sep	NNW3	NNW1	NNW2	ENE1	NW1	ESE5	SE7	SE6	SE9	SE7	S3	WSW8	WSW11	WSW12	WSW10	WSW10	SSW10	E3	SE10	SE10	ESE4	ESE4	SSE6	SSE16	S3.8	SSE16	
4-Sep	SSE18	SSE15	SSE14	SSE14	SSE12	SSE12	SE11	SE12	SE14	SSE8	SE11	SE11	SSE10	SE6	SW4	SSW4	N6	WNW4	NNW9	NNW7	N8	NNW10	NNW11	NNW13	SE4.5	SSE18	
5-Sep	N8	NNW9	NW7	WNW3	NNW1	NNE3	WNW1	NW1	ESE3	SE7	S9	SSE12	S11	S14	S9	SE9	SE16	SE14	SSE7	SSW4	N2	NNW5	NW9	NNW13	SSE1.9	SE16	
6-Sep	NW5	NW2	N4	NW2	NW1	N2	NW2	N4	NNE5	NE4	NE2	NW5	NW2	NNW2	NNW2	NW4	N4	NNE5	NNW7	N10	N12	NNW14	N16	N16	N5.2	N16	
7-Sep	N18	N14	N15	NAF	NAF	NAF	NAF	NAF	NAF	N12	N12	N12	N12	N18	N19	N19	NNW20	N22	NNW16	NNW10	NNW9	NNW11	NNW11	NNW8	N14.1	N22	
8-Sep	N8	NNW9	NNW8	NNW8	N6	N3	NNW4	NNW5	NNW7	N11	N8	NNW13	NNW7	NNW8	N10	N13	N11	NNE5	N4	N6	N6	NNW4	NNW2	NNW6.8	N13		
9-Sep	ESE0	N2	NE0	N4	NW4	NW3	ENE2	ENE1	ESE1	WNW2	W3	W4	ESE2	SSW4	ENE6	ESE2	E1	WNW1	WNW3	N3	N3	NNW4	NW3	NNE2	NNW1.1	ENE6	
10-Sep	WNW1	NE1	NNW4	N3	ENE2	NNW2	NW5	NNW6	NNW4	N4	N4	N4	W6	WSW6	WSW12	WSW7	SW7	SSW10	S10	S12	S15	SSE10	E5	ESE8	SW2.1	S15	
11-Sep	SSE9	SSE10	SE12	SE12	ESE15	ESE10	SE9	SSE15	SSE18	SSE16	SSW21	SSW21	SSW24	SSW23	SW28	SSW25	SW29	SW16	SSW11	SSW11	SW10	W15	W23	WNW13	SSW12.2	SW29	
12-Sep	NW3	SSW3	S6	S7	SE6	SE6	S0	NW1	NNW8	NNW17	NNW17	NNW15	NNW18	NNW16	NNW15	NNW15	NNW11	NNW13	NNW5	WNW3	NNW11	WNW2	N3	NW3	NNW6.2	NNW18	
13-Sep	E1	NW1	WNW2	NW1	WNW2	WNW2	WSW1	SE2	ESE4	NNE2	NE3	E4	SE7	ESE5	SE5	SE8	SSE13	SE10	SE10	SE8	SSE8	SE4	ENE3	SE7	SE3.6	SSE13	
14-Sep	ESE9	ESE7	E3	E3	SE7	ESE9	SE10	ESE7	SE9	SE9	SE9	SSE11	SE11	SE6	SW4	WSW8	WSW11	SW8	SW6	NW4	W2	SSW2	SSE1	SE6	SSE4.5	SE11	
15-Sep	SE8	SE7	SE8	SE9	SE8	SE9	SE9	SE9	SE7	SSE4	SSE2	NE3	WNW1	N8	NNE11	NNE8	N7	NNW7	N8	NNW6	NNW7	NW5	NNW7	ENE2.3	NNE11		
16-Sep	NNW8	NNW11	NNW10	NNW7	N5	NNW6	NNW4	NNW7	NNW6	N7	NNE8	N7	N6	WSW5	S6	SSE13	SSE19	SSE25	SE23	SE20	SE18	SE26	SE23	SE18	SE4.6	SE26	
17-Sep	SE20	SE18	SE16	SE15	SSE15	SSE17	SE22	SSE20	SSE20	SSE18	S18	S17	SSE18	SSE19	S17	S20	SSE20	SSE18	SSE18	SE18	SSE14	SSE12	SSE12	SSE10	SSE16.9	SE22	
18-Sep	S8	SE5	SE7	SE11	SE11	SE2	NNW4	WNW5	NW3	WSW3	NW4	NNW5	WSW4	WSW9	N4	WNW4	WNW3	SSE4	ESE3	WSW1	SSE3	S3	SE7	SE7	SSE1.4	SE11	
19-Sep	SSE10	SSE15	SSE10	SSE15	SE14	SE14	SE14	SE18	SE17	SSW9	WSW23	WSW23	WSW23	WSW28	WSW25	WSW27	WNW28	WNW21	WSW27	W22	W33	W33	WNW23	W19	WSW12.2	W33	
20-Sep	W22	W21	W22	W23	WNW12	WNW11	WNW26	WNW28	NW19	NW18	WNW18	WNW17	WNW19	W18	WNW13	WNW20	WNW16	WSW18	WSW14	WSW13	SW11	SE8	SE11	SE16	W13.7	WNW28	
21-Sep	SE16	SSE18	SE15	SE13	SE12	SE14	SE18	SE17	SE18	SE16	SSE6	SW17	WSW9	WSW12	WSW12	WSW9	WSW11	SW11	S9	ESE10	SE7	SE5	SE6	ESE8	SSE8.3	SE18	
22-Sep	SE4	SE7	SE7	SE6	SE8	ESE6	SE7	SE7	SE6	SE9	SE11	SE10	SE14	SE10	SE12	SW10	WSW19	WSW12	W11	WSW15	W17	W9	W8	WNW10	SSW4.7	WSW19	
23-Sep	WNW12	NW11	NW1	ESE2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	WNW12	
24-Sep	AF	AF	AF	AF	AF	AF	AF	NNW3	NNW5	N7	NNW5	N4	N7	N5	N9	ENE5	SE11	SSE20	SSE18	SSE21	SSE24	SSE21	W19	WSW7	SE8	SSE3.8	SSE24
25-Sep	SW12	W18	W19	W18	W17	WSW17	W23	NW23	WNW18	WNW17	WNW19	NNW19	NNW17	NNW11	NNW11	N13	N11	NNE10	NNE10	NNE9	NNE8	NE8	NE11	NNE7	NW10.2	NW23	
26-Sep	NNE5	N4	NE10	NE9	NNE9	NNE9	NNE8	NNE12	NNE10	NNE11	N14	NNE12	NNE11	NNE14	N17	N16	NNE15	N19	N20	N19	N19	N17	N16	N16	NNE12.5	N20	
27-Sep	N11	NNW9	NNW10	NNW10	NNW9	NNW11	NNW10	NNW9	NNW8	NNW6	N7	NE5	SE5	SSW4	WSW5	SSE3	SSE8	S5	SE5	SE5	SE5	SE7	SSE11	SE12	N1.6	SE12	
28-Sep	SSE13	SSE15	SSE12	SSE11	SSE13	SSE18	SSE24	SSE24	S26	S28	S25	S26	S26	S24	SSW24	S26	S23	S18	S18	SSE19	S21	SSE22	SSE15	SSE14	S19.9	S28	
29-Sep	SSE14	SSE18	SSE17	SSE16	SE15	SE10	SSE14	SSE17	SE16	SSE19	SSE16	SSE19	S16	S12	SSW18	SSW21	SW20	SSW11	SSW12	SSW12	SSW7	S5	SE9	SSE10	SSE13.0	SSW21	
30-Sep	SSE8	SSE8	SE7	SE6	SSW4	NNW2	NW1	SE6	SE2	NW2	NNW3	NNW4	NNW8	N9	N4	NNW4	NW6	N7	N6	N6	NNE5	NW2	N5	NNE9	NNE1.8	N9	

SSE1.7	SSE1.9	SSE1.7	SSE2.7	SE3.5	SE3.3	SSE2.9	SSE2.6	SE3.2	SSE1.9	SW1.6	SW2.2	SW2.8	SW3.8	WSW3.8	WSW3.5	SW3.8	SSW2.3	SSW2.4	S1.7	SW1.4	W1.5	NNW0.6	E1.1	Diurnal Average
W22	W21	W22	W23	W17	SSE18	WNW26	WNW28	S26	S28	S25	S26	S26	WSW28	SW28	WSW27	SW29	SSE25	WSW27	SSE24	W33	W33	SE23	W19	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: 10 km/h on Sep 4 17:00	Hours of Data: 688
Minimum Value: 0 km/h on Sep 9 18:00	Hours of Missing Data: 32
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 9	Hours of Calibration: 0
	Percent Operational Time: 95.6

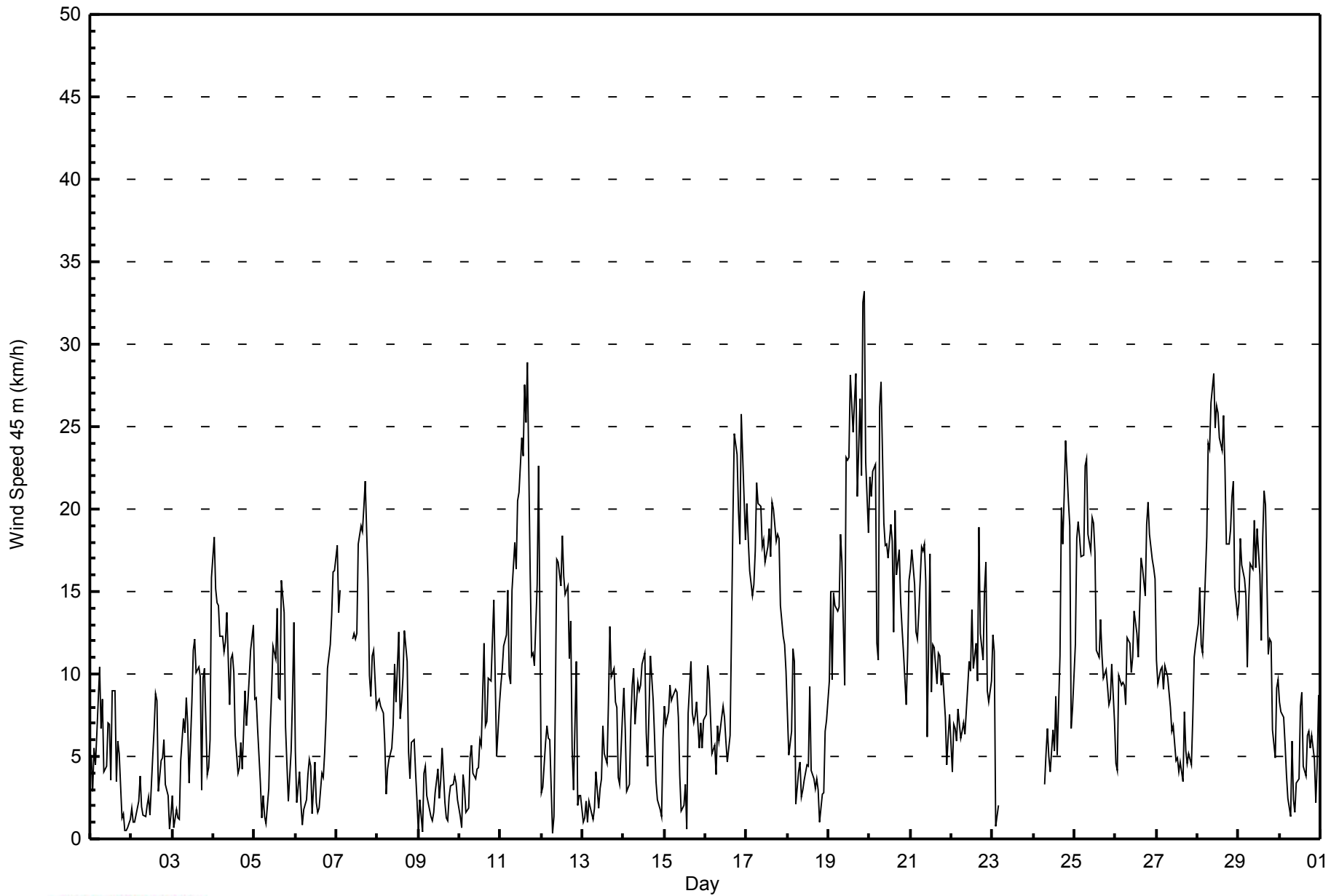
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	2	2	1	2	2	3	2	3	2	2	3	2	2	4	6	7	2	2	2	2	1	1	1	1	7
2-Sep	1	1	1	1	1	2	1	1	1	1	2	2	2	2	9	9	1	2	2	1	1	1	1	1	9
3-Sep	1	1	1	1	1	3	2	2	2	2	2	3	3	4	3	5	4	4	4	3	2	2	3	4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

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

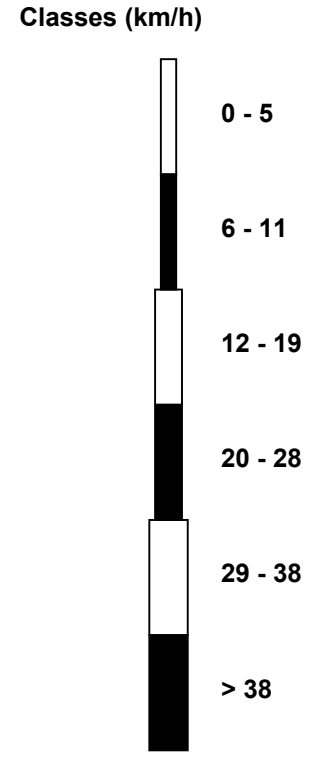
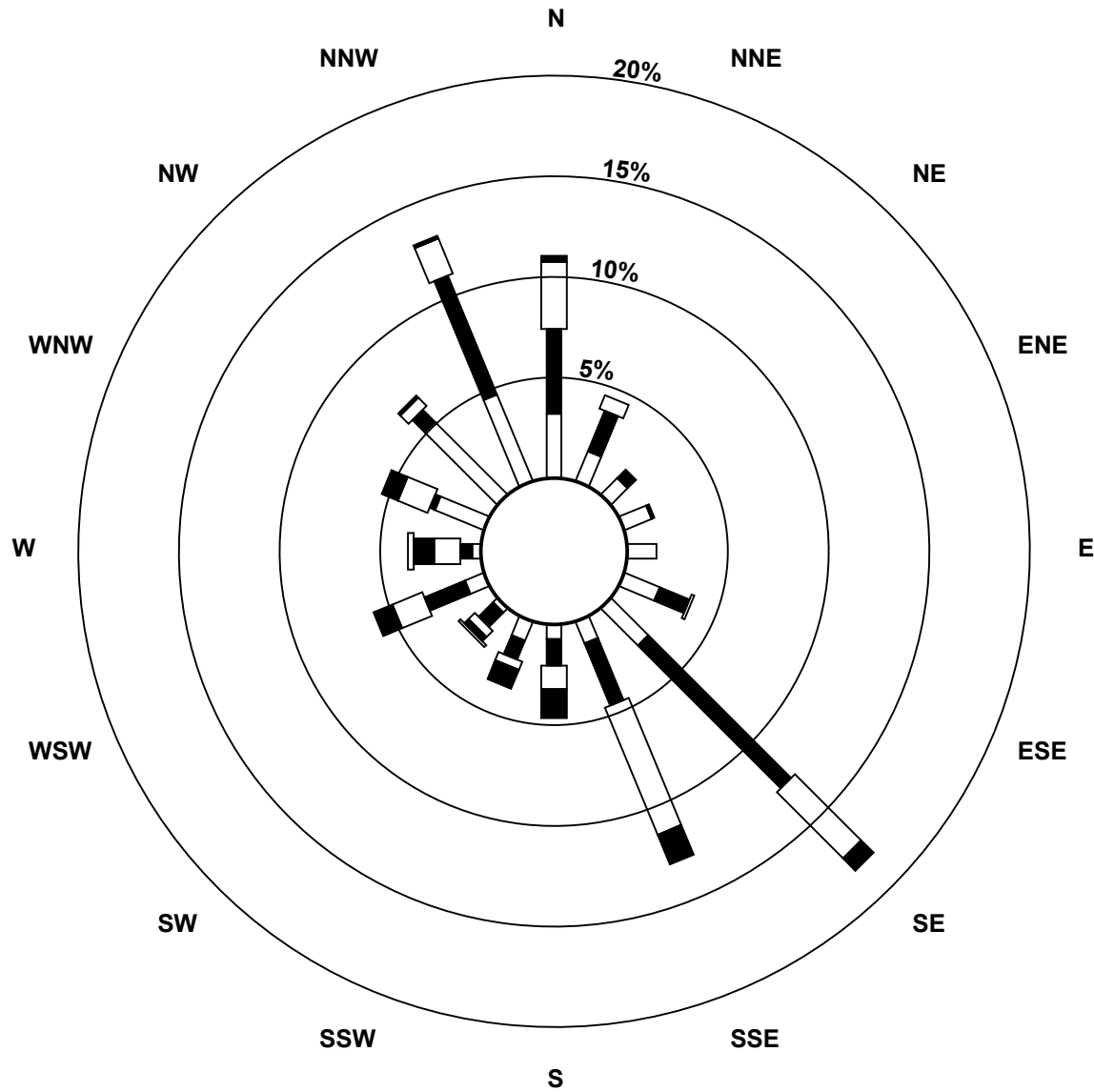
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	209	30.38	30.38
6 - 11	246	35.76	66.13
12 - 19	170	24.71	90.84
20 - 28	60	8.72	99.56
29 - 38	3	0.44	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 688

Total Number of Hours: 720

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

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



Total Number of Valid Hours: 688



Maximum Speed: 47 km/h on Sep 19 22:00	Maximum Daily Speed Average: 25.5 km/h on Sep 28	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 9 03:00	Minimum Daily Speed Average: 1.2 km/h on Sep 5	Hours of Data: 694
Maximum Diurnal Speed Average: 4.0 km/h at hour 14	Minimum Diurnal Speed Average: 0.6 km/h at hour 24	Hours of Missing Data: 26
Monthly Average Velocity: 2.1 km/h 209.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 7 Median = 13 Q ₃ = 20 P ₉₀ = 27 P ₉₉ = 36	Percent Operational Time: 96.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Sep	WNW10	S2	SW7	SW7	SW8	SSW5	S4	S6	SSW3	SE4	SE7	SSE5	SE3	S9	WSW9	ENE9	SE8	SSW3	ESE1	NNW3	WNW5	N4	WNW5	W10	SSW2.6	W10			
2-Sep	WNW4	NE2	SSE3	SE3	SE5	SE4	SSE1	S1	SE2	ESE1	N2	WNW2	WSW6	W7	NNW11	NNE16	N4	NW10	NW9	NW14	NNW13	N12	N9	N5	NNW3.5	NNE16			
3-Sep	NW4	N3	NE2	ESE2	SE5	SSE6	S6	SSE7	SE8	ESE6	SW4	WSW10	WSW13	WSW13	WSW11	WSW12	SSW11	ENE4	SSE17	SSE16	SSE8	SSE8	SSE13	S13	S5.4	SSE17			
4-Sep	SSE14	SSE17	SSE15	SSE18	SSE18	SSE17	SSE16	SSE18	SSE18	S10	SSE13	S8	SSE10	SSW8	SW9	SW8	N11	NNE9	N16	NNE11	N16	N16	N18	N20	SE4.4	N20			
5-Sep	N14	N15	N12	NNW8	NW7	NNW10	NNW6	NE1	SE4	SE9	S10	SSE14	S12	S15	S11	SE16	SE25	SE25	SSE11	S7	WSW6	NW9	NNW17	NNW26	SSE1.2	NNW26			
6-Sep	NNW12	NW9	NW11	NW8	NW4	N6	NNE4	NNE7	NNE7	NE6	ENE2	N4	NNE4	ENE4	E5	N2	ENE6	ENE11	NNE10	NNE13	NNE17	N18	N22	N23	N7.7	N23			
7-Sep	N24	NNE21	N21	NNE20	NNE17	NNE19	NNE15	NNE16	NNE17	NNE18	NNE17	NNE17	NNE18	N25	N27	N27	N30	N31	N23	NNW16	N13	N18	N18	N14	N19.7	N31			
8-Sep	N17	N16	N13	N14	N12	N9	N10	N8	N7	N9	N15	NNE12	NNW17	NNW9	N11	N14	NNE18	N15	NNE8	N6	NNE10	NNE12	NNE9	NNE6	N11.3	NNE18			
9-Sep	NE2	NNE3	SSE0	NNW3	N9	NNE4	N1	NW1	ENE2	NW2	W3	WNW5	ESE2	SW4	ENE8	E3	SE1	NW1	WNW4	NW6	NNW9	N15	N11	NNE8	N3.0	NNW15			
10-Sep	NNE6	W2	NNW6	NW8	W6	NW4	NNW10	NNW10	NW8	NW4	NNW5	NNW4	WNW8	WSW7	WSW13	WSW8	SW8	SSW12	SSW12	SSW16	SSW20	SSW15	SE9	SE9	WSW4.9	SSW20			
11-Sep	S7	S9	S10	SSE12	SSE12	SSE11	SSE12	S18	S20	S17	SW25	SSW24	SW30	SSW28	SW33	SW31	SW36	SW24	SW23	SW22	WSW19	W26	W35	W23	SW17.8	SW36			
12-Sep	W9	WSW12	SW13	SW12	WSW8	W6	NW7	NNW12	NNW15	N23	NNW23	NNW21	NNW25	NNW22	N20	NNW21	N16	NNW20	NNW11	NNW7	N17	NNW2	WNW8	NNW12	NNW11.6	NNW25			
13-Sep	NNW8	NNW8	N4	N3	NNW3	NNE2	E5	ESE7	ESE5	NE2	E2	ESE5	SE7	SE5	SSE4	SSE9	SSE13	SSE12	SSE14	SSE14	SSE8	SSE6	SE2	SE8	SE4.0	SSE14			
14-Sep	SSE11	SSE8	SSE6	SSE7	S9	SSE9	SSE12	S8	SE10	SE13	SE13	SSE11	SSE12	SE7	WSW6	WSW9	WSW13	SW11	SW15	WSW16	WSW10	WSW5	W4	WSW7	S6.9	WSW16			
15-Sep	WSW7	SW5	SSE5	S5	S5	S5	S5	S6	SE6	SSE3	SSW1	S2	N3	NNW1	NNE15	NE12	NNE10	NNE9	NNE8	ESE7	E4	N6	NNE9	ENE2.0	NNE15				
16-Sep	N11	N17	N16	N12	N9	N7	E5	N3	N7	NNE10	NE10	NNE10	NNE8	W4	SSE7	SSE14	SSE23	SSE31	SE33	SE30	SE27	SE35	SE32	SE28	ESE7.9	SE35			
17-Sep	SE29	SE27	SE24	SE23	SE24	SE27	SE33	SSE31	SSE30	SSE24	S20	S19	SSE24	SSE25	SSE20	S23	SSE24	SSE21	SSE28	SE34	SE32	SE26	SSE22	SSE18	SSE25.0	SE34			
18-Sep	SSE13	S6	S7	S7	S7	SE3	N6	NNW9	NNW4	NNW4	NNW5	NNW5	W3	W8	N6	NW5	NW4	SSE4	SE8	ESE11	SSE12	SE14	SSE15	SSE18	SSE2.9	SSE18			
19-Sep	SE23	SSE28	SSE18	SSE17	S12	S10	S11	S14	S12	SW14	WSW26	WSW27	WSW27	WSW33	WSW29	WSW36	NNW4	WNW31	W36	W31	W45	W47	WNW34	W28	WSW18.7	W47			
20-Sep	W33	W32	W34	W34	NNW20	NNW21	NNW38	NNW39	NW27	NW23	NNW23	NNW22	NNW25	W23	NNW17	NNW27	NNW24	WSW26	WSW23	WSW22	SW21	SSW13	SSE12	S11	W21.8	WNW39			
21-Sep	SSE18	SSE20	SSE13	SSE14	SSE13	S14	S12	SSE13	SSE13	SSE12	S6	SW20	WSW10	WSW16	WSW15	WSW14	WSW16	SW20	SSW17	S18	S13	SSE13	SE18	SSE19	S11.7	SW20			
22-Sep	SE15	SSE19	SSE17	S8	SSE11	SSE13	SSE9	SSE15	SSE16	SE13	SE15	SSE13	SE19	SE14	SSE12	WSW15	WSW25	WSW18	WSW21	W28	W28	W22	NNW18	NNW25	SSW9.0	W28			
23-Sep	WNW22	NW20	NW5	SW2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	WNW22			
24-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	SE4	NNW2	N8	NNW7	N6	NNE5	E8	E10	ESE14	SE20	SE34	SE33	SE35	SE37	SSE27	W26	WSW13	S12	SSE10.2	SE37
25-Sep	SW20	WSW29	WSW29	WSW27	WSW24	WSW21	WSW28	NNW31	W26	W24	W25	NW26	NNW26	NNW23	NNW15	NNW15	N17	N14	NNE14	NNE15	NNE15	NNE13	NNE14	NE14	NNE10	WNW13.2	WNW31		
26-Sep	NNE8	NNE8	NE17	NE15	NNE15	NNE14	NNE14	NNE20	NNE19	NNE16	NNE16	N20	NNE19	NNE16	NNE21	NNE26	N24	NNE23	N28	N29	N27	N25	N24	N23	NNE19.0	N29			
27-Sep	N17	N15	N17	N16	N15	NNW18	NNW18	NNW15	NNW11	NNW9	N9	NNE5	SE4	SSW4	SW5	SE3	SE9	S6	S7	S9	SSE10	SSE13	SSE14	SSE15	N3.0	NNW18			
28-Sep	SSE18	SSE20	SSE18	SSE18	SSE21	SSE26	SSE31	SSE30	SSE33	SSE32	SSE28	SSE30	SSE29	S28	S26	S30	S28	S24	SSE23	SSE23	SSE26	SSE30	SSE23	SSE21	SSE25.5	SSE33			
29-Sep	SSE21	SSE23	SSE21	SE25	SE24	SE22	SE27	SE29	SE27	SE30	SE24	SSE24	SSE18	SSE14	S20	SSW24	SSW25	SSW15	SSW19	SSW18	SSW11	SSW9	SSE9	SSE9	SSE18.2	SE30			
30-Sep	SSE9	SSE8	SSE9	S8	SW10	W7	WNW4	SE7	S4	WSW5	NW5	NW9	NNW12	N13	N6	NNW6	NW8	NNW11	NNE10	NNE10	NNE8	N5	N10	NNE15	NNW2.8	NNE15			

SSW1.6	SSW2.1	SSW2.0	S2.3	S2.8	SSE2.4	S2.7	S2.2	SE2.9	SSE1.8	SW1.6	WSW2.3	SW2.4	SW4.0	WSW3.9	WSW3.2	SW3.7	SSW2.5	SSW3.8	SSW3.8	SW2.8	WSW2.2	NW1.2	N0.6	Diurnal Average
W33	W32	W34	W34	SE24	SE27	NNW38	NNW39	SSE33	SSE32	SSE28	SSE30	SW30	WSW33	SW33	WSW36	NNW41	SE33	W36	SE37	W45	W47	W35	W28	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: 13 km/h on Sep 4 17:00	Hours of Data: 694
Minimum Value: 1 km/h on Sep 3 01:00	Hours of Missing Data: 26
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 10	Hours of Calibration: 0
	Percent Operational Time: 96.4

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

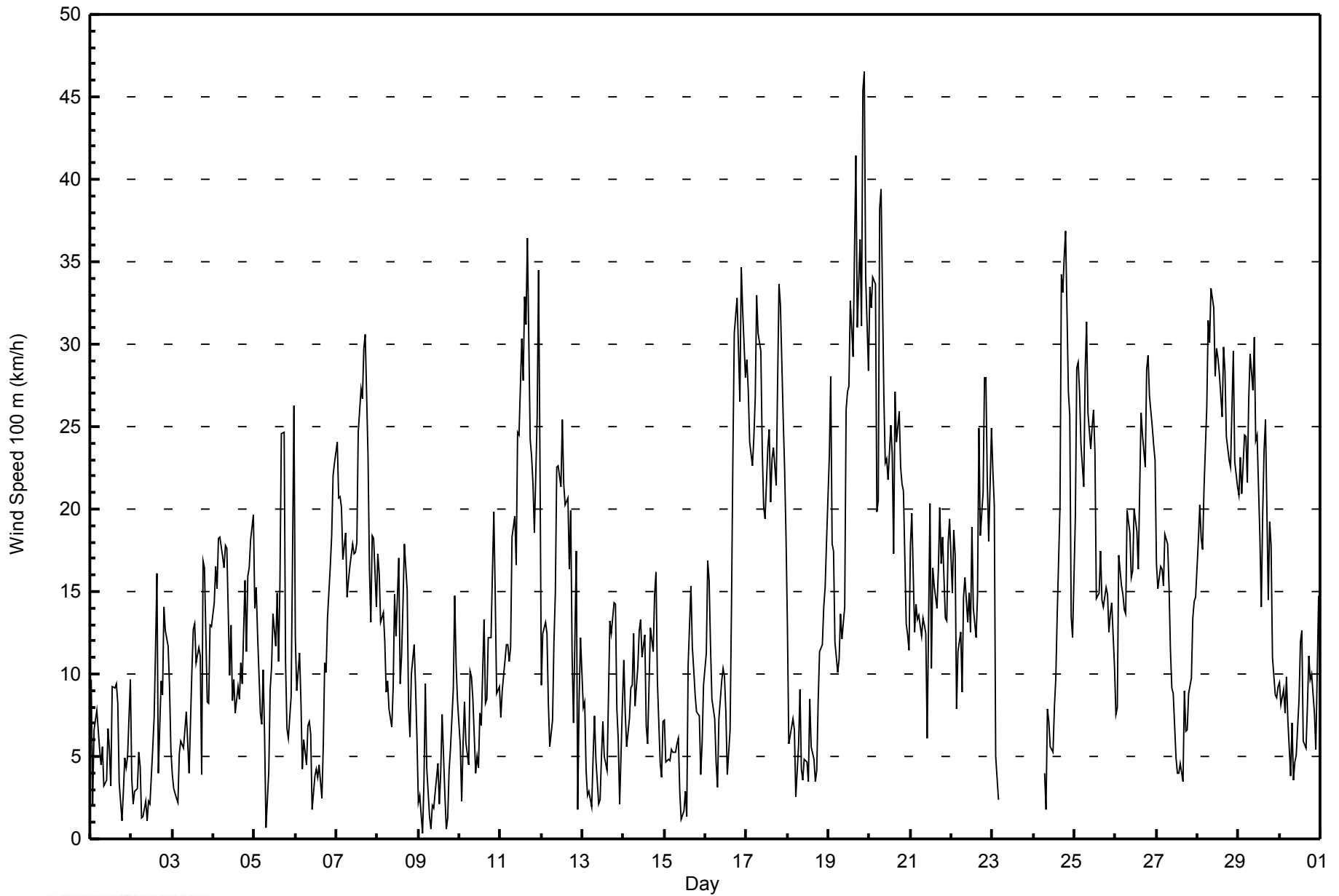
6	6	7	7	12	9	7	8	7	7	7	7	7	8	13	10	13	12	10	7	12	9	8	7	
Diurnal Maximum																								

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

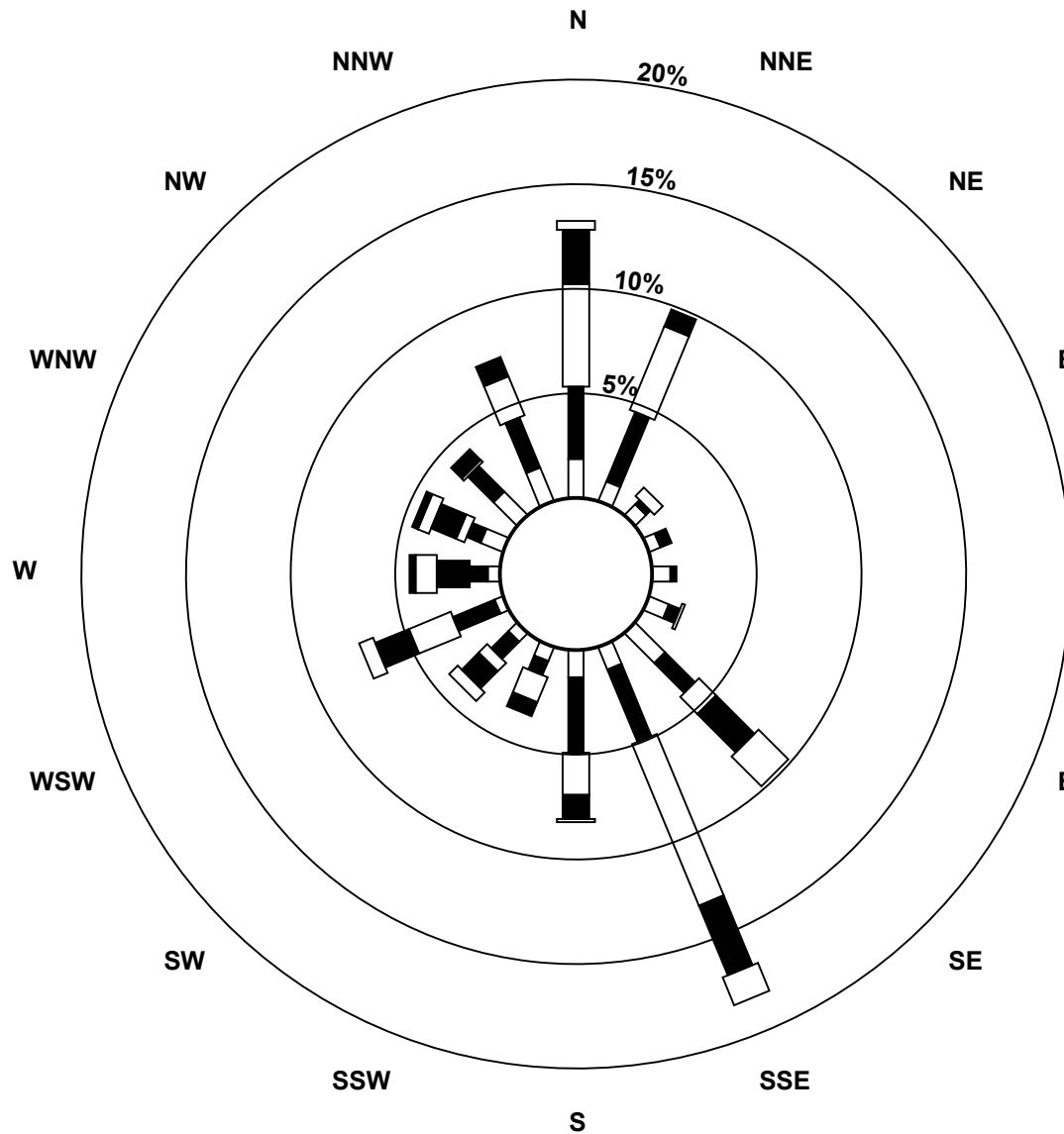
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	120	17.29	17.29
6 - 11	195	28.10	45.39
12 - 19	195	28.10	73.49
20 - 28	132	19.02	92.51
29 - 38	48	6.92	99.42
> 38	4	0.58	100.00

Total Number of Valid Hours: 694

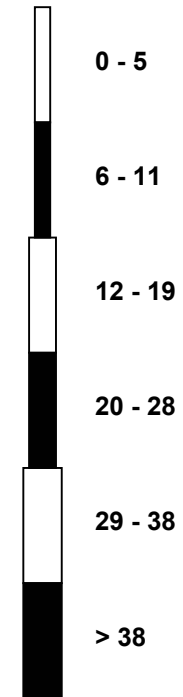
Total Number of Hours: 720

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

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



Classes (km/h)



Total Number of Valid Hours: 694



Maximum Speed: 41 km/h on Sep 24 19:00	Maximum Daily Speed Average: 29.7 km/h on Sep 28	Hours in Service: 720
Minimum Speed Value: 2 km/h on Sep 27 13:00	Minimum Daily Speed Average: 3.6 km/h on Sep 27	Hours of Data: 162
Maximum Diurnal Speed Average: 7.0 km/h at hour 17	Minimum Diurnal Speed Average: 0.0 km/h at hour 23	Hours of Missing Data: 558
Monthly Average Velocity: 3.6 km/h 169.3 deg	Percentiles: P ₁ = 3 P ₁₀ = 8 Q ₁ = 14 Median = 21 Q ₃ = 28 P ₉₀ = 33 P ₉₉ = 40	Percent Operational Time: 22.5

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	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---
2-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	---	---
3-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	---	---
4-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	---	---
5-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	---	---
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	AF	AF	AF	AF	AF	AF	---	---
8-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	---	---
9-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	---	---
10-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	---	---
11-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	---	---
12-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	---	---
13-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	---	---
14-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	---	---
15-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	---	---
16-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	---	---
17-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	---	---
18-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	---	---
19-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	---	---
20-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	---	---
21-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	---	---
22-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	---	---
23-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	---	---
24-Sep	AF	AF	AF	AF	AF	AF	SE17	SE6	ESE3	E4	E7	ESE12	ESE14	ESE15	ESE19	SE25	SE39	SE39	SE41	SSE40	SSE30	W31	W21	SSW14	SSE15.5	SE41
25-Sep	SW29	W38	W37	W35	W30	WSW28	W34	WNNW36	W31	W27	W28	NNW28	NNW25	NNW15	NNW16	N19	N15	NNE16	NNE19	NNE19	NNE16	NNE18	NE17	NE15	WNNW15.8	W38
26-Sep	NE11	NNE11	NE23	NE21	NE20	NE18	NE19	NNE27	NE25	NE21	NNE21	NNE23	NNE22	NNE21	NNE25	NNE29	NNE28	NNE27	N31	N33	NNE31	NNE28	N28	N26	NNE23.1	N33
27-Sep	N21	N19	N19	N18	N17	NNW23	NNW22	NNW19	NNW14	N11	N10	NNE5	ESE2	SSW5	SW5	SSE3	SSE8	S8	SSW10	SSW14	SSW17	S18	S18	SSW14	NNW3.6	NNW23
28-Sep	S16	S19	S25	S28	SSE32	SSE31	SSE33	SSE33	SSE37	S36	SSE29	SSE31	SSE30	S33	S30	S34	S32	S28	S32	S29	S33	S34	SSE27	SSE28	S29.7	SSE37
29-Sep	S27	S28	S26	SSE23	SSE22	SSE24	SSE24	SSE26	SSE28	SE32	SE26	SSE24	SSE19	S15	S23	SSW29	SSW29	SSW22	SSW26	SSW27	SSW19	SW16	SSW9	S7	S20.7	SE32
30-Sep	S8	SSW5	S9	SSW12	WSW15	WNNW12	NW9	SE3	S4	W6	NNW9	NNW12	NNW15	N14	N7	N7	NW8	NNW14	NNE13	NNE14	NNE11	N8	N14	NNE20	NNW5.2	NNE20

SSW6.8 SW6.9SSW5.7SSW6.1SSW5.3SSW3.3	S4.2 SE1.0 SSE3.9 SSE4.2 SE2.5 E1.6 E1.7 SE3.0 SSE3.6 SSE4.2 SSE7.0 SSE5.5 SE6.9 SE6.6 SSE6.2 SW3.6 SSE0.0 ESE3.0	Diurnal Average
SW29 W38 W37 W35 SSE32 SSE31	W34WNNW36 SSE37 SSE36 SSE29 SSE31 SSE30 S33 S30 S34 SE39 SE39 SE41 SSE40 S33 S34 N28 SSE28	Diurnal Maximum

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



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 8 km/h on Sep 25 08:00	Hours of Data: 162
Minimum Value: 1 km/h on Sep 24 10:00	Hours of Missing Data: 558
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 5 P ₉₉ = 7	Hours of Calibration: 0
	Percent Operational Time: 22.5

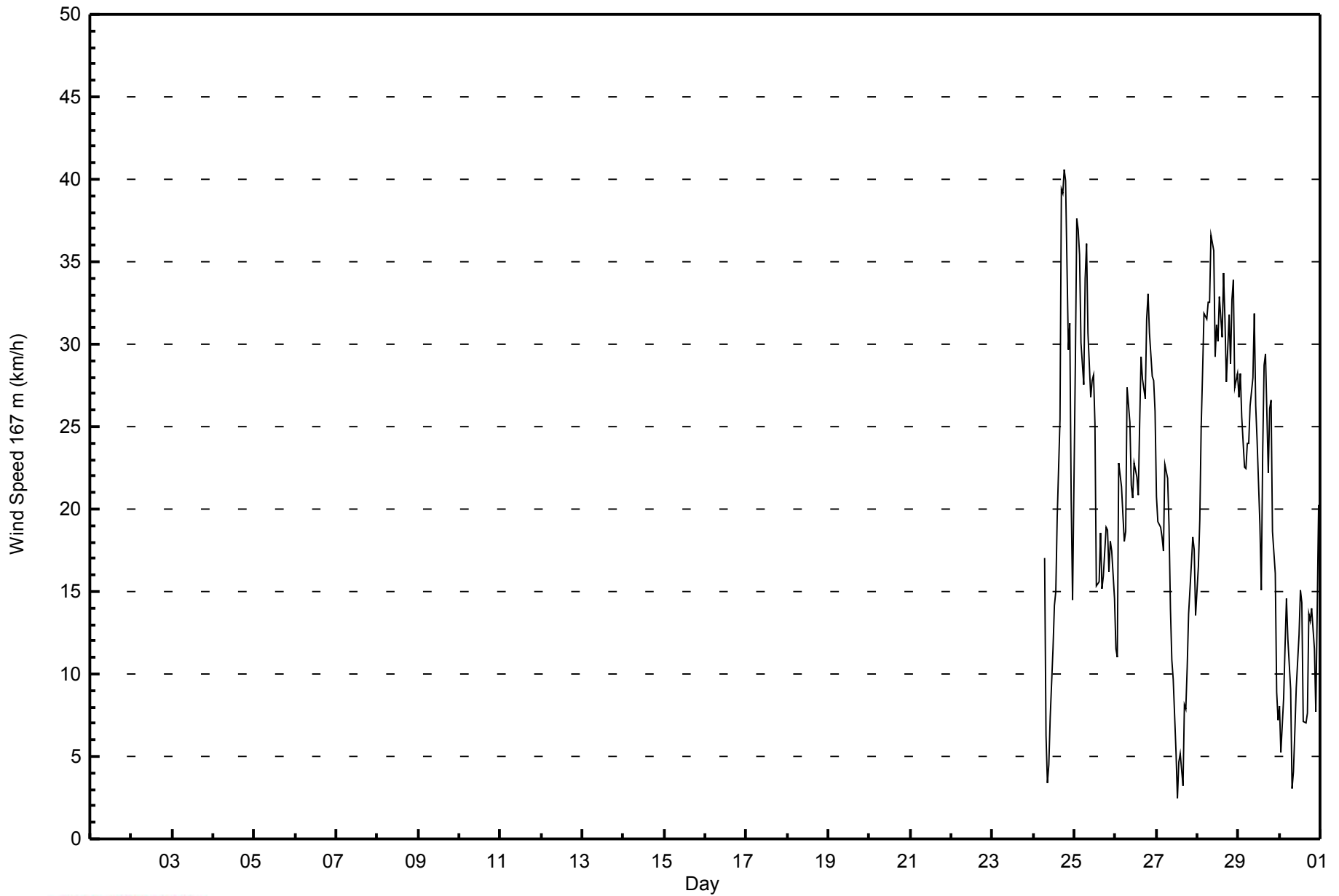
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
2-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF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

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

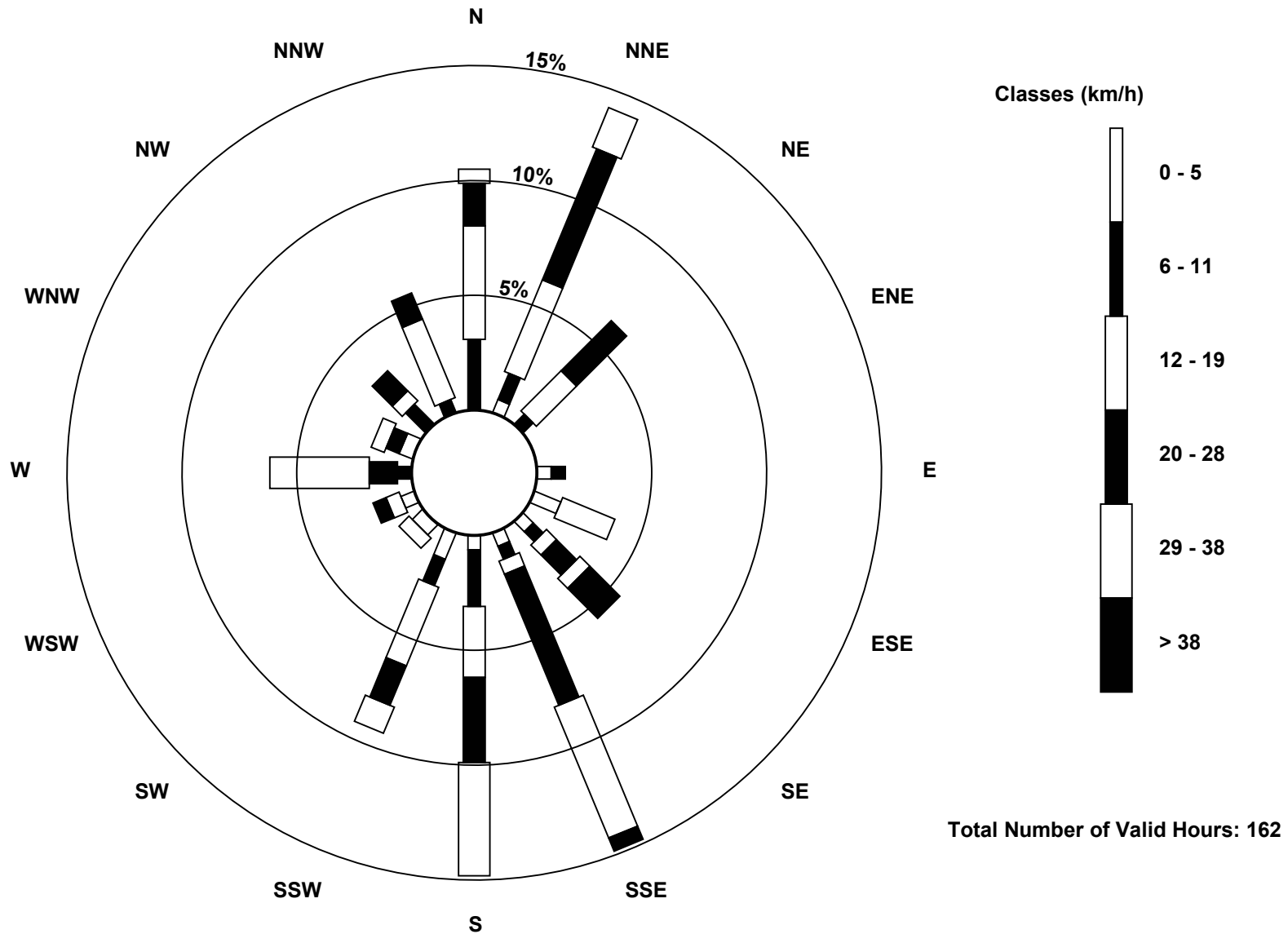
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	10	6.17	6.17
6 - 11	21	12.96	19.14
12 - 19	46	28.40	47.53
20 - 28	47	29.01	76.54
29 - 38	34	20.99	97.53
> 38	4	2.47	100.00

Total Number of Valid Hours: 162

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg

Lower Camp Met Tower - September 2014

Direction of Maximum Speed: 172 deg on Sep 28 10:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 171.3 deg on Sep 28		Hours of Data:	694
Direction of Minimum Speed: 311 deg on Sep 5 08:00		Hours of Missing Data:	26
Direction of Minimum Daily Speed Average: 0.7 deg on Sep 9		Percent Operational Time:	96.4
Monthly Average Direction: 301.0 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	315	135	128	131	126	134	122	139	135	146	152	147	149	168	243	82	148	111	337	324	10	325	25	18	141.0
2-Sep	312	335	50	85	132	75	86	96	83	142	57	31	233	251	324	346	300	323	311	349	340	324	311	341	332.0
3-Sep	340	344	328	72	323	122	127	129	141	146	182	255	237	241	245	246	203	92	132	142	119	117	159	147	179.0
4-Sep	149	154	153	148	152	152	139	142	136	161	142	146	147	138	236	212	8	300	339	348	350	338	343	346	143.3
5-Sep	356	335	309	301	343	13	284	311	107	133	169	163	178	169	183	138	131	144	156	195	351	342	323	332	162.1
6-Sep	317	315	350	307	321	352	304	355	17	47	36	320	326	345	346	317	350	26	346	354	358	348	350	349	348.2
7-Sep	349	352	352	1	1	6	1	4	7	6	358	8	7	357	349	352	343	351	347	333	331	334	335	339	353.1
8-Sep	349	335	331	341	2	349	335	320	310	347	356	5	335	337	347	356	5	356	19	3	6	356	346	327	348.2
9-Sep	117	0	43	349	314	318	61	77	109	288	269	276	112	194	71	118	96	290	297	353	356	335	319	24	346.3
10-Sep	299	39	332	350	65	330	318	344	330	352	4	9	278	244	239	239	215	196	188	181	187	167	93	111	217.0
11-Sep	148	151	142	130	113	103	126	158	154	167	210	205	209	208	215	213	224	217	199	201	224	259	267	286	195.1
12-Sep	312	197	189	190	146	128	176	306	346	344	342	336	343	341	345	343	341	335	333	294	335	301	349	321	337.2
13-Sep	79	325	294	323	303	294	252	130	117	23	56	89	129	123	136	141	151	141	142	128	149	137	57	126	132.4
14-Sep	123	106	79	84	125	121	129	123	134	143	146	147	146	128	235	245	244	224	228	311	274	200	147	127	151.8
15-Sep	133	124	139	131	135	131	129	138	130	158	152	168	44	303	1	16	28	0	339	359	343	335	320	345	74.6
16-Sep	342	341	341	341	349	345	330	341	336	2	23	358	355	257	171	153	151	151	146	141	133	145	141	141	134.2
17-Sep	143	138	138	146	153	150	143	152	154	163	176	178	161	153	169	170	162	159	149	136	151	147	153	164	154.9
18-Sep	174	130	133	134	131	136	330	294	322	243	322	337	256	256	10	298	296	150	109	257	154	191	129	125	176.1
19-Sep	148	154	152	150	140	132	140	138	136	199	250	250	255	252	252	258	292	290	258	278	279	277	290	280	245.6
20-Sep	273	275	279	280	288	300	290	296	306	306	296	295	285	273	289	296	284	255	245	238	221	131	130	144	278.8
21-Sep	139	148	137	138	139	137	142	134	138	136	148	235	242	250	252	256	244	232	171	122	126	137	128	121	160.9
22-Sep	144	138	141	142	127	113	139	133	132	139	136	146	143	143	139	234	253	246	259	255	261	279	277	289	180.3
23-Sep	303	308	306	108	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
24-Sep	AF	AF	AF	AF	AF	AF	343	343	352	344	354	4	7	6	57	143	151	149	152	154	165	274	257	146	151.0
25-Sep	217	267	268	269	272	252	265	309	294	294	285	319	322	309	344	354	353	16	23	25	30	34	38	21	305.1
26-Sep	24	8	49	41	29	24	32	21	26	28	18	6	18	28	24	10	8	12	6	3	10	6	6	360	15.2
27-Sep	354	346	337	339	340	337	334	334	332	343	349	45	146	203	240	156	154	177	136	125	131	129	149	145	3.5
28-Sep	151	162	159	154	157	166	168	167	171	172	173	171	171	178	192	191	186	182	171	168	169	166	157	160	171.3
29-Sep	154	152	151	150	145	141	151	147	143	149	150	165	174	169	195	209	218	200	209	206	193	170	144	156	169.2
30-Sep	155	153	145	146	192	335	321	140	139	315	341	338	342	351	2	332	313	1	6	6	15	325	356	29	13.4

158.7	162.5	156.2	145.8	136.5	132.6	153.5	143.7	138.4	157.1	201.6	216.0	213.0	221.2	238.1	236.0	221.2	203.8	187.1	178.7	203.3	243.0	302.3	111.7
Diurnal Average																							

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Sep 6 13:00	Hours in Service: 720 Hours of Data: 694 Hours of Missing Data: 26 Hours of Calibration: 0 Percent Operational Time: 96.4
Minimum Value: 8 deg on Sep 28 20:00	
Percentiles: P ₁ = 10 P ₁₀ = 13 Q ₁ = 18 Median = 23 Q ₃ = 38 P ₉₀ = 67 P ₉₉ = 94	

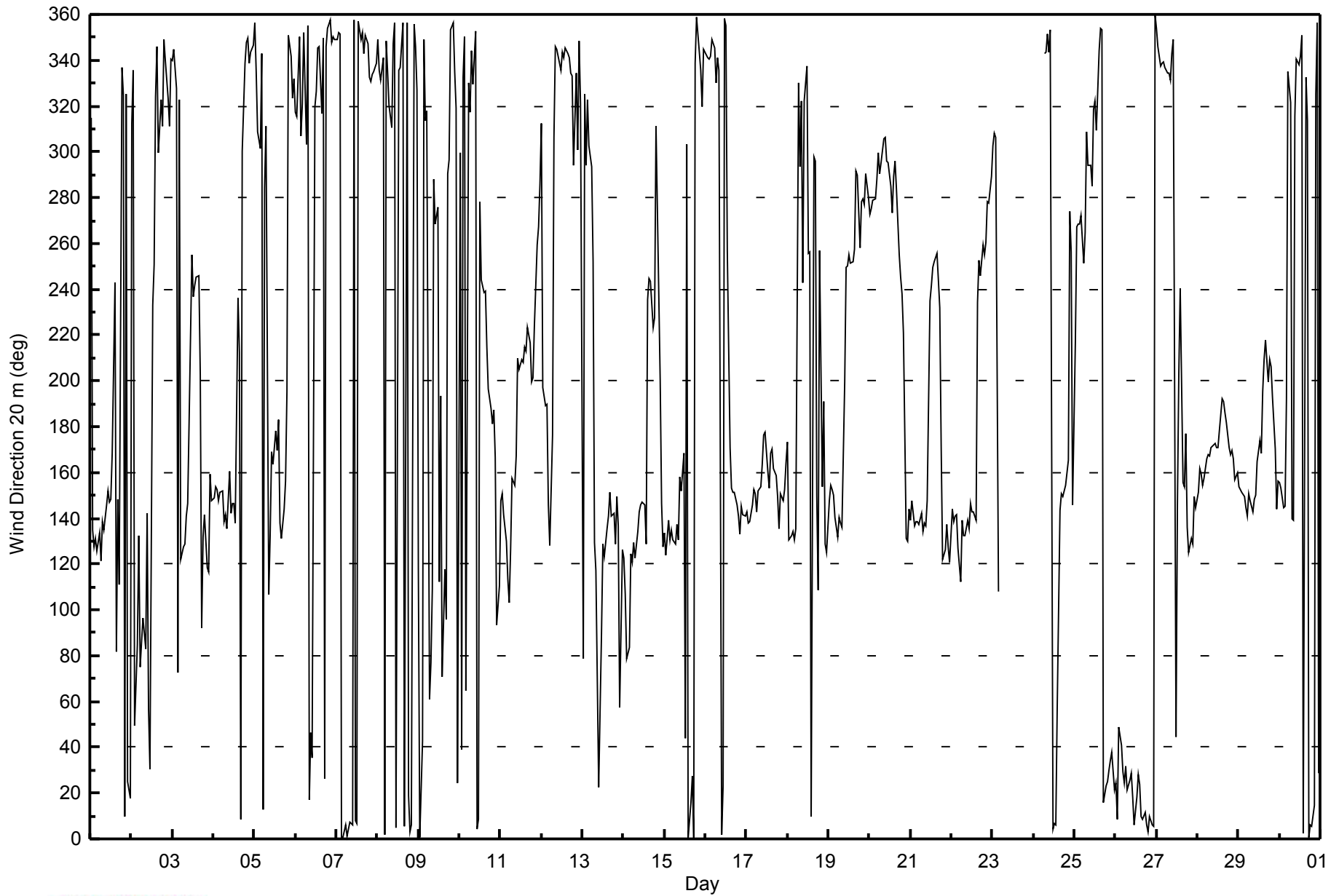
Day	Hourly Period Ending At (MST)																								Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Sep	63	63	28	19	21	16	30	17	40	27	20	17	34	34	46	92	22	27	70	81	89	72	76	56	92																						
2-Sep	39	69	47	42	49	37	56	62	82	50	72	88	40	29	29	80	39	34	23	22	22	27	49	36	88																						
3-Sep	36	93	30	48	61	41	15	18	17	18	46	34	20	24	26	31	45	94	28	21	42	43	33	11	94																						
4-Sep	8	10	15	14	12	14	24	21	20	24	18	13	15	73	86	90	86	33	27	29	33	24	20	19	90																						
5-Sep	23	22	21	52	31	49	24	99	47	26	29	21	18	15	36	31	23	22	22	60	55	39	20	18	99																						
6-Sep	28	42	33	27	75	71	33	54	51	49	79	19	103	81	84	35	44	46	22	19	21	18	20	21	103																						
7-Sep	18	22	19	24	26	27	26	25	26	26	29	30	26	21	23	19	22	23	19	19	20	20	23	30	30																						
8-Sep	24	17	18	26	21	50	20	29	25	34	38	38	22	42	40	32	27	24	27	47	33	24	50	75	75																						
9-Sep	95	24	93	24	36	42	35	28	82	82	49	53	53	44	72	64	38	18	24	31	16	27	72	62	95																						
10-Sep	81	85	58	73	63	67	23	22	26	29	30	44	34	54	26	44	37	16	17	11	11	24	91	44	91																						
11-Sep	13	11	12	10	16	22	31	11	11	23	13	14	12	13	14	12	10	12	12	17	13	18	18	40	40																						
12-Sep	88	55	25	19	29	23	93	97	23	22	24	24	23	24	25	26	22	22	32	39	57	20	57	23	97																						
13-Sep	64	35	45	71	24	35	91	91	40	88	62	59	21	32	32	18	12	16	12	19	11	82	71	16	91																						
14-Sep	15	25	61	44	24	16	14	14	17	20	21	15	17	35	76	29	18	12	34	45	82	93	82	52	93																						
15-Sep	28	27	18	14	14	14	14	19	18	39	53	52	67	93	26	27	37	28	17	12	64	19	29	19	93																						
16-Sep	15	17	18	20	22	19	54	27	22	27	33	33	42	65	28	15	12	11	16	21	19	17	19	20	65																						
17-Sep	17	20	19	21	19	19	17	20	18	18	13	14	19	16	15	12	13	11	16	22	25	22	19	14	25																						
18-Sep	15	38	17	13	31	79	22	16	55	55	67	53	84	28	64	69	48	38	102	88	89	101	25	27	102																						
19-Sep	72	13	27	14	15	14	16	13	13	57	18	21	19	18	18	21	24	34	23	22	21	19	24	22	72																						
20-Sep	20	21	22	21	72	34	19	17	18	21	23	24	24	26	36	24	22	14	12	11	15	29	15	11	72																						
21-Sep	13	12	18	17	16	15	13	14	14	16	36	17	26	21	21	26	15	19	41	32	27	75	45	64	75																						
22-Sep	53	15	15	34	12	20	54	25	52	21	20	15	17	19	14	50	14	14	20	10	14	45	29	27	54																						
23-Sep	17	25	94	94	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	94																						
24-Sep	AF	AF	AF	AF	AF	AF	19	27	25	27	31	20	34	20	58	27	18	18	17	13	9	32	70	58	70																						
25-Sep	21	22	19	21	22	14	15	17	23	24	23	18	19	20	24	20	16	25	29	27	25	28	27	29	29																						
26-Sep	32	53	22	27	22	24	28	23	24	30	26	21	26	30	23	22	23	23	21	19	22	21	21	18	53																						
27-Sep	21	20	18	17	19	16	17	16	20	26	29	36	39	50	40	63	17	23	20	15	39	35	16	16	63																						
28-Sep	16	13	14	13	13	12	11	11	11	11	13	12	12	12	14	13	11	12	9	8	9	12	14	13	16																						
29-Sep	13	9	10	11	13	12	19	18	18	18	18	13	15	22	15	13	11	13	13	12	21	28	10	11	28																						
30-Sep	14	16	36	25	38	73	73	41	76	88	36	24	22	23	75	51	43	21	36	34	65	54	28	30	88																						
Diurnal Maximum																								95	93	94	94	75	79	93	99	82	88	79	88	103	93	86	92	86	94	102	88	89	101	91	75

AF - Analyzer Failure



WBEA
Hourly Averages

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





Direction of Maximum Speed: 275 deg on Sep 19 22:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 161.6 deg on Sep 28		Hours of Data:	688
Direction of Minimum Speed: 178 deg on Sep 12 07:00		Hours of Missing Data:	32
Direction of Minimum Daily Speed Average: 1.2 deg on Sep 9		Percent Operational Time:	95.6
Monthly Average Direction: 295.9 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	314	150	153	159	149	142	132	143	142	144	148	149	148	170	245	80	144	126	57	2	318	308	282	14	150.2
2-Sep	357	7	23	123	156	99	106	105	98	139	52	27	239	254	330	355	307	325	316	342	349	342	335	295	337.1
3-Sep	3	80	341	82	22	138	139	137	141	142	188	256	241	245	249	249	203	90	137	150	141	125	155	148	178.2
4-Sep	150	155	153	147	152	150	143	143	139	165	143	147	144	148	231	211	3	328	347	356	346	349	355	355	138.9
5-Sep	1	343	326	313	312	21	355	97	108	134	168	163	178	170	181	138	133	141	154	197	346	350	336	337	148.1
6-Sep	331	317	0	337	348	11	328	2	23	47	50	326	333	29	33	321	1	42	353	1	6	353	356	355	358.1
7-Sep	356	0	359	AF	AF	AF	AF	AF	AF	14	6	16	15	4	355	357	348	358	354	338	340	339	340	349	356.8
8-Sep	360	347	342	351	8	12	2	339	322	354	4	11	339	340	352	1	14	2	26	6	19	11	7	346	357.7
9-Sep	158	8	152	4	345	347	47	69	89	304	270	279	107	200	73	119	94	295	298	349	346	3	356	14	360.0
10-Sep	351	334	350	349	77	2	334	351	350	0	12	10	279	244	242	243	217	197	191	183	186	175	102	111	215.9
11-Sep	150	155	144	132	118	115	134	162	157	169	211	204	210	207	215	214	225	219	200	204	225	258	267	280	199.2
12-Sep	301	224	200	199	159	137	178	324	347	349	344	338	347	345	349	348	346	339	340	315	343	308	332	351	340.3
13-Sep	46	341	280	350	346	343	116	116	117	28	58	93	131	123	135	144	151	140	149	142	150	155	104	135	133.3
14-Sep	134	118	121	114	137	133	136	131	136	142	144	146	145	132	244	250	246	223	212	255	263	211	172	145	158.2
15-Sep	146	140	146	139	140	140	137	142	131	151	157	164	33	335	11	27	37	12	342	355	1	345	343	352	80.3
16-Sep	347	343	346	349	355	352	351	347	339	11	26	7	5	260	172	151	150	151	145	140	135	146	143	141	125.9
17-Sep	144	138	139	143	149	147	143	150	151	161	175	175	158	151	168	170	162	161	147	139	146	142	148	159	153.0
18-Sep	171	140	140	140	136	137	347	314	329	259	323	345	266	260	4	300	299	155	110	190	130	148	139	140	162.2
19-Sep	144	150	152	151	143	138	145	142	141	209	251	252	256	253	253	257	293	289	260	277	278	275	289	281	246.8
20-Sep	273	275	276	280	287	300	290	296	307	307	295	296	285	274	290	296	283	256	244	232	214	146	135	146	277.7
21-Sep	141	147	140	141	141	142	145	138	141	140	149	237	246	253	255	257	243	230	179	140	131	126	137	137	165.1
22-Sep	140	139	143	145	132	126	144	136	136	139	137	144	143	142	141	241	253	245	247	249	253	263	264	297	190.9
23-Sep	302	307	348	161	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
24-Sep	AF	AF	AF	AF	AF	AF	353	348	346	337	349	354	11	6	76	134	140	139	141	143	154	264	252	144	138.9
25-Sep	210	256	258	258	262	243	255	297	281	283	274	310	314	300	339	347	347	12	22	24	28	27	33	16	296.1
26-Sep	22	6	41	34	22	21	26	17	22	23	17	4	15	25	19	8	5	9	3	0	6	3	3	357	12.1
27-Sep	353	342	334	336	337	333	329	329	329	339	346	35	133	199	232	143	143	170	146	132	136	133	140	137	359.7
28-Sep	143	153	148	142	149	154	158	158	161	164	164	162	162	170	181	180	175	173	163	160	161	158	146	152	161.6
29-Sep	144	142	141	140	135	131	138	137	133	140	138	151	163	161	185	199	209	190	200	197	186	169	137	147	157.9
30-Sep	145	144	140	145	188	311	333	130	128	296	332	330	334	347	355	333	306	353	6	8	12	338	355	24	9.7

146.6 159.0 152.9 151.8 141.5 138.1 152.5 144.9 139.0 147.4 206.1 226.3 223.2 227.7 244.1 243.8 226.4 203.0 185.0 177.5 199.9 257.2 10.6 95.3

Diurnal Average

AF - Analyzer Failure

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



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 100 deg on Sep 10 02:00			Hours of Data:	688
Minimum Value: 4 deg on Sep 22 20:00			Hours of Missing Data:	32
Percentiles: P ₁ = 7 P ₁₀ = 10 Q ₁ = 13 Median = 17 Q ₃ = 31 P ₉₀ = 57 P ₉₉ = 92			Hours of Calibration:	0
			Percent Operational Time:	95.6

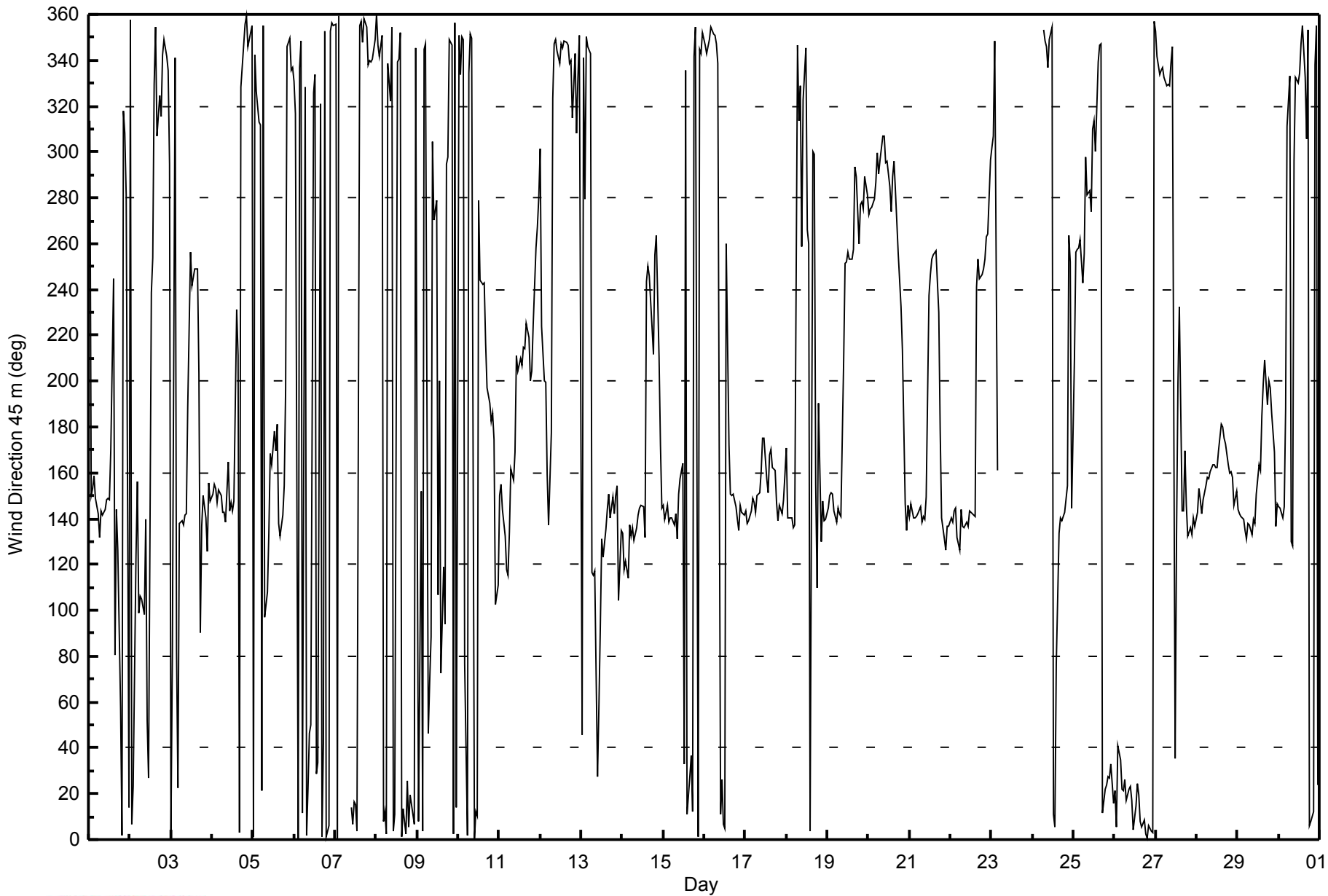
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	43	45	19	27	26	10	16	14	39	27	17	15	26	30	46	85	19	24	71	90	83	78	92	71	92
2-Sep	44	56	38	41	31	34	54	67	64	49	64	93	37	22	27	84	40	29	22	18	10	19	95	38	95
3-Sep	16	70	28	59	63	34	10	18	14	13	45	25	16	16	19	31	44	88	21	19	28	29	23	7	88
4-Sep	6	7	12	11	11	12	15	15	14	20	14	8	12	60	74	83	79	30	19	21	26	18	15	14	83
5-Sep	18	15	13	34	67	22	42	74	38	20	26	18	14	12	32	24	18	17	20	27	57	32	12	12	74
6-Sep	22	31	20	48	75	57	38	31	31	38	78	14	95	70	74	27	42	36	16	16	17	13	14	15	95
7-Sep	13	18	15	AF	AF	AF	AF	AF	AF	16	19	22	22	19	17	19	15	16	17	13	13	13	14	17	22
8-Sep	19	12	13	17	15	22	14	22	20	27	29	34	19	38	35	25	21	20	18	31	18	20	31	60	60
9-Sep	88	18	76	23	28	37	49	33	78	80	40	53	49	38	69	36	42	33	9	19	12	10	22	27	88
10-Sep	95	100	64	64	85	48	17	16	16	23	24	37	30	51	22	39	32	16	15	7	8	16	73	30	100
11-Sep	12	11	11	7	10	24	22	9	9	22	12	16	12	14	14	12	8	10	12	16	10	13	10	29	29
12-Sep	82	45	20	17	31	14	92	62	18	16	20	19	18	18	21	18	18	18	14	30	48	31	33	17	92
13-Sep	62	48	41	69	48	51	67	68	34	74	46	51	18	33	26	14	8	11	7	12	8	59	55	9	74
14-Sep	9	14	25	30	13	9	10	11	14	17	16	11	14	22	62	25	13	12	11	53	45	66	59	10	66
15-Sep	9	8	8	7	9	9	8	12	13	30	59	52	62	92	21	16	26	25	10	8	43	14	15	9	92
16-Sep	9	11	12	12	13	13	35	21	15	23	25	24	36	64	29	12	10	9	12	18	15	13	15	14	64
17-Sep	13	15	16	17	17	15	14	18	15	17	10	12	17	13	13	9	10	9	14	17	22	18	16	13	22
18-Sep	11	24	11	9	17	68	19	14	55	48	59	47	80	19	52	65	43	36	33	76	27	29	10	15	80
19-Sep	26	11	17	10	10	10	11	8	8	53	10	12	12	11	10	13	21	30	19	15	13	12	20	17	53
20-Sep	13	13	14	14	69	37	13	12	15	17	15	19	19	18	28	20	18	8	7	8	11	25	12	7	69
21-Sep	9	8	11	11	10	9	8	9	9	8	37	11	20	17	16	20	10	18	21	15	30	57	34	54	57
22-Sep	49	11	10	11	8	14	15	19	34	15	15	12	12	14	9	47	7	12	10	4	7	20	15	19	49
23-Sep	15	21	91	79	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	91
24-Sep	AF	AF	AF	AF	AF	AF	54	21	21	20	27	15	47	32	49	20	14	13	12	10	9	30	48	31	54
25-Sep	22	15	12	15	14	9	10	13	16	17	18	16	15	16	22	15	14	18	16	20	18	17	18	18	22
26-Sep	23	61	15	19	14	16	17	14	16	18	16	16	18	20	16	16	17	16	16	15	16	16	16	14	61
27-Sep	17	16	13	14	14	12	13	13	16	24	24	29	34	49	39	53	12	23	21	13	17	17	11	11	53
28-Sep	13	10	13	11	12	12	9	9	9	9	11	10	10	9	12	11	8	8	8	7	7	10	11	11	13
29-Sep	12	5	6	7	9	7	12	12	12	12	14	12	13	20	14	14	11	12	13	12	18	25	8	7	25
30-Sep	9	11	14	25	27	62	50	41	84	71	27	18	19	19	50	48	40	17	28	26	56	52	21	19	84
	95	100	91	79	85	68	92	74	84	80	78	93	95	92	74	85	79	88	71	90	83	78	95	71	
	Diurnal Maximum																								

AF - Analyzer Failure



WBEA
Hourly Averages

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 275 deg on Sep 19 22:00		Hours in Service: 720
Direction of Maximum Daily Speed Average: 163.9 deg on Sep 28		Hours of Data: 694
Direction of Minimum Speed: 154 deg on Sep 9 03:00	Direction of Minimum Daily Speed Average: 1.2 deg on Sep 5	Hours of Missing Data: 26
Monthly Average Direction: 257.9 deg		Percent Operational Time: 96.4

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	292	184	215	222	222	196	184	180	194	146	141	153	134	173	251	74	128	194	105	337	297	1	282	264	204.5
2-Sep	289	39	153	132	140	146	162	185	130	107	9	303	250	259	339	12	4	316	307	325	337	351	357	352	336.6
3-Sep	307	356	43	119	146	163	177	161	137	123	217	255	243	245	246	247	209	74	149	168	159	147	159	172	186.2
4-Sep	165	158	156	151	154	153	150	149	149	181	160	177	155	207	229	216	2	18	2	14	6	1	3	5	137.5
5-Sep	8	350	350	339	325	329	327	49	125	140	170	164	181	174	182	139	139	144	151	191	245	321	332	341	148.3
6-Sep	343	323	313	319	313	4	25	22	25	53	77	353	18	70	92	10	57	69	21	15	15	5	6	6	9.6
7-Sep	5	14	11	16	17	22	16	16	17	15	14	19	17	8	360	1	353	3	2	348	355	351	351	2	6.7
8-Sep	1	356	356	1	355	352	355	2	356	357	5	14	343	346	358	5	16	9	26	10	25	23	22	22	4.0
9-Sep	42	24	154	341	6	13	358	313	78	306	268	283	119	215	70	98	124	311	294	326	332	349	0	15	354.6
10-Sep	16	269	342	322	272	308	296	300	307	319	341	348	287	249	243	255	220	207	206	204	206	205	137	141	244.9
11-Sep	187	187	175	159	148	161	157	179	170	186	216	210	215	212	220	218	227	226	219	229	242	264	273	275	216.5
12-Sep	274	251	231	235	248	273	318	331	340	351	346	340	348	347	351	348	351	348	338	328	352	339	299	334	331.1
13-Sep	332	348	4	351	343	30	98	123	109	46	101	116	138	143	150	154	153	150	160	161	166	166	131	138	138.3
14-Sep	159	149	152	153	170	165	158	173	141	141	140	154	150	138	258	253	247	228	224	238	239	237	271	248	186.5
15-Sep	243	227	166	173	170	176	178	172	146	149	194	179	5	348	12	33	52	32	13	30	122	91	2	16	63.7
16-Sep	9	354	359	3	357	356	99	6	3	28	34	18	23	268	168	152	151	150	145	141	139	146	145	143	121.6
17-Sep	146	141	142	144	145	146	144	150	150	156	173	171	153	149	166	171	163	164	149	143	144	145	149	154	151.3
18-Sep	163	176	183	179	181	133	360	346	344	329	329	345	281	269	358	308	323	150	130	123	149	145	159	156	160.2
19-Sep	146	149	159	167	170	174	177	177	174	225	249	250	254	253	253	258	290	289	260	279	278	275	286	279	250.6
20-Sep	274	272	274	277	289	299	291	296	305	305	299	300	286	276	289	293	282	257	254	240	234	207	164	178	277.6
21-Sep	157	160	160	158	163	171	179	159	160	158	184	235	241	253	256	250	241	234	209	181	169	148	146	152	187.5
22-Sep	145	155	153	172	160	149	164	158	152	146	144	149	144	145	156	242	254	255	257	266	268	264	283	300	205.9
23-Sep	295	304	324	236	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
24-Sep	AF	AF	AF	AF	AF	AF	137	348	351	339	350	15	94	100	121	132	140	143	146	157	265	257	170	146.5	
25-Sep	222	255	256	257	258	246	256	296	278	280	271	308	314	303	343	349	351	14	24	24	27	28	38	24	295.6
26-Sep	25	21	47	42	29	26	31	24	30	31	25	11	17	28	23	12	11	12	7	5	8	8	6	3	17.7
27-Sep	2	355	350	349	352	341	337	335	341	348	359	30	125	201	230	144	146	180	189	169	166	160	157	150	355.5
28-Sep	155	157	160	159	159	156	156	156	159	164	163	162	162	172	183	181	178	177	168	164	163	160	156	159	163.9
29-Sep	157	157	153	144	138	138	143	142	139	141	137	149	161	166	187	204	212	197	208	205	200	209	158	155	162.0
30-Sep	158	164	160	184	220	273	298	132	171	258	307	314	331	354	4	347	308	345	20	23	21	1	1	28	345.0

202.1 202.6 193.0 191.0 176.2 164.6 178.4 170.7 144.0 152.7 216.0 243.6 232.4 229.3 251.6 253.4 229.2 212.8 196.9 198.0 219.1 253.0 308.1 350.3

Diurnal Average

AF - Analyzer Failure

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



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 98 deg on Sep 15 14:00	Hours of Data: 694
Minimum Value: 2 deg on Sep 29 05:00	Hours of Missing Data: 26
Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 9 Median = 12 Q ₃ = 20 P ₉₀ = 41 P ₉₉ = 82	Hours of Calibration: 0
	Percent Operational Time: 96.4

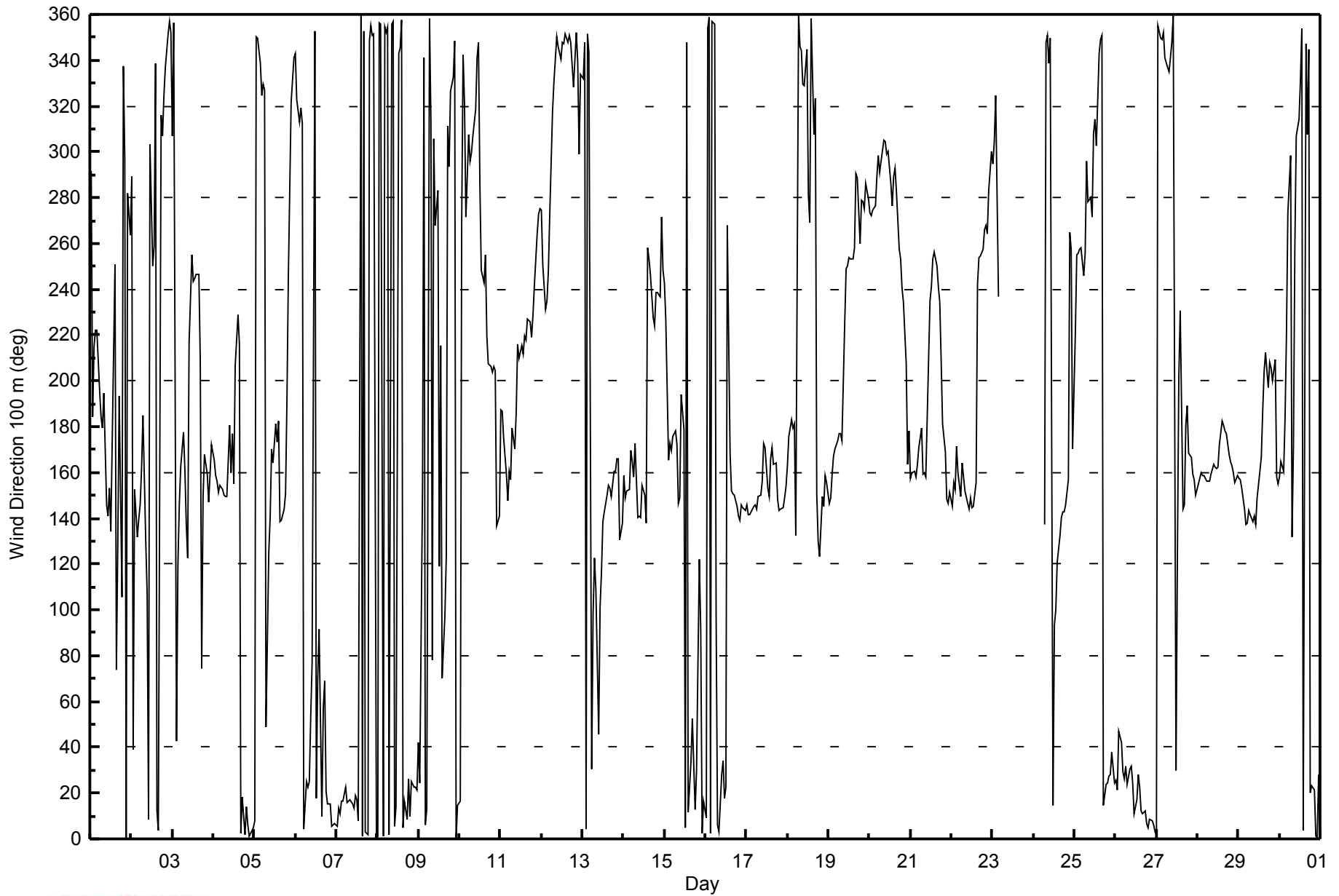
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	22	66	16	13	17	17	36	26	47	30	12	20	28	27	44	43	24	20	82	53	26	19	32	13	82
2-Sep	44	43	16	18	12	21	87	69	31	84	76	67	26	16	25	34	40	20	18	6	6	5	3	22	87
3-Sep	14	33	25	69	11	11	14	11	14	10	45	16	12	12	14	20	44	91	19	12	22	16	11	9	91
4-Sep	9	7	8	4	4	5	6	5	7	13	14	14	14	41	19	57	49	23	12	13	14	12	10	8	57
5-Sep	10	9	6	11	8	5	5	82	18	12	22	16	15	10	26	13	9	5	22	22	12	33	3	5	82
6-Sep	9	10	11	17	22	20	21	20	20	22	83	24	64	32	46	73	51	25	13	17	9	9	9	9	83
7-Sep	7	12	8	9	10	11	10	9	9	10	11	11	14	12	10	12	9	9	9	6	10	7	8	10	14
8-Sep	8	8	10	10	6	4	8	11	17	20	15	22	17	26	27	18	12	12	11	15	11	10	22	28	28
9-Sep	74	14	87	38	10	21	64	94	46	55	45	47	56	27	74	22	97	43	7	13	7	9	13	10	97
10-Sep	37	61	46	31	20	21	9	14	13	19	17	34	25	34	16	26	21	15	12	10	7	14	41	37	61
11-Sep	27	20	20	14	17	28	19	9	9	20	9	12	9	12	11	8	5	6	5	10	6	6	5	10	28
12-Sep	26	14	8	10	15	26	14	9	9	13	14	13	13	14	16	15	14	15	7	14	16	51	15	8	51
13-Sep	8	12	23	23	15	31	19	11	28	61	65	41	14	26	27	15	8	9	7	7	11	17	47	8	65
14-Sep	12	13	7	10	10	7	11	10	7	6	5	10	9	18	51	18	11	8	4	4	15	33	30	9	51
15-Sep	10	26	10	14	11	9	12	16	17	44	72	78	73	98	11	11	15	14	11	38	38	49	34	20	98
16-Sep	7	4	5	7	9	37	45	57	13	15	16	17	43	63	20	10	4	5	6	10	9	7	8	6	63
17-Sep	7	6	8	9	7	7	5	12	9	13	12	13	14	9	13	9	10	9	9	5	5	6	5	7	14
18-Sep	5	13	10	9	14	44	12	10	27	33	33	38	80	18	33	45	41	47	9	10	6	6	7	6	80
19-Sep	4	4	7	7	11	13	12	8	11	37	6	8	7	8	7	8	16	28	16	13	9	8	14	12	37
20-Sep	8	7	8	9	48	12	8	8	10	12	11	12	15	15	23	16	15	4	5	3	6	16	17	8	48
21-Sep	12	10	14	9	9	9	13	13	12	13	43	7	13	11	11	10	5	8	10	6	15	12	6	11	43
22-Sep	9	4	4	10	13	6	10	9	9	10	7	7	5	6	14	27	4	6	7	4	3	4	12	6	27
23-Sep	11	10	34	74	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	74
24-Sep	AF	AF	AF	AF	AF	AF	33	60	13	10	21	27	41	23	14	9	6	4	4	3	6	30	23	22	60
25-Sep	16	8	6	10	9	7	7	10	12	13	15	12	10	11	21	9	10	13	10	11	11	10	13	11	21
26-Sep	17	18	8	10	9	9	9	7	9	11	12	9	9	13	10	7	8	9	8	8	8	8	8	8	18
27-Sep	9	11	9	9	9	8	7	6	11	16	18	33	37	45	39	70	9	22	13	16	12	8	9	12	70
28-Sep	9	6	7	11	9	8	7	7	7	7	9	8	8	8	12	10	7	7	7	6	5	6	9	9	12
29-Sep	9	5	7	4	2	3	3	3	4	3	6	9	12	18	13	12	9	12	10	9	14	14	17	11	18
30-Sep	11	12	10	18	14	18	31	42	43	16	19	8	13	13	38	39	42	17	17	17	48	30	9	11	48
Diurnal Maximum																									
74 66 87 74 48 44 87 94 47 84 83 78 80 98 74 73 97 91 82 53 48 51 47 37																									

AF - Analyzer Failure



WBEA
Hourly Averages

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





Wood Buffalo Environmental Association
Summary of Hour Averages

Vertical Wind Speed 20 m (VW20m) - km/h
Lower Camp Met Tower - September 2014

Maximum Value: 1.0 km/h on Sep 17 16:00																				Maximum Daily Average: 0.4 km/h on Sep 17					Hours in Service: 720		
Minimum Value: -1.2 km/h on Sep 7 18:00																				Minimum Daily Average: -0.7 km/h on Sep 7					Hours of Data: 694		
Maximum Diurnal Average: -0.1 km/h at hour 10																				Minimum Diurnal Average: -0.3 km/h at hour 16					Hours of Missing Data: 26		
Monthly Average: -0.17 km/h																				Percentiles: P ₁ = -1.1 P ₁₀ = -0.6 Q ₁ = -0.4 Median = -0.1 Q ₃ = 0.1 P ₉₀ = 0.2 P ₉₉ = 0.6					Hours of Calibration: 0		
																									Percent Operational Time: 96.4		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	-0.4	-0.1	-0.1	0.1	0.1	0.3	0.1	0.2	-0.1	-0.1	0.2	0.2	0.0	0.0	-0.3	-0.3	0.0	-0.1	-0.3	-0.2	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	0.3
2-Sep	-0.4	-0.2	-0.1	-0.2	-0.1	-0.2	-0.2	-0.3	-0.3	-0.3	-0.1	-0.3	0.0	-0.2	-0.4	-0.7	-0.4	-0.5	-0.4	-0.4	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0
3-Sep	-0.2	-0.1	-0.2	-0.2	-0.3	-0.1	-0.1	0.0	0.4	0.2	0.1	-0.1	-0.3	-0.4	-0.6	-0.5	-0.3	-0.5	-0.1	0.3	-0.1	-0.1	-0.2	0.4	-0.1	0.4	
4-Sep	0.5	0.2	0.4	0.3	0.2	0.1	0.0	0.3	0.0	0.4	0.0	0.1	0.1	0.1	-0.3	-0.1	-0.4	-0.4	-0.5	-0.5	-0.5	-0.5	-0.7	-0.1	-0.1	0.5	
5-Sep	-0.6	-0.4	-0.5	-0.3	-0.2	-0.1	-0.3	-0.1	-0.2	0.1	0.3	0.5	0.4	0.5	0.1	0.1	0.1	0.4	0.0	0.1	-0.2	-0.4	-0.4	-0.5	-0.1	0.5	
6-Sep	-0.4	-0.1	-0.4	-0.4	-0.2	-0.2	-0.4	-0.3	-0.3	-0.1	-0.2	-0.4	-0.1	-0.3	-0.3	-0.3	-0.4	-0.5	-0.5	-0.6	-0.8	-0.8	-0.9	-0.9	-0.4	-0.1	
7-Sep	-1.0	-0.6	-0.9	-0.7	-0.5	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.6	-0.9	-1.1	-0.8	-0.8	-1.2	-0.8	-0.4	-0.5	-0.4	-0.4	-0.4	-0.7	-0.4	
8-Sep	-0.5	-0.5	-0.5	-0.4	-0.3	-0.2	-0.3	-0.3	-0.4	-0.8	-0.8	-0.5	-0.6	-0.7	-0.4	-0.6	-0.8	-0.6	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.5	-0.2	
9-Sep	-0.2	-0.2	-0.1	-0.3	-0.4	-0.3	-0.2	-0.2	-0.3	-0.1	0.0	-0.3	-0.3	0.1	-0.5	-0.1	-0.2	-0.2	-0.2	-0.2	-0.1	-0.2	-0.2	-0.1	-0.2	0.1	
10-Sep	-0.2	-0.3	-0.4	-0.2	-0.2	-0.2	-0.5	-0.4	-0.3	-0.1	-0.4	-0.4	-0.2	-0.3	-0.6	-0.5	-0.1	0.1	0.2	0.3	0.2	0.7	-0.4	-0.4	-0.2	0.7	
11-Sep	0.3	0.3	0.1	0.0	-0.8	-0.5	-0.1	0.8	0.5	0.1	-0.4	-0.3	-0.4	-0.4	-0.5	-0.6	-0.6	-0.2	-0.1	0.0	-0.2	-0.5	-0.8	-0.5	-0.2	0.8	
12-Sep	-0.3	0.0	0.0	0.2	0.1	0.0	-0.1	-0.2	-0.5	-0.9	-1.1	-0.8	-0.9	-0.9	-0.8	-0.9	-0.5	-0.5	-0.2	-0.2	-0.6	-0.2	-0.2	-0.3	-0.4	0.2	
13-Sep	-0.1	-0.2	-0.3	-0.3	-0.4	-0.4	-0.2	-0.2	-0.3	-0.4	-0.3	0.0	-0.3	-0.2	0.0	0.0	0.3	0.1	0.2	-0.2	-0.1	0.1	-0.2	0.0	-0.1	0.3	
14-Sep	0.2	-0.1	-0.1	-0.1	0.1	0.1	-0.1	-0.1	-0.1	0.1	0.6	0.0	0.4	0.0	-0.2	-0.4	-0.4	-0.3	-0.1	-0.2	-0.2	0.0	0.0	-0.1	0.0	0.6	
15-Sep	0.0	-0.1	-0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.7	-0.5	-0.5	-0.5	-0.6	-0.4	-0.5	-0.4	-0.4	0.2	
16-Sep	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.3	-0.6	-0.3	-0.5	-0.3	-0.5	-0.6	-0.6	-0.1	0.1	0.2	0.1	0.4	0.2	-0.1	0.2	0.1	0.6	-0.2	0.6	
17-Sep	0.1	0.1	0.1	0.2	0.3	0.6	0.5	0.6	0.6	0.8	0.5	0.3	0.4	0.3	0.5	1.0	0.6	0.6	0.2	0.4	0.6	0.2	0.1	0.1	0.4	1.0	
18-Sep	0.5	0.0	0.0	0.2	0.3	-0.1	-0.4	-0.4	0.0	0.5	-0.4	-0.4	0.1	-0.6	0.2	-0.3	-0.3	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	0.5	
19-Sep	0.0	0.2	-0.1	0.2	0.1	0.2	0.3	0.3	0.1	-0.1	-0.8	-0.6	-0.8	-0.8	-0.6	-0.8	-1.0	-1.0	-1.0	-0.7	-1.2	-1.1	-1.2	-0.9	-0.5	0.3	
20-Sep	-0.6	-0.8	-0.7	-0.9	-0.6	-0.5	-1.1	-0.8	-0.8	-0.8	-0.8	-0.8	-0.7	-0.7	-0.4	-1.0	-0.7	-0.6	-0.5	-0.5	0.0	0.1	0.1	0.2	-0.6	0.2	
21-Sep	0.1	0.3	0.2	0.1	0.2	0.2	0.3	0.0	0.3	0.2	0.1	-0.4	-0.3	-0.6	-0.5	-0.5	-0.5	-0.3	0.2	0.1	-0.3	-0.1	-0.1	-0.2	-0.1	0.3	
22-Sep	-0.1	0.0	0.0	0.1	0.0	0.0	0.0	-0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.0	-0.3	-0.6	-0.4	-0.3	-0.5	-0.6	-0.4	-0.3	-0.3	-0.1	0.2	
23-Sep	-0.6	-0.7	-0.2	-0.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	-0.1	
24-Sep	AF	AF	AF	AF	AF	AF	-0.1	-0.2	-0.3	-0.3	-0.2	-0.4	-0.3	-0.6	-0.1	0.2	0.2	0.2	0.1	0.1	-0.5	-0.1	0.1	-0.1	0.2	0.2	
25-Sep	0.0	-0.4	-0.4	-0.5	-0.4	-0.1	-0.5	-0.5	-0.4	-0.1	-0.4	-0.5	-0.3	-0.1	-0.3	-0.3	-0.3	-0.1	0.0	-0.2	-0.1	-0.1	-0.2	-0.1	-0.3	0.0	
26-Sep	-0.2	-0.1	-0.1	-0.1	-0.2	-0.1	0.0	0.0	-0.2	-0.1	-0.1	-0.3	-0.2	-0.2	-0.3	-0.1	-0.2	-0.1	-0.3	-0.6	-0.4	-0.4	-0.2	-0.3	-0.2	0.0	
27-Sep	0.0	-0.1	0.1	0.1	0.1	0.1	0.0	-0.1	0.0	0.2	-0.1	0.1	0.4	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.4	
28-Sep	-0.1	0.2	0.1	0.1	0.2	0.2	0.4	0.5	0.3	0.4	0.2	0.2	0.4	0.3	0.0	-0.1	0.3	0.3	0.5	0.3	0.5	0.3	-0.2	0.1	0.2	0.5	
29-Sep	0.0	-0.1	-0.1	0.0	-0.2	-0.1	0.3	0.1	0.0	0.1	0.3	0.0	0.3	0.2	0.1	-0.5	-0.5	-0.2	-0.2	-0.2	0.2	0.2	0.0	0.2	0.0	0.3	
30-Sep	0.1	0.1	0.1	0.0	0.1	0.0	0.0	-0.1	0.1	0.0	-0.1	-0.1	-0.1	-0.2	0.1	0.1	-0.1	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.1	
																								Diurnal Average			
																								Diurnal Maximum			
																								0.0			
																								0.6			

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 20 m (VW20m) - km/h
Lower Camp Met Tower - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.7 km/h on Sep 19 21:00	Hours in Service: 720 Hours of Data: 694 Hours of Missing Data: 26 Hours of Calibration: 0 Percent Operational Time: 96.4
Minimum Value: 0.1 km/h on Sep 30 07:00	
Percentiles: P ₁ = 0.1 P ₁₀ = 0.4 Q ₁ = 0.8 Median = 1.4 Q ₃ = 2.0 P ₉₀ = 2.8 P ₉₉ = 3.6	

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	0.3	0.6	0.7	0.9	1.1	0.9	1.3	1.0	1.3	1.5	1.3	1.0	1.6	2.0	1.7	0.8	0.4	0.4	0.4	0.3	0.2	0.3	0.2	2.0
2-Sep	0.4	0.3	0.3	0.2	0.2	0.6	0.6	0.7	0.7	0.9	1.4	1.4	1.5	1.6	1.8	2.0	0.7	0.9	0.6	0.4	0.2	0.1	0.2	0.1	2.0
3-Sep	0.2	0.2	0.2	0.3	0.4	0.6	0.8	1.1	1.6	1.5	1.5	1.8	1.8	1.9	1.7	1.7	1.6	1.9	1.3	1.3	0.5	0.6	0.9	1.6	1.9
4-Sep	1.7	1.5	1.5	1.9	1.5	1.6	1.7	2.1	2.0	1.1	1.7	1.6	1.8	1.1	0.9	1.3	1.9	0.6	1.3	1.0	1.3	1.2	1.7	1.9	2.1
5-Sep	1.2	1.0	0.6	0.3	0.2	0.2	0.2	0.6	0.9	1.3	1.5	1.7	1.4	1.3	1.0	1.5	2.5	2.5	1.1	0.6	0.2	0.5	0.8	1.8	2.5
6-Sep	0.8	0.2	0.3	0.4	0.3	0.3	0.3	0.9	1.1	1.2	1.0	0.7	0.9	0.6	0.7	0.7	0.8	1.0	1.0	1.6	2.0	2.0	2.4	2.5	2.5
7-Sep	2.5	2.3	2.3	2.3	2.0	2.2	1.6	2.0	2.1	2.2	2.3	2.3	2.4	3.1	3.0	3.2	3.0	3.3	2.5	1.4	1.1	1.6	1.7	1.0	3.3
8-Sep	1.3	1.0	1.0	1.2	0.7	0.3	0.4	0.9	1.0	1.6	2.3	1.9	2.2	1.7	1.9	1.8	2.2	1.8	0.9	0.5	0.7	0.7	0.6	0.4	2.3
9-Sep	0.3	0.2	0.1	0.4	0.5	0.3	0.3	0.3	0.7	0.9	0.9	1.1	0.9	1.2	1.3	0.6	0.6	0.2	0.1	0.2	0.1	0.2	0.3	0.2	1.3
10-Sep	0.4	0.5	0.5	0.6	0.4	0.3	0.4	0.6	0.7	1.1	1.3	1.4	1.5	1.6	1.8	1.6	1.4	1.3	0.9	1.0	1.5	1.6	1.4	1.6	1.8
11-Sep	1.1	1.2	1.3	1.2	2.2	2.0	1.7	1.8	2.2	2.2	2.0	2.2	2.2	2.2	2.6	2.2	2.5	1.6	1.2	1.1	0.8	1.8	3.0	2.1	3.0
12-Sep	1.2	0.7	1.1	1.2	0.9	0.7	0.2	0.4	1.5	2.8	2.9	2.7	3.0	2.6	2.6	2.7	1.7	2.1	0.6	0.3	1.9	0.3	0.3	0.3	3.0
13-Sep	0.1	0.2	0.3	0.3	0.4	0.3	0.3	0.7	1.2	1.3	1.5	1.6	1.8	1.7	1.5	1.5	1.5	1.2	0.7	0.9	0.7	0.4	0.3	0.5	1.8
14-Sep	0.8	0.7	0.3	0.3	0.7	1.0	1.2	0.9	1.5	1.8	1.9	1.9	1.9	1.6	1.6	1.5	1.4	0.7	0.4	0.6	0.5	0.3	0.2	0.3	1.9
15-Sep	0.5	0.6	0.3	0.9	0.8	0.9	0.9	1.2	1.1	1.2	1.1	1.2	1.5	1.3	1.6	1.9	1.6	1.4	0.5	0.8	0.9	0.7	0.6	0.7	1.9
16-Sep	0.6	1.4	1.2	0.9	0.5	0.6	0.5	0.9	1.0	1.4	1.8	1.6	1.6	1.6	1.3	1.8	2.3	2.8	3.2	3.1	2.7	3.5	3.4	2.9	3.5
17-Sep	3.1	2.8	2.5	2.5	2.5	2.9	3.7	3.2	3.1	2.4	1.8	1.8	2.5	2.6	1.9	2.0	2.1	1.8	2.6	3.2	2.8	2.3	1.8	1.3	3.7
18-Sep	0.8	0.6	0.6	1.4	1.5	0.4	0.3	0.5	1.0	1.2	1.5	1.6	2.2	1.8	1.7	1.0	0.8	0.3	0.1	0.4	0.2	0.2	0.6	1.0	2.2
19-Sep	1.5	1.8	1.5	1.7	1.7	1.6	1.7	2.0	2.0	2.1	3.0	3.0	2.9	3.6	2.9	3.2	4.2	3.3	3.6	3.3	4.7	4.4	3.4	2.5	4.7
20-Sep	3.0	2.9	3.3	3.4	2.5	1.6	3.6	3.9	2.9	2.9	2.8	2.7	3.1	2.7	2.4	3.0	2.3	1.9	1.3	1.0	1.1	0.8	1.2	1.5	3.9
21-Sep	2.0	2.3	2.1	1.4	1.4	1.6	2.2	2.2	2.6	2.2	1.5	2.1	1.6	2.0	1.7	1.5	1.1	1.0	0.8	1.1	1.1	0.9	1.3	1.5	2.6
22-Sep	0.6	0.8	0.7	0.4	0.5	0.7	0.7	1.2	1.6	1.8	2.1	1.8	2.3	1.8	1.5	1.5	1.9	1.0	0.7	1.0	1.5	1.2	0.7	0.8	2.3
23-Sep	1.2	1.4	0.3	0.5	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.4
24-Sep	AF	AF	AF	AF	AF	AF	0.3	0.6	1.2	1.0	1.0	1.3	1.1	1.4	1.2	2.1	3.4	2.8	3.2	3.2	2.2	2.9	1.2	1.1	3.4
25-Sep	1.5	2.5	2.5	2.5	2.4	1.9	2.6	3.5	2.9	2.9	3.1	2.9	2.6	1.8	1.8	2.1	1.6	1.7	1.8	1.6	1.4	1.6	1.9	1.3	3.5
26-Sep	0.9	0.8	1.6	1.7	1.5	1.6	1.4	2.1	2.1	2.0	1.9	2.4	2.3	2.0	2.3	2.9	2.8	2.6	3.1	3.2	3.1	2.8	2.8	2.5	3.2
27-Sep	1.8	1.4	1.5	1.5	1.3	1.5	1.4	1.3	1.4	1.3	1.4	1.7	1.6	1.5	1.4	1.2	1.3	0.8	0.5	0.5	0.5	1.0	1.4	1.7	1.8
28-Sep	1.9	1.8	1.6	1.6	1.7	2.2	2.6	2.7	2.9	2.9	2.8	2.8	2.8	2.6	2.5	2.5	2.3	1.9	1.9	1.9	2.1	2.6	2.1	1.7	2.9
29-Sep	1.8	1.8	1.7	1.7	1.6	0.9	2.1	2.5	2.5	3.1	2.8	2.5	2.0	1.9	2.0	2.0	1.9	1.4	1.4	1.6	1.1	0.6	0.6	0.8	3.1
30-Sep	0.9	0.8	0.8	0.8	0.8	0.6	0.1	0.8	0.6	0.5	0.6	0.6	1.4	1.6	1.3	1.0	1.1	0.8	0.8	1.1	1.0	0.3	0.6	1.5	1.6

3.1	2.9	3.3	3.4	2.5	2.9	3.7	3.9	3.1	3.1	3.1	3.1	3.0	3.1	3.6	3.0	3.2	4.2	3.3	3.6	3.3	4.7	4.4	3.4	2.9		
Diurnal Maximum																										

AF - Analyzer Failure



Maximum Value: 1.5 km/h on Sep 28 08:00		Maximum Daily Average: 0.8 km/h on Sep 17		Hours in Service: 720																						
Minimum Value: -1.9 km/h on Sep 19 21:00		Minimum Daily Average: -0.7 km/h on Sep 7		Hours of Data: 688																						
Maximum Diurnal Average: 0.2 km/h at hour 6		Minimum Diurnal Average: -0.2 km/h at hour 16		Hours of Missing Data: 32																						
Monthly Average: 0.01 km/h		Percentiles: P ₁ = -1.2 P ₁₀ = -0.6 Q ₁ = -0.3 Median = -0.1 Q ₃ = 0.4 P ₉₀ = 0.8 P ₉₉ = 1.1		Hours of Calibration: 0																						
				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	-0.5	0.1	0.1	0.3	0.4	0.8	0.6	0.6	0.1	0.3	0.5	0.5	0.1	0.3	-0.1	-0.1	0.3	0.3	0.0	-0.1	0.0	0.0	0.0	0.0	0.2	0.8
2-Sep	-0.1	-0.1	0.0	0.0	0.0	0.4	-0.2	0.0	-0.1	-0.1	0.3	0.0	0.3	-0.1	-0.6	-0.4	-0.2	-0.3	-0.5	-0.3	-0.1	-0.1	0.0	0.0	-0.1	0.4
3-Sep	0.0	0.0	-0.1	-0.1	-0.1	0.2	0.3	0.4	0.7	0.7	0.4	0.3	-0.1	-0.3	-0.5	-0.6	-0.1	-0.2	0.4	0.8	0.0	0.1	-0.1	1.1	0.1	1.1
4-Sep	1.2	0.7	1.0	0.8	0.7	0.6	0.5	0.6	0.6	0.9	0.2	0.3	0.5	0.6	0.0	0.0	-0.3	-0.3	-0.3	-0.5	-0.3	-0.5	-0.5	-0.6	0.3	1.2
5-Sep	-0.5	-0.3	-0.4	-0.3	-0.1	-0.1	-0.2	-0.1	0.0	0.3	0.5	0.8	0.5	0.6	0.1	0.4	0.5	1.0	0.3	0.2	-0.1	-0.3	-0.4	-0.4	0.1	1.0
6-Sep	-0.3	-0.1	-0.3	-0.2	0.0	-0.1	-0.2	-0.2	-0.1	0.2	0.0	-0.4	0.1	-0.1	-0.1	-0.3	-0.5	-0.2	-0.3	-0.6	-0.6	-0.8	-0.9	-0.7	-0.3	0.2
7-Sep	-0.9	-0.7	-0.8	AF	AF	AF	AF	AF	AF	-0.7	-0.7	-0.5	-0.4	-1.0	-1.0	-1.0	-0.7	-1.1	-0.7	-0.3	-0.5	-0.4	-0.4	-0.3	-0.7	-0.3
8-Sep	-0.4	-0.6	-0.6	-0.4	-0.2	-0.1	-0.3	-0.3	-0.4	-0.7	-0.7	-0.4	-0.8	-0.5	-0.4	-0.5	-0.7	-0.6	-0.3	-0.4	-0.3	-0.3	-0.3	-0.2	-0.4	-0.1
9-Sep	-0.1	-0.2	0.0	-0.3	-0.4	-0.2	-0.1	-0.1	-0.2	-0.2	0.0	-0.2	-0.2	0.2	-0.2	-0.1	-0.1	-0.2	-0.2	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	0.2
10-Sep	-0.2	-0.3	-0.4	-0.2	-0.1	-0.2	-0.5	-0.5	-0.3	-0.1	-0.2	-0.2	-0.1	-0.2	-0.5	-0.3	0.0	0.3	0.2	0.2	0.2	0.9	-0.2	-0.4	-0.1	0.9
11-Sep	0.6	0.5	0.6	0.4	-0.5	-0.2	0.1	0.9	0.9	0.3	-0.2	0.1	-0.3	0.0	-0.1	-0.3	-0.1	0.0	0.2	0.1	0.0	-0.6	-1.0	-0.4	0.0	0.9
12-Sep	-0.2	-0.2	-0.2	0.1	0.4	0.4	0.0	0.0	-0.5	-1.0	-1.1	-0.6	-0.9	-1.0	-0.7	-0.9	-0.5	-0.6	-0.2	-0.2	-0.6	-0.2	-0.1	-0.2	-0.4	0.4
13-Sep	0.0	-0.2	-0.2	-0.2	-0.2	-0.1	0.0	-0.1	0.1	-0.4	-0.1	0.3	0.2	0.4	0.4	0.2	0.7	0.4	0.8	0.3	0.1	0.3	0.1	0.6	0.1	0.8
14-Sep	0.7	0.3	0.1	0.1	0.3	0.4	0.3	0.4	0.4	1.0	0.5	0.7	0.3	-0.2	-0.3	-0.1	0.0	0.1	0.0	-0.2	0.0	0.1	0.5	0.5	0.2	1.0
15-Sep	0.6	0.4	0.3	0.8	0.6	0.6	0.7	0.5	0.5	0.6	0.2	-0.3	0.1	-0.1	-0.1	-0.5	-0.2	-0.3	-0.6	-0.6	-0.4	-0.4	-0.3	-0.3	0.1	0.8
16-Sep	-0.4	-0.5	-0.3	-0.5	-0.4	-0.4	-0.1	-0.7	-0.3	-0.3	-0.2	-0.1	-0.2	-0.3	0.1	0.4	0.6	1.0	1.2	1.0	0.5	1.0	1.0	1.0	0.1	1.2
17-Sep	1.0	0.8	0.6	0.8	1.0	1.0	1.0	1.1	1.1	1.0	0.5	0.3	0.7	0.8	0.9	1.1	1.0	0.9	0.8	1.0	1.1	0.5	0.5	0.4	0.8	1.1
18-Sep	0.8	0.3	0.3	0.7	0.9	0.1	-0.3	-0.3	0.0	0.5	-0.1	0.0	0.3	-0.4	0.6	0.0	0.0	0.3	0.2	0.0	0.1	0.1	0.4	0.3	0.2	0.9
19-Sep	0.5	0.5	0.2	1.1	0.9	0.9	1.2	1.2	0.7	0.3	-0.6	-0.5	-0.9	-0.7	-0.7	-0.8	-1.7	-1.2	-1.1	-1.0	-1.9	-1.8	-1.3	-1.0	-0.3	1.2
20-Sep	-0.9	-0.9	-1.2	-1.2	-0.6	-0.5	-1.1	-1.3	-1.0	-1.0	-0.9	-1.0	-0.9	-0.7	-0.4	-1.4	-0.8	-0.6	-0.3	-0.3	0.3	0.6	0.5	1.0	-0.6	1.0
21-Sep	0.8	0.8	1.0	0.8	0.7	0.8	1.3	0.5	1.0	0.8	0.3	0.0	-0.1	-0.4	-0.4	-0.4	-0.4	-0.1	0.3	1.1	0.0	0.1	0.0	0.3	0.4	1.3
22-Sep	0.1	0.3	0.4	0.5	0.4	0.4	0.4	0.1	0.2	0.2	0.5	0.6	0.7	0.6	0.6	-0.2	-0.7	-0.3	-0.2	-0.3	-0.5	-0.4	-0.3	-0.5	0.1	0.7
23-Sep	-0.7	-0.8	0.0	0.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.1
24-Sep	AF	AF	AF	AF	AF	AF	-0.2	-0.3	-0.3	-0.3	-0.2	-0.4	-0.4	-0.7	0.1	0.6	1.1	0.8	1.0	1.0	1.0	-1.0	-0.2	0.5	0.1	1.1
25-Sep	0.0	-0.5	-0.6	-0.5	-0.8	-0.1	-0.6	-1.3	-0.8	-0.7	-0.9	-1.2	-0.9	-0.6	-0.5	-0.5	-0.3	-0.1	0.0	0.0	0.0	0.1	-0.2	-0.2	-0.5	0.1
26-Sep	-0.1	-0.1	0.0	0.1	-0.1	-0.1	-0.1	0.0	-0.2	0.0	-0.1	-0.3	-0.2	-0.1	-0.2	-0.4	-0.4	-0.2	-0.5	-0.6	-0.5	-0.5	-0.5	-0.4	-0.2	0.1
27-Sep	-0.1	-0.2	-0.3	-0.1	-0.2	-0.1	-0.3	-0.4	-0.2	0.0	-0.1	0.3	0.7	-0.1	0.0	0.2	0.5	0.4	0.2	0.2	0.2	0.5	0.7	0.5	0.1	0.7
28-Sep	0.7	1.0	0.6	0.8	0.9	0.8	1.1	1.5	1.2	0.7	0.4	0.7	0.9	0.3	-0.1	-0.5	-0.2	0.0	0.5	0.7	0.8	0.9	0.5	0.7	0.6	1.5
29-Sep	0.6	0.8	0.6	0.8	0.6	0.5	0.9	0.9	0.7	0.8	1.0	0.6	0.8	0.5	0.0	-0.3	-0.3	-0.2	-0.2	-0.2	0.2	0.3	0.5	0.8	0.5	1.0
30-Sep	0.5	0.6	0.4	0.2	0.0	-0.1	0.0	0.2	0.3	0.1	-0.1	-0.1	-0.4	-0.2	0.1	-0.1	-0.3	-0.2	-0.1	-0.2	-0.2	0.0	0.0	0.0	0.0	0.6
																								Diurnal Average		
																								Diurnal Maximum		
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 45 m (VW45m) - km/h
Lower Camp Met Tower - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 4.9 km/h on Sep 19 21:00	Hours of Data: 688
Minimum Value: 0.1 km/h on Sep 3 00:00	Hours of Missing Data: 32
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.8 Median = 1.5 Q ₃ = 2.1 P ₉₀ = 2.9 P ₉₉ = 3.8	Hours of Calibration: 0
	Percent Operational Time: 95.6

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

AF - Analyzer Failure



Maximum Value: 2.7 km/h on Sep 17 09:00		Maximum Daily Average: 1.6 km/h on Sep 17		Hours in Service: 720																						
Minimum Value: -1.1 km/h on Sep 25 13:00		Minimum Daily Average: -0.2 km/h on Sep 12		Hours of Data: 694																						
Maximum Diurnal Average: 0.4 km/h at hour 19		Minimum Diurnal Average: 0.1 km/h at hour 14		Hours of Missing Data: 26																						
Monthly Average: 0.24 km/h		Percentiles: P ₁ = -0.9 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.1 Q ₃ = 0.4 P ₉₀ = 1.0 P ₉₉ = 2.4		Hours of Calibration: 0																						
				Percent Operational Time: 96.4																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	-0.5	-0.1	-0.1	0.0	-0.1	-0.2	0.2	0.0	0.0	0.0	0.2	-0.1	-0.1	0.2	0.4	-0.2	0.1	-0.2	0.0	-0.1	0.0	0.1	-0.1	-0.1	0.0	0.4
2-Sep	0.1	0.0	0.0	0.1	0.2	0.2	-0.2	-0.1	0.0	0.1	0.4	0.5	0.4	-0.1	-0.4	0.2	0.0	-0.1	-0.2	-0.1	-0.2	0.0	0.2	0.0	0.0	0.5
3-Sep	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.2	0.4	0.0	-0.3	0.7	-0.1	-0.2	-0.5	-0.1	0.2	-0.3	0.6	1.1	-0.2	-0.4	-0.5	0.0	0.0	1.1
4-Sep	0.7	1.5	1.6	1.5	2.5	1.6	0.7	1.2	0.6	0.7	0.3	-0.2	0.1	0.6	0.3	0.3	-0.2	0.1	0.3	0.1	0.4	0.0	-0.1	0.2	0.6	2.5
5-Sep	-0.3	-0.3	0.0	-0.1	-0.2	-0.2	-0.1	0.0	-0.3	0.2	0.7	0.6	0.0	-0.1	-0.2	1.1	0.4	1.4	0.6	0.2	0.0	-0.1	0.0	-0.1	0.1	1.4
6-Sep	0.0	-0.2	-0.4	-0.2	-0.1	-0.3	-0.1	-0.2	0.3	0.0	0.2	-0.4	0.3	0.4	0.3	0.1	0.1	0.1	0.2	0.1	0.2	0.4	0.5	0.4	0.1	0.5
7-Sep	0.2	0.2	0.2	0.7	0.4	0.1	0.6	0.6	-0.1	0.3	0.0	0.3	0.7	-0.2	0.6	0.3	0.3	0.1	0.6	0.2	0.1	0.0	-0.1	0.3	0.3	0.7
8-Sep	0.4	0.2	0.1	0.1	-0.1	-0.1	-0.1	0.2	0.2	-0.7	-0.1	0.0	0.3	0.2	0.4	0.6	0.2	0.5	0.0	-0.1	-0.2	0.4	0.5	-0.2	0.1	0.6
9-Sep	-0.1	0.1	0.0	-0.1	0.1	-0.2	-0.2	-0.1	0.0	0.1	0.0	0.3	-0.1	0.0	0.1	-0.4	-0.2	-0.4	-0.3	-0.1	-0.1	0.0	0.0	0.0	-0.1	0.3
10-Sep	0.0	0.0	-0.2	-0.1	-0.2	-0.2	-0.4	-0.4	-0.4	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	0.2	0.3	0.2	0.2	0.7	1.0	0.7	-0.3	0.0	1.0
11-Sep	0.0	-0.5	-0.5	-0.3	-0.9	-0.5	0.0	0.4	0.6	0.6	0.4	0.0	-0.4	-0.1	0.4	0.3	1.6	0.9	0.5	0.8	0.7	0.2	-0.1	1.2	0.2	1.6
12-Sep	0.0	-0.5	-0.2	0.1	0.3	-0.1	-0.2	-0.3	-0.4	-0.3	-0.4	-0.1	-0.5	-0.1	0.2	-0.4	-0.2	0.1	0.0	-0.1	-0.2	-0.1	-0.3	-0.1	-0.2	0.3
13-Sep	0.0	-0.1	0.0	-0.1	0.1	0.0	-0.2	0.3	0.2	-0.3	0.3	0.1	0.0	0.6	0.0	-0.1	0.1	0.6	1.2	0.1	-0.8	0.0	0.0	0.8	0.1	1.2
14-Sep	0.4	0.5	0.1	0.2	0.1	0.1	0.1	-0.1	0.3	0.0	0.4	0.5	0.1	-0.1	-0.4	-0.2	0.7	0.5	0.7	1.0	0.0	-0.2	0.0	0.1	0.2	1.0
15-Sep	0.0	-0.1	0.1	0.1	0.2	0.0	0.1	0.1	0.1	0.4	0.5	0.4	-0.3	0.2	0.1	0.0	0.2	0.4	-0.2	-0.4	0.0	0.2	0.1	0.0	0.1	0.5
16-Sep	-0.1	-0.1	0.2	0.2	-0.2	-0.1	0.1	-0.2	-0.2	0.0	-0.2	0.3	-0.1	0.3	-0.1	0.8	0.7	1.4	1.1	1.1	1.2	1.0	1.3	1.3	0.4	1.4
17-Sep	1.2	1.6	1.3	1.9	2.5	2.4	1.6	1.7	2.7	2.2	1.0	1.0	1.8	1.3	1.6	0.9	1.6	1.4	2.2	1.9	2.7	1.4	0.6	0.7	1.6	2.7
18-Sep	1.0	0.1	-0.1	0.0	0.1	0.1	0.0	-0.1	0.0	0.6	0.4	1.1	0.5	0.1	0.9	0.6	0.4	0.3	0.3	0.3	0.5	0.7	0.7	0.8	0.4	1.1
19-Sep	1.1	1.0	1.1	1.3	0.3	0.0	0.2	-0.3	-0.3	0.6	0.5	0.4	0.3	0.9	0.4	0.3	-0.9	-0.4	0.4	-0.2	-0.9	-0.8	-0.7	-0.7	0.2	1.3
20-Sep	-0.9	-0.7	-0.5	-0.3	-0.4	-0.2	-0.2	-0.7	-0.1	0.0	-0.4	-0.9	-0.3	-0.1	0.6	-0.5	-0.3	0.3	0.3	0.8	1.9	0.5	-0.4	-0.3	-0.1	1.9
21-Sep	0.1	0.5	0.5	0.6	0.7	0.2	0.1	0.0	0.3	0.2	0.3	0.6	0.0	0.0	0.0	0.1	0.4	0.5	0.1	0.3	0.4	-0.5	1.6	2.4	0.4	2.4
22-Sep	0.4	0.5	0.9	0.0	0.2	0.5	0.2	0.3	1.3	0.3	0.7	0.3	0.7	0.0	0.2	0.3	0.3	0.2	0.6	0.0	0.0	0.6	-0.1	-0.4	0.3	1.3
23-Sep	-0.5	-0.6	0.0	0.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.1
24-Sep	AF	AF	AF	AF	AF	AF	0.2	0.0	-0.2	-0.2	-0.1	-0.2	-0.2	-0.2	0.3	1.0	1.8	1.9	2.1	1.8	2.2	-0.3	0.0	1.0	0.6	2.2
25-Sep	0.8	0.4	0.3	0.1	0.0	0.5	0.3	-0.5	-0.3	-0.5	-0.3	-1.1	-1.1	-0.8	-0.6	-0.4	-0.1	0.3	0.3	0.2	0.2	0.0	0.2	-0.2	-0.1	0.8
26-Sep	0.0	0.0	-0.1	-0.2	-0.1	-0.1	0.1	0.3	0.2	0.3	-0.1	0.1	-0.1	0.1	-0.1	0.4	0.5	0.2	0.8	0.4	0.4	0.3	0.3	0.5	0.2	0.8
27-Sep	0.4	0.2	0.1	0.1	0.1	-0.1	-0.3	-0.4	-0.2	0.0	0.3	0.5	0.6	-0.1	0.3	0.2	0.2	0.4	0.1	0.3	0.2	0.6	0.7	0.7	0.2	0.7
28-Sep	1.2	1.8	1.8	1.5	1.2	1.6	1.7	1.4	1.0	0.0	0.0	0.6	0.6	-0.4	-0.1	-0.7	-0.7	-0.7	-0.2	0.1	0.1	0.4	1.2	0.9	0.6	1.8
29-Sep	0.6	0.9	0.7	0.9	1.1	1.3	2.0	2.4	1.9	1.7	1.8	2.1	1.8	0.1	-0.1	0.1	0.1	-0.2	-0.1	-0.1	0.2	0.1	0.1	0.5	0.8	2.4
30-Sep	0.3	0.4	0.4	-0.1	-0.1	-0.1	0.0	0.2	0.2	0.2	-0.1	-0.2	-0.5	0.0	-0.2	0.1	-0.1	-0.2	0.1	0.0	0.2	0.0	0.1	0.3	0.0	0.4
																								Diurnal Average		
																								Diurnal Maximum		
																								0.2 1.2		
																								0.2 1.8		
																								0.2 1.8		
																								0.3 1.9		
																								0.3 2.5		
																								0.2 2.4		
																								0.2 2.0		
																								0.2 2.4		
																								0.2 2.7		
																								0.2 2.2		
																								0.2 1.8		
																								0.2 2.1		
																								0.2 1.8		
																								0.1 1.3		
																								0.1 1.6		
																								0.2 1.1		
																								0.3 1.8		
																								0.3 1.9		
																								0.4 2.2		
																								0.3 1.9		
																								0.3 2.7		
																								0.2 1.4		
																								0.2 1.6		
																								0.3 2.4		

AF - Analyzer Failure



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4.8 km/h on Sep 19 22:00			Hours of Data:	694
Minimum Value: 0.1 km/h on Sep 2 22:00			Hours of Missing Data:	26
			Hours of Calibration:	0
Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 0.8 Median = 1.4 Q ₃ = 2.2 P ₉₀ = 2.8 P ₉₉ = 3.8			Percent Operational Time:	96.4

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

AF - Analyzer Failure



Maximum Value: 2.4 km/h on Sep 25 01:00	Maximum Daily Average: 1.4 km/h on Sep 29	Hours in Service: 720
Minimum Value: -1.1 km/h on Sep 25 13:00	Minimum Daily Average: 0.2 km/h on Sep 30	Hours of Data: 162
Maximum Diurnal Average: 1.0 km/h at hour 21	Minimum Diurnal Average: 0.0 km/h at hour 14	Hours of Missing Data: 558
Monthly Average: 0.58 km/h	Percentiles: $P_1 = -0.8$ $P_{10} = -0.1$ $Q_1 = 0.1$ Median = 0.4 $Q_3 = 0.9$ $P_{90} = 1.6$ $P_{99} = 2.4$	Hours of Calibration: 0
		Percent Operational Time: 22.5

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	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
2-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	AF	--	--
3-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	AF	--	--
4-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	AF	--	--
5-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	AF	--	--
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	AF	--	--
7-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	AF	--	--
8-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	AF	--	--
9-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	AF	--	--
10-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	AF	--	--
11-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	AF	--	--
12-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	AF	--	--
13-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	AF	--	--
14-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	AF	--	--
15-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	AF	--	--
16-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	AF	--	--
17-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	AF	--	--
18-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	AF	--	--
19-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	AF	--	--
20-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	AF	--	--
21-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	AF	--	--
22-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	AF	--	--
23-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	AF	--	--
24-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	AF	--	--
25-Sep	2.4	1.6	1.2	0.8	0.8	0.9	0.6	1.4	0.5	0.3	0.3	0.6	1.0	0.3	0.4	0.7	1.4	2.1	1.9	2.2	1.7	2.0	0.2	0.6	1.4	1.1	2.2
26-Sep	0.0	-0.1	0.3	0.0	0.1	-0.1	0.3	0.3	0.6	0.5	0.4	0.2	0.1	0.2	0.3	0.6	0.7	0.2	0.9	0.6	0.7	0.5	0.4	0.4	0.3	0.9	0.9
27-Sep	0.4	0.3	0.4	0.4	0.3	0.2	0.1	0.1	0.2	0.1	0.5	0.2	0.4	0.0	0.3	0.1	-0.1	0.8	1.2	1.3	1.5	0.5	0.9	1.1	0.5	1.5	1.5
28-Sep	1.1	1.2	1.1	1.3	1.1	1.1	0.9	0.9	0.7	0.0	-0.1	0.4	0.2	-0.6	0.8	0.1	0.0	0.1	-0.5	-0.3	-0.1	0.4	0.8	0.5	0.5	1.3	1.3
29-Sep	0.3	0.5	0.2	0.5	0.9	1.7	1.5	1.8	2.0	1.6	2.2	2.2	1.9	0.5	1.1	1.9	2.0	1.7	2.0	2.4	2.2	1.5	0.3	0.4	1.4	2.4	2.4
30-Sep	0.4	0.4	0.4	0.5	0.4	0.0	0.0	0.1	0.3	0.2	0.0	-0.3	-0.4	0.1	-0.2	0.0	0.2	-0.3	0.2	0.1	0.3	0.1	0.3	0.7	0.2	0.7	0.7
	0.8	0.7	0.6	0.6	0.6	0.6	0.7	0.5	0.7	0.5	0.6	0.4	0.2	0.0	0.4	0.5	0.7	0.7	0.9	0.9	1.0	0.5	0.5	0.6			Diurnal Average
	2.4	1.6	1.2	1.3	1.1	1.7	1.5	1.8	2.0	1.6	2.2	2.2	1.9	0.5	1.1	1.9	2.1	1.9	2.2	2.4	2.2	1.5	0.9	1.4			Diurnal Maximum

AF - Analyzer Failure



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 3.6 km/h on Sep 25 08:00	Hours of Data: 162
Minimum Value: 0.4 km/h on Sep 30 09:00	Hours of Missing Data: 558
Percentiles: $P_1 = 0.3$ $P_{10} = 0.8$ $Q_1 = 1.1$ Median = 1.6 $Q_3 = 2.3$ $P_{90} = 2.9$ $P_{99} = 3.5$	Hours of Calibration: 0
	Percent Operational Time: 22.5

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

AF - Analyzer Failure

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 4
BUFFALO VIEWPOINT
SEPTEMBER 2014**

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

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

October 30, 2014

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	339	21	381	50.00	43	0	5	0
H2S (ppb) Average	342	21	378	50.42	3	0	1	0
THC (ppm) Average	339	21	381	50.00	3.6	-	2.6	-
Temperature (C) Average	720	0	0	100.00	30.3	-	19.4	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	31	-	-	-
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 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	339	0.9	3	-	0	0	0	0	0	1	43
H2S (ppb) Average	342	0.3	0	-	0	0	0	0	0	1	3
THC (ppm) Average	339	2.26	0.2	-	2	2.1	2.1	2.2	2.3	2.5	3.6
Temperature 2 m (C) Average	720	9.84	5.7	-	-2.1	3.3	5.7	9	13.1	17.9	30.3
Wind Speed 10 m (km/h) Average	720	10.3	6	-	0	4	6	9	14	19	31
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	04 Sep 2014 13:00	19 Sep 2014 12:00	360	Data Invalidated - manifold blower unplugged
H2S	04 Sep 2014 16:00	19 Sep 2014 12:00	357	Data Invalidated - manifold blower unplugged
THC	04 Sep 2014 13:00	19 Sep 2014 12:00	360	Data Invalidated - manifold blower unplugged

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 43 ppb on Sep 27 14:00	Maximum Daily Average: 5.0 ppb on Sep 27		Hours of Data:	339
Minimum Value: 0 ppb on Sep 25 11:00	Minimum Daily Average: 0.1 ppb on Sep 26		Hours of Missing Data:	381
Maximum Diurnal Average: 3.5 ppb at hour 14	Minimum Diurnal Average: 0.2 ppb at hour 5		Hours of Calibration:	21
Monthly Average: 0.9 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 24		Percent Operational Time:	50.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	Z	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1
2-Sep	0	Z	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0.3	2
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	0.2	0	
4-Sep	0	Z	0	0	0	0	0	0	0	C	C	C	C	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0	
5-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
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	--	--	
7-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
8-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
9-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
10-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
11-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
12-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
13-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
14-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
15-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
16-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
17-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
18-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
19-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	0	1	1	1	0	0	0	0	0	--	1	
20-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	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	0.2	0	
22-Sep	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
23-Sep	0	Z	4	0	0	0	1	0	1	1	4	3	1	1	1	7	25	13	9	6	3	2	3	2	3.8	25
24-Sep	1	Z	0	0	0	0	0	0	0	1	3	2	1	1	1	0	0	0	0	0	1	0	0	0.6	3	
25-Sep	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	
26-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
27-Sep	0	Z	0	0	0	1	1	0	2	0	0	0	11	43	24	11	9	5	3	1	1	1	0	5.0	43	
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	0.1	0	
29-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0.3	1	
30-Sep	0	Z	0	0	0	0	0	0	0	0	0	6	10	1	1	0	1	0	0	0	0	0	0	0.9	10	

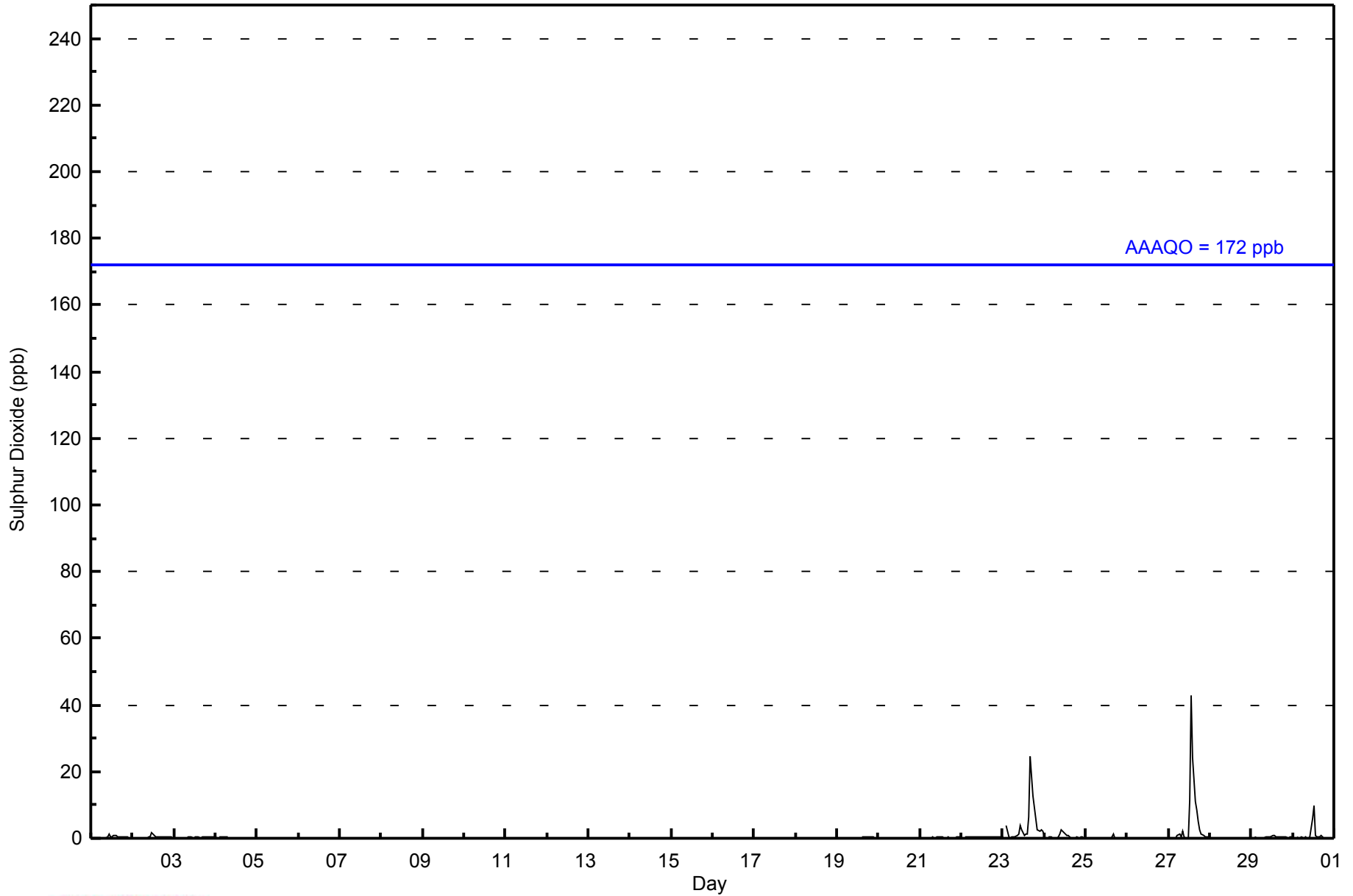
0.2	--	0.4	0.2	0.2	0.2	0.3	0.2	0.4	0.4	0.8	1.0	1.9	3.5	2.0	1.4	2.6	1.4	1.0	0.7	0.4	0.4	0.4	0.3	Diurnal Average	
1	--	4	0	0	1	1	0	2	1	4	6	11	43	24	11	25	13	9	6	3	2	3	2	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	333	98.23	98.23
11 - 20	3	0.88	99.12
21 - 60	3	0.88	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: 339

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - September 2014

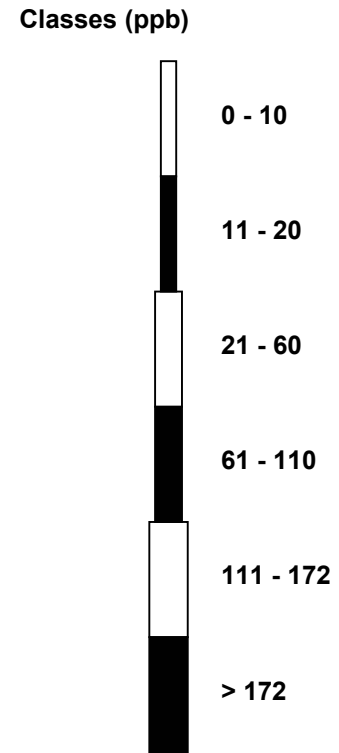
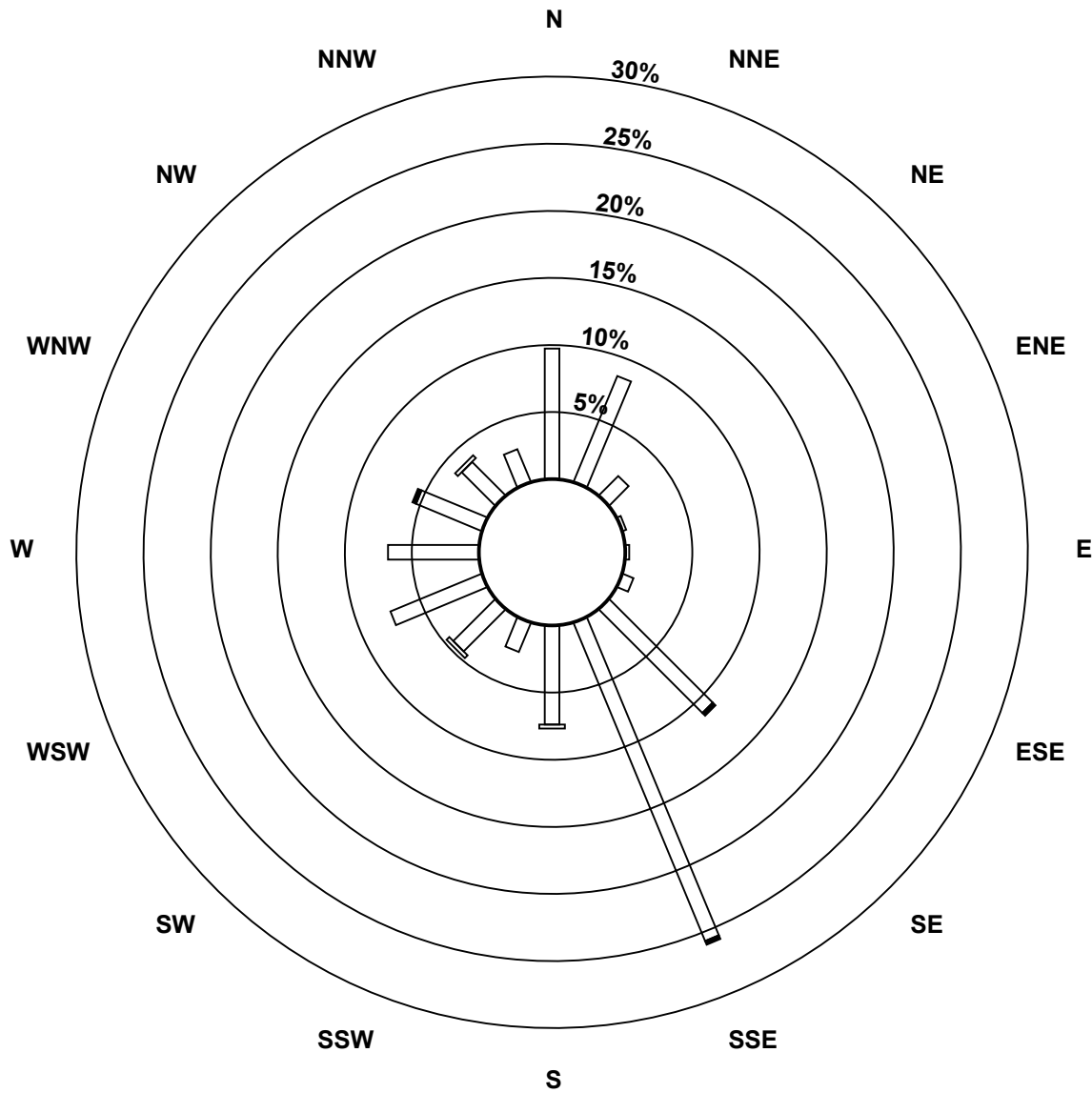
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	33	29	7	1	1	3	37	87	25	8	15	25	23	18	12	9	333
11 - 20	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	3
21 - 60	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	3
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	33	29	7	1	1	3	38	88	26	8	16	25	23	19	13	9	339

Total Number of Valid Hours: 339

Total Number of Hours: 720

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

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

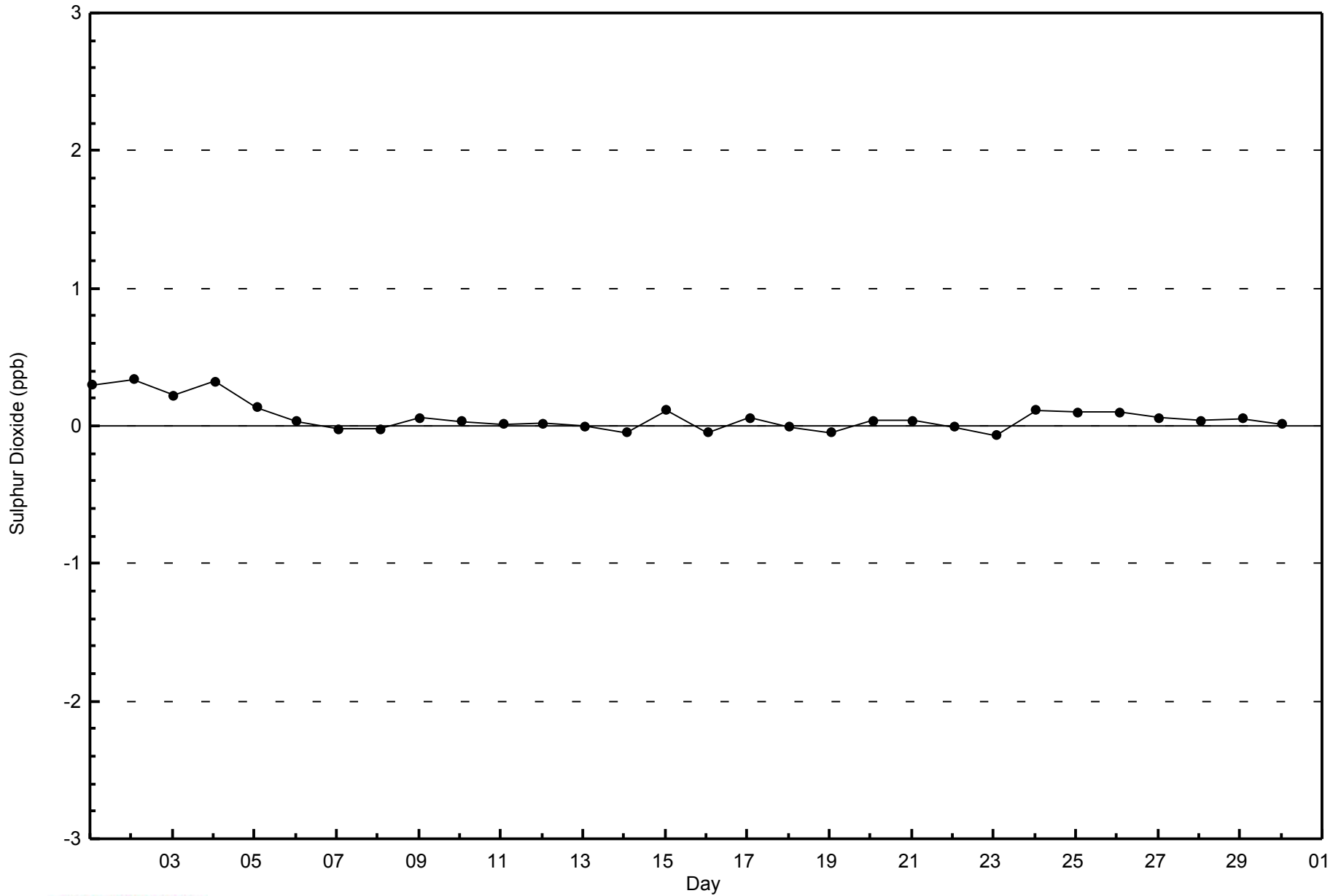


Total Number of Valid Hours: 339



WBEA
Zero Responses

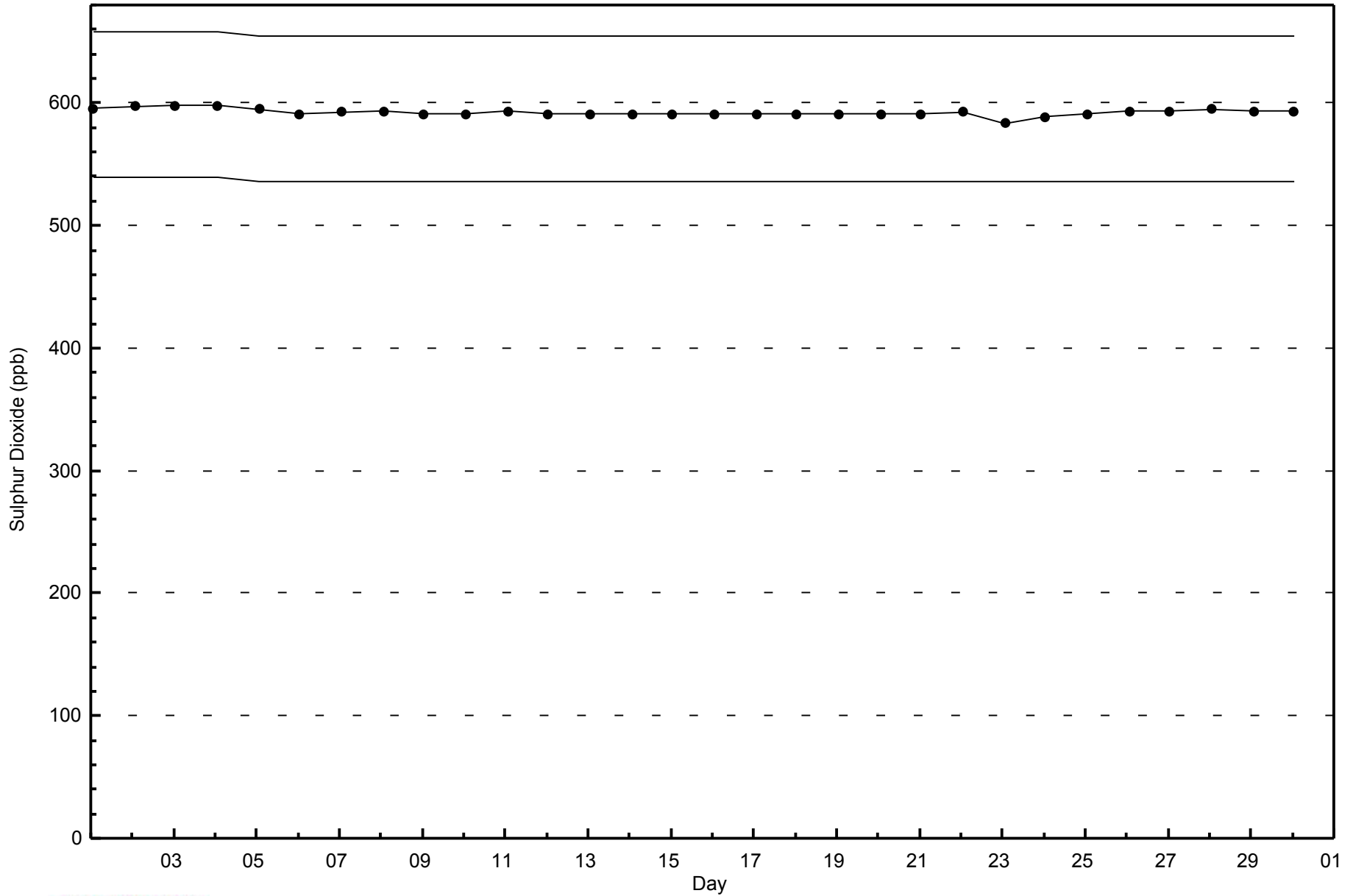
Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - September 2014





Wood Buffalo Environmental Association Summary of Hour Averages

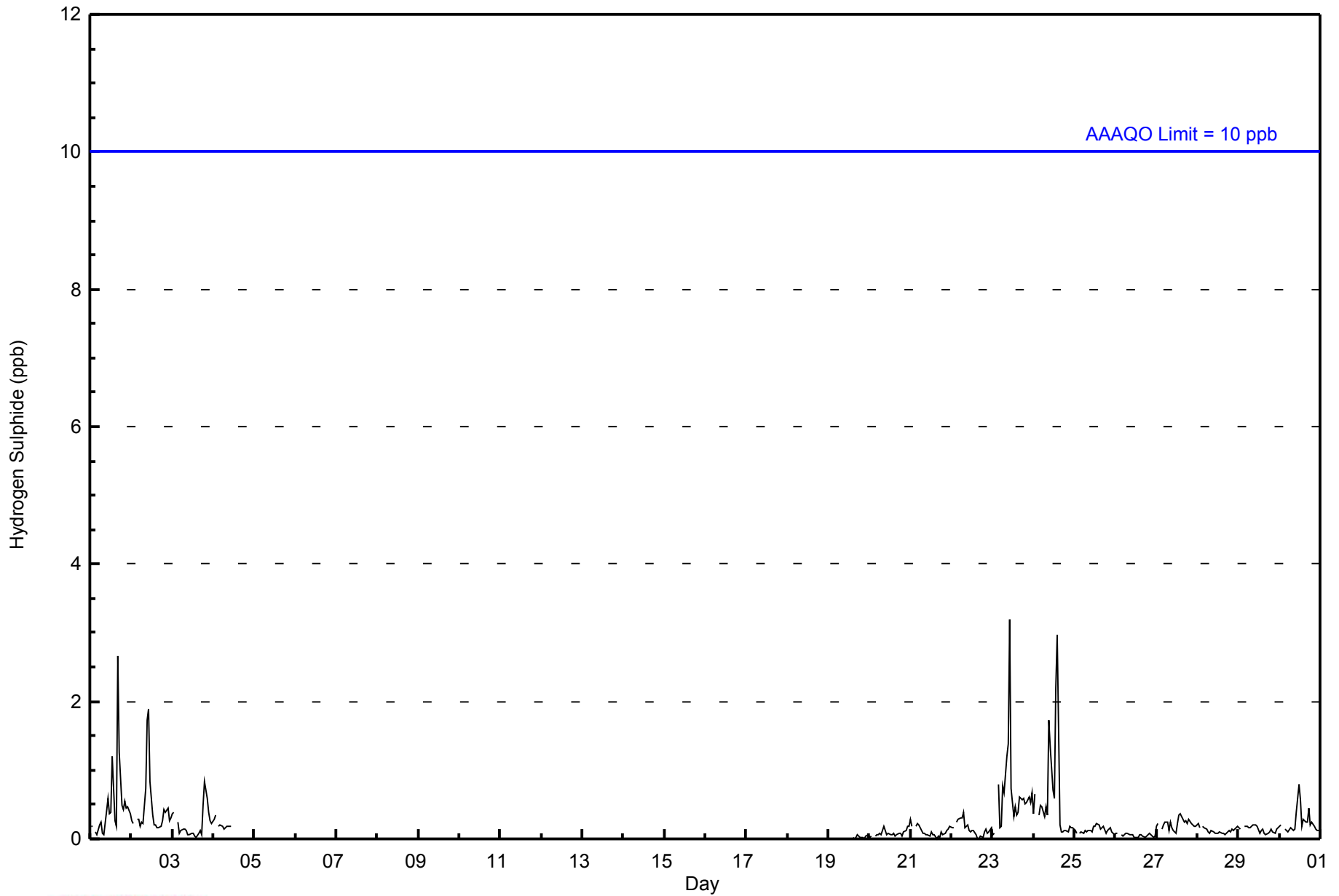
Hydrogen Sulphide (H₂S) - ppb Buffalo Viewpoint - September 2014

Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0	Hours in Service: 720																							
Maximum Value: 3 ppb on Sep 23 11:00		Maximum Daily Average: 0.7 ppb on Sep 23		Hours of Data: 342																							
Minimum Value: 0 ppb on Sep 19 16:00		Minimum Daily Average: 0.1 ppb on Sep 26		Hours of Missing Data: 378																							
Maximum Diurnal Average: 0.6 ppb at hour 11		Minimum Diurnal Average: 0.1 ppb at hour 16		Hours of Calibration: 21																							
Monthly Average: 0.3 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 2		Percent Operational Time: 50.4																							
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	0	0	Z	0	0	0	0	0	0	0	1	0	0	1	0	0	3	1	0	0	1	0	0	0	0.5	3	
2-Sep	0	0	Z	0	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
3-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.2	1	
4-Sep	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0	
5-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	--	--	
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	AF	AF	AF	AF	AF	AF	--	--	
8-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	--	--	
9-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	--	--	
10-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	--	--	
11-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	--	--	
12-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	--	--	
13-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	--	--	
14-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	--	--	
15-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	--	--	
16-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	--	--	
17-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	--	--	
18-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	--	--	
19-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	--	0	
20-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	
21-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	
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	Z	1	0	0	1	1	1	1	3	1	0	0	0	0	1	1	1	1	1	1	1	1	0.7	3	
24-Sep	0	1	Z	0	0	0	0	0	0	2	1	1	1	2	3	0	0	0	0	0	0	0	0	0	0.6	3	
25-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	
26-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	
27-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	
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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
30-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	
		0.2	0.2	--	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.6	0.3	0.2	0.4	0.3	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average		
		0	1	--	1	0	0	1	1	1	2	3	1	1	2	3	0	3	1	1	1	1	1	1	1	Diurnal Maximum	
Z - zeronspan C - Calibration AF - Analyzer Failure				Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																							



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - September 2014





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	339	99.12	99.12
3 - 4	3	0.88	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: 342

Total Number of Hours: 720



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - September 2014

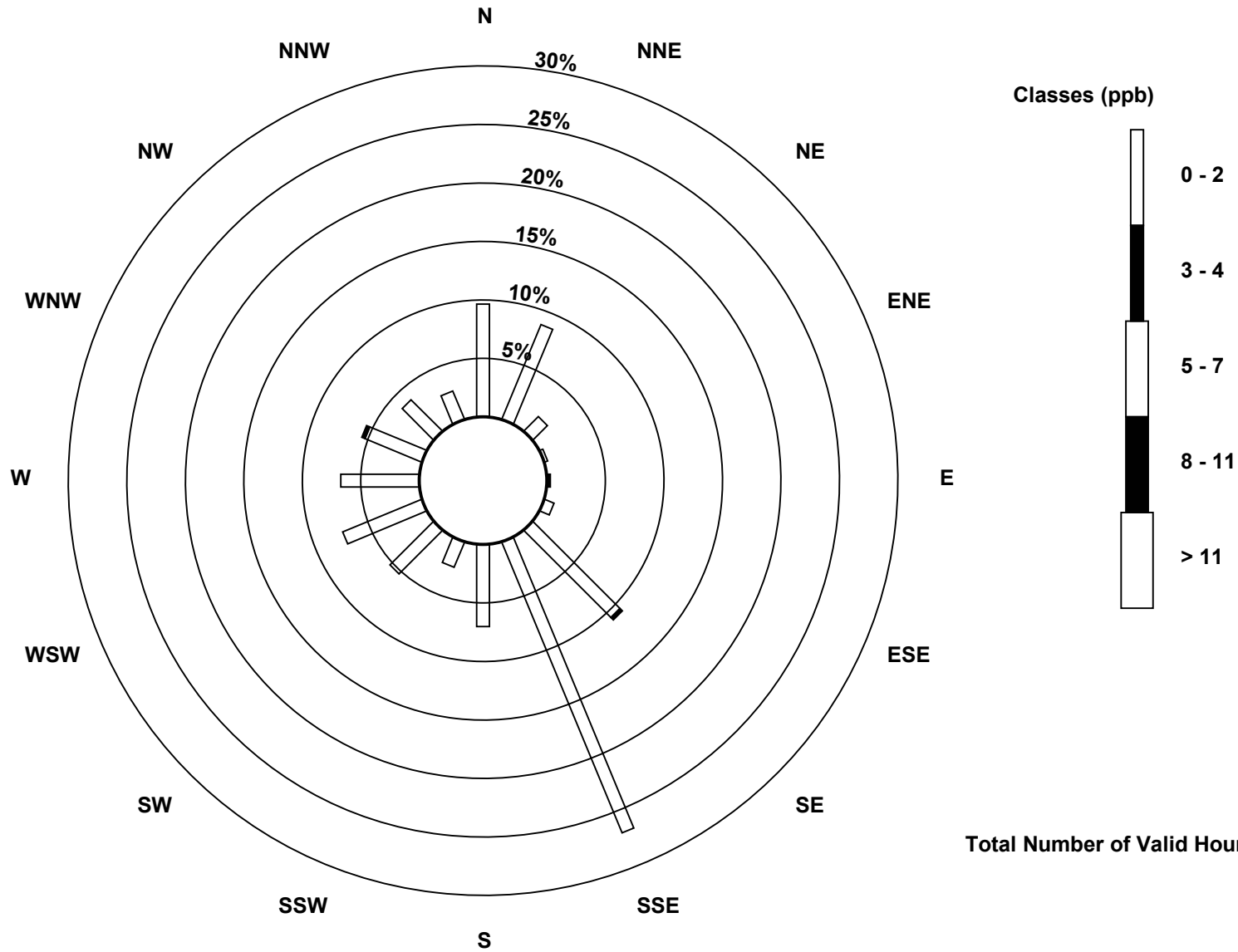
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	33	30	6	1	0	3	36	92	24	8	18	25	23	18	13	9	339
3 - 4	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	3
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	33	30	6	1	1	3	37	92	24	8	18	25	23	19	13	9	342

Total Number of Valid Hours: 342

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

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

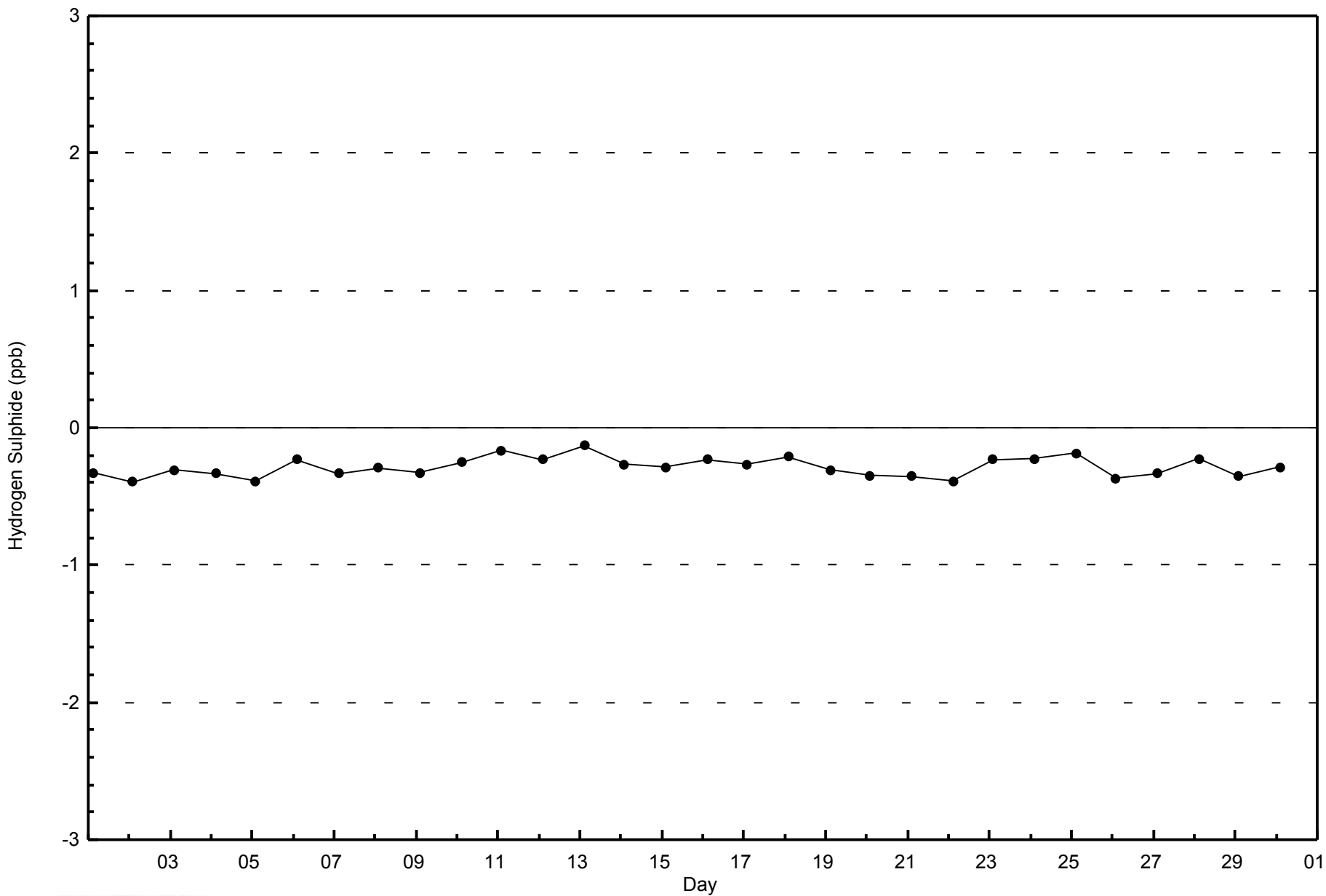


Total Number of Valid Hours: 342



WBEA
Zero Responses

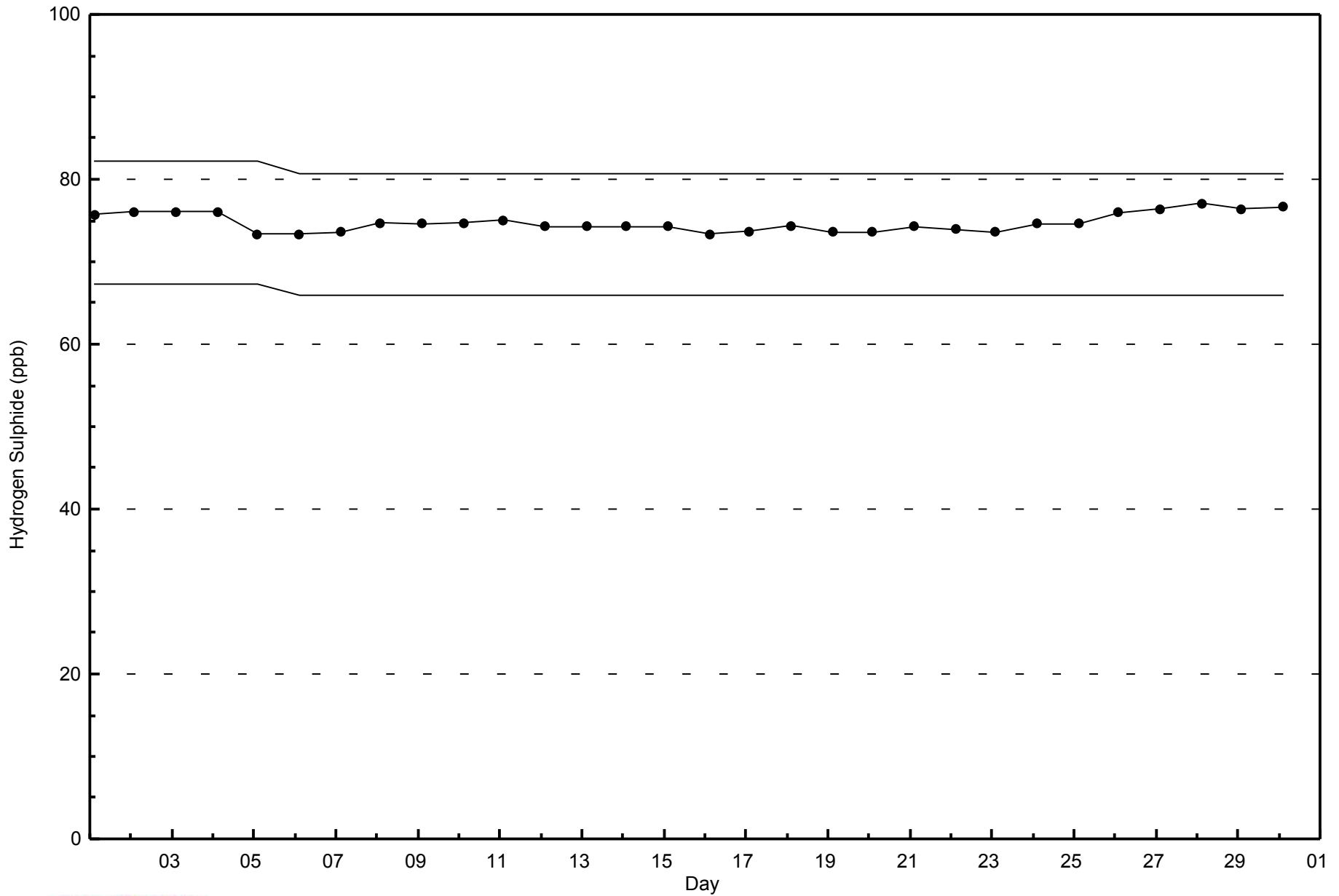
Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - September 2014





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - September 2014



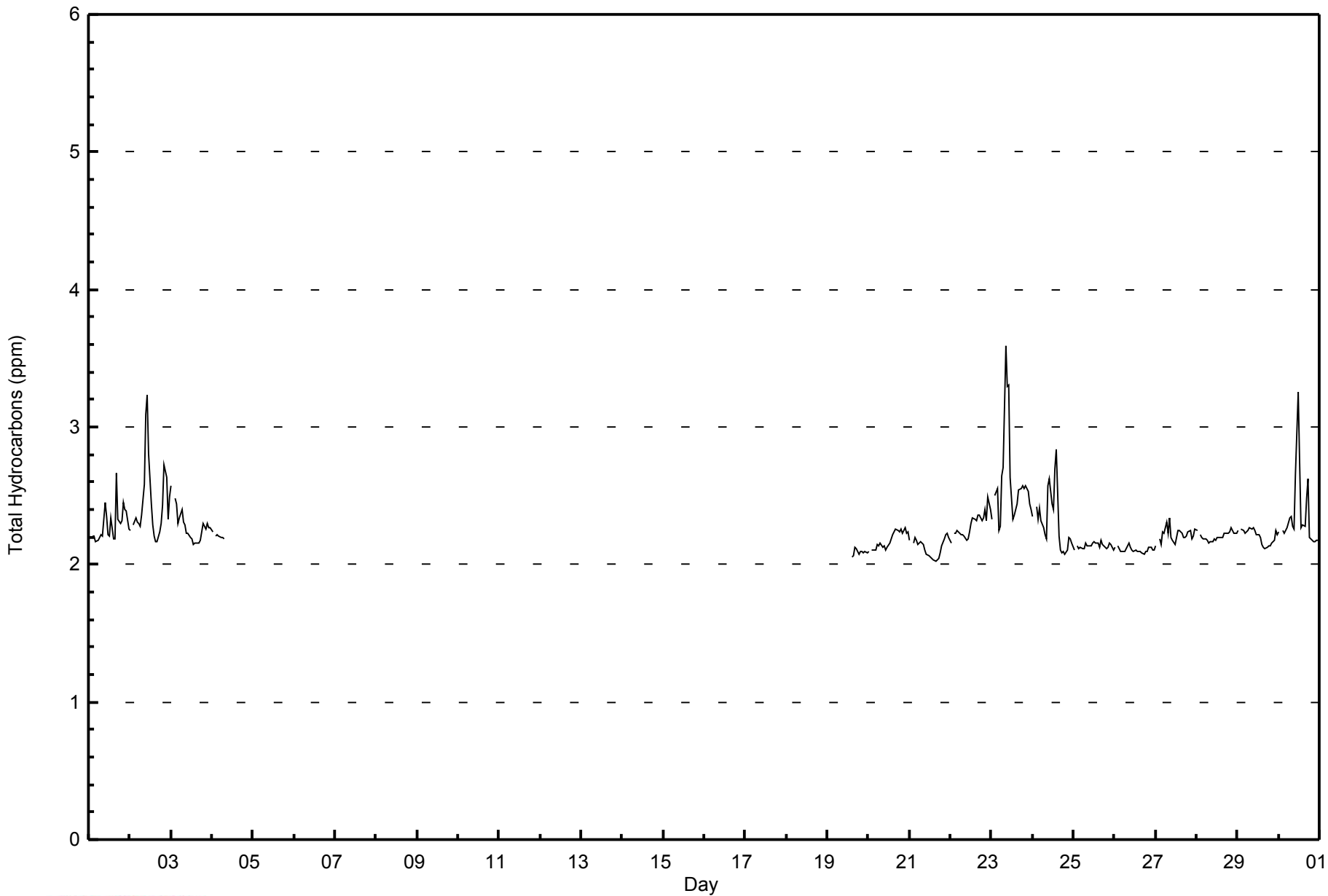


Maximum Value: 3.6 ppm on Sep 23 09:00																	Maximum Daily Average: 2.6 ppm on Sep 23							Hours in Service: 720			
Minimum Value: 2.0 ppm on Sep 21 16:00																	Minimum Daily Average: 2.1 ppm on Sep 26							Hours of Data: 339			
Maximum Diurnal Average: 2.4 ppm at hour 11																	Minimum Diurnal Average: 2.2 ppm at hour 16							Hours of Missing Data: 381			
Monthly Average: 2.26 ppm																	Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.5 P ₉₉ = 3.3							Hours of Calibration: 21			
																								Percent Operational Time: 50.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	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	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.2	2.2	2.3	2.2	2.2	2.7	2.3	2.3	2.3	2.5	2.4	2.4	2.3	2.3	2.7	
2-Sep	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.6	3.1	3.2	2.8	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.7	2.6	2.3	2.5	2.4	
3-Sep	2.6	Z	2.5	2.4	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.6	
4-Sep	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	C	C	C	C	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.2	
5-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	AF	--	
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	AF	--	
7-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	AF	--	
8-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	AF	--	
9-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	AF	--	
10-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	AF	--	
11-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	AF	--	
12-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	AF	--	
13-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	AF	--	
14-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	AF	--	
15-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	AF	--	
16-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	AF	--	
17-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	AF	--	
18-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	AF	--	
19-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	AF	--	
20-Sep	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	
21-Sep	2.2	Z	2.2	2.2	2.2	2.1	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	2.1	2.1	2.2	2.2	2.2	2.2	2.1	
22-Sep	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.4	2.3	2.5	2.4	2.3	2.5	
23-Sep	2.3	Z	2.5	2.6	2.2	2.3	2.6	2.7	3.6	3.3	3.3	2.6	2.3	2.4	2.4	2.4	2.5	2.6	2.6	2.5	2.6	2.5	2.4	2.4	2.6	3.6	
24-Sep	2.4	Z	2.4	2.3	2.4	2.3	2.3	2.2	2.2	2.6	2.6	2.4	2.4	2.7	2.8	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.8
25-Sep	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
26-Sep	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
27-Sep	2.1	Z	2.2	2.1	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	
28-Sep	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	
29-Sep	2.2	Z	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	
30-Sep	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.3	2.7	3.3	2.7	2.3	2.3	2.3	2.5	2.6	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	3.3
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan																								C - Calibration		AF - Analyzer Failure	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	5	1.47	1.47
2.1 - 3.0	328	96.76	98.23
3.1 - 10.0	6	1.77	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 339

Total Number of Hours: 720



WBEA
Frequency Distribution

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

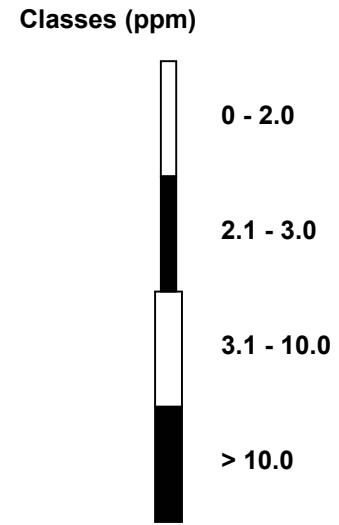
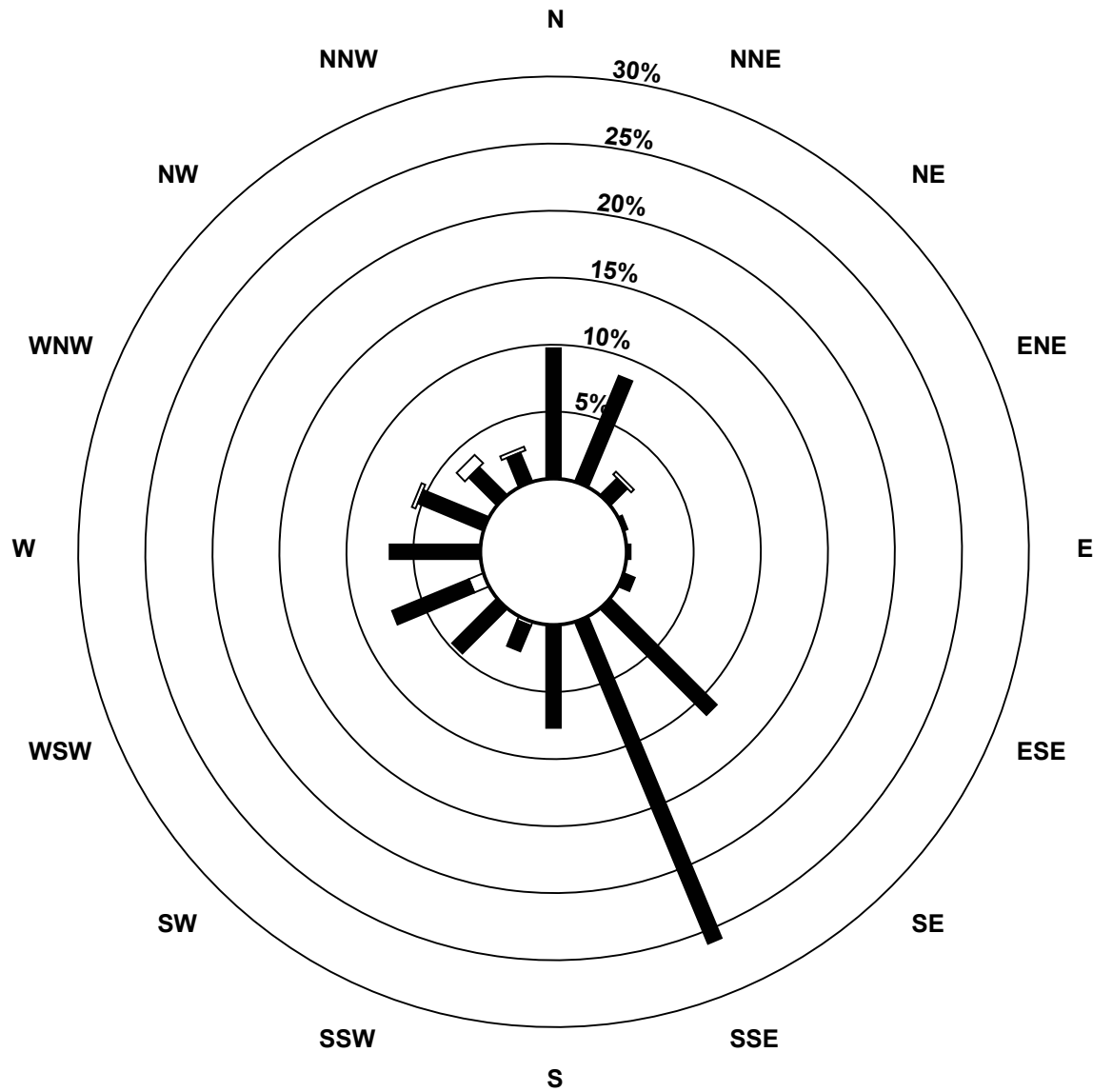
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	1	0	4	0	0	0	0	5
2.1 - 3.0	33	29	6	1	1	3	38	88	26	7	16	21	23	18	10	8	328
3.1 - 10.0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	3	1	6
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	33	29	7	1	1	3	38	88	26	8	16	25	23	19	13	9	339

Total Number of Valid Hours: 339

Total Number of Hours: 720

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

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

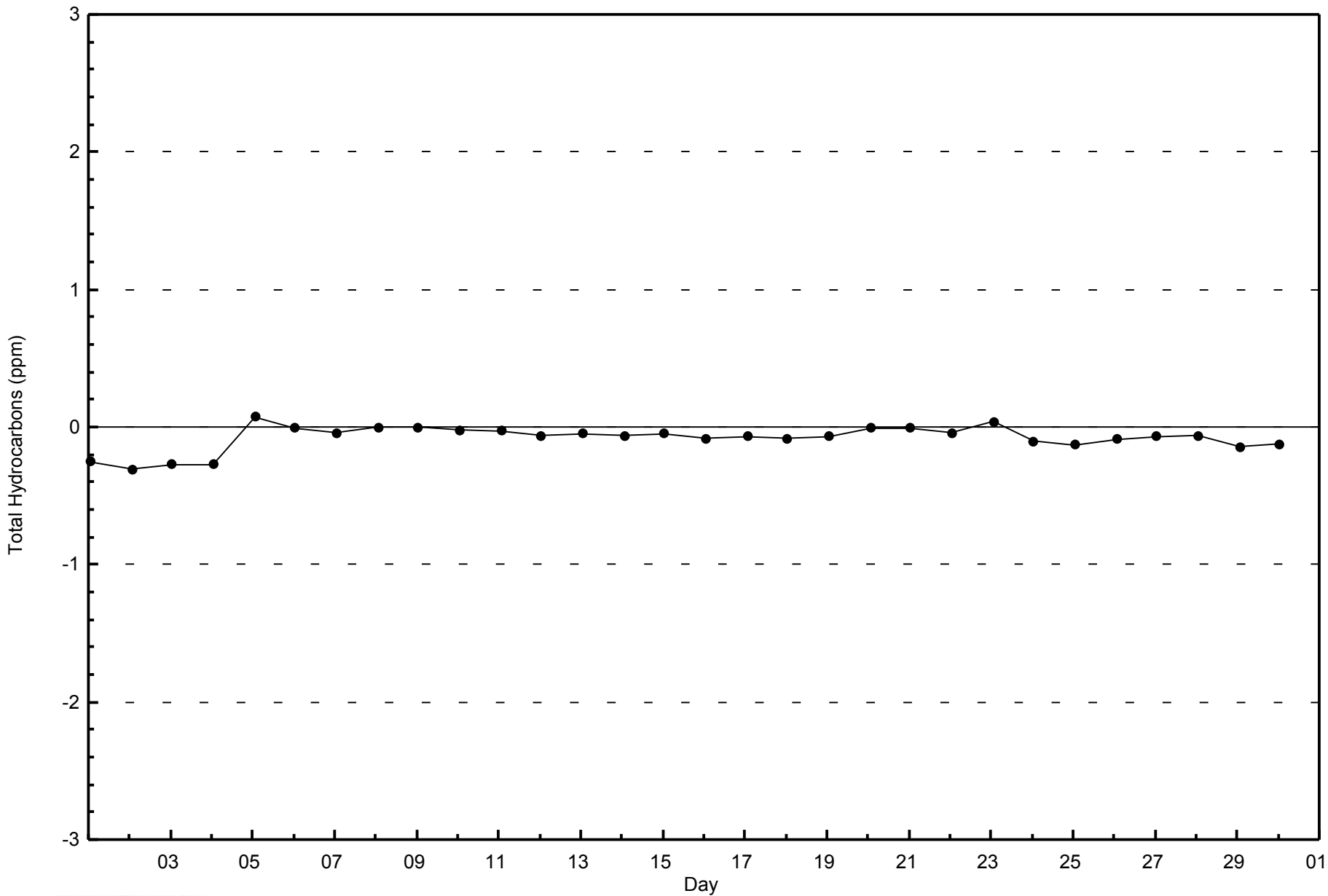


Total Number of Valid Hours: 339



WBEA
Zero Responses

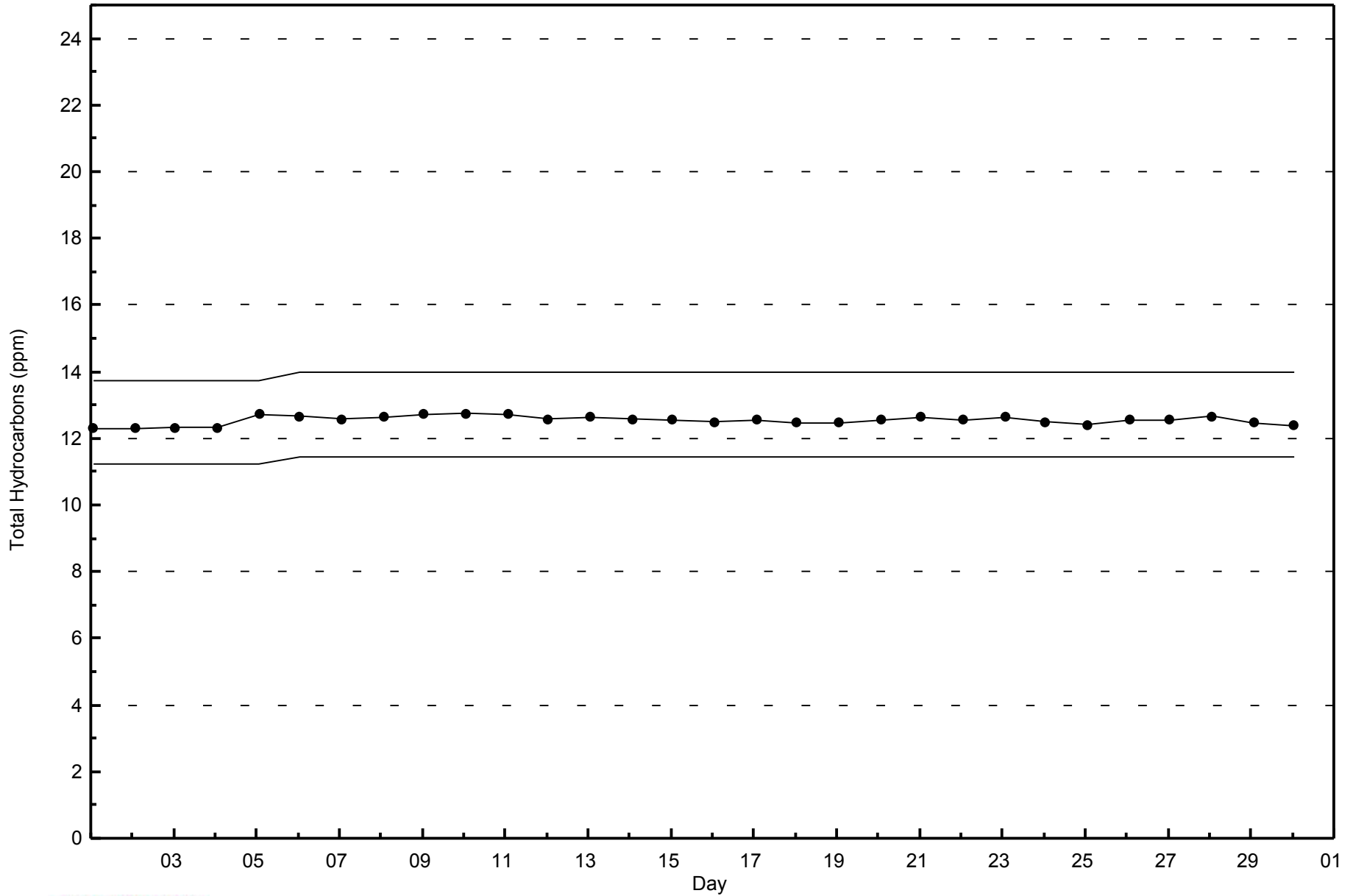
Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - September 2014





WBEA
Span Responses

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



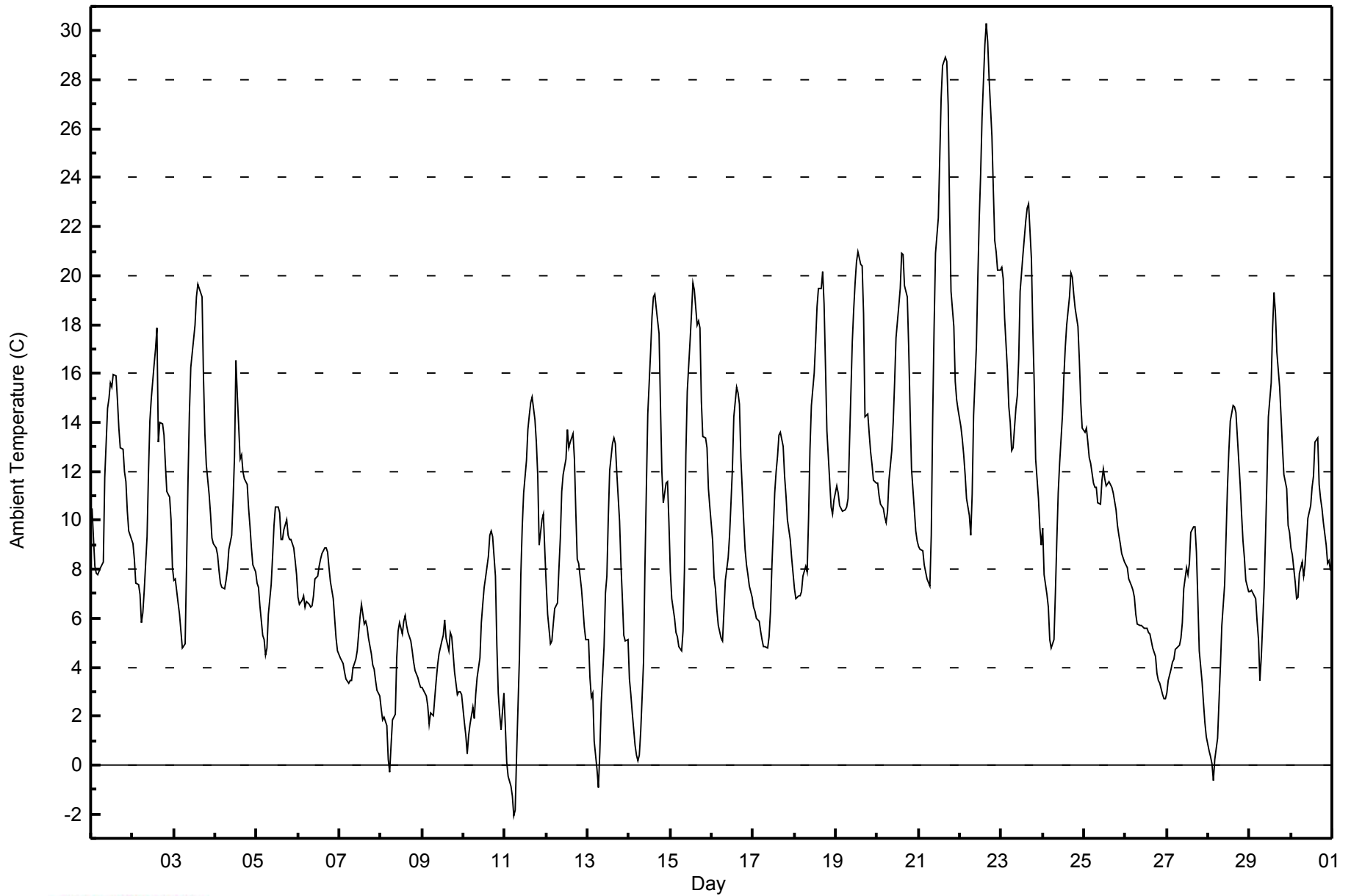


Maximum Value: 30.3 C on Sep 22 16:00		Maximum Daily Average: 19.4 C on Sep 22		Hours in Service: 720																																												
Minimum Value: -2.1 C on Sep 11 06:00		Minimum Daily Average: 3.5 C on Sep 8		Hours of Data: 720																																												
Maximum Diurnal Average: 15.0 C at hour 15		Minimum Diurnal Average: 5.5 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 9.84 C		Percentiles: P ₁ = -0.4 P ₁₀ = 3.3 Q ₁ = 5.7 Median = 9.0 Q ₃ = 13.1 P ₉₀ = 17.9 P ₉₉ = 27.6		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	10.5	9.3	8.1	7.8	7.8	8.0	8.2	8.3	11.8	14.6	15.0	15.6	15.4	16.0	15.9	14.9	13.8	13.0	12.9	12.0	11.6	10.4	9.6	9.2	11.7	16.0																						
2-Sep	9.1	8.4	7.5	7.4	6.9	5.8	6.2	7.1	9.3	11.9	14.0	15.0	16.4	17.0	17.8	13.2	14.0	13.9	13.5	12.3	11.2	10.9	10.0	8.1	11.1	17.8																						
3-Sep	7.6	7.6	6.6	6.1	5.5	4.8	5.0	8.1	11.5	14.3	16.2	17.4	18.0	19.1	19.6	19.3	19.1	15.9	13.5	12.2	11.1	10.2	9.3	9.0	12.0	19.6																						
4-Sep	8.8	8.6	8.0	7.4	7.3	7.2	7.6	8.0	8.8	9.4	10.8	12.6	16.5	15.1	12.5	12.7	12.0	11.7	11.4	10.5	9.7	8.9	8.2	7.9	10.1	16.5																						
5-Sep	7.5	7.3	6.5	5.3	5.1	4.5	4.8	6.2	7.4	8.5	9.8	10.6	10.6	10.3	9.2	9.2	9.6	10.0	9.4	9.2	9.2	8.9	8.4	7.7	8.1	10.6																						
6-Sep	6.9	6.6	6.8	6.9	6.5	6.7	6.6	6.5	6.5	6.9	7.6	7.7	8.2	8.4	8.7	8.9	8.9	8.7	8.1	7.5	6.8	6.0	5.2	4.7	7.2	8.9																						
7-Sep	4.4	4.2	4.1	3.8	3.5	3.4	3.4	3.5	4.0	4.3	4.7	5.4	6.0	6.6	5.8	5.9	5.6	5.2	4.5	4.1	3.9	3.5	3.0	2.8	4.4	6.6																						
8-Sep	2.3	1.9	2.0	1.6	0.2	-0.3	0.8	1.8	2.1	4.4	5.4	5.8	5.4	5.9	6.1	5.7	5.4	5.1	4.7	4.2	3.9	3.6	3.3	3.1	3.5	6.1																						
9-Sep	3.2	3.1	2.8	2.4	1.7	2.1	2.0	2.8	3.5	4.1	4.5	5.1	5.3	5.9	5.2	4.6	5.4	5.3	4.6	3.8	2.9	3.0	3.0	2.9	3.7	5.9																						
10-Sep	1.7	1.2	0.5	1.2	1.7	2.3	1.9	2.9	3.6	4.4	5.8	6.6	7.3	7.7	8.5	9.4	9.6	9.4	7.7	4.9	3.0	2.1	1.4	2.9	4.5	9.6																						
11-Sep	1.6	0.1	-0.5	-0.9	-1.3	-2.1	-1.9	0.4	4.4	7.8	9.7	11.1	12.5	13.7	14.3	14.8	15.0	14.1	13.2	11.8	9.0	10.0	10.2	8.8	7.3	15.0																						
12-Sep	7.4	6.2	5.0	5.1	5.8	6.4	6.6	8.0	9.3	11.2	11.9	12.5	13.7	12.9	13.2	13.5	12.5	10.3	8.4	8.2	7.2	6.4	5.6	5.1	8.9	13.7																						
13-Sep	5.1	3.6	2.7	3.0	1.0	-0.2	-0.9	0.5	2.6	4.9	7.0	7.7	10.1	12.0	13.1	13.4	13.1	12.0	10.0	8.2	6.8	5.3	5.1	5.1	6.3	13.4																						
14-Sep	3.5	2.9	2.1	0.8	0.4	0.2	0.4	1.4	4.2	8.1	11.3	14.3	16.9	18.3	19.1	19.3	18.7	17.6	14.7	12.0	10.7	11.5	11.6	9.9	9.6	19.3																						
15-Sep	7.9	6.8	6.0	5.4	5.2	4.8	4.7	5.4	7.9	12.7	15.3	17.3	18.4	19.7	19.4	18.0	18.2	17.9	14.8	13.4	13.3	12.9	11.3	10.6	12.0	19.7																						
16-Sep	9.2	7.7	7.2	6.3	5.7	5.2	5.1	6.3	7.5	8.5	9.4	10.7	12.1	14.2	15.4	15.2	14.7	12.6	10.0	8.8	8.2	7.8	7.3	6.8	9.2	15.4																						
17-Sep	6.5	6.3	6.0	5.9	5.5	5.1	4.8	4.8	4.8	5.3	6.3	8.1	11.1	12.0	12.6	13.5	13.6	13.0	11.8	11.0	10.0	9.2	8.5	7.8	8.5	13.6																						
18-Sep	7.2	6.8	6.9	6.9	7.1	7.7	8.1	7.9	10.1	12.9	14.7	16.0	17.3	18.7	19.5	19.5	20.2	18.8	16.3	13.7	11.6	10.5	10.2	10.9	12.5	20.2																						
19-Sep	11.4	11.1	10.6	10.5	10.4	10.4	10.5	10.9	13.1	17.3	18.6	19.7	20.6	21.0	20.5	20.4	18.4	14.3	14.3	13.5	12.8	12.3	11.6	11.5	14.4	21.0																						
20-Sep	11.5	11.0	10.7	10.5	10.2	9.9	10.4	11.6	12.8	14.0	15.6	17.5	18.8	19.5	20.9	20.9	19.6	19.1	17.0	14.5	12.1	10.4	9.6	9.2	14.0	20.9																						
21-Sep	9.0	8.8	8.7	8.2	7.9	7.6	7.3	9.4	14.2	17.9	20.9	22.3	24.8	27.2	28.6	28.9	28.7	26.9	22.7	19.4	17.9	15.7	14.9	14.5	17.2	28.9																						
22-Sep	13.8	13.3	12.7	11.8	10.9	10.2	9.4	11.1	14.3	17.1	19.9	22.3	24.1	26.4	29.4	30.3	29.6	28.0	25.7	23.5	21.4	21.0	20.2	20.2	19.4	30.3																						
23-Sep	20.4	19.9	18.2	16.1	14.6	14.0	12.8	13.0	14.6	15.1	16.6	19.4	20.8	21.5	22.2	22.7	23.0	20.7	17.8	15.6	12.5	10.9	9.7	9.0	16.7	23.0																						
24-Sep	9.7	7.8	7.0	6.4	5.1	4.8	5.1	7.0	9.2	11.1	12.4	14.3	15.8	17.1	18.0	19.2	20.1	20.0	19.2	18.6	17.9	16.6	14.8	13.8	13.0	20.1																						
25-Sep	13.6	13.8	13.2	12.6	12.3	11.5	11.4	11.3	10.7	10.7	11.7	12.1	11.7	11.4	11.6	11.5	11.4	11.1	10.4	9.8	9.4	9.0	8.6	8.3	11.2	13.8																						
26-Sep	8.2	8.0	7.6	7.3	7.1	6.9	6.1	5.8	5.7	5.7	5.6	5.6	5.4	5.4	5.1	4.8	4.4	3.7	3.5	3.3	2.9	2.7	2.7	2.7	5.4	8.2																						
27-Sep	2.9	3.5	3.9	4.2	4.3	4.7	4.8	4.9	5.2	5.8	7.2	8.1	7.8	8.2	9.5	9.7	9.8	8.7	6.7	4.6	3.4	2.6	1.7	1.2	5.6	9.8																						
28-Sep	0.6	0.3	0.1	-0.6	0.2	1.1	2.6	4.0	5.7	7.4	9.3	11.4	12.8	14.1	14.7	14.6	14.4	13.4	11.5	10.3	9.1	8.5	7.6	7.1	7.5	14.7																						
29-Sep	7.1	7.1	7.0	6.8	5.9	5.1	3.5	4.4	7.3	9.4	11.7	14.2	15.6	17.9	19.3	18.5	16.9	15.4	14.2	13.0	11.9	11.3	9.8	9.5	10.9	19.3																						
30-Sep	8.9	8.6	7.5	6.8	6.9	7.8	8.3	7.7	8.2	9.1	10.1	10.6	11.3	11.8	13.2	13.4	11.5	10.9	10.5	9.9	9.0	8.2	8.3	8.0	9.4	13.4																						
																								7.6	7.1	6.5	6.1	5.7	5.5	5.5	6.4	8.0	9.8	11.3	12.6	13.7	14.5	15.0	14.9	14.6	13.6	12.1	10.8	9.7	9.0	8.4	7.9	Diurnal Average
																								20.4	19.9	18.2	16.1	14.6	14.0	12.8	13.0	14.6	17.9	20.9	22.3	24.8	27.2	29.4	30.3	29.6	28.0	25.7	23.5	21.4	21.0	20.2	20.2	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Buffalo Viewpoint - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Buffalo Viewpoint - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	9	1.25	1.25
0 - 10	399	55.42	56.67
10 - 20	275	38.19	94.86
> 20	37	5.14	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 31 km/h on Sep 7 18:00	Maximum Daily Speed Average: 21.6 km/h on Sep 7	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 16 08:00	Minimum Daily Speed Average: 0.4 km/h on Sep 5	Hours of Data: 720
Maximum Diurnal Speed Average: 2.4 km/h at hour 5	Minimum Diurnal Speed Average: 0.1 km/h at hour 2	Hours of Missing Data: 0
Monthly Average Velocity: 0.1 km/h 309.8 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 14 P ₉₀ = 19 P ₉₉ = 28	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	WSW4	SSE7	S8	S7	S6	SSE6	S6	SSE6	WSW3	NNE4	S7	ESE6	ESE4	SSE8	SW10	N3	SE5	SSE6	SE5	NNE3	WSW5	SSW0	SW6	WSW8	S3.4	SW10	
2-Sep	WSW6	SW3	SSE4	S2	SSE5	SE7	SSE4	SE5	SE2	NE3	NNW7	NW7	NW6	WNW7	NNW10	N17	NNE1	WSW5	WNW6	NW9	NW8	NNE7	N4	S3	NW2.2	N17	
3-Sep	SW4	SW3	SSE5	SSE6	SSE7	SE9	SE9	SSE7	SSE5	SW5	W5	WNW8	W9	W7	W7	WSW8	SSW9	N5	SE7	SSE7	S7	S8	SSE8	SSE9	SSW3.9	SSW9	
4-Sep	SSE8	SSE7	SSE6	SSE8	SSE8	SE8	SE8	SSE8	SSE8	SSE7	SSE7	S8	SE7	WNW5	SSW8	SSW9	N8	NNE11	N18	N14	N14	N13	N11	N15	E1.9	N18	
5-Sep	N11	N16	N14	N12	NW7	NW7	W4	SE3	SSE5	SSE9	SSE9	SSE11	SSE10	SSE10	SE5	ESE7	SE11	SSE11	SE4	SW2	WSW3	NW6	NNW16	NNW17	NNW0.4	NNW17	
6-Sep	NW10	WNW8	NW9	WNW6	SW3	NNE8	NNE9	NNE11	NNE9	NE7	ENE3	ESE3	NE5	ENE4	ESE4	ESE5	E5	NE8	NNE10	NNE13	NNE16	NNE18	NNE21	N22	NNE6.9	N22	
7-Sep	N24	NNE25	N21	N21	NNE18	NNE18	N17	NNE18	N16	N16	N18	N15	N19	N25	N29	N27	N31	N31	N29	N22	N22	N21	N21	N19	N21.6	N31	
8-Sep	N18	N23	N22	N22	N13	N13	N14	N9	N8	N9	N13	N14	N18	NNW8	N6	NNE15	NNE17	N14	NNE11	NE4	NNW3	NE6	NE7	NE6	N11.9	N23	
9-Sep	NE5	NE6	ENE3	SW0	ESE1	NE4	ENE3	NE4	NE4	NNE3	NNE3	WSW4	NNW3	SW2	N5	ENE4	E3	SSW2	S2	SW4	SW5	NW8	N9	NNE7	NNE1.9	N9	
10-Sep	NNE5	SSW4	SSW4	NW7	W4	W6	W3	WNW10	WNW11	NW11	WNW9	NW8	WNW6	WNW8	W7	SW7	SSW8	SSW8	S7	SSE7	S8	SSE10	SSE10	SSW11	WSW3.9	WNW11	
11-Sep	S11	SSE12	SSE12	SSE12	SSE12	SSE12	SSE11	SSE12	SSE11	SSW18	SSW18	SSW19	SSW19	SSW20	SSW21	SSW19	SW19	SSW11	S8	S8	SSE8	WSW7	W11	W12	S11.4	SSW21	
12-Sep	W11	SW5	S7	S6	SW5	W6	WNW9	NW11	NW12	NNW19	NNW19	NNW20	NNW21	NNW20	NNW17	N16	N14	NNW21	WNW5	WSW3	N16	WSW4	SW3	NW8	NW8.8	NNW21	
13-Sep	NW7	N9	N7	ENE3	SSE3	SSE3	SSE7	SSE5	SSE7	ESE3	E4	N6	NE5	NE6	NE6	SE7	SE9	SE8	SE7	SSE7	SSE8	SE11	ESE7	SE7	ESE3.2	SE11	
14-Sep	SSE7	SSE8	S9	SSE10	SSE11	SSE10	SSE10	SSE9	SSE6	SE5	SE7	SE7	E3	N5	W7	W8	WSW6	SSW6	S7	SSE8	SSE9	WSW4	W6	SSW5	S5.0	SSE11	
15-Sep	SSE5	SSE4	SSE7	SSE9	SSE8	SSE9	SSE9	SSE8	SSE6	NW1	N4	NNE6	N7	N7	NNE6	NNE13	NNE11	NNE11	NNE9	NNE8	ESE4	NE5	N3	NNE6	ENE2.7	NNE13	
16-Sep	NNE10	N12	N13	NNE12	NNE10	NNE8	NNE4	NW0	N4	NNE9	NNE11	NNE11	NNE10	NNE7	E3	SE11	SE13	SE16	SE14	SE14	SE16	SE15	SE14	SE15	ENE4.9	SE16	
17-Sep	SE12	SSE10	SE12	SSE10	SSE12	SSE14	SSE13	SSE11	SE14	SSE16	SSE14	SSE14	SSE11	SSE15	SSE16	SSE18	SSE15	SSE12	SSE11	SSE13	SSE11	SSE9	SSE10	SSE10	SSE12.5	SSE18	
18-Sep	SSE8	S7	SSE9	SSE9	SSE9	WSW2	N6	NNE4	NNE3	NNE6	N5	N4	N4	N6	N3	N2	NNE2	SE3	SE5	SE6	SE7	SSE7	SE8	SE10	SE2.4	SE10	
19-Sep	SSE13	SSE12	SSE11	SSE9	SSE8	SSE7	SSE7	SE8	SSE8	SW12	WSW18	SW19	WSW18	WSW22	WSW18	WSW23	WNW28	W18	WSW21	W15	W23	W25	W22	W16	WSW11.4	WNW28	
20-Sep	W18	W18	W20	W21	W20	WNW17	WNW18	WNW22	WNW24	WNW20	WNW18	WNW18	WNW20	W16	WNW16	WNW17	WSW13	WSW12	SW10	S9	SSE10	SSE9	SSE10	SE12	W12.5	WNW24	
21-Sep	SE10	SSE10	SE10	SE10	SE9	SSE9	SSE11	SSE8	S6	SSW7	SW9	SW13	SW10	WSW13	WSW11	WSW11	WSW11	SSW8	SSE8	SSE9	SSE10	SE9	SSE8	SSE9	S7.1	SW13	
22-Sep	SSE9	SE11	SE10	SE9	SE10	SSE9	SSE9	SSE8	SSE9	SSE8	SE7	SE7	SE10	SE7	SW6	WSW13	WSW12	SW8	SW9	SW11	SW9	SW6	W8	W9	S6.0	WSW13	
23-Sep	WNW12	NW12	NW11	SW4	SSE5	N3	NNW6	N9	NW5	NW5	WNW5	NE5	N5	NNW5	NNE5	NNW5	NW2	SE5	SE5	SSE6	SSE7	SSE7	SSE8	SSE7	NW1.2	WNW12	
24-Sep	ESE3	SSE6	S3	SSE4	SSE7	SSE6	SSE5	SE3	SE1	N5	NNE6	NNE8	NE7	ENE6	E7	SE15	SE15	SE15	SE13	SSE11	SSE10	W19	W5	SSE9	SE4.4	W19	
25-Sep	SSW9	WSW16	WSW16	WSW11	WSW13	WSW14	WSW17	WNW23	W18	W17	W20	WNW23	NW18	NW16	NNW12	N16	N15	N14	NNE17	NNE15	NNE14	NNE12	NNE15	NNE11	NW9.7	WNW23	
26-Sep	NNE7	NNE8	NE13	NE14	NNE15	NNE15	NNE13	NNE18	NNE18	NNE17	NNE17	N21	NNE19	NNE16	NNE18	N26	N26	N25	N29	N30	N27	N25	N25	N24	NNE19.1	N30	
27-Sep	N19	N19	N22	N23	N19	N21	N20	N19	NNW12	N11	NNE9	N7	WNW4	SW3	S5	SSE7	SSE7	SSE7	SSE7	SSE8	SSE8	SSE7	SSE6	SSE7	SSE7	N5.5	N23
28-Sep	SSE10	SSE10	SSE10	SSE10	SSE12	SSE10	SSE12	SSE15	SSE22	SSE22	SSE20	SSE20	SSE21	S22	S21	S22	S19	S16	SSE14	SSE13	SSE13	SSE14	SSE12	SE11	SSE15.3	SSE22	
29-Sep	SE12	SE13	SE11	SE13	SSE10	S5	S7	SSE6	SSE8	SE13	SSE14	SSE14	SSE16	SSE13	S16	SSW19	S15	S10	SSW13	S12	SSE8	S6	SSE9	SE7	SSE10.6	SSW19	
30-Sep	SE7	SSE6	SSE8	SSE8	S6	WSW4	W3	SSE5	S5	WSW4	NW7	NW9	NNW12	N16	N8	NNE5	NW6	N7	N8	NE6	NE9	NNE6	N8	NNE13	N2.6	N16	

ESE0.2	ESE0.1	ESE0.7	SE1.2	SSE2.4	SE1.0	SSE1.0	E0.6	SSE0.3	NW0.8	NNW1.4	NNW1.8	NW2.2	NNW2.3	NNW2.3	NNW1.1	W0.6	NNE0.2	ESE0.9	ESE1.4	ESE1.2	NNW0.4	N1.1	NE1.2	Diurnal Average
N24	NNE25	N22	N23	W20	NNW21	N20	WNW23	WNW24	SSE22	SSE20	NNW23	NNW21	N25	N29	N27	N31	N31	N29	N30	N27	W25	N25	N24	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 12 21:00	Hours of Data: 720
Minimum Value: 1 km/h on Sep 23 20:00	Hours of Missing Data: 0
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 6	Hours of Calibration: 0
	Percent Operational Time: 100.0

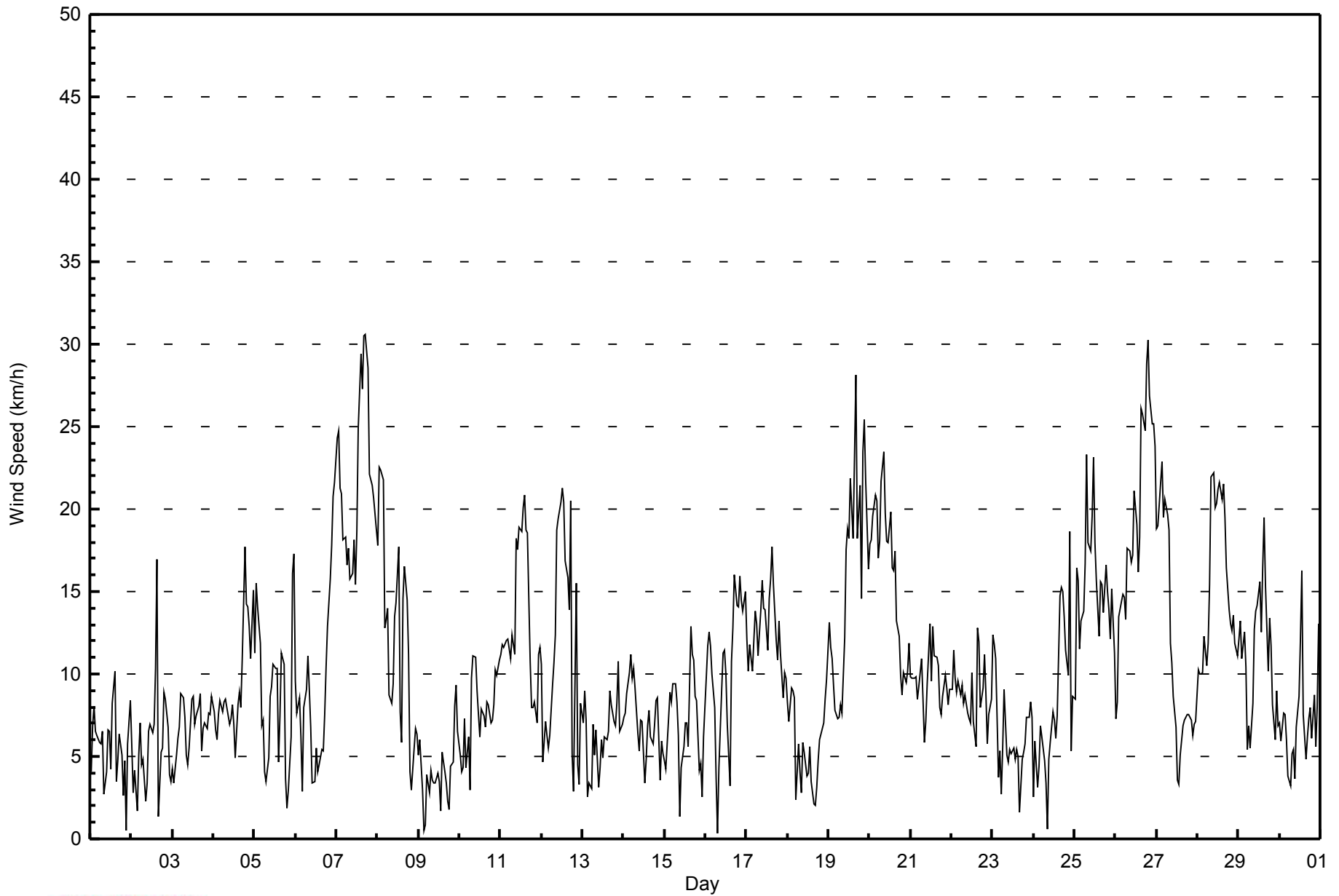
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	2	2	1	1	2	2	2	1	1	1	2	2	2	3	3	4	1	1	2	3	1	2	1	2	4
2-Sep	2	1	1	1	2	1	2	1	1	2	2	2	2	3	6	8	1	2	1	2	1	1	2	2	8
3-Sep	1	1	1	1	1	1	1	1	1	1	3	3	3	3	3	3	3	5	2	2	1	2	2	3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

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	144	20.00	20.00
6 - 11	337	46.81	66.81
12 - 19	175	24.31	91.11
20 - 28	58	8.06	99.17
29 - 38	6	0.83	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

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

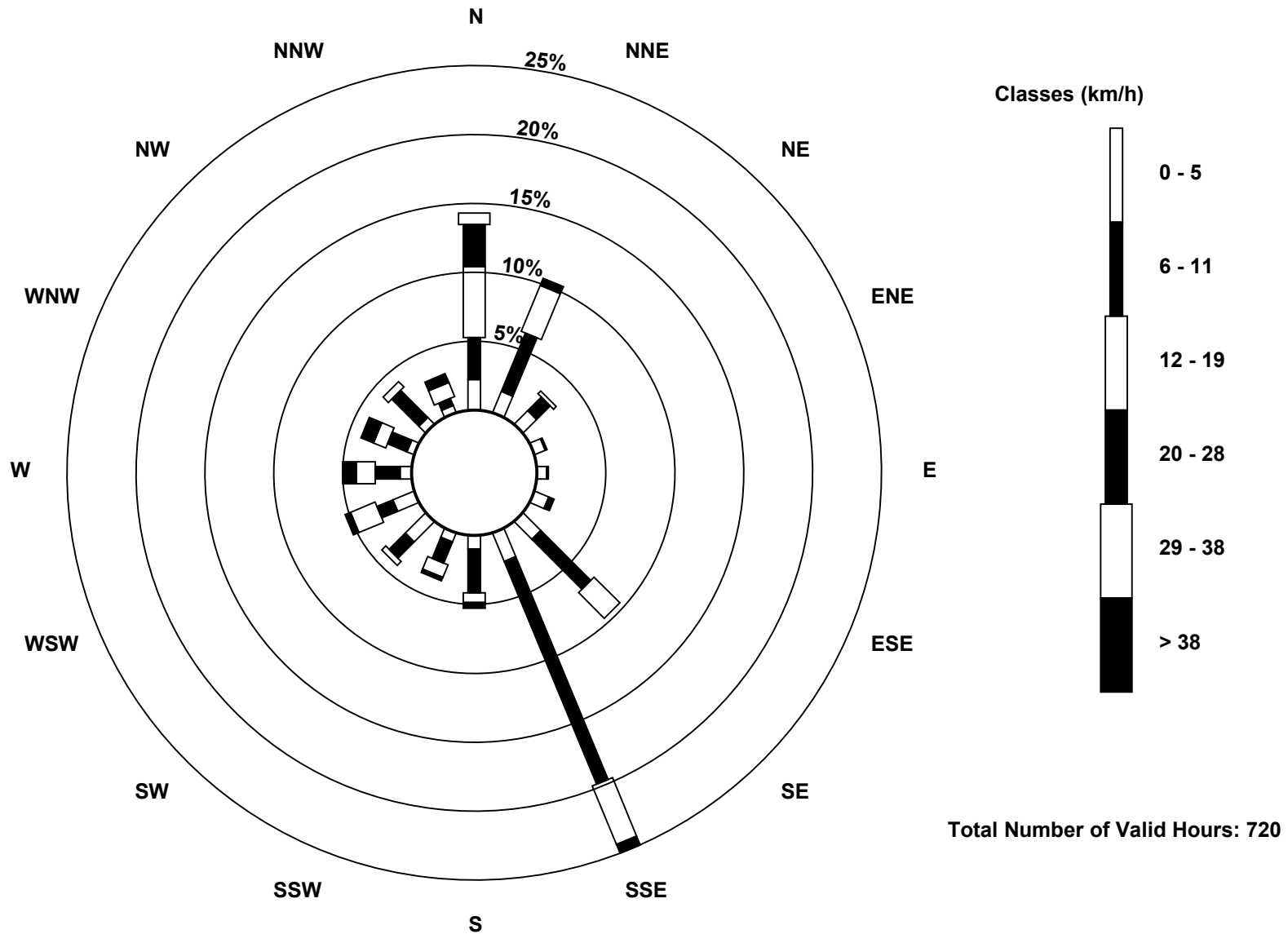
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	16	12	10	6	5	8	13	16	7	5	15	12	6	4	5	4	144
6 - 11	22	33	10	1	1	3	37	126	23	12	12	9	13	11	20	4	337
12 - 19	37	26	2	0	0	0	19	33	5	7	3	14	10	7	4	8	175
20 - 28	22	4	0	0	0	0	0	5	3	2	0	3	7	7	0	5	58
29 - 38	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	103	75	22	7	6	11	69	180	38	26	30	38	36	29	29	21	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

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





Direction of Maximum Speed: 355 deg on Sep 7 18:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 3.1 deg on Sep 7	Hours of Data: 720
Direction of Minimum Speed: 323 deg on Sep 16 08:00	Direction of Minimum Daily Speed Average: 0.4 deg on Sep 5
Direction of Minimum Speed: 323 deg on Sep 16 08:00	Hours of Missing Data: 0
Monthly Average Direction: 233.0 deg	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	258	165	183	191	175	164	177	148	255	12	173	107	109	156	224	10	137	159	143	31	252	193	222	255	178.9
2-Sep	249	221	166	175	165	139	157	142	124	46	339	306	313	296	330	2	19	258	291	316	322	12	356	187	318.1
3-Sep	234	232	157	151	153	146	145	153	166	227	262	286	268	277	279	249	202	349	137	148	184	170	155	148	191.3
4-Sep	148	148	152	155	147	145	146	149	148	153	159	169	164	284	197	199	3	16	2	10	11	4	356	6	88.1
5-Sep	4	354	352	351	310	306	280	153	151	161	152	165	166	164	137	121	140	149	142	226	242	307	330	328	348.1
6-Sep	315	299	312	295	225	17	23	24	28	44	67	106	49	57	115	114	95	46	26	16	16	12	12	10	17.6
7-Sep	10	15	10	11	12	12	11	14	11	7	5	10	7	360	357	2	356	355	354	354	354	356	357	360	3.1
8-Sep	358	357	2	7	6	357	356	4	7	9	360	7	360	338	357	14	12	8	18	52	344	34	37	39	5.7
9-Sep	54	54	67	225	108	47	63	54	43	25	13	243	329	229	8	75	86	197	184	223	230	325	4	30	25.2
10-Sep	18	211	205	325	268	269	266	298	299	305	298	305	288	294	278	235	201	208	178	168	170	164	150	204	248.0
11-Sep	180	158	154	152	147	147	149	150	165	207	198	202	206	199	206	204	214	209	183	181	154	248	269	267	190.9
12-Sep	260	231	182	182	214	279	287	313	319	337	335	332	340	342	345	357	6	336	289	257	360	243	228	321	325.5
13-Sep	312	353	357	73	154	162	147	153	150	118	79	4	39	39	41	130	133	137	146	161	160	142	119	132	116.4
14-Sep	155	155	169	159	158	151	155	164	154	137	132	99	352	268	279	248	194	178	156	149	255	277	201	169.0	
15-Sep	156	159	158	156	161	161	155	151	150	320	354	21	354	0	19	23	32	21	14	33	107	43	7	28	66.8
16-Sep	20	353	7	14	18	19	22	323	355	12	23	15	16	16	89	137	136	138	137	129	135	145	145	134	78.6
17-Sep	136	150	139	149	159	148	156	156	146	159	164	156	155	151	153	152	151	157	148	149	155	159	165	162	153.0
18-Sep	166	171	161	151	149	257	4	18	21	27	3	349	7	359	360	5	32	130	144	146	140	155	143	145	126.2
19-Sep	147	156	155	151	153	155	150	146	157	231	242	236	245	250	247	251	289	274	248	267	274	268	274	270	242.7
20-Sep	265	265	271	272	275	290	283	294	301	296	294	294	283	274	293	290	257	245	223	190	154	155	151	140	272.4
21-Sep	146	148	133	134	144	154	156	164	172	205	219	222	230	243	254	242	238	210	152	159	154	139	149	158	181.2
22-Sep	148	144	146	144	136	154	154	161	151	159	145	141	131	131	219	242	254	224	224	228	221	233	271	271	182.0
23-Sep	283	304	321	234	147	353	347	358	320	309	300	46	9	348	15	340	312	134	144	161	153	161	153	157	318.8
24-Sep	106	153	178	157	156	159	165	142	132	0	25	31	40	78	95	126	132	140	136	148	167	269	261	160	138.2
25-Sep	207	256	257	247	248	237	253	294	280	278	270	297	312	316	328	359	1	9	16	16	17	21	31	25	308.8
26-Sep	29	24	38	39	29	30	28	17	21	28	23	11	12	19	16	9	9	9	6	5	6	6	1	3	14.4
27-Sep	359	356	351	352	353	349	351	357	348	10	14	9	295	229	187	152	153	161	156	150	166	150	164	156	1.4
28-Sep	155	156	155	159	159	166	161	154	154	158	160	168	167	172	181	178	178	169	158	154	147	152	151	138	162.2
29-Sep	138	141	140	142	147	172	170	158	156	144	152	155	148	155	179	196	186	182	197	187	166	177	148	127	162.1
30-Sep	132	149	158	168	184	253	260	148	174	254	305	318	330	2	359	13	305	358	359	36	37	20	9	27	1.8

118.7 112.6 112.2 126.6 154.9 145.3 156.6 86.9 147.1 309.2 296.1 303.1 319.6 302.9 284.7 289.3 262.3 29.8 110.7 118.0 112.2 329.0 9.9 42.8

Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

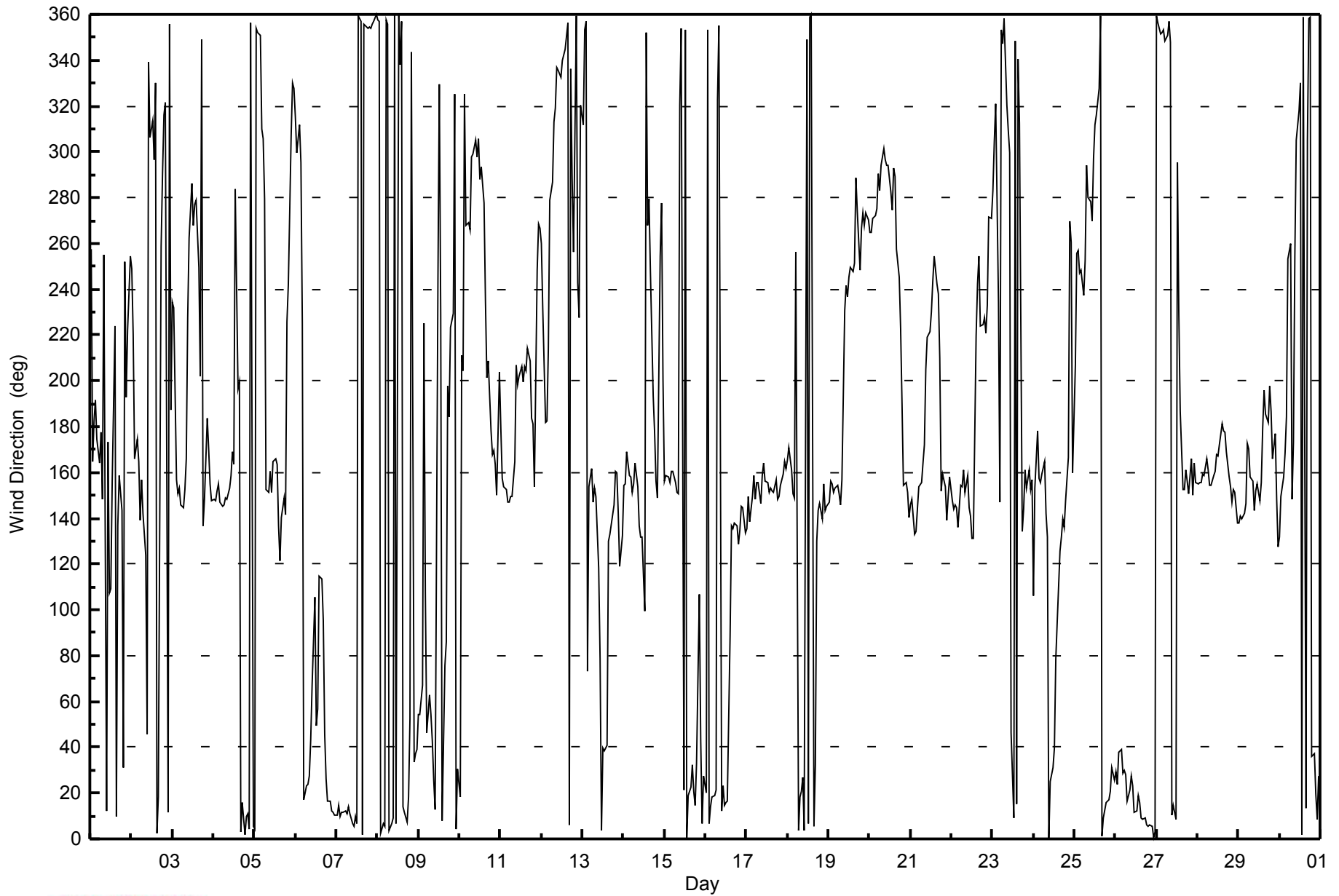
Wind Direction (WD) - deg
Buffalo Viewpoint - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 92 deg on Sep 24 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: 5 deg on Sep 30 01:00																									
Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 13 Median = 18 Q ₃ = 26 P ₉₀ = 48 P ₉₉ = 86																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	53	19	15	20	31	41	37	18	64	54	39	34	27	32	23	83	23	20	19	85	21	92	13	14	92
2-Sep	21	31	23	86	36	13	24	16	57	43	32	32	36	39	47	19	74	37	16	13	11	13	27	65	86
3-Sep	28	40	21	11	7	7	10	15	35	38	52	27	34	54	39	37	23	80	43	28	16	15	14	24	80
4-Sep	13	13	51	22	12	13	28	14	31	23	22	19	38	63	12	17	79	18	11	14	14	13	17	12	79
5-Sep	14	11	10	10	17	12	39	46	31	26	28	28	27	24	45	21	20	22	63	80	35	40	12	12	80
6-Sep	15	13	12	21	63	13	13	17	16	23	52	35	24	31	22	25	23	20	17	16	12	12	11	11	63
7-Sep	12	12	12	13	13	13	12	13	14	14	12	15	14	13	11	12	11	12	11	11	11	11	11	12	15
8-Sep	11	11	12	11	12	13	12	16	17	21	20	19	14	39	48	15	15	14	12	46	64	43	14	8	64
9-Sep	18	11	60	91	86	37	29	19	44	34	47	59	59	89	50	48	55	33	68	11	14	26	15	17	91
10-Sep	31	43	39	19	55	20	61	12	14	15	18	26	44	29	40	48	26	20	16	10	10	9	15	15	61
11-Sep	19	9	8	7	9	13	15	17	30	19	20	20	19	23	18	20	17	17	16	14	10	47	17	12	47
12-Sep	13	53	20	16	23	18	12	13	16	16	14	18	19	17	21	17	12	20	37	49	57	24	47	18	57
13-Sep	9	13	49	56	20	15	8	17	23	58	49	28	44	39	41	45	20	16	11	11	11	5	39	6	58
14-Sep	10	12	10	10	8	9	10	13	21	28	26	26	81	67	53	29	32	14	18	11	9	64	35	31	81
15-Sep	21	36	14	7	11	10	7	9	22	88	39	37	22	21	32	14	16	14	9	19	61	26	59	21	88
16-Sep	11	11	15	10	8	10	14	74	51	20	16	18	23	33	78	21	20	19	18	22	20	21	22	19	78
17-Sep	20	22	20	24	21	22	21	22	22	23	23	25	29	23	22	22	22	21	20	20	19	18	16	17	29
18-Sep	14	14	11	6	19	69	26	12	39	24	42	58	63	35	67	77	80	34	15	18	16	9	12	17	80
19-Sep	19	18	16	14	20	17	23	15	20	25	20	19	20	17	18	15	19	38	20	19	18	17	18	17	38
20-Sep	16	15	16	17	16	15	16	15	14	15	16	16	18	20	22	17	19	16	14	10	8	10	9	9	22
21-Sep	12	11	10	8	18	12	6	12	22	27	25	17	26	24	24	20	19	19	16	13	11	9	14	17	27
22-Sep	15	13	11	13	8	12	9	18	22	26	29	34	20	28	60	20	16	16	13	12	17	22	14	13	60
23-Sep	16	16	22	59	32	81	17	15	37	36	30	45	35	41	40	22	70	19	14	7	6	19	15	15	81
24-Sep	54	21	53	20	11	14	26	23	92	17	19	15	16	31	37	18	19	18	18	18	21	19	49	27	92
25-Sep	28	14	14	15	17	16	14	15	18	17	18	15	16	19	32	13	11	11	12	12	12	13	15	15	32
26-Sep	18	17	15	15	14	14	15	11	12	14	14	13	12	13	14	12	12	12	11	11	13	12	12	11	18
27-Sep	12	12	11	11	10	12	13	12	20	15	22	27	58	53	48	26	21	13	12	12	9	12	15	10	58
28-Sep	12	13	16	15	17	16	17	17	17	19	19	21	21	21	21	21	19	18	15	14	12	14	13	12	21
29-Sep	10	11	12	12	13	21	17	21	21	18	19	23	21	23	23	18	18	19	16	17	17	19	9	11	23
30-Sep	5	18	10	13	32	48	40	66	16	48	14	13	21	13	19	28	26	18	12	20	24	28	10	15	66
	54	53	60	91	86	81	61	74	92	88	52	59	81	89	78	83	80	80	68	85	64	92	59	65	
	Diurnal Maximum																								



WBEA
Hourly Averages

Wind Direction (WD) - deg
Buffalo Viewpoint - September 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 7, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	8:10	End Time (MST)	11:40
Barometric Pressure	747 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Cal Gas Concentration	51.00 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL107926		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2586
DACS voltage range	0-5V	DACS channel #	11

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-592	-592
Analyzer Range (mv)	5000	5000	Lamp voltage	817	822
Calculated slope	0.999005	0.999312	Chamber temp.	45.3	45.2
Calculated intercept	-0.761006	-0.220233	Pressure (mmHg)	687.7	690.1
Analyzer Background	9.4	9.6	Flow (lpm)	0.488	0.495
Analyzer Coefficient	0.907	0.896	Intensity	85	85

Analyzer make TEI 43i Analyzer serial # JC1327300932

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	NA
as found span	5000	58.8	599.8	607.9	0.987
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	58.8	599.8	599.9	1.000
second point	5000	29.4	299.9	301.7	0.994
third point	5000	14.7	149.9	149.4	1.004
calibrator zero	5000	0.0	0.0	0.2	NA
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	58.8	599.8	600.6	0.999
Average Correction Factor					0.999

Corrected As found 607.6 Previous response 601.1 % change -1.1%

Notes:

Adjusted zero and span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

SO₂ Calibration Summary

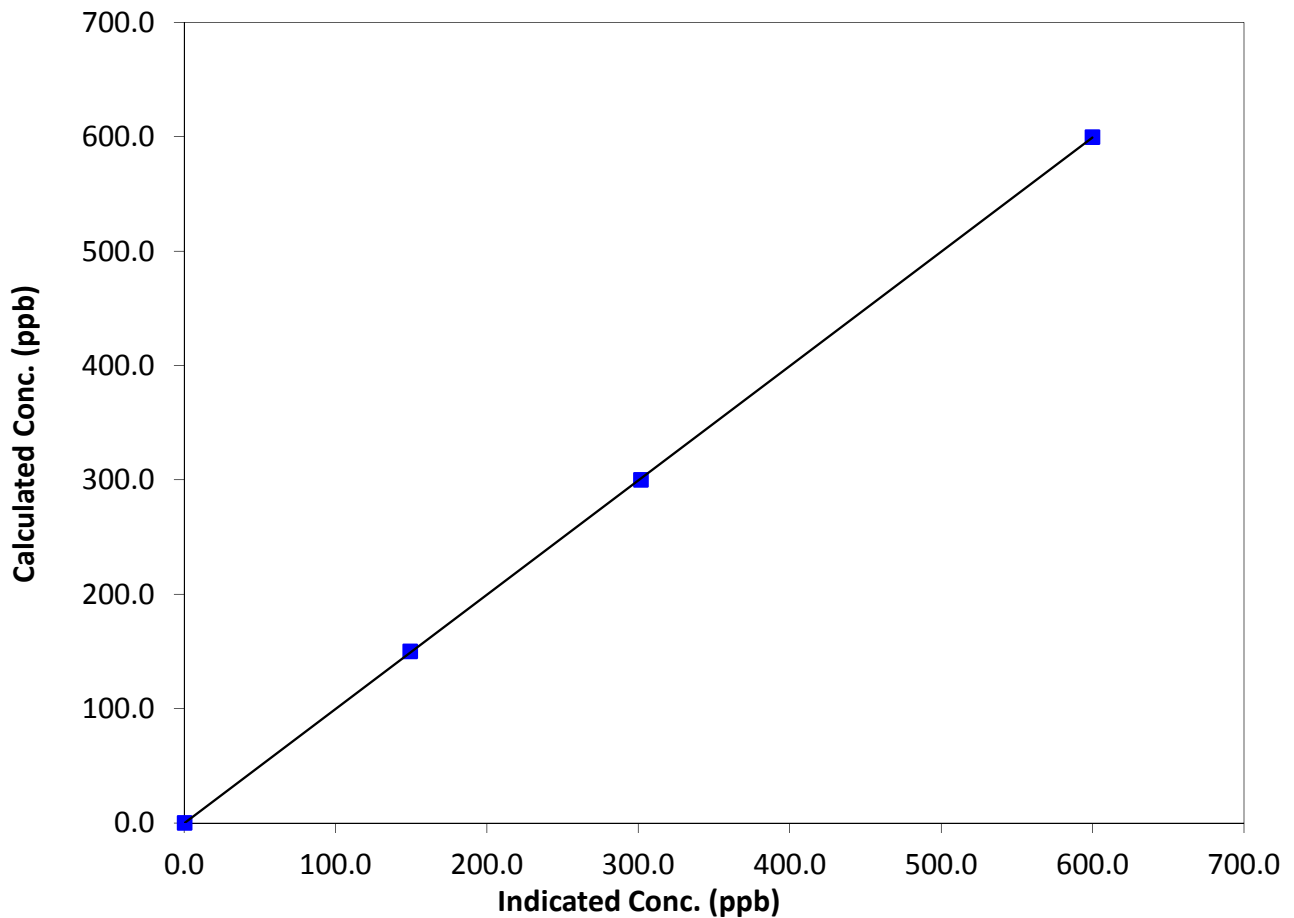
Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 7, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	8:10	End Time (MST)	11:40
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

Calibration Data

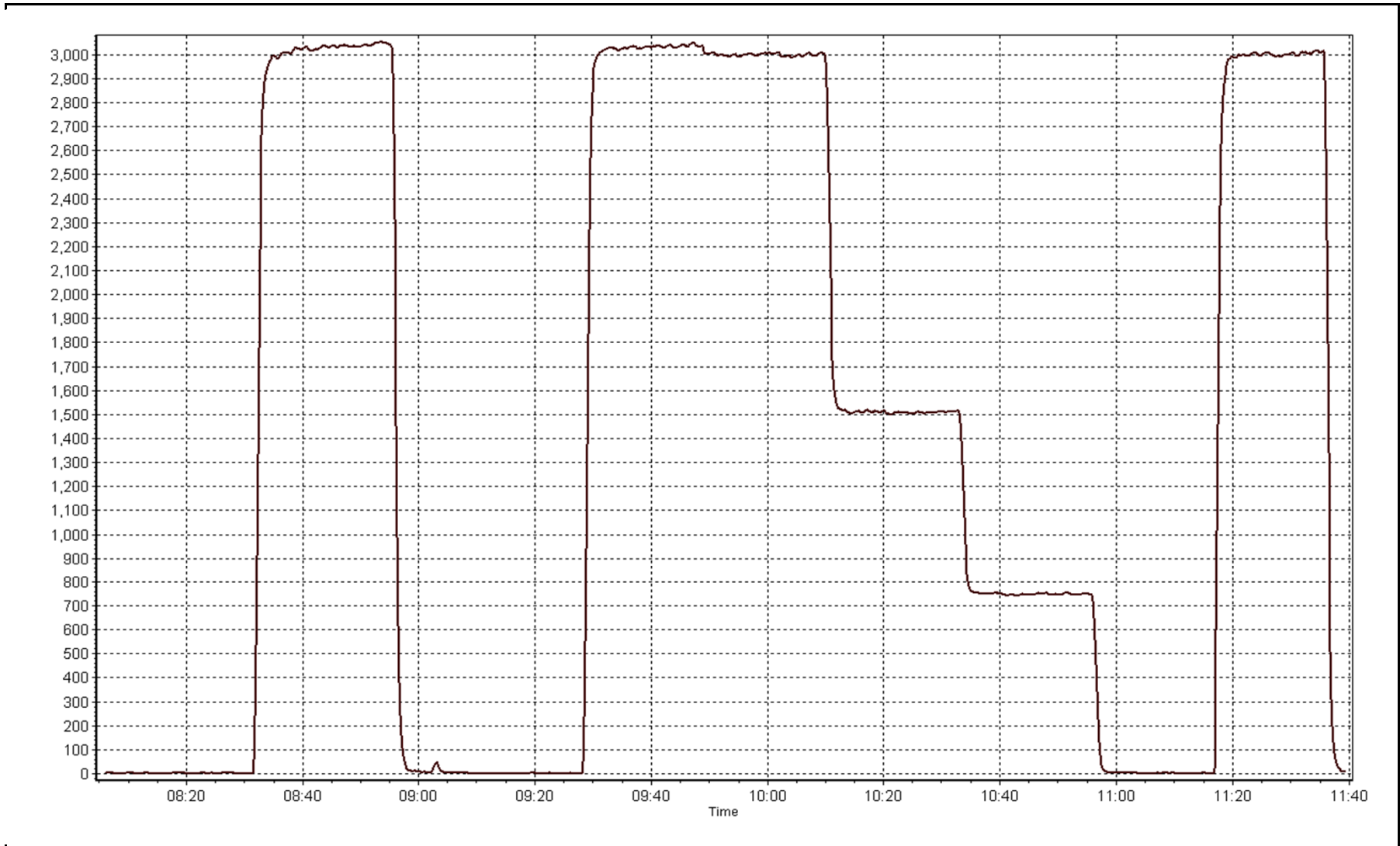
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999985
599.8	599.9	0.9997		
299.9	301.7	0.9940	Slope	0.999312
149.9	149.4	1.0040		
			Intercept	-0.220233

SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 4, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 11, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	11:35	End Time (MST)	14:25
Barometric Pressure	NA mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11551008
Cal Gas Concentration	9.75 ppm H2S	Cal Gas Expiry Date	2/22/2016
Gas Cert Reference	LL101590	SO2 gas conc.	51.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2586
DACS voltage range	0-5V	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-616	-616
Analyzer Range (mv)	5000	5000	Lamp voltage	867	867
Calculated slope	0.982956	0.975240	Chamber temp.	45	45
Calculated intercept	0.022843	-0.055091	Pressure	547.8	535.8
Analyzer Background	16.1	15.9	Flow	1.043	1.028
Analyzer Coefficient	1.000	0.96	Intensity	94	94
			Converter temp.	329	328

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	NA
as found span	6000	46.2	75.1	78.4	0.957
SO2 scrubber check	5000	29.4	299.9	1.0	NA
calibrator zero	6000	0.0	0.0	-0.4	NA
high point	6000	46.2	75.1	76.6	0.980
second point	6000	25.9	42.1	43.8	0.961
third point	6000	15.4	25.0	26.0	0.961
calibrator zero	6000	0.0	0.0	-0.4	NA
as left zero	5000	0.0	0.0	-0.4	NA
as left span	6000	46.2	75.1	79.4	0.945
Average Correction Factor					0.968

Corrected As found 78.8 Previous response 76.4 % change -3.1%

Notes:

Adjusted span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

H2S Calibration Summary

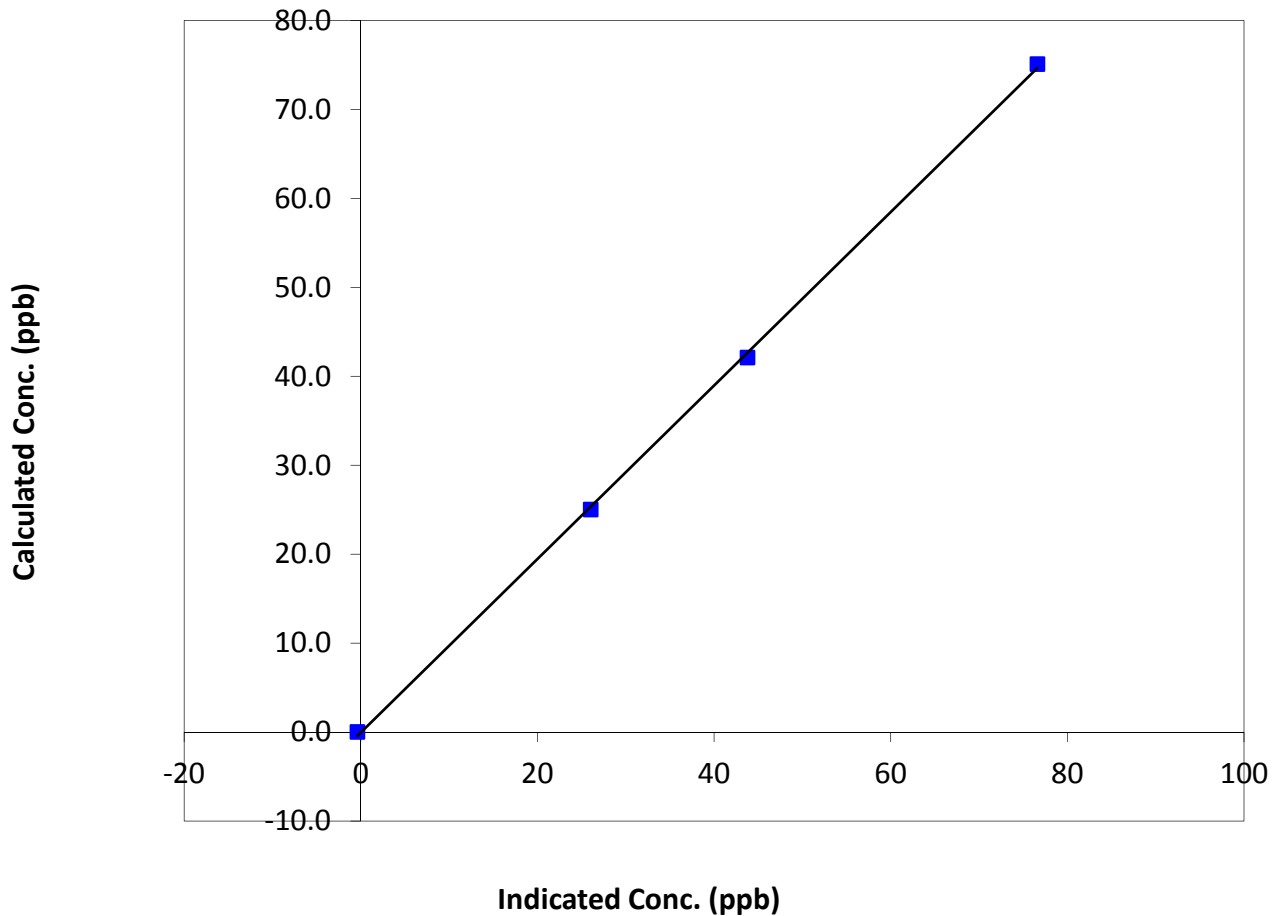
Station Information

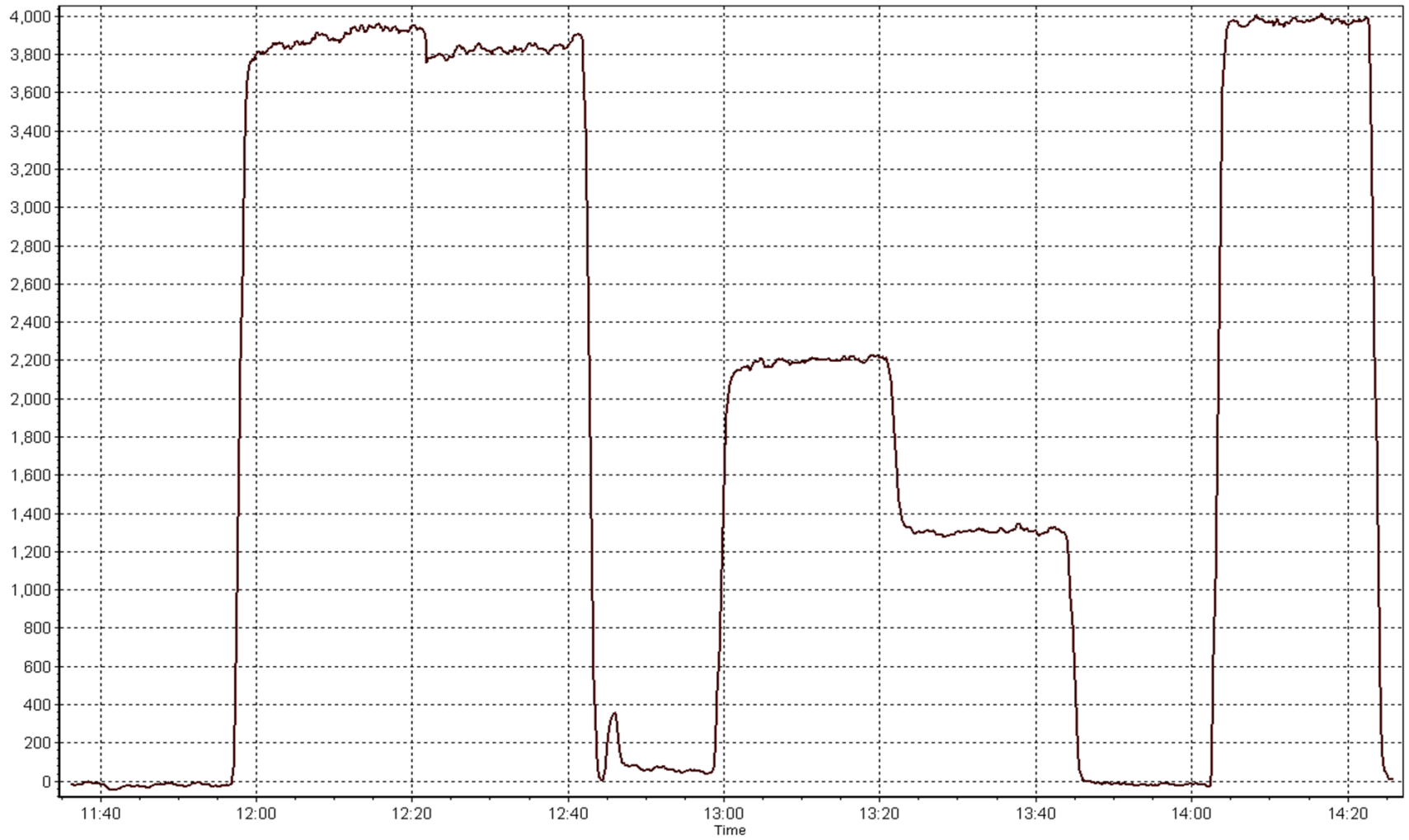
Calibration Date	September 4, 2014	Previous Calibration	August 11, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	11:35	End Time (MST)	14:25
Analyzer make	TEI 450i	Analyzer serial #	1336160094

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999744
75.1	76.6	0.9800		
42.1	43.8	0.9614	Slope	0.975240
25.0	26.0	0.9615		
			Intercept	-0.055091

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Thursday, September 04, 2014	Previous Calibration	Thursday, August 07, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	8:10	End Time (MST)	11:40
Barometric Pressure	747 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Gas Cert Reference	LL107926	Cal Gas Expiry Date	5/29/2014
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1067.8 ppm
C3H8 Cal Gas Conc.	201 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2586
DACS voltage range	0-5V	DACS channel #	19

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.5	8.5
Analyzer Range (mv)	5000	5000	Air or Bypass press	30.4	30.4
Calculated slope	0.999668	1.000886	Fuel Pressure	18.7	17.2
Calculated intercept	-0.068162	-0.048313			
BKG	1.7	1.4			
COEF	4.108	4.109			

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	-0.28	N/A
as found span	5000	58.8	12.56	12.18	1.031
calibrator zero	5000	0.0	0.00	0.02	N/A
high point	5000	58.8	12.56	12.57	0.999
second point	5000	29.4	6.28	6.36	0.988
third point	5005	14.7	3.14	3.20	0.981
calibrator zero	5000	0.0	0.00	0.02	N/A
as left zero	5000	0.0	0.00	-0.03	N/A
as left span	5000	58.8	12.56	12.64	0.994
Average Correction Factor					0.989

Corrected As found 12.46 Previous response 12.63 % change 1.3%

Notes:

Filter changed after as founds. Adjusted zero and span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

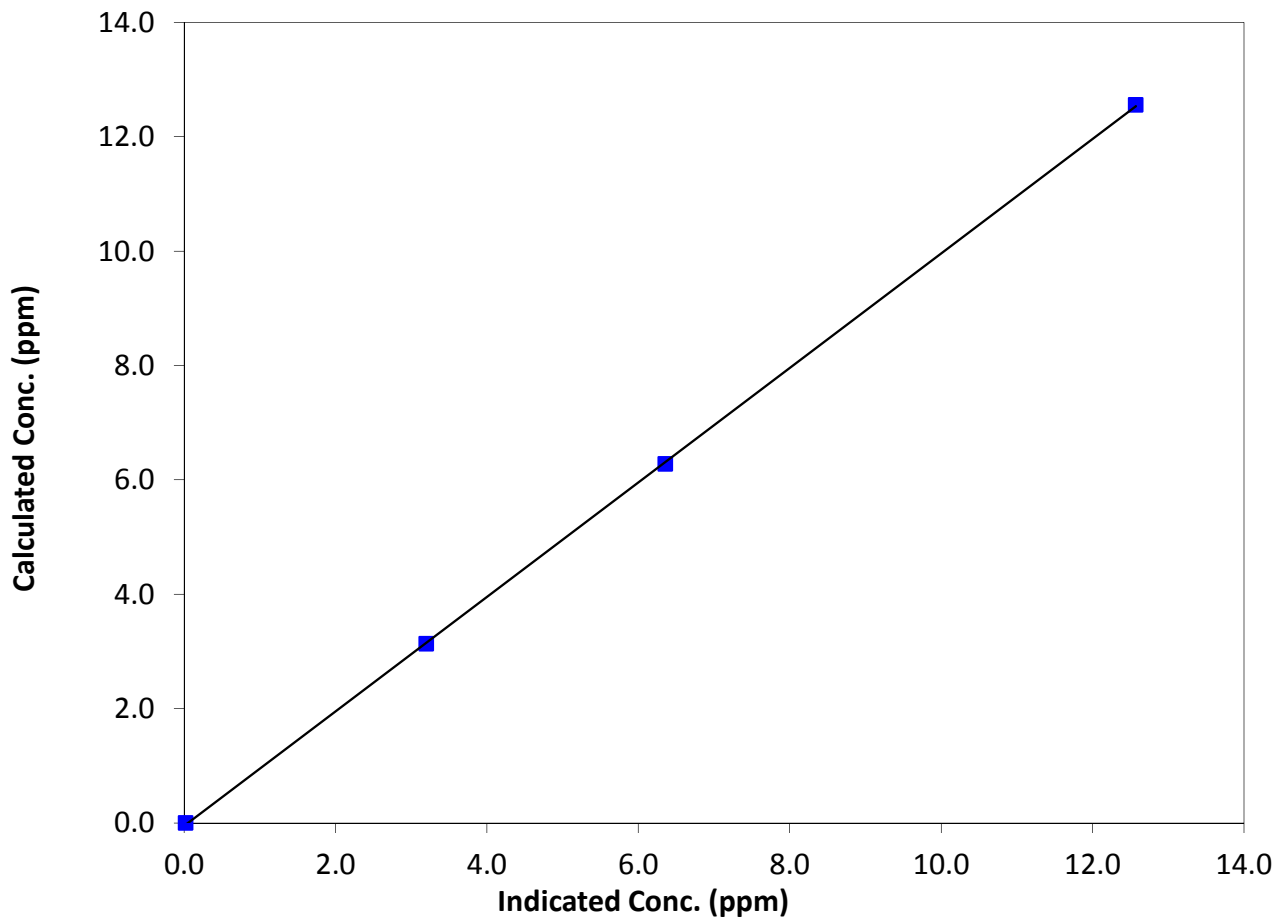
Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 7, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	8:10	End Time (MST)	11:40
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

Calibration Data

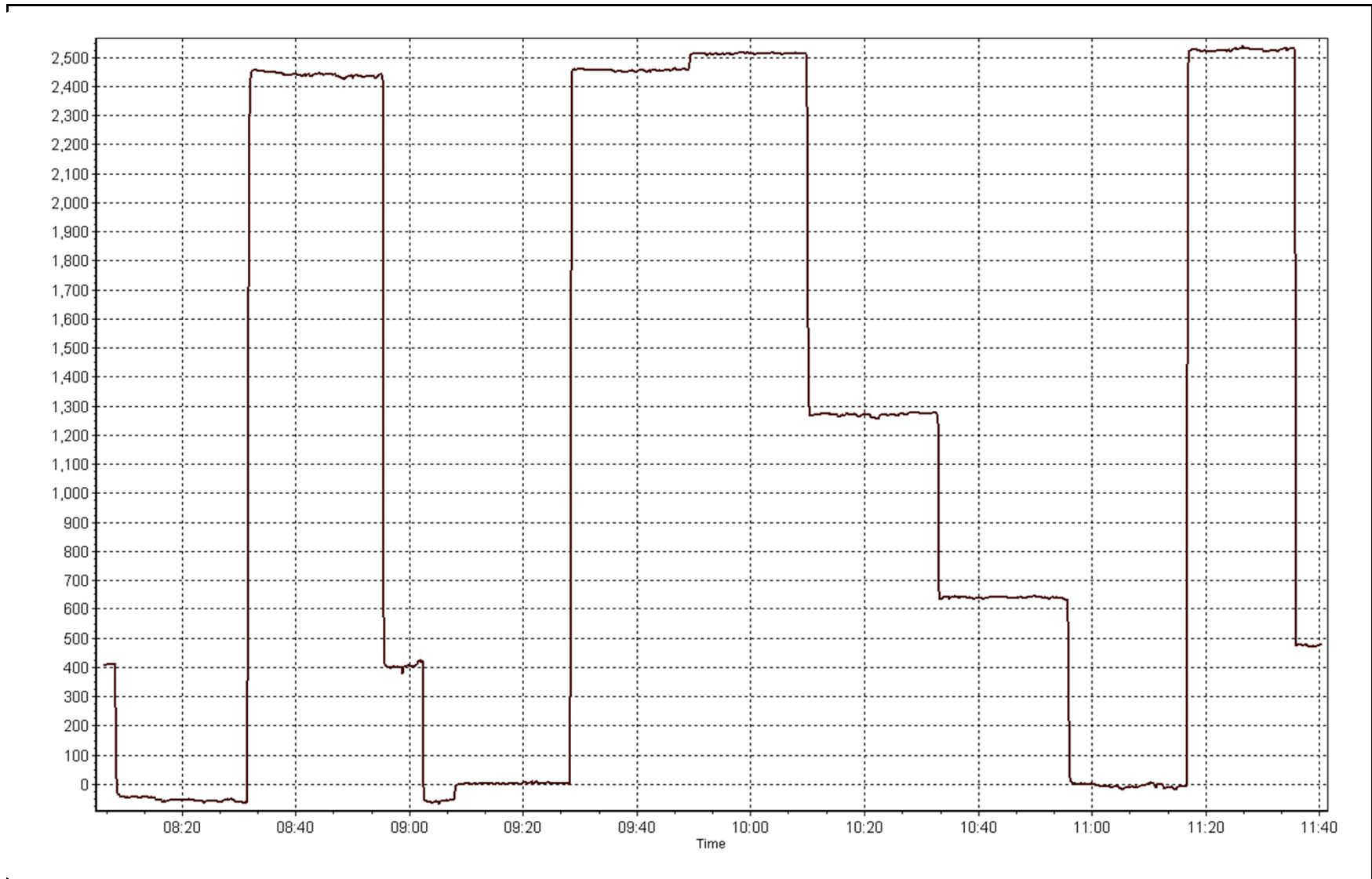
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	N/A	Correlation Coefficient	0.999966
12.56	12.57	0.9988		
6.28	6.36	0.9876	Slope	1.000886
3.14	3.20	0.9810		
			Intercept	-0.048313

THC Calibration Curve



THC Calibration Plot

Date: September 4, 2014



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 5 MANNIX SEPTEMBER 2014

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

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

October 30, 2014

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	683	36	37	99.86	84	0	11	0
H2S (ppb) Average	684	36	36	100.00	17	3	3	0
THC (ppm) Average	681	36	39	99.58	5.1	-	2.8	-
Temperature 2 m (C) Average	720	0	0	100.00	29.7	-	18.7	-
Temperature 20 m (C) Average	720	0	0	100.00	29.9	-	20	-
Temperature 45 m (C) Average	720	0	0	100.00	29.5	-	20.4	-
Temperature 75 m (C) Average	720	0	0	100.00	29.2	-	21.2	-
Temperature 90 m (C) Average	720	0	0	100.00	29	-	21.4	-
Relative Humidity 2 m (%) Average	720	0	0	100.00	97	-	-	-
Relative Humidity 20 m (%) Average	720	0	0	100.00	97	-	-	-
Relative Humidity 45 m (%) Average	720	0	0	100.00	97	-	-	-
Relative Humidity 75 m (%) Average	720	0	0	100.00	98	-	-	-
Relative Humidity 90 m (%) Average	720	0	0	100.00	99	-	-	-
Wind Speed 20 m (km/h) Average	720	0	0	100.00	31	-	-	-
Wind Speed 45 m (km/h) Average	720	0	0	100.00	38	-	-	-
Wind Speed 75 m (km/h) Average	720	0	0	100.00	41	-	-	-
Wind Speed 90 m (km/h) Average	719	0	1	99.86	43	-	-	-
Wind Direction 20 m (deg) Average	720	0	0	100.00	-	-	-	-
Wind Direction 45 m (deg) Average	720	0	0	100.00	-	-	-	-
Wind Direction 75 m (deg) Average	720	0	0	100.00	-	-	-	-
Wind Direction 90 m (deg) Average	719	0	1	99.86	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	720	0	0	100.00	0.8	-	-	-
Vertical Wind Speed 45 m (km/h) Average	720	0	0	100.00	1.5	-	-	-
Vertical Wind Speed 75 m (km/h) Average	720	0	0	100.00	1.4	-	-	-
Vertical Wind Speed 90 m (km/h) Average	719	0	1	99.86	4.4	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	683	2.3	7	-	0	0	0	0	1	6	84
H2S (ppb) Average	684	1.1	2	-	0	0	0	0	1	3	17
THC (ppm) Average	681	2.3	0.3	-	2	2.1	2.1	2.2	2.3	2.6	5.1
Temperature 2 m (C) Average	720	9.79	5.5	-	-2.7	3.3	5.9	9	13.1	17.9	29.7
Temperature 20 m (C) Average	720	10.17	5.5	-	-1.2	3.6	6.1	9.4	13.2	18.1	29.9
Temperature 45 m (C) Average	720	10.18	5.5	-	-1.1	3.5	6.1	9.5	13.3	17.8	29.5
Temperature 75 m (C) Average	720	10.24	5.6	-	-1	3.4	6.1	9.8	13.2	17.8	29.2
Temperature 90 m (C) Average	720	10.24	5.6	-	-0.7	3.3	6	9.9	13.3	17.7	29
Relative Humidity 2 m (%) Average	720	73.8	18	-	26	47	62	77	90	94	97
Relative Humidity 20 m (%) Average	720	70.2	18	-	24	43	57	73	86	92	97
Relative Humidity 45 m (%) Average	720	68.7	18	-	24	41	55	71	84	91	97
Relative Humidity 75 m (%) Average	720	67.8	18	-	24	42	54	69	83	90	98
Relative Humidity 90 m (%) Average	720	67.8	18	-	25	41	54	69	83	91	99
Wind Speed 20 m (km/h) Average	720	9.7	6	-	1	4	5	8	13	18	31
Wind Speed 45 m (km/h) Average	720	14.4	8	-	1	5	8	14	20	25	38
Wind Speed 75 m (km/h) Average	720	16.5	9	-	0	5	9	16	23	29	41
Wind Speed 90 m (km/h) Average	719	17.7	9	-	0	5	10	17	25	31	43
Wind Direction 20 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	719	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	720	0.02	0.3	-	-0.9	-0.3	-0.1	0	0.2	0.3	0.8
Vertical Wind Speed 45 m (km/h) Average	720	0.22	0.4	-	-1.1	-0.3	-0.1	0.2	0.5	0.8	1.5
Vertical Wind Speed 75 m (km/h) Average	720	0.13	0.3	-	-0.8	-0.3	-0.1	0.1	0.3	0.6	1.4
Vertical Wind Speed 90 m (km/h) Average	719	0.75	0.9	-	-1.2	-0.2	0.1	0.6	1.3	1.9	4.4

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	17 Sep 2014 12:00	17 Sep 2014 12:00	1	Maintenance - sample manifold cleaned
THC	17 Sep 2014 12:00	17 Sep 2014 12:00	1	Maintenance - sample manifold cleaned
THC	26 Sep 2014 10:00	26 Sep 2014 11:00	2	Maintenance - replaced fuel cylinder
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	12 Sep 2014 21:00	12 Sep 2014 21:00	1	Unstable operation - spike in output signal

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Summary of Hour Averages

Mannix - September 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 84 ppb on Sep 2 13:00	Maximum Daily Average: 10.6 ppb on Sep 26		Hours of Data:	683
Minimum Value: 0 ppb on Sep 16 09:00	Minimum Daily Average: 0.0 ppb on Sep 20		Hours of Missing Data:	37
Maximum Diurnal Average: 5.8 ppb at hour 13	Minimum Diurnal Average: 0.4 ppb at hour 7		Hours of Calibration:	36
Monthly Average: 2.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 6 P ₉₉ = 31		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	Z	0	0	0	0	0	0	0	8	11	2	2	1	2	4	4	2	2	2	1	1	0	0	1.9	11	
2-Sep	0	Z	0	0	0	0	0	0	0	0	7	26	84	31	3	2	1	2	3	2	2	3	11	1	7.8	84	
3-Sep	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	3	1	0	0	0	0	0.4	3	
4-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	6	3	2	11	11	5	2.0	11
5-Sep	4	Z	1	1	0	0	0	0	1	2	7	6	2	2	1	0	0	2	0	0	0	0	0	0	1.3	7	
6-Sep	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	17	1.2	17	
7-Sep	21	Z	1	1	0	0	1	0	0	1	0	1	2	3	1	2	1	7	5	1	10	2	1	1	2.7	21	
8-Sep	0	Z	1	2	12	18	3	47	31	11	10	3	1	0	0	1	2	0	0	0	0	0	0	0	6.3	47	
9-Sep	0	Z	0	0	0	1	1	0	0	1	2	2	12	7	6	3	7	5	3	2	5	6	8	2	3.3	12	
10-Sep	1	Z	1	1	1	0	0	1	1	5	5	14	2	1	0	0	0	1	0	0	0	0	0	0	1.5	14	
11-Sep	0	Z	0	0	0	0	0	0	0	2	3	2	1	1	1	1	1	0	0	0	0	0	0	0	0.6	3	
12-Sep	0	Z	0	0	0	0	0	0	1	1	0	1	0	1	0	0	1	1	4	6	1	0	1	1	0.8	6	
13-Sep	0	Z	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0.4	1	
14-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	
15-Sep	0	Z	0	0	0	0	0	0	0	0	12	15	21	20	21	14	1	1	0	0	0	0	0	0	4.7	21	
16-Sep	1	Z	1	1	1	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
17-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	
18-Sep	0	Z	0	0	0	0	0	1	6	1	17	11	17	12	14	18	7	4	4	6	3	2	1	0	5.4	18	
19-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	
20-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	
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	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	0.2	0	
23-Sep	0	Z	34	25	1	0	1	2	1	2	3	9	C	C	10	3	12	14	10	7	5	2	1	0	6.8	34	
24-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	
25-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	9	17	12	1	1	1	0	0	0	0	0	0	1.7	17	
26-Sep	0	Z	0	0	0	0	0	0	0	0	0	5	0	0	0	7	2	20	27	31	42	51	58	10.6	58		
27-Sep	46	Z	27	25	10	1	0	0	1	2	1	1	4	10	9	8	8	3	2	2	1	1	0	0	7.1	46	
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	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1	
30-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	7	1	2	1	0	0	0	1	0	0.7	7	

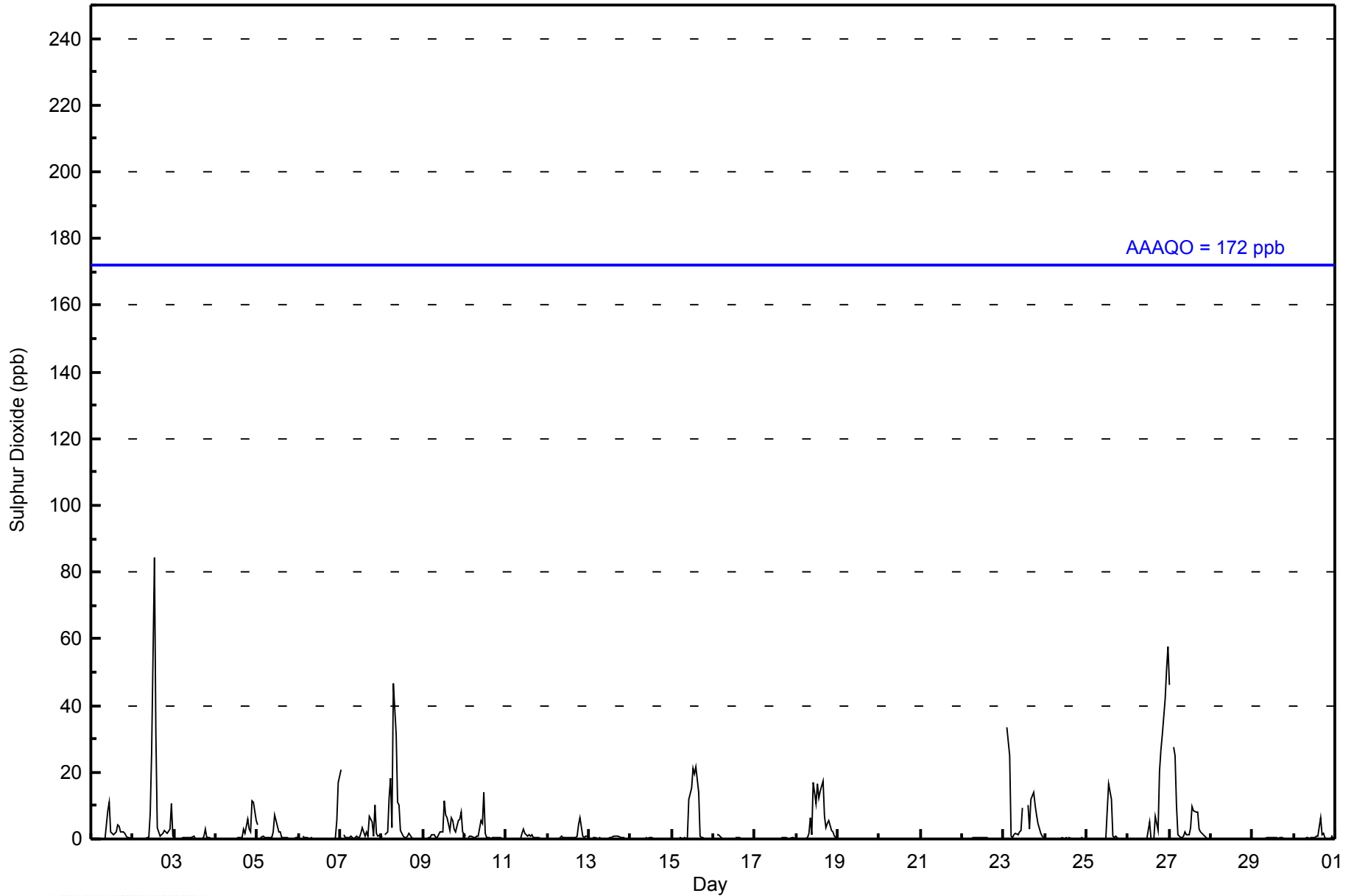
2.6	--	2.3	2.0	0.9	0.9	0.4	1.8	1.5	1.4	2.8	3.4	5.8	3.8	2.9	2.2	1.9	1.6	2.2	2.0	2.1	2.4	3.1	2.9	Diurnal Average	
46	--	34	25	12	18	3	47	31	11	17	26	84	31	21	18	12	14	20	27	31	42	51	58	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Mannix - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	640	93.70	93.70
11 - 20	25	3.66	97.36
21 - 60	17	2.49	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



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - September 2014

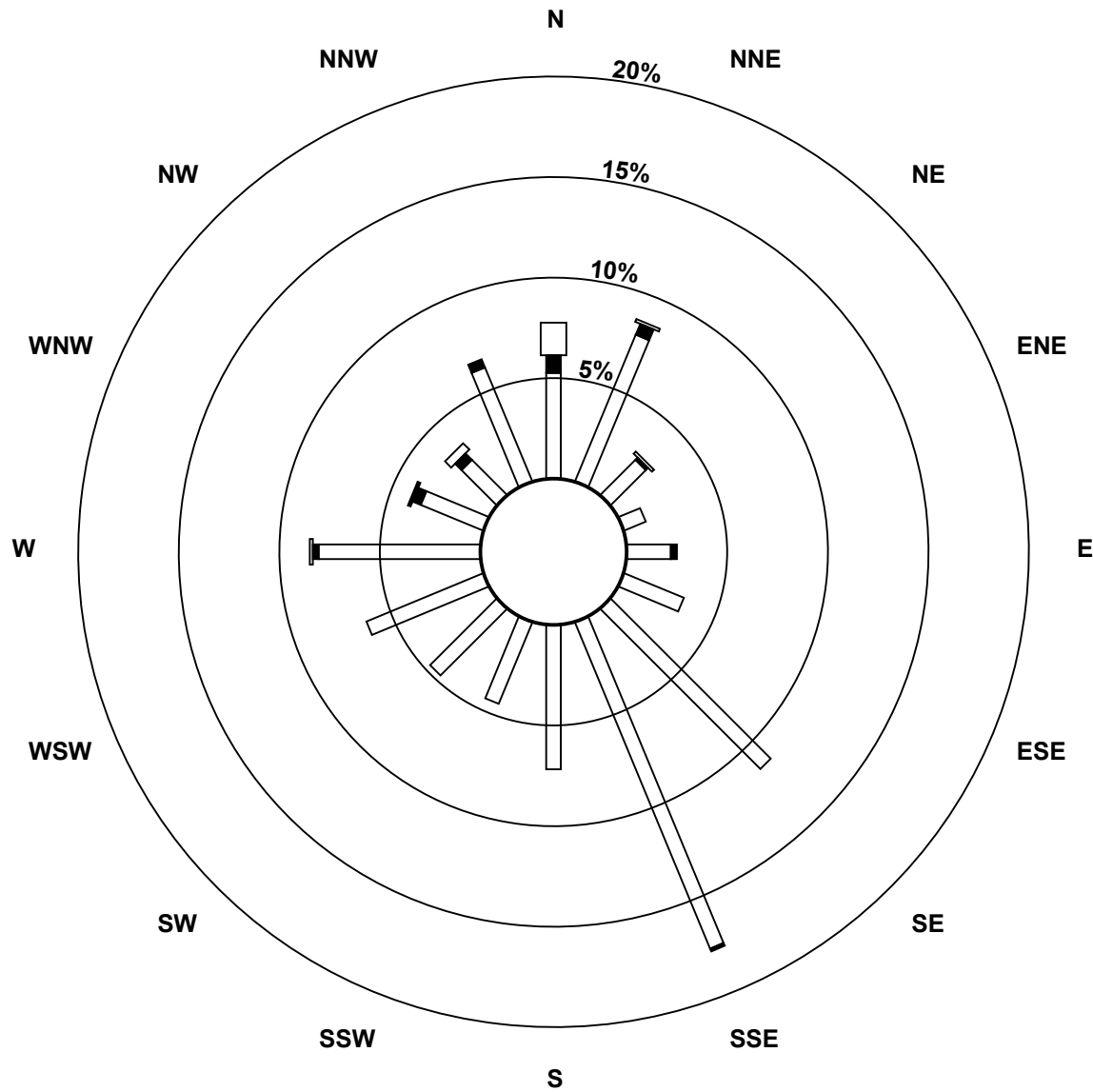
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	36	54	17	8	15	22	77	120	49	30	32	43	55	23	17	42	640
11 - 20	6	4	1	0	2	0	0	1	0	0	0	0	2	3	3	3	25
21 - 60	11	1	1	0	0	0	0	0	0	0	0	0	1	0	3	0	17
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	53	59	19	8	17	22	77	121	49	30	32	43	58	27	23	45	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

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

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



Classes (ppb)

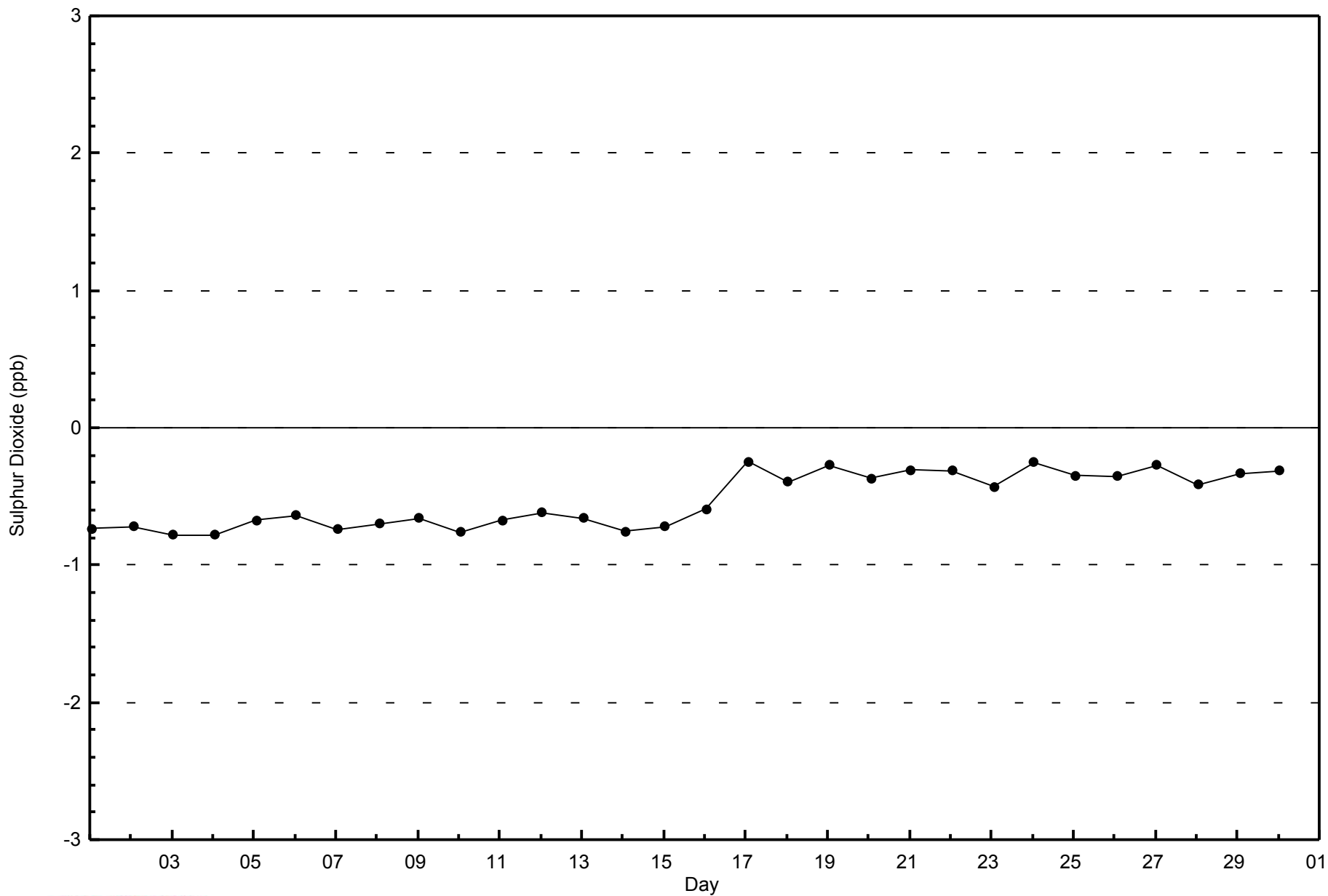


Total Number of Valid Hours: 683



WBEA
Zero Responses

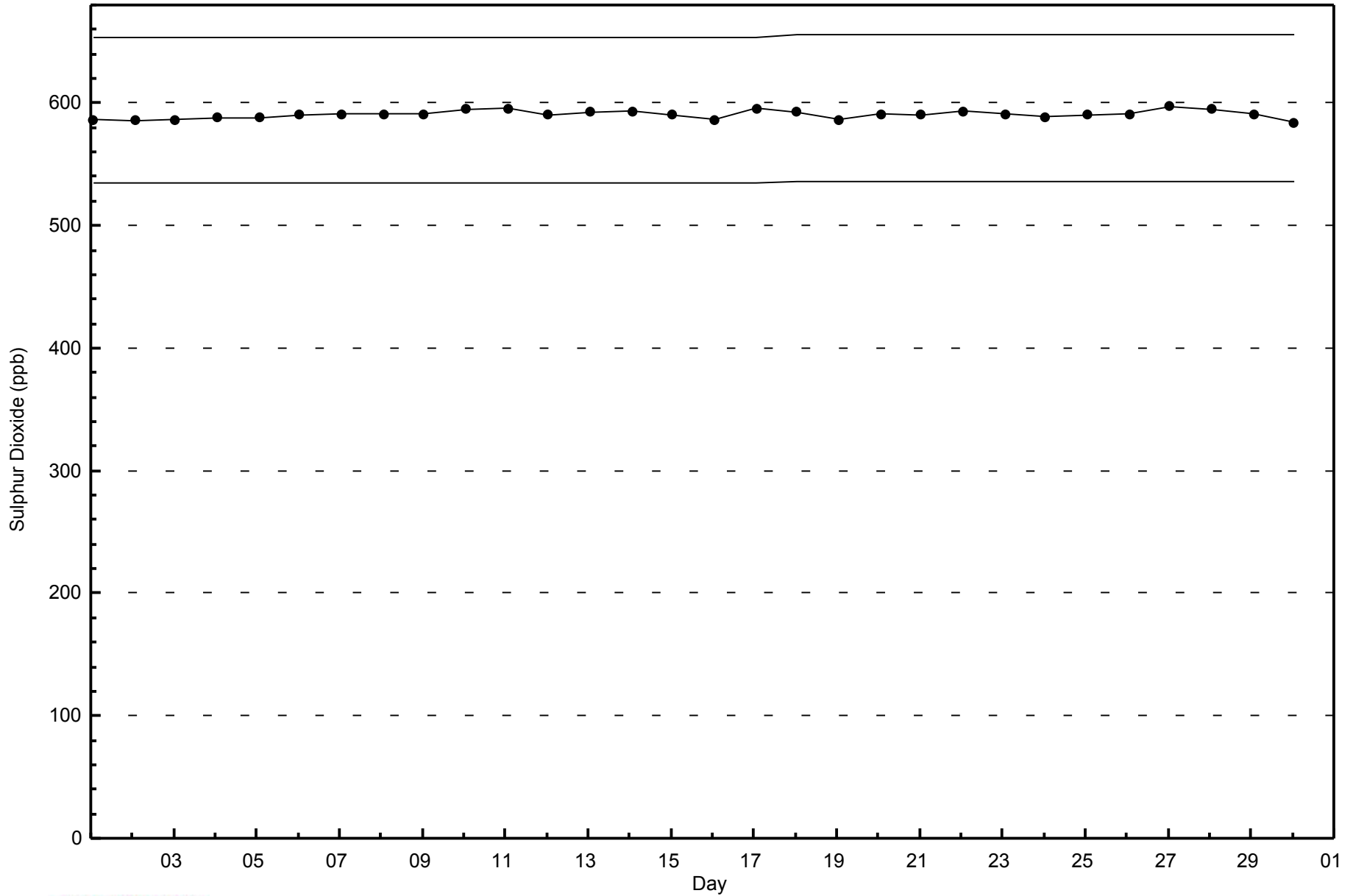
Sulphur Dioxide (SO₂) - ppb
Mannix - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Mannix - September 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

Mannix - September 2014

Number of Exceedences (AAAQO):	1-hr: 3	24-hr: 0	Hours in Service:	720
Maximum Value: 17 ppb on Sep 16 02:00	Maximum Daily Average: 3.3 ppb on Sep 26		Hours of Data:	684
Minimum Value: 0 ppb on Sep 5 19:00	Minimum Daily Average: 0.2 ppb on Sep 17		Hours of Missing Data:	36
Maximum Diurnal Average: 4.6 ppb at hour 3	Minimum Diurnal Average: 0.7 ppb at hour 15		Hours of Calibration:	36
Monthly Average: 1.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 8		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0.4	1	
2-Sep	0	0	Z	0	0	0	0	0	0	1	4	3	2	1	1	4	3	2	0	3	4	3	9	1	1.9	9	
3-Sep	1	1	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0.5	2		
4-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	2	0	0	0	9	5	4	3	4	2	5	2	1.7	9
5-Sep	2	4	Z	5	5	4	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5	6	1.5	6	
6-Sep	7	5	Z	3	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	4	7	7	4	5	2.3	7	
7-Sep	7	5	Z	4	2	4	4	3	2	3	1	2	2	2	1	2	2	2	3	2	3	3	3	3	2.7	7	
8-Sep	2	3	Z	2	3	6	3	5	4	2	2	2	1	1	1	1	1	2	1	1	1	2	2	1	2.1	6	
9-Sep	1	1	Z	1	2	3	2	2	1	2	2	1	1	1	1	1	1	1	1	1	0	0	4	6	1.5	6	
10-Sep	7	3	Z	2	3	1	0	1	1	2	3	2	0	0	0	0	0	0	0	0	0	0	0	0	1.1	7	
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	Z	0	0	0	0	3	3	2	1	2	1	1	2	2	2	4	3	2	1	3	0	1	1.5	4	
13-Sep	5	3	3	Z	6	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	6	
14-Sep	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1	
15-Sep	0	0	Z	0	0	1	0	0	0	0	1	1	1	2	1	2	1	1	1	1	1	0	0	2	0.8	2	
16-Sep	13	17	6	10	Z	4	0	0	0	3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2.5	17	
17-Sep	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
18-Sep	0	0	Z	0	0	1	2	6	4	1	2	2	2	1	2	2	1	1	1	1	1	1	0	0	1.5	6	
19-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	
20-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	
21-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	
22-Sep	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
23-Sep	0	0	Z	1	0	4	11	8	7	5	3	1	C	C	0	0	0	0	1	1	1	1	0	0	2.2	11	
24-Sep	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
25-Sep	0	0	Z	0	0	0	0	0	0	0	0	1	1	2	1	1	1	2	1	1	1	1	1	1	0.7	2	
26-Sep	1	1	Z	1	1	1	2	6	2	1	2	4	6	3	4	6	5	5	6	3	4	3	3	4	3.3	6	
27-Sep	3	3	Z	2	2	2	2	2	2	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	1.2	3	
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	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	Z	0	0	0	0	0	0	0	1	3	2	2	1	1	1	2	4	1	1	1	2	1	1.1	4	

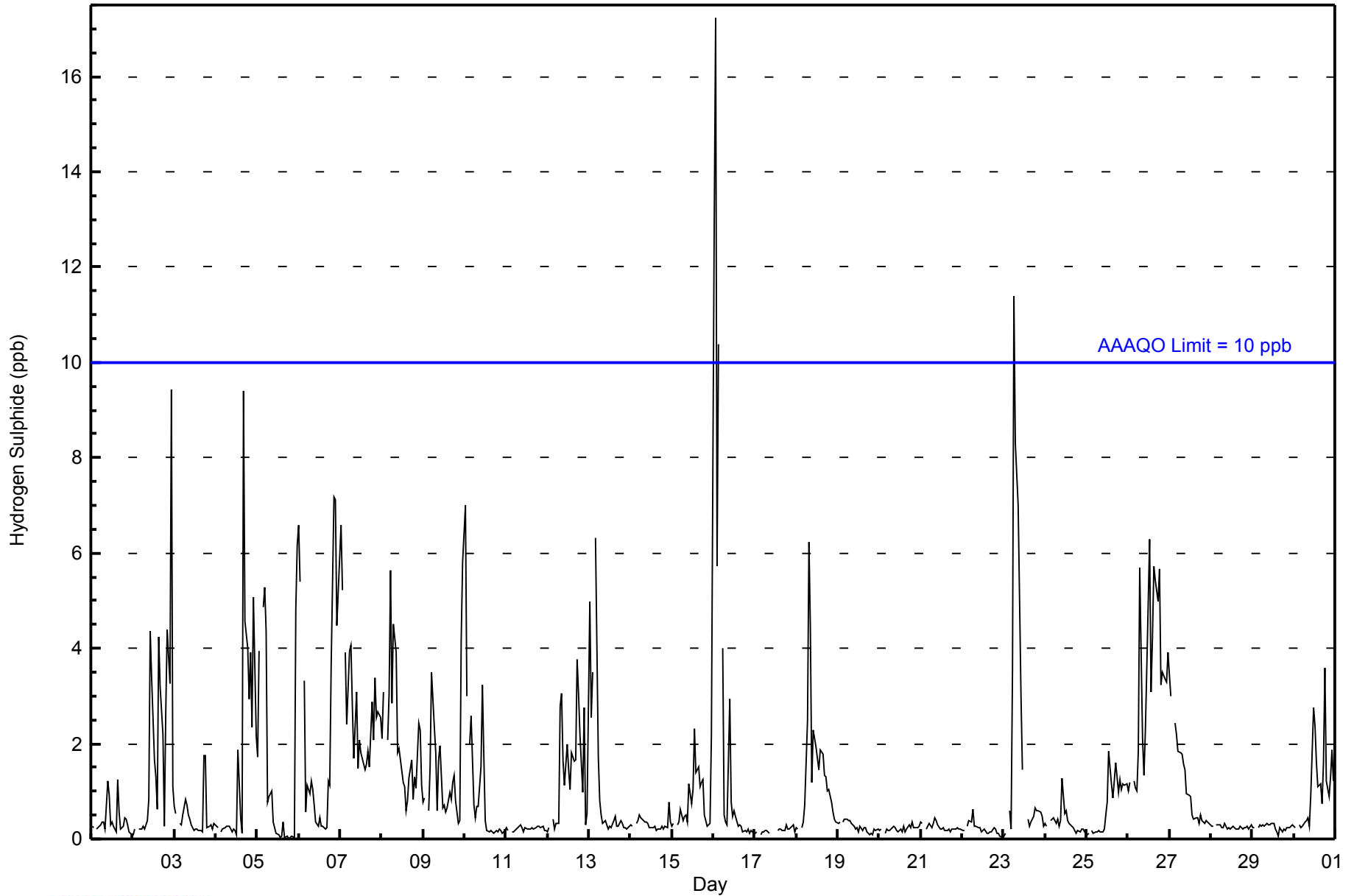
1.7	1.7	4.6	1.2	1.0	1.3	1.2	1.4	1.1	1.0	1.1	0.9	0.9	0.8	0.7	0.9	1.1	1.1	1.1	0.9	1.1	1.1	1.5	1.2	Diurnal Average		
13	17	6	10	6	6	11	8	7	5	4	4	4	6	3	4	6	9	5	6	4	7	7	9	6	Diurnal Maximum	

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



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Mannix - September 2014





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mannix - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	590	86.26	86.26
3 - 4	58	8.48	94.74
5 - 7	29	4.24	98.98
8 - 11	4	0.58	99.56
> 11	3	0.44	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mannix - September 2014

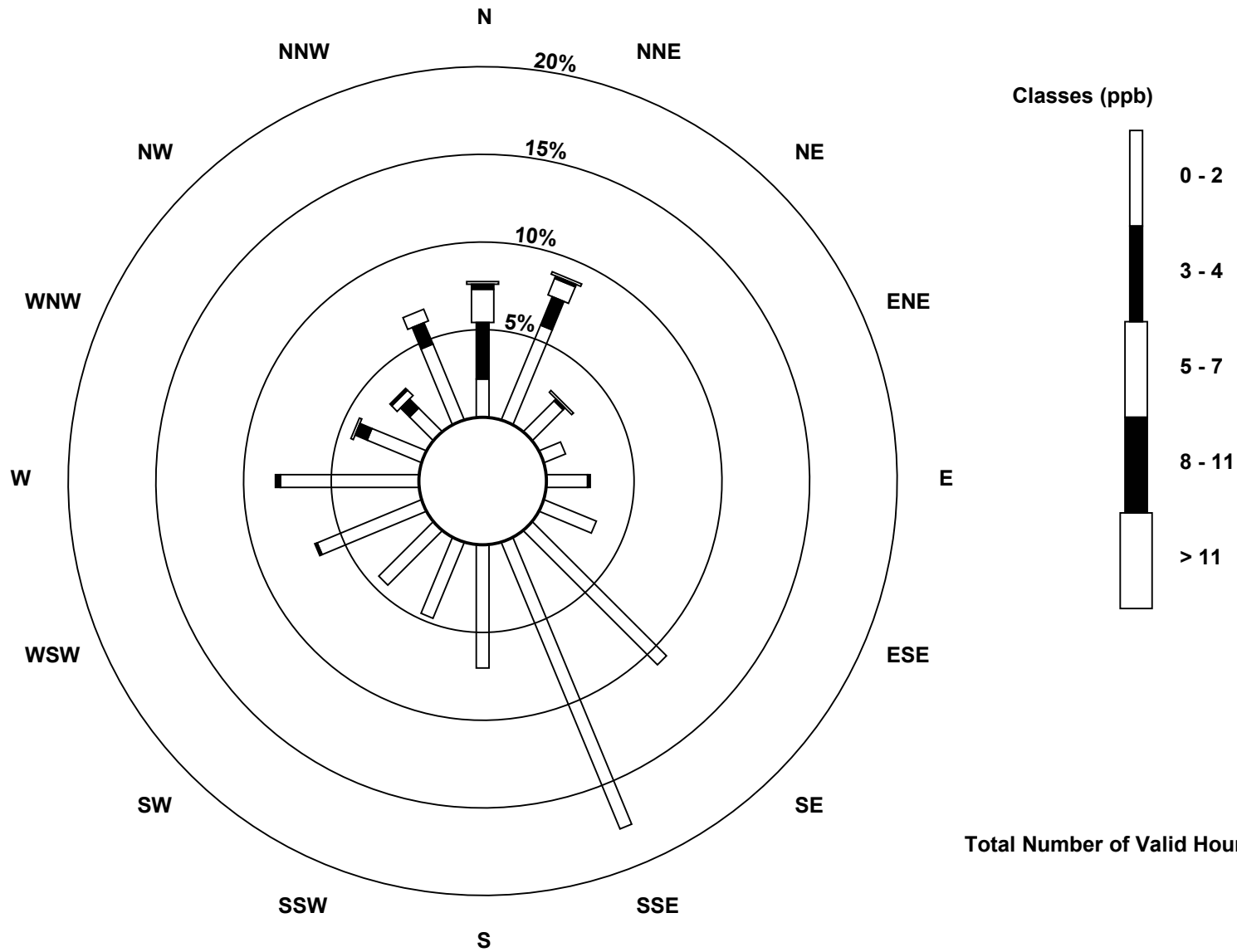
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	15	40	17	9	16	22	74	121	48	32	30	44	54	23	13	32	590
3 - 4	22	12	1	0	1	0	0	0	0	0	0	1	2	5	5	9	58
5 - 7	13	7	0	0	0	0	0	0	0	0	0	0	0	1	3	5	29
8 - 11	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4
> 11	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Totals	53	61	19	9	17	22	74	121	48	32	30	45	56	29	22	46	684

Total Number of Valid Hours: 684

Total Number of Hours: 720

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

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

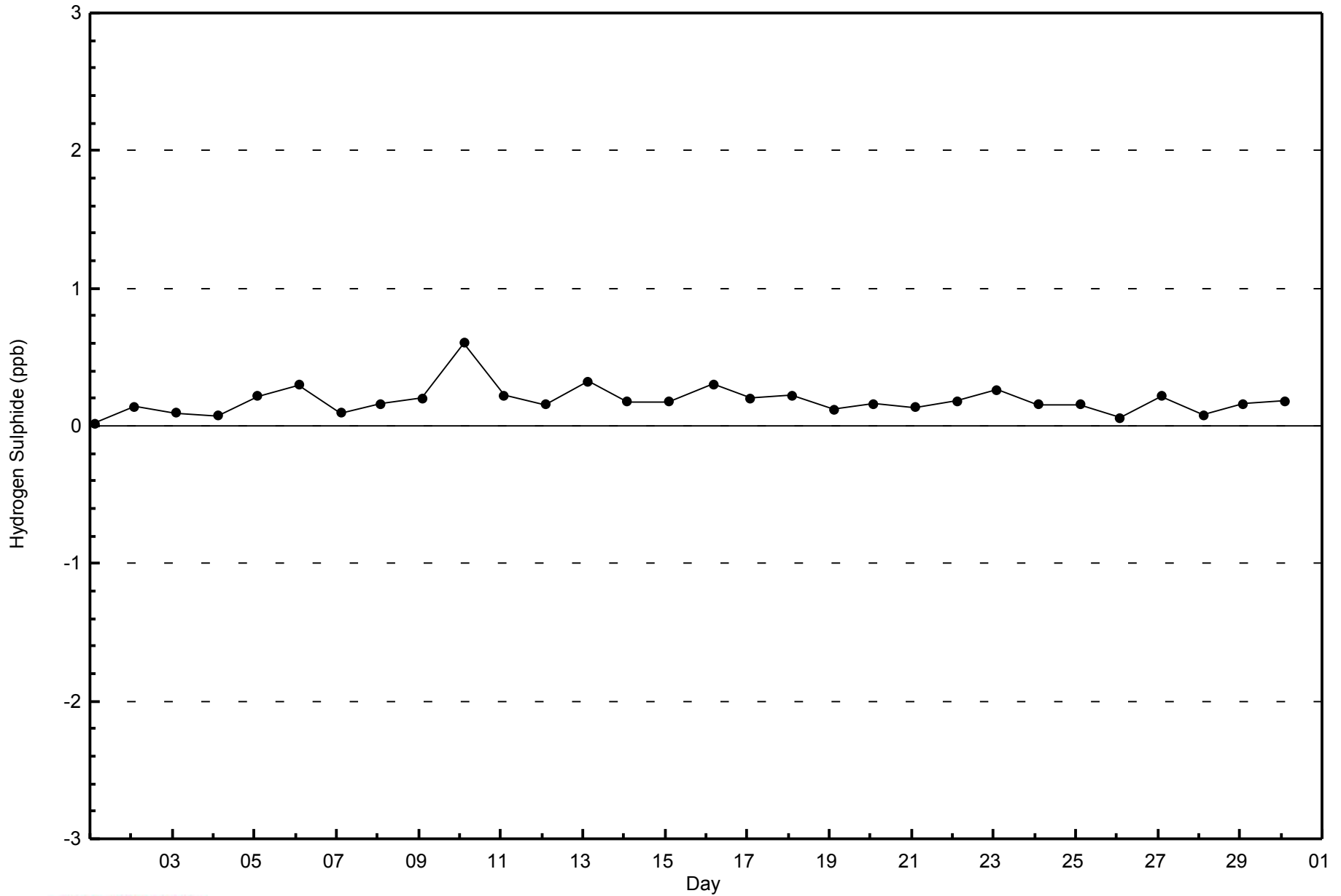


Total Number of Valid Hours: 684



WBEA
Zero Responses

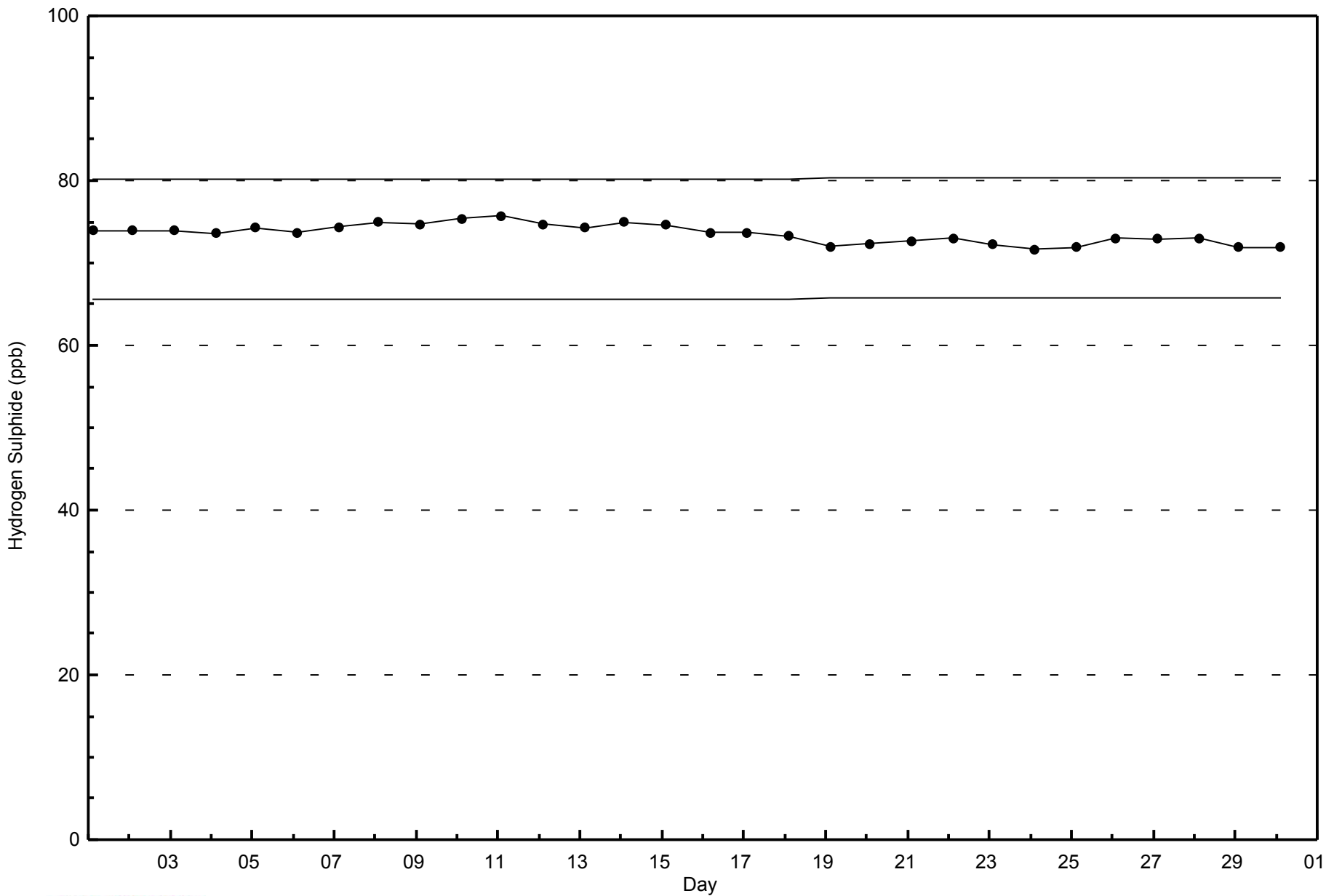
Hydrogen Sulphide (H₂S) - ppb
Mannix - September 2014





WBEA
Span Responses

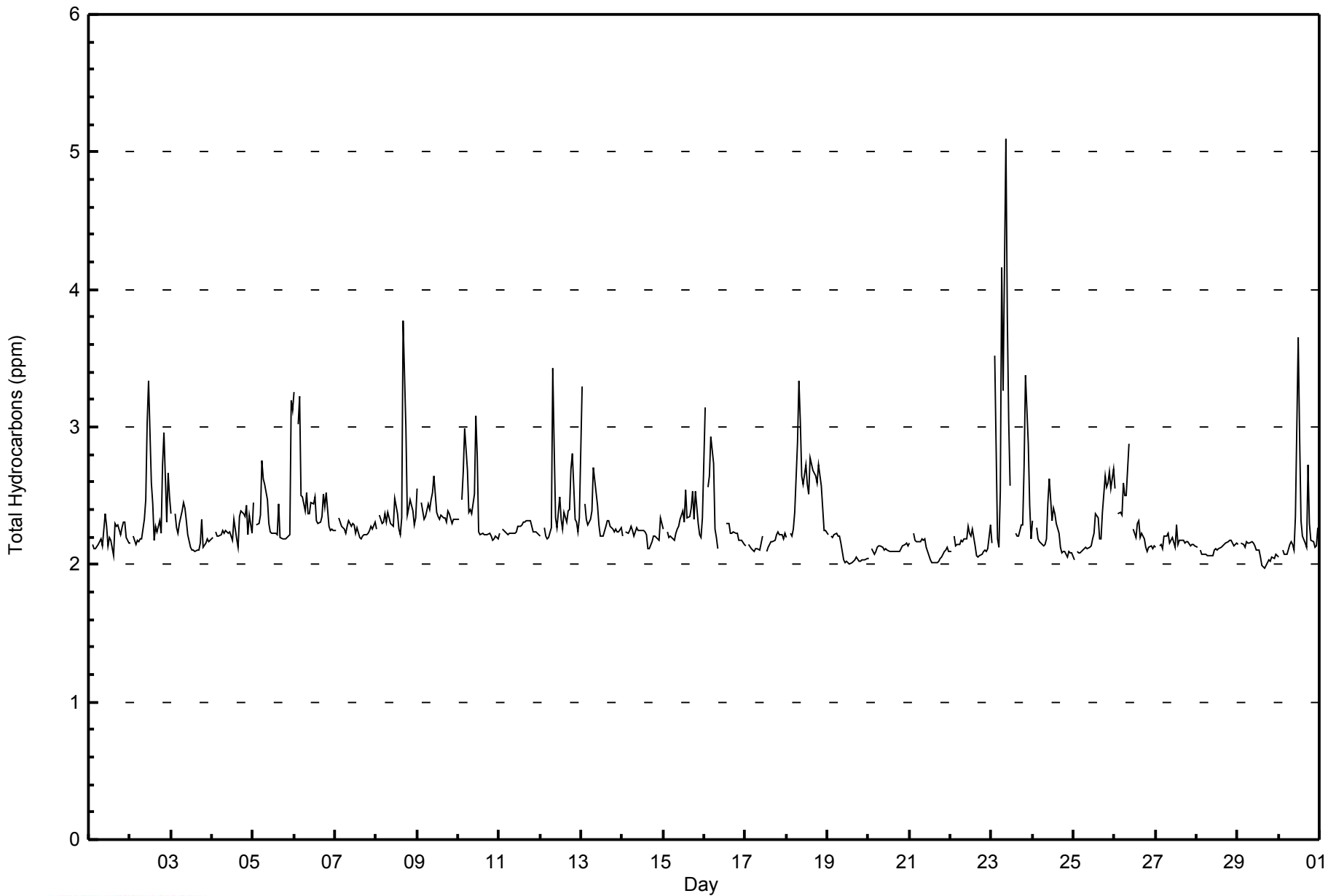
Hydrogen Sulphide (H₂S) - ppb
Mannix - September 2014





WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Mannix - September 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	33	4.85	4.85
2.1 - 3.0	630	92.51	97.36
3.1 - 10.0	18	2.64	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - September 2014

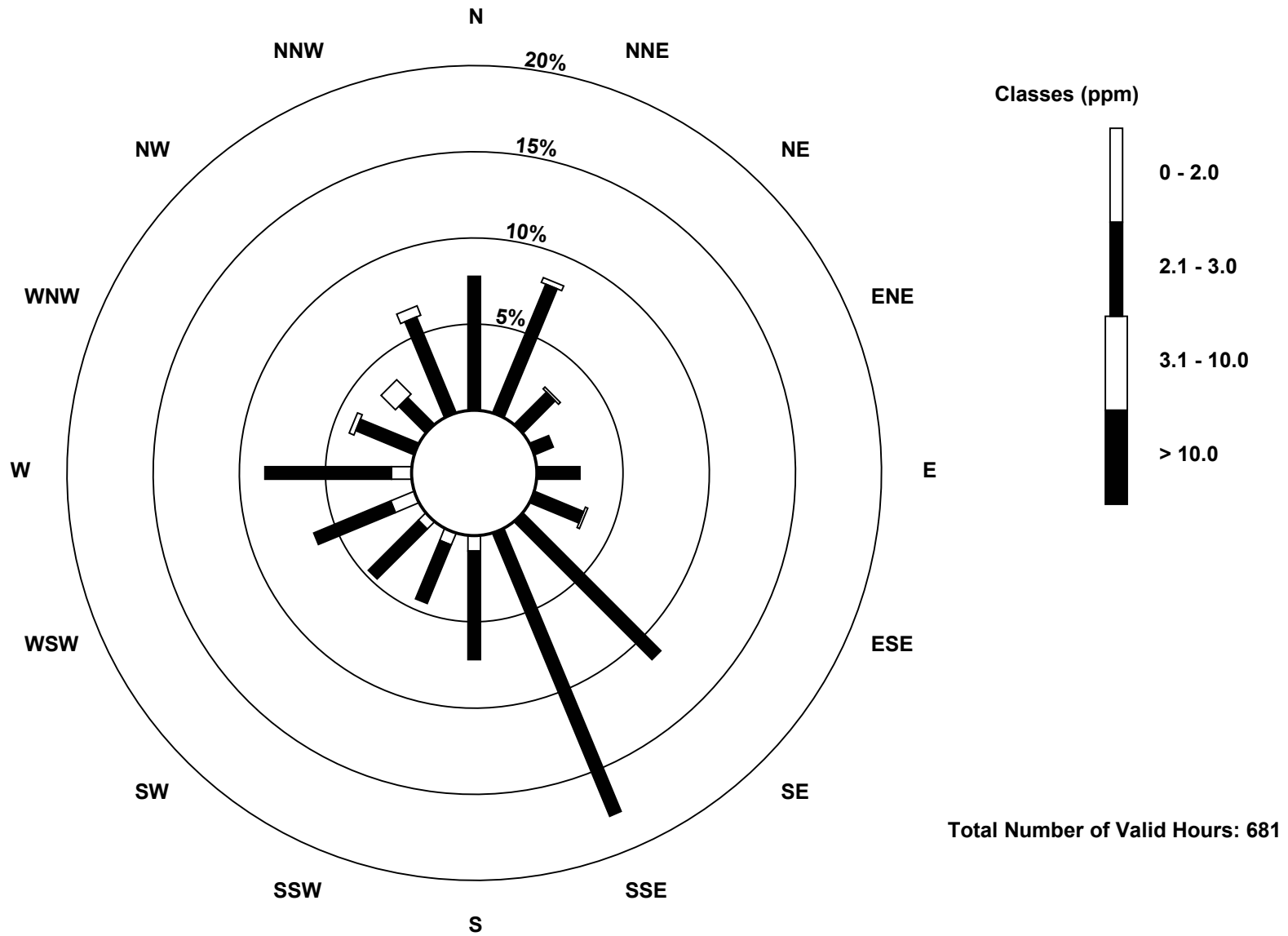
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	6	5	4	10	8	0	0	0	33
2.1 - 3.0	53	55	18	8	17	21	77	121	43	25	28	33	50	25	15	41	630
3.1 - 10.0	0	2	1	0	0	1	0	0	0	0	0	0	0	2	8	4	18
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	53	57	19	8	17	22	77	121	49	30	32	43	58	27	23	45	681

Total Number of Valid Hours: 681

Total Number of Hours: 720

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

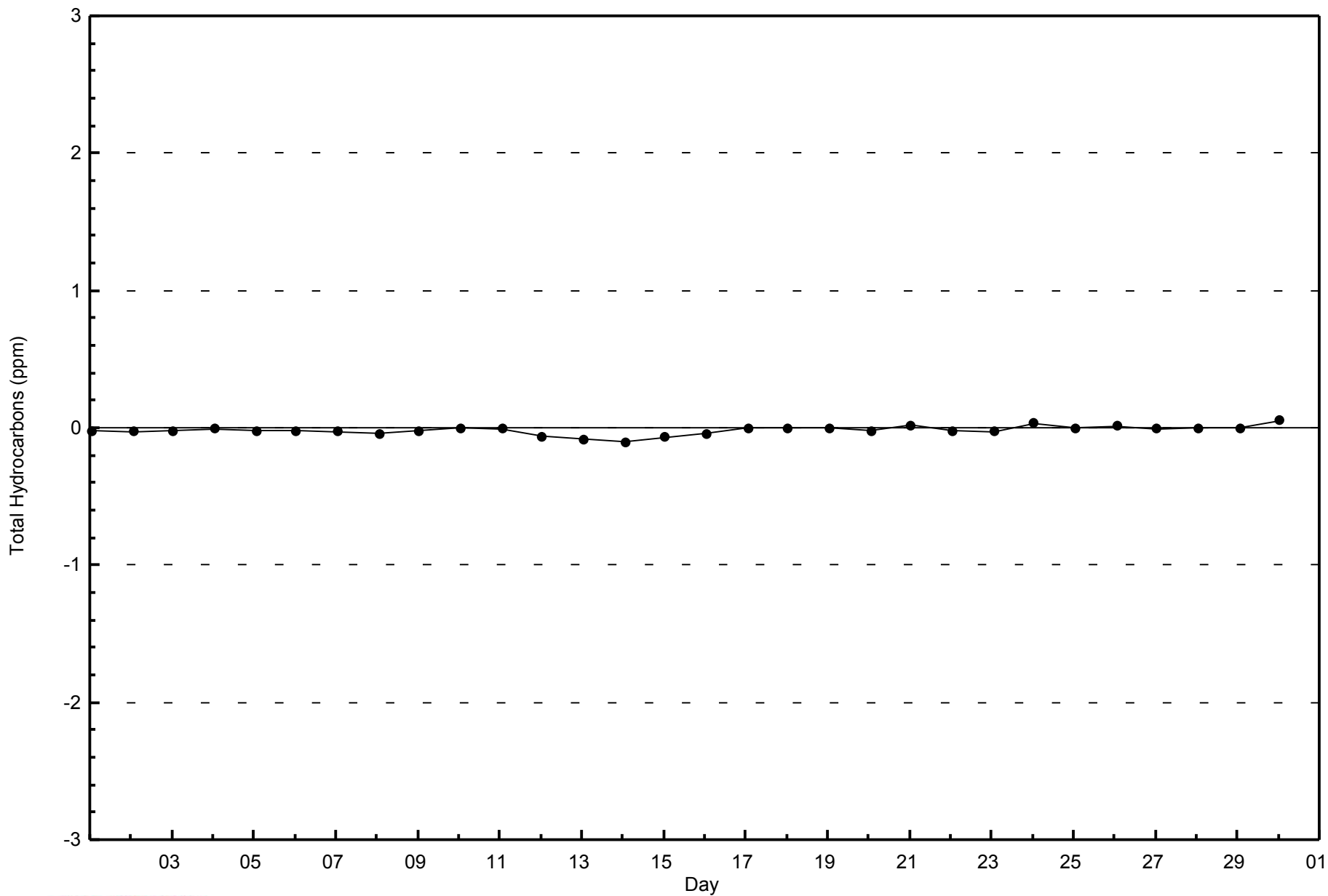
**Total Hydrocarbons (THC) - ppm
Mannix (AMS 5)**





WBEA
Zero Responses

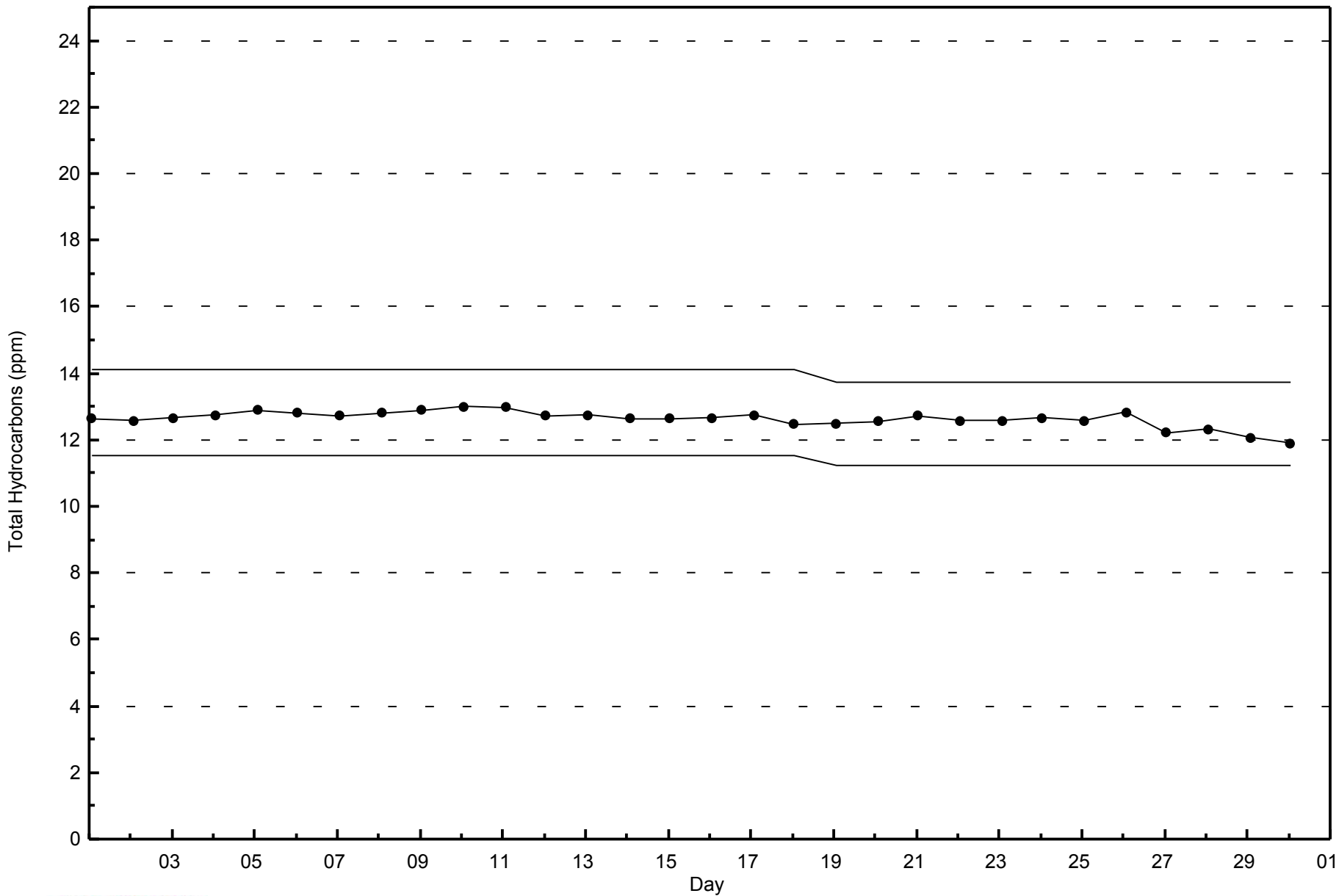
Total Hydrocarbons (THC) - ppm
Mannix - September 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Mannix - September 2014



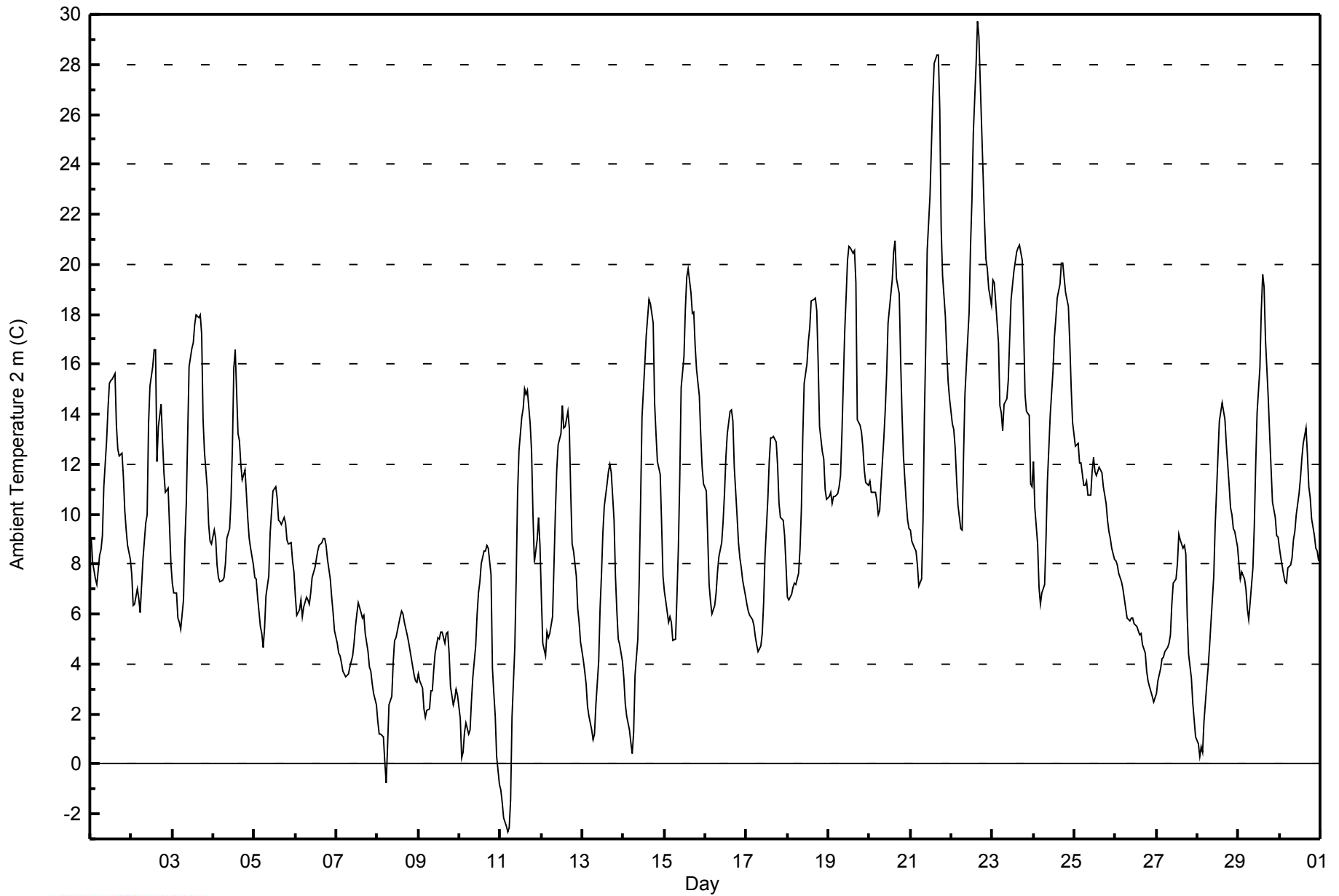


Maximum Value: 29.7 C on Sep 22 16:00		Maximum Daily Average: 18.7 C on Sep 22		Hours in Service: 720																																													
Minimum Value: -2.7 C on Sep 11 05:00		Minimum Daily Average: 3.4 C on Sep 8		Hours of Data: 720																																													
Maximum Diurnal Average: 14.7 C at hour 15		Minimum Diurnal Average: 5.7 C at hour 6		Hours of Missing Data: 0																																													
Monthly Average: 9.79 C		Percentiles: P ₁ = -0.8 P ₁₀ = 3.3 Q ₁ = 5.9 Median = 9.0 Q ₃ = 13.1 P ₉₀ = 17.9 P ₉₉ = 26.6		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	9.0	8.1	7.8	7.4	7.2	8.3	8.6	9.2	11.1	12.9	14.2	15.2	15.3	15.4	15.6	13.6	12.6	12.3	12.4	11.5	10.2	9.4	8.7	8.2	11.0	15.6																							
2-Sep	7.5	6.4	6.4	7.0	6.6	6.1	7.1	8.2	9.7	10.0	13.6	15.1	15.9	16.6	16.6	12.1	13.5	14.4	12.9	11.6	10.9	11.0	9.6	8.0	10.7	16.6																							
3-Sep	7.2	6.9	6.8	5.8	5.7	5.4	6.6	8.9	10.4	13.2	15.9	16.6	16.9	17.6	18.0	17.9	18.0	17.2	13.8	12.5	11.0	9.6	8.9	8.8	11.6	18.0																							
4-Sep	9.3	9.0	7.9	7.5	7.3	7.4	7.5	8.0	9.0	9.4	10.6	12.7	15.9	16.6	13.2	13.0	12.0	11.4	11.8	10.8	9.8	9.0	8.6	8.0	10.2	16.6																							
5-Sep	7.5	7.4	6.7	5.5	5.2	4.7	5.4	6.7	7.5	9.2	10.1	10.9	11.1	10.7	9.8	9.7	9.6	9.8	9.6	9.0	8.8	8.8	8.2	7.7	8.3	11.1																							
6-Sep	6.7	6.0	6.2	6.6	5.9	6.3	6.7	6.5	6.4	6.8	7.5	7.8	8.2	8.5	8.7	8.9	9.0	9.0	8.7	8.2	7.4	6.7	6.1	5.3	7.3	9.0																							
7-Sep	4.8	4.4	4.3	4.0	3.7	3.5	3.5	3.6	3.9	4.3	4.8	5.5	6.0	6.5	6.1	5.9	6.0	5.2	4.5	3.9	3.7	3.2	2.8	2.4	4.4	6.5																							
8-Sep	1.7	1.2	1.2	1.1	0.1	-0.8	0.8	2.4	2.7	4.0	4.9	5.0	5.6	5.9	6.1	6.0	5.6	5.2	4.9	4.5	4.2	3.6	3.3	3.3	3.4	6.1																							
9-Sep	3.6	3.3	3.0	2.2	1.9	2.1	2.2	2.9	2.9	3.8	4.5	5.0	5.0	5.3	5.3	4.8	5.2	5.3	4.5	3.1	2.4	2.6	3.0	2.7	3.6	5.3																							
10-Sep	1.8	0.2	0.5	1.2	1.6	1.2	1.4	2.5	3.5	4.7	6.0	6.8	7.3	8.0	8.5	8.5	8.8	8.6	7.6	3.8	2.8	1.9	0.3	-0.8	4.0	8.8																							
11-Sep	-1.1	-1.6	-2.1	-2.5	-2.7	-2.6	-1.4	1.8	4.6	7.5	10.9	12.6	13.9	14.2	15.0	14.8	14.9	13.6	12.5	10.0	8.1	9.0	9.8	8.7	7.0	15.0																							
12-Sep	6.7	4.8	4.3	5.3	5.1	5.2	5.9	7.9	10.0	11.8	12.8	13.2	14.3	13.4	13.5	14.1	13.4	10.9	8.8	8.5	7.5	6.2	5.7	4.9	8.9	14.3																							
13-Sep	4.1	3.7	3.2	2.3	1.9	1.4	1.0	1.2	2.4	4.1	6.2	7.6	9.3	10.3	11.2	11.7	12.0	11.6	9.8	7.5	6.1	5.0	4.8	4.1	5.9	12.0																							
14-Sep	3.5	2.4	1.9	1.4	0.8	0.4	1.3	3.6	5.0	7.4	10.5	13.9	16.0	17.1	17.9	18.6	18.4	17.6	14.4	13.2	12.1	11.6	9.6	7.5	9.4	18.6																							
15-Sep	6.9	6.5	5.7	5.9	5.7	5.0	5.0	6.8	8.6	11.4	15.1	16.3	18.2	19.5	19.8	18.9	18.0	18.1	16.8	15.8	14.7	13.2	11.9	11.2	12.3	19.8																							
16-Sep	10.9	9.1	7.2	6.5	6.0	6.3	6.9	7.7	8.3	8.8	9.7	10.8	12.3	13.2	14.1	14.2	13.7	11.9	9.9	8.8	8.2	7.8	7.4	6.8	9.4	14.2																							
17-Sep	6.4	6.1	5.9	5.8	5.5	5.1	4.8	4.5	4.7	5.2	6.5	8.3	10.6	12.1	13.1	13.1	13.1	12.9	11.9	10.4	9.9	9.8	9.1	7.9	8.4	13.1																							
18-Sep	6.7	6.6	6.8	7.1	7.2	7.2	7.6	8.6	10.2	13.1	15.2	16.0	16.9	17.4	18.6	18.6	18.7	18.2	16.1	13.5	12.5	12.2	11.0	10.6	12.4	18.7																							
19-Sep	10.7	10.9	10.5	10.7	10.7	10.8	11.1	11.5	13.2	17.3	18.7	20.1	20.7	20.7	20.4	20.6	19.3	13.8	13.6	13.3	12.7	11.8	11.2	11.1	14.4	20.7																							
20-Sep	11.3	10.9	10.9	10.8	10.5	10.0	10.1	11.2	13.1	14.2	15.6	17.6	18.8	19.4	20.5	20.9	19.4	18.8	16.2	14.0	12.3	10.5	9.8	9.4	14.0	20.9																							
21-Sep	9.3	8.9	8.6	8.5	7.9	7.1	7.4	9.7	13.9	16.9	20.6	22.8	24.7	26.6	28.0	28.4	28.4	26.2	21.5	19.5	17.9	16.5	15.3	14.6	17.0	28.4																							
22-Sep	13.6	13.4	12.7	11.4	10.4	9.4	9.4	12.3	14.8	17.0	18.1	20.7	22.5	25.3	28.0	29.7	29.1	27.2	23.6	21.7	20.2	19.8	19.0	18.4	18.7	29.7																							
23-Sep	19.4	19.3	18.5	16.9	14.3	14.0	13.4	14.4	14.6	15.4	17.0	18.6	19.7	20.1	20.5	20.6	20.8	20.2	17.4	14.8	14.1	13.9	11.2	11.1	16.7	20.8																							
24-Sep	12.1	10.3	8.8	7.1	6.4	6.8	7.2	9.0	11.3	12.6	13.9	15.8	17.1	17.8	18.6	19.2	20.0	20.0	19.5	18.9	18.3	16.9	15.1	13.7	14.0	20.0																							
25-Sep	12.7	12.8	12.8	12.1	12.0	11.1	11.1	11.3	10.8	10.8	11.7	12.2	11.7	11.6	11.9	11.8	11.6	11.1	10.4	9.8	9.3	9.0	8.6	8.2	11.1	12.8																							
26-Sep	8.1	8.0	7.7	7.3	7.0	6.6	6.2	5.8	5.7	5.8	5.8	5.6	5.5	5.4	5.2	5.2	4.8	4.4	3.7	3.3	3.1	2.7	2.5	2.6	5.3	8.1																							
27-Sep	2.8	3.3	3.9	4.2	4.3	4.5	4.6	4.8	5.2	6.4	7.3	7.4	8.0	9.2	9.0	8.6	8.7	8.4	6.0	4.4	3.5	2.4	1.8	1.1	5.4	9.2																							
28-Sep	0.8	0.3	0.7	0.5	1.7	3.2	3.9	4.7	5.7	7.5	9.5	10.9	12.3	13.7	14.5	14.1	13.8	12.8	11.2	10.3	10.0	9.4	9.3	8.7	7.9	14.5																							
29-Sep	8.0	7.4	7.7	7.4	7.0	6.2	5.8	6.5	7.9	9.5	12.0	14.1	15.8	18.1	19.6	19.1	17.0	14.6	13.2	11.8	10.5	9.9	9.2	9.1	11.1	19.6																							
30-Sep	8.6	8.3	7.6	7.3	7.2	7.8	8.0	8.2	9.0	9.3	10.0	10.8	11.4	12.2	12.8	13.4	12.4	11.1	10.6	9.8	9.1	8.6	8.5	8.1	9.6	13.4																							
																								7.4	6.8	6.5	6.1	5.8	5.7	6.0	7.0	8.2	9.7	11.3	12.5	13.6	14.3	14.7	14.5	14.3	13.4	11.9	10.6	9.7	9.1	8.3	7.7	Diurnal Average	
																								19.4	19.3	18.5	16.9	14.3	14.0	13.4	14.4	14.8	17.3	20.6	22.8	24.7	26.6	28.0	29.7	29.1	27.2	23.6	21.7	20.2	19.8	19.0	18.4	Diurnal Maximum	



WBEA
Hourly Averages

Ambient Temperature 2 m (AT2m) - C
Mannix - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature 2 m (AT2m) - C
Mannix - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	9	1.25	1.25
0 - 10	404	56.11	57.36
10 - 20	274	38.06	95.42
> 20	33	4.58	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

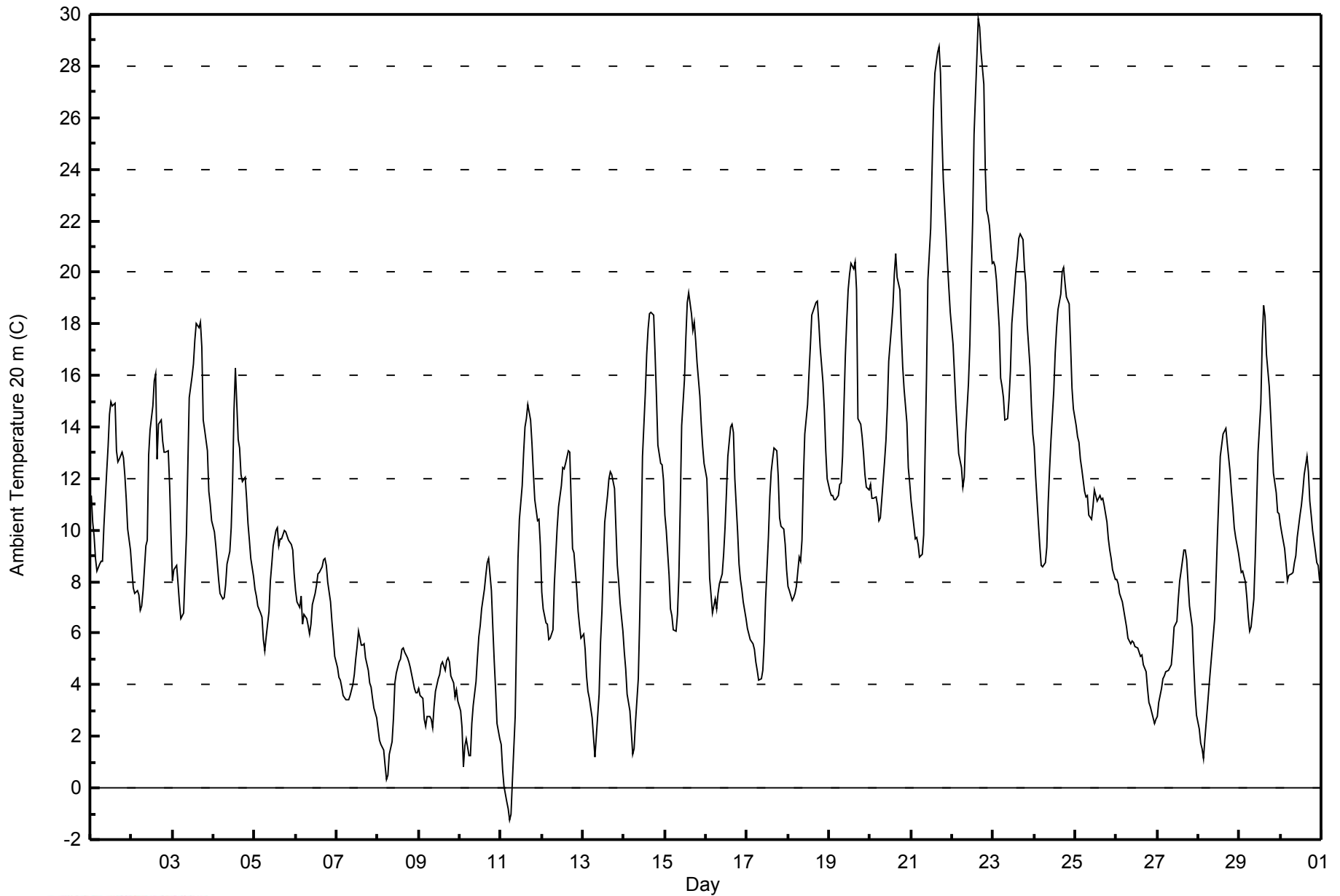
Mannix - September 2014

Maximum Value: 29.9 C on Sep 22 16:00		Maximum Daily Average: 20.0 C on Sep 22		Hours in Service: 720																							
Minimum Value: -1.2 C on Sep 11 06:00		Minimum Daily Average: 3.3 C on Sep 8		Hours of Data: 720																							
Maximum Diurnal Average: 14.4 C at hour 16		Minimum Diurnal Average: 6.4 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 10.17 C		Percentiles: P ₁ = 0.4 P ₁₀ = 3.6 Q ₁ = 6.1 Median = 9.4 Q ₃ = 13.2 P ₉₀ = 18.1 P ₉₉ = 27.3		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	11.3	10.3	9.8	8.9	8.4	8.7	8.8	8.8	10.2	12.3	13.2	14.5	15.0	14.8	14.9	13.1	12.7	12.8	13.0	12.8	12.1	11.2	10.0	9.2	11.5	15.0	
2-Sep	8.5	7.8	7.6	7.6	7.5	6.9	7.0	7.7	9.4	9.6	12.9	13.9	14.8	15.8	16.0	12.7	14.1	14.3	13.5	13.0	13.0	13.1	11.7	9.8	11.2	16.0	
3-Sep	8.1	8.4	8.6	7.9	7.2	6.6	6.8	8.4	9.8	12.5	15.1	15.9	16.5	17.3	18.0	17.8	18.1	17.1	14.3	13.9	13.1	11.5	11.0	10.4	12.3	18.1	
4-Sep	9.9	9.4	8.7	8.1	7.6	7.4	7.4	7.9	8.7	9.2	10.1	11.9	14.7	16.3	13.5	13.2	12.2	11.9	12.1	11.3	10.3	9.6	8.9	8.2	10.3	16.3	
5-Sep	7.7	7.5	7.1	6.8	6.6	5.7	5.3	5.9	6.9	8.0	8.7	9.4	10.0	10.1	9.4	9.7	9.7	10.0	10.0	9.8	9.6	9.4	9.2	8.3	8.4	10.1	
6-Sep	7.7	7.2	7.0	7.5	6.3	6.7	6.6	6.3	6.0	6.4	7.1	7.5	7.9	8.3	8.4	8.6	8.8	8.9	8.6	8.0	7.2	6.5	5.8	5.1	7.3	8.9	
7-Sep	4.7	4.3	4.2	3.9	3.6	3.4	3.4	3.4	3.6	4.0	4.4	5.0	5.5	6.1	5.6	5.5	5.6	5.1	4.6	4.1	3.9	3.5	3.1	2.7	4.3	6.1	
8-Sep	2.3	1.9	1.7	1.5	0.9	0.3	0.5	1.3	1.8	2.7	4.1	4.4	4.9	5.0	5.4	5.4	5.3	5.1	4.9	4.7	4.4	3.9	3.7	3.7	3.3	5.4	
9-Sep	3.8	3.6	3.5	2.7	2.4	2.8	2.8	2.7	2.3	3.2	3.8	4.2	4.4	4.8	4.9	4.6	4.9	5.1	4.9	4.4	4.1	3.5	3.8	3.4	3.8	5.1	
10-Sep	3.0	2.3	0.8	1.6	1.9	1.2	1.3	2.5	3.2	4.1	5.1	5.9	6.3	7.0	7.7	8.3	8.7	8.9	7.6	6.2	4.9	3.8	2.5	1.9	4.5	8.9	
11-Sep	1.7	0.7	0.1	-0.5	-0.8	-1.2	-1.0	0.3	2.8	6.0	8.9	10.4	11.7	12.9	14.0	14.3	14.9	14.3	13.3	12.2	11.2	10.4	10.4	9.4	7.3	14.9	
12-Sep	7.6	7.0	6.4	6.4	5.7	5.8	6.1	7.9	9.0	10.1	10.9	11.7	12.4	12.4	12.6	13.1	13.0	11.1	9.3	9.1	7.7	6.8	6.3	5.8	8.9	13.1	
13-Sep	6.0	5.4	4.4	3.7	3.5	2.7	1.9	1.2	2.0	3.6	5.7	6.8	8.6	10.3	11.3	12.0	12.3	12.2	11.6	10.1	8.6	8.0	7.2	6.1	6.9	12.3	
14-Sep	5.3	4.6	3.6	3.0	2.2	1.3	1.5	2.5	4.3	6.6	9.5	12.9	15.3	16.8	17.8	18.4	18.4	18.3	16.8	15.1	13.3	12.6	12.6	12.0	10.2	18.4	
15-Sep	10.6	10.0	8.2	7.0	6.7	6.2	6.1	6.7	8.2	11.0	14.1	15.9	17.5	18.8	19.2	18.4	17.8	18.1	17.3	16.5	15.2	14.1	13.2	12.6	12.9	19.2	
16-Sep	12.0	10.2	8.1	7.5	6.8	7.4	7.0	7.5	7.9	8.3	9.1	10.1	11.5	12.9	14.0	14.1	13.8	12.0	9.9	8.7	8.1	7.7	7.2	6.6	9.5	14.1	
17-Sep	6.2	6.0	5.7	5.6	5.4	4.9	4.5	4.2	4.2	4.6	5.6	7.3	9.7	11.3	12.3	12.7	13.2	13.1	12.1	10.5	10.1	10.0	9.4	8.5	8.2	13.2	
18-Sep	7.8	7.7	7.3	7.4	7.6	7.8	8.9	8.8	9.6	12.0	13.8	14.9	16.0	17.1	18.3	18.7	18.8	18.9	18.1	17.1	15.7	14.6	13.1	12.0	13.0	18.9	
19-Sep	11.5	11.3	11.3	11.2	11.2	11.3	11.8	11.8	12.9	16.8	18.1	19.3	19.9	20.3	20.1	20.4	19.3	14.3	14.1	13.6	13.0	12.2	11.7	11.6	14.5	20.4	
20-Sep	11.8	11.3	11.2	11.3	11.0	10.4	10.5	11.2	12.6	13.5	14.8	16.5	17.9	18.7	19.9	20.7	19.8	19.3	17.7	16.3	15.5	14.1	12.4	11.8	14.6	20.7	
21-Sep	11.1	10.6	9.7	9.7	9.4	8.9	9.1	9.8	13.0	15.9	19.7	21.7	24.0	26.3	27.7	28.5	28.8	27.7	25.4	23.6	21.5	20.3	19.4	18.5	18.4	28.8	
22-Sep	17.2	16.1	14.9	13.9	13.0	12.4	11.7	12.0	13.7	15.7	17.2	19.7	22.0	25.3	28.3	29.9	29.5	28.5	27.3	24.0	22.4	22.2	21.8	20.3	20.0	29.9	
23-Sep	20.4	20.2	19.7	17.9	15.9	15.6	15.2	14.3	14.3	15.1	16.2	18.0	19.4	20.1	20.6	21.3	21.5	21.3	20.2	19.6	17.9	16.4	14.8	13.7	17.9	21.5	
24-Sep	13.3	12.1	10.3	9.4	8.6	8.6	8.7	9.4	11.1	12.4	13.5	15.4	16.9	17.8	18.5	19.1	20.0	20.2	19.6	19.0	18.8	17.2	15.5	14.7	14.6	20.2	
25-Sep	14.1	13.6	13.4	12.8	12.4	11.5	11.3	11.3	10.6	10.4	10.9	11.6	11.3	11.1	11.3	11.2	11.2	10.9	10.3	9.7	9.2	8.9	8.5	8.1	11.1	14.1	
26-Sep	8.1	7.9	7.6	7.2	6.9	6.6	6.3	5.8	5.6	5.7	5.7	5.5	5.4	5.3	5.1	5.2	4.8	4.5	3.8	3.3	3.1	2.7	2.5	2.7	5.3	8.1	
27-Sep	2.8	3.3	3.8	4.2	4.3	4.5	4.6	4.7	4.8	5.4	6.3	6.4	7.3	8.0	8.4	9.3	9.2	8.8	7.9	7.0	6.3	4.9	3.6	2.8	5.8	9.3	
28-Sep	2.3	1.7	1.5	1.2	1.9	3.3	4.0	4.6	5.3	6.5	8.2	9.8	11.3	12.9	13.7	13.9	13.9	13.3	12.2	11.5	10.9	10.1	9.7	9.1	8.0	13.9	
29-Sep	8.7	8.3	8.4	8.0	7.4	6.6	6.1	6.3	7.3	9.0	11.0	13.0	14.9	17.4	18.7	18.3	16.8	15.6	14.5	13.3	12.2	11.5	10.7	10.6	11.4	18.7	
30-Sep	10.2	9.9	9.3	8.7	8.1	8.3	8.3	8.4	8.7	9.0	9.7	10.6	10.9	11.5	12.1	12.9	12.3	11.1	10.6	10.0	9.2	8.7	8.7	8.1	9.8	12.9	
		8.5	8.0	7.5	7.1	6.6	6.4	6.4	6.8	7.7	9.0	10.4	11.7	12.8	13.8	14.3	14.4	14.3	13.8	12.8	11.9	11.1	10.3	9.6	8.9	Diurnal Average	
		20.4	20.2	19.7	17.9	15.9	15.6	15.2	14.3	14.3	16.8	19.7	21.7	24.0	26.3	28.3	29.9	29.5	28.5	27.3	24.0	22.4	22.2	21.8	20.3	Diurnal Maximum	



WBEA
Hourly Averages

Ambient Temperature 20 m (AT20m) - C
Mannix - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature 20 m (AT20m) - C
Mannix - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	4	0.56	0.56
0 - 10	384	53.33	53.89
10 - 20	295	40.97	94.86
> 20	37	5.14	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

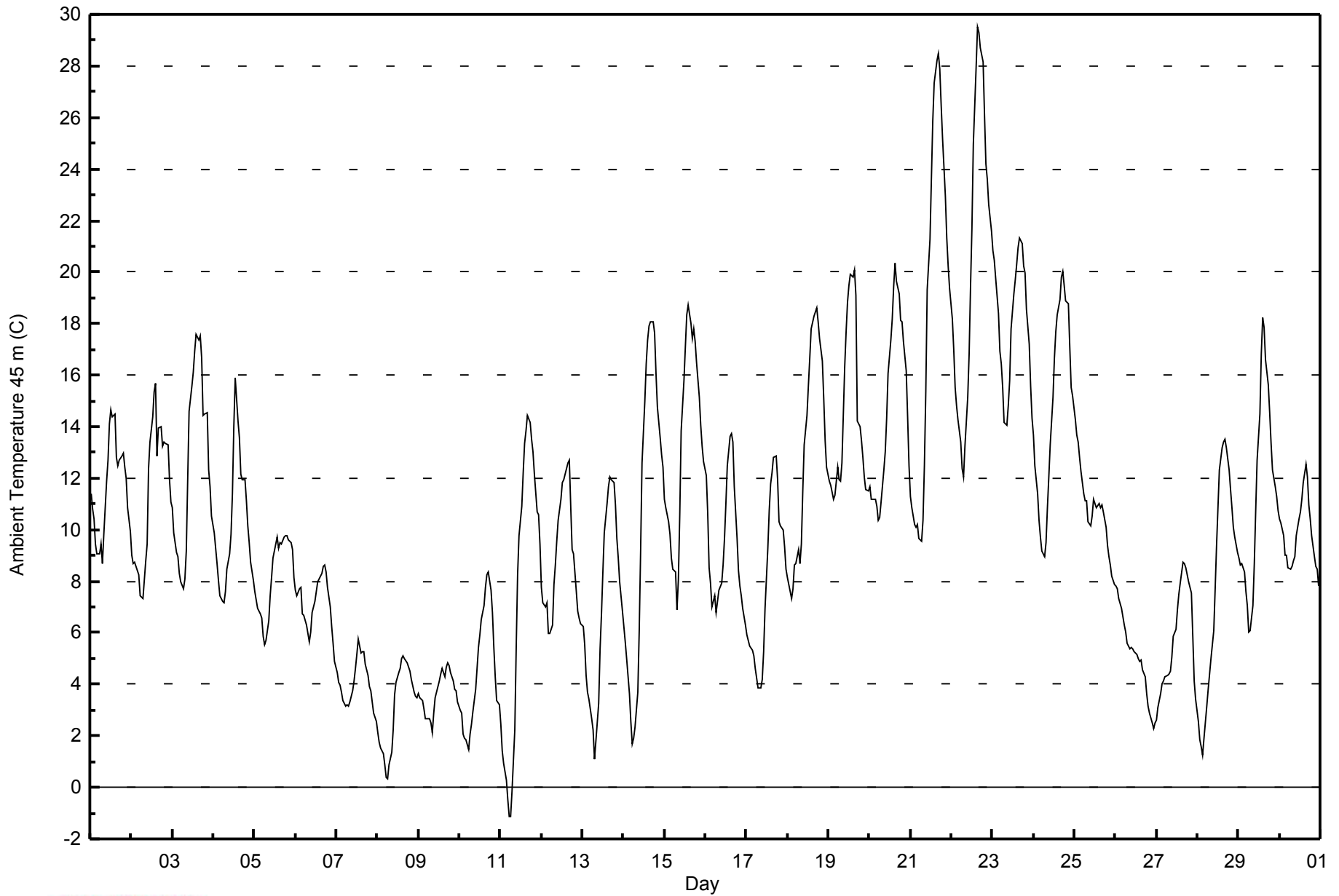
Mannix - September 2014

Maximum Value: 29.5 C on Sep 22 16:00		Maximum Daily Average: 20.4 C on Sep 22		Hours in Service: 720																																												
Minimum Value: -1.1 C on Sep 11 06:00		Minimum Daily Average: 3.1 C on Sep 8		Hours of Data: 720																																												
Maximum Diurnal Average: 14.0 C at hour 16		Minimum Diurnal Average: 6.6 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 10.18 C		Percentiles: P ₁ = 0.8 P ₁₀ = 3.5 Q ₁ = 6.1 Median = 9.5 Q ₃ = 13.3 P ₉₀ = 17.8 P ₉₉ = 27.8		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	11.4	10.8	10.4	9.4	9.1	9.1	9.5	8.7	9.8	11.9	12.7	14.1	14.7	14.4	14.5	12.8	12.5	12.7	12.9	12.9	12.4	12.0	10.8	9.9	11.6	14.7																						
2-Sep	9.0	8.7	8.8	8.4	8.2	7.5	7.4	7.3	8.8	9.5	12.4	13.4	14.4	15.3	15.7	12.9	13.9	14.0	13.3	13.4	13.3	13.3	12.0	11.1	11.3	15.7																						
3-Sep	10.9	9.9	9.1	9.0	8.3	8.0	7.7	8.1	9.2	11.9	14.6	15.6	16.1	17.0	17.6	17.3	17.5	16.7	14.4	14.5	14.5	12.3	11.7	10.5	12.6	17.6																						
4-Sep	9.9	9.3	8.7	8.0	7.4	7.2	7.2	7.6	8.4	9.1	9.8	11.4	14.0	15.9	14.2	13.6	12.1	12.0	12.0	11.1	10.2	9.5	8.8	8.0	10.2	15.9																						
5-Sep	7.6	7.3	7.0	6.7	6.5	5.9	5.5	5.7	6.5	7.4	8.2	8.9	9.4	9.7	9.3	9.5	9.5	9.7	9.8	9.8	9.6	9.5	9.2	8.2	8.2	9.8																						
6-Sep	7.6	7.4	7.7	7.8	6.7	6.7	6.3	6.0	5.7	6.0	6.8	7.2	7.6	8.0	8.1	8.3	8.6	8.6	8.4	7.8	7.0	6.3	5.6	4.9	7.1	8.6																						
7-Sep	4.4	4.1	4.0	3.7	3.4	3.2	3.2	3.2	3.3	3.7	4.1	4.6	5.2	5.7	5.2	5.3	5.3	4.8	4.4	3.9	3.7	3.3	2.9	2.5	4.0	5.7																						
8-Sep	2.1	1.8	1.5	1.3	0.9	0.4	0.3	0.9	1.4	2.2	3.6	4.1	4.5	4.6	5.0	5.1	5.0	4.8	4.7	4.5	4.2	3.7	3.5	3.5	3.1	5.1																						
9-Sep	3.6	3.5	3.3	3.0	2.6	2.7	2.7	2.5	2.1	2.9	3.5	3.9	4.1	4.4	4.6	4.3	4.7	4.8	4.7	4.4	4.1	3.8	3.7	3.3	3.6	4.8																						
10-Sep	3.0	2.9	2.0	1.9	1.8	1.5	2.1	2.5	2.9	3.8	4.6	5.4	5.9	6.5	7.1	7.7	8.3	8.4	7.7	6.8	5.4	4.3	3.4	3.2	4.5	8.4																						
11-Sep	2.4	1.4	1.0	0.3	-0.5	-1.1	-1.1	-0.1	2.2	5.4	8.3	9.8	10.9	12.2	13.4	13.8	14.4	14.1	13.5	13.0	12.2	10.7	10.6	9.5	7.3	14.4																						
12-Sep	7.8	7.2	7.0	7.2	6.0	6.0	6.3	7.9	8.6	9.5	10.4	11.2	11.8	11.9	12.1	12.6	12.7	10.9	9.2	9.0	7.6	6.8	6.6	6.3	8.9	12.7																						
13-Sep	6.2	5.5	4.3	3.7	3.4	2.6	2.2	1.1	1.8	3.3	5.4	6.7	8.4	9.9	11.0	11.6	12.0	11.9	11.8	11.0	9.7	8.9	8.0	6.9	7.0	12.0																						
14-Sep	6.2	5.6	5.0	3.6	2.5	1.7	1.9	2.3	3.7	6.1	9.2	12.6	15.0	16.5	17.4	17.9	18.1	18.0	17.6	16.1	14.8	13.6	12.9	12.4	10.5	18.1																						
15-Sep	11.2	10.9	10.3	9.8	8.9	8.5	8.4	6.9	8.0	10.6	13.8	15.8	17.1	18.3	18.7	18.0	17.4	17.8	17.3	16.5	15.1	14.1	13.2	12.7	13.3	18.7																						
16-Sep	12.1	10.7	8.5	7.9	7.0	7.5	6.8	7.2	7.7	7.9	8.6	9.7	11.0	12.5	13.6	13.7	13.4	11.7	9.7	8.4	7.8	7.4	6.9	6.3	9.3	13.7																						
17-Sep	5.9	5.7	5.5	5.3	5.1	4.6	4.3	3.9	3.9	4.2	5.3	6.9	9.3	10.7	11.8	12.2	12.8	12.9	11.9	10.3	10.2	10.0	9.3	8.5	7.9	12.9																						
18-Sep	8.2	7.9	7.3	7.7	8.7	8.7	9.3	8.7	9.4	11.5	13.3	14.4	15.5	16.7	17.8	18.3	18.5	18.6	18.1	17.4	16.6	15.1	13.4	12.5	13.1	18.6																						
19-Sep	11.9	11.7	11.4	11.2	11.3	12.4	12.0	11.9	12.6	16.4	17.7	18.8	19.5	19.9	19.8	20.1	19.1	14.2	14.0	13.5	12.8	12.0	11.6	11.5	14.5	20.1																						
20-Sep	11.7	11.2	11.2	11.2	10.9	10.3	10.5	11.1	12.3	13.0	14.3	16.0	17.4	18.2	19.4	20.3	19.6	19.2	18.1	18.1	17.3	16.1	14.4	12.5	14.8	20.3																						
21-Sep	11.3	10.9	10.2	10.1	10.2	9.7	9.5	10.4	12.5	15.3	19.3	21.3	23.6	25.9	27.3	28.2	28.5	27.9	26.5	25.2	23.0	21.3	20.2	19.4	18.7	28.5																						
22-Sep	18.2	17.0	15.5	14.8	14.3	13.4	12.4	12.0	13.2	15.1	16.8	19.4	21.7	24.9	27.9	29.5	29.3	28.7	28.2	26.1	24.2	23.6	22.6	21.6	20.4	29.5																						
23-Sep	20.8	20.5	19.7	18.4	16.9	16.4	15.5	14.2	14.1	14.8	15.8	17.8	19.1	19.7	20.3	20.9	21.3	21.1	20.2	20.0	18.6	17.2	15.6	14.3	18.1	21.3																						
24-Sep	13.7	12.5	11.4	10.4	9.7	9.2	9.0	9.5	10.9	12.1	13.3	15.1	16.7	17.7	18.3	18.9	19.8	20.0	19.5	18.9	18.7	17.1	15.5	15.2	14.7	20.0																						
25-Sep	14.3	13.7	13.4	12.8	12.3	11.4	11.1	11.1	10.3	10.1	10.5	11.2	11.0	10.8	11.0	10.9	10.9	10.7	10.1	9.4	8.9	8.7	8.2	7.9	10.9	14.3																						
26-Sep	7.8	7.7	7.3	7.0	6.6	6.3	6.0	5.6	5.4	5.5	5.4	5.3	5.2	5.0	4.9	4.9	4.6	4.3	3.6	3.2	2.9	2.5	2.3	2.5	5.1	7.8																						
27-Sep	2.6	3.1	3.7	4.0	4.1	4.3	4.4	4.4	4.5	5.1	5.9	6.1	6.9	7.5	7.9	8.7	8.7	8.5	8.2	8.0	7.6	5.9	4.2	3.4	5.7	8.7																						
28-Sep	2.6	1.9	1.6	1.2	1.9	3.1	3.8	4.4	5.0	6.1	7.7	9.4	10.8	12.3	13.2	13.4	13.5	13.2	12.3	11.6	10.9	10.1	9.7	9.1	7.9	13.5																						
29-Sep	8.9	8.6	8.7	8.4	7.6	7.1	6.0	6.1	7.1	8.7	10.7	12.7	14.5	16.8	18.2	17.9	16.6	15.6	14.5	13.3	12.3	11.7	11.3	10.8	11.4	18.2																						
30-Sep	10.4	10.3	9.8	9.0	9.0	8.5	8.4	8.6	8.8	9.0	9.8	10.4	10.7	11.2	11.8	12.5	12.0	11.0	10.4	9.8	9.0	8.6	8.4	7.8	9.8	12.5																						
																								8.8	8.3	7.8	7.4	7.0	6.8	6.6	6.6	7.3	8.6	10.1	11.3	12.4	13.3	13.9	14.0	14.0	13.6	12.9	12.3	11.5	10.6	9.9	9.2	Diurnal Average
																								20.8	20.5	19.7	18.4	16.9	16.4	15.5	14.2	14.1	16.4	19.3	21.3	23.6	25.9	27.9	29.5	29.3	28.7	28.2	26.1	24.2	23.6	22.6	21.6	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature 45 m (AT45m) - C
Mannix - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature 45 m (AT45m) - C
Mannix - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	4	0.56	0.56
0 - 10	381	52.92	53.47
10 - 20	301	41.81	95.28
> 20	34	4.72	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

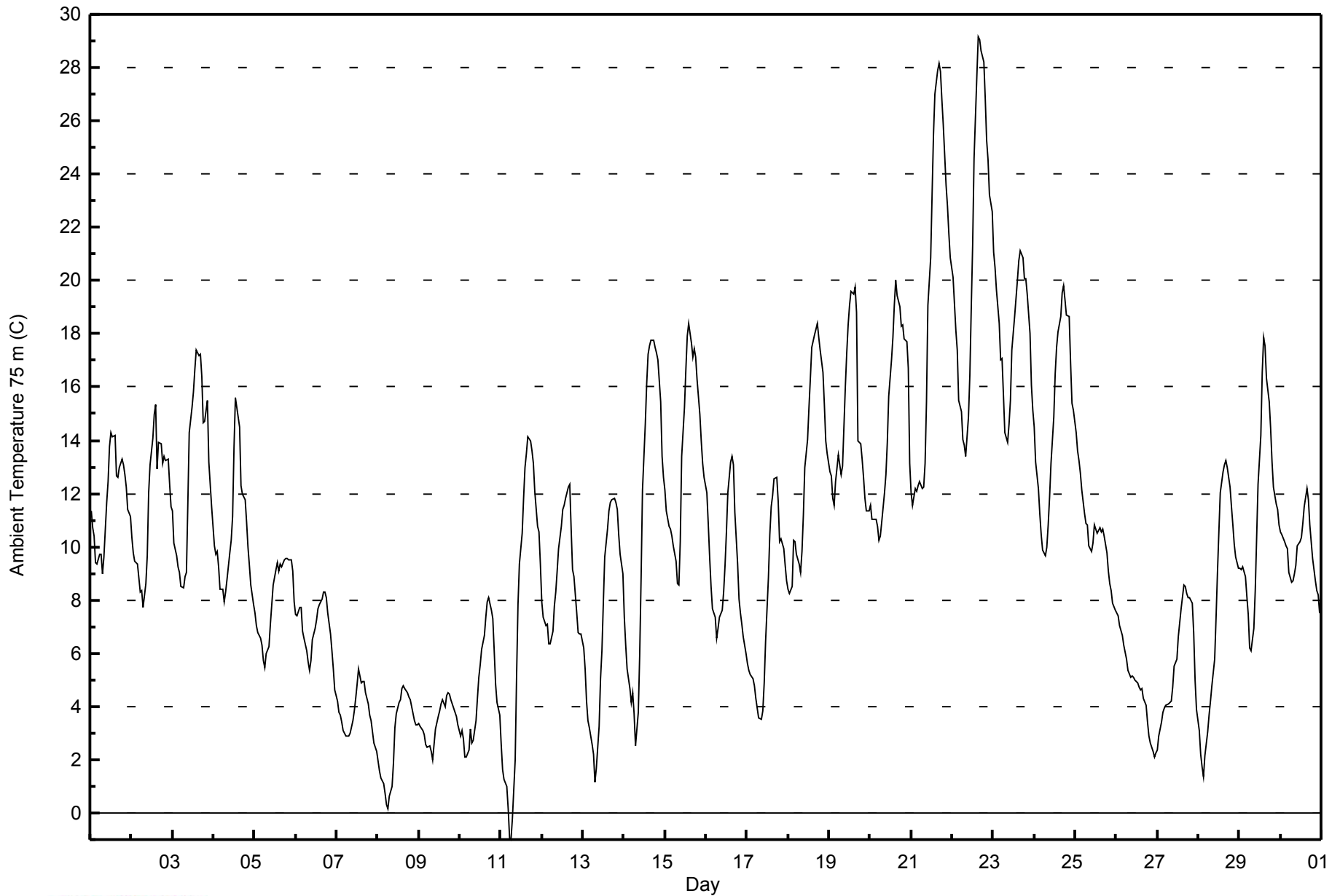
Mannix - September 2014

Maximum Value: 29.2 C on Sep 22 16:00		Maximum Daily Average: 21.2 C on Sep 22		Hours in Service: 720																																												
Minimum Value: -1.0 C on Sep 11 07:00		Minimum Daily Average: 2.8 C on Sep 8		Hours of Data: 720																																												
Maximum Diurnal Average: 13.8 C at hour 16		Minimum Diurnal Average: 6.9 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 10.24 C		Percentiles: P ₁ = 0.6 P ₁₀ = 3.4 Q ₁ = 6.1 Median = 9.8 Q ₃ = 13.2 P ₉₀ = 17.8 P ₉₉ = 27.8		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	11.3	10.7	10.4	9.4	9.3	9.7	9.7	9.0	9.6	11.7	12.4	13.8	14.3	14.1	14.2	12.6	12.6	13.0	13.3	13.1	12.7	12.2	11.4	11.1	11.7	14.3																						
2-Sep	10.4	9.8	9.5	9.3	8.8	8.3	8.3	7.7	8.6	9.7	12.0	13.1	14.1	15.0	15.3	12.9	13.9	13.9	13.1	13.4	13.2	13.3	12.3	11.5	11.6	15.3																						
3-Sep	11.4	10.2	9.6	9.2	9.0	8.5	8.4	8.9	9.1	11.6	14.3	15.2	15.8	16.6	17.4	17.2	17.3	16.4	14.7	14.7	15.5	13.2	12.3	11.5	12.8	17.4																						
4-Sep	10.1	9.7	9.8	9.2	8.4	8.4	7.9	8.3	8.8	9.8	10.3	11.2	13.7	15.6	14.9	14.5	12.3	12.0	11.8	10.9	10.0	9.3	8.6	7.8	10.5	15.6																						
5-Sep	7.5	7.0	6.8	6.5	6.3	5.7	5.5	6.0	6.3	7.1	7.8	8.6	9.1	9.4	9.1	9.4	9.2	9.5	9.6	9.6	9.5	9.5	9.1	7.9	8.0	9.6																						
6-Sep	7.5	7.4	7.7	7.7	6.8	6.6	6.1	5.7	5.4	5.7	6.5	6.9	7.2	7.7	7.8	8.0	8.3	8.3	8.1	7.5	6.7	6.1	5.4	4.6	6.9	8.3																						
7-Sep	4.2	3.8	3.7	3.4	3.1	2.9	2.9	2.9	3.0	3.4	3.8	4.3	4.8	5.4	4.9	5.0	4.9	4.5	4.1	3.7	3.5	3.0	2.6	2.3	3.8	5.4																						
8-Sep	2.0	1.6	1.3	1.1	0.7	0.3	0.2	0.6	1.0	1.9	3.2	3.7	4.1	4.2	4.7	4.8	4.7	4.5	4.4	4.2	4.0	3.5	3.3	3.3	2.8	4.8																						
9-Sep	3.4	3.2	3.1	2.9	2.6	2.4	2.5	2.3	2.0	2.6	3.1	3.6	3.8	4.1	4.3	4.0	4.4	4.5	4.5	4.3	3.9	3.8	3.6	3.3	3.4	4.5																						
10-Sep	2.9	3.1	2.8	2.1	2.1	2.4	3.1	2.6	2.7	3.4	4.3	5.1	5.6	6.2	6.7	7.4	7.9	8.1	7.6	7.3	6.1	4.8	4.2	3.7	4.7	8.1																						
11-Sep	2.6	1.6	1.3	1.0	0.1	-1.0	-1.0	-0.2	2.0	5.1	7.8	9.3	10.5	11.8	13.0	13.5	14.1	14.0	13.6	13.2	12.1	10.8	10.6	9.4	7.3	14.1																						
12-Sep	7.9	7.3	7.0	7.1	6.4	6.4	6.8	7.8	8.3	9.1	9.9	10.8	11.4	11.6	11.8	12.2	12.4	10.7	9.1	8.9	7.5	6.8	6.7	6.7	8.8	12.4																						
13-Sep	6.2	5.4	4.2	3.4	3.2	2.5	2.2	1.2	1.7	3.2	5.0	6.1	7.9	9.6	10.6	11.3	11.7	11.8	11.8	11.7	11.4	10.5	9.7	9.0	7.1	11.8																						
14-Sep	7.3	6.3	5.4	4.7	4.1	4.5	3.8	2.5	3.8	5.9	8.8	12.1	14.6	16.1	17.2	17.5	17.7	17.8	17.5	17.3	17.0	15.5	13.4	12.6	11.0	17.8																						
15-Sep	12.2	11.4	10.8	10.7	10.4	10.0	9.5	8.6	8.6	10.2	13.4	15.2	16.7	17.9	18.4	17.7	17.1	17.5	17.1	16.3	15.0	14.0	13.1	12.6	13.5	18.4																						
16-Sep	12.0	10.9	9.6	8.5	7.7	7.4	6.6	6.9	7.4	7.6	8.3	9.3	10.6	12.0	13.2	13.4	13.1	11.3	9.3	8.1	7.5	7.1	6.6	6.0	9.2	13.4																						
17-Sep	5.6	5.4	5.2	5.0	4.8	4.3	3.9	3.6	3.5	3.8	4.9	6.5	8.8	10.4	11.5	11.9	12.5	12.6	11.7	10.2	10.3	9.9	9.3	8.7	7.7	12.6																						
18-Sep	8.4	8.2	8.5	10.2	10.2	9.7	9.4	9.0	9.8	11.2	13.0	14.0	15.2	16.3	17.5	18.0	18.2	18.4	17.9	17.4	16.5	15.3	14.0	13.5	13.3	18.4																						
19-Sep	12.8	12.7	11.8	11.5	12.5	13.5	13.1	12.7	13.1	16.0	17.3	18.4	19.1	19.6	19.5	19.8	18.8	14.0	13.9	13.3	12.6	11.8	11.4	11.3	14.6	19.8																						
20-Sep	11.5	11.0	11.0	11.0	10.8	10.2	10.4	10.9	12.0	12.7	13.9	15.6	17.0	17.9	19.1	20.0	19.4	19.0	18.3	18.3	17.8	17.7	16.7	13.1	14.8	20.0																						
21-Sep	12.0	11.5	12.2	12.1	12.3	12.5	12.2	12.2	13.1	15.5	19.1	20.9	23.2	25.5	27.0	27.9	28.2	27.8	26.8	25.8	23.6	22.8	21.7	20.9	19.5	28.2																						
22-Sep	20.1	19.1	18.1	17.4	15.5	15.1	14.0	13.8	13.4	14.8	16.4	19.0	21.3	24.6	27.7	29.2	29.1	28.6	28.2	26.8	25.3	24.6	23.2	22.6	21.2	29.2																						
23-Sep	21.1	20.5	19.7	18.4	17.0	17.1	15.7	14.3	13.9	14.6	15.5	17.4	18.6	19.3	20.0	20.8	21.1	20.8	20.0	20.1	19.5	18.0	16.1	15.1	18.1	21.1																						
24-Sep	14.5	13.2	12.2	11.3	10.5	9.9	9.7	10.0	10.8	11.9	13.2	14.9	16.5	17.5	18.1	18.7	19.6	19.8	19.3	18.7	18.6	16.9	15.4	15.2	14.8	19.8																						
25-Sep	14.3	13.6	13.3	12.8	12.1	11.2	10.9	10.8	10.0	9.8	10.1	10.8	10.7	10.5	10.7	10.6	10.7	10.4	9.8	9.1	8.6	8.3	7.9	7.6	10.6	14.3																						
26-Sep	7.5	7.4	7.0	6.7	6.3	6.1	5.8	5.3	5.1	5.2	5.1	5.0	4.9	4.7	4.6	4.7	4.3	4.0	3.4	2.9	2.6	2.3	2.1	2.2	4.8	7.5																						
27-Sep	2.4	2.9	3.4	3.8	3.9	4.0	4.1	4.1	4.2	4.7	5.5	5.8	6.6	7.2	7.6	8.6	8.5	8.3	8.1	8.1	7.9	6.8	5.0	3.9	5.6	8.6																						
28-Sep	3.1	2.2	1.7	1.3	2.1	3.1	3.7	4.2	4.8	5.8	7.4	9.0	10.5	12.0	12.8	13.1	13.3	13.0	12.2	11.5	10.8	10.1	9.6	9.2	7.8	13.3																						
29-Sep	9.2	9.1	9.3	8.9	8.2	7.5	6.2	6.1	6.9	8.4	10.4	12.3	14.2	16.5	17.9	17.5	16.3	15.5	14.4	13.2	12.3	11.6	11.4	10.8	11.4	17.9																						
30-Sep	10.6	10.5	10.2	10.0	9.9	9.0	8.7	8.7	9.0	9.3	10.0	10.2	10.4	10.9	11.5	12.2	11.8	10.8	10.2	9.5	8.7	8.4	8.2	7.5	9.8	12.2																						
																								9.1	8.6	8.2	7.9	7.5	7.3	7.0	6.9	7.3	8.4	9.8	10.9	12.0	13.0	13.6	13.8	13.8	13.4	12.8	12.3	11.7	10.9	10.2	9.5	Diurnal Average
																								21.1	20.5	19.7	18.4	17.0	17.1	15.7	14.3	13.9	16.0	19.1	20.9	23.2	25.5	27.7	29.2	29.1	28.6	28.2	26.8	25.3	24.6	23.2	22.6	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature 75 m (AT75m) - C
Mannix - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature 75 m (AT75m) - C
Mannix - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	3	0.42	0.42
0 - 10	367	50.97	51.39
10 - 20	315	43.75	95.14
> 20	35	4.86	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

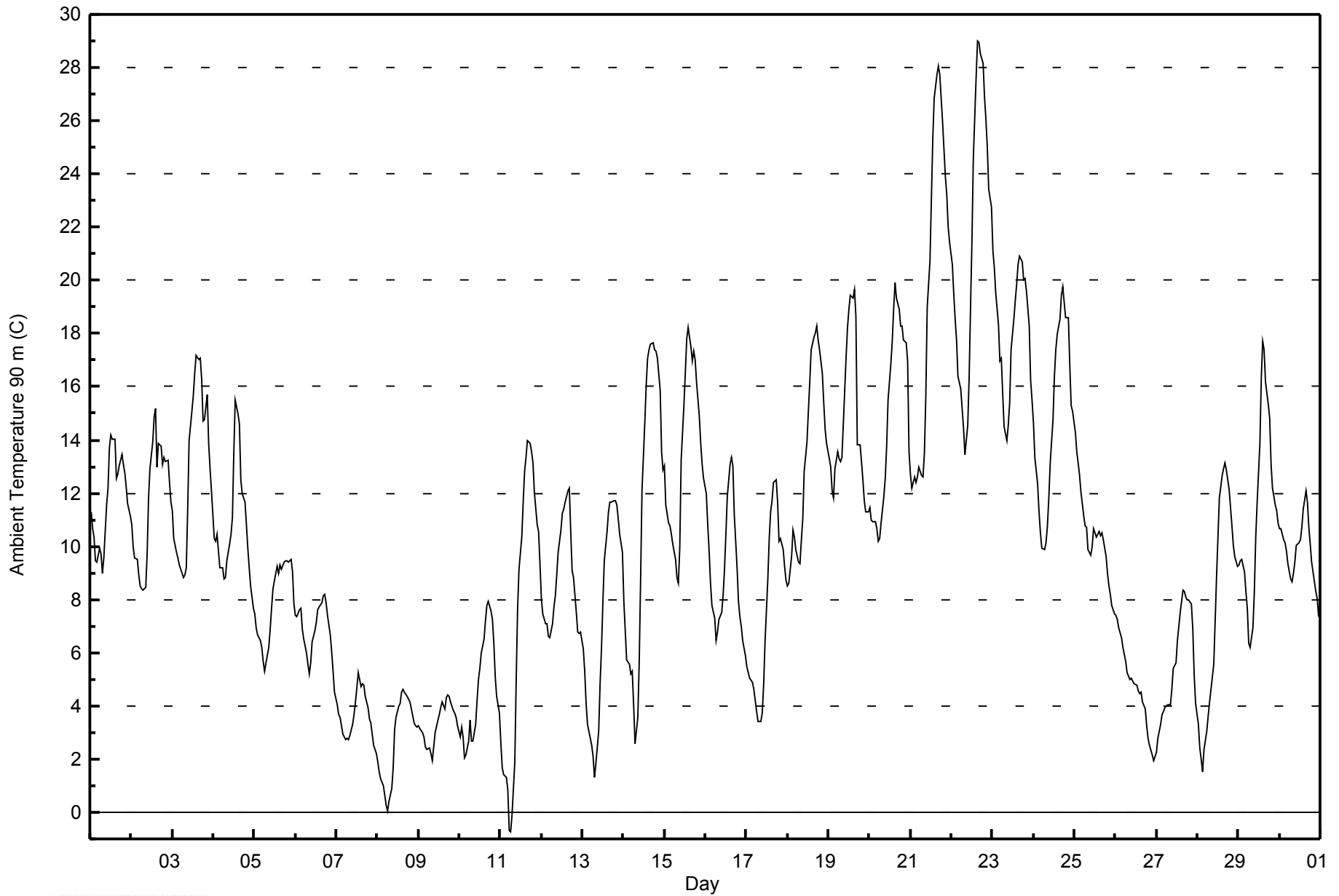
Mannix - September 2014

Maximum Value: 29.0 C on Sep 22 16:00		Maximum Daily Average: 21.4 C on Sep 22		Hours in Service: 720																																												
Minimum Value: -0.7 C on Sep 11 07:00		Minimum Daily Average: 2.7 C on Sep 8		Hours of Data: 720																																												
Maximum Diurnal Average: 13.7 C at hour 16		Minimum Diurnal Average: 7.0 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 10.24 C		Percentiles: P ₁ = 0.8 P ₁₀ = 3.3 Q ₁ = 6.0 Median = 9.9 Q ₃ = 13.3 P ₉₀ = 17.7 P ₉₉ = 27.7		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	11.3	10.7	10.3	9.5	9.4	10.0	9.7	9.0	9.6	11.5	12.2	13.7	14.2	14.0	14.0	12.6	12.7	13.1	13.4	13.1	12.8	12.2	11.6	11.1	11.7	14.2																						
2-Sep	10.8	10.0	9.5	9.5	8.9	8.5	8.4	8.3	8.5	9.7	11.8	12.9	13.9	14.8	15.2	13.0	13.9	13.8	13.1	13.4	13.2	13.2	12.4	11.6	11.6	15.2																						
3-Sep	11.3	10.3	9.8	9.6	9.3	9.1	8.8	8.9	9.2	11.4	13.9	15.1	15.7	16.5	17.2	17.0	17.1	16.3	14.7	14.8	15.7	13.8	12.9	12.1	12.9	17.2																						
4-Sep	10.3	10.2	10.4	9.8	9.2	9.2	8.7	8.8	9.5	10.1	10.5	11.1	13.6	15.5	15.0	14.6	12.5	12.0	11.7	10.8	9.9	9.2	8.5	7.7	10.8	15.5																						
5-Sep	7.4	6.9	6.7	6.5	6.2	5.7	5.3	5.6	6.2	6.9	7.7	8.4	9.0	9.2	9.0	9.3	9.2	9.4	9.5	9.5	9.4	9.5	9.0	7.8	7.9	9.5																						
6-Sep	7.4	7.4	7.6	7.7	6.9	6.5	6.0	5.5	5.2	5.6	6.4	6.8	7.2	7.6	7.7	7.9	8.2	8.2	7.9	7.4	6.7	6.1	5.3	4.5	6.8	8.2																						
7-Sep	4.1	3.7	3.6	3.3	2.9	2.7	2.8	2.7	2.9	3.3	3.7	4.2	4.7	5.2	4.7	4.8	4.8	4.4	4.0	3.5	3.4	2.9	2.5	2.2	3.6	5.2																						
8-Sep	1.9	1.5	1.2	1.0	0.6	0.3	0.1	0.4	0.9	1.7	3.1	3.6	4.0	4.1	4.5	4.6	4.5	4.4	4.2	4.1	3.9	3.4	3.2	3.2	2.7	4.6																						
9-Sep	3.2	3.1	3.0	2.8	2.5	2.3	2.4	2.2	2.0	2.5	3.0	3.5	3.7	4.0	4.1	3.9	4.3	4.4	4.3	4.2	3.9	3.7	3.6	3.3	3.3	4.4																						
10-Sep	2.8	3.2	2.8	2.0	2.2	2.7	3.5	2.7	2.7	3.3	4.2	5.0	5.4	6.0	6.5	7.2	7.8	7.9	7.5	7.3	6.3	5.1	4.4	3.7	4.7	7.9																						
11-Sep	2.6	1.7	1.4	1.3	0.8	-0.7	-0.7	-0.1	1.9	5.0	7.7	9.2	10.3	11.7	12.8	13.3	14.0	13.9	13.6	13.1	12.1	10.8	10.5	9.3	7.3	14.0																						
12-Sep	8.0	7.5	7.1	7.1	6.6	6.6	7.1	7.7	8.2	8.9	9.8	10.6	11.2	11.4	11.6	12.1	12.2	10.5	9.1	8.8	7.5	6.8	6.7	6.8	8.7	12.2																						
13-Sep	6.1	5.3	4.1	3.3	3.1	2.5	2.1	1.3	1.8	3.0	4.9	6.1	7.9	9.5	10.5	11.3	11.7	11.7	11.7	11.7	11.6	11.0	10.5	9.7	7.2	11.7																						
14-Sep	7.9	6.8	5.7	5.6	5.2	5.3	4.0	2.6	3.6	5.7	8.8	12.1	14.7	16.1	17.1	17.4	17.6	17.6	17.4	17.3	17.1	15.9	13.6	12.9	11.2	17.6																						
15-Sep	13.0	11.6	10.9	10.8	10.5	10.1	9.5	8.8	8.6	9.9	13.2	15.3	16.6	17.8	18.2	17.5	17.0	17.3	17.0	16.2	14.9	13.9	13.1	12.6	13.5	18.2																						
16-Sep	12.0	10.8	9.8	8.6	7.8	7.3	6.5	6.8	7.2	7.5	8.2	9.1	10.4	11.9	13.1	13.3	13.0	11.2	9.2	7.9	7.3	7.0	6.5	5.9	9.1	13.3																						
17-Sep	5.5	5.2	5.0	4.9	4.6	4.2	3.8	3.4	3.4	3.7	4.8	6.4	8.8	10.3	11.3	11.7	12.4	12.5	11.6	10.2	10.3	9.9	9.2	8.7	7.6	12.5																						
18-Sep	8.5	8.6	9.6	10.6	10.4	9.9	9.4	9.3	10.2	11.1	12.8	13.9	15.1	16.2	17.4	17.8	18.0	18.3	17.8	17.4	16.5	15.4	14.4	13.9	13.4	18.3																						
19-Sep	13.3	13.0	12.1	11.8	12.9	13.6	13.3	13.2	13.4	15.9	17.1	18.2	18.9	19.4	19.3	19.6	18.7	13.8	13.8	13.2	12.5	11.7	11.3	11.3	14.6	19.6																						
20-Sep	11.5	11.0	10.9	10.9	10.7	10.2	10.3	10.9	11.9	12.5	13.8	15.5	16.9	17.7	18.9	19.9	19.3	18.9	18.3	18.3	17.8	17.7	17.0	13.5	14.8	19.9																						
21-Sep	12.7	12.2	12.6	12.4	12.6	13.0	12.6	12.6	13.5	15.6	19.0	20.7	23.1	25.3	26.9	27.8	28.1	27.7	26.8	26.0	23.9	23.2	22.0	21.4	19.7	28.1																						
22-Sep	20.6	19.5	18.6	17.7	16.4	15.9	15.2	14.4	13.5	14.6	16.3	19.0	21.4	24.6	27.6	29.0	29.0	28.5	28.2	26.9	26.1	25.0	23.4	22.8	21.4	29.0																						
23-Sep	21.1	20.5	19.6	18.4	17.0	17.1	15.8	14.5	14.0	14.6	15.4	17.4	18.6	19.2	19.9	20.6	20.9	20.7	20.0	20.0	19.6	18.3	16.2	15.5	18.1	21.1																						
24-Sep	14.7	13.4	12.4	11.3	10.5	9.9	9.9	10.1	10.8	11.8	13.1	14.8	16.4	17.4	18.0	18.6	19.5	19.7	19.2	18.6	18.6	16.8	15.3	15.1	14.8	19.7																						
25-Sep	14.3	13.6	13.2	12.7	12.0	11.1	10.8	10.7	9.9	9.7	10.0	10.7	10.5	10.4	10.6	10.4	10.5	10.3	9.6	9.0	8.5	8.2	7.8	7.5	10.5	14.3																						
26-Sep	7.4	7.3	6.9	6.5	6.2	5.9	5.7	5.2	5.0	5.0	4.9	4.8	4.8	4.6	4.5	4.5	4.2	3.9	3.3	2.8	2.5	2.2	2.0	2.1	4.7	7.4																						
27-Sep	2.2	2.8	3.3	3.7	3.8	4.0	4.0	4.0	4.1	4.6	5.4	5.6	6.5	7.0	7.5	8.3	8.3	8.1	8.0	8.0	7.8	6.9	5.1	4.1	5.5	8.3																						
28-Sep	3.3	2.4	2.0	1.5	2.4	3.1	3.6	4.1	4.6	5.6	7.2	8.9	10.3	11.8	12.7	12.9	13.1	12.9	12.2	11.5	10.8	10.1	9.6	9.3	7.7	13.1																						
29-Sep	9.3	9.5	9.5	9.0	8.3	7.7	6.4	6.2	6.9	8.2	10.3	11.6	13.9	16.3	17.7	17.4	16.2	15.4	14.8	13.1	12.2	11.5	11.3	10.9	11.4	17.7																						
30-Sep	10.7	10.7	10.3	10.2	9.8	9.3	8.8	8.7	9.0	9.4	10.1	10.1	10.2	10.7	11.4	12.1	11.7	10.7	10.1	9.4	8.7	8.3	8.1	7.4	9.8	12.1																						
																								9.2	8.7	8.3	8.0	7.7	7.4	7.1	7.0	7.3	8.3	9.6	10.8	11.9	12.9	13.5	13.7	13.7	13.2	12.7	12.2	11.7	11.0	10.2	9.6	Diurnal Average
																								21.1	20.5	19.6	18.4	17.0	17.1	15.8	14.5	14.0	15.9	19.0	20.7	23.1	25.3	27.6	29.0	29.0	28.5	28.2	26.9	26.1	25.0	23.4	22.8	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature 90 m (AT90m) - C
Mannix - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature 90 m (AT90m) - C
Mannix - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	3	0.42	0.42
0 - 10	364	50.56	50.97
10 - 20	320	44.44	95.42
> 20	33	4.58	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

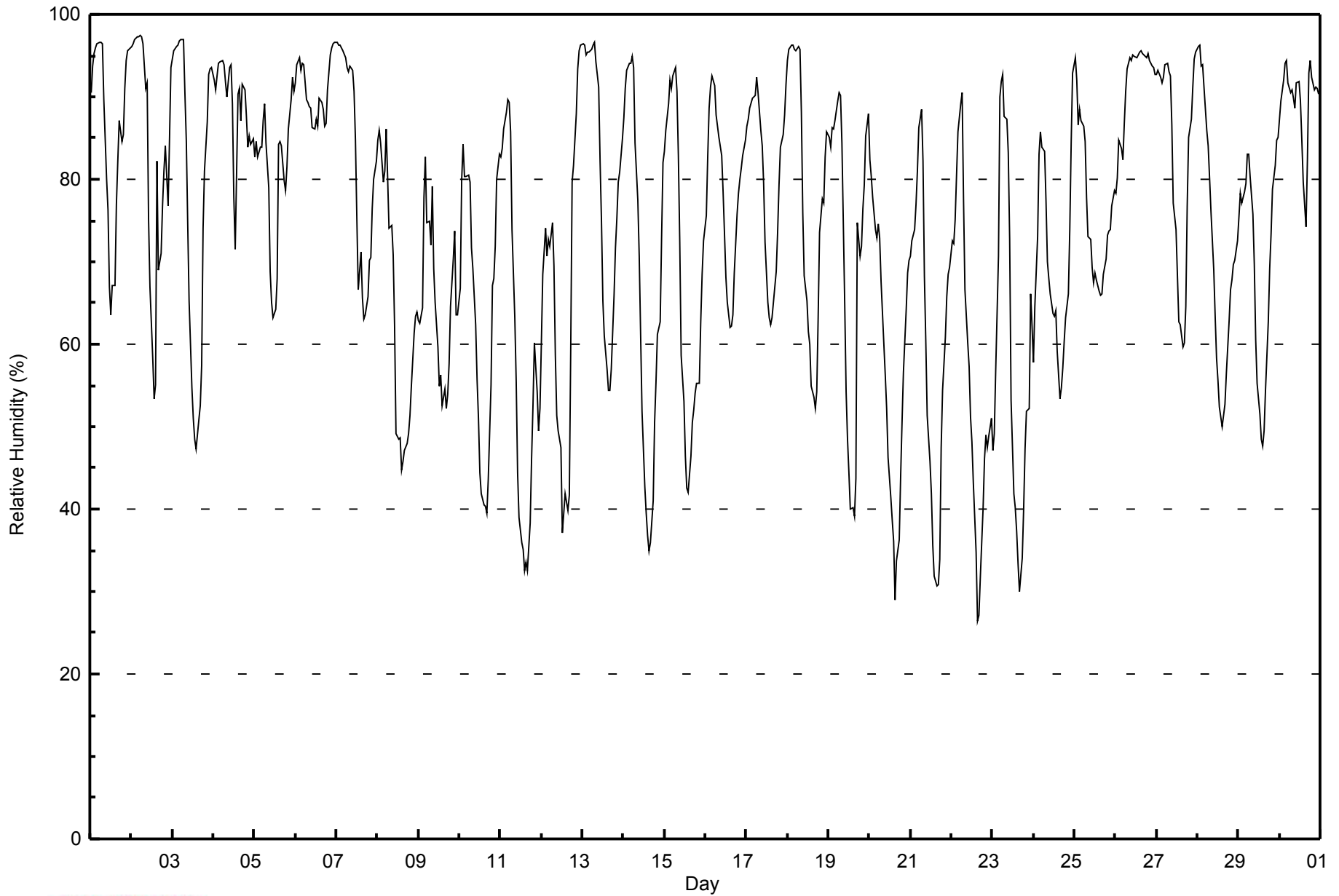
Mannix - September 2014

Maximum Value: 97 % on Sep 2 06:00															Maximum Daily Average: 91.4 % on Sep 26															Hours in Service: 720	
Minimum Value: 26 % on Sep 22 16:00															Minimum Daily Average: 57.2 % on Sep 22															Hours of Data: 720	
Maximum Diurnal Average: 88.9 % at hour 6															Minimum Diurnal Average: 55.8 % at hour 15															Hours of Missing Data: 0	
Monthly Average: 73.8 %															Percentiles: P ₁ = 32 P ₁₀ = 47 Q ₁ = 62 Median = 77 Q ₃ = 90 P ₉₀ = 94 P ₉₉ = 97															Hours of Calibration: 0	
																														Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Sep	90	94	95	96	96	97	97	96	90	80	76	67	64	67	67	77	82	87	85	85	91	94	96	96	86.1	97					
2-Sep	96	96	97	97	97	97	97	96	91	92	75	67	58	53	55	82	69	71	77	81	84	77	85	94	82.8	97					
3-Sep	95	96	96	96	97	97	97	91	85	75	65	55	51	48	47	51	52	57	74	81	87	93	93	94	78.0	97					
4-Sep	92	91	93	94	94	94	94	92	90	94	89	78	72	90	91	87	91	91	88	84	85	84	85	85	89.0	94					
5-Sep	83	85	83	84	84	87	89	84	79	69	65	63	64	68	84	85	84	80	79	82	86	90	92	91	80.8	92					
6-Sep	92	94	95	93	94	94	90	89	89	89	86	86	87	86	90	89	88	86	87	91	95	96	97	97	90.8	97					
7-Sep	97	96	96	96	96	95	94	93	94	93	91	85	75	67	71	66	63	64	66	70	71	77	80	82	82.3	97					
8-Sep	85	86	84	80	81	86	80	74	74	71	62	49	49	49	45	46	47	48	49	51	55	61	63	64	64.1	86					
9-Sep	63	63	64	78	83	75	75	72	79	69	65	60	55	56	53	55	52	54	58	65	70	74	64	64	65.1	83					
10-Sep	67	80	84	80	80	80	80	72	69	62	56	51	44	42	41	40	40	44	55	67	68	72	80	83	64.0	84					
11-Sep	83	84	86	88	90	89	86	74	63	55	44	39	36	35	33	34	33	38	46	52	60	54	49	52	58.5	90					
12-Sep	60	68	74	71	73	72	75	69	59	51	50	47	37	40	42	40	42	59	80	82	88	93	96	96	65.1	96					
13-Sep	96	96	95	95	95	96	96	97	94	91	82	75	65	61	57	54	54	57	66	72	75	80	81	85	79.9	97					
14-Sep	87	91	93	94	94	95	94	84	77	71	61	52	43	40	37	35	36	41	50	55	61	63	73	82	67.1	95					
15-Sep	83	86	89	92	91	93	94	91	83	72	59	53	46	43	42	46	51	52	54	55	55	63	69	73	68.1	94					
16-Sep	76	83	89	91	93	91	88	86	85	83	78	73	68	65	62	62	64	69	76	78	80	81	83	85	78.7	93					
17-Sep	86	87	89	90	90	90	92	90	86	84	80	72	65	63	62	63	65	69	73	79	84	85	88	92	80.3	92					
18-Sep	94	96	96	96	96	96	96	96	88	76	68	65	62	60	55	54	52	54	63	74	78	77	83	86	77.5	96					
19-Sep	85	84	86	86	87	89	90	90	84	65	54	48	44	40	40	39	44	75	71	72	76	79	85	88	71.0	90					
20-Sep	82	80	78	74	73	75	73	68	60	56	52	46	41	39	36	29	34	36	44	50	57	64	69	70	57.8	82					
21-Sep	71	73	74	77	81	86	88	82	68	60	51	46	42	36	32	31	31	34	47	54	61	66	69	69	59.6	88					
22-Sep	73	72	75	81	86	89	90	77	67	60	57	51	48	43	35	26	27	32	40	46	49	48	49	51	57.2	90					
23-Sep	47	49	57	71	90	92	93	88	87	83	73	53	42	40	37	33	30	34	40	47	52	52	66	62	59.1	93					
24-Sep	58	65	73	83	86	84	83	77	70	68	66	64	63	64	59	53	55	57	60	63	66	74	84	93	69.6	93					
25-Sep	95	92	87	88	87	86	85	78	73	73	69	67	69	68	66	66	66	69	70	73	74	74	77	79	76.3	95					
26-Sep	78	80	85	84	82	87	91	93	95	94	95	95	95	95	95	96	95	95	95	95	94	94	94	93	91.4	96					
27-Sep	93	93	92	92	92	94	94	93	92	87	77	74	68	63	62	60	60	65	77	85	87	91	95	95	82.6	95					
28-Sep	96	96	94	94	91	86	84	80	76	69	63	58	56	52	50	51	53	56	63	67	68	70	70	73	71.5	96					
29-Sep	75	78	77	79	80	83	83	80	76	70	61	55	52	49	48	49	54	63	69	73	79	82	85	85	70.2	85					
30-Sep	87	89	92	94	94	92	91	91	90	89	92	92	90	85	80	74	82	93	94	92	91	91	91	90	89.4	94					
82.2															84.1															Diurnal Average	
97															96															Diurnal Maximum	
85.6															87.1																
88.4															88.9																
88.6															84.8																
80.5															75.0																
69.0															63.3																
58.6															56.2																
55.8															55.9																
56.4															61.0																
66.6															70.9																
74.2															76.7																
79.6															81.5																



WBEA
Hourly Averages

Relative Humidity (RH) - %
Mannix - September 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Mannix - September 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	35	4.86	4.86
40 - 60	131	18.19	23.06
60 - 80	224	31.11	54.17
80 - 100	330	45.83	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

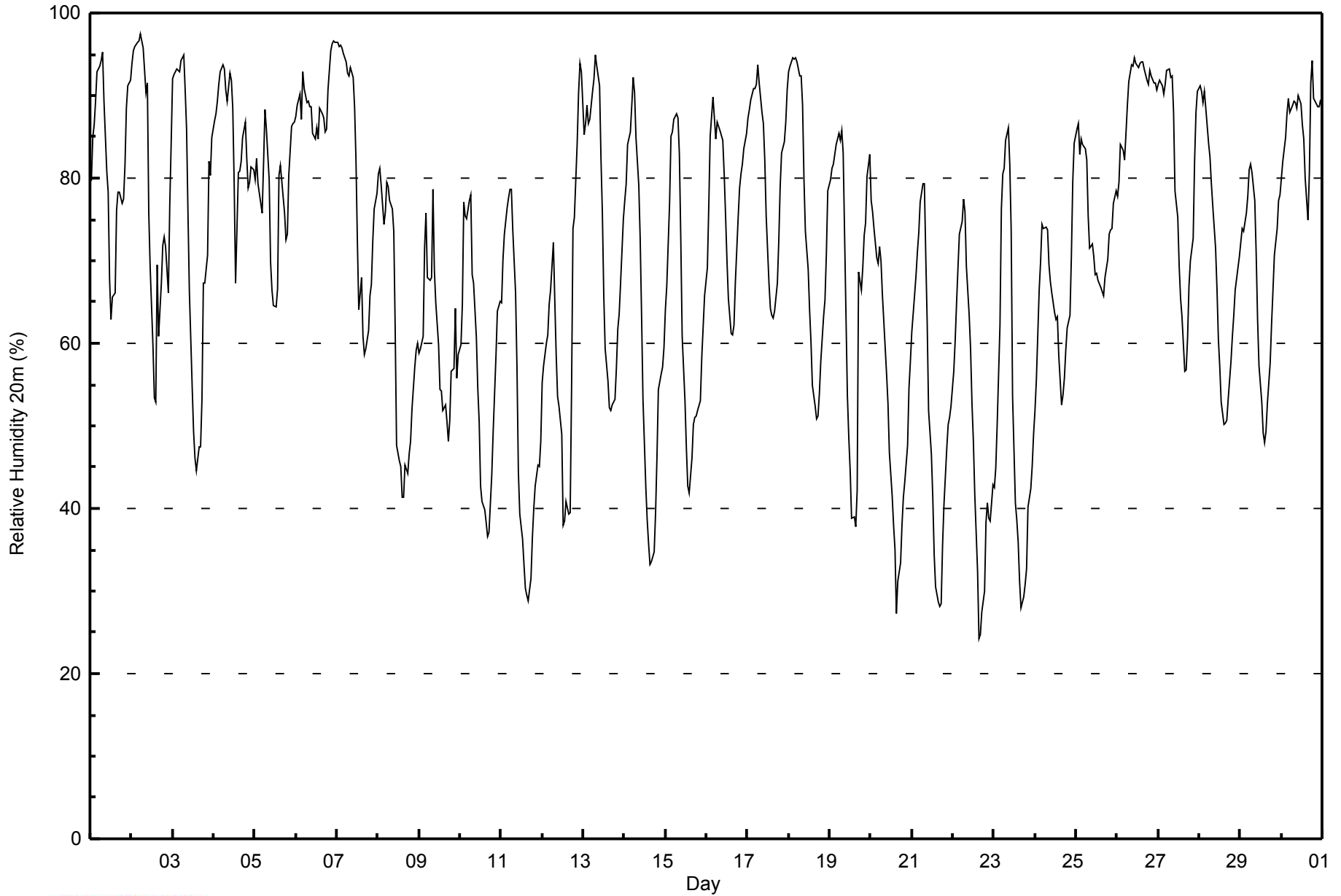


Maximum Value: 97 % on Sep 2 06:00																			Maximum Daily Average: 90.0 % on Sep 26						Hours in Service: 720																			
Minimum Value: 24 % on Sep 22 16:00																			Minimum Daily Average: 51.0 % on Sep 22						Hours of Data: 720																			
Maximum Diurnal Average: 85.0 % at hour 7																			Minimum Diurnal Average: 53.5 % at hour 16						Hours of Missing Data: 0																			
Monthly Average: 70.2 %																			Percentiles: P ₁ = 29 P ₁₀ = 43 Q ₁ = 57 Median = 73 Q ₃ = 86 P ₉₀ = 92 P ₉₉ = 96						Hours of Calibration: 0																			
																									Percent Operational Time: 100.0																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Sep	80	85	86	89	93	94	94	95	89	81	78	68	63	66	66	76	78	78	77	77	82	88	91	92	82.0	95																		
2-Sep	94	95	96	96	97	97	97	96	90	92	76	69	60	53	53	70	61	67	72	73	72	66	77	84	79.3	97																		
3-Sep	92	93	93	93	93	94	95	91	86	76	66	55	49	46	45	47	47	53	67	67	71	82	80	85	73.6	95																		
4-Sep	87	88	89	91	93	94	93	91	89	93	92	88	79	67	81	81	82	85	87	82	79	79	81	81	85.5	94																		
5-Sep	80	82	79	77	76	82	88	86	80	70	66	65	64	67	80	82	80	76	72	73	80	86	87	87	77.7	88																		
6-Sep	87	89	90	87	93	91	89	89	89	89	85	85	86	85	88	88	87	86	86	91	95	96	97	96	89.4	97																		
7-Sep	96	96	96	96	95	94	93	92	93	92	89	82	72	64	68	61	59	59	61	66	67	72	76	78	80.0	96																		
8-Sep	80	81	79	74	76	79	79	77	76	74	62	48	46	45	41	41	45	44	47	48	52	57	59	60	61.3	81																		
9-Sep	59	59	61	72	76	68	68	68	79	69	65	60	54	54	52	52	51	48	51	57	57	64	56	59	60.7	79																		
10-Sep	60	65	77	75	75	77	78	68	67	61	55	51	43	41	40	38	37	37	44	49	54	59	64	65	57.5	78																		
11-Sep	65	70	73	76	78	79	79	74	66	57	44	39	36	33	30	29	29	32	36	40	43	45	45	48	52.0	79																		
12-Sep	55	57	60	61	65	66	72	65	59	54	52	49	38	39	41	39	39	55	74	75	84	90	94	93	61.5	94																		
13-Sep	85	87	89	87	87	90	92	95	94	91	82	76	66	59	55	52	52	53	53	57	62	64	67	75	73.7	95																		
14-Sep	77	79	84	86	89	92	90	85	79	73	63	53	43	39	36	33	34	35	39	46	54	56	57	59	61.8	92																		
15-Sep	64	67	77	85	86	87	88	87	83	73	61	53	47	43	42	46	50	51	51	52	53	58	62	66	63.8	88																		
16-Sep	69	77	85	88	90	85	87	86	86	85	80	75	70	65	61	61	62	68	75	79	80	82	84	85	77.7	90																		
17-Sep	87	88	90	91	91	91	94	91	88	87	82	76	67	64	63	63	64	67	72	79	83	84	87	91	80.9	94																		
18-Sep	93	94	95	94	95	94	92	92	89	80	73	69	64	60	55	52	51	51	54	58	63	65	71	78	74.3	95																		
19-Sep	80	81	82	83	84	85	85	86	83	63	54	49	45	39	39	38	42	69	67	69	73	75	80	83	68.0	86																		
20-Sep	77	76	74	70	70	72	70	66	60	56	53	47	41	38	35	27	31	33	38	41	43	48	55	58	53.3	77																		
21-Sep	61	64	68	71	73	77	79	79	70	62	52	47	41	34	30	29	28	28	36	40	47	50	51	52	53.0	79																		
22-Sep	57	60	65	69	73	75	77	76	69	63	59	53	48	42	32	24	25	27	30	38	41	39	39	43	51.0	77																		
23-Sep	42	45	50	62	76	80	81	84	86	82	74	53	41	39	36	31	28	29	31	33	40	42	45	49	52.5	86																		
24-Sep	52	56	66	70	74	74	74	69	67	66	64	63	63	58	53	54	56	59	62	63	70	80	84	84	65.5	84																		
25-Sep	86	87	83	85	84	84	82	75	71	72	71	68	69	68	67	66	66	68	70	73	74	74	77	78	74.9	87																		
26-Sep	78	79	84	83	82	86	89	92	94	93	95	94	93	94	94	94	93	92	91	93	92	92	91	91	90.0	95																		
27-Sep	91	92	91	90	91	93	93	92	92	88	79	75	69	65	63	57	57	61	67	70	73	82	88	90	79.6	93																		
28-Sep	91	91	89	90	89	84	83	79	77	72	67	60	57	53	50	50	51	53	58	61	63	66	68	71	69.7	91																		
29-Sep	72	74	74	76	78	81	82	81	77	71	63	57	53	49	48	49	53	58	62	66	71	74	77	78	67.6	82																		
30-Sep	80	82	85	88	90	88	89	89	89	89	90	89	86	85	80	75	81	91	94	90	89	89	89	90	86.9	94																		
																			76.0	77.9	80.4	81.9	83.7	84.5	85.0	83.5	80.7	75.7	69.8	63.9	58.5	55.3	54.4	53.5	53.8	57.0	60.8	63.6	66.7	69.9	72.5	75.0	Diurnal Average	
																			96	96	96	96	97	97	97	96	94	93	95	94	93	94	94	94	93	92	94	93	95	96	97	96	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity 20m (RH20m) - %
Mannix - September 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity 20m (RH20m) - %
Mannix - September 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	52	7.22	7.22
40 - 60	155	21.53	28.75
60 - 80	256	35.56	64.31
80 - 100	257	35.69	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

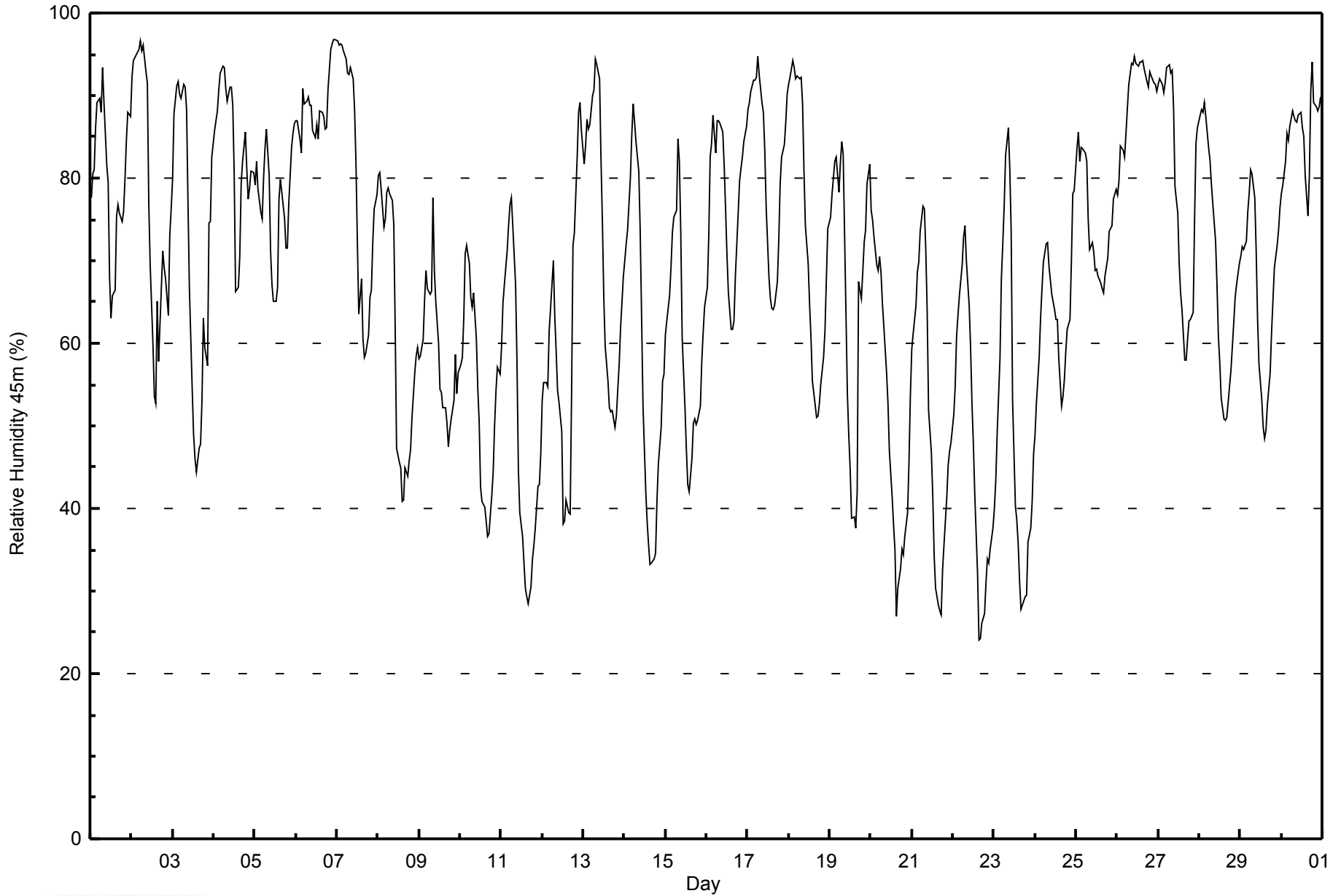


Maximum Value: 97 % on Sep 6 23:00																	Maximum Daily Average: 90.0 % on Sep 26																	Hours in Service: 720	
Minimum Value: 24 % on Sep 22 16:00																	Minimum Daily Average: 48.1 % on Sep 22																	Hours of Data: 720	
Maximum Diurnal Average: 82.8 % at hour 7																	Minimum Diurnal Average: 53.1 % at hour 16																	Hours of Missing Data: 0	
Monthly Average: 68.7 %																	Percentiles: P ₁ = 28 P ₁₀ = 41 Q ₁ = 55 Median = 71 Q ₃ = 84 P ₉₀ = 91 P ₉₉ = 96																	Hours of Calibration: 0	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Sep	78	81	81	86	89	90	88	93	89	82	80	68	63	66	67	75	77	76	75	76	80	85	88	88	79.9	93									
2-Sep	92	94	95	95	96	97	95	96	93	92	77	69	60	54	53	65	58	67	71	69	68	63	73	76	77.8	97									
3-Sep	80	88	91	92	90	90	91	91	88	77	67	55	49	46	44	47	48	53	63	60	57	75	75	83	70.8	92									
4-Sep	86	87	88	91	93	94	93	91	89	91	91	89	81	66	67	71	79	82	86	81	77	79	81	81	83.8	94									
5-Sep	79	82	79	76	75	80	84	86	80	71	67	65	65	67	77	80	78	75	72	72	77	84	85	87	76.8	87									
6-Sep	87	87	85	83	91	89	89	90	89	89	86	85	86	85	88	88	87	86	86	91	96	96	97	97	88.8	97									
7-Sep	97	96	96	96	95	94	93	93	93	92	88	82	72	64	68	61	58	59	61	66	66	72	76	78	79.9	97									
8-Sep	80	81	79	74	75	78	79	78	77	74	62	47	46	45	41	41	45	44	46	47	51	56	58	59	61.0	81									
9-Sep	58	58	61	65	69	67	66	66	78	69	65	60	54	54	52	52	50	47	50	51	53	59	54	56	58.9	78									
10-Sep	57	58	63	71	72	70	66	64	66	61	55	50	42	41	40	38	37	37	42	44	50	54	57	56	53.8	72									
11-Sep	60	65	67	71	74	77	78	74	67	58	45	39	37	33	30	29	29	30	34	35	37	43	43	47	50.1	78									
12-Sep	53	55	55	55	61	64	70	63	59	54	53	49	38	38	41	39	39	54	72	73	83	88	89	86	59.7	89									
13-Sep	82	84	87	86	86	90	91	94	94	92	82	75	66	60	55	52	52	52	50	51	54	57	62	68	71.8	94									
14-Sep	70	72	74	80	85	89	87	84	81	74	63	53	42	38	36	33	33	34	35	41	45	50	55	56	58.8	89									
15-Sep	61	63	66	69	73	75	76	85	82	73	61	52	47	43	42	46	50	51	50	51	52	58	61	64	60.5	85									
16-Sep	67	73	83	84	88	83	87	87	87	86	81	76	71	66	62	62	63	68	76	80	81	82	84	86	77.6	88									
17-Sep	88	89	91	92	92	92	95	93	89	88	83	76	68	65	64	64	65	68	73	79	83	84	87	90	81.5	95									
18-Sep	91	92	94	93	92	92	92	92	89	81	74	70	65	61	55	53	51	51	53	55	58	61	68	74	73.3	94									
19-Sep	75	78	80	82	83	78	82	84	83	64	54	49	45	39	39	38	42	67	65	69	72	74	79	82	66.8	84									
20-Sep	76	75	73	70	69	71	69	65	59	56	53	47	41	38	35	27	30	33	35	34	37	39	46	54	51.3	76									
21-Sep	59	61	65	69	70	74	77	76	71	64	52	47	41	34	30	28	28	27	32	36	41	45	47	48	51.0	77									
22-Sep	51	55	61	63	66	69	73	74	70	65	60	53	48	42	32	24	24	26	27	31	34	33	35	38	48.1	74									
23-Sep	40	43	49	58	68	72	77	83	86	81	74	53	40	39	36	31	28	29	29	29	36	38	41	47	50.3	86									
24-Sep	49	53	58	63	67	70	72	72	69	68	66	64	63	63	58	52	54	56	59	62	63	70	78	78	63.6	78									
25-Sep	84	86	82	84	84	83	82	75	71	72	71	69	69	68	67	67	66	68	70	74	74	77	79	79	74.8	86									
26-Sep	78	80	84	83	83	85	89	91	94	94	95	94	94	94	94	94	93	92	91	93	92	91	91	91	90.0	95									
27-Sep	91	92	91	90	91	93	94	93	93	88	79	76	70	66	64	58	58	61	63	63	64	75	84	86	78.5	94									
28-Sep	88	88	88	89	87	84	82	79	77	72	67	61	58	53	51	51	51	53	57	60	62	66	67	70	69.2	89									
29-Sep	71	72	71	72	76	78	81	81	78	71	63	57	53	50	48	50	53	56	61	65	69	72	74	76	66.6	81									
30-Sep	78	79	82	85	85	86	88	87	87	87	88	88	86	85	80	75	80	90	94	89	89	88	89	90	85.7	94									
73.5 75.6 77.2 79.0 80.8 81.8 82.8 82.8 81.0 76.2 70.0 64.0 58.6 55.4 53.9 53.1 53.5 56.4 59.2 60.9 63.4 67.1 70.1 72.3																								Diurnal Average											
97 96 96 96 96 97 95 96 94 94 95 94 94 94 94 94 94 93 92 94 93 96 96 97 97																								Diurnal Maximum											



WBEA
Hourly Averages

Relative Humidity 45m (RH45m) - %
Mannix - September 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity 45m (RH45m) - %
Mannix - September 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	61	8.47	8.47
40 - 60	163	22.64	31.11
60 - 80	261	36.25	67.36
80 - 100	235	32.64	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

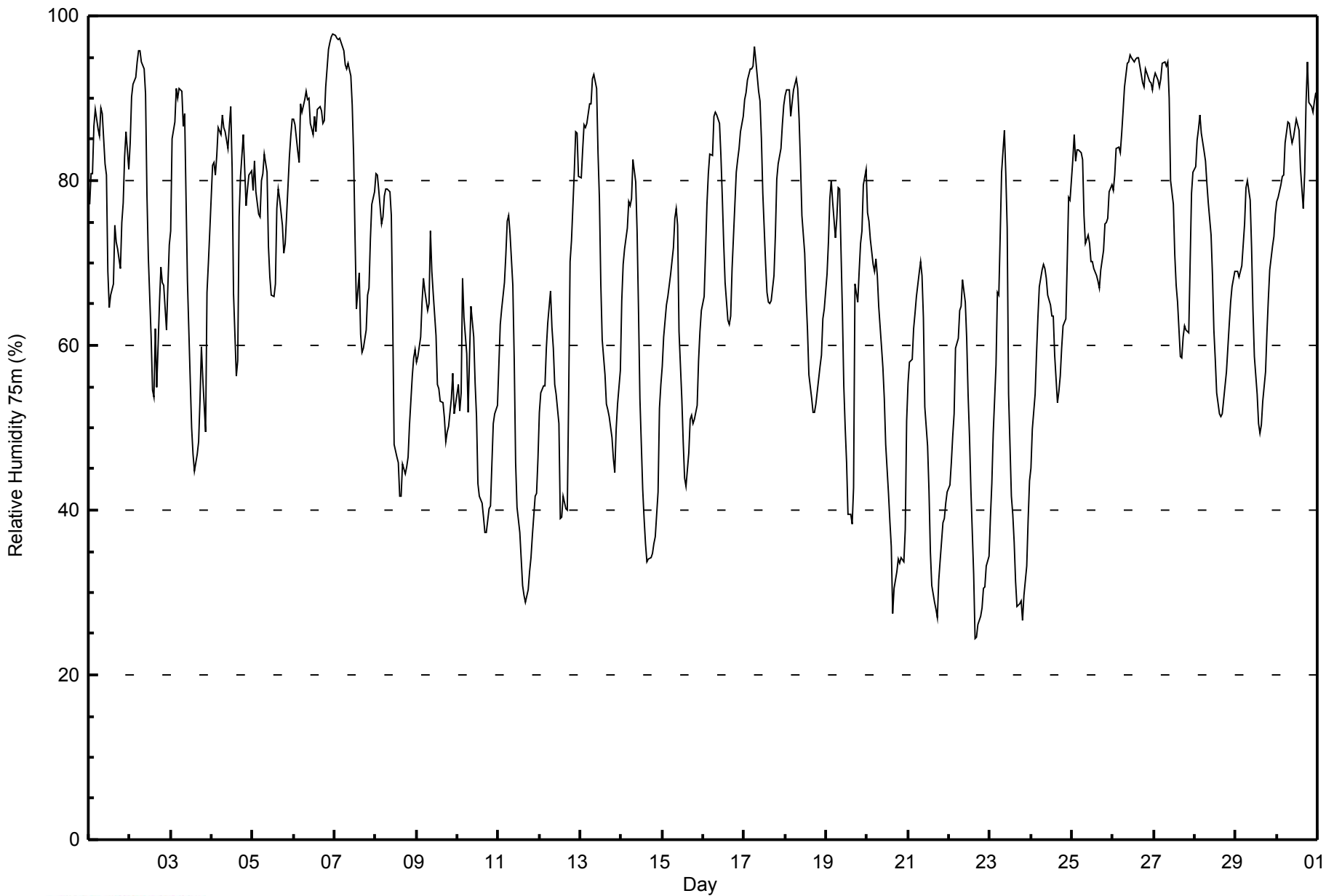


Maximum Value: 98 % on Sep 7 00:00																			Maximum Daily Average: 90.5 % on Sep 26						Hours in Service: 720			Daily Average	Daily Maximum
Minimum Value: 24 % on Sep 22 16:00																			Minimum Daily Average: 44.6 % on Sep 22						Hours of Data: 720			78.4	89
Maximum Diurnal Average: 80.8 % at hour 8																			Minimum Diurnal Average: 53.1 % at hour 16						Hours of Missing Data: 0			76.2	96
Monthly Average: 67.8 %																			Percentiles: P ₁ = 28 P ₁₀ = 42 Q ₁ = 54 Median = 69 Q ₃ = 83 P ₉₀ = 90 P ₉₉ = 97						Hours of Calibration: 0			68.8	91
																			Percent Operational Time: 100.0						80.1	89			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Sep	77	81	81	87	89	86	85	89	88	82	81	69	65	66	67	75	73	72	69	75	77	83	86	81	78.4	89			
2-Sep	85	90	92	93	94	96	96	94	93	91	78	71	61	55	54	62	55	65	70	68	67	62	67	72	76.2	96			
3-Sep	74	85	87	91	90	91	91	87	88	78	68	56	50	47	45	47	48	53	60	56	50	66	70	74	68.8	91			
4-Sep	82	82	81	83	86	86	88	86	86	84	87	89	81	66	56	58	76	81	86	81	77	79	81	81	80.1	89			
5-Sep	79	82	79	76	76	80	81	83	81	72	68	66	66	67	77	79	78	75	71	72	76	83	85	87	76.6	87			
6-Sep	87	87	84	82	89	88	90	91	90	90	87	86	88	86	89	89	88	87	87	91	96	97	97	98	89.4	98			
7-Sep	98	97	97	97	97	96	94	94	94	93	89	83	73	64	69	61	59	60	62	66	67	73	77	79	80.8	98			
8-Sep	81	81	79	75	76	78	79	79	79	76	63	48	47	46	42	42	46	44	45	46	50	56	58	59	61.4	81			
9-Sep	58	59	61	65	68	67	64	65	74	69	66	61	55	55	53	53	51	48	49	50	54	57	52	53	58.6	74			
10-Sep	55	52	54	68	63	59	52	59	65	61	55	51	43	42	41	39	37	37	40	40	46	51	52	53	50.7	68			
11-Sep	58	63	64	68	71	75	76	74	67	58	46	40	37	34	31	30	29	30	32	34	37	42	42	46	49.3	76			
12-Sep	52	54	55	55	60	63	67	62	60	55	54	50	39	39	42	40	40	54	70	73	81	86	86	80	59.0	86			
13-Sep	80	84	87	86	87	89	89	92	93	91	83	78	67	61	56	53	52	51	49	46	45	50	53	57	70.1	93			
14-Sep	65	70	72	74	77	77	78	83	80	74	64	54	42	39	36	34	34	34	35	36	37	42	52	55	56.0	83			
15-Sep	57	61	65	66	67	69	72	75	77	75	62	54	48	44	43	47	51	51	51	51	53	58	62	64	59.2	77			
16-Sep	66	71	77	81	83	83	88	88	88	87	83	78	72	68	63	63	64	69	77	81	83	84	86	88	77.9	88			
17-Sep	90	91	92	94	94	94	96	95	91	90	85	78	70	66	65	65	65	68	73	80	82	84	87	89	82.7	96			
18-Sep	90	91	91	88	89	91	92	91	87	82	76	71	66	62	56	53	52	52	53	54	57	59	63	64	72.2	92			
19-Sep	69	73	78	80	77	73	75	79	79	64	55	50	46	40	40	38	43	67	65	69	72	74	80	81	65.3	81			
20-Sep	76	75	73	70	69	71	68	65	60	57	54	48	42	39	36	27	31	33	34	34	34	34	38	51	50.7	76			
21-Sep	55	58	58	62	64	66	69	70	68	63	52	48	42	35	31	29	28	27	32	34	38	39	41	42	48.0	70			
22-Sep	43	46	49	52	60	61	64	65	68	65	61	54	49	43	32	24	25	26	27	28	30	31	33	34	44.6	68			
23-Sep	39	43	49	58	66	66	73	81	86	81	74	54	42	40	36	31	28	29	29	27	30	33	39	44	49.1	86			
24-Sep	45	50	54	59	63	67	69	70	69	68	66	65	64	64	59	53	54	56	60	62	63	70	78	78	62.8	78			
25-Sep	83	86	82	84	84	83	83	76	72	73	72	70	70	69	68	68	67	69	71	75	75	75	79	80	75.6	86			
26-Sep	79	81	84	84	83	86	88	91	94	94	95	95	94	95	95	95	94	92	91	94	93	92	92	91	90.5	95			
27-Sep	92	93	92	91	92	94	94	94	94	90	80	77	71	67	65	59	58	61	62	62	62	70	78	81	78.4	94			
28-Sep	82	85	86	88	86	84	82	80	77	73	68	62	58	54	52	51	52	53	57	60	63	65	67	69	68.9	88			
29-Sep	69	69	68	70	72	75	79	80	78	72	64	59	54	51	49	50	53	57	61	66	69	72	73	76	66.1	80			
30-Sep	77	78	79	80	81	85	87	87	86	85	85	88	87	86	82	77	81	89	94	90	89	88	90	91	85.0	94			
																			71.5						Diurnal Average				
																			98						Diurnal Maximum				



WBEA
Hourly Averages

Relative Humidity 75m (RH75m) - %
Mannix - September 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity 75m (RH75m) - %
Mannix - September 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	66	9.17	9.17
40 - 60	173	24.03	33.19
60 - 80	258	35.83	69.03
80 - 100	223	30.97	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

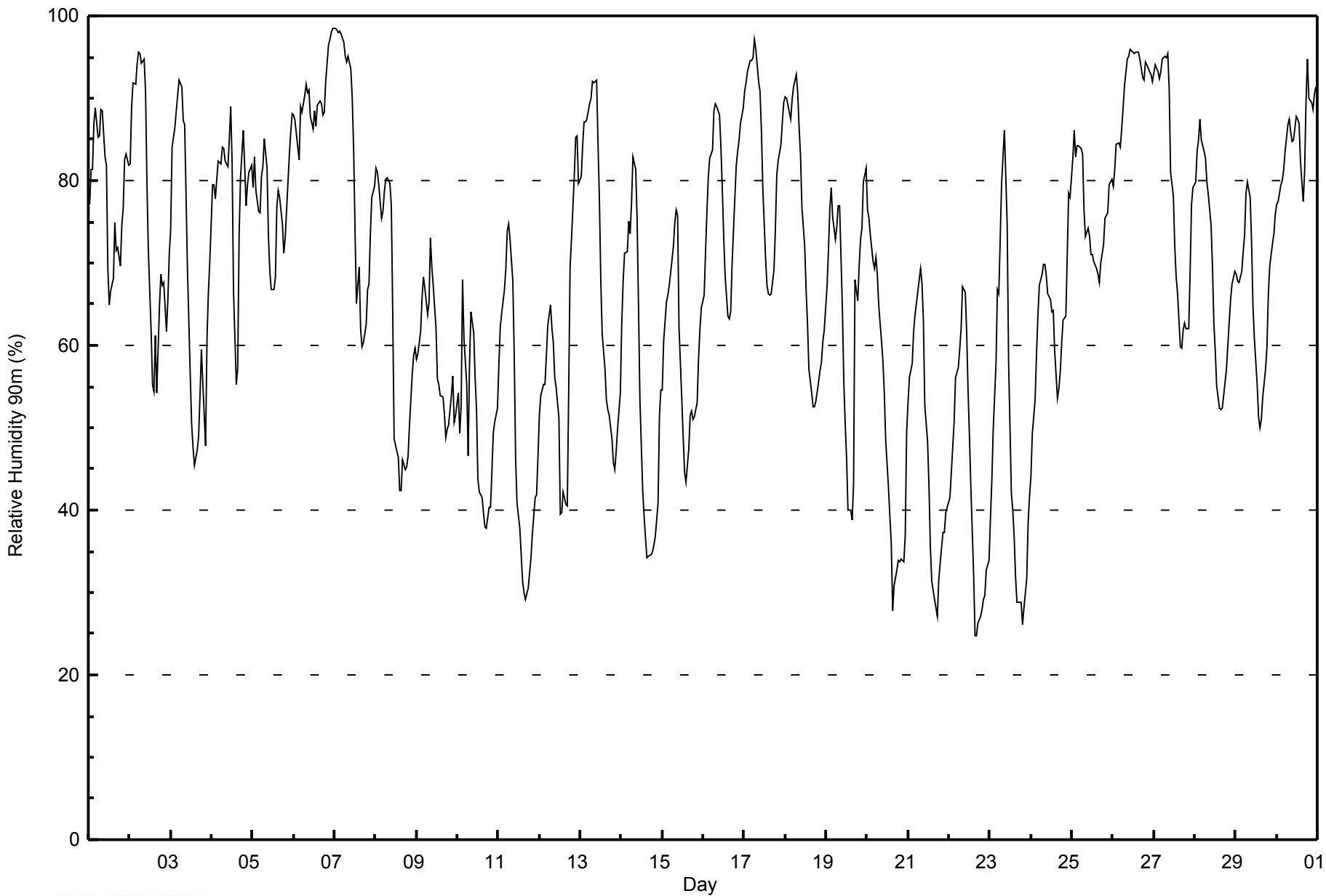


Maximum Value: 99 % on Sep 7 00:00														Maximum Daily Average: 91.2 % on Sep 26														Hours in Service: 720	
Minimum Value: 25 % on Sep 22 16:00														Minimum Daily Average: 43.7 % on Sep 22														Hours of Data: 720	
Maximum Diurnal Average: 80.7 % at hour 8														Minimum Diurnal Average: 53.6 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 67.8 %														Percentiles: P ₁ = 28 P ₁₀ = 41 Q ₁ = 54 Median = 69 Q ₃ = 83 P ₉₀ = 91 P ₉₉ = 98														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Sep	77	81	81	87	89	85	86	89	88	83	82	69	65	67	68	75	72	72	70	75	77	83	83	82	78.5	89			
2-Sep	82	89	92	92	94	96	95	94	95	91	80	71	62	55	54	61	54	65	69	67	68	62	66	71	76.0	96			
3-Sep	74	84	86	89	90	92	91	87	87	78	69	57	51	48	45	47	49	54	60	56	48	61	66	70	68.3	92			
4-Sep	79	80	78	80	82	82	84	84	82	82	85	89	82	66	55	57	73	80	86	82	77	80	81	82	78.7	89			
5-Sep	79	83	79	76	76	80	82	85	82	73	69	67	67	68	77	79	78	75	71	73	76	83	86	88	77.2	88			
6-Sep	88	87	84	82	89	88	90	92	91	91	88	86	89	87	89	90	89	88	88	92	96	97	98	99	89.9	99			
7-Sep	99	98	98	98	98	97	95	94	95	94	90	84	74	65	70	62	60	60	62	67	67	74	78	79	81.6	99			
8-Sep	82	81	79	75	76	79	80	80	80	77	64	49	47	46	42	42	46	45	45	47	50	57	59	60	62.0	82			
9-Sep	58	59	62	66	68	67	64	65	73	70	67	62	56	55	54	54	52	49	50	50	54	56	51	51	58.9	73			
10-Sep	54	49	53	68	61	55	47	58	64	61	56	52	44	42	42	40	38	38	40	40	45	49	51	52	50.0	68			
11-Sep	58	62	64	67	69	74	75	73	68	59	46	41	38	35	31	30	29	31	32	34	37	41	42	46	49.3	75			
12-Sep	51	54	55	55	59	62	65	62	60	56	55	51	39	40	42	41	40	54	69	73	81	85	85	80	59.0	85			
13-Sep	81	84	87	87	88	89	90	92	92	85	78	68	61	57	53	52	52	49	46	45	47	50	54	54	69.9	92			
14-Sep	63	68	71	71	75	73	77	83	81	75	65	53	42	39	37	34	34	35	35	36	37	41	51	55	55.5	83			
15-Sep	55	61	65	66	67	69	72	75	76	76	62	53	49	45	43	47	52	52	51	51	53	58	62	65	59.4	76			
16-Sep	66	71	76	81	83	84	89	89	89	88	84	79	73	68	64	63	64	70	78	82	84	85	87	89	78.6	89			
17-Sep	91	92	93	95	95	95	97	96	92	91	86	79	70	67	66	66	66	69	74	81	82	84	87	90	83.5	97			
18-Sep	90	90	88	88	90	91	93	91	86	83	77	72	67	63	57	54	53	53	53	54	57	58	61	62	72.1	93			
19-Sep	67	72	77	79	76	73	74	77	77	64	56	51	46	40	40	39	43	68	65	70	73	74	80	82	65.1	82			
20-Sep	76	75	73	70	69	71	69	65	60	58	54	49	43	39	36	28	31	33	34	34	34	34	37	50	50.9	76			
21-Sep	53	56	58	62	64	65	68	69	67	63	53	48	43	35	31	29	28	27	32	34	37	37	40	40	47.5	69			
22-Sep	42	44	48	51	56	57	60	62	67	66	61	54	49	43	32	25	25	26	27	28	29	30	33	34	43.7	67			
23-Sep	39	44	50	58	67	66	73	80	86	81	75	58	42	40	37	32	29	29	29	26	28	32	38	42	49.1	86			
24-Sep	44	49	53	59	64	67	69	70	70	69	66	66	64	64	59	54	55	57	60	63	64	71	78	78	63.0	78			
25-Sep	83	86	83	84	84	84	83	76	73	74	73	71	71	70	69	69	68	70	72	75	76	76	79	80	76.3	86			
26-Sep	79	81	84	85	84	86	89	92	95	95	96	96	95	96	96	96	95	93	92	94	94	93	93	92	91.2	96			
27-Sep	93	94	93	92	93	95	95	95	95	91	81	78	72	68	66	60	60	62	63	62	62	69	77	79	79.0	95			
28-Sep	80	84	85	87	85	84	83	80	78	75	69	63	59	55	52	52	52	54	57	60	63	66	67	69	69.1	87			
29-Sep	69	68	68	69	71	73	79	80	78	73	65	61	55	51	50	51	54	57	60	66	70	72	74	76	66.2	80			
30-Sep	77	77	79	80	81	84	87	87	86	85	85	88	87	87	82	77	81	90	95	90	89	89	91	91	85.3	95			
																								Diurnal Average					
																								Diurnal Maximum					



WBEA
Hourly Averages

Relative Humidity 90m (RH90m) - %
Mannix - September 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity 90m (RH90m) - %
Mannix - September 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	64	8.89	8.89
40 - 60	172	23.89	32.78
60 - 80	264	36.67	69.44
80 - 100	220	30.56	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Table with columns for Day, Hourly Period Ending At (MST) (1-24), Daily Average, and Daily Maximum. Summary statistics include: Maximum Speed: 31 km/h on Sep 19 22:00, Minimum Speed Value: 1 km/h on Sep 1 20:00, Maximum Diurnal Speed Average: 2.9 km/h at hour 15, Monthly Average Velocity: 1.3 km/h 205.4 deg, Maximum Daily Speed Average: 18.2 km/h on Sep 28, Minimum Daily Speed Average: 0.7 km/h on Sep 23, Minimum Diurnal Speed Average: 0.4 km/h at hour 10, Percentiles: P1=1 P10=4 Q1=5 Median=8 Q3=13 P90=18 P99=26, Hours in Service: 720, Hours of Data: 720, Hours of Missing Data: 0, Percent Operational Time: 100.0.



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on Sep 19 17:00	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0
Minimum Value: 1 km/h on Sep 23 18:00	
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 8	

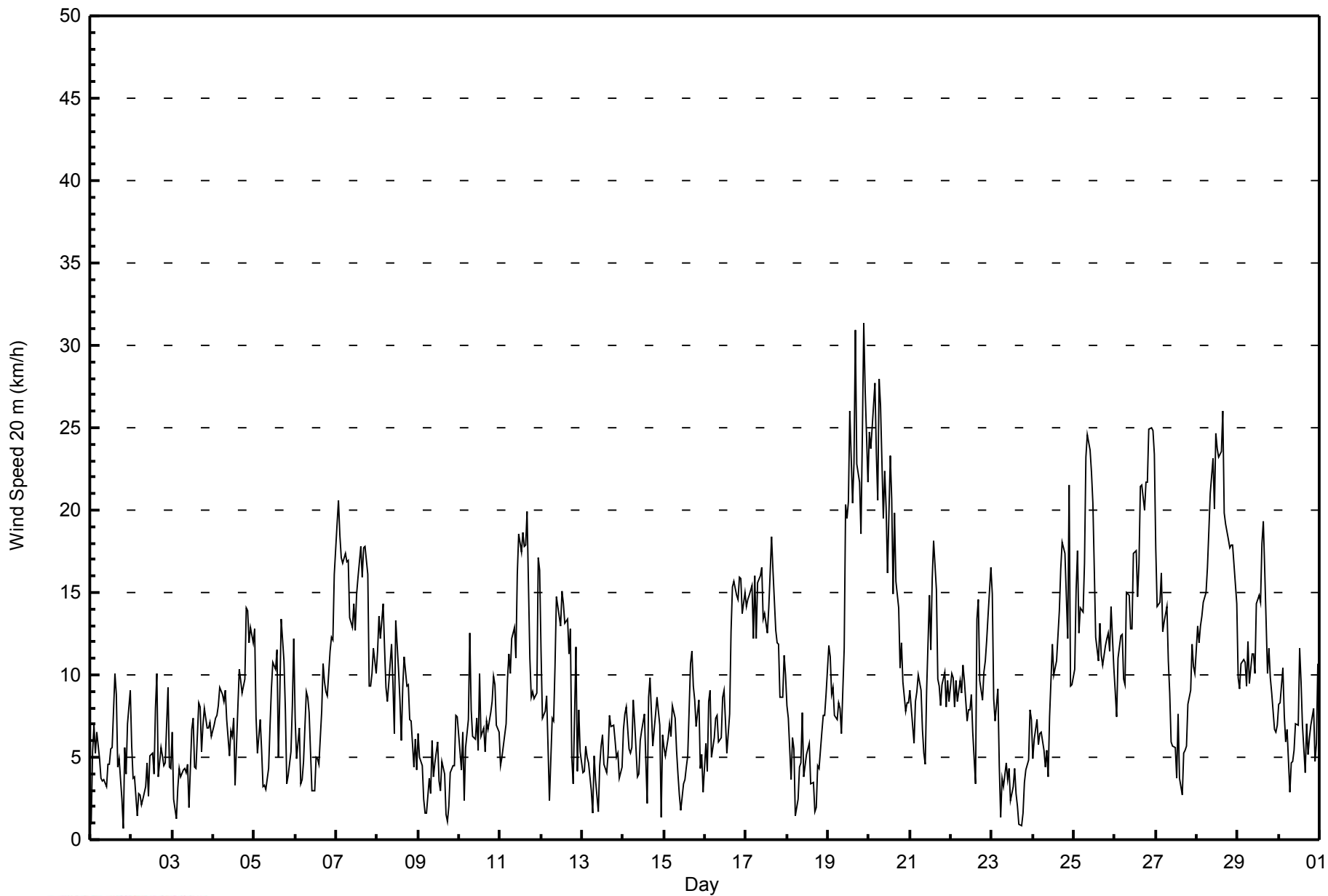
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	1	2	2	2	2	2	3	2	2	2	2	2	3	5	4	2	2	1	1	1	2	1	1	5	
2-Sep	3	2	1	1	2	2	1	2	1	2	3	3	3	5	5	2	3	2	3	3	3	2	1	5	
3-Sep	1	1	1	1	1	1	2	1	2	2	4	4	4	4	4	3	6	4	4	2	2	2	3	6	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

Diurnal Maximum



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	192	26.67	26.67
6 - 11	308	42.78	69.44
12 - 19	169	23.47	92.92
20 - 28	49	6.81	99.72
29 - 38	2	0.28	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

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

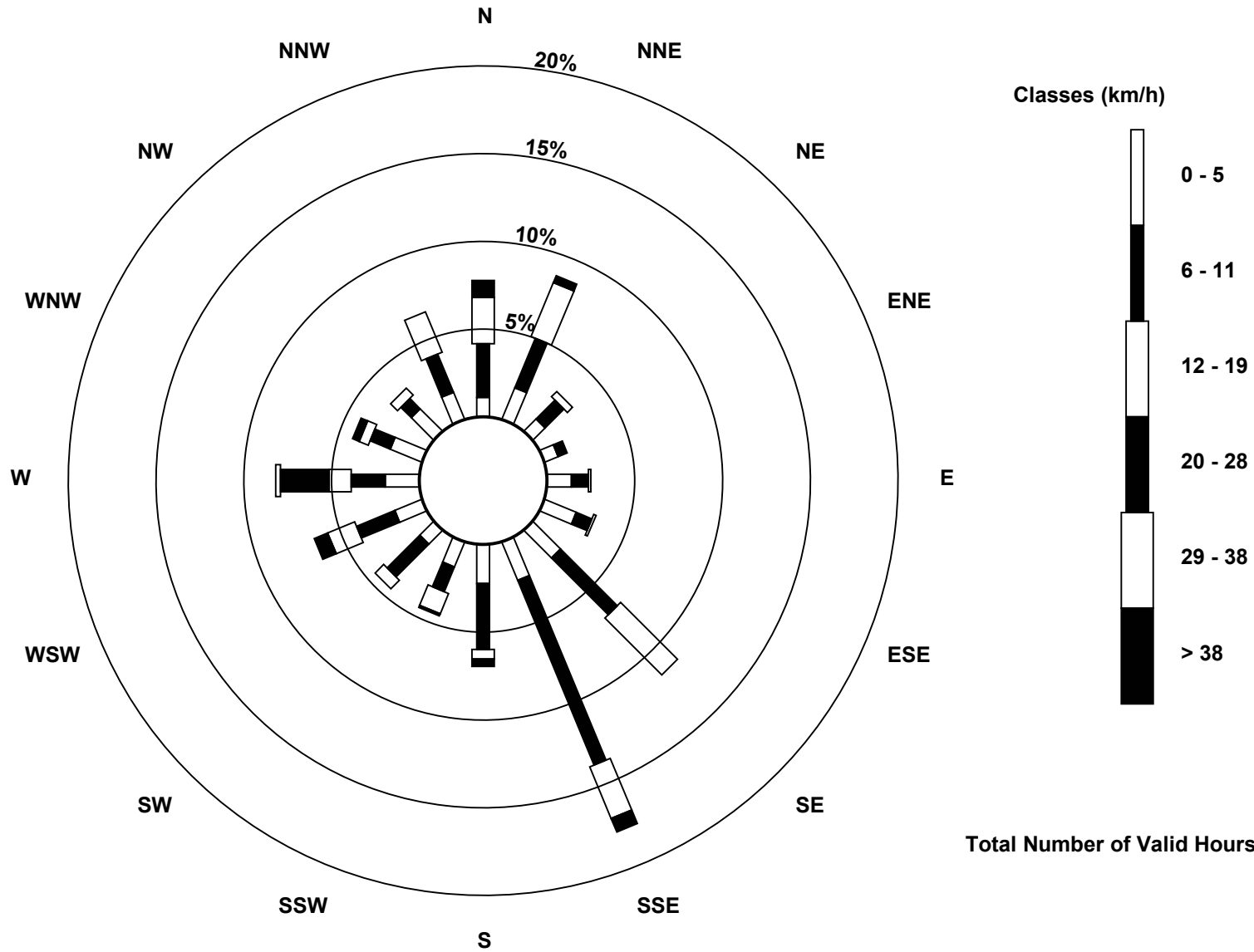
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	14	7	6	10	14	16	17	16	11	8	12	14	14	13	12	192
6 - 11	22	22	11	4	7	7	33	82	27	11	19	17	14	9	6	17	308
12 - 19	19	24	3	0	1	1	33	23	4	9	5	12	9	4	4	18	169
20 - 28	7	3	0	0	0	0	0	6	3	1	0	6	20	3	0	0	49
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	63	21	10	18	22	82	128	50	32	32	47	59	30	23	47	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

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





Maximum Speed: 38 km/h on Sep 28 16:00	Maximum Daily Speed Average: 25.8 km/h on Sep 28	Hours in Service: 720
Minimum Speed Value: 1 km/h on Sep 23 17:00	Minimum Daily Speed Average: 1.1 km/h on Sep 23	Hours of Data: 720
Maximum Diurnal Speed Average: 4.2 km/h at hour 20	Minimum Diurnal Speed Average: 0.7 km/h at hour 10	Hours of Missing Data: 0
Monthly Average Velocity: 2.2 km/h 196.4 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 8 Median = 14 Q ₃ = 20 P ₉₀ = 25 P ₉₉ = 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	WNW3	SSW9	SW13	SW10	SW10	S8	SW8	S6	SW5	SE4	SSE6	SE6	E6	S9	SW15	NNE12	ESE6	SSW9	SSW5	NW2	WSW5	WNW6	W9	W14	SW4.7	SW15
2-Sep	W10	W6	W7	W4	SW2	SSW5	SW5	SSW4	SSE4	ESE4	W3	NW7	NW7	NW5	NW10	NNW17	NNE7	W6	W6	NW11	N9	N14	NNE9	NNW3	NW4.3	NNW17
3-Sep	WNW9	NNW4	N1	S2	SW4	SSW8	S8	S6	SSE5	SE5	S3	W7	W9	WSW5	SSE6	SSE12	S13	WSW9	ENE10	SSE15	SSE15	S18	S18	SSE13	S5.7	S18
4-Sep	SSE12	SSE13	SSE14	SSE14	SSE15	SSE14	SSE13	SSE14	SSE11	S11	SSE11	S12	S11	WNW4	SW15	SW20	N14	NNE14	N16	N20	N22	N19	N20	N19	SE2.3	N22
5-Sep	NNE20	N12	N9	N11	NNW8	NNW7	WNW3	SE3	SE5	SSE10	SSE13	SSE16	SSE16	SSE17	SSE9	ESE12	SE19	SE16	SE12	S6	W6WNW10	NW16	NNW21	SE1.8	NNW21	
6-Sep	NNW14	NW10	NW15	NNW6	W3	NE9	NNE12	NNE11	NNE10	NE6	ESE4	ESE4	E6	E6	SE7	E10	E12	ENE11	ENE11	NE12	NNE16	N18	N18	N24	NNE7.4	N24
7-Sep	N27	NNE29	NNE24	NNE24	NNE23	NNE24	NNE23	NNE19	NNE18	NNE19	NNE17	NNE19	NNE21	NNW28	N24	NNW27	N27	N25	N15	N14	NNW17	NNW19	NNW17	N21.3	NNE29	
8-Sep	NNW20	NNW23	NNW21	N22	N18	N15	N13	N13	N16	N12	N10	NNE17	NNW16	NW14	NNW10	N14	NNE15	NNE13	NNE13	NE10	NE10	N7	NNE9	NNE6	N13.3	NNW23
9-Sep	NE8	NNE7	NE6	SE1	NNW3	NNE2	NNE5	NNE4	WSW7	W4	WSW5	WSW6	NNW4	SW4	NE6	NE5	SSE2	NNW2	W2	W6	W4	NW6	N12	NNE11	NNW2.4	N12
10-Sep	N8	SW3	W11	NNW6	WNW9	W11	WNW18	WNW14	WNW8	WNW8	NW10	NW7	W12	WSW8	WSW8	WSW7	SW10	S12	S15	S22	S24	SSW23	S17	SSW16	WSW7.6	S24
11-Sep	SSW11	SSW12	SSW13	S15	S20	S23	S23	S21	S20	S18	SSW29	SSW32	SSW33	SSW34	SSW30	SSW31	SSW33	SSW22	SSW19	SSW20	SSW18	WSW15	W23	W21	SSW20.5	SSW34
12-Sep	W17	WSW11	WSW14	WSW14	WSW11	W6	WNW11	NW13	NNW16	NNW23	NNW21	NW20	NNW23	NNW21	NNW21	NNW20	NNW17	NNW22	NW9	WNW3	NNW19	WNW5	W11	NW10	NW12.2	NNW23
13-Sep	NNW8	N8	NNE9	N7	N7	NNE4	ENE3	ESE7	ESE4	SSE2	SE5	SE6	SE7	SE5	ENE5	ESE7	SE10	SE10	SSE13	S16	S17	S16	S10	SSE11	SE4.1	S17
14-Sep	SE14	SE16	SE15	SSE13	SSE12	SSE12	SE16	SSE12	SE5	SE4	SE7	SE8	SE9	E5	WNW3	WNW11	WSW11	SW9	SSW13	SW17	SW19	WSW15	WNW6	WSW11	S7.0	SW19
15-Sep	W9	WSW6	SSW6	S9	SSE10	S13	S11	SSE10	SSE5	SE3	E2	E3	NE4	NNE5	NNE7	NNE14	NE14	NE12	ENE12	E11	SE13	SE7	SE9	E5	ESE3.5	NE14
16-Sep	ENE9	NNE6	N15	NNE14	NNE8	E10	ESE11	ESE11	ESE7	NNE8	NE11	ENE11	NE8	ENE7	SE10	SE16	SE21	SE21	SE20	ESE20	SE21	SE22	SE19	SE21	ESE9.9	SE22
17-Sep	SE19	SE21	SE21	SE21	SSE18	SSE22	SE17	SE22	SE23	SE22	SE19	SE18	SE17	SSE20	SSE22	SSE25	SE22	SE18	SE17	SE17	SE15	SE15	SE17	SSE16	SE19.2	SSE25
18-Sep	SSE15	SSE15	S9	SSE12	SSE10	NNW1	NNW7	NNW9	NNE7	NNE10	NNW5	WNW6	WNW6	W6	NW4	W4	NW2	ESE3	ESE7	SE7	SSE11	SE13	SSE16	SSE17	SSE3.2	SSE17
19-Sep	SSE20	SSE20	SSE17	SSE17	SSE15	SSE14	SSE15	SSE14	SSE11	SW16	WSW26	SW27	SW27	WSW33	WSW25	WSW29	W36	W30	WSW29	W23	W29	W36	W32	W26	SW17.5	W36
20-Sep	W29	W28	W29	W32	W28	W27	W33	W31	WNW27	WNW29	WNW25	WNW22	W28	W24	W18	W24	W20	WSW19	SW18	SW23	SW22	SSW20	S20	SSE17	W21.4	W33
21-Sep	SSE16	SSE16	SSE12	SSE15	SSE17	S20	S18	S13	S9	SSE6	SW13	SW20	SW15	WSW20	WSW21	WSW19	WSW14	SW17	S20	S22	SSE21	SSE18	SSE19	SSE18	S13.6	S22
22-Sep	SSE21	SSE20	SSE17	SE18	SSE15	SE18	SSE17	SSE18	SSE15	SSE10	SE10	SE10	SE12	SE8	SSW5	WSW17	W17	WSW14	WSW14	WSW21	WSW20	W20	W21	WNW25	SSW8.9	WNW25
23-Sep	WNW23	WNW16	NW13	W13	SSW11	WNW3	NNE6	NNW6	NW7	NNW6	NW6	ENE2	E4	ENE5	NE3	ESE3	NNE1	NW1	ESE2	ESE6	ESE8	ESE9	SE15	SE13	NW1.1	WNW23
24-Sep	ESE9	SE9	SE14	SE11	SE13	SE13	SE11	SE8	ESE8	ESE5	E10	E14	E13	ESE14	ESE14	SE18	SE22	SE25	SE26	SE24	SSE18	W25	W13	S17	SE11.4	SE26
25-Sep	SSW19	WSW21	WSW23	WSW18	WSW19	WSW19	WSW22	W28	W28	W27	W26	WNW26	WNW22	NW17	NW15	NNW18	NNW16	N14	NNE17	NNE17	NNE17	NNE15	NE18	NNE14	WNW12.1	W28
26-Sep	NNE12	NNE10	NE15	NE16	NE17	NNE13	NNE12	NNE21	NNE20	NNE17	NNE17	NNE23	NNE24	NNE19	NNE22	NNE29	NNE29	NNE27	N30	N31	N34	N34	N34	N32	NNE22.1	N34
27-Sep	N24	N20	N20	N22	N17	NNW19	NNW20	NNW16	N12	N8	N8	NNW7	WSW4	SW8	SW5	S4	S7	S10	S12	S16	S18	SSE19	S19	S19	NNW2.4	N24
28-Sep	SSE21	SSE19	SSE20	SSE21	SSE21	SSE22	SSE23	SSE25	SSE27	SSE29	SSE26	SSE31	SSE30	SSE31	S36	S38	S31	S29	SSE26	SSE26	SSE25	SSE26	SSE23	SSE21	SSE25.8	S38
29-Sep	SSE17	SE17	SE19	SE20	SE18	SE16	SE18	SE15	SE16	SE15	SE13	SE18	SSE19	S20	S28	SSW30	SSW26	S18	SSW21	SSW19	S16	SSW14	S11	SSE12	SSE16.2	SSW30
30-Sep	SSE15	SSE15	S18	S16	SW13	W11	WNW5	SSE6	SSW7	W8	NW9	NW11	NW17	NNW13	NNW10	NNW5	WNW9	NW8	NNE9	NNE10	NNE11	NNE7	N8	NNE14	NW2.8	S18

SSW1.3	S2.1	SSW2.1	S2.4	S3.5	S3.4	S2.7	SSE2.2	SSE1.6	SSW0.7	SW1.8	SSW1.7	SW1.5	SW2.9	SW4.0	SW3.1	SW2.6	SSW2.3	SSE3.2	S4.2	S3.5	SW3.2	SW1.8	SSW1.1	Diurnal Average	
W29	NNE29	W29	W32	W28	W27	W33	W31	W28	WNW29	SSW29	SSW32	SSW33	SSW34	S36	S38	W36	W30	N30	N31	N34	W36	N34	N32	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: 13 km/h on Sep 19 17:00	Hours of Data: 720
Minimum Value: 1 km/h on Sep 2 03:00	Hours of Missing Data: 0
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 8	Hours of Calibration: 0
	Percent Operational Time: 100.0

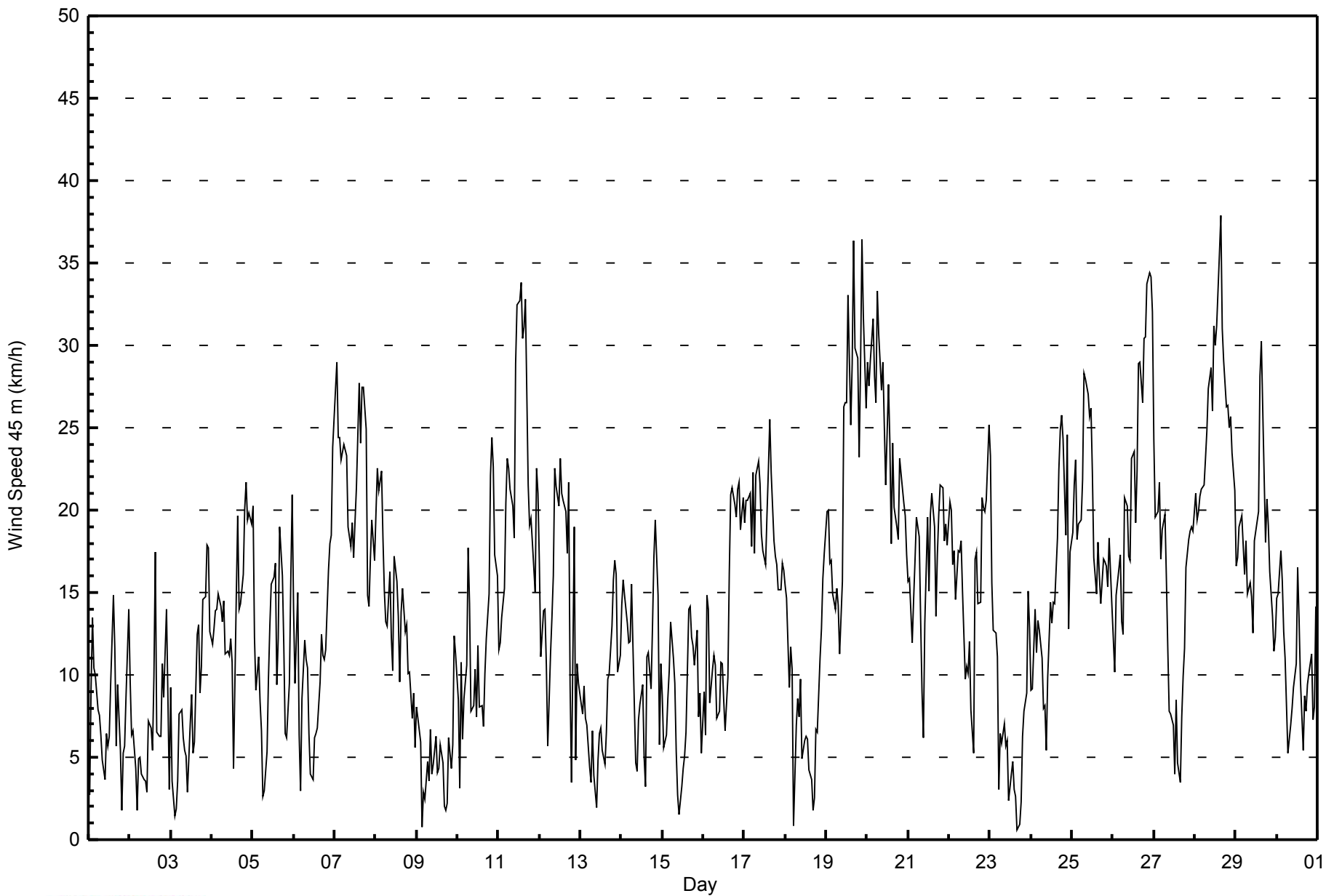
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	2	4	2	3	1	3	4	2	3	2	2	2	2	3	7	5	3	1	2	1	2	1	3	1	7
2-Sep	3	1	1	2	2	2	1	2	1	1	3	3	3	3	5	6	4	2	2	4	3	2	3	1	6
3-Sep	1	3	1	1	1	1	1	1	1	2	2	4	3	4	4	4	4	5	4	3	3	2	2	3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

Diurnal Maximum



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	88	12.22	12.22
6 - 11	199	27.64	39.86
12 - 19	251	34.86	74.72
20 - 28	143	19.86	94.58
29 - 38	39	5.42	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

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

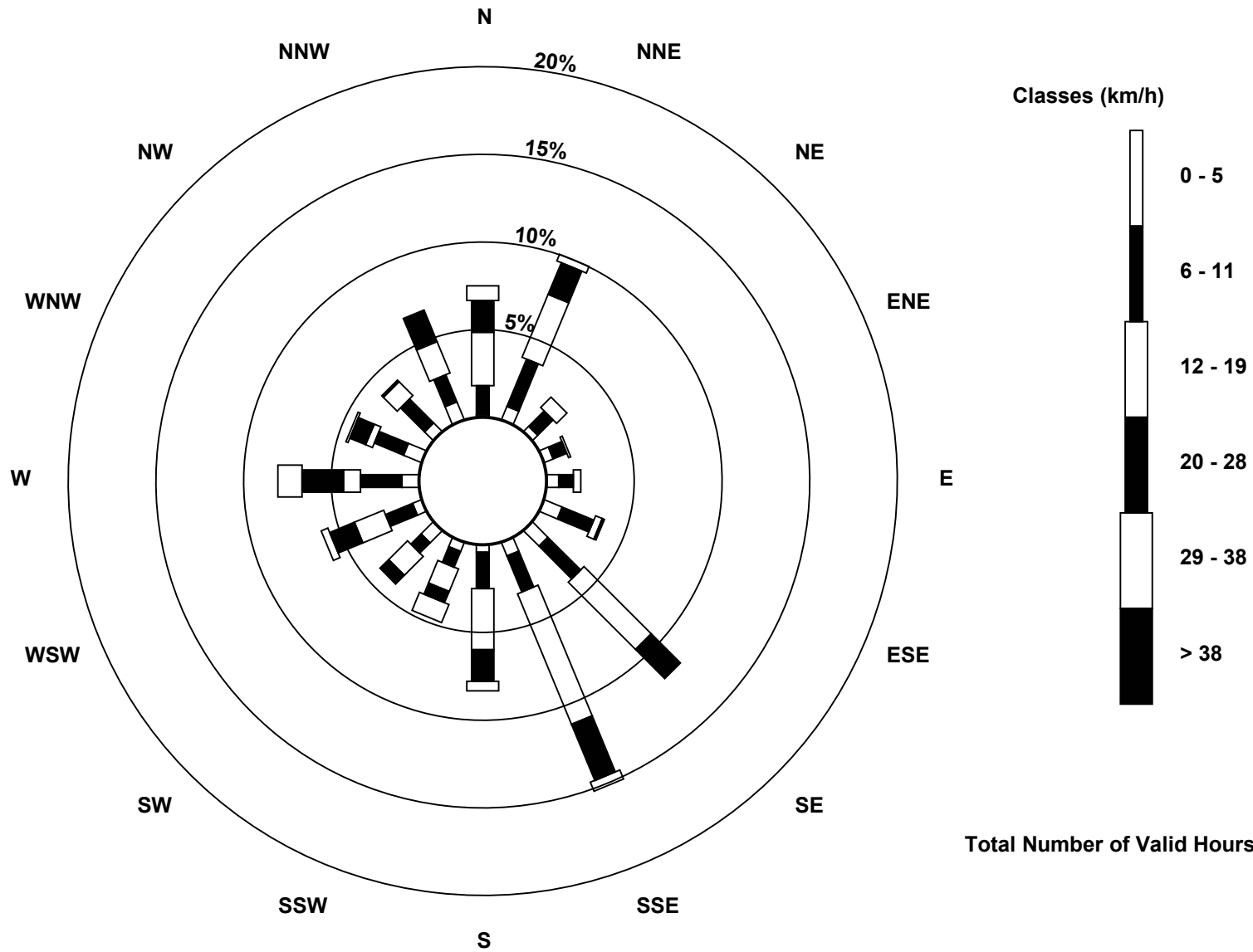
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	6	3	4	5	8	9	6	3	4	7	4	7	8	5	8	88
6 - 11	12	21	9	6	6	14	19	16	15	7	6	12	17	13	14	12	199
12 - 19	22	28	6	1	3	3	39	58	25	10	11	13	7	3	8	14	251
20 - 28	13	14	0	0	0	1	17	25	13	5	5	11	17	7	1	14	143
29 - 38	6	3	0	0	0	0	0	4	4	8	0	3	10	1	0	0	39
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	54	72	18	11	14	26	84	109	60	34	29	43	58	32	28	48	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

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





Summary of Hour Averages

Mannix - September 2014

Maximum Speed: 41 km/h on Sep 28 16:00	Maximum Daily Speed Average: 30.7 km/h on Sep 28	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 23 17:00	Minimum Daily Speed Average: 1.6 km/h on Sep 15	Hours of Data: 720
Maximum Diurnal Speed Average: 4.6 km/h at hour 20	Minimum Diurnal Speed Average: 0.9 km/h at hour 10	Hours of Missing Data: 0
Monthly Average Velocity: 2.5 km/h 204.3 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 9 Median = 16 Q ₃ = 23 P ₉₀ = 29 P ₉₉ = 37	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	WNW5	SSW8	SW13	WSW13	WSW12	WSW6	WSW9	SSW7	WSW6	SE3	SSE6	SE5	E6	S10	SW16	NNE14	E7	SSW10	SSW9	NW3	WNW6	NW7	WNW5	W15	SW4.5	SW16
2-Sep	WNW15	NW9	WNW7	NW7	N1	WSW2	W2	SSW3	S4	SE2	W3	NW7	NW7	NW6	NW10	NNW21	NNE9	WNW6	W8	NW13	N10	N15	NNE14	N6	NW5.9	NNW21
3-Sep	NW7	NNW4	NNW4	W2	W3	SSW3	SSW7	S8	S6	SSE5	SSW3	W7	W9	WSW5	SSE6	SSE13	S14	WSW10	ENE11	SSE17	S19	SSE26	S25	S19	S6.5	SSE26
4-Sep	SSE17	SSE17	SSE16	SSE17	SSE19	SSE17	SSE17	SSE17	SSE13	S15	SSE15	S14	S11	W5	SW14	SSW22	N15	NNE18	N20	N23	N26	N24	N24	N23	SE2.8	N26
5-Sep	N25	N15	N13	N13	NNW10	NNW8	NNW3	SE2	SE5	SSE10	SSE13	SSE16	SSE17	SSE18	SE11	SE13	SE20	SE19	SE15	S8	WSW6	NNW12	NNW19	NNW25	ESE1.6	N25
6-Sep	NNW17	NW12	NW16	N9	NW5	NNE12	NNE15	NNE13	NNE11	NE7	ESE4	ESE4	E6	E6	SE7	E9	E12	ENE12	ENE12	NE13	NNE18	NNE20	N21	N27	NNE8.9	N27
7-Sep	N30	NNE32	NNE28	NNE27	NNE26	NNE26	NNE26	NNE21	NNE20	NNE21	NNE18	NNE21	NNE24	N31	N27	NNW30	N31	N28	N17	N17	NNW20	NNW23	NNW21	N23.9	NNE32	
8-Sep	NNW24	NNW27	NNW25	N25	N21	N18	N15	N14	N18	NNE13	N11	NNE19	NNW17	NNW14	NNW10	N15	NNE17	NNE14	NNE16	NE12	NE13	NNE10	NNE12	NNE8	N15.3	NNW27
9-Sep	NE10	NE9	NE6	E3	NNE4	N3	NNE6	NNE5	WSW6	W4	WSW4	WSW6	NNW4	SW5	NE6	NE5	SSE2	NNW2	WNW2	W6	WNW4	NNW7	NNE16	NNE15	N3.0	NNE16
10-Sep	N11	N1	W9	NNW7	NNW12	NNW13	NNW21	NNW17	WNW9	WNW8	NW10	WNW8	W12	WSW8	WSW8	WSW8	SW11	S14	S17	S29	S33	SSW30	SSW24	SSW22	WSW8.8	SSW33
11-Sep	SSW17	SSW16	SSW19	SSW21	S27	S30	S29	S26	S23	S21	SSW32	SSW35	SSW35	SSW36	SSW34	SSW34	SSW36	SSW25	SSW24	SSW22	SW19	WSW19	W27	W25	SSW24.2	SSW36
12-Sep	W22	W15	WSW16	WSW16	WSW16	NNW11	NW15	NW16	NNW17	NNW24	NNW23	NNW21	NNW24	NNW23	NNW22	NNW21	NNW19	NNW26	NW12	NW4	N23	NW5	NNW10	NNW14	NW14.6	NNW26
13-Sep	NNW11	N10	NNE12	NNE9	NNE9	NNE6	ENE7	ESE5	ESE3	SE2	SE4	SE6	SE6	SE5	ENE5	SE6	SE8	SSE12	SSE15	S23	S28	S25	SSW17	S11	SSE4.7	S28
14-Sep	SSE17	SSE19	SSE19	SSE20	S22	S15	SE18	SSE16	SSE4	SE4	SE7	SE9	SE9	E5	W4	NNW11	WSW12	SW10	SW13	WSW20	WSW25	WSW23	W10	W14	SSW9.0	WSW25
15-Sep	W16	W9	WSW7	SW5	SW5	SSW6	SW7	SSW8	SSW5	S3	E1	E3	NE5	NNE5	NNE7	NNE15	NE15	NE14	ENE13	ESE10	SE11	SE8	SE11	E7	E1.6	W16
16-Sep	E11	ENE6	NNE14	NE15	ENE11	E10	ESE9	ESE8	ESE7	NE8	NE12	ENE11	NE9	ENE7	SE9	SE16	SE21	SE19	SE20	ESE16	SE20	SE22	SE17	SE23	ESE10.4	SE23
17-Sep	SE20	SE22	SE23	SE23	SE19	SSE25	SE17	SE24	SE24	SE23	SE18	SE16	SE15	SSE21	SSE24	SSE28	SSE25	SE21	SE19	SE17	SE20	SE20	SE21	SE21	SE21.0	SSE28
18-Sep	SSE18	SSE18	S16	SSW12	SSW7	WNW7	NNW10	N12	NNE13	NNE12	NNW5	NW6	WNW6	W5	NW4	WSW3	NNW2	ESE2	ESE5	ESE6	SE10	SE13	SSE23	SSE23	SSE3.1	SSE23
19-Sep	SSE26	SE29	SSE23	SSE21	S18	S11	S16	S18	S15	SW18	WSW29	SW29	SW28	WSW37	WSW28	WSW32	W39	W33	WSW35	W27	W32	W40	W35	W29	SW20.2	W40
20-Sep	W32	W31	W32	W34	W32	W30	W37	W34	NNW29	NNW30	NNW26	NNW22	W29	W25	W19	W25	WSW23	WSW23	WSW22	SW25	SW22	SSW22	SSW27	S22	W24.2	W37
21-Sep	SSE21	S21	SSW13	S13	S13	SSW19	SSW21	SSW21	SSW14	SSW10	SW14	SW21	SW16	WSW21	WSW23	WSW21	WSW16	SW20	S23	S26	S26	S26	SSE28	SSE28	SSW17.5	SSE28
22-Sep	SSE31	SSE31	SSE29	SE23	SE14	SE20	SSE22	SSE26	SSE20	SSE11	SE11	SE10	SE11	SE8	SSW7	WSW19	W19	WSW17	WSW18	WSW26	W27	W27	W27	NNW32	SSW11.1	NNW32
23-Sep	WNW29	NNW20	NW15	NNW12	SSW12	WSW5	NNE8	N7	NNW9	NNW7	NNW7	NE2	E4	ENE5	NE3	SE3	NE0	NNW1	ESE2	ESE6	ESE6	ESE9	SE12	SE7	NNW2.1	NNW29
24-Sep	SE7	SE8	SE16	SE9	SE10	SE12	SE11	SE7	ESE7	ESE6	E10	E12	E13	ESE12	ESE13	SE14	SE22	SE27	SE26	SE27	SSE23	W26	W16	S19	SE11.1	SE27
25-Sep	SW23	WSW26	WSW27	WSW22	WSW23	WSW23	WSW26	NNW31	W29	W28	W27	NNW27	NNW23	NW18	NW15	N19	NNW17	N16	NNE21	NNE20	NNE20	NNE19	NE21	NNE17	NNW13.2	NNW31
26-Sep	NE15	NNE13	NE18	NE20	NE22	NE17	NNE16	NNE25	NNE25	NE21	NNE20	NNE26	NNE22	NNE26	NNE32	NNE33	NNE30	N35	N34	N37	N37	N37	N37	N36	NNE25.4	N37
27-Sep	N27	N22	N23	N25	N19	NNW22	NNW23	NNW18	N13	N8	N8	NNW7	WSW4	SW9	SW5	S4	S8	S11	S13	S18	S20	SSE24	S24	S23	NNW2.4	N27
28-Sep	S25	SSE26	SSE27	SSE28	SSE30	SSE28	SSE29	SSE31	SSE32	SSE31	SSE28	SSE34	SSE33	SSE33	S39	S41	S35	S33	SSE32	SSE32	SSE30	SSE32	SSE30	SSE29	SSE30.7	S41
29-Sep	SSE25	SSE25	SE26	SE26	SE24	SE22	SE22	SE18	SE17	SE15	SE12	SE19	SSE20	S22	S30	SSW33	SSW30	S21	SSW25	SSW23	S20	SSW16	SSW14	SSE14	SSE19.5	SSW33
30-Sep	S17	S12	S19	S17	WSW13	NNW17	NW8	SE4	SW6	W10	NNW10	NNW12	NNW18	NNW14	NNW10	N6	WNW9	NNW9	NNE12	NNE12	NNE14	NNE9	NNE9	NNE17	NW4.0	S19

SSW2.2	S2.7	SSW2.9	S2.6	SSW3.4	SSW2.6	SSW2.0	S2.3	SSE1.6	SSW0.9	SW1.8	SSW1.8	SW1.6	SW3.0	SW4.2	SW3.2	SW2.7	SSW2.6	S3.4	S4.6	SSW4.0	SW4.3	SW2.8	SW1.7	Diurnal Average	
W32	NNE32	W32	W34	W32	W30	W37	W34	SSE32	SSE31	SSW32	SSW35	SSW35	WSW37	S39	S41	W39	W33	WSW35	N34	N37	W40	N37	N36	Diurnal Maximum	

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



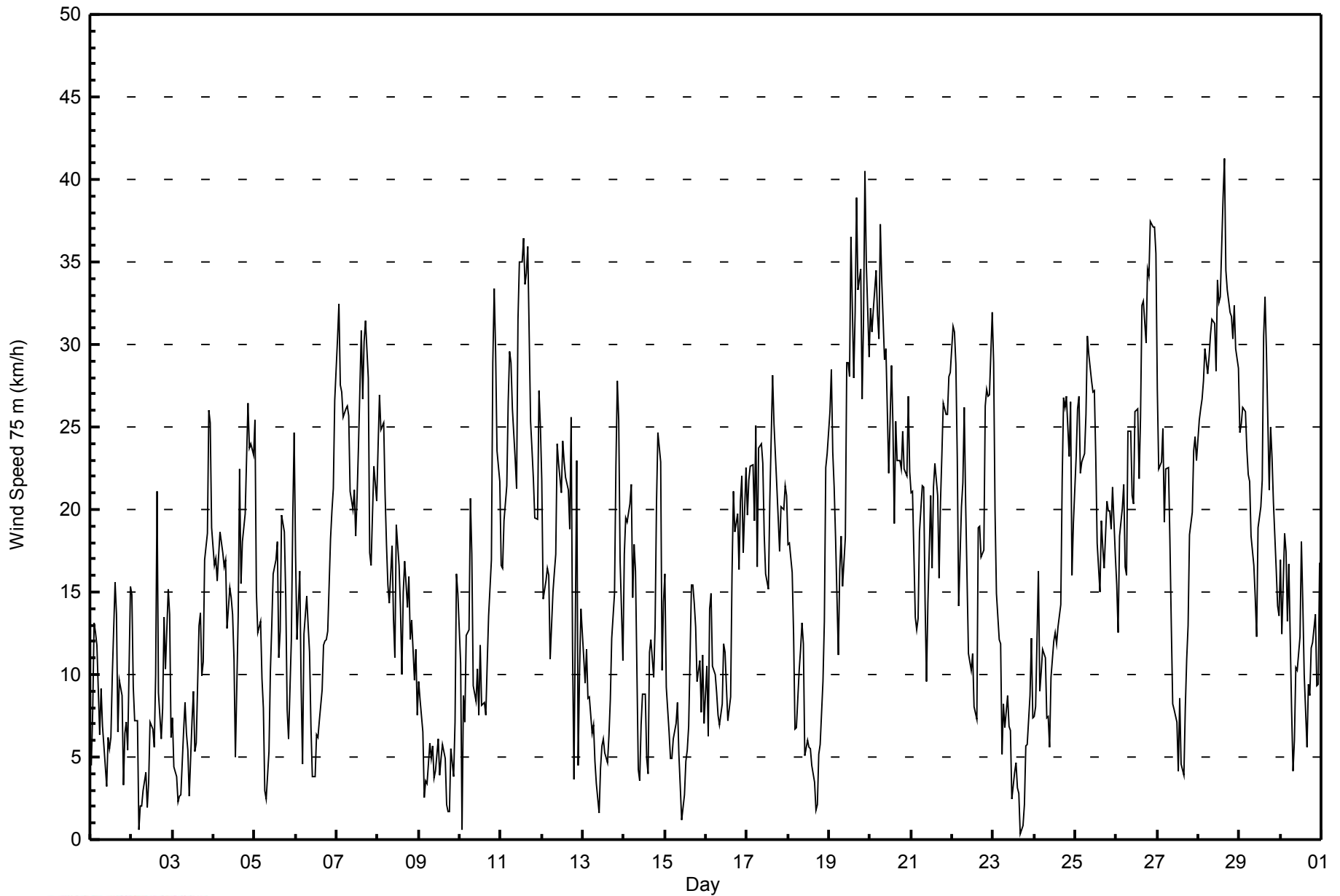
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 13 km/h on Sep 19 17:00	Hours of Data: 720
Minimum Value: 1 km/h on Sep 23 18:00	Hours of Missing Data: 0
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 8	Hours of Calibration: 0
	Percent Operational Time: 100.0

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	81	11.25	11.25
6 - 11	163	22.64	33.89
12 - 19	204	28.33	62.22
20 - 28	195	27.08	89.31
29 - 38	73	10.14	99.44
> 38	4	0.56	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

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

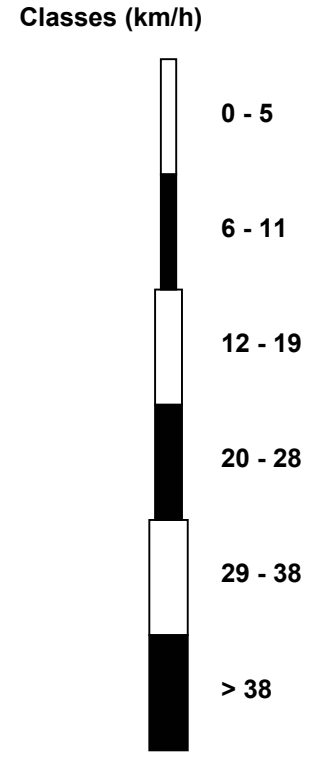
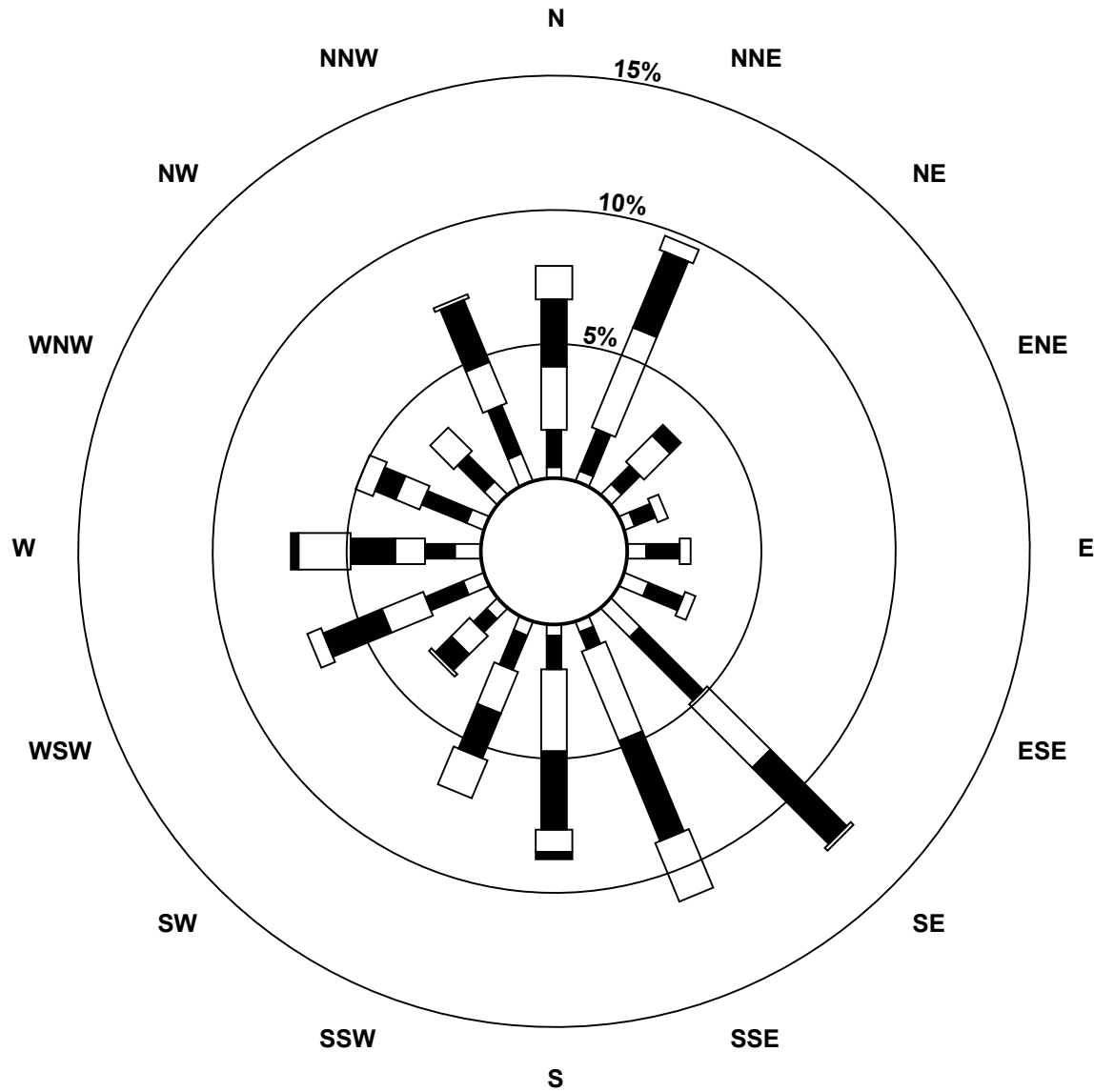
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	3	4	3	5	7	11	3	3	4	4	6	7	5	5	8	81
6 - 11	10	12	7	6	9	10	24	5	9	10	5	11	8	13	10	14	163
12 - 19	17	29	10	3	3	3	24	26	22	12	7	12	8	7	9	12	204
20 - 28	18	22	4	0	0	0	29	29	21	13	6	17	12	6	0	18	195
29 - 38	9	4	0	0	0	0	1	17	6	11	1	4	14	5	0	1	73
> 38	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	4
Totals	57	70	25	12	17	20	89	80	63	50	23	50	51	36	24	53	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

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



Total Number of Valid Hours: 720



Maximum Speed: 43 km/h on Sep 28 16:00	Maximum Daily Speed Average: 33.3 km/h on Sep 28	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 23 17:00	Minimum Daily Speed Average: 1.4 km/h on Sep 15	Hours of Data: 719
Maximum Diurnal Speed Average: 4.9 km/h at hour 21	Minimum Diurnal Speed Average: 1.0 km/h at hour 10	Hours of Missing Data: 1
Monthly Average Velocity: 2.6 km/h 199.0 deg	Percentiles: $P_1 = 2$ $P_{10} = 5$ $Q_1 = 10$ Median = 17 $Q_3 = 25$ $P_{90} = 31$ $P_{99} = 38$	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	W6	SSW7	SW13	WSW14	WSW14	WSW8	WSW10	SW8	WSW6	SE3	SSE6	SE6	E6	S10	SW16	NNE13	ENE6	SSW10	SSW8	NW5	WNW7	NW8	NW5	W13	WSW4.6	SW16
2-Sep	WNW14	NW9	NW6	NW7	NNW2	W2	WNW2	SW2	S4	S2	W4	NW7	NW7	NNW6	NNW10	NNW22	NNE10	WNW6	W9	NW14	N11	N15	N15	N8	NW6.5	NNW22
3-Sep	NW7	NW6	NW5	W5	W4	WNW3	SSW5	SSW8	S8	SSE6	SSW3	WSW7	W9	WSW6	SSE6	SSE13	S14	SW10	ENE12	SSE18	S19	SSE28	SSE29	S21	S6.7	SSE29
4-Sep	SSE18	SSE16	S13	SSE14	SSE16	SSE14	SSE14	SSE15	SE13	S15	SSE15	S15	S11	WNW5	SW12	SSW22	NNW16	N20	N21	N24	N29	N26	N26	N25	SE1.4	N29
5-Sep	N27	NNW16	NNW15	NNW14	NNW11	NNW9	NNW4	ESE2	SE5	SSE10	SE14	SSE17	SSE17	SSE19	SSE13	ESE16	SE22	SE21	SE16	SSE8	WSW6	W13	NW21	NW26	ESE1.7	N27
6-Sep	NNW19	NW13	NW16	NNW10	NNW6	NNE15	NNE16	NNE14	NNE12	NE7	ESE4	E4	E7	E8	SE8	E11	E14	ENE13	NE13	NE13	NNE19	N20	N22	N27	NNE9.6	N27
7-Sep	N31	N34	NNE29	N29	NNE27	N27	N28	NNE27	NNE22	NNE21	NNE22	N19	N22	NNE25	NNW32	NNW28	NNW31	N33	N29	NNW18	N18	NNW21	NNW24	NNW22	N25.1	N34
8-Sep	NNW26	NNW29	NNW26	NNW26	N22	N19	N16	N15	N18	N14	N11	NNE20	NNW17	NW14	NNW10	NNW16	NNE18	N15	NNE17	NNE13	NNE15	NNE11	NNE13	NNE9	N16.2	NNW29
9-Sep	NE10	NNE9	NE7	ENE3	NNE4	N4	NNE7	NNE6	WSW5	WSW3	WSW4	WSW6	NNW4	SW5	NE6	NNE5	SSE2	NNW2	WNW2	W5	W4	NNW8	N18	NNE16	N3.5	N18
10-Sep	N12	NNE2	W8	NW7	WNW14	WNW15	WNW21	WNW17	WNW10	WNW8	WNW10	WNW8	W12	WSW8	WSW8	WSW8	SSW11	S14	S18	S30	S37	SSW33	SSW27	SSW25	SW9.3	S37
11-Sep	SSW19	SSW19	SSW22	SSW25	S29	S33	S32	S29	S25	S23	SSW32	SSW36	S36	S38	SSW35	SSW36	SSW37	SSW27	SSW26	SSW23	SW21	WSW22	W29	W26	SSW26.0	S38
12-Sep	W23	W15	WSW16	WSW18	WSW19	WNW13	NW17	NW17	NNW18	NNW25	NNW23	NW21	NNW25	NNW24	NW22	NNW22	NNW19	NNW27	NW13	NW4	UO	NW5	WNW10	NW16	NW15.5	NNW27
13-Sep	NNW12	N11	N12	N9	N10	NNE8	NE8	ESE8	ESE4	SE2	SE5	SE7	SE7	ESE5	ENE4	ESE6	SE10	SE13	SSE16	SSE23	S28	S29	SSW22	SSW14	SE5.2	S29
14-Sep	SSE14	SSE18	SSE20	S22	S21	S10	SE17	SSE18	SSE4	SE4	SE7	SE10	SE10	E5	W4	W11	WSW12	SW10	SSW13	WSW21	WSW24	WSW24	W12	W16	SSW9.0	WSW24
15-Sep	W17	W12	WSW9	WSW6	WSW7	SW6	SW8	SW8	SW5	SSW4	ENE1	E3	NNE5	NNE6	NNE7	NNE16	NE15	ENE14	E14	ESE16	ESE11	SE13	E8	E1.4	W17	
16-Sep	E12	ENE7	NNE12	NE16	ENE12	E12	ESE14	ESE13	ESE8	NNE8	NE12	NE12	NE10	ENE8	ESE10	SE17	SE23	ESE22	SE23	ESE24	SE24	SE25	SE22	SE25	ESE12.8	SE25
17-Sep	SE23	SE24	SE25	SE24	SE21	SE27	SE19	SE25	SE26	SE25	SE20	SE19	SE19	SE22	SE26	SE30	SE27	SE24	SE23	SE22	SE24	SE24	SE24	SE23	SE23.4	SE30
18-Sep	SE20	SE19	S17	SW13	SW7	WNW10	NNW12	N13	NNE17	NNE13	NW5	WNW6	WNW5	W5	NW5	WSW3	NW2	ESE3	E9	ESE11	SE12	SE17	SE25	SE26	SE3.4	SE26
19-Sep	SE29	SE32	SSE27	SSE22	S17	SSW11	S15	S17	SSW17	SW19	SW29	SW30	SW29	WSW37	WSW28	WSW33	W39	W35	WSW36	W28	W32	WSW41	W36	W31	SW21.2	WSW41
20-Sep	W33	W32	W33	W35	W33	W32	W38	W35	WNW29	WNW29	W26	WNW22	W28	W25	W19	W25	WSW24	WSW24	WSW24	SW25	SW22	SSW22	SSW28	S23	W24.9	W38
21-Sep	S21	S22	SSW16	S12	S12	SSW18	SSW24	SW24	SSW18	SSW12	SW15	SW21	SW17	SW22	WSW23	WSW21	WSW17	SSW22	S24	S28	S28	S27	SSE30	SSE31	SSW18.8	SSE31
22-Sep	SSE34	SSE33	SSE32	SE28	SE19	SE23	SSE24	SSE30	SSE23	SSE12	SE12	SE11	SE13	SE9	SSW8	WSW19	W19	WSW18	WSW19	WSW28	W30	W28	W29	WNW33	SSW12.6	SSE34
23-Sep	W31	WNW21	NW16	W11	SSW12	WSW6	NNE9	NNW8	NNW10	NNW8	NW7	NE3	E4	ENE5	NE3	ESE3	NNE0	NW1	E3	E9	ESE12	ESE18	ESE13	ESE14	NNW1.6	W31
24-Sep	ESE13	ESE12	SE18	ESE13	ESE12	SE13	ESE15	ESE11	ESE12	ESE9	E14	E16	E16	E18	ESE19	ESE22	SE28	SE30	SE30	SE30	SSE26	WSW27	WSW17	S20	SE14.4	SE30
25-Sep	SSW25	WSW27	WSW28	WSW23	WSW24	WSW25	WSW27	W31	W29	W27	W27	WNW27	WNW23	NW18	NW15	NNW20	NNW18	N17	NNE22	NNE21	NNE21	NNE21	NNE23	NNE19	WNW13.9	W31
26-Sep	NNE17	NNE14	NE20	NE22	NNE24	NNE18	NNE18	NNE27	NNE27	NNE23	NNE22	N27	N27	NNE23	NNE27	N34	N35	N32	N36	N36	N39	N38	N38	N37	NNE27.0	N39
27-Sep	N28	N23	N24	N26	N20	NNW24	NNW24	NNW19	NNW14	NNW8	N8	NNW7	WSW4	SW9	SW5	S4	S8	S11	S13	S19	S20	SSE23	S26	S25	NNW2.8	N28
28-Sep	S27	SSE28	SSE30	SSE32	SE35	SE32	SE33	SE34	SE34	SSE33	SSE30	SSE36	SSE34	SSE34	S41	S43	SSE36	SSE35	SSE35	SSE34	SSE33	SSE36	SSE33	SSE33	SSE33.3	S43
29-Sep	SSE29	SSE29	SE30	SE29	SE27	SE26	SE25	SE22	SE19	SE17	SE14	SE20	SE21	SSE23	S32	SSW34	SSW31	S23	SSW27	S25	S22	SSW18	SSW16	S13	SSE21.3	SSW34
30-Sep	S15	S9	SSE17	S16	WSW14	WNW17	NW9	ESE3	SW5	WNW10	NNW11	NW13	NW18	NNW15	NNW10	N6	WNW9	NW9	N13	NNE13	NNE15	N10	N10	NNE18	NW5.0	NW18

SSW2.4	S2.7	SSW3.1	SSW2.8	SSW3.4	SSW2.3	SSW1.7	SSE2.2	SSE1.6	SSW1.0	SSW1.8	SSW1.8	SW1.6	SSW2.9	SW4.2	SW3.1	SSW2.6	SSW2.6	SSE3.6	S4.8	S4.9	SSW4.2	SW3.1	SW1.9	Diurnal Average	
SSE3.4	N34	W33	W35	SE35	S33	W38	W35	SE34	SSE33	SSW32	SSW36	S36	S38	S41	S43	W39	SSE35	N36	N36	N39	WSW41	N38	N37	Diurnal Maximum	

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: 12 km/h on Sep 19 17:00			Hours of Data:	719
Minimum Value: 1 km/h on Sep 23 18:00			Hours of Missing Data:	1
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 7			Hours of Calibration:	0
			Percent Operational Time:	99.9

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

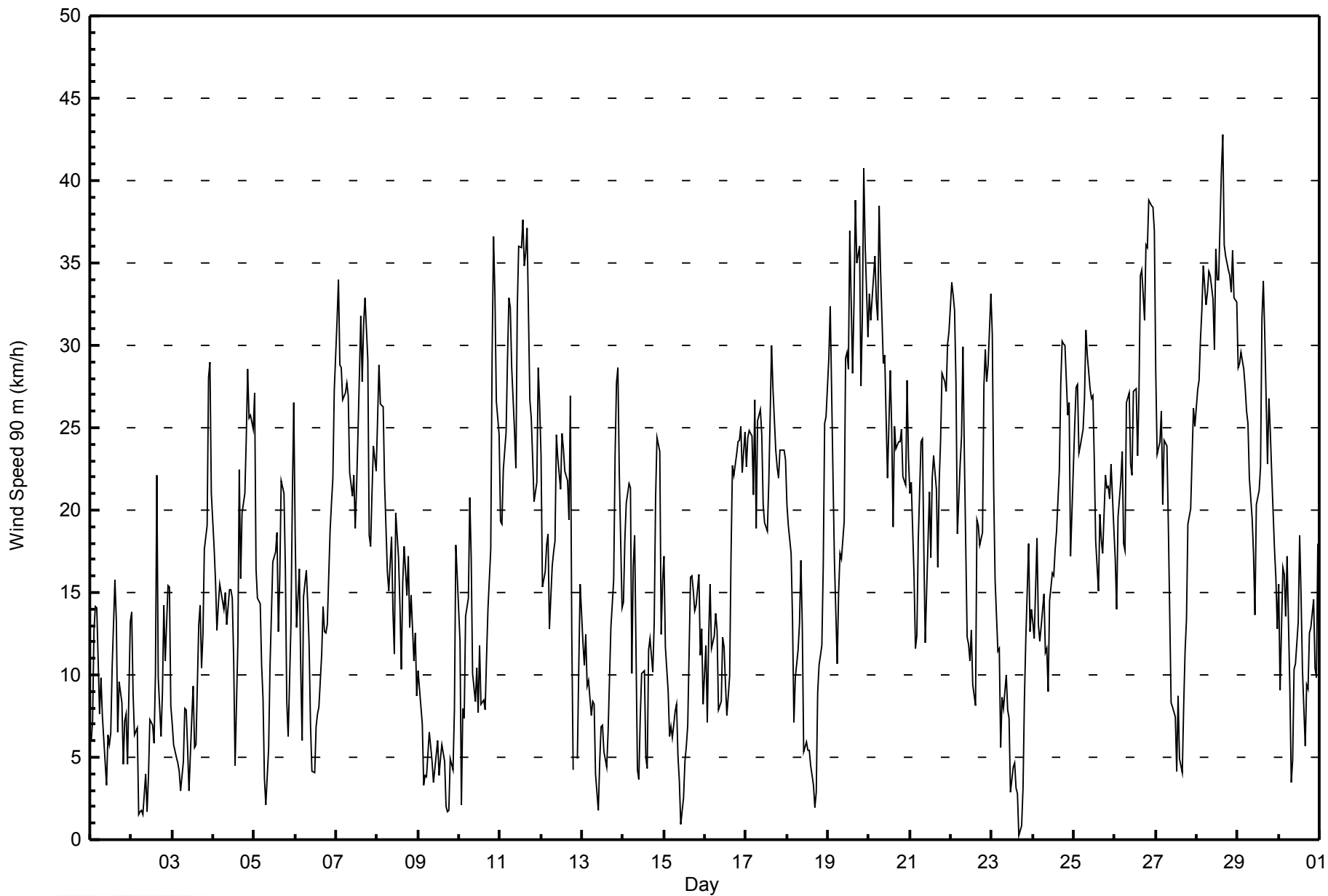
UO - Unstable Operation



WBEA
Hourly Averages

Wind Speed 90 m (WS90m) - km/h

Mannix - September 2014





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	73	10.15	10.15
6 - 11	140	19.47	29.62
12 - 19	209	29.07	58.69
20 - 28	192	26.70	85.40
29 - 38	100	13.91	99.30
> 38	5	0.70	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



WBEA
Frequency Distribution

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

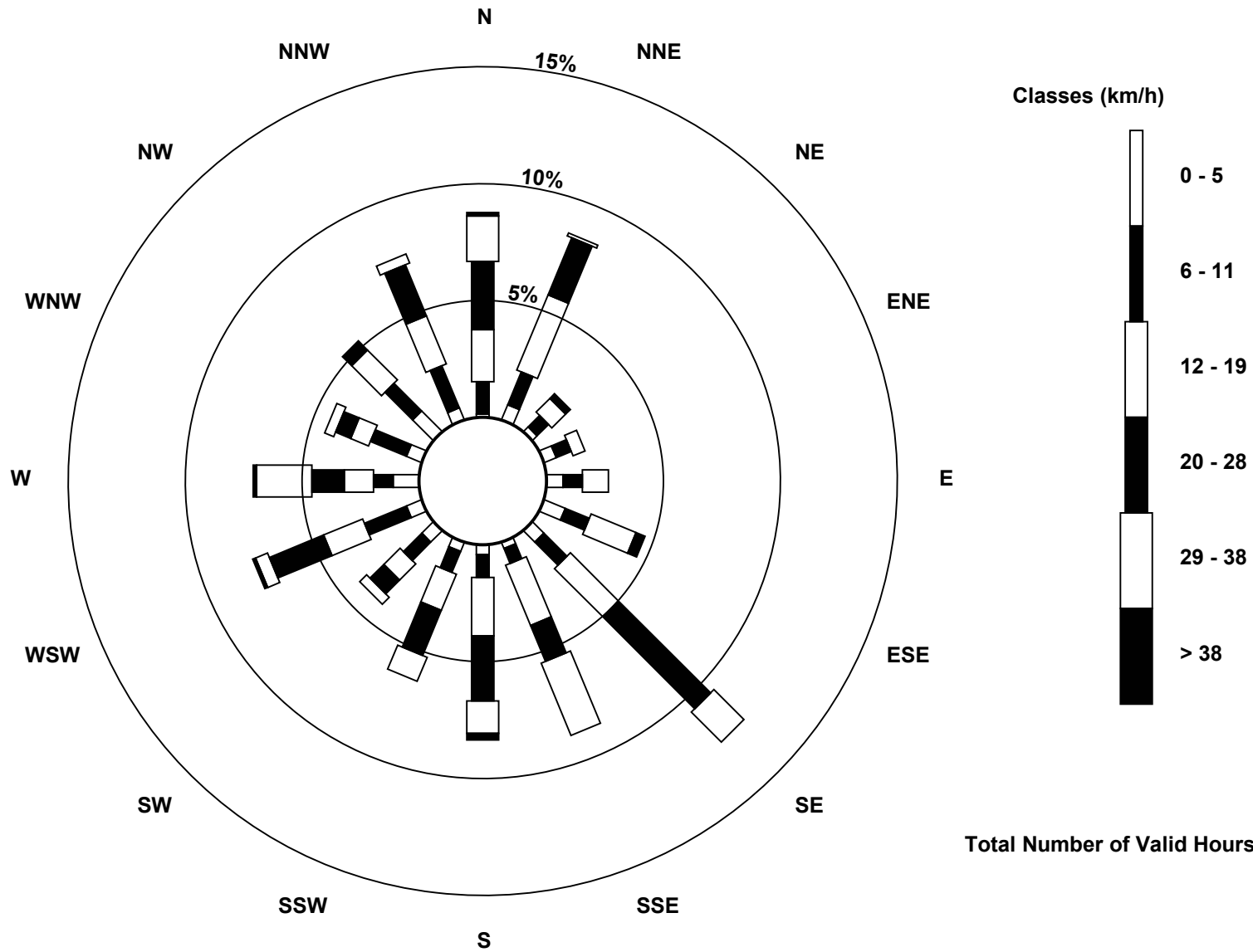
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	5	2	4	5	7	5	2	3	3	5	5	8	5	9	4	73
6 - 11	10	11	5	5	6	8	10	5	7	7	8	14	6	12	12	14	140
12 - 19	16	25	6	4	8	15	21	20	18	12	7	13	9	6	13	16	209
20 - 28	21	19	2	0	0	3	40	12	20	15	6	18	10	5	4	17	192
29 - 38	14	1	0	0	0	0	13	24	10	8	3	4	17	3	0	3	100
> 38	1	0	0	0	0	0	0	0	2	0	0	1	1	0	0	0	5
Totals	63	61	15	13	19	33	89	63	60	45	29	55	51	31	38	54	719

Total Number of Valid Hours: 719

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

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



Total Number of Valid Hours: 719



Summary of Hour Averages

Mannix - September 2014

Direction of Maximum Speed: 261 deg on Sep 19 22:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 160.3 deg on Sep 28		Hours of Data:	720
Direction of Minimum Speed: 320 deg on Sep 1 20:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 0.7 deg on Sep 23		Percent Operational Time:	100.0
Monthly Average Direction: 240.0 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	310	199	215	210	192	165	204	181	239	133	154	134	84	180	225	25	114	202	216	320	230	256	247	262	202.8
2-Sep	253	236	242	207	183	183	190	196	131	95	283	315	299	310	297	336	23	268	262	297	357	356	23	263	297.1
3-Sep	263	295	268	218	208	159	164	160	137	129	177	263	271	257	172	163	178	263	65	159	174	166	161	151	185.0
4-Sep	146	151	154	150	152	151	146	152	142	179	162	182	174	289	218	219	356	9	357	10	2	352	5	351	109.1
5-Sep	11	351	355	357	342	324	258	184	136	159	149	156	163	158	155	117	137	147	150	188	276	283	320	324	144.4
6-Sep	328	284	297	299	219	43	29	28	19	34	99	101	93	98	145	92	88	67	55	46	14	9	355	2	31.1
7-Sep	6	17	16	18	18	16	14	18	20	20	22	19	14	18	343	348	343	353	352	351	2	337	335	337	5.3
8-Sep	337	334	339	347	358	358	359	5	5	13	360	24	334	319	330	347	20	8	29	36	33	1	14	28	359.1
9-Sep	45	19	35	230	314	17	22	357	238	254	252	254	343	216	45	40	163	324	254	269	267	274	4	9	327.2
10-Sep	358	236	266	343	263	252	273	292	270	289	298	301	274	248	254	247	222	189	167	185	190	192	178	185	243.1
11-Sep	178	174	170	167	173	175	177	173	168	179	204	201	196	197	208	209	213	209	198	195	198	238	264	264	201.1
12-Sep	261	242	230	226	220	232	269	309	331	333	335	324	336	343	327	327	340	332	298	260	340	273	262	288	309.5
13-Sep	328	339	10	10	12	16	125	105	114	150	118	121	124	124	65	118	132	145	152	171	194	193	154	136	120.4
14-Sep	148	149	160	152	148	144	147	165	141	136	141	137	132	78	303	284	255	228	205	219	233	254	275	236	181.6
15-Sep	228	191	159	158	155	164	162	159	150	104	89	91	43	29	27	24	34	38	47	100	128	122	142	67	104.8
16-Sep	56	6	353	5	17	88	123	110	113	24	47	63	51	75	132	145	141	133	135	122	136	140	134	143	110.7
17-Sep	140	141	140	144	148	149	136	145	141	142	142	132	128	150	152	150	146	146	138	129	130	132	145	151	142.2
18-Sep	165	159	184	156	149	91	340	341	27	30	336	287	289	264	323	265	307	123	105	135	153	149	157	157	159.4
19-Sep	152	152	160	157	158	157	154	155	159	232	240	230	236	248	249	250	270	270	246	264	264	261	266	268	241.1
20-Sep	264	266	265	270	270	273	272	272	290	287	284	288	275	275	270	279	258	250	233	221	202	184	168	156	265.8
21-Sep	147	153	142	146	155	163	169	164	160	143	214	230	234	241	254	247	247	217	177	167	164	152	147	149	191.5
22-Sep	151	146	142	149	159	154	159	157	153	151	135	137	132	121	183	246	267	255	235	242	246	264	272	278	197.0
23-Sep	282	293	305	262	207	337	15	325	306	332	315	59	96	71	39	105	47	330	154	122	119	127	153	143	290.3
24-Sep	123	136	158	155	152	160	148	150	118	101	78	89	82	100	106	128	133	138	134	138	153	267	257	171	136.8
25-Sep	208	248	255	245	247	239	252	279	272	274	263	291	296	306	310	345	337	9	25	25	28	28	34	28	293.0
26-Sep	30	29	46	38	39	34	25	18	25	31	25	14	13	18	17	13	12	11	6	360	9	10	9	6	16.6
27-Sep	5	3	359	3	354	333	331	334	348	348	349	336	248	225	232	180	173	191	181	173	174	165	168	166	336.4
28-Sep	163	160	157	158	154	149	152	145	150	157	157	153	158	168	178	177	175	174	165	165	159	158	154	145	160.3
29-Sep	145	139	138	137	132	132	139	136	136	136	141	142	149	169	187	201	202	184	199	193	175	189	166	150	161.1
30-Sep	160	163	167	190	210	254	260	164	214	270	284	309	323	330	337	341	290	325	8	14	19	10	6	26	309.0

215.1	199.9	206.0	185.8	178.5	166.9	189.5	171.6	150.9	177.7	221.9	204.7	237.2	228.4	239.8	240.7	227.8	214.5	153.9	162.4	178.6	242.8	251.8	260.2
Diurnal Average																							

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



Summary of Hour Standard Deviations

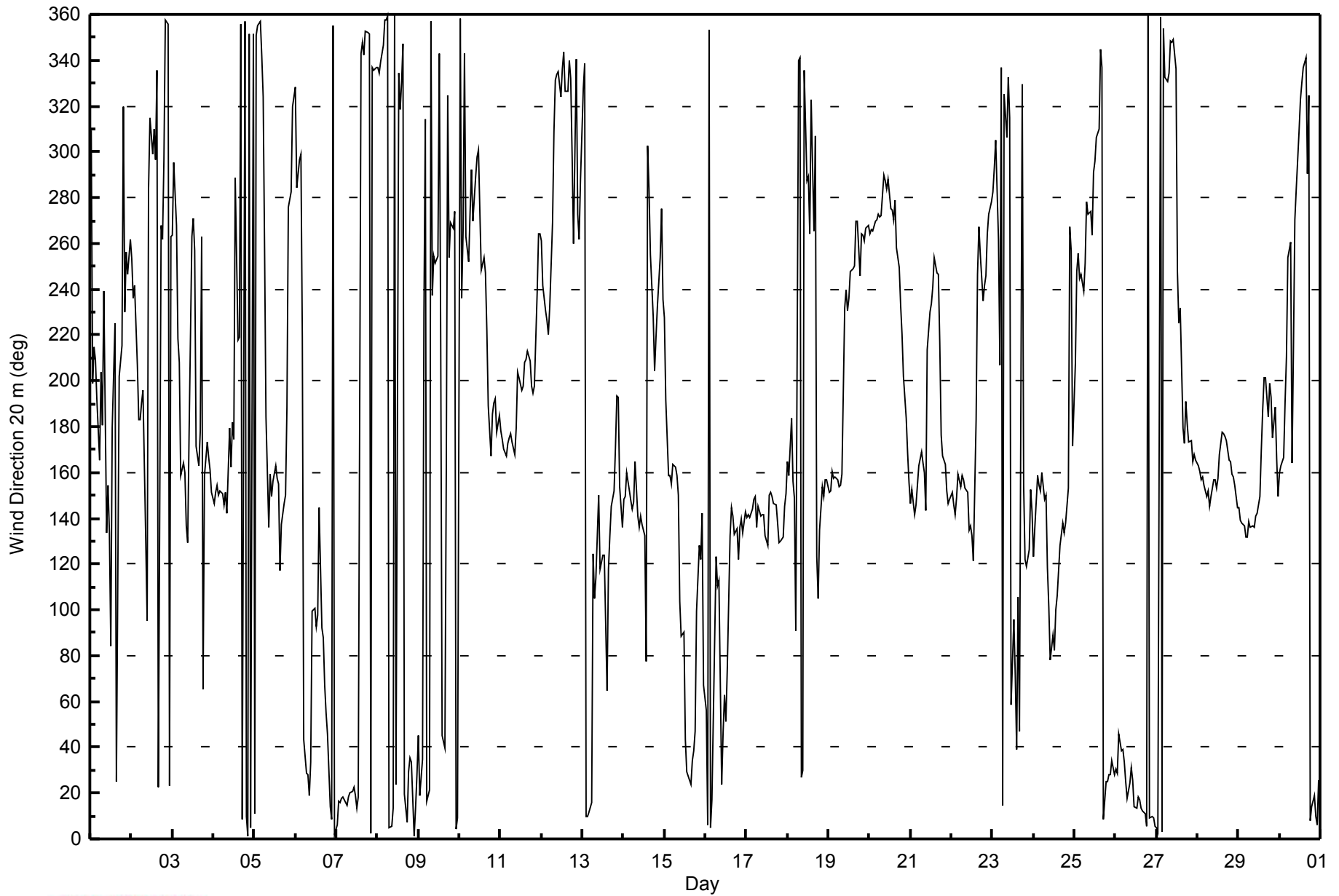
Mannix - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 92 deg on Sep 2 11:00 Minimum Value: 4 deg on Sep 22 23:00 Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 13 Median = 16 Q ₃ = 25 P ₉₀ = 46 P ₉₉ = 76																	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	90	22	16	20	18	38	53	35	45	43	31	34	21	39	20	64	41	24	37	91	18	27	12	7	91
2-Sep	12	23	20	62	42	38	35	53	32	17	92	38	46	46	35	24	59	44	16	32	53	11	25	50	92
3-Sep	9	53	60	18	10	22	18	16	21	30	68	29	29	49	55	23	23	70	42	30	15	13	13	17	70
4-Sep	14	15	15	14	14	14	15	18	29	41	22	24	25	67	18	15	61	19	22	18	23	21	24	21	67
5-Sep	19	21	27	14	18	58	28	41	29	25	25	22	23	16	41	29	12	16	17	62	22	21	19	16	62
6-Sep	16	28	14	27	33	46	16	14	15	25	49	37	24	20	24	18	10	17	16	33	12	14	15	16	49
7-Sep	14	12	13	14	12	13	13	12	13	14	13	15	15	17	17	19	17	18	19	20	20	18	16	18	20
8-Sep	17	15	17	16	13	14	15	20	19	37	40	19	29	23	29	23	17	22	20	19	18	39	13	20	40
9-Sep	12	17	19	59	64	43	12	60	14	39	22	20	55	41	61	60	70	76	51	27	30	36	18	15	76
10-Sep	30	27	27	59	18	13	11	14	16	17	20	35	21	45	48	60	32	21	14	15	16	15	14	21	60
11-Sep	24	20	11	11	15	16	18	17	17	31	19	20	21	21	19	17	17	15	12	14	24	7	7	7	31
12-Sep	7	31	10	8	17	60	11	22	20	20	23	22	23	20	22	21	22	16	23	64	58	48	9	32	64
13-Sep	30	47	26	20	12	28	69	14	28	69	30	21	35	37	55	40	15	13	12	13	15	13	29	22	69
14-Sep	11	11	13	20	15	14	13	18	26	24	21	20	19	51	71	23	13	22	11	15	9	38	71	10	71
15-Sep	16	15	16	15	12	11	12	16	24	44	79	34	49	53	44	19	15	14	10	20	16	20	21	44	79
16-Sep	22	24	15	13	26	14	18	19	28	32	23	20	31	51	24	16	15	14	14	19	14	14	19	14	51
17-Sep	15	16	14	15	17	15	16	15	14	14	18	17	17	19	16	15	14	13	14	14	11	13	12	12	19
18-Sep	14	13	23	14	14	50	42	24	25	21	56	42	27	35	55	34	61	53	10	13	19	13	14	13	61
19-Sep	14	13	15	15	14	16	15	15	17	34	14	16	17	14	13	13	15	27	14	13	11	10	10	9	34
20-Sep	7	7	8	8	10	12	7	8	12	13	13	16	12	13	17	11	14	10	9	10	14	13	15	12	17
21-Sep	13	13	15	12	13	14	13	14	18	22	37	17	21	14	14	16	15	20	16	11	12	10	10	11	37
22-Sep	11	11	13	10	11	11	11	13	15	22	15	16	14	24	66	14	9	9	9	8	10	6	4	5	66
23-Sep	11	16	18	17	36	84	53	33	39	37	39	80	60	64	56	75	77	59	45	8	9	25	13	9	84
24-Sep	11	11	20	13	16	16	28	26	23	26	19	10	17	16	19	14	15	12	13	12	14	33	49	18	49
25-Sep	17	12	11	10	14	12	12	11	11	10	14	15	14	15	17	15	14	24	14	14	13	13	13	13	24
26-Sep	13	13	11	12	13	13	14	11	12	13	14	12	12	13	11	12	12	12	14	15	12	12	11	13	15
27-Sep	14	16	16	16	13	14	14	16	17	27	44	26	57	25	64	55	28	16	12	8	9	8	9	8	64
28-Sep	9	10	10	11	12	12	12	11	12	12	13	13	13	14	15	16	15	13	10	10	9	10	11	10	16
29-Sep	12	10	11	11	11	11	10	12	11	13	14	15	18	18	18	15	14	16	15	16	12	12	20	9	20
30-Sep	12	13	9	15	23	48	64	61	24	19	16	25	16	18	29	31	35	40	25	17	15	18	17	14	64
																	Diurnal Maximum 90 53 60 62 64 84 69 61 45 69 92 80 60 67 71 75 77 76 51 91 58 48 71 50								



WBEA
Hourly Averages

Wind Direction 20 m (WD20m) - deg
Mannix - September 2014





Direction of Maximum Speed: 178 deg on Sep 28 16:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 160.8 deg on Sep 28		Hours of Data:	720
Direction of Minimum Speed: 31 deg on Sep 23 17:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 1.1 deg on Sep 23		Percent Operational Time:	100.0
Monthly Average Direction: 244.3 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	287	208	224	233	216	185	222	189	232	140	152	135	85	182	223	28	110	200	199	314	254	294	259	269	215.0
2-Sep	277	278	275	277	219	213	224	192	151	107	277	319	315	317	304	341	24	277	267	312	6	0	17	344	313.1
3-Sep	288	337	8	186	223	200	186	169	151	141	188	265	271	258	165	162	178	245	65	161	168	173	169	158	182.1
4-Sep	151	152	155	151	154	152	148	154	148	179	163	180	176	282	217	214	358	13	359	9	2	356	6	353	129.7
5-Sep	12	351	353	356	343	341	296	164	139	160	151	157	163	158	161	121	135	145	146	172	272	285	325	330	131.6
6-Sep	334	309	311	339	281	36	30	30	21	37	106	109	89	98	144	95	90	67	57	45	15	9	360	4	25.4
7-Sep	7	17	18	17	18	16	15	18	21	20	22	18	14	19	348	351	346	356	355	350	2	341	340	341	5.8
8-Sep	343	339	344	350	360	0	1	6	6	11	1	22	337	325	334	350	20	12	30	36	37	10	19	31	0.3
9-Sep	47	30	43	139	348	17	29	20	238	260	251	254	344	216	44	39	158	335	262	270	277	318	8	13	348.7
10-Sep	5	234	271	331	284	266	290	298	283	295	304	304	278	248	248	243	216	188	170	186	190	193	190	201	236.3
11-Sep	199	197	194	182	179	178	179	175	169	181	203	199	195	196	206	208	212	209	199	202	212	245	268	268	201.4
12-Sep	267	257	241	240	241	271	288	320	334	338	338	326	341	346	331	332	342	337	310	286	346	284	269	315	316.0
13-Sep	330	352	13	9	10	31	71	109	110	149	126	125	126	125	75	123	131	146	154	172	183	190	184	158	138.5
14-Sep	143	144	146	159	162	160	146	162	143	135	140	140	132	81	296	286	255	225	209	225	232	245	289	252	185.1
15-Sep	260	243	196	179	165	169	176	166	164	140	99	97	41	25	24	24	35	38	57	101	125	125	141	91	114.9
16-Sep	69	28	0	16	31	86	121	112	113	27	49	59	51	75	132	143	139	131	133	121	133	137	132	141	108.0
17-Sep	137	139	139	143	148	148	136	144	141	140	141	131	128	150	151	149	146	146	136	127	132	132	145	147	141.3
18-Sep	160	160	181	166	160	334	339	347	23	28	332	297	290	271	319	260	322	119	103	124	149	143	158	155	154.9
19-Sep	153	149	161	158	163	164	157	158	168	232	239	230	236	247	248	250	271	271	247	265	266	262	268	271	235.2
20-Sep	265	268	268	272	273	277	275	276	293	290	286	291	277	275	271	281	259	250	236	227	215	197	187	167	263.7
21-Sep	153	161	156	151	157	170	177	183	176	164	215	228	230	241	253	246	245	216	182	169	168	157	153	155	187.5
22-Sep	155	151	147	145	147	146	155	156	154	153	135	139	133	126	194	245	266	258	243	247	251	266	276	284	194.7
23-Sep	285	299	313	277	209	285	21	338	322	337	321	60	90	66	43	117	31	323	115	107	115	116	142	132	310.3
24-Sep	120	127	141	135	139	148	138	134	119	109	89	94	88	102	108	125	131	136	134	137	153	266	259	178	134.9
25-Sep	210	250	258	249	250	242	253	281	274	275	264	293	298	309	312	348	339	9	26	25	28	27	34	29	295.5
26-Sep	31	30	43	39	38	33	28	19	25	31	26	15	14	20	18	13	12	12	7	2	10	10	10	7	17.3
27-Sep	8	7	3	6	359	337	334	335	349	351	355	337	247	221	232	185	174	188	185	179	178	160	170	170	336.8
28-Sep	166	159	156	155	152	149	152	147	150	157	156	153	156	168	178	178	176	174	165	166	160	159	156	149	160.8
29-Sep	150	142	139	137	133	131	136	136	133	134	138	142	149	170	186	201	201	186	199	193	181	195	185	157	163.3
30-Sep	164	167	169	189	226	279	292	155	213	270	304	318	326	335	339	348	296	325	13	18	21	14	10	28	308.3
197.3	184.0	197.4	174.2	176.4	171.2	179.4	162.7	149.1	192.1	215.4	209.0	231.9	222.5	233.0	234.1	218.8	207.1	162.8	175.8	183.0	220.9	223.9	212.3		
Diurnal Average																									

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



Summary of Hour Standard Deviations

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on Sep 18 06:00	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0
Minimum Value: 2 deg on Sep 14 21:00	
Percentiles: P ₁ = 4 P ₁₀ = 6 Q ₁ = 8 Median = 11 Q ₃ = 19 P ₉₀ = 38 P ₉₉ = 72	

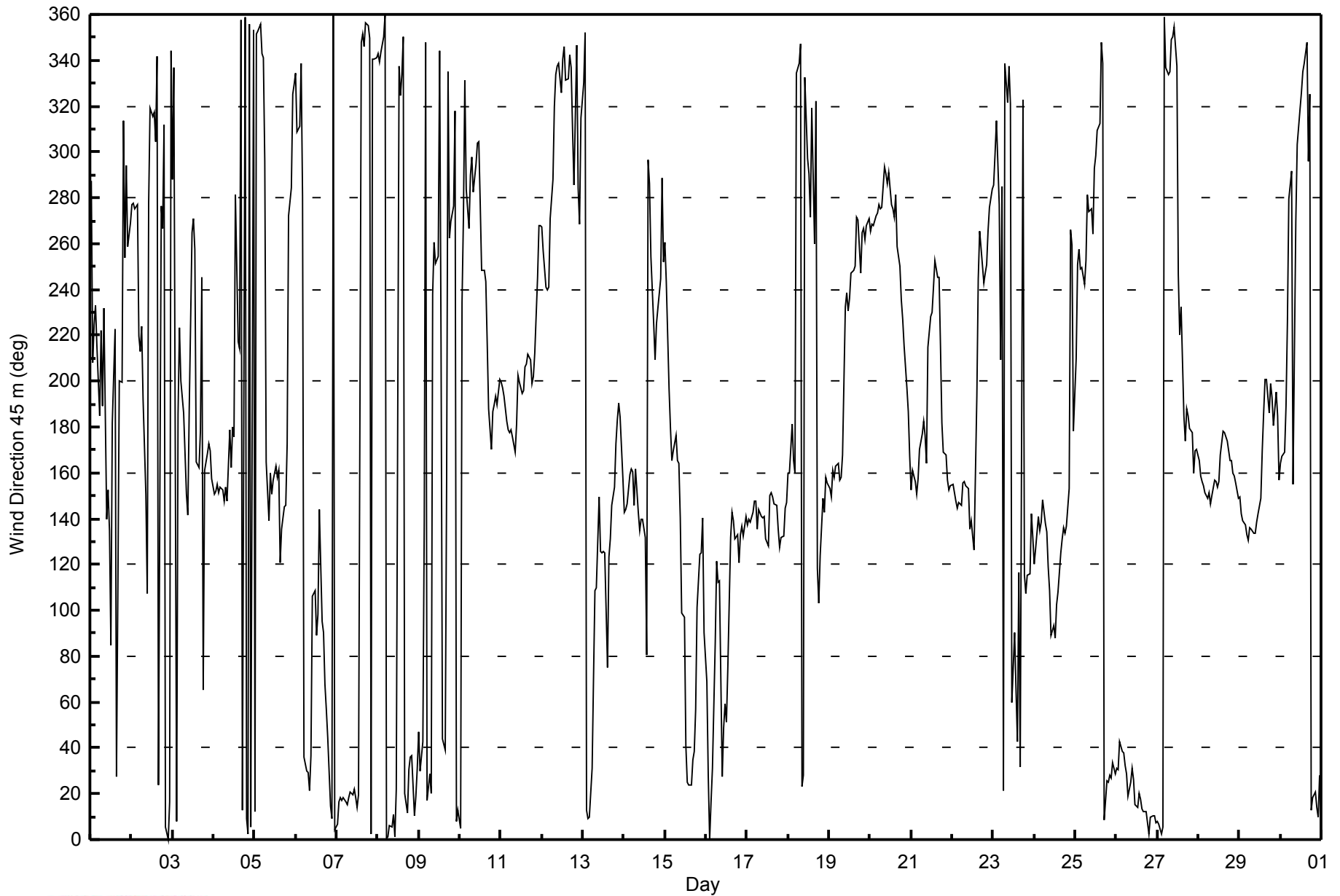
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	59	28	12	12	18	30	41	29	41	36	18	29	17	36	16	63	39	15	22	70	26	23	10	7	70
2-Sep	10	17	18	52	85	29	20	38	24	30	81	28	35	41	32	20	32	40	12	18	23	5	12	38	85
3-Sep	8	33	62	46	17	10	15	12	16	22	57	27	27	47	54	16	16	70	40	26	10	4	4	7	70
4-Sep	8	8	7	7	7	7	8	10	19	19	16	11	15	66	20	7	67	12	15	12	17	14	16	13	67
5-Sep	13	14	17	10	14	41	52	70	21	18	19	16	15	9	33	24	7	10	11	33	18	20	11	10	70
6-Sep	9	18	8	25	49	13	10	10	9	19	40	30	19	11	17	13	9	15	12	31	6	6	9	9	49
7-Sep	9	7	8	9	7	8	8	8	8	9	9	10	11	13	9	12	10	12	13	14	15	10	9	11	15
8-Sep	9	8	9	9	6	8	7	11	12	32	27	14	24	17	20	17	12	17	13	14	12	33	10	19	33
9-Sep	10	12	13	74	49	39	9	60	8	36	22	18	59	28	61	53	56	73	57	25	39	31	11	10	74
10-Sep	13	76	24	41	12	6	8	6	14	13	13	30	19	33	39	53	25	11	7	3	5	4	4	10	76
11-Sep	13	8	5	5	4	5	6	7	8	23	10	10	12	11	15	11	10	7	4	6	7	19	5	6	23
12-Sep	6	7	5	4	8	28	7	12	13	13	16	17	15	12	15	13	15	9	16	50	18	44	12	25	50
13-Sep	24	35	16	16	11	11	27	10	23	60	23	16	33	34	45	34	9	9	5	6	4	4	14	8	60
14-Sep	3	3	8	8	9	8	5	14	15	17	14	17	15	51	69	19	11	17	5	5	2	17	32	8	69
15-Sep	8	16	25	10	5	5	9	11	20	38	81	29	36	49	35	13	11	11	10	15	12	13	13	35	81
16-Sep	16	27	11	11	23	12	13	11	24	28	19	16	25	40	17	12	10	9	11	14	10	11	15	11	40
17-Sep	11	12	9	9	12	9	12	11	9	10	13	12	11	14	11	10	10	9	10	8	6	7	7	5	14
18-Sep	5	5	9	8	11	97	20	12	17	14	46	34	29	38	58	34	63	49	6	13	16	13	6	6	97
19-Sep	8	6	7	6	8	9	7	6	11	26	11	11	14	12	10	11	15	26	12	13	10	8	10	9	26
20-Sep	6	7	7	7	8	10	6	7	7	10	10	13	10	12	16	11	13	8	5	5	6	7	10	6	16
21-Sep	7	7	11	5	4	9	5	8	11	24	26	13	18	12	12	14	12	16	9	4	6	5	5	5	26
22-Sep	5	6	8	5	8	5	4	6	9	18	10	12	9	16	60	11	9	6	6	3	8	4	4	4	60
23-Sep	8	10	11	19	14	60	32	24	28	28	36	91	49	60	59	72	81	63	13	7	8	14	9	4	91
24-Sep	8	8	11	5	6	9	12	16	16	18	16	8	14	11	15	10	11	7	8	8	10	33	39	11	39
25-Sep	15	10	8	8	11	9	9	11	11	8	13	12	11	12	14	9	9	23	10	9	9	9	10	9	23
26-Sep	10	10	8	9	9	10	11	7	9	9	11	8	8	10	7	7	8	9	10	12	8	7	7	8	12
27-Sep	11	12	14	13	11	11	9	11	12	22	32	24	52	19	49	44	22	9	6	3	3	4	6	4	52
28-Sep	4	7	6	7	8	9	9	8	9	9	10	9	10	10	8	10	10	7	6	7	6	6	8	8	10
29-Sep	8	5	6	5	6	5	5	7	7	9	10	11	14	13	12	10	8	11	9	10	6	7	18	5	18
30-Sep	9	9	6	12	19	14	25	49	19	19	16	16	11	15	23	24	35	37	16	14	11	12	13	10	49

59	76	62	74	85	97	52	70	41	60	81	91	59	66	69	72	81	73	57	70	39	44	39	38	
Diurnal Maximum																								



WBEA
Hourly Averages

Wind Direction 45 m (WD45m) - deg
Mannix - September 2014





Direction of Maximum Speed: 177 deg on Sep 28 16:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 161.1 deg on Sep 28		Hours of Data:	720
Direction of Minimum Speed: 51 deg on Sep 23 17:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 1.6 deg on Sep 15		Percent Operational Time:	100.0
Monthly Average Direction: 249.4 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	282	213	232	252	247	237	247	213	241	143	154	133	85	178	221	28	92	205	204	321	285	321	288	273	233.8
2-Sep	290	309	301	306	356	240	266	206	175	140	278	319	322	318	307	346	28	288	277	316	6	3	12	3	325.8
3-Sep	319	342	341	273	264	210	207	190	178	159	201	263	269	257	166	162	179	241	62	165	171	167	169	172	184.3
4-Sep	161	159	168	159	162	160	154	153	177	165	180	179	281	218	212	355	16	2	11	5	359	6	357		137.2
5-Sep	11	351	351	354	340	339	337	140	142	159	152	156	161	157	162	127	136	143	144	169	256	285	328	332	115.4
6-Sep	337	319	321	351	326	33	31	30	26	43	108	105	87	98	140	96	92	71	62	48	18	12	4	7	25.6
7-Sep	9	18	20	18	19	18	17	20	22	20	23	19	17	20	350	353	348	358	357	350	4	343	344	345	7.2
8-Sep	347	344	348	354	2	2	3	8	7	12	5	23	341	328	335	354	22	15	32	38	39	19	22	31	3.7
9-Sep	48	35	47	83	18	11	29	31	238	262	257	252	342	220	50	40	158	342	287	267	285	342	14	19	5.7
10-Sep	10	6	270	327	295	289	301	301	295	299	306	303	279	249	245	242	215	187	175	190	191	199	205	210	237.8
11-Sep	210	208	204	198	187	182	183	179	172	185	201	198	194	195	204	206	211	209	202	211	223	253	268	270	204.3
12-Sep	270	268	252	249	256	285	306	326	334	340	340	328	343	346	333	334	343	339	317	309	351	307	286	330	319.0
13-Sep	335	3	18	14	14	33	63	111	113	136	131	129	134	127	77	126	132	147	155	171	177	191	202	191	148.5
14-Sep	157	158	157	166	172	180	146	157	148	137	140	142	135	81	280	284	254	225	214	238	240	252	280	259	194.3
15-Sep	265	264	250	225	230	201	216	208	200	173	90	100	37	25	24	27	38	41	66	104	125	128	139	100	96.7
16-Sep	83	66	19	40	61	91	122	118	114	35	52	60	54	75	130	141	139	132	135	122	134	137	135	141	108.7
17-Sep	138	140	139	143	146	147	136	144	141	141	142	133	132	150	151	149	147	146	138	133	140	138	142	139	142.0
18-Sep	147	150	176	209	202	303	337	359	26	27	333	304	293	277	323	256	328	116	104	118	140	140	155	149	150.8
19-Sep	148	146	161	166	177	186	170	171	184	231	237	230	235	246	248	250	271	270	248	266	268	263	268	271	233.9
20-Sep	266	269	270	273	274	278	276	278	294	290	287	291	277	275	272	281	257	249	239	233	226	207	199	179	264.1
21-Sep	165	175	200	172	178	194	207	213	198	193	218	227	229	240	250	244	243	217	188	175	177	170	164	160	197.6
22-Sep	161	157	152	143	137	141	149	155	157	159	141	145	137	136	203	243	264	257	248	256	260	270	279	288	196.5
23-Sep	285	301	318	283	210	251	28	350	336	346	328	56	87	68	54	124	51	328	105	103	112	109	137	125	319.1
24-Sep	124	128	137	129	133	137	132	124	119	113	99	98	94	105	109	125	134	137	135	138	155	264	261	184	137.9
25-Sep	214	252	258	250	251	243	253	282	274	275	264	293	300	311	314	349	341	10	26	27	28	28	35	31	296.4
26-Sep	34	33	45	41	39	37	33	21	27	34	29	17	16	23	20	15	13	14	9	4	11	11	11	9	19.7
27-Sep	9	10	4	8	4	341	338	338	351	355	3	342	244	219	236	185	173	185	187	180	177	163	176	181	341.7
28-Sep	175	162	157	154	151	149	151	148	151	157	156	153	156	167	177	177	174	174	166	166	161	160	158	153	161.1
29-Sep	156	149	146	142	139	139	137	137	135	135	140	143	149	169	184	199	199	186	199	194	185	204	204	168	165.5
30-Sep	172	172	170	189	241	287	306	135	218	281	327	328	329	338	341	356	298	328	15	22	21	14	12	29	322.2
208.7	185.6	194.6	188.0	192.8	193.7	194.8	176.3	161.9	200.6	214.4	210.3	233.1	222.9	231.1	234.5	221.1	207.3	171.3	185.4	191.5	222.7	229.9	228.4		
Diurnal Average																									

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



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 101 deg on Sep 10 02:00	Hours of Data: 720
Minimum Value: 2 deg on Sep 10 07:00	Hours of Missing Data: 0
Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 7 Median = 10 Q ₃ = 16 P ₉₀ = 33 P ₉₉ = 76	Hours of Calibration: 0
	Percent Operational Time: 100.0

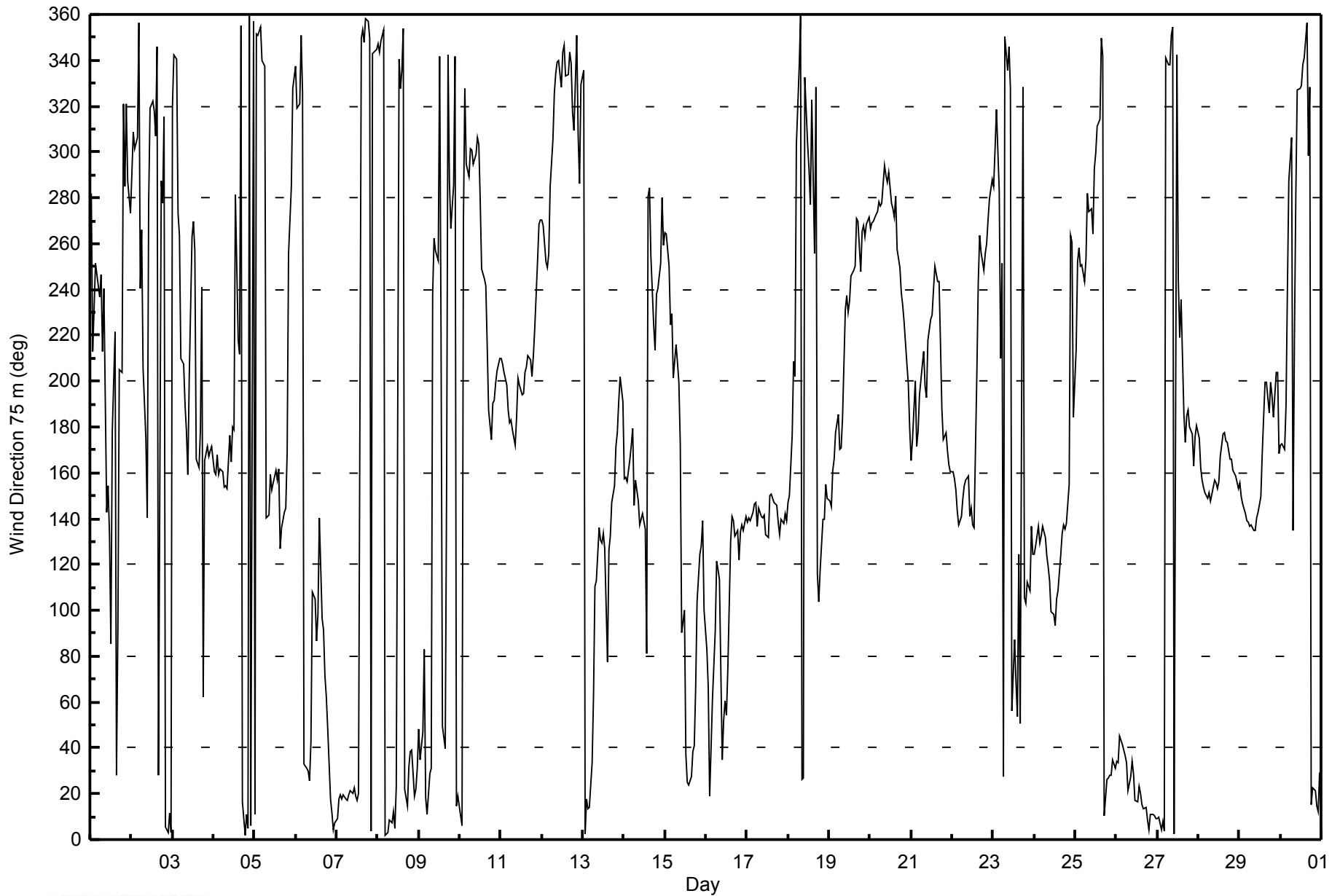
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	36	33	12	10	13	28	40	28	45	36	16	24	15	36	14	62	33	16	12	54	15	26	27	7	62
2-Sep	7	11	13	16	89	25	38	41	21	70	66	30	33	37	31	18	18	34	13	13	18	5	5	18	89
3-Sep	9	13	33	35	26	32	12	7	16	23	56	24	24	43	57	13	14	70	40	22	7	3	3	5	70
4-Sep	6	4	5	3	4	5	6	7	19	11	12	9	13	62	24	5	69	11	13	10	15	11	13	11	69
5-Sep	10	12	14	9	12	28	41	51	17	15	17	13	12	8	27	20	6	7	8	20	17	22	8	8	51
6-Sep	8	13	7	20	41	10	8	9	8	20	32	23	16	12	14	14	9	14	11	28	6	5	7	7	41
7-Sep	7	6	7	8	6	6	7	6	7	7	7	9	9	11	7	11	8	11	12	12	15	8	7	9	15
8-Sep	7	6	8	7	5	5	6	9	9	23	24	12	23	16	18	16	9	17	10	12	9	29	7	15	29
9-Sep	8	10	12	23	46	26	9	53	18	38	24	18	65	21	67	48	40	79	54	28	32	26	9	8	79
10-Sep	9	101	21	36	7	5	2	4	13	13	11	29	17	31	37	46	25	10	9	2	3	3	4	4	101
11-Sep	7	6	3	5	4	3	3	5	7	19	9	9	10	10	14	10	8	6	3	7	8	14	5	5	19
12-Sep	4	5	5	4	4	9	4	10	12	11	14	15	14	11	13	12	13	8	14	45	10	42	18	16	45
13-Sep	18	30	14	13	9	10	13	15	25	60	24	17	27	26	41	36	9	7	5	4	2	6	3	14	60
14-Sep	5	4	7	3	5	6	7	12	18	16	12	13	12	46	77	19	11	15	6	3	3	10	20	5	77
15-Sep	4	7	21	9	16	13	10	12	17	38	79	33	33	47	31	11	10	9	11	15	14	13	10	29	79
16-Sep	11	25	13	10	18	11	14	13	24	25	16	13	25	32	16	10	8	8	10	15	9	10	13	9	32
17-Sep	9	10	7	7	10	7	10	9	7	8	11	10	10	12	9	8	8	7	8	7	5	4	4	3	12
18-Sep	4	5	8	13	21	39	15	11	12	12	45	36	34	41	55	42	61	44	12	16	14	12	4	7	61
19-Sep	6	5	5	5	13	16	11	4	12	20	9	11	13	10	9	10	14	26	12	12	10	7	9	8	26
20-Sep	6	6	7	7	8	8	5	7	6	9	9	11	9	11	15	12	13	6	4	4	3	5	6	5	15
21-Sep	9	8	13	9	9	16	6	4	9	21	16	12	16	10	11	14	10	15	9	6	6	5	3	3	21
22-Sep	3	3	5	4	5	4	4	3	6	14	8	11	9	14	50	10	8	7	5	4	5	6	4	5	50
23-Sep	7	9	10	20	10	49	28	23	18	23	36	87	40	49	59	66	95	65	14	12	12	13	8	11	95
24-Sep	11	11	6	8	7	8	9	14	15	17	14	10	13	14	16	11	10	6	6	6	8	32	30	11	32
25-Sep	14	9	7	7	9	7	8	11	11	7	12	12	10	11	16	7	7	21	7	8	6	6	9	6	21
26-Sep	7	8	6	7	7	8	9	5	6	7	11	7	7	8	6	6	7	8	8	10	6	5	6	6	11
27-Sep	9	10	12	11	11	10	7	8	12	21	29	23	41	17	61	33	23	8	6	4	4	3	4	4	61
28-Sep	3	6	3	5	6	6	6	6	7	8	9	8	9	9	7	9	8	6	5	5	5	4	6	5	9
29-Sep	5	3	3	2	4	3	3	5	7	8	9	9	12	12	11	8	8	10	7	8	5	8	11	5	12
30-Sep	8	6	5	15	18	12	20	51	30	15	17	14	10	13	22	22	33	36	13	11	8	9	13	8	51

36	101	33	36	89	49	41	53	45	70	79	87	65	62	77	66	95	79	54	54	32	42	30	29	
Diurnal Maximum																								



WBEA
Hourly Averages

Wind Direction 75 m (WD75m) - deg
Mannix - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 97 deg on Sep 23 17:00			Hours of Data:	719
Minimum Value: 1 deg on Sep 13 21:00			Hours of Missing Data:	1
Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 10 Q ₃ = 16 P ₉₀ = 33 P ₉₉ = 73			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	28	32	11	8	8	20	40	19	45	35	16	24	17	36	15	63	35	16	10	47	12	25	32	7	63
2-Sep	10	12	14	15	81	53	40	53	25	75	58	29	29	34	29	18	17	32	14	10	18	5	4	14	81
3-Sep	9	10	27	12	21	34	18	7	13	28	53	20	20	39	57	13	14	69	40	18	5	4	5	4	69
4-Sep	5	6	10	5	5	6	8	7	21	12	12	9	13	61	28	5	68	10	12	9	13	10	12	10	68
5-Sep	9	12	12	10	12	19	35	59	20	14	18	13	11	8	26	15	5	8	7	21	17	21	7	7	59
6-Sep	8	11	7	17	35	9	7	8	7	20	34	25	19	12	14	14	8	14	10	26	5	4	6	7	35
7-Sep	6	6	6	7	5	6	6	6	7	7	7	8	9	10	7	10	8	10	11	12	14	7	6	8	14
8-Sep	6	6	7	7	5	5	6	8	8	20	23	12	22	15	18	15	9	16	9	11	8	26	6	13	26
9-Sep	7	9	11	15	43	24	9	46	21	38	21	17	64	21	74	62	46	78	53	27	24	25	8	6	78
10-Sep	7	79	19	35	5	4	2	4	12	12	9	27	16	28	35	42	24	10	10	2	3	3	4	4	79
11-Sep	6	5	3	5	4	3	3	5	7	18	9	9	10	10	13	10	8	6	3	8	8	11	4	4	18
12-Sep	3	5	6	3	3	10	4	9	12	11	14	15	13	10	13	12	13	7	13	42	UO	38	19	13	42
13-Sep	11	26	13	12	8	11	13	8	22	54	29	20	29	32	46	42	9	8	5	4	1	4	3	9	54
14-Sep	7	2	8	4	5	13	6	11	21	22	13	13	12	49	67	17	10	14	6	3	3	8	15	6	67
15-Sep	7	5	12	8	10	11	8	10	15	33	83	36	36	44	32	10	10	9	12	13	11	9	9	26	83
16-Sep	10	22	14	9	14	10	11	10	23	25	14	13	27	33	17	10	8	7	9	11	8	9	13	9	33
17-Sep	9	10	7	7	10	7	10	9	7	8	11	9	9	12	8	8	8	6	8	6	5	4	3	2	12
18-Sep	4	4	18	12	21	17	14	9	10	11	42	32	39	39	50	44	61	41	4	8	11	11	3	6	61
19-Sep	5	4	4	7	17	18	13	6	11	18	9	11	13	9	8	9	13	24	12	10	9	6	8	7	24
20-Sep	6	6	6	7	7	7	4	6	6	8	8	11	9	10	14	11	12	5	4	4	4	5	5	6	14
21-Sep	14	14	9	13	12	13	4	4	7	20	14	12	16	10	10	12	9	15	9	7	7	5	2	3	20
22-Sep	3	3	5	3	5	5	3	3	5	12	9	11	9	13	49	10	7	6	4	4	4	5	3	5	49
23-Sep	6	9	10	20	12	43	29	17	15	20	35	83	38	55	54	66	97	67	12	6	5	6	8	5	97
24-Sep	5	6	6	4	5	6	6	9	12	13	9	8	11	11	14	9	9	6	6	6	7	32	26	12	32
25-Sep	14	9	7	6	8	7	7	10	10	7	11	12	9	10	17	6	7	21	6	7	6	6	8	6	21
26-Sep	7	7	5	6	6	7	8	4	6	7	10	6	6	8	5	6	6	7	7	9	5	5	6	6	10
27-Sep	9	10	11	11	11	9	7	7	11	19	27	24	51	17	48	33	24	8	6	4	4	2	5	4	51
28-Sep	3	6	2	4	4	5	6	5	7	8	9	7	8	9	7	9	8	6	5	5	5	4	5	4	9
29-Sep	4	2	3	3	4	4	2	4	5	7	10	10	12	12	11	8	8	10	7	8	6	9	9	7	12
30-Sep	8	8	7	17	16	14	16	57	35	17	15	13	9	12	21	22	30	33	12	10	7	7	13	7	57

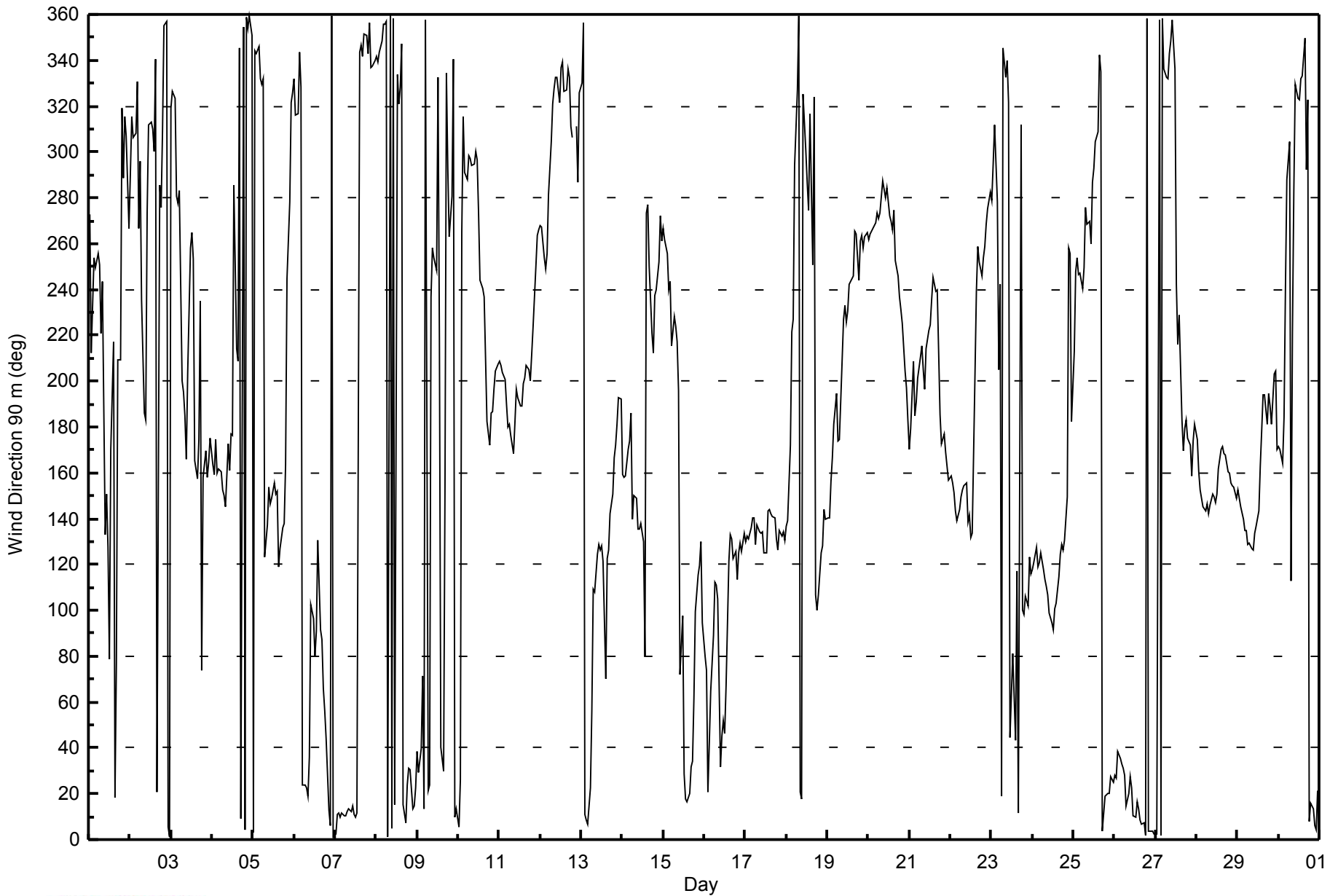
28	79	27	35	81	53	40	59	45	75	83	83	64	61	74	66	97	78	53	47	24	38	32	26	
Diurnal Maximum																								

UO - Unstable Operation



WBEA
Hourly Averages

Wind Direction 90 m (WD90m) - deg
Mannix - September 2014





Summary of Hour Averages

Mannix - September 2014

Maximum Value: 0.8 km/h on Sep 28 12:00		Maximum Daily Average: 0.5 km/h on Sep 28		Hours in Service: 720																						
Minimum Value: -0.9 km/h on Sep 26 21:00		Minimum Daily Average: -0.3 km/h on Sep 12		Hours of Data: 720																						
Maximum Diurnal Average: 0.1 km/h at hour 10		Minimum Diurnal Average: 0.0 km/h at hour 21		Hours of Missing Data: 0																						
Monthly Average: 0.02 km/h		Percentiles: P ₁ = -0.6 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.0 Q ₃ = 0.2 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	0.0	-0.2	-0.2	-0.2	-0.2	0.0	0.0	0.1	-0.1	0.2	0.3	0.3	0.3	0.1	-0.2	0.2	0.2	-0.1	0.0	-0.1	-0.2	-0.1	-0.1	0.0	0.0	0.3
2-Sep	0.0	-0.1	-0.1	-0.1	-0.2	-0.1	0.0	0.3	0.5	0.2	-0.2	0.1	-0.1	0.0	-0.2	-0.5	0.0	0.0	0.1	-0.1	-0.2	-0.4	-0.1	-0.3	-0.1	0.5
3-Sep	-0.1	-0.1	0.0	-0.1	-0.4	-0.1	0.0	0.0	0.4	0.4	0.2	-0.1	-0.1	-0.1	0.1	0.1	0.1	-0.1	0.2	0.1	-0.1	0.2	0.4	0.3	0.0	0.4
4-Sep	0.2	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.1	0.2	0.2	0.1	0.0	-0.1	-0.2	-0.2	-0.2	-0.2	-0.3	-0.5	-0.2	-0.4	-0.3	0.0	0.3
5-Sep	-0.2	-0.3	-0.2	-0.3	-0.3	-0.3	-0.2	-0.1	0.1	0.2	0.1	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	-0.1	0.0	-0.1	-0.3	-0.6	0.0	0.3
6-Sep	-0.2	0.1	-0.2	-0.1	-0.4	0.3	0.1	0.1	-0.1	0.3	0.1	0.2	0.3	0.1	0.2	0.5	0.5	0.6	0.6	0.3	-0.3	-0.3	-0.4	-0.4	0.1	0.6
7-Sep	-0.6	-0.3	0.4	0.0	-0.1	-0.2	-0.2	-0.1	0.0	0.1	-0.1	0.1	-0.4	-0.1	-0.5	-0.5	-0.7	-0.5	-0.2	0.0	-0.2	-0.3	-0.3	-0.1	-0.2	0.4
8-Sep	-0.1	-0.4	-0.2	-0.4	-0.5	-0.4	-0.2	-0.1	0.0	-0.1	0.1	-0.1	-0.4	-0.1	-0.1	-0.4	-0.1	-0.2	0.1	0.0	0.1	-0.1	-0.1	0.1	-0.1	0.1
9-Sep	0.1	-0.1	0.1	-0.2	-0.1	0.0	0.0	-0.2	-0.1	-0.1	-0.3	-0.3	-0.1	0.2	0.1	0.0	0.1	0.0	-0.1	0.1	0.0	0.0	-0.3	-0.3	-0.1	0.2
10-Sep	-0.2	-0.2	0.0	0.0	-0.1	-0.3	-0.1	-0.3	0.0	0.0	-0.1	0.1	-0.1	0.0	-0.1	0.1	-0.2	0.1	0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	0.2
11-Sep	-0.1	-0.1	-0.2	0.0	0.2	0.1	0.2	0.2	0.3	0.3	0.0	-0.1	0.1	0.1	0.0	-0.1	-0.3	0.1	-0.1	-0.2	-0.1	-0.3	0.2	0.2	0.0	0.3
12-Sep	0.1	-0.3	-0.1	-0.3	-0.2	-0.1	0.0	-0.2	-0.4	-0.5	-0.6	-0.4	-0.4	-0.5	-0.4	-0.6	-0.4	-0.3	-0.2	-0.1	-0.5	0.0	0.1	-0.1	-0.3	0.1
13-Sep	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	0.1	0.1	0.1	0.1	0.4	0.4	-0.1	0.2	0.2	0.2	0.3	0.1	0.3	0.0	-0.1	-0.1	0.0	0.3	0.1	0.4
14-Sep	0.1	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.3	0.2	-0.1	0.3	0.0	0.3	0.2	-0.1	-0.1	0.0	-0.2	-0.2	-0.3	-0.1	0.0	-0.1	0.1	0.3
15-Sep	-0.2	-0.4	-0.3	-0.1	0.0	0.0	-0.1	0.0	0.1	0.3	0.1	0.0	0.0	0.6	0.2	0.1	0.0	0.5	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.6
16-Sep	0.3	-0.1	-0.3	-0.4	-0.1	0.3	0.2	0.4	0.2	-0.1	0.7	0.5	0.3	0.2	0.3	0.0	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.3	0.2	0.7
17-Sep	0.3	0.3	0.2	0.1	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.3	0.4	0.4	0.4	0.6	0.3	0.1	0.2	0.0	0.1	0.2	0.1	0.2	0.3	0.6
18-Sep	0.3	0.2	0.0	0.1	0.0	0.1	-0.1	-0.1	-0.1	-0.1	0.2	0.3	0.0	0.0	0.3	0.1	-0.1	0.0	0.1	0.1	0.1	0.2	0.3	0.4	0.1	0.4
19-Sep	0.2	0.2	0.3	0.5	0.3	0.1	0.3	0.3	0.2	0.0	-0.4	-0.2	-0.3	-0.2	-0.3	-0.1	-0.2	-0.7	-0.3	0.0	0.3	0.1	0.3	0.3	0.0	0.5
20-Sep	0.3	0.3	0.2	0.5	0.1	-0.1	0.2	0.3	-0.6	-0.5	-0.2	-0.1	0.2	-0.1	0.1	0.0	0.1	-0.2	-0.3	-0.4	-0.2	-0.1	0.1	0.4	0.0	0.5
21-Sep	0.3	0.3	0.1	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.0	-0.4	-0.2	-0.4	-0.2	-0.2	-0.1	-0.2	0.0	0.3	0.4	0.4	0.4	0.3	0.1	0.4
22-Sep	0.4	0.4	0.3	0.2	0.3	0.4	0.4	0.3	0.4	0.2	0.1	0.1	0.1	0.0	0.2	-0.1	0.1	-0.1	-0.2	-0.2	-0.3	-0.1	0.0	-0.1	0.1	0.4
23-Sep	-0.3	-0.2	-0.2	0.0	-0.2	-0.1	-0.1	0.1	0.1	-0.1	0.0	0.0	-0.2	0.3	0.1	0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.0	0.3
24-Sep	0.2	0.1	0.1	0.1	0.1	0.3	0.0	0.1	0.2	0.3	0.2	0.3	0.4	0.4	0.4	0.1	0.3	0.3	0.5	0.2	0.4	0.1	0.1	0.3	0.2	0.5
25-Sep	-0.2	-0.4	-0.2	-0.3	-0.3	-0.4	-0.3	-0.1	0.0	0.0	0.0	-0.3	-0.4	-0.3	-0.4	-0.5	-0.4	-0.1	0.3	0.1	0.0	0.0	0.0	0.0	-0.2	0.3
26-Sep	0.2	0.1	0.2	0.2	0.3	0.1	0.1	-0.2	0.2	0.1	0.2	-0.1	-0.3	0.0	-0.2	-0.5	-0.4	-0.5	-0.5	-0.4	-0.9	-0.6	-0.7	-0.6	-0.2	0.3
27-Sep	-0.4	-0.4	-0.4	-0.4	-0.5	-0.6	-0.6	-0.3	-0.4	0.0	0.0	-0.1	0.1	-0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.3	0.3	0.4	-0.1	0.4
28-Sep	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.3	0.5	0.5	0.7	0.8	0.5	0.6	0.1	0.2	0.5	0.3	0.6	0.6	0.6	0.5	0.5	0.4	0.5	0.8
29-Sep	0.3	0.3	0.2	0.3	0.2	0.2	0.3	0.3	0.2	0.3	0.2	0.3	0.5	0.2	0.0	-0.1	-0.1	0.1	-0.1	0.1	0.1	0.0	0.0	0.3	0.2	0.5
30-Sep	0.3	0.2	0.3	0.0	-0.1	-0.3	0.0	0.0	0.0	-0.1	-0.2	-0.2	-0.5	-0.1	0.0	0.0	0.0	-0.1	0.0	-0.1	0.0	-0.1	-0.1	0.0	-0.1	0.3
																								Diurnal Average		
																								Diurnal Maximum		



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



Summary of Hour Averages

Mannix - September 2014

Maximum Value: 1.5 km/h on Sep 28 11:00		Maximum Daily Average: 0.9 km/h on Sep 28		Hours in Service: 720																						
Minimum Value: -1.1 km/h on Sep 26 21:00		Minimum Daily Average: -0.2 km/h on Sep 12		Hours of Data: 720																						
Maximum Diurnal Average: 0.4 km/h at hour 10		Minimum Diurnal Average: 0.1 km/h at hour 22		Hours of Missing Data: 0																						
Monthly Average: 0.22 km/h		Percentiles: P ₁ = -0.7 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.2 Q ₃ = 0.5 P ₉₀ = 0.8 P ₉₉ = 1.1		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0.1	0.0	-0.2	0.0	-0.2	0.1	0.0	0.2	-0.1	0.3	0.5	0.8	0.3	0.2	0.1	0.3	0.3	0.1	0.2	0.1	0.0	-0.1	0.0	-0.2	0.1	0.8
2-Sep	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.6	0.8	0.3	-0.1	0.2	0.0	0.0	0.0	-0.4	0.2	0.1	0.0	-0.2	-0.1	-0.4	0.0	0.0	0.0	0.8
3-Sep	-0.3	0.0	0.1	0.2	0.0	0.0	-0.1	0.1	0.4	0.9	0.6	0.0	-0.1	0.0	0.6	0.4	0.4	0.3	0.3	0.5	0.3	0.4	0.5	0.6	0.3	0.9
4-Sep	0.7	0.8	0.7	0.7	0.7	0.7	0.8	0.8	0.6	0.4	0.5	0.4	0.2	0.3	0.1	-0.2	0.0	-0.1	0.3	-0.1	-0.3	0.0	-0.1	0.0	0.3	0.8
5-Sep	0.1	-0.2	-0.1	-0.4	-0.4	0.0	0.1	0.2	0.3	0.8	0.2	0.7	1.1	0.6	0.5	0.6	0.8	0.7	0.5	0.2	0.1	0.0	-0.2	-0.4	0.2	1.1
6-Sep	-0.3	0.2	-0.2	0.0	-0.1	0.3	0.2	0.4	0.0	0.6	0.5	0.4	0.4	0.0	0.5	0.5	0.5	0.9	0.8	0.6	0.0	0.0	-0.1	-0.3	0.2	0.9
7-Sep	-0.3	-0.3	-0.3	0.1	-0.2	-0.2	-0.3	-0.1	0.0	0.2	0.1	0.3	-0.2	0.2	-0.6	-0.3	-0.7	-0.2	0.0	0.6	0.3	-0.3	-0.4	-0.1	-0.1	0.6
8-Sep	-0.2	-0.4	-0.2	-0.4	-0.4	-0.2	-0.2	0.3	0.5	0.3	0.3	0.2	-0.2	0.3	0.1	-0.2	0.2	0.3	0.4	0.1	0.4	0.1	0.0	0.3	0.1	0.5
9-Sep	0.3	0.2	0.4	0.2	0.0	0.1	0.2	0.0	-0.1	-0.1	-0.3	-0.2	0.1	0.4	0.6	0.1	0.3	0.2	0.2	0.1	0.1	-0.1	0.1	0.0	0.1	0.6
10-Sep	-0.1	0.0	0.3	0.1	0.0	-0.2	-0.2	0.0	0.1	0.4	-0.2	0.4	0.1	0.4	0.4	0.1	0.0	0.2	0.6	0.1	0.2	0.1	0.1	-0.1	0.1	0.6
11-Sep	0.0	-0.1	0.0	0.2	0.6	0.5	0.6	0.7	0.8	1.0	0.3	0.2	0.2	-0.1	0.2	-0.1	-0.4	-0.2	-0.1	-0.2	-0.3	-0.4	-0.1	-0.1	0.1	1.0
12-Sep	-0.1	-0.3	0.1	-0.3	-0.2	-0.1	-0.2	0.0	-0.3	-0.3	-0.4	0.1	0.0	-0.3	-0.3	-0.7	-0.4	-0.5	0.0	0.0	-0.7	0.0	0.0	-0.1	-0.2	0.1
13-Sep	-0.1	-0.1	0.1	0.0	-0.2	0.0	0.1	0.2	0.4	0.6	0.6	0.0	0.5	0.7	0.4	0.5	0.5	0.4	0.6	0.4	0.4	0.1	0.2	0.4	0.3	0.7
14-Sep	0.7	1.1	0.8	0.5	0.4	0.2	0.8	0.5	0.7	0.5	0.1	0.7	0.4	0.5	0.5	0.2	-0.2	0.0	-0.1	-0.3	-0.5	-0.3	-0.1	0.0	0.3	1.1
15-Sep	0.0	-0.1	0.0	0.0	0.0	-0.1	0.0	0.0	0.2	0.6	0.1	0.1	0.2	1.1	0.5	0.7	0.1	0.6	0.4	0.7	0.6	0.4	0.4	0.4	0.3	1.1
16-Sep	0.6	0.2	-0.1	0.0	0.2	0.5	0.6	1.0	0.4	0.2	0.9	0.4	0.5	0.6	0.8	0.3	0.9	0.7	0.8	1.0	0.9	1.0	0.9	1.0	0.6	1.0
17-Sep	1.0	0.9	1.0	0.7	1.0	0.9	1.0	1.1	0.9	0.8	0.7	0.7	1.0	1.0	1.0	1.3	1.2	0.7	0.7	0.6	0.6	0.7	0.5	0.5	0.8	1.3
18-Sep	0.6	0.5	0.1	0.1	0.0	0.1	-0.1	0.0	0.1	0.0	0.5	0.5	0.3	0.6	0.9	0.4	0.1	0.3	0.2	0.3	0.4	0.5	0.7	0.7	0.3	0.9
19-Sep	0.6	0.7	0.7	0.8	0.5	0.4	0.8	0.8	0.6	0.1	-0.4	0.1	-0.3	-0.4	-0.4	-0.3	-0.2	-0.5	-0.6	-0.1	0.1	-0.3	0.1	-0.2	0.1	0.8
20-Sep	-0.2	-0.1	-0.3	0.1	-0.1	-0.3	-0.4	-0.3	-0.1	-0.4	-0.2	0.2	0.0	-0.1	0.2	0.2	-0.1	-0.2	-0.4	-0.5	-0.4	-0.1	0.2	0.5	-0.1	0.5
21-Sep	0.9	0.5	0.4	0.4	0.7	0.4	0.2	0.2	0.5	0.5	0.2	-0.5	0.3	-0.5	-0.4	0.0	0.0	-0.1	0.2	0.5	0.7	0.9	0.9	0.7	0.3	0.9
22-Sep	0.9	1.2	0.7	1.0	0.9	1.1	0.8	0.8	1.0	0.6	0.5	0.4	0.2	0.2	0.7	-0.2	0.0	-0.2	-0.2	-0.5	-0.5	-0.4	-0.4	-0.5	0.3	1.2
23-Sep	-0.5	-0.2	-0.2	0.0	-0.2	0.0	0.0	0.2	0.2	0.0	0.1	0.0	-0.1	0.5	0.3	0.2	-0.1	0.0	0.2	0.3	0.2	0.4	0.6	0.5	0.1	0.6
24-Sep	0.3	0.5	0.7	0.6	0.7	0.8	0.6	0.3	0.5	0.6	0.5	0.4	0.7	0.7	0.7	0.6	0.9	0.9	0.8	0.8	0.6	-0.2	0.1	0.4	0.6	0.9
25-Sep	-0.2	-0.6	-0.3	-0.5	-0.4	-0.4	-0.4	-0.3	-0.2	-0.2	0.0	0.1	-0.4	0.0	-0.1	-0.7	-0.5	0.0	0.3	0.0	0.2	0.1	0.2	0.2	-0.2	0.3
26-Sep	0.3	0.3	0.3	0.3	0.4	0.2	0.3	-0.1	0.2	0.3	0.3	-0.2	-0.2	0.1	0.0	-0.5	-0.2	-0.3	-0.4	-0.3	-1.1	-1.0	-0.9	-0.9	-0.1	0.4
27-Sep	0.0	0.2	0.0	-0.2	-0.1	-0.6	-0.7	-0.3	-0.6	0.1	0.3	0.1	0.5	0.0	0.2	0.3	0.5	0.3	0.2	0.4	0.3	0.6	0.4	0.6	0.1	0.6
28-Sep	0.7	0.9	0.8	0.8	0.8	1.0	0.8	1.1	1.0	1.1	1.5	1.4	1.1	1.1	0.5	0.9	1.2	0.9	0.8	0.7	0.8	0.9	0.9	0.7	0.9	1.5
29-Sep	0.8	0.8	0.8	0.7	0.6	0.5	0.6	0.5	0.3	0.5	0.5	0.7	0.7	0.7	0.5	-0.1	0.1	0.2	0.0	0.1	0.3	0.0	0.2	0.5	0.4	0.8
30-Sep	0.5	0.4	0.4	0.1	-0.2	-0.3	-0.1	0.2	0.1	0.0	-0.2	0.0	-0.4	-0.1	0.2	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.3	0.1	0.5
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.7 km/h on Sep 19 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: 0.1 km/h on Sep 3 05:00																									
Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 0.8 Median = 1.4 Q ₃ = 2.1 P ₉₀ = 2.7 P ₉₉ = 3.5																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	0.5	0.2	0.5	0.4	0.3	0.6	0.6	0.6	1.3	1.4	1.7	1.6	1.5	1.4	1.9	2.2	0.9	0.5	0.5	0.5	0.3	0.3	0.3	0.4	2.2
2-Sep	0.3	0.3	0.2	0.3	0.2	0.2	0.3	1.0	1.2	1.0	1.7	2.0	2.0	1.8	1.7	1.7	0.9	1.0	0.7	0.8	0.9	0.9	0.6	0.3	2.0
3-Sep	0.2	0.4	0.2	0.2	0.1	0.2	0.5	0.7	1.1	1.5	1.8	1.8	1.5	1.7	1.6	1.8	1.6	2.5	1.3	1.4	0.5	0.8	0.6	0.9	2.5
4-Sep	1.1	1.4	1.2	1.3	1.3	1.3	1.4	1.5	1.4	1.1	1.2	1.4	1.9	1.4	0.9	1.2	2.3	1.4	2.4	2.2	2.5	2.9	2.2	2.6	2.9
5-Sep	2.5	1.8	1.5	1.1	0.8	0.7	0.4	1.0	1.5	1.9	2.0	2.3	2.4	1.9	1.1	1.3	1.9	2.0	1.6	0.8	0.3	0.5	1.8	2.6	2.6
6-Sep	1.5	0.7	0.5	0.9	0.7	1.3	1.4	1.7	1.3	1.4	1.2	1.0	1.4	1.0	1.1	1.3	1.3	1.6	1.5	1.3	1.2	1.2	1.9	2.2	2.2
7-Sep	2.4	2.7	2.6	2.7	2.4	2.4	2.7	2.3	2.0	2.1	2.2	2.1	2.1	2.6	3.2	3.1	3.2	3.4	3.0	2.4	2.1	2.1	2.4	2.2	3.4
8-Sep	2.3	2.2	2.5	2.5	1.4	1.1	1.2	2.0	2.4	2.3	2.1	2.2	2.2	2.1	2.1	1.9	2.1	1.8	1.6	1.0	1.2	1.2	0.9	0.9	2.5
9-Sep	0.9	0.7	0.9	0.6	0.5	0.4	0.5	0.6	0.8	1.2	1.3	1.6	1.5	1.4	1.7	1.0	1.0	0.9	0.7	0.5	0.7	1.2	1.3	0.9	1.7
10-Sep	0.6	0.3	0.6	0.6	0.8	0.4	0.4	1.0	1.0	1.3	1.6	1.9	1.7	2.1	2.3	2.2	2.0	1.4	0.8	0.8	1.3	0.9	0.6	0.4	2.3
11-Sep	0.4	0.3	0.5	0.6	1.0	1.5	1.7	1.9	2.2	2.5	3.4	3.4	3.4	3.4	3.5	3.4	3.2	1.8	0.8	0.8	0.7	0.9	1.3	1.4	3.5
12-Sep	0.7	0.5	0.4	0.4	0.6	0.5	0.5	1.5	2.5	3.2	3.4	3.4	3.6	2.9	2.8	2.7	2.1	2.5	0.8	0.7	2.3	0.4	0.5	0.9	3.6
13-Sep	0.7	1.0	1.0	0.9	0.7	0.5	0.5	0.8	1.1	1.4	1.8	1.8	2.0	2.1	2.0	1.7	1.6	0.9	0.4	0.5	0.9	0.6	0.4	0.5	2.1
14-Sep	0.5	0.5	0.7	0.7	0.7	0.7	0.9	1.4	1.4	1.7	2.0	2.0	1.6	2.0	1.9	1.3	0.8	0.2	0.5	0.3	0.4	0.4	0.4	0.2	2.0
15-Sep	0.2	0.2	0.3	0.3	0.4	0.3	0.3	0.6	0.8	1.1	1.4	1.2	1.8	2.0	2.0	2.0	1.7	1.5	0.9	1.5	1.8	1.1	1.2	0.7	2.0
16-Sep	1.0	0.5	0.7	0.7	0.7	0.8	1.5	1.7	1.4	1.4	2.0	2.0	2.3	2.1	2.3	2.2	2.4	2.5	2.4	2.7	2.6	2.5	2.8	2.7	2.8
17-Sep	2.5	2.7	2.5	2.4	2.3	2.6	2.4	2.6	2.8	2.7	2.7	2.7	2.7	2.9	2.8	3.3	2.8	2.2	1.8	2.0	1.1	1.3	1.5	1.1	3.3
18-Sep	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.6	1.0	1.8	2.2	2.1	2.1	2.0	2.0	1.3	1.1	0.6	0.3	0.4	0.4	0.7	1.0	1.0	2.2
19-Sep	1.3	1.4	1.3	1.2	0.9	0.8	1.1	1.0	1.1	2.2	2.8	3.3	3.1	3.7	2.9	3.3	3.3	3.0	3.1	2.1	3.0	3.4	2.9	1.9	3.7
20-Sep	2.2	2.1	2.3	2.7	2.6	2.1	2.1	2.0	2.5	2.7	2.3	2.5	2.6	2.3	2.4	2.4	1.8	1.7	0.6	0.3	0.3	0.4	0.6	0.7	2.7
21-Sep	1.3	1.2	0.7	0.9	0.8	0.7	0.7	0.8	1.1	1.1	2.0	2.3	2.6	2.6	2.7	2.3	1.6	1.3	0.5	0.5	0.6	0.9	1.0	1.1	2.7
22-Sep	1.3	1.5	1.3	1.0	0.7	0.7	0.6	1.3	2.1	1.7	1.6	1.7	1.5	1.4	1.8	2.1	1.4	0.8	0.7	0.5	0.3	0.3	0.7	0.5	2.1
23-Sep	1.3	1.2	1.2	0.5	0.4	0.4	0.5	0.7	1.1	1.1	1.5	1.7	1.6	1.9	1.7	1.6	1.0	0.5	0.2	0.5	0.6	0.8	0.8	0.7	1.9
24-Sep	0.8	0.7	0.6	0.6	0.6	0.7	1.1	0.9	1.5	1.3	1.5	1.4	1.3	1.7	2.4	2.9	3.1	2.8	2.8	2.6	1.7	2.5	1.4	0.9	3.1
25-Sep	1.3	1.8	2.1	1.6	2.1	1.9	2.1	2.4	2.6	2.1	2.8	2.7	2.1	2.1	1.9	1.9	1.8	1.8	2.2	2.0	1.9	1.8	2.0	1.7	2.8
26-Sep	1.6	1.3	1.4	1.7	2.0	1.5	1.3	1.8	2.3	2.1	1.9	2.3	2.3	2.0	2.2	2.9	3.0	2.7	3.4	3.6	3.3	2.9	3.1	3.3	3.6
27-Sep	3.0	2.4	2.7	3.0	2.2	2.2	2.2	2.0	1.8	1.7	1.9	1.5	1.8	2.3	1.8	1.9	1.4	0.7	0.3	0.2	0.3	0.7	0.7	0.5	3.0
28-Sep	0.8	1.2	1.5	1.9	2.3	2.8	2.7	3.1	3.4	3.4	3.3	3.6	3.6	3.2	3.3	3.5	3.1	2.6	2.0	1.9	2.1	2.2	2.4	2.3	3.6
29-Sep	1.6	1.1	1.2	1.0	1.1	0.8	1.3	1.4	1.6	1.8	2.0	2.6	2.6	2.8	2.8	2.9	2.2	1.0	1.5	1.4	1.0	0.6	0.6	0.6	2.9
30-Sep	0.6	0.5	0.5	0.6	0.4	0.4	0.5	0.4	0.5	0.5	0.8	1.5	2.0	2.1	1.9	1.5	0.9	0.9	1.1	1.2	1.3	0.8	1.0	1.7	2.1
Diurnal Maximum																									



Summary of Hour Averages

Mannix - September 2014

Maximum Value: 1.4 km/h on Sep 22 02:00		Maximum Daily Average: 0.6 km/h on Sep 28		Hours in Service: 720																							
Minimum Value: -0.8 km/h on Sep 21 12:00		Minimum Daily Average: -0.2 km/h on Sep 11		Hours of Data: 720																							
Maximum Diurnal Average: 0.3 km/h at hour 10		Minimum Diurnal Average: 0.0 km/h at hour 17		Hours of Missing Data: 0																							
Monthly Average: 0.13 km/h		Percentiles: P ₁ = -0.6 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 0.6 P ₉₉ = 1.0		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	0.1	-0.1	-0.2	0.0	-0.2	-0.1	0.0	-0.1	0.0	0.2	0.3	0.7	0.3	0.0	0.1	0.4	0.0	0.0	0.1	0.0	0.0	0.1	0.1	-0.1	0.1	0.7	
2-Sep	0.2	0.0	0.0	0.1	0.0	0.1	0.1	0.4	0.4	0.2	0.0	0.4	0.0	-0.1	0.1	-0.3	0.2	0.1	-0.2	-0.1	0.0	-0.3	0.0	0.0	0.1	0.4	
3-Sep	-0.1	0.0	0.0	0.1	0.0	0.1	-0.1	-0.1	0.1	0.8	0.7	-0.1	-0.1	-0.1	0.4	0.2	0.1	0.2	0.1	0.2	0.3	0.7	0.5	0.5	0.2	0.8	
4-Sep	0.5	0.6	0.3	0.5	0.5	0.4	0.4	0.7	0.4	0.5	0.3	0.1	-0.1	0.3	0.1	-0.4	0.2	-0.1	0.8	0.2	0.1	0.3	0.4	0.6	0.3	0.8	
5-Sep	0.7	0.4	0.1	-0.4	-0.4	0.1	0.2	0.0	0.2	1.1	0.0	0.3	0.9	0.3	0.3	0.1	-0.2	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.2	1.1	
6-Sep	-0.1	0.5	0.0	0.2	-0.1	0.3	0.2	0.3	-0.2	0.4	0.6	0.4	0.3	-0.4	0.1	-0.1	-0.3	0.9	0.8	0.5	0.2	0.2	0.3	0.2	0.2	0.9	
7-Sep	0.2	0.2	0.0	0.4	0.0	0.3	0.1	0.3	0.1	0.3	0.2	0.6	0.1	0.6	-0.2	0.2	-0.4	0.4	0.7	1.4	1.0	0.1	-0.1	0.1	0.3	1.4	
8-Sep	0.2	-0.1	0.2	0.0	-0.2	0.0	0.1	0.2	0.9	0.4	0.7	0.3	0.1	0.4	0.2	-0.1	0.3	0.7	0.6	0.1	0.5	0.2	0.0	0.2	0.3	0.9	
9-Sep	0.1	0.4	0.4	0.4	0.0	0.0	0.2	0.1	0.1	-0.3	-0.3	-0.3	-0.1	0.2	0.5	0.1	0.1	0.3	0.4	0.1	0.0	-0.2	0.6	0.2	0.1	0.6	
10-Sep	0.1	0.1	0.3	0.1	0.1	-0.1	0.3	0.5	0.3	0.5	-0.2	0.5	0.3	0.5	0.3	-0.3	-0.3	-0.1	0.4	0.0	-0.1	-0.5	-0.4	-0.4	0.1	0.5	
11-Sep	-0.3	-0.4	-0.4	-0.3	-0.1	0.1	0.2	0.3	0.5	0.6	-0.1	-0.4	-0.1	-0.6	0.0	-0.6	-0.6	-0.5	-0.6	-0.6	-0.4	-0.4	-0.1	0.0	-0.2	0.6	
12-Sep	0.0	-0.3	0.2	-0.3	-0.1	0.0	0.1	0.2	-0.2	0.1	-0.1	0.6	0.5	-0.3	-0.1	-0.5	-0.2	-0.2	0.2	-0.2	-0.4	0.1	0.0	0.1	0.0	0.6	
13-Sep	0.1	-0.1	0.3	-0.1	-0.3	0.0	0.0	0.1	0.3	0.6	0.3	-0.3	0.3	0.5	0.2	0.4	-0.2	0.1	0.4	0.5	1.0	0.1	-0.2	0.0	0.2	1.0	
14-Sep	0.6	0.9	0.4	0.4	0.4	0.2	0.3	0.3	0.3	0.3	0.0	0.3	0.2	0.4	0.4	0.4	-0.3	-0.1	-0.2	-0.4	-0.6	-0.4	0.0	0.0	0.1	0.9	
15-Sep	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.2	-0.1	0.3	0.1	-0.1	-0.1	1.3	0.4	0.8	0.2	0.3	0.6	0.5	0.1	0.0	0.1	0.3	0.2	1.3	
16-Sep	0.6	0.3	0.3	0.2	0.3	0.3	0.2	0.9	0.2	0.4	0.8	0.2	0.3	0.3	0.1	-0.4	-0.2	-0.3	0.1	0.2	-0.1	-0.1	0.2	0.1	0.2	0.9	
17-Sep	0.1	0.0	0.0	-0.1	0.5	-0.1	0.3	0.2	-0.1	0.0	0.0	-0.3	0.5	0.7	0.3	0.3	0.4	0.1	-0.1	-0.2	0.1	0.1	-0.2	-0.2	0.1	0.7	
18-Sep	0.1	0.2	0.0	-0.3	-0.1	-0.1	0.1	0.3	0.4	0.1	0.5	0.6	0.4	0.5	1.0	0.4	-0.2	0.2	0.2	0.9	0.0	-0.1	0.6	0.2	0.2	1.0	
19-Sep	0.0	0.1	0.6	0.7	0.3	0.1	0.3	0.5	0.3	0.0	-0.6	0.2	-0.1	-0.4	-0.5	-0.2	0.2	0.1	-0.6	-0.1	0.3	-0.1	0.4	0.2	0.1	0.7	
20-Sep	0.1	0.1	0.1	0.2	0.3	-0.1	-0.3	-0.1	0.6	0.2	0.1	0.6	0.2	0.4	0.3	0.5	-0.1	-0.3	-0.5	-0.6	-0.4	-0.4	-0.3	0.3	0.0	0.6	
21-Sep	0.7	0.4	-0.1	0.0	0.1	-0.1	-0.4	-0.3	0.1	0.2	0.1	-0.8	0.3	-0.4	-0.6	0.0	-0.2	-0.3	-0.1	0.3	0.4	0.5	0.7	0.6	0.1	0.7	
22-Sep	0.9	1.4	0.7	0.2	0.0	0.2	0.4	0.6	0.6	0.2	0.1	0.0	-0.3	0.0	0.6	-0.3	0.1	-0.1	-0.3	-0.4	-0.5	-0.4	-0.3	-0.1	0.1	1.4	
23-Sep	-0.1	0.2	0.1	0.2	-0.2	0.1	0.0	0.3	0.1	0.1	0.3	0.1	-0.3	0.4	0.2	0.1	-0.2	-0.1	0.0	0.4	0.6	0.6	-0.1	-0.3	0.1	0.6	
24-Sep	-0.1	0.0	-0.1	-0.3	-0.1	0.0	-0.2	0.1	0.3	0.5	0.3	-0.1	0.3	0.2	0.1	0.0	-0.1	-0.4	-0.6	-0.4	0.4	0.0	-0.1	0.0	0.0	0.5	
25-Sep	-0.5	-0.6	-0.2	-0.4	-0.4	-0.5	-0.3	0.1	0.1	0.2	0.2	1.0	0.2	0.4	0.3	-0.5	-0.3	0.4	0.3	0.1	0.3	0.2	0.5	0.3	0.0	1.0	
26-Sep	0.1	0.3	0.3	0.5	0.5	0.2	0.3	0.2	0.5	0.5	0.5	0.1	0.3	0.3	0.3	0.1	0.1	0.1	0.4	0.5	-0.5	-0.5	-0.3	-0.4	0.2	0.5	
27-Sep	0.8	1.1	0.5	0.0	0.4	-0.2	-0.3	0.2	-0.3	0.2	0.4	0.1	0.5	-0.2	0.2	0.2	0.4	0.1	0.0	0.3	0.3	0.4	0.3	0.4	0.2	1.1	
28-Sep	0.5	0.7	0.6	0.3	0.1	0.4	0.3	0.0	0.4	0.6	1.1	0.6	0.8	1.0	0.2	0.6	1.0	0.6	0.7	0.6	0.7	0.8	0.6	0.3	0.6	1.1	
29-Sep	0.4	0.1	0.1	-0.3	-0.2	-0.3	-0.3	-0.3	-0.4	-0.2	-0.3	0.2	0.0	0.6	0.3	-0.3	-0.3	0.0	-0.3	-0.3	0.1	-0.3	-0.2	0.2	-0.1	0.6	
30-Sep	0.3	0.2	0.3	0.1	-0.2	-0.1	0.0	0.1	0.1	0.1	-0.1	0.3	-0.1	0.0	0.4	0.0	0.2	0.2	0.0	0.2	0.1	0.1	0.2	0.4	0.1	0.4	
		0.2	0.2	0.2	0.1	0.0	0.0	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	Diurnal Average		
		0.9	1.4	0.7	0.7	0.5	0.4	0.4	0.9	0.9	1.1	1.1	1.0	0.9	1.3	1.0	0.8	1.0	0.9	0.8	1.4	1.0	0.8	0.7	0.6	Diurnal Maximum	



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4.0 km/h on Sep 12 13:00			Hours of Data:	720
Minimum Value: 0.2 km/h on Sep 2 06:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.8 Median = 1.5 Q ₃ = 2.2 P ₉₀ = 2.8 P ₉₉ = 3.6				

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	0.4	0.7	0.5	0.5	0.5	0.6	0.4	1.3	1.5	1.9	1.8	1.7	1.4	2.0	2.0	0.9	0.3	0.5	0.6	0.3	0.3	0.4	0.3	2.0		
2-Sep	0.5	0.4	0.2	0.3	0.2	0.2	0.2	1.0	1.1	0.8	1.8	2.2	2.2	2.1	2.0	1.5	0.9	1.3	0.9	0.8	1.2	1.0	0.6	0.3	2.2		
3-Sep	0.3	0.3	0.2	0.3	0.2	0.2	0.3	0.5	0.8	1.6	2.0	1.9	1.6	1.8	1.8	1.9	1.8	2.6	1.5	1.8	0.4	0.6	0.5	0.7	2.6		
4-Sep	0.8	0.9	0.8	0.8	0.8	0.8	0.9	1.0	1.1	1.1	1.0	1.1	1.9	1.6	0.9	0.6	1.9	1.4	2.6	2.1	2.2	2.9	1.9	2.7	2.9		
5-Sep	2.2	1.9	1.8	1.1	1.0	0.8	0.5	0.9	1.7	2.4	2.3	2.6	2.7	2.1	1.2	1.5	1.9	2.1	1.5	0.8	0.3	0.6	1.7	2.4	2.7		
6-Sep	1.5	0.7	0.6	1.1	1.0	1.2	1.3	1.5	1.2	1.4	1.5	1.1	1.8	1.3	1.2	1.7	1.6	1.8	1.5	1.2	0.9	1.0	1.7	1.8	1.8		
7-Sep	2.1	2.7	2.6	2.5	2.1	2.2	2.4	2.1	1.9	2.0	2.1	2.2	2.3	2.7	3.0	3.0	2.9	3.2	3.0	2.6	2.4	2.0	2.0	2.1	3.2		
8-Sep	2.2	2.1	2.4	2.5	1.5	1.0	1.0	2.0	2.5	2.4	2.3	2.3	2.4	2.4	2.3	2.1	2.1	1.9	1.4	0.8	1.0	1.2	0.8	0.9	2.5		
9-Sep	0.8	0.6	1.0	0.7	0.7	0.5	0.5	0.8	0.8	1.1	1.3	1.9	1.8	1.4	2.0	1.1	1.1	1.0	0.8	0.6	0.9	1.4	1.2	0.7	2.0		
10-Sep	0.6	0.4	0.8	0.6	0.8	0.3	0.3	0.7	1.0	1.4	1.7	2.1	2.0	2.5	2.5	2.4	2.3	1.5	0.8	0.3	0.9	0.7	0.6	0.6	2.5		
11-Sep	0.8	0.4	0.5	0.7	0.7	1.2	1.4	1.5	2.1	2.6	3.3	3.4	3.7	3.6	3.5	3.3	3.1	1.6	0.6	0.9	0.9	0.9	1.5	1.4	3.7		
12-Sep	0.6	0.4	0.4	0.4	0.4	0.4	0.5	1.5	2.4	3.4	3.3	3.6	4.0	2.9	3.0	2.8	2.2	2.3	0.8	0.8	2.0	0.6	0.5	0.9	4.0		
13-Sep	0.8	1.1	1.2	1.1	0.8	0.5	0.6	1.2	1.1	1.4	1.9	1.8	2.0	2.3	2.3	1.8	1.5	0.6	0.3	0.3	0.5	0.2	0.4	0.3	2.3		
14-Sep	0.4	0.4	0.6	0.5	0.4	0.5	0.4	1.1	1.1	1.1	1.6	2.0	2.2	1.8	2.2	2.2	1.4	0.9	0.3	0.3	0.2	0.5	0.4	0.3	2.2		
15-Sep	0.3	0.3	0.3	0.2	0.4	0.3	0.3	0.3	0.5	1.2	1.4	1.3	2.1	2.1	2.3	2.0	1.5	1.5	1.1	2.3	2.1	1.4	1.3	0.8	2.3		
16-Sep	1.2	0.8	0.6	0.7	0.8	1.3	1.8	2.0	1.7	1.6	2.2	2.3	2.6	2.6	2.5	2.2	2.4	2.2	2.4	3.1	2.4	2.5	2.7	2.6	3.1		
17-Sep	2.3	2.5	2.3	2.3	2.2	2.3	2.2	2.4	2.5	2.6	2.6	2.6	2.8	3.1	2.9	3.2	2.9	2.0	1.6	1.7	1.2	1.3	1.0	0.7	3.2		
18-Sep	0.5	0.4	0.8	0.8	0.5	0.6	0.5	0.6	0.8	1.9	2.4	2.3	2.3	2.2	2.4	1.5	1.2	0.8	1.2	1.2	0.8	1.0	0.7	0.6	2.4		
19-Sep	0.9	0.9	1.0	0.9	0.8	0.9	0.9	0.8	1.0	2.2	2.6	3.6	3.2	3.6	2.9	3.6	3.6	3.0	3.0	2.1	3.4	3.9	3.1	2.1	3.9		
20-Sep	2.3	2.4	2.7	3.3	2.9	2.2	2.2	2.1	2.7	2.9	2.5	2.6	2.9	2.8	2.5	2.6	1.8	1.7	0.6	0.2	0.2	0.3	0.4	0.7	3.3		
21-Sep	0.9	0.8	0.7	0.9	0.8	0.5	0.6	0.5	1.0	1.1	2.2	2.3	2.8	2.8	2.8	2.5	1.7	1.2	0.4	0.5	0.7	0.5	0.6	0.7	2.8		
22-Sep	0.7	0.7	0.8	0.6	1.1	0.6	0.4	0.9	1.6	1.6	1.4	1.7	1.4	1.2	2.1	2.1	1.5	0.9	0.8	0.6	0.4	0.3	0.8	0.6	2.1		
23-Sep	1.3	1.5	1.2	0.7	0.4	0.5	0.5	0.6	1.1	1.0	1.6	1.9	1.9	2.1	1.8	1.7	1.1	0.5	0.5	1.2	1.5	2.0	0.9	1.2	2.1		
24-Sep	1.4	1.2	0.9	1.1	0.9	0.8	1.2	1.3	1.8	1.6	2.0	2.0	1.8	2.5	3.0	3.1	3.1	2.6	2.8	2.5	1.7	2.6	1.5	1.2	3.1		
25-Sep	1.4	1.8	2.2	1.6	1.9	1.8	2.0	2.5	2.7	2.3	2.8	3.0	2.1	2.1	2.0	1.8	1.6	1.8	2.0	1.8	1.7	1.6	1.9	1.5	3.0		
26-Sep	1.5	1.1	1.0	1.5	1.7	1.2	1.0	1.3	2.0	1.8	1.8	2.2	2.0	1.8	1.9	2.8	2.8	2.5	3.2	3.6	3.0	2.7	3.1	3.1	3.6		
27-Sep	3.2	2.8	3.0	3.2	2.8	2.2	2.0	1.9	1.8	1.9	2.0	1.6	2.2	2.6	2.0	2.2	1.4	0.8	0.2	0.3	0.2	0.5	0.5	0.6	3.2		
28-Sep	0.5	0.9	1.1	1.6	2.0	2.6	2.5	2.7	3.2	3.4	3.3	3.5	3.5	3.5	3.4	3.6	3.1	2.5	2.0	1.7	1.9	1.9	2.0	2.0	3.6		
29-Sep	1.3	0.7	0.7	0.6	1.0	0.9	1.1	1.3	1.5	1.9	2.1	2.6	2.6	2.9	2.9	2.6	2.2	1.1	1.4	1.3	1.1	0.7	0.6	0.3	2.9		
30-Sep	0.4	0.3	0.4	0.6	0.4	0.4	0.5	0.6	0.3	0.5	0.9	1.8	2.1	1.9	2.1	1.7	0.7	0.9	1.0	1.2	1.1	0.8	1.1	1.5	2.1		
	3.2	2.8	3.0	3.3	2.9	2.6	2.5	2.7	3.2	3.4	3.3	3.6	4.0	3.6	3.5	3.6	3.6	3.6	3.2	3.2	3.6	3.4	3.9	3.1	3.1		
Diurnal Maximum																											



Summary of Hour Averages

Mannix - September 2014

Maximum Value: 4.4 km/h on Sep 19 17:00																		Maximum Daily Average: 2.6 km/h on Sep 20																		Hours in Service: 720												
Minimum Value: -1.2 km/h on Sep 24 19:00																		Minimum Daily Average: -0.2 km/h on Sep 16																		Hours of Data: 719												
Maximum Diurnal Average: 1.0 km/h at hour 1																		Minimum Diurnal Average: 0.6 km/h at hour 9																		Hours of Missing Data: 1												
Monthly Average: 0.75 km/h																		Percentiles: P ₁ = -0.8 P ₁₀ = -0.2 Q ₁ = 0.1 Median = 0.6 Q ₃ = 1.3 P ₉₀ = 1.9 P ₉₉ = 3.7																		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	0.5	0.3	0.6	1.4	0.9	0.6	0.9	0.3	0.4	-0.1	0.4	0.2	-0.1	0.2	0.9	0.4	-0.3	0.3	0.4	0.3	0.8	0.7	0.5	1.3	0.5	1.4																						
2-Sep	1.9	0.8	0.6	0.7	0.1	0.1	0.2	0.4	0.3	0.0	0.3	0.9	0.4	0.2	1.0	0.9	0.1	0.5	0.6	1.4	0.2	-0.1	0.1	0.0	0.5	1.9																						
3-Sep	0.4	0.3	0.3	0.6	0.5	0.3	0.1	0.2	0.4	0.9	0.6	0.4	0.6	0.4	0.4	0.5	0.7	1.3	-0.3	0.8	0.8	1.8	1.9	1.3	0.6	1.9																						
4-Sep	1.0	0.9	0.5	0.7	0.8	0.7	0.7	0.9	0.5	1.0	0.7	0.6	0.2	0.8	0.8	0.4	1.1	-0.2	1.5	0.4	0.8	1.3	0.9	1.5	0.8	1.5																						
5-Sep	1.3	1.3	0.9	0.2	0.2	0.6	0.4	0.0	0.1	1.4	0.1	0.7	1.3	0.6	0.3	-0.3	-0.6	0.2	0.1	0.1	0.6	1.7	1.7	1.7	0.6	1.7																						
6-Sep	1.1	1.7	1.3	0.7	0.3	0.0	-0.2	0.0	-0.5	0.0	0.4	0.0	-0.2	-0.8	0.0	-0.6	-0.8	0.2	0.2	0.1	0.1	0.2	0.7	0.6	0.2	1.7																						
7-Sep	0.6	0.2	-0.2	0.2	-0.4	0.1	0.0	0.1	-0.1	0.1	-0.2	0.5	-0.1	0.5	1.5	1.5	1.0	1.8	2.0	2.6	1.5	1.3	1.2	1.3	0.7	2.6																						
8-Sep	1.5	1.5	1.4	1.1	0.3	0.5	0.6	0.4	1.1	0.5	1.0	0.1	1.1	1.4	0.6	0.5	0.1	0.9	0.3	-0.2	0.2	0.1	0.0	-0.1	0.6	1.5																						
9-Sep	-0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.4	-0.1	0.0	-0.1	0.1	0.3	0.2	-0.1	-0.1	0.4	0.5	0.6	0.2	0.1	0.8	0.2	0.1	0.8																						
10-Sep	0.1	0.1	1.1	0.8	1.6	1.5	2.6	2.4	1.4	1.3	0.7	1.2	1.4	1.1	0.9	0.3	0.2	0.4	1.0	1.3	1.7	1.1	0.6	0.6	1.1	2.6																						
11-Sep	0.5	0.3	0.4	0.7	1.2	1.5	1.7	1.4	1.2	1.4	1.4	1.2	1.6	1.1	1.6	1.0	1.2	0.7	0.5	0.4	0.7	1.5	2.7	2.7	1.2	2.7																						
12-Sep	2.5	1.3	2.0	1.3	1.9	1.5	1.8	1.7	1.0	1.7	1.3	2.1	2.0	0.9	1.3	1.0	0.8	1.4	1.4	0.1	UO	0.5	1.1	1.3	1.4	2.5																						
13-Sep	0.9	0.1	0.3	-0.1	-0.3	-0.1	-0.3	-0.3	0.0	0.3	-0.2	-0.7	-0.3	0.0	-0.2	0.1	-0.6	0.3	0.7	1.3	1.7	1.9	1.1	0.4	0.3	1.9																						
14-Sep	0.9	1.5	1.1	1.0	1.0	0.4	0.5	0.8	0.2	0.0	-0.1	0.2	-0.2	0.0	0.7	1.6	0.7	0.4	0.3	1.1	1.4	2.0	1.3	1.7	0.8	2.0																						
15-Sep	2.1	1.1	0.8	0.3	0.3	0.1	0.3	0.3	0.1	0.3	0.0	-0.3	-0.2	1.3	0.4	0.5	-0.3	-0.1	0.0	-0.3	-0.6	-0.3	0.0	0.0	0.2	2.1																						
16-Sep	0.0	-0.1	0.0	-0.3	-0.1	-0.1	-0.5	0.2	-0.3	0.2	0.3	-0.3	0.0	-0.2	-0.4	-0.6	-0.2	-1.1	-0.2	-0.6	-0.7	-0.4	-0.3	0.2	-0.2	0.3																						
17-Sep	0.1	-0.1	-0.1	0.0	0.6	0.3	0.1	0.4	0.2	0.0	-0.1	-0.7	0.2	0.9	0.6	0.8	0.7	0.4	0.0	-0.6	0.4	0.3	0.2	-0.2	0.2	0.9																						
18-Sep	0.4	0.5	0.6	0.5	0.3	1.0	0.9	0.6	0.2	0.0	0.7	1.0	0.8	0.9	1.3	0.7	-0.2	0.1	-0.3	-0.2	-0.2	-0.2	1.0	0.7	0.5	1.3																						
19-Sep	0.6	0.9	1.5	1.4	0.8	0.4	0.7	1.0	0.9	1.3	1.6	2.4	2.1	2.8	2.1	2.8	4.4	3.5	2.6	2.7	3.6	3.9	3.7	3.2	2.1	4.4																						
20-Sep	3.5	3.3	3.5	3.8	3.7	3.1	3.7	3.5	3.5	3.2	2.7	2.9	3.0	3.0	2.2	3.1	2.0	1.8	1.4	1.1	0.8	0.5	1.0	1.1	2.6	3.8																						
21-Sep	1.3	1.2	0.4	0.4	0.4	0.6	0.7	1.0	0.8	0.7	0.9	0.6	1.4	1.2	1.4	1.6	1.1	0.8	1.0	1.4	1.5	1.5	1.8	1.6	1.1	1.8																						
22-Sep	2.1	2.5	1.9	1.1	0.4	0.9	1.3	1.6	1.4	0.3	0.2	0.1	-0.3	0.0	1.2	1.3	2.0	1.6	1.3	2.4	2.6	2.7	3.0	3.8	1.5	3.8																						
23-Sep	3.3	2.5	1.5	1.4	0.3	0.5	0.0	0.5	0.6	0.4	0.8	0.0	-0.6	0.1	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	-0.4	-0.5	-0.4	-0.7	0.4	3.3																						
24-Sep	-0.8	-0.5	-0.4	-0.9	-0.7	-0.4	-0.5	-0.4	-0.2	0.0	-0.3	-0.6	-0.3	-0.6	-0.8	-0.8	-0.7	-0.5	-1.2	-0.5	1.0	3.0	1.7	0.8	-0.2	3.0																						
25-Sep	0.8	2.0	2.5	1.6	1.8	1.6	2.3	3.4	3.2	3.1	3.1	3.8	2.6	2.2	1.7	0.4	0.7	0.7	0.1	-0.2	-0.1	-0.1	-0.1	-0.2	1.5	3.8																						
26-Sep	-0.3	-0.1	-0.1	0.0	-0.1	-0.2	0.0	0.0	0.0	-0.1	0.2	0.0	0.3	0.0	0.2	0.1	0.2	0.2	1.2	1.7	0.0	-0.1	0.1	0.1	0.1	1.7																						
27-Sep	1.3	1.8	1.3	0.5	1.1	1.1	1.2	1.5	0.2	0.5	0.7	0.5	0.6	0.1	0.4	0.2	0.5	0.6	0.5	0.8	0.8	1.2	1.2	1.5	0.8	1.8																						
28-Sep	1.4	1.6	1.5	1.0	0.9	1.0	1.2	0.9	1.1	1.3	1.9	1.4	1.6	2.2	1.8	2.4	2.4	1.8	1.9	1.7	1.6	1.8	1.5	1.3	1.5	2.4																						
29-Sep	1.3	1.2	1.0	0.5	0.2	0.2	-0.6	-0.6	-0.8	-0.5	-0.3	0.2	0.2	1.3	1.7	1.4	1.3	0.9	0.9	0.9	1.0	0.4	0.4	0.5	0.5	1.7																						
30-Sep	0.7	0.3	0.8	0.6	0.8	1.9	1.0	0.0	0.4	1.3	0.5	1.4	1.3	0.8	0.9	0.0	1.1	0.9	0.0	0.1	0.0	0.1	0.3	0.1	0.6	1.9																						
																								1.0	1.0	0.9	0.7	0.6	0.7	0.7	0.7	0.6	0.7	0.6	0.7	0.7	0.8	0.8	0.7	0.6	0.7	0.6	0.7	0.8	0.9	1.0	0.9	Diurnal Average
																								3.5	3.3	3.5	3.8	3.7	3.1	3.7	3.5	3.5	3.2	3.1	3.8	3.0	3.0	2.2	3.1	4.4	3.5	2.6	2.7	3.6	3.9	3.7	3.8	Diurnal Maximum
UO - Unstable Operation																																																



Summary of Hour Standard Deviations

Mannix - September 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4.2 km/h on Sep 12 13:00			Hours of Data:	719
Minimum Value: 0.2 km/h on Sep 23 19:00			Hours of Missing Data:	1
			Hours of Calibration:	0
			Percent Operational Time:	99.9
Percentiles: P ₁ = 0.3 P ₁₀ = 0.5 Q ₁ = 0.8 Median = 1.4 Q ₃ = 2.2 P ₉₀ = 2.8 P ₉₉ = 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	0.8	0.5	0.9	0.8	0.8	0.7	0.7	0.4	1.2	1.4	1.8	1.5	1.4	1.4	2.0	2.3	0.8	0.4	0.5	0.7	0.5	0.5	0.5	0.5	2.3	
2-Sep	0.6	0.5	0.4	0.4	0.3	0.2	0.2	0.8	1.0	0.6	1.8	2.2	2.4	2.4	2.1	1.7	0.9	1.2	1.0	0.9	1.5	1.1	0.7	0.3	2.4	
3-Sep	0.4	0.5	0.3	0.4	0.3	0.3	0.3	0.4	0.8	1.4	2.0	1.9	1.7	1.9	1.9	2.1	1.9	2.8	1.3	1.6	0.5	0.5	0.6	0.7	2.8	
4-Sep	0.7	0.9	0.8	0.7	0.7	0.6	0.6	0.7	1.1	1.0	0.9	1.1	1.8	1.7	1.0	0.5	3.1	1.5	2.6	2.3	2.4	3.0	1.9	2.7	3.1	
5-Sep	2.3	2.0	1.9	1.2	1.1	0.8	0.6	0.9	1.5	2.5	2.4	2.9	2.8	2.1	1.1	1.2	1.8	1.9	1.4	0.8	0.5	0.9	1.7	2.4	2.9	
6-Sep	1.5	0.9	0.8	1.3	1.2	1.2	1.1	1.6	1.3	1.4	1.4	0.9	1.5	1.1	1.2	1.3	1.2	1.6	1.4	1.1	0.8	1.0	1.8	1.9	1.9	
7-Sep	2.2	3.1	2.7	2.5	2.1	2.5	2.6	2.2	2.1	2.1	2.2	2.3	2.6	2.9	2.9	3.1	2.9	3.1	3.0	2.6	2.5	1.9	1.9	2.2	3.1	
8-Sep	2.1	2.1	2.5	2.6	1.6	1.3	1.1	2.1	2.6	2.6	2.5	2.4	2.6	2.5	2.4	2.2	2.1	2.0	1.2	0.7	0.9	1.2	0.8	0.7	2.6	
9-Sep	0.7	0.6	0.9	0.5	0.7	0.5	0.5	0.8	0.8	1.1	1.4	1.9	1.8	1.5	1.9	1.1	1.2	1.0	0.8	0.9	1.0	1.7	1.2	0.7	1.9	
10-Sep	0.6	0.5	0.8	0.9	0.7	0.4	0.4	0.8	1.0	1.3	1.6	2.2	2.1	2.6	2.7	2.6	2.5	1.5	0.7	0.3	0.9	0.7	0.8	0.8	2.7	
11-Sep	0.9	0.5	0.6	0.8	0.7	1.2	1.2	1.4	2.1	2.8	3.4	3.3	3.7	3.7	3.5	3.2	3.2	1.7	0.7	1.0	1.0	1.1	1.5	1.5	3.7	
12-Sep	0.6	0.7	0.5	0.5	0.4	0.6	0.6	1.6	2.4	3.4	3.4	3.6	4.2	2.9	2.9	2.9	2.3	2.2	0.9	1.0	UO	0.9	0.8	1.1	4.2	
13-Sep	1.0	1.1	1.3	1.3	0.8	0.5	0.5	0.6	0.8	1.3	1.6	1.5	1.7	2.0	2.3	1.7	1.4	0.6	0.4	0.3	0.3	0.3	0.5	0.4	2.3	
14-Sep	0.4	0.4	0.6	0.5	0.4	0.5	0.4	1.0	0.9	0.8	1.5	1.9	2.1	1.8	2.3	2.3	1.5	1.0	0.4	0.3	0.3	0.5	0.6	0.5	2.3	
15-Sep	0.5	0.4	0.6	0.4	0.5	0.3	0.3	0.3	0.4	1.1	1.3	1.2	2.0	2.1	2.4	2.1	1.5	1.5	0.9	1.8	1.9	1.3	1.3	0.7	2.4	
16-Sep	1.0	0.7	0.7	0.7	0.8	0.8	1.4	1.5	1.5	1.6	2.3	2.4	2.7	2.4	2.2	2.2	2.4	2.2	2.2	2.3	2.4	2.4	2.5	2.7	2.7	
17-Sep	2.4	2.4	2.2	2.2	2.2	2.3	2.3	2.3	2.5	2.6	2.5	2.4	2.8	3.1	2.8	3.1	2.8	1.8	1.5	1.5	1.2	1.0	0.7	0.5	3.1	
18-Sep	0.6	0.5	1.0	1.0	0.7	0.9	0.7	0.7	0.7	1.9	2.5	2.3	2.4	2.4	2.5	1.5	1.3	0.7	0.4	0.4	0.7	1.1	0.7	0.6	2.5	
19-Sep	0.9	0.8	1.0	1.0	1.0	0.9	0.9	0.8	1.2	2.3	2.8	3.7	3.5	3.7	3.0	3.8	3.8	3.4	3.3	2.2	3.8	4.1	3.2	2.3	4.1	
20-Sep	2.5	2.6	2.9	3.4	3.1	2.2	2.2	2.1	2.5	2.7	2.4	2.6	2.8	2.8	2.5	2.5	1.9	1.8	0.7	0.3	0.3	0.4	0.5	0.8	3.4	
21-Sep	0.7	0.8	0.7	1.0	0.9	0.4	0.6	0.5	0.8	1.2	2.3	2.5	2.9	3.0	3.0	2.7	1.9	1.2	0.5	0.5	0.7	0.6	0.4	0.4	3.0	
22-Sep	0.5	0.7	0.8	0.6	1.0	0.5	0.4	0.7	1.4	1.5	1.4	1.6	1.4	1.2	2.4	2.2	1.7	1.0	1.0	0.8	0.5	0.3	1.0	0.8	2.4	
23-Sep	1.3	1.4	1.5	0.9	0.5	0.6	0.5	0.8	1.1	1.1	1.6	1.9	1.7	2.0	1.8	1.6	1.1	0.4	0.2	0.4	0.7	1.0	0.9	1.1	2.0	
24-Sep	1.2	1.0	1.0	1.0	0.7	0.8	1.1	1.0	1.5	1.3	1.5	1.4	1.3	1.9	2.6	3.0	3.2	2.8	2.9	2.4	1.6	2.7	1.8	1.4	3.2	
25-Sep	1.4	2.1	2.5	1.9	2.1	2.0	2.2	2.6	3.0	2.4	2.9	2.8	2.0	1.9	1.9	1.7	1.6	1.8	1.9	1.8	1.6	1.5	2.0	1.5	3.0	
26-Sep	1.5	1.1	0.9	1.4	1.7	1.1	0.8	1.2	2.0	1.8	1.8	2.3	2.1	1.9	1.9	2.9	3.0	2.7	3.6	3.8	3.2	2.8	3.2	3.4	3.8	
27-Sep	3.4	3.2	3.2	3.5	3.0	2.2	2.0	1.9	1.9	2.0	2.2	1.7	2.3	2.7	2.1	2.3	1.5	0.8	0.2	0.2	0.2	0.4	0.4	0.7	3.5	
28-Sep	0.5	0.8	0.9	1.5	1.8	2.3	2.5	2.5	3.1	3.5	3.2	3.5	3.4	3.6	3.3	3.6	3.2	2.4	2.0	1.8	1.9	1.8	1.9	1.9	3.6	
29-Sep	1.4	0.7	0.7	0.7	0.8	0.9	0.7	1.2	1.3	1.9	2.2	2.7	2.6	3.0	3.0	2.7	2.3	1.1	1.5	1.4	1.2	0.8	0.7	0.4	3.0	
30-Sep	0.4	0.4	0.5	0.6	0.7	0.6	0.7	0.6	0.4	0.7	1.2	2.0	2.2	1.9	2.1	1.7	1.0	1.2	0.9	1.2	1.1	0.7	1.2	1.4	2.2	
	3.4	3.2	3.2	3.5	3.1	2.5	2.6	2.6	3.1	3.5	3.4	3.7	4.2	3.7	3.5	3.8	3.8	3.4	3.6	3.8	3.8	4.1	3.2	3.4		
Diurnal Maximum																										
UO - Unstable Operation																										



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 16, 2014	Previous Calibration	August 14, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	12:42
Barometric Pressure	730 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Cal Gas Concentration	51 ppm	Cal Gas Expiry Date	29-May-14
Gas Cert Reference	LL107934		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633
DACS voltage range		DACS channel #	N/A

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-635	-635
Analyzer Range (mv)	5000	5000	Lamp voltage	870	865
Calculated slope	0.994072	0.991708	Chamber temp.	45.2	45.0
Calculated intercept	0.480358	1.019064	Pressure (mmHg)	694.6	695.5
Analyzer Background	7.9	7.4	Flow (lpm)	0.475	0.478
Analyzer Coefficient	1.001	1.001	Intensity	89	91

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	-0.7	NA
as found span	5000	58.8	599.8	603.1	0.994
calibrator zero	5000	0.0	0.0	-0.2	0.000
high point	5000	58.8	599.8	603.8	0.993
second point	5000	29.4	299.9	302.0	0.993
third point	5000	14.7	149.9	148.6	1.009
calibrator zero					
as left zero	5000	0.0	0.0	-0.1	0.000
as left span	5000	58.8	599.8	599.8	1.000
Average Correction Factor					0.998

Corrected As found 603.9 Previous response 602.9 % change -0.2%

Notes:

Zero adjusted, filter changed after As Finds

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

SO₂ Calibration Summary

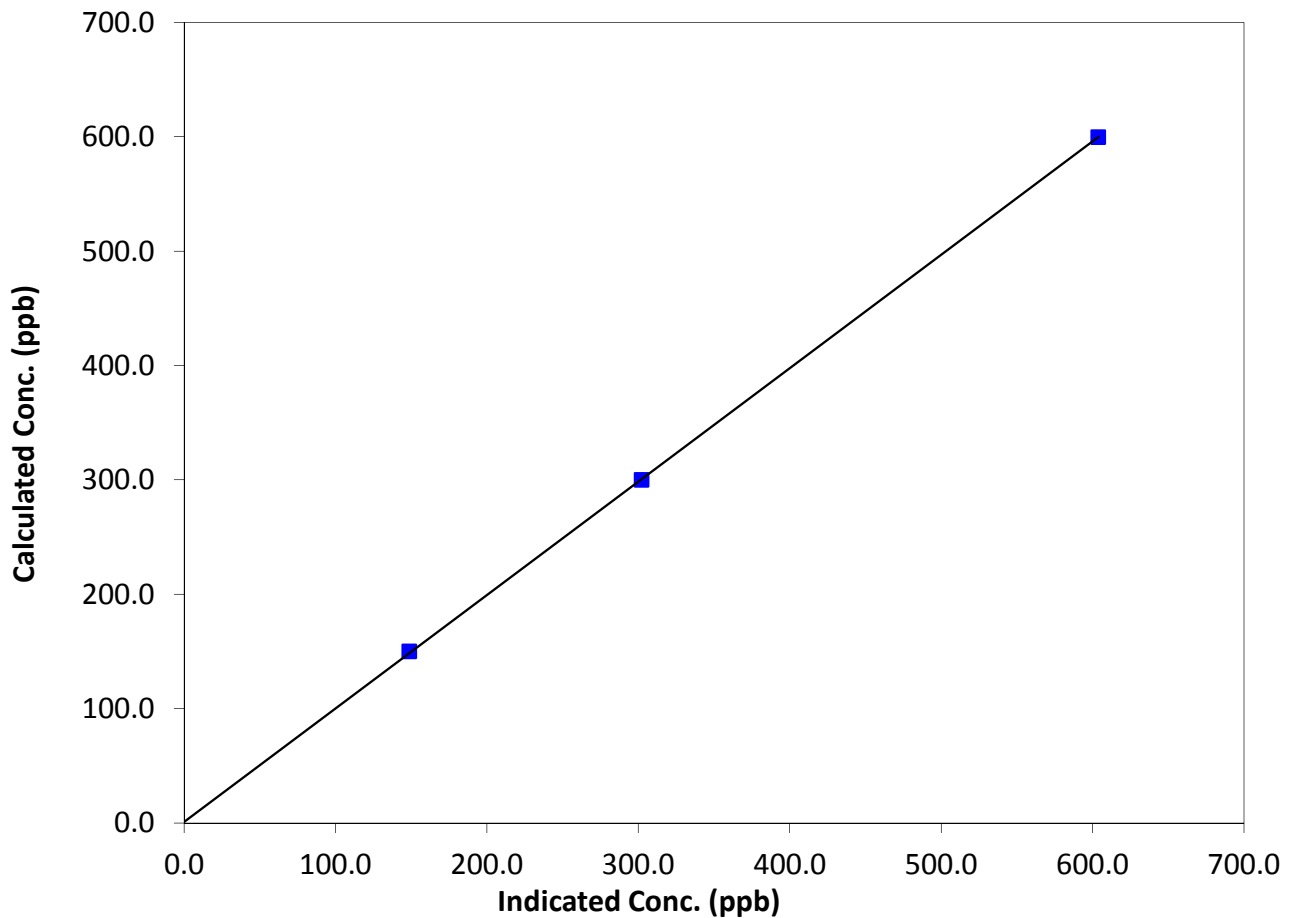
Station Information

Calibration Date	September 16, 2014	Previous Calibration	August 14, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:20	End Time (MST)	12:42
Analyzer make	TEI 43i	Analyzer serial #	1008841399

Calibration Data

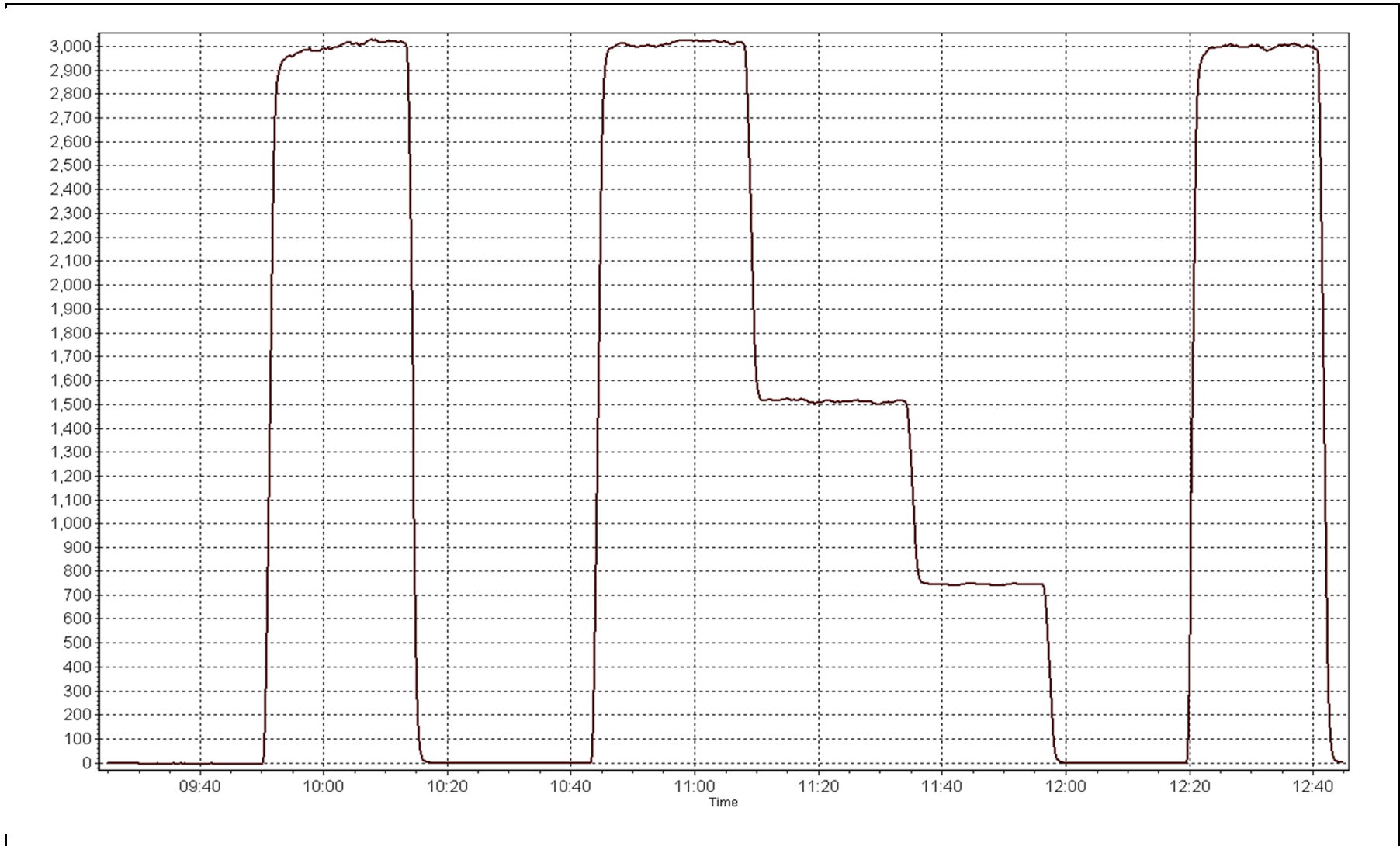
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999982
599.8	603.8	0.9933		
299.9	302.0	0.9929	Slope	0.991708
149.9	148.6	1.0090		
			Intercept	1.019064

SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 16, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	September 17, 2014	Previous Calibration	August 13, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	12:12
Barometric Pressure	725 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11061107
Cal Gas Concentration	10.2 ppm H2S	Cal Gas Expiry Date	30-May-13
Gas Cert Reference	LL155272	SO2 gas conc.	51.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633
DACS voltage range	0-5v	DACS channel #	28

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-624	-624
Analyzer Range (mv)	5000	5000	Lamp voltage	875	876
Calculated slope	0.993591	1.006095	Chamber temp.	45	45
Calculated intercept	0.101448	-0.044564	Pressure	508.9	511.6
Analyzer Background	14.6	14.3	Flow	1.054	1.057
Analyzer Coefficient	1.135	1.117	Intensity (%)	115	115
			Converter temp.	325	324

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.20	NA
as found span	5000	36.8	75.1	76.2	0.986
SO2 scrubber check	5000	29.4	299.9	1.8	NA
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	36.8	75.1	74.7	1.005
second point	5000	20.6	42.0	41.9	1.004
third point	5000	12.3	25.1	24.7	1.015
calibrator zero					
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	36.8	75.1	74.1	1.013
Average Correction Factor					1.008

Corrected As found	76.0	Previous response	75.5	% change	-0.7%
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Notes:

As found zero used as calibrator zero, Span with a small adjustment. Scrubber check before As Finds. Filter changed after third point

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

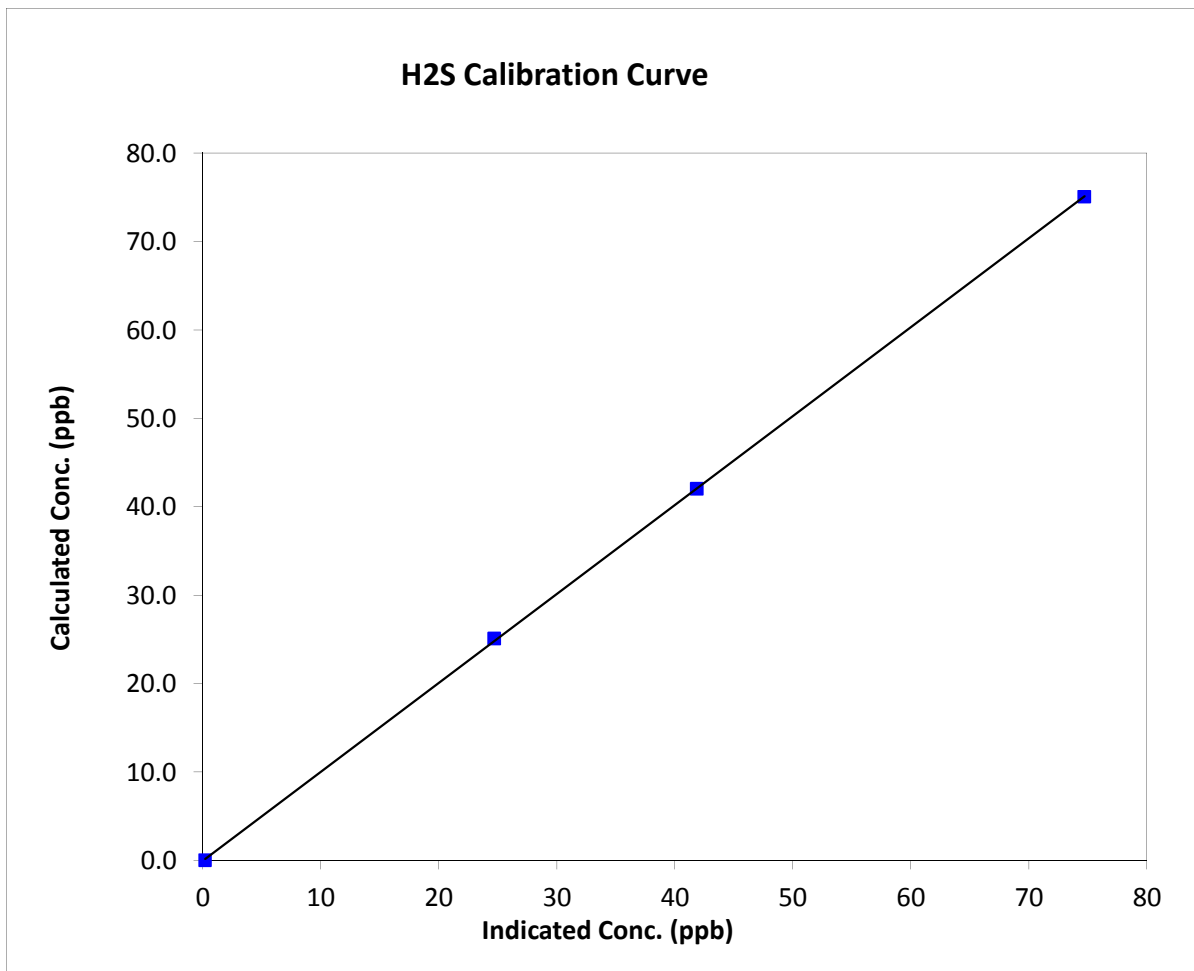
H2S Calibration Summary

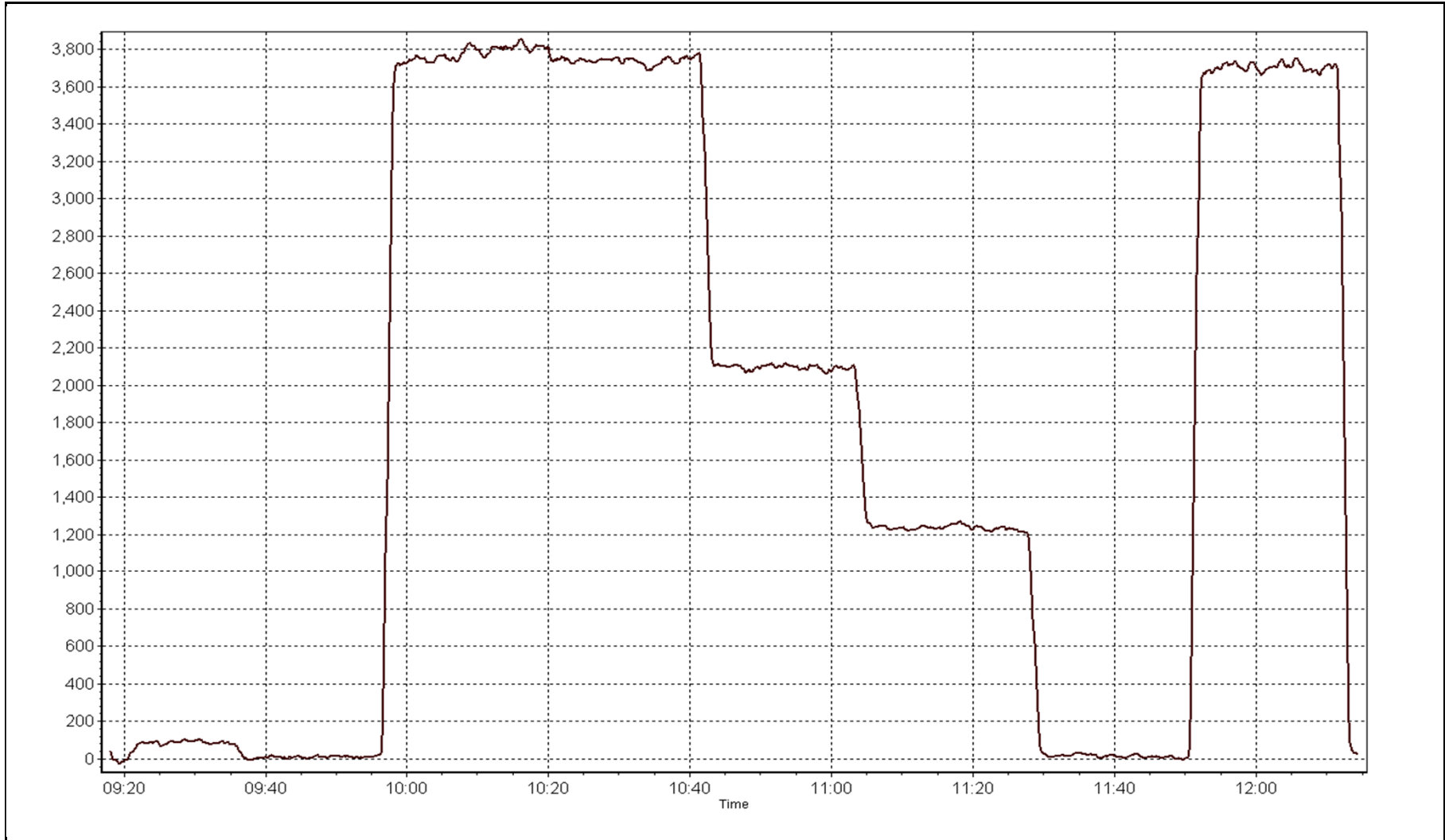
Station Information

Calibration Date	September 17, 2014	Previous Calibration	August 13, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:15	End Time (MST)	12:12
Analyzer make	TEI 450i	Analyzer serial #	815129108

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999966
75.1	74.7	1.0047		
42.0	41.9	1.0038	Slope	1.006095
25.1	24.7	1.0150		
			Intercept	-0.044564







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Tuesday, September 16, 2014	Previous Calibration	Thursday, August 14, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	12:42
Barometric Pressure	740 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Gas Cert Reference	LL107934	Cal Gas Expiry Date	29-May-14
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1081.5 ppm
C3H8 Cal Gas Conc.	206 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633
DACS voltage range	0-5v	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	11.6	11.6
Analyzer Range (mv)	5000	5000	Air	41.6	41.0
Calculated slope	0.997498	1.001750	Fuel Pressure	20.2	20.2
Calculated intercept	0.032857	-0.013533	Detector Temp	125.0	125.0
Bkg	2.03	1.95	Flame Temp	162.9	163.0
Slope	1.712	1.705			

Analyzer make TEI 51i-LT Analyzer serial # 1317958295

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.07	N/A
as found span	5000	58.8	12.72	12.58	1.011
calibrator zero	5000	0.0	0.00	-0.01	N/A
high point	5000	58.8	12.72	12.68	1.003
second point	5000	29.0	6.27	6.35	0.988
third point	5000	14.7	3.18	3.17	1.005
calibrator zero	5000	0.0	0.00		N/A
as left zero	5000	0.0	0.00	0.06	N/A
as left span	5000	58.8	12.72	12.85	0.990
Average Correction Factor					0.999

Corrected As found 12.65 Previous response 12.72 % change 0.5%

Notes:

Zero and Span with small adjustments, filter changed after As Finds

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

THC Calibration Summary

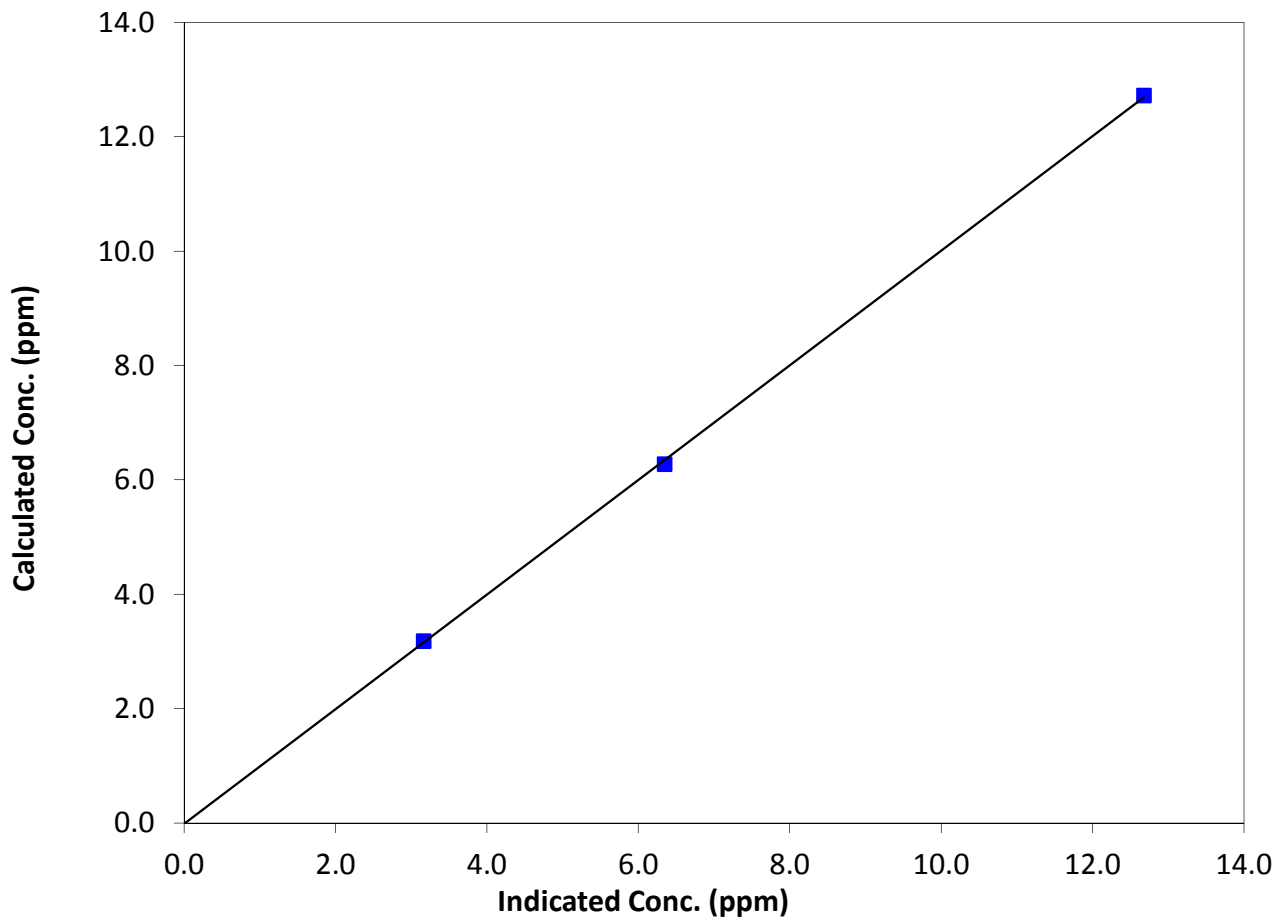
Station Information

Calibration Date	September 16, 2014	Previous Calibration	August 14, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:20	End Time (MST)	12:42
Analyzer make	TEI 51i-LT	Analyzer serial #	1317958295

Calibration Data

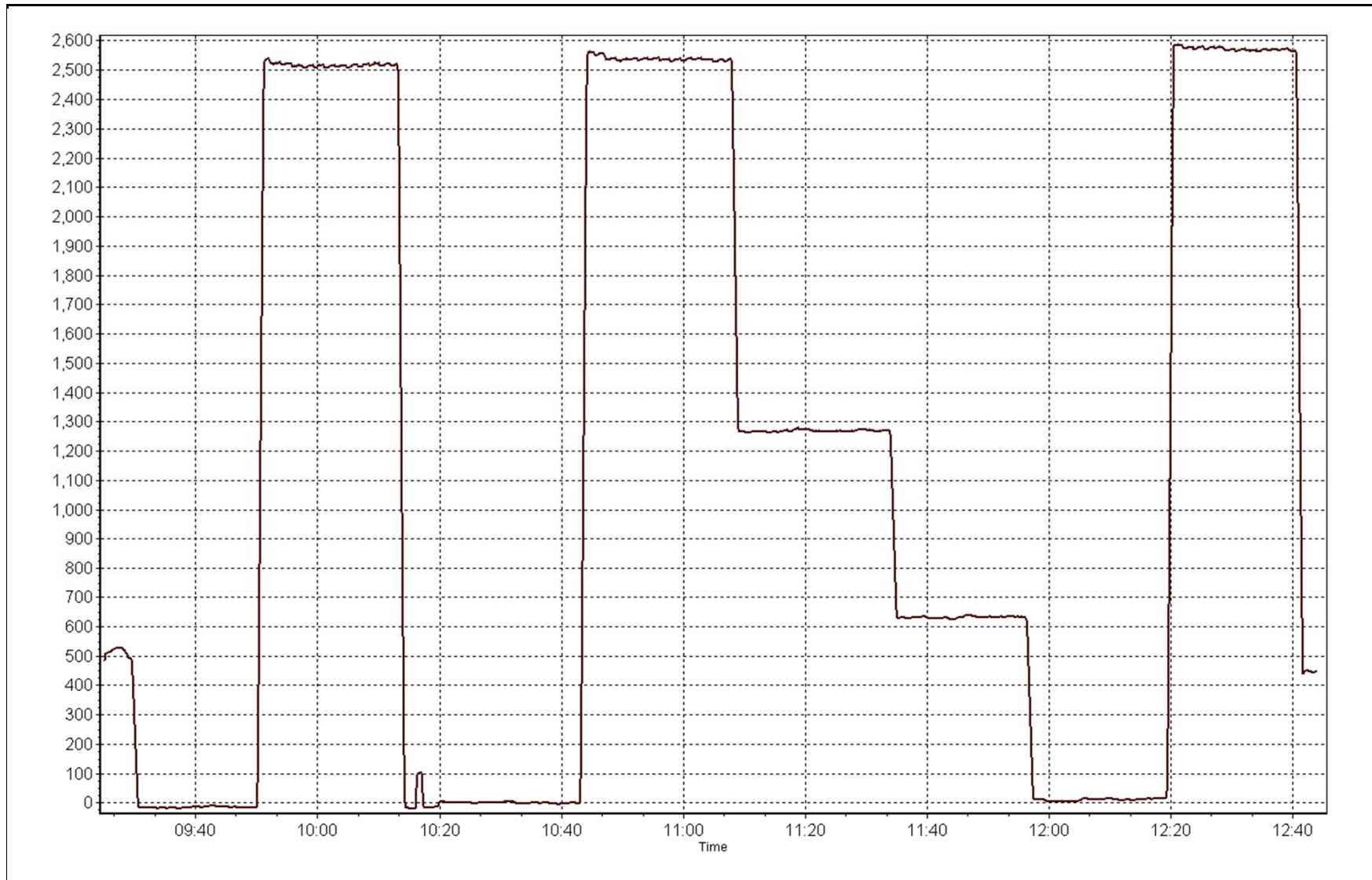
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	N/A	Correlation Coefficient	0.999918
12.72	12.68	1.0031		
6.27	6.35	0.9881	Slope	1.001750
3.18	3.17	1.0046		
			Intercept	-0.013533

THC Calibration Curve



THC Calibration Plot

Date: September 16, 2014



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 6
PATRICIA MCINNES
SEPTEMBER 2014**

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

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

October 30, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
 SEPTEMBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	683	36	37	99.86	15	0	4	0
TRS (ppb) Average	680	40	40	100.00	2	0	1	0
THC (ppm) Average	681	38	39	99.86	2.4	-	2.1	-
NMHC(ppm) Average	681	38	39	99.86	0.051	-	0.003	-
CH4(ppm) Average	681	38	39	99.86	2.4	-	2.1	-
O3 (ppb) Average	682	37	38	99.86	41	0	28	-
NO2 (ppb) Average	680	40	40	100.00	17	0	7	-
NO (ppb) Average	680	40	40	100.00	17	-	4	-
NOX (ppb) Average	680	40	40	100.00	25	-	10	-
NH3 (ppb) Average	635	55	85	95.83	0	0	0	-
PM2.5 (ug/m3) Average	706	0	14	98.06	33.8	-	10.3	0
Temperature 2 m (C) Average	720	0	0	100.00	29.5	-	18.2	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	-	-
Wind Speed 10 m (km/h) Average	696	0	24	96.67	32	-	-	-
Wind Direction 10 m (deg) Average	696	0	24	96.67	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
 SEPTEMBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	683	0.9	2	-	0	0	0	0	1	2	15
TRS (ppb) Average	680	0.5	0	-	0	0	0	0	1	1	2
THC (ppm) Average	681	1.98	0.1	-	1.9	1.9	1.9	2	2	2.1	2.4
NMHC(ppm) Average	681	0	0.002	-	0	0	0	0	0	0	0.051
CH4(ppm) Average	681	1.98	0.1	-	1.9	1.9	1.9	2	2	2	2.4
O3 (ppb) Average	682	17.6	8	-	2	7	11	17	23	28	41
NO2 (ppb) Average	680	3.3	3	-	0	1	1	3	5	7	17
NO (ppb) Average	680	1.4	2	-	0	0	0	1	2	3	17
NOX (ppb) Average	680	4.6	4	-	0	1	2	3	6	10	25
NH3 (ppb) Average	635	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	706	4.8	4.1	-	0.1	1.2	2.1	3.7	6.4	9.5	33.8
Temperature 2 m (C) Average	720	9.48	5.8	-	-1.5	2.4	5.4	8.9	12.6	18	29.5
Relative Humidity (%) Average	720	74	19	-	24	44	62	78	90	94	98
Wind Speed 10 m (km/h) Average	696	9.4	6	-	0	3	5	8	13	18	32
Wind Direction 10 m (deg) Average	696	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
SEPTEMBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	06 Sep 2014 12:00	06 Sep 2014 12:00	1	Maintenance - sample manifold cleaned
NMHC, CH4, THC	06 Sep 2014 12:00	06 Sep 2014 12:00	1	Maintenance - sample manifold cleaned
O3	06 Sep 2014 12:00	06 Sep 2014 12:00	1	Maintenance - sample manifold cleaned
NH3	01 Sep 2014 10:00	30 Sep 2014 09:00	29	Stabilization after daily span
NH3	06 Sep 2014 12:00	06 Sep 2014 12:00	1	Maintenance - sample manifold cleaned
PM2.5	08 Sep 2014 12:00	08 Sep 2014 12:00	1	Maintenance - Flow and zero check, sample head cleaning
PM2.5	15 Sep 2014 04:00	15 Sep 2014 13:00	11	Analyzer failure - analyzer removed for off site repair
PM2.5	25 Sep 2014 12:00	25 Sep 2014 12:00	1	Intermittent unstable operation - excessive baseline drift
PM2.5	26 Sep 2014 23:00	26 Sep 2014 23:00	1	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	03 Sep 2014 16:00	03 Sep 2014 16:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	03 Sep 2014 17:00	04 Sep 2014 14:00	22	DAS collection error - invalid program uploaded
Wind Speed, Wind Direction	24 Sep 2014 00:00	24 Sep 2014 00:00	1	Flatline in sensor output signal

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 15 ppb on Sep 12 11:00	Maximum Daily Average: 3.8 ppb on Sep 18		Hours of Data:	683
Minimum Value: 0 ppb on Sep 6 22:00	Minimum Daily Average: 0.1 ppb on Sep 20		Hours of Missing Data:	37
Maximum Diurnal Average: 1.8 ppb at hour 18	Minimum Diurnal Average: 0.2 ppb at hour 7		Hours of Calibration:	36
Monthly Average: 0.9 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 11		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	0	1	9	11	2	0	0	0	0	1	1	0	0	0	0	0	1.2	11
2-Sep	Z	0	0	0	0	0	0	0	1	2	1	1	3	1	11	10	5	2	10	5	1	0	0	0	2.4	11
3-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
4-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	0.3	1
5-Sep	1	1	0	Z	0	0	0	0	1	1	2	3	1	1	0	0	0	C	C	C	C	0	0	3	0.8	3
6-Sep	8	3	0	0	Z	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0.7	8
7-Sep	6	2	0	0	0	Z	0	0	0	0	0	0	0	0	2	1	0	0	1	0	1	0	0	0	0.6	6
8-Sep	Z	0	0	1	3	1	0	1	3	1	0	1	2	6	8	5	8	1	0	0	0	0	0	0	1.9	8
9-Sep	0	Z	0	0	0	0	0	0	0	0	0	1	1	3	3	5	5	5	2	3	2	3	3	3	1.7	5
10-Sep	2	1	Z	1	1	1	2	1	1	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0.7	2
11-Sep	0	0	0	Z	0	0	0	0	0	5	3	2	1	1	1	1	1	0	0	0	0	0	0	0	0.7	5
12-Sep	0	0	0	0	Z	0	0	0	3	11	15	5	3	5	2	1	4	6	2	0	0	0	0	0	2.6	15
13-Sep	0	1	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
14-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
15-Sep	0	Z	0	0	0	0	0	0	0	0	1	4	0	1	1	0	2	8	6	2	1	0	0	0	1.2	8
16-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
17-Sep	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1
18-Sep	0	0	0	0	Z	0	0	0	0	2	1	5	12	10	9	9	11	14	8	2	1	1	1	0	3.8	14
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	Z	0	0	0	0	0	0	C	C	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	0.3	0
22-Sep	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
23-Sep	0	0	0	Z	0	0	0	0	2	6	5	3	1	0	0	0	0	0	1	4	5	5	2	1	1.6	6
24-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	0.4	1
25-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	2	3	1	1	0	0	0	0	0	0.4	3
26-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	1	2	0.4	2
27-Sep	2	Z	4	4	2	2	1	2	3	1	2	0	1	1	2	2	2	2	1	0	0	0	0	0	1.5	4
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	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
30-Sep	0	0	0	0	Z	0	0	0	0	0	2	8	3	11	8	3	7	9	2	0	0	0	0	0	2.4	11

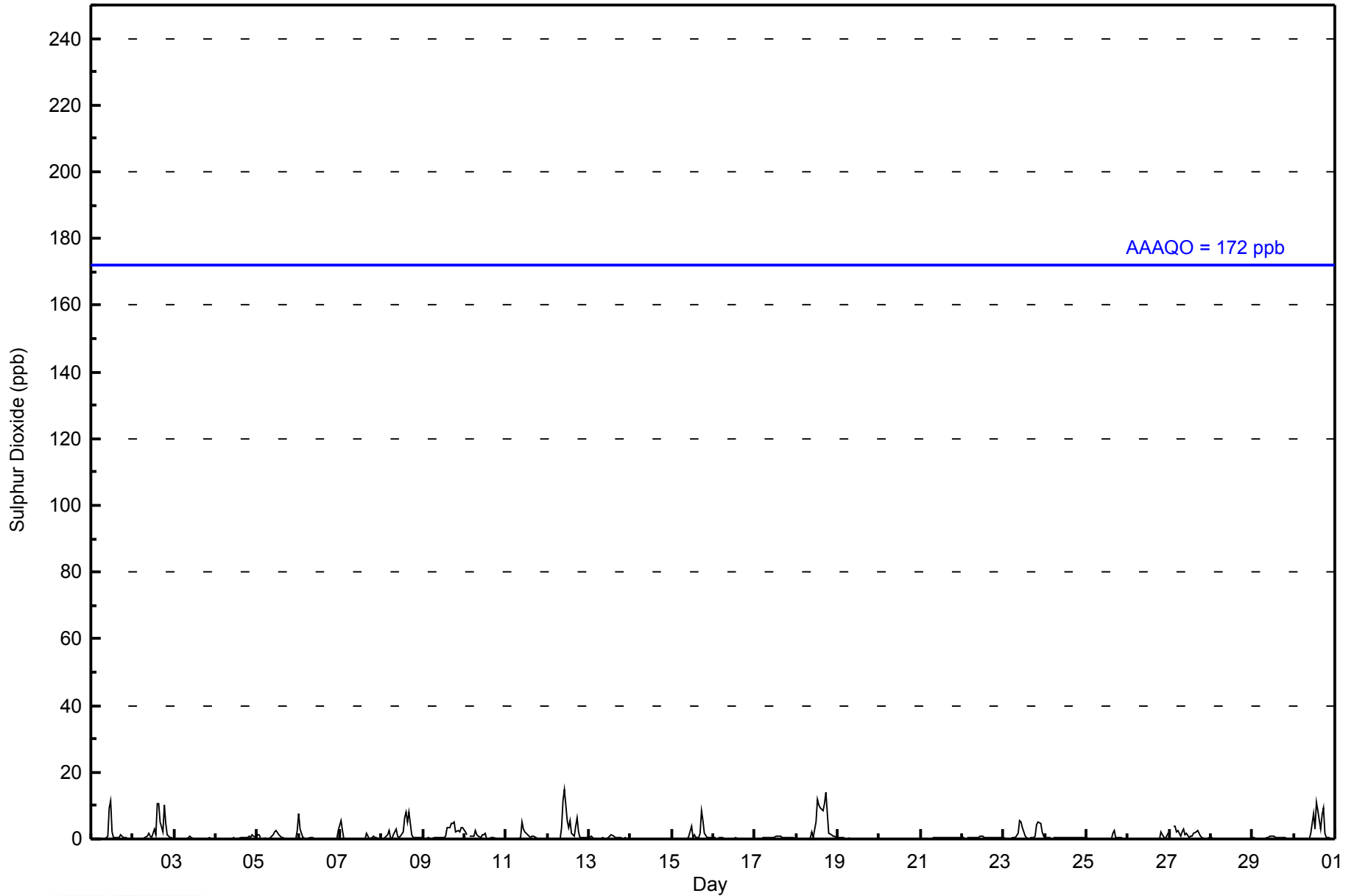
0.9	0.5	0.3	0.4	0.4	0.3	0.2	0.3	0.6	1.2	1.5	1.7	1.2	1.5	1.7	1.4	1.7	1.8	1.3	0.8	0.6	0.5	0.4	0.5	Diurnal Average	
8	3	4	4	3	2	2	2	3	11	15	11	12	11	11	10	11	14	10	5	5	5	3	3	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	675	98.83	98.83
11 - 20	8	1.17	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



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - September 2014

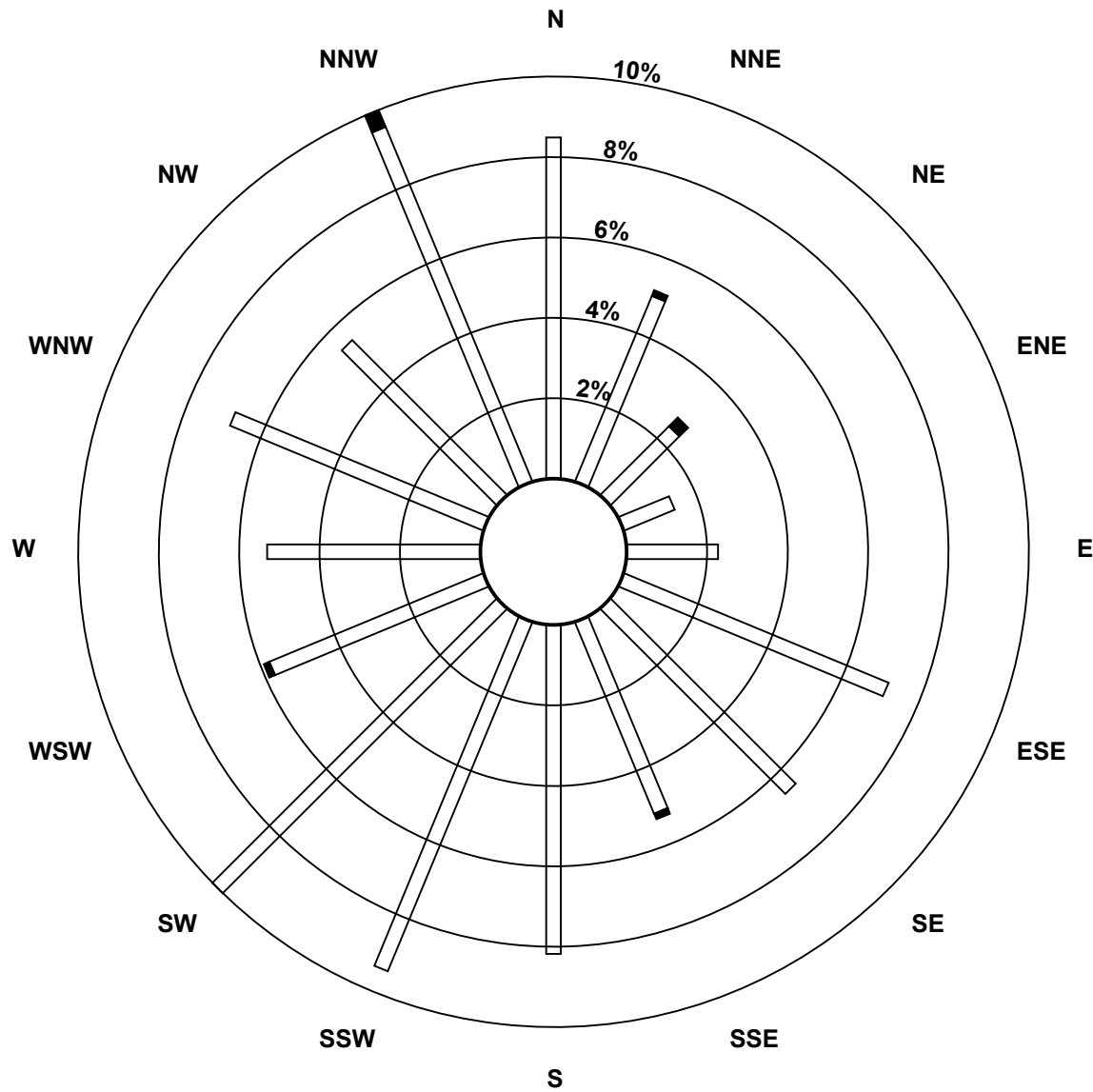
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	56	33	16	9	15	47	43	34	54	62	66	38	35	45	36	63	652
11 - 20	0	1	2	0	0	0	0	1	0	0	0	1	0	0	0	3	8
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	34	18	9	15	47	43	35	54	62	66	39	35	45	36	66	660

Total Number of Valid Hours: 660

Total Number of Hours: 720

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

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



Classes (ppb)

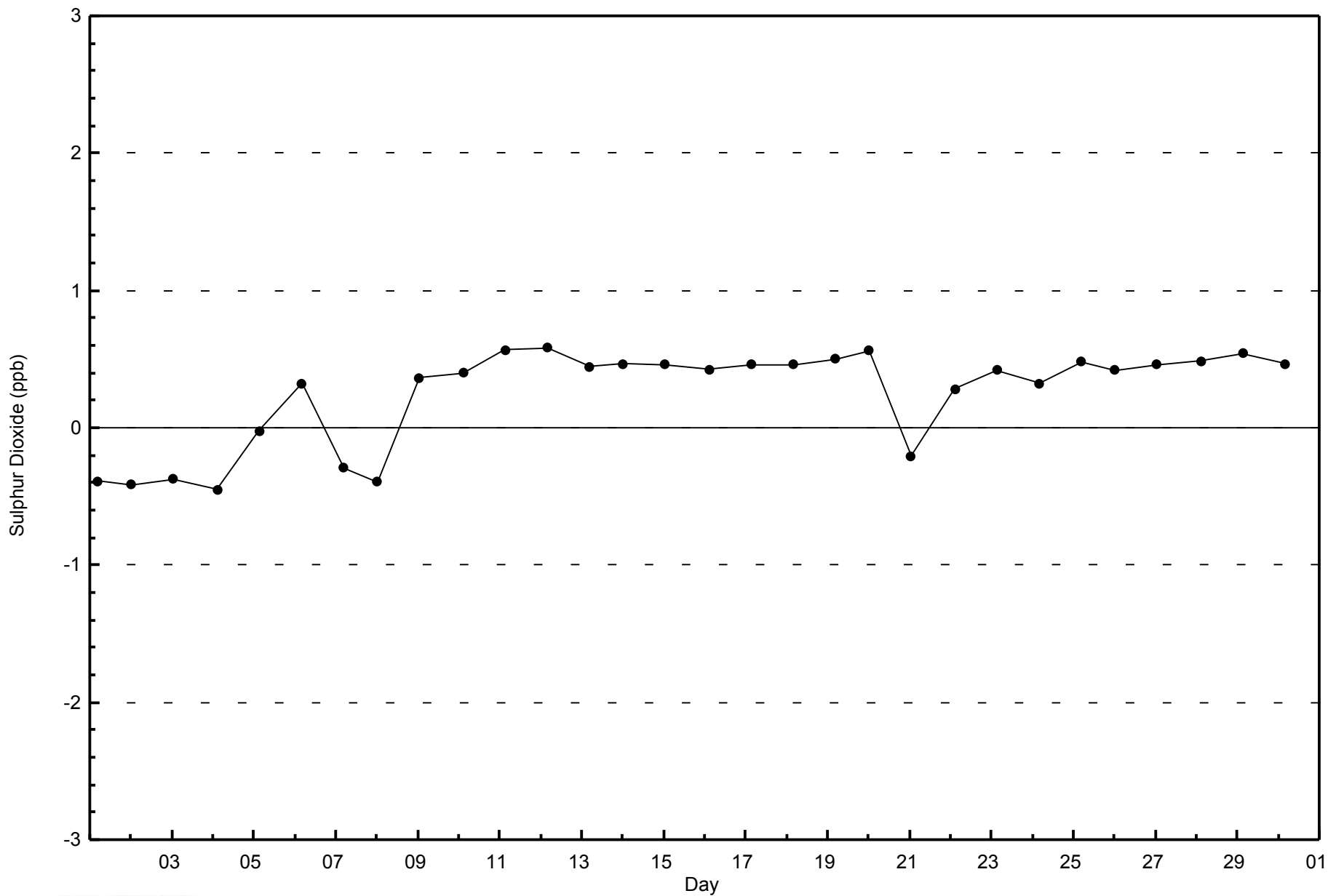


Total Number of Valid Hours: 660



WBEA
Zero Responses

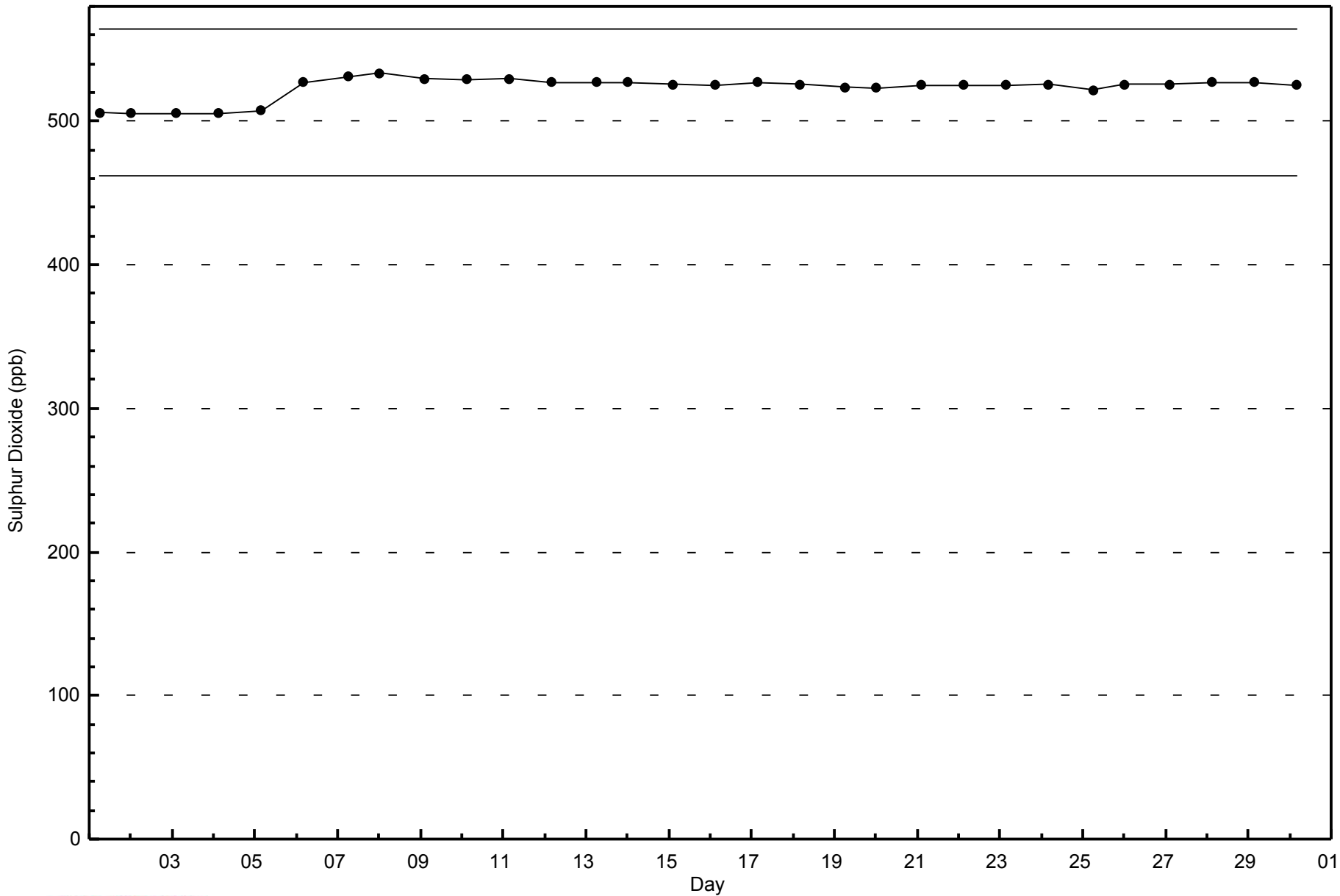
Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - September 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes - September 2014

Number of Exceedences (AAAQO):	1-hr: 0 24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Sep 7 00:00	Maximum Daily Average: 0.7 ppb on Sep 18	Hours of Data:	680
Minimum Value: 0 ppb on Sep 1 08:00	Minimum Daily Average: 0.3 ppb on Sep 1	Hours of Missing Data:	40
Maximum Diurnal Average: 0.6 ppb at hour 18	Minimum Diurnal Average: 0.4 ppb at hour 7	Hours of Calibration:	40
Monthly Average: 0.5 ppb	Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 1$	Percent Operational Time:	100.0

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

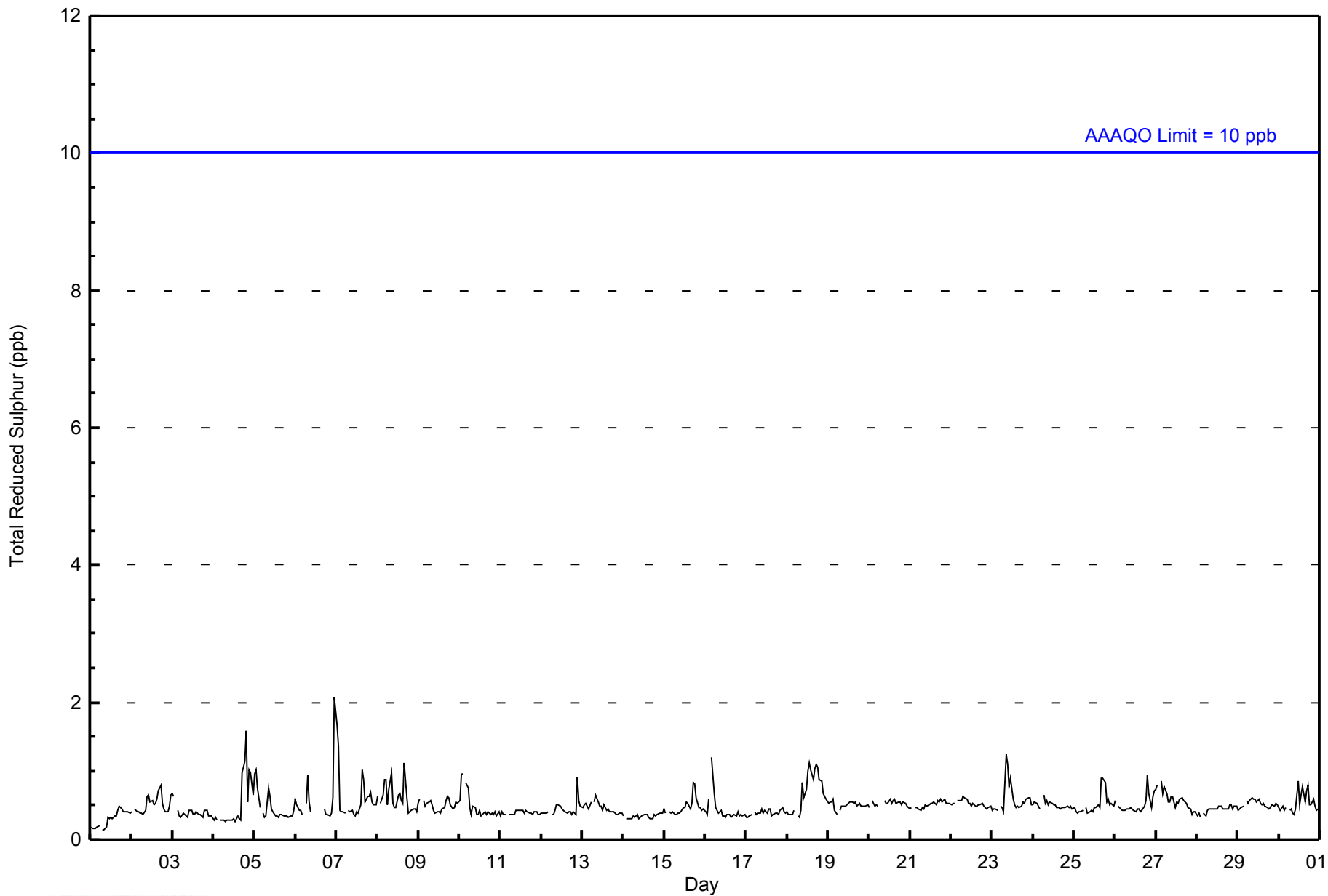
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Diurnal Average	
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	Diurnal Maximum	

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



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - September 2014





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	680	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: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - September 2014

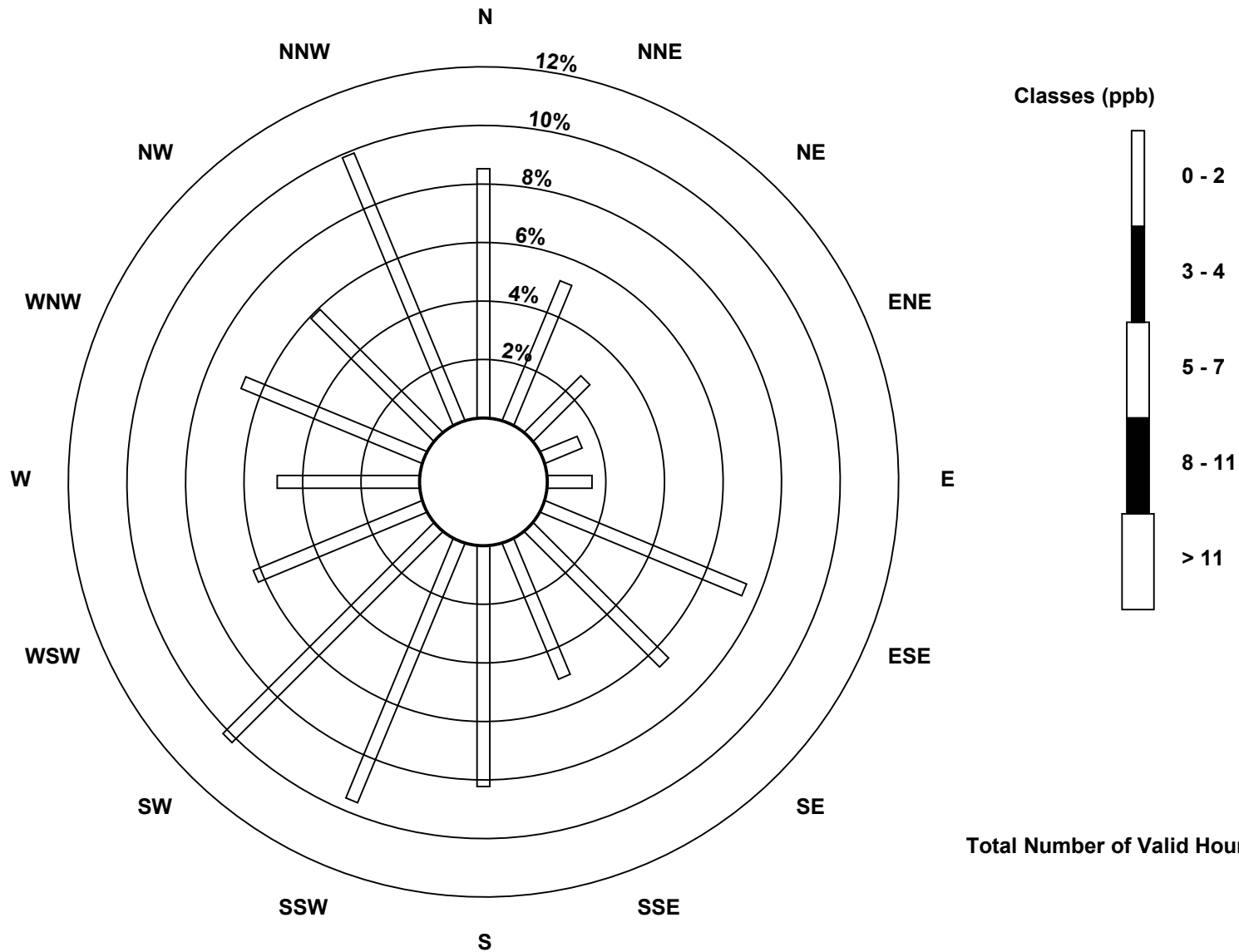
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	56	34	18	9	10	49	43	33	54	63	67	41	32	44	39	65	657
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	34	18	9	10	49	43	33	54	63	67	41	32	44	39	65	657

Total Number of Valid Hours: 657

Total Number of Hours: 720

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

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

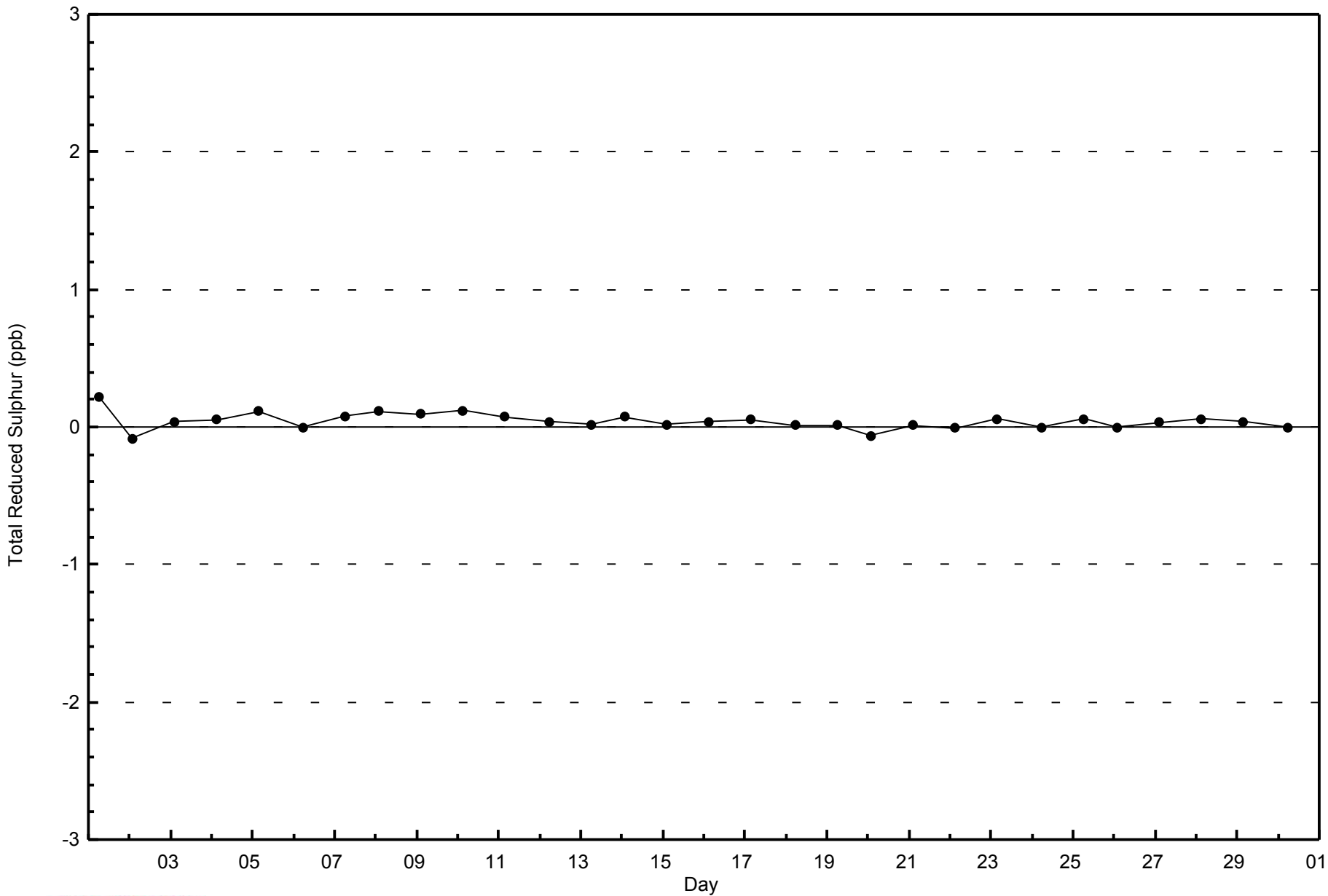


Total Number of Valid Hours: 657



WBEA
Zero Responses

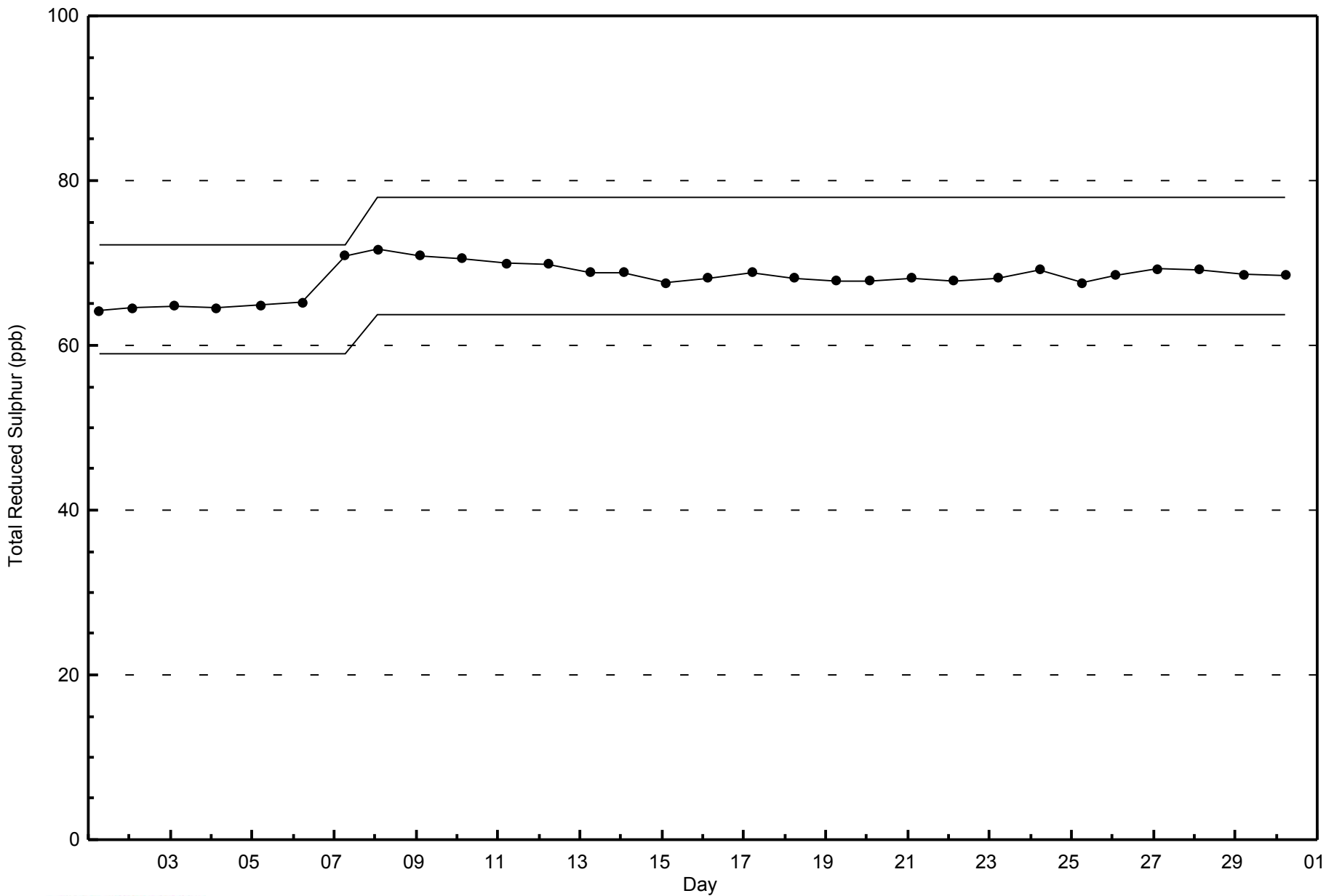
Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - September 2014





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - September 2014



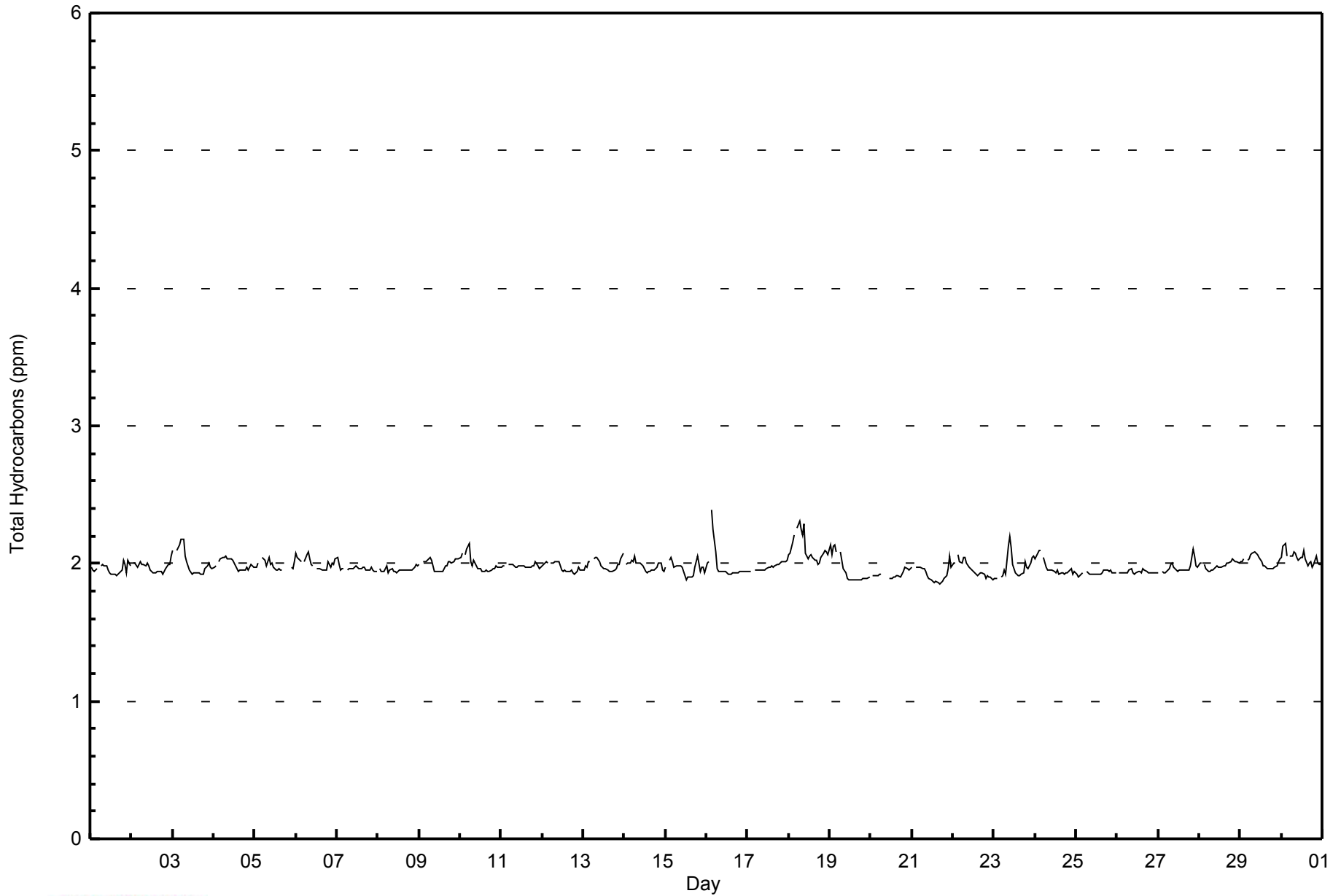


Maximum Value: 2.4 ppm on Sep 16 04:00																	Maximum Daily Average: 2.1 ppm on Sep 18										Hours in Service: 720	
Minimum Value: 1.9 ppm on Sep 21 17:00																	Minimum Daily Average: 1.9 ppm on Sep 20										Hours of Data: 681	
Maximum Diurnal Average: 2.0 ppm at hour 4																	Minimum Diurnal Average: 1.9 ppm at hour 15										Hours of Missing Data: 39	
Monthly Average: 1.98 ppm																	Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.2										Hours of Calibration: 38	
																											Percent Operational Time: 99.9	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Sep	2.0	2.0	1.9	1.9	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	1.9	2.0	2.0	2.0	2.0	2.0	
2-Sep	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.0	2.1	
3-Sep	2.1	Z	2.1	2.1	2.1	2.2	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	
4-Sep	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
5-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	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	
6-Sep	2.1	2.0	2.0	2.0	Z	2.0	2.1	2.1	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	2.1	
7-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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	
8-Sep	Z	2.0	1.9	1.9	2.0	2.0	1.9	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
9-Sep	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
10-Sep	2.0	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
11-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	
12-Sep	2.0	2.0	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	2.0	2.0	2.0	2.0	2.0	2.0	
13-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	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.0	
14-Sep	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.1	2.1	
15-Sep	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	1.9	2.0	2.0	1.9	2.0	2.1	
16-Sep	2.0	2.0	Z	2.4	2.3	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.4	
17-Sep	1.9	1.9	1.9	Z	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
18-Sep	2.1	2.1	2.2	2.2	Z	2.3	2.3	2.2	2.2	2.3	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
19-Sep	2.1	2.1	2.1	2.1	2.1	Z	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	1.9	2.0	2.1	
20-Sep	Z	1.9	1.9	1.9	1.9	1.9	1.9	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0	
21-Sep	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	1.9	2.1	2.1	
22-Sep	2.0	2.0	Z	2.1	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	2.0	2.1	
23-Sep	1.9	1.9	1.9	Z	1.9	1.9	2.0	1.9	2.1	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.0	2.2	2.0	
24-Sep	2.0	2.1	2.1	2.1	Z	2.0	2.0	1.9	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.1	
25-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	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	
26-Sep	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	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	
27-Sep	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	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	2.1	
28-Sep	2.0	2.0	Z	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
29-Sep	2.0	2.0	2.0	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
30-Sep	2.0	2.1	2.1	2.1	Z	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	
																								Diurnal Average				
																								Diurnal Maximum				
Z - zerospan C - Calibration M - Maintenance																												



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Patricia McInnes - September 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Patricia McInnes - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	613	90.01	90.01
2.1 - 3.0	68	9.99	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Patricia McInnes - September 2014

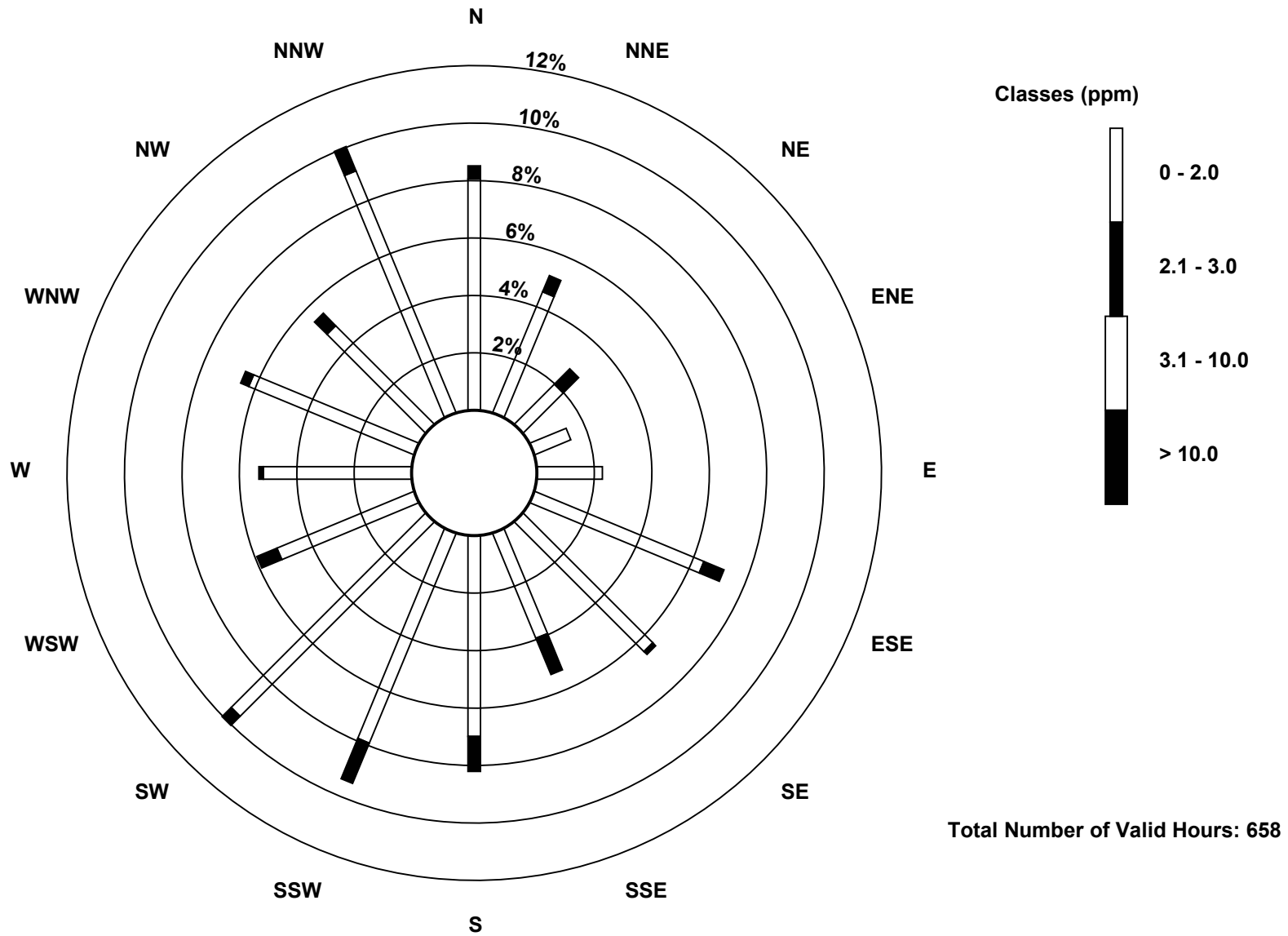
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	53	30	13	9	15	42	42	26	46	52	63	34	34	41	32	60	592
2.1 - 3.0	3	4	5	0	0	5	1	9	8	10	3	5	1	2	4	6	66
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	34	18	9	15	47	43	35	54	62	66	39	35	43	36	66	658

Total Number of Valid Hours: 658

Total Number of Hours: 720

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

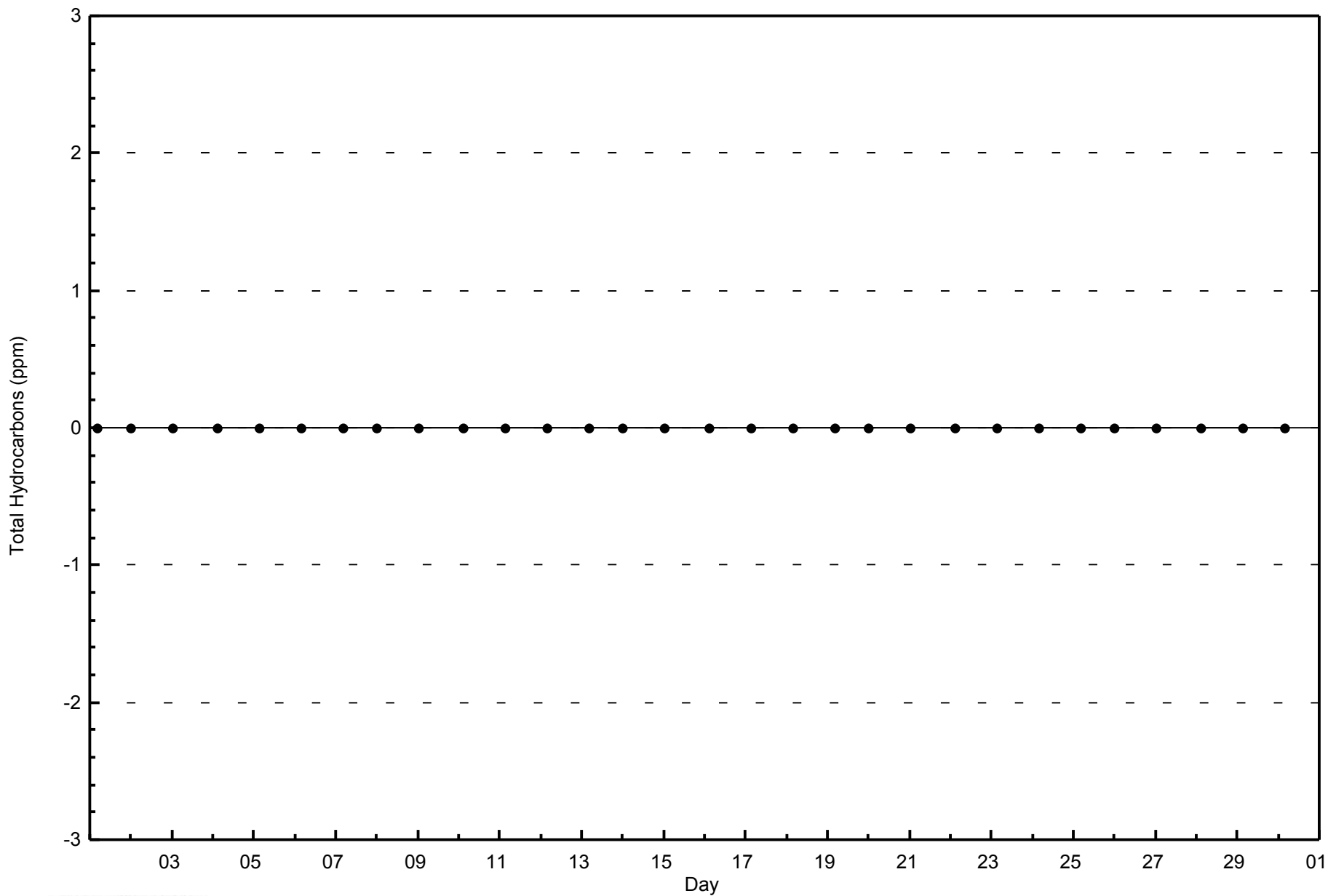
**Total Hydrocarbons (THC) - ppm
Patricia McInnes (AMS 6)**





WBEA
Zero Responses

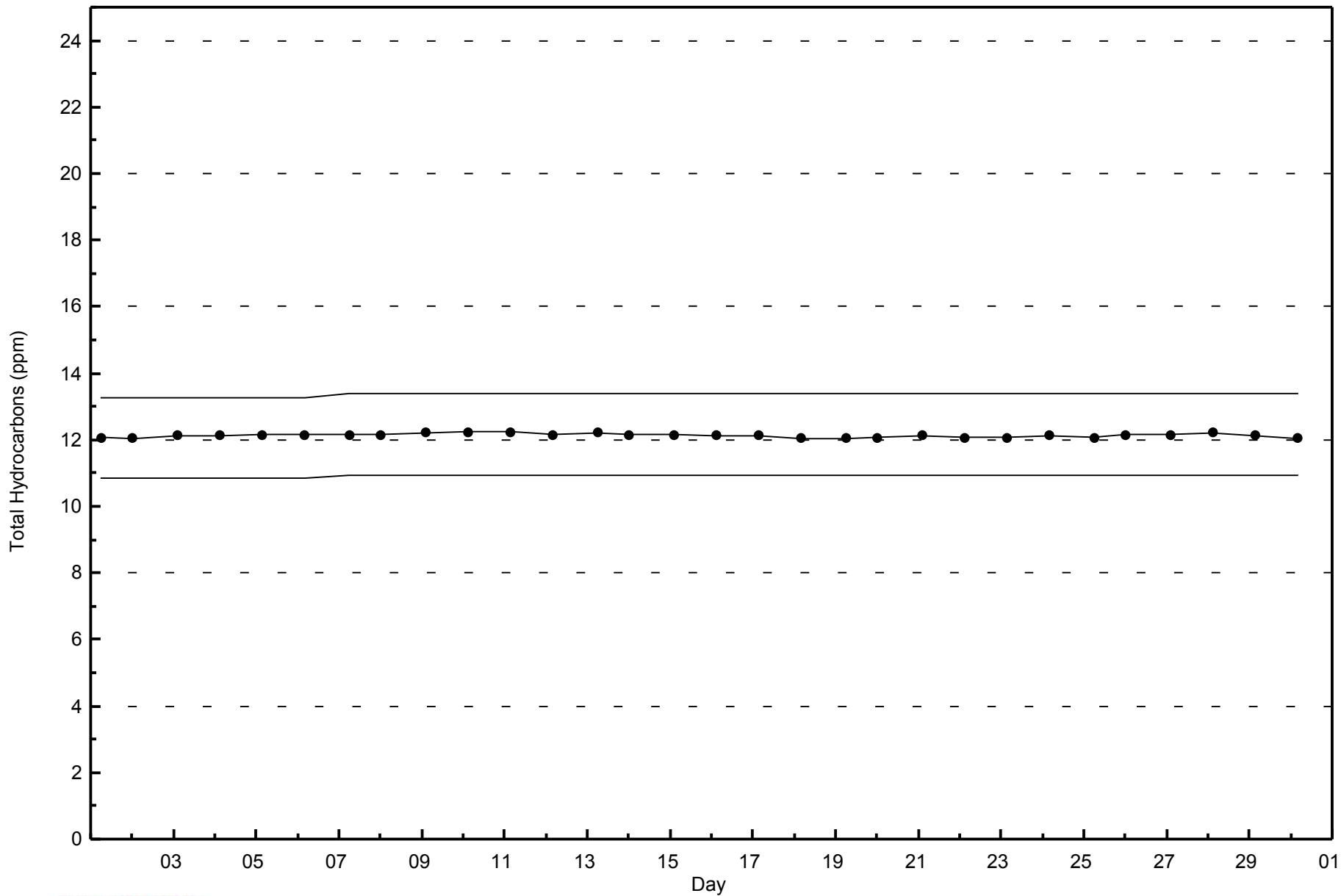
Total Hydrocarbons (THC) - ppm
Patricia McInnes - September 2014





WBEA
Span Responses

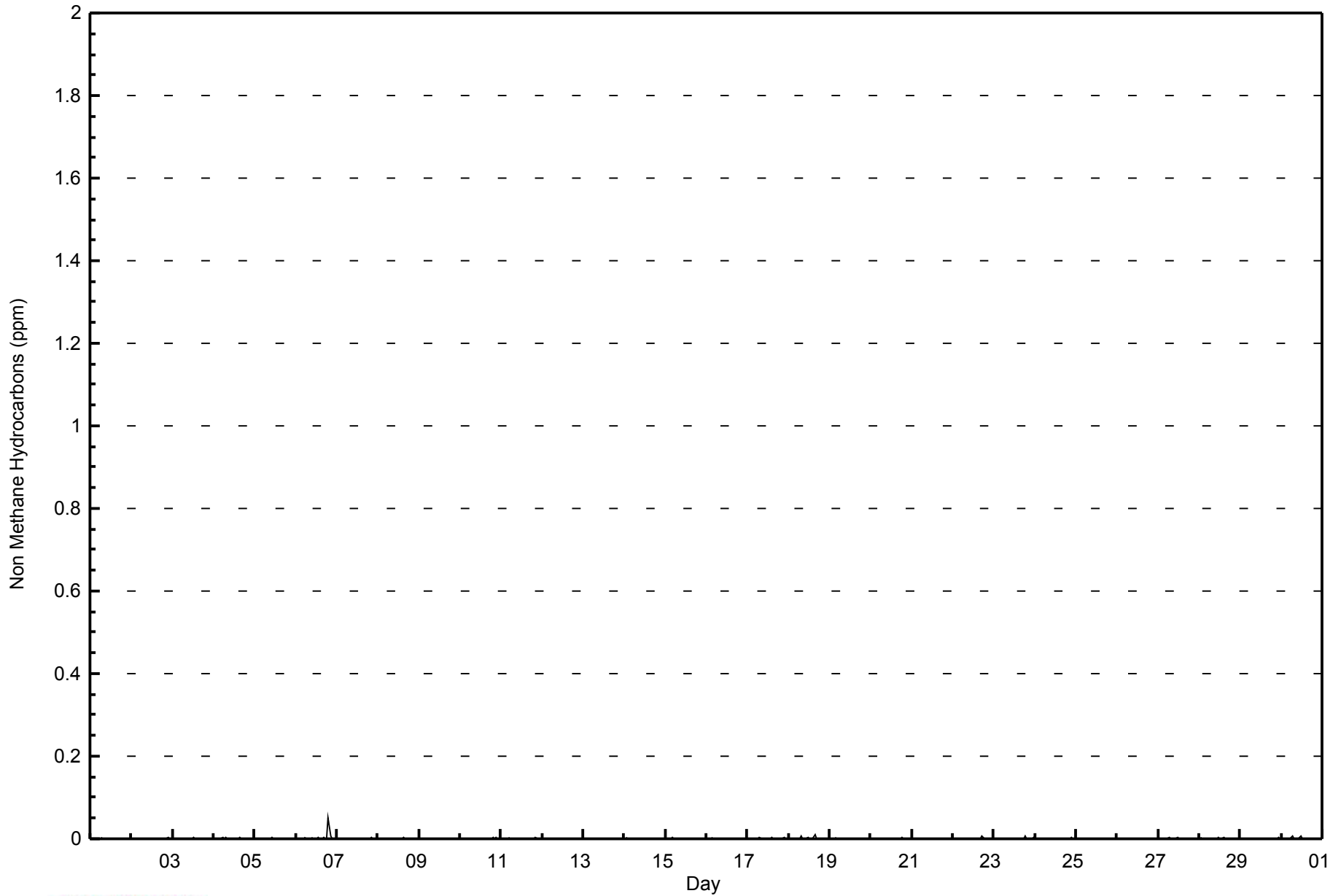
Total Hydrocarbons (THC) - ppm
Patricia McInnes - September 2014





WBEA
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - September 2014





WBEA
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	673	98.83	98.83
0.006 - 0.05	8	1.17	100.00
0.06 - 0.1	0	0.00	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - September 2014

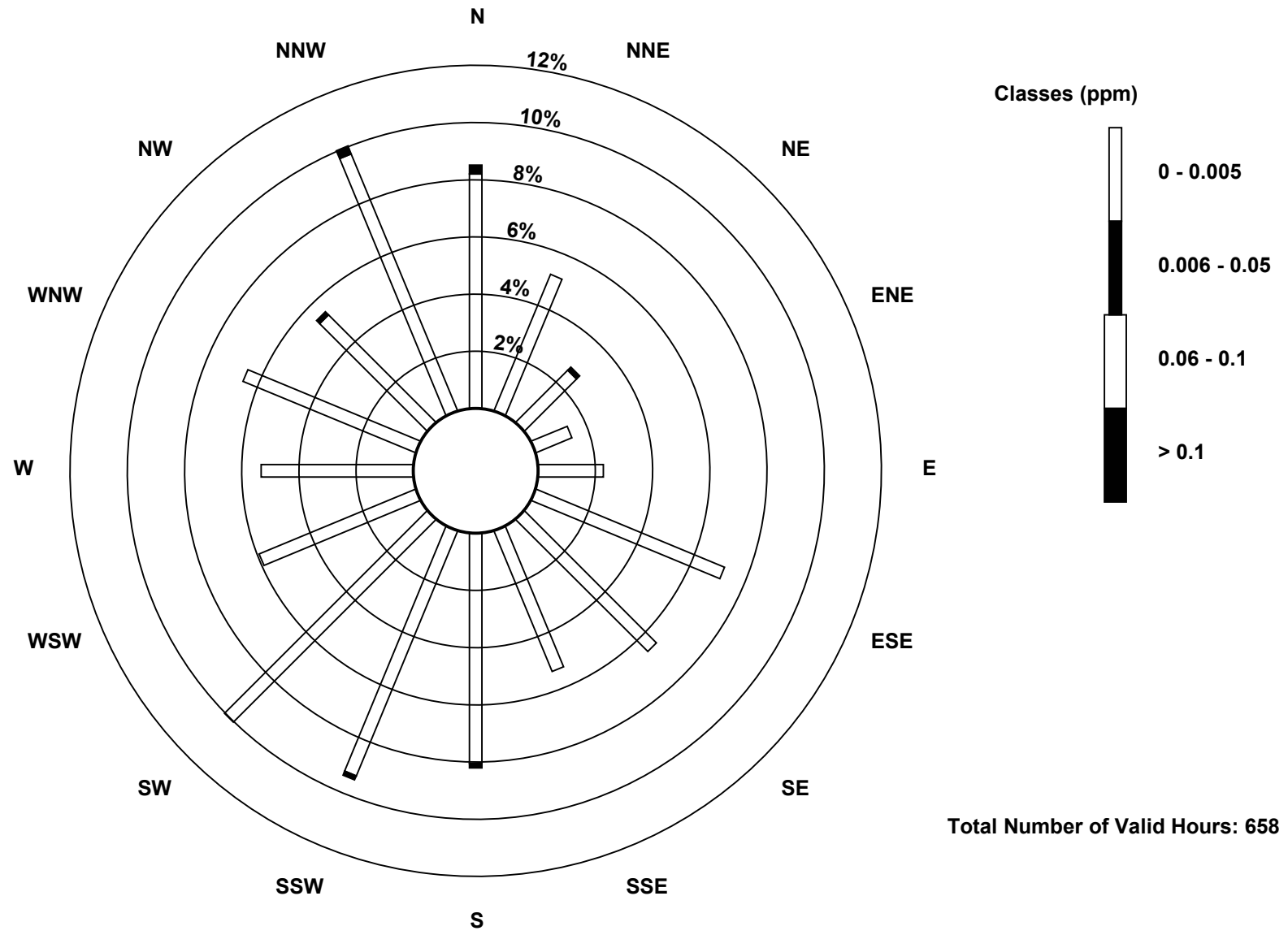
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	54	34	17	9	15	47	43	35	53	61	66	39	35	43	35	64	650
0.006 - 0.05	2	0	1	0	0	0	0	0	1	1	0	0	0	0	1	2	8
0.06 - 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	34	18	9	15	47	43	35	54	62	66	39	35	43	36	66	658

Total Number of Valid Hours: 658

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

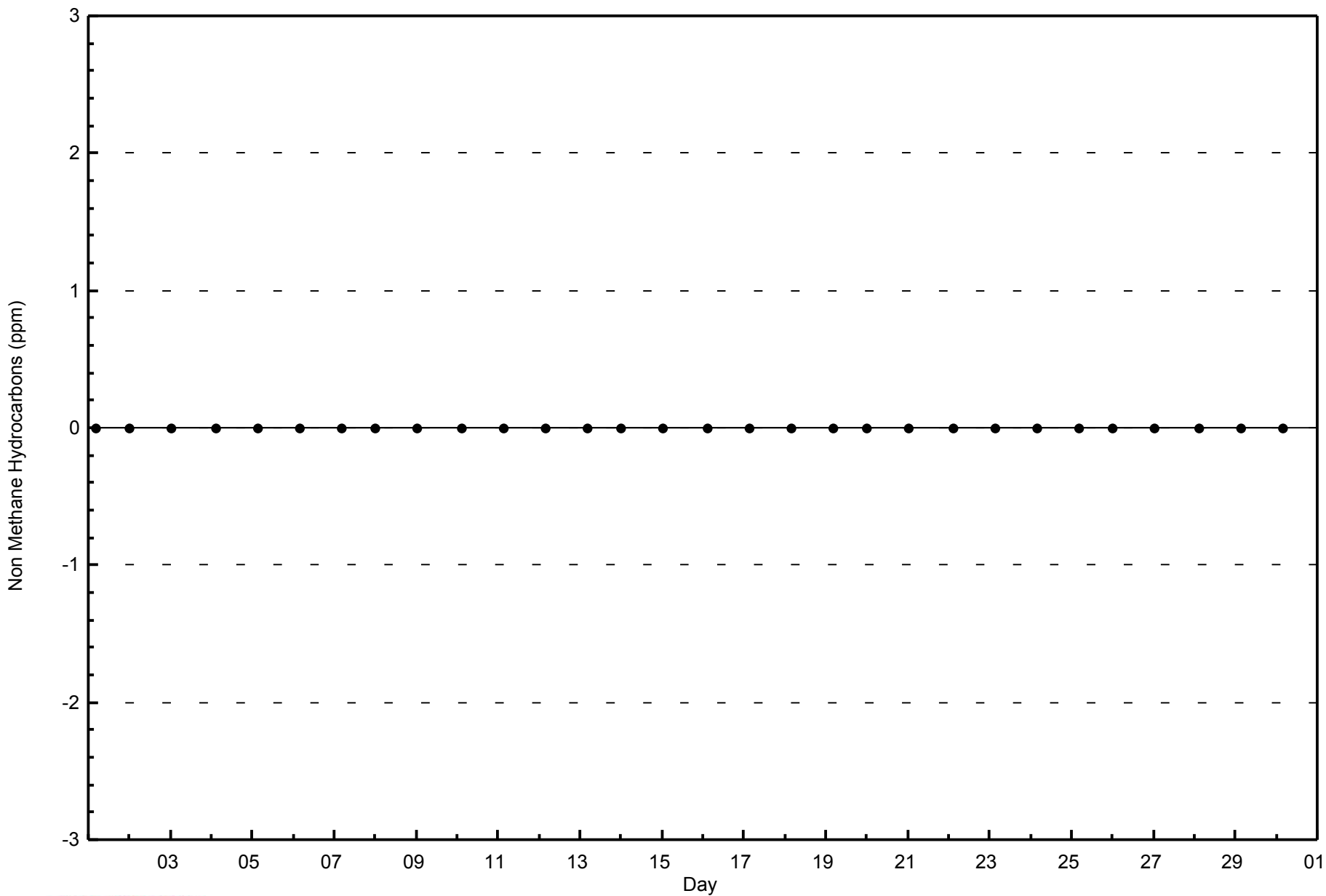
Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes (AMS 6)





WBEA
Zero Responses

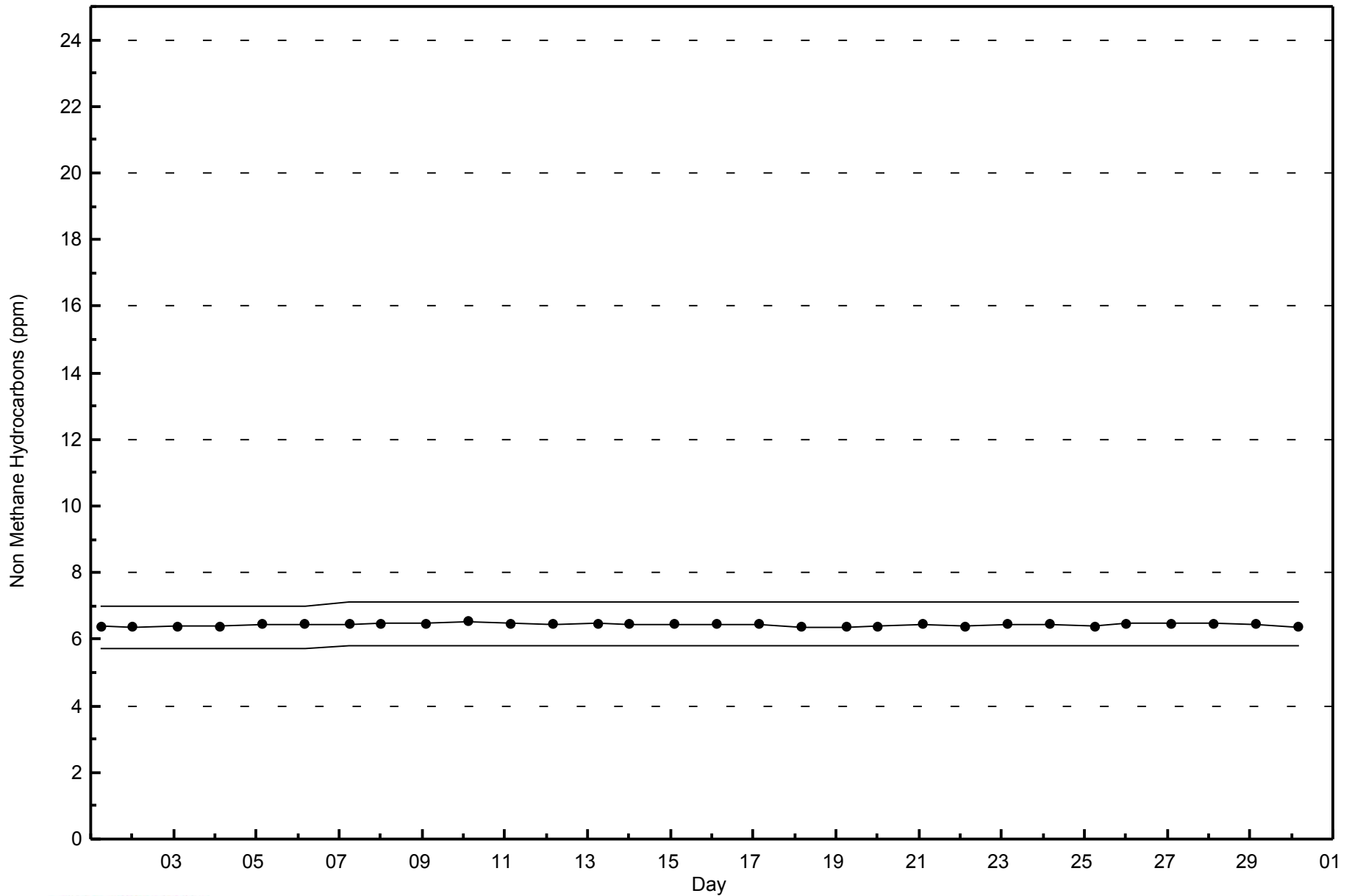
Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - September 2014





WBEA
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2.4 ppm on Sep 16 04:00	Maximum Daily Average: 2.1 ppm on Sep 18		Hours of Data:	681
Minimum Value: 1.9 ppm on Sep 21 17:00	Minimum Daily Average: 1.9 ppm on Sep 20		Hours of Missing Data:	39
Maximum Diurnal Average: 2.0 ppm at hour 4	Minimum Diurnal Average: 1.9 ppm at hour 15		Hours of Calibration:	38
Monthly Average: 1.98 ppm	Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.2		Percent Operational Time:	99.9

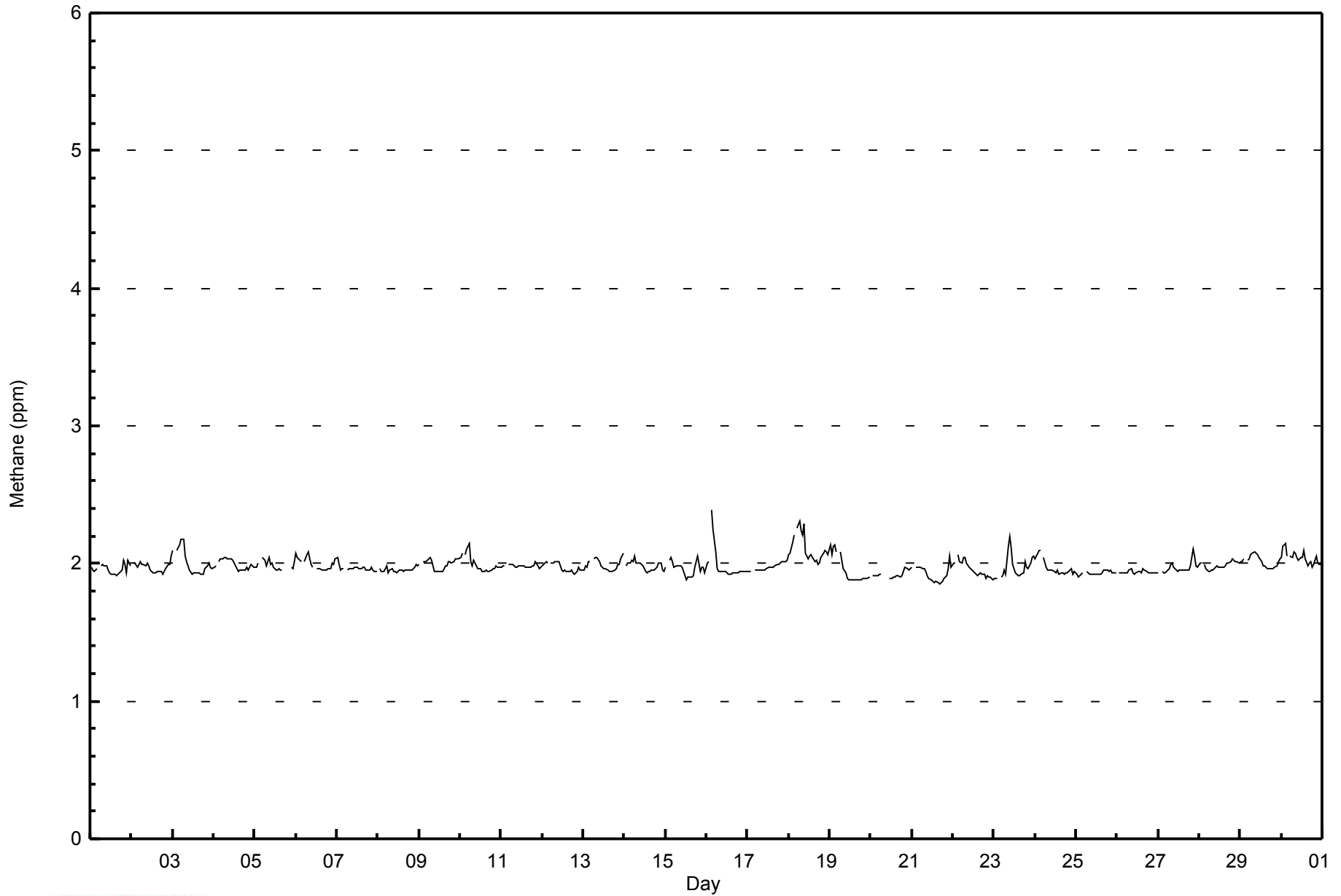
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																											
1-Sep	2.0	2.0	1.9	1.9	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0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

Z - zerspan C - Calibration M - Maintenance



WBEA
Hourly Averages

Methane (CH₄) - ppm
Patricia McInnes - September 2014





WBEA
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	615	90.31	90.31
2.1 - 3.0	66	9.69	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - September 2014

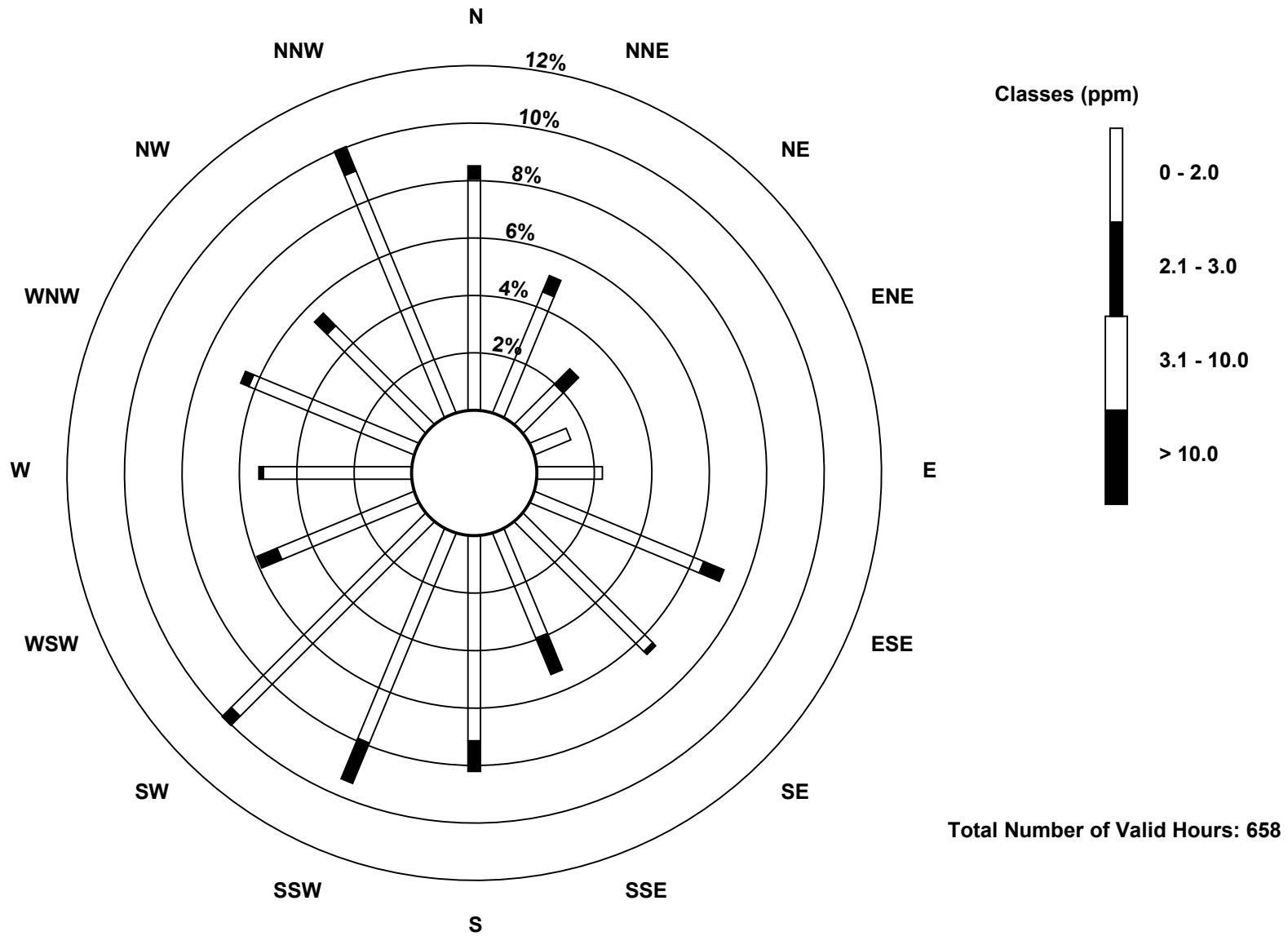
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	53	30	13	9	15	42	42	26	47	52	63	34	34	41	32	60	593
2.1 - 3.0	3	4	5	0	0	5	1	9	7	10	3	5	1	2	4	6	65
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	34	18	9	15	47	43	35	54	62	66	39	35	43	36	66	658

Total Number of Valid Hours: 658

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

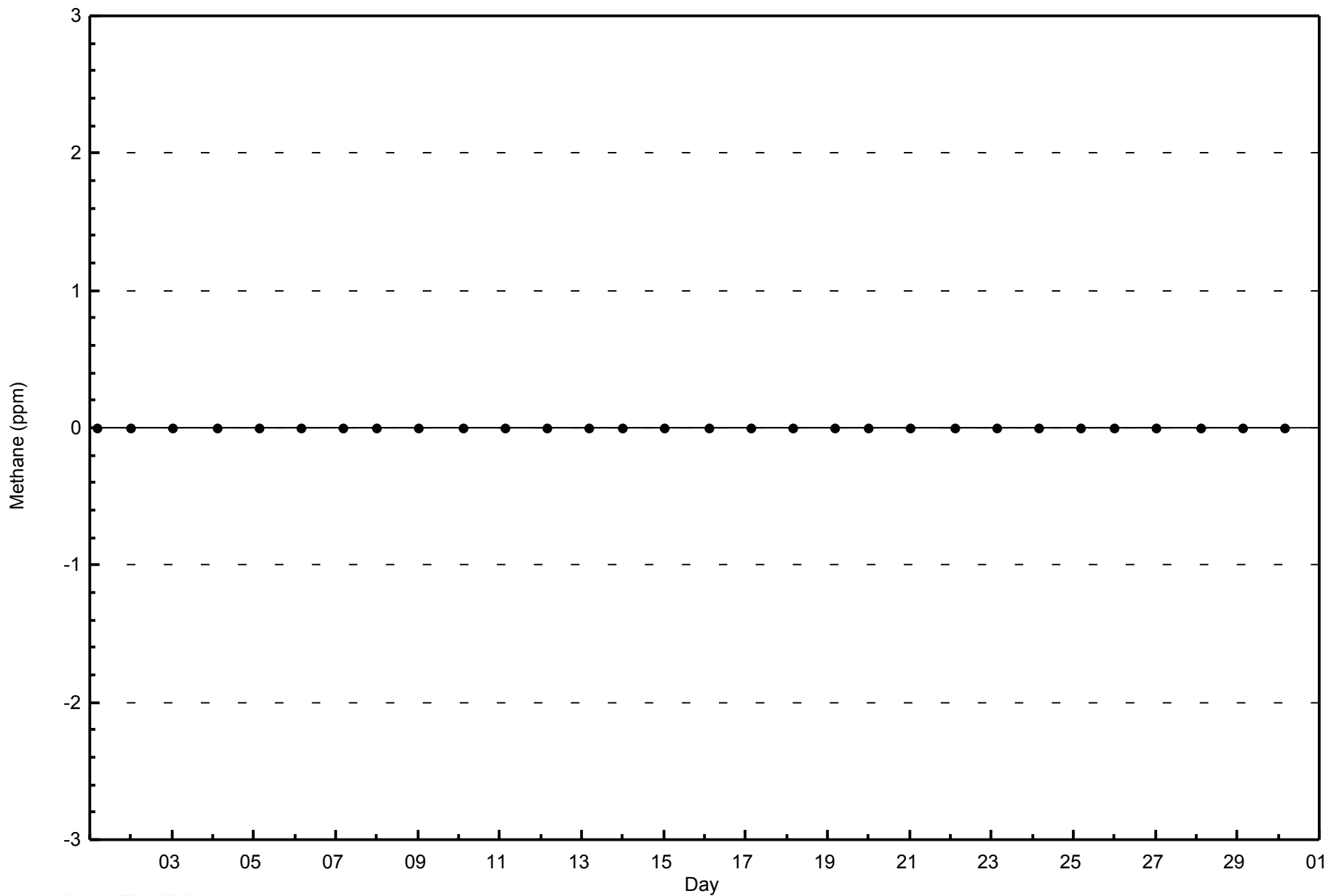
Methane (CH₄) - ppm
Patricia McInnes (AMS 6)





WBEA
Zero Responses

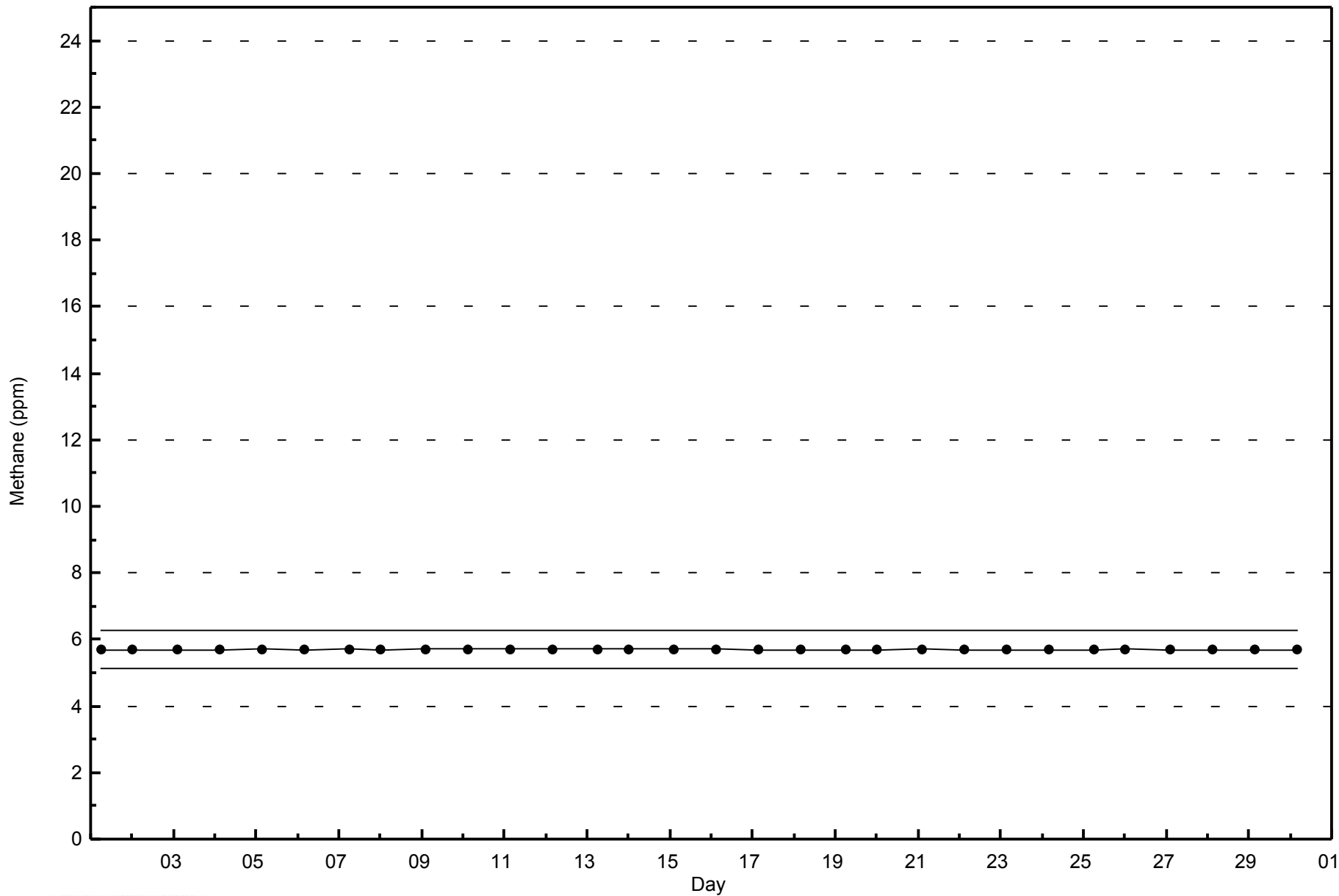
Methane (CH₄) - ppm
Patricia McInnes - September 2014





WBEA
Span Responses

Methane (CH₄) - ppm
Patricia McInnes - September 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O3) - ppb

Patricia McInnes - September 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 41 ppb on Sep 19 18:00	Maximum Daily Average: 27.5 ppb on Sep 23		Hours of Data:	682
Minimum Value: 2 ppb on Sep 16 04:00	Minimum Daily Average: 8.1 ppb on Sep 30		Hours of Missing Data:	38
Maximum Diurnal Average: 25.0 ppb at hour 16	Minimum Diurnal Average: 10.2 ppb at hour 6		Hours of Calibration:	37
Monthly Average: 17.6 ppb	Percentiles: P ₁ = 3 P ₁₀ = 7 Q ₁ = 11 Median = 17 Q ₃ = 23 P ₉₀ = 28 P ₉₉ = 37		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	9	12	14	12	11	10	10	Z	11	12	17	23	23	24	23	23	23	24	13	8	12	16	7	8	15.0	24
2-Sep	7	7	Z	10	7	4	6	6	10	12	20	24	25	26	28	26	26	23	18	17	15	14	8	6	15.0	28
3-Sep	5	4	4	Z	2	2	3	3	7	12	19	23	21	22	22	22	23	23	20	8	5	6	12	13	12.3	23
4-Sep	13	13	11	10	Z	7	7	7	8	7	5	7	13	17	20	17	16	22	19	14	15	15	15	16	12.7	22
5-Sep	15	17	14	13	8	Z	5	13	13	18	19	21	21	19	19	20	16	16	15	16	13	11	8	10	14.8	21
6-Sep	8	7	6	7	5	5	Z	3	8	15	16	M	18	18	18	C	C	C	C	C	13	10	9	8	--	18
7-Sep	11	16	19	19	18	18	18	Z	20	20	19	19	22	23	23	22	23	24	23	22	19	18	18	18	19.7	24
8-Sep	16	16	Z	14	13	11	15	16	17	20	21	23	22	23	24	24	24	23	21	17	13	11	11	12	17.8	24
9-Sep	10	8	10	Z	7	6	8	11	18	26	26	25	26	27	27	25	21	18	16	11	11	8	10	12	15.9	27
10-Sep	12	11	10	9	Z	3	15	19	11	14	22	20	23	30	30	29	29	30	27	21	23	22	22	22	19.6	30
11-Sep	21	20	20	17	16	Z	13	17	20	20	23	25	27	30	32	32	33	31	26	25	19	24	29	27	23.8	33
12-Sep	25	22	18	20	19	17	Z	14	14	19	20	24	27	28	28	29	29	23	26	23	21	20	18	13	21.6	29
13-Sep	15	13	13	7	5	5	5	Z	6	8	13	16	22	26	27	30	32	28	21	14	15	15	8	6	15.2	32
14-Sep	7	7	Z	6	5	5	3	6	8	12	18	24	32	34	34	35	35	32	25	21	17	15	23	21	18.6	35
15-Sep	17	15	12	Z	13	14	13	12	14	15	18	26	27	27	28	28	27	19	12	10	18	15	15	22	18.1	28
16-Sep	15	12	4	2	Z	4	8	11	10	11	13	14	15	16	16	15	15	15	15	15	17	17	18	18	12.9	18
17-Sep	17	17	16	14	14	Z	12	10	10	10	10	11	11	11	11	12	15	14	10	10	9	8	8	7	11.6	17
18-Sep	5	4	4	3	6	5	Z	3	5	8	13	16	17	21	23	25	24	22	14	9	7	4	7	9	11.1	25
19-Sep	8	10	7	6	10	9	3	Z	19	22	27	30	33	35	36	35	39	41	39	35	31	31	28	26	24.3	41
20-Sep	25	25	Z	24	24	24	C	C	25	26	28	29	31	31	31	32	32	31	29	21	16	19	22	23	26.1	32
21-Sep	23	24	24	Z	20	19	18	16	16	18	19	20	22	22	23	22	23	20	14	12	12	12	12	16	18.5	24
22-Sep	12	12	9	7	Z	9	8	8	13	23	26	31	35	36	36	34	31	27	24	32	32	32	34	34	23.6	36
23-Sep	37	37	35	35	26	Z	20	20	20	16	23	33	36	36	37	38	37	31	28	25	21	19	13	11	27.5	38
24-Sep	12	12	11	7	11	6	Z	17	20	21	19	22	20	16	24	28	27	25	24	23	20	28	39	32	20.2	39
25-Sep	33	31	24	19	15	14	14	Z	23	21	20	19	18	17	17	18	19	24	21	23	22	24	20	22	20.6	33
26-Sep	21	21	Z	20	18	17	15	12	10	12	13	13	11	11	13	11	13	17	19	19	20	22	22	23	16.2	23
27-Sep	22	21	24	Z	25	22	18	14	15	16	19	23	22	23	24	24	23	23	18	12	5	5	10	13	18.3	25
28-Sep	8	8	8	9	Z	15	16	15	18	22	25	25	26	27	28	27	26	25	24	22	21	20	21	22	19.9	28
29-Sep	22	20	16	13	12	Z	13	12	13	14	16	19	23	32	31	27	25	21	20	17	16	13	13	11	18.3	32
30-Sep	9	7	4	8	6	4	Z	3	7	8	9	10	12	9	13	15	11	8	10	8	6	7	6	5	8.1	15

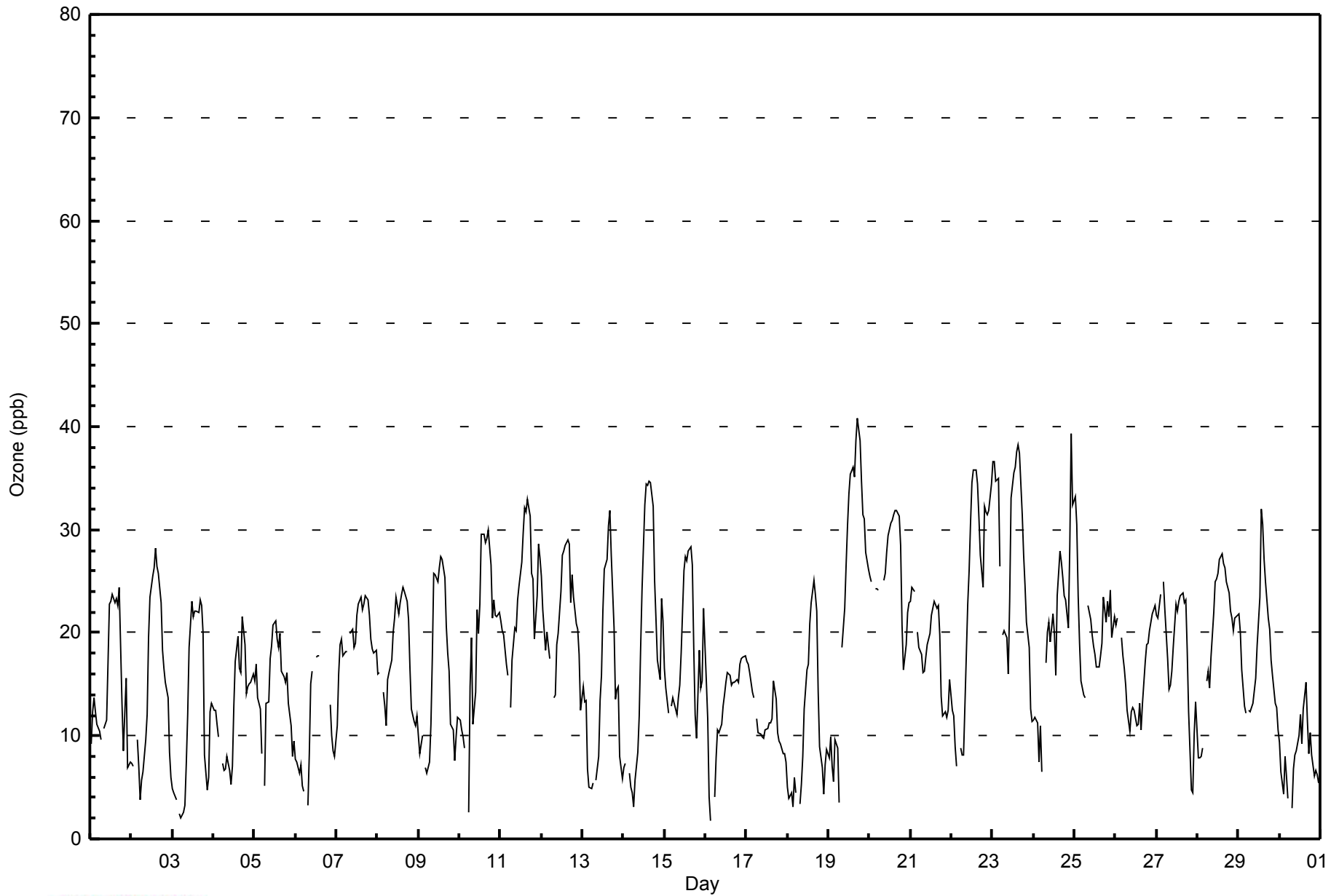
15.3	15.0	13.5	12.4	12.7	10.2	11.0	11.3	13.7	15.9	18.4	21.1	22.7	23.9	24.8	25.0	24.7	23.5	20.4	17.6	16.2	16.0	16.1	16.2	Diurnal Average
37	37	35	35	26	24	20	20	25	26	28	33	36	36	37	38	39	41	39	35	32	32	39	34	Diurnal Maximum

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Patricia McInnes - September 2014





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	431	63.20	63.20
21 - 50	251	36.80	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - September 2014

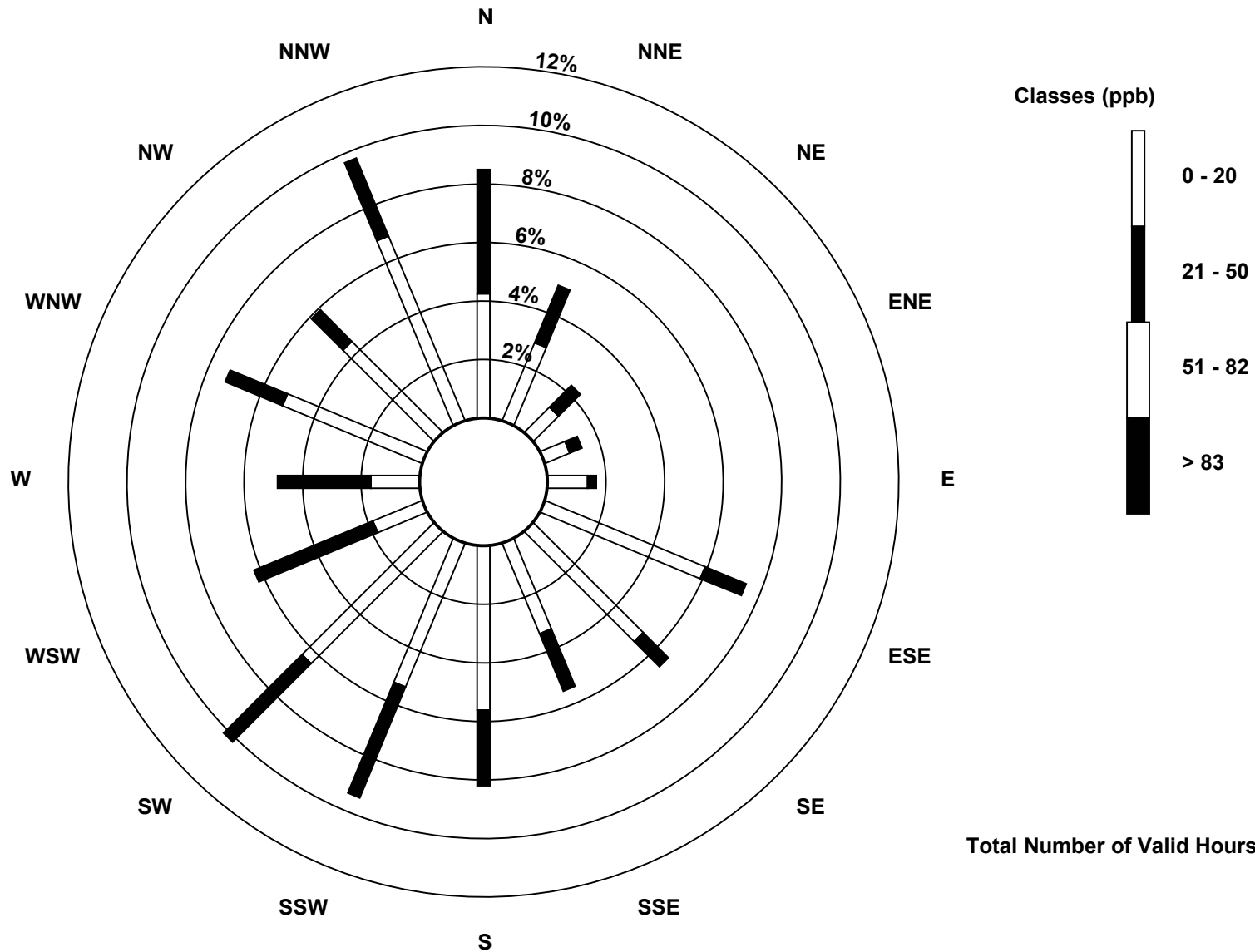
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	19	8	6	9	39	35	22	37	35	42	12	11	34	29	45	411
21 - 50	28	14	7	3	2	10	8	14	17	27	25	29	21	14	10	19	248
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	33	15	9	11	49	43	36	54	62	67	41	32	48	39	64	659

Total Number of Valid Hours: 659

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

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

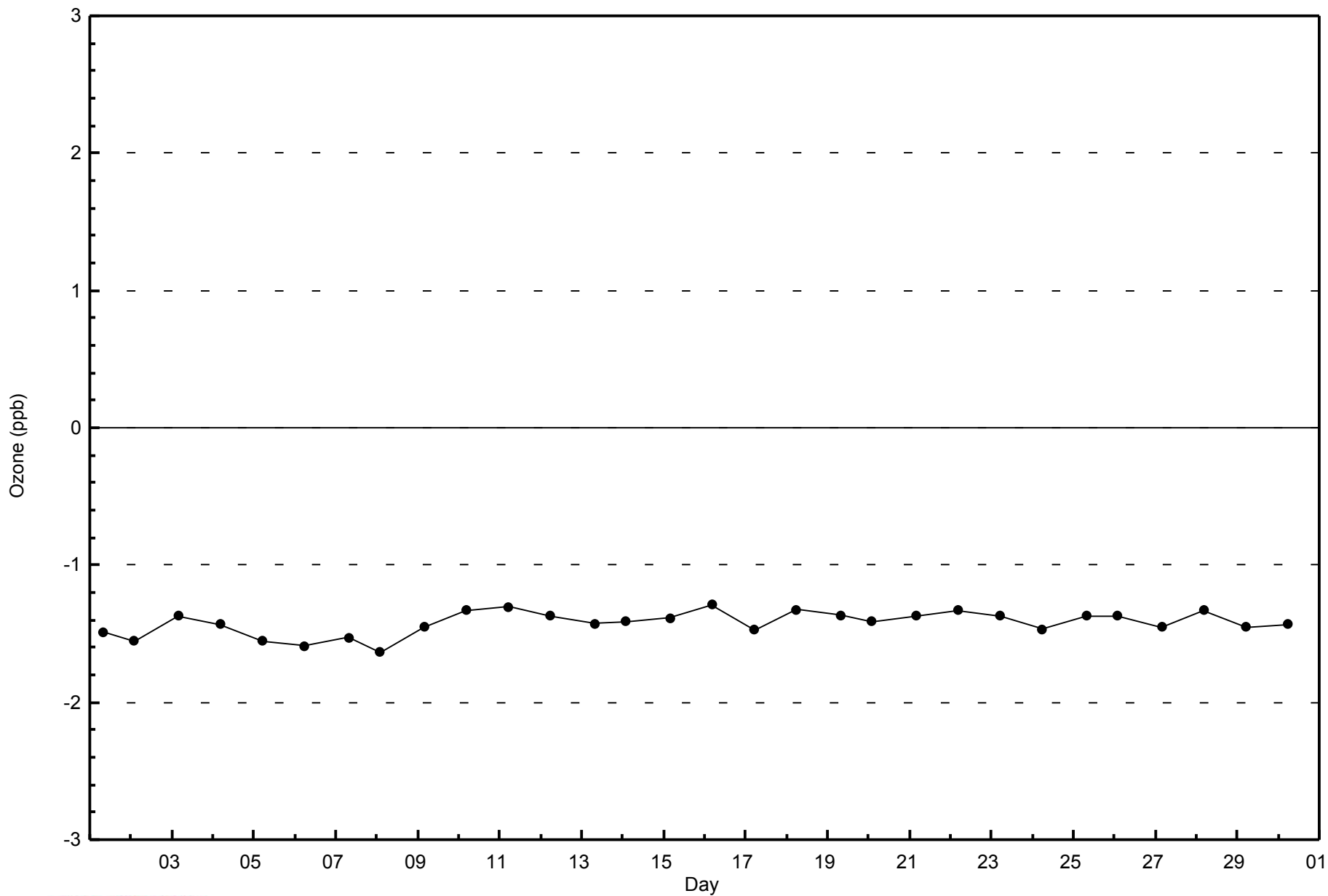


Total Number of Valid Hours: 659



WBEA
Zero Responses

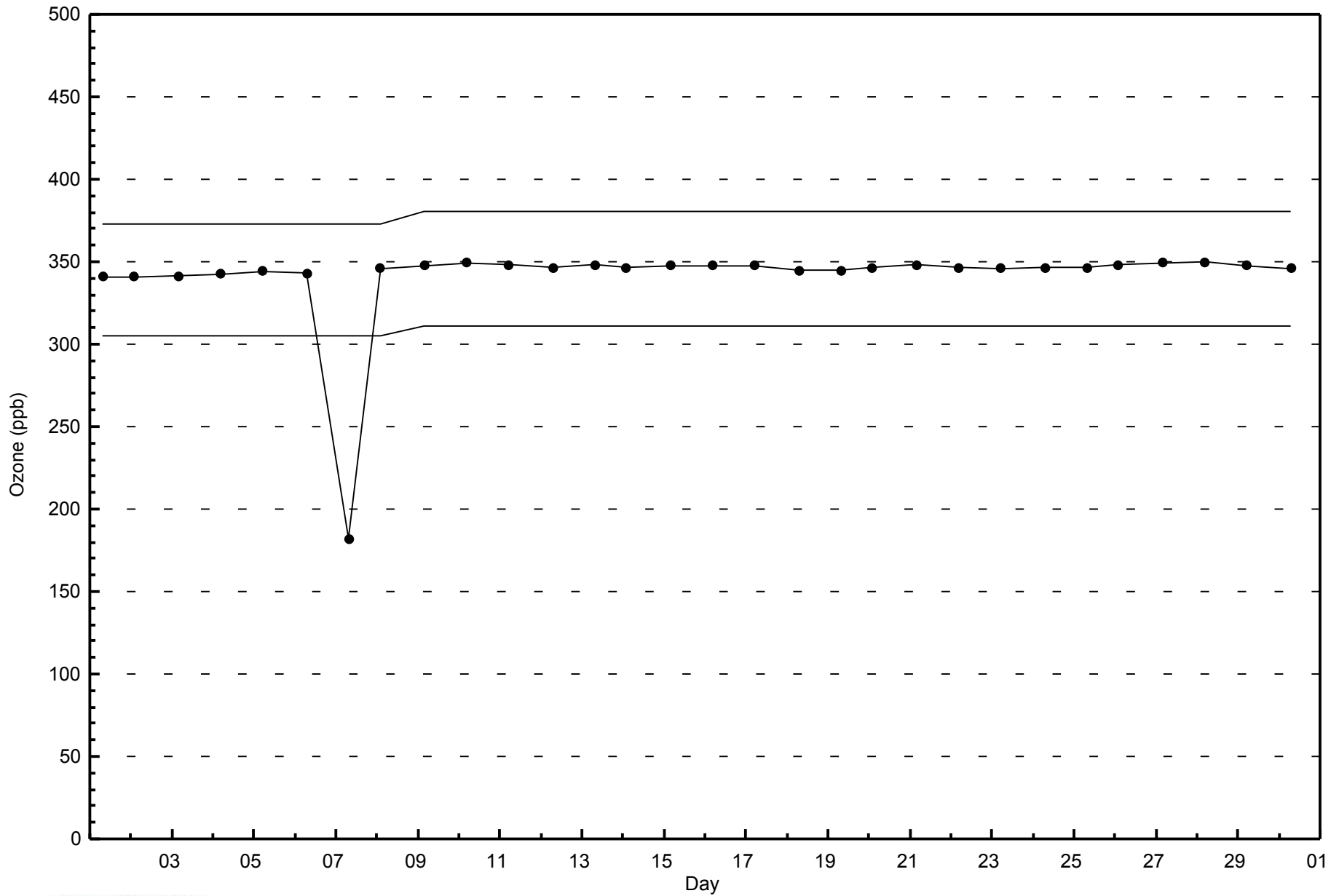
Ozone (O₃) - ppb
Patricia McInnes - September 2014





WBEA
Span Responses

Ozone (O₃) - ppb
Patricia McInnes - September 2014



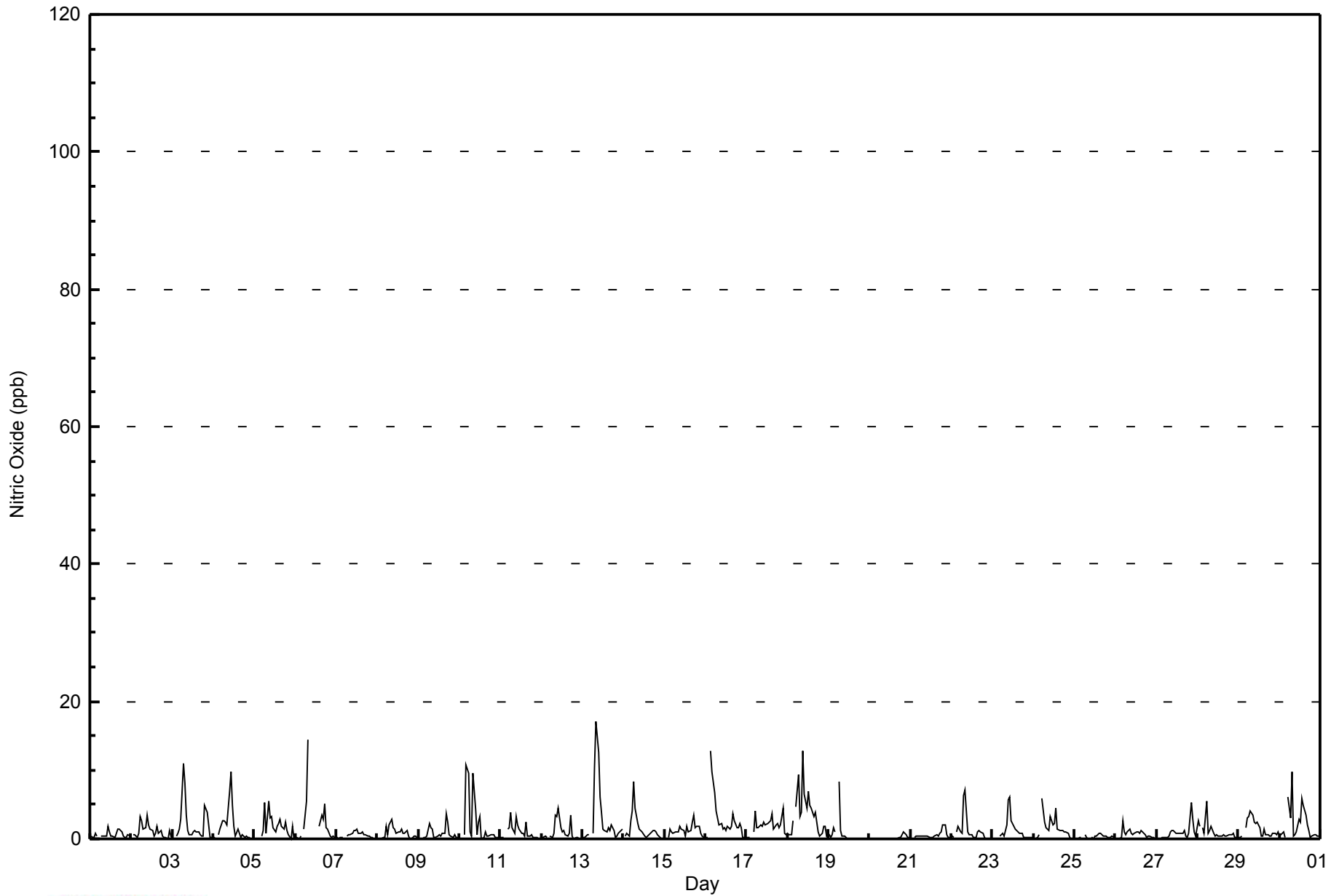


Maximum Value: 17 ppb on Sep 13 09:00														Maximum Daily Average: 3.5 ppb on Sep 18														Hours in Service: 720			
Minimum Value: 0 ppb on Sep 5 00:00														Minimum Daily Average: 0.2 ppb on Sep 20														Hours of Data: 680			
Maximum Diurnal Average: 3.0 ppb at hour 8														Minimum Diurnal Average: 0.3 ppb at hour 24														Hours of Missing Data: 40			
Monthly Average: 1.4 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 11														Hours of Calibration: 40			
																												Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Sep	0	0	0	1	0	Z	0	0	0	0	2	1	0	1	0	1	1	1	1	0	0	0	1	0	0.6	2					
2-Sep	Z	1	1	0	1	3	3	1	2	4	2	1	1	0	1	2	1	1	0	0	0	0	1	0	1.2	4					
3-Sep	1	Z	0	1	2	3	11	8	4	1	1	1	1	1	1	1	0	0	5	4	2	0	0	2.1	11						
4-Sep	0	0	Z	1	1	3	3	3	2	7	10	5	2	0	2	1	0	1	0	0	0	0	0	0	1.8	10					
5-Sep	0	0	0	Z	0	1	5	1	5	3	3	2	1	2	2	3	2	2	2	1	1	0	2	0	1.7	5					
6-Sep	0	0	0	0	Z	1	5	14	C	C	C	C	C	C	2	3	3	5	2	1	0	0	0	0	--	14					
7-Sep	0	0	0	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.5	1					
8-Sep	Z	0	0	0	0	2	1	2	3	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.8	3					
9-Sep	0	Z	0	0	0	0	2	2	1	0	0	0	1	0	1	1	4	2	1	0	0	1	0	0	0.8	4					
10-Sep	0	0	Z	1	11	10	1	0	10	4	1	2	3	0	0	1	0	0	1	1	1	0	0	0	2.0	11					
11-Sep	0	0	0	Z	1	2	4	2	1	3	2	1	1	1	0	2	0	0	1	0	0	0	0	0	1.0	4					
12-Sep	0	0	0	0	Z	1	0	1	3	3	4	2	1	1	1	0	1	4	0	0	0	0	0	0	1.0	4					
13-Sep	0	0	0	1	1	Z	1	10	17	13	6	4	1	1	1	2	1	2	1	0	0	1	1	1	2.9	17					
14-Sep	Z	0	1	0	3	4	8	4	2	1	1	1	0	0	0	1	1	1	1	1	1	0	0	0	1.5	8					
15-Sep	0	Z	0	1	1	1	1	1	1	2	1	1	0	2	1	1	2	3	2	2	2	1	0	0	1.2	3					
16-Sep	0	0	Z	13	10	7	4	3	2	2	1	2	1	2	2	4	3	2	2	2	2	2	0	0	2.8	13					
17-Sep	0	0	0	Z	1	4	2	2	2	2	2	2	2	3	3	4	1	2	2	2	2	5	1	1	1.9	5					
18-Sep	1	1	1	3	Z	5	9	3	4	13	7	4	7	5	5	3	4	3	1	0	1	2	2	0	3.5	13					
19-Sep	1	0	1	2	1	Z	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	8					
20-Sep	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	1	1	1	0	0	0.2	1					
21-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2	2	1	0	0	0.5	2					
22-Sep	0	0	Z	1	2	1	1	6	7	1	1	1	1	0	0	1	1	1	1	0	0	0	0	0	1.2	7					
23-Sep	0	0	0	Z	0	1	1	0	2	6	6	3	2	1	1	1	1	1	0	0	0	0	0	0	1.2	6					
24-Sep	0	0	0	1	Z	6	2	2	1	1	3	2	2	4	1	1	1	1	1	1	1	0	0	0	1.5	6					
25-Sep	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.3	1					
26-Sep	Z	0	0	0	3	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.7	3					
27-Sep	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	1	5	3	1	0	0.9	5					
28-Sep	3	2	Z	2	1	5	1	1	2	1	1	1	0	0	0	1	0	0	1	1	1	1	0	0	1.0	5					
29-Sep	0	0	0	Z	2	3	3	4	3	2	2	2	2	0	0	1	1	1	0	0	1	1	1	1	1.4	4					
30-Sep	0	1	1	0	Z	6	3	10	0	1	1	3	2	6	5	3	2	1	0	0	1	1	0	0	2.1	10					
														0.3 0.3 0.3 1.1 1.7 2.8 2.7 3.0 2.8 2.7 2.2 1.5 1.3 1.3 1.1 1.4 1.3 1.3 0.8 0.8 0.9 0.7 0.4 0.3														Diurnal Average			
														3 2 1 13 11 10 11 14 17 13 10 5 7 6 5 4 4 4 5 2 5 5 5 5 2 1														Diurnal Maximum			
Z - zerospan														C - Calibration																	



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Patricia McInnes - September 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Patricia McInnes - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	680	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Patricia McInnes - September 2014

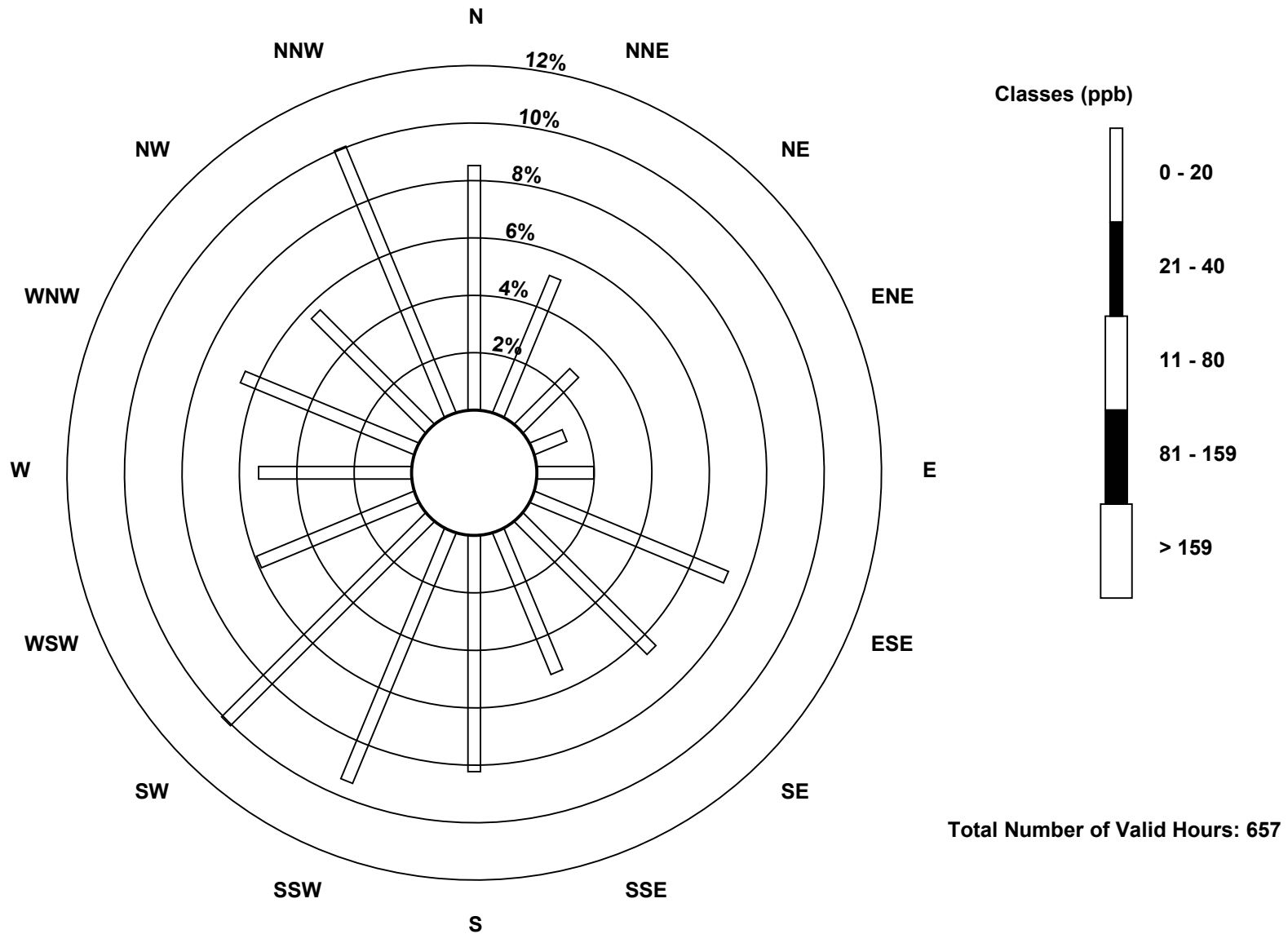
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	56	34	18	8	13	48	43	35	54	62	66	39	35	43	37	66	657
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	34	18	8	13	48	43	35	54	62	66	39	35	43	37	66	657

Total Number of Valid Hours: 657

Total Number of Hours: 720

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

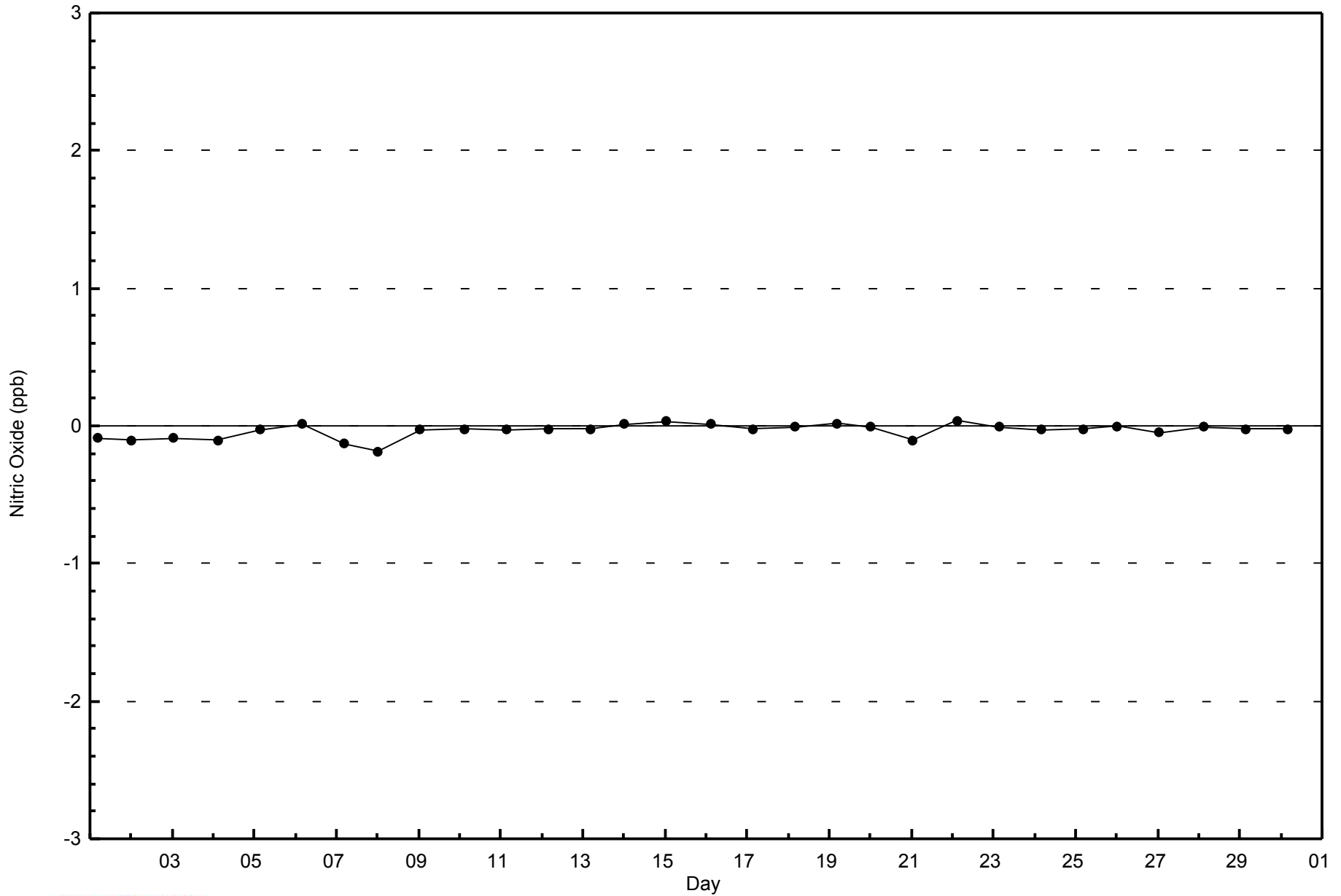
**Nitric Oxide (NO) - ppb
Patricia McInnes (AMS 6)**





WBEA
Zero Responses

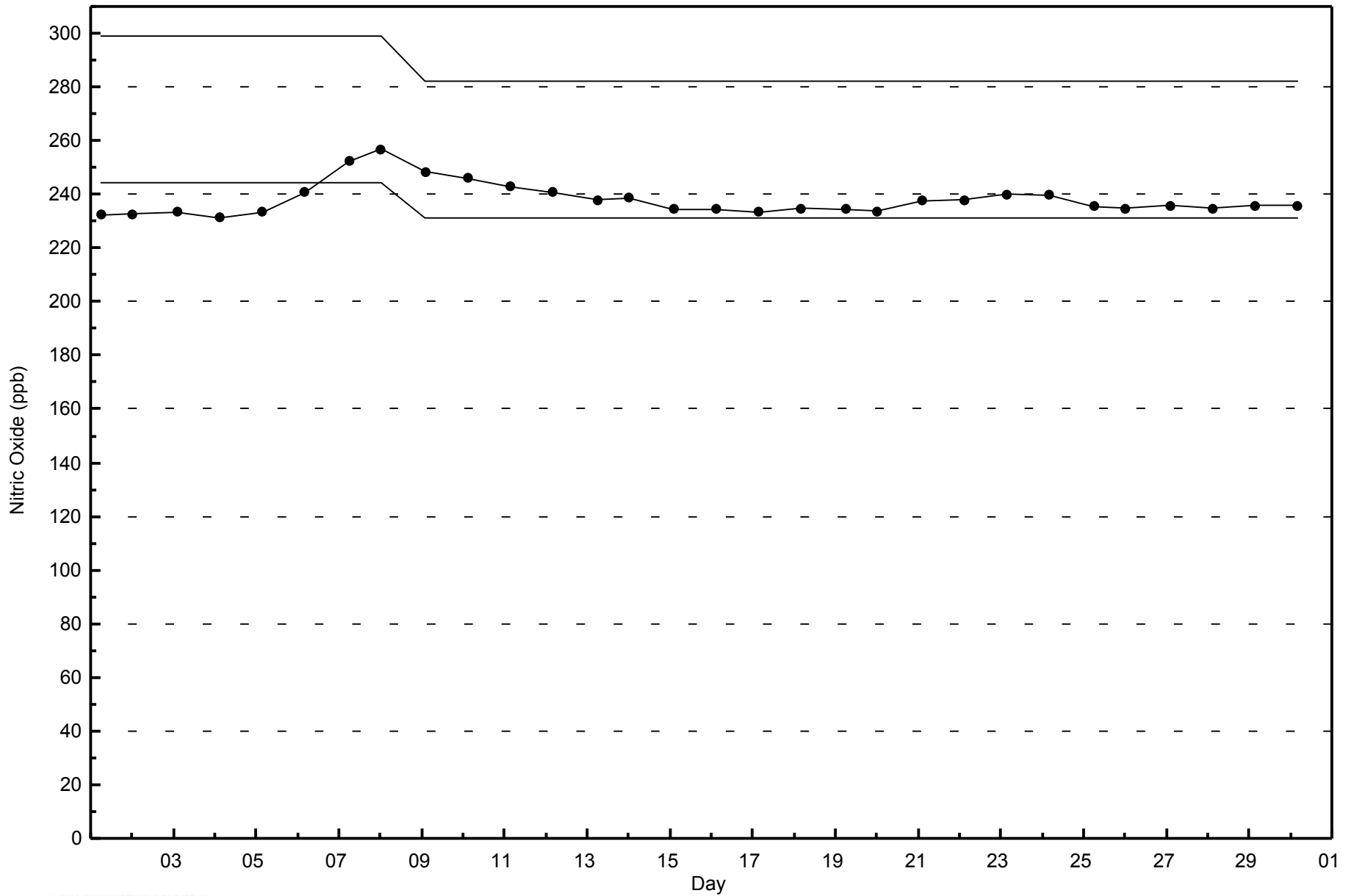
Nitric Oxide (NO) - ppb
Patricia McInnes - September 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Patricia McInnes - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 17 ppb on Sep 15 19:00	Maximum Daily Average: 6.8 ppb on Sep 18		Hours of Data:	680
Minimum Value: 0 ppb on Sep 1 09:00	Minimum Daily Average: 1.1 ppb on Sep 20		Hours of Missing Data:	40
Maximum Diurnal Average: 4.7 ppb at hour 6	Minimum Diurnal Average: 2.2 ppb at hour 15		Hours of Calibration:	40
Monthly Average: 3.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 3 Q ₃ = 5 P ₉₀ = 7 P ₉₉ = 13		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	3	1	0	1	1	Z	0	0	0	0	2	2	1	2	1	1	3	5	5	3	1	1	4	2	1.6	5
2-Sep	Z	3	2	0	2	3	2	1	1	2	2	2	2	1	2	4	2	2	3	2	1	1	3	7	2.2	7
3-Sep	5	Z	5	5	4	3	4	3	2	1	1	1	1	1	2	2	1	2	11	9	7	2	1	3.1	11	
4-Sep	1	0	Z	1	2	2	2	2	1	3	6	4	1	0	2	3	1	3	2	3	1	2	1	1	1.8	6
5-Sep	4	3	3	Z	4	4	4	1	6	4	4	2	2	3	4	6	5	3	3	3	3	1	2	4	3.3	6
6-Sep	10	5	2	2	Z	2	7	10	C	C	C	C	C	C	2	2	4	5	3	4	2	4	5	6	--	10
7-Sep	8	4	2	4	3	Z	3	4	3	3	4	3	3	2	2	4	3	3	2	2	3	2	2	2	3.0	8
8-Sep	Z	2	3	4	5	7	3	3	3	2	2	2	3	3	3	3	4	5	5	3	2	2	5	5	3.3	7
9-Sep	4	Z	3	2	2	3	4	5	5	2	1	1	2	1	2	4	7	10	9	6	5	5	5	5	4.0	10
10-Sep	5	6	Z	9	14	14	4	2	11	8	1	4	4	0	0	2	1	1	3	6	3	2	2	1	4.6	14
11-Sep	2	2	2	Z	5	6	8	3	1	4	3	2	2	1	1	3	2	2	5	4	1	2	0	1	2.6	8
12-Sep	1	2	4	1	Z	2	2	3	6	5	6	3	2	3	2	1	3	7	2	0	1	3	1	2	2.6	7
13-Sep	1	2	2	3	3	Z	2	5	8	8	5	3	2	2	2	2	6	9	8	4	4	5	5	5	4.0	9
14-Sep	Z	1	2	1	4	5	6	3	1	1	1	1	1	0	0	0	0	1	2	2	3	2	1	1	1.6	6
15-Sep	3	Z	3	5	4	3	2	1	1	1	2	2	1	3	2	2	6	15	17	14	9	7	3	1	4.6	17
16-Sep	3	2	Z	12	12	11	7	3	3	3	2	2	1	1	1	1	2	2	2	1	2	1	1	1	3.3	12
17-Sep	1	1	1	Z	2	3	3	3	3	2	2	1	1	2	2	3	2	3	5	3	3	4	2	2	2.3	5
18-Sep	3	2	2	4	Z	5	4	2	3	7	5	5	7	7	9	9	12	13	13	9	10	11	8	6	6.8	13
19-Sep	7	6	7	8	4	Z	13	3	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2.3	13
20-Sep	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	1	2	5	5	3	1	1	1.1	5
21-Sep	1	Z	1	2	2	2	1	1	1	1	1	1	0	0	1	1	1	4	7	5	5	5	2	3	1.8	7
22-Sep	3	1	Z	5	5	3	3	8	8	2	2	2	2	1	1	2	6	7	3	1	1	1	1	0	2.8	8
23-Sep	0	0	1	Z	5	7	2	2	7	13	11	6	5	4	4	4	5	10	6	5	7	8	8	6	5.5	13
24-Sep	5	4	3	3	Z	10	9	5	3	3	5	4	7	11	6	2	2	3	4	4	6	3	1	2	4.6	11
25-Sep	1	1	1	1	2	Z	2	1	0	0	0	0	0	1	1	2	4	3	5	6	7	4	7	3	2.1	7
26-Sep	Z	2	4	2	3	3	3	5	6	3	2	2	4	4	3	6	4	3	1	3	3	1	2	2	3.1	6
27-Sep	3	Z	4	4	3	4	4	6	5	4	3	2	2	2	2	3	3	3	4	6	8	5	3	3	3.6	8
28-Sep	8	6	Z	4	4	6	4	4	3	2	1	1	1	1	1	1	1	2	2	3	3	3	2	2	2.8	8
29-Sep	1	2	3	Z	6	7	6	5	4	3	3	3	3	1	2	3	2	4	2	3	4	5	5	5	3.5	7
30-Sep	4	5	5	2	Z	6	4	7	1	2	2	5	6	9	8	6	10	10	6	7	8	5	4	4	5.4	10

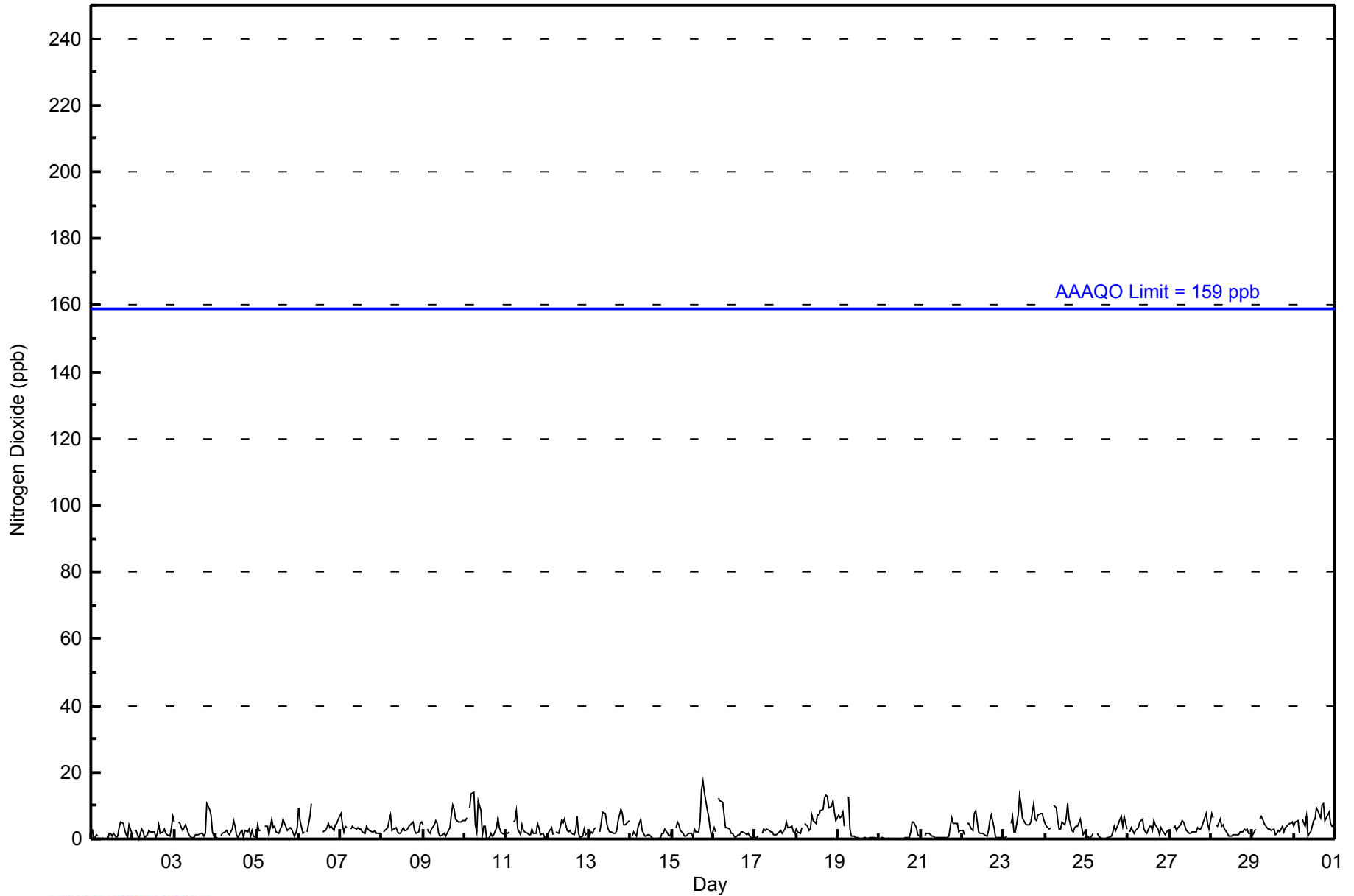
3.4	2.6	2.5	3.3	3.9	4.7	3.9	3.5	3.5	3.1	2.7	2.2	2.2	2.3	2.2	2.7	3.3	4.5	4.4	4.3	3.9	3.5	3.0	2.7	Diurnal Average	
10	6	7	12	14	14	13	10	11	13	11	6	7	11	9	9	12	15	17	14	10	11	8	7	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	680	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - September 2014

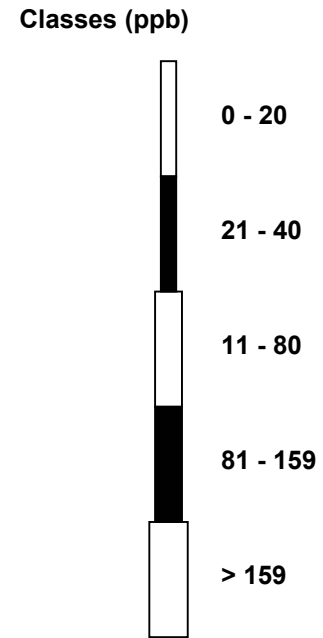
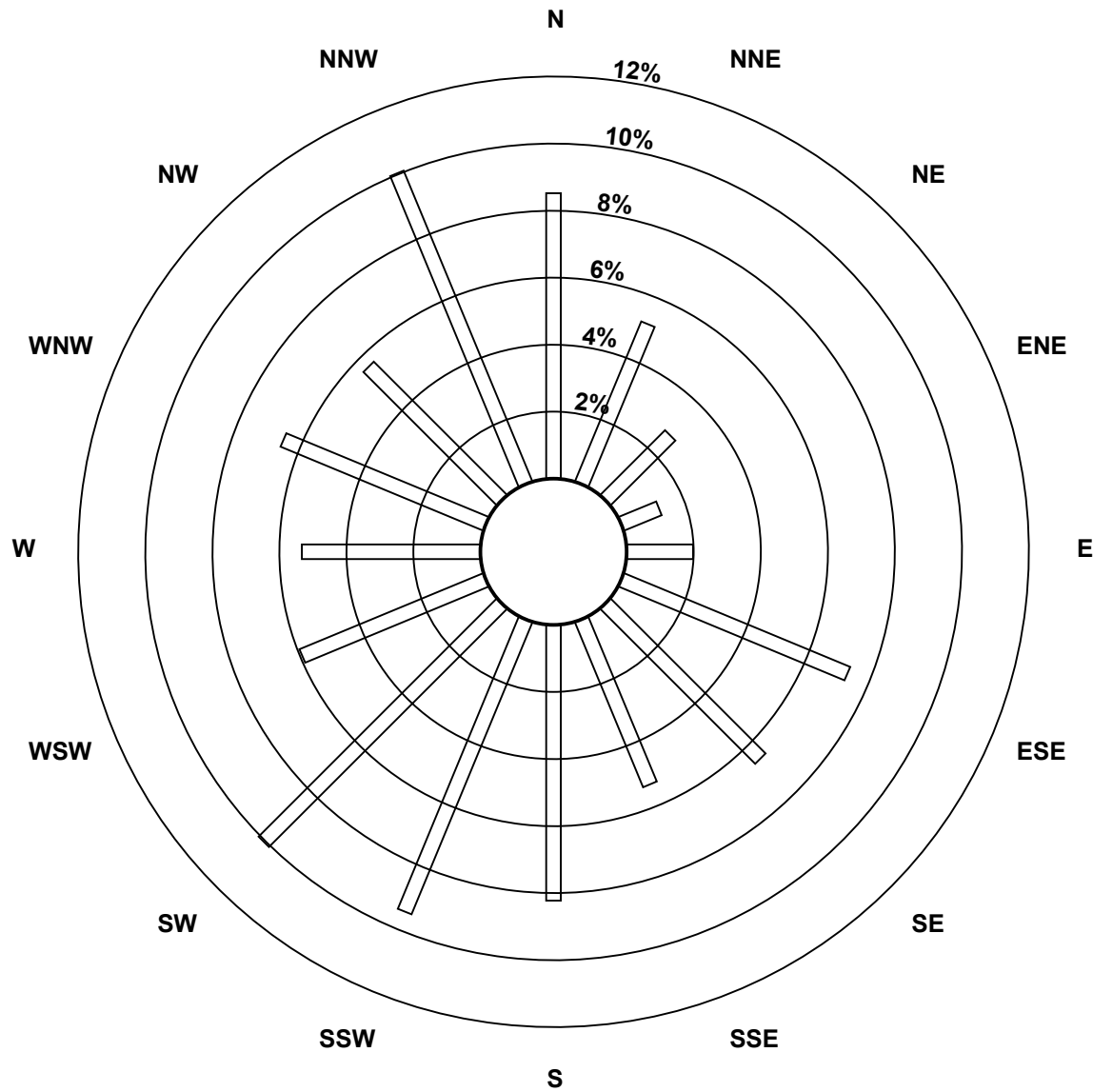
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	56	34	18	8	13	48	43	35	54	62	66	39	35	43	37	66	657
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	34	18	8	13	48	43	35	54	62	66	39	35	43	37	66	657

Total Number of Valid Hours: 657

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes (AMS 6)

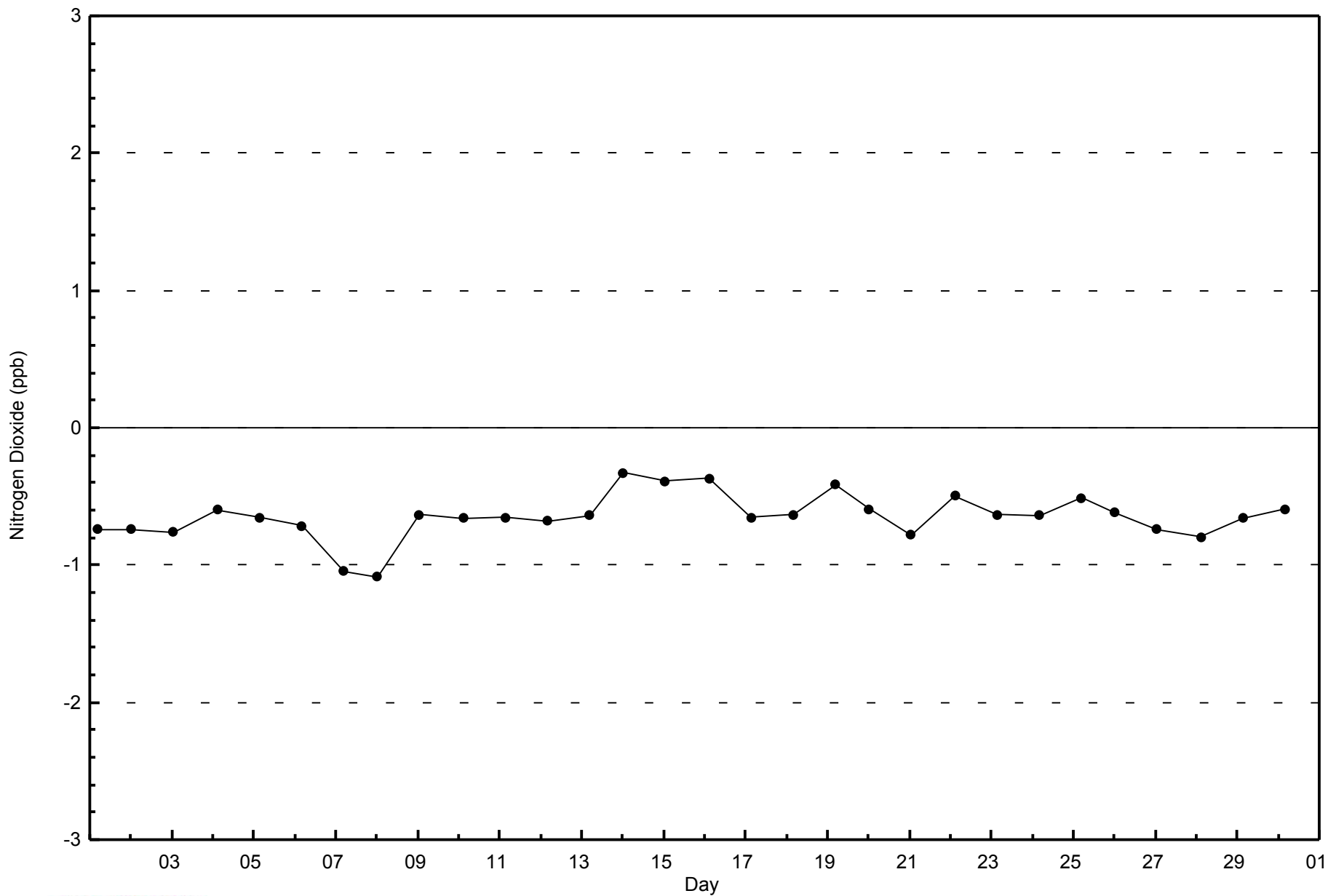


Total Number of Valid Hours: 657



WBEA
Zero Responses

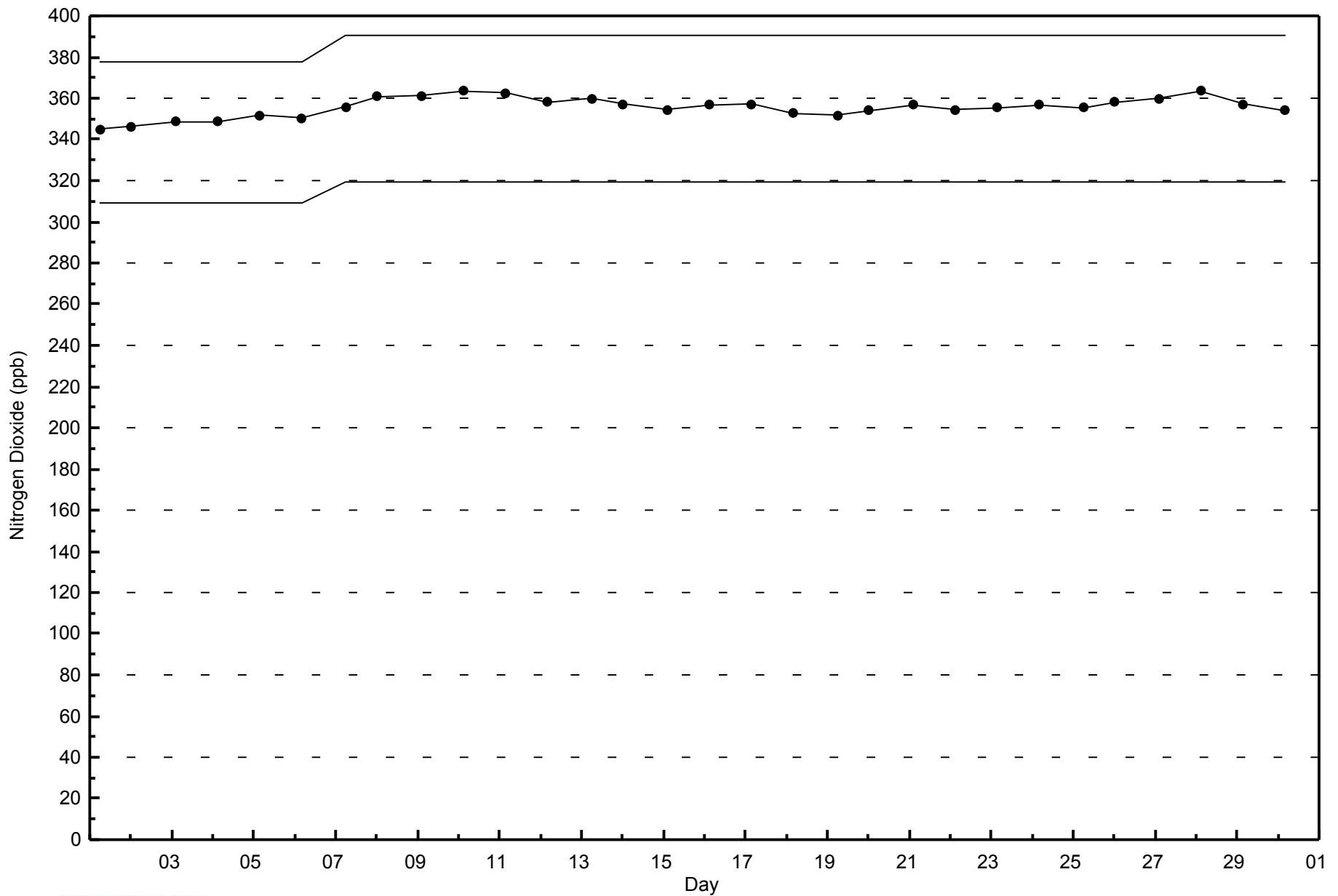
Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - September 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - September 2014



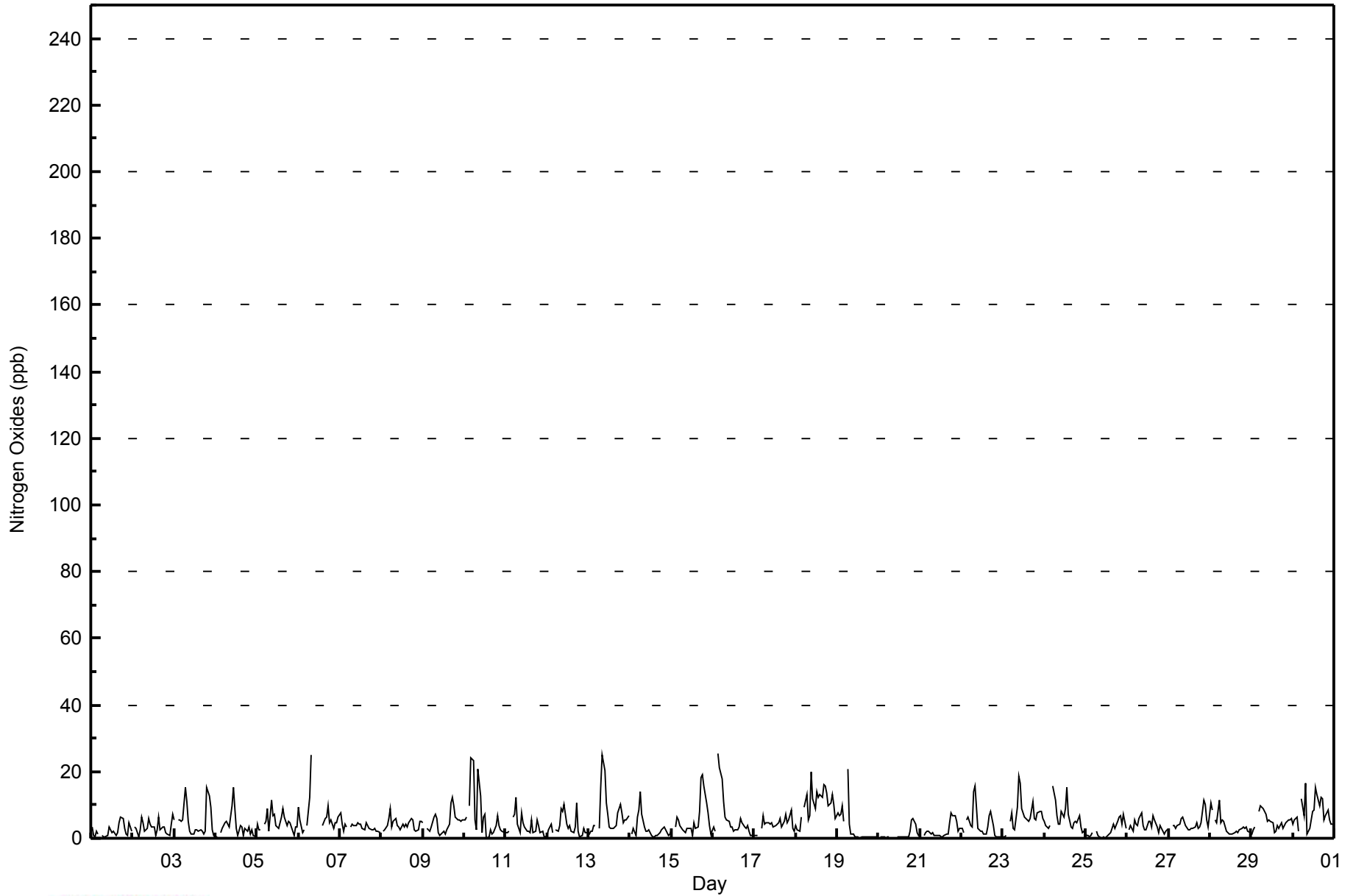


Maximum Value: 25 ppb on Sep 16 04:00																		Maximum Daily Average: 10.3 ppb on Sep 18						Hours in Service: 720			
Minimum Value: 0 ppb on Sep 4 02:00																		Minimum Daily Average: 1.3 ppb on Sep 20						Hours of Data: 680			
Maximum Diurnal Average: 7.5 ppb at hour 6																		Minimum Diurnal Average: 2.8 ppb at hour 3						Hours of Missing Data: 40			
Monthly Average: 4.6 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 6 P ₉₀ = 10 P ₉₉ = 21						Hours of Calibration: 40			
																		Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	3	1	1	2	1	Z	1	0	0	1	3	3	2	2	1	2	5	6	6	3	1	1	5	2	2.2	6	
2-Sep	Z	3	3	0	3	6	5	2	3	6	4	3	3	1	2	6	3	3	3	2	1	1	4	7	3.3	7	
3-Sep	5	Z	6	5	5	5	15	11	5	2	1	1	3	3	2	2	2	1	2	15	13	9	2	1	5.2	15	
4-Sep	1	0	Z	2	3	5	5	4	3	10	15	9	3	1	4	3	1	3	2	3	1	3	1	1	3.6	15	
5-Sep	4	3	3	Z	4	5	9	2	12	7	7	4	3	5	6	9	7	4	5	5	4	1	3	3	5.0	12	
6-Sep	10	6	2	2	Z	4	12	25	C	C	C	C	C	C	4	6	6	10	5	5	3	5	5	6	--	25	
7-Sep	8	4	2	4	3	Z	3	4	4	4	5	4	4	3	3	5	4	3	2	3	3	2	2	2	3.5	8	
8-Sep	Z	2	3	4	6	9	3	5	6	4	3	3	4	4	4	3	5	6	6	3	2	2	5	5	4.2	9	
9-Sep	5	Z	3	2	2	3	6	7	6	2	1	2	2	1	3	4	11	12	10	6	6	5	5	5	4.8	12	
10-Sep	5	6	Z	10	24	23	5	3	21	13	2	6	7	0	0	2	1	2	4	7	4	3	2	1	6.6	24	
11-Sep	2	2	2	Z	7	7	12	4	2	8	5	3	2	2	2	5	2	2	5	4	1	2	0	1	3.6	12	
12-Sep	1	2	4	2	Z	3	2	4	9	8	10	4	3	4	2	2	3	10	2	0	1	3	2	2	3.6	10	
13-Sep	1	2	2	4	4	Z	3	15	25	20	10	7	3	3	3	3	4	8	10	8	5	5	6	7	6.9	25	
14-Sep	Z	1	3	1	6	9	14	7	3	2	2	2	1	0	0	1	1	2	3	3	3	2	1	1	3.1	14	
15-Sep	3	Z	3	7	5	4	3	2	2	3	3	3	1	5	3	3	8	18	19	16	11	8	4	1	5.8	19	
16-Sep	4	2	Z	25	21	18	11	6	5	5	3	3	2	2	3	3	6	5	3	3	4	2	1	1	6.1	25	
17-Sep	1	1	1	Z	3	7	4	5	5	4	5	3	4	4	5	6	3	5	7	5	5	9	3	2	4.2	9	
18-Sep	4	3	2	6	Z	9	13	6	7	20	12	9	14	12	13	12	16	16	13	10	11	13	10	6	10.3	20	
19-Sep	8	7	7	10	5	Z	21	4	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	3.0	21	
20-Sep	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	1	2	5	6	4	2	1	1.3	6
21-Sep	1	Z	1	2	2	2	1	2	1	1	1	1	1	1	1	1	1	4	8	7	7	5	2	3	2.4	8	
22-Sep	3	2	Z	6	6	4	3	14	16	3	2	2	2	1	1	3	7	8	4	1	1	1	0	0	4.0	16	
23-Sep	0	0	1	Z	5	8	3	2	9	19	16	9	6	6	5	6	11	6	5	8	8	8	6	6	6.7	19	
24-Sep	5	4	3	4	Z	16	12	7	4	4	8	6	9	15	7	4	3	4	5	5	7	3	1	2	6.1	16	
25-Sep	1	1	1	1	2	Z	2	1	0	0	0	0	1	1	2	3	4	3	5	6	7	4	7	3	2.4	7	
26-Sep	Z	2	4	2	5	4	4	6	7	4	3	3	5	5	3	7	6	3	2	4	3	1	2	3	3.8	7	
27-Sep	3	Z	4	4	3	4	4	6	6	5	4	2	2	3	3	3	5	3	3	5	12	10	6	4	4.5	12	
28-Sep	10	8	Z	6	5	11	5	5	5	2	1	1	1	1	2	2	2	2	3	3	3	4	2	2	3.8	11	
29-Sep	1	2	3	Z	8	10	9	9	7	5	5	5	4	2	2	4	3	4	3	4	5	6	5	6	4.9	10	
30-Sep	4	6	6	2	Z	12	7	17	1	2	3	8	9	15	13	10	12	12	6	7	9	5	4	4	7.6	17	
																		Diurnal Average						Diurnal Maximum			
																		3.7 2.9 2.8 4.5 5.6 7.5 6.6 6.4 6.3 5.9 4.9 3.8 3.5 3.5 3.3 4.1 4.5 5.8 5.2 5.1 4.8 4.3 3.4 2.9									
																		10 8 7 25 24 23 21 25 25 20 16 9 14 15 13 12 16 18 19 16 13 13 10 7									
Z - zerospan																		C - Calibration									



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	672	98.82	98.82
21 - 40	8	1.18	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - September 2014

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	56	33	16	8	13	47	43	34	54	62	66	39	35	43	36	64	649
21 - 40	0	1	2	0	0	1	0	1	0	0	0	0	0	0	1	2	8
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	34	18	8	13	48	43	35	54	62	66	39	35	43	37	66	657

Total Number of Valid Hours: 657

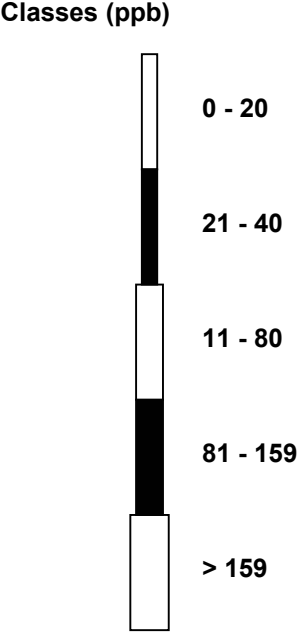
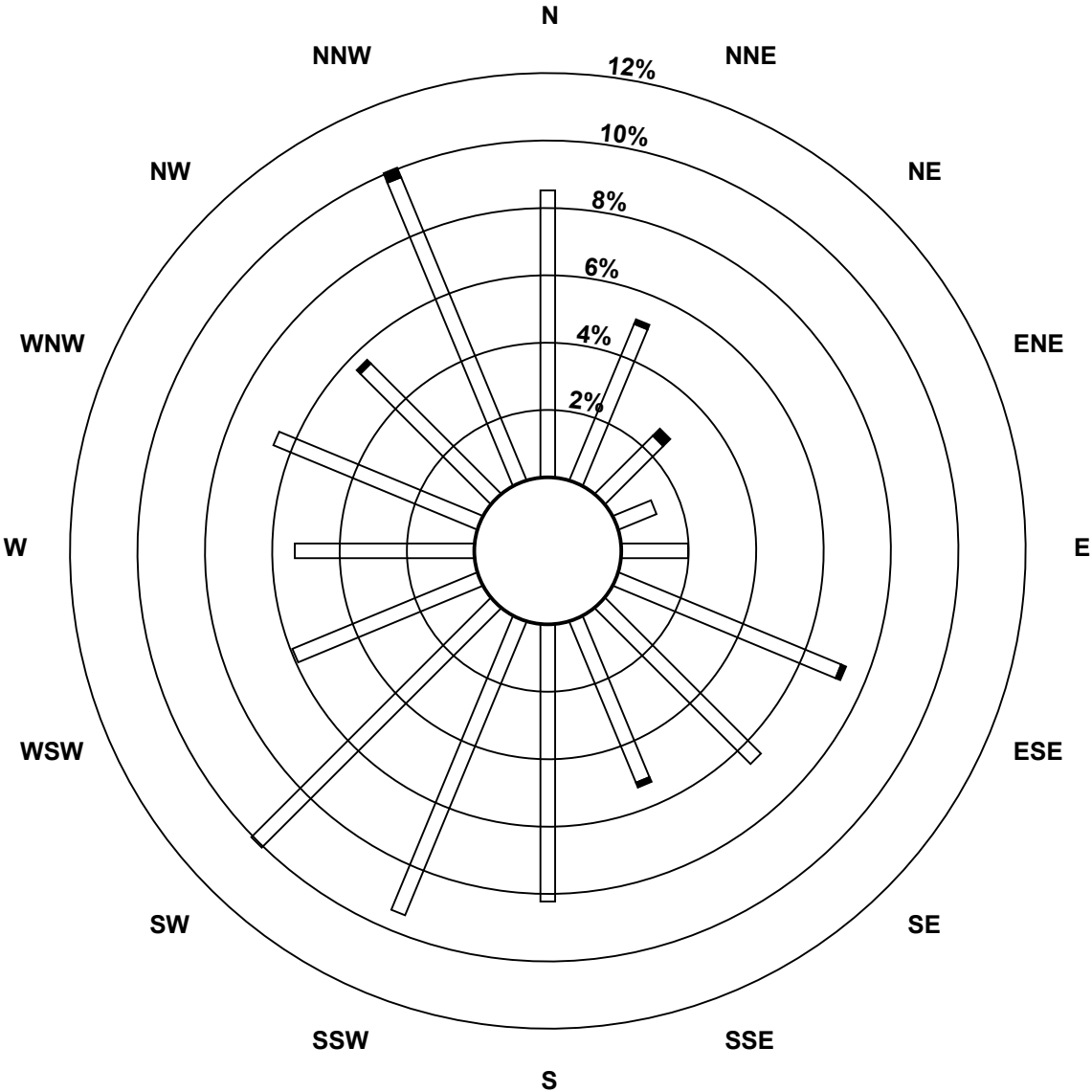
Total Number of Hours: 720

Wood Buffalo Environmental Association

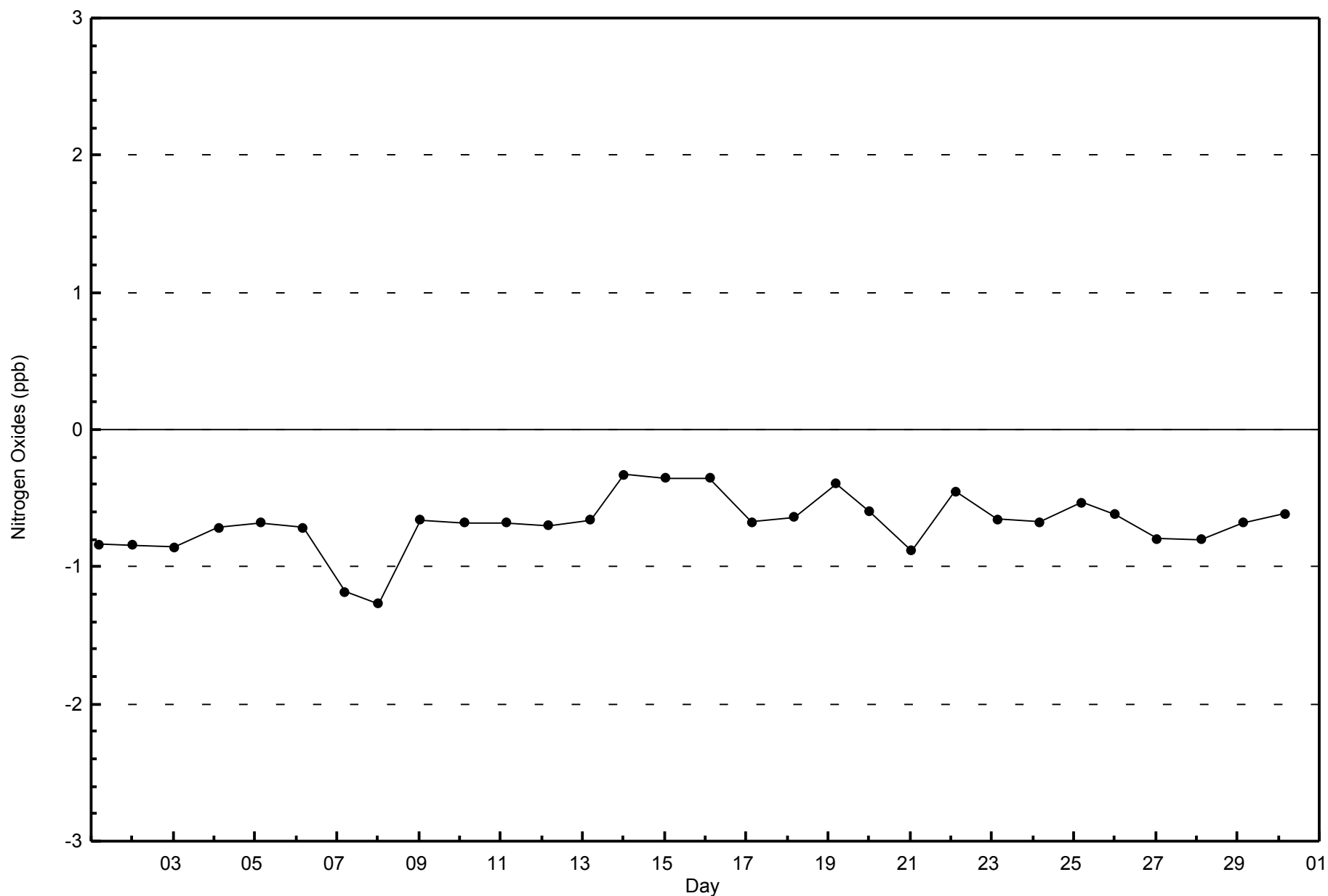
Wind Rose Sep 2014

Nitrogen Oxides (NO_x) - ppb

Patricia McInnes (AMS 6)



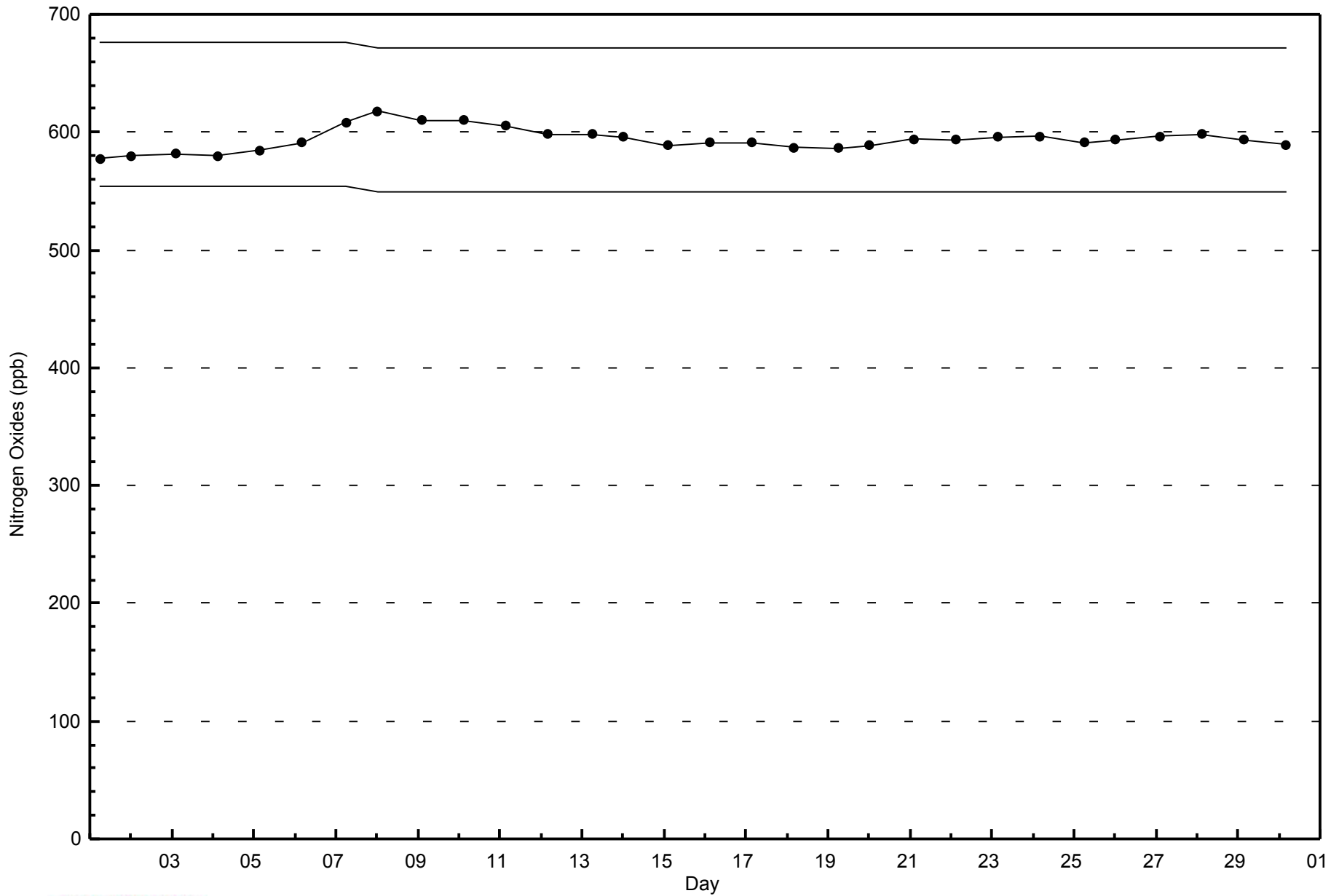
Total Number of Valid Hours: 657





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - September 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Ammonia (NH₃) - ppb

Patricia McInnes - September 2014

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	Minimum Daily Average: 0.0 ppb on Sep 1	Minimum Diurnal Average: 0.0 ppb at hour 1	Hours of Data: 635
Maximum Diurnal Average: 0.0 ppb at hour 1	Minimum Diurnal Average: 0.0 ppb at hour 1	Monthly Average: 0.0 ppb	Hours of Missing Data: 85
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 0			Hours of Calibration: 55
			Percent Operational Time: 95.8

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

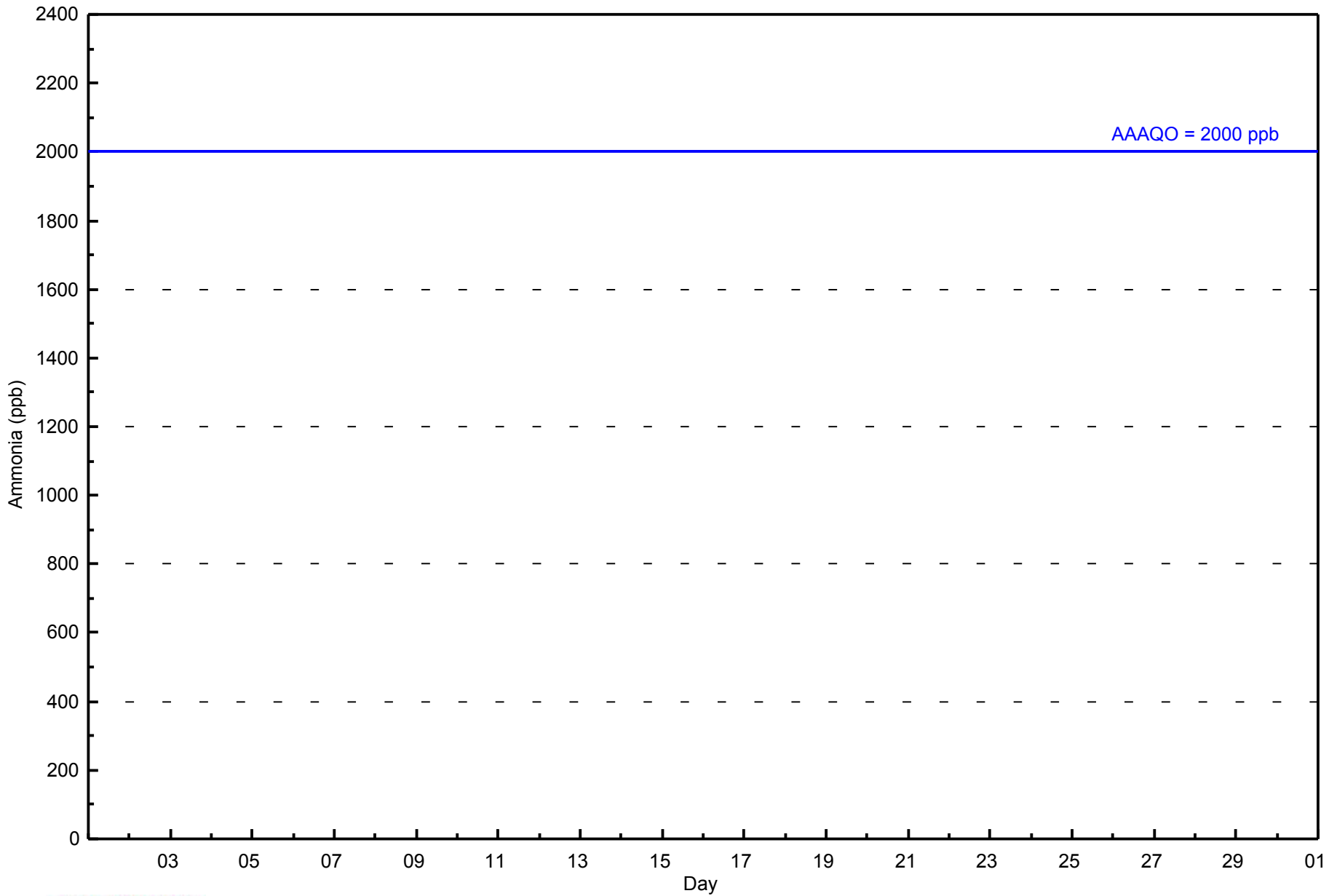
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

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



WBEA
Hourly Averages

Ammonia (NH₃) - ppb
Patricia McInnes - September 2014





WBEA
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	635	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: 635

Total Number of Hours: 720



WBEA
Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - September 2014

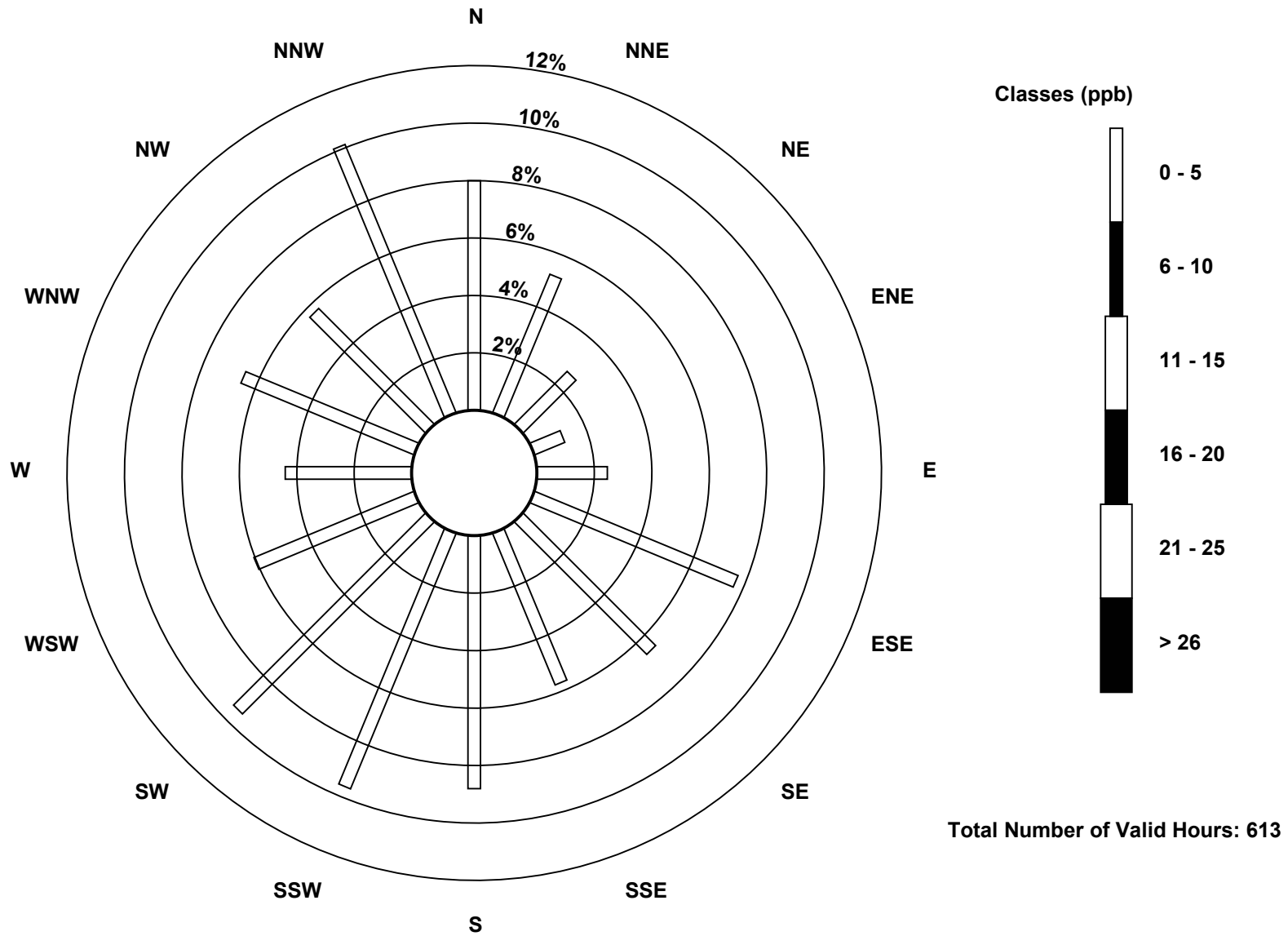
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	49	32	16	7	15	47	40	35	54	59	58	37	27	40	35	62	613
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	49	32	16	7	15	47	40	35	54	59	58	37	27	40	35	62	613

Total Number of Valid Hours: 613

Total Number of Hours: 720

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

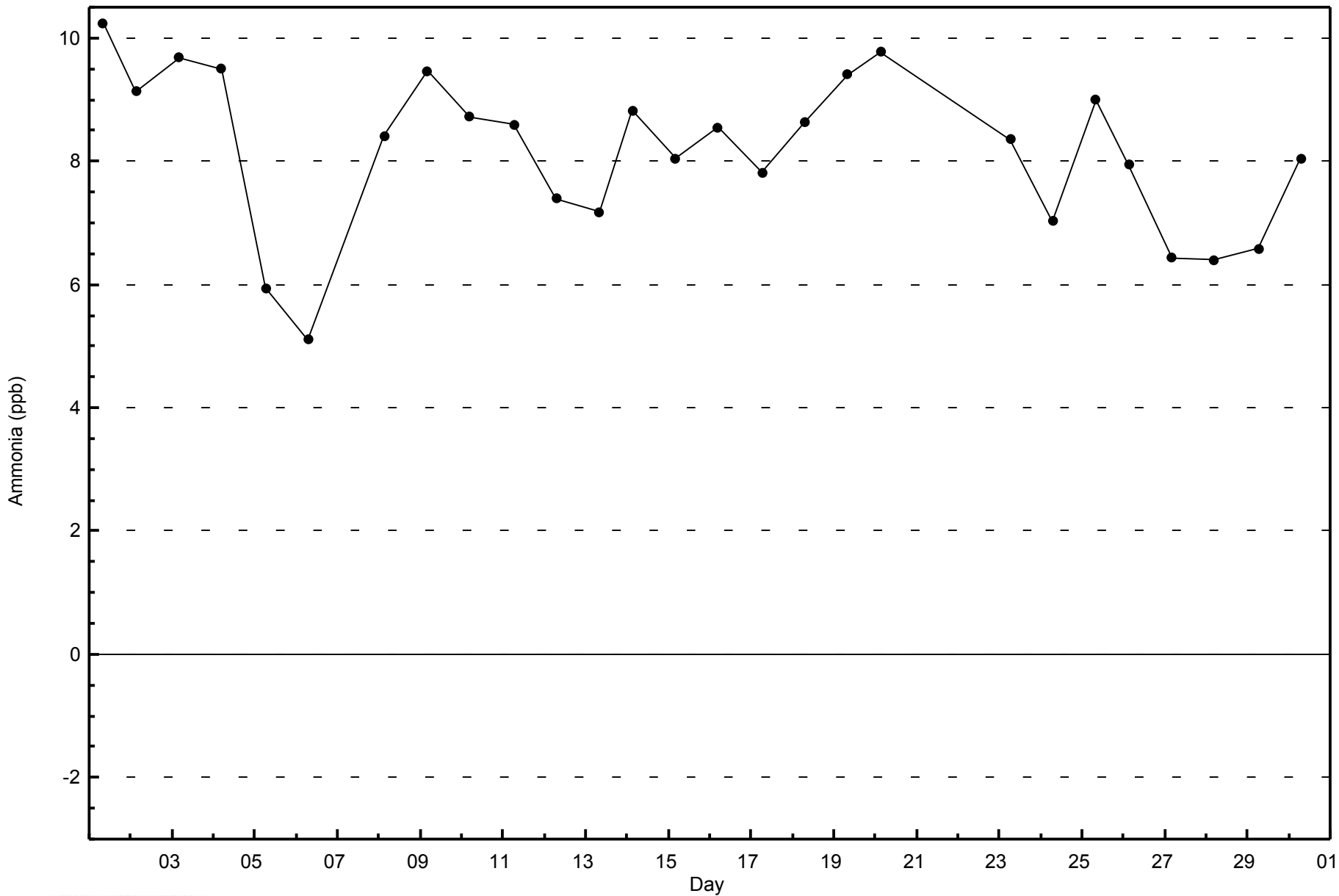
**Ammonia (NH₃) - ppb
Patricia McInnes (AMS 6)**





WBEA
Zero Responses

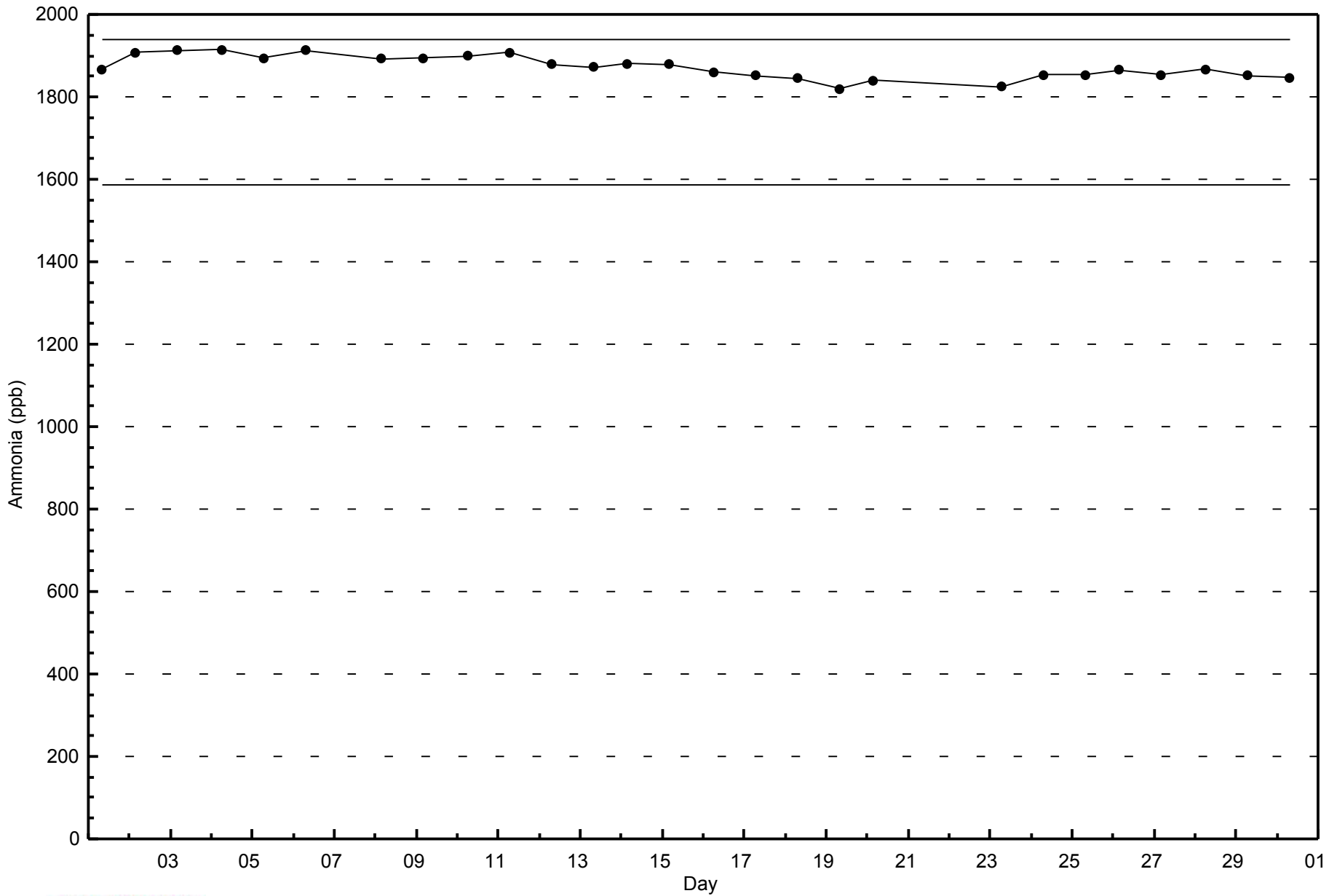
Ammonia (NH₃) - ppb
Patricia McInnes - September 2014





WBEA
Span Responses

Ammonia (NH₃) - ppb
Patricia McInnes - September 2014





Number of Exceedences (AAAQO): 24-hr: 0	Hours in Service: 720
Maximum Value: 33.8 µg/m ³ on Sep 27 22:00	Maximum Daily Average: 10.3 µg/m ³ on Sep 18
Minimum Value: 0.1 µg/m ³ on Sep 25 10:00	Hours of Data: 706
Maximum Diurnal Average: 7.6 µg/m ³ at hour 22	Hours of Missing Data: 14
Monthly Average: 4.80 µg/m ³	Hours of Calibration: 0
Minimum Daily Average: 1.0 µg/m ³ on Sep 26	Percent Operational Time: 98.1
Minimum Diurnal Average: 2.9 µg/m ³ at hour 13	
Percentiles: P ₁ = 0.2 P ₁₀ = 1.2 Q ₁ = 2.1 Median = 3.7 Q ₃ = 6.4 P ₉₀ = 9.5 P ₉₉ = 20.1	

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	3.5	2.7	2.2	1.8	2.1	2.5	2.5	1.7	1.5	1.6	2.8	3.3	3.6	1.7	2.0	2.1	1.9	2.3	4.3	5.6	3.5	3.3	5.2	3.7	2.8	5.6
2-Sep	3.9	2.4	2.2	1.6	2.6	3.2	2.4	1.6	3.0	4.3	4.0	3.3	3.7	3.8	5.2	7.0	4.5	3.7	7.6	4.5	3.8	3.7	4.2	6.5	3.9	7.6
3-Sep	5.3	5.9	5.9	6.1	5.3	5.5	7.7	3.3	2.8	2.2	2.0	2.5	3.1	2.7	2.3	2.6	2.2	1.5	1.4	3.9	6.4	6.6	3.7	3.4	3.9	7.7
4-Sep	3.7	3.7	3.6	3.5	3.6	3.4	3.2	3.1	1.8	2.4	3.2	3.4	2.3	2.3	2.6	3.3	2.1	2.0	3.5	6.0	5.1	4.3	4.0	3.8	3.3	6.0
5-Sep	3.9	4.2	5.8	4.3	4.2	4.0	3.6	1.4	2.5	1.9	2.9	3.4	4.2	5.8	6.6	6.8	6.6	2.9	3.4	5.4	6.1	5.8	6.4	10.4	4.7	10.4
6-Sep	19.0	12.5	6.4	4.9	2.1	2.2	4.5	8.3	5.7	5.0	5.3	6.5	5.3	4.7	3.9	1.6	2.3	2.5	2.9	3.2	2.1	2.5	2.9	4.1	5.0	19.0
7-Sep	3.4	2.3	1.3	1.3	1.6	1.6	1.2	1.1	1.3	1.3	1.6	1.6	1.5	1.3	1.3	1.7	1.6	1.6	1.2	1.3	1.6	1.3	1.5	2.1	1.6	3.4
8-Sep	2.7	2.4	1.7	1.1	1.3	2.0	0.8	1.0	1.1	0.3	0.2	M	2.0	3.5	6.3	8.5	9.5	10.5	3.7	2.4	2.6	3.2	3.7	3.3	3.2	10.5
9-Sep	4.5	5.2	4.8	4.9	4.9	5.0	5.0	5.6	4.1	2.5	1.9	2.0	1.7	1.7	2.7	3.5	6.0	7.7	8.7	8.2	9.3	8.2	7.5	6.1	5.1	9.3
10-Sep	5.2	5.2	4.7	4.7	8.5	7.4	5.4	3.8	6.4	3.8	1.7	2.4	2.5	1.0	1.0	1.4	1.5	2.2	3.1	4.8	4.4	3.6	3.3	2.5	3.8	8.5
11-Sep	2.7	2.9	2.8	3.0	3.2	3.8	4.4	2.9	2.0	2.3	2.3	2.4	2.2	1.9	1.8	2.3	2.2	3.1	6.0	5.4	5.5	5.6	4.3	2.9	3.2	6.0
12-Sep	2.1	2.1	2.5	2.4	2.3	2.3	2.1	2.8	5.5	7.2	8.7	6.6	4.5	4.8	4.1	4.2	4.6	6.2	4.3	3.8	4.1	7.0	6.2	6.4	4.5	8.7
13-Sep	6.9	8.5	8.3	7.5	8.3	8.0	7.4	7.1	8.5	8.3	5.4	3.0	3.4	4.9	5.4	7.1	6.7	8.9	11.5	16.9	12.5	13.1	17.8	18.6	8.9	18.6
14-Sep	11.1	7.8	7.1	6.4	6.7	5.9	6.4	5.3	5.5	5.2	5.6	5.7	4.4	3.9	4.6	5.3	5.8	5.7	7.7	8.6	8.6	7.8	5.1	4.4	6.3	11.1
15-Sep	5.6	4.5	4.0	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	3.7	3.5	5.4	11.3	13.1	12.2	8.5	13.1	12.2	9.6	--	13.1
16-Sep	10.2	9.5	13.9	16.5	13.8	14.3	14.0	12.0	10.3	8.6	6.9	5.8	4.6	3.7	3.1	3.8	4.3	5.0	4.8	5.2	5.1	4.1	3.3	2.8	7.7	16.5
17-Sep	2.7	2.6	2.7	2.6	1.6	1.3	1.1	1.5	1.5	1.4	1.3	1.1	1.3	1.4	2.9	2.2	3.5	5.1	8.5	6.3	7.1	7.3	6.3	5.5	3.3	8.5
18-Sep	5.9	4.6	4.9	6.5	10.6	4.6	3.5	4.6	7.0	9.0	8.6	8.2	9.6	9.3	9.9	9.9	11.5	11.2	14.4	14.7	17.3	21.1	20.3	20.6	10.3	21.1
19-Sep	21.1	16.6	15.0	13.6	12.1	14.9	15.0	13.2	9.2	8.5	7.0	4.0	2.5	1.5	1.6	1.6	1.5	1.9	0.5	0.5	0.8	0.6	0.6	0.5	6.8	21.1
20-Sep	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.8	0.9	2.3	12.9	7.2	3.4	2.7	1.5	12.9
21-Sep	4.6	4.9	3.7	3.2	2.8	3.3	2.4	2.1	1.4	1.5	1.5	1.5	1.2	1.0	1.7	1.5	2.1	5.3	8.1	3.6	4.2	6.9	6.1	9.4	3.5	9.4
22-Sep	8.8	8.3	8.9	7.2	7.5	6.3	5.8	9.1	7.0	4.1	4.0	2.2	1.8	1.5	1.5	2.3	4.5	6.3	7.3	9.0	10.1	10.3	10.3	9.9	6.4	10.3
23-Sep	8.1	7.0	6.6	4.1	1.8	3.0	4.9	6.3	6.2	4.3	5.1	3.4	2.4	2.3	2.1	2.3	2.8	8.7	9.8	8.7	13.0	17.8	17.7	15.2	6.8	17.8
24-Sep	15.1	14.9	10.8	9.5	7.7	9.4	7.1	5.4	5.1	5.0	5.7	5.4	4.7	3.0	2.2	1.8	2.4	3.3	2.4	2.5	6.5	5.8	2.6	3.7	5.9	15.1
25-Sep	1.0	1.2	2.6	3.9	5.9	6.5	7.2	5.7	1.1	0.1	0.1	UO	0.2	0.6	0.5	2.6	3.2	2.3	4.0	3.5	3.5	2.5	3.0	2.5	2.8	7.2
26-Sep	2.4	1.7	1.7	1.2	1.1	0.8	1.0	1.2	1.2	0.8	0.6	0.3	0.5	0.7	0.5	1.1	0.9	0.3	0.2	0.9	0.8	1.7	UO	1.8	1.0	2.4
27-Sep	1.6	0.8	1.3	1.6	2.0	1.7	2.8	8.6	6.5	3.2	3.2	1.5	1.9	2.5	3.9	4.4	6.4	9.2	9.6	13.9	30.9	33.8	17.5	4.7	7.2	33.8
28-Sep	5.7	4.3	3.1	2.3	1.7	1.6	1.5	1.8	1.0	0.4	0.8	1.0	1.6	1.4	1.4	1.3	1.1	1.5	2.1	3.8	4.7	2.7	7.5	2.3	2.4	7.5
29-Sep	2.4	2.0	2.4	2.5	2.6	2.5	2.7	2.8	2.4	2.1	1.7	1.7	1.9	1.7	1.7	2.0	2.5	4.1	6.7	8.8	9.7	14.1	23.1	9.6	4.7	23.1
30-Sep	9.0	13.8	11.1	7.2	6.7	7.4	7.1	8.0	6.2	6.5	7.1	5.7	4.8	10.6	6.3	3.9	3.3	4.8	2.9	3.9	3.8	3.4	5.6	4.7	6.4	13.8

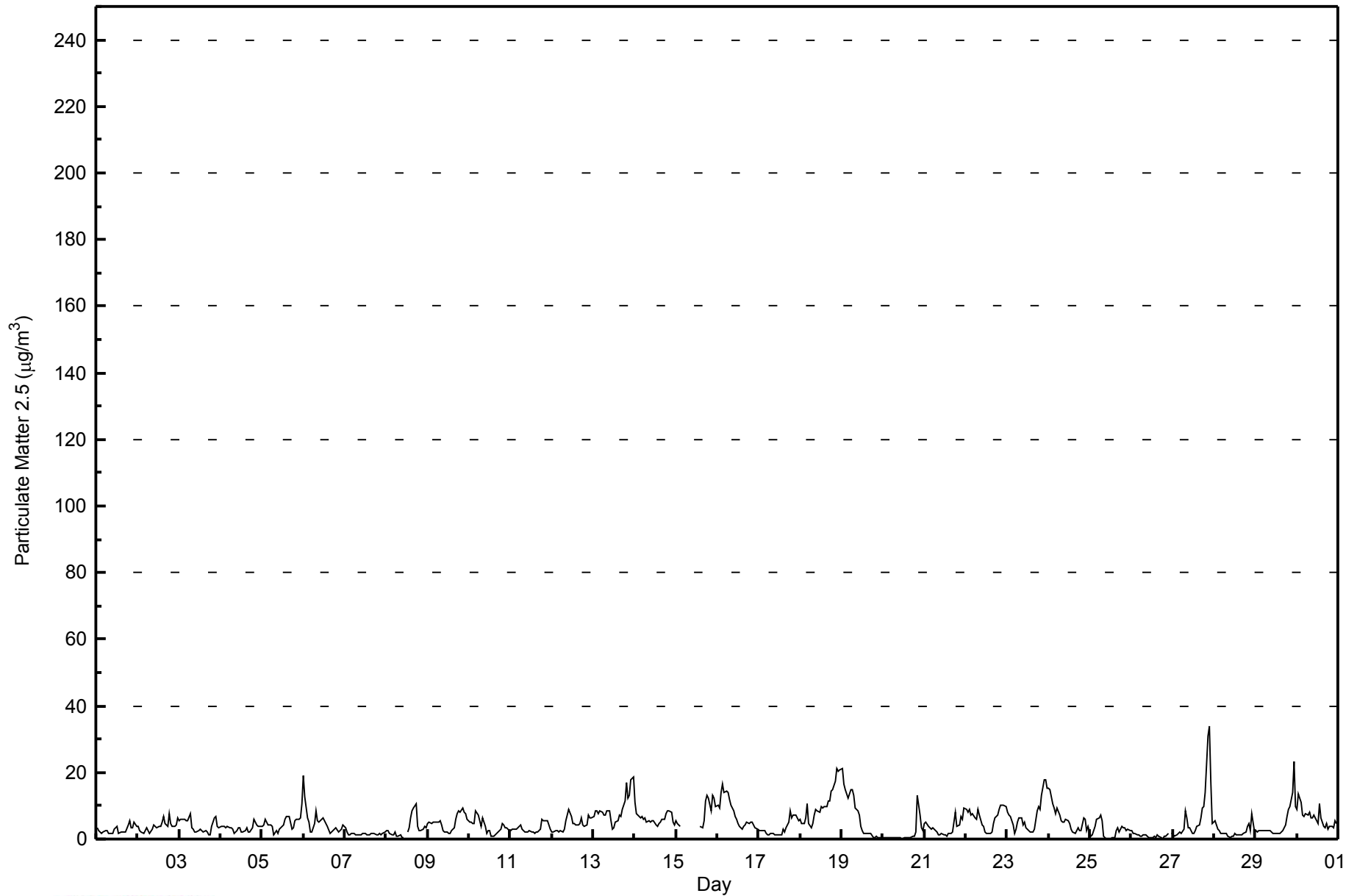
6.1	5.5	5.1	4.7	4.7	4.6	4.6	4.5	4.1	3.6	3.5	3.3	2.9	3.0	3.1	3.4	3.8	4.7	5.5	6.0	7.2	7.6	7.4	6.1	Diurnal Average	
21.1	16.6	15.0	16.5	13.8	14.9	15.0	13.2	10.3	9.0	8.7	8.2	9.6	10.6	9.9	9.9	11.5	11.3	14.4	16.9	30.9	33.8	23.1	20.6	Diurnal Maximum	

M - Maintenance AF - Analyzer Failure UO - Unstable Operation
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - September 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - September 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	431	61.05	61.05
6 - 15	207	29.32	90.37
16 - 25	15	2.12	92.49
26 - 80	2	0.28	92.78
> 81.0	0	0.00	92.78

Total Number of Valid Hours: 706

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - September 2014

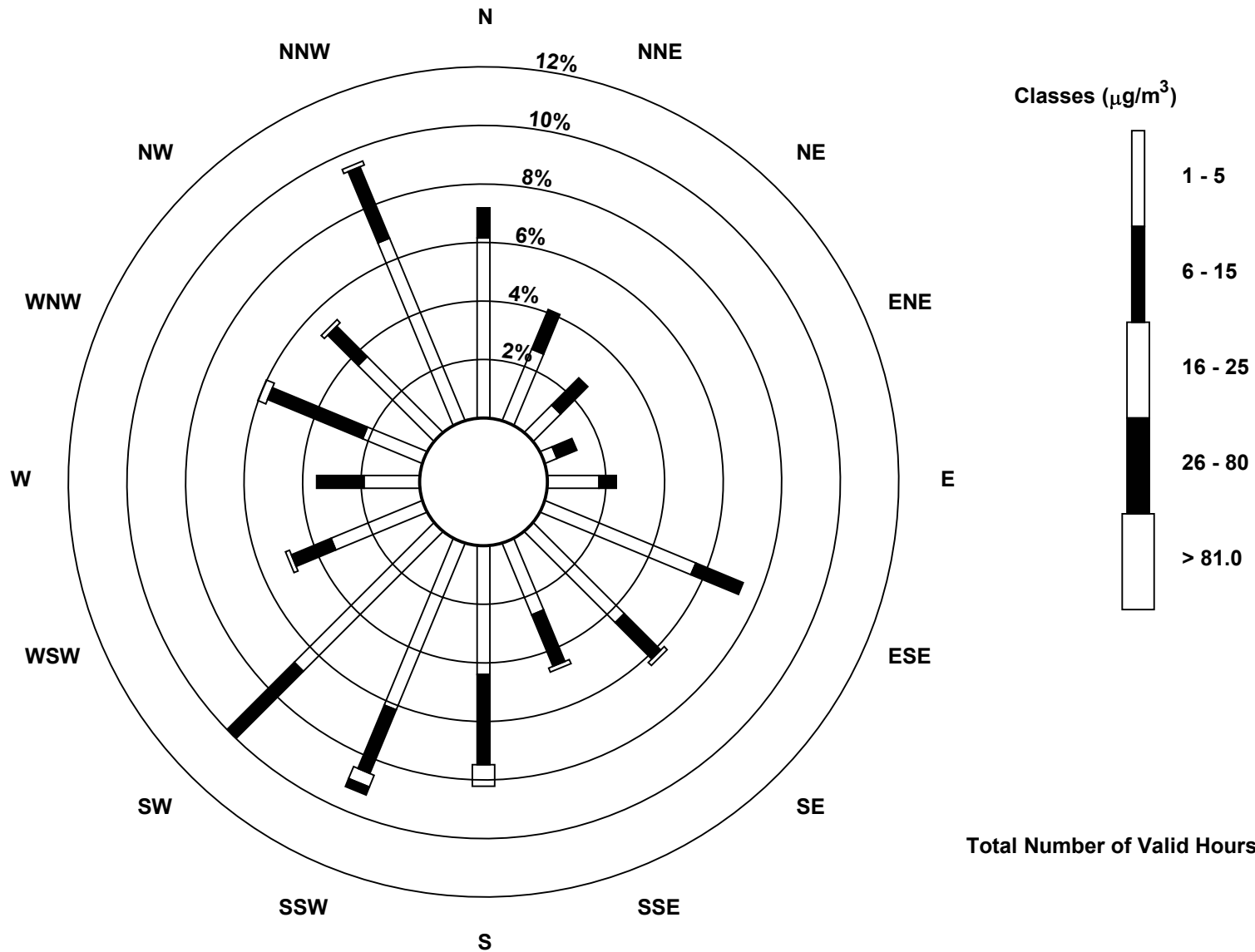
Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	42	18	9	3	12	38	30	18	30	42	46	23	13	15	25	46	410
6 - 15	7	10	9	5	4	12	12	13	21	16	22	10	11	24	10	18	204
16 - 25	0	0	0	0	0	0	1	1	5	3	0	1	0	2	1	1	15
26 - 80	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	49	28	18	8	16	50	43	32	56	63	68	34	24	41	36	65	631

Total Number of Valid Hours: 682

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

Particulate Matter 2.5 (PM_{2.5}) - µg/m³
 Patricia McInnes (AMS 6)



Total Number of Valid Hours: 682



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

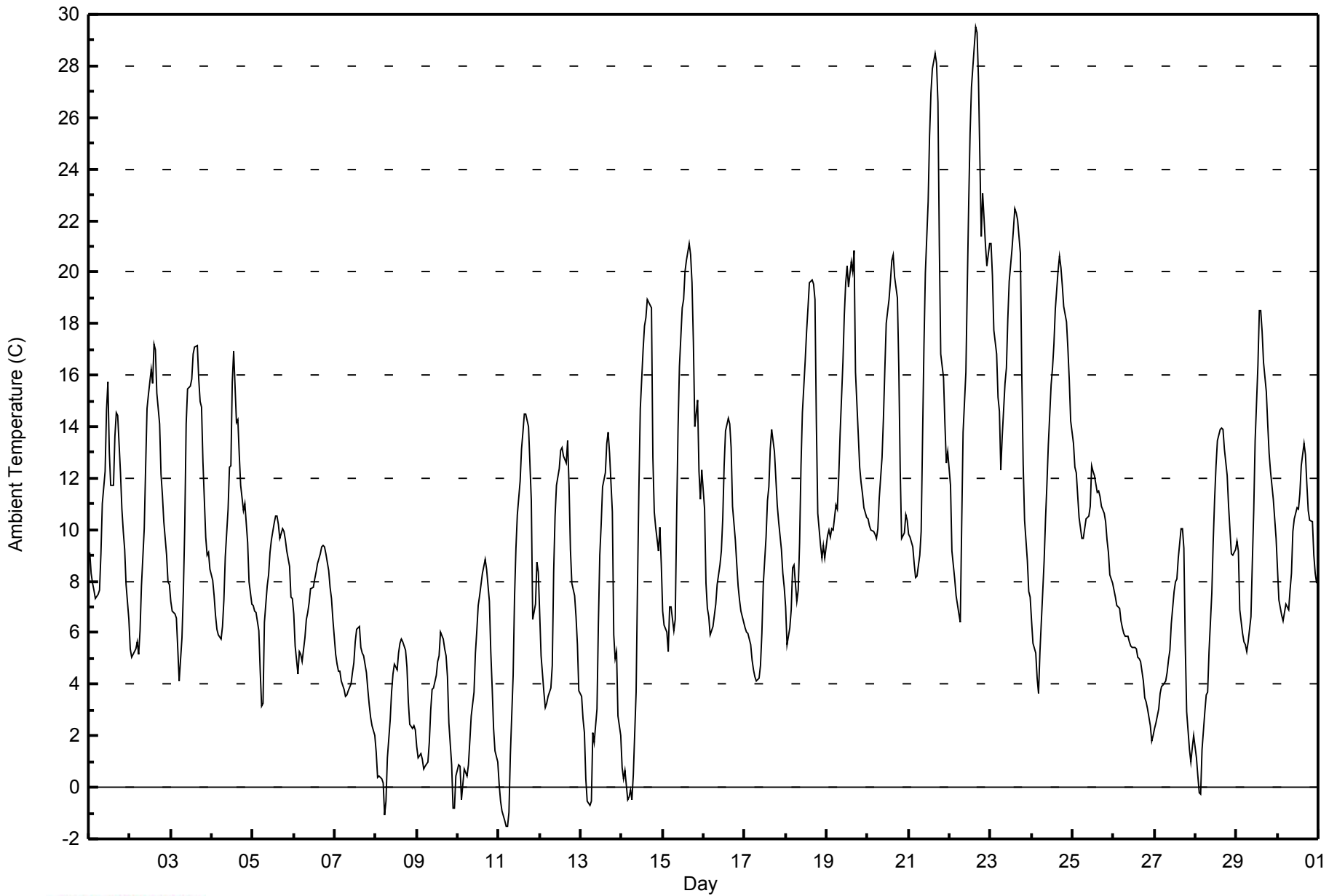
Patricia McInnes - September 2014

Maximum Value: 29.5 C on Sep 22 16:00		Maximum Daily Average: 18.2 C on Sep 22		Hours in Service: 720																																													
Minimum Value: -1.5 C on Sep 11 05:00		Minimum Daily Average: 2.6 C on Sep 9		Hours of Data: 720																																													
Maximum Diurnal Average: 14.9 C at hour 16		Minimum Diurnal Average: 5.1 C at hour 6		Hours of Missing Data: 0																																													
Monthly Average: 9.48 C		Percentiles: P ₁ = -0.8 P ₁₀ = 2.4 Q ₁ = 5.4 Median = 8.9 Q ₃ = 12.6 P ₉₀ = 18.0 P ₉₉ = 27.3		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	9.1	8.3	7.9	7.7	7.3	7.5	7.6	9.1	11.0	12.3	14.7	15.8	13.0	11.7	11.7	13.6	14.5	14.4	12.2	10.8	9.9	9.2	7.9	6.5	10.6	15.8																							
2-Sep	5.4	5.1	5.2	5.4	5.7	5.2	6.1	7.8	10.0	12.4	14.7	15.2	16.3	15.7	17.2	17.0	15.3	14.1	12.1	11.3	10.3	9.0	8.0	7.9	10.5	17.2																							
3-Sep	7.2	6.8	6.7	6.6	5.4	4.1	5.8	7.6	10.1	14.1	15.5	15.6	15.8	16.8	17.1	17.1	15.9	15.0	14.8	12.6	9.7	9.0	9.1	8.5	11.1	17.1																							
4-Sep	8.0	7.4	6.7	6.2	5.9	5.7	6.2	7.3	9.0	10.8	12.4	12.5	15.7	16.9	14.2	14.3	12.9	11.7	10.8	11.0	10.3	9.5	8.0	7.1	10.0	16.9																							
5-Sep	7.0	6.8	6.8	6.1	4.5	3.2	3.2	6.4	7.8	8.3	9.1	9.6	10.3	10.5	10.6	10.2	9.7	10.1	9.9	9.6	9.2	8.6	7.4	7.4	8.0	10.6																							
6-Sep	6.8	5.5	4.4	5.3	5.1	4.9	5.8	6.5	6.8	7.2	7.7	7.7	8.1	8.3	8.7	9.1	9.3	9.4	9.3	9.0	8.4	7.8	7.3	6.5	7.3	9.4																							
7-Sep	5.2	4.8	4.5	4.5	4.1	3.8	3.5	3.6	3.8	4.0	4.4	4.9	5.6	6.1	6.3	5.4	5.2	5.1	4.4	3.8	3.2	2.7	2.4	2.0	4.3	6.3																							
8-Sep	1.3	0.4	0.4	0.3	0.1	-1.1	-0.5	1.2	2.6	3.7	4.4	4.8	4.6	5.2	5.6	5.7	5.7	5.3	4.6	3.3	2.4	2.3	2.4	2.2	2.8	5.7																							
9-Sep	1.6	1.2	1.3	1.1	0.7	0.8	1.0	1.7	3.0	3.8	3.9	4.4	4.9	5.1	6.0	5.8	5.4	5.1	4.3	2.5	0.9	-0.8	-0.8	0.4	2.6	6.0																							
10-Sep	0.9	0.8	-0.5	0.1	0.7	0.4	0.9	1.8	2.8	3.7	5.2	6.1	7.0	7.4	8.3	8.6	8.8	8.5	7.2	5.3	3.9	2.3	1.4	1.0	3.9	8.8																							
11-Sep	0.1	-0.5	-0.9	-1.3	-1.5	-1.5	-0.9	1.3	4.3	7.4	9.3	10.6	11.9	13.1	13.8	14.5	14.5	14.0	12.6	11.1	6.5	7.1	8.8	8.3	6.8	14.5																							
12-Sep	6.7	5.1	3.7	3.1	3.3	3.5	3.9	4.7	8.4	10.5	11.7	12.4	13.1	13.2	12.9	12.6	13.5	11.7	9.2	7.9	7.5	6.6	5.6	3.7	8.1	13.5																							
13-Sep	3.5	2.7	2.1	0.4	-0.5	-0.7	-0.6	2.1	1.7	3.1	6.4	9.0	10.2	11.6	12.2	13.3	13.8	13.0	10.7	5.9	5.0	5.3	2.8	2.0	5.6	13.8																							
14-Sep	0.8	0.4	0.6	-0.5	-0.4	-0.1	-0.5	0.5	3.7	7.9	11.6	14.7	17.0	17.9	18.2	18.9	18.8	18.6	12.8	10.7	10.1	9.2	10.1	8.7	8.7	18.9																							
15-Sep	6.8	6.3	6.0	5.3	7.0	7.0	6.1	6.5	10.5	13.9	16.3	18.6	18.9	20.0	20.5	21.1	20.7	19.6	17.2	14.0	15.0	12.3	11.2	12.3	13.0	21.1																							
16-Sep	10.8	7.9	6.9	6.6	5.9	6.2	6.7	7.1	7.9	8.7	9.1	10.4	12.5	13.8	14.4	14.1	13.2	10.9	9.6	8.7	7.8	7.3	6.9	6.4	9.2	14.4																							
17-Sep	6.2	6.0	6.0	5.5	5.0	4.6	4.3	4.1	4.2	4.7	6.0	7.9	9.7	11.1	11.7	13.2	13.9	13.0	12.0	11.0	10.3	9.2	8.3	7.8	8.2	13.9																							
18-Sep	7.0	5.5	6.2	6.9	8.5	8.6	7.2	7.7	9.5	12.5	14.6	16.5	17.7	18.6	19.6	19.7	19.5	18.9	14.2	10.6	9.4	8.9	9.4	8.9	11.9	19.7																							
19-Sep	9.8	10.0	9.7	10.0	10.0	10.9	10.8	12.1	13.8	16.5	18.3	19.6	20.2	19.4	20.4	20.0	20.8	16.1	13.7	12.4	11.8	11.4	10.9	10.5	14.1	20.8																							
20-Sep	10.4	10.1	10.0	9.9	9.8	9.6	10.1	11.2	12.8	14.3	16.2	18.0	19.0	19.6	20.4	20.7	19.8	19.0	16.3	12.3	9.7	9.9	10.6	10.4	13.8	20.7																							
21-Sep	9.8	9.7	9.3	8.7	8.1	8.2	9.0	9.9	13.5	17.2	20.0	22.7	25.3	27.0	27.9	28.5	28.1	26.6	21.0	16.8	15.9	14.1	12.6	13.0	16.8	28.5																							
22-Sep	11.7	9.2	8.6	8.1	7.4	6.7	6.4	10.2	13.8	16.1	19.4	22.6	25.4	27.2	28.8	29.5	29.3	27.5	21.4	23.1	22.1	21.1	20.2	21.1	18.2	29.5																							
23-Sep	21.1	19.9	17.8	16.8	15.1	14.6	12.3	13.6	15.7	16.3	18.2	19.6	20.9	21.6	22.4	22.3	22.0	20.7	16.1	12.5	10.4	8.8	7.6	7.4	16.4	22.4																							
24-Sep	6.4	5.6	5.2	4.2	3.6	5.3	7.6	8.8	10.4	11.8	13.3	15.6	16.3	17.2	18.6	20.1	20.6	20.2	19.5	18.7	18.1	17.1	15.8	14.2	13.1	20.6																							
25-Sep	13.3	12.4	12.2	11.4	10.5	9.7	9.7	10.0	10.4	10.5	10.9	12.5	12.3	12.1	11.5	11.5	11.3	10.9	10.7	10.3	9.6	9.1	8.2	7.9	10.8	13.3																							
26-Sep	7.6	7.4	7.0	7.0	6.5	6.2	6.0	5.9	5.9	5.7	5.5	5.4	5.4	5.3	5.1	5.0	4.9	4.1	3.5	3.3	3.0	2.4	1.8	2.0	5.1	7.6																							
27-Sep	2.3	2.5	3.1	3.6	3.9	4.0	4.1	4.5	5.0	5.3	6.4	7.6	8.0	8.1	8.9	10.1	10.1	9.3	5.5	2.9	1.5	1.0	1.5	2.0	5.0	10.1																							
28-Sep	1.1	0.4	-0.2	-0.3	1.5	2.9	3.6	3.7	5.3	7.5	9.6	11.2	12.5	13.5	13.9	14.0	13.9	13.2	12.1	10.9	10.0	9.0	9.0	9.2	7.8	14.0																							
29-Sep	9.5	9.2	6.9	5.9	5.6	5.5	5.3	5.6	6.6	8.8	10.7	13.4	16.4	18.5	18.5	17.7	16.5	15.3	14.1	13.0	12.3	11.2	10.4	9.6	11.1	18.5																							
30-Sep	8.5	7.3	6.7	6.4	6.8	7.1	6.9	7.6	8.3	9.9	10.4	10.9	10.8	11.4	12.5	13.4	12.9	11.8	10.8	10.4	10.3	9.0	8.3	7.9	9.4	13.4																							
																								6.9	6.1	5.7	5.4	5.2	5.1	5.3	6.3	8.0	9.6	11.2	12.5	13.5	14.1	14.6	14.9	14.7	13.8	11.8	10.2	9.1	8.3	7.8	7.4	Diurnal Average	
																								21.1	19.9	17.8	16.8	15.1	14.6	12.3	13.6	15.7	17.2	20.0	22.7	25.4	27.2	28.8	29.5	29.3	27.5	21.4	23.1	22.1	21.1	20.2	21.1	21.1	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Patricia McInnes - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Patricia McInnes - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	20	2.78	2.78
0 - 10	403	55.97	58.75
10 - 20	256	35.56	94.31
> 20	41	5.69	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

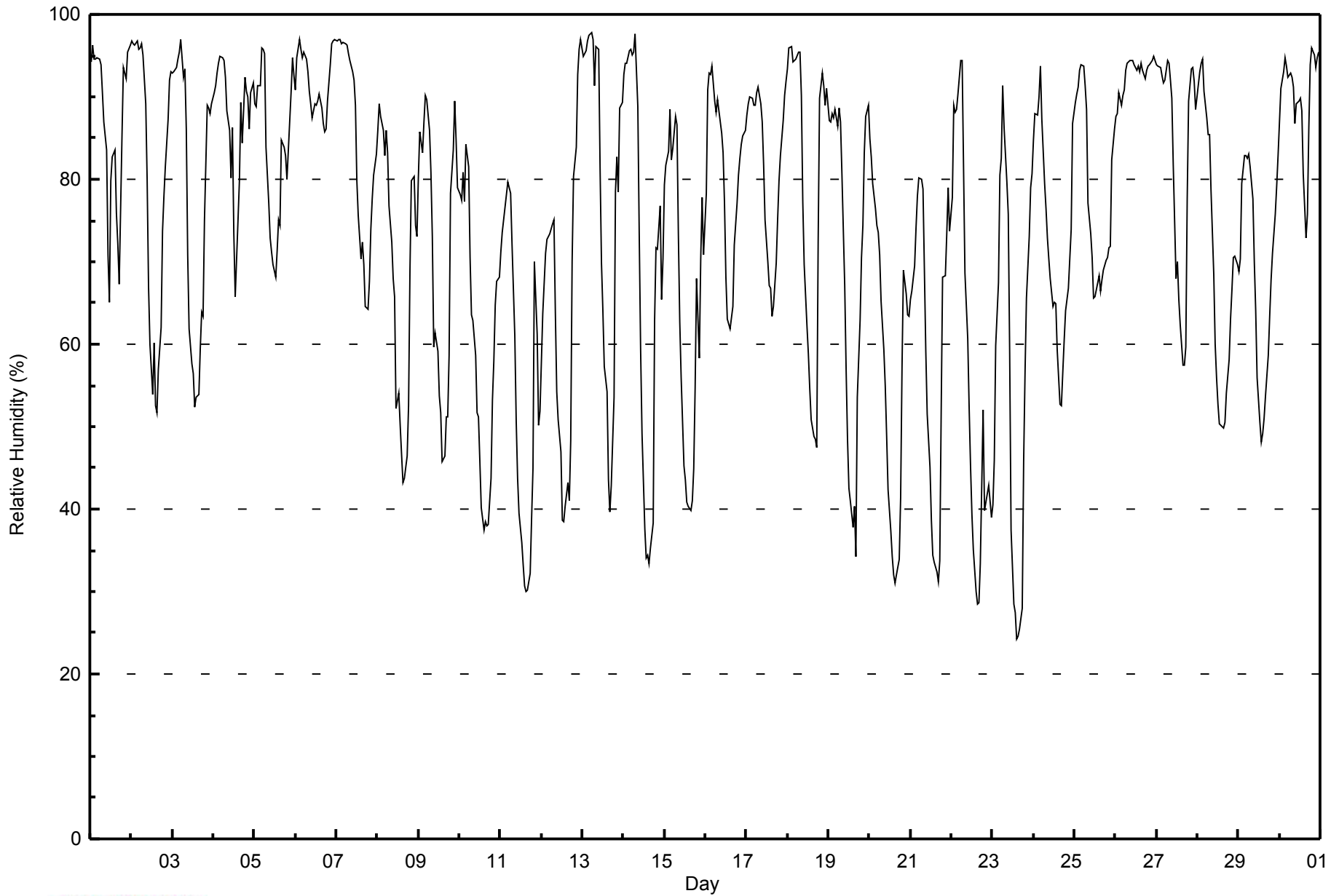


Maximum Value: 98 % on Sep 13 06:00																		Maximum Daily Average: 92.7 % on Sep 26																		Hours in Service: 720													
Minimum Value: 24 % on Sep 23 15:00																		Minimum Daily Average: 54.6 % on Sep 11																		Hours of Data: 720													
Maximum Diurnal Average: 89.3 % at hour 5																		Minimum Diurnal Average: 53.1 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 74.0 %																		Percentiles: P ₁ = 28 P ₁₀ = 44 Q ₁ = 62 Median = 78 Q ₃ = 90 P ₉₀ = 94 P ₉₉ = 97																		Hours of Calibration: 0													
																																				Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Sep	94	96	95	95	95	95	94	90	87	84	71	65	80	83	84	76	72	67	85	94	93	92	95	96	86.5	96																							
2-Sep	97	96	96	97	96	96	97	95	89	80	67	60	54	60	52	52	57	62	74	78	82	87	92	93	79.5	97																							
3-Sep	93	93	94	95	95	97	92	93	86	71	62	58	57	52	54	54	59	64	63	75	89	89	88	89	77.6	97																							
4-Sep	91	91	93	94	95	95	94	92	88	86	80	86	73	66	75	80	89	84	92	91	90	86	90	92	87.3	95																							
5-Sep	89	89	91	91	96	96	95	84	77	73	71	70	68	71	75	74	85	84	83	80	84	91	95	93	83.5	96																							
6-Sep	91	95	97	96	95	95	95	93	91	89	87	89	89	90	90	89	87	86	86	90	94	96	97	97	91.8	97																							
7-Sep	97	97	97	96	97	96	96	95	94	93	92	89	80	76	70	72	70	65	64	68	74	78	81	83	84.1	97																							
8-Sep	86	89	88	86	83	86	83	77	72	68	66	52	54	50	47	43	44	46	53	69	80	80	74	73	68.7	89																							
9-Sep	80	86	83	87	90	90	86	81	73	60	61	59	54	52	46	46	51	51	59	78	84	90	85	79	71.2	90																							
10-Sep	78	78	81	77	84	81	71	64	63	59	52	51	46	40	37	38	38	38	44	53	58	65	68	68	59.7	84																							
11-Sep	71	74	75	78	80	79	78	72	61	51	44	40	36	33	31	30	30	32	39	45	70	61	50	52	54.6	80																							
12-Sep	58	64	71	73	73	73	75	75	64	54	51	47	39	39	40	43	41	48	70	80	84	93	96	97	64.5	97																							
13-Sep	95	95	96	97	98	98	97	91	96	96	81	70	64	57	54	44	40	43	54	79	83	78	89	89	78.4	98																							
14-Sep	93	94	94	96	96	95	95	98	89	73	59	49	38	34	34	33	35	38	63	72	71	77	65	70	69.3	98																							
15-Sep	79	82	83	88	82	84	88	87	73	63	56	45	44	41	40	40	41	45	55	68	58	70	78	71	65.0	88																							
16-Sep	78	91	93	93	94	90	88	90	88	86	83	77	68	63	62	63	65	72	77	80	82	84	85	86	80.8	94																							
17-Sep	88	89	90	90	89	89	90	91	89	87	82	75	70	67	67	63	65	70	75	80	83	87	90	92	81.6	92																							
18-Sep	93	96	96	94	94	95	95	95	90	77	70	62	59	55	51	49	48	47	72	90	93	91	89	91	78.9	96																							
19-Sep	87	87	88	87	88	86	89	87	81	67	57	48	43	41	38	40	34	54	63	71	74	83	88	89	69.6	89																							
20-Sep	85	83	79	77	74	74	71	65	59	55	49	42	37	34	32	31	32	34	41	57	69	66	63	63	57.2	85																							
21-Sep	66	66	70	74	78	80	80	79	69	59	51	45	39	34	34	32	31	34	52	68	68	73	79	74	59.8	80																							
22-Sep	78	89	88	88	90	94	94	82	69	61	52	45	39	35	30	29	29	33	52	40	41	42	43	39	57.6	94																							
23-Sep	41	46	60	67	81	83	91	86	80	76	59	37	29	28	24	25	25	28	46	57	66	73	79	81	56.9	91																							
24-Sep	85	88	88	90	94	87	79	76	73	70	68	65	65	65	59	53	53	57	61	64	67	70	74	87	72.4	94																							
25-Sep	89	90	91	93	94	94	91	89	77	73	71	66	66	67	68	67	68	69	70	70	72	72	82	86	78.1	94																							
26-Sep	88	88	91	89	90	91	93	94	94	94	94	94	93	94	93	94	93	92	93	94	94	94	95	94	92.7	95																							
27-Sep	94	94	94	93	92	92	94	94	92	90	82	68	70	65	62	58	57	60	78	89	93	94	92	88	82.7	94																							
28-Sep	92	93	94	95	91	87	85	85	79	69	60	56	53	50	50	50	50	54	58	63	67	70	71	70	70.5	95																							
29-Sep	69	70	79	83	83	83	83	81	78	70	64	56	50	48	49	51	54	59	63	68	71	76	79	83	68.8	83																							
30-Sep	87	91	93	95	94	92	93	92	91	87	89	89	90	88	81	73	76	86	94	96	95	93	95	95	89.8	96																							
																								83.7	86.0	87.6	88.4	89.3	89.1	88.5	85.8	80.4	74.0	67.7	61.9	58.1	55.9	54.3	53.1	54.0	56.8	65.9	73.5	77.6	80.1	81.5	82.0	Diurnal Average	
																								97	97	97	97	98	98	97	98	96	96	94	94	93	94	93	94	93	92	94	96	95	96	97	97	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Patricia McInnes - September 2014





Maximum Speed: 32 km/h on Sep 19 18:00	Maximum Daily Speed Average: 15.4 km/h on Sep 20	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 21 23:00	Minimum Daily Speed Average: 1.1 km/h on Sep 18	Hours of Data: 696
Maximum Diurnal Speed Average: 2.6 km/h at hour 22	Minimum Diurnal Speed Average: 0.4 km/h at hour 11	Hours of Missing Data: 24
Monthly Average Velocity: 1.3 km/h 256.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 13 P ₉₀ = 18 P ₉₉ = 24	Percent Operational Time: 96.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	S4	SW3	SW6	S7	SSW6	SSW7	SSW5	SSW5	SW6	S6	SSE5	SSE6	SW7	WSW3	SW7	SSW5	NE4	NE4	SW3	NW4	WNW5	WNW5	S2	SW2	SSW3.5	SW7
2-Sep	SW3	SSE1	SSW3	WSW3	SW2	SSW2	S4	SSW5	S5	S4	ESE2	NE5	NNW6	SW12	WSW4	NNE10	N16	NW9	W5	NW6	NW5	NW5	NW4	W2	WNW1.8	N16
3-Sep	WSW3	SSW3	WSW4	SW2	SW2	WSW3	SSE3	SSE5	S5	SSE6	SSW5	E6	ESE6	SE8	S9	M	MS	MS	MS	MS	MS	MS	MS	MS	---	S9
4-Sep	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	---	N16
5-Sep	NNW12	NNW9	NW7	NW5	WNW5	W4	W3	NW2	ESE5	SE8	SSE9	SSE10	SSE10	ESE9	ESE8	ESE12	ESE13	ESE13	ESE10	ESE6	NW5	WNW4	WNW2	NW12	ESE1.9	ESE13
6-Sep	NW7	SW5	W4	W4	WSW2	W1	NE3	NE3	ENE5	ESE6	ESE7	E8	E8	E9	E11	E11	E12	E10	NE7	NE7	N8	N11	N12	NNW14	NE3.9	NNW14
7-Sep	NNW18	NNW17	N18	N17	N15	N17	N15	N15	N16	N16	N14	N16	NNE15	N16	N16	N19	NNW16	NNW19	N17	N14	NNW10	NNW9	NNW11	NNW11	N15.0	NNW19
8-Sep	NNW8	NNW9	NNW12	NNW12	NNW10	NNW7	NNW9	NNW12	N14	N14	N13	N12	NNW11	NW11	NNW11	NNW10	N11	N11	N8	NW5	WNW4	NW3	NNW5	NW4	NNW9.0	N14
9-Sep	W4	WNW4	WNW4	WNW3	WNW3	NW3	NW4	NW6	NNW4	NNW3	W5	W2	WSW2	W3	W4	NNE6	NNE12	NNE8	NNW6	WNW4	WNW4	WNW6	WNW7	NW7	NW3.7	NNE12
10-Sep	NW7	NW5	WNW5	WNW3	NNE3	NW5	WNW10	NW7	NE3	NNW5	N4	NNE5	NNE4	WSW4	NW1	SSE7	SW7	SSW11	SSW7	SSW6	SSW7	SSW7	SW9	SW11	WSW2.6	SSW11
11-Sep	SW11	SW9	SW8	SSW7	SSW7	SSW7	S7	S10	SSW13	SSW18	SSW23	SSW23	SSW24	SSW25	SSW24	SSW22	SW20	SSW14	S7	SSW6	WNW2	SW9	WSW16	WSW14	SSW13.0	SSW25
12-Sep	WSW9	SSW6	S7	SW10	SW8	SW7	WSW6	SW4	NNW5	NNW17	NNW18	NNW18	NNW20	NNW19	NNW17	NW14	NNW13	NNW14	NW14	WNW6	NNW10	NNW6	W3	W6	NW7.7	NNW20
13-Sep	WNW7	WNW6	WNW4	WNW3	WNW4	WNW4	WNW2	E2	ESE4	SSE3	SE4	SE5	S8	SSE8	SE9	ESE7	ESE7	ESE7	SE5	SSW3	SW5	SW5	S4	S4	SSE2.1	SE9
14-Sep	S3	SSW4	SSW3	SW2	SSW5	S3	SSE5	SSE6	SSE7	SE7	SE7	SE8	S9	WSW11	W10	W7	W6	SW5	SW6	SW5	SW5	SW7	SW2	SSW4.3	WSW11	
15-Sep	S5	SSE4	S4	S3	SSW6	SSW7	SW9	SW8	SSW6	SE5	ESE4	SE4	SSE6	ENE8	NE7	ENE5	NE8	NNE10	N6	NNE5	ENE7	ESE4	ESE5	SE8	SE2.2	NNE10
16-Sep	NE3	WNW5	NW8	NNW10	NNW9	NE6	ENE7	ESE8	E7	ENE8	NE9	NE10	ENE10	E10	ESE11	SE13	E17	E16	ESE15	ESE15	ESE17	ESE19	ESE15	ESE16	E8.2	ESE19
17-Sep	ESE15	ESE14	ESE13	SE14	SE15	ESE15	ESE17	SE16	ESE16	ESE16	SE14	SE17	SE17	SE16	SE18	ESE15	SE17	SE15	SE10	SE12	SE10	SE7	SE7	SE7	SE13.7	SE18
18-Sep	SSE5	SSW3	SSW5	S6	SSW5	SW2	NNW3	NW4	NNW3	NNE8	NNE9	NNE7	NE6	NE7	ENE5	N6	NE6	NNE6	SW1	WNW4	NW1	SSW4	S2	S3	NNE1.1	NNE9
19-Sep	SE5	SSE4	SSE4	S5	SSW6	S6	SSE4	SW9	SW12	SSW13	SW17	WSW19	WSW24	WSW19	WSW26	WSW21	WSW30	WNW32	WSW21	WSW16	WSW15	W20	WSW20	WSW17	WSW13.4	WNW32
20-Sep	WSW18	W18	W17	W20	W21	W18	W16	W21	WNW20	WNW21	WNW20	WNW21	WNW23	WNW21	W20	W19	WSW18	WSW15	WSW9	SW6	SW6	SW7	SSW9	SW10	W15.4	WNW23
21-Sep	SSW10	SW11	SW11	SW9	SW9	SW10	SW13	SW10	SW17	SW18	SW18	SW18	WSW16	SW17	SW16	SSW15	SSW16	S7	S4	SSW5	SSW5	S5	SSE0	S2	SW10.5	SW18
22-Sep	SSE3	SSW3	S5	S5	S4	SSW3	SW4	S5	SE7	S11	S9	S11	SSW11	SW12	SW13	SSW9	S8	SSW5	WSW7	W12	WNW10	WNW11	WNW13	WNW19	SW5.8	WNW19
23-Sep	WNW16	NW5	W5	SW9	WSW4	SW5	W4	WNW6	NNW10	N11	N7	NNE11	NNE7	N7	N5	N6	N5	N7	NNW5	WNW3	WSW2	WSW3	WNW2	AF	NNW4.1	WNW16
24-Sep	SW2	SSW3	SSW3	SSW2	WSW1	SSE4	SE5	SE8	SE10	ESE11	E10	E7	ENE7	ESE14	ESE21	ESE16	ESE14	ESE12	SE12	SE7	W20	WSW11	SSW6	SE6.2	ESE21	
25-Sep	SW10	SW11	SW10	SW10	SW7	WSW8	SW11	WSW9	W19	W19	WNW10	W17	WNW13	NNW16	NW14	NNW9	N12	NNW10	N9	NNE15	NNE13	NNE16	NE11	NNE11	WNW6.8	WNW20
26-Sep	NNE9	NNE9	NNE12	NNE12	NNE14	NNE13	NNE13	NNE14	NNE16	NNE14	NNE17	NNE16	NNE13	NNE12	NNE16	N18	N18	N19	NNW21	N20	N20	N18	N18	N17	N15.0	NNW21
27-Sep	N18	N15	N16	N14	N14	NNW9	NNW8	NNW8	NNW10	NNW9	NNW8	NNW6	NW6	NNW7	NW7	NW5	NW1	W4	WSW2	SW2	SSW3	SSW4	SSW6	S6	NNW5.9	N18
28-Sep	SSE5	SE5	SE6	SE8	SE11	SE14	SE12	SE13	SE13	SSE16	SSE19	SSE20	S21	S24	S23	S25	S23	S19	SSE15	SSE12	SSE13	SSE12	SSE13	SSE12	SSE14.0	S25
29-Sep	S12	SSE9	SE8	ESE7	ESE9	ESE10	ESE11	ESE13	ESE14	ESE16	ESE12	ESE15	SE9	S20	SSW20	SSW20	SSW17	S14	SSW12	S8	S8	S6	S7	S6	SSE9.6	SSW20
30-Sep	S4	SSE3	S4	WSW6	SW4	S4	S3	SSW4	WSW9	WNW3	NNW7	NW10	NNW13	NNW10	NNW12	N9	N6	NW4	NW7	NNW5	N6	NNW5	N6	N4	NW3.5	NNW13

W2.4	W2.2	W2.1	WSW2.2	WSW1.5	SW1.6	SW1.3	SW1.4	SW0.8	S0.7	SW0.4	ESE0.5	WSW1.4	WSW2.2	WSW2.4	SSW1.2	SW0.5	NNW1.3	NNW1.0	NNW0.9	NW1.3	NNW2.6	W2.5	W2.5	Diurnal Average
N18	W18	N18	W20	W21	W18	ESE17	W21	WNW20	WNW21	SSW23	SSW23	SSW24	SSW25	WSW26	S25	WSW30	WNW32	NNW21	N20	N20	W20	WSW20	WNW19	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Patricia McInnes - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 10 km/h on Sep 24 22:00	Hours of Data: 696
Minimum Value: 0 km/h on Sep 9 20:00	Hours of Missing Data: 24
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 7	Hours of Calibration: 0
	Percent Operational Time: 96.7

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

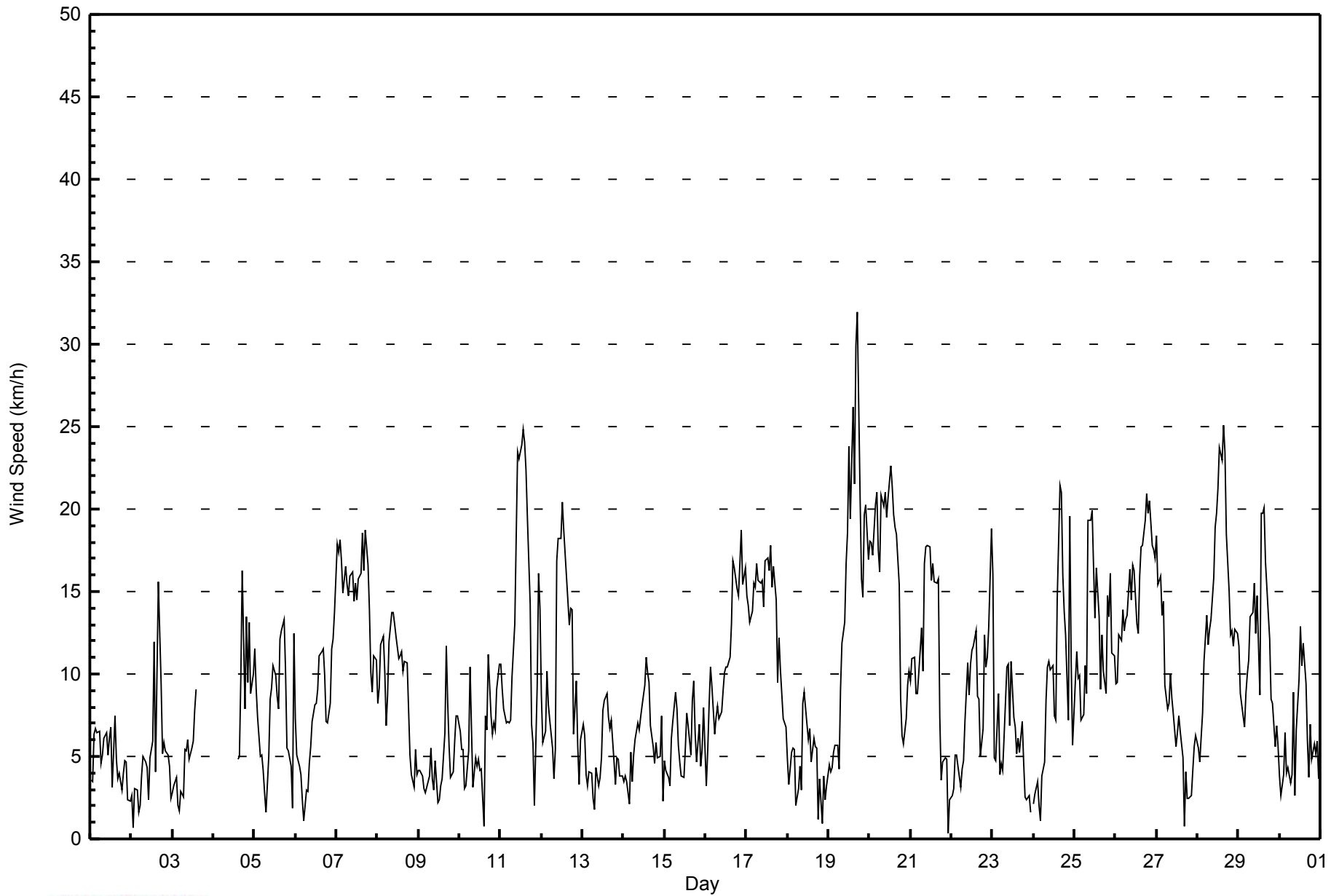
Diurnal Maximum

M - Maintenance AF - Analyzer Failure MS - Missing



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Patricia McInnes - September 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Patricia McInnes - September 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	214	30.75	30.75
6 - 11	263	37.79	68.53
12 - 19	177	25.43	93.97
20 - 28	40	5.75	99.71
29 - 38	2	0.29	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Patricia McInnes - September 2014

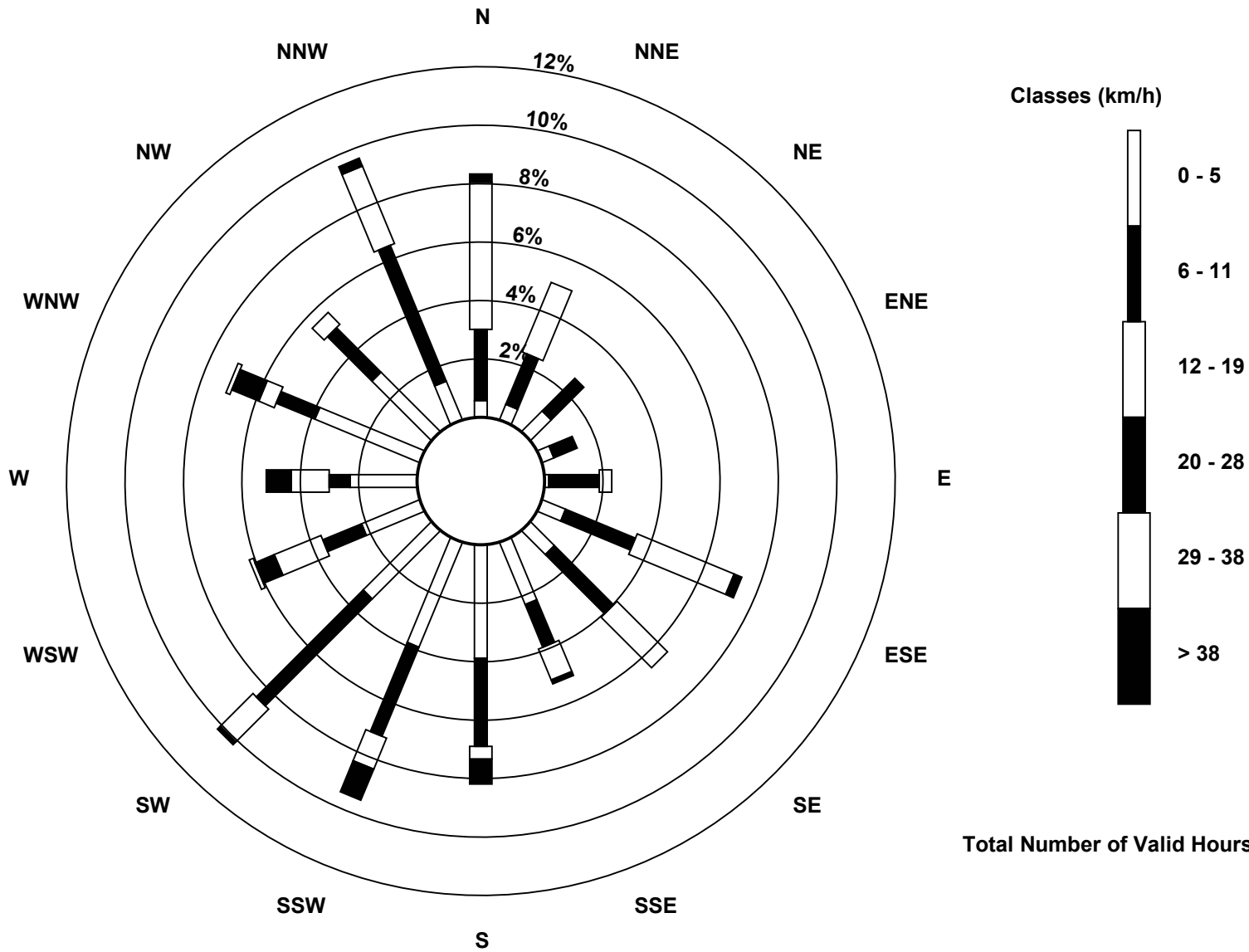
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	4	7	3	1	6	8	16	27	27	23	15	16	27	20	10	214
6 - 11	17	13	11	6	12	18	20	11	21	23	36	10	5	10	15	35	263
12 - 19	35	18	0	0	3	25	17	8	3	8	11	12	9	4	4	20	177
20 - 28	2	0	0	0	0	2	0	1	6	8	1	5	6	7	0	2	40
29 - 38	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	58	35	18	9	16	51	45	36	57	66	71	43	36	49	39	67	696

Total Number of Valid Hours: 696

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Patricia McInnes (AMS 6)**





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Patricia McInnes - September 2014

Direction of Maximum Speed: 285 deg on Sep 19 18:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 267.6 deg on Sep 20	Hours of Data: 696
Direction of Minimum Speed: 159 deg on Sep 21 23:00	Hours of Missing Data: 24
Direction of Minimum Daily Speed Average: 1.1 deg on Sep 18	Percent Operational Time: 96.7
Monthly Average Direction: 269.3 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	191	224	215	191	193	194	197	205	218	186	165	161	221	250	220	196	36	37	228	317	287	284	183	214	208.7
2-Sep	218	165	212	247	216	204	188	201	173	169	107	52	343	233	251	28	5	324	270	307	313	316	309	273	294.0
3-Sep	240	200	240	234	226	251	152	161	173	159	195	96	119	142	169	M	MS	MS	MS	MS	MS	MS	MS	MS	--
4-Sep	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	284	244	281	355	331	353	337	343	324	326	--
5-Sep	343	340	323	318	300	265	268	315	119	144	149	159	151	118	115	109	117	118	114	106	320	300	288	326	108.6
6-Sep	320	230	274	264	240	263	50	41	61	103	104	94	98	98	93	96	81	79	47	43	9	355	353	338	51.8
7-Sep	341	341	352	5	360	357	356	1	2	3	10	11	13	358	357	353	340	344	353	352	343	337	340	335	354.0
8-Sep	334	327	330	334	343	334	326	344	350	7	3	358	333	321	334	341	355	11	357	309	301	309	339	314	341.5
9-Sep	277	293	303	284	292	307	307	311	341	348	279	275	248	266	278	14	23	28	337	298	298	301	298	306	316.6
10-Sep	312	319	296	283	25	321	295	304	36	331	349	30	27	258	322	154	220	197	196	196	202	210	218	219	253.7
11-Sep	222	225	218	204	192	194	186	184	194	210	200	198	207	213	211	209	215	210	189	208	291	231	257	249	211.1
12-Sep	244	211	179	218	218	225	239	229	331	337	339	341	339	331	336	323	328	328	321	283	334	327	260	272	313.0
13-Sep	297	301	301	289	287	289	284	97	119	148	138	129	169	162	145	112	111	111	124	192	224	215	178	171	166.3
14-Sep	185	194	202	233	200	183	160	162	158	146	135	143	178	238	261	271	274	261	217	228	221	229	233	227	208.0
15-Sep	188	163	179	180	200	209	218	218	206	134	123	146	167	72	52	62	50	15	356	27	75	103	114	124	126.4
16-Sep	49	302	317	337	347	38	78	110	97	60	43	56	59	81	111	124	97	101	106	107	111	110	121	112	88.9
17-Sep	119	113	119	137	126	120	118	124	119	123	126	124	125	126	126	121	144	137	124	128	132	124	129	140	125.5
18-Sep	168	205	194	169	192	223	327	307	328	17	14	13	42	36	57	5	53	31	235	301	304	206	182	182	19.9
19-Sep	130	152	163	169	208	187	156	216	218	208	231	239	245	256	254	251	255	285	252	241	245	261	252	252	243.7
20-Sep	256	263	264	264	261	262	269	275	285	282	283	297	286	291	281	266	258	258	248	232	219	219	211	215	267.6
21-Sep	210	215	226	220	217	219	223	227	227	226	226	228	240	236	218	205	211	185	175	210	211	177	159	171	219.4
22-Sep	154	196	182	188	190	209	220	179	146	184	186	185	194	227	223	208	182	198	246	272	282	294	294	293	224.9
23-Sep	297	318	266	229	239	217	264	299	343	0	5	18	20	8	6	355	350	7	341	289	254	245	287	AF	328.1
24-Sep	233	206	193	193	245	160	127	126	127	115	88	101	92	68	103	108	115	116	123	125	146	279	249	192	124.2
25-Sep	218	235	233	228	232	237	222	246	269	270	282	268	292	328	325	328	356	342	359	22	21	25	41	32	301.1
26-Sep	28	23	32	22	31	28	14	13	19	23	21	16	18	23	15	8	3	353	347	357	359	355	349	351	9.6
27-Sep	354	352	351	356	354	340	336	327	333	338	327	340	305	346	307	311	315	260	246	231	199	195	201	188	333.3
28-Sep	148	135	131	128	128	135	135	132	135	153	161	161	169	173	189	180	179	174	164	158	155	147	158	167	159.9
29-Sep	176	152	131	121	118	119	117	122	119	119	117	116	133	177	194	199	200	187	206	191	186	186	176	170	158.1
30-Sep	175	163	174	240	219	175	189	196	254	282	343	326	334	331	342	350	4	304	306	333	350	335	350	350	317.1

269.3 265.2 261.2 251.4 241.7 222.3 223.1 215.5 214.3 184.5 235.4 119.4 241.0 250.5 240.0 210.1 248.0 340.1 289.0 302.3 304.6 290.3 268.0 270.8
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Patricia McInnes - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 100 deg on Sep 21 23:00	Hours in Service: 720 Hours of Data: 696 Hours of Missing Data: 24 Hours of Calibration: 0 Percent Operational Time: 96.7
Minimum Value: 5 deg on Sep 9 20:00	
Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 13 Median = 17 Q ₃ = 26 P ₉₀ = 46 P ₉₉ = 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	60	52	18	13	14	18	52	26	20	26	48	44	49	81	20	32	92	52	36	44	35	62	53	72	92
2-Sep	33	87	55	40	71	52	21	21	27	43	86	61	42	21	67	34	18	27	16	10	8	10	10	30	87
3-Sep	39	22	17	50	30	41	50	21	24	30	60	66	36	20	18	M	MS	MS	MS	MS	MS	MS	MS	MS	66
4-Sep	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	87	59	27	16	16	15	11	14	12	11	87
5-Sep	13	17	13	25	22	19	30	59	32	22	23	20	21	19	16	14	14	15	18	45	61	23	55	12	61
6-Sep	26	32	16	26	47	72	39	43	25	21	22	18	19	17	13	14	15	14	20	19	16	13	13	22	72
7-Sep	12	12	15	13	14	13	13	13	14	13	14	14	16	16	16	15	12	13	15	15	12	10	11	11	16
8-Sep	12	9	9	9	11	11	8	13	17	22	21	30	20	23	23	17	21	16	18	10	12	30	15	43	43
9-Sep	25	11	22	31	24	23	15	15	38	55	25	69	83	73	52	48	15	18	22	5	11	5	5	8	83
10-Sep	8	14	14	85	58	21	11	25	54	33	37	45	60	68	91	40	44	17	15	14	13	10	10	10	91
11-Sep	9	10	9	11	12	14	14	16	18	18	17	18	17	16	18	18	17	15	15	21	33	11	9	8	33
12-Sep	10	30	21	11	12	19	13	21	83	15	17	18	18	17	21	14	21	12	23	14	17	54	23	12	83
13-Sep	7	8	43	36	34	21	24	88	25	54	60	60	37	34	29	37	37	16	26	21	7	19	7	18	88
14-Sep	12	14	25	42	16	25	12	14	16	21	21	22	36	40	38	32	33	24	16	7	10	12	10	78	78
15-Sep	22	19	14	26	17	16	12	11	20	36	45	52	31	37	34	48	38	13	16	32	18	17	20	14	52
16-Sep	43	15	13	9	12	22	24	16	21	27	22	23	24	28	28	18	15	16	17	17	17	15	17	13	43
17-Sep	16	14	15	15	16	15	15	17	14	15	17	18	17	20	18	18	16	15	15	13	13	11	12	12	20
18-Sep	16	27	34	12	17	51	33	11	33	21	19	34	48	34	56	41	33	35	77	16	66	14	45	19	77
19-Sep	22	22	17	17	16	22	35	10	11	16	20	19	19	13	14	13	14	19	13	11	10	14	13	15	35
20-Sep	9	11	10	12	11	12	12	13	13	15	14	14	16	18	21	16	13	11	11	13	11	7	10	10	21
21-Sep	11	13	9	9	10	10	9	11	10	13	14	15	17	20	18	18	14	18	15	15	23	17	100	88	100
22-Sep	75	42	7	8	12	26	8	21	15	20	24	22	20	25	17	37	16	15	24	9	9	7	8	10	75
23-Sep	16	43	37	14	25	19	32	19	18	21	29	26	38	41	61	39	46	14	16	31	43	31	52	AF	61
24-Sep	32	28	19	35	57	40	15	14	15	19	15	15	14	21	14	13	15	13	12	13	12	46	29	19	57
25-Sep	16	10	18	13	14	22	15	16	13	14	16	17	19	14	12	22	15	12	17	12	15	13	11	16	22
26-Sep	12	12	11	13	12	11	12	14	11	12	12	13	15	11	12	14	16	16	14	16	15	15	15	14	16
27-Sep	15	14	14	15	14	22	13	11	11	18	26	53	39	30	36	72	93	37	27	28	42	15	15	18	93
28-Sep	11	22	8	13	13	12	13	12	14	19	16	16	16	16	18	15	14	12	13	12	12	10	12	11	22
29-Sep	13	18	11	11	11	12	13	14	13	13	15	15	41	17	18	18	17	14	14	15	14	19	19	12	41
30-Sep	35	55	28	10	26	37	48	47	11	48	13	14	12	14	15	21	20	37	12	22	23	33	16	24	55

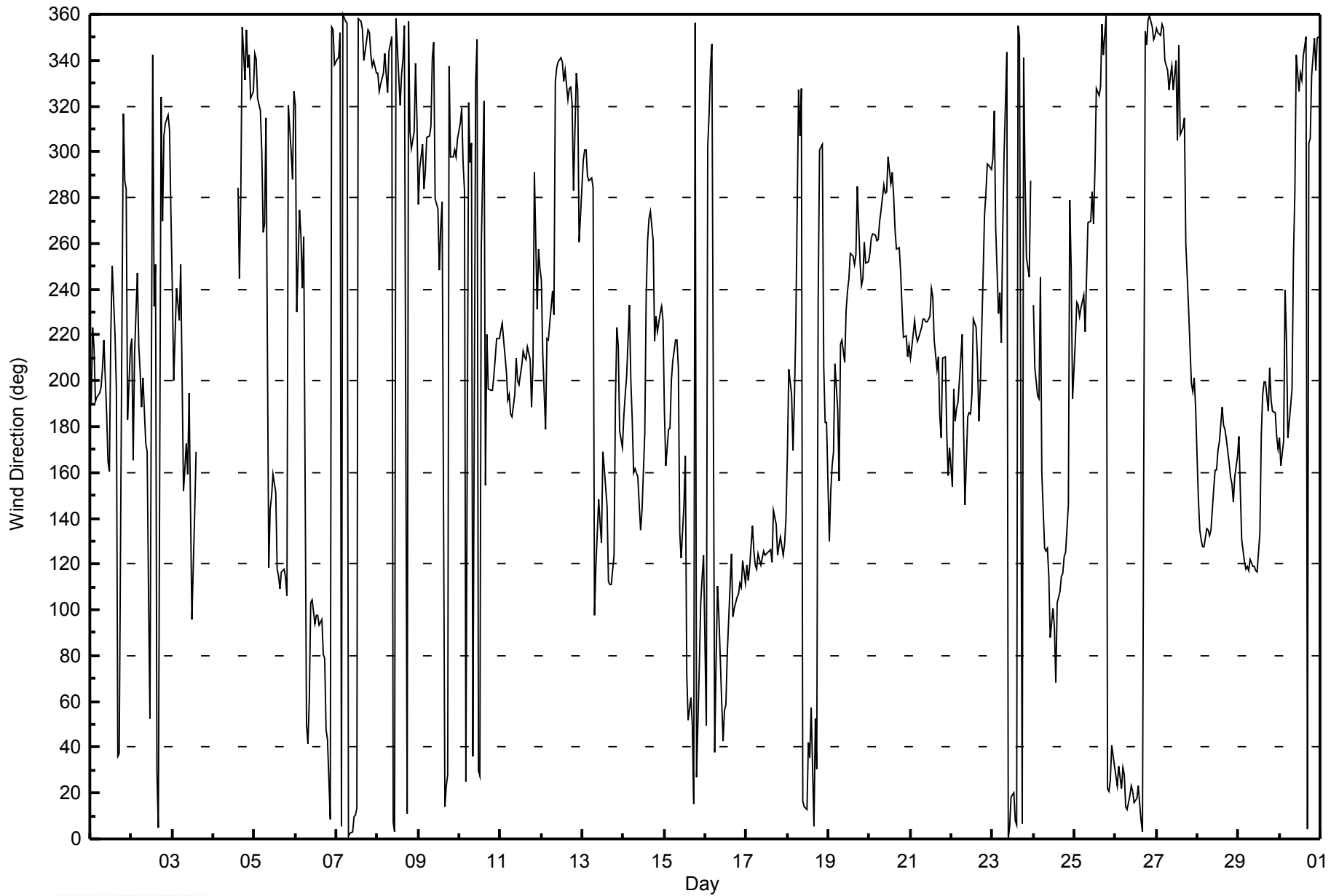
75	87	55	85	71	72	52	88	83	55	86	69	83	81	91	72	93	52	77	45	66	62	100	88	
Diurnal Maximum																								

M - Maintenance AF - Analyzer Failure MS - Missing



WBEA
Hourly Averages

Wind Direction (WD) - deg
Patricia McInnes - September 2014





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 5, 2014	Previous Calibration	August 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	17:40	End Time (MST)	20:23
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1220
Cal Gas Concentration	47.0 ppm	Cal Gas Expiry Date	12/12/2016
Gas Cert Reference	SA130110A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	0-5000mV	DACS channel #	SE 1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-677	-677
Analyzer Range (mv)	1000	1000	Lamp voltage	771	771
Calculated slope	1.000674	0.997776	Chamber temp.	44.9	44.9
Calculated intercept	0.917151	-0.675989	Pressure (mmHg)	697.0	697.0
Analyzer Background	5.4	5.6	Flow (lpm)	0.438	0.438
Analyzer Coefficient	1.010	1.039	Intensity	91	91

Analyzer make Thermo 43i Analyzer serial # 1008841397

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	NA
as found span	5000	55.3	519.8	505.4	1.029
calibrator zero	5000	0.0	0.0	-0.3	NA
high point	5000	55.3	519.8	521.0	0.998
second point	5000	27.7	260.4	262.6	0.992
third point	5000	13.9	130.7	132.3	0.988
calibrator zero	5000	0.0	0.0	-0.3	NA
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	55.3	519.8	525.5	0.989
Average Correction Factor					0.992

Corrected As found 505.7 Previous response 518.6 % change 2.5%

Notes:

SO₂ span adjusted. No diagnostic issues noted with instrument.

Calibration Performed By:

Zack Eastman



Wood Buffalo Environmental Association

SO₂ Calibration Summary

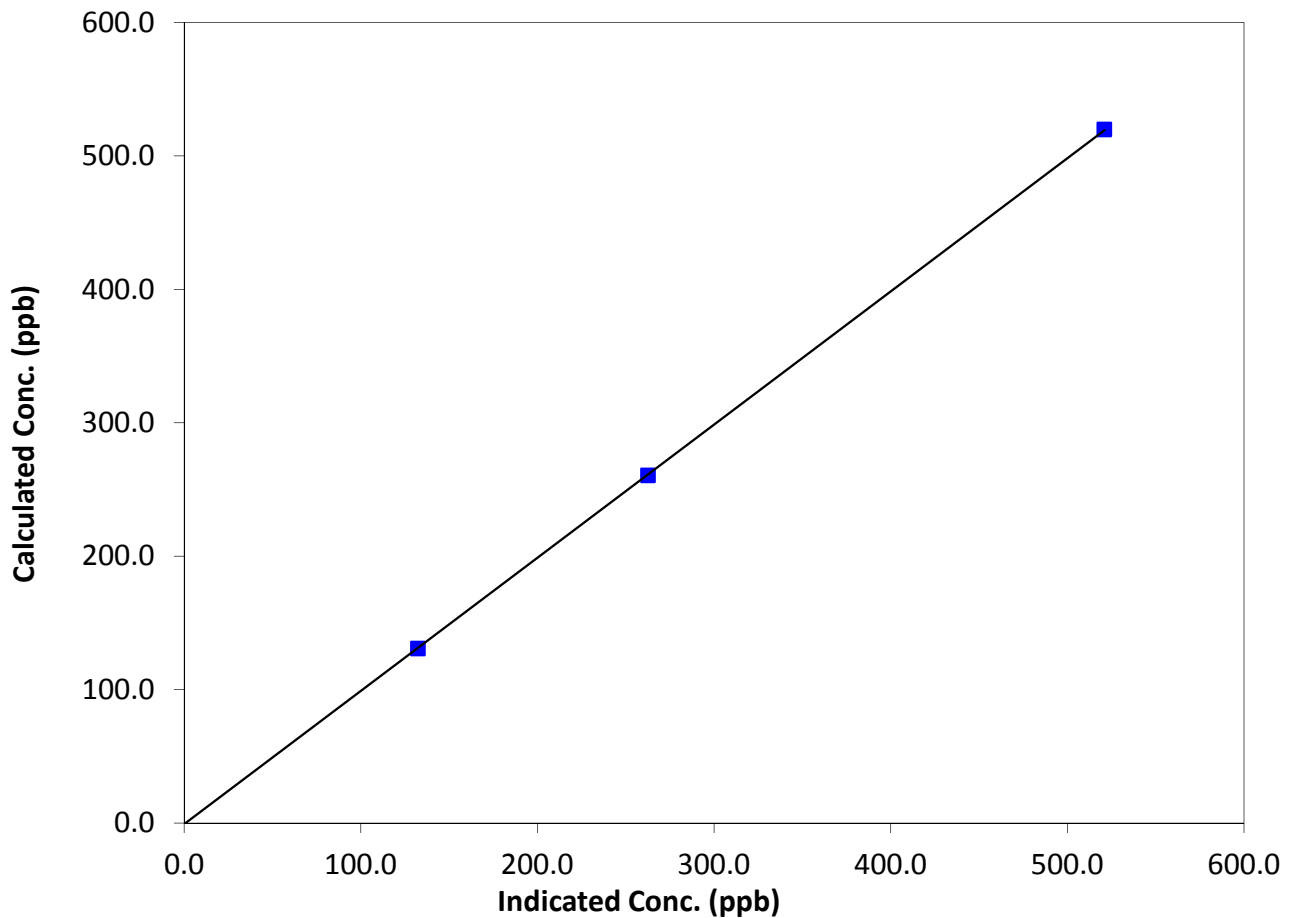
Station Information

Calibration Date	September 5, 2014	Previous Calibration	August 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	17:40	End Time (MST)	20:23
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

Calibration Data

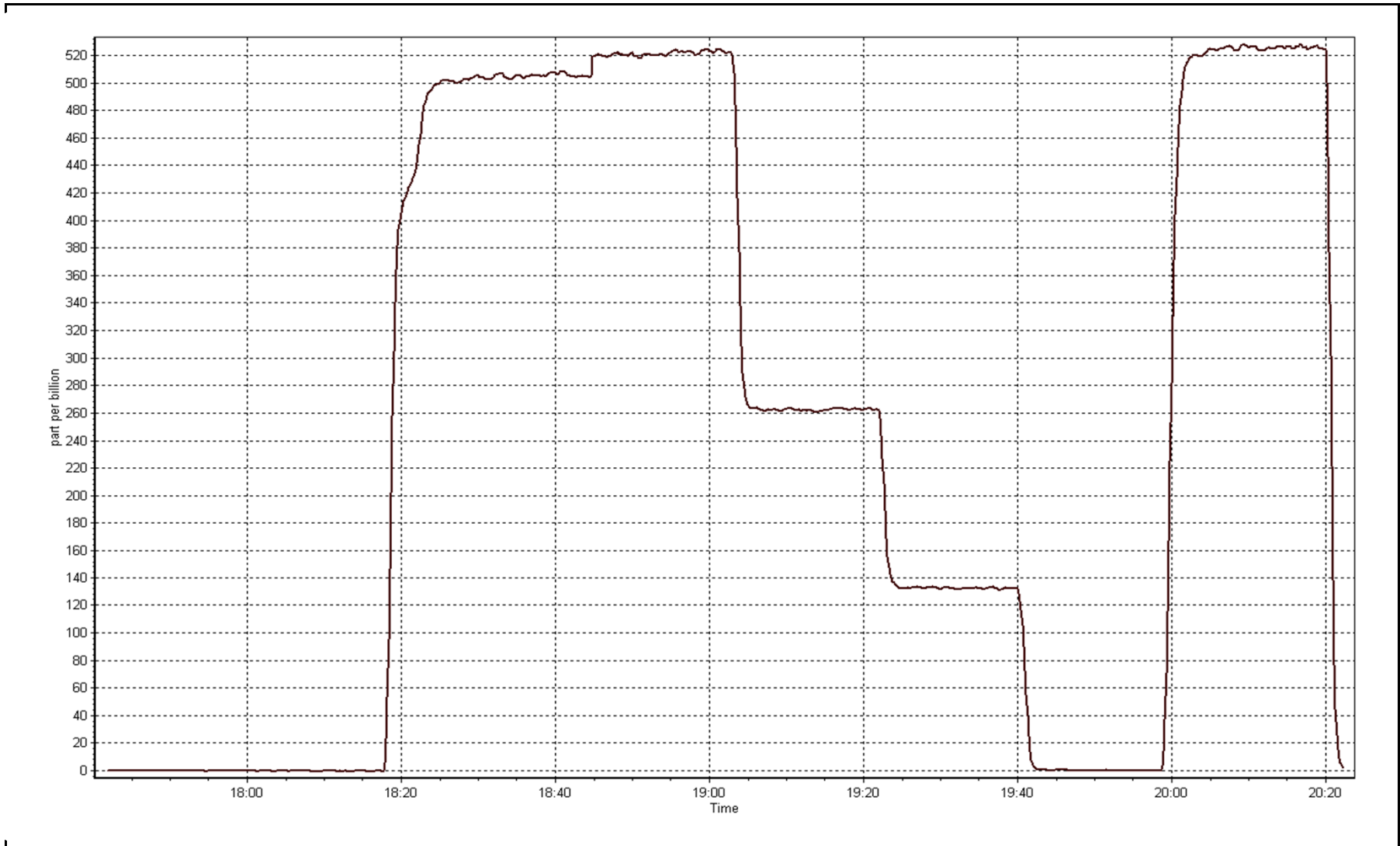
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999981
519.8	521.0	0.9977		
260.4	262.6	0.9915	Slope	0.997776
130.7	132.3	0.9876		
			Intercept	-0.675989

SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 5, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	September 6, 2014	Previous Calibration	August 8, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)		End Time (MST)	16:27
Barometric Pressure	727.5 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	1220
Cal Gas Concentration	4.84 ppm H2S	Cal Gas Expiry Date	June 10 2014
Gas Cert Reference	ALM009562	SO2 gas conc.	47.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	0-5000mV	DACS channel #	SE 2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-657	-657
Analyzer Range (input)	100	100	Lamp voltage	844	844
Calculated slope	1.010074	0.997551	Chamber temp.	45	45
Calculated intercept	-0.046107	-0.289569	Pressure	702.0	702.0
Analyzer Background	14	14.4	Flow	0.488	0.488
Analyzer Coefficient	1.208	1.259	Intensity	116	116
			Converter temp.	850	850

Analyzer make/model	TEI 43i	Analyzer serial #	1008841398
Converter make/model	JC Andelle model 26	Converter serial #	20101-07

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	NA
as found span	5000	72.3	70.0	65.9	1.062
SO2 scrubber check	5000	21.3	200.2	0.5	NA
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	72.3	70.0	70.3	0.996
second point	5000	36.3	35.1	35.8	0.982
third point	5000	18.7	18.1	18.6	0.973
calibrator zero	5000	0.0	0.0	0.0	NA
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	72.3	70.0	72.5	0.965
Average Correction Factor					0.984

Corrected As found	65.9	Previous response	69.3	% change	5.3%
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Notes:

5.3% change related to soiled inlet filter. New filter installed, span adjusted up 1ppb.

Calibration Performed By:

Zack Eastman



Wood Buffalo Environmental Association

TRS Calibration Summary

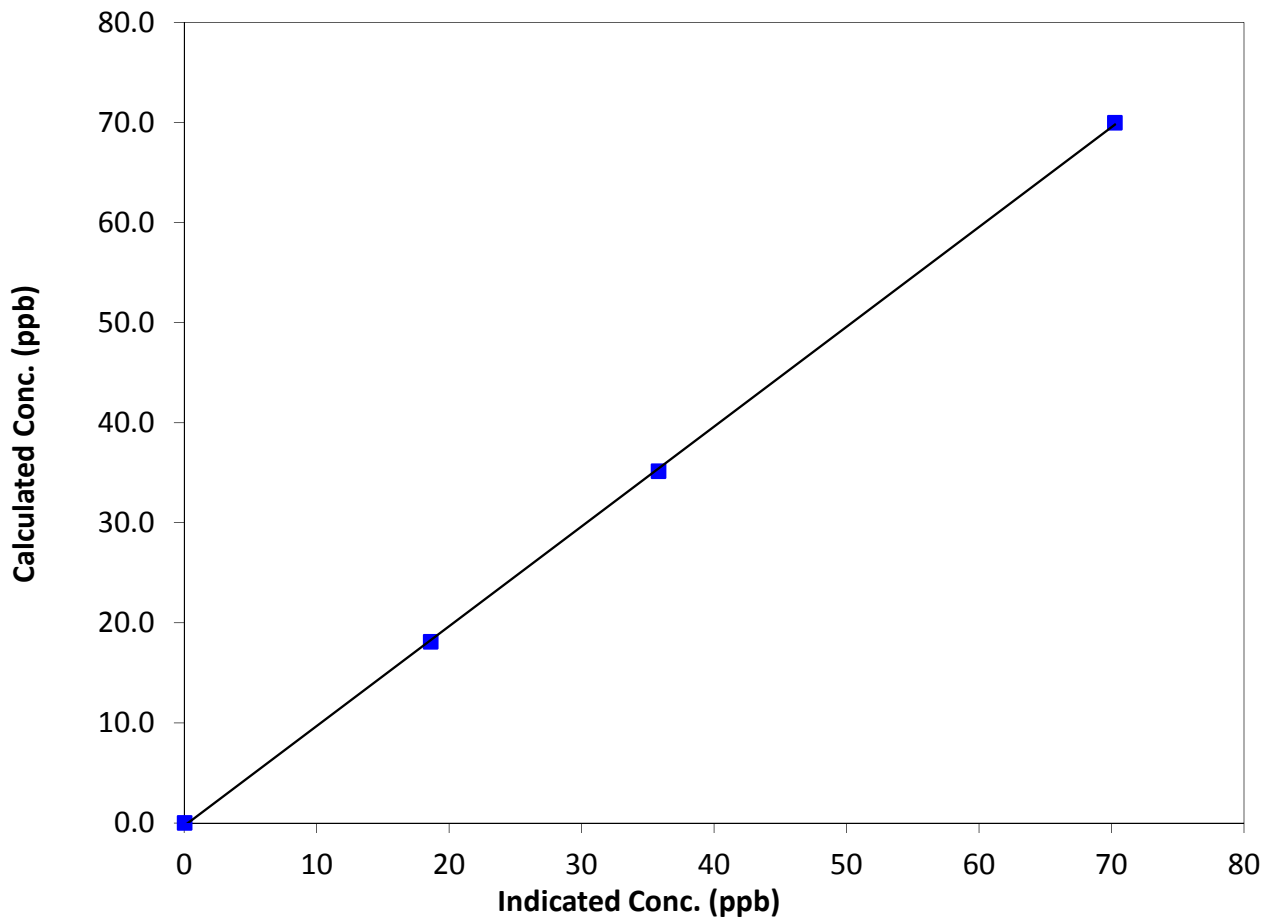
Station Information

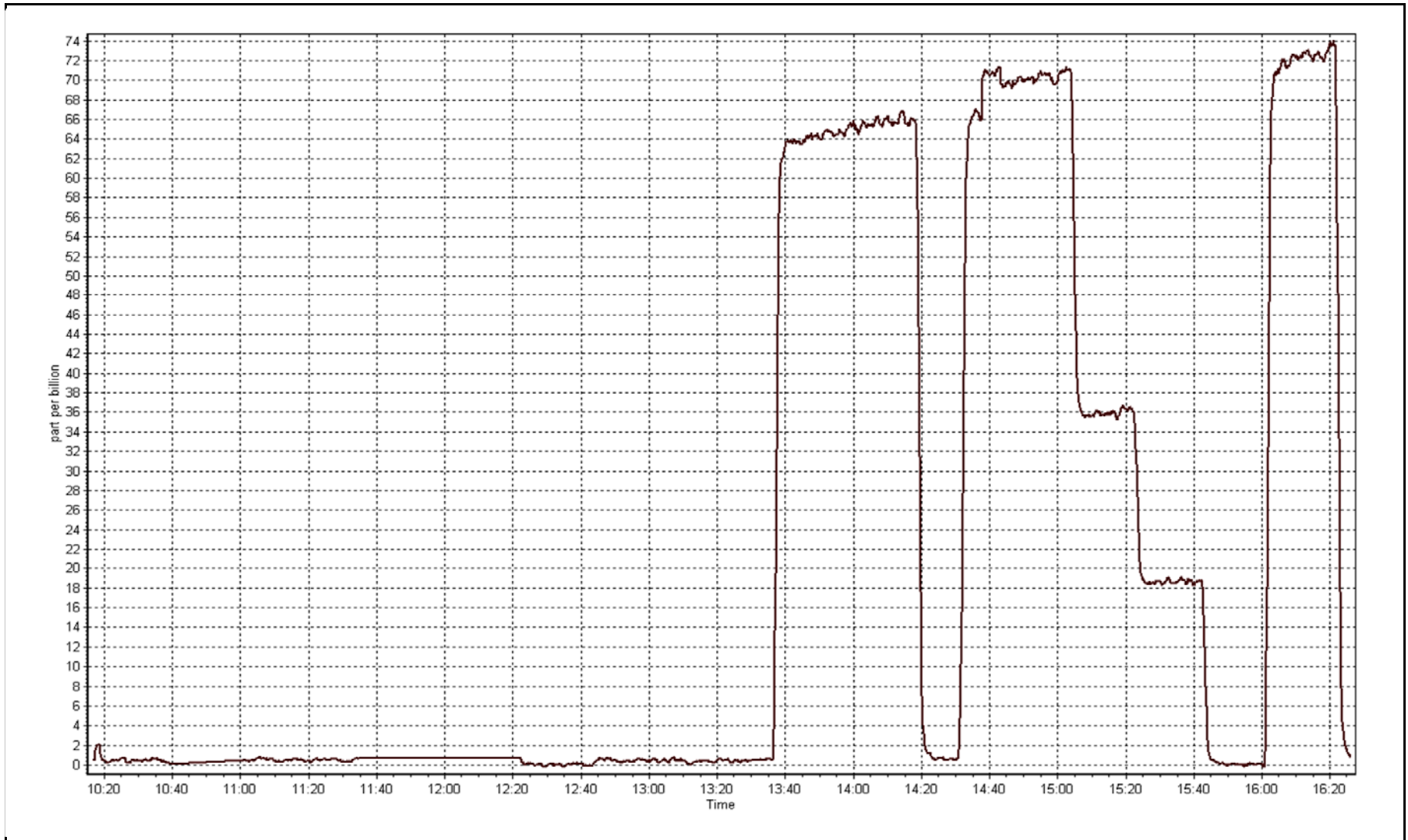
Calibration Date	September 6, 2014	Previous Calibration	August 8, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)		End Time (MST)	16:27
Analyzer make	TEI 43i	Analyzer serial #	1008841398

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999921
70.0	70.3	0.9961		
35.1	35.8	0.9815	Slope	0.997551
18.1	18.6	0.9732		
			Intercept	-0.289569

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Friday, September 05, 2014	Prev Calibration	Wednesday, August 06, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	17:40	End Time (MST)	20:23
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	API T700	Serial Number	1220
Gas Cert Reference	SA130110A	Cal Gas Expiry Date	Monday, December 12, 2016
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	36.7	36.7
THC Range (input)	50	50	Flame Temp	405.8	405.8
NMHC Range (ppm)	50	50	Carrier Pressure	34.5	34.5
NMHC Range (input)	50	50	Fuel Pressure	42.3	42.3
THC Calc slope	1.003126	1.008162	Air Pressure	32.4	32.4
THC Calc intercept	-0.010016	-0.034085	Detector Temp	175.0	175.0
NMHC Calc slope	1.007118	1.010697	Filter Temp	175.0	175.0
NMHC Calc intercept	-0.014039	-0.024067			

Analyzer make Thermo 55i Analyzer serial # 1331259521

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	N/A
as found span	5000	55.3	12.08	12.00	1.007
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	12.08	12.00	1.007
second point	5000	27.7	6.05	6.05	1.000
third point	5000	13.8	3.01	3.06	0.985
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	55.3	12.08	12.08	1.000
Average Correction Factor					0.997

Corrected As found 12.00 Previous response 12.05 % change 0.4%

Notes:

No adjustments made.

Calibration Performed By: Zack Eastman



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	55.3	6.42	6.36	1.009
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	6.42	6.36	1.009
second point	5000	27.7	3.21	3.22	0.998
third point	5000	13.8	1.60	1.63	0.983
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	55.3	6.42	6.41	1.001
Average Correction Factor					0.997

Corrected As found 6.36 Previous response 6.39 % change 0.4%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	55.3	5.66	5.64	1.004
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	5.66	5.64	1.004
second point	5000	27.7	2.84	2.83	1.002
third point	5000	13.8	1.41	1.43	0.988
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	55.3	5.66	5.67	0.999
Average Correction Factor					

Corrected As found 5.64 Previous response 5.67 % change 0.5%



Wood Buffalo Environmental Association

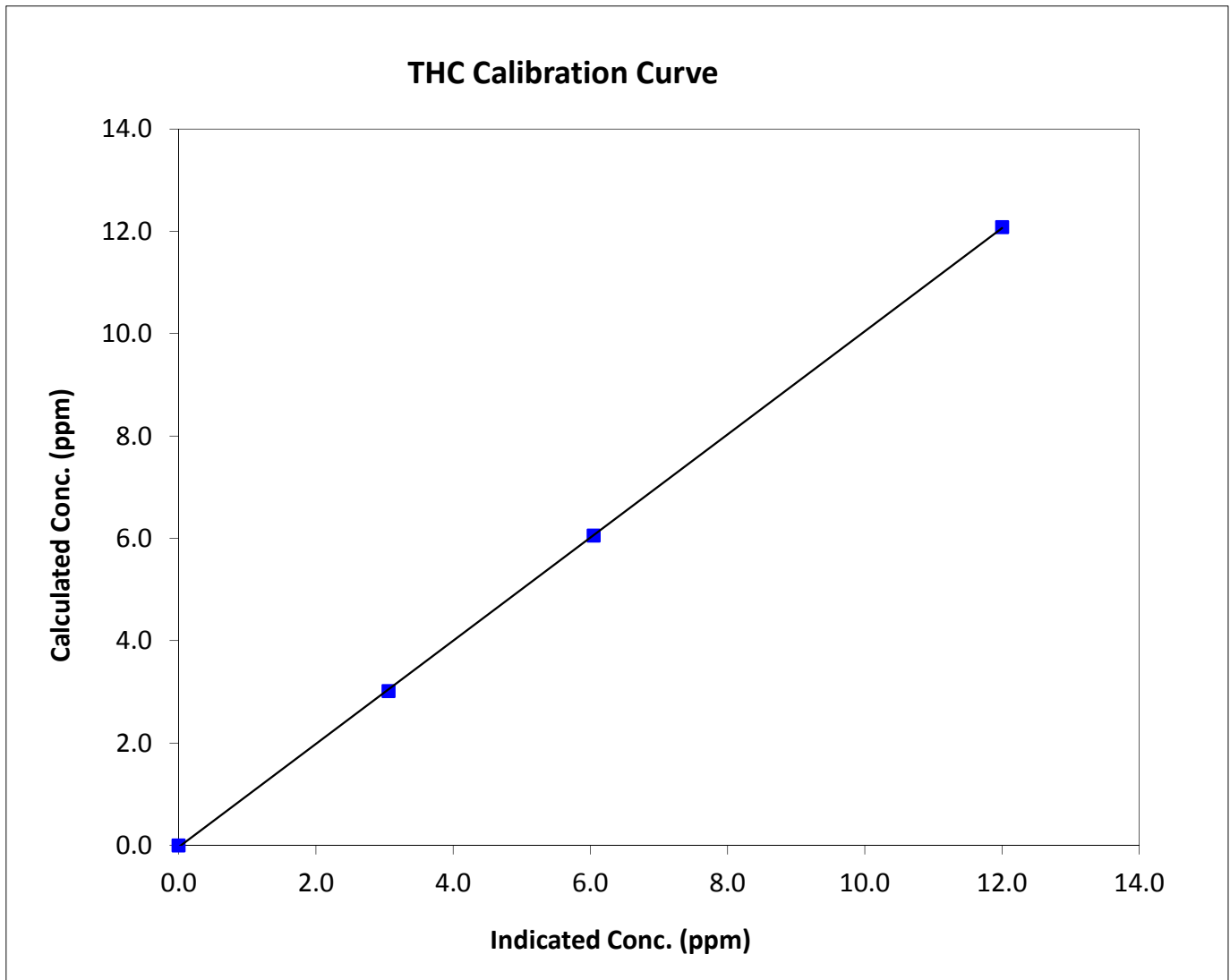
THC Calibration Summary

Station Information

Calibration Date	September 5, 2014	Previous Calibration	August 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	17:40	End Time (MST)	20:23
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999963
12.08	12.00	1.0067		
6.05	6.05	1.0002	Slope	1.008162
3.01	3.06	0.9852		
			Intercept	-0.034085





Wood Buffalo Environmental Association

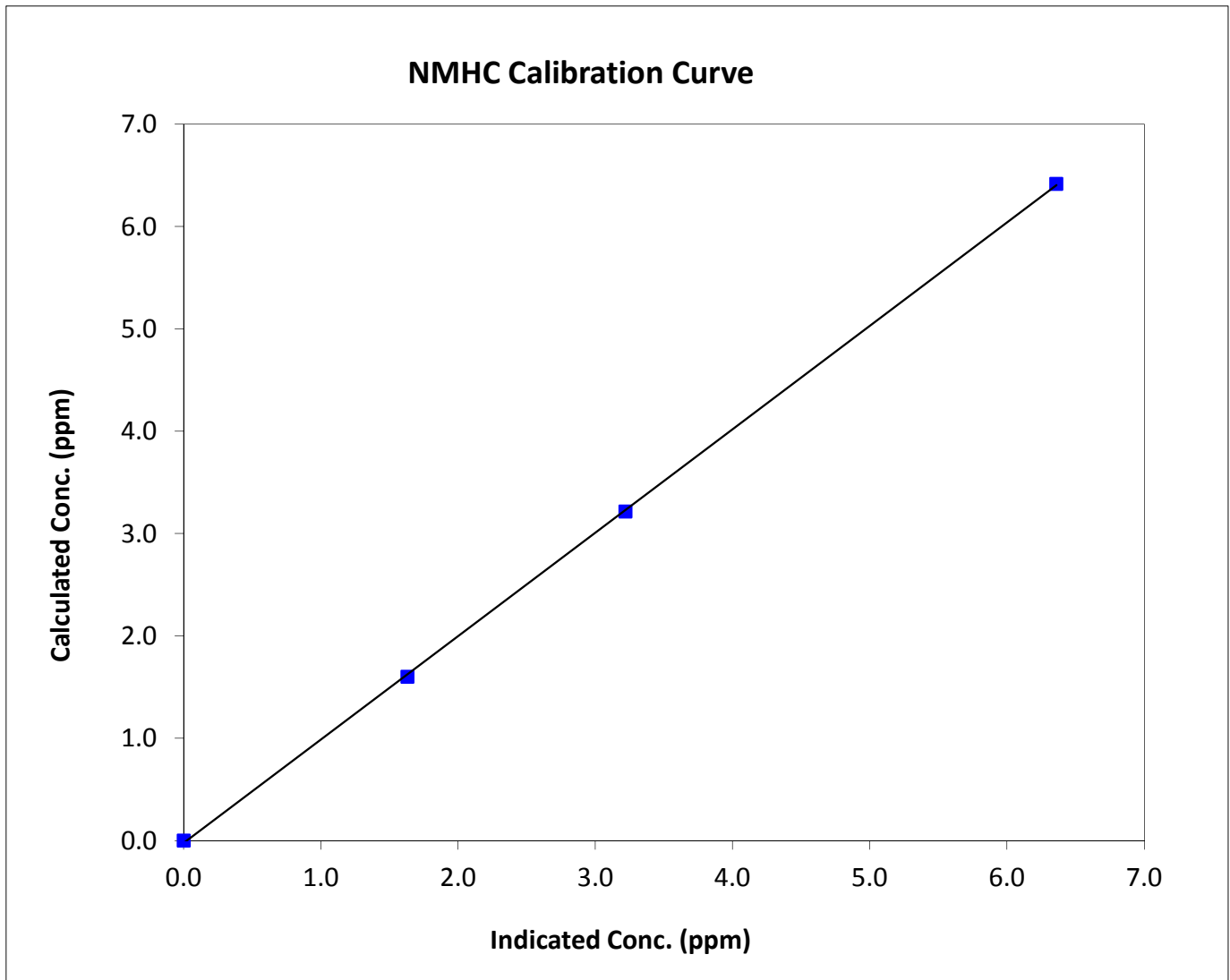
NMHC Calibration Summary

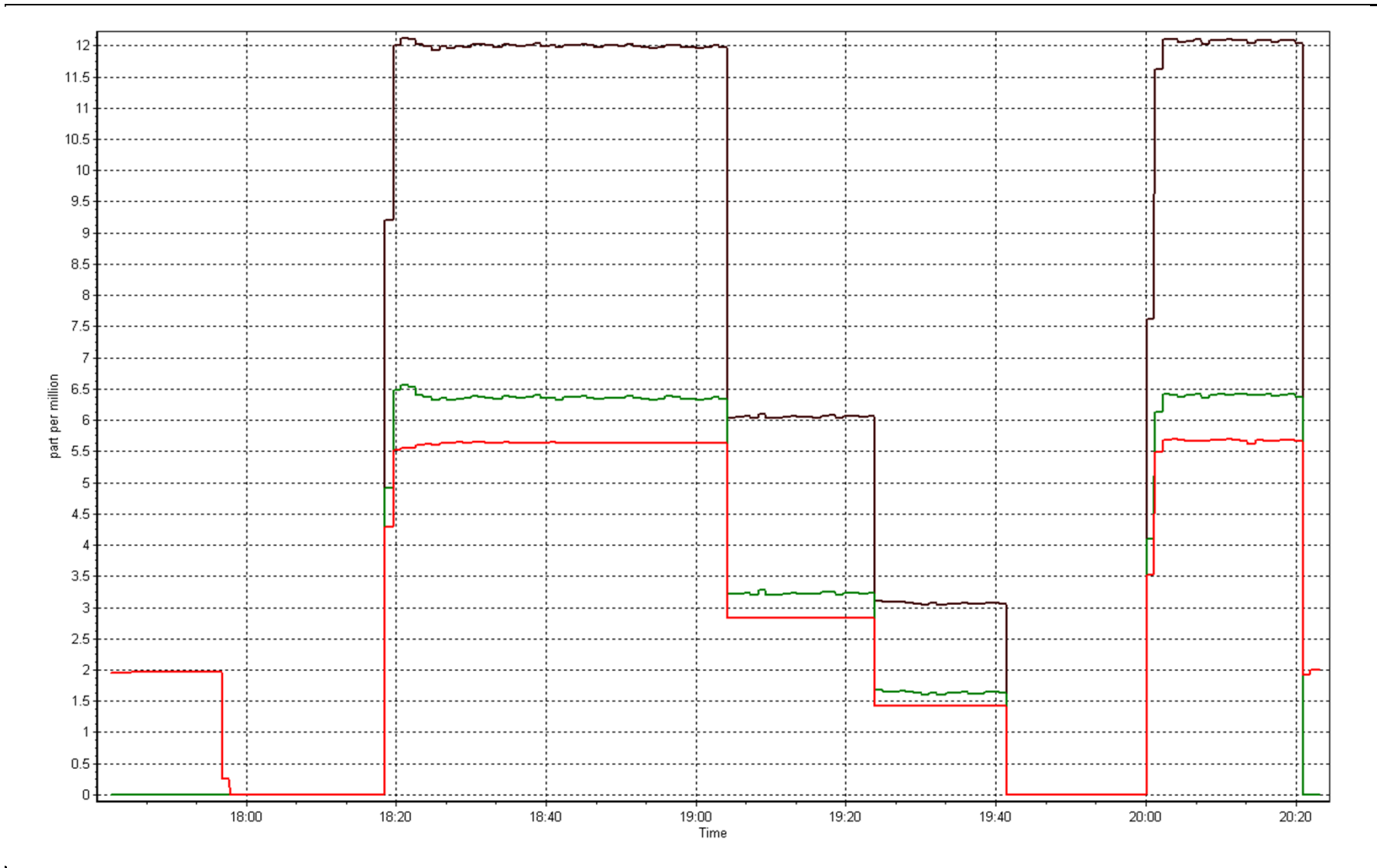
Station Information

Calibration Date	September 5, 2014	Previous Calibration	August 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	17:40	End Time (MST)	20:23
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999934
6.42	6.36	1.0091		
3.21	3.22	0.9983	Slope	1.010697
1.60	1.63	0.9825		
			Intercept	-0.024067







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	September 6, 2014	Previous Calibration	August 8, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	15:43	End Time (MST)	19:02
Barometric Pressure	727.5 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	API T700	Serial Number	1220
NO2 calibration used	Saturday, September 06, 2014	Transfer Standard	SA130110A
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	0-5000mV	DACS channel #	SE4

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	32.0	32.0
Analyzer Range (input)	500	500	Lamp temp.	53.0	53.0
Calculated slope	0.993482	0.997503	Pressure	681.0	681.0
Calculated intercept	1.650616	-0.812792	Flow cell A	0.610	0.610
Analyzer Background	0.0	0.0	Flow cell B	0.640	0.640
Analyzer Coefficient	0.956	0.962	Cell A Intensity	345	345
			Cell B Intensity	348	348

Analyzer make Thermo 49i Analyzer serial # 1300156234

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Gen Ref Vs. Drive (mv)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.000	0.0	-1.0	N/A
as found span	5000	1070 vs. 622	345.5	342.8	1.008
calibrator zero	5000	0.000	0.0	-1.0	N/A
high point	5000	1070 vs. 622	345.5	345.8	0.999
second point	5000	972 vs. 430	233.6	235.8	0.991
third point	5000	848 vs. 222	116.2	119.7	0.971
calibrator zero	5000	0.000	0.0	-1.0	N/A
as left zero	5000	0.000	0.0	-0.3	N/A
as left span	5000	1070 vs. 622	345.5	347.1	0.995
Average Correction Factor					0.987

Corrected As found 343.8 Previous response 346.1 % change 0.7%

Notes:

span adjusted slightly. No issues noted with instruments performance.

Calibration Performed By: Zack Eastman



Wood Buffalo Environmental Association

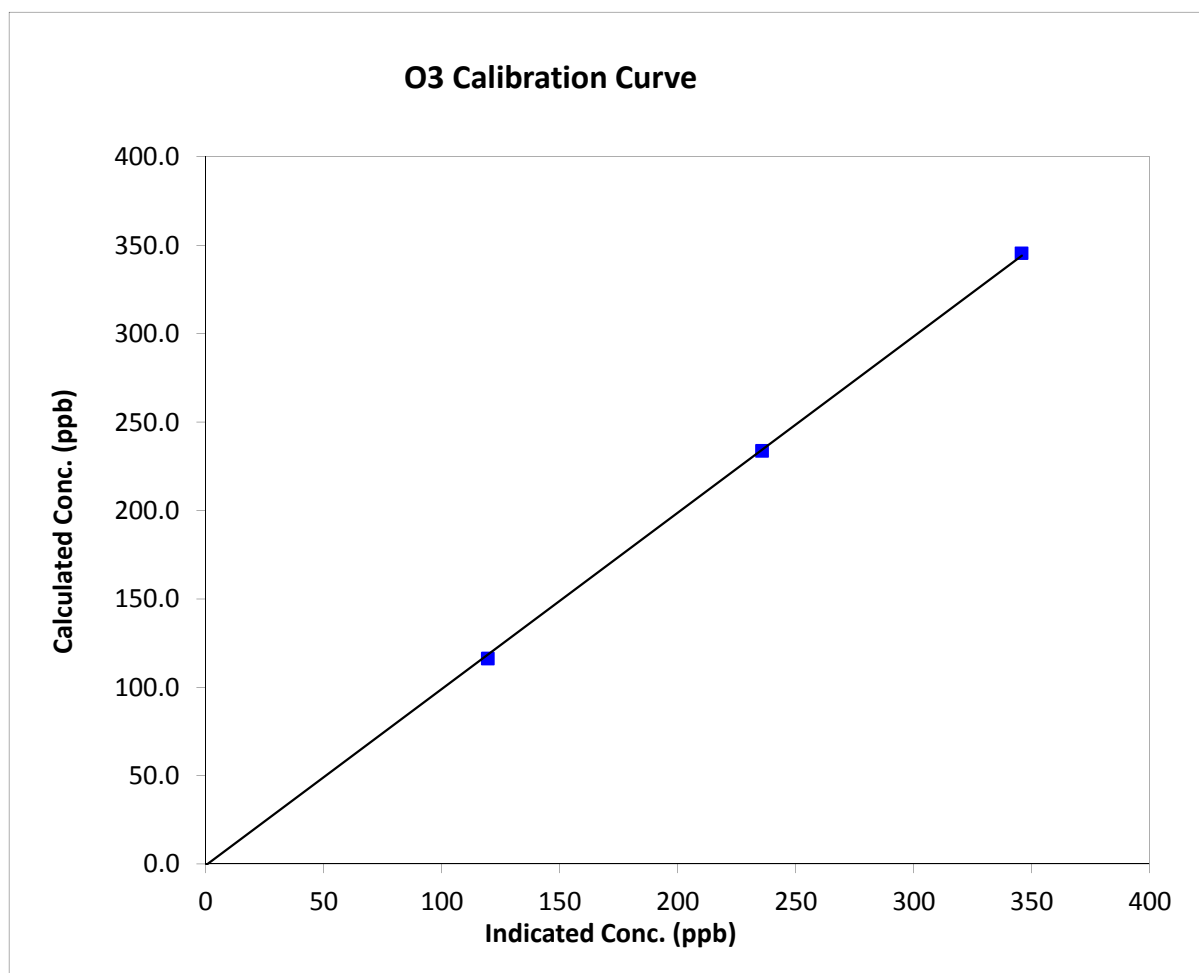
O₃ Calibration Summary

Station Information

Calibration Date	Saturday, September 06, 2014	Previous Calibration	August 8, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	15:43	End Time (MST)	19:02
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

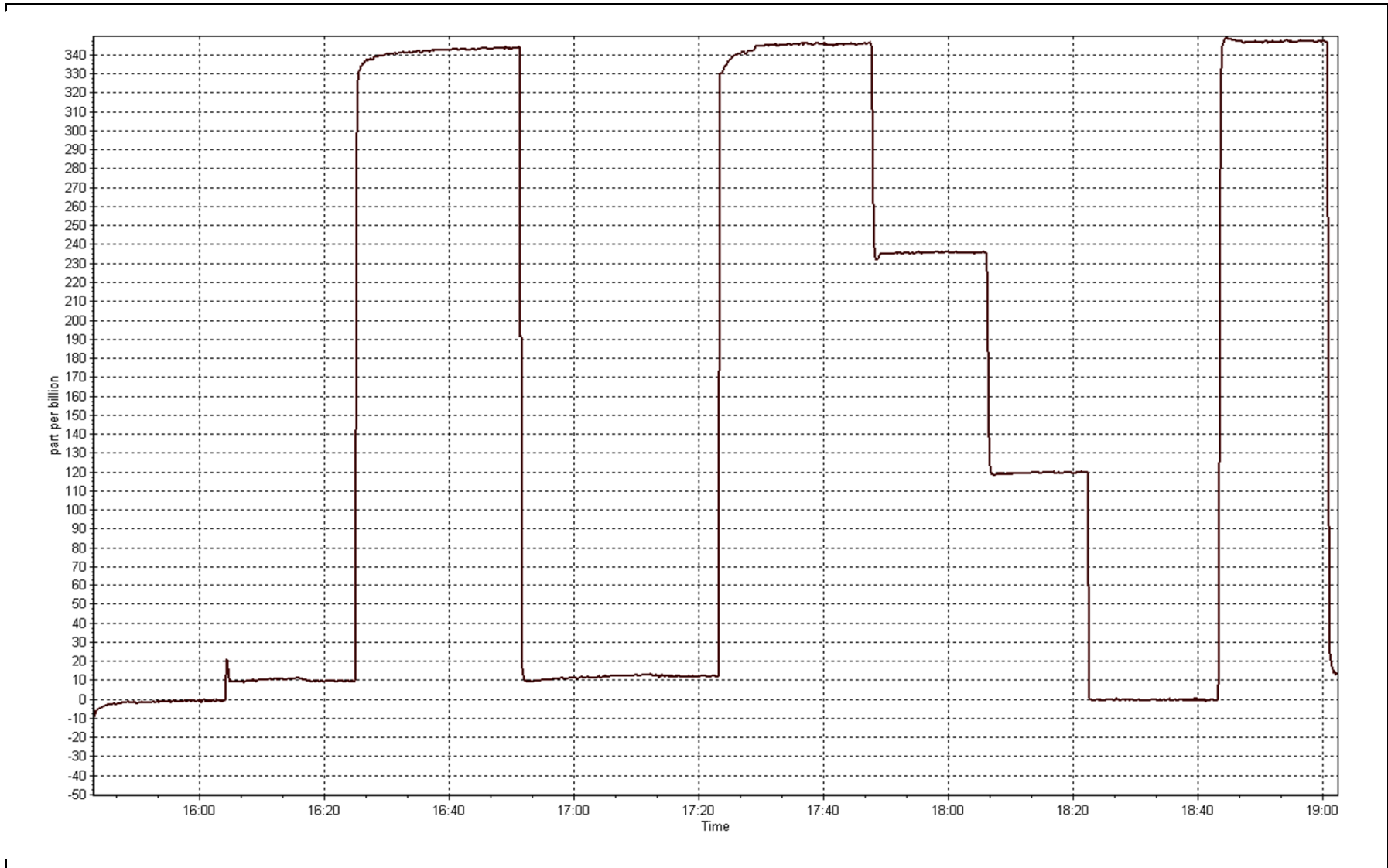
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.0	N/A	Correlation Coefficient	0.999827
345.5	345.8	0.9991		
233.6	235.8	0.9907	Slope	0.997503
116.2	119.7	0.9708		
			Intercept	-0.812792



O3 Calibration Plot

Date: September 6, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	September 6, 2014	Previous Calibration	August 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	API T700	Serial Number	1220
NO Cal Gas Conc	54.4 ppm	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	54.4 ppm	Cal Gas Serial #	SA130110A

DACs Information

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

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	1.002824	1.003477	1.001496
	Data Offset	0.457940	0.668100	1.095152
After	Data Slope	0.997337	0.998287	0.987332
	Data Offset	0.027288	-0.235368	-1.221607
IP address:		192.168.1.42		
Voltage Range		N/A		

Analyzer Information

Analyzer make/model Thermo Scientific 42i Analyzer serial # 1218153460

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.988		1.065	
NOx coefficient	0.993		0.997	
NO2 coefficient	1.000		1.000	
NO bkgnd	2.7		2.8	
NOx bkgnd	3.2		4.1	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	328	Deg C	328	Deg C
PMT voltage	-760	V	-760	V
PMT Temp	-2.8	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	180.6	mmHg	180.6	mmHg
R Cell Press Nox	180.9	mmHg	180.9	mmHg
NO sample flow	0.822	ccm	0.822	ccm
Nox sample Flow	0.826	ccm	0.826	ccm

Notes:

No span adjusted. Third point on GPT was initial out by 8.9% when first high NO ref point was used. Performed second High NO ref point to confirm NOx drift. Used this point and cal passed.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date: September 6, 2014 Station Number: AMS 6

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-1.1	0.0	-1.0	N/A	N/A
as found span	5000	55.3	601.7	601.7	0.0	587.8	587.4	0.4	1.0236	1.0243
calibrator zero	5000	0.0	0.0	0.0	0.0	-1.1	0.0	-1.0	N/A	N/A
high point	5000	55.3	601.7	601.7	0.0	601.8	602.4	-0.5	0.9998	0.9988
second point	5000	27.7	301.4	301.4	0.0	304.3	303.2	1.2	0.9904	0.9940
third point	5000	13.9	151.2	151.2	0.0	153.0	151.7	1.3	0.9884	0.9969
calibrator zero	5000	0.0	0.0	0.0	0.0	-1.1	0.0	-1.0	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.2	N/A	N/A
as left span	5000	55.3	601.7	260.7	341.0	616.8	262.2	354.6	0.9755	0.9943
Average Correction Factor									0.9929	0.9966

Corrected As found NO_x= 588.9 NO= 587.4 Percent Change NO_x= 1.8% NO= 2.0%
 Previous Response NO_x= 599.5 NO= 598.9

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 55.30 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			-1.0			N/A	
1st NO ₂ (300)	N/A	260.7	345.5	610.2	260.7	349.5	0.9753	1.0000	0.9886	101.2%
2nd NO ₂ (200)	N/A	372.6	233.6	611.3	372.6	238.7	0.9735	1.0000	0.9786	102.2%
3rd NO ₂ (100)	N/A	490.0	116.2	612.0	490.0	122.0	0.9724	1.0000	0.9525	105.0%
4th NO ₂ (0)	606.2	N/A	-1.0	605.2	606.2	-1.0	0.9833	1.0000	N/A	N/A
Average Correction Factor							0.9761	1.0000	0.9732	102.8%

Calibration Performed By: Zack Eastman



Wood Buffalo Environmental Association

NO_x Calibration Summary

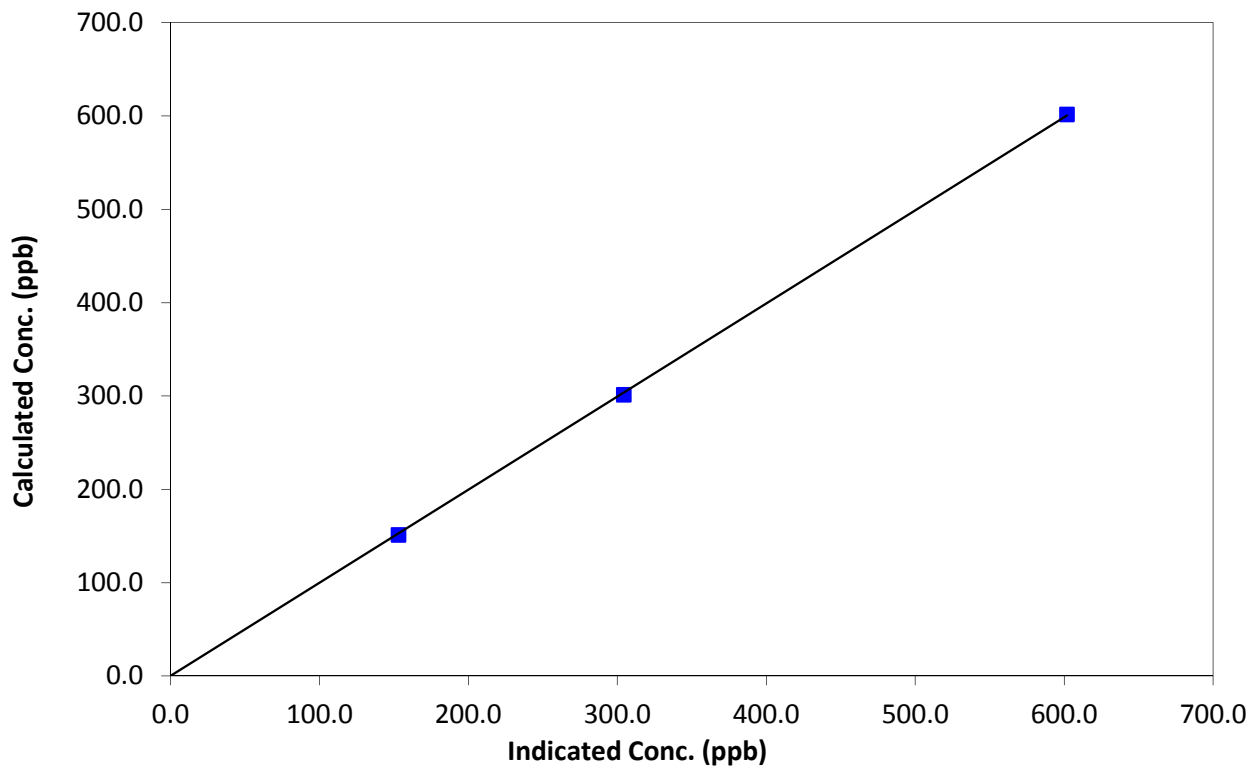
Station Information

Calibration Date	September 6, 2014	Previous Calibration	August 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	
Analyzer make	Thermo Scientific 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.1	N/A	Correlation Coefficient	0.999958
601.7	601.8	0.9998		
301.4	304.3	0.9904	Slope	0.997337
151.2	153.0	0.9884		
0.0	-1.1	0.0000	Intercept	0.027288

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

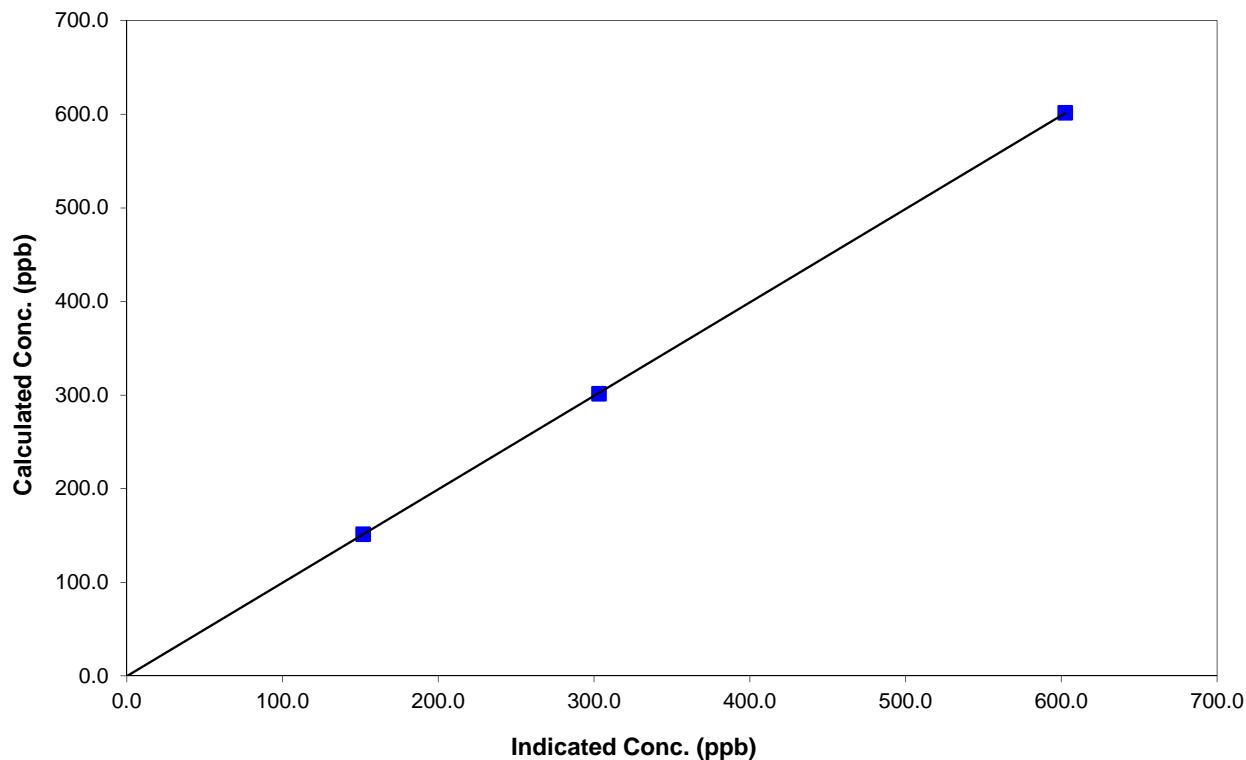
Station Information

Calibration Date	September 6, 2014	Previous Calibration	August 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	
Analyzer make	Thermo Scientific 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999994
601.7	602.4	0.9988		
301.4	303.2	0.9940	Slope	0.998287
151.2	151.7	0.9969		
0.0	0.0	0.0000	Intercept	-0.235368

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

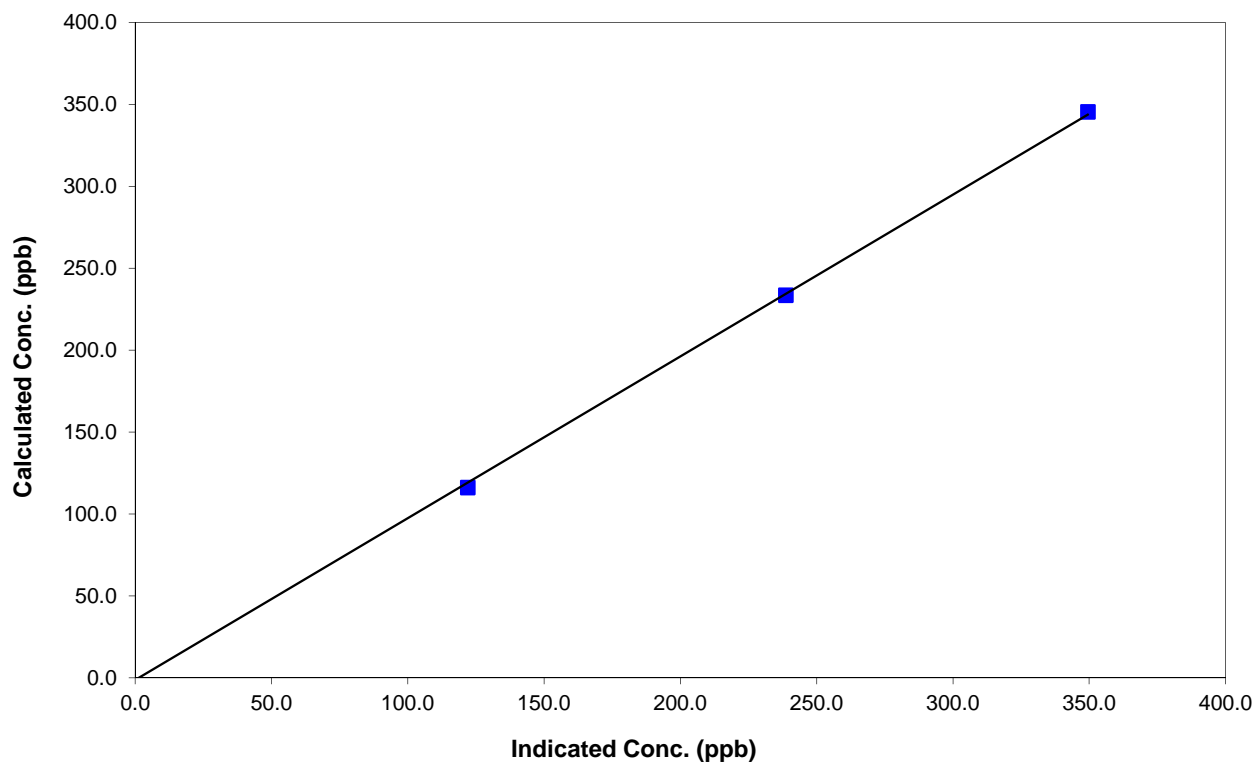
Station Information

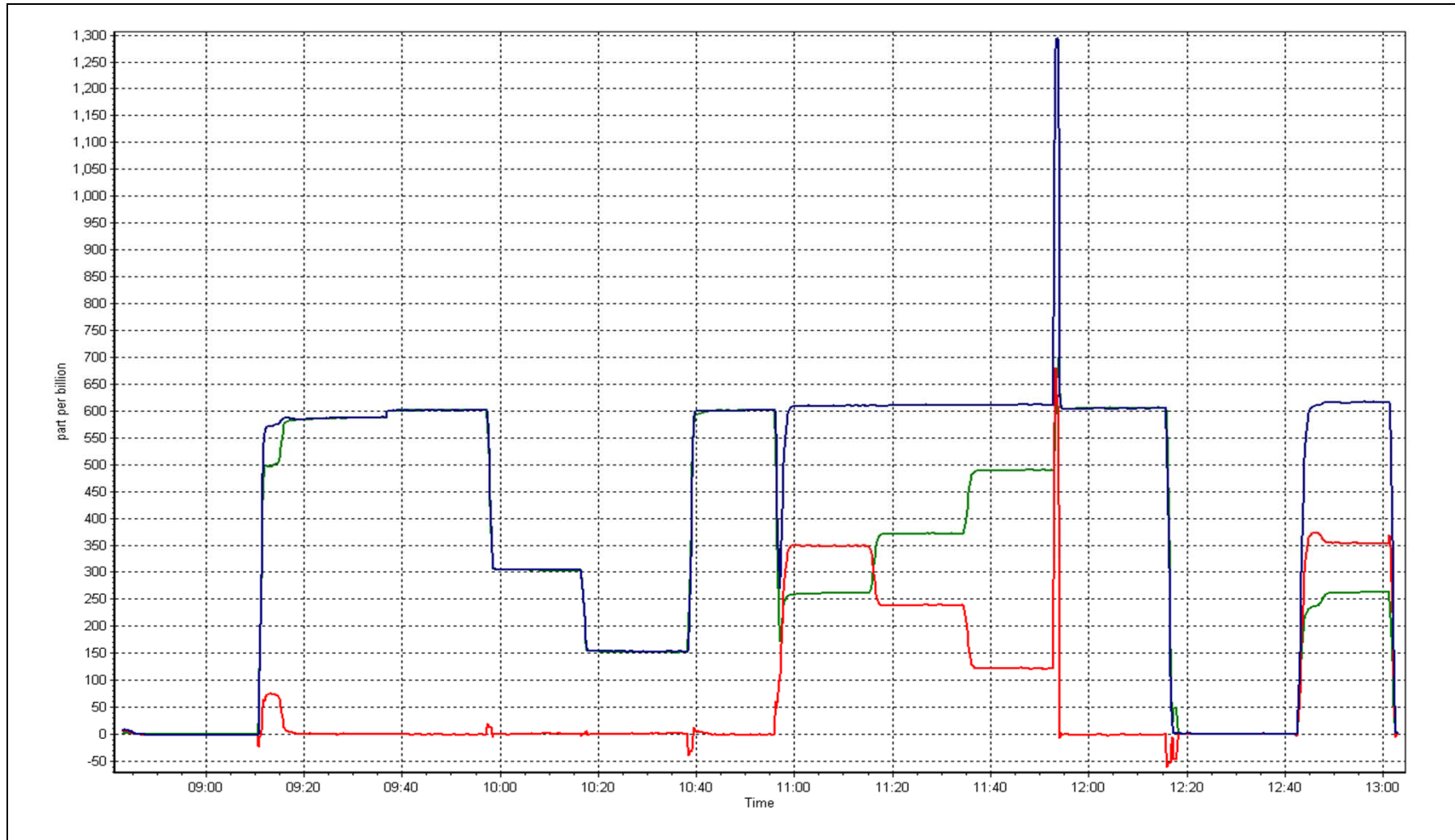
Calibration Date	September 6, 2014	Previous Calibration	August 6, 2014
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	
Analyzer make	Thermo Scientific 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.0	N/A	Correlation Coefficient	0.999735
345.5	349.5	0.9886		
233.6	238.7	0.9786	Slope	0.987332
116.2	122.0	0.9525		
			Intercept	-1.221607

NO₂ Calibration Curve







Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date	September 7, 2014	Previous Calibration	August 12, 2014
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	7:20	End Time (MST)	12:14
Barometric Pressure	n/a mmHg	Station Temperature	21.0 Deg C
Calibrator	API T700	Serial Number	1220
NH3 Cal Gas Conc	190 ppm	Cal Gas Expiry Date	April 3, 2012
NOx Cal Gas Conc	54.4 ppm	Cal Gas Serial #	LL86349

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2582
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Parameter		Nt	NOx	NH3
MV conversion	Analyzer Range (ppb)	2500	1000	2500
	Analyzer Range (mv)	2500	1000	2500
Before	Data Slope	1.003466	1.005957	1.003847
	Data Offset	0.988919	0.130392	0.972563
After	Data Slope	0.999665	0.990706	1.000778
	Data Offset	-2.242181	0.065064	-2.634638
Channel #		NA		
Voltage Range		0-5	0-5	0-5

Analyzer Information

Analyzer make/model	Thermo 17c	Analyzer serial #	622817829
		Converter serial #	617817369

Test Point	before		after	
Concentration range	0-2500	ppb	0-2500	ppb
Nt coefficient	0.887	ppb	0.889	ppb
NOX coefficient	0.905	ppb	0.905	ppb
NH3 coefficient	0.910		0.933	
NO coefficient	0.899		0.895	
NO2 coefficient	1.000	ppb	1.000	ppb
No bkgnd	5.9		5.8	
Nt bkgnd	8.8		5.9	
NOX bkgnd	5.2		5.1	
NH3 conv temp	771	DegC	771	Deg C
Chamber Temp	49.7	Deg C	49.7	Deg C
Moly Temp	322.0	Deg C	322.0	Deg C
PMT Temp	-8.7	Deg C	-8.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	120.0	mmHg	120.0	mmHg
PMT Voltage	-838.0	v	-838.0	v
Sample Flow 1 NO	502.0	ccm	502.0	ccm
Sample Flow 2 Nox	454.0	ccm	454.0	ccm
Sample Flow 3 Nt	507.0	ccm	507.0	ccm

Notes:

Nt zero adjusted. NO, Nox and NT span adjusted slightly on NO high point.



Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date:

September 7, 2014

Station Number:

AMS 6

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NO _x conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-2.7	-0.4	-2.3	NA	NA
as found NO	5000	55.3	601.7	601.7	NA	598.9	604.2	-5.3	1.005	NA
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2	NA	NA
high NO point	5000	55.3	601.7	601.7	NA	601.2	602.1	-0.9	1.001	NA
NO/O ₃ point	5000	55.3	601.7	601.7	NA	612.3	612.3	0.0	0.983	NA
as found NH ₃	5000	52.8	2006.4	NA	2006.4	2051.0	1.0	2050.0	0.978	0.979
first NH ₃	5000	52.8	2006.4	NA	2006.4	2008.0	2.0	2006.0	0.999	1.000
second NH ₃	5000	26.3	999.4	NA	999.4	1003.5	0.5	1003.0	0.996	0.996
third NH ₃	5000	13.3	505.4	NA	505.4	510.0	0.0	510.0	0.991	0.991
as left zero						0.0				
as left span						0.0				
Average Correction Factor									0.9917	0.9959

Corrected As found

Nt = 601.6 ppb

NH₃ = 2052.3 ppb

Previous response

Nt = 598.6 ppb

NH₃ = 1997.7 ppb

Nt percent change -0.5%

NH₃ percent change -2.7%

Converter efficiency 93.3%

Calibration Performed By:

Zack Eastman



Wood Buffalo Environmental Association

NH3 Calibration Summary

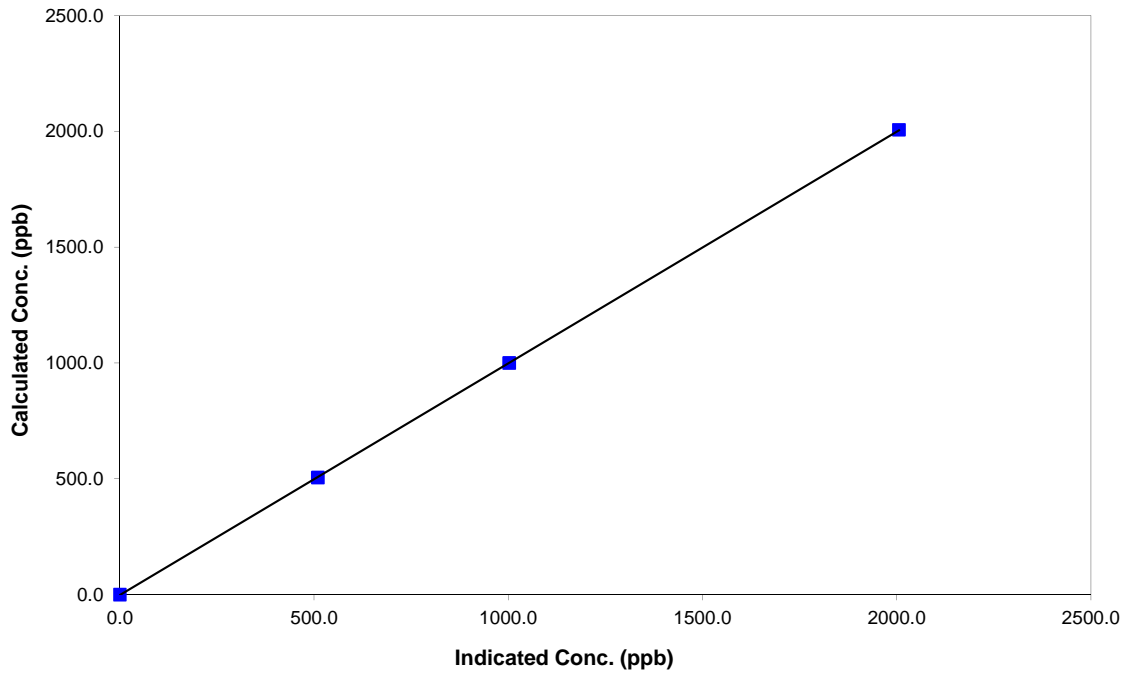
Station Information

Calibration Date	September 7, 2014	Previous Calibration	August 12, 2014
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	7:20	End Time (MST)	12:14
Analyzer make	Thermo 17c	Analyzer serial #	622817829

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999992
2006.4	2006.0	1.0002		
999.4	1003.0	0.9964	Slope	1.000778
505.4	510.0	0.9910		
			Intercept	-2.634638

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

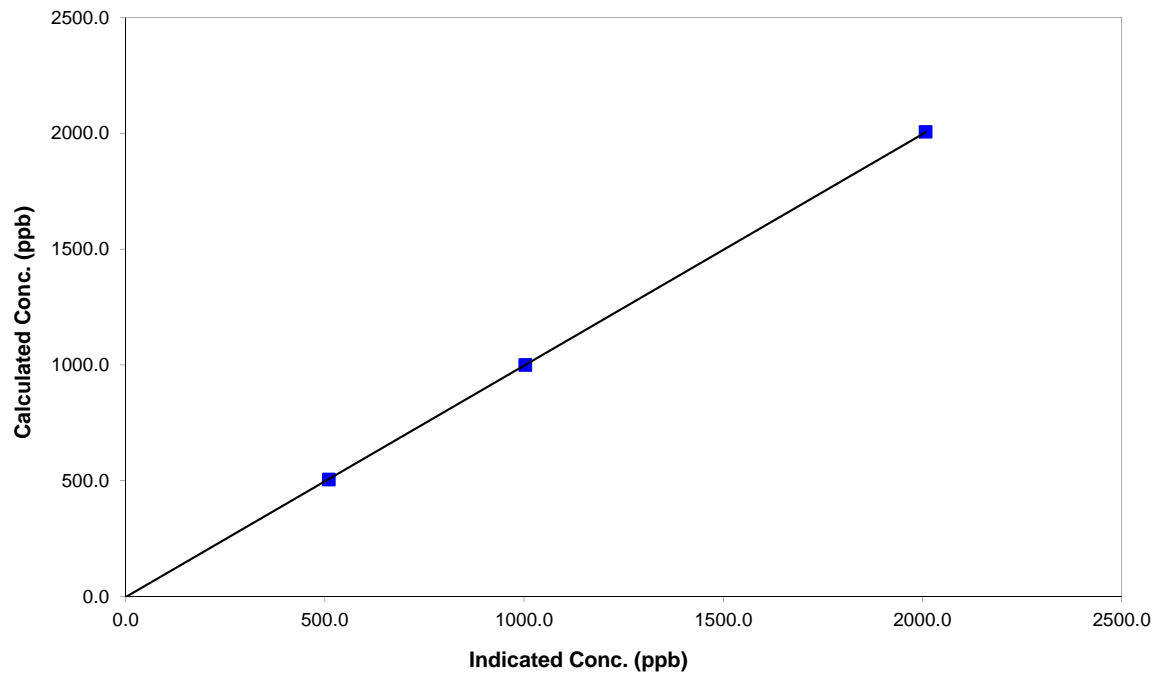
Station Information

Calibration Date	September 7, 2014	Previous Calibration	August 12, 2014
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	7:20	End Time (MST)	12:14
Analyzer make	Thermo 17c	Analyzer serial #	622817829

Nt (NH₃) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999993
2006.4	2008.0	0.9992		
999.4	1003.5	0.9959	Slope	0.999665
505.4	510.0	0.9910		
	0.0		Intercept	-2.242181

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

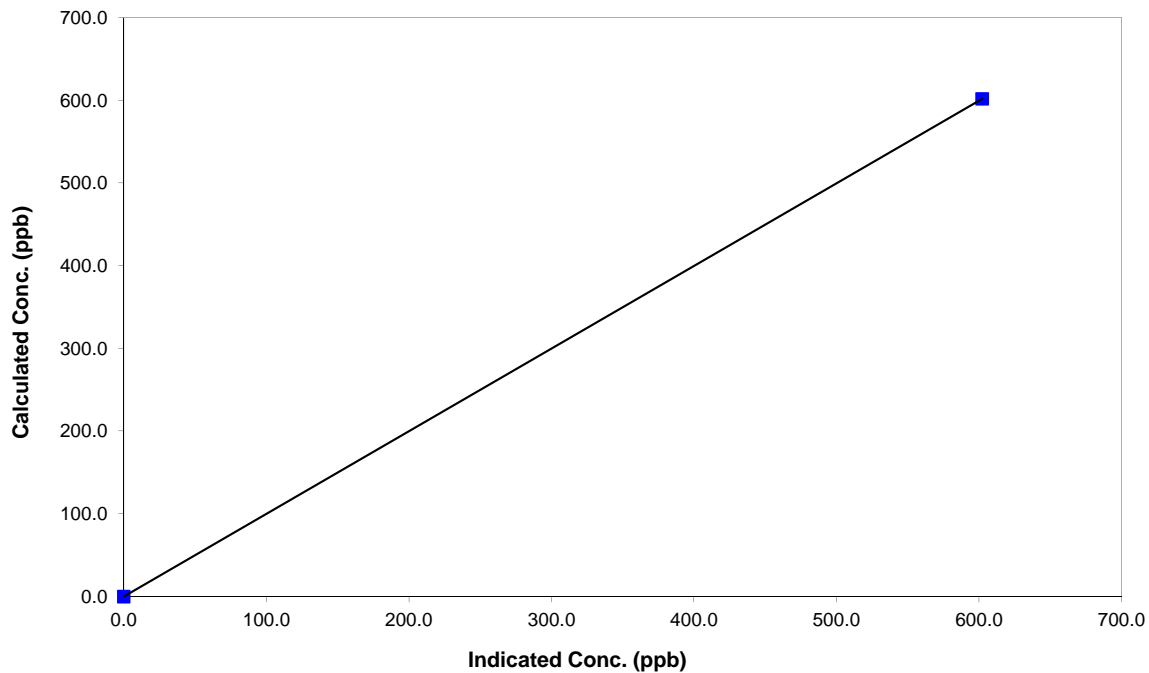
Station Information

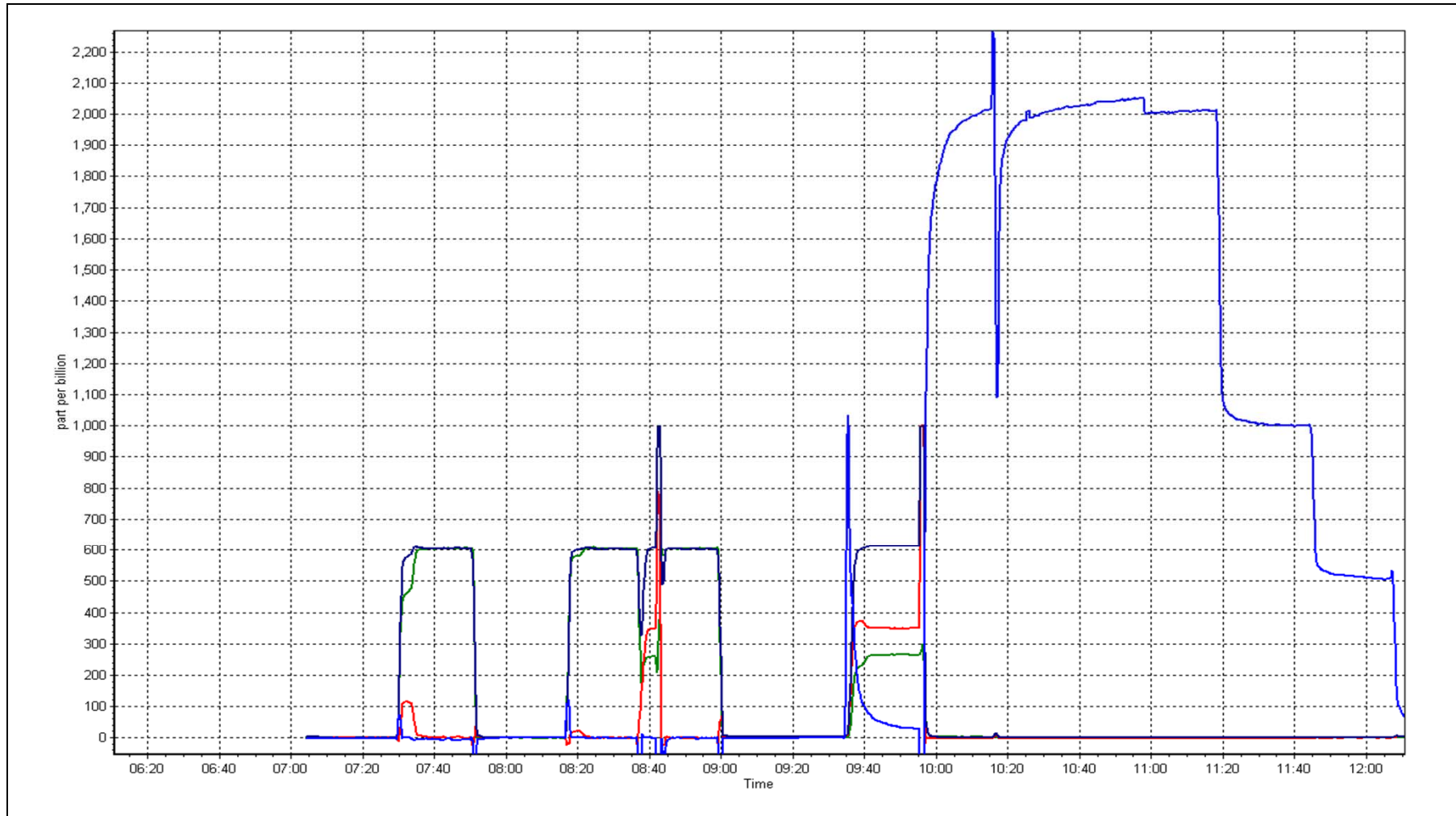
Calibration Date	September 7, 2014	Previous Calibration	August 12, 2014
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	7:20	End Time (MST)	12:14
Analyzer make	Thermo 17c	Analyzer serial #	622817829

NO_x Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999788
601.7	602.1	0.9993		
601.7	612.3	0.9826		
			Slope	0.990706
			Intercept	0.065064

NO_x Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 7
ATHABASCA VALLEY
SEPTEMBER 2014

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

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

October 30, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
 SEPTEMBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	682	38	38	100.00	13	0	2	0
TRS (ppb) Average	685	35	35	100.00	2	0	1	0
THC (ppm) Average	683	37	37	100.00	2.3	-	2.1	-
NMHC (ppm) Average	683	37	37	100.00	0.323	-	0.047	-
CH4(ppm) Average	683	37	37	100.00	2.3	-	2	-
O3 (ppb) Average	683	36	37	99.86	40	0	22	-
NO2 (ppb) Average	681	39	39	100.00	33	0	12	-
NO (ppb) Average	681	39	39	100.00	69	-	15	-
NOX (ppb) Average	681	39	39	100.00	90	-	26	-
PM2.5 (ug/m3) Average	718	0	2	99.72	42.8	0	12.4	0
CO(ppm) Average	683	37	37	100.00	0.4	0	0.2	-
Temperature 2 m (C) Average	720	0	0	100.00	30.3	-	18.0	-
Barometric Pressure (inHg) Average	720	0	0	100.00	29.7	-	-	-
Relative Humidity (%) Average	720	0	0	100.00	100	-	-	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	39	-	-	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
 SEPTEMBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	682	0.8	1	-	0	0	0	0	1	1	13
TRS (ppb) Average	685	0.3	0	-	0	0	0	0	0	1	2
THC (ppm) Average	683	1.96	0.1	-	1.8	1.9	1.9	1.9	2	2.1	2.3
NMHC (ppm) Average	683	0.012	0.025	-	0	0	0	0	0	0	0.323
CH4(ppm) Average	683	1.95	0.1	-	1.8	1.9	1.9	1.9	2	2	2.3
O3 (ppb) Average	683	12.9	9	-	0	2	5	12	20	26	40
NO2 (ppb) Average	681	6.8	5	-	0	2	3	6	9	14	33
NO (ppb) Average	681	5.7	8	-	0	0	1	2	7	16	69
NOX (ppb) Average	681	12.5	12	-	0	2	4	9	17	27	90
PM2.5 (ug/m3) Average	718	7.05	4.9	-	0.4	2.1	3.6	6	8.9	12.9	42.8
CO(ppm) Average	683	0.1	0.1	-	0	0	0	0.1	0.1	0.2	0.4
Temperature 2 m (C) Average	720	10.31	5.5	-	-2.2	3.7	6.4	9.8	13.7	18.1	30.3
Barometric Pressure (inHg) Average	720	28.98	0.3	-	28.5	28.6	28.8	29	29.1	29.4	29.7
Relative Humidity (%) Average	720	75	18	-	28	46	65	80	89	93	100
Wind Speed 10 m (km/h) Average	720	7.6	6	-	0	2	3	6	11	16	39
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
SEPTEMBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
O3	03 Sep 2014 13:00	03 Sep 2014 13:00	1	Maintenance - sample manifold cleaned
PM2.5	05 Sep 2014 12:00	05 Sep 2014 12:00	1	Maintenance - Flow and zero check, sample head cleaning
PM2.5	24 Sep 2014 20:00	24 Sep 2014 20:00	1	Maintenance - Station operator on site

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 13 ppb on Sep 30 17:00	Maximum Daily Average: 2.5 ppb on Sep 12		Hours of Data:	682
Minimum Value: 0 ppb on Sep 4 21:00	Minimum Daily Average: 0.3 ppb on Sep 7		Hours of Missing Data:	38
Maximum Diurnal Average: 1.7 ppb at hour 13	Minimum Diurnal Average: 0.4 ppb at hour 6		Hours of Calibration:	38
Monthly Average: 0.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 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	0	0	0	Z	1	1	1	1	0	1	3	5	5	1	1	1	1	1	1	1	1	0	0	0	1.0	5
2-Sep	0	0	0	Z	0	0	0	0	0	1	1	1	1	2	4	8	6	3	2	3	3	2	1	1	1.8	8
3-Sep	1	1	0	Z	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	1
4-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	1	0.3	2
5-Sep	1	0	0	Z	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0.5	1
6-Sep	3	4	2	Z	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	4
7-Sep	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.3	1
8-Sep	0	1	2	Z	0	0	1	1	0	0	0	0	1	2	4	5	2	1	0	0	0	0	0	0	0.9	5
9-Sep	0	0	0	Z	0	0	0	0	1	0	1	1	1	1	1	2	3	2	4	3	1	1	1	1	1.1	4
10-Sep	1	1	1	Z	1	1	1	1	1	1	2	5	9	3	1	1	1	1	1	1	1	1	0	0	1.4	9
11-Sep	0	0	0	Z	0	0	0	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0.8	2
12-Sep	0	0	0	Z	0	0	1	1	1	1	2	5	7	3	4	5	2	1	9	9	4	1	1	1	2.5	9
13-Sep	1	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.3	1
14-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
15-Sep	0	0	0	Z	0	0	0	0	0	0	0	3	6	1	1	1	1	3	4	2	1	1	1	0	1.2	6
16-Sep	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
17-Sep	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	1
18-Sep	0	0	0	Z	0	0	0	0	1	1	1	1	8	7	5	7	7	7	3	1	1	0	0	0	2.4	8
19-Sep	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
20-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
21-Sep	0	0	0	Z	0	0	0	0	C	C	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.4	1
22-Sep	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0.5	1
23-Sep	0	0	0	Z	0	0	0	0	0	3	11	6	1	1	0	0	1	1	1	1	1	1	1	1	1.3	11
24-Sep	1	0	1	Z	1	0	0	0	1	1	1	1	1	1	0	1	1	0	0	1	0	1	1	1	0.6	1
25-Sep	1	1	1	Z	1	1	0	1	0	0	0	0	1	1	1	1	3	4	1	1	0	0	0	0	0.8	4
26-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	0.4	0
27-Sep	0	0	0	Z	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	0	0.7	1
28-Sep	0	0	0	Z	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0.5	1
29-Sep	1	1	1	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.7	1
30-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	3	8	13	3	2	2	1	0	0	0	1.7	13

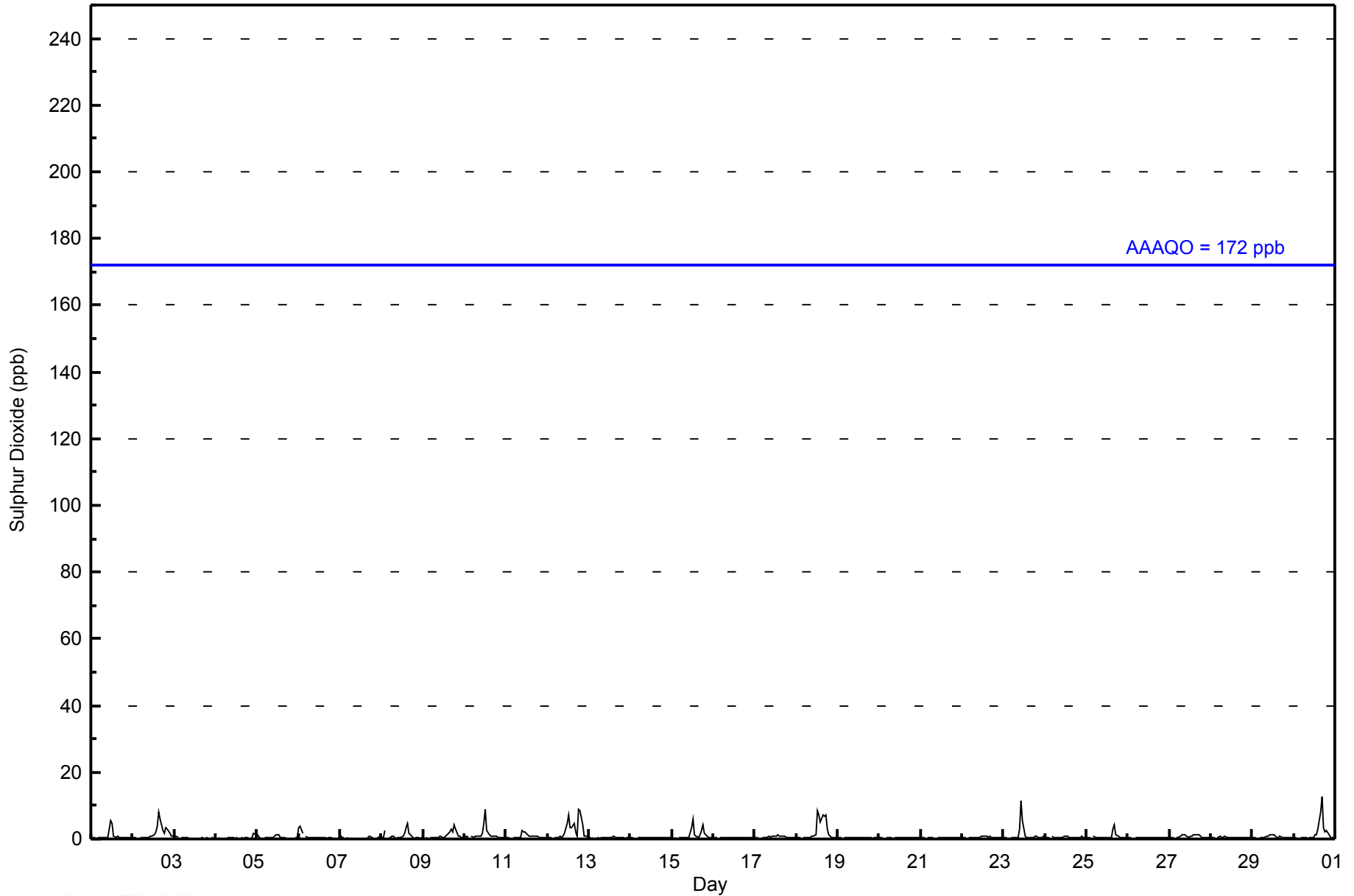
0.5	0.5	0.5	--	0.4	0.4	0.4	0.5	0.5	0.6	1.1	1.3	1.7	1.1	1.1	1.6	1.7	1.1	1.2	1.0	0.7	0.5	0.5	0.5	Diurnal Average	
3	4	2	--	1	1	1	1	1	3	11	6	9	7	5	8	13	7	9	9	4	2	2	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	680	99.71	99.71
11 - 20	2	0.29	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - September 2014

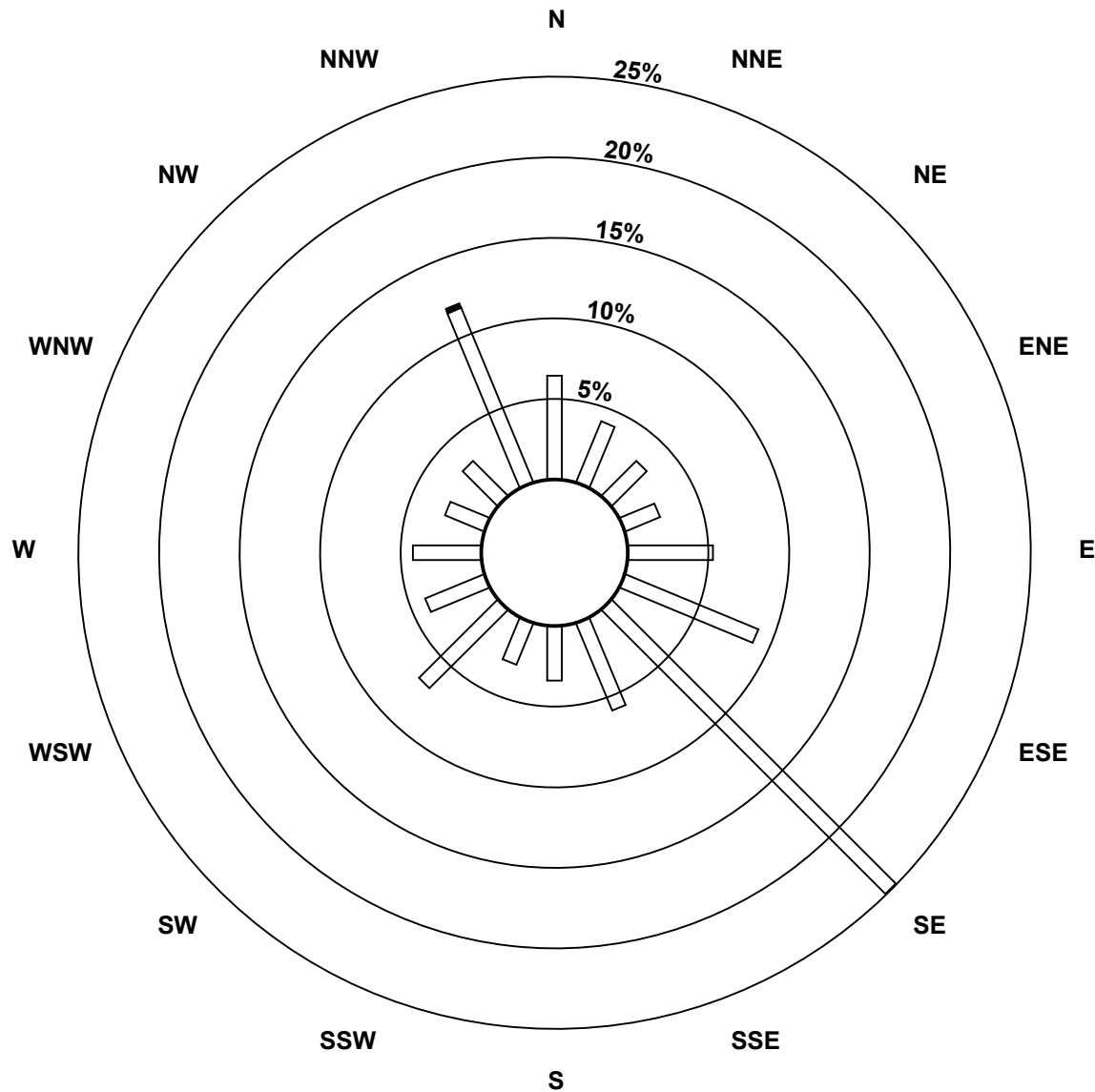
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	44	28	21	16	36	61	170	40	23	19	47	27	29	18	21	80	680
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	44	28	21	16	36	61	170	40	23	19	47	27	29	18	21	82	682

Total Number of Valid Hours: 682

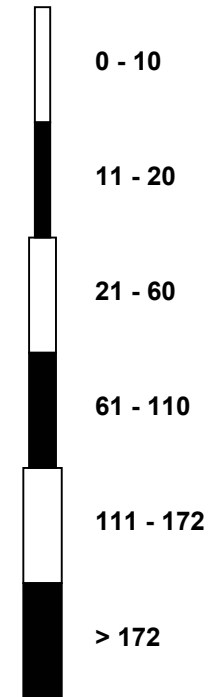
Total Number of Hours: 720

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

**Sulphur Dioxide (SO₂) - ppb
Athabasca Valley (AMS 7)**



Classes (ppb)

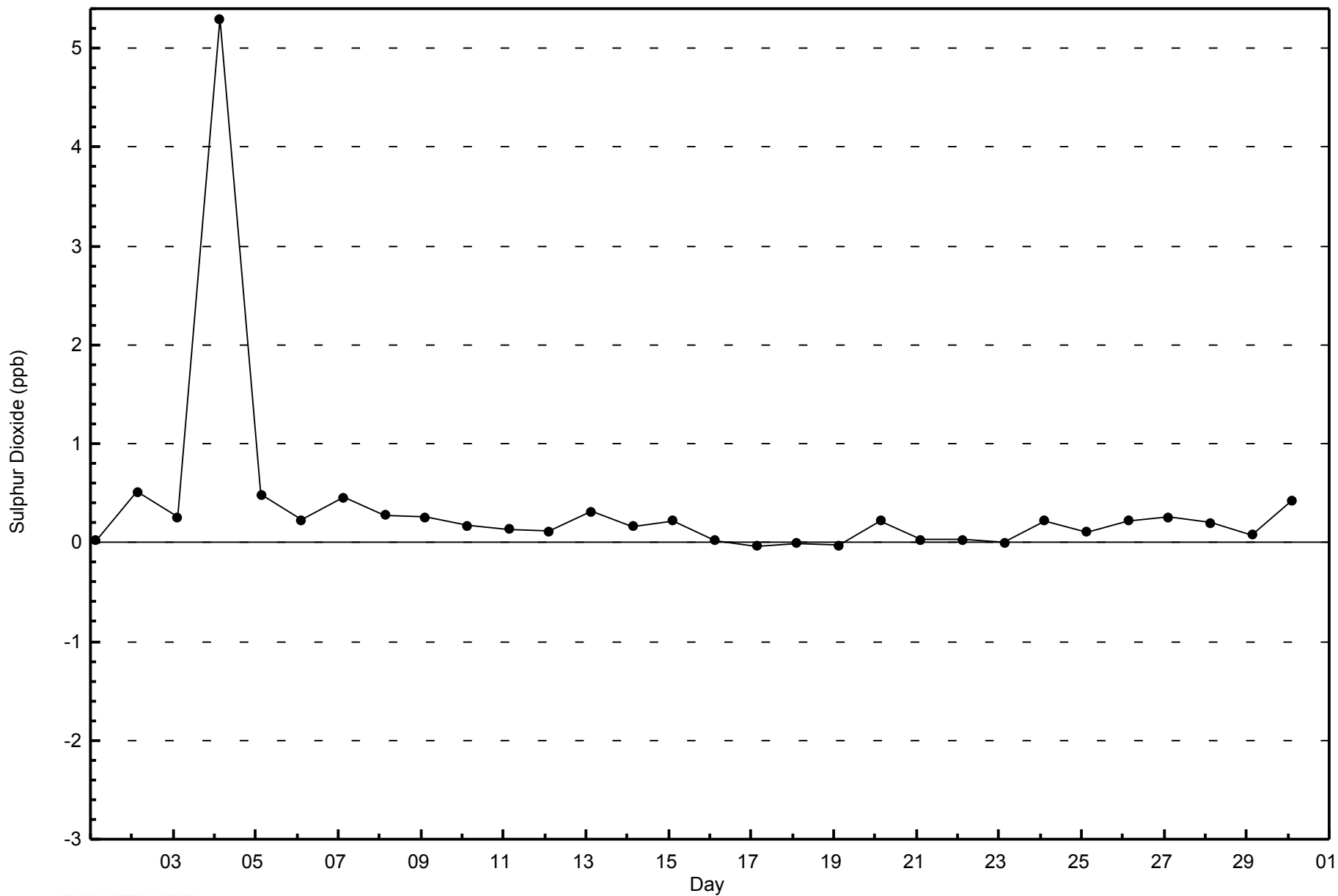


Total Number of Valid Hours: 682



WBEA
Zero Responses

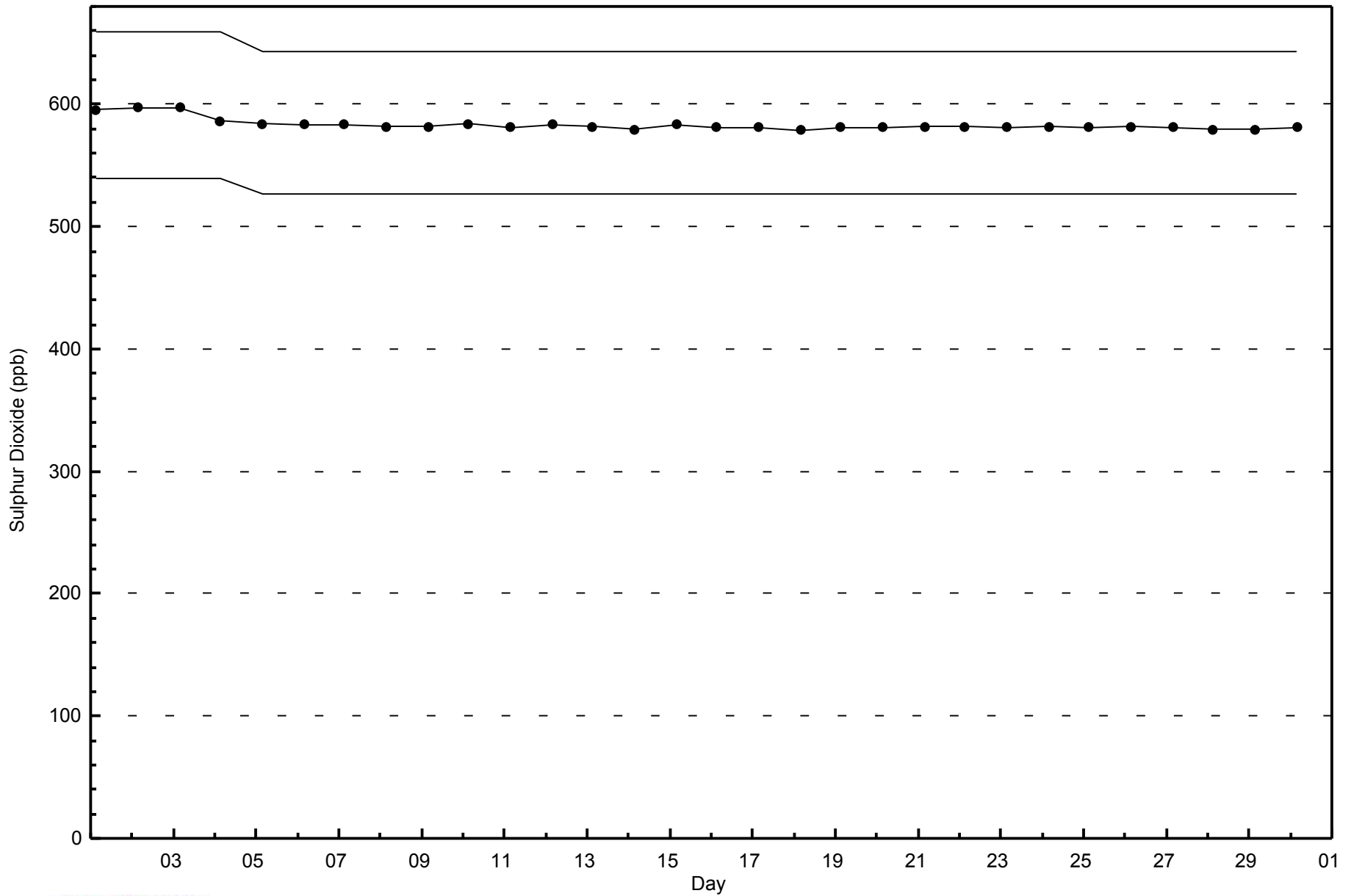
Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - September 2014





WBEA
Span Responses

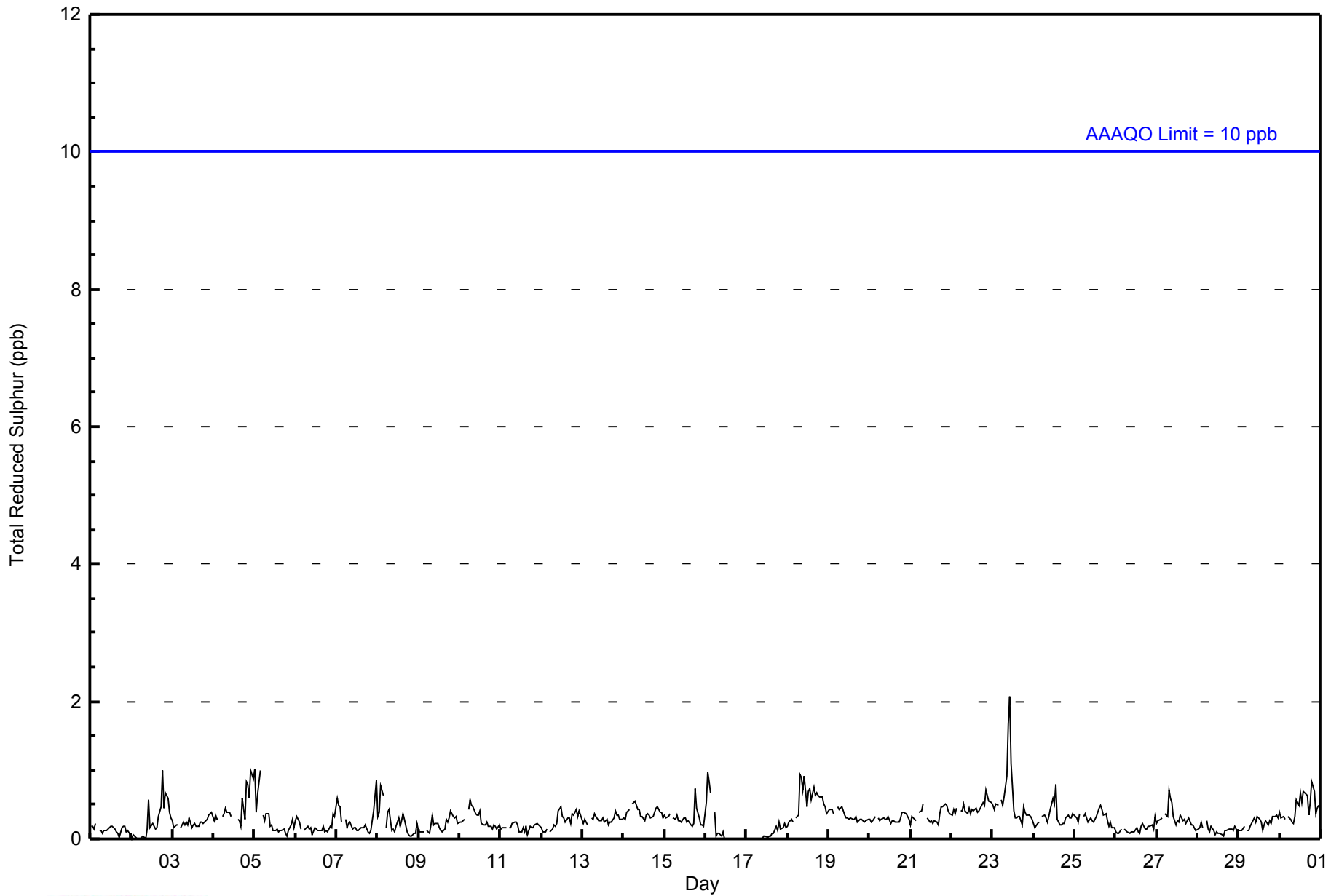
Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - September 2014





WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - September 2014





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	685	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - September 2014

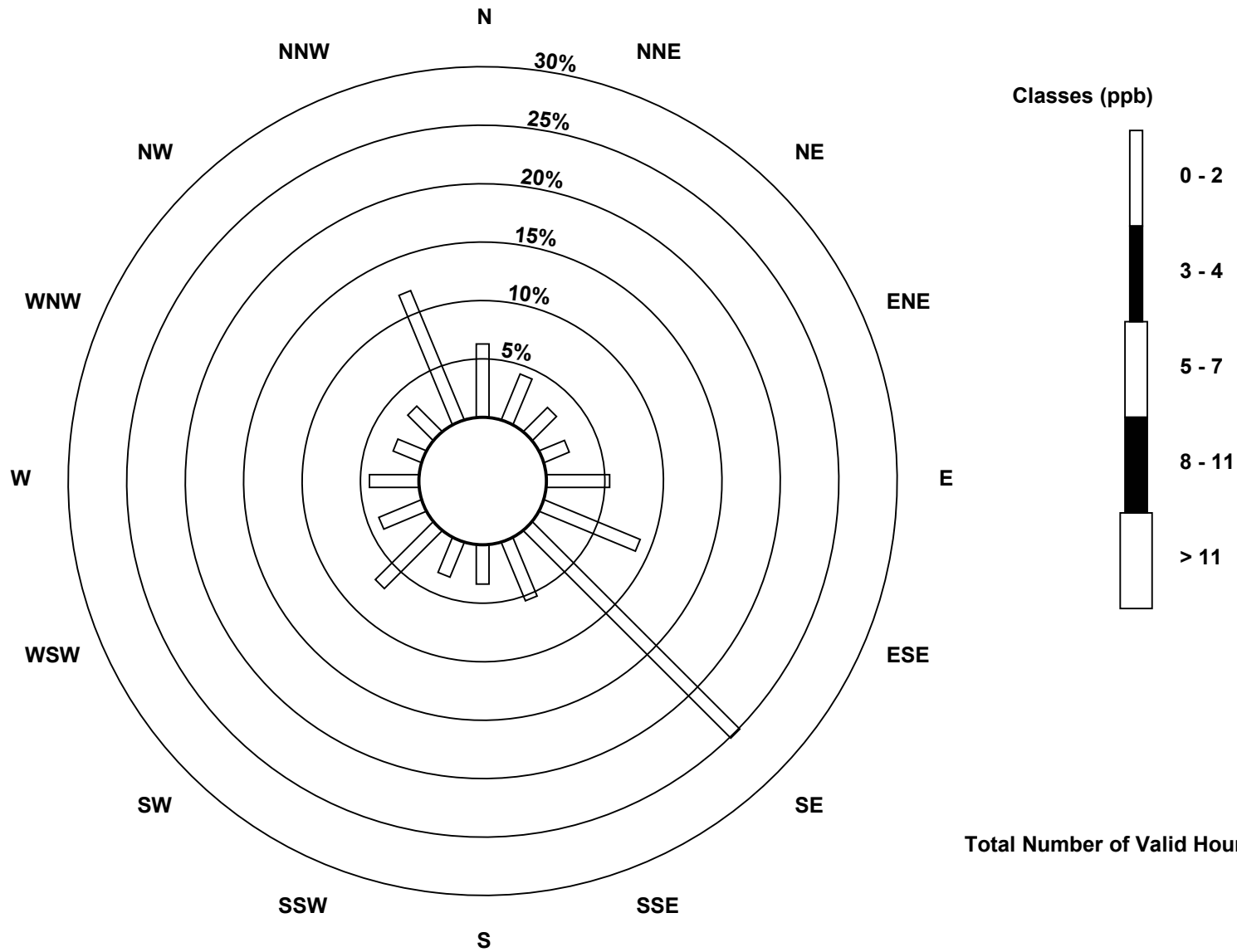
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	43	29	20	16	37	61	172	37	23	22	48	27	29	18	21	82	685
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	43	29	20	16	37	61	172	37	23	22	48	27	29	18	21	82	685

Total Number of Valid Hours: 685

Total Number of Hours: 720

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

**Total Reduced Sulphur (TRS) - ppb
Athabasca Valley (AMS 7)**

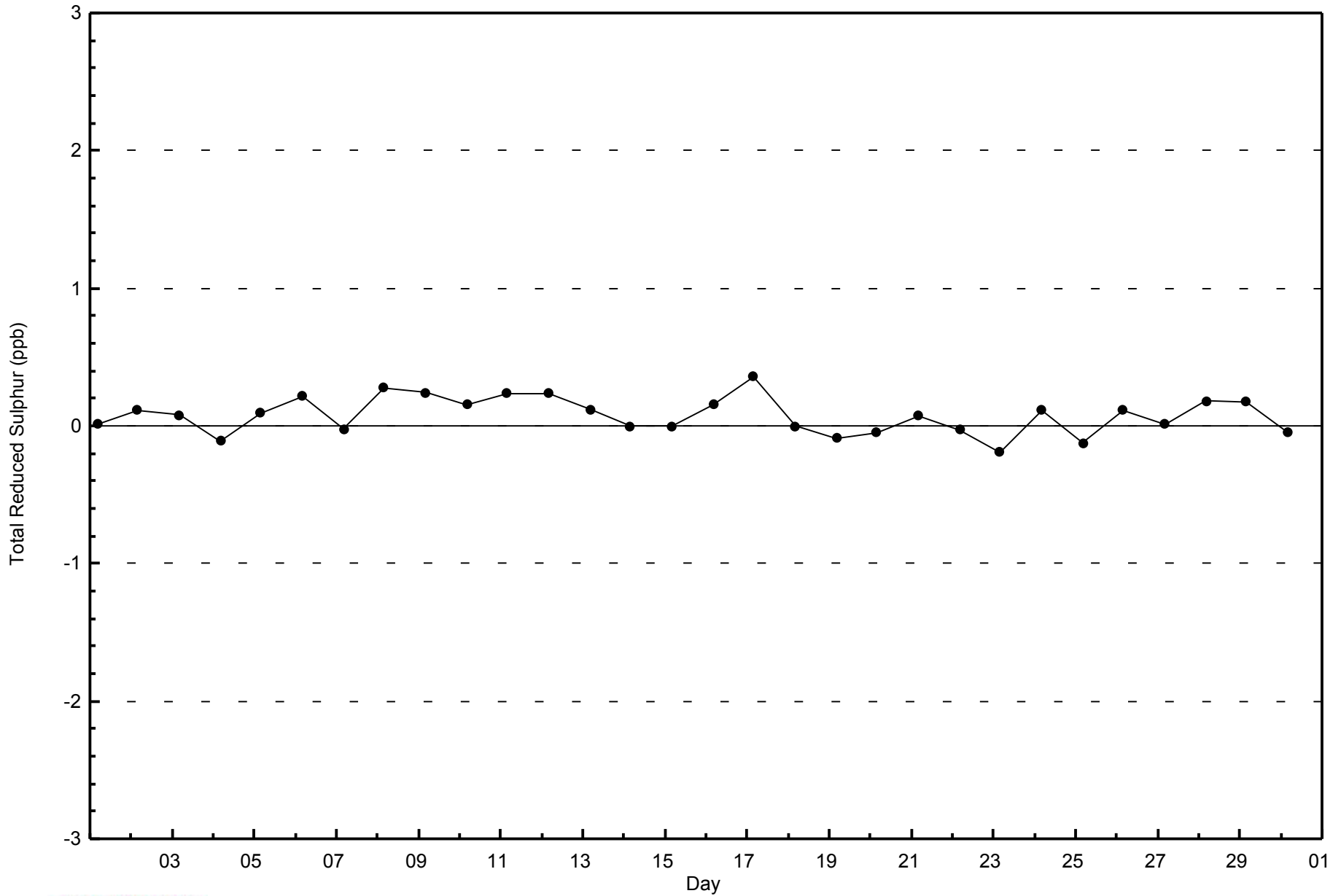


Total Number of Valid Hours: 685



WBEA
Zero Responses

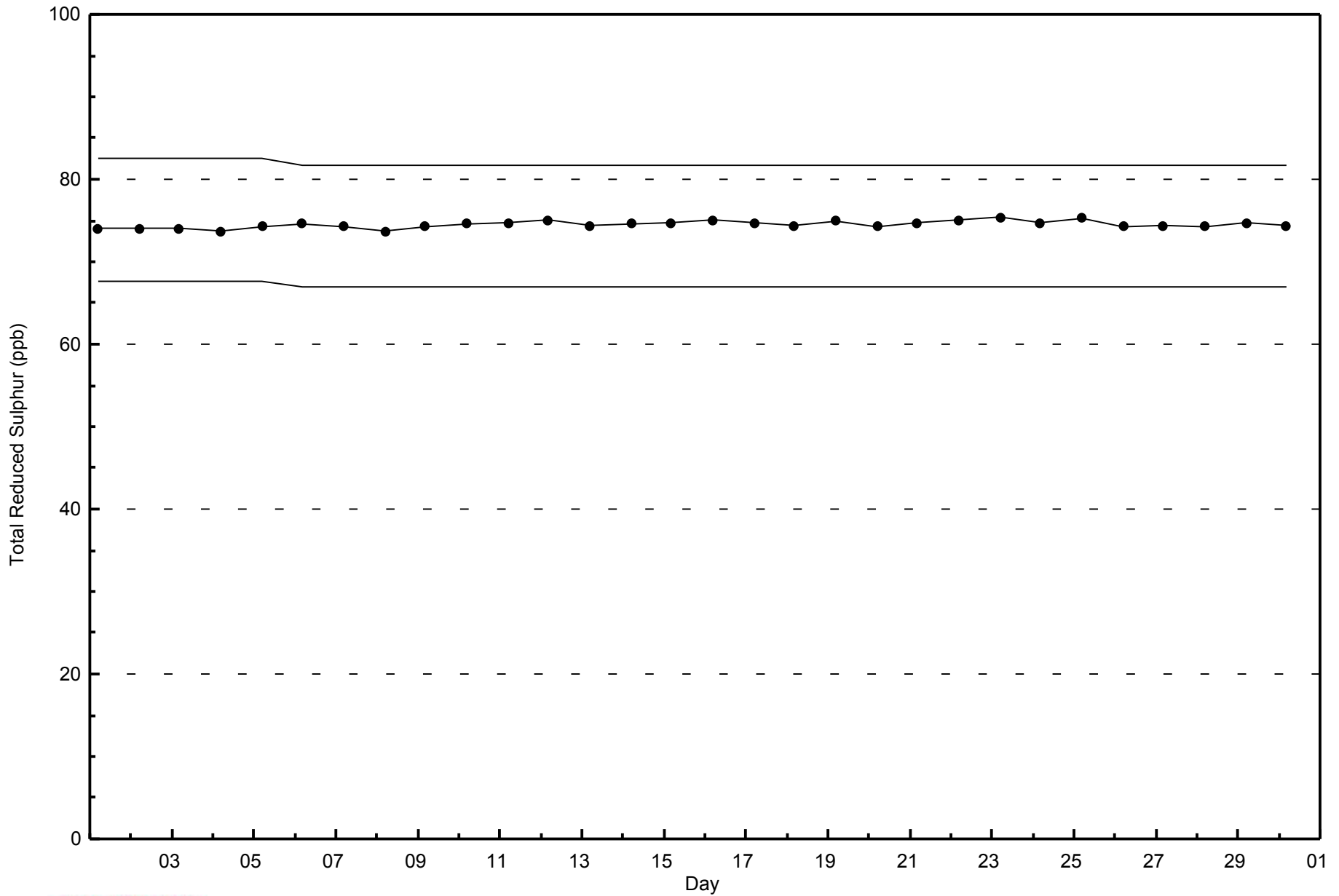
Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - September 2014





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - September 2014



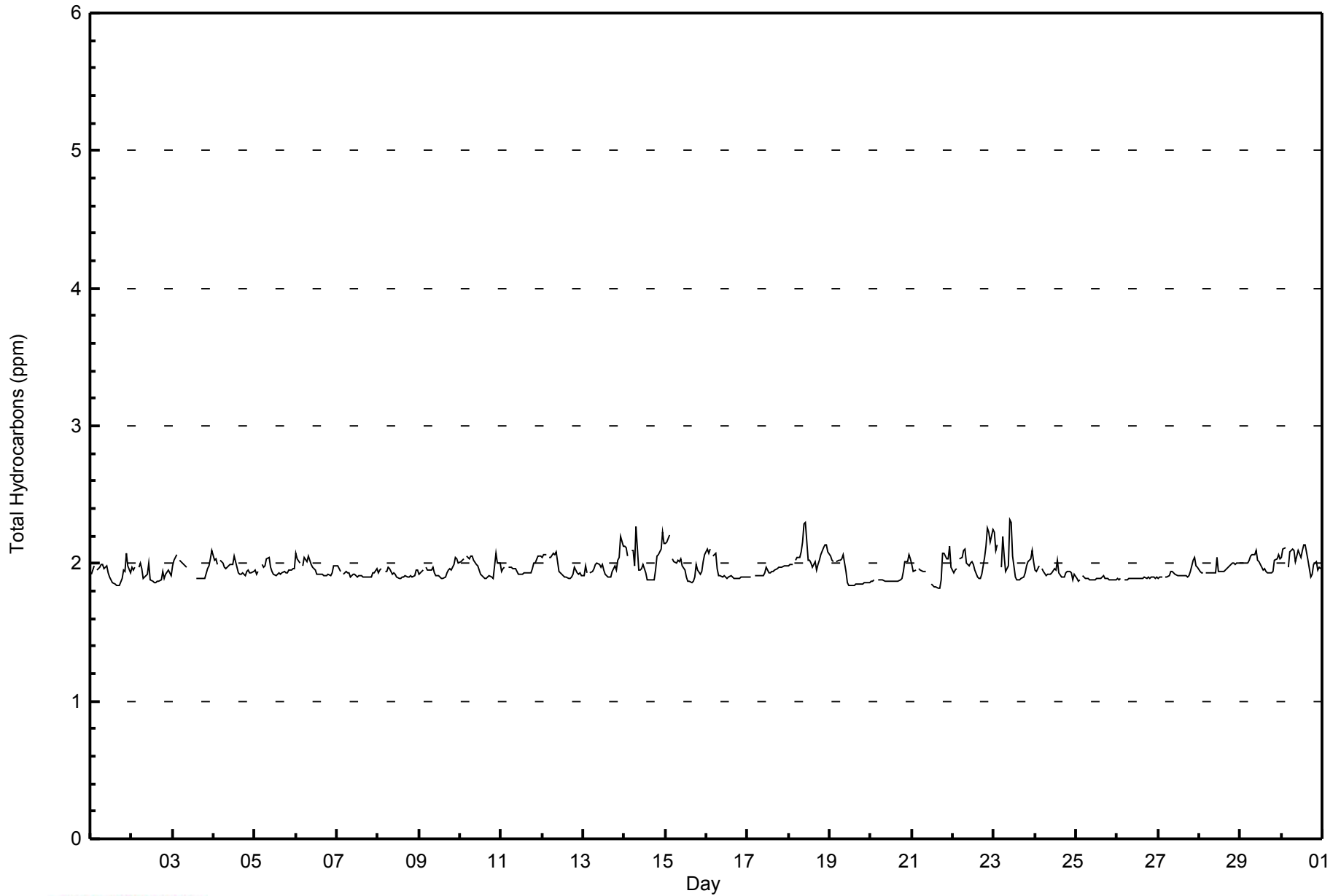


Maximum Value: 2.3 ppm on Sep 23 10:00																			Maximum Daily Average: 2.1 ppm on Sep 18						Hours in Service: 720	
Minimum Value: 1.8 ppm on Sep 21 17:00																			Minimum Daily Average: 1.9 ppm on Sep 25						Hours of Data: 683	
Maximum Diurnal Average: 2.0 ppm at hour 23																			Minimum Diurnal Average: 1.9 ppm at hour 17						Hours of Missing Data: 37	
Monthly Average: 1.96 ppm																			Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.2						Hours of Calibration: 37	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	1.9	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	2.1	2.0	1.9	1.9	2.1
2-Sep	2.0	2.0	2.0	Z	2.0	2.0	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
3-Sep	2.0	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.0	2.1
4-Sep	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.1
5-Sep	2.0	1.9	1.9	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	2.0	2.0	2.0	2.0	2.0	2.0
6-Sep	2.1	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1
7-Sep	2.0	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	1.9	1.9	1.9	2.0	1.9	2.0
8-Sep	1.9	2.0	2.0	Z	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	2.0	2.0	1.9	2.0
9-Sep	1.9	1.9	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0
10-Sep	2.0	2.0	2.0	Z	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.0	2.0	2.1
11-Sep	1.9	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1
12-Sep	2.0	2.1	2.1	Z	2.0	2.0	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.1
13-Sep	1.9	2.0	1.9	Z	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.2	2.1	2.0	2.2
14-Sep	2.1	2.1	2.1	Z	2.1	2.1	2.0	2.3	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.2	2.1	2.0	2.3
15-Sep	2.2	2.2	2.2	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	2.0	2.0	1.9	1.9	2.0	2.1	2.0	2.2
16-Sep	2.1	2.1	2.1	Z	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
17-Sep	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0
18-Sep	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.2	2.3	2.3	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	2.3
19-Sep	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	1.9	1.9	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	2.1
20-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	2.0	2.0	2.1	2.0	1.9	2.1
21-Sep	2.0	1.9	2.0	Z	2.0	1.9	1.9	1.9	1.9	C	C	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.1	2.1	2.0	2.0	2.1	2.0	1.9	2.1
22-Sep	1.9	1.9	2.0	Z	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.1	2.3	2.2	2.2	2.3	2.0	2.3
23-Sep	2.2	2.1	2.1	Z	2.0	2.2	2.1	1.9	2.0	2.3	2.3	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.3
24-Sep	2.0	1.9	2.0	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
25-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	1.9	1.9	1.9	1.9
26-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	1.9	1.9	1.9	1.9
27-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	2.0	2.0	2.0	2.0	1.9	2.0
28-Sep	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
29-Sep	2.0	2.0	2.0	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.0	2.0	2.1
30-Sep	2.0	2.1	2.1	Z	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1
																								Diurnal Average		
																								Diurnal Maximum		
																								2.0 2.0 2.0 -- 2.0 2.0 2.0 2.0 2.0 2.0 2.0 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0		
																								2.2 2.2 2.2 -- 2.1 2.2 2.1 2.3 2.2 2.3 2.3 2.1 2.1 2.1 2.1 2.0 2.0 2.0 2.0 2.1 2.1 2.3 2.2 2.2 2.3 2.0 2.1		
																								Z - zerospan C - Calibration		



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Athabasca Valley - September 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Athabasca Valley - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	600	87.85	87.85
2.1 - 3.0	83	12.15	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



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Athabasca Valley - September 2014

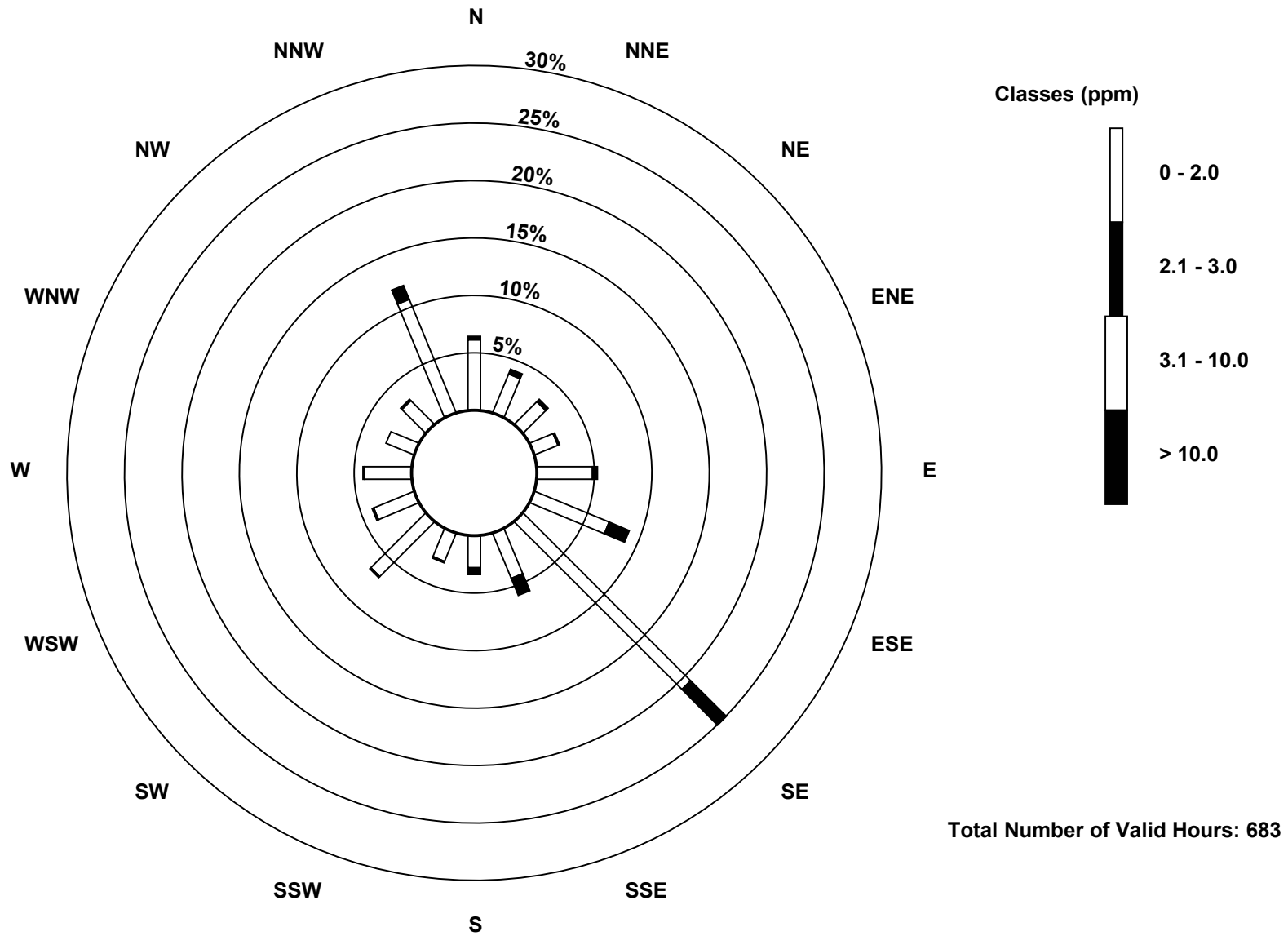
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	42	25	19	15	33	48	141	29	19	18	46	26	28	18	20	73	600
2.1 - 3.0	2	3	2	1	3	13	30	11	4	1	1	1	1	0	1	9	83
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	44	28	21	16	36	61	171	40	23	19	47	27	29	18	21	82	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

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

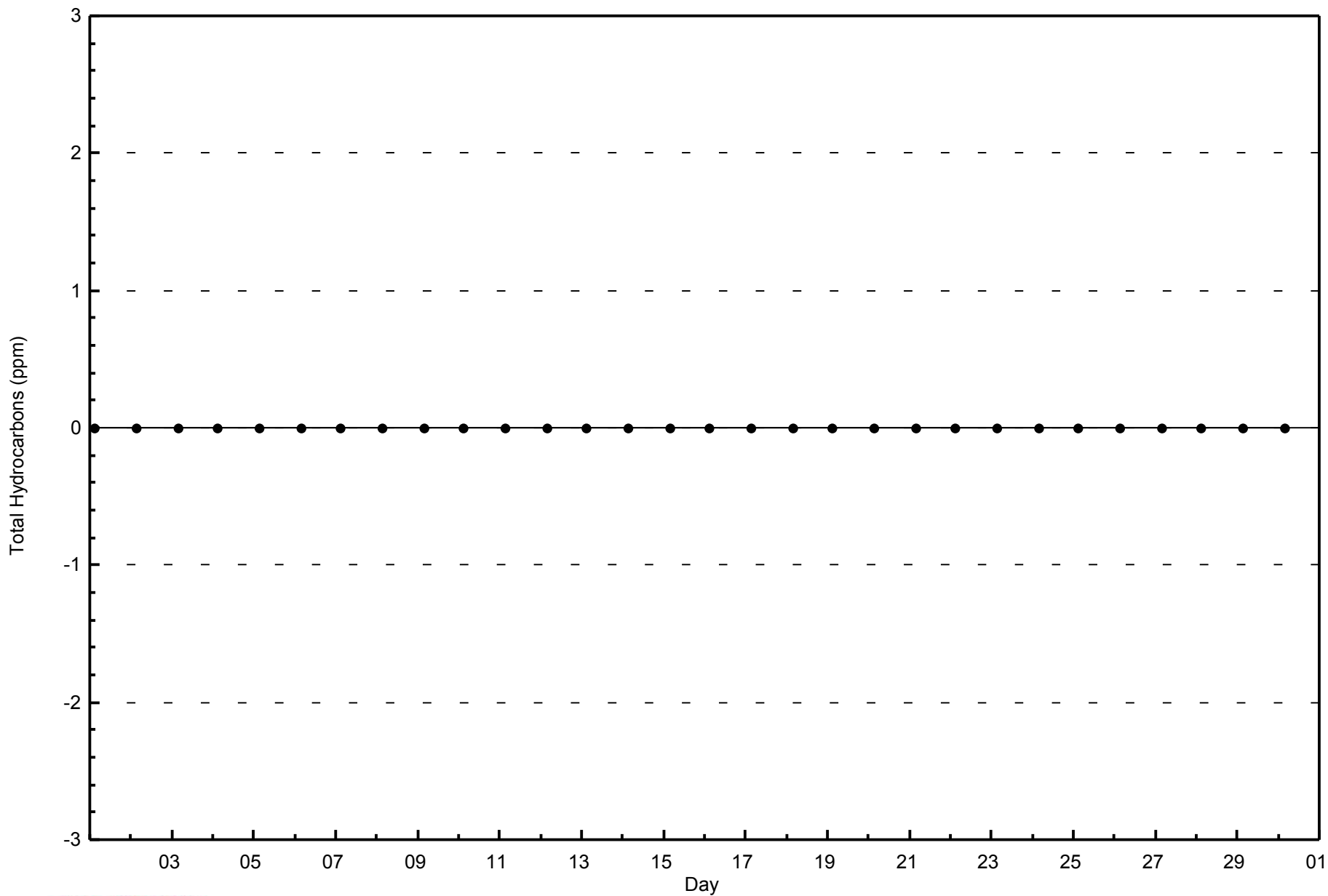
**Total Hydrocarbons (THC) - ppm
Athabasca Valley (AMS 7)**





WBEA
Zero Responses

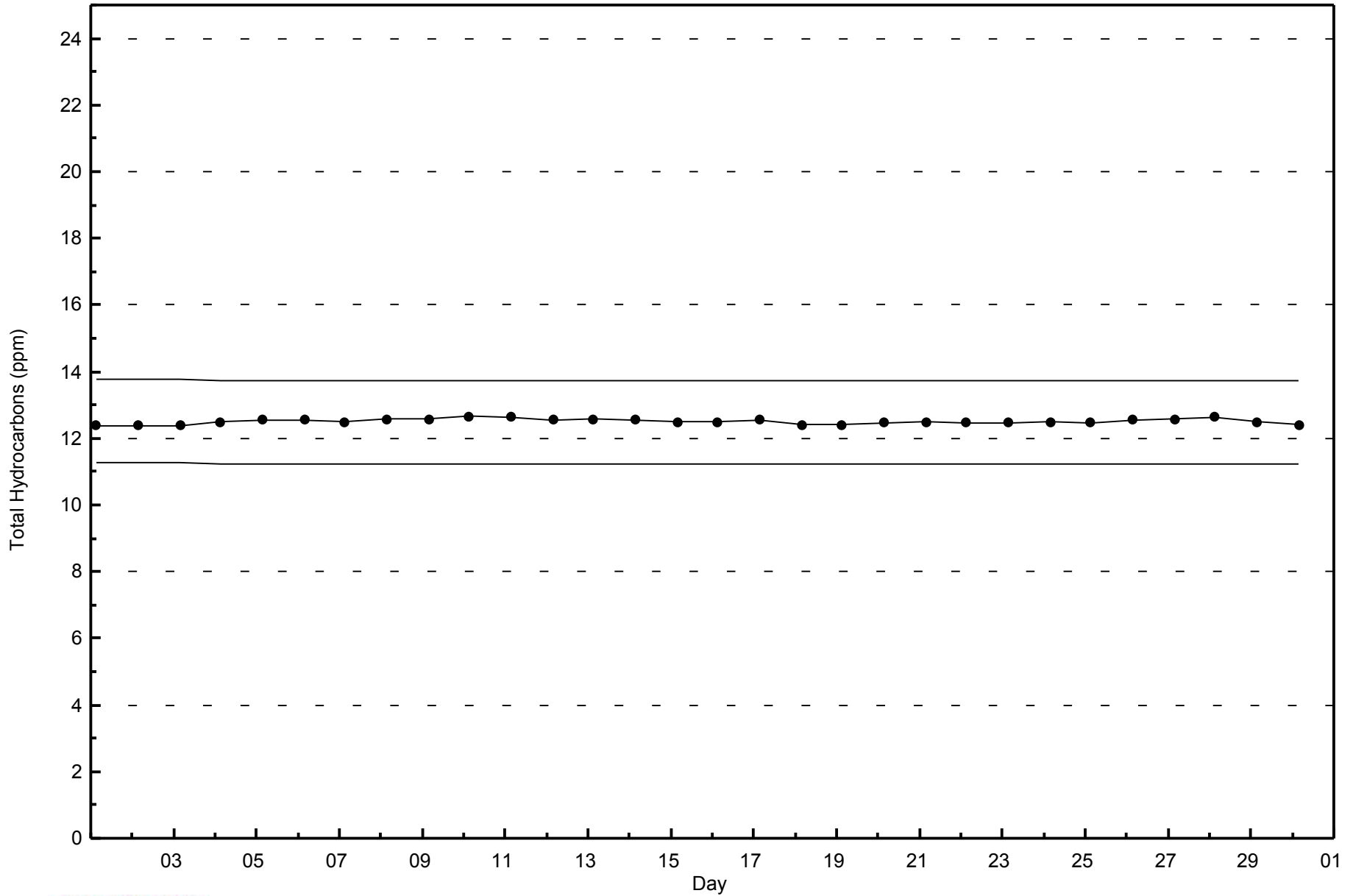
Total Hydrocarbons (THC) - ppm
Athabasca Valley - September 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Athabasca Valley - September 2014



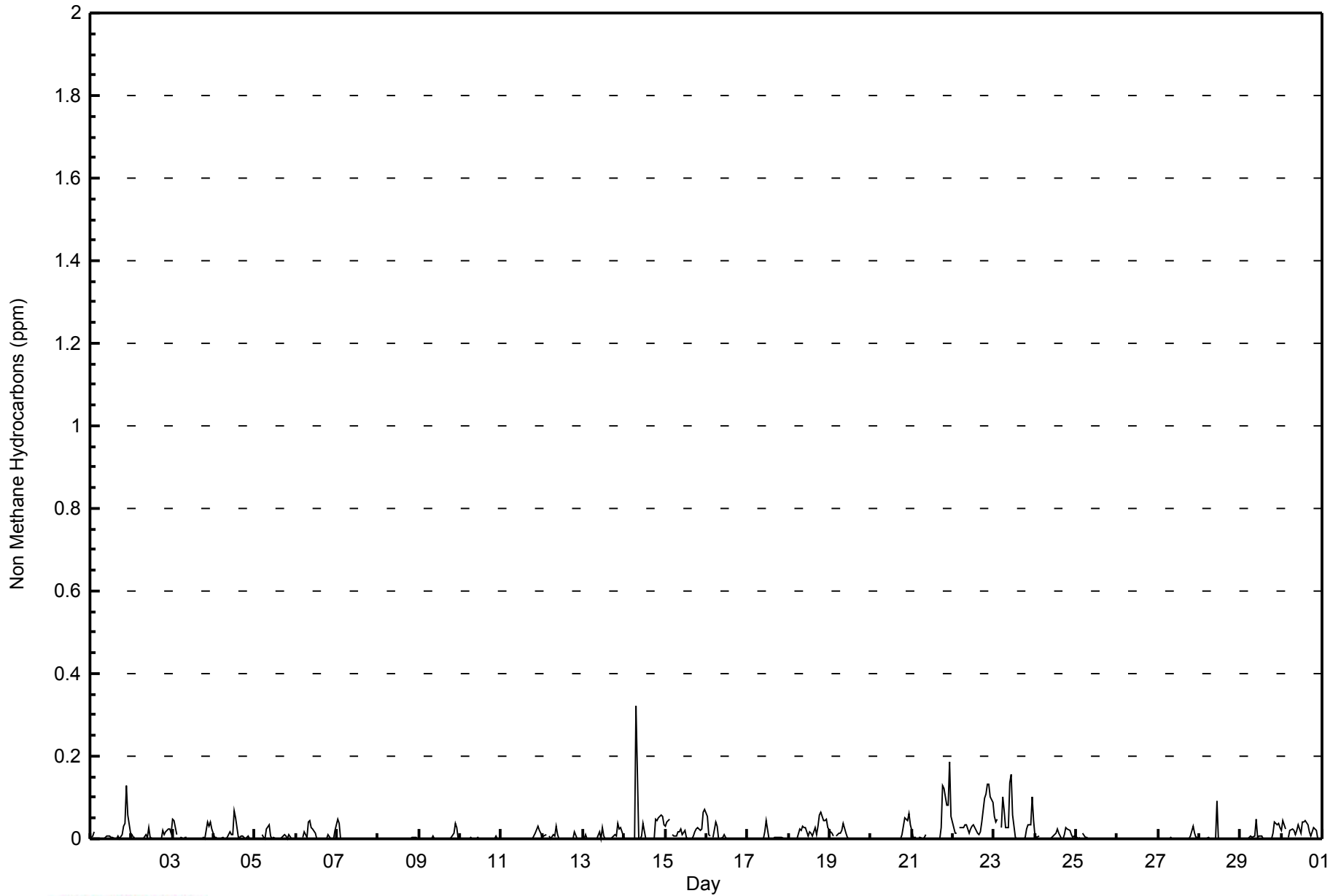


Maximum Value: 0.323 ppm on Sep 14 08:00		Maximum Daily Average: 0.047 ppm on Sep 22		Hours in Service:	720																								
Minimum Value: 0.000 ppm on Sep 1 09:00		Minimum Daily Average: 0.000 ppm on Sep 26		Hours of Data:	683																								
Maximum Diurnal Average: 0.029 ppm at hour 23		Minimum Diurnal Average: 0.002 ppm at hour 17		Hours of Missing Data:	37																								
Monthly Average: 0.012 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.1		Hours of Calibration:	37																								
				Percent Operational Time:	100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Sep	0.005	0.007	0.016	Z	0.001	0.001	0.001	0.001	0.000	0.007	0.008	0.006	0.005	0.003	0.001	0.001	0.005	0.002	0.012	0.031	0.038	0.129	0.056	0.013	0.015	0.129			
2-Sep	0.012	0.004	0.002	Z	0.001	0.000	0.000	0.000	0.010	0.005	0.029	0.003	0.000	0.000	0.000	0.001	0.001	0.001	0.020	0.012	0.017	0.025	0.023	0.012	0.008	0.029			
3-Sep	0.047	0.045	0.011	Z	0.001	0.002	0.000	0.003	0.005	C	C	C	C	C	0.001	0.001	0.000	0.000	0.003	0.001	0.040	0.032	0.040	0.024	0.014	0.047			
4-Sep	0.004	0.003	0.000	Z	0.000	0.002	0.001	0.001	0.003	0.019	0.011	0.012	0.068	0.051	0.004	0.004	0.006	0.006	0.000	0.005	0.006	0.000	0.001	0.000	0.009	0.068			
5-Sep	0.000	0.000	0.000	Z	0.012	0.004	0.000	0.023	0.035	0.008	0.000	0.005	0.000	0.000	0.000	0.000	0.002	0.012	0.005	0.001	0.011	0.000	0.001	0.001	0.005	0.035			
6-Sep	0.001	0.001	0.000	Z	0.002	0.018	0.004	0.040	0.043	0.028	0.025	0.012	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.009	0.001	0.000	0.000	0.022	0.009	0.043			
7-Sep	0.049	0.039	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	0.004	0.049			
8-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.005	0.004	0.000	0.001	0.005			
9-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.013	0.037	0.028	0.000	0.004	0.037			
10-Sep	0.000	0.000	0.001	Z	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.005	0.000	0.000	0.000	0.001	0.005			
11-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.015	0.030	0.022	0.014	0.004	0.030			
12-Sep	0.003	0.007	0.012	Z	0.008	0.002	0.011	0.008	0.030	0.011	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.017	0.000	0.000	0.002	0.000	0.000	0.005	0.030			
13-Sep	0.000	0.010	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.017	0.001	0.028	0.005	0.001	0.000	0.000	0.000	0.003	0.009	0.008	0.036	0.025	0.026	0.006	0.008	0.036			
14-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.323	0.000	0.000	0.005	0.037	0.000	0.001	0.001	0.000	0.000	0.000	0.047	0.044	0.050	0.057	0.055	0.032	0.028	0.323			
15-Sep	0.031	0.042	0.047	Z	0.010	0.005	0.008	0.016	0.017	0.022	0.011	0.021	0.003	0.001	0.000	0.000	0.007	0.018	0.025	0.028	0.019	0.025	0.064	0.071	0.021	0.071			
16-Sep	0.055	0.009	0.006	Z	0.002	0.039	0.029	0.000	0.000	0.003	0.009	0.003	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.007	0.055			
17-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.046	0.000	0.000	0.000	0.002	0.005	0.003	0.003	0.002	0.000	0.000	0.000	0.003	0.046			
18-Sep	0.000	0.000	0.001	Z	0.001	0.001	0.023	0.022	0.032	0.026	0.028	0.005	0.018	0.015	0.008	0.026	0.009	0.031	0.057	0.065	0.045	0.045	0.047	0.028	0.023	0.065			
19-Sep	0.018	0.012	0.006	Z	0.008	0.012	0.013	0.020	0.036	0.013	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	0.006	0.036			
20-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.032	0.052	0.043	0.062	0.035	0.010	0.062				
21-Sep	0.022	0.003	0.003	Z	0.003	0.002	0.001	0.004	0.009	C	C	0.001	0.001	0.001	0.001	0.000	0.001	0.027	0.131	0.122	0.080	0.082	0.188	0.053	0.035	0.188			
22-Sep	0.026	0.015	0.013	Z	0.027	0.028	0.028	0.033	0.035	0.014	0.025	0.030	0.035	0.026	0.014	0.011	0.018	0.042	0.100	0.109	0.133	0.134	0.103	0.087	0.047	0.134			
23-Sep	0.054	0.041	0.046	Z	0.026	0.101	0.066	0.027	0.028	0.135	0.155	0.058	0.002	0.000	0.000	0.000	0.000	0.003	0.024	0.034	0.035	0.102	0.046	0.043	0.155				
24-Sep	0.007	0.004	0.006	Z	0.001	0.001	0.000	0.001	0.001	0.001	0.003	0.009	0.013	0.025	0.013	0.001	0.002	0.010	0.027	0.025	0.020	0.010	0.003	0.008	0.008	0.027			
25-Sep	0.003	0.001	0.003	Z	0.013	0.005	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	0.000	0.000	0.000	0.001	0.013			
26-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			
27-Sep	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.029	0.014	0.003	0.005	0.003	0.029				
28-Sep	0.000	0.000	0.000	Z	0.000	0.002	0.000	0.001	0.000	0.000	0.091	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.001	0.000	0.004	0.091			
29-Sep	0.000	0.001	0.001	Z	0.001	0.002	0.007	0.005	0.005	0.048	0.003	0.007	0.006	0.001	0.001	0.001	0.000	0.002	0.001	0.013	0.040	0.034	0.038	0.026	0.010	0.048			
30-Sep	0.019	0.043	0.023	Z	0.004	0.020	0.022	0.019	0.010	0.021	0.032	0.013	0.040	0.040	0.043	0.034	0.018	0.006	0.016	0.026	0.019	0.001	0.002	0.001	0.020	0.043			
					0.012	0.010	0.007	--	0.004	0.008	0.007	0.018	0.010	0.013	0.016	0.010	0.007	0.006	0.003	0.003	0.002	0.005	0.016	0.020	0.023	0.026	0.029	0.016	Diurnal Average
					0.055	0.045	0.047	--	0.027	0.101	0.066	0.323	0.043	0.135	0.155	0.058	0.068	0.051	0.043	0.034	0.018	0.042	0.131	0.122	0.133	0.134	0.188	0.087	Diurnal Maximum
Z - zerospan				C - Calibration																									



WBEA
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - September 2014





WBEA
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	449	65.74	65.74
0.006 - 0.05	205	30.01	95.75
0.06 - 0.1	26	3.81	99.56
> 0.1	3	0.44	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - September 2014

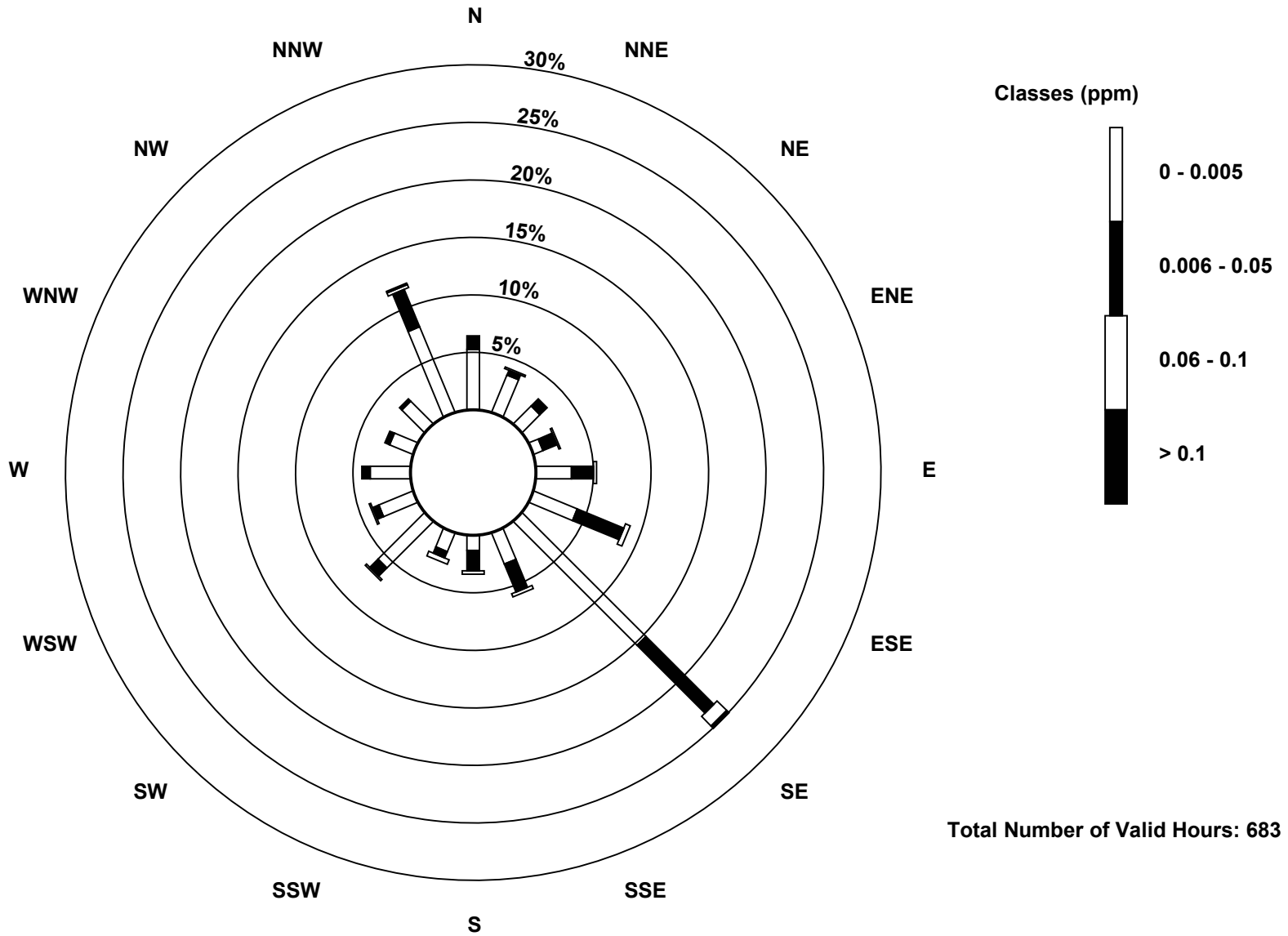
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	36	24	15	6	21	28	104	20	9	12	39	22	24	15	19	55	449
0.006 - 0.05	8	3	6	9	13	30	57	18	12	4	7	4	5	3	2	24	205
0.06 - 0.1	0	1	0	1	2	3	8	2	2	3	1	1	0	0	0	2	26
> 0.1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	3
Totals	44	28	21	16	36	61	171	40	23	19	47	27	29	18	21	82	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

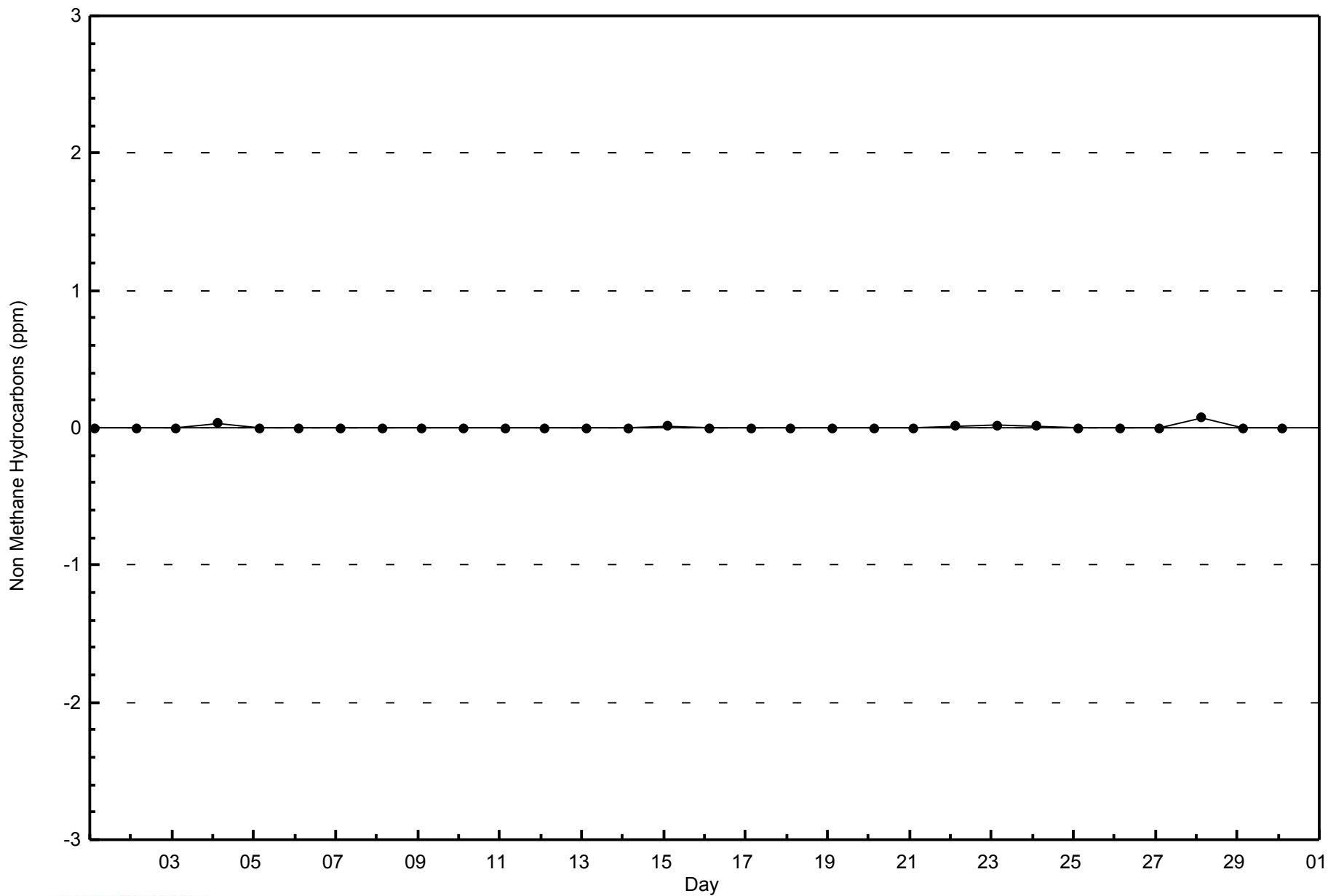
Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley (AMS 7)





WBEA
Zero Responses

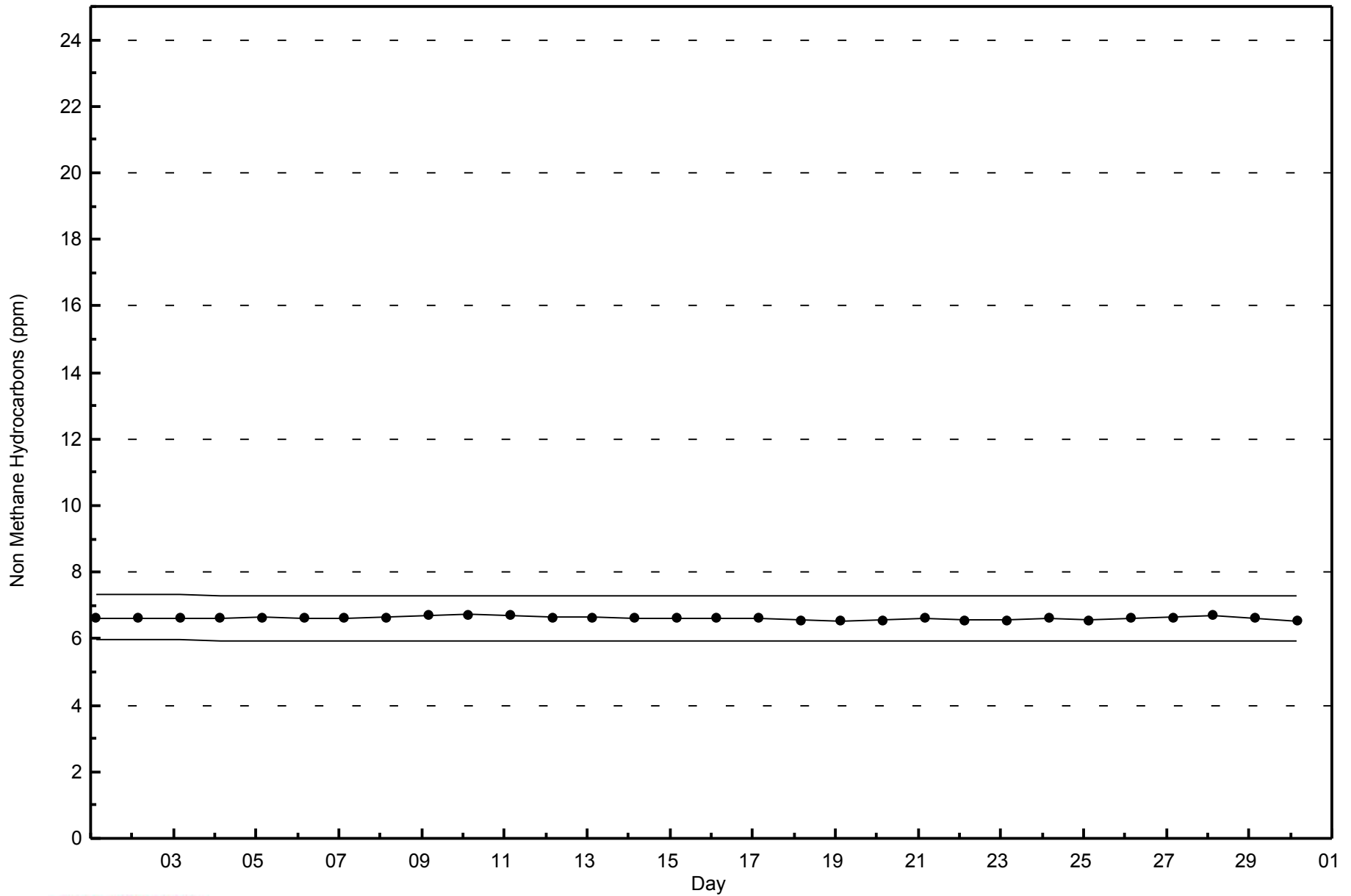
Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - September 2014





WBEA
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - September 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

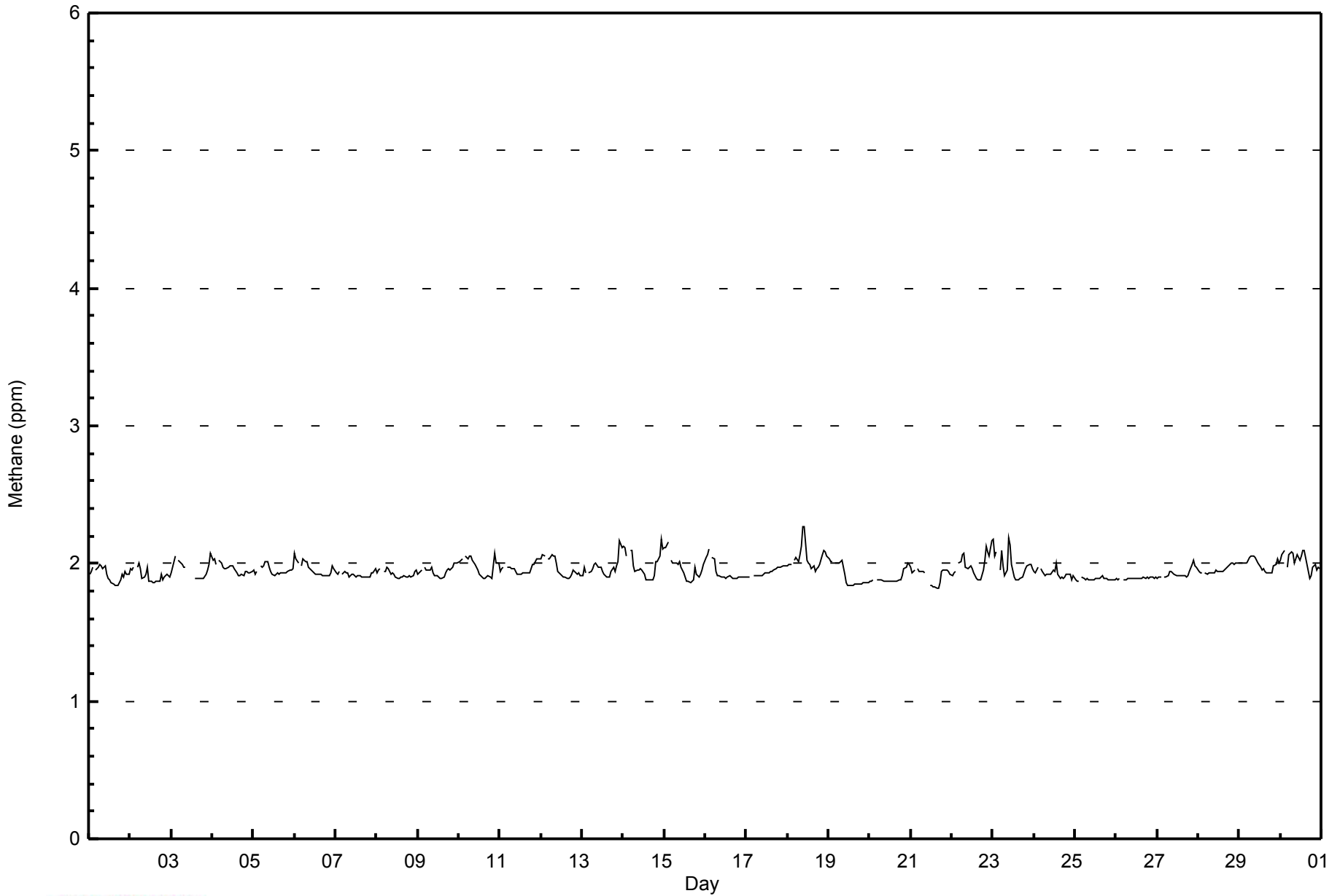
Athabasca Valley - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0															Hours in Service: 720																				
Maximum Value: 2.3 ppm on Sep 18 11:00															Maximum Daily Average: 2.0 ppm on Sep 18																				
Minimum Value: 1.8 ppm on Sep 21 17:00															Hours of Data: 683																				
Maximum Diurnal Average: 2.0 ppm at hour 3															Hours of Missing Data: 37																				
Monthly Average: 1.95 ppm															Hours of Calibration: 37																				
															Percent Operational Time: 100.0																				
Minimum Daily Average: 1.9 ppm on Sep 25																																			
Minimum Diurnal Average: 1.9 ppm at hour 17																																			
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 = 2.2																																			
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	1.9	1.9	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0	
2-Sep	2.0	2.0	2.0	Z	2.0	2.0	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
3-Sep	1.9	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.0	2.1	2.0	2.1	2.0	2.1	2.0	2.1	2.0	2.1	
4-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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	1.9	1.9	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	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
6-Sep	2.1	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1		
7-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0		
8-Sep	1.9	2.0	2.0	Z	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	2.0	2.0	2.1	2.0	2.1	2.0	2.1	2.0	2.1	2.0	2.1		
9-Sep	1.9	1.9	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
10-Sep	2.0	2.0	2.0	Z	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
11-Sep	1.9	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
12-Sep	2.0	2.1	2.1	Z	2.0	2.0	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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	
13-Sep	1.9	2.0	1.9	Z	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.2	2.1	2.0	2.2	2.0	2.2	2.0	2.2	2.0	2.2		
14-Sep	2.1	2.1	2.1	Z	2.1	2.1	2.0	1.9	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.2	2.1	2.0	2.2	2.0	2.2	2.0	2.2	2.0	2.2		
15-Sep	2.1	2.1	2.2	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	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
16-Sep	2.0	2.1	2.1	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
17-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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
18-Sep	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.1	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	2.1	2.1	2.1	2.1	2.0	2.3	2.0	2.3	2.0	2.3	2.0		
19-Sep	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	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	1.9	1.9	1.9	1.9	1.9	2.0		
20-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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
21-Sep	2.0	1.9	1.9	Z	2.0	1.9	1.9	1.9	1.9	C	C	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
22-Sep	1.9	1.9	1.9	Z	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.2	2.0	2.2	2.0	2.2	2.0	2.2	2.0	2.2		
23-Sep	2.2	2.1	2.1	Z	1.9	2.1	2.0	1.9	2.0	2.2	2.1	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	2.0	2.2	
24-Sep	1.9	1.9	2.0	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
25-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
26-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9		
27-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	2.0	2.0	2.0	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0		
28-Sep	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
29-Sep	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
30-Sep	2.0	2.1	2.1	Z	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
Diurnal Average																											2.0	2.0							
Diurnal Maximum																											2.2	2.1							
Z - zerospan C - Calibration																																			



WBEA
Hourly Averages

Methane (CH₄) - ppm
Athabasca Valley - September 2014





WBEA
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Athabasca Valley - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	626	91.65	91.65
2.1 - 3.0	57	8.35	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



WBEA
Frequency Distribution

Methane (CH₄) - ppm
Athabasca Valley - September 2014

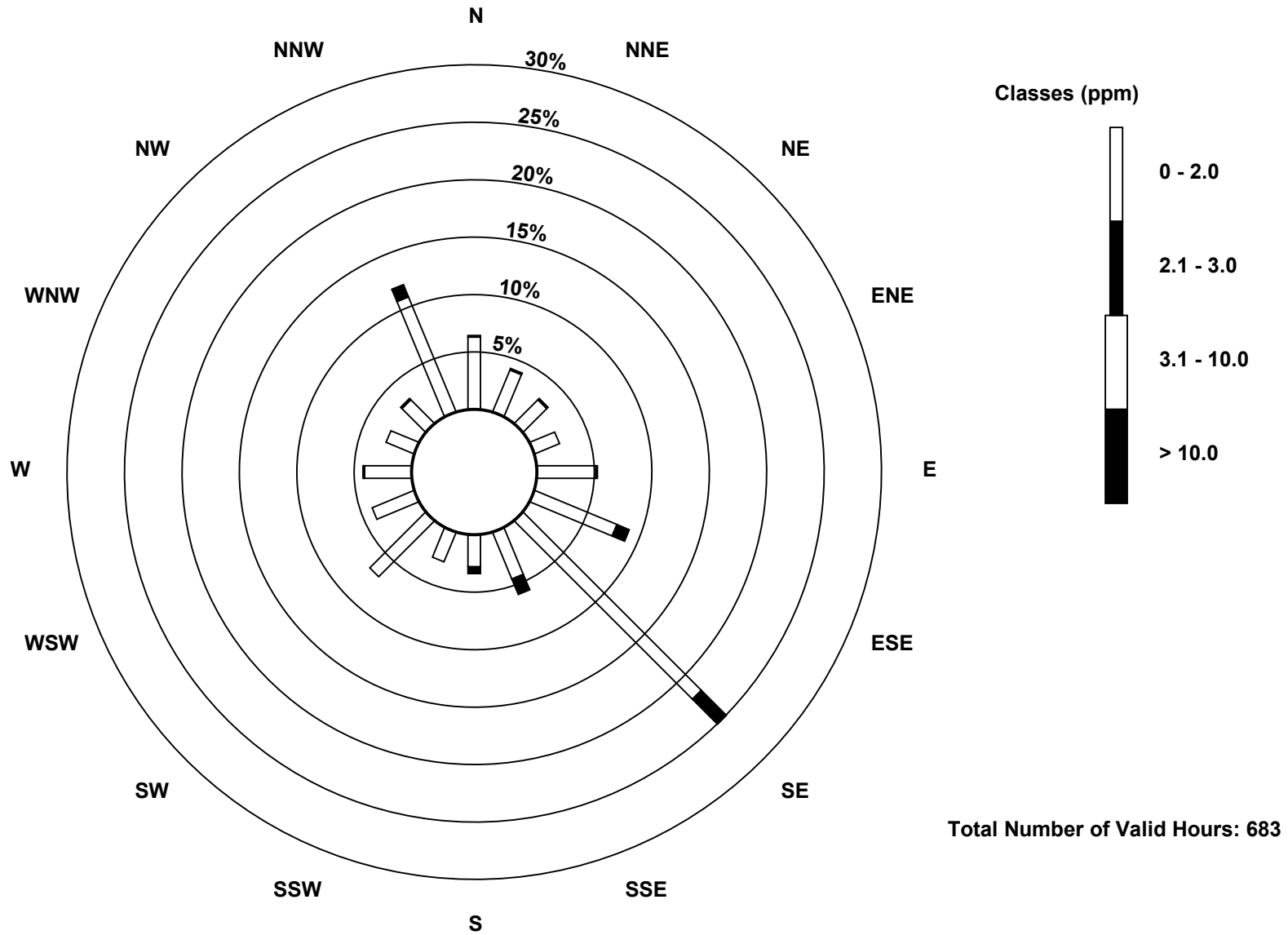
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	43	27	20	16	35	53	150	30	19	19	47	27	28	18	20	74	626
2.1 - 3.0	1	1	1	0	1	8	21	10	4	0	0	0	1	0	1	8	57
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	44	28	21	16	36	61	171	40	23	19	47	27	29	18	21	82	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

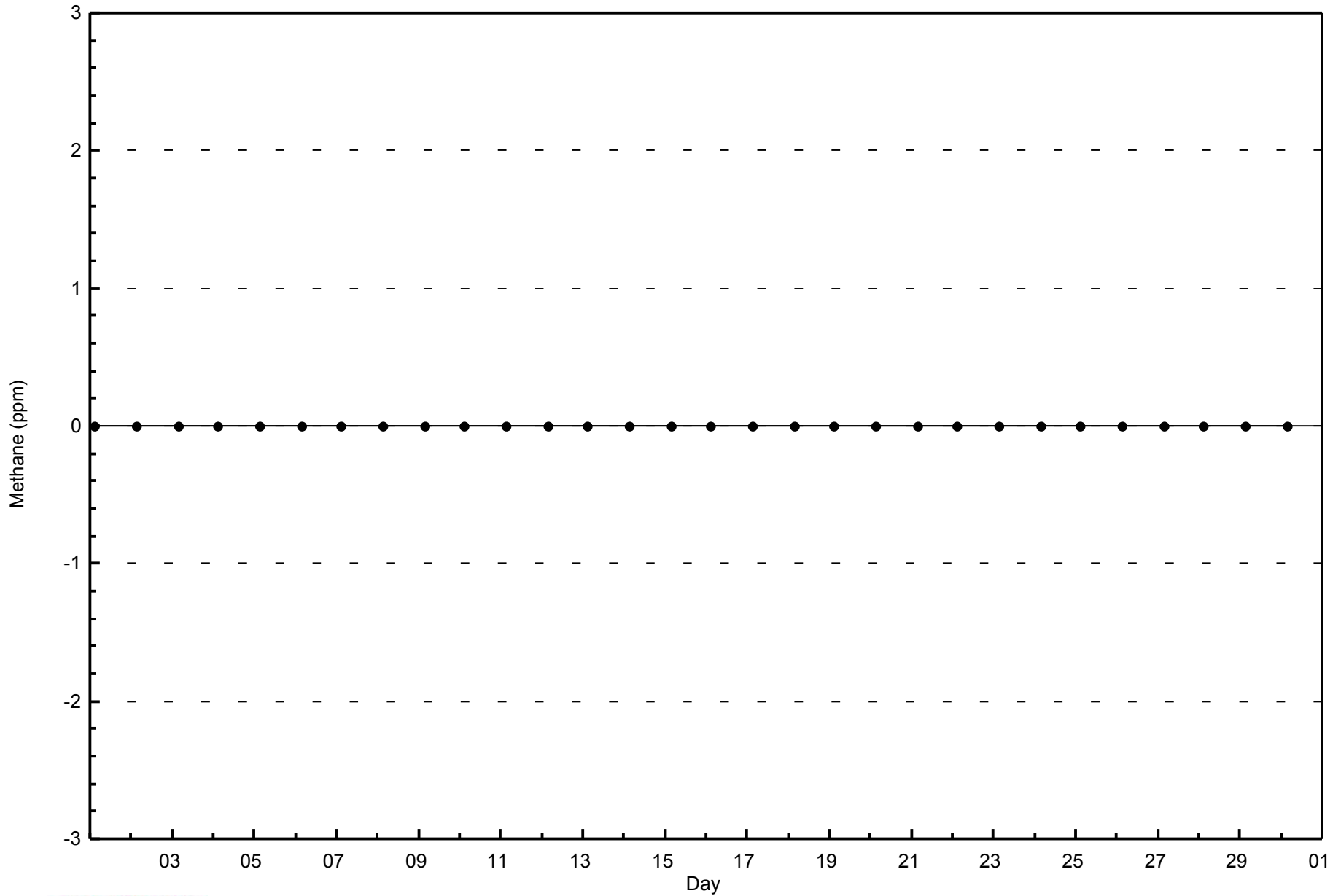
Methane (CH₄) - ppm
Athabasca Valley (AMS 7)





WBEA
Zero Responses

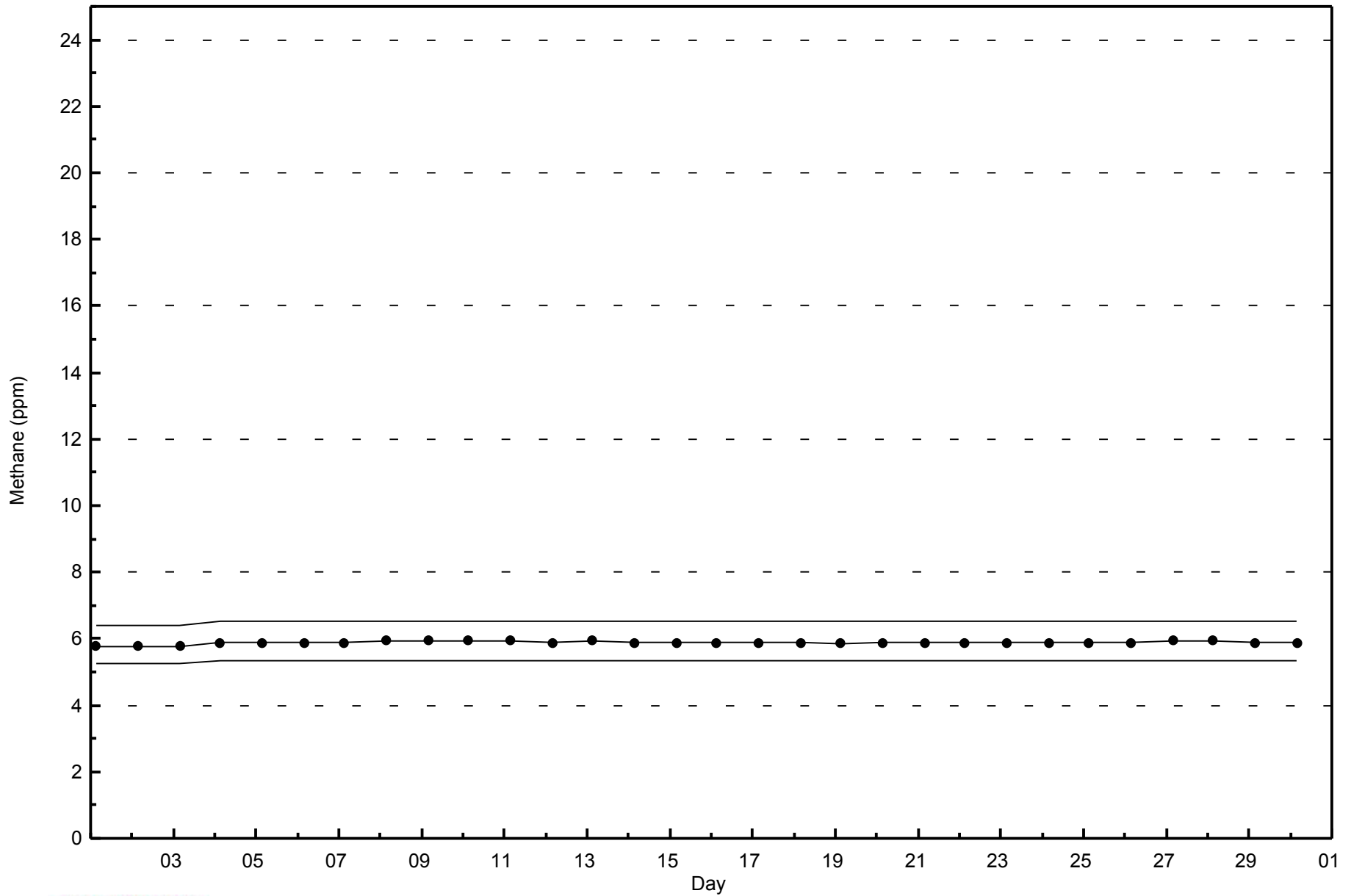
Methane (CH₄) - ppm
Athabasca Valley - September 2014





WBEA
Span Responses

Methane (CH₄) - ppm
Athabasca Valley - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 40 ppb on Sep 19 18:00	Maximum Daily Average: 22.4 ppb on Sep 19		Hours of Data:	683
Minimum Value: 0 ppb on Sep 3 03:00	Minimum Daily Average: 3.8 ppb on Sep 30		Hours of Missing Data:	37
Maximum Diurnal Average: 23.2 ppb at hour 16	Minimum Diurnal Average: 5.4 ppb at hour 6		Hours of Calibration:	36
Monthly Average: 12.9 ppb	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 5 Median = 12 Q ₃ = 20 P ₉₀ = 26 P ₉₉ = 37		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	5	3	3	Z	3	2	3	3	5	5	9	14	15	18	20	21	20	16	9	6	2	1	1	2	8.1	21
2-Sep	2	2	3	Z	2	0	1	3	3	6	11	24	26	26	25	23	21	10	6	3	2	3	4	10.1	26	
3-Sep	1	0	0	Z	0	0	0	1	2	3	10	18	M	18	17	18	21	20	14	9	3	2	1	3	7.3	21
4-Sep	6	4	5	Z	2	1	1	1	C	C	C	C	9	10	14	12	19	17	10	7	12	13	13	8.9	19	
5-Sep	14	16	15	Z	9	4	3	2	5	13	15	19	19	17	17	18	14	12	14	11	11	6	5	11.9	19	
6-Sep	1	4	5	Z	3	1	1	4	8	10	14	16	16	18	17	18	18	17	15	14	12	11	5	9	10.3	18
7-Sep	13	16	15	Z	17	13	15	17	21	20	19	17	21	24	23	25	25	24	23	21	22	19	18	14	19.2	25
8-Sep	16	12	10	Z	11	7	8	11	16	16	16	20	17	20	20	20	23	22	20	19	17	14	10	3	15.1	23
9-Sep	8	8	5	Z	1	1	1	1	2	11	19	19	22	24	25	23	17	16	14	7	5	2	2	1	10.1	25
10-Sep	0	0	0	Z	0	0	1	1	3	5	7	10	19	21	26	26	22	24	20	17	16	6	8	10	10.6	26
11-Sep	20	14	9	Z	4	2	2	5	7	14	22	24	27	30	32	32	32	30	19	13	7	3	6	8	15.7	32
12-Sep	10	7	5	Z	4	3	1	3	3	6	20	20	24	28	27	24	23	22	18	12	9	18	13	13	13.6	28
13-Sep	10	5	3	Z	5	4	2	2	3	5	4	8	13	20	28	30	30	24	11	10	4	3	3	4	10.1	30
14-Sep	2	3	5	Z	2	1	4	7	8	11	15	19	26	29	29	31	33	26	13	11	3	3	1	5	12.4	33
15-Sep	4	4	4	Z	2	1	1	2	5	7	13	17	22	28	27	28	28	25	4	7	12	10	9	9	11.6	28
16-Sep	5	0	0	Z	3	5	8	5	6	11	12	13	15	14	12	13	15	15	15	15	16	17	17	17	10.9	17
17-Sep	17	16	15	Z	13	11	10	9	9	9	9	9	10	10	10	10	11	9	8	8	7	6	6	5	10.0	17
18-Sep	5	4	3	Z	1	0	0	0	1	2	6	15	17	23	26	24	30	22	8	6	3	1	2	5	9.0	30
19-Sep	8	9	7	Z	6	3	2	2	3	16	25	29	32	35	35	34	38	40	40	36	33	30	27	26	22.4	40
20-Sep	25	24	24	Z	23	22	21	23	25	26	28	30	31	31	31	32	32	30	22	12	6	4	3	8	22.3	32
21-Sep	10	11	9	Z	5	3	2	4	C	C	15	19	20	21	22	21	21	8	1	1	2	1	3	2	9.5	22
22-Sep	3	4	5	Z	0	1	1	3	9	15	16	20	26	32	30	32	26	11	7	6	2	1	2	2	11.1	32
23-Sep	6	7	6	Z	7	0	3	5	7	13	19	32	35	37	38	37	34	29	6	6	5	5	7	9	15.3	38
24-Sep	10	11	9	Z	5	5	7	7	11	13	11	9	4	3	20	27	26	24	20	17	15	25	39	30	15.2	39
25-Sep	29	32	27	Z	8	12	14	15	20	21	20	18	17	14	13	15	16	24	21	25	26	25	24	21	19.9	32
26-Sep	17	20	18	Z	16	16	15	14	11	11	11	12	12	11	13	13	14	18	17	20	20	20	22	23	15.8	23
27-Sep	22	22	23	Z	24	20	16	11	12	15	19	21	23	23	24	24	24	19	12	6	1	1	3	4	15.9	24
28-Sep	5	5	6	Z	8	10	10	10	11	19	24	23	24	26	27	26	25	22	17	16	17	17	17	16	16.7	27
29-Sep	15	15	14	Z	11	8	6	8	9	11	14	17	25	30	30	27	22	20	16	13	4	2	1	2	13.9	30
30-Sep	3	3	2	Z	2	1	1	1	2	3	2	3	2	6	7	12	12	11	4	2	2	5	2	2	3.8	12

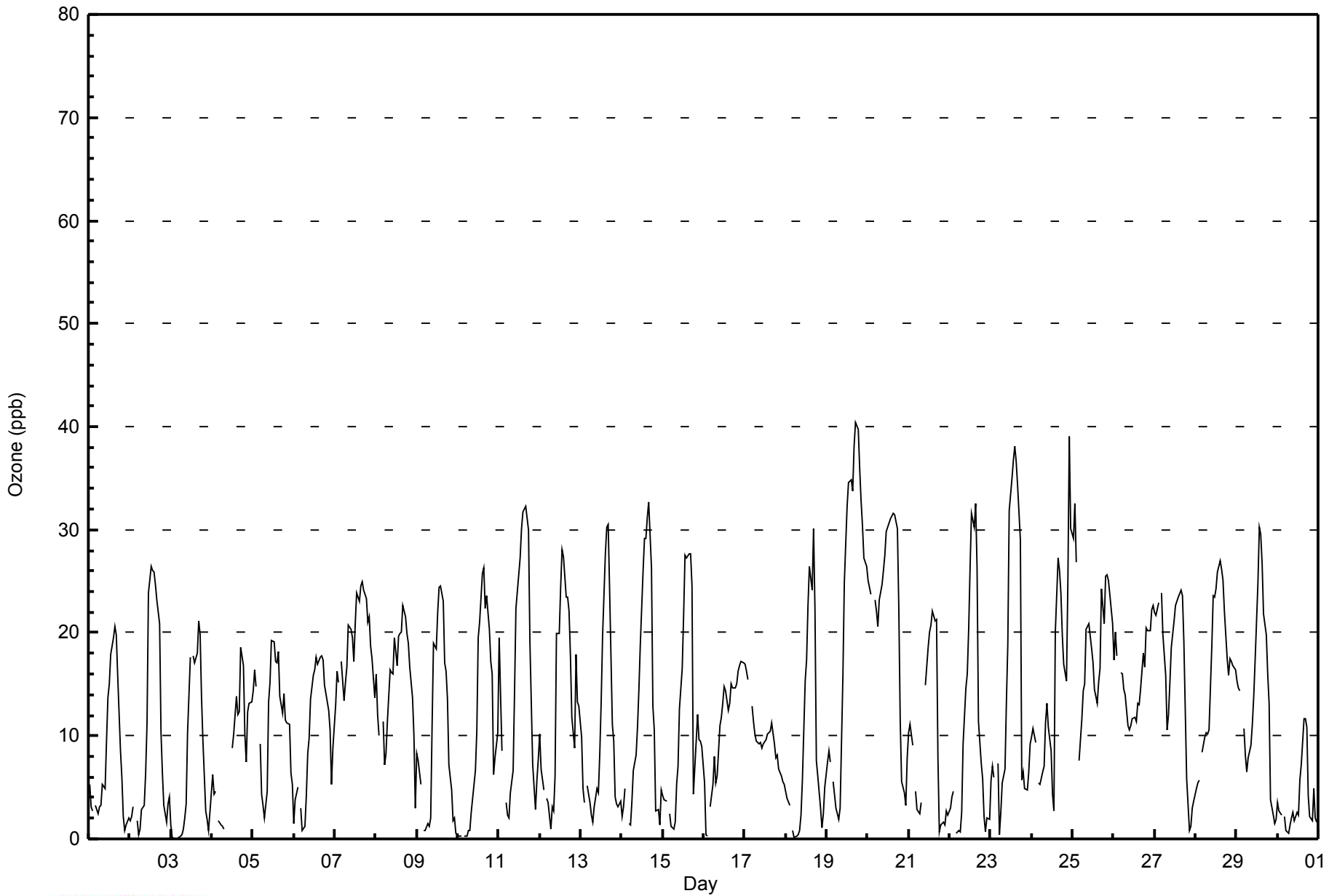
9.8	9.4	8.5	--	6.6	5.4	5.4	6.0	8.1	11.4	14.6	17.7	19.7	21.5	22.9	23.2	22.9	20.7	14.5	12.1	9.7	9.2	9.2	9.1	Diurnal Average		
29	32	27	--	24	22	21	23	25	26	28	32	35	37	38	37	38	40	40	40	36	33	30	39	30	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Athabasca Valley - September 2014





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	528	77.31	77.31
21 - 50	155	22.69	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - September 2014

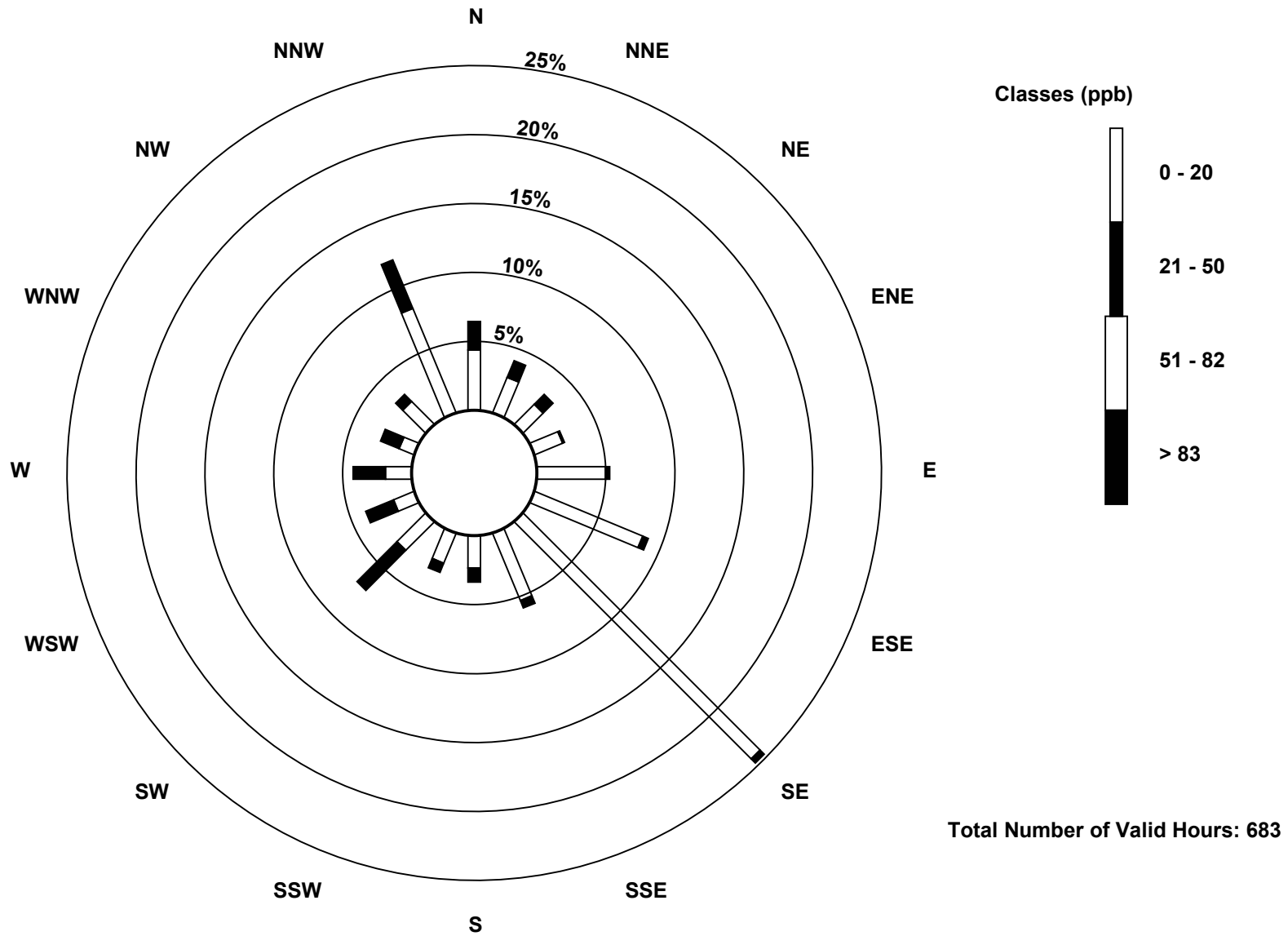
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	30	19	14	15	34	58	166	36	16	16	20	11	13	8	16	56	528
21 - 50	14	9	7	1	2	3	3	4	7	5	28	15	16	10	5	26	155
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	44	28	21	16	36	61	169	40	23	21	48	26	29	18	21	82	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

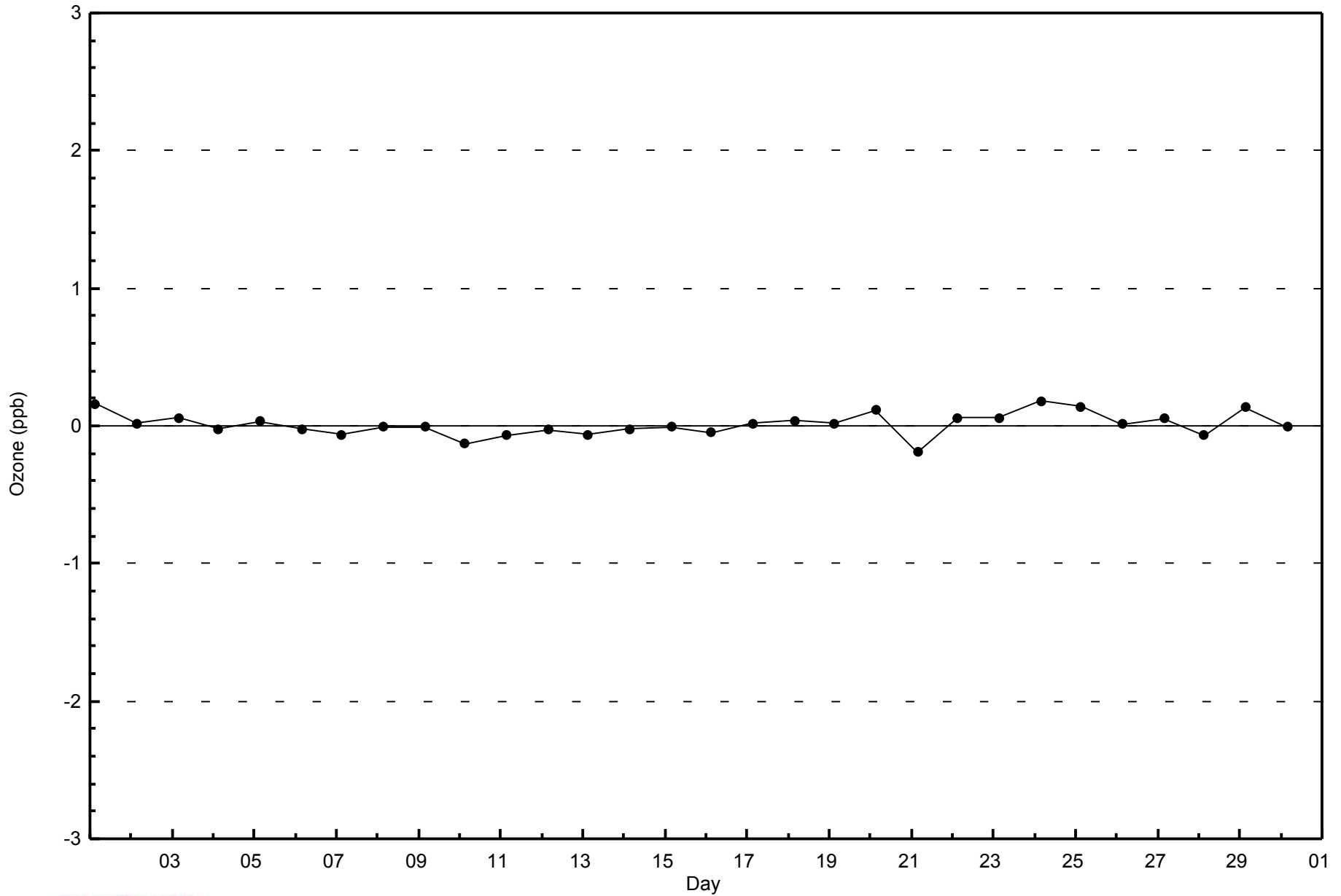
Ozone (O₃) - ppb
Athabasca Valley (AMS 7)





WBEA
Zero Responses

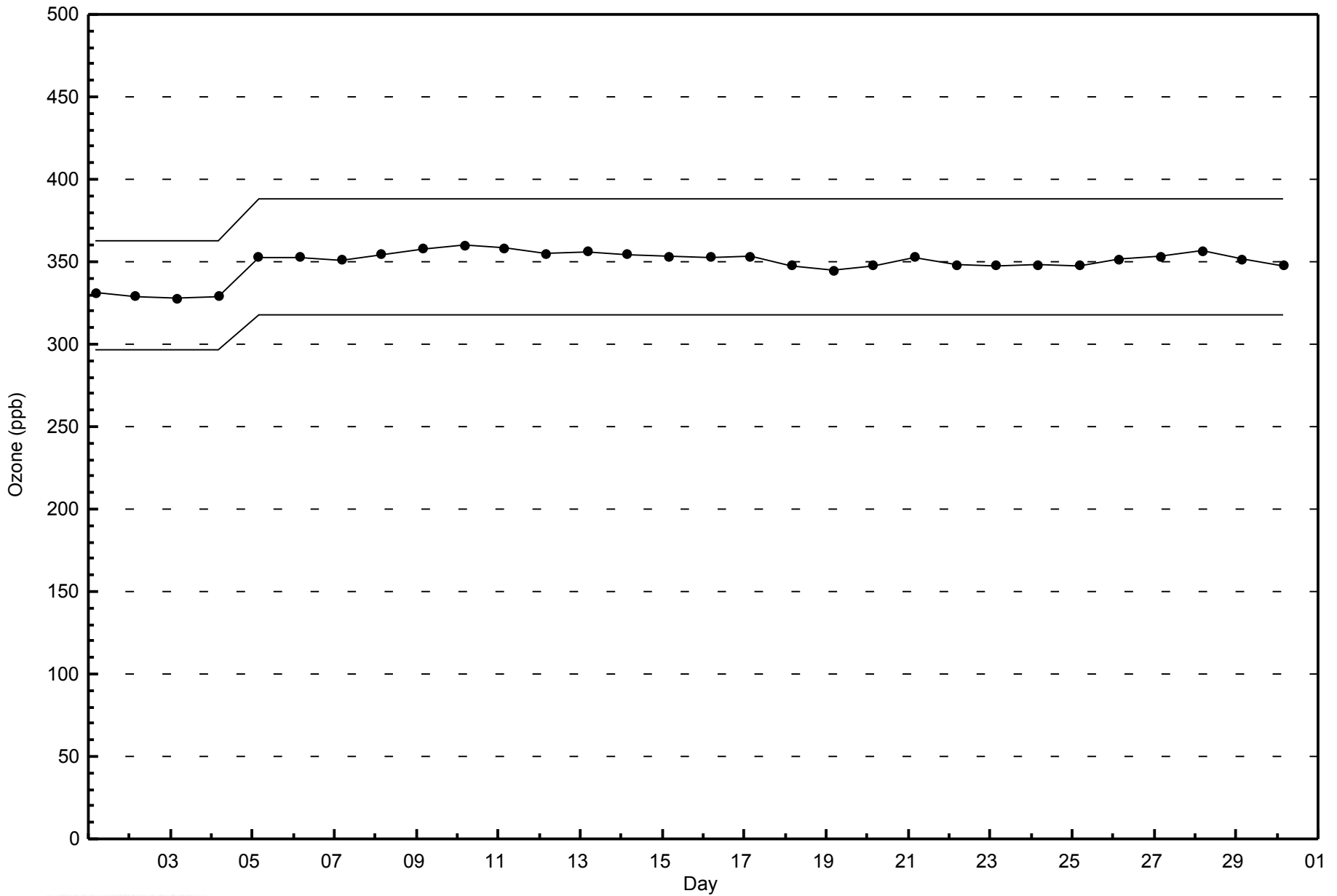
Ozone (O₃) - ppb
Athabasca Valley - September 2014





WBEA
Span Responses

Ozone (O₃) - ppb
Athabasca Valley - September 2014



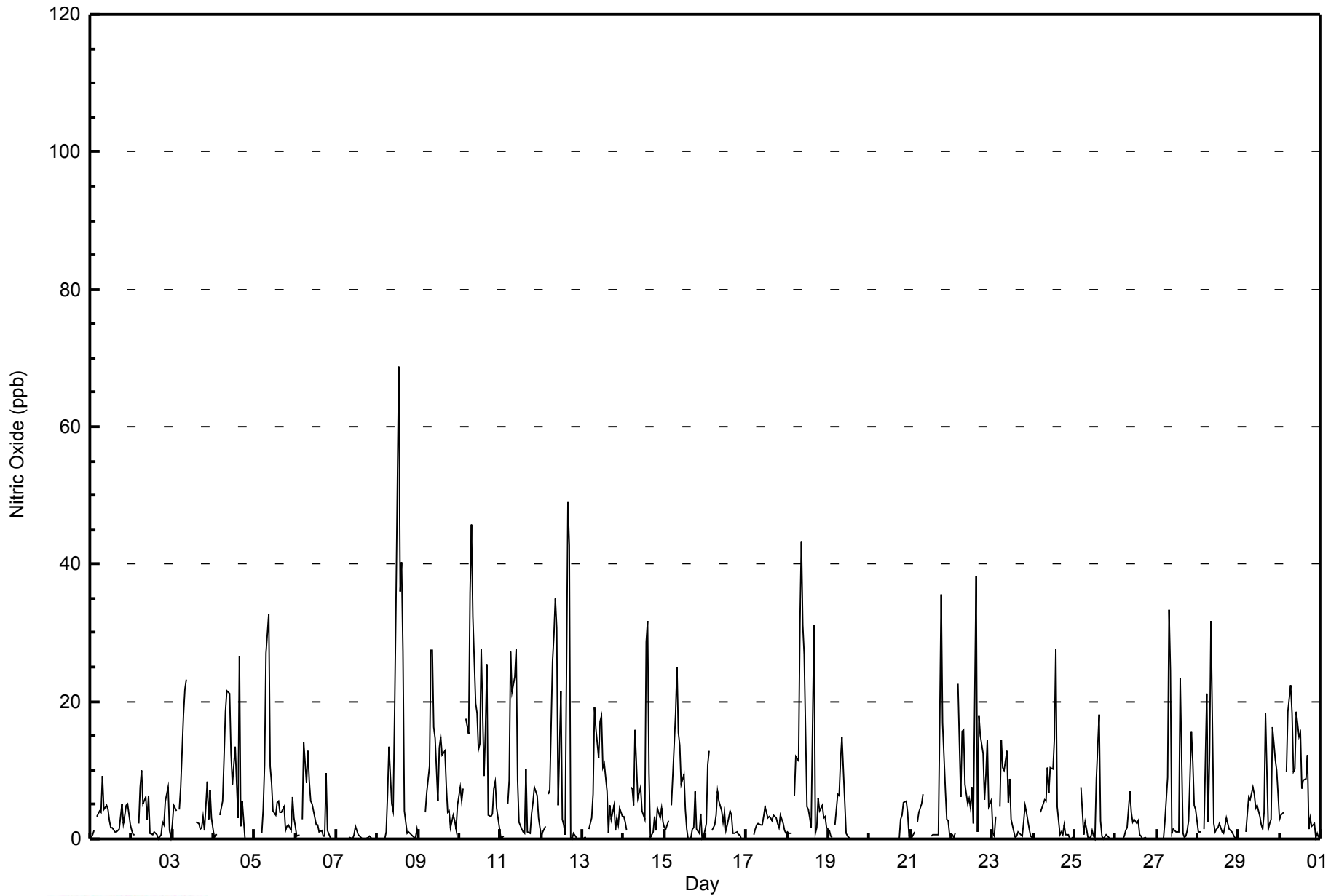


Maximum Value: 69 ppb on Sep 8 13:00																	Maximum Daily Average: 14.9 ppb on Sep 10																	Hours in Service: 720															
Minimum Value: 0 ppb on Sep 4 22:00																	Minimum Daily Average: 0.2 ppb on Sep 7																	Hours of Data: 681															
Maximum Diurnal Average: 15.2 ppb at hour 8																	Minimum Diurnal Average: 1.0 ppb at hour 1																	Hours of Missing Data: 39															
Monthly Average: 5.7 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 7 P ₉₀ = 16 P ₉₉ = 38																	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	1	1	Z	3	4	4	9	4	5	4	3	2	2	1	1	1	1	5	2	4	5	5	2	3.0	9																							
2-Sep	1	1	1	Z	2	7	10	5	6	3	6	1	1	1	1	1	0	1	2	2	5	8	1	0	2.9	10																							
3-Sep	2	5	4	Z	4	8	18	22	23	C	C	C	C	C	2	2	1	2	3	1	8	3	7	3	6.7	23																							
4-Sep	0	1	1	Z	3	6	12	19	22	21	12	8	11	13	3	27	2	5	0	0	0	0	0	0	7.2	27																							
5-Sep	0	0	0	Z	1	4	11	27	33	11	8	4	3	5	6	4	4	5	1	2	2	1	6	3	6.1	33																							
6-Sep	2	0	1	Z	3	14	8	13	8	6	5	3	2	2	1	1	0	0	10	1	0	0	0	0	3.5	14																							
7-Sep	0	0	0	Z	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0.2	2																							
8-Sep	0	0	0	Z	0	1	6	14	5	4	18	34	69	36	40	27	4	1	1	1	1	0	0	1	11.5	69																							
9-Sep	0	0	0	Z	4	7	11	28	27	16	15	6	13	15	12	13	8	4	4	2	3	3	1	5	8.5	28																							
10-Sep	7	5	7	Z	17	15	36	46	32	20	18	13	14	28	9	16	25	4	3	4	7	8	4	2	14.9	46																							
11-Sep	0	0	1	Z	5	8	27	21	24	28	9	2	1	1	1	10	1	1	4	5	8	6	3	2	7.3	28																							
12-Sep	0	1	2	Z	7	7	26	30	35	31	5	22	3	2	1	49	43	0	0	1	0	0	0	0	11.4	49																							
13-Sep	0	0	0	Z	1	3	6	19	16	12	17	18	10	11	7	1	5	3	5	1	3	2	4	3	6.5	19																							
14-Sep	3	2	1	Z	8	7	5	16	6	7	7	4	3	29	32	10	0	1	3	1	4	3	5	2	6.9	32																							
15-Sep	2	1	3	Z	5	9	18	25	16	14	8	9	4	1	0	0	1	2	7	2	1	4	0	0	5.7	25																							
16-Sep	2	11	13	Z	1	2	4	7	6	4	3	4	1	2	4	3	1	1	1	1	1	0	0	0	3.1	13																							
17-Sep	0	0	0	Z	1	1	2	2	2	2	3	5	3	3	3	3	3	3	2	2	3	2	1	1	2.1	5																							
18-Sep	1	1	1	Z	6	12	11	32	43	31	27	5	4	3	2	31	1	2	6	4	5	3	3	2	10.2	43																							
19-Sep	1	0	0	Z	2	7	6	11	15	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2.2	15																							
20-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	5	6	4	0	0.9	6																							
21-Sep	1	0	1	Z	2	4	5	7	C	C	C	C	0	1	1	1	1	17	36	17	7	3	3	1	5.6	36																							
22-Sep	1	0	1	Z	23	6	16	16	8	5	6	4	7	2	38	1	18	15	12	6	9	14	5	6	9.6	38																							
23-Sep	1	0	3	Z	5	15	10	10	13	5	9	3	1	0	0	1	1	0	3	5	4	1	0	0	4.0	15																							
24-Sep	0	0	0	Z	4	4	6	6	10	7	10	10	15	28	5	1	1	1	2	1	1	0	0	0	4.8	28																							
25-Sep	0	0	0	Z	7	1	3	1	0	0	1	0	0	0	9	18	3	0	0	1	0	0	0	0	1.9	18																							
26-Sep	0	0	0	Z	0	0	1	2	7	4	2	3	2	3	1	0	0	0	0	0	0	0	0	0	1.1	7																							
27-Sep	0	0	0	Z	0	3	9	33	24	1	1	1	1	1	23	1	0	0	1	3	16	11	5	4	6.1	33																							
28-Sep	1	1	1	Z	1	21	2	13	32	2	1	2	2	2	1	1	2	3	1	1	1	1	0	0	4.0	32																							
29-Sep	0	0	0	Z	1	4	6	6	7	6	5	5	3	2	1	4	18	1	2	3	16	12	10	7	5.2	18																							
30-Sep	3	3	4	Z	10	18	22	18	10	10	19	15	15	7	8	9	12	1	3	2	2	0	1	0	8.5	22																							
																								1.0	1.2	1.5	--	4.3	6.6	10.1	15.2	15.0	9.3	7.9	6.6	6.6	7.2	7.4	7.3	5.2	2.5	4.1	2.4	3.9	3.2	2.3	1.5	Diurnal Average	
																								7	11	13	--	23	21	36	46	43	31	27	34	69	36	40	49	43	17	36	17	16	14	10	7	Diurnal Maximum	
Z - zerospan C - Calibration																																																	



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Athabasca Valley - September 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	633	92.95	92.95
21 - 40	43	6.31	99.27
41 - 80	5	0.73	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - September 2014

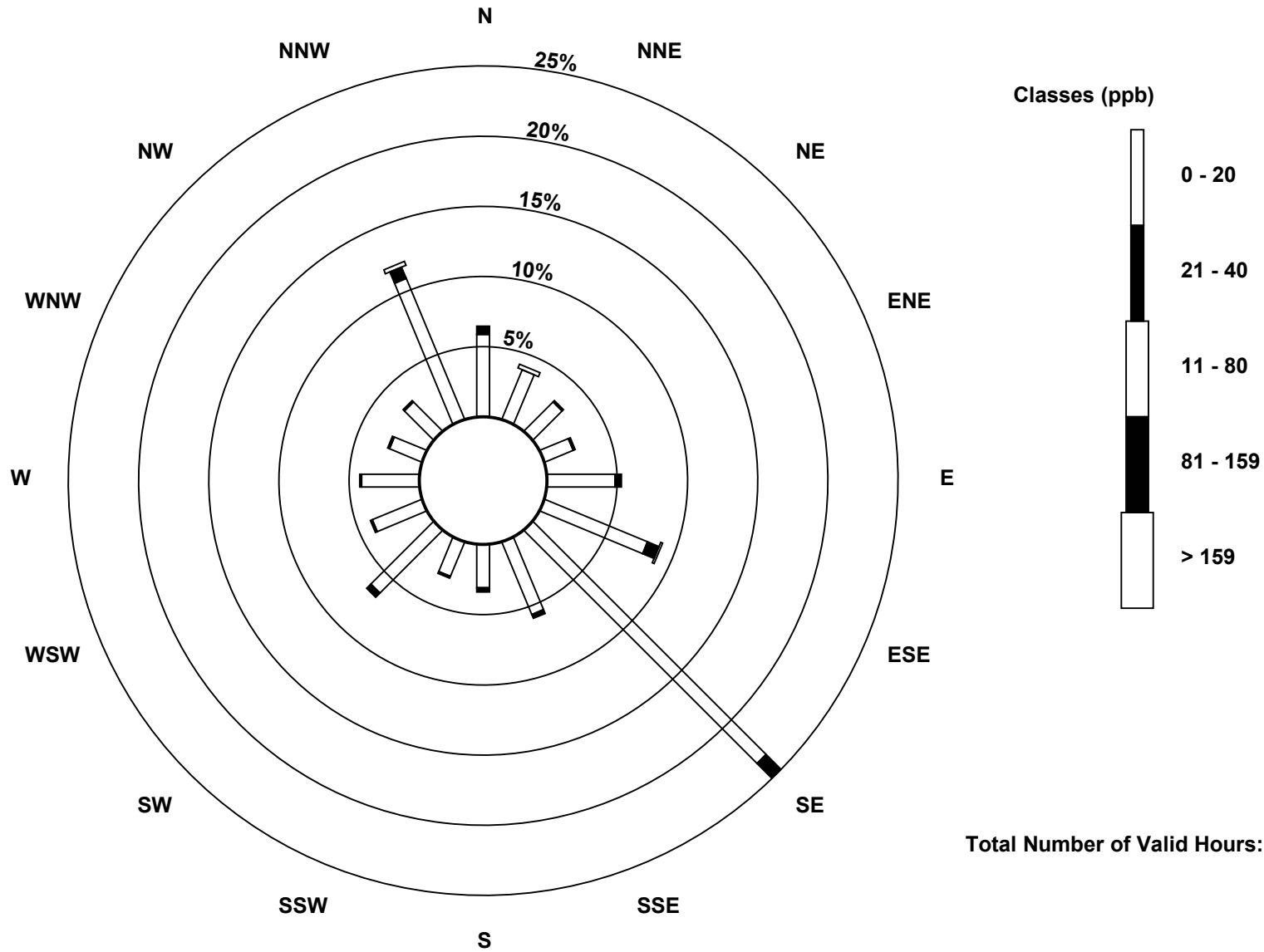
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	40	26	20	15	33	54	160	38	21	18	43	26	28	17	20	74	633
21 - 40	4	0	1	1	3	6	10	2	2	1	3	1	1	1	1	6	43
11 - 80	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	2	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	44	28	21	16	36	61	170	40	23	19	46	27	29	18	21	82	681

Total Number of Valid Hours: 681

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Nitric Oxide (NO) - ppb
Athabasca Valley (AMS 7)

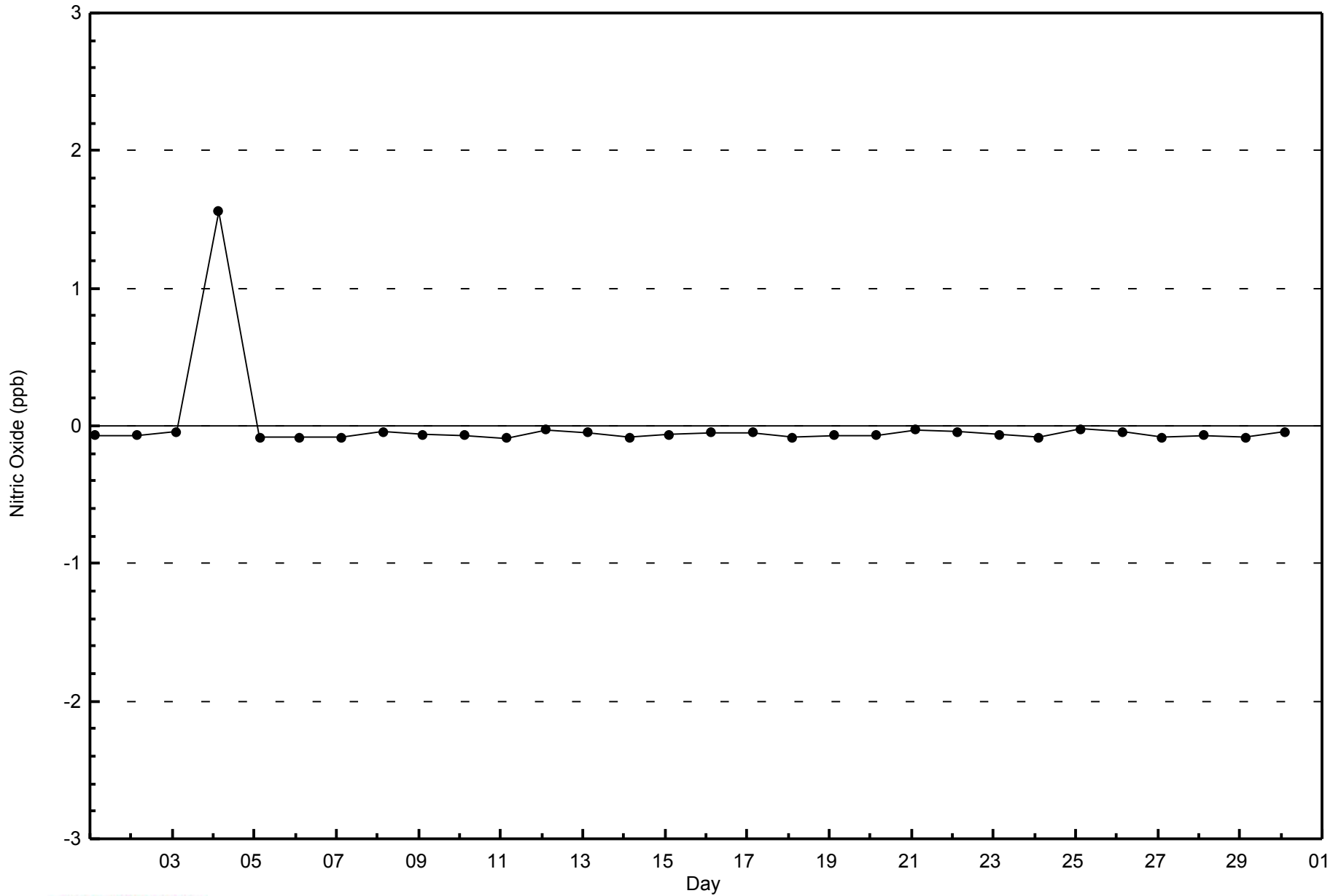


Total Number of Valid Hours: 681



WBEA
Zero Responses

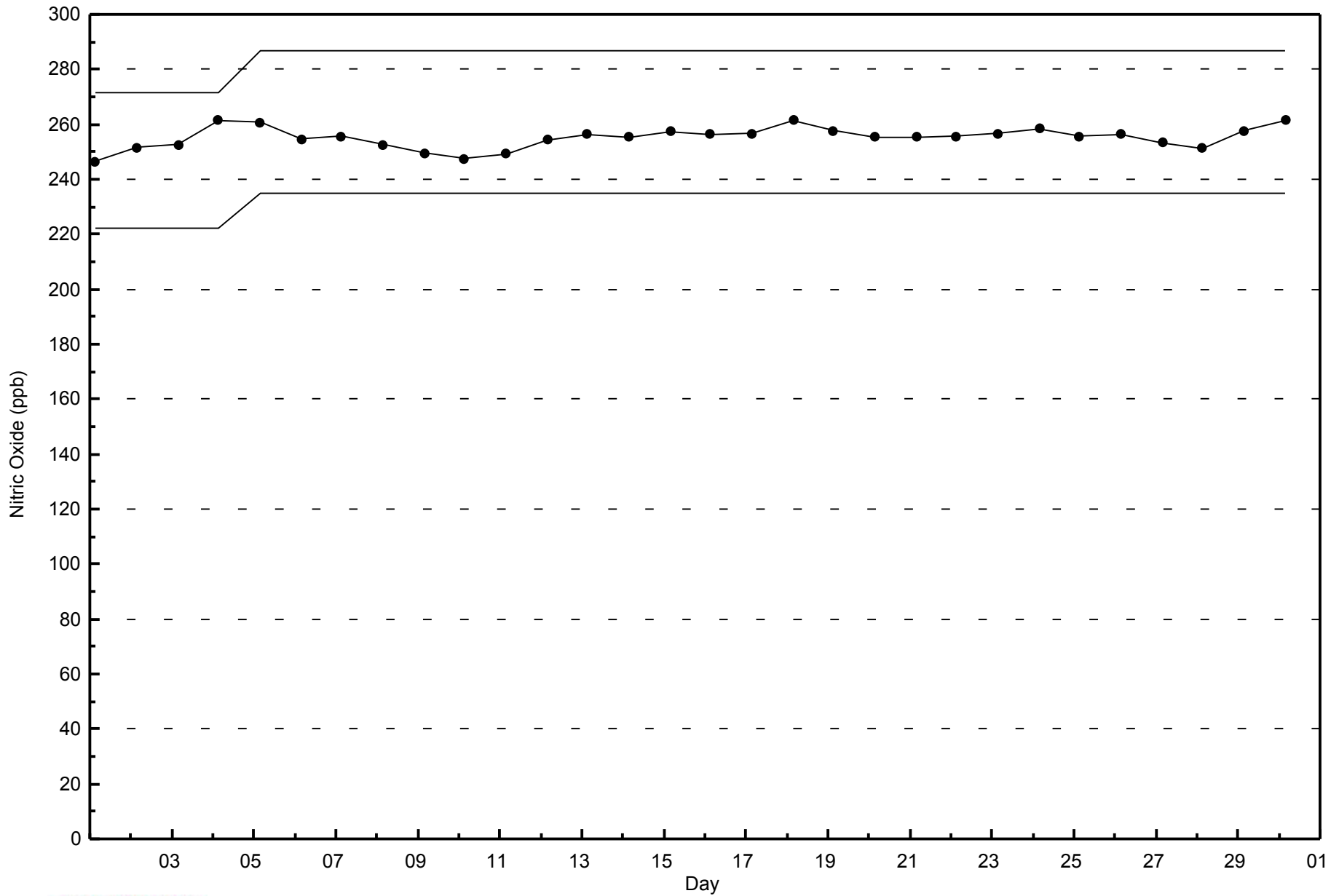
Nitric Oxide (NO) - ppb
Athabasca Valley - September 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Athabasca Valley - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 33 ppb on Sep 23 19:00	Maximum Daily Average: 12.3 ppb on Sep 23		Hours of Data:	681
Minimum Value: 0 ppb on Sep 20 01:00	Minimum Daily Average: 1.6 ppb on Sep 26		Hours of Missing Data:	39
Maximum Diurnal Average: 10.6 ppb at hour 19	Minimum Diurnal Average: 4.4 ppb at hour 15		Hours of Calibration:	39
Monthly Average: 6.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 6 Q ₃ = 9 P ₉₀ = 14 P ₉₉ = 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	3	4	5	Z	5	6	5	4	3	3	3	4	5	6	3	2	4	4	8	6	9	7	6	5	4.6	9
2-Sep	4	3	3	Z	5	6	6	3	3	1	5	2	2	3	3	4	2	4	11	12	12	12	6	4	5.1	12
3-Sep	6	5	5	Z	4	4	4	5	5	C	C	C	C	C	3	3	2	3	8	5	11	11	10	8	5.7	11
4-Sep	4	4	3	Z	4	4	5	6	6	6	5	8	7	9	6	9	7	9	7	8	4	4	3	5.8	9	
5-Sep	3	3	4	Z	6	7	7	11	11	8	6	5	6	6	8	7	7	7	5	8	8	5	2	3	6.2	11
6-Sep	15	11	7	Z	4	7	6	9	9	6	4	4	3	2	2	2	1	1	2	2	1	2	6	4	4.7	15
7-Sep	3	3	5	Z	3	6	4	4	2	2	2	3	3	2	2	2	2	3	2	4	2	4	4	6	3.1	6
8-Sep	5	8	8	Z	8	13	13	10	5	5	7	11	21	10	8	13	6	6	7	5	5	4	7	14	8.6	21
9-Sep	6	6	7	Z	9	9	10	12	14	15	11	11	5	1	6	11	12	12	14	17	12	14	11	11	10.2	17
10-Sep	12	11	9	Z	10	10	16	13	18	11	15	13	6	18	5	2	1	7	10	11	12	18	15	10	11.0	18
11-Sep	3	6	6	Z	8	10	10	11	10	7	5	3	2	2	2	5	3	4	14	19	20	20	15	13	8.6	20
12-Sep	8	10	9	Z	15	15	19	15	18	15	5	10	4	4	3	13	6	7	9	14	14	5	7	4	9.9	19
13-Sep	3	5	5	Z	5	6	9	9	10	8	9	8	8	7	3	2	6	10	17	12	17	14	13	11	8.5	17
14-Sep	9	7	5	Z	9	8	6	10	4	5	6	5	5	9	8	6	2	6	12	6	14	14	14	9	7.7	14
15-Sep	9	7	7	Z	8	9	9	9	7	7	6	10	8	2	0	1	3	8	27	17	9	10	4	5	7.8	27
16-Sep	8	14	12	Z	9	5	5	6	7	2	3	1	1	1	3	3	1	1	2	1	2	1	1	1	3.9	14
17-Sep	1	1	1	Z	2	3	3	4	3	3	3	3	2	2	2	2	5	7	5	4	4	4	3	2	2.9	7
18-Sep	2	2	2	Z	4	5	5	8	9	7	11	5	6	6	5	25	5	12	20	15	11	14	12	9	8.7	25
19-Sep	6	4	4	Z	6	8	9	9	8	4	2	2	2	1	2	2	1	1	1	1	1	0	0	0	3.1	9
20-Sep	0	0	0	Z	1	2	3	2	1	0	0	0	0	0	0	1	1	2	8	13	14	14	17	10	4.0	17
21-Sep	7	4	4	Z	7	7	6	5	C	C	C	C	1	1	1	2	2	17	23	18	14	10	7	4	7.4	23
22-Sep	4	2	5	Z	13	9	11	10	7	6	7	8	9	7	12	5	13	22	21	17	14	20	16	15	10.9	22
23-Sep	10	7	8	Z	11	17	16	11	14	13	16	9	4	3	3	5	7	12	33	24	21	16	14	9	12.3	33
24-Sep	7	4	6	Z	9	10	10	11	12	9	9	14	19	23	8	2	3	5	9	9	9	4	2	6	8.6	23
25-Sep	5	1	1	Z	12	6	4	3	3	1	1	1	1	1	2	6	5	5	3	5	2	2	1	1	3.2	12
26-Sep	1	1	1	Z	1	0	1	1	4	4	3	1	2	2	1	1	2	2	3	2	2	2	1	2	1.6	4
27-Sep	2	2	2	Z	3	6	11	14	15	5	3	2	2	2	6	2	3	7	8	11	17	13	10	8	6.7	17
28-Sep	4	3	2	Z	5	23	6	3	10	3	2	2	2	2	2	2	3	5	9	9	6	5	4	4	5.0	23
29-Sep	3	3	3	Z	6	9	12	9	8	7	6	6	5	4	4	6	27	6	8	9	19	17	15	12	8.8	27
30-Sep	9	8	7	Z	5	8	9	8	6	6	9	7	10	11	12	12	13	8	12	14	12	6	7	7	8.8	14

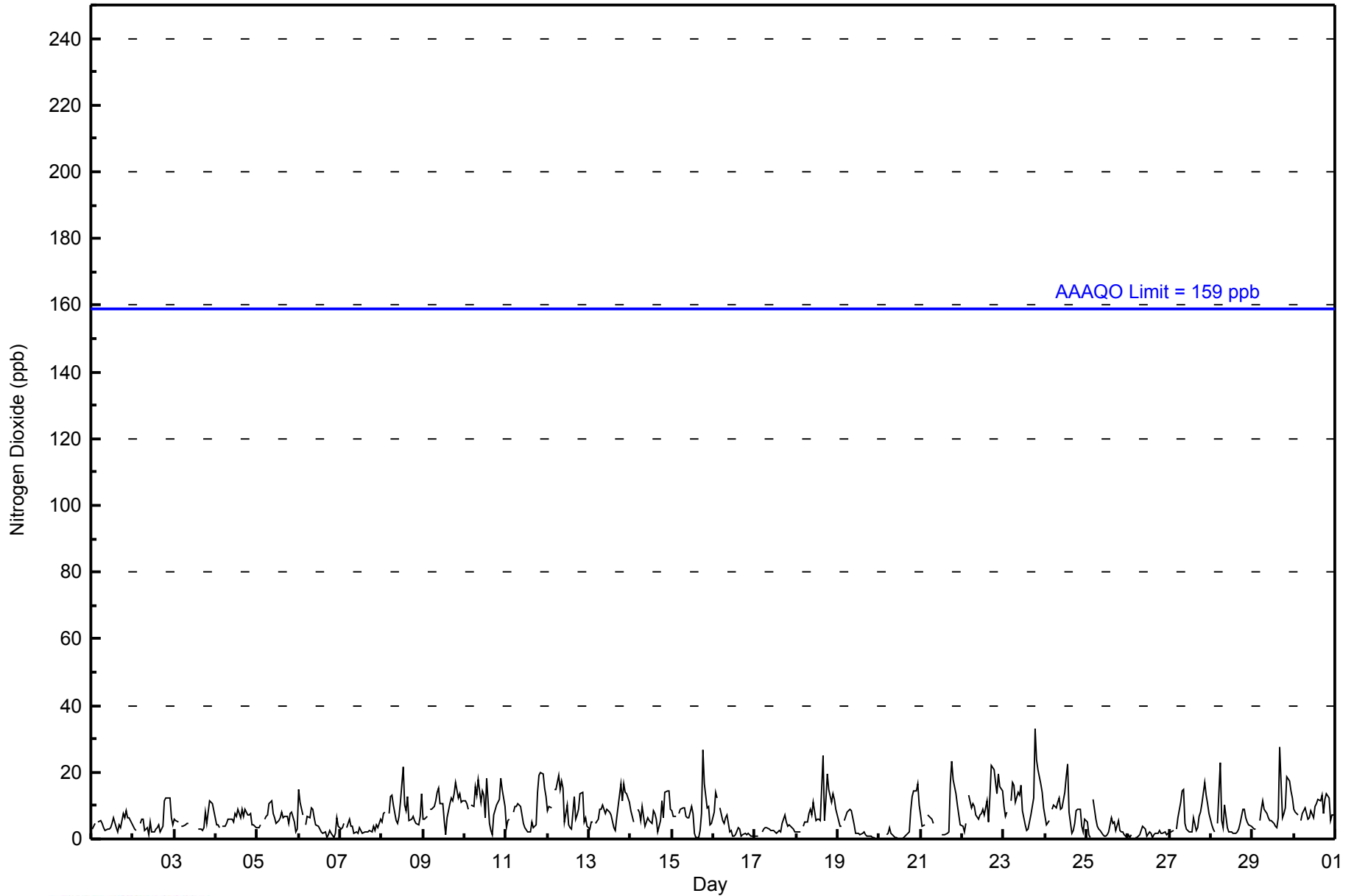
5.3	4.9	4.9	--	6.5	7.8	7.9	7.8	7.9	6.0	5.8	5.6	5.1	5.1	4.4	5.2	5.2	6.6	10.6	9.7	10.0	9.0	7.9	6.6	Diurnal Average	
15	14	12	--	15	23	19	15	18	15	16	14	21	23	12	25	27	22	33	24	21	20	17	15	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	669	98.24	98.24
21 - 40	12	1.76	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - September 2014

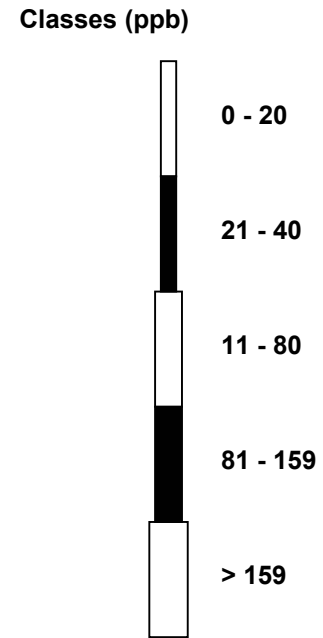
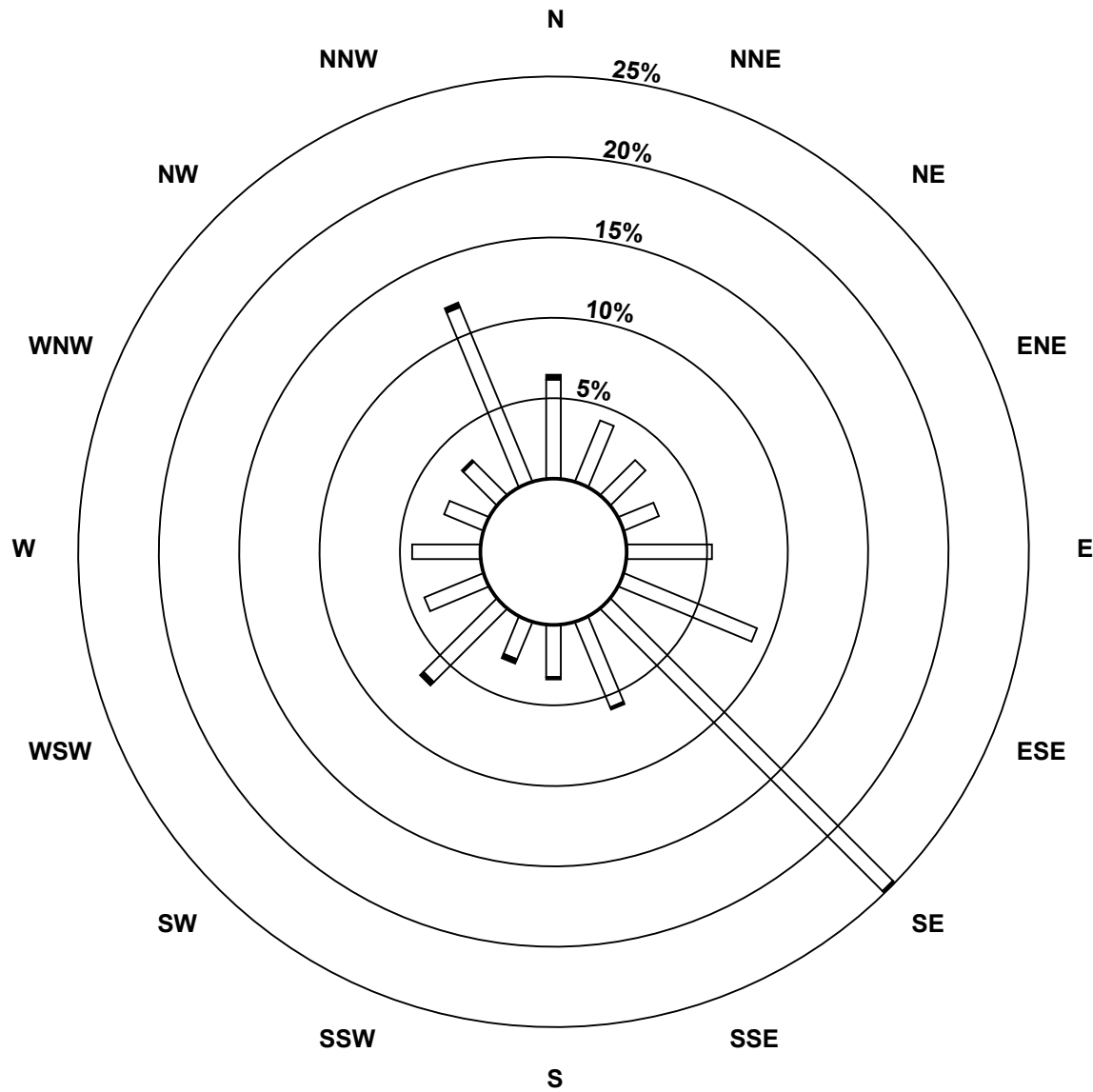
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	42	28	21	16	36	61	169	39	22	17	44	27	29	18	20	80	669
21 - 40	2	0	0	0	0	0	1	1	1	2	2	0	0	0	1	2	12
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	44	28	21	16	36	61	170	40	23	19	46	27	29	18	21	82	681

Total Number of Valid Hours: 681

Total Number of Hours: 720

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

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley (AMS 7)**

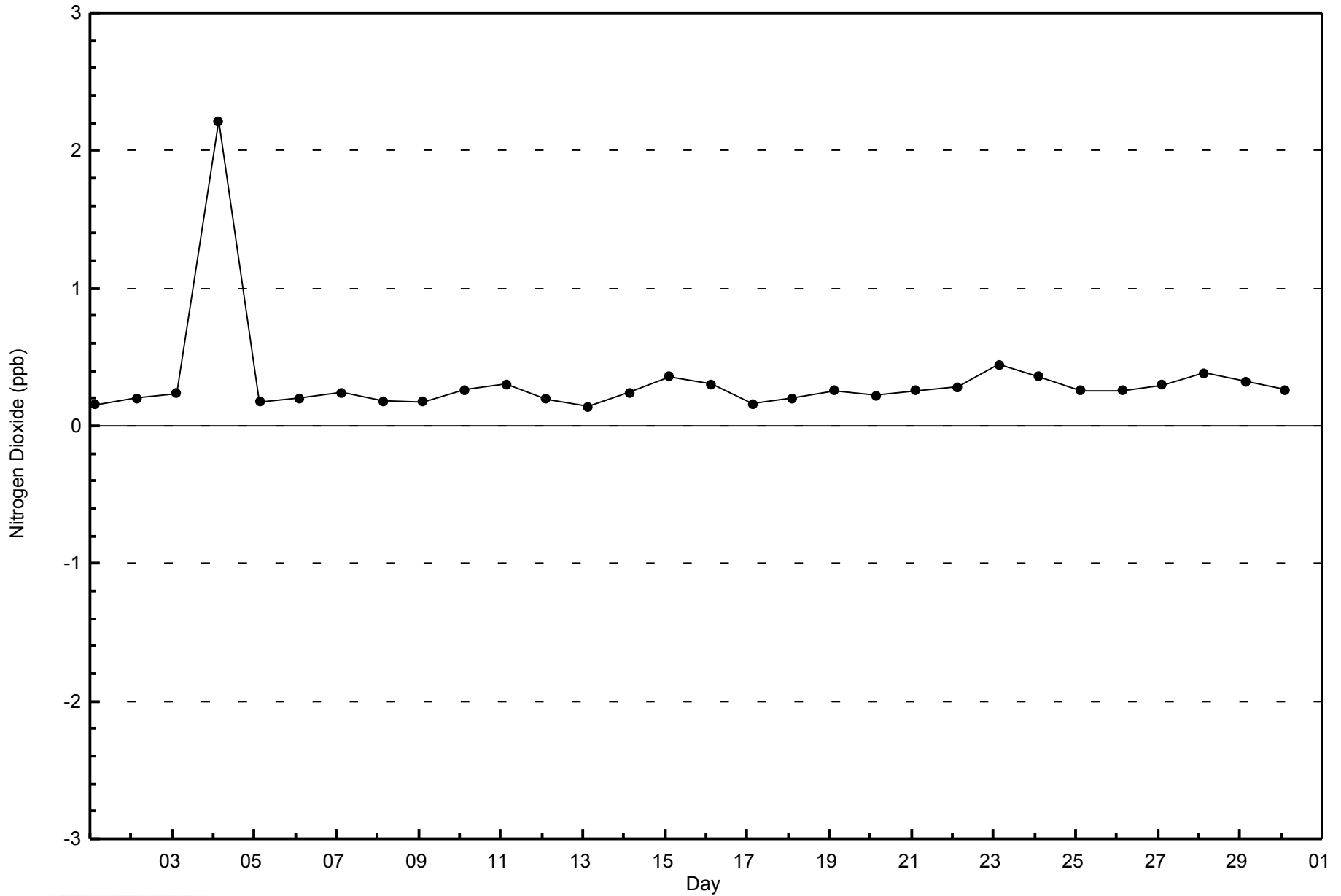


Total Number of Valid Hours: 681



WBEA
Zero Responses

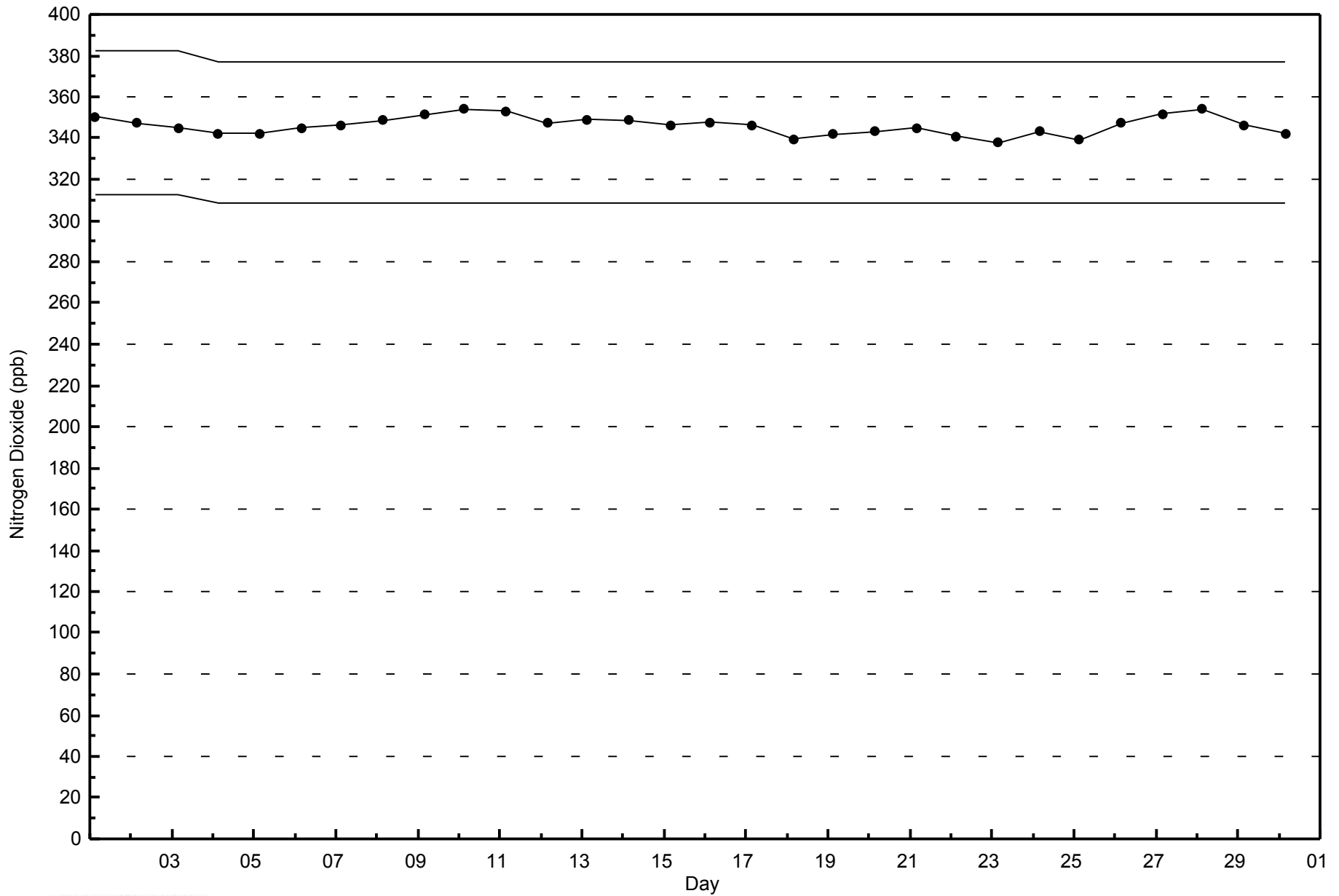
Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - September 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - September 2014



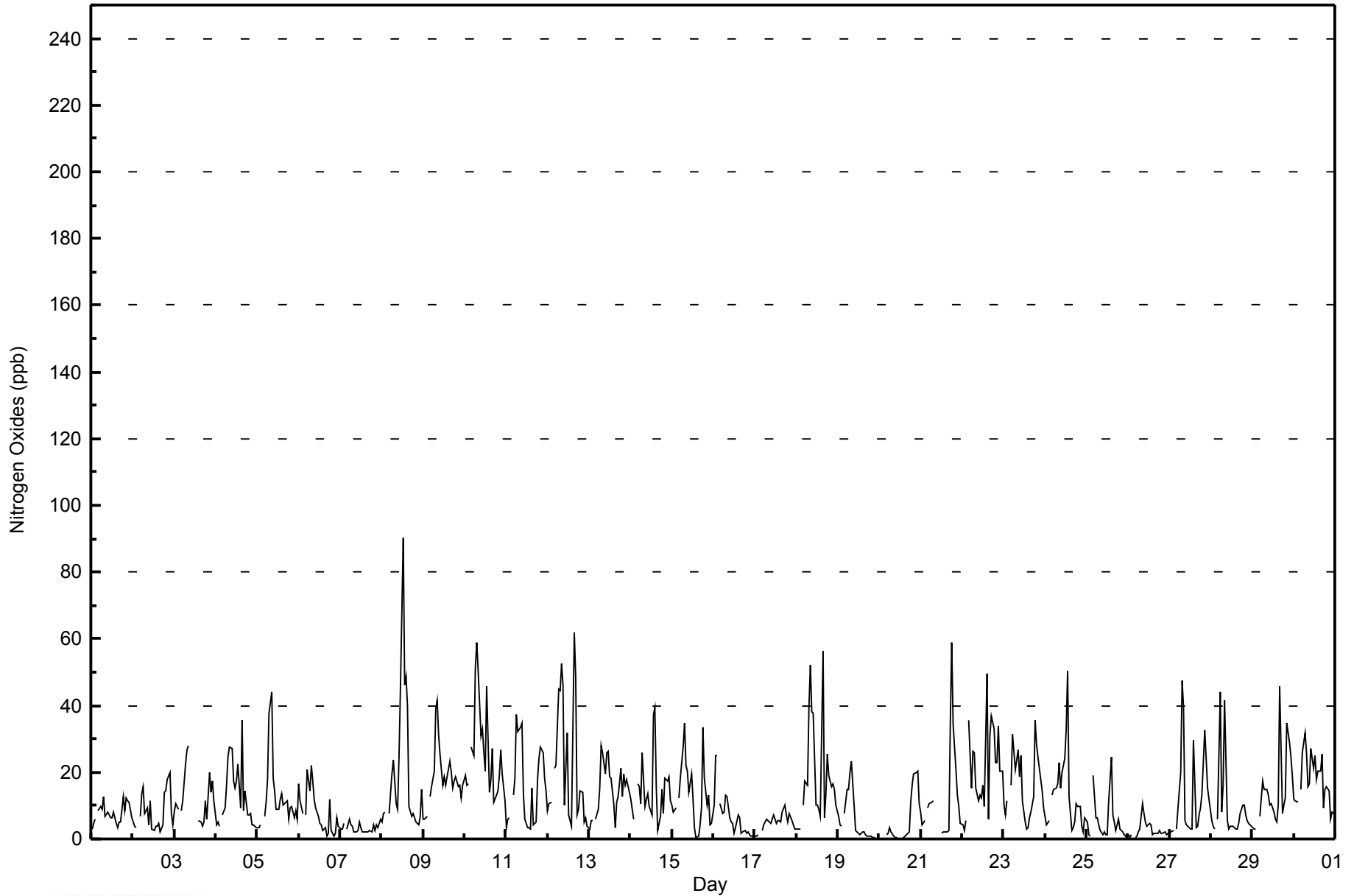


Maximum Value: 90 ppb on Sep 8 13:00																	Maximum Daily Average: 25.9 ppb on Sep 10																	Hours in Service: 720			
Minimum Value: 0 ppb on Sep 20 03:00																	Minimum Daily Average: 2.7 ppb on Sep 26																	Hours of Data: 681			
Maximum Diurnal Average: 22.9 ppb at hour 8																	Minimum Diurnal Average: 6.1 ppb at hour 2																	Hours of Missing Data: 39			
Monthly Average: 12.5 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 9 Q ₃ = 17 P ₉₀ = 27 P ₉₉ = 52																	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	3	5	6	Z	8	10	9	13	7	8	7	6	6	8	5	3	5	5	13	9	12	11	11	6	7.6	13											
2-Sep	5	4	3	Z	7	13	16	8	9	4	11	3	3	4	4	5	2	4	14	14	18	20	8	4	8.0	20											
3-Sep	8	10	9	Z	8	11	23	27	28	C	C	C	C	C	5	5	4	5	12	6	20	14	17	11	12.4	28											
4-Sep	4	5	4	Z	7	9	16	25	27	27	18	15	18	22	9	35	9	14	7	7	4	4	3	13.0	35												
5-Sep	3	3	4	Z	7	11	18	38	44	18	15	9	9	12	13	10	11	12	6	9	10	6	8	6	12.3	44											
6-Sep	17	11	8	Z	7	21	14	22	17	12	10	7	5	4	3	3	1	1	12	3	1	2	6	4	8.2	22											
7-Sep	3	3	5	Z	3	6	4	4	2	2	2	5	4	2	2	2	2	3	2	4	2	4	4	6	3.4	6											
8-Sep	5	7	8	Z	8	14	19	24	11	9	25	45	90	46	49	40	10	7	8	6	5	4	7	15	20.0	90											
9-Sep	6	6	7	Z	13	16	20	39	42	31	25	16	19	16	19	23	20	15	18	19	16	16	12	16	18.7	42											
10-Sep	19	16	17	Z	28	25	51	59	50	31	33	26	20	46	14	18	27	11	13	15	19	27	19	12	25.9	59											
11-Sep	4	6	6	Z	13	18	37	32	33	35	13	6	4	3	3	15	4	5	18	24	28	26	18	14	15.9	37											
12-Sep	9	11	11	Z	21	22	45	45	52	46	10	32	7	6	4	62	49	7	9	14	14	5	7	4	21.3	62											
13-Sep	3	5	5	Z	6	9	15	28	26	20	26	26	19	18	10	3	11	13	21	13	20	16	18	14	15.0	28											
14-Sep	12	9	6	Z	17	16	10	26	10	12	14	10	7	37	39	15	2	7	15	8	18	17	19	11	14.7	39											
15-Sep	10	8	9	Z	12	18	27	35	22	20	14	19	12	3	0	1	4	9	33	18	10	13	4	5	13.5	35											
16-Sep	10	25	25	Z	11	8	8	13	13	6	5	5	2	3	7	6	2	2	3	2	2	1	1	1	7.0	25											
17-Sep	1	1	1	Z	3	4	5	6	5	5	6	7	5	5	6	5	8	10	7	5	8	6	4	3	5.1	10											
18-Sep	3	3	3	Z	10	17	16	39	52	38	38	10	10	9	7	56	6	14	25	19	16	17	15	10	18.9	56											
19-Sep	7	4	4	Z	8	15	15	20	23	10	2	2	2	1	2	2	1	1	1	1	1	0	0	0	5.3	23											
20-Sep	0	0	0	Z	1	2	3	2	1	0	0	0	0	0	0	1	1	2	11	16	20	20	20	10	4.9	20											
21-Sep	8	4	5	Z	9	11	11	11	C	C	C	C	1	2	2	2	3	34	59	34	21	13	10	5	13.0	59											
22-Sep	4	2	5	Z	36	15	26	26	15	11	13	12	16	10	50	6	31	37	33	23	23	34	20	20	20.4	50											
23-Sep	10	7	12	Z	16	32	26	21	27	18	25	11	5	3	3	6	8	13	36	28	25	18	14	9	16.3	36											
24-Sep	7	4	6	Z	13	15	15	16	23	15	20	24	33	50	13	2	3	5	11	10	10	4	2	6	13.4	50											
25-Sep	5	1	1	Z	19	6	6	4	3	1	2	1	1	11	24	7	5	3	6	3	2	2	1	1	5.1	24											
26-Sep	1	0	1	Z	1	1	2	3	11	7	5	4	4	4	1	2	2	2	3	2	2	2	1	2	2.7	11											
27-Sep	2	2	2	Z	3	9	20	48	39	6	4	3	3	3	30	3	4	7	9	14	33	24	15	12	12.8	48											
28-Sep	5	4	3	Z	6	44	8	16	42	5	3	4	4	4	3	3	5	8	10	10	7	6	5	4	9.0	44											
29-Sep	3	3	3	Z	7	12	18	15	15	13	10	10	8	6	5	10	46	8	10	12	35	29	24	19	14.0	46											
30-Sep	12	12	11	Z	15	26	32	26	16	17	27	21	25	18	20	20	25	9	15	16	15	6	8	8	17.3	32											
																	6.3 6.1 6.4 -- 10.7 14.5 17.9 22.9 22.9 15.3 13.7 12.2 11.8 12.3 11.8 12.5 10.4 9.1 14.6 12.1 13.9 12.2 10.2 8.1																	Diurnal Average			
																	19 25 25 -- 36 44 51 59 52 46 38 45 90 50 50 62 49 37 59 34 35 34 24 20																	Diurnal Maximum			
Z - zerospan C - Calibration																																					



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	564	82.82	82.82
21 - 40	92	13.51	96.33
41 - 80	24	3.52	99.85
81 - 159	1	0.15	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - September 2014

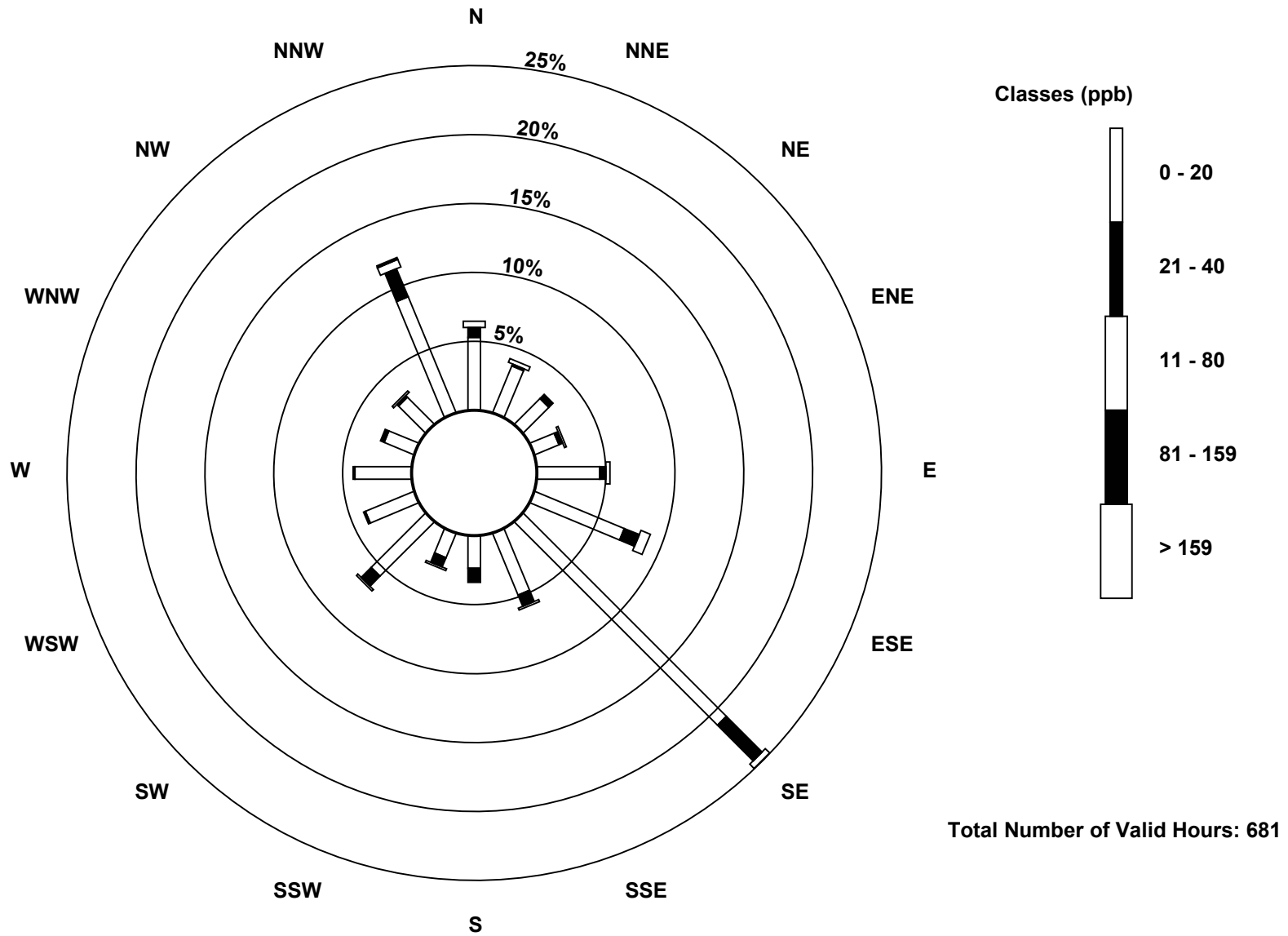
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	25	18	13	31	48	142	33	16	13	38	26	28	16	19	62	564
21 - 40	5	1	3	2	3	8	25	6	7	5	7	1	1	2	1	15	92
11 - 80	3	2	0	1	2	5	3	1	0	1	1	0	0	0	1	4	24
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	44	28	21	16	36	61	170	40	23	19	46	27	29	18	21	82	681

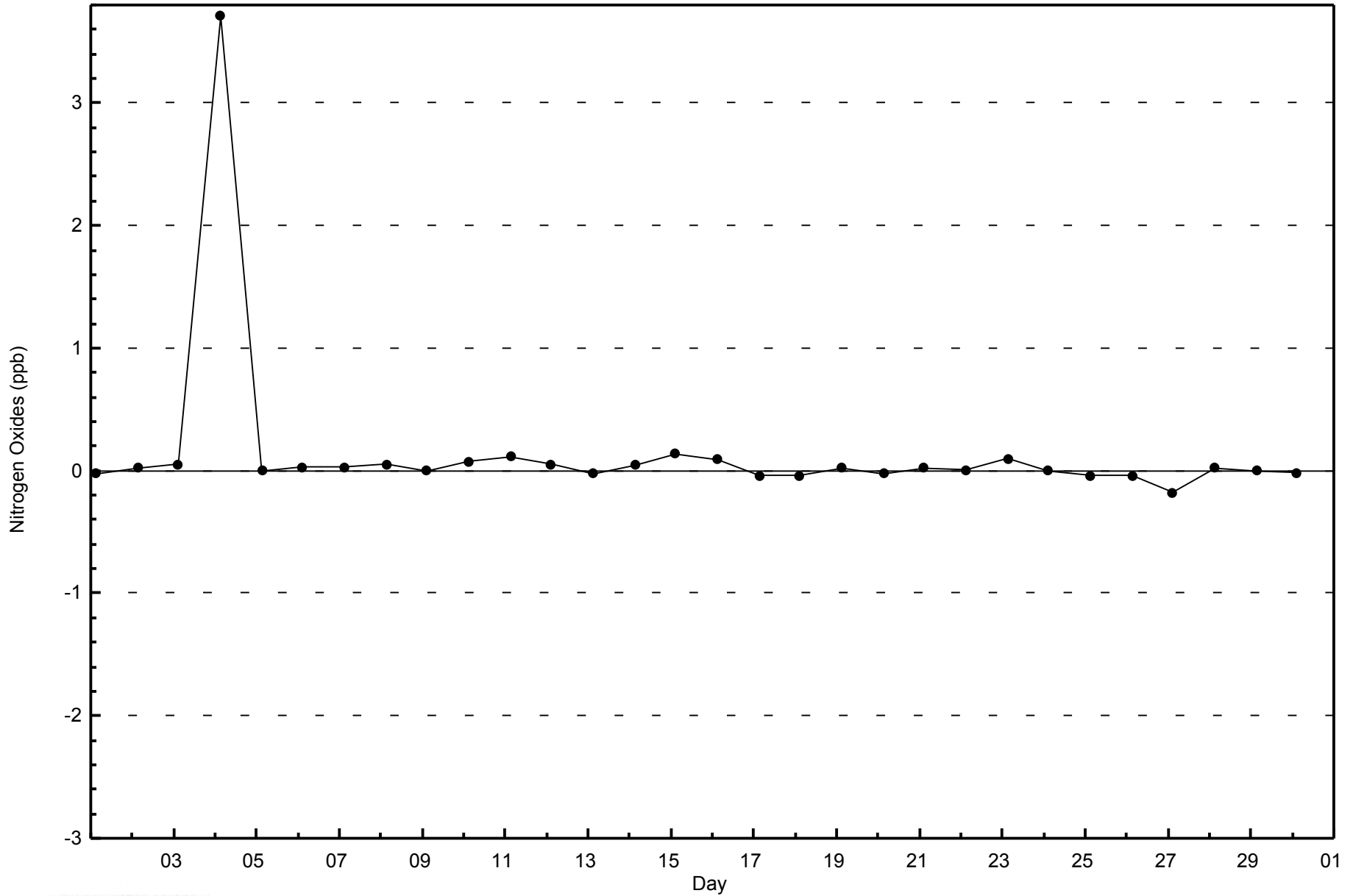
Total Number of Valid Hours: 681

Total Number of Hours: 720

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

**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley (AMS 7)**

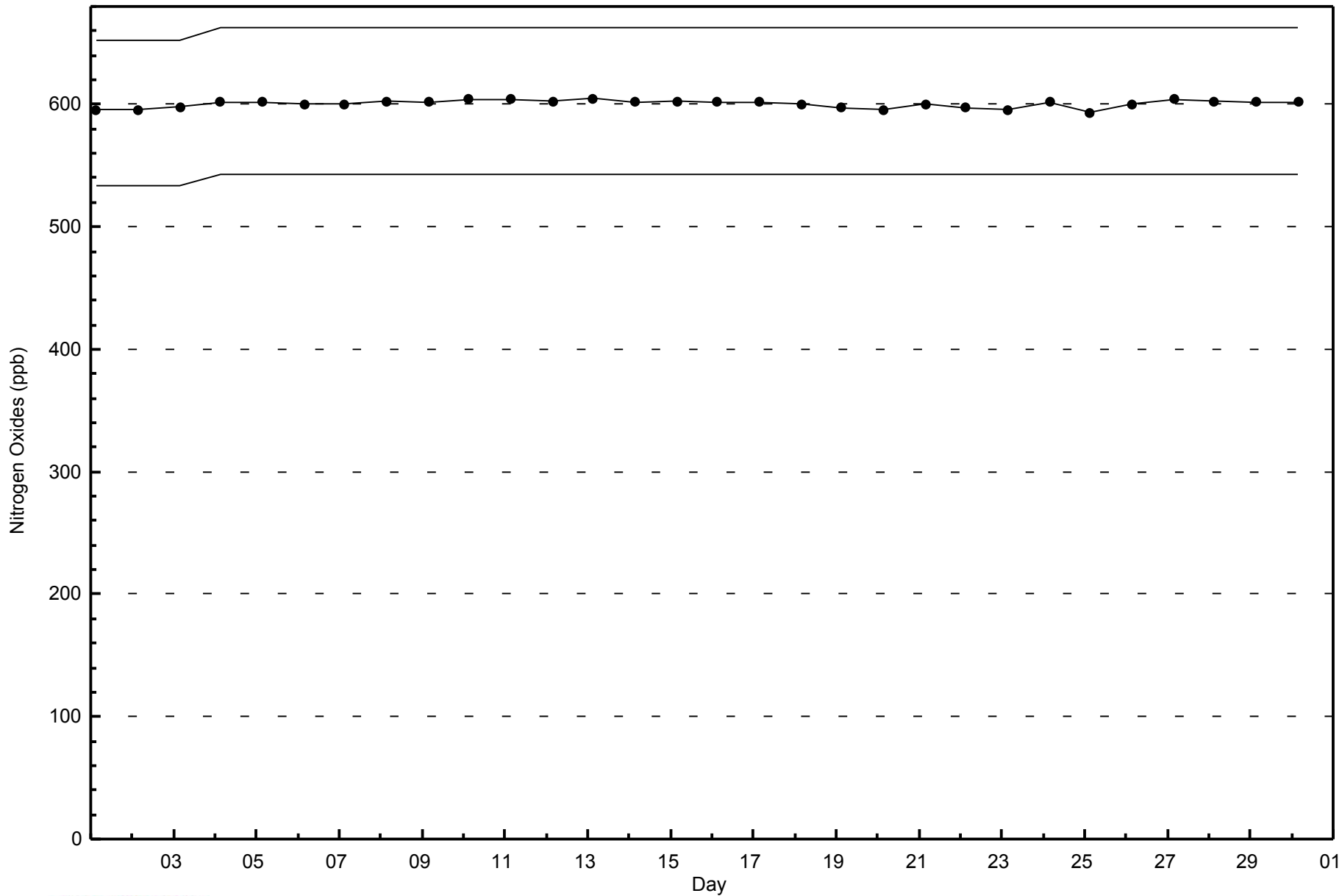






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - September 2014





Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 42.8 µg/m ³ on Sep 10 12:00	Maximum Daily Average: 12.4 µg/m ³ on Sep 13	Hours of Data:	718
Minimum Value: 0.4 µg/m ³ on Sep 25 02:00	Minimum Daily Average: 1.4 µg/m ³ on Sep 7	Hours of Missing Data:	2
Maximum Diurnal Average: 10.0 µg/m ³ at hour 22	Minimum Diurnal Average: 5.3 µg/m ³ at hour 6	Hours of Calibration:	0
Monthly Average: 7.05 µg/m ³	Percentiles: P ₁ = 0.8 P ₁₀ = 2.1 Q ₁ = 3.6 Median = 6.0 Q ₃ = 8.9 P ₉₀ = 12.9 P ₉₉ = 24.1	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	7.2	6.5	4.9	4.3	4.1	4.2	3.6	3.2	2.9	2.8	3.6	5.7	5.4	5.3	6.4	6.8	6.8	4.7	3.2	5.9	8.4	9.6	6.9	4.6	5.3	9.6
2-Sep	5.7	5.8	4.5	3.5	3.5	3.6	3.7	3.6	3.6	3.8	4.3	4.5	6.7	7.6	8.3	8.3	5.1	4.9	8.3	8.2	10.2	12.3	11.0	8.8	6.2	12.3
3-Sep	7.9	10.1	9.7	8.8	7.3	5.7	5.6	4.0	3.7	7.0	6.7	6.6	8.1	9.3	8.3	6.5	6.9	8.0	6.8	4.9	6.7	10.7	12.9	11.1	7.6	12.9
4-Sep	10.3	8.6	6.1	4.1	3.1	3.0	3.2	3.3	3.1	3.6	3.6	4.2	4.7	8.9	10.9	13.8	6.3	6.7	8.6	10.3	7.7	6.5	7.0	7.2	6.5	13.8
5-Sep	7.1	5.9	3.7	3.9	3.6	3.4	3.5	4.4	4.9	4.2	4.2	M	5.0	5.4	4.2	4.5	4.4	3.7	4.6	8.3	11.3	10.5	6.3	4.3	5.3	11.3
6-Sep	16.4	16.0	11.5	6.6	5.4	6.6	5.9	6.2	4.5	4.3	4.4	4.8	4.5	3.6	2.8	1.8	1.9	1.8	2.1	1.9	1.6	1.2	0.8	1.1	4.9	16.4
7-Sep	1.5	1.5	1.6	0.7	0.9	1.0	0.7	0.6	0.8	0.9	1.1	1.3	1.2	1.2	1.8	1.7	1.5	1.6	1.8	2.4	2.2	1.7	1.5	2.1	1.4	2.4
8-Sep	1.7	1.7	1.5	1.3	1.0	1.5	5.0	5.2	0.8	0.8	1.2	2.3	3.1	3.2	5.5	7.6	8.8	7.3	11.8	10.0	8.8	6.2	5.9	4.6	4.5	11.8
9-Sep	3.8	3.7	3.7	3.8	4.9	5.9	7.6	10.1	10.5	10.0	3.7	5.1	5.7	4.1	4.3	8.3	20.6	21.0	26.9	19.7	21.6	11.2	9.1	8.9	9.8	26.9
10-Sep	9.6	7.9	9.0	8.9	9.3	11.7	16.5	11.9	11.0	10.9	12.6	42.8	5.9	8.0	7.4	6.4	9.9	19.7	8.2	9.6	8.5	12.1	7.2	5.3	11.3	42.8
11-Sep	3.0	3.4	7.5	5.7	5.1	5.4	6.4	6.9	7.1	4.6	3.3	4.1	5.2	5.8	5.7	6.0	10.6	6.8	12.2	14.7	18.2	17.8	12.2	7.5	7.7	18.2
12-Sep	6.1	5.6	5.2	4.9	5.3	6.7	9.6	8.9	11.2	13.0	13.2	16.7	13.2	8.9	8.7	9.2	11.3	8.1	19.3	12.1	10.6	8.8	9.0	7.8	9.7	19.3
13-Sep	8.1	7.1	6.1	5.3	5.2	4.1	5.1	5.2	6.0	6.8	10.2	12.9	10.9	11.7	9.5	12.9	19.8	17.9	22.1	21.7	29.5	24.5	19.3	14.5	12.4	29.5
14-Sep	12.9	12.2	9.2	8.2	8.4	7.9	7.2	7.4	7.0	7.2	8.6	11.6	12.9	8.8	8.9	8.8	9.6	10.3	16.7	12.2	14.1	19.1	21.3	16.5	11.1	21.3
15-Sep	17.2	15.6	13.0	10.4	9.2	9.1	9.4	10.0	8.7	8.3	6.8	13.7	10.8	6.5	4.4	4.3	8.0	12.3	15.7	8.7	7.5	8.3	7.8	8.1	9.7	17.2
16-Sep	9.7	10.9	13.3	15.3	13.4	12.6	10.8	8.7	6.1	5.8	8.8	9.9	8.9	8.4	8.5	8.0	6.5	6.9	6.3	5.9	5.7	4.8	4.4	3.3	8.5	15.3
17-Sep	2.3	2.0	1.9	1.8	1.7	1.7	1.8	1.7	1.8	1.7	1.9	2.2	2.3	2.5	4.2	5.2	7.8	8.9	8.5	9.4	8.8	7.9	7.3	6.5	4.2	9.4
18-Sep	4.9	5.2	7.4	4.2	3.7	4.3	5.1	4.8	7.0	6.2	9.1	13.3	14.0	13.3	15.2	17.9	11.6	16.4	17.9	15.2	15.8	20.8	22.3	18.7	11.4	22.3
19-Sep	16.0	13.1	11.5	9.7	9.1	11.0	9.8	11.0	12.4	13.1	12.0	8.1	5.8	3.9	4.5	4.7	4.7	4.5	2.3	2.0	2.3	2.0	0.8	0.7	7.3	16.0
20-Sep	0.9	1.2	1.5	2.0	2.0	2.0	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.4	3.3	5.8	9.2	9.8	12.5	10.2	3.6	12.5
21-Sep	8.9	7.5	6.8	6.2	5.0	4.3	3.7	3.5	3.9	3.6	2.3	1.2	0.9	1.2	1.8	2.1	2.5	5.6	7.9	5.3	6.5	9.5	9.2	5.1	4.8	9.5
22-Sep	4.1	4.4	6.2	7.7	7.3	5.0	5.7	5.5	4.5	4.1	3.2	4.5	8.1	7.0	4.6	5.0	7.3	11.7	14.9	9.2	15.9	24.3	25.4	36.0	9.7	36.0
23-Sep	17.4	13.7	9.9	9.4	8.4	5.9	7.5	11.1	12.0	14.4	18.0	9.3	4.3	4.0	5.2	5.5	5.7	5.8	9.6	8.9	5.6	7.9	10.7	22.1	9.7	22.1
24-Sep	17.4	8.2	6.7	6.0	11.4	4.8	4.7	4.3	4.5	5.5	5.3	5.5	9.4	14.9	8.4	7.7	8.6	7.3	9.1	M	8.3	6.6	1.6	2.8	7.3	17.4
25-Sep	0.8	0.4	2.7	3.9	3.8	4.8	5.8	5.3	3.2	2.4	2.4	2.5	2.6	2.8	3.3	3.6	3.7	3.0	3.5	3.2	3.1	2.9	3.1	3.1	3.2	5.8
26-Sep	2.9	2.9	3.8	3.8	3.4	2.8	2.6	2.7	3.0	2.8	2.6	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.6	3.8
27-Sep	2.1	2.1	2.2	2.3	2.5	2.6	3.1	3.6	4.8	4.2	3.7	3.7	3.9	4.4	5.9	7.1	7.8	8.7	11.6	16.2	18.9	11.3	8.0	6.4	6.1	18.9
28-Sep	4.7	4.2	3.9	3.4	3.3	5.2	3.3	3.4	3.4	3.0	3.1	3.8	4.7	5.2	5.9	6.2	6.8	7.2	8.1	7.5	6.5	5.9	5.1	4.4	4.9	8.1
29-Sep	3.3	2.8	2.7	2.6	2.7	2.8	3.0	3.0	3.3	3.2	3.2	3.5	4.3	5.7	6.7	7.6	8.5	9.3	8.6	10.3	15.6	16.3	14.9	12.3	6.5	16.3
30-Sep	12.4	11.3	8.3	8.2	7.8	8.3	8.9	7.4	7.4	7.3	8.2	6.9	8.2	8.8	10.7	8.2	7.8	6.9	5.3	8.2	8.6	8.2	8.7	6.5	8.3	12.4

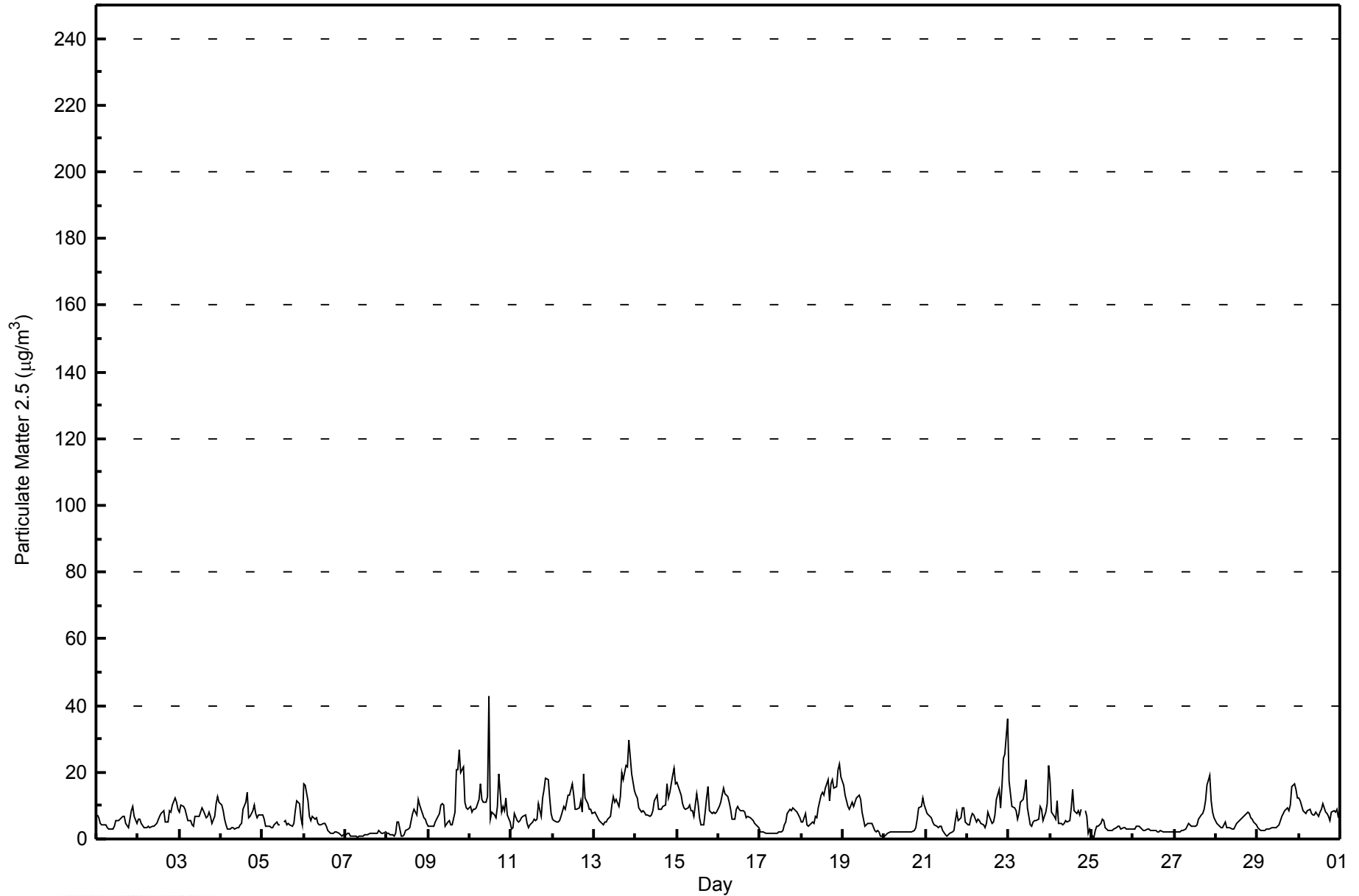
7.5	6.7	6.2	5.6	5.4	5.3	5.7	5.6	5.5	5.6	5.8	7.4	6.2	6.2	6.2	6.7	7.5	8.0	9.6	9.0	10.0	10.0	9.1	8.4	Diurnal Average	
17.4	16.0	13.3	15.3	13.4	12.6	16.5	11.9	12.4	14.4	18.0	42.8	14.0	14.9	15.2	17.9	20.6	21.0	26.9	21.7	29.5	24.5	25.4	36.0	Diurnal Maximum	

M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - September 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - September 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	308	42.90	42.90
6 - 15	346	48.19	91.09
16 - 25	44	6.13	97.21
26 - 80	4	0.56	97.77
> 81.0	0	0.00	97.77

Total Number of Valid Hours: 718

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Athabasca Valley - September 2014

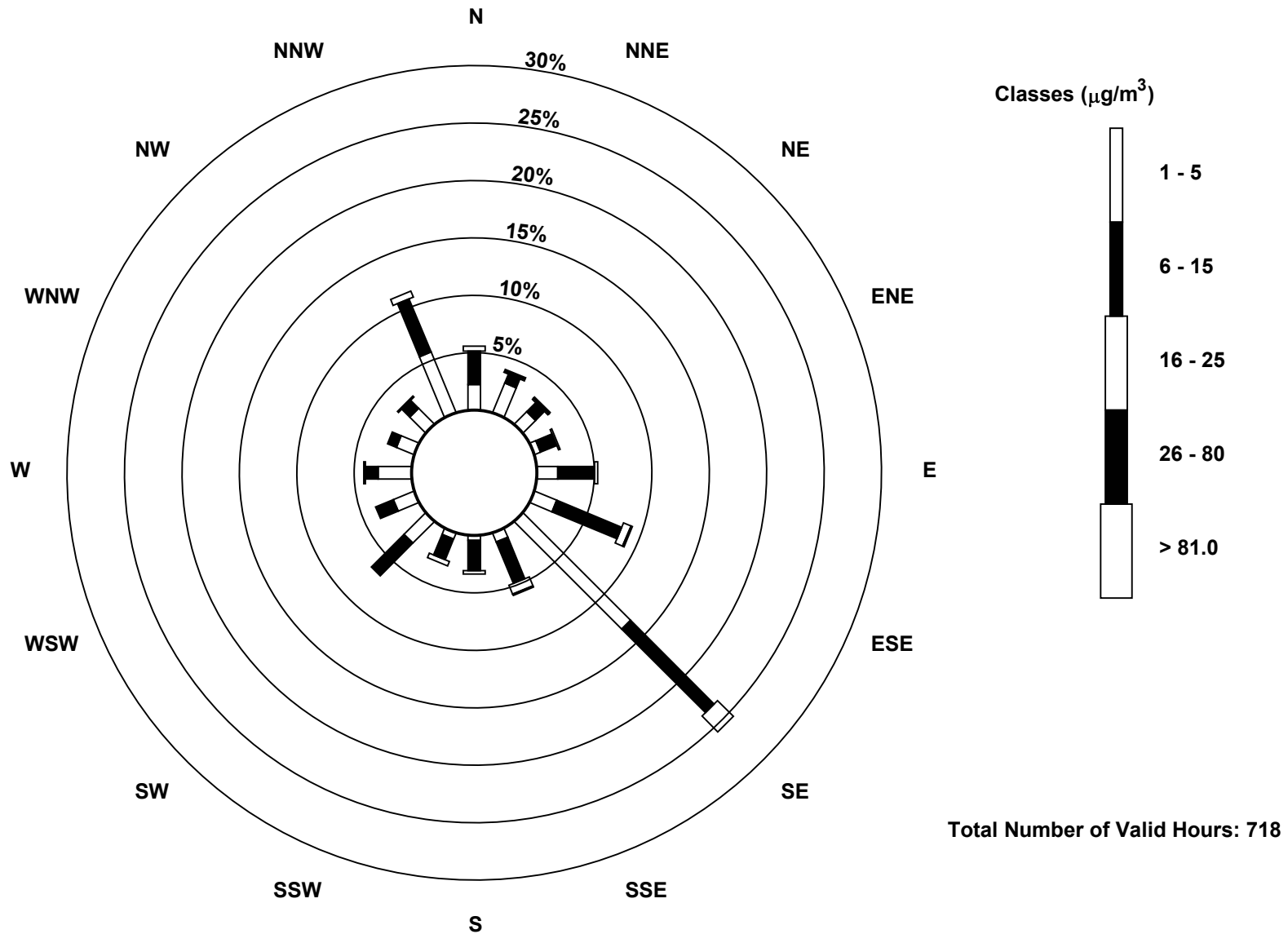
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	16	20	11	4	13	15	95	6	3	4	19	14	21	12	14	41	308
6 - 15	21	6	8	11	23	44	74	28	19	14	29	12	8	6	7	36	346
16 - 25	3	1	1	1	2	5	14	6	2	3	0	0	1	0	1	4	44
26 - 80	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	4
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	40	28	21	16	38	65	183	41	24	21	48	26	30	18	22	81	702

Total Number of Valid Hours: 718

Total Number of Hours: 720

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

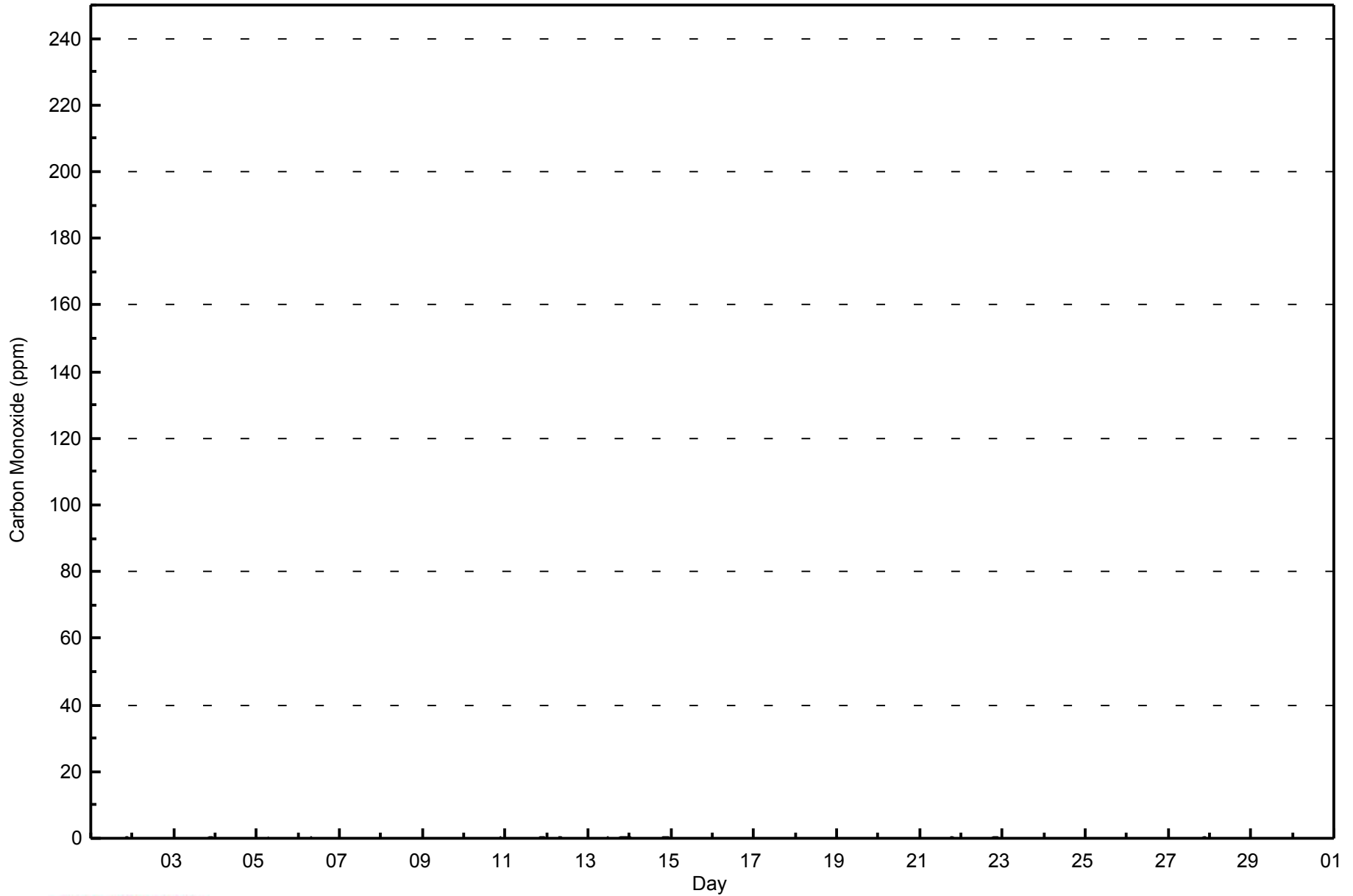
**Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Athabasca Valley (AMS 7)**





WBEA
Hourly Averages

Carbon Monoxide (CO) - ppm
Athabasca Valley - September 2014





WBEA
Cumulative Frequency Distribution

Carbon Monoxide (CO) - ppm
Athabasca Valley - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	681	99.71	99.71
0.4 - 0.5	2	0.29	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: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Carbon Monoxide (CO) - ppm
Athabasca Valley - September 2014

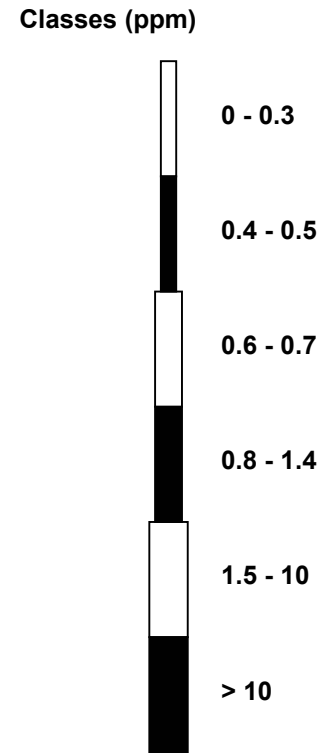
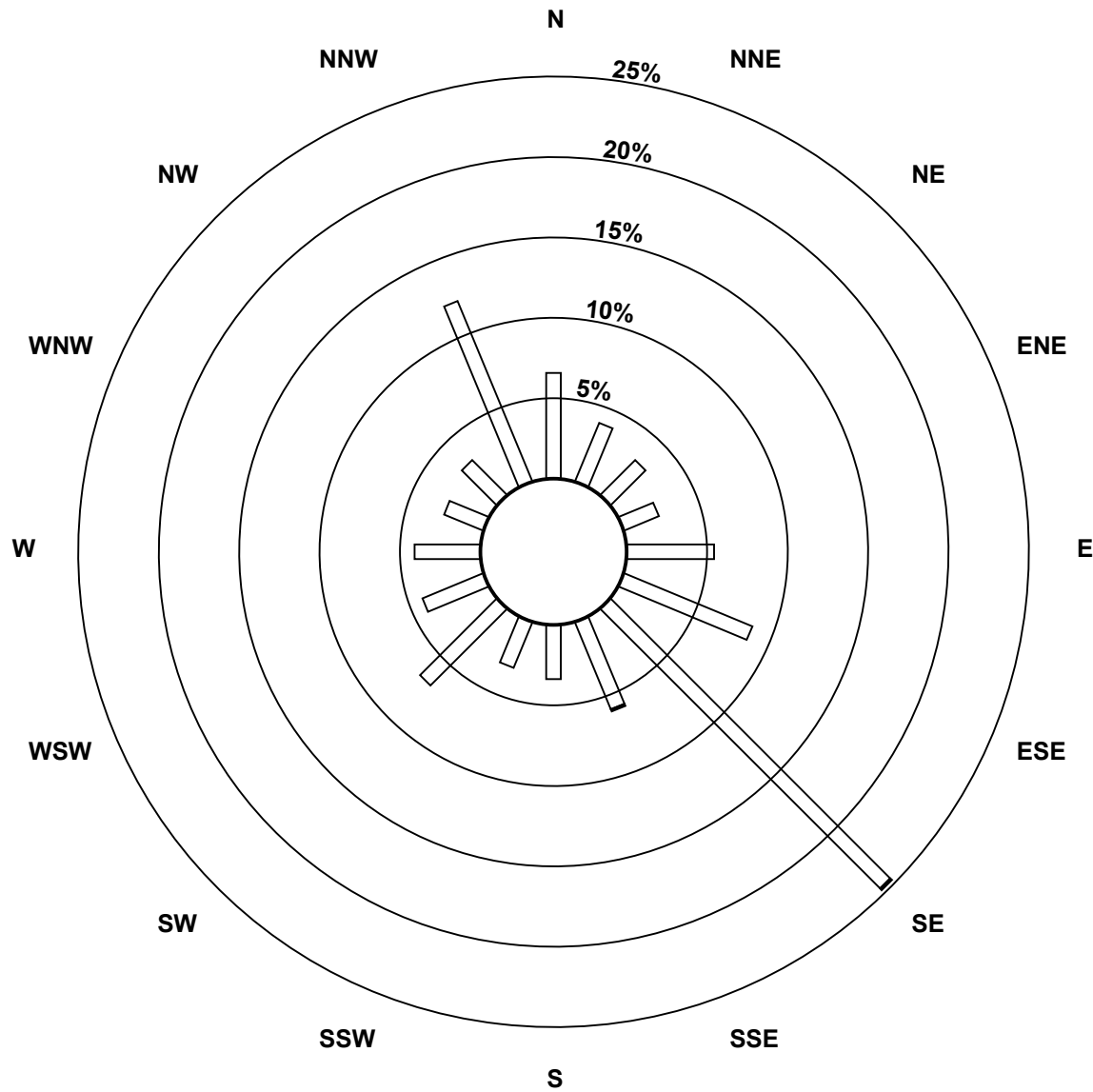
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	45	27	21	16	37	59	168	40	23	21	46	28	28	18	21	83	681
0.4 - 0.5	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
0.6 - 0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.8 - 1.4	0	0	0	0	0	0	0	0	0	0	0	0	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
Totals	45	27	21	16	37	59	169	41	23	21	46	28	28	18	21	83	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

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

**Carbon Monoxide (CO) - ppm
Athabasca Valley (AMS 7)**

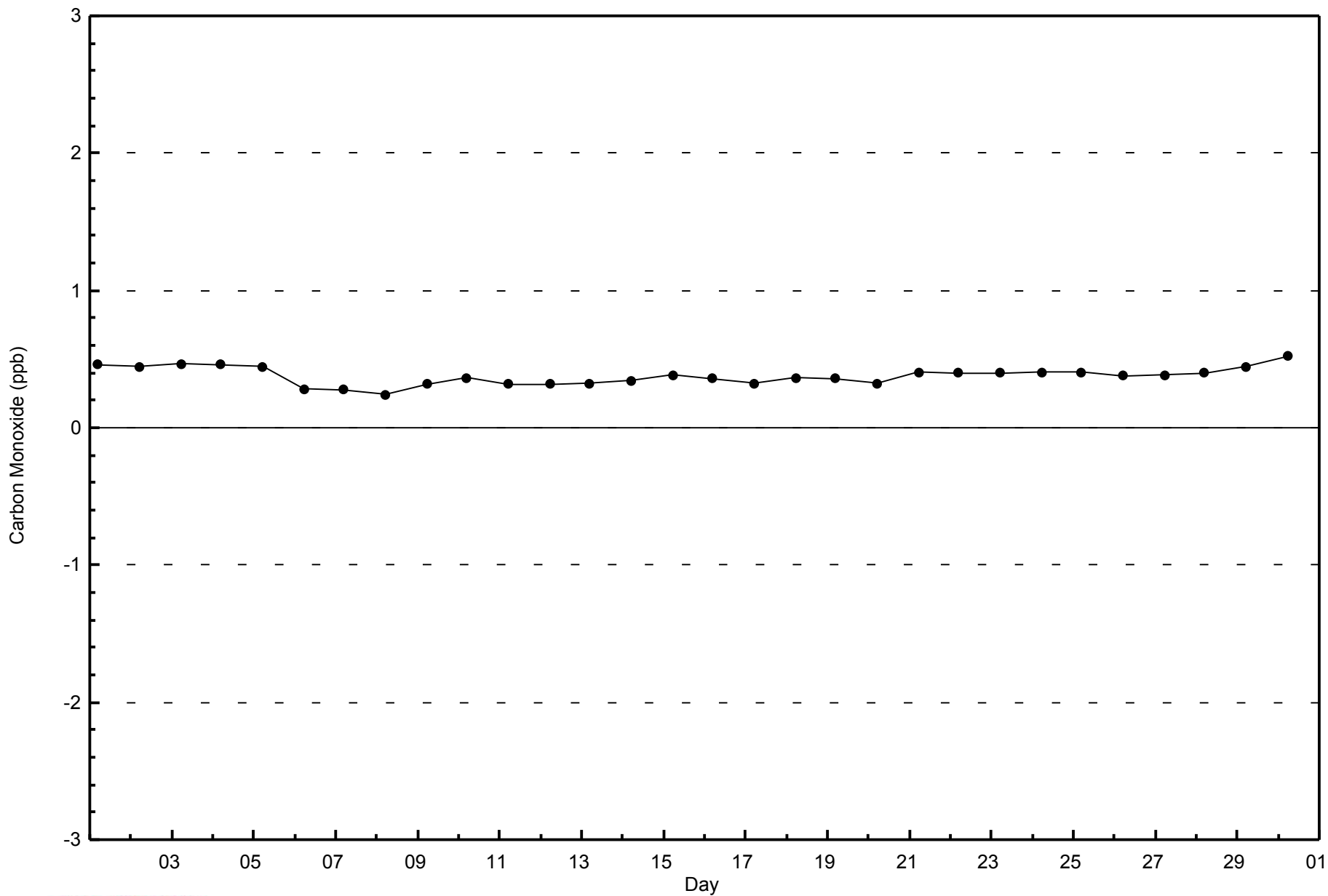


Total Number of Valid Hours: 683



WBEA
Zero Responses

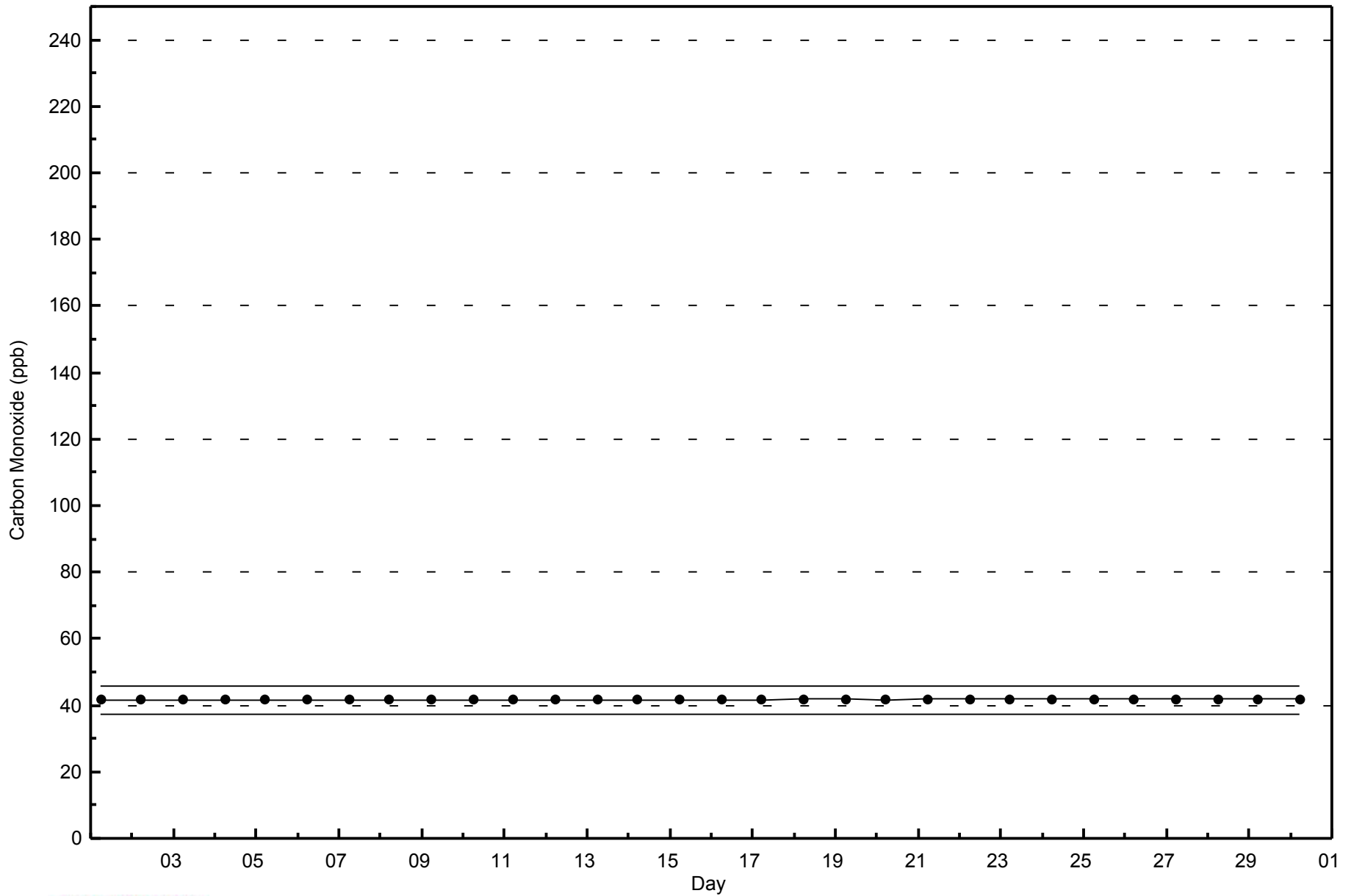
Carbon Monoxide (CO) - ppb
Athabasca Valley - September 2014





WBEA
Span Responses

Carbon Monoxide (CO) - ppb
Athabasca Valley - September 2014



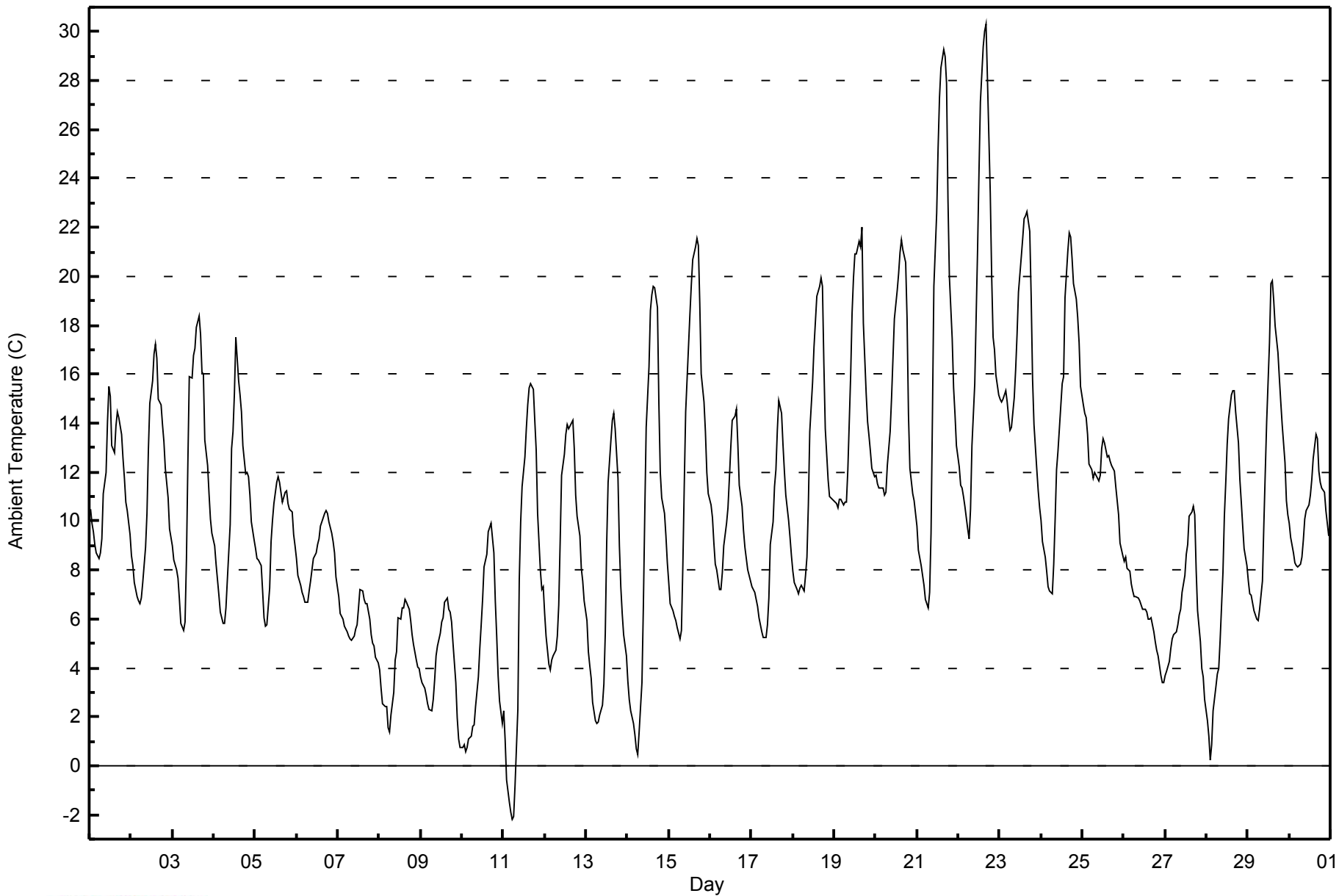


Maximum Value: 30.3 C on Sep 22 17:00		Maximum Daily Average: 18.0 C on Sep 22		Hours in Service: 720																																												
Minimum Value: -2.2 C on Sep 11 06:00		Minimum Daily Average: 4.1 C on Sep 9		Hours of Data: 720																																												
Maximum Diurnal Average: 15.7 C at hour 16		Minimum Diurnal Average: 6.0 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 10.31 C		Percentiles: P ₁ = 0.4 P ₁₀ = 3.7 Q ₁ = 6.4 Median = 9.8 Q ₃ = 13.7 P ₉₀ = 18.1 P ₉₉ = 27.8		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	10.5	9.9	9.6	9.0	8.7	8.5	8.7	9.2	11.1	12.0	14.0	15.5	15.1	13.1	12.8	13.9	14.4	14.2	13.5	12.6	11.8	10.7	10.4	9.4	11.6	15.5																						
2-Sep	8.6	8.2	7.5	6.9	6.8	6.6	6.9	7.5	8.9	10.3	12.9	14.8	15.8	16.8	17.3	16.7	15.0	14.7	14.0	13.3	12.1	11.0	9.7	9.3	11.3	17.3																						
3-Sep	9.0	8.4	8.0	7.7	6.8	5.8	5.5	5.9	8.4	12.4	15.9	15.8	16.8	17.1	17.9	18.4	17.7	16.1	16.0	13.3	12.3	11.1	10.1	9.5	11.9	18.4																						
4-Sep	9.0	8.2	7.6	7.0	6.3	5.8	5.8	6.4	7.6	9.8	13.0	13.7	15.2	17.5	15.7	15.2	14.4	13.1	12.0	12.0	11.8	11.0	10.0	9.2	10.7	17.5																						
5-Sep	8.9	8.5	8.4	8.2	7.1	6.1	5.7	5.7	7.3	9.2	10.0	10.7	11.6	11.8	11.6	11.2	10.8	11.2	11.2	10.7	10.5	10.4	9.5	9.0	9.4	11.8																						
6-Sep	8.5	7.8	7.4	7.1	6.9	6.7	6.7	7.2	7.5	8.0	8.4	8.7	9.0	9.3	9.8	10.2	10.3	10.4	10.3	10.0	9.5	9.1	8.7	7.7	8.5	10.4																						
7-Sep	6.9	6.2	6.1	6.0	5.7	5.5	5.3	5.2	5.1	5.3	5.6	5.7	6.5	7.2	7.1	6.8	6.6	6.6	6.0	5.4	5.0	4.9	4.5	4.2	5.8	7.2																						
8-Sep	3.9	3.1	2.5	2.4	2.4	1.6	1.4	2.1	3.0	4.3	4.7	6.0	6.0	6.5	6.4	6.8	6.7	6.4	5.9	5.3	5.0	4.3	4.1	4.0	4.4	6.8																						
9-Sep	3.6	3.4	3.2	2.9	2.5	2.3	2.3	2.7	3.5	4.5	4.9	5.4	5.9	6.1	6.7	6.8	6.4	6.3	5.9	5.0	3.4	1.9	1.1	0.7	4.1	6.8																						
10-Sep	0.8	0.9	0.6	0.7	1.1	1.2	1.6	1.7	2.4	3.6	4.8	5.8	6.8	8.1	8.6	9.6	9.7	9.9	8.7	6.8	5.3	3.7	2.6	1.7	4.4	9.9																						
11-Sep	2.2	1.0	-0.6	-1.5	-1.9	-2.2	-2.1	-0.8	2.3	7.6	10.0	11.4	12.6	13.8	14.8	15.4	15.6	15.4	14.1	12.9	10.3	8.0	7.2	7.3	7.2	15.6																						
12-Sep	6.2	5.3	4.2	3.9	4.3	4.5	4.7	5.3	6.6	9.1	11.9	12.7	13.6	14.0	13.8	14.0	14.1	13.0	11.1	10.2	9.4	8.0	7.5	6.8	8.9	14.1																						
13-Sep	5.9	4.7	4.1	3.5	2.6	1.9	1.7	1.8	2.1	2.5	3.3	5.4	9.1	11.6	13.3	14.1	14.4	13.8	11.8	9.0	7.3	6.2	5.4	4.5	6.7	14.4																						
14-Sep	3.4	2.7	2.3	1.7	1.3	0.7	0.5	1.4	3.4	6.5	10.3	13.8	16.3	18.6	19.3	19.6	19.5	18.7	14.8	12.0	10.9	10.3	9.4	8.3	9.4	19.6																						
15-Sep	7.5	6.6	6.3	6.1	5.9	5.7	5.2	5.5	8.2	11.4	14.4	17.1	18.4	19.7	20.7	21.2	21.5	21.3	18.9	16.0	14.9	13.6	12.0	11.1	12.9	21.5																						
16-Sep	10.7	10.2	9.1	8.3	8.0	7.2	7.2	7.9	9.0	9.9	10.6	11.7	13.0	14.1	14.3	14.6	13.2	11.5	10.6	9.6	8.9	8.5	8.0	7.6	10.1	14.6																						
17-Sep	7.3	7.2	7.1	6.5	6.0	5.8	5.4	5.2	5.3	5.8	6.8	9.1	10.0	11.4	12.1	13.7	14.9	14.4	13.2	12.0	11.0	10.0	9.4	8.6	9.1	14.9																						
18-Sep	7.9	7.5	7.2	7.1	7.2	7.4	7.2	7.8	8.5	10.7	13.7	15.7	17.1	18.2	19.2	19.6	19.9	19.6	16.4	13.8	11.7	11.0	11.0	10.9	12.3	19.9																						
19-Sep	10.8	10.7	10.6	10.9	10.9	10.7	10.8	10.7	12.1	15.9	18.5	20.0	20.9	20.9	21.4	21.2	22.0	18.1	15.2	14.1	13.5	12.9	12.2	11.8	14.9	22.0																						
20-Sep	11.8	11.5	11.4	11.3	11.3	11.1	11.2	12.3	13.7	15.0	16.6	18.3	19.4	20.1	21.0	21.5	21.1	20.6	18.3	14.4	12.2	11.1	10.8	10.3	14.8	21.5																						
21-Sep	9.8	8.8	8.2	7.8	7.4	6.8	6.4	7.1	9.5	14.3	19.6	22.6	25.3	27.3	28.5	29.2	29.0	27.9	23.1	20.0	17.5	15.4	14.3	13.1	16.6	29.2																						
22-Sep	12.2	11.5	11.3	11.0	10.6	9.7	9.3	10.5	13.1	15.6	18.4	21.1	24.3	27.2	29.4	30.0	30.3	28.1	23.4	20.0	17.5	17.0	16.0	15.2	18.0	30.3																						
23-Sep	15.0	14.9	15.0	15.3	14.9	14.2	13.7	13.8	15.1	16.2	17.6	19.4	20.8	21.5	22.4	22.5	22.6	21.8	19.2	15.8	13.9	12.1	11.2	10.5	16.6	22.6																						
24-Sep	10.0	9.1	8.5	8.0	7.3	7.2	7.0	8.2	10.1	12.1	12.8	14.7	15.6	15.9	19.1	21.0	21.8	21.6	20.7	19.7	19.1	18.3	17.3	15.5	14.2	21.8																						
25-Sep	14.8	14.4	14.2	13.5	12.3	12.1	11.8	12.0	11.9	11.6	11.9	13.0	13.4	13.2	12.6	12.7	12.5	12.3	12.0	11.4	10.8	10.3	9.1	8.6	12.2	14.8																						
26-Sep	8.4	8.5	8.1	7.9	7.4	7.1	6.9	6.9	6.8	6.7	6.6	6.4	6.3	6.0	6.0	6.0	5.5	5.1	4.7	4.5	3.7	3.4	3.4	6.2	8.5																							
27-Sep	3.7	3.9	4.2	4.8	5.2	5.4	5.5	5.8	6.1	6.4	7.1	7.8	8.7	9.0	10.2	10.4	10.6	10.2	8.0	6.3	5.1	4.0	3.6	2.7	6.4	10.6																						
28-Sep	1.8	1.2	0.2	0.9	2.2	3.2	3.7	4.0	5.1	7.9	10.2	11.6	13.1	14.2	15.1	15.3	15.3	14.5	13.2	11.7	10.8	9.8	8.9	8.2	8.4	15.3																						
29-Sep	7.5	7.0	7.0	6.4	6.1	6.0	5.9	6.4	7.6	9.8	12.0	14.1	17.3	19.7	19.8	19.0	18.0	16.9	15.8	14.9	13.9	12.4	10.8	10.3	11.9	19.8																						
30-Sep	9.9	9.3	8.7	8.3	8.2	8.1	8.3	8.5	9.2	10.1	10.4	10.7	11.1	11.7	12.6	13.6	13.3	12.1	11.6	11.4	11.2	10.4	9.9	9.4	10.3	13.6																						
																								7.9	7.4	6.9	6.6	6.4	6.1	6.0	6.5	7.7	9.5	11.2	12.6	13.8	14.7	15.3	15.7	15.6	14.9	13.3	11.8	10.7	9.7	8.9	8.3	Diurnal Average
																								15.0	14.9	15.0	15.3	14.9	14.2	13.7	13.8	15.1	16.2	19.6	22.6	25.3	27.3	29.4	30.0	30.3	28.1	23.4	20.0	19.1	18.3	17.3	15.5	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Athabasca Valley - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Athabasca Valley - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	6	0.83	0.83
0 - 10	366	50.83	51.67
10 - 20	308	42.78	94.44
> 20	40	5.56	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

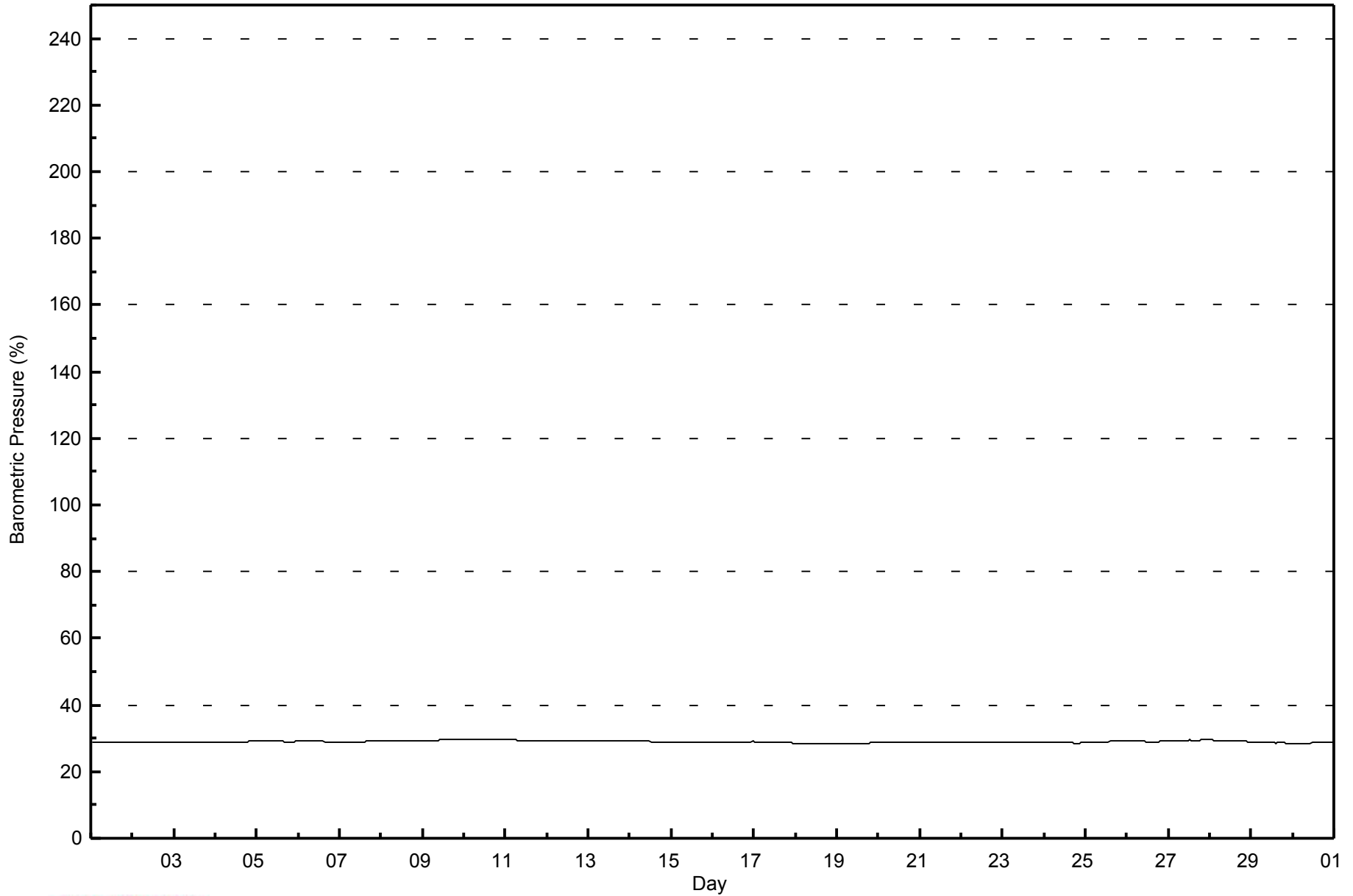


Maximum Value: 29.7 % on Sep 10 09:00																				Maximum Daily Average: 29.6 % on Sep 10					Hours in Service: 720										
Minimum Value: 28.5 % on Sep 19 16:00																				Minimum Daily Average: 28.6 % on Sep 19					Hours of Data: 720										
Maximum Diurnal Average: 29.0 % at hour 9																				Minimum Diurnal Average: 28.9 % at hour 17					Hours of Missing Data: 0										
Monthly Average: 28.98 %																				Percentiles: P ₁ = 28.5 P ₁₀ = 28.6 Q ₁ = 28.8 Median = 29.0 Q ₃ = 29.1 P ₉₀ = 29.4 P ₉₉ = 29.6					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	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	28.7	28.7	28.7	28.7	28.7	28.7	28.7
2-Sep	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
3-Sep	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
4-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	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
5-Sep	29.1	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	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
6-Sep	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
7-Sep	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	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
8-Sep	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3
9-Sep	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
10-Sep	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.7	29.7	29.7	29.7	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6
11-Sep	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.4	29.3	29.3	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
12-Sep	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	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
13-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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
14-Sep	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	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
15-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	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	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
17-Sep	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.7	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
18-Sep	28.6	28.6	28.6	28.6	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5
19-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	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6
20-Sep	28.7	28.7	28.7	28.8	28.8	28.8	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
21-Sep	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	28.8	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
22-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	28.6	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
23-Sep	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
24-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	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6
25-Sep	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	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
26-Sep	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	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
27-Sep	29.1	29.2	29.2	29.2	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
28-Sep	29.5	29.5	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
29-Sep	29.0	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.6	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
30-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	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6
																								Diurnal Average											
																								Diurnal Maximum											



WBEA
Hourly Averages

Barometric Pressure (BP) - %
Athabasca Valley - September 2014



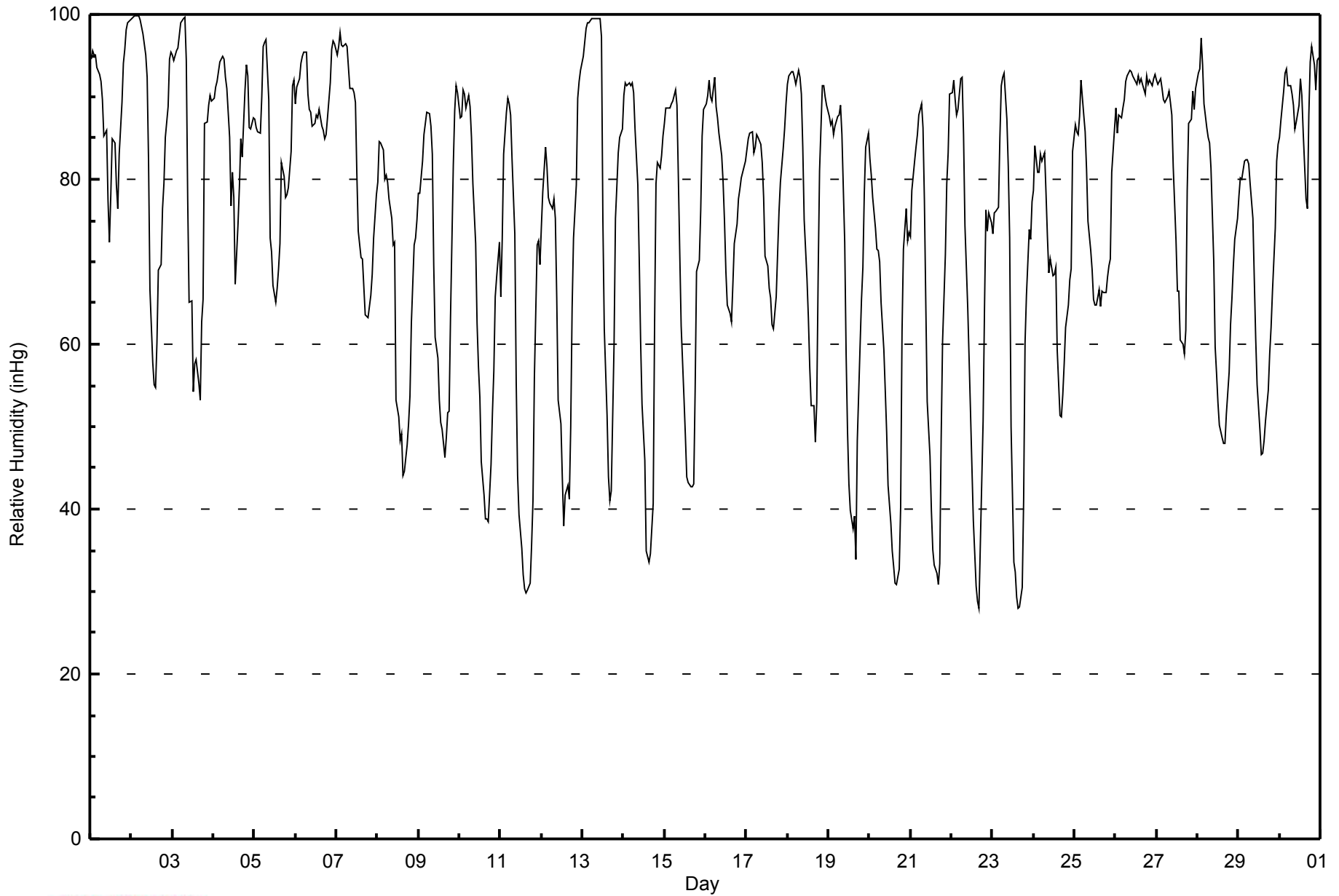


Maximum Value: 100 inHg on Sep 2 04:00																			Maximum Daily Average: 91.1 inHg on Sep 26						Hours in Service: 720																								
Minimum Value: 28 inHg on Sep 23 16:00																			Minimum Daily Average: 58.1 inHg on Sep 20						Hours of Data: 720																								
Maximum Diurnal Average: 89.6 inHg at hour 6																			Minimum Diurnal Average: 53.5 inHg at hour 16						Hours of Missing Data: 0																								
Monthly Average: 75.0 inHg																			Percentiles: P ₁ = 30 P ₁₀ = 46 Q ₁ = 65 Median = 80 Q ₃ = 89 P ₉₀ = 93 P ₉₉ = 100						Hours of Calibration: 0																								
																									Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Sep	95	96	95	95	93	93	92	90	85	86	78	72	78	85	84	79	76	83	89	94	96	98	99	99	88.8	99																							
2-Sep	100	100	100	100	100	99	98	98	95	92	82	67	58	55	55	60	69	70	76	79	85	89	95	96	84.0	100																							
3-Sep	95	94	96	96	97	99	100	100	94	78	65	65	54	58	55	53	63	65	87	87	89	90	90	80.3	100																								
4-Sep	90	91	92	93	94	95	95	92	91	85	77	81	78	67	75	79	85	83	91	94	93	86	86	87	86.7	95																							
5-Sep	87	86	86	86	90	96	97	97	90	73	71	67	65	67	69	72	82	80	78	78	79	83	91	92	81.8	97																							
6-Sep	89	91	92	94	95	95	95	90	88	88	87	87	88	87	89	86	86	85	85	87	92	96	97	97	90.3	97																							
7-Sep	95	96	98	96	96	96	96	94	91	91	90	89	81	74	71	70	67	64	63	65	66	68	73	78	82.0	98																							
8-Sep	80	85	84	84	80	81	80	78	75	72	72	53	51	48	49	44	45	48	50	54	62	72	73	75	66.4	85																							
9-Sep	78	78	82	85	87	88	88	86	83	70	61	58	53	51	50	46	49	52	52	63	82	88	91	91	71.3	91																							
10-Sep	88	88	91	90	89	90	89	85	79	72	63	57	53	46	42	39	39	38	45	52	57	66	68	72	66.6	91																							
11-Sep	66	73	83	88	90	89	88	83	73	55	44	39	35	32	30	30	30	31	36	41	56	72	73	70	58.6	90																							
12-Sep	74	79	84	81	78	77	76	78	75	66	53	50	44	38	42	43	41	50	64	73	79	90	92	93	67.5	93																							
13-Sep	95	97	98	99	99	99	99	100	100	99	99	97	75	62	51	44	41	42	60	75	79	83	85	86	81.9	100																							
14-Sep	90	92	91	92	91	92	90	86	79	70	60	53	46	35	34	34	35	41	63	80	82	81	83	85	70.2	92																							
15-Sep	87	89	89	89	89	90	91	89	80	71	62	54	49	44	43	43	43	43	54	69	70	76	85	89	70.3	91																							
16-Sep	89	90	92	90	89	92	89	87	86	83	80	75	69	65	64	63	67	72	75	78	79	80	81	82	79.8	92																							
17-Sep	84	85	86	86	83	84	85	85	84	82	78	71	69	67	66	62	62	66	71	76	80	84	86	89	77.9	89																							
18-Sep	91	93	93	93	92	92	93	92	90	84	75	68	63	57	52	52	48	53	68	81	91	91	90	89	78.9	93																							
19-Sep	88	87	87	86	86	88	88	89	85	72	59	50	43	40	38	39	34	48	60	65	69	78	84	86	68.7	89																							
20-Sep	83	81	78	74	72	71	70	65	59	54	49	43	38	35	33	31	31	33	40	61	72	76	73	73	58.1	83																							
21-Sep	73	79	82	84	85	88	89	86	77	65	53	46	40	35	33	32	31	33	49	60	71	80	83	90	64.4	90																							
22-Sep	90	92	90	88	88	92	92	85	74	64	58	52	45	39	31	29	28	36	51	64	76	74	76	75	66.2	92																							
23-Sep	73	76	76	77	85	91	92	93	87	81	73	50	34	32	29	28	28	31	41	60	66	74	73	77	63.7	93																							
24-Sep	79	84	81	81	83	82	83	78	73	69	70	68	68	69	59	51	51	54	58	62	65	68	69	83	70.4	84																							
25-Sep	87	86	85	88	92	88	86	81	75	71	69	65	65	65	67	65	66	66	66	68	70	70	81	86	75.3	92																							
26-Sep	89	86	88	87	89	90	92	93	93	93	93	92	92	93	92	92	92	90	93	92	92	91	92	93	91.1	93																							
27-Sep	92	91	92	91	90	89	90	91	89	88	82	73	66	66	60	60	59	62	79	87	87	91	89	91	81.4	92																							
28-Sep	93	93	97	94	89	86	85	84	81	70	60	56	53	50	49	48	48	51	57	62	66	69	73	75	70.5	97																							
29-Sep	78	80	80	82	82	82	82	80	75	68	61	55	50	47	47	48	51	54	59	62	66	74	82	84	67.9	84																							
30-Sep	85	87	91	93	93	91	91	90	89	86	87	89	92	90	86	78	76	88	94	96	94	91	94	95	89.5	96																							
																								86.0	87.4	88.6	88.7	89.0	89.6	89.4	87.5	83.3	76.7	70.4	64.8	59.8	56.6	54.9	53.5	53.7	57.0	64.4	72.2	76.9	81.0	83.5	85.6	Diurnal Average	
																								100	100	100	100	100	99	100	100	100	99	99	97	92	93	92	92	92	90	94	96	96	98	99	99	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - inHg
Athabasca Valley - September 2014





Maximum Speed: 39 km/h on Sep 19 18:00	Maximum Daily Speed Average: 14.1 km/h on Sep 20	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 18 09:00	Minimum Daily Speed Average: 0.4 km/h on Sep 2	Hours of Data: 720
Maximum Diurnal Speed Average: 3.3 km/h at hour 15	Minimum Diurnal Speed Average: 0.3 km/h at hour 19	Hours of Missing Data: 0
Monthly Average Velocity: 0.7 km/h 159.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 6 Q ₃ = 11 P ₉₀ = 16 P ₉₉ = 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	SE7	SE4	SE4	SE4	SSE6	SE6	SE6	SE5	ESE1	E5	ENE3	E4	WNW1	SW1	S6	SW3	SSW4	SW5	E2	ENE3	ESE1	ESE3	SE3	SE4	SE2.9	SE7
2-Sep	SE4	SE4	SE5	SE6	SE6	SE5	SE4	S1	SE1	WSW6	W3	NNW3	NNW7	WSW6	SW6	N4	NNW12	NNW9	WNNW1	W3	WSW2	NW2	SSW1	ESE1	W0.4	NNW12
3-Sep	SE2	ESE2	ESE4	ESE6	ESE5	E6	SE6	SE7	ESE4	E6	SE2	SSW5	SSW1	SSW5	SW7	SW8	SW13	SW9	SW3	WSW5	S2	ESE2	SE3	SE5	S3.1	SW13
4-Sep	SE7	SE8	SE9	SE10	SE12	SE12	SE13	SE11	SE9	SE7	E4	WSW4	E2	ESE3	W5	SW8	W8	N13	NNW8	NNW6	NW7	NNW12	NW9	NW8	SE1.5	SE13
5-Sep	NNW10	NNW8	NW7	NW6	N2	SSW2	SSW2	ESE4	ESE4	ESE5	SE7	SE7	SE7	SE7	SE7	ESE10	SE11	SE9	SE7	SE3	NNW5	NW6	W4	WNNW5	ESE1.7	SE11
6-Sep	NW7	W6	WNW3	SW5	SW4	ESE1	E2	NE1	E2	SE4	SE5	ESE6	E7	E7	E7	ESE7	E9	E5	NE3	NE4	N5	N7	NNW10	NNW17	NE1.9	NNW17
7-Sep	NNW18	NNW19	NNW19	N11	N10	NNW13	N8	N7	NNE10	N10	N8	ENE6	NE8	NNE11	NNE10	N16	NNW16	NNW17	N12	NNE10	NNE9	N8	NNW11	NNW13	N11.1	NNW19
8-Sep	NNW13	NNW11	NNW12	NNW13	NNW16	NW13	NW10	NNW13	NNW15	NNW12	NNW13	N11	NNW13	NNW11	NNW12	NNW10	N7	NE6	NE5	ENE3	SSE1	E2	NE2	NW1	NNW8.6	NNW16
9-Sep	SW5	SW3	ESE0	E2	ESE3	ESE4	E3	E2	E3	NNE3	NNW4	NNW3	SW2	SW6	SW4	N6	NNE8	NE4	NNE4	N1	ENE1	ESE1	E1	E3	NE0.8	NNE8
10-Sep	E3	ESE2	ESE2	ESE3	ESE2	SW1	SE2	ESE4	ESE2	ESE1	ENE2	NE2	NW3	N3	SW2	WSW3	S7	SSW7	SW6	SSW5	SSE7	SSE7	SSE6	SSE4	SSE2.1	SSE7
11-Sep	S7	E3	ESE7	ESE9	SE8	SE11	SE11	SE11	SE9	SSW9	SW20	SW18	SW20	SW22	SW20	SW19	SW17	SW11	SSE4	SSE7	SSE1	SSW1	ESE3	SE5	SSW7.6	SW22
12-Sep	SE4	SE4	SE3	SE3	SE4	SE4	ESE3	ESE1	E4	ENE4	N11	N13	N14	N14	NNW13	NNW14	NNE10	NNW6	NNW17	N4	NNW7	NNW5	W4	WSW4	N4.3	NNW17
13-Sep	WSW5	S1	SW2	WSW4	WSW4	WSW5	WSW2	SE2	E3	E4	ENE5	E4	ENE6	E2	WSW4	SW1	E3	ESE5	SE4	SE1	ESE3	ESE2	SE4	SE3	SE1.4	ENE6
14-Sep	SSE3	SSE4	SE5	SSE5	SSE4	SE6	SE10	SE10	SE10	SE8	ESE4	E3	SW9	WSW8	SW11	WSW7	SW6	S1	ESE2	ESE1	SE2	SE2	ESE4	SSE3.9	SW11	
15-Sep	SE5	SE4	SSE5	SE5	SE7	SE8	SE8	SE8	SE7	ESE5	NE1	ENE3	N3	NE3	NNW3	NNW5	N5	NNE4	N2	NE1	ESE2	SE4	E2	ESE2	ESE2.4	SE8
16-Sep	NNE2	N2	NNW6	NNW7	N6	NNE3	ENE3	E2	ESE3	E6	NE5	ENE6	E10	ESE9	SSE14	SE12	E18	ESE13	ESE13	ESE12	ESE15	ESE15	SE16	ESE13	ESE6.6	E18
17-Sep	ESE14	ESE10	SE12	SE11	SE17	SE14	SE13	SE16	SE16	SE14	SE15	SSE17	SE20	SE20	SE20	SE15	SE16	SE14	SE12	SE14	SSE11	SE11	SE9	SE9	SE14.0	SE20
18-Sep	SE7	SE6	SE6	SE9	SE9	SE5	ENE2	NE1	NNE0	W1	NNW6	NNW11	NNW9	NNW9	NNW8	NNW7	NNW6	NNW2	SSW2	WSW0	SE2	ESE2	SE3	SSE3	NE0.8	NNW11
19-Sep	SE6	SE6	SE5	SE7	SE8	SE8	SE8	SE9	SE5	SW10	SW15	WSW14	WSW18	NNW20	W22	W18	W31	WNNW39	W20	WSW16	WSW16	W18	WSW18	WSW19	WSW10.4	WNNW39
20-Sep	WSW18	WSW16	W22	W24	W20	W13	W12	W24	WNNW18	WNNW19	WNNW20	NW23	WNNW24	WNNW25	WNNW21	W22	W22	W15	WSW6	SE1	ESE3	SSE3	SE5	ESE4	W14.1	WNNW25
21-Sep	SE8	SE10	SE9	SE10	SE10	SE10	SE9	SE9	SE9	SE7	SW12	SW14	SSW10	SW12	SW13	SW13	SW13	S3	SSE2	SE5	SSW1	S1	SE0	WSW1	S5.7	SW14
22-Sep	SW1	SSW2	S2	S2	S4	ESE1	ESE2	SE4	SE7	SE10	E6	ENE2	ENE2	SSW3	SW11	SW7	SW6	SW5	SSW2	SE1	SE2	S2	SE3	SSE3	S2.4	SW11
23-Sep	SSE3	SE3	SE1	ESE3	SSE1	ESE2	SW1	WNNW1	NNW4	NNW7	NNW7	NNW9	NNW7	NNW7	NW5	NNW8	N7	N5	NW2	S1	SW0	ESE1	ESE2	ESE1	NNW2.2	NNW9
24-Sep	SSE2	SE2	SSE2	SE3	SSE3	SE4	SE5	SE5	SE8	SE6	NNE3	NNW4	N3	N3	SE8	ESE16	ESE16	SE12	SE10	SE11	SSE7	W14	W9	S3	SE3.9	ESE16
25-Sep	SSW5	SW6	WSW8	WSW5	NW1	W6	WSW11	W14	W24	W23	WNNW23	W18	WNNW15	NNW18	NNW15	N7	N11	NNW11	NNE7	NE8	NNE8	NE8	NE7	NE5	NW7.2	W24
26-Sep	NE5	NNE6	NE7	NNE7	NE9	NNE9	NNE10	NNE9	NNE9	NNE9	NNE9	NNE9	NNE7	NNE7	NNE11	N11	N13	N14	N12	N15	N15	N16	N17	NNW16	N10.1	N17
27-Sep	NNW16	NNW15	NNW13	NNW12	NNW12	NNW10	NW6	NW6	NNW8	NNW9	NW6	NW6	NW5	NNW8	WNNW4	N5	WNNW3	W2	SW2	E2	SE3	SE4	SSE4	SE8	NNW5.1	NNW16
28-Sep	SE8	SE7	SE10	SE9	SE15	SE17	SE14	SE15	SE13	SE14	SE17	SE17	SSE16	SSE19	S16	S17	S17	SSE12	SE11	SE14	SE14	SE14	SE13	SE14	SSE13.6	SSE19
29-Sep	SE12	SE12	SE15	SE13	SE14	SE12	SE11	SE11	SE10	SE13	SE12	SE15	SSE13	S15	S14	SSW16	SSW11	SSE10	SSE8	SSE7	SSE6	SSE3	SE2	S2	SSE9.8	SSW16
30-Sep	SSE4	SSE3	S1	SSW3	SSW3	S2	SSE3	S3	WNNW2	E0	NNW3	NNW2	NNW5	NNW6	NNW7	NNW7	NNW6	N2	NNW2	NNW5	NNW6	N4	N4	NNW3	NNW1.9	NNW7

SE1.2 SE1.0 SE1.0 SE1.8 SE2.7 SE2.7 SE3.1 SE2.8 ESE2.0 SE1.3 NW0.5 NNW0.8 NNW1.3 W1.9 WSW3.3 WSW2.4 W2.0 NNW1.2 ESE0.3 ESE1.4 ESE1.0 NE0.4 SE0.5 SE0.7	Diurnal Average
NNW18 NNW19 W22 W24 W20 SE17 SE14 W24 W24 W23 WNNW23 NW23 WNNW24 WNNW25 W22 W22 W31 WNNW39 W20 WSW16 WSW16 W18 WSW18 WSW19	Diurnal Maximum

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



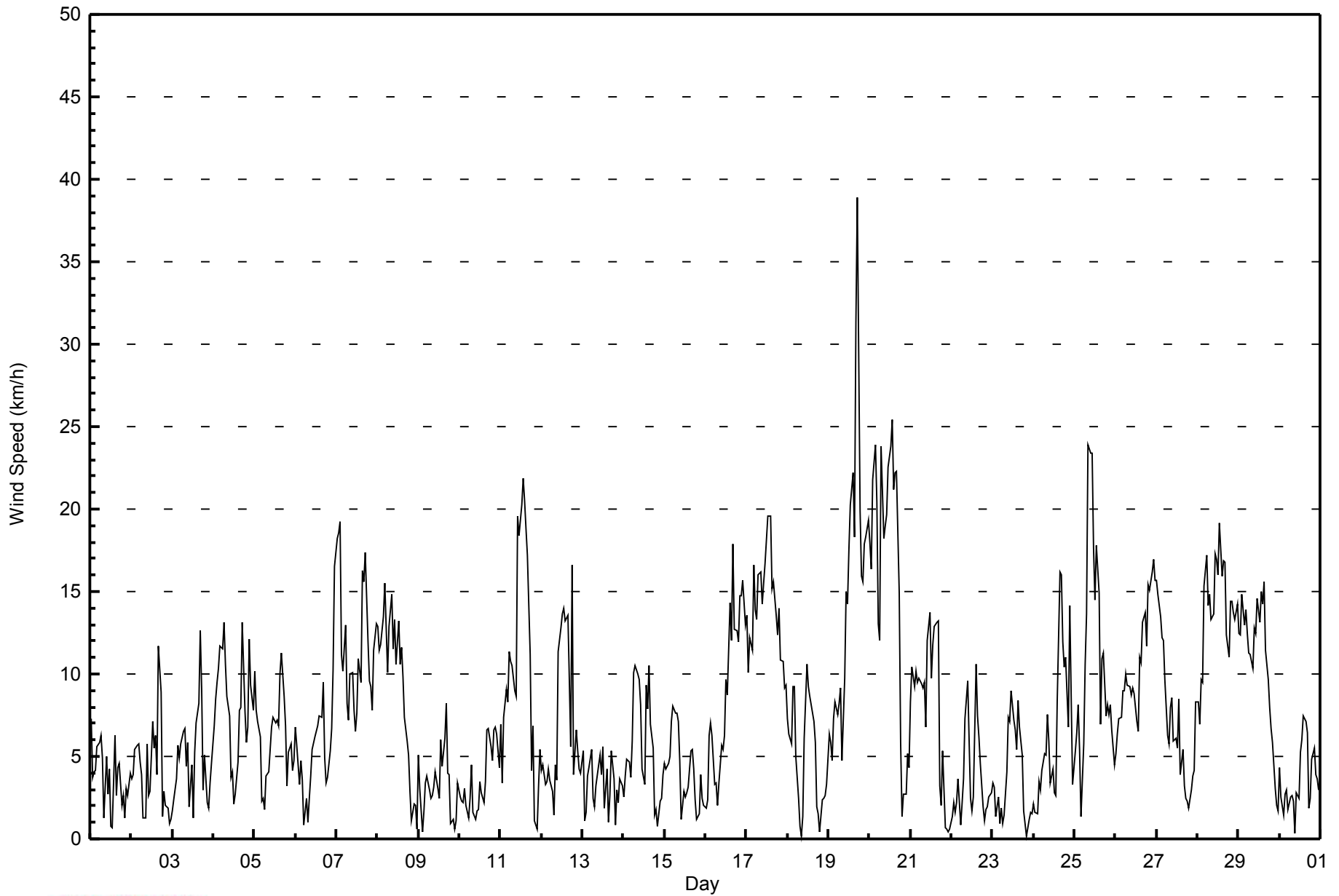
Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 9 km/h on Sep 24 22:00			Hours of Data:	720
Minimum Value: 1 km/h on Sep 10 01:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P 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	2	2	2	1	1	2	2	2	1	1	2	4	4	4	2	2	2	1	1	1	1	1	1	4
2-Sep	2	2	1	1	1	1	1	1	1	1	1	1	2	3	4	7	5	2	2	1	1	2	1	1	7
3-Sep	1	1	1	1	1	1	1	2	1	1	3	3	2	2	2	2	6	2	2	3	2	1	1	1	6
4-Sep	2	2	2	2	2	2	2	3	2	3	2	3	2	2	5	2	6	5	3	2	3	2	2	1	6
5-Sep	2	2	2	2	2	2	1	1	1	2	2	3	3	2	2	3	3	3	4	2	3	2	1	2	4
6-Sep	2	2	2	3	2	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	2	2	4	4	4
7-Sep	6	3	4	4	3	3	3	3	3	3	3	3	3	3	3	5	4	5	4	4	3	3	3	3	6
8-Sep	4	2	2	2	3	2	2	3	3	3	3	4	4	5	3	3	3	2	2	1	2	1	1	1	5
9-Sep	3	2	1	1	1	1	1	1	1	1	2	2	2	2	2	3	2	2	1	1	1	1	1	1	3
10-Sep	1	1	1	1	2	2	1	2	1	2	1	1	1	2	2	2	3	3	2	1	1	1	2	3	3
11-Sep	4	2	2	2	2	2	2	2	2	6	5	6	6	6	6	6	5	5	2	1	2	1	1	2	6
12-Sep	2	1	1	1	1	1	1	1	1	2	4	4	5	5	3	4	4	8	7	2	5	4	1	1	8
13-Sep	1	2	1	1	1	1	1	1	2	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	2
14-Sep	1	2	2	2	2	3	2	2	2	2	2	2	4	4	3	3	2	2	1	1	1	1	1	1	4
15-Sep	1	1	1	1	2	1	2	1	1	1	1	1	1	2	1	2	2	2	1	2	2	2	1	1	2
16-Sep	1	1	3	3	2	1	2	1	1	2	2	2	3	3	3	4	4	5	4	4	4	4	5	4	5
17-Sep	5	3	3	4	5	4	4	5	5	4	5	4	5	5	5	5	4	4	4	3	3	3	2	3	5
18-Sep	2	2	2	2	2	1	1	1	1	1	3	2	2	2	2	1	1	1	2	1	1	1	2	2	3
19-Sep	3	2	2	3	2	2	2	2	2	5	4	5	6	5	7	8	8	9	7	3	3	5	4	4	9
20-Sep	3	3	4	4	4	5	5	5	4	5	4	5	6	6	6	5	5	4	3	1	1	1	2	2	6
21-Sep	2	2	2	2	2	2	2	2	2	2	5	3	2	3	3	3	5	2	1	3	1	1	1	1	5
22-Sep	1	1	1	1	1	1	1	2	3	3	2	2	2	3	2	2	2	2	3	2	2	1	1	1	3
23-Sep	2	2	1	2	2	1	2	1	3	2	1	3	2	2	2	2	1	1	2	1	1	1	1	1	3
24-Sep	1	1	1	1	1	2	2	2	2	3	2	1	1	1	5	6	5	4	3	3	2	9	4	1	9
25-Sep	2	2	2	3	1	2	3	3	6	4	5	4	3	3	4	2	3	2	2	3	3	3	2	2	6
26-Sep	2	2	2	3	2	2	2	3	3	3	3	2	3	2	3	3	4	5	4	4	5	4	4	4	5
27-Sep	4	3	3	3	3	3	2	1	2	2	2	2	3	2	2	2	1	1	2	2	2	2	2	2	4
28-Sep	2	2	3	3	3	3	3	3	3	3	5	5	5	6	6	6	5	3	3	3	3	3	3	3	6
29-Sep	3	2	3	3	3	3	2	3	3	3	3	4	6	5	5	5	6	3	3	2	2	2	1	1	6
30-Sep	2	2	1	2	1	1	1	2	1	1	1	1	3	2	3	2	2	2	2	2	2	2	1	1	3
Diurnal Maximum																									



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Athabasca Valley - September 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Athabasca Valley - September 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	316	43.89	43.89
6 - 11	240	33.33	77.22
12 - 19	138	19.17	96.39
20 - 28	24	3.33	99.72
29 - 38	1	0.14	99.86
> 38	1	0.14	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Athabasca Valley - September 2014

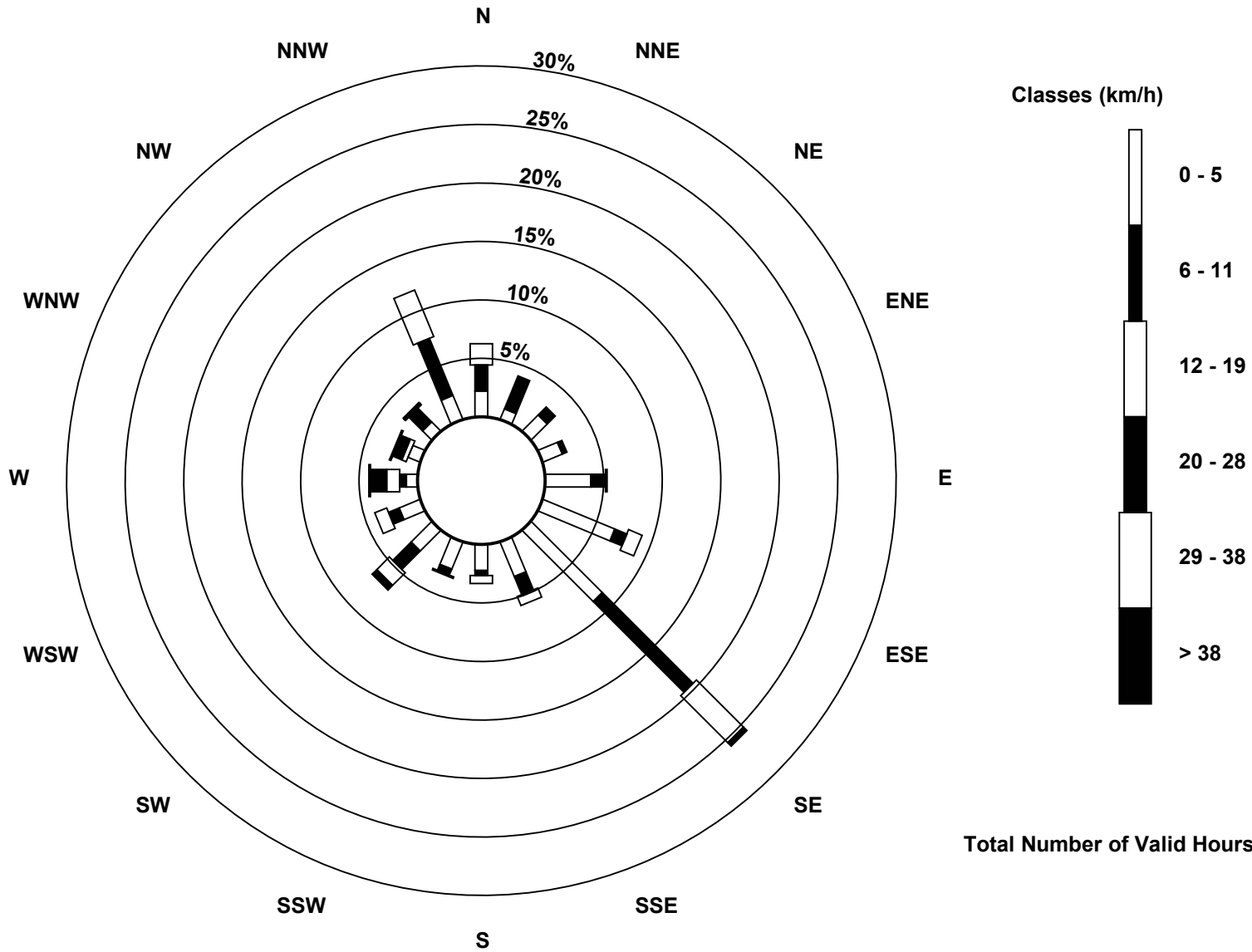
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	16	7	14	13	28	48	62	23	16	18	18	14	7	8	8	16	316
6 - 11	16	22	7	3	9	8	79	12	3	4	16	7	4	0	12	38	240
12 - 19	13	0	0	0	1	9	41	6	5	1	11	8	8	3	1	31	138
20 - 28	0	0	0	0	0	0	3	0	0	0	4	0	10	6	1	0	24
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Totals	45	29	21	16	38	65	185	41	24	23	49	29	30	18	22	85	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Athabasca Valley (AMS 7)**





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Athabasca Valley - September 2014

Direction of Maximum Speed: 296 deg on Sep 19 18:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 275.7 deg on Sep 20	Hours of Data: 720
Direction of Minimum Speed: 26 deg on Sep 18 09:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.4 deg on Sep 2	Percent Operational Time: 100.0
Monthly Average Direction: 277.0 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	129	136	133	134	149	137	135	136	118	89	67	91	282	233	186	215	210	214	97	78	121	106	139	140	138.3
2-Sep	137	133	132	127	135	126	126	171	143	248	270	317	337	246	226	355	342	343	299	274	258	306	205	114	269.0
3-Sep	124	108	114	123	115	101	126	132	115	97	139	213	207	211	222	224	223	219	214	237	185	122	130	146	169.5
4-Sep	139	141	137	142	139	141	141	134	131	135	92	245	88	113	280	230	267	352	327	345	315	327	323	318	141.5
5-Sep	331	329	323	321	349	211	209	108	109	119	127	131	146	127	134	122	130	131	125	135	347	324	261	299	115.4
6-Sep	308	259	293	226	218	114	98	39	80	136	131	111	94	98	99	107	85	90	39	48	9	354	343	335	51.9
7-Sep	341	335	336	355	353	340	354	8	13	359	11	60	34	14	16	355	345	347	2	14	22	358	334	337	355.1
8-Sep	346	327	329	337	338	325	324	337	340	340	339	357	334	328	335	342	7	40	39	75	166	81	47	306	341.7
9-Sep	226	215	112	83	104	104	89	89	82	31	331	342	232	218	229	353	31	37	25	350	75	122	84	88	47.4
10-Sep	97	102	109	109	119	226	140	120	123	108	63	52	308	352	232	243	188	205	219	194	160	150	152	149	162.0
11-Sep	179	96	106	114	126	132	136	139	130	207	227	222	221	219	220	225	226	221	160	154	156	196	119	124	191.6
12-Sep	143	135	125	128	138	126	108	118	85	67	358	357	355	355	344	336	14	341	329	349	335	340	276	239	357.4
13-Sep	244	181	231	242	237	237	240	127	99	101	75	79	73	83	258	227	96	116	125	135	110	113	139	137	140.4
14-Sep	165	151	134	147	149	138	137	135	139	131	135	102	85	218	237	226	255	222	172	102	122	141	129	121	158.5
15-Sep	142	138	148	140	140	139	137	135	126	109	36	74	358	46	327	327	7	24	351	37	105	137	83	72	109.4
16-Sep	18	351	344	347	5	31	67	98	104	83	52	70	81	114	161	139	90	104	113	109	121	123	128	121	103.2
17-Sep	123	121	128	127	135	131	129	131	129	127	137	147	138	137	134	128	145	140	135	143	152	146	146	141	135.3
18-Sep	143	142	139	140	140	138	71	54	26	273	343	340	342	336	337	332	338	340	210	246	129	115	131	158	46.7
19-Sep	136	144	138	146	136	142	138	139	132	219	218	250	256	283	269	268	269	296	259	252	249	265	252	252	250.5
20-Sep	253	255	262	266	268	269	277	275	288	292	292	310	289	298	287	271	267	266	243	124	121	154	133	123	275.7
21-Sep	138	135	135	138	138	132	132	130	131	138	219	226	212	223	232	226	230	187	153	143	205	186	138	255	176.5
22-Sep	215	211	191	185	175	115	107	125	143	138	81	73	57	196	220	224	221	220	209	133	132	171	137	161	171.7
23-Sep	156	139	140	120	147	115	216	295	327	347	337	336	332	329	324	334	350	355	326	189	233	108	117	110	342.4
24-Sep	165	145	166	142	160	132	124	135	140	133	13	335	10	359	125	122	122	127	139	145	154	281	265	174	138.5
25-Sep	193	220	255	250	308	272	245	259	278	280	296	276	294	336	338	349	349	341	27	37	30	36	37	52	304.6
26-Sep	43	21	46	23	43	20	12	19	27	24	27	19	24	25	18	11	356	355	359	357	354	355	352	341	9.6
27-Sep	348	341	337	340	344	330	321	323	338	332	325	319	318	337	300	352	282	263	223	94	133	141	152	135	334.9
28-Sep	127	128	140	139	139	142	145	143	141	139	144	145	156	164	183	172	171	162	145	144	143	142	144	139	149.0
29-Sep	128	128	132	131	134	137	135	132	134	137	132	133	162	172	187	198	209	166	166	158	147	156	145	189	150.1
30-Sep	147	154	184	209	211	189	148	171	303	88	334	337	336	345	341	345	343	3	338	333	338	350	1	336	335.8

141.6	139.9	131.4	137.1	133.1	133.8	132.8	135.7	114.3	125.3	305.0	298.5	294.5	272.3	247.1	253.3	265.3	298.5	101.7	117.1	107.3	41.4	133.9	131.7
Diurnal Average																							

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Athabasca Valley - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 99 deg on Sep 23 07:00	Hours of Data: 720
Minimum Value: 9 deg on Sep 18 17:00	Hours of Missing Data: 0
Percentiles: P ₁ = 10 P ₁₀ = 13 Q ₁ = 16 Median = 22 Q ₃ = 37 P ₉₀ = 64 P ₉₉ = 96	Hours of Calibration: 0
	Percent Operational Time: 100.0

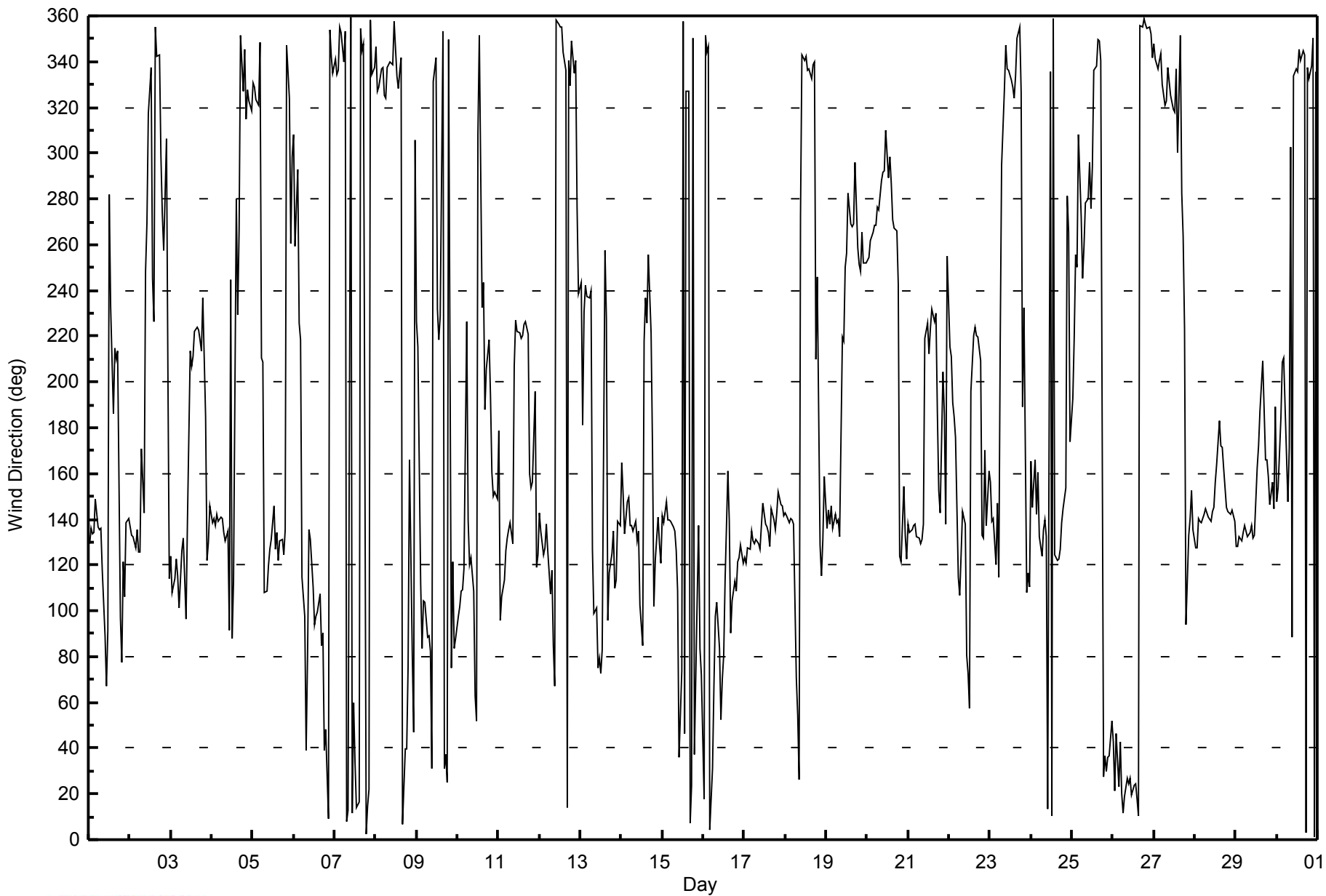
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	18	20	25	27	19	20	22	27	89	22	55	37	85	91	49	59	32	34	42	23	64	30	33	23	91
2-Sep	26	27	13	18	16	18	24	75	65	21	60	33	14	60	43	62	15	14	87	42	75	62	81	60	87
3-Sep	63	27	24	16	16	19	12	15	27	23	74	49	88	26	22	19	21	16	42	43	62	29	32	18	88
4-Sep	12	12	11	10	12	11	11	12	14	28	40	64	88	57	71	16	48	23	20	21	19	12	15	16	88
5-Sep	14	15	17	22	64	69	68	29	29	40	34	32	33	23	30	20	16	21	26	73	32	24	41	47	73
6-Sep	24	31	45	26	55	81	24	82	41	29	24	26	20	19	21	22	13	24	31	28	19	22	21	13	82
7-Sep	14	10	13	22	20	15	27	28	21	21	26	30	26	21	24	22	18	19	21	22	19	26	13	13	30
8-Sep	19	11	11	11	13	11	13	14	16	18	17	29	14	21	22	23	25	29	22	27	73	39	37	79	79
9-Sep	43	42	80	72	25	23	19	16	28	47	26	43	68	16	33	35	23	37	18	88	61	87	71	15	88
10-Sep	13	21	40	34	55	84	50	25	62	75	59	55	25	67	79	46	30	28	16	17	10	10	19	72	84
11-Sep	63	64	19	14	18	10	12	10	11	51	18	23	17	19	19	21	18	31	25	16	91	99	40	27	99
12-Sep	40	39	53	32	14	41	23	65	14	49	23	22	23	23	19	20	37	31	13	32	22	54	31	18	65
13-Sep	17	69	52	26	14	10	31	70	57	31	27	36	17	99	33	96	63	32	33	78	22	26	26	27	99
14-Sep	36	25	22	32	24	18	13	12	12	13	20	44	63	20	37	15	28	12	58	54	53	46	21	25	63
15-Sep	22	15	18	15	14	11	13	10	14	30	67	32	33	51	56	26	38	31	38	66	90	29	33	61	90
16-Sep	37	35	19	20	15	23	33	48	41	25	29	32	17	34	18	32	15	22	22	21	20	20	20	20	48
17-Sep	20	22	16	18	18	18	18	17	18	18	20	17	15	16	16	17	18	17	17	15	17	15	15	14	22
18-Sep	16	18	18	14	13	19	17	55	86	61	16	11	16	11	10	11	9	52	69	98	56	35	58	42	98
19-Sep	22	21	27	27	17	17	15	13	24	44	14	23	19	17	14	18	13	21	16	13	11	17	14	11	44
20-Sep	11	11	11	10	12	18	17	12	15	16	16	16	18	18	19	16	14	13	33	72	38	39	22	25	72
21-Sep	15	13	12	10	12	11	13	12	10	28	49	15	12	13	15	19	14	37	43	25	87	83	98	71	98
22-Sep	17	24	50	21	21	69	31	29	23	16	24	74	79	76	11	12	12	10	85	90	64	37	36	30	90
23-Sep	53	57	77	63	71	46	99	69	37	22	15	12	17	14	24	17	17	16	46	80	98	80	63	52	99
24-Sep	46	57	57	27	40	33	23	26	24	27	53	16	28	44	61	19	19	18	16	16	27	61	37	40	61
25-Sep	32	27	16	31	92	27	13	15	10	11	18	15	22	13	16	21	17	10	24	21	21	19	20	24	92
26-Sep	31	17	18	22	21	15	15	20	19	17	19	18	19	17	15	19	20	21	21	19	20	19	21	14	31
27-Sep	17	15	13	14	15	17	18	16	15	12	21	21	41	13	51	34	39	30	74	65	43	27	37	10	74
28-Sep	13	17	16	17	12	11	12	11	12	14	17	18	18	18	27	24	18	16	15	12	12	12	13	12	27
29-Sep	13	13	12	13	12	12	14	14	17	16	16	15	32	26	29	27	27	24	25	24	13	46	35	39	46
30-Sep	36	53	67	55	55	72	50	59	43	96	34	28	26	16	16	16	18	56	52	27	15	33	23	28	96

Diurnal Maximum



WBEA
Hourly Averages

Wind Direction (WD) - deg
Athabasca Valley - September 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 13, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	13:55
Barometric Pressure	734 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Cal Gas Concentration	50.8 ppm	Cal Gas Expiry Date	41557
Gas Cert Reference	LL 105142		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2575
DACS voltage range	0-5V	DACS channel #	1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-681	-681
Analyzer Range (mv)	5000	5000	Lamp voltage	795	802
Calculated slope	0.985334	0.994981	Chamber temp.	43.9	43.6
Calculated intercept	0.375625	1.842012	Pressure (mmHg)	699.3	704.5
Analyzer Background	10.5	10.2	Flow (lpm)	0.546	0.550
Analyzer Coefficient	0.814	0.797	Intensity	49000	49000

Analyzer make Thermo 43c Analyzer serial # 607415781

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	NA
as found span	5000	58.8	597.4	607.8	0.983
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	58.8	597.4	599.4	0.997
second point	5000	29.4	298.7	297.6	1.004
third point	5000	14.7	149.4	146.4	1.020
calibrator zero	6000	0.0	0.0	-0.1	NA
as left zero	6000	0.0	0.0	0.5	NA
as left span	5000	58.8	597.4	600.6	0.995
Average Correction Factor					1.007

Corrected As found 607.9 Previous response 605.9 % change -0.3%

Notes:

adjusted span

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

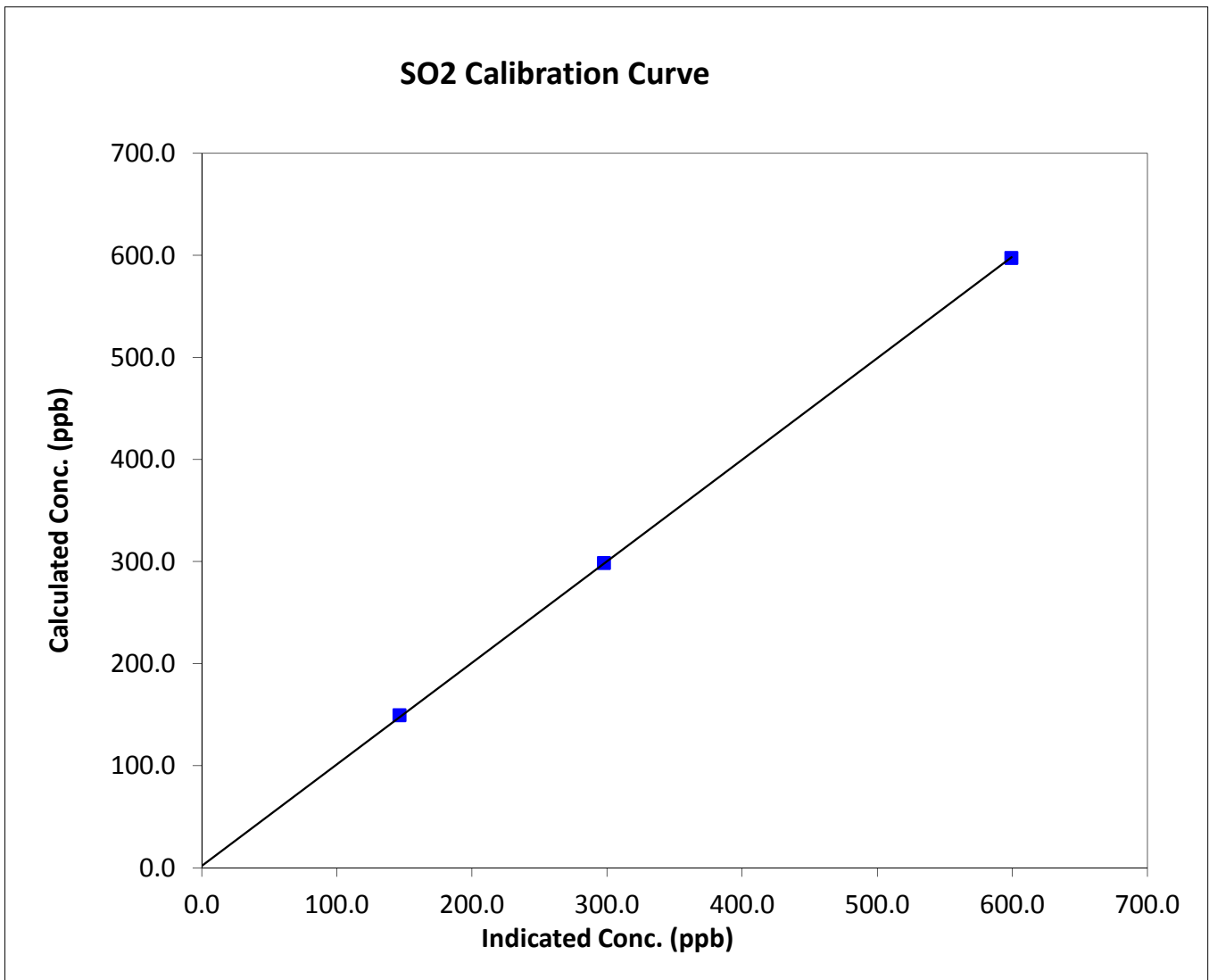
SO₂ Calibration Summary

Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 13, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:40	End Time (MST)	13:55
Analyzer make	Thermo 43c	Analyzer serial #	607415781

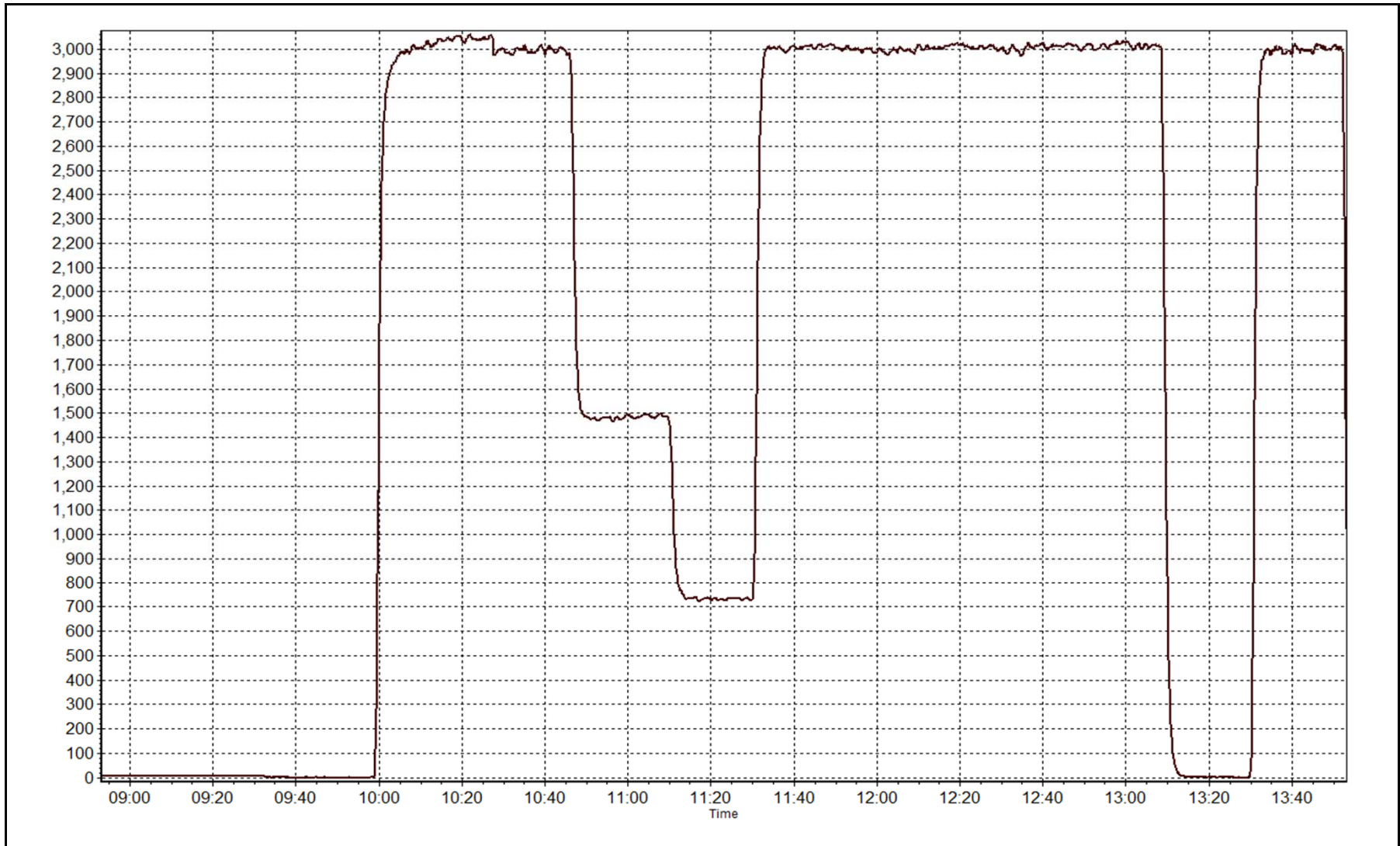
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999960
597.4	599.4	0.9967		
298.7	297.6	1.0037	Slope	0.994981
149.4	146.4	1.0202		
			Intercept	1.842012



SO2 Calibration Plot

Date: September 3, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 14, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	10:55	End Time (MST)	13:10
Barometric Pressure	737 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	8400311
Cal Gas Concentration	5.64 ppm H2S	Cal Gas Expiry Date	11/3/2009
Gas Cert Reference	CC 188098	SO2 gas conc.	50.8 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2575
DACS voltage range	0-5V	DACS channel #	2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-619	-619
Analyzer Range (input)	5000	5000	Lamp voltage	808	808
Calculated slope	1.003487	1.007150	Chamber temp.	44	44
Calculated intercept	-0.168376	-0.026464	Pressure	681.5	680.0
Analyzer Background	16.7	16.7	Flow	0.472	0.473
Analyzer Coefficient	1.011	1.011	Intensity	43500	43500
			Converter temp.	800	800

Analyzer make/model	TEI 45C	Analyzer serial #	630718530
Converter make/model	Model 26 Thermal Oxidizer	Converter serial #	20101-14

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.0	NA
as found span	6000	79.8	75.0	74.5	1.007
SO2 scrubber check	5000	14.7	149.4	0.4	NA
calibrator zero	6000	0.0	0.0	0.0	NA
high point	6000	79.8	75.0	74.5	1.007
second point	6000	44.7	42.0	41.7	1.008
third point	6000	26.6	25.0	25.0	1.001
calibrator zero	5000	0.0	0.0	0.0	NA
as left zero	5000	0.0	0.0	0.0	NA
as left span	6000	79.8	75.0	73.6	1.019
Average Correction Factor					1.005

Corrected As found	74.5	Previous response	74.9	% change	0.5%
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Notes:

no adjustments required.

Calibration Performed By:

Mike Martineau



Wood Buffalo Environmental Association

TRS Calibration Summary

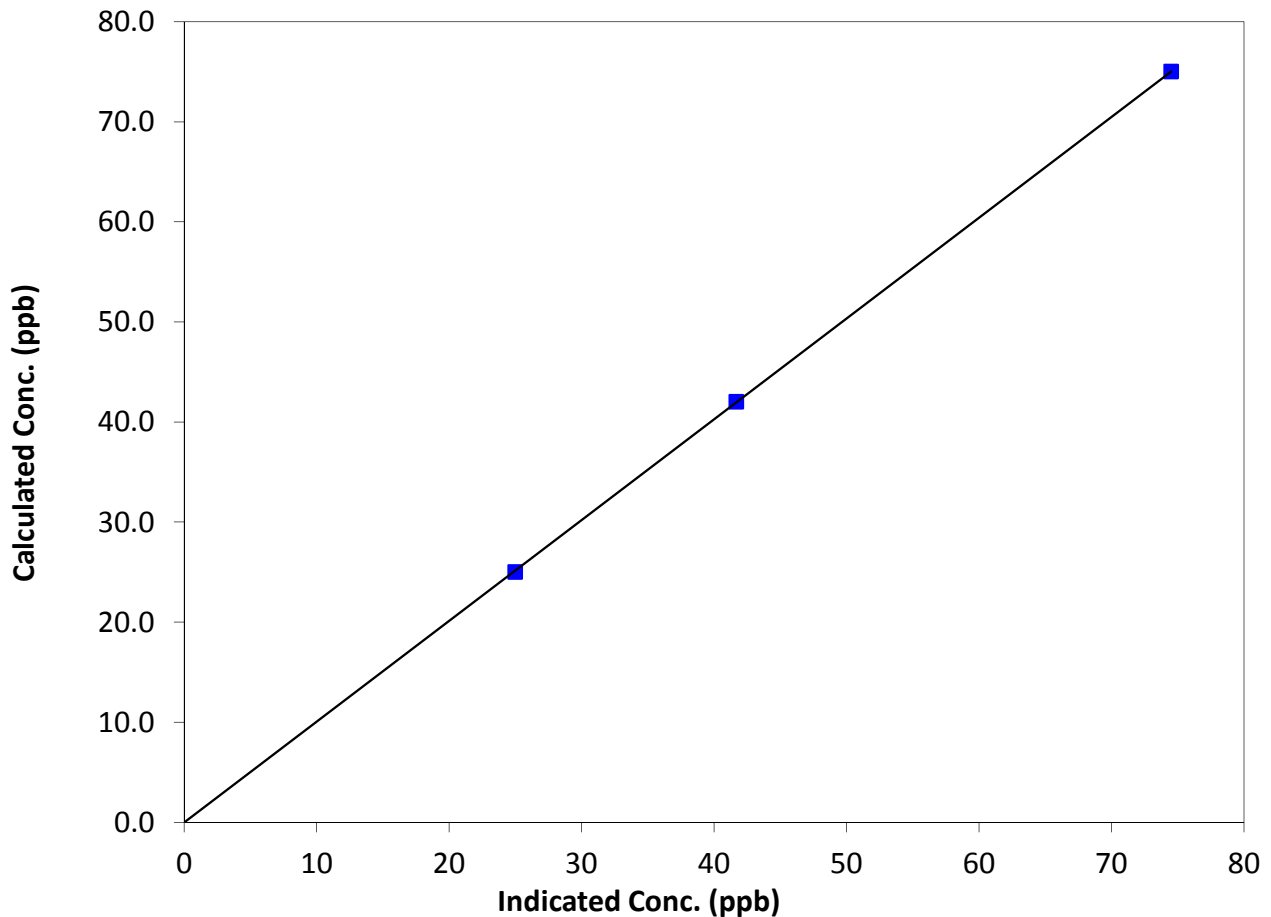
Station Information

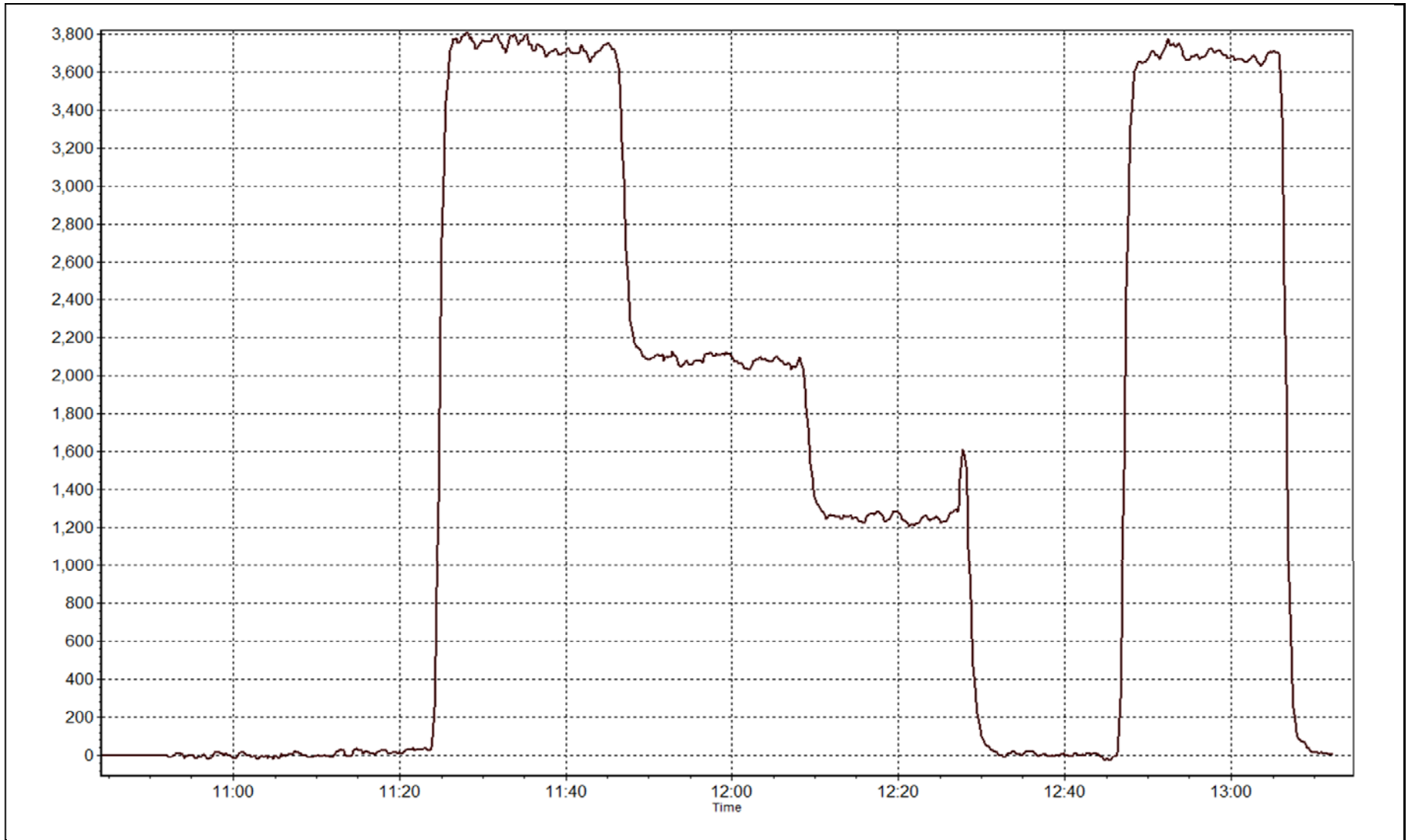
Calibration Date	September 4, 2014	Previous Calibration	August 14, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	10:55	End Time (MST)	13:10
Analyzer make	TEI 45C	Analyzer serial #	630718530

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999992
75.0	74.5	1.0069		
42.0	41.7	1.0081	Slope	1.007150
25.0	25.0	1.0010		
			Intercept	-0.026464

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Wednesday, September 03, 2014	Prev Calibration	Wednesday, August 13, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	13:55
Barometric Pressure	734 mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
Gas Cert Reference	LL 105142	Cal Gas Expiry Date	Thursday, October 10, 2013
CH4 Cal Gas Conc.	502.0 ppm	CH4 Equiv Conc.	1063.0 ppm
C3H8 Cal Gas Conc.	204.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5563

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	37.6	32.0
THC Range (input)	50	50	Flame Temp	387.3	385.0
NMHC Range (ppm)	50	50	Carrier Pressure	32.1	32.1
NMHC Range (input)	50	50	Fuel Pressure	41.4	41.4
THC Calc slope	1.003777	0.999650	Air Pressure	32.5	32.5
THC Calc intercept	0.016118	0.016043			
NMHC Calc slope	0.996137	0.998892			
NMHC Calc intercept	0.009999	0.012034			

Analyzer make Thermo Scientific 55i Analyzer serial # 1218153354

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	N/A
as found span	5000	58.8	12.50	12.41	1.007
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	58.8	12.50	12.50	1.000
second point	5000	29.4	6.25	6.22	1.005
third point	5000	14.7	3.13	3.10	1.008
calibrator zero	6000	0.0	0.00	0.00	N/A
as left zero	6000	0.0	0.00	0.00	N/A
as left span	5000	58.8	12.50	12.51	0.999
Average Correction Factor					1.004

Corrected As found 12.41 Previous response 12.44 % change 0.2%

Notes:

adjusted span

Calibration Performed By: Michael Martineau



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	58.8	6.60	6.65	0.992
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	58.8	6.60	6.60	1.000
second point	5000	29.4	3.30	3.28	1.006
third point	5000	14.7	1.65	1.63	1.012
calibrator zero	6000	0.0	0.00	0.00	N/A
as left zero	6000	0.0	0.00	0.00	N/A
as left span	5000	58.8	6.60	6.59	1.001
Average Correction Factor					1.006

Corrected As found 6.65 Previous response 6.61 % change -0.6%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	58.8	5.90	5.76	1.025
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	58.8	5.90	5.90	1.001
second point	5000	29.4	2.95	2.93	1.007
third point	5000	14.7	1.48	1.47	1.004
calibrator zero	6000	0.0	0.00	0.00	N/A
as left zero	6000	0.0	0.00	0.00	N/A
as left span	5000	58.8	5.90	5.92	0.997
Average Correction Factor					

Corrected As found 5.76 Previous response 5.82 % change 1.1%



Wood Buffalo Environmental Association

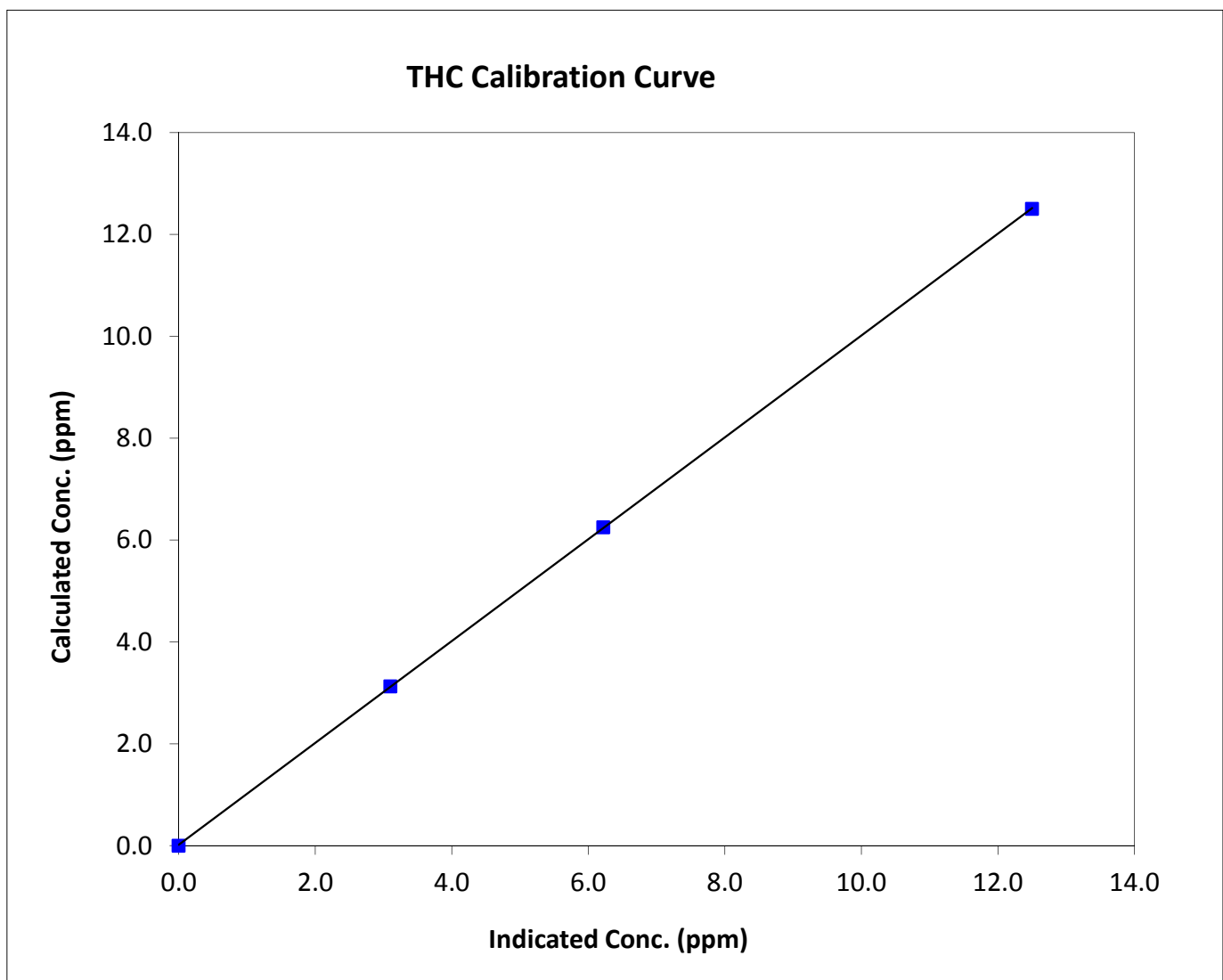
THC Calibration Summary

Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 13, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:40	End Time (MST)	13:55
Analyzer make	Thermo Scientific 55i	Analyzer serial #	1218153354

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999991
12.50	12.50	1.0001		
6.25	6.22	1.0049	Slope	0.999650
3.13	3.10	1.0081		
			Intercept	0.016043





Wood Buffalo Environmental Association

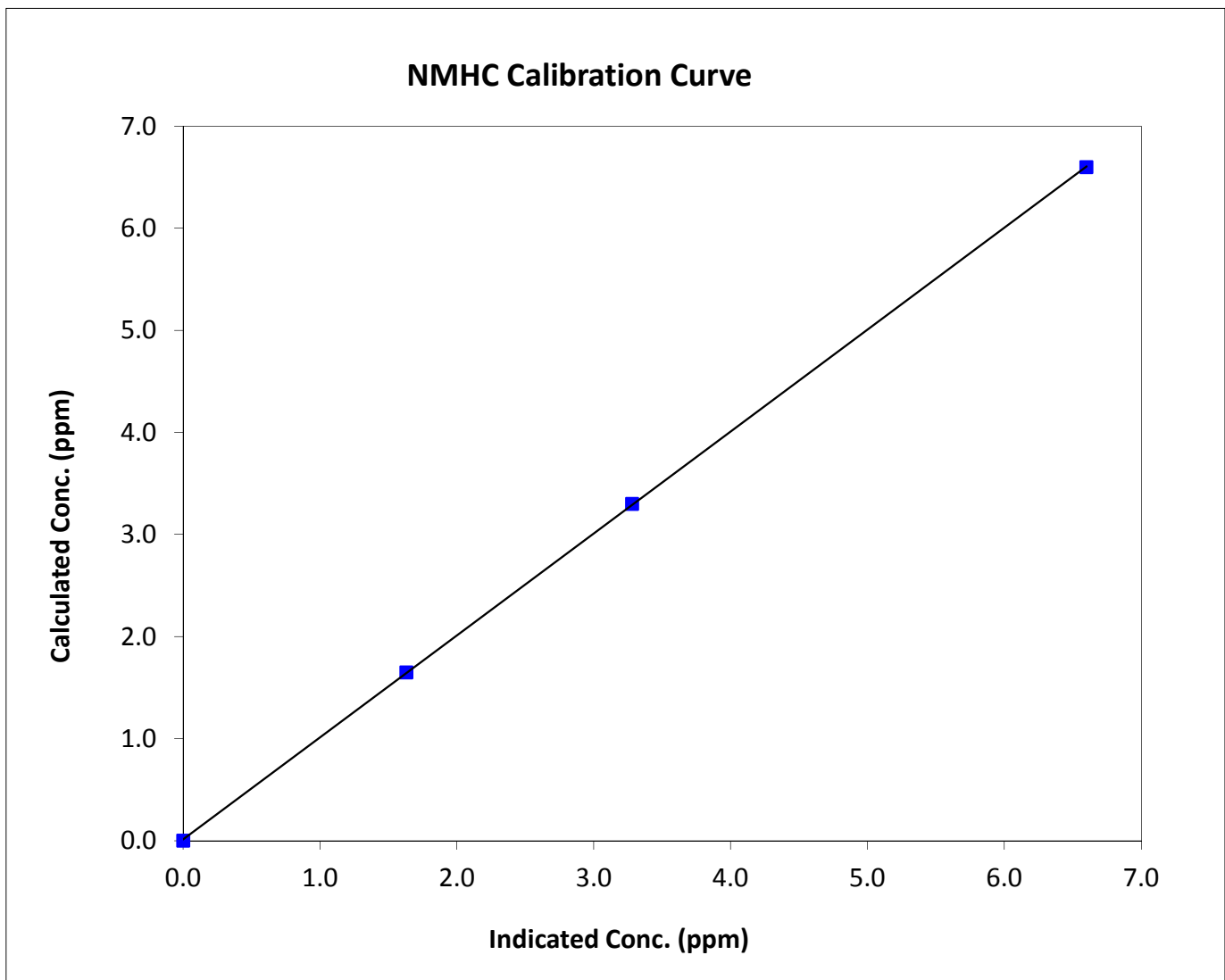
NMHC Calibration Summary

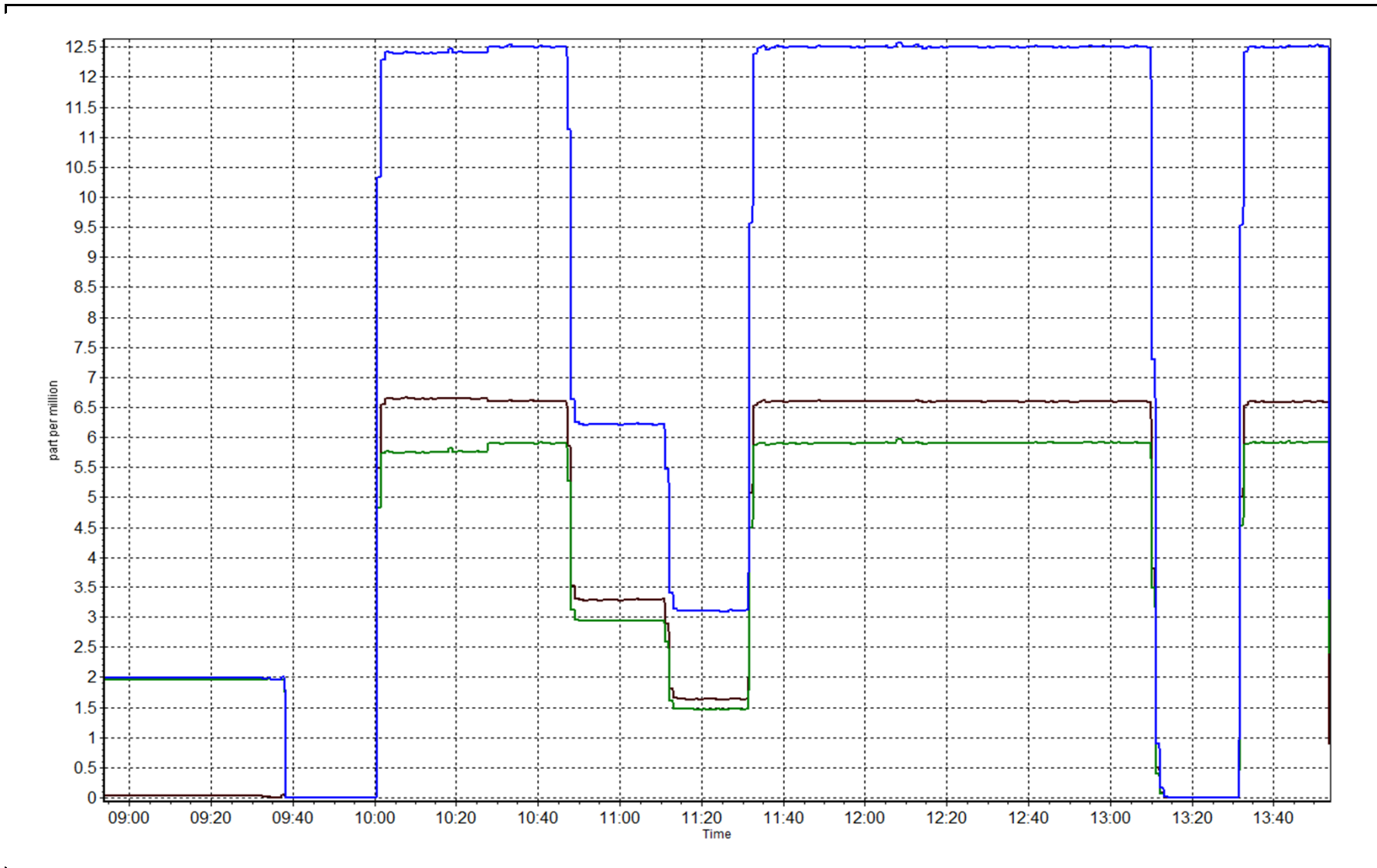
Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 13, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:40	End Time (MST)	13:55
Analyzer make	Thermo Scientific 55i	Analyzer serial #	1218153354

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999984
6.60	6.60	0.9996		
3.30	3.28	1.0057	Slope	0.998892
1.65	1.63	1.0119		
			Intercept	0.012034







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 14, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:15	End Time (MST)	10:55
Barometric Pressure	737 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
NO2 calibration used	Wednesday, August 13, 2014	Transfer Standard	N/A
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5563
DACS voltage range	0-5V	DACS channel #	5

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	30.8	28.7
Analyzer Range (input)	5000	5000	Lamp temp.	70.9	70.8
Calculated slope	1.008294	0.991320	Pressure	718.6	732.4
Calculated intercept	1.220597	0.924244	Flow cell A	0.678	0.685
Analyzer Background	-0.2	-0.2	Flow cell B	0.742	0.751
Analyzer Coefficient	1.009	1.072	Cell A Intensity	106800	10600
			Cell B Intensity	89700	89000

Analyzer make TEI 49C Analyzer serial # 607415760

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.1	N/A
as found span	5000	N/A	352.6	333.6	1.057
calibrator zero	5000	0.00	0.0	0.1	N/A
high point	5000	N/A	352.6	355.5	0.992
second point	5000	N/A	178.2	177.7	1.003
third point	5000	N/A	90.4	89.7	1.008
calibrator zero	5000	0.00	0.0	0.1	N/A
as left zero	5000	0.00	0.0	0.0	N/A
as left span	5000	N/A	352.6	354.0	0.996
Average Correction Factor					1.001

Corrected As found 333.6 Previous response 348.5 % change 4.5%

Notes:

Adjusted span. Diagnostics OK.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

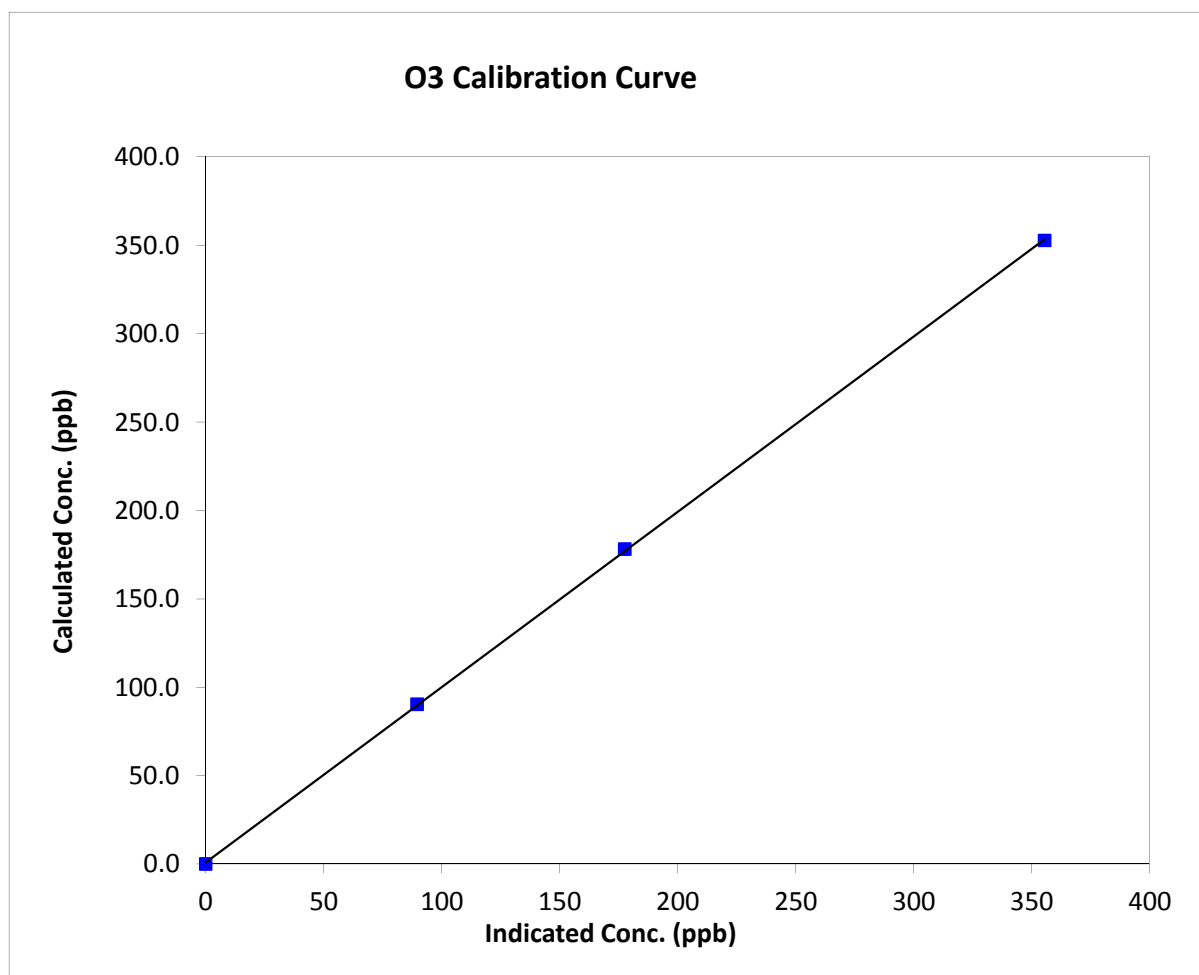
O₃ Calibration Summary

Station Information

Calibration Date	Thursday, September 04, 2014	Previous Calibration	August 14, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:15	End Time (MST)	10:55
Analyzer make	TEI 49C	Analyzer serial #	607415760

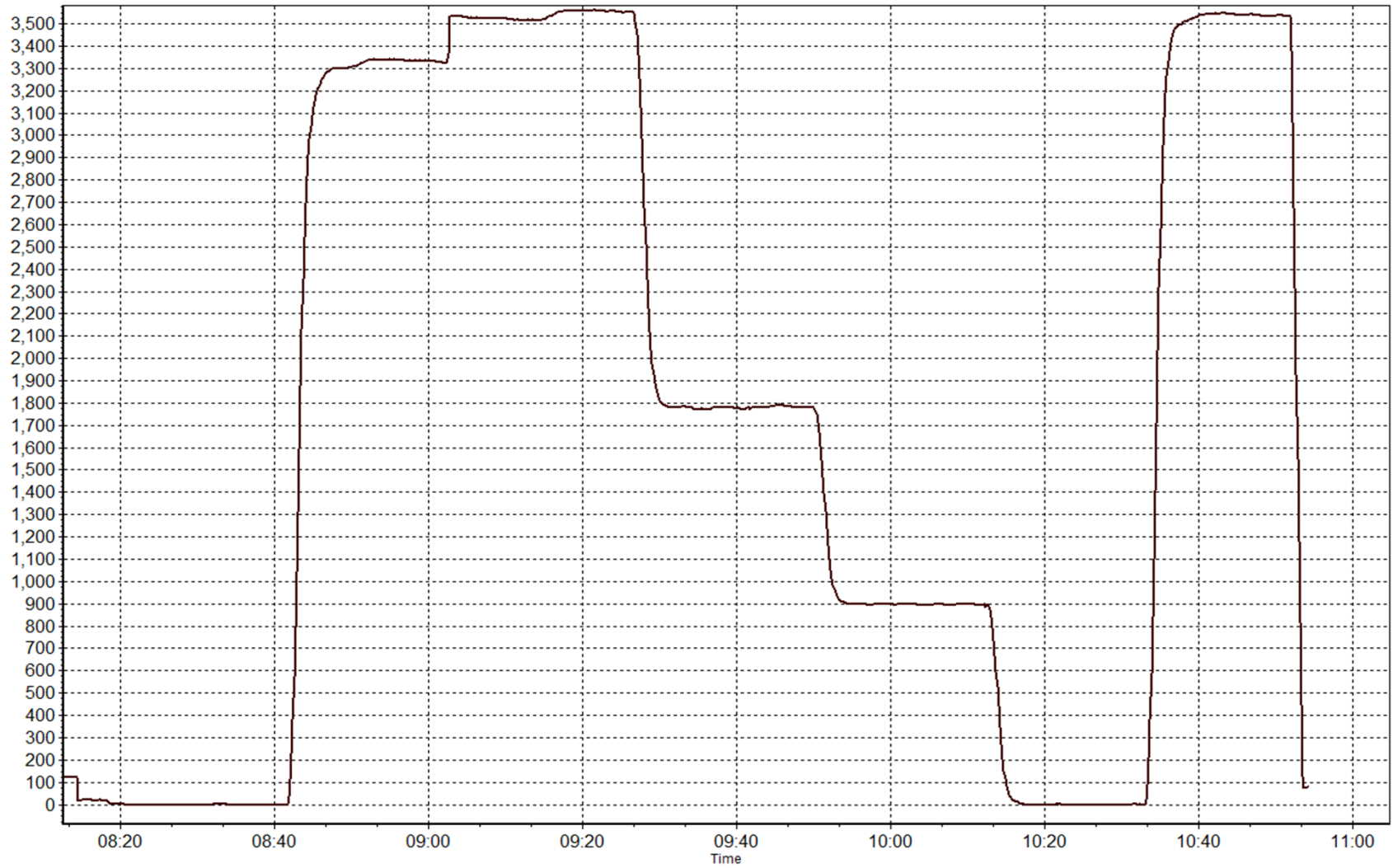
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999956
352.6	355.5	0.9920		
178.2	177.7	1.0028	Slope	0.991320
90.4	89.7	1.0078		
			Intercept	0.924244



O3 Calibration Plot

Date: September 4, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 13, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	13:55
Barometric Pressure	734 mmHg	Station Temperature	21.0 Deg C
Calibrator	Sabio 4010	Serial Number	11021107
NO Cal Gas Conc	51 ppm	Cal Gas Expiry Date	October 10, 2013
NOx Cal Gas Conc	51.2 ppm	Cal Gas Serial #	LL 105142

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2575
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	1.004137	0.999866	0.989355
	Data Offset	1.632538	1.721982	0.171895
After	Data Slope	0.996199	0.991581	1.005399
	Data Offset	1.304677	1.338870	0.574073
Channel #		4	5	6
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model	Thermo 42c	Analyzer serial #	601114773
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.854	ppb	0.854	ppb
NOX coefficient	0.998	ppb	0.998	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	3.6		3.6	
NOX bkgrnd	3.9		3.9	
Nt coefficient	n/a		n/a	
Chamber Temp	49.6	Deg C	49.6	Deg C
Moly Temp	323.0	Deg C	323.0	Deg C
PMT Temp	-3.6	Deg C	-3.6	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	168.3	mmHg	167.8	mmHg
Sample Flow	0.791	ccm	0.783	ccm

Notes:

no adjustments required.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

September 3, 2014

Station Number:

AMS 7

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.1	N/A	N/A
as found span	5000	58.8	602.1	599.8	2.4	604.4	604.8	-0.3	0.9962	0.9917
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.1	N/A	N/A
high point	5000	58.8	602.1	599.8	2.4	604.4	604.8	-0.3	0.9962	0.9917
second point	5000	29.4	301.1	299.9	1.2	299.4	299.6	0.0	1.0055	1.0009
third point	5000	14.7	150.5	149.9	0.6	147.5	147.5	0.1	1.0205	1.0163
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.1	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	N/A	N/A
as left span	5000	58.8	602.1	251.8	350.4	594.3	252.7	341.6	1.0131	0.9964
Average Correction Factor									1.0074	1.0030

Corrected As found

NO_x= 604.5

NO= 604.9

Percent Change

NO_x= -1.1%

NO= -1.1%

Previous Response

NO_x= 598.0

NO= 598.1

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

58.80

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO ₂ (300)	N/A	251.8	352.6	602.4	251.8	350.5	0.9879	1.0000	1.0061	99.4%
2nd NO ₂ (200)	N/A	426.2	178.2	602.6	426.2	176.4	0.9876	1.0000	1.0102	99.0%
3rd NO ₂ (100)	N/A	514.0	90.4	602.4	514.0	88.6	0.9879	1.0000	1.0203	98.0%
4th NO ₂ (0)	604.4	N/A	-0.6	603.8	604.4	-0.4	0.9856	1.0000	N/A	N/A
Average Correction Factor							0.9872	1.0000	1.0122	98.8%

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

NO_x Calibration Summary

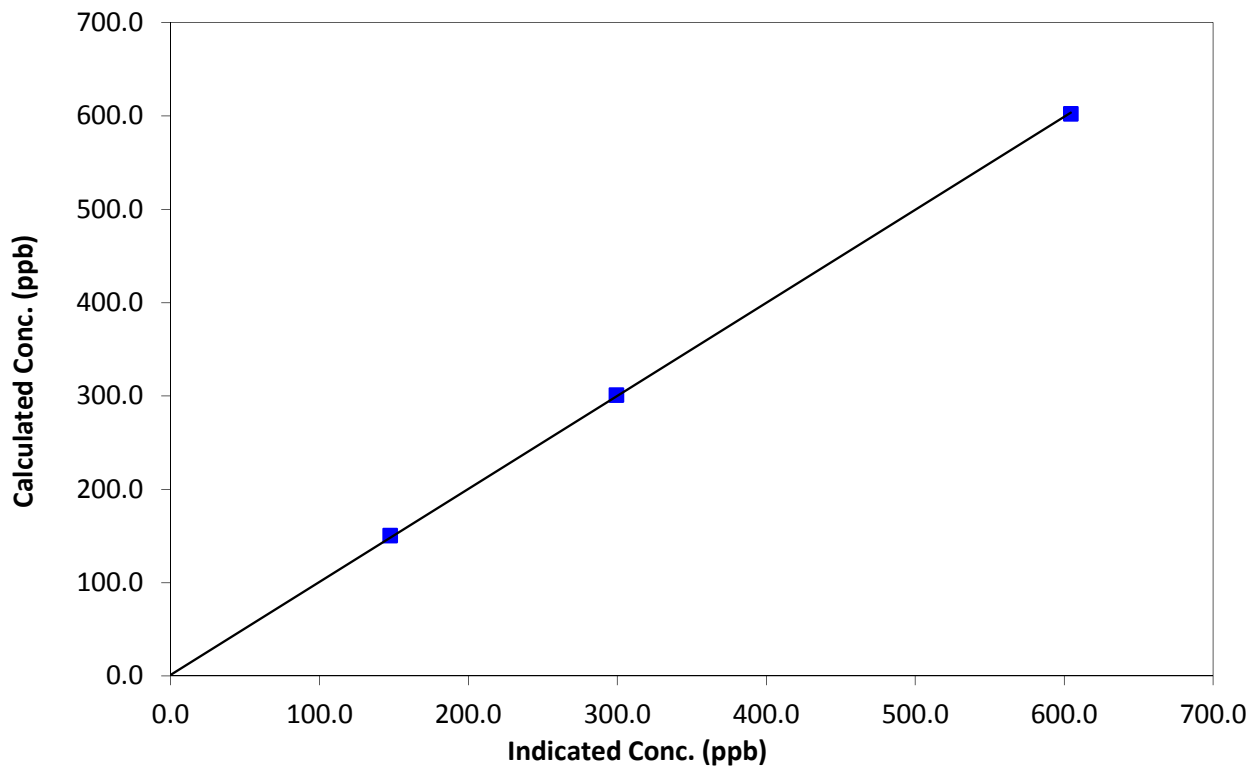
Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 13, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:40	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	0.999952
602.1	604.4	0.9962		
301.1	299.4	1.0055	Slope	0.996199
150.5	147.5	1.0205		
0.0	-0.1	0.0000	Intercept	1.304677

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

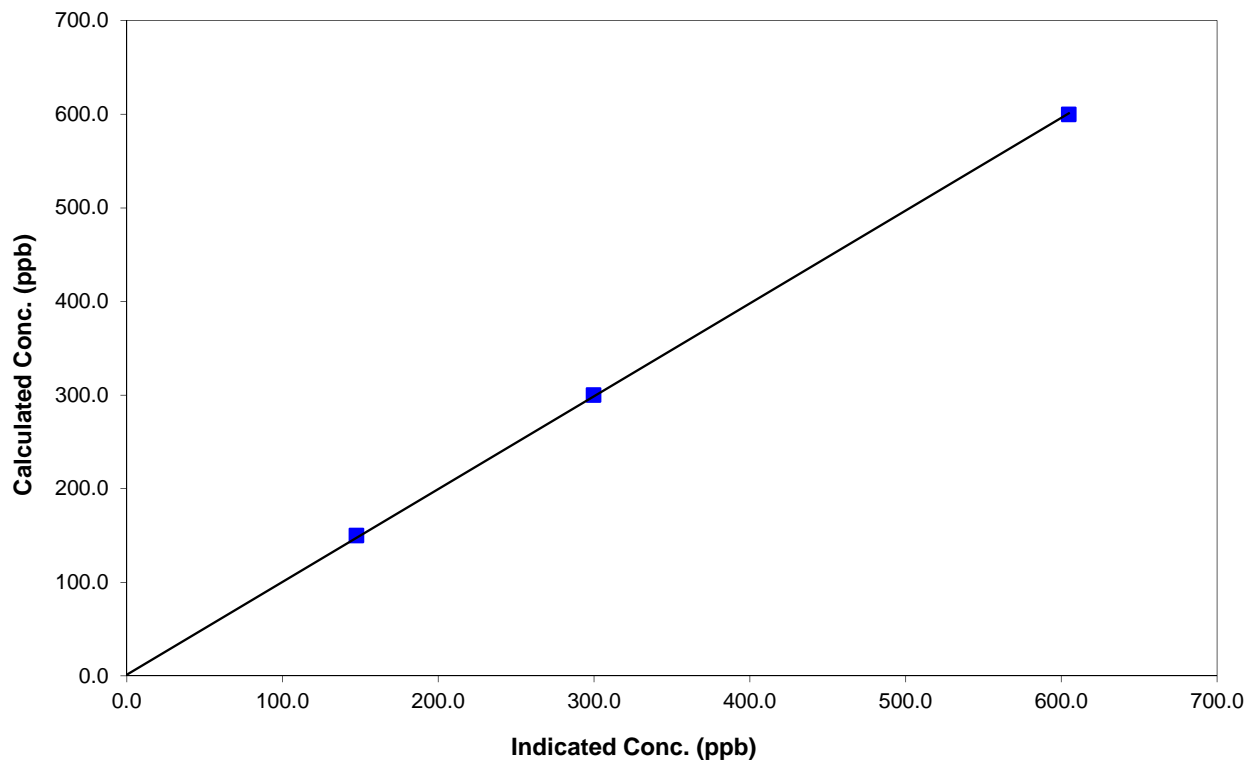
Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 13, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:40	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	0.999952
599.8	604.8	0.9917		
299.9	299.6	1.0009	Slope	0.991581
149.9	147.5	1.0163		
0.0	-0.1	0.0000	Intercept	1.338870

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

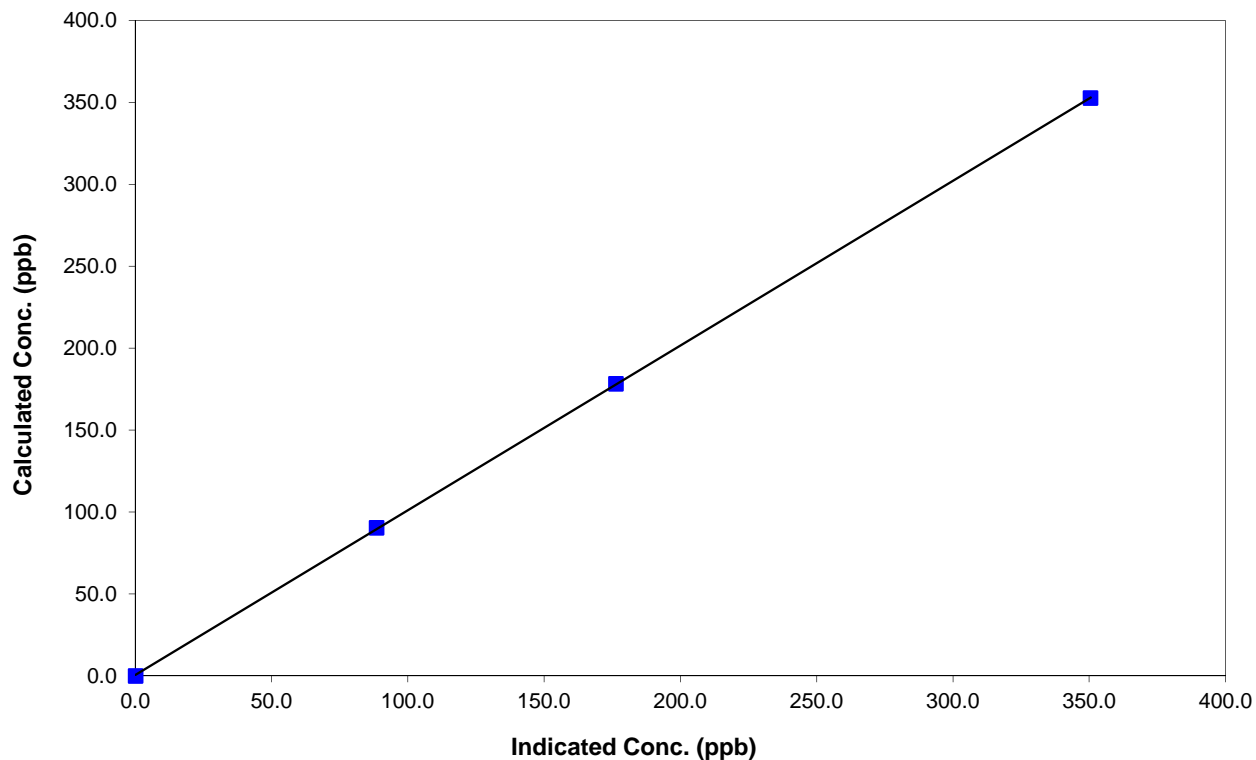
Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 13, 2014
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:40	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	0.999982
352.6	350.5	1.0061		
178.2	176.4	1.0102	Slope	1.005399
90.4	88.6	1.0203		
			Intercept	0.574073

NO₂ Calibration Curve







Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Calibration Date	September 5, 2014	Previous Calibration	August 15, 2014
Station Name	Athabasca Valley	Station Number	7
Reason:	Routine	Install	Removal
Start Time (MST)	8:10	End Time (MST)	11:25
Barometric Pressure	741 mmHg	Station temp.	20 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
Cal Gas Concentration	3060 ppm	Cal Gas Expiry Date	4/27/2015
Gas Cert Reference	LL 85940		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5563
DACS voltage range	0-5V	DACS channel #	11

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	50	50	Chamber temp.	47.7	48.0
Analyzer Range (mv)	5000	5000	Pressure	713.6	719.0
Calculated slope	0.996857	0.998684	Flow	1.270	1.275
Calculated intercept	0.008741	0.139602	Intensity	200000	200200
Analyzer Background	1.611	1.817	S/R ratio	1.165400	1.165580
Analyzer Coefficient	1.020	1.024			

Analyzer make TEI 48C Analyzer serial # 508011060

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.2	N/A
as found span	5000	67.60	41.4	41.7	0.991
calibrator zero	5000	0.00	0.0	0.0	N/A
high point	5000	67.60	41.4	41.4	0.999
second point	5000	34.20	20.9	20.6	1.015
third point	5000	14.70	9.0	8.8	1.022
calibrator zero	6000	0.00	0.0	0.0	N/A
as left zero	6000	0.00	0.0	0.0	N/A
as left span	5000	67.60	41.4	41.3	1.001
Average Correction Factor					1.012

Corrected As found 41.5 Previous response 41.2 % change -0.7%

Notes:

changed inlet filter. Adjusted zero and span.

Calibration Performed By: Michael Martineau



Wood Buffalo Environmental Association

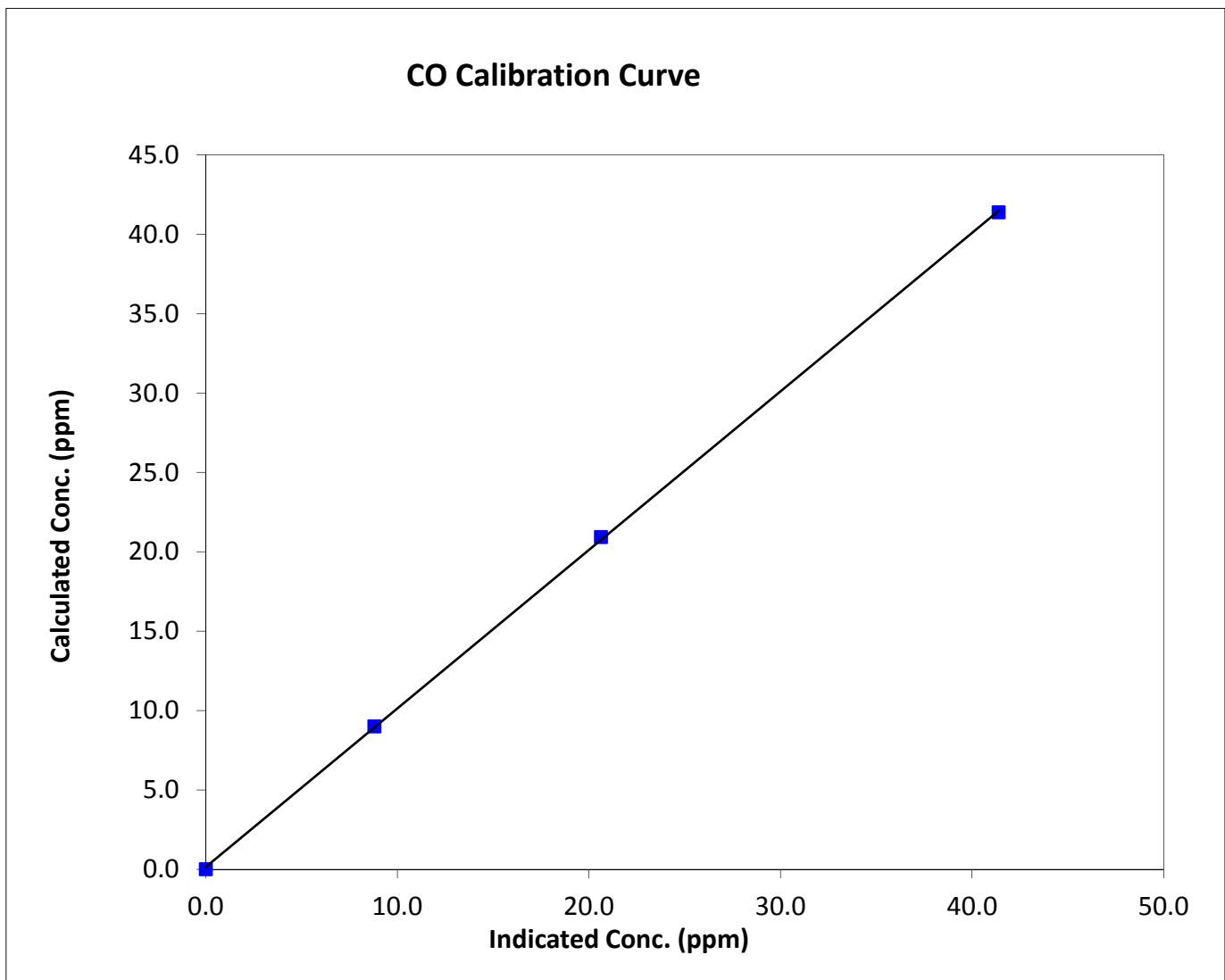
CO Calibration Summary

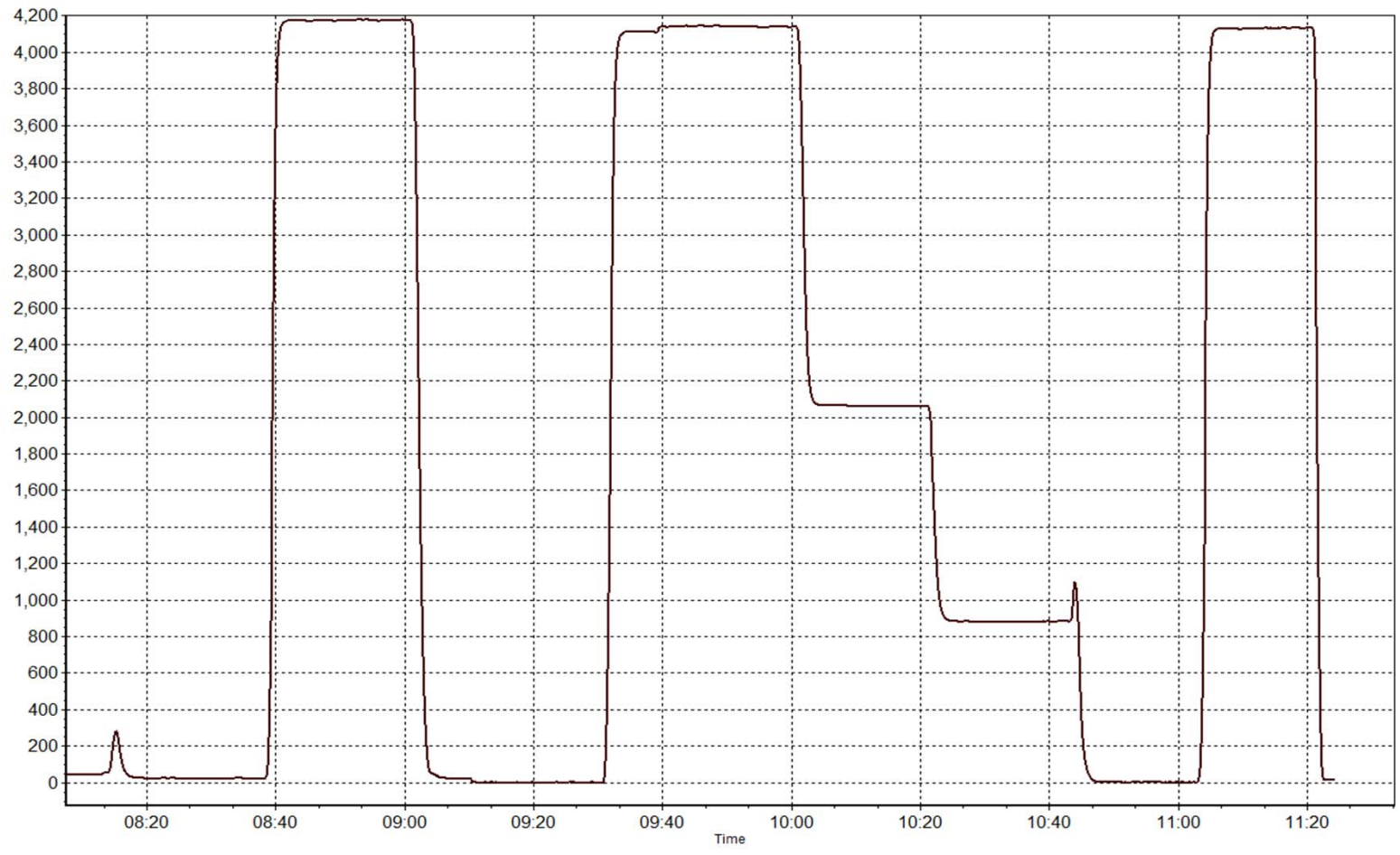
Station Information

Calibration Date	September 5, 2014	Previous Calibration	August 15, 2014
Station Name	Athabasca Valley	Station Number	7
Start Time (MST)	8:10	End Time (MST)	11:25
Analyzer make	TEI 48C	Analyzer serial #	508011060

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999923
41.4	41.4	0.9994		
20.9	20.6	1.0148	Slope	0.998684
9.0	8.8	1.0216		
			Intercept	0.139602





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 8
FORT CHIPEWYAN
SEPTEMBER 2014**

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

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

October 30, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
SEPTEMBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	686	34	34	100.00	6	0	1	0
O3(ppb) Average	686	34	34	100.00	38	0	32	-
NO2(ppb) Average	681	39	39	100.00	11	0	3	-
NO(ppb) Average	681	39	39	100.00	2	-	0	-
NOX(ppb) Average	681	39	39	100.00	11	-	3	-
PM2.5(ug/m3) Average	718	0	2	99.72	15.8	-	9.7	0
Wind Speed 10 m (km/h) Average	719	0	1	99.86	42	-	-	-
Wind Direction 10 m (deg) Average	719	0	1	99.86	-	-	-	-
Temperature 2 m (C) Average	720	0	0	100.00	23.8	-	16	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	-	-
Precipitation (mm) Total	719	0	1	99.86	4.8	-	-	-
Global Solar Radiation (W/m2) Average	720	0	0	100.00	685	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
 SEPTEMBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2(ppb) Average	686	0.2	0	-	0	0	0	0	0	0	0	6
O3(ppb) Average	686	21	6	-	5	13	17	21	26	28	38	38
NO2(ppb) Average	681	0.5	1	-	0	0	0	0	0	1	11	11
NO(ppb) Average	681	0.1	0	-	0	0	0	0	0	0	2	2
NOX(ppb) Average	681	0.5	1	-	0	0	0	0	0	1	11	11
PM2.5(ug/m3) Average	718	3.32	2.6	-	0.4	1	1.6	2.5	4.1	7	15.8	15.8
Wind Speed 10 m (km/h) Average	719	12.9	8	-	1	5	7	10	18	24	42	42
Wind Direction 10 m (deg) Average	719	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	720	8.97	4.5	-	-1.3	3.2	5.8	8.8	12	14.8	23.8	23.8
Relative Humidity (%) Average	720	74	16	-	23	51	64	77	86	92	99	99
Precipitation (mm) Total	719	-	-	24.89	0	0	0	0	0	0	4.8	4.8
Global Solar Radiation (W/m2) Average	720	128.7	180	-	0	0	0	15	226	441	685	685

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
SEPTEMBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	04 Sep 2014 17:00	04 Sep 2014 18:00	2	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	13 Sep 2014 20:00	13 Sep 2014 20:00	1	Flatline in sensor output signal
Precipitation Collector	04 Sep 2014 06:00	04 Sep 2014 06:00	1	Maintenance - tipping bucket cleaned

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 6 ppb on Sep 28 01:00	Maximum Daily Average: 1.4 ppb on Sep 28		Hours of Data:	686
Minimum Value: 0 ppb on Sep 9 21:00	Minimum Daily Average: 0.0 ppb on Sep 9		Hours of Missing Data:	34
Maximum Diurnal Average: 3.0 ppb at hour 2	Minimum Diurnal Average: 0.2 ppb at hour 21		Hours of Calibration:	34
Monthly Average: 0.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 2		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-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
2-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
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	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.1	0
5-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
6-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
7-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
8-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
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	0.0	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	0.1	0
11-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
12-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
13-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
14-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
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	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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Sep	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
19-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.2	1
20-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
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	Z	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0.6	1
23-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
24-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
25-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
26-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
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	5	0.3	5
28-Sep	6	3	Z	1	1	1	2	2	1	1	1	2	1	1	1	1	1	1	2	2	1	1	1	1	1.4	6
29-Sep	0	Z	1	1	1	1	1	2	3	3	3	1	1	0	0	0	1	2	2	1	1	1	1	1	1.4	3
30-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

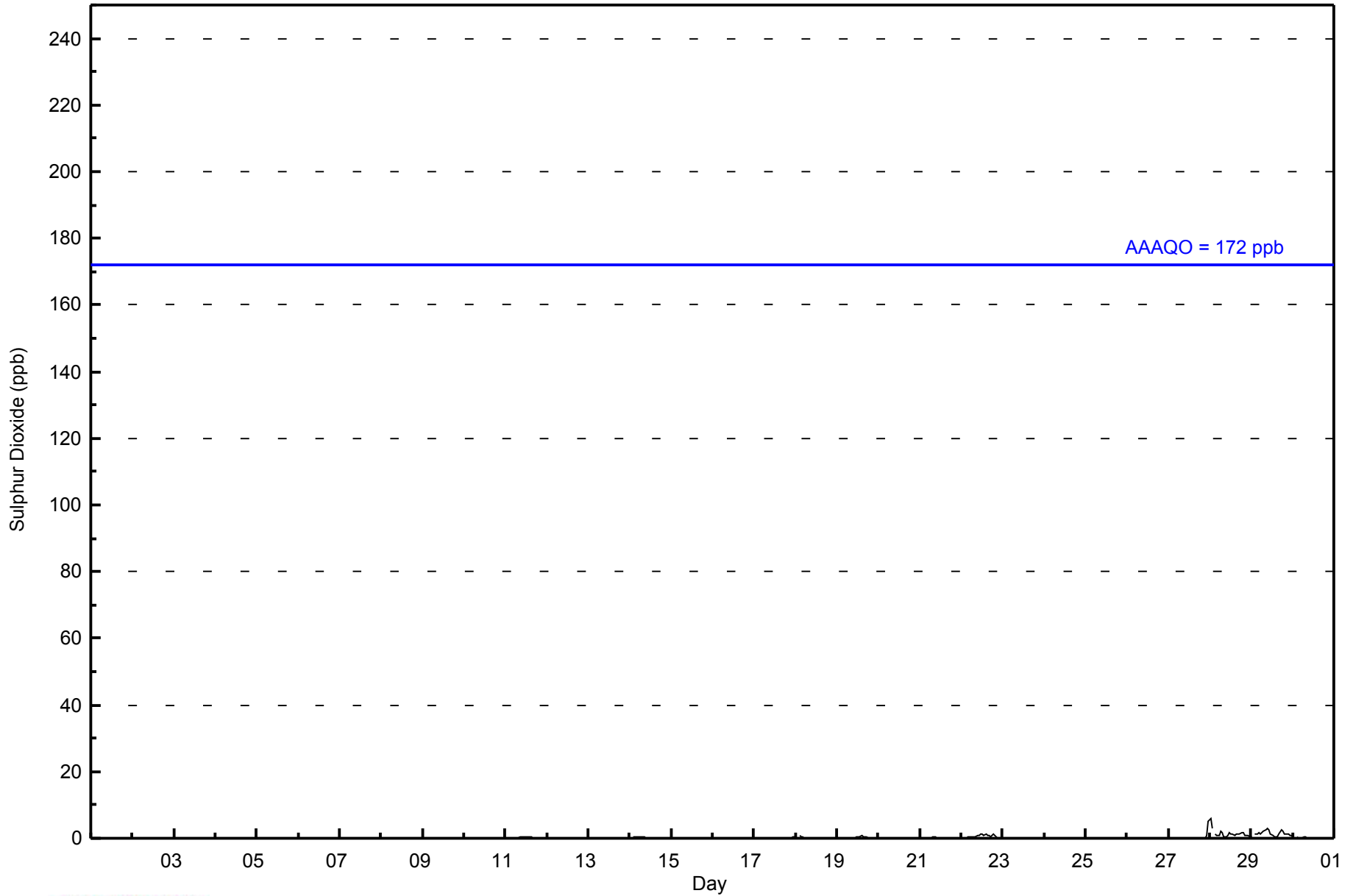
0.3	3.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3	Diurnal Average	
6	3	1	1	1	1	2	2	3	3	3	3	2	1	1	1	1	1	2	2	2	1	1	1	5	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort Chipeywan - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipeywan - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	686	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: 686

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipeywan - September 2014

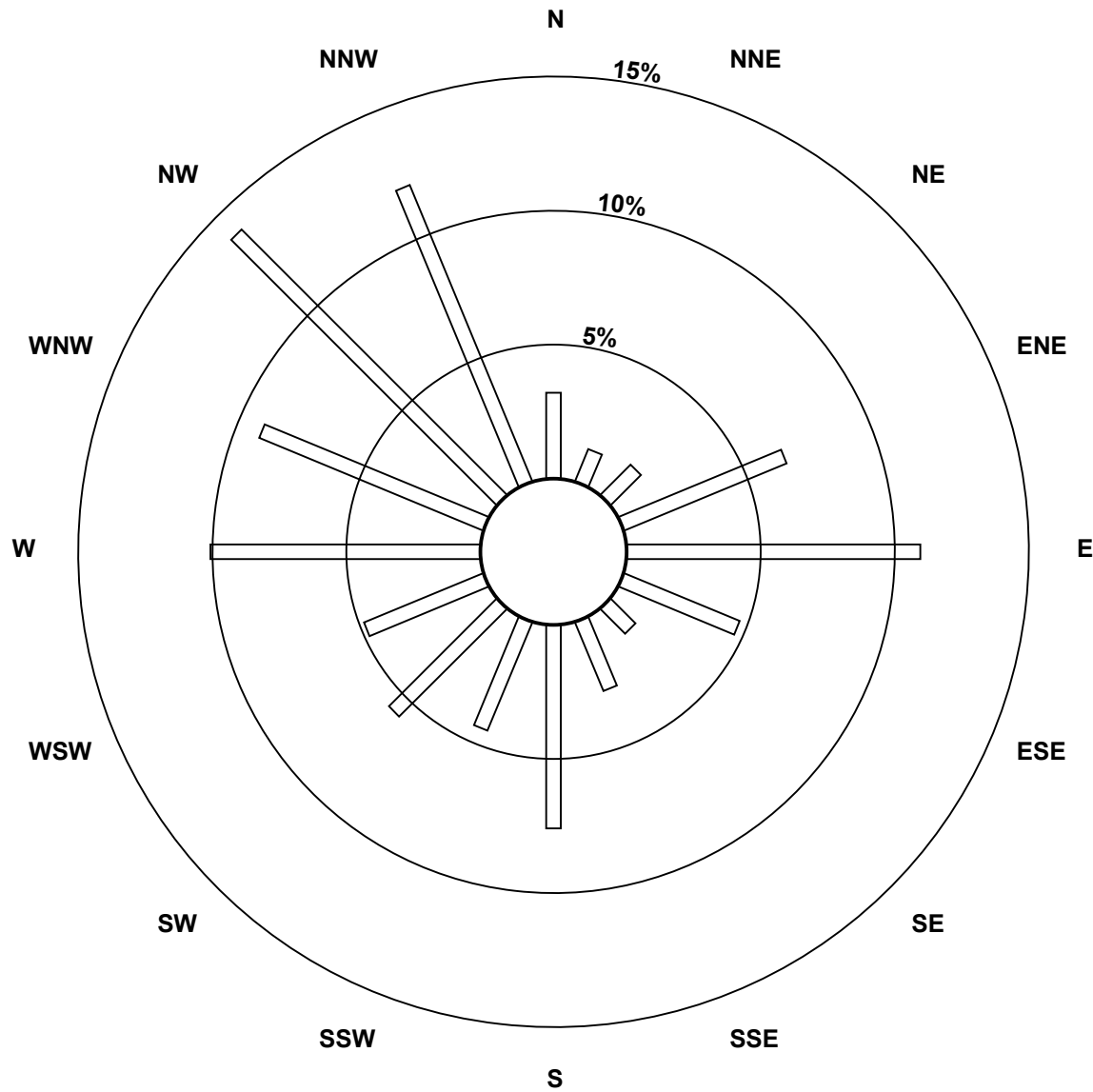
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	22	9	11	45	75	32	9	19	52	30	39	33	69	62	96	82	685
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	9	11	45	75	32	9	19	52	30	39	33	69	62	96	82	685

Total Number of Valid Hours: 685

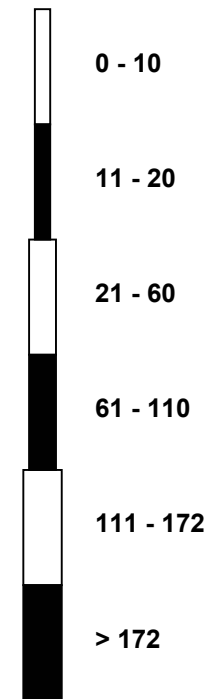
Total Number of Hours: 720

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

**Sulphur Dioxide (SO₂) - ppb
Fort Chipeywan (AMS 8)**



Classes (ppb)

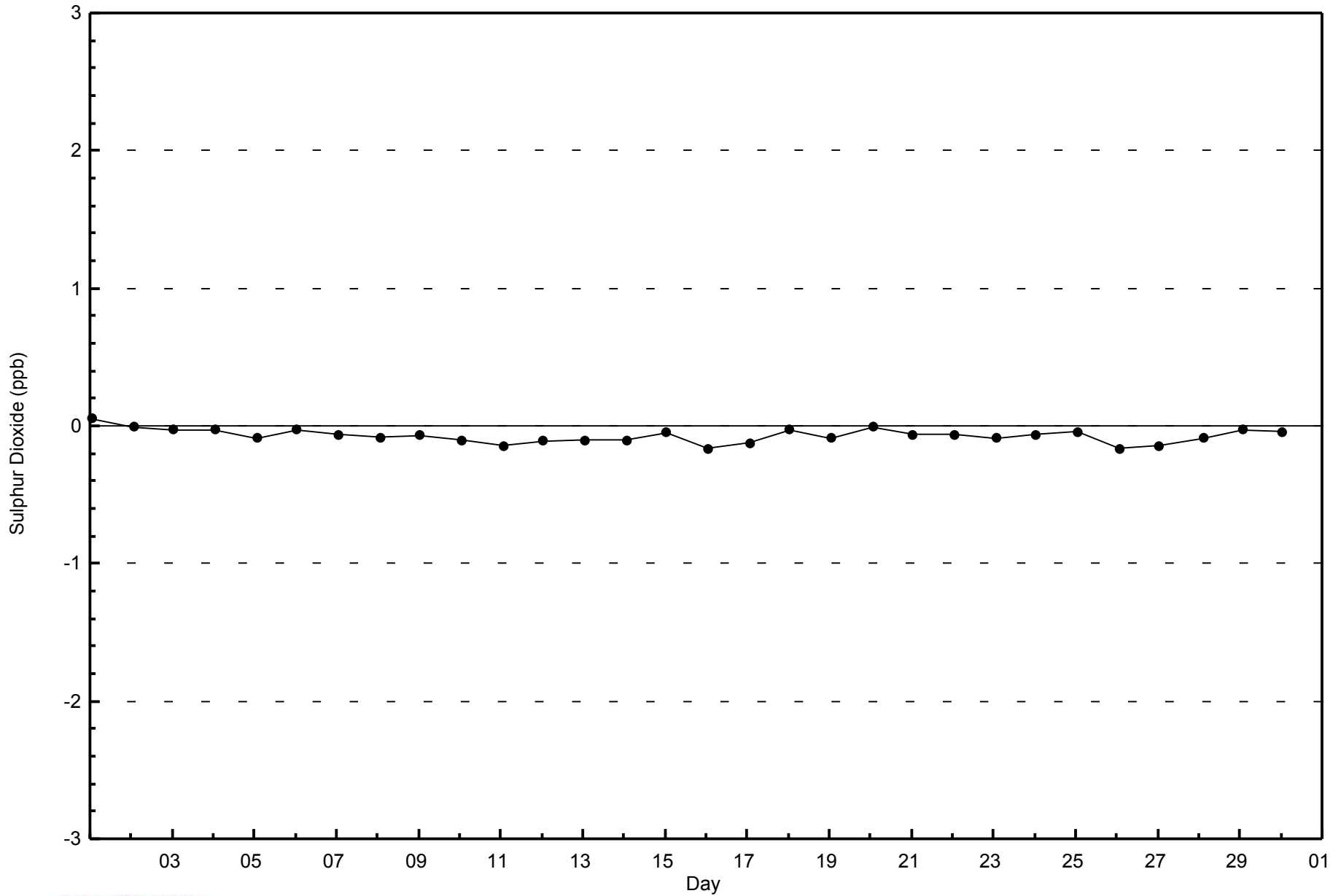


Total Number of Valid Hours: 685



WBEA
Zero Responses

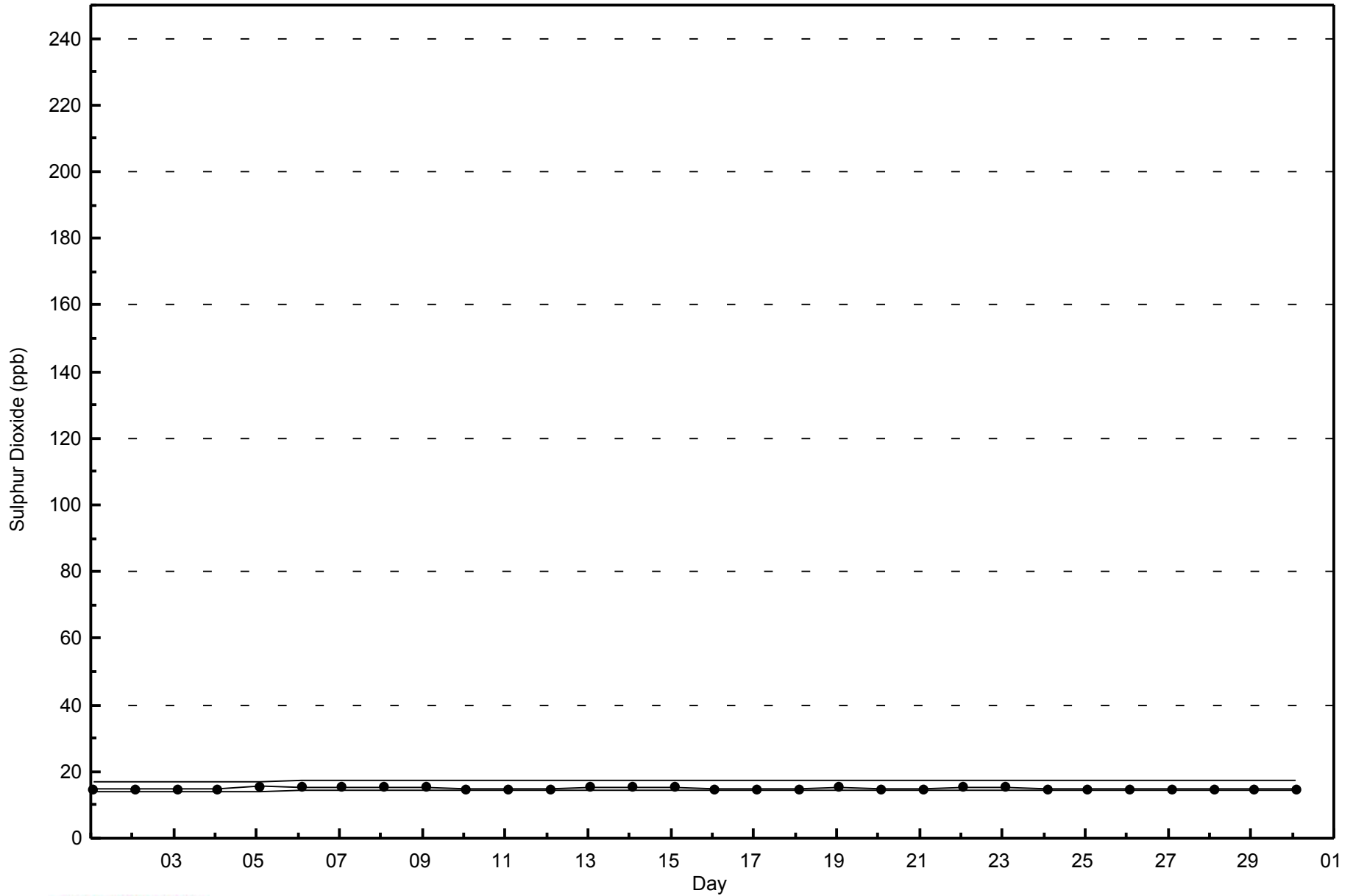
Sulphur Dioxide (SO₂) - ppb
Fort Chipeywan - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort Chipeywan - September 2014





Maximum Value: 2 ppb on Sep 21 09:00	Maximum Daily Average: 0.3 ppb on Sep 29	Hours in Service: 720
Minimum Value: 0 ppb on Sep 2 01:00	Minimum Daily Average: 0.0 ppb on Sep 26	Hours of Data: 681
Maximum Diurnal Average: 0.2 ppb at hour 9	Minimum Diurnal Average: 0.0 ppb at hour 2	Hours of Missing Data: 39
Monthly Average: 0.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1	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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-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
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	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	C	0	0	0	0	0	0	--	0
5-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
6-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
7-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
8-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
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	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	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
12-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
13-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
14-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
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	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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-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
19-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
20-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
21-Sep	0	Z	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-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
25-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
26-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
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	0
28-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	0.2	1
29-Sep	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
30-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

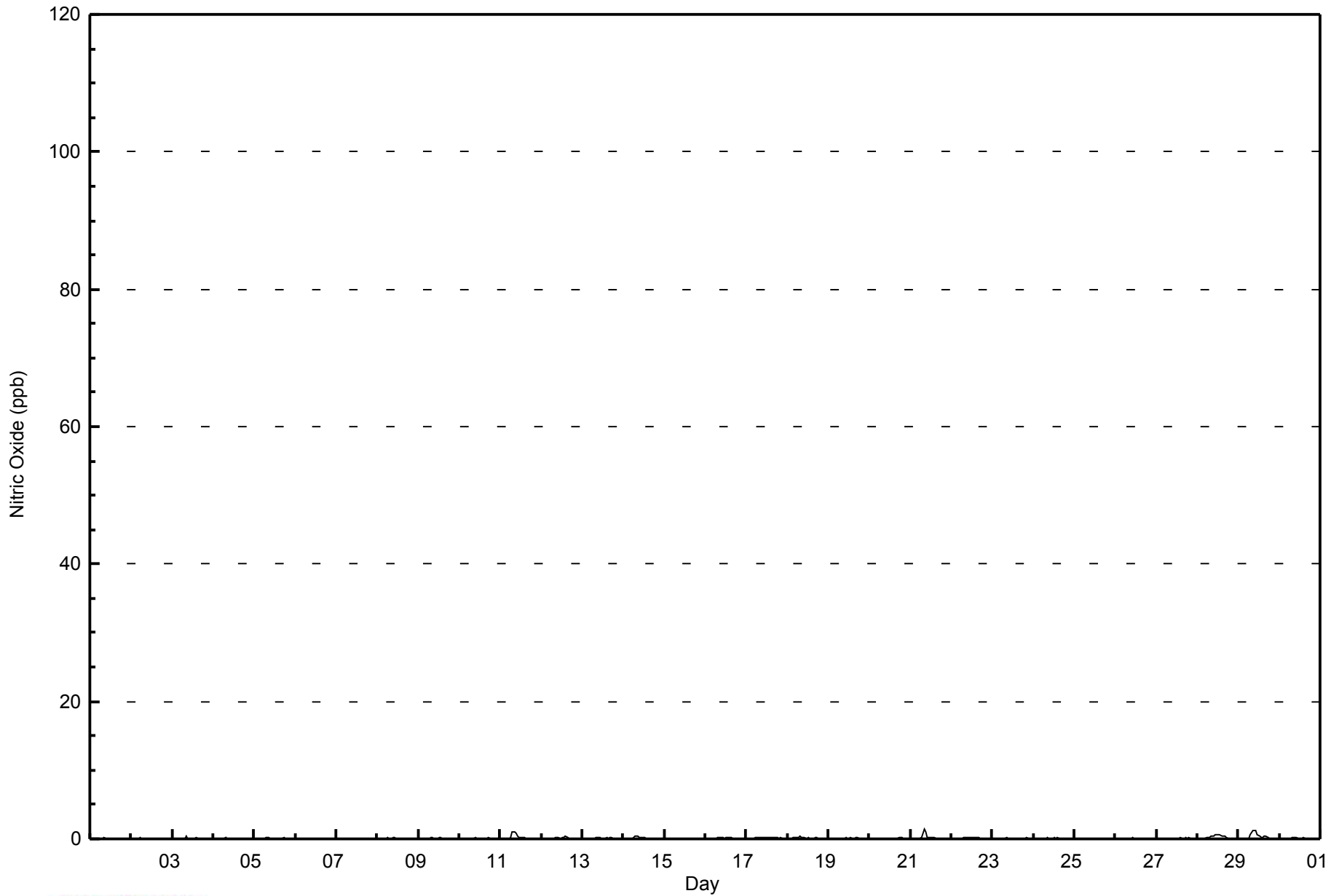
0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	Diurnal Average
0	0	0	0	0	0	0	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

Z - zerospan C - Calibration



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Fort Chipeywan - September 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipeywan - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	681	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: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipeywan - September 2014

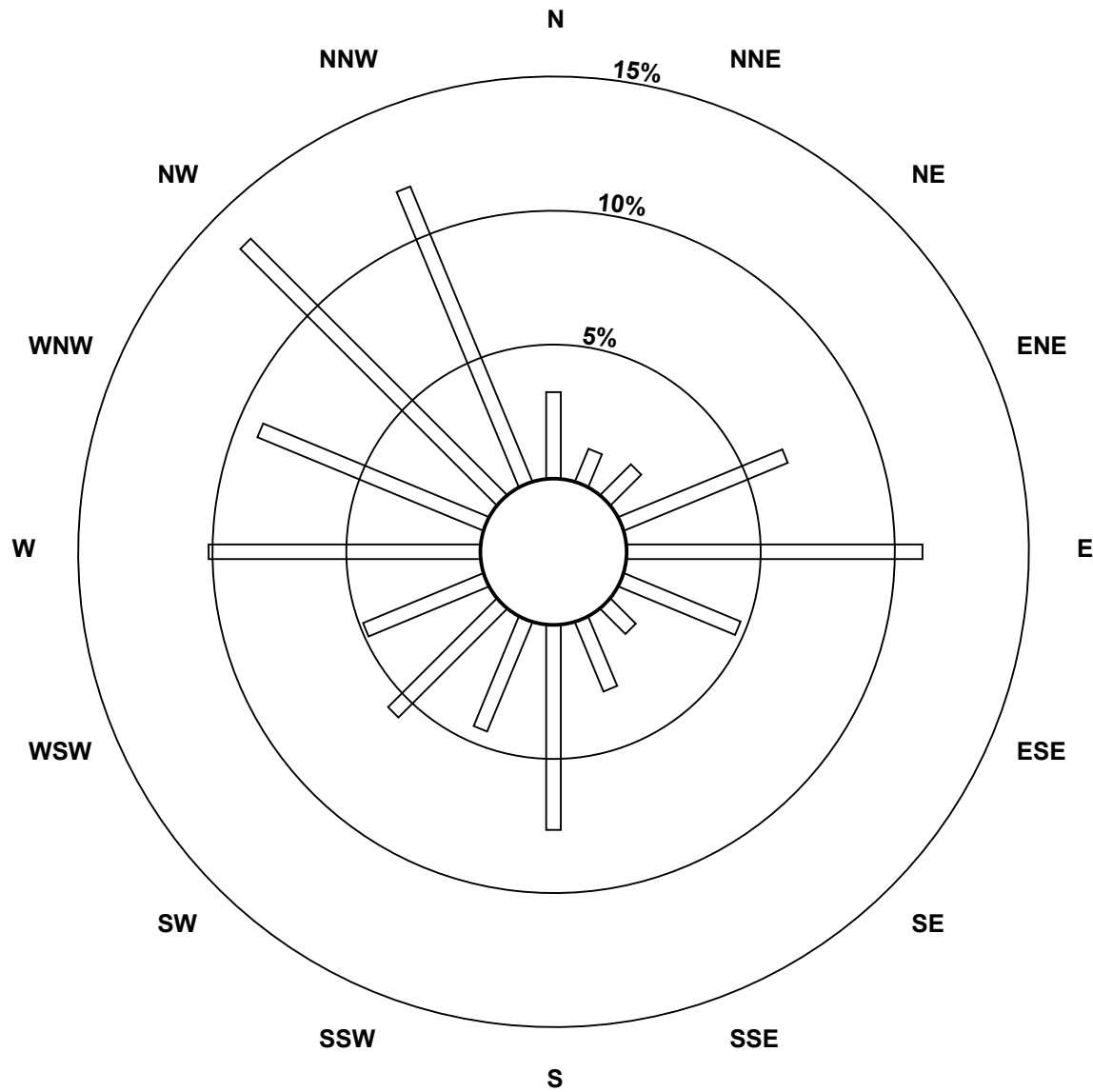
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	9	11	45	75	32	9	19	52	30	39	33	69	62	92	81	680
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	9	11	45	75	32	9	19	52	30	39	33	69	62	92	81	680

Total Number of Valid Hours: 680

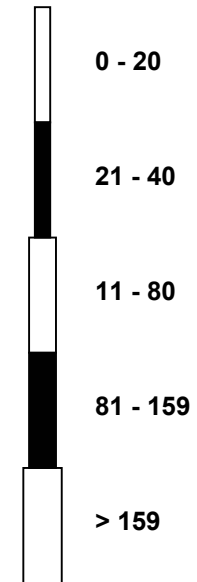
Total Number of Hours: 720

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

**Nitric Oxide (NO) - ppb
Fort Chipeywan (AMS 8)**



Classes (ppb)

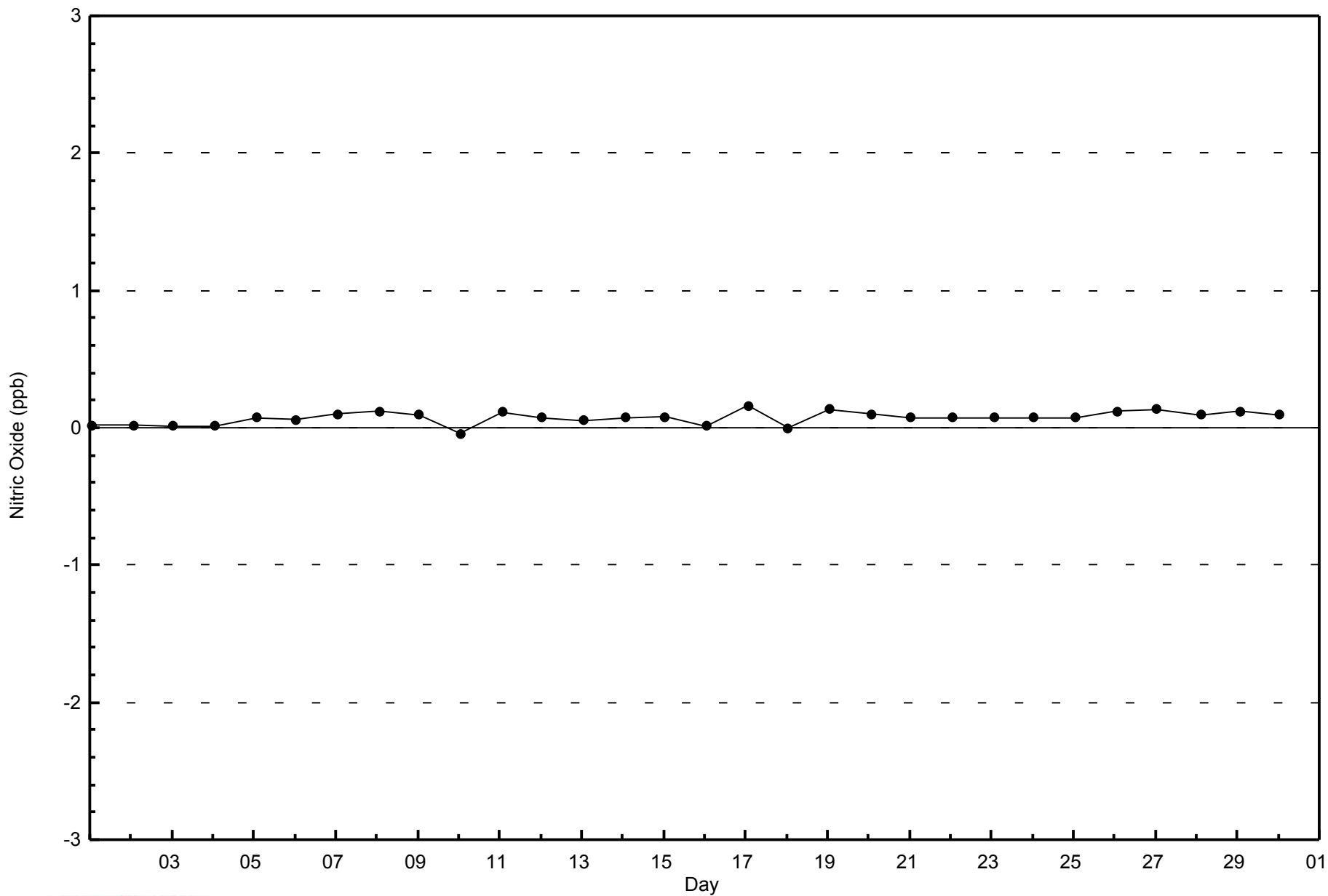


Total Number of Valid Hours: 680



WBEA
Zero Responses

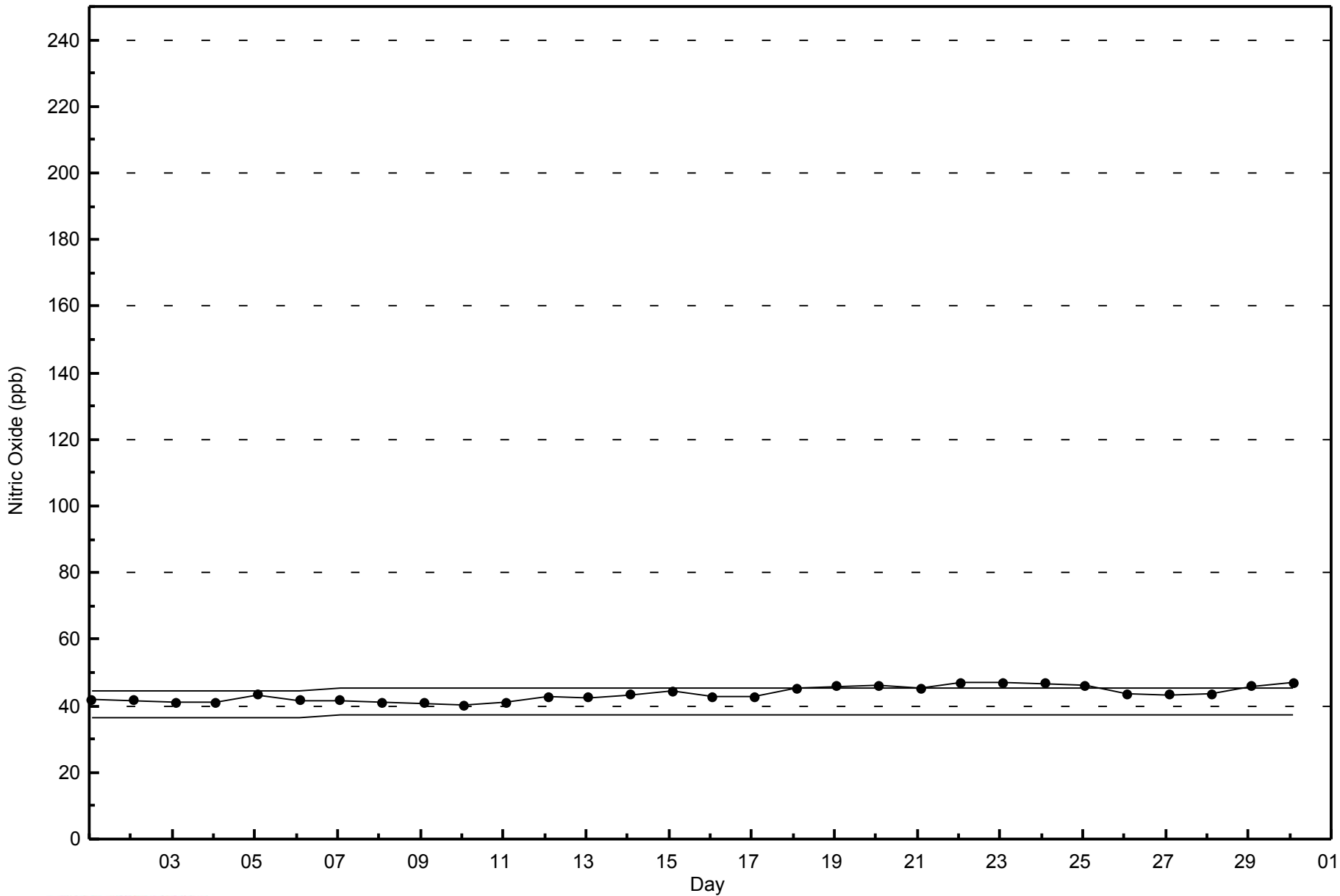
Nitric Oxide (NO) - ppb
Fort Chipeywan - September 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Fort Chipeywan - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 11 ppb on Sep 28 01:00	Maximum Daily Average: 2.8 ppb on Sep 28		Hours of Data:	681
Minimum Value: 0 ppb on Sep 2 08:00	Minimum Daily Average: 0.0 ppb on Sep 16		Hours of Missing Data:	39
Maximum Diurnal Average: 7.4 ppb at hour 2	Minimum Diurnal Average: 0.2 ppb at hour 12		Hours of Calibration:	39
Monthly Average: 0.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.2	1
2-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
3-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	0.1	1
4-Sep	0	Z	1	1	1	1	0	1	0	C	C	C	C	C	C	C	C	C	0	0	0	0	0	0	--	1
5-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0.2	2
6-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
7-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
8-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
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	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	Z	0	0	0	0	2	3	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.6	3
12-Sep	1	Z	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1
13-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0.2	1
14-Sep	0	Z	1	1	1	2	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
15-Sep	0	Z	0	0	1	1	0	0	0	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
17-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0.2	2
18-Sep	4	Z	4	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.9	4
19-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0.4	1
20-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.1	1
21-Sep	0	Z	0	0	1	2	3	3	2	2	1	0	0	0	0	0	0	0	0	2	1	1	1	1	0.9	3
22-Sep	1	Z	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	1
23-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.2	1
24-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
25-Sep	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1
26-Sep	2	Z	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
27-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	9	0.6	9
28-Sep	11	7	Z	8	4	3	2	1	1	1	1	1	1	2	2	2	2	2	3	2	2	3	2	2	2.8	11
29-Sep	2	Z	3	4	4	6	5	4	3	2	2	1	1	1	2	4	3	4	4	4	3	3	2	1	2.8	6
30-Sep	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1

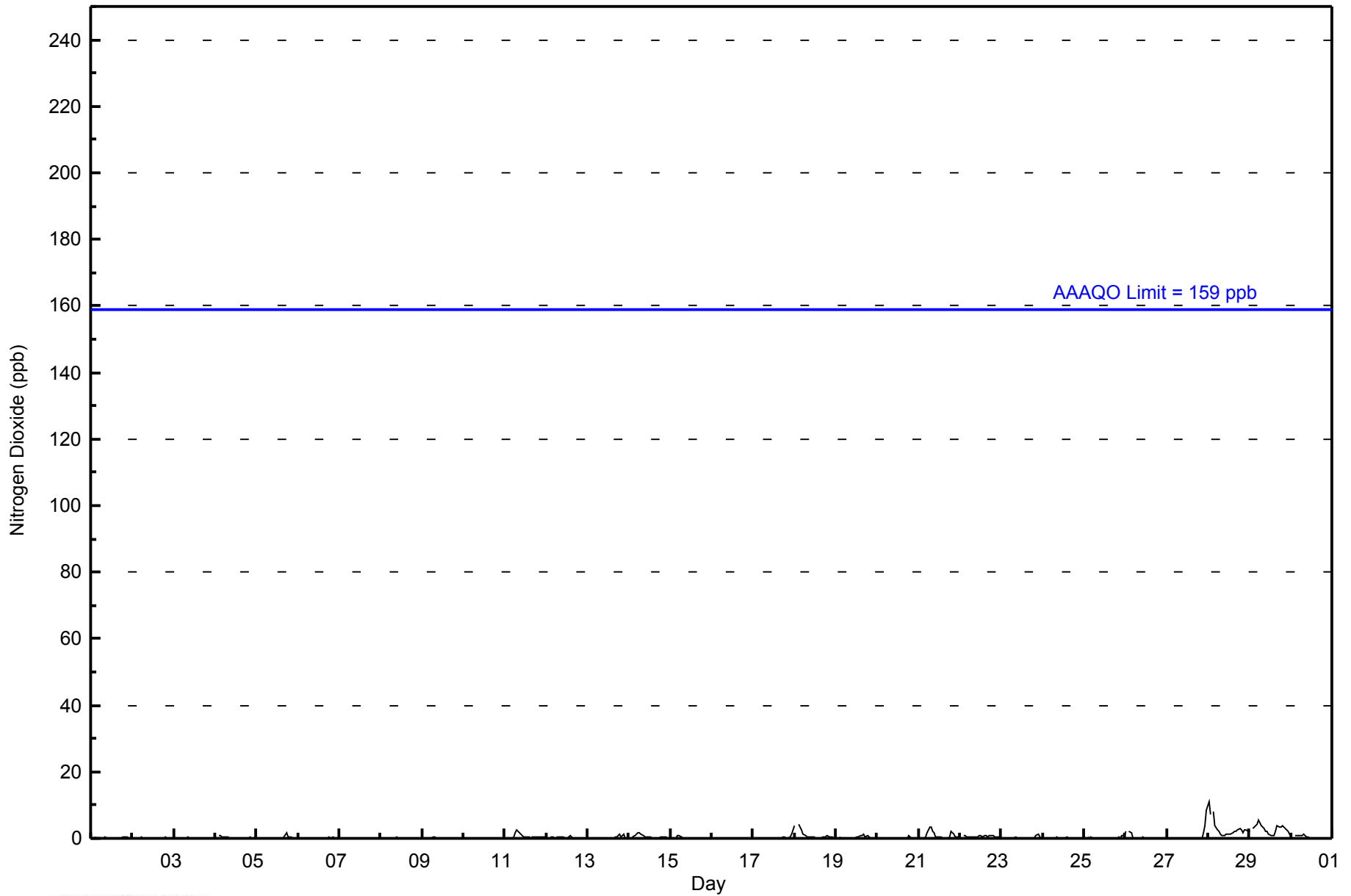
0.8	7.4	0.5	0.7	0.6	0.6	0.6	0.6	0.5	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.4	0.4	0.5	0.6	Diurnal Average		
11	7	4	8	4	6	5	4	3	2	2	1	1	1	2	2	4	3	4	4	4	3	3	4	9	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort Chipeywan - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort Chipeywan - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	681	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: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort Chipeywan - September 2014

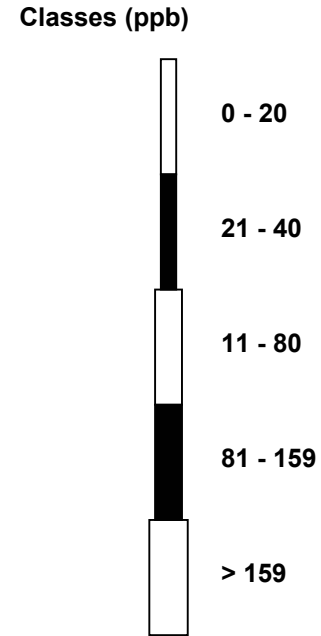
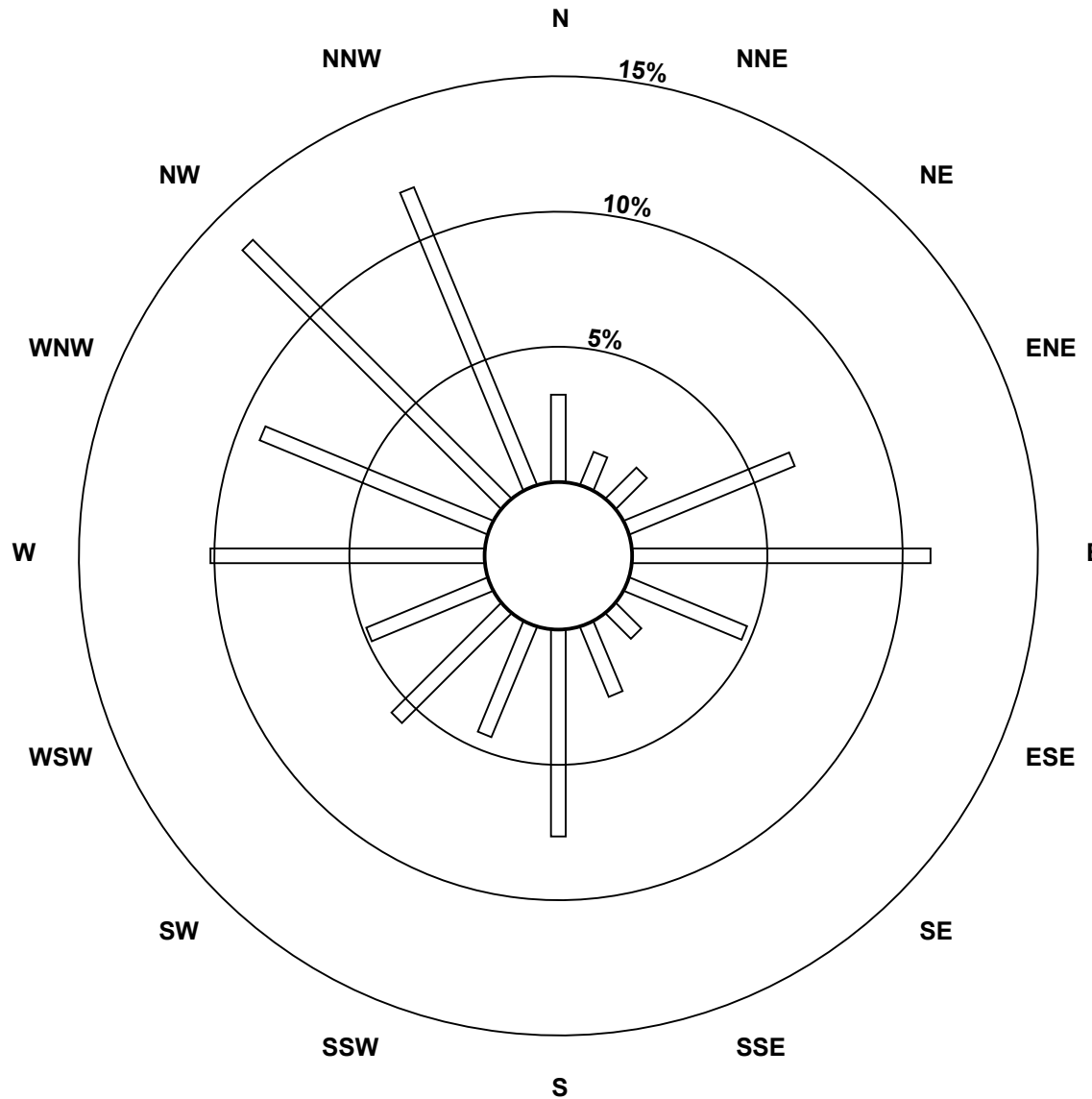
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	9	11	45	75	32	9	19	52	30	39	33	69	62	92	81	680
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	9	11	45	75	32	9	19	52	30	39	33	69	62	92	81	680

Total Number of Valid Hours: 680

Total Number of Hours: 720

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

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipeywan (AMS 8)**

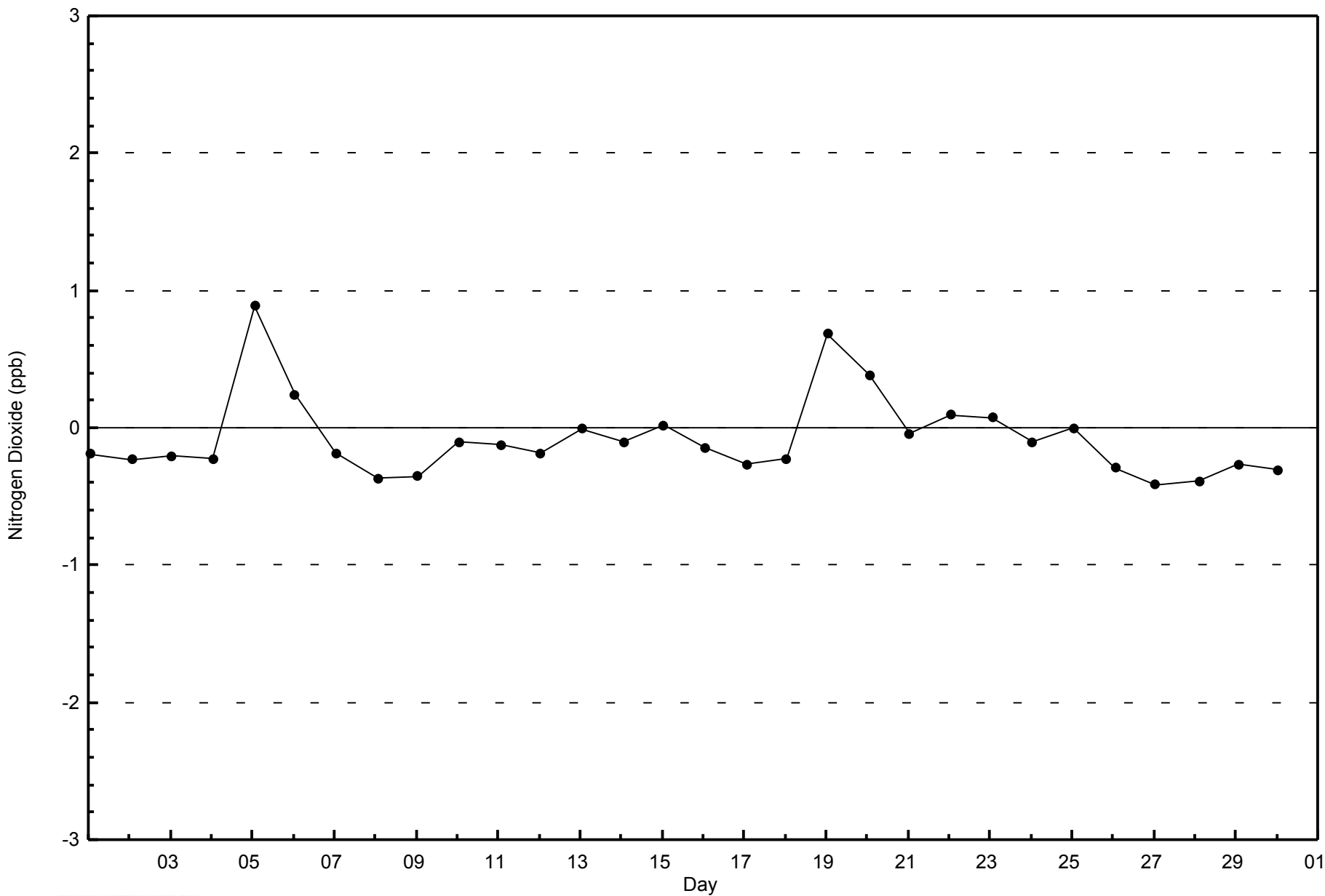


Total Number of Valid Hours: 680



WBEA
Zero Responses

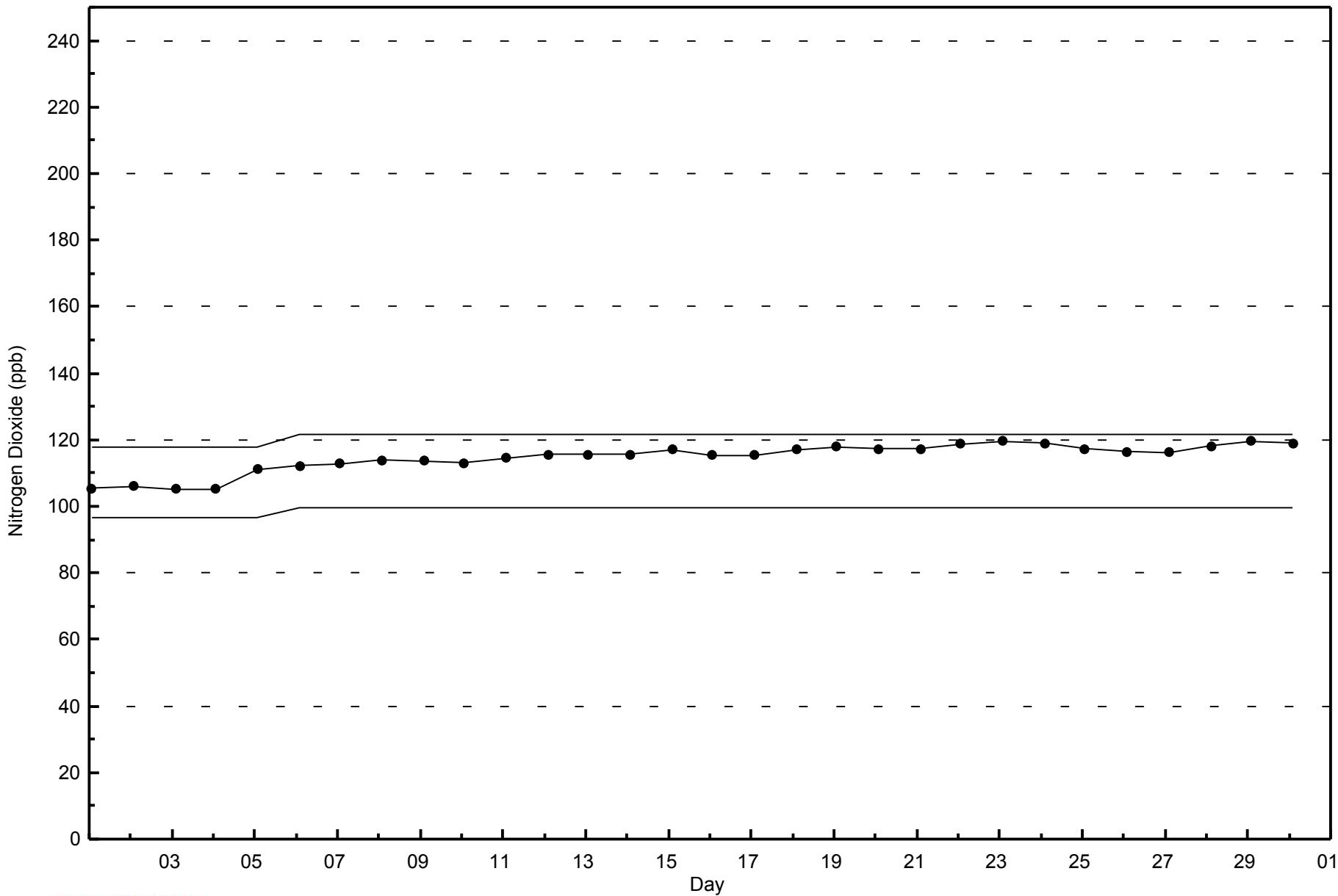
Nitrogen Dioxide (NO₂) - ppb
Fort Chipeywan - September 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Fort Chipeywan - September 2014



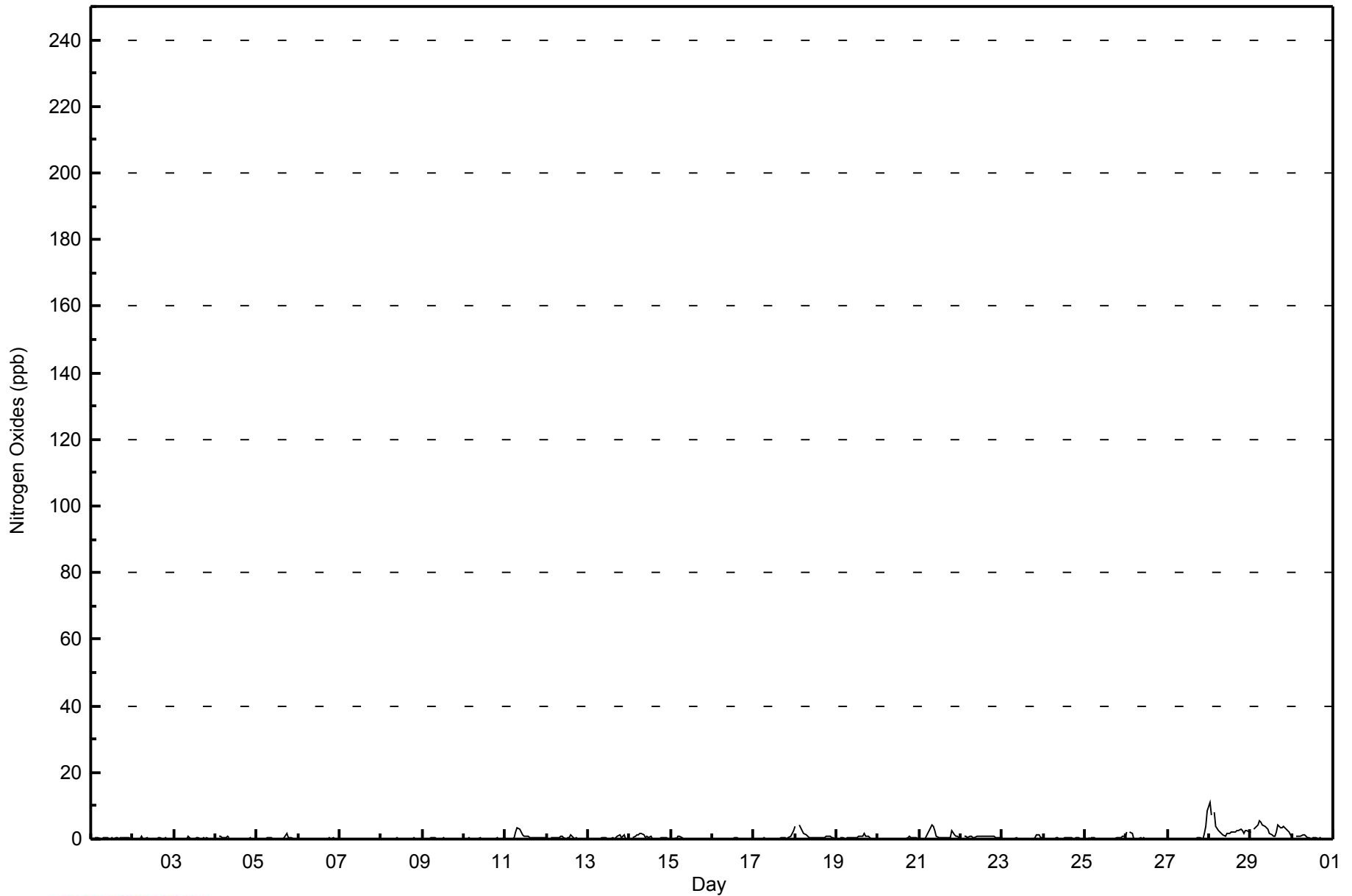


Maximum Value: 11 ppb on Sep 28 01:00																		Maximum Daily Average: 3.1 ppb on Sep 29						Hours in Service: 720		
Minimum Value: 0 ppb on Sep 26 21:00																		Minimum Daily Average: 0.0 ppb on Sep 7						Hours of Data: 681		
Maximum Diurnal Average: 7.4 ppb at hour 2																		Minimum Diurnal Average: 0.3 ppb at hour 12						Hours of Missing Data: 39		
Monthly Average: 0.5 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 4						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	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
2-Sep	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
3-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	0.2	1
4-Sep	0	Z	1	1	1	1	0	1	0	C	C	C	C	C	C	C	C	C	0	0	0	0	0	0	--	1
5-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0.2	2
6-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
7-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
8-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
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	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	Z	0	0	0	0	2	4	3	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.8	4
12-Sep	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
13-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0.3	1
14-Sep	0	Z	0	1	1	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
15-Sep	0	Z	0	0	1	1	0	0	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	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1
17-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0.3	2
18-Sep	4	Z	4	4	3	2	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1.1	4
19-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	2	1	1	1	0	0	0	0	0	0.4	2
20-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.2	1
21-Sep	0	Z	0	0	1	2	3	4	4	3	1	0	0	0	0	0	0	0	1	2	1	1	1	1	1.1	4
22-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0.8	1
23-Sep	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1
24-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1
25-Sep	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1
26-Sep	2	Z	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
27-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	9	0.7	9
28-Sep	11	7	Z	8	4	3	2	2	1	1	2	2	2	2	2	2	3	3	3	2	2	3	2	2	3.0	11
29-Sep	2	Z	3	4	4	5	5	4	4	4	3	2	1	1	1	2	4	4	4	4	3	3	2	1	3.1	5
30-Sep	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort Chipeywan - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort Chipeywan - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	681	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: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort Chipecywan - September 2014

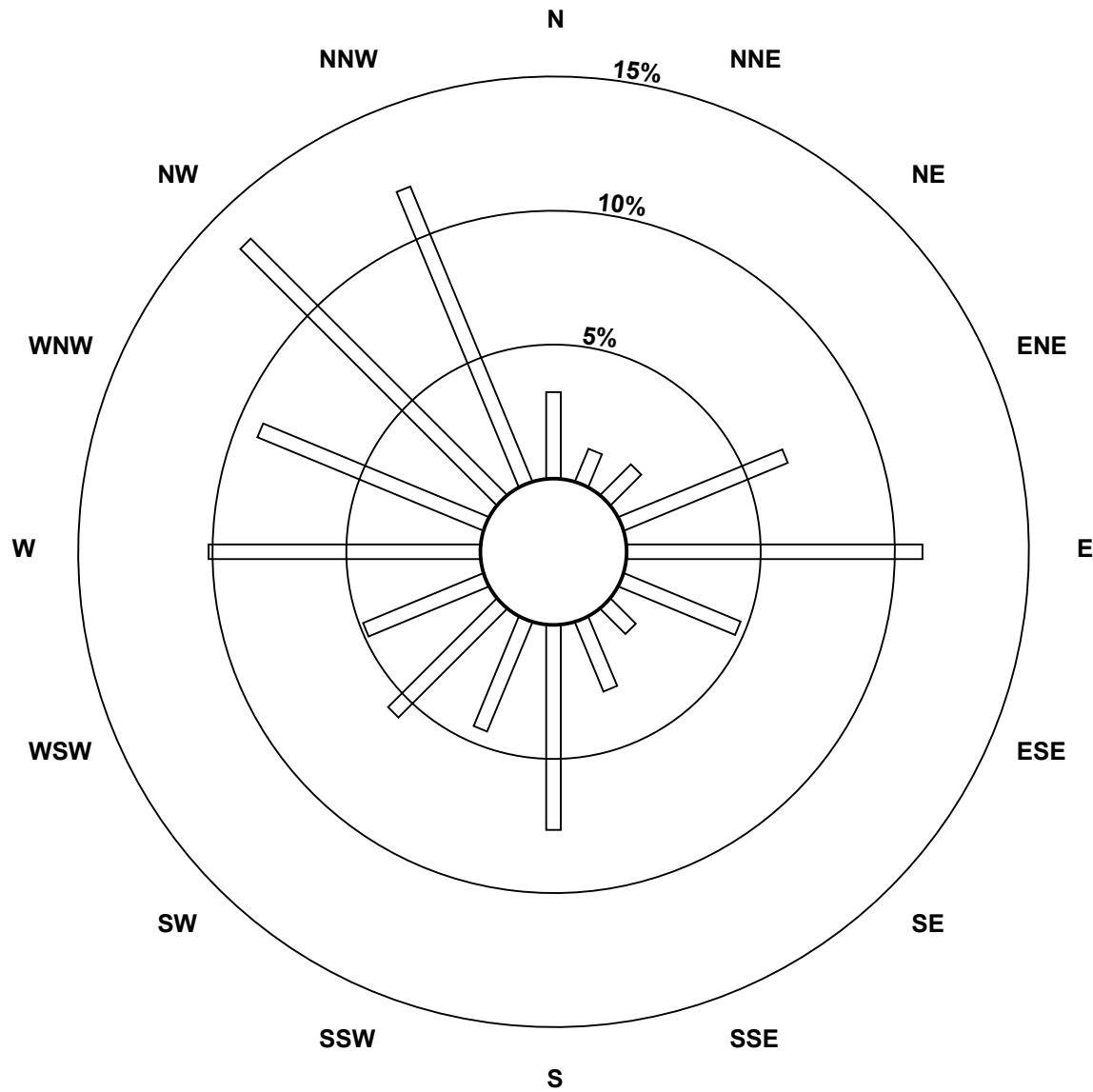
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	9	11	45	75	32	9	19	52	30	39	33	69	62	92	81	680
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	9	11	45	75	32	9	19	52	30	39	33	69	62	92	81	680

Total Number of Valid Hours: 680

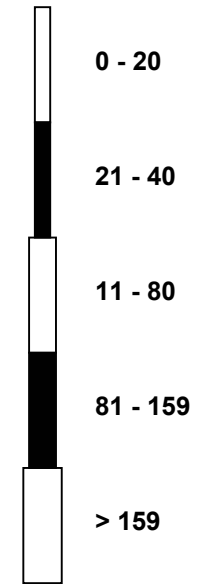
Total Number of Hours: 720

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

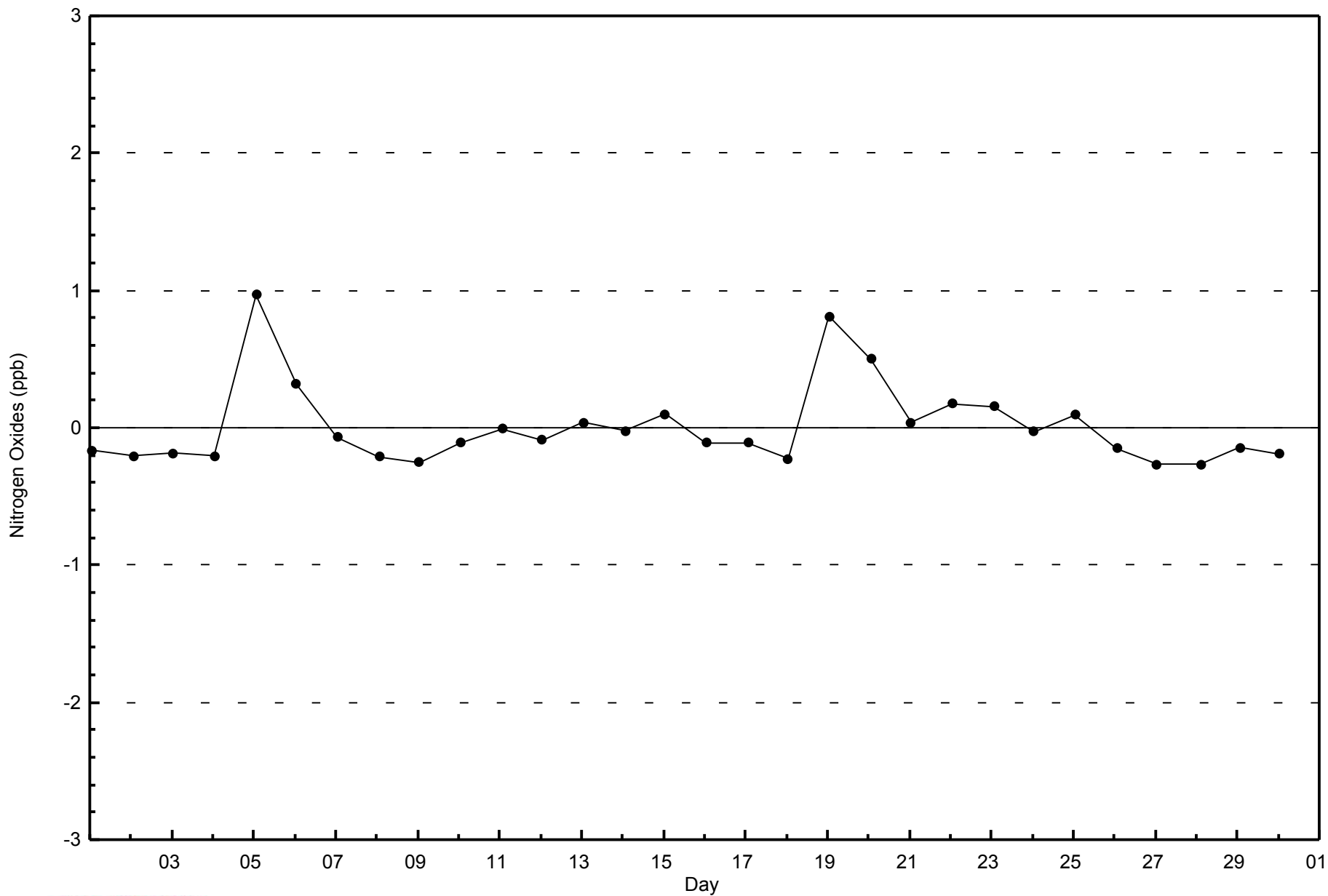
**Nitrogen Oxides (NO_x) - ppb
Fort Chipeywan (AMS 8)**



Classes (ppb)



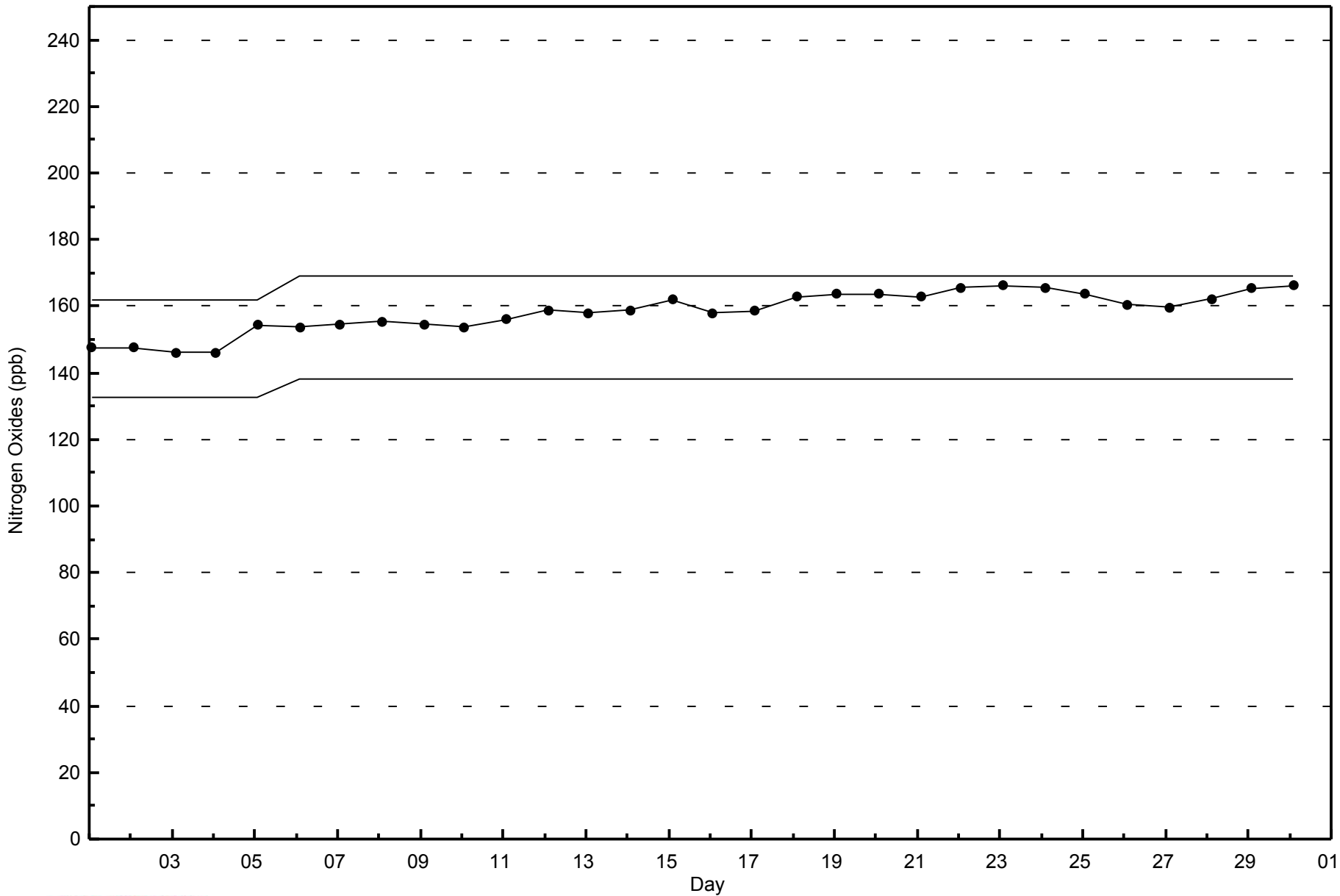
Total Number of Valid Hours: 680





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort Chipeywan - September 2014





Summary of Hour Averages

Fort Chipewyan - September 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 38 ppb on Sep 23 16:00	Maximum Daily Average: 32.4 ppb on Sep 23		Hours of Data:	686
Minimum Value: 5 ppb on Sep 18 04:00	Minimum Daily Average: 11.0 ppb on Sep 18		Hours of Missing Data:	34
Maximum Diurnal Average: 25.0 ppb at hour 16	Minimum Diurnal Average: 16.6 ppb at hour 8		Hours of Calibration:	34
Monthly Average: 21.0 ppb	Percentiles: P ₁ = 6 P ₁₀ = 13 Q ₁ = 17 Median = 21 Q ₃ = 26 P ₉₀ = 28 P ₉₉ = 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	13	12	Z	9	10	11	13	15	18	20	23	25	24	24	24	25	25	25	27	24	21	20	17	17	19.3	27	
2-Sep	18	17	Z	15	14	11	11	12	14	15	17	15	13	17	22	25	25	23	24	21	21	21	19	24	18.0	25	
3-Sep	24	24	Z	22	20	21	20	13	21	25	26	25	26	26	26	26	26	26	26	24	29	24	22	22	23.7	29	
4-Sep	20	17	Z	12	12	12	12	11	13	14	16	20	20	20	22	22	C	C	C	C	24	23	21	20	17.5	24	
5-Sep	20	19	Z	17	15	15	14	11	18	21	25	25	25	26	27	27	24	21	19	22	18	15	15	17	19.9	27	
6-Sep	15	16	Z	19	20	18	18	20	23	23	25	25	26	26	25	25	29	32	26	27	25	25	23	22	23.1	32	
7-Sep	22	17	Z	17	16	13	15	17	21	26	29	28	28	28	28	27	26	26	23	21	21	23	22	20	22.3	29	
8-Sep	20	19	Z	19	19	17	17	17	19	21	24	27	27	27	26	25	26	26	24	19	19	17	20	22	21.6	27	
9-Sep	23	21	Z	18	18	16	16	16	20	29	30	30	28	27	27	28	27	27	26	24	22	21	20	20	23.2	30	
10-Sep	18	18	Z	16	17	19	20	21	23	26	27	28	29	30	30	29	29	28	26	23	22	20	19	19	23.3	30	
11-Sep	20	18	Z	19	19	18	16	16	20	22	24	25	27	26	29	32	31	29	28	26	23	22	21	21	23.1	32	
12-Sep	19	18	Z	16	18	18	17	13	13	16	20	24	25	25	25	27	27	26	24	22	20	19	19	18	20.4	27	
13-Sep	16	16	Z	14	14	12	9	9	13	14	17	19	21	22	21	21	22	24	28	29	28	23	22	19	18.8	29	
14-Sep	19	18	Z	19	18	16	15	17	16	19	20	25	30	34	33	33	34	33	31	29	28	27	26	25	24.6	34	
15-Sep	21	21	Z	17	20	21	22	21	21	21	21	22	22	22	21	21	22	22	22	23	24	24	23	23	21.6	24	
16-Sep	22	21	Z	22	21	21	21	21	20	19	20	20	21	23	24	25	26	28	28	27	25	22	18	16	22.2	28	
17-Sep	15	14	Z	15	16	18	19	18	17	17	17	16	16	16	16	16	15	14	13	11	10	9	8	7	14.4	19	
18-Sep	5	5	Z	5	5	6	5	6	8	10	12	14	13	14	18	18	15	14	13	12	13	14	14	16	11.0	18	
19-Sep	15	15	Z	15	15	16	15	15	15	15	15	17	20	22	24	23	22	22	24	24	28	27	24	21	19.6	28	
20-Sep	18	16	Z	15	24	15	12	14	18	17	21	20	18	19	20	20	20	19	18	17	15	15	19	20	17.8	24	
21-Sep	20	23	Z	21	18	17	15	15	15	18	20	20	20	20	20	20	20	20	20	15	18	19	19	18	18.8	23	
22-Sep	19	19	Z	16	16	15	16	16	18	20	21	24	26	26	29	25	24	21	30	32	33	29	28	29	23.1	33	
23-Sep	33	35	Z	32	29	28	26	28	28	31	34	35	35	36	37	38	38	37	35	33	31	28	29	29	32.4	38	
24-Sep	30	30	Z	28	28	28	28	27	27	27	26	26	27	26	26	27	26	27	26	27	29	31	31	30	25	27.6	31
25-Sep	19	17	Z	17	18	15	13	15	18	19	22	23	26	27	27	27	26	26	25	25	25	24	23	23	21.7	27	
26-Sep	21	19	Z	21	28	28	28	27	26	25	24	24	23	23	26	28	28	27	27	26	24	22	20	18	24.6	28	
27-Sep	17	15	Z	13	13	11	10	9	9	12	16	19	21	23	26	22	19	19	22	22	22	19	17	13	16.9	26	
28-Sep	11	13	Z	13	17	20	20	22	24	26	27	27	27	27	28	27	27	27	26	25	24	22	22	21	22.7	28	
29-Sep	20	20	Z	17	16	14	15	16	17	19	21	24	28	31	32	30	28	28	27	24	24	23	22	22	22.5	32	
30-Sep	19	18	Z	15	15	15	16	18	17	14	13	13	13	13	12	11	12	12	12	12	11	11	12	14	13.8	19	

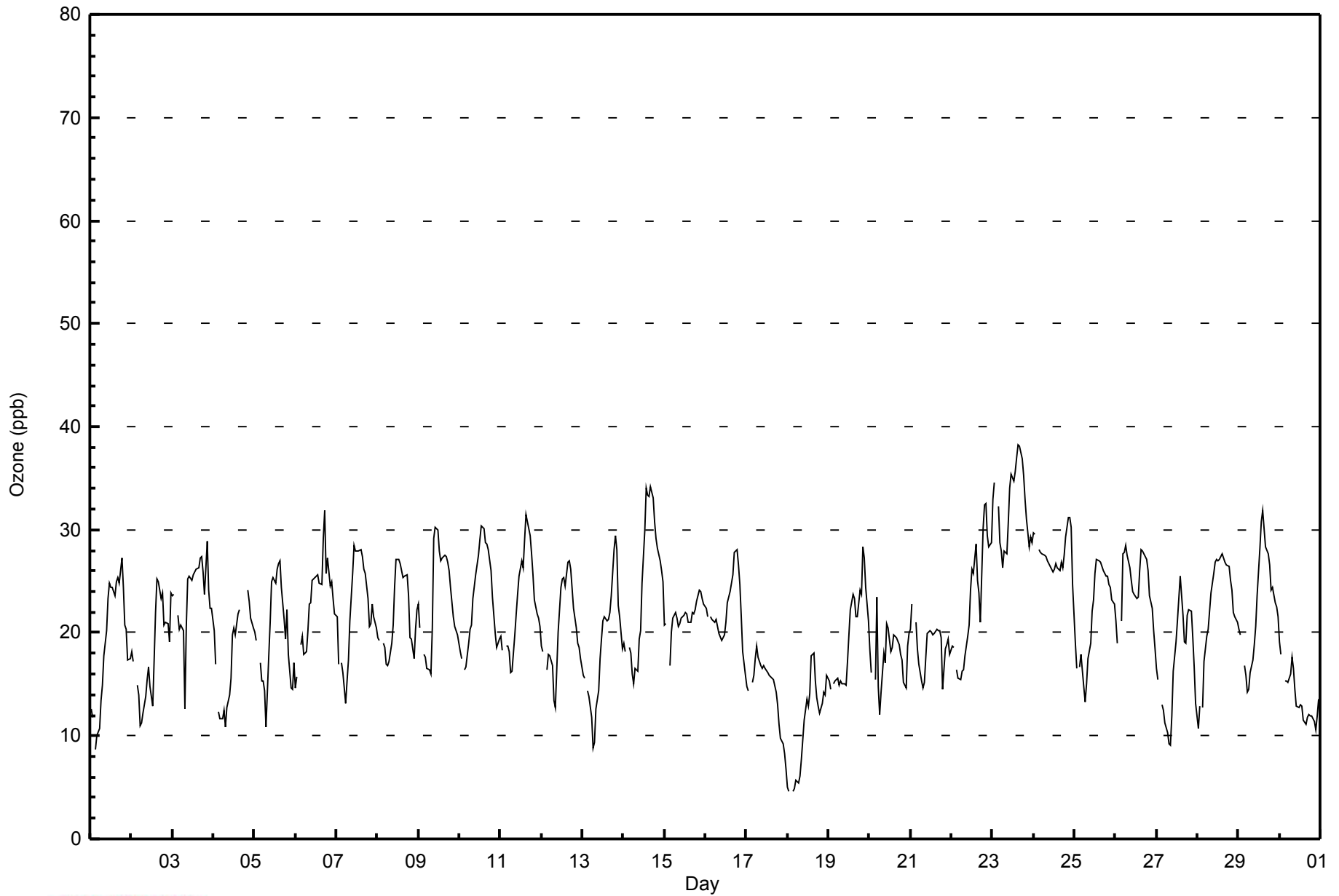
19.0	18.3	--	17.1	17.6	16.8	16.6	16.6	16.6	18.2	20.0	21.7	22.9	23.5	24.2	24.9	25.0	24.9	24.4	24.2	23.1	22.7	21.3	20.5	20.0	Diurnal Average	
33	35	--	32	29	28	28	28	28	28	31	34	35	35	36	37	38	38	37	35	33	33	31	30	29	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Fort Chipeywan - September 2014





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort Chipeywan - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	326	47.52	47.52
21 - 50	360	52.48	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Fort Chipeywan - September 2014

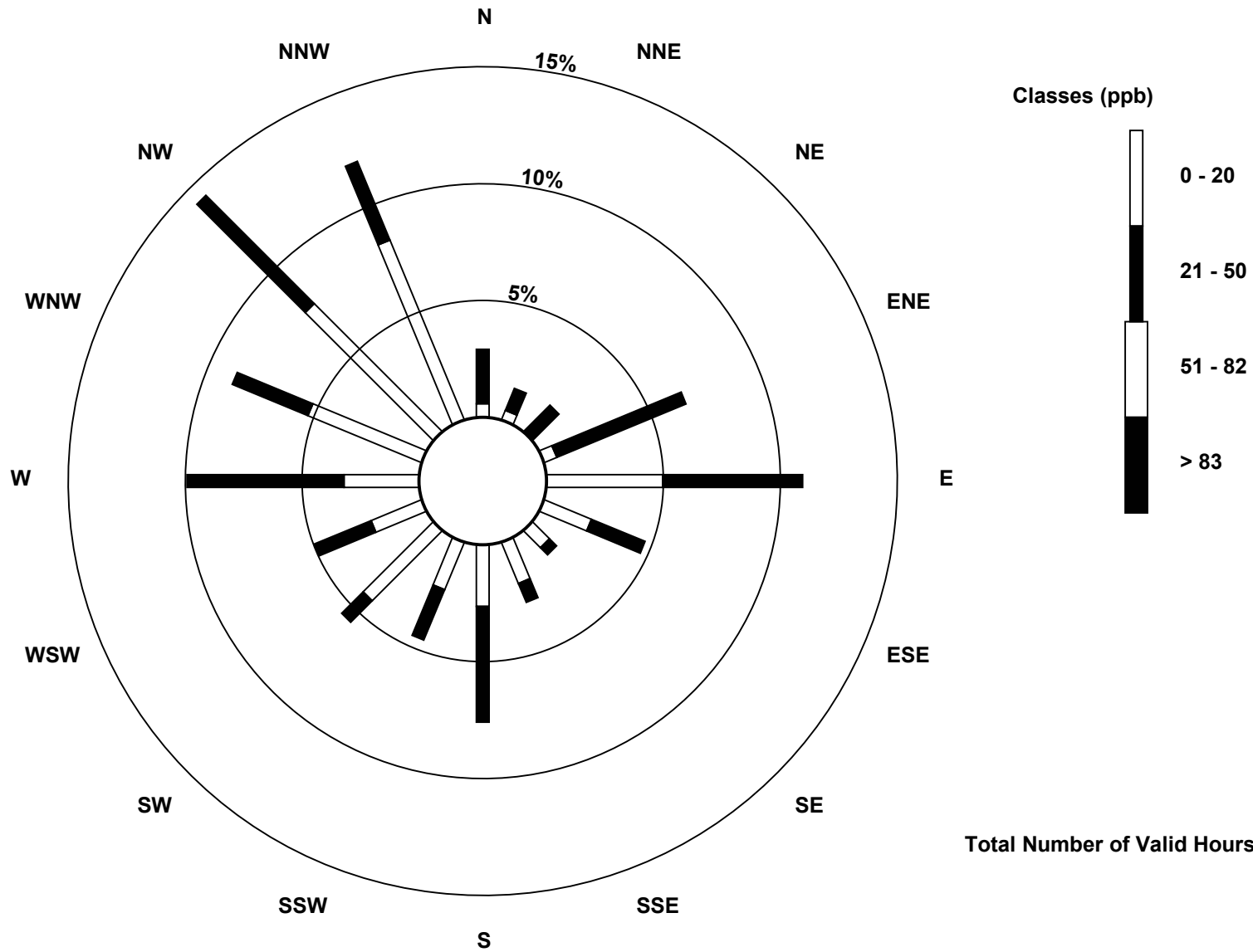
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	4	3	0	4	34	15	7	13	18	15	29	16	22	36	53	57	326
21 - 50	16	7	11	41	41	17	3	6	34	16	9	18	46	24	45	25	359
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	10	11	45	75	32	10	19	52	31	38	34	68	60	98	82	685

Total Number of Valid Hours: 685

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

Ozone (O₃) - ppb
 Fort Chipeywan (AMS 8)

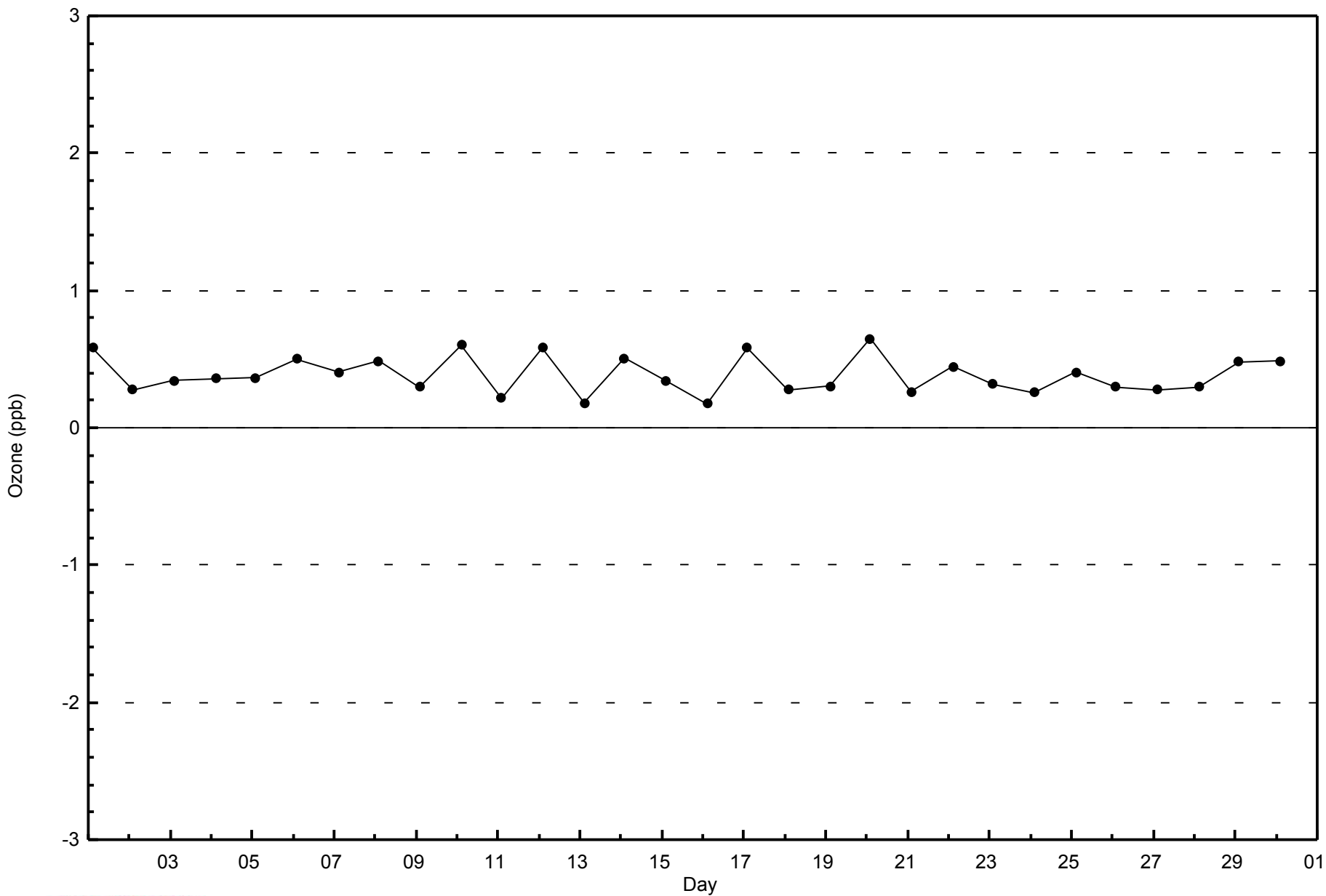


Total Number of Valid Hours: 685



WBEA
Zero Responses

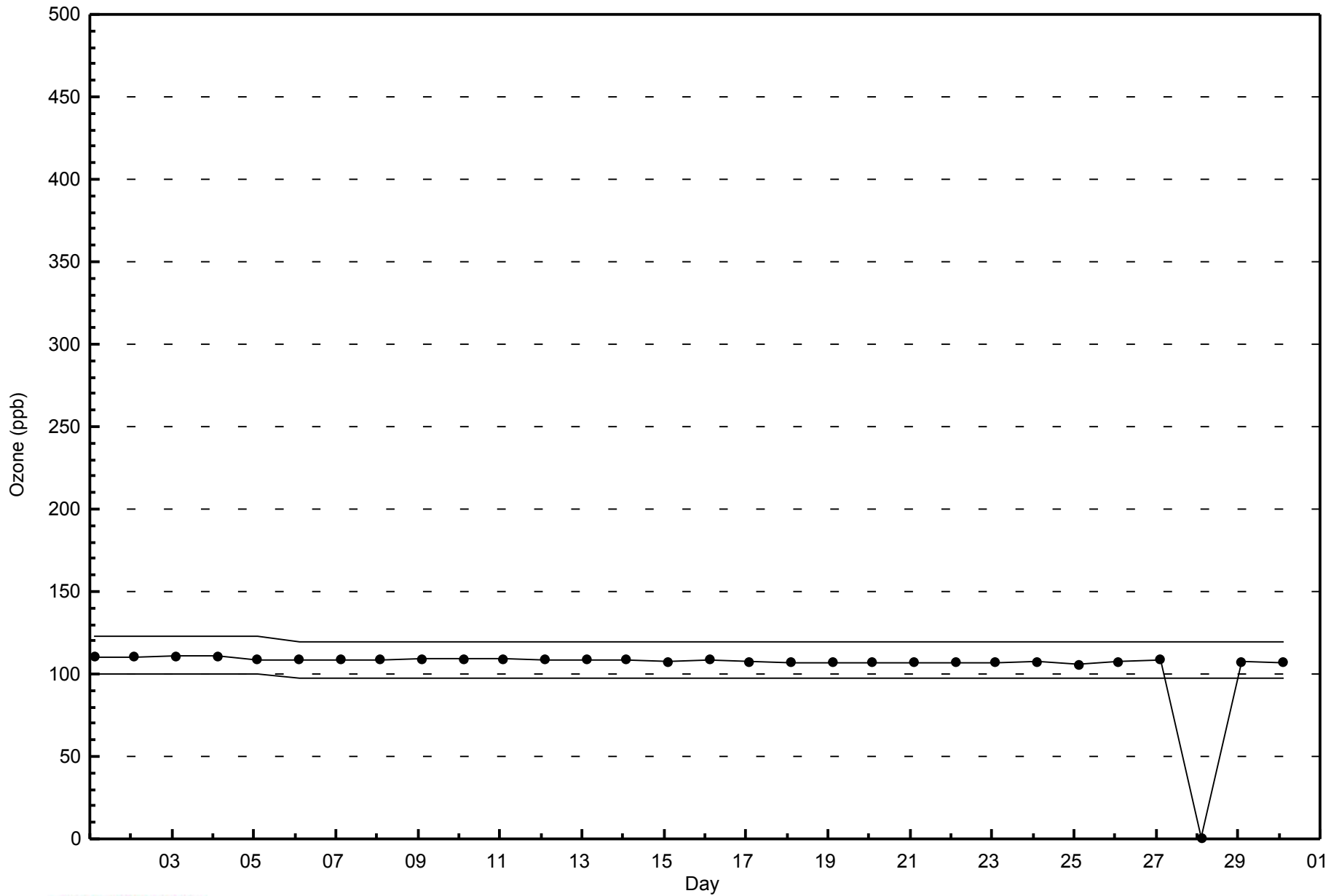
Ozone (O₃) - ppb
Fort Chipeywan - September 2014





WBEA
Span Responses

Ozone (O₃) - ppb
Fort Chipeywan - September 2014





Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 15.8 µg/m ³ on Sep 12 07:00	Maximum Daily Average: 9.7 µg/m ³ on Sep 18	Hours of Data:	718
Minimum Value: 0.4 µg/m ³ on Sep 7 22:00	Minimum Daily Average: 1.0 µg/m ³ on Sep 7	Hours of Missing Data:	2
Maximum Diurnal Average: 4.5 µg/m ³ at hour 7	Minimum Diurnal Average: 2.4 µg/m ³ at hour 14	Hours of Calibration:	0
Monthly Average: 3.32 µg/m ³	Percentiles: P ₁ = 0.5 P ₁₀ = 1.0 Q ₁ = 1.6 Median = 2.5 Q ₃ = 4.1 P ₉₀ = 7.0 P ₉₉ = 13.0	Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	5.3	5.4	5.0	3.7	4.2	5.2	5.4	5.7	4.6	3.4	2.7	2.1	2.1	1.8	2.1	1.4	1.6	1.9	1.7	3.3	2.8	2.5	2.7	2.8	3.3	5.7
2-Sep	4.0	5.1	4.8	4.7	5.0	4.8	3.8	2.8	2.9	3.3	2.6	2.1	1.8	1.7	1.9	2.1	2.4	2.2	1.9	1.9	2.5	2.7	2.8	2.5	3.0	5.1
3-Sep	2.9	4.0	2.9	3.0	2.9	2.9	2.2	1.6	1.6	1.6	1.5	1.7	2.0	2.2	2.2	2.1	2.1	2.4	2.5	1.8	2.1	1.9	1.9	1.9	2.3	4.0
4-Sep	2.7	3.3	3.5	3.7	3.5	3.5	3.2	3.2	2.5	2.1	2.3	3.5	3.1	2.7	1.7	1.8	M	M	1.5	1.4	1.5	1.1	1.0	0.9	2.4	3.7
5-Sep	1.0	1.1	1.3	1.3	1.3	1.6	2.1	1.4	1.5	1.0	0.6	0.5	0.6	0.7	1.0	1.0	1.3	1.1	0.9	0.8	1.3	0.8	0.8	1.1	1.1	2.1
6-Sep	1.5	2.5	2.9	3.4	3.2	3.5	2.9	1.8	1.4	1.2	0.9	0.8	0.7	0.6	0.7	0.6	0.8	0.7	0.8	0.7	0.6	0.6	0.6	0.6	1.4	3.5
7-Sep	0.6	0.7	0.8	0.9	0.9	0.9	1.3	2.5	2.6	1.9	1.2	0.8	1.1	1.4	0.9	0.5	0.6	0.5	0.6	0.7	0.5	0.4	0.5	0.6	1.0	2.6
8-Sep	0.6	0.7	0.8	0.8	0.8	0.9	1.3	1.7	1.7	1.6	0.9	0.7	0.9	1.0	1.1	0.8	1.0	1.5	1.6	1.4	1.4	1.4	1.4	1.4	1.1	1.7
9-Sep	1.6	2.0	1.9	1.9	2.4	2.7	2.4	2.4	1.8	1.4	1.5	1.5	2.0	2.0	1.9	1.8	1.9	2.1	2.1	2.2	2.7	2.4	2.4	2.3	2.1	2.7
10-Sep	2.1	2.3	2.7	2.8	3.0	3.3	3.2	3.4	2.4	1.7	1.7	1.8	1.8	1.8	1.4	1.4	1.6	1.5	1.5	1.0	1.0	1.1	1.1	1.2	1.9	3.4
11-Sep	2.6	3.8	4.1	3.9	3.7	3.5	4.0	3.5	2.4	2.0	1.8	1.8	1.8	2.5	2.7	2.8	2.8	3.0	3.5	3.0	2.8	2.9	3.1	3.2	3.0	4.1
12-Sep	4.1	4.2	4.6	6.6	13.1	15.8	15.8	14.5	13.3	9.8	5.7	3.2	2.9	2.4	3.1	2.3	2.5	3.8	3.5	2.6	2.8	2.7	2.3	2.3	6.0	15.8
13-Sep	2.9	3.5	3.8	3.9	4.1	3.9	3.3	3.4	4.2	4.0	3.4	4.4	3.4	2.7	2.3	2.9	3.3	3.3	4.7	2.9	3.4	3.5	3.1	2.8	3.5	4.7
14-Sep	2.9	3.3	4.9	6.7	8.5	9.3	11.7	10.1	8.1	6.2	6.2	5.5	3.8	2.5	2.6	2.8	2.8	2.6	4.1	4.7	4.6	4.3	3.8	3.5	5.2	11.7
15-Sep	4.9	5.4	5.5	6.2	6.5	5.8	6.7	8.5	9.8	9.2	8.1	7.6	6.8	6.0	5.2	4.5	4.2	3.4	3.0	2.9	2.7	2.8	3.3	3.4	5.5	9.8
16-Sep	3.6	4.2	4.1	3.8	3.7	3.7	3.7	3.2	2.5	2.3	2.1	2.3	2.4	2.3	2.0	1.7	1.5	1.7	2.0	2.3	2.3	2.0	1.8	1.4	2.6	4.2
17-Sep	1.3	1.2	1.4	1.6	1.8	1.9	2.0	1.7	0.9	0.5	0.6	0.7	0.9	1.0	1.5	1.8	1.9	2.0	2.0	2.0	2.1	2.0	2.4	3.3	1.6	3.3
18-Sep	6.4	8.9	8.2	8.0	8.7	11.3	10.7	12.1	9.8	9.0	9.1	9.3	7.2	6.2	5.7	5.5	7.6	11.8	13.2	14.4	14.3	13.8	11.6	9.2	9.7	14.4
19-Sep	9.0	10.5	10.2	8.4	7.9	7.5	7.1	7.0	6.5	6.5	6.0	5.6	5.6	6.8	7.4	7.8	7.0	6.9	8.0	5.6	1.6	1.3	1.5	1.8	6.4	10.5
20-Sep	2.4	3.2	3.9	3.7	3.3	3.7	4.7	3.6	2.7	2.0	1.4	1.9	2.1	1.9	2.5	2.5	2.4	2.5	3.3	3.8	3.4	2.5	1.8	1.4	2.8	4.7
21-Sep	1.2	1.2	1.4	1.6	2.0	2.5	3.0	3.3	2.8	3.1	3.9	4.0	3.6	3.2	3.6	3.0	2.8	3.3	5.5	7.9	7.5	7.9	7.9	7.6	3.9	7.9
22-Sep	8.0	8.3	7.9	8.0	8.0	7.6	7.0	6.7	5.7	5.1	5.0	4.9	4.7	5.0	5.2	5.8	6.0	6.3	7.8	8.9	7.9	7.8	7.9	7.6	6.8	8.9
23-Sep	5.3	3.6	2.7	2.6	3.8	4.8	4.2	2.9	2.6	1.6	1.1	1.0	1.0	1.0	1.1	1.0	1.1	1.4	1.9	2.1	6.1	3.9	3.0	2.5	6.1	
24-Sep	1.7	1.8	1.9	1.7	1.5	1.6	1.7	1.7	1.6	1.5	1.5	1.6	1.5	2.0	2.1	2.3	2.4	2.3	2.3	2.6	2.5	2.6	4.4	2.0	4.4	
25-Sep	6.7	6.5	5.5	4.4	2.9	2.8	2.2	1.0	0.5	0.5	0.7	1.0	1.5	1.7	1.7	1.7	1.7	1.6	1.6	2.3	1.2	1.9	1.9	2.5	2.3	6.7
26-Sep	1.3	1.8	1.9	1.6	0.8	0.6	0.5	0.5	0.6	0.5	0.6	0.5	0.8	1.0	0.7	0.7	0.7	0.8	1.1	1.0	1.2	1.6	1.7	1.8	1.0	1.9
27-Sep	2.1	2.3	2.6	2.8	3.0	3.1	3.0	2.9	2.5	2.2	2.1	2.2	2.3	2.2	2.2	2.6	2.6	2.7	3.0	2.5	2.6	3.0	5.6	10.4	3.0	10.4
28-Sep	12.7	9.9	7.9	8.8	5.4	4.5	4.8	3.2	2.0	1.7	1.9	1.7	1.9	2.0	2.0	2.7	3.6	3.6	4.7	4.1	3.2	3.0	3.3	3.6	4.3	12.7
29-Sep	4.5	5.4	6.0	5.6	5.0	5.2	5.2	5.1	5.3	3.7	2.8	2.2	1.9	1.8	1.9	2.2	2.9	3.7	3.9	4.2	4.2	4.1	3.7	3.7	3.9	6.0
30-Sep	4.6	5.6	6.1	6.1	5.7	5.4	5.7	6.3	6.8	6.9	7.5	6.3	3.7	2.6	3.2	2.3	1.8	1.7	1.7	1.7	1.3	1.2	1.1	0.9	4.0	7.5

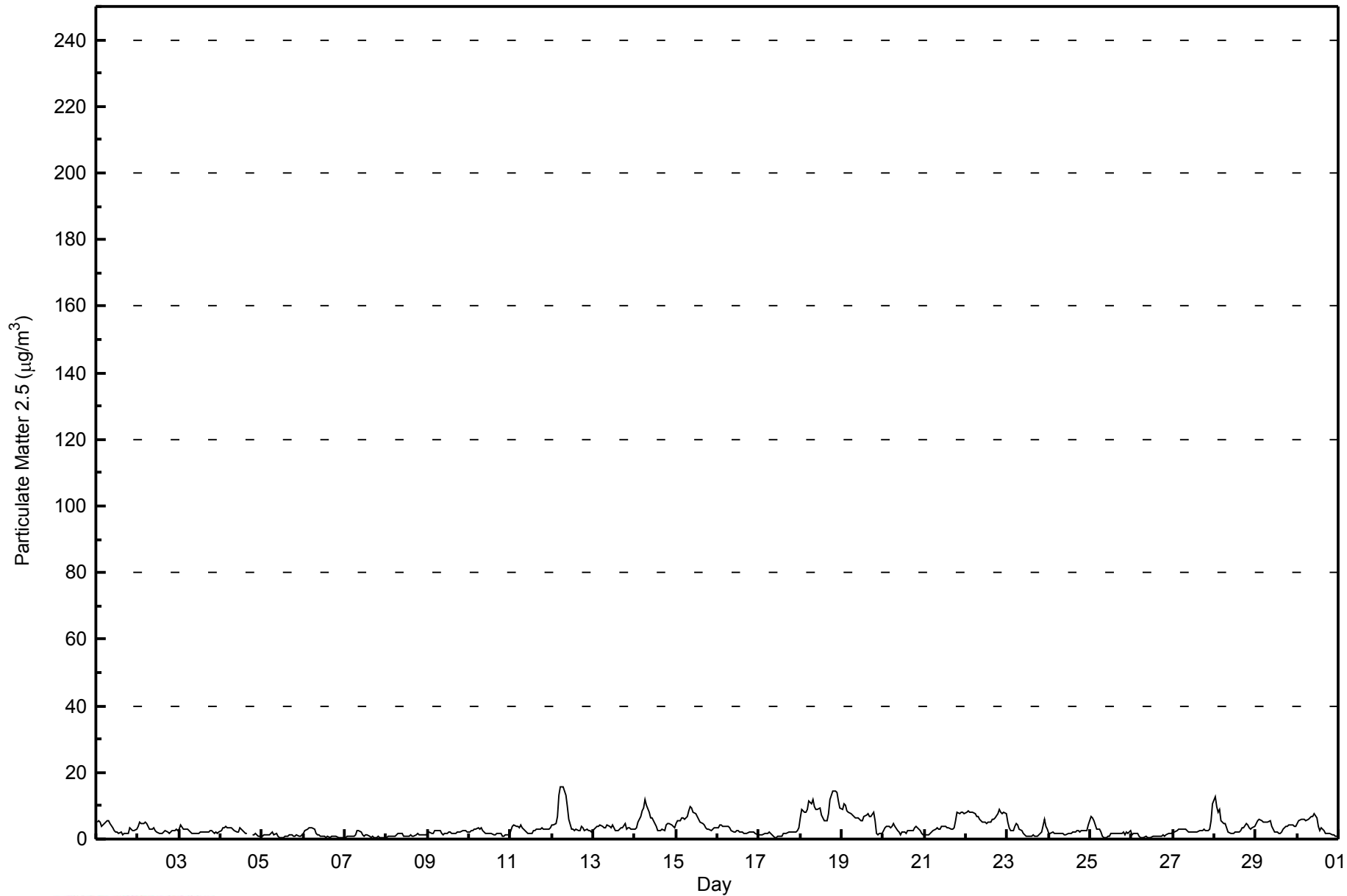
3.7	4.1	4.0	4.1	4.2	4.4	4.5	4.3	3.8	3.2	2.9	2.8	2.5	2.4	2.4	2.4	2.6	2.8	3.2	3.2	3.0	3.1	3.0	3.1	Diurnal Average
12.7	10.5	10.2	8.8	13.1	15.8	15.8	14.5	13.3	9.8	9.1	9.3	7.2	6.8	7.4	7.8	7.6	11.8	13.2	14.4	14.3	13.8	11.6	10.4	Diurnal Maximum

M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipeywan - September 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipeywan - September 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	518	72.14	72.14
6 - 15	115	16.02	88.16
16 - 25	2	0.28	88.44
26 - 80	0	0.00	88.44
> 81.0	0	0.00	88.44

Total Number of Valid Hours: 718

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort Chipeywan - September 2014

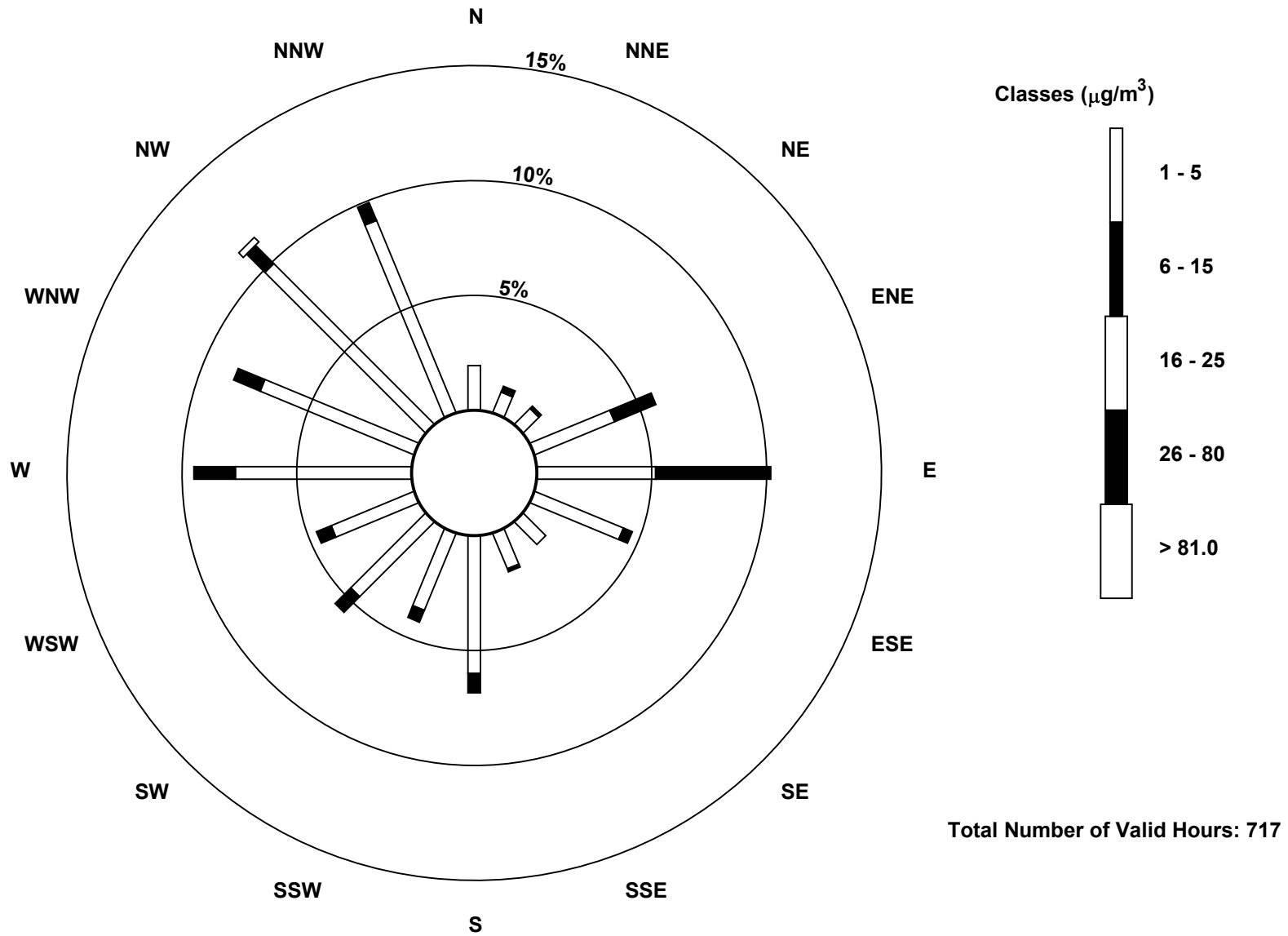
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	14	7	7	27	37	30	10	12	43	26	33	28	55	52	71	65	517
6 - 15	0	2	1	14	36	3	0	1	6	4	7	5	13	9	8	6	115
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	14	9	8	41	73	33	10	13	49	30	40	33	68	61	81	71	634

Total Number of Valid Hours: 717

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
 Fort Chipeywan (AMS 8)



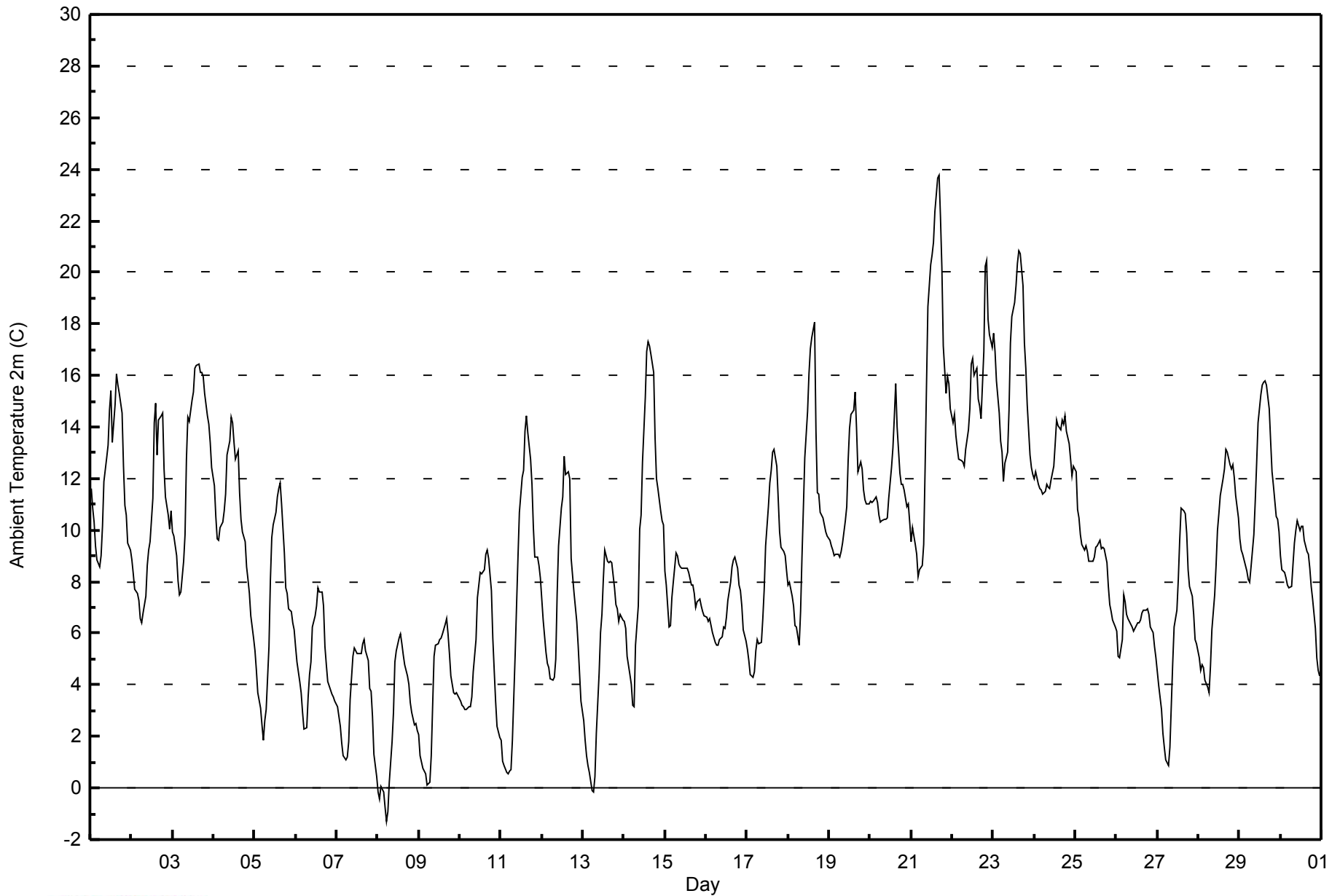


Maximum Value: 23.8 C on Sep 21 17:00		Maximum Daily Average: 16.0 C on Sep 23		Hours in Service: 720																							
Minimum Value: -1.3 C on Sep 8 06:00		Minimum Daily Average: 2.5 C on Sep 8		Hours of Data: 720																							
Maximum Diurnal Average: 12.4 C at hour 16		Minimum Diurnal Average: 5.9 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 8.97 C		Percentiles: P ₁ = -0.1 P ₁₀ = 3.2 Q ₁ = 5.8 Median = 8.8 Q ₃ = 12.0 P ₉₀ = 14.8 P ₉₉ = 20.7		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	11.6	10.9	10.3	9.4	8.9	8.6	9.0	10.2	11.9	12.8	13.3	14.6	15.4	13.4	14.9	16.0	15.6	15.3	14.5	12.5	10.9	10.6	9.5	9.2	12.1	16.0	
2-Sep	8.8	8.3	7.7	7.5	7.3	6.6	6.4	6.8	7.4	8.6	9.2	9.5	11.2	14.2	14.9	12.9	14.3	14.4	14.6	12.4	11.3	10.6	10.1	10.7	10.2	14.9	
3-Sep	9.9	9.8	9.0	8.0	7.5	7.6	8.8	9.8	12.8	14.4	14.2	15.0	15.4	16.3	16.4	16.4	16.1	16.1	15.9	15.3	14.5	14.1	13.4	12.5	12.9	16.4	
4-Sep	11.7	10.5	9.7	9.6	10.1	10.3	10.7	11.4	12.9	13.4	14.4	14.2	13.4	12.8	13.1	11.4	10.4	9.9	9.6	8.6	8.1	7.5	6.7	5.8	10.7	14.4	
5-Sep	5.3	4.5	3.7	3.1	2.5	1.9	2.6	3.1	5.5	8.0	9.7	10.2	10.7	11.3	11.6	11.8	11.0	9.1	7.7	7.5	6.9	6.8	6.4	6.1	7.0	11.8	
6-Sep	5.5	4.9	4.1	3.7	2.9	2.3	2.3	3.5	4.4	4.9	6.2	6.7	7.1	7.8	7.6	7.6	7.0	5.5	4.8	4.1	3.8	3.6	3.5	3.4	4.9	7.8	
7-Sep	3.1	2.7	2.4	1.8	1.3	1.1	1.2	1.8	3.4	5.1	5.4	5.3	5.2	5.2	5.2	5.6	5.8	5.3	5.0	3.8	3.7	2.8	1.3	0.5	3.5	5.8	
8-Sep	-0.2	-0.4	0.1	-0.1	-0.8	-1.3	-0.9	0.2	1.8	2.9	4.9	5.3	5.8	6.0	5.6	5.2	4.8	4.4	4.0	3.3	2.9	2.4	2.5	2.2	2.5	6.0	
9-Sep	2.1	1.2	0.7	0.7	0.6	0.1	0.2	1.2	3.2	5.1	5.5	5.6	5.7	5.8	6.0	6.4	6.6	6.0	5.2	4.3	3.7	3.6	3.7	3.6	3.6	6.6	
10-Sep	3.4	3.2	3.2	3.1	3.0	3.2	3.2	3.5	4.5	5.8	7.4	7.9	8.3	8.3	8.5	9.0	9.2	8.9	7.6	5.8	4.5	3.4	2.4	2.0	5.4	9.2	
11-Sep	1.8	1.0	0.9	0.6	0.5	0.6	0.7	1.9	5.2	7.1	8.9	10.7	12.1	12.3	13.8	14.4	13.8	12.7	11.8	10.1	8.9	9.0	8.6	8.1	7.3	14.4	
12-Sep	7.3	6.5	5.2	4.8	4.7	4.2	4.2	4.3	5.0	7.6	9.4	10.9	11.3	12.9	12.2	12.3	12.0	8.9	8.3	7.6	6.4	5.6	4.4	3.4	7.5	12.9	
13-Sep	2.6	1.9	1.2	0.8	0.6	-0.1	-0.2	0.4	2.1	4.5	6.0	6.7	8.1	9.3	8.8	8.8	8.8	8.7	7.8	7.1	6.9	6.5	6.7	6.5	5.0	9.3	
14-Sep	6.5	6.2	5.1	4.4	4.0	3.2	3.1	5.5	7.1	10.0	10.6	12.7	15.1	16.9	17.3	17.2	16.8	16.1	13.6	12.0	11.6	10.7	10.4	10.2	10.3	17.3	
15-Sep	8.4	7.9	6.2	6.3	7.4	8.0	9.1	9.0	8.7	8.6	8.5	8.5	8.5	8.5	8.3	7.8	7.9	7.5	7.0	7.2	7.3	7.1	6.9	6.7	7.8	9.1	
16-Sep	6.6	6.5	6.6	6.3	6.0	5.6	5.5	5.6	5.8	5.9	6.2	6.2	6.6	7.3	8.0	8.6	8.8	9.0	8.5	7.9	7.6	7.1	6.1	5.7	6.8	9.0	
17-Sep	5.4	5.0	4.4	4.3	4.5	5.3	5.8	5.6	5.6	6.6	7.7	9.4	10.9	11.8	12.3	13.0	13.2	12.5	11.2	9.9	9.4	9.2	9.0	8.4	8.3	13.2	
18-Sep	7.9	8.0	7.4	7.0	6.3	6.3	5.5	6.9	8.9	10.9	12.8	14.6	16.1	17.1	17.5	18.1	13.9	11.5	11.4	10.7	10.5	10.2	9.9	9.8	10.8	18.1	
19-Sep	9.6	9.4	9.2	9.0	9.0	9.1	9.0	9.2	9.5	10.3	10.9	12.7	14.0	14.5	14.7	15.4	13.9	12.3	12.6	12.4	11.6	11.2	11.0	11.0	11.3	15.4	
20-Sep	11.1	11.1	11.1	11.3	11.0	10.6	10.3	10.4	10.4	10.4	10.5	11.2	12.4	13.2	14.4	15.7	14.0	12.2	11.8	11.8	11.6	10.9	11.0	10.3	11.6	15.7	
21-Sep	9.6	10.1	9.4	9.1	8.2	8.4	8.6	9.4	12.4	15.5	18.7	20.3	20.7	21.2	22.4	23.6	23.8	22.1	20.2	17.1	15.3	15.9	15.7	14.7	15.5	23.8	
22-Sep	14.2	14.5	13.7	13.2	12.8	12.7	12.6	12.5	13.2	13.9	14.7	16.4	16.7	16.0	16.3	15.1	14.8	14.3	16.9	20.2	20.5	18.2	17.6	17.1	15.3	20.5	
23-Sep	17.7	16.9	15.8	14.5	13.4	13.0	11.9	12.6	13.0	14.6	17.3	18.3	18.8	19.5	20.3	20.8	20.7	19.5	17.3	16.3	14.9	12.9	12.4	12.2	16.0	20.8	
24-Sep	12.0	12.3	11.8	11.6	11.6	11.4	11.5	11.8	11.7	11.6	11.9	12.5	13.4	14.3	14.1	13.9	14.3	14.1	14.4	13.8	13.3	12.8	12.1	12.5	12.7	14.4	
25-Sep	12.3	10.8	10.5	9.8	9.5	9.2	9.4	9.2	8.8	8.8	8.8	8.9	9.3	9.4	9.6	9.3	9.4	9.3	8.7	7.8	7.1	6.9	6.5	6.2	9.0	12.3	
26-Sep	6.1	5.1	5.1	5.8	7.5	7.2	6.7	6.6	6.4	6.3	6.1	6.2	6.4	6.4	6.5	6.8	6.9	6.9	6.9	6.7	6.2	6.0	5.5	5.0	6.3	7.5	
27-Sep	4.5	3.9	3.0	2.1	1.6	1.1	0.9	1.6	3.2	4.9	6.2	6.9	8.1	9.6	10.8	10.7	10.6	9.9	8.5	7.8	7.4	6.7	5.7	5.6	5.9	10.8	
28-Sep	5.1	4.6	4.8	4.6	4.2	3.9	3.7	4.7	6.1	7.5	8.6	10.0	10.6	11.4	12.0	12.4	13.2	13.0	12.5	12.4	12.5	12.0	11.4	10.5	8.8	13.2	
29-Sep	9.7	9.2	9.1	8.7	8.4	8.1	8.0	8.6	9.8	11.1	12.6	14.2	15.2	15.6	15.7	15.8	15.6	14.7	13.5	12.3	11.7	10.5	10.4	10.0	11.6	15.8	
30-Sep	9.0	8.5	8.4	8.1	7.9	7.7	7.8	8.7	9.5	10.0	10.4	10.0	10.1	10.1	9.6	9.2	9.1	8.5	7.8	7.3	6.2	5.1	4.6	4.4	8.2	10.4	
		7.6	7.2	6.7	6.3	6.1	5.9	5.9	6.5	7.7	8.9	9.9	10.7	11.4	11.9	12.3	12.4	12.1	11.3	10.7	9.9	9.3	8.7	8.2	7.8	Diurnal Average	
		17.7	16.9	15.8	14.5	13.4	13.0	12.6	12.6	13.2	15.5	18.7	20.3	20.7	21.2	22.4	23.6	23.8	22.1	20.2	20.2	20.5	18.2	17.6	17.1	Diurnal Maximum	



WBEA
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Fort Chipeywan - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature 2m (AT 2m) - C
Fort Chipeywan - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	8	1.11	1.11
0 - 10	431	59.86	60.97
10 - 20	268	37.22	98.19
> 20	13	1.81	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

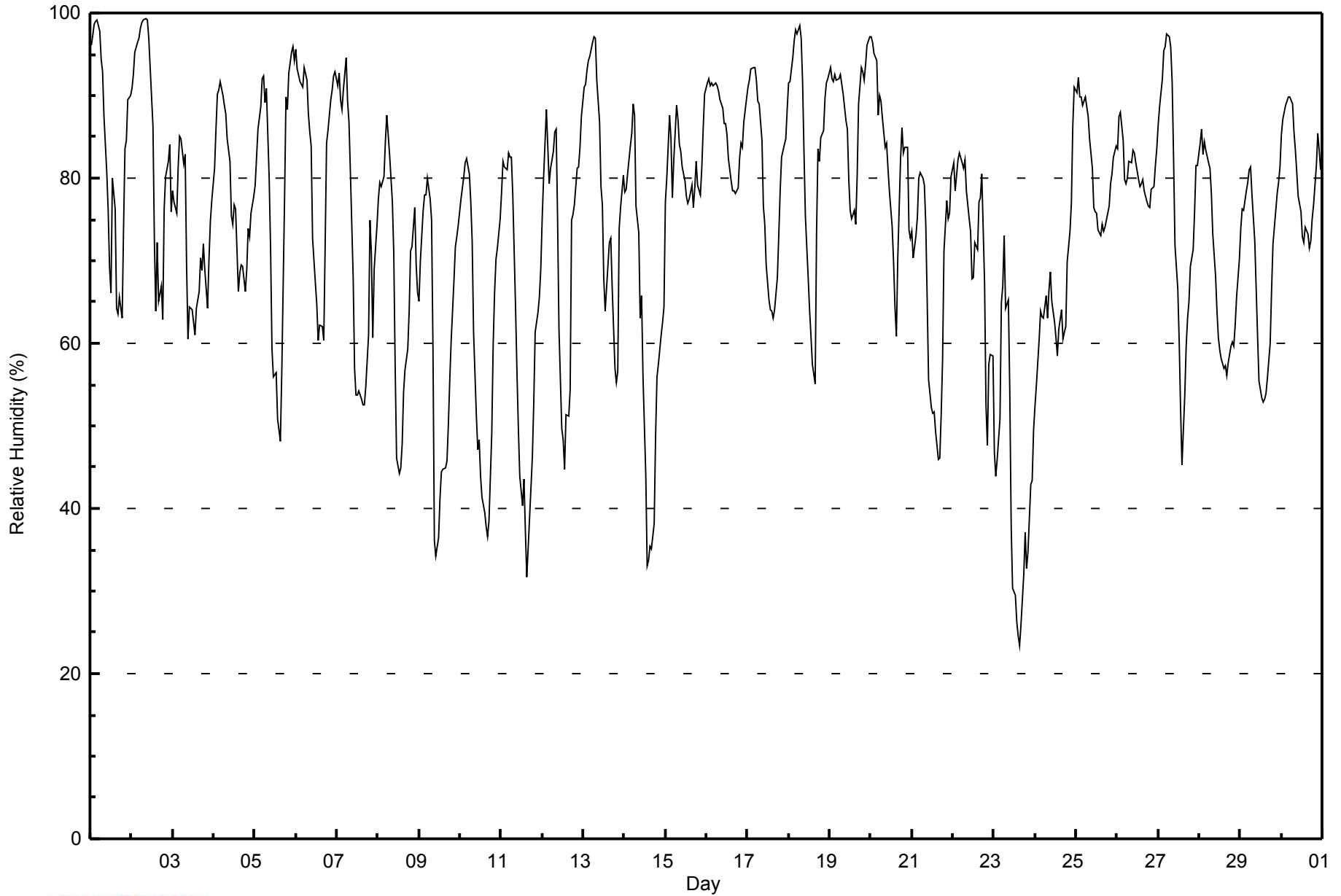


Maximum Value: 99 % on Sep 2 09:00																		Maximum Daily Average: 88.2 % on Sep 19																		Hours in Service: 720			
Minimum Value: 23 % on Sep 23 16:00																		Minimum Daily Average: 43.6 % on Sep 23																		Hours of Data: 720			
Maximum Diurnal Average: 86.8 % at hour 6																		Minimum Diurnal Average: 58.9 % at hour 15																		Hours of Missing Data: 0			
Monthly Average: 74.0 %																		Percentiles: P ₁ = 32 P ₁₀ = 51 Q ₁ = 64 Median = 77 Q ₃ = 86 P ₉₀ = 92 P ₉₉ = 98																		Hours of Calibration: 0			
																																				Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24															
1-Sep	96	97	99	99	99	98	94	93	87	81	76	69	66	80	76	64	64	66	63	74	84	85	89	90	82.9	99													
2-Sep	91	93	95	96	97	98	99	99	99	99	97	93	86	72	64	72	65	67	63	76	80	82	84	76	85.2	99													
3-Sep	78	77	76	81	85	85	82	83	69	60	64	64	63	61	64	66	70	69	72	69	64	70	75	77	71.9	85													
4-Sep	81	86	90	91	92	90	89	88	85	82	75	74	77	76	66	68	70	69	66	69	74	73	76	78	78.5	92													
5-Sep	79	83	86	89	92	92	89	91	80	71	59	56	56	51	49	48	56	78	90	88	93	95	96	94	77.6	96													
6-Sep	96	93	92	91	91	93	92	88	86	84	73	67	65	60	62	62	60	72	84	86	90	91	92	93	81.8	96													
7-Sep	91	93	90	88	91	95	89	87	81	68	57	54	54	53	53	53	55	61	75	71	61	69	74	71.4	95														
8-Sep	77	79	79	80	84	88	85	83	77	71	57	46	44	45	48	54	57	59	64	71	72	76	69	66	68.1	88													
9-Sep	65	70	76	78	78	80	78	75	59	36	34	36	41	44	45	45	46	50	56	60	68	72	73	74	60.0	80													
10-Sep	77	79	80	82	82	81	77	72	61	51	47	48	44	41	39	38	37	38	49	60	66	70	71	75	61.2	82													
11-Sep	78	82	81	81	83	82	83	78	64	56	50	44	40	43	37	32	35	43	46	53	61	64	66	69	60.5	83													
12-Sep	75	80	88	84	79	81	83	86	86	75	62	50	48	45	51	51	54	75	76	77	81	81	84	87	72.5	88													
13-Sep	91	91	93	94	95	96	97	97	92	87	79	77	68	64	70	72	73	67	57	55	57	74	76	80	79.2	97													
14-Sep	78	79	80	84	86	89	88	77	73	63	66	56	44	33	34	35	35	38	49	56	57	61	62	64	62.0	89													
15-Sep	77	80	88	85	78	82	89	87	84	83	81	80	78	77	77	79	76	79	82	79	78	81	86	90	81.5	90													
16-Sep	92	92	91	91	91	92	91	91	90	88	87	87	85	82	80	78	78	78	79	82	84	84	87	90	86.3	92													
17-Sep	91	92	93	93	93	92	89	89	85	77	74	70	65	64	64	63	64	68	73	78	83	84	85	88	79.9	93													
18-Sep	92	92	95	97	98	97	99	97	92	83	75	68	64	61	57	55	74	84	82	85	86	90	92	92	83.5	99													
19-Sep	93	92	92	92	92	92	93	91	90	87	86	80	76	75	76	74	80	89	93	93	92	94	96	97	88.2	97													
20-Sep	97	96	95	94	88	90	89	87	84	84	81	79	74	70	64	61	70	82	86	83	84	84	74	73	82.1	97													
21-Sep	73	70	73	75	80	81	80	79	74	65	56	52	52	52	49	46	46	51	58	71	77	75	76	80	66.4	81													
22-Sep	82	79	80	82	83	82	81	82	79	75	74	68	68	72	71	77	78	80	67	52	48	57	59	58	72.3	83													
23-Sep	47	44	46	51	65	67	73	64	65	54	38	30	29	26	25	23	26	32	37	33	35	43	43	49	43.6	73													
24-Sep	52	55	61	64	63	63	66	63	66	69	65	62	61	58	62	64	60	61	62	70	74	77	86	91	65.7	91													
25-Sep	90	92	90	90	89	90	89	87	85	81	76	76	76	74	73	74	74	74	76	77	79	81	83	84	81.6	92													
26-Sep	84	87	88	85	80	79	80	82	82	83	83	82	80	79	79	80	78	77	77	76	79	79	82	84	81.0	88													
27-Sep	86	89	92	95	96	97	97	96	92	82	72	67	60	52	45	54	60	63	65	69	71	76	81	82	76.7	97													
28-Sep	84	86	83	84	83	82	81	78	73	68	64	61	59	58	57	57	56	58	60	60	60	62	66	70	68.8	86													
29-Sep	74	76	76	78	80	81	81	78	72	67	61	55	53	53	53	54	56	60	66	72	74	78	80	81	69.2	81													
30-Sep	85	87	89	89	90	90	89	86	83	81	78	76	73	72	74	73	72	72	75	77	82	86	83	81	80.9	90													
81.8 83.0 84.5 85.5 86.1 86.8 86.4 84.4 79.9 73.8 68.2 64.2 61.7 59.9 58.9 59.2 60.8 65.1 67.8 70.9 73.4 76.1 78.0 79.7																		Diurnal Average																					
97 97 99 99 99 98 99 99 99 99 97 93 86 82 80 80 80 89 93 93 93 95 96 97																		Diurnal Maximum																					



WBEA
Hourly Averages

Relative Humidity (RH) - %
Fort Chipeywan - September 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Fort Chipeywan - September 2014

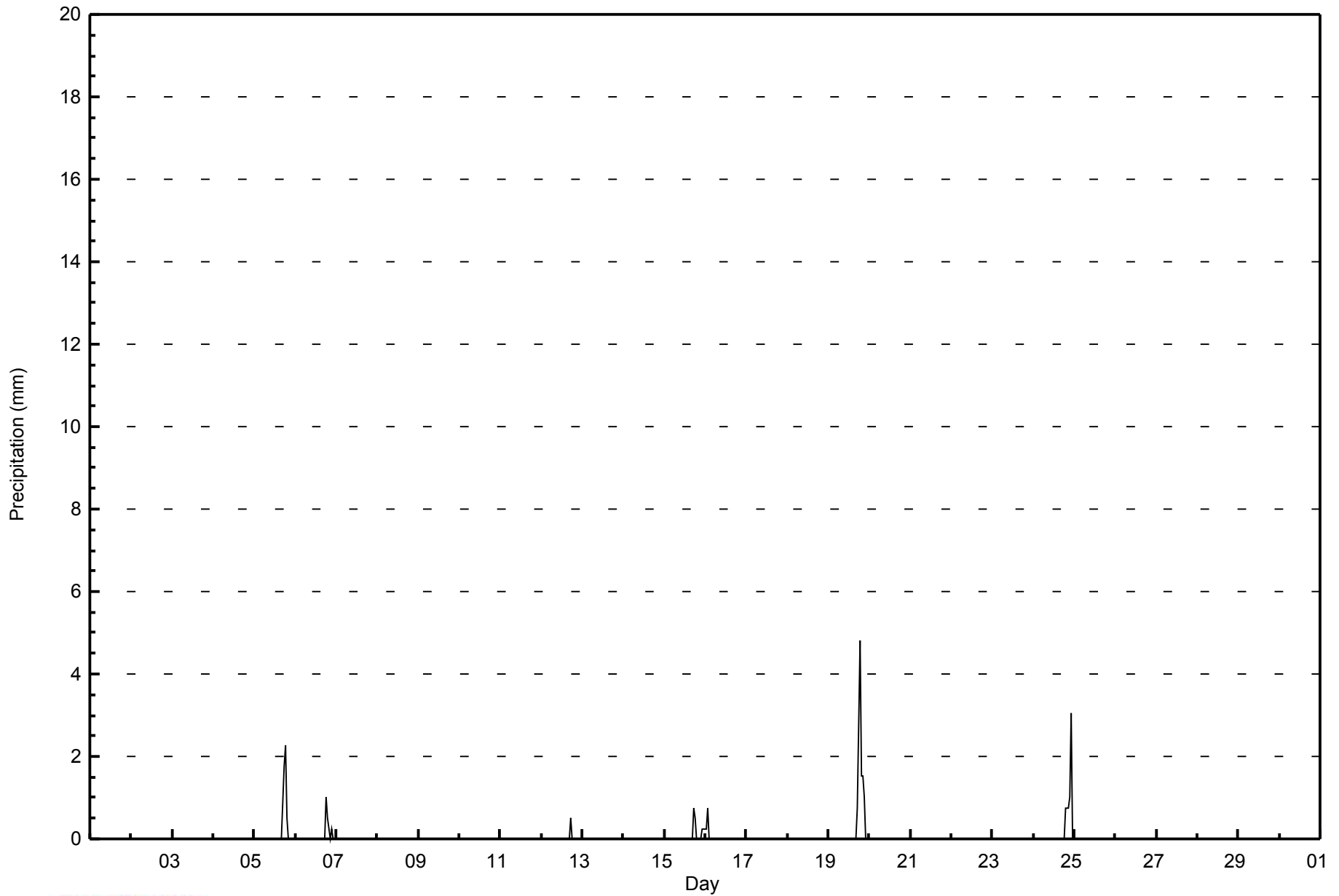
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	26	3.61	3.61
40 - 60	105	14.58	18.19
60 - 80	292	40.56	58.75
80 - 100	297	41.25	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 4.8 mm on Sep 19 19:00 Maximum Daily Total: 9.7 mm on Sep 19		Hours in Service: 720 Hours of Data: 719 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9																																
Minimum Value: 0.0 mm on Sep 1 01:00 Maximum Diurnal Total: 8.6 mm at hour 19 Monthly Total: 24.89 mm		Minimum Daily Total: 0.0 mm on Sep 1 Minimum Diurnal Total: 0.0 mm at hour 3 Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.7																																
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	
3-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	0.0	0.0	0.0	0.0	
4-Sep	0.0	0.0	0.0	0.0	0.0	0.0	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	1.8	2.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	2.3
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	1.0	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	1.0
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	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	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	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	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	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	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.8	0.5	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.8
16-Sep	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8
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	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	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	0.8	4.8	1.5	1.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7	4.8
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	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	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	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	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	0.8	0.8	1.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	3.0
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	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	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	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	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	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	0.0	0.0	0.0	0.0	0.0
		0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	8.6	3.3	2.3	2.3	3.3	0.3			Diurnal Average							
		0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	4.8	1.5	1.5	1.0	3.0	0.3			Diurnal Maximum							
M - Maintenance																																		





WBEA
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort Chipeywan - September 2014

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	701	97.50	97.50
0.4 - 0.5	4	0.56	98.05
0.6 - 0.7	0	0.00	98.05
0.8 - 1.4	8	1.11	99.17
1.5 - 10	6	0.83	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720

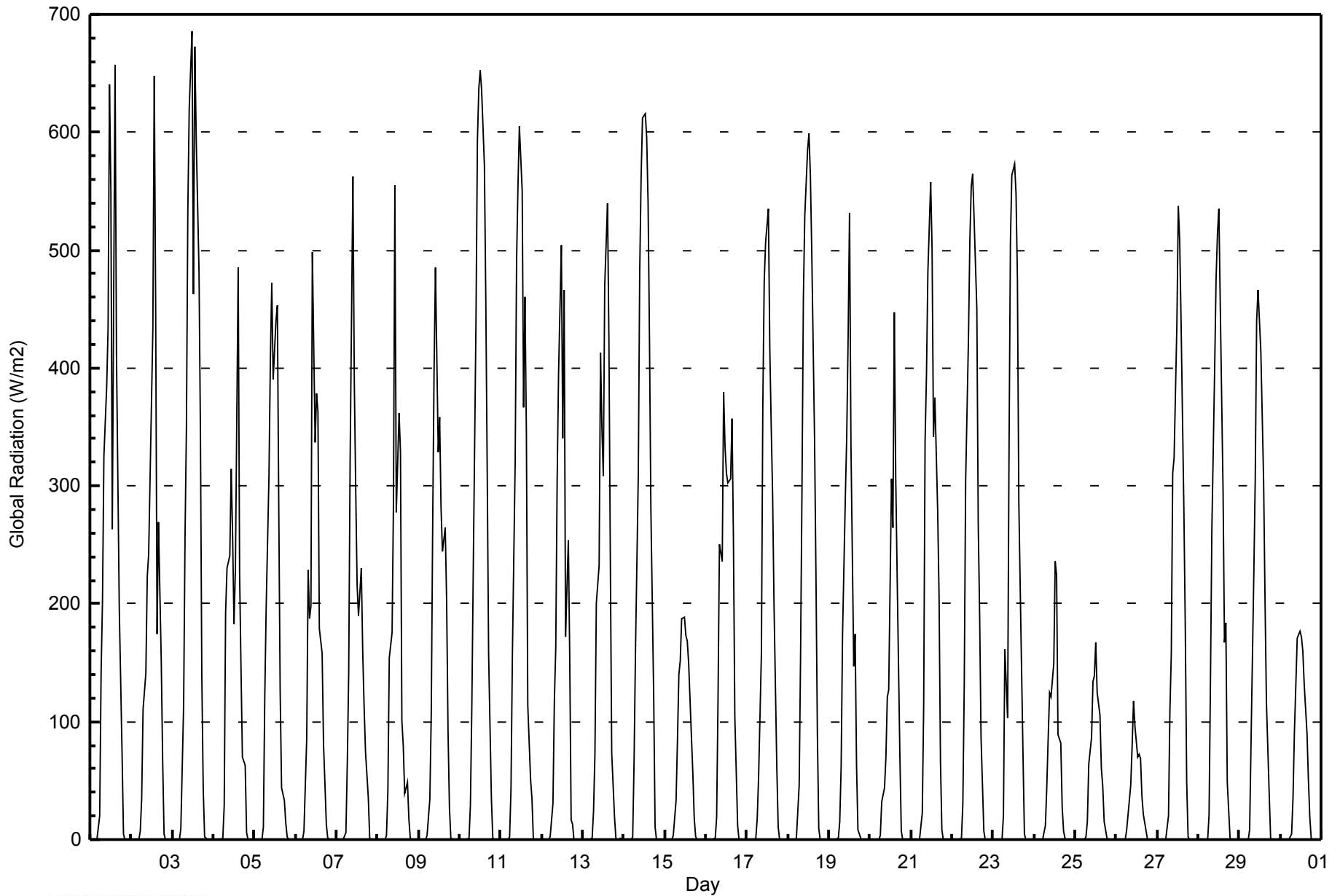


Maximum Value: 685 W/m2 on Sep 3 12:00		Maximum Daily Average: 221.4 W/m2 on Sep 3		Hours in Service: 720																						
Minimum Value: 0 W/m2 on Sep 1 01:00		Minimum Daily Average: 26.9 W/m2 on Sep 26		Hours of Data: 720																						
Maximum Diurnal Average: 402.6 W/m2 at hour 13		Minimum Diurnal Average: 0.1 W/m2 at hour 4		Hours of Missing Data: 0																						
Monthly Average: 128.7 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 15 Q ₃ = 226 P ₉₀ = 441 P ₉₉ = 636		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	20	141	203	325	385	435	640	549	264	658	412	304	196	72	5	0	0	0	0	192.0	658
2-Sep	0	0	0	0	0	7	35	111	141	223	242	306	433	648	451	174	270	151	68	5	0	0	0	0	136.0	648
3-Sep	0	0	0	0	0	10	114	258	350	534	620	685	463	673	594	482	345	138	43	2	0	0	0	0	221.4	685
4-Sep	0	0	0	0	0	2	29	192	230	241	314	258	183	231	485	226	146	70	63	6	0	0	0	0	111.5	485
5-Sep	0	0	0	0	0	10	121	197	308	407	472	391	440	453	281	126	43	33	14	2	0	0	0	0	137.4	472
6-Sep	0	0	0	0	0	7	87	229	187	198	498	337	378	363	179	157	80	48	13	1	0	0	0	0	115.1	498
7-Sep	0	0	0	0	0	6	65	142	321	563	388	298	216	190	230	160	113	74	36	1	0	0	0	0	116.8	563
8-Sep	0	0	0	0	0	4	42	154	176	287	556	278	362	329	100	79	39	48	18	1	0	0	0	0	103.1	556
9-Sep	0	0	0	0	0	3	35	107	264	396	486	329	358	282	245	265	202	91	27	1	0	0	0	0	128.7	486
10-Sep	0	0	0	0	0	1	30	113	225	443	594	637	653	636	572	457	313	158	34	1	0	0	0	0	202.8	653
11-Sep	0	0	0	0	0	3	43	156	321	492	555	606	551	367	460	345	114	51	34	0	0	0	0	0	170.8	606
12-Sep	0	0	0	0	0	2	31	118	163	305	396	505	340	467	172	254	153	17	13	1	0	0	0	0	122.3	505
13-Sep	0	0	0	0	0	2	23	72	200	233	413	348	308	470	540	423	239	73	18	1	0	0	1	0	140.2	540
14-Sep	0	1	1	0	0	2	68	162	309	481	562	612	616	596	539	424	280	122	11	0	0	0	0	0	199.3	616
15-Sep	0	0	0	0	0	3	33	85	140	152	187	189	173	168	149	86	56	18	2	0	0	0	0	0	60.1	189
16-Sep	0	0	0	0	0	1	19	120	250	236	380	334	311	302	306	357	255	105	12	0	0	0	0	0	124.6	380
17-Sep	0	0	0	0	0	1	18	53	158	367	473	507	535	416	352	293	200	62	11	0	0	0	0	0	143.6	535
18-Sep	0	0	0	0	0	1	46	157	298	459	529	585	600	564	499	339	224	91	9	0	0	0	0	0	183.3	600
19-Sep	0	0	0	0	0	1	16	62	174	291	343	427	531	336	147	174	63	9	1	0	0	0	0	0	107.3	531
20-Sep	0	0	0	0	0	0	4	32	44	71	122	127	306	264	447	308	227	70	8	0	0	0	0	0	84.7	447
21-Sep	0	0	0	0	0	1	23	113	339	395	482	557	501	342	374	279	205	66	9	0	0	0	0	0	153.7	557
22-Sep	0	0	0	0	0	1	31	131	304	424	507	554	565	528	449	267	190	87	7	0	0	0	0	0	168.6	565
23-Sep	0	0	0	0	0	0	20	162	103	330	506	563	574	548	475	287	213	71	5	0	0	0	0	0	160.8	574
24-Sep	0	0	0	0	0	0	12	45	86	124	121	149	236	225	88	82	28	8	1	0	0	0	0	0	50.2	236
25-Sep	0	0	0	0	0	0	3	16	65	86	134	139	167	124	106	60	45	15	2	0	0	0	0	0	40.1	167
26-Sep	0	0	0	0	0	0	7	20	46	80	118	96	70	72	69	37	21	7	0	0	0	0	0	0	26.9	118
27-Sep	0	0	0	0	0	0	20	109	158	310	324	438	538	508	438	279	179	49	3	0	0	0	0	0	139.8	538
28-Sep	0	0	0	0	0	0	21	136	263	400	476	514	535	453	295	167	184	48	1	0	0	0	0	0	145.7	535
29-Sep	0	0	0	0	0	0	9	83	227	306	440	466	414	360	303	203	117	38	1	0	0	0	0	0	123.7	466
30-Sep	0	0	0	0	0	0	5	35	92	131	170	177	172	161	131	90	51	19	1	0	0	0	0	0	51.4	177
		0.1	0.1	0.1	0.1	0.1	2.9	38.2	119.1	208.9	311.6	394.7	401.7	402.6	377.9	337.9	243.1	163.3	67.7	17.9	1.0	0.1	0.1	0.1	0.1	Diurnal Average
		0	1	1	0	0	20	141	258	350	563	620	685	653	673	658	482	345	196	72	6	0	0	1	0	Diurnal Maximum



WBEA
Hourly Averages

Global Radiation (GR) - W/m²
Fort Chipeywan - September 2014





WBEA
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Fort Chipeywan - September 2014

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	372	51.67	51.67
21 - 100	78	10.83	62.50
101 - 300	129	17.92	80.42
301 - 600	129	17.92	98.33
601 - 900	12	1.67	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 42 km/h on Sep 28 11:00	Maximum Daily Speed Average: 28.1 km/h on Sep 28	Hours in Service: 720
Minimum Speed Value: 1 km/h on Sep 22 19:00	Minimum Daily Speed Average: 0.9 km/h on Sep 18	Hours of Data: 719
Maximum Diurnal Speed Average: 1.5 km/h at hour 5	Minimum Diurnal Speed Average: 0.2 km/h at hour 7	Hours of Missing Data: 1
Monthly Average Velocity: 0.2 km/h 116.6 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 7 Median = 10 Q ₃ = 18 P ₉₀ = 24 P ₉₉ = 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	WNW8	WNW7	WNW7	WNW7	NW7	NW8	NW7	NNW6	NW9	NW10	NW11	NW10	NW9	N9	NNW7	NNW10	NW10	NW9	NW7	NW6	WNW7	NW7	NW8	NW10	NW8.0	NW11	
2-Sep	NNW11	NNW10	NNW10	NNW11	NNW10	NW8	NNW10	NW8	WNW7	W7	NW10	NW7	NW7	NNW7	NNW8	NW10	NNW7	NW3	WNW3	WNW7	W8	WNW7	NNW5	N5	NW7.2	NNW11	
3-Sep	NNE1	NE2	N4	N5	N6	N7	N4	SW2	S3	S4	ESE7	ESE8	ESE7	E9	ESE11	E11	ESE13	ESE13	ESE12	S10	S7	S10	S12	SSW12	SE4.1	ESE13	
4-Sep	SSW9	SSW5	SW7	WSW7	WSW4	WSW4	SSW6	SW8	WSW7	NW10	NNW11	NNW13	NNW12	NW16	NW17	NW18	NW16	NNW12	NNW12	NNW6	NW5	NW7	NW9	NW8	NW7.0	NW18	
5-Sep	NNW8	NNW8	NNW9	NNW11	NNW11	NW8	W3	W5	W4	SSW5	SSW7	S11	S15	S19	S17	SSW12	WSW5	WNW6	N6	S2	WSW5	W8	NNW11	NNW11	WSW3.9	S19	
6-Sep	NW9	NW10	NNW10	NNW11	NNW8	NNW7	NW7	NW8	NW7	WNW4	NNW5	NW4	W5	NW4	NW4	NW3	NW4	N3	NNW3	N4	N5	NNW5	NW7	NW6	NW5.7	NNW11	
7-Sep	NW8	NNW8	N10	NNW9	NNW10	NNW9	NNW9	NNW9	NNW9	NNW9	NNW12	N13	N12	NNW13	NNW14	N13	N7	NNW10	NNW8	NW6	WNW9	NW7	NNW7	NNW8	NW10	NNW9.3	NNW14
8-Sep	NNW10	NNW10	NNW11	NNW10	NNW9	NNW9	NW9	NNW8	NNW9	NNW7	NNW9	NNW9	NW10	WNW11	WNW11	NW8	NW12	NW7	WNW6	WNW5	NW6	WNW5	NW7	NNW6	NW8.0	NW12	
9-Sep	N5	W6	WNW8	WNW7	WNW6	WNW6	WNW5	WNW5	WNW6	WNW11	NW8	WNW7	WNW11	W11	W12	W10	WNW10	W11	W10	W9	W10	WNW9	WNW7	NW7	WNW7.9	W12	
10-Sep	WNW7	NW8	NW7	NW8	NW9	NNW8	NW8	NW7	NW8	WNW7	W8	WSW14	WSW16	WSW16	WSW19	WSW18	WSW15	WSW13	WSW8	WSW8	SW10	SW11	SW13	SW14	W9.0	WSW19	
11-Sep	SW12	SW11	SW13	SW18	SW18	SW20	SSW20	SSW24	SSW27	SSW31	SSW29	SW28	SW27	SSW22	SW17	W14	W15	W14	W13	W11	WNW11	W10	W9	W7	SW15.8	SSW31	
12-Sep	WNW5	W8	WNW9	NW10	NW13	NW14	NW10	W7	WNW9	NW11	NW13	NW14	WNW13	NW13	NW11	NW13	NW10	NNW10	NNW9	NNW8	NW8	NNW9	NNW10	NNW11	NW9.9	NW14	
13-Sep	NNW10	NNW11	NNW11	NNW10	NNW9	SW2	W5	W5	WNW4	W3	SE4	ESE8	SSE5	SE4	E12	E10	ESE7	SSW1	WNW6	AF	E4	ESE5	SE4	ESE7	NE1.7	E12	
14-Sep	ESE7	ESE9	S3	SSW3	SW4	SW5	SW6	SW2	SW5	SSW5	ESE4	ESE4	S4	SW13	WSW12	W12	W10	W8	WSW8	WSW7	WSW6	WSW4	W4	W8	SW4.3	SW13	
15-Sep	NW8	WNW6	WNW4	NNE2	NNE6	NE8	ENE15	E21	ENE24	ENE24	ENE28	ENE20	ENE23	ENE23	ENE23	ENE24	ENE25	ENE24	E28	E30	E33	E34	E34	E33	ENE19.4	E34	
16-Sep	E37	E32	E29	E24	E25	ENE22	ENE23	E25	E28	E25	E26	E27	E26	E24	E24	E20	E17	E18	ESE23	ESE27	ESE29	ESE28	ESE23	ESE21	E24.5	E37	
17-Sep	SE21	SE20	ESE20	ESE24	ESE23	SE20	SSE24	SSE26	SSE26	SSE28	SSE25	SSE24	SSE24	SSE21	SSE24	SSE24	SSE22	SSE20	SSE21	S20	S14	S15	S11	SSW9	SSE19.9	SSE28	
18-Sep	SW8	WSW8	W7	WNW7	WNW8	WNW8	W9	W8	W8	W9	WNW10	W8	WSW10	WSW6	NW8	NW5	E14	E16	E10	ENE10	ENE10	E15	E17	E18	NNW0.9	E18	
19-Sep	E20	E18	E19	E21	E19	E21	E18	E23	E23	E20	E20	E19	E20	E17	E14	ENE10	E8	SSE7	W6	W11	W18	W16	W16	W14	E9.7	E23	
20-Sep	W15	WNW15	WNW15	WNW15	WNW13	WNW15	NW15	NW15	NW15	NW15	NW13	WNW12	WNW12	NW9	WNW8	WNW8	SW4	ESE7	ESE12	ESE11	ESE11	ESE9	SE3	S2	SW6	WNW5.7	WNW15
21-Sep	SW10	S6	SW8	SW12	SW12	SW8	SW12	SW9	SW10	SW11	WSW17	WSW19	WSW19	W14	WSW12	WSW10	WSW7	SW5	SE2	E7	E11	E10	E8	E9	SW6.5	WSW19	
22-Sep	E13	E17	E20	E19	E22	E21	E19	E19	E17	E19	E15	E12	E10	E13	E11	ESE6	E5	E6	WSW1	W11	W9	W11	WNW13	WNW9	E8.9	E22	
23-Sep	NW9	NW8	W5	W6	W10	W10	W9	W11	W10	W11	W16	W16	W15	W18	W15	W14	WSW9	WSW7	NW4	NE9	NE9	ENE6	ENE10	ENE13	WNW6.7	W18	
24-Sep	ENE13	ENE17	ENE20	ENE20	ENE20	ENE23	ENE25	ENE28	E32	E33	ENE31	ENE33	ENE32	ENE30	ENE30	ENE30	ENE30	ENE32	ENE28	ENE22	E17	E19	E18	SSE7	ENE24.2	E33	
25-Sep	WSW20	W19	W19	W17	W22	W19	W20	W21	WNW21	WNW18	NW22	NW19	NW20	NW16	NNW11	NNW12	NNW9	N7	N5	NNE7	N8	NNE8	NNE8	NNE12	WNW11.7	NW22	
26-Sep	NE12	NNE12	NE11	NE11	E24	E25	ENE22	E25	E27	E30	E25	ENE23	ENE20	NE18	NE23	ENE26	NE24	NE20	NE15	NNE11	NNE10	N9	N9	NNW10	ENE16.8	E30	
27-Sep	NNW11	NNW10	NNW10	NNW9	NNW8	NNW8	NNW8	NNW10	NNW3	NW3	SE5	ESE5	E7	SE6	SSW8	SW8	SW8	SSW5	S11	S14	SSE16	S21	S19	S18	SSW2.7	S21	
28-Sep	S17	S17	S22	S26	S24	S23	S23	S23	S32	S35	SSW42	S37	S40	S40	S37	S29	S33	S29	S29	S31	SSW34	SSW30	SW22	SSW13	S28.1	SSW42	
29-Sep	SSW8	SSW14	SSW20	SSW18	SSW18	S16	S22	SSW22	S23	S20	S22	S26	S24	S25	S28	SSW23	SSW21	S15	S10	ESE4	SE4	SSW6	SSE5	SW7	S16.3	S28	
30-Sep	SW10	SW4	W3	NW11	NW10	NNW8	NNW9	NW13	NNW11	NNW13	NNW17	NNW14	NNW14	NNW13	NNW13	NW15	NW13	NW11	WNW11	WNW11	WNW9	WNW10	NW10	NW12	NW9.9	NNW17	
NW1.0 NNW1.0 NNW1.2 NNW1.4 N1.5 N0.9 NE0.2 ESE0.6 SE1.3 SSE1.3 SE0.6 SE1.0 S1.2 S0.9 S0.9 W0.4 ENE0.6 E1.3 ESE1.3 SE1.3 SSE0.8 S1.0 NW0.4 NW0.7 E37 E32 E29 S26 E25 E25 ENE25 ENE28 S32 S35 SSW42 S37 S40 S40 S37 ENE30 S33 ENE32 S29 S31 SSW34 E34 E34 E33																								Diurnal Average	Diurnal Maximum		

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



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 7 km/h on Sep 4 14:00	Hours of Data: 719
Minimum Value: 0 km/h on Sep 2 21:00	Hours of Missing Data: 1
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7	Hours of Calibration: 0
	Percent Operational Time: 99.9

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

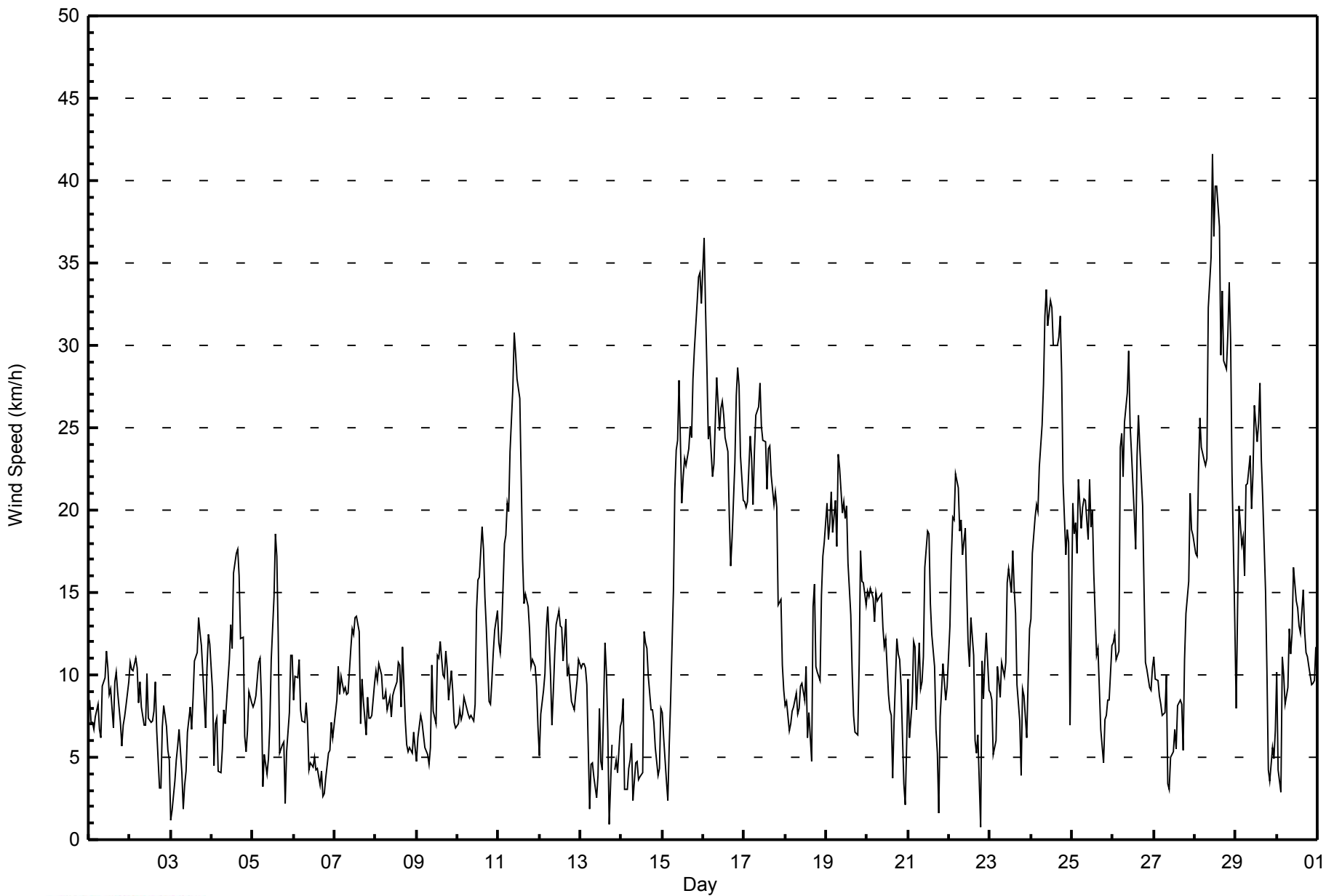
6	5	6	5	6	5	5	6	5	6	7	7	7	7	6	7	7	7	7	5	5	5	5	5	6	
Diurnal Maximum																									

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Fort Chipeywan - September 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort Chipeywan - September 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	89	12.38	12.38
6 - 11	325	45.20	57.58
12 - 19	154	21.42	79.00
20 - 28	115	15.99	94.99
29 - 38	33	4.59	99.58
> 38	3	0.42	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Fort Chipecywan - September 2014

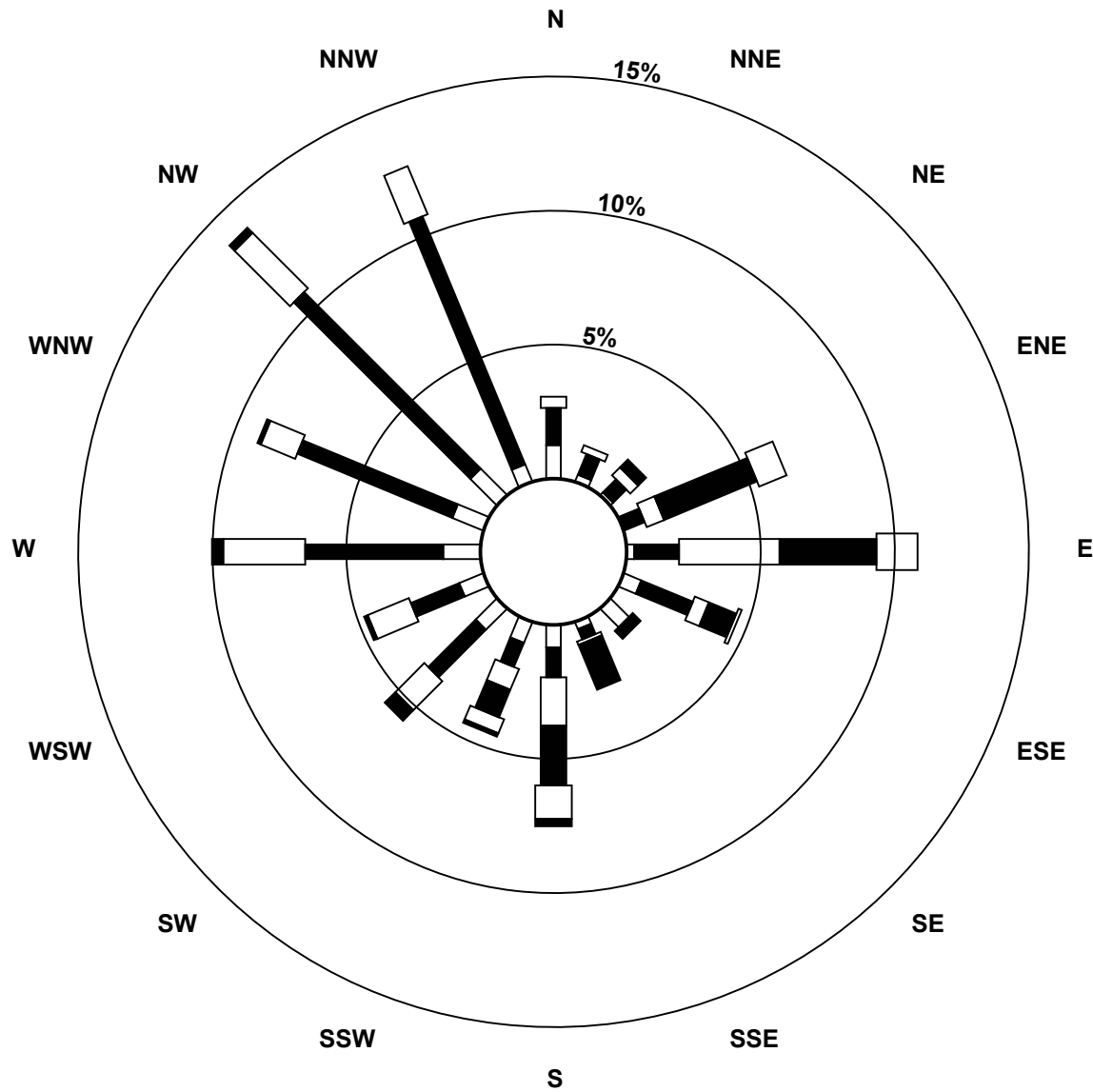
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	9	2	1	0	2	5	7	2	6	6	8	7	10	9	10	5	89
6 - 11	10	6	5	6	12	15	0	3	8	7	18	14	37	45	67	72	325
12 - 19	3	2	3	5	27	4	0	1	13	6	11	12	22	10	21	14	154
20 - 28	0	0	3	27	26	8	3	13	16	8	4	1	3	1	2	0	115
29 - 38	0	0	0	8	11	1	0	0	9	4	0	0	0	0	0	0	33
> 38	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	3
Totals	22	10	12	46	78	33	10	19	54	32	41	34	72	65	100	91	719

Total Number of Valid Hours: 719

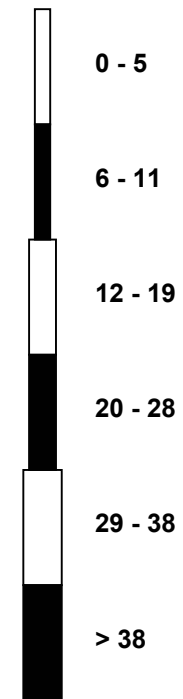
Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Fort Chipecywan (AMS 8)**



Classes (km/h)



Total Number of Valid Hours: 719



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort Chipeywan - September 2014

Direction of Maximum Speed: 198 deg on Sep 28 11:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 184.7 deg on Sep 28	Hours of Data: 719
Direction of Minimum Speed: 248 deg on Sep 22 19:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 0.9 deg on Sep 18	Percent Operational Time: 99.9
Monthly Average Direction: 296.0 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	294	295	300	291	308	318	323	327	317	317	312	305	315	353	342	328	314	325	317	318	303	314	315	324	315.9
2-Sep	336	334	334	345	343	325	335	325	290	277	309	312	314	335	335	319	333	309	295	282	276	286	340	2	321.1
3-Sep	20	40	10	352	355	354	5	236	189	182	123	106	113	101	102	101	105	113	117	175	185	185	188	196	128.0
4-Sep	193	213	218	237	249	238	203	222	249	306	329	335	336	323	326	322	321	332	338	342	308	316	315	324	307.3
5-Sep	331	329	334	341	333	321	281	274	266	205	200	190	173	175	183	202	258	283	359	170	258	271	286	300	256.0
6-Sep	311	326	338	339	344	333	324	318	321	302	328	326	267	319	309	319	318	8	342	1	353	336	322	307	326.2
7-Sep	308	331	351	345	345	342	340	346	340	348	352	352	342	339	351	357	328	333	308	302	324	347	335	325	338.7
8-Sep	334	343	337	336	334	328	326	332	332	331	329	334	311	293	301	308	323	315	284	292	315	284	316	335	321.4
9-Sep	352	279	289	292	292	302	303	300	303	286	304	297	285	280	278	276	284	271	267	272	280	286	298	306	287.2
10-Sep	301	305	308	310	320	330	323	322	320	296	260	249	254	256	240	245	251	243	237	237	228	227	230	228	261.7
11-Sep	232	229	224	218	219	214	212	208	207	206	212	216	214	208	227	263	266	272	275	274	283	278	277	276	227.9
12-Sep	287	279	290	309	323	317	312	281	286	307	310	322	301	314	307	304	307	330	342	332	325	331	346	347	314.0
13-Sep	343	345	345	344	345	229	278	278	301	276	127	121	158	133	93	96	109	197	292	AF	89	107	127	112	41.2
14-Sep	112	114	171	203	219	233	231	216	221	204	110	116	180	232	248	265	274	261	244	251	252	257	262	264	232.7
15-Sep	318	287	289	27	19	55	73	79	77	78	77	73	72	73	76	71	74	73	79	80	84	82	81	83	74.8
16-Sep	88	93	93	83	80	78	77	82	86	79	82	85	84	87	91	95	92	99	112	109	105	110	114	121	92.5
17-Sep	129	126	118	121	122	142	156	152	152	160	154	153	153	150	154	156	150	161	164	178	182	190	191	210	151.8
18-Sep	228	249	276	282	288	287	277	274	277	277	291	275	240	255	310	306	91	87	79	75	73	84	84	88	335.1
19-Sep	89	87	80	81	79	86	85	84	88	83	81	81	88	85	82	65	85	149	278	266	272	272	279	279	81.2
20-Sep	280	284	287	291	298	296	305	305	308	310	299	282	308	299	291	214	114	108	112	102	107	138	187	215	293.3
21-Sep	221	189	220	220	223	215	217	221	219	219	240	238	246	261	257	250	249	225	130	82	88	88	86	89	222.5
22-Sep	89	81	81	82	85	84	91	90	92	98	93	93	93	91	96	110	98	81	248	277	263	278	287	300	86.2
23-Sep	313	313	272	264	272	267	275	278	263	264	275	271	266	268	272	256	244	323	45	42	58	61	69		281.7
24-Sep	66	75	76	77	74	73	77	77	82	81	76	73	71	68	67	65	64	64	74	77	81	86	90	150	74.6
25-Sep	252	266	267	262	264	265	270	280	288	302	309	314	318	326	336	338	341	353	358	18	11	23	12	29	300.4
26-Sep	35	28	34	41	91	83	76	79	79	89	79	72	57	48	54	58	54	50	41	30	17	9	0	348	59.3
27-Sep	346	344	344	343	340	334	330	330	330	323	131	109	101	146	213	219	225	197	170	175	168	179	189	189	203.9
28-Sep	187	183	175	172	170	172	170	178	183	190	198	185	180	180	180	174	180	183	184	189	196	205	214	211	184.7
29-Sep	196	194	196	196	192	190	185	192	190	187	182	180	179	174	177	192	194	187	173	116	139	208	158	215	185.9
30-Sep	227	217	281	316	326	331	332	324	344	343	335	340	338	336	328	319	317	312	303	287	282	292	315	325	319.0

316.0 340.9 336.6 339.4 359.2 4.8 56.1 109.8 141.9 156.6 143.6 144.4 178.7 177.6 170.4 274.3 64.6 96.8 108.6 132.1 155.4 184.7 314.1 312.4

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

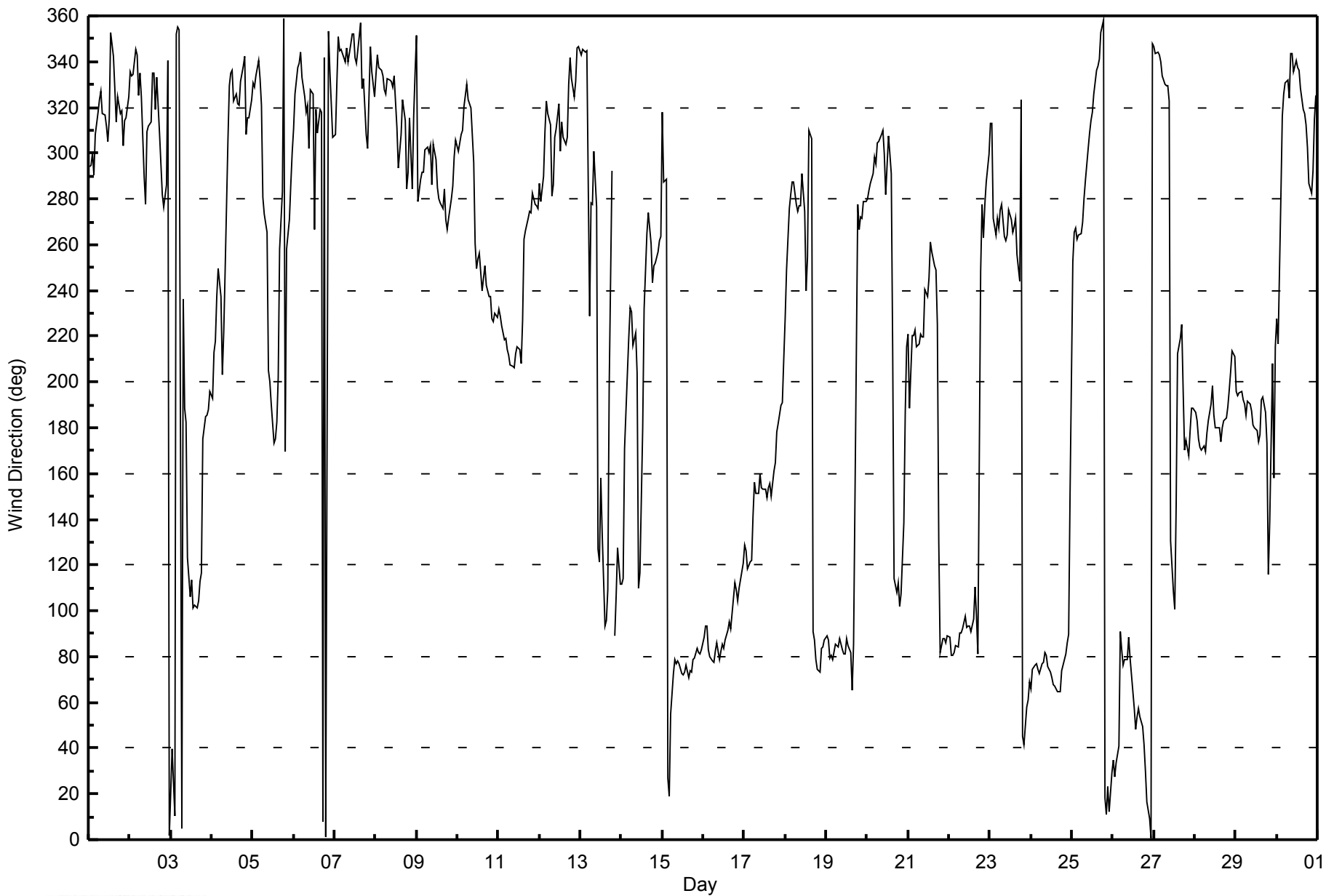
Wind Direction (WD) - deg
Fort Chipeywan - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 88 deg on Sep 22 19:00														Hours in Service: 720 Hours of Data: 719 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9											
Minimum Value: 3 deg on Sep 2 20:00																									
Percentiles: P ₁ = 5 P ₁₀ = 7 Q ₁ = 9 Median = 15 Q ₃ = 21 P ₉₀ = 28 P ₉₉ = 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	13	21	17	15	19	25	20	26	22	26	31	27	38	29	20	23	20	12	11	17	14	13	38
2-Sep	16	16	16	16	20	15	19	22	19	22	19	35	35	44	36	24	31	27	28	3	3	7	17	12	44
3-Sep	69	25	23	40	18	15	20	34	17	12	14	9	11	9	6	7	6	6	11	27	18	7	8	7	69
4-Sep	11	20	12	25	32	52	14	11	20	21	26	24	25	21	23	23	23	26	28	18	17	17	18	52	
5-Sep	18	16	15	13	16	22	32	17	36	25	22	19	13	12	12	12	32	32	26	75	19	14	15	16	75
6-Sep	17	20	23	21	20	18	21	20	24	34	51	47	44	51	31	45	47	52	32	22	16	20	11	14	52
7-Sep	13	20	18	16	14	15	16	21	25	29	30	30	24	27	29	35	26	24	16	15	27	21	20	16	35
8-Sep	18	17	18	17	16	13	15	20	23	27	40	35	35	23	21	19	21	21	13	20	15	10	17	26	40
9-Sep	21	20	11	9	11	12	26	17	22	24	43	40	22	23	19	21	23	16	15	12	11	13	11	12	43
10-Sep	10	11	9	8	12	16	16	19	23	31	33	22	21	21	17	16	16	12	11	11	11	9	10	12	33
11-Sep	8	11	10	7	8	8	8	8	8	8	10	10	11	11	25	17	15	14	15	15	12	12	13	16	25
12-Sep	21	10	10	15	18	15	17	18	15	19	23	25	20	29	21	21	19	23	23	20	16	19	18	16	29
13-Sep	17	20	19	18	22	61	21	22	25	56	27	24	59	60	10	7	10	69	8	AF	13	26	19	8	69
14-Sep	8	9	37	16	9	8	12	17	16	18	23	43	15	21	21	20	19	10	12	13	12	12	15	43	
15-Sep	17	17	39	76	25	12	11	8	9	9	8	13	9	11	10	9	9	9	7	8	7	7	7	8	76
16-Sep	5	5	6	7	7	8	8	8	7	9	10	9	8	7	7	6	6	11	5	5	4	6	6	5	11
17-Sep	5	6	7	5	5	10	10	10	9	8	9	11	9	12	9	11	9	10	10	8	8	8	10	15	15
18-Sep	13	25	12	13	14	12	12	16	17	17	23	28	30	43	33	47	54	7	9	8	11	6	7	6	54
19-Sep	6	5	6	6	7	6	7	6	6	6	7	7	4	5	7	10	11	72	18	16	14	15	14	14	72
20-Sep	15	15	14	16	16	17	17	19	19	19	19	18	28	29	27	53	36	9	7	10	10	43	41	22	53
21-Sep	11	21	12	9	8	11	7	12	13	10	13	12	15	18	17	18	18	10	59	13	10	10	12	8	59
22-Sep	13	10	7	6	5	7	8	6	7	5	5	5	5	4	10	20	16	7	88	13	10	14	12	13	88
23-Sep	14	16	37	13	10	15	13	14	13	16	17	18	17	17	18	17	18	17	12	63	13	11	20	8	63
24-Sep	10	8	7	7	8	8	7	7	6	6	8	7	7	8	8	8	9	9	8	9	6	6	9	44	44
25-Sep	16	14	15	15	14	14	15	15	15	18	19	19	19	24	26	24	26	25	23	14	14	10	16	16	26
26-Sep	11	13	12	12	16	10	10	10	8	8	10	9	13	12	12	11	12	12	15	24	18	20	20	17	24
27-Sep	18	16	14	13	15	15	17	15	68	48	18	12	12	27	22	15	15	39	10	11	9	6	6	6	68
28-Sep	5	7	6	8	8	9	11	11	8	10	8	10	9	8	8	9	8	6	6	8	7	7	8	7	11
29-Sep	10	6	6	6	8	7	7	7	7	9	9	10	10	11	10	9	8	8	6	24	31	31	27	27	31
30-Sep	10	14	38	11	15	16	16	17	22	22	21	24	25	24	25	21	19	19	16	14	13	15	16	21	38
69 25 39 76 32 61 32 34 68 56 51 47 59 60 38 53 54 72 88 75 31 43 41 44																									
Diurnal Maximum																									
AF - Analyzer Failure																									



WBEA
Hourly Averages

Wind Direction (WD) - deg
Fort Chipeywan - September 2014





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 7, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	8:55	End Time (MST)	13:00
Barometric Pressure	740 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	API T700	Serial Number	747
Cal Gas Concentration	2.45 ppm	Cal Gas Expiry Date	9/16/2016
Gas Cert Reference	LL103809		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205
DACS voltage range	0-5v	DACS channel #	DIFF 1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	20	20	PMT voltage (mV)	7	7
Analyzer Range (mv)	5000	5000	HV power supply (V)	529	529
Calculated slope	0.995001	0.988966	Chamber temp.	50.0	50.0
Calculated intercept	-0.012923	0.010473	Pressure (in Hg)	26.4	26.6
Analyzer Background	6.9	6.9	Flow (lpm)	0.621	0.627
Analyzer Coefficient	1.016	1.051	UV Lamp (mV)	4408	4410

Analyzer make	T100u	Analyzer serial #	138
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.05	NA
as found span	5000	37.1	18.18	17.59	1.033
calibrator zero	5000	0.0	0.0	-0.05	NA
high point	5000	37.1	18.18	18.35	0.991
second point	5000	19.8	9.70	9.82	0.988
third point	5000	9.9	4.85	4.94	0.982
calibrator zero					
as left zero	5000	0.0	0.0	-0.1	NA
as left span	5000	37.1	18.2	16.3	1.112
Average Correction Factor					0.987

Corrected As found	17.6	Previous response	18.3	% change	3.6%
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Notes:

As found zero used as calibrator zero
Span adjusted

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

SO₂ Calibration Summary

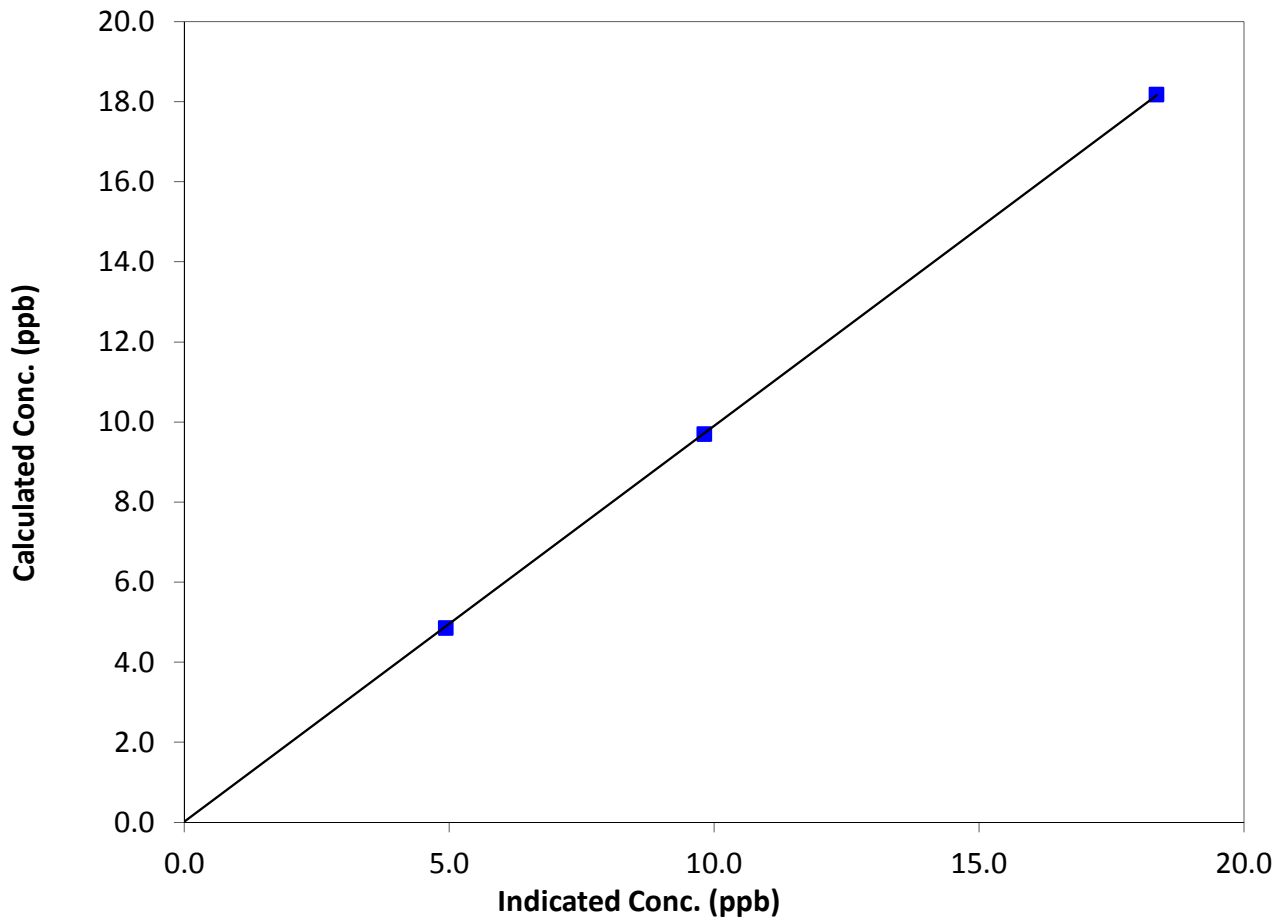
Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 7, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	8:55	End Time (MST)	13:00
Analyzer make	T100u	Analyzer serial #	138

Calibration Data

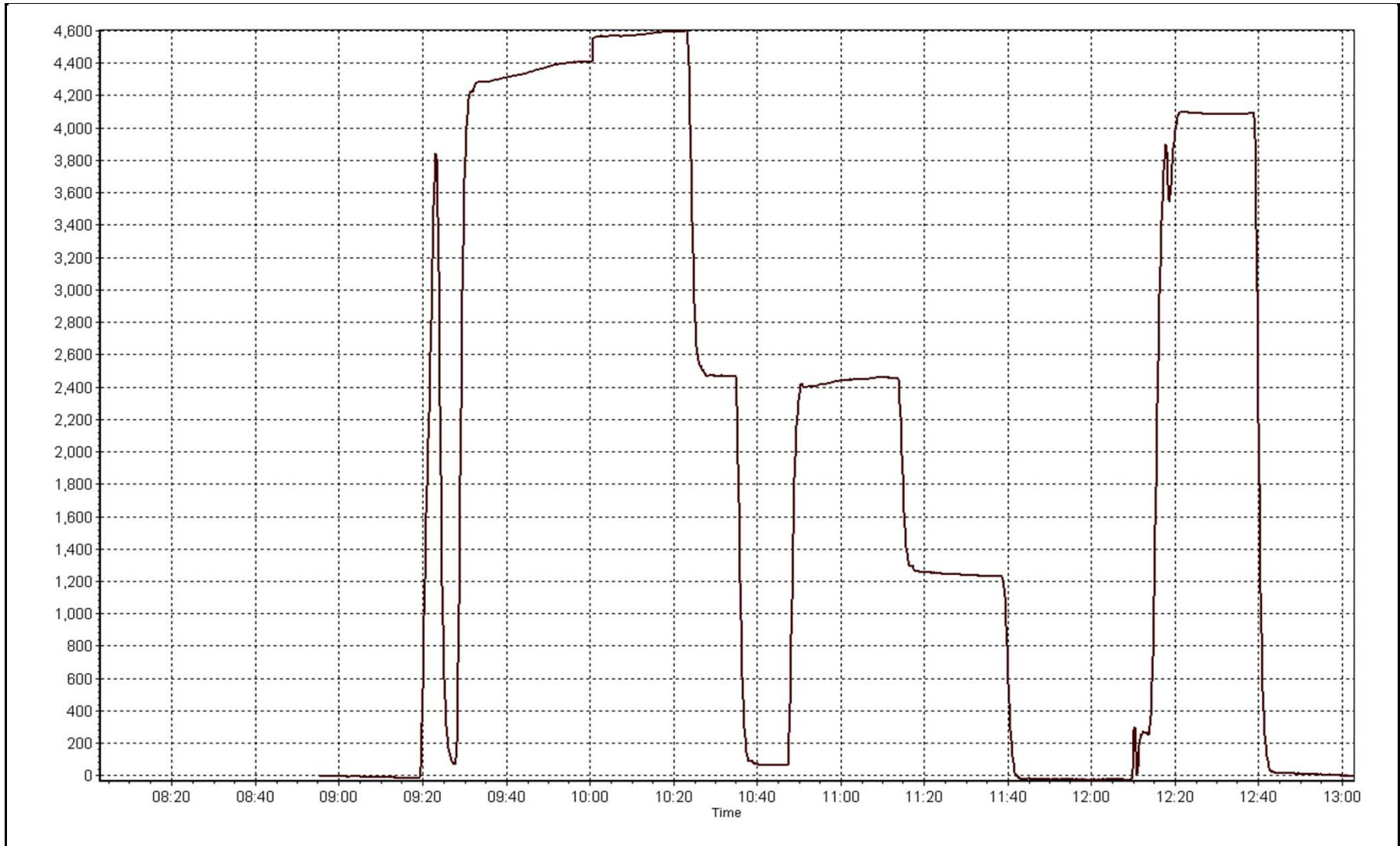
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999978
18.2	18.4	0.9906		
9.7	9.8	0.9885	Slope	0.988966
4.9	4.9	0.9823		
			Intercept	0.010473

SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 4, 2014





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 7, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	16:42	End Time (MST)	19:00
Barometric Pressure	740 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	API T700	Serial Number	735
NO2 calibration used	Thursday, August 07, 2014	Transfer Standard	NA
DACS make/model	Campebls CR3000	DACS serial No.	8205
DACS voltage range	0-5V	DACS channel #	Digital

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	200	200	Bench temp. (Deg C)	26.6	27.2
Analyzer Range (input)	5000	5000	Lamp temp. (Deg C)	58.0	58.0
Calculated slope	0.981886	0.993142	Pressure (in Hg)	27.0	27.1
Calculated intercept	-0.108449	0.105263	Flow cell (LPM)	0.735	0.740
Analyzer Background	-0.50	-0.5	Cell A Intensity	NA	NA
Analyzer Coefficient	1.049	1.017	Cell B Intensity	NA	NA

Analyzer make API T400 Analyzer serial # 1020

Calibration Data

Set Point	Dilution air flow rate (cc/min)	O3 Ref -- O3 Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.0	N/A
as found span	5000	197.5 -- 810.1	105.9	109.8	0.965
calibrator zero	5000	0.00	0.0	0.0	N/A
high point	5000	197.5 -- 810.1	105.9	106.7	0.993
second point	5000	148 -- 772	81.0	81.4	0.995
third point	5000	93 -- 715	53.9	54.0	0.998
calibrator zero	5000	0.00	0.0		N/A
as left zero	5000	0.00	0.0	0.4	N/A
as left span	5000	197.5 -- 810.1	105.9	107.9	N/A
Average Correction Factor					0.996

Corrected As found 109.8 Previous response 108.0 % change -1.6%

Notes:

As Found zero used as Calibrator Zero. Span adjusted, filter change after third point.

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

O₃ Calibration Summary

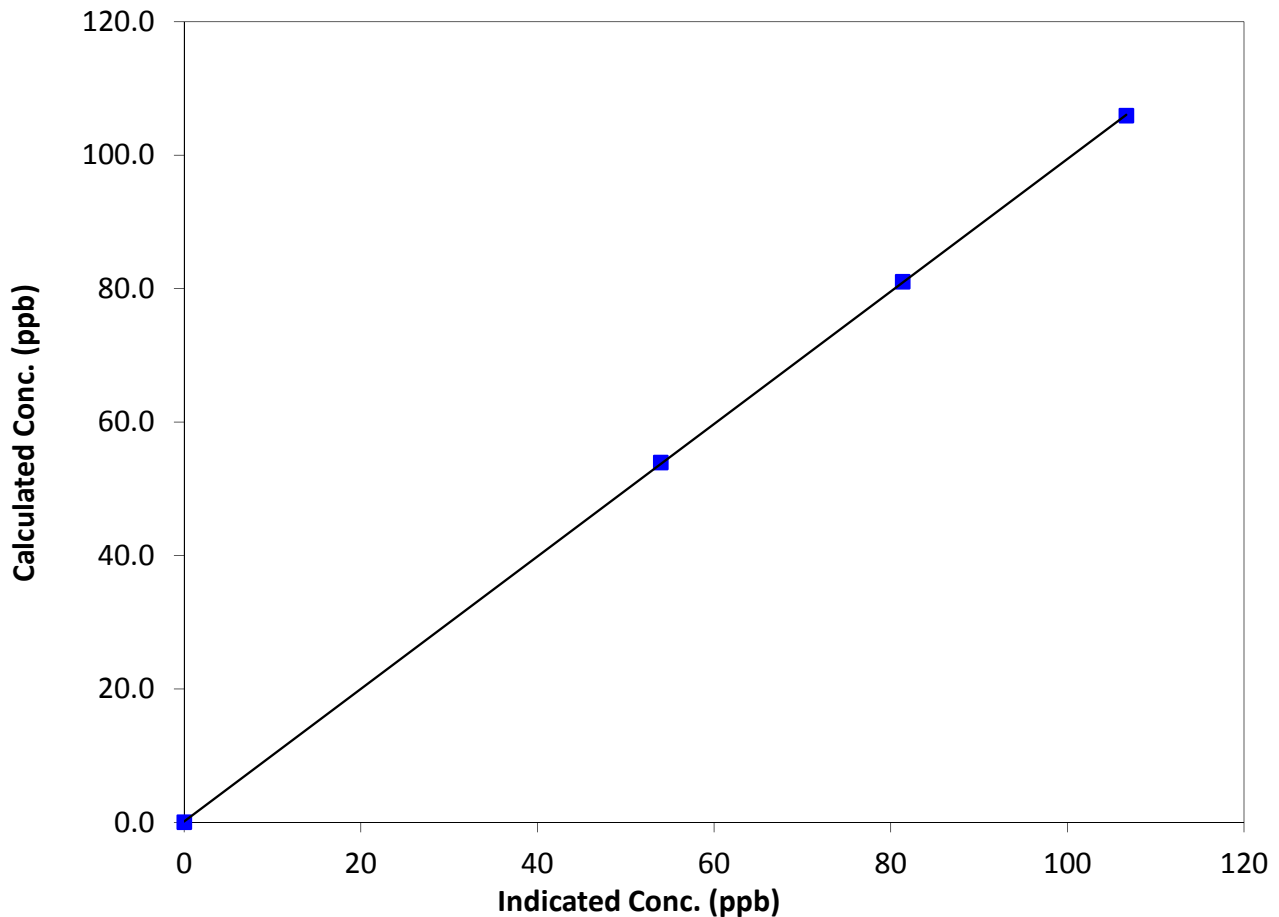
Station Information

Calibration Date	Thursday, September 04, 2014	Previous Calibration	August 7, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	16:42	End Time (MST)	19:00
Analyzer make	API T400	Analyzer serial #	1020

Calibration Data

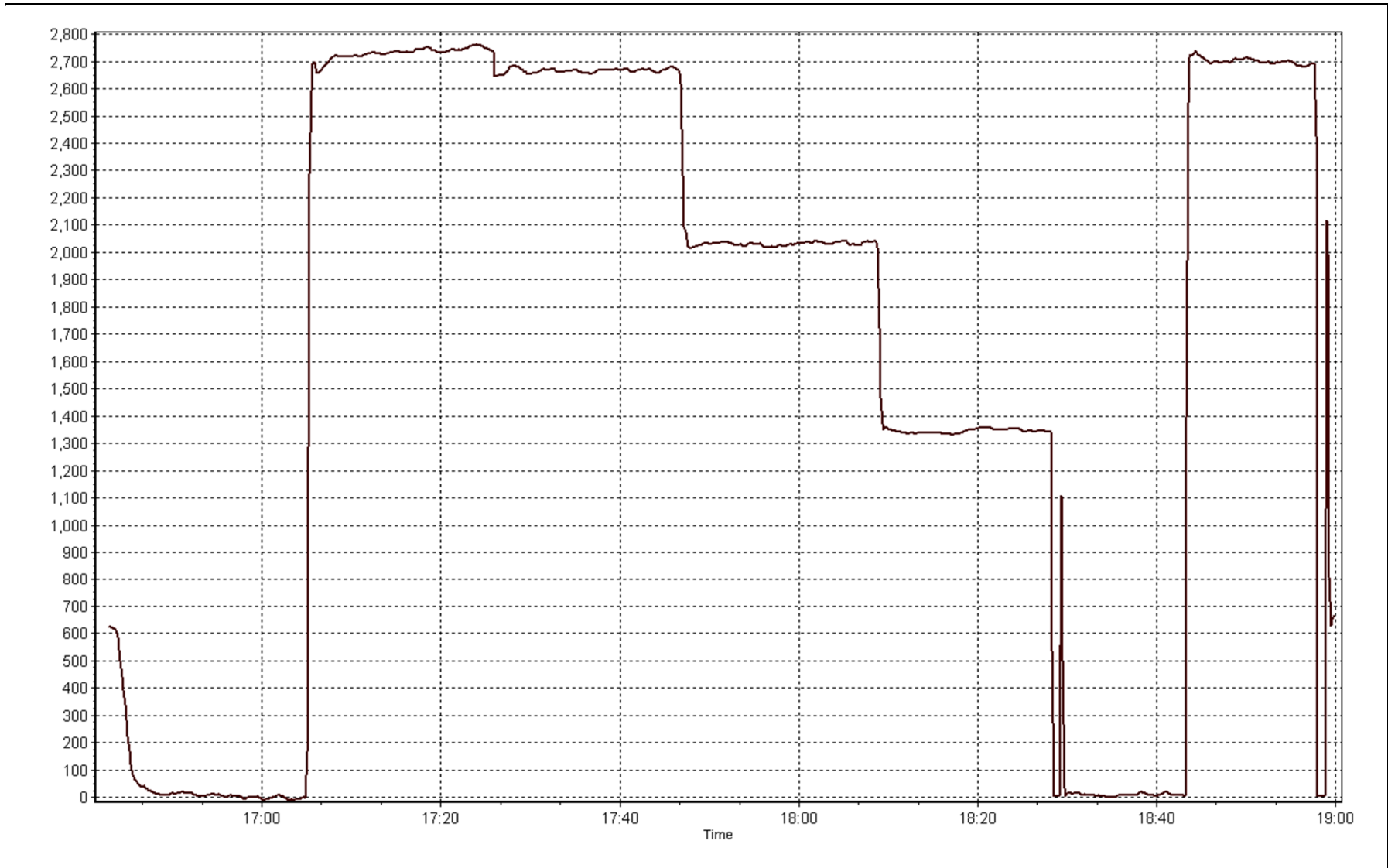
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999988
105.9	106.7	0.9927		
81.0	81.4	0.9954	Slope	0.993142
53.9	54.0	0.9985		
			Intercept	0.105263

O₃ Calibration Curve



O3 Calibration Plot

Date: September 4, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 7, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	8:55	End Time (MST)	16:45
Barometric Pressure	740 mmHg	Station Temperature	21.0 Deg C
Calibrator	API T700	Serial Number	747
NO Cal Gas Conc	20.2 ppm	Cal Gas Expiry Date	09-16-2016
NO _x Cal Gas Conc	20.3 ppm	Cal Gas Serial #	LL103809

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8205
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Parameter		NO _x	NO	NO ₂
MV conversion	Analyzer Range (ppb)	200	200	200
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.999929	0.999196	0.986947
	Data Offset	0.095357	0.215067	0.086648
After	Data Slope	1.001044	0.999021	0.997925
	Data Offset	0.239080	0.503239	0.197156
Channel #		DIFF 3	DIFF 1	DIFF 2
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model	API T200u	Analyzer serial #	172
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Test Point	before		after	
Concentration range	200	ppb	200	ppb
NO coefficient	1.171	mv	1.350	mv
NO _x coefficient	1.184	mv	1.365	mv
NO bkgnd	-0.1	mv	-0.2	mv
NO _x bkgnd	0.4	mv	0.8	mv
Chamber Temp	40	Deg C	40	Deg C
Moly Temp	314.2	Deg C	315	Deg C
PMT Temp	5.1	Deg C	5	Deg C
O ₃ flow	88	ccm	88	ccm
R Cell Press	2.6	mmHg	2.9	mmHg
Sample Flow	1119	ccm	1157	ccm
PMT Voltage	0.1	V	-0.6	V

Notes: Blockage in air dryer occurred during second NO point. Bypassed dryer until spare part arrives. Filter changed



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

September 4, 2014

Station Number:

AMS 8

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.3	N/A	N/A
as found span	5000	37.1	150.6	149.9	0.7	147.2	146.6	0.6	1.023	1.023
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	N/A	N/A
high point	5000	37.1	150.6	149.9	0.7	150.6	149.7	0.8	1.000	1.001
second point	5000	19.8	80.4	80.0	0.4	79.4	79.3	0.1	1.013	1.009
third point	5000	9.9	40.2	40.0	0.2	39.7	39.7	-0.2	1.014	1.007
calibrator zero	5000	0.0	0.0	0.0	0.0				NA	NA
as left zero	5000	0.0	0.0	0.0	0.0	-0.6	0.0	-0.6	NA	NA
as left span	5000	37.1	150.6	149.9	0.7				NA	NA
Average Correction Factor									1.009	1.006

Corrected As found
Previous Response

NO_x= 147.5
NO_x= 150.5

NO= 146.6
NO= 149.5

Percent Change

NO_x= 2.1%

NO= 2.0%

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 37.10 ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO ₂ (100ppb O ₃)	N/A	44.4	105.9	150.5	44.4	106.1	1.001	1.000	0.999	100.1%
2nd NO ₂ (75ppb O ₃)	N/A	69.3	81.0	150.2	69.3	80.9	1.003	1.000	1.002	99.8%
3rd NO ₂ (50ppb O ₃)	N/A	96.5	53.9	150.2	96.5	53.7	1.003	1.000	1.003	99.7%
4th NO ₂ (0ppb O ₃)	150.3	N/A	0.2	150.5	150.3	0.1	1.001	1.000	N/A	N/A
Average Correction Factor							1.002	1.000	1.001	99.9%

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

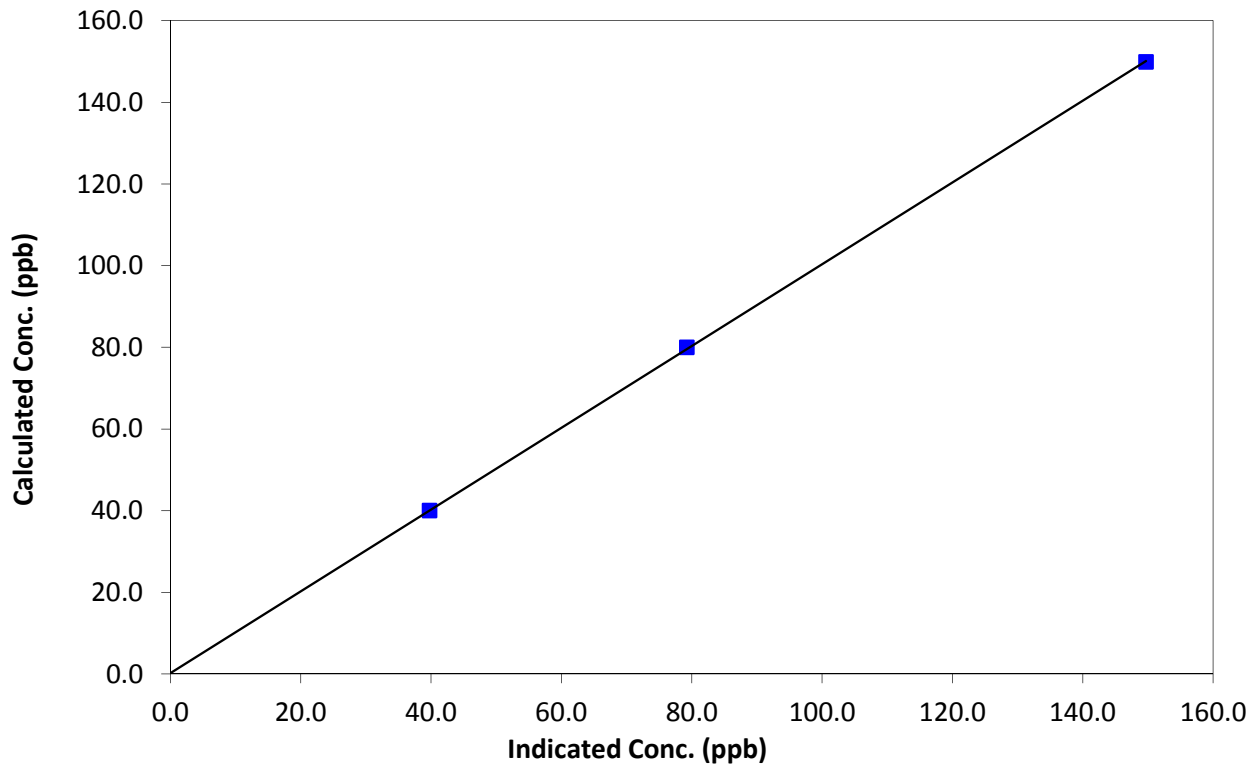
Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 7, 2014
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	8:55	End Time (MST)	16:45
Analyzer make	API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999980
149.9	149.7	1.0012		
80.0	79.3	1.0092	Slope	1.001044
40.0	39.7	1.0066		
			Intercept	0.239080

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

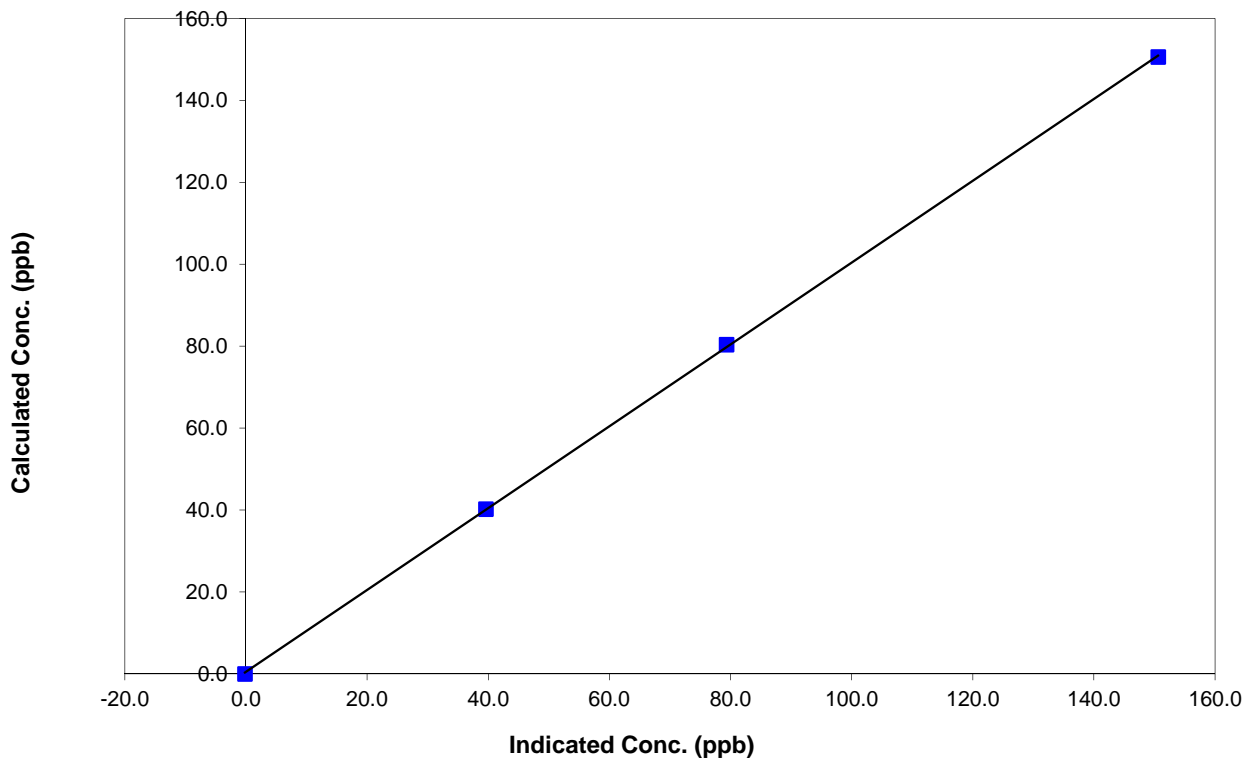
Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 7, 2014
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	8:55	End Time (MST)	16:45
Analyzer make	API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999952
150.6	150.6	1.0001		
80.4	79.4	1.0129	Slope	0.999021
40.2	39.7	1.0137		
			Intercept	0.503239

NO Calibration Curve





Wood Buffalo Environmental Association

NO2 Calibration Summary

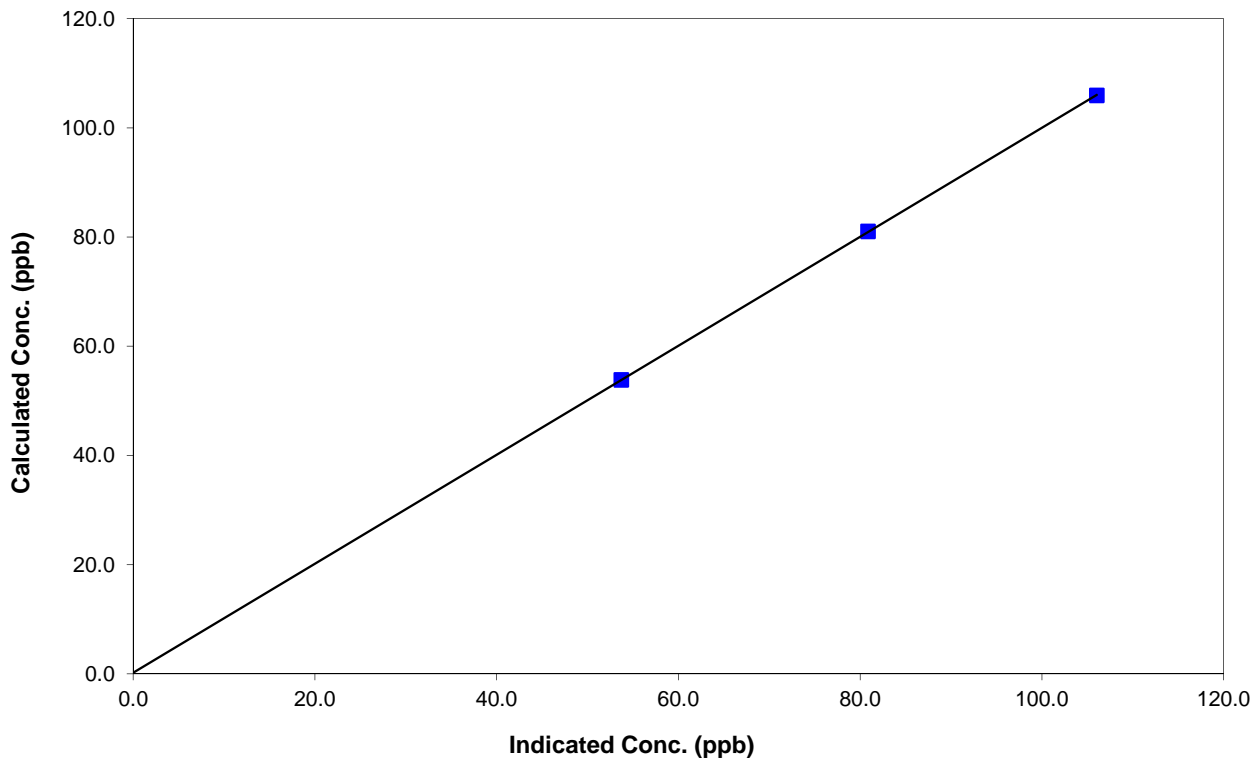
Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 7, 2014
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	8:55	End Time (MST)	16:45
Analyzer make	API T200u	Analyzer serial #	172

Calibration Information

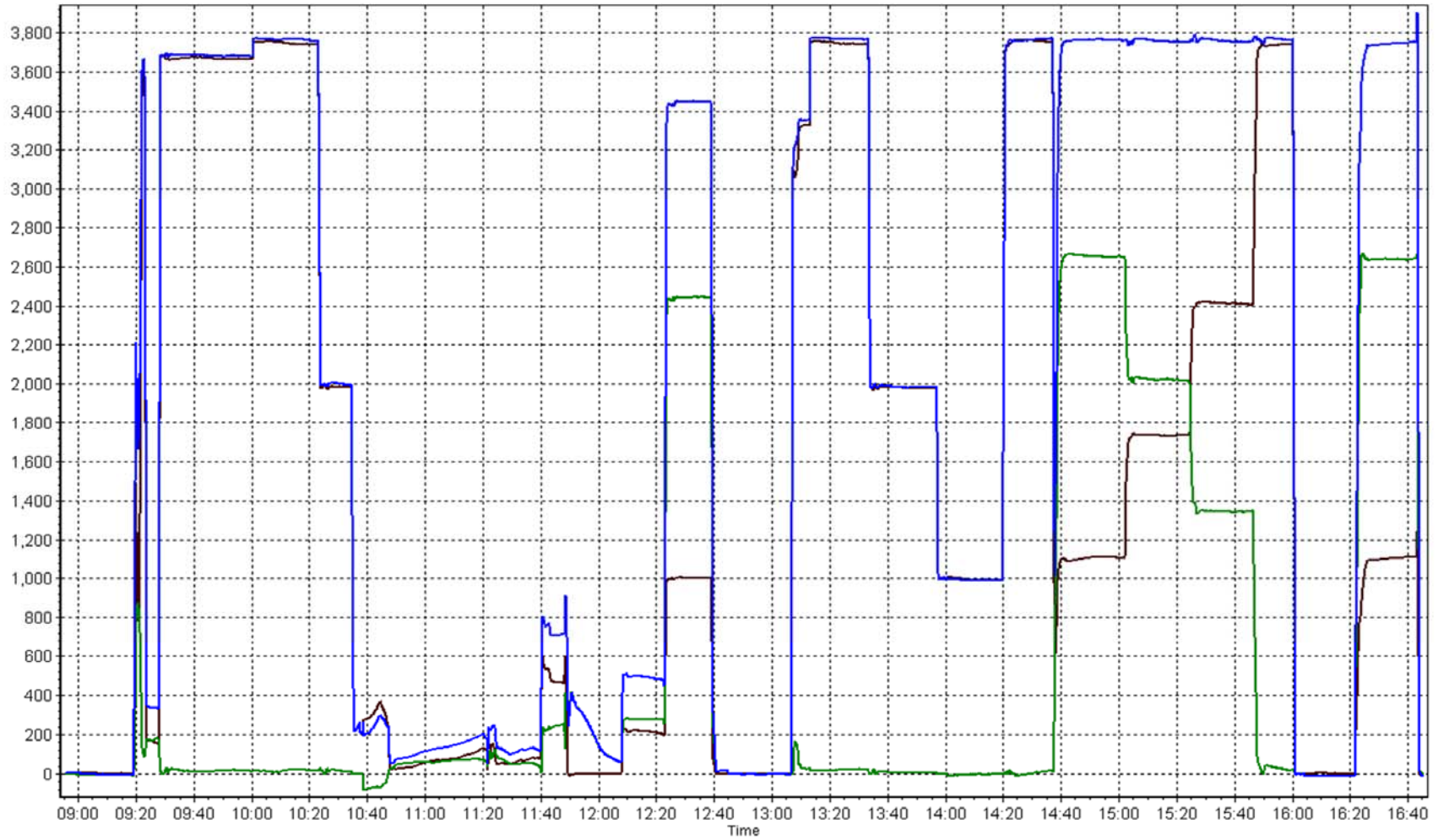
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999996
105.9	106.1	0.9988		
81.0	80.9	1.0015	Slope	0.997925
53.9	53.7	1.0027		
			Intercept	0.197156

NO2 Calibration Curve



NOx, NO & NO₂ Calibration Plot

Date: September 4, 2014



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 9
BARGE LANDING
SEPTEMBER 2014**

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

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

October 30, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
 SEPTEMBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
TRS(ppb) Average	683	37	37	100.00	3	0	1	0
THC(ppm) Average	684	36	36	100.00	3.3	-	2.5	-
Temperature (C) Average	720	0	0	100.00	31.9	-	20.2	-
Wind Speed 10 m (km/h) Average	714	0	6	99.17	19	-	-	-
Wind Direction 10 m (deg) Average	714	0	6	99.17	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
 SEPTEMBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
TRS(ppb) Average	683	0.3	0	-	0	0	0	0	0	1	3
THC(ppm) Average	684	2.14	0.2	-	1.9	1.9	2	2.1	2.2	2.4	3.3
Temperature (C) Average	720	11.34	5.9	-	-0.9	4.3	7.2	10.5	15	19.4	31.9
Wind Speed 10 m (km/h) Average	714	5.9	4	-	0	2	3	5	8	10	19
Wind Direction 10 m (deg) Average	714	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
SEPTEMBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	13 Sep 2014 05:00	13 Sep 2014 08:00	4	Flatline in sensor output signal
Wind Speed, Wind Direction	15 Sep 2014 10:00	15 Sep 2014 11:00	2	Maintenance - met sensor calibration

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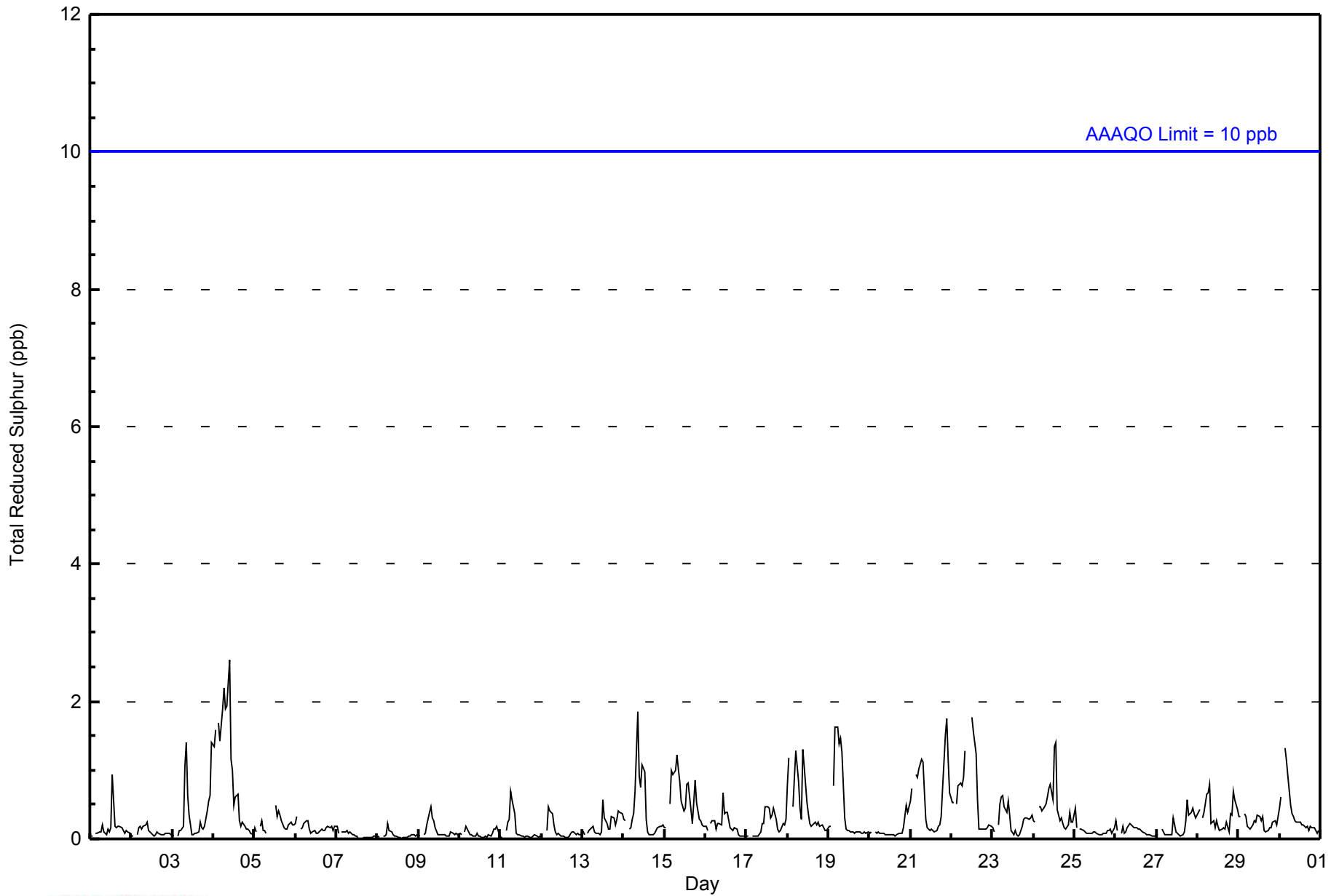


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3 ppb on Sep 4 10:00 Maximum Daily Average: 1.0 ppb on Sep 4																	Hours in Service: 720 Hours of Data: 683 Hours of Missing Data: 37 Hours of Calibration: 37 Percent Operational Time: 100.0										
Minimum Value: 0 ppb on Sep 7 16:00 Minimum Daily Average: 0.1 ppb on Sep 8 Maximum Diurnal Average: 0.5 ppb at hour 9 Minimum Diurnal Average: 0.1 ppb at hour 17 Monthly Average: 0.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 2																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	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	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
2-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	
3-Sep	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1	
4-Sep	1	2	Z	2	1	2	2	2	2	3	1	1	0	1	1	0	0	0	0	0	0	0	0	0	1.0	3	
5-Sep	0	0	Z	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
6-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	
7-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	
8-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	
9-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	
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	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
12-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	
13-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
14-Sep	0	0	Z	0	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
15-Sep	0	0	Z	1	1	1	1	1	1	1	1	0	1	1	0	0	1	1	1	1	0	0	0	0	0.6	1	
16-Sep	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
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	1	1	Z	0	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
19-Sep	0	0	Z	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
20-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	
21-Sep	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	0.6	2
22-Sep	1	1	Z	1	1	1	1	1	1	C	C	C	2	2	1	1	0	0	0	0	0	0	0	0	0.6	2	
23-Sep	0	0	Z	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
24-Sep	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1	
25-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	
26-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	
27-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1	
28-Sep	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	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	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
																								Diurnal Average			
																								Diurnal Maximum			
																								Z - zerospan C - Calibration			
																								Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb			



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Barge Landing - September 2014





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - September 2014

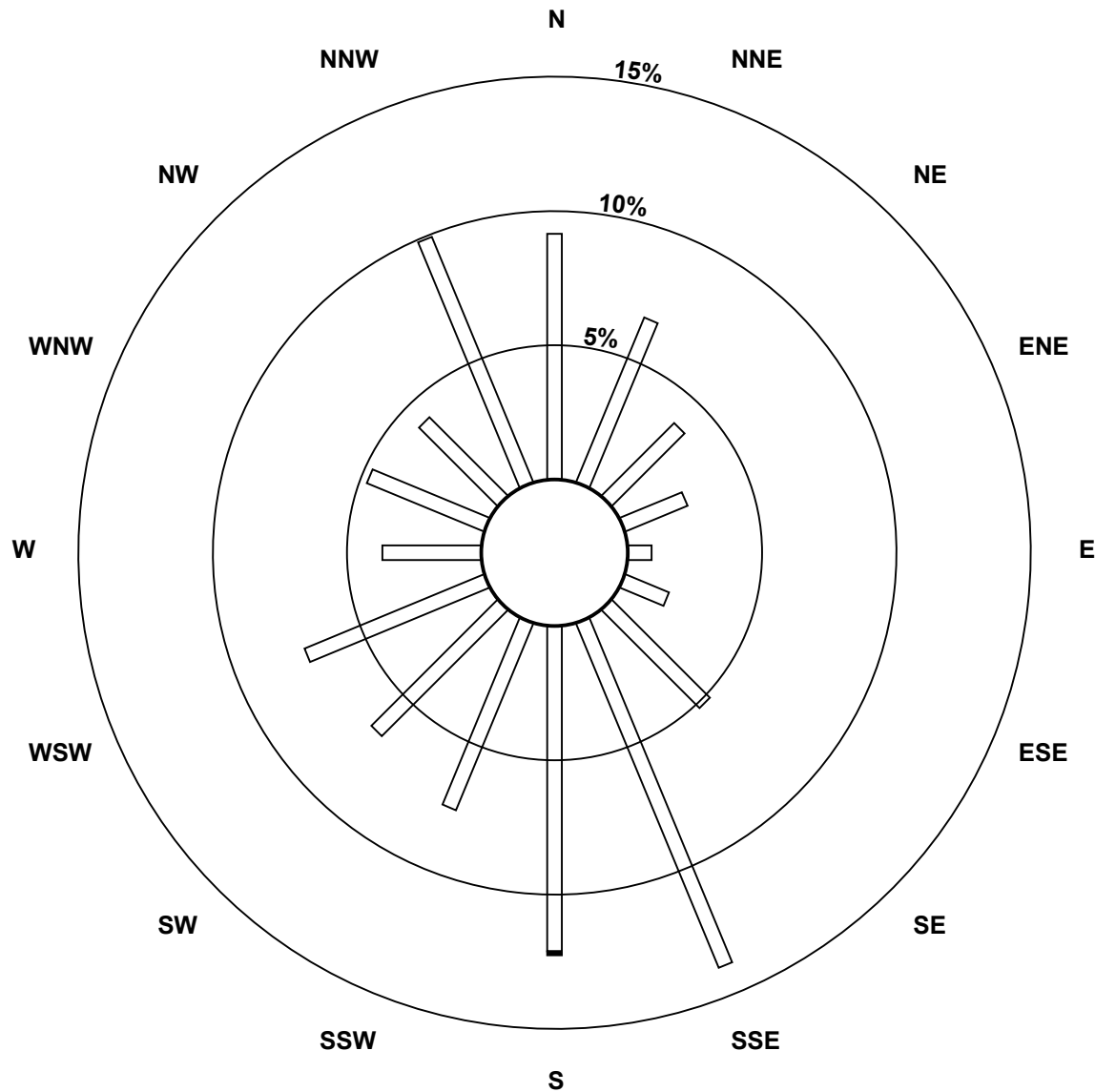
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	62	45	26	17	6	12	35	94	82	51	45	49	25	32	28	67	676
3 - 4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	45	26	17	6	12	35	94	83	51	45	49	25	32	28	67	677

Total Number of Valid Hours: 677

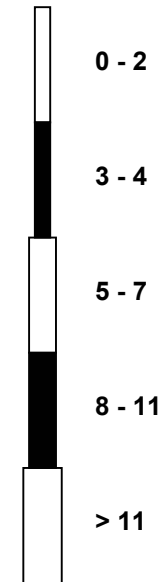
Total Number of Hours: 720

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

**Total Reduced Sulphur (TRS) - ppb
Barge Landing (AMS 9)**



Classes (ppb)

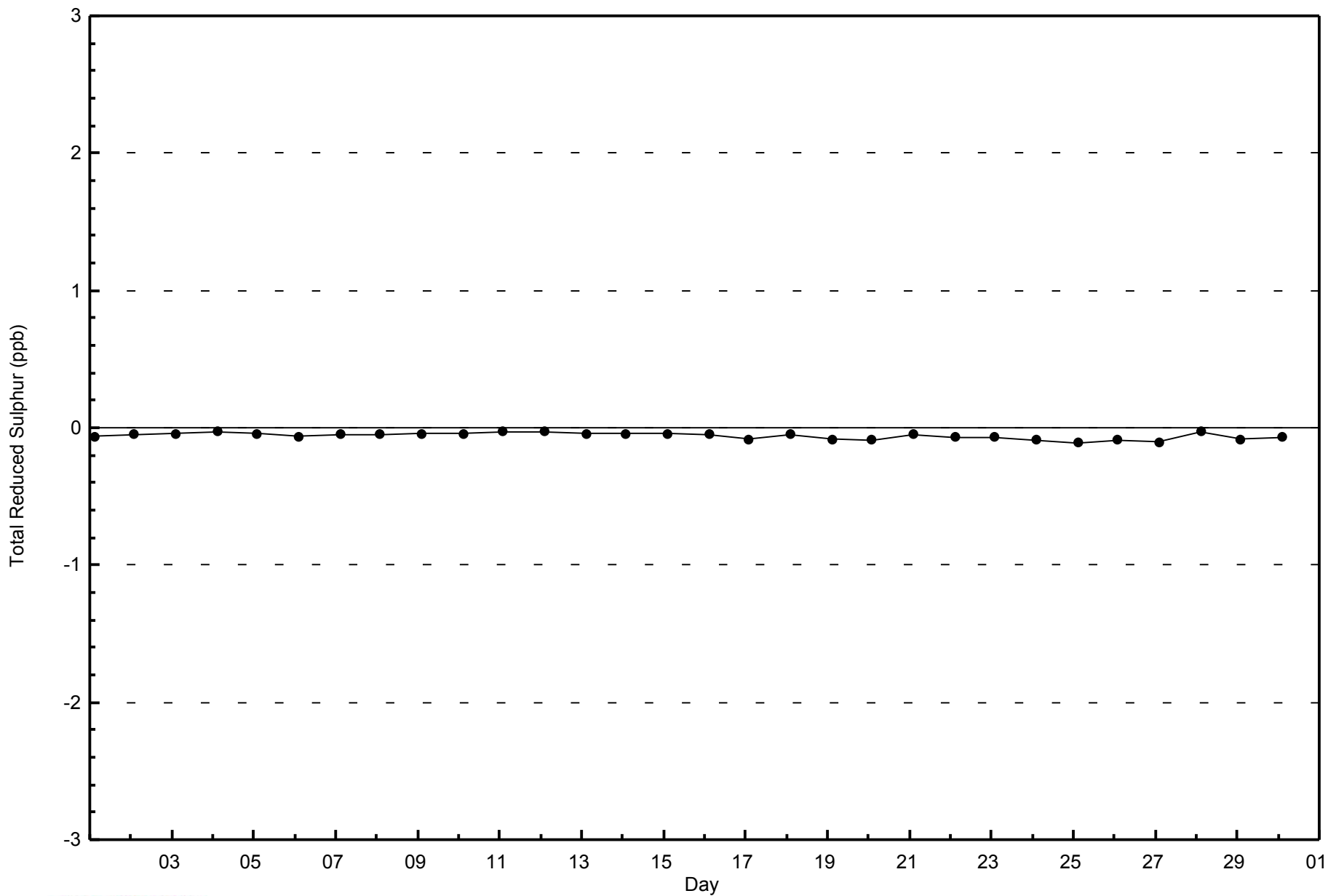


Total Number of Valid Hours: 677



WBEA
Zero Responses

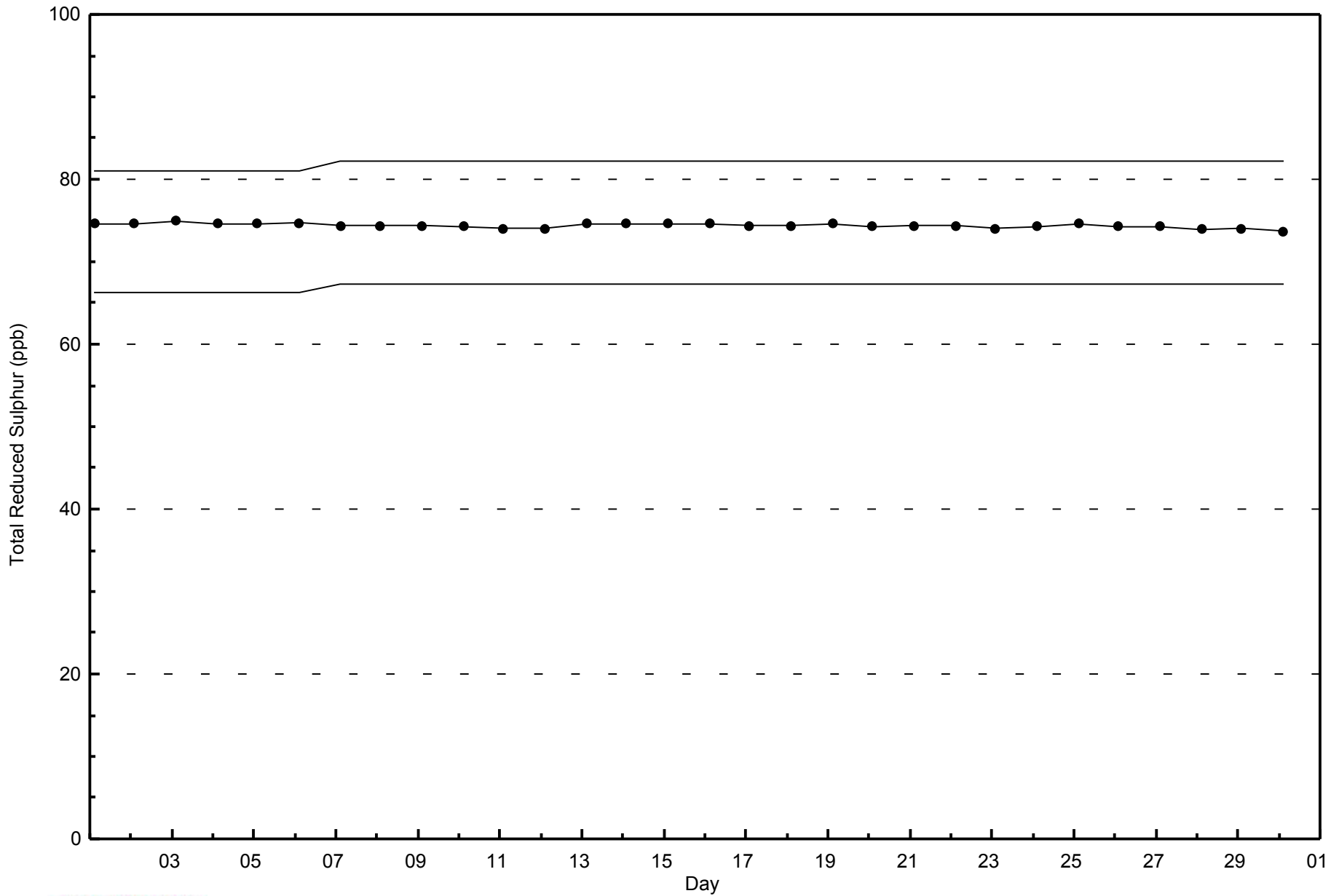
Total Reduced Sulphur (TRS) - ppb
Barge Landing - September 2014





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Barge Landing - September 2014





Wood Buffalo Environmental Association
Summary of Hour Averages

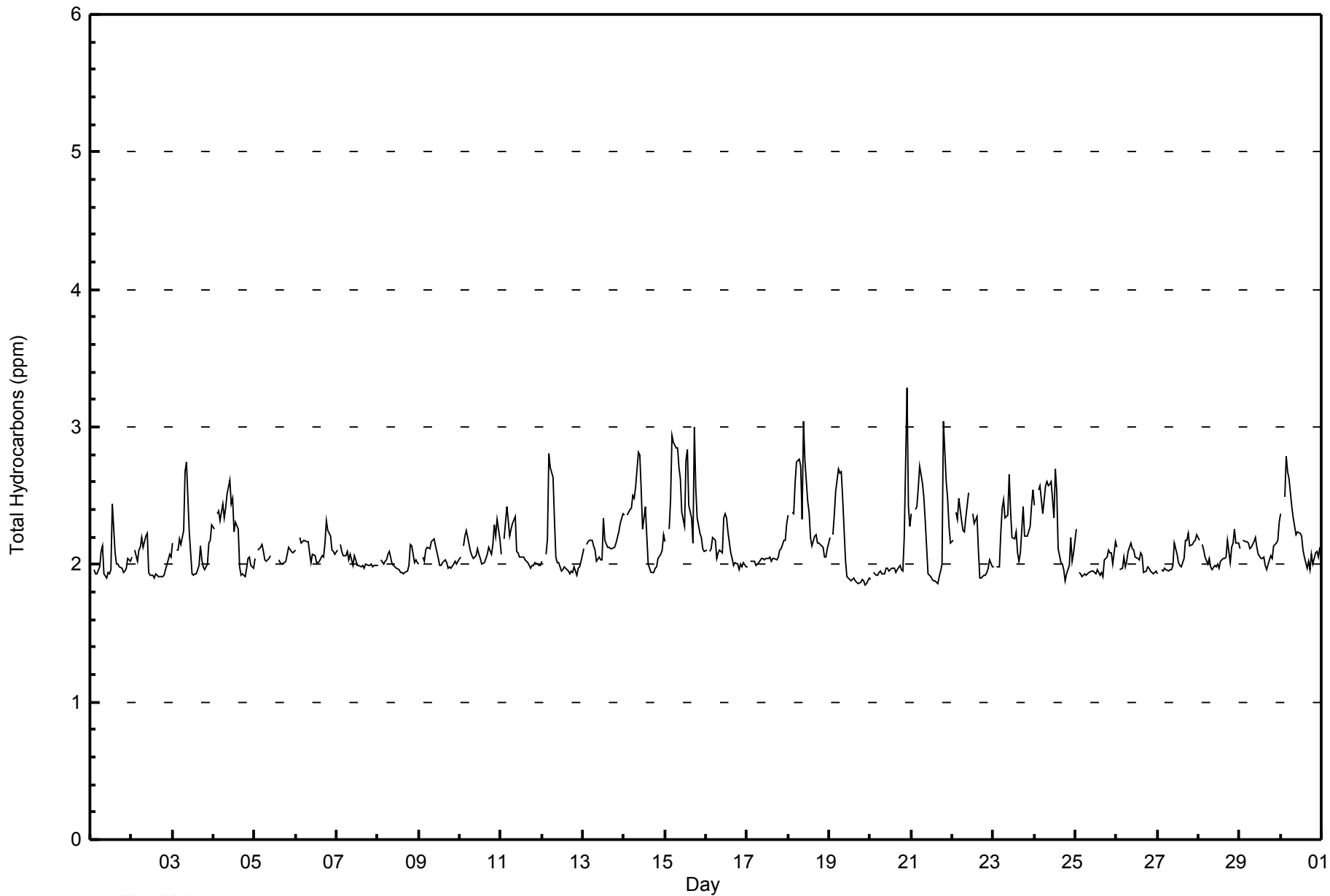
Total Hydrocarbons (THC) - ppm
Barge Landing - September 2014

Maximum Value: 3.3 ppm on Sep 20 22:00		Maximum Daily Average: 2.5 ppm on Sep 15		Hours in Service: 720																							
Minimum Value: 1.9 ppm on Sep 19 22:00		Minimum Daily Average: 2.0 ppm on Sep 25		Hours of Data: 684																							
Maximum Diurnal Average: 2.3 ppm at hour 6		Minimum Diurnal Average: 2.0 ppm at hour 17		Hours of Missing Data: 36																							
Monthly Average: 2.14 ppm		Percentiles: $P_1 = 1.9$ $P_{10} = 1.9$ $Q_1 = 2.0$ Median = 2.1 $Q_3 = 2.2$ $P_{90} = 2.4$ $P_{99} = 2.8$		Hours of Calibration: 36																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	1.9	Z	2.0	1.9	1.9	2.0	2.1	2.1	1.9	1.9	1.9	1.9	2.0	2.4	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	
2-Sep	2.1	Z	2.1	2.0	2.1	2.1	2.2	2.1	2.2	2.2	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.0	
3-Sep	2.2	Z	2.1	2.1	2.2	2.1	2.3	2.7	2.7	2.5	2.2	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.0	2.0	2.0	2.2	2.2	2.3	2.3	2.2	
4-Sep	2.3	Z	2.4	2.4	2.3	2.4	2.3	2.4	2.5	2.6	2.4	2.5	2.2	2.3	2.3	2.0	1.9	1.9	1.9	2.0	2.0	2.1	2.0	2.0	2.0	2.2	
5-Sep	2.0	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
6-Sep	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	
7-Sep	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
8-Sep	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.2	2.1	2.0	2.0	2.0	2.0	2.0	
9-Sep	2.0	Z	2.1	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
10-Sep	2.1	Z	2.1	2.2	2.3	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.3	2.2	2.3	2.2	2.2	2.1	
11-Sep	2.1	Z	2.2	2.4	2.3	2.2	2.3	2.3	2.4	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
12-Sep	2.0	Z	2.1	2.2	2.8	2.7	2.6	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.1	
13-Sep	2.1	Z	2.1	2.2	2.2	2.2	2.1	2.1	2.0	2.1	2.0	2.0	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.4	2.4	2.2	
14-Sep	2.4	Z	2.4	2.4	2.4	2.5	2.5	2.6	2.8	2.8	2.5	2.3	2.4	2.2	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.8	
15-Sep	2.2	Z	2.3	2.5	2.9	2.9	2.8	2.9	2.7	2.6	2.4	2.3	2.8	2.8	2.4	2.3	2.2	3.0	2.6	2.3	2.2	2.2	2.1	2.1	2.1	2.5	
16-Sep	2.1	Z	2.1	2.1	2.2	2.2	2.0	2.1	2.1	2.1	2.3	2.4	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
17-Sep	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.3	2.1	
18-Sep	2.4	Z	2.4	2.4	2.6	2.7	2.8	2.7	2.3	3.0	2.8	2.5	2.4	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.4	
19-Sep	2.2	Z	2.2	2.4	2.5	2.7	2.7	2.7	2.5	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	
20-Sep	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.2	3.3	2.4	2.3	2.1	3.3	
21-Sep	2.4	Z	2.4	2.4	2.6	2.7	2.6	2.5	2.3	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	3.0	2.6	2.5	2.3	2.2	2.3	3.0	
22-Sep	2.2	Z	2.4	2.3	2.5	2.3	2.2	2.2	2.3	2.5	C	C	2.4	2.3	2.3	2.1	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.2	2.5	
23-Sep	2.0	Z	2.0	2.0	2.2	2.4	2.5	2.3	2.4	2.7	2.4	2.2	2.2	2.2	2.1	2.0	2.1	2.4	2.2	2.2	2.2	2.3	2.4	2.5	2.3	2.7	
24-Sep	2.4	Z	2.5	2.6	2.5	2.4	2.6	2.6	2.6	2.6	2.6	2.3	2.7	2.5	2.1	2.0	2.0	1.9	1.9	2.0	2.2	2.0	2.1	2.1	2.3	2.7	
25-Sep	2.3	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.1	2.0	2.2	2.0	2.3	
26-Sep	2.1	Z	2.0	2.0	2.1	2.0	2.0	2.1	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.1	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.2	
27-Sep	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.1	
28-Sep	2.2	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.0	2.1	2.2	2.3	2.2	2.2	2.1	2.3	
29-Sep	2.1	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.1	2.2	2.2	2.3	2.1	2.3	
30-Sep	2.4	Z	2.5	2.8	2.7	2.6	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.8
		2.1	--	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Average
		2.4	--	2.5	2.8	2.9	2.9	2.8	2.9	2.8	3.0	2.8	2.5	2.8	2.8	2.4	2.3	2.2	3.0	2.6	3.0	2.6	3.3	2.4	2.5	2.1	Diurnal Maximum
Z - zerospan		C - Calibration																									



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Barge Landing - September 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	308	45.03	45.03
2.1 - 3.0	375	54.82	99.85
3.1 - 10.0	1	0.15	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - September 2014

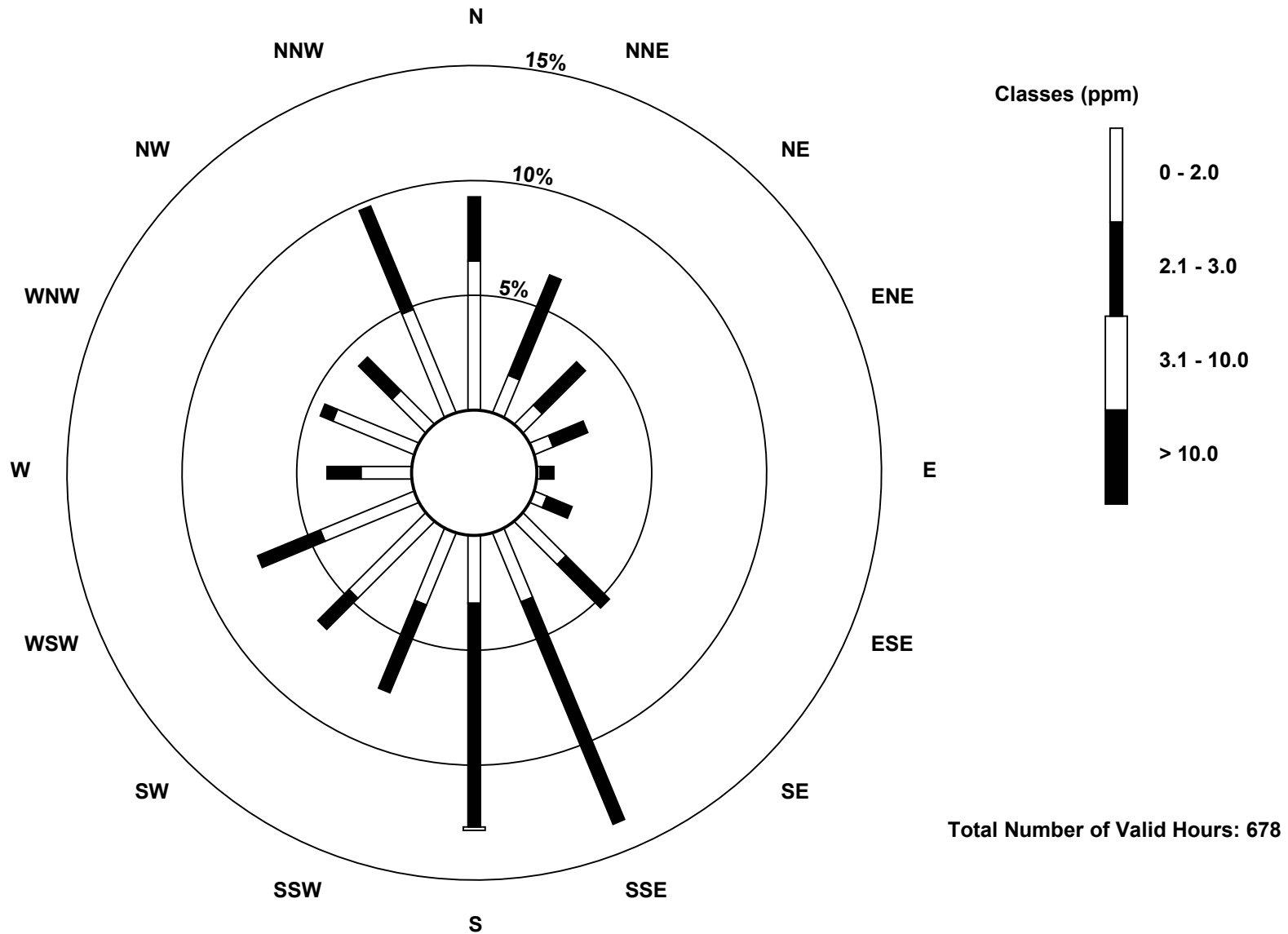
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	44	12	8	6	1	4	18	22	20	23	32	30	15	26	14	33	308
2.1 - 3.0	19	32	18	11	4	8	18	71	66	28	13	20	10	4	14	33	369
3.1 - 10.0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	63	44	26	17	5	12	36	93	87	51	45	50	25	30	28	66	678

Total Number of Valid Hours: 678

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

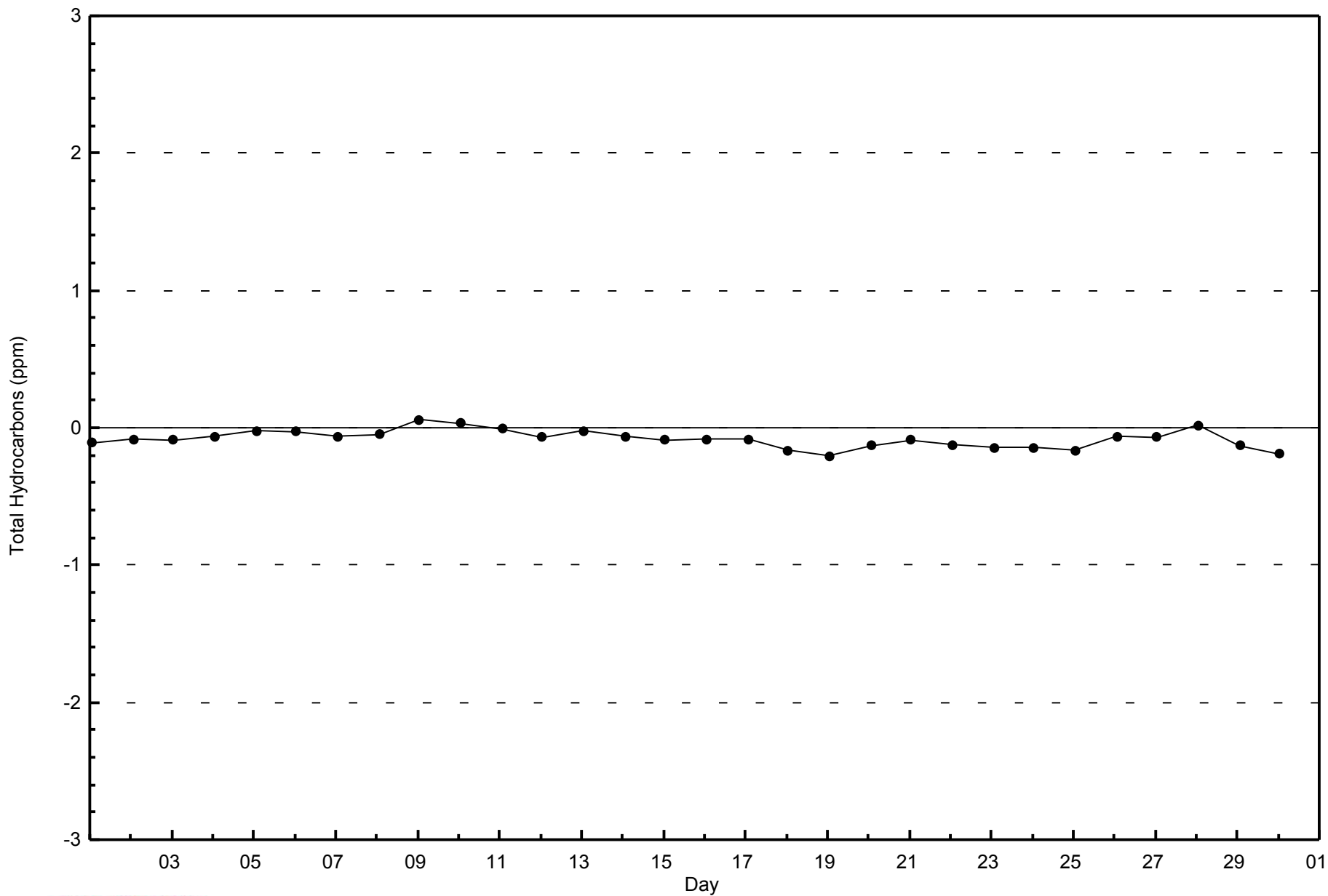
Total Hydrocarbons (THC) - ppm
Barge Landing (AMS 9)





WBEA
Zero Responses

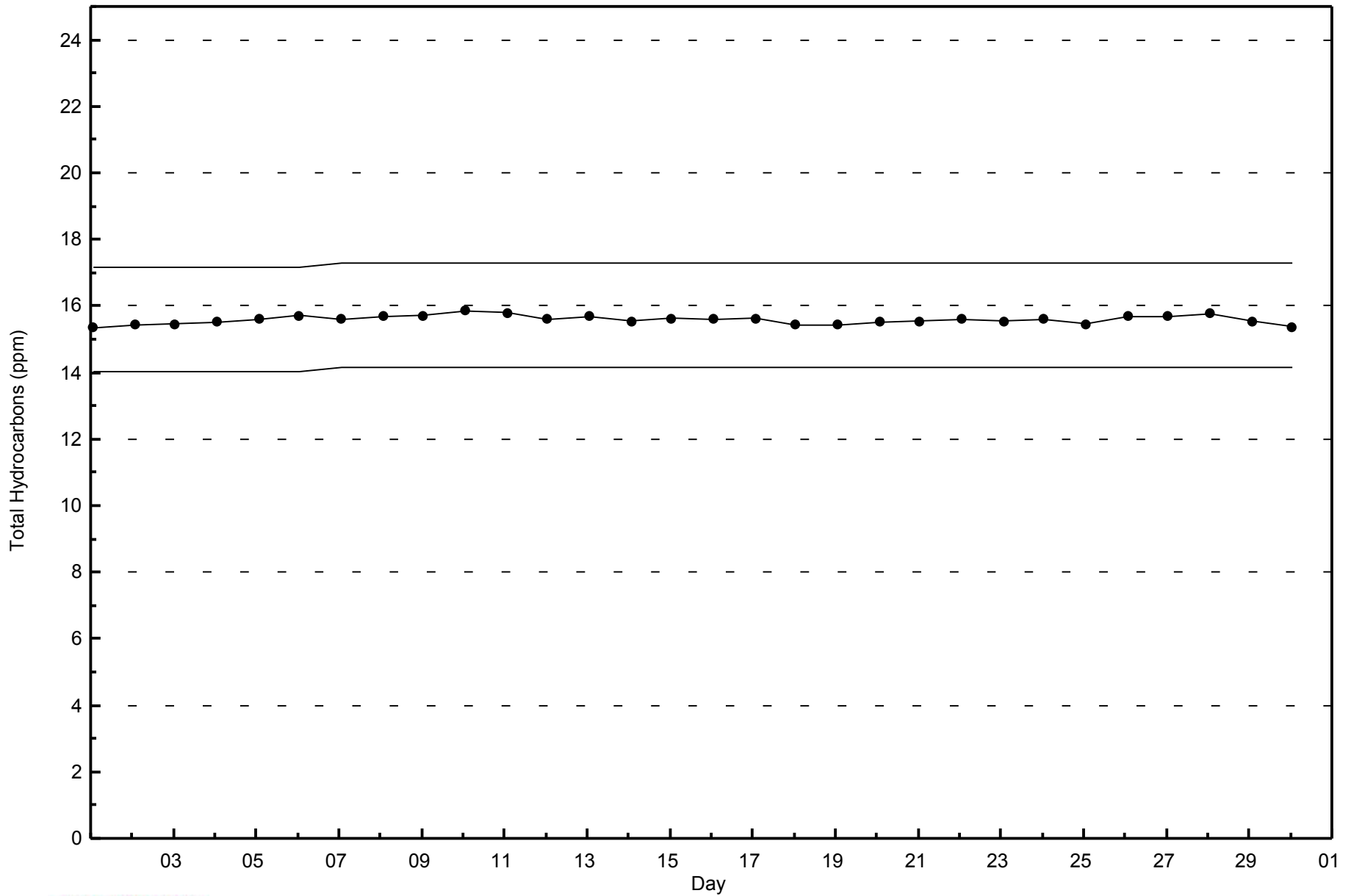
Total Hydrocarbons (THC) - ppm
Barge Landing - September 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Barge Landing - September 2014



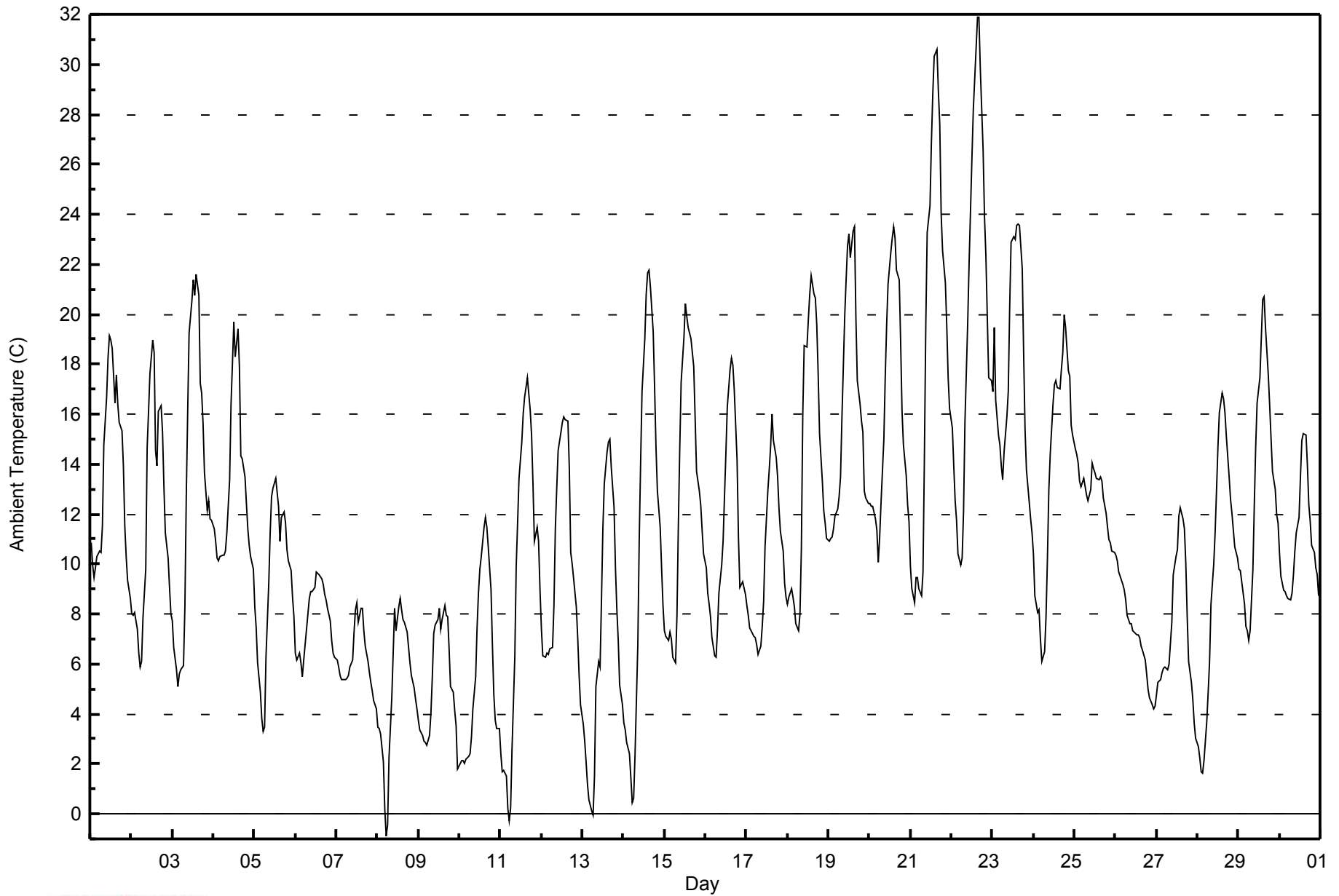


Maximum Value: 31.9 C on Sep 22 17:00		Maximum Daily Average: 20.2 C on Sep 22		Hours in Service: 720																							
Minimum Value: -0.9 C on Sep 8 06:00		Minimum Daily Average: 5.0 C on Sep 8		Hours of Data: 720																							
Maximum Diurnal Average: 16.8 C at hour 15		Minimum Diurnal Average: 6.5 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 11.34 C		Percentiles: P ₁ = 0.2 P ₁₀ = 4.3 Q ₁ = 7.2 Median = 10.5 Q ₃ = 15.0 P ₉₀ = 19.4 P ₉₉ = 28.3		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	10.9	10.0	9.5	9.9	10.3	10.5	10.5	11.5	14.8	16.7	18.2	19.1	19.0	18.6	16.4	17.6	16.4	15.6	15.3	13.9	11.5	10.3	9.3	8.6	13.5	19.1	
2-Sep	8.0	8.0	8.1	7.4	6.4	5.9	6.1	7.9	9.8	14.7	16.1	17.6	19.0	18.5	14.5	13.9	16.1	16.3	15.3	13.1	11.3	10.2	9.1	8.0	11.7	19.0	
3-Sep	7.7	6.7	5.7	5.1	5.6	5.8	5.9	8.3	12.7	16.1	19.3	20.5	21.4	20.8	21.6	20.7	17.2	16.8	15.6	13.7	12.2	12.5	11.8	11.7	13.1	21.6	
4-Sep	11.4	10.9	10.2	10.1	10.3	10.4	10.4	10.5	11.3	13.4	16.4	18.0	19.7	18.3	19.4	17.9	14.3	14.2	13.5	12.4	11.4	10.8	10.3	9.8	13.1	19.7	
5-Sep	8.3	7.4	6.0	4.9	3.8	3.3	3.5	6.3	9.2	11.2	12.7	13.0	13.4	12.9	12.3	10.9	11.9	12.1	11.6	10.6	10.1	9.7	8.7	7.9	9.2	13.4	
6-Sep	6.5	6.2	6.4	6.1	5.5	6.2	7.4	8.0	8.6	8.9	8.9	9.1	9.7	9.7	9.6	9.4	9.2	8.8	8.6	8.2	7.7	6.9	6.4	6.3	7.8	9.7	
7-Sep	6.2	5.9	5.6	5.4	5.4	5.4	5.4	5.5	5.9	6.1	7.3	8.1	8.5	7.6	8.2	8.2	7.3	6.7	6.1	5.7	5.3	5.0	4.6	4.2	6.2	8.5	
8-Sep	3.5	3.4	3.2	2.1	0.2	-0.9	-0.5	2.3	4.7	6.4	8.3	7.3	8.3	8.6	8.1	7.8	7.7	7.3	6.7	6.1	5.6	5.1	4.6	4.2	5.0	8.6	
9-Sep	3.8	3.4	3.2	2.9	2.9	2.8	3.1	4.0	5.5	7.2	7.6	7.8	8.2	7.4	7.8	8.3	8.0	7.9	6.6	5.1	4.9	4.1	3.5	1.8	5.3	8.3	
10-Sep	2.0	2.1	2.1	2.0	2.2	2.3	2.4	3.1	4.2	5.5	7.4	8.8	9.8	10.3	11.5	11.9	11.5	10.7	8.9	6.7	4.8	3.8	3.4	3.4	5.9	11.9	
11-Sep	2.4	1.7	1.7	1.5	0.2	-0.3	0.2	2.6	6.3	9.9	11.6	13.4	14.9	16.0	16.7	17.1	17.5	16.2	15.2	13.2	10.9	11.5	10.9	9.0	9.2	17.5	
12-Sep	7.5	6.3	6.3	6.4	6.4	6.6	6.7	8.3	11.4	13.0	14.5	15.3	15.6	15.9	15.8	15.7	13.8	10.5	10.0	9.5	8.3	7.1	5.6	4.4	10.0	15.9	
13-Sep	3.6	2.9	2.1	1.2	0.6	0.1	0.0	1.5	5.1	6.1	5.9	8.6	11.4	13.2	14.5	14.9	15.0	13.9	12.2	9.8	8.2	7.0	5.2	4.4	7.0	15.0	
14-Sep	3.7	3.4	2.9	2.4	1.5	0.4	0.6	2.4	6.8	11.0	14.1	16.9	19.0	20.8	21.7	21.8	21.1	19.3	17.1	14.7	13.0	11.5	9.9	8.3	11.0	21.8	
15-Sep	7.3	7.1	7.0	7.3	7.0	6.2	6.0	8.0	11.6	14.7	17.3	19.1	20.4	19.9	19.5	19.0	18.5	17.9	15.8	13.7	12.9	12.4	11.4	10.4	12.9	20.4	
16-Sep	9.9	8.9	8.4	7.9	7.1	6.3	6.2	7.4	8.8	10.0	10.9	12.7	14.4	16.3	17.8	18.2	18.0	16.9	14.1	11.0	9.0	9.2	9.3	8.8	11.1	18.2	
17-Sep	8.3	8.0	7.4	7.2	7.1	7.1	6.8	6.4	6.7	7.5	8.5	10.7	12.9	13.8	14.7	16.0	14.9	14.3	13.5	12.2	11.3	10.5	9.3	8.7	10.2	16.0	
18-Sep	8.4	8.7	9.0	8.7	8.3	7.6	7.3	8.0	10.6	16.0	18.7	18.7	19.8	20.8	21.5	20.8	20.7	19.6	17.6	15.2	13.3	12.2	11.7	11.1	13.9	21.5	
19-Sep	10.9	11.0	11.1	11.4	11.9	12.2	12.7	13.5	15.8	19.9	21.4	22.7	23.2	22.3	23.3	23.5	19.9	17.3	16.4	15.7	15.3	12.9	12.6	12.4	16.2	23.5	
20-Sep	12.4	12.3	12.3	11.8	11.4	10.1	11.1	12.5	15.0	17.5	19.6	21.2	22.5	23.1	23.5	23.1	21.8	21.4	18.9	16.1	14.8	13.6	12.4	11.7	16.2	23.5	
21-Sep	9.9	9.0	8.5	9.4	9.5	9.0	8.8	9.7	14.3	19.6	23.3	24.3	26.9	28.8	30.3	30.6	28.9	27.6	24.0	22.6	21.2	19.5	17.5	16.2	18.7	30.6	
22-Sep	15.4	13.9	12.5	11.8	10.4	9.9	10.2	12.1	15.7	19.7	22.1	24.2	26.3	28.2	30.6	31.9	31.9	29.8	26.6	23.9	22.3	19.9	17.4	17.4	20.2	31.9	
23-Sep	16.9	19.5	16.6	15.1	14.8	13.9	13.4	14.5	15.9	16.9	20.3	22.9	23.1	23.0	23.6	23.6	23.6	21.8	18.4	15.4	13.7	12.5	11.8	11.3	17.6	23.6	
24-Sep	10.4	8.7	8.1	8.2	7.0	6.1	6.5	7.9	10.2	12.9	14.4	16.4	17.2	17.4	17.1	17.0	17.8	18.4	20.0	19.5	17.7	17.5	15.6	15.2	13.6	20.0	
25-Sep	14.6	14.4	14.0	13.3	13.1	13.4	13.1	12.7	12.5	13.0	14.0	13.8	13.6	13.5	13.4	13.5	13.3	12.6	12.0	11.5	11.0	10.9	10.5	10.5	12.8	14.6	
26-Sep	10.4	10.2	9.7	9.3	9.2	8.9	8.5	8.0	7.6	7.6	7.4	7.3	7.2	7.2	7.0	6.7	6.5	6.2	5.6	5.0	4.6	4.4	4.2	4.3	7.2	10.4	
27-Sep	4.8	5.3	5.4	5.6	5.8	5.9	5.8	6.0	6.8	7.7	9.5	10.3	10.6	11.9	12.3	11.8	11.4	10.0	7.9	6.1	5.3	4.6	3.7	3.0	7.4	12.3	
28-Sep	2.7	2.2	1.7	1.6	2.1	3.7	4.9	6.1	8.4	10.0	11.3	13.0	14.7	16.1	16.9	16.6	16.0	15.1	13.5	12.6	12.0	11.4	10.7	10.2	9.7	16.9	
29-Sep	9.8	9.8	9.3	8.4	7.5	7.3	7.0	7.3	9.8	12.4	14.7	16.4	17.5	19.0	20.6	20.7	19.5	17.6	16.3	15.0	13.7	13.0	12.0	11.7	13.2	20.7	
30-Sep	10.4	9.5	9.0	8.9	8.7	8.6	8.5	8.8	9.6	10.5	11.2	11.9	13.5	14.9	15.2	15.2	13.9	12.4	11.7	10.8	10.5	9.9	9.6	8.7	10.9	15.2	
		8.3	7.9	7.4	7.1	6.7	6.5	6.6	7.7	9.8	12.1	13.8	15.0	16.1	16.5	16.8	16.8	16.1	15.2	13.8	12.3	11.1	10.3	9.4	8.8	Diurnal Average	
		16.9	19.5	16.6	15.1	14.8	13.9	13.4	14.5	15.9	19.9	23.3	24.3	26.9	28.8	30.6	31.9	31.9	29.8	26.6	23.9	22.3	19.9	17.5	17.4	Diurnal Maximum	



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Barge Landing - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Barge Landing - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	4	0.56	0.56
0 - 10	329	45.69	46.25
10 - 20	328	45.56	91.81
> 20	59	8.19	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 19 km/h on Sep 19 16:00	Maximum Daily Speed Average: 11.4 km/h on Sep 28	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 22 02:00	Minimum Daily Speed Average: 0.4 km/h on Sep 23	Hours of Data: 714
Maximum Diurnal Speed Average: 2.6 km/h at hour 11	Minimum Diurnal Speed Average: 0.3 km/h at hour 23	Hours of Missing Data: 6
Monthly Average Velocity: 1.1 km/h 210.5 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 P ₉₀ = 10 P ₉₉ = 17	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	WNW3	SSW2	S3	SSW4	SW6	SW4	SSE1	SW3	SSW3	SSE4	SSW6	NNW2	SW4	WSW4	NNE8	SSW1	SSW7	S4	WNW3	W3	WNW3	ENE1	WSW3	WSW3	SW2.1	NNE8
2-Sep	W2	W2	WSW2	SW1	SSE2	SSE3	SSE2	S2	S2	WSW3	WSW3	WNW1	NNE0	S1	NNW4	S1	WSW3	WNW4	NW4	WNW3	NNW2	NNW3	WSW3	WSW2	W1.3	NW4
3-Sep	NW3	WSW1	SW2	SW2	SSW2	S3	SE3	SE3	SSW4	SSW4	SW5	WSW9	SW8	SW3	WNW2	NW3	ENE6	ESE5	SE7	SE6	W2	SSE4	S6	SSE6	S2.4	WSW9
4-Sep	SSE6	SSE6	SSE6	SSE6	SSE7	SSE5	SSE6	S7	SSE7	S7	S9	S7	S6	S5	SW5	N9	N8	N8	N9	N6	N7	NNE7	N7	N6	SE1.2	S9
5-Sep	NW4	NW4	NW2	WNW2	WSW3	WSW3	SW3	WSW3	SSW4	S7	S8	S7	S10	SSE9	S7	SSE7	SSE7	SSE6	SSE3	SSE3	SW2	NNW3	NW6	NW4	SSW2.7	S10
6-Sep	WNW2	W3	WSW4	SW1	WSW3	NNW3	N5	NNE6	ENE5	ENE5	E4	ENE3	ENE4	ENE3	ENE4	NE4	NE4	NE6	NE6	NNE7	NNE8	N7	NNE8	NNE10	NNE3.3	NNE10
7-Sep	NNE9	N9	N9	NNE10	NNE10	NNE9	NNE7	N8	N8	N8	NNE8	NNE9	N9	N10	N12	N12	N10	N10	N9	N7	NNW8	NNW9	N9	NNW7	N8.7	N12
8-Sep	NNW8	NNW10	NNW9	NNW6	NNW4	SSW1	SW2	N2	N5	NNE6	NNE7	N7	NNW6	N7	N6	NNE7	NNW6	N6	NNE7	N4	NNW4	NNW3	N2	WNW2	N4.8	NNW10
9-Sep	NW1	WNW1	WSW3	WNW3	NNW3	NNW2	NNW2	S0	SSW1	N4	NNE3	SSE1	NW2	NNE4	NE2	SSW2	N2	N4	NNW3	NNW3	NNW4	NNW4	NNW4	NW2	NNW1.8	N4
10-Sep	SSW2	WSW1	W3	WSW4	W3	W3	W1	WSW3	W4	WSW5	WSW4	WSW4	WSW5	NW4	SW4	SW7	S8	S8	S6	S6	SSE6	S6	S5	SSW6	SW3.4	S8
11-Sep	S6	SSW6	SSW8	SSW8	S6	S7	S7	S7	S9	SSW12	SSW16	SSW16	SSW17	SSW18	SW16	SSW15	SW15	SW9	SSW7	SW4	SW4	WSW9	W6	NNW4	SSW8.9	SSW18
12-Sep	WSW5	SSE4	S4	SSE3	SSE2	SW3	W2	NNW3	NNW7	NNW9	NNW9	NNW11	NNW8	NNW10	N9	NNW7	N8	NW4	NW3	NNW6	WNW2	WNW3	WNW1	SW1	NNW3.5	NNW11
13-Sep	W3	NNW1	WSW1	SW2	AF	AF	AF	AF	SSW2	S5	S4	SE4	S6	SSE7	SSE8	SSE8	S6	SSE6	SSE6	SSE4	W1	E1	S2	SSW2	SSE3.4	SSE8
14-Sep	SE2	SE4	SE4	SE4	SSE2	S2	SSW3	SSE4	SSW5	S6	S7	SSW7	S7	SSW6	SW8	SW8	SW8	SSW5	SSW4	SSW3	NW1	WSW2	WSW3	WSW3	SSW3.8	SW8
15-Sep	SW2	SSE3	SSE4	S5	S4	SSE4	SSE4	S4	SSE3	M	M	NE5	NE4	N5	NNE5	NE6	NE6	N4	N4	NNW3	NNW4	NNW5	NNW5	NNW4	NE1.3	NE6
16-Sep	N5	NNW6	N7	N7	N5	NNW4	NNW3	NNW4	NNW4	NNW3	NNE3	NNE6	NNE6	NNE6	NE6	NE7	ENE7	ESE5	SE9	SE11	SSE7	SE11	SE10	SE9	ENE2.5	SE11
17-Sep	SE11	SE10	SE8	SE9	SE9	SE10	SE10	SE11	SSE10	SSW10	S10	S11	S12	S11	S10	S11	S12	SSE10	SSE10	SSE9	SSE7	S4	SE3	SSE4	SSE8.8	S12
18-Sep	S3	S4	S4	SSE4	SE3	NNW1	NNW2	NW3	NW3	NW2	WNW2	ESE3	ENE4	ENE4	NNE1	ENE3	E3	ESE4	ESE4	ESE4	SE2	ESE3	SE1	ESE2	ESE1.3	ENE4
19-Sep	NNE2	E3	SE4	SSE4	S5	S4	S5	S6	S7	SW9	WSW14	SW14	WSW14	WSW12	WSW17	WSW19	W15	W10	WSW15	WNW17	W17	W16	WNW10	WSW9	WSW8.2	WSW19
20-Sep	WSW7	WSW7	W9	W7	WSW6	SW5	W10	WNW9	WNW8	WNW8	WNW9	NW10	WNW12	WNW11	WNW12	WNW11	WNW7	WSW7	WSW8	SSW4	S5	S6	SSE6	SSE4	W6.1	WNW12
21-Sep	S2	SW2	S2	SSW5	SSW5	S5	SSW4	SW4	SSW4	S7	SW9	SW11	WSW11	WSW12	WSW12	WSW9	SSE3	ESE3	SSE5	S7	SSE6	SE5	SSE5	SE3	SSW4.6	WSW12
22-Sep	SSE3	N0	S2	SSE3	SE2	SSE5	SSE6	S7	S8	S7	S8	S9	SSE9	SSE9	SSE8	SW9	SW10	SW6	SW5	SW5	WSW6	SSW3	ESE1	SSW1	S4.8	SW10
23-Sep	WSW4	WNW3	N1	SW1	NE1	NNE2	NNW4	NW2	NW2	NNW3	NW4	ENE1	ENE4	ENE3	E3	SE4	S5	S4	SE4	ESE4	SE3	N2	NNW3	NNW1	NE0.4	S5
24-Sep	NNW3	N1	NNW2	NE1	ESE3	W1	NNW3	NNW3	NNW3	NNW3	NNW3	NNW5	NNE4	NNW3	NNW5	NNW4	NNE2	SE5	SE6	SSE6	WSW3	W8	S4	S7	NW0.8	W8
25-Sep	SSW7	WSW10	WSW9	SW9	SW9	WSW10	W8	W9	W9	WSW10	W10	NW12	WNW9	N6	NNW7	NNW7	N6	NNE8	NNE8	NNE7	NNE7	NE8	NE7	NNE7	WNW4.1	NW12
26-Sep	NNE7	NE8	NE9	NE9	NE9	NE10	NE8	NNE9	NE10	NE10	NE10	NNE11	NNE11	NNE10	NNE11	N12	N12	N10	N12	N13	N13	N12	N11	N9	NNE9.8	N13
27-Sep	N8	N9	N8	N8	NNW5	NW6	NW5	NNW6	NNW6	NNE5	ENE5	ENE4	SSW3	S5	SW2	SSE6	SSE5	SSE5	SSE5	SE6	SSE5	SSE5	SSE6	SSE6	NE0.7	N9
28-Sep	SSE7	SE7	SE7	SSE7	SSE8	S7	SSE7	SSE11	SSE14	S17	S15	SSE16	SSE17	S18	S16	SSW16	S15	S13	S11	S12	S11	SSE10	S10	S9	S11.4	S18
29-Sep	S8	S9	SSE6	SSE6	SSE6	SSE10	SE9	SSE9	SSE8	S8	S12	SSE13	SSE14	SSE12	S10	SW10	SW11	SSW11	SSW12	SSW10	SSW7	SSW5	S5	S4	S8.4	SSE14
30-Sep	SSW2	SSE4	SSE5	SSE6	SW2	SSW2	NW3	SSE2	SE5	WSW3	NW1	WNW3	NNW5	N6	NE5	E2	WNW4	N4	NNE4	NE3	N1	NNW4	N4	NE5	NNE0.7	N6

SW0.7	SW0.7	SSW1.0	S1.4	S1.3	S1.6	SSW1.0	S1.0	SSW1.4	SSW2.0	SSW2.6	SW1.9	SSW2.2	SW1.5	WSW1.5	WSW1.8	SW1.4	S1.0	S1.0	S0.8	W0.7	NNW0.7	NW0.3	SW0.4	Diurnal Average	
SE11	WSW10	NNW9	NNE10	NNE10	WSW10	SE10	SE11	SSE14	S17	SSW16	SSW16	SSW17	S18	WSW17	WSW19	SW15	S13	WSW15	WNW17	W17	W16	N11	NNE10	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
Barge Landing - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 7 km/h on Sep 2 15:00	Hours of Data: 714
Minimum Value: 0 km/h on Sep 24 07:00	Hours of Missing Data: 6
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 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	2	1	1	1	2	1	1	2	1	2	2	1	3	2	3	2	3	1	1	2	1	1	1	1	3
2-Sep	1	1	1	1	1	1	1	1	1	1	2	2	1	1	7	1	2	1	1	1	1	1	2	1	7
3-Sep	1	1	1	1	1	1	1	1	1	1	2	3	3	3	3	3	2	2	2	1	2	1	2	2	3
4-Sep	1	2	1	1	2	2	2	2	2	3	3	2	2	2	1	4	3	3	3	2	2	3	2	2	4
5-Sep	1	1	1	1	1	1	2	1	2	2	3	3	3	3	2	2	2	2	2	2	1	1	1	1	3
6-Sep	2	2	1	1	1	1	2	2	2	2	1	1	1	1	1	1	2	2	2	2	3	2	3	3	3
7-Sep	3	3	3	3	3	2	2	2	2	3	3	3	3	3	4	4	3	3	3	2	2	3	2	2	4
8-Sep	2	3	3	2	1	2	1	2	2	2	3	2	2	3	2	2	2	2	2	2	1	1	1	1	3
9-Sep	1	1	2	1	0	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2
10-Sep	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	1	1	1	1	1	2	3
11-Sep	1	2	2	2	1	2	2	2	3	5	5	6	6	6	6	5	5	5	2	1	1	3	3	2	6
12-Sep	2	1	1	1	1	1	1	2	3	3	3	3	3	3	2	4	2	1	4	2	1	1	1	1	4
13-Sep	1	1	2	2	AF	AF	AF	AF	2	1	2	2	2	2	3	3	2	1	1	1	2	1	1	1	3
14-Sep	1	1	1	1	1	1	1	1	1	2	2	2	2	3	2	3	3	2	1	1	1	1	1	1	3
15-Sep	1	1	1	1	1	1	1	1	1	1	M	M	2	2	1	2	2	1	1	1	1	1	1	1	2
16-Sep	1	1	2	2	1	1	1	1	1	1	1	2	2	2	2	2	2	2	4	3	2	3	3	3	4
17-Sep	3	3	2	3	3	3	3	3	4	4	3	4	4	4	4	4	4	3	3	3	2	2	1	1	4
18-Sep	1	1	1	1	2	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	2
19-Sep	1	1	1	1	2	1	2	2	2	4	4	4	4	4	6	6	7	4	6	7	6	7	4	3	7
20-Sep	2	2	3	2	3	2	4	3	4	3	4	4	5	5	4	4	3	2	2	1	1	1	1	1	5
21-Sep	1	1	1	2	2	2	1	1	1	2	3	4	3	4	4	4	1	1	1	2	1	1	1	1	4
22-Sep	1	1	1	1	1	1	1	2	3	3	3	3	3	3	3	3	2	1	1	1	1	1	1	1	3
23-Sep	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	2
24-Sep	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	3	2	2	3	3	2	2	3
25-Sep	2	3	3	3	3	3	3	3	3	3	4	5	4	4	2	2	2	2	2	2	2	3	3	2	5
26-Sep	2	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	4	3	4	4	4	3	3	3	4
27-Sep	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2
28-Sep	1	1	1	2	2	2	2	4	5	6	6	5	6	7	6	6	5	5	4	4	3	3	3	3	7
29-Sep	2	3	2	1	1	2	2	2	3	3	4	5	4	4	3	3	4	4	4	3	2	1	1	2	5
30-Sep	1	1	1	1	1	1	1	2	1	1	1	1	2	2	2	1	2	1	1	1	1	1	1	2	2

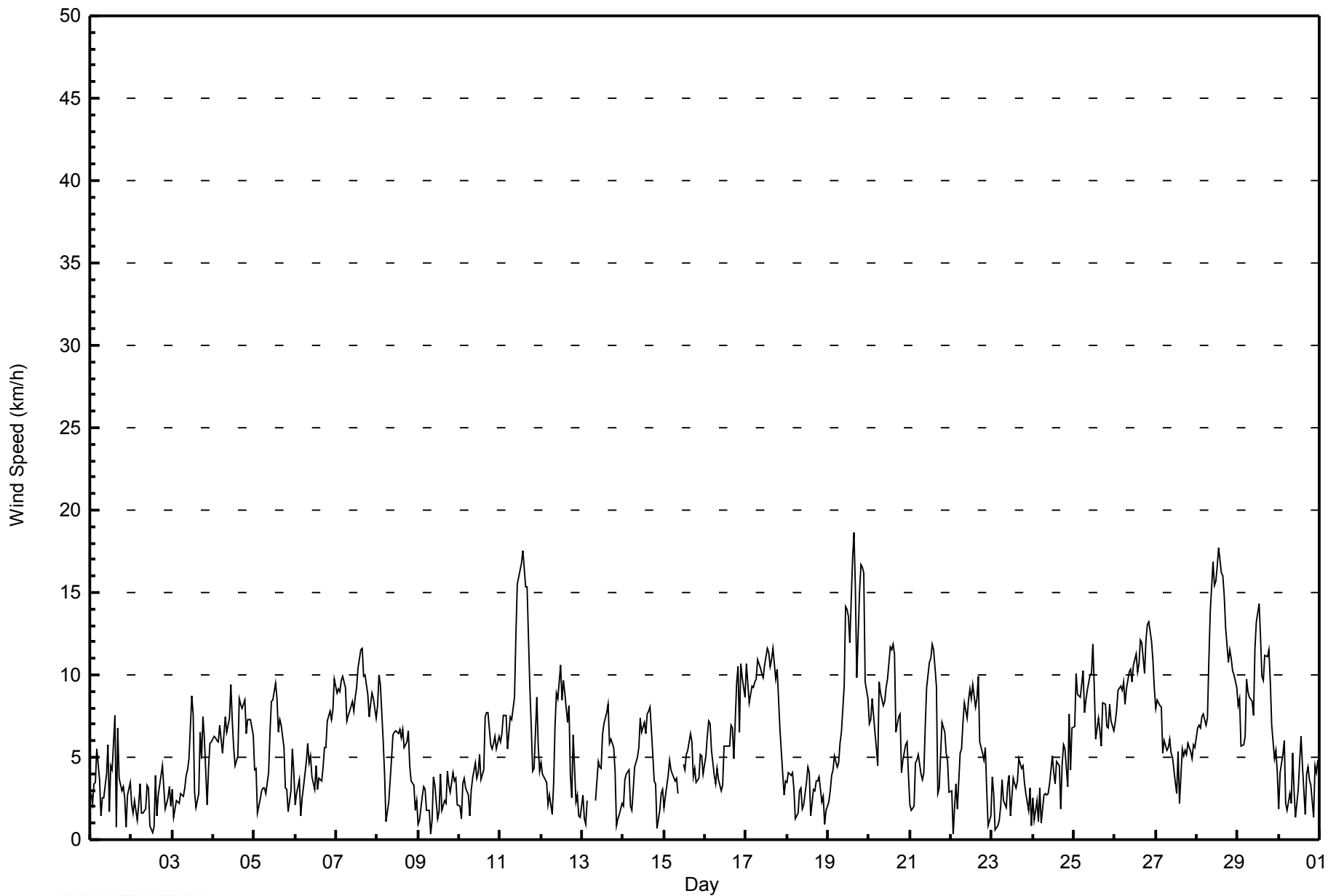
Diurnal Maximum

M - Maintenance AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Barge Landing - September 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Barge Landing - September 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	365	51.12	51.12
6 - 11	299	41.88	93.00
12 - 19	50	7.00	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



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Barge Landing - September 2014

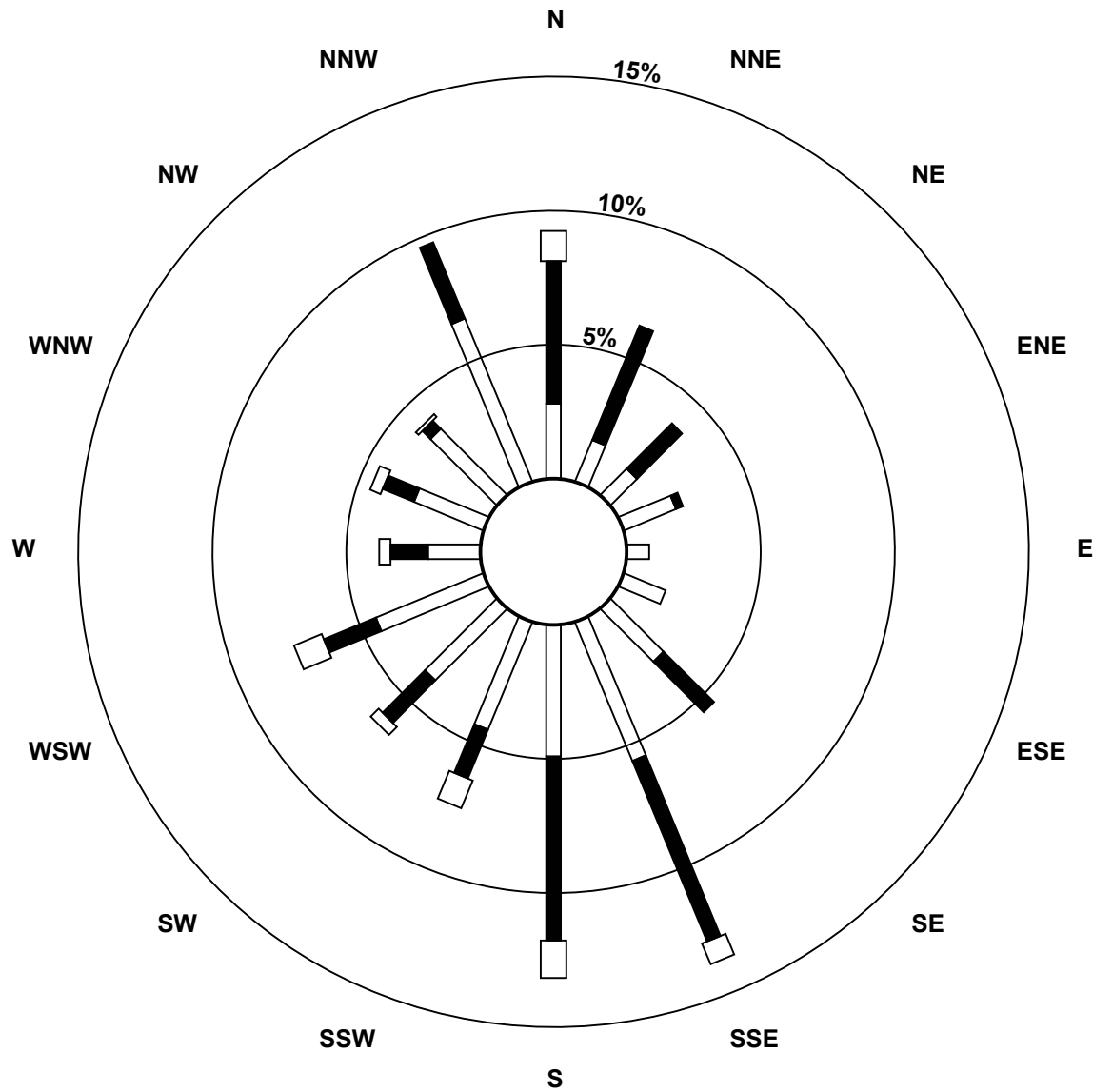
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	20	12	10	15	6	12	20	40	35	31	27	31	14	20	25	47	365
6 - 11	38	33	17	2	0	0	19	52	49	14	16	15	10	9	3	22	299
12 - 19	8	0	0	0	0	0	0	6	10	8	3	8	3	3	1	0	50
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	45	27	17	6	12	39	98	94	53	46	54	27	32	29	69	714

Total Number of Valid Hours: 714

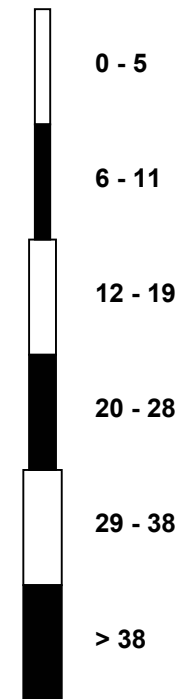
Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Barge Landing (AMS 9)**



Classes (km/h)



Total Number of Valid Hours: 714



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Barge Landing - September 2014

Direction of Maximum Speed: 248 deg on Sep 19 16:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 171.7 deg on Sep 28	Hours of Data: 714
Direction of Minimum Speed: 359 deg on Sep 22 02:00	Direction of Minimum Daily Speed Average: 0.4 deg on Sep 23
Direction of Minimum Daily Speed Average: 0.4 deg on Sep 23	Hours of Missing Data: 6
Monthly Average Direction: 255.5 deg	Percent Operational Time: 99.2

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	290	201	191	196	232	226	153	218	209	164	211	328	229	247	17	206	199	184	298	270	290	66	241	257	228.0
2-Sep	270	262	243	223	163	150	163	185	177	239	258	298	23	181	338	177	256	287	320	286	339	340	253	252	261.1
3-Sep	310	241	224	232	199	179	134	129	209	196	217	238	233	234	295	309	77	117	140	143	281	162	169	162	187.7
4-Sep	160	168	162	157	168	162	152	173	162	173	179	178	182	173	225	359	353	6	7	1	5	15	359	352	145.2
5-Sep	324	310	319	284	250	255	232	250	205	170	180	188	183	168	177	151	149	163	168	160	226	330	326	318	196.3
6-Sep	288	267	249	218	254	331	6	23	72	73	89	73	73	77	64	43	54	40	39	25	19	6	12	16	29.8
7-Sep	20	11	4	13	28	29	16	7	359	1	16	15	10	359	354	350	355	351	355	350	348	348	350	348	3.0
8-Sep	348	343	346	337	329	207	220	354	354	18	20	350	346	355	4	13	348	7	27	9	342	344	349	287	354.0
9-Sep	322	296	239	296	335	338	341	177	200	10	32	167	318	19	37	199	360	350	346	335	335	335	335	325	338.8
10-Sep	211	244	264	258	276	278	267	252	265	251	250	237	240	318	221	223	177	175	179	171	162	170	184	201	214.8
11-Sep	190	199	196	194	172	179	173	171	182	207	205	205	199	208	217	213	230	230	213	215	215	252	276	289	208.2
12-Sep	245	161	185	162	154	220	272	331	342	342	338	340	341	334	0	341	352	317	319	335	293	288	301	220	329.7
13-Sep	266	334	247	219	AF	AF	AF	AF	209	169	190	139	171	159	154	151	175	150	147	166	276	83	191	201	168.1
14-Sep	125	126	131	143	158	190	193	160	205	185	183	192	188	206	225	218	222	199	197	205	316	254	250	248	195.3
15-Sep	228	164	150	180	174	160	158	175	168	M	M	50	45	9	21	46	47	7	353	338	335	345	343	342	35.5
16-Sep	349	345	351	352	350	341	338	338	337	325	32	21	27	25	49	41	62	106	140	145	149	139	143	139	56.9
17-Sep	136	142	132	134	136	142	145	140	156	160	169	184	182	175	169	169	170	154	148	148	168	172	127	163	155.8
18-Sep	180	188	183	152	128	332	345	325	326	309	293	110	71	65	32	62	97	105	110	105	134	112	125	104	107.5
19-Sep	24	86	142	167	178	177	177	179	176	221	237	234	238	249	248	248	278	260	257	286	275	279	288	249	247.9
20-Sep	242	250	263	267	258	228	267	291	298	299	296	304	282	287	291	292	297	242	240	202	189	171	160	159	268.2
21-Sep	186	230	183	193	201	187	211	214	209	190	226	234	242	248	242	245	155	116	151	172	158	144	149	138	206.5
22-Sep	150	359	190	160	131	147	165	172	175	186	191	178	168	158	167	214	236	222	227	232	241	213	118	196	188.0
23-Sep	247	291	357	214	46	19	340	320	325	328	324	57	65	75	94	134	177	174	137	112	134	350	341	340	55.0
24-Sep	342	4	335	36	122	268	331	330	334	324	340	330	16	345	335	342	13	124	139	161	248	269	188	179	319.2
25-Sep	200	238	237	229	228	244	278	267	263	256	272	311	303	353	342	342	356	14	14	15	23	38	47	27	299.7
26-Sep	24	43	53	46	39	49	47	32	36	39	38	25	26	18	15	11	5	7	6	2	4	7	3	0	22.2
27-Sep	358	351	353	350	342	320	325	335	339	30	58	72	206	175	225	166	152	153	155	145	163	159	157	150	41.1
28-Sep	154	143	145	157	155	173	166	157	163	173	171	166	167	181	191	194	186	186	177	175	169	168	169	171	171.7
29-Sep	176	174	168	168	151	155	146	155	161	179	170	167	161	163	184	219	216	197	197	197	193	195	173	178	176.9
30-Sep	203	161	154	167	216	213	306	152	132	249	313	287	347	7	54	79	288	355	29	54	10	343	2	46	20.8

230.8 214.6 198.3 186.4 178.4 183.9 192.6 189.7 195.8 206.5 212.4 218.6 210.6 219.4 248.8 240.5 232.8 184.2 169.4 181.1 260.6 298.4 304.7 215.4

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
Barge Landing - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 112 deg on Sep 2 13:00	Hours in Service: 720 Hours of Data: 714 Hours of Missing Data: 6 Hours of Calibration: 0 Percent Operational Time: 99.2
Minimum Value: 7 deg on Sep 27 20:00	
Percentiles: P ₁ = 11 P ₁₀ = 17 Q ₁ = 21 Median = 26 Q ₃ = 36 P ₉₀ = 59 P ₉₉ = 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	64	52	24	28	23	26	68	48	55	42	33	90	83	58	30	100	28	28	32	37	29	63	32	19	100
2-Sep	32	52	32	59	47	18	37	40	49	39	55	94	112	95	88	78	51	41	21	21	12	26	43	35	112
3-Sep	22	46	43	26	35	32	24	21	38	37	38	26	36	88	93	75	29	32	15	11	66	18	20	17	93
4-Sep	15	23	17	15	20	47	22	24	25	28	29	34	34	29	29	52	28	25	25	25	23	25	23	23	52
5-Sep	17	16	21	39	28	23	27	45	41	36	36	35	33	31	29	27	23	30	56	20	60	39	16	17	60
6-Sep	35	29	15	76	38	42	23	25	25	24	30	36	26	27	24	25	22	23	24	24	26	25	25	26	76
7-Sep	23	24	23	24	22	22	24	24	23	24	25	28	27	25	26	25	25	24	23	21	22	21	22	22	28
8-Sep	21	21	23	20	13	77	40	64	31	33	44	35	41	38	37	29	31	25	23	30	29	20	35	42	77
9-Sep	53	48	70	42	16	15	39	93	72	46	52	77	88	35	68	74	69	26	15	12	18	18	20	55	93
10-Sep	76	74	19	14	22	27	27	20	24	25	33	42	48	66	61	40	31	24	21	17	11	15	22	24	76
11-Sep	18	21	25	25	18	20	22	23	28	28	27	28	29	28	26	27	22	27	25	18	24	25	45	41	45
12-Sep	45	33	26	34	56	38	68	27	24	26	29	26	29	27	31	29	24	38	29	36	68	25	58	73	73
13-Sep	28	62	84	46	AF	AF	AF	AF	43	43	40	69	42	35	31	24	32	18	11	21	87	71	65	48	87
14-Sep	39	14	23	13	61	47	34	31	32	33	31	42	40	44	34	38	24	21	16	17	67	34	19	15	67
15-Sep	34	34	19	16	22	18	32	29	51	M	M	49	51	30	23	26	25	24	18	16	27	19	17	29	51
16-Sep	18	18	20	20	19	28	15	17	21	36	47	31	38	38	35	29	25	52	22	18	16	21	21	20	52
17-Sep	16	20	16	16	16	18	22	19	26	29	29	31	32	30	27	31	26	21	16	20	24	34	17	24	34
18-Sep	19	21	30	20	26	51	21	16	29	65	88	69	46	41	84	41	29	16	11	14	30	27	76	32	88
19-Sep	51	30	20	27	20	26	28	22	29	29	21	23	25	25	23	24	37	33	29	34	34	35	34	20	51
20-Sep	19	22	29	32	58	43	31	32	33	32	35	33	35	37	33	35	32	25	16	22	27	18	15	25	58
21-Sep	54	63	41	37	29	24	32	26	30	30	23	21	23	25	26	25	38	20	12	16	17	22	16	14	63
22-Sep	17	70	35	27	62	13	14	22	23	32	32	34	29	26	27	29	20	21	18	17	18	44	72	62	72
23-Sep	34	79	94	106	75	53	20	47	83	25	29	91	47	31	43	49	36	18	14	11	20	63	32	83	106
24-Sep	16	53	28	67	18	68	16	20	19	32	29	20	28	31	22	18	73	51	22	32	67	34	39	21	73
25-Sep	26	18	18	21	22	21	36	30	28	26	34	24	31	31	25	23	25	21	21	21	22	21	23	22	36
26-Sep	21	27	22	21	20	21	21	20	19	20	20	19	19	22	20	21	21	21	22	22	22	22	21	22	27
27-Sep	22	21	20	20	22	14	17	22	23	25	33	60	66	45	86	42	27	15	11	7	15	11	13	10	86
28-Sep	13	8	9	16	18	24	21	20	25	26	28	26	26	26	27	28	24	24	23	23	22	21	21	22	28
29-Sep	23	20	19	18	12	17	13	19	22	26	24	26	26	26	28	24	24	23	24	23	22	24	17	53	53
30-Sep	50	26	14	17	50	52	22	80	21	53	63	35	36	28	35	54	39	27	37	56	62	19	22	27	80

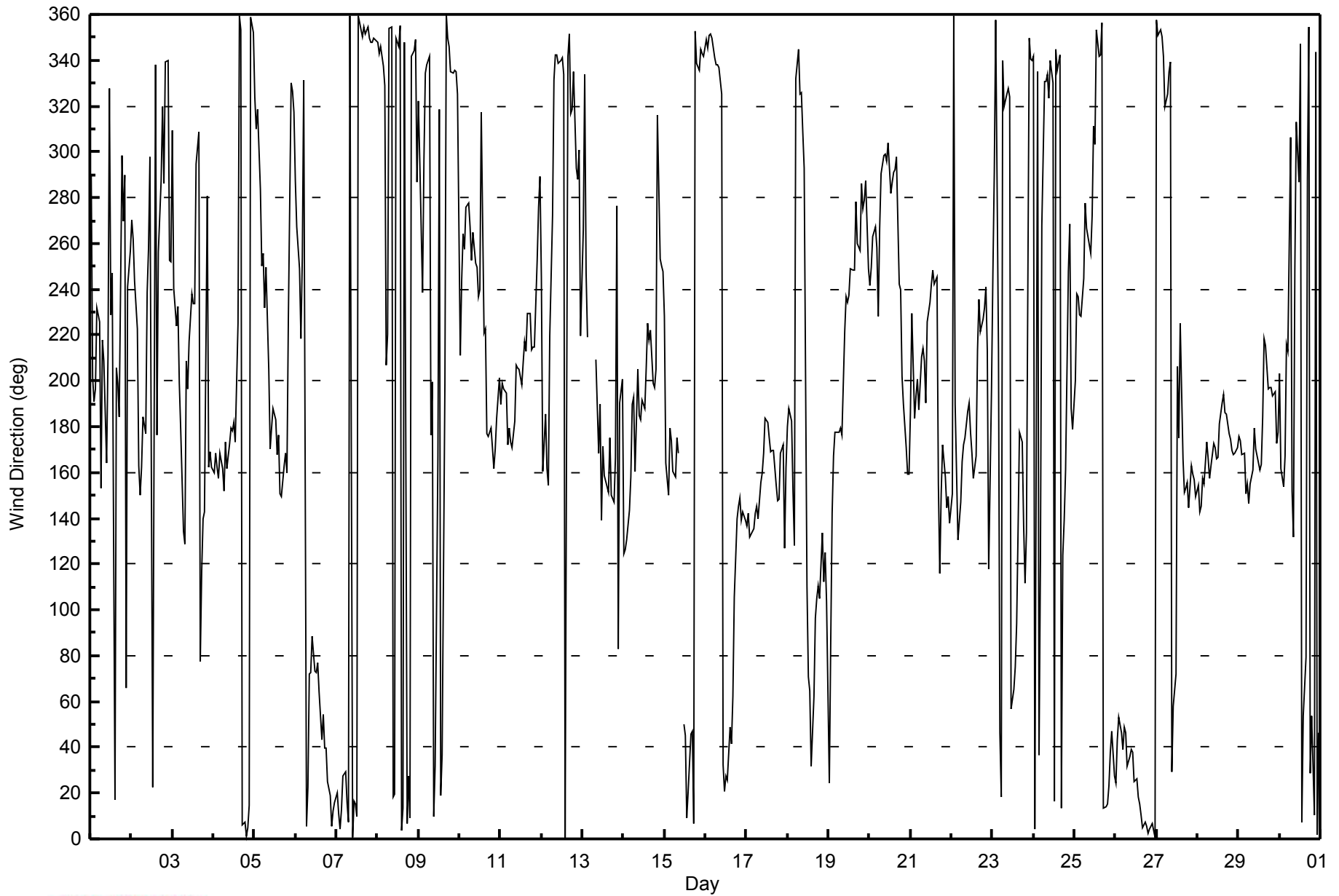
76	79	94	106	75	77	68	93	83	65	88	94	112	95	93	100	73	52	56	56	87	71	76	83	
Diurnal Maximum																								

M - Maintenance AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Barge Landing - September 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	September 5, 2014	Previous Calibration	July 4, 2014
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	8:00	End Time (MST)	10:50
Barometric Pressure	NA mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11071107
Cal Gas Concentration	4.77 ppm H2S	Cal Gas Expiry Date	05/30/13
Gas Cert Reference	LL86129	SO2 gas conc.	59.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2638
DACS voltage range		DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-689	-689
Analyzer Range (input)	5000	5000	Lamp voltage	992	996
Calculated slope	0.991434	1.001602	Chamber temp.	45	45
Calculated intercept	0.053768	0.171776	Pressure	554.3	578.0
Analyzer Background	2.28	2.25	Flow	0.363	0.372
Analyzer Coefficient	0.963	0.963	Intensity	91	91
			Converter temp.	850	850

Analyzer make/model	Thermo 45C	Analyzer serial #	328702540
Converter make/model	CDN-101	Converter serial #	376

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.0	NA
as found span	5000	83.7	79.8	79.8	1.001
SO2 scrubber check	5000	10.1	119.2	0.1	NA
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	83.8	79.9	79.8	1.002
second point	5000	41.9	40.0	39.5	1.011
third point	5000	20.8	19.8	19.6	1.011
calibrator zero	6000	0.0	0.0	0.0	NA
as left zero	6000	0.0	0.0	0.1	NA
as left span	5000	83.7	79.8	80.4	0.994
Average Correction Factor					1.008

Corrected As found	79.8	Previous response	80.5	% change	0.9%
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Notes:

Changed filter after as founds.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

TRS Calibration Summary

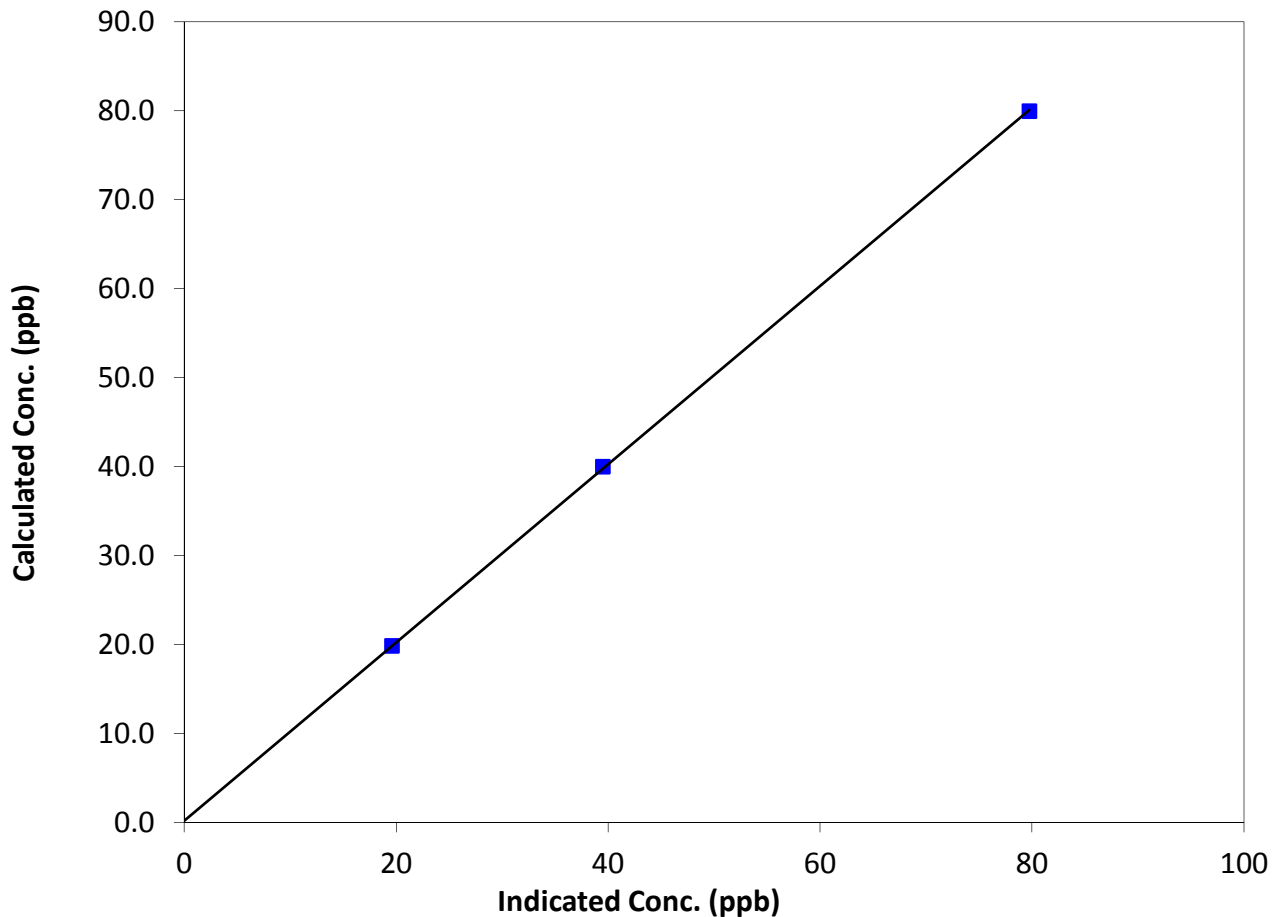
Station Information

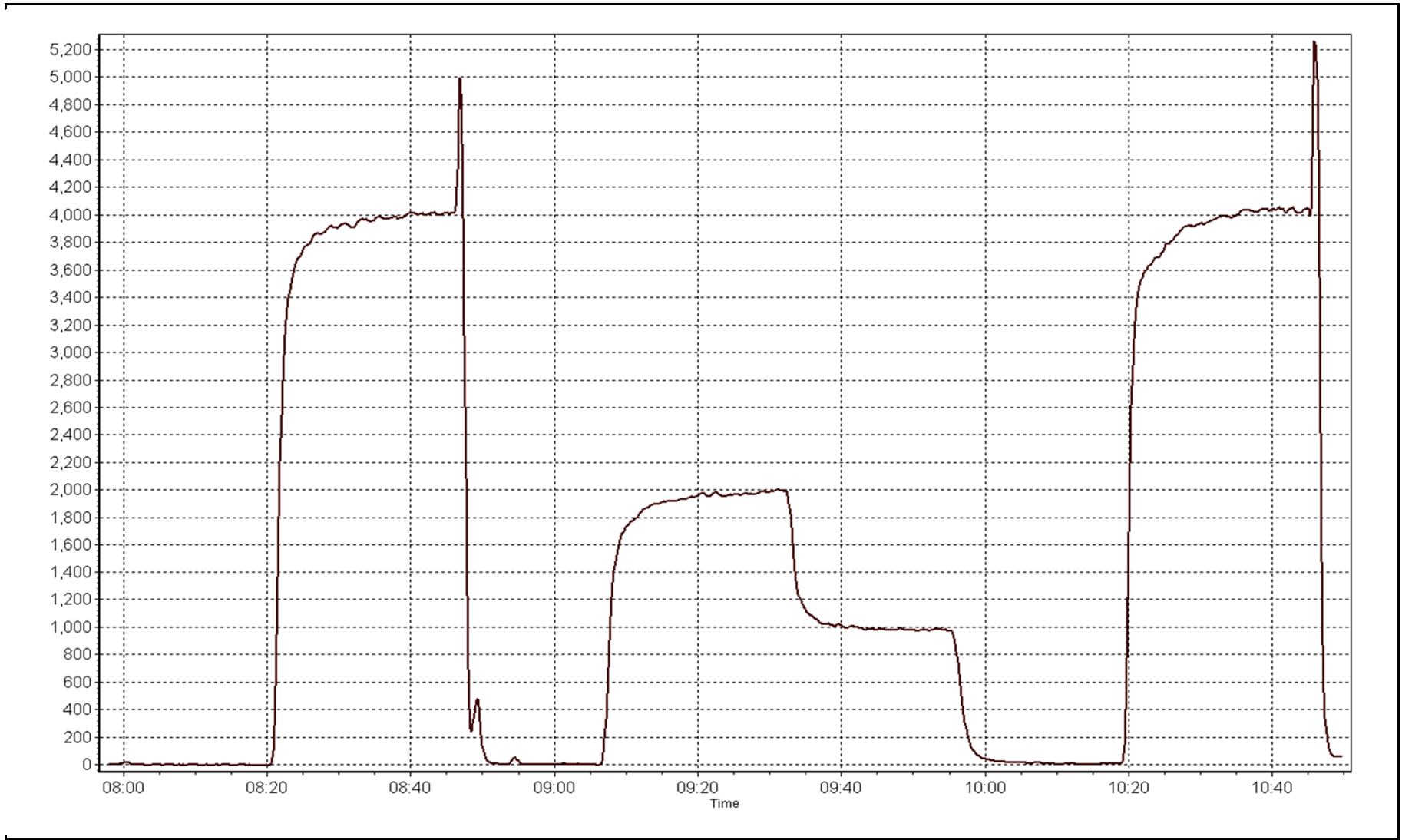
Calibration Date	September 5, 2014	Previous Calibration	July 4, 2014
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	8:00	End Time (MST)	10:50
Analyzer make	Thermo 45C	Analyzer serial #	328702540

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999978
79.9	79.8	1.0023		
40.0	39.5	1.0115	Slope	1.001602
19.8	19.6	1.0115		
			Intercept	0.171776

TRS Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Friday, September 05, 2014	Previous Calibration	Friday, August 15, 2014
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	10:45	End Time (MST)	13:55
Barometric Pressure	730 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
Gas Cert Reference	139843	Cal Gas Expiry Date	11/24/2012
CH4 Cal Gas Conc.	494 ppm	CH4 Equiv Conc.	1049.5 ppm
C3H8 Cal Gas Conc.	202 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2638
DACS voltage range		DACS channel #	5

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	9.1	9.1
Analyzer Range (mv)	5000	5000	Air or Bypass press	34.7	34.7
Calculated slope	0.994949	0.997957	Fuel Pressure	24.1	24.1
Calculated intercept	-0.012940	0.022923	BKG	5.73	5.79
			COEF	4.165	4.210

Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.00	-0.06	N/A
as found span	6000	89.7	15.69	15.43	1.017
calibrator zero	6000	0.0	0.00	-0.01	N/A
high point	6000	89.7	15.69	15.71	0.999
second point	6000	48.0	8.40	8.37	1.003
third point	6000	18.0	3.15	3.13	1.007
calibrator zero	6000	0.0	0.00	-0.01	N/A
as left zero	6000	0.5	0.09	-0.03	N/A
as left span	6000	89.7	15.69	15.68	1.001
Average Correction Factor					1.003

Corrected As found	15.48	Previous response	15.78	% change	1.9%
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Notes:

Filter changed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

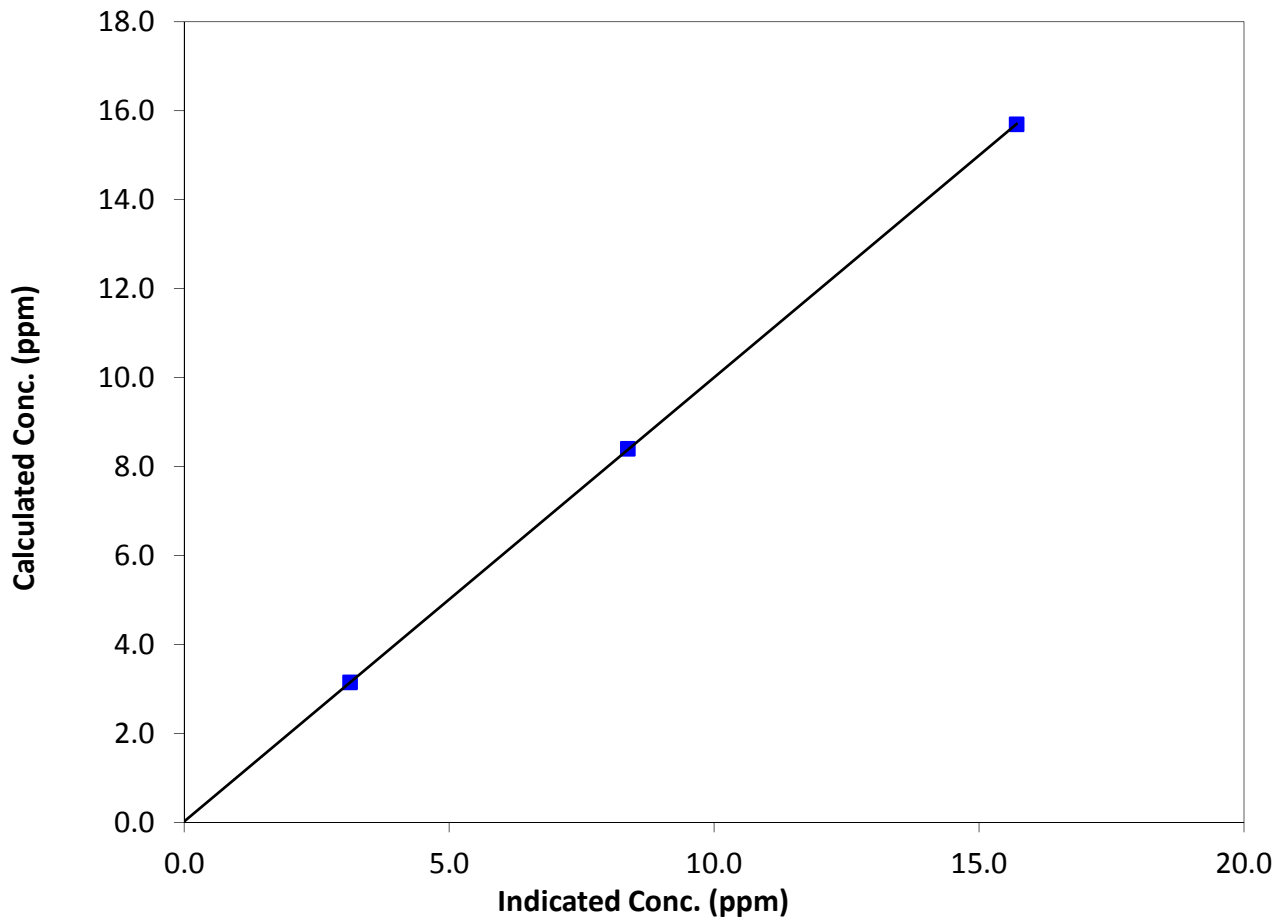
Station Information

Calibration Date	September 5, 2014	Previous Calibration	August 15, 2014
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	10:45	End Time (MST)	13:55
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

Calibration Data

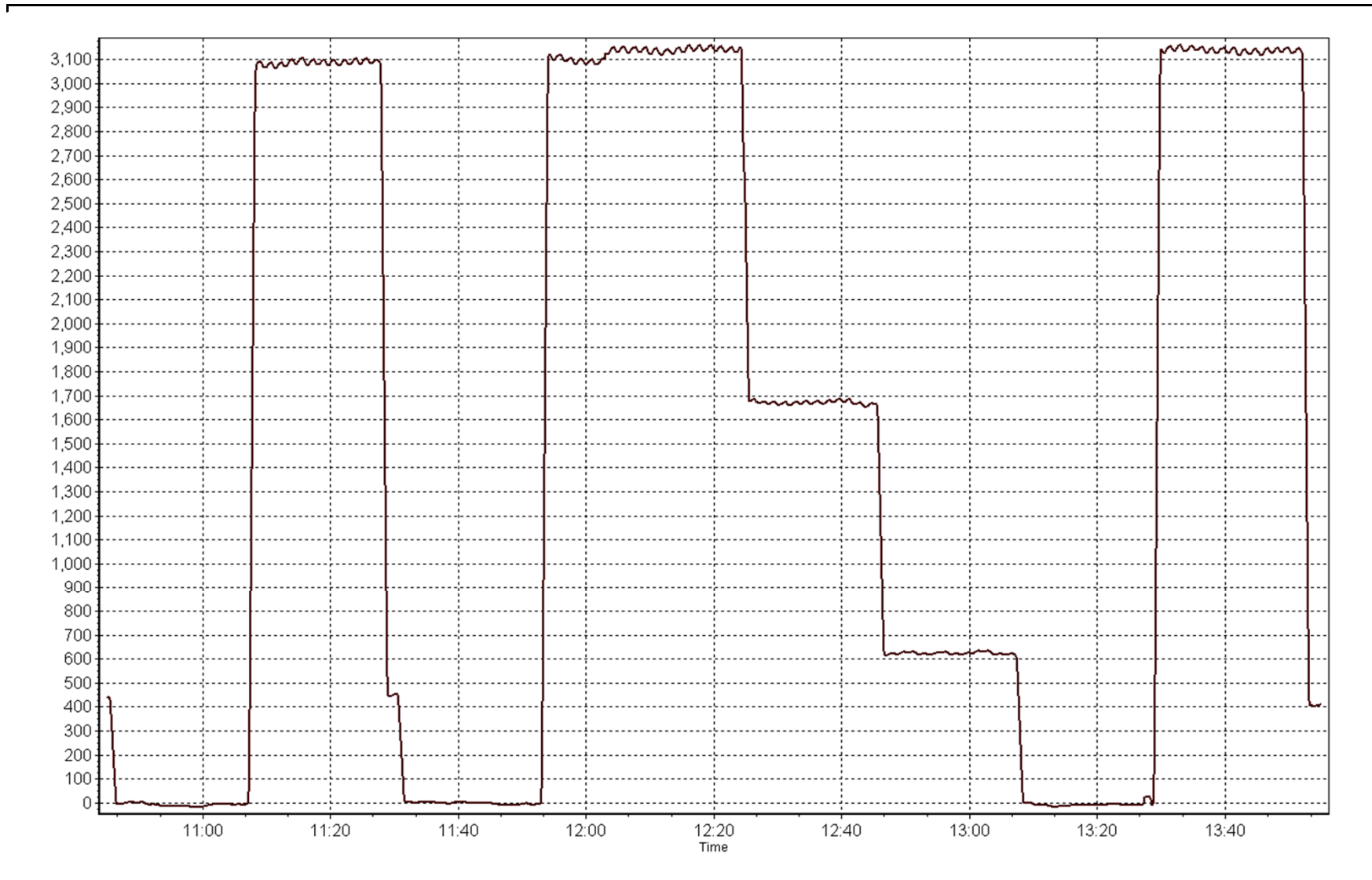
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	N/A	Correlation Coefficient	0.999995
15.69	15.71	0.9987		
8.40	8.37	1.0031	Slope	0.997957
3.15	3.13	1.0066		
			Intercept	0.022923

THC Calibration Curve



THC Calibration Plot

Date: September 5, 2014



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 11
LOWER CAMP
SEPTEMBER 2014**

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

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

October 30, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
 SEPTEMBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	683	37	37	100.00	30	0	6	0
H2S (ppb) Average	684	36	36	100.00	7	0	2	0
THC (ppm) Average	682	38	38	100.00	4.1	-	2.7	-
Temperature (C) Average	720	0	0	100.00	30.7	-	18.4	-
Wind Speed 10 m (km/h) Average	717	0	3	99.58	30	-	-	-
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 - LOWER CAMP (AMS 11)
 SEPTEMBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	683	1.8	3	-	0	0	1	1	1	3	30
H2S (ppb) Average	684	0.7	1	-	0	0	0	1	1	1	7
THC (ppm) Average	682	2.3	0.3	-	1.9	2	2.1	2.2	2.4	2.7	4.1
Temperature 2 m (C) Average	720	10.54	5.5	-	-0.9	4.1	6.6	9.9	13.7	18.6	30.7
Wind Speed 10 m (km/h) Average	717	7.8	5	-	0	2	4	7	11	15	30
Wind Direction 10 m (deg) Average	717	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
SEPTEMBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	15 Sep 2014 00:00	15 Sep 2014 00:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	15 Sep 2014 13:00	15 Sep 2014 14:00	2	Maintenance - met sensor calibration

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 30 ppb on Sep 15 13:00	Maximum Daily Average: 5.5 ppb on Sep 15		Hours of Data:	683
Minimum Value: 0 ppb on Sep 9 06:00	Minimum Daily Average: 0.4 ppb on Sep 8		Hours of Missing Data:	37
Maximum Diurnal Average: 4.4 ppb at hour 13	Minimum Diurnal Average: 0.7 ppb at hour 4		Hours of Calibration:	37
Monthly Average: 1.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 21		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	1	Z	1	1	1	1	1	1	1	2	9	3	3	9	6	2	2	1	1	1	1	1	1	1	2.2	9
2-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	8	29	11	1	1	1	1	1	1	1	1	1	2.9	29
3-Sep	0	Z	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	0	1	0	0.8	2
4-Sep	1	Z	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2
5-Sep	0	Z	1	1	1	0	0	0	1	1	4	5	2	1	1	1	1	2	1	1	1	1	1	1	1.1	5
6-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.6	1
7-Sep	0	Z	1	0	1	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0.4	1
8-Sep	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	1	1	0	0	0	0	0	0	0	0.4	1
9-Sep	0	Z	0	0	0	0	0	0	0	0	1	20	9	5	2	1	1	1	1	1	0	1	0	0	1.9	20
10-Sep	0	Z	0	1	0	0	0	0	1	0	1	2	21	7	1	1	1	1	1	1	1	1	1	1	2.0	21
11-Sep	1	Z	1	1	1	1	1	1	1	2	3	3	4	3	3	6	4	7	2	1	1	3	1	1	2.3	7
12-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0.8	1
13-Sep	0	Z	0	1	0	0	1	0	0	0	5	11	4	3	3	6	2	1	1	1	1	1	1	1	2.0	11
14-Sep	1	Z	1	1	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
15-Sep	1	Z	1	0	1	1	1	1	1	1	21	24	30	21	13	2	2	2	1	1	1	1	1	1	5.5	30
16-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	5	16	19	3	2	1	2	2	2	2	2.8	19
17-Sep	5	Z	4	1	3	2	1	2	11	8	6	9	7	4	5	3	4	4	3	1	1	1	1	1	3.8	11
18-Sep	1	Z	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0.8	1
19-Sep	1	Z	2	1	1	1	1	1	1	C	C	1	1	1	1	9	5	2	5	12	1	3	3	3	2.6	12
20-Sep	1	Z	1	1	2	7	19	19	2	2	4	2	9	4	6	4	8	3	6	7	1	1	1	1	4.8	19
21-Sep	1	Z	1	1	1	1	1	1	1	1	2	2	1	1	1	2	3	2	1	1	1	1	1	1	1.5	3
22-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	3	2	1	1	1	1	1	1	1	1.2	3
23-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	3	2	2	2	1	1	1	0	1	1	1	1.1	3
24-Sep	1	Z	1	0	0	1	0	1	1	1	1	1	1	1	1	1	1	2	4	5	4	2	1	1	1.3	5
25-Sep	1	Z	1	1	1	2	1	6	3	7	4	3	1	1	1	1	1	1	1	1	0	1	1	1	1.7	7
26-Sep	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0.4	1
27-Sep	1	Z	1	1	0	0	0	0	1	1	0	1	1	3	19	25	10	2	1	1	1	0	0	0	2.9	25
28-Sep	0	Z	0	0	0	1	2	2	2	2	3	2	3	1	1	1	1	1	1	1	1	1	1	1	1.2	3
29-Sep	0	Z	0	0	0	0	0	0	0	1	1	5	12	2	1	1	2	1	1	1	1	1	1	1	1.5	12
30-Sep	1	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0.6	1

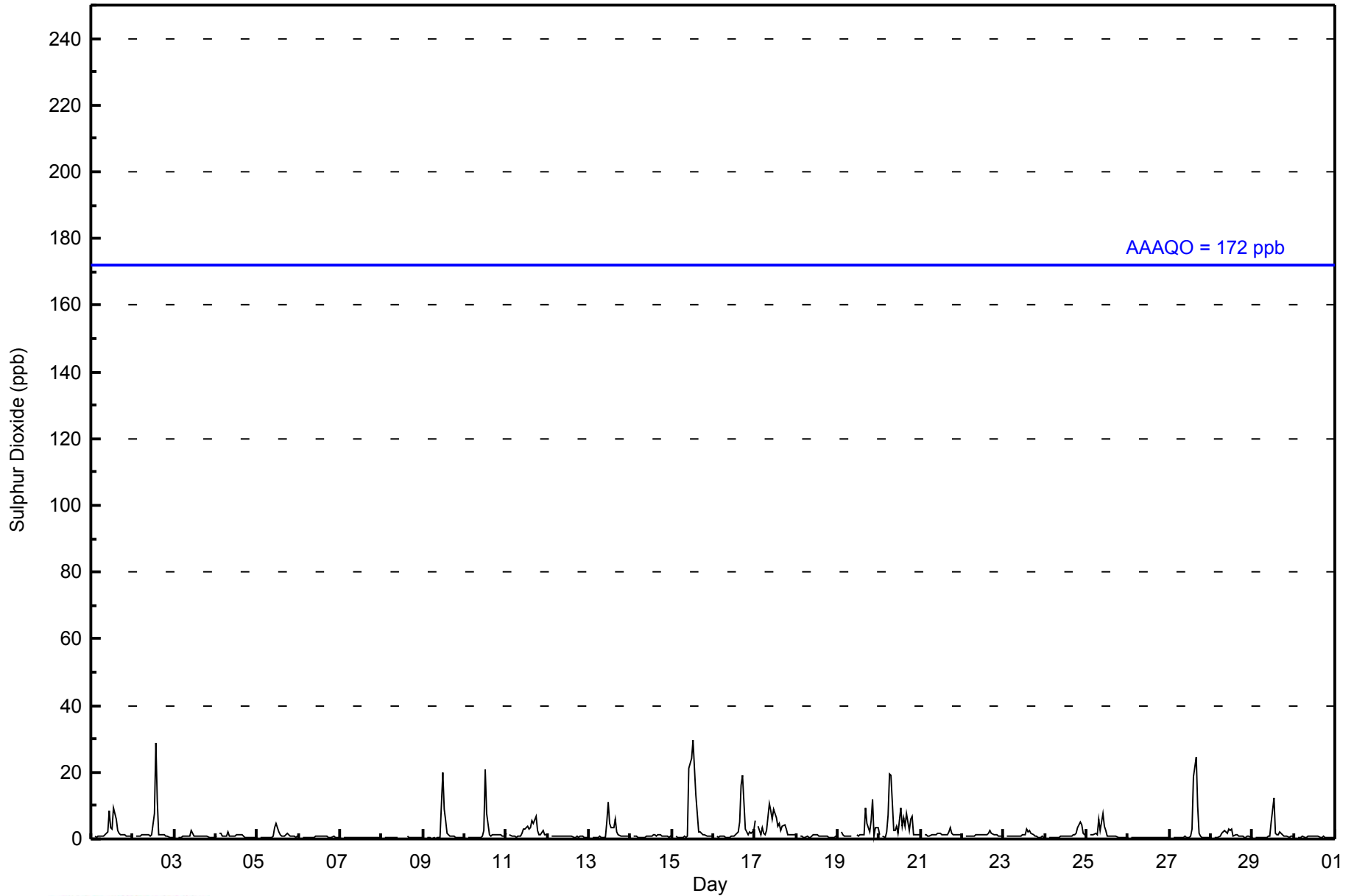
0.9	--	0.9	0.7	0.8	0.9	1.3	1.6	1.2	1.4	2.7	3.6	4.4	3.8	3.1	2.5	2.6	2.2	1.3	1.3	1.3	0.9	0.9	0.9	Diurnal Average	
5	--	4	1	3	7	19	19	11	8	21	24	30	29	19	25	16	19	6	7	12	4	3	3	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Lower Camp - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Lower Camp - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	664	97.22	97.22
11 - 20	12	1.76	98.98
21 - 60	7	1.02	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Lower Camp - September 2014

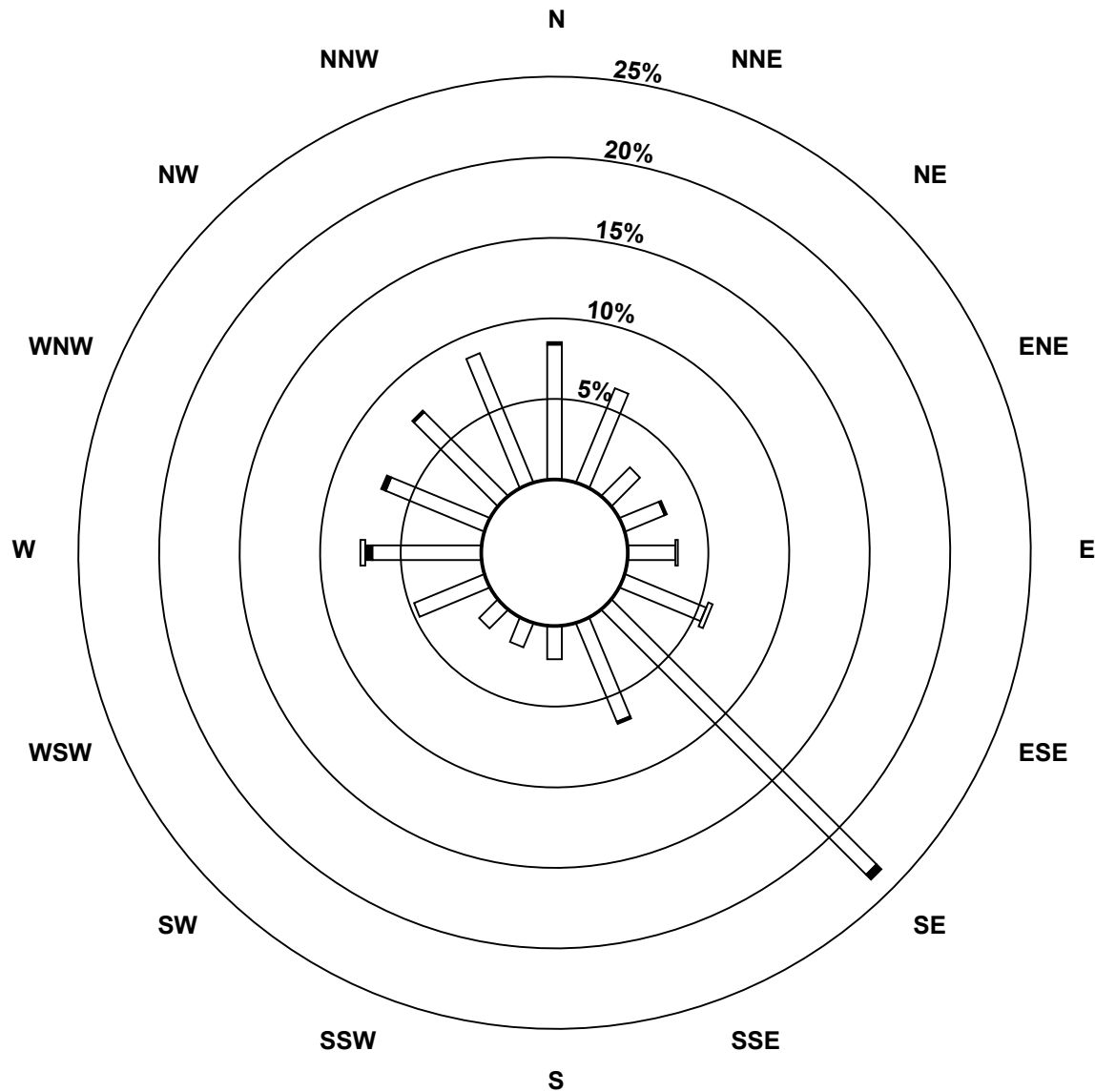
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	57	43	17	18	20	37	158	45	14	11	11	32	46	45	50	59	663
11 - 20	1	0	0	1	0	0	3	1	0	0	0	0	3	2	1	0	12
21 - 60	0	0	0	0	1	2	0	0	0	0	0	0	2	0	0	0	5
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	58	43	17	19	21	39	161	46	14	11	11	32	51	47	51	59	680

Total Number of Valid Hours: 680

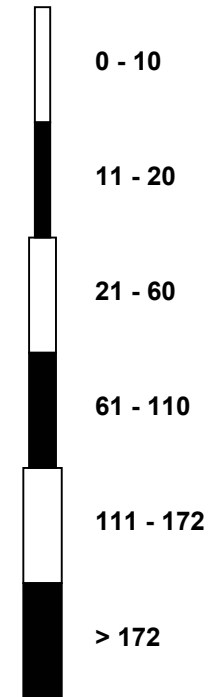
Total Number of Hours: 720

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

**Sulphur Dioxide (SO₂) - ppb
Lower Camp (AMS 11)**



Classes (ppb)

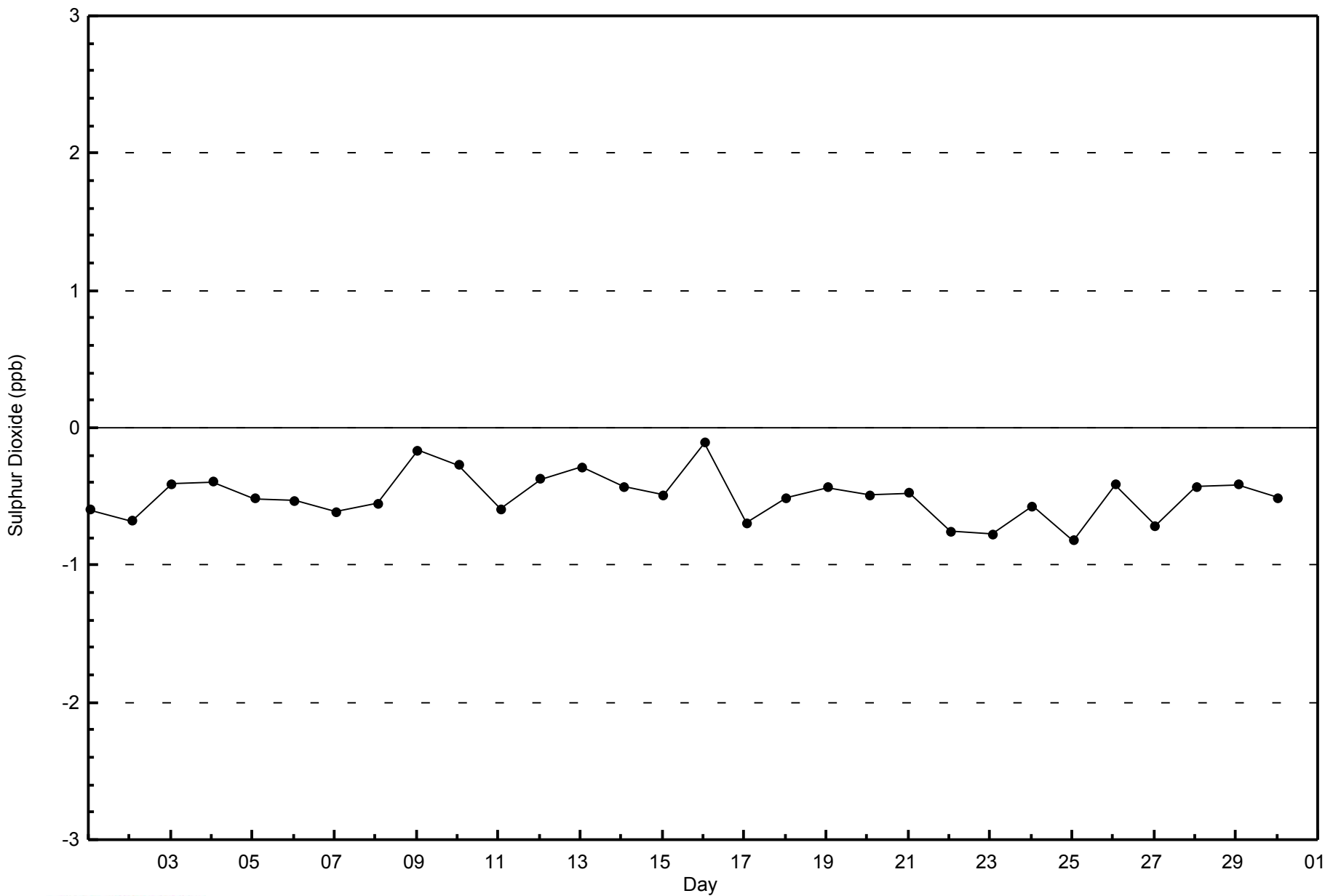


Total Number of Valid Hours: 680



WBEA
Zero Responses

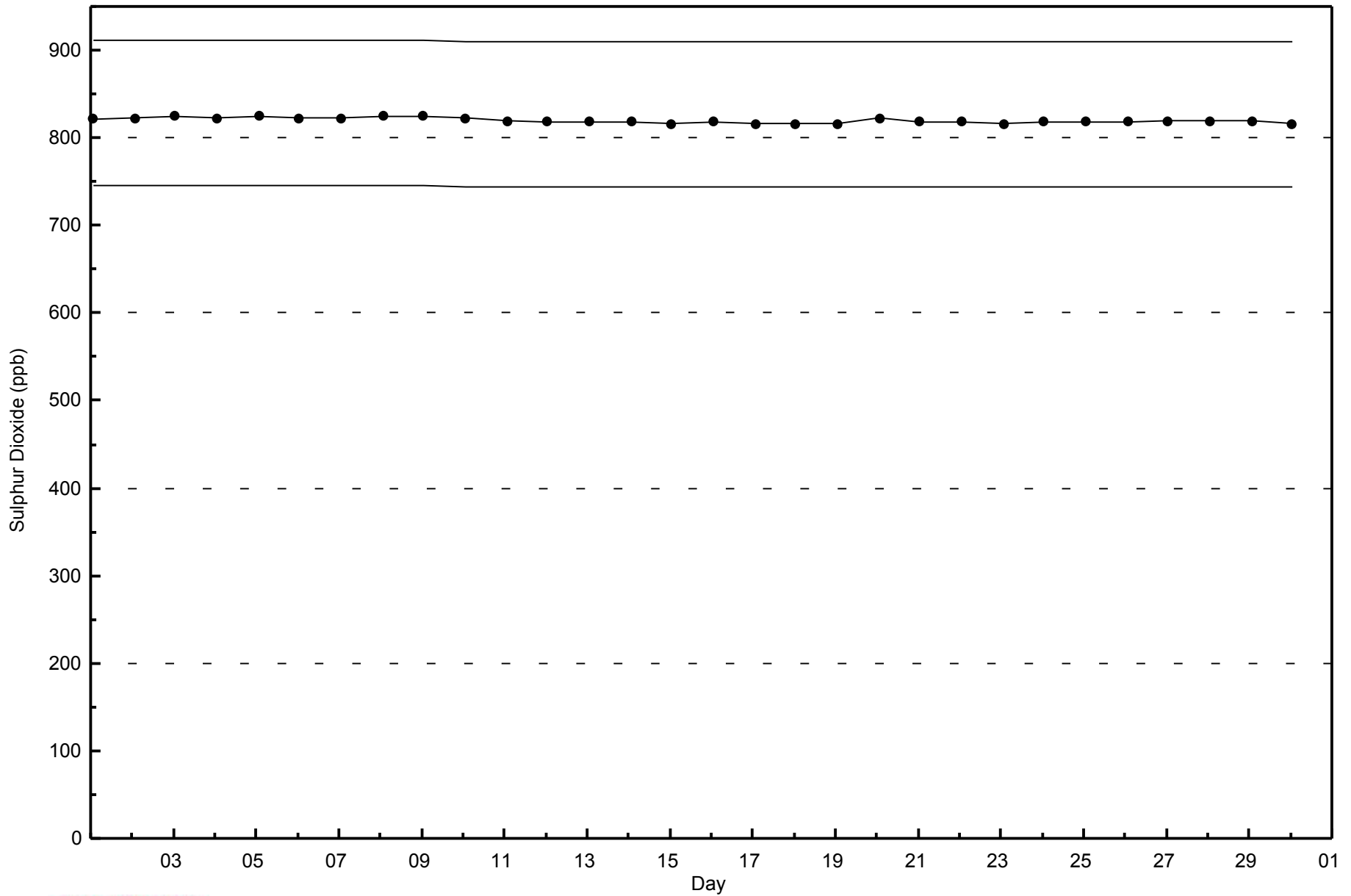
Sulphur Dioxide (SO₂) - ppb
Lower Camp - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Lower Camp - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 7 ppb on Sep 10 21:00	Maximum Daily Average: 1.6 ppb on Sep 11		Hours of Data:	684
Minimum Value: 0 ppb on Sep 6 20:00	Minimum Daily Average: 0.1 ppb on Sep 26		Hours of Missing Data:	36
Maximum Diurnal Average: 1.1 ppb at hour 6	Minimum Diurnal Average: 0.5 ppb at hour 16		Hours of Calibration:	36
Monthly Average: 0.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 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	1	1	Z	1	1	1	1	1	1	2	2	1	1	1	1	0	0	1	1	1	1	1	1	1	0.9	2
2-Sep	1	1	Z	1	1	1	2	2	3	2	1	1	1	1	1	1	0	0	1	0	0	0	0	0	1.0	3
3-Sep	0	0	Z	0	1	1	1	1	1	1	2	0	0	0	0	0	1	0	1	1	1	1	1	0	0.7	2
4-Sep	0	1	Z	2	6	6	4	1	1	4	1	1	0	1	1	1	1	0	0	0	0	0	0	0	1.4	6
5-Sep	0	0	Z	0	0	1	0	0	0	1	1	1	1	1	2	1	1	0	0	1	1	1	0	1	0.6	2
6-Sep	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
7-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.3	1
8-Sep	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
9-Sep	0	0	Z	0	0	0	0	0	C	C	C	C	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
10-Sep	0	1	Z	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	1	4	7	6	3	1	1.3	7
11-Sep	1	1	Z	1	1	3	4	3	2	1	1	1	1	1	1	1	1	1	3	5	3	1	0	0	1.6	5
12-Sep	1	1	Z	1	2	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.6	2
13-Sep	0	0	Z	1	0	0	1	1	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0.6	1
14-Sep	0	0	Z	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	0.6	1
15-Sep	1	1	Z	1	0	0	0	1	0	1	3	3	4	3	1	1	1	0	0	0	1	0	0	0	1.0	4
16-Sep	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.3	1
17-Sep	1	0	Z	0	1	0	0	0	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	1	0.5	1
18-Sep	1	1	Z	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0.6	1
19-Sep	0	0	Z	1	1	1	1	1	0	C	C	0	0	0	0	0	2	1	1	0	1	0	1	1	0.7	2
20-Sep	0	1	Z	0	1	3	4	3	1	1	1	0	1	0	1	1	1	1	1	2	2	3	1	1	1.2	4
21-Sep	1	1	Z	3	1	1	1	1	0	0	0	0	0	0	0	0	0	1	3	3	1	1	1	1	0.9	3
22-Sep	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.6	1
23-Sep	1	1	Z	1	1	4	1	1	1	0	1	0	0	1	1	1	1	1	1	1	1	0	1	1	0.9	4
24-Sep	1	1	Z	1	1	2	2	2	2	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1.0	2
25-Sep	2	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
26-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
27-Sep	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0	0	0.5	1
28-Sep	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1.0	2
29-Sep	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	2	1	2	2	2	1	0.8	2
30-Sep	2	1	Z	1	3	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	3

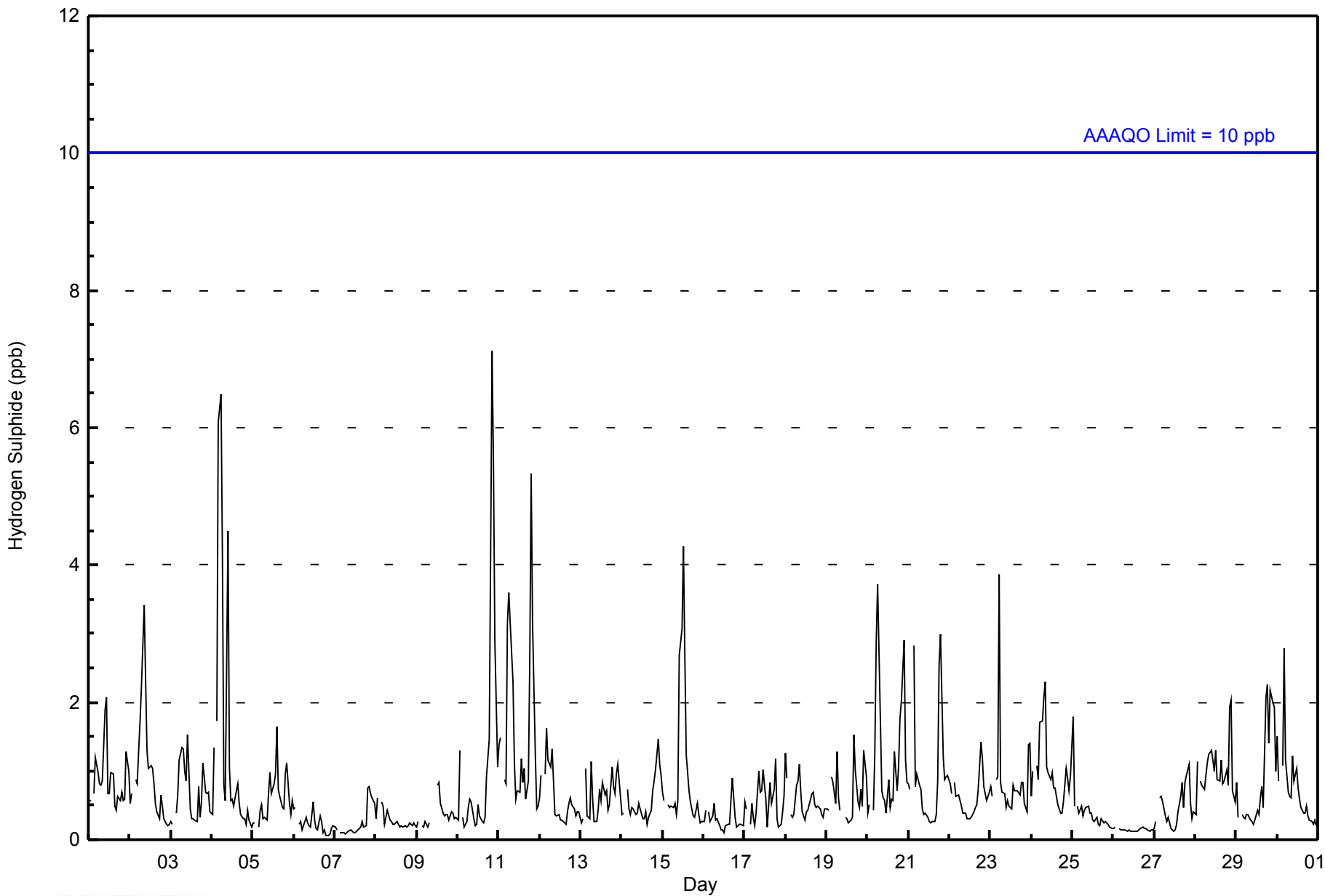
0.6	0.6	--	0.7	0.9	1.1	1.0	0.8	0.8	0.8	0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.8	1.0	1.0	0.9	0.7	0.6	Diurnal Average
2	1	--	3	6	6	4	3	3	3	4	3	3	4	3	2	1	2	2	3	5	7	6	3	1	Diurnal Maximum

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



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - September 2014





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	656	95.91	95.91
3 - 4	23	3.36	99.27
5 - 7	5	0.73	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - September 2014

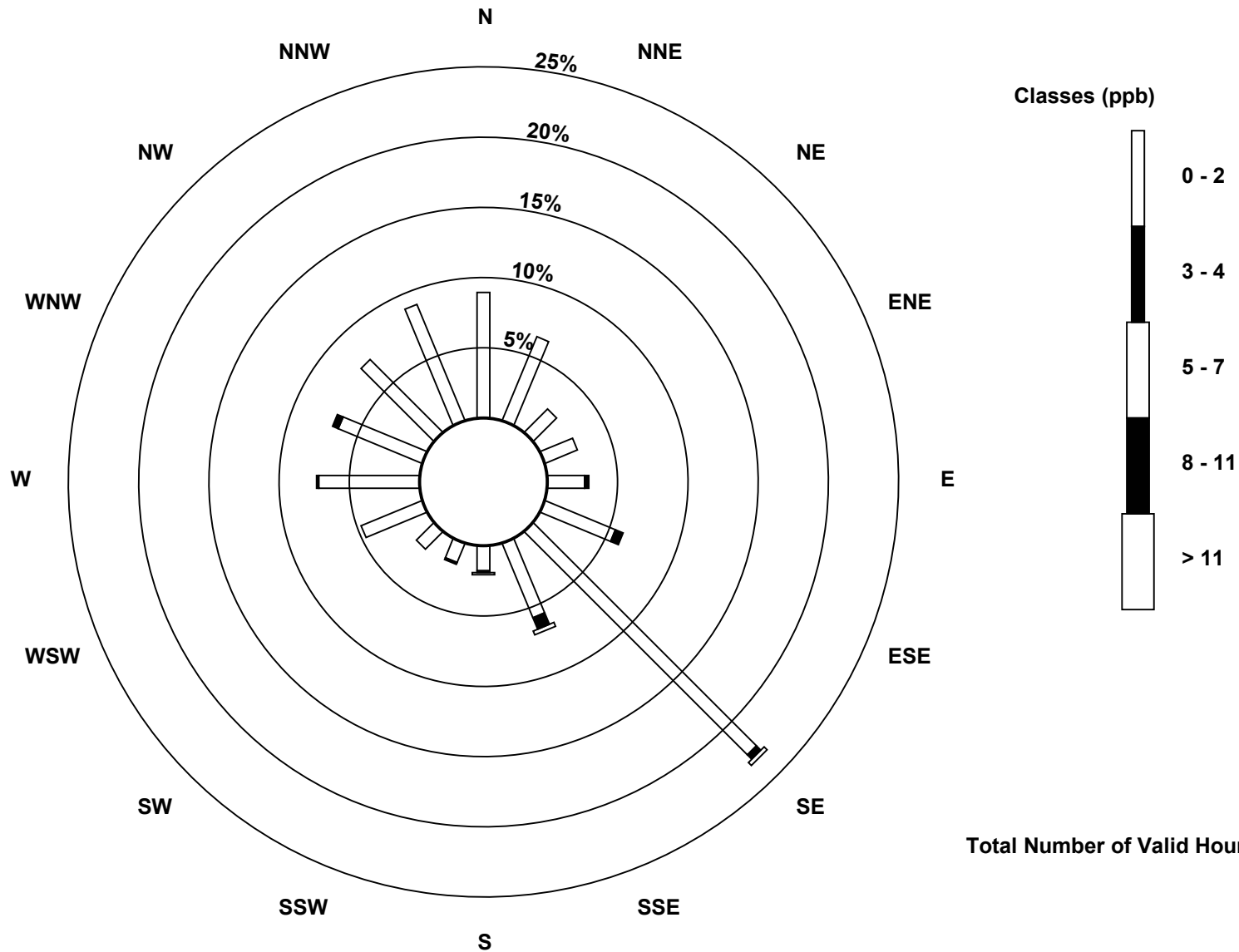
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	61	44	16	17	18	37	153	39	12	10	12	32	49	44	50	61	655
3 - 4	0	0	0	0	2	4	3	6	1	1	0	0	1	3	0	0	21
5 - 7	0	0	0	0	0	0	2	2	1	0	0	0	0	0	0	0	5
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	44	16	17	20	41	158	47	14	11	12	32	50	47	50	61	681

Total Number of Valid Hours: 681

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Hydrogen Sulphide (H₂S) - ppb
Lower Camp (AMS 11)

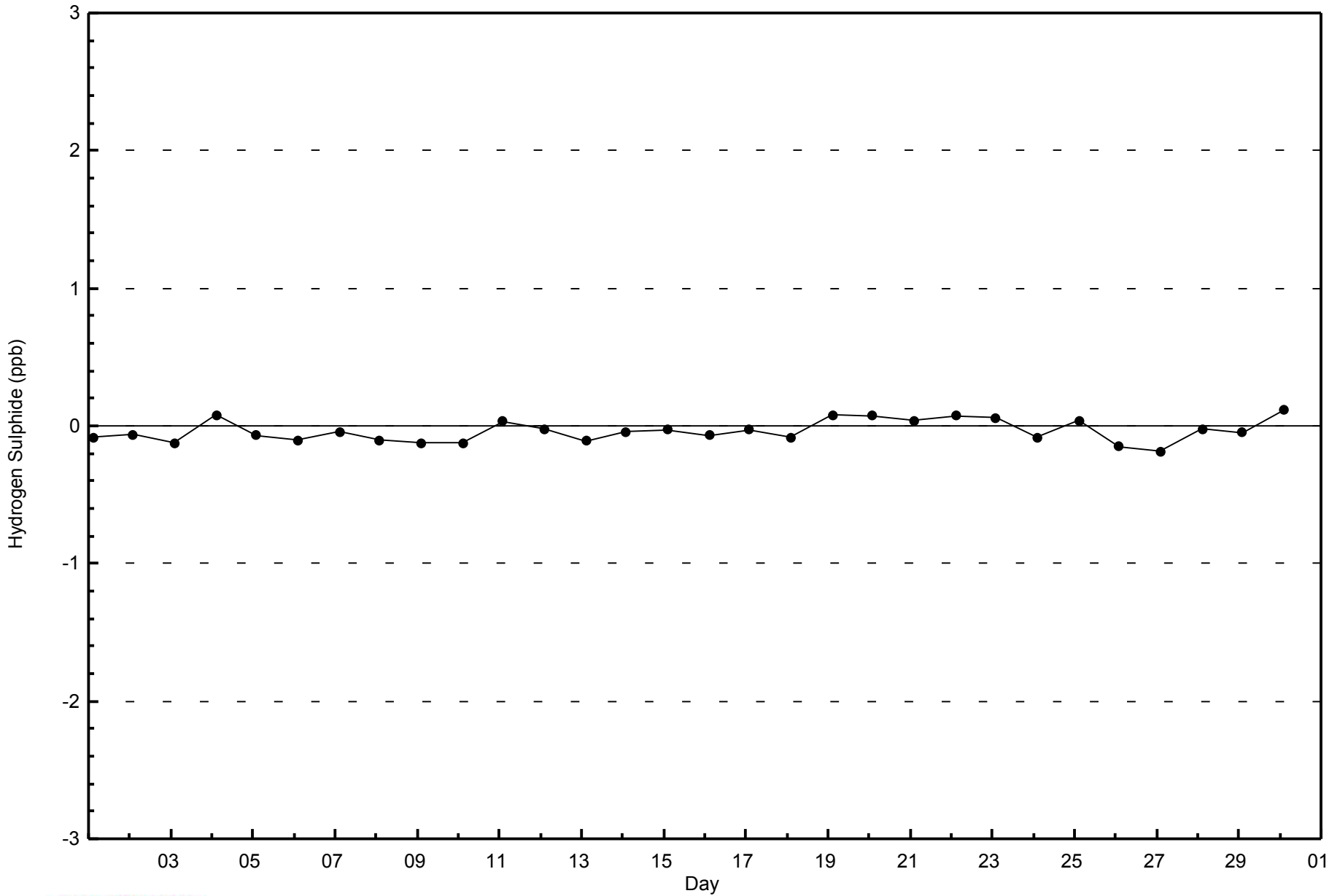


Total Number of Valid Hours: 681



WBEA
Zero Responses

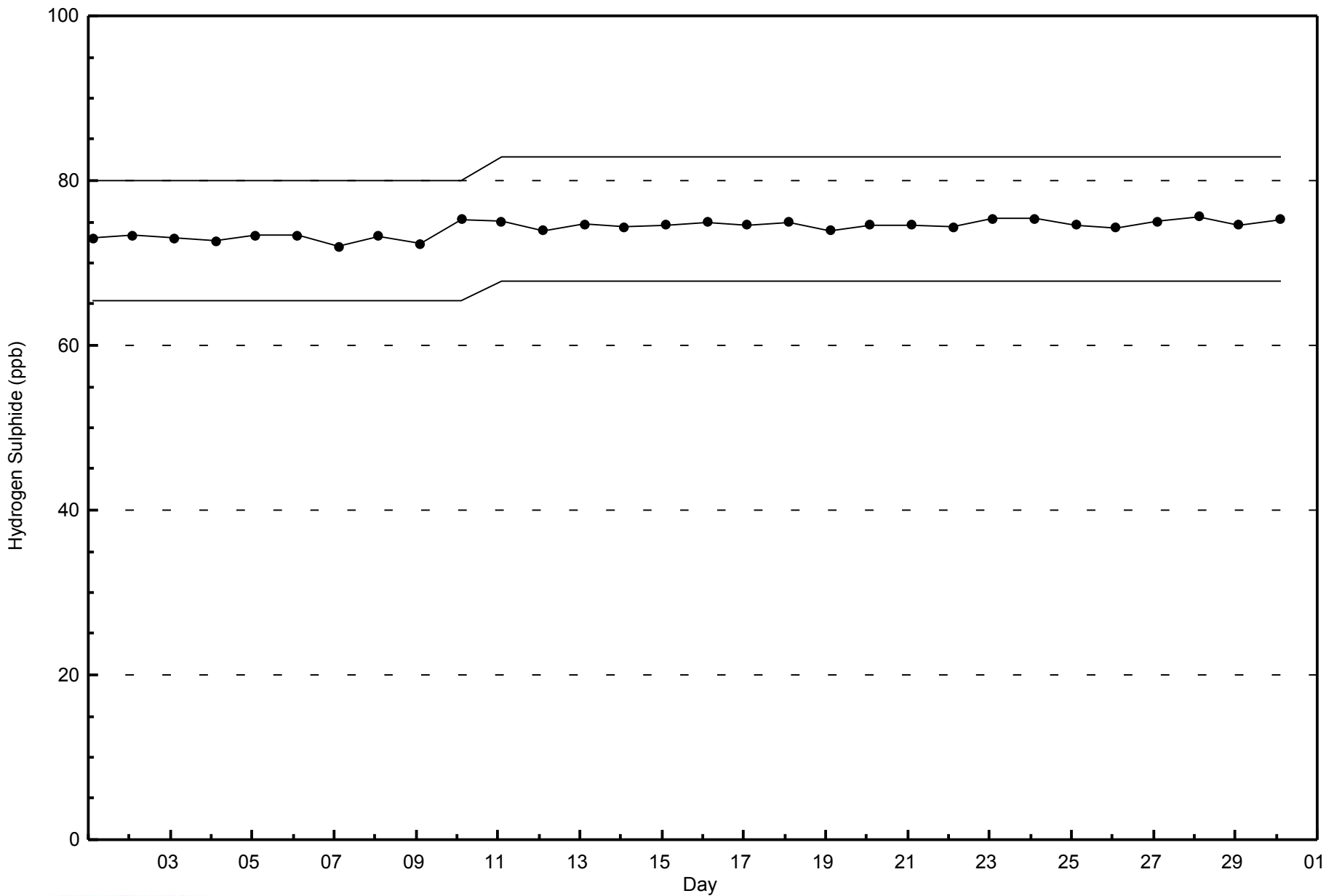
Hydrogen Sulphide (H₂S) - ppb
Lower Camp - September 2014





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - September 2014



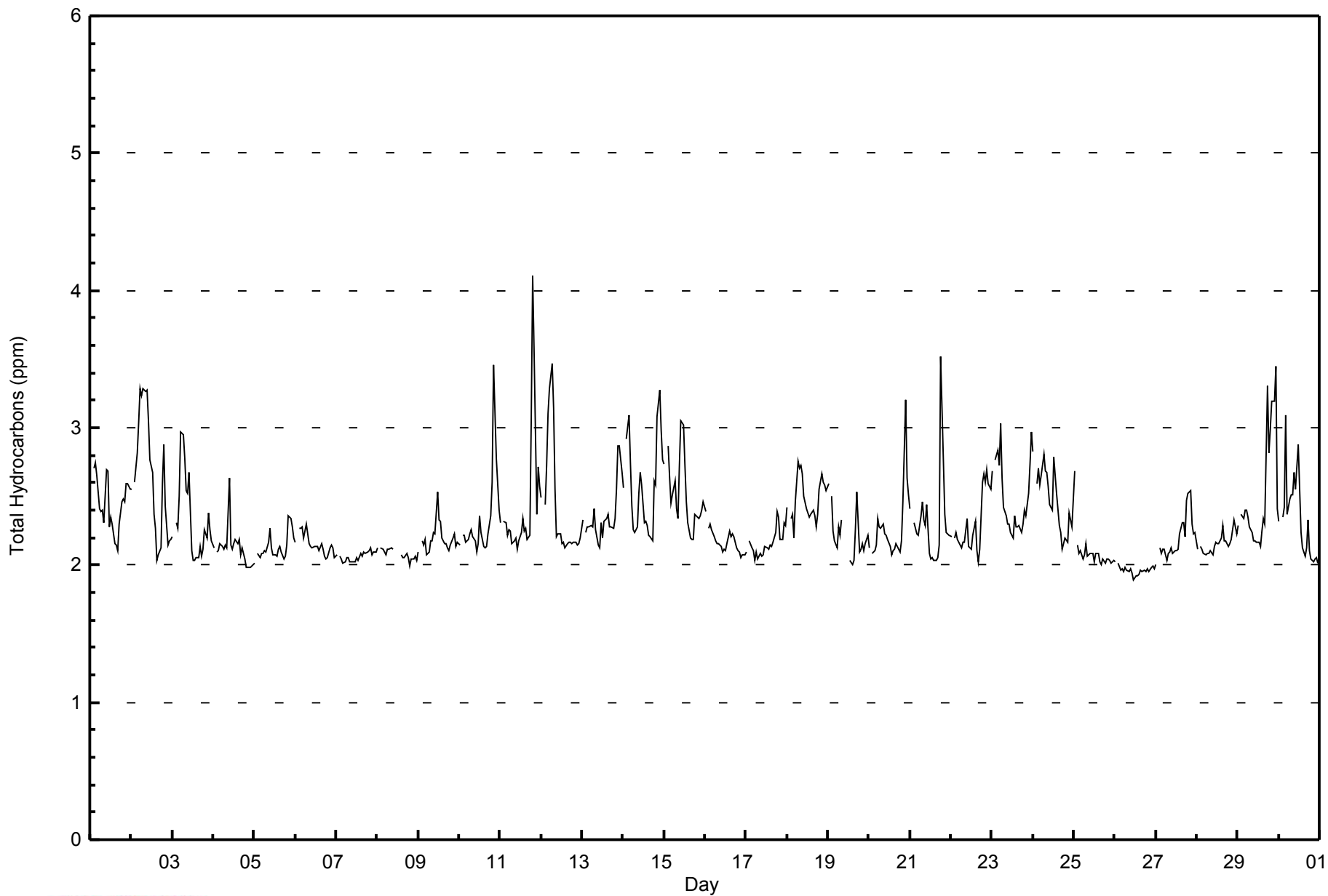


Maximum Value: 4.1 ppm on Sep 11 20:00																	Maximum Daily Average: 2.7 ppm on Sep 2																	Hours in Service: 720															
Minimum Value: 1.9 ppm on Sep 26 12:00																	Minimum Daily Average: 2.0 ppm on Sep 26																	Hours of Data: 682															
Maximum Diurnal Average: 2.4 ppm at hour 21																	Minimum Diurnal Average: 2.2 ppm at hour 17																	Hours of Missing Data: 38															
Monthly Average: 2.30 ppm																	Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.4 P ₉₀ = 2.7 P ₉₉ = 3.3																	Hours of Calibration: 38															
																																		Percent Operational Time: 100.0															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Sep	2.4	Z	2.7	2.7	2.7	2.4	2.4	2.4	2.3	2.7	2.7	2.3	2.3	2.3	2.2	2.1	2.1	2.3	2.5	2.5	2.5	2.6	2.6	2.6	2.4	2.7																							
2-Sep	2.6	Z	2.6	2.8	3.0	3.3	3.2	3.3	3.3	3.3	3.1	2.8	2.7	2.4	2.3	2.0	2.1	2.1	2.6	2.9	2.4	2.2	2.2	2.2	2.7	3.3																							
3-Sep	2.2	Z	2.3	2.3	2.5	3.0	2.9	2.8	2.5	2.5	2.7	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.3	2.2	2.4	2.3	2.2	2.3	3.0																								
4-Sep	2.1	Z	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.6	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.6																								
5-Sep	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.4	2.3	2.3	2.2	2.1	2.4																							
6-Sep	2.2	Z	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.3																							
7-Sep	2.1	Z	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1																							
8-Sep	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	C	C	C	C	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.1	2.1																							
9-Sep	2.1	Z	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.5	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.5																							
10-Sep	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.1	2.2	2.4	2.2	2.1	2.1	2.1	2.2	2.4	2.6	3.5	3.1	2.8	2.4	2.3	3.5																							
11-Sep	2.3	Z	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.2	2.3	2.2	2.2	3.1	4.1	3.6	2.4	2.7	2.6	2.5	4.1																							
12-Sep	2.5	Z	2.4	2.7	3.1	3.3	3.5	3.1	2.6	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.4	3.5																							
13-Sep	2.3	Z	2.2	2.3	2.3	2.3	2.3	2.4	2.3	2.1	2.1	2.3	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.6	2.9	2.9	2.7	2.4	2.9																							
14-Sep	2.6	Z	2.9	3.1	2.7	2.4	2.3	2.2	2.3	2.5	2.7	2.6	2.3	2.3	2.2	2.2	2.2	2.2	2.6	2.6	3.1	3.3	3.0	2.8	2.6	3.3																							
15-Sep	2.7	Z	2.9	2.6	2.5	2.5	2.6	2.4	2.3	2.7	3.0	3.0	2.7	2.5	2.3	2.2	2.2	2.2	2.4	2.4	2.3	2.4	2.4	2.5	2.5	3.0																							
16-Sep	2.4	Z	2.3	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	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4																							
17-Sep	2.1	Z	2.2	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4	2.3	2.2	2.2	2.3	2.3	2.2	2.4																							
18-Sep	2.4	Z	2.3	2.4	2.2	2.5	2.8	2.7	2.7	2.7	2.5	2.4	2.4	2.3	2.4	2.4	2.4	2.3	2.4	2.6	2.7	2.6	2.6	2.5	2.5	2.8																							
19-Sep	2.6	Z	2.5	2.3	2.2	2.1	2.3	2.2	2.3	C	C	C	C	2.0	2.0	2.0	2.3	2.5	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.6																							
20-Sep	2.1	Z	2.1	2.1	2.1	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.5	3.2	2.6	2.5	2.3	3.2																							
21-Sep	2.4	Z	2.3	2.3	2.2	2.2	2.4	2.5	2.3	2.3	2.4	2.1	2.0	2.1	2.0	2.0	2.1	2.1	3.5	3.1	2.4	2.2	2.2	2.2	2.3	3.5																							
22-Sep	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.1	2.1	2.1	2.2	2.3	2.1	2.0	2.1	2.6	2.7	2.6	2.7	2.6	2.6	2.3	2.7																							
23-Sep	2.7	Z	2.8	2.8	2.7	3.0	2.6	2.4	2.4	2.3	2.3	2.2	2.4	2.3	2.3	2.3	2.2	2.3	2.4	2.4	2.5	2.7	3.0	2.5	3.0																								
24-Sep	2.8	Z	2.6	2.7	2.6	2.7	2.8	2.7	2.7	2.6	2.4	2.4	2.8	2.7	2.5	2.3	2.2	2.1	2.2	2.2	2.2	2.4	2.3	2.3	2.5	2.8																							
25-Sep	2.7	Z	2.1	2.1	2.1	2.0	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.7																							
26-Sep	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																							
27-Sep	2.0	Z	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.5	2.5	2.5	2.3	2.2	2.2	2.2	2.5																							
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	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.1	2.2	2.2	2.3	2.3	2.2	2.3																							
29-Sep	2.3	Z	2.4	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.3	2.3	2.3	3.3	2.8	3.0	3.2	3.2	3.4	2.4	2.5	3.4																							
30-Sep	2.3	Z	2.4	2.4	3.1	2.4	2.5	2.5	2.5	2.7	2.5	2.9	2.5	2.2	2.1	2.1	2.1	2.3	2.1	2.0	2.0	2.0	2.1	2.0	2.3	3.1																							
																								2.3	--	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.3	Diurnal Average	
																								2.8	--	2.9	3.1	3.1	3.3	3.5	3.3	3.3	3.3	3.3	3.1	3.0	2.8	2.7	2.5	2.4	2.4	3.3	3.5	4.1	3.6	3.3	3.4	3.0	Diurnal Maximum
Z - zerospan C - Calibration																																																	



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Lower Camp - September 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	73	10.70	10.70
2.1 - 3.0	583	85.48	96.19
3.1 - 10.0	26	3.81	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - September 2014

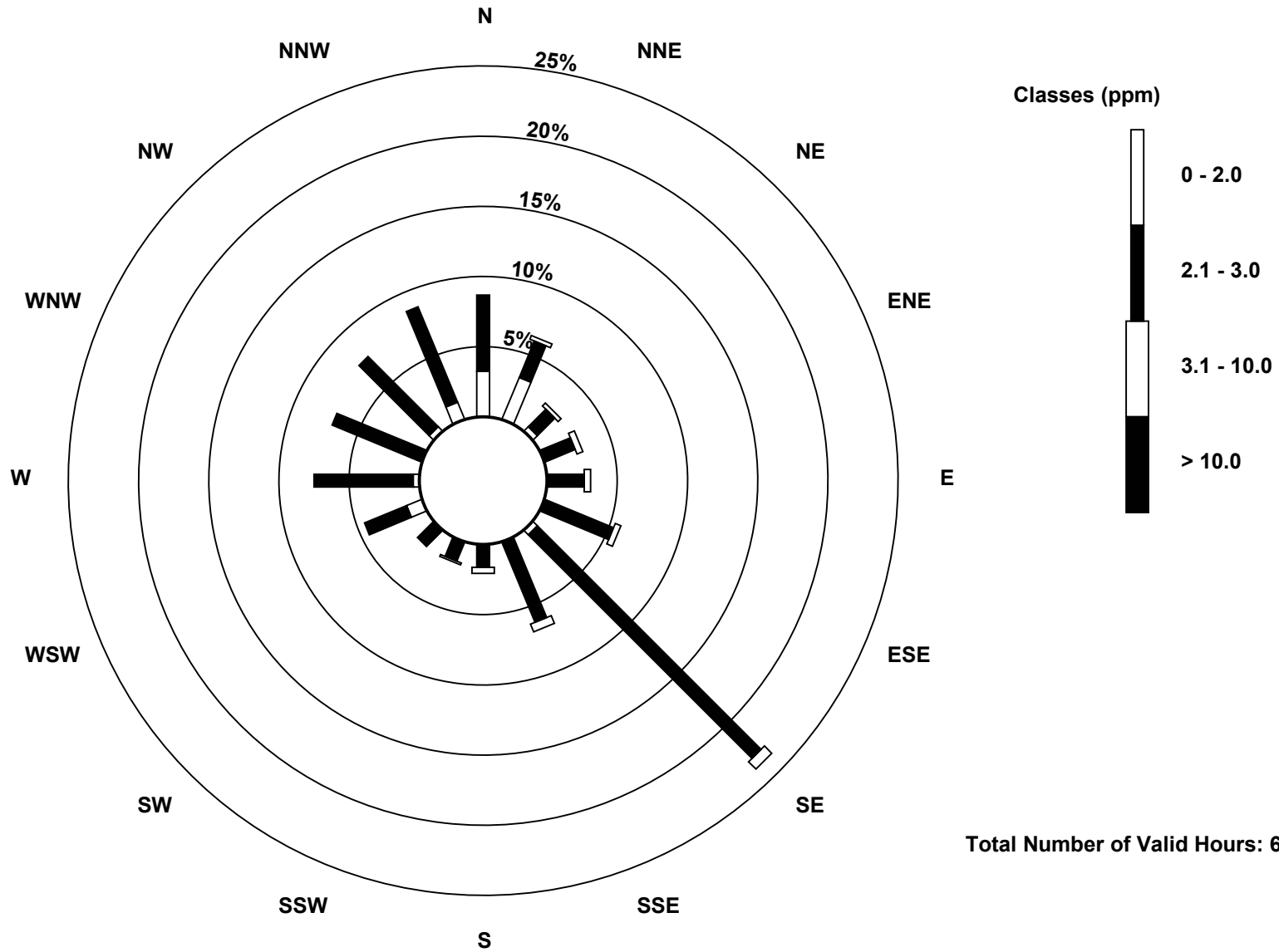
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	22	22	3	0	0	0	3	0	0	0	0	8	3	0	3	9	73
2.1 - 3.0	37	19	12	16	18	36	153	42	11	10	11	22	48	47	48	50	580
3.1 - 10.0	0	2	2	3	3	3	5	4	3	1	0	0	0	0	0	0	26
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	59	43	17	19	21	39	161	46	14	11	11	30	51	47	51	59	679

Total Number of Valid Hours: 679

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

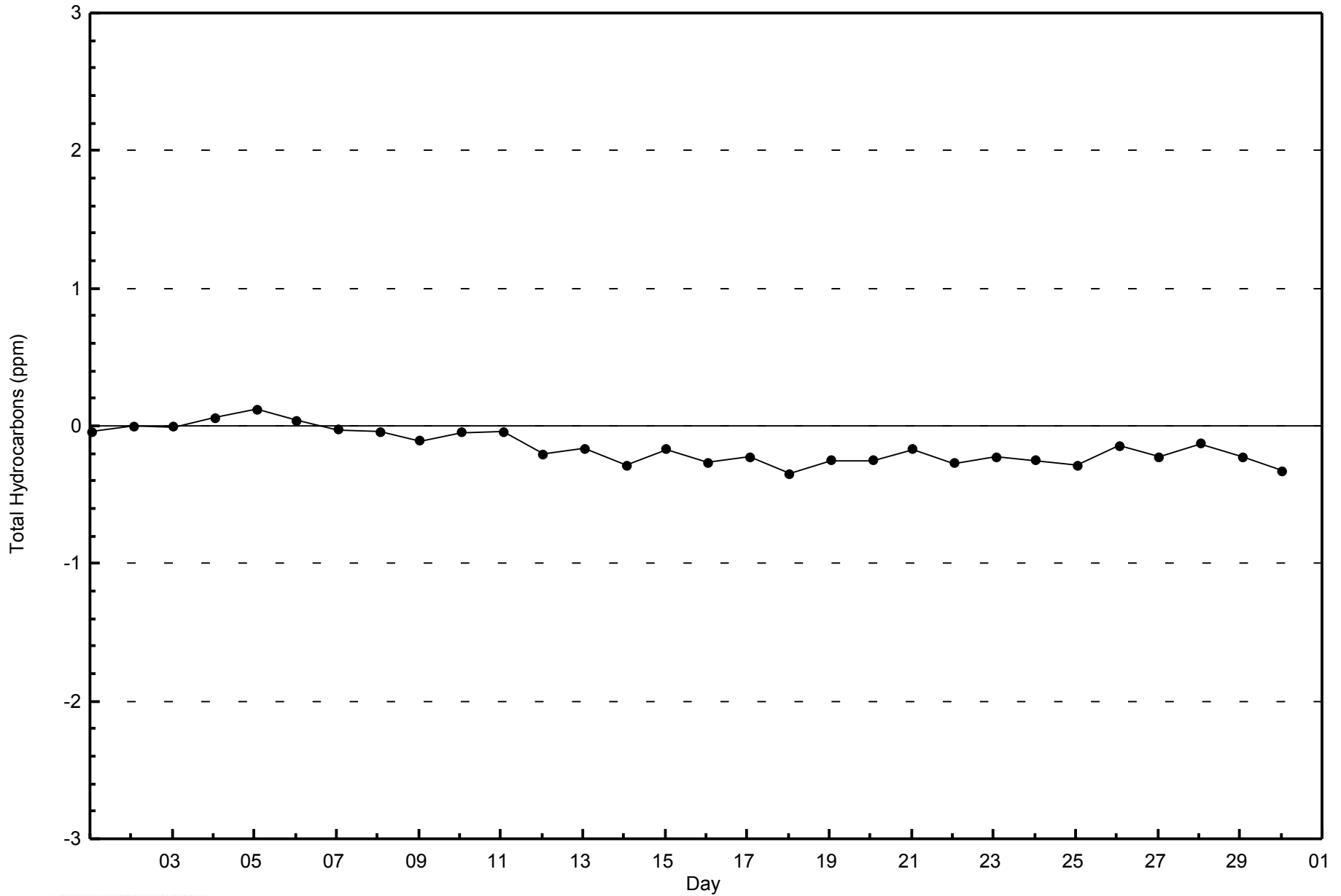
Total Hydrocarbons (THC) - ppm
Lower Camp (AMS 11)





WBEA
Zero Responses

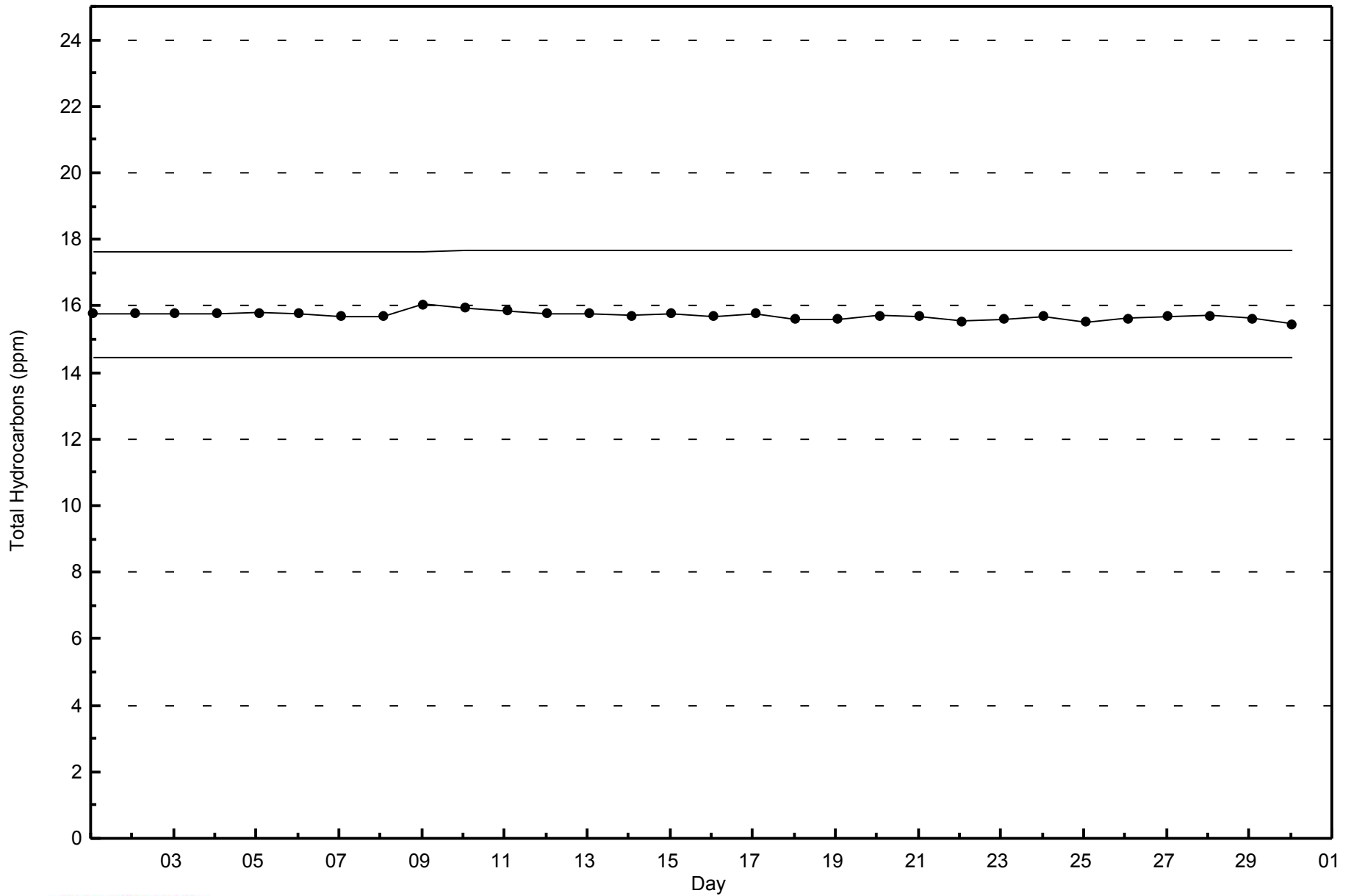
Total Hydrocarbons (THC) - ppm
Lower Camp - September 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Lower Camp - September 2014



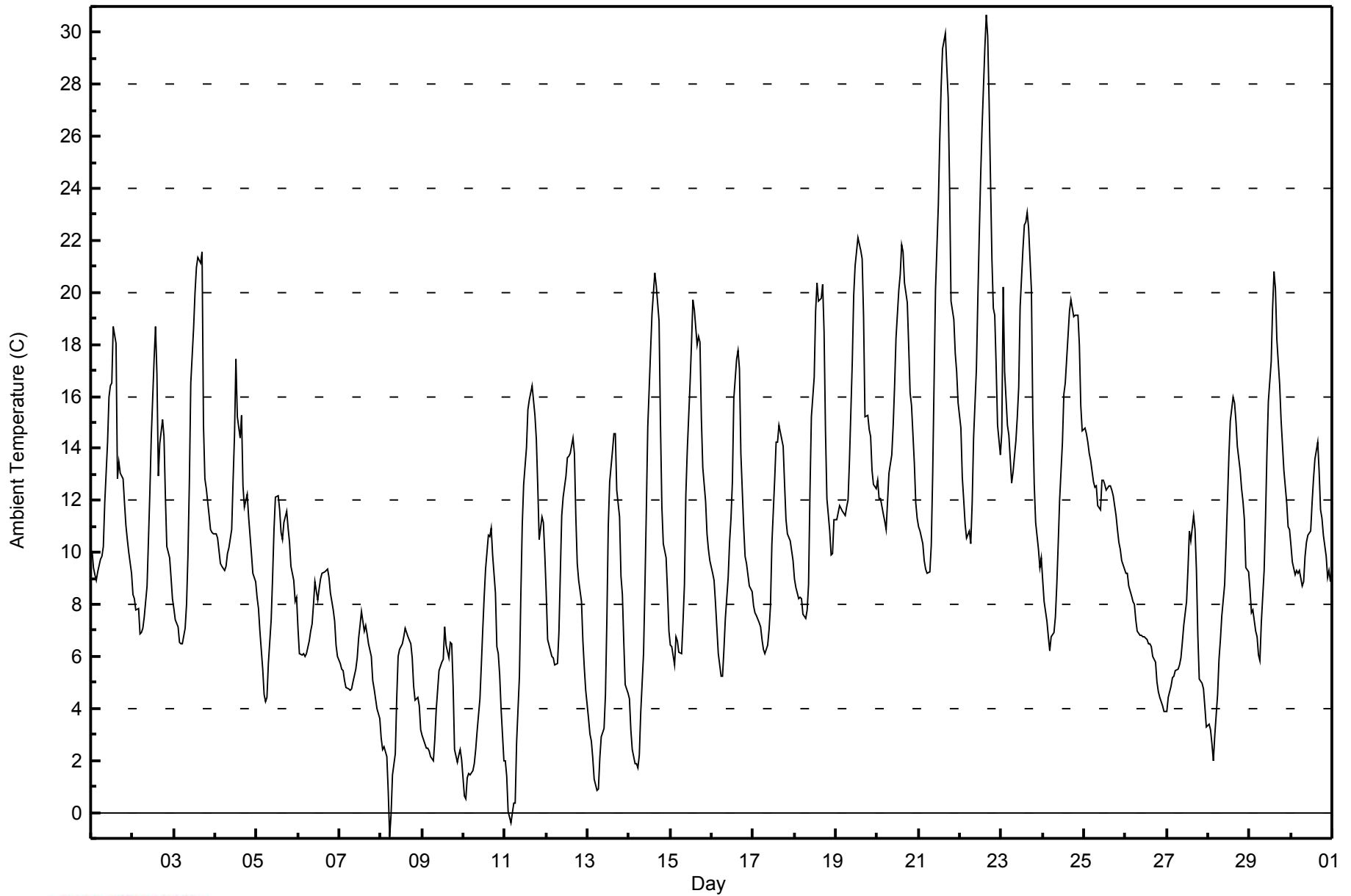


Maximum Value: 30.7 C on Sep 22 16:00		Maximum Daily Average: 18.4 C on Sep 22		Hours in Service: 720																																												
Minimum Value: -0.9 C on Sep 8 06:00		Minimum Daily Average: 3.9 C on Sep 9		Hours of Data: 720																																												
Maximum Diurnal Average: 15.9 C at hour 15		Minimum Diurnal Average: 6.4 C at hour 6		Hours of Missing Data: 0																																												
Monthly Average: 10.54 C		Percentiles: P ₁ = 0.5 P ₁₀ = 4.1 Q ₁ = 6.6 Median = 9.9 Q ₃ = 13.7 P ₉₀ = 18.6 P ₉₉ = 27.4		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	10.1	9.4	9.2	8.9	9.3	9.7	9.8	10.2	11.9	14.2	16.0	16.4	16.5	18.7	18.0	12.8	13.5	13.1	12.8	11.9	11.0	10.5	10.0	9.2	12.2	18.7																						
2-Sep	8.4	8.2	7.8	7.9	6.9	6.9	7.1	7.5	8.7	10.5	12.3	14.5	17.5	18.7	16.8	12.9	14.2	15.1	14.4	12.1	10.2	9.8	9.1	8.2	11.1	18.7																						
3-Sep	7.9	7.4	7.1	6.5	6.5	6.5	7.1	8.0	9.9	12.7	16.5	18.7	20.0	21.3	21.1	21.6	14.9	12.8	12.4	11.4	10.9	10.8	10.7	12.7	21.6																							
4-Sep	10.7	10.6	10.1	9.6	9.4	9.3	9.4	10.0	10.2	10.9	12.8	14.5	17.5	15.2	14.4	15.3	12.6	11.7	12.3	11.3	10.7	9.9	9.2	8.9	11.5	17.5																						
5-Sep	8.3	7.8	7.0	5.5	4.5	4.3	4.4	5.7	7.4	9.0	10.9	12.1	12.2	11.7	10.8	10.5	11.1	11.6	10.9	10.4	9.5	8.9	8.1	8.3	8.8	12.2																						
6-Sep	7.1	6.1	6.0	6.1	6.0	6.1	6.6	7.0	7.2	8.0	8.8	8.2	8.6	9.0	9.2	9.3	9.3	9.4	9.0	8.4	7.8	7.3	6.4	6.0	7.6	9.4																						
7-Sep	5.7	5.5	5.4	5.1	4.8	4.8	4.7	4.8	5.0	5.5	6.0	6.7	7.2	7.7	7.0	7.2	6.8	6.5	6.0	5.1	4.7	4.4	4.0	3.6	5.6	7.7																						
8-Sep	2.9	2.4	2.5	2.1	0.8	-0.9	-0.1	1.4	2.2	4.4	6.0	6.3	6.5	6.8	7.1	6.9	6.7	6.5	5.9	4.9	4.3	4.4	4.1	3.2	4.1	7.1																						
9-Sep	3.0	2.8	2.5	2.5	2.3	2.1	2.0	2.8	4.0	4.7	5.4	5.8	5.9	7.1	6.4	5.9	6.5	6.5	4.9	2.4	1.9	2.2	2.4	2.0	3.9	7.1																						
10-Sep	0.6	0.5	1.3	1.5	1.4	1.6	1.9	2.4	3.1	4.3	5.7	7.0	8.3	9.4	10.7	10.6	10.9	9.9	8.4	6.4	6.1	5.3	4.0	2.0	5.1	10.9																						
11-Sep	2.0	1.4	0.1	-0.4	0.0	0.3	0.3	2.7	5.3	8.4	11.1	12.6	14.0	15.5	15.9	16.1	16.4	15.3	14.3	12.6	10.5	11.4	11.2	9.9	8.6	16.4																						
12-Sep	8.4	6.7	6.2	6.0	5.9	5.7	5.7	6.9	9.2	11.4	12.2	13.0	13.7	13.7	13.8	14.4	13.8	11.4	9.6	8.9	8.1	6.6	5.6	4.7	9.2	14.4																						
13-Sep	3.6	3.0	2.7	2.1	1.3	0.8	0.9	2.1	2.9	3.3	4.5	7.4	11.0	12.7	13.9	14.6	14.6	12.4	11.4	9.1	8.4	6.5	4.9	4.6	6.6	14.6																						
14-Sep	4.4	3.2	2.4	1.9	1.9	1.7	2.2	3.8	6.1	8.7	11.7	14.8	17.7	19.2	20.0	20.7	20.3	18.9	15.0	11.7	10.4	9.8	8.5	7.0	10.1	20.7																						
15-Sep	6.4	6.4	5.7	6.7	6.6	6.2	6.1	7.4	8.8	12.2	13.9	16.5	18.0	19.7	19.3	18.0	18.3	18.1	15.2	13.3	12.0	10.7	10.1	9.7	11.9	19.7																						
16-Sep	9.2	8.9	8.1	7.1	6.1	5.2	5.2	6.2	7.5	9.0	10.4	11.3	12.7	15.9	17.4	17.8	17.1	13.8	11.0	9.9	9.6	9.1	8.7	8.5	10.2	17.8																						
17-Sep	7.9	7.7	7.6	7.3	7.1	6.7	6.3	6.1	6.4	7.0	7.9	10.4	12.8	14.3	14.3	14.9	14.6	14.1	12.6	11.2	10.7	10.4	10.1	9.7	9.9	14.9																						
18-Sep	9.0	8.6	8.2	8.3	8.2	7.6	7.5	7.8	8.8	12.4	15.2	16.7	19.3	20.4	19.7	19.8	20.3	18.5	14.7	12.1	10.8	9.9	10.0	11.2	12.7	20.4																						
19-Sep	11.3	11.5	11.8	11.7	11.6	11.4	11.8	12.0	13.5	17.3	19.9	21.0	21.5	22.1	21.6	21.3	19.1	15.2	15.3	14.7	14.4	13.1	12.6	12.4	15.3	22.1																						
20-Sep	12.8	12.1	12.1	11.4	11.2	10.9	12.0	13.0	13.7	14.9	16.4	18.2	20.1	20.7	21.8	21.6	20.4	19.6	17.9	16.1	15.6	13.4	11.9	11.3	15.4	21.8																						
21-Sep	11.0	10.8	10.3	9.7	9.4	9.2	9.3	10.3	13.0	16.6	20.1	23.3	25.9	27.9	29.4	29.9	28.7	27.5	24.1	19.6	18.9	17.6	16.9	15.8	18.1	29.9																						
22-Sep	14.8	12.9	12.0	11.1	10.6	10.8	10.3	11.9	14.4	17.1	19.7	22.1	24.4	26.3	29.4	30.7	29.9	27.4	21.3	19.4	19.1	17.1	14.9	13.7	18.4	30.7																						
23-Sep	14.6	20.2	16.9	14.9	14.5	13.6	12.7	13.1	14.3	15.2	16.4	19.5	21.7	22.6	22.7	23.1	22.5	20.1	15.2	12.6	11.1	10.1	9.4	9.8	16.1	23.1																						
24-Sep	8.9	8.1	7.4	6.8	6.2	6.8	6.9	7.5	8.8	10.3	12.0	14.2	16.1	16.5	17.5	19.3	19.7	19.4	19.1	19.1	19.1	18.0	15.6	14.7	13.3	19.7																						
25-Sep	14.8	14.6	14.2	13.8	13.6	12.7	12.5	12.5	11.8	11.7	12.8	12.8	12.6	12.4	12.6	12.6	12.4	12.2	11.4	10.9	10.4	10.1	9.7	9.3	12.3	14.8																						
26-Sep	9.2	9.2	8.7	8.3	8.1	8.0	7.4	6.9	6.8	6.8	6.7	6.7	6.5	6.5	6.4	6.0	5.8	5.0	4.6	4.4	4.1	3.9	3.9	6.5	9.2																							
27-Sep	3.9	4.4	4.8	5.2	5.2	5.4	5.5	5.7	6.0	6.5	7.2	8.1	9.4	10.8	10.5	11.4	10.9	9.3	6.8	5.1	4.9	4.7	4.0	3.3	6.6	11.4																						
28-Sep	3.4	3.2	2.6	2.0	3.0	4.5	5.9	6.6	7.6	8.8	10.3	12.0	13.7	15.0	16.0	15.8	15.1	14.1	13.2	12.4	12.0	11.2	9.4	9.2	9.5	16.0																						
29-Sep	8.6	7.7	7.8	7.0	6.8	6.1	5.9	7.3	9.3	11.4	13.8	15.8	17.3	19.4	20.8	20.1	18.2	16.5	15.1	14.1	13.1	11.9	11.0	10.9	12.3	20.8																						
30-Sep	10.3	9.6	9.1	9.3	9.2	9.3	8.7	8.9	9.8	10.4	10.7	10.8	11.9	12.8	13.6	14.2	13.1	11.7	11.3	10.7	9.8	9.1	9.3	8.9	10.5	14.2																						
																								8.0	7.7	7.3	6.9	6.6	6.4	6.5	7.3	8.5	10.1	11.8	13.2	14.7	15.7	15.9	15.8	15.5	14.2	12.6	11.1	10.4	9.6	8.9	8.3	Diurnal Average
																								14.8	20.2	16.9	14.9	14.5	13.6	12.7	13.1	14.4	17.3	20.1	23.3	25.9	27.9	29.4	30.7	29.9	27.5	24.1	19.6	19.1	18.0	16.9	15.8	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Lower Camp - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Lower Camp - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	4	0.56	0.56
0 - 10	362	50.28	50.83
10 - 20	310	43.06	93.89
> 20	44	6.11	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 30 km/h on Sep 19 22:00	Maximum Daily Speed Average: 12.6 km/h on Sep 20	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 9 03:00	Minimum Daily Speed Average: 0.2 km/h on Sep 23	Hours of Data: 717
Maximum Diurnal Speed Average: 2.4 km/h at hour 14	Minimum Diurnal Speed Average: 0.1 km/h at hour 18	Hours of Missing Data: 3
Monthly Average Velocity: 0.3 km/h 178.5 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 11 P ₉₀ = 15 P ₉₉ = 22	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	SW1	ESE2	ESE2	ESE4	SE5	SE6	ESE5	SE6	ESE3	SE6	SE7	SE6	SE3	SSE7	WSW8	ENE4	SE5	E2	NE0	W1	ESE1	W1	NNE1	NNE1	SE2.8	WSW8
2-Sep	W2	NW1	ENE3	ENE2	SE1	ENE4	NE2	ENE3	E3	E3	NNE5	NE5	WSW3	W6	NW8	NNW8	NW3	NW5	WNW5	NNW1	WNW3	WNW3	NW2	NNE1	NNW1.7	NNW8
3-Sep	NW2	NNW1	N1	ENE3	NNE2	E5	ESE7	ESE9	SE9	SE7	SE4	W9WSW10	WSW10	WSW9	WSW9	SSW6	NE5	SE7	SE7	E2	NNE1	SSE6	SE10	SSE2.1	WSW10	
4-Sep	SSE11	SSE10	SE9	SE9	SE8	SE8	SE8	SE10	SE12	SSE6	SE9	SE9	SE8	S3	WSW1	NNW1	N4	W4	NNW7	NNW6	NNW7	NNW8	NNW9	N11	SE2.8	SE12
5-Sep	N7	NNW7	NW6	WNW3	NW2	WSW2	W3	NE1	E3	ESE6	SE7	SSE9	S7	S8	S5	ESE8	ESE13	SE12	SSE4	SSW4	WNW3	NW4	WNW7	NW11	SSE1.2	ESE13
6-Sep	WNW5	WNW2	NNW1	WNW3	NW1	NNE2	NNW2	NNE4	NNE5	NE5	ENE3	NNW5	N2	NW3	W1	NW3	N1	NE6	N7	N10	N11	N12	N13	N13	N4.4	N13
7-Sep	N15	N13	N13	N14	N13	NNE13	N10	N11	N11	N13	N12	NNE13	NNE15	N17	N18	N17	NNW17	N18	N15	NNW8	NNW7	NNW9	NNW9	NNW7	N12.5	N18
8-Sep	N7	NNW7	NNW7	NNW8	N5	NNW2	NW3	NW6	NW7	NNW7	N9	N11	NNW13	NNW8	N8	N11	NNE13	N11	NNE6	N2	NNE3	N6	N4	NW0	N6.4	NNE13
9-Sep	E1	NNW1	E0	NW2	WNW4	WNW2	ENE1	ENE4	ENE2	NW3	W4	W5	ENE3	SW3	ENE6	ESE4	ENE1	NNW2	NW2	NNW1	WNW2	W3	W3	NW1	NW0.8	ENE6
10-Sep	W2	N1	NNW3	NW3	NE1	NW2	NW5	NNW5	NW4	N5	N5	N5	W7	WSW4	WSW10	WSW6	SSW6	S6	S5	SSE6	SSE8	SSE8	ESE4	E6	WSW1.1	WSW10
11-Sep	SE5	SE5	ESE6	ESE6	E11	SSE7	SSE6	SSE11	SSE11	SSE9	SSW13	SSW15	SW16	SSW14	SW18	SW15	SW21	SW10	S6	S6	SSW4	WSW11	W16	W12	SSW7.6	SW21
12-Sep	NW5	SW3	SE3	SE4	SE6	SE5	E0	NE1	NNW6	NNW14	NNW15	NNW15	NNW17	NNW14	NNW13	NNW13	NNW10	NNW11	NNW4	NW3	NW9	WNW2	NW1	WNW3	NNW5.6	NNW17
13-Sep	W1	W2	WNW2	NW1	W4	W4	WSW2	E3	ESE6	NNE2	NNE3	ENE4	ESE8	ESE6	ESE5	SE7	SE8	SE6	SE6	SE5	NE2	N1	WNW1	SE5	ESE2.1	SE8
14-Sep	ESE5	ESE2	NE1	NE1	SE4	SE6	ESE10	ESE8	ESE11	SE8	SE9	SE8	SE10	ESE8	W1	W8	WSW9	SW6	S2	NNE5	ENE2	ESE1	ESE2	AF	SE3.5	ESE11
15-Sep	ESE3	E3	E2	SE7	SE7	SE6	SE6	SE7	SE8	SE6	E3	ESE4	M	M	N8	N9	NE9	N8	WNW5	NW2	WNW3	W4	WNW4	W4	E1.6	N9
16-Sep	WNW5	NW7	NW6	NNW4	N3	NW3	NW3	NW5	NNW6	NNE7	NNE9	N8	N6	WSW4	SE6	SE8	SE11	SE14	SE17	SE17	SE17	SE18	SE19	SE16	ESE3.9	SE19
17-Sep	SE15	SE17	SE15	SE12	SE13	SE18	SE15	SE14	SE12	SSE10	SSE9	SE12	SE13	SSE10	SSE12	SSE12	SSE9	SE12	SE17	SE13	SE10	SE7	SSE5	SE12.1	SE18	
18-Sep	SSE5	ESE3	SE5	SE7	SE8	SSE3	WNW4	WNW5	NW4	WNW4	NW5	NW5	WSW8	W7	NNW5	WNW6	WNW3	SE3	E1	NNW0	ENE1	NE0	ESE3	SE7	SW0.9	SE8
19-Sep	SE9	SE9	SE9	SSE9	SE7	SE8	SE9	SE11	SE10	SSW7	WSW17	WSW18	WSW19	WSW22	WSW19	WSW21	WNW27	WNW21	WSW23	W21	W29	W30	W22	W17	WSW10.9	W30
20-Sep	W21	W18	W19	W19	WNW13	WNW10	W21	WNW25	WNW19	WNW18	WNW17	WNW15	W18	W18	W13	WNW17	W13	WSW13	WSW10	SW8	SSW9	ESE4	SE9	SE8	W12.6	WNW25
21-Sep	SE10	SE13	SE12	SE7	SE8	SE8	SE11	SE12	SE12	SE9	SE8	WSW13	WSW9	W11	W10	W9	WSW7	SW6	SSE5	SE9	SE9	SE9	SE11	SE12	SSE6.1	WSW13
22-Sep	SE9	ESE8	SE6	SE4	SE6	SE6	SE5	SE9	SE9	SE10	SE11	SE9	SE11	SE10	SE10	SW6	WSW13	WSW6	NNE2	W6	W8	ESE0	E2	ESE4	SE4.5	WSW13
23-Sep	N2	WNW10	WNW0	SE1	E3	WNW4	WNW3	WNW4	NNW3	NW3	N3	E1	SE6	SSE4	SE1	SE2	SE4	SE4	ESE1	E1	E2	ENE1	ENE1	NW3	N0.2	WNW10
24-Sep	W3	NE1	WNW2	WNW2	NNE1	NW2	NW4	NW4	NNW6	NW6	NNW5	NNW5	NNW5	NNW7	NE2	ESE12	SE16	SE16	SE16	SE15	SE11	W17	W4	SE7	SE1.4	W17
25-Sep	SSW8	WSW15	WSW16	W15	W14	WSW13	WSW17	WNW22	W19	W19	W19	WNW21	NW17	WNW11	NNW10	NNW11	NNW9	NNE10	NNE11	NNE9	NNE7	NNE7	NE11	NNE6	WNW8.9	WNW22
26-Sep	NNE5	NNE5	NE10	NE9	NNE8	NNE9	NNE7	NNE12	NNE10	NNE11	N13	NNE12	NNE11	NNE13	N17	N16	N14	N18	N18	N18	N18	N16	N15	N15	NNE11.9	N18
27-Sep	NNW10	NNW9	NW10	NW9	NNW8	NW10	NW10	NW9	NW7	N8	NE6	ESE4	SSE2	WNW4	ESE4	SE7	SSE4	E2	ESE2	SE5	SE8	SE8	SE9	N2.2	NW10	
28-Sep	SE11	SSE10	SE7	SE7	SE9	SE11	SSE15	SSE15	SSE16	SSE17	SSE16	SSE17	SSE17	SSE16	S14	S15	SSE14	SSE9	SSE11	SSE11	SSE12	SSE11	SE9	SE7	SSE12.1	SSE17
29-Sep	SE7	SE9	SE9	SE9	SE7	SE7	SE10	ESE13	ESE16	SE16	SE15	SE13	SE11	SE8	S12	SSW14	SSW13	S6	S7	S7	SSE3	SE3	SE5	SE6	SSE8.4	ESE16
30-Sep	SE6	SE6	SE6	SE5	ESE1	WNW2	WNW0	SE6	SE3	N2	NW4	NW5	NNW7	NNW8	N5	NW4	WNW6	NNW5	N4	N5	N3	W1	NNW3	NNE7	N1.6	NNW8

SE1.0 SSE0.6 SE0.7 SE0.9 ESE1.7 SE1.5 SSE1.4 ESE1.4 ESE2.0 ESE0.8 N0.3	WNW1.1 WSW1.5 WSW2.4 W2.2 W1.9	WSW1.7 W0.1 SE0.5 SE0.9 SSE0.2 W1.0	NNNE0.5 ENE0.9	Diurnal Average
W21 W18 W19 W19 W14 SE13 W21	WNW25 WNW19 W19 W19	WNW21 WSW19 WSW22 WSW19	WSW21 WNW27 WNW21 WSW23 W21 W29 W30 W22 W17	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Lower Camp - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Sep 19 18:00	Hours in Service: 720 Hours of Data: 717 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6
Minimum Value: 1 km/h on Sep 9 19:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 5 P 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	2	1	1	2	2	2	2	1	1	2	2	2	3	5	6	2	2	1	1	1	1	1	1	6
2-Sep	2	1	2	2	1	2	2	2	1	1	1	1	2	2	6	7	1	1	1	1	2	1	1	1	7
3-Sep	1	1	2	2	2	2	2	2	2	2	1	2	3	3	3	3	4	6	2	2	2	1	3	3	6
4-Sep	3	3	2	2	2	2	3	3	4	2	3	3	3	3	2	2	8	2	3	2	2	2	2	3	8
5-Sep	2	2	1	2	2	1	1	1	2	3	3	3	3	3	2	6	3	4	2	2	1	2	2	3	6
6-Sep	2	1	2	1	2	2	1	2	2	2	2	1	2	1	2	1	2	2	2	4	3	3	3	4	4
7-Sep	3	4	3	3	3	3	2	3	2	3	3	3	3	4	5	4	4	5	4	2	2	2	2	2	5
8-Sep	1	1	2	2	2	1	1	1	1	2	4	4	3	3	3	3	3	3	2	2	1	2	2	1	4
9-Sep	1	1	1	2	1	1	2	1	1	1	1	2	3	2	4	1	1	1	1	1	1	1	1	1	4
10-Sep	2	2	2	2	2	1	2	1	1	1	1	2	2	3	3	3	3	2	2	2	3	2	2	2	3
11-Sep	2	1	2	2	3	3	2	3	4	4	4	5	5	5	6	6	6	5	2	2	2	3	4	4	6
12-Sep	2	2	1	2	2	1	1	1	3	4	4	4	5	4	4	3	3	6	1	2	6	1	2	2	6
13-Sep	1	1	1	1	1	1	1	2	2	1	1	2	2	1	1	2	2	1	1	2	1	1	1	1	2
14-Sep	2	1	2	1	2	2	3	2	2	2	3	3	2	3	3	2	2	2	1	1	1	1	1	1	3
15-Sep	1	1	1	2	2	1	1	2	2	1	1	1	M	M	3	3	3	2	2	1	1	1	1	1	3
16-Sep	1	2	2	1	2	2	1	1	1	3	3	2	3	2	2	2	4	4	5	5	5	6	6	5	6
17-Sep	5	6	5	5	5	5	5	6	5	4	4	3	4	4	4	4	4	3	4	5	4	3	3	2	6
18-Sep	2	2	2	3	3	2	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	3	2	3
19-Sep	3	3	3	3	3	3	3	2	3	5	4	5	4	6	6	6	9	10	8	5	7	6	6	4	10
20-Sep	4	4	4	4	5	3	4	5	4	4	4	3	5	4	5	4	4	3	2	2	2	2	4	2	5
21-Sep	3	3	3	2	3	3	3	3	3	3	2	6	3	4	3	2	3	2	1	2	3	2	2	2	6
22-Sep	2	2	2	1	2	2	2	3	2	3	3	2	2	2	2	3	3	2	1	2	2	2	1	1	3
23-Sep	3	3	1	1	2	1	1	1	2	1	1	2	1	2	2	2	2	1	1	1	1	1	1	1	3
24-Sep	1	1	2	1	1	1	2	2	2	2	1	1	2	3	3	4	5	4	4	5	3	5	4	2	5
25-Sep	4	4	4	4	4	3	4	5	4	4	5	4	3	3	3	3	2	3	3	2	2	2	3	2	5
26-Sep	2	2	3	2	2	2	2	2	2	2	2	3	3	3	3	4	4	3	4	5	5	4	4	4	5
27-Sep	3	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	1	1	1	2	2	3	3
28-Sep	3	3	2	3	3	4	5	5	5	6	6	6	5	5	5	5	5	3	4	3	4	4	3	2	6
29-Sep	2	2	2	2	2	2	3	3	3	4	5	4	4	3	4	6	5	2	3	2	2	2	1	1	6
30-Sep	1	2	2	2	1	1	1	2	2	1	1	1	3	2	2	2	3	1	2	2	2	1	2	2	3

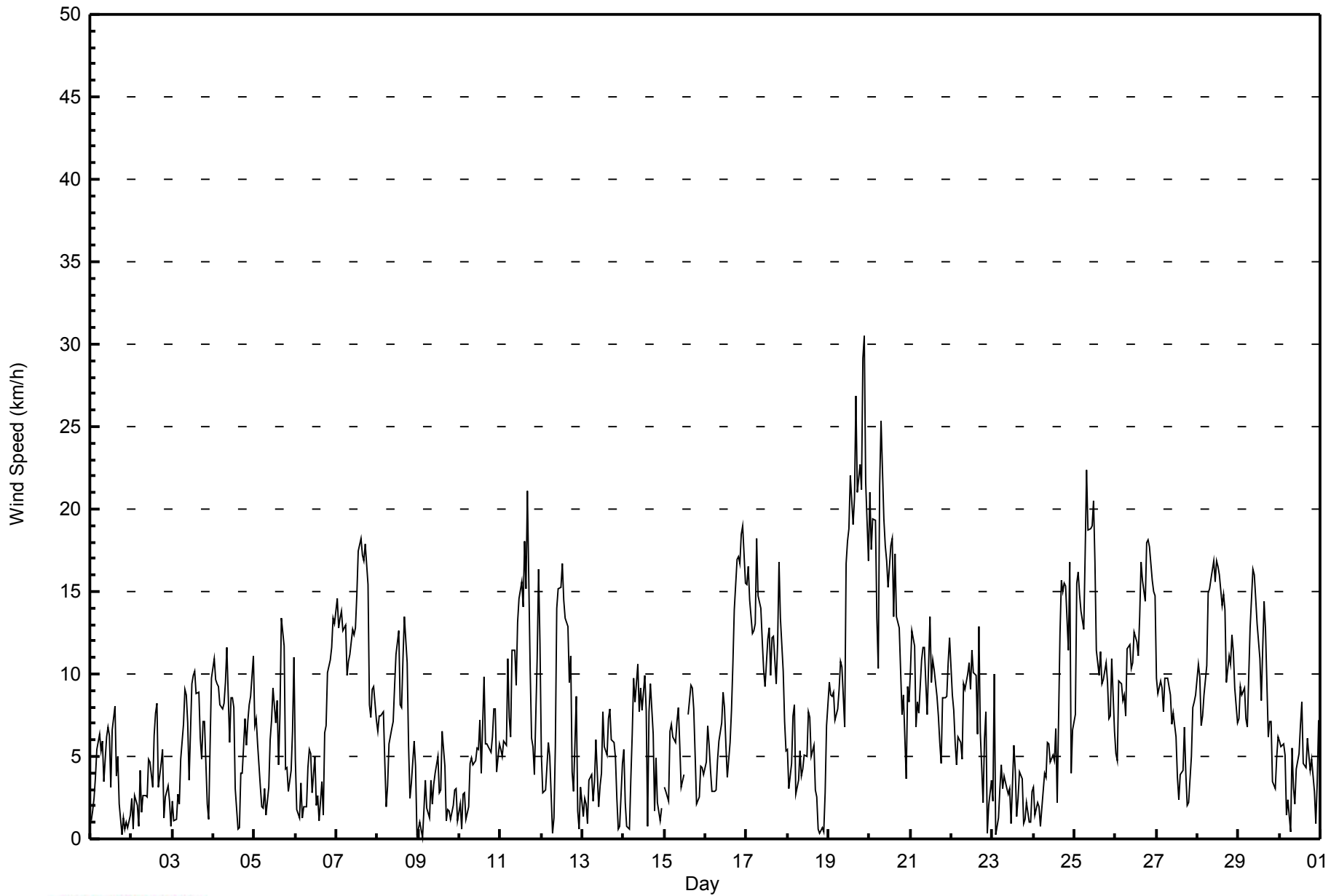
5	6	5	5	5	5	5	5	6	5	6	6	6	5	6	6	7	9	10	8	5	7	6	6	5	
Diurnal Maximum																									

M - Maintenance AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Lower Camp - September 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Lower Camp - September 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	278	38.77	38.77
6 - 11	285	39.75	78.52
12 - 19	139	19.39	97.91
20 - 28	13	1.81	99.72
29 - 38	2	0.28	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 717

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Lower Camp - September 2014

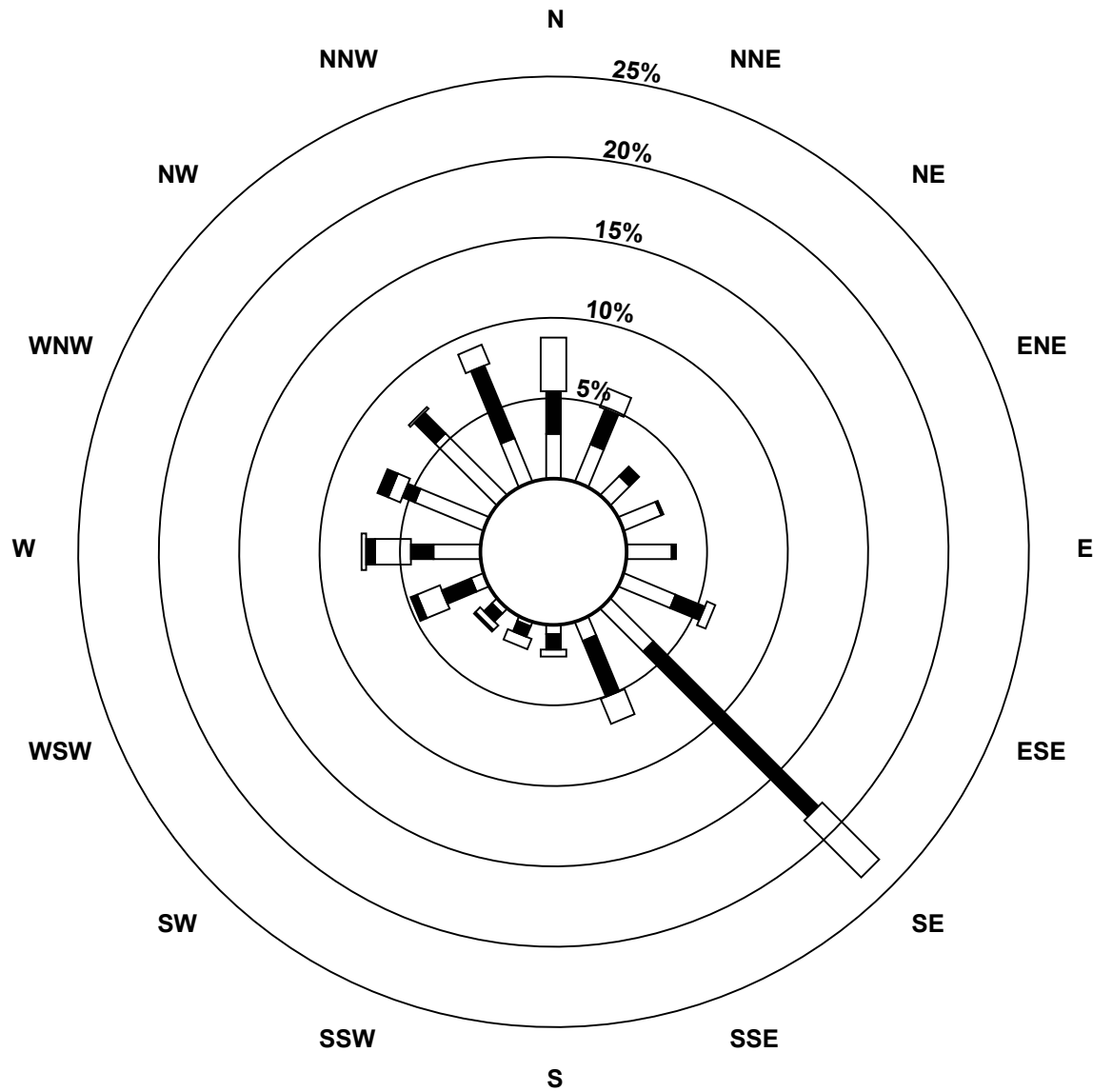
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	20	18	12	18	20	25	27	9	4	2	3	6	21	33	39	21	278
6 - 11	19	17	6	1	2	14	104	27	7	5	5	14	10	6	13	35	285
12 - 19	24	9	0	0	0	4	36	12	3	5	3	11	16	6	1	9	139
20 - 28	0	0	0	0	0	0	0	0	0	0	1	3	4	5	0	0	13
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	63	44	18	19	22	43	167	48	14	12	12	34	53	50	53	65	717

Total Number of Valid Hours: 717

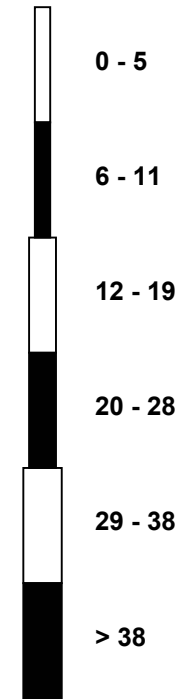
Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Lower Camp (AMS 11)**



Classes (km/h)



Total Number of Valid Hours: 717



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg
Lower Camp - September 2014

Direction of Maximum Speed: 269 deg on Sep 19 22:00		Hours in Service: 720
Direction of Maximum Daily Speed Average: 272.7 deg on Sep 20		Hours of Data: 717
Direction of Minimum Speed: 82 deg on Sep 9 03:00	Direction of Minimum Daily Speed Average: 0.2 deg on Sep 23	Hours of Missing Data: 3
Monthly Average Direction: 294.4 deg		Percent Operational Time: 99.6

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	220	114	108	120	134	135	123	131	120	127	132	130	138	148	239	65	132	94	40	264	106	281	27	31	132.7
2-Sep	274	305	59	65	131	73	54	76	95	85	21	39	257	267	319	345	317	320	291	333	286	289	311	24	339.3
3-Sep	306	290	360	57	28	101	110	120	134	138	264	256	257	256	256	203	53	130	139	88	21	150	137	167.8	
4-Sep	147	149	145	144	144	138	136	137	127	152	131	134	180	239	339	5	278	333	340	347	331	338	351	126.3	
5-Sep	360	329	306	296	309	246	273	49	100	120	146	154	169	171	177	120	118	131	147	204	283	318	303	323	154.7
6-Sep	290	302	331	284	321	17	327	14	29	45	66	328	355	323	265	311	6	43	355	8	2	355	353	353	355.6
7-Sep	356	0	2	7	8	19	6	7	8	11	10	23	14	1	356	359	341	355	356	332	329	328	332	344	359.3
8-Sep	6	328	327	341	6	334	316	317	319	330	359	8	334	335	351	5	20	8	23	4	21	8	11	306	352.1
9-Sep	82	332	82	324	282	286	58	59	61	306	264	276	67	235	68	103	74	341	306	342	293	274	272	316	325.7
10-Sep	267	1	342	307	55	318	307	338	310	354	10	353	279	257	256	256	202	179	176	162	164	153	112	90	250.0
11-Sep	138	138	113	103	81	149	164	151	149	162	209	207	214	201	215	216	228	214	183	178	202	252	260	271	199.0
12-Sep	310	222	134	128	138	138	81	34	342	341	338	332	340	336	344	341	333	327	327	308	324	295	318	300	335.5
13-Sep	280	280	294	304	279	259	238	89	103	25	13	74	113	106	108	128	137	137	143	128	53	360	283	127	118.4
14-Sep	123	109	52	47	130	126	123	115	122	133	132	134	130	118	266	263	245	226	170	12	65	115	106	AF	134.6
15-Sep	103	79	92	137	140	138	137	131	130	136	88	110	M	M	355	10	39	11	300	308	296	275	282	279	83.4
16-Sep	298	323	326	333	359	323	312	319	329	12	31	8	3	245	133	134	134	137	133	125	127	130	130	127	110.6
17-Sep	132	126	125	131	133	137	132	138	137	145	165	159	139	136	153	160	151	150	135	127	132	128	131	154	138.1
18-Sep	157	123	129	130	133	149	295	287	311	286	311	305	252	264	330	289	282	143	98	348	60	56	114	138	233.0
19-Sep	133	145	143	147	134	136	134	136	133	199	249	247	258	254	252	255	284	283	256	267	272	269	277	272	249.5
20-Sep	267	265	269	270	287	288	274	288	294	295	297	295	271	267	274	288	273	253	245	222	201	104	131	141	272.7
21-Sep	129	136	136	133	134	136	140	134	133	136	140	237	250	265	263	264	248	217	162	138	140	137	140	139	160.4
22-Sep	134	111	125	138	127	124	126	128	133	130	127	136	132	132	139	236	253	251	19	265	268	114	90	117	144.8
23-Sep	355	297	298	135	94	284	303	296	329	315	360	80	130	150	133	125	145	138	102	90	101	57	65	304	351.3
24-Sep	273	39	295	286	16	318	305	309	329	315	335	339	340	345	56	121	131	128	131	134	145	262	260	142	139.4
25-Sep	200	256	257	259	260	245	253	289	273	272	269	300	308	297	337	343	340	13	20	22	31	29	38	14	294.8
26-Sep	24	17	43	36	24	22	29	15	25	23	16	360	12	25	18	5	4	7	1	359	5	3	5	358	12.0
27-Sep	347	337	325	326	328	321	317	319	322	326	349	39	108	157	282	104	130	150	96	103	143	141	137	126	350.0
28-Sep	135	148	146	132	139	145	154	152	153	159	156	154	154	164	172	174	167	164	159	156	156	149	132	141	154.4
29-Sep	131	133	135	130	136	137	130	121	120	130	128	139	146	144	177	204	205	177	191	187	157	144	132	145	147.4
30-Sep	137	143	133	135	108	295	297	125	126	4	325	311	327	340	356	312	299	348	356	4	8	281	342	25	0.4

138.2	163.6	123.8	123.8	113.4	134.6	160.2	116.4	110.6	107.0	10.7	289.6	254.1	248.1	273.9	280.7	241.8	269.2	139.9	130.3	157.6	280.3	22.9	73.7	
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
Lower Camp - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 111 deg on Sep 4 16:00	Hours in Service: 720 Hours of Data: 717 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6
Minimum Value: 11 deg on Sep 20 01:00	
Percentiles: P ₁ = 12 P ₁₀ = 16 Q ₁ = 20 Median = 27 Q ₃ = 41 P ₉₀ = 69 P ₉₉ = 98	

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	78	54	66	29	26	32	34	38	66	18	23	25	34	45	46	68	24	44	94	80	94	72	90	83	94
2-Sep	37	85	56	62	81	39	93	73	37	53	22	28	84	35	33	73	48	35	23	83	61	27	41	37	93
3-Sep	25	69	59	39	79	33	23	17	27	32	67	20	24	23	25	27	58	97	32	23	51	69	36	23	97
4-Sep	23	24	22	22	21	27	35	28	26	43	29	29	31	77	106	111	86	60	29	31	30	23	18	21	111
5-Sep	29	19	25	48	43	41	27	88	43	34	42	36	43	33	50	40	26	32	49	37	49	43	23	13	88
6-Sep	34	53	63	29	83	60	54	32	28	34	54	23	80	57	89	68	98	31	21	20	19	21	19	21	98
7-Sep	20	22	19	17	19	17	19	18	18	18	22	17	16	20	22	22	20	21	19	16	17	14	15	23	23
8-Sep	26	14	17	19	34	55	35	20	20	29	43	26	24	35	30	28	20	20	19	43	38	27	35	94	94
9-Sep	99	58	93	53	47	41	94	26	49	30	29	41	72	56	65	27	71	71	61	69	45	35	32	61	99
10-Sep	55	106	71	84	90	60	30	37	25	28	14	37	24	72	23	58	51	33	28	26	27	26	61	40	106
11-Sep	25	25	30	36	25	46	47	26	30	46	28	32	26	35	25	27	16	23	29	31	46	15	13	28	47
12-Sep	39	69	48	29	24	23	95	80	28	22	22	20	23	22	24	22	20	22	21	40	45	38	91	45	95
13-Sep	33	36	38	82	26	14	50	58	28	76	48	49	20	30	24	18	24	19	21	27	46	94	93	24	94
14-Sep	33	48	86	88	67	33	24	18	18	28	28	19	19	102	26	17	24	81	16	63	85	52	AF	102	102
15-Sep	23	40	34	23	20	20	27	32	25	25	26	27	M	M	15	17	20	28	24	70	78	26	26	16	78
16-Sep	31	15	25	26	30	53	59	19	24	33	24	25	52	72	30	26	27	29	24	24	23	24	23	26	72
17-Sep	26	23	25	33	30	32	24	30	31	33	35	39	34	29	36	34	31	29	28	21	34	37	41	36	41
18-Sep	20	66	32	29	30	63	25	20	24	31	39	44	20	23	41	20	56	25	101	78	32	63	44	23	101
19-Sep	23	29	27	23	29	36	25	19	20	58	16	17	15	14	13	14	19	29	19	13	12	11	16	14	58
20-Sep	11	12	12	13	26	15	12	12	13	14	13	16	17	14	21	18	18	13	12	20	24	58	25	29	58
21-Sep	21	17	18	37	28	36	27	18	22	25	25	42	22	18	16	21	24	28	40	16	32	22	17	17	42
22-Sep	20	20	21	21	20	29	36	23	28	25	19	17	16	13	15	59	13	17	62	41	22	90	35	14	90
23-Sep	62	25	100	98	56	31	33	21	47	40	48	96	18	56	92	71	32	26	68	48	36	63	48	41	100
24-Sep	53	36	51	45	59	43	33	32	31	23	25	23	25	39	83	17	19	17	19	22	23	29	82	21	83
25-Sep	38	15	14	16	15	14	12	16	13	12	14	16	16	14	24	20	18	18	15	19	18	18	17	20	38
26-Sep	23	52	12	15	17	15	18	14	14	16	17	17	17	18	13	17	18	16	18	19	18	19	17	18	52
27-Sep	21	21	19	16	17	13	13	13	14	20	23	27	41	78	63	45	17	23	43	43	17	17	22	24	78
28-Sep	23	21	29	28	29	33	24	25	26	25	27	27	27	27	29	28	26	24	23	24	23	25	27	25	33
29-Sep	24	16	15	15	17	14	21	16	12	16	18	24	31	27	31	29	26	25	27	26	49	44	18	16	49
30-Sep	16	34	18	61	80	78	89	30	74	47	21	14	20	21	46	43	33	19	41	28	79	67	39	19	89

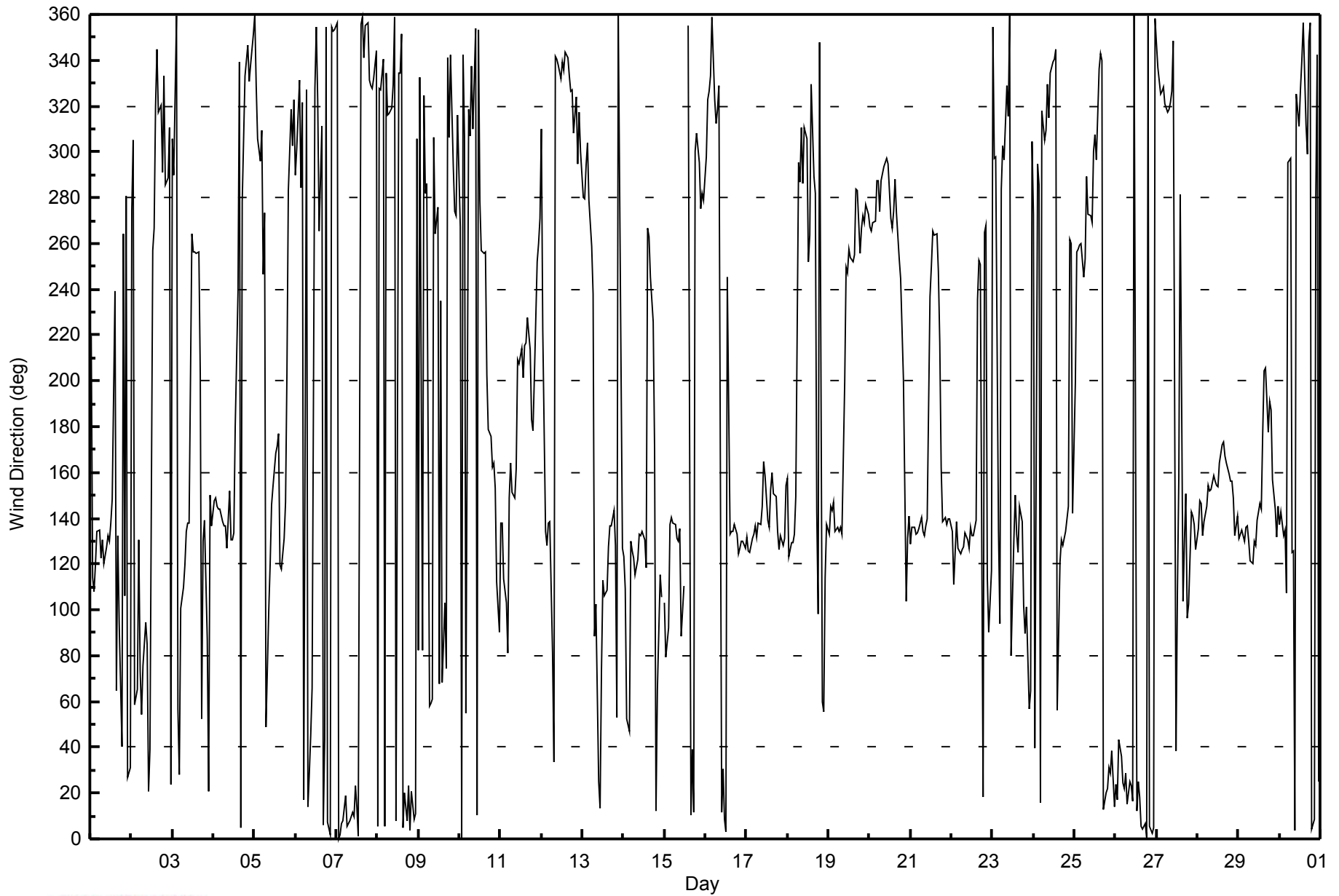
99	106	100	98	90	78	95	88	74	76	67	96	84	78	106	111	98	97	101	83	94	94	93	94	
Diurnal Maximum																								

M - Maintenance AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Lower Camp - September 2014





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 8, 2014	Previous Calibration	August 20, 2014
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Install		
Start Time (MST)	10:25	End Time (MST)	13:55
Barometric Pressure	760 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
Cal Gas Concentration	51.3 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL107920		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2634
DACS voltage range	0-5v	DACS channel #	SE1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-626	-626
Analyzer Range (mv)	5000	5000	Lamp voltage	848	856
Calculated slope	0.998839	0.997942	Chamber temp.	43.8	43.5
Calculated intercept	0.610700	1.401783	Pressure (mmHg)	710.4	727.5
Analyzer Background	28.3	27.7	Flow (lpm)	0.459	0.465
Analyzer Coefficient	1.008	1.003	Intensity	35xxx	35xxx

Analyzer make TEI 43C Analyzer serial # 613516794

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.8	NA
as found span	5000	80.9	830.0	831.1	0.999
calibrator zero	5000	0.0	0.0	-0.3	NA
high point	5000	80.9	830.0	831.2	0.999
second point	5000	40.9	419.6	417.7	1.005
third point	5002	20.4	209.2	207.8	1.007
calibrator zero	5000	0.0	0.0	-0.3	NA
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	80.9	830.0	834.1	0.995
Average Correction Factor					1.003

Corrected As found 831.9 Previous response 830.4 % change -0.2%

Notes:

Filter changed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

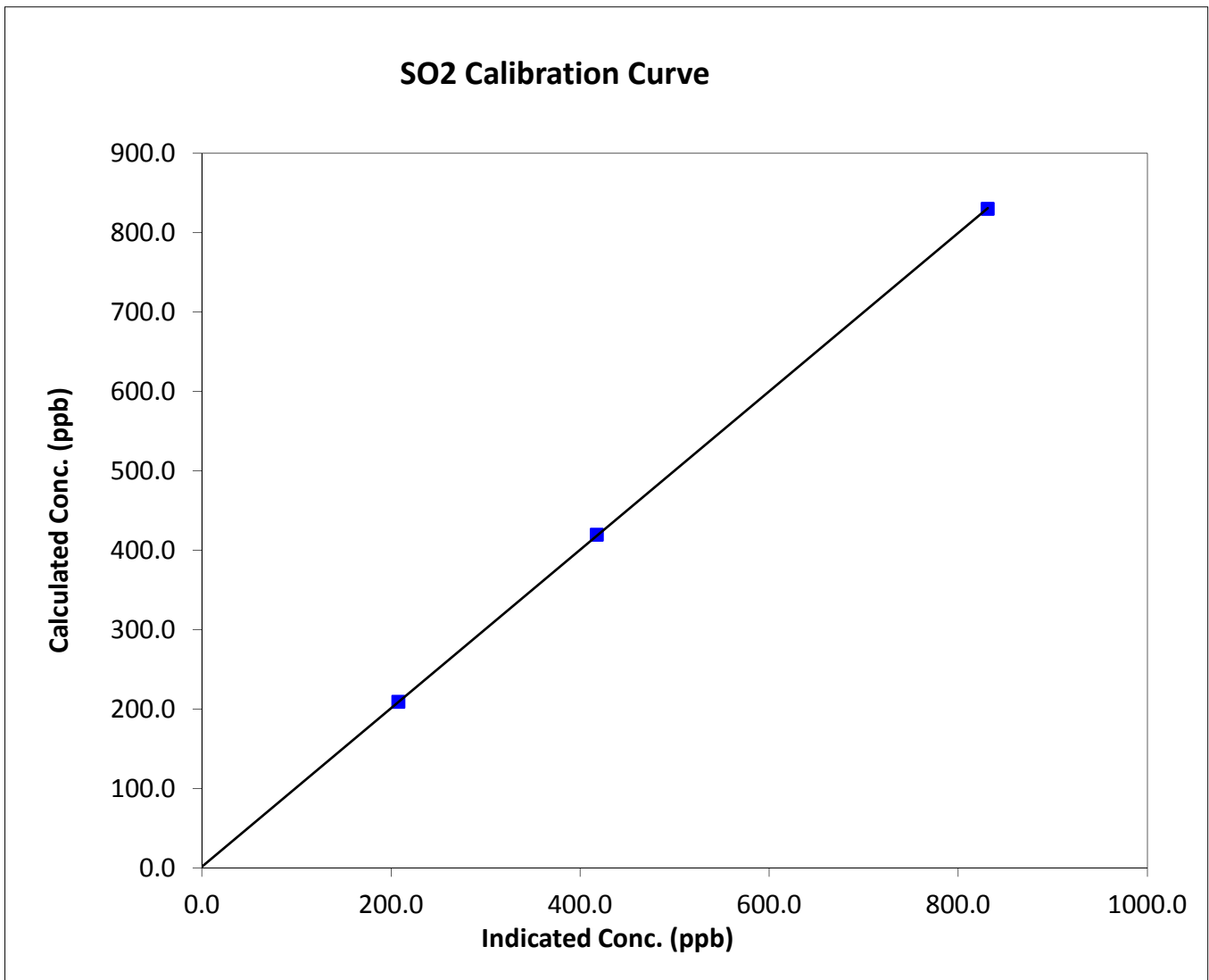
SO₂ Calibration Summary

Station Information

Calibration Date	September 8, 2014	Previous Calibration	August 20, 2014
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	10:25	End Time (MST)	13:55
Analyzer make	TEI 43C	Analyzer serial #	613516794

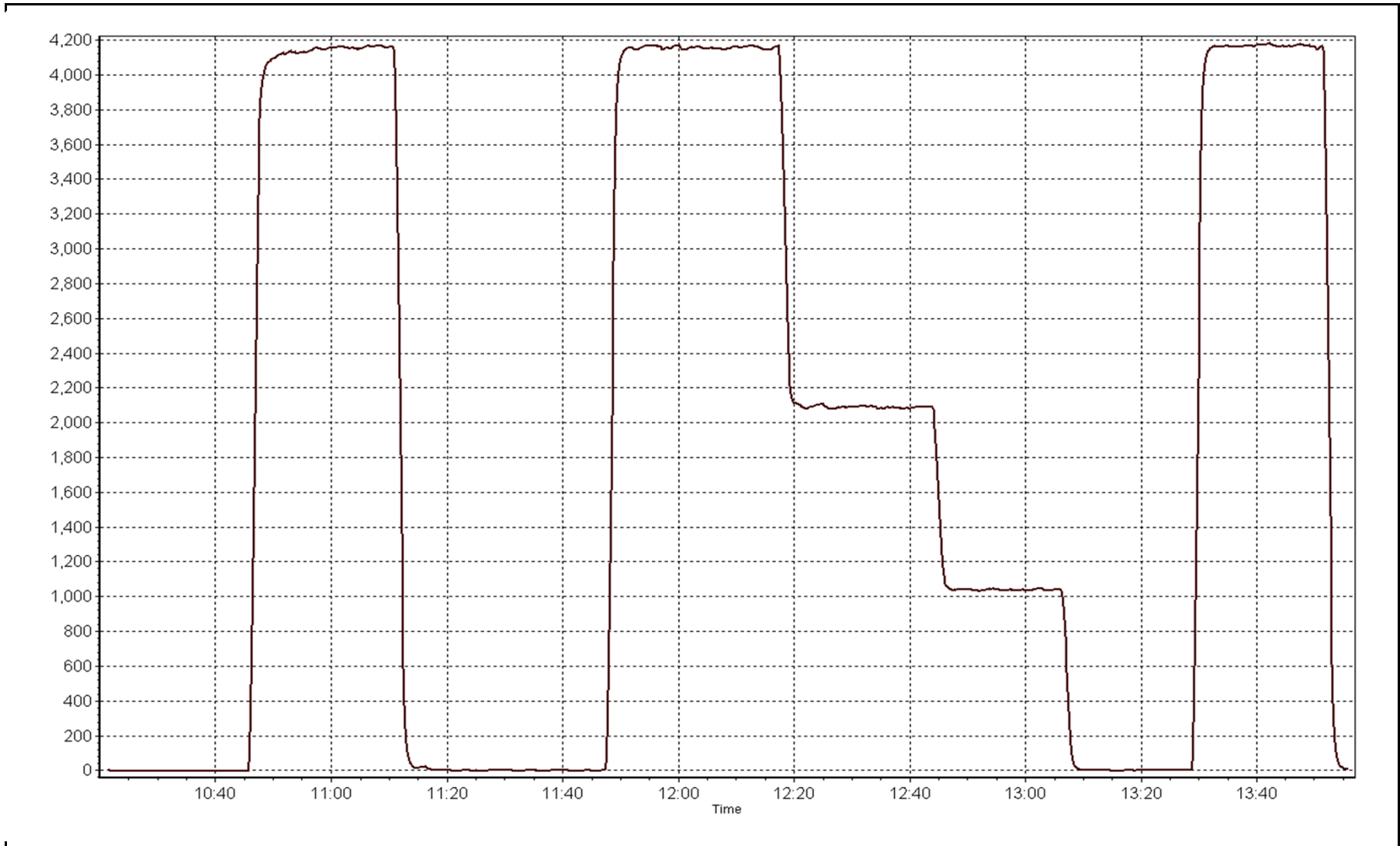
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999989
830.0	831.2	0.9986		
419.6	417.7	1.0047	Slope	0.997942
209.2	207.8	1.0071		
			Intercept	1.401783



SO2 Calibration Plot

Date: September 8, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 19, 2014
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	11:40
Barometric Pressure	760 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11051107
Cal Gas Concentration	10.3 ppm H2S	Cal Gas Expiry Date	5/30/2013
Gas Cert Reference	LL20284	SO2 gas conc.	51.3 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2634
DACS voltage range	0-5v	DACS channel #	SE2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage (v)	-681	-681
Analyzer Range (mv)	5000	5000	Lamp voltage (v)	966	972
Calculated slope	1.000921	0.995069	Chamber temp. (deg C)	45	45
Calculated intercept	-0.117720	0.134607	Pressure (mmHg)	556.1	540.7
Analyzer Background	1.65	1.71	Flow(LPM)	0.385	0.374
Analyzer Coefficient	0.862	0.884	Intensity(%)	91	91
			Converter temp.(deg C)	370	370

Analyzer make/model	Thermo 43i	Analyzer serial #	1008841400
Converter make/model	TEI 340	Converter serial #	328702539

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	NA
as found span	5000	36.4	75.0	72.7	1.031
SO2 scrubber check	5000	20.5	210.3	1.5	NA
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5001	36.4	75.0	75.3	0.996
second point	5002	19.4	39.9	39.9	1.001
third point	5002	9.7	20.0	19.9	1.004
calibrator zero	5000	0.0	0.0	-0.1	NA
as left zero	5000	0.0	0.0	-0.1	NA
as left span	4999	36.4	75.0		
Average Correction Factor					1.000

Corrected As found	72.8	Previous response	75.0	% change	3.1%
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Notes:

Changed filter after as founds. Adjusted span.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

H2S Calibration Summary

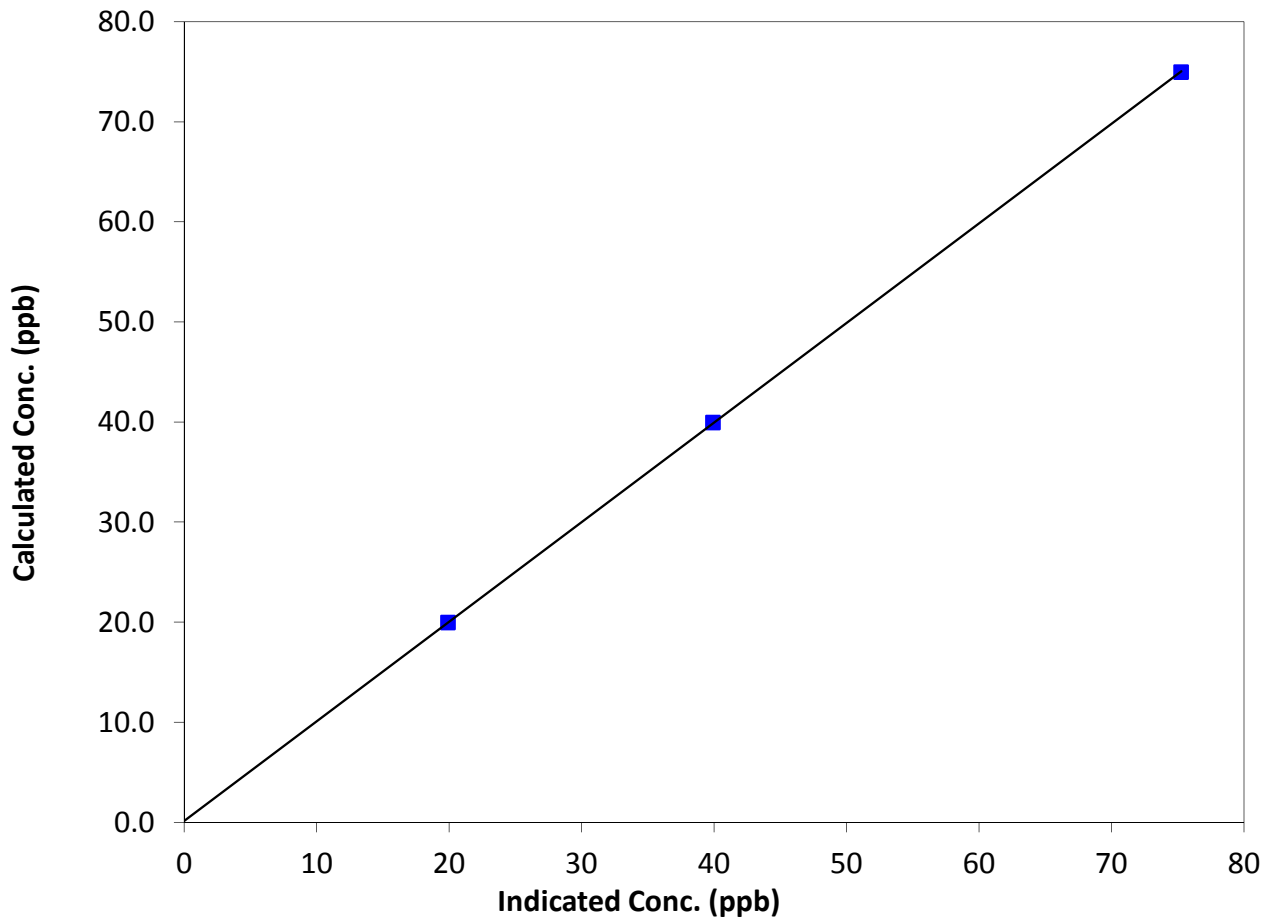
Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 19, 2014
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	8:40	End Time (MST)	11:40
Analyzer make	Thermo 43i	Analyzer serial #	1008841400

Calibration Data

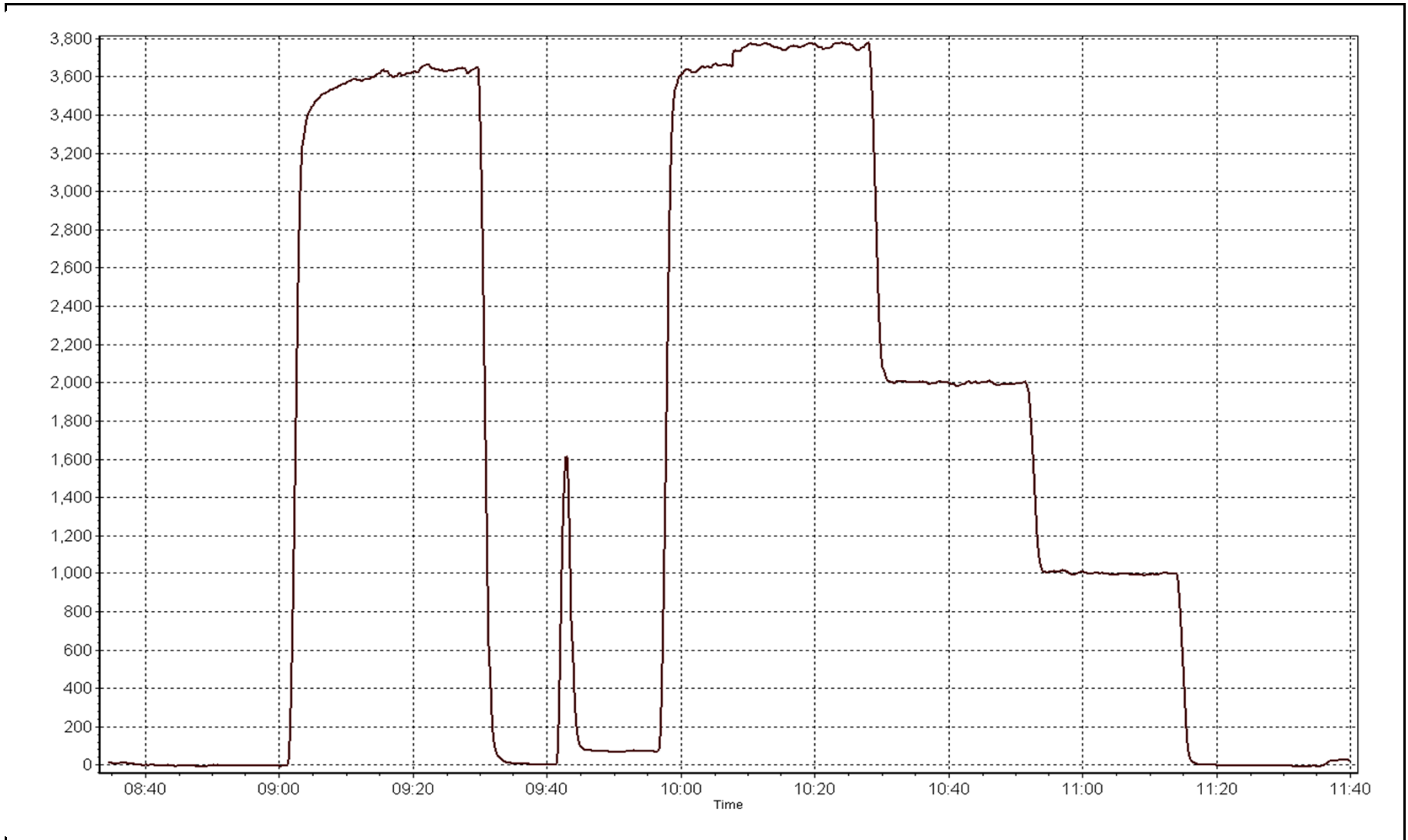
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999993
75.0	75.3	0.9960		
39.9	39.9	1.0011	Slope	0.995069
20.0	19.9	1.0036		
			Intercept	0.134607

H2S Calibration Curve



H2S Calibration Plot

Date: Tuesday, September 09, 2014





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	September 8, 2014	Previous Calibration	August 18, 2014
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	13:55
Barometric Pressure	760 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
Gas Cert Reference	CC 302056	Cal Gas Expiry Date	
CH4 Cal Gas Conc.	510 ppm	CH4 Equiv Conc.	1073.8 ppm
C3H8 Cal Gas Conc.	205 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2634
DACS voltage range	0-5v	DACS channel #	SE3

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.2	8.2
Analyzer Range (mv)	5000	5000	Air or Bypass press	37.8	37.8
Calculated slope	0.999547	1.002069	Fuel Pressure	24.2	24.2
Calculated intercept	0.040957	0.010743			

Analyzer make	51i-LT	Analyzer serial #	1218153580
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.02	N/A
as found span	5001	80.9	17.37	17.47	0.995
calibrator zero	5000	0.0	0.00	0.03	N/A
high point	5001	80.9	17.37	17.35	1.001
second point	5000	40.9	8.78	8.71	1.009
third point	5002	20.4	4.38	4.33	1.010
calibrator zero	5000	0.0	0.00	0.03	N/A
as left zero	5000	0.0	0.00	-0.04	N/A
as left span	5000	80.9	17.37	17.60	0.987
Average Correction Factor					1.007

Corrected As found	17.44	Previous response	17.34	% change	-0.6%
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Notes:

Filter changed after as founds. Zero and span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

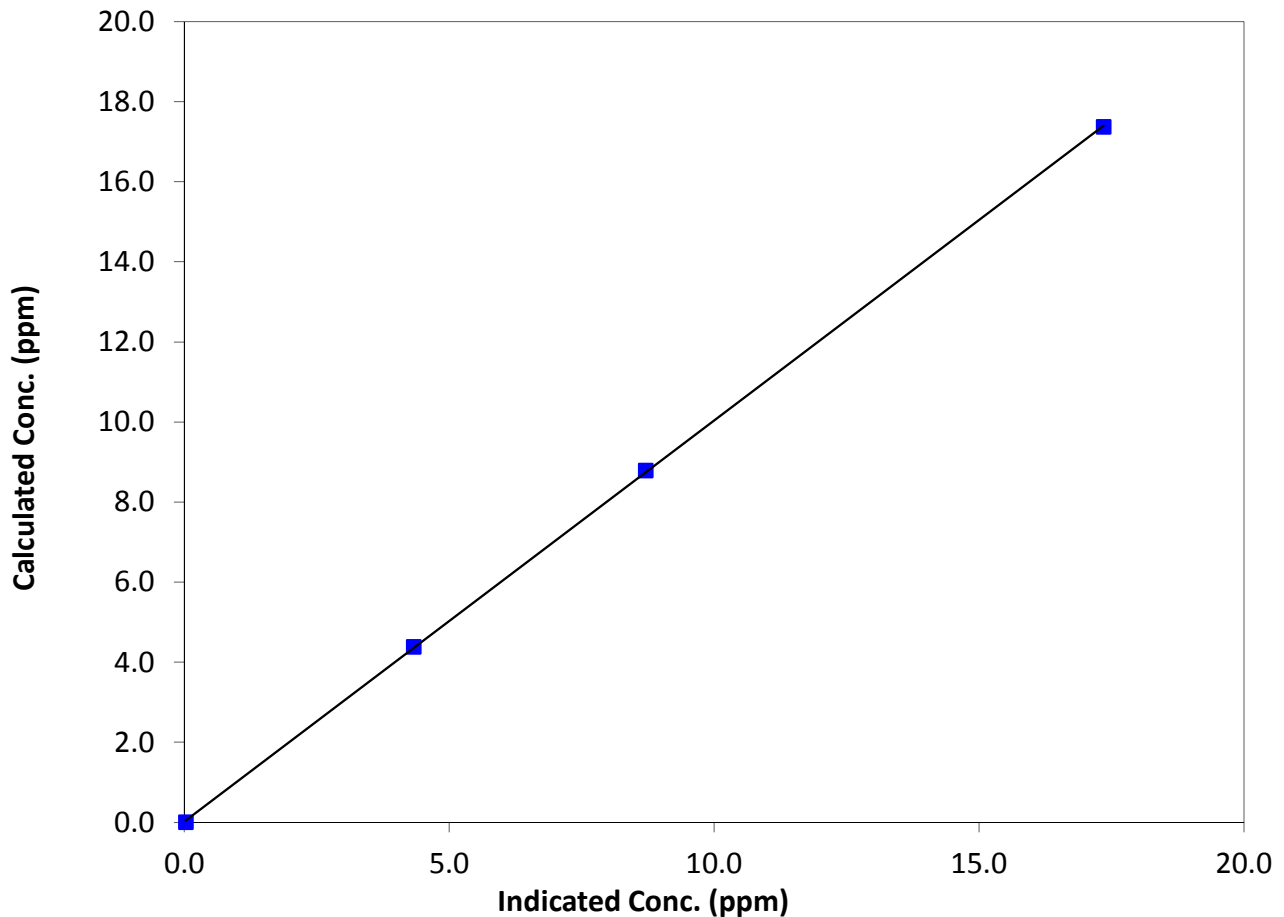
Station Information

Calibration Date	September 8, 2014	Previous Calibration	August 18, 2014
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	10:25	End Time (MST)	13:55
Analyzer make	51i-LT	Analyzer serial #	1218153580

Calibration Data

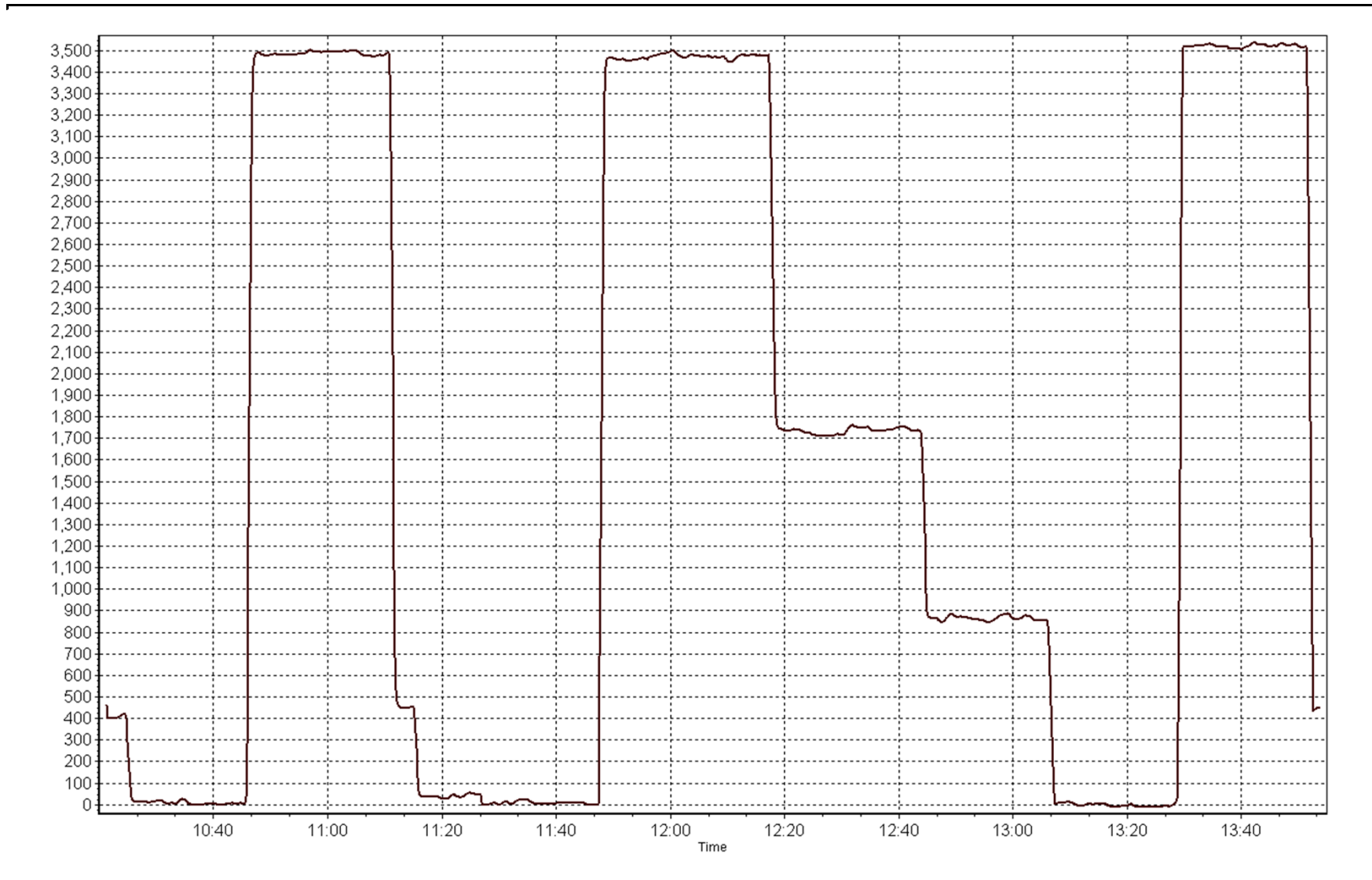
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	N/A	Correlation Coefficient	0.999967
17.37	17.35	1.0010		
8.78	8.71	1.0087	Slope	1.002069
4.38	4.33	1.0103		
			Intercept	0.010743

THC Calibration Curve



THC Calibration Plot

Date: September 8, 2014



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 12
MILLENNIUM MINE
SEPTEMBER 2014**

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

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

October 30, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)
 SEPTEMBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	685	35	35	100.00	107	0	12	0
TRS(ppb) Average	683	37	37	100.00	3	0	1	0
THC(ppm) Average	685	35	35	100.00	5	-	2.9	-
NO2(ppb) Average	680	39	40	99.86	35	0	16	-
NO(ppb) Average	680	39	40	99.86	117	-	21	-
NOX(ppb) Average	680	39	40	99.86	152	-	36	-
PM2.5(ug/m3) Average	719	0	1	99.86	31.6	-	10.4	0
Temperature 2 m (C) Average	720	0	0	100.00	30.1	-	19.7	-
Wind Speed 10 m (km/h) Average	718	0	2	99.72	24	-	-	-
Wind Direction 10 m (deg) Average	718	0	2	99.72	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)
 SEPTEMBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	685	1.2	6	-	0	0	0	0	1	1	107
TRS(ppb) Average	683	0.5	0	-	0	0	0	0	1	1	3
THC(ppm) Average	685	2.35	0.4	-	2	2.1	2.1	2.2	2.4	2.8	5
NO2(ppb) Average	680	7.1	6	-	0	1	2	6	11	15	35
NO(ppb) Average	680	7.3	13	-	0	0	1	2	8	21	117
NOX(ppb) Average	680	14.4	17	-	0	1	3	9	20	34	152
PM2.5(ug/m3) Average	719	5.81	3.9	-	1.4	2.2	3	4.7	7.6	10.6	31.6
Temperature 2 m (C) Average	720	9.96	5.6	-	-0.7	3.6	5.9	9.2	13	18.1	30.1
Wind Speed 10 m (km/h) Average	718	7.9	5	-	0	3	4	7	11	14	24
Wind Direction 10 m (deg) Average	718	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -MILLENNIUM MINE (AMS 12)
 SEPTEMBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NO, NOX	24 Sep 2014 07:00	24 Sep 2014 07:00	1	Maintenance - manifold cleaning
PM2.5	24 Sep 2014 11:00	24 Sep 2014 11:00	1	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	18 Sep 2014 18:00	18 Sep 2014 18:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	23 Sep 2014 19:00	23 Sep 2014 19:00	1	Flatline in sensor output signal

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 107 ppb on Sep 2 14:00	Maximum Daily Average: 11.9 ppb on Sep 2		Hours of Data:	685
Minimum Value: 0 ppb on Sep 25 07:00	Minimum Daily Average: 0.2 ppb on Sep 28		Hours of Missing Data:	35
Maximum Diurnal Average: 6.7 ppb at hour 14	Minimum Diurnal Average: 0.3 ppb at hour 23		Hours of Calibration:	35
Monthly Average: 1.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 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	Z	0	0	0	0	0	0	0	1	2	1	1	1	1	1	1	1	1	0	1	0	0	0	0.6	2
2-Sep	0	Z	0	1	1	0	0	0	0	1	11	42	40	107	54	5	1	1	3	4	1	1	1	1	11.9	107
3-Sep	1	Z	1	1	1	1	1	1	1	1	1	2	1	0	0	0	0	1	0	0	0	0	0	0.6	2	
4-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1	
5-Sep	0	Z	0	0	0	0	0	0	0	1	2	4	1	1	0	0	0	0	0	0	0	0	0	0.6	4	
6-Sep	1	Z	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2	
7-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
8-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
9-Sep	0	Z	0	1	0	0	0	0	1	0	1	2	12	5	4	1	1	1	0	0	1	1	0	1.5	12	
10-Sep	0	Z	1	1	1	1	1	1	4	4	3	2	27	13	1	1	1	1	1	1	1	1	0	2.8	27	
11-Sep	0	Z	0	0	0	0	0	0	0	2	5	2	1	1	1	1	1	1	1	1	1	0	0	1.0	5	
12-Sep	1	Z	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
13-Sep	0	Z	0	0	0	0	0	0	0	0	0	1	2	1	4	1	0	0	0	0	0	0	0	0.5	4	
14-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
15-Sep	0	Z	0	0	0	0	0	0	0	1	7	7	8	55	45	13	1	1	1	1	0	0	0	6.3	55	
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	0.3	0	
17-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
18-Sep	0	Z	0	0	0	0	0	0	1	1	1	1	1	5	1	6	3	1	1	0	1	0	0	1.1	6	
19-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
20-Sep	0	Z	0	0	0	0	0	0	6	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0.7	6	
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	0.2	0	
22-Sep	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.6	7	
23-Sep	4	Z	4	4	2	1	1	0	0	0	0	0	0	0	0	1	1	1	2	1	0	0	1	1.1	4	
24-Sep	0	Z	0	0	0	0	C	C	C	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
25-Sep	0	Z	0	0	0	0	0	1	1	1	1	3	5	1	1	1	1	1	1	1	1	1	1	0.8	5	
26-Sep	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
27-Sep	0	Z	0	0	0	0	0	0	0	0	0	1	8	6	6	4	2	1	0	0	0	0	0	1.4	8	
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	0.2	0	
29-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
30-Sep	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	

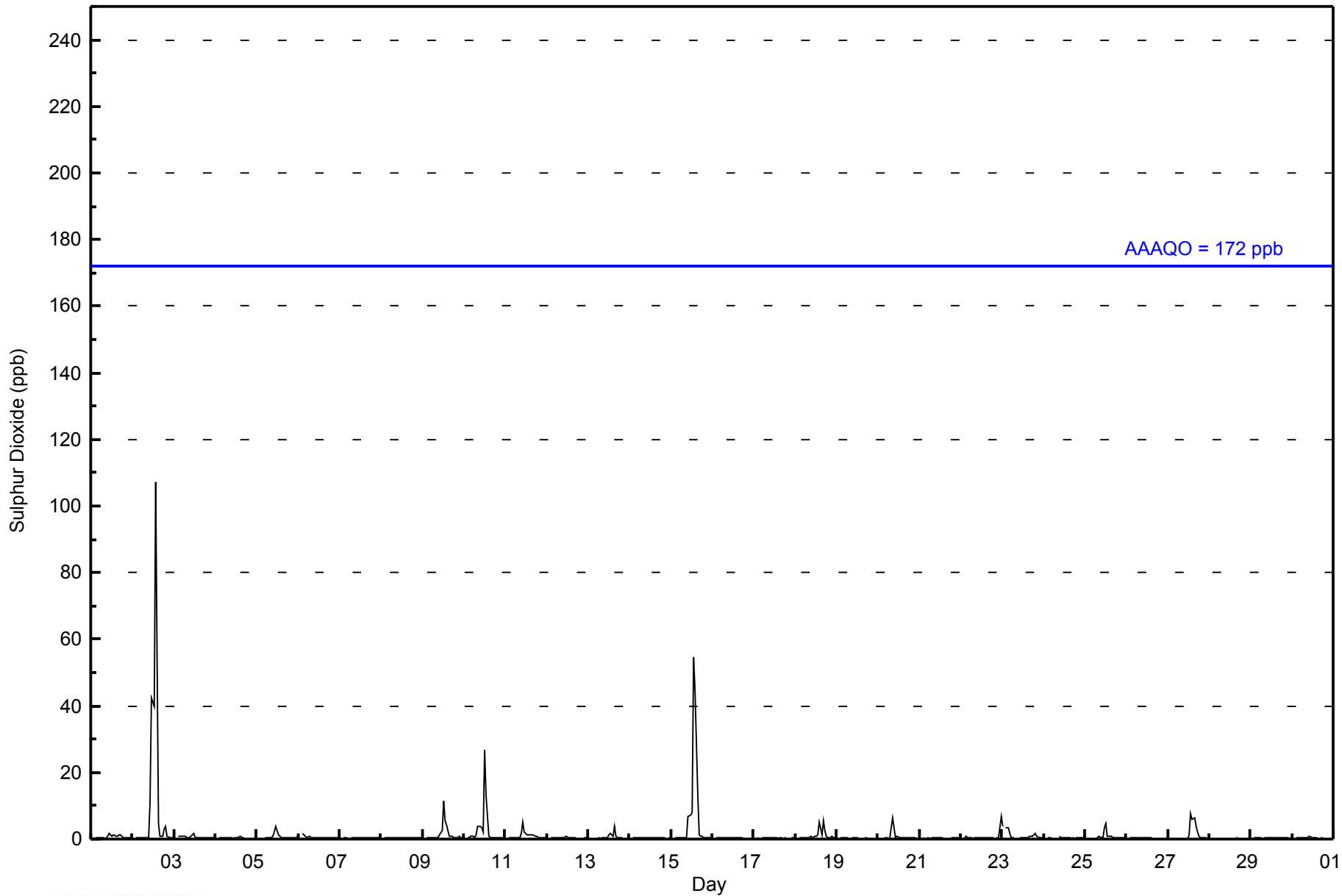
0.4	--	0.5	0.5	0.4	0.3	0.3	0.4	0.7	0.7	1.3	2.5	3.5	6.7	4.2	1.3	0.7	0.6	0.5	0.5	0.3	0.3	0.3	0.5	Diurnal Average
4	--	4	4	2	1	1	1	6	4	11	42	40	107	54	13	6	3	3	4	1	1	1	7	Diurnal Maximum

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Millennium - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Millennium - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	674	98.39	98.39
11 - 20	4	0.58	98.98
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: 685

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Millennium - September 2014

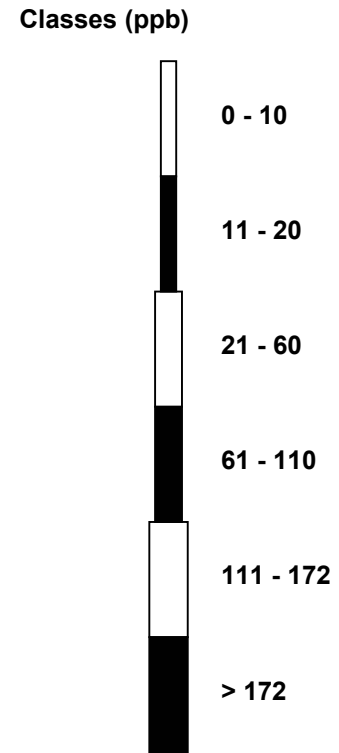
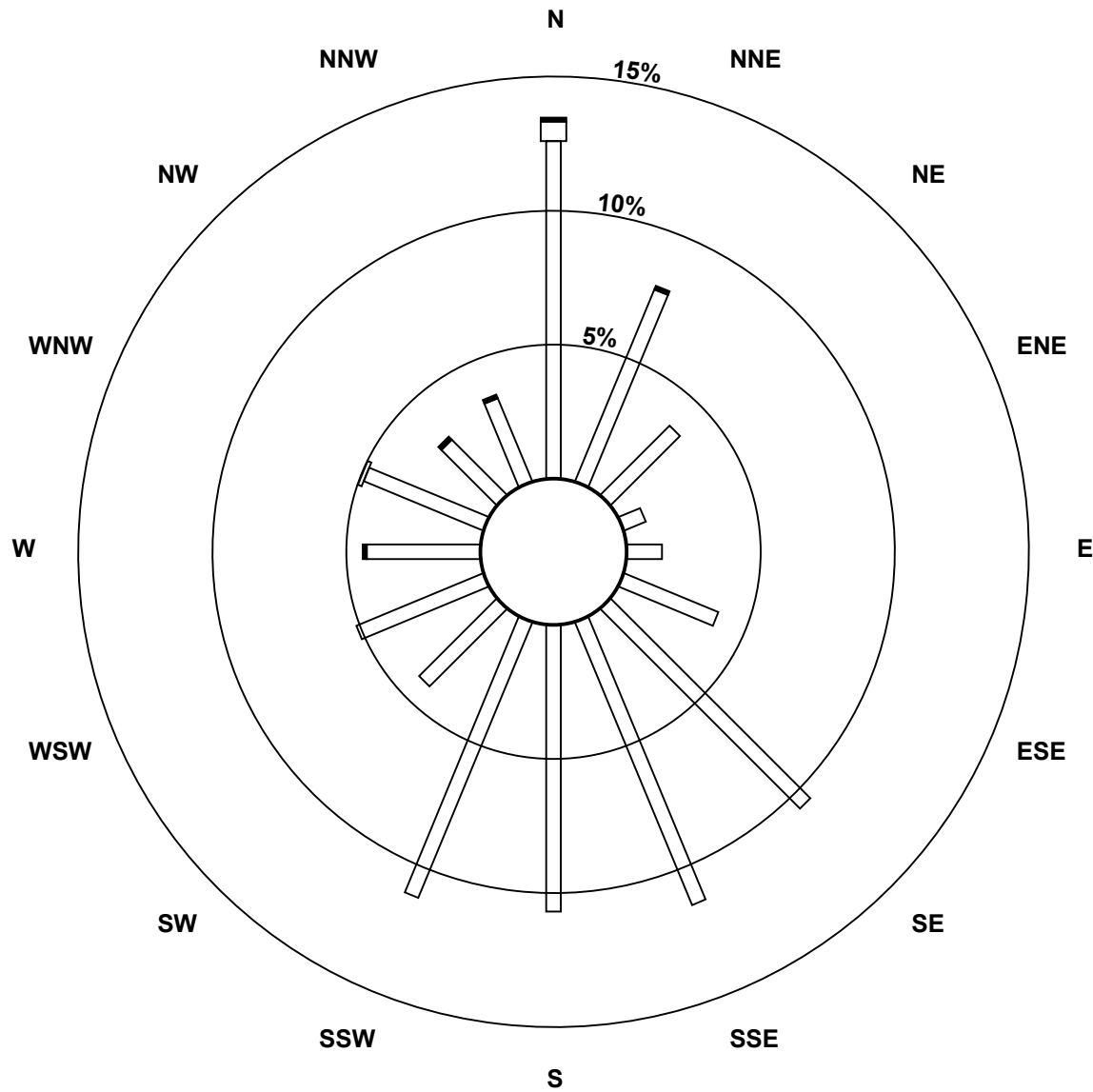
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	86	53	25	6	9	26	72	78	73	76	28	35	29	33	20	23	672
11 - 20	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	4
21 - 60	5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	6
61 - 110	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
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
Totals	92	54	25	6	9	26	72	78	73	76	28	35	30	34	21	24	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

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

**Sulphur Dioxide (SO₂) - ppb
Millennium (AMS 12)**

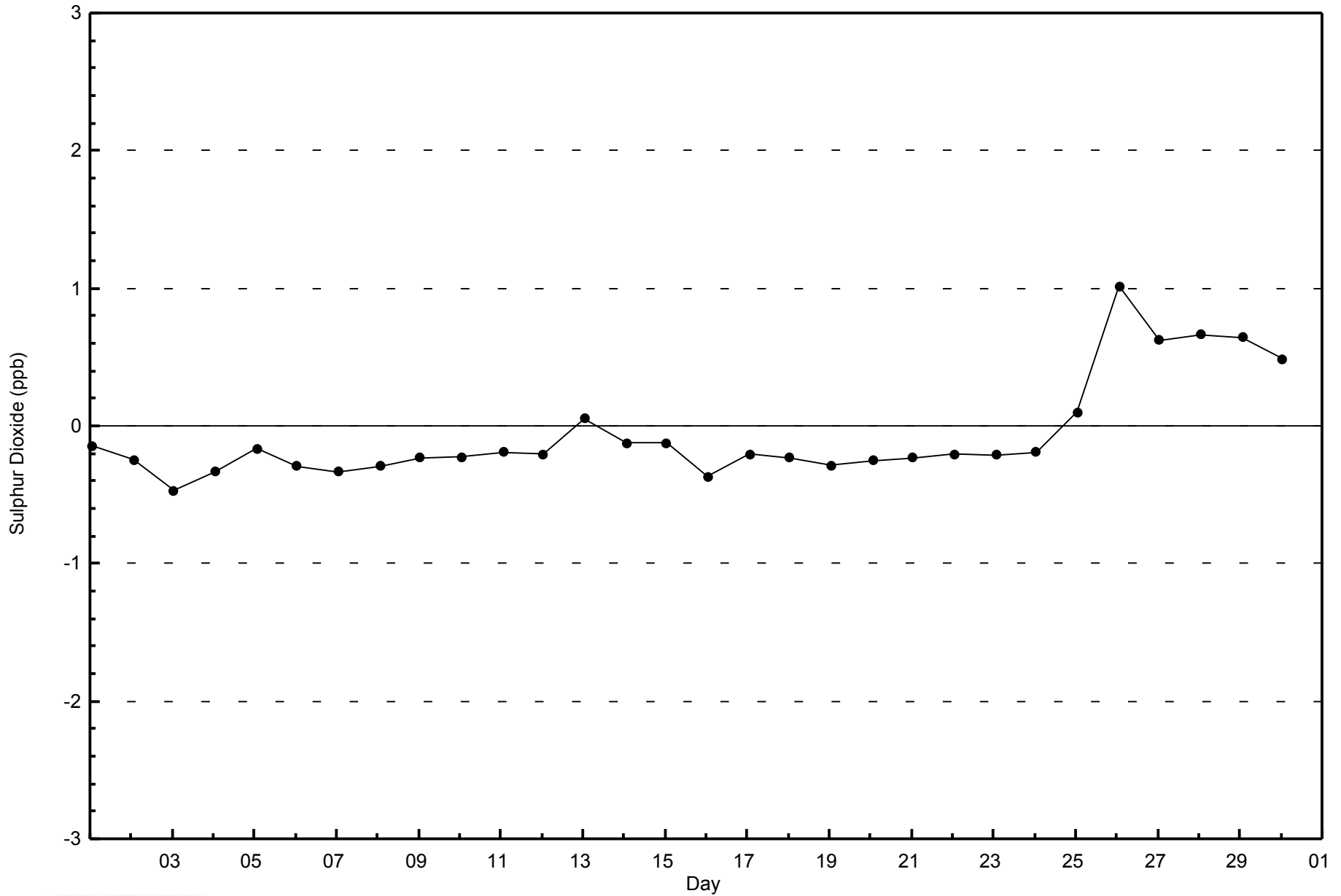


Total Number of Valid Hours: 683



WBEA
Zero Responses

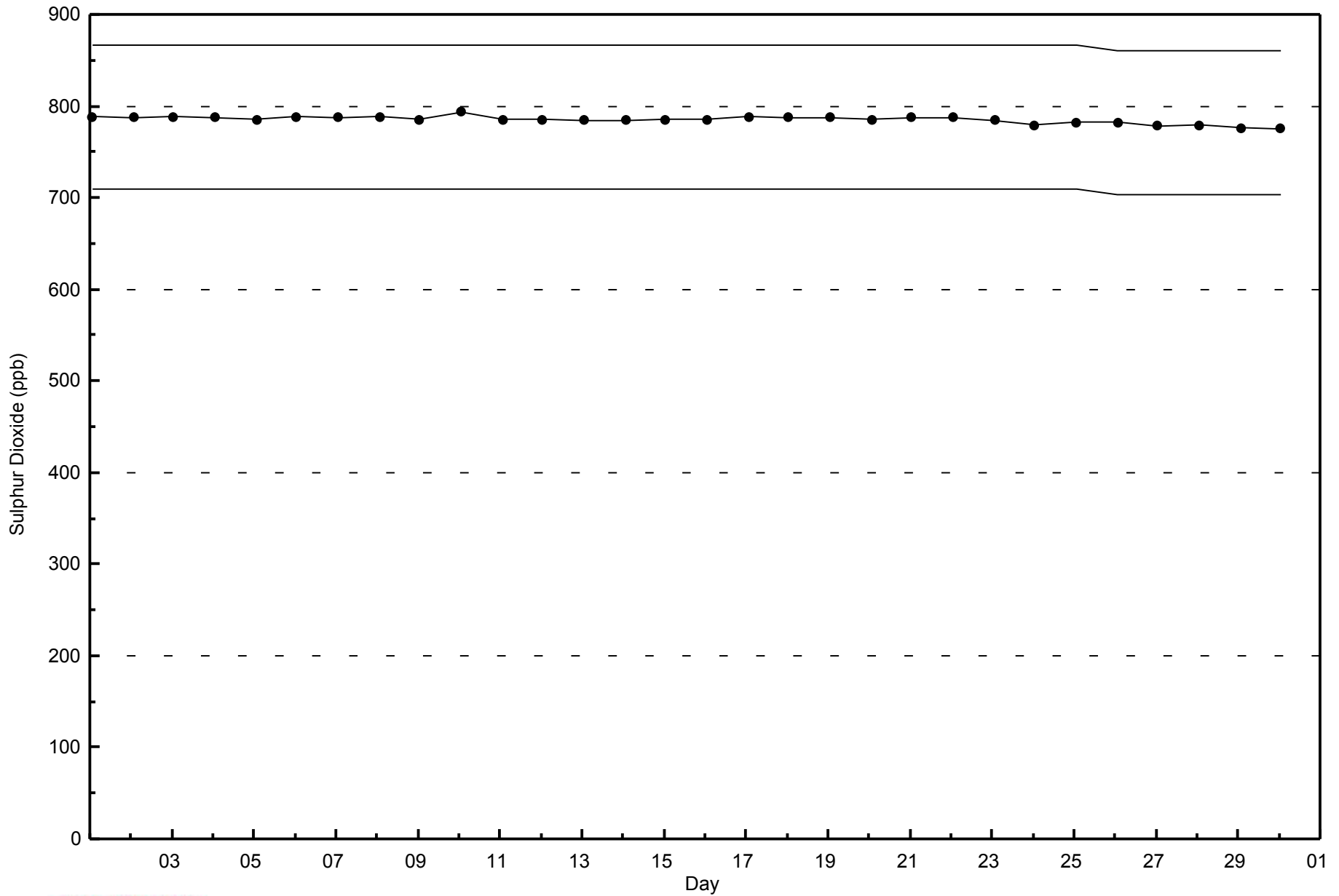
Sulphur Dioxide (SO₂) - ppb
Millennium - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Millennium - September 2014





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Maximum Value: 3 ppb on Sep 2 12:00	Maximum Daily Average: 1.1 ppb on Sep 2	Hours in Service: 720
Minimum Value: 0 ppb on Sep 20 20:00	Minimum Daily Average: 0.2 ppb on Sep 7	Minimum Diurnal Average: 0.4 ppb at hour 19	Hours of Data: 683
Maximum Diurnal Average: 0.6 ppb at hour 11	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 2		Hours of Missing Data: 37
Monthly Average: 0.5 ppb			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	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	0.7	1
2-Sep	1	1	Z	1	1	1	1	1	1	2	3	3	1	1	1	0	0	1	2	2	0	0	0	1	1.1	3
3-Sep	1	2	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
4-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	0.4	1
5-Sep	0	0	Z	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.5	2
6-Sep	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
7-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
8-Sep	0	0	Z	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
9-Sep	0	0	Z	0	1	1	0	1	1	1	1	2	1	1	1	0	0	0	0	0	1	1	1	0	0.7	2
10-Sep	0	0	Z	1	1	2	1	1	2	2	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0.8	2
11-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	0.3	1
12-Sep	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1
13-Sep	1	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0.4	1
14-Sep	1	0	Z	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	1
15-Sep	0	0	Z	0	1	0	0	0	1	0	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0.6	2
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	0.3	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	0.3	0
18-Sep	0	0	Z	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0.6	1
19-Sep	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	1	0	1	2	0.6	3
20-Sep	1	1	Z	1	2	3	1	1	2	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0.8	3
21-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1
22-Sep	1	0	Z	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.6	2
23-Sep	2	1	Z	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.6	2
24-Sep	1	0	Z	1	1	0	C	C	C	C	1	1	1	1	1	1	0	0	0	0	1	1	1	1	0.6	1
25-Sep	0	0	Z	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
26-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
27-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.5	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	0.3	0
29-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	0.4	1
30-Sep	0	0	Z	0	0	1	1	1	1	1	2	1	1	1	1	1	1	2	1	0	0	0	0	0	0.7	2

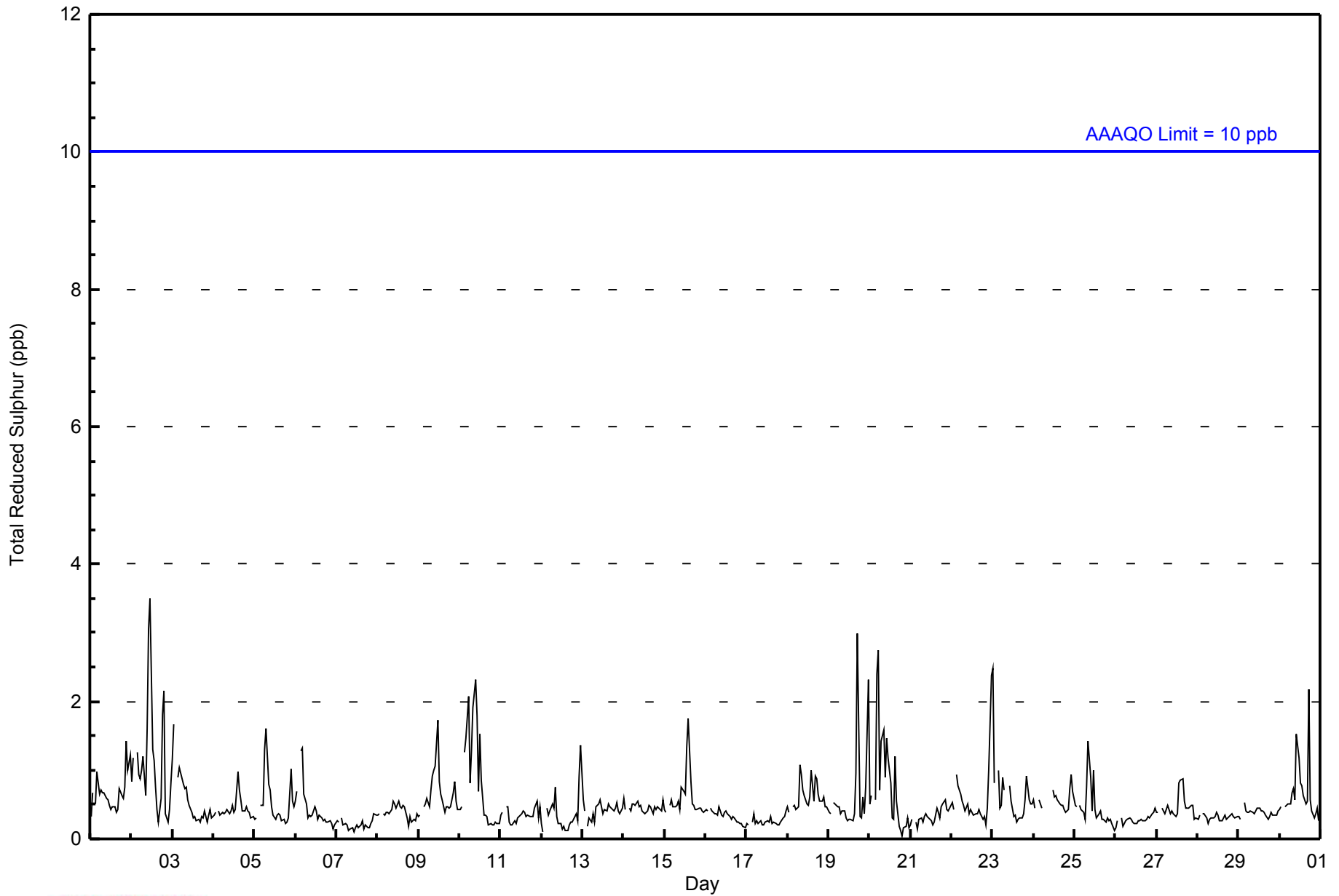
0.5	0.5	--	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.6	Diurnal Average
2	2	--	1	2	3	1	2	2	2	2	3	3	2	1	2	1	1	3	2	2	1	1	1	2	Diurnal Maximum

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



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Millennium - September 2014





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Millennium - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	679	99.41	99.41
3 - 4	4	0.59	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Millennium - September 2014

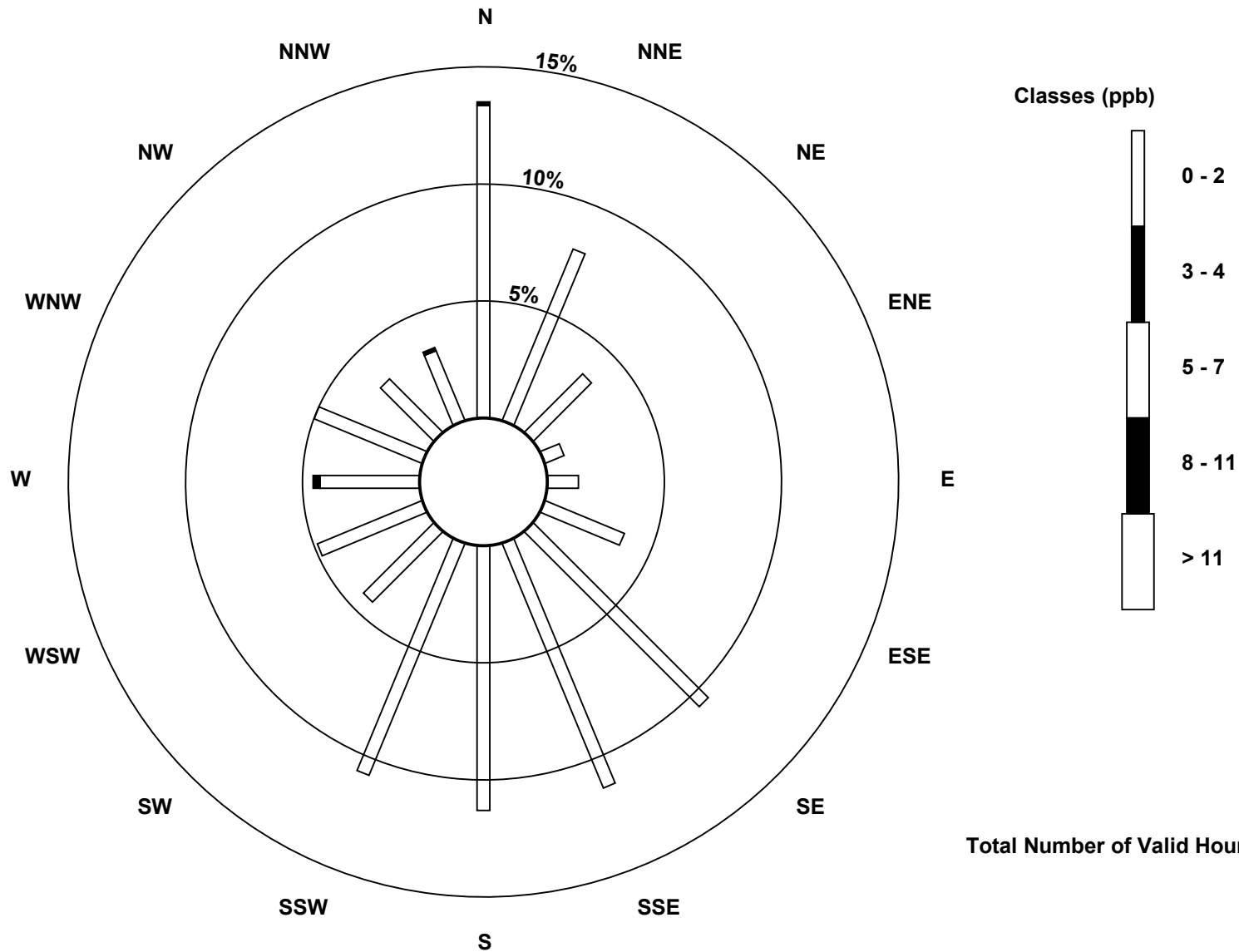
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	91	54	24	6	9	25	72	77	77	73	29	33	29	34	22	22	677
3 - 4	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	4
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	92	54	24	6	9	25	72	77	77	73	29	33	31	34	22	23	681

Total Number of Valid Hours: 681

Total Number of Hours: 720

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

**Total Reduced Sulphur (TRS) - ppb
Millennium (AMS 12)**

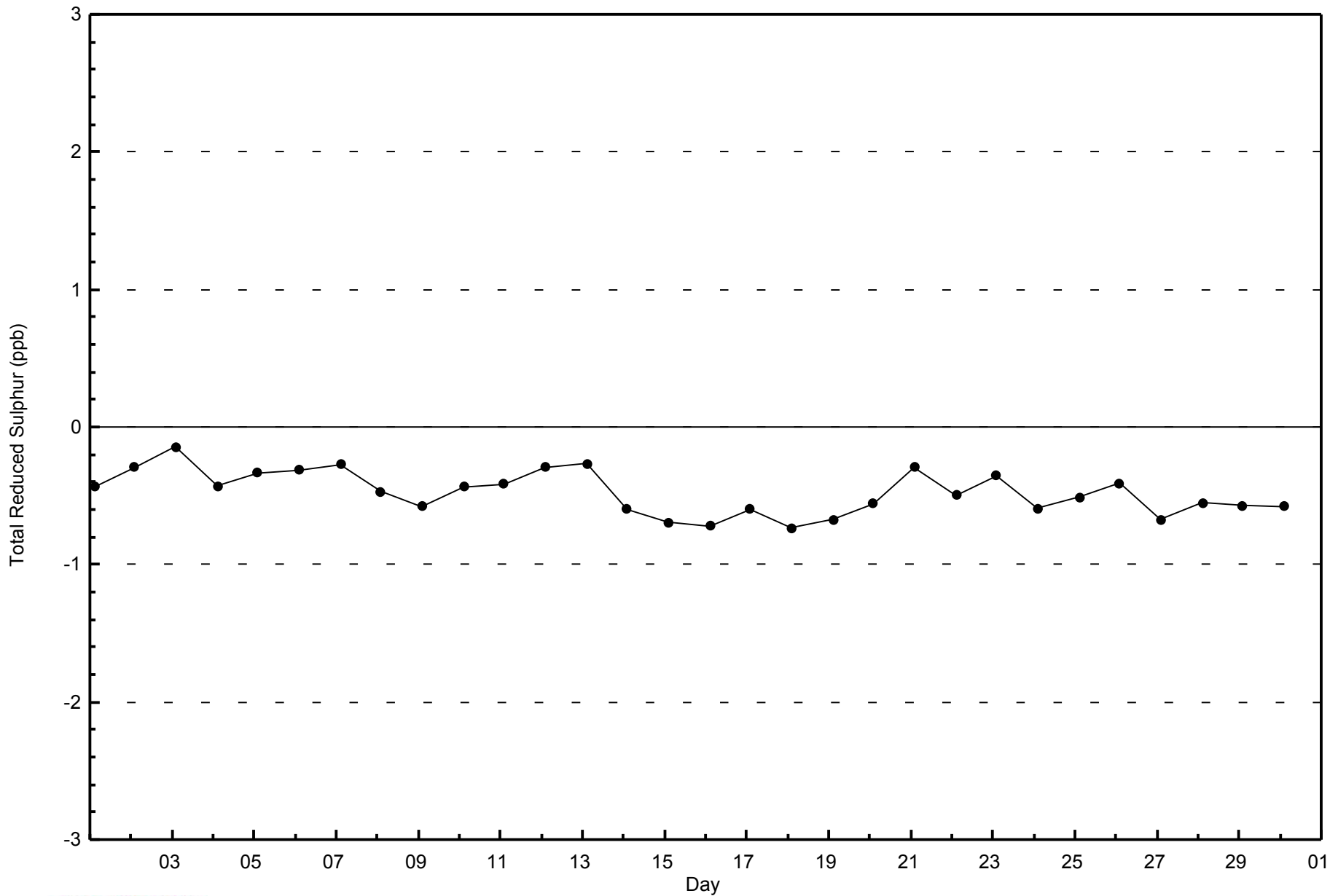


Total Number of Valid Hours: 681



WBEA
Zero Responses

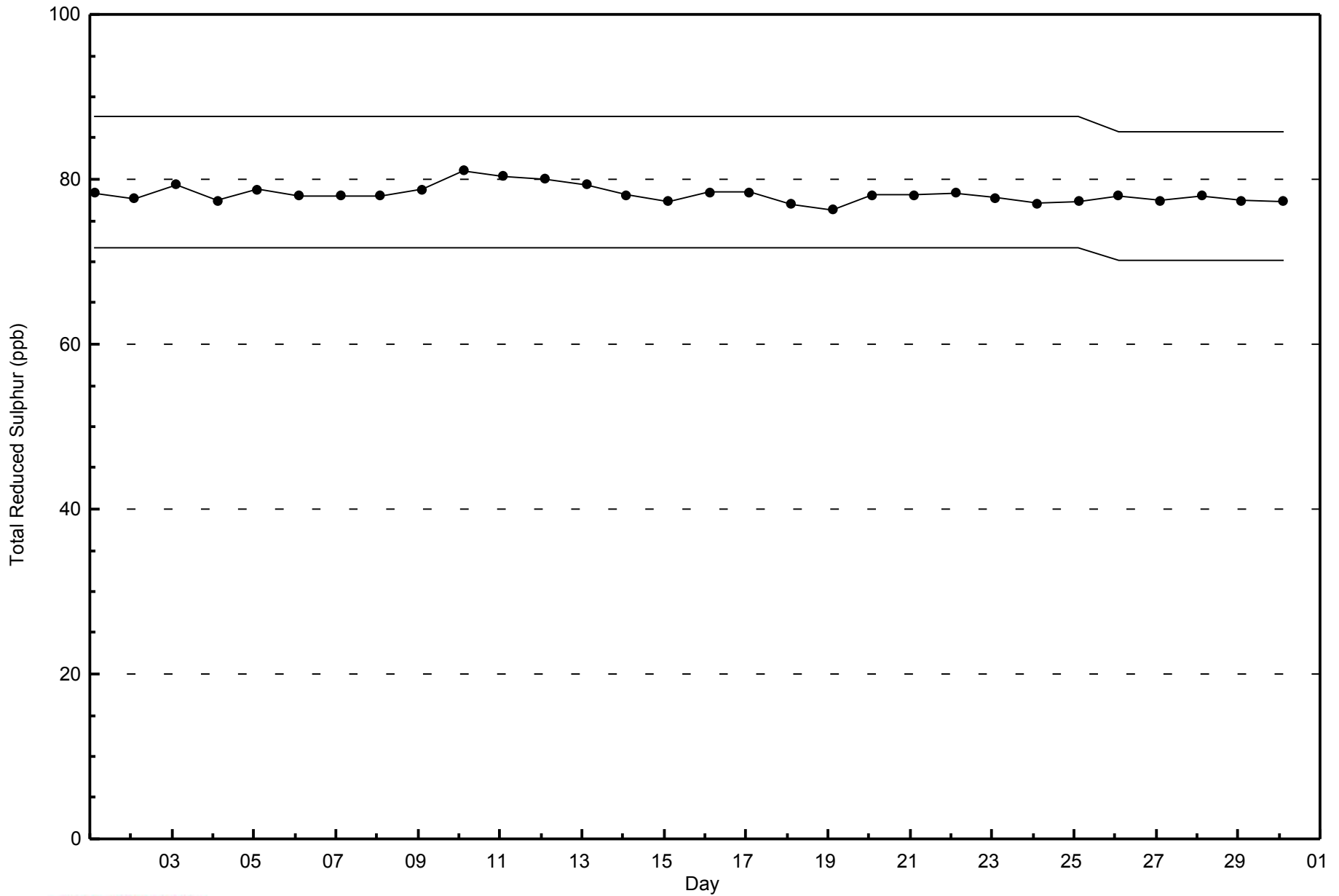
Total Reduced Sulphur (TRS) - ppb
Millennium - September 2014





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Millennium - September 2014



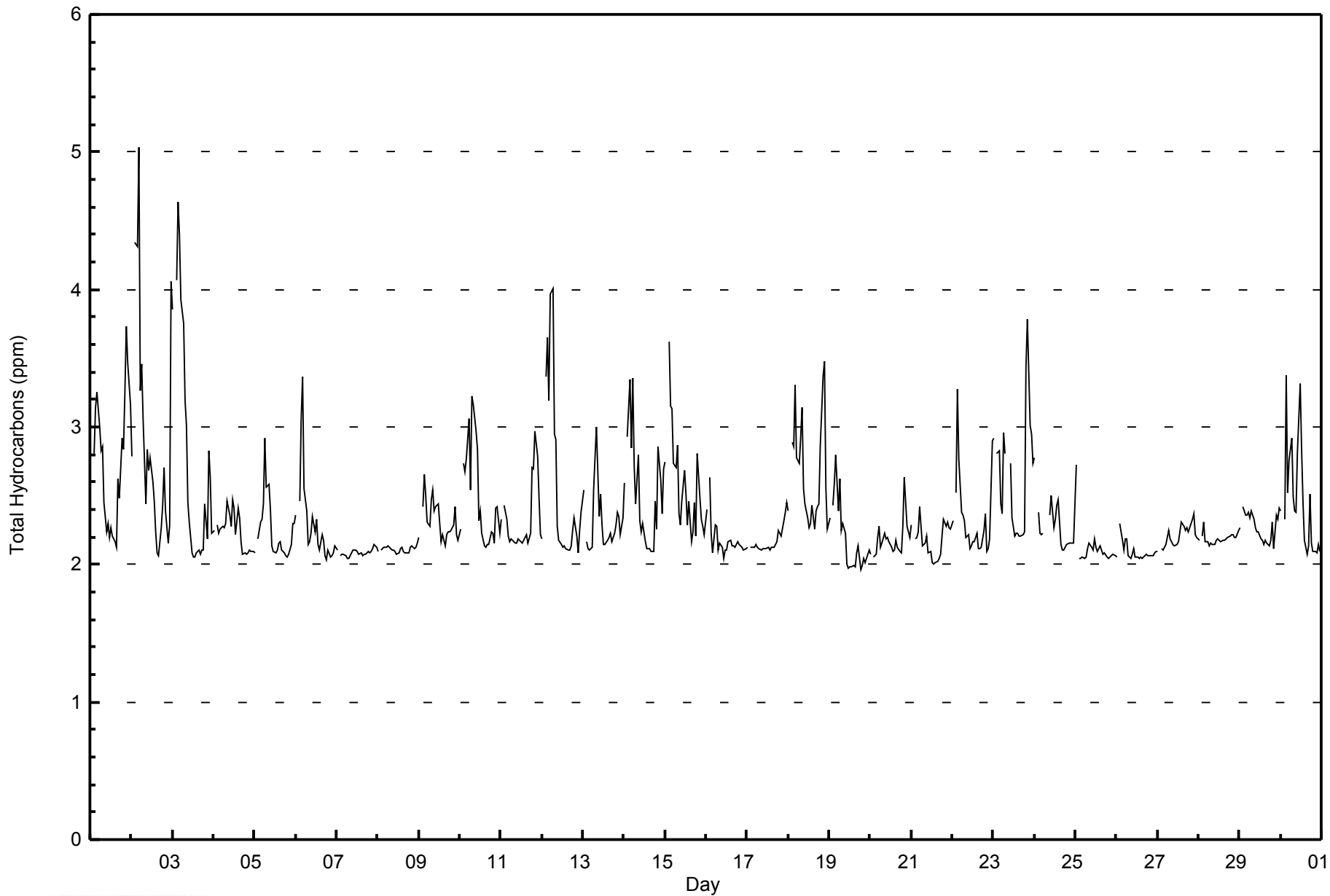


Maximum Value: 5.0 ppm on Sep 2 05:00		Maximum Daily Average: 2.9 ppm on Sep 2		Hours in Service: 720																							
Minimum Value: 2.0 ppm on Sep 19 19:00		Minimum Daily Average: 2.1 ppm on Sep 7		Hours of Data: 685																							
Maximum Diurnal Average: 2.7 ppm at hour 4		Minimum Diurnal Average: 2.1 ppm at hour 16		Hours of Missing Data: 35																							
Monthly Average: 2.35 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.4 P ₉₀ = 2.8 P ₉₉ = 4.1		Hours of Calibration: 35																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	2.1	Z	2.8	3.1	3.3	3.0	2.8	2.9	2.4	2.2	2.3	2.2	2.3	2.2	2.2	2.1	2.6	2.5	2.9	2.8	3.3	3.7	3.5	3.2	2.7	3.7	
2-Sep	2.8	Z	4.3	4.3	5.0	3.3	3.5	3.1	2.4	2.8	2.7	2.8	2.6	2.5	2.2	2.1	2.1	2.3	2.4	2.7	2.4	2.2	2.3	4.1	2.9	5.0	
3-Sep	3.9	Z	4.1	4.6	4.4	3.9	3.8	3.2	3.0	2.5	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.2	2.8	2.6	2.2	2.8	4.6	
4-Sep	2.2	Z	2.3	2.2	2.3	2.3	2.3	2.3	2.5	2.4	2.3	2.5	2.4	2.2	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5
5-Sep	2.1	Z	2.2	2.3	2.3	2.4	2.9	2.6	2.6	2.4	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.3	2.2	2.9	
6-Sep	2.4	Z	2.5	3.1	3.4	2.5	2.4	2.1	2.2	2.2	2.4	2.2	2.3	2.1	2.1	2.2	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.3	3.4	
7-Sep	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
8-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	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	
9-Sep	2.2	Z	2.4	2.7	2.5	2.3	2.3	2.5	2.5	2.4	2.4	2.4	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.4	2.2	2.2	2.3	2.7	
10-Sep	2.3	Z	2.7	2.7	2.8	3.1	2.5	3.2	3.2	3.0	2.8	2.3	2.4	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.4	2.4	2.2	2.5	3.2	
11-Sep	2.3	Z	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.7	2.7	3.0	2.8	2.5	2.2	2.3	3.0	
12-Sep	2.2	Z	3.4	3.7	3.2	4.0	4.0	2.9	2.9	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.3	2.2	2.1	2.2	2.4	2.6	4.0	
13-Sep	2.5	Z	2.2	2.1	2.1	2.1	2.5	2.8	3.0	2.4	2.5	2.3	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.2	2.3	2.3	3.0	
14-Sep	2.6	Z	2.9	3.3	2.9	3.4	2.7	2.4	2.8	2.3	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.5	2.3	2.9	2.6	2.4	2.7	2.5	3.4	
15-Sep	2.7	Z	3.6	3.2	3.1	2.7	2.7	2.9	2.4	2.3	2.5	2.7	2.5	2.3	2.5	2.2	2.2	2.5	2.2	2.8	2.5	2.3	2.3	2.2	2.6	3.6	
16-Sep	2.4	Z	2.6	2.2	2.1	2.3	2.3	2.1	2.2	2.1	2.0	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.6	
17-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	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.2	2.4	
18-Sep	2.4	Z	2.9	2.9	3.3	2.8	2.7	2.9	3.1	2.5	2.4	2.3	2.3	2.3	2.4	2.3	2.4	2.4	2.4	2.9	3.4	3.5	2.6	2.3	2.7	3.5	
19-Sep	2.3	Z	2.4	2.6	2.8	2.4	2.6	2.3	2.3	2.2	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	2.1	2.2	2.8	
20-Sep	2.1	Z	2.1	2.1	2.2	2.3	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.3	2.6	2.3	2.2	2.2	2.2	2.6	
21-Sep	2.3	Z	2.2	2.2	2.2	2.4	2.1	2.1	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.4	
22-Sep	2.3	Z	2.5	3.3	2.8	2.4	2.4	2.3	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.4	2.1	2.1	2.2	2.9	2.3	3.3	
23-Sep	2.9	Z	2.8	2.8	2.4	2.4	3.0	2.8	C	C	C	C	2.7	2.3	2.2	2.2	2.2	2.2	2.2	3.4	3.8	3.0	2.9	2.7	2.6	3.8	
24-Sep	2.8	Z	2.4	2.2	2.2	2.2	C	C	C	C	2.4	2.5	2.3	2.3	2.4	2.5	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.8	
25-Sep	2.7	Z	2.0	2.0	2.1	2.0	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.7	
26-Sep	2.1	Z	2.3	2.2	2.1	2.2	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
27-Sep	2.1	Z	2.1	2.1	2.1	2.1	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.4	2.2	2.2	2.2	2.4	
28-Sep	2.2	Z	2.2	2.3	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
29-Sep	2.3	Z	2.4	2.4	2.4	2.4	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.3	2.1	2.4	2.3	2.4	2.3	2.4	
30-Sep	2.4	Z	2.3	3.4	2.5	2.8	2.9	2.5	2.4	2.4	2.8	3.3	2.8	2.5	2.2	2.1	2.1	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.5	3.4	
		2.4	--	2.6	2.7	2.6	2.5	2.6	2.5	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.4	Diurnal Average	
		3.9	--	4.3	4.6	5.0	4.0	4.0	3.2	3.2	3.0	2.8	3.3	2.8	2.5	2.5	2.3	2.6	2.5	2.9	3.4	3.8	3.7	3.5	4.1	Diurnal Maximum	
Z - zerospan		C - Calibration																									



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Millennium - September 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Millennium - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	28	4.09	4.09
2.1 - 3.0	613	89.49	93.58
3.1 - 10.0	44	6.42	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Millennium - September 2014

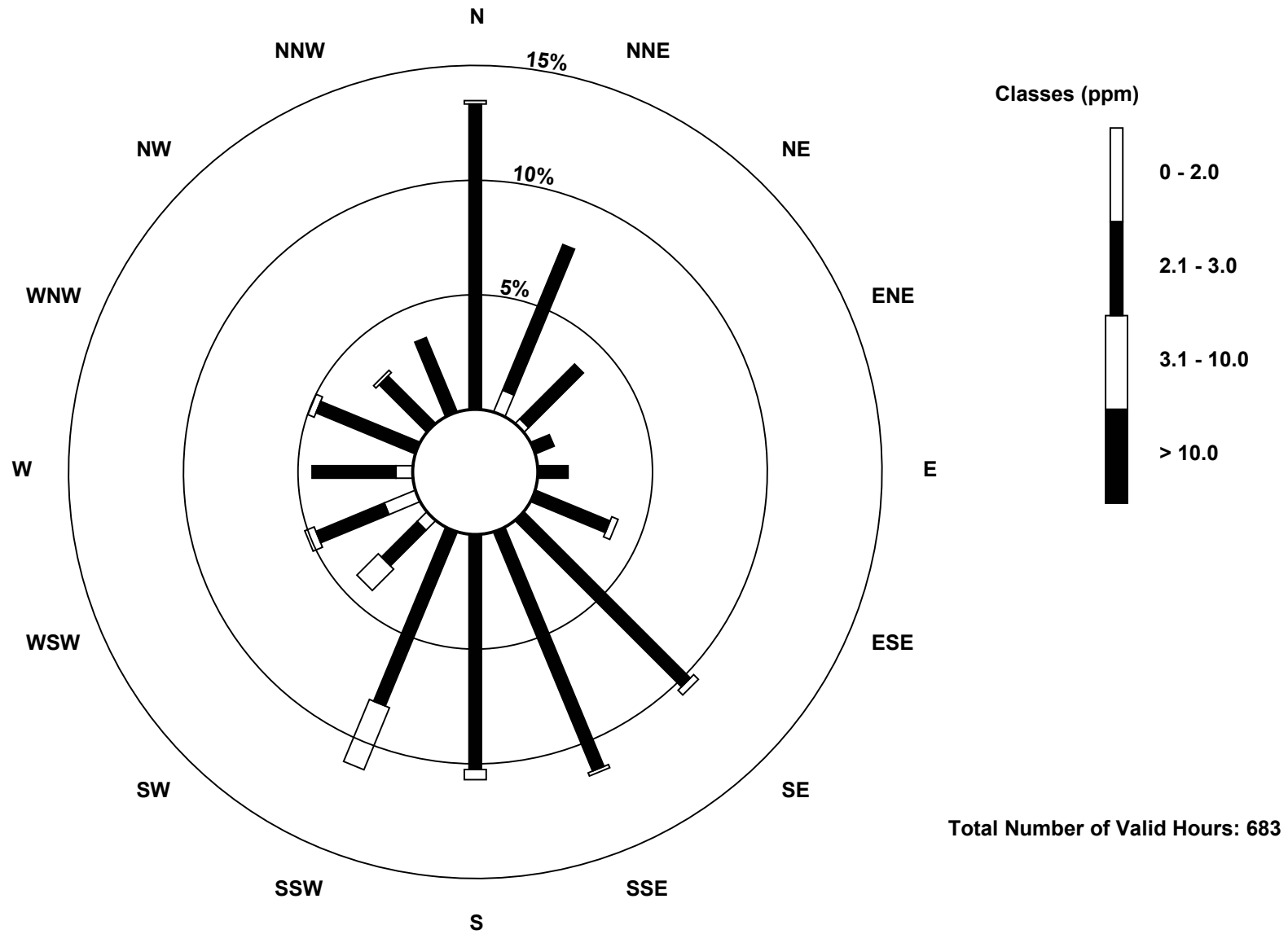
Concentration Ranges (ppm)	Wind Direction																Totals	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
0 - 2.0	0	7	2	0	0	0	0	0	0	0	0	4	10	5	0	0	0	28
2.1 - 3.0	91	47	23	6	9	24	70	77	70	56	15	22	25	32	20	24	611	
3.1 - 10.0	1	0	0	0	0	2	2	1	3	20	9	3	0	2	1	0	44	
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals	92	54	25	6	9	26	72	78	73	76	28	35	30	34	21	24	683	

Total Number of Valid Hours: 683

Total Number of Hours: 720

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

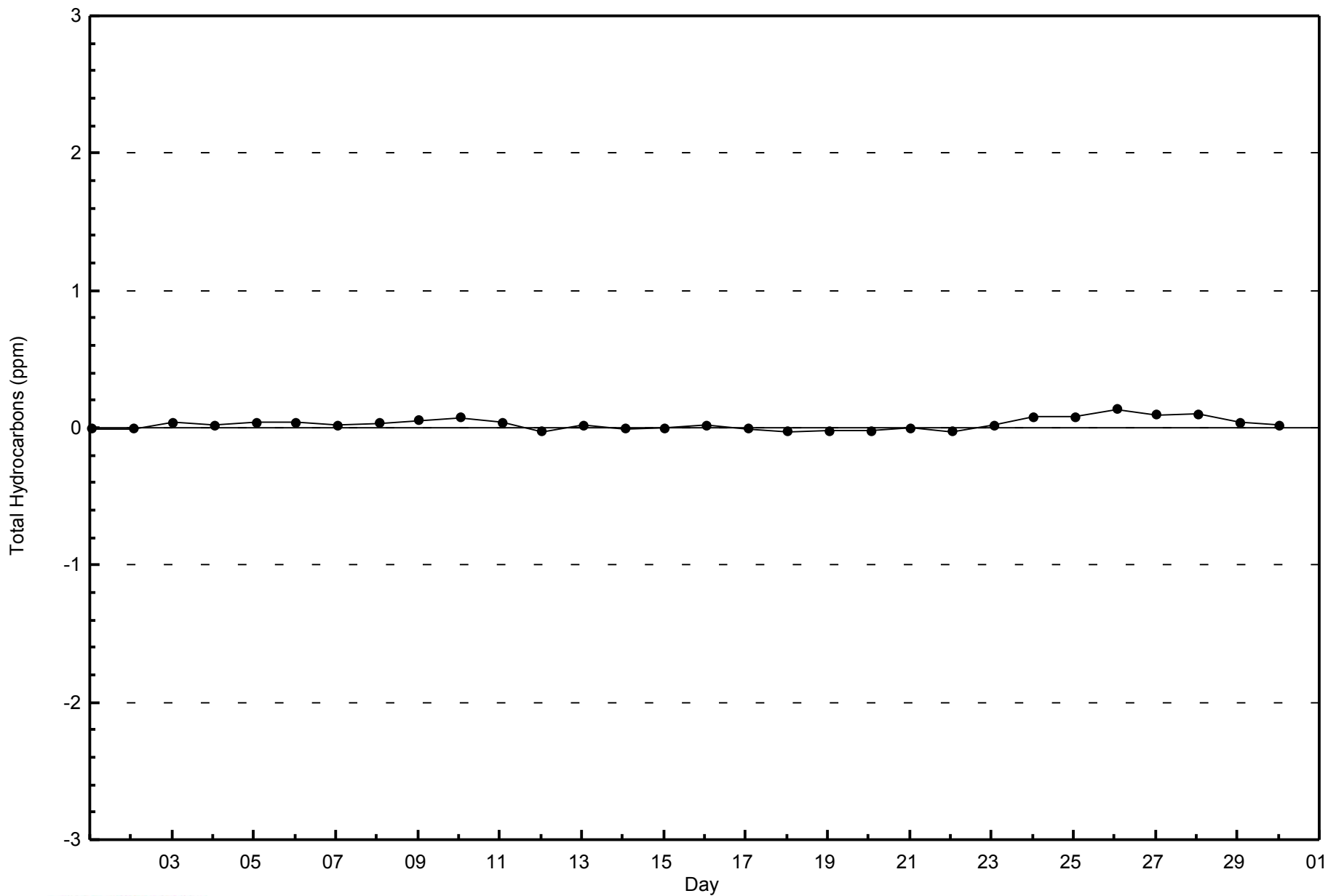
**Total Hydrocarbons (THC) - ppm
Millennium (AMS 12)**





WBEA
Zero Responses

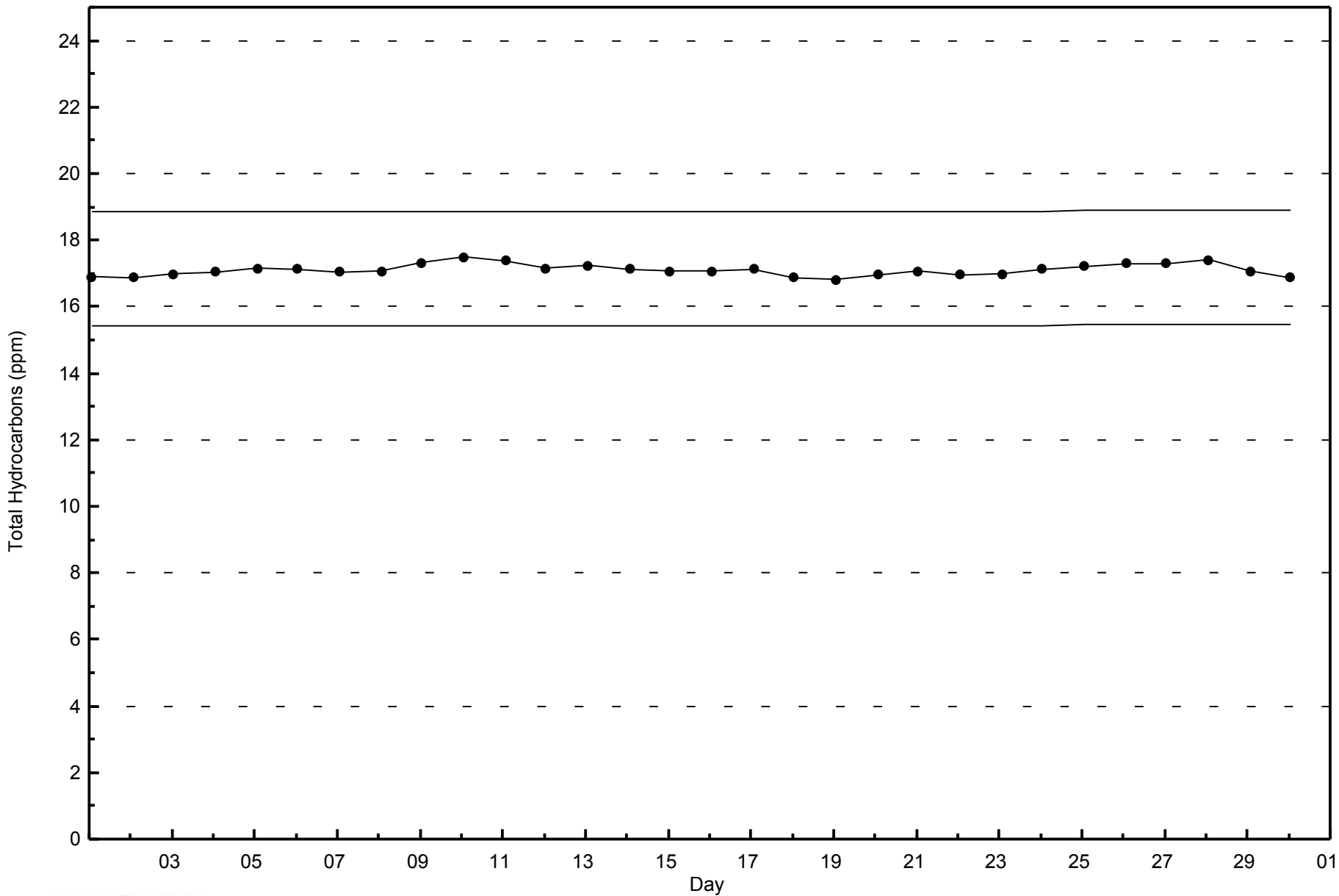
Total Hydrocarbons (THC) - ppm
Millennium - September 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Millennium - September 2014



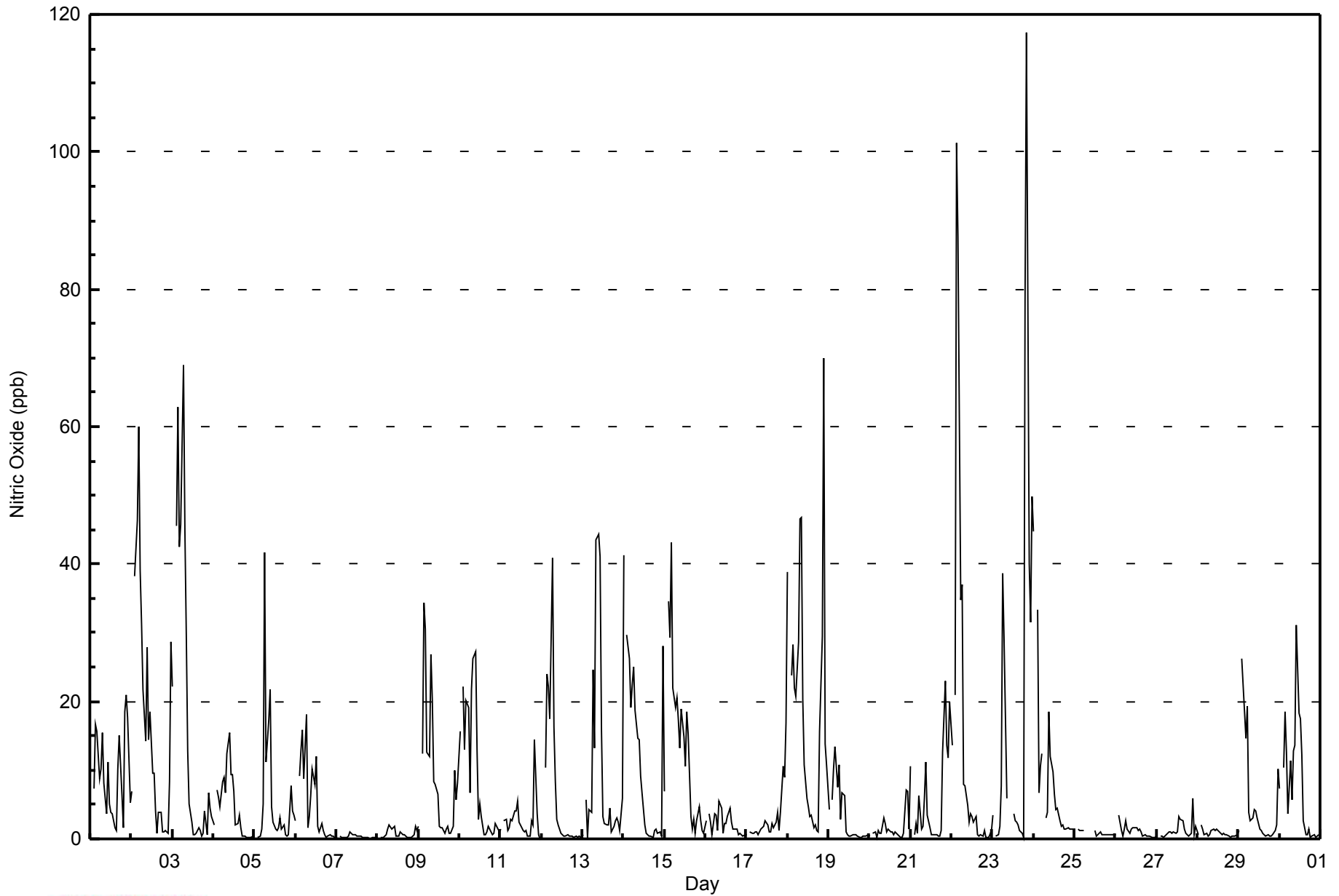


Maximum Value: 117 ppb on Sep 23 21:00																			Maximum Daily Average: 20.9 ppb on Sep 23						Hours in Service: 720		
Minimum Value: 0 ppb on Sep 7 20:00																			Minimum Daily Average: 0.3 ppb on Sep 7						Hours of Data: 680		
Maximum Diurnal Average: 16.2 ppb at hour 7																			Minimum Diurnal Average: 1.0 ppb at hour 19						Hours of Missing Data: 40		
Monthly Average: 7.3 ppb																			Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 8 P ₉₀ = 21 P ₉₉ = 61						Hours of Calibration: 39		
																									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	Z	7	17	16	9	10	15	8	4	11	5	4	4	2	1	10	15	6	2	19	21	18	5	9.0	21	
2-Sep	7	Z	38	46	60	39	31	22	14	28	14	18	10	10	4	1	4	4	1	1	1	1	8	29	17.0	60	
3-Sep	22	Z	46	63	42	46	69	45	30	13	5	2	1	1	1	2	1	1	1	4	1	7	5	3	17.7	69	
4-Sep	2	Z	7	6	5	8	9	7	12	15	9	9	7	2	2	3	2	0	0	0	0	0	0	0	4.7	15	
5-Sep	0	Z	0	0	2	5	42	11	17	22	5	2	1	1	2	3	1	2	1	0	1	8	4	4	5.8	42	
6-Sep	3	Z	9	13	16	9	18	2	3	6	10	8	12	2	1	2	1	1	0	0	1	0	0	0	5.1	18	
7-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	0.3	1	
8-Sep	0	Z	0	0	0	1	1	2	1	2	2	0	0	1	1	1	1	0	0	0	0	1	2	1	0.8	2	
9-Sep	2	Z	12	34	31	13	12	27	20	8	8	6	2	2	2	1	1	2	1	1	2	10	6	8	9.1	34	
10-Sep	16	Z	22	13	20	19	7	22	26	27	13	3	5	3	1	1	1	2	1	1	1	2	2	1	9.0	27	
11-Sep	2	Z	3	3	1	2	3	3	4	4	5	2	2	1	1	1	1	0	3	2	14	4	1	0	2.6	14	
12-Sep	0	Z	10	24	22	17	41	16	8	3	2	1	1	1	0	1	0	0	0	0	0	0	0	0	6.5	41	
13-Sep	1	Z	6	0	4	4	25	13	44	44	41	16	3	2	2	2	4	1	2	3	3	2	1	6	10.0	44	
14-Sep	41	Z	30	26	19	22	25	19	15	14	9	7	2	1	1	0	0	0	1	1	1	1	0	28	11.5	41	
15-Sep	7	Z	35	29	43	22	19	20	17	13	19	15	11	19	15	3	1	3	1	3	5	3	1	1	13.2	43	
16-Sep	3	Z	4	2	1	4	3	1	5	5	1	2	2	3	4	3	1	1	1	1	1	1	0	1	2.2	5	
17-Sep	1	Z	1	1	1	1	1	1	2	2	2	3	2	1	1	2	2	2	4	1	4	11	9	17	3.0	17	
18-Sep	39	Z	24	28	22	21	29	47	47	20	11	6	5	3	4	2	2	1	1	16	30	70	14	11	19.5	70	
19-Sep	4	Z	6	10	13	8	11	3	7	6	1	1	0	0	1	1	1	0	0	0	0	0	0	1	3.2	13	
20-Sep	0	Z	1	1	0	1	1	1	3	2	1	1	1	1	1	1	1	0	0	0	1	7	7	1	1.5	7	
21-Sep	11	Z	1	2	1	6	2	2	6	11	3	2	1	1	1	1	1	0	1	13	23	14	12	20	5.7	23	
22-Sep	14	Z	21	101	88	35	37	8	8	5	2	4	3	3	3	1	0	1	0	1	0	0	0	1	14.6	101	
23-Sep	4	Z	0	1	2	8	39	29	6	C	C	C	4	3	2	2	1	1	0	78	117	40	31	50	20.9	117	
24-Sep	45	Z	33	7	11	12	M	3	4	19	12	10	6	4	4	3	2	2	1	1	2	1	1	1	8.4	45	
25-Sep	1	Z	1	1	1	1	C	C	C	C	C	C	1	0	1	1	1	1	1	1	1	1	1	1	--	1	
26-Sep	1	Z	4	1	0	1	3	1	1	2	2	2	2	1	1	1	0	1	0	0	0	0	0	0	1.1	4	
27-Sep	0	Z	0	0	0	0	1	1	1	1	1	1	1	3	3	3	2	1	1	0	1	6	1	2	1.3	6	
28-Sep	1	Z	2	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0.8	2	
29-Sep	1	Z	26	18	15	19	4	3	3	4	4	3	1	1	1	1	1	1	0	0	1	1	2	10	5.3	26	
30-Sep	7	Z	10	19	13	4	11	6	13	14	31	18	18	12	3	1	1	1	0	0	1	0	0	1	7.9	31	
		7.8	--	12.0	15.7	15.0	11.3	16.2	11.4	11.3	10.6	8.1	5.3	3.6	2.9	2.1	1.4	1.5	1.5	1.0	4.4	7.7	7.1	4.3	6.8	Diurnal Average	
		45	--	46	101	88	46	69	47	47	44	41	18	18	19	15	3	10	15	6	78	117	70	31	50	Diurnal Maximum	
Z - zerospan		C - Calibration					M - Maintenance																				



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Millennium - September 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Millennium - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	610	89.71	89.71
21 - 40	46	6.76	96.47
41 - 80	21	3.09	99.56
81 - 159	3	0.44	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Millennium - September 2014

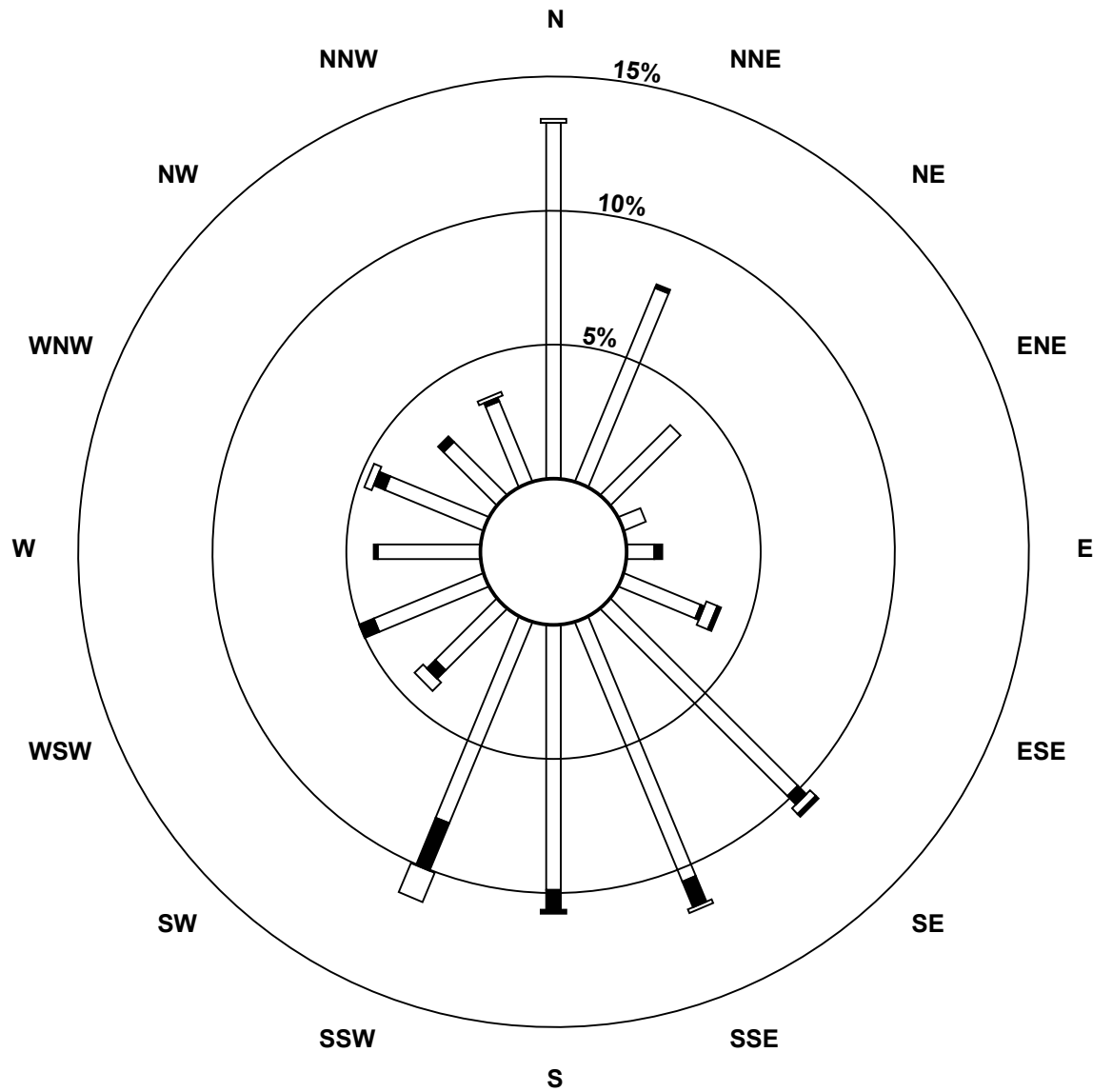
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	90	53	25	6	7	21	67	71	67	55	22	30	26	27	19	22	608
21 - 40	0	1	0	0	2	1	3	7	5	13	3	4	1	3	2	1	46
41 - 80	1	0	0	0	0	3	2	1	0	8	3	0	0	2	0	1	21
81 - 159	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	54	25	6	9	26	73	79	73	76	28	34	27	32	21	24	678

Total Number of Valid Hours: 678

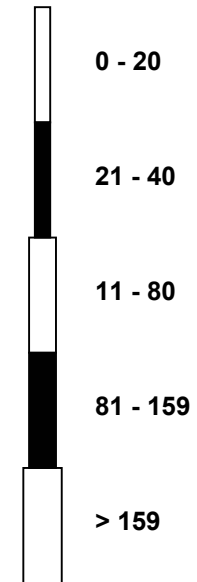
Total Number of Hours: 720

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

**Nitric Oxide (NO) - ppb
Millennium (AMS 12)**



Classes (ppb)

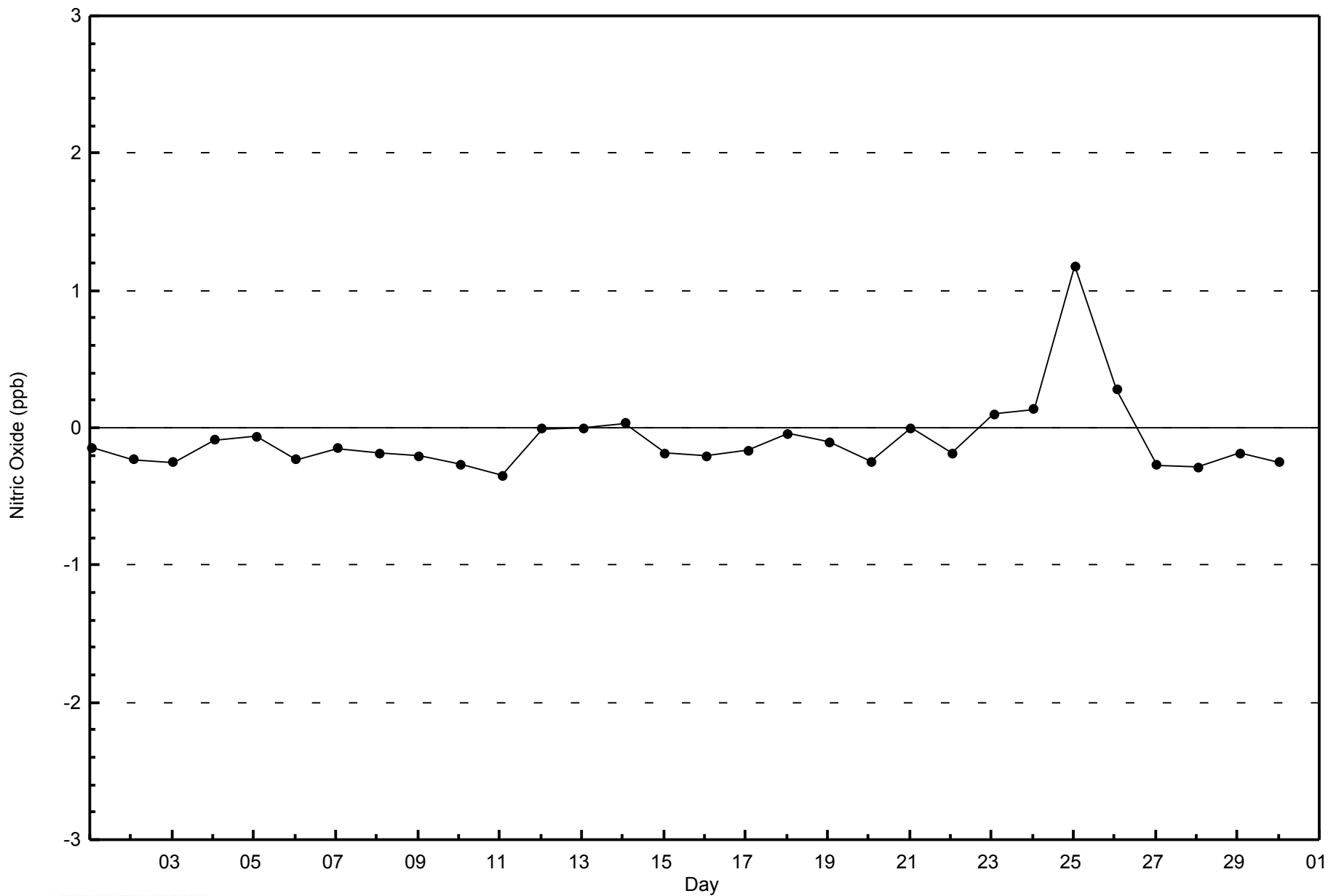


Total Number of Valid Hours: 678



WBEA
Zero Responses

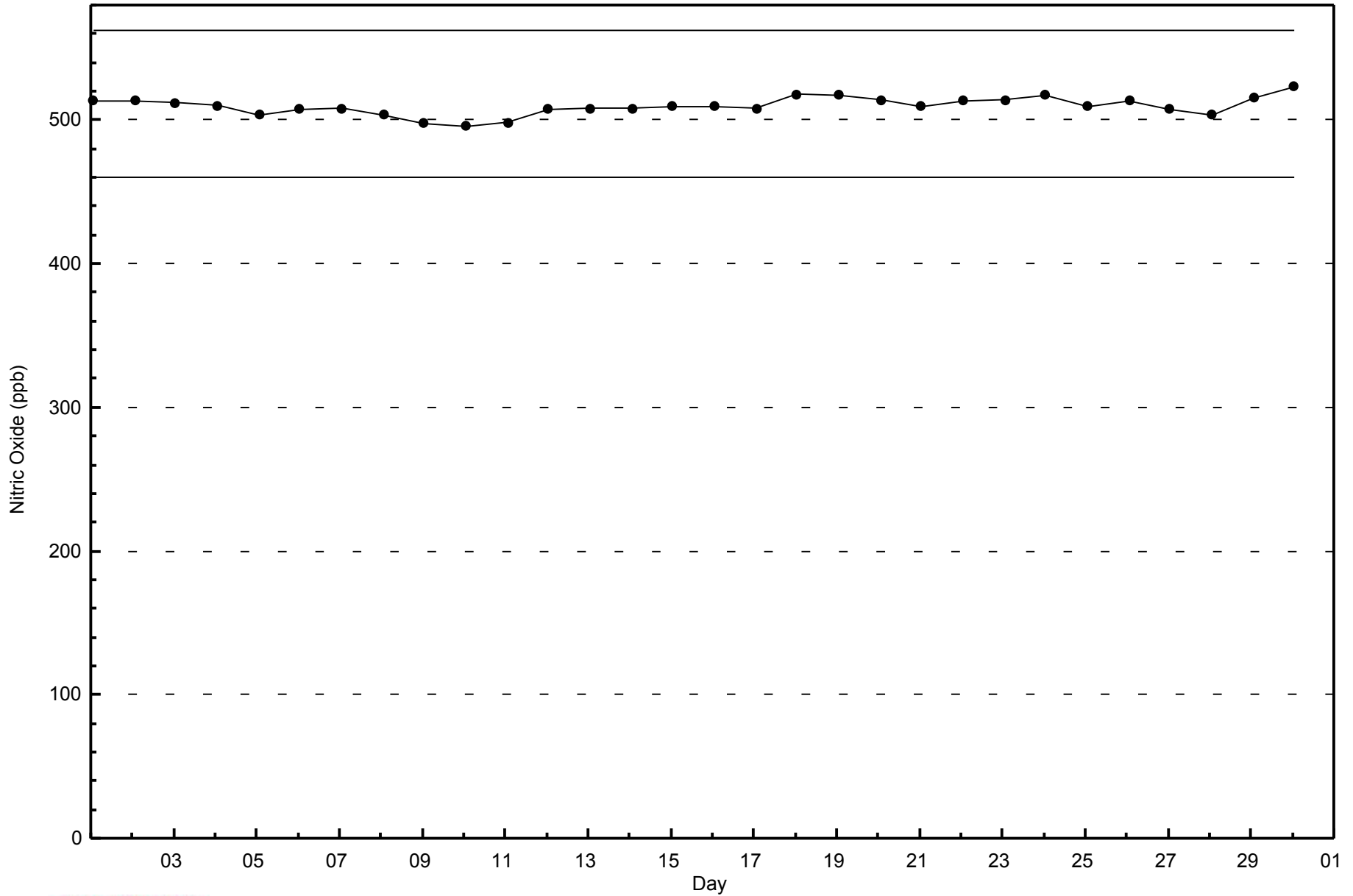
Nitric Oxide (NO) - ppb
Millennium - September 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Millennium - September 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Millennium - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 35 ppb on Sep 23 21:00	Maximum Daily Average: 15.6 ppb on Sep 23
Minimum Value: 0 ppb on Sep 3 13:00	Hours of Data: 680
Maximum Diurnal Average: 10.4 ppb at hour 22	Hours of Missing Data: 40
Monthly Average: 7.1 ppb	Hours of Calibration: 39
Minimum Daily Average: 1.7 ppb on Sep 7	Percent Operational Time: 99.9
Minimum Diurnal Average: 2.9 ppb at hour 16	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 6 Q ₃ = 11 P ₉₀ = 15 P ₉₉ = 25	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	1	Z	8	7	8	8	7	6	3	2	7	5	7	7	2	2	14	19	14	9	15	14	10	8	7.9	19
2-Sep	7	Z	8	8	8	5	4	5	5	12	12	19	13	13	8	2	5	6	5	12	8	9	12	11	8.4	19
3-Sep	9	Z	8	9	8	7	8	6	7	8	5	2	0	0	0	2	1	1	2	16	9	16	15	13	6.5	16
4-Sep	11	Z	12	10	9	9	8	7	7	7	5	5	3	2	7	7	5	1	2	0	2	3	2	2	5.4	12
5-Sep	1	Z	2	6	9	10	17	10	12	13	5	2	2	2	5	9	4	5	3	3	3	10	12	11	6.8	17
6-Sep	12	Z	13	13	10	10	14	4	5	6	9	9	10	4	2	5	4	0	0	4	6	3	1	3	6.2	14
7-Sep	1	Z	4	2	2	2	2	2	4	1	1	0	0	0	0	0	0	0	0	1	3	4	4	6	1.7	6
8-Sep	3	Z	2	2	5	8	5	2	1	1	1	0	0	1	1	1	1	1	3	6	8	9	14	12	3.8	14
9-Sep	12	Z	14	16	12	11	10	11	11	9	10	9	5	5	5	4	5	8	6	8	14	16	13	17	10.0	17
10-Sep	16	Z	12	10	12	12	10	16	17	18	12	5	9	5	0	0	0	5	7	6	8	13	12	7	9.1	18
11-Sep	9	Z	12	11	6	8	8	4	4	4	6	2	1	1	1	2	0	3	18	19	24	21	10	4	7.7	24
12-Sep	4	Z	15	19	19	16	15	13	10	3	2	1	0	0	0	1	1	2	6	6	5	1	5	6	6.6	19
13-Sep	11	Z	15	4	9	8	11	9	13	14	14	8	3	3	3	5	11	7	13	15	19	16	15	15	10.4	19
14-Sep	18	Z	11	9	7	9	8	6	7	7	7	8	4	1	1	0	0	0	10	17	16	17	10	18	8.3	18
15-Sep	15	Z	13	10	11	8	7	7	9	8	11	13	12	17	19	8	6	11	6	14	18	14	12	13	11.5	19
16-Sep	15	Z	10	9	7	9	7	2	7	4	0	1	1	2	3	2	1	2	3	1	3	2	1	2	4.1	15
17-Sep	2	Z	4	3	2	3	1	0	1	0	0	0	0	0	0	1	1	3	5	3	6	10	8	9	2.8	10
18-Sep	8	Z	6	5	4	3	4	7	10	7	6	4	4	4	7	5	8	8	11	25	23	24	17	18	9.6	25
19-Sep	14	Z	13	12	13	13	12	9	9	7	1	0	0	0	0	0	2	2	0	1	2	0	1	3	5.0	14
20-Sep	1	Z	3	4	0	6	4	1	5	3	1	2	1	1	0	2	2	1	1	6	12	15	17	14	4.3	17
21-Sep	17	Z	9	12	12	14	9	5	6	7	3	1	0	0	0	0	0	0	7	16	18	17	18	20	8.4	20
22-Sep	20	Z	21	25	16	15	18	11	10	7	5	7	7	7	9	2	2	5	14	17	5	5	3	16	10.7	25
23-Sep	17	Z	13	14	14	10	19	15	9	C	C	C	7	7	6	6	6	8	28	35	35	31	26	15.6	35	
24-Sep	29	Z	25	21	18	19	M	10	8	18	15	14	13	13	13	8	4	9	6	4	10	7	4	6	12.5	29
25-Sep	10	Z	2	2	2	2	C	C	C	C	C	C	3	1	2	3	1	3	2	3	4	3	4	5	--	10
26-Sep	6	Z	13	9	3	10	11	4	1	4	3	2	1	3	4	2	1	1	0	0	0	0	0	0	3.4	13
27-Sep	0	Z	2	2	2	3	8	6	2	1	1	0	1	6	4	5	4	4	8	10	13	15	7	8	4.9	15
28-Sep	6	Z	10	9	6	7	3	3	3	1	1	1	1	1	1	1	1	3	4	4	6	5	7	8	3.9	10
29-Sep	11	Z	18	17	15	16	10	7	4	5	4	3	2	2	1	2	2	5	5	4	6	8	8	12	7.2	18
30-Sep	11	Z	11	11	10	7	7	5	6	7	11	11	11	10	4	1	2	9	6	3	3	2	3	3	6.7	11

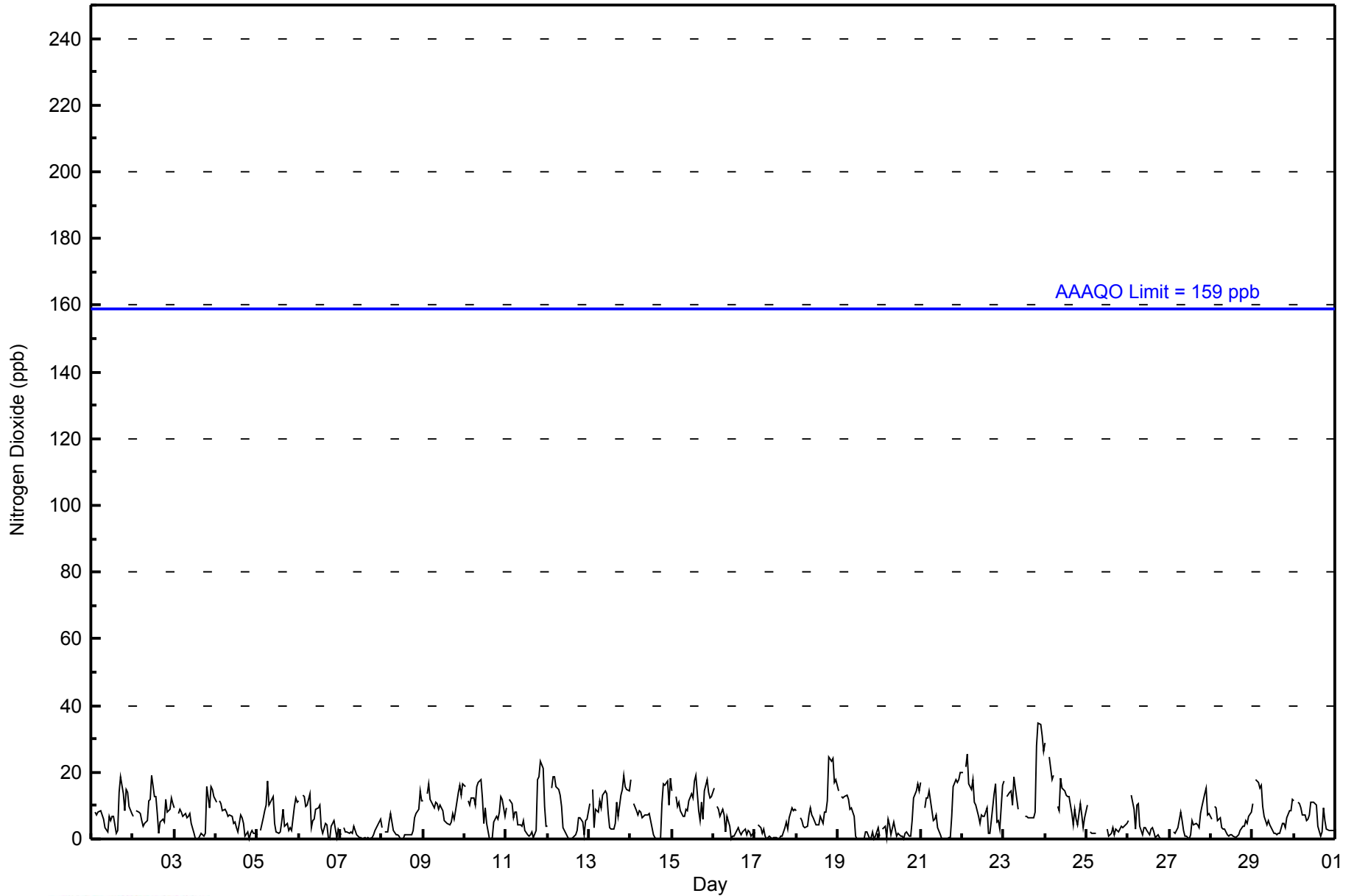
9.8	--	10.2	9.7	8.6	9.0	8.7	6.7	6.8	6.6	5.6	4.9	4.1	3.9	3.6	2.9	3.2	4.3	5.8	8.6	10.1	10.4	9.2	9.8	Diurnal Average	
29	--	25	25	19	19	19	16	17	18	15	19	13	17	19	9	14	19	18	28	35	35	31	26	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Millennium - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Millennium - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	665	97.79	97.79
21 - 40	15	2.21	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Millennium - September 2014

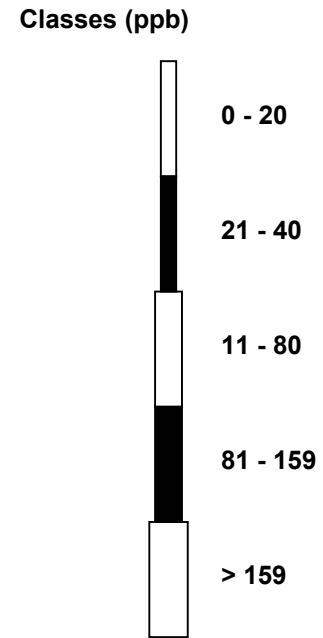
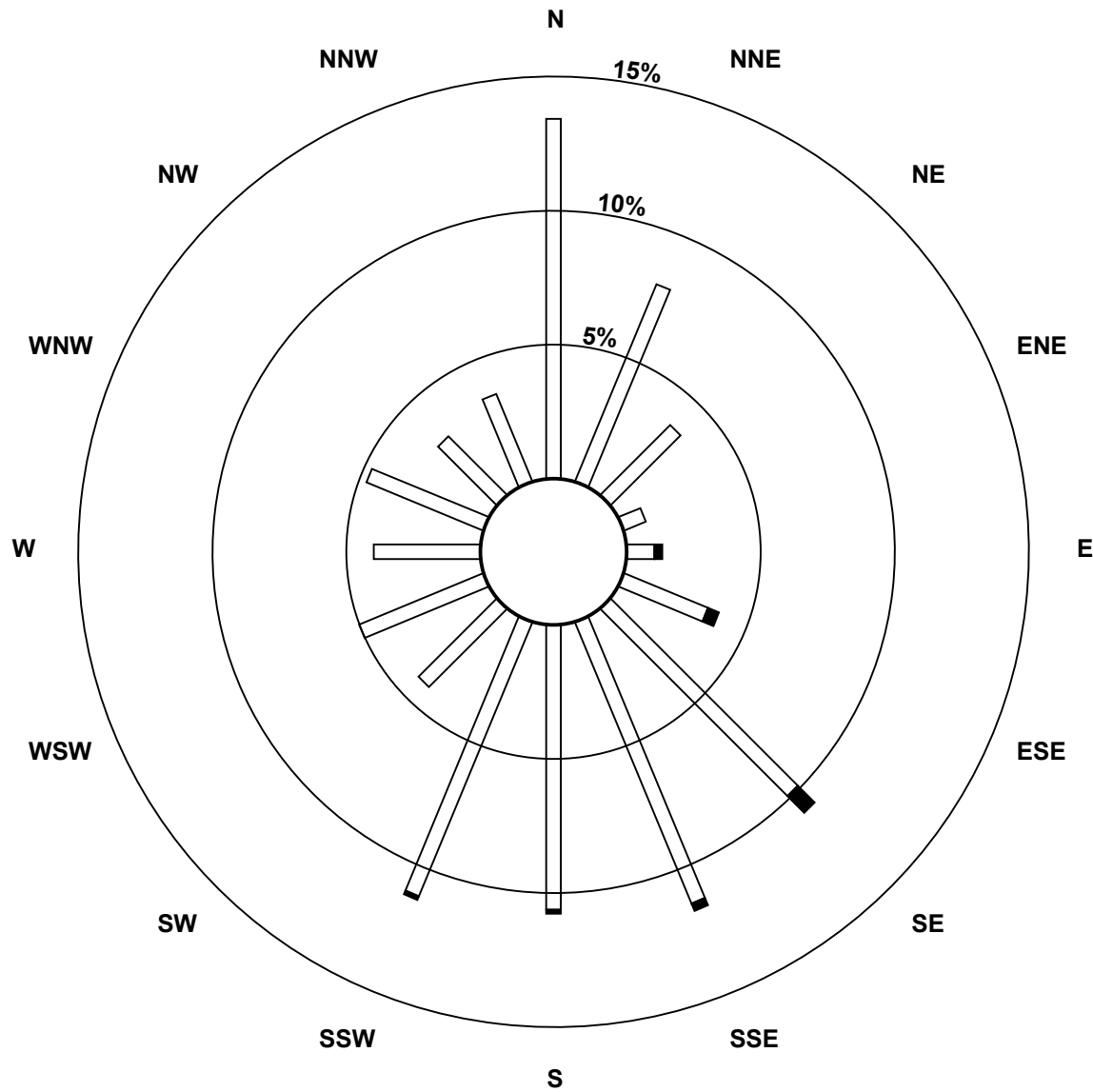
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	91	54	25	6	7	23	67	77	72	75	28	34	27	32	21	24	663
21 - 40	0	0	0	0	2	3	6	2	1	1	0	0	0	0	0	0	15
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	54	25	6	9	26	73	79	73	76	28	34	27	32	21	24	678

Total Number of Valid Hours: 678

Total Number of Hours: 720

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

**Nitrogen Dioxide (NO₂) - ppb
Millennium (AMS 12)**

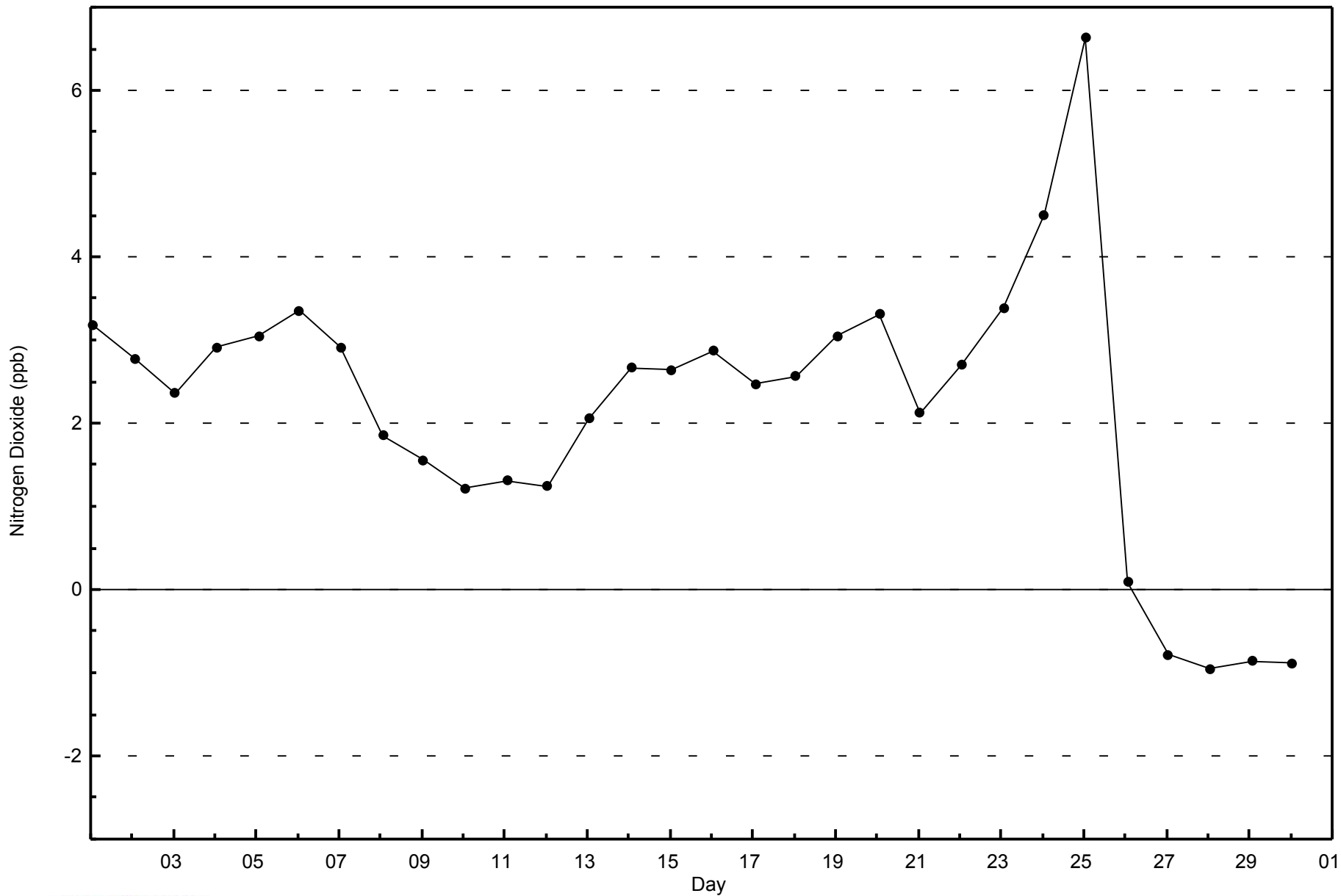


Total Number of Valid Hours: 678



WBEA
Zero Responses

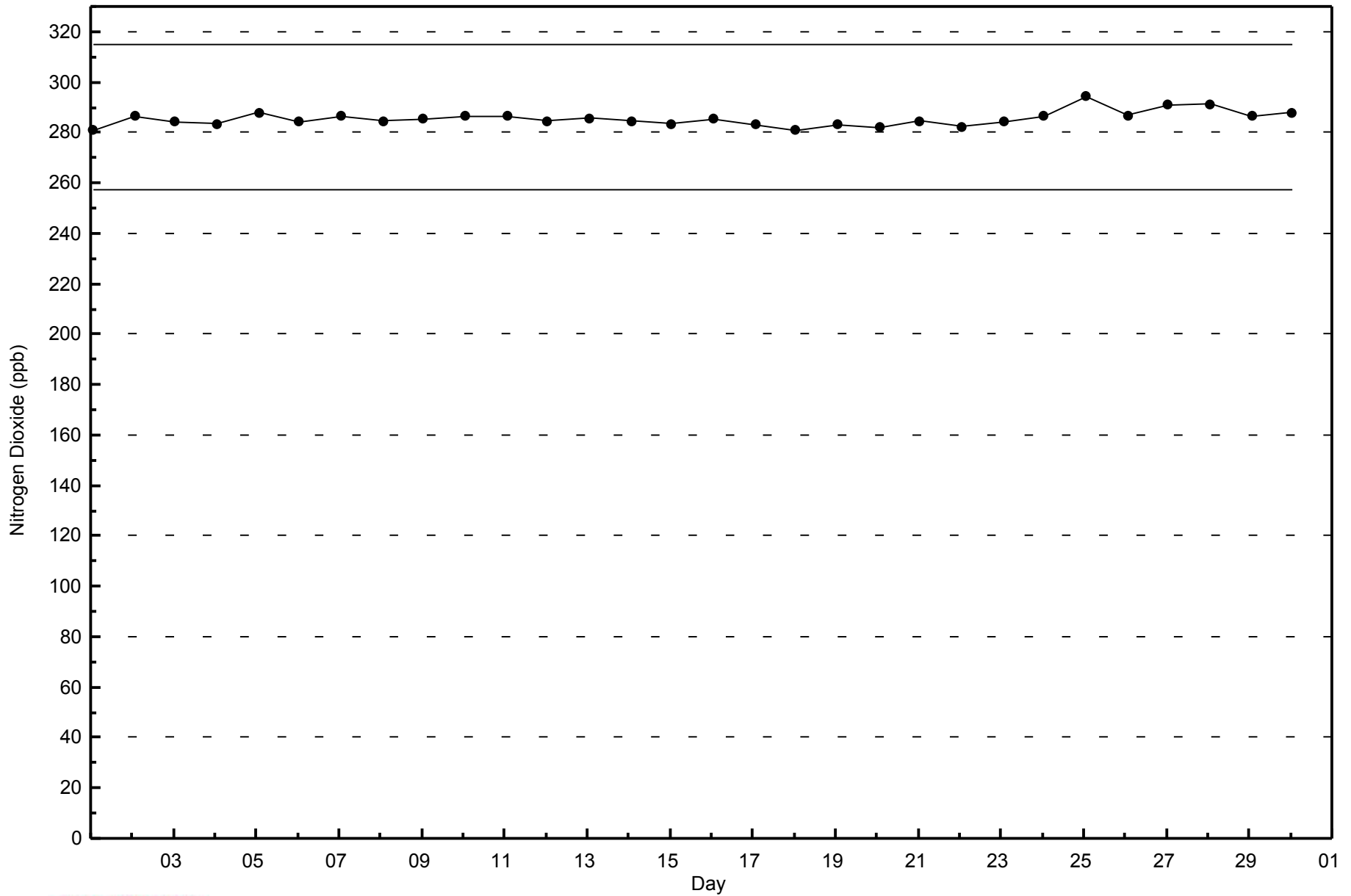
Nitrogen Dioxide (NO₂) - ppb
Millennium - September 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Millennium - September 2014



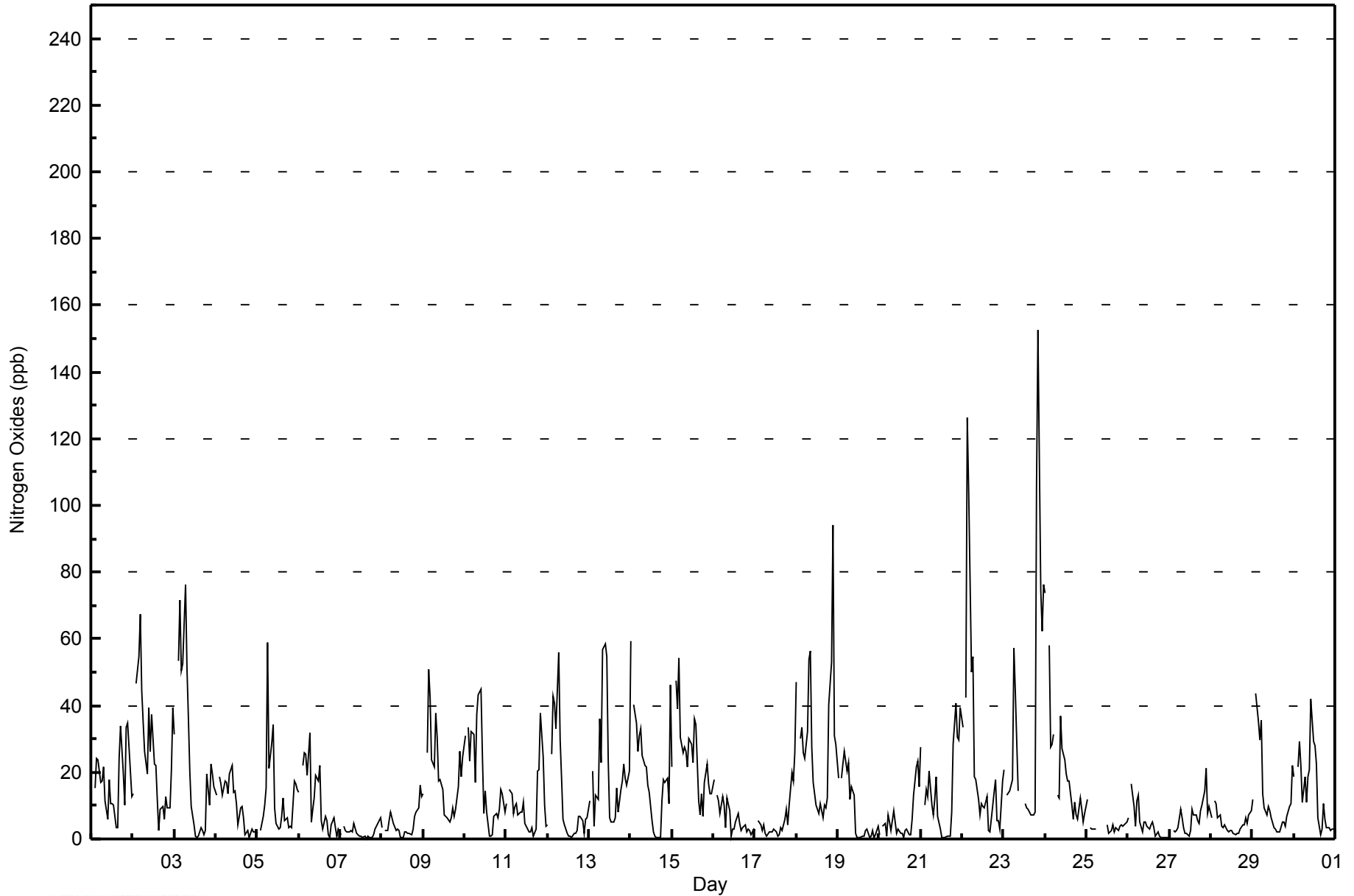


Maximum Value: 152 ppb on Sep 23 21:00																			Maximum Daily Average: 36.5 ppb on Sep 23						Hours in Service: 720		
Minimum Value: 0 ppb on Sep 7 16:00																			Minimum Daily Average: 2.1 ppb on Sep 7						Hours of Data: 680		
Maximum Diurnal Average: 25.4 ppb at hour 4																			Minimum Diurnal Average: 4.3 ppb at hour 16						Hours of Missing Data: 40		
Monthly Average: 14.4 ppb																			Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 3 Median = 9 Q ₃ = 20 P ₉₀ = 34 P ₉₉ = 76						Hours of Calibration: 39		
																									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	1	Z	15	24	24	17	18	22	11	6	18	10	10	10	3	4	24	34	20	10	33	35	27	13	17.0	35	
2-Sep	14	Z	47	54	67	45	35	26	20	39	26	37	22	22	12	3	9	10	6	13	9	9	21	39	25.5	67	
3-Sep	31	Z	53	72	51	53	76	51	37	20	10	4	1	1	1	3	3	1	2	20	10	22	20	16	24.2	76	
4-Sep	13	Z	19	17	13	18	17	13	19	22	14	14	10	4	9	10	6	1	3	0	2	3	2	2	10.1	22	
5-Sep	2	Z	3	7	10	15	59	21	29	34	9	5	3	3	7	12	5	7	3	4	3	18	16	15	12.6	59	
6-Sep	14	Z	22	26	25	19	32	5	9	12	19	17	22	5	3	7	5	1	0	4	6	3	1	3	11.4	32	
7-Sep	1	Z	4	2	2	2	2	2	5	2	1	1	1	1	1	0	1	0	1	1	3	4	4	6	2.1	6	
8-Sep	3	Z	2	2	5	8	6	4	3	3	3	0	0	2	2	2	2	1	3	7	8	9	16	13	4.6	16	
9-Sep	13	Z	26	51	42	24	22	38	31	17	18	15	7	7	7	5	6	10	7	9	16	26	19	25	19.1	51	
10-Sep	31	Z	34	23	32	31	17	37	43	45	25	8	14	8	1	1	1	7	8	6	9	15	14	8	18.2	45	
11-Sep	11	Z	15	13	8	10	11	7	8	8	11	5	3	2	2	3	1	3	20	21	38	25	10	4	10.4	38	
12-Sep	4	Z	25	43	41	33	56	29	18	6	4	2	1	1	1	2	2	3	7	7	5	2	6	6	13.1	56	
13-Sep	11	Z	20	4	13	12	36	23	57	59	55	24	6	5	5	7	15	8	15	17	22	18	16	20	20.4	59	
14-Sep	59	Z	40	35	26	31	33	25	22	22	16	14	6	2	1	1	0	0	12	18	17	18	10	46	19.8	59	
15-Sep	22	Z	47	39	54	30	26	27	26	22	30	28	23	36	34	12	7	14	7	17	22	17	14	13	24.7	54	
16-Sep	18	Z	13	12	7	13	10	3	12	9	1	3	3	5	8	5	3	3	4	2	3	3	1	3	6.3	18	
17-Sep	3	Z	5	4	3	4	2	1	2	2	2	3	2	1	1	3	3	6	9	4	10	20	17	26	5.8	26	
18-Sep	47	Z	30	34	26	24	32	54	56	28	17	10	9	8	10	6	10	9	12	40	53	94	31	28	29.1	94	
19-Sep	18	Z	18	22	26	20	23	12	16	13	2	1	0	0	1	1	3	3	0	1	3	0	1	4	8.2	26	
20-Sep	1	Z	4	5	1	7	5	2	8	5	2	3	2	2	1	2	3	1	1	6	13	22	23	16	5.8	23	
21-Sep	28	Z	10	15	13	21	10	7	12	19	7	3	1	1	1	1	1	1	8	28	41	30	29	40	14.1	41	
22-Sep	33	Z	42	126	104	50	55	19	18	12	7	11	10	9	13	2	2	6	14	18	5	6	3	17	25.3	126	
23-Sep	21	Z	13	15	16	18	57	44	15	C	C	C	11	9	9	8	7	7	8	106	152	74	62	76	36.5	152	
24-Sep	74	Z	58	28	28	31	M	13	12	C	C	C	20	17	17	10	6	11	7	6	12	9	5	8	20.9	74	
25-Sep	12	Z	3	3	3	3	C	C	C	C	C	C	4	1	3	4	2	4	3	4	4	4	4	5	--	12	
26-Sep	6	Z	17	10	4	11	13	5	2	5	5	4	3	4	5	3	1	2	1	0	0	0	0	0	4.5	17	
27-Sep	1	Z	2	2	3	4	9	7	3	2	2	1	2	9	7	7	6	5	8	10	14	21	8	10	6.2	21	
28-Sep	6	Z	12	11	6	7	4	3	4	3	2	3	2	2	1	2	2	3	4	4	6	5	7	8	4.7	12	
29-Sep	12	Z	44	35	30	35	14	9	7	10	8	7	3	3	2	2	2	5	5	4	7	10	10	22	12.5	44	
30-Sep	19	Z	21	29	22	11	19	11	19	21	42	29	28	23	7	1	3	11	6	3	3	3	3	3	14.6	42	
		17.6	--	22.2	25.4	23.5	20.2	24.9	18.0	18.1	17.2	13.7	10.2	7.7	6.8	5.8	4.3	4.7	5.9	6.8	13.0	17.7	17.5	13.4	16.5	Diurnal Average	
		74	--	58	126	104	53	76	54	57	59	55	37	28	36	34	12	24	34	20	106	152	94	62	76	Diurnal Maximum	
Z - zerospan		C - Calibration					M - Maintenance																				



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Millennium - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Millennium - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	518	76.18	76.18
21 - 40	115	16.91	93.09
41 - 80	42	6.18	99.26
81 - 159	5	0.74	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Millennium - September 2014

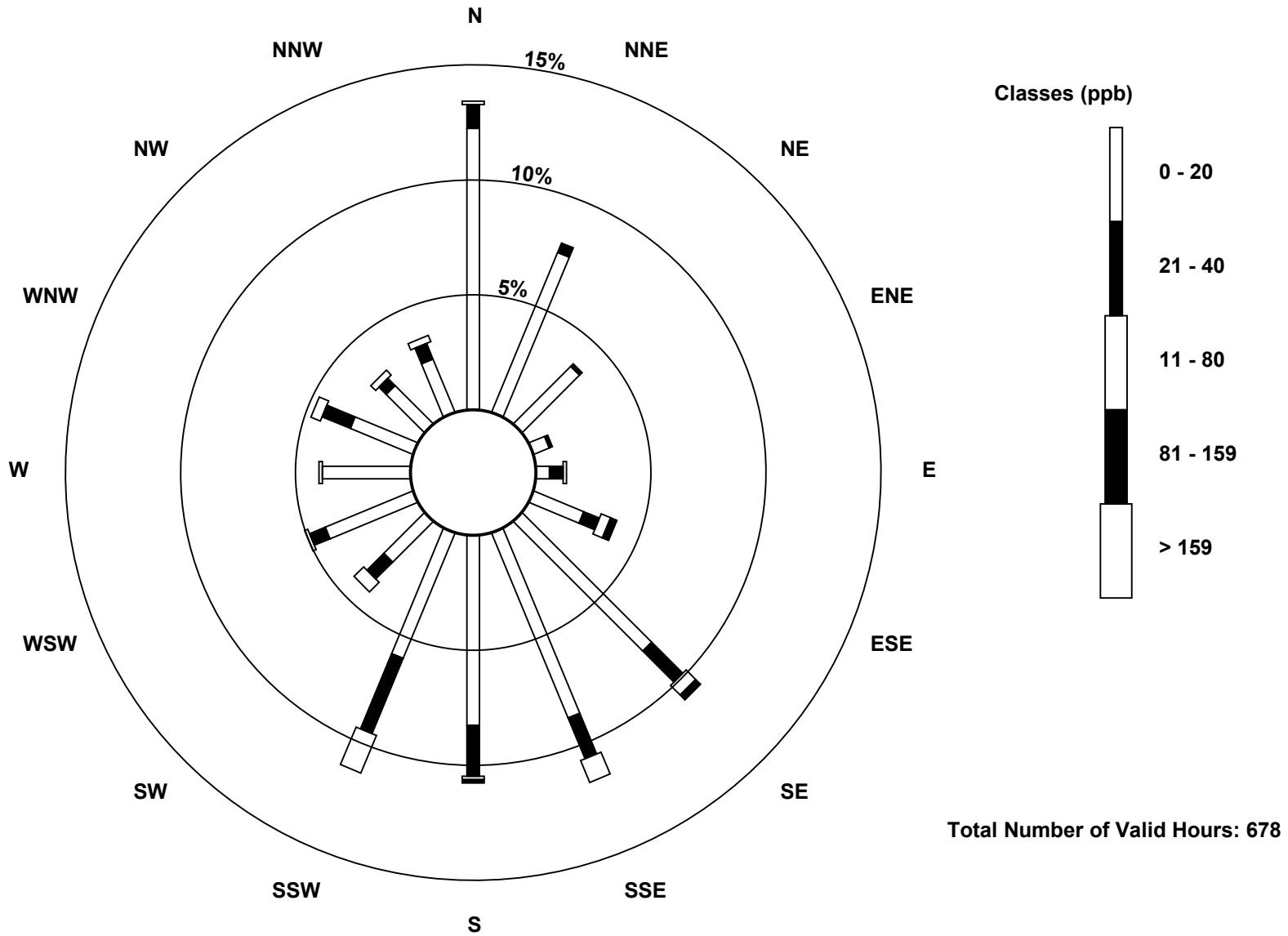
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	83	51	24	5	4	16	54	59	56	40	17	28	26	20	16	17	516
21 - 40	7	3	1	1	4	5	13	13	15	24	7	5	0	9	3	5	115
11 - 80	1	0	0	0	1	3	4	7	1	12	4	1	1	3	2	2	42
81 - 159	0	0	0	0	0	2	2	0	1	0	0	0	0	0	0	0	5
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	54	25	6	9	26	73	79	73	76	28	34	27	32	21	24	678

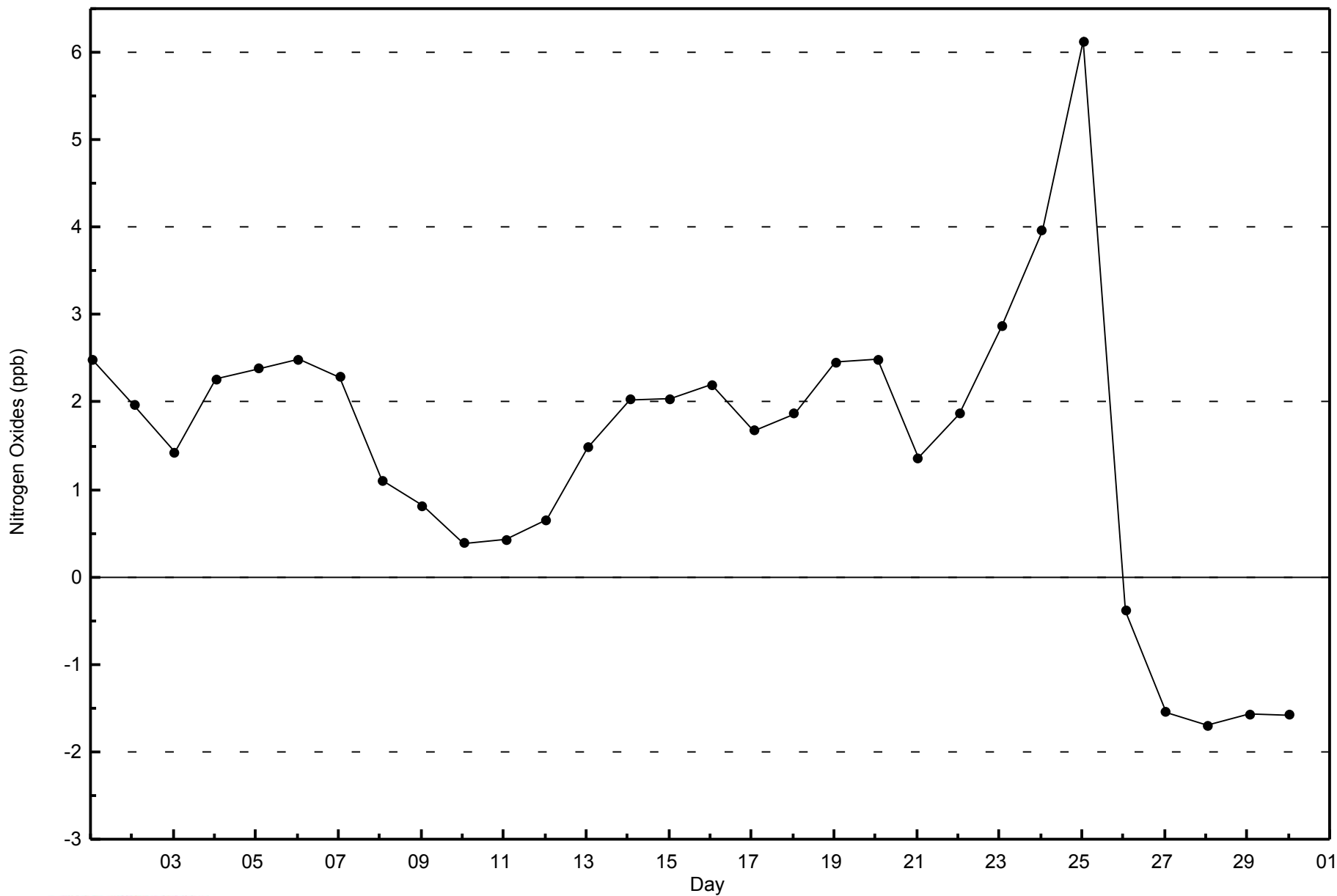
Total Number of Valid Hours: 678

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Nitrogen Oxides (NO_x) - ppb
Millennium (AMS 12)

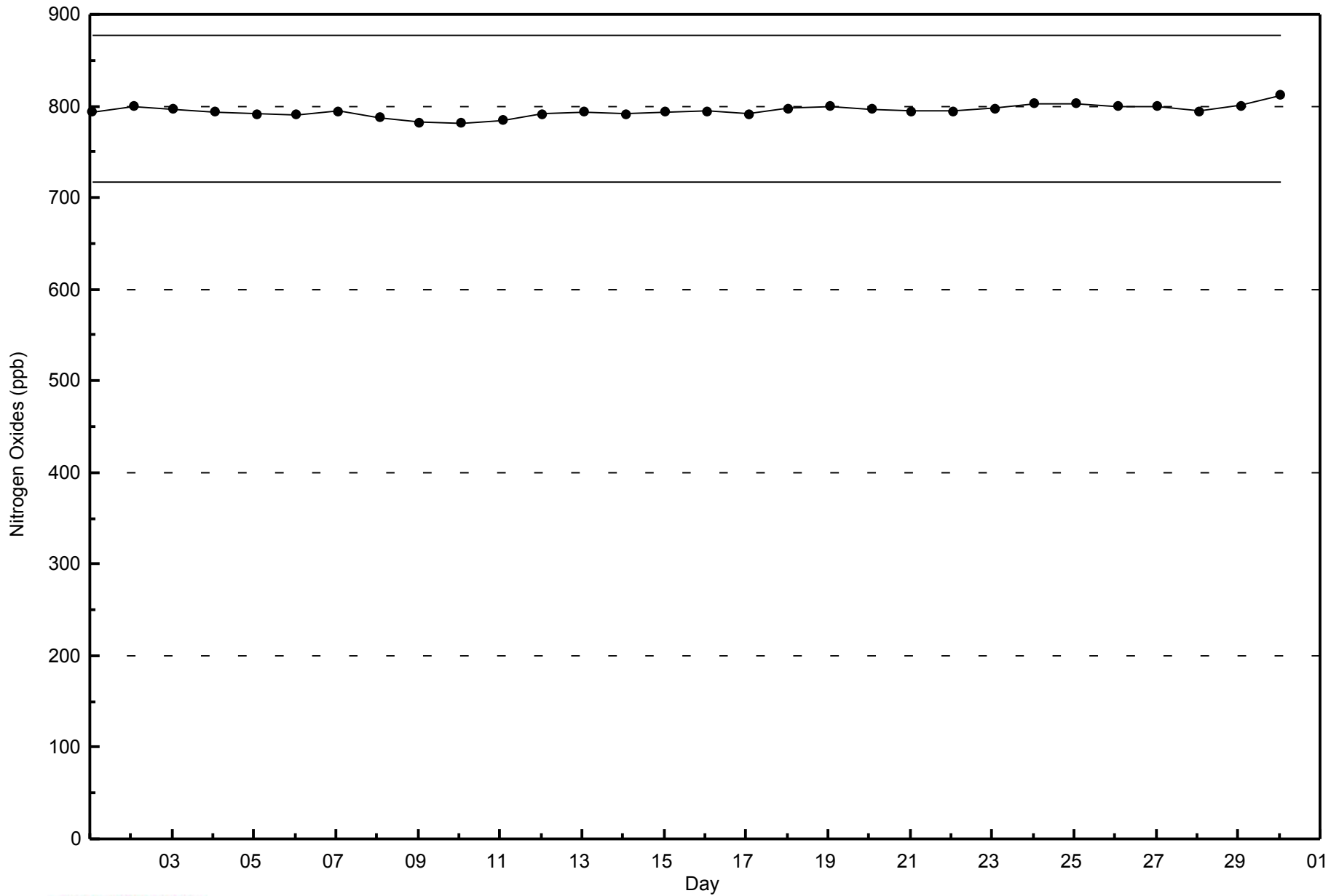






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Millennium - September 2014





Summary of Hour Averages

Millennium - September 2014

Number of Exceedences (AAAQO): 24-hr: 0	Hours in Service: 720
Maximum Value: 31.6 µg/m ³ on Sep 23 21:00	Maximum Daily Average: 10.4 µg/m ³ on Sep 22
Minimum Value: 1.4 µg/m ³ on Sep 20 00:00	Hours of Data: 719
Maximum Diurnal Average: 8.0 µg/m ³ at hour 20	Hours of Missing Data: 1
Monthly Average: 5.81 µg/m ³	Hours of Calibration: 0
Minimum Daily Average: 2.2 µg/m ³ on Sep 26	Percent Operational Time: 99.9
Minimum Diurnal Average: 4.5 µg/m ³ at hour 16	
Percentiles: P ₁ = 1.7 P ₁₀ = 2.2 Q ₁ = 3.0 Median = 4.7 Q ₃ = 7.6 P ₉₀ = 10.6 P ₉₉ = 16.6	

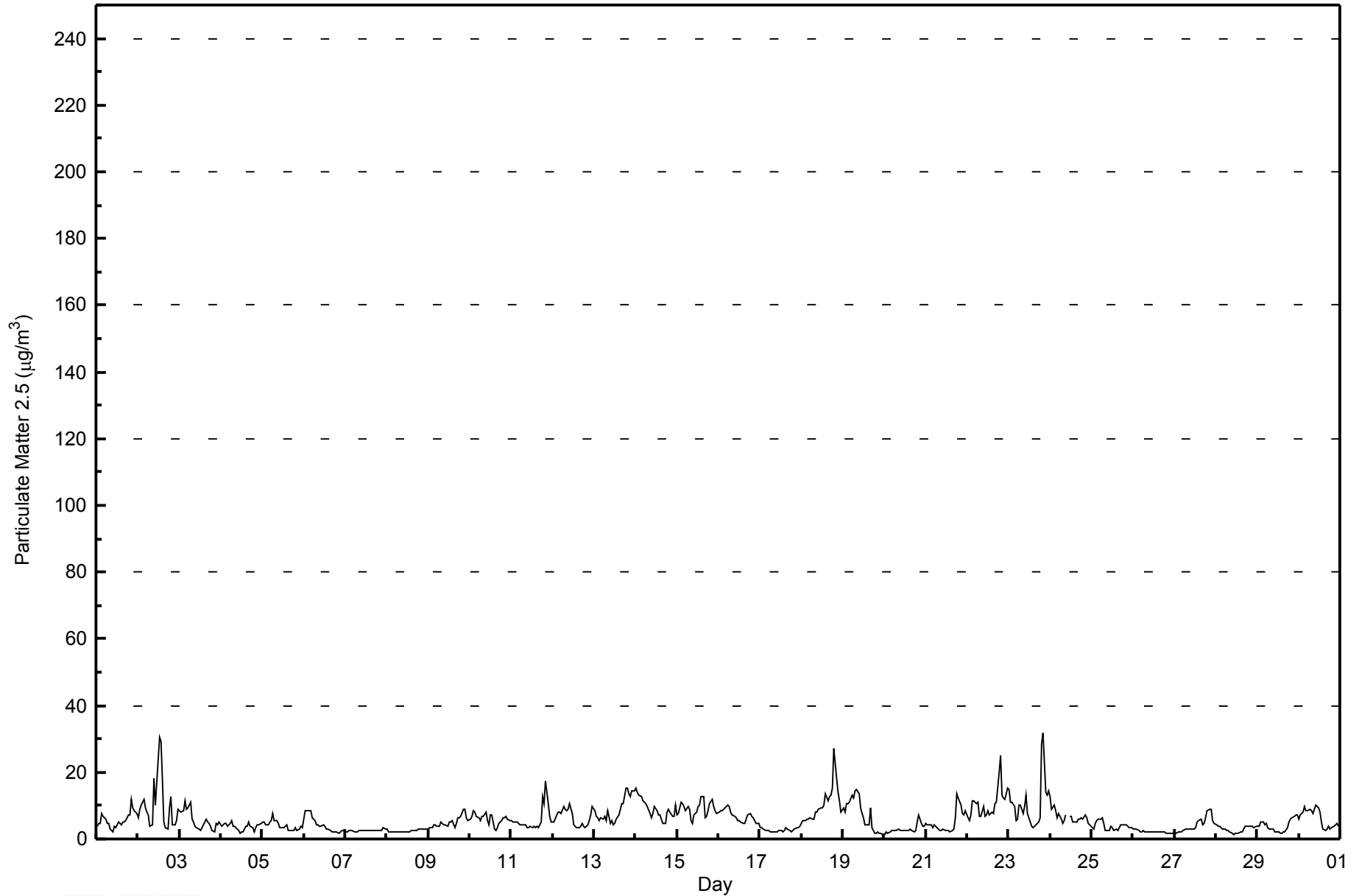
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Sep	3.6	4.6	4.5	7.6	6.6	6.0	4.7	4.6	3.1	2.1	3.6	3.5	4.2	5.1	4.1	5.3	5.2	5.7	7.4	7.1	11.7	9.4	8.4	7.5	5.6	11.7																						
2-Sep	6.4	8.7	10.1	12.1	9.2	7.9	7.2	4.0	4.3	18.4	10.2	16.9	30.4	29.4	17.7	5.0	3.5	3.2	9.3	12.9	4.1	4.1	5.6	8.8	10.4	30.4																						
3-Sep	8.5	7.9	8.7	11.3	9.1	9.1	10.9	5.9	5.1	3.6	3.5	3.1	2.7	3.4	4.3	6.1	5.0	4.6	3.8	2.5	2.2	4.5	4.4	5.0	5.6	11.3																						
4-Sep	3.8	4.2	4.8	4.9	3.9	4.5	5.6	3.7	3.7	3.0	2.6	1.7	2.0	2.2	3.6	3.9	5.3	3.6	3.4	2.1	3.2	4.3	4.4	4.5	3.7	5.6																						
5-Sep	5.1	5.2	4.1	4.4	5.2	5.5	7.5	5.7	5.4	4.7	3.3	3.2	3.4	4.0	4.2	2.3	2.4	2.6	2.5	3.4	2.7	2.9	3.7	3.2	4.0	7.5																						
6-Sep	5.9	8.3	8.5	8.6	8.7	6.4	5.7	4.3	4.4	3.9	4.0	4.3	3.8	3.2	3.0	2.4	2.1	2.1	2.1	2.3	1.7	2.1	2.4	2.6	4.3	8.7																						
7-Sep	2.3	2.2	2.4	2.4	2.3	2.3	2.2	2.2	2.4	2.5	2.4	2.4	2.4	2.4	2.6	2.5	2.5	2.5	2.7	2.6	2.7	2.6	3.2	3.1	2.5	3.2																						
8-Sep	2.8	2.3	2.0	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.2	2.4	2.5	2.3	2.7	3.1	2.8	3.1	3.0	3.0	3.0	2.4	3.1																						
9-Sep	3.0	3.2	3.4	4.0	4.3	3.7	3.8	4.9	4.7	4.0	4.2	3.9	5.3	5.2	5.3	3.5	4.5	6.4	6.3	6.7	8.8	8.8	6.2	5.5	5.0	8.8																						
10-Sep	5.9	6.7	8.3	7.9	6.7	6.3	5.6	6.8	7.0	8.0	5.4	4.2	7.2	7.2	3.1	2.7	3.4	4.5	5.4	6.3	6.4	6.6	6.0	5.3	6.0	8.3																						
11-Sep	5.4	5.1	5.3	5.3	4.5	4.2	4.4	4.3	4.3	3.3	3.4	3.7	3.6	3.9	3.3	3.8	3.4	5.2	12.9	10.5	17.4	10.6	6.7	5.0	5.8	17.4																						
12-Sep	5.0	5.0	7.2	8.1	8.0	7.8	9.7	8.9	8.4	8.8	10.6	7.6	4.3	3.7	3.4	3.3	3.7	4.7	3.9	3.5	4.1	5.6	7.3	9.9	6.4	10.6																						
13-Sep	8.5	6.9	6.4	5.5	6.2	6.0	6.6	5.4	8.4	4.7	5.3	4.4	4.7	5.8	7.3	8.7	10.6	10.7	15.4	15.3	13.4	12.7	14.2	14.6	8.7	15.4																						
14-Sep	15.2	14.1	13.2	12.7	11.5	11.1	10.8	9.5	7.5	6.2	7.7	9.6	8.6	7.2	7.1	6.1	4.6	4.7	8.2	9.0	7.9	6.9	6.7	10.4	9.0	15.2																						
15-Sep	7.2	7.4	11.2	10.6	9.9	8.6	9.8	8.9	5.5	4.8	7.1	8.1	9.6	10.1	12.8	12.6	6.3	6.8	8.3	10.6	11.9	9.8	8.7	7.7	8.9	12.8																						
16-Sep	8.0	8.4	8.5	8.8	9.2	10.1	9.6	7.9	7.2	6.9	6.2	5.5	5.4	5.0	4.6	4.7	6.1	7.2	7.6	6.7	6.5	5.5	4.8	4.5	6.9	10.1																						
17-Sep	3.6	3.5	3.2	2.7	2.5	2.7	2.3	2.2	2.2	1.9	2.0	2.6	2.4	2.2	2.4	3.4	3.1	2.6	2.2	2.5	2.8	3.2	3.3	4.0	2.7	4.0																						
18-Sep	4.8	5.7	5.5	6.1	5.9	6.3	6.0	6.0	8.1	8.2	9.1	9.5	9.3	10.0	13.4	11.6	12.7	13.0	15.2	27.1	18.2	14.1	11.4	8.0	10.2	27.1																						
19-Sep	9.3	7.9	10.4	10.7	11.1	13.2	12.2	14.6	14.9	13.8	9.4	7.7	6.3	4.2	4.1	4.4	9.1	3.5	1.7	1.8	2.0	1.7	1.5	1.4	7.4	14.9																						
20-Sep	1.5	2.0	1.8	2.0	2.4	2.8	2.5	2.5	2.9	2.6	2.4	2.7	2.5	2.4	2.4	2.8	2.7	2.3	2.6	4.9	7.1	4.7	3.7	3.7	2.9	7.1																						
21-Sep	4.8	4.3	4.3	4.0	3.3	4.3	3.4	3.1	2.6	2.7	2.8	2.7	2.6	2.4	2.1	2.4	3.0	6.4	13.4	12.5	10.3	7.8	7.4	8.4	5.0	13.4																						
22-Sep	6.4	5.4	7.4	11.3	11.4	10.5	11.2	6.6	7.0	9.9	6.9	7.1	8.5	7.2	8.0	7.6	10.4	10.9	20.1	25.1	13.0	12.2	11.8	15.1	10.4	25.1																						
23-Sep	14.7	11.0	10.9	9.7	5.6	5.8	10.3	10.1	7.7	9.7	13.0	7.5	5.1	3.8	3.4	3.9	4.4	5.3	6.5	28.5	31.6	14.0	13.1	14.2	10.4	31.6																						
24-Sep	12.5	9.0	10.0	8.3	6.2	7.5	5.7	4.8	5.4	7.2	M	6.7	6.8	4.9	5.0	4.9	6.1	5.8	6.2	6.0	7.3	6.4	4.8	4.2	6.6	12.5																						
25-Sep	3.3	3.1	4.7	5.4	6.1	6.1	6.4	4.5	2.4	2.4	2.4	3.6	3.3	2.6	2.8	2.6	3.5	4.1	4.2	4.2	4.1	3.8	3.5	3.4	3.9	6.4																						
26-Sep	2.9	2.9	3.0	2.6	2.2	2.3	2.4	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.2	3.0																						
27-Sep	1.9	1.9	2.1	2.2	2.3	2.4	3.1	3.1	2.9	2.8	2.8	2.8	3.3	5.1	5.4	5.8	4.4	4.9	6.4	8.6	9.0	9.1	5.4	4.8	4.3	9.1																						
28-Sep	4.4	3.9	3.8	3.5	3.1	2.9	2.7	2.5	2.0	1.6	1.4	1.5	1.6	1.8	2.0	2.1	2.9	3.6	3.7	3.8	3.9	3.8	3.6	3.7	2.9	4.4																						
29-Sep	3.7	3.7	5.2	5.1	4.3	4.7	3.5	3.0	2.8	3.0	2.3	2.1	2.0	1.8	1.8	2.1	2.1	3.5	5.1	6.1	6.3	6.7	7.1	7.2	4.0	7.2																						
30-Sep	5.8	7.3	7.9	9.6	8.6	8.5	9.0	8.7	7.5	8.8	10.2	9.4	8.0	5.3	2.9	2.6	2.9	3.6	2.8	3.5	3.8	4.3	4.8	3.8	6.2	10.2																						
																								5.9	5.7	6.3	6.7	6.1	6.1	6.2	5.4	5.1	5.5	5.1	5.1	5.4	5.2	4.9	4.5	4.7	5.0	6.5	8.0	7.6	6.4	6.0	6.1	Diurnal Average
																								15.2	14.1	13.2	12.7	11.5	13.2	12.2	14.6	14.9	18.4	13.0	16.9	30.4	29.4	17.7	12.6	12.7	13.0	20.1	28.5	31.6	14.1	14.2	15.1	Diurnal Maximum

M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Millennium - September 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Millennium - September 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	425	59.11	59.11
6 - 15	282	39.22	98.33
16 - 25	7	0.97	99.30
26 - 80	5	0.70	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Millennium - September 2014

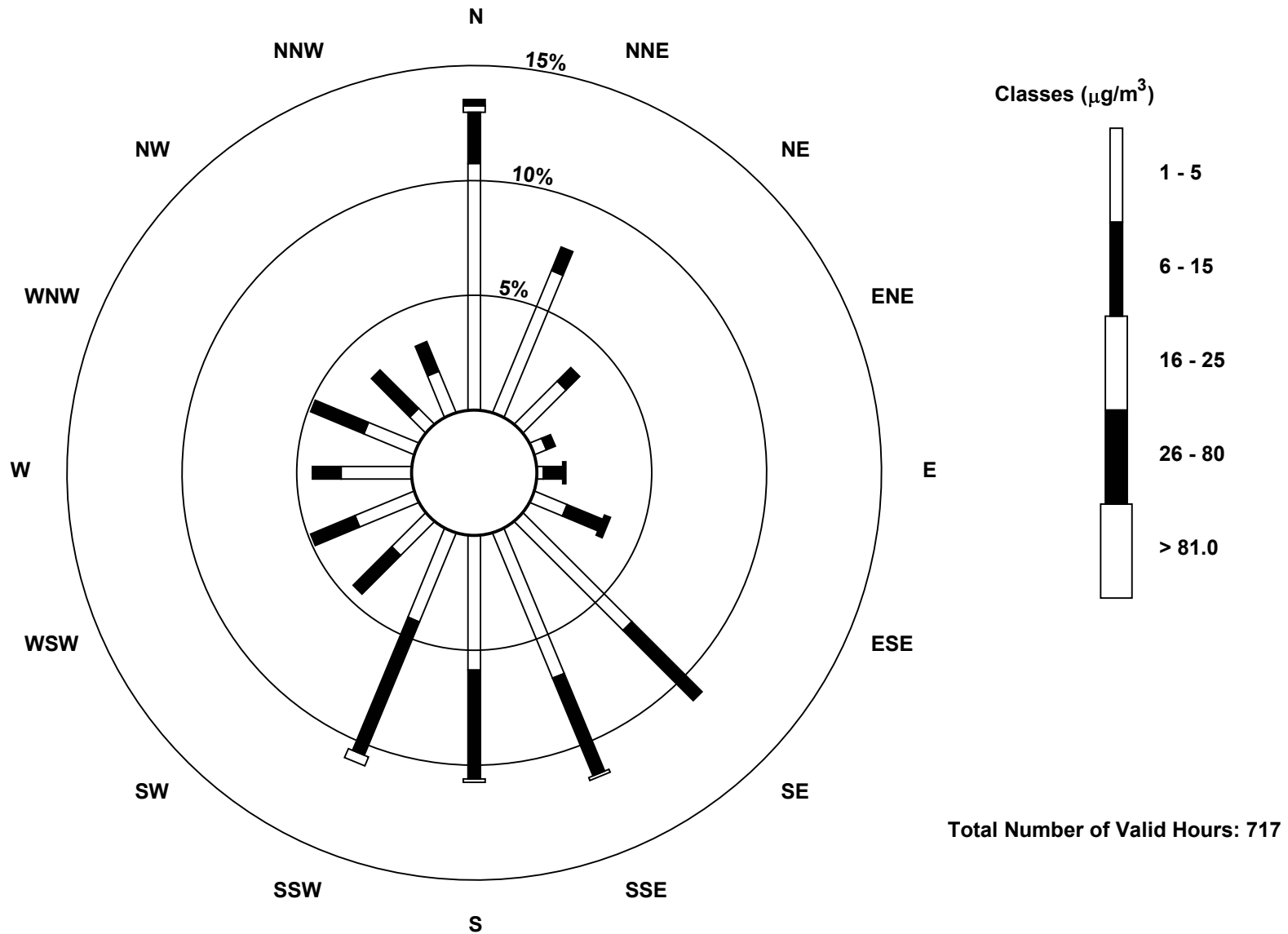
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	77	48	19	4	2	11	48	49	42	30	15	20	22	17	7	14	425
6 - 15	16	8	6	3	6	12	31	33	34	45	17	15	9	18	17	10	280
16 - 25	2	0	0	0	0	0	0	1	1	3	0	0	0	0	0	0	7
26 - 80	2	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	5
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	97	56	25	7	9	25	79	83	77	78	32	35	31	35	24	24	717

Total Number of Valid Hours: 717

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Millennium (AMS 12)



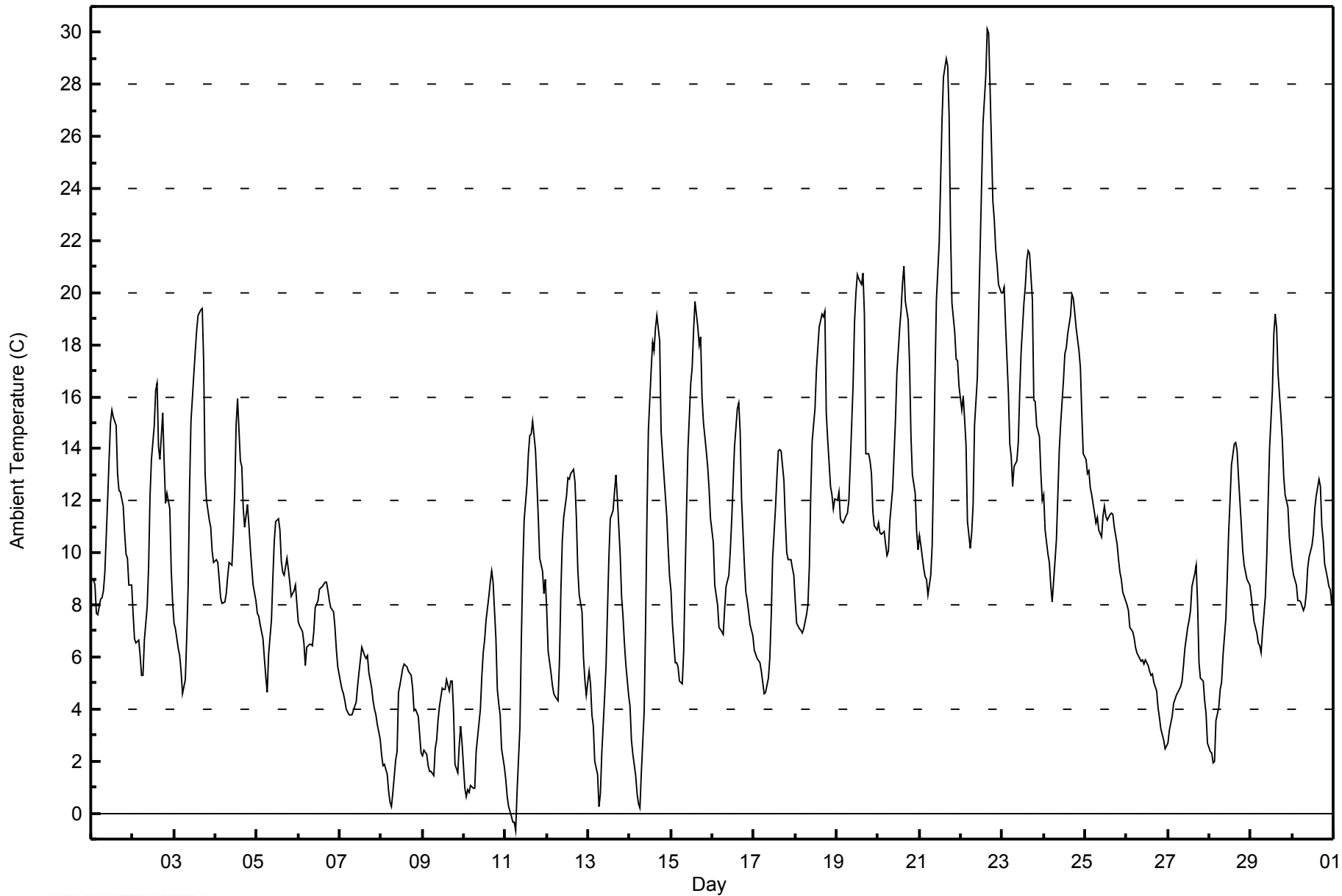


Maximum Value: 30.1 C on Sep 22 16:00		Maximum Daily Average: 19.7 C on Sep 22		Hours in Service: 720																																												
Minimum Value: -0.7 C on Sep 11 07:00		Minimum Daily Average: 3.2 C on Sep 9		Hours of Data: 720																																												
Maximum Diurnal Average: 14.8 C at hour 16		Minimum Diurnal Average: 5.9 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 9.96 C		Percentiles: P ₁ = 0.2 P ₁₀ = 3.6 Q ₁ = 5.9 Median = 9.2 Q ₃ = 13.0 P ₉₀ = 18.1 P ₉₉ = 27.7		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	8.9	9.0	8.8	7.7	7.6	8.2	8.3	8.6	9.2	12.1	13.6	15.0	15.5	15.2	14.9	13.1	12.4	12.3	11.8	10.8	9.9	9.8	8.8	8.7	10.8	15.5																						
2-Sep	7.7	6.7	6.5	6.7	6.1	5.3	5.3	6.7	8.0	9.5	12.2	13.6	14.9	16.2	16.5	14.1	13.6	15.4	13.5	11.9	12.3	11.7	9.4	8.1	10.5	16.5																						
3-Sep	7.3	7.1	6.3	6.0	5.4	4.6	5.1	6.8	8.7	12.5	15.1	16.8	17.7	18.5	19.1	19.3	19.4	17.3	13.0	12.0	11.2	11.0	10.1	9.6	11.7	19.4																						
4-Sep	9.8	9.6	9.0	8.3	8.1	8.1	8.5	9.1	9.6	9.5	10.7	12.3	15.0	15.9	13.5	13.3	11.7	11.0	11.8	11.1	10.2	9.5	8.7	8.2	10.5	15.9																						
5-Sep	7.7	7.6	7.3	6.7	5.9	5.2	4.6	6.1	7.4	9.0	10.5	11.2	11.3	10.9	9.7	9.2	9.2	9.8	9.4	8.9	8.3	8.5	8.8	8.1	8.4	11.3																						
6-Sep	7.3	7.2	7.0	6.6	5.6	6.4	6.5	6.5	6.4	7.0	7.9	8.2	8.6	8.7	8.7	8.9	8.9	8.5	8.2	7.9	7.7	7.1	6.2	5.6	7.4	8.9																						
7-Sep	5.0	4.8	4.6	4.3	4.0	3.8	3.8	3.7	3.9	4.3	4.8	5.4	5.9	6.4	6.1	5.9	6.0	5.4	4.8	4.3	4.0	3.8	3.4	2.9	4.6	6.4																						
8-Sep	2.2	1.8	1.9	1.5	0.8	0.4	0.2	0.8	2.0	2.4	4.6	4.9	5.6	5.7	5.7	5.6	5.5	5.3	4.8	4.0	4.0	3.7	3.0	2.3	3.3	5.7																						
9-Sep	2.2	2.4	2.2	1.8	1.6	1.6	1.5	2.4	2.8	3.6	4.1	4.8	4.8	4.7	5.1	4.7	5.0	5.0	3.9	1.9	1.5	2.6	3.3	2.7	3.2	5.1																						
10-Sep	0.9	0.6	0.9	0.8	1.1	0.9	1.0	2.4	2.9	4.0	5.2	6.2	6.6	7.4	8.3	8.9	9.3	8.9	6.7	4.7	4.2	3.8	2.5	1.8	4.2	9.3																						
11-Sep	1.3	0.6	0.3	-0.1	-0.3	-0.4	-0.7	0.9	3.3	6.6	9.4	11.3	12.6	13.8	14.5	14.6	15.1	14.0	12.7	11.4	9.8	9.3	8.5	9.0	7.4	15.1																						
12-Sep	7.8	6.2	5.4	4.9	4.6	4.5	4.3	5.8	8.5	10.4	11.3	12.2	12.9	12.9	13.1	13.2	12.7	11.3	9.4	8.4	7.8	6.0	5.2	4.6	8.5	13.2																						
13-Sep	5.5	5.0	3.8	3.4	2.0	1.5	0.3	0.7	2.3	4.5	5.7	7.7	9.8	11.3	11.6	12.3	13.0	12.1	10.0	8.3	7.6	6.6	5.7	4.5	6.5	13.0																						
14-Sep	4.1	2.8	2.3	1.5	0.7	0.4	0.2	1.6	3.9	7.2	11.5	14.7	17.1	18.1	17.8	18.6	19.1	18.2	14.7	13.8	13.0	11.4	10.2	9.1	9.7	19.1																						
15-Sep	8.5	7.3	5.8	5.8	5.6	5.1	5.0	6.2	9.0	11.7	14.0	16.5	17.1	18.5	19.6	18.7	18.0	18.3	16.0	15.0	13.9	13.3	12.5	11.3	12.2	19.6																						
16-Sep	10.4	8.7	8.4	8.0	7.2	7.0	6.8	7.9	8.7	9.1	10.0	11.2	12.7	14.1	15.5	15.8	14.7	12.1	9.5	8.5	8.2	7.7	7.3	6.8	9.8	15.8																						
17-Sep	6.3	6.1	5.9	5.8	5.5	5.0	4.6	4.7	5.2	6.0	7.6	9.8	11.7	12.9	13.9	14.0	13.9	12.8	11.2	10.0	9.7	9.7	9.4	9.1	8.8	14.0																						
18-Sep	8.2	7.3	7.1	7.0	6.9	7.1	7.6	8.0	9.4	12.2	14.3	15.6	17.0	17.9	18.7	19.2	19.1	19.3	15.4	14.3	12.5	12.2	11.7	12.1	12.5	19.3																						
19-Sep	12.0	12.3	11.3	11.2	11.2	11.4	11.5	12.0	13.4	16.4	18.8	20.0	20.7	20.5	20.3	20.7	19.2	13.8	13.8	13.5	13.0	11.6	11.1	10.9	14.6	20.7																						
20-Sep	11.2	10.8	10.7	10.8	10.3	9.9	10.1	11.2	12.4	13.8	15.1	16.9	18.6	19.3	20.4	21.0	19.7	19.0	17.2	14.5	13.0	12.3	10.8	10.1	14.1	21.0																						
21-Sep	10.7	10.3	9.4	9.1	9.0	8.4	9.1	10.3	13.2	16.7	19.7	21.9	24.3	26.7	28.3	29.0	28.7	26.8	22.5	19.6	18.5	17.4	17.4	16.4	17.6	29.0																						
22-Sep	15.5	16.0	15.1	14.1	11.2	10.2	10.8	11.8	14.9	16.8	19.3	21.7	24.1	26.5	28.3	30.1	30.0	27.9	23.5	22.8	21.7	21.1	20.3	20.0	19.7	30.1																						
23-Sep	20.0	20.2	18.8	16.1	14.2	13.7	12.6	13.3	13.5	14.3	16.1	17.7	19.6	20.3	21.2	21.6	21.5	19.7	15.9	15.8	14.9	14.5	13.0	12.0	16.7	21.6																						
24-Sep	12.2	10.9	10.0	9.6	8.8	8.1	9.7	10.5	12.2	13.9	14.9	16.6	17.6	17.9	18.4	19.1	19.9	19.8	19.2	18.7	17.8	17.1	15.3	13.8	14.7	19.9																						
25-Sep	13.6	13.1	13.1	12.5	12.2	11.5	11.2	11.3	10.9	10.6	11.4	11.8	11.4	11.2	11.5	11.5	11.5	11.0	10.3	9.7	9.2	9.0	8.5	8.2	11.1	13.6																						
26-Sep	8.0	7.8	7.1	7.0	6.8	6.4	6.2	6.1	5.9	5.9	5.8	5.9	5.7	5.5	5.3	5.3	5.0	4.7	4.0	3.7	3.2	2.8	2.5	2.6	5.4	8.0																						
27-Sep	2.7	3.2	3.7	4.2	4.4	4.5	4.7	4.8	5.1	5.7	6.3	7.1	7.4	7.8	8.7	9.2	9.5	8.0	5.8	5.2	5.1	4.3	3.9	2.7	5.6	9.5																						
28-Sep	2.4	2.3	1.9	2.0	3.6	4.0	4.8	5.0	6.0	7.5	9.0	10.8	12.0	13.4	14.2	14.2	13.9	12.9	11.1	10.1	9.5	9.2	9.0	8.8	8.2	14.2																						
29-Sep	8.3	7.9	7.4	6.9	6.6	6.4	6.1	7.0	8.3	9.9	12.0	14.0	16.2	18.4	19.2	18.6	16.9	15.3	14.3	12.9	12.2	11.8	10.6	10.0	11.6	19.2																						
30-Sep	9.5	9.1	8.8	8.2	8.1	8.1	7.8	8.0	8.4	9.4	9.8	10.3	10.7	11.7	12.2	12.8	12.5	11.0	10.5	9.6	9.1	8.7	8.6	8.0	9.6	12.8																						
																								7.9	7.5	7.0	6.6	6.2	5.9	5.9	6.7	7.9	9.4	11.0	12.4	13.5	14.3	14.7	14.8	14.5	13.6	11.8	10.8	10.1	9.6	8.8	8.3	Diurnal Average
																								20.0	20.2	18.8	16.1	14.2	13.7	12.6	13.3	14.9	16.8	19.7	21.9	24.3	26.7	28.3	30.1	30.0	27.9	23.5	22.8	21.7	21.1	20.3	20.0	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Millennium - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Millennium - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	4	0.56	0.56
0 - 10	398	55.28	55.83
10 - 20	286	39.72	95.56
> 20	32	4.44	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 24 km/h on Sep 26 20:00	Maximum Daily Speed Average: 16.3 km/h on Sep 7	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 18 06:00	Minimum Daily Speed Average: 0.4 km/h on Sep 18	Hours of Data: 718
Maximum Diurnal Speed Average: 1.7 km/h at hour 20	Minimum Diurnal Speed Average: 0.2 km/h at hour 3	Hours of Missing Data: 2
Monthly Average Velocity: 0.4 km/h 124.6 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 7 Q ₃ = 11 P ₉₀ = 14 P ₉₉ = 20	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	W2	SW7	SSW7	SSW5	SSW7	S5	SSW4	SSW6	SSW5	SSE4	S5	SSE4	E3	SSW7	SSW9	NNE8	ESE5	SSW6	SSW3	WSW0	SSW4	SW4	SW5	SW5	SSW3.7	SSW9
2-Sep	SW4	SW4	SW5	SSW4	SSW3	SSW4	SSW2	SSW4	S4	S2	NNW5	N5	N7	N7	N8	N11	N4	NW5	WNW6	WNW5	N6	NNE6	NNW3	WSW3	NW2.1	N11
3-Sep	WSW3	NW1	SW3	SSW5	SSW5	SSW4	SSW4	SSW4	SSW5	S6	SSW2	WSW3	W5	WSW4	WSW4	S7	S9	SW6	NE5	SSE3	SSE4	S4	S5	SSE6	SSW3.5	S9
4-Sep	SSE6	SSE5	SSE5	SSE5	S5	S6	S5	S5	SSE5	SSW6	S5	S7	S7	SW1	SW7	SW9	N9	NNE10	N11	N14	N14	N12	N14	N14	NNE0.8	N14
5-Sep	NNE16	N13	N12	N8	N6	NNW5	WNW4	WNW1	SSE3	SSE5	SSE7	SSE8	SSE8	S7	S6	ESE9	SE13	SE12	SSE8	SSW4	W2	W4	NNW7	NNW10	E1.0	NNE16
6-Sep	N8	NW5	NW6	WNW4	SW3	NNE7	NE7	NNE9	NNE7	NE4	ESE3	SSE2	E4	ESE6	ESE7	ESE6	ESE6	ENE8	NE7	NE6	NNE9	N12	N14	N16	NNE4.6	N16
7-Sep	N19	NNE20	NNE17	NNE17	NNE15	NNE16	NNE15	NNE16	NNE15	NNE13	N15	NNE13	NNE15	N16	N20	N19	N21	N23	N19	N13	N13	N13	N15	N15	N16.3	N23
8-Sep	N14	N17	N19	N19	N15	N13	N11	N12	N15	N12	N10	N14	N9	NW9	N8	NNE13	NNE13	NNE13	NNE9	NE8	NE8	NE9	NE4	NE1	N11.1	N19
9-Sep	NE0	ENE2	ENE3	ESE2	NNW1	NNW1	NNE2	SW1	SW5	WSW4	WSW4	WSW5	NW6	WSW2	NNE3	NNE6	NW2	SW2	WSW1	W2	SSW1	WNW4	N7	NNE6	NW1.3	N7
10-Sep	NNW2	S2	WSW3	WSW2	WNW4	SW4	WSW2	WNW4	WSW3	W4	WNW5	NW5	WNW6	W4	WSW6	WSW6	SW5	SSE5	S6	S6	S8	S9	S6	S7	SW3.1	S9
11-Sep	SSW10	SSW9	SSW9	SSW10	SSW9	S11	S9	S11	S13	S13	SSW17	SSW17	SSW17	S18	SSW17	SSW15	SSW17	SSW10	SSW9	SSW9	SSW7	S4	WNW0	W7	SSW10.8	S18
12-Sep	W7	SW5	SW7	SSW6	S5	SSW4	SW3	WNW5	NW7	NW10	NNW12	NW11	NNW14	NNW13	NNW13	N14	N14	N15	NW5	WNW3	N12	N1	W4	W4	NNW5.5	N15
13-Sep	NNW6	N6	N7	N6	NNE5	NNE4	E3	ESE5	ESE4	SW2	NNW1	S5	S5	S2	NNE6	E3	SSE5	SE4	SSE4	SSE4	S4	S5	SSE4	SE3	ESE1.2	N7
14-Sep	SSE3	S3	SSW5	SSW5	SSW6	SSW6	S4	SSW6	SSW6	S6	SSE6	SSE6	SSE7	S4	N7	NNW3	WSW6	SW5	SSW5	SSW6	SSW8	SSW2	SSW3	SSW6	SSW3.9	SSW8
15-Sep	SSW7	SSW5	SSW3	S4	SSW3	SSW6	S4	S4	SSE3	S4	E3	SE3	N6	N6	NNE10	NE10	NE9	ENE5	ESE8	ESE10	ESE11	SE7	SE3	ESE2.3	ESE11	
16-Sep	ESE2	SE1	NNE4	ENE6	ENE4	E6	ESE8	ESE6	ESE4	NE6	NE8	NE8	NE6	ENE4	SE8	SE10	SE13	SE15	ESE15	SE16	SE16	SE16	SE16	SE12	ESE7.4	SE16
17-Sep	SE16	SE14	SE13	SE12	SE13	SE15	SE15	SE13	SE12	SE14	SSE12	SSE11	SSE12	SE12	SSE11	SSE12	SSE11	SE11	SE14	SE15	SE12	SE12	SE10	SE9	SE12.3	SE16
18-Sep	SSE5	S5	SSW6	SSW4	S3	WNW0	NNE2	WNW4	N4	N5	NW5	WNW4	NNW4	NNW4	N5	WNW3	NW2	AF	E3	E4	SSE4	SE5	S4	SSE6	SW0.4	SSW6
19-Sep	SE7	SE10	SSE5	S4	SSE4	SE4	SSE5	SE5	SSE5	S7	SW11	WSW12	WSW13	WSW16	WSW11	WSW13	W16	W14	WSW13	W11	W14	W16	W14	W10	WSW7.3	W16
20-Sep	W10	W9	WNW12	WNW12	NW12	W12	WNW11	WNW12	WNW16	WNW13	WNW13	W12	WNW12	W13	W10	WNW11	W8	WSW8	SW6	SSW5	SSW7	S4	SE6	SE6	W8.2	WNW16
21-Sep	SE8	SSE6	SE6	SE6	SSE5	SSE5	S7	SSE6	SSE5	SSE6	S8	SSW10	SW9	SW9	WSW9	W8	WSW7	SSW7	S5	SSE5	SSE5	SE6	SE8	SE6	S5.1	SSW10
22-Sep	SE7	SE8	SE9	SE6	S2	SSE4	SSE5	SSE5	SSE6	S8	SSE7	SSE7	SE7	SE8	SSE6	SSW7	W7	W6	SSW3	SSW4	WSW3	NW4	NW4	NW7	S3.7	SE9
23-Sep	WNW6	WNW8	NNW3	SW5	WSW2	N4	NW1	NW5	NW5	N5	NW3	N4	NE2	N3	N3	N1	NNE1	WNW1	AF	ESE4	ESE6	E5	SE3	SE5	N1.3	WNW8
24-Sep	ESE5	SSE4	SE6	SE6	SSE5	SSE4	SE8	SSE5	SE9	SE4	ESE6	ESE8	ESE7	ESE8	ESE12	SE14	SE17	SE16	SE18	SE15	SSE6	W10	WNW1	S5	SE7.2	SE18
25-Sep	SSW7	SW5	WSW8	WSW6	WSW7	SW9	WSW9	WNW13	W14	W12	W12	WNW13	NW9	NNW8	NNW8	N10	N12	N12	NNE14	NNE14	NNE11	NNE11	NNE12	NE10	NW5.6	NNE14
26-Sep	NNE8	NNE7	NE9	NE11	NE12	NE8	NE9	NNE13	NNE16	NE14	NNE14	NNE13	NNE14	NNE12	NNE16	NNE20	NNE20	N18	N24	N24	NNE23	N21	N19	N17	NNE14.7	N24
27-Sep	N16	N14	N14	N14	N14	N11	N10	NNW8	N10	N8	N7	N7	N5	N4	N4	N2	S4	SSW5	S4	S4	S5	SSE3	S7	S5	N4.7	N16
28-Sep	S8	S7	SSE6	SSE6	SE11	SE11	SSE10	SSE10	SSE11	SSE12	SSE11	SSE12	SSE13	SSE14	S18	S19	S17	S15	SSE8	SSE7	SSE7	SSE7	SSE7	SE10	SSE10.5	S19
29-Sep	SE8	SE10	SE10	SE10	SE11	SE11	SE11	SE12	SE14	SE14	SE13	SE14	SSE10	S9	S14	SSW16	SSW13	S11	S9	SSW8	S8	SSW7	S5	SSE4	SSE9.3	SSW16
30-Sep	SSE4	SSE4	SSE4	SSW6	SSW8	SW3	SSW3	S2	SW5	WSW3	WNW4	NW6	NW8	NNW7	N8	N5	WNW4	NNW5	NNE10	NNE8	NNE9	N6	N8	NNE12	NNW2.3	NNE12

E0.5	ESE0.5	E0.2	SSE0.6	SSE0.7	SSE1.1	SSE1.5	SSE0.5	SSE0.8	SSE0.9	SSW0.7	SW1.0	WNW0.6	WSW0.9	WNW0.7	NNW0.6	S0.2	E0.4	E1.4	ESE1.7	E1.1	ENE0.7	NE1.2	NE1.0	Diurnal Average	
N19	NNE20	N19	N19	N15	NNE16	NNE15	NNE16	WNW16	SE14	SSW17	SSW17	SSW17	S18	N20	NNE20	N21	N23	N24	N24	NNE23	N21	N19	N17	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Millennium - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Sep 4 17:00	Hours in Service: 720 Hours of Data: 718 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7
Minimum Value: 1 km/h on Sep 3 01:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P 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	1	2	1	1	1	2	1	2	2	1	2	2	1	5	3	9	2	1	1	2	1	1	1	1	9
2-Sep	1	1	1	1	2	1	1	1	1	1	2	2	2	2	3	5	2	2	2	1	2	1	1	1	5
3-Sep	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	5	6	1	1	1	1	2	6
4-Sep	1	1	1	1	1	2	1	1	2	2	2	2	3	2	2	2	10	3	4	4	3	5	4	4	10
5-Sep	4	4	3	3	3	3	1	2	1	2	2	3	3	2	2	3	4	4	3	2	1	1	3	4	4
6-Sep	3	2	2	1	1	4	2	3	2	2	2	1	2	2	2	2	2	2	2	2	2	3	3	3	4
7-Sep	5	4	4	4	3	3	3	3	3	3	3	3	4	4	5	5	5	5	4	3	3	4	4	4	5
8-Sep	3	4	4	4	4	3	2	3	3	3	4	4	4	3	4	4	3	3	4	3	2	2	2	2	4
9-Sep	1	1	1	1	2	2	2	2	1	1	2	2	3	2	4	2	1	1	1	1	1	2	2	2	4
10-Sep	2	2	1	1	1	2	2	2	1	1	2	2	2	2	3	3	2	2	1	1	3	2	2	2	3
11-Sep	2	2	2	2	3	3	3	3	3	4	5	5	5	6	6	5	6	4	2	2	1	2	1	3	6
12-Sep	3	1	1	1	2	2	1	2	2	4	4	4	5	5	4	5	4	6	2	2	7	2	1	1	7
13-Sep	2	2	2	2	2	1	2	1	2	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	2
14-Sep	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	2	1	1	1	1	2	1	1	3
15-Sep	1	1	2	1	1	1	1	1	1	1	2	1	1	1	2	3	2	2	1	3	3	3	4	3	4
16-Sep	1	1	2	1	1	3	3	2	2	2	2	3	2	2	3	4	5	4	5	5	5	5	5	4	5
17-Sep	5	4	4	4	4	5	5	5	4	5	4	4	4	4	4	4	4	3	4	4	3	3	3	3	5
18-Sep	1	1	1	2	1	1	1	1	2	2	2	2	2	2	1	1	1	AF	1	1	1	1	1	2	2
19-Sep	2	3	2	1	1	2	2	1	1	2	4	4	4	6	4	5	6	8	5	4	6	6	5	4	8
20-Sep	4	4	4	5	4	4	4	4	5	5	5	4	4	5	4	5	3	3	2	1	1	2	1	2	5
21-Sep	2	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	2	2	1	1	1	1	2	2	3
22-Sep	2	2	2	2	1	1	1	1	2	2	2	2	3	3	3	2	2	3	2	1	1	2	2	3	3
23-Sep	3	3	2	2	3	2	1	1	2	1	1	2	2	2	2	1	1	1	AF	1	1	1	1	2	3
24-Sep	1	2	2	2	2	2	3	3	3	2	3	3	2	3	5	5	5	5	5	5	3	5	2	2	5
25-Sep	2	3	3	2	3	3	3	5	5	4	4	5	4	3	3	3	4	3	3	3	3	2	3	3	5
26-Sep	2	2	3	3	3	2	2	3	3	3	3	3	3	3	4	5	5	4	5	5	5	5	4	4	5
27-Sep	4	4	4	3	4	3	3	3	3	2	2	2	2	1	2	2	2	1	1	1	1	1	1	1	4
28-Sep	2	2	2	2	3	3	3	3	3	4	3	4	4	5	5	5	5	5	2	2	2	2	2	3	5
29-Sep	2	3	2	2	2	3	3	3	4	4	4	4	4	4	5	5	5	3	3	2	2	2	1	2	5
30-Sep	1	1	1	2	1	2	1	1	1	2	1	2	3	3	2	2	2	2	2	2	3	2	2	2	3

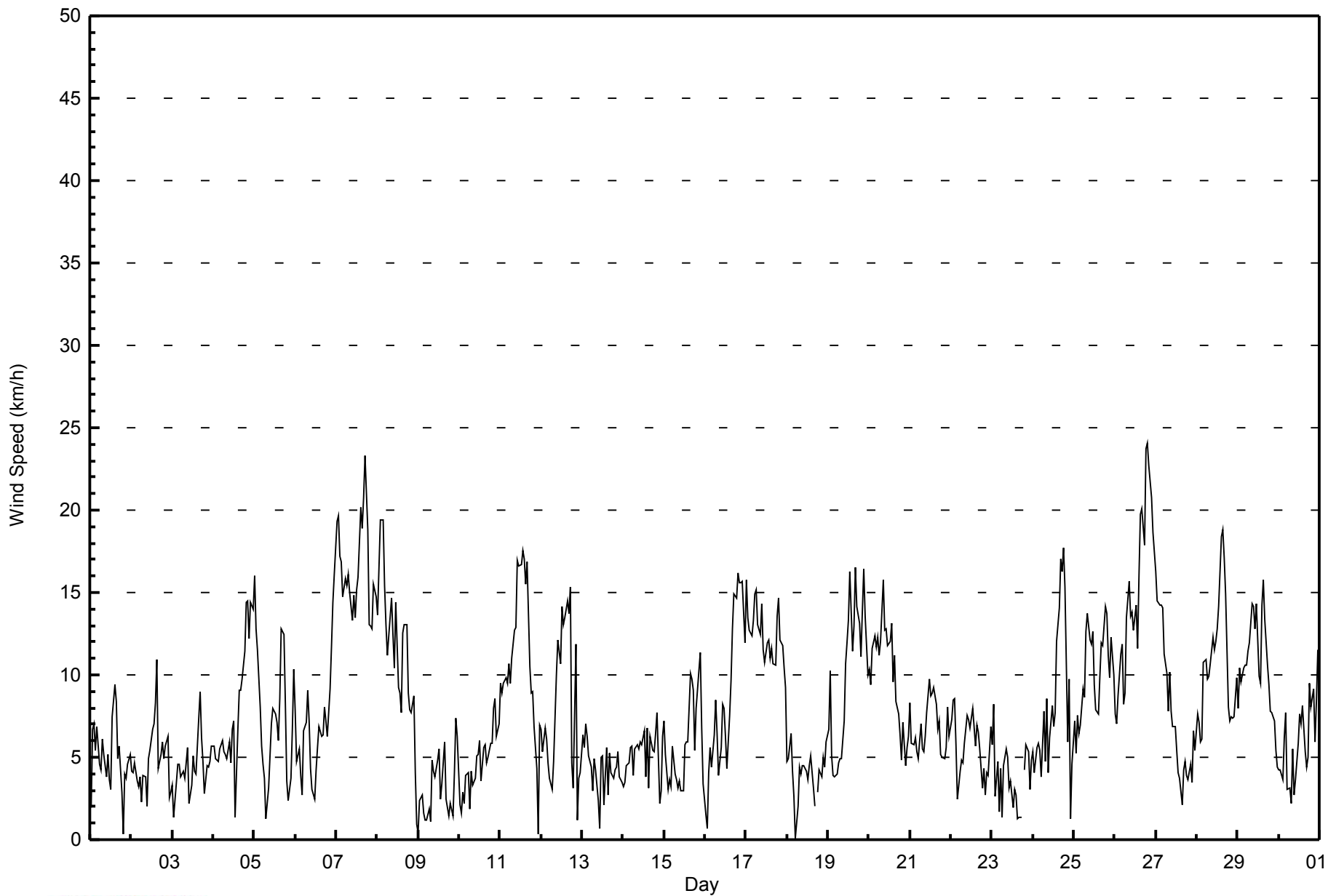
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Diurnal Maximum																									

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Millennium - September 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Millennium - September 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	272	37.88	37.88
6 - 11	276	38.44	76.32
12 - 19	160	22.28	98.61
20 - 28	10	1.39	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 718

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Millennium - September 2014

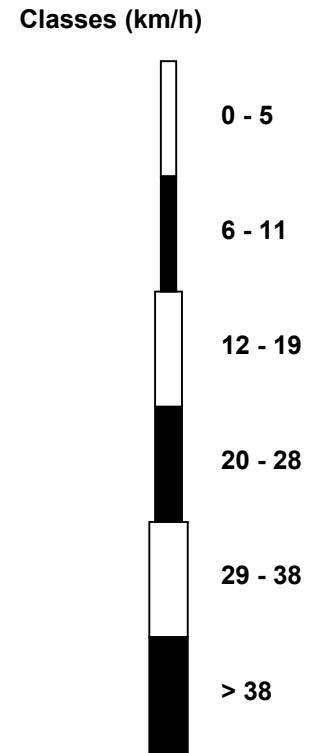
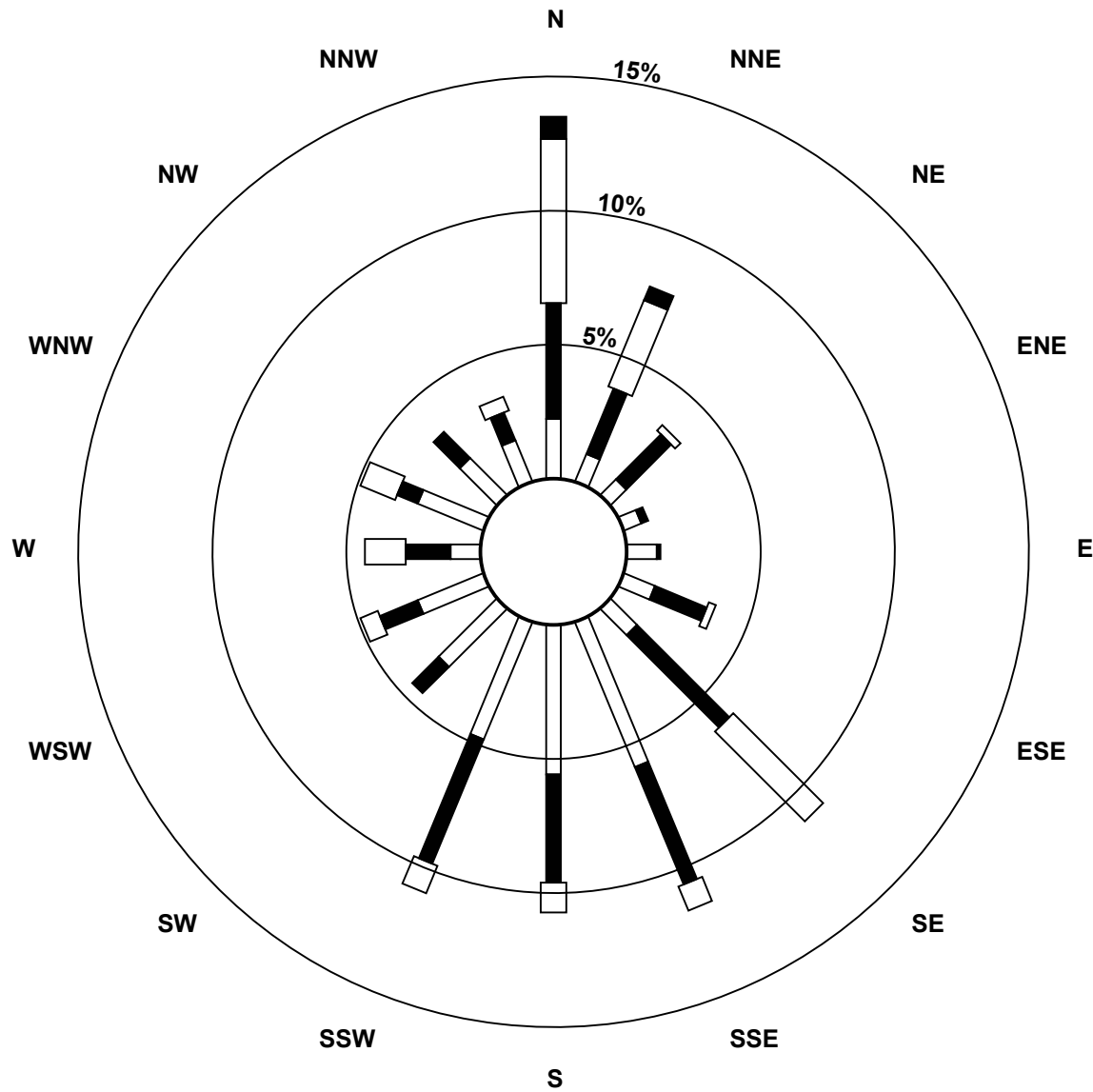
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	16	8	6	5	8	9	10	42	40	34	22	19	8	19	14	12	272
6 - 11	31	19	17	2	1	15	35	34	29	36	10	11	12	6	10	8	276
12 - 19	44	25	2	0	0	2	34	7	8	8	0	5	11	10	0	4	160
20 - 28	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	97	56	25	7	9	26	79	83	77	78	32	35	31	35	24	24	718

Total Number of Valid Hours: 718

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Millennium (AMS 12)**



Total Number of Valid Hours: 718



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Millennium - September 2014

Direction of Maximum Speed: 7 deg on Sep 26 20:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 8.2 deg on Sep 7	Hours of Data: 718
Direction of Minimum Speed: 283 deg on Sep 18 06:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 0.4 deg on Sep 18	Percent Operational Time: 99.7
Monthly Average Direction: 228.2 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	262	218	210	201	203	183	202	211	208	168	185	159	82	193	210	23	121	208	207	240	204	223	229	232	200.9
2-Sep	227	221	220	206	206	204	195	196	187	184	345	352	358	0	359	352	360	323	285	293	352	19	333	239	316.0
3-Sep	249	312	229	210	207	196	198	203	200	189	206	252	269	238	237	188	186	225	40	168	165	178	178	152	202.5
4-Sep	154	164	160	164	171	170	170	170	147	197	172	188	182	222	222	219	6	16	359	6	4	358	7	0	23.0
5-Sep	12	3	356	355	349	340	284	283	164	162	160	160	163	175	175	120	132	137	149	196	259	279	342	341	88.9
6-Sep	350	325	320	285	230	21	41	30	22	43	123	160	101	109	123	111	108	61	46	43	30	8	8	8	33.3
7-Sep	7	19	18	12	13	14	15	14	17	12	11	16	14	11	1	3	358	6	6	1	0	357	355	0	8.2
8-Sep	4	1	5	7	10	10	11	8	9	9	9	8	354	325	355	15	22	12	19	49	35	42	45	39	10.5
9-Sep	49	73	62	118	342	337	31	226	226	250	258	240	324	253	22	21	316	230	251	264	201	297	9	14	318.4
10-Sep	343	186	248	247	285	235	247	296	250	281	302	308	293	272	239	255	217	167	173	178	186	190	178	188	229.7
11-Sep	194	192	193	192	192	182	181	182	178	179	201	195	195	191	202	203	212	208	196	200	199	188	290	276	195.8
12-Sep	261	231	215	200	188	213	225	299	315	326	339	318	342	346	346	360	8	357	325	298	358	2	263	277	327.2
13-Sep	329	359	8	5	19	30	94	110	120	236	346	180	171	181	19	82	149	146	151	156	180	184	166	144	109.0
14-Sep	156	184	195	206	206	209	188	206	208	185	160	164	148	179	5	337	250	218	201	203	208	194	205	208	197.8
15-Sep	205	197	205	188	192	198	189	189	159	179	88	135	3	8	0	16	35	41	72	113	118	121	135	133	111.3
16-Sep	108	126	18	73	60	100	123	122	103	55	55	46	42	78	132	138	137	130	123	126	127	133	135	140	114.4
17-Sep	133	136	132	135	135	133	137	141	141	136	153	158	149	142	153	161	152	146	130	135	142	134	136	136	140.5
18-Sep	164	182	210	197	189	283	15	295	352	350	319	298	330	341	358	296	312	AF	79	99	147	140	170	149	233.8
19-Sep	145	142	164	174	152	136	156	146	164	186	227	240	241	242	247	251	275	278	245	266	272	264	278	277	240.5
20-Sep	275	278	289	294	304	280	294	300	296	294	284	278	282	277	272	282	269	250	232	202	199	175	141	141	276.3
21-Sep	142	154	144	143	147	166	180	165	157	147	176	208	227	230	255	259	243	212	174	149	163	142	134	140	180.1
22-Sep	137	140	134	144	170	167	164	161	158	180	165	147	146	144	152	206	261	263	195	209	237	311	313	308	172.3
23-Sep	299	302	333	221	239	11	309	318	323	359	311	9	43	9	1	6	23	292	AF	104	107	98	130	128	353.1
24-Sep	117	148	146	141	152	164	143	151	137	125	117	113	109	113	124	130	132	128	132	165	273	289	172	172	133.7
25-Sep	196	230	252	245	251	228	246	289	280	278	266	294	306	328	335	354	358	7	17	23	21	20	30	36	319.4
26-Sep	32	27	42	37	39	38	34	22	28	35	33	19	12	23	18	15	14	11	7	7	12	10	6	5	18.6
27-Sep	2	359	359	359	359	352	349	342	2	3	9	354	358	2	8	8	184	206	188	174	176	163	184	171	357.5
28-Sep	172	170	151	156	145	146	156	148	156	157	158	154	155	165	176	178	177	178	160	159	164	159	153	144	161.7
29-Sep	140	129	127	130	124	124	130	128	130	132	135	138	154	179	182	200	205	179	188	193	180	198	176	148	154.8
30-Sep	151	149	167	206	211	224	207	178	219	257	292	305	315	341	356	0	300	330	14	26	20	8	360	19	338.6

83.8	123.5	89.3	152.7	153.0	146.3	147.1	155.7	152.7	160.5	193.7	215.6	286.4	242.8	284.0	331.8	189.8	81.6	86.6	104.1	91.9	67.8	44.0	44.1
Diurnal Average																							

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Millennium - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 102 deg on Sep 13 11:00	Hours of Data: 718
Minimum Value: 8 deg on Sep 14 19:00	Hours of Missing Data: 2
Percentiles: P ₁ = 11 P ₁₀ = 15 Q ₁ = 17 Median = 22 Q ₃ = 33 P ₉₀ = 53 P ₉₉ = 90	Hours of Calibration: 0
	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	42	32	15	14	14	19	17	19	24	31	36	49	46	29	25	79	33	11	56	86	18	12	16	16	86
2-Sep	16	12	12	14	15	23	24	23	33	69	46	29	25	37	31	33	50	35	19	18	40	16	45	51	69
3-Sep	18	62	24	14	13	25	17	18	23	27	95	87	54	81	71	41	27	62	83	45	22	22	19	17	95
4-Sep	17	16	16	15	18	17	17	20	36	37	35	21	25	90	21	17	65	19	20	17	17	22	18	22	90
5-Sep	16	18	21	20	43	62	28	82	34	35	28	30	28	27	34	21	18	19	21	66	53	24	33	32	82
6-Sep	24	45	33	26	49	67	16	19	21	33	51	55	31	31	22	30	27	18	15	25	18	15	15	17	67
7-Sep	18	17	16	16	14	15	15	15	16	15	16	19	19	17	18	18	20	18	16	19	18	20	20	18	20
8-Sep	17	16	18	16	15	15	14	15	16	17	26	18	33	35	39	22	18	18	22	12	17	16	24	88	88
9-Sep	52	41	17	39	62	60	56	75	22	41	46	40	44	66	83	27	52	43	73	65	58	39	30	17	83
10-Sep	58	90	59	70	21	19	91	36	52	34	39	37	39	71	60	56	56	31	17	16	18	18	22	21	91
11-Sep	16	15	15	16	20	20	20	21	19	20	23	23	23	23	23	21	21	20	17	15	13	48	101	30	101
12-Sep	25	19	13	16	49	29	17	33	29	35	34	36	34	31	29	27	15	23	37	43	38	72	17	23	72
13-Sep	28	26	21	25	19	20	57	27	43	64	102	47	52	92	39	65	31	18	10	15	14	17	17	15	102
14-Sep	13	15	30	17	15	12	12	17	17	24	30	35	33	76	28	74	33	16	8	12	10	77	28	11	77
15-Sep	13	13	64	24	28	10	16	19	34	42	63	70	18	21	24	17	16	15	23	19	18	18	48	65	70
16-Sep	65	78	43	22	19	32	24	24	36	24	21	26	38	58	34	28	22	18	22	19	21	20	20	22	78
17-Sep	19	18	20	21	20	19	19	20	22	21	26	27	26	25	24	22	23	20	18	17	16	16	16	17	27
18-Sep	17	15	14	21	27	90	47	17	27	38	52	56	66	52	32	46	51	AF	11	16	31	25	21	14	90
19-Sep	20	17	20	24	20	46	23	14	23	24	31	31	30	31	29	31	29	40	30	29	32	28	33	32	46
20-Sep	31	28	27	33	30	26	33	31	29	33	31	30	34	32	35	35	31	30	22	21	10	25	12	13	35
21-Sep	13	15	13	13	17	17	18	18	22	30	25	28	33	33	33	28	30	21	19	12	13	12	14	17	33
22-Sep	14	14	14	15	21	11	13	13	20	22	24	29	24	24	48	32	31	26	26	27	69	36	31	27	69
23-Sep	35	32	48	23	71	26	59	21	29	27	52	50	70	63	64	76	77	32	AF	11	13	17	38	19	77
24-Sep	16	18	20	16	16	15	17	24	19	37	33	27	31	29	28	22	19	17	17	18	23	54	101	21	101
25-Sep	19	53	36	29	32	24	29	32	32	29	33	33	33	35	36	24	20	19	15	15	15	16	15	14	53
26-Sep	16	18	11	15	15	15	14	16	14	13	15	15	15	17	14	15	15	15	17	16	15	16	16	16	18
27-Sep	18	18	19	19	18	23	26	29	20	21	18	30	38	35	70	95	36	16	12	12	11	21	17	17	95
28-Sep	16	18	16	22	18	18	22	20	22	22	22	22	22	22	18	18	18	19	19	21	20	19	18	16	22
29-Sep	16	15	15	15	16	16	16	17	16	17	18	21	23	25	20	20	18	18	19	17	18	18	25	15	25
30-Sep	12	12	15	17	15	29	29	27	15	28	28	28	31	33	25	25	39	36	21	16	17	18	19	15	39

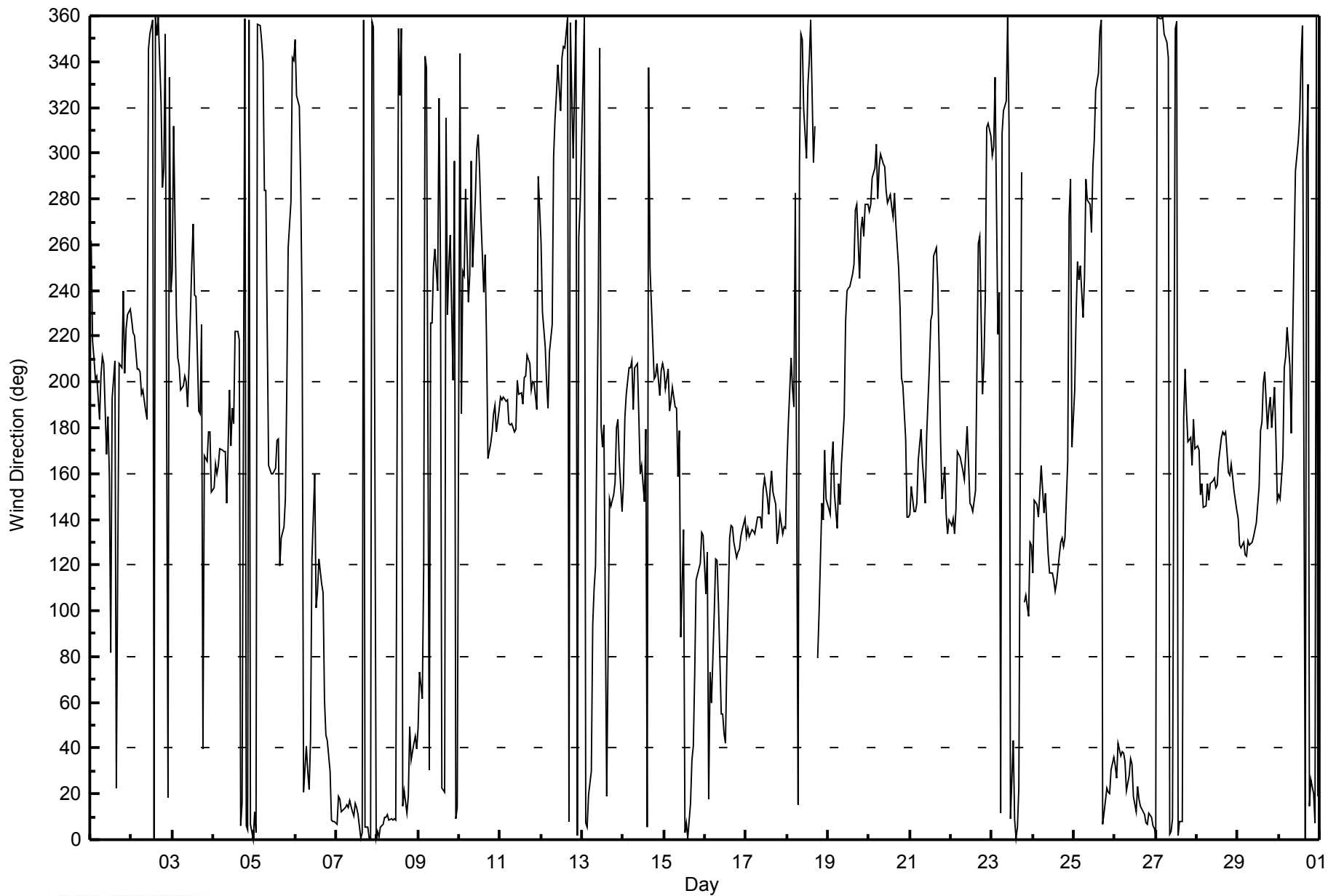
65	90	64	70	71	90	91	82	52	69	102	87	70	92	83	95	77	62	83	86	69	77	101	88	
Diurnal Maximum																								

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Millennium - September 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 24, 2014	Previous Calibration	August 28, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	6:25	End Time (MST)	8:15
Barometric Pressure	724 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11091107
Cal Gas Concentration	51.1 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL107924		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2374
DACS voltage range	0-5 volts	DACS channel #	1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-665	-665
Analyzer Range (mv)	5000	5000	Lamp voltage	783	783
Calculated slope	0.993595	1.004372	Chamber temp.	45.1	45.1
Calculated intercept	-0.310588	-0.206764	Pressure (mmHg)	704.6	704.6
Analyzer Background	8.4	8.4	Flow (lpm)	0.425	0.425
	1.199	1.199	Intensity	92	92

Analyzer make	43i Thermo	Analyzer serial #	1118148499
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.0	NA
as found span	6000	94.1	801.4	798.4	1.004
calibrator zero	6000	0.0	0.0	0.0	NA
high point	6000	94.1	801.4	798.4	1.004
second point	6000	47.1	401.1	398.6	1.006
third point	6000	23.5	200.1	200.4	0.999
calibrator zero	6000	0.0	0.0	0.6	NA
as left zero	6000	0.0	0.0	0.6	NA
as left span	6000	94.1	801.4	794.4	1.009
Average Correction Factor					1.003

Corrected As found	798.4	Previous response	806.9	% change	1.1%
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Notes:

Filter changed No mainanence or adjustments made

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

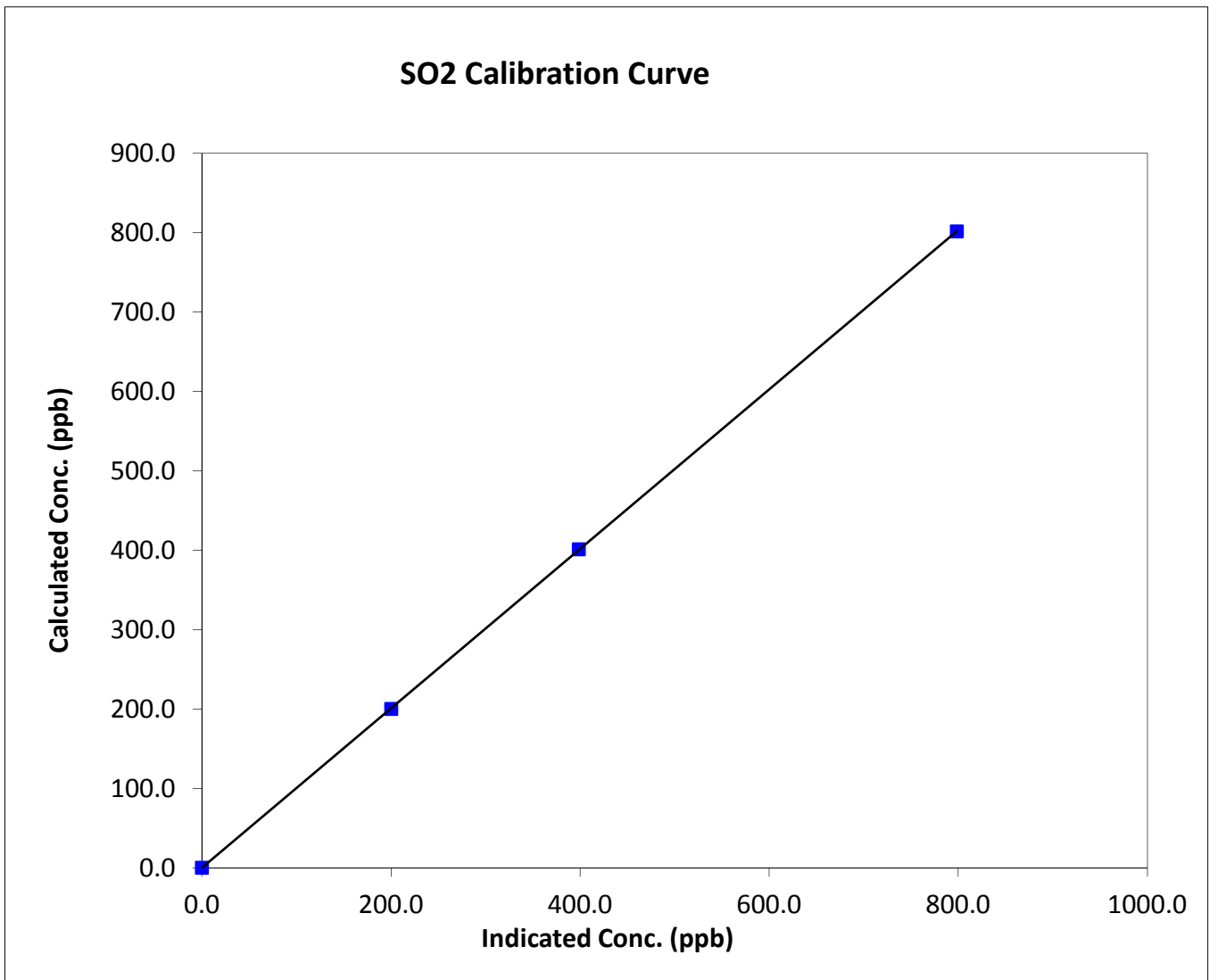
SO₂ Calibration Summary

Station Information

Calibration Date	September 24, 2014	Previous Calibration	August 28, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	6:25	End Time (MST)	8:15
Analyzer make	43i Thermo	Analyzer serial #	1118148499

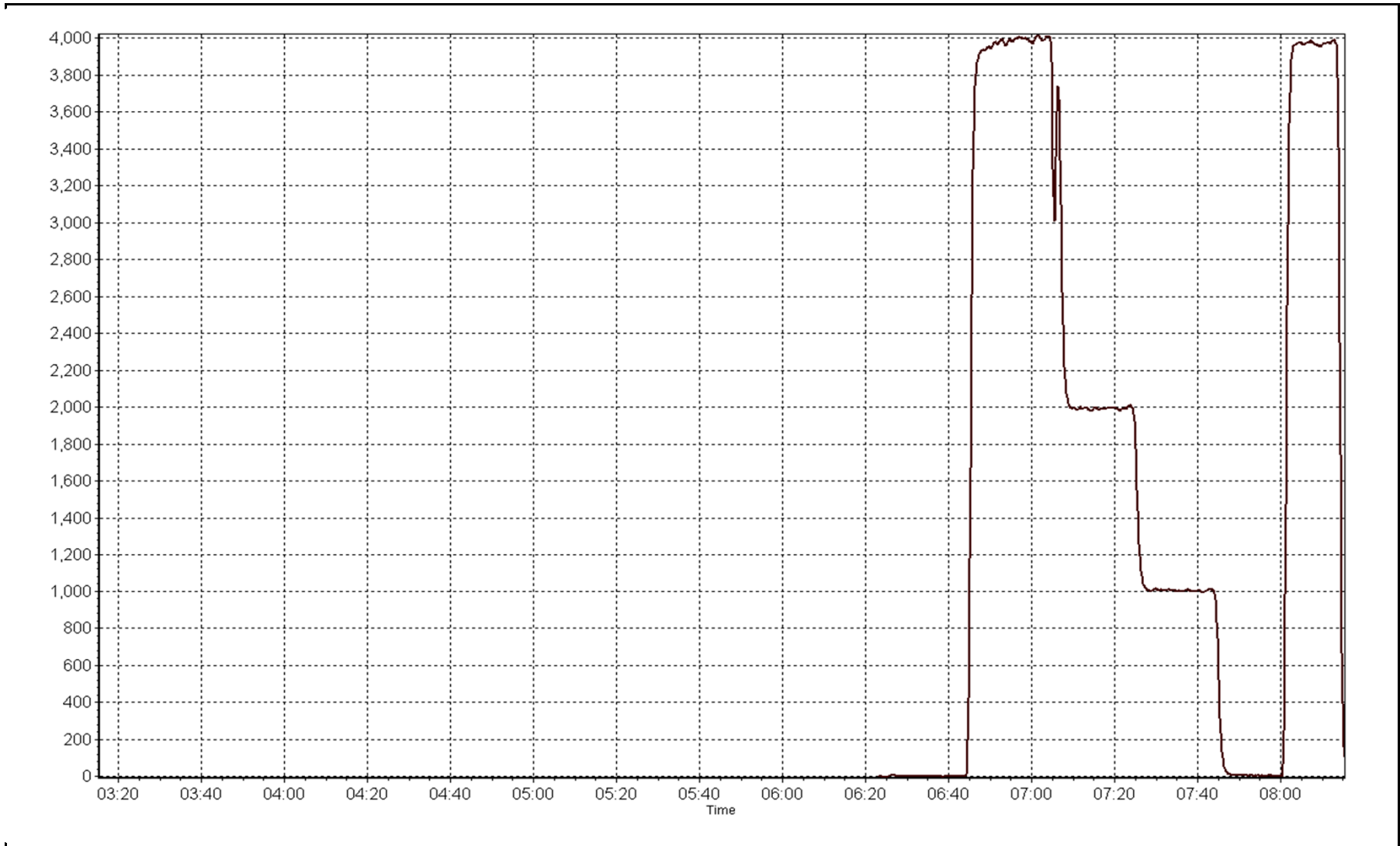
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999994
801.4	798.4	1.0038		
401.1	398.6	1.0064	Slope	1.004372
200.1	200.4	0.9987		
			Intercept	-0.206764



SO2 Calibration Plot

Date: September 24, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	September 24, 2014	Previous Calibration	August 27, 2014
Station Name	Millenium Mine	Station Number	Ams 12
Reason:	Routine		
Start Time (MST)	8:15	End Time (MST)	10:25
Barometric Pressure	727 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11091107
Cal Gas Concentration	10.4 ppm H2S	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL84557	SO2 gas conc.	51.1 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2374
DACS voltage range	0-5 volts	DACS channel #	2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-597	-597
Analyzer Range (input)	5000	5000	Lamp voltage	886	886
Calculated slope	0.985925	0.986965	Chamber temp.	44.1	44.1
Calculated intercept	0.481100	0.294306	Pressure	681	681
Analyzer Background	19.4	19.4	Flow	0.601	0.601
Analyzer Coefficient	0.667	0.667	Intensity	46803	46803
			Converter temp.	817	817

Analyzer make/model	TEI 43C	Analyzer serial #	0509110887
Converter make/model	CDN-101	Converter serial #	375

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	NA
as found span	5000	38.5	80.1	80.8	0.992
SO2 scrubber check	6000	47.1	401.1	0.4	NA
calibrator zero	5000	0.0	0.0	-0.3	NA
high point	5000	38.5	80.1	80.8	0.992
second point	5000	19.2	39.9	40.4	0.989
third point	5000	9.6	20.0	19.9	1.005
calibrator zero	6000	0.0	0.0	-0.1	NA
as left zero	6000	0.0	0.0	-0.1	NA
as left span	5000	38.5	80.1	81.8	0.979
Average Correction Factor					0.996

Corrected As found	81.1	Previous response	80.7	% change	-0.4%
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Notes:

No adjustments made, filter changed out, scrubber checked before as founds

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

TRS Calibration Summary

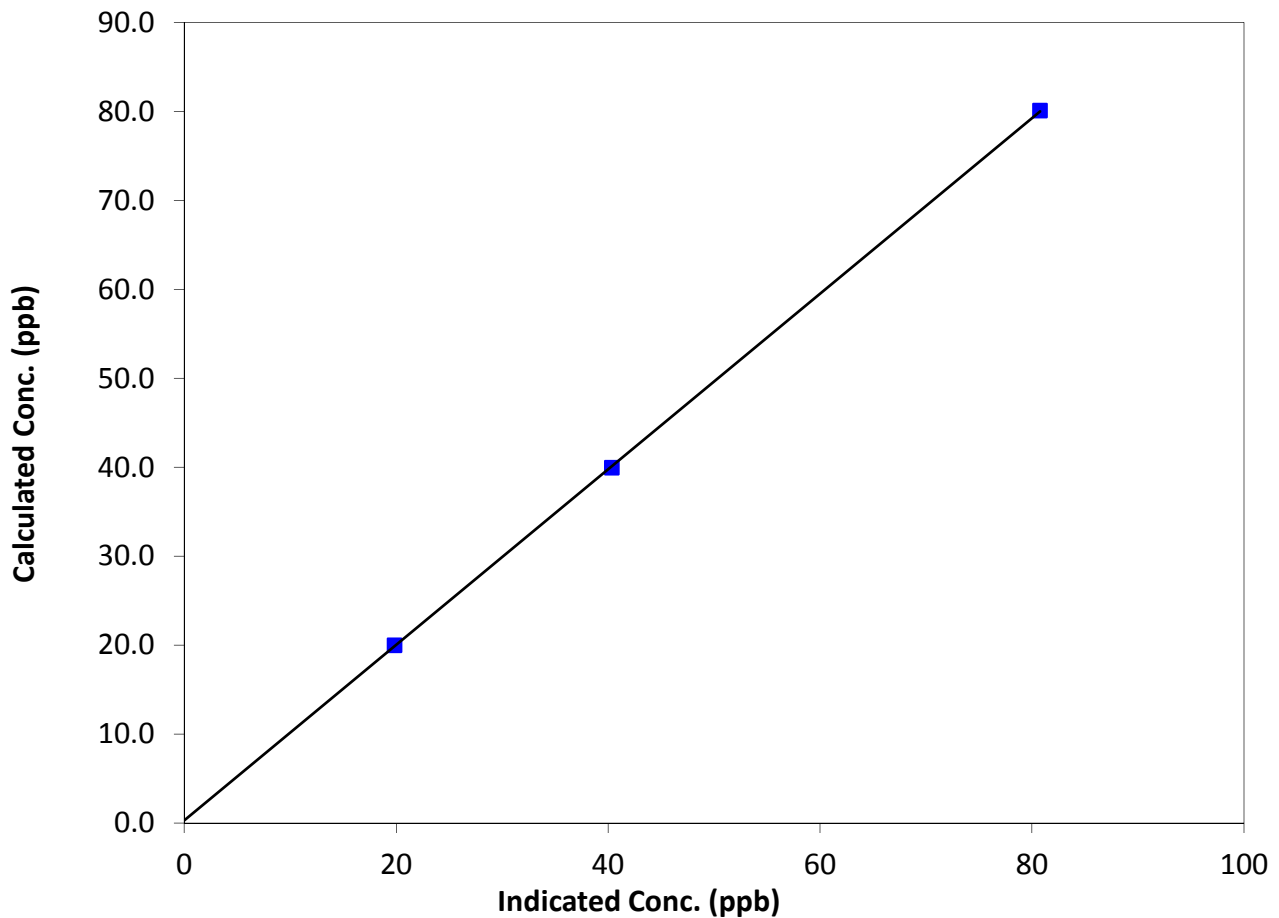
Station Information

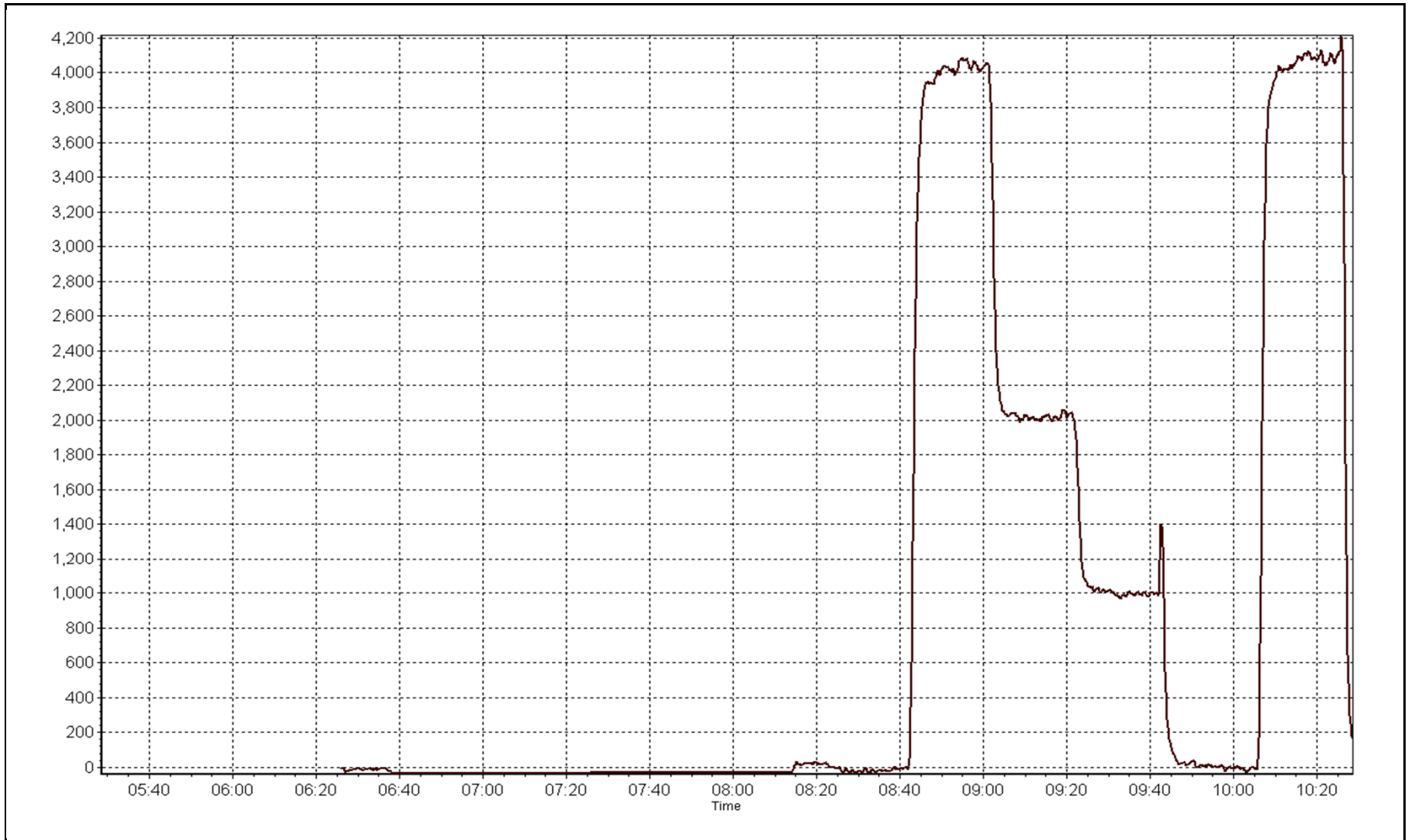
Calibration Date	September 24, 2014	Previous Calibration	August 27, 2014
Station Name	Millenium Mine	Station Number	Ams 12
Start Time (MST)	8:15	End Time (MST)	10:25
Analyzer make	TEI 43C	Analyzer serial #	0509110887

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999986
80.1	80.8	0.9916		
39.9	40.4	0.9895	Slope	0.986965
20.0	19.9	1.0054		
			Intercept	0.294306

TRS Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Wednesday, September 24, 2014	Previous Calibration	Thursday, August 28, 2014
Station Name	Millennium	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	6:25	End Time (MST)	8:15
Barometric Pressure	na mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11091107
Gas Cert Reference	LL107924	Cal Gas Expiry Date	5/29/2014
CH4 Cal Gas Conc.	510.0 ppm	CH4 Equiv Conc.	1079.3 ppm
C3H8 Cal Gas Conc.	207.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2374
DACS voltage range	0 - 5 volts	DACS channel #	3

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	11.8	11.8
Analyzer Range (mv)	5000	5000	Air or Bypass press	42.9	42.9
Calculated slope	1.001966	1.010366	Fuel Pressure	19.3	19.3
Calculated intercept	-0.012651	-0.154028		3.87	3.87
				2.23	2.23

Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958296
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.00	0.06	N/A
as found span	6000	94.1	16.93	16.84	1.005
calibrator zero	6000	0.0	0.00	0.06	N/A
high point	6000	94.1	16.93	16.84	1.005
second point	6000	47.1	8.47	8.63	0.982
third point	6000	23.5	4.23	4.41	0.960
calibrator zero	6000	0.0	0.00	0.15	N/A
as left zero	6000	0.0	0.00	0.15	N/A
as left span	6000	94.1	16.93	17.36	0.975
Average Correction Factor					0.982

Corrected As found	16.78	Previous response	16.91	% change	0.7%
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Notes:

Filter changed out, No adjustments made, NO maintenance done,

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

THC Calibration Summary

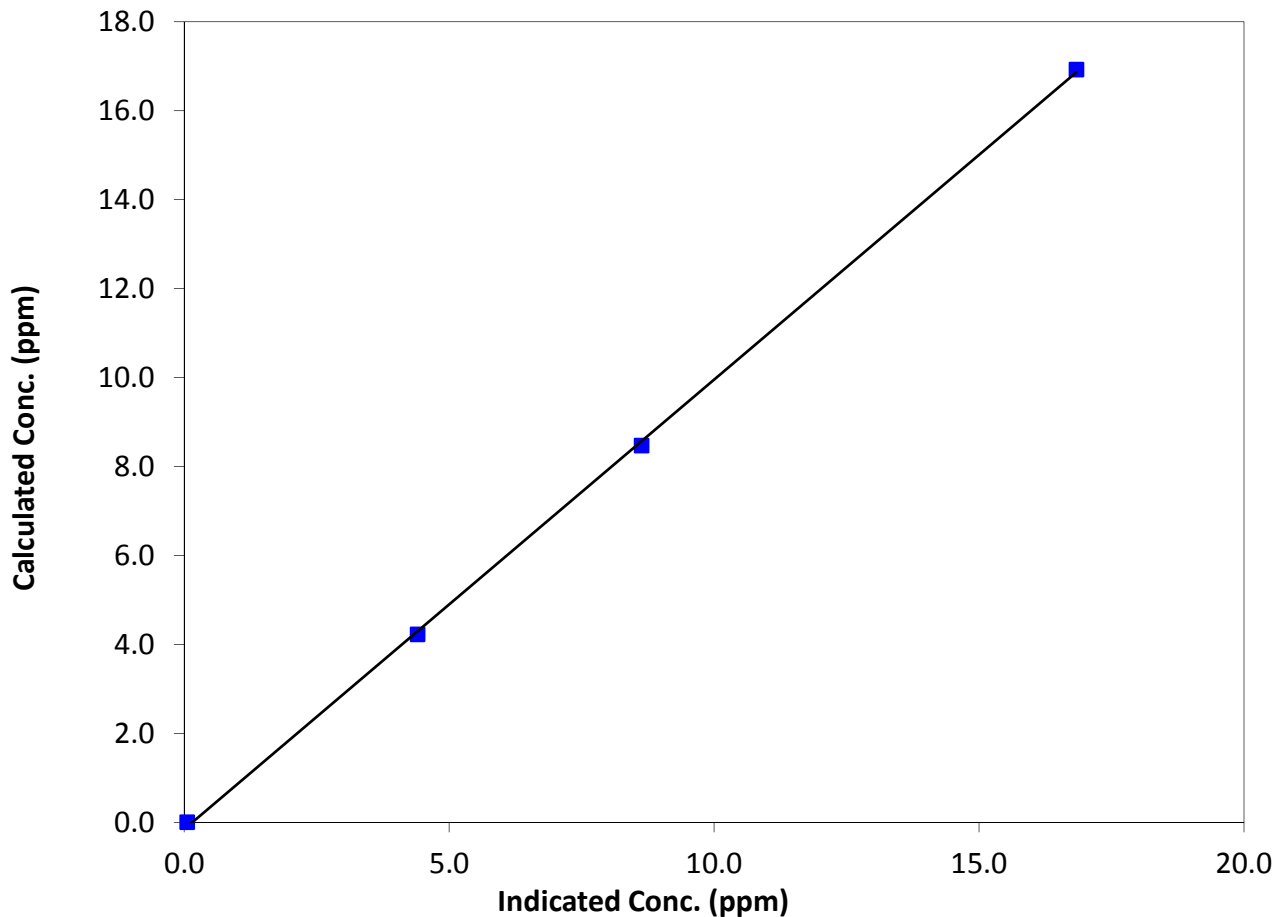
Station Information

Calibration Date	September 24, 2014	Previous Calibration	August 28, 2014
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	6:25	End Time (MST)	8:15
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958296

Calibration Data

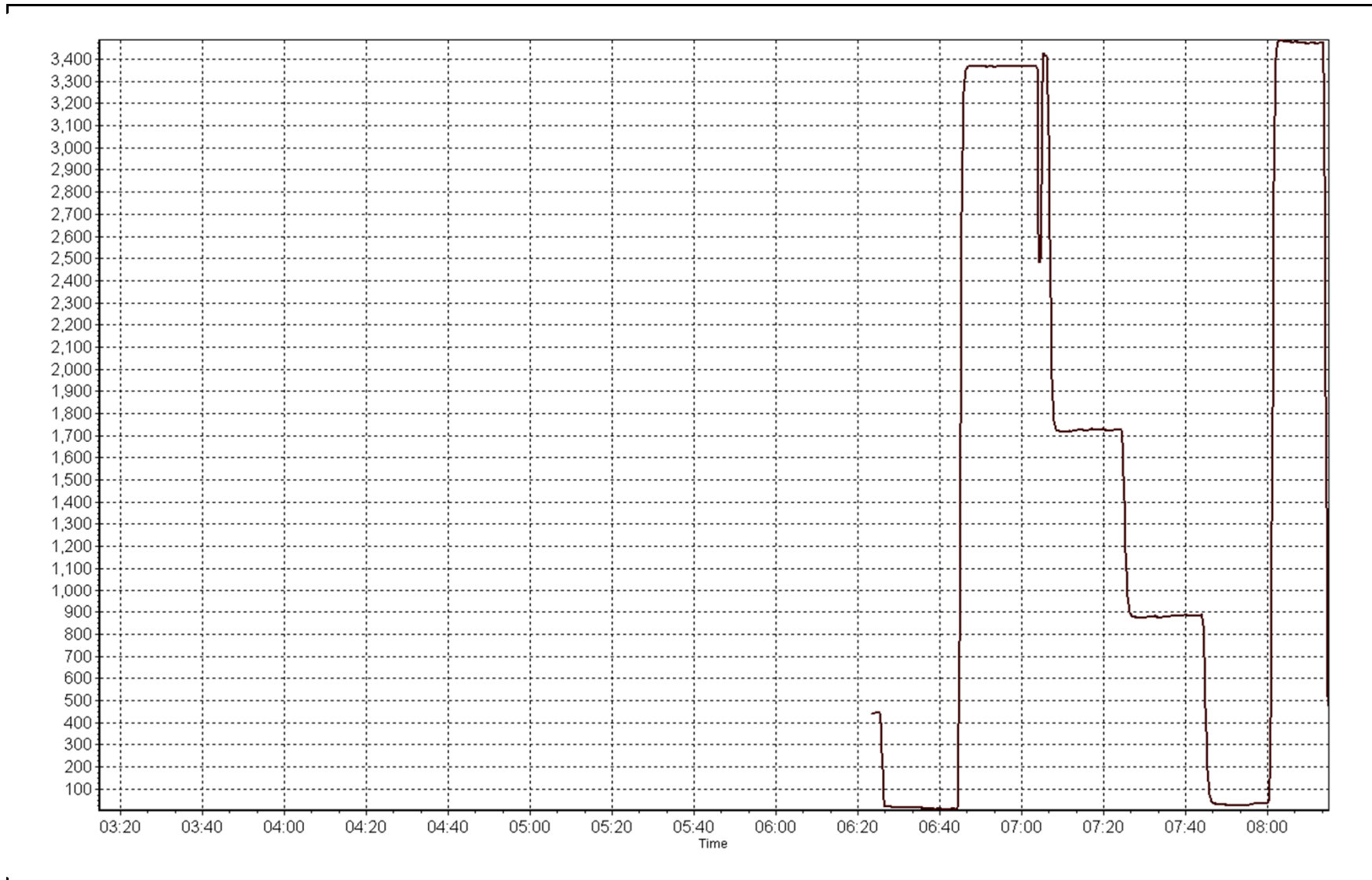
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.06	N/A	Correlation Coefficient	0.999826
16.93	16.84	1.0051		
8.47	8.63	0.9817	Slope	1.010366
4.23	4.41	0.9596		
			Intercept	-0.154028

THC Calibration Curve



THC Calibration Plot

Date: September 24, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	September 25, 2014	Previous Calibration	August 28, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	6:30	End Time (MST)	11:30
Barometric Pressure	724 mmHg	Station Temperature	22.0 Deg C
Calibrator	Sabio 4010	Serial Number	11091107
NO Cal Gas Conc	51 ppm	Cal Gas Expiry Date	May 29, 2014
NOx Cal Gas Conc	51 ppm	Cal Gas Serial #	LL107924

DACs Information

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

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.995519	0.999994	1.008579
	Data Offset	1.608225	-0.011150	0.835671
After	Data Slope	0.992287	0.993709	1.009969
	Data Offset	0.916160	-0.108265	-0.824399
Channel #		7	6	5
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model API T200 Analyzer serial # 723

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	1.141	ppb	1.141	ppb
NOX coefficient	1.148	ppb	1.147	ppb
NO2 coefficient		ppb		ppb
NO bkgrnd	0.6		0.3	
NOX bkgrnd	1.6		4.2	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.4	Deg C	314.4	Deg C
PMT Temp	6.8	Deg C	6.8	Deg C
O3 flow	87.0	ccm	87.0	ccm
R Cell Press	2.8	mmHg	3.0	mmHg
Sample Flow	493-503	ccm	502-499	ccm

Notes:

Filter changed, Molyconverter and Charcoal changed out, Zero adjusted



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

September 25, 2014

Station Number:

AMS 12

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	0.8	0.6	1.8	N/A	N/A
as found span	6000	94.1	799.9	799.9	0.0	802.6	802.2	2.2	0.9966	0.9971
calibrator zero	6000	0.0	0.0	0.0	0.0	0.0	0.3	0.2	N/A	N/A
high point	6000	94.1	799.9	799.9	0.0	806.2	805.4	1.2	0.9921	0.9931
second point	6000	47.1	400.4	400.4	0.0	401.2	402.2	0.0	0.9979	0.9954
third point	6000	23.5	199.8	199.8	0.0	198.8	201.2	-1.0	1.0048	0.9928
calibrator zero	6000	0.0	0.0	0.0	0.0	0.0	0.2	0.4	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	0.0	0.2	0.4	N/A	N/A
as left span	6000	94.1	799.9	494.8	305.1	798.6	507.8	291.0	1.0016	0.9744
Average Correction Factor									0.9983	0.9938

Corrected As found

NO_x= 801.8

NO= 801.6

Percent Change

NO_x= 0.0%

NO= -0.2%

Previous Response

NO_x= 801.8

NO= 799.9

GPT Calibration Data

Dilution Flow

6000

ccm

Source Gas Flow

94.10

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.2			N/A	
1st NO ₂ (300)	N/A	494.8	307.6	799.0	494.8	304.4	0.9856	1.0000	1.0105	99.0%
2nd NO ₂ (200)	N/A	600.2	202.2	801.6	600.2	202.4	0.9824	1.0000	0.9990	100.1%
3rd NO ₂ (100)	N/A	700.6	101.8	801.8	700.6	101.8	0.9822	1.0000	1.0000	100.0%
4th NO ₂ (0)	802.4	N/A	1.0	803.4	802.4	1.6	0.9802	1.0000	N/A	N/A
Average Correction Factor							0.9826	1.0000	1.0032	99.7%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

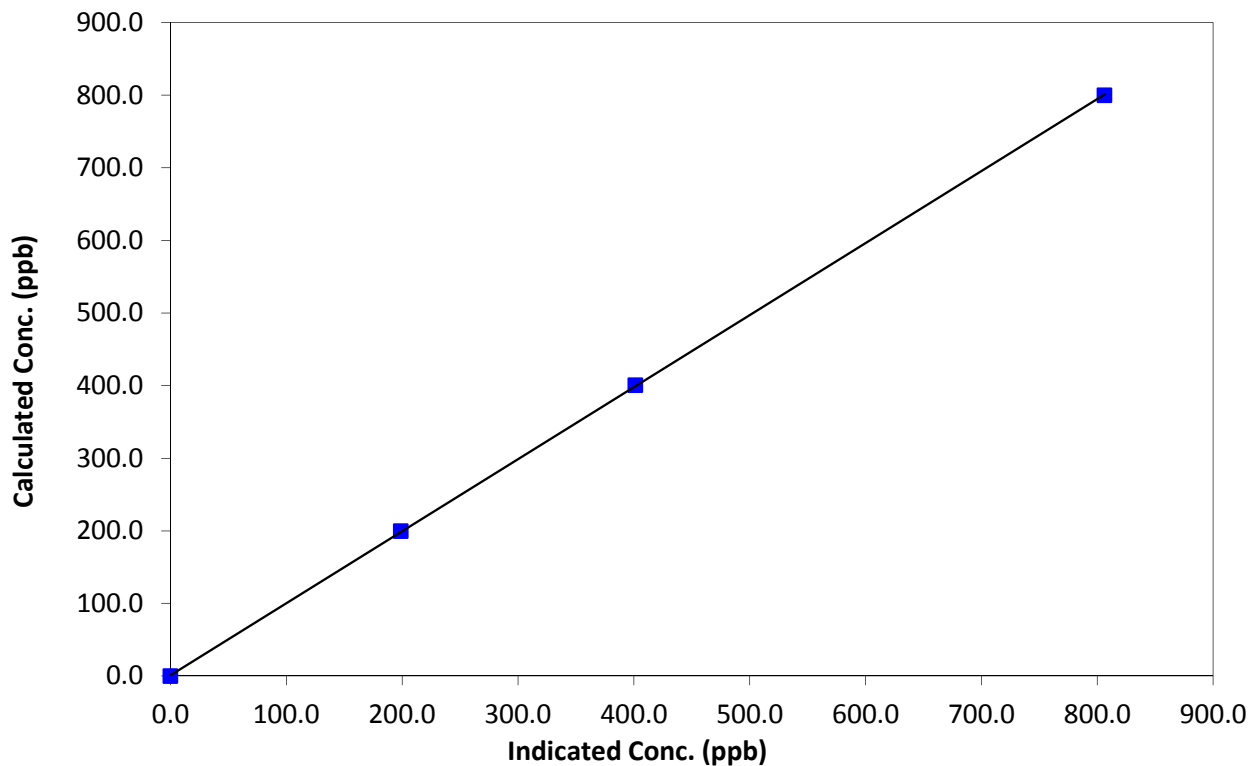
Station Information

Calibration Date	September 25, 2014	Previous Calibration	August 28, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	6:30	End Time (MST)	11:30
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999984
799.9	806.2	0.9921		
400.4	401.2	0.9979	Slope	0.992287
199.8	198.8	1.0048		
0.0	0.0	0.0000	Intercept	0.916160

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

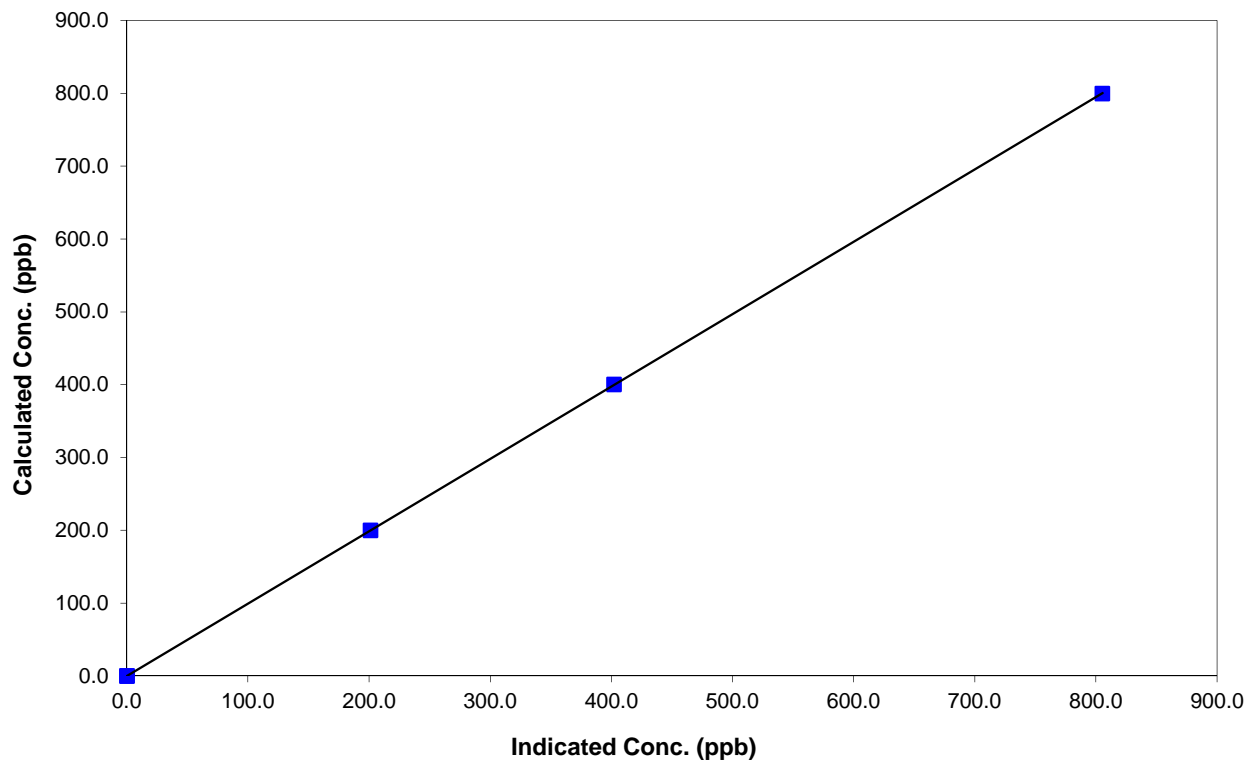
Station Information

Calibration Date	September 25, 2014	Previous Calibration	August 28, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	6:30	End Time (MST)	11:30
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999998
799.9	805.4	0.9931		
400.4	402.2	0.9954	Slope	0.993709
199.8	201.2	0.9928		
0.0	0.2	0.0000	Intercept	-0.108265

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

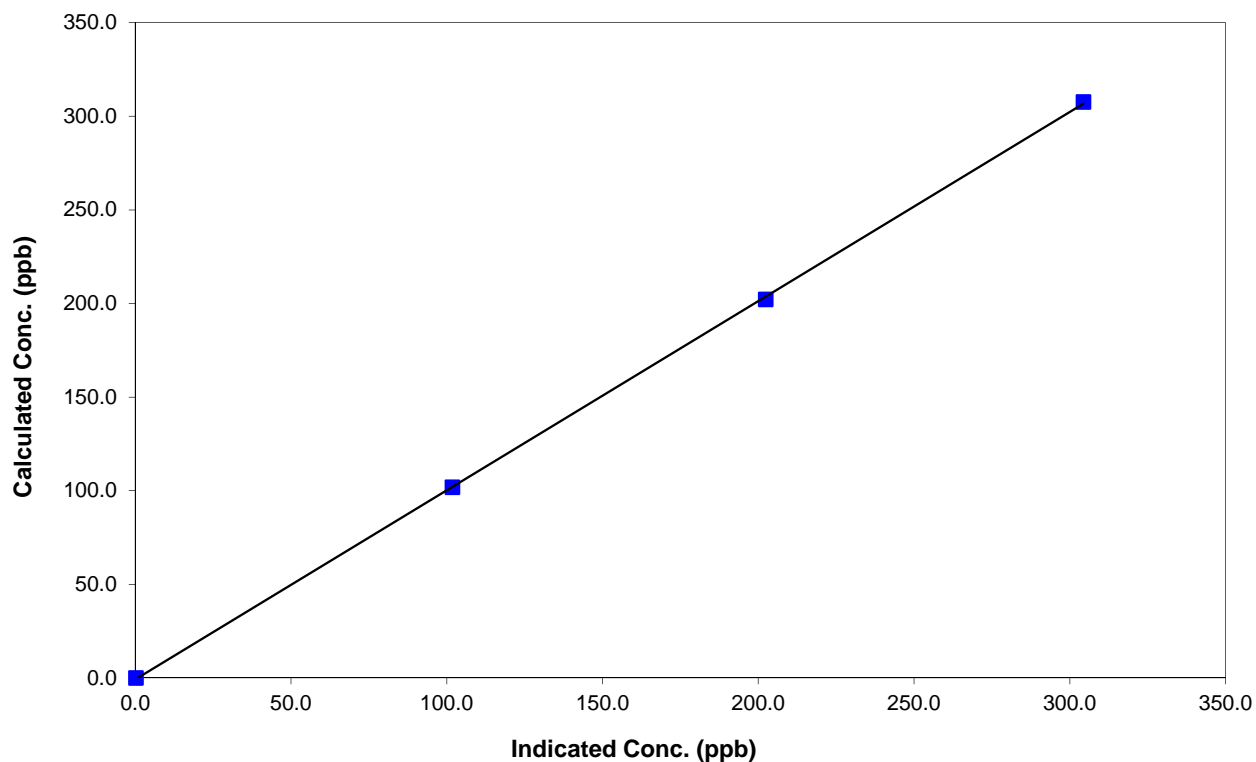
Station Information

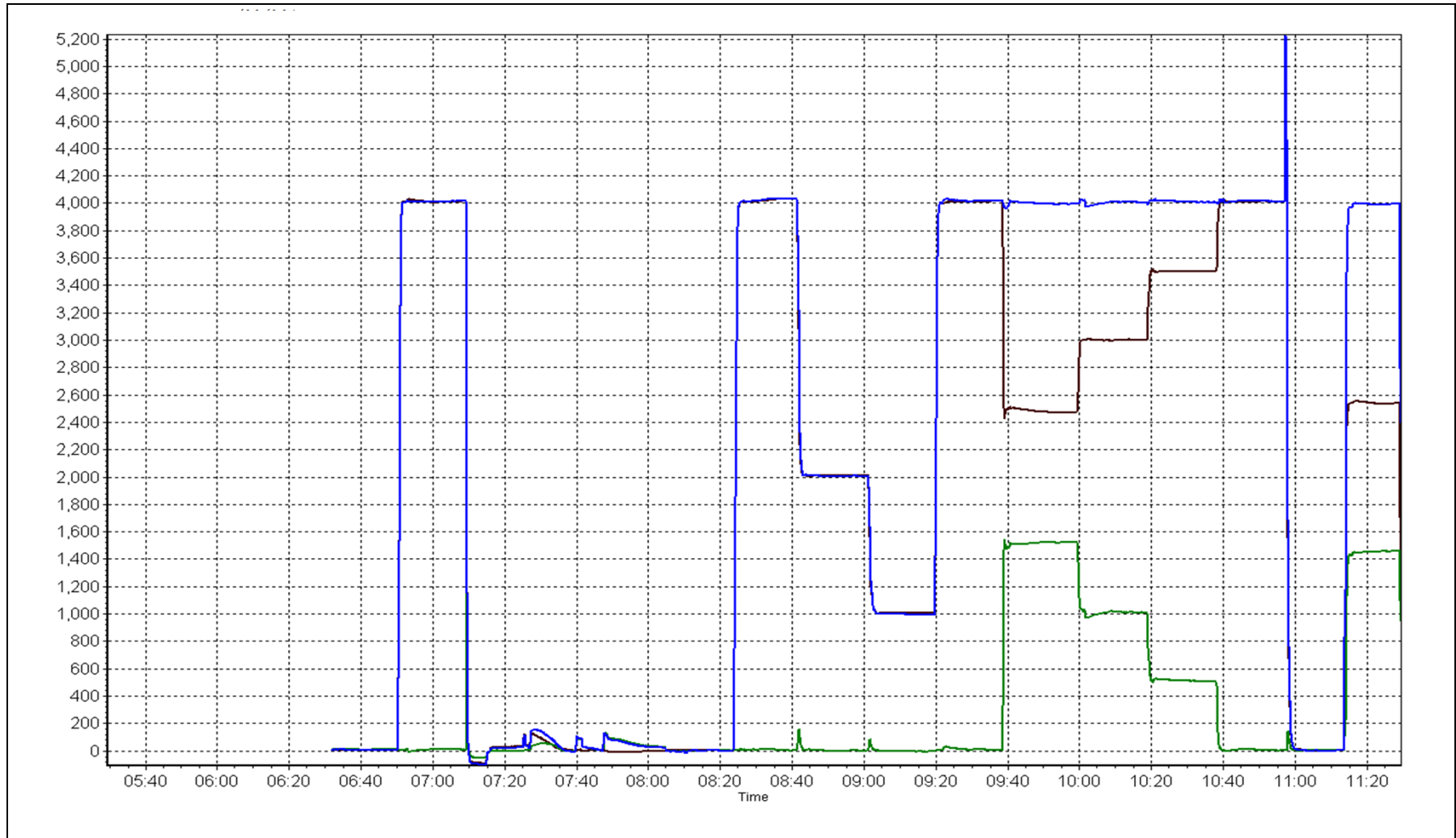
Calibration Date	September 25, 2014	Previous Calibration	August 28, 2014
Station Number	Millenium Mine	Station Number	AMS 12
Start Time (MST)	6:30	End Time (MST)	11:30
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999937
307.6	304.4	1.0105		
202.2	202.4	0.9990	Slope	1.009969
101.8	101.8	1.0000		
			Intercept	-0.824399

NO₂ Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 13
FORT MCKAY SOUTH
SEPTEMBER 2014**

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

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

October 30, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
 SEPTEMBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	681	39	39	100.00	36	0	7	0
TRS(ppb) Average	683	37	37	100.00	16	2	2	0
THC(ppm) Average	654	42	66	96.67	4.2	-	2.5	-
O3(ppb) Average	683	37	37	100.00	44	0	23	-
NO2(ppb) Average	680	40	40	100.00	26	0	10	-
NO(ppb) Average	680	40	40	100.00	59	-	9	-
NOX(ppb) Average	680	40	40	100.00	67	-	18	-
PM2.5(ug/m3) Average	717	0	3	99.58	22.6	-	10.2	0
Temperature 2 m (C) Average	720	0	0	100.00	31	-	16.2	-
Relative Humidity (%) Average	720	0	0	100.00	100	-	-	-
Wind Speed 10 m (km/h) Average	714	0	6	99.17	16	-	-	-
Wind Direction 10 m (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 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	681	1.4	4	-	0	0	0	0	1	1	36
TRS(ppb) Average	683	0.4	1	-	0	0	0	0	0	1	16
THC(ppm) Average	654	2.11	0.3	-	1.8	1.9	1.9	2	2.2	2.5	4.2
O3(ppb) Average	683	12.4	10	-	0	1	2	12	20	26	44
NO2(ppb) Average	680	3.2	4	-	0	0	1	2	5	8	26
NO(ppb) Average	680	2.6	6	-	0	0	0	0	2	8	59
NOX(ppb) Average	680	5.8	9	-	0	0	1	3	7	15	67
PM2.5(ug/m3) Average	717	4.86	3.6	-	0.2	1.4	2	3.7	7.1	9.9	22.6
Temperature 2 m (C) Average	720	8.63	6.2	-	-4	0.9	4.2	7.9	12.9	17	31
Relative Humidity (%) Average	720	79.5	19	-	25	49	66	86	96	98	100
Wind Speed 10 m (km/h) Average	714	4.8	3	-	0	1	2	4	7	9	16
Wind Direction 10 m (deg) Average	714	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)
 SEPTEMBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	14 Sep 2014 16:00	14 Sep 2014 17:00	2	Intermittent unstable operation - excessive baseline drift
THC	19 Sep 2014 15:00	19 Sep 2014 17:00	3	Intermittent unstable operation - excessive baseline drift
THC	21 Sep 2014 15:00	21 Sep 2014 16:00	2	Intermittent unstable operation - excessive baseline drift
THC	28 Sep 2014 17:00	29 Sep 2014 09:00	17	Analyzer failure - communication error
PM2.5	11 Sep 2014 14:00	11 Sep 2014 15:00	2	Maintenance - Flow and zero check, sample head cleaning
PM2.5	23 Sep 2014 12:00	23 Sep 2014 12:00	1	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	13 Sep 2014 04:00	13 Sep 2014 08:00	5	Flatline in sensor output signal
Wind Speed, Wind Direction	18 Sep 2014 08:00	18 Sep 2014 08:00	1	Flatline in sensor output signal

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 36 ppb on Sep 1 14:00	Maximum Daily Average: 6.7 ppb on Sep 28		Hours of Data:	681
Minimum Value: 0 ppb on Sep 10 08:00	Minimum Daily Average: 0.2 ppb on Sep 6		Hours of Missing Data:	39
Maximum Diurnal Average: 4.8 ppb at hour 14	Minimum Diurnal Average: 0.4 ppb at hour 4		Hours of Calibration:	39
Monthly Average: 1.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 27		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	Z	0	0	0	0	0	0	0	0	0	1	19	36	11	1	1	1	1	0	0	0	0	0	3.3	36
2-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	0.4	0
3-Sep	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0.5	1
4-Sep	0	Z	1	1	1	1	1	1	1	1	1	1	2	3	1	1	1	1	0	0	0	0	0	0	0.8	3
5-Sep	0	Z	0	0	0	0	0	0	0	0	2	18	31	31	16	3	1	1	4	2	1	1	0	0	5.0	31
6-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
7-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
8-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0.4	1
9-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	0.4	1
10-Sep	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	1	1	0	1	1	0	0	--	1
11-Sep	0	Z	0	0	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0.6	1
12-Sep	0	Z	0	0	0	0	0	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
13-Sep	0	Z	0	0	0	0	0	0	0	0	0	4	11	11	7	8	16	5	2	1	1	1	1	1	3.1	16
14-Sep	0	Z	0	0	0	0	0	0	1	1	5	10	4	2	0	1	1	1	1	1	1	1	1	1	1.4	10
15-Sep	0	Z	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0.6	1
16-Sep	0	Z	1	0	0	0	1	1	1	1	1	1	1	1	1	2	5	2	1	1	0	0	1	0.8	5	
17-Sep	1	Z	1	0	0	1	1	3	2	1	1	1	2	3	1	1	1	1	1	2	3	1	1	1	1.3	3
18-Sep	1	Z	1	1	1	1	1	1	C	C	C	0	0	0	1	1	0	0	0	0	0	0	0	0	0.5	1
19-Sep	0	Z	0	0	0	0	1	1	1	0	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0.5	1
20-Sep	0	Z	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
21-Sep	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0.5	1
22-Sep	1	Z	1	1	1	1	1	1	2	2	2	27	22	35	23	1	1	1	2	1	1	1	1	1	5.6	35
23-Sep	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	8	9	1	0	0	0	0	0	1.1	9
24-Sep	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	0.7	2
25-Sep	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1	0.5	1
26-Sep	0	Z	1	0	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0.6	1
27-Sep	1	Z	1	1	1	1	0	1	0	1	1	0	1	1	3	4	22	9	1	1	0	0	0	0	2.1	22
28-Sep	0	Z	0	0	0	0	0	0	1	15	13	21	28	12	2	1	1	1	13	28	10	2	2	1	6.7	28
29-Sep	1	Z	0	0	0	0	0	0	1	5	7	2	4	11	21	1	1	1	1	1	1	1	1	0	2.7	21
30-Sep	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1

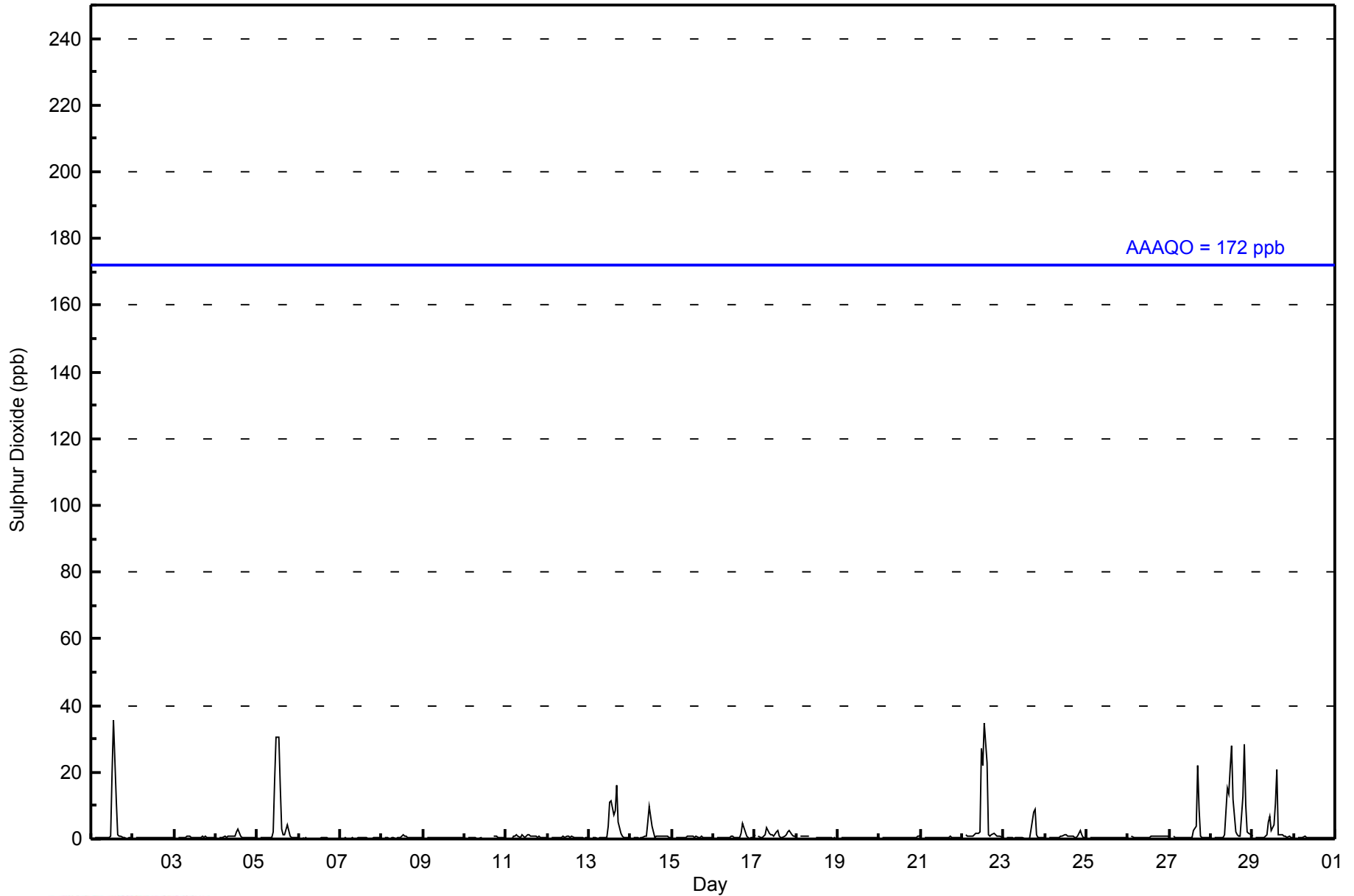
0.5	--	0.4	0.4	0.4	0.4	0.5	0.6	0.6	1.3	2.0	3.7	4.6	4.8	2.8	1.0	2.0	1.6	1.4	1.5	0.9	0.5	0.5	0.5	Diurnal Average	
1	--	1	1	1	1	1	3	2	15	18	31	31	36	23	8	22	9	13	28	10	2	2	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	657	96.48	96.48
11 - 20	12	1.76	98.24
21 - 60	12	1.76	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



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - September 2014

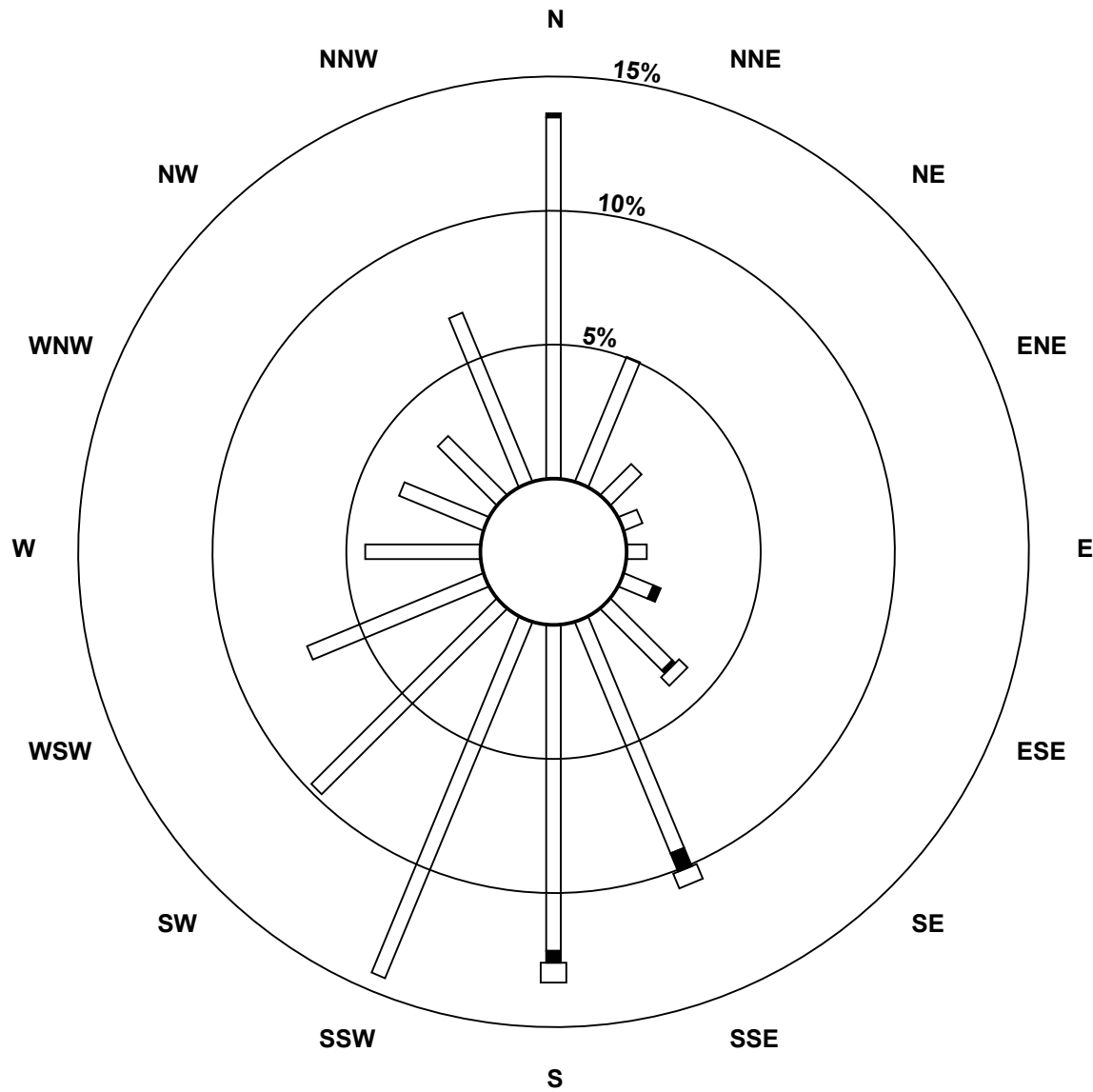
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	91	34	11	5	5	8	22	63	82	97	66	48	29	23	21	46	651
11 - 20	1	0	0	0	0	2	1	5	3	0	0	0	0	0	0	0	12
21 - 60	0	0	0	0	0	0	3	4	5	0	0	0	0	0	0	0	12
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	92	34	11	5	5	10	26	72	90	97	66	48	29	23	21	46	675

Total Number of Valid Hours: 675

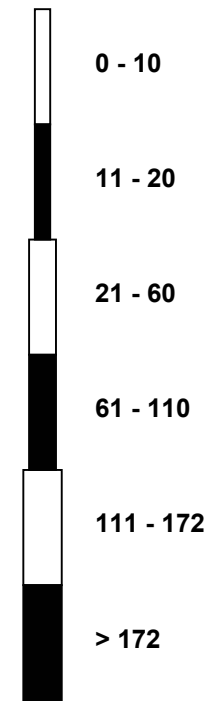
Total Number of Hours: 720

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

**Sulphur Dioxide (SO₂) - ppb
Fort McKay South (AMS 13)**



Classes (ppb)

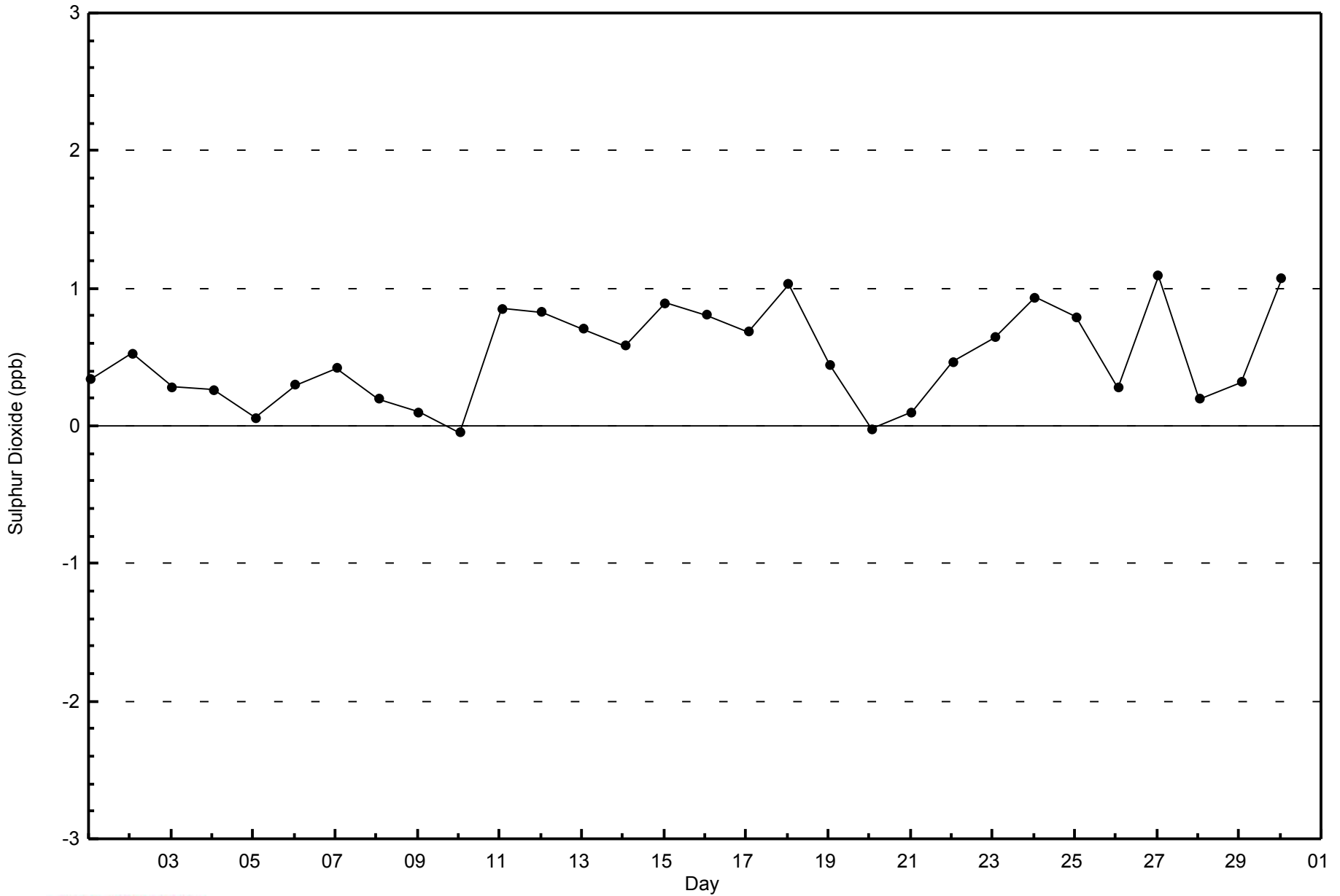


Total Number of Valid Hours: 675



WBEA
Zero Responses

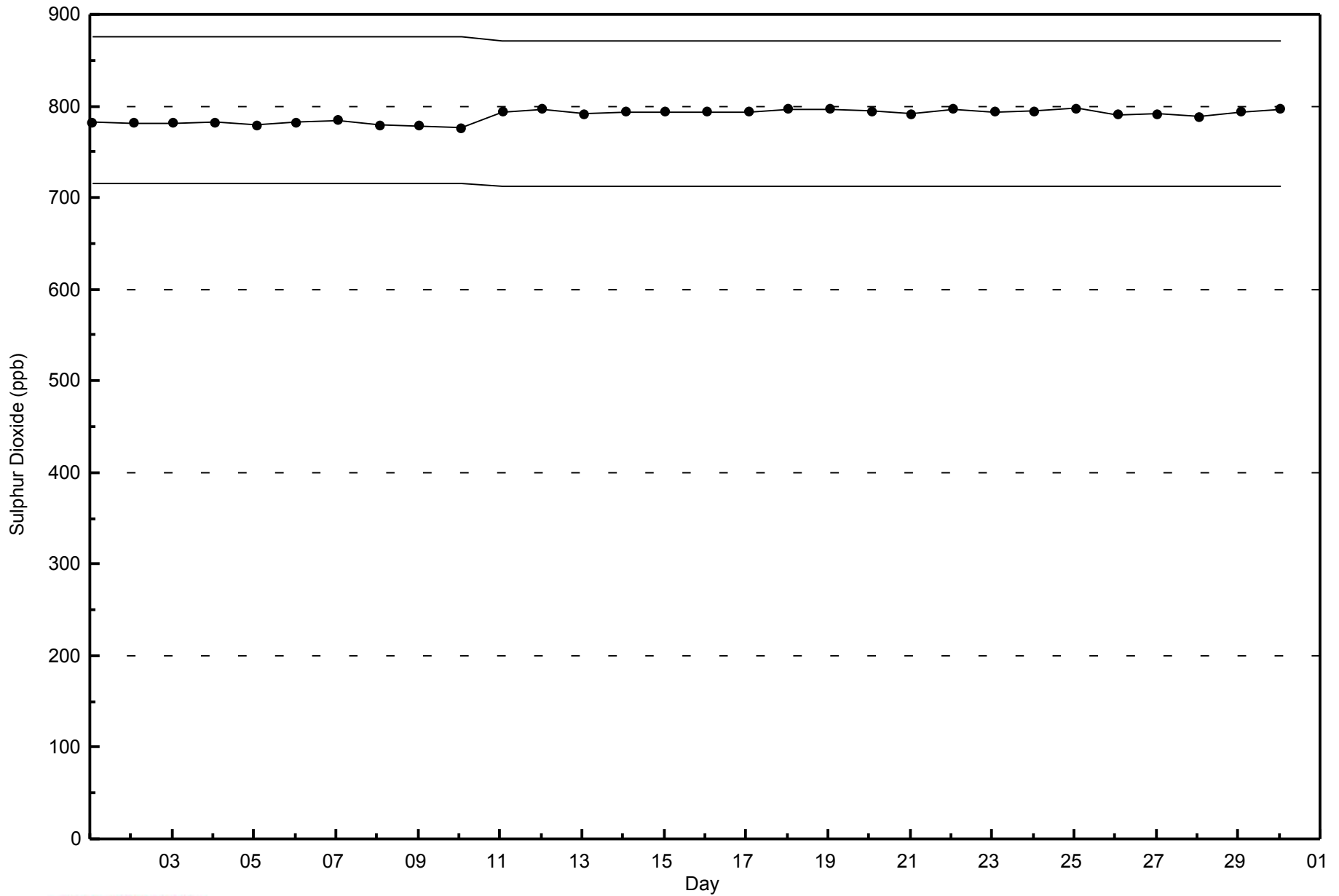
Sulphur Dioxide (SO₂) - ppb
Fort McKay South - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - September 2014





Number of Exceedences (AAAQO):	1-hr: 2	24-hr: 0	Hours in Service:	720
Maximum Value: 16 ppb on Sep 24 01:00	Maximum Daily Average: 1.6 ppb on Sep 24		Hours of Data:	683
Minimum Value: 0 ppb on Sep 3 05:00	Minimum Daily Average: 0.1 ppb on Sep 10		Hours of Missing Data:	37
Maximum Diurnal Average: 2.4 ppb at hour 3	Minimum Diurnal Average: 0.2 ppb at hour 16		Hours of Calibration:	37
Monthly Average: 0.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 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	Z	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0.3	2
2-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
3-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
4-Sep	0	0	Z	1	3	3	2	3	3	3	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1.0	3
5-Sep	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	1	1	0	0	0	0	0.4	1
6-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
7-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
8-Sep	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0.1	0
9-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
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	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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	0	0	0	0.3	1
14-Sep	0	0	Z	0	0	0	0	0	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2
15-Sep	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
16-Sep	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1
17-Sep	0	0	Z	0	0	1	0	0	1	1	1	1	1	1	0	0	0	1	2	1	1	1	1	1	0.6	2
18-Sep	0	0	Z	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Sep	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
20-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
21-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	3	0.6	6
22-Sep	2	1	Z	1	1	1	1	1	1	1	1	1	2	2	2	0	0	0	0	0	0	0	0	0	0.9	2
23-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	11	0.8	11
24-Sep	16	10	Z	2	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	1.6	16
25-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
26-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
27-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	0.2	1
28-Sep	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	1
29-Sep	0	1	Z	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	1
30-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

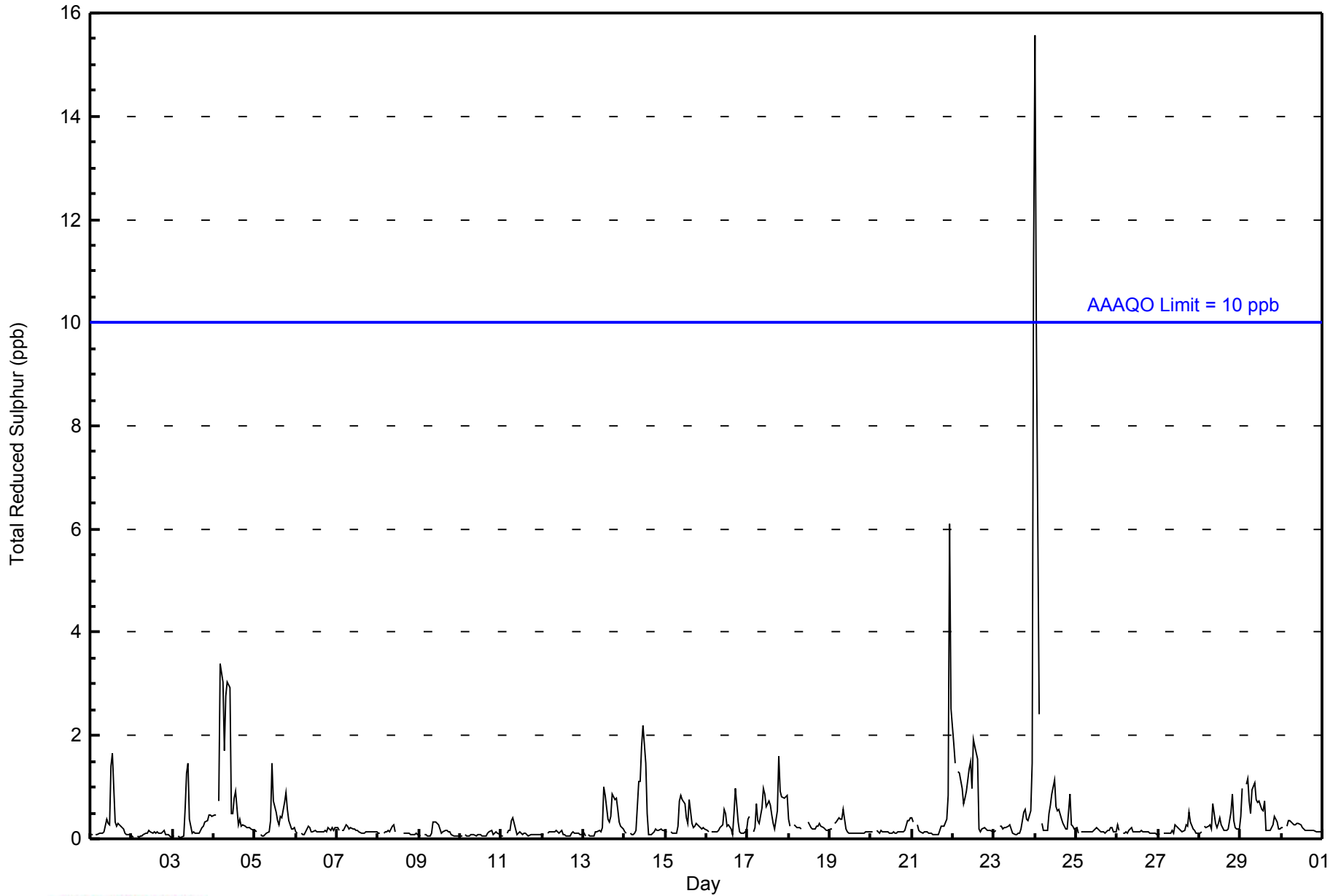
0.7	0.5	2.4	0.2	0.3	0.3	0.2	0.3	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.4	0.6	Diurnal Average	
16	10	2	1	3	3	2	3	3	3	2	2	2	2	2	0	0	1	2	1	1	1	6	11	Diurnal Maximum	

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



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - September 2014





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	673	98.54	98.54
3 - 4	6	0.88	99.41
5 - 7	1	0.15	99.56
8 - 11	1	0.15	99.71
> 11	2	0.29	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - September 2014

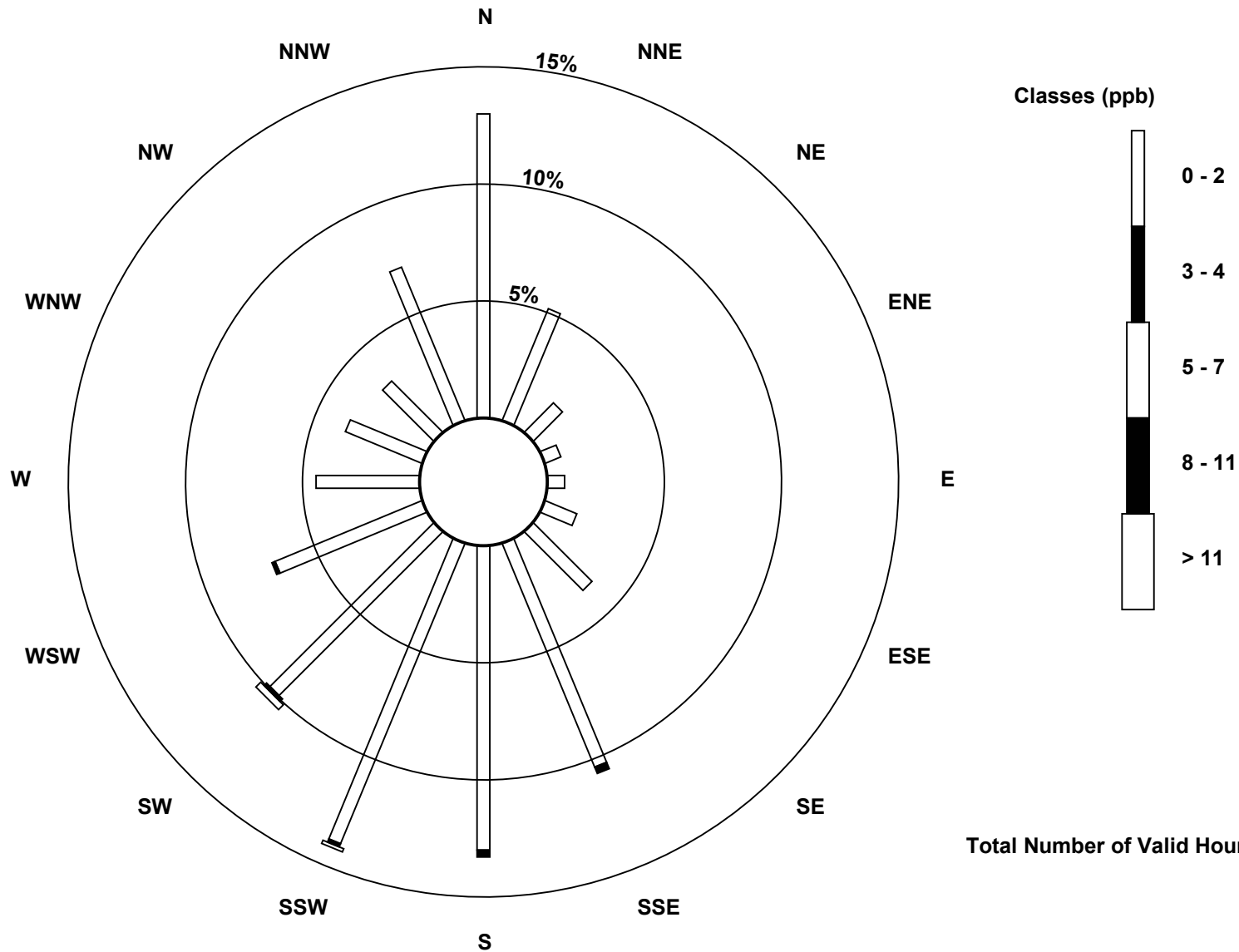
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	88	35	12	5	5	10	24	70	88	94	67	46	30	24	21	48	667
3 - 4	0	0	0	0	0	0	0	2	2	1	0	1	0	0	0	0	6
5 - 7	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
8 - 11	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
> 11	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Totals	88	35	12	5	5	10	24	72	90	96	70	47	30	24	21	48	677

Total Number of Valid Hours: 677

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

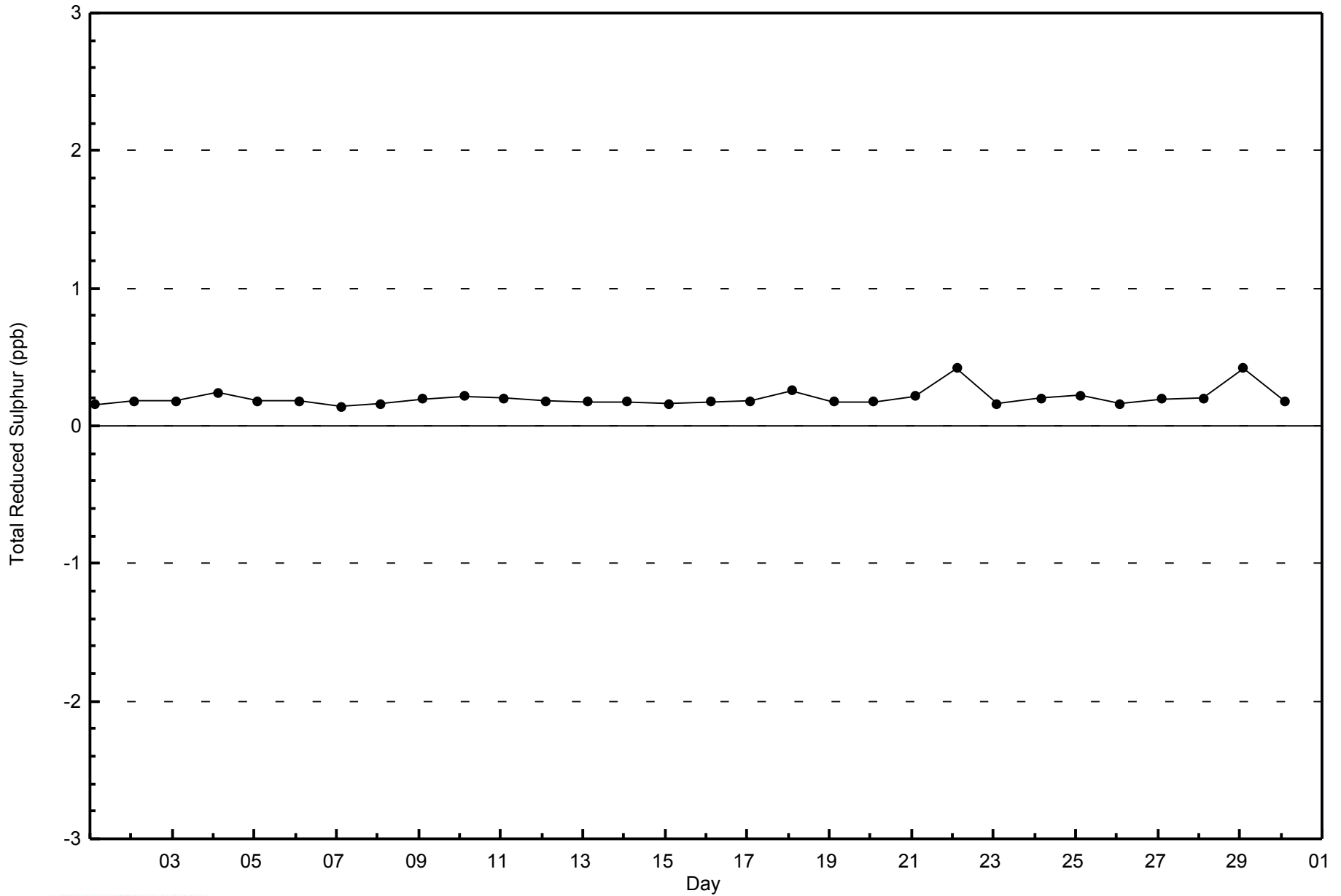
Total Reduced Sulphur (TRS) - ppb
Fort McKay South (AMS 13)





WBEA
Zero Responses

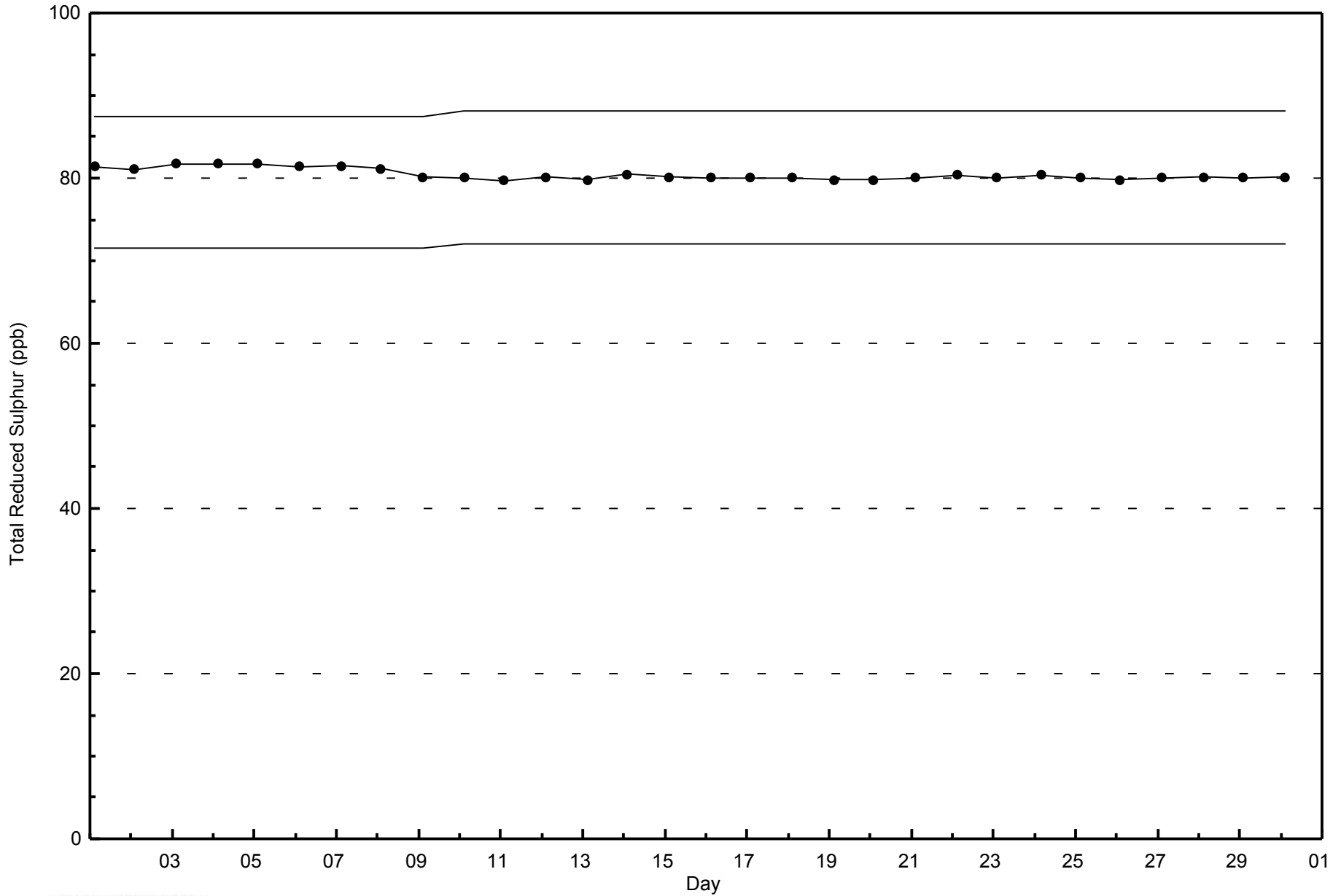
Total Reduced Sulphur (TRS) - ppb
Fort McKay South - September 2014





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - September 2014



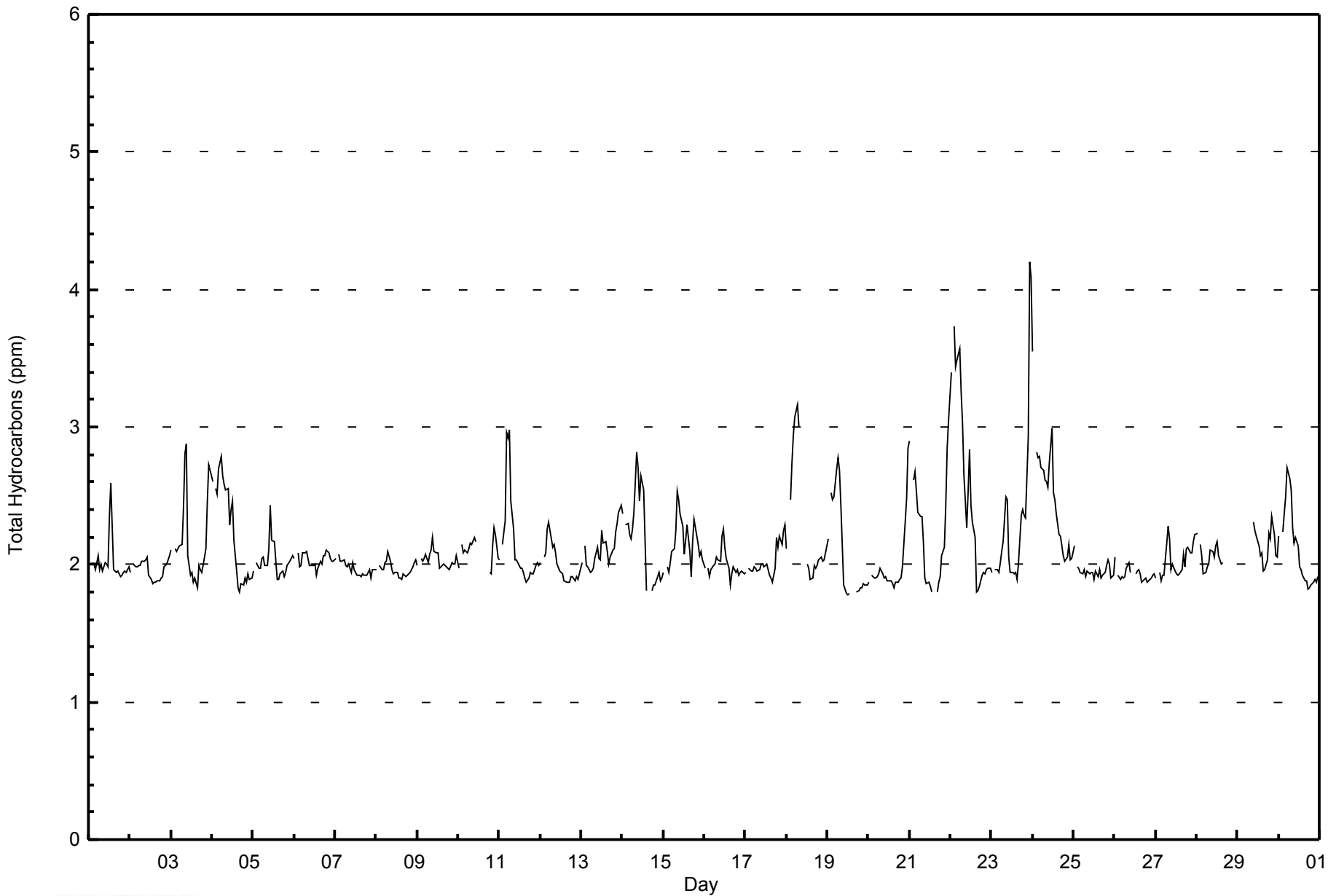


Maximum Value: 4.2 ppm on Sep 23 23:00																		Maximum Daily Average: 2.5 ppm on Sep 22						Hours in Service: 720							
Minimum Value: 1.8 ppm on Sep 19 13:00																		Minimum Daily Average: 1.9 ppm on Sep 26						Hours of Data: 654							
Maximum Diurnal Average: 2.3 ppm at hour 6																		Minimum Diurnal Average: 1.9 ppm at hour 17						Hours of Missing Data: 66							
Monthly Average: 2.11 ppm																		Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.2 P ₉₀ = 2.5 P ₉₉ = 3.4						Hours of Calibration: 42							
																								Percent Operational Time: 96.7							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Sep	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.6	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.6
2-Sep	1.9	Z	2.0	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	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.1
3-Sep	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.4	2.8	2.9	2.1	1.9	1.9	1.9	1.9	1.8	2.0	2.0	1.9	2.0	2.1	2.5	2.7	2.7	2.2	2.2	2.2	2.2	2.2	2.2	2.9
4-Sep	2.6	Z	2.6	2.5	2.7	2.8	2.6	2.6	2.5	2.6	2.3	2.4	2.5	2.2	2.0	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.9	1.9	2.2	2.2	2.2	2.2	2.2	2.2	2.8
5-Sep	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.4	2.2	2.2	2.0	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.4
6-Sep	2.0	Z	2.1	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	1.9	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	2.0	2.0	2.0	2.1
7-Sep	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
8-Sep	2.0	Z	2.0	2.0	2.0	2.0	2.0	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
9-Sep	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
10-Sep	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	C	C	C	C	C	C	C	C	1.9	1.9	2.1	2.3	2.2	2.0	--	--	--	--	2.3	
11-Sep	2.0	Z	2.1	2.3	3.0	2.9	3.0	2.5	2.3	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2	2.2	3.0
12-Sep	2.0	Z	2.1	2.1	2.3	2.3	2.2	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.3
13-Sep	2.0	Z	2.1	2.0	2.0	1.9	1.9	2.0	2.0	2.1	2.0	2.0	2.2	2.2	2.2	2.2	2.1	2.0	2.1	2.1	2.1	2.2	2.3	2.4	2.4	2.1	2.1	2.1	2.1	2.1	2.4
14-Sep	2.4	Z	2.3	2.3	2.2	2.2	2.3	2.4	2.8	2.7	2.5	2.6	2.5	2.2	1.8	UO	UO	UO	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.2	2.2	2.2	2.2	2.2	2.8
15-Sep	1.9	Z	2.0	1.9	2.0	2.1	2.1	2.3	2.5	2.5	2.4	2.3	2.1	2.2	2.3	2.1	1.9	1.9	2.2	2.3	2.3	2.1	2.1	2.1	2.0	2.2	2.2	2.2	2.2	2.2	2.5
16-Sep	2.0	Z	2.0	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.2	2.3	2.1	2.0	2.0	1.9	1.9	2.0	1.9	2.0	1.9	1.9	1.9	2.0	1.9	2.0	1.9	1.9	1.9	1.9	2.3
17-Sep	1.9	Z	2.0	1.9	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.2	2.1	2.2	2.1	2.3	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.3
18-Sep	2.1	Z	2.5	2.7	2.9	3.1	3.2	3.0	C	C	C	C	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	3.2
19-Sep	2.2	Z	2.5	2.5	2.5	2.7	2.8	2.7	2.4	1.9	1.8	1.8	1.8	1.8	UO	UO	UO	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.1	2.1	2.1	2.1	2.1	2.8
20-Sep	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	2.0	2.3	2.5	2.9	2.0	2.0	2.0	2.0	2.0	2.0	2.9
21-Sep	2.9	Z	2.6	2.7	2.5	2.4	2.4	2.4	2.2	1.9	1.9	1.9	1.8	1.8	UO	UO	1.8	1.9	1.9	1.9	2.1	2.1	2.4	2.9	3.1	2.3	2.3	2.3	2.3	3.1	3.1
22-Sep	3.4	Z	3.7	3.4	3.5	3.6	3.3	3.0	2.6	2.3	2.5	2.8	2.4	2.3	2.2	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	3.7
23-Sep	1.9	Z	2.0	2.0	1.9	2.0	2.1	2.2	2.5	2.5	2.1	1.9	1.9	1.9	1.9	1.9	2.0	2.4	2.4	2.4	2.3	2.9	4.2	4.1	2.3	2.3	2.3	2.3	2.3	2.3	4.2
24-Sep	3.6	Z	2.8	2.8	2.8	2.7	2.7	2.6	2.6	2.6	2.7	3.0	2.5	2.5	2.4	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.5	2.5	2.5	2.5	2.5	3.6
25-Sep	2.1	Z	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1
26-Sep	2.1	Z	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	C	C	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
27-Sep	1.9	Z	1.9	1.9	1.9	1.9	2.2	2.3	2.2	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.3
28-Sep	2.2	Z	2.1	2.1	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.0	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	--	--	--	2.2
29-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.3	2.3	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.2	2.2	2.4	2.2	2.1	2.1	--	--	--	--	--	2.4
30-Sep	2.2	Z	2.2	2.4	2.5	2.7	2.6	2.5	2.3	2.2	2.2	2.1	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.1	2.1	2.1	2.1	2.7
		2.2	--	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	Diurnal Average
		3.6	--	3.7	3.4	3.5	3.6	3.3	3.0	2.8	2.9	2.7	3.0	2.5	2.6	2.4	2.2	2.2	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	Diurnal Maximum
Z - zerospan		C - Calibration					AF - Analyzer Failure					UO - Unstable Operation																			



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Fort McKay South - September 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	395	60.40	60.40
2.1 - 3.0	247	37.77	98.17
3.1 - 10.0	12	1.83	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 654

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - September 2014

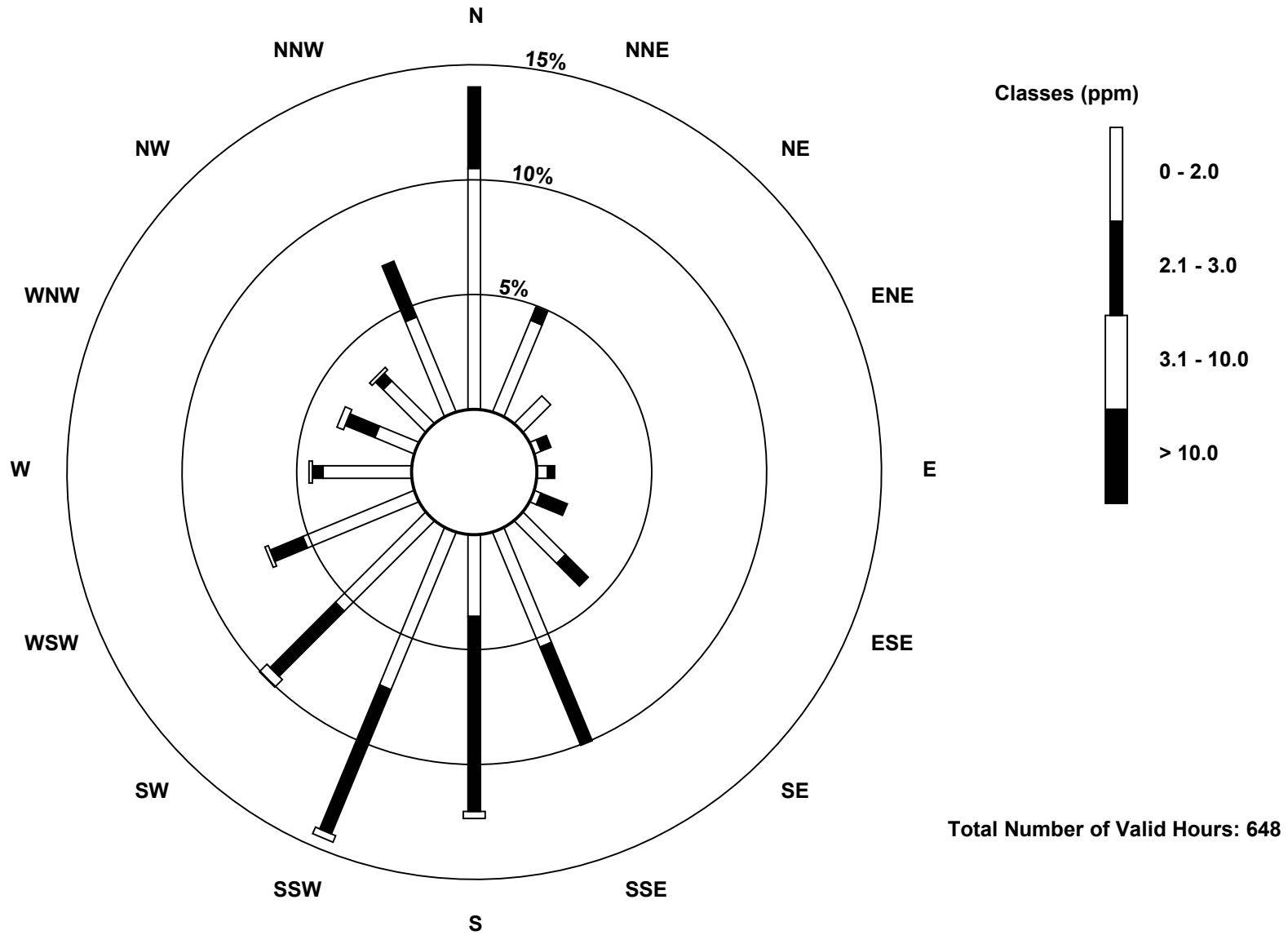
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	68	28	11	2	3	2	17	35	23	48	36	34	25	12	17	29	390
2.1 - 3.0	23	4	0	3	2	8	9	30	55	44	26	10	3	9	3	17	246
3.1 - 10.0	0	0	0	0	0	0	0	0	2	2	3	1	1	2	1	0	12
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	32	11	5	5	10	26	65	80	94	65	45	29	23	21	46	648

Total Number of Valid Hours: 648

Total Number of Hours: 720

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

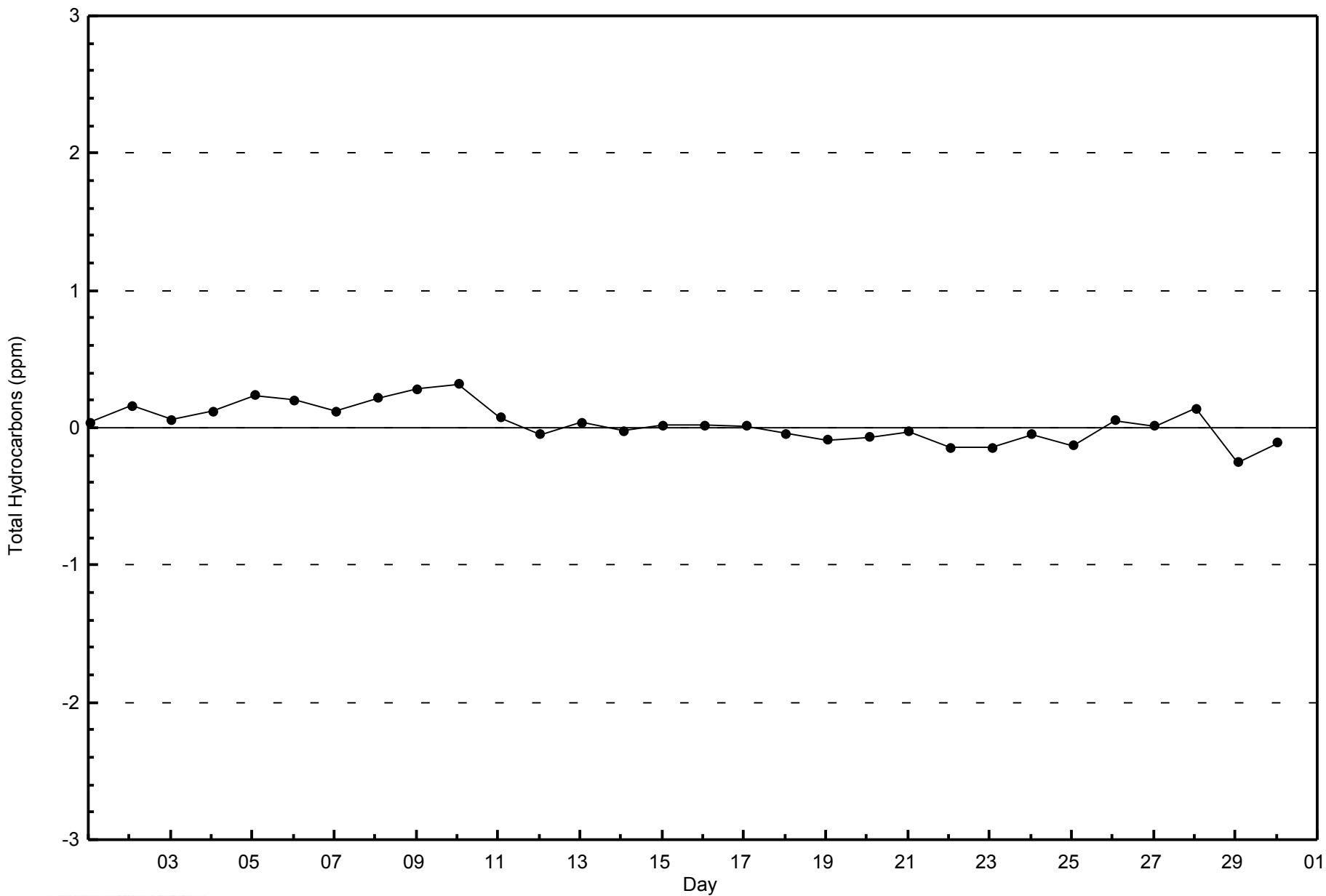
**Total Hydrocarbons (THC) - ppm
Fort McKay South (AMS 13)**





WBEA
Zero Responses

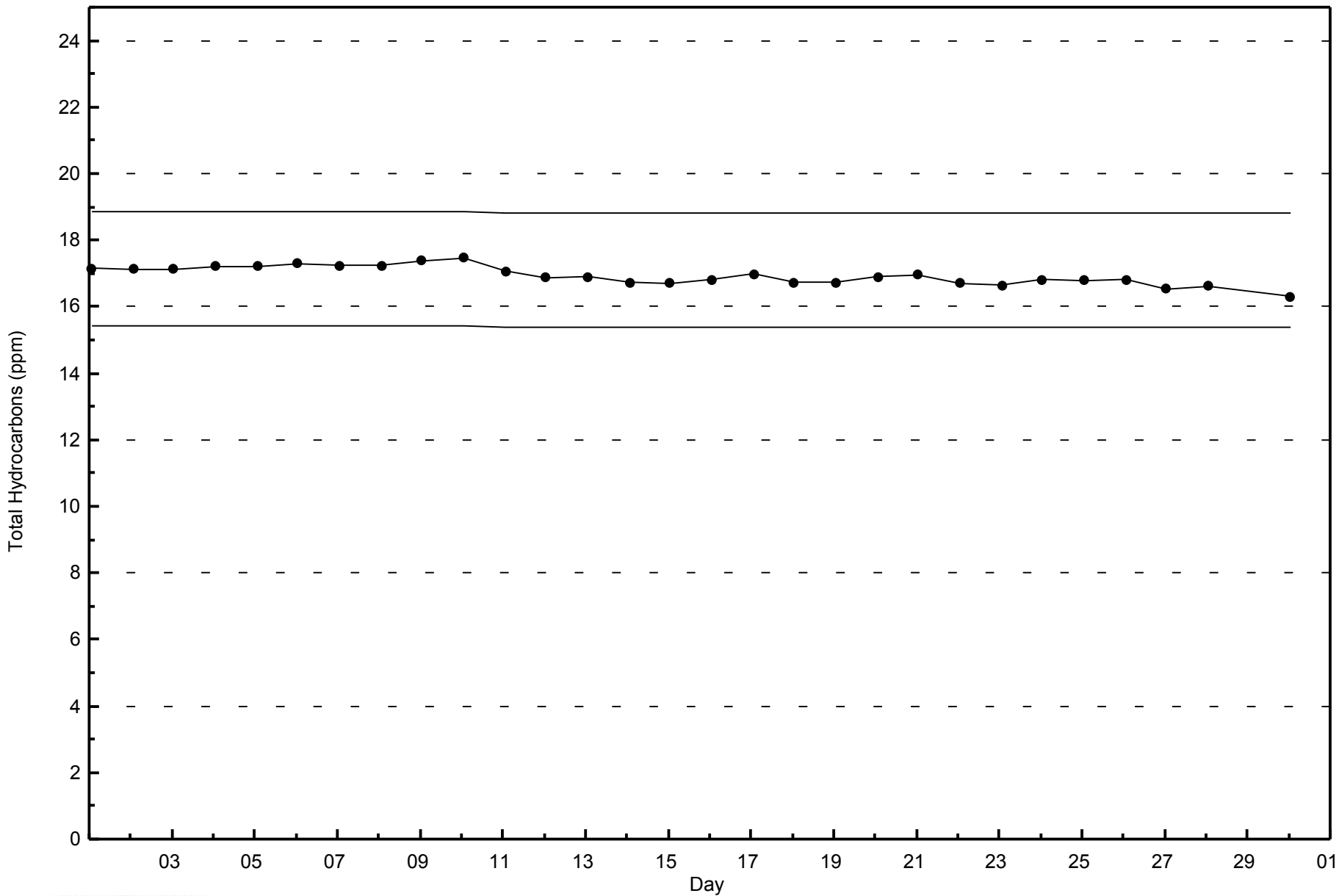
Total Hydrocarbons (THC) - ppm
Fort McKay South - September 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Fort McKay South - September 2014





Summary of Hour Averages

Fort McKay South - September 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 44 ppb on Sep 19 21:00	Maximum Daily Average: 22.9 ppb on Sep 19		Hours of Data:	683
Minimum Value: 0 ppb on Sep 1 05:00	Minimum Daily Average: 4.3 ppb on Sep 30		Hours of Missing Data:	37
Maximum Diurnal Average: 23.9 ppb at hour 15	Minimum Diurnal Average: 0.3 ppb at hour 3		Hours of Calibration:	37
Monthly Average: 12.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 12 Q ₃ = 20 P ₉₀ = 26 P ₉₉ = 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	4	2	Z	0	0	0	5	5	9	14	19	26	20	21	23	21	15	8	3	1	1	0	0	0	8.7	26
2-Sep	1	0	Z	0	0	0	0	1	3	5	11	19	24	24	22	18	18	18	10	2	1	1	1	0	7.8	24
3-Sep	0	0	Z	0	0	0	0	1	1	3	19	23	23	23	23	23	19	16	14	3	2	1	0	0	8.6	23
4-Sep	1	1	Z	0	1	0	1	1	2	6	4	8	9	4	18	19	14	12	13	9	14	14	12	12	7.6	19
5-Sep	10	7	Z	2	2	1	2	7	12	13	15	17	16	17	15	16	13	11	5	2	1	2	4	6	8.5	17
6-Sep	2	2	Z	3	1	1	3	9	16	21	19	18	19	18	14	13	11	13	14	13	15	19	21	23	12.5	23
7-Sep	24	22	Z	23	21	21	20	20	17	16	20	22	23	24	26	26	25	23	22	18	18	17	17	12	20.7	26
8-Sep	12	16	Z	16	9	4	2	9	16	18	22	23	25	26	26	25	25	22	15	10	4	3	2	2	14.5	26
9-Sep	1	1	Z	6	4	2	1	3	6	10	17	17	20	19	19	19	20	14	8	5	4	4	4	3	9.1	20
10-Sep	4	4	Z	4	5	6	6	7	12	16	19	23	26	28	28	27	26	24	12	5	1	0	6	16	13.2	28
11-Sep	18	14	Z	1	0	0	0	4	12	19	C	C	C	C	C	33	34	31	27	17	11	25	28	26	16.7	34
12-Sep	20	15	Z	5	3	3	6	11	16	19	22	26	28	30	31	30	25	21	8	11	15	3	3	2	15.3	31
13-Sep	3	1	Z	1	1	1	1	2	4	7	13	15	15	21	28	29	27	24	7	3	2	1	0	0	9.0	29
14-Sep	0	1	Z	0	0	0	0	1	4	10	15	25	30	34	36	36	34	21	11	5	4	4	3	3	12.0	36
15-Sep	2	2	Z	1	1	1	1	1	4	8	14	20	23	24	13	18	22	18	7	3	2	2	1	3	8.3	24
16-Sep	3	5	Z	8	5	2	2	3	4	7	6	8	13	15	18	20	17	12	12	12	16	16	15	15	10.2	20
17-Sep	14	13	Z	12	11	11	10	8	10	11	11	11	12	13	13	14	13	12	8	2	1	1	1	1	9.3	14
18-Sep	2	0	Z	0	0	0	0	0	C	C	12	14	19	23	26	27	24	14	6	3	2	1	1	1	8.4	27
19-Sep	1	1	Z	1	1	1	1	1	7	25	29	31	32	34	36	37	37	38	37	44	44	37	32	23	22.9	44
20-Sep	21	20	Z	22	20	7	19	23	24	24	27	29	31	33	34	34	30	28	19	14	6	1	1	1	20.3	34
21-Sep	1	1	Z	1	1	1	1	1	7	16	20	20	21	23	23	22	13	8	4	1	1	1	1	1	8.0	23
22-Sep	1	0	Z	1	1	0	1	1	8	18	21	32	37	39	43	37	38	25	15	18	20	20	15	22	18.0	43
23-Sep	26	16	Z	5	3	1	2	3	8	8	23	34	38	40	40	38	27	15	12	7	5	3	2	1	15.6	40
24-Sep	1	1	0	Z	0	0	0	1	3	4	5	5	5	4	5	6	4	2	1	9	12	17	12	6	4.4	17
25-Sep	18	22	Z	16	17	17	17	22	19	17	16	15	17	19	25	25	27	26	26	24	24	21	26	22	20.9	27
26-Sep	17	20	Z	23	23	22	20	16	14	17	14	12	12	12	13	14	17	19	21	24	24	26	25	23	18.6	26
27-Sep	22	23	Z	23	18	15	13	9	13	19	20	20	22	21	24	23	15	8	2	1	1	1	1	1	13.7	24
28-Sep	1	1	Z	3	8	12	13	17	21	19	19	22	24	27	29	28	27	24	18	16	16	18	17	14	17.1	29
29-Sep	8	4	Z	3	2	1	1	3	6	8	13	22	23	24	28	27	22	10	3	6	1	6	3	1	9.7	28
30-Sep	0	1	Z	1	1	1	0	1	1	2	1	5	11	11	14	10	7	7	5	6	6	3	3	3	4.3	14

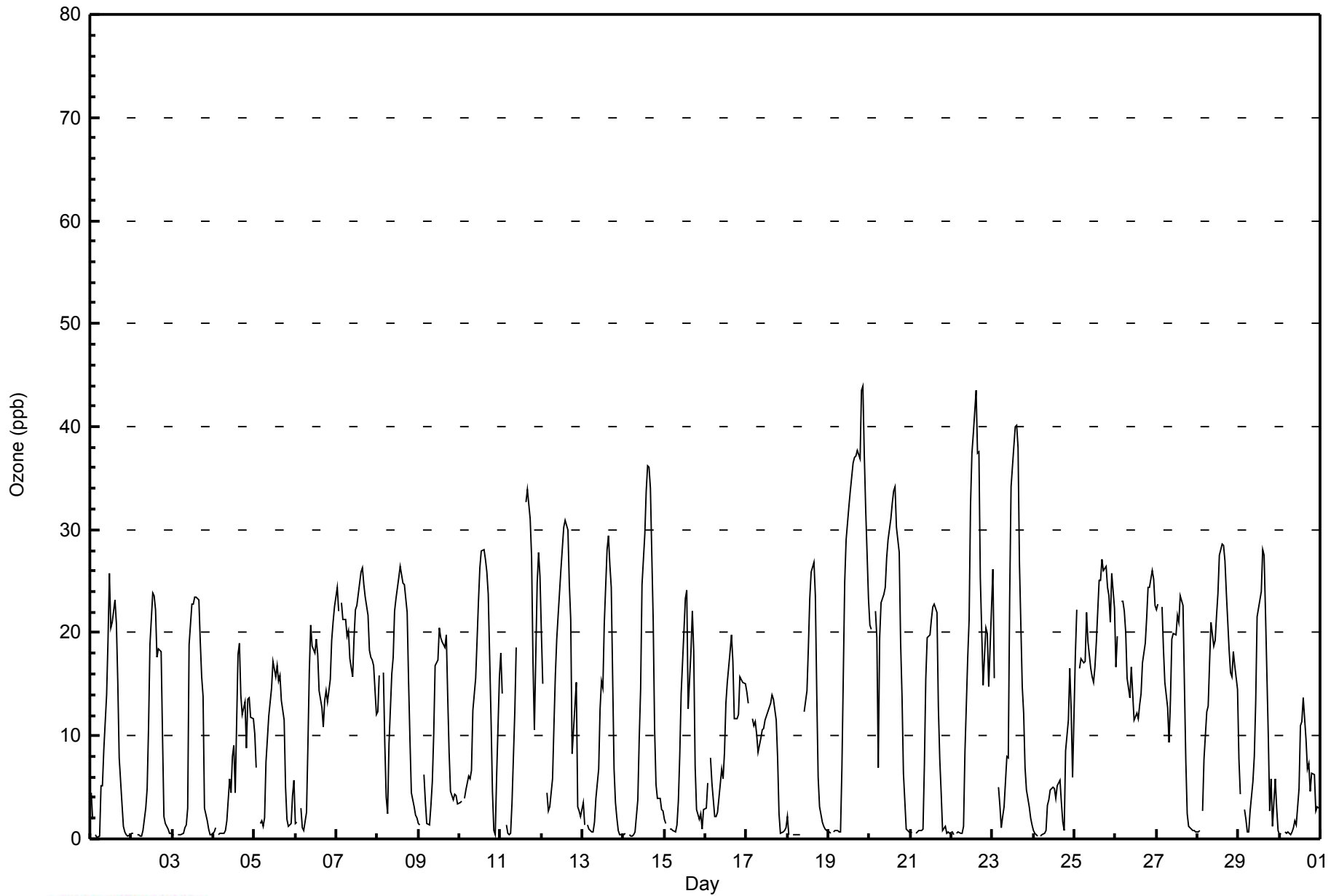
7.9	7.2	0.3	6.2	5.3	4.5	5.0	6.3	9.6	13.0	16.0	19.4	21.4	22.5	23.9	23.8	21.5	17.5	12.2	9.8	9.1	8.9	8.6	8.1	Diurnal Average		
26	23	0	23	23	22	20	23	24	25	29	34	38	40	43	38	38	38	38	37	44	44	37	32	26	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Fort McKay South - September 2014





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	515	75.40	75.40
21 - 50	168	24.60	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - September 2014

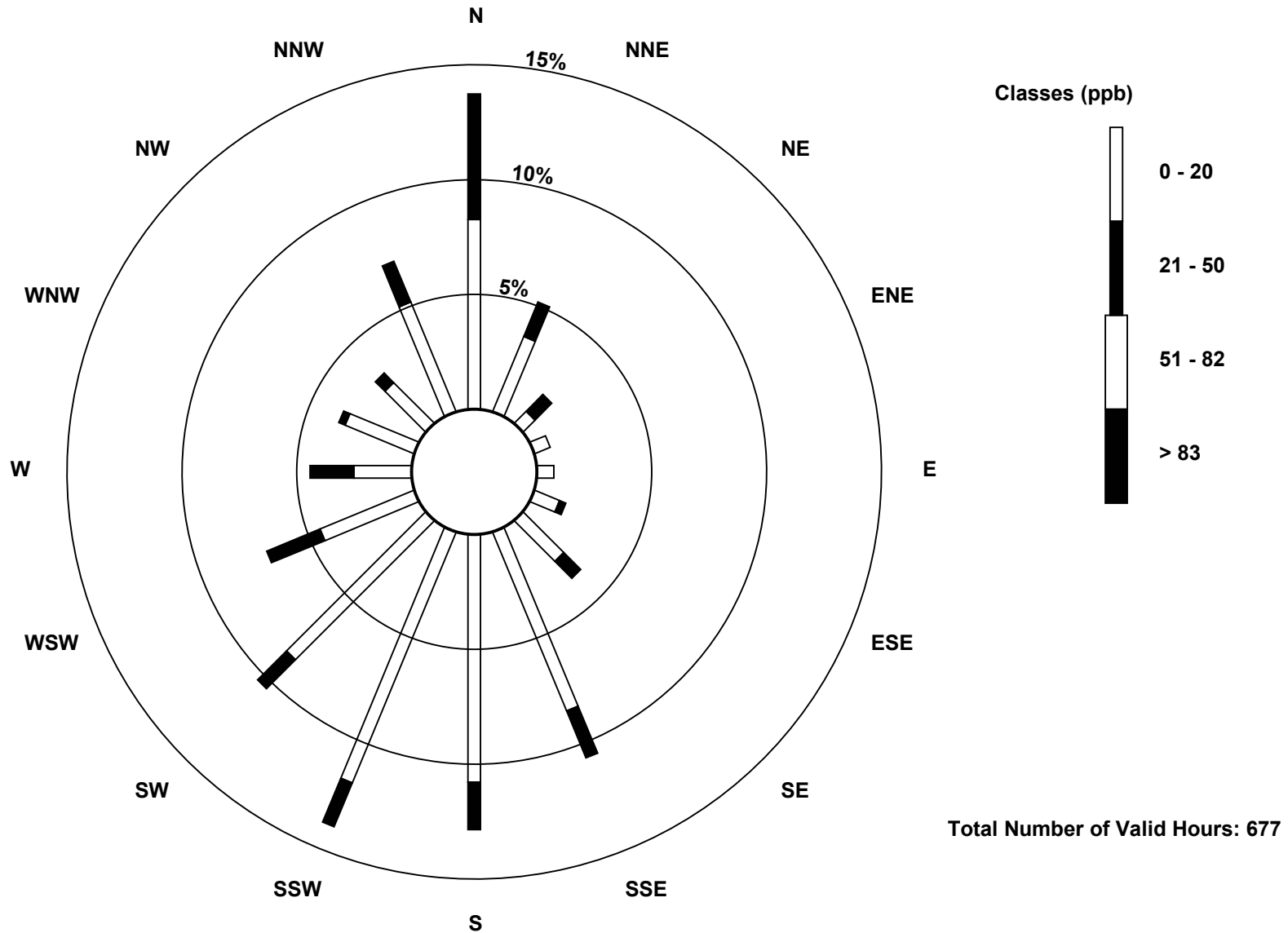
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	56	24	5	5	5	8	17	57	73	80	58	30	17	22	17	35	509
21 - 50	37	11	7	0	0	2	7	15	14	14	12	17	13	2	4	13	168
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	93	35	12	5	5	10	24	72	87	94	70	47	30	24	21	48	677

Total Number of Valid Hours: 677

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

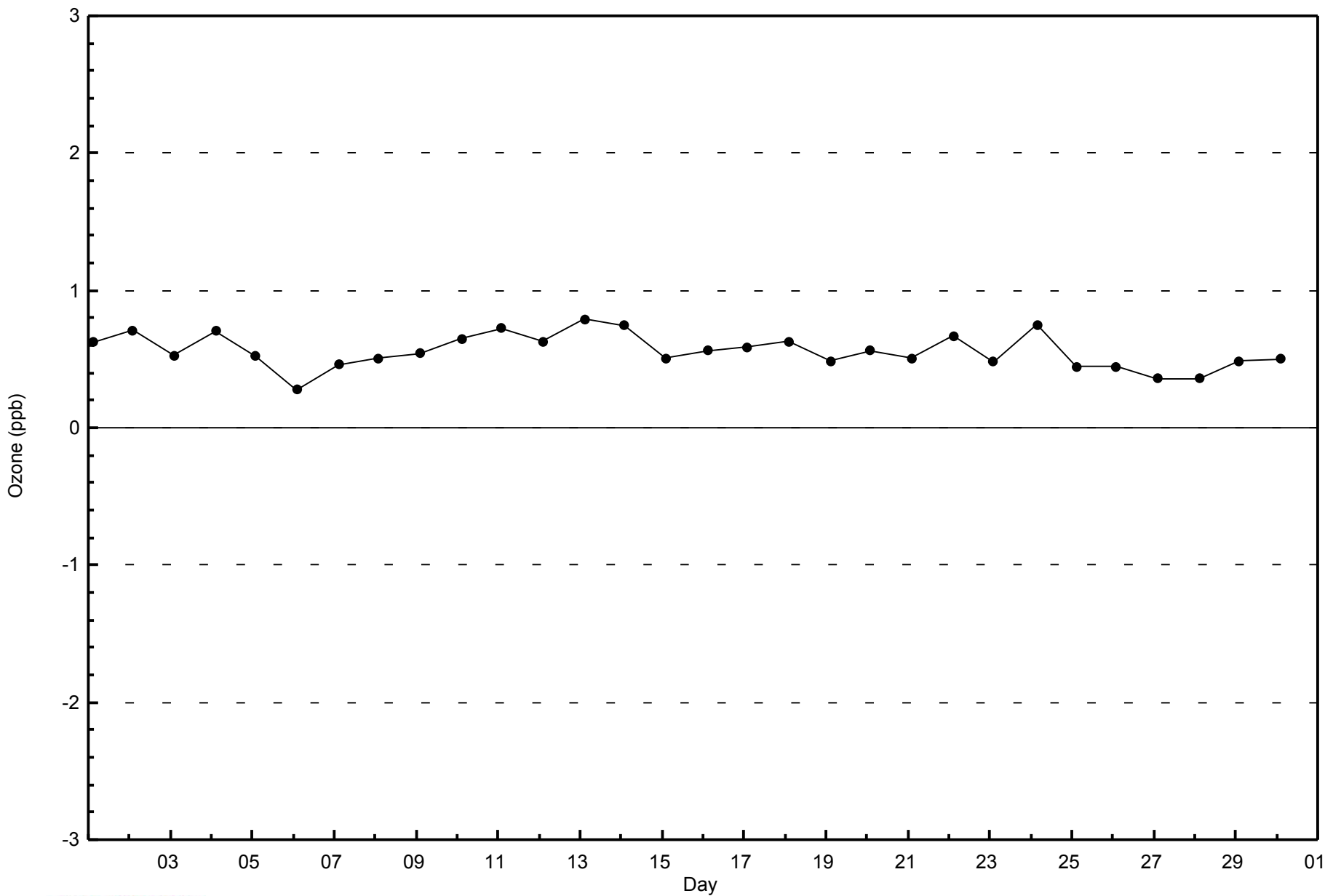
Ozone (O₃) - ppb
Fort McKay South (AMS 13)





WBEA
Zero Responses

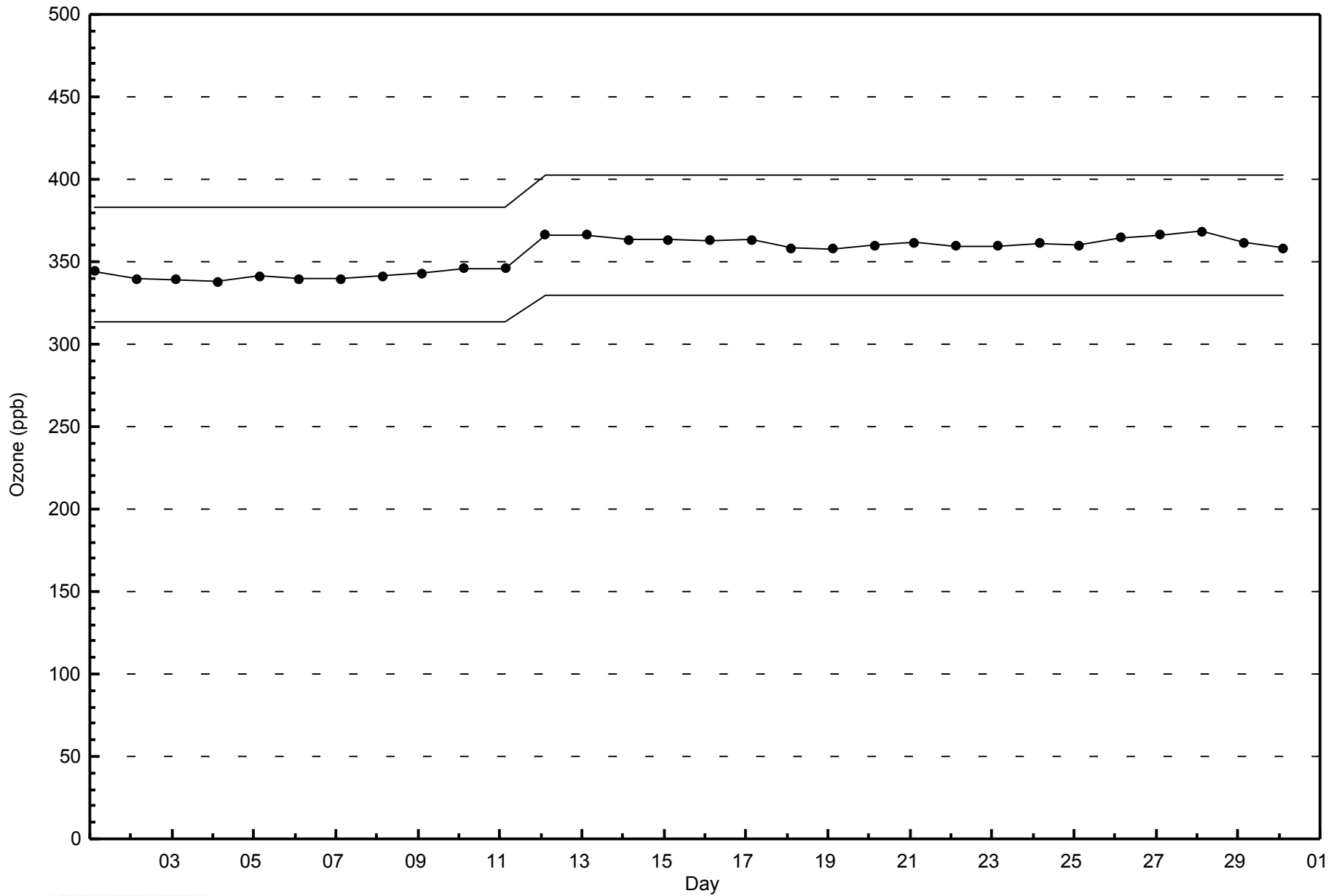
Ozone (O₃) - ppb
Fort McKay South - September 2014





WBEA
Span Responses

Ozone (O₃) - ppb
Fort McKay South - September 2014





Maximum Value: 59 ppb on Sep 11 07:00	Maximum Daily Average: 8.7 ppb on Sep 24	Hours in Service: 720
Minimum Value: 0 ppb on Sep 1 03:00	Minimum Daily Average: 0.0 ppb on Sep 25	Hours of Data: 680
Maximum Diurnal Average: 6.4 ppb at hour 9	Minimum Diurnal Average: 0.3 ppb at hour 19	Hours of Missing Data: 40
Monthly Average: 2.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 2 P ₉₀ = 8 P ₉₉ = 36	Hours of Calibration: 40
		Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	Z	0	0	0	3	0	0	0	1	1	0	3	5	1	1	1	1	1	0	0	0	0	0	0.9	5
2-Sep	0	Z	0	0	0	0	0	1	1	3	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4
3-Sep	0	Z	0	0	0	0	2	24	49	38	4	0	0	0	0	1	0	0	0	0	0	0	1	3	5.4	49
4-Sep	2	Z	1	2	2	6	8	6	6	7	13	7	4	5	2	1	0	0	0	0	0	0	0	0	3.1	13
5-Sep	0	Z	0	0	0	0	0	0	1	4	7	6	5	2	0	1	1	1	1	0	0	0	0	0	1.3	7
6-Sep	0	Z	0	0	0	0	1	2	2	1	1	1	0	1	2	1	0	0	0	0	0	0	0	0	0.5	2
7-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	0.1	1
8-Sep	0	Z	0	0	0	0	1	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
9-Sep	0	Z	0	0	0	0	0	1	8	9	3	3	2	1	1	2	1	1	0	0	0	0	0	0	1.4	9
10-Sep	0	Z	0	1	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	6	15	6	0	--	15
11-Sep	0	Z	0	8	36	37	59	30	7	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	7.9	59
12-Sep	0	Z	0	0	1	0	0	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
13-Sep	0	Z	0	0	0	0	0	10	9	8	4	4	9	5	2	1	2	0	0	0	0	2	8	7	3.1	10
14-Sep	3	Z	0	0	0	0	2	7	18	9	7	7	3	1	0	0	0	0	0	0	0	0	0	0	2.5	18
15-Sep	0	Z	0	0	0	0	0	3	15	12	9	5	4	3	9	3	1	1	1	0	0	0	1	0	2.9	15
16-Sep	0	Z	0	0	0	1	3	8	8	5	12	10	5	4	3	1	1	1	0	0	0	0	0	0	2.7	12
17-Sep	0	Z	0	0	0	0	0	1	1	1	1	1	2	1	1	1	0	0	0	3	3	1	0	0	0.8	3
18-Sep	0	Z	2	18	23	27	26	19	C	C	C	C	4	2	2	1	2	1	0	0	0	0	0	0	6.8	27
19-Sep	0	Z	1	1	0	2	7	11	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	11
20-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	19	46	3.4	46
21-Sep	51	Z	9	3	3	2	2	4	2	1	0	0	0	0	0	0	0	0	0	5	4	10	8	10	5.0	51
22-Sep	9	Z	8	2	1	2	7	14	8	4	5	2	2	3	2	0	0	0	0	0	0	0	0	0	3.0	14
23-Sep	0	Z	0	0	0	0	1	3	3	5	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	5
24-Sep	0	Z	1	2	3	3	2	2	17	23	28	42	26	20	9	8	8	5	2	0	0	0	0	0	8.7	42
25-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
26-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	0.2	1
27-Sep	0	Z	0	0	0	0	0	0	1	0	2	2	2	2	2	2	4	2	0	0	0	0	3	4	1.2	4
28-Sep	4	Z	0	0	0	0	0	0	1	3	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0.7	4
29-Sep	0	Z	0	0	0	4	5	5	7	9	6	1	1	2	1	1	1	2	6	3	15	8	1	2	3.5	15
30-Sep	10	Z	8	11	22	31	28	20	11	6	13	6	3	4	2	2	0	0	0	0	0	0	0	0	7.7	31

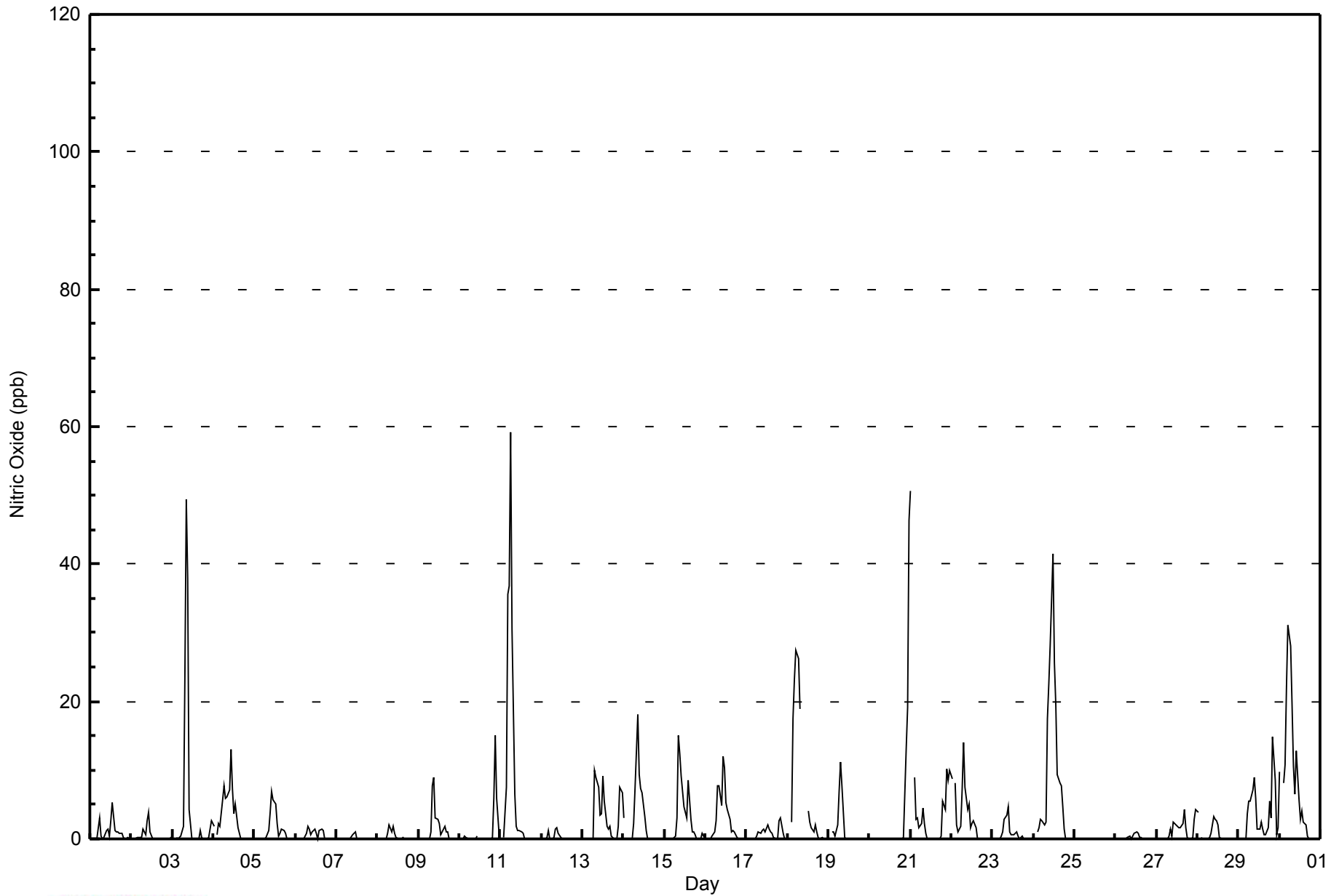
2.6	--	1.0	1.6	3.1	3.9	5.2	5.9	6.4	5.4	4.5	3.7	2.8	2.2	1.3	0.9	0.9	0.5	0.3	0.4	1.0	1.7	1.6	2.4	Diurnal Average	
51	--	9	18	36	37	59	30	49	38	28	42	26	20	9	8	8	5	6	5	15	15	19	46	Diurnal Maximum	

Z - zerospan C - Calibration



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Fort McKay South - September 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	661	97.21	97.21
21 - 40	14	2.06	99.26
41 - 80	5	0.74	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - September 2014

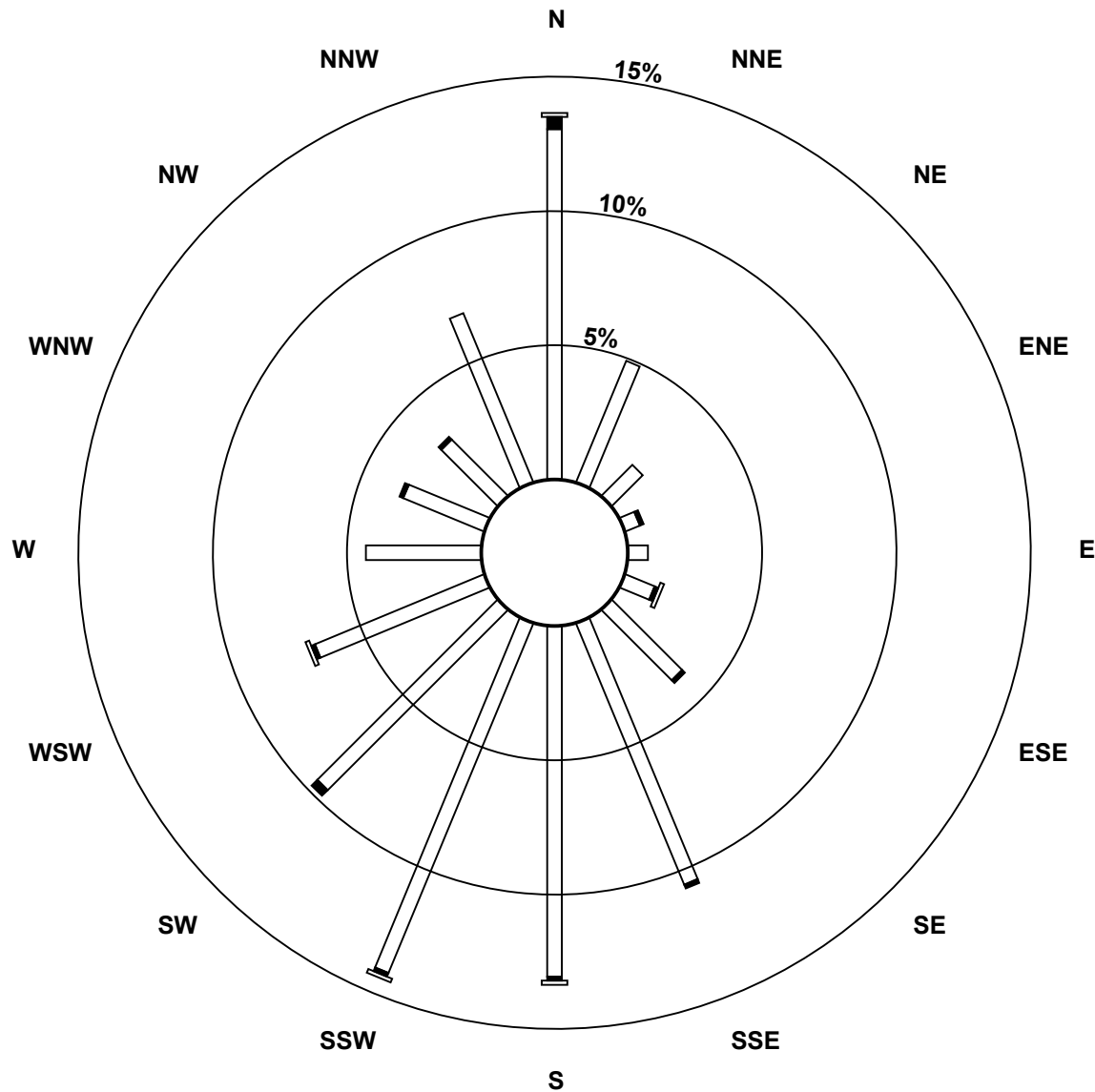
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	33	11	4	5	8	25	71	88	95	64	46	29	22	20	46	655
21 - 40	3	0	0	1	0	1	1	1	1	1	2	1	0	1	1	0	14
11 - 80	1	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	92	33	11	5	5	10	26	72	90	97	66	48	29	23	21	46	674

Total Number of Valid Hours: 674

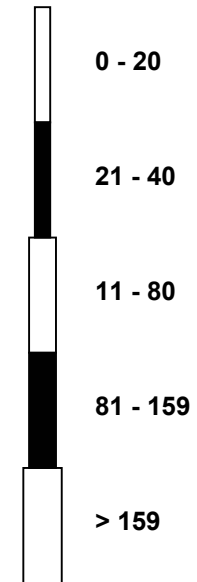
Total Number of Hours: 720

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

**Nitric Oxide (NO) - ppb
Fort McKay South (AMS 13)**



Classes (ppb)

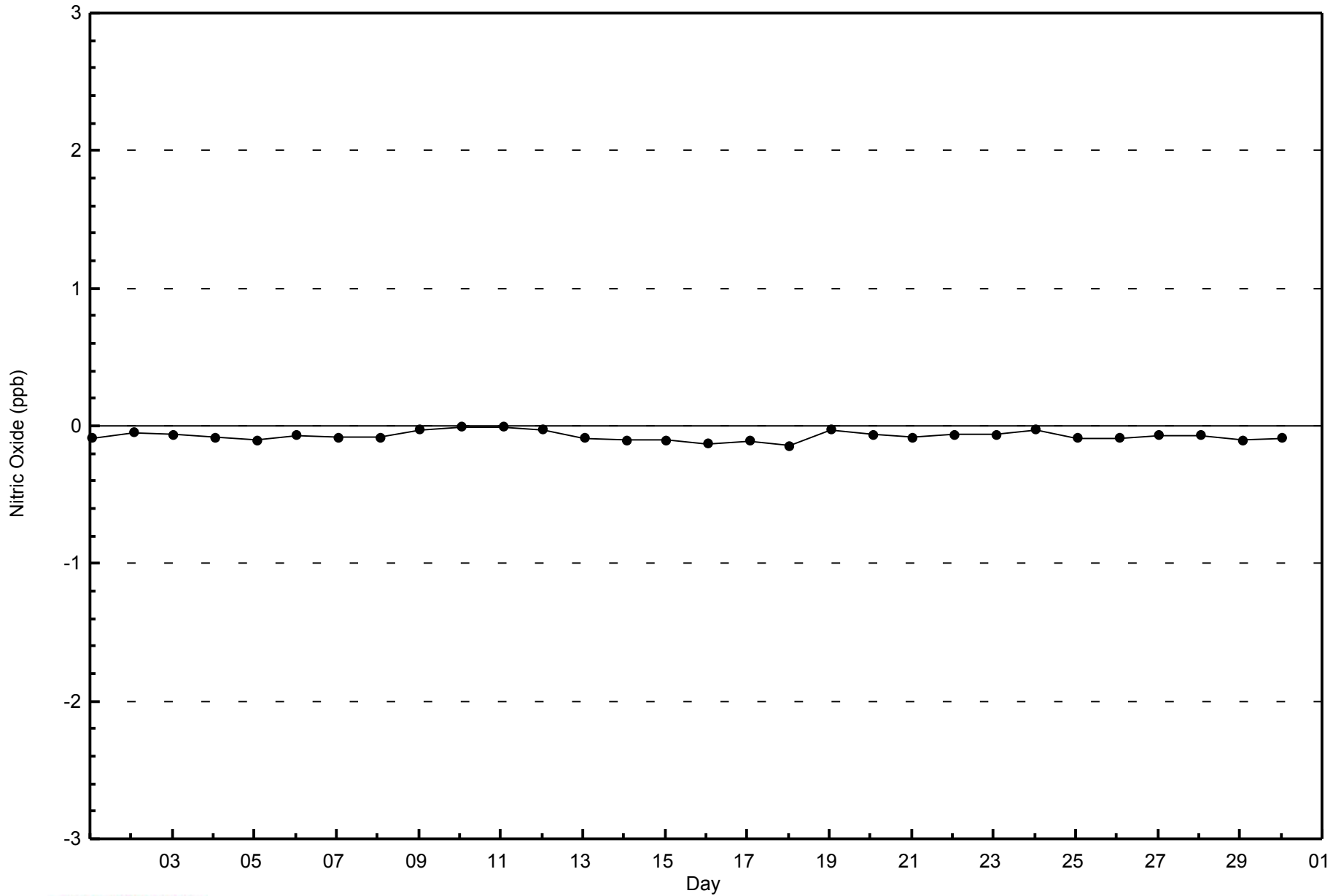


Total Number of Valid Hours: 674



WBEA
Zero Responses

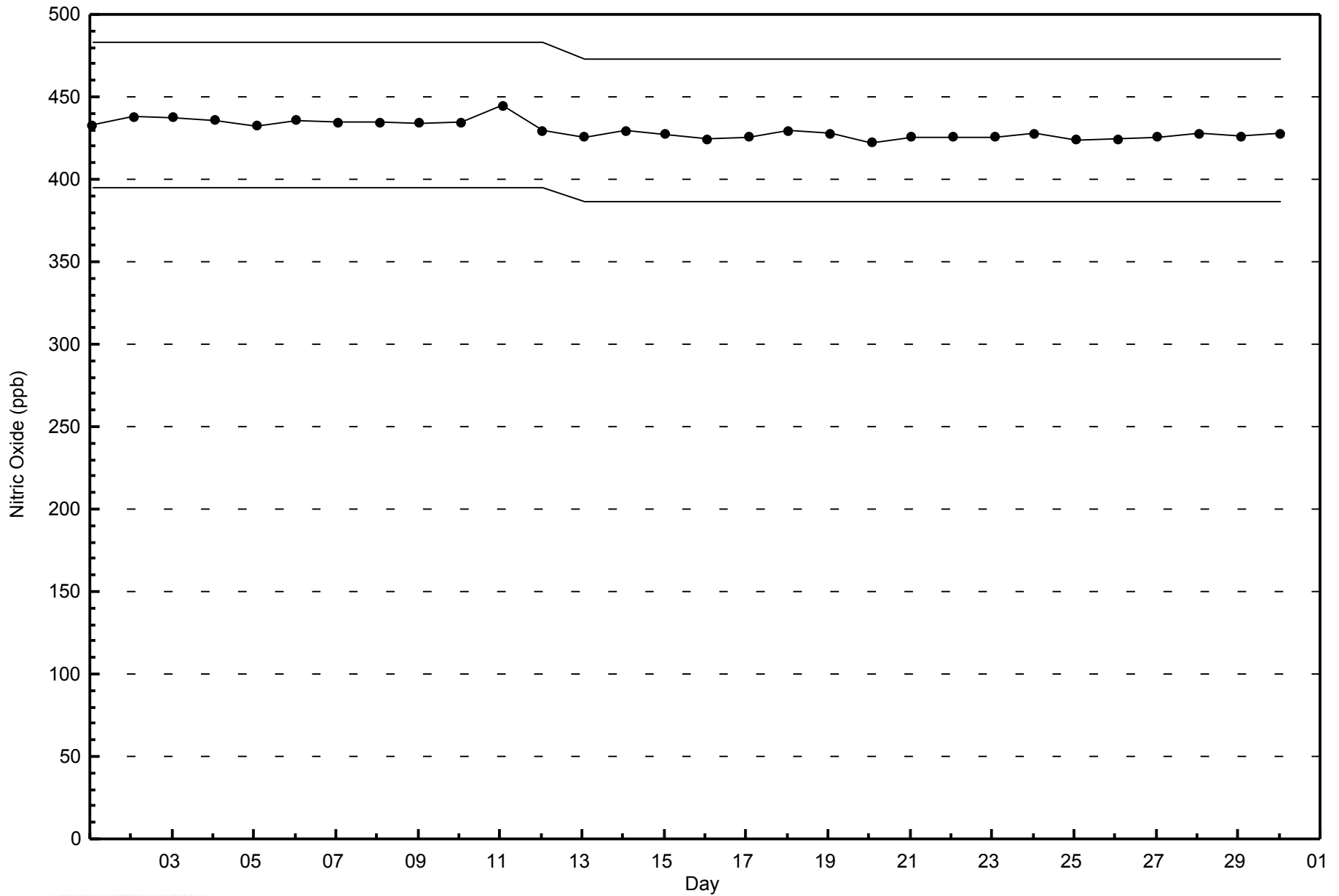
Nitric Oxide (NO) - ppb
Fort McKay South - September 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Fort McKay South - September 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Fort McKay South - September 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 26 ppb on Sep 24 12:00	Maximum Daily Average: 9.6 ppb on Sep 24		Hours of Data:	680
Minimum Value: 0 ppb on Sep 1 01:00	Minimum Daily Average: 0.7 ppb on Sep 2		Hours of Missing Data:	40
Maximum Diurnal Average: 4.8 ppb at hour 11	Minimum Diurnal Average: 1.7 ppb at hour 3		Hours of Calibration:	40
Monthly Average: 3.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 8 P ₉₉ = 18		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	Z	0	0	1	2	0	0	0	2	2	2	10	12	6	3	4	2	2	1	1	0	0	0	2.2	12
2-Sep	0	Z	0	0	0	0	0	1	1	1	4	2	1	1	1	1	1	0	0	0	0	0	1	1	0.7	4
3-Sep	1	Z	1	0	0	0	0	4	7	9	2	0	0	0	0	0	5	3	2	2	2	4	3	2	2.1	9
4-Sep	2	Z	2	2	5	4	3	5	5	8	5	7	8	3	2	2	2	1	1	2	2	2	2	2	3.5	8
5-Sep	2	Z	2	1	1	1	0	0	2	5	10	9	10	7	3	3	5	7	4	2	1	2	3	3	3.5	10
6-Sep	3	Z	2	0	0	0	2	5	5	2	3	4	3	1	4	6	8	5	4	5	5	4	3	3	3.3	8
7-Sep	3	Z	2	2	4	4	4	1	1	2	2	1	1	1	0	0	1	0	0	1	1	0	1	1	1.5	4
8-Sep	1	Z	0	0	1	1	1	3	2	3	2	1	1	1	1	2	2	2	1	1	1	1	2	1	1.3	3
9-Sep	1	Z	1	1	1	1	1	1	8	11	8	8	5	4	4	7	6	4	2	1	1	1	1	1	3.4	11
10-Sep	1	Z	2	3	2	0	0	0	0	0	2	C	C	C	C	C	C	3	2	2	7	7	9	6	--	9
11-Sep	1	Z	7	13	13	7	8	13	8	3	3	2	2	2	1	1	1	1	1	0	0	0	0	0	3.8	13
12-Sep	0	Z	1	2	5	2	1	2	4	3	2	1	1	1	1	1	1	1	1	1	0	0	0	0	1.4	5
13-Sep	1	Z	1	0	0	0	0	3	4	5	4	4	9	9	6	7	10	5	3	3	2	4	3	2	3.7	10
14-Sep	1	Z	1	1	0	1	1	1	8	9	9	13	9	5	1	0	0	1	1	1	1	2	1	1	2.9	13
15-Sep	1	Z	0	0	1	0	0	2	6	8	10	8	7	10	20	11	6	8	8	6	4	6	6	7	5.8	20
16-Sep	6	Z	4	4	6	6	6	7	9	7	10	9	5	5	4	3	4	6	5	4	1	2	3	2	5.1	10
17-Sep	3	Z	3	4	4	3	4	4	3	2	2	1	2	2	1	1	2	3	4	8	8	5	2	2	3.1	8
18-Sep	2	Z	1	1	1	1	0	0	C	C	C	C	6	5	4	4	9	5	4	3	2	2	1	1	2.7	9
19-Sep	1	Z	2	1	2	2	2	2	7	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.9	7
20-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	9	8	12	1.4	12
21-Sep	9	Z	5	5	3	2	2	1	2	2	1	1	0	0	0	0	0	1	1	7	8	11	9	8	3.4	11
22-Sep	7	Z	4	3	2	2	2	3	9	9	10	7	13	16	12	1	0	1	1	1	1	0	1	0	4.4	16
23-Sep	0	Z	1	1	1	2	5	5	7	7	2	2	2	4	5	3	3	7	9	6	4	3	3	5	3.8	9
24-Sep	5	Z	6	4	3	2	2	1	11	15	20	26	24	22	18	15	14	8	4	5	5	6	2	4	9.6	26
25-Sep	7	Z	1	1	1	1	0	0	0	0	0	0	0	0	1	2	1	4	4	4	4	5	1	2	1.8	7
26-Sep	7	Z	1	1	1	1	1	4	6	2	3	4	4	4	4	4	2	1	1	1	1	1	1	1	2.5	7
27-Sep	1	Z	1	1	2	1	4	3	4	1	5	5	4	4	4	6	13	8	4	2	1	1	1	1	3.2	13
28-Sep	1	Z	1	1	1	2	4	3	2	6	5	5	4	1	1	1	1	2	5	6	5	3	2	2	2.9	6
29-Sep	2	Z	1	1	2	6	5	7	9	10	7	3	4	6	5	3	6	15	20	15	17	11	4	4	7.0	20
30-Sep	4	Z	2	2	2	2	1	2	3	4	4	5	4	5	5	7	4	4	2	2	1	2	4	5	3.3	7

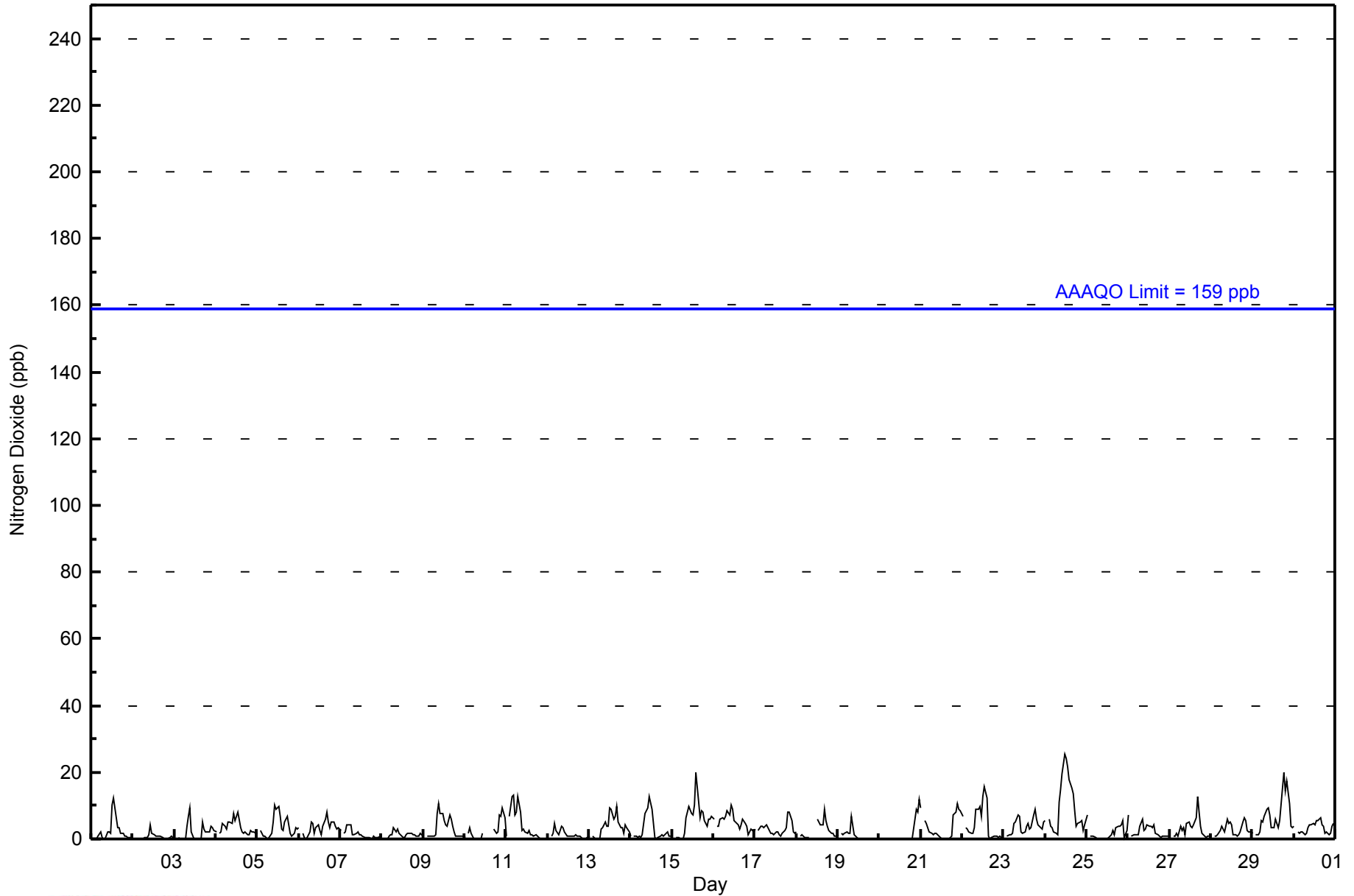
2.4	--	1.7	1.9	2.2	1.9	2.0	2.8	4.5	4.6	4.8	4.5	4.7	4.6	4.0	3.3	3.8	3.6	3.2	3.0	3.0	3.1	2.6	2.6	Diurnal Average	
9	--	7	13	13	7	8	13	11	15	20	26	24	22	20	15	14	15	20	15	17	11	9	12	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	677	99.56	99.56
21 - 40	3	0.44	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - September 2014

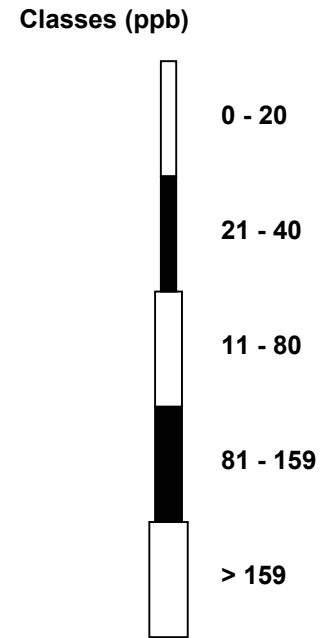
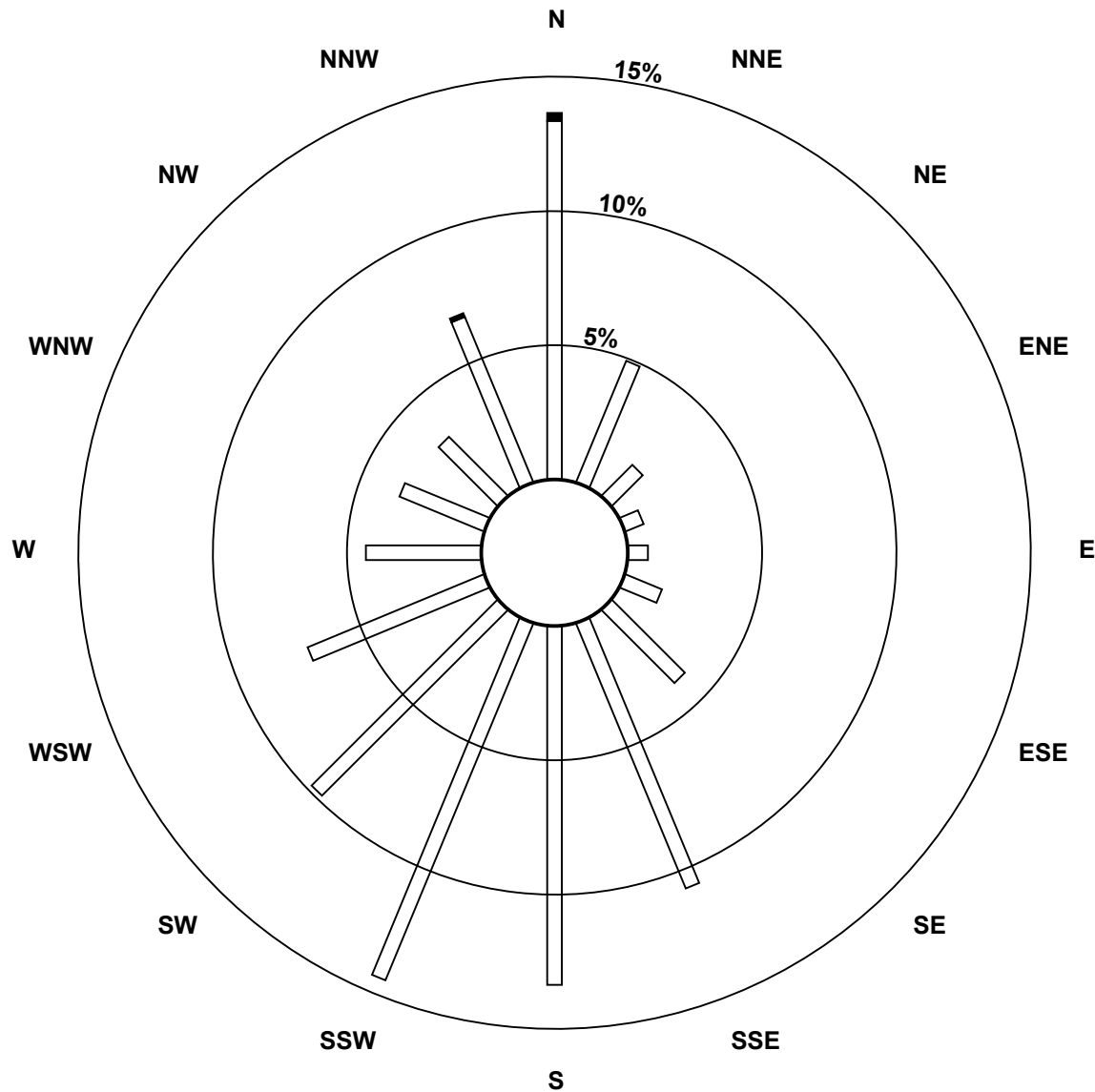
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	90	33	11	5	5	10	26	72	90	97	66	48	29	23	21	45	671
21 - 40	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	92	33	11	5	5	10	26	72	90	97	66	48	29	23	21	46	674

Total Number of Valid Hours: 674

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South (AMS 13)

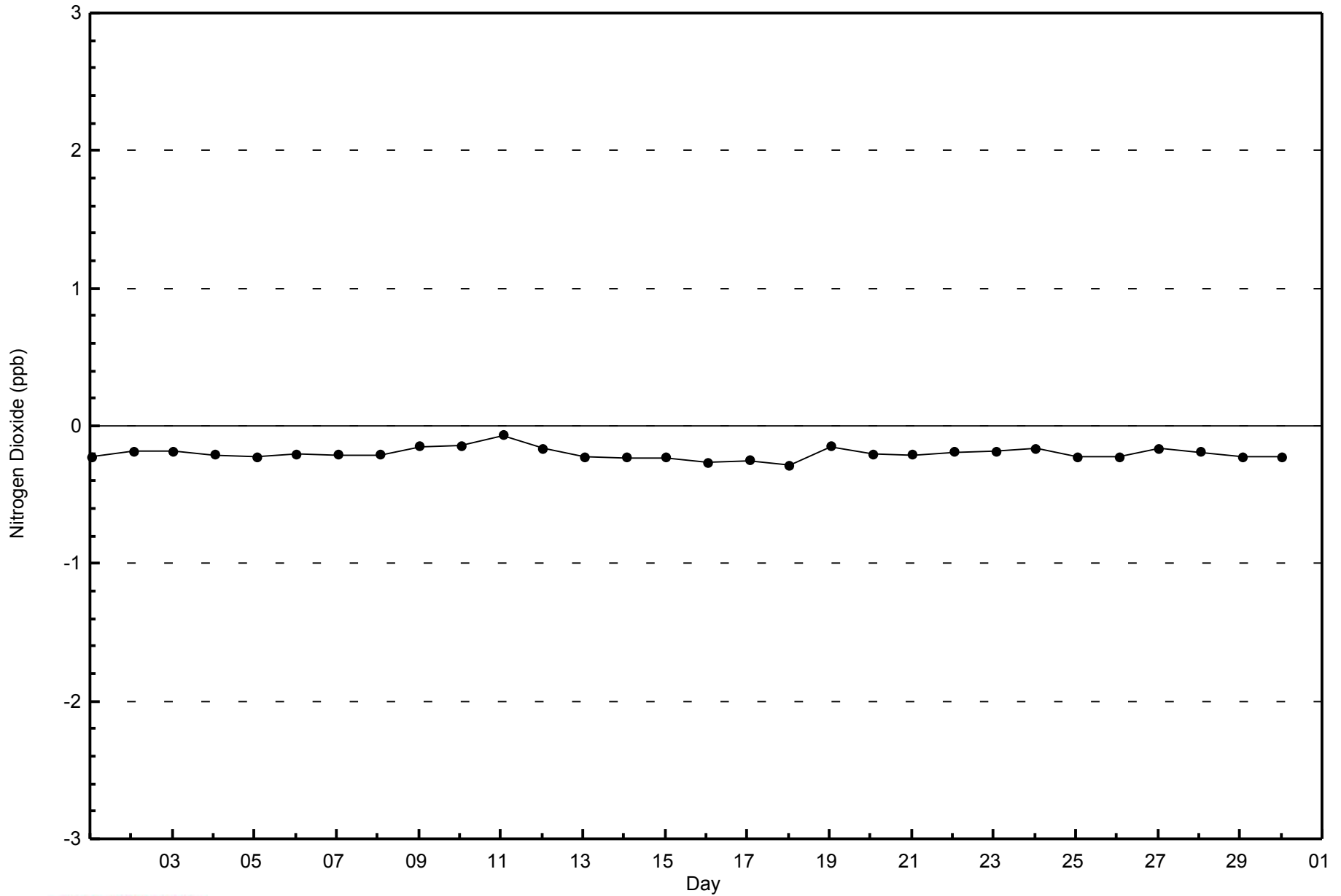


Total Number of Valid Hours: 674



WBEA
Zero Responses

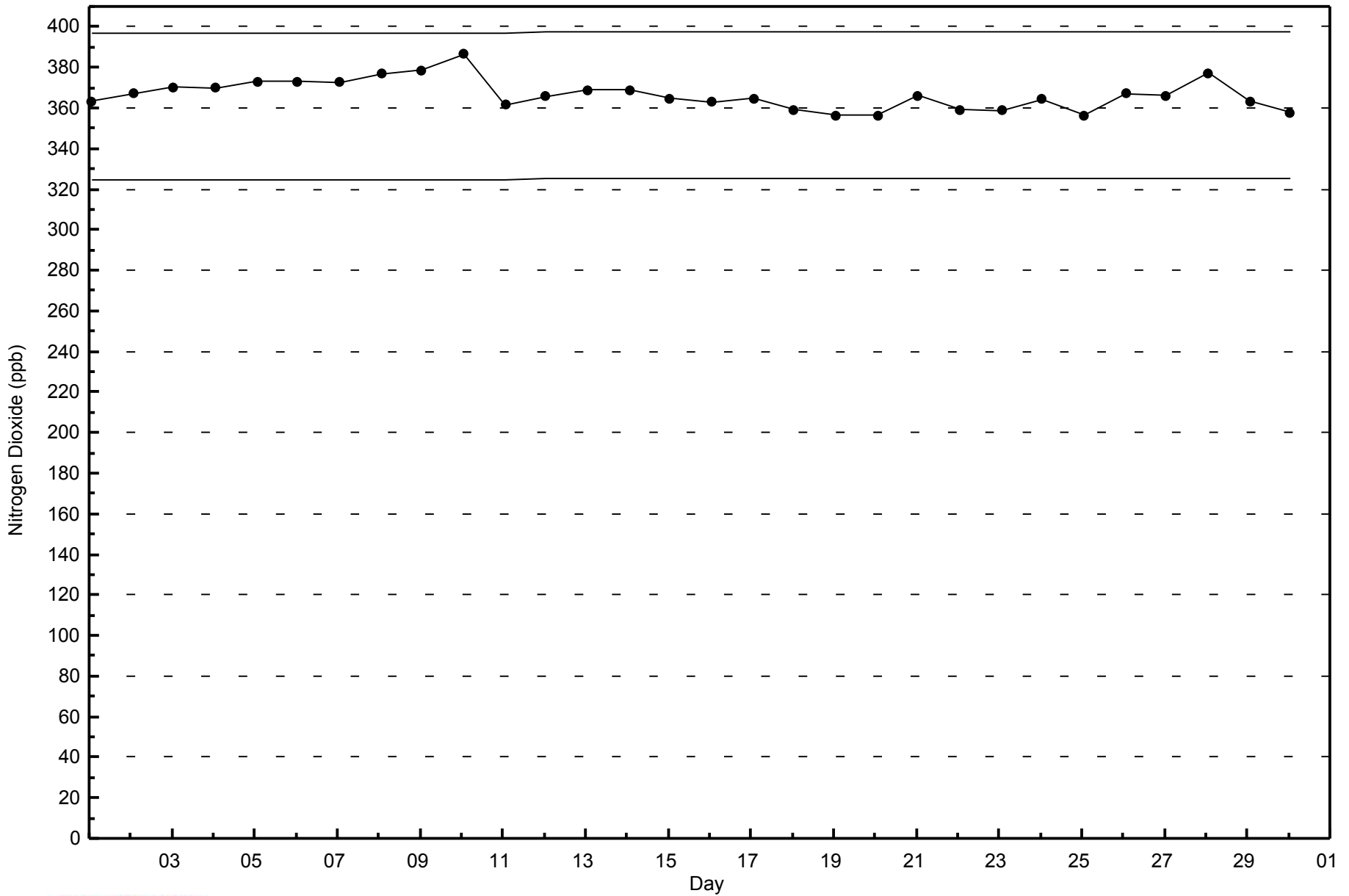
Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - September 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - September 2014



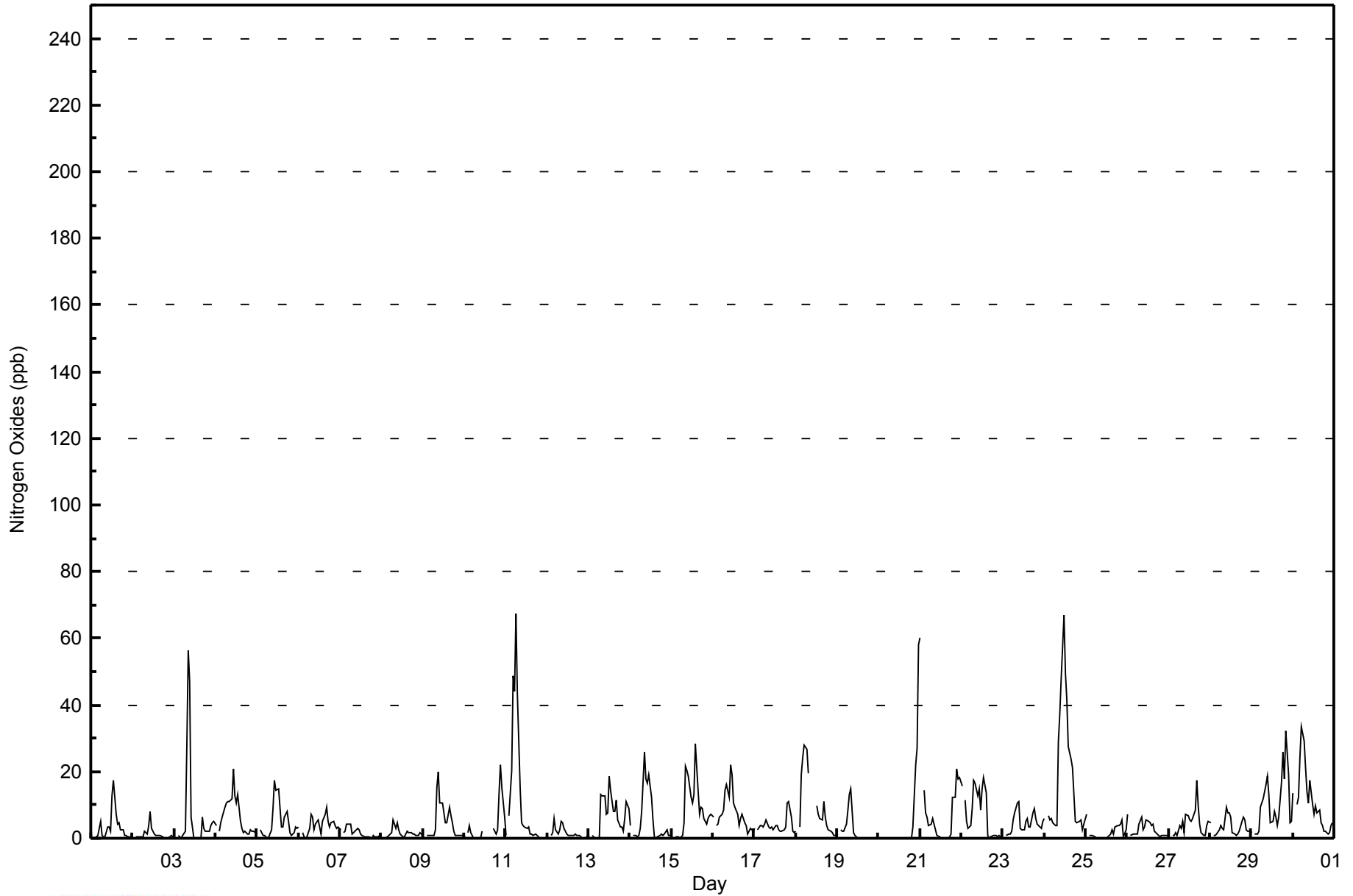


Maximum Value: 67 ppb on Sep 11 07:00																		Maximum Daily Average: 18.3 ppb on Sep 24						Hours in Service: 720			
Minimum Value: 0 ppb on Sep 2 19:00																		Minimum Daily Average: 1.2 ppb on Sep 2						Hours of Data: 680			
Maximum Diurnal Average: 10.9 ppb at hour 9																		Minimum Diurnal Average: 2.8 ppb at hour 3						Hours of Missing Data: 40			
Monthly Average: 5.8 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 7 P ₉₀ = 15 P ₉₉ = 49						Hours of Calibration: 40			
																		Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	0	Z	0	0	1	5	1	0	0	3	4	2	13	17	7	4	5	2	2	1	1	0	1	0	3.1	17	
2-Sep	0	Z	0	0	0	0	0	2	1	4	8	3	1	1	1	1	1	0	0	0	0	0	1	1	1.2	8	
3-Sep	1	Z	1	0	0	1	2	28	56	47	6	0	0	0	0	0	6	3	2	2	2	4	5	5	7.5	56	
4-Sep	4	Z	2	4	6	9	11	11	11	12	21	13	11	13	5	3	2	2	1	1	2	2	2	2	6.5	21	
5-Sep	2	Z	2	1	1	0	0	0	3	9	17	14	15	9	3	4	6	8	5	2	1	2	3	3	4.8	17	
6-Sep	3	Z	2	0	0	0	3	7	6	3	4	6	3	1	5	7	10	5	3	5	5	4	3	3	3.9	10	
7-Sep	3	Z	2	2	4	4	4	1	2	2	3	2	1	1	0	0	0	0	0	1	1	0	1	1	1.6	4	
8-Sep	1	Z	0	0	1	1	2	5	3	5	3	1	0	0	1	2	2	2	1	1	1	1	2	1	1.6	5	
9-Sep	1	Z	1	1	1	1	1	2	15	20	11	10	8	5	5	9	7	5	2	1	1	1	1	1	4.7	20	
10-Sep	1	Z	2	4	2	0	0	0	0	0	2	C	C	C	C	C	C	3	1	2	13	22	15	6	--	22	
11-Sep	1	Z	7	20	49	44	67	43	15	5	4	4	3	3	1	1	1	1	1	0	0	0	0	0	11.8	67	
12-Sep	0	Z	1	2	6	2	1	3	5	5	3	1	1	1	1	1	1	1	1	1	0	0	0	0	1.6	6	
13-Sep	1	Z	1	0	0	0	0	13	13	13	7	7	19	14	8	8	12	6	3	3	2	6	11	9	6.8	19	
14-Sep	4	Z	1	1	0	1	3	8	26	18	17	19	12	6	1	0	0	1	1	1	1	2	1	1	5.4	26	
15-Sep	1	Z	0	0	0	0	1	5	22	20	19	12	11	13	28	14	7	9	9	6	4	6	7	7	8.8	28	
16-Sep	6	Z	4	4	6	7	9	14	16	12	22	19	11	9	7	4	6	7	5	4	1	2	3	2	7.9	22	
17-Sep	3	Z	3	4	4	3	4	5	3	3	3	2	4	4	2	2	2	3	3	11	11	6	2	2	3.9	11	
18-Sep	2	Z	3	19	24	28	27	19	C	C	C	C	10	7	6	5	11	6	4	3	2	2	1	1	9.5	28	
19-Sep	1	Z	3	2	2	4	9	13	15	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3	15	
20-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	22	27	58	4.8	58	
21-Sep	60	Z	14	8	7	4	4	6	4	3	1	0	0	0	0	0	0	1	1	12	12	21	18	18	8.4	60	
22-Sep	16	Z	12	5	3	4	9	17	17	13	15	8	15	18	14	1	0	1	1	1	1	0	1	0	7.4	18	
23-Sep	0	Z	1	1	1	2	6	8	11	11	3	2	3	5	6	3	3	8	9	6	4	3	3	5	4.5	11	
24-Sep	6	Z	7	6	6	5	4	4	29	37	48	67	50	41	28	24	21	13	5	5	5	6	2	4	18.3	67	
25-Sep	7	Z	1	1	1	1	0	0	0	0	0	0	0	0	1	2	1	3	4	4	4	5	1	2	1.7	7	
26-Sep	7	Z	1	1	1	1	1	4	6	2	3	5	5	5	4	4	2	1	1	1	1	1	1	1	2.7	7	
27-Sep	1	Z	1	1	2	1	4	3	5	2	7	7	6	5	6	8	17	10	4	2	1	1	4	5	4.4	17	
28-Sep	5	Z	1	1	1	2	4	3	3	9	8	8	6	2	1	1	1	2	5	6	5	3	2	2	3.5	9	
29-Sep	2	Z	1	1	2	9	11	12	16	19	13	4	5	8	6	4	6	17	26	18	32	19	5	5	10.5	32	
30-Sep	14	Z	10	12	24	33	29	21	14	11	17	10	7	10	8	8	5	4	2	2	1	2	4	5	11.0	33	
		5.0	--	2.8	3.5	5.2	5.8	7.2	8.7	10.9	10.0	9.3	8.2	7.5	6.9	5.4	4.2	4.7	4.1	3.5	3.4	4.0	4.8	4.1	5.0	Diurnal Average	
		60	--	14	20	49	44	67	43	56	47	48	67	50	41	28	24	21	17	26	18	32	22	27	58	Diurnal Maximum	
Z - zerospan		C - Calibration																									



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	644	94.71	94.71
21 - 40	24	3.53	98.24
41 - 80	12	1.76	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - September 2014

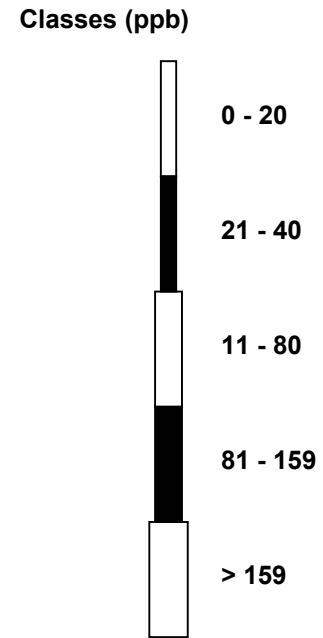
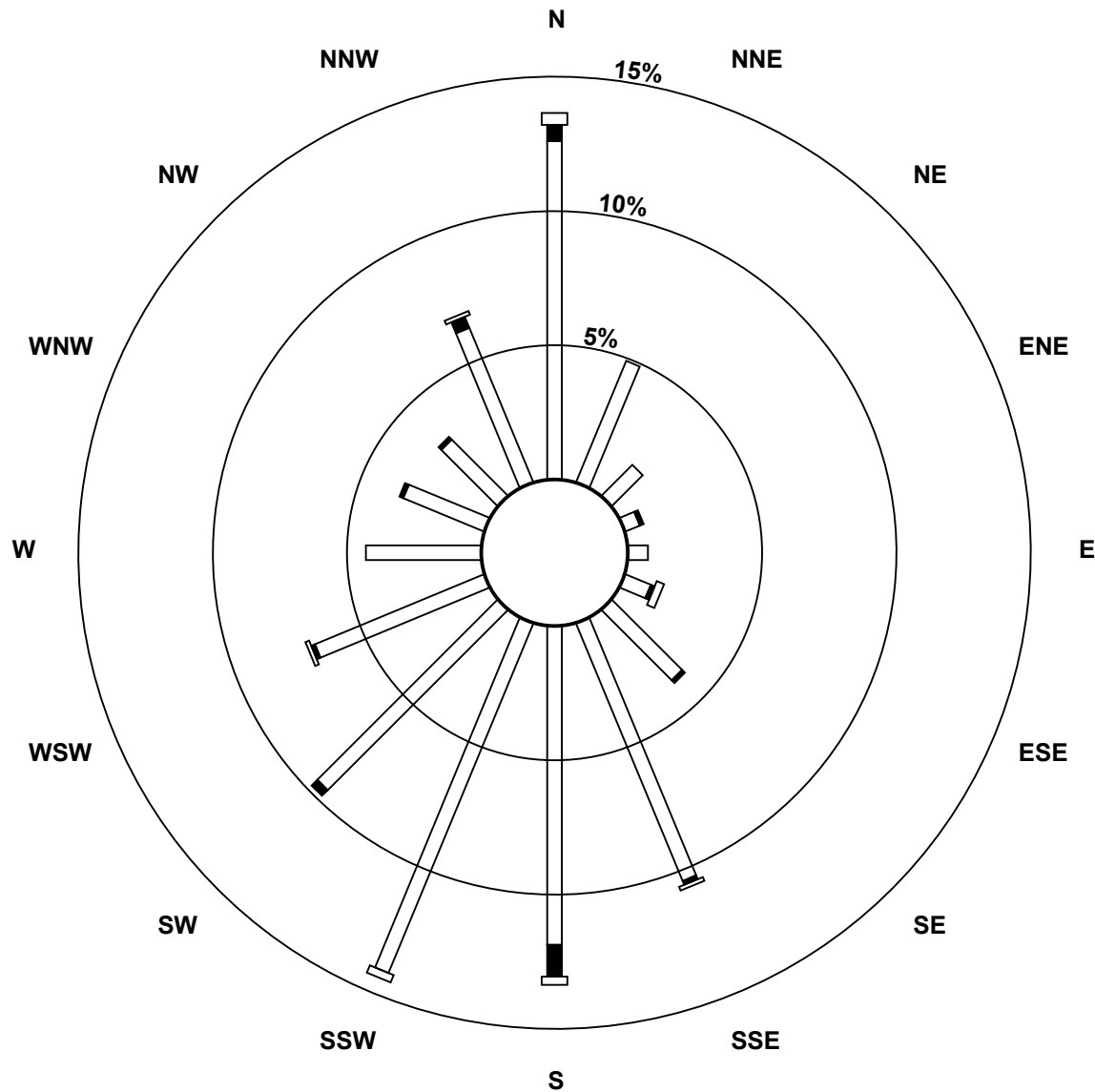
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	85	33	11	4	5	7	25	70	80	95	64	46	29	22	20	42	638
21 - 40	4	0	0	1	0	1	1	1	8	0	2	1	0	1	1	3	24
11 - 80	3	0	0	0	0	2	0	1	2	2	0	1	0	0	0	1	12
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	92	33	11	5	5	10	26	72	90	97	66	48	29	23	21	46	674

Total Number of Valid Hours: 674

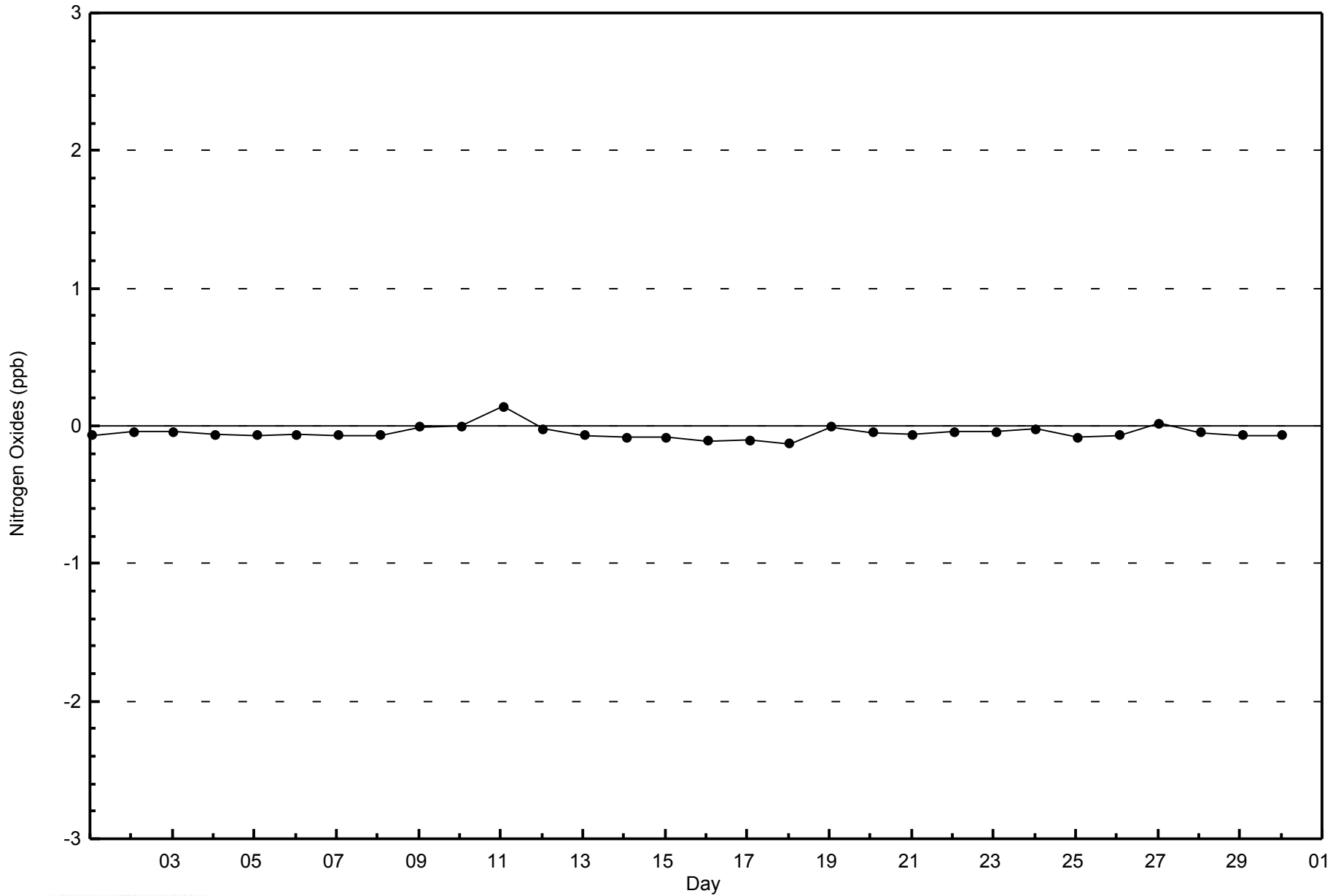
Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

Nitrogen Oxides (NO_x) - ppb
 Fort McKay South (AMS 13)



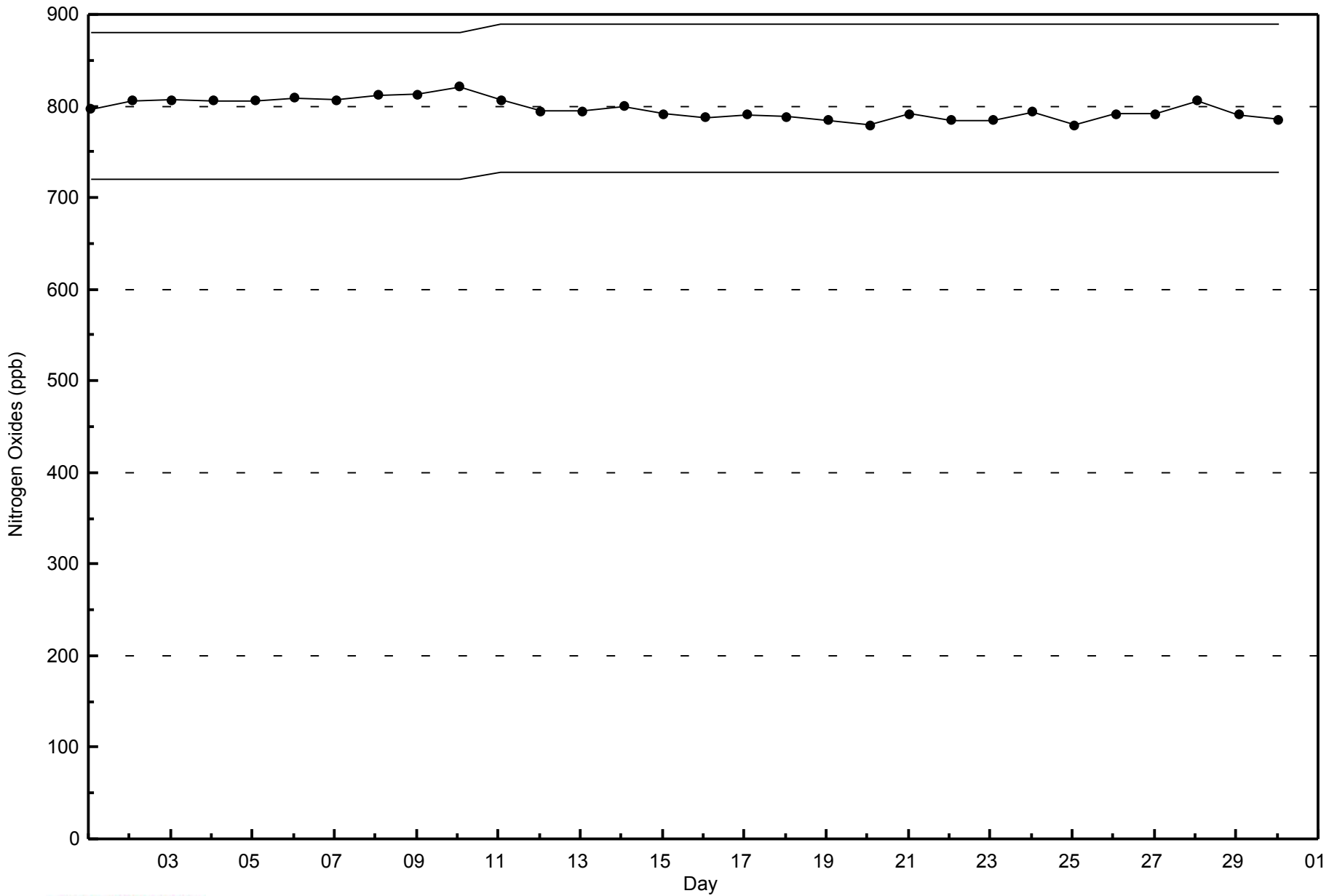
Total Number of Valid Hours: 674





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - September 2014





Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 22.6 µg/m ³ on Sep 23 21:00	Maximum Daily Average: 10.2 µg/m ³ on Sep 22	Hours of Data:	717
Minimum Value: 0.2 µg/m ³ on Sep 20 02:00	Minimum Daily Average: 1.6 µg/m ³ on Sep 20	Hours of Missing Data:	3
Maximum Diurnal Average: 6.5 µg/m ³ at hour 1	Minimum Diurnal Average: 3.1 µg/m ³ at hour 16	Hours of Calibration:	0
Monthly Average: 4.86 µg/m ³	Percentiles: P ₁ = 0.3 P ₁₀ = 1.4 Q ₁ = 2.0 Median = 3.7 Q ₃ = 7.1 P ₉₀ = 9.9 P ₉₉ = 15.2	Percent Operational Time:	99.6

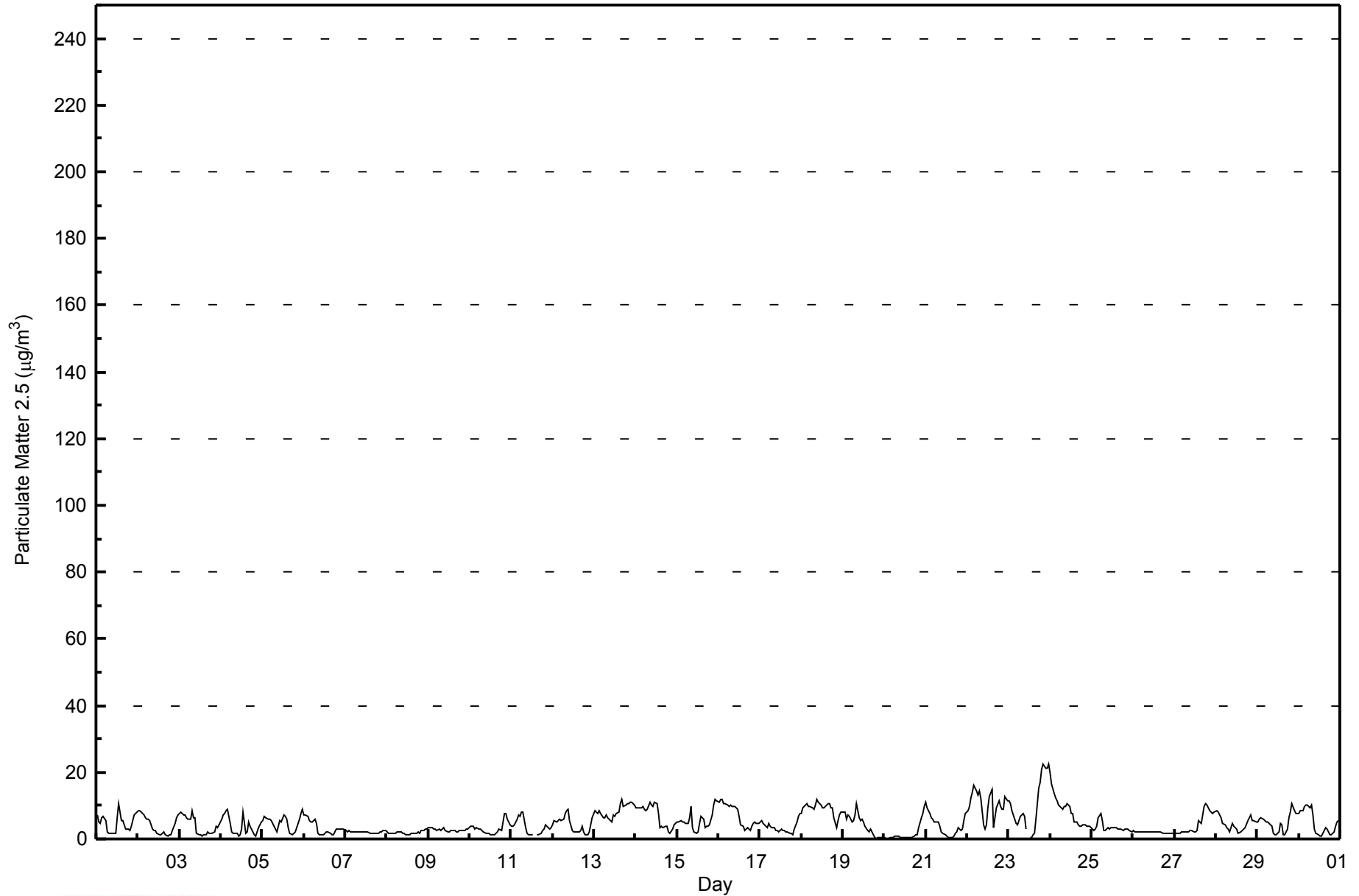
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Sep	7.1	4.9	4.8	6.3	6.6	5.4	2.1	1.8	1.5	1.7	1.8	1.8	6.2	10.5	5.3	5.7	4.2	3.1	2.9	2.7	4.0	5.6	7.2	8.1	4.6	10.5																							
2-Sep	8.5	8.4	8.2	7.1	6.3	5.9	6.1	5.6	3.2	2.8	2.6	1.7	1.4	1.4	1.8	2.3	1.3	1.0	1.2	1.2	2.5	4.5	6.3	7.3	4.1	8.5																							
3-Sep	7.8	8.0	7.4	7.1	6.5	5.9	5.9	8.3	6.5	6.2	1.9	1.1	1.1	1.0	1.1	1.3	2.0	1.8	1.5	1.6	2.1	4.0	3.3	4.3	4.1	8.3																							
4-Sep	6.0	7.1	7.8	8.5	9.0	4.6	2.0	1.7	1.8	1.8	0.9	1.2	3.2	8.2	1.7	2.0	5.2	4.0	2.2	1.2	1.0	2.1	3.5	5.3	3.8	9.0																							
5-Sep	5.7	6.9	6.2	6.1	5.9	5.3	4.5	4.0	2.3	3.8	5.5	5.0	7.2	6.9	5.8	3.5	1.6	1.4	1.5	2.0	3.6	5.7	7.8	8.7	4.9	8.7																							
6-Sep	7.1	7.1	6.9	5.7	5.2	4.9	5.8	4.5	1.7	1.1	1.2	1.4	1.9	2.1	2.0	1.7	1.4	1.4	1.9	2.9	2.9	2.8	3.1	2.8	3.3	7.1																							
7-Sep	2.6	2.2	2.3	2.1	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	1.9	1.8	1.7	1.8	1.9	1.9	2.0	2.2	2.5	2.4	2.1	2.6																							
8-Sep	2.1	1.8	1.7	1.7	1.6	1.8	2.1	2.3	2.0	1.8	1.5	1.4	1.3	1.2	1.5	1.7	1.6	1.7	1.9	1.9	2.4	2.7	2.8	2.8	1.9	2.8																							
9-Sep	3.5	3.4	3.3	2.8	3.0	2.7	2.9	2.6	3.2	3.6	2.5	2.3	2.1	2.6	2.4	2.3	2.1	2.1	2.4	2.6	2.7	2.7	3.0	2.9	2.7	3.6																							
10-Sep	3.7	3.9	3.7	3.1	3.2	3.0	2.9	2.7	2.2	1.7	1.7	1.8	1.4	1.4	1.4	1.8	2.3	2.8	2.7	4.9	7.5	7.7	5.8	4.4	3.2	7.7																							
11-Sep	3.7	3.7	4.1	6.0	7.3	6.7	7.9	8.2	3.3	1.8	1.4	1.5	1.2	M	M	1.5	1.4	1.6	2.6	2.8	4.2	3.5	2.8	3.4	3.7	8.2																							
12-Sep	4.4	5.4	5.1	5.4	6.0	5.3	5.9	7.8	8.4	8.9	5.4	2.7	2.1	2.1	1.9	2.2	2.5	3.6	2.1	1.3	1.2	2.1	4.0	6.4	4.3	8.9																							
13-Sep	8.6	8.1	7.6	8.3	7.4	6.4	6.2	7.4	6.5	5.4	5.1	7.4	6.6	7.6	7.9	10.5	11.9	9.8	10.0	10.4	10.4	10.9	11.0	10.3	8.4	11.9																							
14-Sep	9.5	9.2	9.2	9.5	9.6	9.0	8.5	9.0	11.2	10.0	9.9	11.0	10.7	7.8	3.2	3.7	3.3	3.9	3.9	2.3	1.7	3.2	4.1	4.5	7.0	11.2																							
15-Sep	4.9	5.1	5.4	5.1	4.9	4.7	4.5	6.3	9.6	3.4	2.0	1.7	2.3	4.6	6.6	5.8	3.4	3.8	4.0	4.4	7.0	10.2	11.7	11.4	5.5	11.7																							
16-Sep	10.9	12.0	11.9	10.7	10.7	10.1	10.0	10.3	9.9	9.6	9.2	8.8	6.7	4.1	3.9	2.7	2.9	3.3	2.6	3.9	4.7	5.2	4.8	4.7	7.2	12.0																							
17-Sep	5.1	5.6	4.6	3.6	3.4	4.8	4.0	3.6	3.3	2.7	2.4	2.3	3.0	2.6	2.4	2.3	2.1	1.7	1.6	1.4	2.9	5.1	6.8	7.7	3.5	7.7																							
18-Sep	7.8	9.2	10.3	10.6	9.9	9.6	9.3	8.7	10.1	12.0	11.0	10.3	9.2	9.2	9.8	10.5	10.6	9.4	9.3	6.3	3.3	5.6	7.4	7.9	9.1	12.0																							
19-Sep	8.2	8.0	6.0	7.1	6.9	5.2	5.4	7.3	10.4	6.2	5.5	5.9	4.9	3.7	2.6	2.2	2.8	1.9	0.6	0.2	0.2	0.5	0.6	0.4	4.3	10.4																							
20-Sep	0.2	0.2	0.2	0.3	0.4	0.6	0.8	0.8	0.6	0.6	0.6	0.5	0.5	0.3	0.3	0.4	0.5	0.8	1.2	1.3	3.5	6.5	7.6	9.9	1.6	9.9																							
21-Sep	10.9	9.3	7.5	6.3	5.8	4.9	4.9	5.2	3.8	2.1	1.6	1.2	0.8	0.4	0.3	0.4	1.0	1.7	2.0	3.2	2.7	3.0	5.4	7.8	3.8	10.9																							
22-Sep	8.3	9.7	12.2	14.1	16.0	14.5	12.9	14.5	12.1	4.3	2.8	4.2	9.4	12.7	14.7	3.5	6.5	9.1	11.5	9.8	8.9	9.0	12.7	11.6	10.2	16.0																							
23-Sep	11.2	10.4	8.3	6.1	4.6	4.4	5.3	6.8	7.4	6.9	2.8	UO	0.3	0.6	1.3	1.6	5.9	15.4	17.0	20.6	22.6	21.2	21.0	22.5	9.8	22.6																							
24-Sep	19.8	16.7	13.6	12.4	11.3	10.4	9.1	8.7	9.7	9.8	10.7	9.7	7.4	7.5	5.2	4.9	4.1	3.7	3.9	4.2	4.3	3.8	4.0	3.9	8.3	19.8																							
25-Sep	2.9	2.7	3.0	4.0	6.4	7.7	5.4	2.5	2.6	3.6	3.0	3.4	3.3	3.2	3.6	3.0	3.0	2.9	2.7	3.0	2.9	2.8	2.5	2.3	3.4	7.7																							
26-Sep	2.4	2.3	2.1	1.9	1.9	1.9	1.9	2.0	2.2	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.8	1.7	1.7	1.6	1.6	1.6	2.0	2.4																							
27-Sep	1.7	1.8	1.8	1.9	2.0	2.0	2.2	2.1	2.3	2.7	2.5	2.2	2.3	2.4	5.7	4.8	7.4	9.8	10.4	10.2	8.6	7.9	7.6	8.2	4.6	10.4																							
28-Sep	8.4	8.0	7.4	6.3	4.9	4.1	3.6	2.9	2.1	4.6	3.6	3.4	3.1	1.8	1.9	2.3	2.9	3.5	5.5	6.4	7.1	5.4	5.3	5.1	4.6	8.4																							
29-Sep	5.3	5.8	6.5	6.0	5.4	5.3	4.9	4.5	3.8	1.9	1.4	1.3	2.1	4.7	4.2	1.4	1.4	2.9	6.6	8.2	10.7	8.3	7.5	7.8	4.9	10.7																							
30-Sep	7.7	8.5	8.4	9.8	10.3	10.0	9.3	10.2	7.3	3.1	1.8	1.5	1.0	1.0	1.7	3.4	3.1	2.0	1.3	1.1	2.0	4.0	5.0	5.5	5.0	10.3																							
																								6.5	6.5	6.3	6.2	6.1	5.6	5.3	5.5	5.1	4.3	3.5	3.5	3.6	4.0	3.6	3.1	3.4	3.8	4.0	4.2	4.7	5.3	6.0	6.4	Diurnal Average	
																								19.8	16.7	13.6	14.1	16.0	14.5	12.9	14.5	12.1	12.0	11.0	11.0	10.7	12.7	14.7	10.5	11.9	15.4	17.0	20.6	22.6	21.2	21.0	22.5	Diurnal Maximum	

M - Maintenance UO - Unstable Operation
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - September 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - September 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	427	59.55	59.55
6 - 15	245	34.17	93.72
16 - 25	9	1.26	94.98
26 - 80	0	0.00	94.98
> 81.0	0	0.00	94.98

Total Number of Valid Hours: 717

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - September 2014

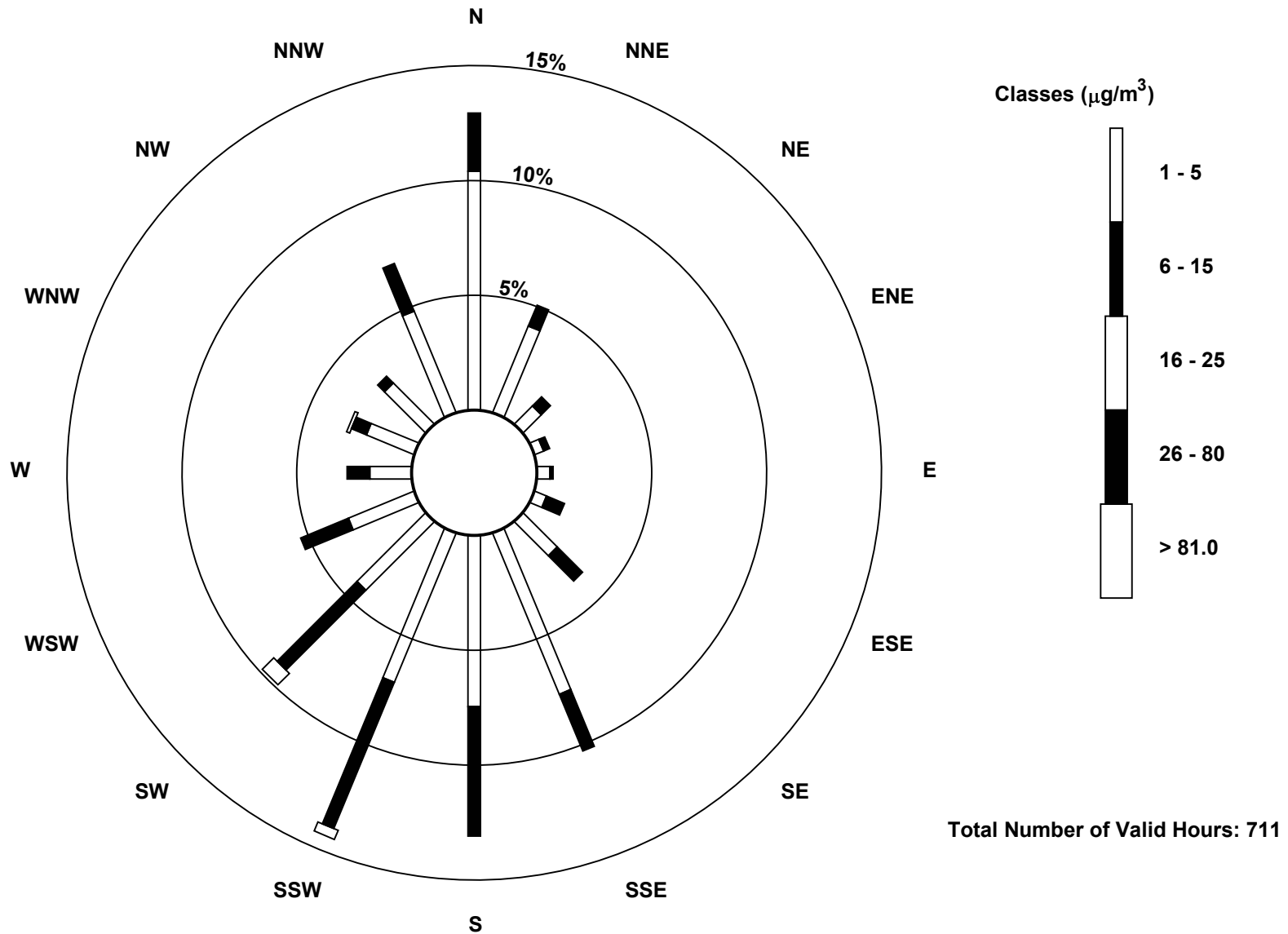
Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	74	29	8	3	4	4	15	54	53	50	30	22	13	16	18	34	427
6 - 15	18	7	4	2	1	6	11	19	40	49	35	16	7	5	3	16	239
16 - 25	0	0	0	0	0	0	0	0	0	3	5	0	0	1	0	0	9
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	92	36	12	5	5	10	26	73	93	102	70	38	20	22	21	50	675

Total Number of Valid Hours: 711

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South (AMS 13)



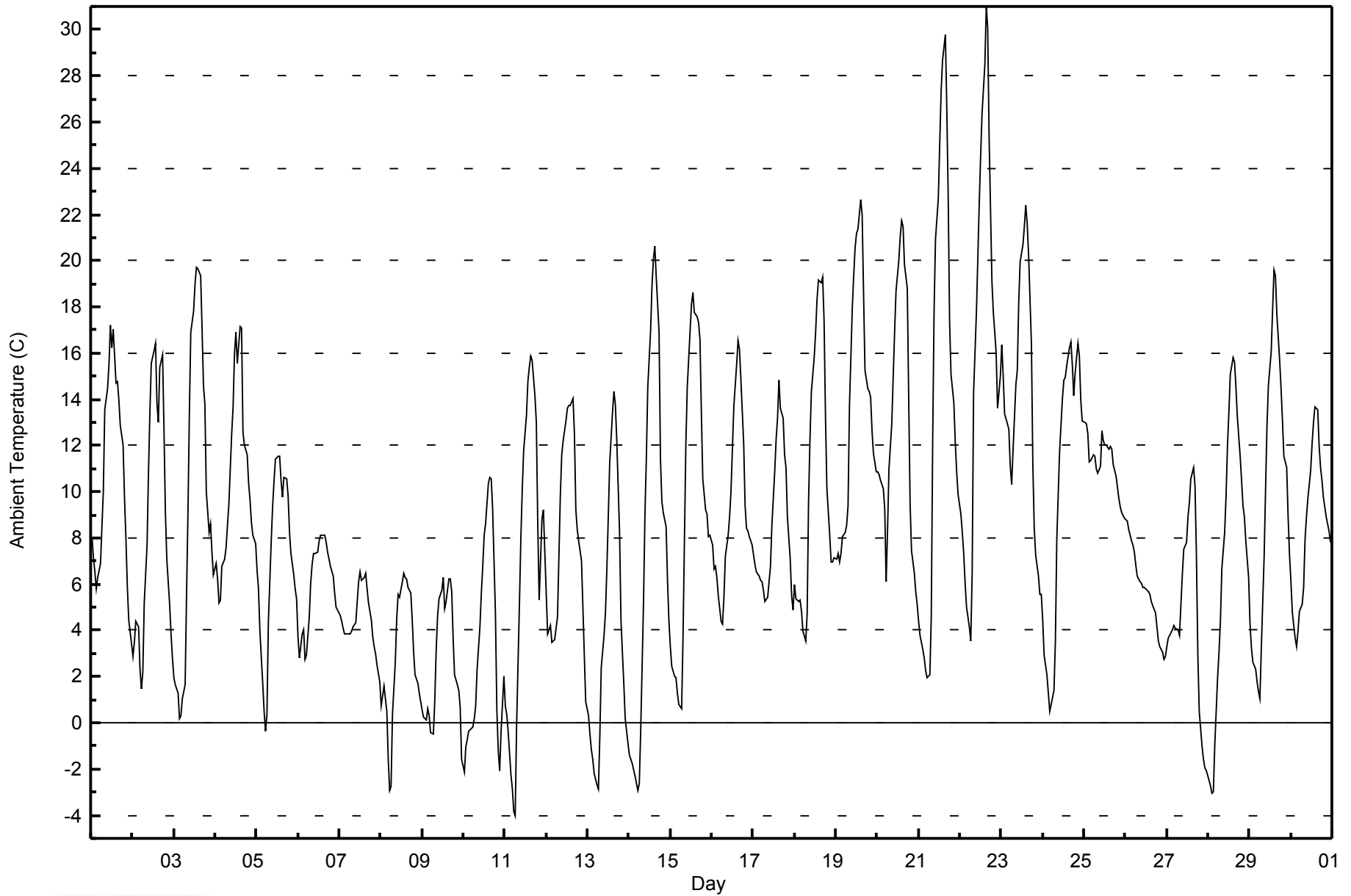


Maximum Value: 31.0 C on Sep 22 16:00		Maximum Daily Average: 16.2 C on Sep 22		Hours in Service: 720																							
Minimum Value: -4.0 C on Sep 11 07:00		Minimum Daily Average: 2.6 C on Sep 9		Hours of Data: 720																							
Maximum Diurnal Average: 15.4 C at hour 16		Minimum Diurnal Average: 3.1 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 8.63 C		Percentiles: P ₁ = -2.9 P ₁₀ = 0.9 Q ₁ = 4.2 Median = 7.9 Q ₃ = 12.9 P ₉₀ = 17.0 P ₉₉ = 26.0		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	8.0	7.1	6.5	5.8	6.3	6.9	8.5	10.0	13.6	14.5	15.5	17.2	16.2	17.0	14.7	14.8	14.0	12.9	12.0	9.8	8.0	5.9	4.4	3.4	10.5	17.2	
2-Sep	2.8	3.5	4.4	4.2	2.3	1.4	2.2	5.2	7.7	10.8	13.4	15.6	16.1	16.4	13.9	13.0	15.4	15.9	12.7	9.1	7.1	5.2	3.9	2.8	8.5	16.4	
3-Sep	1.9	1.7	1.3	0.2	0.3	1.1	1.6	5.6	9.1	13.4	16.9	17.8	19.0	19.7	19.3	17.0	14.6	13.8	10.0	8.2	8.6	7.4	6.4	9.8	19.7		
4-Sep	6.9	6.3	5.2	5.3	6.8	7.1	7.6	8.5	9.5	12.5	13.7	16.0	16.9	15.6	17.2	17.1	12.6	12.0	11.6	10.4	9.6	8.6	8.1	7.8	10.5	17.2	
5-Sep	6.6	5.8	4.0	1.7	0.5	-0.4	0.4	4.3	7.8	9.3	10.4	11.4	11.5	10.5	9.8	10.6	10.6	9.8	8.2	7.3	6.4	5.8	5.4	7.1	11.5	11.5	
6-Sep	3.7	2.8	3.8	4.1	2.8	3.0	4.6	6.1	6.9	7.3	7.3	7.4	7.9	8.1	8.1	8.1	7.8	7.4	7.1	6.8	6.3	5.6	5.0	4.9	6.0	8.1	
7-Sep	4.7	4.4	4.1	3.8	3.8	3.9	3.8	4.0	4.2	4.3	5.3	6.1	6.5	6.2	6.3	6.5	5.8	5.2	4.5	3.7	3.3	3.0	2.5	1.8	4.5	6.5	
8-Sep	0.7	1.2	1.6	0.5	-1.6	-2.9	-2.7	0.4	2.6	4.5	5.6	5.4	6.1	6.5	6.3	6.2	5.8	5.6	4.5	3.0	2.1	1.7	1.3	0.9	2.7	6.5	
9-Sep	0.5	0.2	0.1	0.6	0.3	-0.4	-0.5	1.0	3.2	4.7	5.3	5.8	6.3	5.0	5.2	6.2	6.2	5.7	3.7	2.1	1.7	1.4	0.7	-1.6	2.6	6.3	
10-Sep	-2.1	-1.1	-0.7	-0.4	-0.3	-0.2	0.2	0.7	2.3	4.2	5.6	6.8	8.1	8.6	10.4	10.6	10.5	9.3	4.7	0.6	-1.2	-2.1	-0.4	2.0	3.2	10.6	
11-Sep	0.7	0.3	-0.3	-2.3	-2.9	-3.8	-4.0	-0.1	5.1	7.9	10.0	11.8	13.3	14.7	15.4	15.9	15.7	14.2	13.0	8.6	5.3	8.8	9.2	7.4	6.8	15.9	
12-Sep	5.6	3.8	4.2	3.5	3.6	3.6	4.6	7.2	9.8	11.6	12.2	13.0	13.6	13.7	13.8	14.0	12.5	9.2	8.4	7.9	7.0	5.0	3.0	0.9	8.0	14.0	
13-Sep	0.3	-0.5	-1.1	-1.6	-2.2	-2.7	-2.9	-0.6	2.4	3.8	4.8	6.6	8.9	11.2	13.4	14.3	13.8	12.3	8.2	4.5	3.1	1.7	0.2	-0.9	4.0	14.3	
14-Sep	-1.4	-1.6	-1.8	-2.3	-2.6	-2.9	-2.6	-0.3	5.2	9.0	11.5	14.5	17.0	18.9	20.1	20.6	19.3	16.9	11.4	9.6	9.1	8.5	6.1	4.4	7.8	20.6	
15-Sep	3.3	2.4	2.0	2.0	1.3	0.8	0.6	3.7	7.9	12.0	14.6	17.0	18.1	18.6	17.7	17.6	17.3	16.6	13.4	10.6	9.2	9.0	8.1	8.1	9.7	18.6	
16-Sep	7.7	6.7	6.8	6.3	5.5	4.4	4.3	5.4	7.2	8.1	8.9	10.0	11.9	13.7	15.5	16.5	16.2	14.9	12.1	9.4	8.4	8.3	8.1	7.7	9.3	16.5	
17-Sep	7.3	6.9	6.6	6.3	6.2	6.1	5.7	5.2	5.4	6.1	6.8	8.6	10.8	12.3	13.2	14.8	13.6	13.2	11.6	11.0	8.9	7.1	5.5	4.9	8.5	14.8	
18-Sep	6.0	5.4	5.3	5.3	4.8	4.0	3.5	4.7	9.6	12.2	14.3	15.8	16.9	18.3	19.1	19.0	19.3	17.4	13.2	10.1	8.1	7.0	6.9	7.1	10.6	19.3	
19-Sep	7.1	7.3	7.0	7.3	8.0	8.2	8.6	9.4	13.7	17.9	19.3	20.5	21.2	21.3	22.6	21.9	18.5	15.2	14.5	14.3	14.1	12.6	11.6	10.9	13.9	22.6	
20-Sep	10.9	10.8	10.5	10.1	9.3	6.1	8.4	11.0	12.9	14.9	16.9	18.7	20.0	21.1	21.7	21.5	19.8	18.8	14.0	9.5	7.4	6.4	5.7	5.1	13.0	21.7	
21-Sep	4.4	3.8	3.2	2.8	2.3	1.9	2.1	4.6	12.2	17.9	21.0	22.7	25.1	27.4	28.7	29.8	26.6	22.8	17.4	15.1	13.8	12.2	10.9	9.9	14.1	29.8	
22-Sep	9.0	8.2	7.3	6.0	5.0	4.2	3.6	6.5	14.3	17.8	20.1	22.5	24.5	26.4	28.5	31.0	30.1	25.4	19.1	17.8	16.9	16.0	13.6	15.0	16.2	31.0	
23-Sep	16.4	15.0	13.4	12.9	12.7	11.1	10.3	11.9	14.6	15.3	18.2	20.0	20.7	21.5	22.4	21.6	20.3	16.4	11.2	8.4	7.2	6.4	5.6	5.5	14.1	22.4	
24-Sep	4.5	3.0	2.1	1.3	0.5	0.8	1.4	3.6	7.9	9.9	11.8	14.0	14.8	15.0	15.4	16.2	16.5	15.5	14.1	15.1	16.4	15.9	14.0	13.0	10.1	16.5	
25-Sep	13.0	13.0	12.5	11.3	11.4	11.6	11.6	11.0	10.8	11.1	12.6	12.2	12.0	12.0	11.8	12.0	11.8	11.2	10.7	10.2	9.7	9.3	9.1	8.9	11.3	13.0	
26-Sep	8.8	8.7	8.4	7.9	7.7	7.4	6.9	6.4	6.1	6.0	5.9	5.9	5.7	5.7	5.6	5.3	5.1	4.8	4.2	3.5	3.3	3.1	2.8	2.9	5.7	8.8	
27-Sep	3.3	3.7	3.9	4.0	4.2	4.1	4.0	3.8	5.1	6.4	7.5	7.8	8.9	9.5	10.6	11.0	10.2	7.2	3.0	0.5	-1.1	-1.6	-1.9	-2.1	4.7	11.0	
28-Sep	-2.5	-2.7	-3.1	-3.0	-1.0	2.0	3.0	4.4	6.6	8.3	9.9	12.0	13.4	15.1	15.8	15.6	14.6	13.2	11.5	10.5	9.4	8.9	7.9	6.3	7.3	15.8	
29-Sep	4.3	3.2	2.6	2.3	1.8	1.3	1.1	3.3	7.2	10.1	12.8	14.6	16.0	17.9	19.6	19.3	17.7	15.7	14.4	13.1	11.6	11.1	8.9	7.3	9.9	19.6	
30-Sep	6.1	4.8	3.6	3.3	3.9	4.8	5.1	5.9	7.9	8.9	9.7	10.9	12.1	13.0	13.7	13.6	12.0	11.0	10.5	9.8	8.9	8.6	8.3	7.8	8.5	13.7	
		4.9	4.5	4.1	3.6	3.4	3.1	3.4	5.1	8.0	10.0	11.6	13.0	14.0	14.7	15.2	15.4	14.6	13.0	10.7	8.8	7.6	7.0	6.1	5.5	Diurnal Average	
		16.4	15.0	13.4	12.9	12.7	11.6	11.6	11.9	14.6	17.9	21.0	22.7	25.1	27.4	28.7	31.0	30.1	25.4	19.1	17.8	16.9	16.0	14.0	15.0	Diurnal Maximum	



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Fort McKay South - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Fort McKay South - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	47	6.53	6.53
0 - 10	402	55.83	62.36
10 - 20	239	33.19	95.56
> 20	32	4.44	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

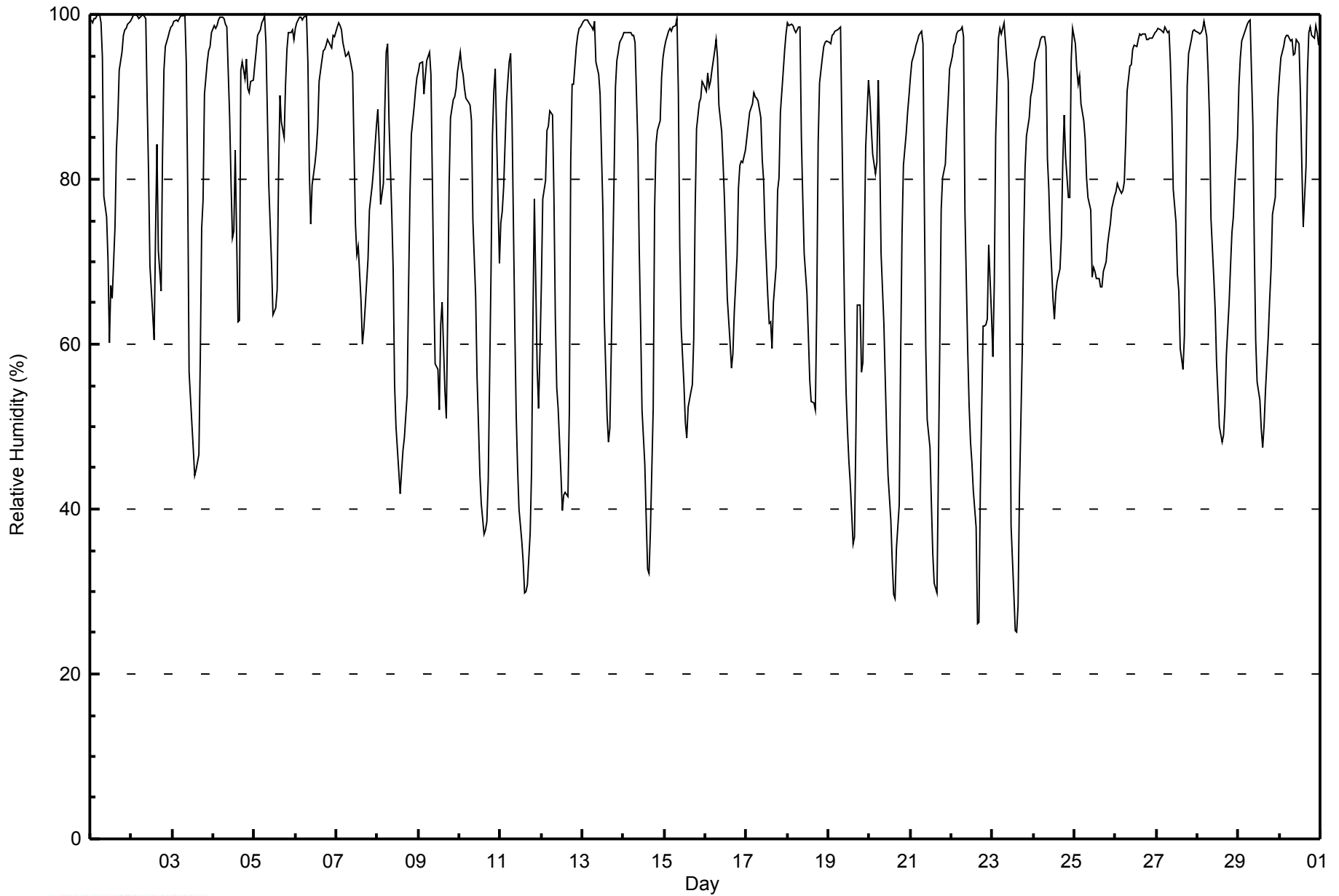
Fort McKay South - September 2014

Maximum Value: 100 % on Sep 1 06:00																			Maximum Daily Average: 94.0 % on Sep 30						Hours in Service: 720		
Minimum Value: 25 % on Sep 23 15:00																			Minimum Daily Average: 59.9 % on Sep 11						Hours of Data: 720		
Maximum Diurnal Average: 95.7 % at hour 6																			Minimum Diurnal Average: 54.8 % at hour 15						Hours of Missing Data: 0		
Monthly Average: 79.5 %																			Percentiles: P ₁ = 30 P ₁₀ = 49 Q ₁ = 66 Median = 86 Q ₃ = 96 P ₉₀ = 98 P ₉₉ = 100						Hours of Calibration: 0		
																			Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	99	99	99	100	100	100	99	95	78	75	70	60	67	66	74	84	87	93	95	97	98	98	99	99	88.9	100	
2-Sep	99	100	100	100	100	100	100	100	100	90	81	70	64	60	73	84	71	66	83	93	96	97	98	98	88.5	100	
3-Sep	99	99	99	99	100	100	100	100	100	94	79	57	50	47	44	45	47	58	74	77	90	94	96	96	98	80.9	100
4-Sep	99	98	99	99	100	100	100	99	99	88	80	73	74	84	63	63	93	94	92	95	91	90	92	92	89.7	100	
5-Sep	94	96	97	98	99	99	100	96	79	75	70	64	64	67	80	90	87	85	91	96	98	98	98	97	88.3	100	
6-Sep	98	99	100	100	99	100	100	94	81	74	79	82	83	86	92	94	96	96	96	97	96	96	97	97	93.1	100	
7-Sep	99	99	99	98	97	95	95	95	95	93	84	75	71	72	65	60	62	65	70	76	78	79	81	86	82.8	99	
8-Sep	88	84	77	79	89	95	96	87	76	69	55	50	45	42	45	47	49	54	67	78	86	89	91	92	72.1	96	
9-Sep	93	94	94	90	93	94	95	93	80	67	58	57	52	62	65	54	51	64	79	87	90	90	91	93	78.6	95	
10-Sep	95	94	93	91	90	89	89	87	75	66	56	50	44	41	37	37	39	44	69	85	91	93	85	70	71.2	95	
11-Sep	75	76	79	89	92	94	95	87	62	51	45	40	36	34	30	30	31	37	45	63	78	57	52	59	59.9	95	
12-Sep	67	78	80	86	86	88	88	78	63	55	52	44	40	42	42	41	52	82	92	91	96	97	98	98	72.4	98	
13-Sep	99	99	99	99	99	98	98	99	94	93	90	83	76	63	51	48	50	59	80	91	94	95	97	97	85.6	99	
14-Sep	98	98	98	98	98	98	97	97	84	72	62	52	45	39	33	32	37	52	76	84	86	87	92	95	75.4	98	
15-Sep	96	97	98	98	98	99	99	99	90	72	62	55	51	49	52	54	55	61	76	86	89	90	92	92	79.6	99	
16-Sep	91	93	91	92	93	96	97	95	89	86	82	77	71	66	60	57	59	64	71	79	82	82	82	84	80.7	97	
17-Sep	85	87	88	89	90	90	90	89	87	82	80	74	66	63	63	59	65	70	79	80	88	93	96	98	81.3	98	
18-Sep	99	99	99	99	98	98	98	98	85	78	71	66	61	56	53	53	52	65	84	92	95	96	97	97	82.8	99	
19-Sep	97	96	97	98	98	98	98	98	86	62	54	50	46	43	36	37	49	65	65	57	58	72	84	92	72.3	98	
20-Sep	90	86	83	81	82	92	84	71	63	56	49	44	39	34	30	29	35	40	58	73	82	86	88	90	65.2	92	
21-Sep	92	94	96	96	97	97	98	96	76	59	51	48	41	35	31	30	44	60	76	80	82	86	89	93	72.9	98	
22-Sep	95	96	97	98	98	98	99	97	76	59	53	48	46	42	38	26	26	42	62	62	62	63	72	64	67.5	99	
23-Sep	58	68	85	97	98	98	98	99	94	92	65	38	30	25	25	28	42	59	72	81	85	87	90	91	71.1	99	
24-Sep	92	94	96	96	97	97	97	96	83	79	73	65	63	66	68	69	73	82	88	83	78	78	94	98	83.6	98	
25-Sep	96	93	91	93	89	87	85	80	78	76	68	69	69	68	68	67	67	69	70	72	73	75	76	78	77.4	96	
26-Sep	78	80	79	78	79	80	84	91	94	94	96	96	96	97	98	97	98	98	97	97	97	97	98	98	91.5	98	
27-Sep	98	98	98	98	98	99	98	98	94	88	79	75	69	66	60	57	61	77	91	95	97	98	98	98	87.0	99	
28-Sep	98	98	98	98	99	97	93	87	75	68	64	58	54	50	48	49	52	59	65	69	74	75	79	85	74.7	99	
29-Sep	91	95	97	98	98	99	99	99	87	72	61	55	53	50	47	50	54	61	65	69	76	78	86	90	76.3	99	
30-Sep	92	95	96	97	97	97	97	97	95	95	97	96	90	82	74	82	93	98	98	97	97	99	98	96	94.0	99	
																			91.7 92.7 93.4 94.4 95.0 95.7 95.6 93.3 83.8 75.5 68.1 62.2 58.4 56.4 54.8 55.3 59.6 67.8 77.7 83.3 86.2 87.3 89.6 90.5						Diurnal Average		
																			99 100 100 100 100 100 100 100 100 100 95 97 96 96 97 98 97 98 98 98 97 98 99 99						Diurnal Maximum		



WBEA
Hourly Averages

Relative Humidity (RH) - %
Fort McKay South - September 2014





Maximum Speed: 16 km/h on Sep 26 20:00	Maximum Daily Speed Average: 10.3 km/h on Sep 26	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 2 02:00	Minimum Daily Speed Average: 0.3 km/h on Sep 4	Hours of Data: 714
Maximum Diurnal Speed Average: 1.4 km/h at hour 22	Minimum Diurnal Speed Average: 0.4 km/h at hour 9	Hours of Missing Data: 6
Monthly Average Velocity: 0.9 km/h 236.9 deg	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 7 P ₉₀ = 9 P ₉₉ = 15	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	WSW2	S2	SSE2	SSW2	SSW1	S2	W2	SSW1	SE1	SE2	SSE4	SSE5	S5	S3	N5	SSE3	S4	SSE0	NW2	SW1	SW1	SSW2	SSW2	SE1	S1.5	SSE5
2-Sep	SE0	NNE0	S1	SSW1	SSW2	SW1	S1	SSW1	SSE2	E2	ENE3	SSE1	NE2	N0	N5	SSW2	W1	W4	W3	WSW2	W1	SW2	SSW2	SW2	SW0.6	N5
3-Sep	SW1	SSW1	SSW1	SSW2	S2	S2	SSW1	SE2	ESE3	ESE5	WSW4	WSW6	SSW6	SW5	W5	NNW2	NNE6	NNE2	SE3	SSW1	WNW2	S2	S3	SSW2	SSW1.5	WSW6
4-Sep	S3	S3	S3	S3	S3	SSW3	S3	S4	SSE3	SSE6	S7	SSE6	ESE5	SE3	SSW4	NNW4	N6	N4	N8	N3	N7	N6	NNW5	NNW5	S0.3	N8
5-Sep	NW5	WNW3	W3	WSW2	WSW2	S1	SSE1	ENE1	SSE3	SSE5	SSE6	S7	S9	SSE7	SSE5	SE4	SSE5	SSE4	W1	SW1	SW2	W2	NNW5	WNW4	S1.9	S9
6-Sep	W3	WSW3	SSW2	S0	SW1	WNW1	N3	N5	NE5	NE5	NE4	NNE5	NE5	NE3	N4	N5	N5	N5	N7	N7	N7	N9	N9	N10	N3.9	N10
7-Sep	N10	N10	N11	N10	N8	NNE8	N7	N8	N8	NNW9	N10	N10	N11	N12	N11	N13	NNW11	NNW11	NNW8	NW6	NNW5	NNW6	NNW5	NW4	N8.7	N13
8-Sep	NNW5	NNW7	NNW6	NW6	NW3	SW2	S1	NNE1	N7	N7	NNE9	N8	N6	N8	N7	N8	N7	N3	NNW2	WNW2	WSW1	WNW1	SW1	SSW1	N3.8	NNE9
9-Sep	SSW1	S1	SW3	WNW3	N1	SW2	SSW2	SW1	NNW1	N3	NNE3	SSW4	SSW5	N1	SSW4	SW3	WNW1	WSW1	W1	W1	WNW2	NW2	WNW2	SW1	WSW1.0	SSW5
10-Sep	SSW3	NNW1	SW2	WSW1	S0	WSW1	ESE1	W1	W2	WNW2	NW2	NE1	SW4	W3	SSW8	SSW5	S7	S6	SSW5	SSW4	S4	S3	SSW7	SSW8	SSW2.7	SSW8
11-Sep	SSW7	SSW8	S6	S5	S4	SSW2	S3	SSE4	S8	SSW13	S14	SSW14	S15	S16	SSW14	SSW14	SSW11	SSW6	S5	SW3	SW4	WSW7	WSW8	WSW7	SSW7.9	S16
12-Sep	SW3	SW5	SE2	S1	SSE1	S1	W3	WNW3	NNW7	NNW9	NW10	NW10	NNW12	NNW9	NNW10	N8	NNW6	NW3	SW1	NNW5	W1	S1	SSW0	WNW1	NW3.5	NNW12
13-Sep	WSW0	W2	SW3	AF	AF	AF	AF	AF	ENE2	ESE4	ESE4	E5	ESE5	ESE6	SSE6	SE5	SE5	SSE5	SSW2	SW2	SW2	WSW1	SSW3	SSW2	SE2.3	SSE6
14-Sep	SW2	SW2	SSW2	SSW1	SSW1	SSW1	SSW2	S2	SSE3	SE4	SE6	SSE6	SSE5	SSE5	SSW7	SSW7	SSW6	S4	SW3	SSW2	SW2	WSW0	SW1	S1	S2.7	SSW7
15-Sep	S1	S1	SSW2	SSE2	SSW2	S2	SSW2	S3	ESE2	E2	ENE3	E3	NNW4	N5	N7	N7	NNE7	N6	NNW3	NW2	NNW3	NNW4	NNW3	NNW4	N1.7	N7
16-Sep	NNW4	NNW5	NNW6	NNW7	NNW5	N4	N4	NNW4	N5	N5	N5	N6	N8	N7	N6	NNE7	E2	SSE7	SSE7	SE7	SE7	SE6	SE7	SSE6	NNE2.1	N8
17-Sep	SSE6	SSE7	SE4	SE4	SE5	SSE6	SSE7	SSE8	SSE8	SSE9	SSE9	SSE8	S10	SSE9	SSE9	SSE10	SSE10	SSE7	SSE5	SSE6	SSE4	S3	SSW3	SSW4	SSE6.5	SSE10
18-Sep	SSW4	SW3	S3	S2	WSW1	WNW1	NW1	AF	NNE2	NNE3	N6	NNE5	NNE5	NE4	NE4	NNE4	NE3	NE1	SW1	SW2	SSW1	SW1	WSW1	SSW1	NNE0.8	N6
19-Sep	NNW2	NNW1	SSW1	SSW2	S1	S2	S1	S2	S5	SSW8	SW11	SW12	SW12	SW11	WSW14	SW14	WSW12	WSW9	WSW10	W11	W13	W13	W8	SW5	WSW6.9	SW14
20-Sep	WSW5	SW5	WSW6	WSW7	WSW3	SSW2	WSW7	W8	W9	W7	W8	W8	W10	W9	WNW10	WNW7	WSW4	SW5	SSW4	SSW4	SSW3	S2	S2	SSW1	WSW5.0	W10
21-Sep	WSW2	SW2	SW3	SW2	SSW2	SSW2	SW2	SW2	S3	SSW7	SSW9	SSW10	SW8	WSW8	WSW8	SSW5	WSW1	WSW2	SSW3	SSE3	S3	S2	SSW2	WSW3	SW3.7	SSW10
22-Sep	SW2	W2	W1	SSW2	SSW2	S2	S2	S4	SSE5	S7	SSE8	SSE8	SE6	SE7	SE7	SW7	SW8	SSW4	SW4	SW5	WSW5	SW3	SW4	WSW3	SSW3.6	SW8
23-Sep	WSW3	SSW0	WSW2	SW1	NW1	NW2	NNW4	N1	N2	NNW3	NW3	NNE3	N4	NNE4	NE3	SE2	S3	SSW2	SW2	SSW2	SSW2	SW1	WNW1	SW2	NW0.6	N4
24-Sep	SW2	SW2	SW2	SSW2	SSW2	SW1	WSW1	WSW1	N3	N3	N5	N7	N7	NNW5	NNW5	NNW4	NNW2	NNW2	WNW2	SSE4	SSW4	WSW7	S3	S4	NW1.2	N7
25-Sep	SSW7	SW8	SSW6	SSW6	SSW6	SW6	WSW6	WSW7	WSW6	WSW7	WSW10	WNW9	WNW8	NW4	N8	NNW7	N6	N8	N9	N7	N8	N6	NNE7	NNE5	WNW3.2	WSW10
26-Sep	NNE5	NNE6	NNE8	NNE8	NNE10	NNE9	NNE8	NNE9	NNE9	NNE10	NNE9	N10	N12	N11	N11	N13	N12	N12	N14	N16	N15	N13	N11	N9	N10.3	N16
27-Sep	NNW8	NNW7	NNW7	NNW7	NW5	WNW4	WNW4	WNW2	N4	N6	NE5	NNE2	S4	SE4	E5	SSE4	SSE5	SSE3	SW2	SW3	SW2	SW3	SW2	SW2	NW1.2	NNW8
28-Sep	SSW2	SSW2	SSW3	S4	SSE6	S7	SSE7	SSE9	SSE12	S15	SSE13	S13	SSE15	S15	S15	S15	S13	S11	SSE8	SSE8	SSE7	SSE7	SSE7	S5	S9.0	SSE15
29-Sep	S4	SSW4	S4	S4	S3	S3	S3	SSE4	SSE6	SSE7	SSE8	SSE10	SSE10	SSE9	S9	SSW10	SSW9	S9	S10	S9	S5	SSW5	S2	SSW1	S6.0	S10
30-Sep	SSW2	SSW2	SSW3	S3	SW2	SW0	ENE1	S2	S2	WSW1	NNE2	WNW3	N6	N7	NNE5	SE1	W3	N3	NW2	NNE4	NNE2	NW2	N4	NNE4	NNW1.0	N7

WSW1.3	WSW1.2	WSW1.1	WSW1.0	SW0.7	SSW0.9	SW0.7	SSW0.7	SE0.4	SSE0.7	S0.8	SSW1.2	SW1.0	SSW0.4	W0.9	WSW0.9	WSW0.9	SW0.9	WSW1.1	WSW1.1	W1.2	W1.4	W1.2	WSW1.2	Diurnal Average
N10	N10	N11	N10	NNE10	NNE9	NNE8	NNE9	SSE12	S15	S14	SSW14	S15	S16	S15	S15	S13	N12	N14	N16	N15	N13	N11	N10	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: 7 km/h on Sep 19 21:00	Hours of Data: 714
Minimum Value: 0 km/h on Sep 23 20:00	Hours of Missing Data: 6
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 3 P ₉₉ = 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	2	1	1	1	1	1	2	1	1	1	1	2	2	2	3	1	1	1	1	1	1	1	1	1	3	
2-Sep	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	1	1	1	1	1	1	1	1	0	1	5
3-Sep	1	1	1	1	1	1	1	1	1	1	1	3	3	3	3	1	3	2	1	1	2	1	1	1	3	
4-Sep	1	1	1	1	1	1	1	1	1	3	2	2	2	1	2	5	4	2	3	2	2	2	2	2	5	
5-Sep	2	1	1	1	1	1	1	1	2	2	3	3	3	2	2	2	2	2	1	1	1	1	1	1	3	
6-Sep	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	2	2	3	3	3	4	4	
7-Sep	3	3	4	3	3	2	2	3	3	3	3	3	3	4	4	5	4	4	3	2	2	2	2	1	5	
8-Sep	2	2	2	2	2	1	1	1	2	3	3	3	2	3	3	3	3	1	1	1	1	1	1	1	3	
9-Sep	1	1	1	2	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2	
10-Sep	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	2	2	1	1	1	2	2	3	3	
11-Sep	2	2	3	1	1	1	0	1	3	5	5	5	6	5	5	5	4	3	1	1	1	2	3	2	6	
12-Sep	2	1	1	1	1	1	1	1	3	3	4	4	4	4	3	3	4	4	1	5	2	1	1	1	5	
13-Sep	1	1	0	AF	AF	AF	AF	AF	1	1	2	2	2	2	2	2	2	2	1	0	1	1	0	1	2	
14-Sep	1	1	1	1	1	1	1	0	1	1	2	2	2	2	3	3	2	1	0	1	1	1	1	1	3	
15-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	
16-Sep	1	1	2	2	2	1	1	1	1	1	2	2	3	2	2	3	2	3	3	3	3	3	3	2	3	
17-Sep	3	3	2	2	2	2	3	3	3	3	3	3	3	3	3	4	3	3	2	2	1	1	1	1	4	
18-Sep	1	1	1	1	1	1	1	AF	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	
19-Sep	2	1	1	1	1	1	1	1	3	3	4	4	5	5	6	6	6	4	5	5	7	6	4	2	7	
20-Sep	2	2	3	3	2	1	3	3	3	3	3	3	4	4	4	4	2	2	1	1	1	1	1	1	4	
21-Sep	1	1	1	1	0	1	1	0	3	3	3	4	3	3	3	2	1	1	1	1	2	1	1	1	4	
22-Sep	1	1	1	1	1	1	0	1	2	2	3	3	2	2	2	3	4	1	1	1	1	1	1	1	4	
23-Sep	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	0	0	1	1	1	1	2	
24-Sep	1	1	1	1	0	1	1	1	1	1	2	2	2	2	2	1	1	1	1	2	3	3	1	1	3	
25-Sep	2	3	2	2	2	2	3	3	3	3	4	4	4	2	3	3	2	3	3	3	3	2	2	2	4	
26-Sep	2	2	3	3	3	3	3	3	3	3	3	3	4	4	3	4	4	4	5	5	5	5	4	3	5	
27-Sep	3	2	2	2	2	1	2	1	2	2	2	1	2	1	2	2	2	1	1	0	1	1	1	1	3	
28-Sep	1	1	1	1	2	3	2	3	4	5	5	5	5	6	6	6	5	4	3	3	2	3	2	1	6	
29-Sep	1	1	1	1	1	1	1	1	2	2	3	3	4	3	3	4	3	3	3	3	1	1	1	1	4	
30-Sep	1	1	1	0	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	2	1	1	1	1	2	
	3	3	4	3	3	3	3	3	4	5	5	5	6	6	6	6	6	6	4	5	5	7	6	4	4	

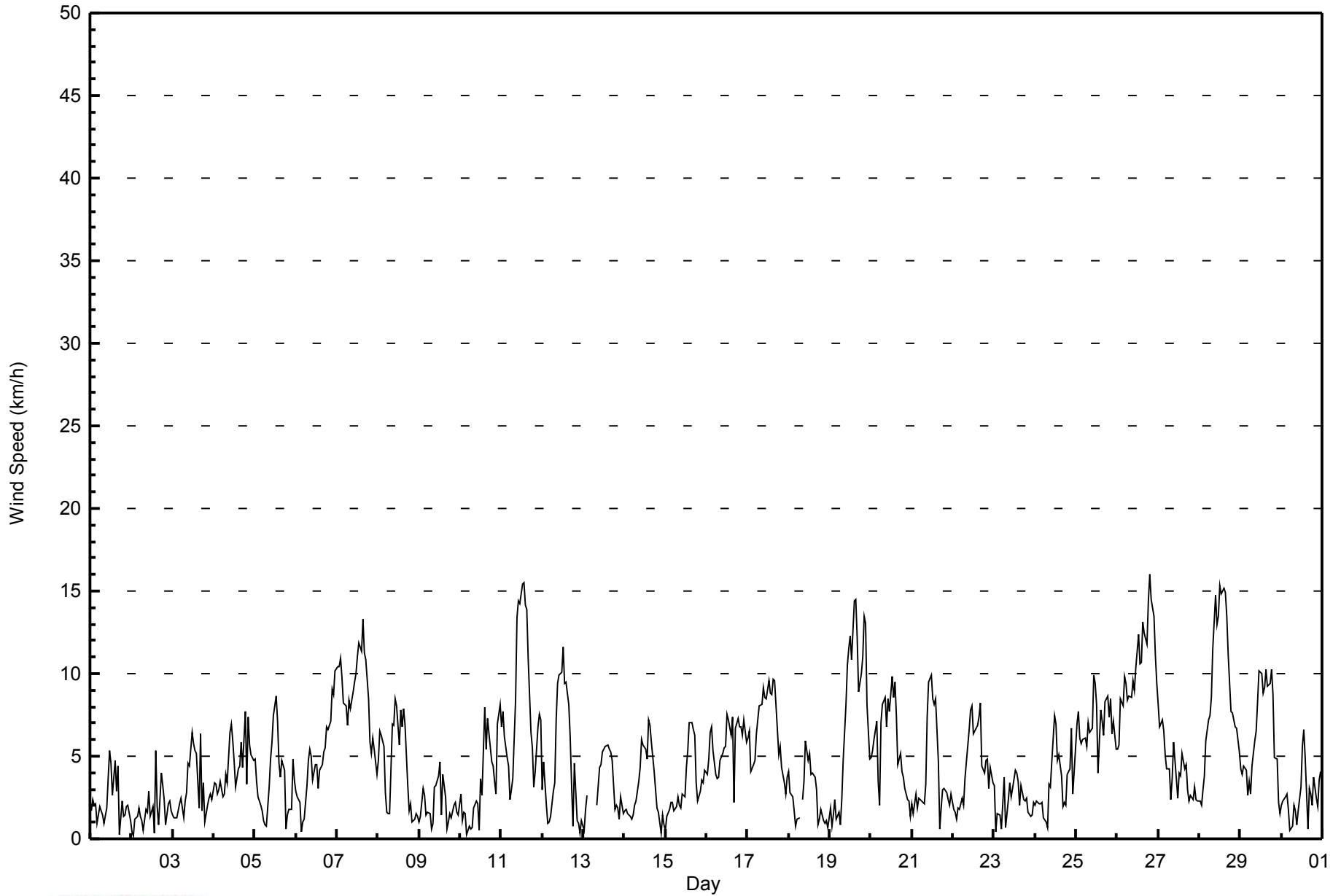
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Fort McKay South - September 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - September 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	463	64.85	64.85
6 - 11	217	30.39	95.24
12 - 19	34	4.76	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



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - September 2014

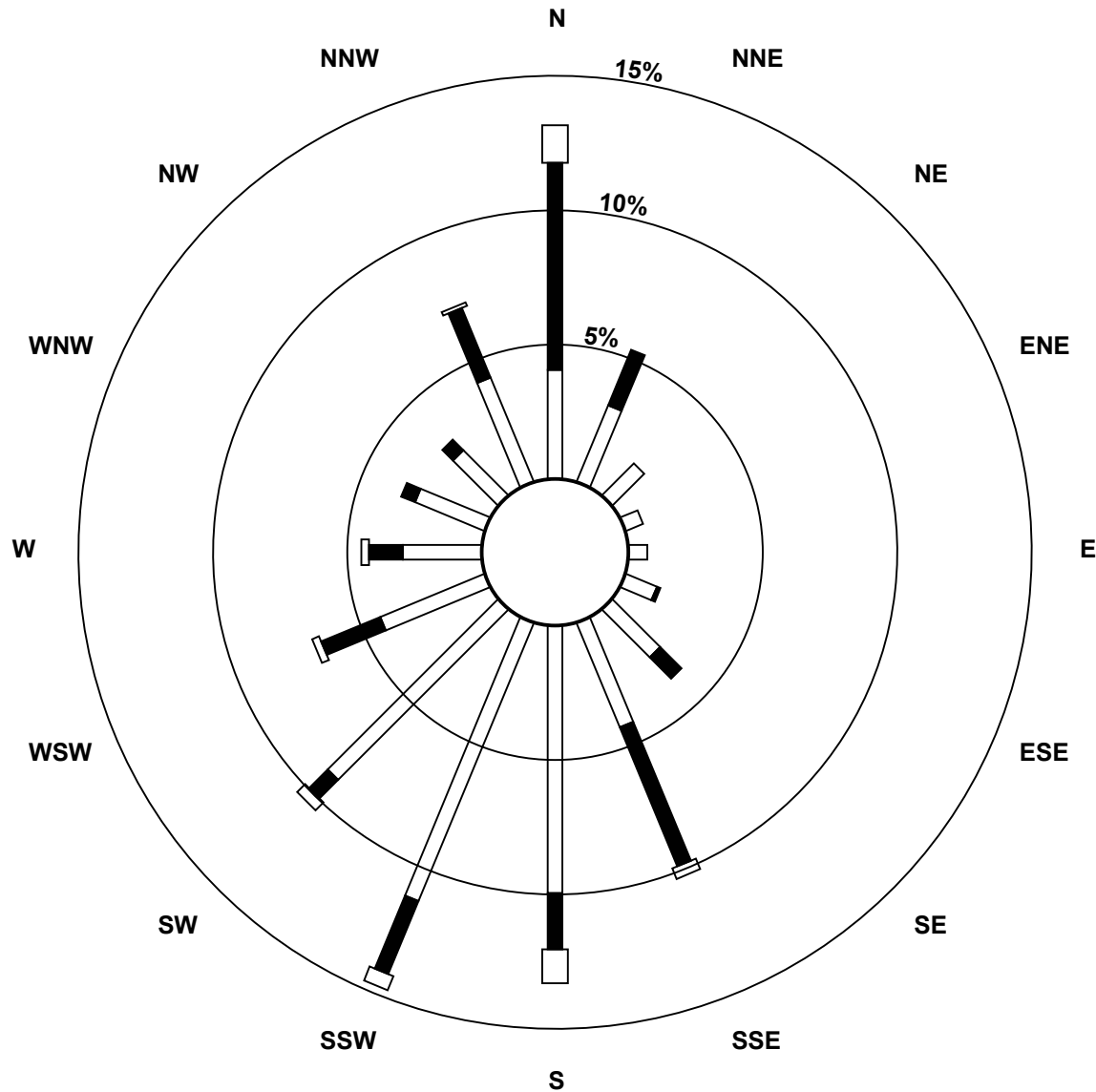
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	29	22	12	5	5	9	18	30	71	80	64	30	21	20	17	30	463
6 - 11	55	16	0	0	0	1	8	40	15	21	7	17	9	4	4	20	217
12 - 19	10	0	0	0	0	0	0	3	9	4	3	2	2	0	0	1	34
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	94	38	12	5	5	10	26	73	95	105	74	49	32	24	21	51	714

Total Number of Valid Hours: 714

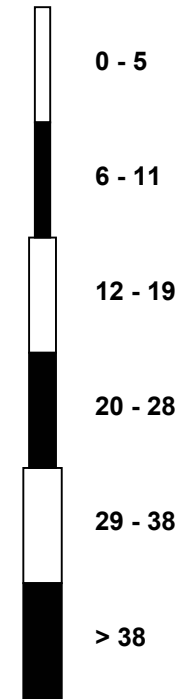
Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Fort McKay South (AMS 13)**



Classes (km/h)



Total Number of Valid Hours: 714



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Fort McKay South - September 2014

Direction of Maximum Speed: 354 deg on Sep 26 20:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 5.6 deg on Sep 26		Hours of Data:	714
Direction of Minimum Speed: 17 deg on Sep 2 02:00		Hours of Missing Data:	6
Direction of Minimum Daily Speed Average: 0.3 deg on Sep 4		Percent Operational Time:	99.2
Monthly Average Direction: 245.4 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	242	180	154	205	213	182	267	197	136	126	152	151	189	178	6	157	179	165	311	215	235	204	204	139	181.7
2-Sep	135	17	176	213	197	227	176	193	156	79	72	152	55	10	1	192	273	259	268	252	260	215	210	216	221.5
3-Sep	221	201	200	199	191	190	203	140	117	117	237	244	211	216	259	337	22	24	130	212	290	179	180	195	204.2
4-Sep	179	180	182	185	177	193	173	172	161	157	175	165	113	136	207	346	353	349	350	350	350	357	343	338	172.3
5-Sep	309	287	276	254	246	185	155	63	166	147	168	169	180	155	161	133	155	160	276	229	214	281	314	296	188.2
6-Sep	281	256	207	180	227	294	357	1	36	42	38	27	34	38	11	11	8	353	3	8	5	352	353	359	4.9
7-Sep	4	358	354	355	7	14	5	356	351	346	3	357	357	352	349	355	344	348	341	325	332	329	334	312	351.8
8-Sep	328	340	347	322	308	220	175	24	8	6	16	357	1	357	5	7	353	349	336	289	245	298	234	213	350.4
9-Sep	212	172	224	290	350	220	205	227	330	9	22	205	196	359	201	216	302	246	261	260	285	304	283	220	246.0
10-Sep	201	344	225	248	190	249	120	276	279	289	325	38	234	266	193	200	176	174	196	200	176	181	194	210	203.9
11-Sep	210	199	189	180	175	209	174	156	186	192	187	195	190	191	200	196	210	205	191	218	219	240	250	251	199.5
12-Sep	229	215	140	189	168	187	272	299	334	330	320	320	348	337	344	3	330	316	221	333	272	172	207	287	324.8
13-Sep	252	281	214	AF	AF	AF	AF	AF	74	113	105	98	104	117	167	138	129	155	209	234	234	256	194	211	142.2
14-Sep	235	218	209	198	194	198	209	177	157	129	130	150	166	165	200	213	203	187	236	208	232	249	223	186	184.8
15-Sep	179	184	193	163	201	182	199	170	118	101	63	81	345	360	360	11	19	3	333	315	327	340	336	343	2.7
16-Sep	340	336	343	344	342	350	349	340	358	2	352	4	354	356	3	19	82	158	148	144	142	142	144	151	20.2
17-Sep	150	147	143	129	143	160	155	152	154	157	157	164	173	149	156	163	160	154	162	158	167	186	213	199	158.4
18-Sep	193	215	180	188	241	292	310	AF	20	15	5	26	15	49	39	23	39	47	224	221	207	216	237	200	16.7
19-Sep	342	329	203	199	191	191	186	178	175	213	216	226	225	225	237	236	254	239	242	268	260	259	262	236	237.4
20-Sep	241	233	245	250	253	204	254	266	277	278	278	277	266	271	297	288	250	227	209	205	204	170	170	205	257.3
21-Sep	237	233	228	229	211	202	232	215	173	198	203	212	219	239	241	212	252	239	204	167	174	185	203	238	214.2
22-Sep	228	281	276	205	197	182	170	174	164	185	168	168	142	127	142	215	224	198	214	225	237	229	234	250	191.5
23-Sep	249	195	245	227	307	315	332	352	354	347	325	22	0	32	53	130	179	200	217	209	213	236	296	229	306.2
24-Sep	221	228	220	213	203	229	244	246	0	2	4	355	354	344	346	342	341	332	290	157	212	247	173	174	305.4
25-Sep	201	226	210	193	202	224	245	248	253	253	257	292	298	319	351	340	359	353	1	1	3	11	30	23	298.7
26-Sep	18	28	28	19	22	20	22	14	15	19	17	9	7	0	3	357	355	356	355	354	353	357	353	351	5.6
27-Sep	346	338	335	334	326	300	303	290	356	5	39	15	172	134	101	155	153	151	229	224	234	230	221	219	325.2
28-Sep	199	200	201	175	166	169	163	156	157	169	166	171	168	178	176	177	177	179	166	164	156	161	166	181	170.5
29-Sep	191	197	190	187	182	177	170	168	161	159	161	157	151	150	182	204	198	181	184	186	186	211	176	196	177.7
30-Sep	205	206	198	187	219	220	76	175	173	249	22	291	349	3	22	125	274	351	324	17	24	307	352	26	341.9

249.8 248.5 239.3 239.8 219.2 210.3 232.9 205.5 142.0 165.0 183.4 208.6 214.4 207.0 259.6 245.6 240.6 229.3 253.6 250.6 265.4 268.2 263.5 258.5

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

Fort McKay South - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 105 deg on Sep 2 14:00	Hours of Data: 714
Minimum Value: 8 deg on Sep 13 20:00	Hours of Missing Data: 6
Percentiles: P ₁ = 12 P ₁₀ = 20 Q ₁ = 26 Median = 33 Q ₃ = 48 P ₉₀ = 73 P ₉₉ = 97	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	86	34	40	18	84	54	98	75	89	71	52	47	41	79	69	54	23	91	37	72	36	26	35	56	98
2-Sep	93	91	56	34	32	51	64	73	56	65	52	88	77	105	67	78	93	34	34	25	65	39	31	45	105
3-Sep	58	37	45	40	37	22	61	38	44	36	81	48	57	65	49	76	50	91	34	86	52	26	31	26	91
4-Sep	14	17	24	19	16	46	29	20	25	29	28	37	39	42	50	81	53	34	27	51	27	27	28	27	81
5-Sep	30	32	37	28	66	76	74	90	28	44	49	34	27	31	27	37	35	37	91	66	48	60	25	30	91
6-Sep	27	26	50	101	64	76	25	26	37	42	48	32	43	40	30	29	23	25	26	24	28	26	25	26	101
7-Sep	24	27	25	25	29	26	30	27	25	27	27	27	28	27	30	30	30	26	26	30	30	29	30	28	30
8-Sep	27	30	29	29	55	36	62	81	30	37	32	34	59	35	35	31	29	38	49	47	56	38	43	44	81
9-Sep	33	27	31	57	46	50	29	80	83	66	63	56	64	94	29	50	84	63	22	30	39	25	30	57	94
10-Sep	36	84	66	73	89	97	102	86	86	66	78	97	68	90	40	57	28	22	12	10	23	21	20	21	102
11-Sep	18	19	18	14	10	22	16	20	25	26	27	27	26	27	27	26	27	27	20	17	20	21	27	24	27
12-Sep	74	20	37	76	93	72	44	38	40	35	37	41	30	42	32	35	30	75	73	66	70	58	94	71	94
13-Sep	83	51	18	AF	AF	AF	AF	AF	39	38	45	45	44	48	42	42	33	25	41	8	34	76	23	30	83
14-Sep	47	46	61	50	71	49	31	14	31	39	34	45	48	60	51	38	24	20	11	46	68	96	52	82	96
15-Sep	84	70	28	15	35	29	47	40	54	83	73	76	62	36	28	31	29	26	17	39	17	16	14	16	84
16-Sep	20	21	23	26	22	34	54	23	24	28	32	42	32	35	45	34	76	27	29	30	33	38	32	28	76
17-Sep	30	32	32	33	33	25	30	31	30	29	29	34	32	33	28	29	28	27	26	31	19	23	18	14	34
18-Sep	17	16	20	44	58	48	50	AF	38	40	33	57	48	64	55	38	46	82	14	9	58	73	55	62	82
19-Sep	61	76	49	27	39	62	52	19	23	31	33	30	32	35	30	30	39	33	41	44	42	41	42	34	76
20-Sep	37	38	40	37	79	46	31	37	41	45	41	46	44	49	44	44	36	28	15	13	27	16	14	33	79
21-Sep	44	57	16	48	24	26	20	22	47	38	30	30	35	41	36	42	94	35	22	15	53	26	27	10	94
22-Sep	44	35	55	45	21	23	15	15	19	28	27	29	36	34	38	31	28	16	24	14	16	16	16	23	55
23-Sep	54	100	67	80	89	54	18	76	45	30	76	71	49	76	60	67	18	26	24	13	21	55	60	38	100
24-Sep	39	12	30	22	24	48	52	71	22	33	28	28	26	24	28	37	68	38	36	37	46	36	45	25	71
25-Sep	23	25	24	20	25	28	35	34	37	44	38	41	44	56	28	31	27	26	27	28	25	29	32	29	56
26-Sep	29	34	28	28	28	27	29	25	28	30	28	27	25	25	26	25	25	27	26	26	27	26	26	27	34
27-Sep	26	27	29	29	27	34	33	51	49	34	55	81	59	41	43	45	38	31	25	16	13	9	29	31	81
28-Sep	22	24	18	19	22	26	26	27	27	25	28	27	27	28	27	27	25	21	23	24	23	27	21	20	28
29-Sep	17	14	15	14	13	12	12	18	23	30	31	30	33	34	32	25	25	20	21	21	17	23	24	68	68
30-Sep	44	37	32	21	69	92	73	42	46	90	51	48	39	29	38	74	39	37	28	66	57	42	22	28	92

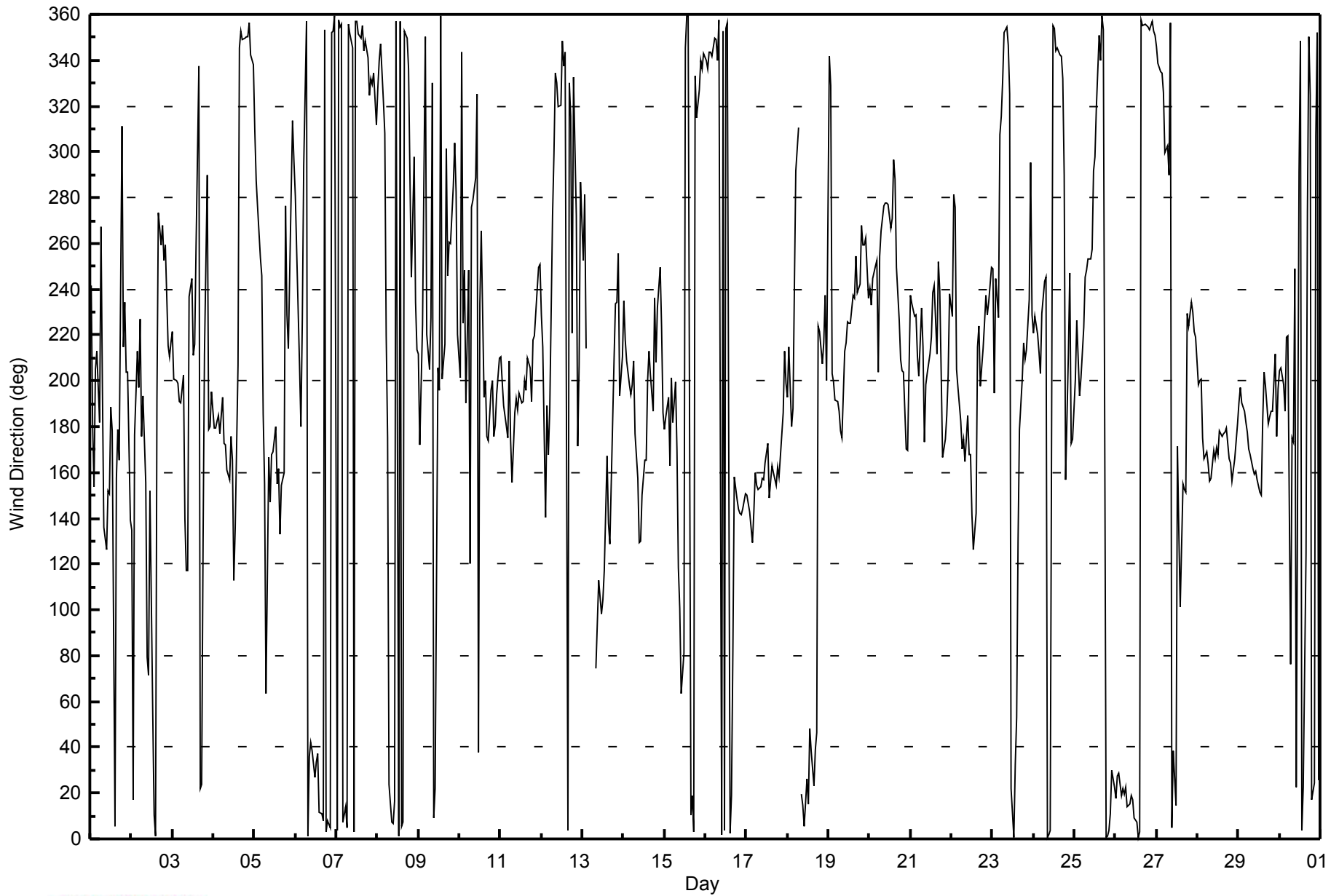
93	100	67	101	93	97	102	90	89	90	81	97	77	105	69	81	94	91	91	91	86	70	96	94	82	
Diurnal Maximum																									

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Fort McKay South - September 2014





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 18, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	11:35	End Time (MST)	16:28
Barometric Pressure	729 mmHg	Station temp.	24 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1377
Cal Gas Concentration	51.1 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL107		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492
DACS voltage range	0-5v	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	24	26
Analyzer Range (mv)	5000	5000	Lamp voltage	2214	2215
Calculated slope	0.996713	0.997638	Chamber temp.	50.0	50.0
Calculated intercept	1.001536	1.457192	Pressure ("Hg)	26.8	26.7
Analyzer Background	26.3	26.3	Flow (lpm)	695	697
Analyzer Coefficient	1.613	1.640	Intensity	75	78

Analyzer make	API T100	Analyzer serial #	599
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	NA
as found span	5000	78.9	806.4	791.5	1.019
calibrator zero	5000	0.0	0.0	-0.2	0.000
high point	5000	78.9	806.4	807.7	0.998
second point	5000	39.4	402.7	400.7	1.005
third point	5000	19.7	201.3	199.7	1.008
calibrator zero					
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	78.9	806.4	805.2	1.001
Average Correction Factor					1.004

Corrected As found	791.9	Previous response	808.0	% change	2.0%
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Notes:

Slight adjustment to span, filter changed after As Finds

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

SO₂ Calibration Summary

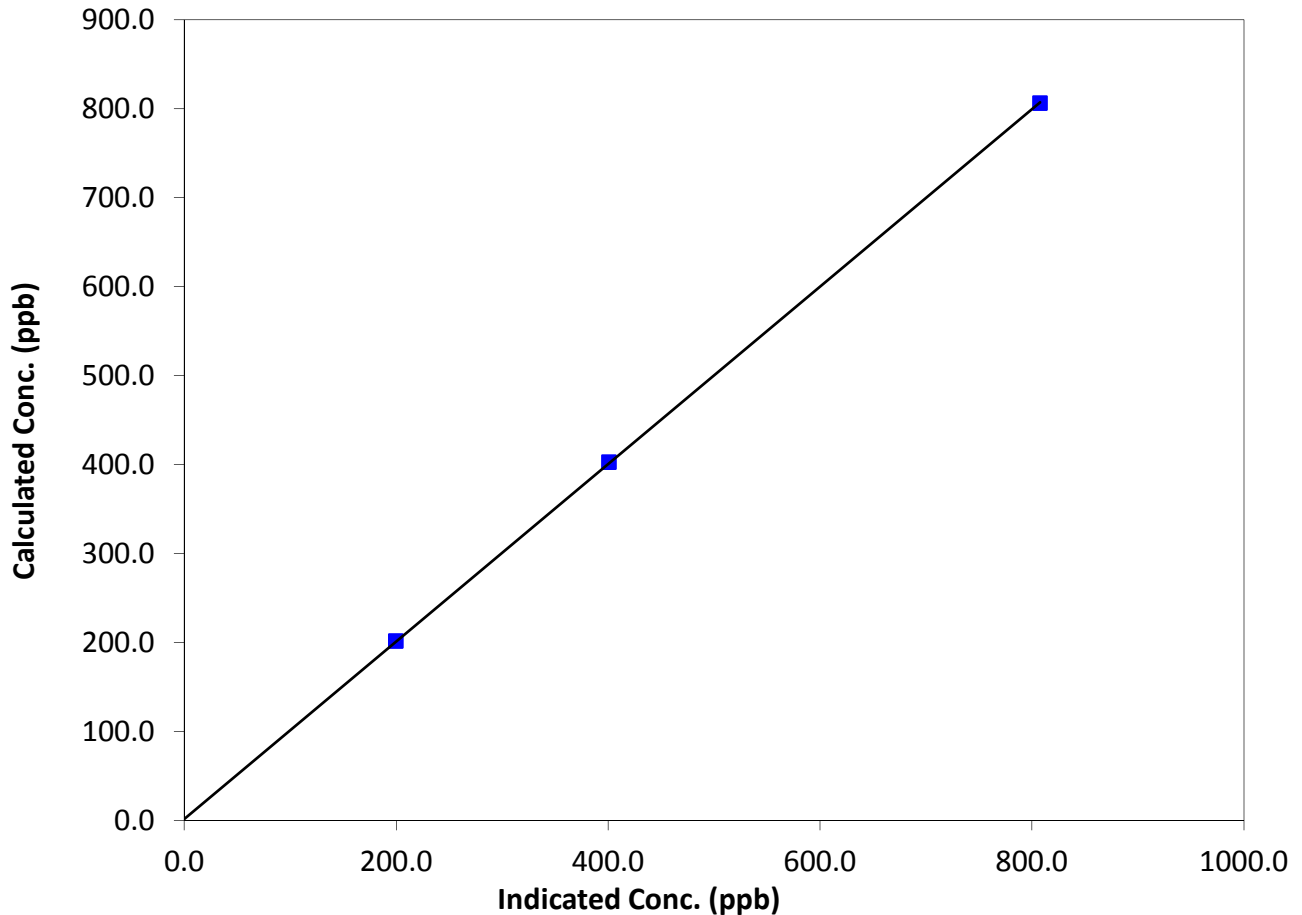
Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 18, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	11:35	End Time (MST)	16:28
Analyzer make	API T100	Analyzer serial #	599

Calibration Data

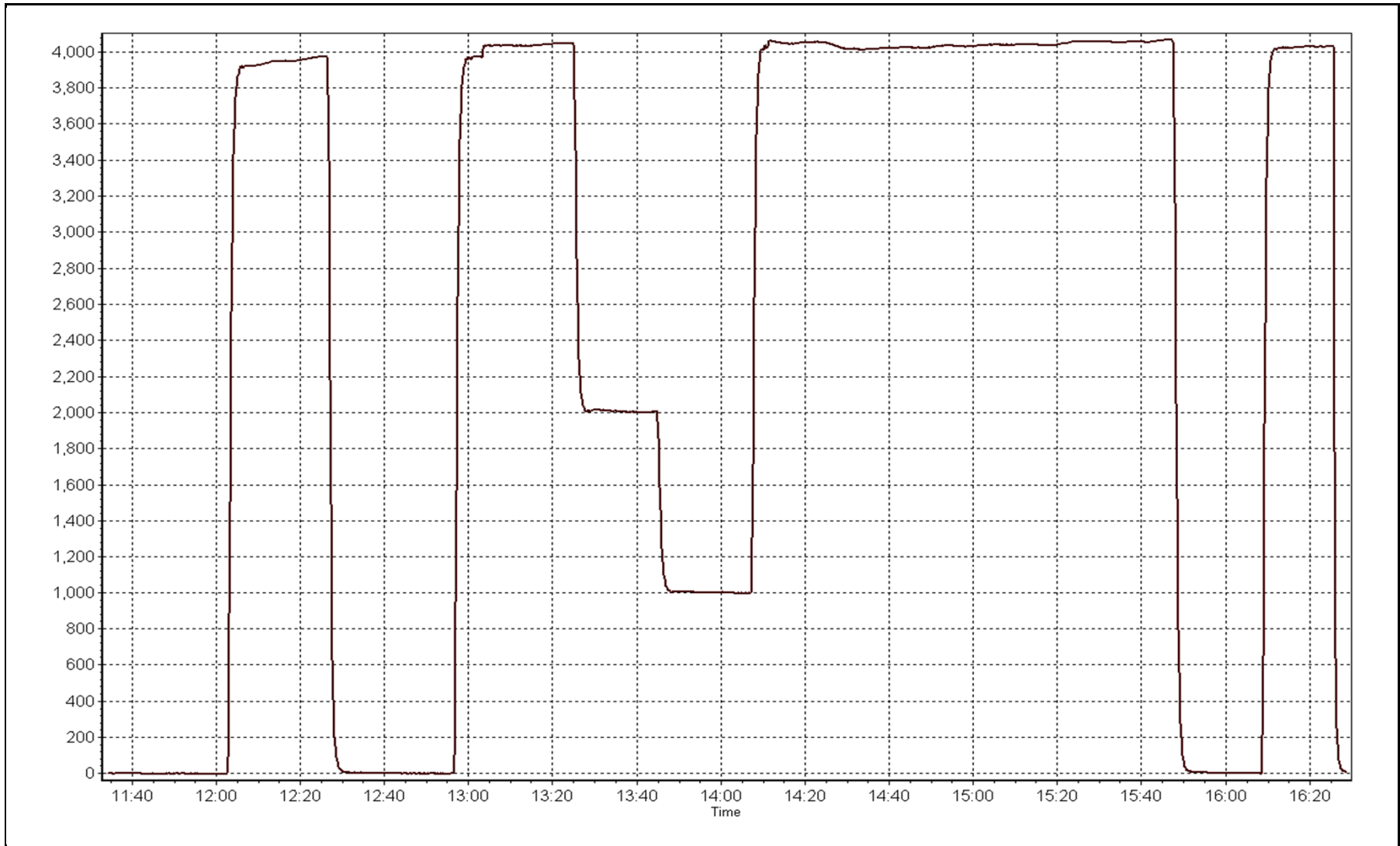
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999986
806.4	807.7	0.9983		
402.7	400.7	1.0049	Slope	0.997638
201.3	199.7	1.0084		
			Intercept	1.457192

SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 10, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	September 8, 2014	Previous Calibration	August 15, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:55	End Time (MST)	13:53
Barometric Pressure	743 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11041107
Cal Gas Concentration	10.4 ppm H2S	Cal Gas Expiry Date	5/30/2013
Gas Cert Reference	LL82750	SO2 gas conc.	51.1 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2581
DACS voltage range	0-5v	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-727	-727
Analyzer Range (input)	5000	5000	Lamp voltage	990	990
Calculated slope	1.001291	0.999714	Chamber temp.	45	45
Calculated intercept	-0.266706	-0.081923	Pressure	694.7	694.7
Analyzer Background	1.84	1.79	Flow	0.439	0.439
Analyzer Coefficient	1.055	1.027	Intensity	90	90
			Converter temp.	800	800

Analyzer make/model	TEI 43i-TLE	Analyzer serial #	1218153359
Converter make/model	CDN-101	Converter serial #	456

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	NA
as found span	5000	38.5	80.1	82.2	0.974
SO2 scrubber check	5000	39.4	402.7	0.3	NA
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	38.5	80.1	80.2	0.999
second point	5000	19.2	39.9	40.1	0.995
third point	5000	9.6	20.0	19.9	1.004
calibrator zero					
as left zero	5000	0.0	0.0	0.3	NA
as left span	4000	30.8	80.1	80.0	1.001
Average Correction Factor					0.999

Corrected As found	82.1	Previous response	80.2	% change	-2.2%
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Notes:

As found zero used as calibrator zero, scrubber check before As Found

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

TRS Calibration Summary

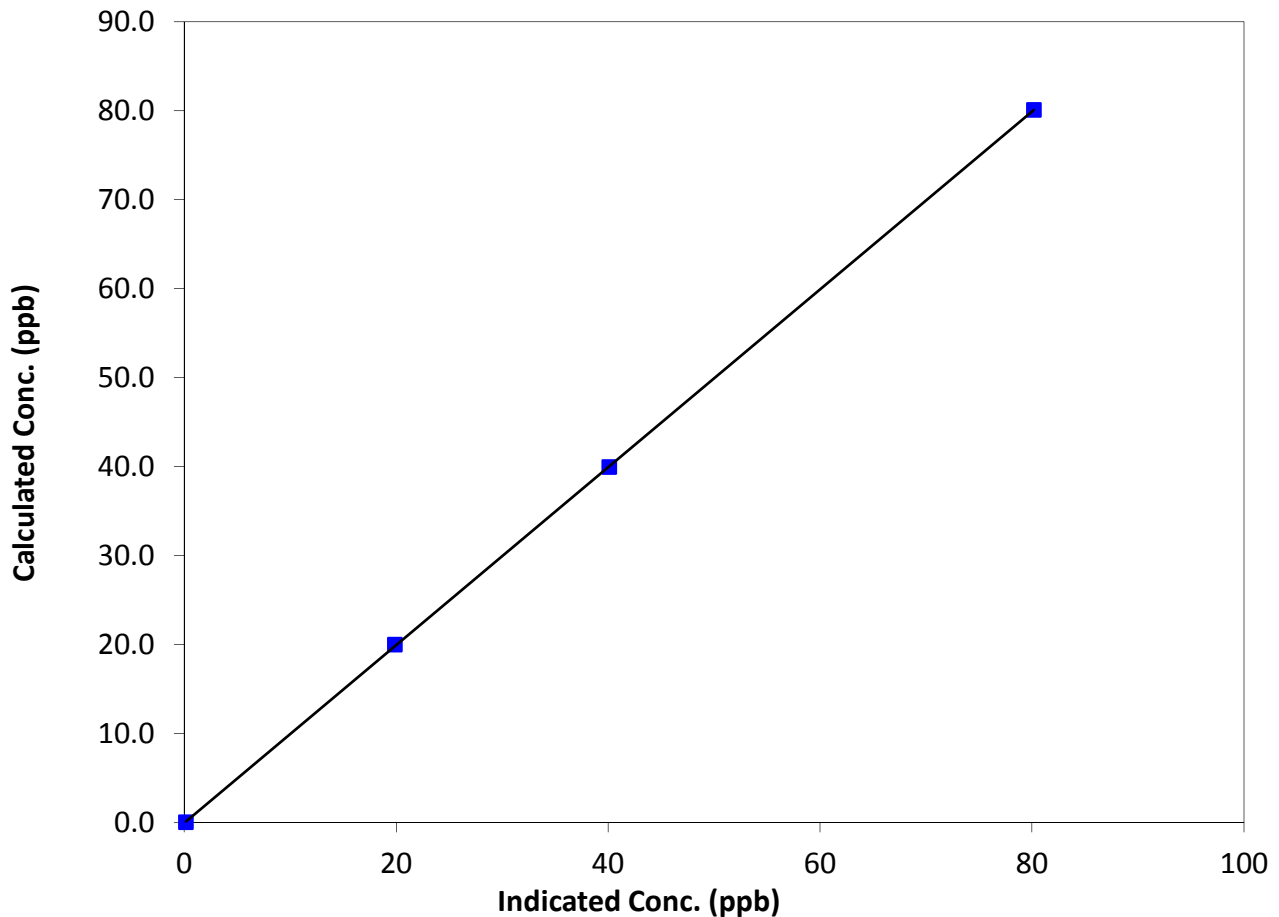
Station Information

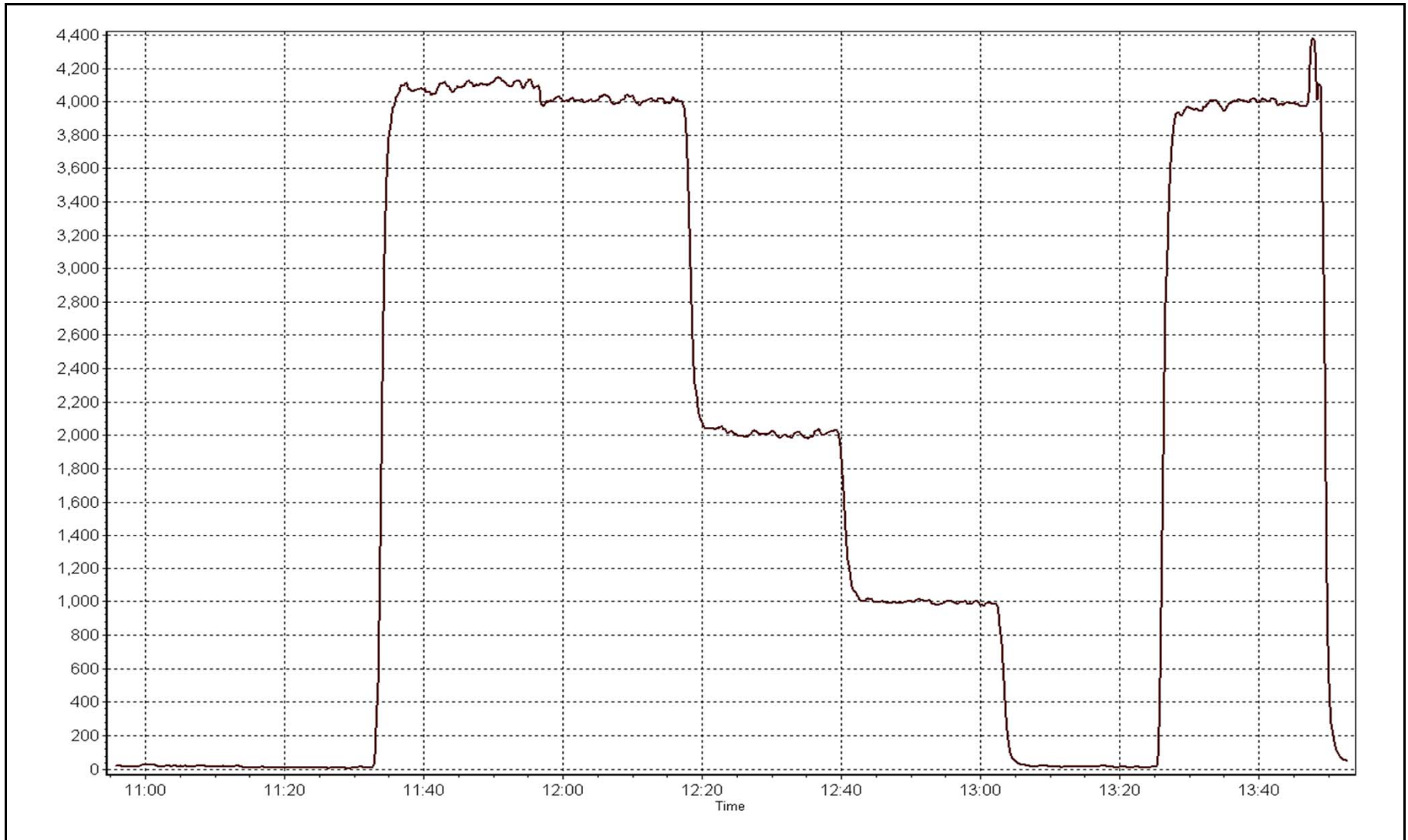
Calibration Date	September 8, 2014	Previous Calibration	August 15, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:55	End Time (MST)	13:53
Analyzer make	TEI 43i-TLE	Analyzer serial #	1218153359

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999988
80.1	80.2	0.9988		
39.9	40.1	0.9953	Slope	0.999714
20.0	19.9	1.0041		
			Intercept	-0.081923

TRS Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Wednesday, September 10, 2014	Previous Calibration	Monday, August 18, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	11:35	End Time (MST)	16:27
Barometric Pressure	729 mmHg	Station temp.	24 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
Gas Cert Reference	LL107918	Cal Gas Expiry Date	5/29/2014
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1076.0 ppm
C3H8 Cal Gas Conc.	204 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492
DACS voltage range	0-5v	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.0	8.0
Analyzer Range (mv)	5000	5000	Air or Bypass press	42.4	42.4
Calculated slope	1.005573	1.010647	Fuel Pressure	22.6	22.6
Calculated intercept	-0.029612	0.029764			
BKG	2.4	2.6			
COEF	4.773	4.708			

Analyzer make: Thermo Model 51iLT Analyzer serial #: 1236656114

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.21	N/A
as found span	5000	78.9	16.98	17.39	0.976
calibrator zero	5000	0.0	0.00	-0.03	N/A
high point	5000	78.9	16.98	16.78	1.012
second point	5000	39.4	8.48	8.35	1.015
third point	5000	19.7	4.24	4.16	1.018
calibrator zero					
as left zero	5000	0.0	0.00	-0.03	N/A
as left span	5000	78.9	16.98	16.78	1.012
Average Correction Factor					1.015

Corrected As found: 17.18 Previous response: 16.91 % change: -1.6%

Notes:

Zero and span with small adjustments, filter changed after As Finds

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

THC Calibration Summary

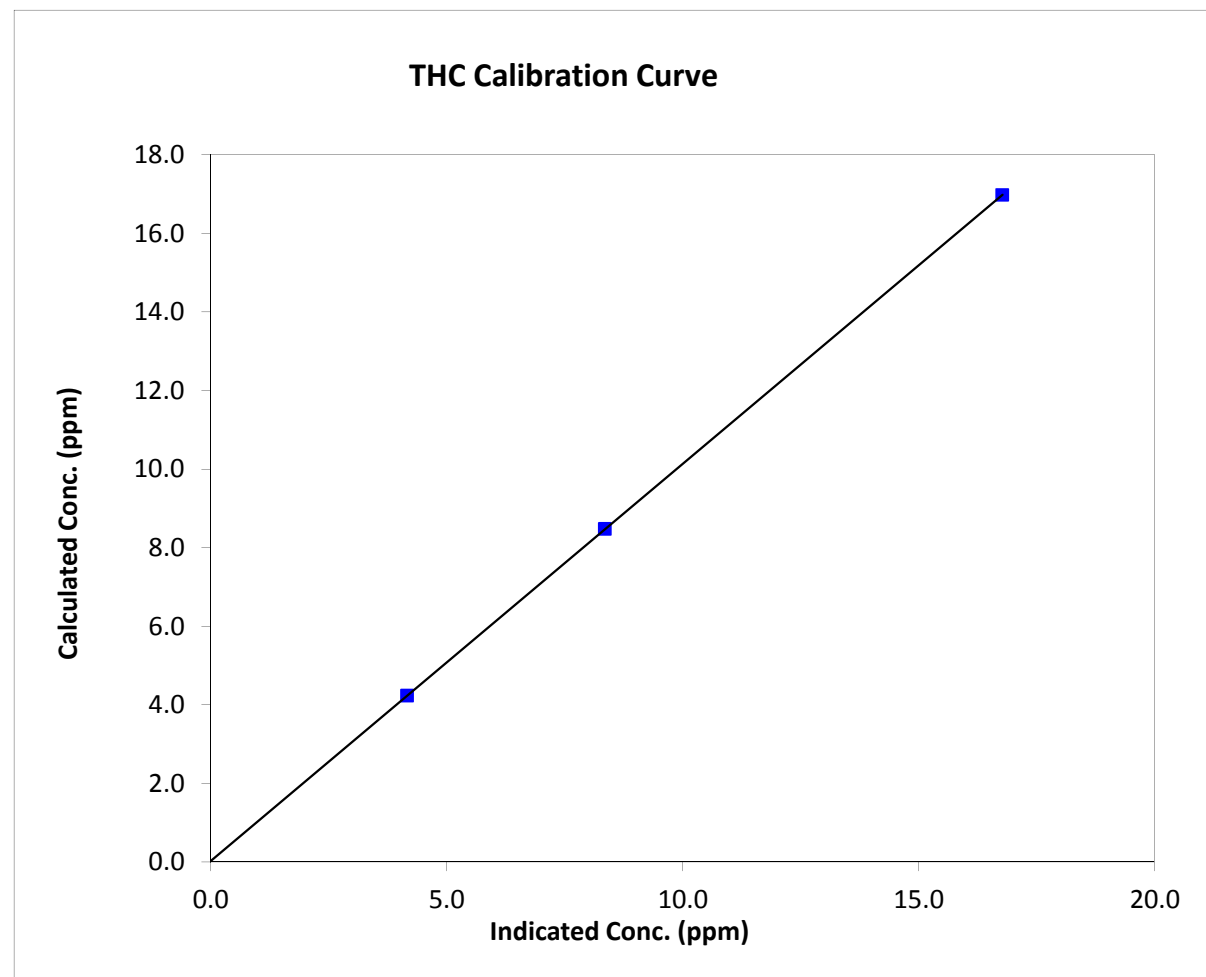
Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 18, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	11:35	End Time (MST)	16:27
Analyzer make	Thermo Model 51iLT	Analyzer serial #	1236656114

Calibration Data

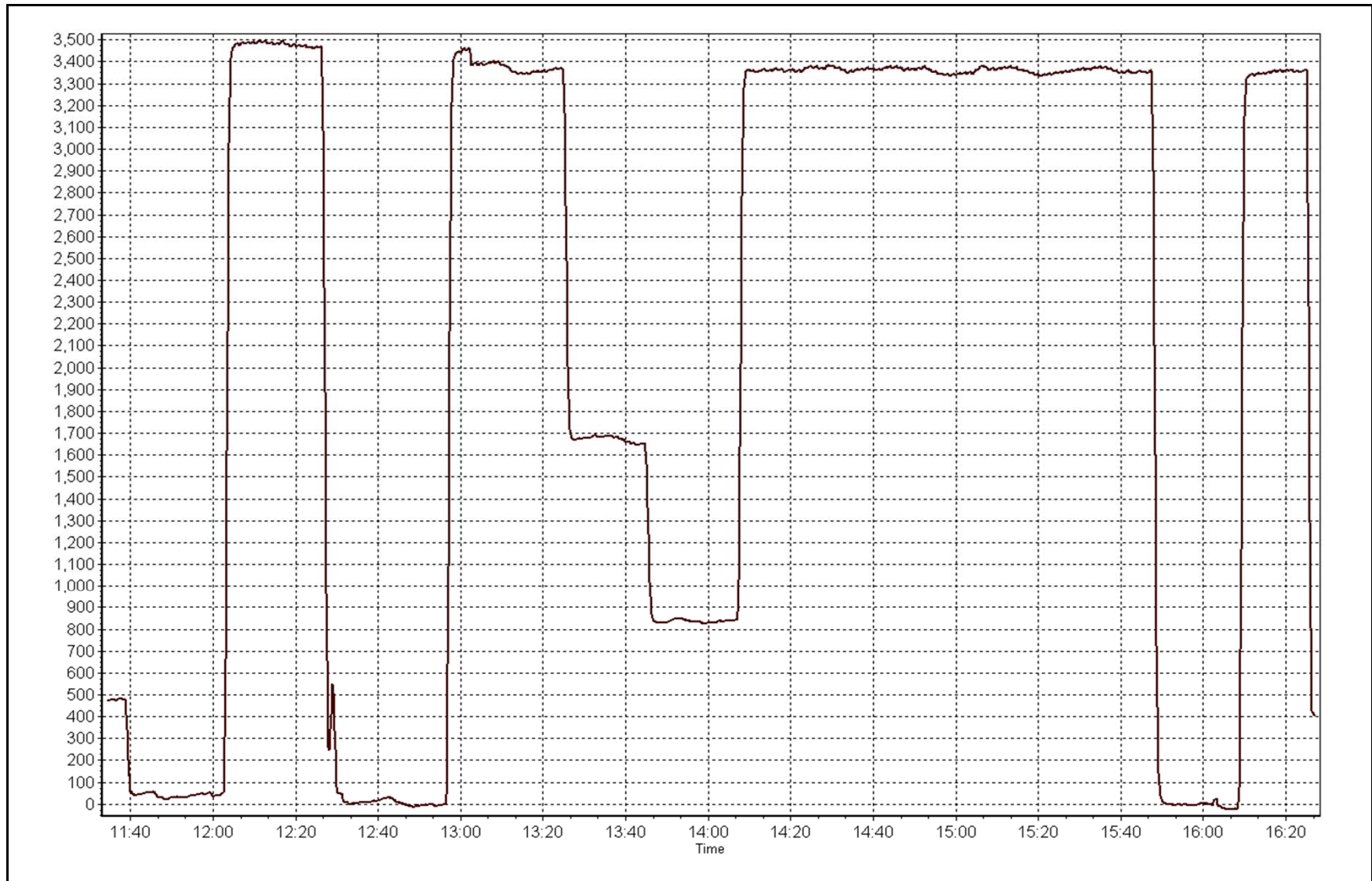
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	N/A	Correlation Coefficient	0.999999
16.98	16.78	1.0122		
8.48	8.35	1.0151	Slope	1.010647
4.24	4.16	1.0180		
			Intercept	0.029764

THC Calibration Curve



THC Calibration Plot

Date: September 10, 2014





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	September 11, 2014	Previous Calibration	August 19, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:02	End Time (MST)	14:55
Barometric Pressure	728 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
NO2 calibration used	Wednesday, September 10, 2014	Transfer Standard	??
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2681
DACS voltage range	0-5v	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	32.5	29.2
Analyzer Range (input)	5000	5000	Lamp temp.	58.0	58.0
Calculated slope	1.009164	0.990177	Pressure ("Hg)	26.6	26.6
Calculated intercept	-0.267327	-0.417627	Flow cell A	340	741
Analyzer Background	-1.1	-1.1			
Analyzer Coefficient	1.014	1.050			

Analyzer make	API T400	Analyzer serial #	825
---------------	----------	-------------------	-----

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.3	N/A
as found span	5000	0.90	364.6	344.9	1.057
calibrator zero	5000	0.000	0.0	0.3	N/A
high point	5000	0.903	364.6	368.3	0.990
second point	5000	0.585	216.6	219.7	0.986
third point	5000	0.358	114.4	115.8	0.988
calibrator zero					
as left zero	5000	0.00	0.0	0.3	N/A
as left span	5000	0.903	364.6	365.4	N/A
Average Correction Factor					0.988

Corrected As found 344.6 Previous response 361.6 % change 4.9%

Notes:

External pump changed, internal plumbing rerouted around internal pump. Span adjusted, filter changed after As Finds

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

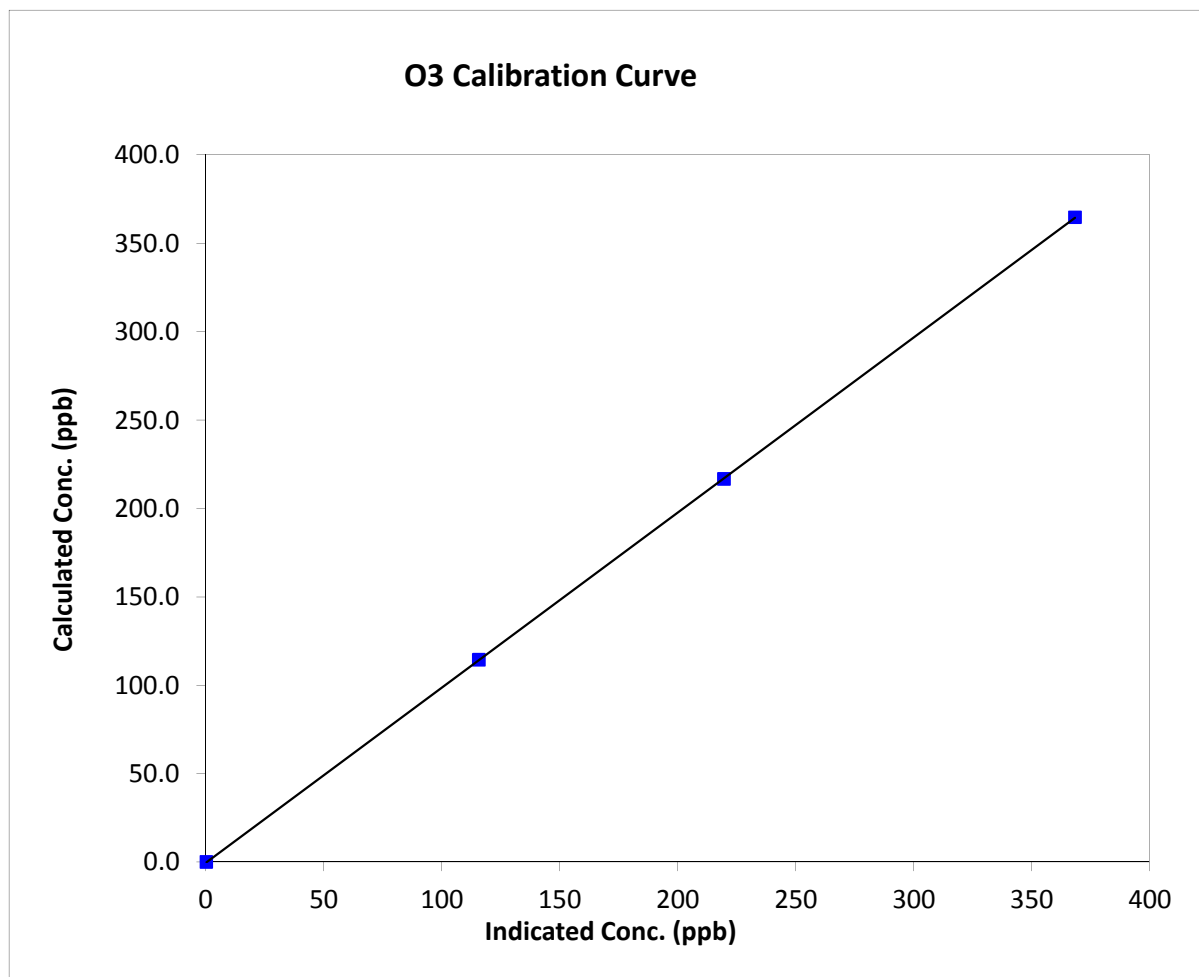
O₃ Calibration Summary

Station Information

Calibration Date	Thursday, September 11, 2014	Previous Calibration	August 19, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:02	End Time (MST)	14:55
Analyzer make	API T400	Analyzer serial #	825

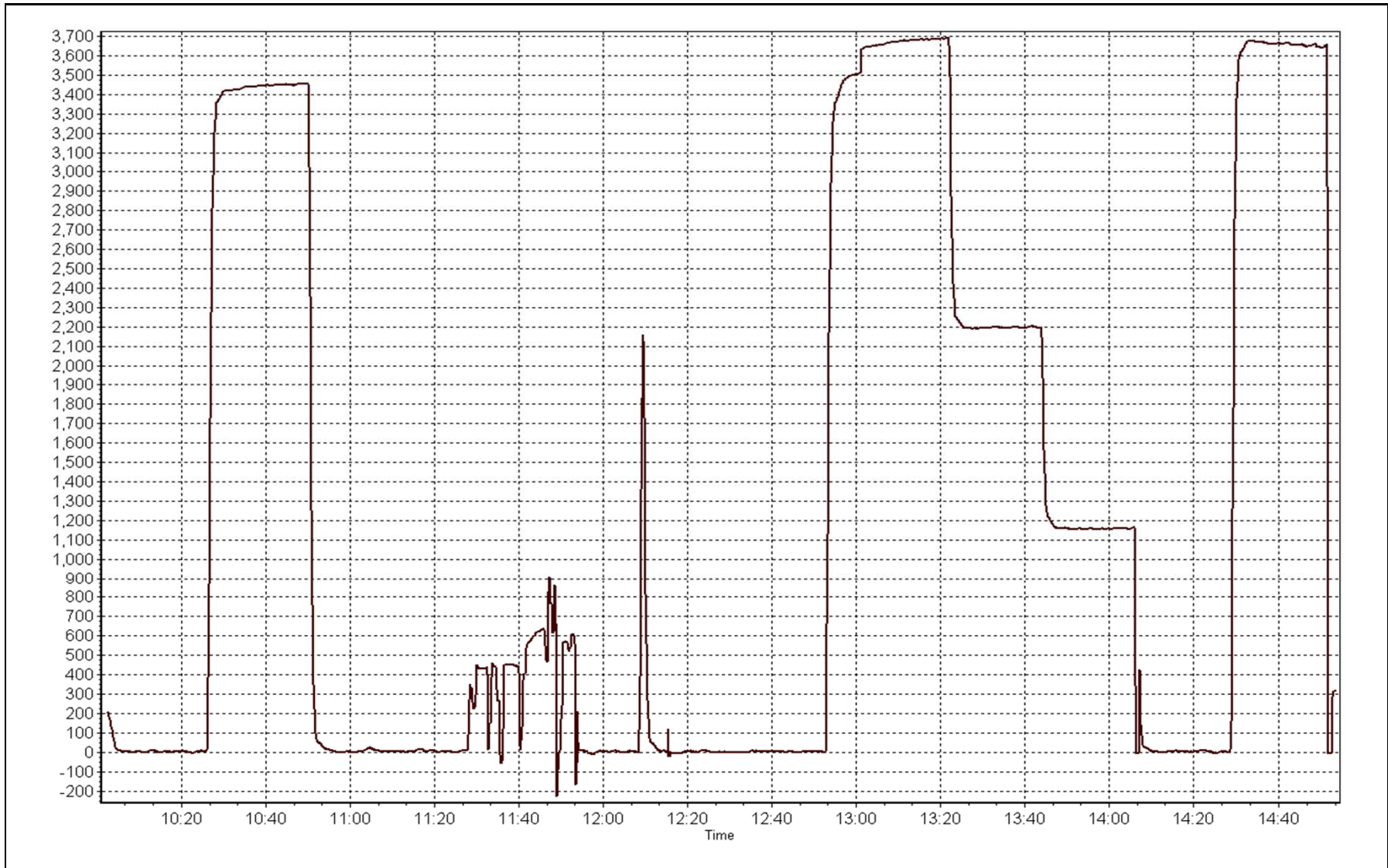
Calibration Data

Calculated concentration (ppb) (C _c)	Indicated concentration (ppb) (I _c)	Correction factor (C _c /I _c)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999994
364.6	368.3	0.9898		
216.6	219.7	0.9857	Slope	0.990177
114.4	115.8	0.9879		
			Intercept	-0.417627



O3 Calibration Plot

Date: September 11, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 18, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	11:35	End Time (MST)	16:28
Barometric Pressure	729 mmHg	Station Temperature	24.0 Deg C
Calibrator	Sabio 4010	Serial Number	11041107
NO Cal Gas Conc	50.7 ppm	Cal Gas Expiry Date	May 29, 2014
NOx Cal Gas Conc	50.8 ppm	Cal Gas Serial #	LL107918

DACS Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 3492

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.998712	0.997704	0.998629
	Data Offset	1.812218	1.764578	0.113273
After	Data Slope	0.996069	0.995422	0.995798
	Data Offset	2.134899	2.156380	0.088540
Channel #		3	2	1
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model Thermo 42C Analyzer serial # 2185

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.861	ppb	0.878	ppb
NOX coefficient	1.001	ppb	1.000	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	4.0		4.1	
NOX bkgrnd	4.1		4.1	
Nt coefficient	N/A		N/A	
Chamber Temp	49.9	Deg C	49.8	Deg C
Moly Temp	325.0	Deg C	325.0	Deg C
PMT Temp	-3.7	Deg C	-3.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	205.4	mmHg	203.5	mmHg
Sample Flow	0.827	ccm	0.826	ccm

Notes:

Filter and span with small adjustments, filter changed after As Finds



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

September 10, 2014

Station Number:

AMS 13

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	N/A	N/A
as found span	5000	78.9	801.6	800.0	1.6	819.2	818.6	1.0	0.9786	0.9774
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	N/A	N/A
high point	5000	78.9	801.6	800.0	1.6	804.0	802.9	1.5	0.9971	0.9965
second point	5000	39.4	400.3	399.5	0.8	397.8	397.4	0.7	1.0062	1.0054
third point	5000	19.7	200.2	199.8	0.4	197.2	196.9	0.3	1.0148	1.0147
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	-0.1	N/A	N/A
as left span	5000	78.9	801.6	437.5	364.1	803.2	443.4	359.9	0.9981	0.9867
Average Correction Factor									1.0060	1.0055

Corrected As found

NO_x= 819.2

NO= 818.6

Percent Change

NO_x= -2.2%

NO= -2.3%

Previous Response

NO_x= 800.8

NO= 800.1

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

78.90

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO ₂ (350)	N/A	437.5	364.6	803.2	437.5	366.0	0.9825	1.0000	0.9963	100.4%
2nd NO ₂ (200)	N/A	585.5	216.6	802.7	585.5	217.6	0.9832	1.0000	0.9955	100.5%
3rd NO ₂ (100)	N/A	687.7	114.4	802.2	687.7	114.8	0.9838	1.0000	0.9968	100.3%
4th NO ₂ (0)	802.1	N/A	0.9	803.0	802.1	1.2	0.9828	1.0000	N/A	N/A
Average Correction Factor							0.9831	1.0000	0.9962	100.4%

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

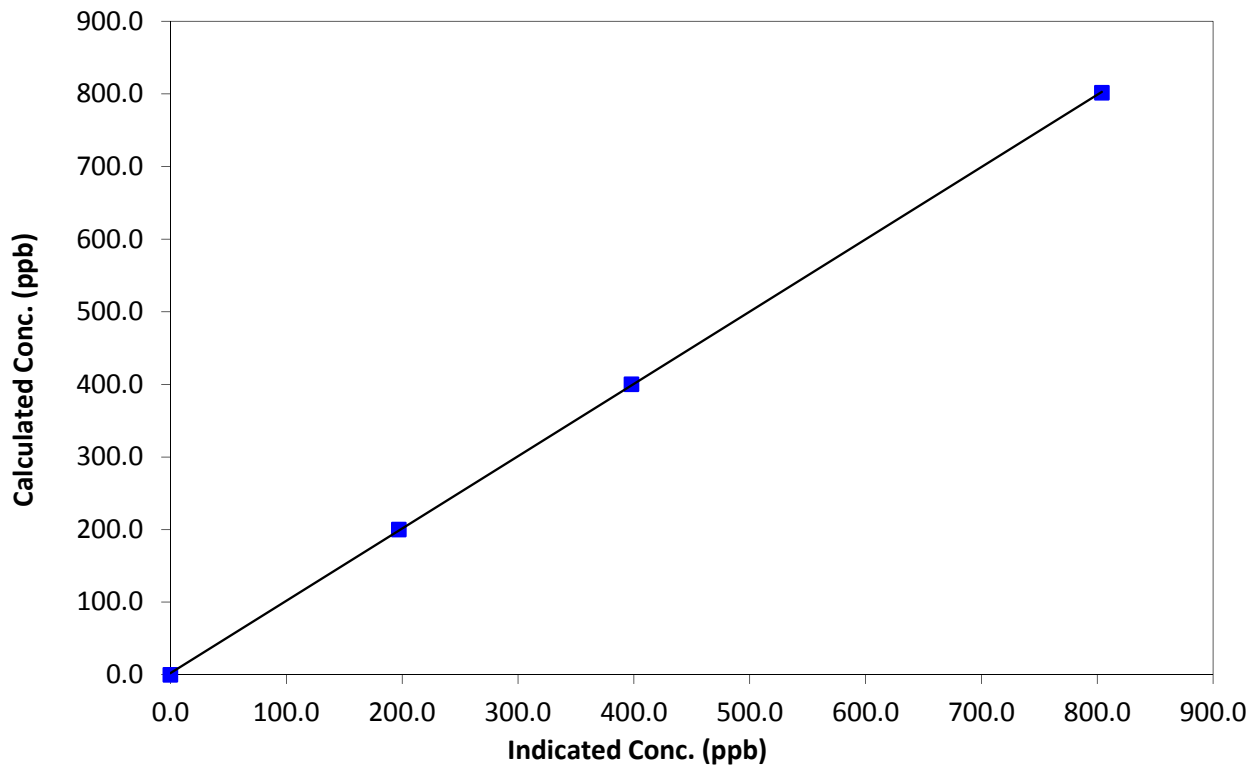
Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 18, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	11:35	End Time (MST)	16:28
Analyzer make	Thermo 42C	Analyzer serial #	2185

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999965
801.6	804.0	0.9971		
400.3	397.8	1.0062	Slope	0.996069
200.2	197.2	1.0148		
			Intercept	2.134899

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

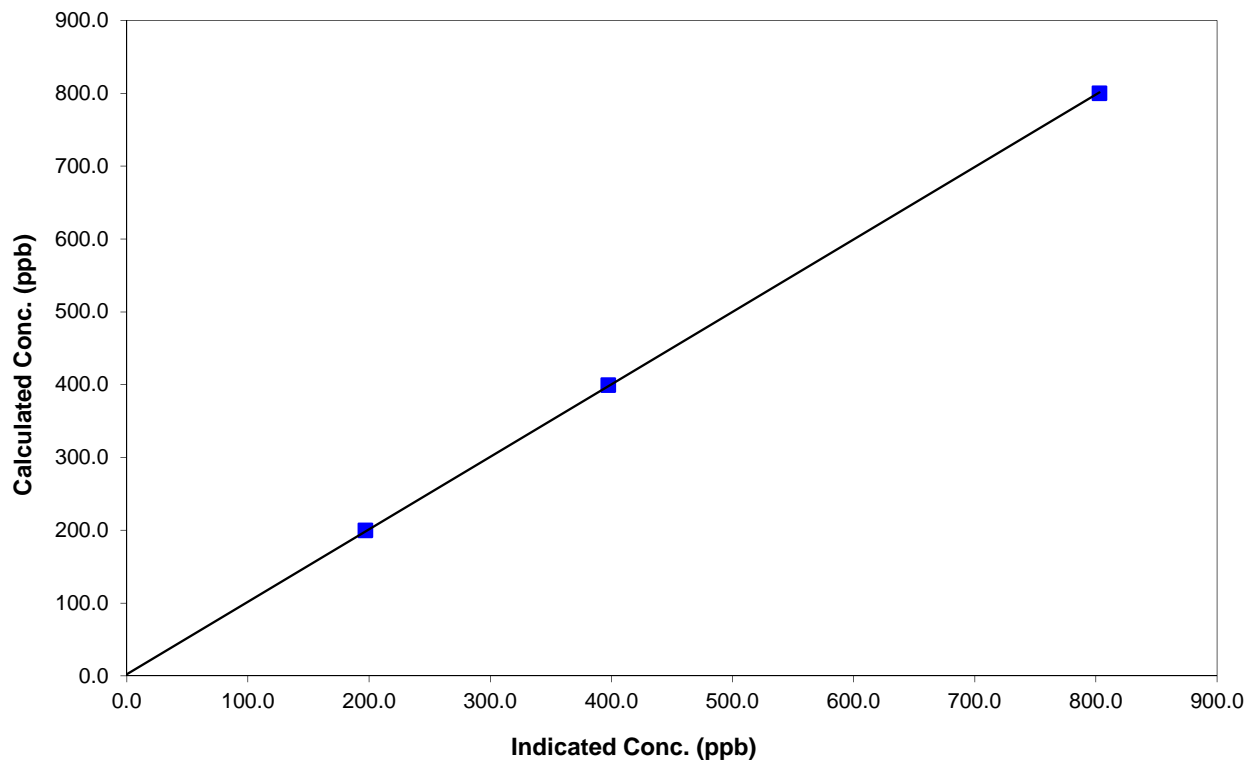
Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 18, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	11:35	End Time (MST)	16:28
Analyzer make	Thermo 42C	Analyzer serial #	2185

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999965
800.0	802.9	0.9965		
399.5	397.4	1.0054	Slope	0.995422
199.8	196.9	1.0147		
			Intercept	2.156380

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

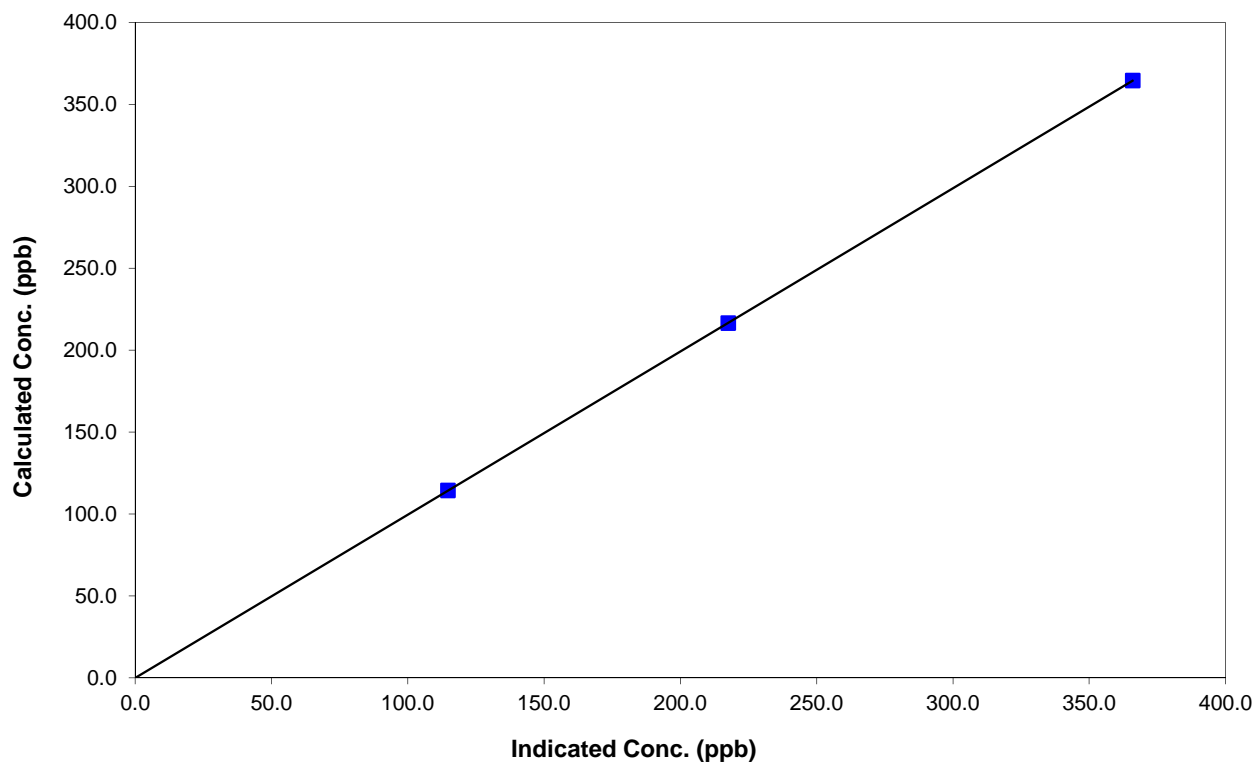
Station Information

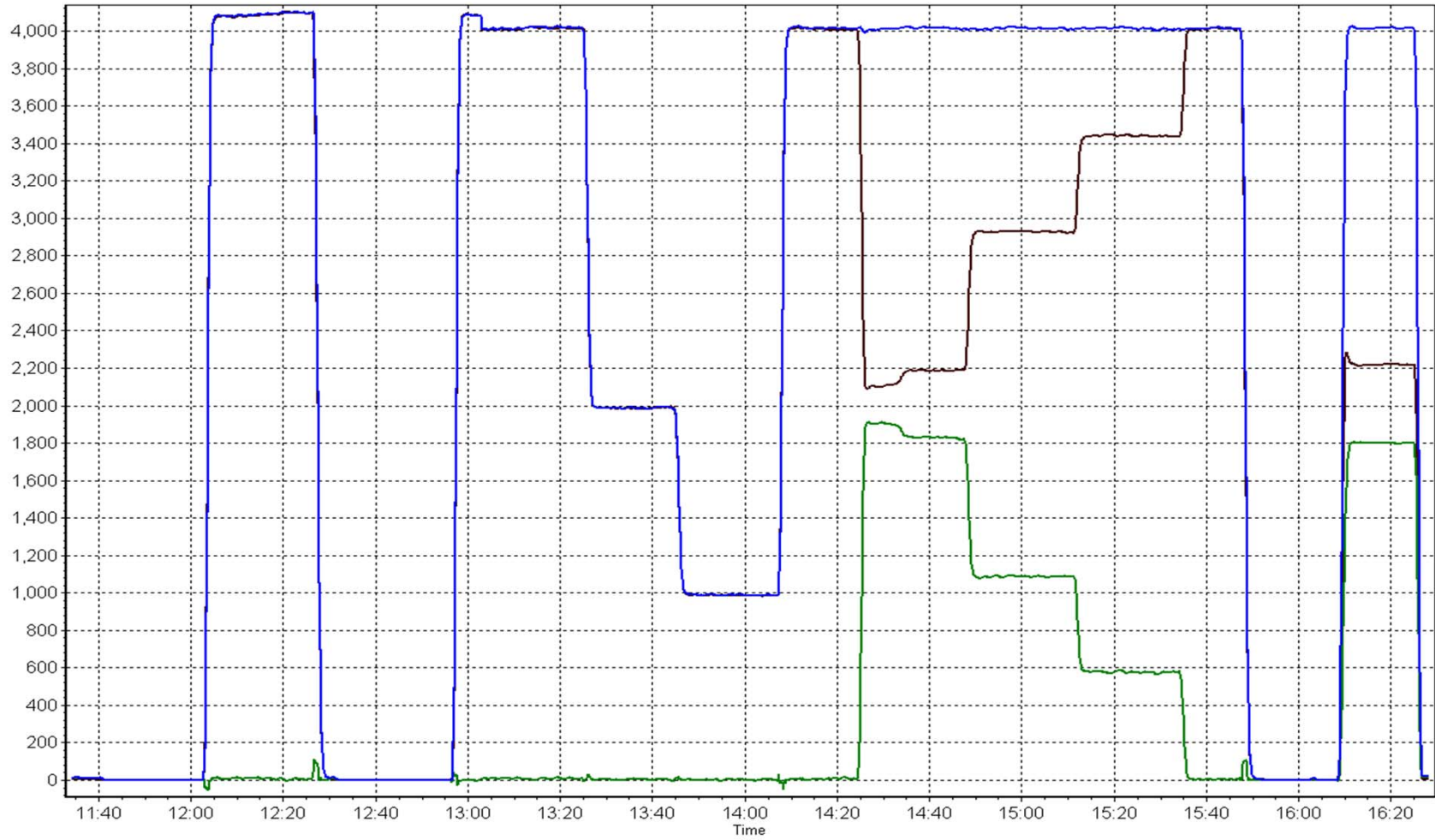
Calibration Date	September 10, 2014	Previous Calibration	August 18, 2014
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	11:35	End Time (MST)	16:28
Analyzer make	Thermo 42C	Analyzer serial #	2185

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	1.000000
364.6	366.0	0.9963		
216.6	217.6	0.9955	Slope	0.995798
114.4	114.8	0.9968		
			Intercept	0.088540

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 14
ANZAC
SEPTEMBER 2014**

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

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

October 30, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
 SEPTEMBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	682	38	38	100.00	9	0	1	0
TRS(ppb) Average	683	36	37	99.86	2	0	1	0
THC(ppm) Average	679	39	41	99.72	8.6	-	2.9	-
NMHC(ppm) Average	679	39	41	99.72	0.165	-	0.079	-
CH4(ppm) Average	679	39	41	99.72	8.6	-	2.9	-
NO2(ppb) Average	673	42	47	99.31	13	0	4	-
NO(ppb) Average	673	42	47	99.31	14	-	2	-
NOX(ppb) Average	673	42	47	99.31	21	-	5	-
O3(ppb) Average	684	35	36	99.86	48	0	28	-
PM2.5(ug/m3) Average	716	3	4	99.86	36	-	9.4	0
Temperature 2 m (C) Average	720	0	0	100.00	29.5	-	18.3	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	-	-
Surface Wetness (% of range) Average	720	0	0	100.00	84	-	-	-
Wind Speed 10 m (km/h) Average	717	0	3	99.58	19	-	-	-
Wind Direction 10 m (deg) Average	717	0	3	99.58	-	-	-	-
Precipitation (mm) Total	719	1	1	100.00	4.1	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
 SEPTEMBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	682	0.4	1	-	0	0	0	0	0	1	9
TRS(ppb) Average	683	0.3	0	-	0	0	0	0	0	0	2
THC(ppm) Average	679	1.93	0.4	-	1.7	1.8	1.8	1.8	1.9	2	8.6
NMHC (ppm) Average	679	0.02	0.028	-	0	0	0	0	0	0.1	0.165
CH4(ppm) Average	679	1.91	0.4	-	1.7	1.8	1.8	1.8	1.9	2	8.6
NO2(ppb) Average	673	1.7	2	-	0	0	1	1	2	4	13
NO(ppb) Average	673	0.6	1	-	0	0	0	0	1	1	14
NOX(ppb) Average	673	2.2	2	-	0	0	1	1	3	5	21
O3(ppb) Average	684	18.4	9	-	1	5	11	18	25	30	48
PM2.5(ug/m3) Average	716	4.82	4.4	-	0.2	1	1.7	3.1	6.5	11.5	36
Temperature 2 m (C) Average	720	9.19	5.9	-	-2.3	1.4	5	9	12.7	17.2	29.5
Relative Humidity (%) Average	720	75.2	19	-	25	46	61	80	91	97	99
Surface Wetness (% of range) Average	720	6.2	13	-	0	0	0	0	6	20	84
Wind Speed 20 m (km/h) Average	717	7	4	-	0	3	5	6	9	13	19
Wind Direction 20 m (deg) Average	717	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	719	-	-	75.95	0	0	0	0	0	0	4.1

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
 SEPTEMBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	10 Sep 2014 08:00	10 Sep 2014 08:00	1	Maintenance - cleaned glass manifold
CH4, NMHC, THC	30 Sep 2014 10:00	30 Sep 2014 11:00	2	Maintenance - replace carrier gas and fuel cylinders
NO2, NO, NOX	11 Sep 2014 10:00	11 Sep 2014 14:00	5	Maintenance - replaced sample pump
O3	10 Sep 2014 08:00	10 Sep 2014 08:00	1	Maintenance - cleaned glass manifold
PM2.5	10 Sep 2014 09:00	10 Sep 2014 09:00	1	Flow and zero reference checks, sample head cleaning
Wind Speed, Wind Direction	09 Sep 2014 05:00	09 Sep 2014 05:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	09 Sep 2014 20:00	09 Sep 2014 21:00	2	Flatline in sensor output signal

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Summary of Hour Averages

Anzac - September 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 9 ppb on Sep 2 18:00	Maximum Daily Average: 1.2 ppb on Sep 12		Hours of Data:	682
Minimum Value: 0 ppb on Sep 7 11:00	Minimum Daily Average: 0.0 ppb on Sep 7		Hours of Missing Data:	38
Maximum Diurnal Average: 0.9 ppb at hour 12	Minimum Diurnal Average: 0.2 ppb at hour 7		Hours of Calibration:	38
Monthly Average: 0.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 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	0	Z	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3
2-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	3	5	9	4	1	1	0	0	0	1.2	9
3-Sep	0	0	0	0	Z	0	0	1	1	4	3	4	2	1	0	0	0	0	0	0	0	0	0	0	0.7	4
4-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
5-Sep	0	0	0	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
6-Sep	Z	1	1	1	2	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0.6	2
7-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
8-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	0.1	1
9-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0.2	1
10-Sep	1	1	1	1	Z	0	0	C	C	C	C	C	C	8	2	0	0	0	0	0	0	0	0	--	8	
11-Sep	0	0	0	0	0	Z	0	0	0	0	1	0	1	1	1	0	1	1	1	1	1	0	0	0.4	1	
12-Sep	0	0	0	0	0	0	Z	0	2	2	2	2	2	3	2	3	2	1	0	2	2	2	0	1.2	3	
13-Sep	Z	0	0	0	0	0	0	0	1	0	3	4	1	1	0	0	0	0	0	0	0	0	0	0.5	4	
14-Sep	0	Z	0	0	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0.3	3	
15-Sep	0	0	Z	0	0	0	0	0	0	C	C	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1	
16-Sep	0	1	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
17-Sep	1	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1	
18-Sep	0	0	0	1	0	Z	0	0	2	3	2	1	1	1	1	1	1	1	0	0	0	0	0	0.8	3	
19-Sep	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
20-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	
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	0.2	0	
22-Sep	0	0	Z	0	0	0	0	0	1	1	1	4	1	1	1	1	0	0	0	0	0	0	0	0.5	4	
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	0.1	0	
24-Sep	0	0	0	0	Z	0	1	2	1	1	1	5	2	0	0	0	1	0	0	0	0	0	0	0.7	5	
25-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0.3	2	
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	0.1	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	0.1	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	0.2	0	
29-Sep	1	1	Z	0	1	1	0	0	1	1	1	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	1	2	1	2	2	2	1	1	1	1	1	1	0.8	2	

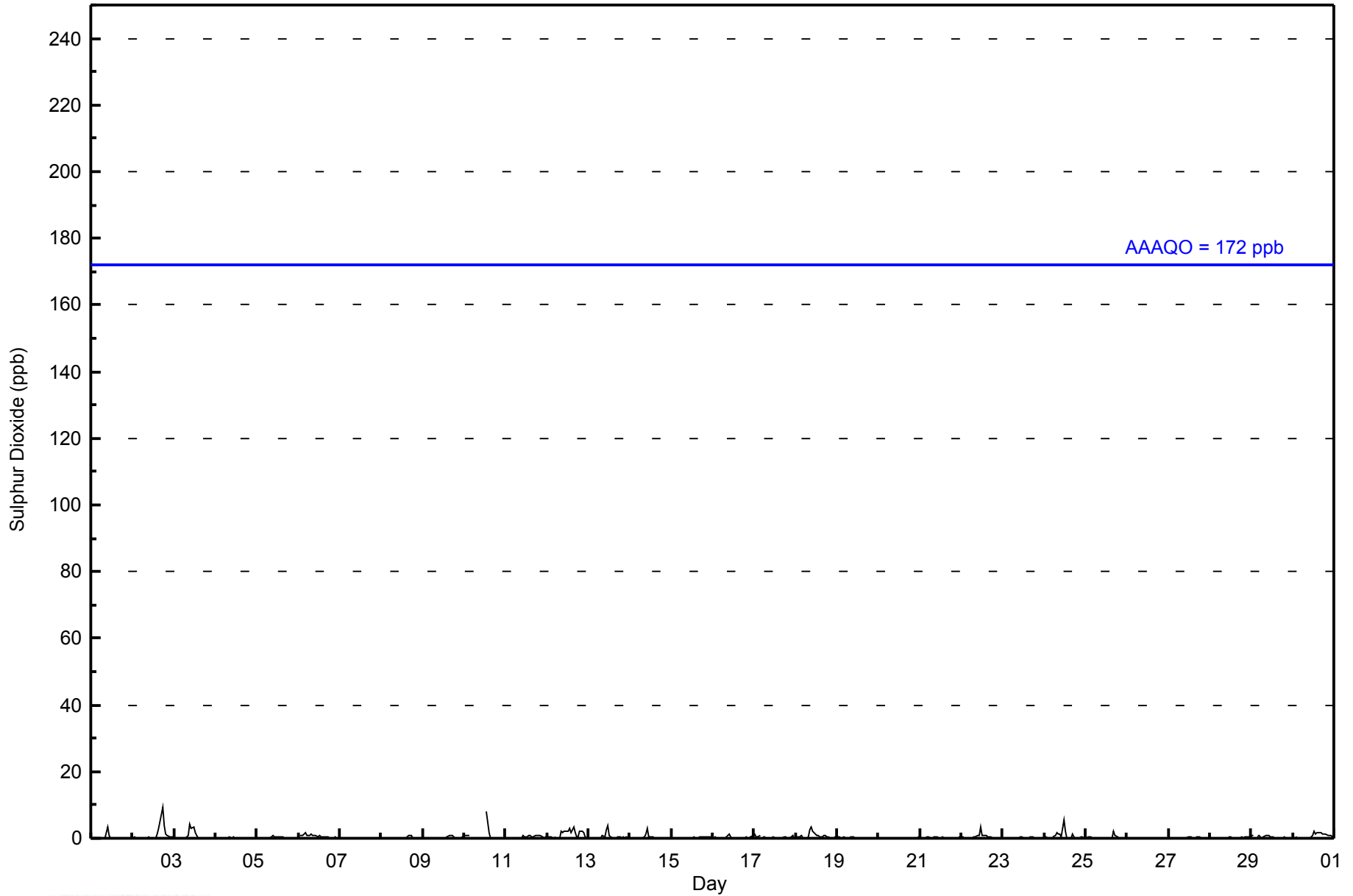
0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.8	0.8	0.9	0.5	0.6	0.4	0.5	0.6	0.6	0.4	0.3	0.3	0.2	0.2	0.2	Diurnal Average	
1	1	1	1	2	1	1	2	2	4	3	5	2	8	2	3	5	9	4	2	2	2	2	1	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Anzac - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	682	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: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - September 2014

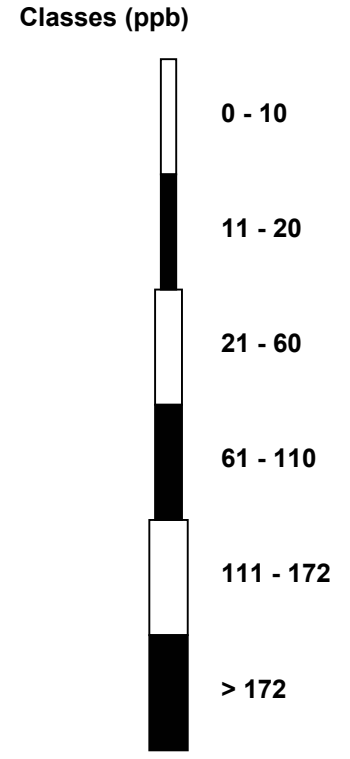
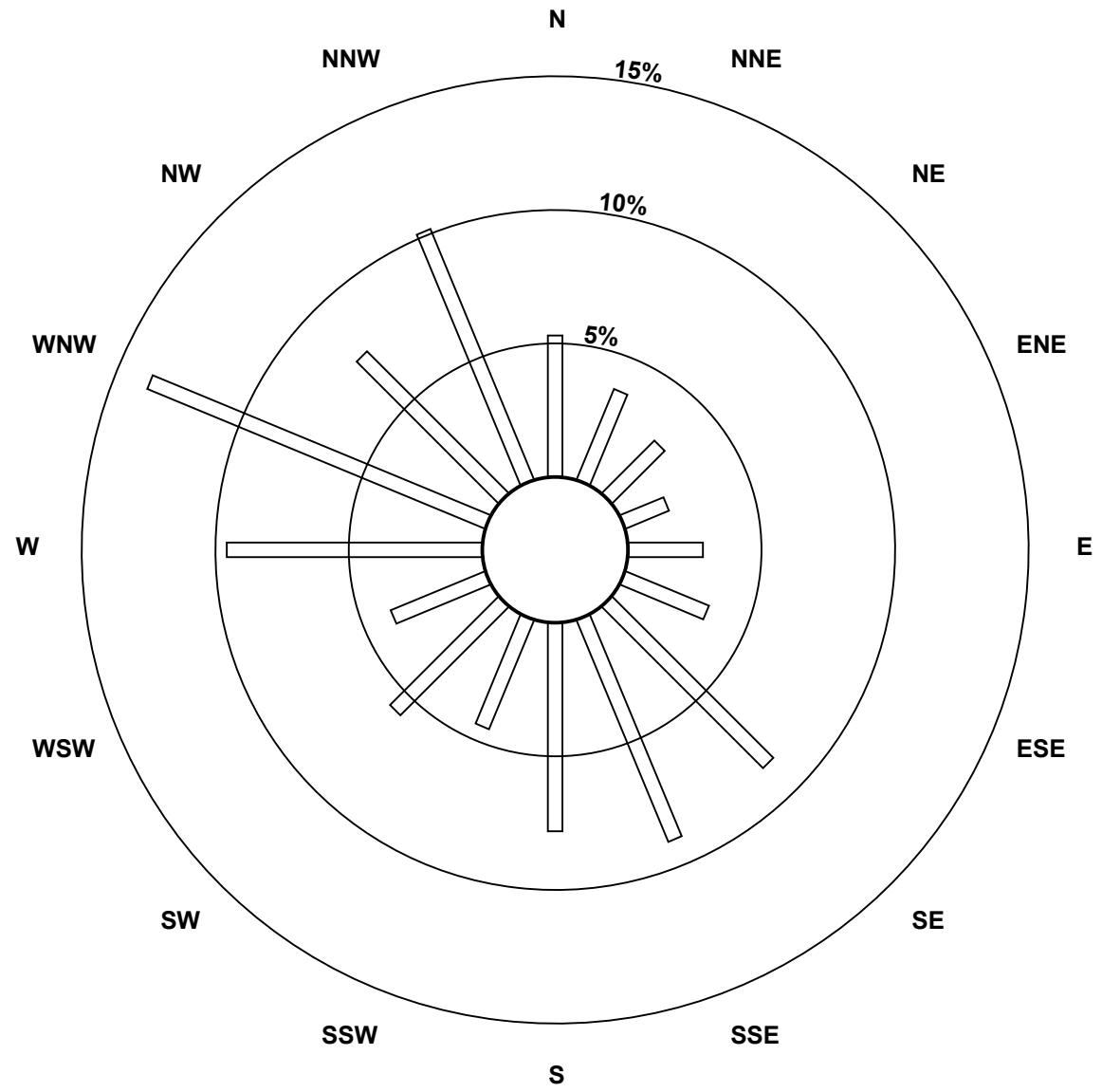
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	36	25	19	12	19	23	58	61	53	30	39	26	65	93	51	69	679
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	25	19	12	19	23	58	61	53	30	39	26	65	93	51	69	679

Total Number of Valid Hours: 679

Total Number of Hours: 720

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

**Sulphur Dioxide (SO₂) - ppb
Anzac (AMS 14)**

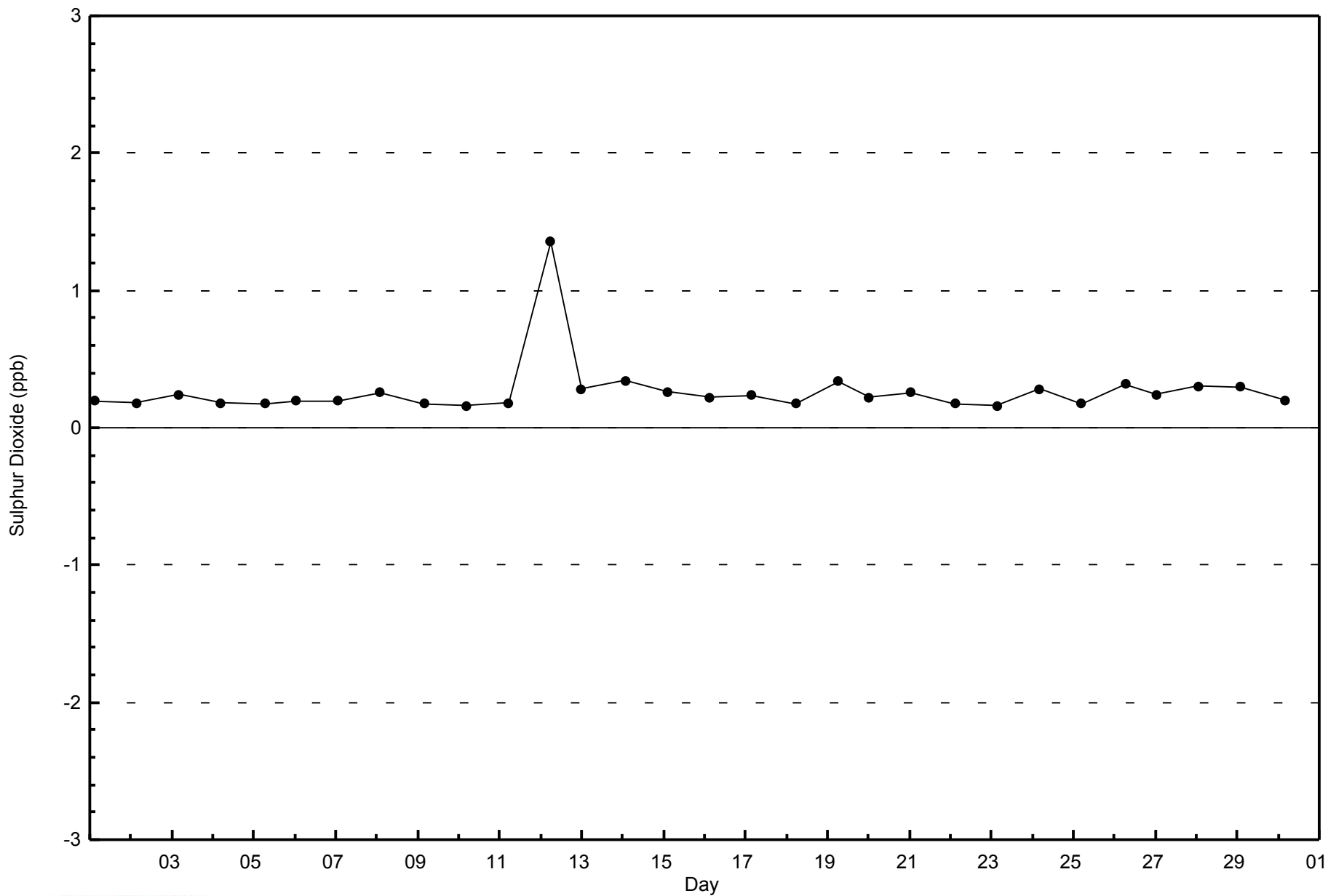


Total Number of Valid Hours: 679



WBEA
Zero Responses

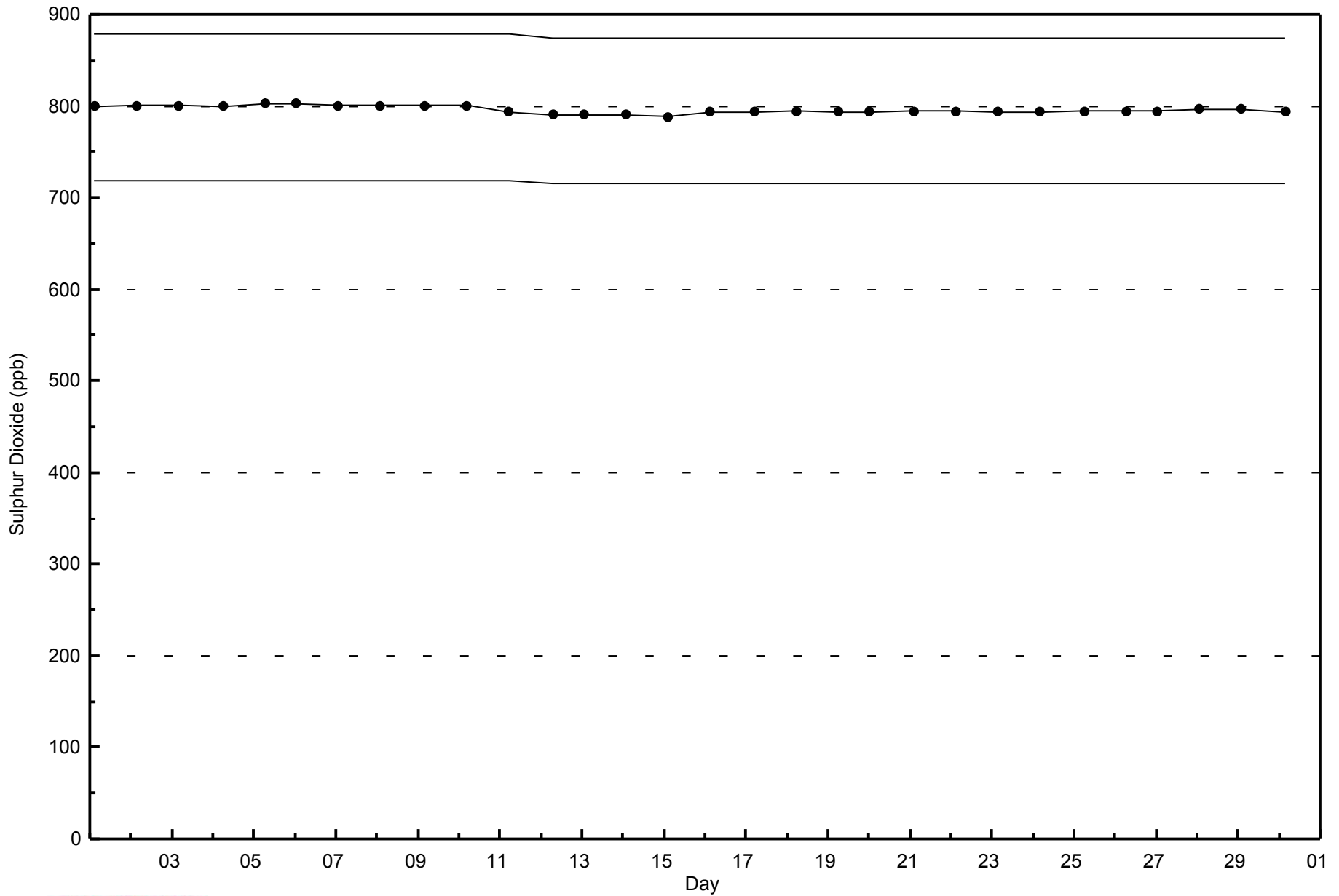
Sulphur Dioxide (SO₂) - ppb
Anzac - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Anzac - September 2014





Summary of Hour Averages

Anzac - September 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Sep 24 07:00	Maximum Daily Average: 0.6 ppb on Sep 24		Hours of Data:	683
Minimum Value: 0 ppb on Sep 14 06:00	Minimum Daily Average: 0.2 ppb on Sep 26		Hours of Missing Data:	37
Maximum Diurnal Average: 0.4 ppb at hour 8	Minimum Diurnal Average: 0.2 ppb at hour 6		Hours of Calibration:	36
Monthly Average: 0.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-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
3-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	0.2	1
4-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
5-Sep	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Sep	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-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
8-Sep	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0
9-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
10-Sep	0	0	0	0	0	Z	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-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
12-Sep	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
13-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
14-Sep	0	0	Z	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
15-Sep	0	0	0	Z	0	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Sep	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
17-Sep	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	1	0.4	2
18-Sep	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1
19-Sep	1	0	0	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
20-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
21-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
22-Sep	0	0	0	Z	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
23-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
24-Sep	0	1	1	0	0	Z	2	2	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
25-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
26-Sep	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
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	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
30-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

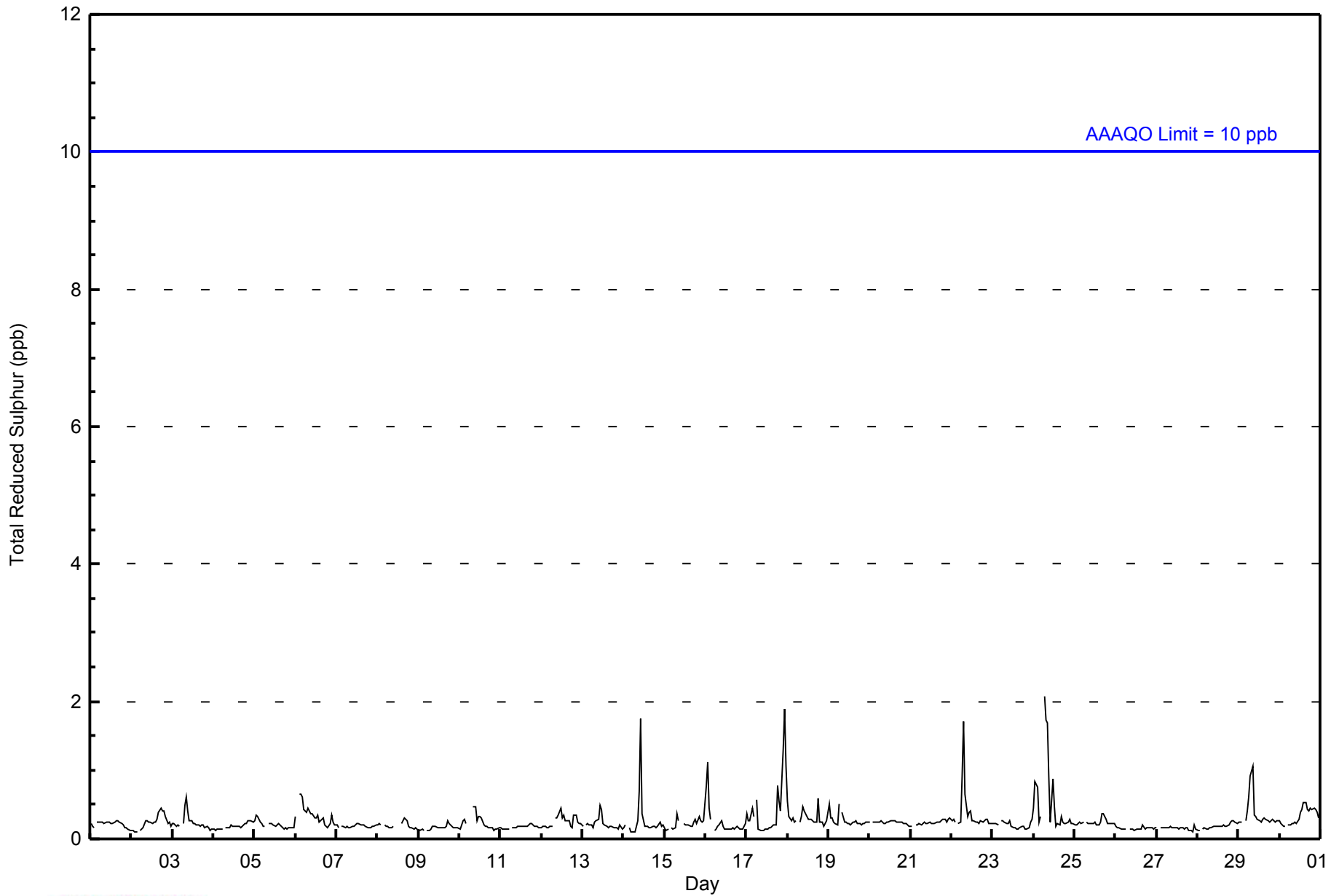
0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.2	Diurnal Average	
1	1	1	1	1	0	2	2	2	1	2	1	0	0	1	1	0	0	1	1	0	1	2	1	Diurnal Maximum		

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



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Anzac - September 2014





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - September 2014

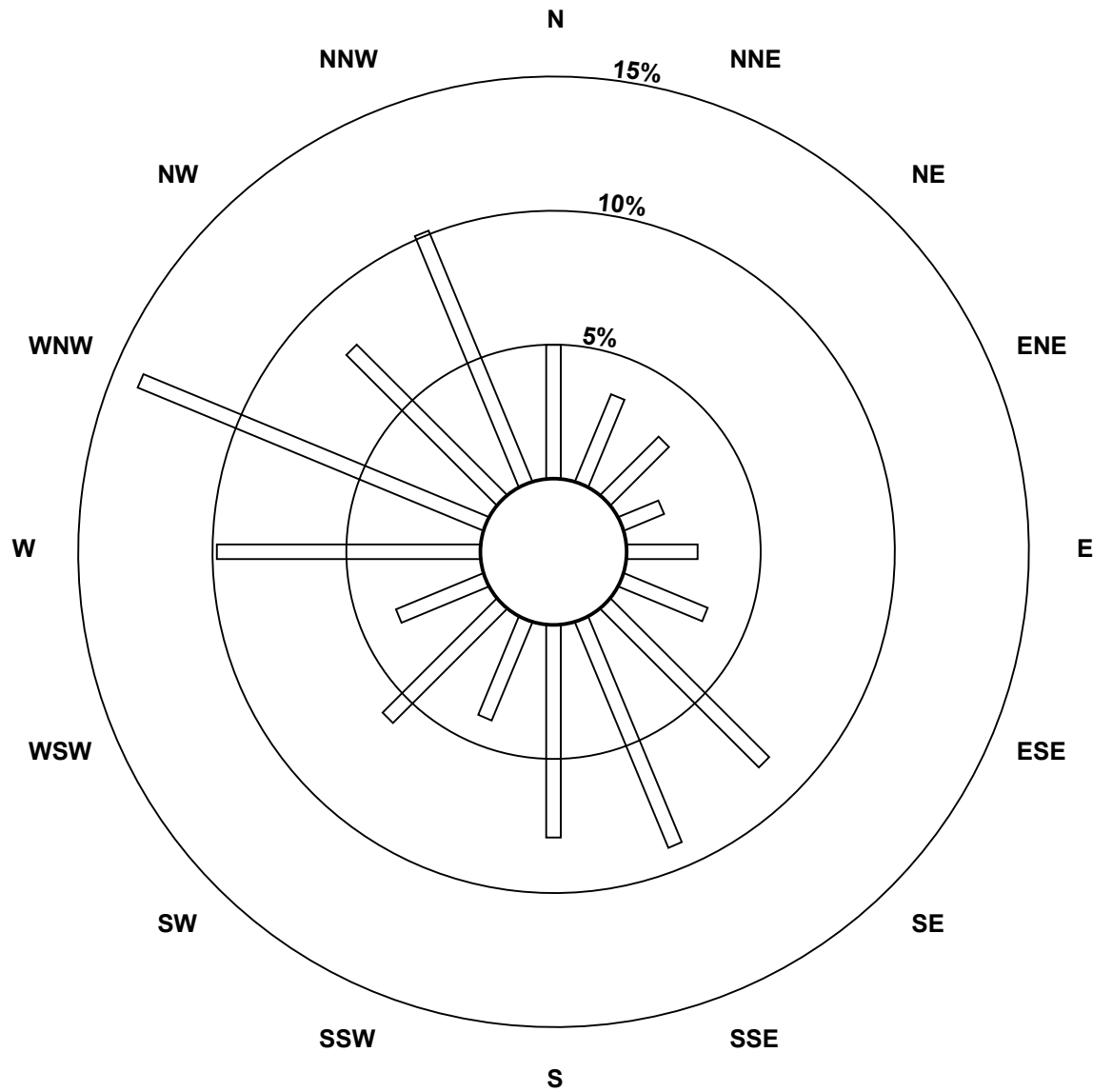
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	34	24	21	11	18	23	57	62	54	27	41	24	67	95	54	69	681
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	34	24	21	11	18	23	57	62	54	27	41	24	67	95	54	69	681

Total Number of Valid Hours: 681

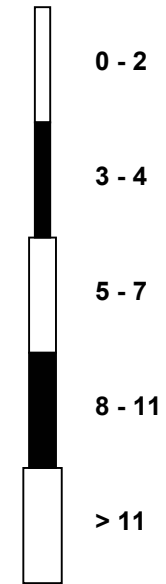
Total Number of Hours: 720

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

**Total Reduced Sulphur (TRS) - ppb
Anzac (AMS 14)**



Classes (ppb)

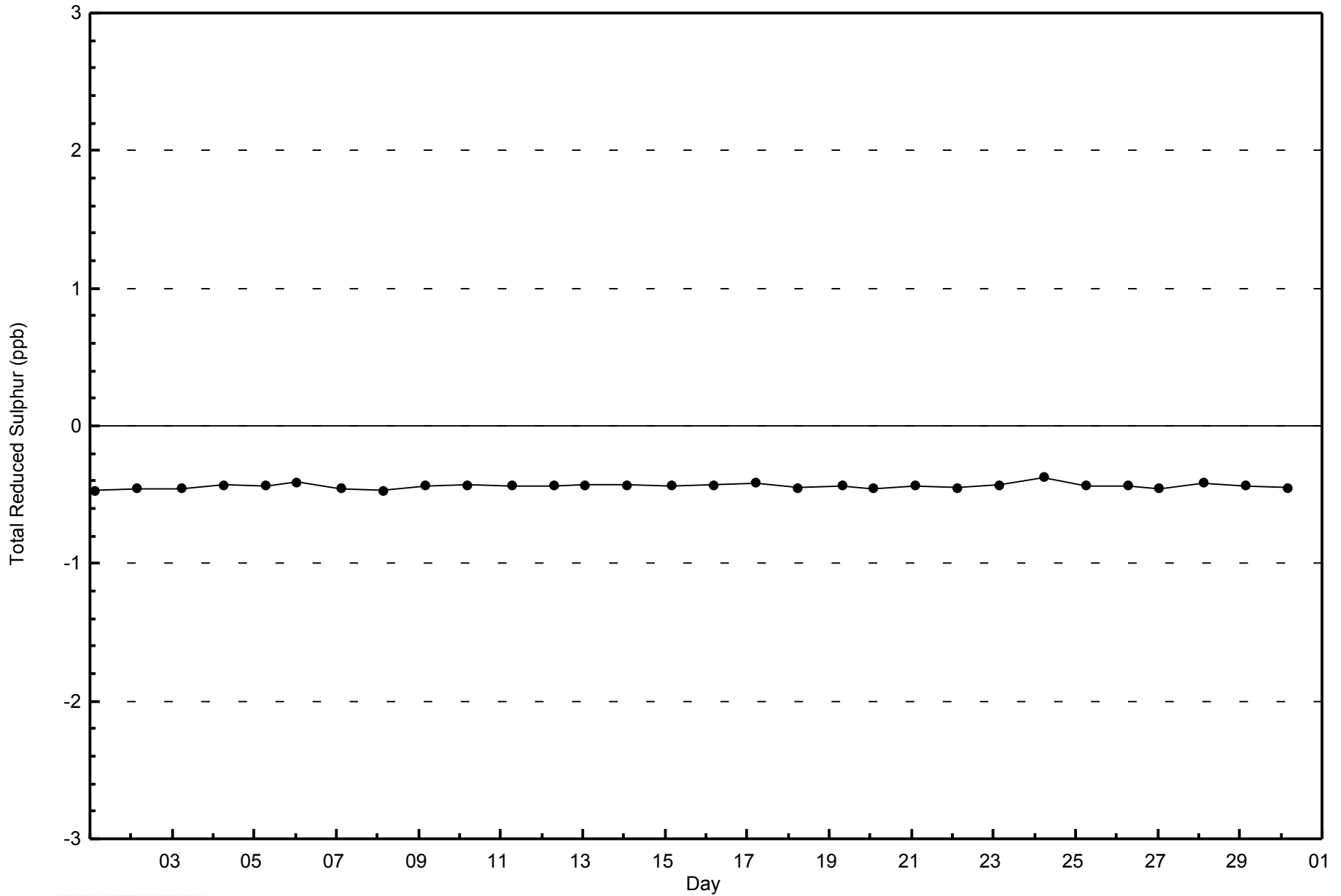


Total Number of Valid Hours: 681



WBEA
Zero Responses

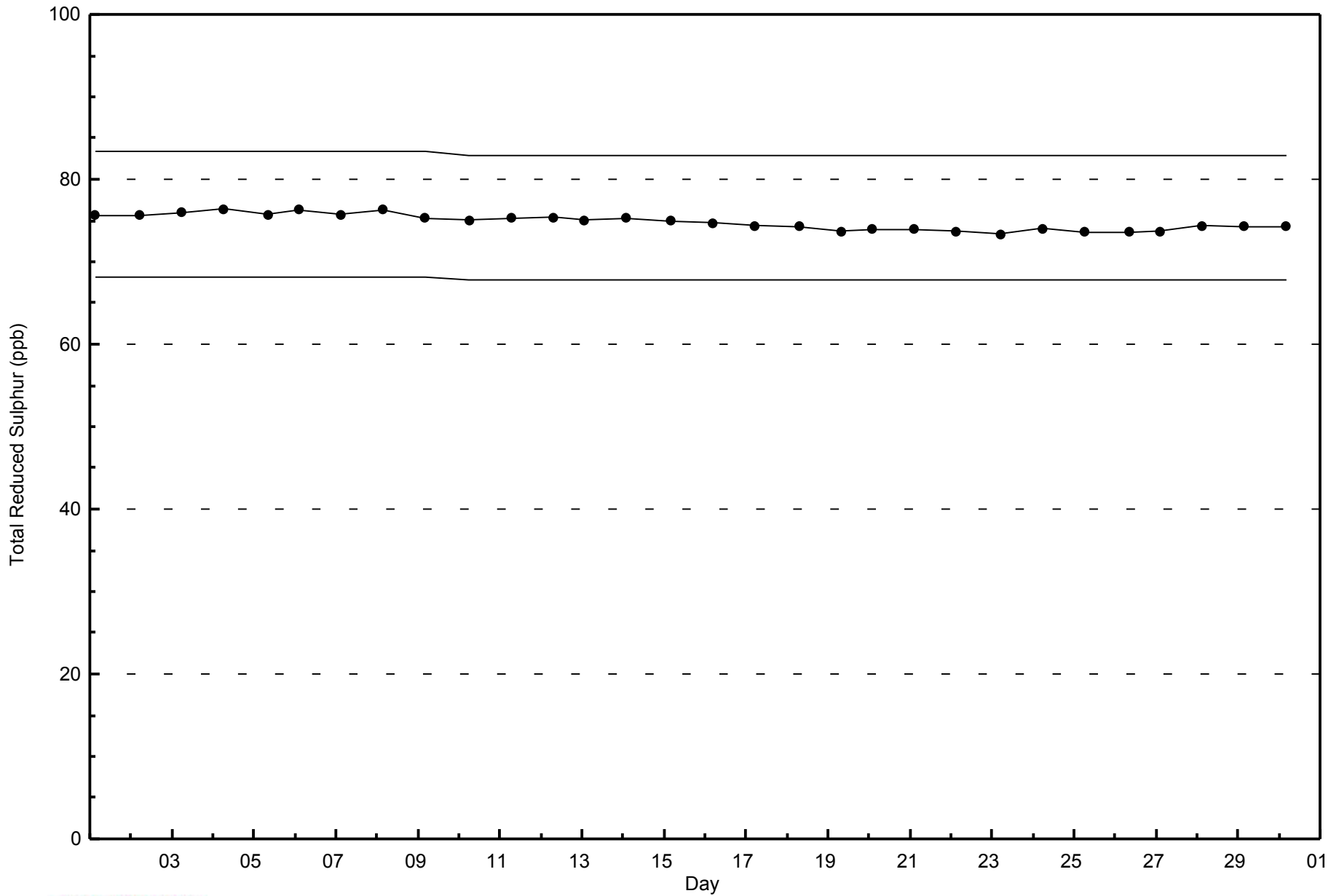
Total Reduced Sulphur (TRS) - ppb
Anzac - September 2014





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Anzac - September 2014



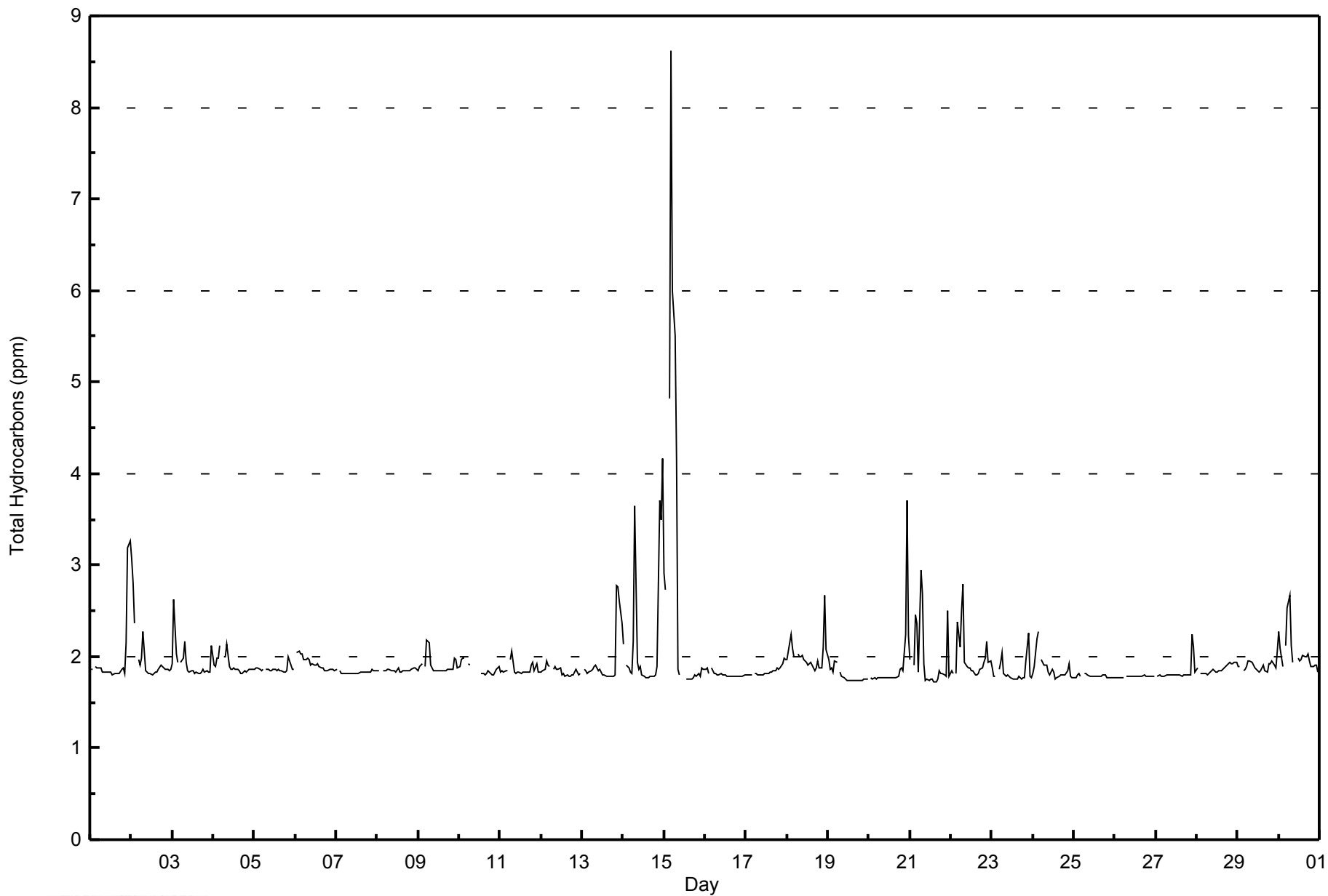


Maximum Value: 8.6 ppm on Sep 15 05:00																	Maximum Daily Average: 2.9 ppm on Sep 15																	Hours in Service: 720	
Minimum Value: 1.7 ppm on Sep 21 16:00																	Minimum Daily Average: 1.8 ppm on Sep 26																	Hours of Data: 679	
Maximum Diurnal Average: 2.2 ppm at hour 5																	Minimum Diurnal Average: 1.8 ppm at hour 14																	Hours of Missing Data: 41	
Monthly Average: 1.93 ppm																	Percentiles: P ₁ = 1.7 P ₁₀ = 1.8 Q ₁ = 1.8 Median = 1.8 Q ₃ = 1.9 P ₉₀ = 2.0 P ₉₉ = 3.6																	Hours of Calibration: 39	
																																		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	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	2.1	3.2	3.3	2.0	3.3									
2-Sep	3.1	2.8	2.4	Z	2.0	1.9	2.0	2.3	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	3.1									
3-Sep	1.9	2.6	2.0	1.9	Z	1.9	2.0	2.2	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	2.1	1.9	2.6										
4-Sep	1.9	1.9	2.0	2.0	2.1	Z	2.0	2.0	2.1	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.1										
5-Sep	1.9	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.8	1.8	1.9	1.9	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.9	2.0	1.9	1.9	2.0										
6-Sep	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.8	1.9	2.1										
7-Sep	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.9										
8-Sep	1.8	1.8	Z	1.9	1.8	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9										
9-Sep	1.8	1.9	1.9	Z	1.9	2.2	2.1	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	1.9	1.9	2.2										
10-Sep	1.9	2.0	2.0	2.0	Z	1.9	1.9	C	C	C	C	C	C	C	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	--	2.0										
11-Sep	1.8	1.8	1.8	1.8	1.8	Z	2.0	2.1	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.8	1.9	2.1										
12-Sep	1.8	1.8	1.9	2.0	1.9	1.9	Z	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	1.8	1.8	1.8	2.0										
13-Sep	Z	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.8	2.8	2.4	2.0	2.8										
14-Sep	2.1	Z	1.9	1.9	1.8	1.8	2.2	3.6	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	3.7	3.5	2.2	4.2										
15-Sep	2.9	2.7	Z	4.8	8.6	6.0	5.5	4.2	1.9	1.8	C	C	C	1.8	1.8	1.7	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.9	8.6										
16-Sep	1.9	1.9	1.8	Z	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9										
17-Sep	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	1.8	2.0										
18-Sep	2.0	2.1	2.2	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	2.1	2.7	2.0	2.7										
19-Sep	2.0	1.9	1.9	1.8	2.0	1.9	Z	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.8	2.0										
20-Sep	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.2	1.9	3.7										
21-Sep	2.0	Z	1.9	2.5	2.4	1.8	2.9	2.7	1.9	1.7	1.8	1.7	1.7	1.7	1.7	1.7	1.8	1.9	1.8	1.8	1.8	2.5	1.8	2.0	2.9										
22-Sep	1.8	1.8	Z	1.8	2.4	2.1	2.5	2.8	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.2	2.0	2.8										
23-Sep	1.9	1.8	1.8	Z	1.9	1.9	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.3	1.8	1.8	2.3										
24-Sep	1.8	1.9	2.2	2.3	Z	2.0	1.9	1.9	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	2.3										
25-Sep	1.8	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8										
26-Sep	1.8	1.8	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8										
27-Sep	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.2	2.1	1.8	2.2										
28-Sep	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	1.9	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	1.9	1.8	1.9	1.9	1.9	1.8	1.8	1.9	1.9	2.0	1.9	2.1	1.9	2.1										
30-Sep	2.3	2.1	1.9	Z	2.1	2.5	2.7	2.1	1.9	M	M	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	2.0	2.7										
																								Diurnal Average											
																								Diurnal Maximum											
Z - zerspan C - Calibration M - Maintenance																																			



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Anzac - September 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	614	90.43	90.43
2.1 - 3.0	52	7.66	98.09
3.1 - 10.0	13	1.91	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 679

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - September 2014

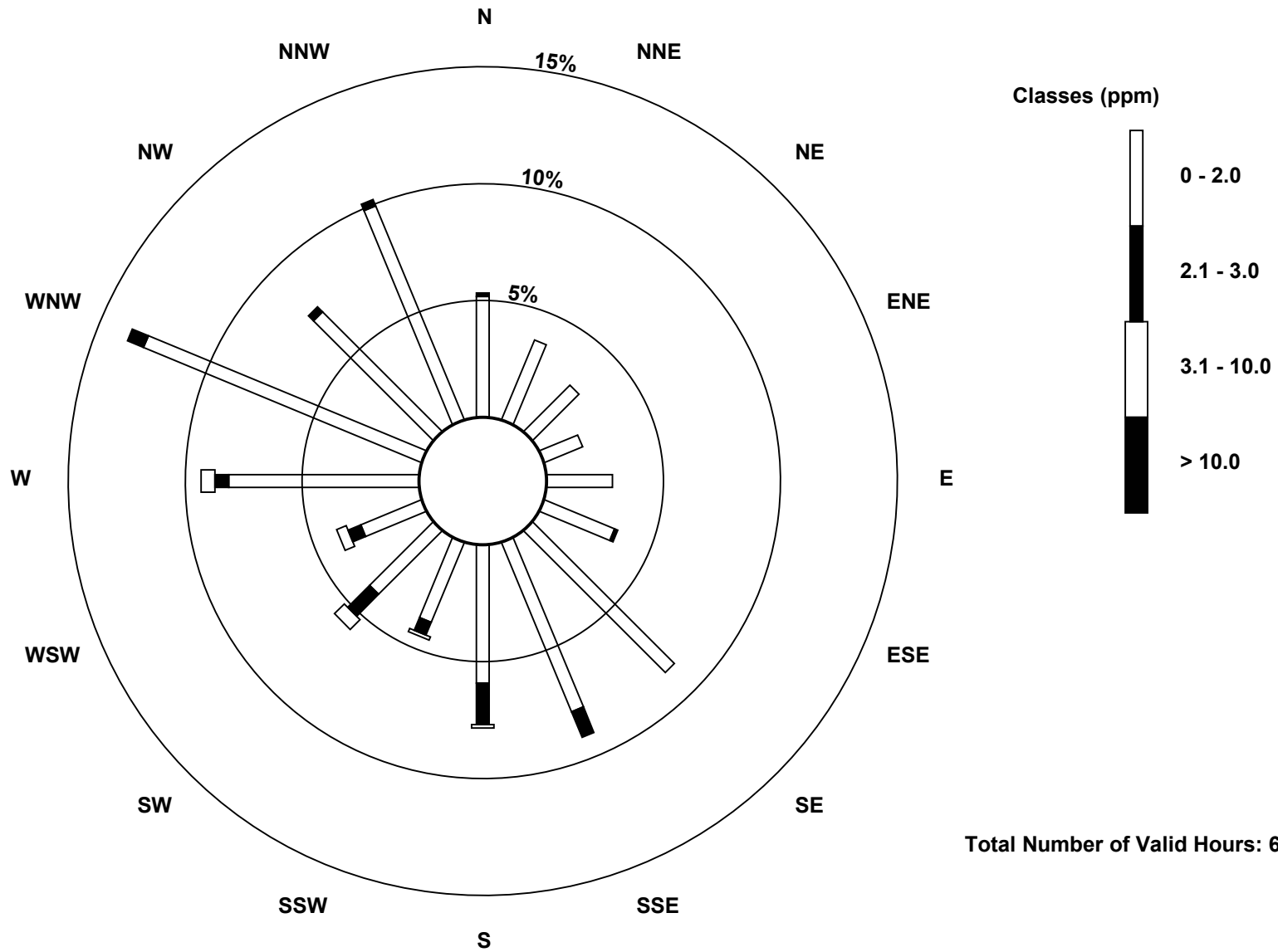
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	35	25	19	12	19	22	58	53	40	25	26	19	55	87	49	67	611
2.1 - 3.0	1	0	0	0	0	1	0	8	12	4	9	4	4	5	2	2	52
3.1 - 10.0	0	0	0	0	0	0	0	0	1	1	4	3	4	0	0	0	13
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	25	19	12	19	23	58	61	53	30	39	26	63	92	51	69	676

Total Number of Valid Hours: 676

Total Number of Hours: 720

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

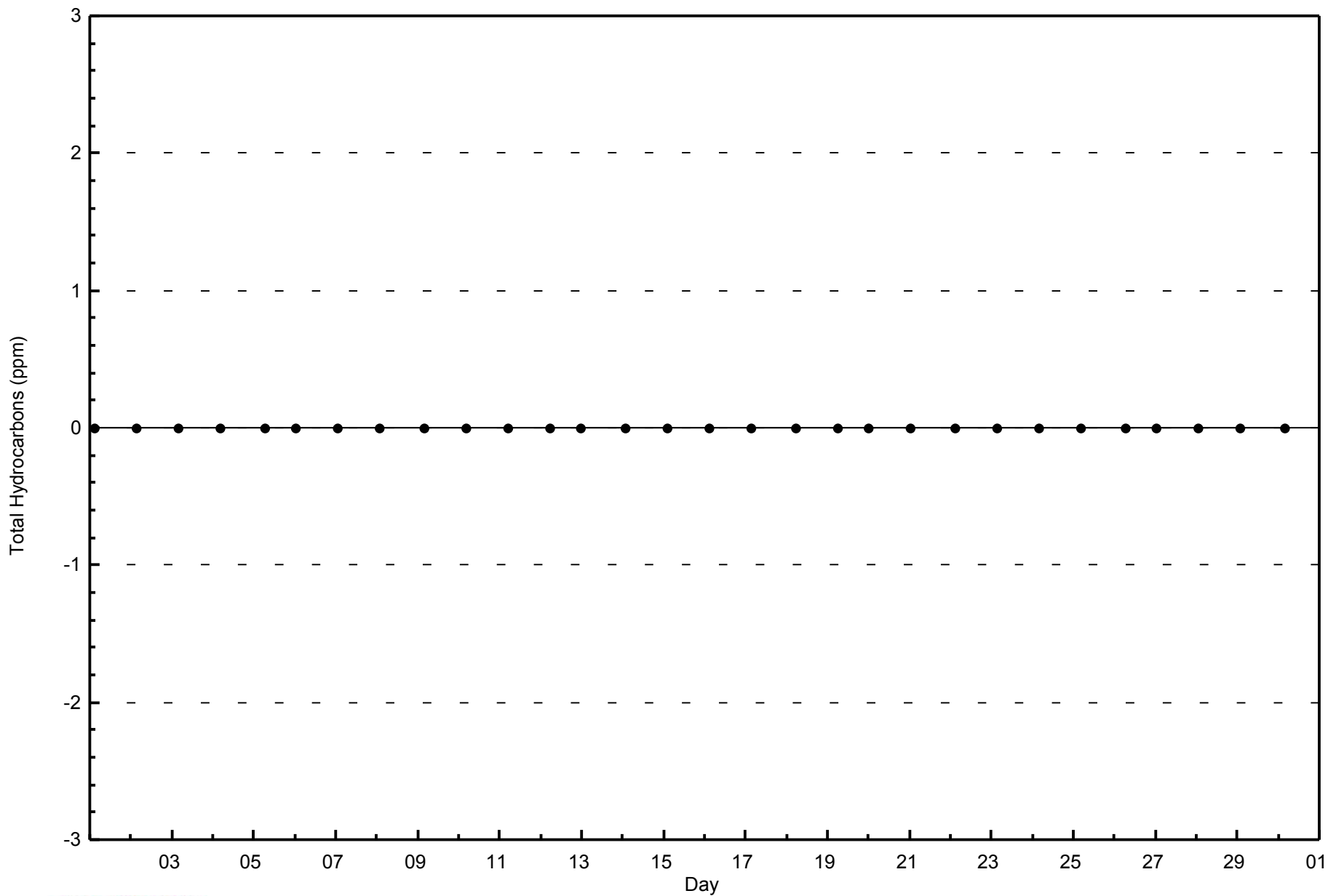
**Total Hydrocarbons (THC) - ppm
Anzac (AMS 14)**





WBEA
Zero Responses

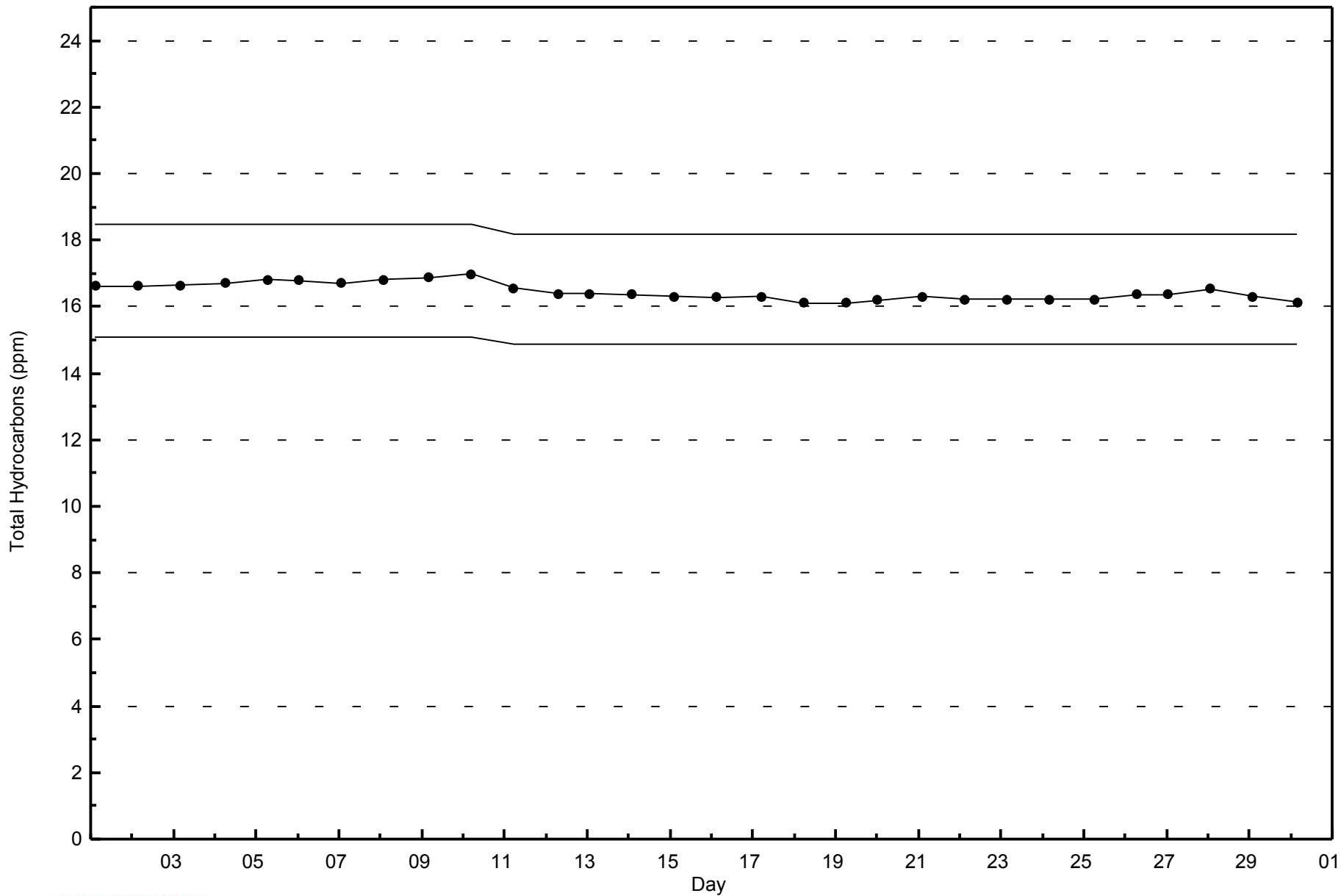
Total Hydrocarbons (THC) - ppm
Anzac - September 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Anzac - September 2014





Summary of Hour Averages

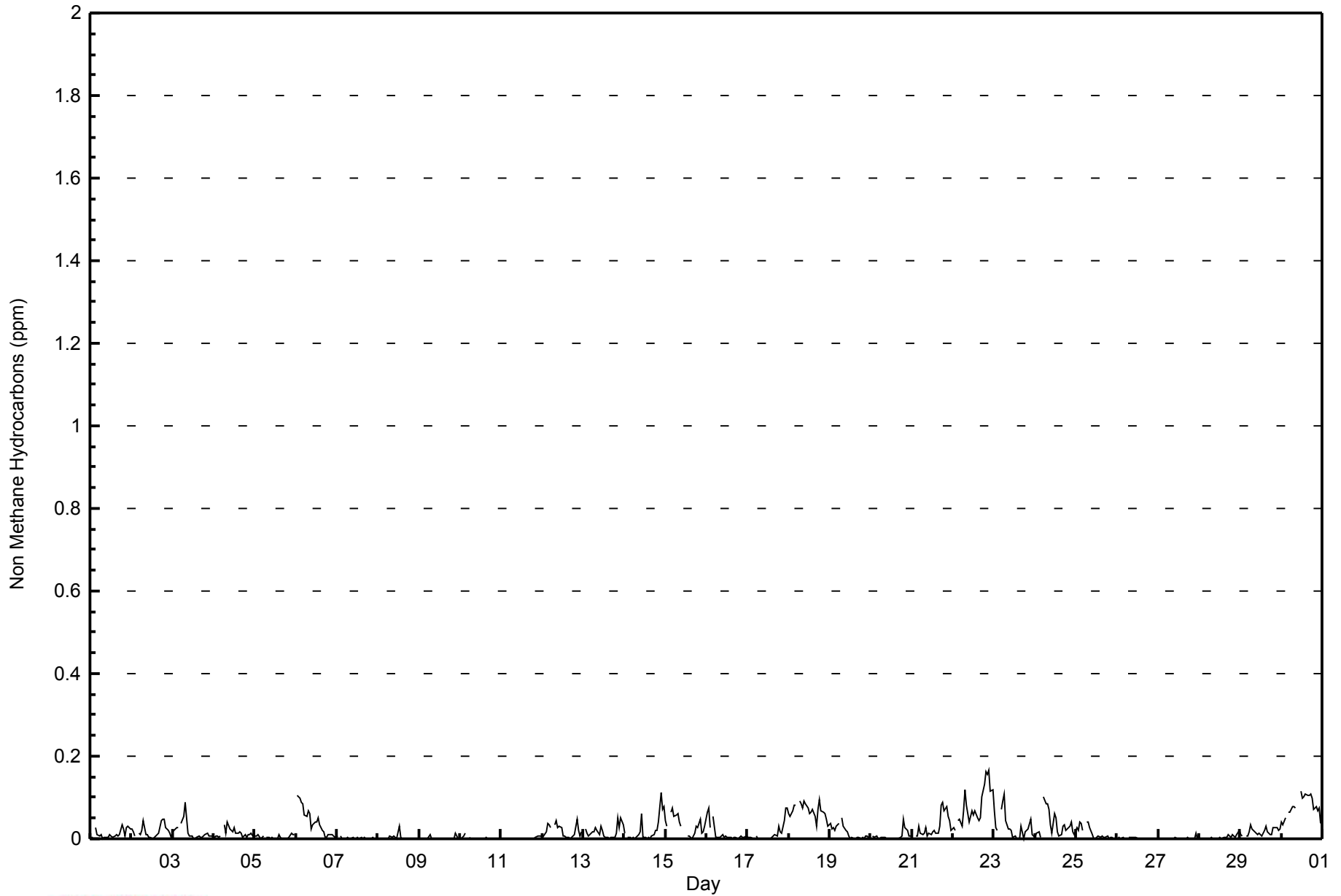
Anzac - September 2014

Maximum Value: 0.165 ppm on Sep 22 22:00		Maximum Daily Average: 0.079 ppm on Sep 22		Hours in Service:	720																																												
Minimum Value: 0.000 ppm on Sep 1 08:00		Minimum Daily Average: 0.001 ppm on Sep 27		Hours of Data:	679																																												
Maximum Diurnal Average: 0.031 ppm at hour 8		Minimum Diurnal Average: 0.012 ppm at hour 16		Hours of Missing Data:	41																																												
Monthly Average: 0.020 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.1 P ₉₉ = 0.1		Hours of Calibration:	39																																												
				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	0.003	0.005	Z	0.028	0.009	0.006	0.012	0.000	0.005	0.004	0.003	0.010	0.006	0.003	0.005	0.010	0.008	0.011	0.033	0.023	0.006	0.027	0.030	0.024	0.012	0.033																							
2-Sep	0.023	0.017	0.007	Z	0.012	0.009	0.020	0.045	0.011	0.010	0.003	0.003	0.000	0.005	0.006	0.011	0.015	0.043	0.048	0.047	0.026	0.019	0.012	0.004	0.017	0.048																							
3-Sep	0.017	0.021	0.028	0.028	Z	0.038	0.056	0.087	0.050	0.014	0.005	0.007	0.001	0.001	0.005	0.006	0.003	0.004	0.008	0.011	0.014	0.007	0.008	0.007	0.018	0.087																							
4-Sep	0.003	0.006	0.008	0.003	0.006	Z	0.034	0.013	0.040	0.024	0.021	0.018	0.026	0.013	0.015	0.018	0.012	0.003	0.012	0.005	0.009	0.010	0.013	0.004	0.014	0.040																							
5-Sep	0.006	0.005	0.009	0.001	0.004	0.005	Z	0.003	0.002	0.001	0.003	0.001	0.000	0.002	0.009	0.005	0.000	0.002	0.000	0.001	0.003	0.013	0.009	0.009	0.004	0.013																							
6-Sep	Z	0.105	0.097	0.087	0.086	0.057	0.054	0.067	0.060	0.025	0.035	0.042	0.041	0.049	0.033	0.021	0.016	0.004	0.004	0.010	0.009	0.011	0.008	0.002	0.040	0.105																							
7-Sep	0.007	Z	0.007	0.000	0.002	0.000	0.003	0.002	0.002	0.003	0.001	0.000	0.004	0.001	0.003	0.000	0.003	0.001	0.000	0.001	0.001	0.003	0.000	0.002	0.002	0.007																							
8-Sep	0.000	0.000	Z	0.000	0.000	0.001	0.000	0.006	0.002	0.006	0.003	0.000	0.031	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.031																							
9-Sep	0.001	0.000	0.000	Z	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.007	0.000	0.001	0.015																							
10-Sep	0.001	0.002	0.008	0.013	Z	0.003	0.000	C	C	C	C	C	C	0.000	0.001	0.002	0.000	0.001	0.001	0.000	0.001	0.000	0.000	0.000	--	0.013																							
11-Sep	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.004	0.005	0.008	0.007	0.001	0.008																						
12-Sep	0.002	0.008	0.017	0.038	0.035	0.027	Z	0.033	0.043	0.028	0.029	0.028	0.008	0.006	0.002	0.002	0.001	0.002	0.007	0.009	0.046	0.021	0.006	0.017	0.018	0.046																							
13-Sep	Z	0.023	0.014	0.007	0.009	0.015	0.017	0.027	0.022	0.010	0.029	0.021	0.005	0.004	0.002	0.000	0.003	0.004	0.002	0.014	0.050	0.026	0.052	0.033	0.017	0.052																							
14-Sep	0.015	Z	0.004	0.002	0.000	0.002	0.001	0.003	0.009	0.017	0.060	0.002	0.003	0.001	0.003	0.001	0.008	0.009	0.019	0.022	0.040	0.113	0.071	0.078	0.021	0.113																							
15-Sep	0.046	0.030	Z	0.065	0.073	0.056	0.059	0.061	0.039	0.032	C	C	C	0.006	0.007	0.001	0.008	0.014	0.032	0.027	0.048	0.014	0.016	0.031	0.033	0.073																							
16-Sep	0.065	0.075	0.028	Z	0.054	0.003	0.002	0.004	0.005	0.010	0.005	0.008	0.002	0.003	0.001	0.002	0.003	0.001	0.004	0.005	0.005	0.003	0.003	0.007	0.013	0.075																							
17-Sep	0.003	0.004	0.005	0.001	Z	0.005	0.000	0.000	0.001	0.000	0.001	0.001	0.001	0.001	0.003	0.007	0.010	0.007	0.029	0.016	0.012	0.044	0.076	0.074	0.013	0.076																							
18-Sep	0.061	0.054	0.066	0.081	0.082	Z	0.092	0.084	0.076	0.092	0.084	0.073	0.061	0.065	0.073	0.055	0.032	0.071	0.094	0.069	0.064	0.062	0.046	0.029	0.068	0.094																							
19-Sep	0.037	0.025	0.027	0.021	0.031	0.036	Z	0.051	0.032	0.021	0.017	0.007	0.001	0.002	0.001	0.001	0.004	0.003	0.001	0.005	0.001	0.007	0.005	0.001	0.015	0.051																							
20-Sep	Z	0.007	0.004	0.005	0.000	0.001	0.003	0.002	0.003	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.000	0.005	0.006	0.049	0.027	0.021	0.008	0.007	0.007	0.049																							
21-Sep	0.006	Z	0.006	0.006	0.029	0.014	0.011	0.013	0.026	0.006	0.014	0.011	0.017	0.020	0.013	0.013	0.029	0.082	0.090	0.068	0.077	0.054	0.043	0.020	0.029	0.090																							
22-Sep	0.027	0.020	Z	0.046	0.048	0.029	0.066	0.118	0.080	0.042	0.055	0.068	0.056	0.068	0.050	0.043	0.051	0.102	0.131	0.161	0.157	0.165	0.114	0.118	0.079	0.165																							
23-Sep	0.067	0.027	0.021	Z	0.071	0.092	0.108	0.043	0.025	0.025	0.020	0.005	0.006	0.000	0.000	0.030	0.001	0.017	0.021	0.023	0.046	0.011	0.008	0.029	0.108	0.108																							
24-Sep	0.005	0.015	0.018	0.003	Z	0.101	0.085	0.083	0.072	0.035	0.013	0.060	0.051	0.016	0.007	0.010	0.031	0.035	0.022	0.022	0.030	0.042	0.018	0.010	0.034	0.101																							
25-Sep	0.026	0.020	0.039	0.037	0.019	Z	0.042	0.041	0.026	0.011	0.001	0.000	0.004	0.005	0.002	0.007	0.003	0.004	0.006	0.002	0.002	0.004	0.001	0.000	0.013	0.042																							
26-Sep	0.000	0.002	0.001	0.002	0.001	0.001	Z	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.004																							
27-Sep	Z	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.003	0.000	0.001	0.000	0.001	0.000	0.000	0.005	0.000	0.001	0.000	0.000	0.013	0.000	0.001	0.013																							
28-Sep	0.002	Z	0.001	0.000	0.001	0.000	0.000	0.002	0.000	0.002	0.000	0.000	0.002	0.000	0.004	0.004	0.005	0.010	0.002	0.010	0.008	0.002	0.010	0.020	0.004	0.020																							
29-Sep	0.009	0.006	Z	0.008	0.007	0.016	0.033	0.025	0.018	0.013	0.011	0.015	0.008	0.013	0.019	0.032	0.017	0.010	0.009	0.026	0.026	0.028	0.020	0.025	0.017	0.033																							
30-Sep	0.039	0.034	0.051	Z	0.065	0.066	0.077	0.079	0.075	M	M	0.117	0.097	0.101	0.109	0.105	0.104	0.108	0.098	0.070	0.077	0.069	0.075	0.038	0.079	0.117																							
																								0.018	0.020	0.019	0.019	0.025	0.022	0.030	0.031	0.025	0.015	0.016	0.018	0.015	0.013	0.013	0.012	0.013	0.018	0.022	0.023	0.026	0.028	0.023	0.019	Diurnal Average	
																								0.067	0.105	0.097	0.087	0.086	0.101	0.108	0.118	0.080	0.092	0.084	0.117	0.097	0.101	0.109	0.105	0.104	0.108	0.131	0.161	0.157	0.165	0.114	0.118	Diurnal Maximum	
Z - zerspan		C - Calibration				M - Maintenance																																											



WBEA
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - September 2014





WBEA
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	306	45.07	45.07
0.006 - 0.05	290	42.71	87.78
0.06 - 0.1	80	11.78	99.56
> 0.1	3	0.44	100.00

Total Number of Valid Hours: 679

Total Number of Hours: 720



WBEA
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - September 2014

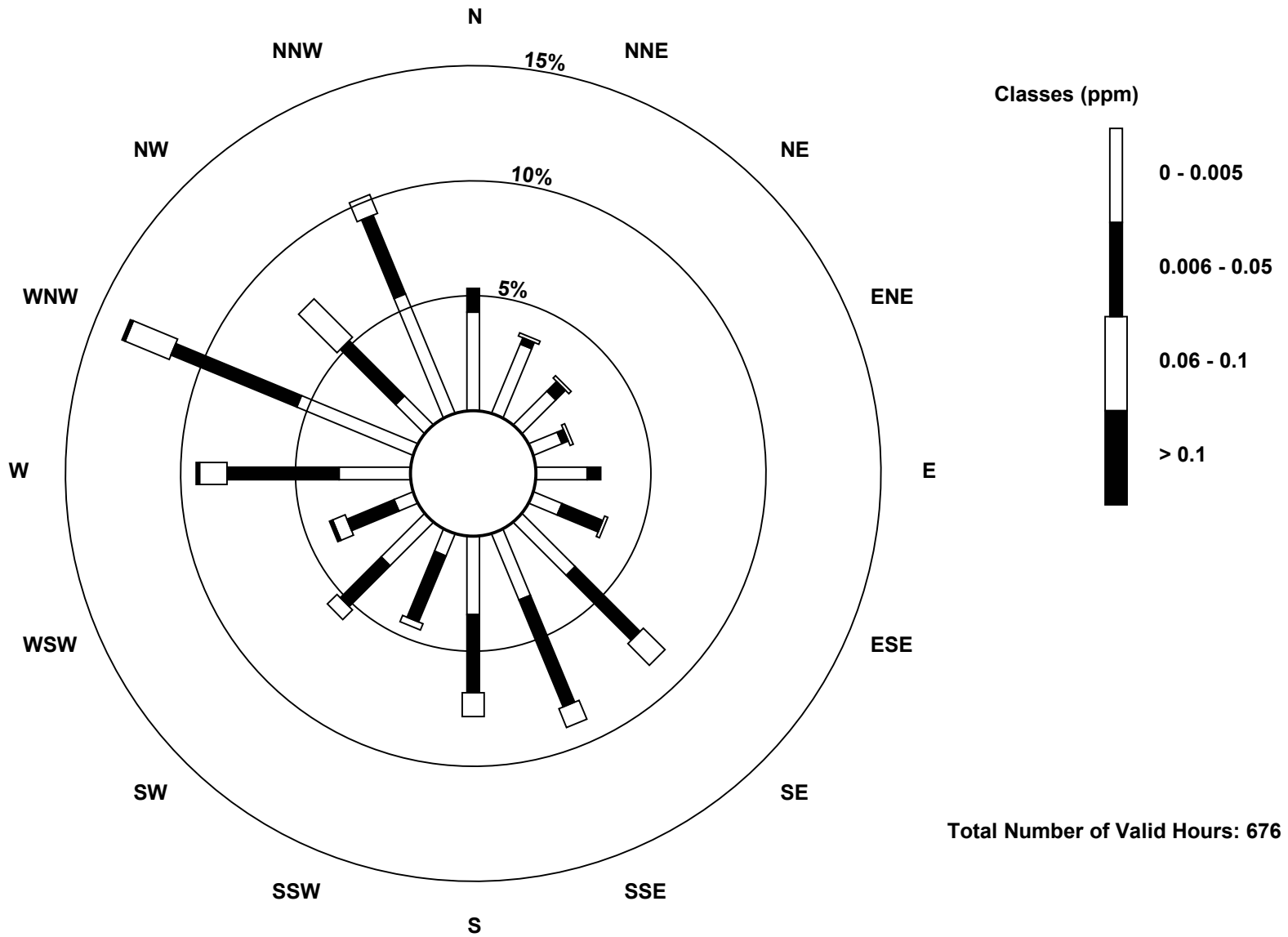
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	29	22	14	9	15	9	22	21	23	7	18	6	21	37	12	38	303
0.006 - 0.05	7	2	4	2	4	13	27	34	23	21	17	15	33	40	23	25	290
0.06 - 0.1	0	1	1	1	0	1	9	6	7	2	4	4	8	14	16	6	80
> 0.1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	3
Totals	36	25	19	12	19	23	58	61	53	30	39	26	63	92	51	69	676

Total Number of Valid Hours: 676

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Non Methane Hydrocarbons (NMHC) - ppm
Anzac (AMS 14)



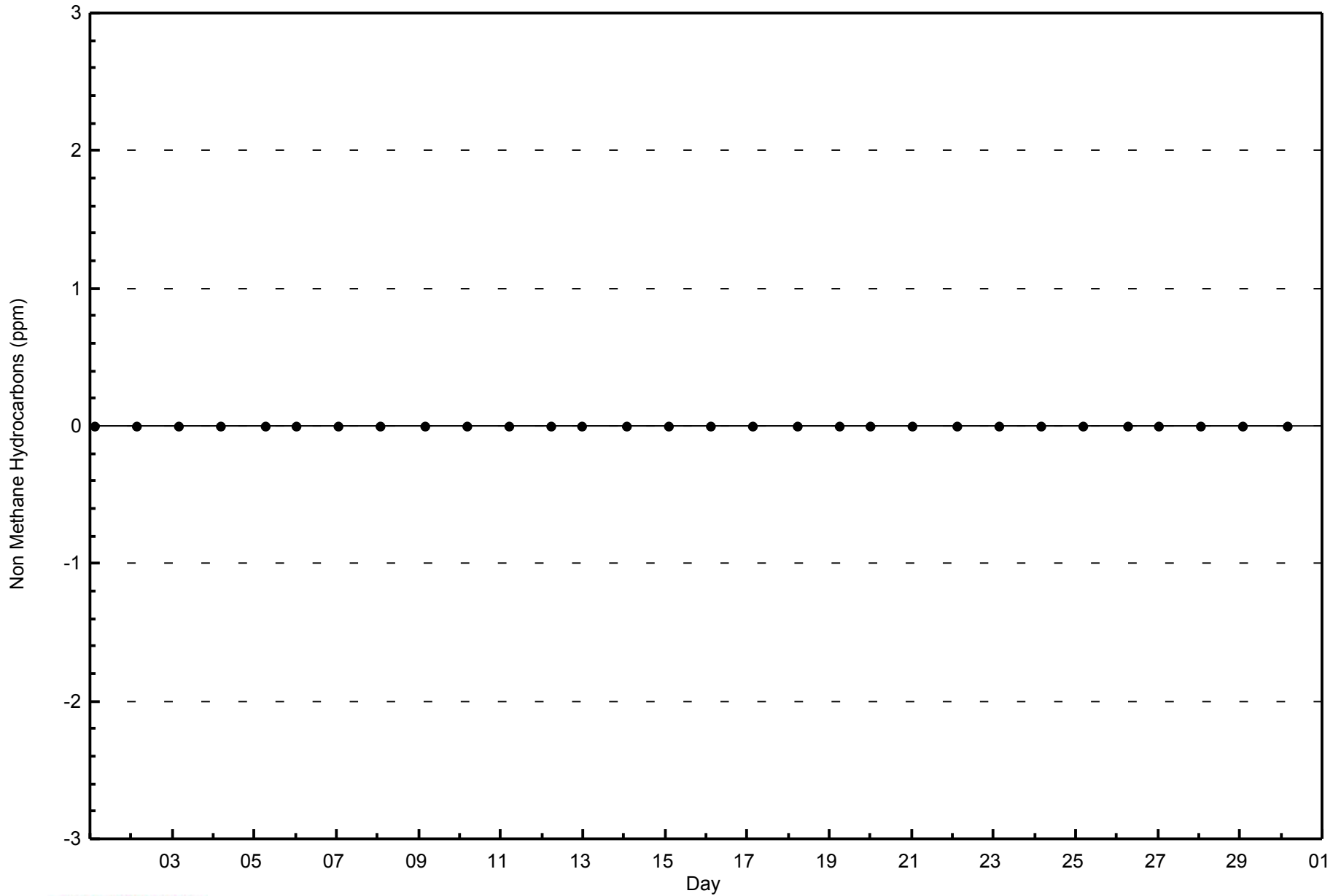


WBEA

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

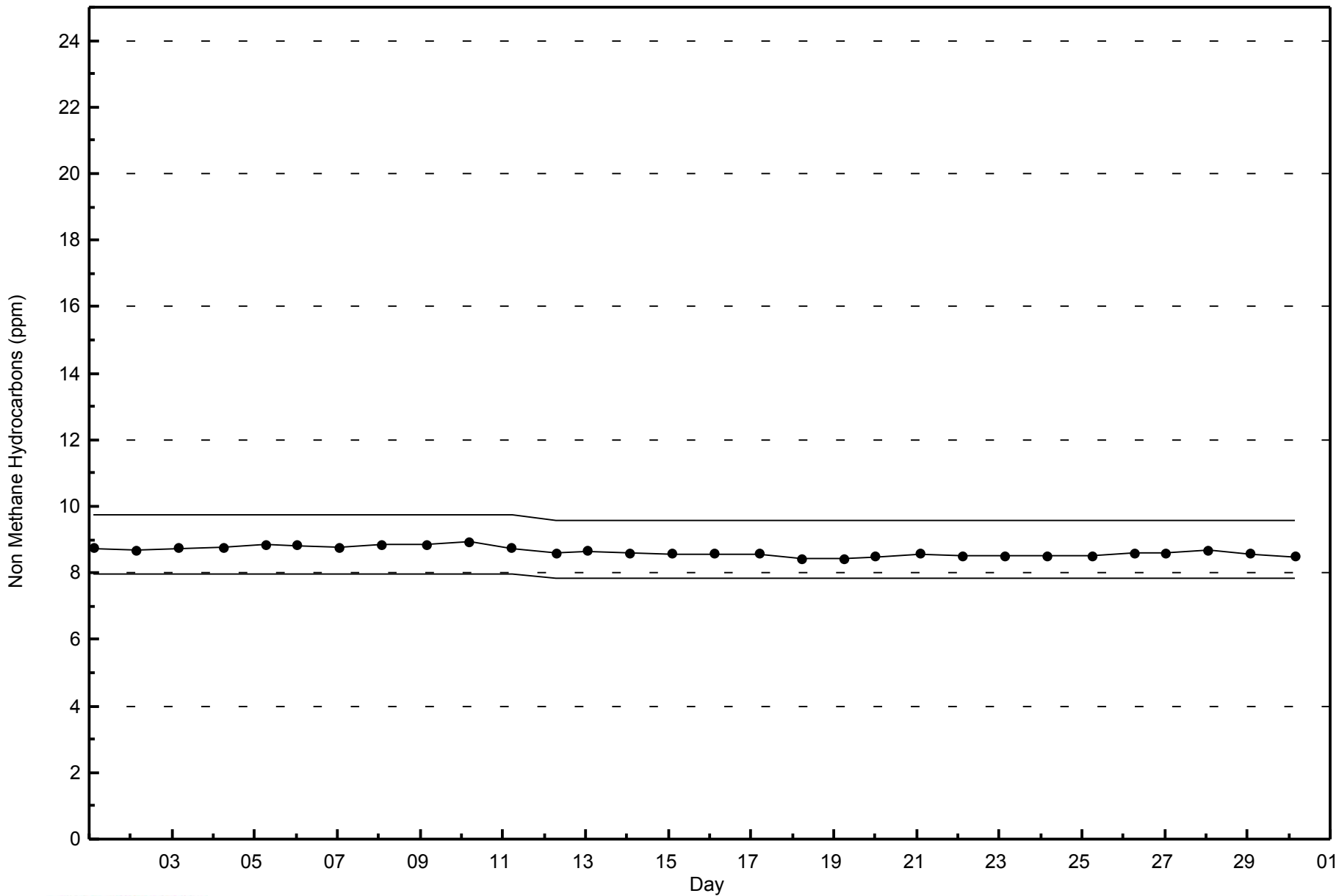
Anzac - September 2014





WBEA
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 8.6 ppm on Sep 15 05:00	Maximum Daily Average: 2.9 ppm on Sep 15		Hours of Data:	679
Minimum Value: 1.7 ppm on Sep 21 16:00	Minimum Daily Average: 1.8 ppm on Sep 25		Hours of Missing Data:	41
Maximum Diurnal Average: 2.2 ppm at hour 5	Minimum Diurnal Average: 1.8 ppm at hour 14		Hours of Calibration:	39
Monthly Average: 1.91 ppm	Percentiles: P ₁ = 1.7 P ₁₀ = 1.8 Q ₁ = 1.8 Median = 1.8 Q ₃ = 1.9 P ₉₀ = 2.0 P ₉₉ = 3.7		Percent Operational Time:	99.7

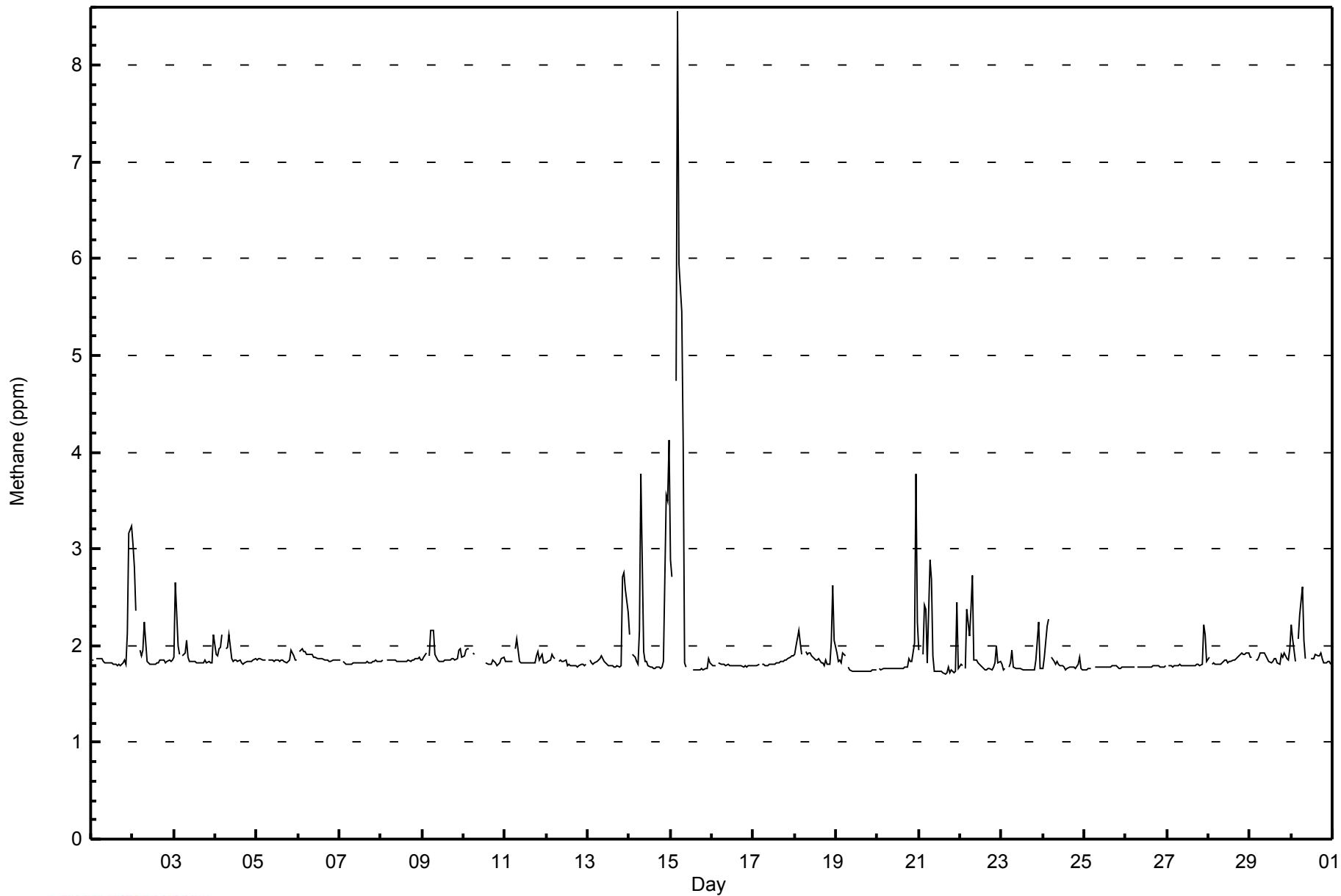
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Sep	1.9	1.8	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	2.1	3.2	3.2	2.0	3.2																							
2-Sep	3.0	2.8	2.4	Z	2.0	1.9	2.0	2.3	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	1.9	2.0	3.0																							
3-Sep	1.9	2.7	2.0	1.9	Z	1.9	1.9	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	2.1	1.9	2.7																							
4-Sep	1.9	1.9	2.0	2.0	2.1	Z	2.0	2.0	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.1																							
5-Sep	1.9	1.9	1.9	1.9	1.8	1.8	Z	1.9	1.9	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	1.9	1.9	1.9	1.9	2.0																							
6-Sep	Z	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	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.9	2.0																							
7-Sep	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.9																							
8-Sep	1.8	1.8	Z	1.9	1.8	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.9																							
9-Sep	1.8	1.9	1.9	Z	1.9	2.2	2.2	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.2																							
10-Sep	1.9	1.9	2.0	2.0	Z	1.9	1.9	C	C	C	C	C	C	C	C	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	--	2.0																							
11-Sep	1.8	1.8	1.8	1.8	1.8	Z	2.0	2.1	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.9	1.8	1.8	1.9	2.1																							
12-Sep	1.8	1.8	1.8	1.9	1.9	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9																							
13-Sep	Z	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	1.8	1.8	1.8	1.8	1.8	2.7	2.8	2.6	2.3	2.0	2.8																							
14-Sep	2.1	Z	1.9	1.9	1.8	1.8	2.2	3.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	3.6	3.5	4.1	2.2	4.1																							
15-Sep	2.9	2.7	Z	4.7	8.6	6.0	5.4	4.1	1.8	1.8	C	C	C	1.8	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.9	1.8	2.9	8.6																							
16-Sep	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8																							
17-Sep	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.8	1.9																							
18-Sep	1.9	2.0	2.2	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.8	1.8	1.8	1.9	1.8	1.8	2.0	2.6	2.0	1.9	2.6																							
19-Sep	1.9	1.8	1.9	1.8	1.9	1.9	Z	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.9																							
20-Sep	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	2.0	3.8	2.2	1.9	3.8																							
21-Sep	2.0	Z	1.9	2.4	2.4	1.8	2.9	2.7	1.9	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.7	1.7	1.7	1.7	2.5	1.8	1.9	2.9																							
22-Sep	1.8	1.8	Z	1.8	2.4	2.1	2.4	2.7	1.9	1.8	1.8	1.8	1.8	1.8	1.7	1.8	1.8	1.8	1.8	1.8	1.8	2.0	1.8	1.8	1.9	2.7																							
23-Sep	1.8	1.8	1.8	Z	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.7	1.9	2.2	1.8	1.8	1.8	2.2																							
24-Sep	1.8	1.9	2.2	2.3	Z	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	2.3																							
25-Sep	1.7	1.7	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8																							
26-Sep	1.8	1.8	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8																							
27-Sep	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.2	2.1	1.8	1.8	2.2																							
28-Sep	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.9	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	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.8	2.0	1.9	2.0																							
30-Sep	2.2	2.1	1.8	Z	2.1	2.3	2.6	2.1	1.9	M	M	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	2.0	2.6																							
																								2.0	2.0	1.9	2.0	2.2	2.0	2.1	2.1	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.1	2.0	Diurnal Average		
																								3.0	2.8	2.4	4.7	8.6	6.0	5.4	4.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.7	3.6	3.8	4.1	Diurnal Maximum	

Z - zerspan C - Calibration M - Maintenance



WBEA
Hourly Averages

Methane (CH₄) - ppm
Anzac - September 2014





WBEA
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Anzac - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	623	91.75	91.75
2.1 - 3.0	44	6.48	98.23
3.1 - 10.0	12	1.77	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 679

Total Number of Hours: 720



WBEA
Frequency Distribution

Methane (CH₄) - ppm
Anzac - September 2014

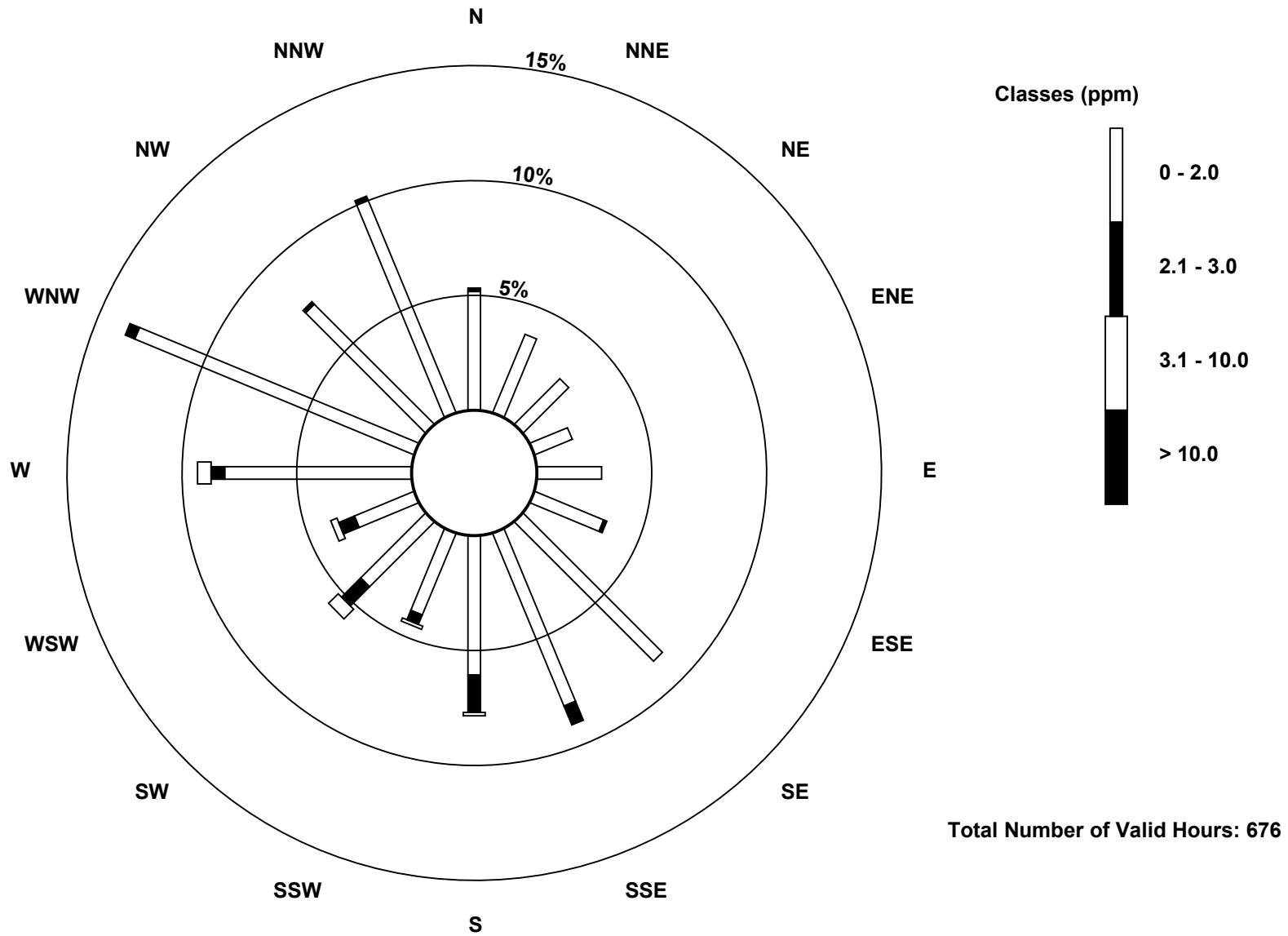
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	35	25	19	12	19	22	58	55	41	26	27	19	55	89	50	68	620
2.1 - 3.0	1	0	0	0	0	1	0	6	11	3	8	5	4	3	1	1	44
3.1 - 10.0	0	0	0	0	0	0	0	0	1	1	4	2	4	0	0	0	12
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	25	19	12	19	23	58	61	53	30	39	26	63	92	51	69	676

Total Number of Valid Hours: 676

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

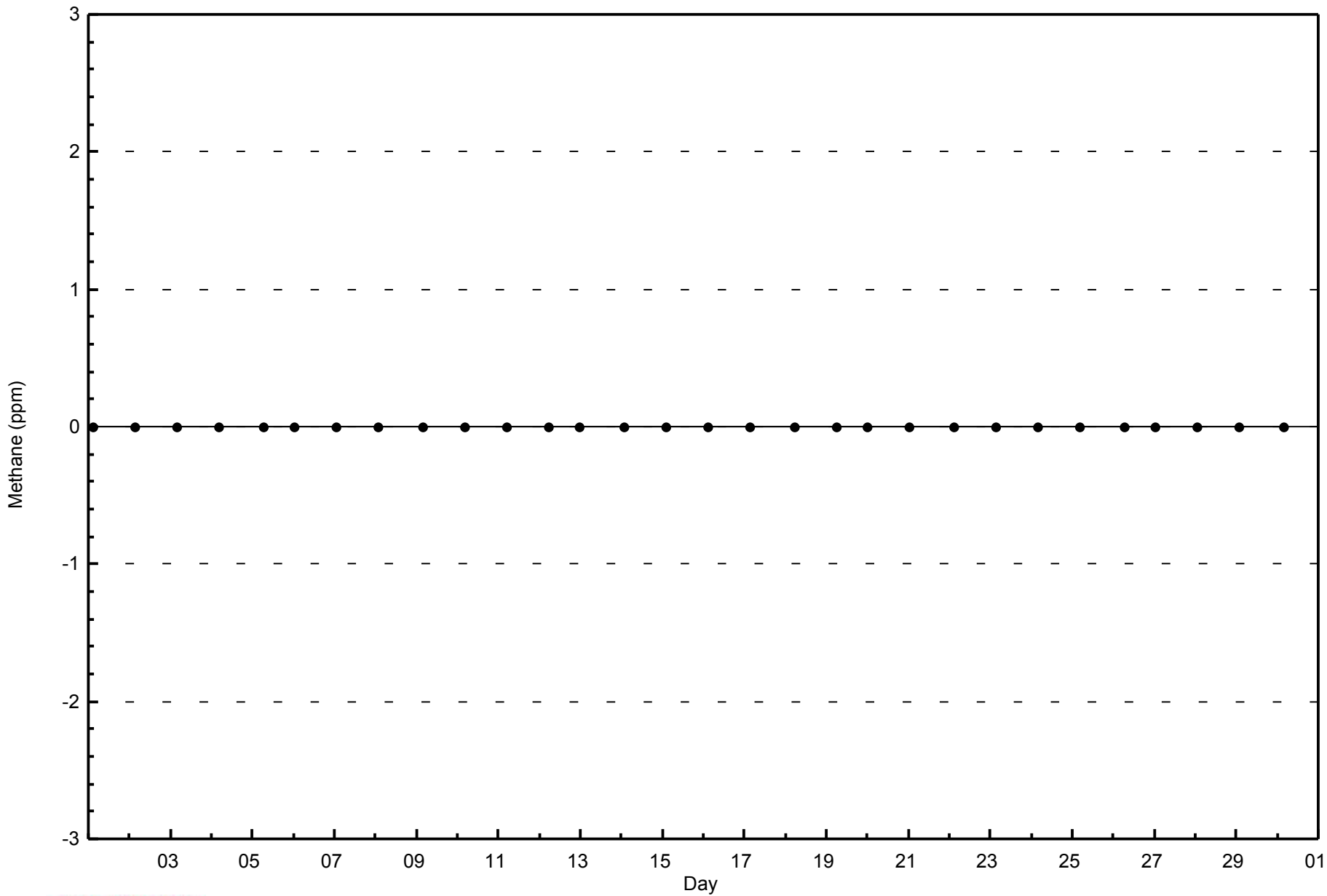
Methane (CH₄) - ppm
 Anzac (AMS 14)





WBEA
Zero Responses

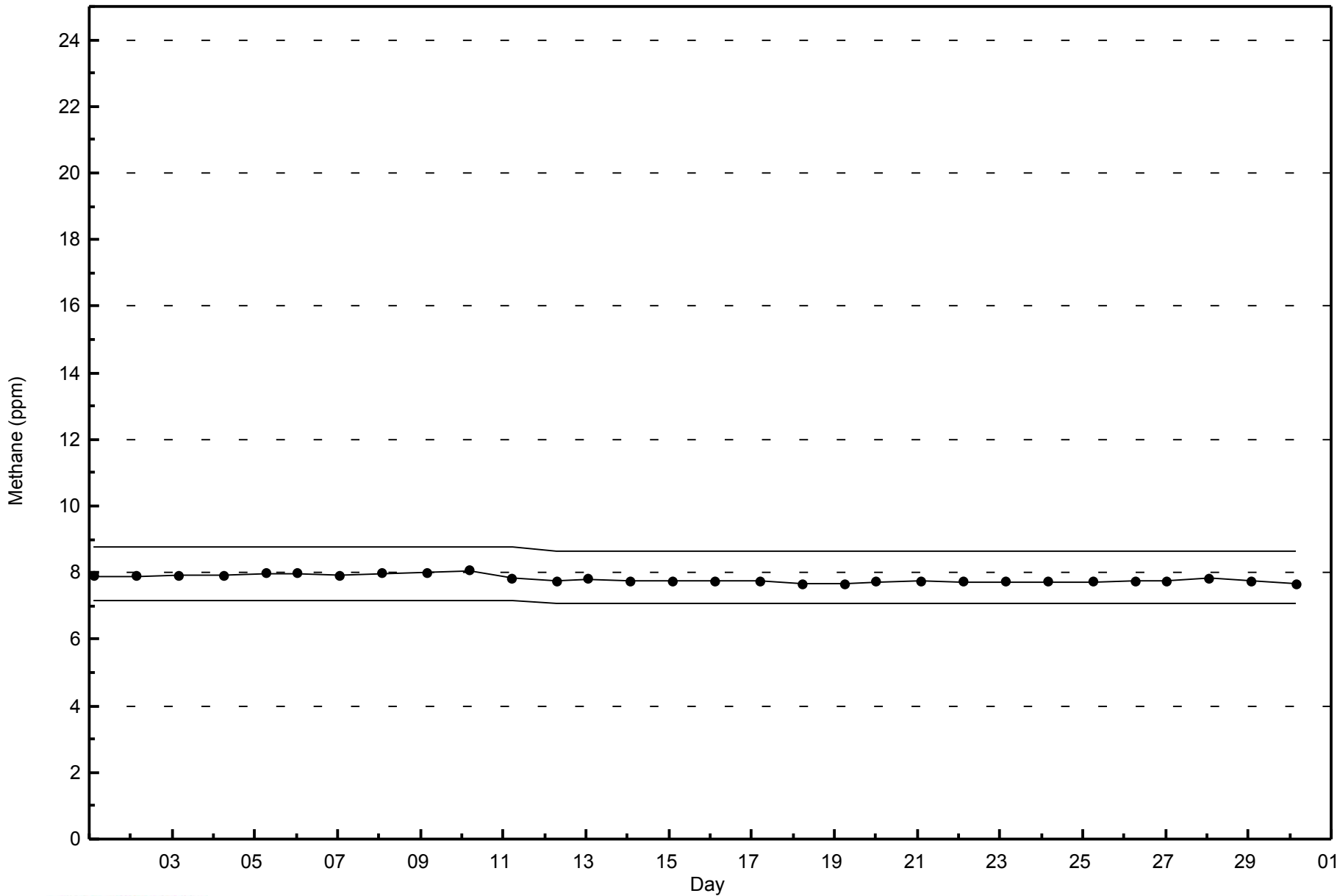
Methane (CH₄) - ppm
Anzac - September 2014





WBEA
Span Responses

Methane (CH₄) - ppm
Anzac - September 2014



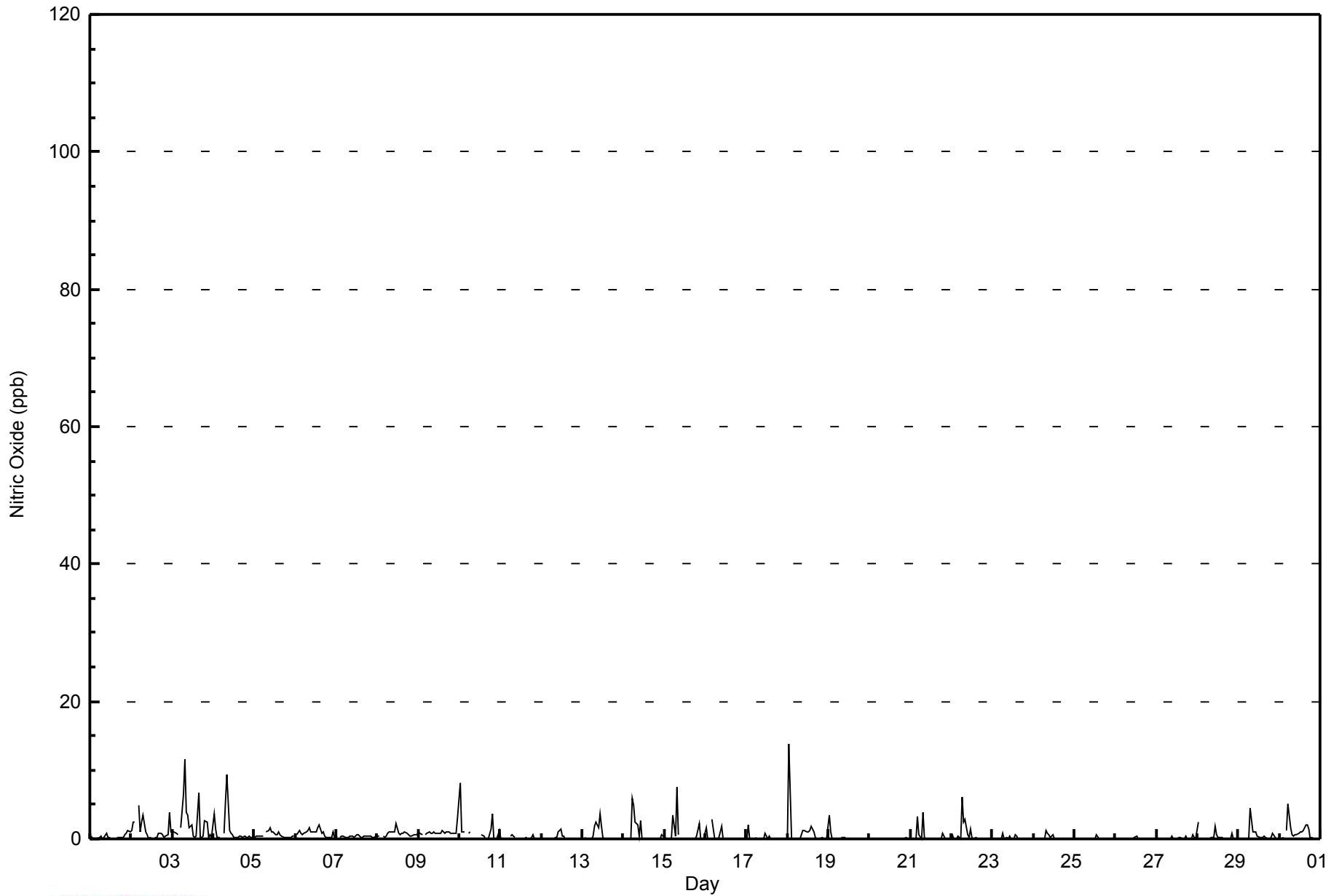


Maximum Value: 14 ppb on Sep 18 02:00																	Maximum Daily Average: 2.1 ppb on Sep 3																	Hours in Service: 720	
Minimum Value: 0 ppb on Sep 10 21:00																	Minimum Daily Average: 0.0 ppb on Sep 20																	Hours of Data: 673	
Maximum Diurnal Average: 1.7 ppb at hour 8																	Minimum Diurnal Average: 0.2 ppb at hour 4																	Hours of Missing Data: 47	
Monthly Average: 0.6 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 6																	Hours of Calibration: 42	
																																		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	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.3	1									
2-Sep	1	2	Z	Z	5	1	3	3	1	1	0	0	0	0	0	0	1	1	1	0	0	1	4	1	1.2	5									
3-Sep	1	1	1	1	Z	2	6	12	4	3	2	2	0	0	0	7	0	0	0	3	2	0	1	0	2.1	12									
4-Sep	4	1	0	0	0	Z	1	5	9	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.2	9									
5-Sep	0	0	0	0	0	0	Z	1	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.6	2									
6-Sep	Z	1	1	1	1	1	1	1	2	1	1	1	1	2	2	1	1	0	0	0	0	0	1	0	0.9	2									
7-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1									
8-Sep	0	0	Z	0	0	0	1	1	1	1	1	2	1	1	1	1	1	1	1	0	1	1	1	1	0.7	2									
9-Sep	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1.0	3									
10-Sep	8	1	1	1	Z	1	1	C	C	C	C	C	C	1	1	0	0	0	1	4	0	0	0	1	--	8									
11-Sep	0	0	0	0	0	Z	0	1	0	M	M	M	M	M	0	0	0	0	0	1	0	0	0	0	0.1	1									
12-Sep	0	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
13-Sep	Z	0	0	0	0	0	0	2	2	2	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4									
14-Sep	0	Z	0	0	0	6	5	2	2	0	3	0	0	0	0	0	0	0	0	0	0	1	1	1	0.8	6									
15-Sep	0	0	Z	0	0	3	0	7	1	C	C	C	C	C	C	0	0	0	0	0	2	0	0	0	--	7									
16-Sep	2	0	0	Z	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3									
17-Sep	0	2	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2									
18-Sep	0	14	0	0	0	Z	0	0	1	1	1	1	1	1	2	1	0	0	0	0	0	0	0	0	1.0	14									
19-Sep	4	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	4									
20-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									
21-Sep	0	Z	0	0	3	1	0	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.4	4									
22-Sep	1	0	Z	0	1	0	6	2	3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	6									
23-Sep	0	0	0	Z	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1									
24-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									
25-Sep	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.0	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	0.0	0									
27-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1									
28-Sep	2	Z	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	1	0	0	0	0.3	2									
29-Sep	0	0	Z	0	0	0	0	4	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0.5	4									
30-Sep	0	0	0	Z	1	5	2	1	0	1	1	1	1	1	1	2	2	1	0	0	0	0	0	0	0.9	5									
																																		Diurnal Average	
																																		Diurnal Maximum	
																																		Z - zerospan	
																																		C - Calibration	
																																		M - Maintenance	



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Anzac - September 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Anzac - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	673	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 673

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Anzac - September 2014

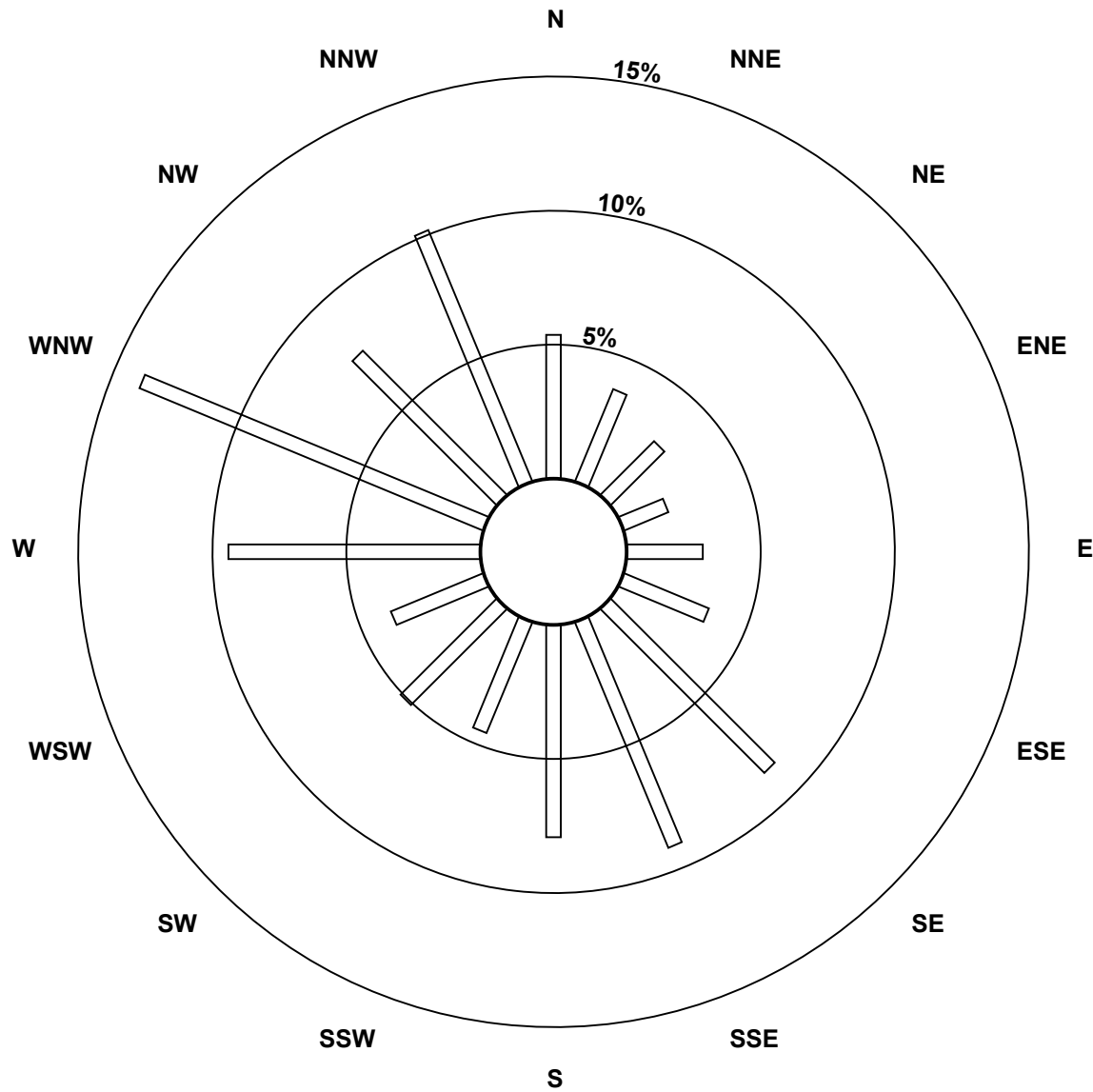
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	25	19	12	19	23	58	61	53	30	34	25	63	93	51	68	670
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	25	19	12	19	23	58	61	53	30	34	25	63	93	51	68	670

Total Number of Valid Hours: 670

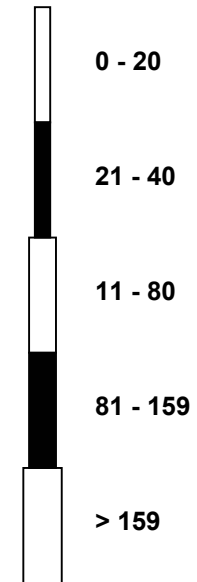
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Nitric Oxide (NO) - ppb
Anzac (AMS 14)



Classes (ppb)

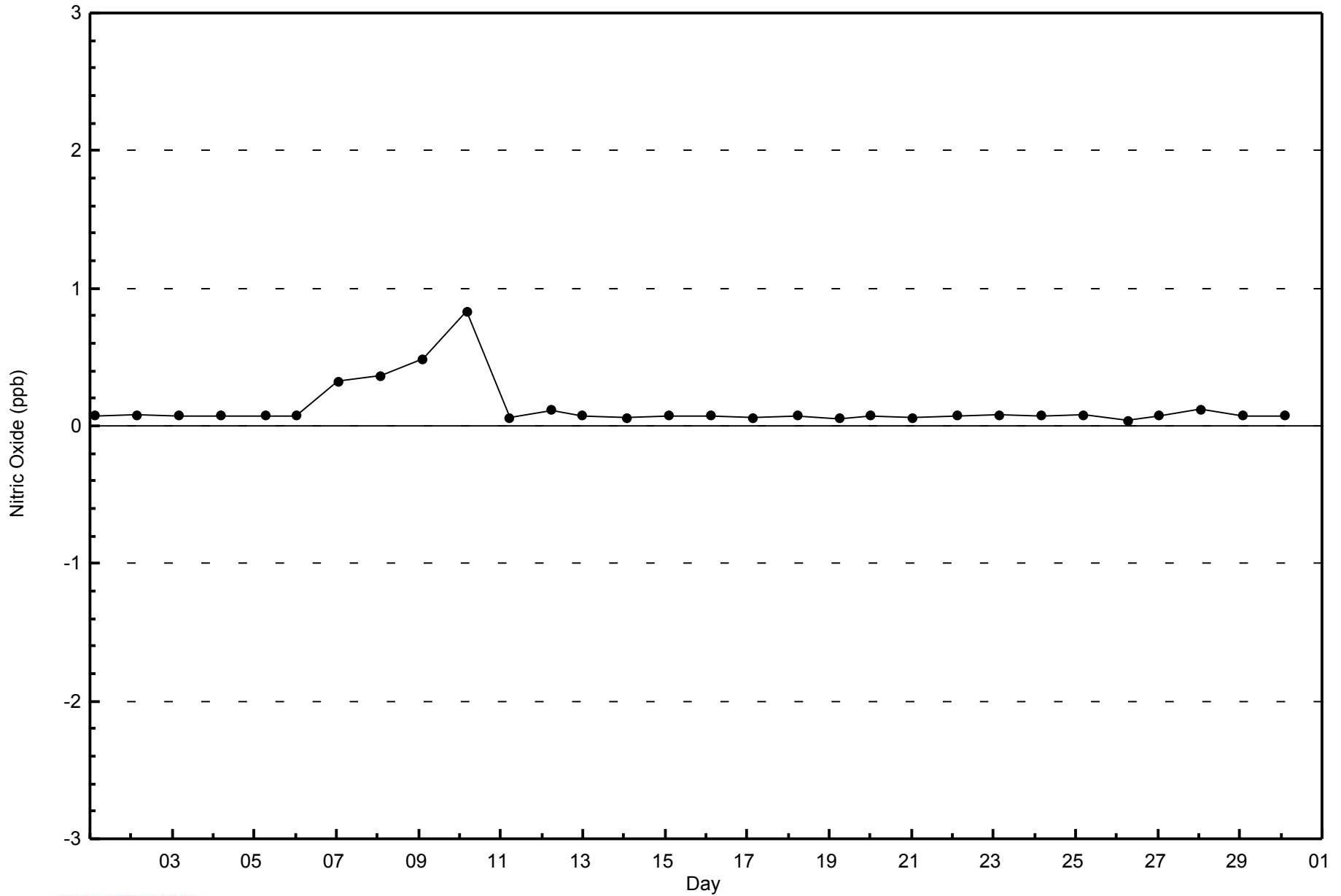


Total Number of Valid Hours: 670



WBEA
Zero Responses

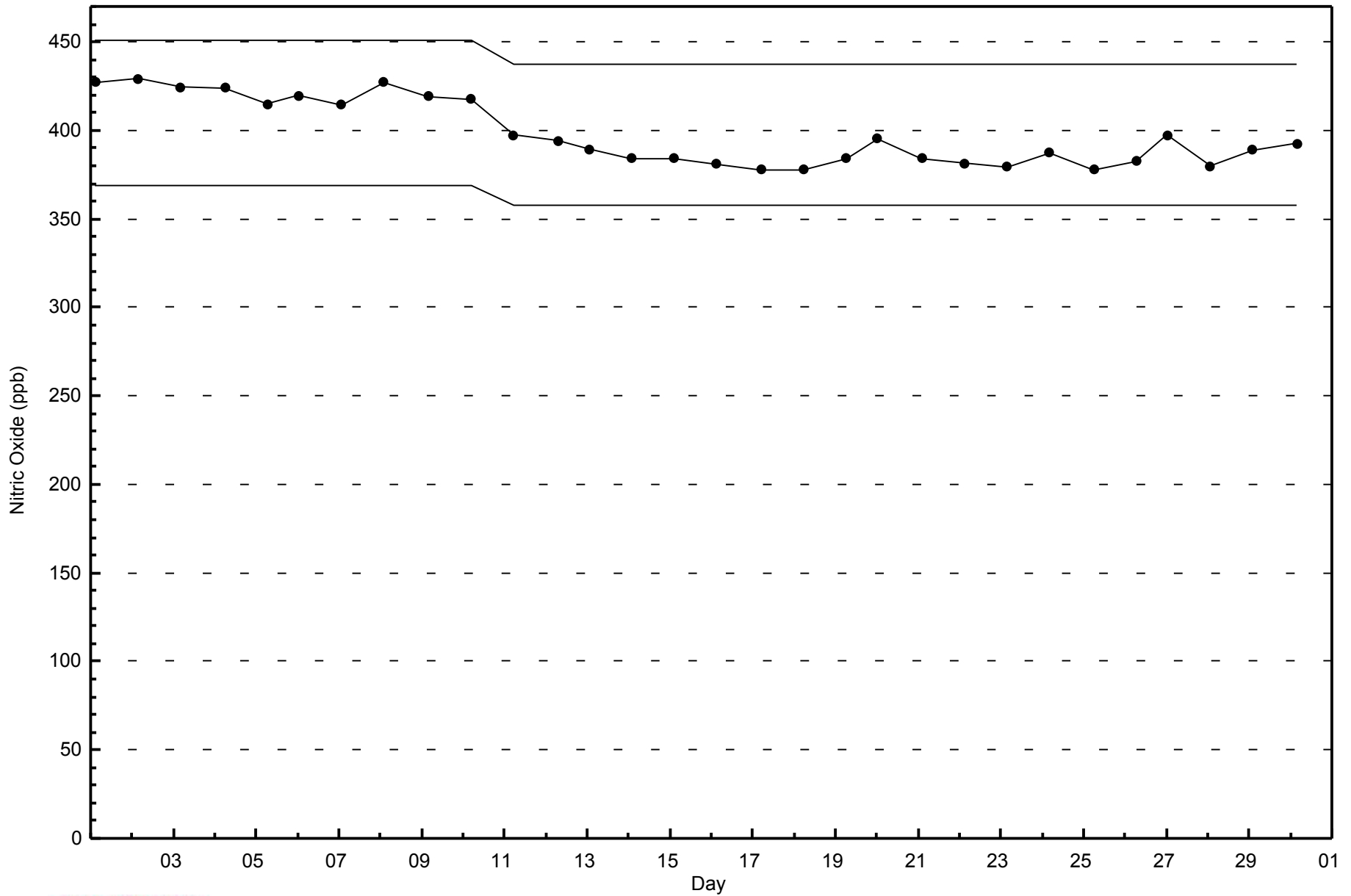
Nitric Oxide (NO) - ppb
Anzac - September 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Anzac - September 2014





Number of Exceedences (AAAO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 13 ppb on Sep 6 03:00	Maximum Daily Average: 3.7 ppb on Sep 30		Hours of Data:	673
Minimum Value: 0 ppb on Sep 16 07:00	Minimum Daily Average: 0.2 ppb on Sep 26		Hours of Missing Data:	47
Maximum Diurnal Average: 2.6 ppb at hour 8	Minimum Diurnal Average: 1.1 ppb at hour 13		Hours of Calibration:	42
Monthly Average: 1.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 4 P ₉₉ = 8		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	6	3	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1.2	6	
2-Sep	1	1	1	Z	1	0	2	4	1	1	1	1	1	1	1	2	3	5	4	3	2	1	1	1	1.5	5	
3-Sep	1	1	0	1	Z	1	3	7	3	4	3	2	1	1	1	4	1	1	1	4	6	1	1	1	1.9	7	
4-Sep	3	4	2	1	1	Z	2	6	8	2	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1.9	8	
5-Sep	2	3	3	1	1	1	Z	1	2	3	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1.3	3	
6-Sep	Z	9	13	8	6	4	4	6	5	3	2	2	2	2	3	1	1	1	1	1	1	1	1	1	3.3	13	
7-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	0.6	1	
8-Sep	1	2	Z	2	2	2	1	1	1	1	1	1	1	1	1	1	3	2	1	1	0	0	0	0	1.1	3	
9-Sep	1	2	2	Z	0	1	2	1	0	1	0	0	1	1	2	1	1	4	2	1	1	2	2	4	1.3	4	
10-Sep	8	5	7	7	Z	2	2	C	C	C	C	C	C	C	3	1	1	0	1	1	3	1	1	0	3	--	8
11-Sep	0	0	0	1	1	Z	2	2	1	M	M	M	M	M	2	2	2	2	2	2	3	2	2	1	1	1.4	3
12-Sep	1	1	1	2	2	2	Z	2	3	3	3	4	2	2	2	3	2	2	2	4	5	3	2	2	2.3	5	
13-Sep	Z	2	1	1	2	2	2	3	4	2	5	4	2	1	1	1	0	0	0	1	1	1	2	1	1.7	5	
14-Sep	1	Z	2	1	0	6	5	2	4	3	6	2	1	1	1	1	1	1	1	1	1	1	6	5	2.2	6	
15-Sep	2	1	Z	1	1	2	2	8	2	C	C	C	C	C	C	0	1	1	1	2	6	2	2	2	--	8	
16-Sep	4	2	1	Z	2	0	0	0	1	2	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.6	4	
17-Sep	2	1	0	1	Z	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	4	2	0.9	4	
18-Sep	2	7	3	2	1	Z	1	1	3	3	2	3	2	3	5	4	5	4	4	3	3	2	2	3	2.9	7	
19-Sep	5	5	2	2	1	2	Z	2	3	2	1	1	1	1	1	1	1	1	1	0	1	0	1	0	0	1.4	5
20-Sep	Z	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	1	1	1	1	1	1	1	1	0.6	1	
21-Sep	1	Z	1	1	7	3	1	5	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	1.6	7
22-Sep	5	2	Z	1	2	1	6	6	5	2	2	5	3	2	2	1	1	3	4	3	4	3	2	2	2.9	6	
23-Sep	1	1	1	Z	1	4	6	1	2	1	2	1	1	1	1	0	1	1	1	1	2	3	4	4	1.8	6	
24-Sep	2	1	2	2	Z	3	4	5	4	2	1	3	2	1	1	1	1	1	1	1	2	2	1	1	1.9	5	
25-Sep	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	4	3	1	1	1	1	1	1.1	4	
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	1	0.2	1	
27-Sep	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0.9	1	
28-Sep	3	Z	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1.1	3	
29-Sep	1	2	Z	1	1	2	2	4	2	1	1	1	1	1	1	2	2	2	1	2	3	3	2	2	1.7	4	
30-Sep	2	1	1	Z	1	2	3	2	2	2	1	2	3	4	6	8	7	8	8	5	4	5	5	2	3.7	8	

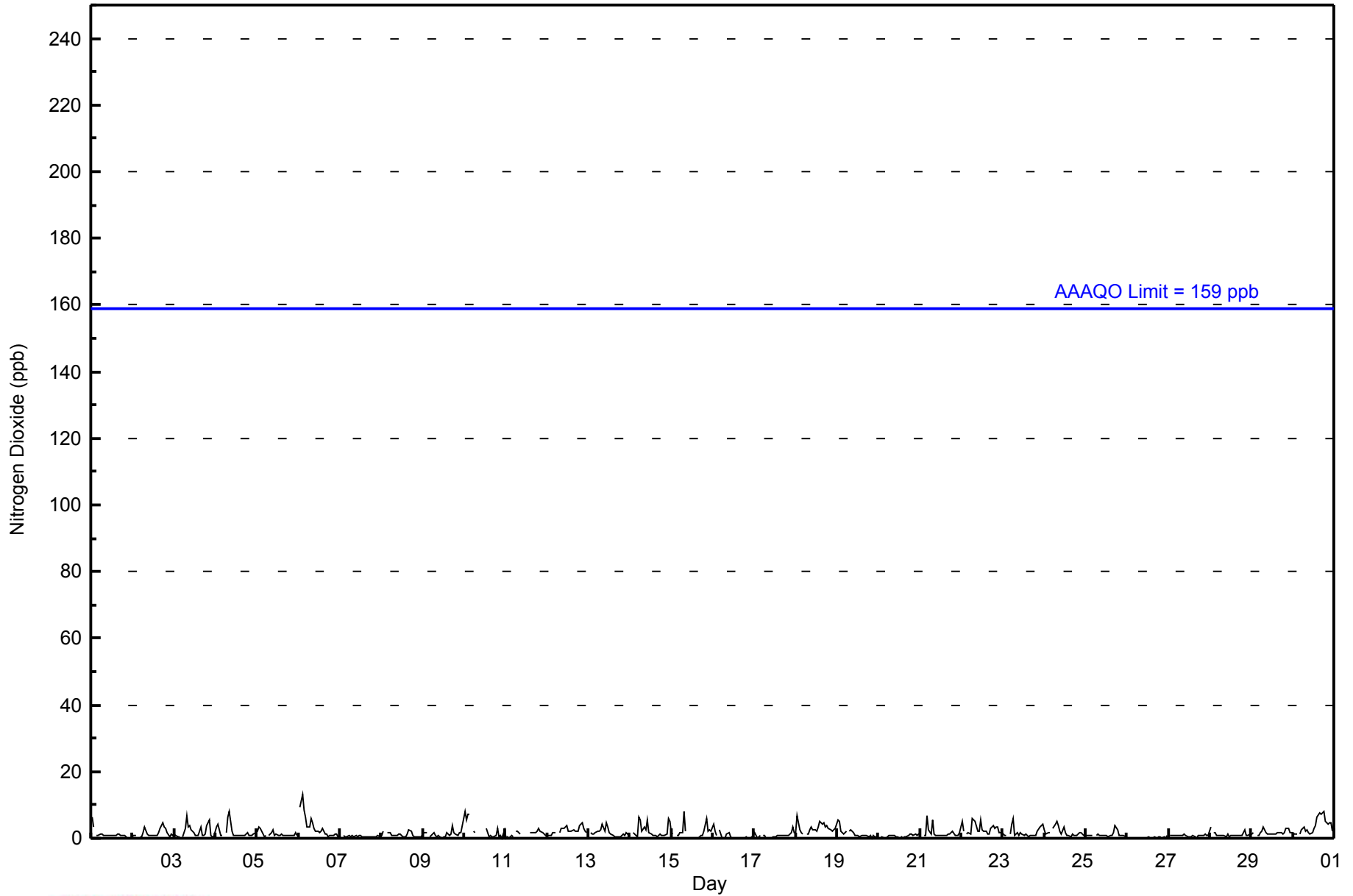
2.2	2.3	1.9	1.6	1.4	1.7	2.1	2.6	2.1	1.6	1.5	1.5	1.1	1.1	1.3	1.3	1.4	1.6	1.5	1.7	1.7	1.4	1.5	1.5	Diurnal Average		
8	9	13	8	7	6	6	8	8	4	6	5	3	4	6	8	7	8	8	8	5	6	5	6	5	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Anzac - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	673	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 673

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - September 2014

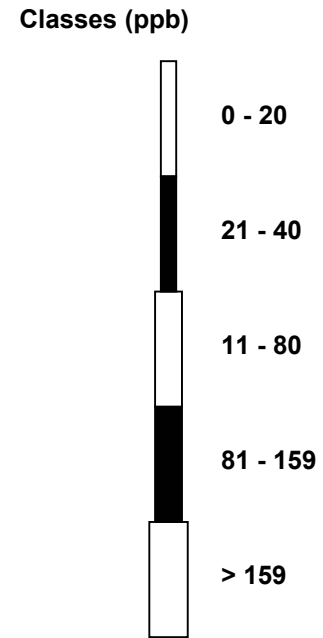
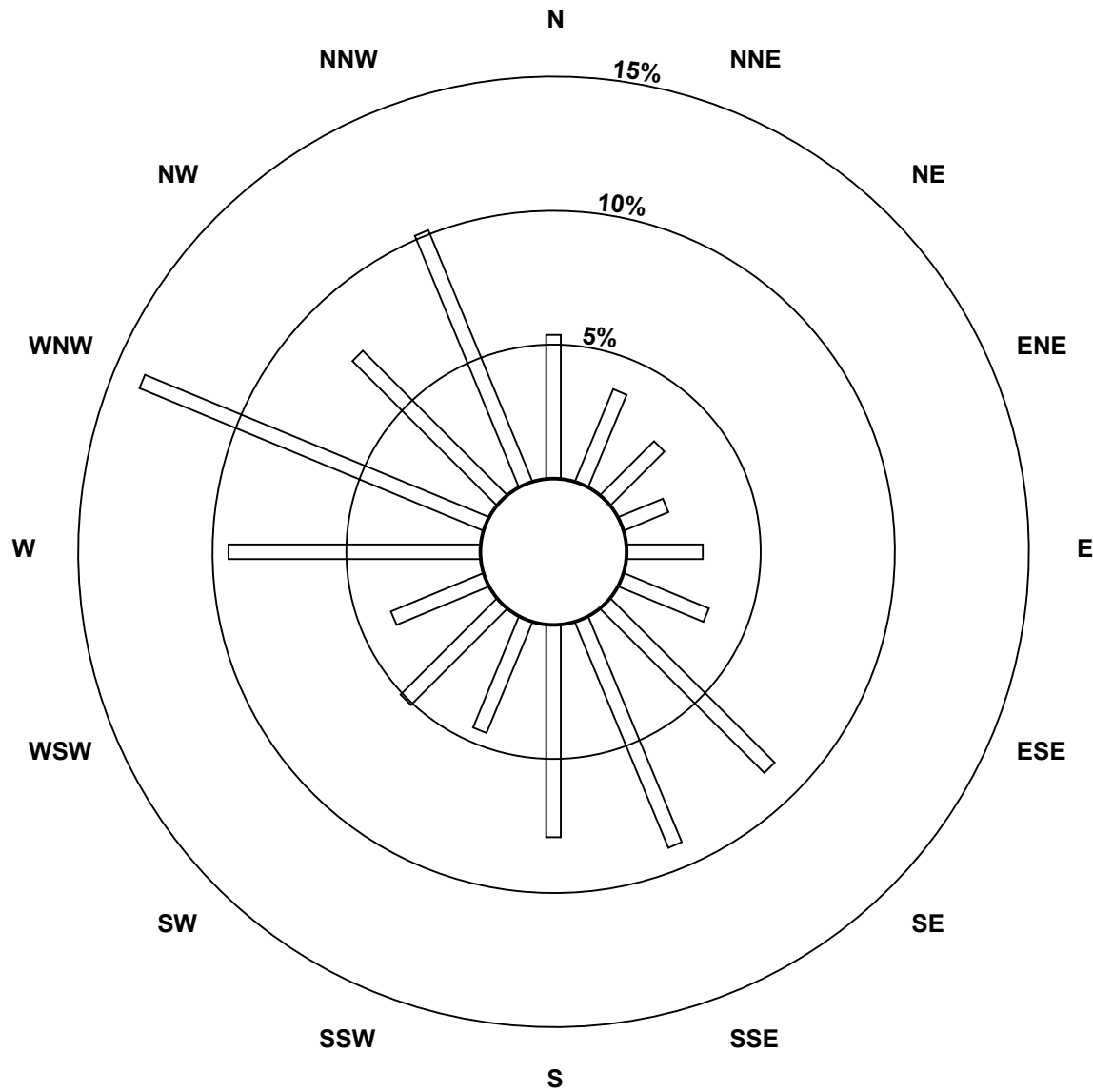
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	25	19	12	19	23	58	61	53	30	34	25	63	93	51	68	670
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	25	19	12	19	23	58	61	53	30	34	25	63	93	51	68	670

Total Number of Valid Hours: 670

Total Number of Hours: 720

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

**Nitrogen Dioxide (NO₂) - ppb
Anzac (AMS 14)**

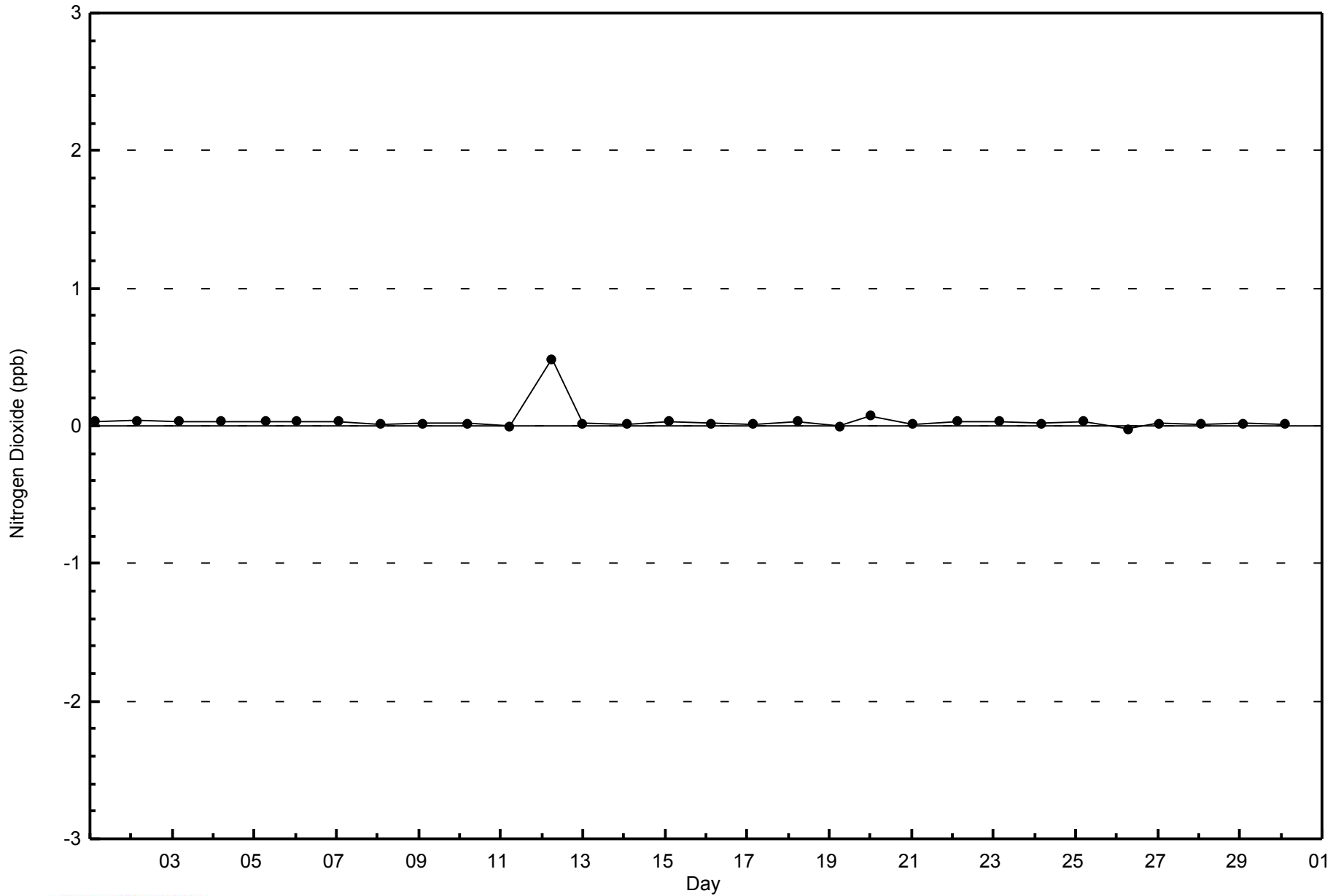


Total Number of Valid Hours: 670



WBEA
Zero Responses

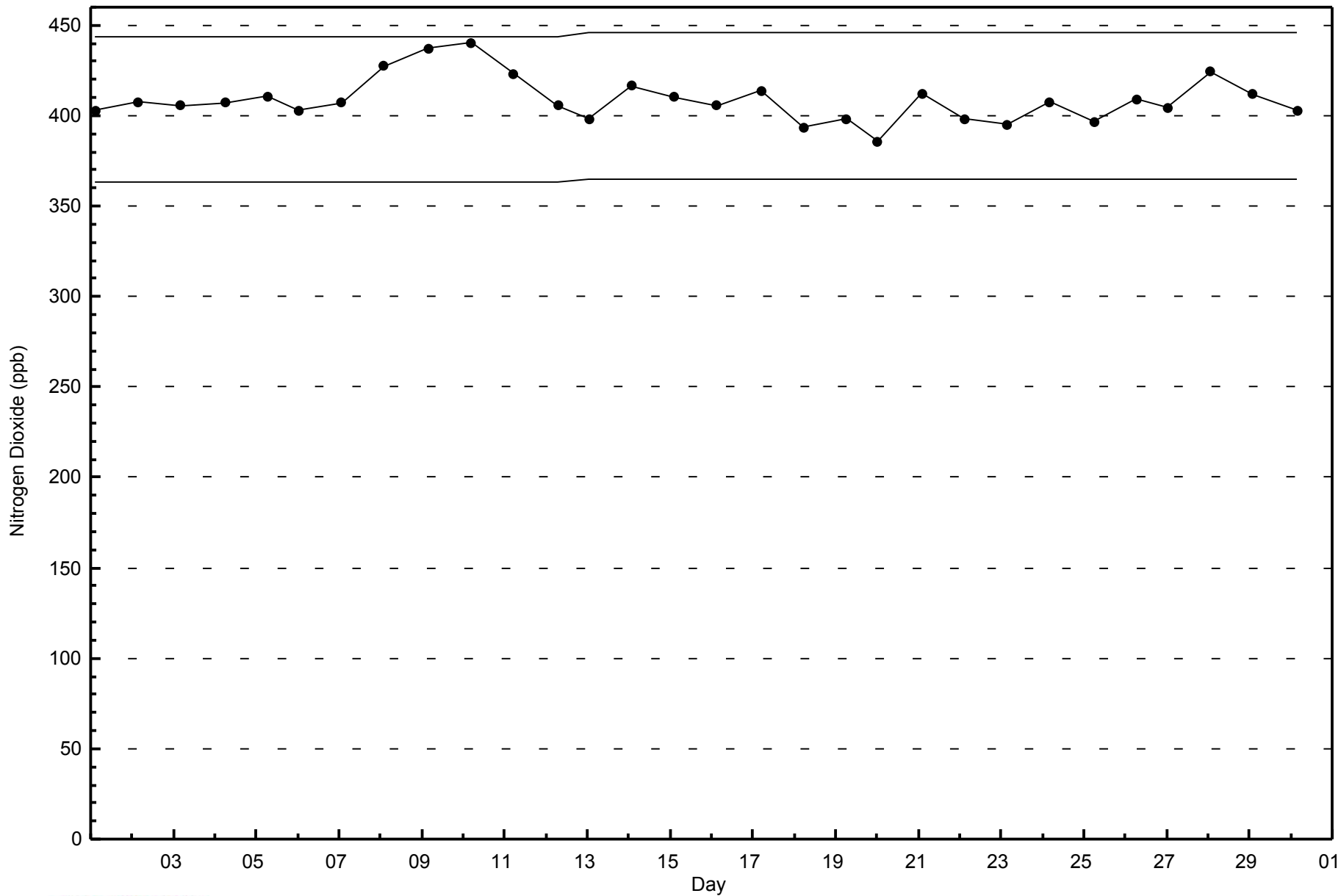
Nitrogen Dioxide (NO₂) - ppb
Anzac - September 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Anzac - September 2014



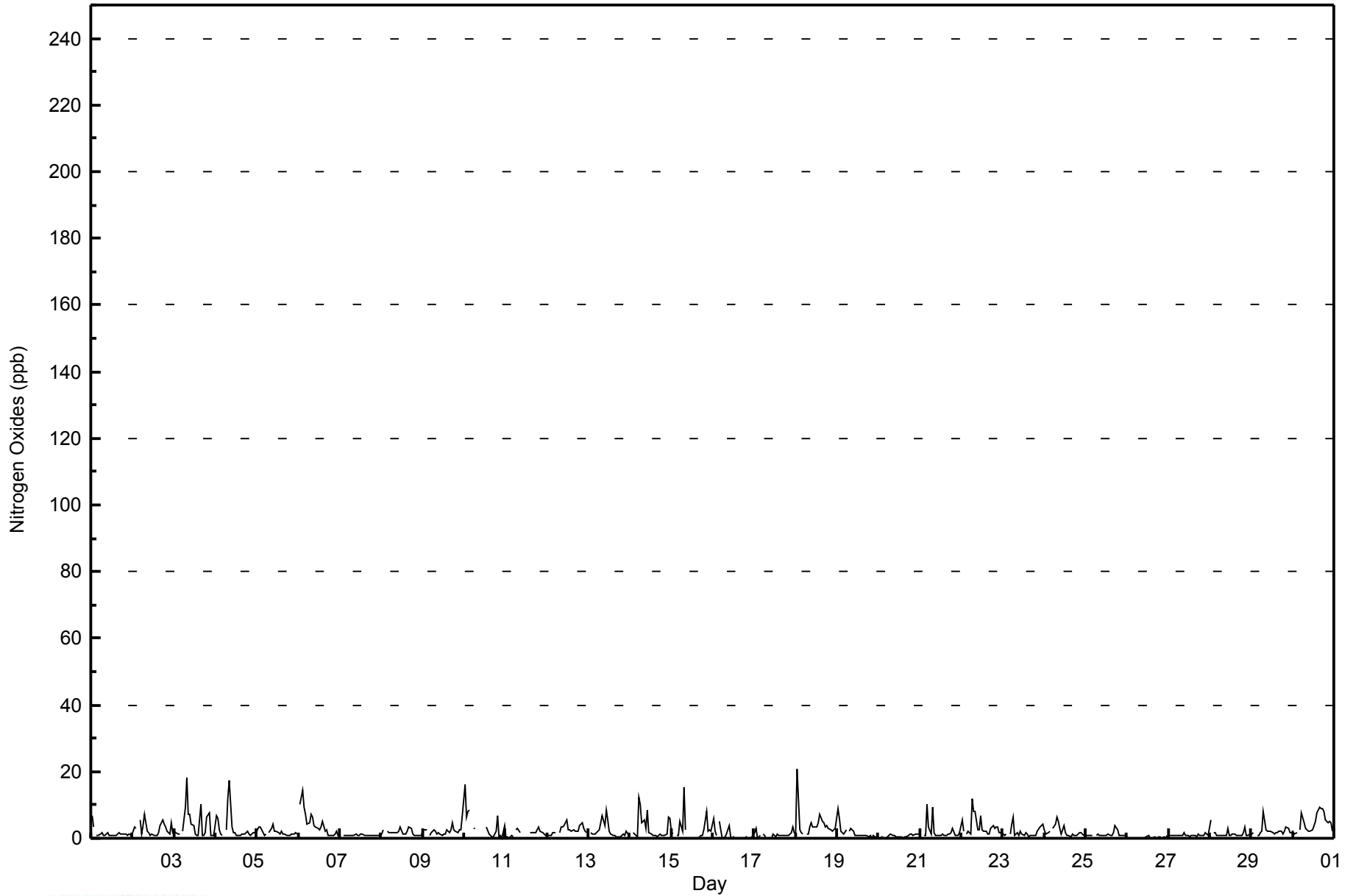


Maximum Value: 21 ppb on Sep 18 02:00																	Maximum Daily Average: 4.6 ppb on Sep 30																	Hours in Service: 720	
Minimum Value: 0 ppb on Sep 16 14:00																	Minimum Daily Average: 0.2 ppb on Sep 26																	Hours of Data: 673	
Maximum Diurnal Average: 4.3 ppb at hour 8																	Minimum Diurnal Average: 1.4 ppb at hour 13																	Hours of Missing Data: 47	
Monthly Average: 2.2 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 12																	Hours of Calibration: 42	
																																		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	7	3	Z	1	1	1	2	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1.5	7									
2-Sep	2	3	3	Z	5	1	4	7	2	2	1	1	1	1	1	2	4	5	4	3	2	1	5	2	2.8	7									
3-Sep	2	2	1	1	Z	2	9	18	7	7	4	4	1	1	1	10	1	1	2	6	8	1	1	1	4.0	18									
4-Sep	7	6	3	1	1	Z	3	12	17	3	2	2	1	1	1	1	1	1	2	1	1	1	2	2	3.1	17									
5-Sep	2	4	3	2	1	1	Z	2	3	4	2	2	2	1	2	1	1	1	1	1	1	1	2	1	1.9	4									
6-Sep	Z	10	14	9	7	4	5	7	6	4	3	3	3	4	5	2	2	1	1	1	1	1	2	1	4.2	14									
7-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	0.9	1									
8-Sep	1	3	Z	2	2	2	2	2	2	2	2	3	1	1	1	2	3	3	1	1	1	1	1	1	1.8	3									
9-Sep	2	3	2	Z	1	2	3	2	1	2	1	1	1	1	3	2	2	5	3	2	2	2	3	7	2.3	7									
10-Sep	16	6	8	8	Z	3	3	C	C	C	C	C	C	3	1	1	0	1	2	7	1	1	0	4	--	16									
11-Sep	0	0	0	1	1	Z	3	3	2	M	M	M	M	M	2	2	2	2	2	3	2	2	1	1	1.5	3									
12-Sep	1	1	1	2	2	2	Z	2	3	3	4	5	3	3	2	2	2	2	2	4	5	3	2	2	2.5	5									
13-Sep	Z	2	1	1	1	2	3	5	7	4	8	5	2	1	1	1	0	0	0	1	1	1	2	1	2.2	8									
14-Sep	1	Z	2	1	0	12	10	5	6	3	8	2	1	1	1	1	1	1	1	1	1	1	7	6	3.1	12									
15-Sep	2	1	Z	1	1	5	2	15	3	C	C	C	C	C	C	0	1	1	1	3	8	2	2	2	--	15									
16-Sep	6	2	1	Z	5	0	0	0	1	4	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.9	6									
17-Sep	2	3	0	1	Z	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	4	2	1.0	4									
18-Sep	1	21	3	2	1	Z	1	1	3	5	4	3	3	4	7	5	5	4	4	3	3	2	2	3	3.9	21									
19-Sep	9	6	2	2	1	2	Z	2	3	2	1	1	1	1	1	1	1	1	0	1	0	1	0	0	1.7	9									
20-Sep	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.6	1									
21-Sep	1	Z	1	1	10	3	1	9	1	1	1	1	1	1	1	1	1	1	2	3	1	1	1	2	2.0	10									
22-Sep	6	2	Z	1	2	1	12	8	8	3	2	7	3	2	2	1	1	3	4	3	4	3	2	2	3.6	12									
23-Sep	1	1	1	Z	1	4	7	1	2	1	2	1	2	1	0	1	1	1	1	2	3	4	4	4	1.9	7									
24-Sep	2	1	2	2	Z	3	4	6	5	3	1	4	2	1	1	1	1	1	1	2	2	1	1	1	2.1	6									
25-Sep	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	4	3	1	1	1	1	1	1.2	4									
26-Sep	0	0	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0.2	1									
27-Sep	Z	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0	1	1	1	1	2	1	1	0.9	2									
28-Sep	6	Z	2	2	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	2	3	1	1	1	1.4	6									
29-Sep	1	2	Z	1	1	2	2	8	3	2	2	2	2	1	2	2	2	2	1	2	4	3	2	1	2.1	8									
30-Sep	2	1	2	Z	2	7	5	3	3	2	2	3	4	5	8	9	9	9	8	5	5	5	5	2	4.6	9									
																	Diurnal Average																		
																	Diurnal Maximum																		
Z - zerospan			C - Calibration			M - Maintenance																													



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Anzac - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	672	99.85	99.85
21 - 40	1	0.15	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 673

Total Number of Hours: 720



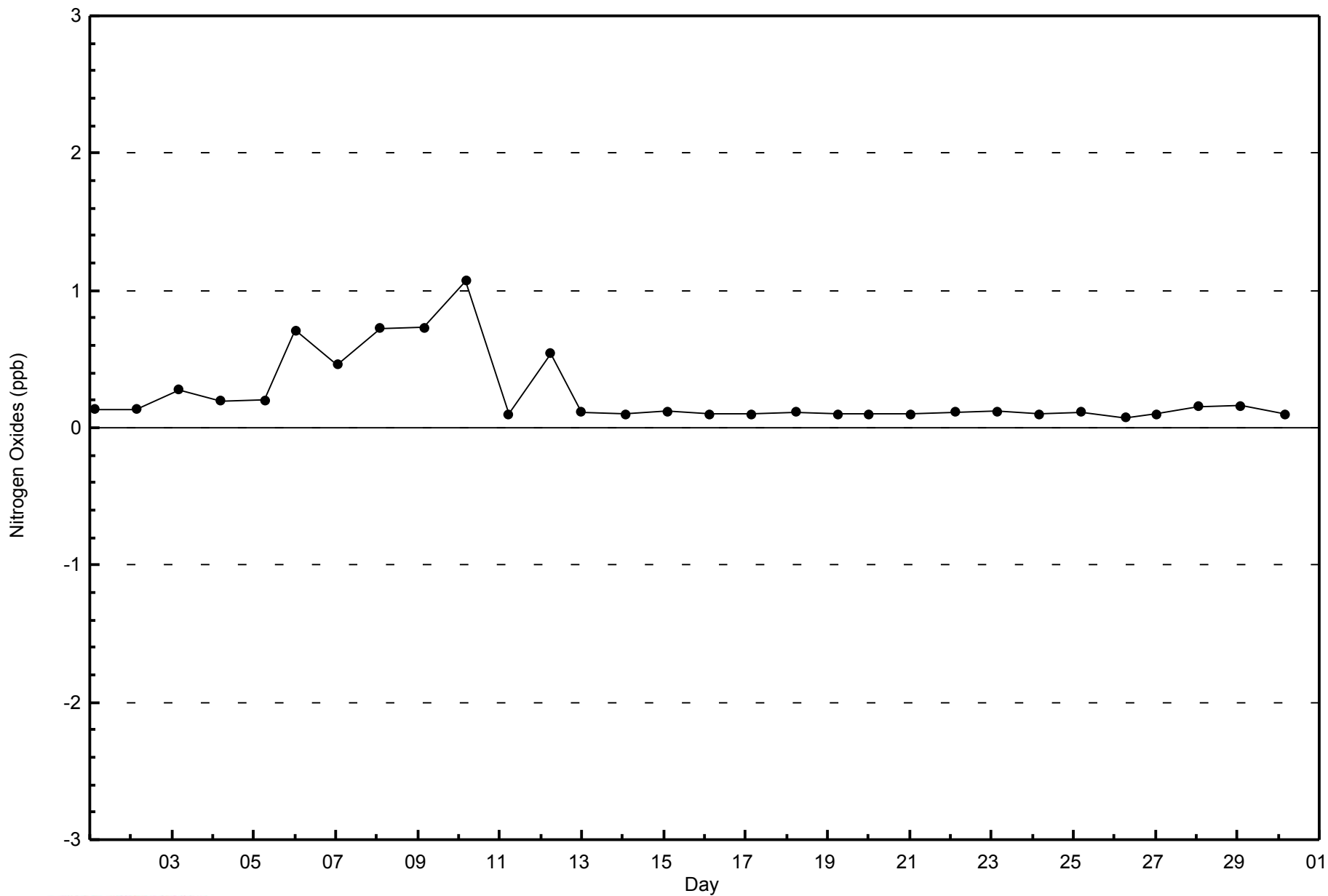
WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - September 2014

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	25	19	12	19	23	58	61	53	30	33	25	63	93	51	68	669
21 - 40	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	25	19	12	19	23	58	61	53	30	34	25	63	93	51	68	670

Total Number of Valid Hours: 670

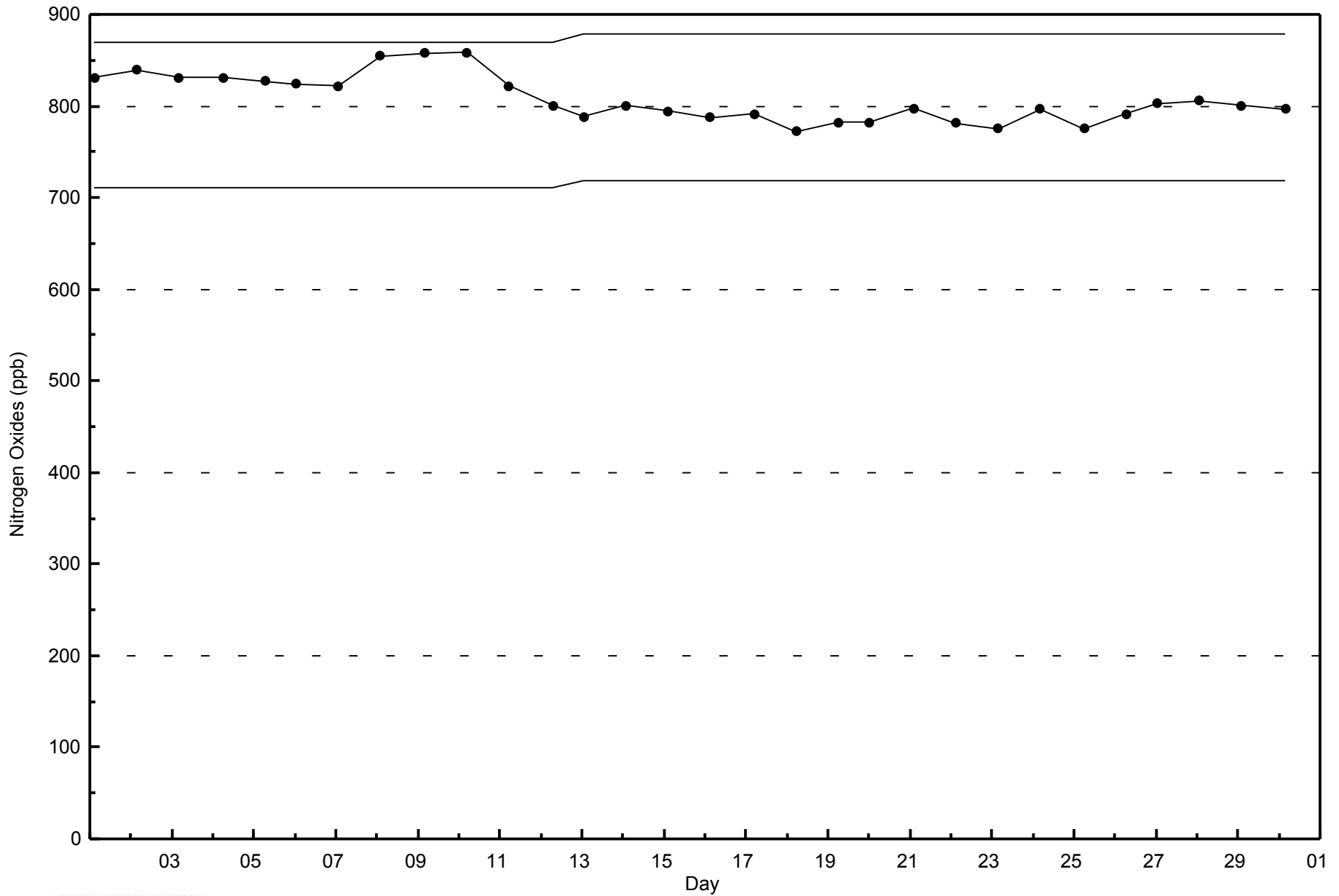
Total Number of Hours: 720





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Anzac - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 48 ppb on Sep 22 15:00	Maximum Daily Average: 28.0 ppb on Sep 19		Hours of Data:	684
Minimum Value: 1 ppb on Sep 2 03:00	Minimum Daily Average: 7.4 ppb on Sep 30		Hours of Missing Data:	36
Maximum Diurnal Average: 26.6 ppb at hour 15	Minimum Diurnal Average: 11.3 ppb at hour 7		Hours of Calibration:	35
Monthly Average: 18.4 ppb	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 11 Median = 18 Q ₃ = 25 P ₉₀ = 30 P ₉₉ = 41		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	16	7	4	Z	17	18	19	21	22	21	23	23	25	28	30	22	22	24	17	7	1	1	1	1	16.0	30
2-Sep	1	1	1	3	Z	2	2	4	15	23	27	28	30	29	33	33	26	24	17	13	7	2	1	1	13.9	33
3-Sep	1	1	1	3	2	Z	1	5	18	26	27	27	27	28	28	27	28	28	22	10	7	7	4	7	14.5	28
4-Sep	4	4	9	9	11	10	Z	11	9	17	20	19	20	24	23	25	30	26	17	16	13	10	11	10	15.2	30
5-Sep	11	11	12	14	14	10	7	Z	21	22	24	25	24	19	19	20	24	26	26	23	19	15	12	10	17.8	26
6-Sep	8	Z	2	5	4	4	5	10	12	15	16	17	17	16	17	19	20	18	14	12	12	12	10	10	11.9	20
7-Sep	11	15	Z	22	24	23	22	21	22	23	22	22	25	24	22	25	22	21	21	20	18	16	14	13	20.4	25
8-Sep	13	12	13	Z	12	12	12	15	17	20	21	24	24	25	26	24	23	22	17	14	9	8	8	10	16.5	26
9-Sep	9	5	6	6	Z	5	4	12	19	25	27	28	27	27	27	28	26	21	16	13	8	6	7	5	15.5	28
10-Sep	1	5	4	5	5	Z	6	M	10	17	22	23	C	C	C	29	29	28	20	12	9	12	7	22	14.1	29
11-Sep	27	21	14	17	12	15	Z	21	25	27	27	29	31	31	33	35	35	34	29	28	28	27	31	31	26.4	35
12-Sep	30	28	26	19	17	22	25	Z	20	20	22	23	27	30	32	29	29	28	22	21	16	18	21	16	23.5	32
13-Sep	6	Z	6	5	4	3	2	4	14	14	13	22	29	32	32	34	31	29	21	17	13	9	17	6	15.8	34
14-Sep	5	3	Z	4	4	2	1	6	18	29	31	35	36	38	38	37	35	29	21	16	5	5	5	9	18.0	38
15-Sep	4	3	2	Z	3	1	3	7	21	C	C	30	30	29	28	29	30	24	19	17	17	18	19	15	16.7	30
16-Sep	7	10	5	9	Z	3	9	10	11	11	13	14	14	14	15	15	15	16	17	16	17	17	17	16	12.6	17
17-Sep	15	15	14	13	12	Z	10	10	10	9	9	9	9	10	13	14	15	15	12	11	12	10	7	2	11.2	15
18-Sep	4	5	8	23	23	16	Z	14	11	12	15	18	22	24	25	29	28	22	15	13	10	6	8	14	15.8	29
19-Sep	12	14	13	13	12	11	22	Z	25	27	29	33	36	37	37	36	36	38	43	42	38	33	28	31	28.0	43
20-Sep	28	Z	25	25	25	25	25	25	26	27	28	29	30	31	32	33	33	32	24	16	12	13	11	18	24.9	33
21-Sep	21	24	Z	17	13	18	12	9	18	20	21	21	23	24	23	24	24	17	16	15	16	14	16	26	18.8	26
22-Sep	21	23	16	Z	10	7	8	12	16	26	32	34	42	45	48	42	38	27	21	10	9	9	10	9	22.4	48
23-Sep	26	31	34	35	Z	20	11	23	25	24	27	36	38	38	39	38	38	30	21	17	13	11	22	21	26.9	39
24-Sep	24	15	19	20	13	Z	16	18	20	23	25	23	25	31	29	26	28	31	31	29	25	27	43	41	25.4	43
25-Sep	39	41	32	27	27	23	Z	22	23	21	20	22	23	21	19	16	17	16	15	23	26	27	26	25	23.8	41
26-Sep	24	23	19	20	20	18	15	Z	13	13	12	12	13	12	12	12	12	13	15	17	18	19	18	17	15.9	24
27-Sep	18	Z	19	21	22	23	21	19	18	20	22	23	24	24	25	25	16	11	16	8	6	7	9	7	17.6	25
28-Sep	4	6	Z	16	18	19	20	22	21	23	23	24	26	27	27	27	28	27	26	24	23	23	23	23	21.8	28
29-Sep	23	22	22	Z	21	17	13	14	15	17	21	28	34	34	31	27	24	23	21	20	17	11	13	12	20.9	34
30-Sep	10	5	5	4	Z	2	3	8	10	9	8	8	10	12	10	9	8	5	6	9	8	7	7	7	7.4	12

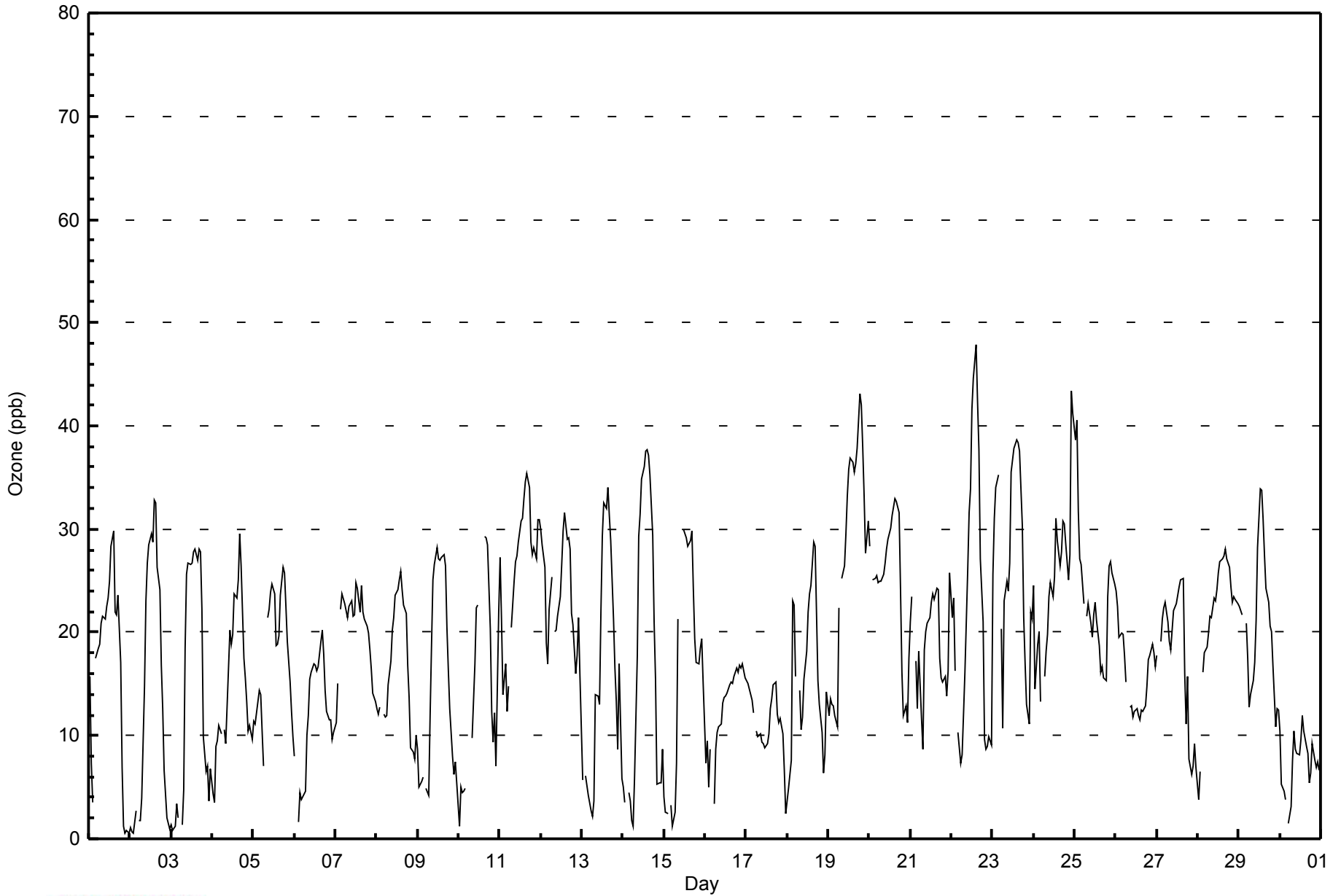
14.1	13.4	12.7	14.3	13.8	12.6	11.3	13.6	17.5	20.1	21.6	23.6	25.4	26.3	26.6	26.3	25.7	23.5	20.0	16.9	14.4	13.4	14.3	14.4	Diurnal Average	
39	41	34	35	27	25	25	25	26	29	32	36	42	45	48	42	38	38	43	42	38	33	43	41	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Anzac - September 2014





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Anzac - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	382	55.85	55.85
21 - 50	302	44.15	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



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Anzac - September 2014

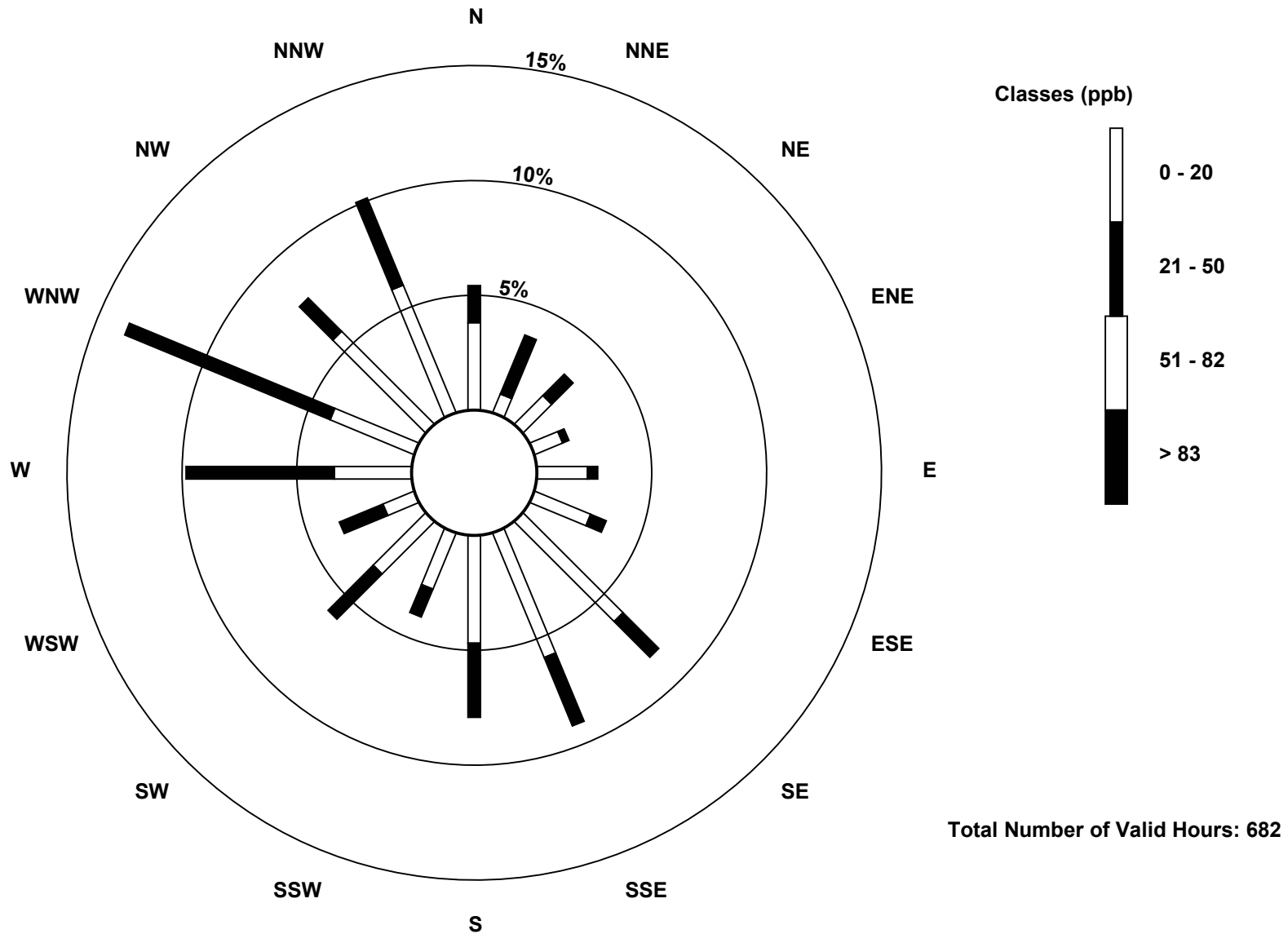
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	26	6	12	9	15	18	42	40	32	18	22	10	23	27	39	41	380
21 - 50	11	19	9	2	3	5	15	22	22	9	19	14	44	66	14	28	302
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	37	25	21	11	18	23	57	62	54	27	41	24	67	93	53	69	682

Total Number of Valid Hours: 682

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

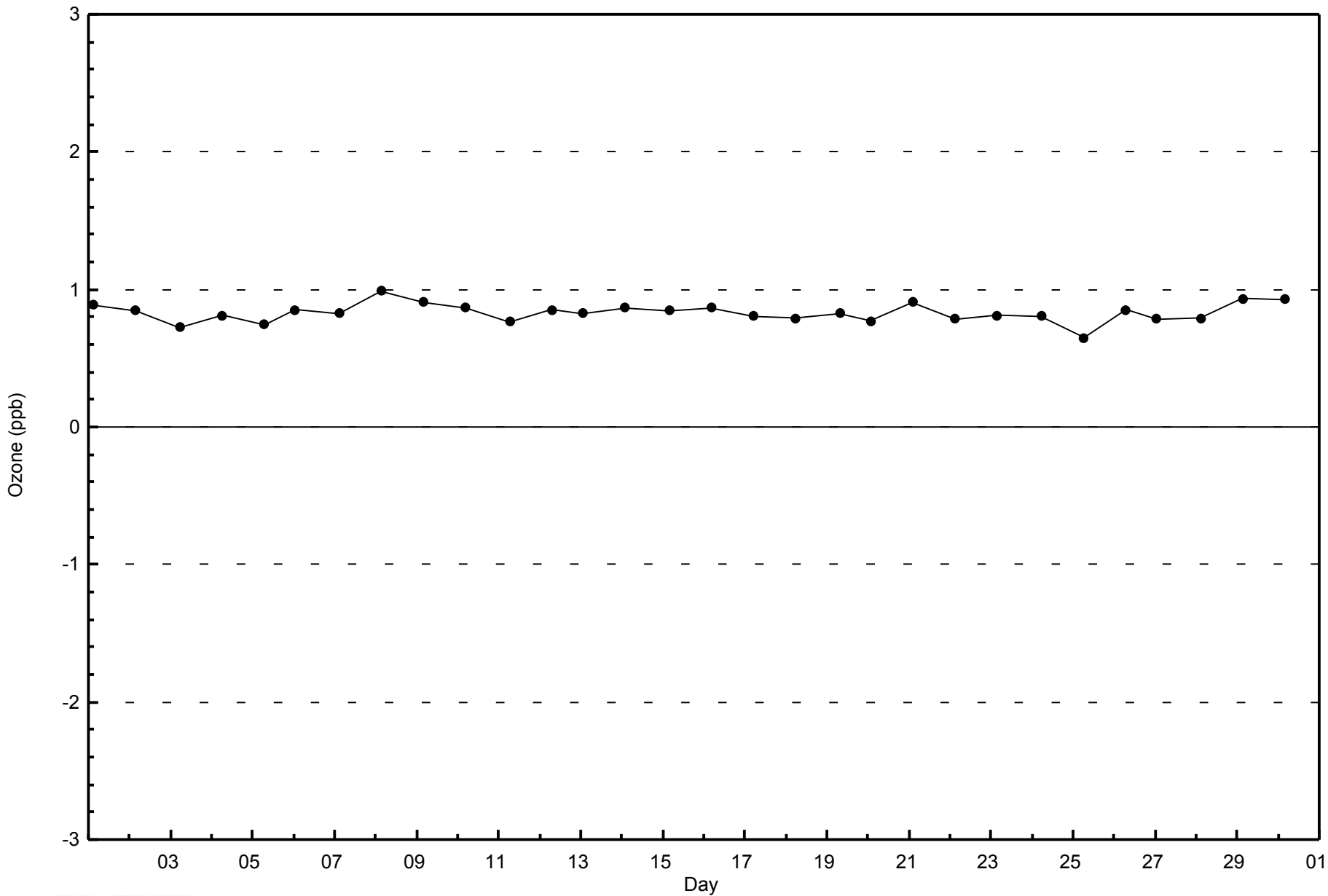
Ozone (O₃) - ppb
Anzac (AMS 14)





WBEA
Zero Responses

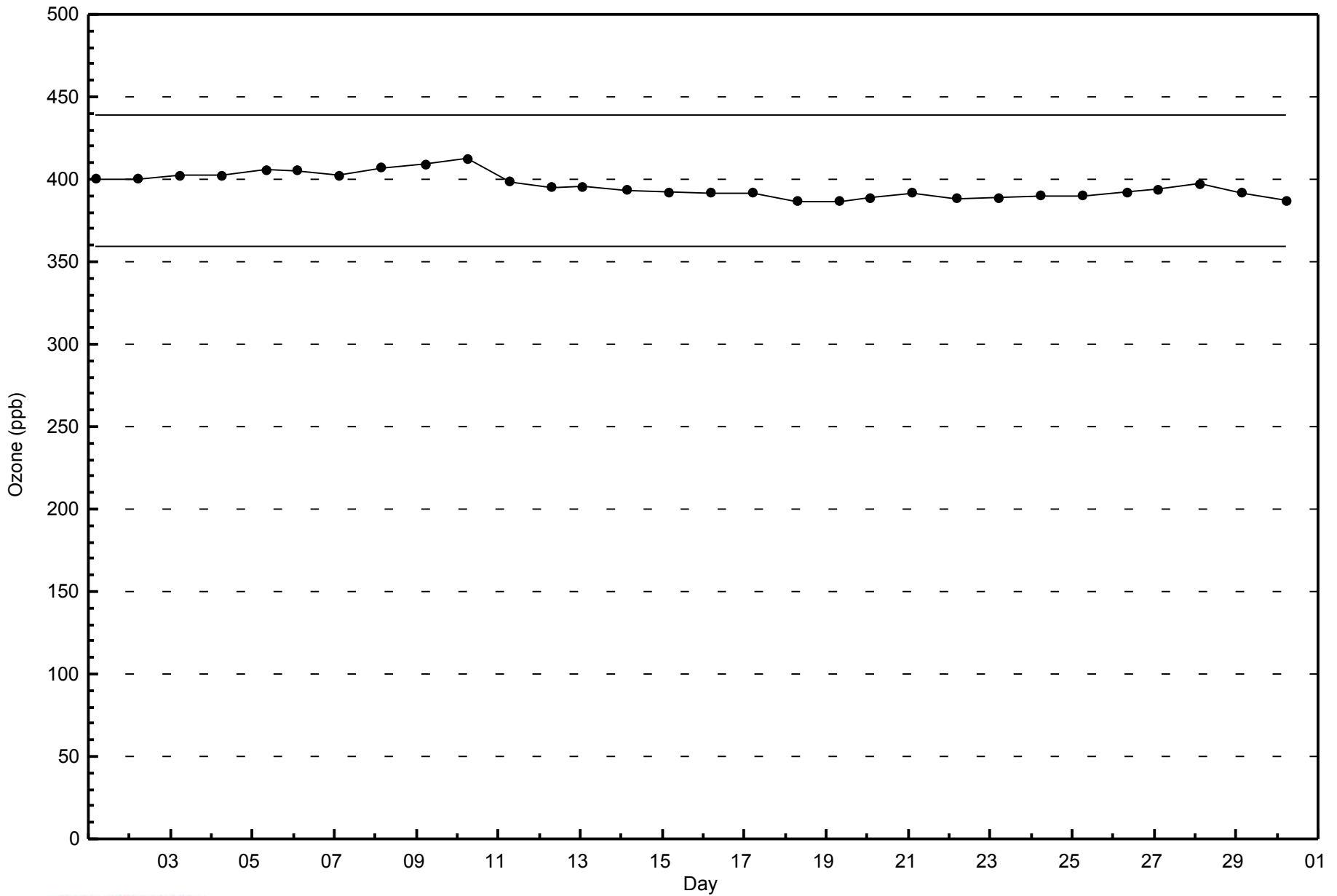
Ozone (O₃) - ppb
Anzac - September 2014





WBEA
Span Responses

Ozone (O₃) - ppb
Anzac - September 2014





Summary of Hour Averages

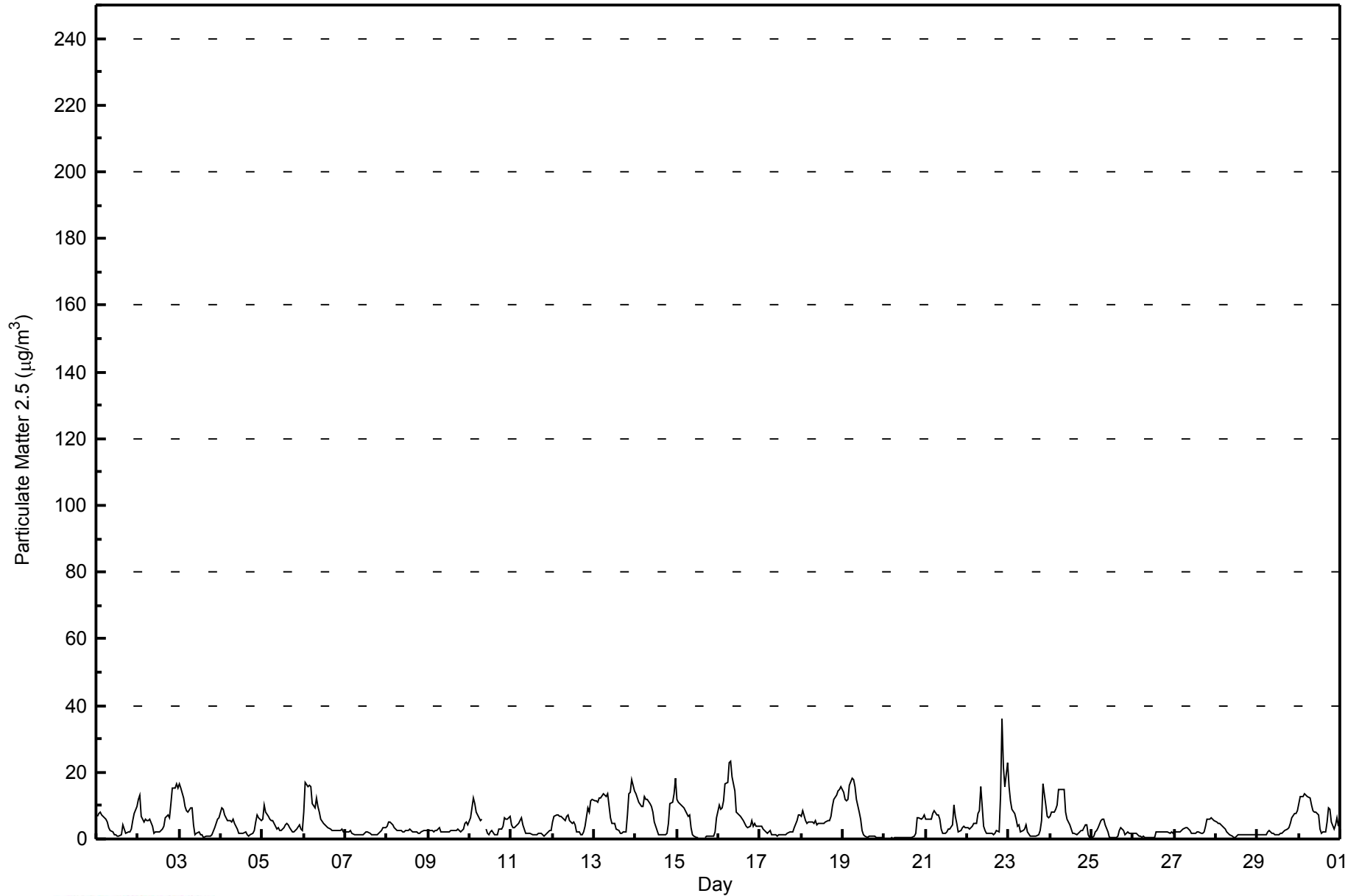
Anzac - September 2014

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 720																								
Maximum Value: 36.0 µg/m ³ on Sep 22 21:00		Maximum Daily Average: 9.4 µg/m ³ on Sep 16																								
Minimum Value: 0.2 µg/m ³ on Sep 20 02:00		Hours of Data: 716																								
Maximum Diurnal Average: 7.4 µg/m ³ at hour 2		Hours of Missing Data: 4																								
Monthly Average: 4.82 µg/m ³		Hours of Calibration: 3																								
Minimum Daily Average: 1.4 µg/m ³ on Sep 26		Percent Operational Time: 99.9																								
Minimum Diurnal Average: 2.1 µg/m ³ at hour 15		Percentiles: P ₁ = 0.2 P ₁₀ = 1.0 Q ₁ = 1.7 Median = 3.1 Q ₃ = 6.5 P ₉₀ = 11.5 P ₉₉ = 17.8																								
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	6.8	7.7	7.9	7.3	6.8	6.1	4.9	3.3	2.7	2.2	1.2	1.2	1.0	0.9	1.2	4.3	2.9	1.5	2.2	2.1	2.9	5.6	7.7	9.8	4.2	9.8
2-Sep	11.9	12.9	6.9	5.1	6.0	5.3	5.4	5.9	3.9	1.8	2.0	2.2	2.2	2.4	3.1	3.9	6.4	7.0	6.2	10.4	15.3	15.3	16.4	15.3	7.2	16.4
3-Sep	16.5	15.3	12.1	9.6	8.4	7.9	9.1	9.3	4.1	1.5	1.7	2.0	1.5	1.1	0.6	0.7	0.7	0.8	0.9	1.4	3.5	4.5	5.8	6.4	5.2	16.5
4-Sep	9.4	8.9	7.0	6.4	5.5	5.4	5.1	6.0	4.9	2.9	1.8	1.7	1.5	1.7	1.9	1.4	1.0	1.2	1.8	2.4	5.0	7.3	6.3	5.5	4.3	9.4
5-Sep	6.1	10.1	8.1	6.6	5.7	5.4	5.5	4.7	3.1	3.5	2.5	2.7	3.3	4.3	4.6	4.3	3.4	2.3	2.0	2.6	3.1	4.4	2.9	2.5	4.3	10.1
6-Sep	8.1	17.0	15.8	16.0	15.6	10.4	9.5	12.4	9.7	7.9	6.0	4.4	4.1	3.7	3.4	3.0	2.7	2.6	2.5	2.5	2.6	2.7	2.9	2.3	7.0	17.0
7-Sep	2.2	2.1	2.1	2.4	1.7	1.3	1.3	1.3	1.2	1.3	1.4	1.7	2.1	1.9	1.6	1.2	1.3	1.4	1.3	1.6	2.1	2.7	3.3	3.4	1.8	3.4
8-Sep	4.0	5.2	5.1	4.3	3.3	3.0	2.8	2.7	2.5	2.3	2.3	2.4	2.6	2.8	2.6	2.1	2.0	2.0	1.9	1.9	2.1	2.5	2.5	2.6	2.8	5.2
9-Sep	2.7	2.5	2.5	2.3	2.5	2.7	3.2	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.7	2.5	2.7	3.0	2.7	2.2	2.8	4.5	5.2	4.3	2.8	5.2
10-Sep	6.2	9.4	12.2	10.8	8.2	6.3	5.5	5.9	M	3.1	1.9	1.5	1.9	2.4	1.4	1.1	1.3	3.1	2.8	3.9	6.6	5.8	6.0	6.7	5.0	12.2
11-Sep	4.0	3.4	3.4	4.1	4.6	5.5	6.2	4.4	1.7	1.7	1.6	1.5	1.5	1.4	1.3	1.2	1.5	1.6	1.5	1.0	1.5	2.3	2.5	2.6	2.6	6.2
12-Sep	5.3	6.8	7.0	7.0	6.9	6.6	5.7	5.3	6.7	7.2	5.6	4.5	5.2	4.2	2.1	2.3	1.3	1.4	2.2	3.7	9.1	8.0	11.5	11.7	5.7	11.7
13-Sep	11.4	11.3	11.1	12.2	12.4	13.6	12.9	12.7	13.5	6.2	4.5	4.7	4.7	2.9	2.4	1.8	1.7	2.1	2.3	7.1	13.8	13.9	17.8	14.4	8.8	17.8
14-Sep	13.4	12.3	10.9	9.8	9.9	12.6	11.8	11.8	10.5	9.7	7.9	5.1	2.7	1.5	1.2	1.2	1.1	1.2	1.8	4.8	10.7	11.1	13.4	18.2	8.1	18.2
15-Sep	12.0	11.1	10.2	9.6	9.4	8.4	6.7	7.3	3.2	1.4	0.7	0.6	0.6	C	C	C	0.6	0.8	0.7	0.7	0.7	0.7	2.2	6.4	4.5	12.0
16-Sep	10.0	8.8	9.5	11.4	16.6	16.8	23.1	23.2	18.7	14.6	8.2	7.4	7.2	6.9	5.3	4.5	3.9	3.4	3.7	5.5	4.0	4.7	3.7	3.7	9.4	23.2
17-Sep	3.8	4.0	2.9	2.0	1.9	2.2	2.4	1.4	1.3	1.3	0.7	1.2	1.3	1.4	1.4	1.5	1.9	2.3	2.1	2.3	3.4	5.4	7.4	7.1	2.6	7.4
18-Sep	6.6	8.4	5.5	4.7	5.0	5.1	5.0	4.5	5.4	4.1	4.6	4.6	4.6	4.8	4.9	5.5	5.6	6.6	9.6	11.8	13.3	14.2	14.8	15.7	7.3	15.7
19-Sep	14.1	11.8	11.4	11.9	15.9	18.1	17.8	15.7	12.0	8.2	6.1	2.7	1.3	0.8	0.6	0.7	0.7	0.9	0.9	0.5	0.4	0.4	0.4	0.3	6.4	18.1
20-Sep	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.5	0.5	0.6	1.0	1.9	6.4	6.2	6.1	6.4	7.4	1.7	7.4
21-Sep	6.1	5.9	5.9	6.1	7.6	8.4	7.2	7.0	6.0	2.8	1.9	1.8	2.1	3.1	2.8	4.0	10.2	6.9	4.9	2.0	2.7	3.2	3.7	3.4	4.8	10.2
22-Sep	3.3	3.2	3.5	4.0	4.7	4.5	7.5	8.4	15.7	4.0	2.3	1.7	1.9	1.9	1.6	1.5	1.5	2.4	2.3	13.1	36.0	21.8	15.9	22.9	7.7	36.0
23-Sep	15.9	11.4	9.1	7.5	5.9	3.9	4.0	2.3	2.4	3.0	4.2	2.1	1.0	0.9	0.9	1.1	0.9	1.3	2.7	5.4	16.5	10.1	6.7	6.5	5.2	16.5
24-Sep	6.9	8.0	8.0	8.7	10.2	14.9	15.0	14.9	14.7	8.2	6.1	4.2	3.0	1.7	1.6	1.4	1.7	2.3	2.4	2.6	4.4	4.4	1.1	0.6	6.1	15.0
25-Sep	0.4	0.7	1.9	2.5	3.4	5.4	6.1	6.0	4.4	2.2	0.4	0.2	0.3	0.5	0.5	0.7	2.5	3.6	2.6	1.4	1.5	2.0	1.8	1.7	2.2	6.1
26-Sep	1.8	1.8	1.6	1.0	0.8	0.6	0.8	0.5	0.3	0.4	0.3	0.3	0.4	2.0	2.3	2.0	2.2	2.1	2.2	2.2	2.1	1.9	2.0	1.9	1.4	2.3
27-Sep	2.5	2.3	2.2	2.2	2.5	3.1	3.4	3.3	3.2	2.7	1.6	1.6	1.8	1.9	1.9	1.6	1.9	2.3	3.9	5.8	5.7	6.5	5.9	5.4	3.1	6.5
28-Sep	5.1	4.8	4.7	4.2	3.7	3.1	2.3	1.5	1.2	0.8	0.6	0.6	0.9	1.3	1.3	1.4	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.0	5.1
29-Sep	1.2	1.2	1.1	1.1	1.2	1.3	2.0	2.4	1.7	1.6	1.4	1.4	1.4	1.7	1.9	2.1	2.6	2.8	3.4	4.9	6.3	7.5	7.6	8.4	2.8	8.4
30-Sep	10.5	12.6	12.7	13.4	13.0	12.6	12.4	10.3	8.4	8.1	7.9	7.4	2.8	1.8	2.0	2.3	5.2	9.2	8.8	4.9	2.8	4.3	6.4	3.8	7.7	13.4
																								Diurnal Average		
																								Diurnal Maximum		
6.9 7.4 6.8 6.5 6.7 6.7 6.8 6.6 5.7 3.9 3.0 2.5 2.2 2.2 2.1 2.1 2.4 2.7 2.8 3.9 6.3 6.2 6.4 6.7																										
16.5 17.0 15.8 16.0 16.6 18.1 23.1 23.2 18.7 14.6 8.2 7.4 7.2 6.9 5.3 5.5 10.2 9.2 9.6 13.1 36.0 21.8 17.8 22.9																										
C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - September 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - September 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	414	57.82	57.82
6 - 15	205	28.63	86.45
16 - 25	24	3.35	89.80
26 - 80	1	0.14	89.94
> 81.0	0	0.00	89.94

Total Number of Valid Hours: 716

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - September 2014

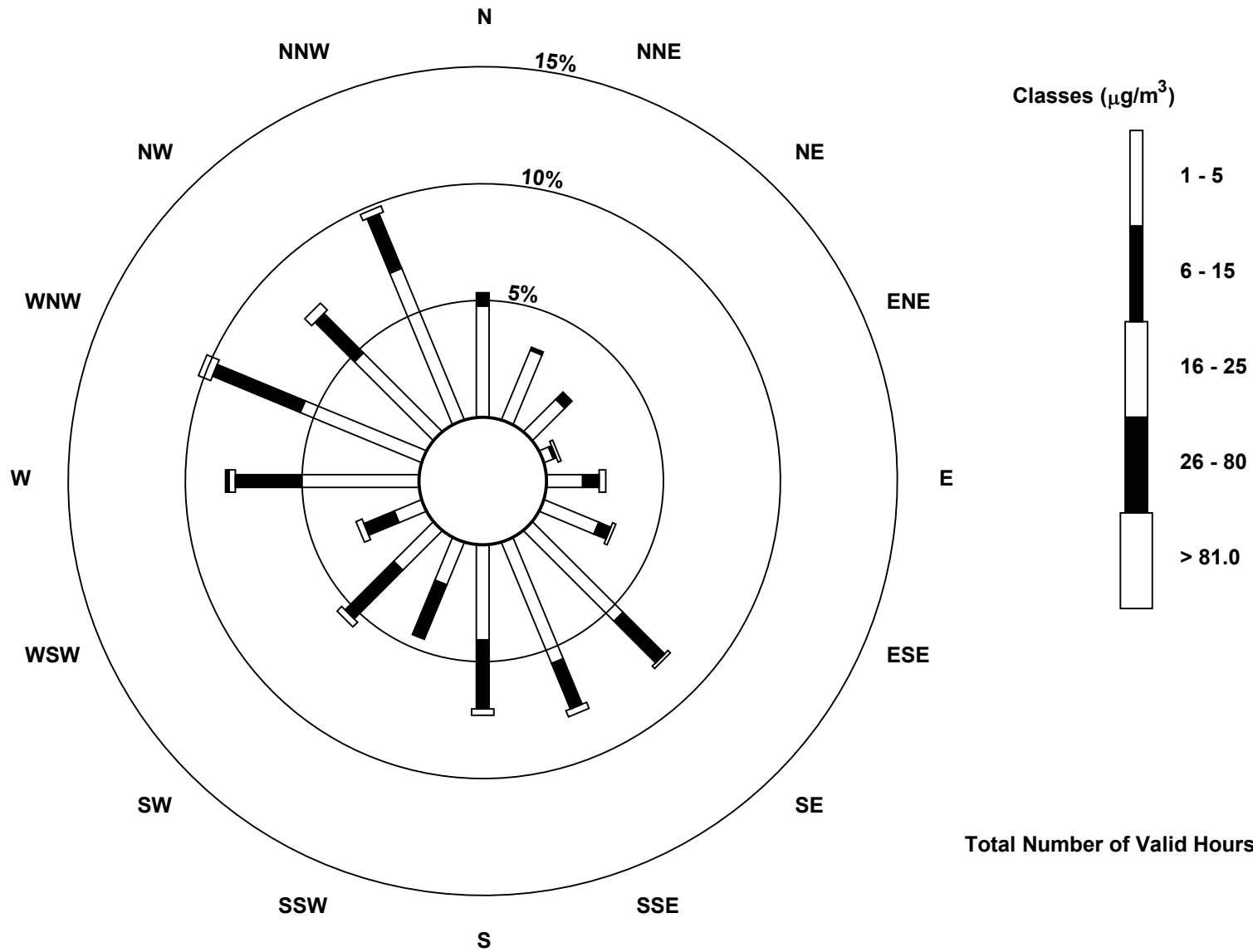
Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	34	23	14	3	11	18	39	40	29	14	17	9	36	40	34	50	411
6 - 15	4	1	3	1	5	4	18	15	21	18	21	10	20	29	17	18	205
16 - 25	0	0	0	1	2	1	1	2	2	0	2	2	2	4	3	2	24
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	38	24	17	5	18	23	58	57	52	32	40	21	59	73	54	70	641

Total Number of Valid Hours: 713

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
 Anzac (AMS 14)



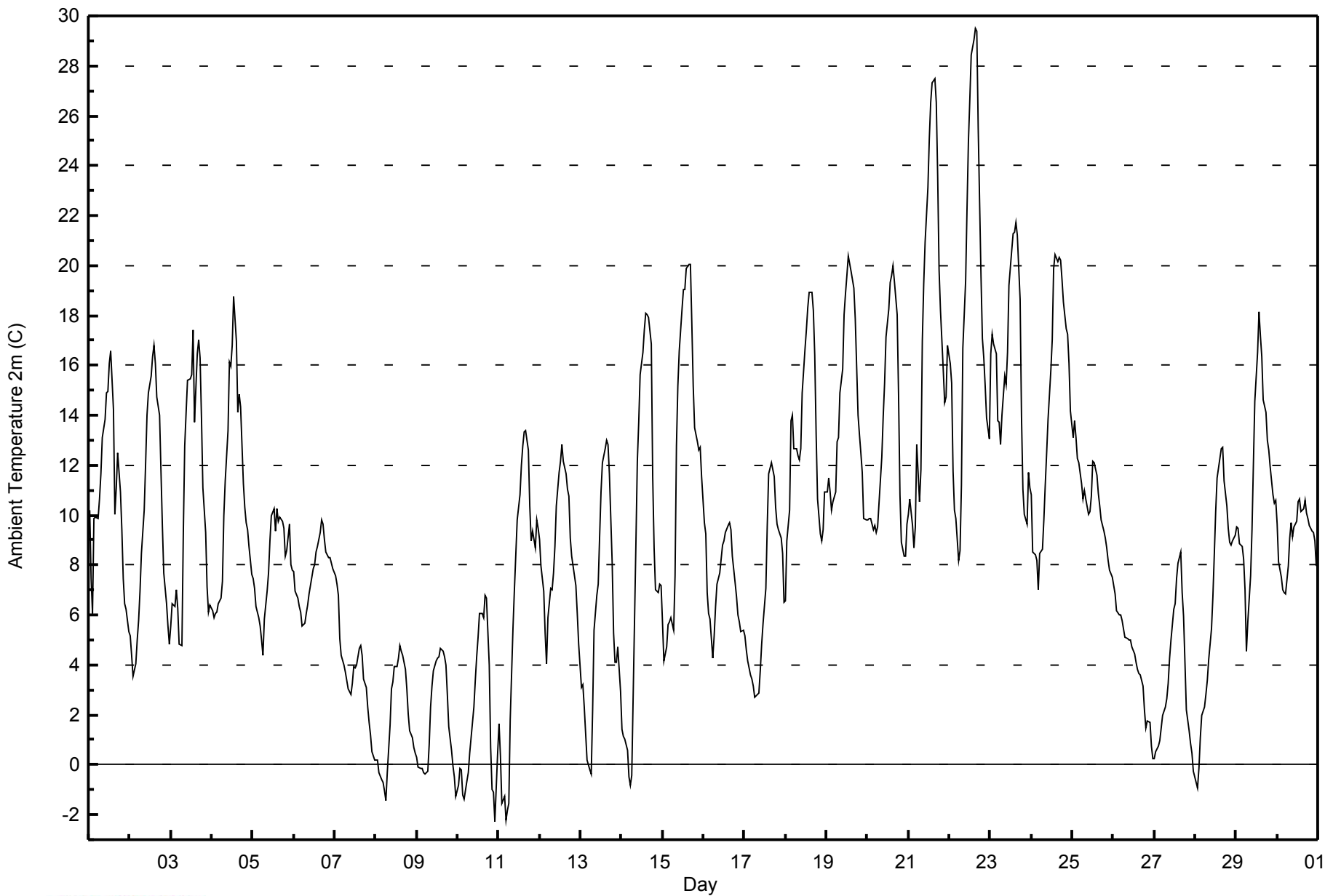


Maximum Value: 29.5 C on Sep 22 16:00		Maximum Daily Average: 18.3 C on Sep 22		Hours in Service: 720																							
Minimum Value: -2.3 C on Sep 10 23:00		Minimum Daily Average: 1.8 C on Sep 8		Hours of Data: 720																							
Maximum Diurnal Average: 13.9 C at hour 15		Minimum Diurnal Average: 5.6 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 9.19 C		Percentiles: P ₁ = -1.3 P ₁₀ = 1.4 Q ₁ = 5.0 Median = 9.0 Q ₃ = 12.7 P ₉₀ = 17.2 P ₉₉ = 26.2		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	10.2	7.5	6.0	9.8	9.9	9.9	10.6	11.7	13.1	13.8	14.9	14.9	16.1	16.6	14.2	10.0	11.1	12.5	10.9	9.4	7.4	6.4	6.2	5.3	10.8	16.6	
2-Sep	5.1	4.4	3.5	4.0	5.0	5.8	6.9	8.5	10.2	12.1	14.0	14.9	15.6	16.3	16.8	16.1	14.7	14.0	11.8	9.6	7.7	6.5	5.5	4.8	9.7	16.8	
3-Sep	5.6	6.5	6.3	7.0	6.3	4.8	4.8	9.3	12.8	14.1	15.4	15.5	15.6	17.4	13.7	16.5	17.0	16.3	13.9	11.1	9.3	7.1	6.1	6.4	10.8	17.4	
4-Sep	6.2	5.9	6.1	6.1	6.5	6.7	7.3	10.0	11.4	13.4	16.1	16.0	16.8	18.8	17.0	14.1	14.8	14.3	11.3	10.3	9.7	9.4	8.7	7.7	11.0	18.8	
5-Sep	7.5	7.1	6.3	5.9	5.6	5.0	4.4	5.8	6.9	7.7	9.0	10.0	10.3	9.4	10.3	9.7	9.9	9.7	9.5	8.4	8.6	9.6	8.0	7.8	8.0	10.3	
6-Sep	7.8	7.0	6.7	6.3	6.1	5.6	5.7	6.1	6.4	6.8	7.2	7.8	8.0	8.5	8.7	9.3	9.8	9.7	9.0	8.5	8.3	8.3	8.1	7.9	7.6	9.8	
7-Sep	7.6	7.3	6.8	5.0	4.4	4.0	3.7	3.4	3.0	2.8	3.3	3.9	3.9	4.0	4.7	4.8	4.4	3.5	3.1	2.3	1.7	1.2	0.5	0.2	3.7	7.6	
8-Sep	0.2	0.2	-0.3	-0.6	-0.7	-1.1	-1.4	-0.3	1.6	3.0	3.3	4.0	3.9	4.3	4.8	4.5	4.4	3.8	3.1	2.0	1.4	1.1	0.7	0.5	1.8	4.8	
9-Sep	0.3	-0.1	-0.1	-0.1	-0.3	-0.4	-0.2	0.8	2.3	3.2	3.8	4.2	4.3	4.3	4.7	4.6	4.3	4.0	2.8	1.6	0.6	-0.1	-0.5	-1.3	1.8	4.7	
10-Sep	-0.8	-0.1	-0.2	-1.2	-1.4	-0.6	-0.3	0.5	1.1	2.3	3.4	4.3	5.1	6.1	6.1	5.9	6.8	6.7	4.0	0.7	-1.0	-1.1	-2.3	0.5	1.8	6.8	
11-Sep	1.7	0.3	-1.5	-1.3	-2.2	-1.8	-1.5	1.8	5.5	7.0	8.4	9.8	10.8	12.0	12.8	13.4	13.4	12.6	10.4	8.9	9.4	8.7	9.8	9.5	6.6	13.4	
12-Sep	9.0	7.9	6.9	5.3	4.0	5.9	7.1	7.0	7.7	8.8	10.4	11.7	12.2	12.8	12.2	11.7	11.0	10.7	9.1	8.4	7.6	7.2	6.1	4.9	8.6	12.8	
13-Sep	3.1	3.2	2.3	1.2	0.2	-0.2	-0.4	2.2	5.4	6.8	7.2	9.1	10.9	12.1	12.6	13.0	12.8	11.6	8.1	5.3	4.1	4.1	4.7	2.9	5.9	13.0	
14-Sep	1.4	1.1	1.1	0.6	-0.5	-0.8	-0.4	2.7	8.9	12.2	13.7	15.6	16.5	17.4	18.1	18.0	17.9	16.8	11.5	8.7	7.0	6.9	7.3	7.2	8.7	18.1	
15-Sep	5.7	4.2	4.7	5.6	5.7	5.9	5.4	7.6	12.8	15.2	16.6	18.3	19.0	19.0	19.9	20.0	20.1	17.7	15.2	13.5	13.0	12.6	12.7	11.5	12.6	20.1	
16-Sep	9.7	9.2	6.9	6.1	5.8	4.3	5.2	6.4	7.3	7.7	8.2	8.8	9.0	9.3	9.6	9.7	9.4	8.4	7.3	6.7	6.0	5.7	5.3	5.4	7.4	9.7	
17-Sep	5.2	4.6	4.2	3.6	3.4	3.2	2.7	2.8	2.9	3.8	4.8	5.7	7.1	9.6	11.7	11.9	12.1	11.6	10.3	9.7	9.4	9.1	8.5	6.5	6.8	12.1	
18-Sep	6.6	9.0	10.2	13.8	14.0	12.6	12.7	12.4	12.2	12.7	14.9	16.6	17.4	18.3	18.9	18.9	18.2	16.4	13.2	10.6	9.2	9.0	9.4	10.9	13.3	18.9	
19-Sep	11.0	11.5	10.9	10.2	10.6	10.9	12.9	13.1	14.9	15.8	18.0	18.9	19.6	20.4	19.7	19.4	19.1	17.9	14.0	13.2	12.5	11.7	9.8	9.8	14.4	20.4	
20-Sep	9.8	9.9	9.8	9.4	9.6	9.3	9.5	10.5	12.3	14.0	15.3	17.1	18.3	19.3	19.6	20.0	19.4	18.0	14.8	10.8	8.9	8.3	8.3	9.6	13.0	20.0	
21-Sep	10.1	10.7	9.6	8.7	9.5	12.9	10.5	11.8	17.0	19.3	20.9	23.1	25.1	26.5	27.3	27.5	26.5	23.6	19.8	18.2	15.8	14.5	14.7	16.8	17.5	27.5	
22-Sep	16.1	15.3	11.8	10.2	9.9	8.2	8.6	11.2	16.7	19.4	22.3	25.0	26.6	28.4	29.1	29.5	29.4	25.6	19.6	17.1	16.3	15.2	13.9	13.1	18.3	29.5	
23-Sep	16.5	17.2	16.8	16.4	13.8	13.7	12.8	14.0	15.6	15.2	16.5	19.2	20.6	21.3	21.3	21.7	21.2	18.6	14.0	11.0	10.0	9.7	11.7	11.1	15.8	21.7	
24-Sep	10.8	8.5	8.4	8.2	7.0	8.5	8.7	9.8	11.2	12.5	13.8	15.8	17.0	19.9	20.4	20.2	20.3	20.2	19.5	18.6	17.5	17.2	16.1	14.2	14.3	20.4	
25-Sep	13.1	13.8	13.1	12.3	12.1	11.3	10.6	11.0	10.6	10.1	10.8	12.2	12.1	11.6	10.9	10.4	9.8	9.4	9.1	8.7	8.2	7.8	7.5	10.7	10.7	13.8	
26-Sep	7.2	6.8	6.2	6.0	6.0	5.8	5.4	5.1	5.0	5.0	4.7	4.4	4.1	3.8	3.7	3.6	3.2	2.2	1.5	1.7	1.7	0.7	0.2	4.1	7.2		
27-Sep	0.3	0.5	0.7	1.0	1.5	2.0	2.3	2.6	3.3	4.3	5.0	6.2	6.5	7.5	8.1	8.5	6.9	6.0	4.1	2.2	1.4	0.9	0.4	-0.3	3.4	8.5	
28-Sep	-0.7	-0.9	-0.2	1.1	2.0	2.3	2.8	3.4	4.2	5.5	6.7	8.4	10.2	11.5	12.3	12.7	12.7	11.4	10.4	9.5	8.9	8.8	9.0	9.2	6.7	12.7	
29-Sep	9.5	9.5	8.9	8.7	8.2	7.0	4.6	5.7	7.5	9.4	12.1	14.6	16.5	18.1	17.2	16.3	14.6	14.1	13.0	12.6	11.9	10.8	10.5	10.6	11.3	18.1	
30-Sep	9.7	8.1	7.5	7.0	6.9	6.9	7.9	9.1	9.7	9.2	9.5	9.8	10.5	10.7	10.2	10.2	10.6	10.1	9.9	9.6	9.4	9.3	9.0	8.0	9.1	10.7	
		6.8	6.5	6.0	5.9	5.6	5.6	5.6	6.9	8.6	9.8	11.0	12.2	13.0	13.9	13.9	13.8	13.6	12.6	10.5	9.0	8.1	7.6	7.2	6.9	Diurnal Average	
		16.5	17.2	16.8	16.4	14.0	13.7	12.9	14.0	17.0	19.4	22.3	25.0	26.6	28.4	29.1	29.5	29.4	25.6	19.8	18.6	17.5	17.2	16.1	16.8	Diurnal Maximum	



WBEA
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Anzac - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature 2m (AT 2m) - C
Anzac - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	39	5.42	5.42
0 - 10	398	55.28	60.69
10 - 20	255	35.42	96.11
> 20	28	3.89	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

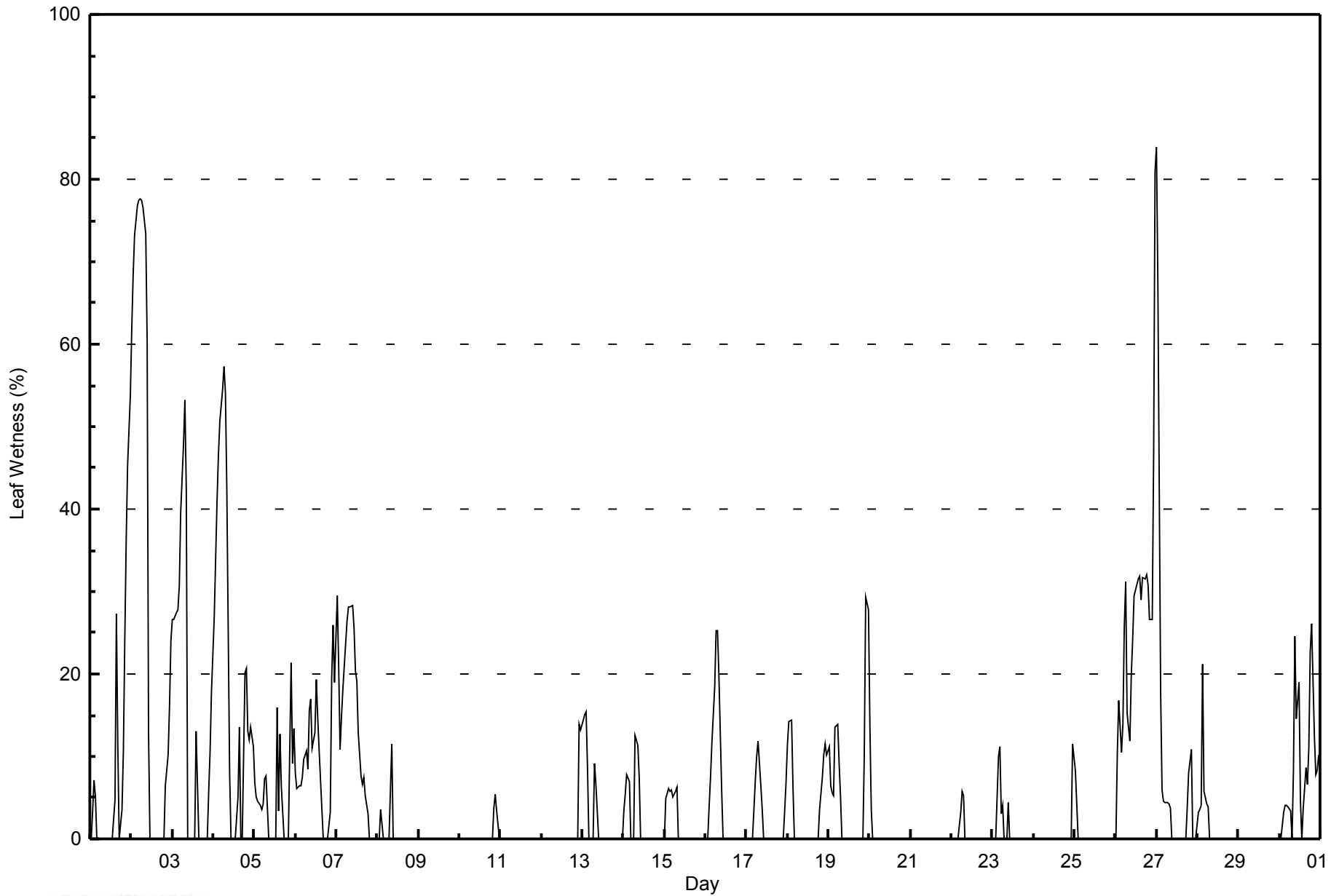


Maximum Value: 84 % on Sep 27 01:00														Maximum Daily Average: 33.0 % on Sep 2														Hours in Service: 720			
Minimum Value: 0 % on Sep 1 01:00														Minimum Daily Average: 0.0 % on Sep 9														Hours of Data: 720			
Maximum Diurnal Average: 11.0 % at hour 7														Minimum Diurnal Average: 1.6 % at hour 18														Hours of Missing Data: 0			
Monthly Average: 6.2 %														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 6 P ₉₀ = 20 P ₉₉ = 76														Hours of Calibration: 0			
																												Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	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	7	5	0	0	0	0	0	0	0	0	0	5	27	11	0	4	11	24	36	45	54	9.7	54						
2-Sep	62	68	73	77	78	78	77	77	73	60	13	0	0	0	0	0	0	0	0	6	10	16	24	33.0	78						
3-Sep	27	27	27	28	31	40	48	53	42	0	0	0	0	13	0	0	0	0	0	6	11	18	15.4	53							
4-Sep	27	34	41	47	51	55	57	54	42	8	0	0	0	5	14	0	0	20	21	13	12	14	11	21.9	57						
5-Sep	7	5	5	4	4	4	7	8	0	0	0	0	16	3	13	6	0	0	0	21	9	13	5.2	21							
6-Sep	8	6	6	7	7	10	11	8	16	17	11	13	19	15	11	4	0	0	0	3	19	26	19	9.8	26						
7-Sep	29	21	11	15	18	24	26	28	28	28	26	20	19	13	8	7	7	5	3	0	0	0	0	14.0	29						
8-Sep	0	0	4	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	12						
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						
10-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	3	0	0.5	5						
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						
12-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	13	1.1	14						
13-Sep	14	15	16	9	0	0	0	9	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.9	16						
14-Sep	3	5	8	7	0	0	0	12	11	7	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3	12						
15-Sep	0	5	6	6	6	5	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	6						
16-Sep	0	0	4	7	12	19	25	25	20	6	0	0	0	0	0	0	0	0	0	0	0	0	0	4.9	25						
17-Sep	0	0	0	0	3	7	10	12	7	4	0	0	0	0	0	0	0	0	0	0	0	3	7	2.2	12						
18-Sep	11	14	14	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	7	10	12	3.7	14						
19-Sep	11	6	6	5	14	14	9	5	0	0	0	0	0	0	0	0	0	0	0	0	10	29	28	5.7	29						
20-Sep	14	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	14						
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						
22-Sep	0	0	0	0	0	3	6	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	6						
23-Sep	0	0	0	10	11	3	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	11						
24-Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0.5	11						
25-Sep	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	8						
26-Sep	0	10	17	11	14	26	31	15	12	20	24	29	31	32	32	29	32	32	32	31	27	27	47	26.7	81						
27-Sep	84	68	18	6	5	4	4	4	4	0	0	0	0	0	0	0	0	0	4	8	11	0	0	9.1	84						
28-Sep	3	4	4	21	6	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.9	21						
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						
30-Sep	0	0	3	4	4	4	3	0	8	25	15	19	5	0	4	9	7	11	23	26	12	8	8	8.6	26						
10.3 10.0 9.0 9.1 8.7 10.0 11.0 10.8 9.4 6.0 2.9 2.7 2.5 2.5 2.7 3.4 2.1 1.6 2.8 3.3 3.6 5.5 7.9 10.0																								Diurnal Average							
84 68 73 77 78 78 77 77 73 60 26 29 31 32 32 29 32 32 32 31 27 36 47 81																								Diurnal Maximum							



WBEA
Hourly Averages

Leaf Wetness (SW) - %
Anzac - September 2014





WBEA
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Anzac - September 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	470	65.28	65.28
0.4 - 0.5	0	0.00	65.28
0.6 - 0.7	0	0.00	65.28
0.8 - 1.4	0	0.00	65.28
1.5 - 10	106	14.72	80.00
> 10	144	20.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

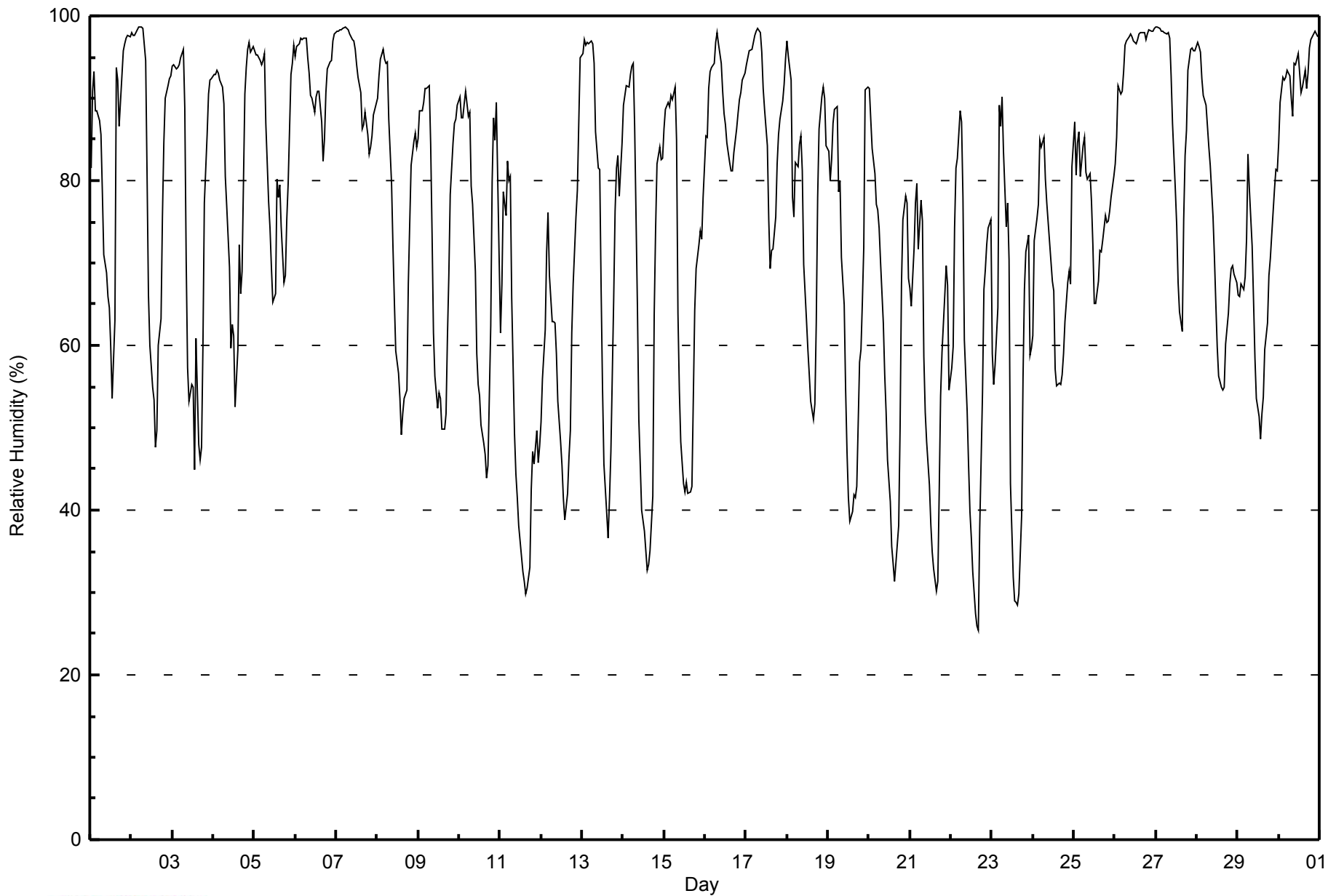


Maximum Value: 99 % on Sep 27 01:00																			Maximum Daily Average: 95.4 % on Sep 26						Hours in Service: 720			
Minimum Value: 25 % on Sep 22 17:00																			Minimum Daily Average: 51.5 % on Sep 11						Hours of Data: 720			
Maximum Diurnal Average: 89.1 % at hour 7																			Minimum Diurnal Average: 55.7 % at hour 15						Hours of Missing Data: 0			
Monthly Average: 75.2 %																			Percentiles: P ₁ = 30 P ₁₀ = 46 Q ₁ = 61 Median = 80 Q ₃ = 91 P ₉₀ = 97 P ₉₉ = 98						Hours of Calibration: 0			
																			Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Sep	81	91	93	88	89	87	86	79	71	69	66	65	60	53	63	94	92	87	93	96	97	97	98	97	82.9	98		
2-Sep	98	98	98	98	99	99	99	98	95	81	66	60	55	53	48	50	60	63	76	85	90	92	92	93	81.0	99		
3-Sep	94	94	94	94	94	95	96	89	70	57	53	55	55	45	61	48	46	48	60	77	86	91	92	92	74.4	96		
4-Sep	93	93	93	93	92	91	89	80	77	69	60	63	61	52	60	72	66	69	90	94	96	97	96	96	81.0	97		
5-Sep	96	95	95	95	94	95	95	87	77	74	69	65	66	80	78	79	74	68	68	75	80	93	94	96	83.0	96		
6-Sep	95	96	97	97	97	97	97	95	93	90	90	88	90	91	91	87	82	85	91	94	94	95	97	98	92.8	98		
7-Sep	98	98	98	98	99	99	99	98	98	97	97	96	94	92	91	86	87	88	86	83	84	85	88	89	92.9	99		
8-Sep	90	93	95	96	95	94	94	87	80	72	65	59	57	54	49	52	54	55	67	75	82	85	86	84	75.8	96		
9-Sep	85	89	88	90	91	91	91	84	74	61	56	52	54	54	50	50	52	61	68	78	85	87	87	89	73.7	91		
10-Sep	90	88	88	89	91	88	88	79	77	69	59	55	54	50	48	47	44	45	62	80	88	85	89	71	71.9	91		
11-Sep	62	68	79	76	82	80	80	66	49	44	41	38	34	33	31	30	31	33	42	47	46	50	46	48	51.5	82		
12-Sep	51	56	62	71	76	69	63	63	63	59	53	48	45	41	39	42	46	50	61	67	76	79	87	95	60.9	95		
13-Sep	95	97	96	97	97	97	97	94	86	82	81	67	55	46	40	37	41	47	66	76	82	83	78	85	75.9	97		
14-Sep	89	90	91	91	93	94	94	87	65	51	46	40	37	35	33	33	35	42	64	74	82	84	83	83	67.3	94		
15-Sep	86	89	89	89	90	90	91	85	64	55	48	43	42	43	42	42	43	53	64	69	72	74	73	78	67.4	91		
16-Sep	85	85	91	93	94	94	97	98	97	94	91	88	87	85	82	81	81	83	86	88	90	91	92	93	89.5	98		
17-Sep	94	95	96	96	97	98	98	98	98	96	91	89	84	75	69	71	72	76	82	86	88	90	92	95	88.5	98		
18-Sep	97	95	92	78	76	82	82	84	85	81	70	63	59	56	53	51	53	63	78	86	90	91	90	84	76.7	97		
19-Sep	84	80	83	87	89	89	79	80	71	65	55	47	42	39	40	42	42	43	58	60	65	72	91	91	66.2	91		
20-Sep	91	87	84	81	77	77	74	70	63	56	52	46	41	36	34	31	34	38	50	67	75	78	77	68	62.0	91		
21-Sep	67	65	72	77	80	72	78	75	59	52	48	43	38	35	33	30	31	42	54	59	66	70	67	55	57.0	80		
22-Sep	57	60	74	82	83	88	87	78	61	52	46	40	37	33	27	26	25	38	54	67	69	72	74	75	58.5	88		
23-Sep	59	55	58	65	89	87	90	83	74	77	70	43	32	29	29	29	30	39	56	67	71	73	59	60	59.4	90		
24-Sep	61	73	76	77	85	84	85	80	77	75	73	68	67	57	55	55	55	56	59	63	68	69	67	82	69.5	85		
25-Sep	87	81	85	86	81	84	85	81	80	81	78	72	65	65	68	71	71	73	76	75	75	76	78	81	77.3	87		
26-Sep	82	85	91	91	91	93	97	97	98	98	97	97	97	97	98	98	98	98	97	98	98	98	98	99	95.4	99		
27-Sep	99	99	98	98	98	98	98	98	97	93	87	79	75	68	64	62	75	83	86	93	96	96	96	96	88.8	99		
28-Sep	97	96	96	92	90	89	87	84	82	76	71	65	60	56	55	55	55	60	64	67	69	70	69	68	73.8	97		
29-Sep	66	66	67	67	68	73	83	79	72	66	58	54	51	49	52	54	60	63	68	70	73	79	81	81	66.7	83		
30-Sep	85	90	92	92	93	93	93	90	88	94	94	96	93	91	91	93	91	93	96	97	98	98	98	97	93.2	98		
	83.8	84.8	87.1	87.5	88.9	88.9	89.1	85.0	78.0	72.9	67.8	62.8	59.6	56.4	55.7	56.6	57.6	61.4	70.8	77.1	81.0	83.3	83.8	83.9	Diurnal Average			
	99	99	98	98	99	99	99	98	98	98	97	97	97	97	98	98	98	98	97	98	98	98	98	99	Diurnal Maximum			



WBEA
Hourly Averages

Relative Humidity (RH) - %
Anzac - September 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Anzac - September 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	41	5.69	5.69
40 - 60	132	18.33	24.03
60 - 80	187	25.97	50.00
80 - 100	360	50.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Anzac - September 2014

Maximum Speed: 19 km/h on Sep 11 16:00	Maximum Daily Speed Average: 11.7 km/h on Sep 28	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 9 22:00	Minimum Daily Speed Average: 1.0 km/h on Sep 23	Hours of Data: 717
Maximum Diurnal Speed Average: 2.5 km/h at hour 14	Minimum Diurnal Speed Average: 1.0 km/h at hour 19	Hours of Missing Data: 3
Monthly Average Velocity: 1.6 km/h 249.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 6 Q ₃ = 9 P ₉₀ = 13 P ₉₉ = 18	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	S3	ESE1	NW3	WNW8	WNW8	W8	WNW6	WNW8	WNW7	W6	W7	W9	WNW9	WNW9	NNW8	WNW3	WSW6	NW5	NW5	WNW2	ESE1	SW3	SW3	WSW3	WNW4.7	WNW9	
2-Sep	WSW4	W3	NNW2	NW4	NW3	NW3	W3	NW2	NW3	N1	E4	WNW5	W6	WNW6	NW7	NNW7	N5	NNW6	NNW4	NW2	WNW3	WNW3	NW2	WNW2	NW3.0	NW7	
3-Sep	W2	WNW2	NW4	WNW4	WNW3	WSW3	SW3	SW2	W4	W5	WNW6	WNW6	W6	W8	WSW6	WSW9	W9	WSW9	SW6	SSE3	SSW3	SSE2	SSW2	SW6	WSW4.1	WSW9	
4-Sep	SW5	SW5	SW6	SSW5	SW7	SSW6	SSW6	SSW6	SSW5	W7	WNW7	NNW5	NE6	NW5	NW5	NNW8	WNW6	NW9	N8	NNW6	NNW6	NW5	NNW6	NNW5	WNW3.0	NW9	
5-Sep	NNW5	NNW5	NNW5	NW3	NW3	NW2	NNW2	N3	SE3	SSE4	SE6	S9	SSE10	SE7	SE10	SE10	SE11	SE10	SSE10	SSE9	S7	WNW7	NW7	NW7	SSE2.3	SE11	
6-Sep	NNW8	NNW6	NW5	NW5	NNW4	NNW3	N3	NNE3	ENE3	ESE5	SE7	ESE7	SE8	ESE8	ESE8	SE9	SE9	ESE7	E6	E6	ESE7	SE5	ESE4	E5	E3.2	SE9	
7-Sep	ENE5	NNE4	NNE6	NE10	NE9	NNE8	NNE6	NNE7	NNE7	NNE8	NNE7	NNE9	NNE9	NNE7	N7	N9	N9	N9	N8	N7	N8	N7	N6	N5	NNW5	NNE6.8	NE10
8-Sep	NNW5	NNW5	NNW6	NNW6	N6	NNW5	NNW6	NNW7	NNW7	N8	N7	NNE7	N8	N7	NNW7	NNW7	NNW7	NNW5	N4	N2	N3	N3	N2	ENE2	N5.3	N8	
9-Sep	SSE1	W1	SW0	N1	AF	SW1	N1	NE2	N2	NE3	NE3	NW1	NW5	WNW4	WNW4	NNW4	NNW5	NNE5	NE3	AF	AF	NNW0	NNE2	NNE2	N1.6	NNE5	
10-Sep	N2	NNW1	NNW3	W2	N2	NNW1	NW2	WNW3	WNW4	NW5	NW5	WNW6	WNW6	NW7	WNW5	WSW4	WSW3	S5	SSE5	S4	S5	SSW5	SW6	SW12	W2.5	SW12	
11-Sep	SW12	W5	W5	W5	W4	SW6	SSW7	SSW7	SW12	SW19	SW18	SW18	SW19	SW18	SW18	SW19	SW19	SW15	SW8	SSW8	SW10	WSW8	WSW9	W10	SW11.3	SW19	
12-Sep	W9	WNW7	W7	W6	W7	WNW7	WNW8	WNW9	NW7	NW8	NNW9	NNW13	NNW13	NNW12	NNW13	NNW10	NNW8	NNW7	NNW5	NNW8	WNW3	NNW7	NNW6	NW5	NW7.5	NNW13	
13-Sep	NW5	NW6	WNW5	NW5	NNW4	WNW3	WNW2	SW1	S2	E3	NE5	SSW4	W7	WNW7	W9	WNW8	NW8	NNW4	E1	SSE3	S5	S5	S6	S4	W2.1	W9	
14-Sep	S5	S4	SSW5	SSW4	SE2	S1	SSE2	S2	SE4	SE3	SE5	S3	W4	WNW6	WNW4	WNW5	WNW6	NW2	SSE1	S3	SSW3	SSW4	SW4	SW5	SSW2.1	WNW6	
15-Sep	SW5	WSW4	W5	W4	WSW4	W4	W4	W5	WNW5	WNW7	WNW7	W5	W7	WSW6	NNW4	NNE3	ENE6	SE5	SSE5	SSE6	SSE7	SSE7	SSE7	SE6	SW2.3	SSE7	
16-Sep	SE4	SE4	NE4	NE5	E2	E5	E8	ESE7	SE9	ESE9	E6	E8	E8	E9	ESE10	E10	E10	E11	E10	ESE11	ESE13	ESE14	SE13	SE12	ESE7.8	ESE14	
17-Sep	SE13	SE12	SE13	SE13	SE13	SE12	SE11	SE11	SE12	SE11	SE13	SSE13	SE12	SSE12	SSE15	SSE15	SSE14	SSE12	SE10	SE9	SE10	SE9	SE6	ESE2	SE11.3	SSE15	
18-Sep	SSE5	SW8	WSW5	WNW9	WNW8	NW5	NW7	NW6	NW5	NNW6	NW5	NW5	W8	W7	W7	W6	W4	WNW2	NE1	SSE1	SSE3	SSE5	S5	SSE8	W3.1	WNW9	
19-Sep	SSE7	SSE8	S4	SSW5	SW3	WSW4	W6	WSW6	W8	W9	W12	W16	W16	W14	W16	W17	W16	WNW15	WNW17	WNW13	WNW13	WNW11	NW8	WNW13	W9.2	W17	
20-Sep	WNW11	WNW12	WNW12	WNW14	WNW14	WNW13	WNW13	WNW14	NW12	WNW12	WNW14	WNW12	WNW13	WNW13	WNW13	WNW11	WNW11	W9	SW6	SSW4	SSW4	SSW4	SW6	SW8	WNW9.5	WNW14	
21-Sep	SW8	SW8	SSW7	SW6	W8	W8	WSW7	W7	W9	W9	W9	W9	W9	W9	W9	W12	WSW7	S5	S6	S6	S5	S6	S8	SSE10	WSW5.9	W12	
22-Sep	SSE10	SSE8	SSE5	SSE5	SSE5	ESE4	SSE5	S4	S3	S4	SSE4	SSE2	WSW2	WNW3	WNW6	W5	W3	WSW2	S3	WSW3	W4	WNW5	WNW4	WNW5	SSW2.4	SSE10	
23-Sep	WNW8	WNW8	WNW6	W6	WNW4	WNW5	WNW4	WNW7	WNW10	NW5	W6	NE6	NE6	ENE5	NNE3	E2	SSE5	ESE5	ESE5	SE4	SSE5	SSE6	SSE7	SSE7	WNW1.0	WNW10	
24-Sep	SE8	SE6	SSE6	SSE7	SE6	SE8	SE9	SE9	SE9	SE13	SE13	SE10	SE10	ESE14	ESE13	ESE14	SE14	SE11	SSE9	SSE9	S8	WSW8	WNW12	WNW7	SE7.4	SE14	
25-Sep	WSW7	W14	WNW13	WNW12	WNW13	WNW14	WNW14	WNW15	NW13	NW14	WNW11	WNW11	NW10	NNW7	NNW10	N9	N5	N4	NNE7	NNE6	NNE6	NE7	NE7	NE7	NW8.1	WNW15	
26-Sep	NE7	NE5	NE6	ENE7	ENE8	E7	NE7	ENE8	NE8	ENE10	NE10	ENE10	ENE9	NE7	NNE7	NNE8	N5	N5	NNW6	NNW7	NNW7	N8	NNW7	NNW7	NE6.1	ENE10	
27-Sep	NNW8	NNW8	NNW8	NNW9	NNW8	NNW8	NNW5	NNW6	N5	N6	N6	NNE4	NE2	NNW2	W2	SSE1	E3	SE4	SSE6	S5	S5	S5	S5	S5	NNW1.9	NNW9	
28-Sep	SSE5	SSE6	SSE8	SSE8	SSE9	SSE9	SSE10	S10	S12	SSE17	S16	SSE15	S15	S17	S16	S15	S15	S12	S10	S12	S11	S14	S12	S11	S11.7	SSE17	
29-Sep	SSW13	SSW15	SSE11	SE12	SE11	SE8	ESE6	SE10	SE13	SE13	SSE14	SSE16	SSE18	S17	SSW17	SSW16	SSW13	SW9	SSW6	SSW6	SSW5	SSW4	S5	S5	S9.6	SSE18	
30-Sep	S4	WSW3	SSE5	SSW1	SSW2	W3	WNW4	WNW6	WNW10	WNW8	WNW6	NW7	NW8	NW8	NW8	NW7	NW4	WNW4	NW5	NW6	NNW5	NW6	NNW6	NNW5	NW4.4	WNW10	

SW2.WSW2.1	W1.5	W1.8	W1.7	W1.5	W1.6	W1.6	W1.8	W1.4	W1.4	W1.5	W2.1	W2.5	W2.4	W2.4	WSW2.1	WSW1.1	S1.0	S1.5	S2.0	SSW1.5	SW1.5	SW2.0	Diurnal Average	
SSW13	SSW15	SE13	WNW14	WNW14	WNW14	WNW14	WNW15	SW19	SW18	SW18	SW19	SW18	SW18	SW19	SW19	WNW15	WNW17	WNW13	ESE13	S14	SE13	WNW13	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 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Sep 24 22:00	Hours in Service: 720 Hours of Data: 717 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6
Minimum Value: 1 km/h on Sep 15 01:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P 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	1	1	2	3	3	3	3	3	3	3	3	3	3	4	4	2	2	1	1	1	1	2	1	1	4
2-Sep	1	2	2	1	1	1	1	1	1	1	2	2	3	3	3	3	2	3	1	1	1	1	1	1	3
3-Sep	1	1	1	1	1	1	1	1	2	2	3	3	3	4	4	4	3	3	3	1	1	1	1	2	4
4-Sep	1	1	1	1	1	1	1	1	1	3	3	3	2	3	3	4	2	5	3	2	2	2	2	2	5
5-Sep	2	2	2	1	1	1	1	1	1	2	3	3	3	2	3	3	3	3	3	2	2	3	2	3	3
6-Sep	3	2	2	2	1	1	1	1	1	1	2	2	3	2	3	3	3	2	2	2	2	2	2	2	3
7-Sep	3	2	2	4	4	3	2	3	3	4	4	4	4	3	3	4	3	3	3	3	2	2	1	1	4
8-Sep	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	2	1	1	1	1	1	1	3
9-Sep	1	1	1	1	AF	1	1	1	1	1	1	1	2	2	2	2	2	2	1	AF	AF	1	1	1	2
10-Sep	1	1	1	1	1	1	1	1	2	2	2	2	3	3	2	2	2	1	1	1	1	1	2	3	3
11-Sep	4	2	2	2	1	2	2	3	5	6	6	6	6	6	5	6	6	5	3	2	3	3	3	4	6
12-Sep	3	3	2	2	2	2	3	4	3	3	4	5	5	5	5	4	3	3	2	4	1	4	4	1	5
13-Sep	1	2	1	1	1	1	1	1	1	1	2	3	3	3	3	3	4	2	1	1	1	1	1	2	4
14-Sep	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	2	1	1	1	1	1	1	3
15-Sep	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	2	1	1	2
16-Sep	2	2	1	2	2	2	3	2	3	3	2	3	3	3	3	4	4	3	4	4	4	4	4	4	4
17-Sep	5	4	4	4	4	4	4	4	4	4	4	5	4	4	5	5	4	4	2	3	3	2	3	1	5
18-Sep	1	2	2	3	3	1	2	2	2	2	2	2	3	3	3	3	2	1	1	1	1	1	1	2	3
19-Sep	2	2	2	1	1	1	2	2	4	3	5	6	6	7	6	7	6	7	8	5	5	5	4	5	8
20-Sep	4	5	5	6	6	5	5	6	5	5	5	5	5	6	5	5	5	3	2	1	1	1	2	2	6
21-Sep	2	2	2	1	2	2	2	2	3	3	3	4	3	4	5	4	3	1	2	1	1	1	2	2	5
22-Sep	2	3	1	2	2	1	1	2	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	3
23-Sep	3	3	2	3	2	1	1	3	3	3	3	3	2	3	2	2	2	1	1	1	1	1	1	1	3
24-Sep	1	2	2	1	1	2	2	2	3	4	4	4	4	5	4	5	5	4	3	2	2	8	5	3	8
25-Sep	3	5	5	5	5	5	5	5	6	5	6	4	5	4	2	4	3	2	1	3	2	2	2	3	6
26-Sep	3	2	3	3	3	3	3	3	3	4	4	4	3	2	3	3	2	2	2	2	2	3	2	2	4
27-Sep	3	3	3	3	3	3	2	2	2	2	2	2	1	2	2	1	1	1	1	1	1	1	2	1	3
28-Sep	1	1	2	2	2	3	3	3	4	5	5	5	5	5	6	5	6	4	4	4	3	4	4	4	6
29-Sep	6	5	3	3	3	3	2	3	4	4	4	4	5	6	6	6	6	5	3	2	2	2	2	1	6
30-Sep	1	1	2	1	1	1	1	2	3	2	2	2	3	3	3	2	1	2	1	3	2	2	2	2	3

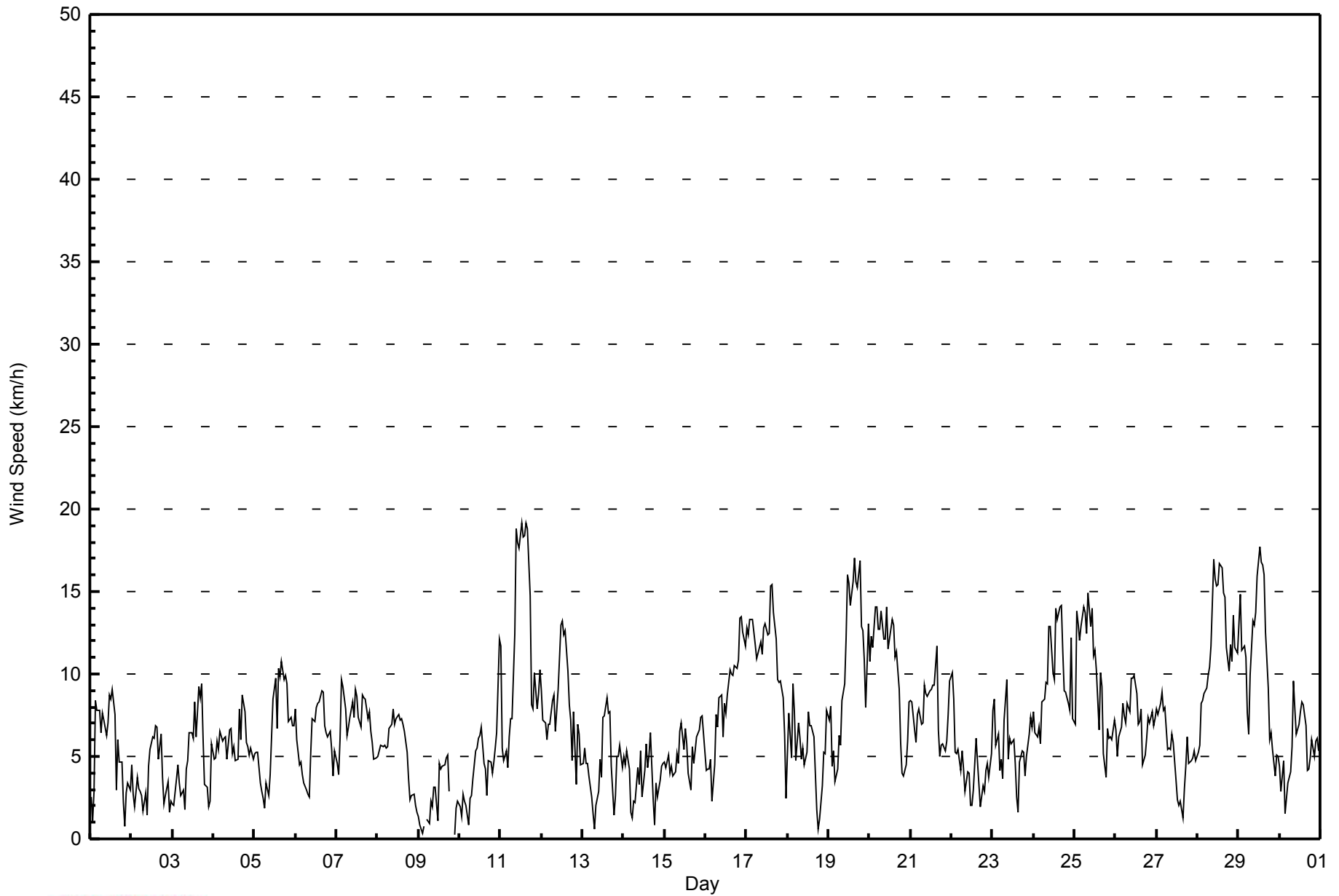
6	5	5	6	6	5	5	6	6	6	6	6	6	7	6	7	6	7	8	5	5	8	5	5	
Diurnal Maximum																								

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Anzac - September 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Anzac - September 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	286	39.89	39.89
6 - 11	327	45.61	85.50
12 - 19	104	14.50	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: 717

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Anzac - September 2014

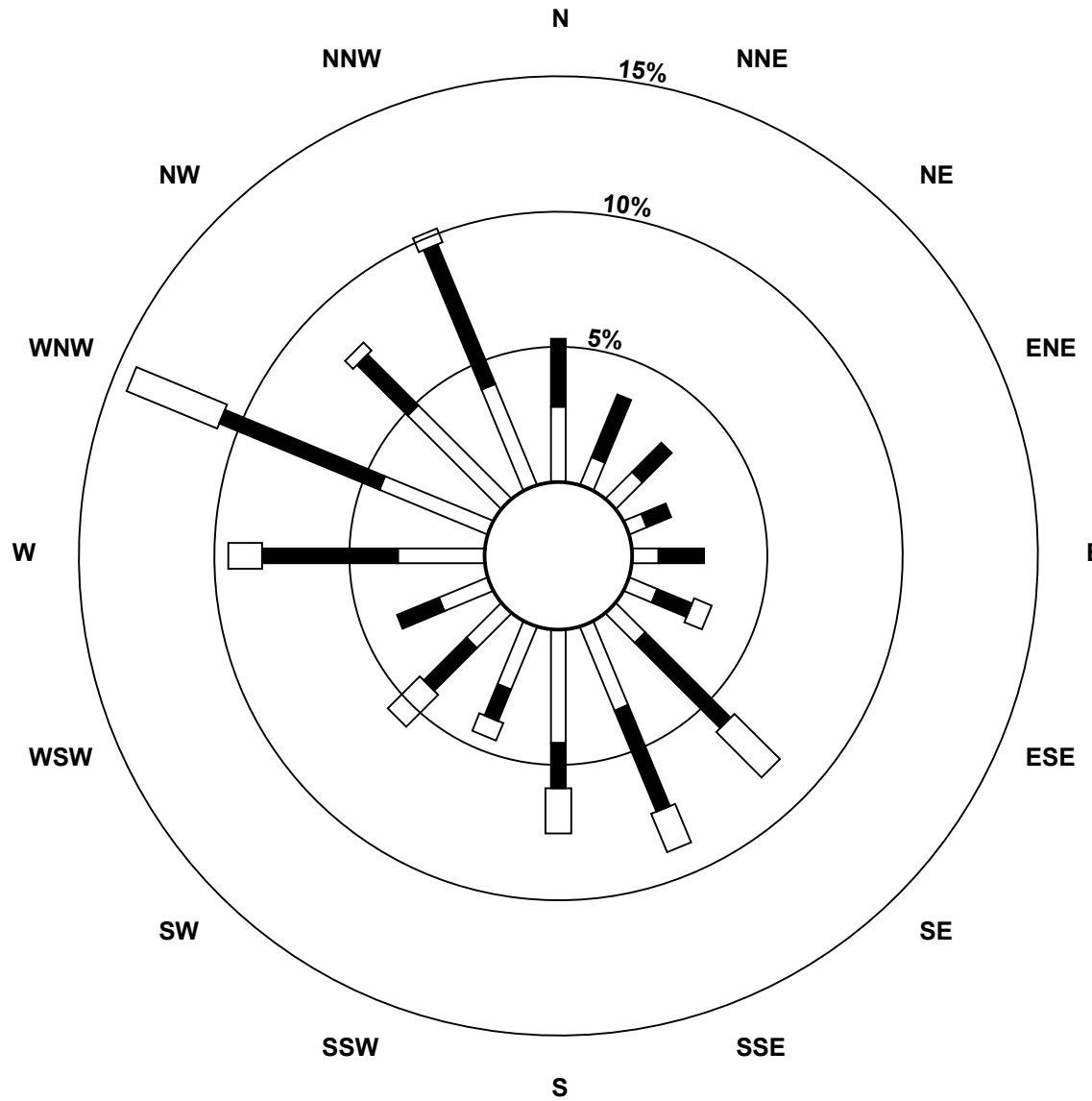
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	20	8	10	5	7	8	11	24	30	18	13	14	23	31	35	29	286
6 - 11	18	18	11	7	12	10	32	29	12	9	16	12	36	46	19	40	327
12 - 19	0	0	0	0	0	5	17	11	12	5	12	0	9	26	3	4	104
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	38	26	21	12	19	23	60	64	54	32	41	26	68	103	57	73	717

Total Number of Valid Hours: 717

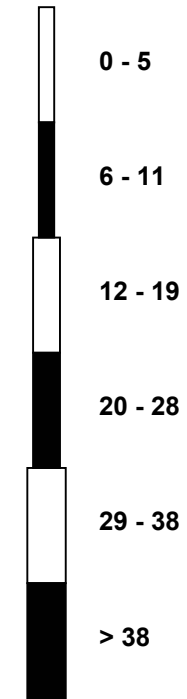
Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Anzac (AMS 14)**



Classes (km/h)



Total Number of Valid Hours: 717



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Anzac - September 2014

Direction of Maximum Speed: 222 deg on Sep 11 16:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 172.3 deg on Sep 28	Hours of Data: 717
Direction of Minimum Speed: 329 deg on Sep 9 22:00	Hours of Missing Data: 3
Direction of Minimum Daily Speed Average: 1.0 deg on Sep 23	Percent Operational Time: 99.6
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	186	116	310	282	288	276	287	296	300	281	268	276	285	285	338	291	255	325	323	285	121	229	220	257	284.6
2-Sep	255	266	335	313	310	320	277	307	307	351	90	287	278	295	318	336	355	346	334	311	291	283	304	288	310.2
3-Sep	271	292	308	289	282	238	234	218	268	260	289	289	276	267	257	245	266	246	216	165	195	147	208	224	255.4
4-Sep	217	232	216	209	215	208	201	208	210	266	296	343	51	323	320	337	303	325	2	335	330	319	328	339	289.7
5-Sep	334	341	345	321	319	312	331	352	139	154	132	172	160	129	147	145	144	142	155	162	178	301	308	312	159.5
6-Sep	328	332	319	314	327	334	353	29	62	111	132	119	124	120	114	127	132	106	88	84	117	141	102	89	98.5
7-Sep	64	24	15	35	34	31	19	18	19	19	25	27	26	13	10	3	352	349	349	356	354	354	351	348	13.3
8-Sep	347	344	341	345	350	348	340	339	347	355	359	18	353	350	346	344	332	347	355	2	357	11	8	66	350.6
9-Sep	150	280	218	356	AF	226	360	36	356	55	37	320	309	302	284	328	343	32	39	AF	AF	329	30	13	350.6
10-Sep	349	338	346	270	354	335	305	291	303	310	311	301	300	311	292	246	238	178	163	178	186	192	215	227	262.7
11-Sep	233	262	264	259	260	234	207	211	223	225	231	218	219	217	215	222	228	230	218	208	222	248	257	267	228.0
12-Sep	279	286	281	277	281	292	292	301	307	323	327	333	341	341	337	338	332	328	328	328	302	334	339	304	317.5
13-Sep	304	308	300	315	329	293	298	216	175	100	46	213	276	292	281	295	311	343	99	159	182	182	169	177	280.1
14-Sep	170	179	206	193	143	179	165	179	135	144	145	190	261	296	290	295	299	320	160	184	199	196	221	217	209.8
15-Sep	236	244	265	269	244	274	261	259	288	289	284	281	269	254	334	25	75	145	155	150	160	154	156	139	231.5
16-Sep	126	128	56	45	84	79	89	121	137	110	92	81	81	100	103	95	92	88	96	114	117	120	126	138	104.8
17-Sep	138	136	134	136	137	136	135	144	142	142	146	151	145	151	159	159	162	160	141	144	138	134	140	109	144.4
18-Sep	157	215	251	289	290	313	313	322	319	327	323	306	267	272	268	260	280	289	50	153	150	159	172	161	270.0
19-Sep	158	165	185	201	229	239	263	246	269	261	270	260	277	277	278	268	263	288	295	282	290	302	304	284	269.8
20-Sep	299	301	302	302	299	303	303	301	306	300	297	302	301	303	300	302	284	273	233	203	208	192	218	232	291.4
21-Sep	232	229	210	225	269	270	253	260	268	274	280	277	275	276	266	261	243	180	175	170	169	169	171	166	240.7
22-Sep	167	165	160	155	160	119	157	187	184	183	156	166	256	288	293	277	273	255	183	250	264	285	287	300	203.1
23-Sep	300	303	301	277	297	283	287	303	298	309	261	37	37	71	25	90	150	122	110	127	163	163	159	157	282.7
24-Sep	139	139	161	156	142	141	135	135	136	140	142	140	124	111	106	112	128	142	147	147	171	253	302	295	139.1
25-Sep	258	274	286	283	291	291	285	283	293	311	305	300	294	319	327	345	352	351	3	22	19	16	26	46	309.3
26-Sep	39	56	48	67	78	82	46	67	51	58	46	57	61	40	20	18	1	357	342	339	347	357	341	331	33.8
27-Sep	336	335	340	343	341	344	334	330	349	356	359	23	50	342	264	153	83	145	167	177	173	180	177	170	343.3
28-Sep	163	154	154	163	159	159	166	169	169	168	171	162	169	176	176	185	185	178	177	174	171	176	189	188	172.3
29-Sep	198	195	150	135	142	136	115	132	136	142	150	158	165	184	193	209	211	215	192	208	201	198	188	188	171.9
30-Sep	187	240	168	200	205	270	288	301	298	297	295	318	319	320	321	318	311	299	310	318	335	323	334	342	305.6

225.3 244.6 262.5 271.0 277.1 276.4 271.4 268.7 267.8 259.4 262.1 259.9 265.8 273.4 270.0 263.9 249.1 238.8 174.6 178.2 184.2 208.5 224.2 228.8

Diurnal Average

AF - Analyzer Failure

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



Summary of Hour Standard Deviations

Anzac - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 99 deg on Sep 9 12:00	Hours of Data: 717
Minimum Value: 7 deg on Sep 15 01:00	Hours of Missing Data: 3
Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 21 Median = 26 Q ₃ = 33 P ₉₀ = 47 P ₉₉ = 82	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	55	54	57	27	30	27	27	29	29	44	41	29	34	39	43	69	32	19	19	35	58	45	13	29	69
2-Sep	13	57	52	22	27	26	33	44	31	78	54	53	55	42	43	31	25	22	20	34	38	16	42	28	78
3-Sep	54	42	19	21	29	25	12	48	42	51	42	37	41	43	58	32	36	29	33	32	13	49	26	15	58
4-Sep	15	17	14	16	13	14	17	18	23	34	35	51	44	66	27	27	33	34	28	24	24	21	23	21	66
5-Sep	21	22	23	38	32	30	49	37	63	51	43	34	25	23	24	21	23	21	19	16	21	35	24	24	63
6-Sep	22	22	23	26	23	27	33	43	46	29	22	25	26	24	26	24	27	25	22	19	28	30	66	43	66
7-Sep	62	35	26	27	27	28	30	27	26	28	34	31	33	29	30	27	25	24	23	22	21	22	20	20	62
8-Sep	21	21	20	21	22	22	21	24	28	28	33	32	29	29	29	33	29	26	25	31	25	25	37	43	43
9-Sep	59	66	87	71	AF	65	79	31	45	55	56	99	35	45	44	32	24	30	44	AF	AF	57	31	21	99
10-Sep	31	61	29	37	45	41	35	31	29	21	29	33	31	33	56	54	64	30	18	17	14	21	19	15	64
11-Sep	24	34	28	36	28	30	20	25	28	21	24	25	25	25	24	22	22	17	22	24	18	26	30	27	36
12-Sep	28	29	27	20	21	22	26	29	30	26	30	26	25	27	25	26	23	21	19	22	24	30	37	20	37
13-Sep	20	20	19	18	18	27	43	56	61	64	35	70	46	40	37	36	30	33	39	31	12	15	14	21	70
14-Sep	17	17	15	13	49	50	18	30	20	46	46	90	63	39	62	44	34	68	80	13	19	16	11	14	90
15-Sep	7	9	14	12	11	15	21	16	33	31	32	53	45	48	63	70	40	17	18	18	14	16	16	16	70
16-Sep	32	43	25	28	60	26	21	27	25	30	39	26	33	34	28	29	28	25	28	27	26	24	24	22	60
17-Sep	24	25	23	22	22	23	23	24	23	25	23	25	24	26	25	22	22	20	18	22	20	16	41	37	41
18-Sep	18	17	28	26	26	26	19	22	24	26	58	47	35	42	46	37	26	54	69	42	12	18	17	14	69
19-Sep	16	17	24	17	40	31	32	22	32	30	33	33	33	37	33	33	33	34	31	34	32	30	30	31	40
20-Sep	30	28	29	27	29	28	27	28	31	29	27	32	28	30	29	30	33	34	24	25	23	13	24	17	34
21-Sep	19	19	17	24	19	24	16	18	27	32	32	35	33	35	40	29	27	23	19	14	15	18	16	15	40
22-Sep	16	19	20	18	22	22	27	16	27	28	39	76	86	68	28	49	38	39	14	33	20	18	16	19	86
23-Sep	24	24	25	27	32	20	29	24	27	36	43	61	43	62	84	92	35	15	16	20	12	13	14	13	92
24-Sep	14	15	20	16	16	16	16	19	22	21	22	23	23	28	26	24	25	22	20	21	19	59	27	30	59
25-Sep	25	27	27	26	26	28	30	33	30	26	27	28	34	24	28	20	23	25	25	23	26	25	29	31	34
26-Sep	36	34	33	33	21	28	34	26	33	22	26	28	25	31	25	28	27	24	22	19	19	24	19	19	36
27-Sep	20	20	20	18	18	19	20	18	21	25	31	53	71	81	81	88	30	24	13	13	15	15	16	18	88
28-Sep	16	18	17	20	21	21	20	21	24	20	24	24	23	25	26	30	31	26	30	23	20	20	30	30	31
29-Sep	31	27	24	23	24	34	31	20	19	22	21	21	23	30	28	30	24	22	27	26	31	36	22	19	36
30-Sep	35	40	26	71	36	26	20	27	24	23	24	20	20	20	19	18	23	22	20	23	20	20	21	17	71

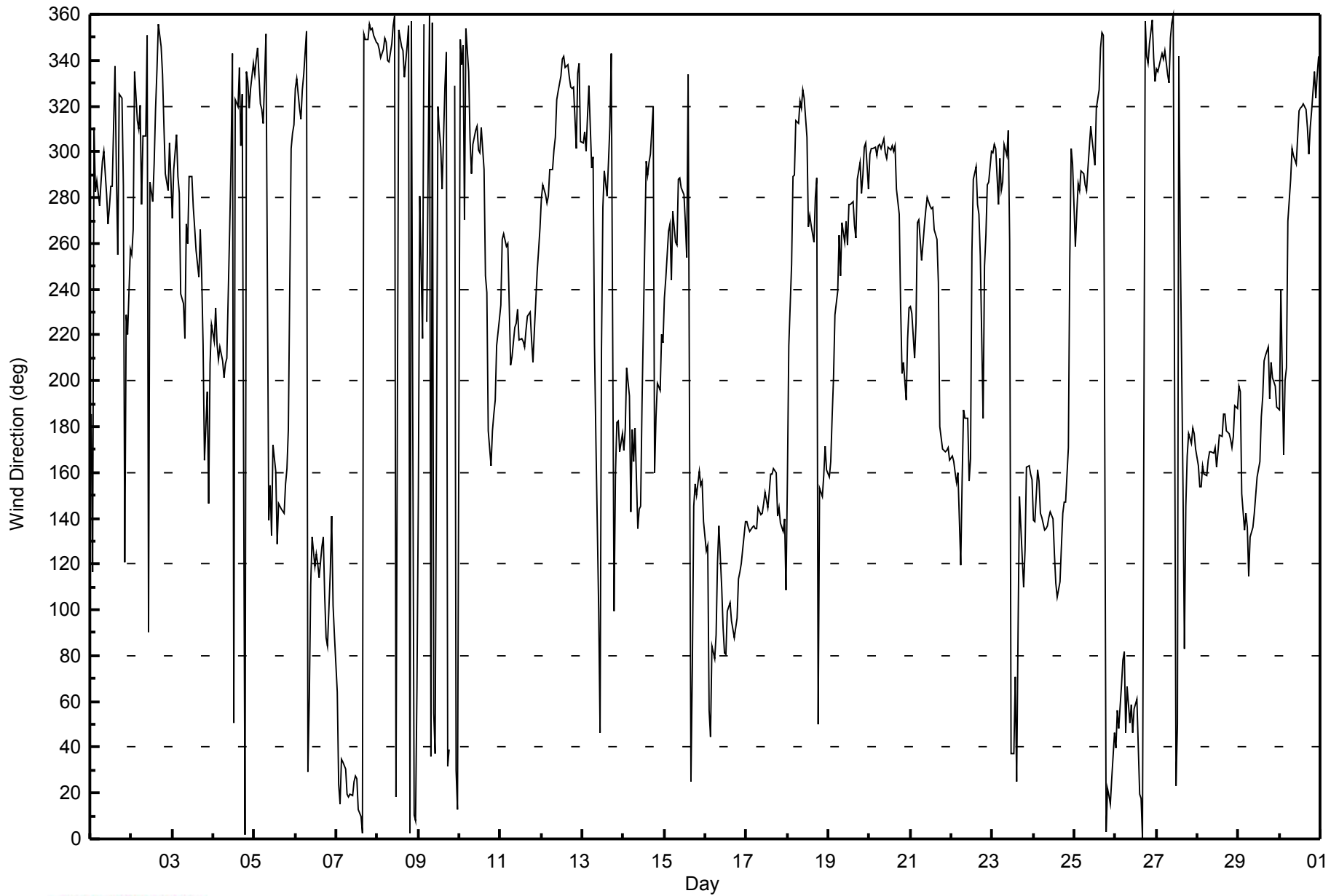
62	66	87	71	60	65	79	56	63	78	58	99	86	81	84	92	64	68	80	42	58	59	66	43	
Diurnal Maximum																								

AF - Analyzer Failure



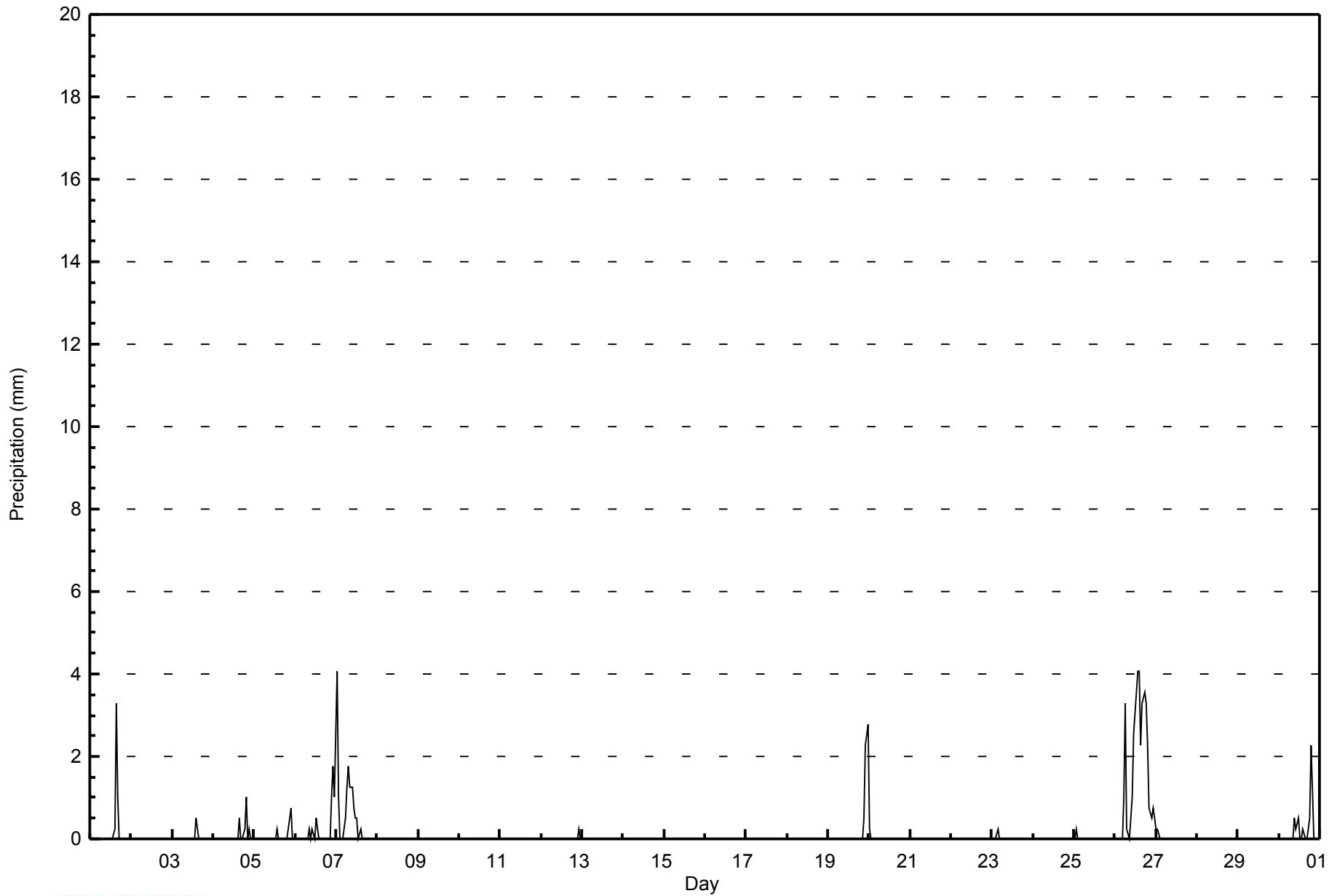
WBEA
Hourly Averages

Wind Direction (WD) - deg
Anzac - September 2014





Maximum Value: 4.1 mm on Sep 7 01:00		Maximum Daily Total: 37.6 mm on Sep 26		Hours in Service: 720																							
Minimum Value: 0.0 mm on Sep 1 01:00		Minimum Daily Total: 0.0 mm on Sep 2		Hours of Data: 719																							
Maximum Diurnal Total: 6.1 mm at hour 16		Minimum Diurnal Total: 0.0 mm at hour 3		Hours of Missing Data: 1																							
Monthly Total: 75.95 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 3.3		Hours of Calibration: 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	3.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	3.3	
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
3-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	0.5	0.5	
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	0.5	0.0	0.0	0.3	1.0	0.0	0.3	0.0	0.0	2.0	1.0	
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	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.0	1.3	0.8	
6-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.8	1.0	5.1	1.8	
7-Sep	4.1	1.0	0.0	0.0	0.0	0.5	1.3	1.8	1.3	1.3	0.8	0.5	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.2	4.1	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
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	0.3	0.0	0.3	0.3	
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	
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	C	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	0.0	0.0	0.0	0.5	2.3	2.8	5.6	2.8	
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	0.0	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	
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	0.3	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	0.3	0.3	
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	0.3	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	
26-Sep	0.0	0.0	0.0	0.0	0.0	1.0	3.3	0.3	0.0	0.5	1.0	2.5	3.6	4.1	4.1	2.3	3.3	3.6	3.3	2.3	0.8	0.5	0.8	0.5	37.6	4.1	
27-Sep	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	
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	0.5	0.3	0.5	0.0	0.0	0.3	0.0	0.0	0.3	0.5	2.3	0.0	0.0	0.0	0.0	4.6	2.3	
		4.6	1.5	0.0	0.3	0.0	1.5	4.6	2.0	1.5	2.3	2.3	3.6	4.6	4.6	5.3	6.1	4.3	3.8	4.1	5.6	1.0	3.0	5.1	4.3	Diurnal Average	
		4.1	1.0	0.0	0.3	0.0	1.0	3.3	1.8	1.3	1.3	1.0	2.5	3.6	4.1	4.1	3.3	3.3	3.6	3.3	2.3	0.8	1.0	2.3	2.8	Diurnal Maximum	
C - Calibration																											





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 11, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	7:30	End Time (MST)	12:05
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Cal Gas Concentration	51 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL107928		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2372
DACS voltage range	NA	DACS channel #	NA

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-596	-596
Analyzer Range (mv)	5000	5000	Lamp voltage	800	800
Calculated slope	0.995194	0.998143	Chamber temp.	44.2	44.2
Calculated intercept	0.683790	0.648780	Pressure (mmHg)	703.6	703.6
Analyzer Background	12.7	12.4	Flow (lpm)	0.397	0.397
Analyzer Coefficient	0.931	0.930	Intensity	30000	30000

Analyzer make TEI 43C Analyzer serial # 613516095

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	NA
as found span	5000	78.3	798.7	807.2	0.989
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	78.3	798.7	800.6	0.998
second point	5000	39.1	398.8	396.4	1.006
third point	5000	19.6	199.9	200.2	0.999
calibrator zero	5000	0.0	0.0	0.9	NA
as left zero	5000	0.0	0.0	0.9	NA
as left span	5000	78.3	798.7	795.6	1.004
Average Correction Factor					1.001

Corrected As found 807.0 Previous response 801.8 % change -0.6%

Notes:

span adjusted maintenance done, filter changed out

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

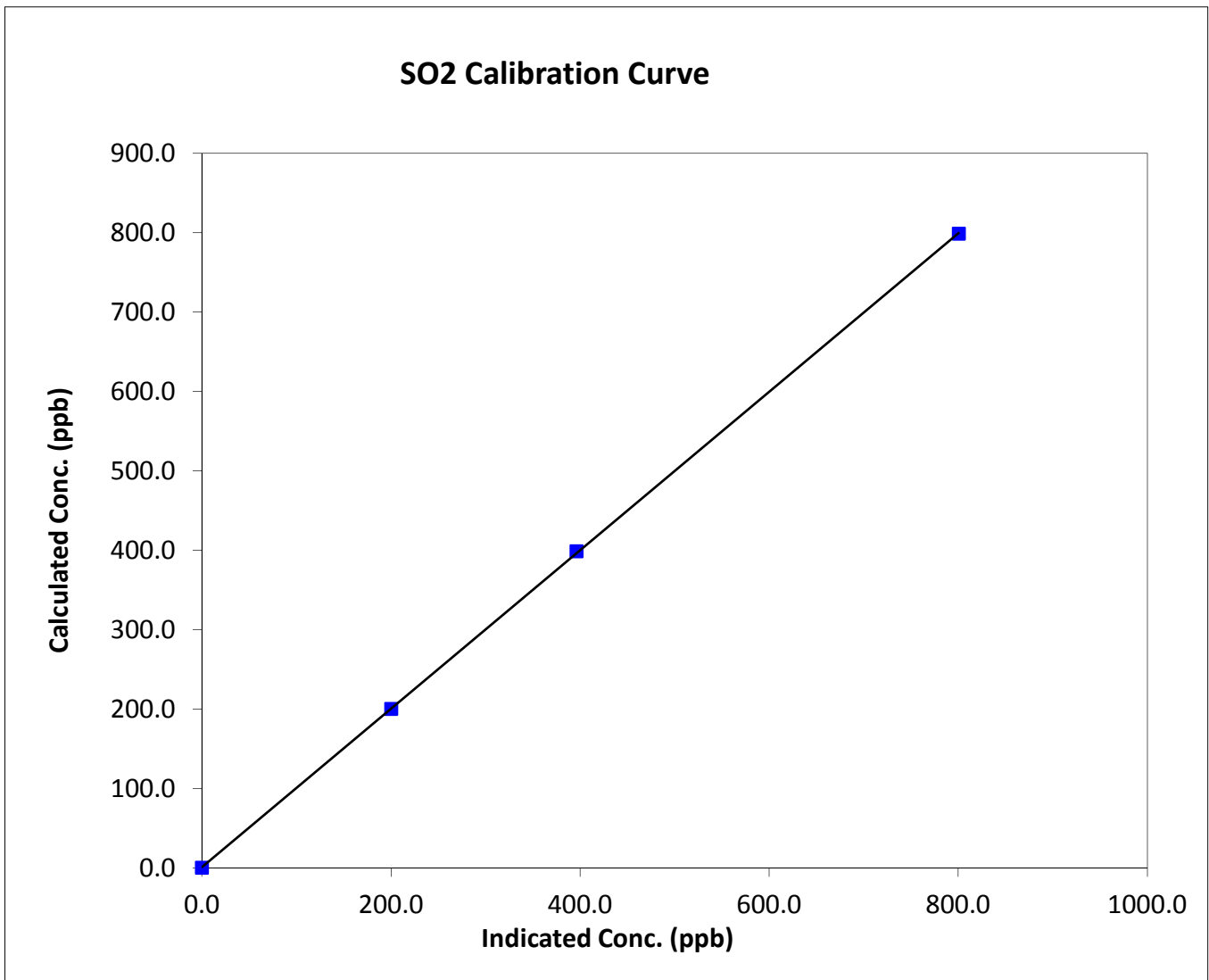
SO₂ Calibration Summary

Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 11, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:30	End Time (MST)	12:05
Analyzer make	TEI 43C	Analyzer serial #	613516095

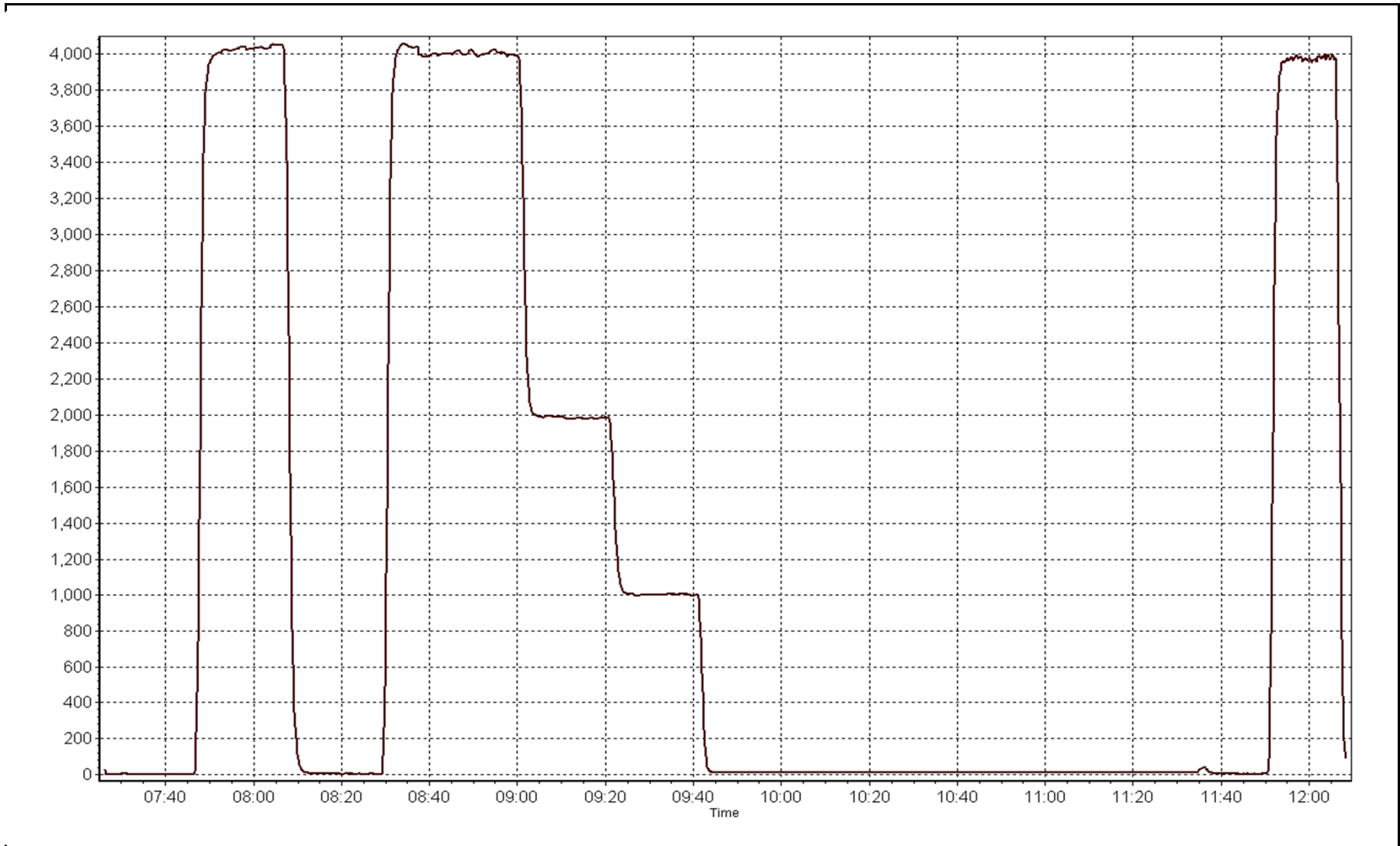
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999976
798.7	800.6	0.9976		
398.8	396.4	1.0061	Slope	0.998143
199.9	200.2	0.9986		
			Intercept	0.648780



SO2 Calibration Plot

Date: September 10, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	September 8, 2014	Previous Calibration	August 12, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:20	End Time (MST)	12:56
Barometric Pressure	732 mmHg	Station temp.	22
Calibrator Make/Model	Sabio 4010	Serial number	8400311
Cal Gas Concentration	9.6 ppm H2S	Cal Gas Expiry Date	2/22/2016
Gas Cert Reference	LL82745	SO2 gas conc.	51.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2372
DACS voltage range	0-5 volts	DACS channel #	2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-731	-731
Analyzer Range (input)	5000	5000	Lamp voltage	986	986
Calculated slope	0.990755	0.987411	Chamber temp.	45	45
Calculated intercept	0.172262	0.181889	Pressure	665.9	665.9
Analyzer Background	2.07	2.01	Flow	0.397	0.397
Analyzer Coefficient	1.152	1.118	Intensity	99	99
			Converter temp.	800	800

Analyzer make/model	43i-TL	Analyzer serial #	1300156232
Converter make/model	CDN-101	Converter serial #	510

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	NA
as found span	5000	39.1	75.1	77.2	0.972
SO2 scrubber check	5000	39.1	398.8	0.0	NA
calibrator zero	5000	0.0	0.0	-0.4	NA
high point	5000	39.1	75.1	75.6	0.992
second point	5000	20.8	39.9	40.6	0.984
third point	5000	10.4	20.0	20.2	0.990
calibrator zero	5000	0.0	0.0	-0.3	NA
as left zero	5000	0.0	0.0	-0.3	NA
as left span	5000	39.1	75.1	74.6	1.007
Average Correction Factor					0.989

Corrected As found	77.6	Previous response	75.6	% change	-2.6%
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Notes:

scrubber checked before as founds, filter change out, span adjusted

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

TRS Calibration Summary

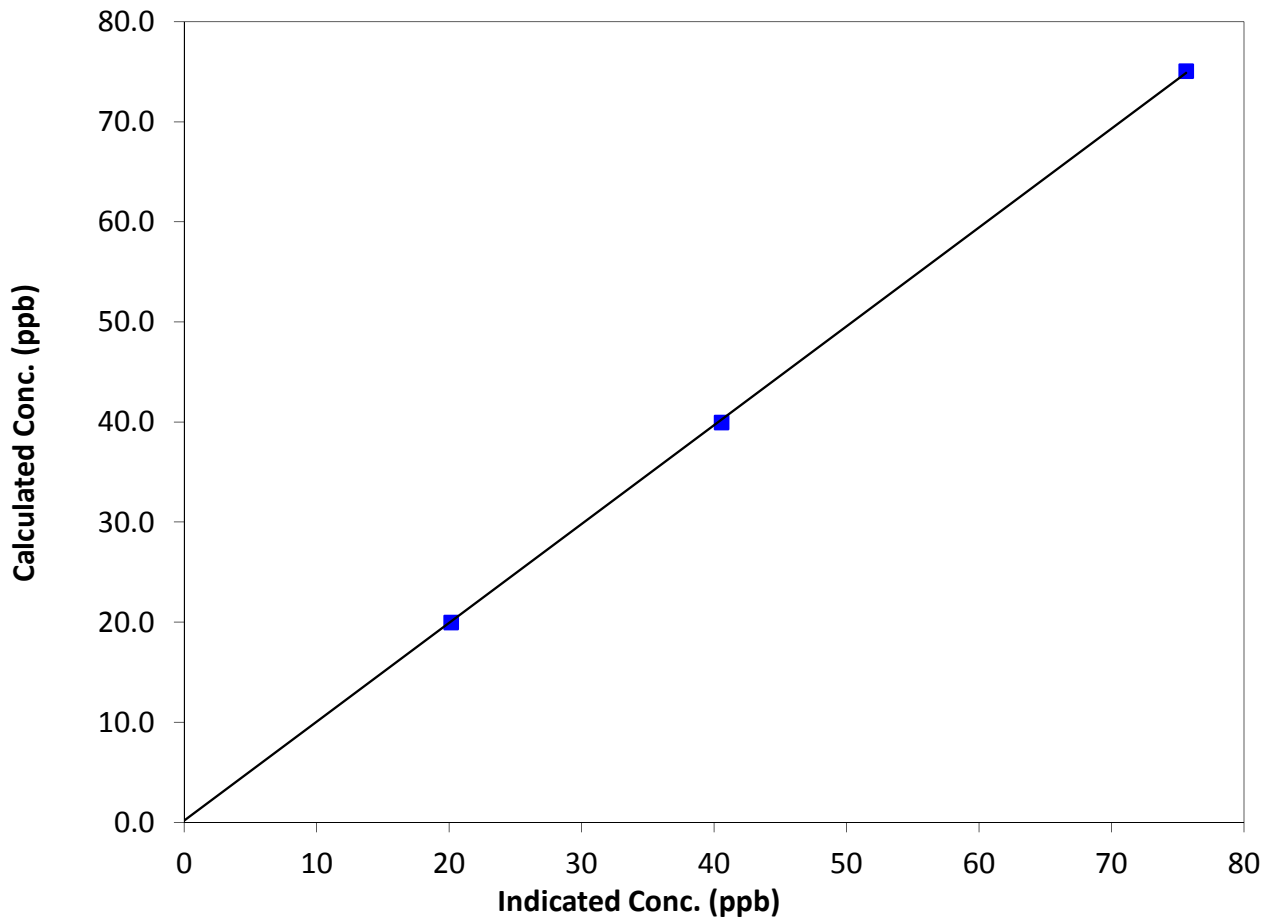
Station Information

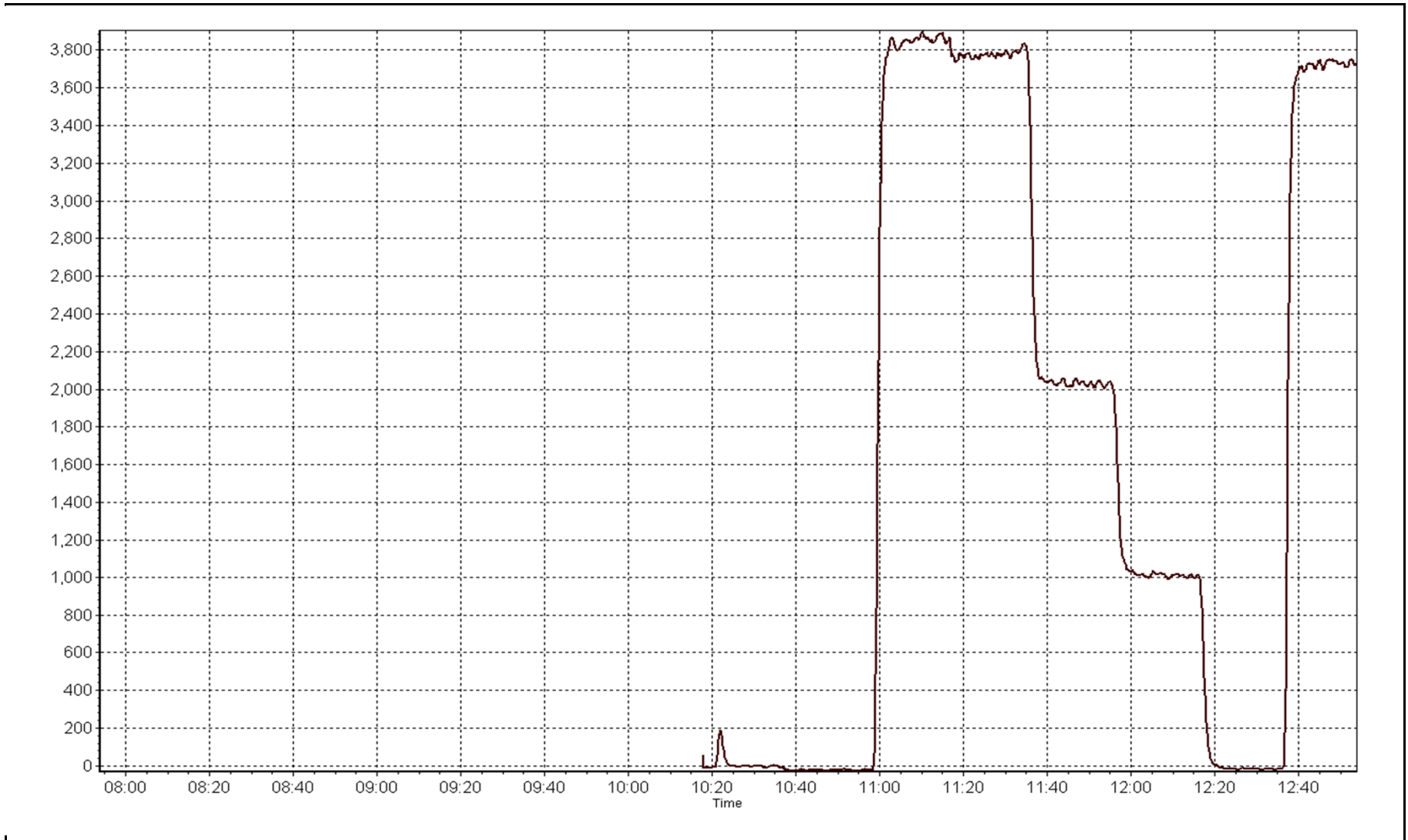
Calibration Date	September 8, 2014	Previous Calibration	August 12, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:20	End Time (MST)	12:56
Analyzer make	43i-TL	Analyzer serial #	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999932
75.1	75.6	0.9925		
39.9	40.6	0.9841	Slope	0.987411
20.0	20.2	0.9905		
			Intercept	0.181889

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Wednesday, September 10, 2014	Prev Calibration	Monday, August 11, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	7:30	End Time (MST)	12:05
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
Gas Cert Reference	LL107928	Cal Gas Expiry Date	Thursday, May 29, 2014
CH4 Cal Gas Conc.	505.0 ppm	CH4 Equiv Conc.	1066.0 ppm
C3H8 Cal Gas Conc.	204.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2372

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	35.1	35.1
THC Range (input)	50	50	Flame Temp	405.0	405.0
NMHC Range (ppm)	50	50	Carrier Pressure	31.8	31.8
NMHC Range (input)	50	50	Fuel Pressure	41.4	41.4
THC Calc slope	1.005031	1.001153	Air Pressure	32.5	32.5
THC Calc intercept	0.000000	0.016212			
NMHC Calc slope	1.007484	1.001637			
NMHC Calc intercept	0.000000	-0.005939			

Analyzer make TEC 55i Analyzer serial # 1218153355

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	N/A
as found span	5000	78.3	16.69	17.06	0.979
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.3	16.69	16.68	1.001
second point	5000	39.1	8.34	8.26	1.009
third point	5000	19.6	4.18	4.17	1.002
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	78.3	16.69	16.68	1.001
Average Correction Factor					1.004

Corrected As found 17.06 Previous response 16.61 % change -2.6%

Notes:

Filter changed, No maintenance Done, Span adjusted

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	78.3	8.79	8.99	0.977
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.3	8.79	8.78	1.001
second point	5000	39.1	4.39	4.37	1.004
third point	5000	19.6	2.20	2.22	0.991
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	78.3	8.79	8.78	1.001
Average Correction Factor					0.998

Corrected As found 8.99 Previous response 8.72 % change -3.0%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	78.3	7.91	8.07	0.980
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.3	7.91	7.90	1.001
second point	5000	39.1	3.95	3.88	1.018
third point	5000	19.6	1.98	1.95	1.015
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	78.3	7.91	7.89	1.002
Average Correction Factor					

Corrected As found 8.07 Previous response 7.89 % change -2.2%



Wood Buffalo Environmental Association

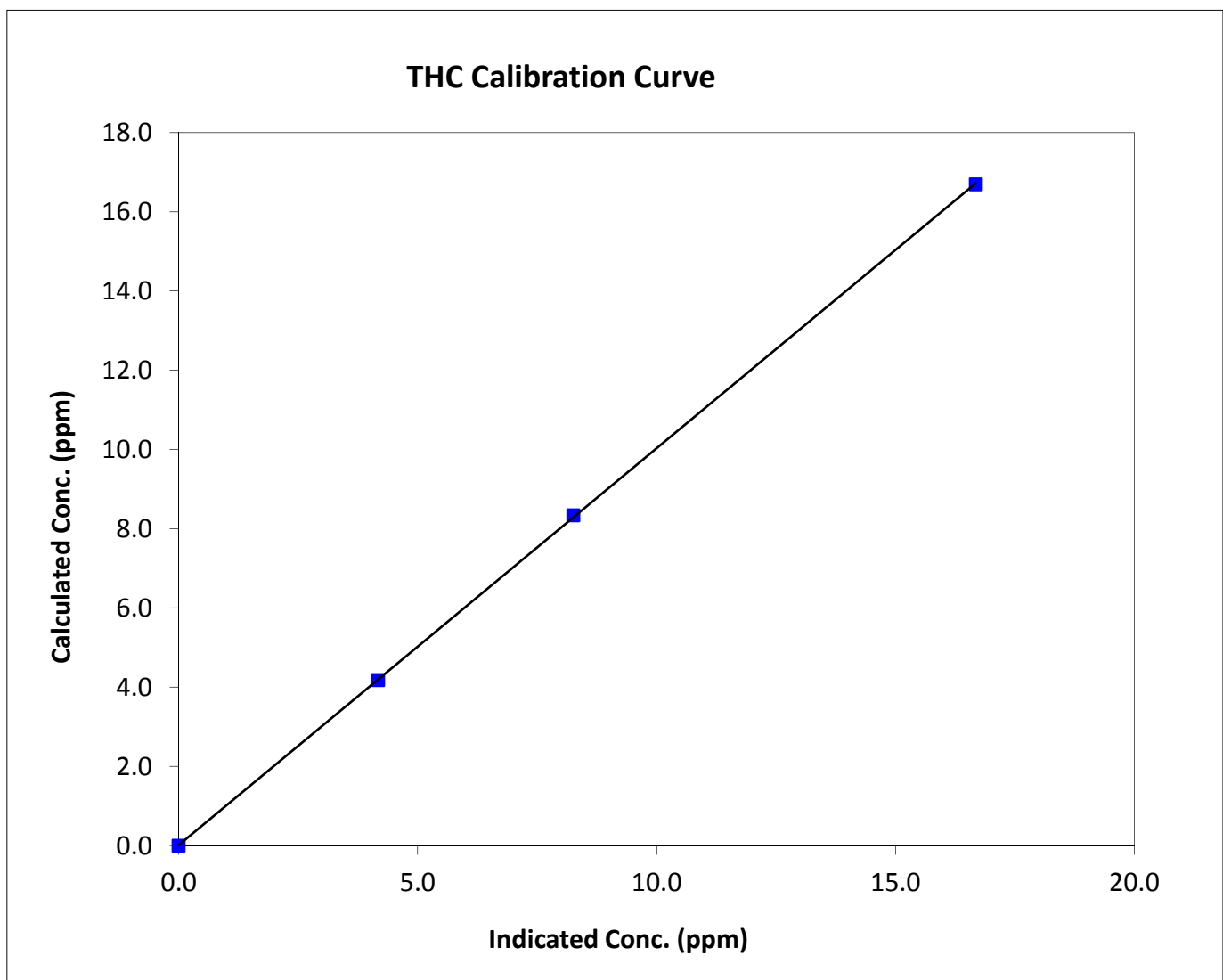
THC Calibration Summary

Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 11, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:30	End Time (MST)	12:05
Analyzer make	TEC 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999977
16.69	16.68	1.0008		
8.34	8.26	1.0092	Slope	1.001153
4.18	4.17	1.0021		
			Intercept	0.016212





Wood Buffalo Environmental Association

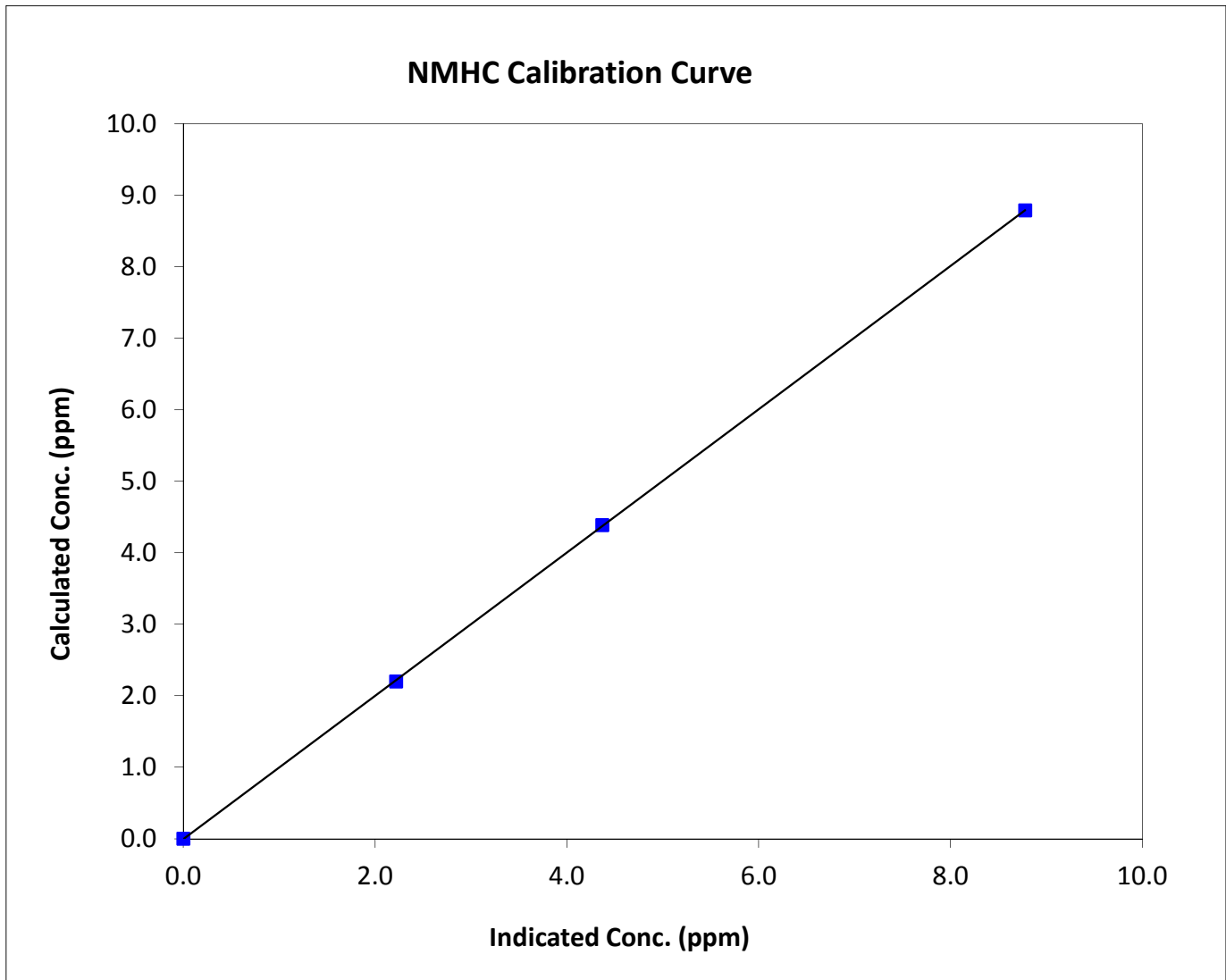
NMHC Calibration Summary

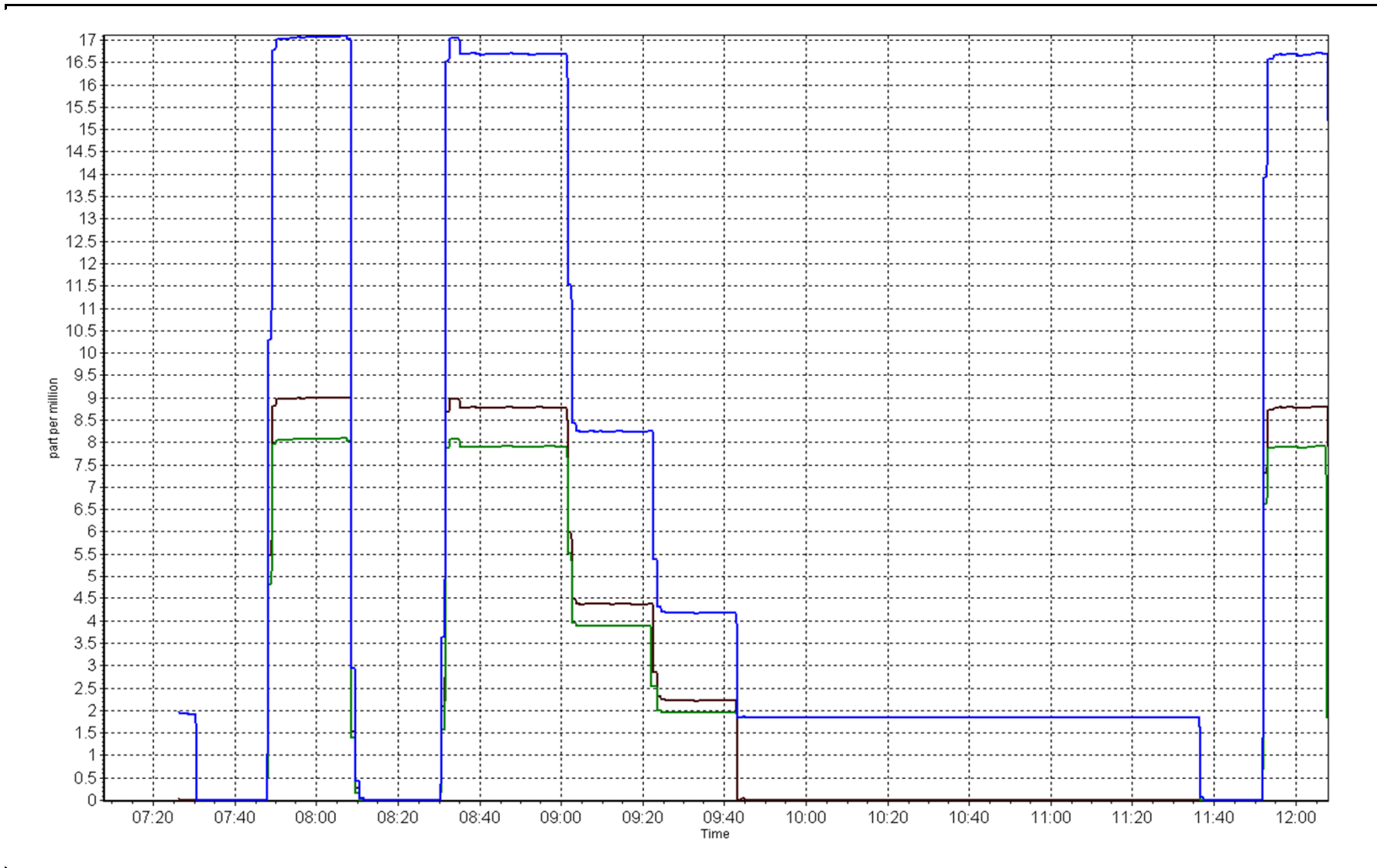
Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 11, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:30	End Time (MST)	12:05
Analyzer make	TEC 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999985
8.79	8.78	1.0006		
4.39	4.37	1.0039	Slope	1.001637
2.20	2.22	0.9906		
			Intercept	-0.005939







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 12, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	12:05	End Time (MST)	14:15
Barometric Pressure	732 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
NO2 calibration used	Monday, August 11, 2014	Transfer Standard	
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2372
DACS voltage range	5000	DACS channel #	7 & 8

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	29.3	29.3
Analyzer Range (input)	5000	5000	Lamp temp.	55.8	55.8
Calculated slope	0.994989	1.001222	Pressure	729.9	729.9
Calculated intercept	0.867380	-1.328074	Flow cell A	0.890	0.890
Analyzer Background	0.4	0.3	Flow cell B	0.783	0.783
Analyzer Coefficient	1.066	1.032	Cell A Intensity	94302	94302
			Cell B Intensity	67556	67556

Analyzer make 49C Analyzer serial # 509110892

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.6	N/A
as found span	5000	N/A	411.6	424.7	0.969
calibrator zero	5000	0.00	0.0	0.6	N/A
high point	5000	N/A	411.6	412.0	0.999
second point	5000	N/A	281.6	282.6	0.996
third point	5000	N/A	145.6	147.9	0.984
calibrator zero	5000	0.00	0.0	0.1	N/A
as left zero	5000	0.00	0.0	0.1	N/A
as left span	5000	N/A	411.6	399.5	1.030
Average Correction Factor					0.993

Corrected As found 424.1 Previous response 412.8 % change -2.7%

Notes:

No Maintenance Done, Span adjusted, Filter changed out

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

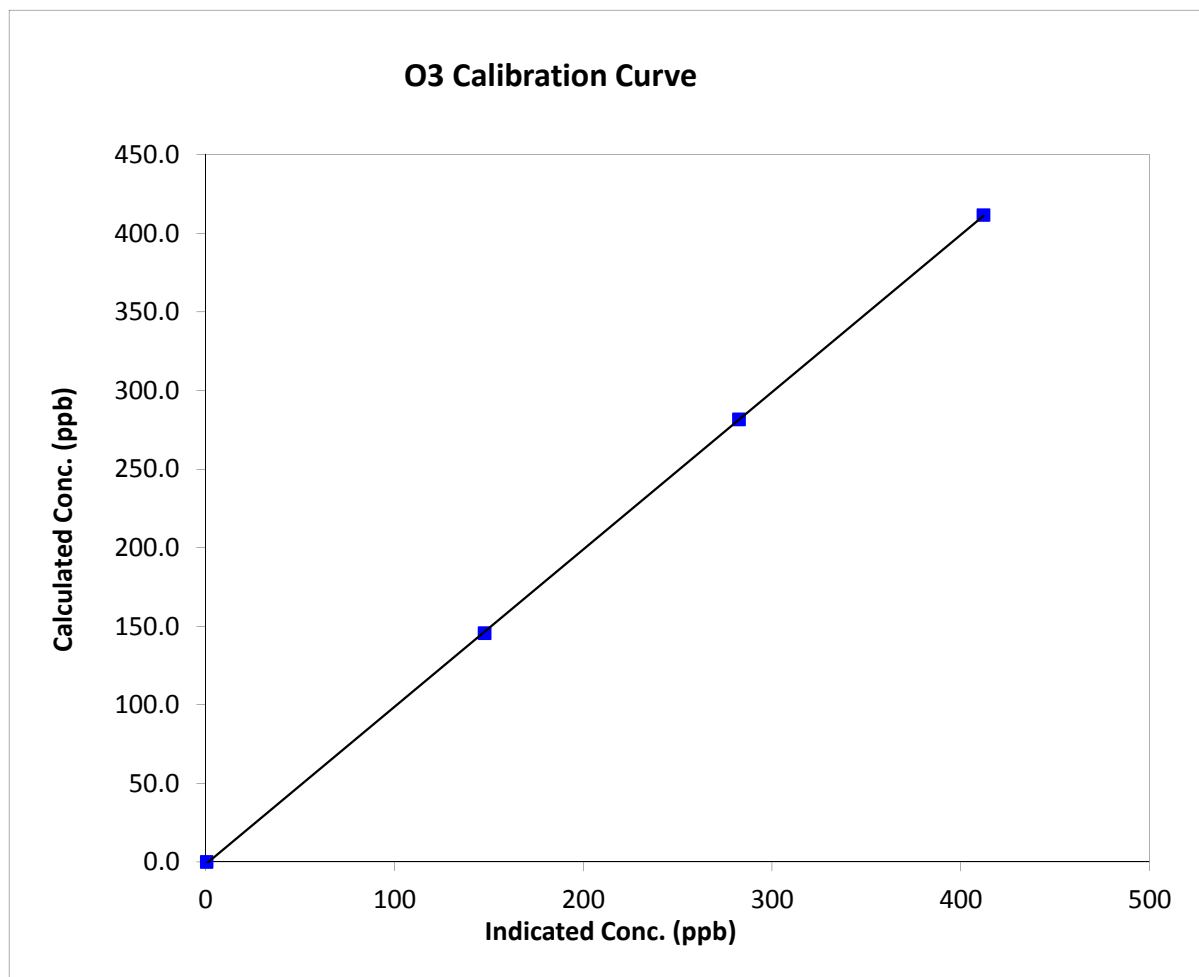
O₃ Calibration Summary

Station Information

Calibration Date	Wednesday, September 10, 2014	Previous Calibration	August 12, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	12:05	End Time (MST)	14:15
Analyzer make	49C	Analyzer serial #	509110892

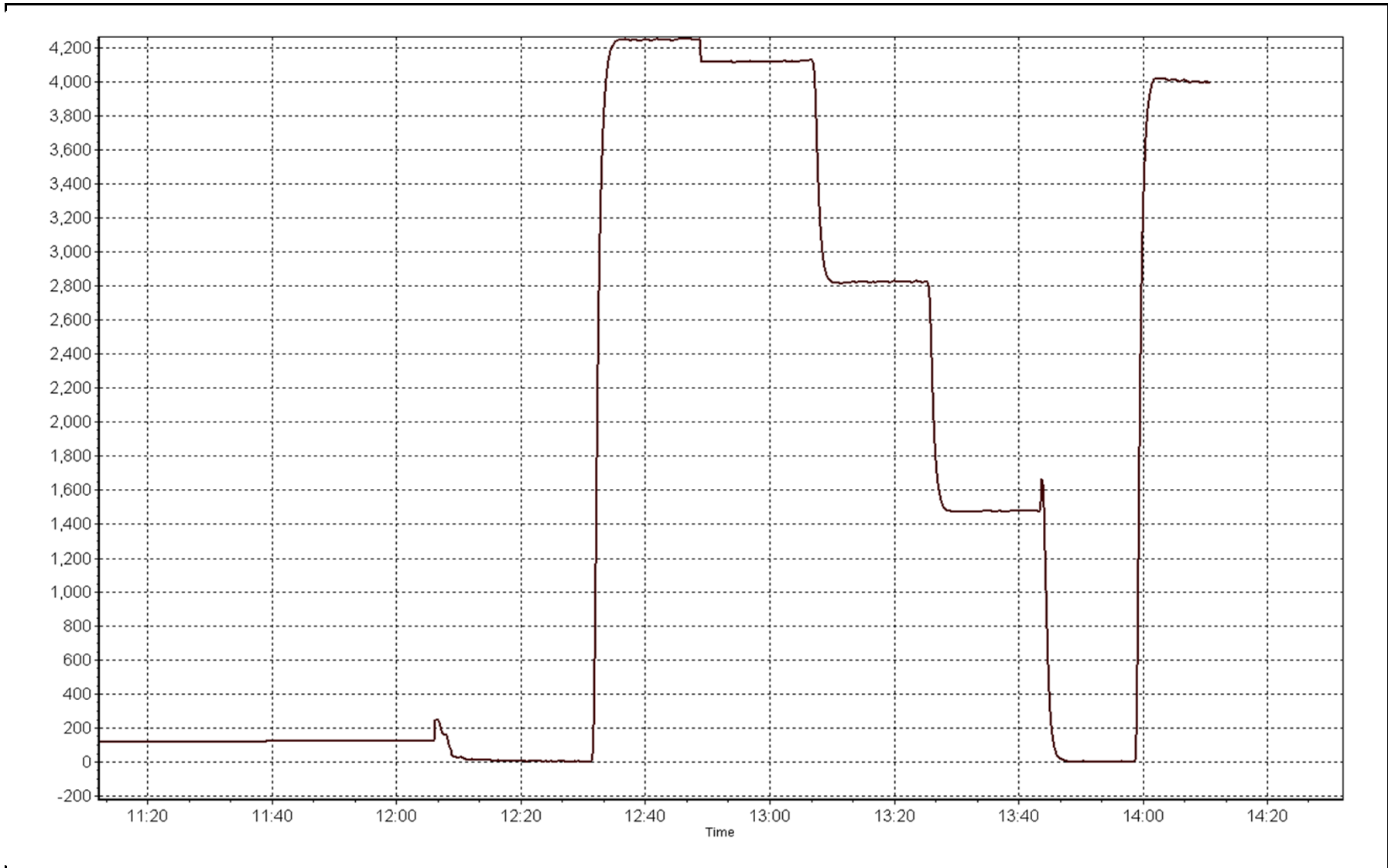
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	N/A	Correlation Coefficient	0.999978
411.6	412.0	0.9990		
281.6	282.6	0.9965	Slope	1.001222
145.6	147.9	0.9844		
			Intercept	-1.328074



O3 Calibration Plot

Date: September 10, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 11, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	7:20	End Time (MST)	12:05
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	Sabio 4010	Serial Number	8400311
NO Cal Gas Conc	51.1 ppm	Cal Gas Expiry Date	May 29, 2014
NOx Cal Gas Conc	51.2 ppm	Cal Gas Serial #	LL107928

DACS Information

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

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.986192	0.986471	1.003443
	Data Offset	0.721241	0.785396	1.619986
After	Data Slope	1.002920	1.001230	1.003038
	Data Offset	0.639807	0.557766	-0.928881
Channel #		6	5	4
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model 42C Analyzer serial # 509110890

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	1.052	ppb	0.988	ppb
NOx coefficient	0.999	ppb	1.002	ppb
NO2 coefficient	1.002	ppb	1.002	ppb
NO bkgrnd	15.8		15.6	
NOx bkgrnd	15.8		15.5	
Nt coefficient	n/a		n/a	
Chamber Temp	49.9	Deg C	49.9	Deg C
Moly Temp	318.0	Deg C	318.0	Deg C
PMT Temp	-2.4	Deg C	-2.4	Deg C
O3 flow	Ok	ccm	Ok	ccm
R Cell Press	221.1	mmHg	224.0	mmHg
Sample Flow	0.537	ccm	0.537	ccm

Notes:

Zero adjusted, filter changed, no maintenance done checked pump is good, diagnostics-flow and pressure are up, Ozone generator looks good as well



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

September 10, 2014

Station Number:

AMS 14

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	1.0	0.8	0.0	N/A	N/A
as found span	5000	78.3	801.8	800.2	1.6	867.4	865.2	1.4	0.9244	0.9249
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	N/A	N/A
high point	5000	78.3	801.8	800.2	1.6	800.0	799.8	-0.7	1.0022	1.0005
second point	5000	39.1	400.4	399.6	0.8	396.4	396.4	-0.8	1.0101	1.0081
third point	5000	19.6	200.7	200.3	0.4	199.1	199.3	-0.6	1.0082	1.0050
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	N/A	N/A
as left span	5000	78.3	801.8	388.6	413.2	808.6	397.0	410.6	0.9916	0.9788
Average Correction Factor									1.0068	1.0045

Corrected As found NO_x= 866.4 NO= 864.4 Percent Change NO_x= -6.2% NO= -6.2%
 Previous Response NO_x= 812.3 NO= 810.4

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 78.30 ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO ₂ (300)	N/A	388.6	411.6	800.0	388.6	410.8	0.9868	1.0000	1.0019	99.8%
2nd NO ₂ (200)	N/A	518.6	281.6	801.0	518.6	281.6	0.9856	1.0000	1.0000	100.0%
3rd NO ₂ (100)	N/A	654.6	145.6	803.0	654.6	147.6	0.9831	1.0000	0.9867	101.3%
4th NO ₂ (0)	800.2	N/A	-0.4	799.8	800.2	-1.4	0.9870	1.0000	N/A	N/A
Average Correction Factor							0.9856	1.0000	0.9962	100.4%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

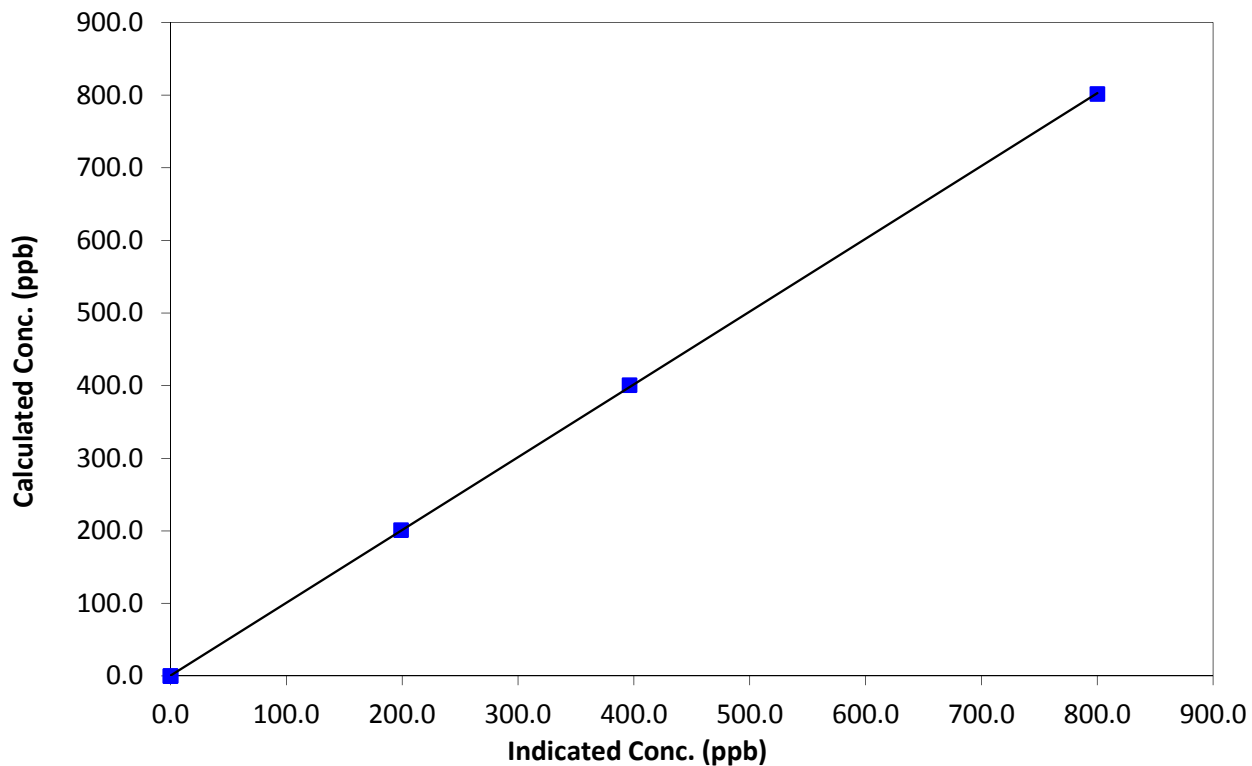
Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 11, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:20	End Time (MST)	12:05
Analyzer make	42C	Analyzer serial #	509110890

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999984
801.8	800.0	1.0022		
400.4	396.4	1.0101	Slope	1.002920
200.7	199.1	1.0082		
0.0	0.1	0.0000	Intercept	0.639807

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

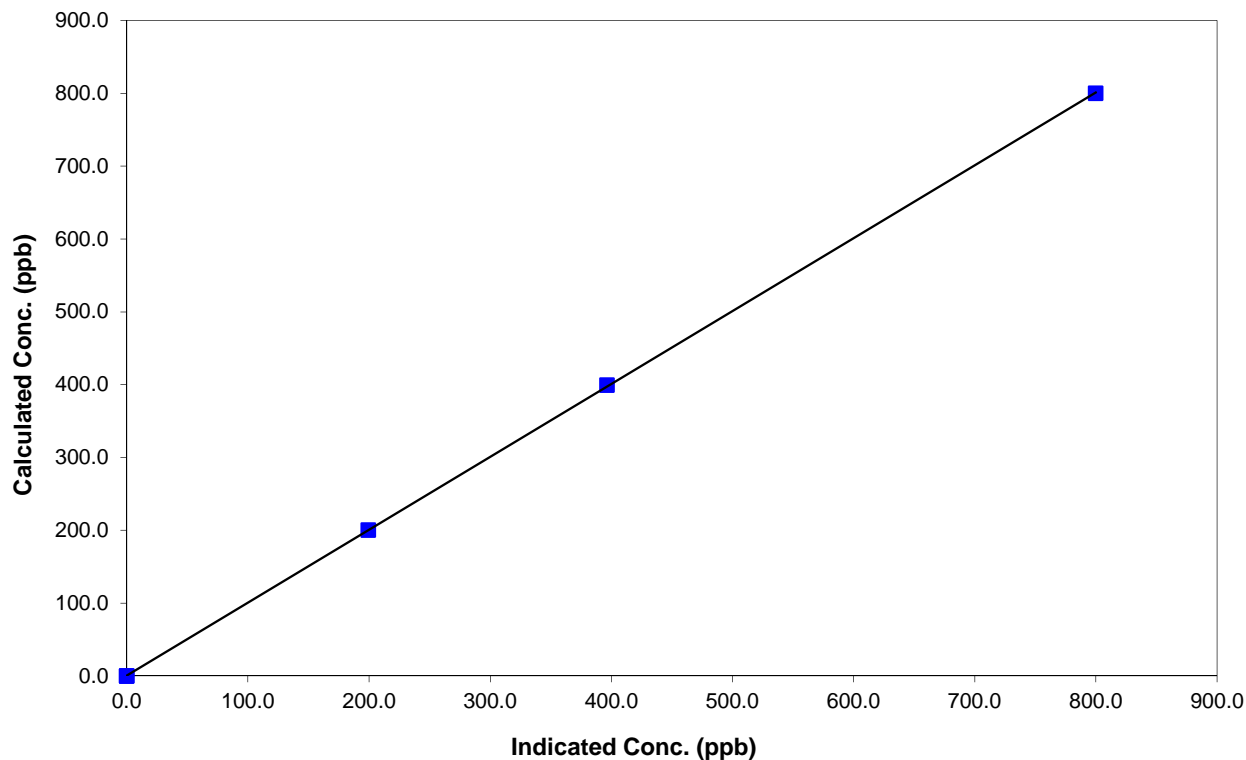
Station Information

Calibration Date	September 10, 2014	Previous Calibration	August 11, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:20	End Time (MST)	12:05
Analyzer make	42C	Analyzer serial #	509110890

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999985
800.2	799.8	1.0005		
399.6	396.4	1.0081	Slope	1.001230
200.3	199.3	1.0050		
0.0	0.1	0.0000	Intercept	0.557766

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

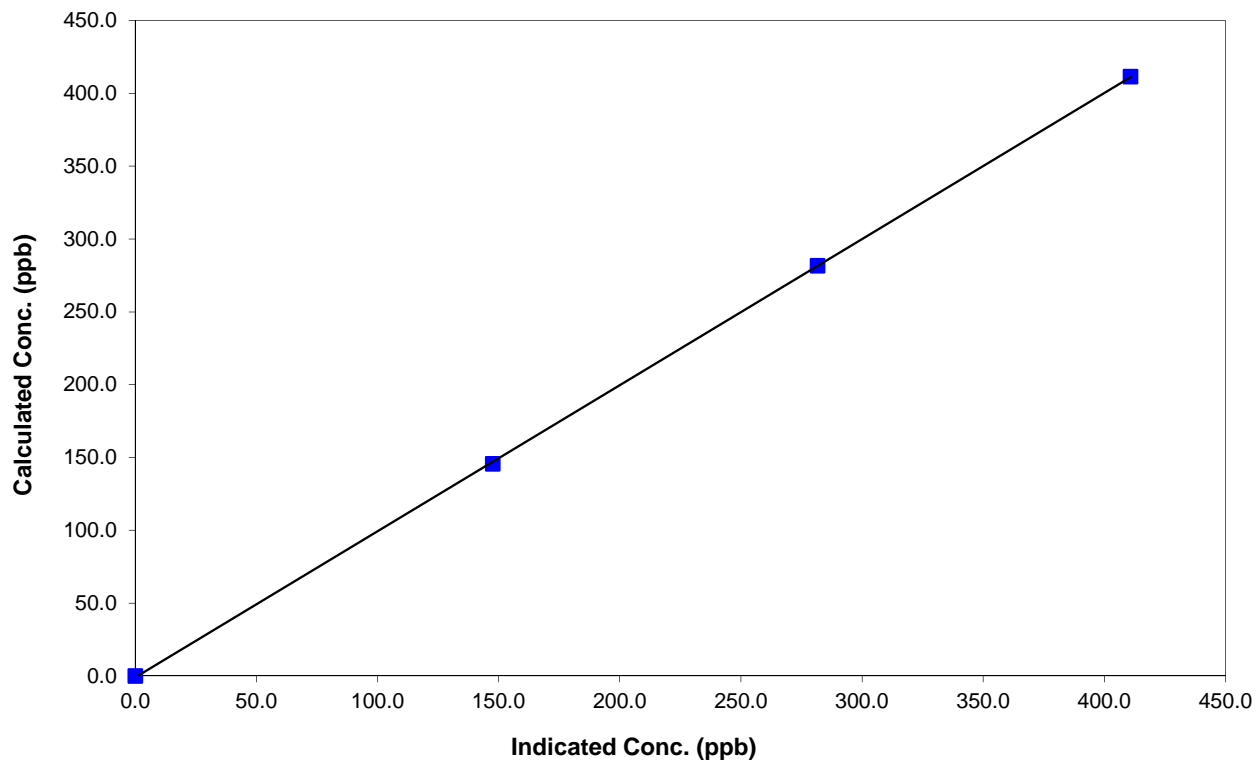
Station Information

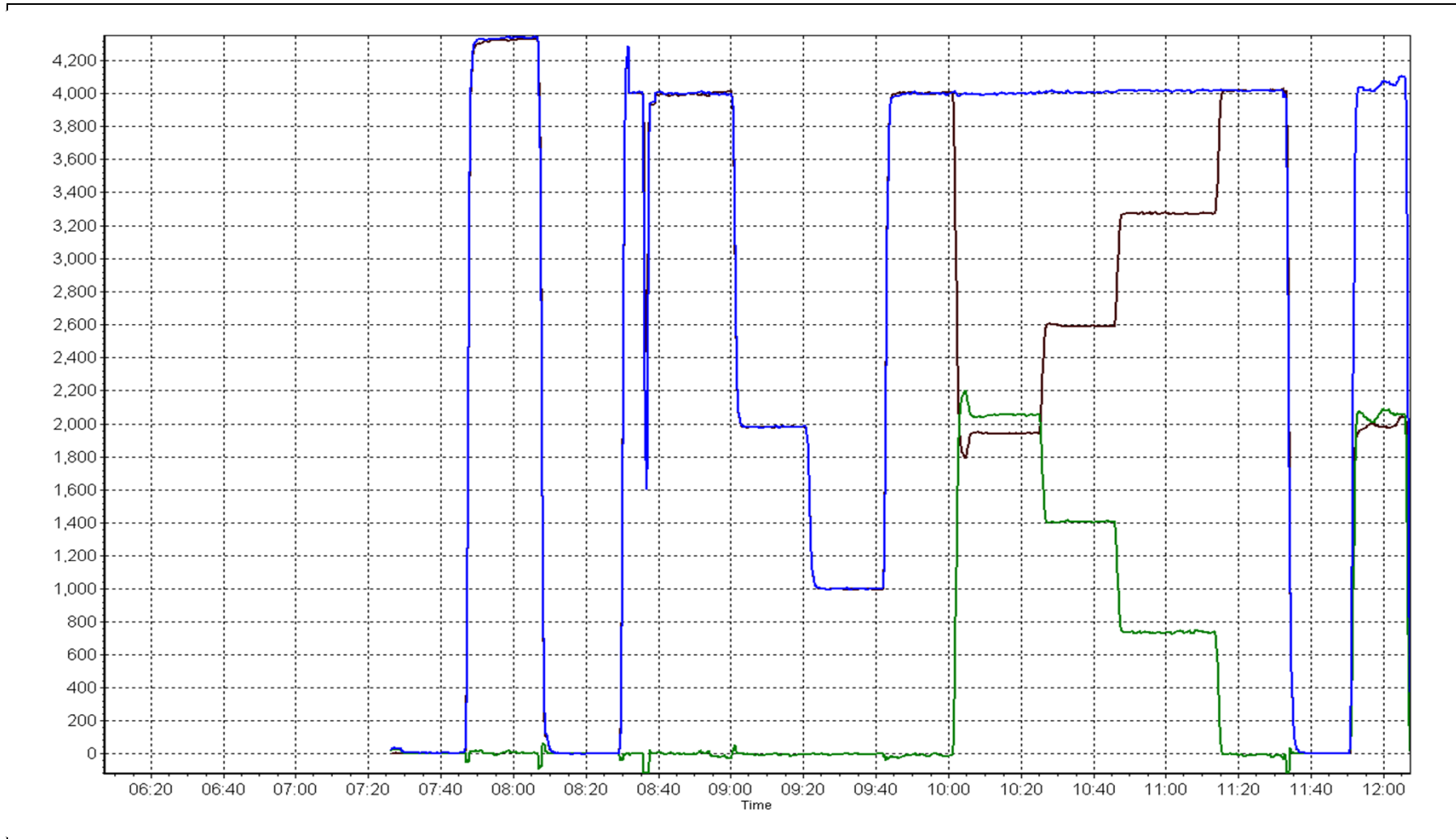
Calibration Date	September 10, 2014	Previous Calibration	August 11, 2014
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	7:20	End Time (MST)	12:05
Analyzer make	42C	Analyzer serial #	509110890

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999965
411.6	410.8	1.0019		
281.6	281.6	1.0000	Slope	1.003038
145.6	147.6	0.9867		
			Intercept	-0.928881

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 15
CNRL HORIZON
SEPTEMBER 2014**

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

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

October 30, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
 SEPTEMBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	671	38	49	98.47	53	0	7	0
TRS (ppb) Average	683	37	37	100.00	1	0	1	0
THC (ppm) Average	682	38	38	100.00	6.1	-	2.7	-
NO2 (ppb) Average	681	39	39	100.00	27	0	11	-
NO (ppb) Average	681	39	39	100.00	131	-	13	-
NOX (ppb) Average	681	39	39	100.00	152	-	19	-
PM2.5 (ug/m3) Average	719	0	1	99.86	26.9	-	10.2	0
Temperature 2 m (C) Average	720	0	0	100.00	31.5	-	18.3	-
Wind Speed 10 m (km/h) Average	718	0	2	99.72	25	-	-	-
Wind Direction 10 m (deg) Average	718	0	2	99.72	-	-	-	-
Precipitation (mm) Total	720	0	0	100.00	4.6	-	-	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	-	-
Global Solar Radiation (W/m2) Average	720	0	0	100.00	516	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
 SEPTEMBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	671	1.3	4	-	0	0	0	0	1	2	53
TRS (ppb) Average	683	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	682	2.34	0.3	-	2.1	2.2	2.2	2.3	2.4	2.5	6.1
NO2 (ppb) Average	681	4	4	-	0	0	1	2	6	10	27
NO (ppb) Average	681	2.6	8	-	0	0	0	0	2	6	131
NOX (ppb) Average	681	6.6	11	-	0	0	1	3	8	15	152
PM2.5 (ug/m3) Average	719	5.16	4.1	-	0	1.4	2.2	3.8	7.1	11.2	26.9
Temperature 2 m (C) Average	720	9.46	6	-	-2.9	2.7	5.4	8.7	13.4	17.3	31.5
Wind Speed 10 m (km/h) Average	718	8.2	4	-	0	3	5	8	11	14	25
Wind Direction 10 m (deg) Average	718	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	720	-	-	52.07	0	0	0	0	0	0	4.6
Relative Humidity (%) Average	720	74.3	20	-	24	45	60	78	93	97	99
Global Solar Radiation (W/m2) Average	720	96.9	137	-	0	0	0	11	164	334	516

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
 SEPTEMBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	16 Sep 2014 10:00	16 Sep 2014 15:00	6	Intermittent unstable operation - excessive baseline drift
SO2	16 Sep 2014 17:00	16 Sep 2014 17:00	1	Intermittent unstable operation - excessive baseline drift
SO2	25 Sep 2014 05:00	25 Sep 2014 07:00	3	Intermittent unstable operation - excessive baseline drift
SO2	26 Sep 2014 06:00	26 Sep 2014 06:00	1	Intermittent unstable operation - excessive baseline drift
PM2.5	08 Sep 2014 15:00	08 Sep 2014 15:00	1	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	13 Sep 2014 07:00	13 Sep 2014 08:00	2	Flatline in sensor output signal

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 53 ppb on Sep 28 08:00	Maximum Daily Average: 6.9 ppb on Sep 17		Hours of Data:	671
Minimum Value: 0 ppb on Sep 5 03:00	Minimum Daily Average: 0.2 ppb on Sep 21		Hours of Missing Data:	49
Maximum Diurnal Average: 3.0 ppb at hour 13	Minimum Diurnal Average: 0.3 ppb at hour 4		Hours of Calibration:	38
Monthly Average: 1.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 16		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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0.4	1	
2-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	0.4	1	
3-Sep	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	
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	Z	0	0	0	0	0	0	0	0	4	14	12	3	1	3	5	5	5	2	0	1	2	1	2.5	14	
6-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	
7-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	2	1	2	1	2	0	0.6	2	
8-Sep	2	Z	1	1	0	0	0	1	0	2	2	2	8	8	2	6	7	1	0	0	0	0	0	0	2.0	8	
9-Sep	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	1	1	0	0	0	0	0	0	0	0	0.4	1	
10-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
11-Sep	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1	
12-Sep	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	3	2	1	0	1	0	0	0	0	0.7	3	
13-Sep	0	Z	0	0	0	0	0	0	0	0	0	2	13	11	7	6	4	9	10	3	2	1	0	0	3.1	13	
14-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.4	1	
15-Sep	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1	
16-Sep	0	Z	0	0	0	0	0	0	0	UO	UO	UO	UO	UO	UO	0	UO	0	0	0	0	0	0	1	--	1	
17-Sep	1	Z	1	0	0	0	2	2	4	9	24	22	17	10	20	14	14	8	4	2	1	1	0	1	6.9	24	
18-Sep	0	Z	0	0	0	0	0	1	1	1	1	4	C	C	C	2	1	1	1	0	0	0	0	0	0.8	4	
19-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	
20-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	
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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
23-Sep	0	Z	0	0	0	0	0	0	0	0	1	2	3	3	3	1	1	0	0	1	4	4	2	1	1	1.2	4
24-Sep	1	Z	0	0	0	0	0	0	1	1	2	3	1	0	0	0	0	1	2	1	1	1	0	0	0.7	3	
25-Sep	0	Z	0	0	UO	UO	UO	0	0	0	0	0	1	0	0	2	1	0	0	0	0	0	0	0	0.3	2	
26-Sep	0	Z	0	0	0	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
27-Sep	0	Z	0	0	0	1	1	0	0	0	2	2	1	1	1	0	0	5	16	8	3	1	1	0	2.0	16	
28-Sep	0	Z	0	0	2	16	34	53	31	8	1	1	0	0	0	0	0	0	0	0	1	1	1	1	6.6	53	
29-Sep	2	Z	1	1	1	1	1	1	5	9	14	15	16	14	10	1	1	1	1	1	0	1	1	0	4.3	16	
30-Sep	0	Z	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0.5	3	

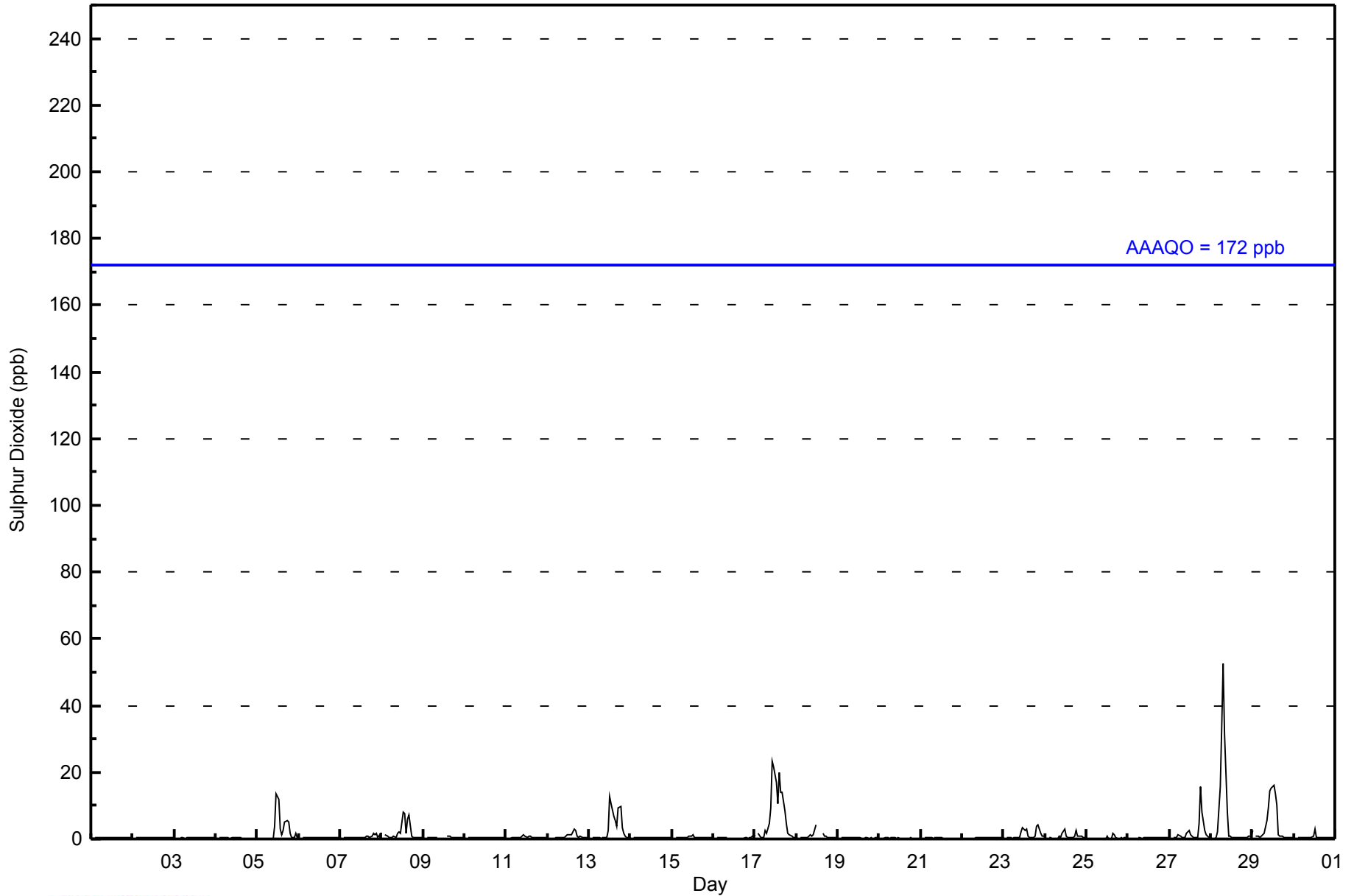
0.4	--	0.4	0.3	0.4	0.9	1.6	2.2	1.7	1.3	2.1	2.7	3.0	2.1	1.8	1.5	1.5	1.3	1.6	0.9	0.7	0.5	0.4	0.4	Diurnal Average	
2	--	1	1	2	16	34	53	31	9	24	22	17	14	20	14	14	9	16	8	4	2	2	2	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	652	97.17	97.17
11 - 20	14	2.09	99.25
21 - 60	5	0.75	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: 671

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - September 2014

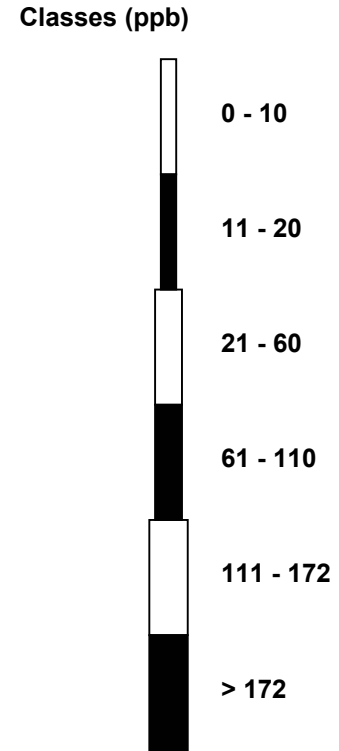
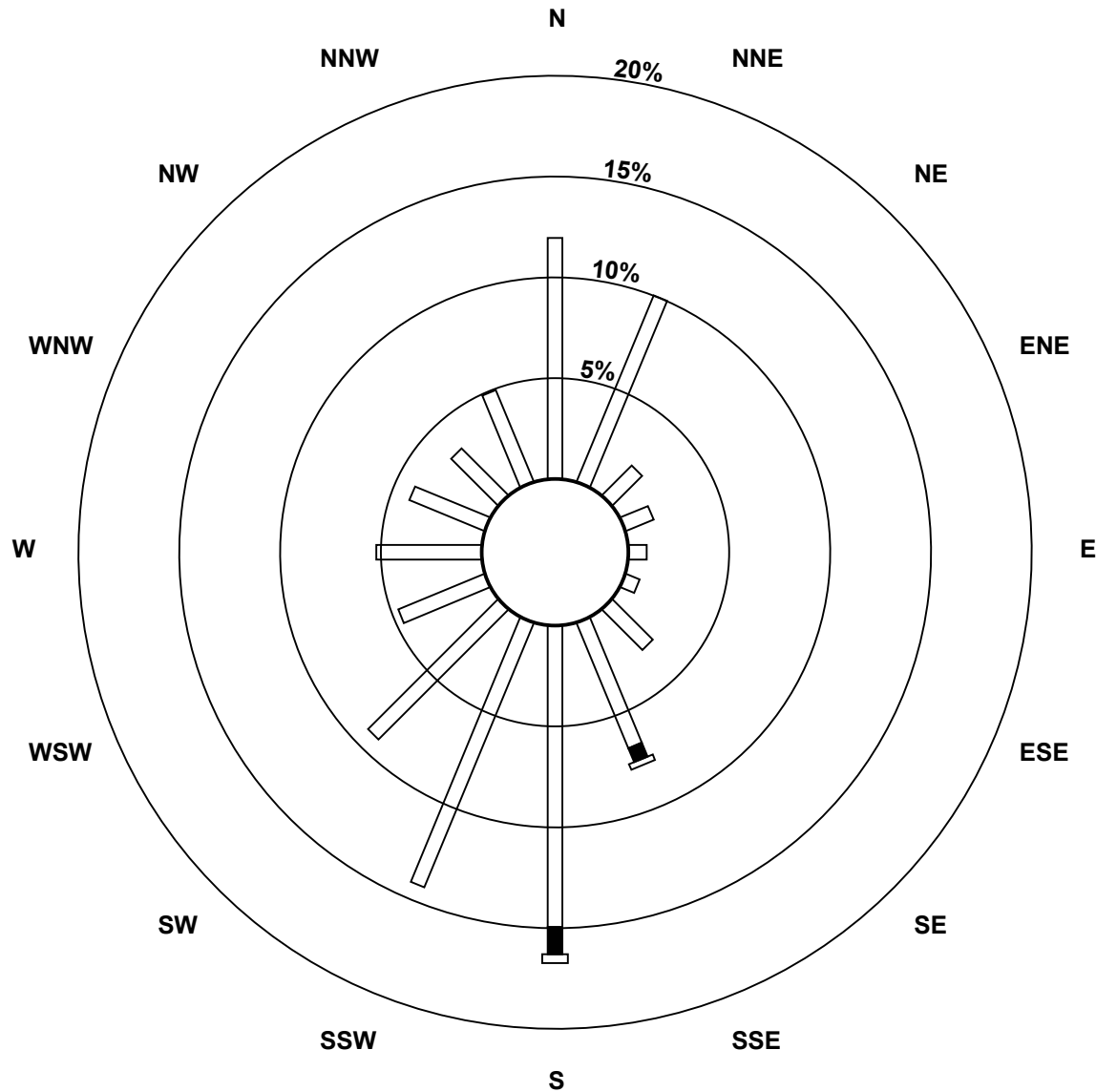
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	80	67	14	10	6	5	19	45	100	95	61	31	35	27	22	33	650
11 - 20	0	0	0	0	0	0	0	5	9	0	0	0	0	0	0	0	14
21 - 60	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	5
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	80	67	14	10	6	5	19	52	112	95	61	31	35	27	22	33	669

Total Number of Valid Hours: 669

Total Number of Hours: 720

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

**Sulphur Dioxide (SO₂) - ppb
CNRL Horizon (AMS 15)**

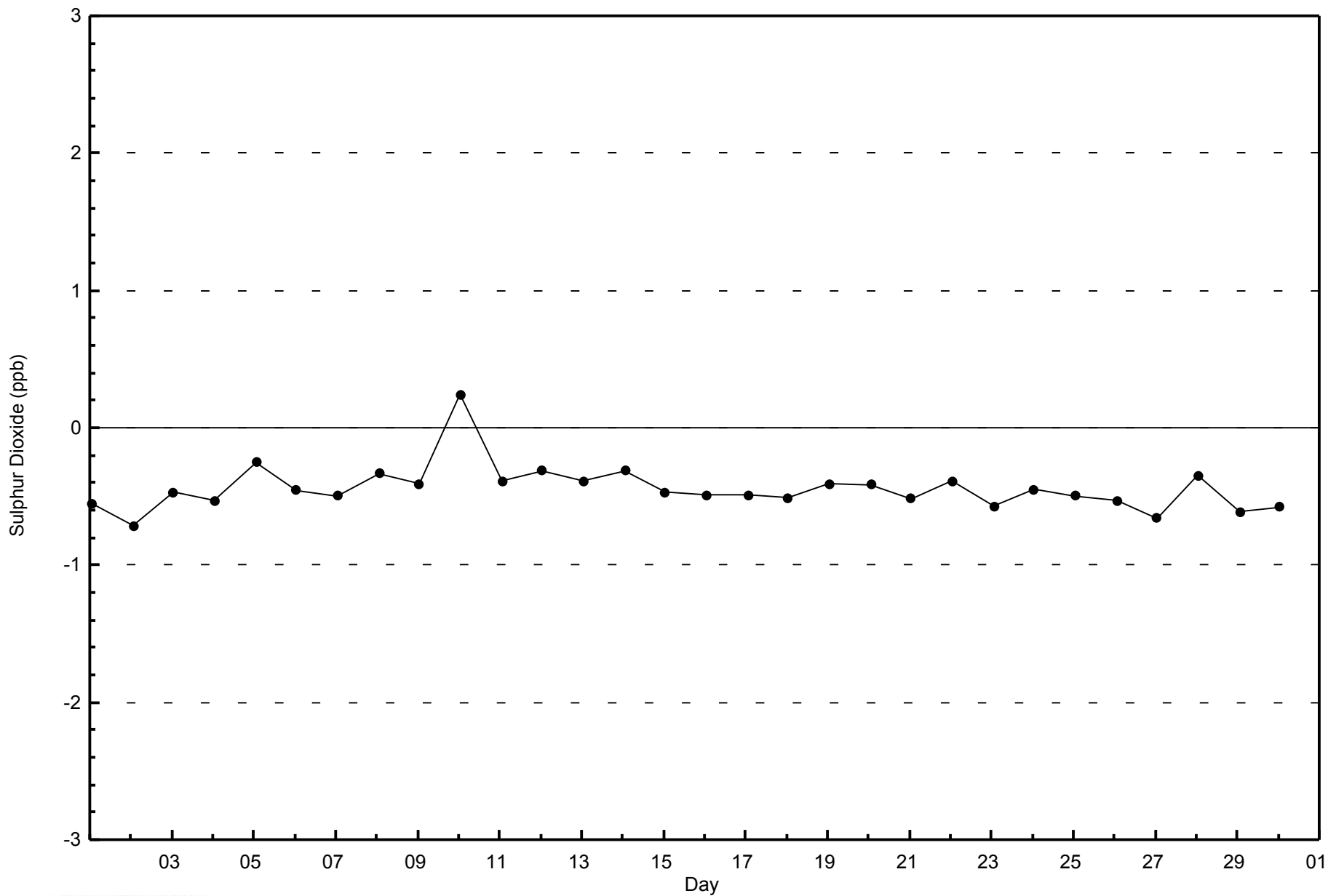


Total Number of Valid Hours: 669



WBEA
Zero Responses

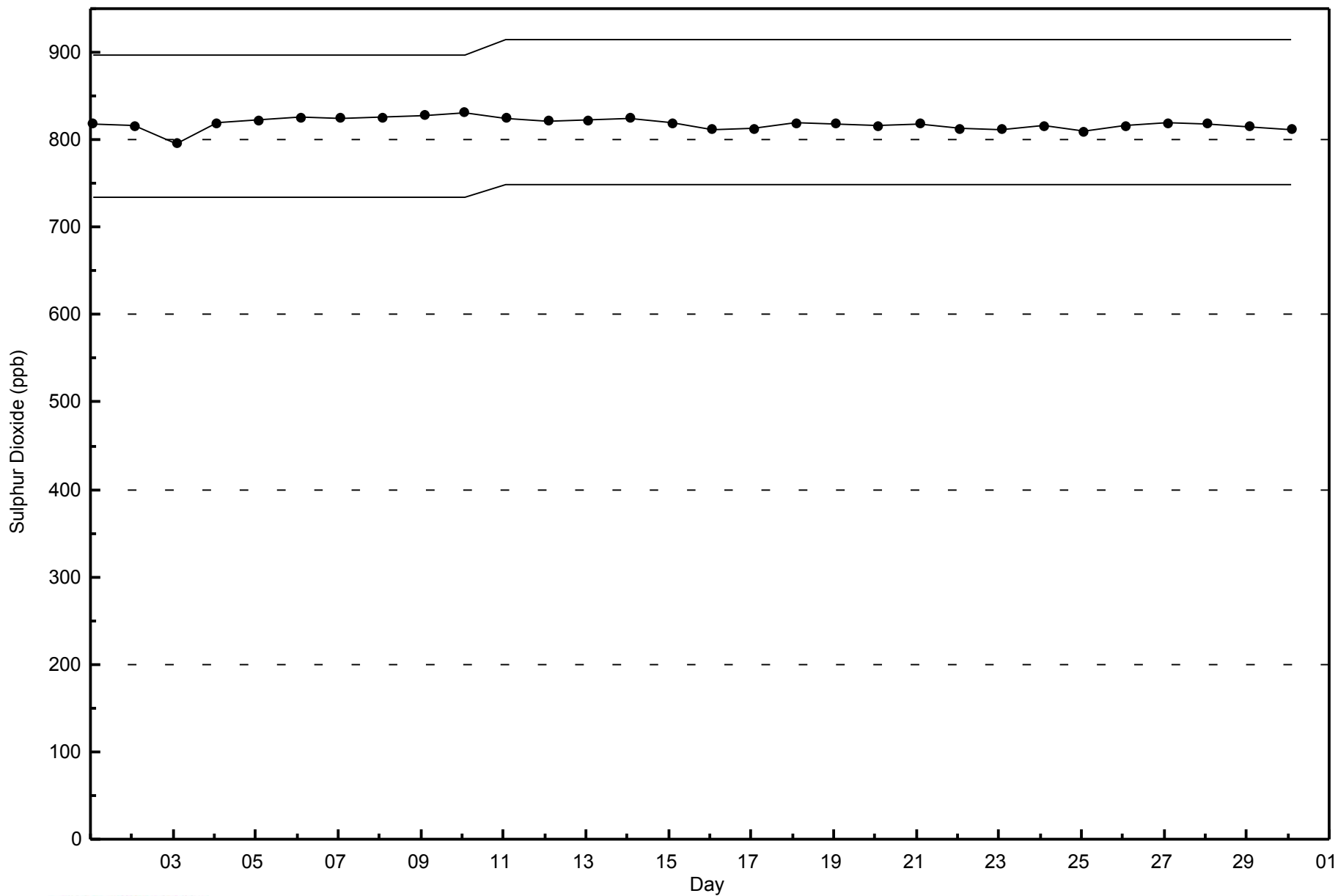
Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 1 ppb on Sep 23 12:00	Maximum Daily Average: 0.6 ppb on Sep 29		Hours of Data:	683
Minimum Value: 0 ppb on Sep 2 05:00	Minimum Daily Average: 0.1 ppb on Sep 2		Hours of Missing Data:	37
Maximum Diurnal Average: 0.3 ppb at hour 20	Minimum Diurnal Average: 0.2 ppb at hour 5		Hours of Calibration:	37
Monthly Average: 0.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1		Percent Operational Time:	100.0

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

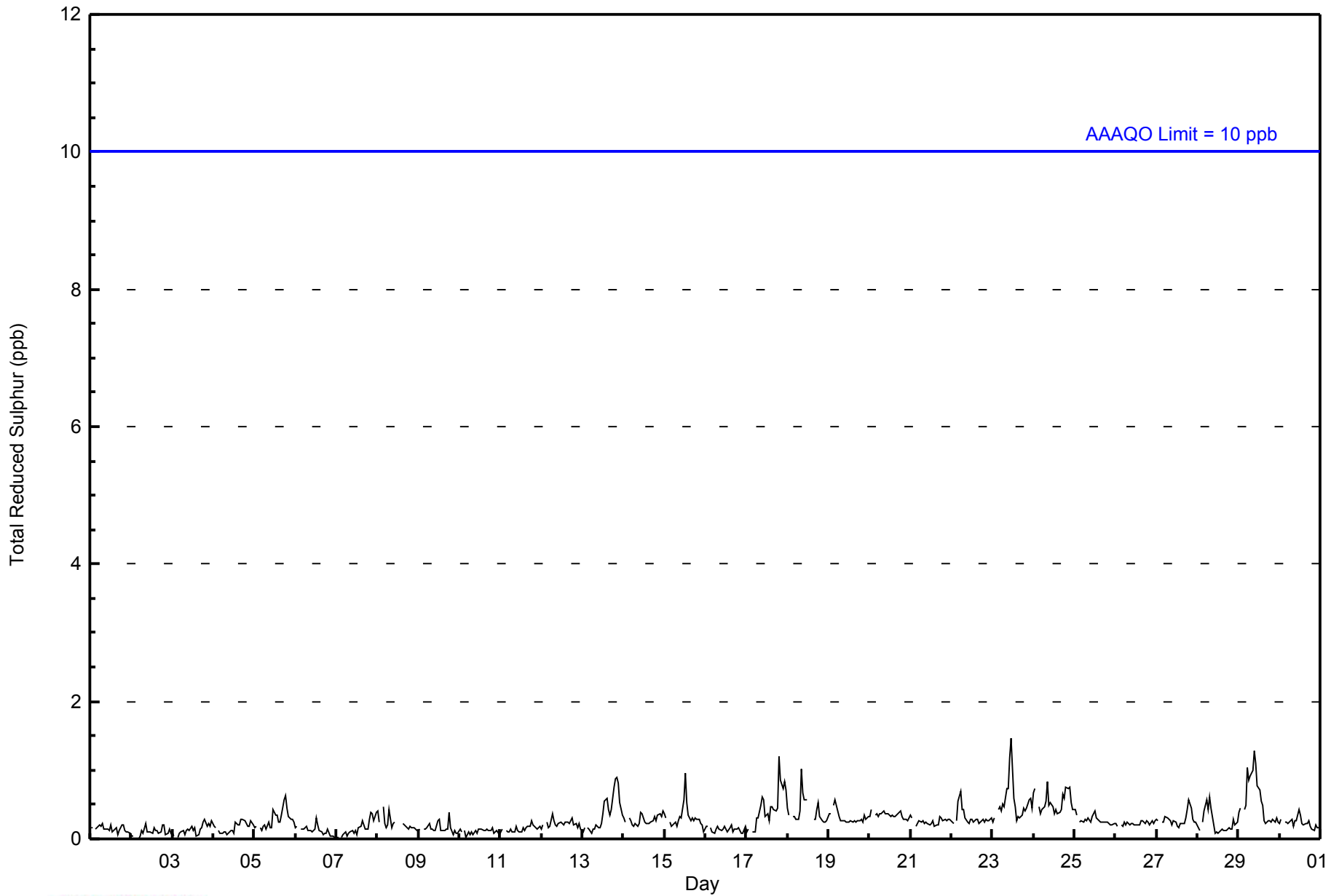
0.2	0.2	--	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2	Diurnal Average		
1	1	--	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - September 2014





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - September 2014

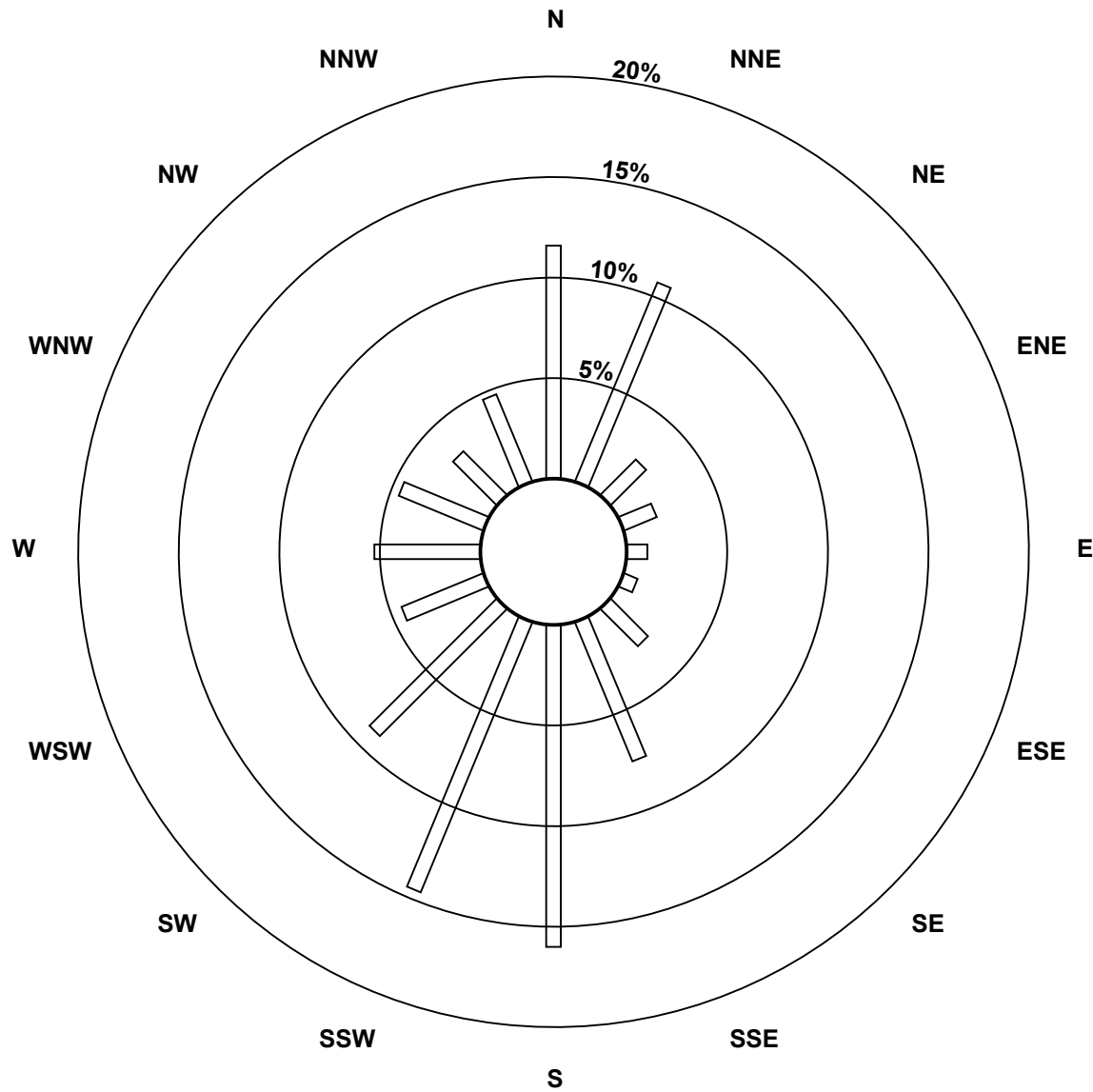
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	79	73	17	12	7	5	18	51	109	99	61	30	36	31	21	32	681
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	79	73	17	12	7	5	18	51	109	99	61	30	36	31	21	32	681

Total Number of Valid Hours: 681

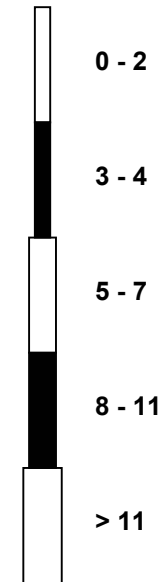
Total Number of Hours: 720

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

**Total Reduced Sulphur (TRS) - ppb
CNRL Horizon (AMS 15)**



Classes (ppb)

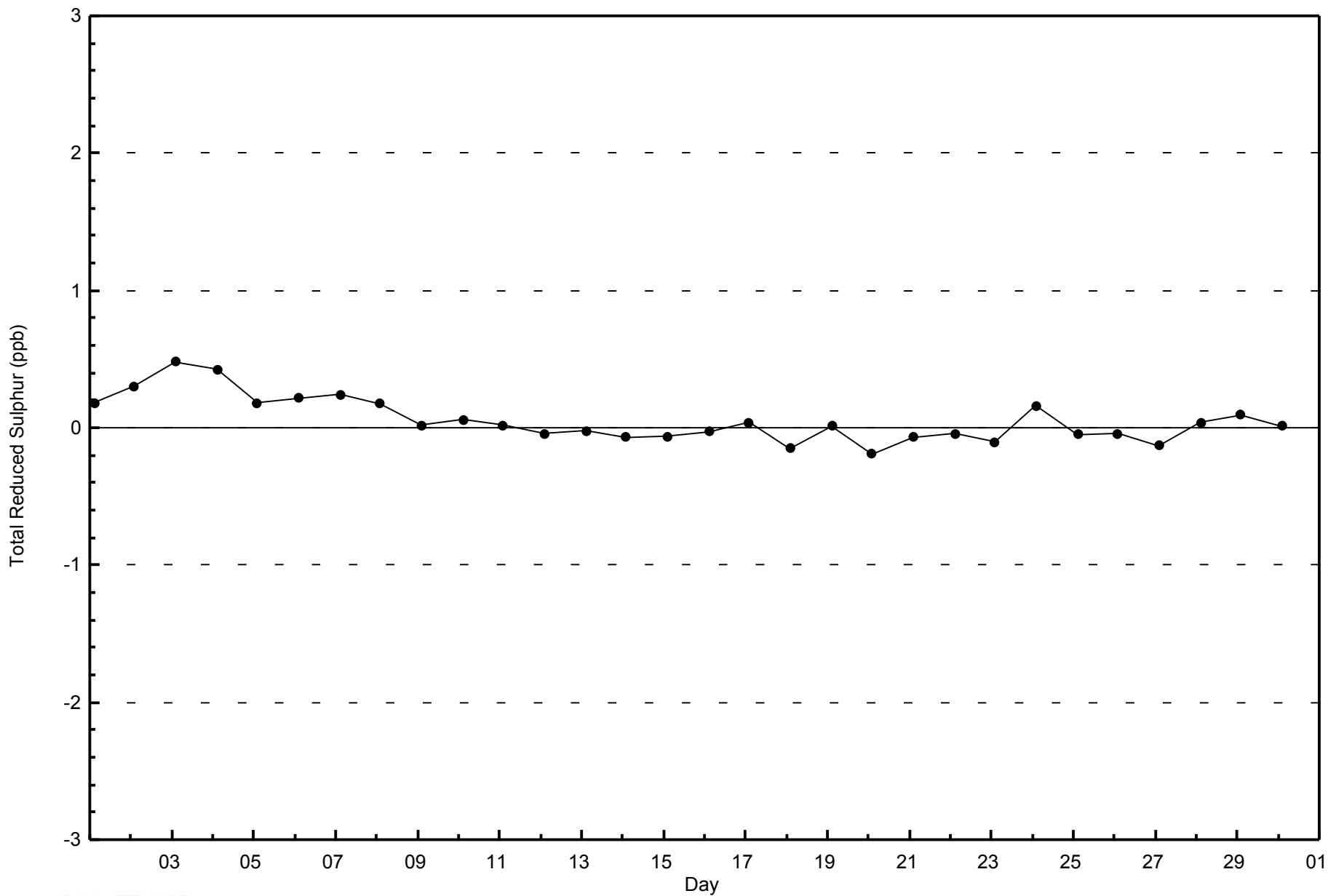


Total Number of Valid Hours: 681



WBEA
Zero Responses

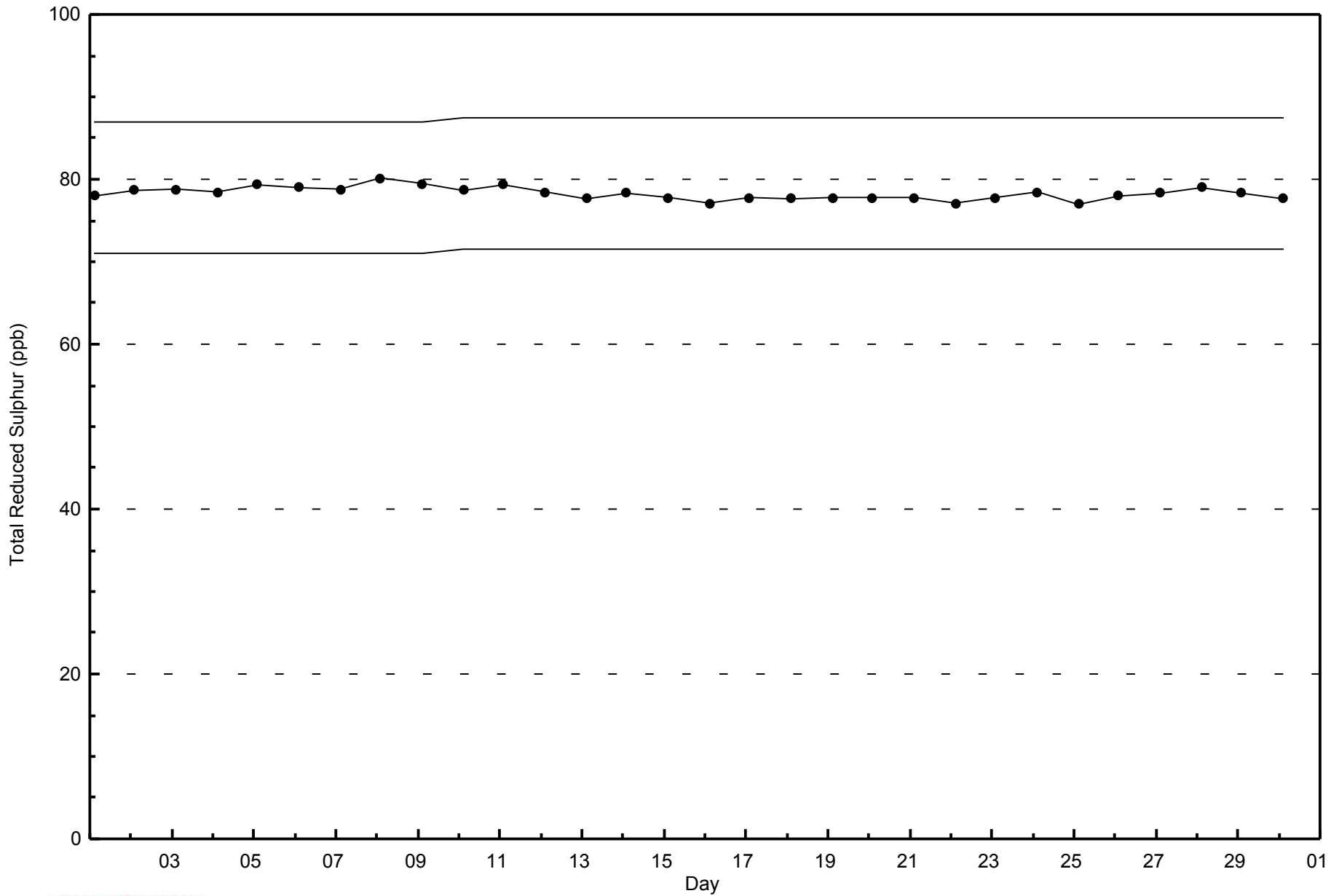
Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - September 2014





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - September 2014



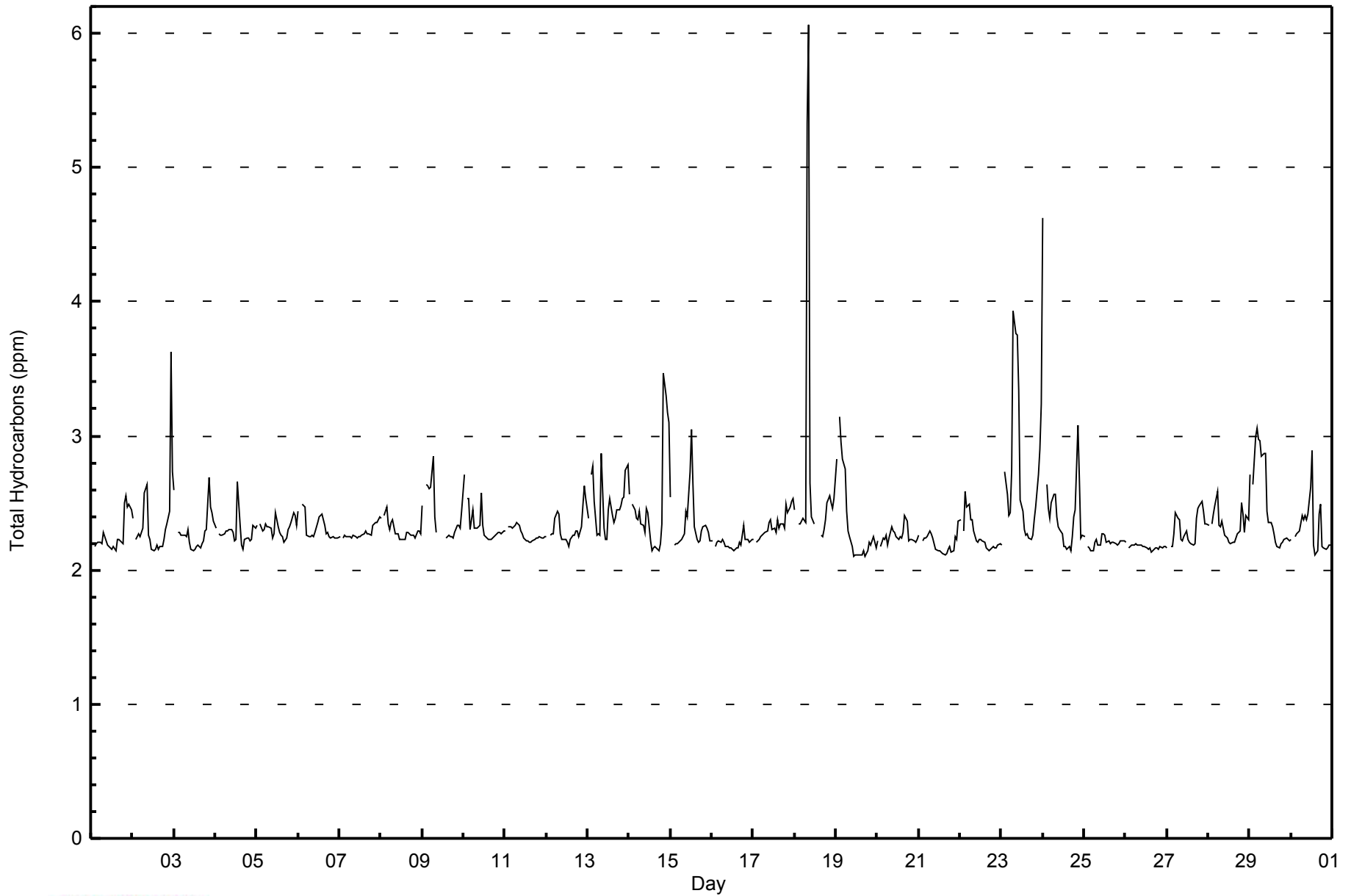


Maximum Value: 6.1 ppm on Sep 18 09:00																	Maximum Daily Average: 2.7 ppm on Sep 18																	Hours in Service: 720	
Minimum Value: 2.1 ppm on Sep 19 11:00																	Minimum Daily Average: 2.2 ppm on Sep 26																	Hours of Data: 682	
Maximum Diurnal Average: 2.5 ppm at hour 9																	Minimum Diurnal Average: 2.2 ppm at hour 16																	Hours of Missing Data: 38	
Monthly Average: 2.34 ppm																	Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.4 P ₉₀ = 2.5 P ₉₉ = 3.6																	Hours of Calibration: 38	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Sep	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.5	2.6	2.5	2.5	2.4	2.3	2.6									
2-Sep	2.4	Z	2.2	2.3	2.2	2.3	2.3	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	2.4	3.6	2.7	2.4	3.6									
3-Sep	2.6	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.7	2.5	2.4	2.4	2.3	2.7									
4-Sep	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.7	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.7									
5-Sep	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.3	2.3									
6-Sep	2.4	Z	2.5	2.5	2.5	2.3	2.2	2.2	2.3	2.2	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5									
7-Sep	2.2	Z	2.2	2.3	2.2	2.2	2.3	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.3	2.4									
8-Sep	2.4	Z	2.4	2.5	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.5									
9-Sep	2.5	Z	2.6	2.6	2.6	2.6	2.8	2.4	2.3	C	C	C	C	C	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.8									
10-Sep	2.7	Z	2.5	2.5	2.3	2.4	2.3	2.3	2.3	2.3	2.6	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.7									
11-Sep	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4									
12-Sep	2.3	Z	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.5	2.6	2.5	2.3	2.6									
13-Sep	2.4	Z	2.7	2.8	2.5	2.3	2.3	2.3	2.9	2.3	2.2	2.2	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.7	2.8	2.5	2.9									
14-Sep	2.6	Z	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.5	2.4	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.3	3.5	3.3	3.2	3.1	2.5	3.5									
15-Sep	2.5	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.7	3.0	2.6	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.4	3.0									
16-Sep	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	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3									
17-Sep	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.5	2.4	2.5	2.5	2.5	2.3	2.5									
18-Sep	2.4	Z	2.3	2.3	2.4	2.4	2.4	5.3	6.1	2.7	2.4	2.3	C	C	C	2.3	2.3	2.3	2.4	2.5	2.6	2.5	2.5	2.5	2.7	6.1									
19-Sep	2.8	Z	3.1	3.0	2.8	2.8	2.4	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	3.1									
20-Sep	2.2	Z	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.3	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4									
21-Sep	2.3	Z	2.2	2.2	2.2	2.2	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	2.1	2.1	2.2	2.2	2.4	2.2	2.4									
22-Sep	2.4	Z	2.3	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	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.6									
23-Sep	2.2	Z	2.7	2.6	2.4	2.4	2.7	3.9	3.8	3.7	3.3	2.5	2.4	2.3	2.3	2.3	2.2	2.2	2.3	2.4	2.5	2.7	2.9	3.2	2.7	3.9									
24-Sep	4.6	Z	2.6	2.5	2.4	2.5	2.6	2.6	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.3	2.4	3.1	2.7	2.2	2.3	2.5	4.6										
25-Sep	2.3	Z	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	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	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2									
27-Sep	2.2	Z	2.2	2.2	2.3	2.4	2.4	2.4	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.4	2.5	2.5	2.5	2.4	2.3	2.3	2.3	2.5									
28-Sep	2.3	Z	2.3	2.4	2.5	2.6	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.5	2.4	2.3	2.4	2.4	2.3	2.6									
29-Sep	2.7	Z	2.6	3.0	3.1	3.0	3.0	2.8	2.9	2.9	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	3.1									
30-Sep	2.2	Z	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.6	2.9	2.2	2.1	2.1	2.4	2.5	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.9									
																	Diurnal Average																		
																	Diurnal Maximum																		
																	2.4																		
																	4.6																		
																	Z - zerospan C - Calibration																		



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
CNRL Horizon - September 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	666	97.65	97.65
3.1 - 10.0	16	2.35	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - September 2014

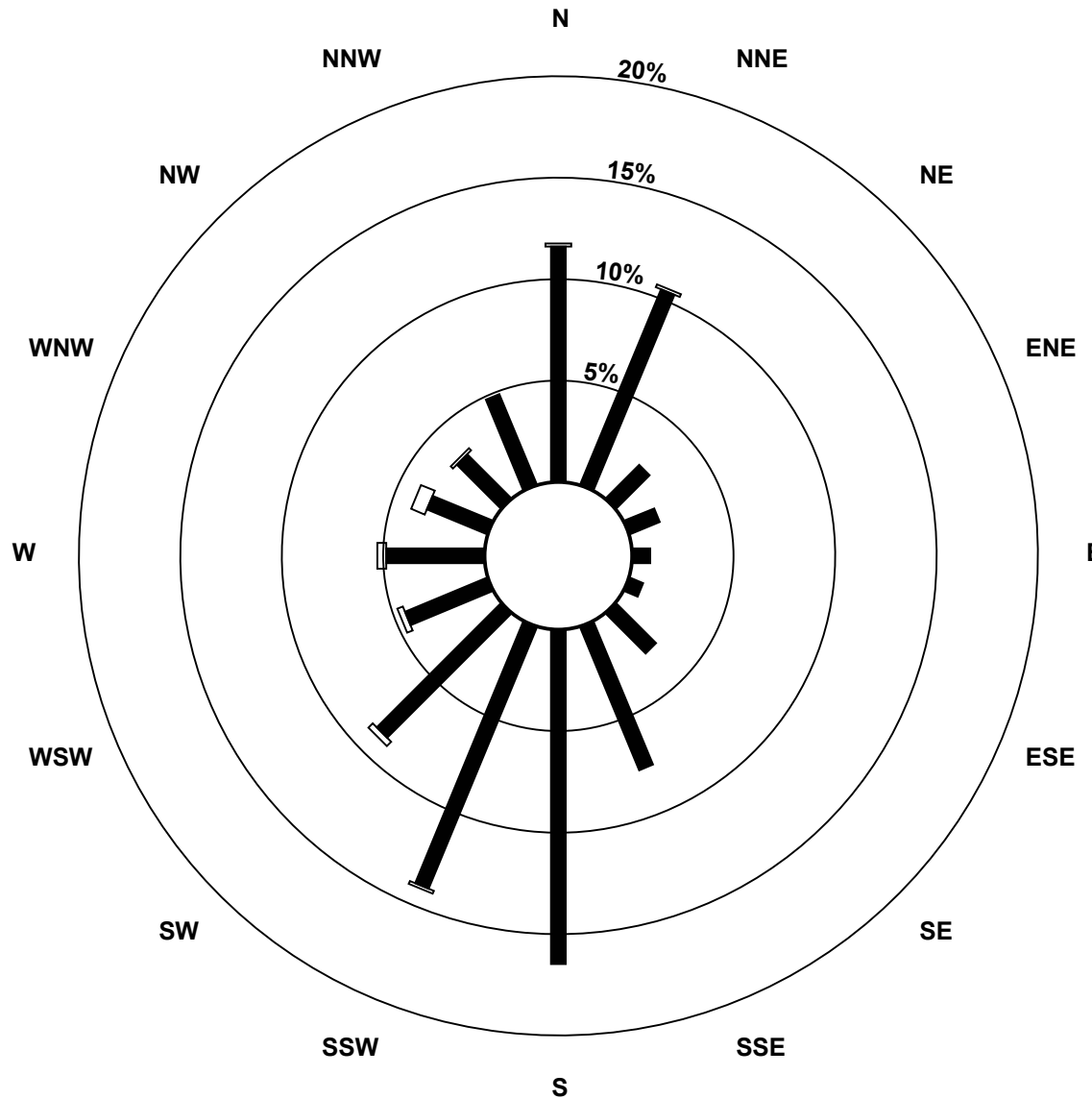
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	79	71	16	11	6	5	19	52	112	95	59	30	33	22	21	33	664
3.1 - 10.0	1	1	0	0	0	0	0	0	0	1	2	2	3	5	1	0	16
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	80	72	16	11	6	5	19	52	112	96	61	32	36	27	22	33	680

Total Number of Valid Hours: 680

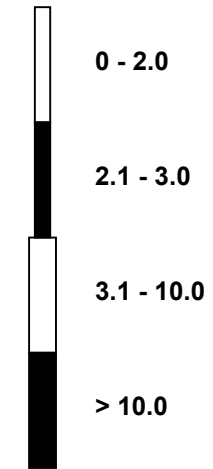
Total Number of Hours: 720

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

**Total Hydrocarbons (THC) - ppm
CNRL Horizon (AMS 15)**



Classes (ppm)

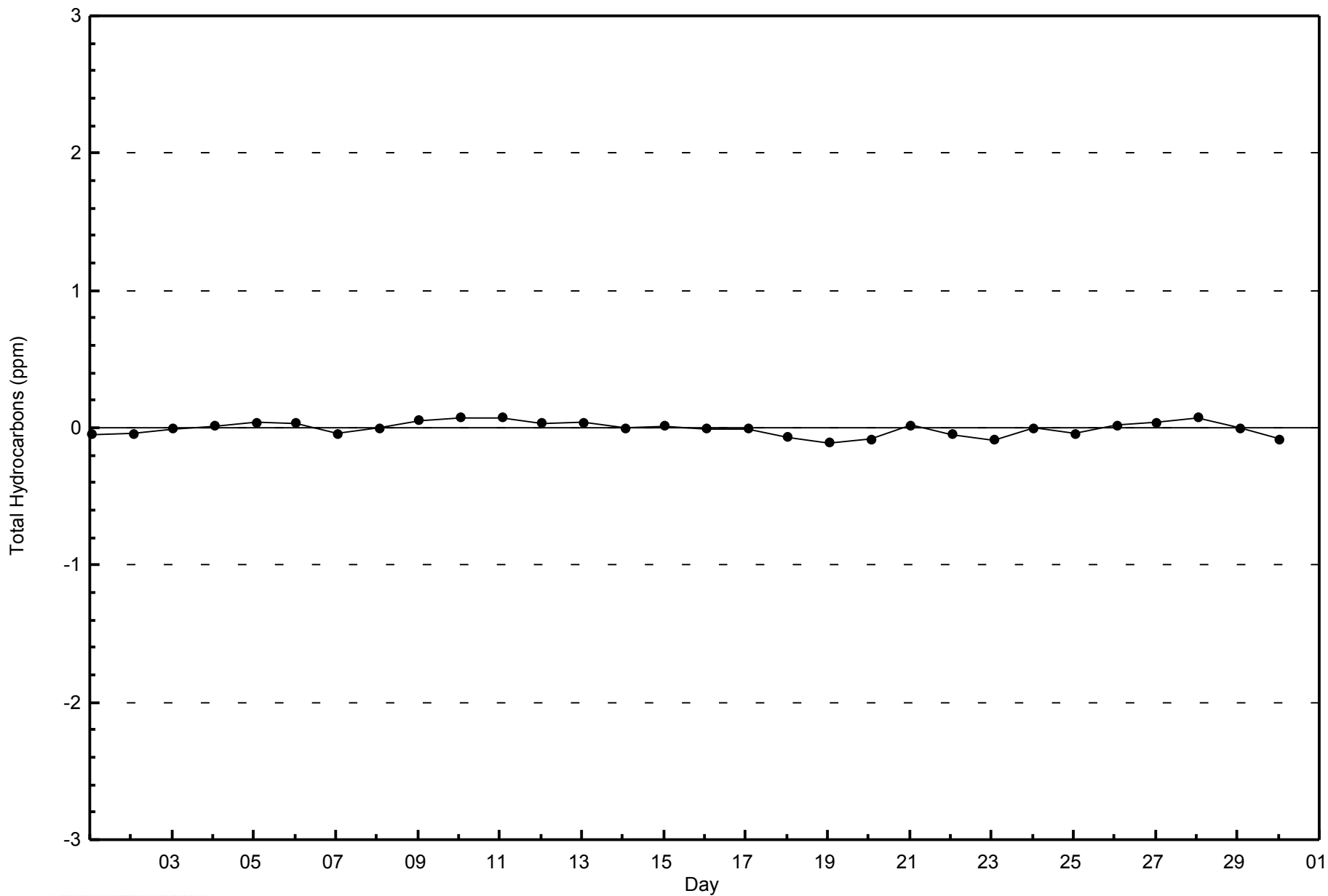


Total Number of Valid Hours: 680



WBEA
Zero Responses

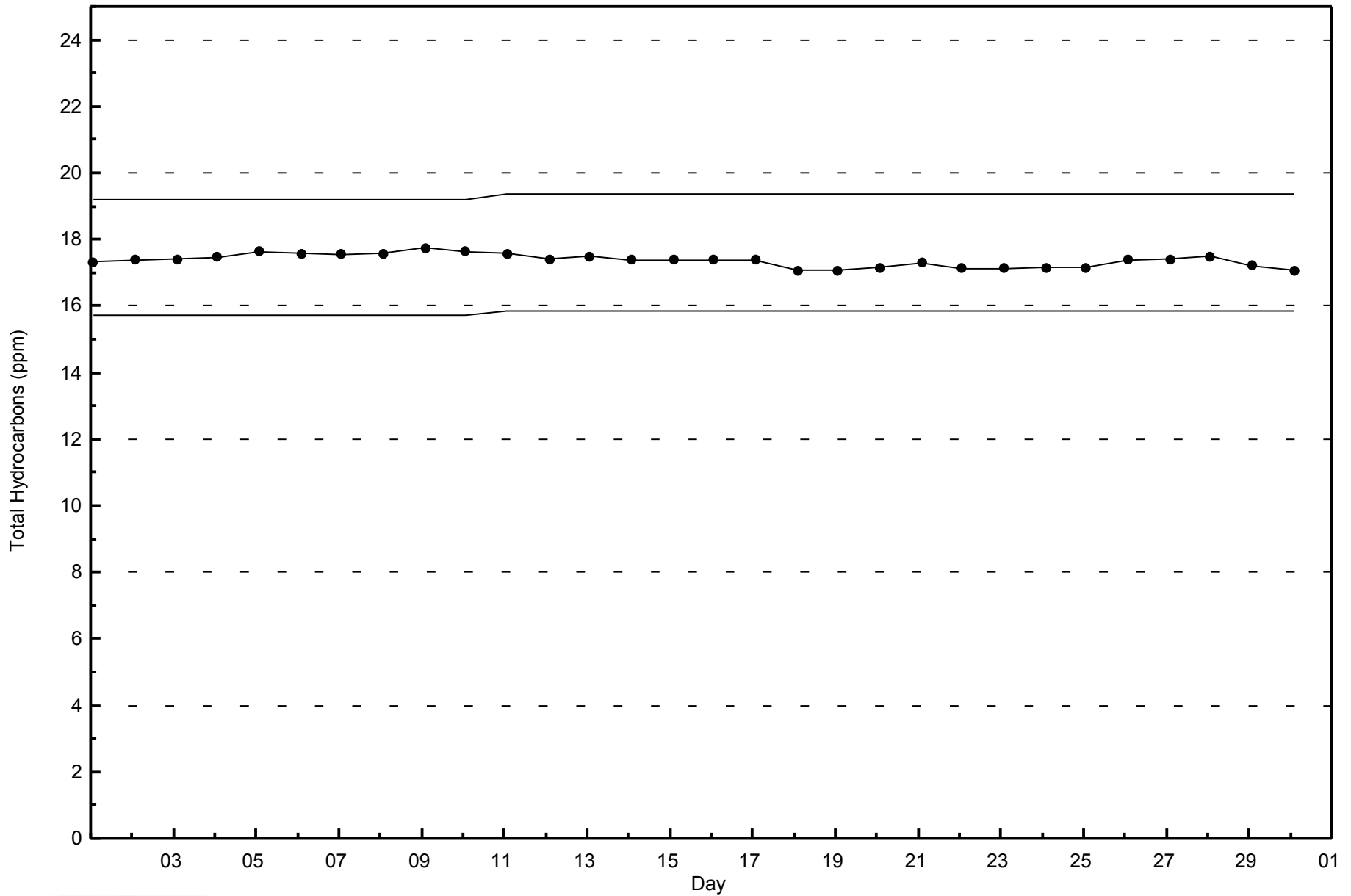
Total Hydrocarbons (THC) - ppm
CNRL Horizon - September 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
CNRL Horizon - September 2014



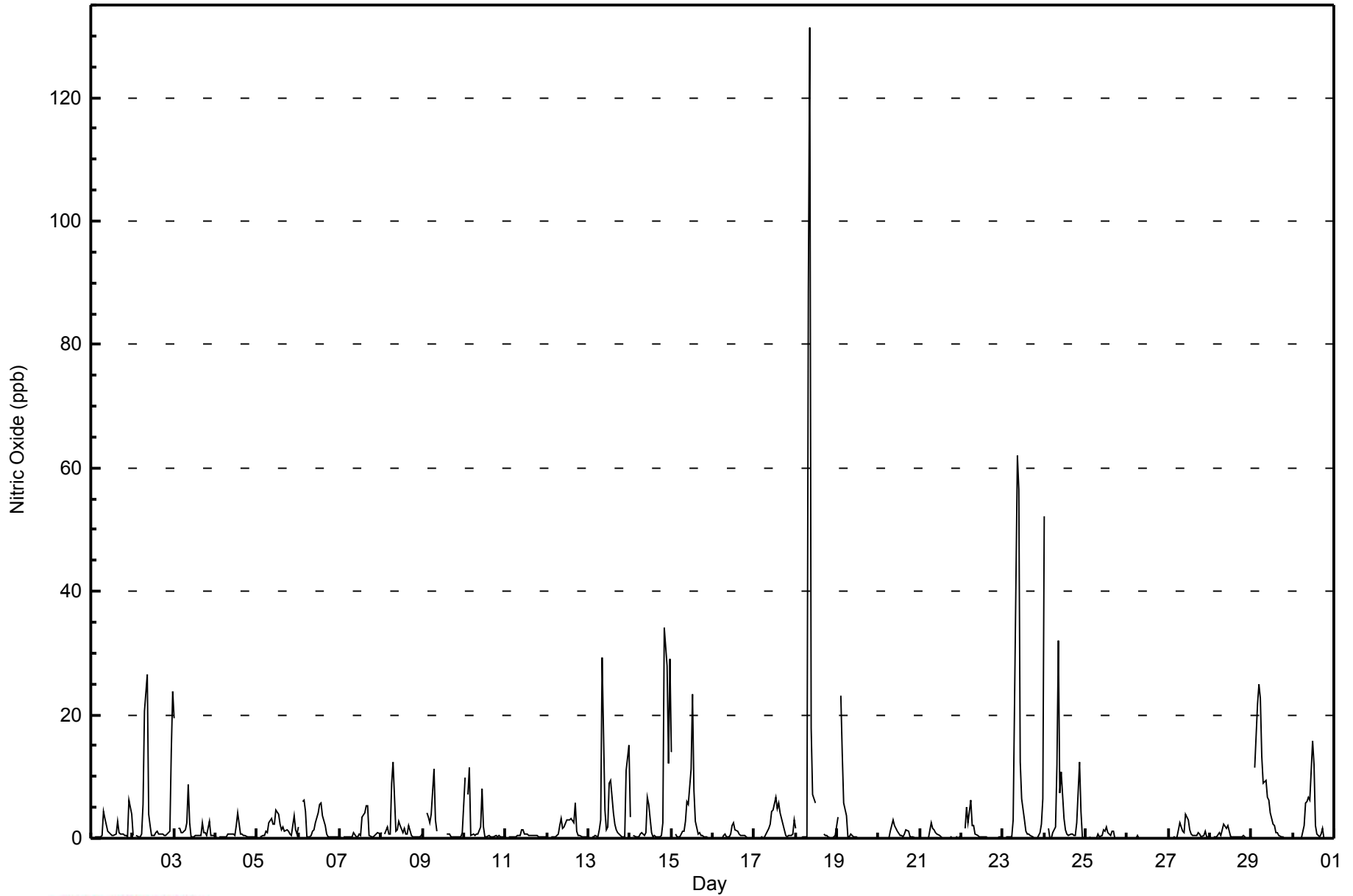


Maximum Value: 131 ppb on Sep 18 09:00																		Maximum Daily Average: 13.4 ppb on Sep 18						Hours in Service: 720		
Minimum Value: 0 ppb on Sep 19 14:00																		Minimum Daily Average: 0.1 ppb on Sep 26						Hours of Data: 681		
Maximum Diurnal Average: 11.2 ppb at hour 9																		Minimum Diurnal Average: 0.3 ppb at hour 19						Hours of Missing Data: 39		
Monthly Average: 2.6 ppb																		Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =2 P ₉₀ =6 P ₉₉ =31						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	Z	0	0	0	0	0	4	3	1	1	1	1	0	1	3	1	1	1	0	0	0	6	4	1.3	6
2-Sep	0	Z	0	0	0	1	6	21	27	4	2	1	0	1	1	1	1	1	1	0	1	1	14	24	4.6	27
3-Sep	19	Z	2	2	1	1	1	3	9	2	0	0	0	1	0	0	2	1	1	0	3	1	1	0	2.2	19
4-Sep	0	Z	0	0	0	0	0	1	1	1	1	0	2	4	1	1	0	0	0	0	0	0	0	0	0.7	4
5-Sep	0	Z	0	0	0	1	1	3	3	2	2	5	4	2	1	2	1	1	1	1	0	4	1	1	1.7	5
6-Sep	2	Z	6	6	4	0	0	0	1	1	2	4	5	6	4	2	1	0	0	0	0	0	0	0	2.0	6
7-Sep	0	Z	0	0	0	0	0	0	1	0	0	1	1	3	4	5	5	0	0	0	1	1	1	1	1.1	5
8-Sep	1	Z	1	2	1	1	9	12	1	1	3	2	1	2	1	1	2	0	0	0	0	0	0	0	1.8	12
9-Sep	1	Z	4	3	3	4	11	3	1	C	C	C	C	C	1	1	0	0	0	0	0	0	0	1	1.9	11
10-Sep	10	Z	7	11	0	1	0	1	1	2	8	2	0	0	0	0	0	0	1	0	0	0	0	0	2.0	11
11-Sep	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Sep	0	Z	0	0	0	0	1	2	3	2	2	3	3	3	3	3	6	1	0	0	0	0	0	0	1.5	6
13-Sep	0	Z	0	0	0	0	1	3	29	5	1	2	9	9	4	2	1	1	1	0	0	11	15	4.2	29	
14-Sep	3	Z	0	0	0	0	1	1	0	1	7	5	1	0	0	0	0	0	0	2	34	28	12	29	5.6	34
15-Sep	14	Z	1	0	0	0	1	1	3	6	5	11	23	8	3	1	1	0	0	0	0	0	0	0	3.5	23
16-Sep	0	Z	0	0	0	0	0	1	0	0	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0.5	2
17-Sep	0	Z	0	0	0	0	0	1	2	2	4	5	7	5	6	4	3	1	0	0	0	1	1	3	2.0	7
18-Sep	2	Z	0	0	0	0	0	88	131	18	7	6	C	C	C	C	1	1	0	0	0	0	0	0	13.4	131
19-Sep	3	Z	23	14	6	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3	23
20-Sep	0	Z	0	0	0	0	0	1	3	2	2	1	1	0	0	1	1	1	0	0	0	0	0	0	0.6	3
21-Sep	0	Z	0	0	0	0	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
22-Sep	0	Z	2	5	3	6	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	6
23-Sep	0	Z	0	0	0	0	3	23	62	57	12	6	3	1	1	1	0	0	0	0	0	1	2	6	7.8	62
24-Sep	52	Z	2	0	0	1	2	12	32	7	11	3	1	1	0	1	1	0	0	3	12	4	0	0	6.4	52
25-Sep	0	Z	0	0	0	0	0	1	0	0	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0.4	2
26-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
27-Sep	0	Z	0	0	0	0	3	2	1	1	4	3	1	1	1	0	0	1	1	0	0	1	0	0	0.9	4
28-Sep	0	Z	0	0	0	1	0	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
29-Sep	0	Z	11	22	25	23	13	9	9	7	6	4	2	2	1	1	0	0	0	0	0	0	0	0	6.0	25
30-Sep	0	Z	0	0	0	0	2	6	6	7	6	16	12	2	1	0	1	2	0	0	0	0	0	0	2.6	16
																		Diurnal Average								
																		Diurnal Maximum								
Z - zerospan																		C - Calibration								



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
CNRL Horizon - September 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
CNRL Horizon - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	662	97.21	97.21
21 - 40	14	2.06	99.27
41 - 80	3	0.44	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



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
CNRL Horizon - September 2014

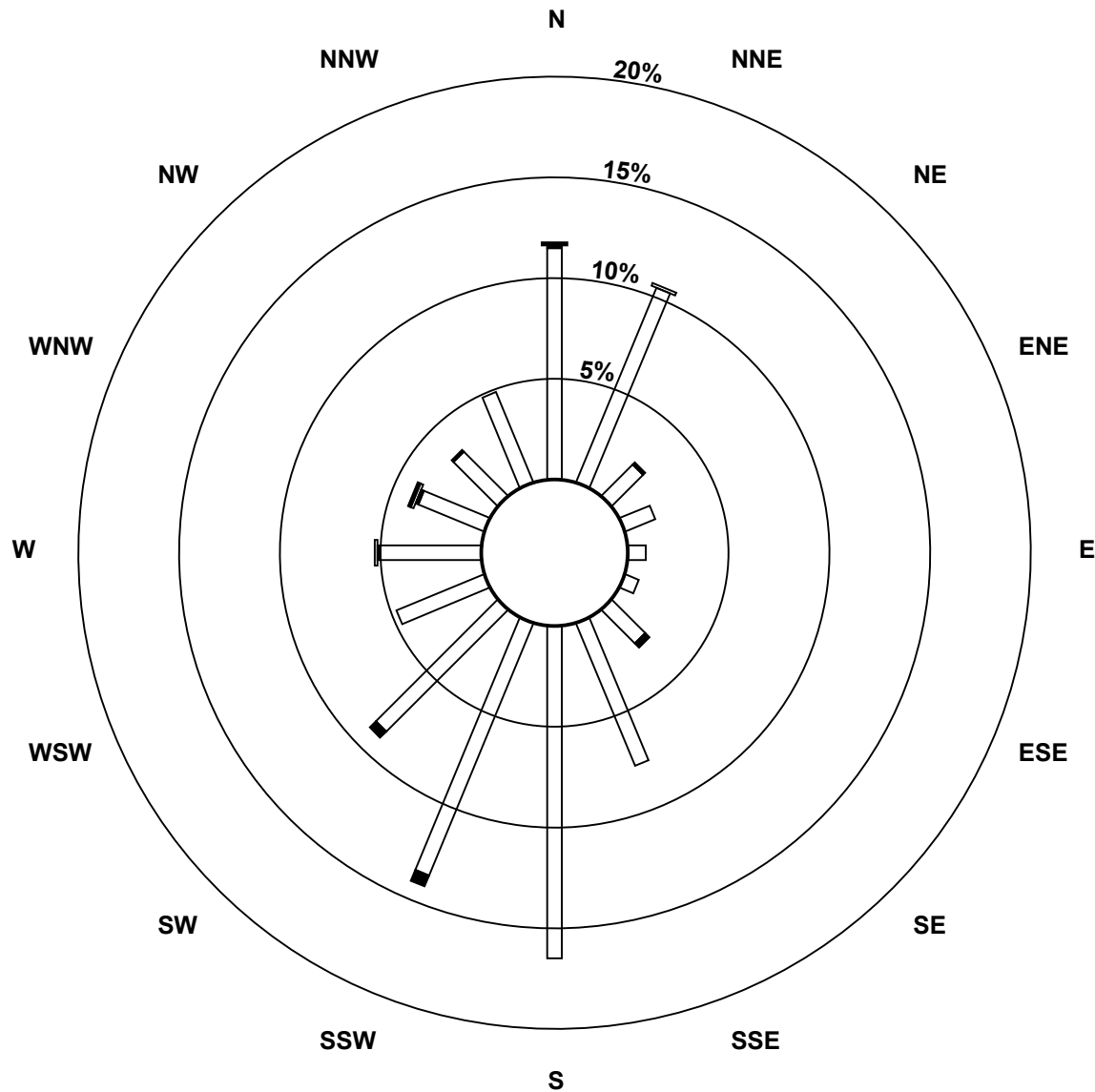
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	78	71	15	11	6	5	16	52	112	92	58	32	34	24	21	33	660
21 - 40	1	0	1	0	0	0	2	0	0	4	3	0	1	1	1	0	14
11 - 80	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	3
81 - 159	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	80	72	16	11	6	5	18	52	112	96	61	32	36	27	22	33	679

Total Number of Valid Hours: 679

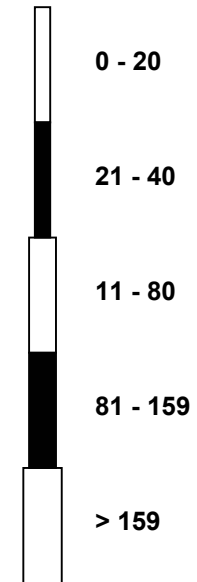
Total Number of Hours: 720

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

**Nitric Oxide (NO) - ppb
CNRL Horizon (AMS 15)**



Classes (ppb)

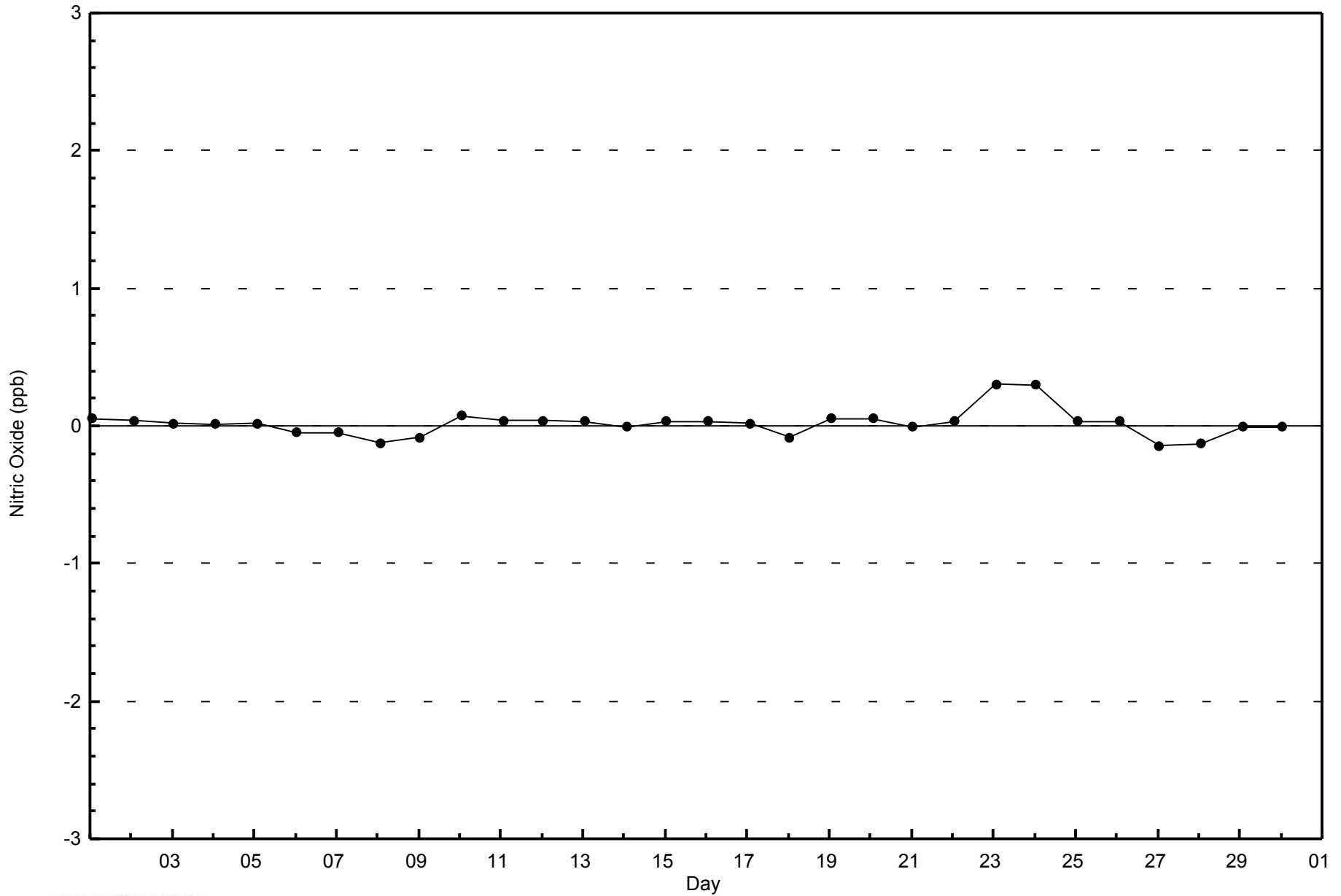


Total Number of Valid Hours: 679



WBEA
Zero Responses

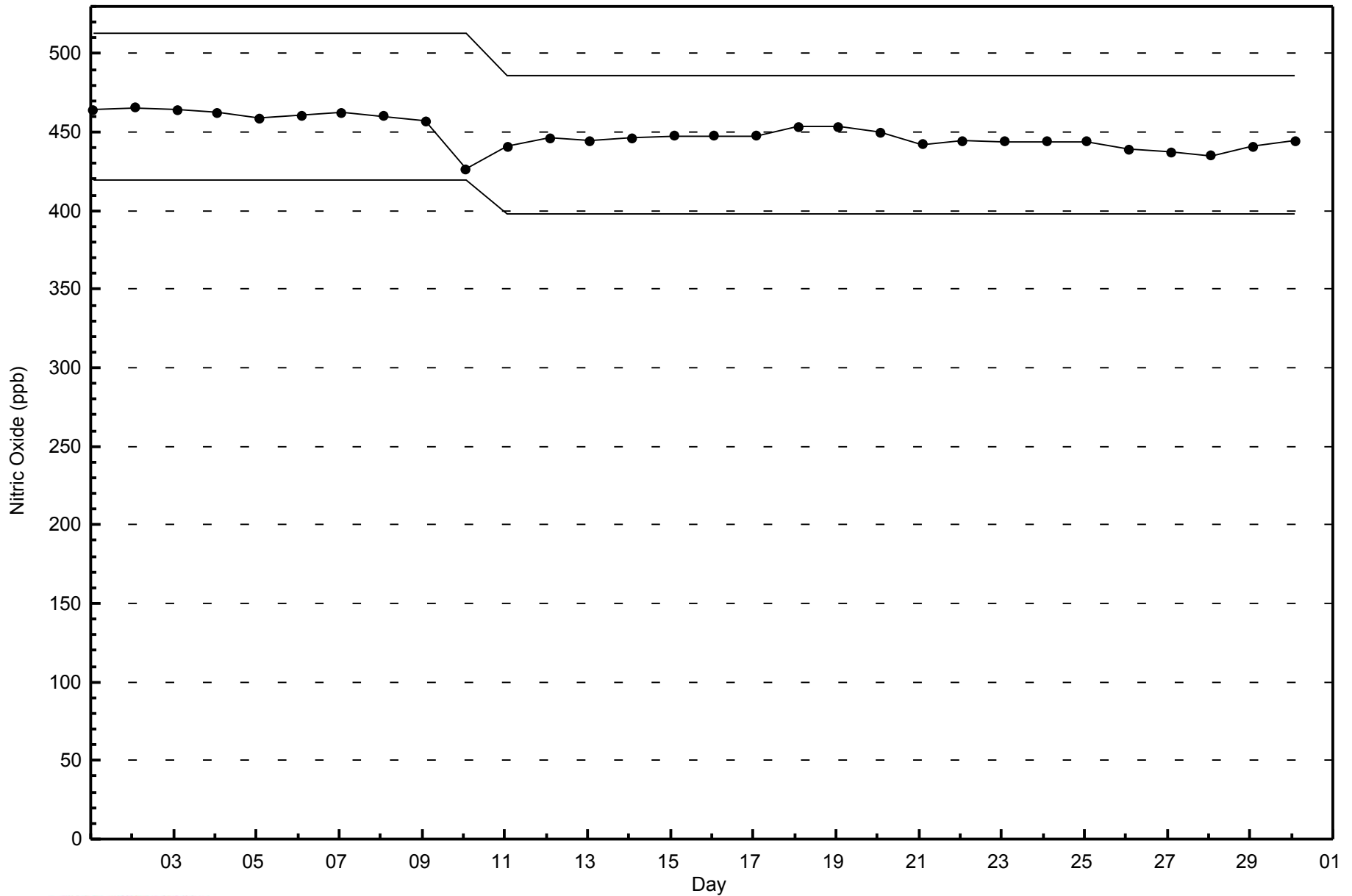
Nitric Oxide (NO) - ppb
CNRL Horizon - September 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
CNRL Horizon - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 27 ppb on Sep 24 01:00	Maximum Daily Average: 10.6 ppb on Sep 23		Hours of Data:	681
Minimum Value: 0 ppb on Sep 3 11:00	Minimum Daily Average: 0.3 ppb on Sep 26		Hours of Missing Data:	39
Maximum Diurnal Average: 5.4 ppb at hour 21	Minimum Diurnal Average: 2.6 ppb at hour 16		Hours of Calibration:	39
Monthly Average: 4.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 6 P ₉₀ = 10 P ₉₉ = 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	0	Z	0	1	1	1	0	4	3	1	1	1	0	0	1	6	2	2	5	7	7	6	12	7	2.9	12
2-Sep	4	Z	2	1	0	2	3	6	8	4	4	1	0	1	3	1	1	2	1	4	7	13	13	3	3.6	13
3-Sep	4	Z	3	3	2	2	2	1	5	2	0	0	0	0	0	0	5	2	6	3	15	8	4	3	3.0	15
4-Sep	1	Z	0	0	0	1	0	1	1	0	0	0	3	6	1	1	0	1	0	0	0	0	2	4	1.0	6
5-Sep	4	Z	6	3	7	5	2	2	3	3	3	7	7	6	6	4	4	7	9	7	5	9	8	6	5.3	9
6-Sep	6	Z	9	7	9	1	0	0	2	4	6	9	11	14	11	9	3	2	0	0	0	0	0	0	4.6	14
7-Sep	0	Z	0	0	0	0	1	1	2	0	0	1	1	5	6	8	9	1	1	2	7	6	9	7	2.9	9
8-Sep	8	Z	6	13	8	6	12	13	1	1	5	3	1	2	1	1	5	0	0	0	1	2	3	3	4.1	13
9-Sep	8	Z	8	11	9	6	8	6	3	C	C	C	C	C	2	2	0	0	0	1	2	5	3	7	4.5	11
10-Sep	17	Z	12	12	5	10	5	3	2	5	12	4	1	0	1	0	0	1	3	1	3	2	2	0	4.3	17
11-Sep	1	Z	5	0	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	0	0	1	1	1	1.0	5
12-Sep	1	Z	3	1	0	3	6	7	6	2	3	4	4	4	6	6	12	7	3	5	3	6	6	5	4.4	12
13-Sep	5	Z	7	4	4	2	3	3	9	4	2	2	9	12	8	6	5	7	7	7	8	8	9	11	6.1	12
14-Sep	7	Z	4	2	2	1	1	1	0	1	6	6	2	0	0	0	1	1	4	24	23	17	12	4.9	24	
15-Sep	12	Z	3	0	1	2	3	2	2	5	7	13	24	17	7	3	3	2	3	3	1	1	0	0	5.0	24
16-Sep	0	Z	1	1	1	1	2	2	1	0	1	2	2	2	2	1	1	1	6	1	1	2	2	4	1.6	6
17-Sep	2	Z	3	2	4	4	5	5	5	5	6	5	5	4	7	5	6	6	5	3	7	7	6	7	4.8	7
18-Sep	5	Z	2	1	1	1	0	9	21	9	6	6	C	C	C	C	4	5	7	8	7	7	8	9	5.9	21
19-Sep	13	Z	13	10	12	11	4	2	2	1	0	0	0	0	0	0	2	0	0	2	2	3	4	2	3.6	13
20-Sep	6	Z	0	5	4	4	0	3	6	4	3	2	1	1	1	2	7	8	1	1	1	1	2	1	2.7	8
21-Sep	2	Z	1	1	1	2	6	4	2	2	1	1	0	0	0	0	0	1	3	1	1	1	2	10	1.8	10
22-Sep	10	Z	3	5	7	9	7	4	2	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	2.4	10
23-Sep	0	Z	8	7	9	10	18	18	21	21	17	11	9	4	3	3	3	3	4	9	10	15	21	19	10.6	21
24-Sep	27	Z	16	9	7	12	12	13	18	10	13	10	5	5	3	5	5	7	10	10	19	13	4	3	10.2	27
25-Sep	3	Z	2	1	1	1	2	3	0	1	3	2	4	3	2	4	4	0	0	1	1	0	1	0	1.6	4
26-Sep	0	Z	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	2
27-Sep	1	Z	1	1	2	6	9	7	3	1	5	5	2	1	1	1	1	7	15	11	15	9	5	2	4.8	15
28-Sep	1	Z	2	4	7	9	10	7	5	3	3	2	1	0	1	0	0	0	1	16	13	3	2	3	4.0	16
29-Sep	4	Z	15	15	14	14	13	9	8	8	8	6	5	4	2	4	2	1	1	1	2	1	1	1	6.1	15
30-Sep	2	Z	2	2	2	2	5	5	5	4	5	9	10	3	2	1	6	8	1	2	1	1	1	0	3.3	10

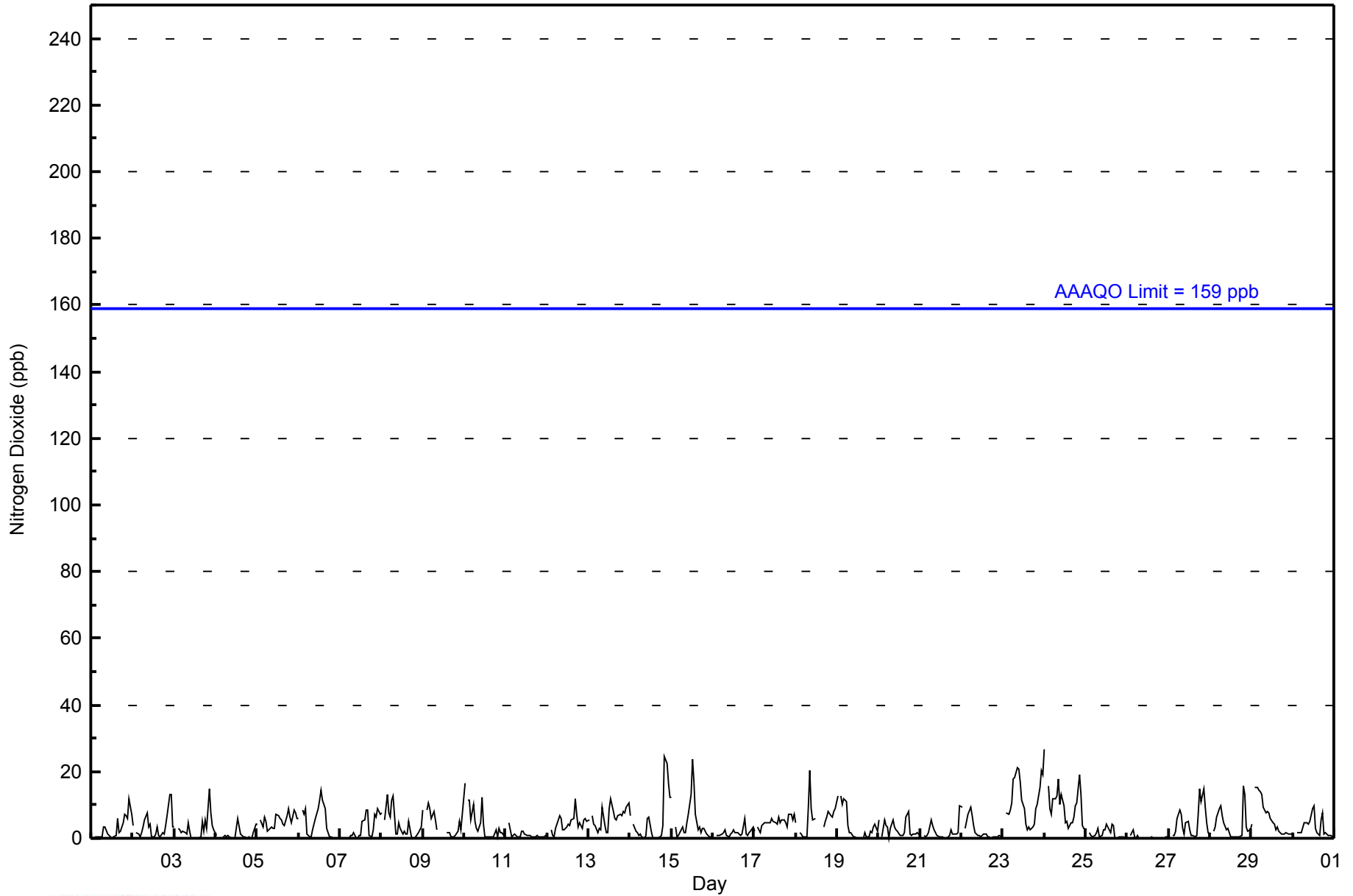
5.1	--	4.5	4.1	3.9	4.3	4.6	4.6	4.8	3.5	4.2	3.9	3.9	3.5	2.7	2.6	3.0	2.7	3.1	3.7	5.4	5.1	4.8	4.4	Diurnal Average	
27	--	16	15	14	14	18	18	21	21	17	13	24	17	11	9	12	8	15	16	24	23	21	19	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - September 2014

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

Total Number of Valid Hours: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - September 2014

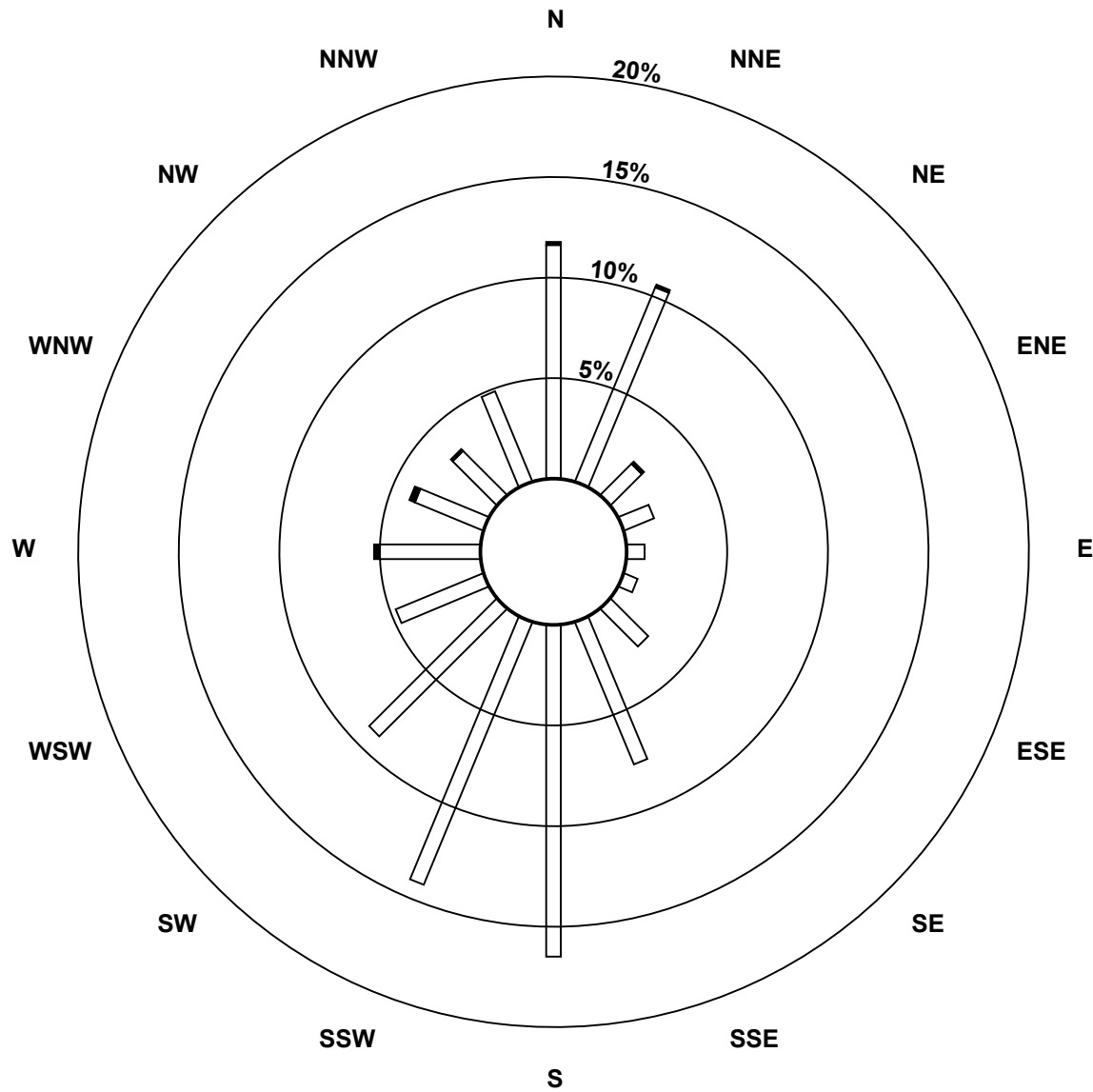
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	79	71	15	11	6	5	18	52	112	96	61	32	34	25	21	33	671
21 - 40	1	1	1	0	0	0	0	0	0	0	0	0	2	2	1	0	8
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	80	72	16	11	6	5	18	52	112	96	61	32	36	27	22	33	679

Total Number of Valid Hours: 679

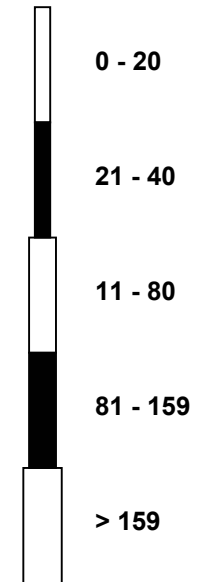
Total Number of Hours: 720

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

**Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon (AMS 15)**



Classes (ppb)

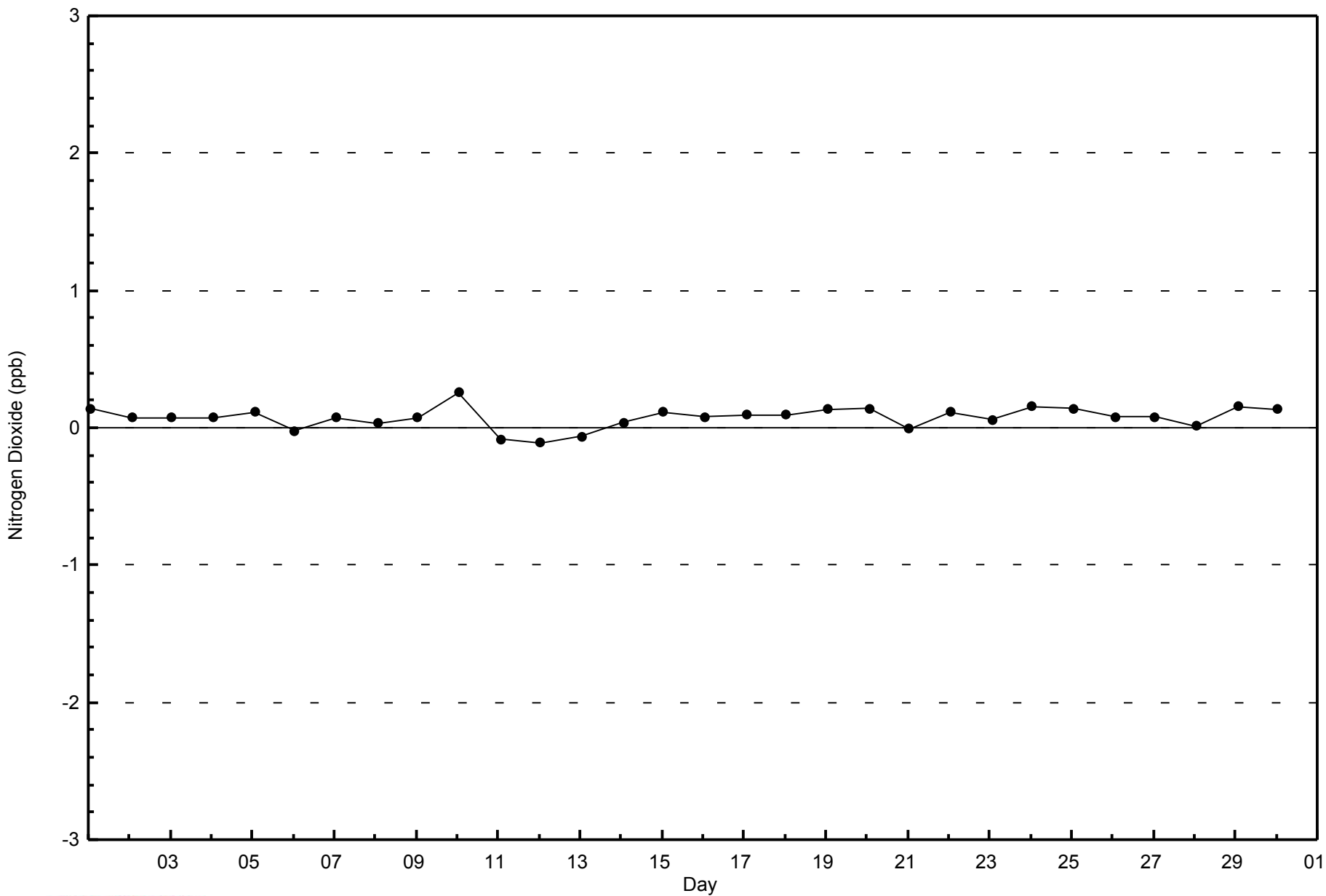


Total Number of Valid Hours: 679



WBEA
Zero Responses

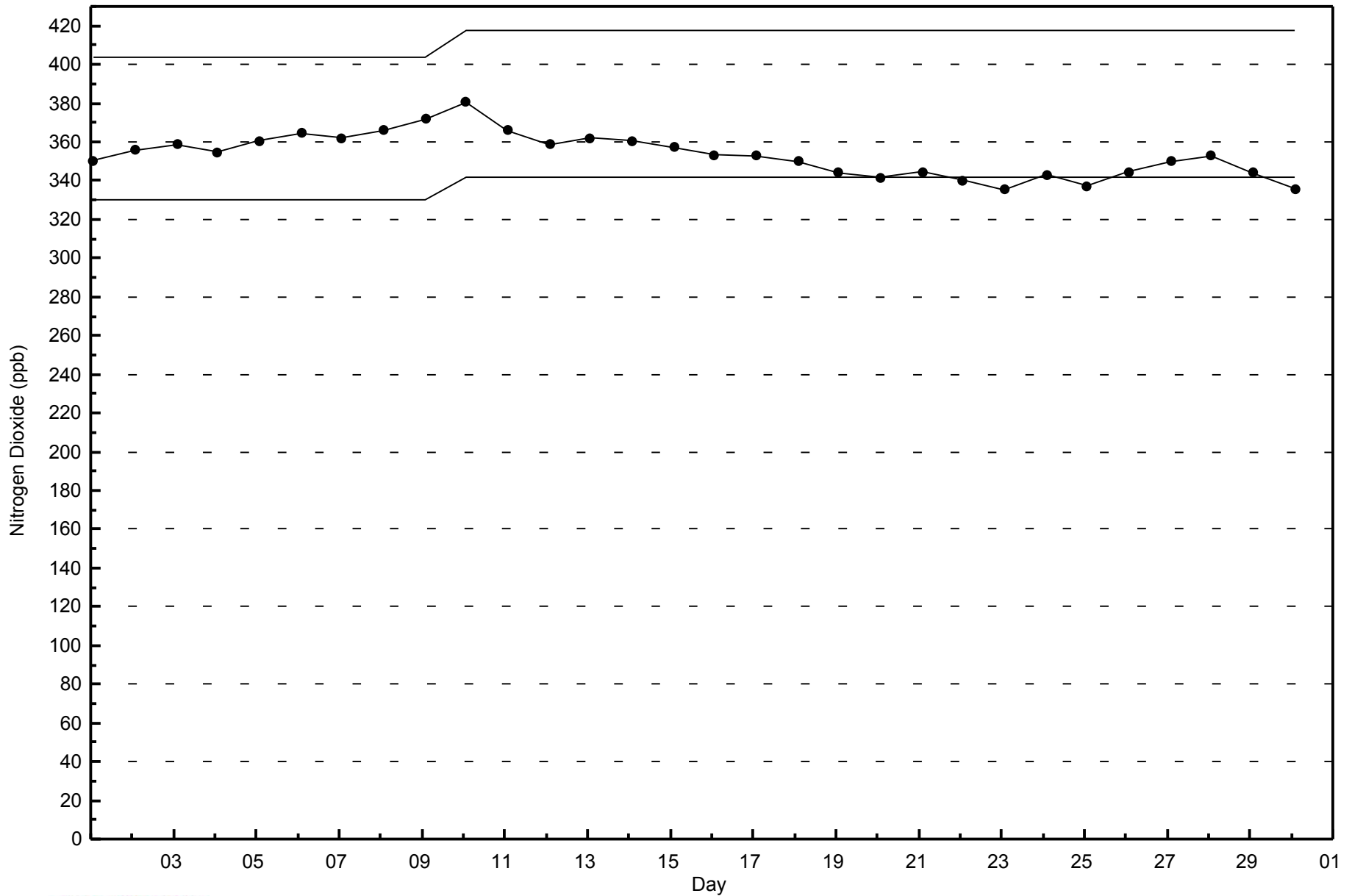
Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - September 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - September 2014





Maximum Value: 152 ppb on Sep 18 09:00	Maximum Daily Average: 19.3 ppb on Sep 18	Hours in Service: 720
Minimum Value: 0 ppb on Sep 26 14:00	Minimum Daily Average: 0.4 ppb on Sep 26	Hours of Data: 681
Maximum Diurnal Average: 16.0 ppb at hour 9	Minimum Diurnal Average: 3.2 ppb at hour 18	Hours of Missing Data: 39
Monthly Average: 6.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 8 P ₉₀ = 15 P ₉₉ = 48	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	Z	1	1	1	1	1	8	7	2	2	1	1	1	1	9	2	3	5	8	7	6	18	11	4.2	18
2-Sep	4	Z	2	2	1	2	9	26	34	8	6	1	1	2	4	1	1	2	2	4	7	14	27	27	8.2	34
3-Sep	23	Z	4	4	2	3	3	4	13	5	0	0	0	1	0	1	7	3	6	3	18	8	4	3	5.1	23
4-Sep	1	Z	1	0	0	1	1	1	1	1	1	1	5	10	2	1	1	1	0	1	0	0	2	5	1.6	10
5-Sep	5	Z	6	4	7	6	3	5	7	5	5	12	11	8	7	6	5	8	10	7	5	12	9	7	6.9	12
6-Sep	8	Z	14	14	13	1	1	1	4	5	8	13	17	20	15	11	4	2	1	0	0	0	0	0	6.6	20
7-Sep	0	Z	0	0	0	0	1	1	2	0	0	2	1	8	10	14	14	1	1	3	8	7	10	8	4.0	14
8-Sep	9	Z	6	15	8	7	20	25	3	3	7	5	2	4	2	2	7	1	0	0	1	2	3	4	5.9	25
9-Sep	9	Z	12	14	11	10	19	8	4	C	C	C	C	C	2	2	1	1	1	1	2	5	3	8	6.4	19
10-Sep	26	Z	19	23	6	11	6	4	3	7	21	6	1	1	1	1	1	1	3	1	3	2	2	0	6.4	26
11-Sep	1	Z	5	1	1	2	1	1	1	4	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1.4	5
12-Sep	1	Z	3	1	1	3	6	9	9	4	5	7	7	7	9	8	18	8	4	5	3	6	6	5	5.9	18
13-Sep	6	Z	7	4	4	2	4	6	39	8	3	4	18	21	12	9	7	8	8	7	8	8	20	26	10.4	39
14-Sep	10	Z	5	2	2	1	2	1	1	2	13	12	2	1	1	0	0	1	1	6	59	50	29	41	10.5	59
15-Sep	26	Z	4	1	1	2	4	3	5	11	12	24	47	25	10	3	4	2	3	3	2	1	0	0	8.4	47
16-Sep	0	Z	1	1	1	1	2	3	1	0	2	4	5	3	3	2	1	2	6	1	1	2	2	4	2.1	6
17-Sep	2	Z	3	2	4	4	5	5	6	7	10	10	11	9	12	9	9	7	5	3	7	8	6	10	6.8	12
18-Sep	6	Z	2	1	1	1	1	98	152	27	13	12	C	C	C	C	4	5	7	8	7	7	8	9	19.3	152
19-Sep	16	Z	36	24	17	14	4	2	3	1	1	0	0	0	0	0	2	0	0	2	1	3	4	2	5.9	36
20-Sep	6	Z	1	5	4	4	0	4	9	6	4	3	1	1	1	3	8	9	2	1	2	1	2	1	3.3	9
21-Sep	2	Z	1	1	1	2	8	6	4	2	2	1	1	0	0	0	1	1	3	1	1	1	2	10	2.2	10
22-Sep	10	Z	5	10	10	16	9	6	3	1	1	1	1	1	1	0	1	0	0	0	0	1	1	1	3.4	16
23-Sep	0	Z	8	7	9	11	21	41	83	77	29	18	12	6	3	4	3	3	5	9	10	16	23	25	18.4	83
24-Sep	79	Z	17	9	7	12	14	25	50	18	24	13	6	6	4	5	5	7	10	13	31	18	4	3	16.5	79
25-Sep	3	Z	2	1	1	1	2	3	1	1	4	4	6	4	2	5	5	0	0	0	1	0	1	0	2.0	6
26-Sep	0	Z	1	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	2
27-Sep	1	Z	1	1	2	6	11	9	4	2	9	8	4	2	1	1	2	8	15	11	15	10	5	2	5.7	15
28-Sep	1	Z	2	4	7	10	10	8	7	4	5	3	1	1	1	1	1	1	1	16	13	3	2	3	4.6	16
29-Sep	4	Z	27	37	39	37	26	18	17	15	14	10	7	6	3	5	3	1	1	1	2	2	1	1	12.1	39
30-Sep	2	Z	2	2	2	2	7	10	11	11	11	25	22	5	3	1	7	9	1	1	1	1	1	0	5.9	25

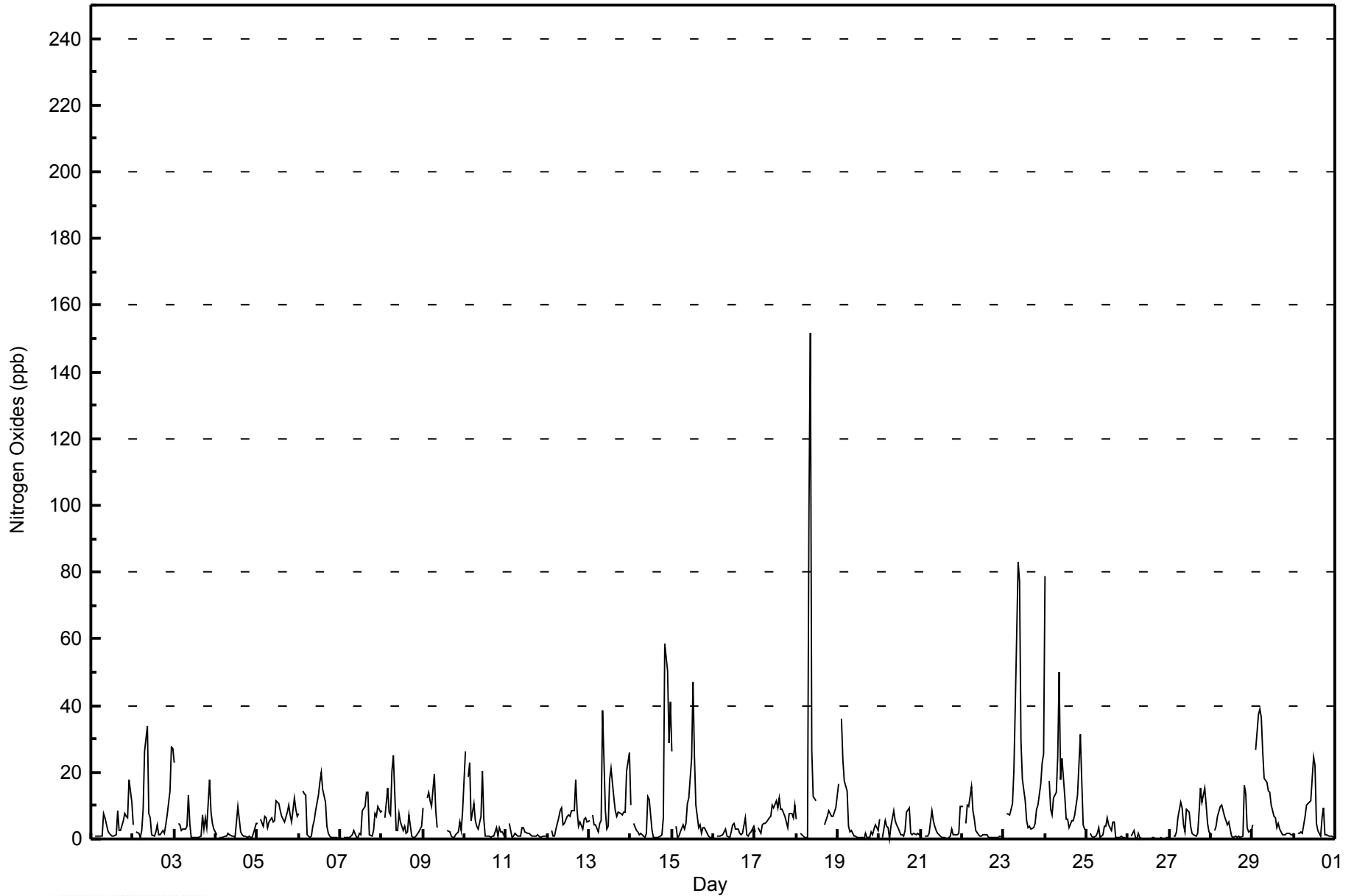
8.7	--	6.5	6.4	5.4	5.8	6.7	11.4	16.0	8.1	7.4	6.9	6.9	5.5	3.9	3.6	4.1	3.2	3.5	4.1	7.2	6.5	6.6	7.3		Diurnal Average
79	--	36	37	39	37	26	98	152	77	29	25	47	25	15	14	18	9	15	16	59	50	29	41		Diurnal Maximum

Z - zerospan C - Calibration



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	637	93.54	93.54
21 - 40	33	4.85	98.38
41 - 80	8	1.17	99.56
81 - 159	3	0.44	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - September 2014

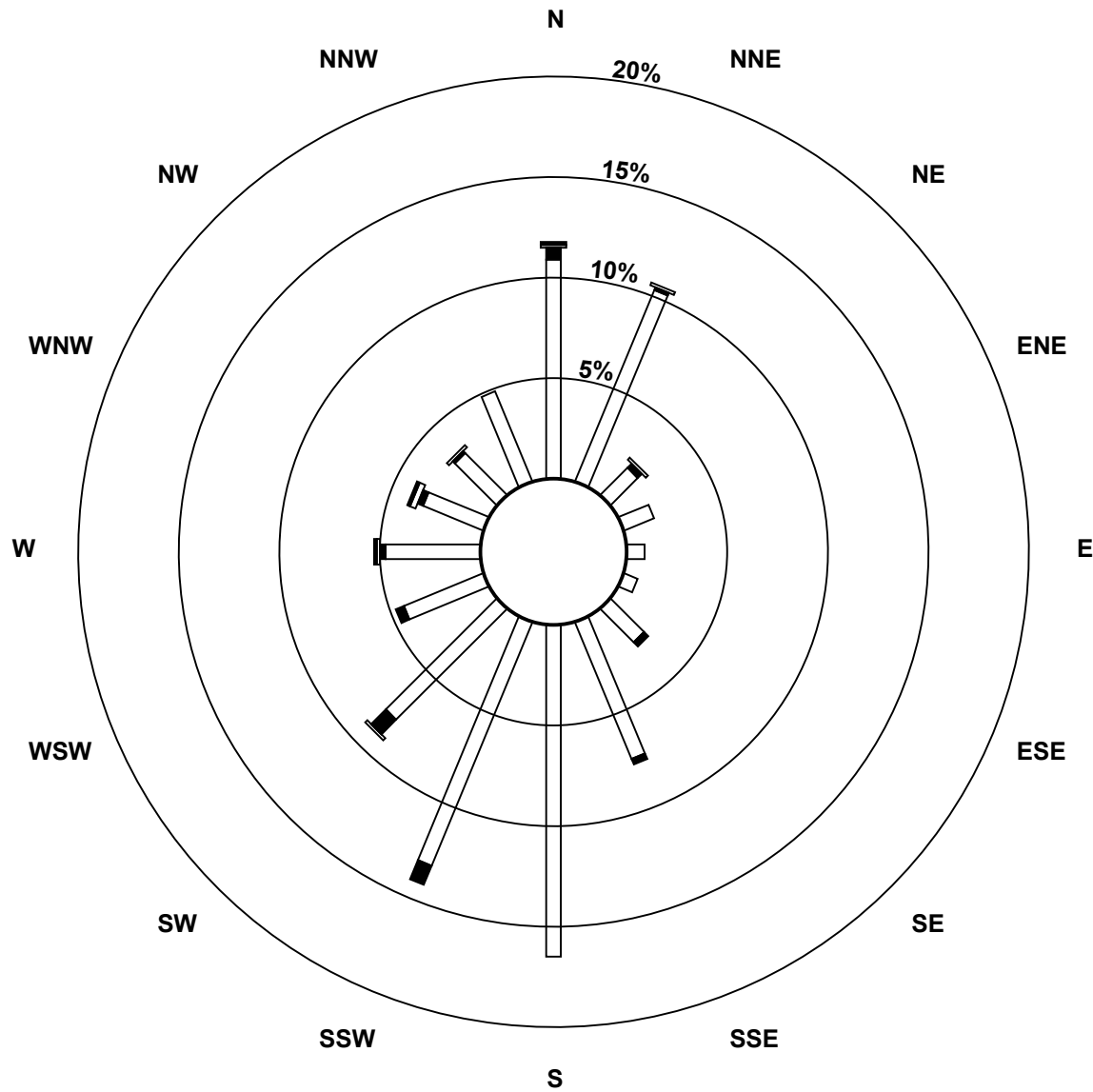
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	74	70	13	11	6	5	16	50	112	89	53	29	32	22	20	33	635
21 - 40	4	1	2	0	0	0	2	2	0	7	7	3	2	2	1	0	33
11 - 80	1	1	1	0	0	0	0	0	0	0	1	0	1	2	1	0	8
81 - 159	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	80	72	16	11	6	5	18	52	112	96	61	32	36	27	22	33	679

Total Number of Valid Hours: 679

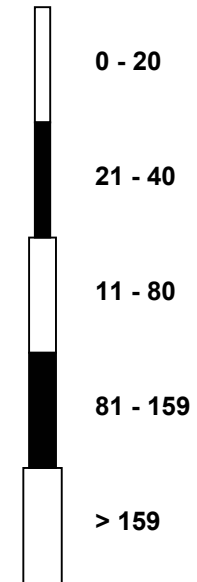
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

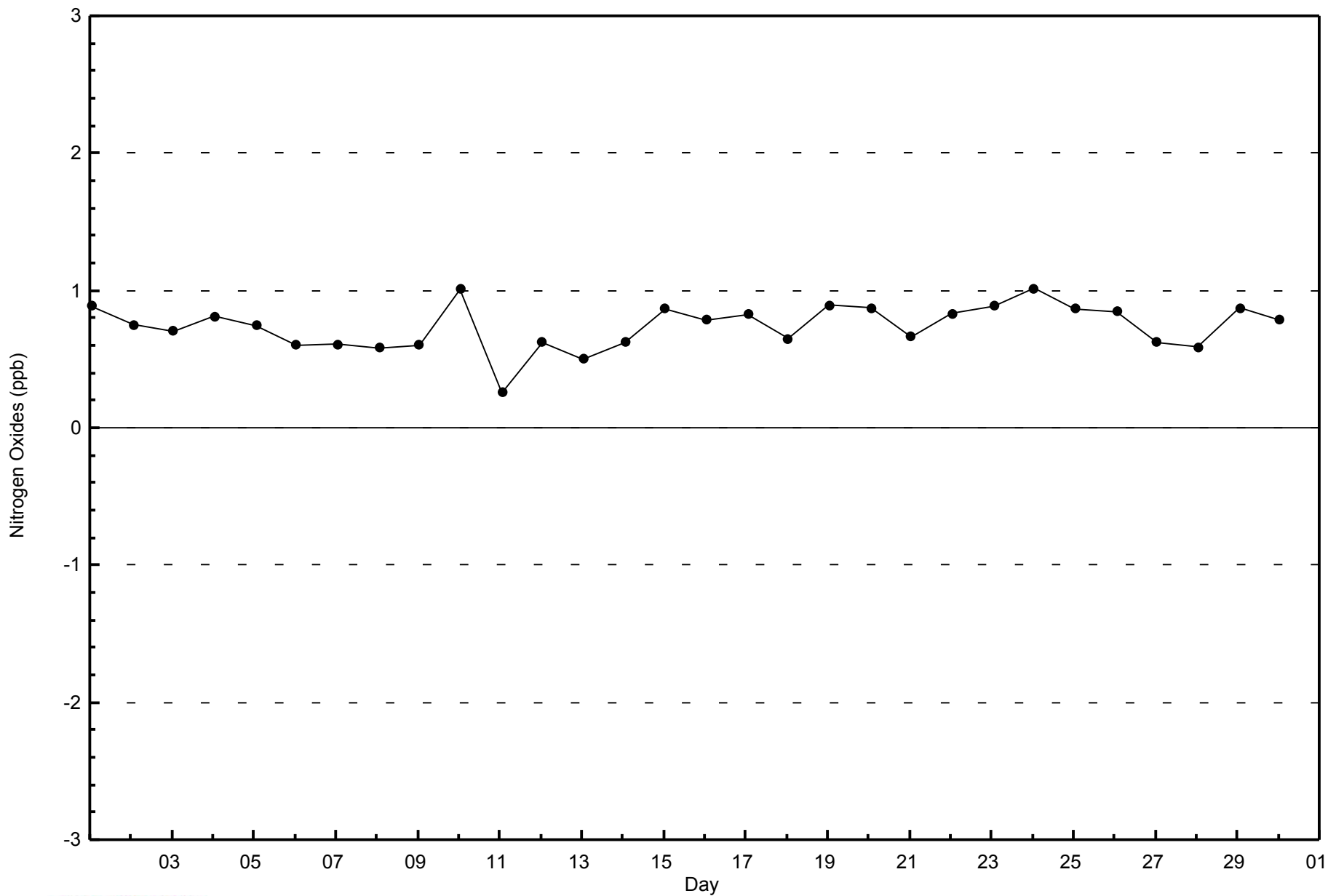
Nitrogen Oxides (NO_x) - ppb
CNRL Horizon (AMS 15)



Classes (ppb)



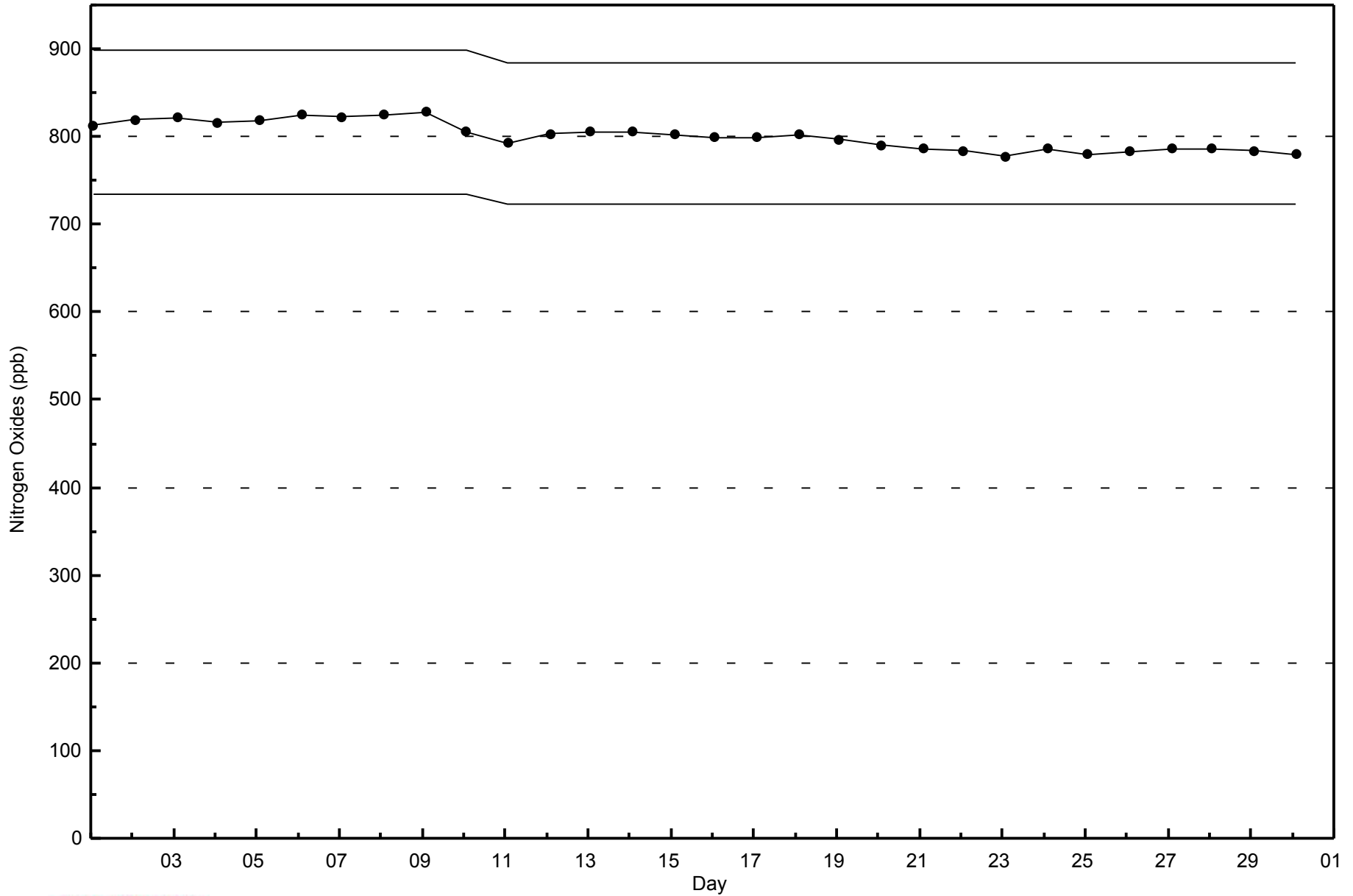
Total Number of Valid Hours: 679





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - September 2014





Summary of Hour Averages

CNRL Horizon - September 2014

Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 26.9 µg/m ³ on Sep 27 19:00	Maximum Daily Average: 10.2 µg/m ³ on Sep 18	Hours of Data:	719
Minimum Value: 0.0 µg/m ³ on Sep 7 00:00	Minimum Daily Average: 0.7 µg/m ³ on Sep 26	Hours of Missing Data:	1
Maximum Diurnal Average: 6.2 µg/m ³ at hour 23	Minimum Diurnal Average: 4.0 µg/m ³ at hour 15	Hours of Calibration:	0
Monthly Average: 5.16 µg/m ³	Percentiles: P ₁ = 0.3 P ₁₀ = 1.4 Q ₁ = 2.2 Median = 3.8 Q ₃ = 7.1 P ₉₀ = 11.2 P ₉₉ = 17.5	Percent Operational Time:	99.9

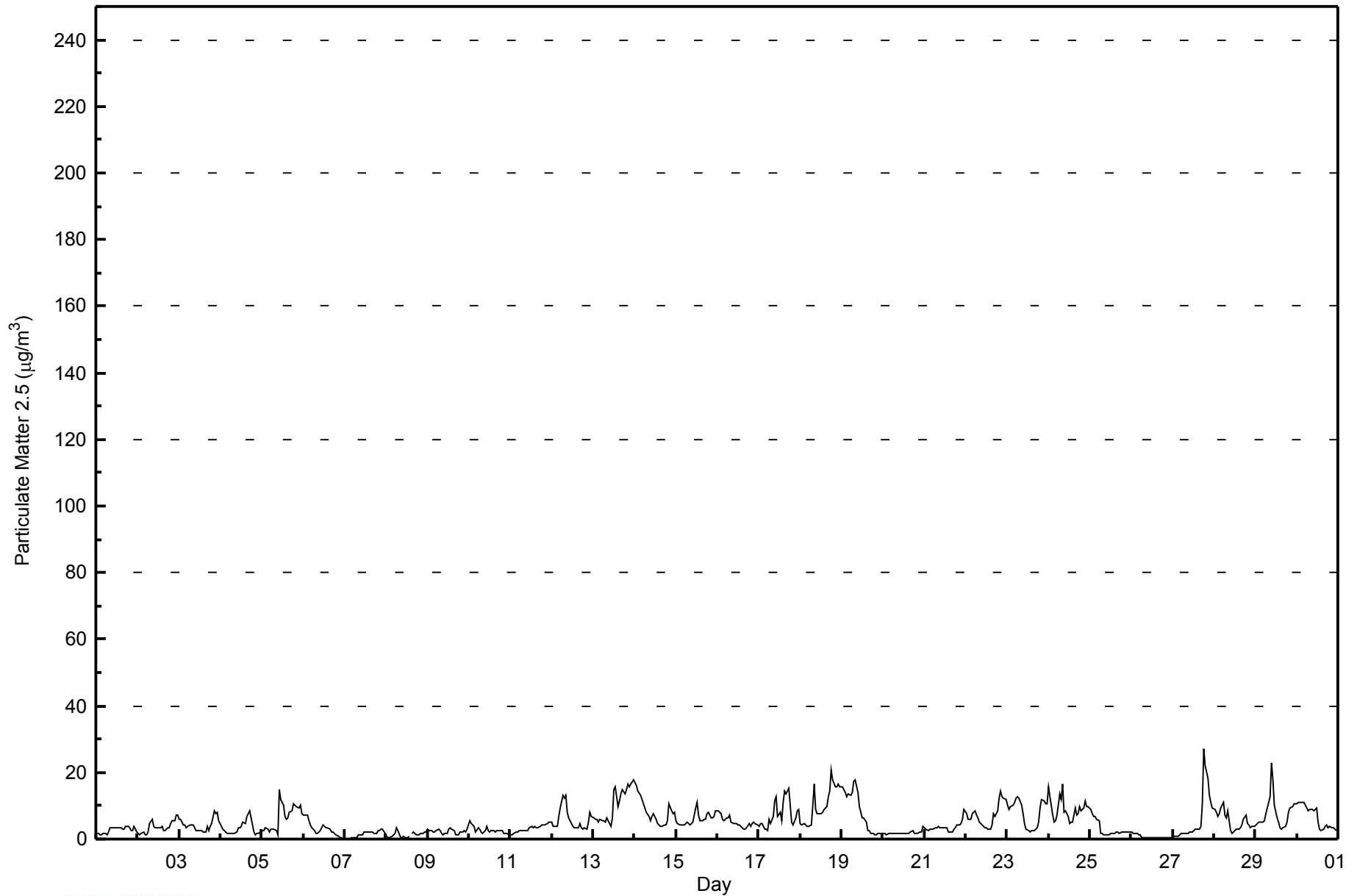
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Sep	1.6	1.5	1.3	1.4	1.6	1.6	1.4	2.2	3.6	3.5	3.5	3.5	3.5	3.3	3.4	3.0	3.1	3.9	3.6	3.6	2.7	2.6	3.8	2.1	2.7	3.9																							
2-Sep	1.5	1.2	1.7	2.0	1.4	1.4	2.3	4.5	5.8	3.7	3.5	3.4	3.3	3.3	3.8	2.6	2.5	3.2	3.5	4.8	5.7	5.7	7.1	7.2	3.6	7.2																							
3-Sep	6.1	6.0	4.4	4.2	3.5	3.7	4.0	4.3	4.4	3.2	2.7	2.6	2.6	2.2	2.3	3.6	2.7	3.8	4.5	8.4	7.5	8.0	5.5	4.3	8.4																								
4-Sep	3.8	2.8	2.6	2.1	1.7	1.7	1.8	1.9	1.8	1.9	3.2	3.2	4.0	5.0	4.6	6.6	7.6	8.7	4.3	1.9	1.3	1.5	1.7	2.2	3.3	8.7																							
5-Sep	2.6	2.6	3.2	2.8	2.2	2.9	3.0	2.8	2.4	1.2	15.0	11.7	10.0	6.6	5.9	6.2	8.2	8.5	10.8	10.2	9.7	9.3	10.0	7.5	6.5	15.0																							
6-Sep	7.1	7.3	7.0	5.4	4.3	3.4	2.6	1.7	1.9	2.1	2.7	4.3	3.9	3.4	3.3	2.9	2.3	2.1	1.7	1.3	0.8	0.5	0.3	0.0	3.0	7.3																							
7-Sep	0.0	0.0	0.0	0.0	0.3	0.3	0.4	0.6	1.1	1.2	1.1	2.2	2.3	2.2	2.2	2.2	2.2	1.6	1.8	2.3	2.5	2.9	2.9	1.5	1.4	2.9																							
8-Sep	0.8	0.4	0.6	1.0	1.1	1.8	3.2	2.5	0.5	0.4	0.9	0.5	0.6	0.8	M	1.9	1.9	1.1	1.1	1.3	1.6	1.6	2.2	2.2	1.3	3.2																							
9-Sep	2.8	2.6	2.5	2.3	2.2	2.4	2.8	2.7	1.8	1.5	1.6	1.7	2.8	3.3	3.0	2.6	1.4	1.5	1.4	1.9	2.0	2.4	2.0	3.1	2.3	3.3																							
10-Sep	5.6	4.7	4.1	4.0	2.1	3.2	2.9	1.9	1.9	2.6	4.0	2.7	2.3	2.4	2.4	2.2	2.4	2.4	2.6	2.6	1.8	1.5	1.6	1.4	2.7	5.6																							
11-Sep	1.4	1.4	1.8	2.0	2.2	2.4	2.4	2.4	2.5	2.6	2.7	3.3	3.6	3.3	4.0	3.3	3.2	3.7	4.1	4.2	4.4	4.8	4.9	4.9	3.1	4.9																							
12-Sep	5.1	3.8	3.9	3.7	6.8	9.3	13.2	12.2	13.0	8.2	6.2	4.8	3.9	3.4	3.6	3.4	4.7	3.5	3.1	3.4	3.2	5.2	8.1	6.8	5.9	13.2																							
13-Sep	6.4	6.1	5.9	5.1	5.7	5.4	5.6	5.1	6.5	4.6	3.8	6.1	14.8	15.7	9.6	11.4	13.6	14.9	13.4	14.9	16.6	15.6	16.5	17.6	10.0	17.6																							
14-Sep	16.8	16.0	14.3	13.1	11.9	10.5	9.3	8.0	6.8	5.6	7.0	7.5	5.8	4.5	4.4	4.0	3.6	4.1	4.4	5.7	10.6	8.5	7.8	8.2	8.3	16.8																							
15-Sep	5.4	4.6	4.0	4.2	4.3	4.4	4.9	4.6	4.2	4.8	5.2	9.3	11.2	7.2	5.7	5.4	5.9	5.9	7.4	8.2	6.4	6.5	6.8	8.6	6.1	11.2																							
16-Sep	8.7	8.1	7.7	5.9	5.6	6.4	6.4	7.3	5.3	4.8	4.8	4.9	4.1	4.2	3.5	3.0	2.9	3.3	4.6	3.9	4.7	5.1	4.6	4.4	5.2	8.7																							
17-Sep	3.7	4.6	4.6	2.9	2.8	2.6	5.9	4.5	6.7	11.5	12.8	6.7	8.0	5.4	11.2	14.4	13.5	15.4	10.1	4.9	4.1	6.3	8.6	8.8	7.5	15.4																							
18-Sep	4.6	4.4	4.8	4.1	3.8	4.0	4.1	10.1	16.4	8.7	7.6	7.5	7.7	8.0	8.9	9.9	12.6	14.5	21.0	17.7	15.9	15.7	16.5	15.7	10.2	21.0																							
19-Sep	15.7	14.7	14.1	12.9	13.4	13.1	14.1	17.3	18.0	14.0	9.9	8.1	6.5	6.2	5.2	2.7	2.5	1.7	1.5	1.4	1.5	1.6	1.6	1.5	8.3	18.0																							
20-Sep	1.6	1.6	1.5	1.7	1.6	1.6	1.5	1.8	1.9	1.8	1.9	1.8	1.5	1.6	1.6	1.8	2.1	2.4	1.8	1.8	1.8	1.9	2.0	3.8	1.9	3.8																							
21-Sep	3.3	2.8	2.6	2.8	2.9	2.9	3.3	3.4	3.8	3.6	3.5	3.3	3.5	3.4	2.3	1.9	1.9	3.0	3.5	4.3	4.1	4.7	6.0	8.9	3.6	8.9																							
22-Sep	7.8	5.9	6.0	6.1	7.6	8.4	7.1	6.5	5.1	4.1	3.7	3.3	3.4	2.9	2.9	4.2	7.4	6.8	8.5	12.2	14.5	12.5	12.1	11.7	7.1	14.5																							
23-Sep	10.2	8.9	9.8	10.3	10.9	12.2	12.8	12.3	10.0	7.8	4.6	3.1	2.4	2.0	2.6	2.7	2.4	3.4	5.2	9.4	11.9	11.4	10.6	10.8	7.8	12.8																							
24-Sep	15.7	12.8	7.0	5.1	5.5	7.1	13.7	11.9	16.7	8.0	8.4	6.7	4.7	5.0	5.2	9.2	7.1	7.8	9.6	8.6	9.2	11.4	9.9	9.7	9.0	16.7																							
25-Sep	8.7	7.6	6.9	6.6	6.1	5.6	1.7	1.6	1.5	1.4	1.4	1.4	1.5	1.7	1.7	1.9	2.1	1.9	2.0	2.1	2.0	2.0	2.0	2.0	3.1	8.7																							
26-Sep	1.9	1.7	1.6	1.5	1.4	1.3	0.5	0.4	0.4	0.2	0.3	0.4	0.3	0.3	0.4	0.5	0.4	0.4	0.4	0.4	0.3	0.4	0.5	0.6	0.7	1.9																							
27-Sep	0.6	0.8	1.0	1.1	1.3	1.6	1.5	1.8	1.7	1.5	2.1	2.3	2.3	3.0	2.9	3.2	3.9	10.6	26.9	22.1	18.0	13.3	10.9	9.3	6.0	26.9																							
28-Sep	8.9	8.0	6.7	7.8	9.1	11.2	7.0	6.3	8.4	2.5	1.9	2.3	2.6	2.8	3.1	3.2	4.3	6.0	7.3	4.6	4.2	3.5	3.8	4.0	5.4	11.2																							
29-Sep	4.1	4.6	4.9	5.1	5.1	5.4	7.6	9.3	12.7	22.9	17.6	10.0	6.5	5.0	3.3	2.9	3.5	3.9	5.1	8.1	9.1	9.8	10.6	10.5	7.8	22.9																							
30-Sep	10.8	11.1	11.2	11.0	10.9	10.1	8.5	8.7	8.9	8.9	8.6	9.3	5.2	2.9	2.6	2.8	3.8	4.2	3.5	3.6	3.3	3.4	3.0	2.4	6.6	11.2																							
																								5.8	5.3	4.9	4.6	4.6	4.9	5.2	5.4	5.9	5.0	5.1	4.6	4.5	4.1	4.0	4.1	4.6	5.1	5.9	5.9	6.1	6.0	6.2	6.1	Diurnal Average	
																								16.8	16.0	14.3	13.1	13.4	13.1	14.1	17.3	18.0	22.9	17.6	11.7	14.8	15.7	11.2	14.4	13.6	15.4	26.9	22.1	18.0	15.7	16.5	17.6	Diurnal Maximum	

M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - September 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - September 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	433	60.22	60.22
6 - 15	219	30.46	90.68
16 - 25	23	3.20	93.88
26 - 80	1	0.14	94.02
> 81.0	0	0.00	94.02

Total Number of Valid Hours: 719

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
CNRL Horizon - September 2014

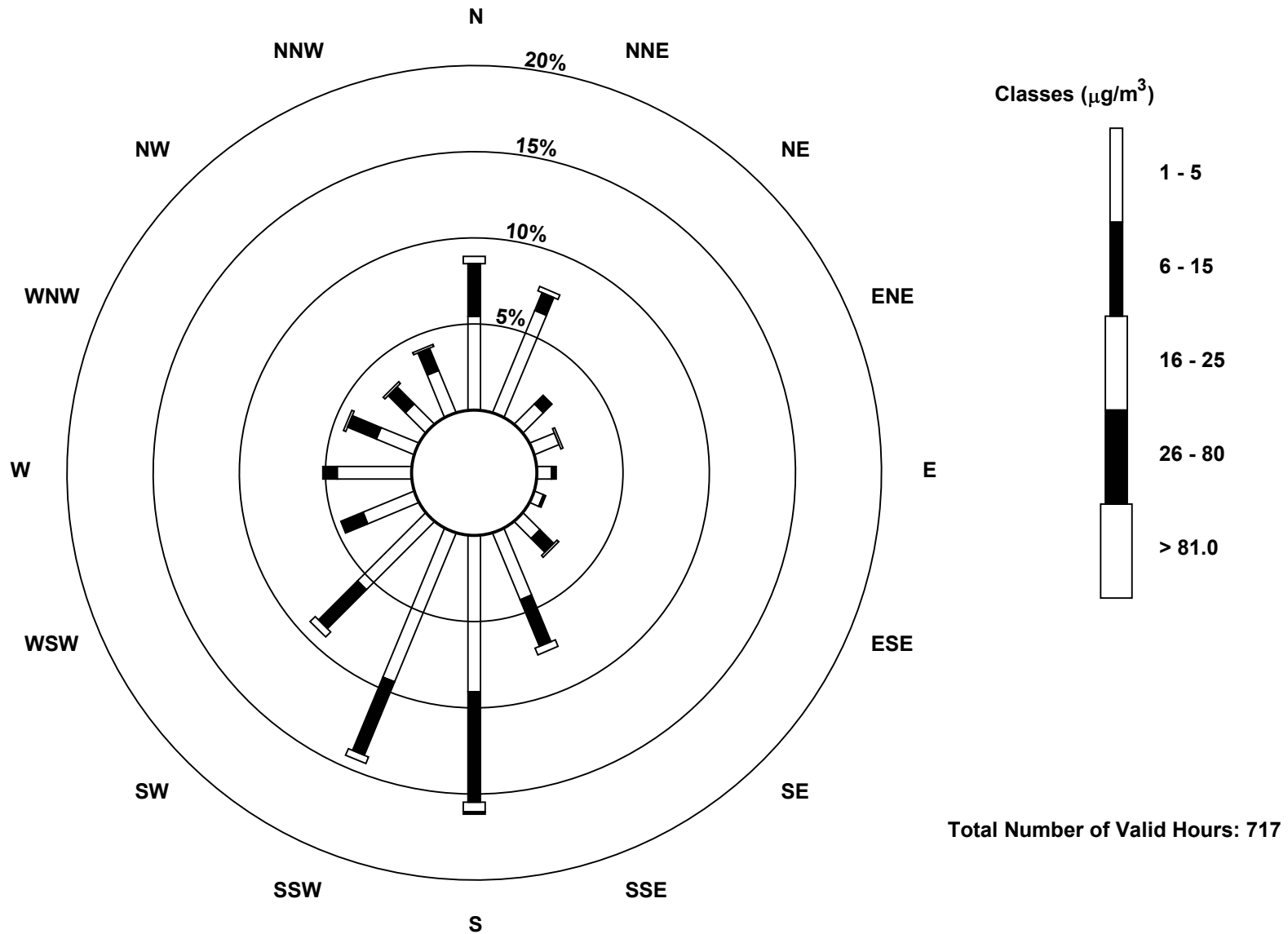
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	39	46	12	11	6	4	10	30	65	67	40	23	31	17	12	19	432
6 - 15	22	8	5	0	2	1	8	21	46	33	23	10	6	13	10	10	218
16 - 25	3	2	0	1	0	0	1	3	4	3	3	0	0	1	1	1	23
26 - 80	0	0	0	0	0	0	0	0	1	0	0	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
Totals	64	56	17	12	8	5	19	54	116	103	66	33	37	31	23	30	674

Total Number of Valid Hours: 717

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon (AMS 15)



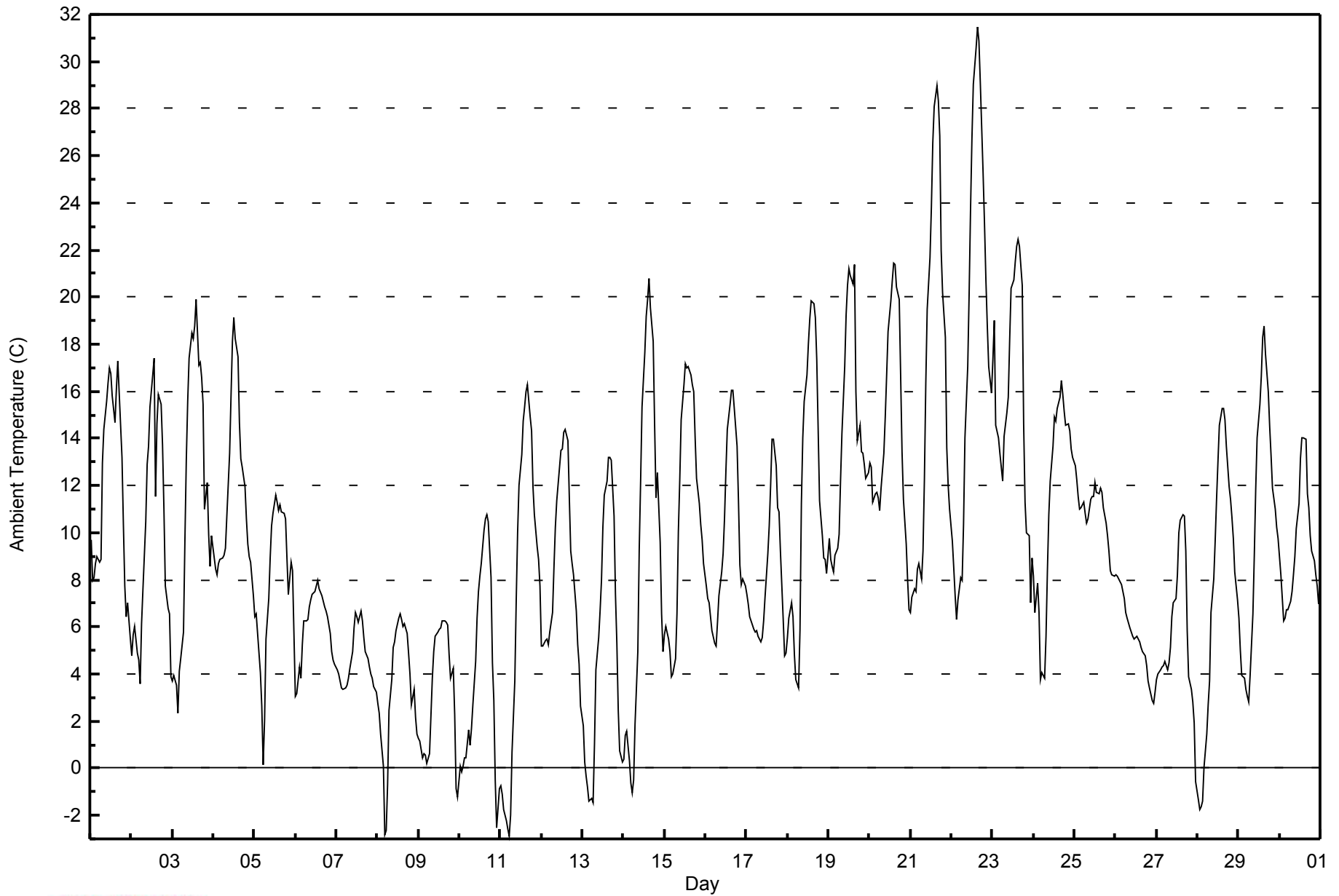


Maximum Value: 31.5 C on Sep 22 16:00		Maximum Daily Average: 18.3 C on Sep 22		Hours in Service: 720																						
Minimum Value: -2.9 C on Sep 11 06:00		Minimum Daily Average: 3.2 C on Sep 9		Hours of Data: 720																						
Maximum Diurnal Average: 15.3 C at hour 16		Minimum Diurnal Average: 4.8 C at hour 6		Hours of Missing Data: 0																						
Monthly Average: 9.46 C		Percentiles: P ₁ = -1.8 P ₁₀ = 2.7 Q ₁ = 5.4 Median = 8.7 Q ₃ = 13.4 P ₉₀ = 17.3 P ₉₉ = 27.8		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	9.7	8.0	8.1	8.7	9.0	8.7	8.8	12.9	14.4	15.6	16.3	17.0	16.8	15.8	14.7	16.1	17.3	15.9	13.2	10.3	7.7	6.4	7.0	5.5	11.8	17.3
2-Sep	4.8	5.7	6.0	4.9	4.6	3.6	6.2	7.6	10.4	12.9	13.7	15.3	16.7	17.4	11.5	14.6	15.9	15.5	13.7	11.0	7.7	6.8	6.6	3.9	9.9	17.4
3-Sep	3.7	3.9	3.5	2.4	4.1	4.7	5.8	9.7	13.1	15.6	17.4	18.5	18.3	18.8	19.9	17.1	17.2	16.6	15.4	11.0	12.1	9.9	8.5	9.9	11.5	19.9
4-Sep	8.9	8.4	8.2	8.7	8.9	8.9	9.1	9.3	10.7	13.4	15.8	18.1	19.1	18.2	17.5	14.7	13.1	12.8	12.0	10.6	9.5	9.0	8.7	7.3	11.7	19.1
5-Sep	6.4	6.6	5.7	4.1	2.6	0.2	2.0	5.5	7.2	8.9	10.3	10.9	11.6	11.3	10.9	11.2	10.9	10.8	10.6	8.9	7.4	8.8	8.4	5.7	7.8	11.6
6-Sep	3.0	3.2	4.3	3.8	5.2	6.3	6.3	6.3	6.9	7.2	7.4	7.5	7.7	8.0	7.6	7.3	7.1	6.9	6.6	6.4	5.7	4.9	4.6	4.4	6.0	8.0
7-Sep	4.2	4.0	3.7	3.4	3.3	3.4	3.5	3.8	4.3	4.9	6.0	6.6	6.4	6.2	6.7	6.3	5.5	4.9	4.6	4.3	4.0	3.8	3.4	3.2	4.6	6.7
8-Sep	2.7	2.4	1.4	0.1	-2.8	-2.7	-0.7	2.4	3.7	5.1	5.3	5.8	6.4	6.5	6.3	6.0	6.1	5.7	4.9	4.0	2.7	3.3	2.1	1.5	3.3	6.5
9-Sep	1.3	1.1	0.4	0.6	0.6	0.2	0.6	2.2	3.8	4.9	5.6	5.8	5.9	6.0	6.3	6.3	6.2	6.1	4.8	3.8	4.2	2.3	-0.8	-1.2	3.2	6.3
10-Sep	0.1	-0.2	0.1	0.4	0.5	1.6	1.0	1.7	2.7	4.5	6.4	7.5	8.1	8.7	10.1	10.6	10.8	10.5	8.1	4.5	2.9	-0.5	-2.5	-0.8	4.0	10.8
11-Sep	-0.7	-1.1	-1.8	-2.2	-2.6	-2.9	-2.0	0.6	3.7	7.1	10.0	12.0	13.3	14.7	15.3	16.0	16.3	14.9	14.3	11.9	10.8	9.4	8.9	7.7	7.2	16.3
12-Sep	5.2	5.2	5.4	5.5	5.2	5.8	6.6	8.5	10.2	11.4	12.1	13.5	13.6	14.3	14.4	13.9	11.5	9.2	8.7	8.2	6.6	5.2	4.4	2.6	8.6	14.4
13-Sep	1.8	0.2	-0.3	-0.8	-1.4	-1.3	-1.4	1.1	4.2	5.5	6.7	8.0	10.2	11.6	12.2	13.2	13.2	13.1	10.7	7.4	5.3	2.5	0.8	0.3	5.1	13.2
14-Sep	0.4	1.4	1.6	0.3	-0.6	-1.0	-0.5	1.9	4.9	9.3	12.2	15.3	17.6	19.2	19.9	20.8	19.5	18.1	14.6	11.5	12.5	9.6	6.6	4.9	9.2	20.8
15-Sep	5.6	6.0	5.5	4.9	3.9	4.0	4.7	6.5	10.0	12.3	14.8	16.3	17.2	17.0	17.0	16.7	16.3	16.0	14.0	12.3	11.2	10.4	9.7	8.7	10.9	17.2
16-Sep	7.8	7.2	7.1	6.4	5.8	5.3	5.2	6.2	7.3	8.3	9.1	10.6	12.6	14.4	15.4	16.0	16.1	15.3	13.6	11.3	8.6	7.8	8.0	7.7	9.7	16.1
17-Sep	7.4	6.9	6.5	6.1	5.9	5.8	5.8	5.6	5.4	5.5	6.2	7.3	9.1	10.3	12.0	14.0	14.0	12.9	11.0	10.9	9.2	6.3	4.8	4.9	8.1	14.0
18-Sep	5.6	6.4	7.0	6.4	4.8	3.8	3.4	5.8	11.2	14.0	15.6	16.7	18.0	19.1	19.8	19.7	19.1	17.4	14.4	11.4	9.9	8.9	8.9	8.3	11.5	19.8
19-Sep	9.8	8.8	8.6	8.3	9.1	9.3	10.0	12.2	14.2	17.0	19.3	20.5	21.2	20.9	20.5	21.4	16.0	13.9	14.5	13.5	13.4	12.9	12.3	12.6	14.2	21.4
20-Sep	13.0	12.8	11.3	11.7	11.7	11.5	10.9	11.9	13.4	14.9	16.7	18.5	19.9	20.6	21.4	21.4	20.5	19.9	16.7	13.4	11.4	9.5	8.0	6.7	14.5	21.4
21-Sep	6.6	7.2	7.6	7.5	8.4	8.7	8.0	9.2	12.3	16.3	19.5	21.7	23.8	26.6	28.1	29.0	28.3	26.8	22.0	20.2	18.3	13.6	12.0	11.0	16.4	29.0
22-Sep	9.6	8.5	7.3	6.3	7.2	8.1	8.0	10.3	14.0	17.0	20.1	23.7	26.7	29.0	30.6	31.5	30.9	29.1	25.2	23.1	20.7	18.8	17.1	15.9	18.3	31.5
23-Sep	17.3	19.0	14.6	14.0	13.4	12.8	12.2	14.1	15.1	15.7	18.2	20.4	20.7	21.5	22.2	22.5	22.2	20.5	14.6	11.3	10.0	9.9	7.0	8.9	15.7	22.5
24-Sep	8.2	6.6	7.9	6.6	3.8	4.0	3.8	5.6	8.4	10.8	12.2	13.7	14.9	14.7	15.3	15.8	16.5	15.9	15.1	14.6	14.6	14.3	13.6	13.2	11.3	16.5
25-Sep	12.8	12.2	11.5	11.0	11.0	11.3	10.8	10.4	10.6	11.4	11.5	11.5	12.1	11.7	11.6	11.9	11.7	11.0	10.4	9.9	9.2	8.4	8.2	8.2	10.9	12.8
26-Sep	8.2	8.2	8.0	7.8	7.5	7.2	6.6	6.4	5.9	5.8	5.6	5.5	5.6	5.5	5.4	5.2	5.0	4.8	4.3	3.7	3.4	2.9	2.8	3.2	5.6	8.2
27-Sep	3.7	4.0	4.2	4.3	4.4	4.5	4.2	4.5	5.2	6.5	7.0	7.2	8.2	10.0	10.6	10.7	10.7	9.2	5.8	3.9	3.3	2.8	1.9	-0.6	5.7	10.7
28-Sep	-1.3	-1.8	-1.6	-1.4	0.1	1.4	2.7	3.7	6.6	8.0	9.7	11.4	13.0	14.6	15.3	15.3	14.8	13.7	12.0	11.4	10.7	9.8	8.4	7.2	7.6	15.3
29-Sep	6.4	5.0	3.9	3.8	3.4	3.1	2.8	3.9	6.5	9.1	11.9	14.0	15.4	16.6	18.3	18.8	17.6	16.0	14.5	13.3	11.9	11.0	10.3	9.8	10.3	18.8
30-Sep	9.0	8.2	6.2	6.3	6.7	6.7	7.1	7.5	8.2	9.0	10.2	11.2	13.1	14.0	14.0	14.0	11.7	11.1	9.9	9.2	8.8	8.2	7.7	7.0	9.4	14.0
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
CNRL Horizon - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
CNRL Horizon - September 2014

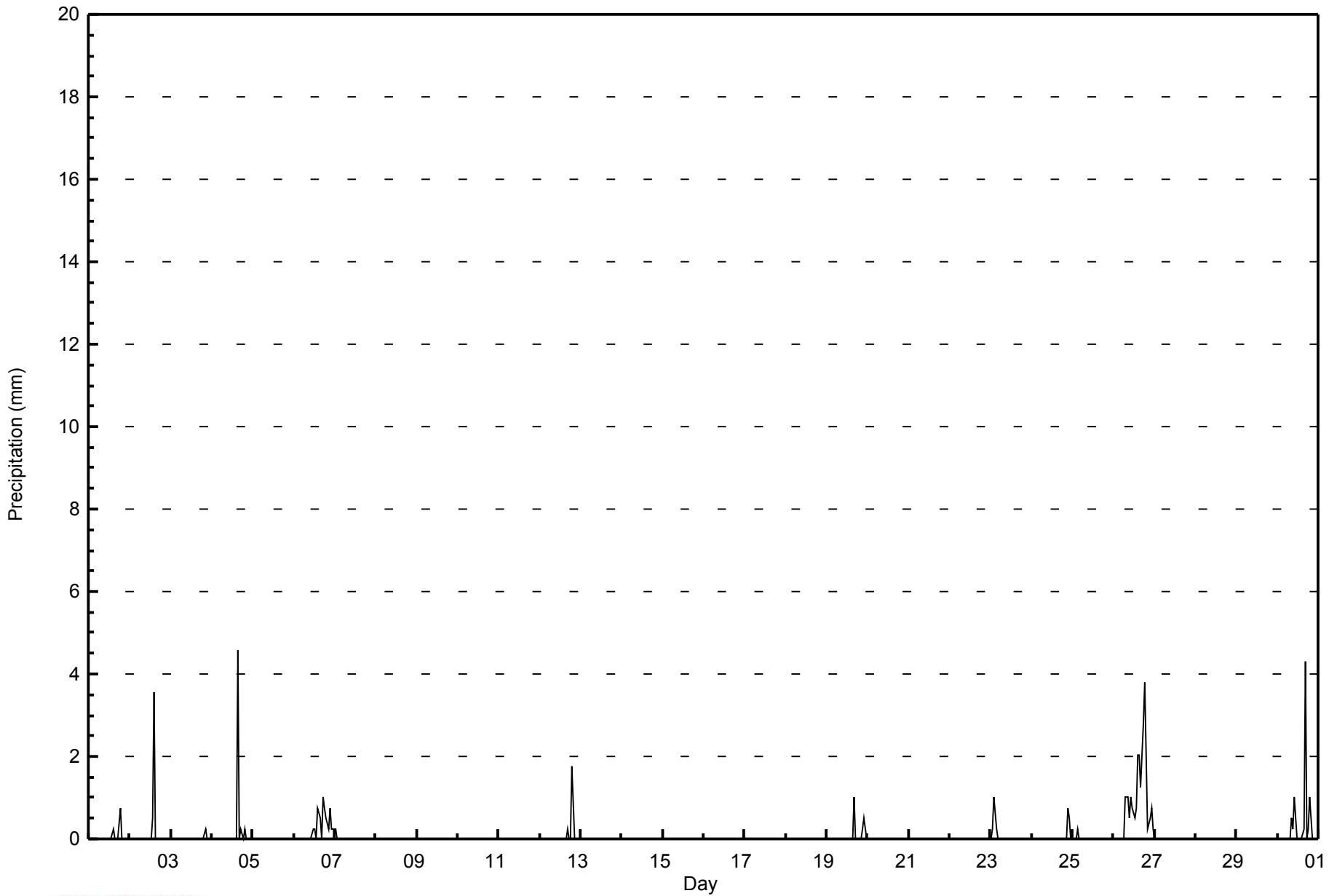
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	29	4.03	4.03
0 - 10	389	54.03	58.06
10 - 20	265	36.81	94.86
> 20	37	5.14	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 4.6 mm on Sep 4 16:00		Maximum Daily Total: 21.3 mm on Sep 26		Hours in Service: 720																						
Minimum Value: 0.0 mm on Sep 1 01:00		Minimum Daily Total: 0.0 mm on Sep 5		Hours of Data: 720																						
Maximum Diurnal Total: 7.4 mm at hour 16		Minimum Diurnal Total: 0.0 mm at hour 5		Hours of Missing Data: 0																						
Monthly Total: 52.07 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 2.0		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	0.0	0.3	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	1.0	0.8
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	0.5	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	3.6
3-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	0.3	0.0	0.0	0.0	0.3	0.3
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	4.6	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	5.1	4.6
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	0.3	0.3	0.0	0.8	0.5	0.0	1.0	0.8	0.5	0.3	0.8	0.3	0.3	5.6	1.0
7-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	0.0	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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
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	0.3	0.0	0.0	1.8	0.0	0.0	0.0	0.0	2.0	1.8
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
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	1.0	0.0	0.0	0.0	0.0	0.3	0.5	0.0	1.8	1.0
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
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	0.3	1.0	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	1.5	1.0
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	0.8	0.5	0.0	0.0	1.3	0.8
25-Sep	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
26-Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.5	1.0	0.8	0.5	0.8	2.0	2.0	1.3	2.8	3.8	2.0	0.3	0.5	0.8	0.3	21.3	3.8
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
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	0.5	0.3	1.0	0.0	0.0	0.0	0.0	0.3	4.3	0.0	0.3	1.0	0.0	0.0	0.0	0.0	7.6	4.3
																								Diurnal Average		
																								Diurnal Maximum		



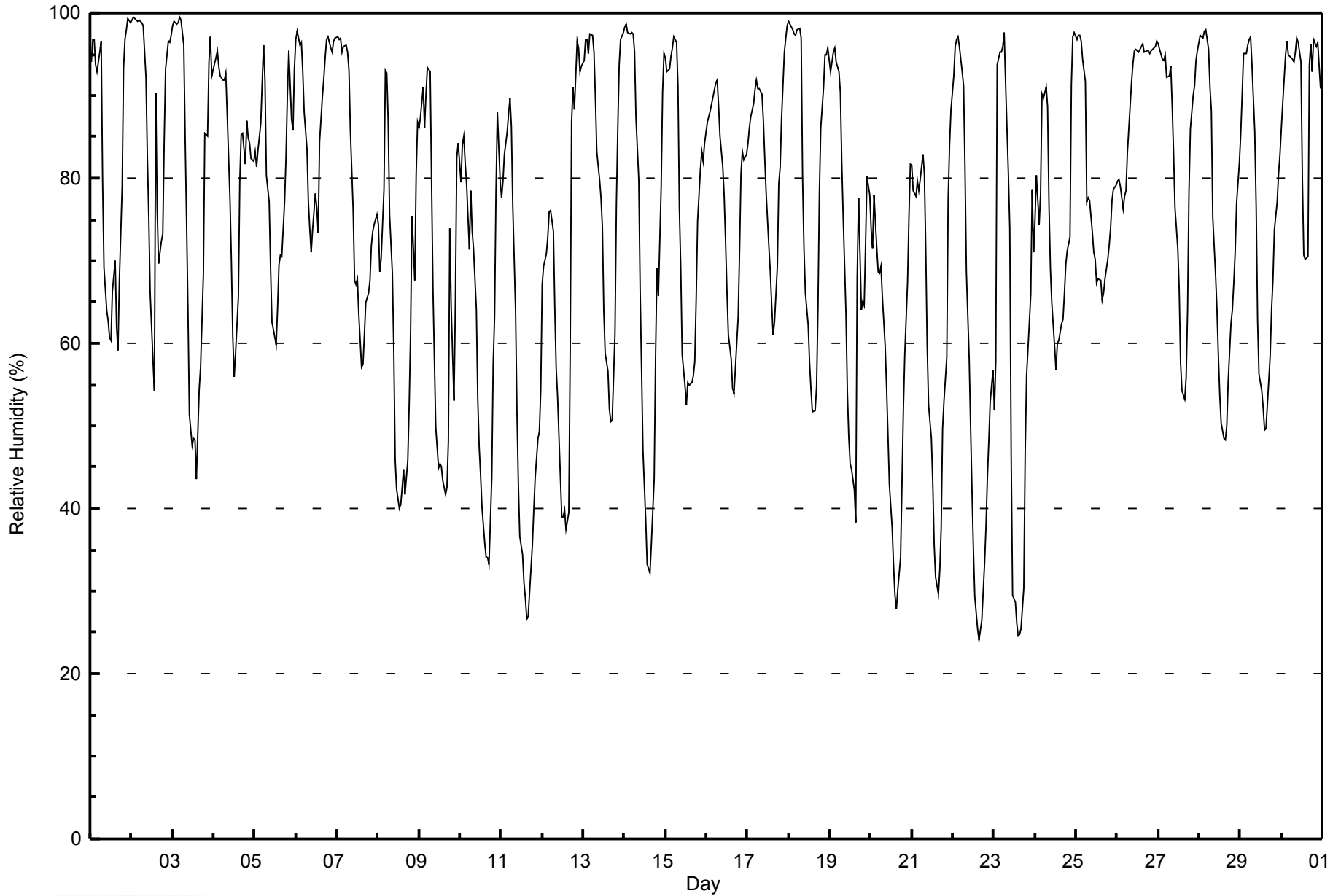


Maximum Value: 99 % on Sep 2 02:00																	Maximum Daily Average: 90.7 % on Sep 30																	Hours in Service: 720	
Minimum Value: 24 % on Sep 22 16:00																	Minimum Daily Average: 54.7 % on Sep 11																	Hours of Data: 720	
Maximum Diurnal Average: 91.3 % at hour 5																	Minimum Diurnal Average: 52.5 % at hour 16																	Hours of Missing Data: 0	
Monthly Average: 74.3 %																	Percentiles: P ₁ = 26 P ₁₀ = 45 Q ₁ = 60 Median = 78 Q ₃ = 93 P ₉₀ = 97 P ₉₉ = 99																	Hours of Calibration: 0	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Sep	94	97	97	94	93	95	97	80	69	64	63	61	60	66	70	62	59	68	79	93	97	98	99	99	81.4	99									
2-Sep	99	99	99	99	99	99	99	98	92	83	75	66	58	54	90	76	70	72	73	84	93	97	97	97	86.3	99									
3-Sep	98	99	99	99	99	99	96	85	75	64	51	48	48	44	54	57	63	68	85	85	94	97	92	77.0	99										
4-Sep	94	95	95	94	92	92	92	93	88	77	70	61	56	59	66	80	85	85	82	87	85	84	82	82	82.3	95									
5-Sep	83	81	83	87	92	96	92	80	77	69	63	62	60	64	70	71	70	77	82	90	95	87	86	93	79.6	96									
6-Sep	97	98	96	96	93	88	83	77	74	71	74	78	76	73	84	90	92	95	97	97	96	95	97	97	88.1	98									
7-Sep	97	97	97	95	96	96	95	93	86	76	68	67	68	63	57	57	61	65	66	68	72	74	74	76	77.7	97									
8-Sep	74	69	70	79	93	93	87	76	68	59	46	42	40	41	43	45	42	46	52	61	75	68	80	87	64.0	93									
9-Sep	86	87	91	86	90	93	93	79	67	58	50	45	45	45	43	42	42	48	74	64	53	65	83	84	67.3	93									
10-Sep	79	84	85	82	79	71	78	74	71	64	53	47	44	40	36	34	34	33	44	57	63	78	88	80	62.5	88									
11-Sep	78	80	83	86	88	90	86	77	64	52	43	37	34	31	29	27	27	33	36	40	44	48	49	54	54.7	90									
12-Sep	67	69	71	73	76	76	74	64	57	53	49	39	39	40	37	40	59	87	91	88	97	96	93	94	67.8	97									
13-Sep	94	97	97	95	97	97	95	90	83	80	78	74	64	59	57	52	51	51	61	77	86	94	97	98	80.1	98									
14-Sep	98	99	98	97	98	97	95	87	80	66	57	47	39	33	33	32	36	43	59	69	66	79	90	95	70.5	99									
15-Sep	95	93	93	95	96	97	96	91	76	69	59	55	53	55	55	55	56	58	65	75	81	83	82	84	75.7	97									
16-Sep	87	87	88	89	90	92	92	89	85	81	78	72	66	61	58	55	54	57	63	71	81	83	82	83	76.8	92									
17-Sep	84	86	87	89	91	92	91	91	90	87	82	78	72	69	64	61	63	69	79	81	87	95	97	98	82.7	98									
18-Sep	99	99	98	98	97	98	98	97	80	72	66	62	58	54	52	52	55	64	78	86	91	95	95	96	80.8	99									
19-Sep	93	94	95	96	94	93	90	82	75	64	54	49	45	45	42	38	68	78	64	65	65	72	80	78	71.6	96									
20-Sep	74	72	78	71	69	68	69	66	60	55	49	43	38	33	29	28	30	34	43	52	59	67	75	82	56.0	82									
21-Sep	82	79	78	80	78	80	83	81	71	60	52	49	43	36	32	30	33	38	50	53	58	78	84	88	62.2	88									
22-Sep	92	96	97	97	96	93	91	81	69	58	50	42	35	29	25	24	25	26	33	38	44	48	53	57	58.4	97									
23-Sep	52	58	94	95	95	96	98	92	81	74	46	30	29	26	25	25	30	47	56	59	66	79	71	60.3	98										
24-Sep	75	80	74	78	90	90	91	89	77	69	65	60	57	60	60	62	63	66	70	71	73	91	97	98	75.2	98									
25-Sep	97	97	97	97	94	92	77	78	77	73	71	70	67	68	68	65	66	68	70	72	74	77	79	79	78.1	97									
26-Sep	80	80	79	76	78	78	83	86	92	94	95	96	95	96	96	96	95	95	96	95	95	96	96	97	90.2	97									
27-Sep	96	96	94	94	95	92	92	94	89	83	76	71	67	58	54	53	56	64	78	86	90	91	94	95	81.7	96									
28-Sep	97	97	97	98	98	96	91	88	75	68	64	58	54	50	48	48	50	55	62	64	67	71	77	82	73.2	98									
29-Sep	85	90	95	95	96	97	97	94	86	76	63	56	54	52	49	50	53	58	64	68	74	77	81	83	74.7	97									
30-Sep	86	89	95	97	95	95	94	94	95	97	96	94	80	71	70	71	94	96	93	97	96	96	94	91	90.7	97									
87.1																	88.1																	Diurnal Average	
99																	99																	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
CNRL Horizon - September 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
CNRL Horizon - September 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	50	6.94	6.94
40 - 60	129	17.92	24.86
60 - 80	216	30.00	54.86
80 - 100	325	45.14	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

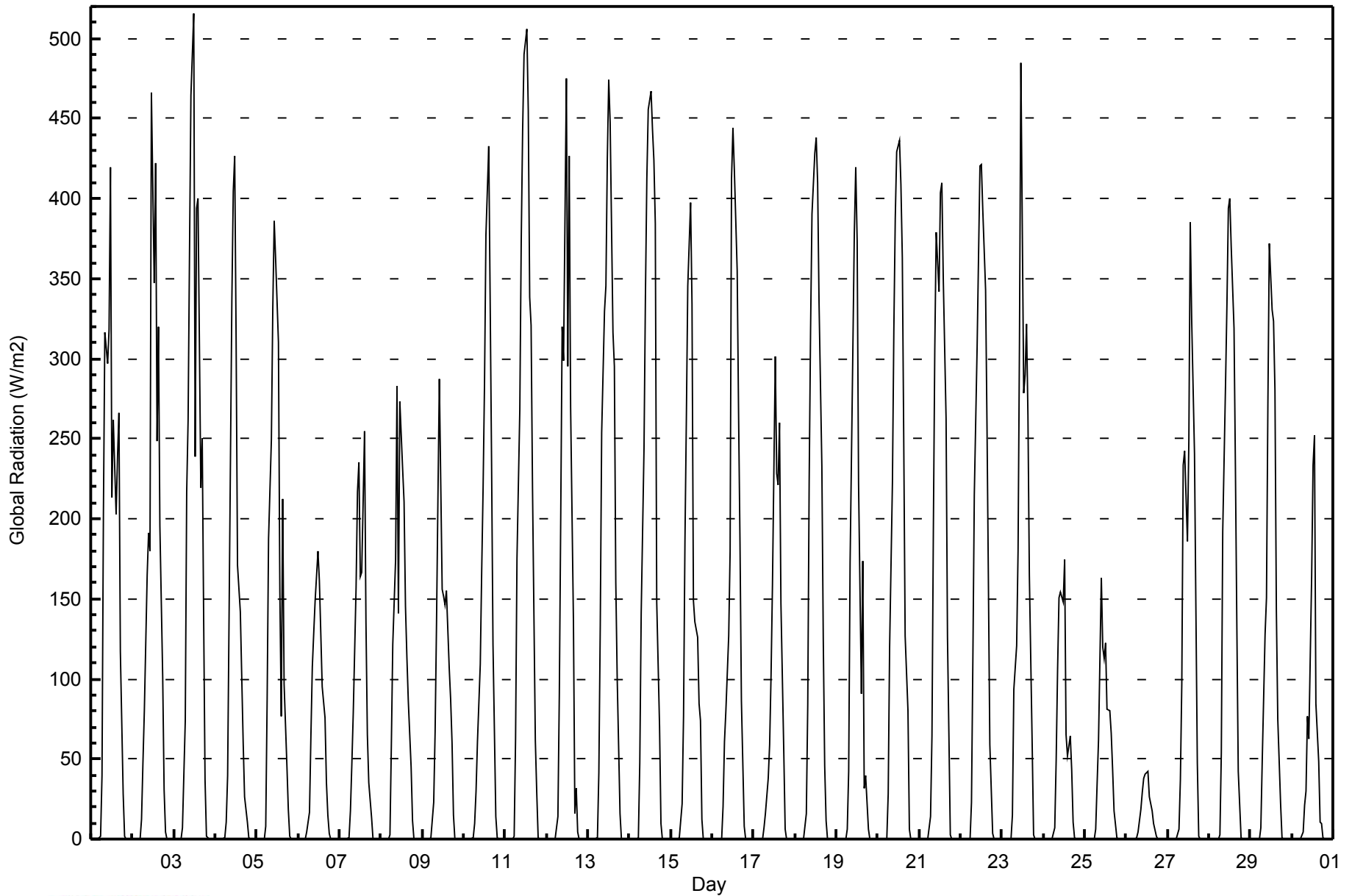


Maximum Value: 516 W/m2 on Sep 3 12:00		Maximum Daily Average: 156.0 W/m2 on Sep 11		Hours in Service: 720																						
Minimum Value: 0 W/m2 on Sep 29 23:00		Minimum Daily Average: 10.4 W/m2 on Sep 26		Hours of Data: 720																						
Maximum Diurnal Average: 333.7 W/m2 at hour 12		Minimum Diurnal Average: 0.0 W/m2 at hour 21		Hours of Missing Data: 0																						
Monthly Average: 96.9 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 11 Q ₃ = 164 P ₉₀ = 334 P ₉₉ = 462		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	2	39	203	316	297	318	419	214	262	203	239	266	117	28	2	0	0	0	0	122.0	419
2-Sep	0	0	0	0	0	12	48	80	164	191	180	467	347	422	249	320	195	101	31	4	0	0	0	0	117.2	467
3-Sep	0	0	0	0	0	7	74	216	262	367	464	516	239	394	400	220	250	140	37	2	0	0	0	0	149.5	516
4-Sep	0	0	0	0	0	1	11	40	137	336	405	427	314	171	142	101	61	26	11	0	0	0	0	0	90.9	427
5-Sep	0	0	0	0	0	8	87	187	250	331	386	363	310	154	77	212	97	46	19	1	0	0	0	0	105.4	386
6-Sep	0	0	0	0	0	4	17	64	107	129	149	179	161	129	95	75	36	15	3	0	0	0	0	0	48.5	179
7-Sep	0	0	0	0	0	1	17	47	78	157	217	236	164	167	255	136	66	35	13	0	0	0	0	0	66.2	255
8-Sep	0	0	0	0	0	2	59	122	174	283	141	273	231	210	145	113	87	45	11	0	0	0	0	0	79.1	283
9-Sep	0	0	0	0	0	1	23	67	135	213	287	156	151	146	155	106	88	60	15	0	0	0	0	0	66.9	287
10-Sep	0	0	0	0	0	1	10	30	61	109	168	220	284	377	433	336	235	122	15	1	0	0	0	0	100.0	433
11-Sep	0	0	0	0	0	2	63	175	268	373	442	490	506	455	338	321	219	62	29	1	0	0	0	0	156.0	506
12-Sep	0	0	0	0	0	0	14	91	202	320	299	475	296	427	270	136	16	32	5	0	0	0	0	0	107.5	475
13-Sep	0	0	0	0	0	1	41	133	254	330	345	424	475	448	316	295	160	100	16	0	0	0	0	0	139.1	475
14-Sep	0	0	0	0	0	1	48	141	244	340	413	455	467	444	424	385	148	71	10	0	0	0	0	0	149.6	467
15-Sep	0	0	0	0	0	1	22	77	186	262	345	397	334	149	135	126	85	74	12	0	0	0	0	0	91.9	397
16-Sep	0	0	0	0	0	0	20	61	80	127	180	412	445	418	355	265	185	86	8	0	0	0	0	0	110.1	445
17-Sep	0	0	0	0	0	0	7	16	38	59	102	158	301	228	221	260	147	56	6	0	0	0	0	0	66.6	301
18-Sep	0	0	0	0	0	0	16	84	223	318	390	429	438	410	335	233	125	46	11	0	0	0	0	0	127.4	438
19-Sep	0	0	0	0	0	0	6	42	173	309	379	420	374	222	91	173	32	40	6	0	0	0	0	0	94.4	420
20-Sep	0	0	0	0	0	0	29	120	223	318	387	430	436	409	363	251	127	80	6	0	0	0	0	0	132.5	436
21-Sep	0	0	0	0	0	0	14	64	194	306	379	342	404	410	351	263	126	65	3	0	0	0	0	0	121.7	410
22-Sep	0	0	0	0	0	0	23	114	215	308	364	420	421	393	343	258	159	59	4	0	0	0	0	0	128.4	421
23-Sep	0	0	0	0	0	0	15	94	121	179	310	485	279	290	322	264	165	59	3	0	0	0	0	0	107.7	485
24-Sep	0	0	0	0	0	0	7	50	106	151	154	148	175	65	52	64	43	11	1	0	0	0	0	0	42.8	175
25-Sep	0	0	0	0	0	0	6	34	62	163	120	113	122	81	81	66	43	18	1	0	0	0	0	0	37.9	163
26-Sep	0	0	0	0	0	0	1	4	18	29	38	40	42	26	22	18	9	2	0	0	0	0	0	0	10.4	42
27-Sep	0	0	0	0	0	0	6	37	97	234	242	186	249	385	324	241	142	48	2	0	0	0	0	0	91.4	385
28-Sep	0	0	0	0	0	0	3	54	192	285	335	394	400	370	319	231	133	43	1	0	0	0	0	0	115.0	400
29-Sep	0	0	0	0	0	0	7	49	128	151	272	372	331	323	280	143	75	22	1	0	0	0	0	0	89.7	372
30-Sep	0	0	0	0	0	0	4	21	30	77	62	164	234	252	85	48	11	9	1	0	0	0	0	0	41.6	252
		0.0	0.0	0.0	0.0	0.0	1.6	24.6	83.9	158.0	235.0	275.8	333.7	304.8	288.0	239.4	196.6	117.7	56.3	10.2	0.4	0.0	0.0	0.0	0.0	Diurnal Average
		0	0	0	0	0	12	87	216	316	373	464	516	506	455	433	385	266	140	37	4	0	0	0	0	Diurnal Maximum



WBEA
Hourly Averages

Global Radiation (GR) - W/m²
CNRL Horizon - September 2014





Maximum Speed: 25 km/h on Sep 28 16:00	Maximum Daily Speed Average: 14.4 km/h on Sep 28	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 27 13:00	Minimum Daily Speed Average: 0.6 km/h on Sep 27	Hours of Data: 718
Maximum Diurnal Speed Average: 2.7 km/h at hour 6	Minimum Diurnal Speed Average: 0.6 km/h at hour 18	Hours of Missing Data: 2
Monthly Average Velocity: 1.6 km/h 228.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 11 P ₉₀ = 14 P ₉₉ = 21	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	SSW6	SW6	SSW7	SSW8	SSW8	SW6	S3	SW2	NNE4	S1	SW4	SE5	SSE5	N4	NNE9	WSW3	SW8	SW6	WNW8	WSW4	WSW1	E1	NW4	SSW4	SW2.6	NNE9
2-Sep	SW6	SSW5	SW6	SW6	SW4	SW4	S1	SSW3	SE2	WSW3	WSW4	WSW1	WSW2	W7	ESE2	SSE3	SW5	W5	NW3	WNW6	WNW5	WNW5	WNW4	SW5	WSW3.0	W7
3-Sep	SSW4	SW5	SW4	S3	SSE4	SSW6	SSW5	S4	S4	S5	SW7	SSW9	SW7	SW6	WSW9	NNE9	NE10	ENE7	SSE6	SW2	SSW2	SW5	SSW6	SSW6	SSW3.2	NE10
4-Sep	S8	S7	S9	S8	S9	S8	S9	S10	S9	S10	S9	S5	NNW7	N10	NNE11	NNE14	N15	N12	N13	NNE9	NNE10	N8	N10	NW8	NNE0.9	N15
5-Sep	WNW6	WNW6	NW8	NW5	NW6	SW6	SSW6	SSW5	S6	SSE7	S9	S11	S12	S10	S9	SSE10	SSE10	S7	SSW4	SSW4	WNW1	NNW9	NNW13	WSW4	SSW3.5	NNW13
6-Sep	WSW3	WNW4	WSW4	W3	N7	NNE7	NNE8	NNE8	NE7	NE6	ENE5	ESE5	E6	ENE5	NE6	NNE6	NNE8	NNE7	NNE9	NNE10	NNE14	NNE12	NNE14	NNE15	NNE6.0	NNE15
7-Sep	NNE14	N15	N14	NNE14	NNE13	N10	N11	NNE12	N14	NNE12	NNE13	N14	N15	N18	N20	N18	N17	N15	N14	N13	NNW11	NNW11	NNW10	NNW11	N13.4	N20
8-Sep	NNW14	N16	N11	NNW5	WNW4	WNW5	NW5	N8	N10	N10	NNW11	NNE10	N9	N10	N10	N10	N10	NNE7	NNE7	NNE4	NNE3	N5	WNW4	W2	N7.3	N16
9-Sep	SW5	WSW2	SW3	W5	WNW2	ESE1	ENE2	NNE3	N5	N7	ENE4	NNE2	NNE3	NE4	E4	N2	NE2	E1	NNE1	N5	N8	N1	NNW3	SW4	N1.6	N8
10-Sep	SSE2	SW4	WSW5	SW6	SW5	W4	SW6	SW6	SSW5	SSW4	SSW3	SSW4	S6	WSW2	S7	SSW9	S11	SSW9	SSW7	S9	S8	SW3	SSW6	SSW9	SSW5.5	SSW11
11-Sep	SSW9	S10	S12	S12	S11	S10	S9	S8	S11	SSW15	SSW18	SSW20	SSW21	SSW21	SSW20	SSW20	SW17	SSW11	SSW8	SW7	SW8	W6	WSW11	SW8	SSW12.0	SSW21
12-Sep	SSW8	SSW8	SSW7	S7	S5	NW2	NNW3	NW8	NW12	NW12	NW16	NNW15	NNW18	NNW15	NNW14	N13	NNW13	W2	WNW1	N9	SW4	W5	WNW6	WNW6	NW5.8	NNW18
13-Sep	NW5	WNW5	W5	WSW4	S6	SW6	AF	AF	SE3	SSE6	S6	SSE8	S9	SSE10	SE10	SE10	SE8	SSE8	SSE7	SW2	NNW2	SW2	SW5	SW6	S3.9	SE10
14-Sep	S5	SSW6	S7	S6	S5	S5	S5	S7	S8	S7	SSE8	S10	S10	SSW11	SSW12	SW10	WSW9	SSW5	W3	WSW5	NW4	WNW5	WSW4	SW6	SSW5.7	SSW12
15-Sep	SW6	SW5	S5	SSW6	S5	SSW6	SSW5	SSE3	SSE3	E3	ESE5	NE6	NE6	NE7	NNE9	NNE10	NNE9	NNE8	N6	N7	N8	N7	N8	N7	NNE2.2	NNE10
16-Sep	N7	N9	N11	N11	N9	N6	N5	NNE6	NNE7	NNE7	NNE8	NNE8	NNE9	NE10	NE10	ENE11	ENE11	ENE10	E8	SSE12	SSE8	SE9	SE8	SSE10	NE5.4	SSE12
17-Sep	SE7	SSE8	SE8	SE7	SE8	SSE6	SSE8	SSE9	SSE11	SSE12	S13	S12	S12	SSW9	S9	S15	SSE14	SSE9	SSE6	SSE7	SSE5	S4	S5	SSW6	SSE8.3	S15
18-Sep	SW8	SSW10	S10	SSE5	S1	WNW3	W3	WNW5	N2	N3	N1	NNE3	NW4	E3	SSE5	SE5	SE5	ESE4	SSE4	SE3	WNW2	NW2	N1	ENE1	S1.3	S10
19-Sep	NNE6	E3	SW2	SW5	SSW8	S9	S8	SSW10	SSW9	SW13	SW15	SW16	SW16	SW14	WSW13	WSW17	W17	WSW9	W17	W17	W20	W23	W16	WSW9	WSW10.2	W23
20-Sep	W11	W11	WSW12	W12	W13	W12	WSW10	W9	W12	WNW14	WNW15	WNW14	W15	W15	W15	W16	WNW11	W5	SSW7	SSW8	S8	S7	S7	SSE5	W9.5	W16
21-Sep	SSE6	S8	S8	S10	SSW13	SSW13	SSW13	SSW13	SSW12	SSW12	SSW13	SSW15	SW13	SW12	WSW13	SW13	SSW6	SSE5	SSE6	SSW9	SSW7	S1	S6	SSW3	SSW9.0	SSW15
22-Sep	SW3	SW2	SSW5	SW6	SSW9	SSW8	SSW9	SSW9	S10	S13	S13	S12	S15	SSW15	SSW14	SSW12	SSW12	SW9	SW7	SW9	SW6	SW6	SW7	SSW7	SSW8.7	S15
23-Sep	SW9	WNW9	SSE3	NE3	NE3	N4	NW6	W6	W5	WNW4	WNW5	N4	NNW4	SE4	SE7	SSE9	SSE10	SSE6	S4	W3	WNW4	NNW5	W3	WSW5	WSW1.4	SSE10
24-Sep	NNE3	N5	NNW5	NNE3	N1	NW5	NNW2	NNE4	N5	N4	N5	NNE8	NNE9	NNE9	NNE9	N6	N7	NNW6	NNW6	NNW6	W7	SW7	S9	S10	N3.4	S10
25-Sep	SSW9	SSW10	SSW9	SSW10	SSW10	WSW8	W14	W11	WSW10	WSW12	WNW14	WNW13	NNW13	NNW13	NNW9	N9	N11	NNE11	NNE11	NNE10	N10	N8	N8	NNE8	WNW4.9	WNW14
26-Sep	N10	NNE10	NNE10	NE13	NNE12	NNE13	NNE10	NNE11	NNE12	NNE13	NNE14	NNE15	NNE16	NNE15	NNE17	NNE19	N21	N16	N18	N19	N18	N19	N16	N13	NNE14.4	N21
27-Sep	N13	N11	N11	N7	NW3	NNW6	NNW5	NW2	NNE7	N8	NNW9	NW5	ENE0	S7	S5	SE4	SSE5	SSE8	S7	S8	S8	SSW8	SSW8	S6	NNW0.6	N13
28-Sep	S6	S6	S6	S7	S9	S12	S13	SSE12	SSE13	S20	SSE18	S20	S24	S21	S22	S25	S23	S18	S12	SSE14	S15	SSE12	S9	S11	S14.4	S25
29-Sep	S8	SSW6	SW7	SSW8	SSW8	SSW8	SSW6	SSW5	SSW5	S8	SSE14	SSE17	S16	SSE15	SSE13	SSW12	SSW13	S11	S11	SSW10	SSW9	SSW8	SSW7	S8	S9.4	SSE17
30-Sep	SSW8	SSW8	SSE6	S8	S7	WSW3	WSW2	S3	SE5	SSW5	S2	WSW3	N7	NE10	ENE7	NE5	NW2	ENE5	NE5	NNW1	NNE4	N2	NNE6	NNE6	ESE0.9	NE10

SW2.1WSW2.4	SW2.4SSW2.4	SSW2.7	SW2.7	SW2.5	SW1.9	SSW1.2	SSW2.1	SSW2.5	SSW2.4	SW2.0	SW1.2	SSW1.0	SW1.1	WSW1.0	S0.6	W0.6	W1.3	NNW1.7	NNW2.3	NNW2.1	SW2.2	Diurnal Average						
NNW14	N16	N14	NNE14	NNE13	SSW13	W14	SSW13	N14	S20	SSE18	S20	S24	S21	S22	S25	S23	S18	N18	N19	W20	W23	N16	NNE15	Diurnal Maximum				

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



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 8 km/h on Sep 19 21:00	Hours of Data: 718
Minimum Value: 1 km/h on Sep 14 23:00	Hours of Missing Data: 2
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 7	Hours of Calibration: 0
	Percent Operational Time: 99.7

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

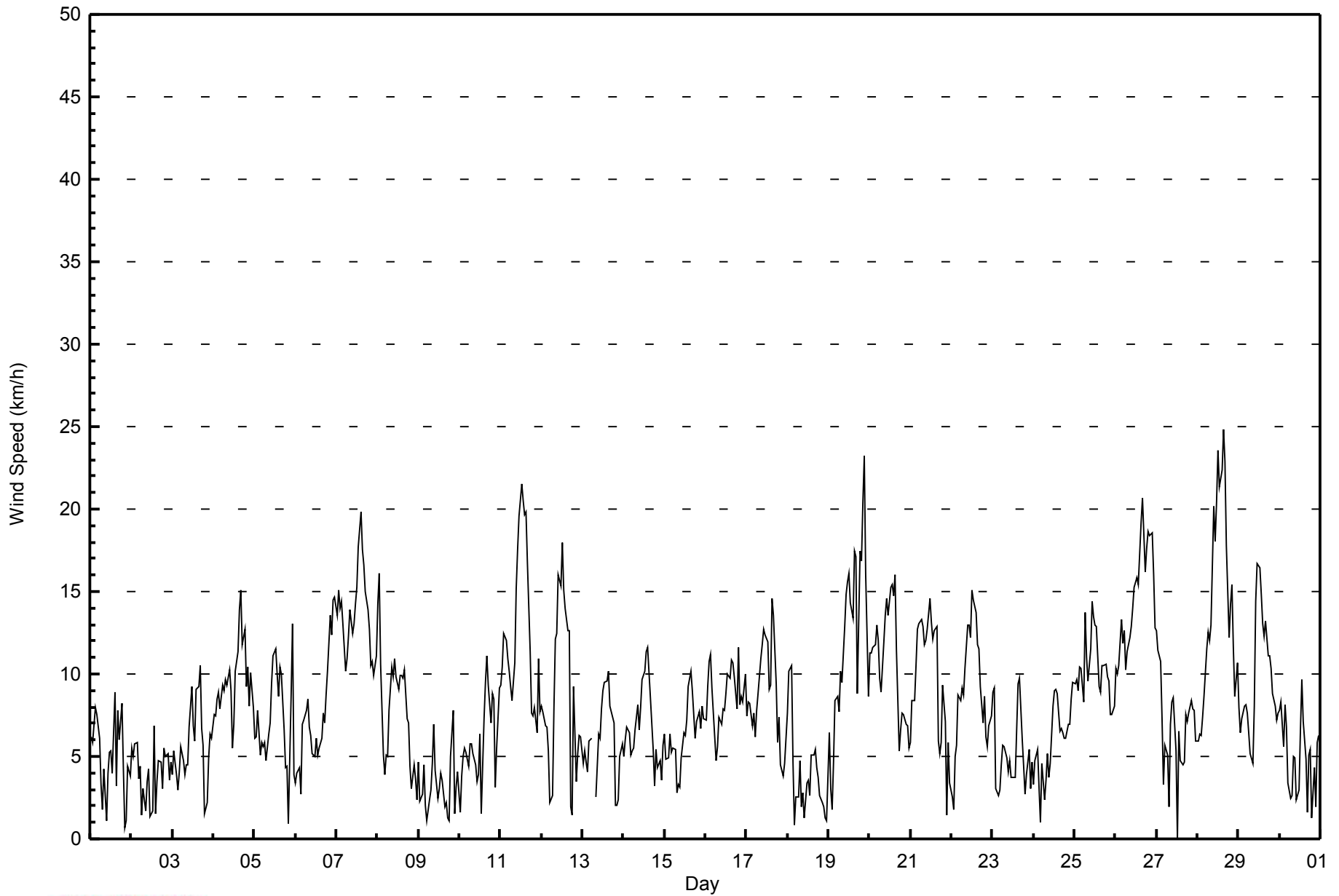
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
CNRL Horizon - September 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
CNRL Horizon - September 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	222	30.92	30.92
6 - 11	344	47.91	78.83
12 - 19	136	18.94	97.77
20 - 28	16	2.23	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 718

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
CNRL Horizon - September 2014

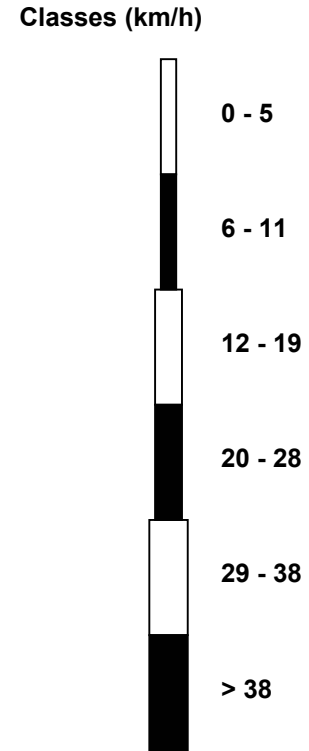
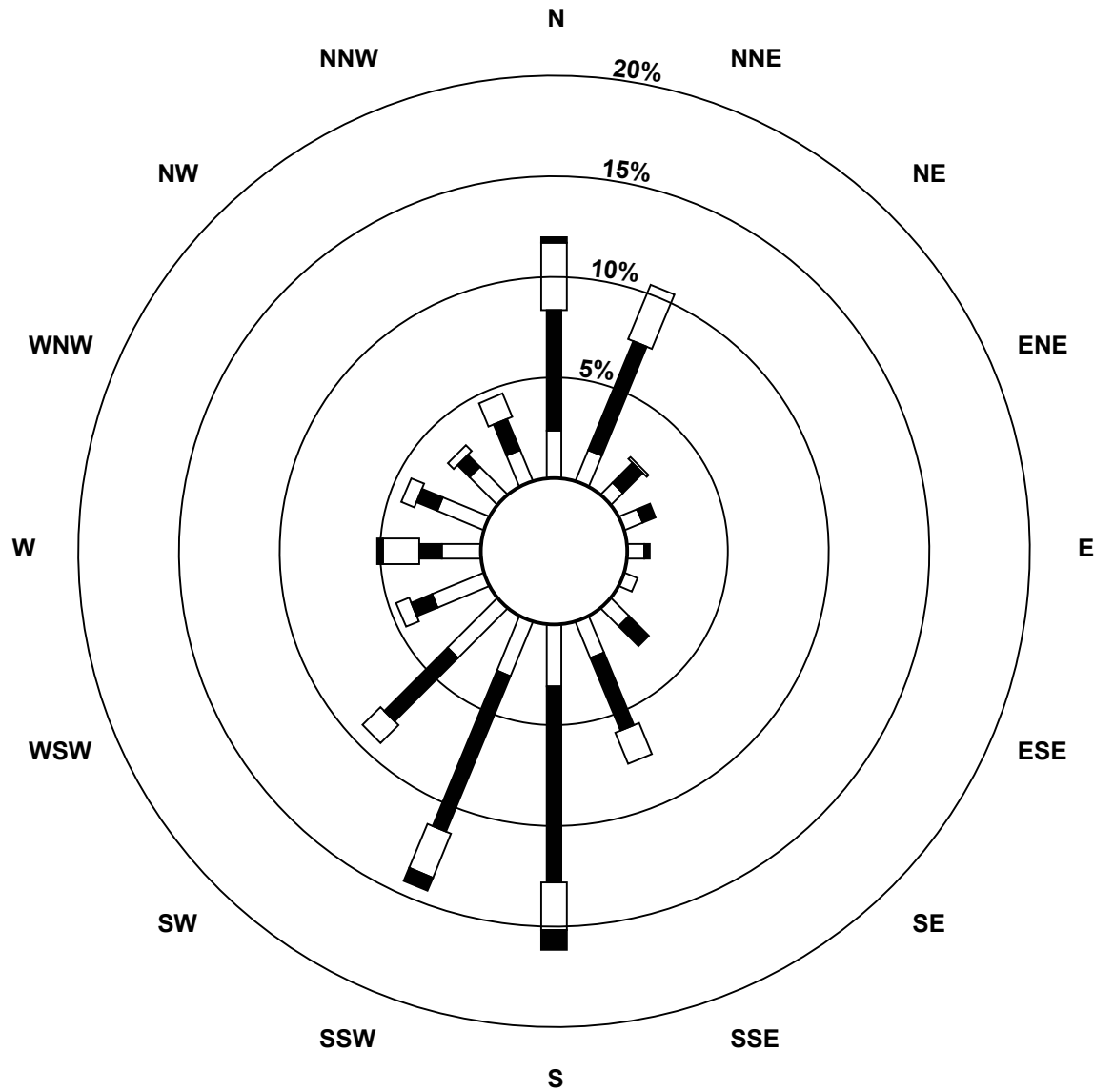
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	17	12	6	7	6	5	9	14	22	21	25	20	14	18	14	12	222
6 - 11	43	42	10	5	2	0	10	28	70	60	32	8	8	8	6	12	344
12 - 19	24	21	1	0	0	0	0	12	17	17	9	5	13	5	3	9	136
20 - 28	2	0	0	0	0	0	0	0	7	5	0	0	2	0	0	0	16
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	86	75	17	12	8	5	19	54	116	103	66	33	37	31	23	33	718

Total Number of Valid Hours: 718

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
CNRL Horizon (AMS 15)**



Total Number of Valid Hours: 718



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
CNRL Horizon - September 2014

Direction of Maximum Speed: 179 deg on Sep 28 16:00		Hours in Service: 720
Direction of Maximum Daily Speed Average: 175.2 deg on Sep 28		Hours of Data: 718
Direction of Minimum Speed: 63 deg on Sep 27 13:00	Direction of Minimum Daily Speed Average: 0.6 deg on Sep 27	Hours of Missing Data: 2
Monthly Average Direction: 236.8 deg		Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	213	226	211	212	210	220	171	235	24	187	214	146	161	349	24	250	218	225	301	256	250	82	309	205	225.7
2-Sep	215	213	219	217	215	220	182	195	144	242	238	258	239	265	110	164	230	265	321	287	299	302	298	236	241.1
3-Sep	198	220	231	189	154	197	197	172	170	184	216	200	227	226	239	30	46	67	159	215	193	215	199	195	195.1
4-Sep	183	190	183	180	176	179	171	183	185	182	171	175	345	358	25	16	6	360	5	22	21	358	358	313	26.4
5-Sep	293	285	311	307	309	223	211	203	184	163	175	172	174	170	169	167	168	185	200	193	288	338	343	257	205.7
6-Sep	239	294	258	275	356	14	27	28	36	55	73	117	86	77	38	22	17	20	18	16	17	12	16	16	22.4
7-Sep	13	10	11	14	13	10	10	12	5	14	17	10	10	357	352	349	354	358	355	351	342	345	338	341	1.5
8-Sep	346	353	351	345	283	303	313	351	4	358	348	15	354	4	3	1	351	18	21	23	20	2	289	263	353.4
9-Sep	222	237	235	279	292	109	63	20	10	10	73	13	13	36	98	6	52	87	26	1	351	354	337	231	2.7
10-Sep	168	235	255	224	228	268	225	214	213	205	198	203	177	247	189	203	191	209	195	183	188	219	194	207	205.9
11-Sep	199	190	183	183	184	183	183	181	185	204	204	204	198	198	201	209	221	210	212	224	220	267	251	234	203.2
12-Sep	201	204	199	188	187	313	331	304	325	319	322	336	335	336	344	351	342	276	290	4	217	261	291	294	316.5
13-Sep	304	292	280	254	191	222	AF	AF	133	162	178	167	176	150	130	129	143	147	161	236	337	217	234	224	177.8
14-Sep	172	196	191	183	186	187	190	176	179	172	167	175	185	202	205	225	255	209	272	254	309	293	244	234	202.7
15-Sep	225	220	183	193	190	199	198	165	158	79	103	42	54	39	22	29	26	13	2	350	351	357	358	358	23.5
16-Sep	360	5	6	6	6	9	359	13	22	26	22	24	31	51	40	63	61	69	88	151	153	145	143	152	48.4
17-Sep	138	149	138	136	137	148	161	156	160	164	178	178	189	200	179	171	164	167	164	165	147	179	190	203	166.0
18-Sep	219	203	185	168	191	293	266	301	6	5	355	20	317	90	165	128	136	110	154	141	293	324	6	68	183.3
19-Sep	25	99	214	222	194	184	184	207	201	221	215	219	221	229	242	241	263	257	262	266	267	270	272	249	239.8
20-Sep	269	260	243	267	270	267	244	277	272	284	283	282	274	272	267	276	284	272	210	193	191	186	188	166	260.9
21-Sep	151	177	173	179	194	200	200	199	200	198	200	209	216	224	237	230	192	151	157	194	213	190	172	203	199.1
22-Sep	215	225	201	215	194	204	197	192	181	186	180	187	191	195	197	206	203	223	222	228	227	227	233	206	201.4
23-Sep	236	291	167	56	53	349	309	280	268	283	302	356	330	142	128	151	150	163	176	264	290	345	269	258	251.8
24-Sep	16	0	345	29	360	306	339	22	352	7	6	15	22	15	12	1	2	347	345	334	277	230	184	186	351.9
25-Sep	203	206	202	196	198	239	265	267	258	254	290	290	328	331	314	2	7	18	16	17	9	5	3	13	301.9
26-Sep	11	18	32	40	25	27	27	19	25	26	22	16	20	19	15	12	4	4	5	4	2	3	8	7	14.7
27-Sep	3	358	353	359	326	336	341	322	13	7	341	307	63	173	170	139	148	153	170	182	189	194	192	185	333.7
28-Sep	187	177	184	174	169	176	172	167	168	172	168	169	174	180	181	179	181	185	179	168	170	164	174	185	175.2
29-Sep	189	209	214	199	195	196	195	212	207	182	168	167	171	159	166	202	206	188	189	195	194	212	192	176	187.2
30-Sep	199	204	164	176	191	247	252	169	134	200	191	239	2	46	66	45	308	66	36	348	28	0	29	32	108.7
235.3	243.2	219.1	205.6	203.5	223.2	215.2	222.1	205.6	208.0	212.5	205.4	217.2	227.2	212.9	218.8	251.4	176.6	277.2	261.9	283.0	294.4	285.0	235.6		
Diurnal Average																									

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg
CNRL Horizon - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 108 deg on Sep 2 13:00	Hours of Data: 718
Minimum Value: 7 deg on Sep 15 00:00	Hours of Missing Data: 2
Percentiles: P ₁ = 8 P ₁₀ = 13 Q ₁ = 17 Median = 21 Q ₃ = 29 P ₉₀ = 53 P ₉₉ = 90	Hours of Calibration: 0
	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	16	21	17	14	14	14	47	76	43	98	53	50	49	79	24	57	29	31	31	26	86	65	16	56	98
2-Sep	10	8	10	10	66	21	74	17	42	56	41	104	108	57	79	54	22	42	45	13	11	14	73	23	108
3-Sep	27	10	26	54	26	11	14	29	30	52	44	33	36	52	37	55	19	47	38	64	71	12	17	15	71
4-Sep	12	18	12	14	16	14	19	16	18	19	26	51	62	25	22	21	20	20	19	20	18	23	20	23	62
5-Sep	18	16	14	52	19	21	17	22	24	32	28	23	23	25	19	22	21	22	42	21	94	35	21	44	94
6-Sep	24	37	46	54	25	17	17	18	24	29	36	29	25	28	20	20	21	19	16	19	18	19	19	18	54
7-Sep	18	18	19	18	17	18	17	18	19	20	20	25	21	21	22	21	21	20	20	19	19	17	18	19	25
8-Sep	20	19	19	40	34	10	14	22	20	24	32	33	26	27	23	31	27	19	16	12	19	23	18	38	40
9-Sep	11	55	38	35	56	68	22	25	24	25	65	87	54	55	52	76	67	54	84	20	19	62	35	57	87
10-Sep	86	35	20	12	17	36	12	14	18	19	46	65	46	92	63	37	26	22	14	9	10	28	16	12	92
11-Sep	13	14	12	12	13	13	15	17	20	22	23	23	21	22	23	23	23	20	23	16	18	23	17	25	25
12-Sep	14	13	14	15	19	67	52	26	19	21	21	24	20	22	23	23	29	63	54	52	33	31	15	12	67
13-Sep	30	14	27	37	14	13	AF	AF	36	27	34	35	29	28	27	26	23	21	13	72	77	61	26	22	77
14-Sep	18	11	13	14	23	13	12	12	21	32	27	25	28	31	30	37	27	16	48	37	11	13	39	7	48
15-Sep	11	25	12	10	17	14	17	36	33	48	42	32	32	21	20	19	19	17	15	13	14	14	17	15	48
16-Sep	14	16	18	17	17	15	14	17	19	21	23	36	28	29	32	28	21	19	30	21	20	23	23	24	36
17-Sep	21	22	23	22	21	23	22	21	20	21	19	19	23	28	26	21	19	15	12	15	20	16	12	11	28
18-Sep	11	13	14	48	73	23	19	17	55	79	101	70	72	84	47	46	27	13	24	18	76	42	64	70	101
19-Sep	26	35	72	23	17	14	15	20	21	24	24	25	27	23	24	24	25	26	22	23	22	20	21	28	72
20-Sep	23	21	20	21	21	20	19	25	23	23	23	27	24	26	26	23	20	31	17	12	9	8	12	22	31
21-Sep	15	10	13	14	15	16	16	16	17	22	21	23	24	28	28	25	33	16	15	14	14	80	10	62	80
22-Sep	62	48	20	18	9	14	14	17	18	18	18	23	19	21	22	24	21	18	18	14	18	26	18	12	62
23-Sep	21	34	60	59	52	14	19	19	28	40	27	58	70	53	49	25	22	14	10	53	14	25	51	55	70
24-Sep	58	19	22	44	71	20	27	32	20	36	25	19	23	18	18	20	18	12	20	21	20	28	16	14	71
25-Sep	17	15	14	16	17	34	21	25	23	25	22	23	22	18	22	20	20	18	18	17	17	15	17	19	34
26-Sep	18	17	18	16	18	18	17	17	17	18	19	19	19	18	18	18	20	20	20	20	20	20	18	19	20
27-Sep	19	18	17	18	24	22	19	43	22	22	24	35	96	40	51	47	37	17	12	7	8	8	8	10	96
28-Sep	7	8	8	12	15	15	15	15	18	17	18	19	17	19	19	16	16	16	13	13	14	14	15	11	19
29-Sep	13	11	8	11	10	11	12	12	17	20	17	17	20	20	21	22	19	15	16	16	16	17	15	17	22
30-Sep	13	18	20	12	15	37	60	37	32	23	39	52	35	23	20	37	75	24	19	83	26	78	23	17	83
	86	55	72	59	73	68	74	76	55	98	101	104	108	92	79	76	75	63	84	83	94	80	73	70	

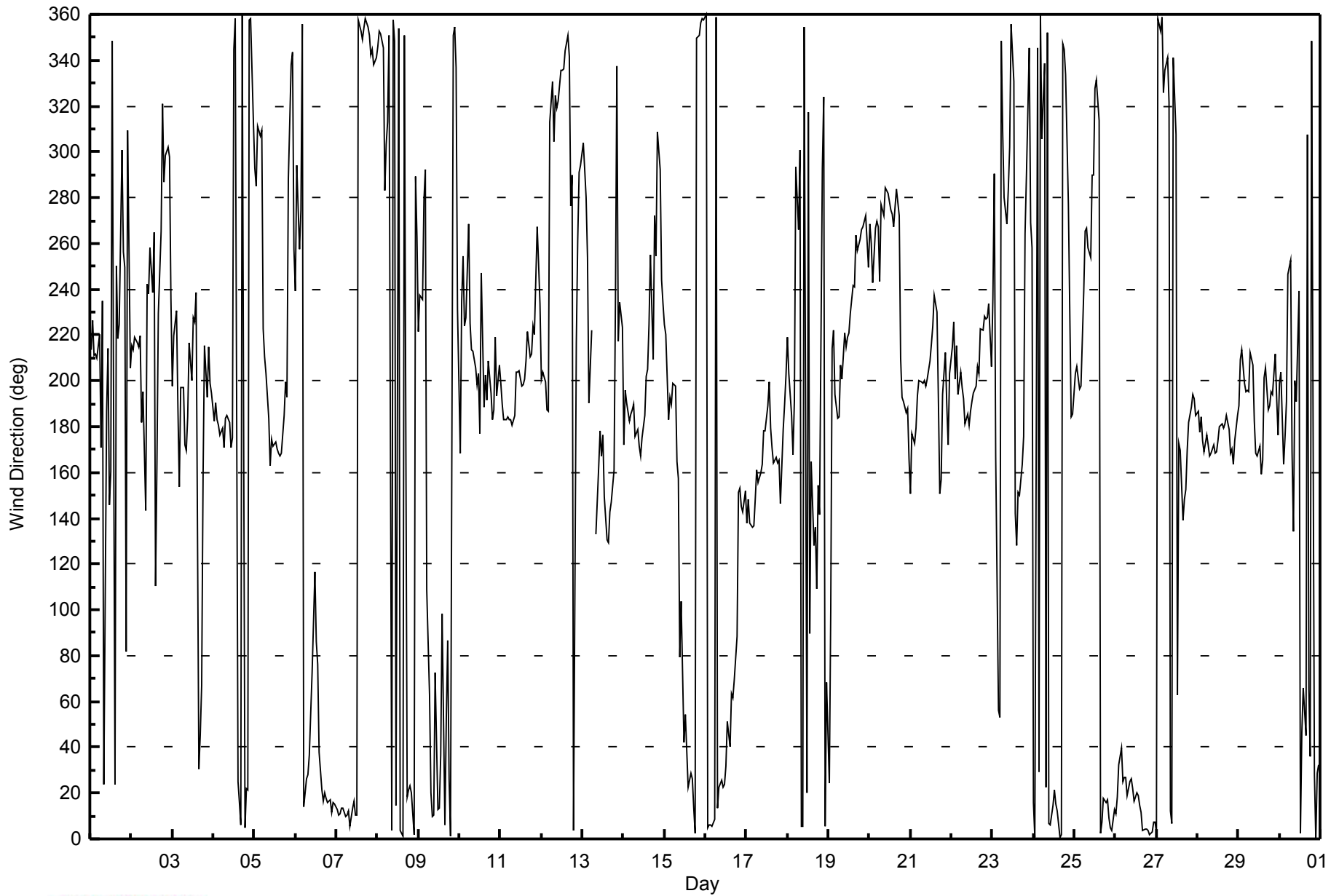
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
CNRL Horizon - September 2014





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 26, 2014
Station Name	CNRL	Station Number	15
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	13:25
Barometric Pressure	n/a mmHg	Station temp.	20 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	10880507
Cal Gas Concentration	50.3 ppm	Cal Gas Expiry Date	11/6/2014
Gas Cert Reference	LL107945		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
DACS voltage range	0-5000mV	DACS channel #	Diff 1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-648	-648
Analyzer Range (mv)	5000	5000	Lamp voltage	765	778
Calculated slope	1.011165	0.992017	Chamber temp.	45.2	45.0
Calculated intercept	0.248485	-0.468273	Pressure (mmHg)	713.6	722.1
Analyzer Background	12.5	12.5	Flow (lpm)	0.435	0.439
Analyzer Coefficient	1.006	1.006	Intensity	88	86

Analyzer make 43i Analyzer serial # 10710321322

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	NA
as found span	5000	82.3	827.9	834.2	0.992
calibrator zero	5000	0.0	0.0	-0.4	NA
high point	5000	82.3	827.9	834.2	0.992
second point	5000	41.2	414.5	420.0	0.987
third point	5000	20.6	207.2	209.4	0.990
calibrator zero	5000	0.0	0.0	-0.4	NA
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	82.3	827.9	834.6	0.992
Average Correction Factor					0.990

Corrected As found 834.6 Previous response 818.5 % change -1.9%

Notes:

no adjustments required.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

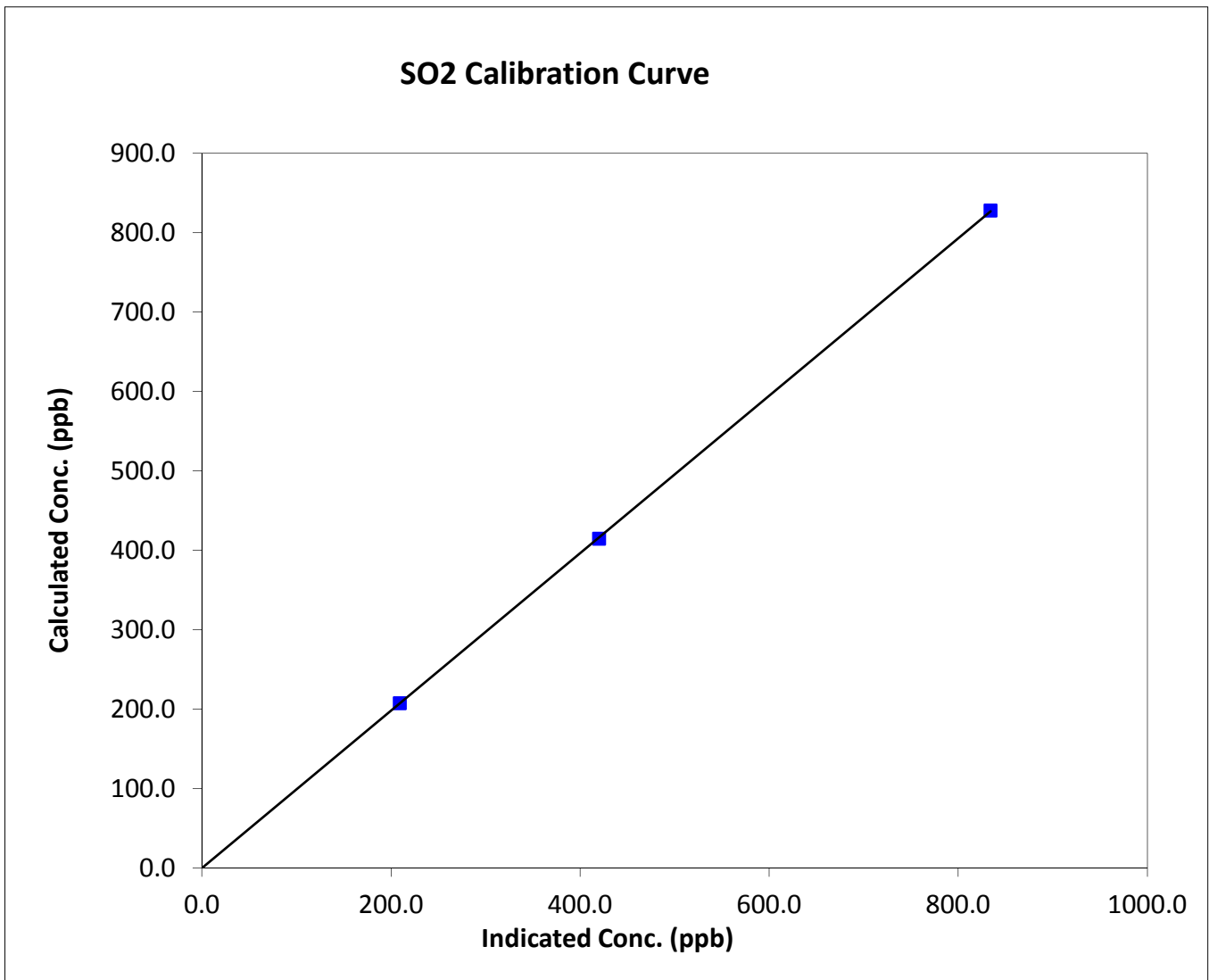
SO₂ Calibration Summary

Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 26, 2014
Station Name	CNRL	Station Number	15
Start Time (MST)	9:15	End Time (MST)	13:25
Analyzer make	43i	Analyzer serial #	10710321322

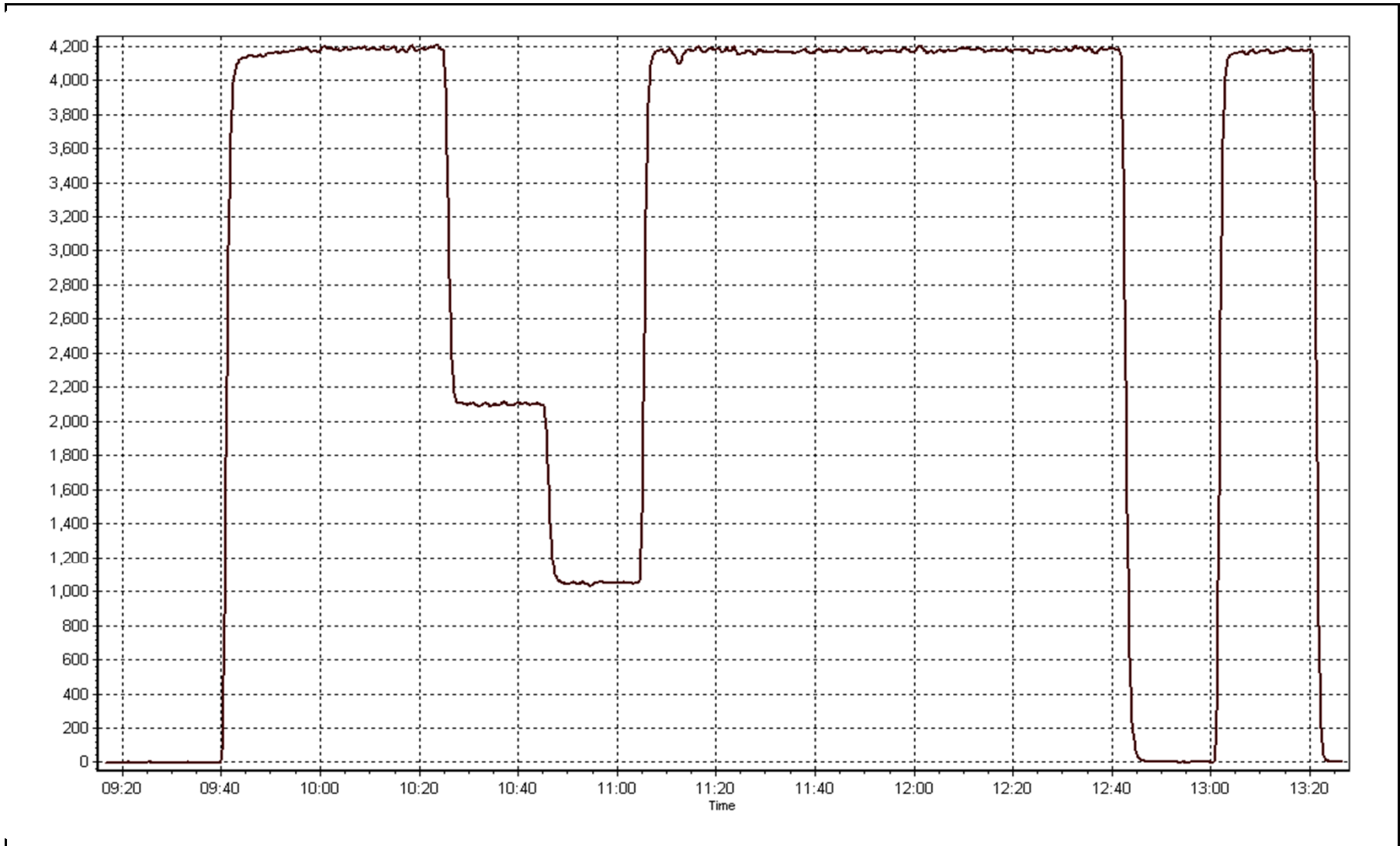
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999988
827.9	834.2	0.9925		
414.5	420.0	0.9868	Slope	0.992017
207.2	209.4	0.9897		
			Intercept	-0.468273



SO2 Calibration Plot

Date: September 9, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	September 8, 2014	Previous Calibration	August 27, 2014
Station Name	CNRL Horizon	Station Number	15
Reason:	Routine		
Start Time (MST)	11:05	End Time (MST)	14:30
Barometric Pressure	740 mmHg	Station temp.	25 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	LL155297
Cal Gas Concentration	10.4 ppm H2S	Cal Gas Expiry Date	5-30-2013
Gas Cert Reference	cc257967	SO2 gas conc.	50.3 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
DACS voltage range	0-5000mV	DACS channel #	DIFF 2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-673	-673
Analyzer Range (input)	5000	5000	Lamp voltage	756	763
Calculated slope	1.009324	0.998509	Chamber temp.	45	45
Calculated intercept	-0.465136	-0.244167	Pressure	687.6	701.5
Analyzer Background	9	9.2	Flow	0.419	0.426
Analyzer Coefficient	0.934	0.927	Intensity	91	92
			Converter temp.	809	809

Analyzer make/model	TEI 431	Analyzer serial #	0710321323
Converter make/model	NOVA model CDN101	Converter serial #	363

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.4	NA
as found span	5000	38.5	80.1	80.8	0.991
SO2 scrubber check	5000	20.6	207.2	0.7	NA
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	38.5	80.1	80.3	0.998
second point	5000	19.2	39.9	40.6	0.983
third point	5000	9.6	20.0	20.2	0.989
calibrator zero	5000	0.0	0.0	0.1	NA
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	38.5	80.1	79.7	1.005
Average Correction Factor					0.990

Corrected As found	80.5	Previous response	79.8	% change	-0.8%
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Notes:

Adjusted zero and span.

Calibration Performed By:

Mike Martineau



Wood Buffalo Environmental Association

TRS Calibration Summary

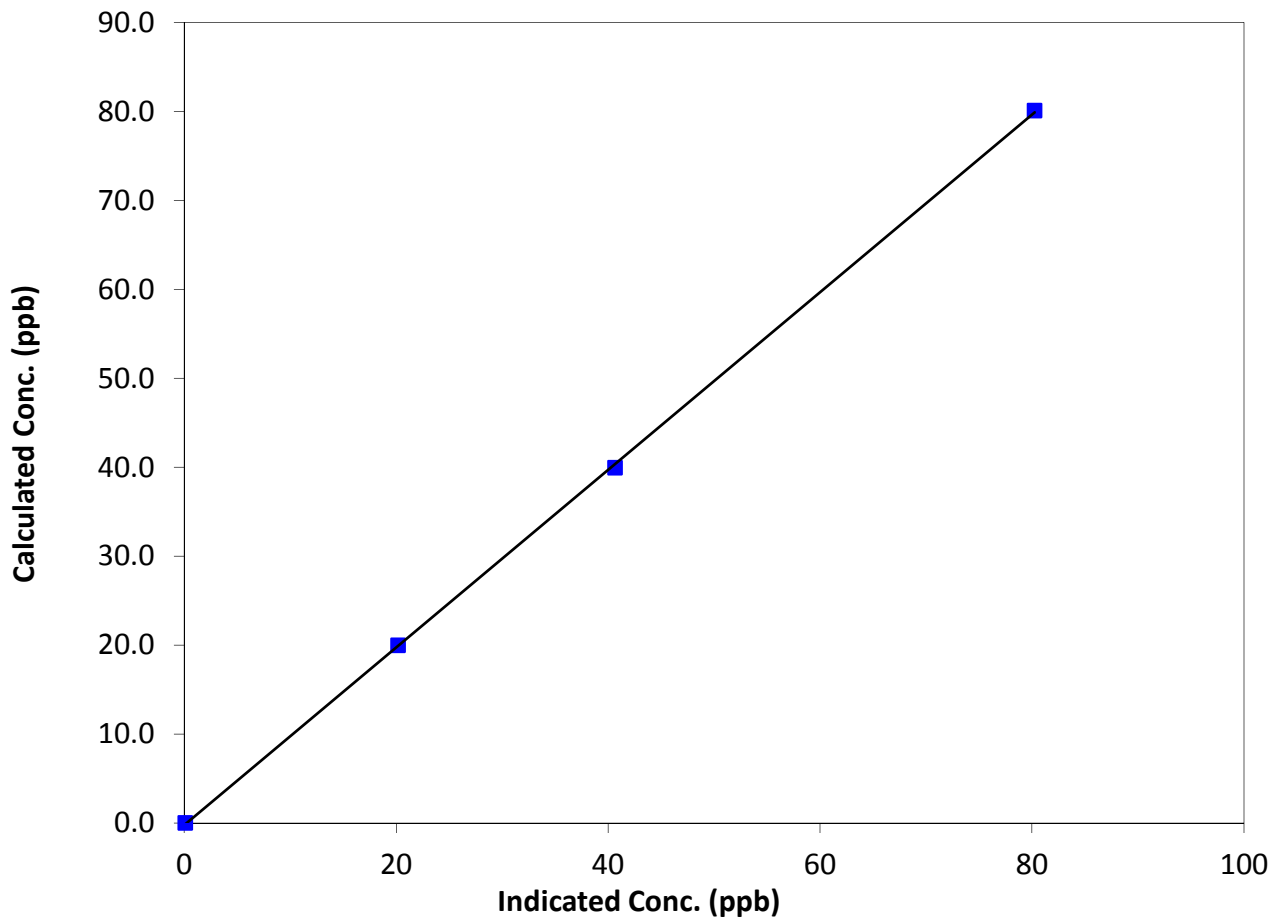
Station Information

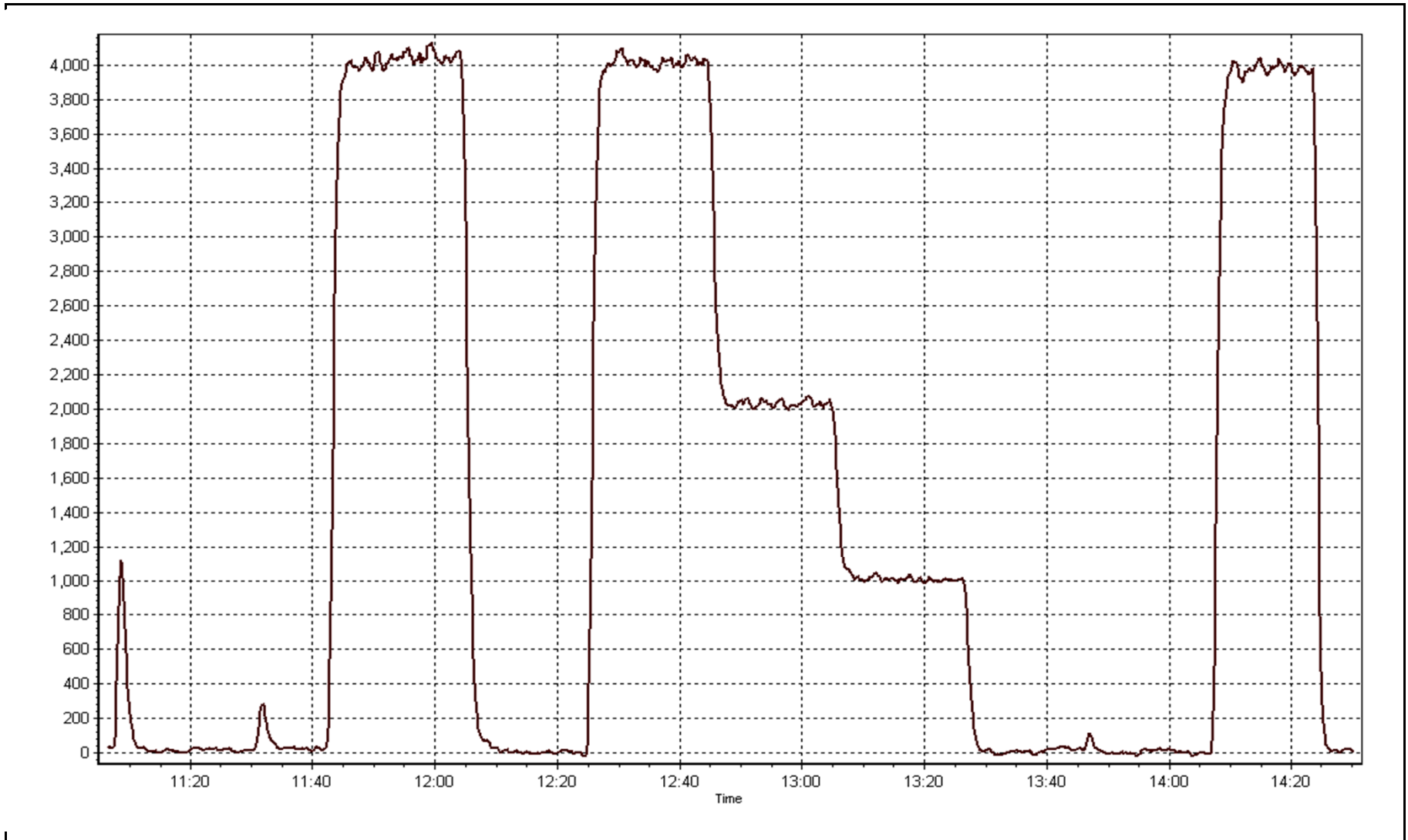
Calibration Date	September 8, 2014	Previous Calibration	August 27, 2014
Station Name	CNRL Horizon	Station Number	15
Start Time (MST)	11:05	End Time (MST)	14:30
Analyzer make	TEI 43I	Analyzer serial #	0710321323

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999936
80.1	80.3	0.9978		
39.9	40.6	0.9826	Slope	0.998509
20.0	20.2	0.9891		
			Intercept	-0.244167

TRS Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 26, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	13:25
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	10880507
Gas Cert Reference	LL107945	Cal Gas Expiry Date	11/6/2014
CH4 Cal Gas Conc.	490.0 ppm	CH4 Equiv Conc.	1062.0 ppm
C3H8 Cal Gas Conc.	208 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	0-5000mV	DACS channel #	SE 3

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	6.0	6.0
Analyzer Range (mv)	5000	5000	Air or Bypass press	20.0	20.0
Calculated slope	0.995639	1.003162	Fuel Pressure	18.0	18.0
Calculated intercept	0.064503	-0.016299			

Analyzer make TEI 51C-LT Analyzer serial # 76232382

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.02	N/A
as found span	5000	82.3	17.48	17.73	0.986
calibrator zero	5000	0.0	0.00	0.02	N/A
high point	5000	82.3	17.48	17.44	1.002
second point	5000	41.2	8.75	8.75	1.000
third point	5000	20.6	4.38	4.36	1.003
calibrator zero	5000	0.0	0.00	0.02	N/A
as left zero	5000	0.0	0.00	0.02	N/A
as left span	5000	82.3	17.48	17.44	1.002
Average Correction Factor					1.002

Corrected As found 17.71 Previous response 17.49 % change -1.2%

Notes:

adjusted span.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

THC Calibration Summary

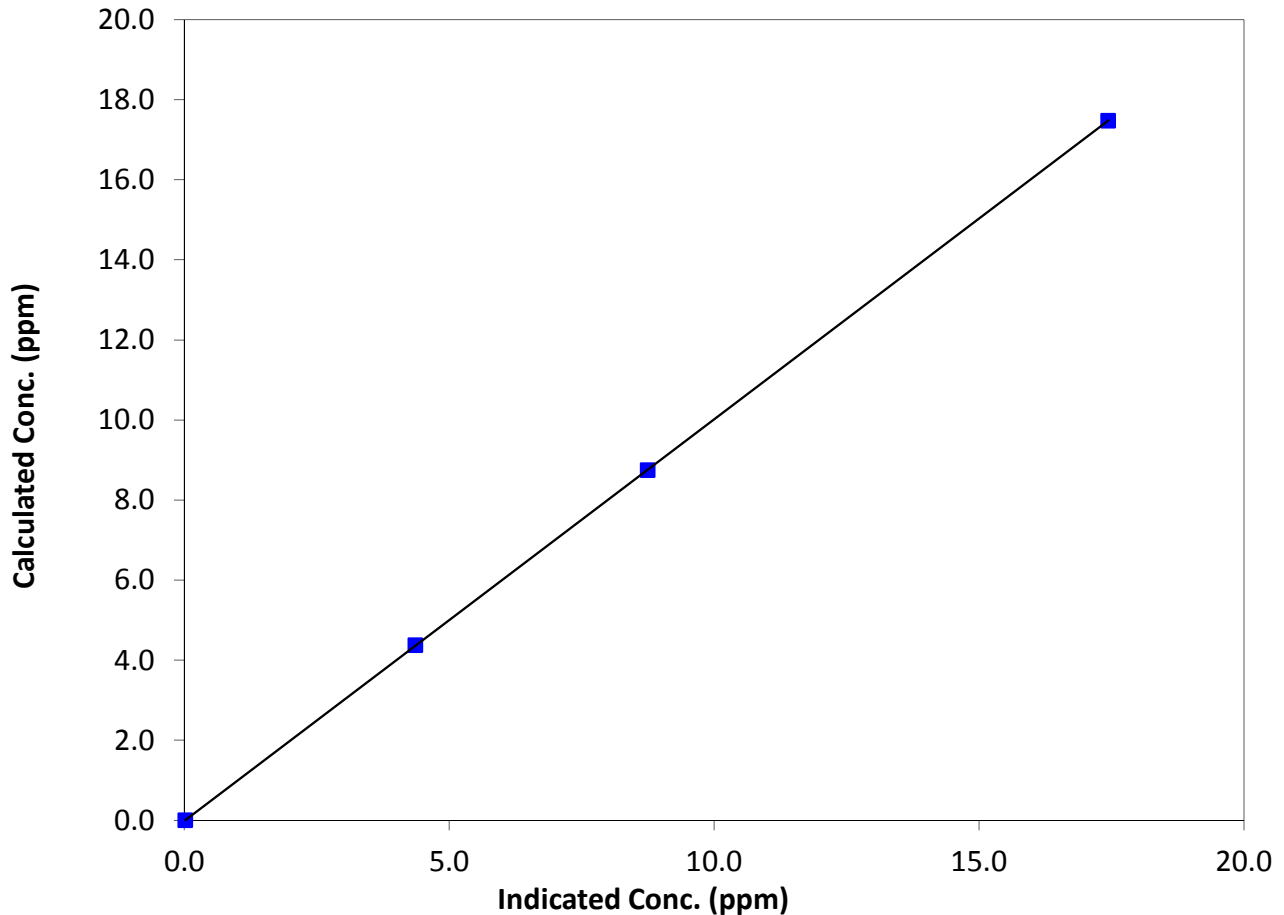
Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 26, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:15	End Time (MST)	13:25
Analyzer make	TEI 51C-LT	Analyzer serial #	76232382

Calibration Data

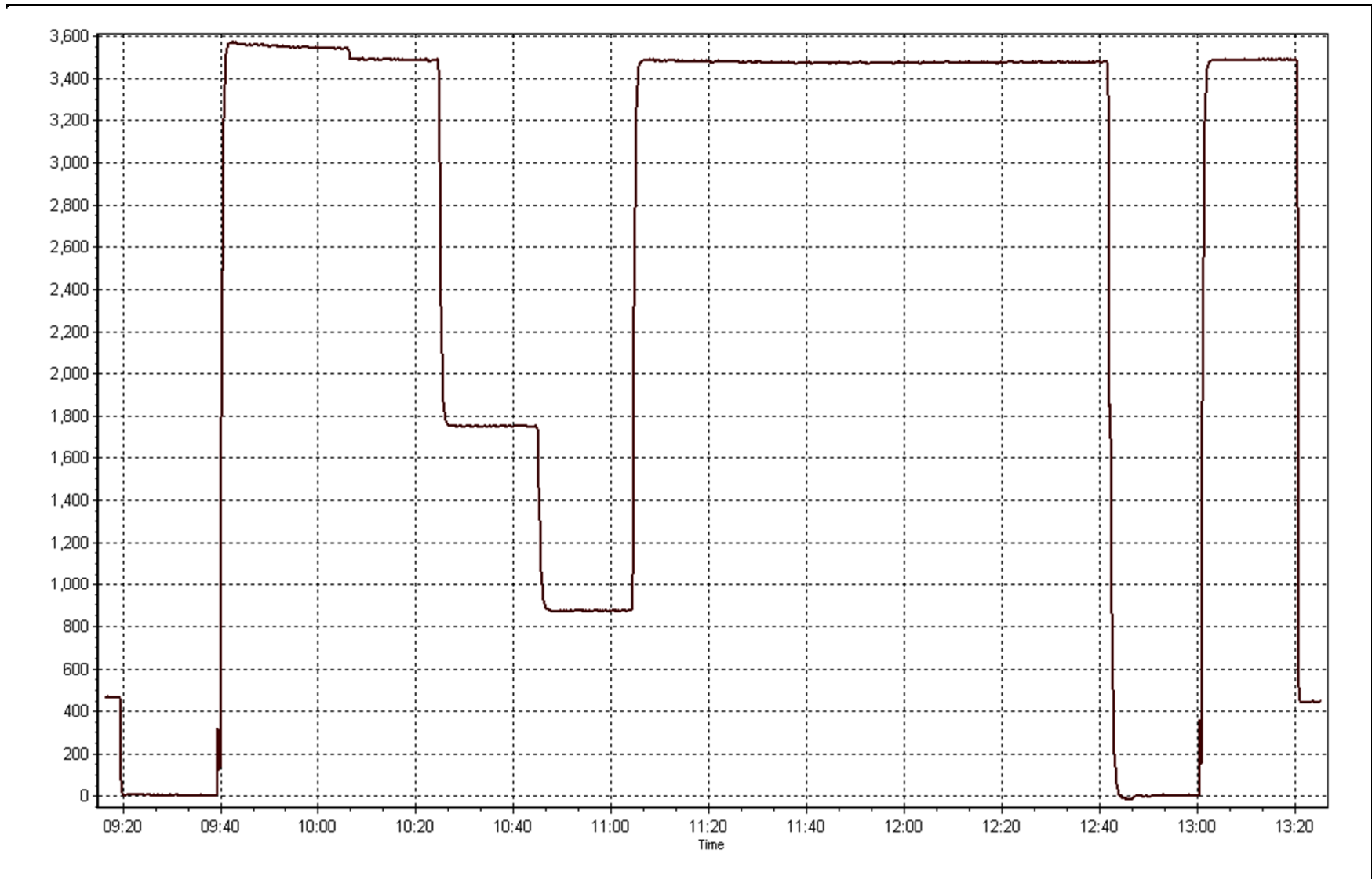
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	N/A	Correlation Coefficient	0.999998
17.48	17.44	1.0023		
8.75	8.75	1.0001	Slope	1.003162
4.38	4.36	1.0027		
			Intercept	-0.016299

THC Calibration Curve



THC Calibration Plot

Date: September 9, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 26, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	13:25
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	Sabio 4010	Serial Number	10880507
NO Cal Gas Conc	48.6 ppm	Cal Gas Expiry Date	November 6, 2014
NOx Cal Gas Conc	48.6 ppm	Cal Gas Serial #	LL107945

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2632
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.982734	0.981714	0.997134
	Data Offset	-1.528111	-0.795321	-0.791651
After	Data Slope	1.002040	0.999476	1.002050
	Data Offset	-1.026746	-0.287266	0.749136
Channel #		Diff 3	Diff 4	Diff 5
Voltage Range		0-5000mv	0-5000mv	0-5000mv

Analyzer Information

Analyzer make/model	42i	Analyzer serial #	710321429
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.923	ppb	0.885	ppb
NOX coefficient	1.000	ppb	1.000	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	11.2		10.6	
NOX bkgrnd	11.4		10.8	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	325.0	Deg C	325.0	Deg C
PMT Temp	-3.0	Deg C	-3.0	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	178.8	mmHg	182.4	mmHg
Sample Flow	0.662	ccm	0.688	ccm

Notes:

adjusted span.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

September 9, 2014

Station Number:

AMS 15

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.6	-0.1	0.1	N/A	N/A
as found span	5000	82.3	800.0	800.0	0.0	835.1	836.1	0.2	0.9579	0.9568
calibrator zero	5000	0.0	0.0	0.0	0.0	0.6	-0.1	0.1	N/A	N/A
high point	5000	82.3	800.0	800.0	0.0	798.5	800.0	-0.1	1.0018	1.0000
second point	5000	41.2	400.5	400.5	0.0	402.3	402.2	0.4	0.9954	0.9956
third point	5000	20.6	200.2	200.2	0.0	200.9	200.9	0.3	0.9965	0.9966
calibrator zero	5000	0.0	0.0	0.0	0.0	0.6	-0.1	0.1	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	2.0	1.2	0.1	N/A	N/A
as left span	5000	82.3	800.0	435.3	364.7	800.5	442.1	359.8	0.9994	0.9847
Average Correction Factor									0.9979	0.9974

Corrected As found

NO_x= 834.5

NO= 836.2

Percent Change

NO_x= -2.3%

NO= -2.5%

Previous Response

NO_x= 815.5

NO= 815.7

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

82.30

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO ₂ (300)	N/A	435.3	362.4	795.0	435.3	361.2	0.9899	1.0000	1.0034	99.7%
2nd NO ₂ (200)	N/A	571.7	225.9	795.0	571.7	224.8	0.9899	1.0000	1.0053	99.5%
3rd NO ₂ (100)	N/A	706.9	90.8	794.7	706.9	88.7	0.9903	1.0000	1.0232	97.7%
4th NO ₂ (0)	797.7	N/A	-1.2	796.5	797.7	0.1	0.9881	1.0000	N/A	N/A
Average Correction Factor							0.9895	1.0000	1.0106	99.0%

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

NO_x Calibration Summary

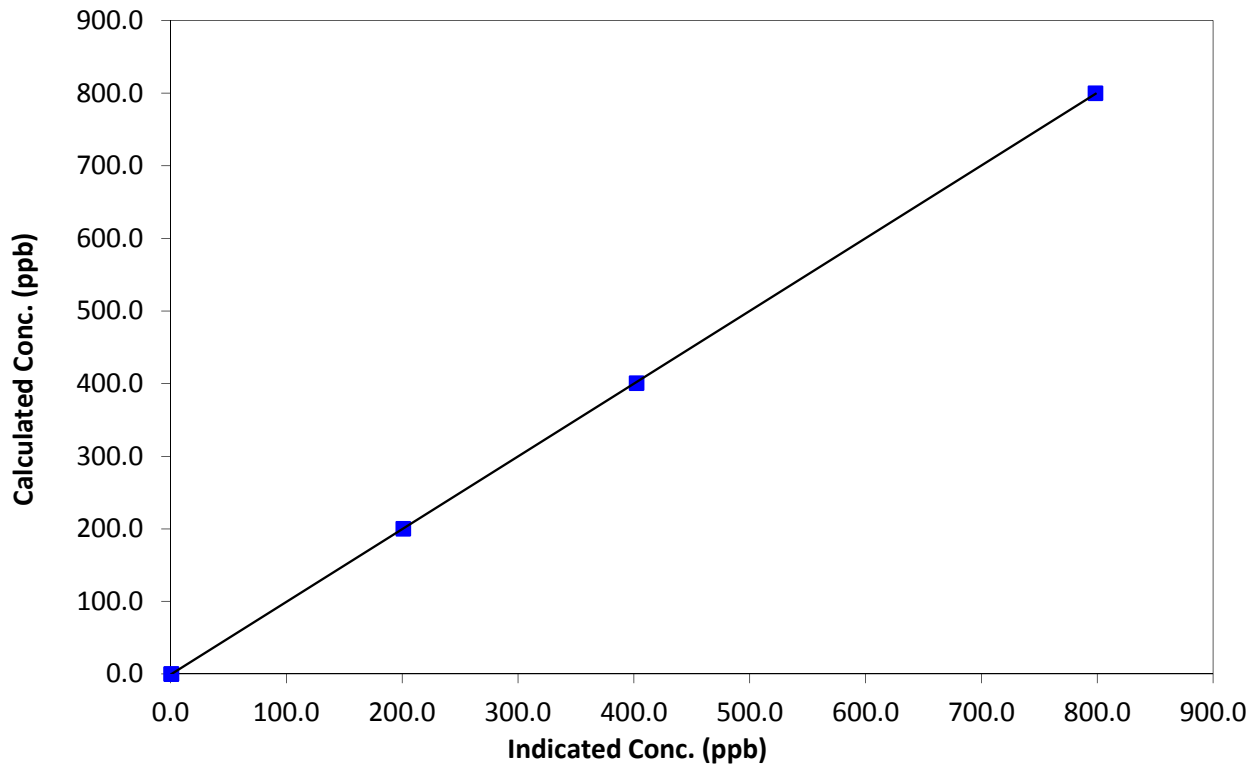
Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 26, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:15	End Time (MST)	13:25
Analyzer make	42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	N/A	Correlation Coefficient	0.999992
800.0	798.5	1.0018		
400.5	402.3	0.9954	Slope	1.002040
200.2	200.9	0.9965		
0.0	0.6	0.0000	Intercept	-1.026746

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

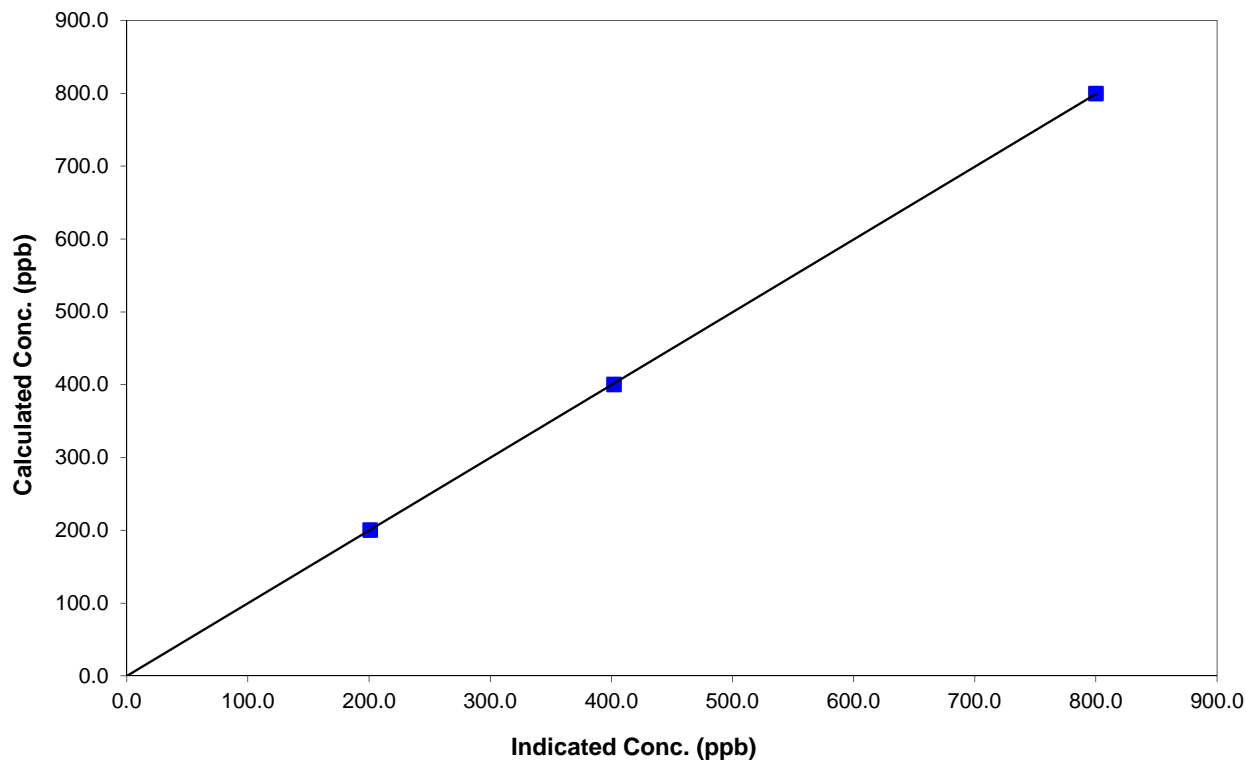
Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 26, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:15	End Time (MST)	13:25
Analyzer make	42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999994
800.0	800.0	1.0000		
400.5	402.2	0.9956	Slope	0.999476
200.2	200.9	0.9966		
0.0	-0.1	0.0000	Intercept	-0.287266

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

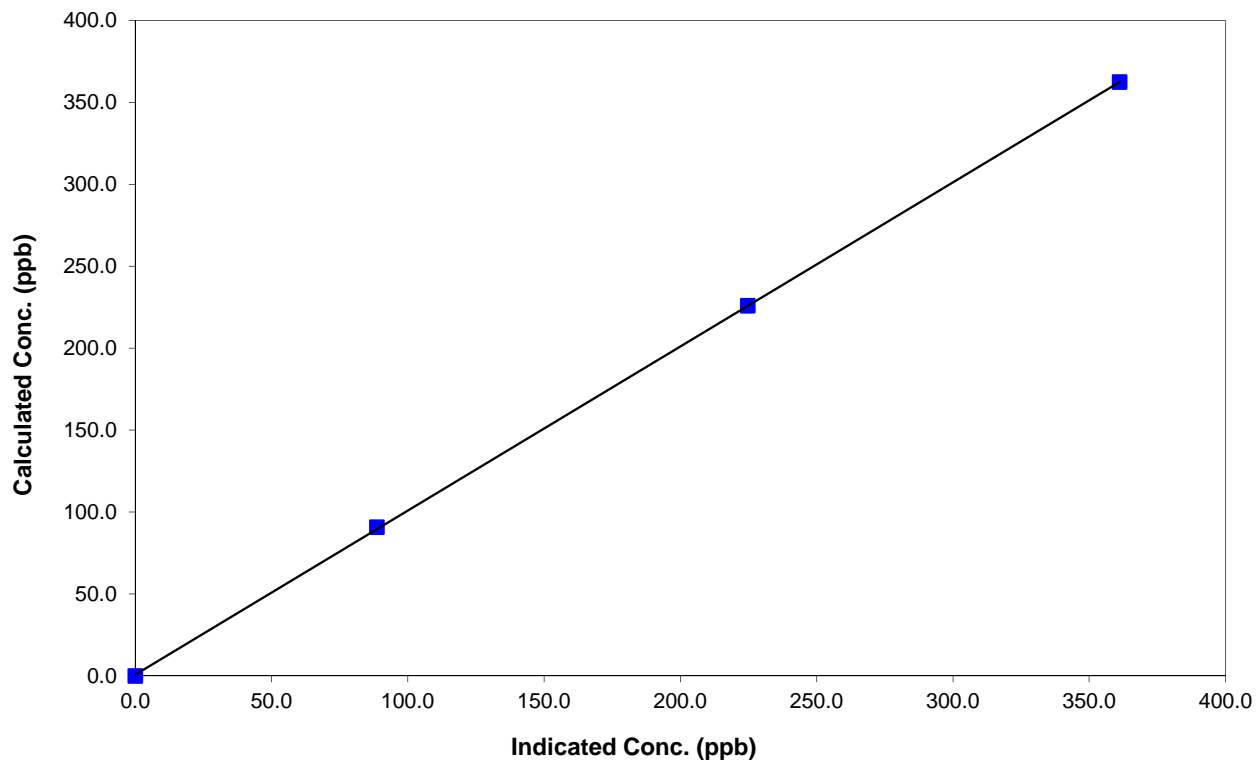
Station Information

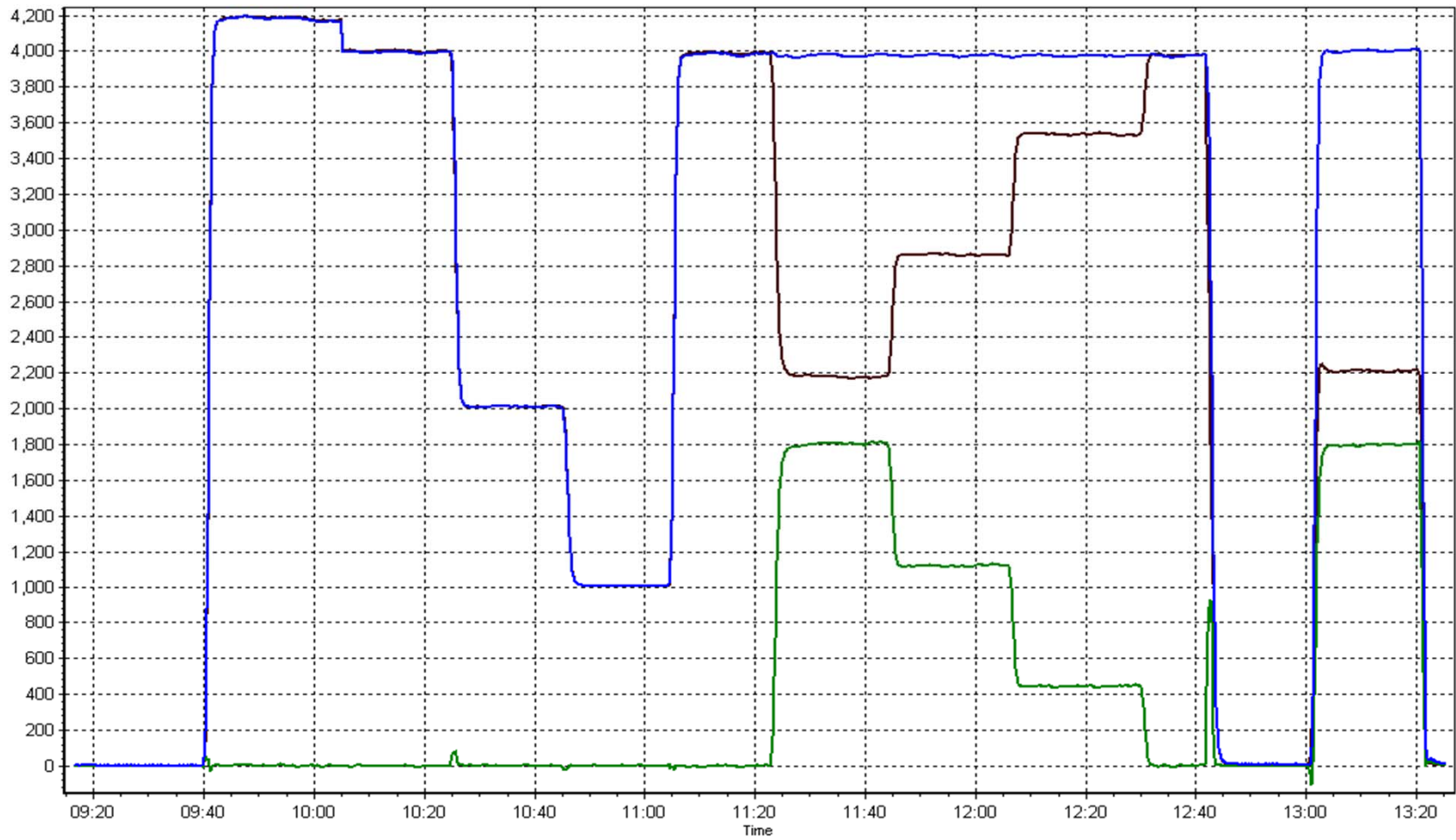
Calibration Date	September 9, 2014	Previous Calibration	August 26, 2014
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:15	End Time (MST)	13:25
Analyzer make	42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999973
362.4	361.2	1.0034		
225.9	224.8	1.0053	Slope	1.002050
90.8	88.7	1.0232		
			Intercept	0.749136

NO₂ Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 16
SHELL MUSKEG RIVER
SEPTEMBER 2014**

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

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

October 30, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
 SEPTEMBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	683	37	37	100.00	31	0	4	0
THC (ppm) Average	680	37	40	99.58	6	-	2.8	-
NO2 (ppb) Average	682	38	38	100.00	29	0	16	-
NO (ppb) Average	682	38	38	100.00	118	-	17	-
NOX (ppb) Average	682	38	38	100.00	147	-	32	-
PM2.5 (ug/m3) Average	718	0	2	99.72	40.1	-	14.3	0
Temperature 2 m (C) Average	720	0	0	100.00	29.5	-	17.8	-
Relative Humidity (%) Average	720	0	0	100.00	100	-	-	-
Barometric Pressure (inHg) Average	720	0	0	100.00	29.6	-	-	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	30	-	-	-
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 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	683	1	3	-	0	0	0	0	1	2	31
THC (ppm) Average	680	2.43	0.4	-	1.9	2.1	2.2	2.3	2.6	2.8	6
NO2 (ppb) Average	682	8.6	7	-	0	1	3	7	13	18	29
NO (ppb) Average	682	7.7	12	-	0	0	0	3	11	23	118
NOX (ppb) Average	682	16.3	17	-	0	1	4	11	23	39	147
PM2.5 (ug/m3) Average	718	5.64	4.4	-	0.2	1.8	2.5	4.8	7.4	10.6	40.1
Temperature 2 m (C) Average	720	9.58	5.6	-	-2.1	3.2	5.5	9	13.1	17.3	29.5
Relative Humidity (%) Average	720	74.6	18	-	25	48	61	78	90	96	100
Barometric Pressure (inHg) Average	720	28.87	0.3	-	28.4	28.5	28.7	28.9	29	29.3	29.6
Wind Speed 10 m (km/h) Average	720	10.1	6	-	1	4	6	9	13	19	30
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
SEPTEMBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	08 Sep 2014 20:00	08 Sep 2014 20:00	1	Power spike
THC	26 Sep 2014 13:00	26 Sep 2014 14:00	2	Maintenance - replace fuel cylinder
PM2.5	03 Sep 2014 01:00	03 Sep 2014 01:00	1	Unstable operation - filter tape advancement
PM2.5	06 Sep 2014 14:00	06 Sep 2014 14:00	1	Maintenance - Flow and zero check, sample head cleaning

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 31 ppb on Sep 5 12:00	Maximum Daily Average: 3.8 ppb on Sep 5		Hours of Data:	683
Minimum Value: 0 ppb on Sep 13 07:00	Minimum Daily Average: 0.2 ppb on Sep 9		Hours of Missing Data:	37
Maximum Diurnal Average: 2.6 ppb at hour 12	Minimum Diurnal Average: 0.4 ppb at hour 6		Hours of Calibration:	37
Monthly Average: 1.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 15		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	1	1	0	0	0	0	0	0.5	4
2-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
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	0.3	0
4-Sep	Z	2	3	2	2	3	3	2	2	3	2	2	1	1	2	1	0	1	1	1	0	0	0	0	1.5	3
5-Sep	Z	0	0	0	0	0	0	0	0	0	5	31	16	12	14	2	1	0	0	0	0	1	1	2	3.8	31
6-Sep	Z	2	1	1	0	0	1	0	0	C	C	C	C	C	0	0	0	0	0	0	0	1	0	1	0.5	2
7-Sep	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-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
9-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
10-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	2	0	0	0	1	1	0.5	4
11-Sep	Z	0	0	1	1	1	1	2	5	4	1	1	1	2	1	0	0	0	0	0	0	0	0	0	1.1	5
12-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
13-Sep	Z	0	0	0	0	0	0	0	0	0	0	1	11	9	5	6	5	7	6	2	1	0	0	0	2.3	11
14-Sep	Z	0	0	0	0	0	0	0	1	2	10	12	15	2	1	0	0	0	0	0	0	0	0	0	2.1	15
15-Sep	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
16-Sep	Z	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
17-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1
18-Sep	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
19-Sep	Z	0	0	0	2	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
20-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
21-Sep	Z	3	5	4	2	1	2	2	1	1	1	1	0	0	0	0	0	0	0	1	2	2	2	1	1.4	5
22-Sep	Z	1	0	0	0	0	0	0	5	14	8	16	C	C	17	10	2	1	1	1	0	0	0	0	3.8	17
23-Sep	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1
24-Sep	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0.4	1
25-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
26-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
27-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	23	22	10	3	1	1	0	3.4	23
28-Sep	Z	0	0	0	0	0	0	1	1	5	6	3	5	2	1	1	0	1	1	4	3	3	3	4	2.0	6
29-Sep	Z	2	1	1	1	0	0	0	0	1	1	2	3	4	4	4	1	1	2	0	0	0	0	1	1.2	4
30-Sep	Z	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1

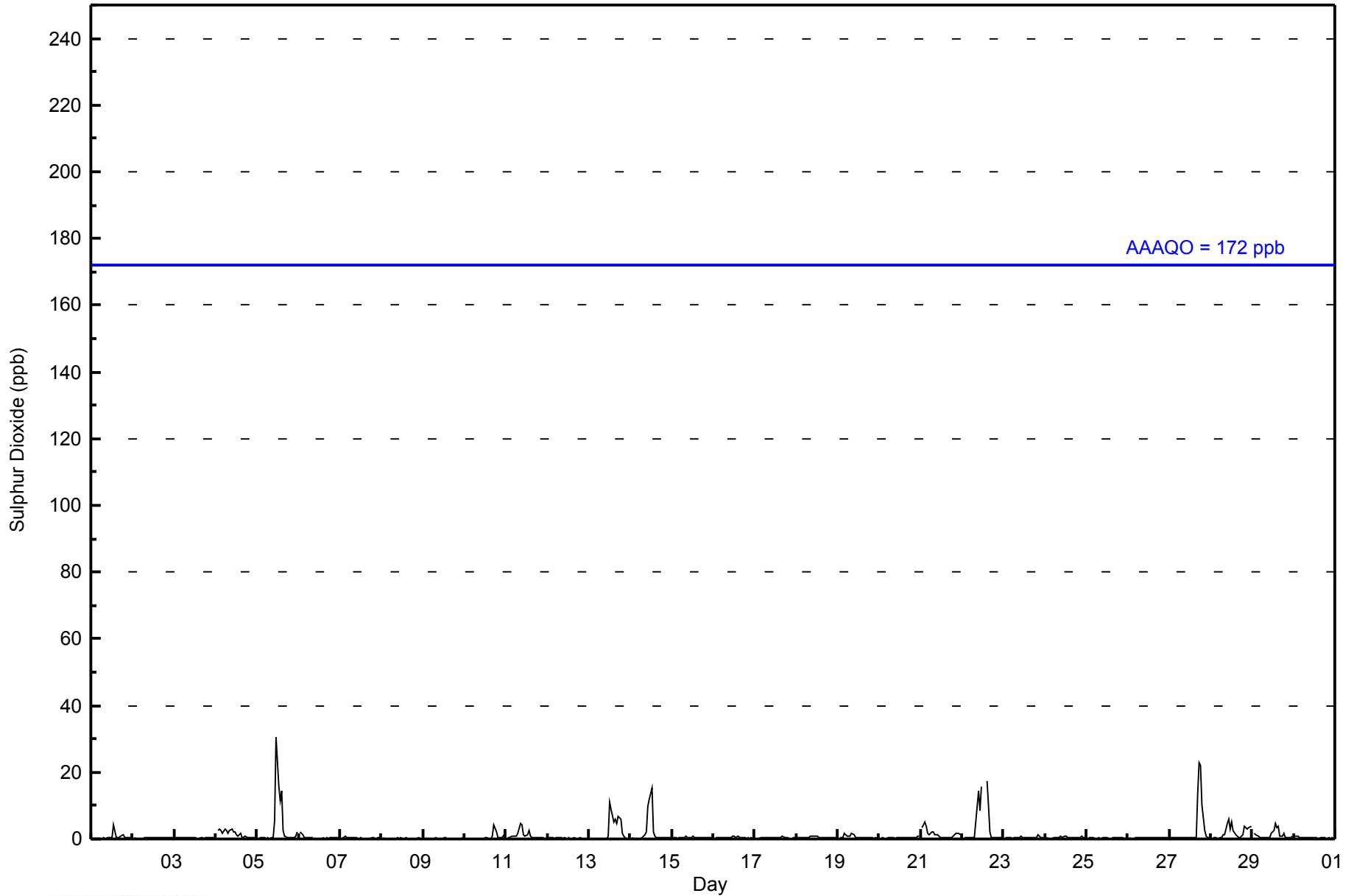
--	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.5	0.8	1.3	1.4	2.6	2.1	1.6	1.7	1.0	1.0	1.5	1.4	0.8	0.6	0.5	0.5	0.6	Diurnal Average
--	3	5	4	2	3	3	2	5	14	10	31	16	12	17	10	13	23	22	10	3	3	3	4	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	670	98.10	98.10
11 - 20	10	1.46	99.56
21 - 60	3	0.44	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - September 2014

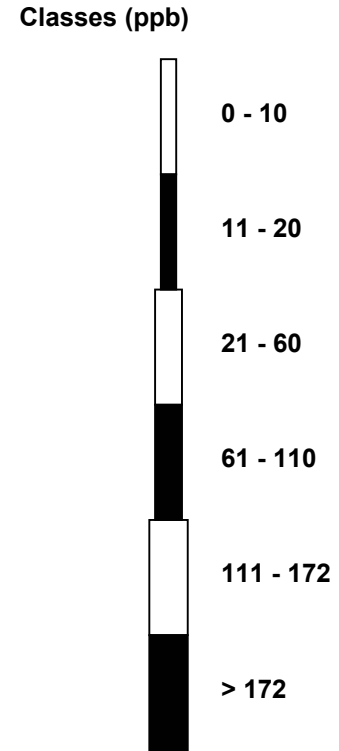
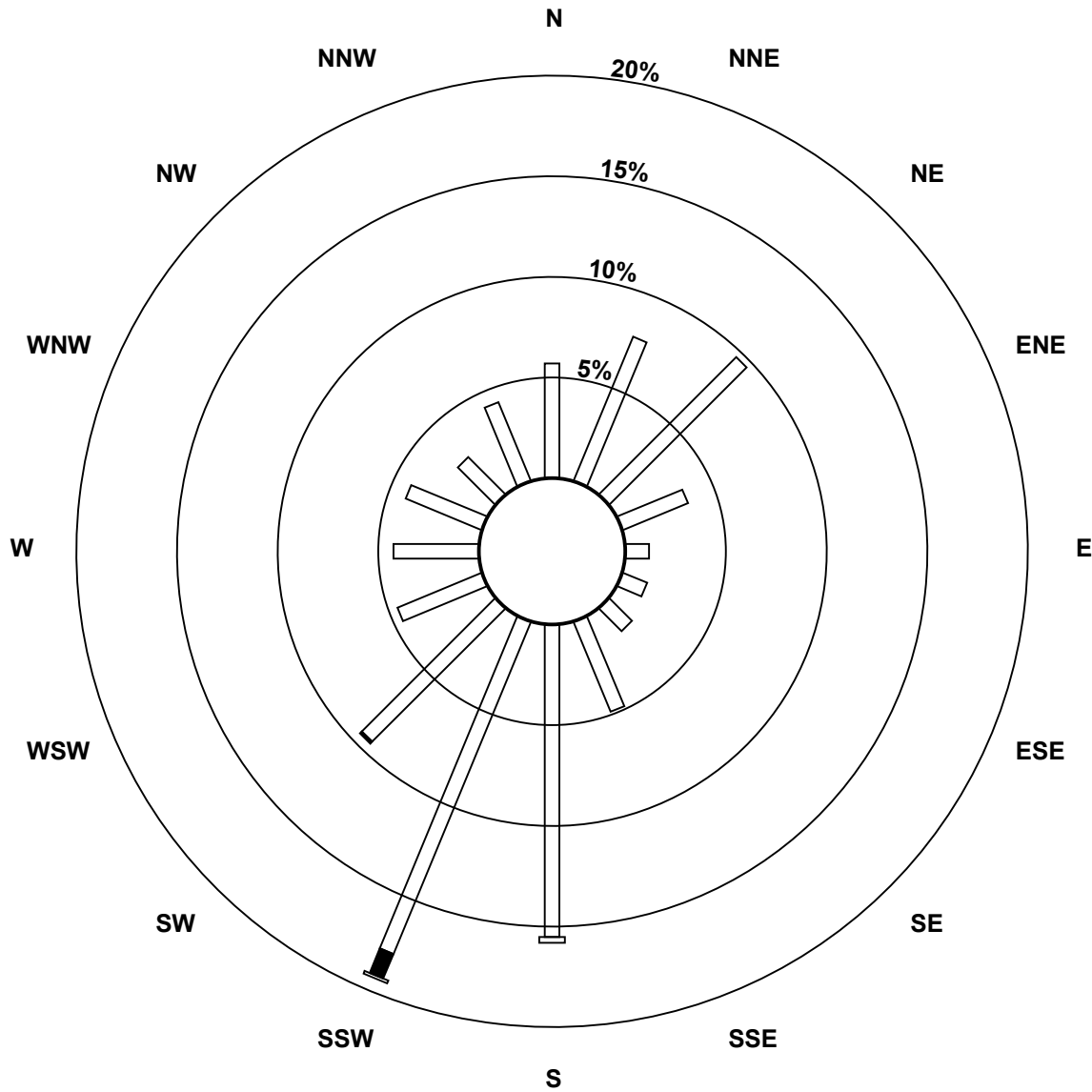
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	39	53	66	24	8	9	11	33	106	122	64	31	29	28	18	29	670
11 - 20	0	0	0	0	0	0	0	0	0	9	1	0	0	0	0	0	10
21 - 60	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	3
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	53	66	24	8	9	11	33	108	132	65	31	29	28	18	29	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

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

**Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River (AMS 16)**

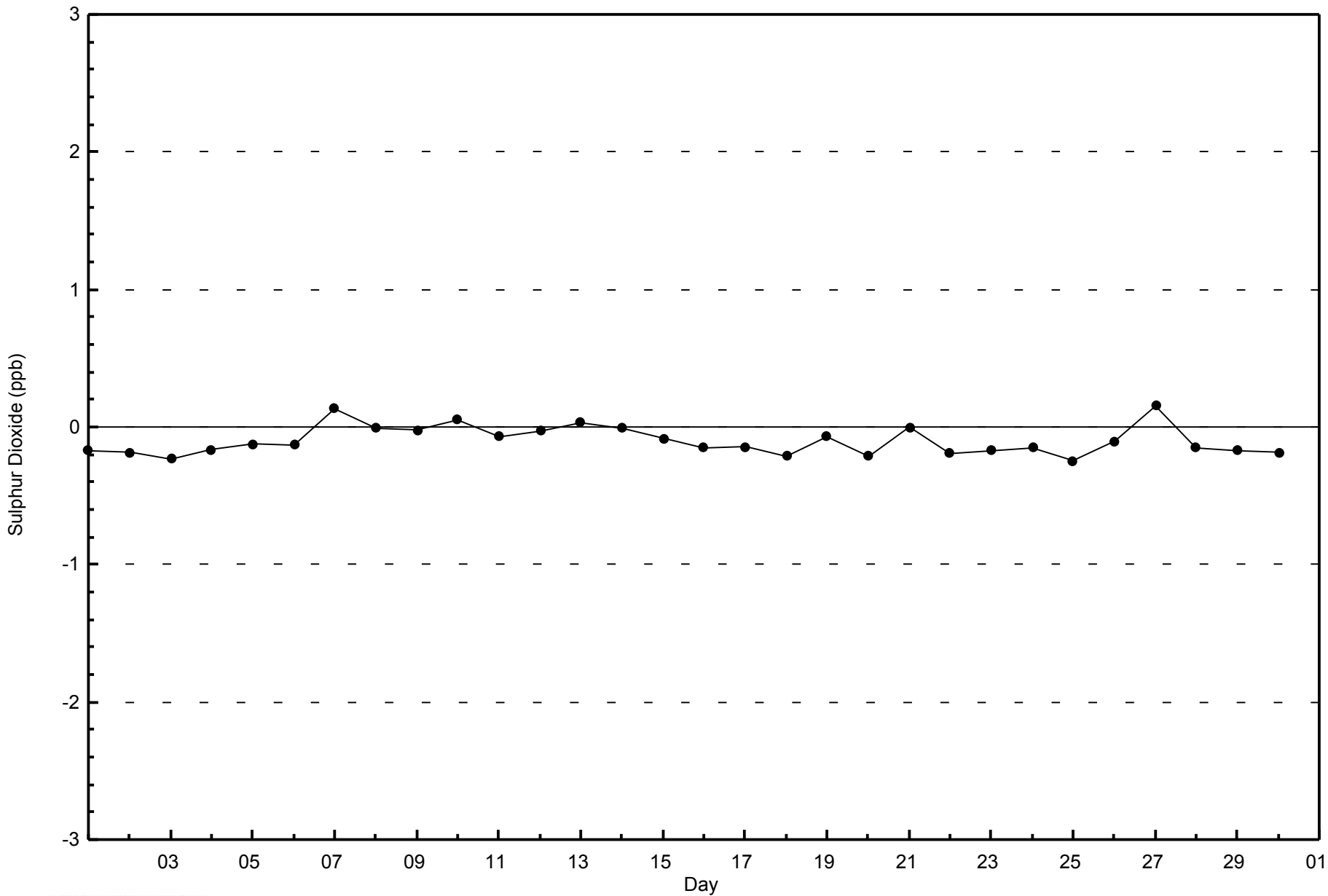


Total Number of Valid Hours: 683



WBEA
Zero Responses

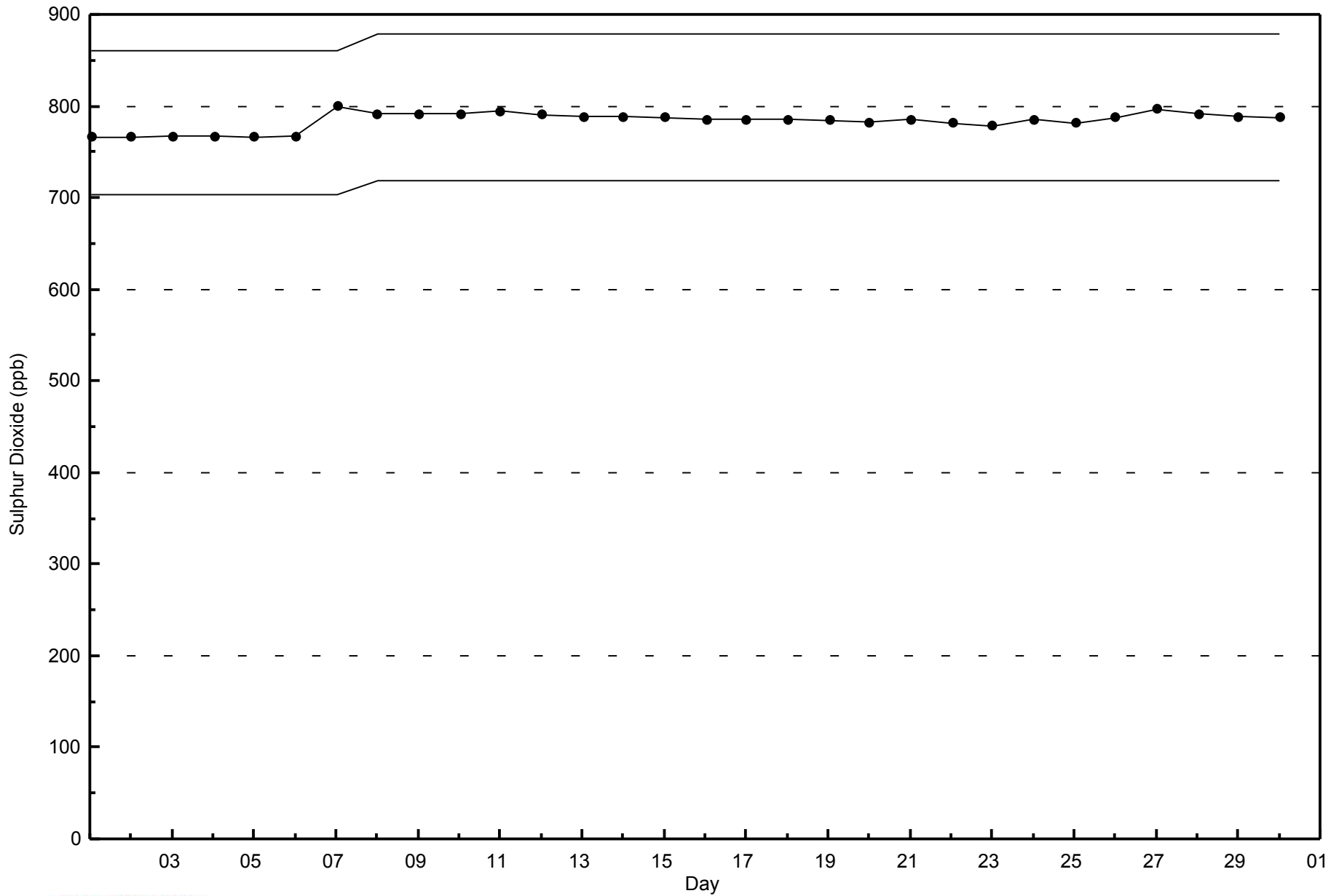
Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - September 2014



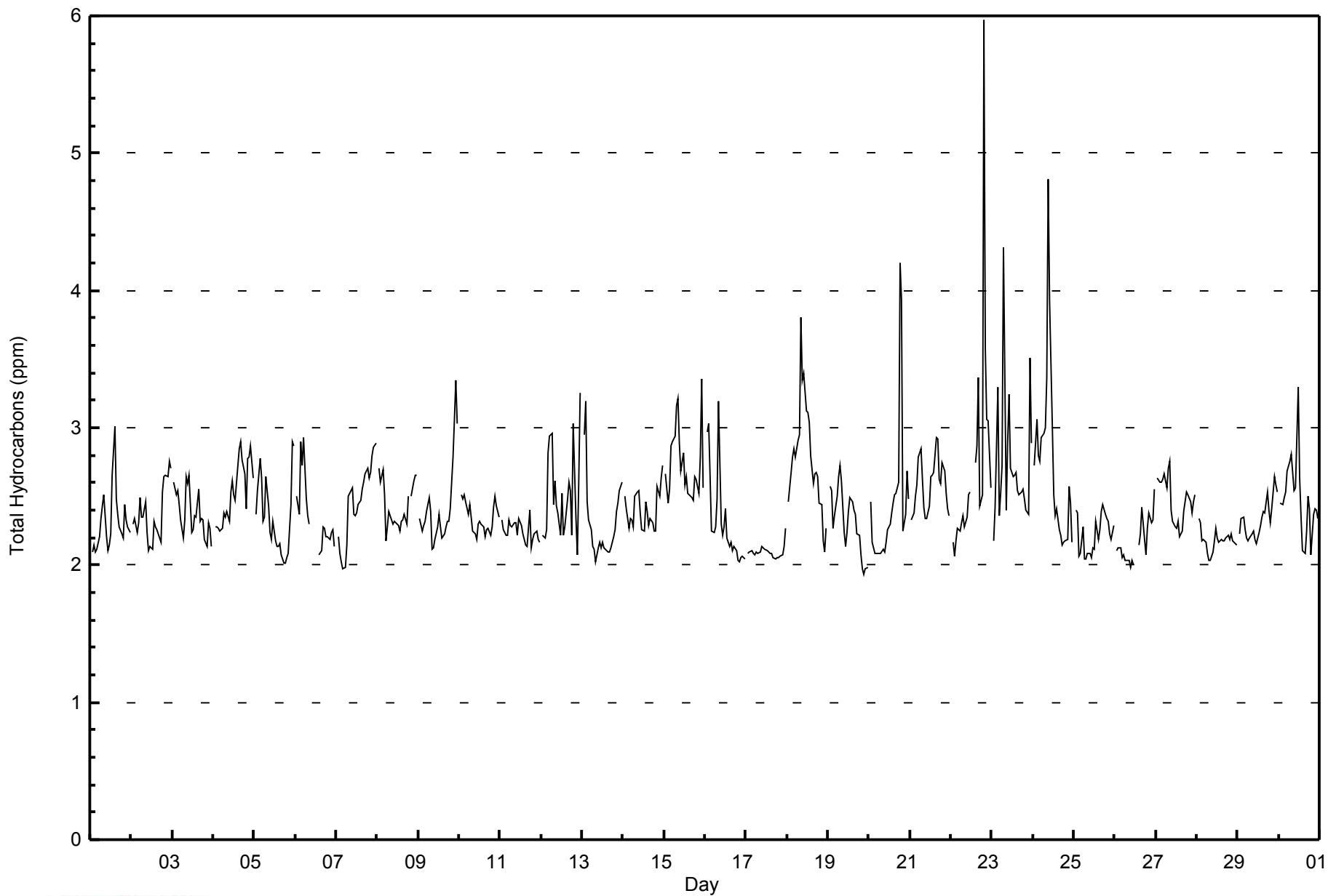


Maximum Value: 6.0 ppm on Sep 22 20:00																	Maximum Daily Average: 2.8 ppm on Sep 18							Hours in Service: 720				
Minimum Value: 1.9 ppm on Sep 19 22:00																	Minimum Daily Average: 2.1 ppm on Sep 17							Hours of Data: 680				
Maximum Diurnal Average: 2.5 ppm at hour 23																	Minimum Diurnal Average: 2.4 ppm at hour 16							Hours of Missing Data: 40				
Monthly Average: 2.43 ppm																	Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.6 P ₉₀ = 2.8 P ₉₉ = 3.8							Hours of Calibration: 37				
																								Percent Operational Time: 99.6				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Sep	Z	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.5	2.2	2.1	2.1	2.2	2.7	3.0	2.5	2.4	2.3	2.2	2.2	2.4	2.3	2.3	2.2	2.3	2.2	2.3	3.0
2-Sep	Z	2.3	2.3	2.2	2.3	2.5	2.4	2.3	2.5	2.2	2.1	2.1	2.1	2.3	2.3	2.3	2.2	2.2	2.5	2.6	2.7	2.6	2.8	2.7	2.4	2.4	2.8	
3-Sep	Z	2.6	2.5	2.5	2.4	2.3	2.2	2.3	2.6	2.6	2.7	2.2	2.3	2.4	2.3	2.5	2.3	2.3	2.3	2.2	2.1	2.3	2.3	2.1	2.4	2.4	2.7	
4-Sep	Z	2.3	2.3	2.3	2.2	2.3	2.4	2.3	2.4	2.3	2.5	2.6	2.5	2.5	2.7	2.9	2.9	2.8	2.7	2.4	2.8	2.8	2.9	2.6	2.5	2.5	2.9	
5-Sep	Z	2.4	2.5	2.8	2.6	2.3	2.3	2.6	2.4	2.2	2.2	2.3	2.2	2.1	2.1	2.2	2.1	2.0	2.0	2.1	2.1	2.4	2.9	2.9	2.3	2.3	2.9	
6-Sep	Z	2.5	2.4	2.9	2.7	2.9	2.5	2.4	2.3	C	C	C	C	C	2.1	2.1	2.3	2.3	2.2	2.2	2.2	2.3	2.1	2.4	2.4	2.9		
7-Sep	Z	2.2	2.1	2.0	2.0	2.0	2.2	2.5	2.5	2.6	2.4	2.4	2.4	2.4	2.5	2.6	2.6	2.7	2.7	2.6	2.7	2.8	2.9	2.9	2.5	2.9		
8-Sep	Z	2.7	2.6	2.7	2.5	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.5	PF	2.5	2.6	2.7	2.7	2.4	2.7		
9-Sep	Z	2.3	2.2	2.3	2.3	2.4	2.5	2.4	2.1	2.1	2.2	2.3	2.4	2.3	2.2	2.2	2.3	2.3	2.3	2.4	2.8	3.1	3.3	3.0	2.4	3.3		
10-Sep	Z	2.5	2.5	2.5	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.3	2.4	2.5	2.4	2.3	2.3	2.5		
11-Sep	Z	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.1	2.1	2.4	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.4		
12-Sep	Z	2.2	2.2	2.3	2.8	2.9	3.0	2.4	2.6	2.4	2.4	2.2	2.5	2.2	2.3	2.5	2.6	2.5	2.2	3.0	2.3	2.1	2.6	3.3	2.5	3.3		
13-Sep	Z	3.0	3.2	2.5	2.3	2.3	2.1	2.1	2.0	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.5	2.5	2.6	2.3	3.2		
14-Sep	Z	2.5	2.4	2.3	2.3	2.3	2.3	2.5	2.5	2.5	2.4	2.3	2.2	2.5	2.4	2.3	2.3	2.3	2.2	2.2	2.6	2.5	2.6	2.7	2.4	2.7		
15-Sep	Z	2.7	2.4	2.6	2.9	2.9	2.9	3.2	3.2	2.9	2.7	2.8	2.6	2.6	2.5	2.5	2.5	2.5	2.6	2.6	2.5	2.8	3.4	2.6	2.7	3.4		
16-Sep	Z	3.0	3.0	2.6	2.2	2.2	2.3	2.5	3.2	2.3	2.2	2.3	2.4	2.2	2.1	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.3	3.2		
17-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	2.0	2.1	2.1	2.1	2.1	2.1	2.3	2.1	2.3		
18-Sep	Z	2.5	2.7	2.8	2.9	2.8	2.9	3.0	3.8	3.3	3.4	3.1	3.1	3.0	2.8	2.6	2.7	2.7	2.6	2.5	2.4	2.2	2.1	2.3	2.8	3.8		
19-Sep	Z	2.6	2.5	2.3	2.4	2.5	2.6	2.7	2.6	2.2	2.1	2.2	2.4	2.5	2.5	2.4	2.4	2.2	2.2	2.1	2.0	1.9	2.0	2.0	2.3	2.7		
20-Sep	Z	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.4	2.4	2.5	2.5	2.6	4.2	3.9	2.3	2.4	2.7	2.5	2.5	4.2		
21-Sep	Z	2.3	2.4	2.5	2.6	2.8	2.8	2.6	2.4	2.3	2.3	2.4	2.6	2.7	2.7	2.9	2.9	2.6	2.6	2.7	2.7	2.5	2.4	2.4	2.6	2.9		
22-Sep	Z	2.2	2.1	2.2	2.3	2.2	2.3	2.4	2.3	2.3	2.5	2.5	C	C	2.8	2.9	3.4	2.4	2.5	6.0	3.6	3.1	3.0	2.6	2.7	6.0		
23-Sep	Z	2.2	2.4	3.3	2.4	2.5	2.7	4.3	2.4	2.9	3.2	2.7	2.6	2.6	2.7	2.5	2.5	2.5	2.5	2.5	2.4	2.4	3.5	2.9	2.7	4.3		
24-Sep	Z	2.7	3.1	2.8	2.8	2.9	3.0	3.0	3.4	4.8	3.9	3.0	2.5	2.4	2.4	2.3	2.2	2.1	2.2	2.2	2.6	2.5	2.2	2.7	2.7	4.8		
25-Sep	Z	2.4	2.4	2.1	2.1	2.3	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.3	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.3	2.2	2.4		
26-Sep	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	M	M	2.1	2.2	2.4	2.2	2.1	2.3	2.4	2.3	2.3	2.6	2.2	2.6		
27-Sep	Z	2.6	2.6	2.6	2.6	2.7	2.6	2.7	2.8	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.4	2.5	2.5	2.5	2.5	2.4	2.5	2.5	2.5	2.8		
28-Sep	Z	2.3	2.3	2.2	2.2	2.2	2.1	2.0	2.0	2.1	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	2.1	2.2	2.3		
29-Sep	Z	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.4	2.3	2.4	2.6	2.6	2.5	2.3	2.6		
30-Sep	Z	2.5	2.4	2.5	2.5	2.7	2.8	2.8	2.7	2.5	2.6	3.3	2.6	2.4	2.1	2.1	2.2	2.5	2.4	2.1	2.4	2.4	2.4	2.3	2.5	3.3		
	--	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.4	2.5	2.5		Diurnal Average		
	--	3.0	3.2	3.3	2.9	2.9	3.0	4.3	3.8	4.8	3.9	3.3	3.1	3.0	3.0	2.9	3.4	2.8	4.2	6.0	3.6	3.1	3.5	3.3		Diurnal Maximum		
Z - zerospan		C - Calibration				M - Maintenance				PF - Power Failure																		



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - September 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	24	3.53	3.53
2.1 - 3.0	628	92.35	95.88
3.1 - 10.0	28	4.12	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - September 2014

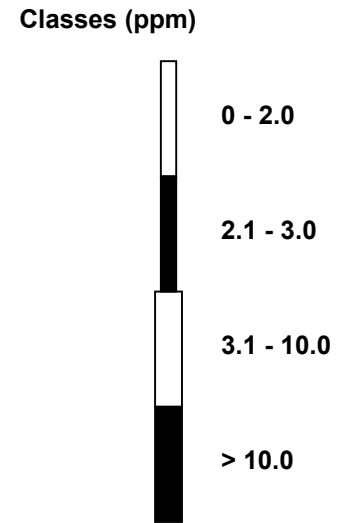
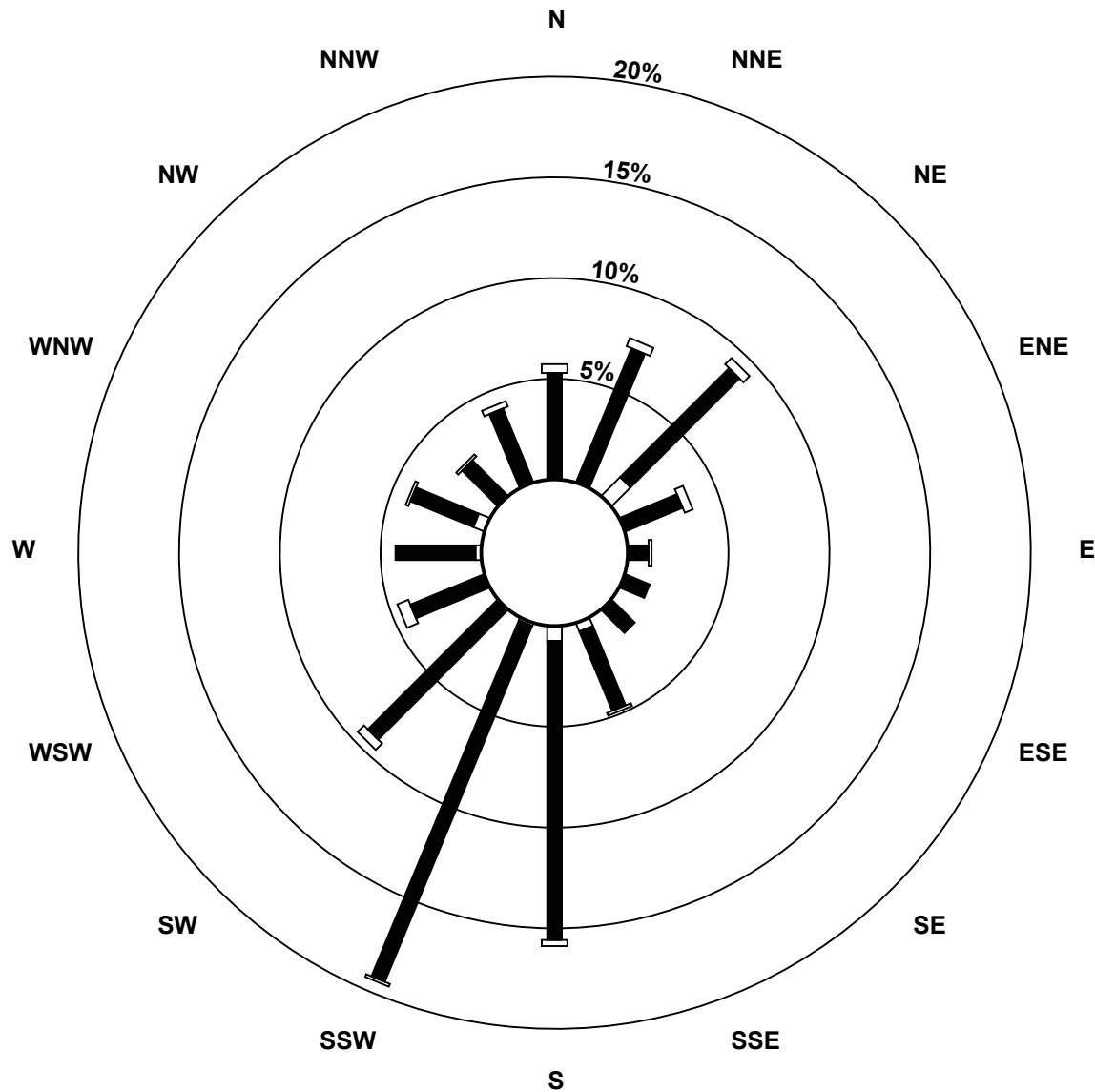
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	9	0	0	0	0	3	5	1	0	0	2	4	0	0	24
2.1 - 3.0	36	49	52	21	7	9	11	29	101	130	62	27	27	23	17	27	628
3.1 - 10.0	3	3	3	3	1	0	0	1	2	1	3	4	0	1	1	2	28
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	52	64	24	8	9	11	33	108	132	65	31	29	28	18	29	680

Total Number of Valid Hours: 680

Total Number of Hours: 720

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

**Total Hydrocarbons (THC) - ppm
Shell Muskeg River (AMS 16)**

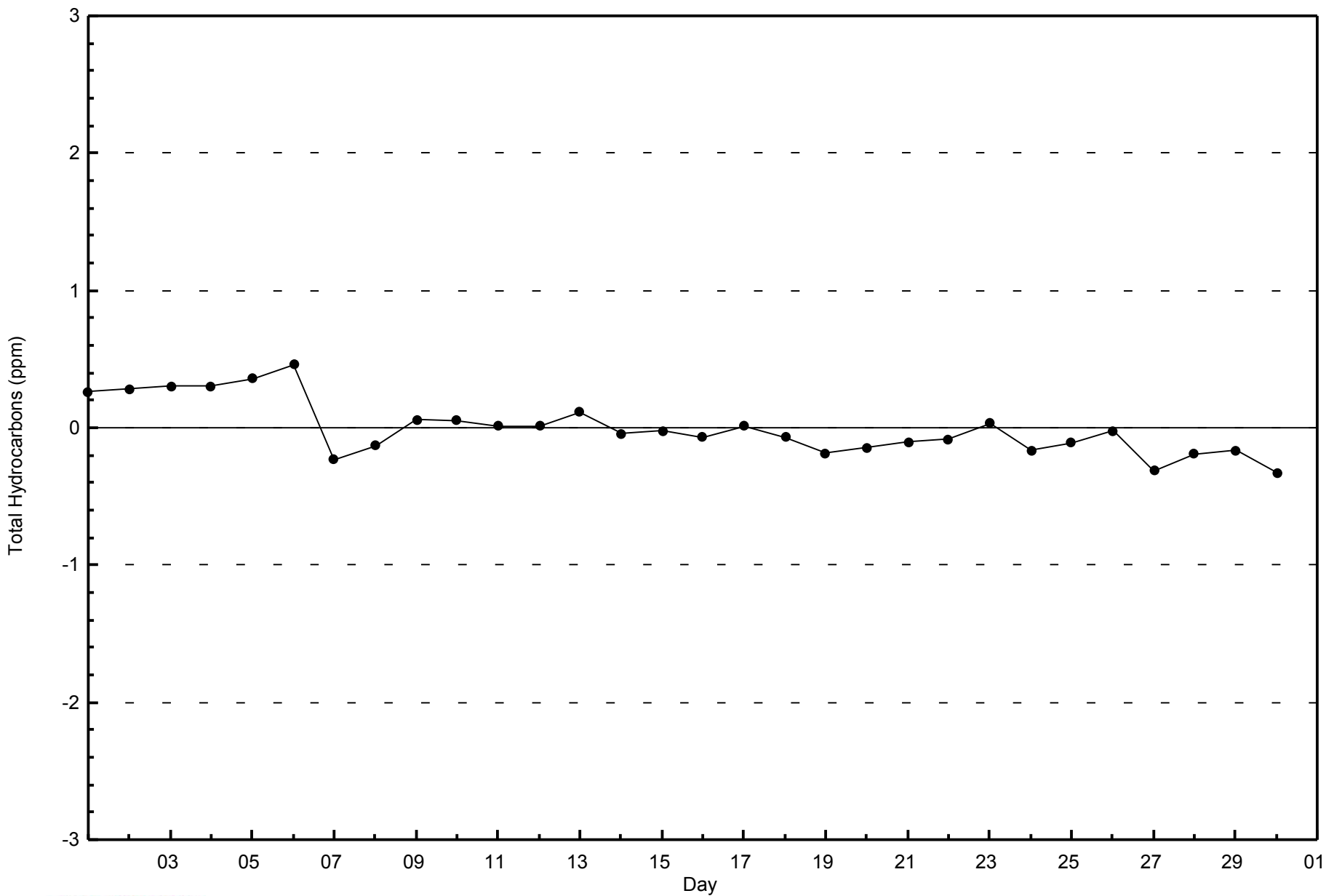


Total Number of Valid Hours: 680



WBEA
Zero Responses

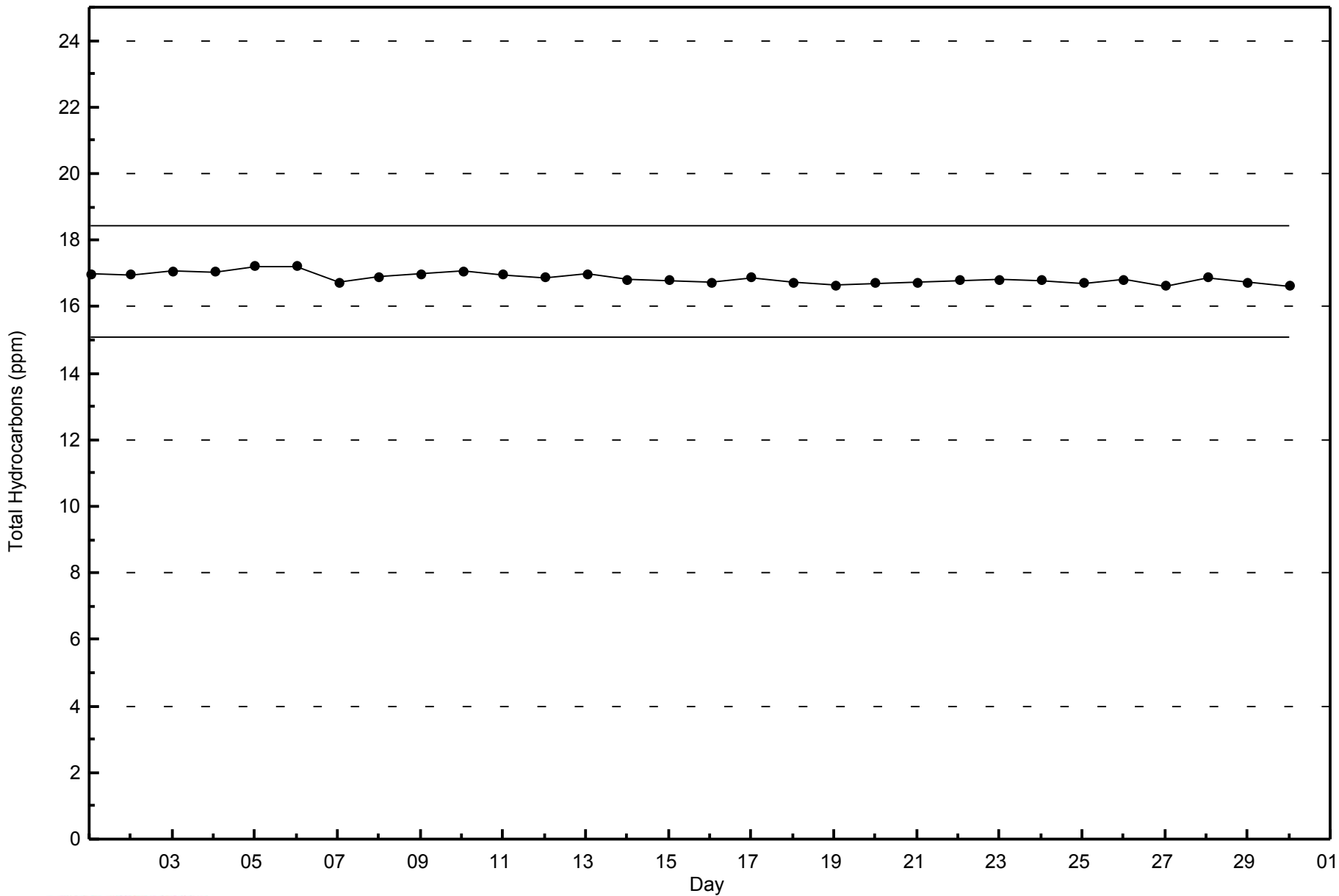
Total Hydrocarbons (THC) - ppm
Shell Muskeg River - September 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - September 2014



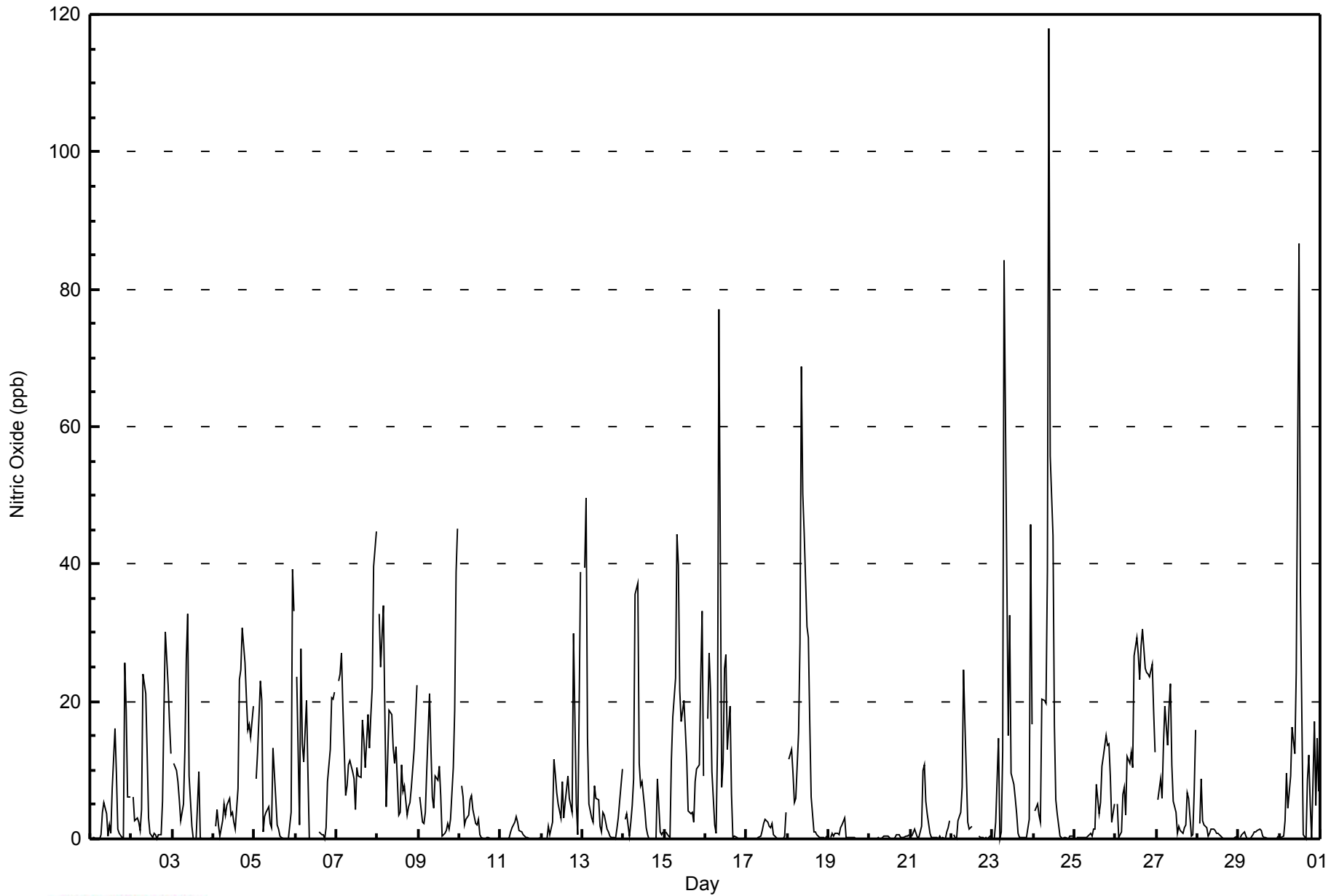


Maximum Value: 118 ppb on Sep 24 10:00																		Maximum Daily Average: 16.8 ppb on Sep 26						Hours in Service: 720			
Minimum Value: 0 ppb on Sep 3 15:00																		Minimum Daily Average: 0.2 ppb on Sep 20						Hours of Data: 682			
Maximum Diurnal Average: 16.7 ppb at hour 9																		Minimum Diurnal Average: 3.7 ppb at hour 18						Hours of Missing Data: 38			
Monthly Average: 7.7 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 3 Q ₃ = 11 P ₉₀ = 23 P ₉₉ = 49						Hours of Calibration: 38			
																		Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	Z	0	0	0	0	0	1	4	5	4	0	2	1	7	16	9	1	1	0	0	26	19	6	6	4.7	26	
2-Sep	Z	6	3	3	2	1	4	24	21	12	3	1	0	1	1	0	1	1	6	19	30	22	17	12	8.3	30	
3-Sep	Z	11	10	8	6	3	5	13	26	33	9	2	0	0	0	10	0	0	0	0	0	0	0	0	5.9	33	
4-Sep	Z	2	4	2	0	3	5	3	5	6	3	4	2	2	7	23	25	31	26	21	16	17	15	19	10.5	31	
5-Sep	Z	9	13	23	20	1	3	4	5	2	2	13	6	2	1	0	0	0	0	0	0	4	39	33	7.8	39	
6-Sep	Z	24	2	28	14	11	20	10	0	C	C	C	C	C	1	1	1	0	2	8	13	21	20	21	10.9	28	
7-Sep	Z	23	24	27	19	6	8	11	11	10	9	4	10	9	9	17	14	10	18	13	18	22	40	45	16.5	45	
8-Sep	Z	33	25	34	19	5	11	19	18	13	11	13	4	4	11	7	8	4	5	5	7	13	18	22	13.4	34	
9-Sep	Z	6	2	2	4	10	21	13	6	5	9	9	11	6	0	1	1	2	1	3	10	19	39	45	9.8	45	
10-Sep	Z	8	6	2	3	4	6	6	4	2	2	3	1	0	0	0	0	0	0	0	0	0	0	0	2.1	8	
11-Sep	Z	0	0	0	0	0	1	2	2	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0.6	3	
12-Sep	Z	0	0	0	2	1	3	12	9	7	5	3	8	3	5	9	6	5	4	30	5	1	19	39	7.6	39	
13-Sep	Z	40	50	15	5	3	2	8	6	6	2	1	4	3	1	1	0	0	0	0	1	3	5	10	7.3	50	
14-Sep	Z	3	4	0	2	5	9	36	37	11	8	8	4	2	1	0	0	0	0	0	9	1	1	1	6.1	37	
15-Sep	Z	1	0	0	11	18	23	44	40	21	17	20	16	11	4	4	4	2	8	10	11	23	33	9	14.5	44	
16-Sep	Z	17	27	22	10	2	1	14	77	8	11	25	27	13	19	6	0	0	0	0	0	0	0	0	12.2	77	
17-Sep	Z	0	0	0	0	0	0	0	0	1	2	3	2	2	2	2	1	0	0	0	0	0	0	4	0.9	4	
18-Sep	Z	12	13	9	5	6	15	29	69	50	45	31	29	17	6	1	1	1	0	0	0	0	0	0	14.8	69	
19-Sep	Z	0	1	0	1	1	1	2	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3	
20-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0.2	1	
21-Sep	Z	0	1	1	0	0	2	10	11	5	4	1	0	0	0	0	0	0	0	0	0	1	2	3	1.8	11	
22-Sep	Z	1	0	0	3	4	8	25	17	3	1	2	2	C	C	C	0	0	0	0	0	0	0	1	3.3	25	
23-Sep	Z	0	2	15	0	1	13	84	38	15	32	10	8	6	4	1	0	0	0	0	0	3	46	17	12.8	84	
24-Sep	Z	4	5	4	3	20	20	20	39	118	56	44	16	6	4	0	0	0	0	0	0	0	0	0	15.7	118	
25-Sep	Z	0	0	0	0	0	0	0	0	1	0	2	1	8	4	5	11	12	15	14	14	9	2	5	4.5	15	
26-Sep	Z	5	0	1	6	8	4	12	11	13	10	27	29	27	23	28	31	25	24	24	24	25	19	13	16.8	31	
27-Sep	Z	6	9	6	14	19	14	19	23	11	6	4	1	2	1	1	2	2	7	6	0	1	7	16	7.5	23	
28-Sep	Z	2	9	3	2	2	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1.1	9	
29-Sep	Z	0	1	1	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1	
30-Sep	Z	0	0	3	10	4	9	16	14	12	24	87	36	18	1	0	9	12	5	0	17	5	15	7	13.2	87	
--		7.1	7.1	7.0	5.4	4.6	7.0	14.6	16.7	13.0	9.5	11.1	7.7	5.4	4.2	4.4	3.9	3.7	4.1	5.1	6.7	7.0	11.4	11.0	Diurnal Average		
--		40	50	34	20	20	23	84	77	118	56	87	36	27	23	28	31	31	26	30	30	25	46	45	Diurnal Maximum		
Z - zerospan		C - Calibration																									



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Shell Muskeg River - September 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Shell Muskeg River - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	603	88.42	88.42
21 - 40	65	9.53	97.95
41 - 80	11	1.61	99.56
81 - 159	3	0.44	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Shell Muskeg River - September 2014

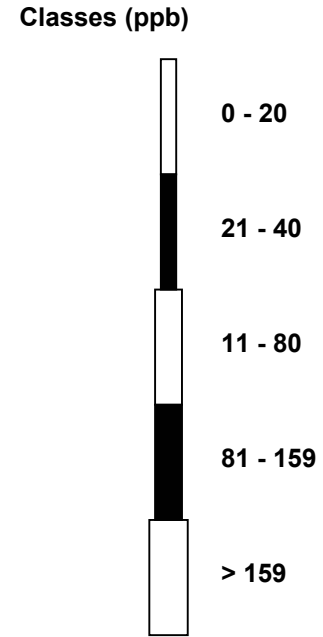
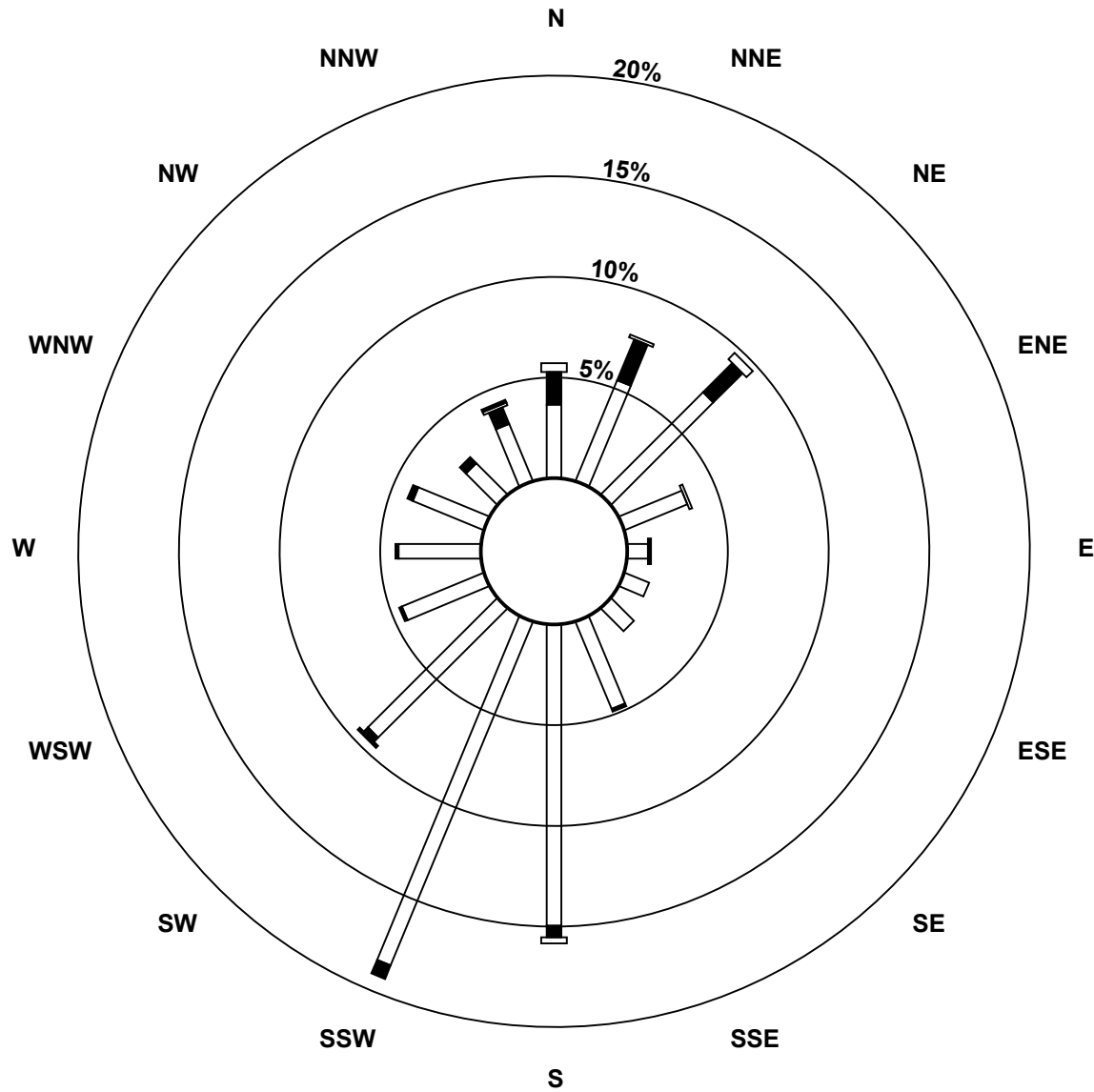
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	25	37	49	23	7	9	11	32	102	126	62	30	28	26	15	21	603
21 - 40	11	15	14	0	0	0	0	1	4	5	2	1	1	2	3	6	65
41 - 80	3	1	3	1	0	0	0	0	2	0	0	0	0	0	0	1	11
81 - 159	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	53	66	24	8	9	11	33	108	131	65	31	29	28	18	29	682

Total Number of Valid Hours: 682

Total Number of Hours: 720

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

**Nitric Oxide (NO) - ppb
Shell Muskeg River (AMS 16)**

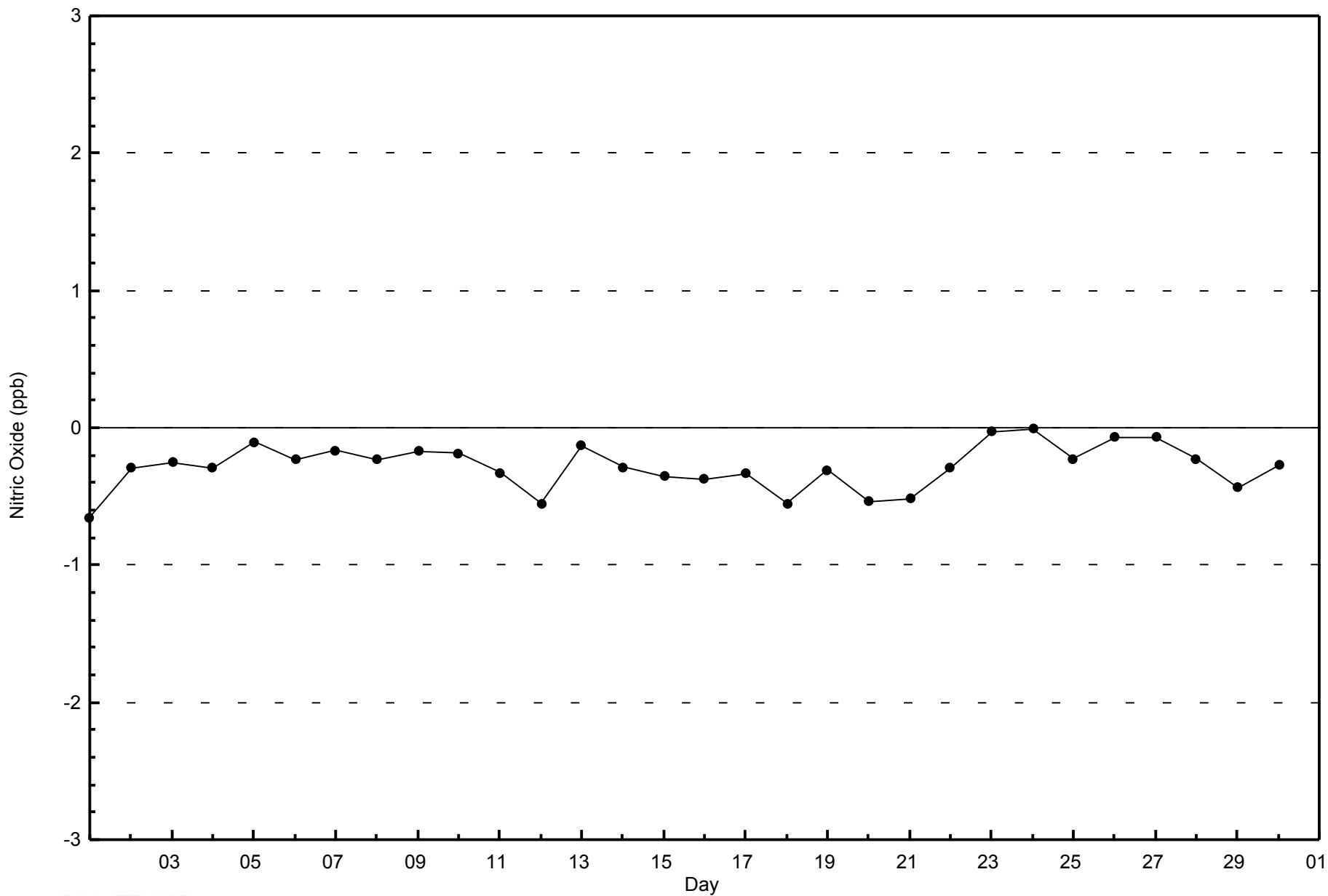


Total Number of Valid Hours: 682



WBEA
Zero Responses

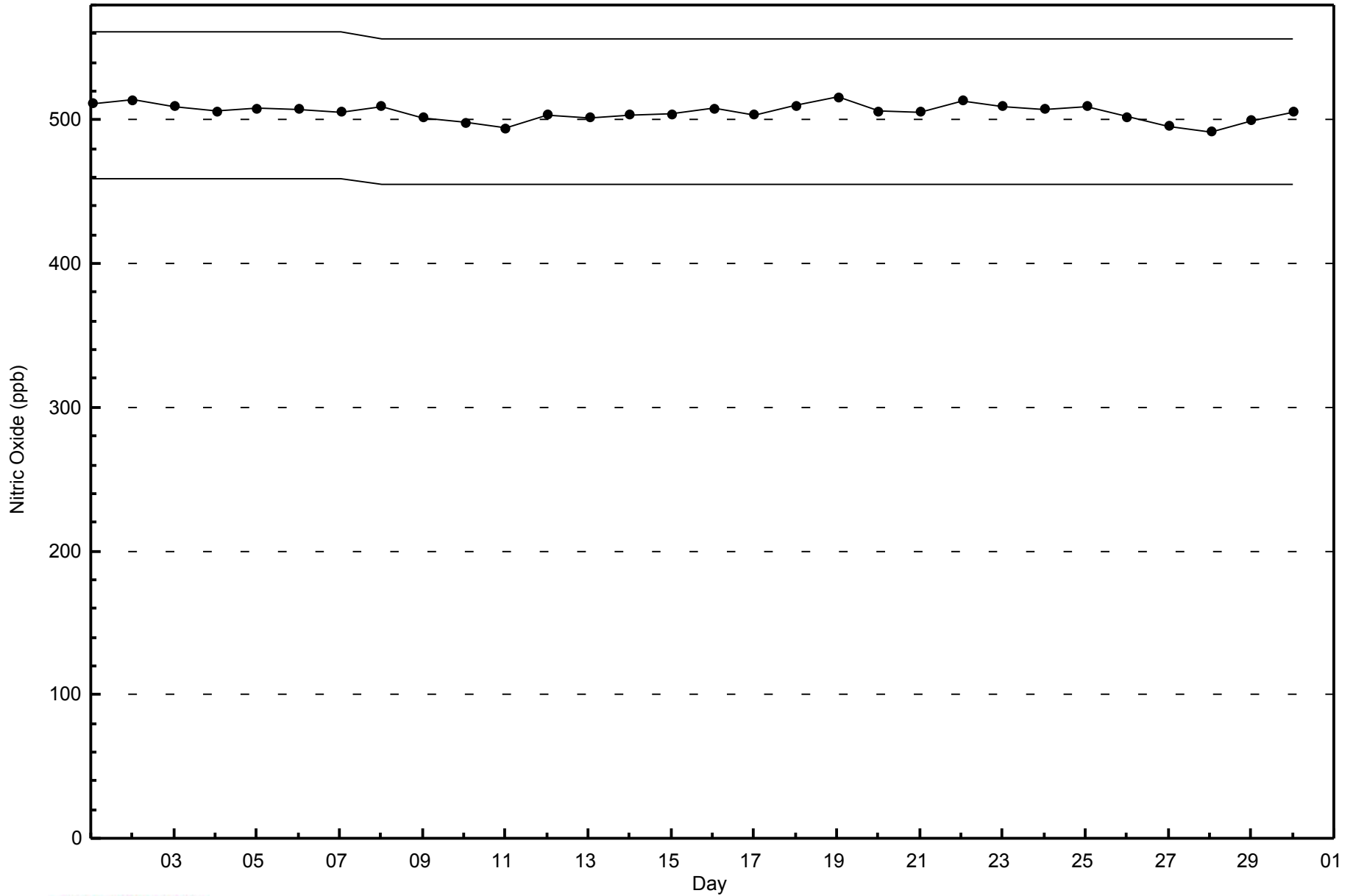
Nitric Oxide (NO) - ppb
Shell Muskeg River - September 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Shell Muskeg River - September 2014





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 29 ppb on Sep 9 23:00	Maximum Daily Average: 15.6 ppb on Sep 7
Minimum Value: 0 ppb on Sep 16 23:00	Hours of Data: 682
Maximum Diurnal Average: 12.0 ppb at hour 23	Hours of Missing Data: 38
Monthly Average: 8.6 ppb	Hours of Calibration: 38
Minimum Daily Average: 1.9 ppb on Sep 17	Percent Operational Time: 100.0
Minimum Diurnal Average: 5.6 ppb at hour 16	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 3 Median = 7 Q ₃ = 13 P ₉₀ = 18 P ₉₉ = 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	Z	2	2	2	1	2	5	5	5	4	1	4	2	11	25	14	5	4	3	5	21	17	10	7	6.9	25
2-Sep	Z	6	3	4	3	2	3	5	5	8	5	3	1	4	6	2	3	4	19	24	23	16	11	6	7.0	24
3-Sep	Z	5	5	4	4	3	4	6	11	14	9	3	0	0	0	7	1	1	2	1	3	4	4	6	4.2	14
4-Sep	Z	13	14	12	10	10	9	7	7	5	4	5	4	10	15	18	19	18	17	16	17	21	22	22	12.0	22
5-Sep	Z	15	20	21	18	7	5	6	7	4	3	14	10	7	8	4	2	1	1	4	4	12	21	21	9.4	21
6-Sep	Z	21	11	15	13	16	16	9	0	C	C	C	C	C	4	2	5	3	3	8	11	18	18	20	10.6	21
7-Sep	Z	18	17	18	17	7	10	14	13	10	9	6	11	14	12	18	18	16	22	17	22	23	25	23	15.6	25
8-Sep	Z	23	23	24	22	14	14	15	13	11	11	14	7	7	11	12	15	10	13	14	19	21	23	17	15.4	24
9-Sep	Z	10	9	8	9	12	17	16	8	6	11	11	14	9	1	3	7	9	12	17	21	26	29	21	12.4	29
10-Sep	Z	14	12	9	9	10	9	8	8	6	5	6	2	1	0	1	1	2	2	2	5	4	4	5	5.4	14
11-Sep	Z	7	5	4	3	6	7	5	5	6	4	3	3	2	2	1	1	2	2	3	6	4	1	3	3.6	7
12-Sep	Z	3	4	7	15	11	9	15	13	9	7	5	11	6	10	13	16	18	16	26	17	8	19	23	12.2	26
13-Sep	Z	24	22	13	8	6	5	5	4	6	2	2	5	7	5	5	4	5	7	11	21	17	17	12	9.3	24
14-Sep	Z	13	13	10	11	13	10	12	13	11	10	12	9	6	3	1	1	1	3	6	12	13	10	6	8.5	13
15-Sep	Z	6	4	5	13	13	11	12	14	14	13	17	16	15	9	9	10	10	16	19	22	22	20	13	13.1	22
16-Sep	Z	16	17	15	9	4	4	6	20	7	7	11	12	9	12	5	1	2	2	1	1	1	0	1	6.9	20
17-Sep	Z	1	0	0	1	1	1	1	1	2	2	2	2	3	3	3	2	2	1	1	1	2	5	7	1.9	7
18-Sep	Z	6	6	6	6	5	4	5	13	16	19	17	20	18	12	5	6	6	6	6	5	6	3	2	8.5	20
19-Sep	Z	4	9	7	13	12	8	8	7	7	1	1	1	1	1	1	1	1	1	0	0	0	0	1	3.6	13
20-Sep	Z	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	3	5	4	4	4	13	11	11	2.9	13
21-Sep	Z	14	20	17	11	11	12	14	11	7	5	2	1	1	1	1	1	3	5	9	7	12	17	17	8.5	20
22-Sep	Z	16	10	5	13	10	14	16	15	10	7	9	10	C	C	C	3	3	7	5	5	4	9	9	9.0	16
23-Sep	Z	3	8	18	5	10	13	27	26	19	28	18	16	12	10	4	2	3	6	6	13	15	24	16	13.1	28
24-Sep	Z	15	14	11	12	16	13	8	11	29	28	28	16	10	11	3	2	1	1	0	0	10	6	4	10.8	29
25-Sep	Z	3	2	2	1	2	2	2	1	2	1	3	3	15	12	14	16	16	19	18	15	10	4	10	7.5	19
26-Sep	Z	5	1	3	6	6	4	10	8	8	7	12	12	13	12	16	16	15	14	17	18	20	16	16	11.0	20
27-Sep	Z	15	16	14	19	21	18	19	19	9	4	4	2	4	3	2	8	15	21	18	11	11	14	12	12.0	21
28-Sep	Z	10	12	9	11	12	9	7	4	3	2	2	2	2	1	1	1	1	3	7	7	5	6	6	5.2	12
29-Sep	Z	9	15	14	8	2	1	1	2	2	2	3	4	4	3	3	3	2	3	2	3	3	8	7	4.5	15
30-Sep	Z	6	9	10	12	9	8	8	7	7	10	20	15	10	1	1	7	16	4	1	9	3	7	5	8.0	20

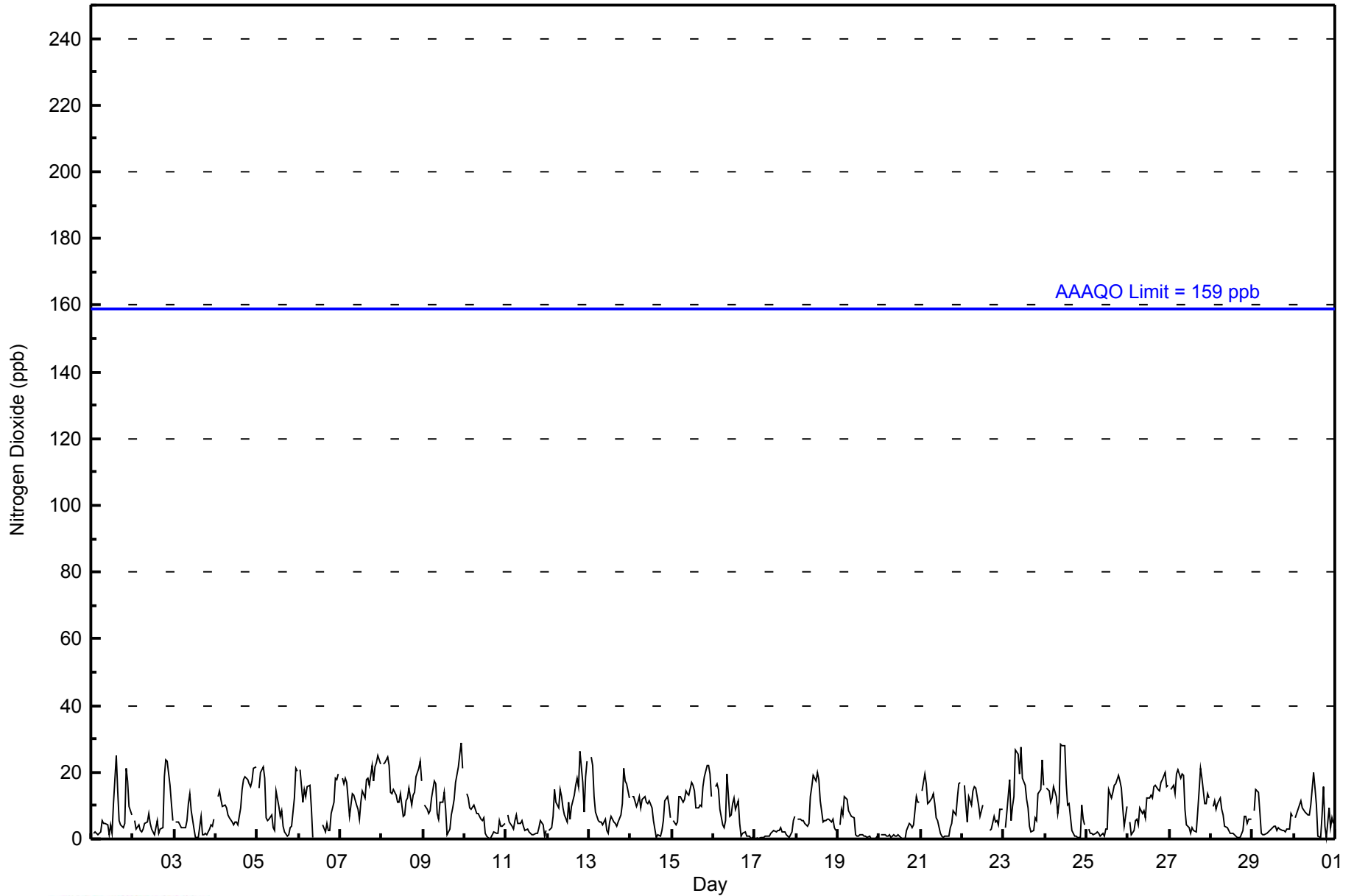
--	10.1	10.1	9.6	9.4	8.3	8.3	9.0	9.0	8.3	7.6	8.1	7.3	6.9	6.4	5.6	5.9	6.4	7.8	8.8	10.7	11.3	12.0	10.9	Diurnal Average	
--	24	23	24	22	21	18	27	26	29	28	28	20	18	25	18	18	19	22	26	23	26	29	23	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	641	93.99	93.99
21 - 40	41	6.01	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - September 2014

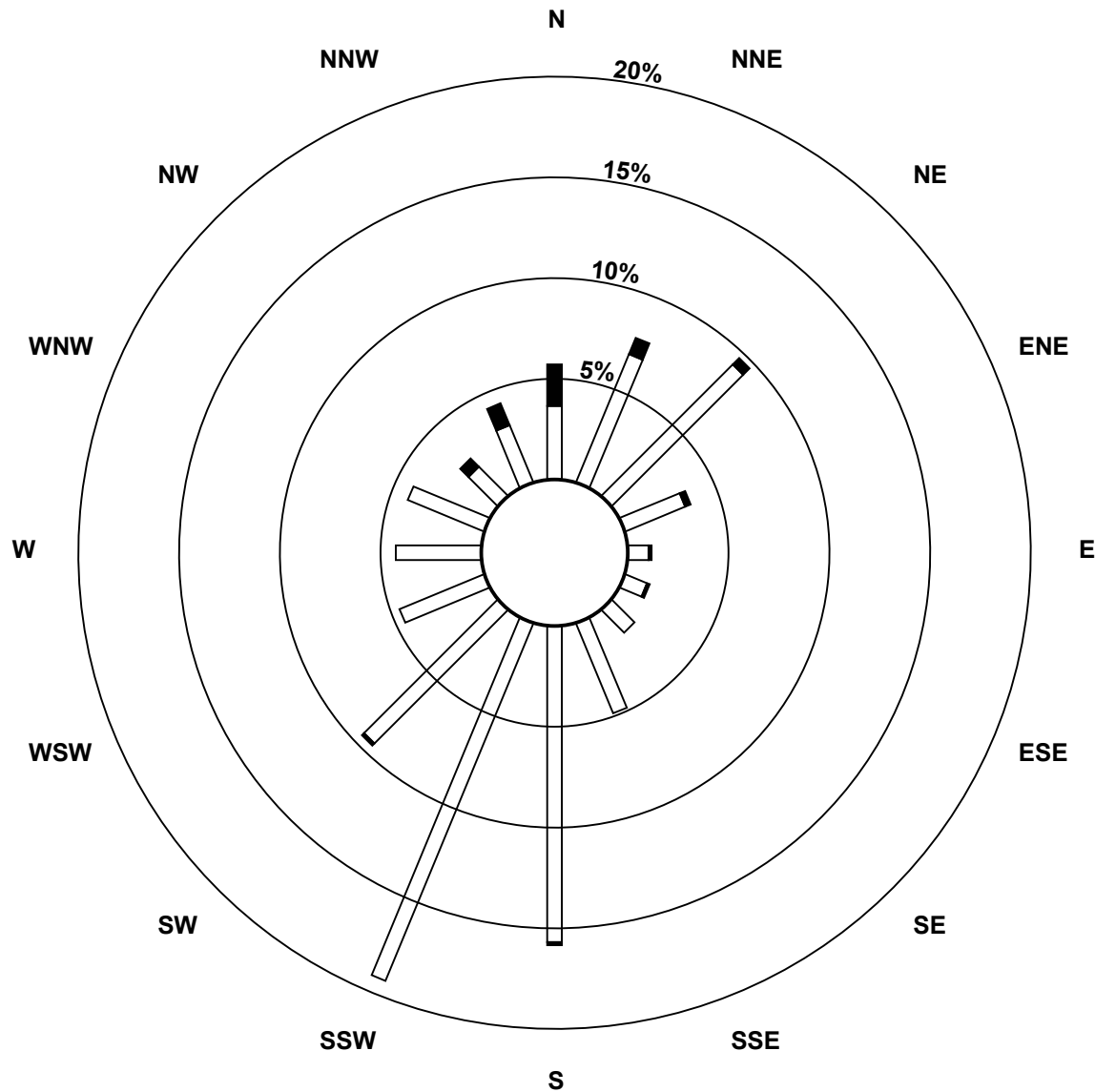
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	25	47	63	22	7	8	11	33	107	131	64	31	29	28	14	21	641
21 - 40	14	6	3	2	1	1	0	0	1	0	1	0	0	0	4	8	41
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	53	66	24	8	9	11	33	108	131	65	31	29	28	18	29	682

Total Number of Valid Hours: 682

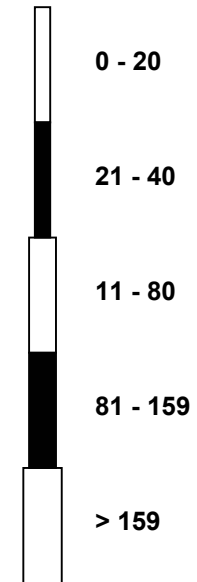
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River (AMS 16)



Classes (ppb)

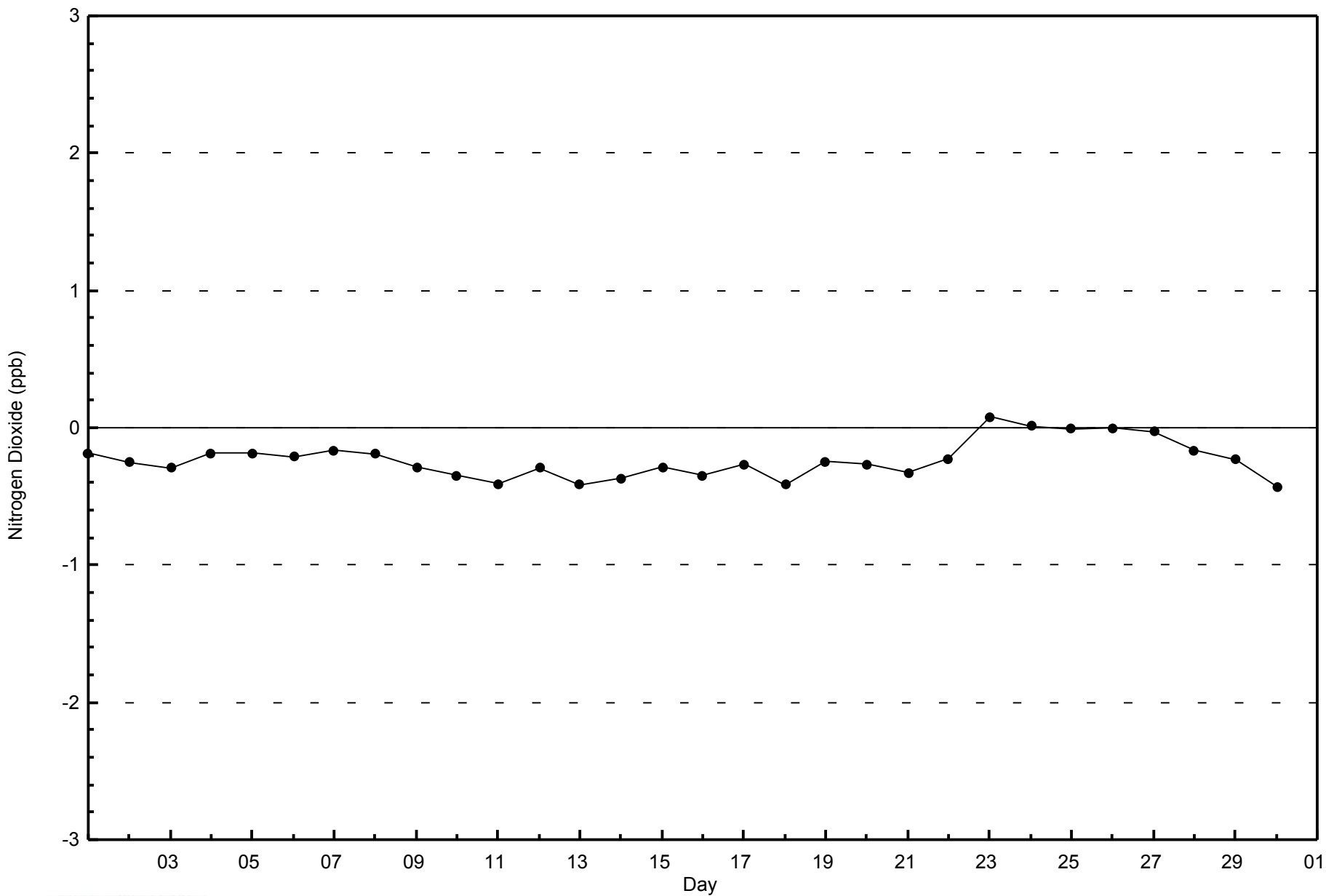


Total Number of Valid Hours: 682



WBEA
Zero Responses

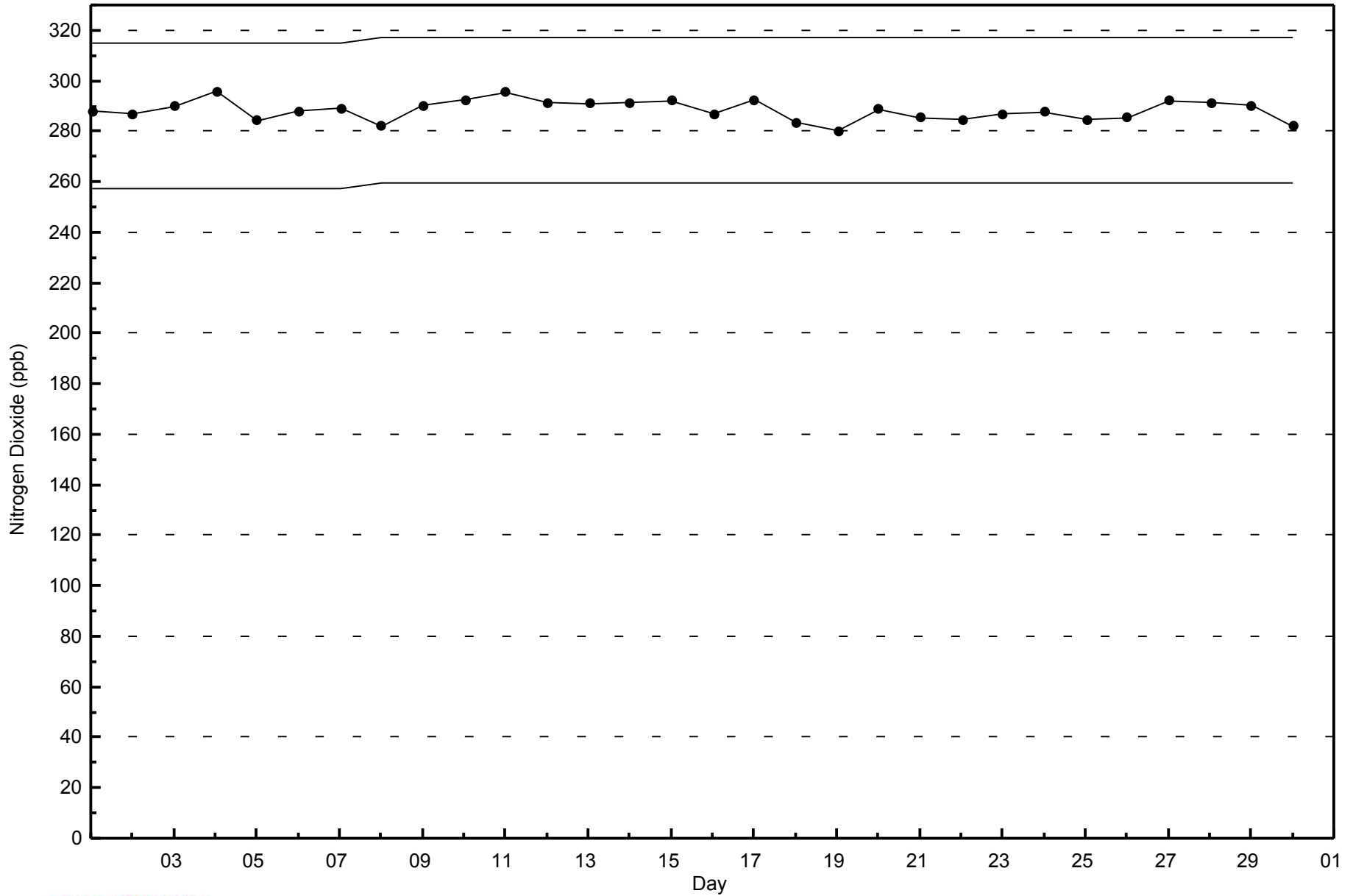
Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - September 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - September 2014



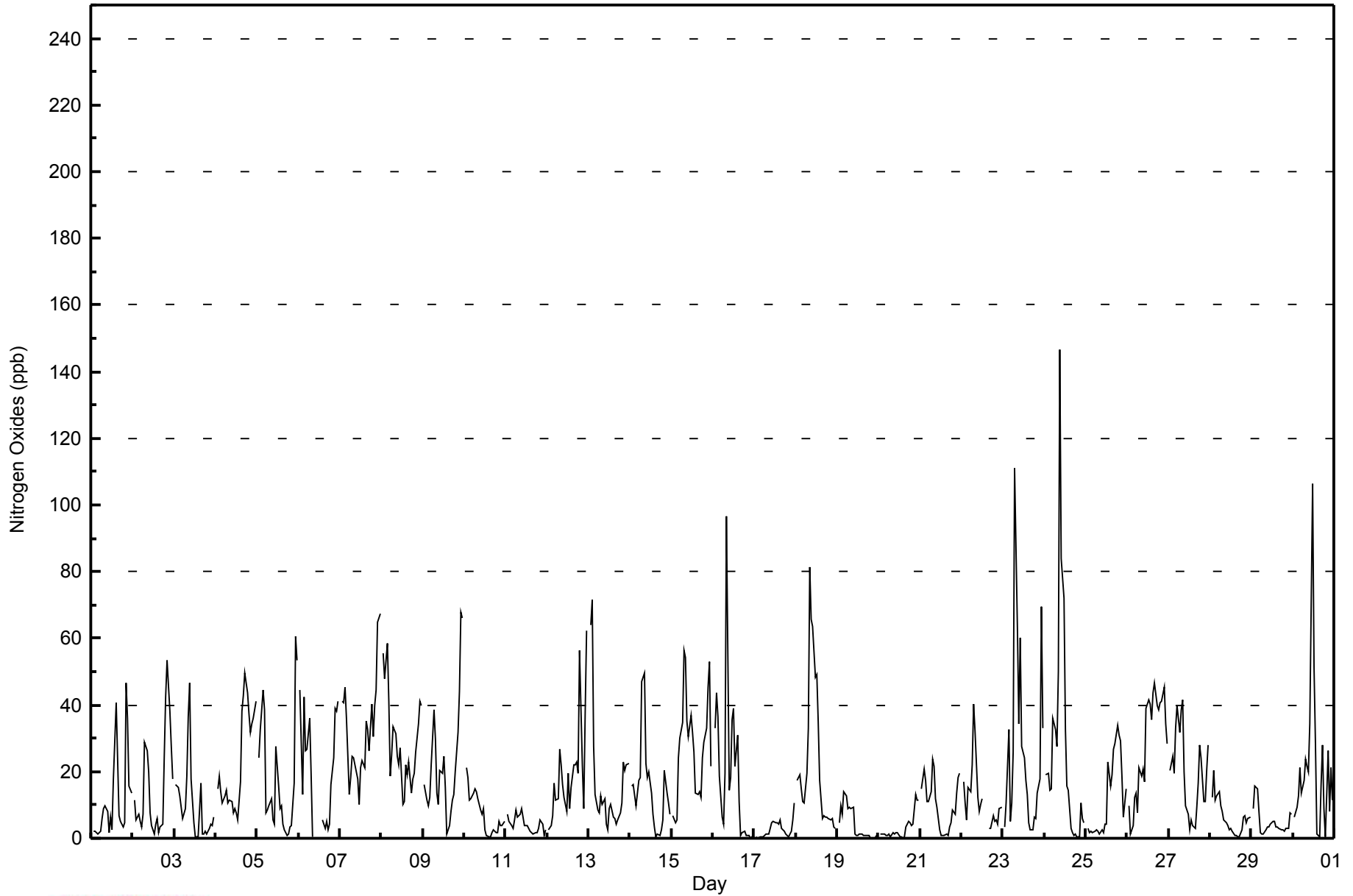


Maximum Value: 147 ppb on Sep 24 10:00		Maximum Daily Average: 32.1 ppb on Sep 7		Hours in Service: 720																						
Minimum Value: 0 ppb on Sep 16 23:00		Minimum Daily Average: 2.8 ppb on Sep 17		Hours of Data: 682																						
Maximum Diurnal Average: 25.6 ppb at hour 9		Minimum Diurnal Average: 9.8 ppb at hour 17		Hours of Missing Data: 38																						
Monthly Average: 16.3 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 4 Median = 11 Q ₃ = 23 P ₉₀ = 39 P ₉₉ = 69		Hours of Calibration: 38																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	Z	2	2	2	1	2	6	9	10	8	2	6	3	18	41	24	7	5	3	5	47	36	16	13	11.6	47
2-Sep	Z	12	6	7	5	3	7	29	26	20	8	4	1	4	6	2	4	4	24	43	53	38	27	18	15.3	53
3-Sep	Z	16	15	13	9	6	9	19	37	47	18	5	0	0	16	1	1	2	1	3	4	4	6	10.1	47	
4-Sep	Z	15	18	14	10	13	14	11	11	11	8	9	7	6	17	38	43	49	43	37	32	34	36	41	22.5	49
5-Sep	Z	24	33	44	38	8	9	10	12	6	4	27	15	9	10	4	2	1	1	4	4	16	61	54	17.2	61
6-Sep	Z	44	13	42	26	27	36	19	1	C	C	C	C	C	5	3	5	3	4	16	24	39	38	41	21.5	44
7-Sep	Z	41	41	45	36	13	18	24	24	20	18	10	21	23	21	35	33	26	40	30	40	45	65	67	32.1	67
8-Sep	Z	55	48	58	41	19	25	34	31	24	22	27	10	11	22	19	23	14	18	19	26	34	41	40	28.8	58
9-Sep	Z	16	12	10	12	22	38	30	14	10	20	20	24	15	1	4	8	11	13	20	32	44	68	66	22.2	68
10-Sep	Z	21	18	11	12	14	15	14	12	8	7	9	2	1	0	0	2	2	2	2	5	4	4	5	7.4	21
11-Sep	Z	7	5	4	3	6	8	6	7	9	6	4	4	3	2	2	1	2	2	3	6	4	1	3	4.2	9
12-Sep	Z	3	4	7	16	11	12	27	22	16	12	8	20	9	15	22	22	23	20	56	22	9	37	62	19.8	62
13-Sep	Z	64	72	28	13	9	8	13	10	12	4	3	9	10	6	6	4	6	8	11	23	20	22	22	16.6	72
14-Sep	Z	16	16	10	13	18	18	47	50	22	18	20	13	7	3	1	1	1	2	5	20	14	11	7	14.6	50
15-Sep	Z	7	5	5	24	30	35	56	54	35	30	37	32	26	13	13	14	12	24	29	33	45	53	22	27.6	56
16-Sep	Z	33	44	37	19	6	4	19	97	14	18	36	39	22	31	11	1	2	2	1	1	1	0	1	19.0	97
17-Sep	Z	1	0	0	0	1	1	1	1	3	4	5	5	5	4	6	3	2	1	1	1	2	6	11	2.8	11
18-Sep	Z	18	19	15	11	11	19	33	81	66	64	48	49	35	18	6	7	6	6	6	5	6	3	3	23.3	81
19-Sep	Z	5	10	7	14	13	9	9	9	9	1	1	1	1	1	1	1	1	1	0	0	0	0	1	4.1	14
20-Sep	Z	1	1	1	1	1	1	0	2	1	2	2	0	0	0	0	3	5	5	4	4	13	11	12	3.1	13
21-Sep	Z	15	21	17	11	11	14	24	22	12	9	3	1	1	1	1	1	3	5	9	7	13	18	19	10.3	24
22-Sep	Z	17	11	5	15	14	22	40	32	12	8	10	12	C	C	C	3	3	7	5	5	4	9	9	12.2	40
23-Sep	Z	3	11	33	5	11	26	111	63	34	60	28	24	18	13	5	2	3	6	6	14	18	69	33	25.9	111
24-Sep	Z	19	19	15	15	36	33	28	50	147	84	72	33	16	15	3	2	1	1	1	0	11	6	4	26.5	147
25-Sep	Z	3	2	2	2	2	2	2	1	2	2	4	4	23	16	19	27	29	34	31	29	19	6	15	12.0	34
26-Sep	Z	10	1	4	12	13	8	21	19	21	17	39	42	40	36	44	47	40	39	41	41	45	34	28	27.8	47
27-Sep	Z	20	25	20	33	40	32	39	42	20	10	7	3	5	4	3	9	17	28	24	11	20	28	19.6	42	
28-Sep	Z	12	20	12	13	14	10	8	5	5	4	3	3	2	1	1	1	1	3	7	7	5	6	6	6.3	20
29-Sep	Z	9	16	15	8	2	1	1	2	3	3	4	5	5	3	4	3	2	3	2	3	3	8	7	4.9	16
30-Sep	Z	6	9	13	21	14	17	24	22	20	34	106	51	28	1	1	16	28	9	1	26	8	21	12	21.2	106
--	--	17.2	17.2	16.5	14.7	12.9	15.3	23.6	25.6	21.3	17.1	19.2	15.0	12.3	10.6	10.1	9.8	10.1	11.9	13.9	17.4	18.2	23.4	21.9	Diurnal Average	
--	--	64	72	58	41	40	38	111	97	147	84	106	51	40	41	44	47	49	43	56	53	45	69	67	Diurnal Maximum	
Z - zerospan		C - Calibration																								



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	488	71.55	71.55
21 - 40	131	19.21	90.76
41 - 80	57	8.36	99.12
81 - 159	5	0.73	99.85
> 159	0	0.00	99.85

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - September 2014

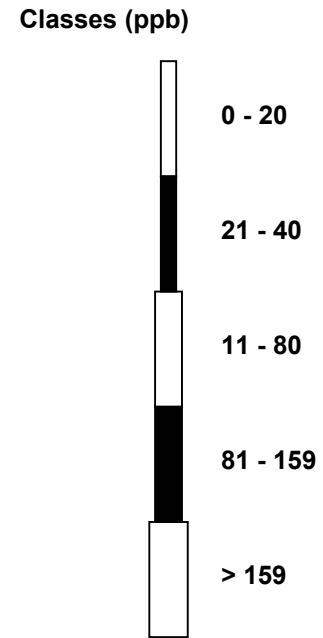
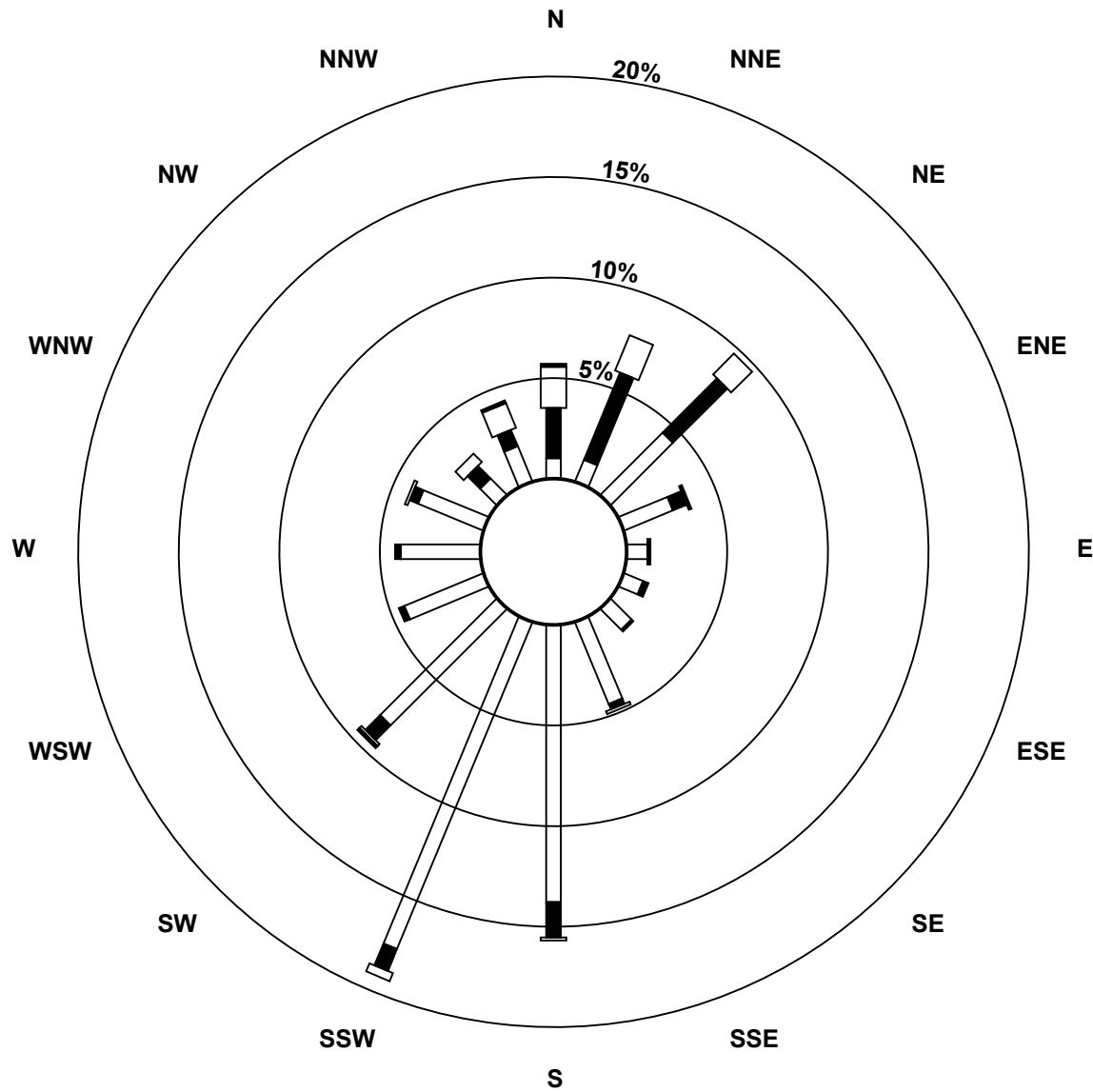
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	7	8	30	18	7	7	10	30	94	120	56	29	27	24	8	13	488
21 - 40	17	32	26	5	0	2	1	2	12	8	7	2	2	3	6	6	131
11 - 80	14	13	10	0	0	0	0	1	1	3	1	0	0	1	4	9	57
81 - 159	1	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	5
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	53	66	24	8	9	11	33	107	131	65	31	29	28	18	29	681

Total Number of Valid Hours: 682

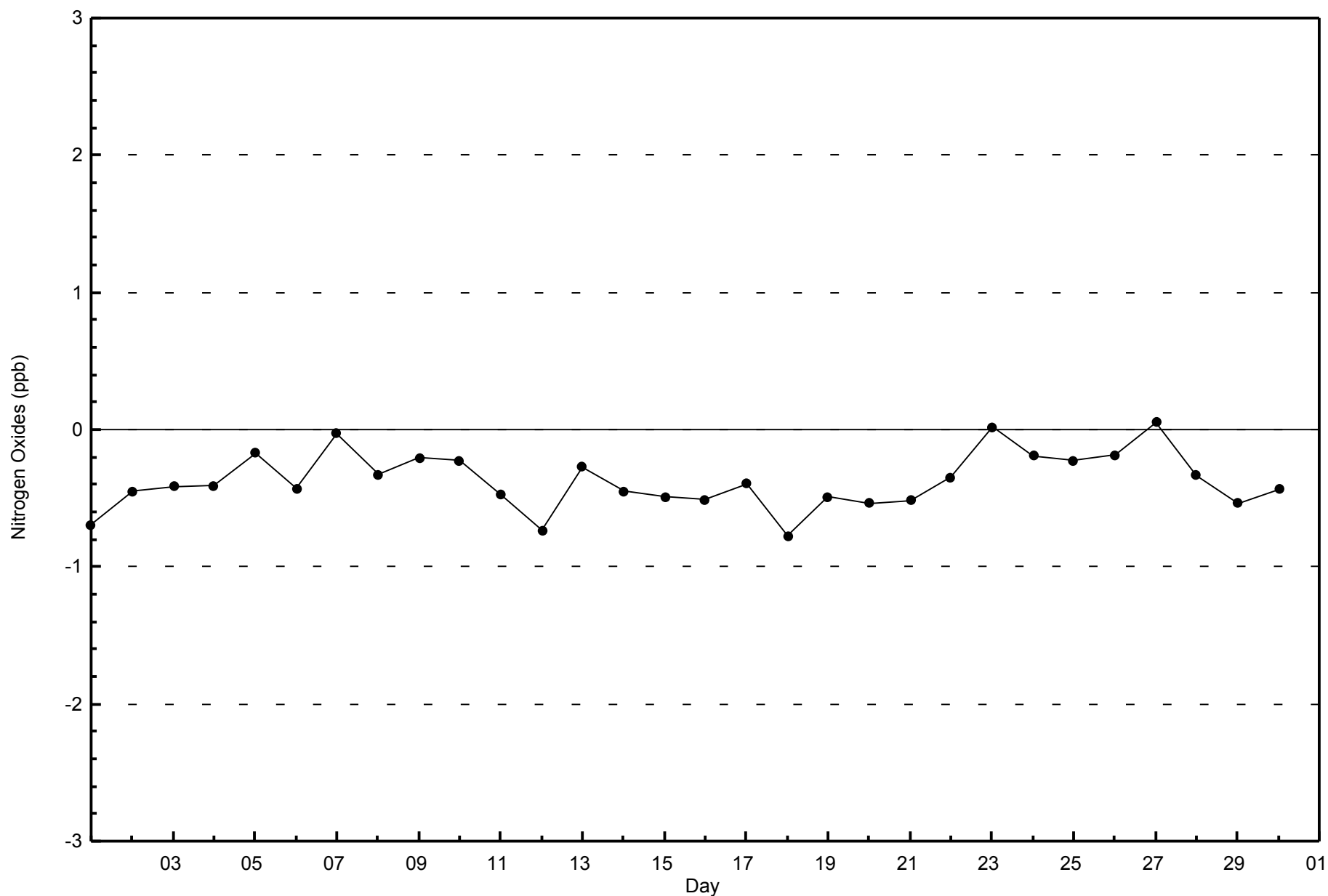
Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

Nitrogen Oxides (NO_x) - ppb
 Shell Muskeg River (AMS 16)



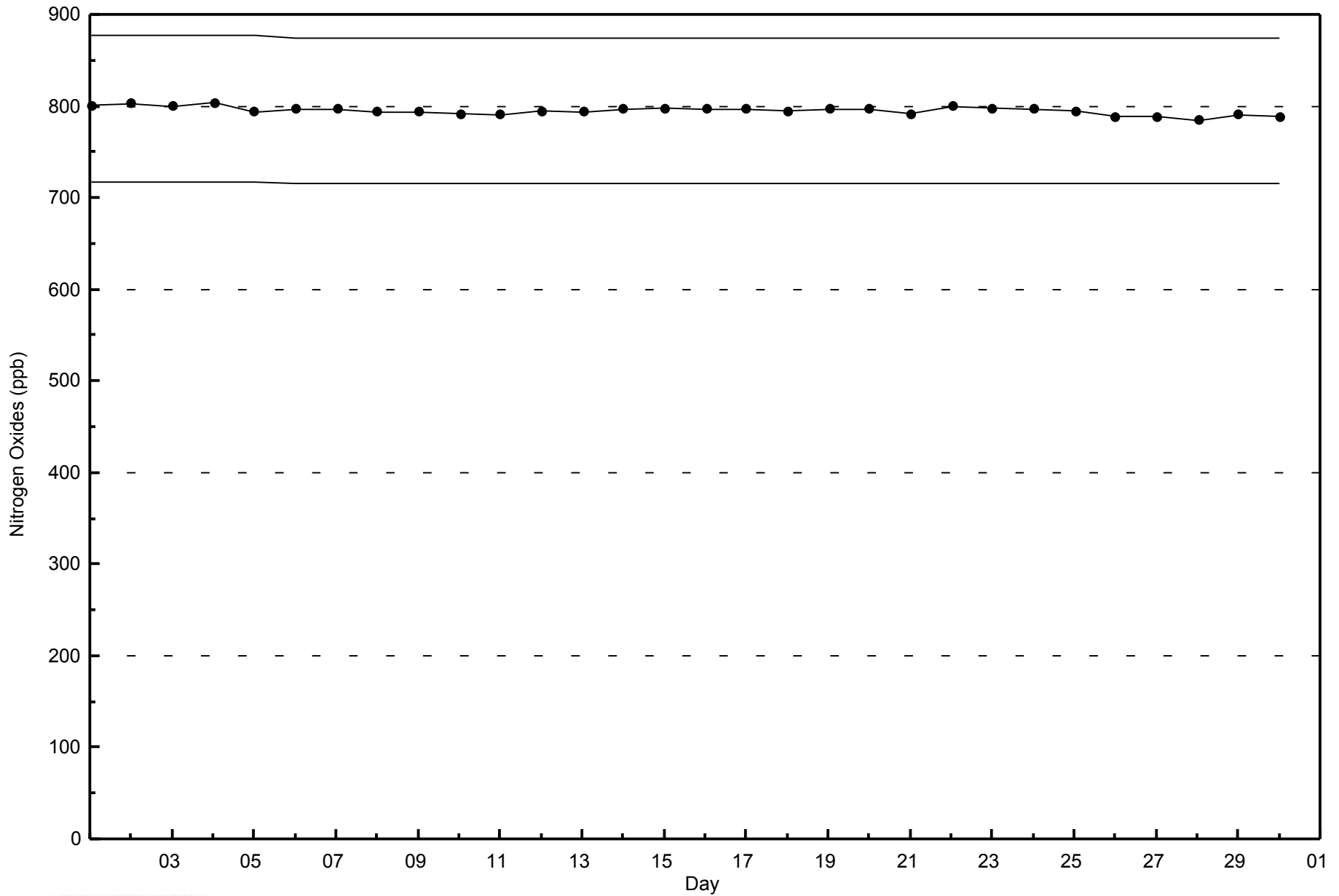
Total Number of Valid Hours: 682





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - September 2014



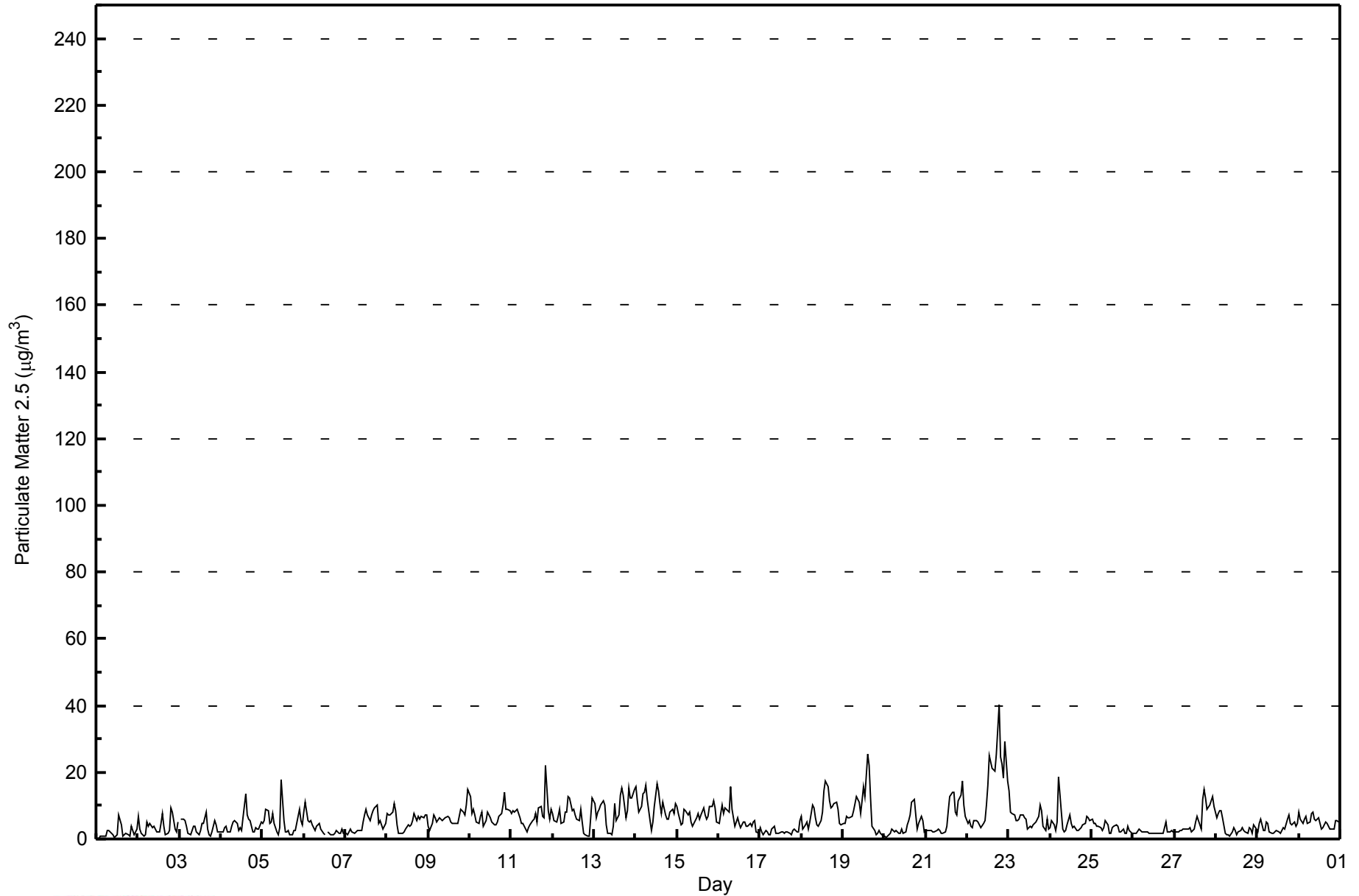


Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 720																																														
Maximum Value: 40.1 µg/m ³ on Sep 22 19:00		Maximum Daily Average: 14.3 µg/m ³ on Sep 22																																														
Minimum Value: 0.2 µg/m ³ on Sep 1 01:00		Hours of Data: 718																																														
Maximum Diurnal Average: 7.1 µg/m ³ at hour 21		Hours of Missing Data: 2																																														
Monthly Average: 5.64 µg/m ³		Hours of Calibration: 0																																														
Minimum Daily Average: 1.8 µg/m ³ on Sep 1		Percent Operational Time: 99.7																																														
Minimum Diurnal Average: 3.8 µg/m ³ at hour 10		Percentiles: P ₁ = 0.7 P ₁₀ = 1.8 Q ₁ = 2.5 Median = 4.8 Q ₃ = 7.4 P ₉₀ = 10.6 P ₉₉ = 20.9																																														
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	0.2	0.2	0.7	0.7	0.8	1.0	2.6	2.6	2.1	1.2	0.4	0.9	1.4	7.1	4.3	0.8	1.4	1.9	1.5	0.9	3.9	2.5	1.4	2.9	1.8	7.1																						
2-Sep	6.8	3.1	1.8	1.1	1.2	5.1	3.7	4.5	3.3	3.6	3.1	2.2	2.0	4.9	7.8	3.6	1.3	1.8	2.7	9.4	8.2	2.8	2.3	5.0	3.8	9.4																						
3-Sep	UO	5.8	6.1	5.6	3.8	1.5	1.4	2.4	4.0	4.0	2.2	1.5	2.5	4.9	4.7	8.1	3.1	1.4	0.9	2.3	5.4	4.3	2.1	1.9	3.5	8.1																						
4-Sep	1.9	1.9	3.5	3.8	2.1	2.0	3.9	5.0	5.5	4.5	2.7	3.2	2.7	6.2	13.6	7.0	6.0	5.3	2.0	1.9	3.5	3.1	3.0	5.0	4.1	13.6																						
5-Sep	4.7	5.4	8.8	8.4	4.5	5.2	7.5	4.7	2.2	1.3	3.5	17.7	5.3	2.3	2.1	2.4	1.3	1.3	2.6	2.6	4.8	8.9	5.4	4.2	4.9	17.7																						
6-Sep	7.9	11.0	5.6	5.0	5.3	4.4	2.7	4.0	4.2	4.6	3.0	1.7	1.5	M	2.2	1.4	1.5	1.1	1.8	2.6	1.5	1.7	3.0	1.8	3.5	11.0																						
7-Sep	1.7	1.4	2.3	2.8	1.9	1.9	2.2	2.6	2.6	2.5	5.0	7.1	9.0	7.1	5.3	7.3	8.7	9.3	10.2	4.8	5.5	4.2	2.8	4.8	4.7	10.2																						
8-Sep	7.5	7.3	7.0	8.1	10.5	8.6	4.1	1.6	1.5	1.5	2.2	2.9	4.3	3.8	4.4	5.4	7.7	5.6	6.7	5.9	6.9	6.6	7.2	7.4	5.6	10.5																						
9-Sep	3.7	2.7	4.9	7.4	6.4	5.1	6.4	6.1	5.7	6.0	6.2	6.7	6.5	5.1	4.5	4.6	4.8	4.9	6.8	9.0	8.1	7.1	10.1	15.0	6.4	15.0																						
10-Sep	12.5	7.7	9.0	7.1	4.9	4.8	6.6	8.0	3.6	5.6	8.1	7.0	6.5	5.1	4.4	4.0	5.1	6.9	7.8	10.1	14.0	9.0	8.7	8.5	7.3	14.0																						
11-Sep	7.7	8.5	8.0	8.8	7.8	6.2	4.8	4.8	2.8	2.2	3.3	4.3	5.4	5.8	7.5	5.3	9.1	9.6	6.9	6.3	21.9	8.4	6.1	8.9	7.1	21.9																						
12-Sep	7.8	5.3	5.0	6.6	8.9	4.8	4.9	8.0	8.2	12.8	12.4	8.4	8.7	7.4	6.1	5.5	8.8	5.0	1.7	1.4	1.0	1.0	6.3	12.5	6.6	12.8																						
13-Sep	10.5	6.4	7.9	8.9	10.1	11.4	10.1	4.2	1.9	1.6	1.4	4.0	10.6	5.5	7.1	13.1	15.4	13.0	6.3	8.5	15.1	12.4	12.5	14.9	8.9	15.4																						
14-Sep	15.8	11.3	8.0	9.9	13.8	14.1	16.2	11.9	5.3	2.4	5.3	9.7	16.7	14.3	10.6	7.8	10.8	7.1	6.0	5.8	8.2	8.8	7.5	10.5	9.9	16.7																						
15-Sep	9.7	7.6	4.4	4.8	9.1	8.6	7.2	8.0	5.2	3.7	4.6	6.6	7.6	6.0	7.4	9.4	7.4	6.0	7.0	9.8	9.8	11.5	9.3	5.1	7.3	11.5																						
16-Sep	4.7	7.5	10.2	7.7	9.2	8.4	8.1	15.8	8.9	4.0	5.0	6.3	4.8	3.2	5.0	4.9	3.7	3.7	4.8	3.7	4.9	5.3	2.0	1.7	6.0	15.8																						
17-Sep	3.6	2.0	1.2	2.6	1.9	1.1	1.4	2.9	3.8	1.8	1.6	1.7	2.0	2.1	1.9	2.0	2.3	1.8	1.4	2.6	3.0	1.9	2.1	5.5	2.3	5.5																						
18-Sep	6.6	3.0	4.2	5.2	3.1	5.2	10.4	9.3	6.5	4.4	4.0	5.4	8.2	14.3	17.3	15.6	11.4	9.4	9.6	10.6	11.2	9.0	4.6	4.4	8.0	17.3																						
19-Sep	4.8	4.6	6.6	6.2	6.4	7.0	8.5	10.7	12.6	10.9	7.6	11.5	15.8	12.8	25.5	21.9	12.2	3.9	2.4	1.3	1.8	2.5	1.5	0.7	8.3	25.5																						
20-Sep	0.6	0.6	0.7	1.7	3.2	2.4	2.3	2.6	1.5	1.7	2.8	1.8	2.3	4.2	5.5	7.2	11.0	12.1	7.0	2.9	4.5	6.8	5.7	2.1	3.9	12.1																						
21-Sep	2.4	2.3	2.6	2.5	2.3	2.2	2.5	2.9	2.5	1.8	1.8	2.0	3.8	8.4	12.5	13.9	13.8	7.9	7.1	11.3	12.9	17.4	10.3	6.7	6.4	17.4																						
22-Sep	4.8	5.4	3.8	3.4	5.5	5.6	5.1	4.4	3.6	4.7	5.4	10.3	16.0	25.0	21.4	20.6	20.4	25.6	40.1	24.6	22.4	18.3	29.4	17.2	14.3	40.1																						
23-Sep	14.3	8.2	7.6	7.2	5.6	5.6	5.8	7.1	7.1	6.2	5.9	3.0	3.9	3.3	4.4	4.5	4.9	6.8	10.3	8.7	3.6	2.4	5.7	2.9	6.1	14.3																						
24-Sep	3.5	5.5	4.0	2.5	5.1	18.6	8.1	3.0	2.1	2.5	4.3	7.3	4.9	3.4	3.6	2.6	2.5	2.9	3.6	4.0	4.6	6.6	6.5	5.5	4.9	18.6																						
25-Sep	5.9	4.6	4.7	4.0	3.7	3.5	2.4	3.4	5.6	4.4	1.5	1.8	3.5	3.7	4.2	3.8	2.3	2.1	3.1	1.9	1.8	3.7	2.3	1.8	3.3	5.9																						
26-Sep	1.7	1.8	1.6	2.9	2.4	2.0	2.0	2.0	2.1	1.9	1.8	1.7	1.7	1.7	1.8	1.9	1.9	1.8	3.2	5.1	2.2	2.1	2.5	2.2	2.2	5.1																						
27-Sep	2.2	2.2	2.3	2.3	2.5	2.9	2.8	3.1	3.1	3.4	2.0	3.1	5.2	6.6	5.4	2.9	12.0	14.9	12.5	8.8	10.2	11.5	12.6	9.8	6.0	14.9																						
28-Sep	6.6	7.5	8.7	8.4	6.1	1.8	1.2	1.1	1.0	2.0	3.6	2.7	1.4	2.0	2.5	3.2	2.4	2.1	1.7	3.6	2.9	1.9	4.2	3.2	3.4	8.7																						
29-Sep	2.1	4.7	6.1	2.6	2.6	5.2	4.8	2.0	1.9	1.9	2.1	2.4	2.0	1.9	2.6	3.5	2.9	5.7	7.1	4.6	4.2	5.0	3.7	4.8	3.6	7.1																						
30-Sep	8.1	5.7	4.5	6.1	6.8	4.5	5.0	7.8	7.9	5.8	5.5	6.2	4.5	2.9	3.4	5.3	4.8	3.9	3.0	3.0	3.0	5.5	5.4	5.2	5.2	8.1																						
																								5.9	5.0	5.1	5.1	5.3	5.3	5.2	5.2	4.3	3.8	3.9	5.0	5.7	6.2	7.0	6.6	6.7	6.2	6.3	5.9	7.1	6.4	6.2	6.1	Diurnal Average
																								15.8	11.3	10.2	9.9	13.8	18.6	16.2	15.8	12.6	12.8	12.4	17.7	16.7	25.0	25.5	21.9	20.4	25.6	40.1	24.6	22.4	18.3	29.4	17.2	Diurnal Maximum
M - Maintenance																								UO - Unstable Operation																								
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - September 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - September 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	421	58.64	58.64
6 - 15	256	35.65	94.29
16 - 25	22	3.06	97.35
26 - 80	3	0.42	97.77
> 81.0	0	0.00	97.77

Total Number of Valid Hours: 718

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - September 2014

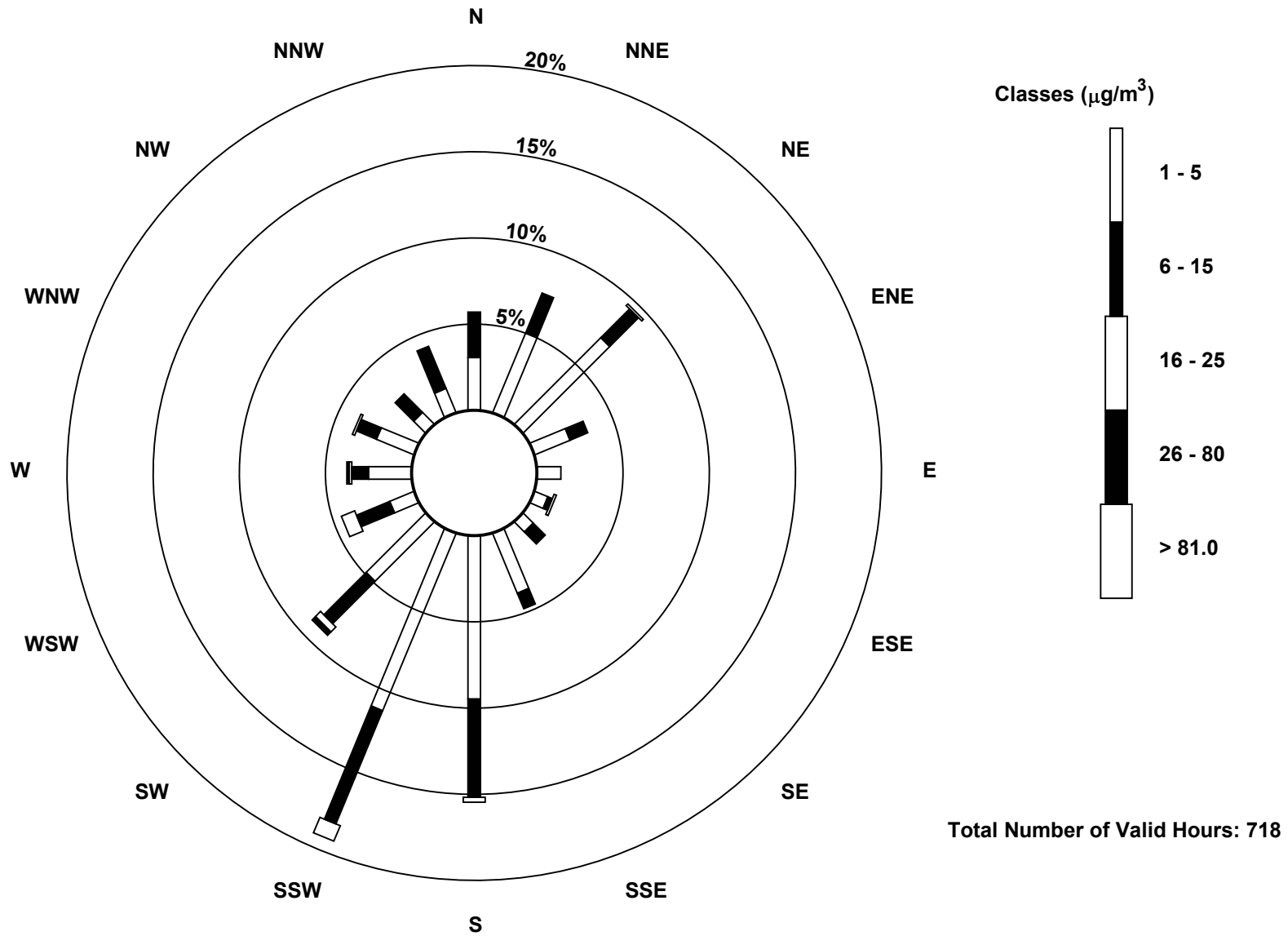
Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	22	36	51	16	10	6	6	27	68	80	35	11	18	17	7	11	421
6 - 15	19	18	17	8	0	2	7	7	41	51	25	15	7	9	11	19	256
16 - 25	0	0	1	0	0	1	0	0	2	7	3	6	1	1	0	0	22
26 - 80	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	3
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	41	54	69	24	10	9	13	34	111	138	65	32	27	27	18	30	702

Total Number of Valid Hours: 718

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
 Shell Muskeg River (AMS 16)



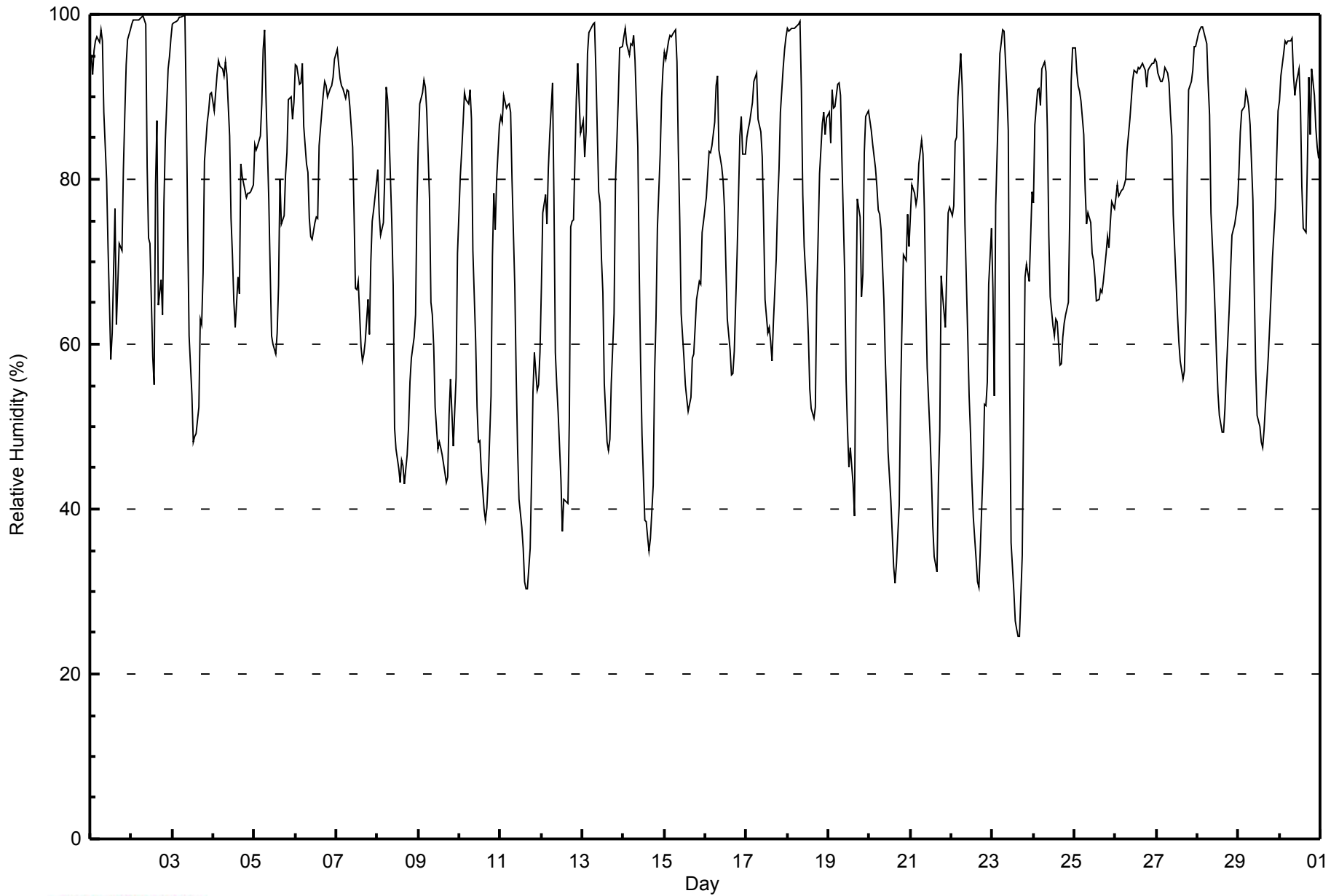


Maximum Value: 100 % on Sep 3 07:00																		Maximum Daily Average: 89.2 % on Sep 30						Hours in Service: 720		
Minimum Value: 25 % on Sep 23 17:00																		Minimum Daily Average: 59.9 % on Sep 11						Hours of Data: 720		
Maximum Diurnal Average: 91.7 % at hour 6																		Minimum Diurnal Average: 53.3 % at hour 16						Hours of Missing Data: 0		
Monthly Average: 74.6 %																		Percentiles: P ₁ = 30 P ₁₀ = 48 Q ₁ = 61 Median = 78 Q ₃ = 90 P ₉₀ = 96 P ₉₉ = 99						Hours of Calibration: 0		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	95	93	96	97	97	97	98	97	88	80	72	65	58	61	76	62	67	72	71	81	88	94	97	98	83.4	98
2-Sep	99	99	99	99	99	99	100	100	99	82	73	72	58	55	79	87	65	68	63	77	85	93	95	97	85.2	100
3-Sep	99	99	99	99	100	100	100	100	89	74	61	54	48	49	49	52	63	62	69	82	87	88	90	91	79.4	100
4-Sep	88	90	93	94	94	93	93	94	93	85	75	71	65	62	68	66	82	80	79	78	78	79	79	79	81.6	94
5-Sep	84	84	84	85	89	96	98	90	78	69	61	60	59	61	67	80	75	76	81	83	90	90	87	89	79.8	98
6-Sep	94	94	92	92	94	86	82	81	75	73	73	75	75	84	88	90	92	91	90	91	91	91	92	95	86.1	95
7-Sep	96	94	92	91	91	90	91	91	89	84	76	67	67	68	60	58	59	60	65	61	70	75	76	79	77.0	96
8-Sep	81	76	73	75	80	91	90	86	75	67	50	47	45	43	46	45	43	47	50	55	58	61	64	77	63.5	91
9-Sep	84	89	90	92	91	88	78	65	64	60	52	47	48	47	47	44	43	44	51	56	48	52	56	71	62.9	92
10-Sep	80	83	87	91	90	89	91	87	71	60	52	48	48	45	40	39	40	44	54	71	78	74	80	87	67.9	91
11-Sep	88	87	90	89	89	89	88	80	67	56	47	41	38	35	31	30	30	35	44	54	59	54	55	59	59.9	90
12-Sep	67	76	78	75	81	85	92	78	59	55	52	44	37	41	41	41	51	74	75	75	90	94	90	86	68.1	94
13-Sep	87	83	86	95	98	98	99	99	93	79	77	70	66	55	48	47	49	55	64	80	85	90	96	96	78.9	99
14-Sep	97	98	96	95	96	96	98	94	84	69	58	49	39	38	37	35	36	43	56	63	74	83	90	93	71.6	98
15-Sep	95	95	97	97	97	98	98	94	83	75	64	58	55	53	52	54	58	59	62	65	68	67	74	75	74.7	98
16-Sep	78	81	83	83	84	87	91	92	84	82	80	76	69	63	59	56	56	59	71	78	85	88	83	83	77.2	92
17-Sep	85	86	87	89	92	92	93	87	86	83	75	65	61	62	60	58	63	70	77	81	88	93	96	97	80.3	97
18-Sep	98	98	98	98	98	98	99	99	91	78	72	66	61	55	52	51	52	66	73	81	87	88	85	87	80.5	99
19-Sep	88	84	91	89	89	91	92	90	82	68	56	50	45	47	43	39	62	78	75	66	69	83	88	88	73.1	92
20-Sep	87	86	84	81	79	76	76	74	65	58	53	47	41	37	33	31	33	40	54	63	71	70	76	72	62.0	87
21-Sep	76	79	78	77	78	82	85	83	76	65	57	49	44	38	34	32	43	50	68	66	62	69	76	77	64.4	85
22-Sep	76	77	85	85	90	95	91	86	75	61	54	49	43	39	34	31	30	35	45	53	53	55	67	74	61.8	95
23-Sep	67	54	77	89	95	97	98	98	91	86	56	36	30	26	25	25	34	51	68	70	68	73	78	63.2	98	
24-Sep	77	87	91	91	89	93	94	93	86	73	66	62	61	63	63	58	58	61	63	64	65	76	92	96	75.8	96
25-Sep	96	93	91	91	89	85	79	75	76	75	71	70	68	65	65	67	66	68	71	73	72	75	77	76	76.4	96
26-Sep	78	79	78	79	79	79	80	83	87	90	92	93	93	93	93	94	94	93	91	93	94	94	94	95	88.3	95
27-Sep	94	93	92	92	92	94	93	92	88	85	76	68	64	60	58	56	57	64	81	91	92	93	96	96	81.9	96
28-Sep	98	98	98	98	98	96	92	88	76	68	64	59	54	51	49	49	52	57	64	69	73	74	75	77	74.0	98
29-Sep	81	86	88	89	91	90	89	87	77	66	57	51	50	48	47	50	53	58	62	66	70	76	83	88	71.0	91
30-Sep	89	93	95	97	96	97	97	97	93	90	92	93	89	79	74	74	82	92	85	93	90	86	84	83	89.2	97
	86.7	87.1	89.0	89.8	90.9	91.7	91.4	88.7	81.3	73.2	65.4	60.1	56.1	54.0	53.9	53.3	56.0	61.2	66.9	72.5	76.2	79.1	82.2	84.7	Diurnal Average	
	99	99	99	99	100	100	100	100	99	90	92	93	93	93	93	94	94	93	91	93	94	94	97	98	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Shell Muskeg River - September 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Shell Muskeg River - September 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	34	4.72	4.72
40 - 60	133	18.47	23.19
60 - 80	222	30.83	54.03
80 - 100	331	45.97	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

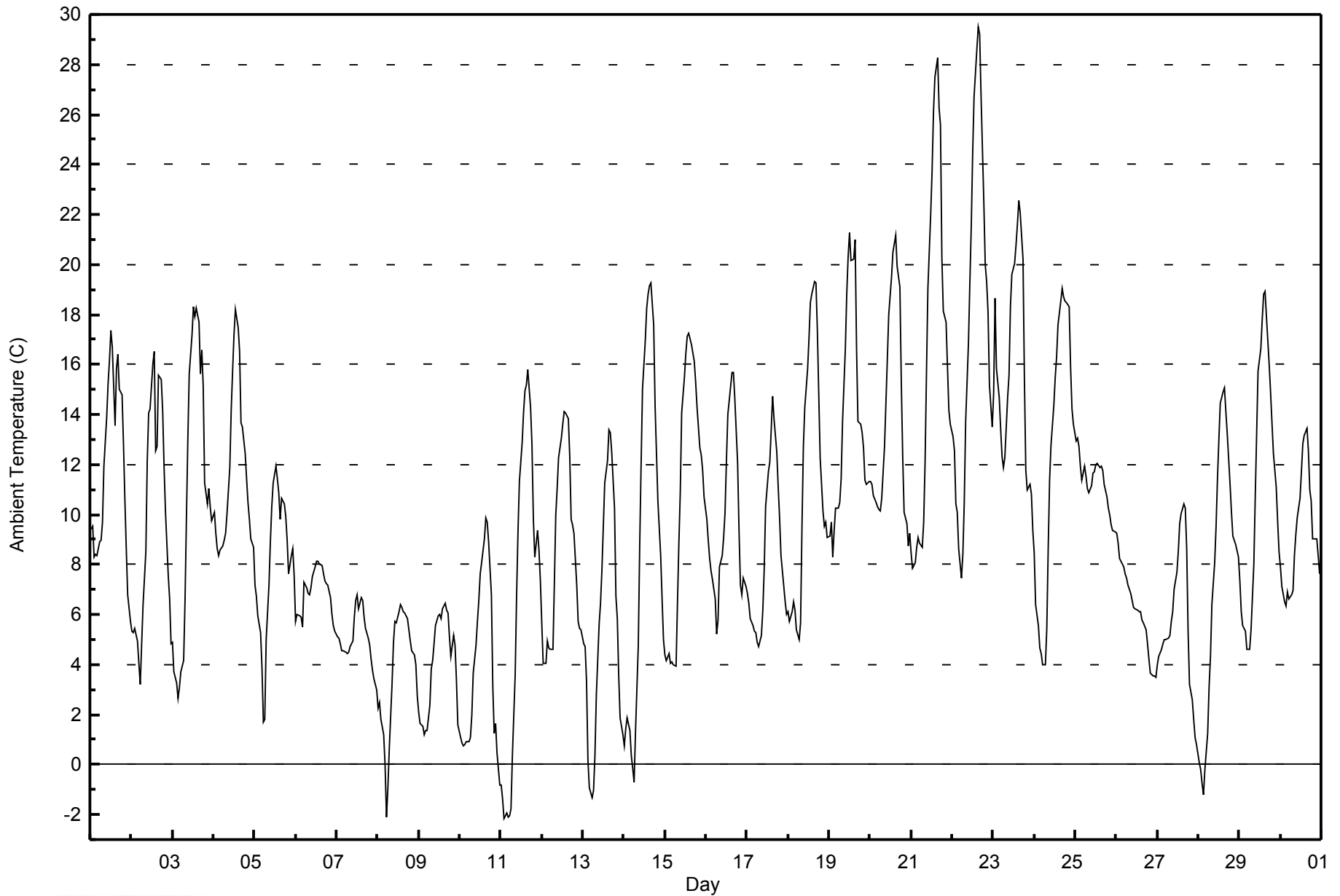


Maximum Value: 29.5 C on Sep 22 16:00		Maximum Daily Average: 17.8 C on Sep 22		Hours in Service: 720																																												
Minimum Value: -2.1 C on Sep 11 03:00		Minimum Daily Average: 3.6 C on Sep 8		Hours of Data: 720																																												
Maximum Diurnal Average: 15.1 C at hour 16		Minimum Diurnal Average: 5.0 C at hour 6		Hours of Missing Data: 0																																												
Monthly Average: 9.58 C		Percentiles: P ₁ = -1.4 P ₁₀ = 3.2 Q ₁ = 5.5 Median = 9.0 Q ₃ = 13.1 P ₉₀ = 17.3 P ₉₉ = 26.7		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	9.4	9.5	8.3	8.4	8.4	8.9	8.9	9.7	11.9	13.9	15.2	16.2	17.4	16.7	13.6	15.9	16.4	15.0	14.8	12.8	10.6	8.7	6.8	5.7	11.8	17.4																						
2-Sep	5.3	5.3	5.5	4.9	4.0	3.2	4.8	6.4	8.5	12.2	14.1	14.2	16.0	16.5	12.5	12.7	15.6	15.4	14.2	11.9	10.2	7.6	6.6	4.8	9.7	16.5																						
3-Sep	4.9	3.7	3.2	2.7	3.1	3.7	4.1	6.6	9.9	13.0	15.6	17.2	18.3	17.9	18.2	17.7	15.6	16.6	15.1	11.3	10.4	11.0	10.3	9.7	10.8	18.3																						
4-Sep	10.1	9.2	8.6	8.3	8.6	8.7	9.0	9.2	10.0	11.9	14.2	15.7	17.2	18.2	17.5	16.5	13.7	13.5	12.4	11.4	10.5	9.8	9.0	8.7	11.8	18.2																						
5-Sep	7.2	6.7	5.9	5.3	3.9	1.7	1.8	5.0	7.2	8.9	10.3	11.3	12.0	11.4	10.9	9.8	10.6	10.4	9.9	8.9	7.6	8.3	8.6	7.6	8.0	12.0																						
6-Sep	5.7	6.0	5.9	5.9	5.5	7.3	7.1	6.8	6.8	7.1	7.5	7.9	8.1	8.1	8.0	8.0	7.6	7.3	7.3	7.2	6.7	6.0	5.5	5.3	6.9	8.1																						
7-Sep	5.1	5.1	4.8	4.5	4.5	4.5	4.5	4.5	4.7	4.9	5.9	6.5	6.8	6.2	6.7	6.6	5.9	5.5	5.0	4.8	4.2	3.8	3.4	3.0	5.1	6.8																						
8-Sep	2.3	2.5	1.8	1.2	0.0	-2.1	-1.0	0.6	3.3	4.9	5.7	5.7	6.1	6.4	6.3	6.1	6.1	5.8	5.4	4.9	4.5	4.4	4.0	2.8	3.6	6.4																						
9-Sep	2.1	1.6	1.5	1.2	1.3	1.4	2.3	3.8	4.1	4.8	5.6	6.0	6.0	5.8	6.2	6.5	6.2	6.0	5.1	4.3	5.2	4.8	3.4	1.6	4.0	6.5																						
10-Sep	1.1	0.9	0.8	0.8	0.9	0.9	1.1	2.0	3.7	4.8	5.7	6.6	7.6	8.1	9.1	9.9	9.7	8.9	6.8	3.1	1.3	1.6	0.4	-0.8	3.9	9.9																						
11-Sep	-0.8	-1.4	-2.1	-2.0	-2.1	-2.1	-1.7	0.4	3.6	6.7	9.3	11.3	12.9	14.1	14.9	15.2	15.8	14.3	12.8	9.8	8.3	9.4	8.6	7.3	6.8	15.8																						
12-Sep	5.7	4.1	4.1	5.0	4.7	4.6	4.6	7.2	10.0	11.0	12.3	13.0	13.6	14.1	14.0	13.8	12.3	9.8	9.6	9.3	7.2	5.7	5.4	5.4	8.6	14.1																						
13-Sep	4.8	4.7	3.3	0.2	-0.9	-1.3	-1.1	0.3	2.8	5.6	6.4	7.8	9.5	11.3	12.2	13.4	13.3	12.5	10.2	6.8	5.8	3.5	1.9	1.2	5.6	13.4																						
14-Sep	0.8	1.4	1.9	1.3	0.4	-0.1	-0.7	1.3	4.8	8.8	12.0	15.0	17.0	18.3	18.8	19.1	19.2	17.6	14.4	12.4	10.5	8.3	6.6	5.0	8.9	19.2																						
15-Sep	4.4	4.2	4.5	4.0	4.1	4.0	3.9	6.4	8.9	10.9	14.1	15.5	16.5	17.1	17.2	16.8	16.5	16.1	15.3	14.3	12.7	12.4	11.7	10.7	10.9	17.2																						
16-Sep	9.8	9.0	8.3	7.7	7.4	6.6	5.2	5.8	7.9	8.4	9.1	10.1	12.1	14.0	15.1	15.7	15.7	14.6	12.1	9.4	7.2	6.8	7.5	7.1	9.7	15.7																						
17-Sep	6.8	6.4	5.8	5.5	5.4	5.3	4.9	4.7	5.2	6.2	7.8	10.3	11.7	12.1	13.4	14.7	13.8	12.5	11.1	9.9	8.3	7.1	6.5	6.0	8.4	14.7																						
18-Sep	6.1	5.7	6.1	6.5	6.2	5.4	5.0	5.7	9.6	12.7	14.3	15.8	17.0	18.5	18.8	19.3	19.3	17.4	14.8	12.3	10.2	9.5	9.7	9.1	11.4	19.3																						
19-Sep	9.1	9.7	8.3	9.4	10.3	10.3	10.5	11.4	13.7	16.6	18.8	20.3	21.2	20.1	20.2	21.0	16.7	13.7	13.6	13.3	12.6	11.4	11.2	11.3	14.0	21.2																						
20-Sep	11.3	11.2	10.7	10.5	10.3	10.2	10.1	10.6	12.7	14.4	16.2	18.0	19.5	20.5	20.8	21.1	19.9	19.1	15.3	12.3	10.1	9.7	8.8	9.2	13.9	21.1																						
21-Sep	8.5	7.9	8.1	8.7	9.1	8.9	8.7	9.7	12.1	15.7	19.1	22.0	23.8	26.1	27.5	28.2	26.2	25.6	20.3	18.1	17.7	15.9	14.2	13.6	16.5	28.2																						
22-Sep	13.1	12.6	10.4	10.1	8.7	7.4	8.4	10.5	13.7	16.9	19.3	21.5	24.4	26.7	28.6	29.5	29.2	26.8	22.5	20.0	19.3	18.1	15.2	13.5	17.8	29.5																						
23-Sep	14.9	18.7	15.9	14.7	13.4	12.3	11.9	12.3	14.6	15.6	18.3	19.6	20.1	20.8	21.6	22.5	22.1	20.2	15.4	11.7	11.0	11.2	10.8	9.4	15.8	22.5																						
24-Sep	8.5	6.4	5.5	4.7	4.5	4.0	4.0	5.4	8.6	11.4	12.8	14.3	15.5	16.3	17.6	18.5	19.1	18.7	18.5	18.3	15.9	14.2	13.6	12.3	19.1	19.1																						
25-Sep	12.9	13.0	12.7	11.9	11.3	11.9	11.5	11.0	10.8	11.2	11.7	11.7	12.0	12.1	11.9	11.9	11.8	11.2	10.7	10.3	10.0	9.6	9.4	9.3	11.3	13.0																						
26-Sep	9.3	8.9	8.2	8.0	7.9	7.6	7.5	7.2	6.8	6.6	6.3	6.2	6.2	6.1	6.1	5.8	5.7	5.4	4.8	4.2	3.7	3.6	3.5	3.5	6.2	9.3																						
27-Sep	4.0	4.3	4.6	4.8	5.0	5.0	5.0	5.2	5.7	6.1	7.0	7.7	8.5	9.6	10.0	10.4	10.3	8.6	5.3	3.2	2.6	1.8	1.1	0.8	5.7	10.4																						
28-Sep	0.1	-0.2	-0.8	-1.2	-0.2	1.3	3.1	4.3	6.4	8.1	9.5	11.4	13.0	14.5	14.9	15.1	14.1	13.2	11.2	10.1	9.2	9.0	8.8	8.3	7.6	15.1																						
29-Sep	7.4	6.1	5.6	5.3	4.6	4.6	4.6	5.4	8.0	10.7	13.2	15.7	16.6	17.8	18.8	18.9	17.9	16.0	14.8	13.6	12.4	11.1	9.8	8.5	11.2	18.9																						
30-Sep	7.9	7.1	6.5	6.3	6.9	6.6	6.8	7.0	8.4	9.2	9.9	10.7	11.7	12.8	13.2	13.4	12.6	11.0	10.6	9.0	9.0	8.4	7.6	9.2	13.4																							
																								6.6	6.3	5.8	5.5	5.2	5.0	5.2	6.2	8.1	10.0	11.6	12.8	13.9	14.6	14.8	15.1	14.6	13.6	12.0	10.3	9.2	8.5	7.7	7.0	Diurnal Average
																								14.9	18.7	15.9	14.7	13.4	12.3	11.9	12.3	14.6	16.9	19.3	22.0	24.4	26.7	28.6	29.5	29.2	26.8	22.5	20.0	19.3	18.1	15.2	13.6	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Shell Muskeg River - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Shell Muskeg River - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	20	2.78	2.78
0 - 10	395	54.86	57.64
10 - 20	275	38.19	95.83
> 20	30	4.17	100.00

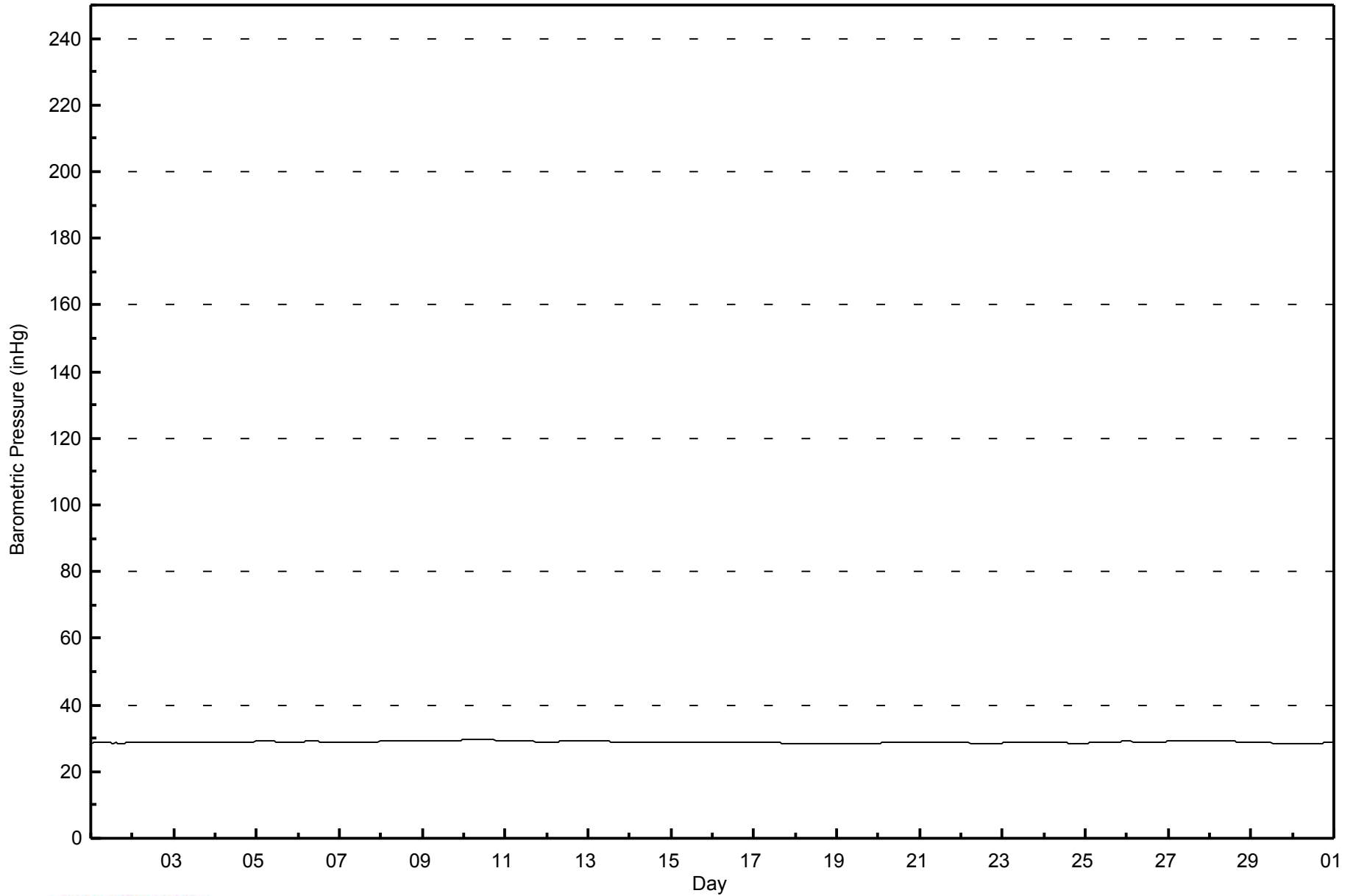
Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Hourly Averages

Barometric Pressure (BP) - inHg
Shell Muskeg River - September 2014





Maximum Speed: 30 km/h on Sep 19 16:00	Maximum Daily Speed Average: 20.7 km/h on Sep 26	Hours in Service: 720
Minimum Speed Value: 1 km/h on Sep 9 06:00	Minimum Daily Speed Average: 0.6 km/h on Sep 23	Hours of Data: 720
Maximum Diurnal Speed Average: 3.0 km/h at hour 12	Minimum Diurnal Speed Average: 0.1 km/h at hour 18	Hours of Missing Data: 0
Monthly Average Velocity: 1.2 km/h 234.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 13 P ₉₀ = 19 P ₉₉ = 25	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	SSW5	SW5	SSW7	SSW7	SSW6	SSW5	S5	SSW5	SSW4	SSW6	SW5	ESE2	SSW3	NNW4	N9	WNW5	SW9	SW10	W8	NW5	NNW5	NW4	SW3	SSW5	SW3.4	SW10
2-Sep	SW4	SSW3	SSW5	S5	SSE4	S5	S3	S4	S3	W4	WNW7	W8	W4	SSE1	WNW14	SW5	W5	WNW8	NNW8	NNW7	NW7	WNW2	ESE1	S3	WSW2.7	WNW14
3-Sep	WSW4	S6	S6	SSW6	SSW6	S5	SSW6	SSW5	SW7	SW6	WSW6	SW10	SW10	SW11	SSW5	NE10	E10	ESE7	SSE9	S7	SW6	S8	S9	SSW9	SSW4.9	SW11
4-Sep	SSW8	S8	S7	S7	SSW9	S8	S8	S7	S9	SSW10	SSW11	SSW9	SSW5	SW5	WNW6	NNE19	NNE17	NNE17	NNE19	NNE17	NNE15	NNE16	N16	NNE11	NNE1.5	NNE19
5-Sep	NNW7	NNW8	NNW7	NNW7	NW5	WSW6	SSW4	SW4	S6	SSW7	SSW9	SSW11	SSW10	SSW9	S10	S10	S9	SSW5	SSW6	SW5	NNW6	N12	NNW9	SW3.3	N12	
6-Sep	NW5	NNW7	NW5	NNW4	NNE7	NNE10	NE17	NE14	E10	E8	ESE5	SE5	E6	E6	E7	ENE9	ENE12	NE16	NE19	NE20	NE21	NE20	NE23	NE24	NE10.0	NE24
7-Sep	NE23	NE25	NE27	NE25	NE21	NE22	NE18	NNE14	NNE14	N14	NNE13	NNE15	NNE16	N18	N19	N19	N18	N17	N13	N18	N13	N15	N14	N12	NNE17.0	NE27
8-Sep	N12	N14	N13	N11	NW8	WSW5	WSW4	SW1	NNE11	NNE9	N11	NNE11	NNW10	N11	NNE15	N11	N11	NNE9	NNE11	NNE9	N9	NNE8	NNW6	WSW2	N8.2	NNE15
9-Sep	SSW2	SSW3	SSE3	SSW3	SSW1	NNE1	NE4	NE9	NE10	NE8	NNW5	WNW4	NNE9	NNE6	SE5	WSW4	NW6	N6	NNW6	N7	N13	NNE11	N7	NNW3	N3.4	NNE13
10-Sep	SSE4	SW5	WSW5	SW5	WSW5	SW3	SW4	S3	W4	W6	NW6	NW5	WSW8	WSW7	SW4	SSW9	SSW11	S11	S9	SSW8	SSW9	SSW11	S8	SSW7	SW5.4	SSW11
11-Sep	S7	S8	S9	S10	S10	SSW10	SSW10	S11	SSW12	SSW15	SW20	SSW21	SSW20	SSW20	SW24	SW21	SW23	WSW20	SW10	SW11	SW12	WSW14	W14	W12	SW13.1	SW24
12-Sep	WSW9	SSW8	SSW8	SSW8	S5	SSW4	SW3	NW8	NNW10	NNW11	NNW12	NNW14	N15	NNW15	N13	NNE12	N14	NNW7	NW8	N14	NW6	WNW6	NNW8	NNW9	NNW6.0	N15
13-Sep	N11	N12	NNE4	S3	SSW5	S4	SSW4	SSW3	S5	SE5	SSW6	SW8	SSW10	SSW8	SSW8	S7	S7	S7	S7	SSW6	ESE1	SSE4	S5	S8	SSW3.7	N12
14-Sep	SSW6	SSW5	SSW6	SSW6	SSW7	SSW5	S5	SSW7	SSW6	SSW7	SW7	SW9	SSW11	SW11	SW12	SW11	SW13	SW10	SW7	SW7	WNW2	SSE4	SSW3	SSW5	SSW6.9	SW13
15-Sep	S5	SSW6	SSW6	SSW7	S7	SSW5	SSW5	S4	SSW5	S3	SSE4	NE7	ENE7	ENE10	NE13	NE17	NE17	NE16	NE14	NE12	ENE10	NE6	NE13	NE16	ENE4.9	NE17
16-Sep	NE13	NNE13	NNE15	NNE18	NE15	ENE7	ENE3	WNW1	N5	ENE6	NE8	NE9	NE9	NE12	NE15	NE18	ENE16	E13	SE8	SSE10	SSE8	SSE10	SSE13	SSE14	ENE7.2	NE18
17-Sep	SSE9	S12	SSE11	SSE11	SSE10	SSE10	SSE12	SSE13	S14	SSE12	S12	S10	SSW15	S14	S14	S14	SSW16	S12	SSE11	S10	SSE6	SSE3	S4	SSW5	S10.5	SSW16
18-Sep	SSW7	SSW7	S6	S6	SSW3	SW2	SE2	S2	S2	NE7	N4	WNW5	NNE3	WNW5	NE4	SE4	SE3	SE4	SE5	SE6	SE5	SSE4	SSW4	SSE5	SSE2.0	SSW7
19-Sep	SSW1	E6	S5	SSW8	SW8	SSW6	SSW6	SSW7	SSW8	SSW11	SW21	SW26	WSW26	WSW21	WSW25	WSW30	WNW28	W15	W21	W27	W26	WNW22	WNW23	W16	WSW13.9	WSW30
20-Sep	W15	W15	W19	W17	W16	W16	W20	W18	WNW17	WNW15	WNW16	WNW17	WNW19	WNW19	WNW19	WNW19	WNW14	W7	WSW11	SW8	SW8	SSW7	SSW9	SSW8	W13.1	W20
21-Sep	SSW7	SSW7	SSW9	SSW12	SW12	SW13	SW11	SW13	SW11	SSW11	SSW11	SW16	WSW20	WSW20	WSW18	WSW17	SW5	SSE4	S6	SSW10	SSW11	S8	S7	SSW8	SW10.4	WSW20
22-Sep	SSW5	SW3	S7	S8	SSW7	SSW9	SSW10	SSW9	SSW9	SSW11	SSW10	SSW13	SSW11	SSW11	SSW11	SSW11	SW14	SW10	SW9	WSW9	WSW12	WSW10	W7	SW5	SSW8.4	SW14
23-Sep	W12	WNW13	NW2	ENE6	WSW3	ESE1	NE4	SW1	NW6	NW5	NW8	NW2	ENE5	ENE7	ESE2	S7	SSW6	SSW4	SSE5	SSE5	SSE5	E2	NE3	SSE3	WSW0.6	WNW13
24-Sep	SE1	ENE3	ENE1	ESE5	E7	W1	SW3	NE2	SSE2	E3	ENE5	NE9	NE12	NE10	ENE10	ESE4	SE8	SSE10	SSE9	S11	SSW10	W16	SW10	S7	SE2.3	W16
25-Sep	SW10	WSW21	WSW21	SW19	SW18	WSW20	WNW17	WNW18	W16	W18	WNW19	NW20	NW15	N12	NNW10	NNW9	NNE13	NNE16	NNE17	NE16	NE19	NE20	NE17	NE17	NW7.2	WSW21
26-Sep	NE19	ENE18	ENE18	NE20	NE23	NE22	NE22	NE20	NE21	NE24	NE23	NE21	NE23	NE23	NE22	NNE22	NNE21	NNE21	NNE28	NNE23	NNE22	NNE21	NNE19	NNE16	NE20.7	NNE28
27-Sep	NNE15	N17	NNE17	N16	N11	N12	N12	N10	N11	NE10	ENE10	NE8	S4	WSW9	SW8	SSW6	SSW7	S7	S6	S6	SSW7	S7	S8	S7	N2.7	NNE17
28-Sep	S8	S8	S7	S8	S8	SSW8	S11	S14	S17	S22	S22	S20	S23	S21	SSW22	S20	S22	S15	S13	S12	S12	S13	SSW14	S12	S14.6	S23
29-Sep	S8	SSE6	SSW6	SSW6	S8	S11	S10	S9	S11	S12	S15	S16	S17	S15	SSW12	SW15	SW16	SSW11	SSW15	SW14	SSW11	SSW7	SSW6	S5	SSW10.5	S17
30-Sep	SSW6	S6	SSW7	SSW7	SW6	SSW5	W1	SE3	S6	WSW5	W3	NNW6	N8	NE11	ENE9	ENE8	N5	NNE7	NE15	ENE8	NNE9	NE13	NE12	ENE13	NE2.7	NE15

WSW1.1	WSW1.0	SSW1.4	SSW1.8	SSW2.1	SSW2.4	SSW1.8	SSW1.9	SSW1.9	SSW1.9	SW2.7	WSW3.0	WSW2.8	WSW2.2	W2.0	WSW1.4	W1.4	S0.1	ENE0.3	NNE0.2	NW1.2	NNW1.2	NNW1.4	ESE0.2	Diurnal Average
NE23	NE25	NE27	NE25	NE23	NE22	NE22	NE20	NE21	NE24	NE23	SW26	WSW26	NE23	WSW25	WSW30	WNW28	NNE21	NNE28	W27	W26	WNW22	NE23	NE24	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 3 16:00	Hours of Data: 720
Minimum Value: 0 km/h on Sep 23 20:00	Hours of Missing Data: 0
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7	Hours of Calibration: 0
	Percent Operational Time: 100.0

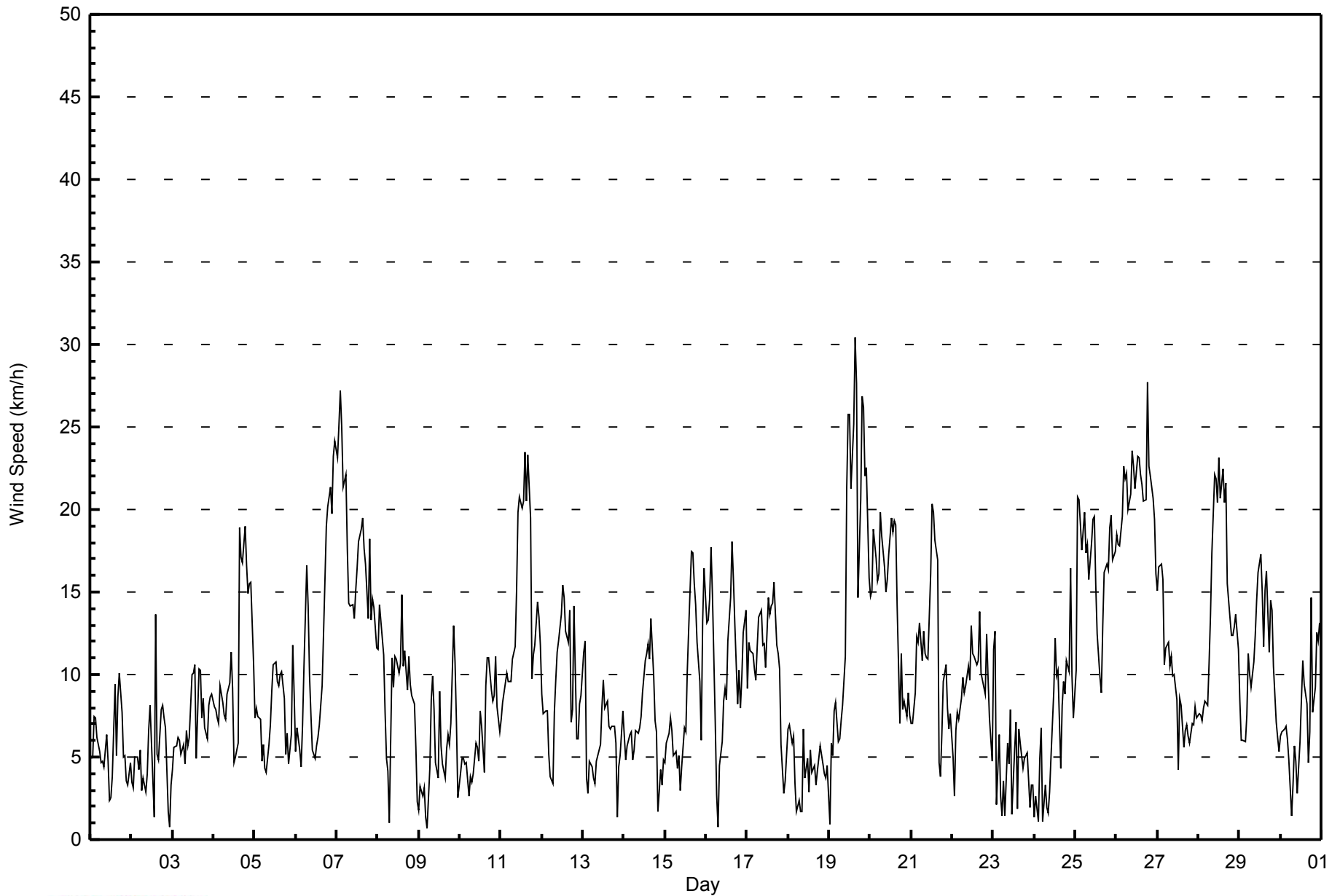
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	1	2	1	2	2	2	1	1	1	2	2	2	2	6	4	3	3	3	2	3	2	2	2	2	6
2-Sep	1	1	1	1	1	1	1	1	1	1	2	2	2	2	6	2	2	2	3	2	1	1	1	2	6
3-Sep	2	1	1	1	1	1	1	2	2	2	2	3	3	5	2	10	5	2	3	2	2	2	2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

Diurnal Maximum



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Shell Muskeg River - September 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - September 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	170	23.61	23.61
6 - 11	315	43.75	67.36
12 - 19	169	23.47	90.83
20 - 28	65	9.03	99.86
29 - 38	1	0.14	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - September 2014

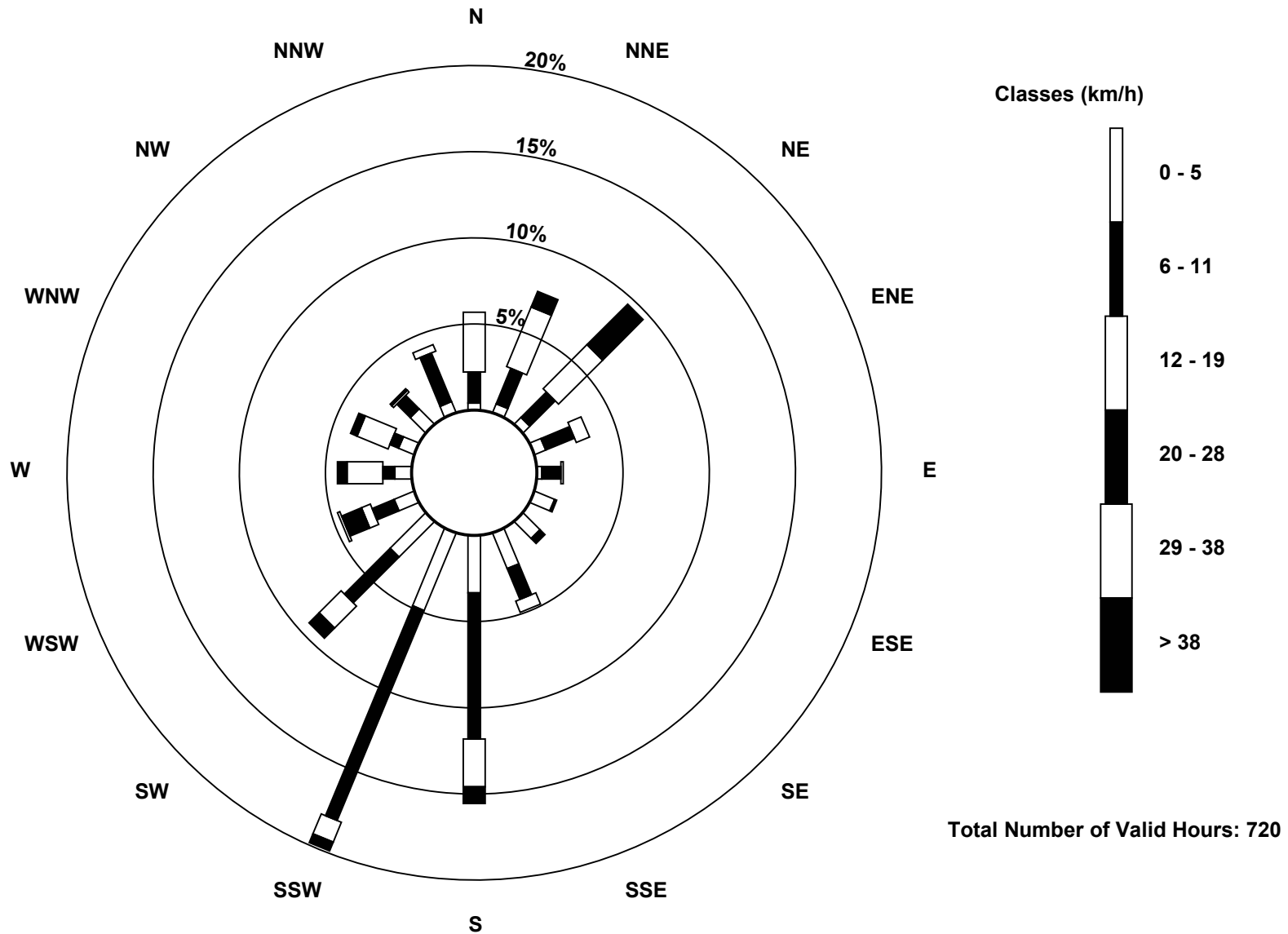
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	4	4	5	2	9	10	16	24	35	21	9	7	7	9	5	170
6 - 11	13	16	15	13	8	1	3	14	61	95	27	10	5	4	8	22	315
12 - 19	25	27	26	6	1	0	0	5	20	9	13	4	15	14	1	3	169
20 - 28	0	7	24	0	0	0	0	0	7	4	6	9	4	3	1	0	65
29 - 38	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	41	54	69	24	11	10	13	35	112	143	67	33	31	28	19	30	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Shell Muskeg River (AMS 16)**





Direction of Maximum Speed: 257 deg on Sep 19 16:00		Hours in Service: 720
Direction of Maximum Daily Speed Average: 39.9 deg on Sep 26		Hours of Data: 720
Direction of Minimum Speed: 12 deg on Sep 9 06:00		Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.6 deg on Sep 23		Percent Operational Time: 100.0
Monthly Average Direction: 227.5 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	204	236	193	209	199	201	175	213	195	198	227	120	199	338	7	300	215	229	270	309	327	313	227	203	229.6
2-Sep	225	195	197	177	158	174	183	182	189	263	292	271	278	168	283	221	262	303	343	327	325	300	116	186	258.2
3-Sep	239	183	189	193	198	186	203	208	215	229	241	236	237	227	192	39	87	106	159	171	235	188	191	194	197.0
4-Sep	193	190	191	185	192	190	184	186	191	195	199	212	199	223	303	16	18	22	20	32	18	18	11	15	22.8
5-Sep	338	327	337	339	320	253	209	219	187	195	209	206	196	196	195	185	170	184	204	205	228	327	2	342	228.0
6-Sep	322	328	320	327	26	22	36	45	87	87	115	138	100	86	93	64	61	52	51	49	46	40	36	41	47.4
7-Sep	35	36	36	37	42	51	37	23	16	11	21	13	15	4	5	5	6	10	6	10	0	0	3	0	20.1
8-Sep	352	357	353	350	326	248	243	228	23	15	359	21	344	351	26	11	358	14	15	22	9	19	347	237	1.3
9-Sep	193	200	154	209	203	12	40	37	56	54	335	294	14	21	143	252	322	359	330	349	11	21	2	328	11.2
10-Sep	165	218	240	220	254	218	216	186	262	280	306	308	237	256	224	205	194	191	190	192	197	192	188	197	214.1
11-Sep	190	183	182	190	189	193	193	190	200	208	215	211	209	211	219	220	230	239	222	231	233	257	270	277	217.6
12-Sep	239	201	202	211	191	193	214	318	336	343	347	345	360	342	358	14	358	334	326	1	312	289	341	341	333.3
13-Sep	351	358	28	187	206	172	196	194	190	141	204	223	204	205	203	179	184	186	185	195	108	155	184	188	193.9
14-Sep	192	206	209	198	204	197	191	210	210	202	215	218	207	225	223	216	230	224	221	226	288	153	192	196	212.0
15-Sep	181	192	199	194	184	195	207	180	207	176	164	50	63	59	56	53	52	48	42	53	75	52	36	40	69.0
16-Sep	34	30	33	33	48	65	70	286	357	61	56	45	42	48	47	53	70	84	145	156	154	161	163	161	67.7
17-Sep	168	171	160	154	154	155	159	164	169	162	175	176	197	189	189	186	194	180	164	169	164	156	190	194	173.3
18-Sep	201	203	179	173	200	216	128	183	188	55	349	301	13	303	41	124	137	136	146	146	135	158	210	167	164.2
19-Sep	193	95	172	201	214	210	192	194	195	211	234	235	238	246	250	257	286	280	261	279	279	285	284	266	253.4
20-Sep	261	260	262	268	271	278	269	275	287	297	297	301	287	286	288	285	297	274	243	223	216	206	197	192	272.1
21-Sep	197	210	211	213	220	219	216	219	214	204	199	228	239	248	249	245	215	168	187	197	196	185	190	196	218.3
22-Sep	193	221	170	184	193	203	209	196	196	207	201	196	208	200	204	193	227	225	231	245	256	252	268	226	212.8
23-Sep	263	290	316	73	256	112	34	227	310	320	320	321	61	71	111	190	195	204	159	163	158	97	53	149	244.6
24-Sep	135	75	59	108	100	276	228	48	159	88	58	36	47	47	65	107	136	157	154	171	199	268	231	190	128.6
25-Sep	217	245	242	234	231	248	285	283	278	264	283	305	321	351	348	341	21	31	31	40	37	49	51	40	312.1
26-Sep	49	58	60	54	53	52	54	48	50	52	52	39	38	35	35	29	24	32	33	24	19	26	28	16	39.9
27-Sep	19	11	12	11	0	352	352	352	8	45	58	54	179	242	236	209	211	184	180	182	200	182	187	189	7.1
28-Sep	188	182	180	186	191	194	186	173	173	182	181	182	184	181	193	191	190	190	185	181	181	190	192	190	185.1
29-Sep	181	164	195	198	186	179	183	177	180	183	181	180	184	187	198	220	221	207	211	217	206	212	199	177	194.0
30-Sep	199	188	195	193	217	197	262	143	186	237	272	331	350	38	67	72	10	14	53	75	23	43	34	61	54.2

237.8	253.9	208.2	193.7	198.0	201.1	205.3	208.2	205.6	202.6	235.7	249.0	242.6	258.4	260.0	257.0	263.7	182.7	75.8	13.0	321.0	335.6	345.2	121.6
Diurnal Average																							

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



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 109 deg on Sep 9 06:00			Hours of Data:	720
Minimum Value: 6 deg on Sep 22 22:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P ₁ = 7 P ₁₀ = 12 Q ₁ = 16 Median = 21 Q ₃ = 28 P ₉₀ = 45 P ₉₉ = 88				

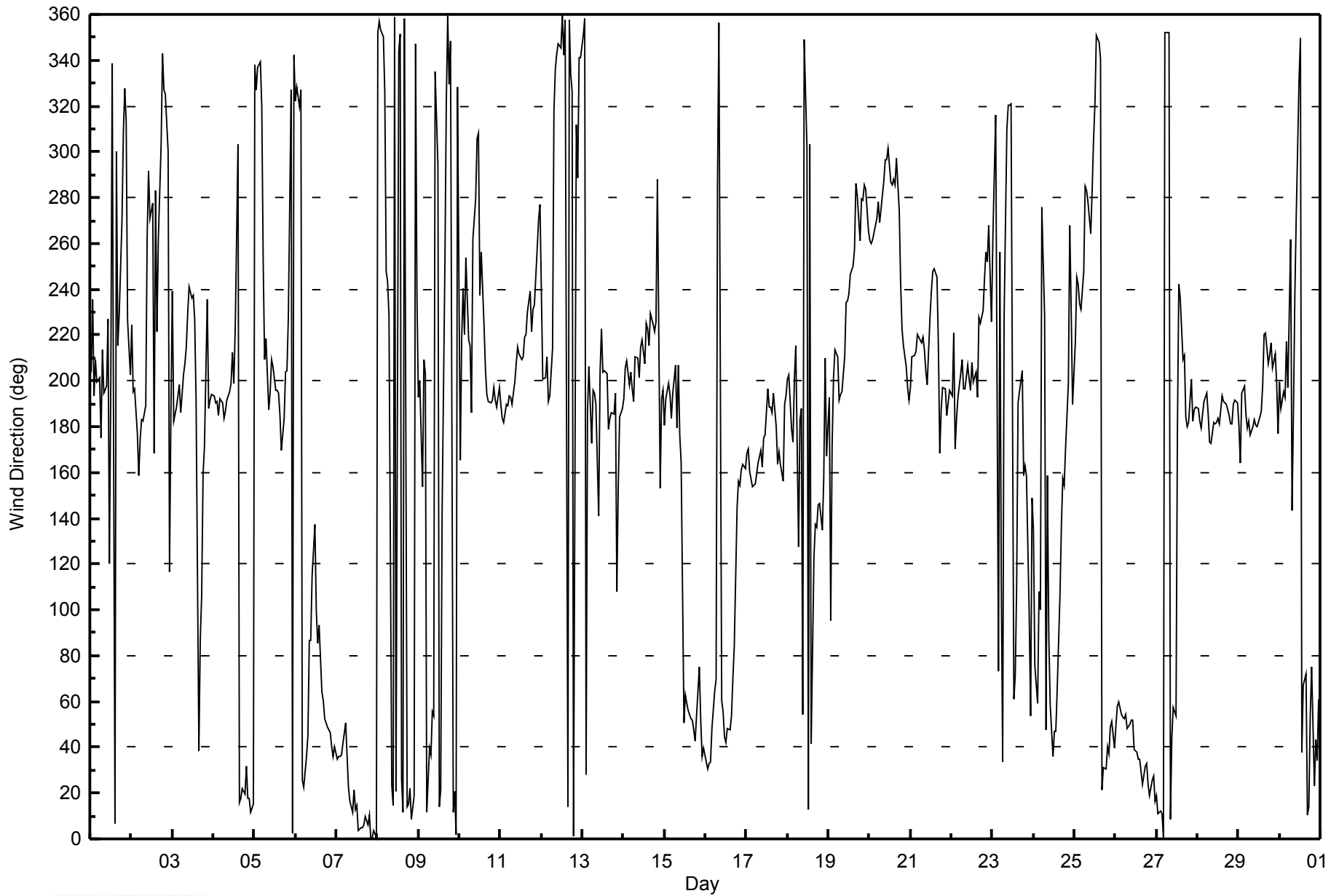
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	28	52	18	17	20	31	23	20	35	27	38	79	88	84	28	65	27	14	28	52	54	70	50	19	88
2-Sep	24	23	21	12	24	18	42	19	38	46	34	23	72	90	38	27	40	31	26	18	11	89	86	55	90
3-Sep	29	9	14	21	16	18	17	25	24	27	36	21	24	29	40	88	24	25	22	19	37	18	19	20	88
4-Sep	21	20	21	18	15	22	20	27	22	23	26	29	36	40	63	24	22	22	21	20	22	21	19	28	63
5-Sep	26	23	20	23	48	26	23	24	27	36	33	28	29	28	22	20	21	21	36	24	28	34	25	23	48
6-Sep	65	16	34	52	96	24	14	25	20	25	28	29	31	18	15	24	17	12	7	11	13	13	12	12	96
7-Sep	12	10	9	12	15	11	20	23	23	22	26	25	26	26	23	23	23	21	25	19	25	23	22	25	26
8-Sep	27	23	23	24	24	27	39	85	33	35	32	35	37	31	25	30	31	29	25	25	28	29	36	58	85
9-Sep	71	27	45	53	93	109	66	27	26	39	57	80	39	51	41	61	38	41	28	26	22	22	35	74	109
10-Sep	40	23	26	16	20	37	19	30	39	26	28	38	33	46	86	33	23	21	16	16	17	17	16	16	86
11-Sep	12	13	14	17	18	18	19	21	23	23	23	24	24	23	22	21	16	12	17	7	7	15	10	11	24
12-Sep	19	15	15	14	20	35	44	19	33	32	33	31	30	34	36	30	32	29	22	23	30	24	23	22	44
13-Sep	23	22	87	68	12	14	17	26	29	40	43	31	31	33	31	31	23	16	16	20	75	55	12	12	87
14-Sep	13	16	16	16	24	21	24	21	26	30	26	29	26	24	27	24	16	15	10	83	16	27	10	83	83
15-Sep	17	12	12	15	13	17	17	20	26	57	44	34	24	14	9	7	9	8	12	13	10	19	17	12	57
16-Sep	10	18	16	9	8	21	51	88	33	36	22	23	32	22	15	18	16	17	25	17	20	18	20	21	88
17-Sep	22	20	20	19	18	19	20	19	20	21	26	33	24	24	25	23	20	20	18	18	17	25	14	13	33
18-Sep	18	18	21	18	20	71	24	74	42	41	63	51	78	59	61	28	34	22	15	12	17	16	38	21	78
19-Sep	87	29	19	17	18	23	19	19	22	25	14	13	14	11	12	13	22	12	17	13	14	12	13	14	87
20-Sep	10	11	10	9	11	11	11	12	15	18	17	17	16	17	15	15	15	22	7	21	18	16	16	16	22
21-Sep	17	15	14	14	14	14	16	15	21	22	25	23	12	13	13	14	37	17	15	16	17	15	18	17	37
22-Sep	23	30	14	15	11	15	16	20	21	25	26	22	25	25	25	21	23	13	14	13	7	6	13	39	39
23-Sep	7	18	76	57	60	71	70	85	21	42	19	87	38	41	79	33	21	18	14	14	12	67	44	55	87
24-Sep	76	29	89	27	15	77	43	69	65	44	24	15	12	10	22	29	23	20	24	22	24	14	25	21	89
25-Sep	22	8	8	9	11	13	15	14	14	17	16	15	22	26	28	30	25	21	18	18	12	13	12	15	30
26-Sep	14	16	16	10	9	9	9	14	13	10	11	14	13	12	12	16	17	15	11	18	18	17	16	20	20
27-Sep	20	19	20	20	23	20	22	25	24	22	28	31	48	32	26	38	29	16	13	13	18	15	16	16	48
28-Sep	15	15	13	14	16	18	18	18	17	18	18	20	19	20	22	21	18	19	17	16	16	17	18	17	22
29-Sep	16	23	19	17	17	16	17	16	18	18	20	20	21	23	23	22	18	21	21	18	21	18	21	27	27
30-Sep	18	19	16	16	19	22	76	79	20	34	32	33	34	27	13	21	69	42	13	57	25	16	20	19	79

87	52	89	68	96	109	76	88	65	57	63	87	88	90	86	88	69	42	36	57	83	89	86	74	
Diurnal Maximum																								



WBEA
Hourly Averages

Wind Direction (WD) - deg
Shell Muskeg River - September 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 6, 2014	Previous Calibration	August 18, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:15
Barometric Pressure	737 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11081107
Cal Gas Concentration	50.8 ppm	Cal Gas Expiry Date	41788
Gas Cert Reference	LL107937		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492
DACS voltage range	0-5 v	DACS channel #	1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-710	-710
Analyzer Range (mv)	5000	5000	Lamp voltage	787	796
Calculated slope	0.998087	0.991937	Chamber temp.	45.0	45.0
Calculated intercept	3.970092	2.992274	Pressure (mmHg)	705.4	709.3
Analyzer Background	6.2	6.3	Flow (lpm)	0.452	0.452
Analyzer Coefficient	1.262	1.290	Intensity	91	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	-0.2	NA
as found span	5000	78.7	799.6	784.9	1.019
calibrator zero	5000	0.0	0.0	0.4	NA
high point	5000	78.7	799.6	805.2	0.993
second point	5000	39.4	400.3	397.4	1.007
third point	5000	19.7	200.2	196.4	1.019
calibrator zero	5000	0.0	0.0	0.4	0.000
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	78.1	793.5	800.4	0.991
Average Correction Factor					1.006

Corrected As found 785.1 Previous response 797.2 % change 1.5%

Notes:

Adjusted span.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

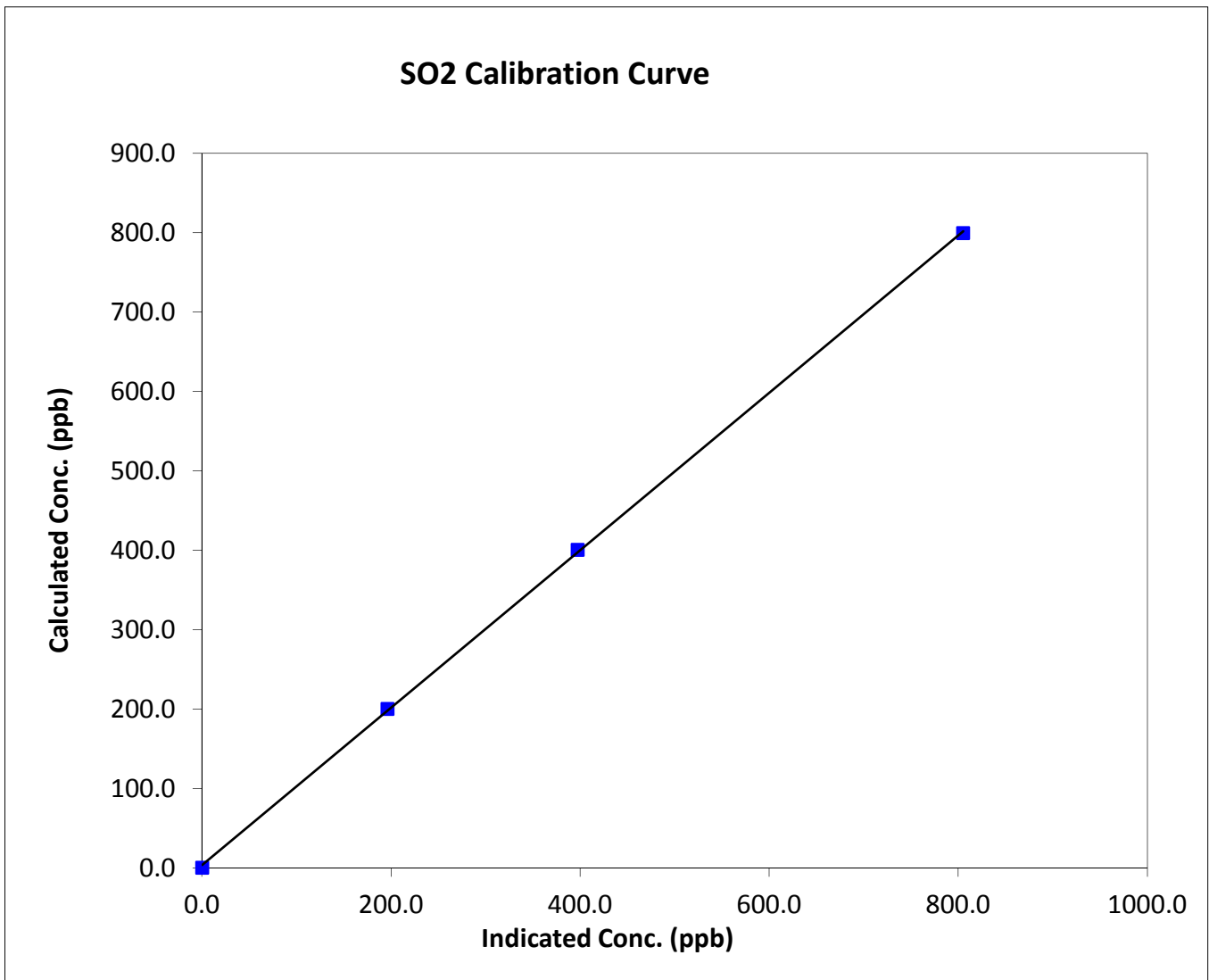
SO₂ Calibration Summary

Station Information

Calibration Date	September 6, 2014	Previous Calibration	August 18, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:00	End Time (MST)	13:15
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

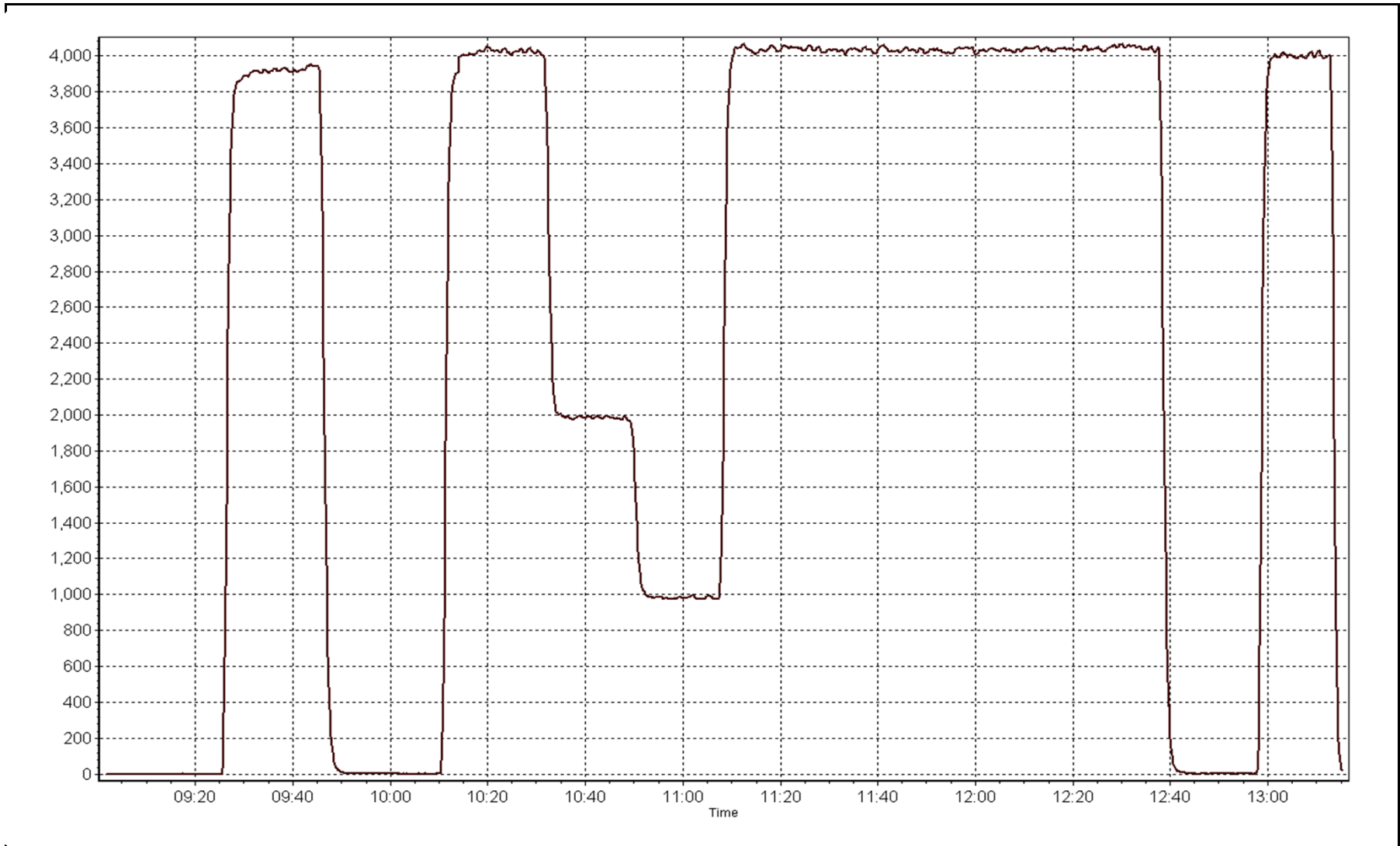
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999912
799.6	805.2	0.9930		
400.3	397.4	1.0073	Slope	0.991937
200.2	196.4	1.0191		
			Intercept	2.992274



SO2 Calibration Plot

Date: September 6, 2014





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	September 6, 2014	Previous Calibration	August 18, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:15
Barometric Pressure	737 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11081107
Gas Cert Reference	LL107937	Cal Gas Expiry Date	41788
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1078.8 ppm
C3H8 Cal Gas Conc.	205 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492
DACS voltage range	0-5 VDC	DACS channel #	DIFF 4

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.2	8.2
Analyzer Range (mv)	5000	5000	Air or Bypass press	34.9	34.9
Calculated slope	0.999143	0.998438	Fuel Pressure	24.2	24.2
Calculated intercept	-0.039014	0.083872			

Analyzer make Thermo 51i-LT Analyzer serial # 1218153485

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.40	N/A
as found span	5000	78.7	16.98	17.22	0.986
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.7	16.98	16.98	1.000
second point	5000	39.4	8.50	8.34	1.019
third point	5000	19.7	4.25	4.12	1.032
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	-0.01	N/A
as left span	5000	78.7	16.98	16.81	1.010
Average Correction Factor					1.017

Corrected As found 16.82 Previous response 17.03 % change 1.3%

Notes:

Adjusted zero and span

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

THC Calibration Summary

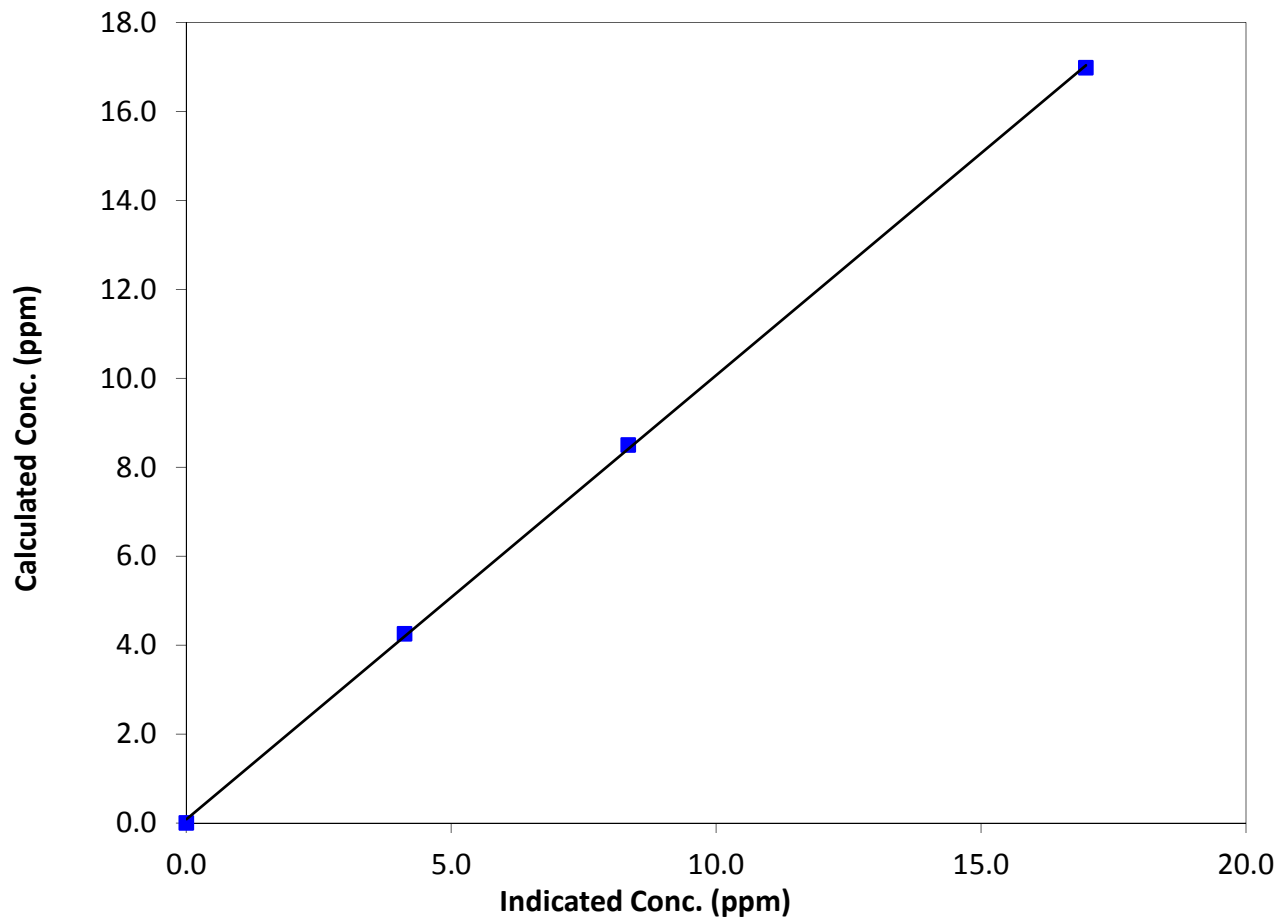
Station Information

Calibration Date	September 6, 2014	Previous Calibration	August 18, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:00	End Time (MST)	13:15
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153485

Calibration Data

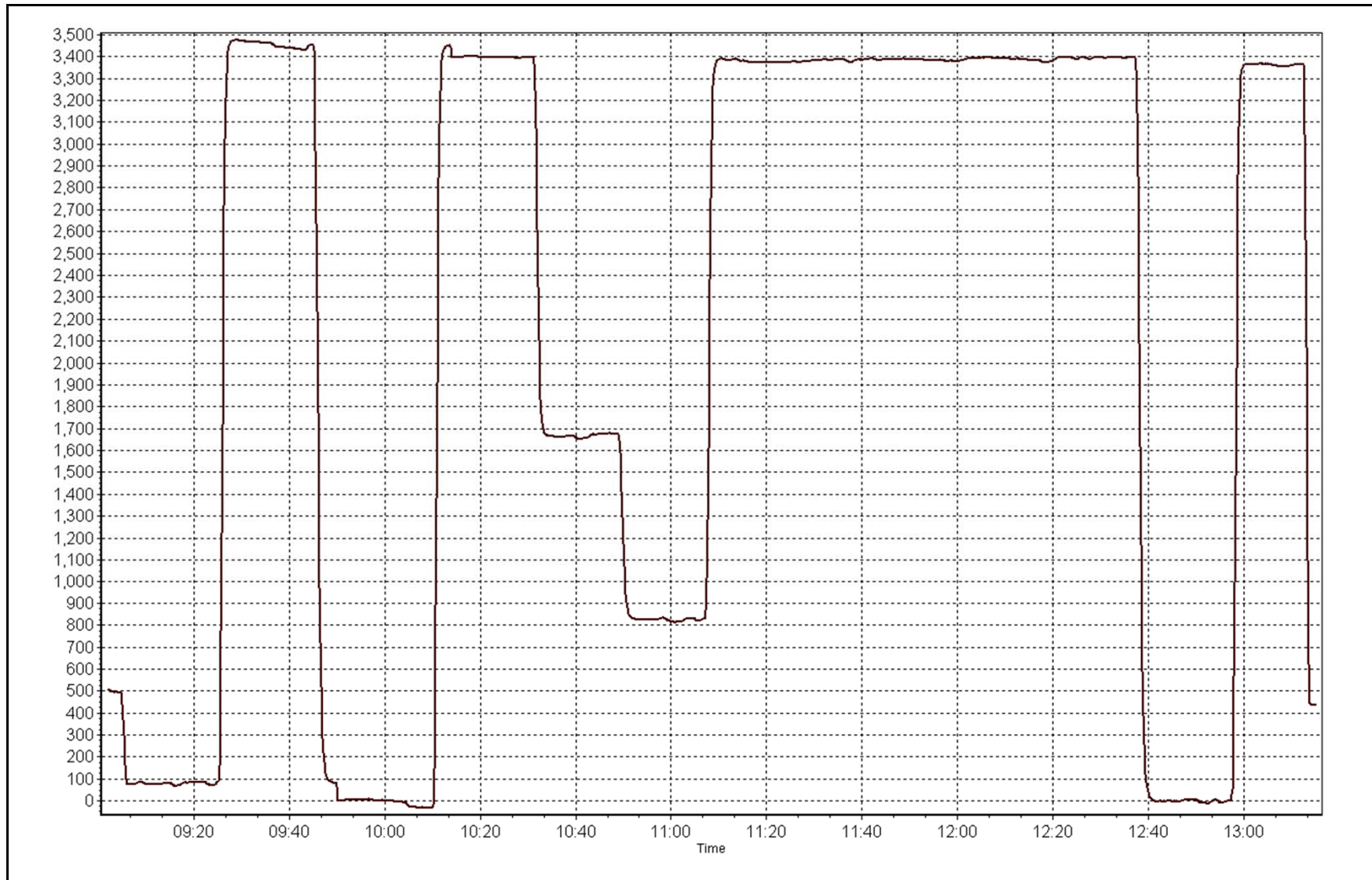
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999864
16.98	16.98	1.0000		
8.50	8.34	1.0193	Slope	0.998438
4.25	4.12	1.0316		
			Intercept	0.083872

THC Calibration Curve



THC Calibration Plot

Date: September 6, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	September 6, 2014	Previous Calibration	August 18, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:15
Barometric Pressure	737 mmHg	Station Temperature	21.0 Deg C
Calibrator	SABIO 4010	Serial Number	11081107
NO Cal Gas Conc	51.2 ppm	Cal Gas Expiry Date	May 29, 2014
NO _x Cal Gas Conc	51.3 ppm	Cal Gas Serial #	LL107937

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8346
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Parameter		NO _x	NO	NO ₂
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.997477	0.996282	1.019865
	Data Offset	1.963179	2.289396	0.054763
After	Data Slope	1.006600	1.004913	0.999766
	Data Offset	1.997378	2.389673	0.366515
Channel #		3	2	1
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	724
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	1.404	ppb	1.404	ppb
NO _x coefficient	1.398	ppb	1.398	ppb
NO ₂ coefficient	n/a	ppb	n/a	ppb
NO bkgrnd	-0.2		-0.2	
NO _x bkgrnd	0.2		0.2	
Nt coefficient	n/a		n/a	
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.7	Deg C	315.1	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O ₃ flow	85.0	ccm	85.0	ccm
R Cell Press	2.9	mmHg	2.9	mmHg
Sample Flow	486.000	ccm	495.000	ccm

Notes:

no adjustments required.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

September 6, 2014

Station Number:

AMS 16

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.6	-0.5	-0.4	N/A	N/A
as found span	5000	78.7	807.5	805.9	1.6	804.9	805.3	-0.5	1.0032	1.0008
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	-0.4	N/A	N/A
high point	5000	78.7	807.5	805.9	1.6	802.7	802.7	0.0	1.0059	1.0040
second point	5000	39.4	404.2	403.5	0.8	395.8	394.4	-0.2	1.0213	1.0230
third point	5000	19.7	202.1	201.7	0.4	196.2	195.2	-0.1	1.0302	1.0334
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	-0.4	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	-0.2	N/A	N/A
as left span	5000	78.1	801.3	509.4	291.9	793.0	707.8	284.4	1.0105	0.7197
Average Correction Factor									1.0191	1.0201

Corrected As found

NO_x= 805.5

NO= 805.8

Percent Change

NO_x= 0.3%

NO= 0.1%

Previous Response

NO_x= 807.5

NO= 806.6

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

78.70

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			-0.4			N/A	
1st NO ₂ (300)	N/A	509.4	292.2	802.6	509.4	292.2	0.9905	1.0000	1.0000	100.0%
2nd NO ₂ (200)	N/A	603.2	198.4	801.4	603.2	197.4	0.9920	1.0000	1.0051	99.5%
3rd NO ₂ (100)	N/A	700.2	101.4	802.2	700.2	101.5	0.9910	1.0000	0.9988	100.1%
4th NO ₂ (0)	801.6	N/A	0.4	802.0	801.6	0.4	0.9912	1.0000	N/A	N/A
Average Correction Factor							0.9912	1.0000	1.0013	99.9%

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

NO_x Calibration Summary

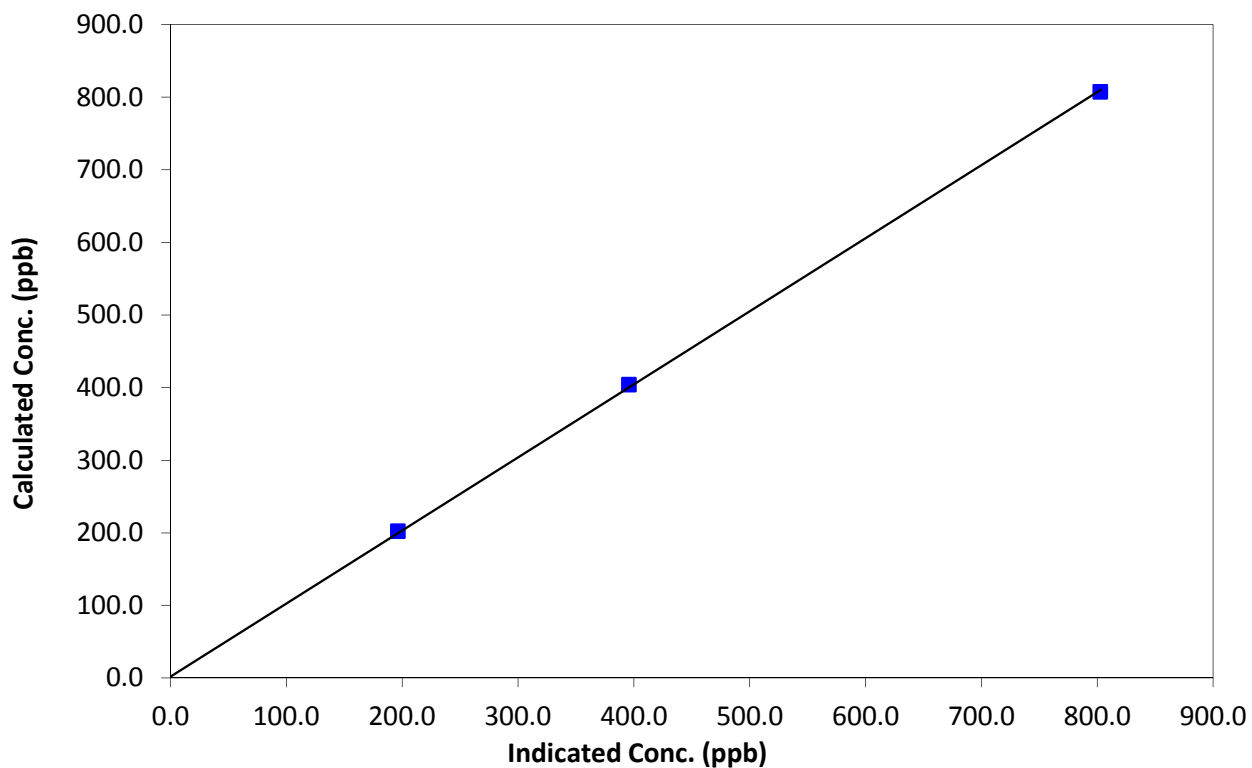
Station Information

Calibration Date	September 6, 2014	Previous Calibration	August 18, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:00	End Time (MST)	13:15
Analyzer make	API T200	Analyzer serial #	724

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999922
807.5	802.7	1.0059		
404.2	395.8	1.0213	Slope	1.006600
202.1	196.2	1.0302		
0.0	0.0	0.0000	Intercept	1.997378

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

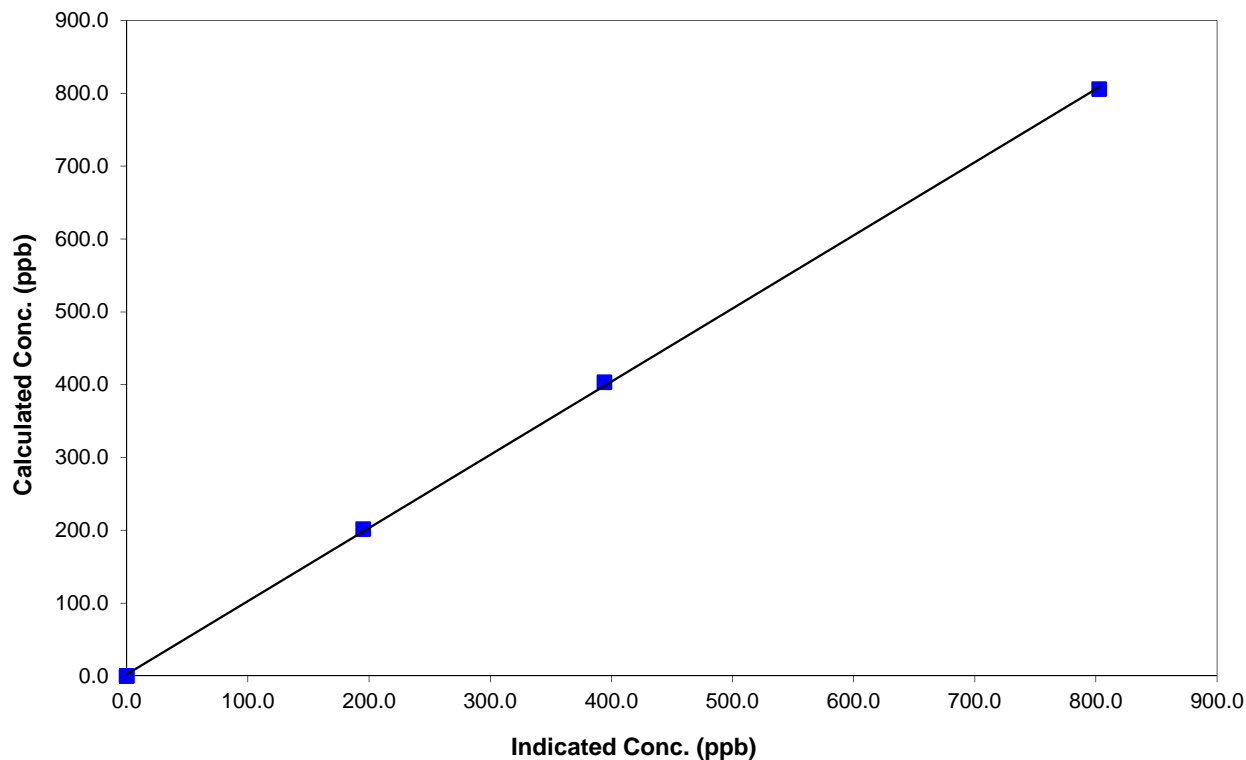
Station Information

Calibration Date	September 6, 2014	Previous Calibration	August 18, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:00	End Time (MST)	13:15
Analyzer make	API T200	Analyzer serial #	724

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999882
805.9	802.7	1.0040		
403.5	394.4	1.0230	Slope	1.004913
201.7	195.2	1.0334		
0.0	0.0	0.0000	Intercept	2.389673

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

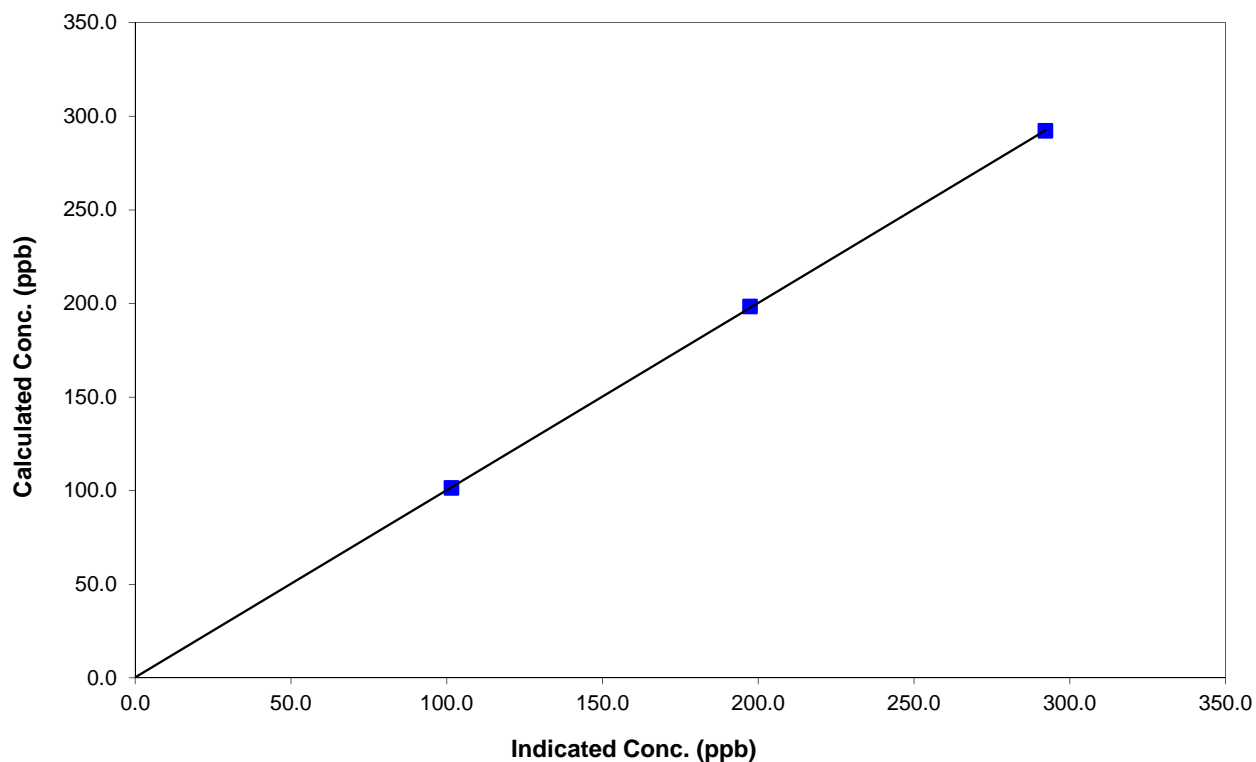
Station Information

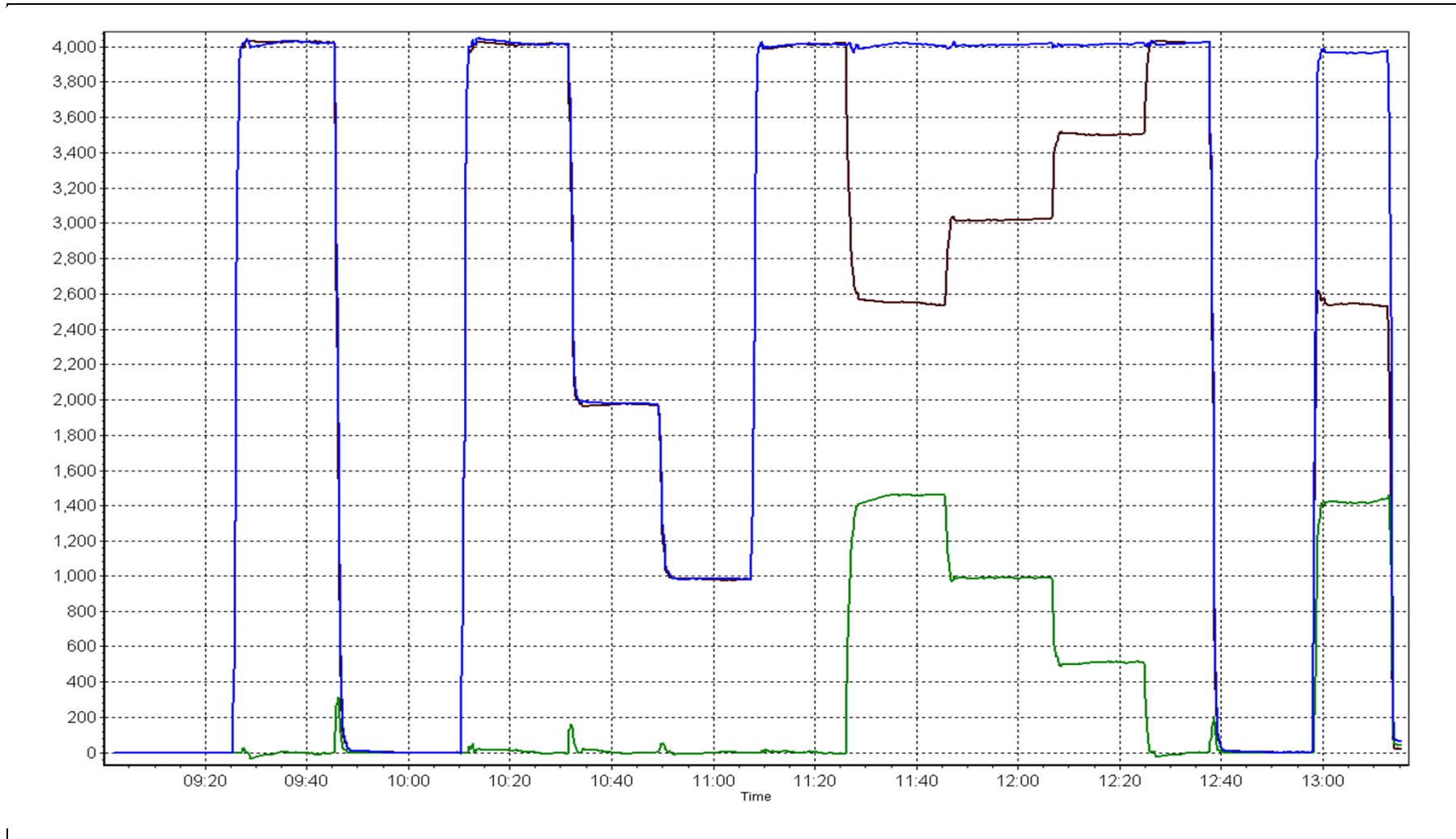
Calibration Date	September 6, 2014	Previous Calibration	August 18, 2014
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:00	End Time (MST)	13:15
Analyzer make	API T200	Analyzer serial #	724

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999984
292.2	292.2	1.0000		
198.4	197.4	1.0051	Slope	0.999766
101.4	101.5	0.9988		
			Intercept	0.366515

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 17
WAPASU
SEPTEMBER 2014**

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

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

October 30, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
 SEPTEMBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	682	38	38	100.00	15	0	4	0
H2S (ppb) Average	684	36	36	100.00	2	0	1	0
THC (ppm) Average	680	37	40	99.58	2.8	-	2.3	-
O3 (ppb) Average	685	35	35	100.00	42	0	29	-
NO2 (ppb) Average	680	40	40	100.00	16	0	6	-
NO (ppb) Average	680	40	40	100.00	16	-	4	-
NOX (ppb) Average	680	40	40	100.00	32	-	8	-
PM2.5 (ug/m3) Average	705	0	15	97.92	41.6	-	9.5	0
Temperature 2 m (C) Average	720	0	0	100.00	27.9	-	19.9	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	-	-
Wind Speed 10 m (km/h) Average	716	0	4	99.44	22	-	-	-
Wind Direction 10 m (deg) Average	716	0	4	99.44	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
 SEPTEMBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	682	0.8	2	-	0	0	0	0	0	2	15
H2S (ppb) Average	684	0.3	0	-	0	0	0	0	0	0	2
THC (ppm) Average	680	2.14	0.1	-	2	2	2.1	2.1	2.2	2.3	2.8
O3 (ppb) Average	685	19.1	9	-	0	6	14	20	25	29	42
NO2 (ppb) Average	680	2.2	3	-	0	0	0	1	3	6	16
NO (ppb) Average	680	1	1	-	0	0	0	1	1	2	16
NOX (ppb) Average	680	3.2	4	-	0	1	1	2	4	7	32
PM2.5 (ug/m3) Average	705	4.1	3.9	-	0	0.6	1.5	3.1	5.6	8.6	41.6
Temperature 2 m (C) Average	720	8.46	6	-	-3.6	0.9	3.9	8.3	12.1	16.8	27.9
Relative Humidity (%) Average	720	74	19	-	23	49	59	77	90	97	99
Wind Speed 10 m (km/h) Average	716	7.8	4	-	0	3	5	7	10	14	22
Wind Direction 10 m (deg) Average	716	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
 SEPTEMBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	22 Sep 2014 07:00	22 Sep 2014 07:00	1	Maintenance - remotely activated daily span cycle
THC	30 Sep 2014 03:00	30 Sep 2014 04:00	2	Unstable operation -calibrator communication problem
PM2.5	04 Sep 2014 08:00	04 Sep 2014 08:00	1	Maintenance - Flow and zero check, sample head cleaning
PM2.5	07 Sep 2014 02:00	07 Sep 2014 05:00	4	Intermittent unstable operation - excessive baseline drift
PM2.5	08 Sep 2014 06:00	08 Sep 2014 07:00	2	Intermittent unstable operation - excessive baseline drift
PM2.5	08 Sep 2014 11:00	08 Sep 2014 11:00	1	Intermittent unstable operation - excessive baseline drift
PM2.5	08 Sep 2014 13:00	08 Sep 2014 17:00	5	Intermittent unstable operation - excessive baseline drift
PM2.5	26 Sep 2014 23:00	27 Sep 2014 00:00	2	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	13 Sep 2014 03:00	13 Sep 2014 06:00	4	Flatline in sensor output signal

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 15 ppb on Sep 21 11:00	Maximum Daily Average: 4.4 ppb on Sep 21		Hours of Data:	682
Minimum Value: 0 ppb on Sep 23 06:00	Minimum Daily Average: 0.1 ppb on Sep 23		Hours of Missing Data:	38
Maximum Diurnal Average: 1.5 ppb at hour 11	Minimum Diurnal Average: 0.2 ppb at hour 24		Hours of Calibration:	38
Monthly Average: 0.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 2 P ₉₉ = 8		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-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	0.3	1
2-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
3-Sep	0	Z	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Sep	0	Z	2	2	2	2	1	4	2	4	8	7	8	4	1	0	0	0	0	0	0	0	0	0	2.1	8
5-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0.4	2
6-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
7-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
8-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
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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	3	1	0	0	0	0	0.5	3
11-Sep	1	Z	3	2	2	1	0	1	0	2	3	4	2	1	1	1	1	1	1	1	1	1	1	1	1.4	4
12-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
13-Sep	0	Z	0	0	0	0	0	0	0	0	0	6	3	4	3	2	2	6	4	4	4	2	1	1	1.9	6
14-Sep	0	Z	0	0	0	0	0	0	0	0	1	2	2	4	6	2	4	4	4	2	1	0	0	0	1.6	6
15-Sep	0	Z	0	0	0	1	3	13	11	4	2	1	0	0	0	0	0	1	0	0	0	0	0	0	1.8	13
16-Sep	0	Z	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0.4	1
17-Sep	0	Z	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
18-Sep	0	Z	0	2	3	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
19-Sep	0	Z	0	0	0	1	3	6	4	7	7	4	5	3	0	0	0	0	0	0	0	0	0	0	1.9	7
20-Sep	0	Z	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	1	0	0.4	1
21-Sep	1	Z	0	3	7	8	6	5	10	11	15	13	5	6	2	0	1	4	3	1	0	0	0	0	4.4	15
22-Sep	0	Z	1	1	1	1	1	1	1	1	1	1	1	3	7	4	5	2	2	2	1	0	0	0	1.5	7
23-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
24-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1
25-Sep	3	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
26-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
27-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.3	1
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	0.3	0
29-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
30-Sep	0	Z	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1

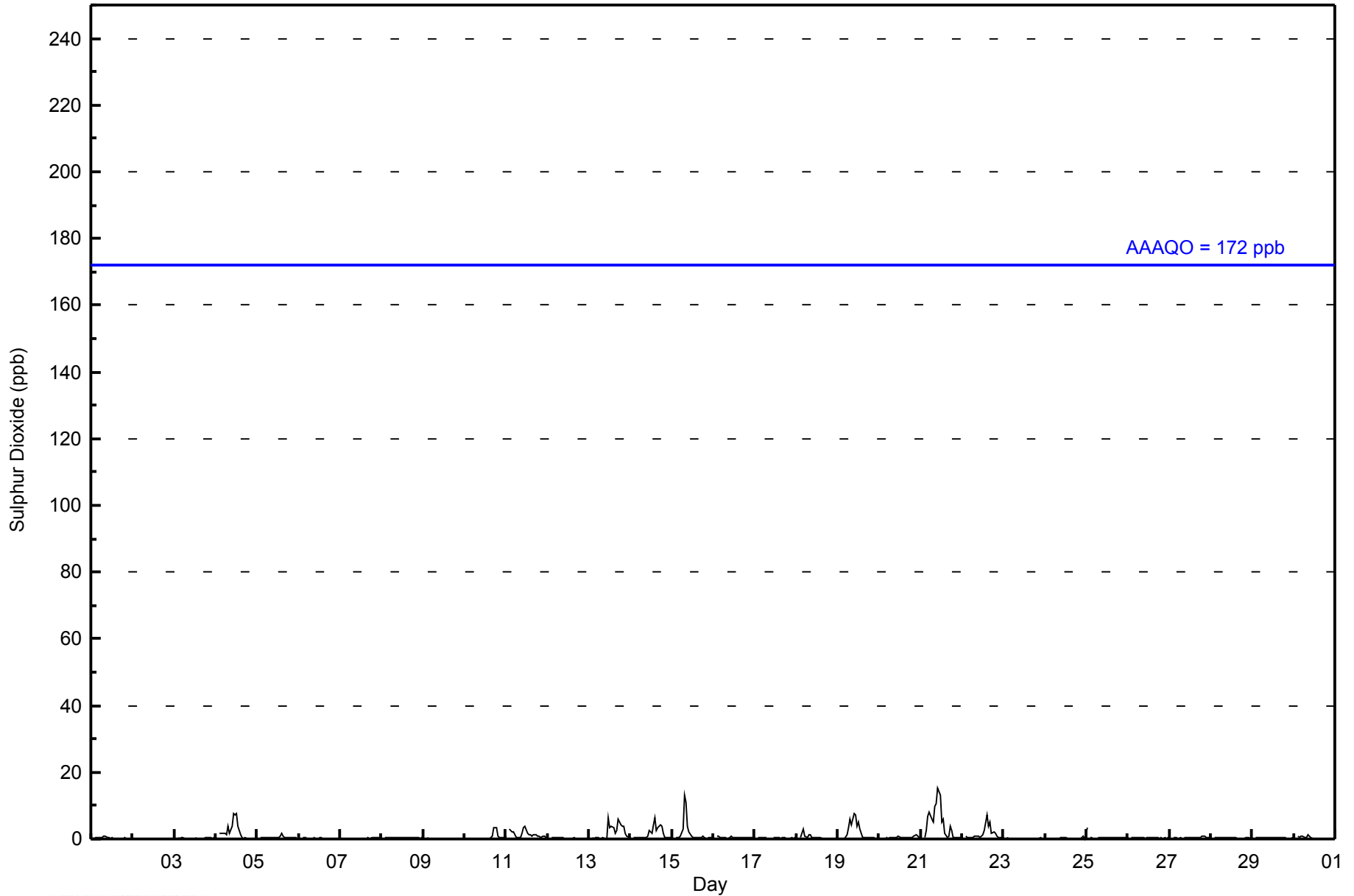
0.4	--	0.5	0.5	0.7	0.7	0.7	1.2	1.3	1.2	1.5	1.5	1.1	1.0	0.9	0.5	0.6	0.9	0.7	0.5	0.4	0.3	0.3	0.2	Diurnal Average	
3	--	3	3	7	8	6	13	11	11	15	13	8	6	7	4	5	6	4	4	4	2	1	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Wapasu - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	677	99.27	99.27
11 - 20	5	0.73	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - September 2014

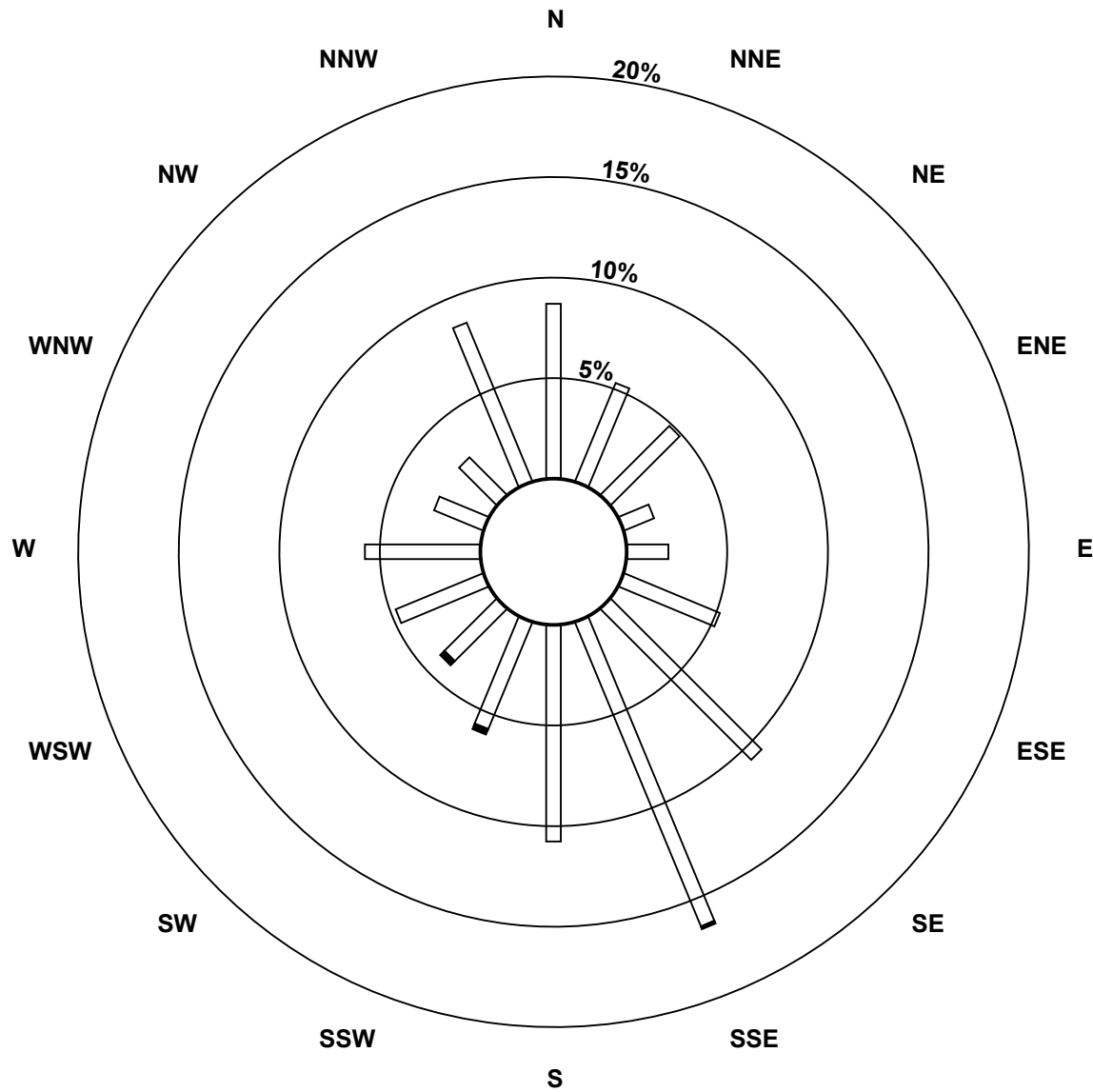
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	59	36	33	11	14	35	72	111	73	39	25	32	39	18	18	58	673
11 - 20	0	0	0	0	0	0	0	1	0	2	2	0	0	0	0	0	5
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	59	36	33	11	14	35	72	112	73	41	27	32	39	18	18	58	678

Total Number of Valid Hours: 678

Total Number of Hours: 720

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

**Sulphur Dioxide (SO₂) - ppb
Wapasu (AMS 17)**



Classes (ppb)

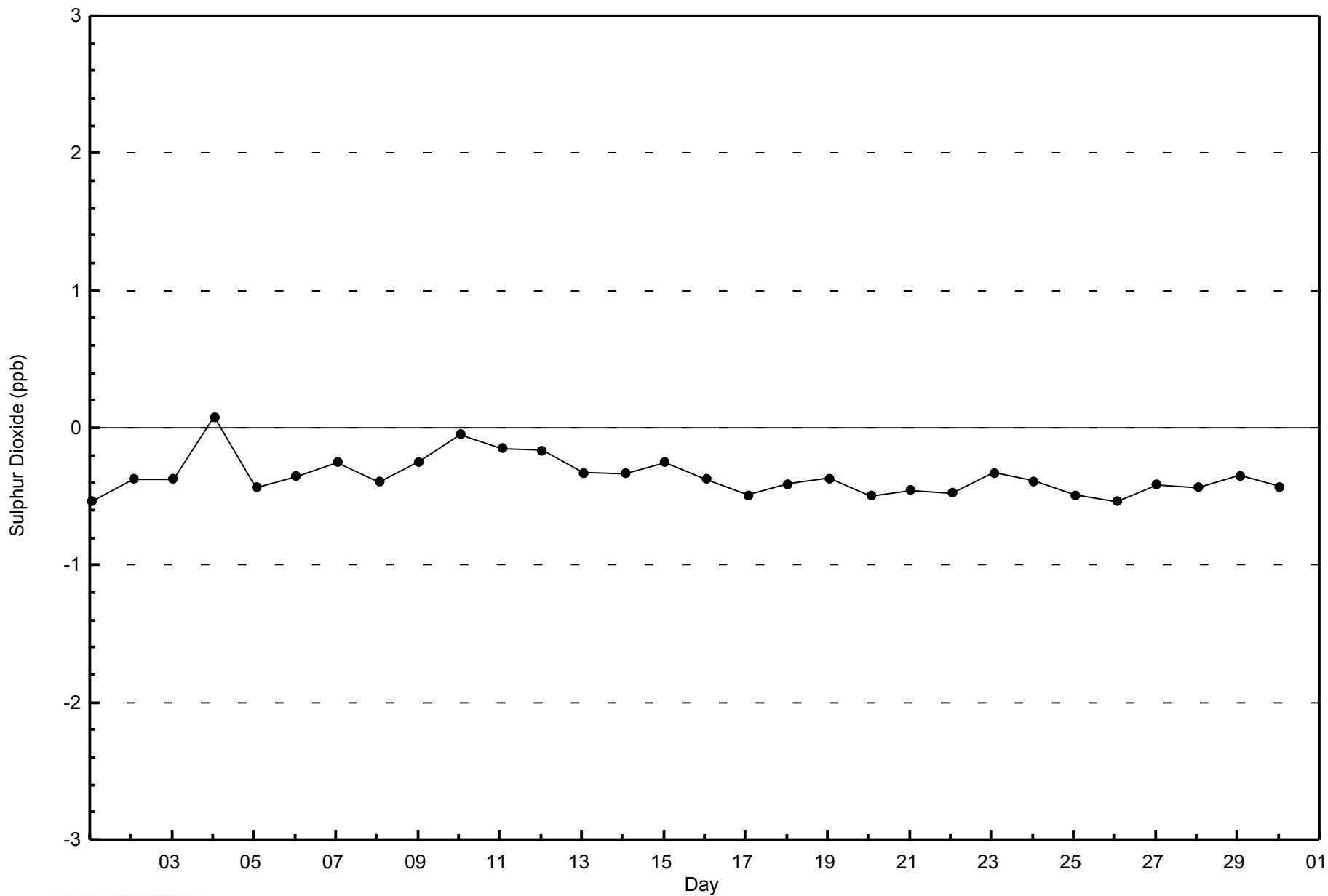


Total Number of Valid Hours: 678



WBEA
Zero Responses

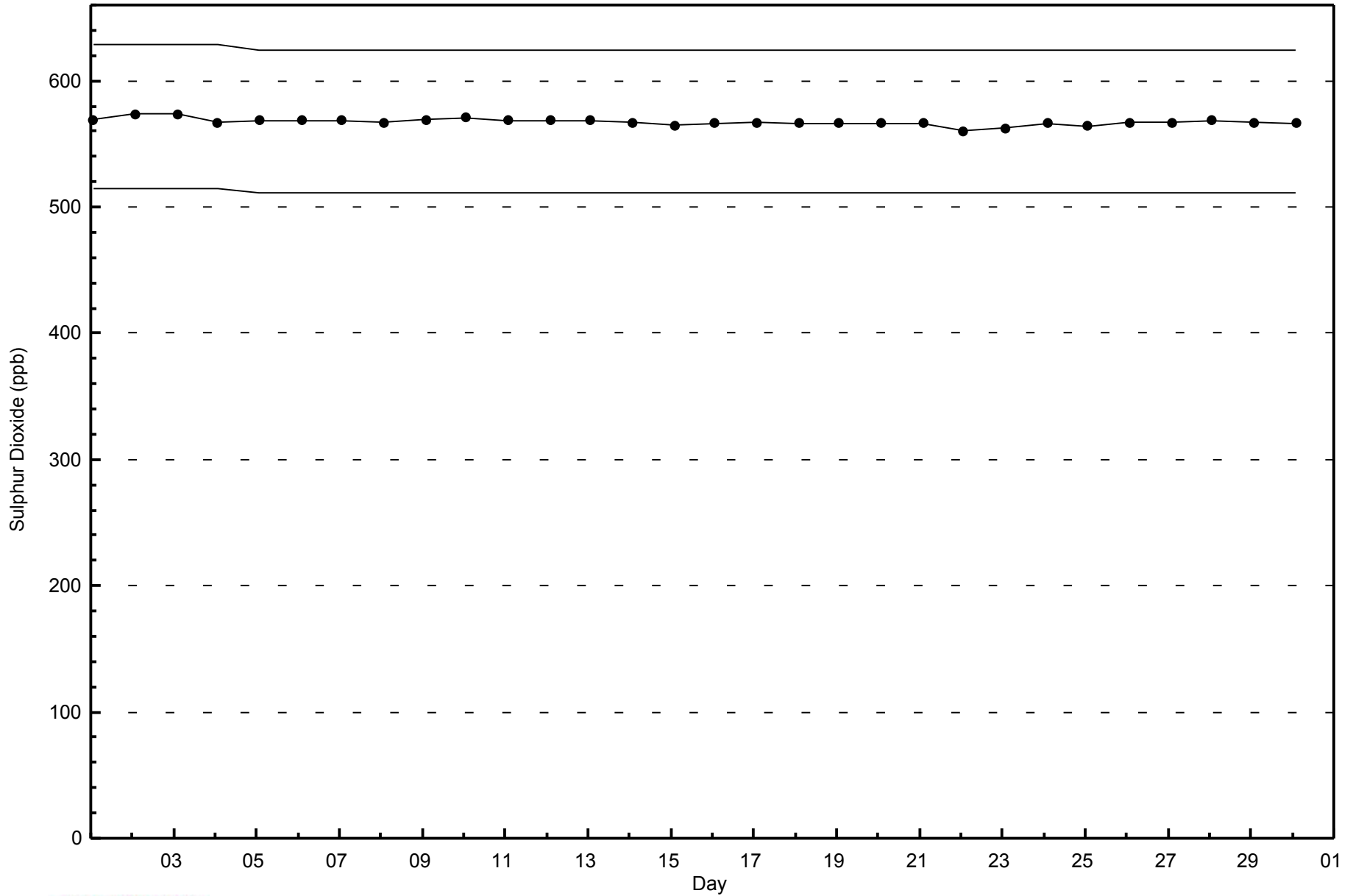
Sulphur Dioxide (SO₂) - ppb
Wapasu - September 2014





WBEA
Span Responses

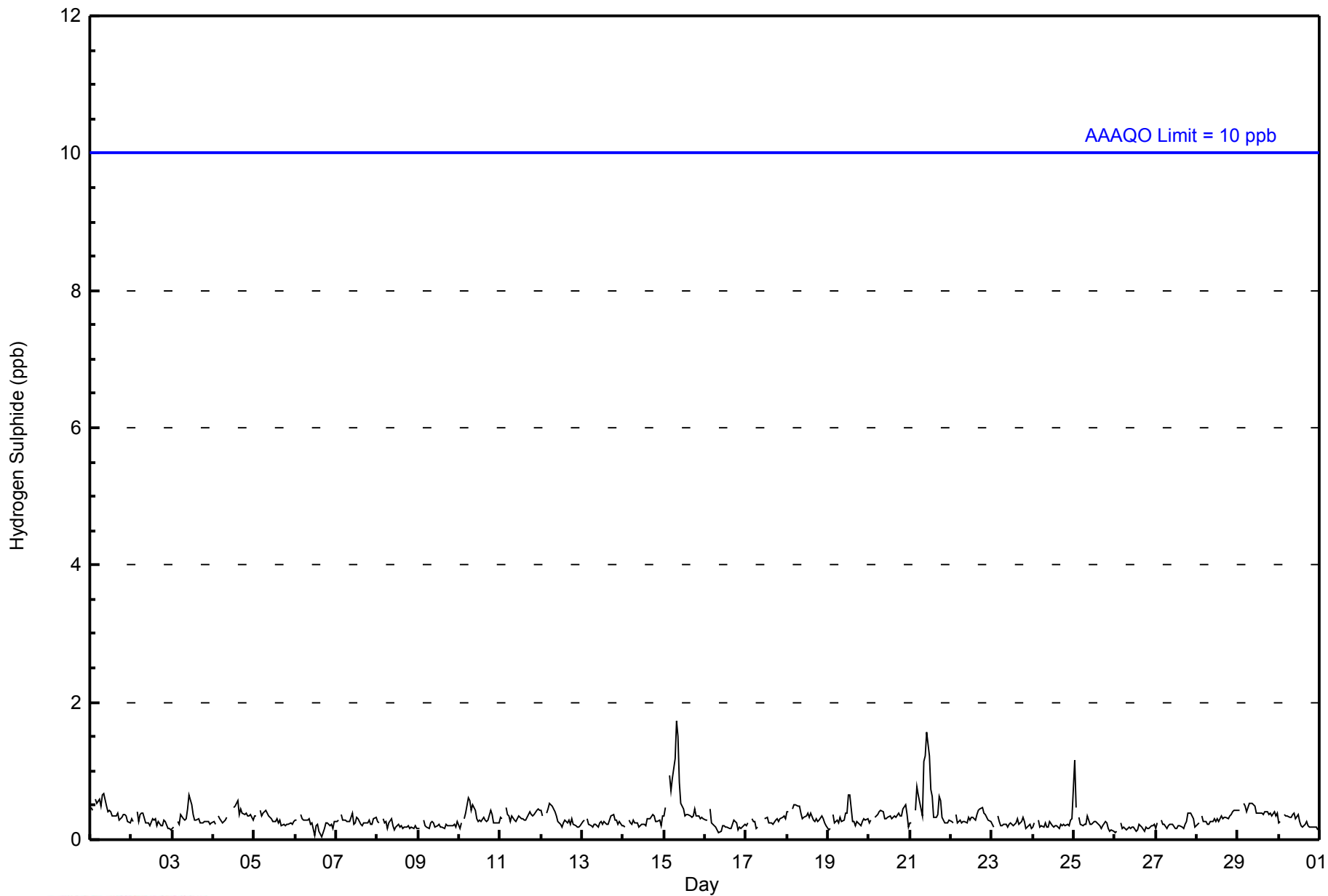
Sulphur Dioxide (SO₂) - ppb
Wapasu - September 2014





WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Wapasu - September 2014





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	684	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - September 2014

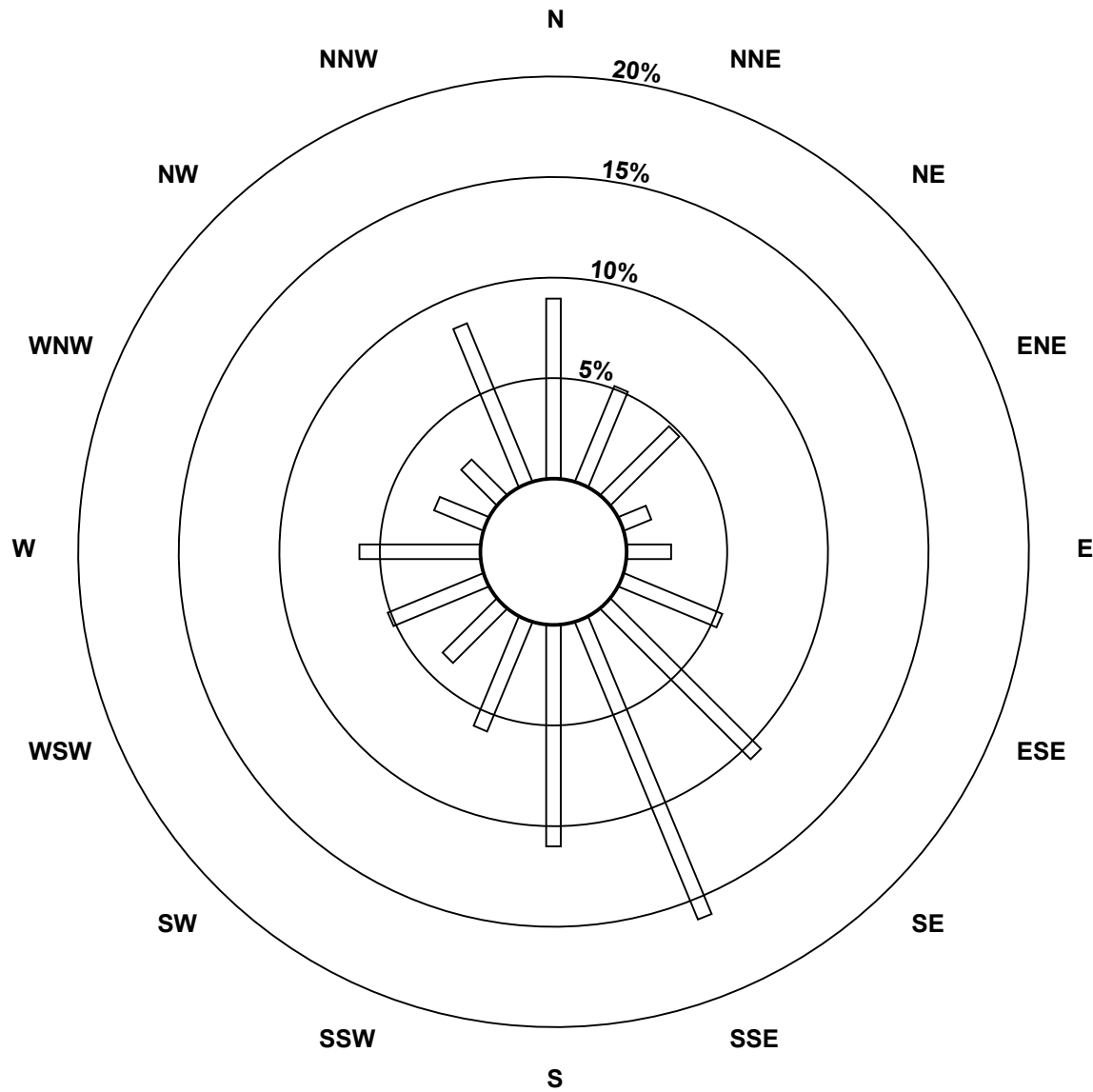
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	61	35	33	10	15	36	72	109	75	40	26	35	41	18	17	58	681
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	35	33	10	15	36	72	109	75	40	26	35	41	18	17	58	681

Total Number of Valid Hours: 681

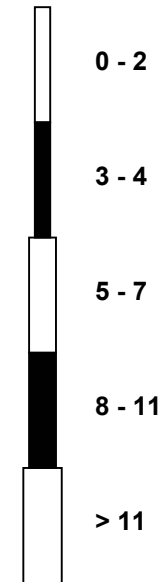
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Hydrogen Sulphide (H₂S) - ppb
Wapasu (AMS 17)



Classes (ppb)

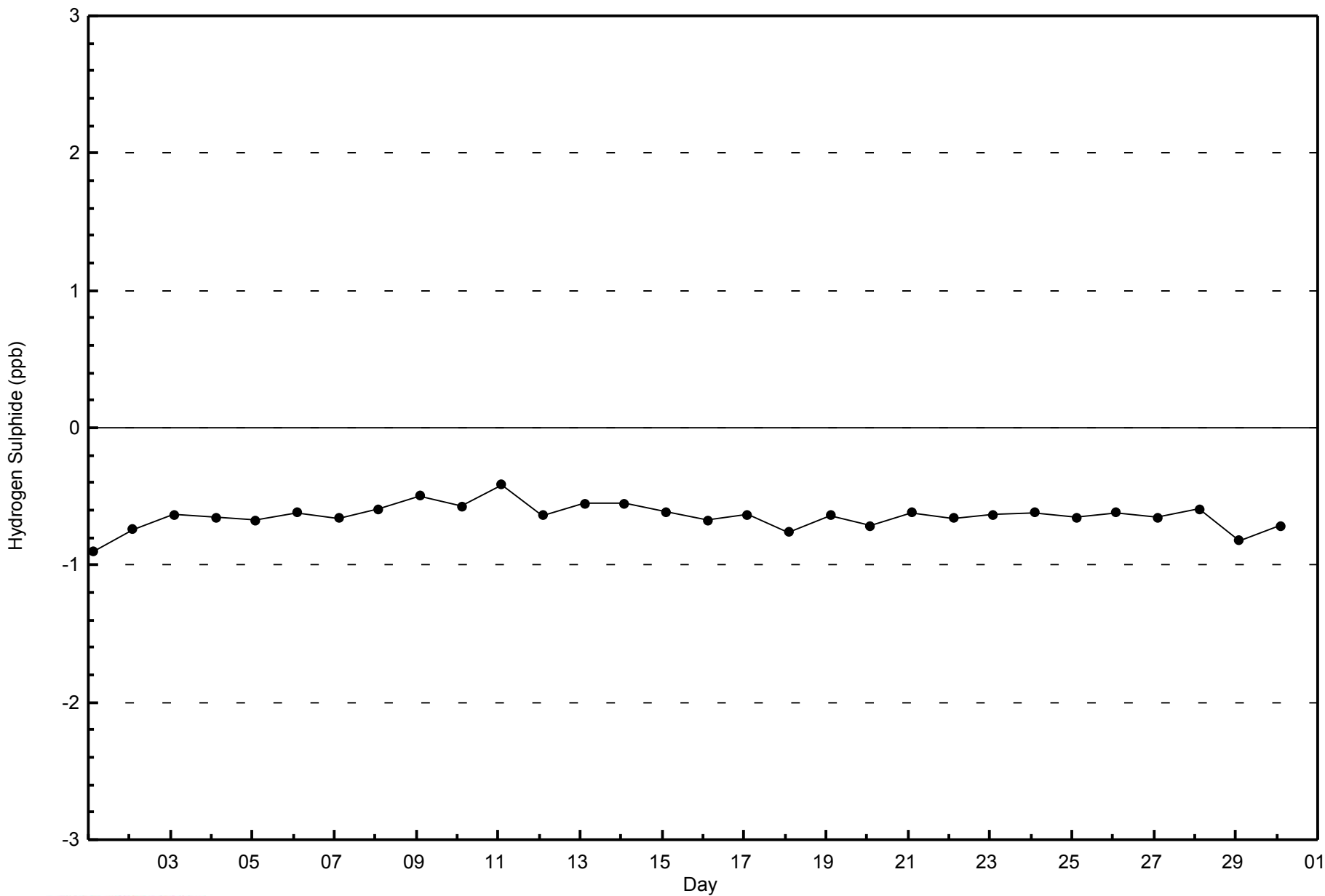


Total Number of Valid Hours: 681



WBEA
Zero Responses

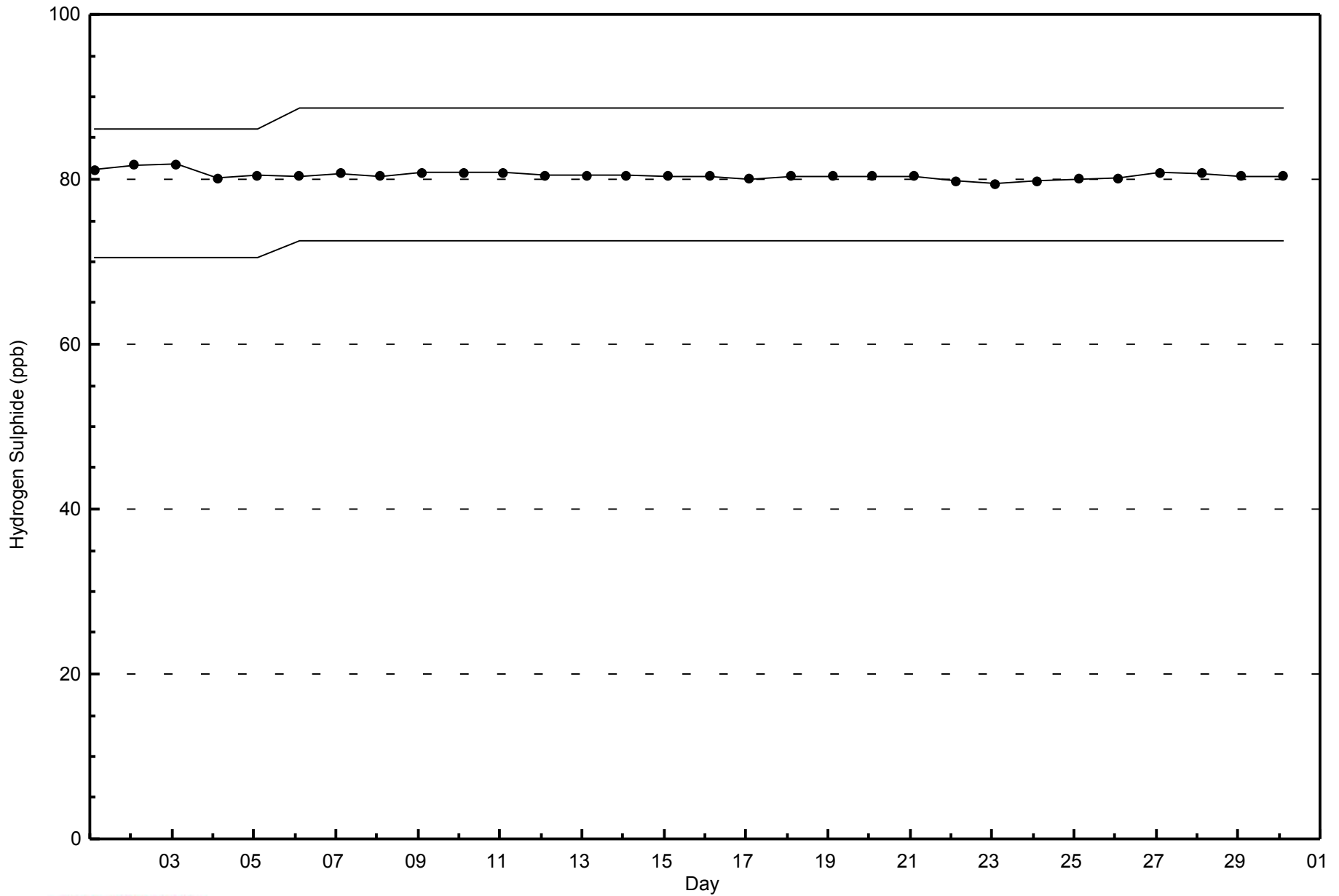
Hydrogen Sulphide (H₂S) - ppb
Wapasu - September 2014





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Wapasu - September 2014



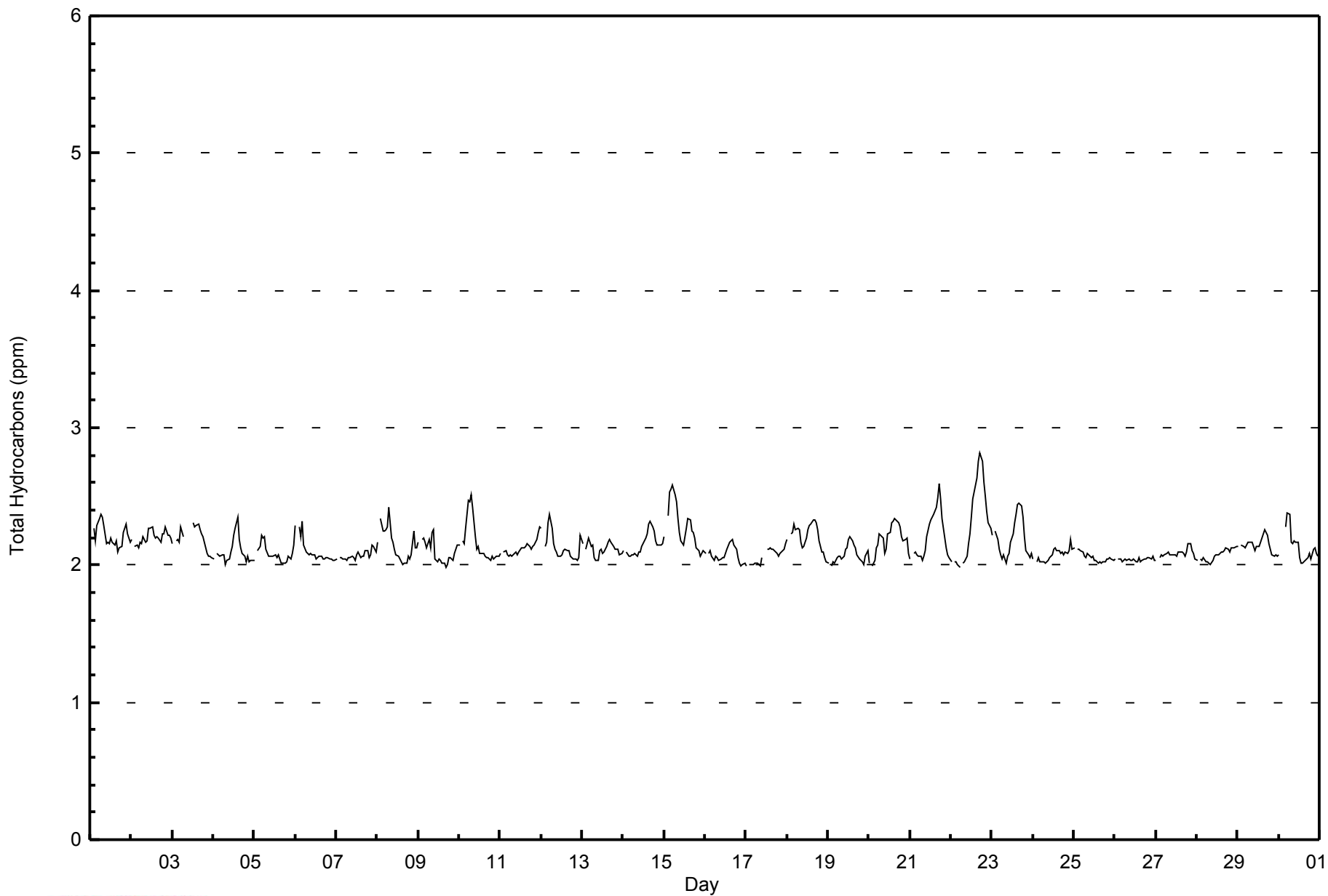


Maximum Value: 2.8 ppm on Sep 22 18:00		Maximum Daily Average: 2.3 ppm on Sep 22		Hours in Service: 720																							
Minimum Value: 2.0 ppm on Sep 9 17:00		Minimum Daily Average: 2.0 ppm on Sep 26		Hours of Data: 680																							
Maximum Diurnal Average: 2.2 ppm at hour 16		Minimum Diurnal Average: 2.1 ppm at hour 10		Hours of Missing Data: 40																							
Monthly Average: 2.14 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.6		Hours of Calibration: 37																							
				Percent Operational Time: 99.6																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	2.2	Z	2.3	2.2	2.3	2.3	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.4
2-Sep	2.2	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3
3-Sep	2.2	Z	2.2	2.2	2.2	2.3	2.2	C	C	C	C	C	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.3	
4-Sep	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.3	
5-Sep	2.0	Z	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.2	
6-Sep	2.3	Z	2.3	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	
7-Sep	2.0	Z	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
8-Sep	2.2	Z	2.3	2.3	2.2	2.3	2.3	2.4	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.2	2.1	2.1	2.1	2.4	
9-Sep	2.2	Z	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.3	
10-Sep	2.1	Z	2.2	2.2	2.3	2.5	2.5	2.5	2.4	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	2.1	2.1	2.5	
11-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	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.1	2.3	
12-Sep	2.3	Z	2.1	2.2	2.3	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.1	2.4	
13-Sep	2.2	Z	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
14-Sep	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.3	
15-Sep	2.2	Z	2.4	2.5	2.6	2.6	2.5	2.5	2.3	2.2	2.2	2.1	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.6	
16-Sep	2.1	Z	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.2	
17-Sep	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	
18-Sep	2.2	Z	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.0	2.1	2.3	
19-Sep	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	
20-Sep	2.0	Z	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.3	
21-Sep	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.3	2.3	2.3	2.4	2.4	2.5	2.6	2.5	2.3	2.2	2.1	2.1	2.1	2.1	2.6	
22-Sep	2.0	Z	2.0	2.0	2.0	2.0	M	2.0	2.0	2.1	2.2	2.2	2.3	2.5	2.6	2.6	2.8	2.8	2.8	2.6	2.5	2.4	2.3	2.3	2.3	2.8	
23-Sep	2.2	Z	2.2	2.2	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.2	2.2	2.3	2.4	2.4	2.5	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.5	
24-Sep	2.0	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	
25-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	2.0	2.0	2.0	2.1	
26-Sep	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.1	
27-Sep	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.0	2.1	2.2	
28-Sep	2.0	Z	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
29-Sep	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
30-Sep	2.1	Z	UO	UO	2.3	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	
		2.1	--	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	Diurnal Average	
		2.3	--	2.4	2.5	2.6	2.6	2.5	2.5	2.4	2.3	2.3	2.3	2.3	2.5	2.6	2.6	2.8	2.8	2.8	2.6	2.5	2.4	2.3	2.3	Diurnal Maximum	
Z - zerospan		C - Calibration					M - Maintenance					UO - Unstable Operation															



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Wapasu - September 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	148	21.76	21.76
2.1 - 3.0	532	78.24	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - September 2014

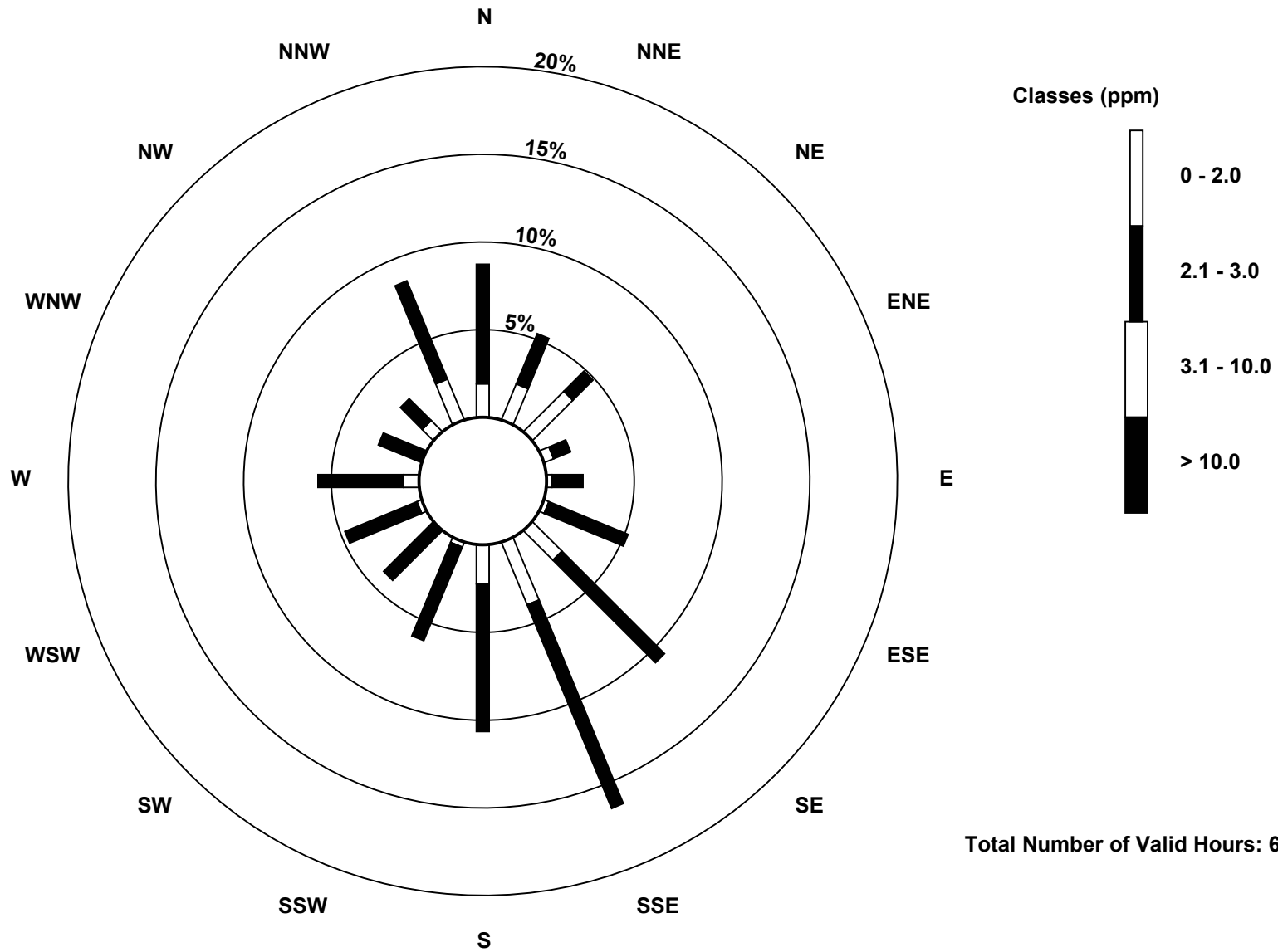
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	13	15	22	4	2	2	16	26	15	2	0	2	6	0	6	17	148
2.1 - 3.0	46	21	11	7	12	33	56	85	57	39	27	30	33	18	12	41	528
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	59	36	33	11	14	35	72	111	72	41	27	32	39	18	18	58	676

Total Number of Valid Hours: 676

Total Number of Hours: 720

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

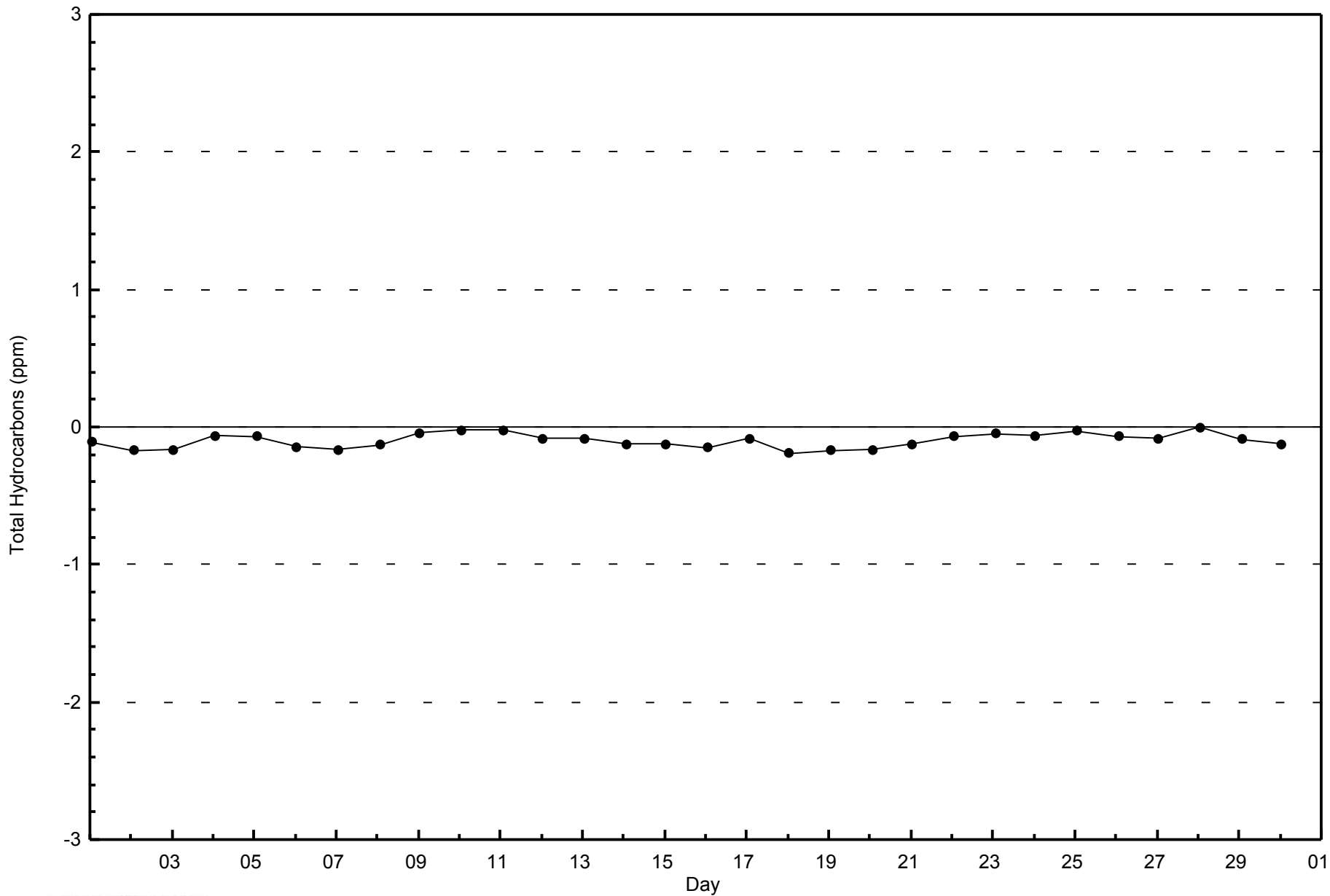
**Total Hydrocarbons (THC) - ppm
Wapasu (AMS 17)**





WBEA
Zero Responses

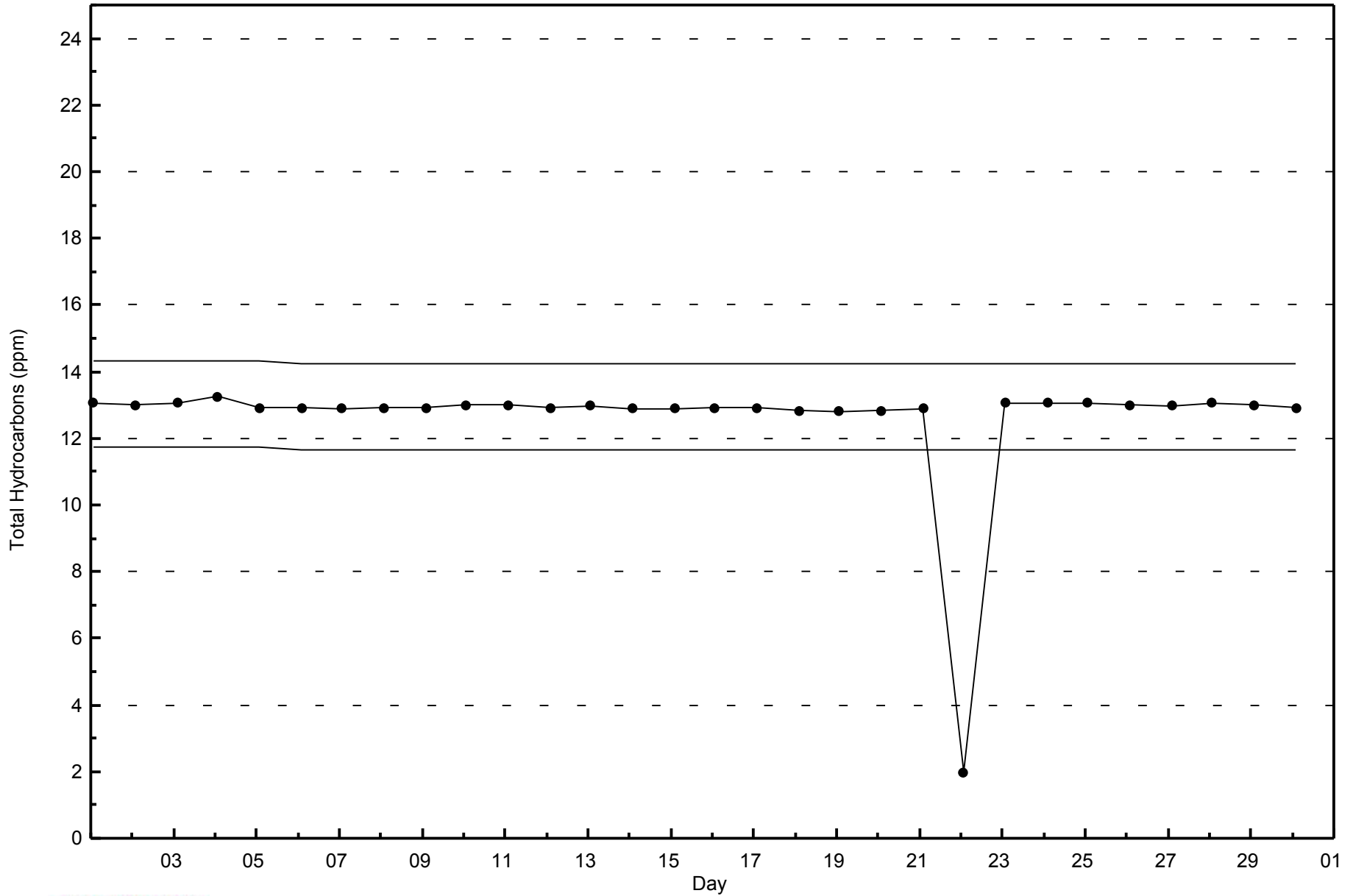
Total Hydrocarbons (THC) - ppm
Wapasu - September 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Wapasu - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 42 ppb on Sep 23 16:00	Maximum Daily Average: 28.8 ppb on Sep 24		Hours of Data:	685
Minimum Value: 0 ppb on Sep 3 02:00	Minimum Daily Average: 10.0 ppb on Sep 30		Hours of Missing Data:	35
Maximum Diurnal Average: 27.1 ppb at hour 16	Minimum Diurnal Average: 11.8 ppb at hour 7		Hours of Calibration:	35
Monthly Average: 19.1 ppb	Percentiles: P ₁ = 1 P ₁₀ = 6 Q ₁ = 14 Median = 20 Q ₃ = 25 P ₉₀ = 29 P ₉₉ = 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	16	12	4	Z	6	5	4	7	13	25	28	30	30	25	24	26	27	28	23	13	7	1	1	2	15.5	30
2-Sep	1	2	5	Z	2	1	1	9	18	22	22	23	21	27	26	24	25	27	21	10	3	2	2	1	12.7	27
3-Sep	1	0	1	Z	1	1	3	11	20	23	26	26	27	27	28	27	29	28	26	23	23	23	22	23	18.1	29
4-Sep	20	18	16	Z	13	13	13	C	C	C	13	20	19	18	17	17	17	17	17	18	17	19	20	22	17.3	22
5-Sep	18	14	10	Z	2	2	2	13	20	22	24	26	27	28	27	26	26	25	24	23	19	16	10	6	17.9	28
6-Sep	2	1	1	Z	13	15	15	16	23	25	28	28	26	24	23	21	17	15	12	13	14	14	16	19	16.5	28
7-Sep	22	21	22	Z	22	22	23	23	20	20	22	24	25	25	26	29	26	24	24	23	22	18	13	13	22.3	29
8-Sep	10	13	13	Z	5	13	13	15	16	20	23	25	26	26	26	27	27	24	17	17	10	3	3	2	16.3	27
9-Sep	2	1	1	Z	1	2	2	7	12	19	24	27	26	26	28	28	28	26	22	13	8	4	4	4	13.7	28
10-Sep	5	4	4	Z	1	1	1	1	6	14	22	21	26	26	26	29	28	26	22	22	24	23	24	24	16.5	29
11-Sep	21	19	18	Z	17	19	20	21	22	21	20	21	24	27	29	29	30	30	24	17	14	16	12	9	20.9	30
12-Sep	8	10	16	Z	10	4	10	16	19	21	21	22	26	28	29	27	25	21	16	20	29	16	9	4	17.7	29
13-Sep	8	12	3	Z	6	6	8	16	17	16	15	20	25	28	33	34	31	27	19	19	22	23	24	23	18.9	34
14-Sep	23	22	21	Z	21	12	13	21	25	29	31	33	36	34	34	37	35	30	21	16	13	7	5	8	22.8	37
15-Sep	5	5	6	Z	1	2	7	8	9	16	21	25	28	30	26	26	27	27	26	29	27	24	21	19	18.1	30
16-Sep	17	16	16	Z	11	14	13	12	13	14	12	16	18	20	21	20	20	19	18	16	17	18	18	19	16.4	21
17-Sep	19	18	18	Z	16	15	14	14	C	C	13	14	13	14	15	14	14	12	10	10	11	12	13	14	13.9	19
18-Sep	15	15	15	Z	8	3	1	5	11	13	16	18	22	27	30	31	30	25	13	11	16	12	16	23	16.3	31
19-Sep	27	29	26	Z	21	19	17	15	19	20	23	29	31	32	30	33	36	33	25	33	36	31	23	22	26.5	36
20-Sep	22	19	18	Z	13	11	9	10	15	19	21	23	26	28	31	32	31	28	20	16	16	15	13	22	19.9	32
21-Sep	21	23	23	Z	17	14	15	15	12	15	15	16	19	25	24	23	22	16	16	17	19	19	23	27	19.0	27
22-Sep	29	28	28	Z	28	27	26	26	27	29	31	36	40	41	37	39	37	27	28	23	18	19	18	18	28.6	41
23-Sep	18	24	24	Z	16	10	4	3	23	28	28	35	38	39	41	42	42	34	19	9	7	25	25	29	24.5	42
24-Sep	32	34	32	Z	31	30	30	27	26	31	32	32	31	30	31	29	28	26	26	25	24	24	22	22	28.8	34
25-Sep	22	25	21	Z	16	16	15	23	17	15	15	13	14	18	25	26	27	28	27	26	24	24	23	22	21.0	28
26-Sep	21	21	21	Z	20	19	16	14	14	14	13	14	14	14	15	17	21	23	22	22	23	22	23	22	18.1	23
27-Sep	23	26	27	Z	23	20	18	17	17	19	20	22	23	23	24	24	24	20	6	5	10	12	14	16	19.0	27
28-Sep	16	16	16	Z	18	21	22	22	22	23	23	24	25	26	26	28	27	26	25	24	24	24	23	22	22.8	28
29-Sep	20	19	19	Z	18	18	17	16	17	19	22	25	28	30	34	33	28	23	22	21	19	16	14	14	21.4	34
30-Sep	13	12	11	Z	9	6	3	4	5	10	10	11	14	15	15	15	14	12	11	9	7	8	8	9	10.0	15

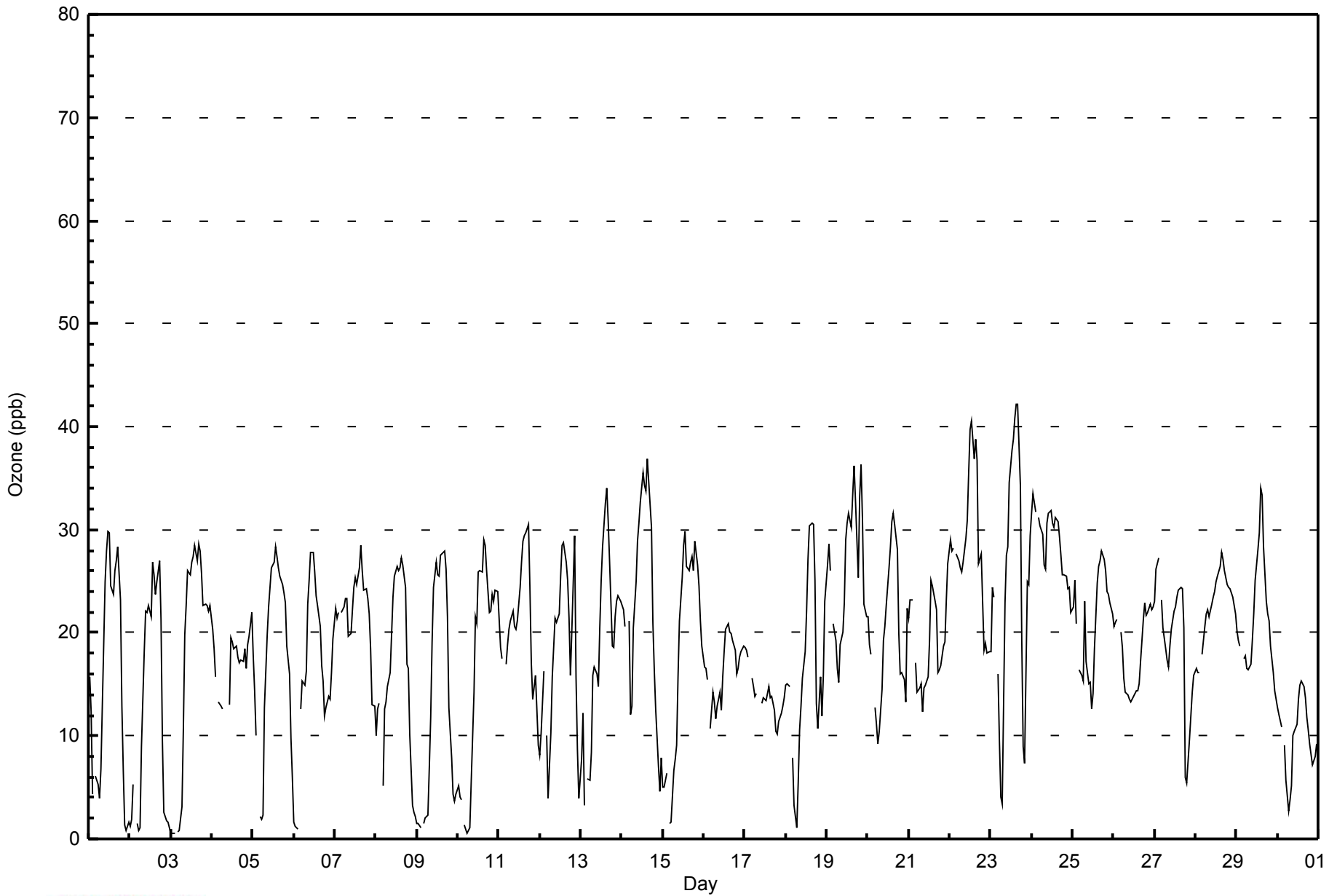
15.8	16.1	15.1	--	12.9	12.0	11.8	14.1	17.0	20.0	21.2	23.2	24.9	26.1	26.7	27.1	26.5	24.4	20.1	18.1	17.3	16.4	15.4	16.0	Diurnal Average	
32	34	32	--	31	30	30	27	27	31	32	36	40	41	41	42	42	34	28	33	36	31	25	29	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Wapasu - September 2014





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Wapasu - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	355	51.82	51.82
21 - 50	330	48.18	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



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Wapasu - September 2014

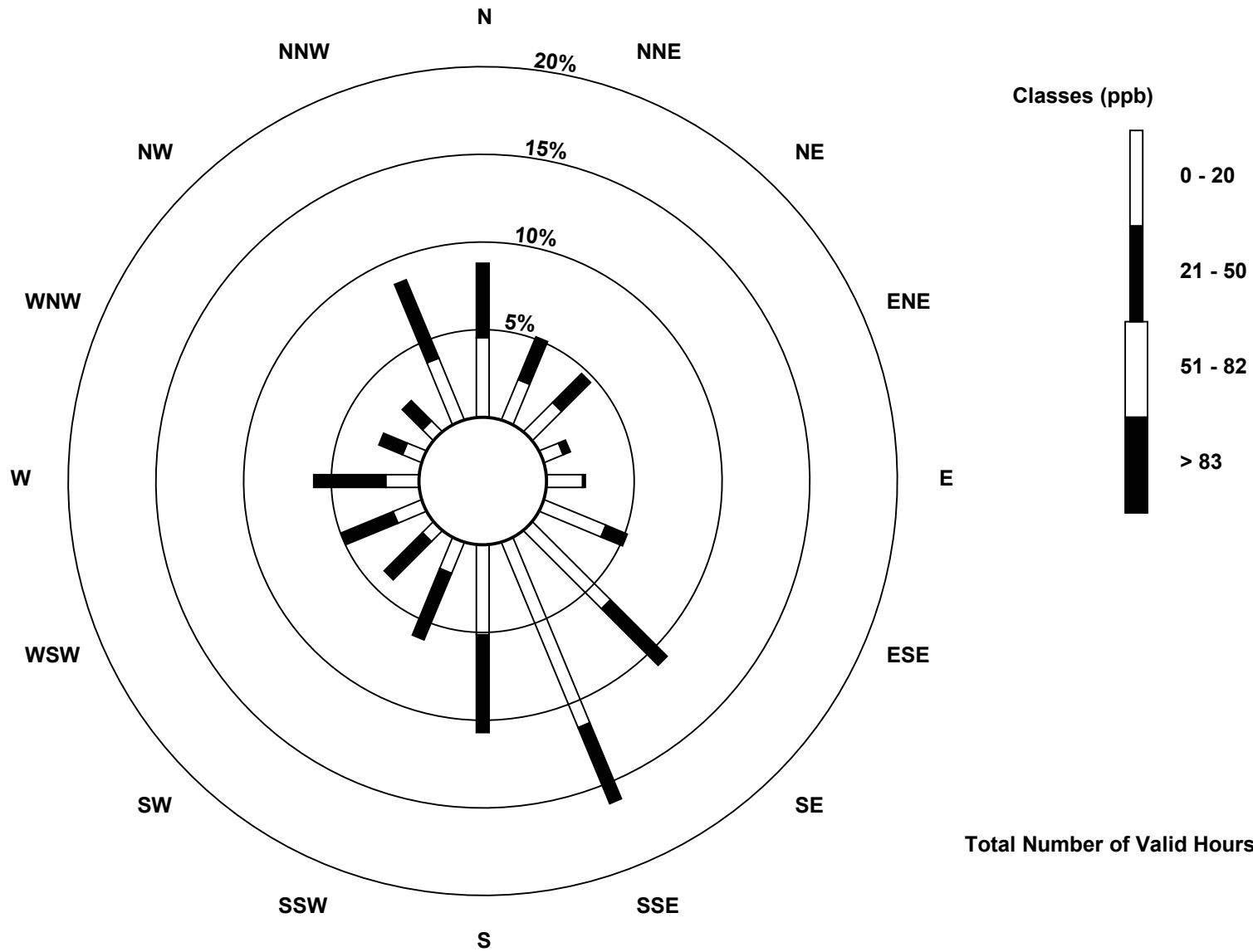
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	31	17	16	8	14	26	43	78	35	13	6	12	13	8	6	26	352
21 - 50	29	18	16	3	1	9	31	32	38	28	21	22	28	10	11	33	330
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	60	35	32	11	15	35	74	110	73	41	27	34	41	18	17	59	682

Total Number of Valid Hours: 682

Total Number of Hours: 720

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

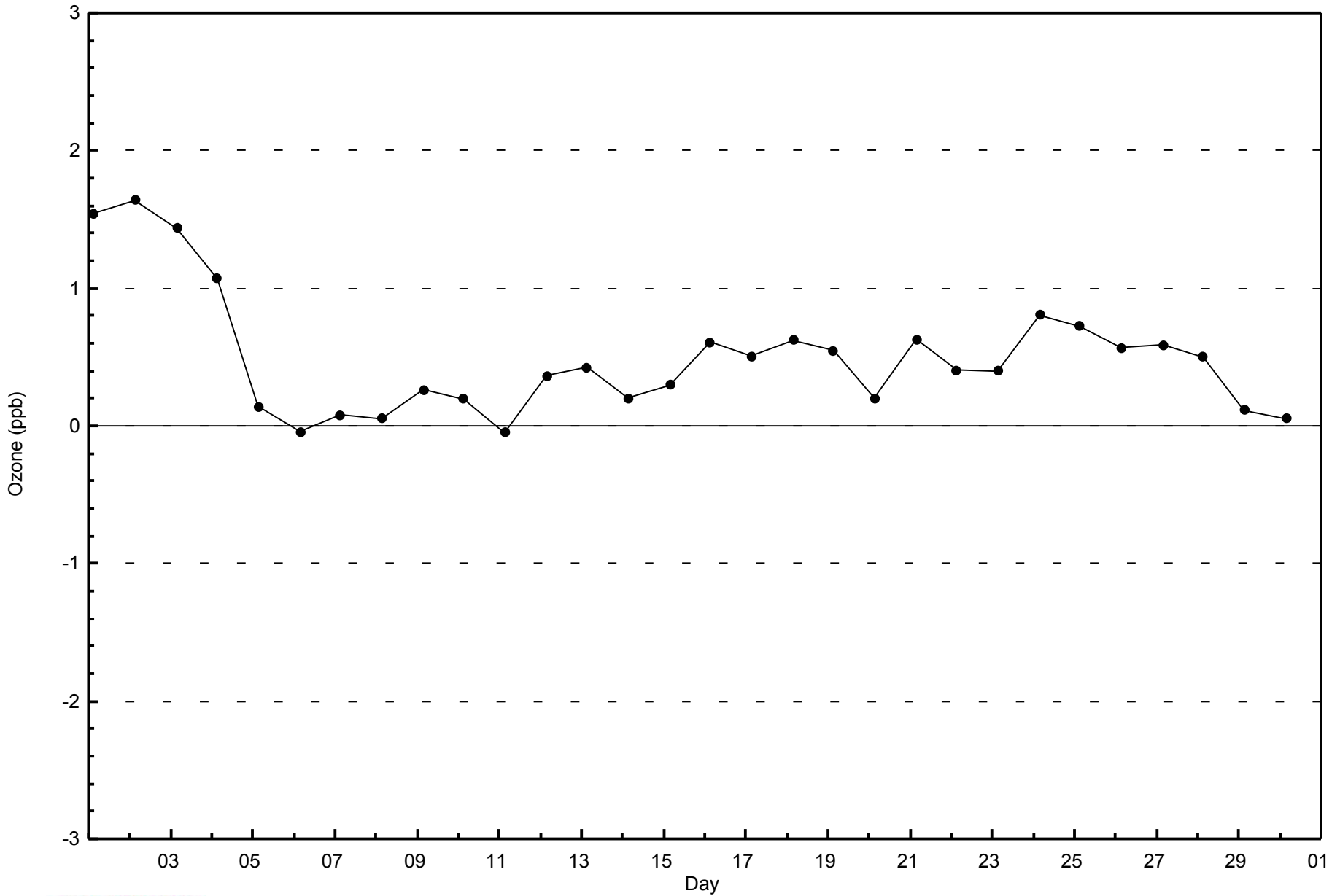
**Ozone (O₃) - ppb
Wapasu (AMS 17)**





WBEA
Zero Responses

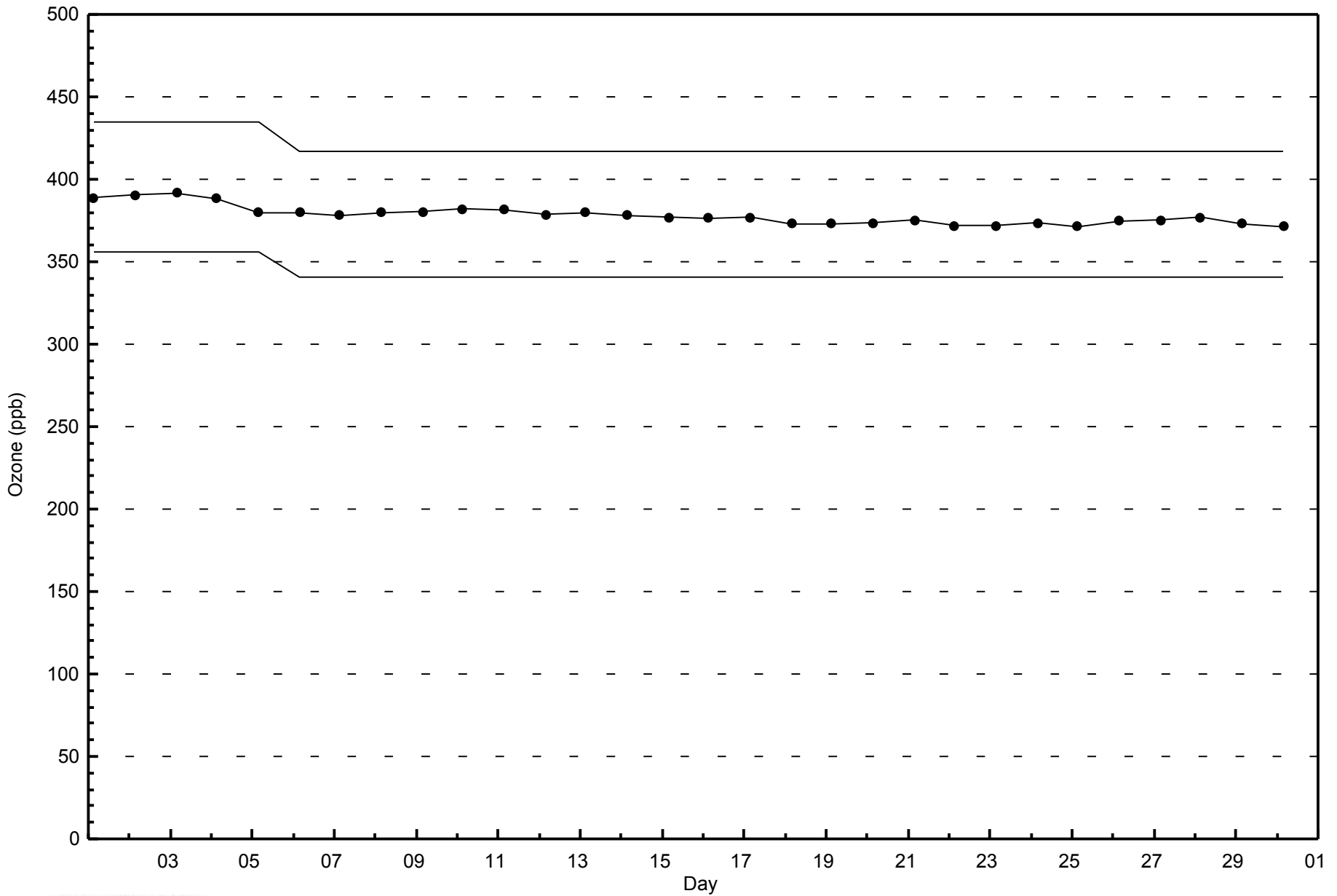
Ozone (O₃) - ppb
Wapasu - September 2014





WBEA
Span Responses

Ozone (O₃) - ppb
Wapasu - September 2014





Maximum Value: 16 ppb on Sep 10 06:00	Maximum Daily Average: 3.6 ppb on Sep 10	Hours in Service: 720
Minimum Value: 0 ppb on Sep 30 23:00	Minimum Daily Average: 0.5 ppb on Sep 17	Hours of Data: 680
Maximum Diurnal Average: 2.2 ppb at hour 9	Minimum Diurnal Average: 0.5 ppb at hour 24	Hours of Missing Data: 40
Monthly Average: 1.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 6	Hours of Calibration: 40
		Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	Z	0	1	0	0	1	4	3	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	0.9	4
2-Sep	1	Z	1	1	1	1	1	2	2	2	2	2	3	1	1	1	1	1	1	1	1	1	1	1	1.2	3
3-Sep	2	Z	2	2	3	3	3	C	C	C	C	C	C	1	1	1	1	1	1	1	1	1	1	1	--	3
4-Sep	1	Z	1	1	1	1	1	1	2	4	4	4	3	3	2	1	1	1	1	1	1	1	1	1	1.5	4
5-Sep	1	Z	1	1	1	1	1	2	1	2	1	1	1	1	1	0	1	1	1	0	0	1	1	1	0.8	2
6-Sep	1	Z	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	0.6	1
7-Sep	1	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.7	1
8-Sep	1	Z	1	1	1	1	1	1	2	2	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0.8	2
9-Sep	0	Z	0	0	0	0	1	2	4	2	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.9	4
10-Sep	1	Z	0	1	8	16	15	14	12	4	2	2	1	1	1	1	1	1	1	0	0	0	0	0	3.6	16
11-Sep	0	Z	0	0	0	0	0	1	1	3	3	4	2	2	1	1	1	1	1	1	1	1	1	1	1.3	4
12-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	0	0	0	0	0.6	1
13-Sep	0	Z	0	1	0	0	1	1	1	1	4	3	1	1	1	1	1	2	1	1	1	1	1	1	1.0	4
14-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	0	0	0	0	1	0.8	2
15-Sep	1	Z	1	0	3	5	2	6	12	6	2	1	1	0	1	0	0	0	0	0	0	0	0	0	1.8	12
16-Sep	0	Z	0	0	0	0	0	1	1	1	2	1	0	0	0	1	1	1	0	1	1	1	0	0	0.6	2
17-Sep	1	Z	1	0	1	0	0	0	1	C	C	C	C	1	1	0	0	1	0	1	0	1	0	0	0.5	1
18-Sep	0	Z	0	1	1	1	2	2	2	1	1	1	1	1	1	1	0	1	1	1	1	2	1	1	1.0	2
19-Sep	1	Z	0	1	1	0	1	1	1	2	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	3
20-Sep	0	Z	0	0	0	1	1	3	4	2	2	2	1	2	1	1	1	1	0	0	1	1	1	1	1.1	4
21-Sep	1	Z	1	1	1	1	1	1	3	4	6	7	4	1	1	1	0	2	0	0	1	0	0	0	1.5	7
22-Sep	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.5	1
23-Sep	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	1	0	0.5	1
24-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
25-Sep	1	Z	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2
26-Sep	1	Z	0	0	1	1	1	1	0	1	0	1	0	1	0	0	1	0	0	0	1	1	0	1	0.5	1
27-Sep	0	Z	0	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	0.6	1
28-Sep	1	Z	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	1	0.6	1
29-Sep	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.5	1
30-Sep	0	Z	0	0	0	0	1	1	2	2	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0.6	2

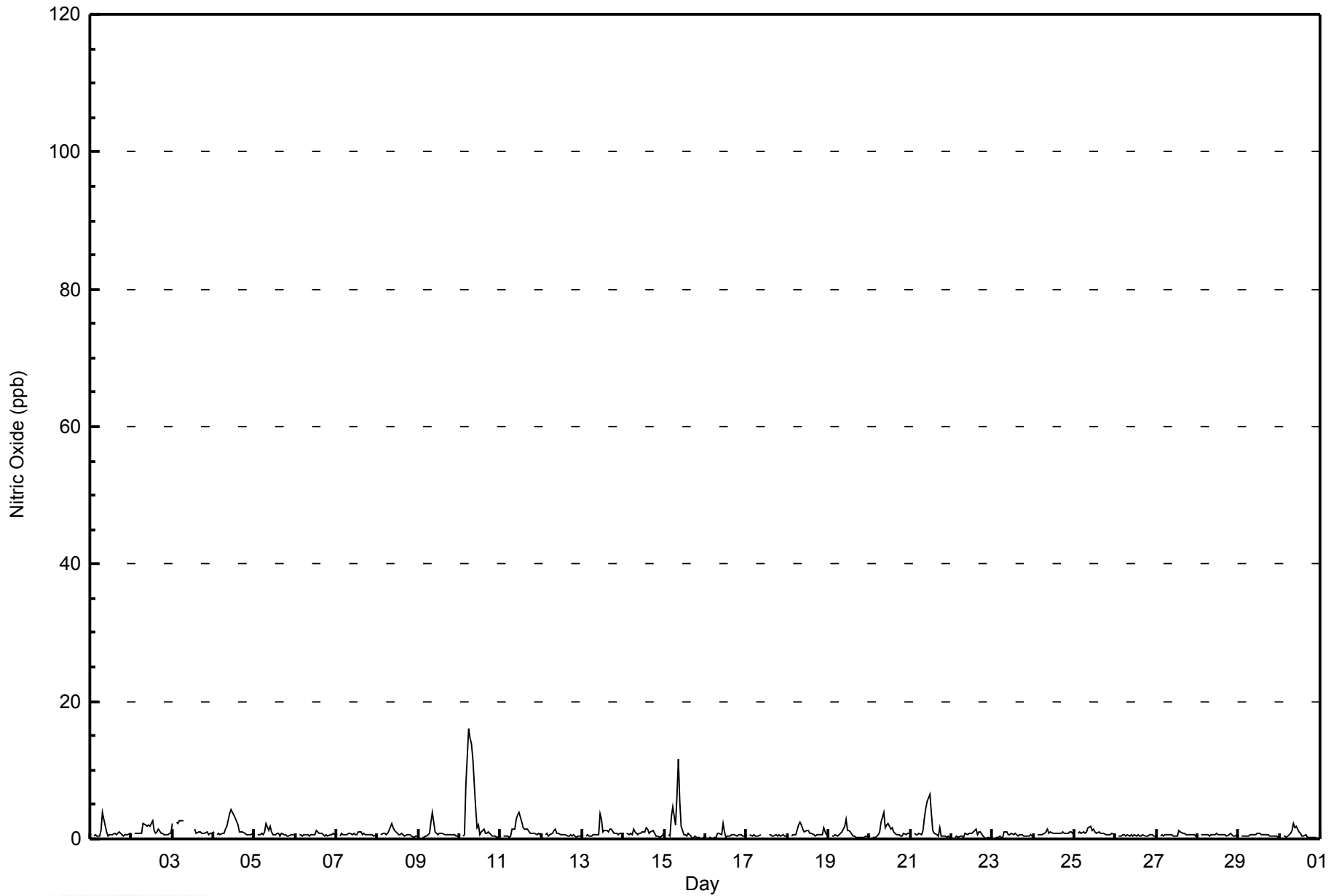
0.6	--	0.6	0.6	0.9	1.3	1.3	1.9	2.2	1.7	1.6	1.4	1.1	1.0	0.9	0.7	0.7	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Diurnal Average
2	--	2	2	8	16	15	14	12	6	6	7	4	3	2	1	1	2	1	1	1	2	1	1	1	Diurnal Maximum

Z - zerospan C - Calibration



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Wapasu - September 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Wapasu - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	680	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Wapasu - September 2014

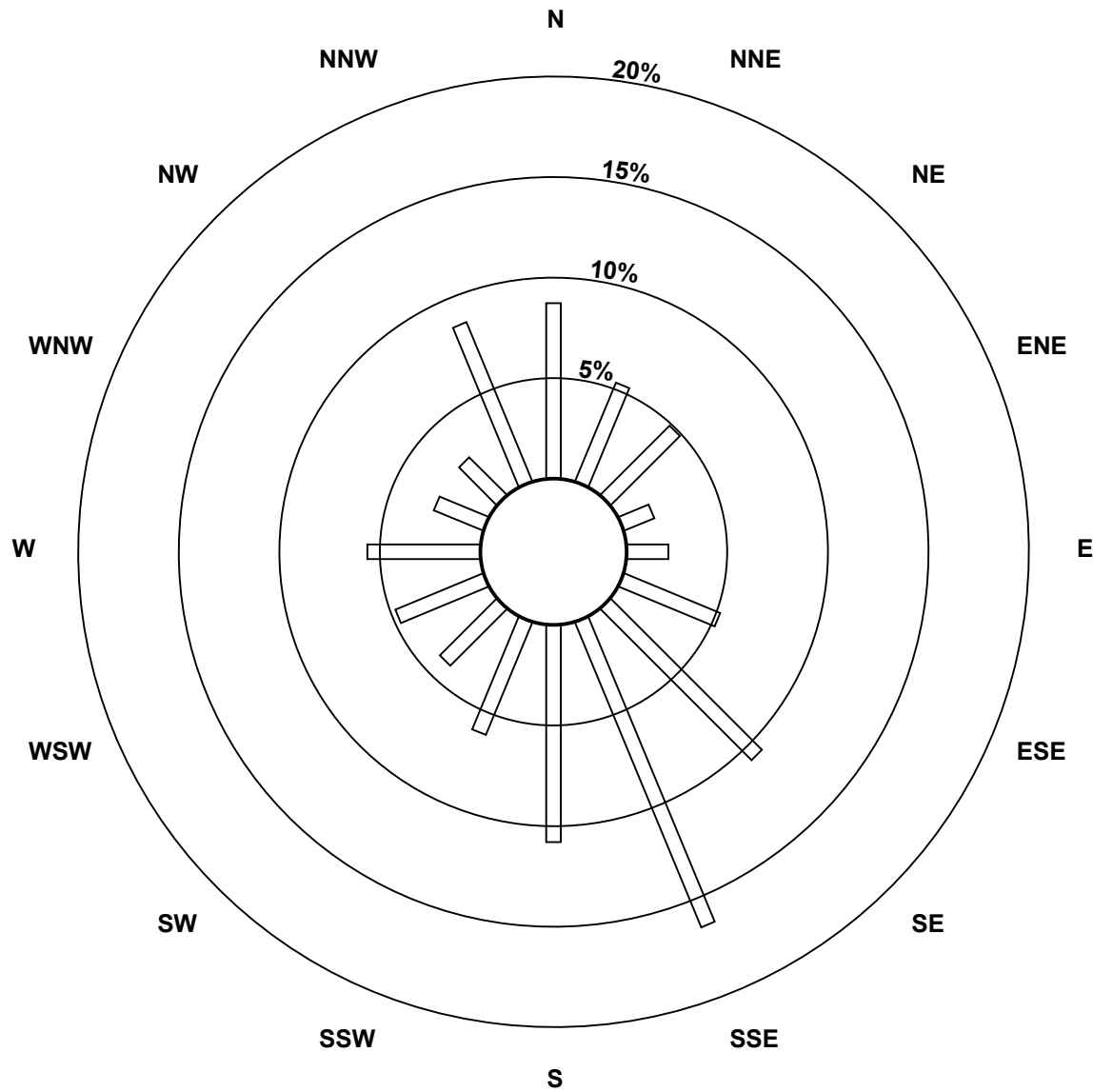
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	59	36	33	11	14	35	72	111	73	41	27	32	38	18	18	58	676
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	59	36	33	11	14	35	72	111	73	41	27	32	38	18	18	58	676

Total Number of Valid Hours: 676

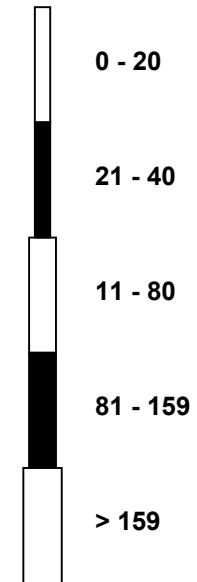
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Nitric Oxide (NO) - ppb
Wapasu (AMS 17)



Classes (ppb)

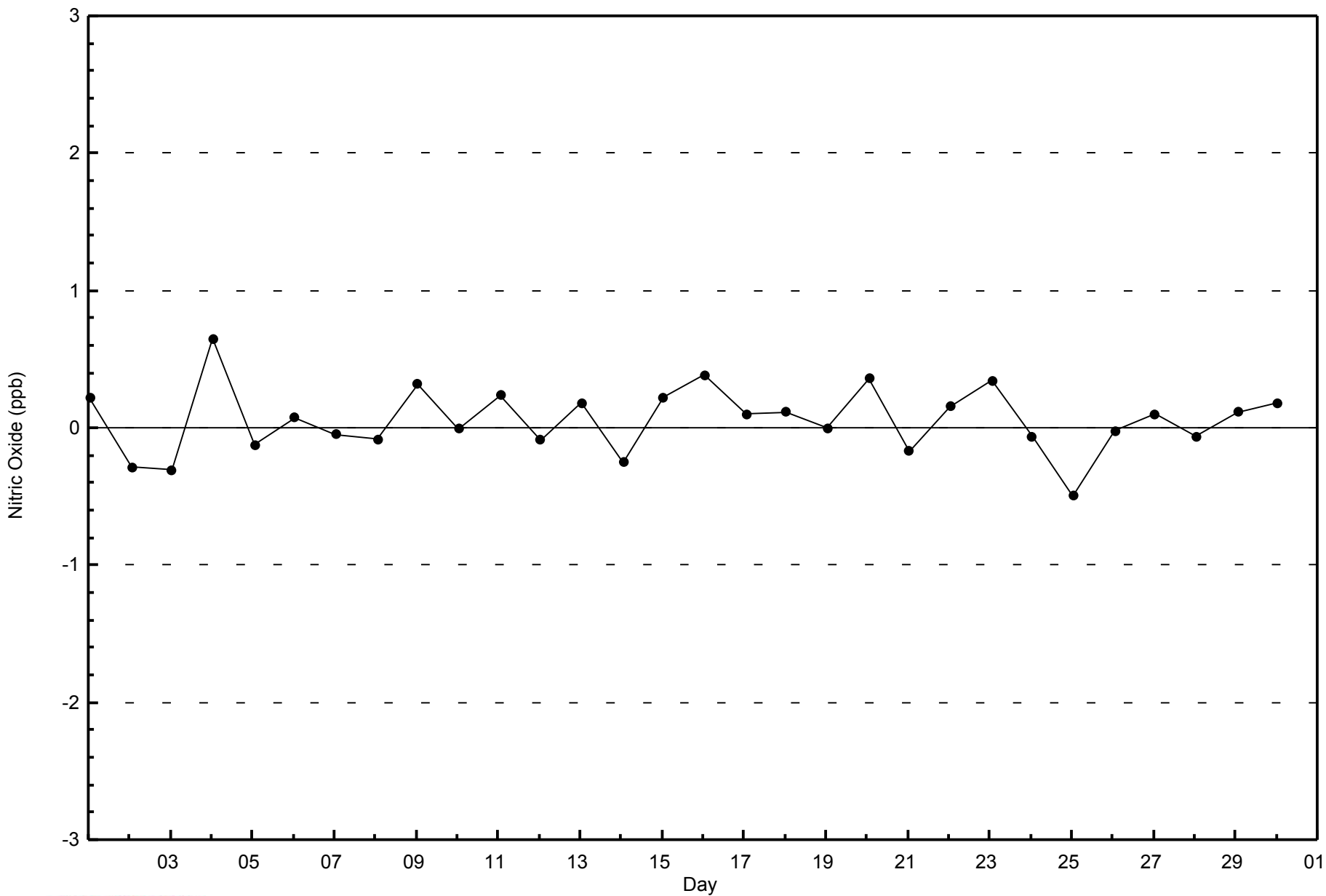


Total Number of Valid Hours: 676



WBEA
Zero Responses

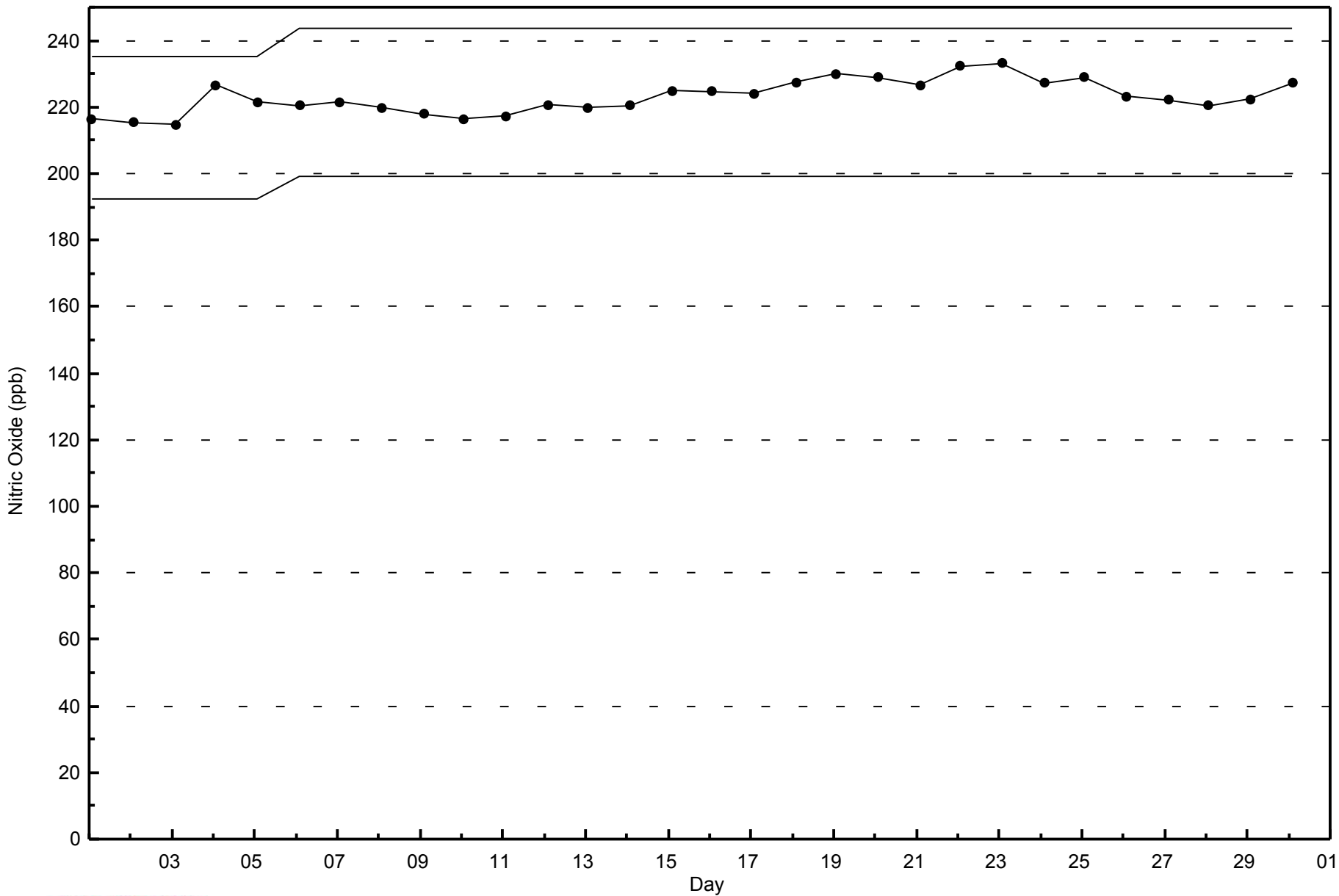
Nitric Oxide (NO) - ppb
Wapasu - September 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Wapasu - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 16 ppb on Sep 22 18:00	Maximum Daily Average: 6.3 ppb on Sep 15		Hours of Data:	680
Minimum Value: 0 ppb on Sep 2 23:00	Minimum Daily Average: 0.0 ppb on Sep 26		Hours of Missing Data:	40
Maximum Diurnal Average: 3.1 ppb at hour 9	Minimum Diurnal Average: 1.0 ppb at hour 16		Hours of Calibration:	40
Monthly Average: 2.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 6 P ₉₉ = 13		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	4	Z	5	8	6	5	6	6	4	2	1	1	1	1	2	1	2	2	1	1	1	1	2	1	2.7	8
2-Sep	0	Z	1	1	0	0	0	2	2	2	2	3	4	2	1	2	2	1	2	0	0	0	0	0	1.2	4
3-Sep	2	Z	1	1	2	1	2	C	C	C	C	C	C	2	1	1	1	1	1	1	0	0	0	0	--	2
4-Sep	0	Z	1	2	2	2	1	3	2	3	3	4	4	5	5	1	2	1	2	1	2	0	1	2	2.0	5
5-Sep	2	Z	6	5	2	1	1	2	1	2	1	0	0	1	1	1	1	1	0	2	2	1	1	1	1.5	6
6-Sep	1	Z	1	2	3	1	1	0	0	0	0	2	3	1	1	1	0	0	0	0	0	0	0	0	0.7	3
7-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	6	6	0.7	6
8-Sep	5	Z	3	3	3	1	0	2	3	2	1	1	1	1	0	0	1	1	2	4	2	2	2	2	1.8	5
9-Sep	1	Z	2	2	2	1	2	5	7	4	2	1	1	1	1	1	1	0	1	0	0	0	0	0	1.5	7
10-Sep	0	Z	0	2	11	15	11	6	13	10	4	4	1	2	5	1	1	4	5	3	1	1	1	1	4.5	15
11-Sep	2	Z	4	4	4	3	1	3	3	4	5	6	4	3	3	4	4	3	6	12	14	8	10	6	4.9	14
12-Sep	4	Z	2	2	6	7	7	4	2	1	1	0	0	0	0	1	1	1	1	0	0	0	0	0	1.7	7
13-Sep	0	Z	1	1	1	1	0	0	0	0	3	4	2	2	1	2	4	6	5	4	5	3	1	1	2.0	6
14-Sep	1	Z	1	1	1	5	7	2	1	1	1	1	1	3	3	2	4	6	10	6	2	3	5	9	3.3	10
15-Sep	11	Z	14	14	13	13	13	12	14	10	4	2	1	1	3	2	1	2	2	1	3	3	4	4	6.3	14
16-Sep	2	Z	2	5	5	0	1	3	2	1	4	1	0	0	0	1	1	1	0	1	2	2	1	0	1.5	5
17-Sep	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	1	0.1	1
18-Sep	1	Z	1	2	3	3	3	3	3	2	1	1	2	1	1	1	1	1	0	0	1	11	8	2	2.3	11
19-Sep	0	Z	1	0	1	1	3	5	2	3	5	3	3	2	2	1	1	1	2	2	3	4	6	5	2.4	6
20-Sep	2	Z	1	3	7	9	10	9	6	2	3	4	2	3	2	2	2	3	3	6	4	5	10	2	4.3	10
21-Sep	2	Z	1	2	5	6	5	4	5	5	7	8	5	2	1	0	1	9	4	3	1	1	1	0	3.4	9
22-Sep	0	Z	1	1	1	1	1	2	2	1	2	3	3	3	6	5	8	16	9	8	10	7	7	7	4.5	16
23-Sep	6	Z	8	6	3	2	1	1	2	1	1	2	2	2	1	1	2	4	3	3	5	5	8	4	3.1	8
24-Sep	3	Z	2	2	0	0	0	3	4	0	0	1	1	1	0	0	0	1	1	0	0	0	3	5	1.2	5
25-Sep	9	Z	2	2	2	2	2	3	4	3	1	2	1	0	1	1	1	0	0	0	0	0	0	0	1.5	9
26-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
27-Sep	0	Z	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	1	1	6	6	3	2	1	1.1	6
28-Sep	0	Z	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0.5	1
29-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	5	3	1	2	2	3	2	1.5	5
30-Sep	2	Z	3	2	3	4	5	4	4	5	5	4	2	1	1	1	1	1	1	0	1	1	1	0	2.1	5

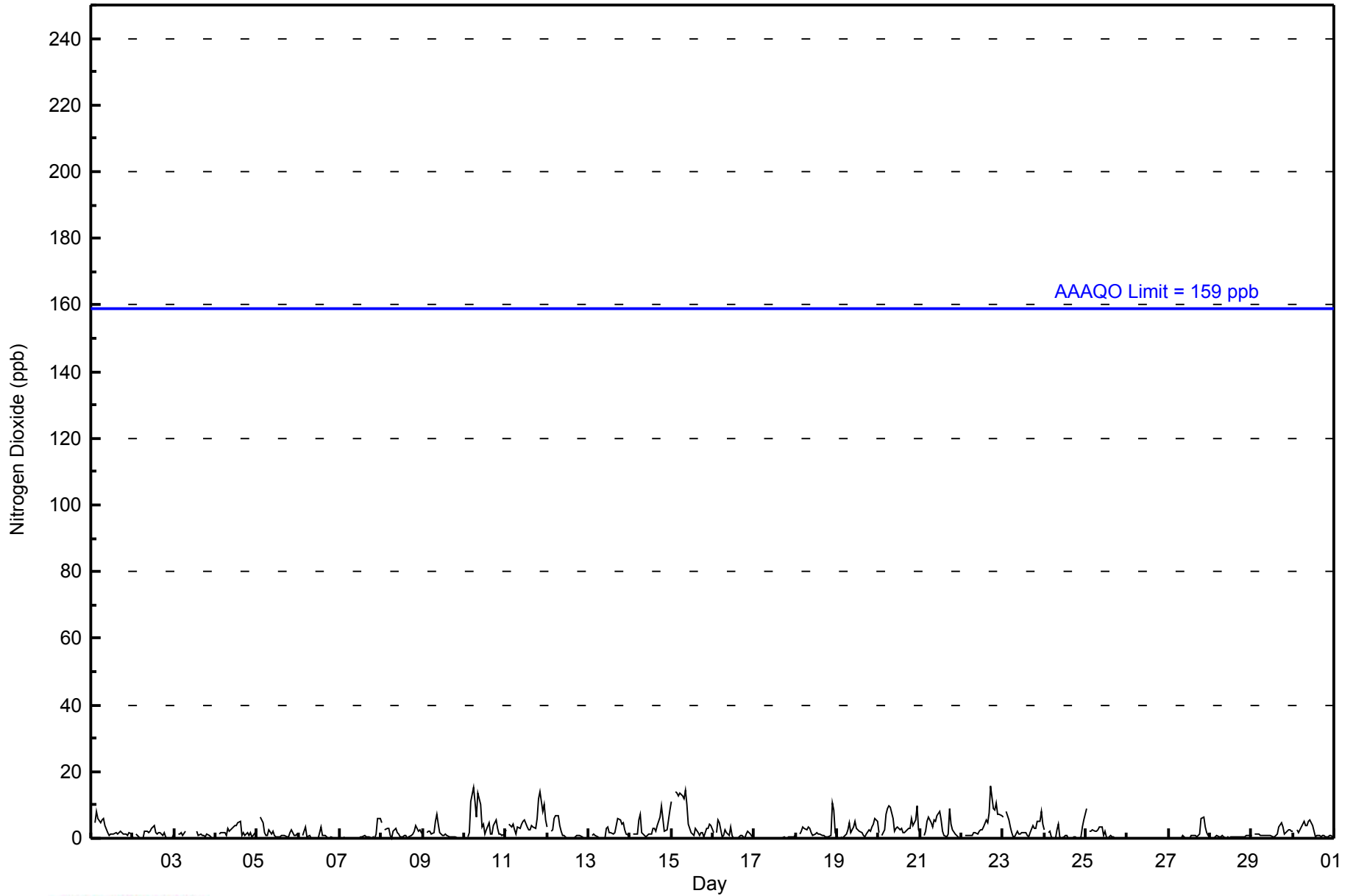
2.0	--	2.1	2.5	2.9	2.8	2.7	2.9	3.1	2.4	2.0	2.0	1.5	1.4	1.5	1.0	1.4	2.3	2.1	2.2	2.4	2.2	2.8	2.1	Diurnal Average	
11	--	14	14	13	15	13	12	14	10	7	8	5	5	6	5	8	16	10	12	14	11	10	9	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wapasu - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	680	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - September 2014

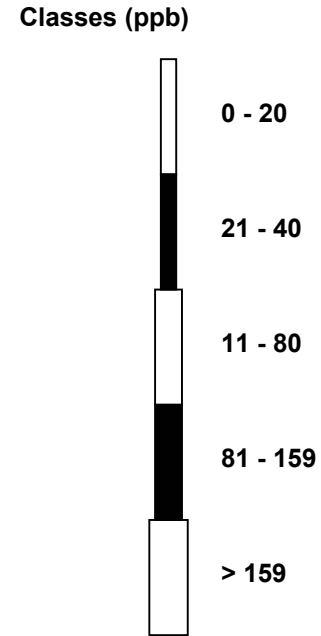
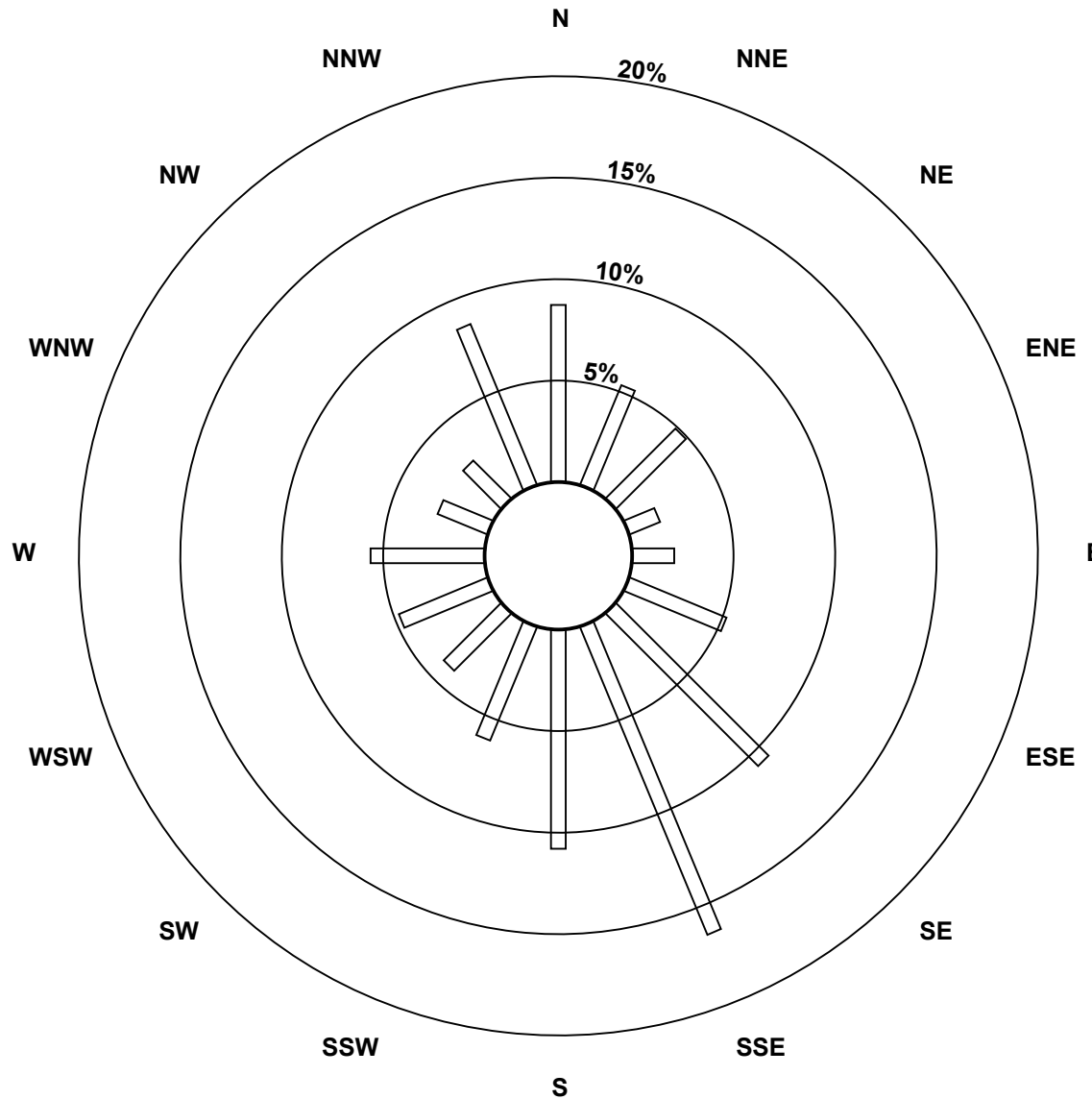
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	59	36	33	11	14	35	72	111	73	41	27	32	38	18	18	58	676
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	59	36	33	11	14	35	72	111	73	41	27	32	38	18	18	58	676

Total Number of Valid Hours: 676

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Nitrogen Dioxide (NO₂) - ppb
Wapasu (AMS 17)

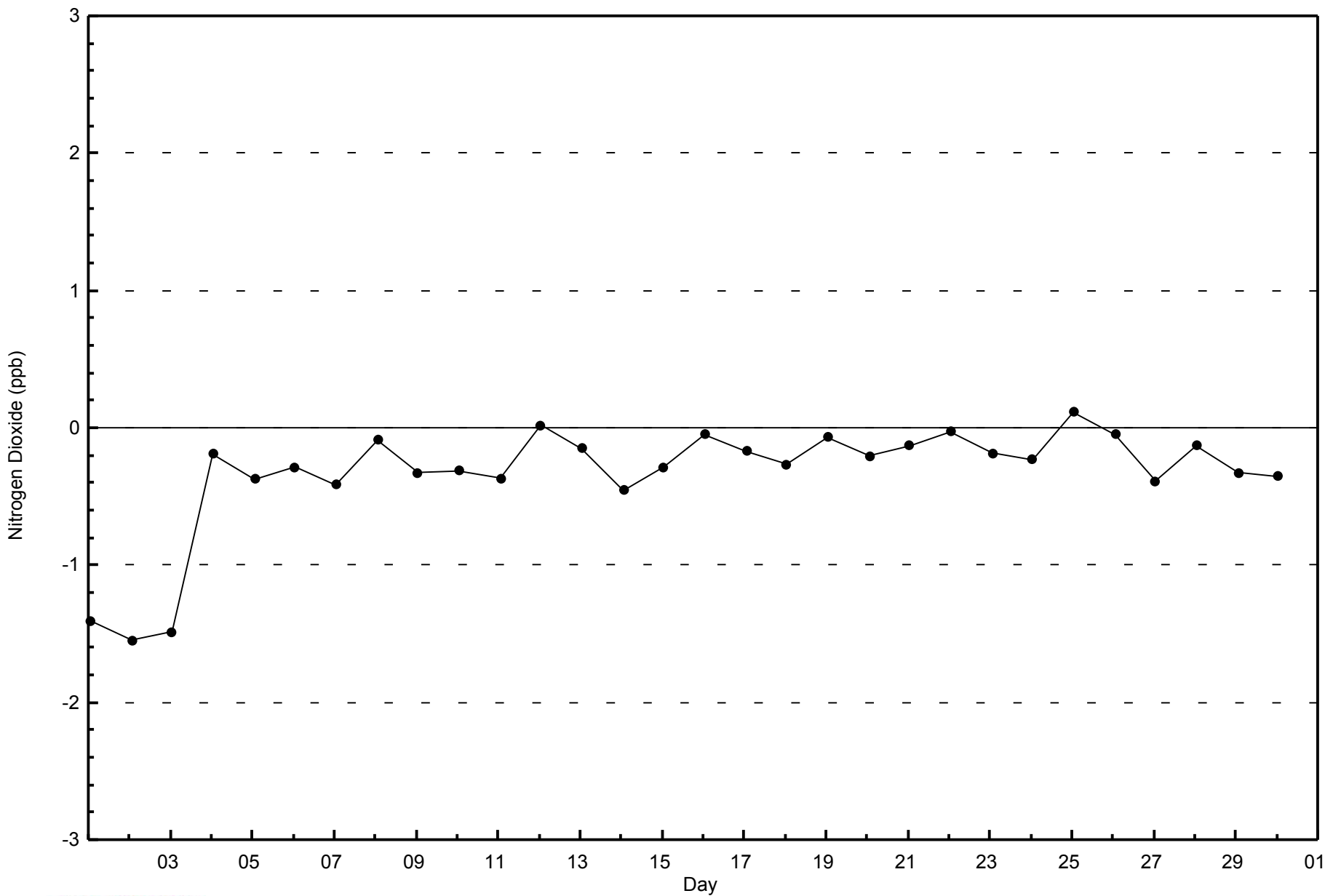


Total Number of Valid Hours: 676



WBEA
Zero Responses

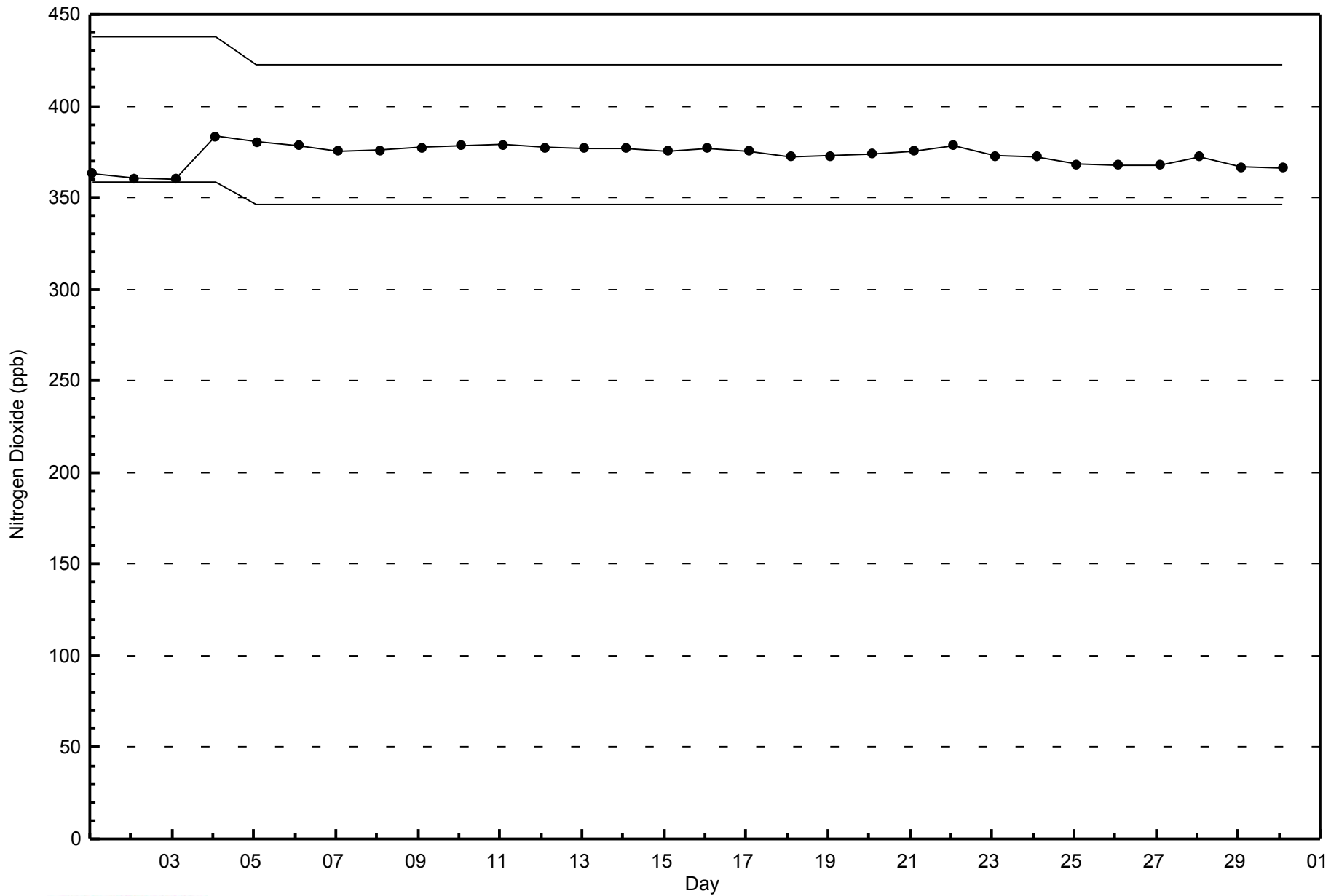
Nitrogen Dioxide (NO₂) - ppb
Wapasu - September 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Wapasu - September 2014



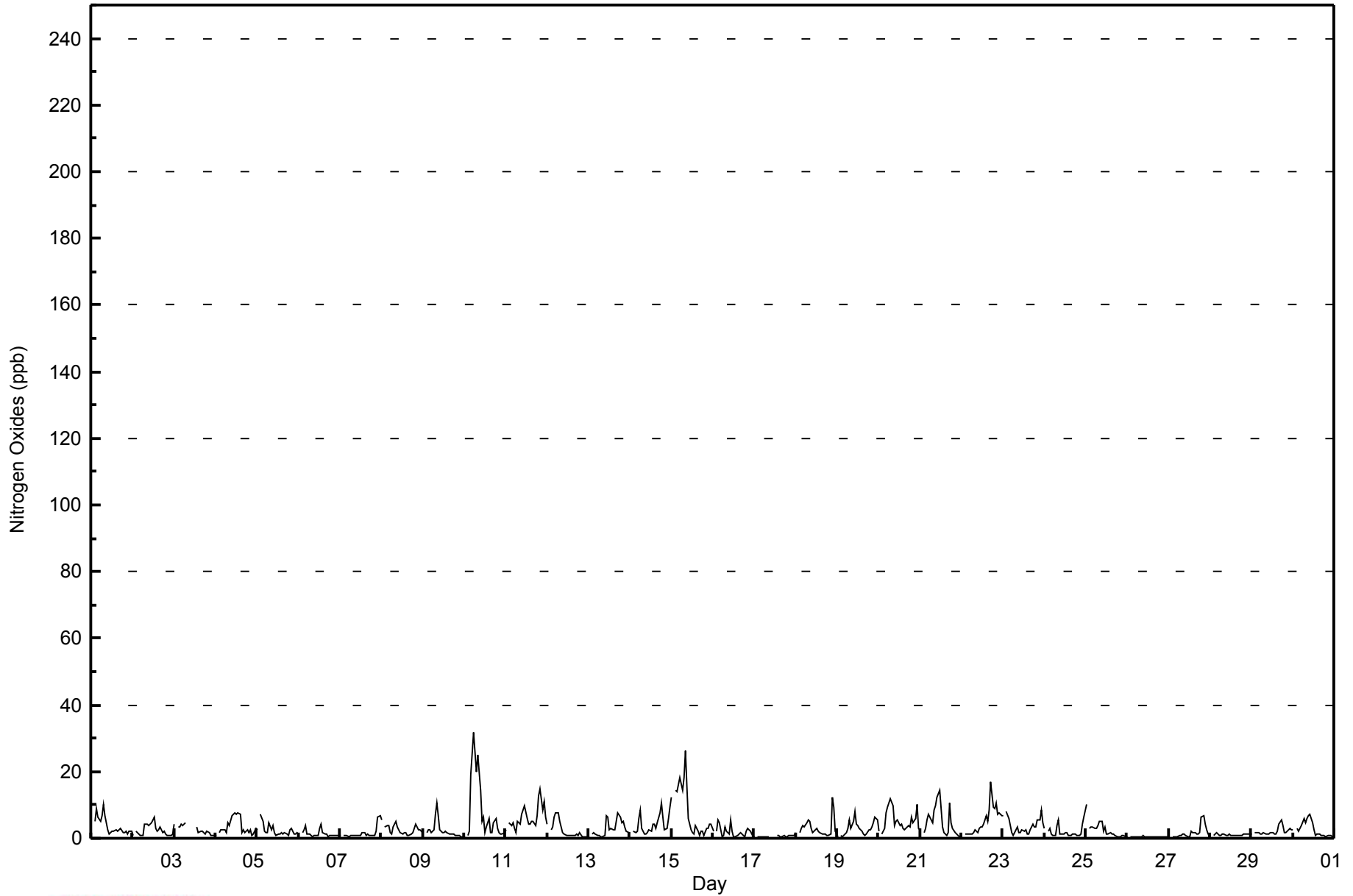


Maximum Value: 32 ppb on Sep 10 06:00																		Maximum Daily Average: 8.1 ppb on Sep 15						Hours in Service: 720			
Minimum Value: 0 ppb on Sep 16 13:00																		Minimum Daily Average: 0.5 ppb on Sep 26						Hours of Data: 680			
Maximum Diurnal Average: 5.2 ppb at hour 9																		Minimum Diurnal Average: 1.7 ppb at hour 16						Hours of Missing Data: 40			
Monthly Average: 3.2 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 7 P ₉₉ = 18						Hours of Calibration: 40			
																								Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	4	Z	5	9	7	5	7	10	7	3	1	2	2	2	2	2	3	3	2	2	2	1	2	2	3.6	10	
2-Sep	1	Z	2	1	1	1	1	4	4	4	4	5	6	3	2	3	3	2	2	1	1	1	1	1	2.4	6	
3-Sep	4	Z	4	4	4	4	5	C	C	C	C	C	C	3	2	2	2	2	1	2	2	1	1	1	--	5	
4-Sep	1	Z	2	3	2	3	2	4	4	7	7	8	7	8	7	2	2	2	2	3	1	1	1	3	3.6	8	
5-Sep	2	Z	7	5	2	2	2	5	3	4	2	1	1	1	2	1	2	1	1	2	3	1	1	2	2.3	7	
6-Sep	1	Z	2	3	4	1	1	1	1	1	1	1	3	4	2	1	1	1	1	1	1	1	1	1	1.4	4	
7-Sep	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	2	6	7	1.4	7	
8-Sep	5	Z	3	4	4	2	1	3	5	3	3	2	1	2	2	1	1	1	2	3	4	2	3	2	2.5	5	
9-Sep	2	Z	2	3	2	2	2	7	11	7	3	2	2	2	2	1	1	1	1	1	1	1	0	0	2.4	11	
10-Sep	1	Z	1	2	19	32	26	20	25	14	5	6	2	3	6	2	2	5	6	3	2	1	1	2	8.1	32	
11-Sep	3	Z	5	4	4	3	2	5	4	7	8	10	6	4	4	5	5	4	7	13	15	9	11	6	6.2	15	
12-Sep	4	Z	3	3	6	7	7	5	4	2	1	1	1	1	1	1	1	1	1	2	0	0	1	1	2.3	7	
13-Sep	1	Z	1	2	1	1	1	1	1	1	7	6	3	3	3	3	5	8	6	5	5	3	2	2	3.0	8	
14-Sep	2	Z	2	2	2	6	9	3	1	1	2	2	2	4	4	3	5	7	11	6	3	3	6	9	4.2	11	
15-Sep	12	Z	14	14	16	18	15	18	26	16	6	2	2	1	4	2	1	2	2	1	3	3	4	4	8.1	26	
16-Sep	2	Z	2	6	5	1	1	4	2	1	6	2	0	0	1	1	2	1	0	2	3	2	2	1	2.0	6	
17-Sep	1	Z	1	0	1	0	0	0	1	C	C	C	C	1	1	0	0	1	0	1	1	1	1	1	0.6	1	
18-Sep	2	Z	2	3	4	3	5	6	5	3	2	3	3	2	2	1	1	1	1	1	12	9	2	3.2	12		
19-Sep	1	Z	1	1	1	2	3	5	3	5	8	4	4	3	2	1	1	1	3	2	3	5	6	5	3.1	8	
20-Sep	2	Z	1	3	8	9	11	12	10	4	5	6	4	4	3	2	3	4	4	6	5	6	10	3	5.4	12	
21-Sep	3	Z	2	3	5	7	5	5	8	10	12	15	9	3	2	1	2	11	5	3	2	1	1	0	4.9	15	
22-Sep	0	Z	1	1	1	1	1	2	2	2	3	3	3	4	7	5	9	17	9	9	10	7	8	7	5.0	17	
23-Sep	7	Z	8	6	4	2	1	2	3	2	2	2	2	2	1	1	2	4	3	3	6	6	9	4	3.6	9	
24-Sep	3	Z	2	3	1	1	1	4	5	1	1	1	2	1	1	1	1	1	1	1	1	1	4	6	2.0	6	
25-Sep	10	Z	3	3	3	3	3	4	5	5	2	3	1	1	2	1	1	1	1	1	1	1	1	1	2.5	10	
26-Sep	1	Z	0	0	1	1	1	1	0	1	0	1	0	1	0	0	1	0	0	0	1	1	0	1	0.5	1	
27-Sep	0	Z	1	1	0	1	1	1	1	1	1	1	1	2	2	2	1	1	2	6	7	4	2	1	1.7	7	
28-Sep	1	Z	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2	
29-Sep	1	Z	2	2	2	1	1	2	1	1	1	2	2	1	1	2	4	5	4	2	2	3	3	3	2.0	5	
30-Sep	2	Z	3	2	3	4	6	5	6	7	7	5	3	1	1	1	1	1	1	1	1	1	1	1	2.7	7	
		2.6	--	2.7	3.1	3.8	4.1	4.0	4.8	5.2	4.0	3.7	3.4	2.6	2.4	2.3	1.7	2.1	3.0	2.7	2.8	2.9	2.7	3.3	2.6	Diurnal Average	
		12	--	14	14	19	32	26	20	26	16	12	15	9	8	7	5	9	17	11	13	15	12	11	9	Diurnal Maximum	
Z - zerospan		C - Calibration																									



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Wapasu - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	676	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: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - September 2014

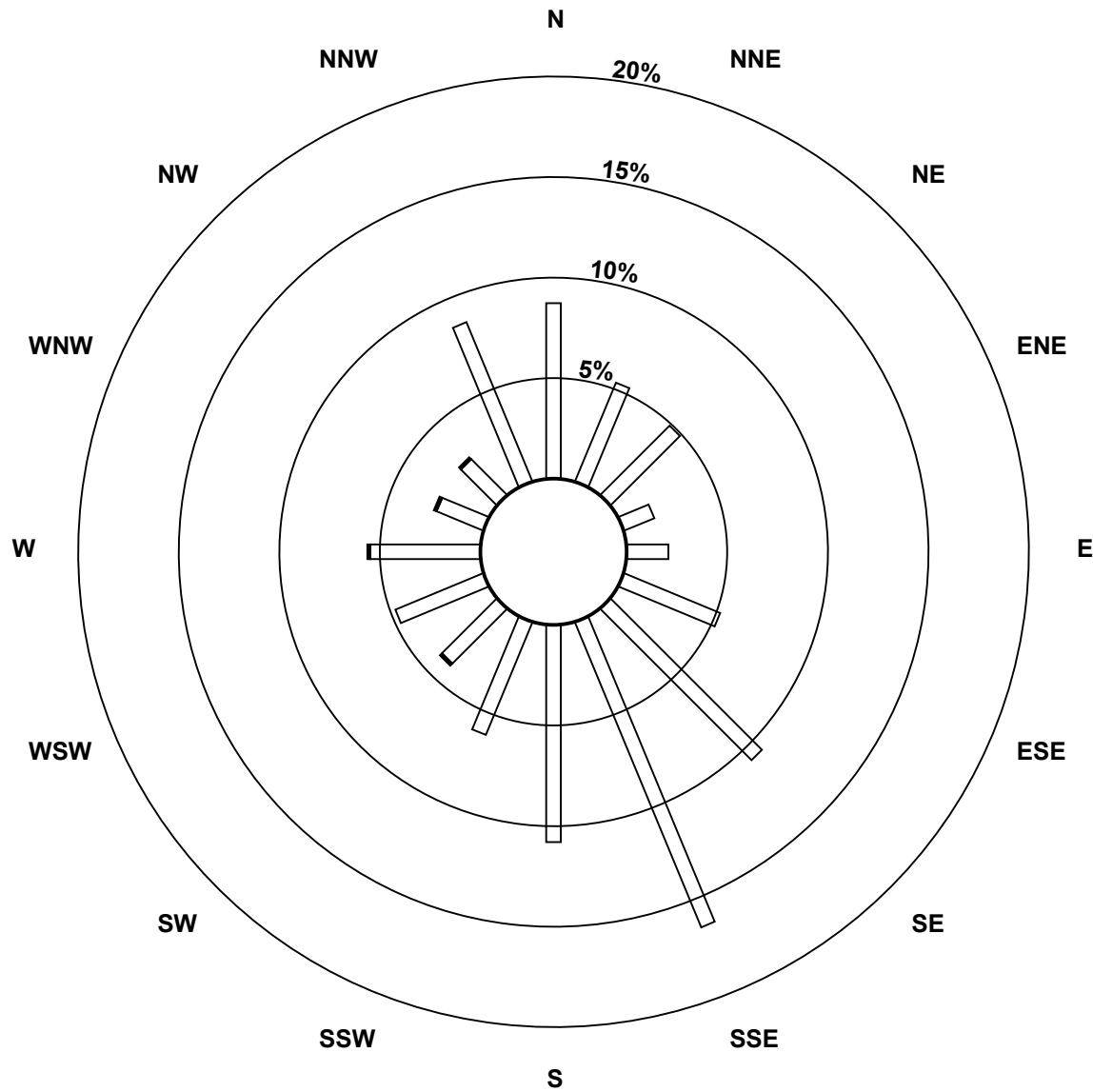
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	59	36	33	11	14	35	72	111	73	41	26	32	37	17	17	58	672
21 - 40	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	4
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	59	36	33	11	14	35	72	111	73	41	27	32	38	18	18	58	676

Total Number of Valid Hours: 676

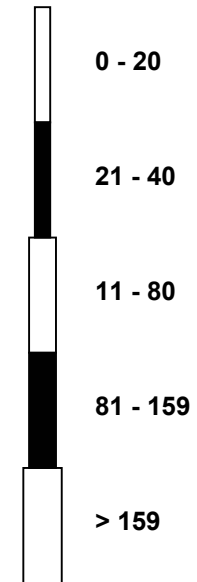
Total Number of Hours: 720

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

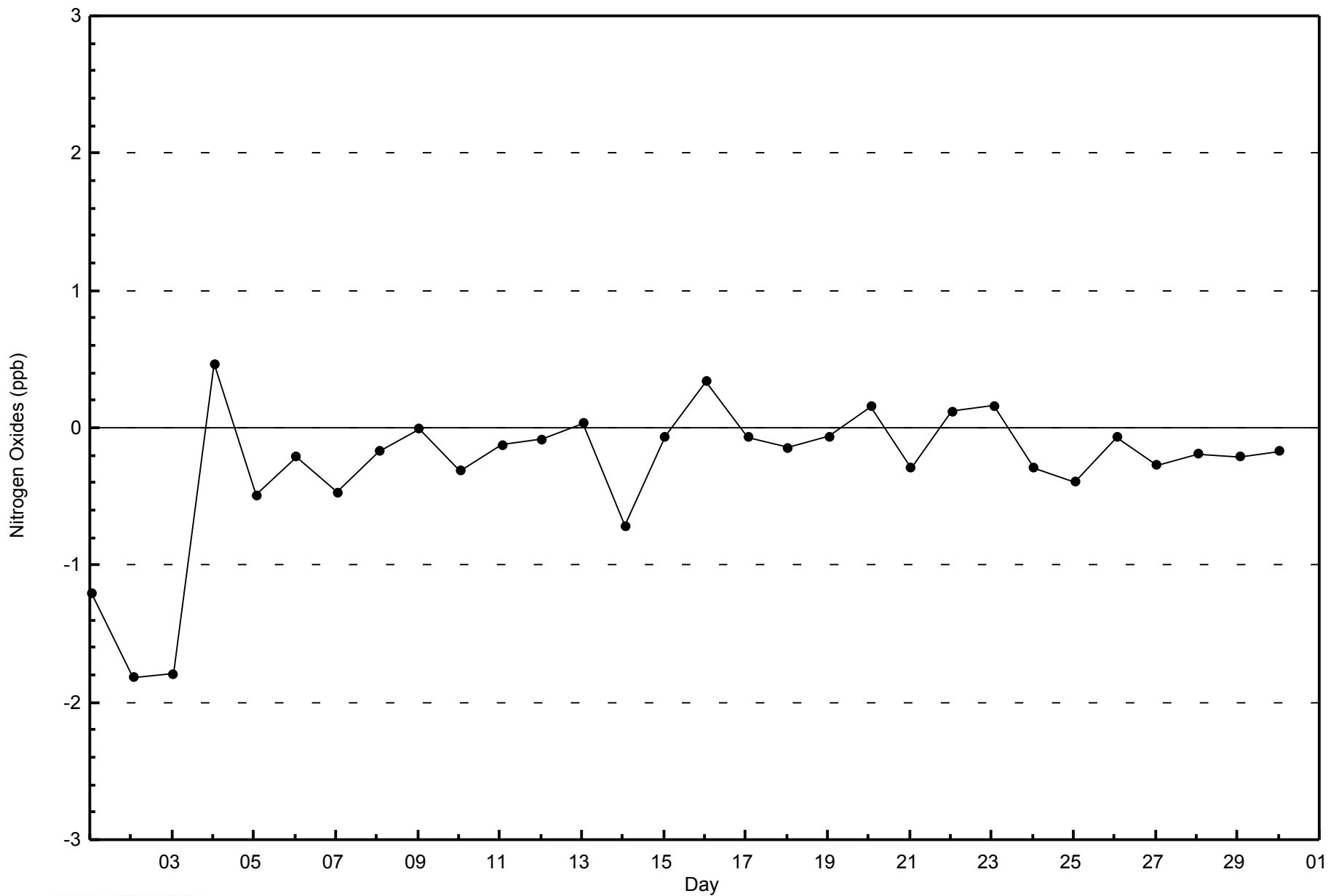
**Nitrogen Oxides (NO_x) - ppb
Wapasu (AMS 17)**



Classes (ppb)



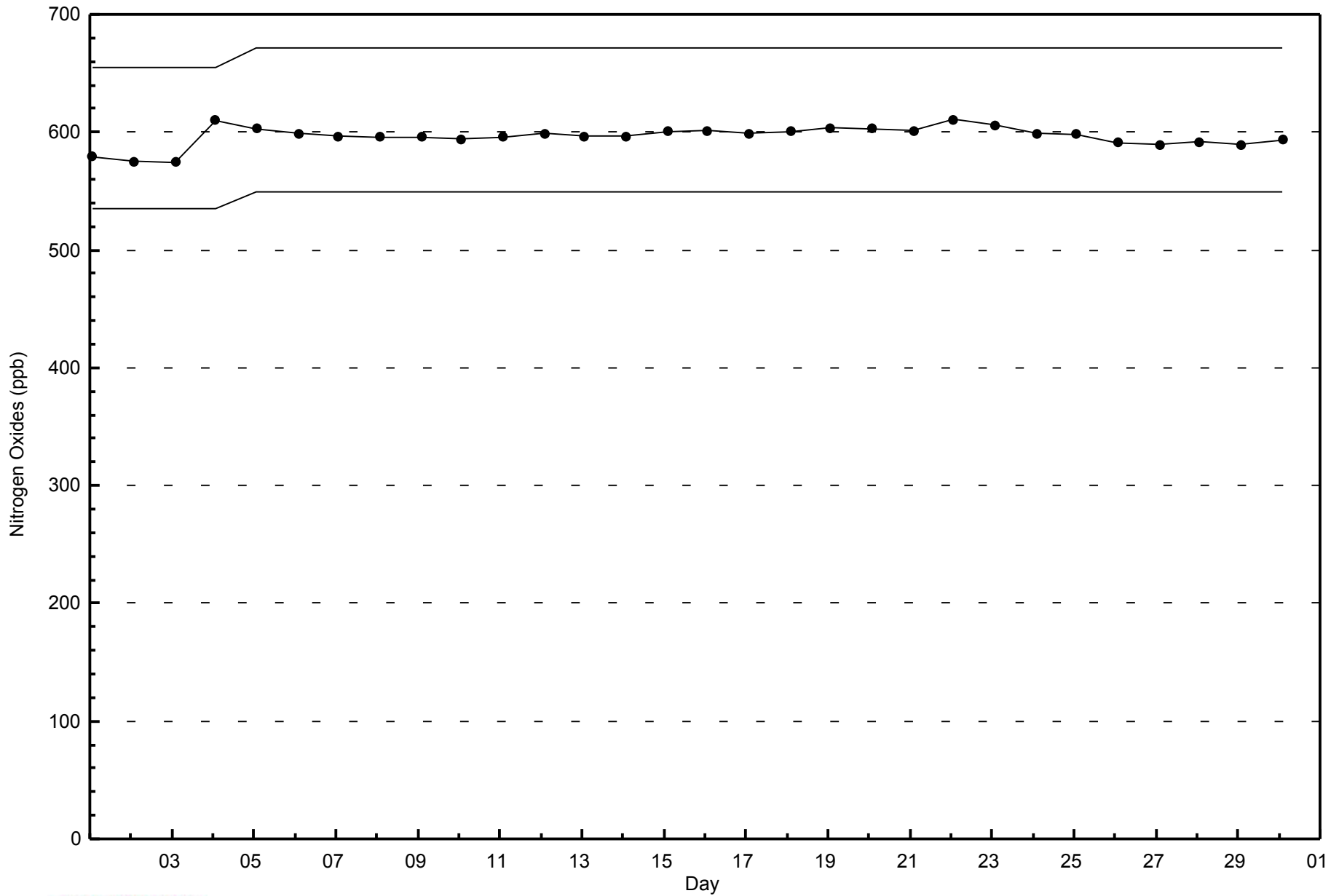
Total Number of Valid Hours: 676





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Wapasu - September 2014





Summary of Hour Averages

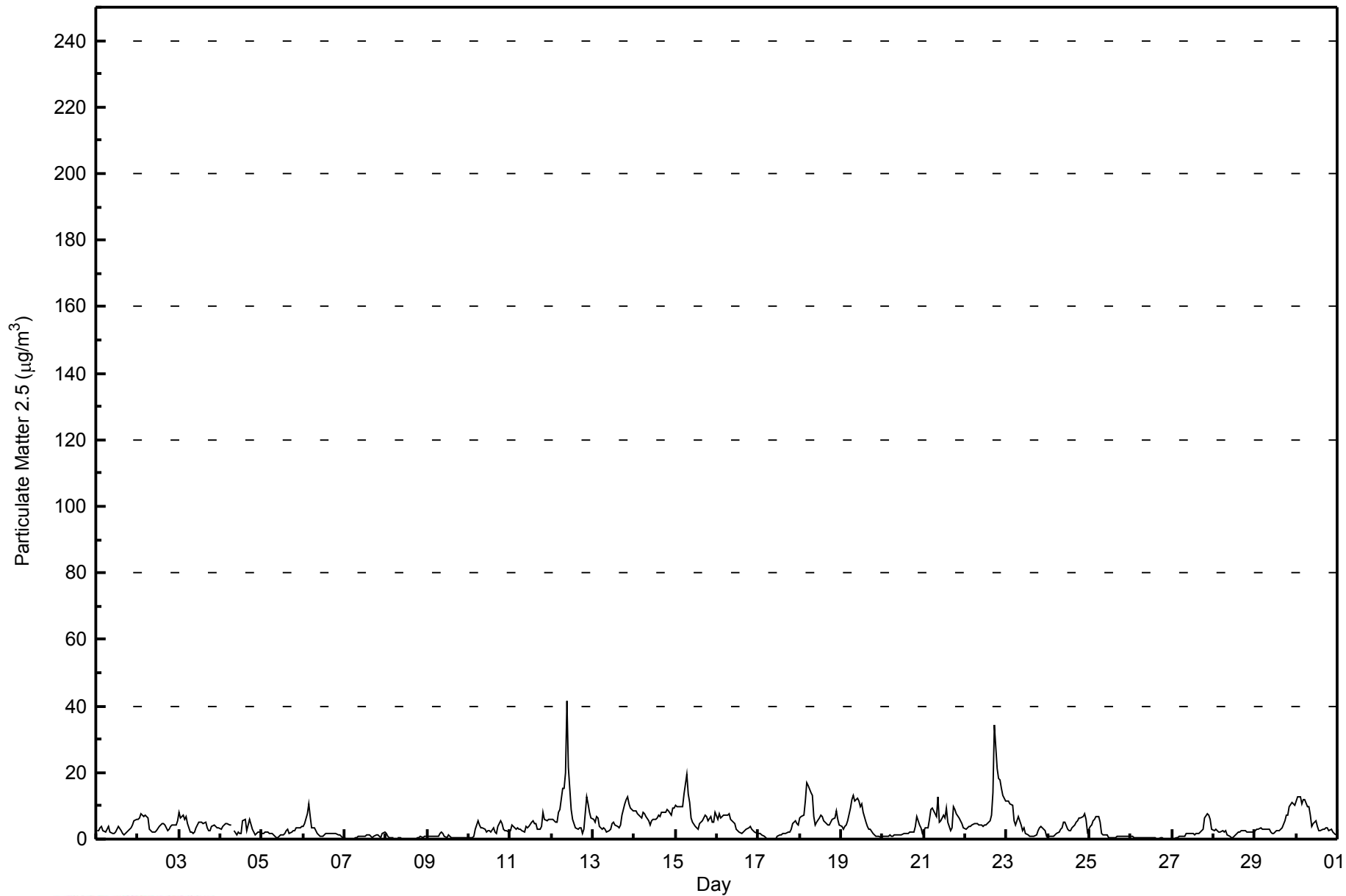
Wapasu - September 2014

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 720																								
Maximum Value: 41.6 µg/m ³ on Sep 12 10:00		Maximum Daily Average: 9.5 µg/m ³ on Sep 12																								
Minimum Value: 0.0 µg/m ³ on Sep 27 01:00		Hours of Data: 705																								
Maximum Diurnal Average: 5.2 µg/m ³ at hour 7		Hours of Missing Data: 15																								
Monthly Average: 4.10 µg/m ³		Hours of Calibration: 0																								
Minimum Daily Average: 0.3 µg/m ³ on Sep 26		Percent Operational Time: 97.9																								
Minimum Diurnal Average: 2.9 µg/m ³ at hour 16		Percentiles: P ₁ = 0.1 P ₁₀ = 0.6 Q ₁ = 1.5 Median = 3.1 Q ₃ = 5.6 P ₉₀ = 8.6 P ₉₉ = 17.4																								
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	2.4	2.6	3.4	3.9	2.5	2.0	3.0	3.6	2.1	1.9	1.9	2.2	2.9	3.6	2.7	1.8	1.4	1.9	2.6	2.9	3.4	4.2	5.5	5.8	2.9	5.8
2-Sep	6.0	6.4	7.8	6.8	7.3	6.8	6.3	3.2	2.2	1.9	2.2	2.4	3.9	4.2	4.5	4.6	4.0	2.7	3.0	3.8	4.2	4.2	4.4	5.7	4.5	7.8
3-Sep	8.2	6.2	7.2	5.9	6.7	4.5	2.0	2.0	1.7	1.9	3.2	5.0	4.9	5.3	4.7	4.9	3.2	2.8	2.7	3.9	4.3	4.0	3.4	3.5	4.3	8.2
4-Sep	3.1	3.9	4.3	4.6	4.5	4.3	4.1	M	2.6	1.4	2.1	1.8	1.9	5.6	6.0	2.7	4.1	5.9	3.1	2.2	1.3	1.8	2.2	1.9	3.3	6.0
5-Sep	1.6	1.7	2.2	2.1	1.6	1.6	1.8	1.5	0.6	0.4	0.9	1.3	1.2	1.5	2.4	2.9	1.6	2.1	2.6	2.6	3.2	3.3	3.5	3.7	2.0	3.7
6-Sep	3.8	4.7	7.6	10.5	6.8	3.5	3.2	2.6	1.6	1.2	0.9	0.9	1.2	1.6	1.5	1.8	1.5	1.6	1.8	1.6	1.4	1.3	1.0	0.5	2.7	10.5
7-Sep	0.3	UO	UO	UO	UO	0.1	0.4	0.3	0.8	0.8	0.7	0.7	0.7	1.4	1.2	1.0	0.6	0.7	1.4	1.4	0.7	0.4	1.6	1.9	0.9	1.9
8-Sep	1.5	0.8	0.2	0.5	0.4	UO	UO	0.3	0.2	0.1	UO	0.2	UO	UO	UO	UO	UO	0.2	0.2	0.5	0.8	0.6	0.7	0.8	--	1.5
9-Sep	0.7	0.9	0.9	1.1	1.0	0.9	1.0	1.5	2.2	1.8	0.8	0.6	1.1	0.9	0.5	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.8	2.2
10-Sep	0.3	0.5	0.5	0.9	3.1	5.4	4.1	3.5	3.6	3.1	2.1	2.6	2.4	2.2	3.3	2.1	1.7	3.9	5.6	4.6	2.8	2.6	2.5	2.1	2.7	5.6
11-Sep	2.4	4.0	3.7	3.2	3.4	3.2	2.9	2.7	2.3	3.7	3.5	4.0	5.1	5.6	4.6	4.5	3.2	2.9	3.9	8.0	6.1	5.5	5.8	5.8	4.2	8.0
12-Sep	6.0	6.0	5.0	5.3	8.2	8.8	15.4	15.1	19.7	41.6	21.8	9.1	6.1	4.8	3.4	3.1	3.5	3.5	1.7	2.8	12.8	10.6	8.3	6.3	9.5	41.6
13-Sep	5.8	5.2	6.8	6.2	4.0	3.0	3.3	2.9	2.1	2.4	3.0	4.5	5.0	4.3	3.8	3.4	4.1	7.3	10.7	11.8	12.6	10.5	9.2	8.6	5.9	12.6
14-Sep	8.5	8.3	7.6	6.6	6.4	7.9	7.7	6.9	5.4	4.2	5.4	5.9	6.2	7.1	6.8	7.9	8.2	8.2	9.0	8.4	7.3	9.3	9.3	7.3	9.3	9.3
15-Sep	10.1	9.8	9.5	9.7	9.8	13.7	19.4	13.5	11.1	6.3	5.2	3.7	3.5	3.0	4.7	5.3	6.5	7.1	7.0	5.4	7.0	5.1	5.2	8.0	7.9	19.4
16-Sep	5.8	7.4	6.3	6.9	7.1	7.4	7.1	7.5	5.8	5.0	4.7	3.0	2.5	2.1	1.7	1.9	2.7	2.9	3.2	3.9	3.2	2.4	2.2	1.8	4.3	7.5
17-Sep	1.7	1.7	1.3	0.9	0.4	0.1	0.2	0.2	0.1	0.2	0.2	0.9	1.2	1.2	1.5	1.6	1.8	2.2	2.3	2.9	4.8	5.5	4.5	4.2	1.7	5.5
18-Sep	6.5	6.8	7.2	11.6	16.8	15.9	14.1	13.3	6.7	4.0	5.3	6.3	7.2	6.9	5.6	4.8	4.2	4.1	4.9	5.9	6.5	8.4	5.8	4.2	7.6	16.8
19-Sep	3.9	3.1	3.6	4.3	5.5	9.5	12.0	12.9	11.3	12.2	11.6	9.9	10.6	8.0	5.0	4.0	2.9	3.0	1.8	1.4	1.0	0.8	0.7	0.5	5.8	12.9
20-Sep	0.7	0.8	0.9	1.0	1.3	0.9	1.0	1.2	1.2	1.1	1.4	1.4	1.7	1.6	1.6	1.6	2.0	2.3	2.1	3.7	7.0	4.3	3.3	1.6	1.9	7.0
21-Sep	2.7	3.4	3.3	5.8	9.1	9.5	7.7	6.7	12.7	4.9	5.6	7.4	6.5	9.5	4.9	2.7	3.4	9.7	8.7	7.5	6.3	5.3	4.5	3.3	6.3	12.7
22-Sep	3.0	3.3	3.6	4.0	4.3	4.5	4.6	4.8	4.3	4.0	3.8	4.0	4.1	4.7	5.4	7.1	13.9	34.2	21.2	18.1	17.6	15.2	13.1	11.6	8.9	34.2
23-Sep	11.6	11.5	10.8	10.3	5.6	4.1	5.4	6.9	4.2	2.5	3.3	1.7	1.1	0.9	0.8	0.9	1.0	1.4	2.4	3.2	3.9	3.0	2.6	0.8	4.2	11.6
24-Sep	0.7	0.7	0.8	1.0	1.2	1.6	1.9	2.8	3.6	4.9	5.2	3.1	2.5	2.6	3.4	4.4	4.9	5.5	6.3	6.3	6.7	7.8	5.8	2.1	3.6	7.8
25-Sep	3.7	4.1	5.6	6.1	6.9	6.9	5.1	1.7	1.5	1.4	1.3	0.4	0.4	0.4	0.5	0.6	0.8	1.0	1.0	1.0	1.0	1.0	0.8	0.8	2.2	6.9
26-Sep	0.8	0.7	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.1	0.1	0.0	UO	UO	0.3	0.8
27-Sep	0.0	0.1	0.2	0.4	0.7	0.7	0.7	1.0	1.7	1.7	1.6	1.5	1.6	1.2	1.7	1.9	2.1	2.4	3.0	6.5	7.6	7.2	5.9	2.9	2.3	7.6
28-Sep	2.6	2.9	2.6	2.2	2.3	2.4	2.2	2.4	1.2	0.6	0.5	0.6	0.9	1.2	2.1	2.2	2.7	2.7	2.7	2.2	2.2	2.0	2.2	2.1	2.0	2.9
29-Sep	2.5	2.9	3.0	3.4	3.1	3.0	2.9	3.1	3.0	2.3	1.8	1.9	2.6	2.5	2.6	2.8	3.2	5.4	7.4	7.4	9.8	11.1	10.4	10.2	4.5	11.1
30-Sep	11.5	12.8	12.5	10.7	11.8	11.8	9.9	9.7	7.2	4.0	4.6	5.4	3.8	2.6	2.6	2.9	3.0	3.6	3.2	2.5	2.8	2.3	1.7	1.1	6.0	12.8
																								Diurnal Average		
																								Diurnal Maximum		
																								4.0 4.2 4.4 4.7 4.9 5.0 5.2 4.6 4.1 4.1 3.6 3.1 3.2 3.3 3.1 2.9 3.2 4.4 4.2 4.4 5.0 4.6 4.4 3.8		
																								11.6 12.8 12.5 11.6 16.8 15.9 19.4 15.1 19.7 41.6 21.8 9.9 10.6 9.5 7.1 7.1 13.9 34.2 21.2 18.1 17.6 15.2 13.1 11.6		
M - Maintenance UO - Unstable Operation																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - September 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - September 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	396	56.17	56.17
6 - 15	173	24.54	80.71
16 - 25	8	1.13	81.84
26 - 80	2	0.28	82.13
> 81.0	0	0.00	82.13

Total Number of Valid Hours: 705

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Wapasu - September 2014

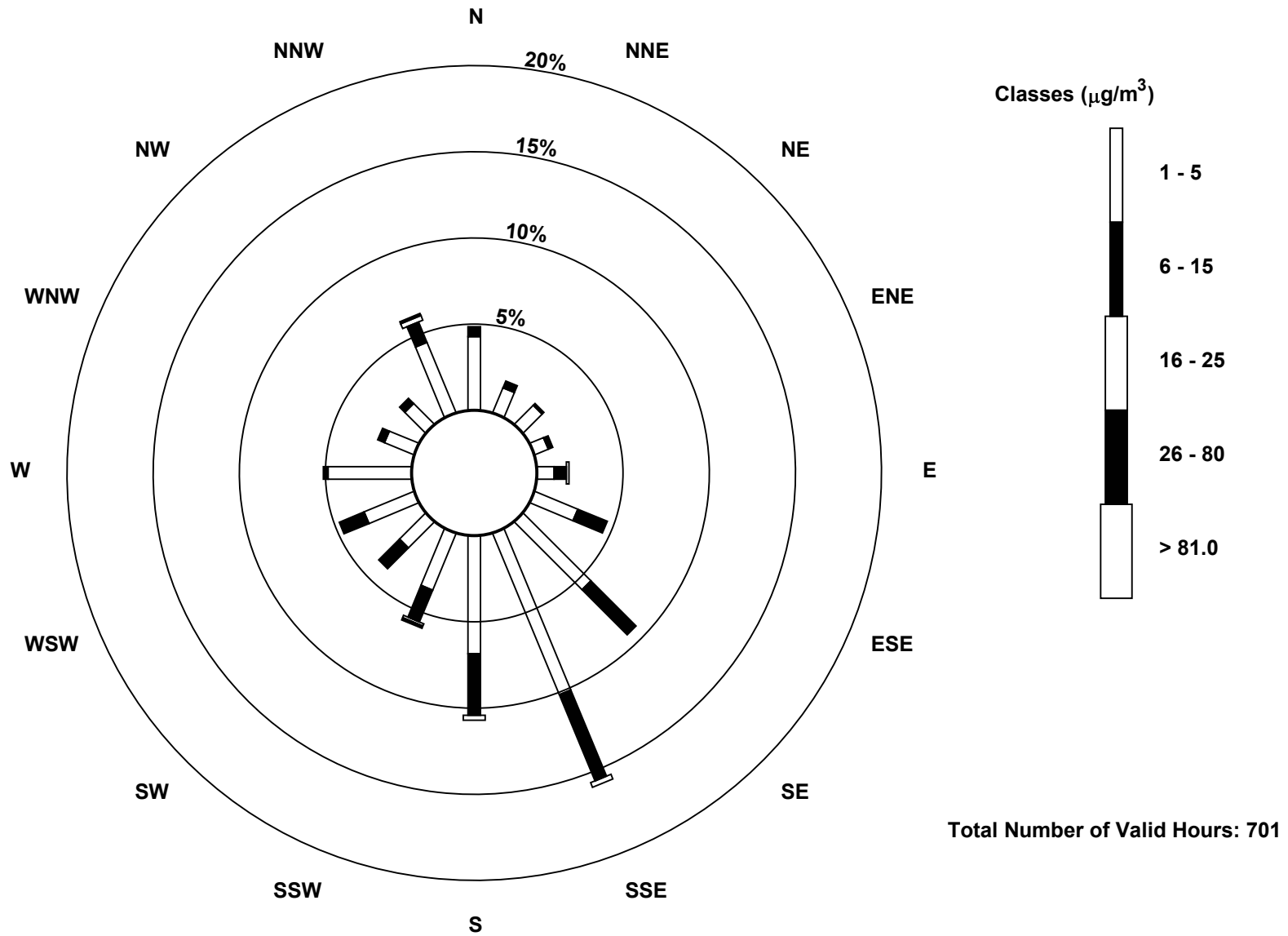
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	30	11	11	6	7	19	39	71	48	25	15	22	34	13	12	31	394
6 - 15	4	3	1	2	5	13	26	38	25	14	12	11	2	3	3	9	171
16 - 25	0	0	0	0	1	0	0	2	2	1	0	0	0	0	0	2	8
26 - 80	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	34	14	12	8	13	32	65	111	75	41	27	33	36	16	15	43	575

Total Number of Valid Hours: 701

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
 Wapasu (AMS 17)



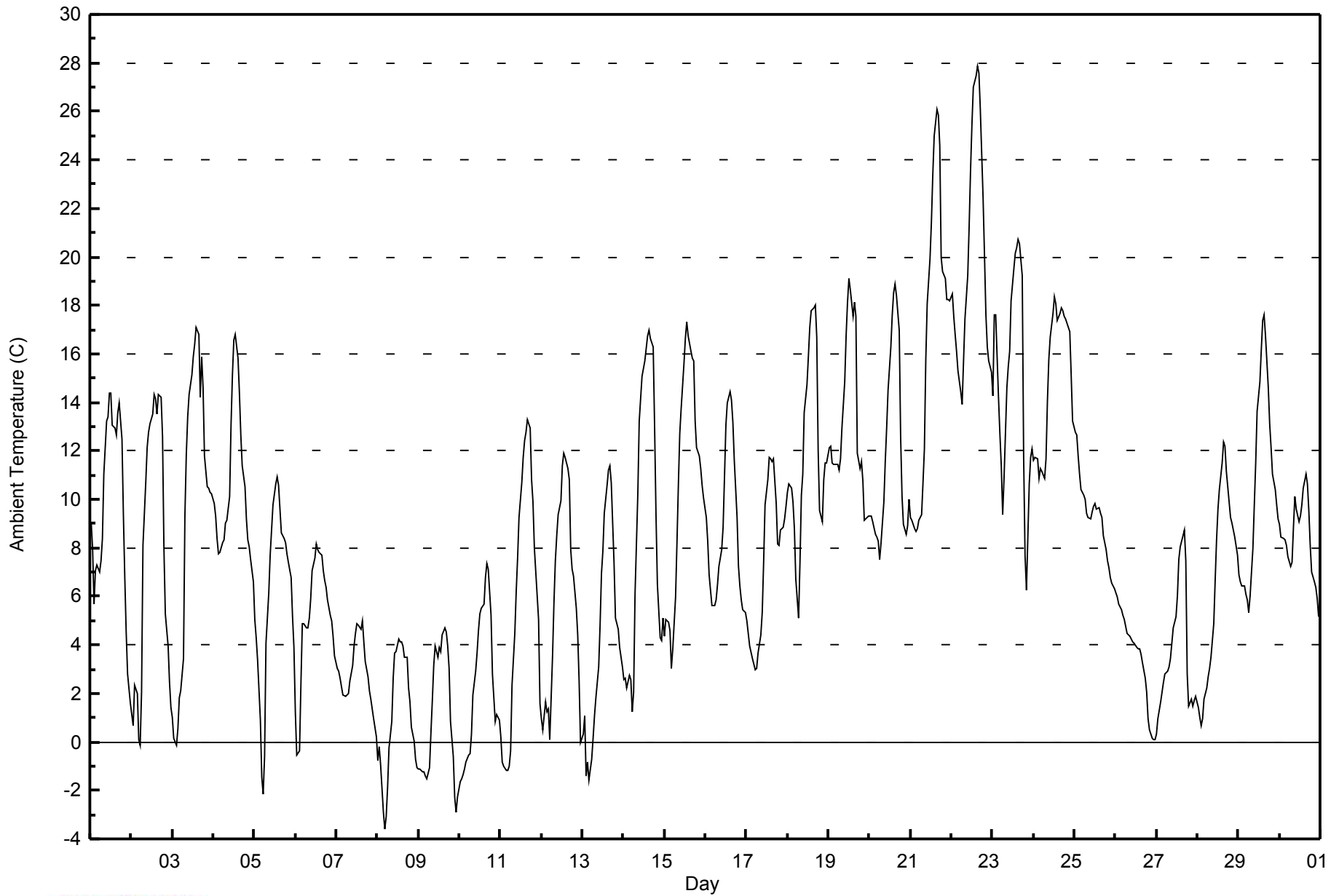


Maximum Value: 27.9 C on Sep 22 16:00		Maximum Daily Average: 19.9 C on Sep 22		Hours in Service: 720																							
Minimum Value: -3.6 C on Sep 8 05:00		Minimum Daily Average: 1.0 C on Sep 8		Hours of Data: 720																							
Maximum Diurnal Average: 13.3 C at hour 16		Minimum Diurnal Average: 4.5 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 8.46 C		Percentiles: P ₁ = -1.9 P ₁₀ = 0.9 Q ₁ = 3.9 Median = 8.3 Q ₃ = 12.1 P ₉₀ = 16.8 P ₉₉ = 25.7		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	9.0	7.9	5.7	7.1	7.3	7.0	7.5	8.4	11.1	13.2	13.4	14.4	14.4	13.0	12.9	12.6	13.6	14.0	12.5	9.4	6.8	4.5	2.8	1.6	9.6	14.4	
2-Sep	1.1	0.6	2.4	2.0	0.1	-0.2	2.1	8.1	10.7	12.1	12.8	13.1	13.5	14.3	14.1	13.5	14.3	14.2	12.6	8.0	5.3	4.0	2.5	1.4	7.6	14.3	
3-Sep	1.0	0.1	-0.1	0.5	1.8	2.1	3.4	9.3	11.8	13.4	14.3	15.1	15.9	16.4	17.1	16.8	14.2	15.9	14.6	11.8	10.5	10.5	10.3	10.3	9.9	17.1	
4-Sep	9.8	9.3	8.4	7.8	7.8	8.2	8.4	9.0	9.2	10.1	13.1	15.1	16.5	16.8	15.8	14.4	12.7	11.4	10.5	9.2	8.3	8.1	7.5	6.6	10.6	16.8	
5-Sep	5.0	4.3	3.4	0.9	-1.5	-2.1	-0.6	4.1	6.1	7.7	8.7	9.8	10.6	10.9	10.6	9.6	8.6	8.4	8.2	7.8	7.4	6.8	5.2	3.9	6.0	10.9	
6-Sep	1.2	-0.5	-0.4	2.4	4.9	4.9	4.7	4.7	5.1	5.9	7.1	7.6	8.2	7.9	7.8	7.7	7.0	6.6	6.4	5.9	5.2	5.0	4.4	3.6	5.1	8.2	
7-Sep	3.1	2.9	2.6	2.3	2.0	1.9	1.9	2.0	2.5	3.1	3.9	4.5	4.9	4.8	4.6	5.0	4.1	3.3	2.7	2.1	1.8	1.4	1.0	0.2	2.9	5.0	
8-Sep	-0.8	-0.2	-0.9	-2.9	-3.6	-3.1	-1.9	-0.3	0.9	2.6	3.7	3.7	4.2	4.1	4.1	3.9	3.5	3.5	2.2	1.7	0.6	0.1	-0.7	-1.1	1.0	4.2	
9-Sep	-1.1	-1.1	-1.2	-1.2	-1.4	-1.5	-1.0	0.4	1.7	3.1	3.9	3.5	3.9	3.7	4.4	4.7	4.5	4.0	3.0	0.8	-0.6	-2.3	-2.9	-2.2	1.0	4.7	
10-Sep	-1.7	-1.5	-1.3	-1.1	-0.9	-0.6	-0.5	0.3	1.9	2.9	3.7	4.6	5.3	5.5	5.7	6.8	7.3	7.1	5.2	2.8	1.8	0.9	1.1	0.9	2.3	7.3	
11-Sep	0.2	-0.8	-1.0	-1.2	-1.2	-1.0	-0.4	2.4	4.5	6.2	7.6	9.2	10.7	11.8	12.4	12.8	13.3	13.0	10.8	9.9	8.0	6.0	5.0	1.6	5.8	13.3	
12-Sep	1.0	0.5	1.6	1.3	1.4	0.1	3.5	5.7	7.5	8.5	9.3	9.9	11.4	11.9	11.8	11.3	10.8	7.9	7.1	6.8	5.5	4.4	2.5	0.0	5.9	11.9	
13-Sep	0.3	1.1	-1.4	-0.9	-1.6	-0.7	0.1	1.1	1.8	3.1	4.8	7.0	7.9	9.4	10.6	11.2	11.4	10.7	7.3	5.1	4.9	4.6	3.9	3.1	4.4	11.4	
14-Sep	2.6	2.7	2.2	2.7	2.6	1.2	2.1	6.1	10.2	13.2	14.1	15.1	15.7	16.2	16.8	17.0	16.6	16.3	13.0	9.4	6.5	4.3	4.2	5.1	9.0	17.0	
15-Sep	4.3	5.1	4.9	4.6	3.1	3.9	6.0	8.2	10.6	12.7	13.8	15.6	16.6	17.3	16.7	16.1	15.8	15.7	13.3	12.2	11.8	11.3	10.6	10.0	10.8	17.3	
16-Sep	9.2	8.3	6.9	6.2	5.6	5.6	5.9	6.5	7.2	7.9	8.8	10.9	13.0	14.0	14.4	14.1	13.2	11.6	9.2	7.2	6.4	5.9	5.5	5.4	8.7	14.4	
17-Sep	5.0	4.5	4.0	3.5	3.2	3.0	3.0	3.6	4.4	5.3	7.4	9.8	10.8	11.7	11.7	11.6	11.7	9.8	8.2	8.1	8.7	8.8	9.2	9.7	7.4	11.7	
18-Sep	10.3	10.6	10.5	9.9	8.8	6.7	5.1	7.4	10.2	11.0	13.6	14.8	15.9	17.1	17.8	17.9	18.0	16.7	12.0	9.5	9.1	10.8	11.5	11.5	12.0	18.0	
19-Sep	12.1	12.2	11.5	11.4	11.4	11.5	11.2	11.7	12.9	14.8	16.8	18.1	19.1	18.6	17.5	18.1	17.5	11.9	11.3	11.6	10.7	9.1	9.2	9.3	13.3	19.1	
20-Sep	9.3	9.3	9.1	8.6	8.4	8.3	7.6	8.2	9.9	11.6	12.9	14.5	16.3	17.6	18.5	18.9	18.4	17.0	12.6	10.1	9.0	8.6	8.9	10.0	11.8	18.9	
21-Sep	9.3	9.1	8.8	8.7	8.8	9.1	9.3	10.7	12.1	15.8	18.1	19.9	21.4	23.4	25.0	26.1	25.9	24.6	20.0	19.4	19.1	18.3	18.2	18.2	16.6	26.1	
22-Sep	18.5	17.5	16.8	16.1	15.3	14.4	13.9	15.7	17.4	19.2	21.2	23.5	25.5	27.0	27.4	27.9	27.6	26.1	22.4	20.0	17.6	16.3	15.7	15.2	19.9	27.9	
23-Sep	14.3	17.6	17.6	14.2	12.7	11.4	9.4	11.0	14.6	15.5	16.1	18.2	19.5	20.2	20.4	20.7	20.6	19.2	11.8	7.7	6.3	10.7	11.7	12.1	14.7	20.7	
24-Sep	11.6	11.7	11.7	10.9	11.3	11.1	10.9	11.7	14.0	15.8	16.7	17.7	18.3	18.1	17.4	17.7	17.9	17.8	17.6	17.4	17.1	16.9	15.1	13.2	15.0	18.3	
25-Sep	12.8	12.6	11.8	11.1	10.4	10.2	10.0	9.4	9.2	9.2	9.5	9.7	9.8	9.6	9.7	9.5	9.3	8.5	7.9	7.5	7.2	6.8	6.5	6.3	9.4	12.8	
26-Sep	6.1	6.0	5.7	5.4	5.2	5.1	4.8	4.5	4.3	4.3	4.1	4.0	3.9	3.8	3.8	3.6	3.3	2.6	2.1	0.9	0.5	0.1	0.1	0.1	3.5	6.1	
27-Sep	0.3	0.9	1.6	2.1	2.5	2.8	2.9	3.1	3.4	4.1	4.7	5.2	6.0	7.5	8.0	8.5	8.8	7.5	2.8	1.4	1.8	1.5	1.7	1.9	3.8	8.8	
28-Sep	1.4	1.0	0.7	1.0	1.7	2.3	2.7	3.0	3.5	4.9	6.7	8.3	9.6	10.4	11.5	12.4	12.2	11.2	9.9	9.2	9.1	8.7	8.5	7.7	6.6	12.4	
29-Sep	6.9	6.6	6.5	6.4	6.1	5.9	5.3	6.0	8.0	9.8	11.5	13.6	14.9	16.2	17.4	17.6	16.7	14.6	13.1	12.2	11.0	10.4	9.7	9.2	10.7	17.6	
30-Sep	8.9	8.4	8.4	8.4	8.1	7.6	7.2	7.4	8.8	10.1	9.6	9.1	9.3	9.8	10.5	11.1	10.6	9.5	8.1	7.0	6.6	6.4	5.9	5.2	8.4	11.1	
		5.7	5.6	5.2	4.9	4.7	4.5	4.8	6.3	7.9	9.2	10.4	11.5	12.4	13.0	13.2	13.3	13.0	12.0	9.9	8.4	7.5	7.0	6.5	6.0	Diurnal Average	
		18.5	17.6	17.6	16.1	15.3	14.4	13.9	15.7	17.4	19.2	21.2	23.5	25.5	27.0	27.4	27.9	27.6	26.1	22.4	20.0	19.1	18.3	18.2	18.2	Diurnal Maximum	



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Wapasu - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Wapasu - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	46	6.39	6.39
0 - 10	404	56.11	62.50
10 - 20	250	34.72	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) - %

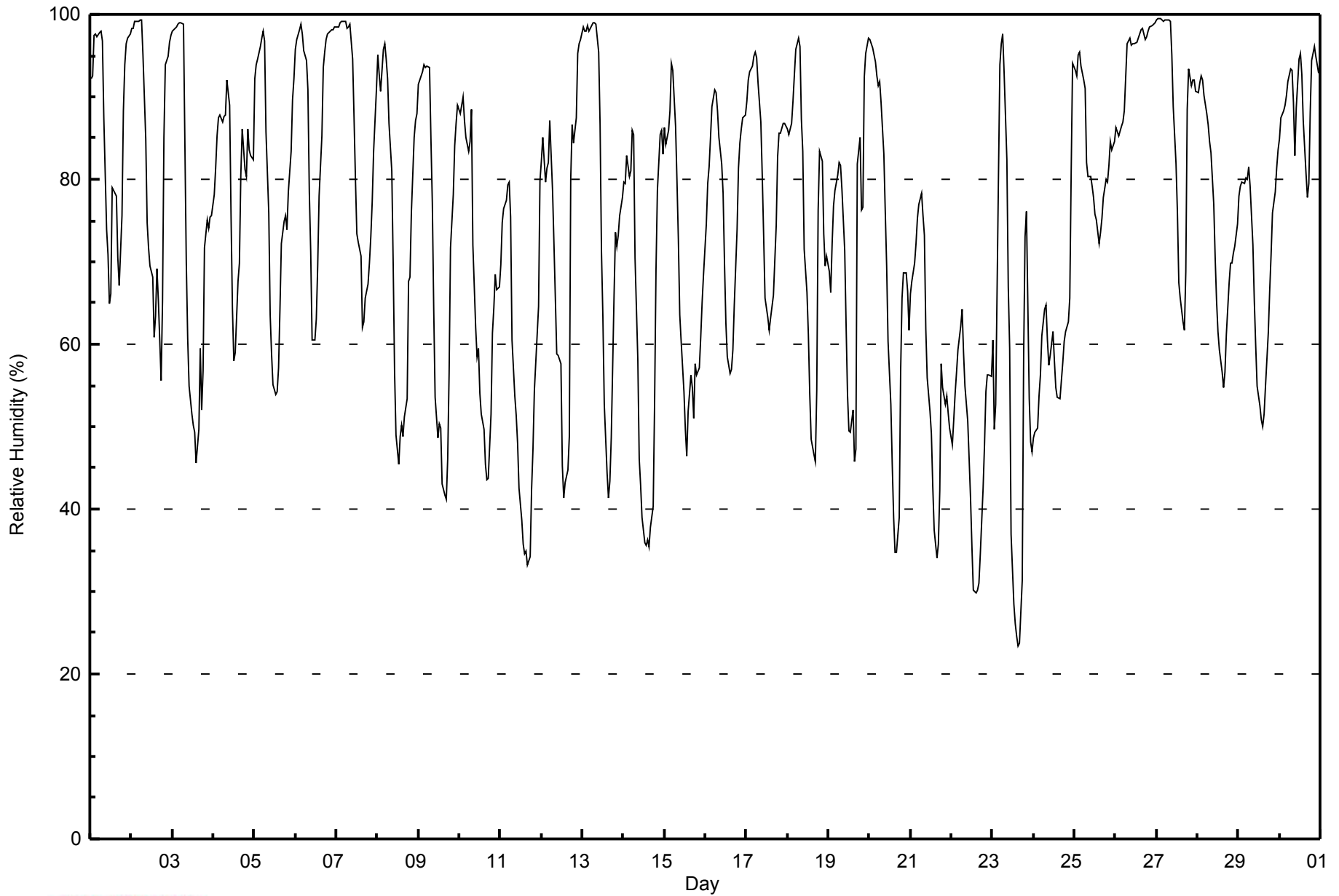
Wapasu - September 2014

Maximum Value: 99 % on Sep 27 03:00 Maximum Daily Average: 94.5 % on Sep 26																		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 23 % on Sep 23 16:00 Minimum Daily Average: 48.0 % on Sep 22 Maximum Diurnal Average: 89.4 % at hour 6 Minimum Diurnal Average: 54.6 % at hour 16 Monthly Average: 74.0 % Percentiles: P ₁ = 30 P ₁₀ = 49 Q ₁ = 59 Median = 77 Q ₃ = 90 P ₉₀ = 97 P ₉₉ = 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	92	93	98	98	97	98	98	97	87	74	71	65	66	79	78	78	71	67	76	88	94	96	97	98	85.6	98
2-Sep	98	98	99	99	99	99	99	95	85	75	72	69	68	61	63	69	65	56	65	85	94	95	97	97	83.5	99
3-Sep	98	98	99	99	99	99	99	84	70	61	55	52	50	49	46	50	59	52	57	72	75	74	75	76	72.8	99
4-Sep	78	81	85	87	88	87	88	88	92	89	76	64	58	59	68	70	81	86	81	80	86	84	83	82	80.0	92
5-Sep	92	94	95	96	97	98	97	86	76	64	59	55	54	54	57	64	72	75	76	74	78	83	90	92	78.2	98
6-Sep	96	97	98	99	98	96	94	91	78	71	61	60	63	69	78	85	94	95	97	98	98	98	99	99	88.0	99
7-Sep	99	99	99	99	99	99	98	98	99	95	87	80	73	72	71	62	63	66	67	70	73	77	83	91	84.1	99
8-Sep	95	93	91	96	96	95	92	87	81	70	57	49	45	49	50	49	51	53	68	68	76	85	87	88	73.7	96
9-Sep	92	92	93	94	94	94	94	85	77	64	54	49	50	50	43	42	41	46	56	72	78	84	87	89	71.6	94
10-Sep	88	89	90	87	85	83	85	88	72	62	59	59	54	52	50	45	44	44	51	61	64	68	67	67	67.3	90
11-Sep	70	75	77	78	79	80	75	61	54	51	48	42	39	36	35	35	33	34	42	47	54	61	65	80	56.3	80
12-Sep	82	85	80	81	82	87	79	72	66	59	59	58	45	41	43	45	49	80	87	84	88	95	97	97	72.5	97
13-Sep	99	98	98	99	98	99	99	99	99	95	87	71	63	53	44	41	43	49	66	74	72	73	76	78	78.0	99
14-Sep	80	79	83	80	81	86	85	71	58	46	43	39	36	36	36	38	40	53	69	79	85	86	83	83	62.8	86
15-Sep	86	84	86	88	94	93	86	80	73	64	60	54	50	46	52	56	55	51	58	56	57	61	65	69	67.7	94
16-Sep	75	79	81	85	89	91	90	88	85	82	78	70	62	58	56	57	59	65	74	81	84	86	87	88	77.2	91
17-Sep	90	92	93	94	95	95	95	92	87	80	73	66	63	62	63	65	66	74	83	86	86	87	87	87	81.6	95
18-Sep	86	85	87	90	93	96	97	96	87	83	72	66	61	54	48	47	46	54	76	83	82	73	70	71	75.2	97
19-Sep	69	66	72	77	79	80	82	82	79	71	62	54	49	49	52	46	47	82	85	76	77	92	95	97	71.7	97
20-Sep	97	96	96	94	92	91	92	89	83	76	69	60	53	45	39	35	35	39	57	66	69	69	67	62	69.6	97
21-Sep	66	68	70	72	75	77	78	76	73	62	56	52	49	43	37	34	36	42	58	55	53	54	52	50	57.8	78
22-Sep	48	51	54	57	59	62	64	59	55	51	46	41	36	30	30	30	31	35	43	48	54	56	56	56	48.0	64
23-Sep	60	50	53	80	94	96	98	93	82	67	60	37	28	26	25	23	24	31	58	73	76	53	48	47	57.7	98
24-Sep	49	49	50	54	56	61	64	65	60	57	59	62	58	55	54	53	56	58	60	61	63	66	81	94	60.2	94
25-Sep	93	93	95	95	94	92	91	82	80	80	79	78	76	75	72	74	75	78	80	80	82	85	84	85	83.2	95
26-Sep	86	86	85	86	87	88	92	96	97	96	96	97	97	97	98	98	98	97	97	98	98	99	99	99	94.5	99
27-Sep	99	99	99	99	99	99	99	99	99	95	89	82	76	68	66	63	62	69	89	93	91	92	92	91	87.9	99
28-Sep	91	92	93	92	90	88	87	85	83	77	71	65	61	59	57	55	57	61	67	70	70	71	72	75	74.4	93
29-Sep	78	79	80	79	80	80	82	79	72	65	60	55	53	51	50	51	55	61	66	71	76	78	81	84	69.5	84
30-Sep	85	87	88	89	90	92	93	93	89	83	89	95	95	93	87	81	78	79	88	94	96	95	94	93	89.5	96
83.8 84.3 85.5 87.5 88.7 89.4 89.1 85.2 79.3 72.2 66.8 61.5 57.8 55.7 54.9 54.6 56.1 60.7 69.4 74.4 77.4 79.2 80.5 82.0																								Diurnal Average		
99 99 99 99 99 99 99 99 99 99 96 96 97 97 98 98 98 97 97 98 98 99 99 99																								Diurnal Maximum		



WBEA
Hourly Averages

Relative Humidity (RH) - %
Wapasu - September 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Wapasu - September 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	32	4.44	4.44
40 - 60	154	21.39	25.83
60 - 80	212	29.44	55.28
80 - 100	322	44.72	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 22 km/h on Sep 24 19:00	Maximum Daily Speed Average: 14.8 km/h on Sep 28	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 6 01:00	Minimum Daily Speed Average: 0.6 km/h on Sep 23	Hours of Data: 716
Maximum Diurnal Speed Average: 3.9 km/h at hour 5	Minimum Diurnal Speed Average: 1.2 km/h at hour 10	Hours of Missing Data: 4
Monthly Average Velocity: 2.0 km/h 177.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 14 P ₉₉ = 19	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	SW5	SSW4	S4	S5	SSE4	SSE4	SE3	SSE5	SSE1	N5	NNW6	NNW5	NNW5	WSW4	W6	WSW6	WSW6	WSW6	W4	ESE1	SE2	SE3	ESE3	E4	SW1.5	WSW6
2-Sep	ESE3	E4	ENE4	ESE2	E3	ESE3	SSE3	ESE1	WNW5	NNW7	NW8	NW8	WNW8	WNW8	WNW7	WNW6	NW5	NNW8	N4	E2	SE3	SE3	SE4	SE4	NNW1.7	NW8
3-Sep	ESE3	SE4	SSE5	SSE6	SSE5	SSE6	SSE5	S4	WSW5	W7	W8	W7	W9	W7	W8	NW9	NE10	NE5	SE4	S8	SSE7	SSE6	SSE7	S7	SSW2.2	NE10
4-Sep	SSE8	S8	SSE7	SSE7	SSE8	SSE7	SSE8	S7	SSW7	SSW9	SW9	WSW8	WNW8	NW10	N10	NNW11	NNW11	NNW13	NNW9	N7	NNE6	N7	NNW8		W1.3	NNW13
5-Sep	NW7	NNW5	NNW5	NW3	ENE2	SE2	SE3	SE3	S1	SW5	SSW6	S8	SSW9	SSW9	SSW8	S9	SSE11	SSE10	SSE9	SSW5	WSW2	NNE3	ENE3	NNE1	SE2.9	SSE11
6-Sep	WSW0	ESE3	SSE3	N5	NNE4	NNE6	NNE5	NE6	ENE7	ENE5	ENE4	NE3	SSE2	WSW2	ESE3	ESE4	NE3	ENE4	NE4	NE6	NE7	NE5	NE7	NE9	NE3.6	NE9
7-Sep	NE10	NE9	NE9	NE8	NE9	NE9	NNE8	NNE8	NNE7	NNE9	NNE8	N9	N10	N10	NNW13	N12	N12	N8	N9	N7	N5	NNW4	NNW6	NNW7	N8.0	NNW13
8-Sep	NNW4	N5	N5	N2	NNE3	NNE4	N3	N5	N8	N8	N9	NNW11	NNW9	NNW9	NNW10	NNW11	NNW8	NNW4	NNW3	N3	N2	SE1	ESE2	ESE2	N4.9	NNW11
9-Sep	SE2	SE1	SE2	SE2	SE1	ESE2	SE2	NNW2	N5	N5	N5	NNW5	N7	NNE5	N4	NW8	NNW9	NW6	NNW3	NNE2	E2	E2	ESE3	SE2	N2.1	NNW9
10-Sep	ESE1	SE2	SE1	WSW1	W1	NW1	W1	SSE0	WNW3	NW5	NW7	NNW6	WNW6	W6	W7	SW7	SSW8	SW8	S6	S7	S7	S8	S8	S8	SW2.6	S8
11-Sep	S7	S7	S9	S8	S9	S10	S9	SSW12	SSW13	SW15	SW15	SSW16	SW18	SSW17	SSW17	SW15	SW15	SW14	SSW7	SSW7	SSW5	S5	S4	SSE4	SSW10.3	SSW18
12-Sep	SSE5	SSE6	SSE5	SSE5	SSE4	SE4	NNW6	NNW6	NNW11	NNW12	NNW14	NNW13	NNW15	NNW15	NNW14	NNW12	NNW9	NW5	NW3	NNW8	NW8	NNW3	WNW3	WNW3	NNW5.3	NNW15
13-Sep	NNW4	N4	AF	AF	AF	AF	ESE3	E4	NE2	WSW2	W4	WSW7	W7	WSW7	W5	W6	SW6	SSW5	SSE4	SE5	SE6	SE6	SE6	SSE6	SSW1.9	W7
14-Sep	SSE7	SSE6	SSE6	SE8	SSE6	SE6	SSE6	SSE7	SSE7	S7	SSW8	SW9	WSW10	WSW11	WSW10	WSW9	SW8	SSW5	SSW3	SE4	ESE3	SE4	SSE6	SE6	S5.0	WSW11
15-Sep	SSE6	SSE7	SE7	SSE7	SSE6	SSE6	SSE6	SSE4	SW3	NNE3	NNE2	N5	N5	N6	NNE7	NE7	E7	ESE7	ESE8	ESE11	SE12	SE11	SE10	SE4	ESE4.3	SE12
16-Sep	ESE5	ESE6	ESE7	ESE11	ESE14	ESE15	SE11	SE7	SE5	E4	E5	ESE6	E8	ESE9	ESE10	E11	ESE10	ESE11	ESE10	SE11	SE14	SE16	SE15	SSE9	ESE9.2	SE16
17-Sep	SSE11	SSE12	SSE11	SSE11	SSE10	SSE12	SSE11	SSE14	SSE13	SSE15	SSE13	SSE13	SSE14	SSE13	SSE13	S15	SSE14	SSE15	SSE17	SSE19	SSE15	SSE12	SSE12	SSE11	SSE13.1	SSE19
18-Sep	SSE9	S8	S7	S4	SSE4	E2	ENE2	N5	NNE8	NNE8	N7	NNW7	NNW6	N7	N6	NNW4	N3	NNE3	ESE3	SE5	SE5	SE8	SE10	SE10	E1.5	SE10
19-Sep	SE11	SE11	SE12	SSE10	S8	S9	S7	S8	S9	SSW10	SW12	SW15	SW17	WSW15	WSW11	WSW13	W13	W10	WSW8	W16	W14	W11	W9	W10	SW7.9	SW17
20-Sep	W9	WSW9	W9	W9	W9	W8	W6	W7	WNW9	WNW8	W11	W11	NNW12	W13	W14	NNW13	NNW12	NNW6	SSW3	S5	SSE6	SSE6	SSE7	SSE8	W6.7	W14
21-Sep	SSE8	SSE9	SSE8	S8	S8	S8	S8	S9	SSW7	SSW8	SSW11	SW12	SW13	WSW14	WSW13	W12	WSW7	SSE4	SSE6	S7	S8	SSE8	SSE9	SSE9	SSW7.3	WSW14
22-Sep	SSE10	SSE10	SSE10	SSE8	SSE8	SSE7	SSE7	S9	S10	S9	SSW9	SSW9	SSW10	SW11	SW10	SW10	SW9	SSW6	S5	S4	SSW4	SSW4	WSW4	W4	SSW6.9	SW11
23-Sep	WSW5	W8	NW6	NE6	SE3	E2	ESE3	E1	NW5	NNW6	N4	N6	NE6	N5	NNW3	WNW3	WSW3	SW3	SE2	SE3	SE4	SE6	SE8	SE9	NE0.6	SE9
24-Sep	SE8	SE9	SE10	SE11	SE11	SE10	SE11	SE11	SE12	SE11	SE13	SE12	SE13	ESE15	ESE18	SE20	SE20	SE20	SE22	SE19	SSE17	SSW11	WSW12	SSW5	SE12.3	SE22
25-Sep	SSW7	SW11	SW10	SW10	WSW12	WSW11	W12	W12	W13	W12	W12	NNW12	NNW10	NNW9	NNW9	NNW9	N8	N8	N8	NNE7	NNE5	NE7	NE5	NE5	WNW5.5	W13
26-Sep	NE6	NE6	NE6	NE7	NE8	NE7	NE5	NNE6	NE8	ENE10	ENE9	NE10	NE10	NE9	NNE8	NNE10	NE11	NNE10	NNE11	NNE12	NNE9	NNE8	NNE9	NNE8	NE8.3	NNE12
27-Sep	N8	N8	NNE10	NNE9	N8	N7	N6	N6	N7	NNW6	N5	NNE4	SE3	SW4	W5	WSW4	WSW5	WSW4	SSE3	SSE5	SSE6	SSE6	SSE7	S6	N1.7	NNE10
28-Sep	SSE8	SSE9	SSE12	SSE11	S13	S14	S14	S14	SSE16	S18	S19	SSE19	S18	S19	S18	S19	S16	S15	S14	S15	S16	S16	S15	SSE14	S14.8	S19
29-Sep	S14	S14	S13	SSE14	SSE14	SSE14	SSE14	SSE15	SSE14	SSE13	SSE16	SSE16	S17	S16	S14	SSW13	SSW13	SSW10	SSW9	S9	SSW8	SSW7	S7	S6	S11.9	S17
30-Sep	S7	S6	SSE7	S6	S4	SSE3	SSE3	SSE5	S1	NNW6	NNW8	NNW10	N9	N8	NNW8	N8	N7	N7	N7	NNW5	N4	N6	N7	N6	N2.7	NNW10

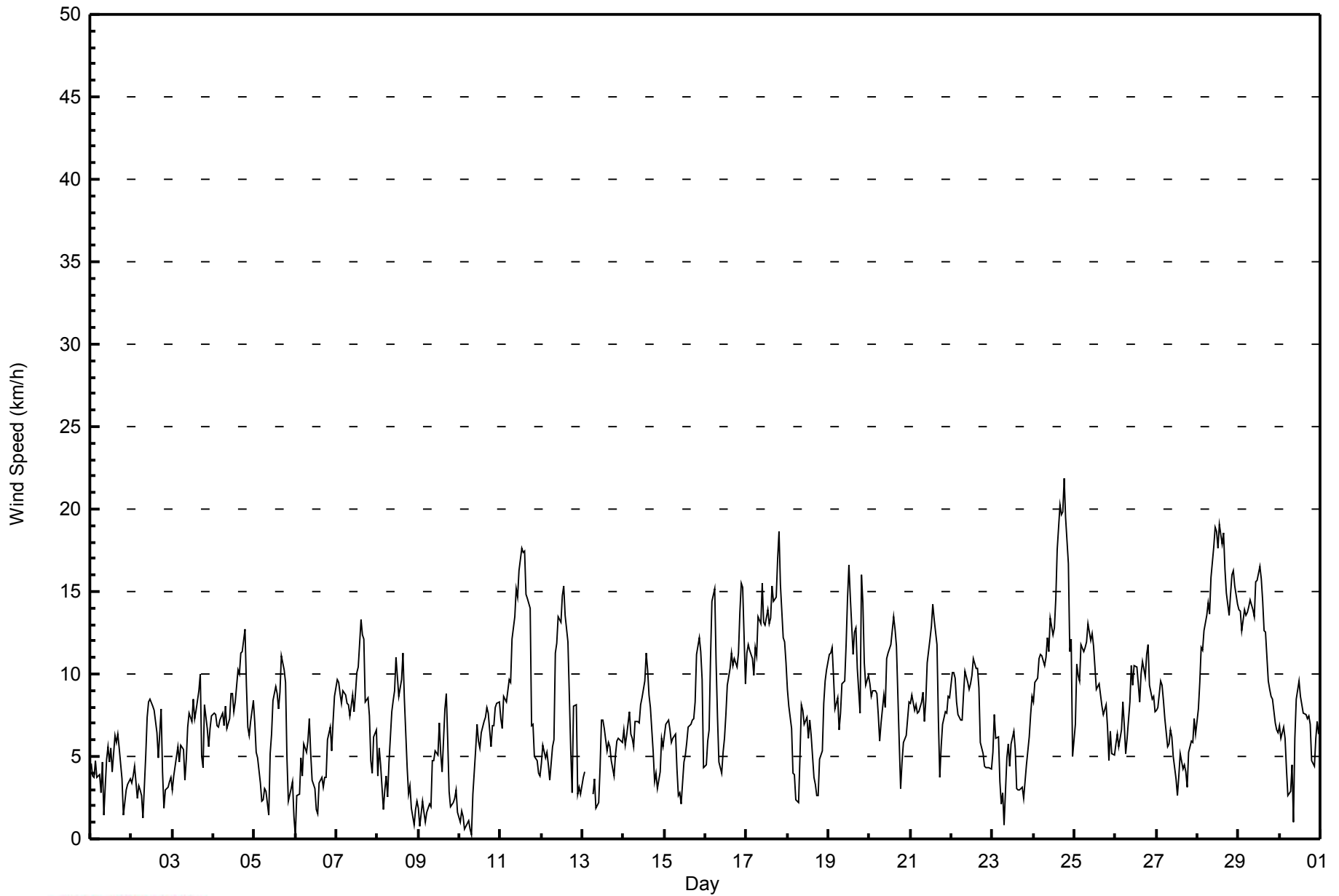
SSE3.5 SSE3.5 SSE3.7 SSE3.7 SSE3.9 SSE3.9 SSE3.3 SSE2.8 S1.6 SW1.2WSW2.0WSW2.4WSW2.6WSW3.1 W3.1 W2.7WSW1.8SSW1.2 SSE2.1 SSE2.7 SSE3.2 SSE3.4 SSE3.2 SSE2.9 S14 S14 S13 SSE14 ESE14 ESE15 S14 SSE15 SSE16 S18 S19 SSE19 S18 S19 S18 ESE20 SE20 SE20 SE22 SE19 SSE17 S16 S15 SSE14	Diurnal Average	Diurnal Maximum
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AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Wapasu - September 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Wapasu - September 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	220	30.73	30.73
6 - 11	372	51.96	82.68
12 - 19	120	16.76	99.44
20 - 28	4	0.56	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 716

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Wapasu - September 2014

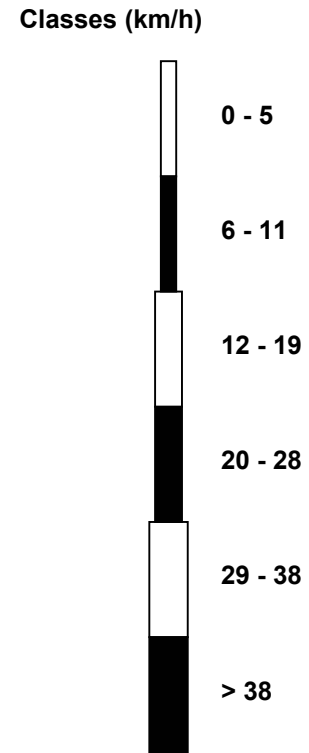
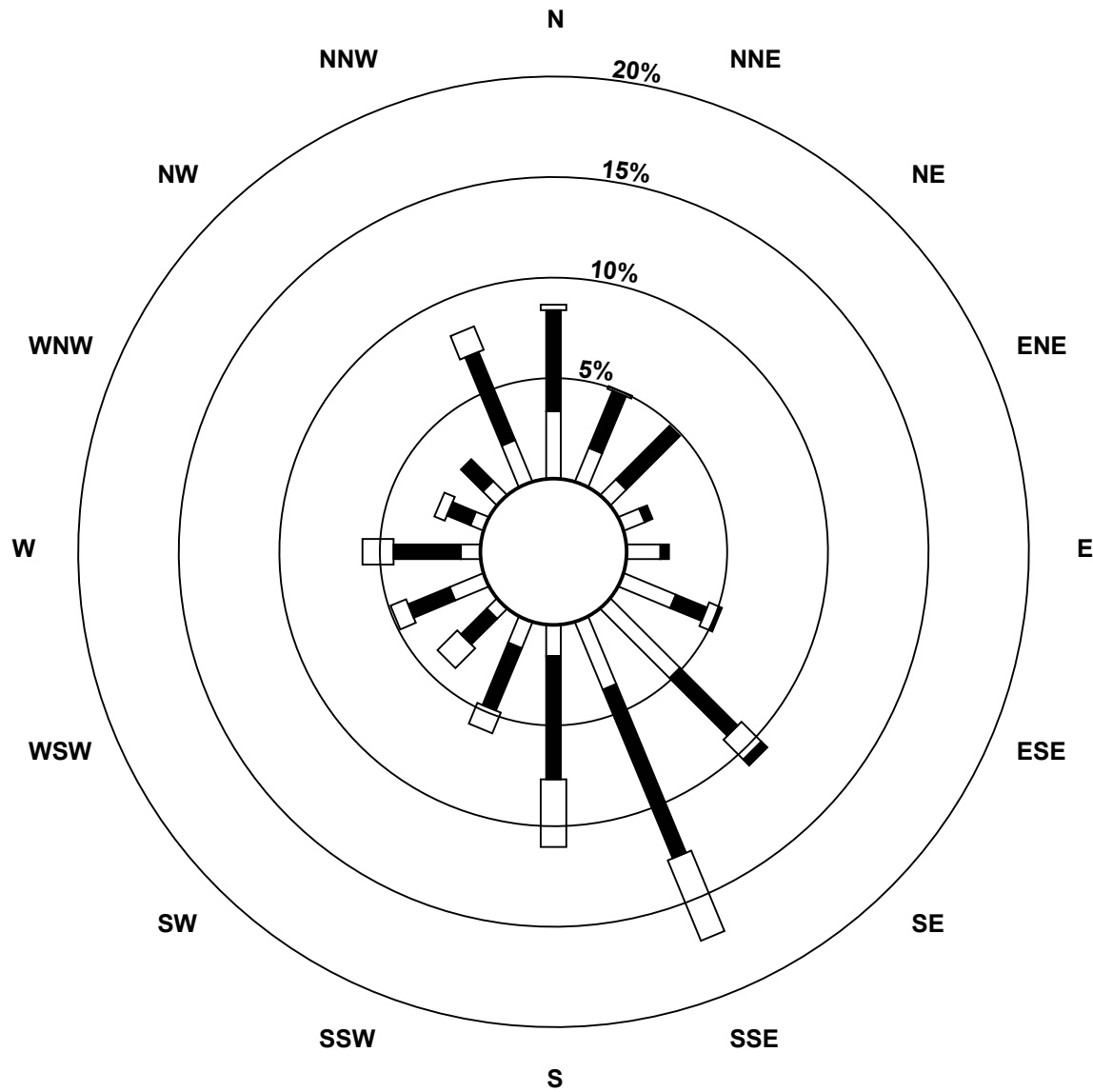
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	24	13	8	8	12	20	35	26	11	10	5	13	7	5	7	16	220
6 - 11	36	22	27	3	3	12	29	65	44	24	13	16	24	9	11	34	372
12 - 19	2	1	0	0	0	4	10	31	24	8	10	6	11	4	0	9	120
20 - 28	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	4
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	36	35	11	15	37	77	122	79	42	28	35	42	18	18	59	716

Total Number of Valid Hours: 716

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Wapasu (AMS 17)**



Total Number of Valid Hours: 716



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Wapasu - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Sep 19 20:00	Hours in Service: 720 Hours of Data: 716 Hours of Missing Data: 4 Hours of Calibration: 0 Percent Operational Time: 99.4
Minimum Value: 0 km/h on Sep 2 00:00	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P 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	1	1	1	1	2	1	1	1	2	2	3	2	2	2	2	2	2	2	1	2	1	1	1	0	3
2-Sep	0	1	1	1	1	1	0	1	1	3	3	3	3	3	3	2	2	3	1	1	1	1	1	1	3
3-Sep	0	1	1	0	1	1	1	1	2	2	3	2	3	3	3	4	5	2	1	2	1	1	2	2	5
4-Sep	2	2	1	1	2	2	2	2	2	2	4	3	3	3	4	4	4	4	4	4	2	2	3	3	4
5-Sep	2	1	2	1	1	1	0	1	1	3	3	3	4	3	4	3	4	3	3	3	1	2	1	1	4
6-Sep	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	2	3	3
7-Sep	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	3	3	3	2	1	2	2	4
8-Sep	1	2	2	1	1	1	1	2	3	3	3	4	4	3	3	3	3	1	1	1	1	1	0	0	4
9-Sep	1	1	1	1	1	1	1	2	2	2	2	2	3	2	2	3	3	2	1	1	1	0	1	1	3
10-Sep	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	2	2	2	2	2	2	3
11-Sep	3	2	3	2	3	3	3	4	5	6	6	6	7	6	7	6	6	5	2	2	1	1	1	1	7
12-Sep	1	1	1	1	1	1	2	2	4	4	4	4	5	5	5	4	4	3	1	4	4	1	1	1	5
13-Sep	2	2	AF	AF	AF	AF	1	1	1	1	2	3	3	3	2	3	2	2	1	1	1	1	1	1	3
14-Sep	1	1	1	1	1	1	1	1	1	2	3	3	4	4	4	3	3	2	1	1	1	1	1	1	4
15-Sep	2	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	3	3	3	3	2	3	3
16-Sep	3	3	3	4	5	4	3	3	2	2	2	3	4	3	3	3	3	3	3	3	4	4	6	5	6
17-Sep	4	4	4	3	3	4	4	4	5	5	4	4	4	4	4	5	5	5	5	5	5	4	4	3	5
18-Sep	3	2	2	2	1	1	1	2	3	3	3	3	3	3	3	2	2	1	1	1	1	2	2	2	3
19-Sep	3	3	3	3	2	3	2	2	3	3	4	6	6	5	3	5	6	6	4	7	5	3	3	3	7
20-Sep	3	2	3	3	3	2	2	2	2	2	3	4	4	4	4	4	4	3	1	1	1	1	1	2	4
21-Sep	2	2	2	2	2	2	2	3	3	3	4	5	4	5	5	4	3	1	1	1	2	2	2	2	5
22-Sep	3	2	3	2	2	2	2	3	3	3	3	3	3	4	4	4	3	2	1	1	1	1	1	1	4
23-Sep	2	2	2	3	1	1	1	1	2	2	2	2	2	3	2	2	1	1	1	1	1	1	1	1	3
24-Sep	1	2	2	2	3	2	2	3	3	3	4	4	4	4	5	6	6	6	6	5	4	5	2	6	6
25-Sep	2	3	3	3	4	3	4	4	4	4	4	4	3	4	3	3	3	3	3	3	2	3	2	2	4
26-Sep	2	2	2	2	3	2	2	2	2	3	3	4	4	3	3	4	4	4	4	4	4	3	3	3	4
27-Sep	3	3	4	3	3	3	2	2	2	2	2	2	1	2	2	2	2	1	1	1	1	1	2	2	4
28-Sep	2	3	3	3	4	5	5	5	5	6	6	6	6	7	6	6	6	5	4	5	5	5	5	4	7
29-Sep	4	4	4	4	4	4	4	4	5	4	5	5	6	5	6	5	5	4	3	3	3	2	2	2	6
30-Sep	2	2	2	2	1	1	1	1	1	2	3	3	3	3	3	3	3	2	3	1	2	2	2	2	3
	4	4	4	4	5	5	5	5	5	6	6	6	7	7	7	6	6	6	6	7	5	5	6	5	

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Wapasu - September 2014

Direction of Maximum Speed: 137 deg on Sep 24 19:00		Hours in Service: 720
Direction of Maximum Daily Speed Average: 173.7 deg on Sep 28		Hours of Data: 716
Direction of Minimum Speed: 243 deg on Sep 6 01:00	Direction of Minimum Daily Speed Average: 0.6 deg on Sep 23	Hours of Missing Data: 4
Monthly Average Direction: 232.5 deg		Percent Operational Time: 99.4

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	221	193	176	191	168	164	143	162	162	352	338	330	333	257	278	253	240	240	262	122	134	129	105	83	224.7
2-Sep	108	83	66	102	87	119	147	114	302	328	315	316	301	300	294	288	324	341	351	90	138	124	127	126	334.2
3-Sep	108	129	148	147	148	148	149	186	239	263	273	259	276	267	270	309	35	50	128	169	150	152	159	172	194.0
4-Sep	168	171	165	156	163	163	168	157	174	192	201	216	257	297	320	350	344	342	343	346	354	14	355	344	279.7
5-Sep	326	333	335	320	62	131	142	135	173	225	213	175	192	199	192	189	167	156	164	200	242	28	69	14	185.3
6-Sep	243	123	147	355	15	13	15	37	58	70	60	42	151	239	111	109	50	58	43	44	49	38	41	40	48.2
7-Sep	42	39	39	35	43	42	33	26	30	17	12	8	356	354	344	351	351	359	356	8	360	347	336	337	11.0
8-Sep	336	352	351	354	33	26	7	1	359	1	349	342	348	347	337	328	333	341	328	350	356	124	118	106	349.7
9-Sep	131	137	130	131	134	105	135	345	0	3	350	338	6	22	356	316	327	324	341	28	82	94	104	136	3.2
10-Sep	122	135	137	252	272	312	270	162	295	319	323	337	302	275	265	233	211	219	191	177	174	172	180	181	225.1
11-Sep	189	178	178	180	180	181	189	207	211	218	215	203	214	203	211	214	224	232	201	209	193	178	178	156	203.6
12-Sep	151	148	162	156	154	142	333	334	339	338	339	331	334	327	333	341	333	322	316	336	315	337	296	295	331.5
13-Sep	344	9	AF	AF	AF	AF	107	98	56	244	272	245	260	250	273	274	235	201	150	144	145	144	146	149	207.8
14-Sep	152	148	151	145	148	144	158	148	151	187	210	226	241	245	249	237	225	207	195	146	106	132	147	144	185.2
15-Sep	148	150	145	151	147	152	153	164	220	21	27	359	356	356	21	49	83	107	113	122	129	135	135	128	119.0
16-Sep	120	108	103	107	110	120	127	133	130	81	83	106	88	103	104	94	108	105	117	133	135	138	141	152	117.2
17-Sep	156	158	156	152	149	155	161	155	156	162	156	162	161	166	165	171	168	166	155	153	159	164	161	161	159.8
18-Sep	164	170	181	182	164	101	63	7	14	16	1	336	341	349	349	342	354	25	111	136	128	130	132	145	83.6
19-Sep	146	140	141	157	172	179	180	176	183	197	224	227	232	245	244	255	271	270	245	275	273	261	261	264	225.2
20-Sep	259	258	261	269	276	270	268	277	282	295	278	281	285	276	275	284	283	282	201	169	149	159	163	168	264.6
21-Sep	162	162	162	181	170	172	186	186	193	207	206	222	228	244	258	259	240	164	164	172	170	162	162	159	196.7
22-Sep	157	151	156	160	154	157	161	172	184	188	212	211	212	230	225	222	217	199	183	186	198	213	247	268	192.0
23-Sep	239	265	320	37	135	87	113	80	317	335	2	349	40	4	328	300	243	230	125	125	130	126	135	134	37.1
24-Sep	138	141	135	134	137	135	138	134	136	142	138	141	128	123	121	124	129	136	137	143	151	197	257	192	139.7
25-Sep	212	231	235	234	238	241	261	278	277	268	276	288	304	337	343	338	359	8	360	12	22	36	42	36	291.8
26-Sep	43	50	52	49	54	47	54	28	52	59	58	54	51	44	31	29	34	33	22	22	17	17	12	18	38.1
27-Sep	8	9	13	14	11	3	1	357	350	348	3	12	137	235	264	248	245	242	168	158	157	155	157	172	0.1
28-Sep	165	157	150	159	169	176	176	172	168	169	169	164	170	181	183	185	190	185	178	182	181	180	172	164	173.7
29-Sep	169	169	171	168	163	162	155	154	161	161	161	166	170	174	181	192	211	205	193	191	193	193	188	178	173.7
30-Sep	177	174	168	177	170	167	160	155	181	341	338	339	350	6	348	4	359	1	0	338	4	0	359	6	356.0

159.7 154.8 152.1 151.5 148.0 149.9 156.2 159.2 183.3 225.2 243.8 245.8 251.3 254.8 263.2 261.2 248.7 202.4 148.6 152.3 151.5 149.7 152.7 151.2

Diurnal Average

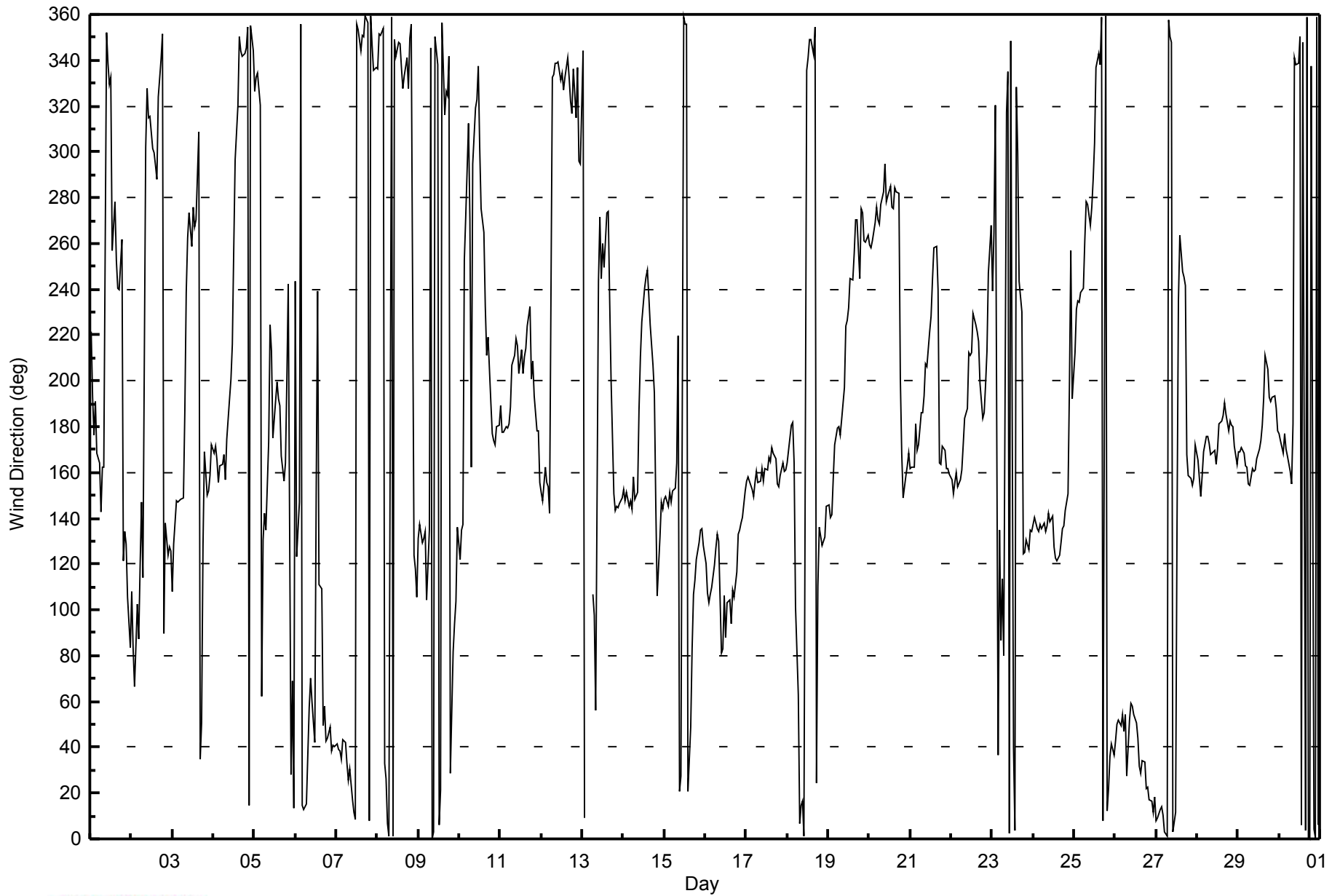
AF - Analyzer Failure

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



WBEA
Hourly Averages

Wind Direction (WD) - deg
Wapasu - September 2014





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Wapasu - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 94 deg on Sep 6 01:00	Hours of Data: 716
Minimum Value: 4 deg on Sep 3 06:00	Hours of Missing Data: 4
Percentiles: P ₁ = 7 P ₁₀ = 17 Q ₁ = 23 Median = 30 Q ₃ = 37 P ₉₀ = 49 P ₉₉ = 87	Hours of Calibration: 0
	Percent Operational Time: 99.4

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	26	34	24	28	28	29	62	24	80	47	53	69	33	48	25	29	31	37	26	73	31	25	18	12	80
2-Sep	13	14	7	32	16	25	20	69	27	38	40	32	32	44	32	27	45	32	26	51	17	16	20	14	69
3-Sep	12	13	10	6	7	4	5	40	35	34	32	45	42	42	40	49	38	42	38	28	19	23	25	26	49
4-Sep	24	21	19	17	20	23	30	21	37	35	37	35	42	37	38	36	30	30	30	32	36	40	32	28	42
5-Sep	20	27	27	22	48	53	17	30	89	59	54	39	42	39	38	32	28	23	26	55	69	56	20	57	89
6-Sep	94	30	32	31	35	38	36	37	30	38	70	68	93	82	38	32	59	38	32	31	27	31	32	31	94
7-Sep	34	33	36	41	33	33	37	40	38	36	40	39	35	34	30	36	34	39	33	38	36	34	24	23	41
8-Sep	28	32	31	22	21	27	33	44	38	38	37	37	46	33	31	27	27	27	30	30	21	61	20	16	61
9-Sep	25	69	27	58	70	23	46	56	40	55	54	40	42	49	65	37	27	24	31	34	22	22	18	75	75
10-Sep	89	25	71	88	87	69	68	91	21	23	30	42	58	39	34	49	39	37	26	23	23	23	28	29	91
11-Sep	36	32	26	29	27	28	31	34	38	35	40	41	36	37	38	40	35	28	33	32	31	21	36	19	41
12-Sep	11	7	9	9	18	26	29	22	32	34	28	30	29	27	31	31	25	30	29	26	31	31	22	27	34
13-Sep	71	32	AF	AF	AF	AF	42	31	65	77	54	39	42	50	61	48	39	35	17	9	8	8	9	7	77
14-Sep	8	7	7	7	9	10	10	15	21	37	39	41	37	35	35	34	32	35	31	13	50	10	7	10	50
15-Sep	11	9	7	8	7	9	10	21	56	66	72	63	58	40	43	33	24	23	17	19	18	17	17	70	72
16-Sep	69	40	45	25	23	20	21	27	31	43	36	49	52	37	30	27	26	22	20	19	19	18	21	25	69
17-Sep	25	27	27	24	24	25	26	24	26	28	30	31	30	29	27	29	29	27	21	20	25	28	26	23	31
18-Sep	25	23	27	26	18	27	39	29	40	42	49	43	58	51	48	70	51	27	24	12	9	14	16	17	70
19-Sep	18	18	17	25	27	30	28	28	33	37	39	37	32	28	21	26	34	34	27	27	26	25	25	26	39
20-Sep	24	23	26	27	27	26	28	25	25	29	28	31	29	30	29	27	25	26	44	12	10	10	14	19	44
21-Sep	18	20	22	27	22	24	29	32	34	36	35	36	34	26	28	28	26	18	11	18	19	17	20	24	36
22-Sep	22	22	23	26	20	20	20	27	31	34	38	36	37	34	34	33	35	29	20	21	21	26	39	24	39
23-Sep	22	26	42	47	35	57	27	76	23	26	49	48	45	55	73	68	54	24	19	10	13	12	10	11	76
24-Sep	12	13	14	15	16	16	17	17	18	20	20	24	25	23	20	21	21	21	19	20	21	43	26	32	43
25-Sep	33	27	29	27	28	24	26	27	26	26	25	28	27	29	30	31	33	40	36	35	35	37	34	33	40
26-Sep	34	33	28	33	27	33	34	34	29	25	27	30	29	34	35	36	36	35	36	36	38	37	36	37	38
27-Sep	37	37	37	37	35	37	37	37	35	34	41	54	64	66	47	50	38	24	21	11	12	13	18	24	66
28-Sep	23	22	18	22	26	32	30	28	27	29	30	28	32	35	34	33	34	32	31	30	32	32	27	25	35
29-Sep	27	26	27	26	24	23	22	21	25	26	26	28	30	32	36	38	35	38	33	32	32	33	31	28	38
30-Sep	28	25	21	27	22	21	14	14	82	31	25	26	35	41	35	38	39	35	40	34	34	37	35	38	82
	94	69	71	88	87	69	68	91	89	77	72	69	93	82	73	70	59	42	44	73	69	61	39	75	
	Diurnal Maximum																								

AF - Analyzer Failure

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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 7, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:10	End Time (MST)	11:40
Barometric Pressure	716 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	API T700	Serial Number	493
Cal Gas Concentration	47.8 ppm	Cal Gas Expiry Date	12-Dec-16
Gas Cert Reference	SA130010A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894
DACS voltage range	NA	DACS channel #	TCP/IP

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-702	-702
Analyzer Range (mv)	1000	1000	Lamp voltage	856	856
Calculated slope	1.001116	1.001116	Chamber temp.	44.9	44.9
Calculated intercept	0.156594	0.156594	Pressure (mmHg)	689.8	689.8
Analyzer Background	8.3	8.3	Flow (lpm)	0.452	0.452
Analyzer Coefficient	0.808	0.808	Intensity	82	82

Analyzer make	Thermo 43i	Analyzer serial #	1218153459
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	NA
as found span	5000	60.4	577.4	575.1	1.004
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	60.4	577.4	576.6	1.001
second point	5000	30.2	288.7	288.5	1.001
third point	5000	15.1	144.4	143.6	1.005
calibrator zero	6000	0.0	0.0	-0.2	NA
as left zero	6000	0.0	0.0	-0.2	NA
as left span	5000	60.4	577.4	570.0	1.013
Average Correction Factor					1.002

Corrected As found	574.9	Previous response	576.6	% change	0.3%
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Notes:

No Maintenance Done, Filter changed out, No adjustments made

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

SO₂ Calibration Summary

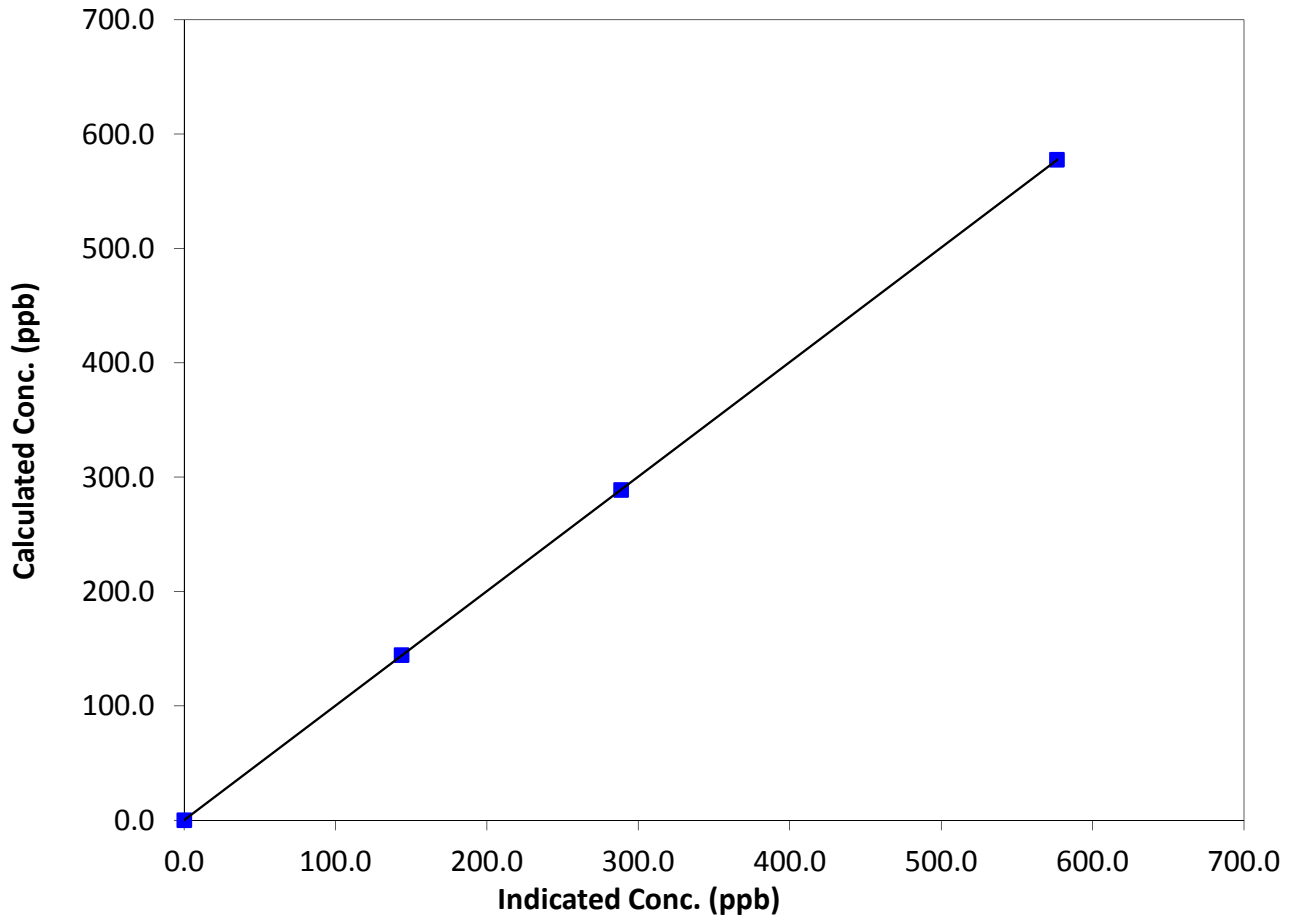
Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 7, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:10	End Time (MST)	11:40
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

Calibration Data

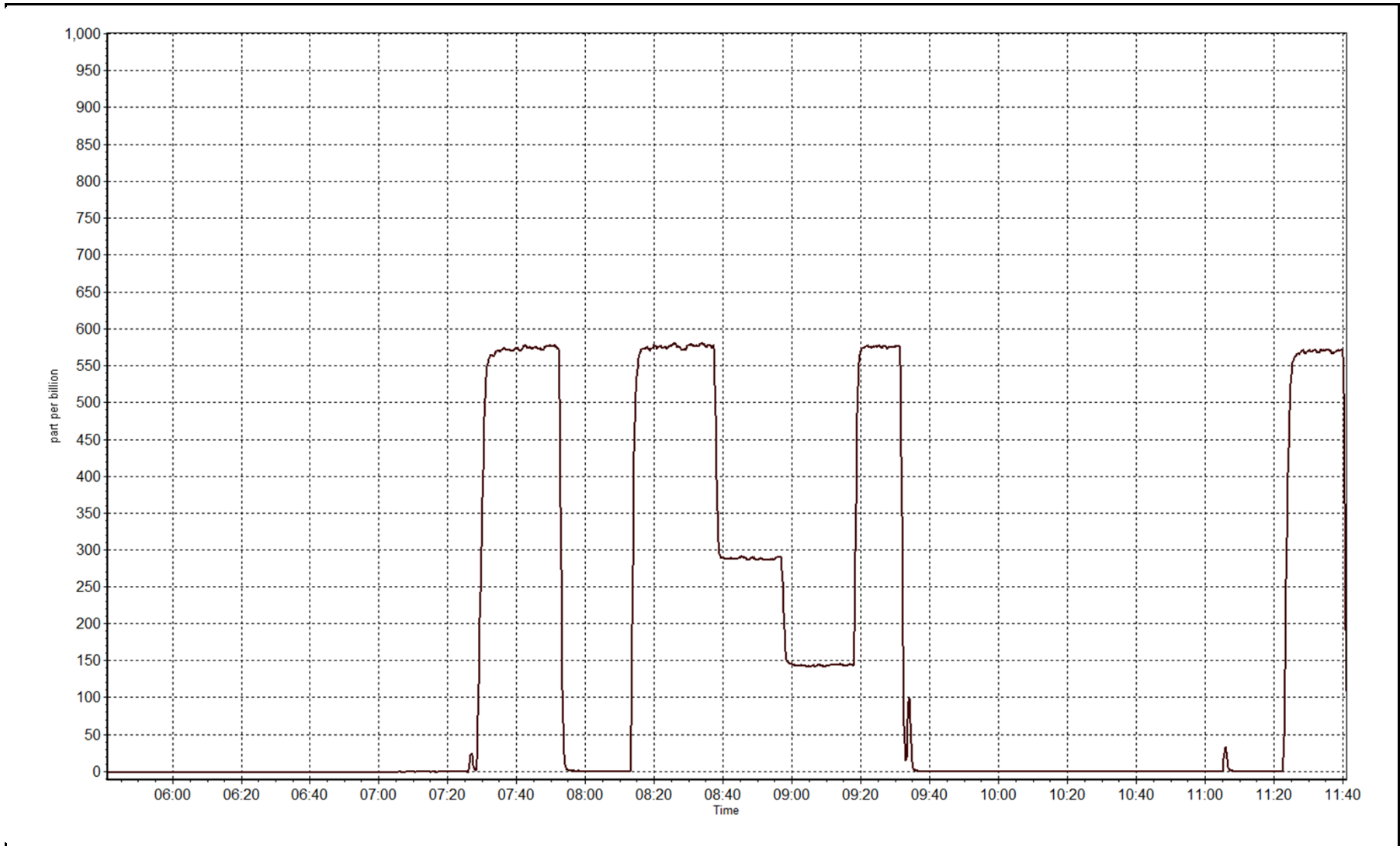
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999998
577.4	576.6	1.0014		
288.7	288.5	1.0007	Slope	1.001116
144.4	143.6	1.0053		
			Intercept	0.156594

SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 3, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 7, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	11:46
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	997
Cal Gas Concentration	10.2 ppm H2S	Cal Gas Expiry Date	30-May-13
Gas Cert Reference	SA5558	SO2 gas conc.	47.8 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894
DACS voltage range	NA	DACS channel #	TCP/IP

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-651	-651
Analyzer Range (mv)	100	100	Lamp voltage	806	806
Calculated slope	0.997492	0.997623	Chamber temp.	45	45
Calculated intercept	0.224073	0.044932	Pressure	562.1	562.1
Analyzer Background	11.8	11.8	Flow	0.973	0.973
Analyzer Coefficient	0.830	0.830	Intensity	90	90
			Converter temp.	342	342

Analyzer make/model	450i	Analyzer serial #	1218153583
Converter make/model		Converter serial #	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.7	NA
as found span	5000	39.3	80.2	80.2	1.000
SO2 scrubber check	5000	80.5	769.6	1.2	NA
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	39.3	80.2	80.2	1.000
second point	5000	19.6	40.0	40.3	0.992
third point	6000	11.8	20.1	20.0	1.003
calibrator zero	5000	0.0	0.0	-0.4	NA
as left zero	5000	0.0	0.0	-0.4	NA
as left span	5000			81.5	
Average Correction Factor					0.998

Corrected As found	80.9	Previous response	80.1	% change	-1.0%
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Notes:

Scrubber checked before the as founds, No Maintenance or adjustments Done, filter changed

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

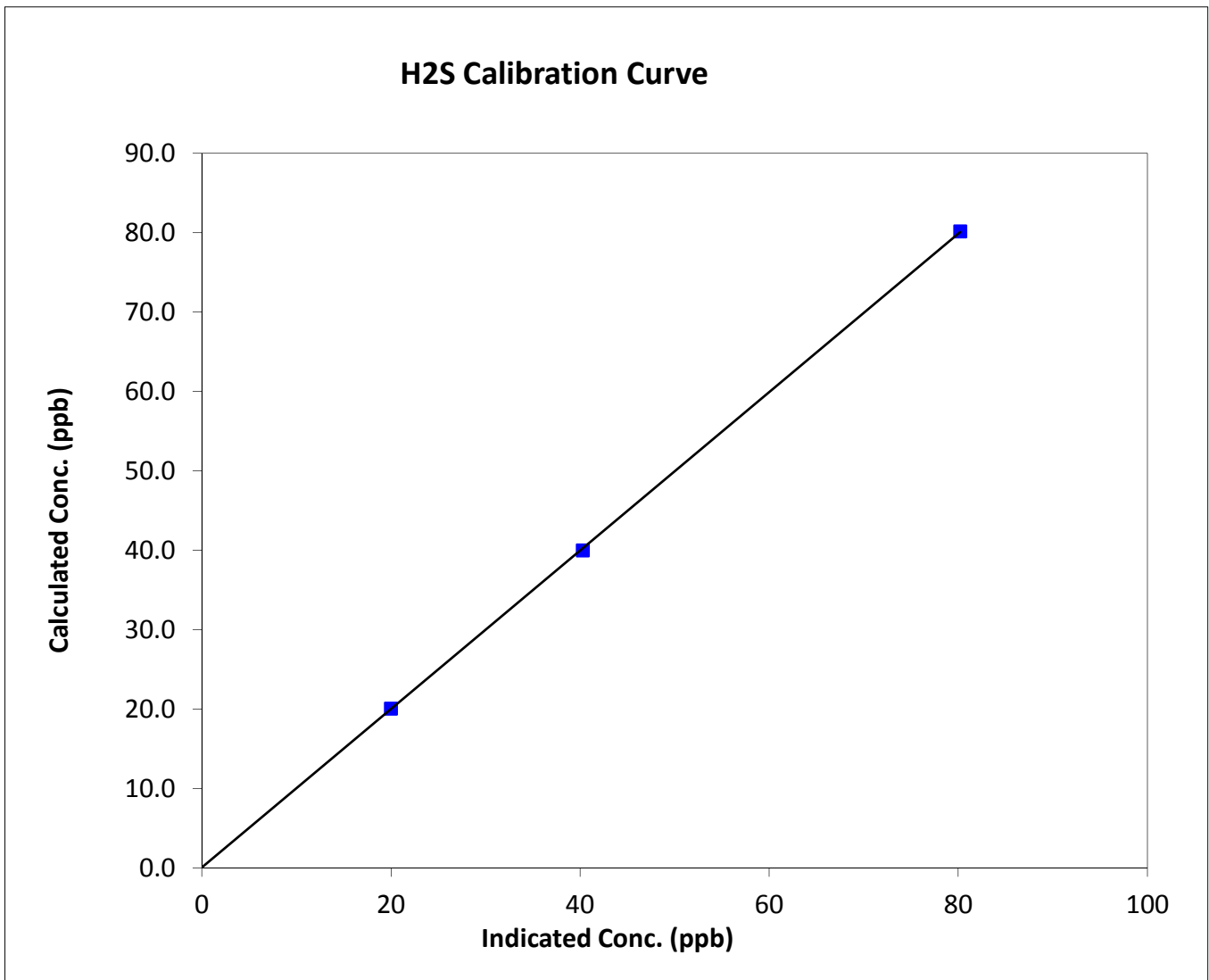
H2S Calibration Summary

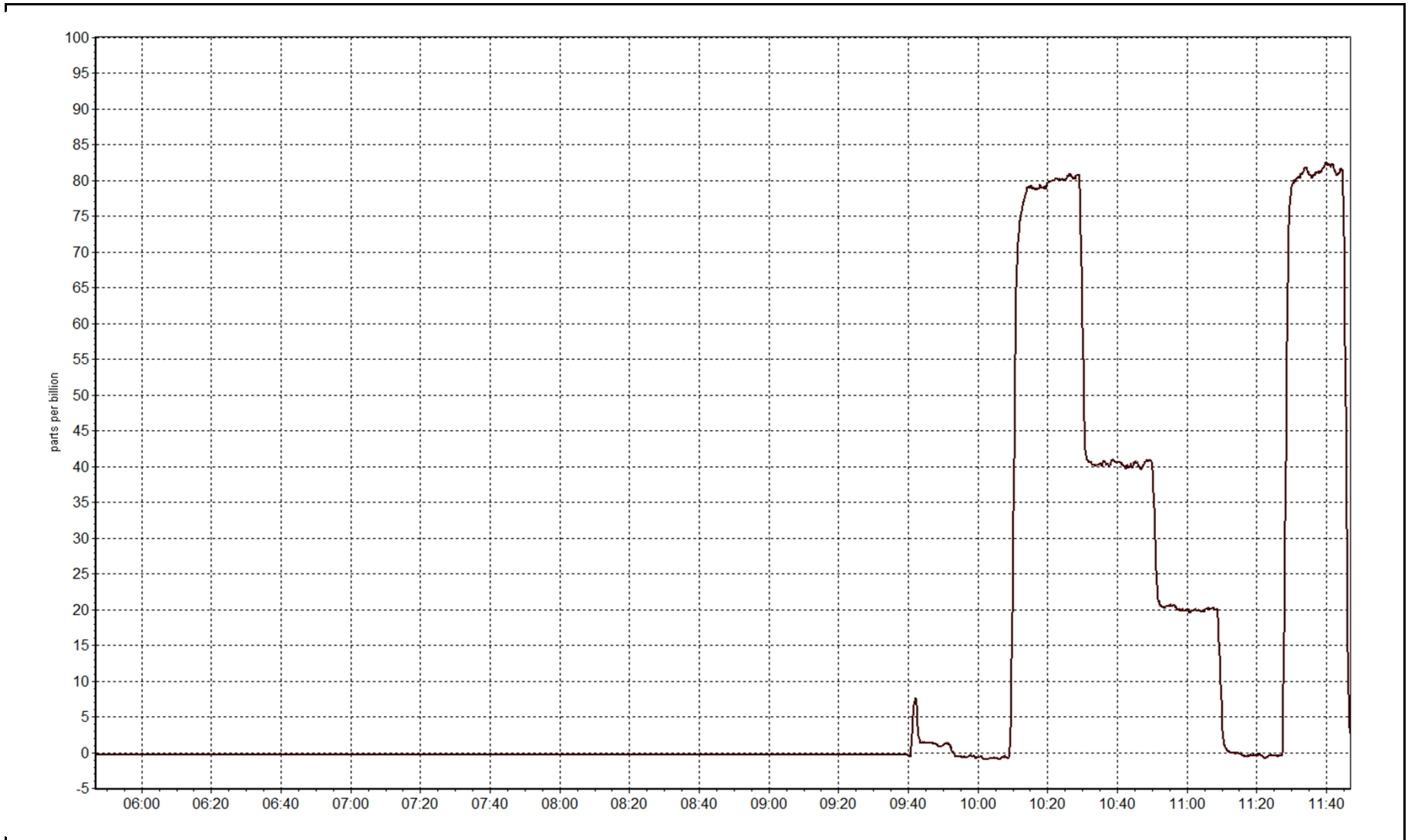
Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 7, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:40	End Time (MST)	11:46
Analyzer make	450i	Analyzer serial #	1218153583

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999973
80.2	80.2	0.9997		
40.0	40.3	0.9922	Slope	0.997623
20.1	20.0	1.0030		
			Intercept	0.044932







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 7, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:10	End Time (MST)	11:40
Barometric Pressure	716 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	API T700	Serial Number	493
Gas Cert Reference	SA130010A	Cal Gas Expiry Date	12-Dec-16
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894
DACS voltage range	NA	DACS channel #	NA

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	100	100	Sample Pressure	8.5	8.5
Analyzer Range (mv)	100	100	Air or Bypass press	40.4	40.4
Calculated slope	1.005980	1.018520	Fuel Pressure	24.8	24.8
Calculated intercept	-0.047055	-0.020291		2.5	2.7
				4.976	4.976

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.02	N/A
as found span	5000	60.4	13.19	13.20	1.000
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	60.4	13.19	12.96	1.018
second point	5000	30.2	6.60	6.52	1.012
third point	5000	15.1	3.30	3.27	1.009
calibrator zero	5000	0.0	0.00	0.10	N/A
as left zero	5000	0.0	0.00	0.10	N/A
as left span	5000	60.4	13.19	13.33	0.990
Average Correction Factor					1.013

Corrected As found	13.18	Previous response	13.16	% change	-0.1%
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Notes:

Filter changed, zero adjusted, no maintenance done

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

THC Calibration Summary

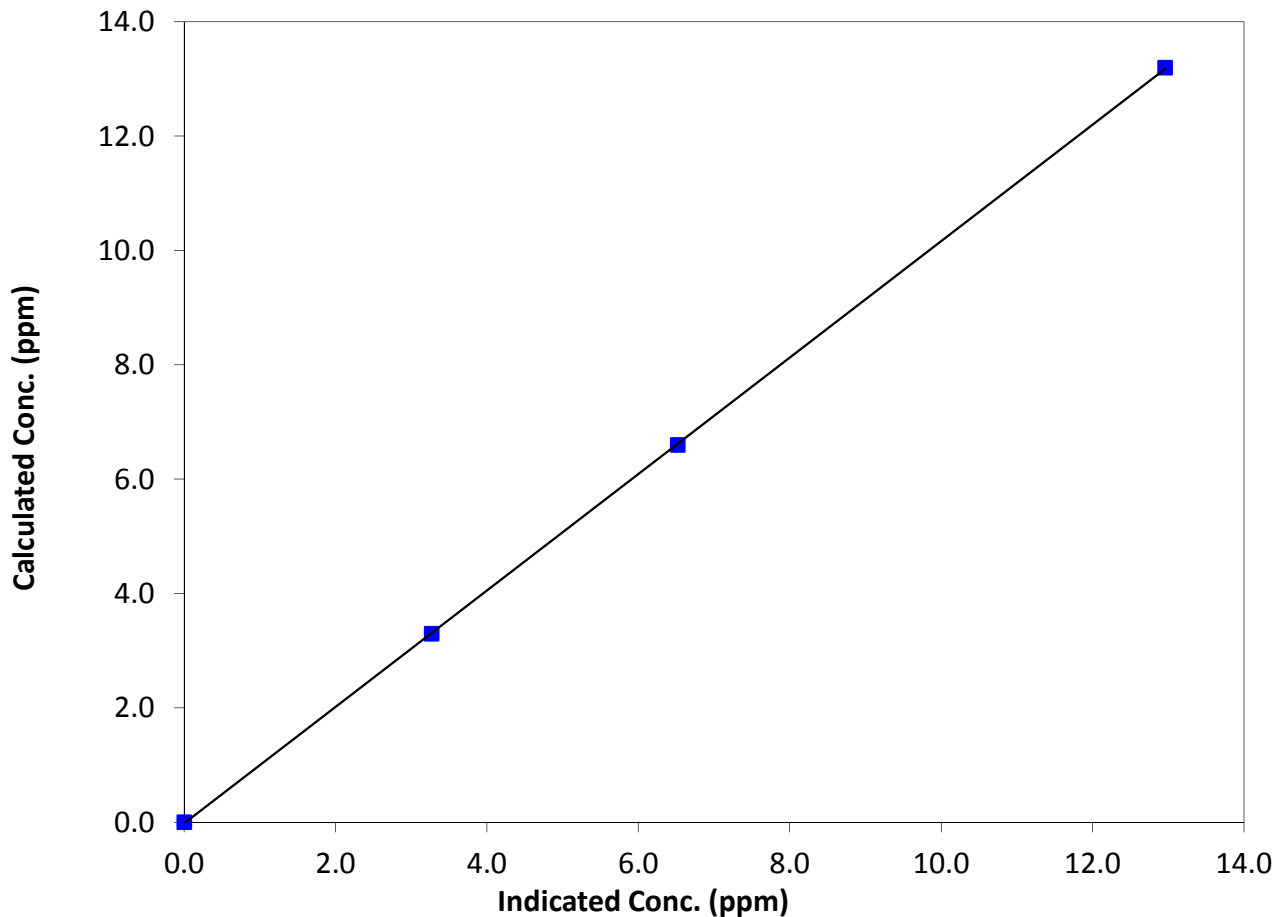
Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 7, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:10	End Time (MST)	11:40
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

Calibration Data

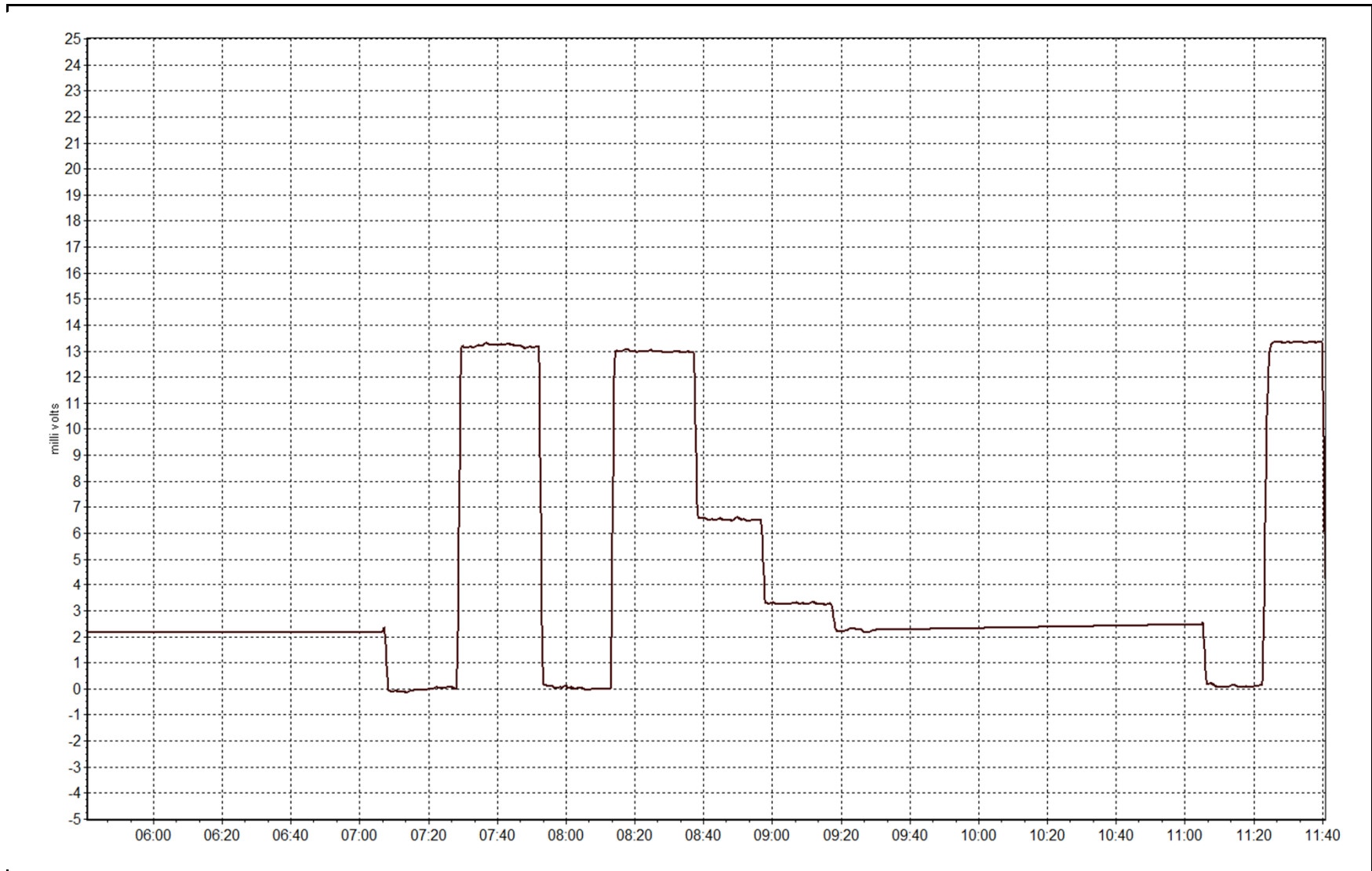
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999986
13.19	12.96	1.0181		
6.60	6.52	1.0118	Slope	1.018520
3.30	3.27	1.0087		
			Intercept	-0.020291

THC Calibration Curve



THC Calibration Plot

Date: September 3, 2014





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 3, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:00	End Time (MST)	9:40
Barometric Pressure	23 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	T700	Serial Number	997
NO2 calibration used	Wednesday, September 03, 2014	Transfer Standard	23
DACS make/model	N/A	DACS serial No.	N/A
DACS voltage range	N/A	DACS channel #	N/A

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Box temp.	27.3	27.3
Analyzer Range (input)	500	500	Photo Lamp Temp.	58.0	58.0
Calculated slope	0.991266	0.996614	Pressure	25.8	25.8
Calculated intercept	-1.149505	-0.366857	Flow	708-719	708-720
Analyzer Background	2.776	4.193			
Analyzer Coefficient	1.016	0.990			

Analyzer make	T400	Analyzer serial #	824
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	1.8	N/A
as found span	5000	932.00	376.3	390.6	0.963
calibrator zero	5000	0.00	0.0	0.3	N/A
high point	5000	713.5	376.3	377.5	0.997
second point	5000	495.5	254.0	256.0	0.992
third point	5000	260.7	131.4	132.0	0.995
calibrator zero	5000	0.00	0.0	-0.1	N/A
as left zero	5000	0.00	0.0	-0.1	N/A
as left span	5000	714.70	376.3	379.3	0.992
Average Correction Factor					0.995

Corrected As found	388.8	Previous response	380.8	% change	-2.1%
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Notes:

Filter changed out, zero and span adjusted, no maintenance done

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

O₃ Calibration Summary

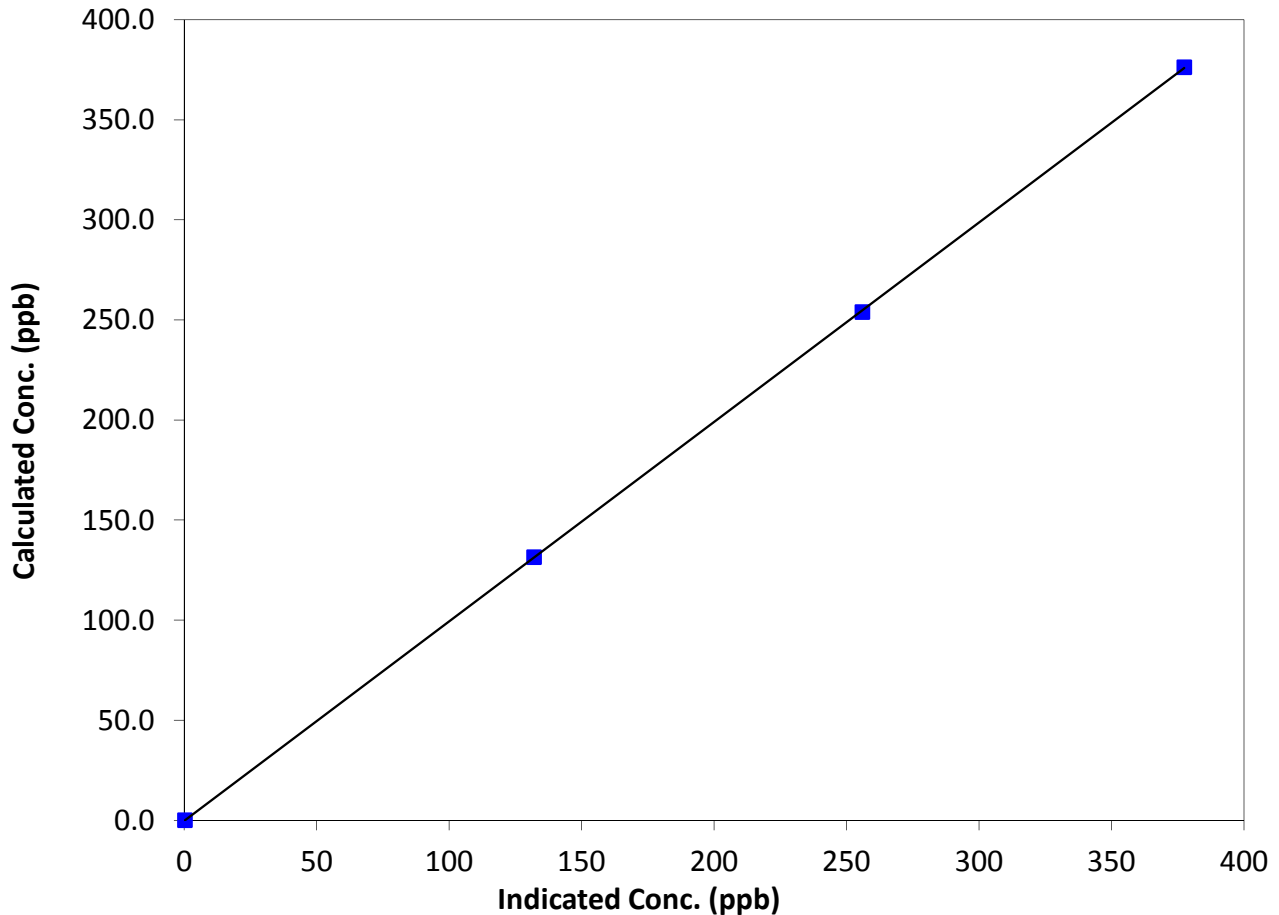
Station Information

Calibration Date	September 4, 2014	Previous Calibration	August 3, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:00	End Time (MST)	9:40
Analyzer make	T400	Analyzer serial #	824

Calibration Data

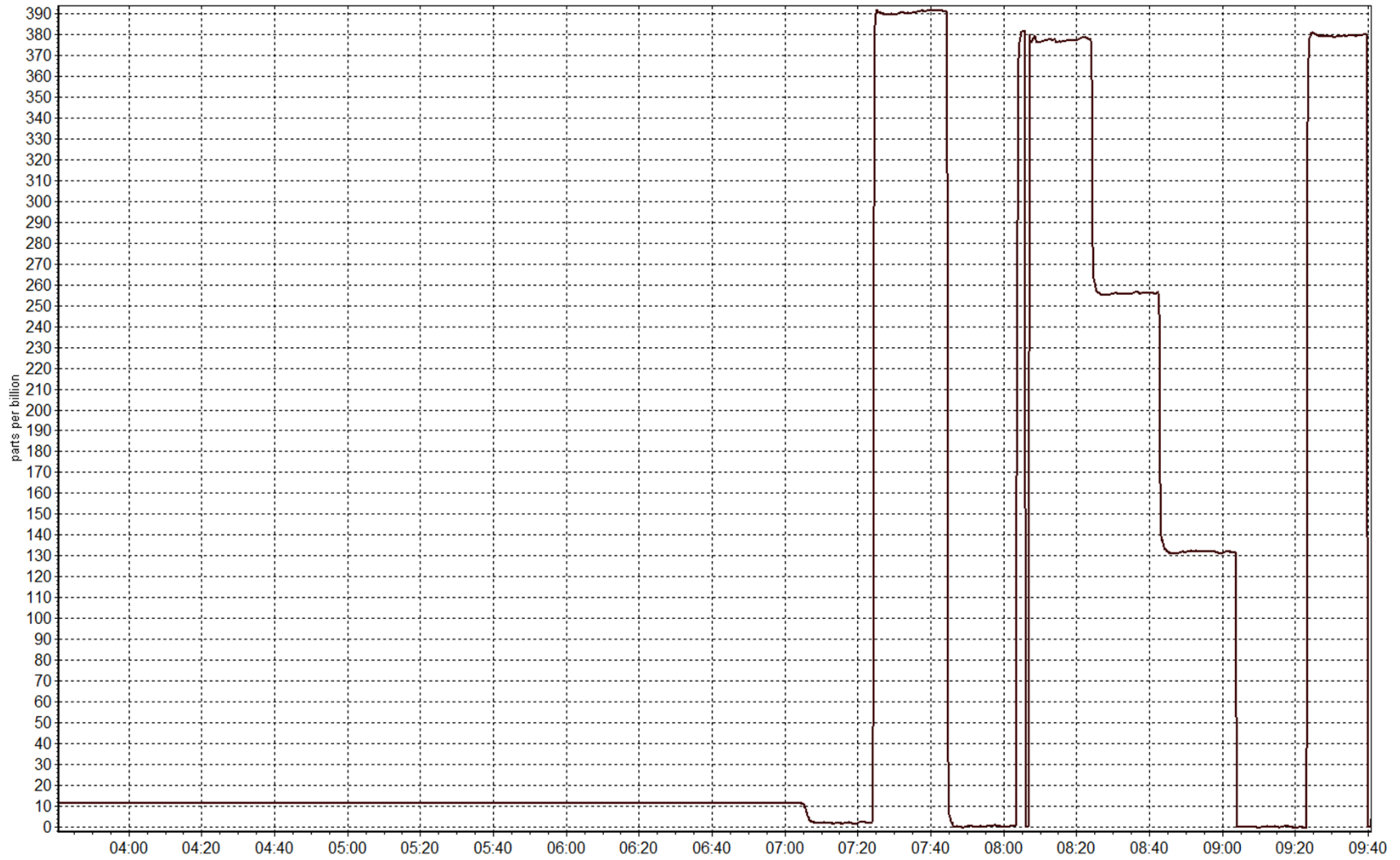
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999989
376.3	377.5	0.9968		
254.0	256.0	0.9922	Slope	0.996614
131.4	132.0	0.9955		
			Intercept	-0.366857

O₃ Calibration Curve



O3 Calibration Plot

Date: September 4, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 6, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:10	End Time (MST)	11:40
Barometric Pressure	mmHg	Station Temperature	21.0 Deg C
Calibrator	API T700	Serial Number	997
NO Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	49.7 ppm	Cal Gas Serial #	SA130010A

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.997778	0.999028	1.012945
	Data Offset	0.324901	0.131933	0.698805
After	Data Slope	0.998647	0.999699	1.000162
	Data Offset	-0.067624	0.072949	-0.648401
Channel #				
Voltage Range				

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	833
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.972	ppb	0.993	ppb
NOX coefficient	0.975	ppb	0.993	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	-0.1		-0.4	
NOX bkgrnd	3.6		0.7	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	316.5	Deg C	316.5	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	71.0	ccm	71.0	ccm
R Cell Press	5.8	mmHg	5.8	mmHg
Sample Flow	446-442	ccm	446-442	ccm

Notes:

Filter changed, No Maintenance Done zero and span adjusted



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

September 3, 2014

Station Number:

AMS 17

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-1.5	-1.5	-0.1	N/A	N/A
as found span	5000	60.4	600.4	600.4	0.0	585.6	585.4	-0.9	1.0252	1.0256
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.4	-0.3	N/A	N/A
high point	5000	60.4	600.4	600.4	0.0	600.8	600.6	0.2	0.9993	0.9996
second point	5000	30.2	300.2	300.2	0.0	302.0	300.6	1.3	0.9940	0.9986
third point	5000	15.1	150.1	150.1	0.0	149.5	148.8	0.7	1.0040	1.0087
calibrator zero	6000	0.0	0.0	0.0	0.0	0.1	0.2	-0.2	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	0.1	0.2	-0.2	N/A	N/A
as left span	5000	60.4	600.4	225.5	374.9	611.0	228.0	383.0	0.9826	0.9890
Average Correction Factor									0.9991	1.0023

Corrected As found

NO_x= 587.1

NO= 586.9

Percent Change

NO_x= 2.4%

NO= 2.4%

Previous Response

NO_x= 601.4

NO= 600.8

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

60.40

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			-0.3			N/A	
1st NO ₂ (300)	N/A	225.5	376.3	602.1	225.5	376.5	0.9852	1.0000	0.9995	100.1%
2nd NO ₂ (200)	N/A	347.8	254.0	602.1	347.8	254.3	0.9852	1.0000	0.9988	100.1%
3rd NO ₂ (100)	N/A	470.4	131.4	604.0	470.4	133.7	0.9821	1.0000	0.9828	101.8%
4th NO ₂ (0)	601.8	N/A	1.9	603.7	601.8	1.9	0.9826	1.0000	N/A	N/A
Average Correction Factor							0.9838	1.0000	0.9937	100.6%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

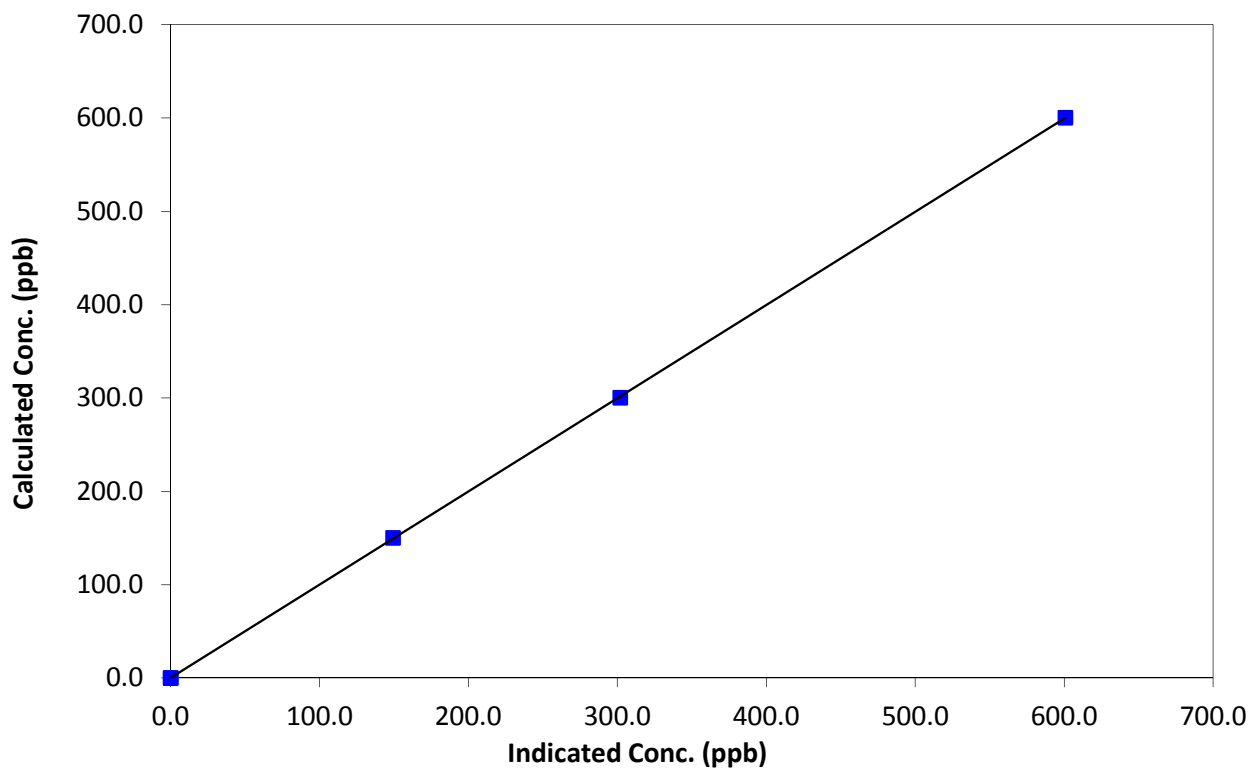
Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 6, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:10	End Time (MST)	11:40
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999989
600.4	600.8	0.9993		
300.2	302.0	0.9940	Slope	0.998647
150.1	149.5	1.0040		
0.0	0.1	0.0000	Intercept	-0.067624

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

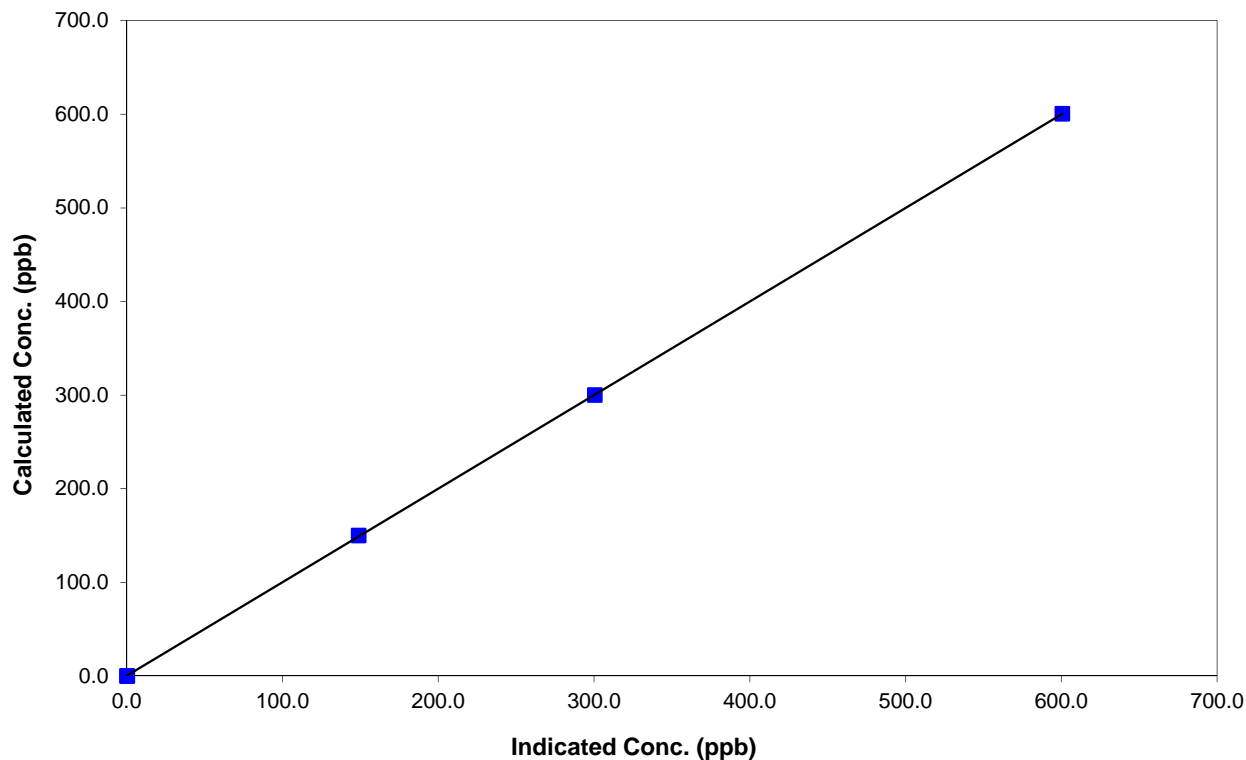
Station Information

Calibration Date	September 3, 2014	Previous Calibration	August 6, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:10	End Time (MST)	11:40
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999992
600.4	600.6	0.9996		
300.2	300.6	0.9986	Slope	0.999699
150.1	148.8	1.0087		
0.0	0.2	0.0000	Intercept	0.072949

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

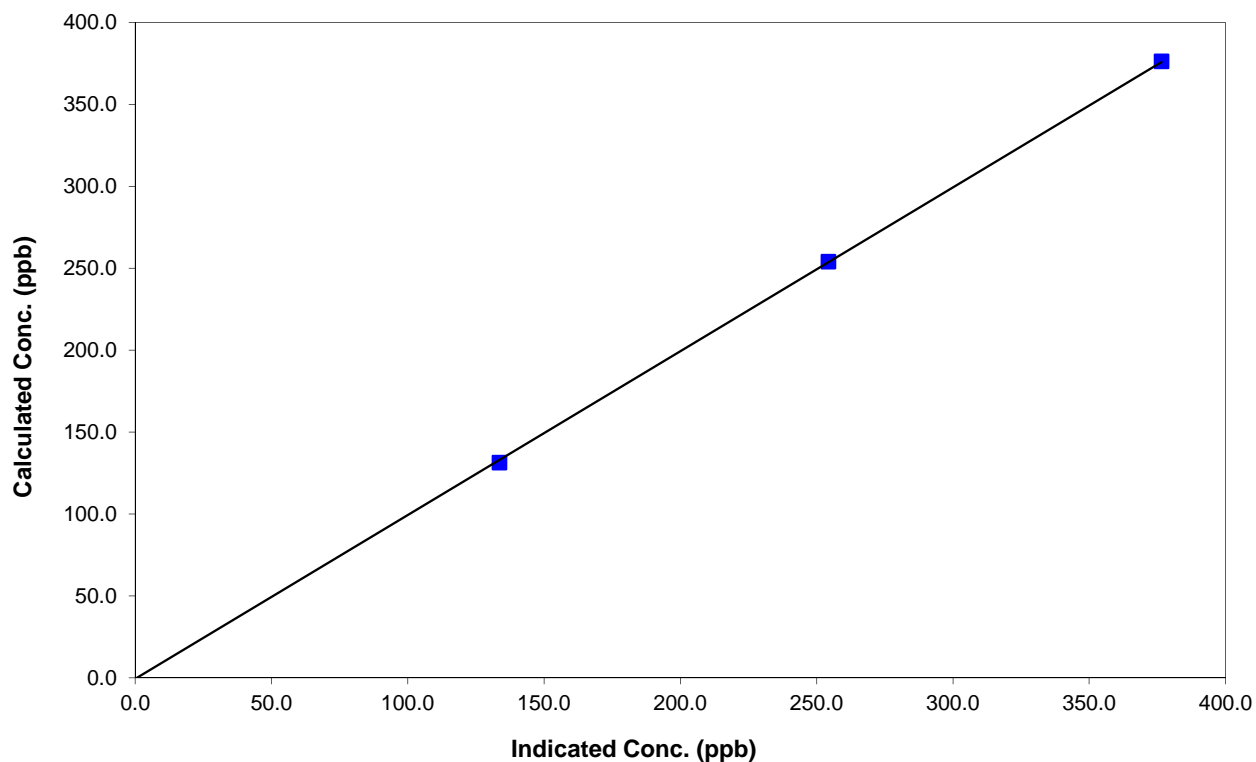
Station Information

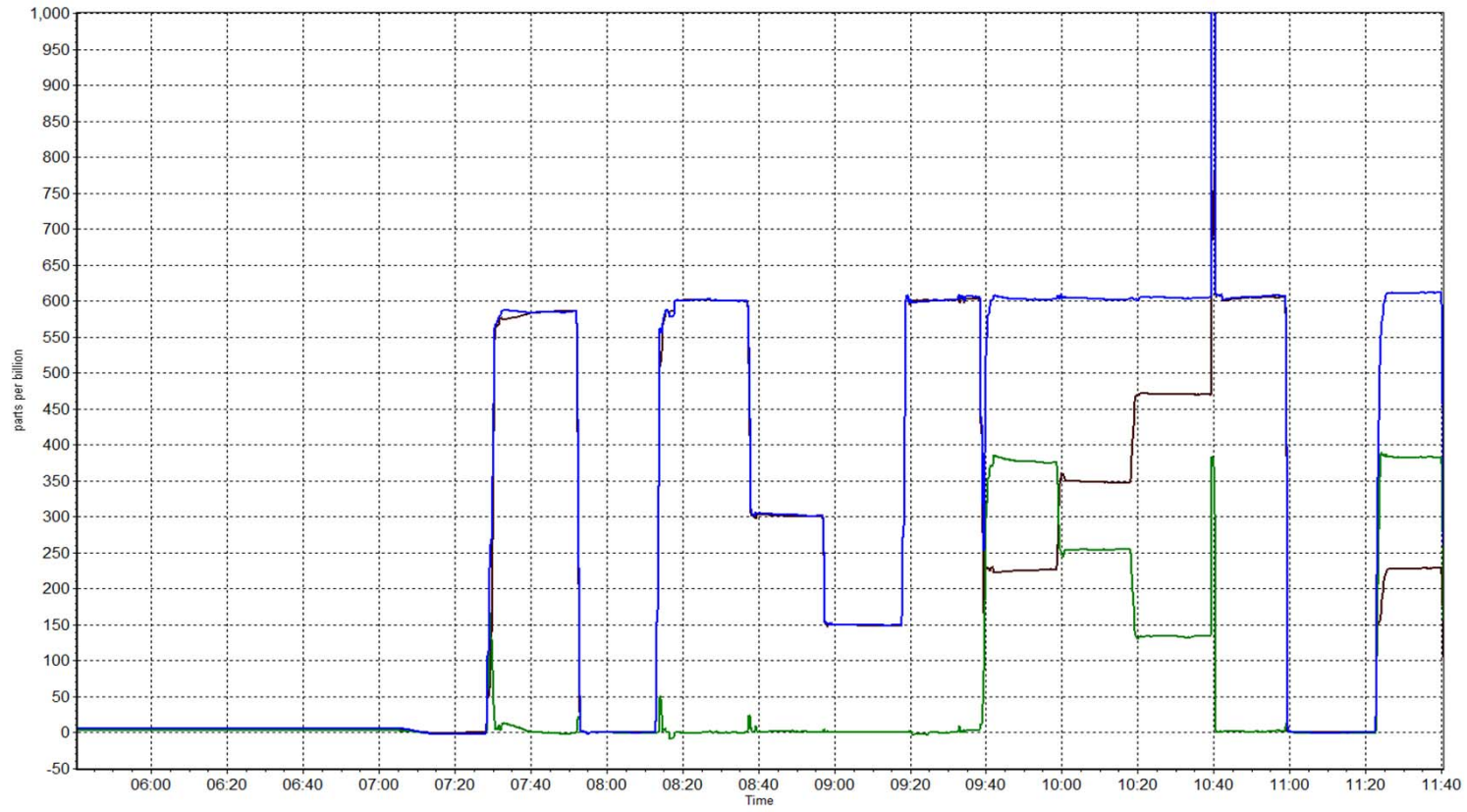
Calibration Date	September 3, 2014	Previous Calibration	August 6, 2014
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	7:10	End Time (MST)	11:40
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999949
376.3	376.5	0.9995		
254.0	254.3	0.9988	Slope	1.000162
131.4	133.7	0.9828		
			Intercept	-0.648401

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 19 FIREBAG SEPTEMBER 2014

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

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

October 30, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
 SEPTEMBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	682	38	38	100.00	21	0	3	0
H2S (ppb) Average	676	38	44	99.17	3	0	1	0
THC (ppm) Average	680	38	40	99.72	3.1	-	2.4	-
NO2 (ppb) Average	682	38	38	100.00	27	0	8	-
NO (ppb) Average	682	38	38	100.00	106	-	9	-
NOX (ppb) Average	682	38	38	100.00	132	-	17	-
Temperature 2 m (C) Average	720	0	0	100.00	26.8	-	19.8	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	-	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	38	-	-	-
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 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1	3	-	0	0	0	0	1	2	44
H2S (ppb) Average	706	0.3	0	-	0	0	0	0	0	1	3
THC (ppm) Average	708	2.25	0.1	-	2	2.1	2.2	2.2	2.3	2.4	3.1
NO2 (ppb) Average	708	3.4	4	-	0	1	1	2	5	9	32
NO (ppb) Average	708	1.5	6	-	0	0	0	0	0	2	92
NOX (ppb) Average	708	4.9	9	-	0	1	1	2	5	10	120
Temperature 2 m (C) Average	744	16.25	5.8	-	2.3	9	11.9	16	20.3	24.8	28.6
Relative Humidity (%) Average	744	63.5	19	-	21	40	48	61	79	91	99
Wind Speed 10 m (km/h) Average	744	11.6	5	-	0	5	8	11	15	18	31
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
SEPTEMBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	05 Sep 2014 08:00	05 Sep 2014 09:00	2	Intermittent unstable operation - excessive baseline drift
H2S	05 Sep 2014 12:00	05 Sep 2014 12:00	1	Intermittent unstable operation - excessive baseline drift
H2S	30 Sep 2014 13:00	30 Sep 2014 15:00	3	Intermittent unstable operation - excessive baseline drift
THC	30 Sep 2014 13:00	30 Sep 2014 14:00	2	Maintenance - replaced fuel cylinder

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 21 ppb on Sep 15 09:00	Maximum Daily Average: 3.5 ppb on Sep 21		Hours of Data:	682
Minimum Value: 0 ppb on Sep 3 01:00	Minimum Daily Average: 0.0 ppb on Sep 26		Hours of Missing Data:	38
Maximum Diurnal Average: 1.4 ppb at hour 9	Minimum Diurnal Average: 0.2 ppb at hour 24		Hours of Calibration:	38
Monthly Average: 0.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 2 P ₉₉ = 7		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-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	1	1	1	1	5	3	2	2	1	1	3	2	0	0	0	0	0	0	0	0	0	1.0	5
5-Sep	0	0	0	Z	0	0	0	C	C	C	C	C	0	0	2	1	0	0	0	0	0	0	0	0.3	2	
6-Sep	0	0	1	1	Z	0	0	0	0	0	0	2	0	0	0	0	0	2	1	1	0	0	0	0.4	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	0.1	0	
8-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	
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	0.1	0	
10-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	1	0	0	0	0.6	5	
11-Sep	1	1	1	Z	0	0	0	0	0	3	5	4	2	1	1	1	1	1	1	0	0	1	2	1	1.1	5
12-Sep	2	2	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
13-Sep	0	0	0	0	0	Z	0	0	0	0	0	3	3	2	2	2	1	4	8	5	4	1	0	0	1.6	8
14-Sep	Z	0	0	0	0	0	0	0	1	5	5	2	0	0	5	4	4	6	6	4	1	0	0	0	2.0	6
15-Sep	0	Z	1	1	1	2	10	12	21	5	1	1	0	0	1	0	0	2	2	0	0	0	0	0	2.7	21
16-Sep	0	1	Z	2	1	1	0	0	0	1	2	2	1	1	1	0	1	1	0	0	0	0	0	0	0.7	2
17-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0.0	0
18-Sep	0	0	0	1	Z	4	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4
19-Sep	0	0	0	0	0	Z	2	5	2	6	4	3	3	2	2	1	0	0	0	1	0	0	0	0	1.4	6
20-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0.4	2
21-Sep	0	Z	0	1	5	6	3	2	7	7	14	9	4	5	2	2	3	5	3	0	0	0	0	0	3.5	14
22-Sep	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	4	2	2	1	2	1	0	1	1.1	4
23-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
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	0.1	0
25-Sep	4	3	1	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4
26-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
27-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0.2	2
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	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2

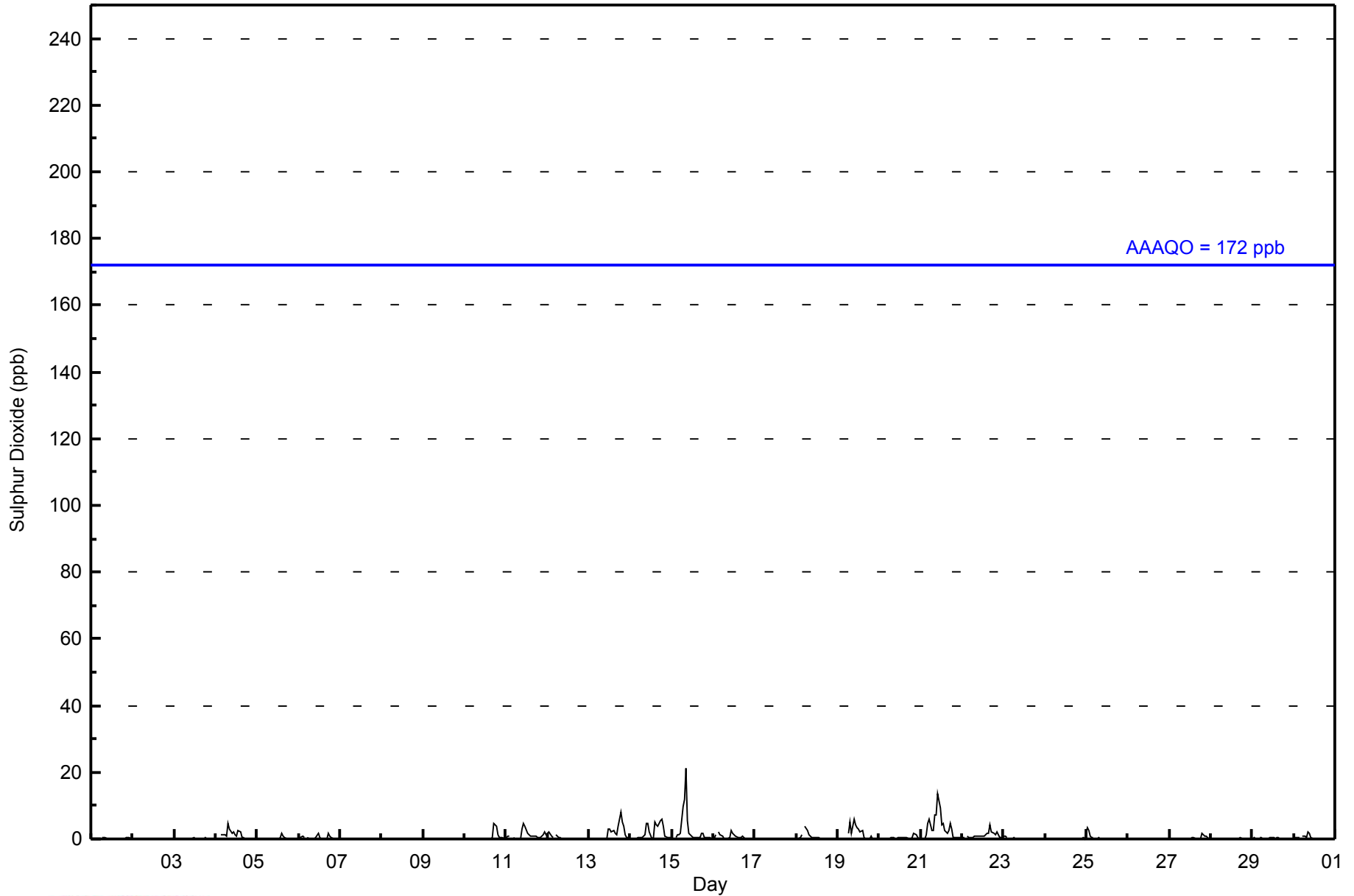
0.4	0.4	0.3	0.4	0.5	0.7	0.7	1.0	1.4	1.1	1.3	1.1	0.6	0.6	0.8	0.5	0.6	0.9	0.9	0.6	0.4	0.3	0.2	0.2	Diurnal Average	
4	3	1	2	5	6	10	12	21	7	14	9	4	5	5	4	4	6	8	5	4	1	2	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Firebag - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	679	99.56	99.56
11 - 20	2	0.29	99.85
21 - 60	1	0.15	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - September 2014

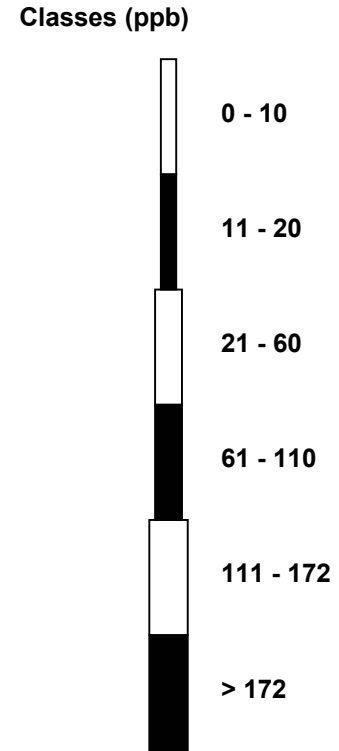
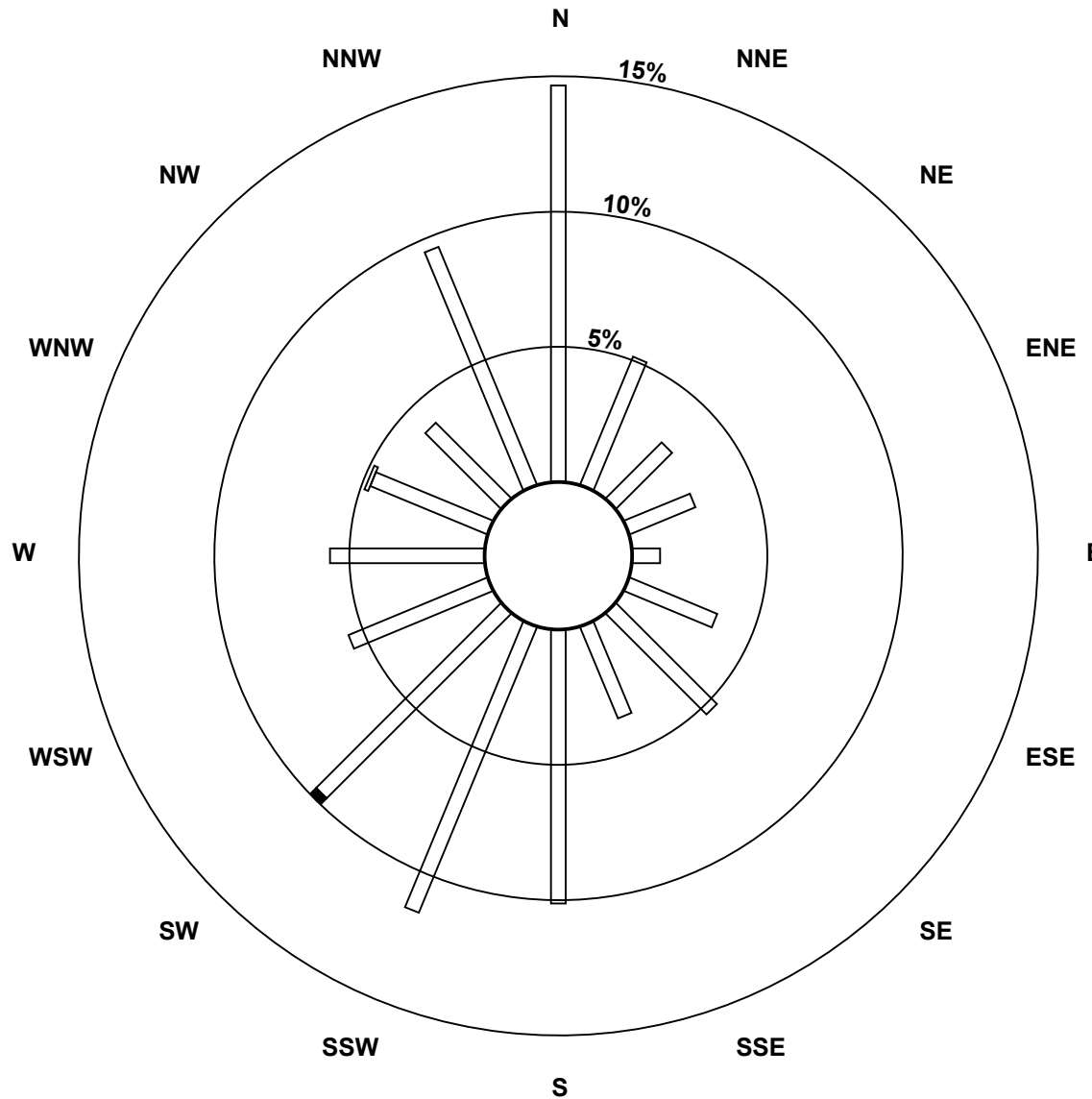
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	100	35	20	18	7	24	36	25	69	78	66	38	39	32	27	65	679
11 - 20	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	100	35	20	18	7	24	36	25	69	78	68	38	39	33	27	65	682

Total Number of Valid Hours: 682

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Sulphur Dioxide (SO₂) - ppb
Firebag (AMS 19)

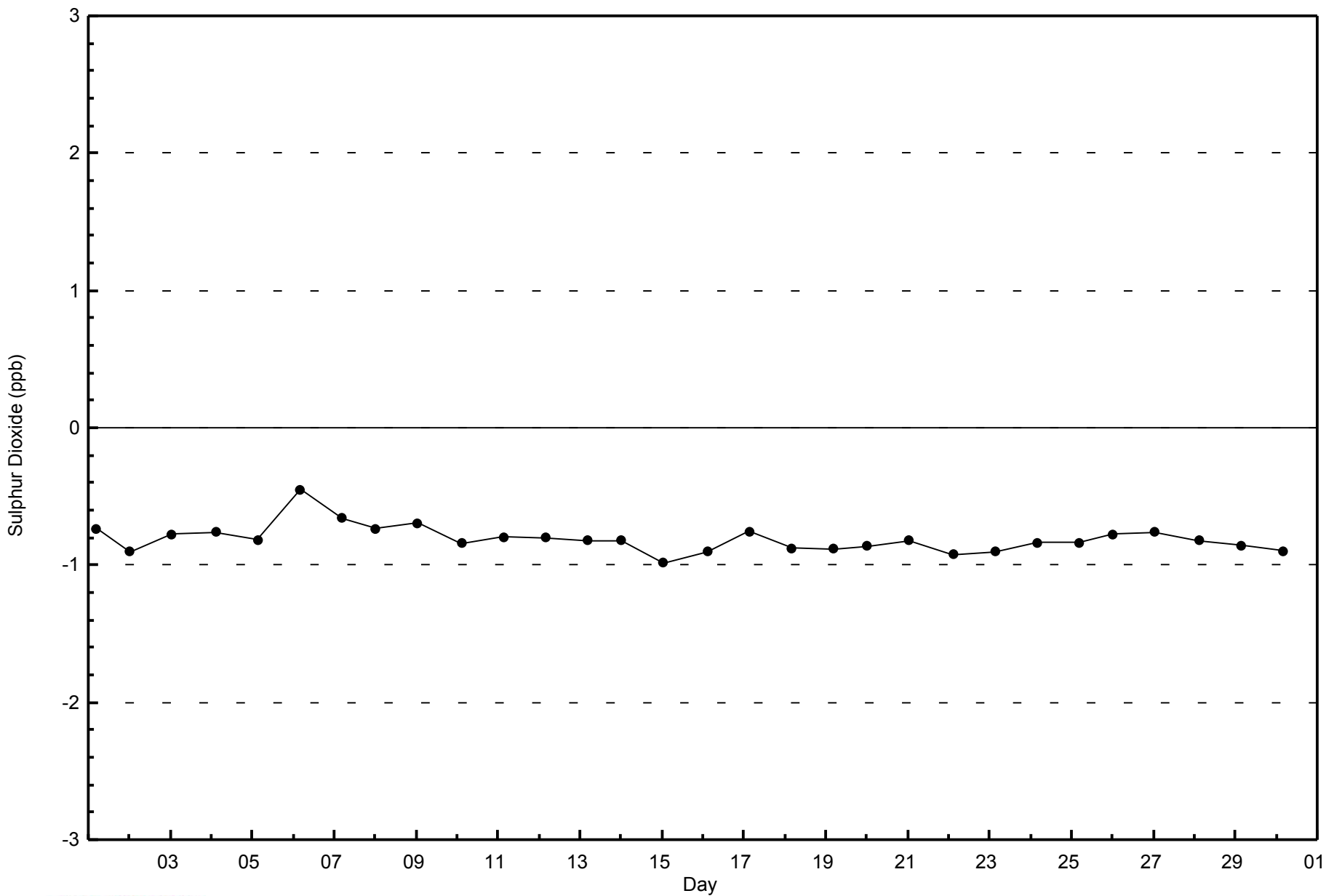


Total Number of Valid Hours: 682



WBEA
Zero Responses

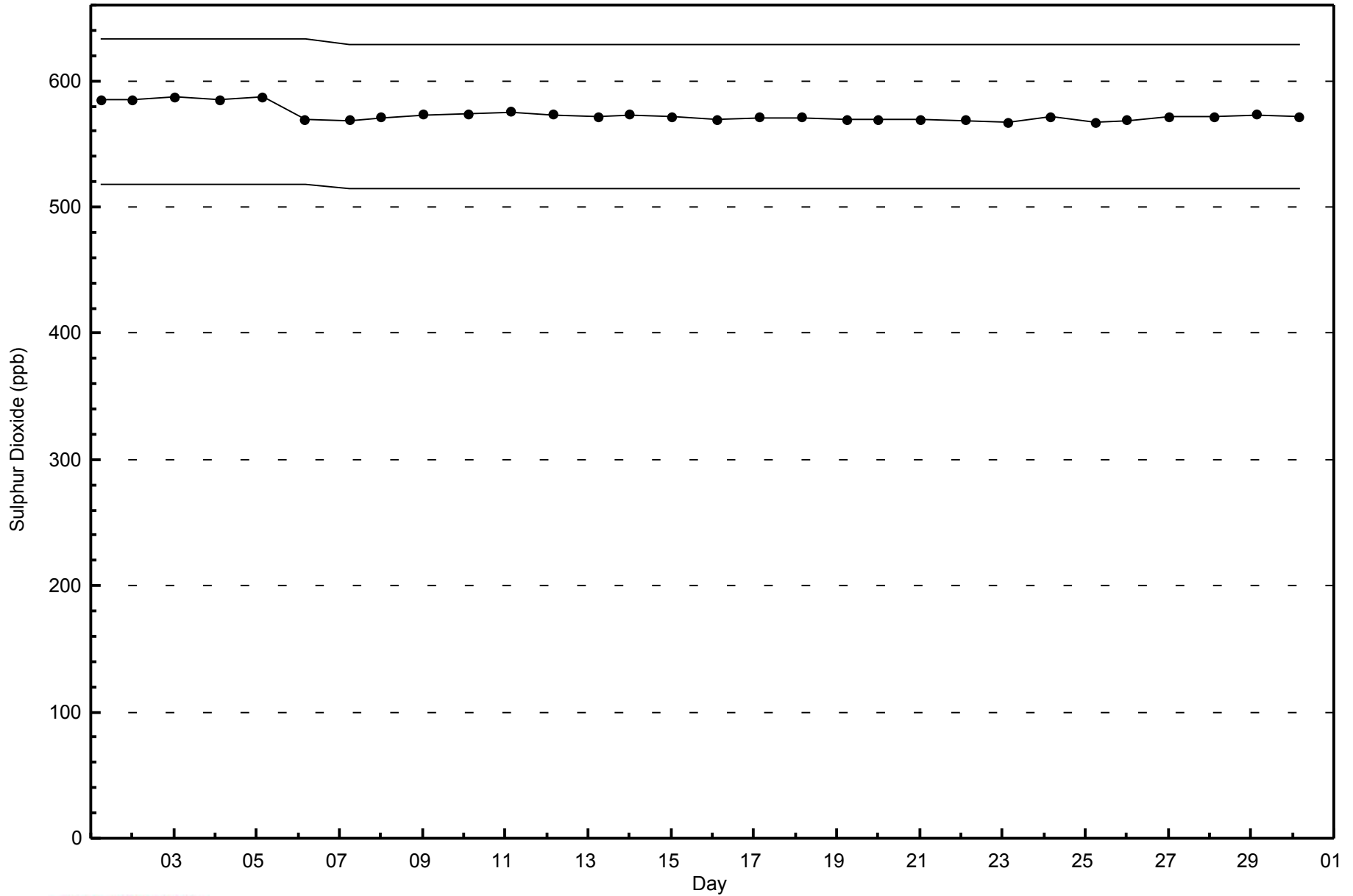
Sulphur Dioxide (SO₂) - ppb
Firebag - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Firebag - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 3 ppb on Sep 15 05:00	Maximum Daily Average: 0.7 ppb on Sep 15		Hours of Data:	676
Minimum Value: 0 ppb on Sep 1 03:00	Minimum Daily Average: 0.1 ppb on Sep 27		Hours of Missing Data:	44
Maximum Diurnal Average: 0.4 ppb at hour 5	Minimum Diurnal Average: 0.2 ppb at hour 16		Hours of Calibration:	38
Monthly Average: 0.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1		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	0	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	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	0.3	1
3-Sep	0	0	Z	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1
5-Sep	0	0	0	0	Z	0	0	UO	UO	0	0	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-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
7-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	0.1	0
8-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
9-Sep	0	0	Z	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	--	0
10-Sep	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
11-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
12-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
13-Sep	0	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Sep	0	Z	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
15-Sep	0	1	Z	2	3	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	3
16-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
17-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0.3	0
18-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	0.3	1
19-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	1
20-Sep	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1
21-Sep	0	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1
22-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
23-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0.3	1
24-Sep	1	1	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Sep	1	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
26-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	0.1	0
27-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	0.1	0
28-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	0.1	0
29-Sep	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
30-Sep	0	0	0	0	0	Z	0	0	0	1	0	0	UO	UO	UO	0	0	0	0	0	0	0	0	0	0	0.3	1

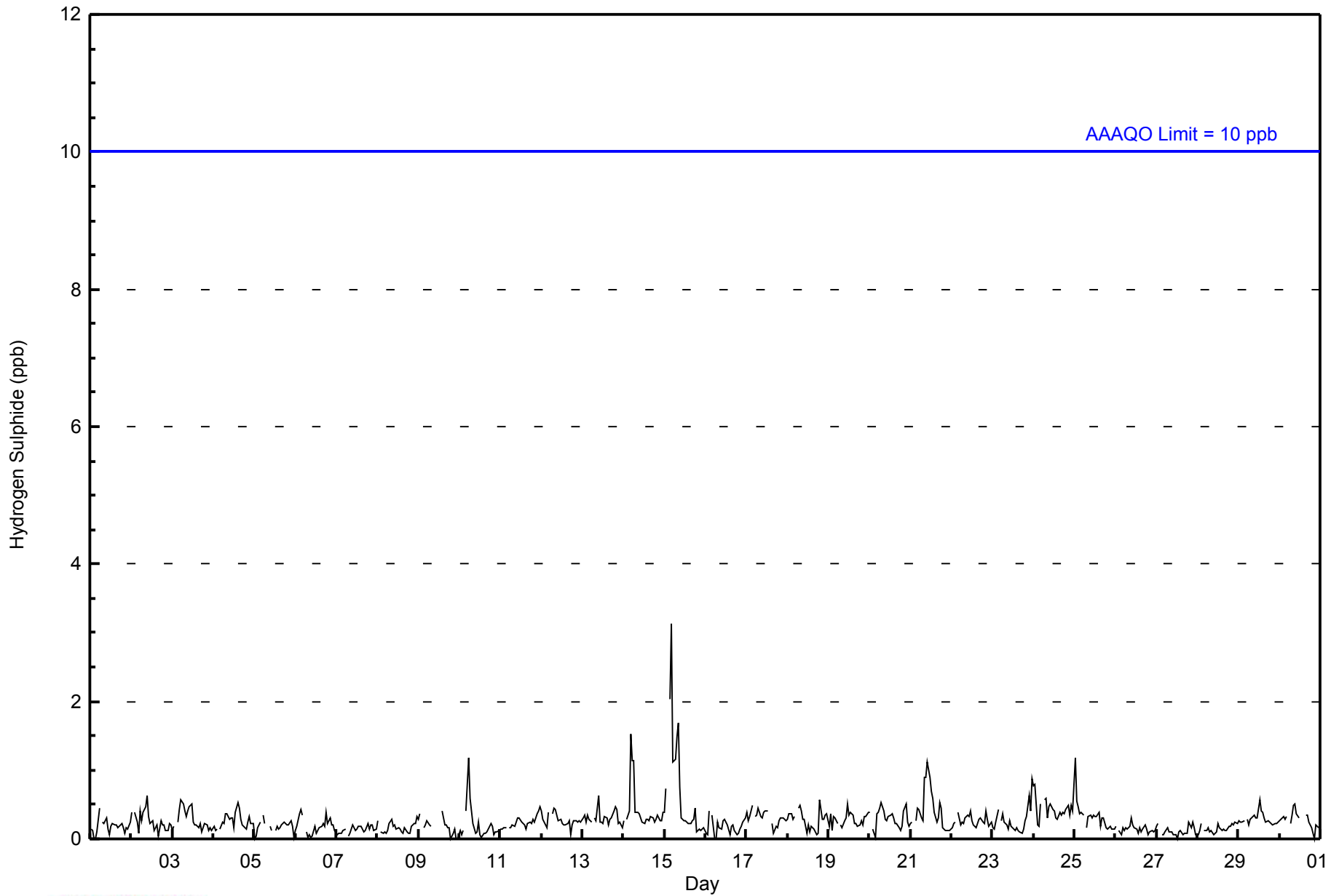
0.3	0.3	0.2	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1	1	0	2	3	1	1	1	1	2	1	1	1	1	1	1	0	0	1	0	1	0	1	0	1	0	1	1	

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



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Firebag - September 2014





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Firebag - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	675	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: 676

Total Number of Hours: 720



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Firebag - September 2014

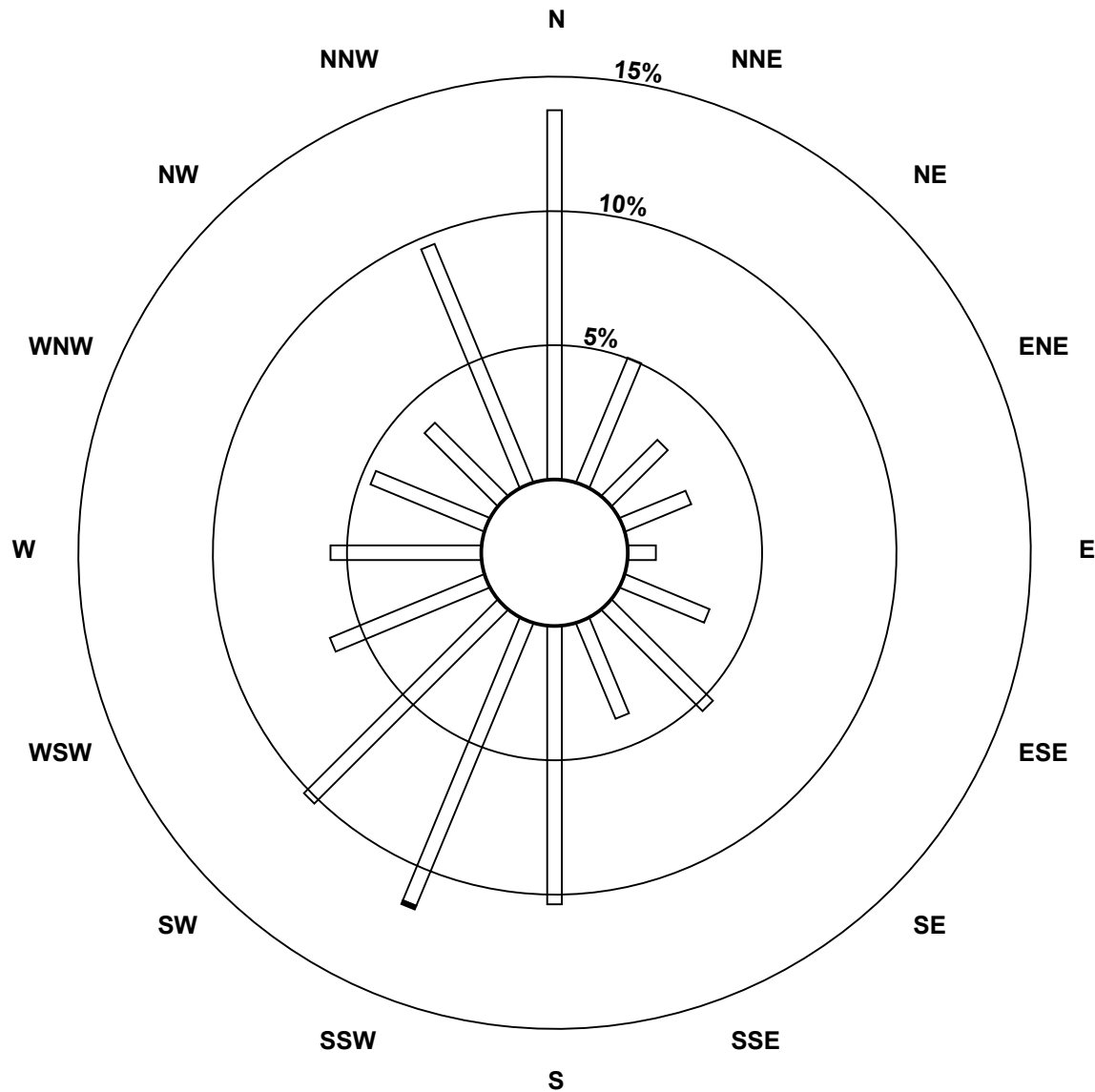
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	93	34	20	18	7	23	36	26	70	77	69	42	38	31	26	65	675
3 - 4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	93	34	20	18	7	23	36	26	70	78	69	42	38	31	26	65	676

Total Number of Valid Hours: 676

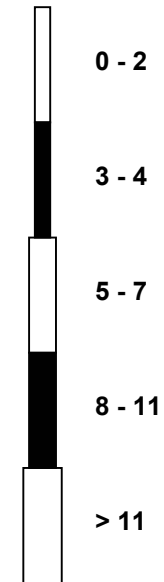
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Hydrogen Sulphide (H₂S) - ppb
Firebag (AMS 19)



Classes (ppb)

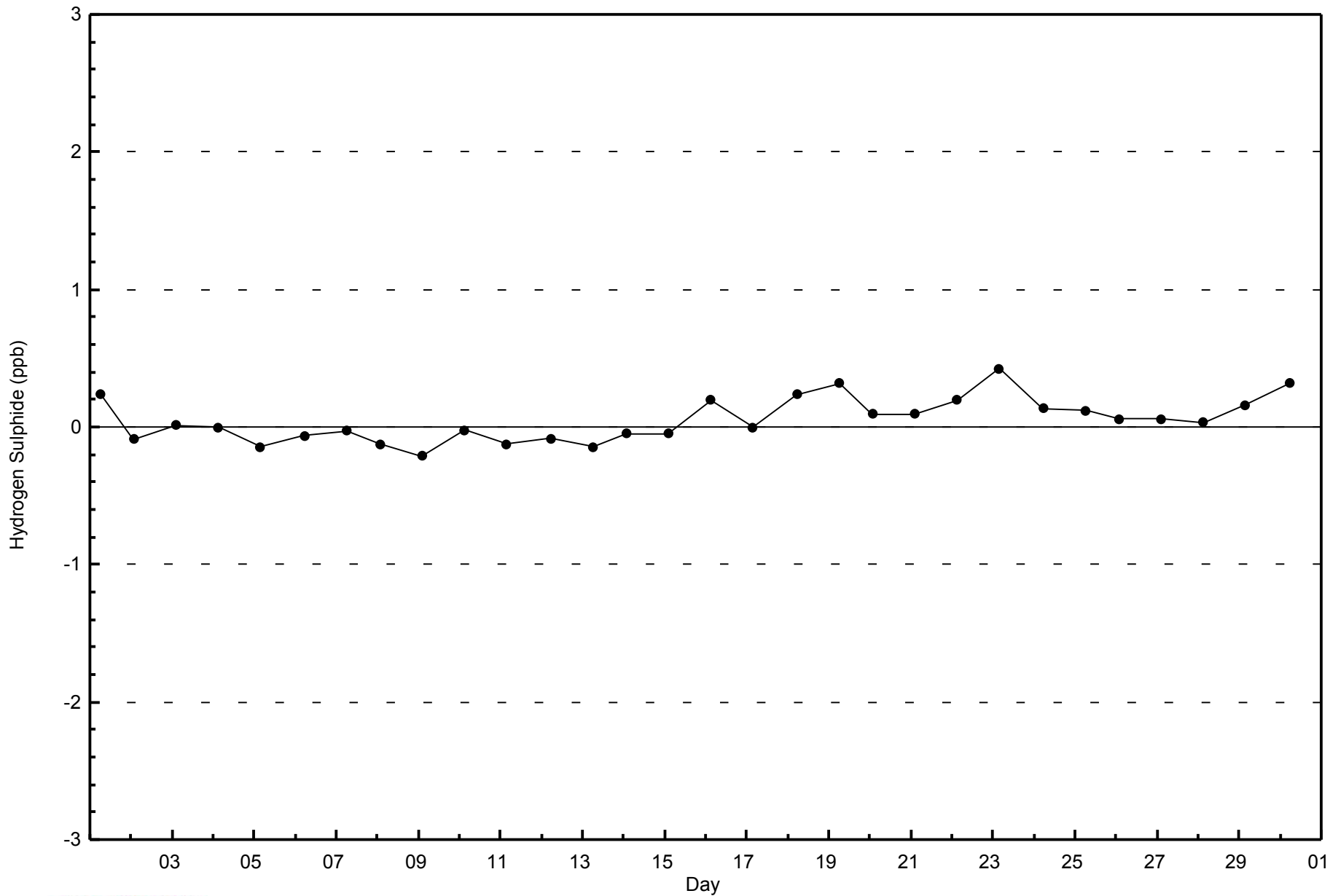


Total Number of Valid Hours: 676



WBEA
Zero Responses

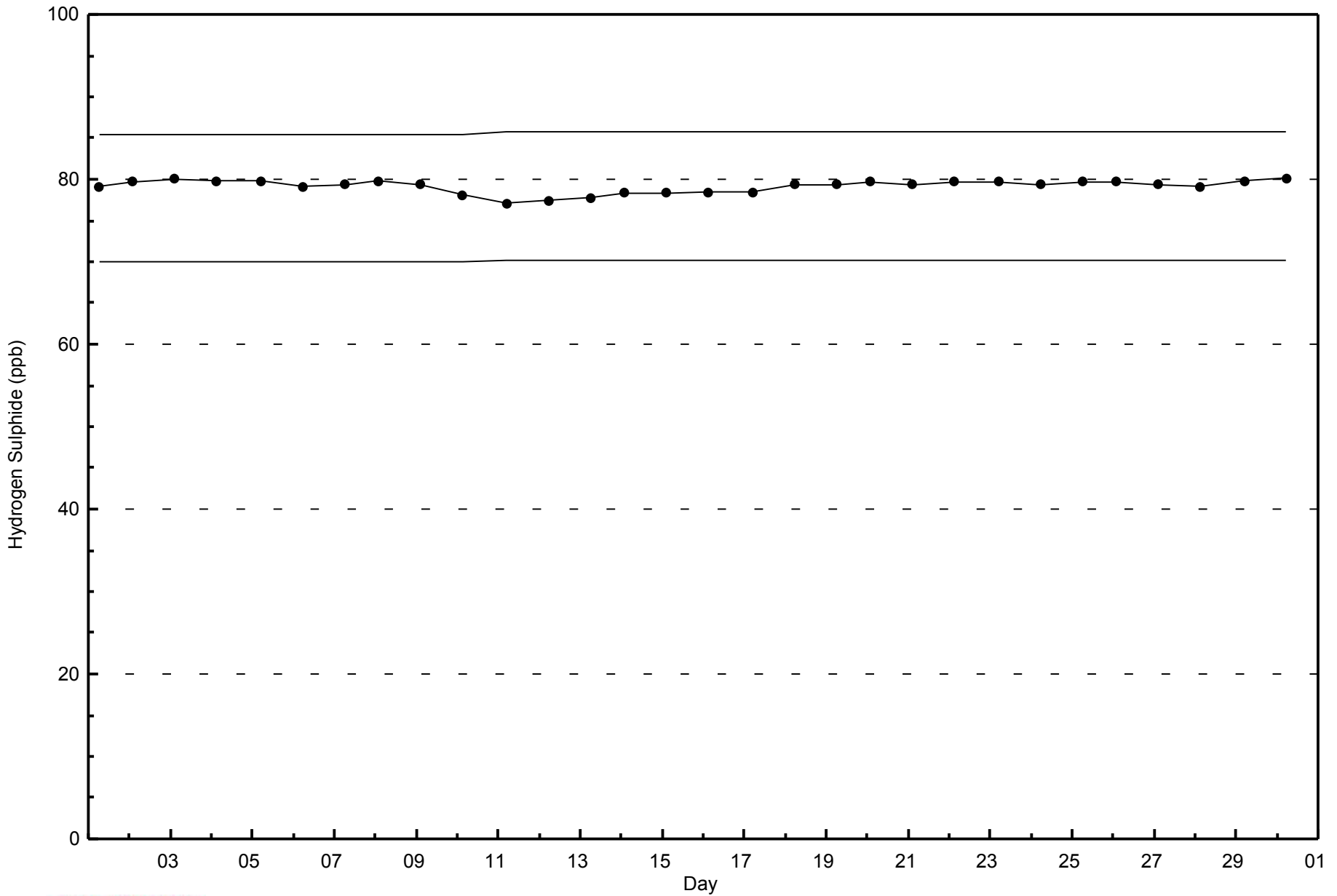
Hydrogen Sulphide (H₂S) - ppb
Firebag - September 2014





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Firebag - September 2014



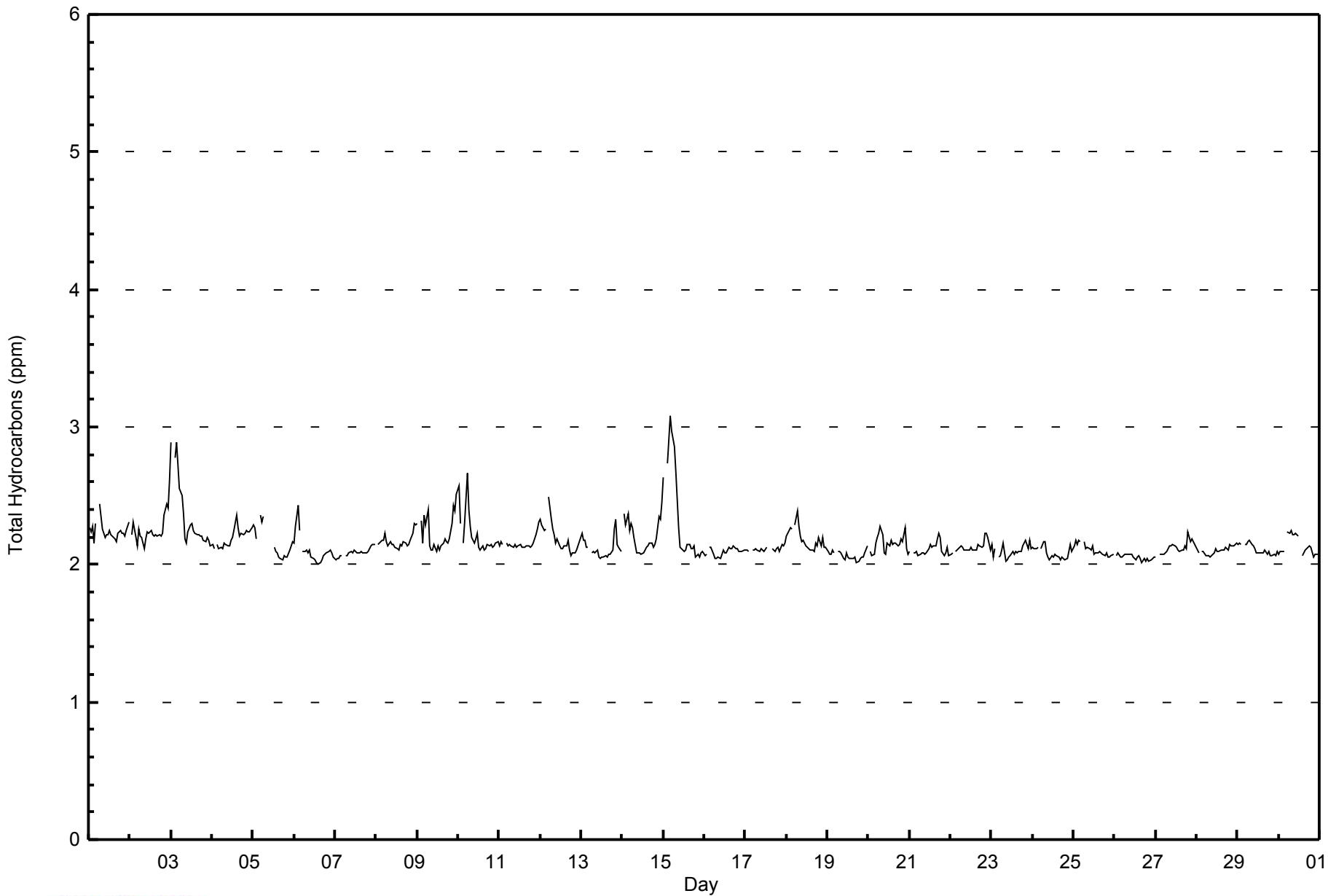


Maximum Value: 3.1 ppm on Sep 15 05:00																	Maximum Daily Average: 2.4 ppm on Sep 3										Hours in Service: 720	
Minimum Value: 2.0 ppm on Sep 6 15:00																	Minimum Daily Average: 2.1 ppm on Sep 26										Hours of Data: 680	
Maximum Diurnal Average: 2.2 ppm at hour 6																	Minimum Diurnal Average: 2.1 ppm at hour 14										Hours of Missing Data: 40	
Monthly Average: 2.16 ppm																	Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.8										Hours of Calibration: 38	
																											Percent Operational Time: 99.7	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Sep	2.3	2.2	2.3	2.2	2.3	Z	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.4		
2-Sep	Z	2.2	2.3	2.2	2.1	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.4	2.6	2.3	2.6	
3-Sep	2.9	Z	2.8	2.9	2.7	2.6	2.5	2.4	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	2.1	2.4	2.9		
4-Sep	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.4		
5-Sep	2.3	2.3	2.2	Z	2.4	2.3	2.3	C	C	C	C	C	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4		
6-Sep	2.2	2.3	2.4	2.3	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4		
7-Sep	2.0	2.0	2.0	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		
8-Sep	Z	2.1	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	2.1	2.2	2.2	2.1	2.2	2.2	2.3	2.3	2.2	2.3	
9-Sep	2.3	Z	2.3	2.2	2.4	2.3	2.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.5	2.2	2.5	
10-Sep	2.6	2.3	Z	2.2	2.3	2.7	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.7	
11-Sep	2.1	2.2	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.2	2.3	
12-Sep	2.3	2.3	2.2	2.3	Z	2.5	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.5	
13-Sep	2.2	2.2	2.2	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.3	2.2	2.1	2.1	2.1	2.3	
14-Sep	Z	2.4	2.3	2.4	2.2	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.3	2.3	2.4	2.2	2.4		
15-Sep	2.6	Z	2.7	2.9	3.1	3.0	2.9	2.7	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	2.3	3.1	
16-Sep	2.1	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
17-Sep	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	C	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.2	
18-Sep	2.2	2.2	2.3	2.3	Z	2.3	2.4	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.2	2.4	
19-Sep	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	
20-Sep	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.1	2.1	2.2	2.3		
21-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	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
22-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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	
23-Sep	2.1	2.0	2.1	Z	2.1	2.1	2.1	2.2	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.2	
24-Sep	2.1	2.1	2.1	2.1	Z	2.1	2.2	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	
25-Sep	2.1	2.2	2.2	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
26-Sep	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	
27-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	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.2	
28-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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	
29-Sep	2.1	2.2	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
30-Sep	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.2	M	M	2.1	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				
Z - zerospan C - Calibration M - Maintenance																												



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Firebag - September 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - September 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	40	5.88	5.88
2.1 - 3.0	639	93.97	99.85
3.1 - 10.0	1	0.15	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - September 2014

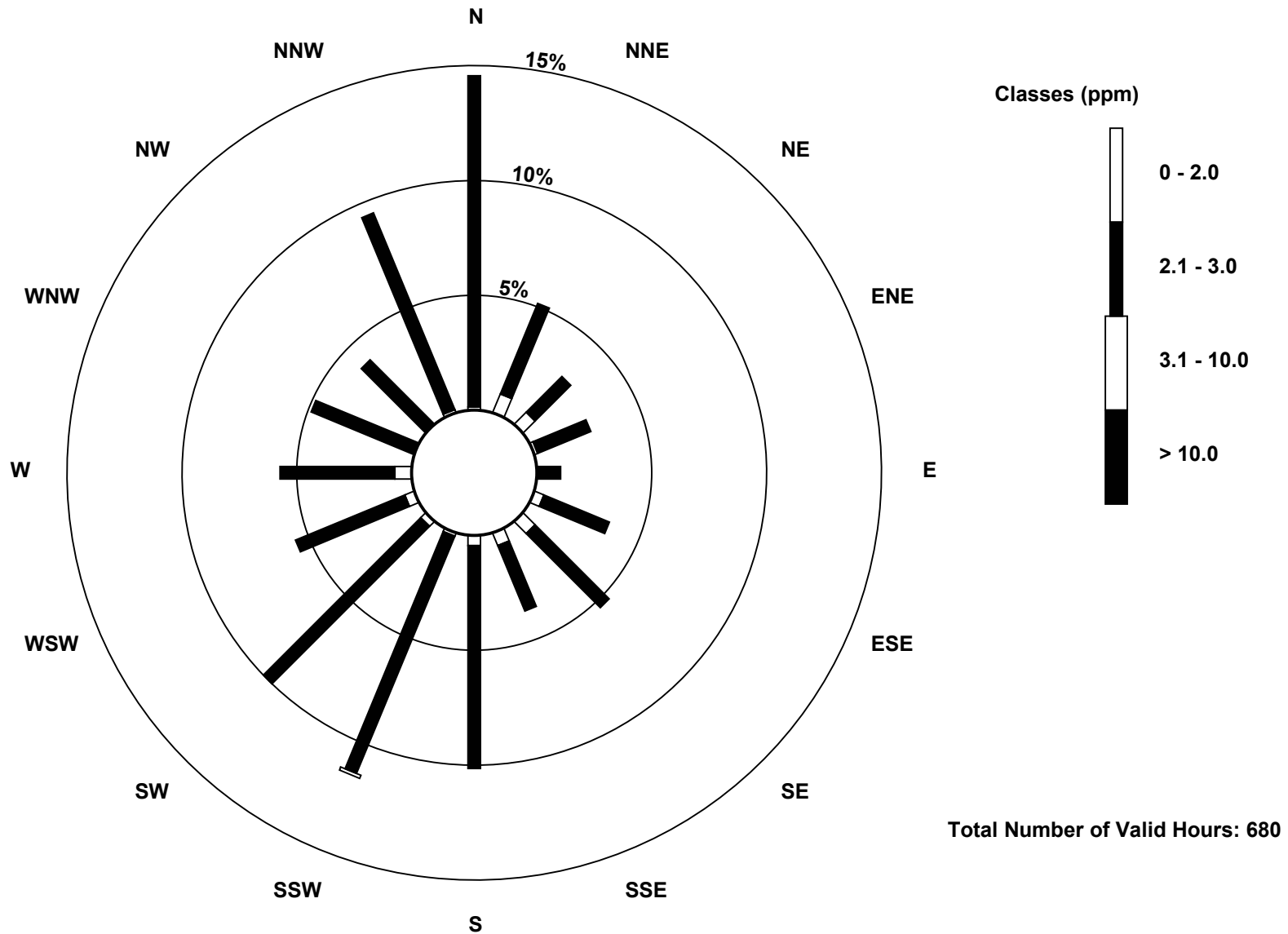
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	1	6	5	1	0	3	5	4	3	1	2	3	5	0	0	1	40
2.1 - 3.0	98	29	15	17	7	21	31	21	66	76	66	35	34	33	27	63	639
3.1 - 10.0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	99	35	20	18	7	24	36	25	69	78	68	38	39	33	27	64	680

Total Number of Valid Hours: 680

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

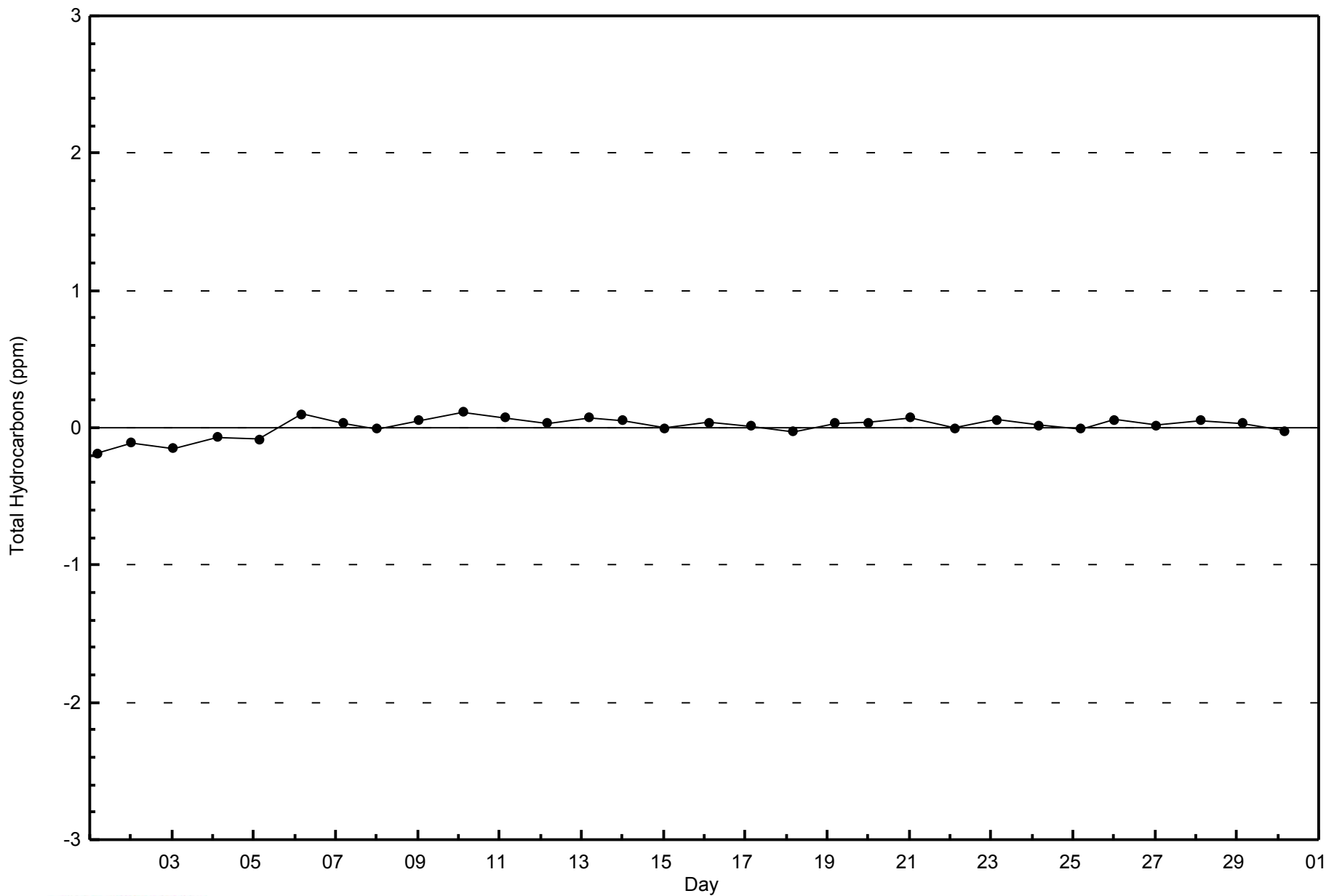
Total Hydrocarbons (THC) - ppm
Firebag (AMS 19)





WBEA
Zero Responses

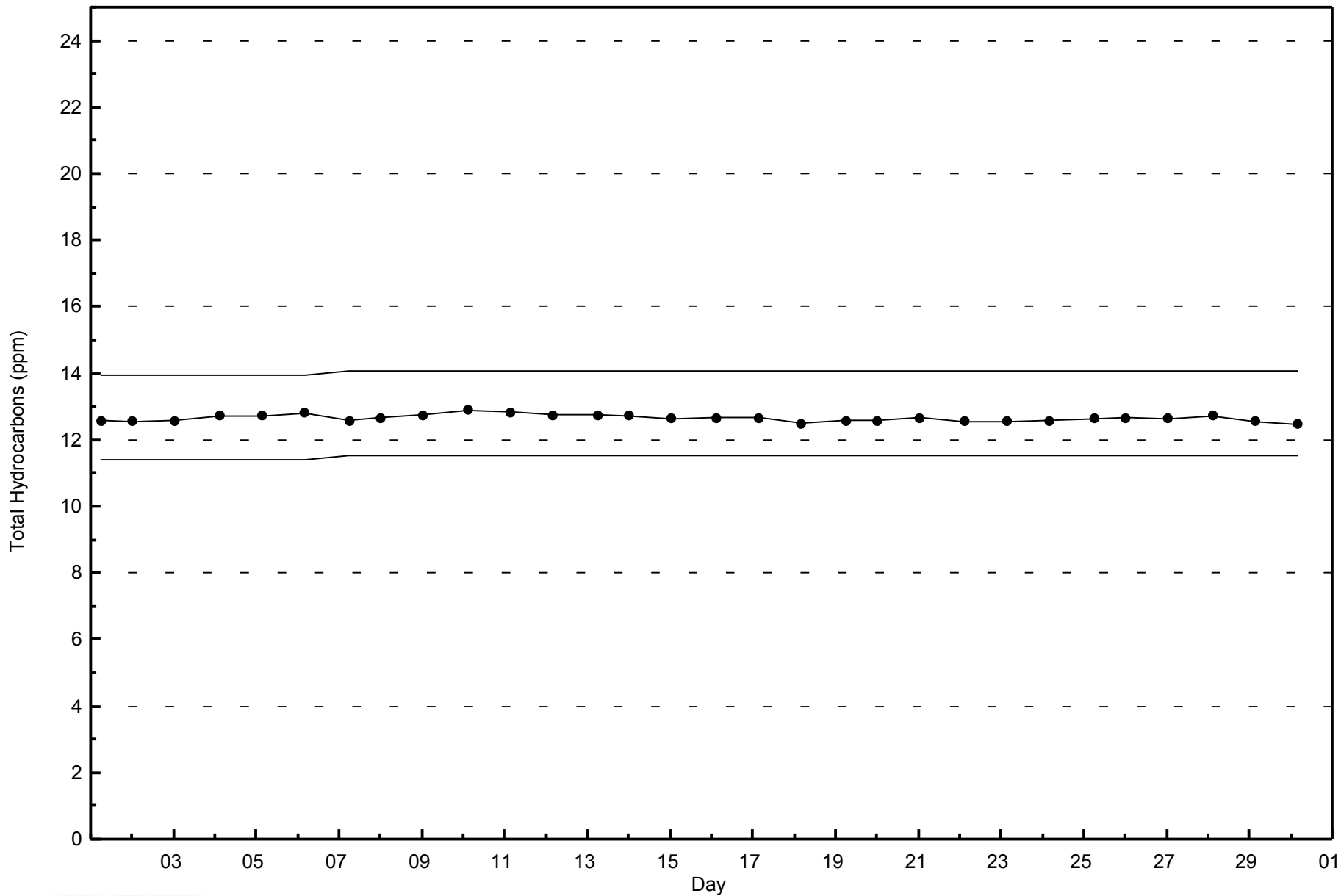
Total Hydrocarbons (THC) - ppm
Firebag - September 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Firebag - September 2014





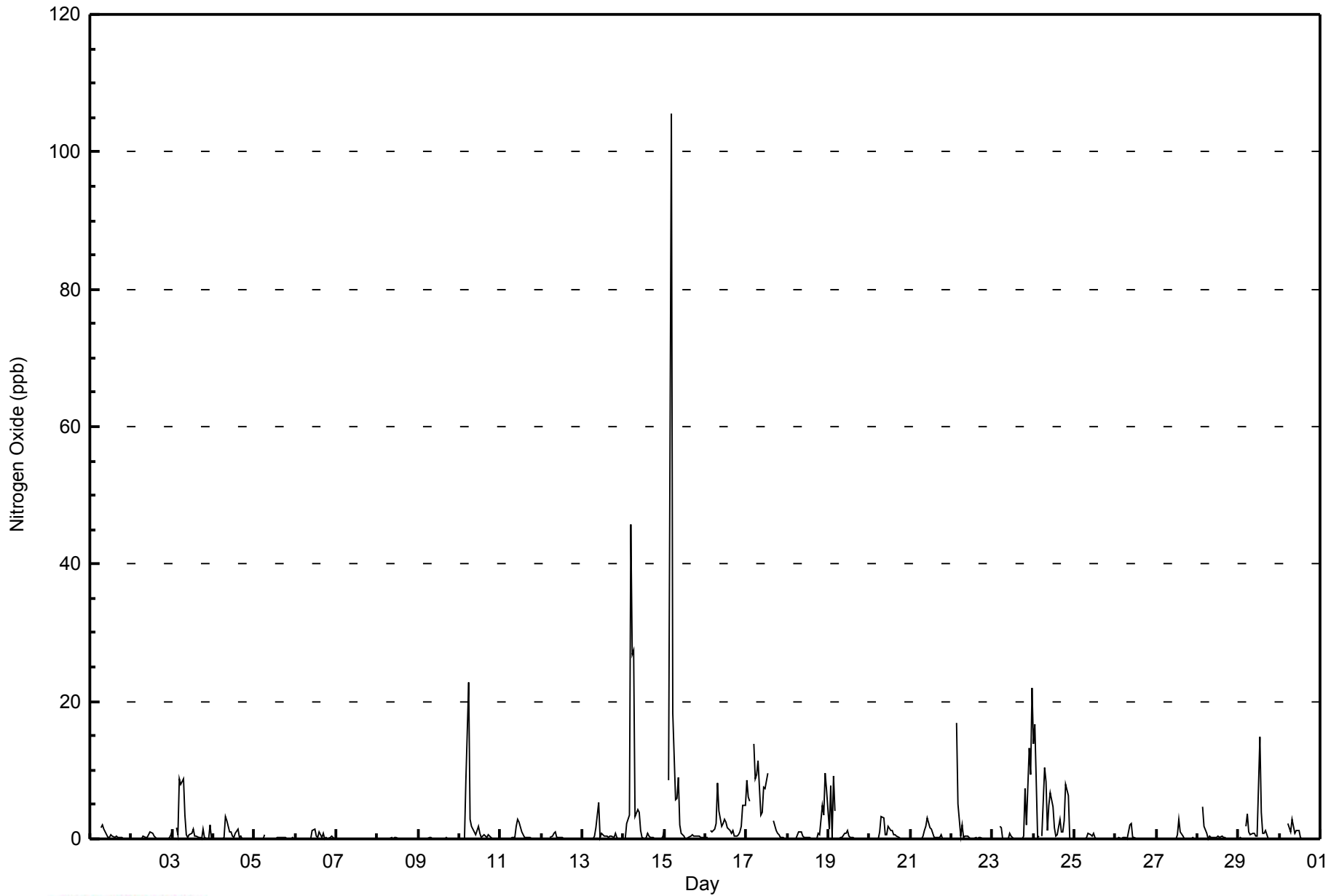
Maximum Value: 106 ppb on Sep 15 05:00																		Maximum Daily Average: 9.4 ppb on Sep 15																		Hours in Service: 720	
Minimum Value: 0 ppb on Sep 1 01:00																		Minimum Daily Average: 0.0 ppb on Sep 7																		Hours of Data: 682	
Maximum Diurnal Average: 7.9 ppb at hour 5																		Minimum Diurnal Average: 0.2 ppb at hour 18																		Hours of Missing Data: 38	
Monthly Average: 1.4 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 22																		Hours of Calibration: 38	
																																				Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Sep	0	0	0	0	0	Z	2	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2											
2-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	0.2	1											
3-Sep	1	Z	2	1	9	8	9	3	1	0	1	1	1	0	0	0	0	0	2	0	0	0	2	0	1.8	9											
4-Sep	0	0	Z	0	0	0	0	3	3	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	0.5	3											
5-Sep	0	0	0	Z	0	0	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1											
6-Sep	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	1	0	1	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	0.0	0											
8-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											
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	0.0	0											
10-Sep	0	0	Z	0	9	23	3	2	1	1	1	2	1	0	1	0	0	1	0	0	0	0	0	0	1.9	23											
11-Sep	0	0	0	Z	0	0	0	0	0	2	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0.4	3											
12-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	0.2	1											
13-Sep	0	0	0	0	0	Z	0	0	0	2	5	0	1	1	0	0	0	0	0	1	0	0	0	0	0.5	5											
14-Sep	Z	0	2	3	46	27	27	3	4	4	1	0	0	0	1	0	0	0	0	0	0	0	0	0	5.3	46											
15-Sep	1	Z	8	56	106	18	6	6	1	9	2	1	0	0	0	0	0	1	0	0	0	0	0	0	9.4	106											
16-Sep	0	0	Z	1	1	1	2	8	4	2	2	3	2	2	1	1	1	0	0	1	1	2	5	5	2.0	8											
17-Sep	8	6	5	Z	14	9	9	11	3	4	8	7	10	C	C	C	3	1	1	1	0	0	0	0	5.0	14											
18-Sep	0	0	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	5	3	10	7	1.3	10											
19-Sep	1	8	0	9	4	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.2	9											
20-Sep	Z	0	0	0	0	0	1	3	3	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0.6	3											
21-Sep	0	Z	0	0	0	0	0	0	1	2	3	2	1	1	0	0	0	0	1	0	0	0	0	0	0.5	3											
22-Sep	0	0	Z	17	5	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	17											
23-Sep	0	0	0	Z	2	2	0	0	0	0	1	0	0	0	0	0	0	0	0	7	2	13	9	22	2.6	22											
24-Sep	14	17	0	0	Z	0	10	8	1	5	7	5	2	0	1	3	1	1	3	8	6	0	0	0	4.0	17											
25-Sep	0	0	0	0	0	Z	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1											
26-Sep	Z	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2											
27-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0	0.2	3											
28-Sep	0	0	Z	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	5											
29-Sep	0	0	0	Z	2	4	1	1	1	1	0	0	15	4	1	1	1	0	0	0	0	0	0	0	1.4	15											
30-Sep	0	0	0	0	Z	2	1	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3											
																		Diurnal Average		Diurnal Maximum																	
																		1.1		14																	
																		1.2		17																	
																		0.7		8																	
																		3.7		56																	
																		7.9		106																	
																		3.8		27																	
																		2.5		27																	
																		2.0		11																	
																		1.5		9																	
																		1.2		5																	
																		1.2		8																	
																		1.1		7																	
																		1.3		15																	
																		0.5		4																	
																		0.4		2																	
																		0.3		3																	
																		0.4		3																	
																		0.2		1																	
																		0.3		3																	
																		0.6		8																	
																		0.5		6																	
																		0.7		13																	
																		0.9		10																	
																		1.2		22																	

Z - zerospan C - Calibration



WBEA
Hourly Averages

Nitrogen Oxide (NO) - ppb
Firebag - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
Firebag - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	675	98.97	98.97
21 - 40	4	0.59	99.56
41 - 80	2	0.29	99.85
81 - 159	1	0.15	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxide (NO) - ppb
Firebag - September 2014

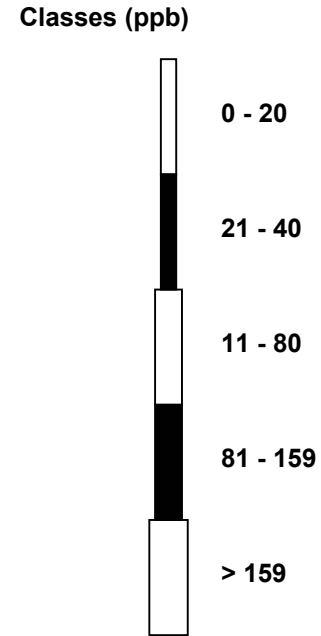
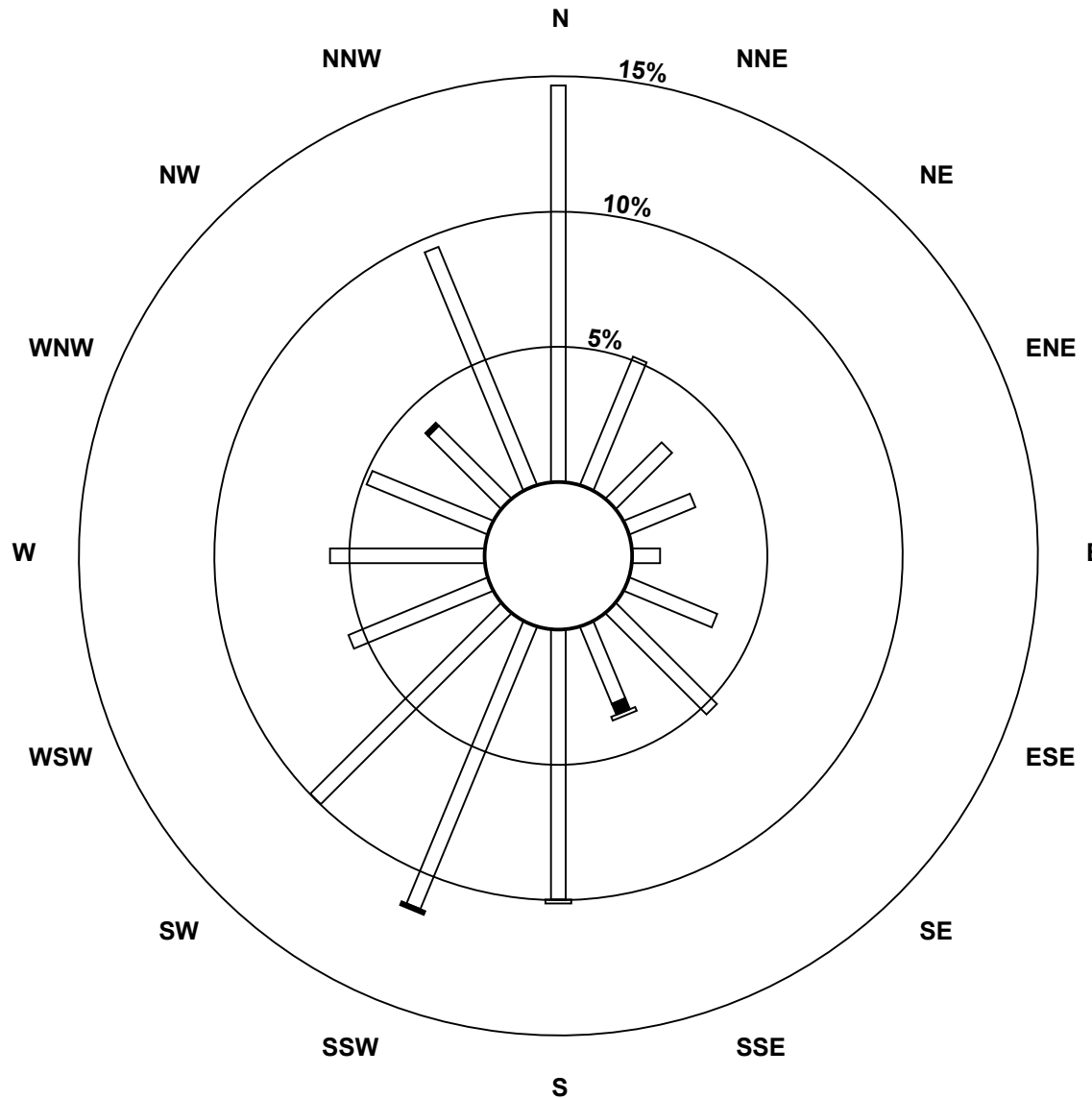
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	100	35	20	18	7	24	36	21	68	77	68	38	39	33	26	65	675
21 - 40	0	0	0	0	0	0	0	3	0	0	0	0	0	0	1	0	4
11 - 80	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	100	35	20	18	7	24	36	25	69	78	68	38	39	33	27	65	682

Total Number of Valid Hours: 682

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Nitrogen Oxide (NO) - ppb
Firebag (AMS 19)

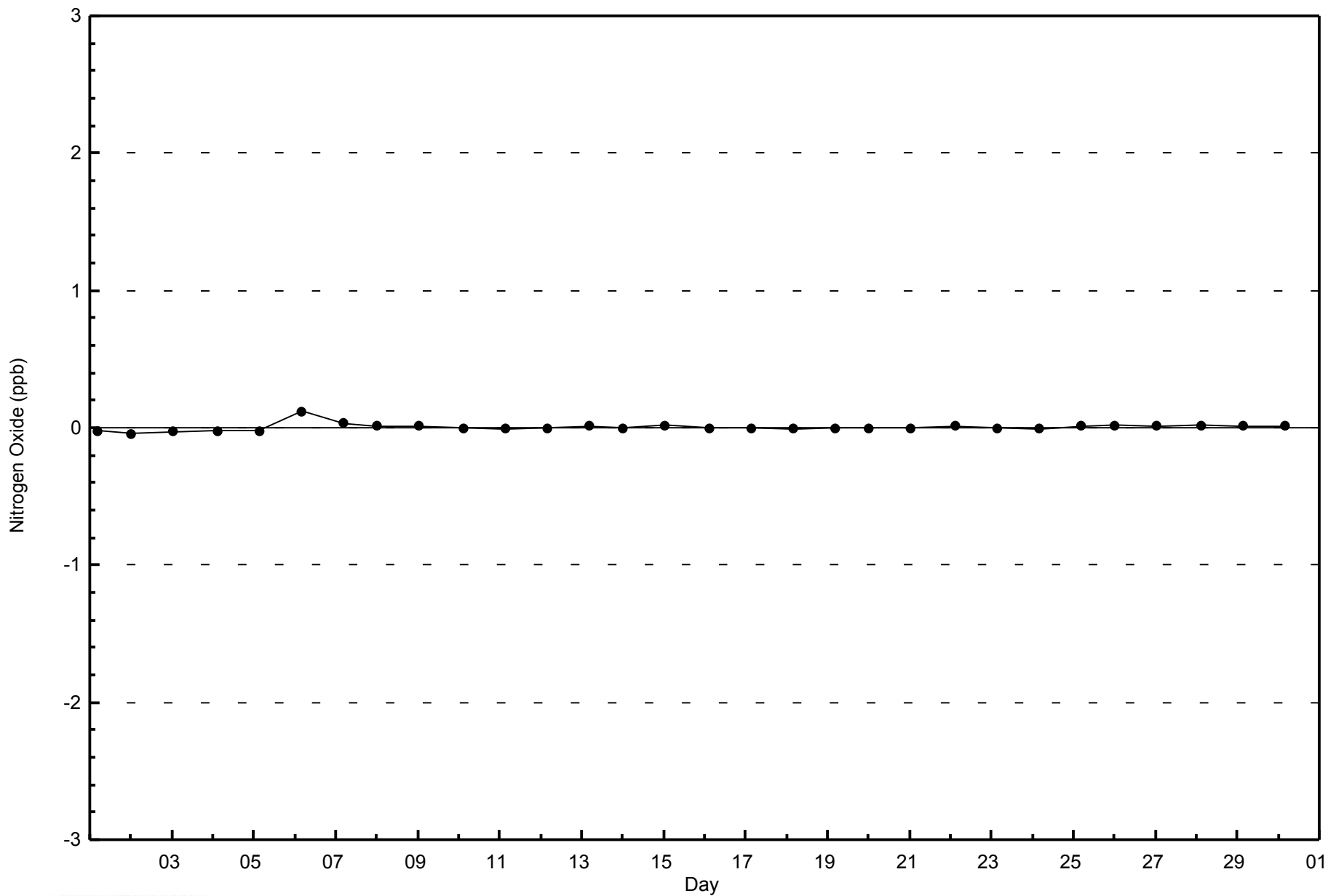


Total Number of Valid Hours: 682



WBEA
Zero Responses

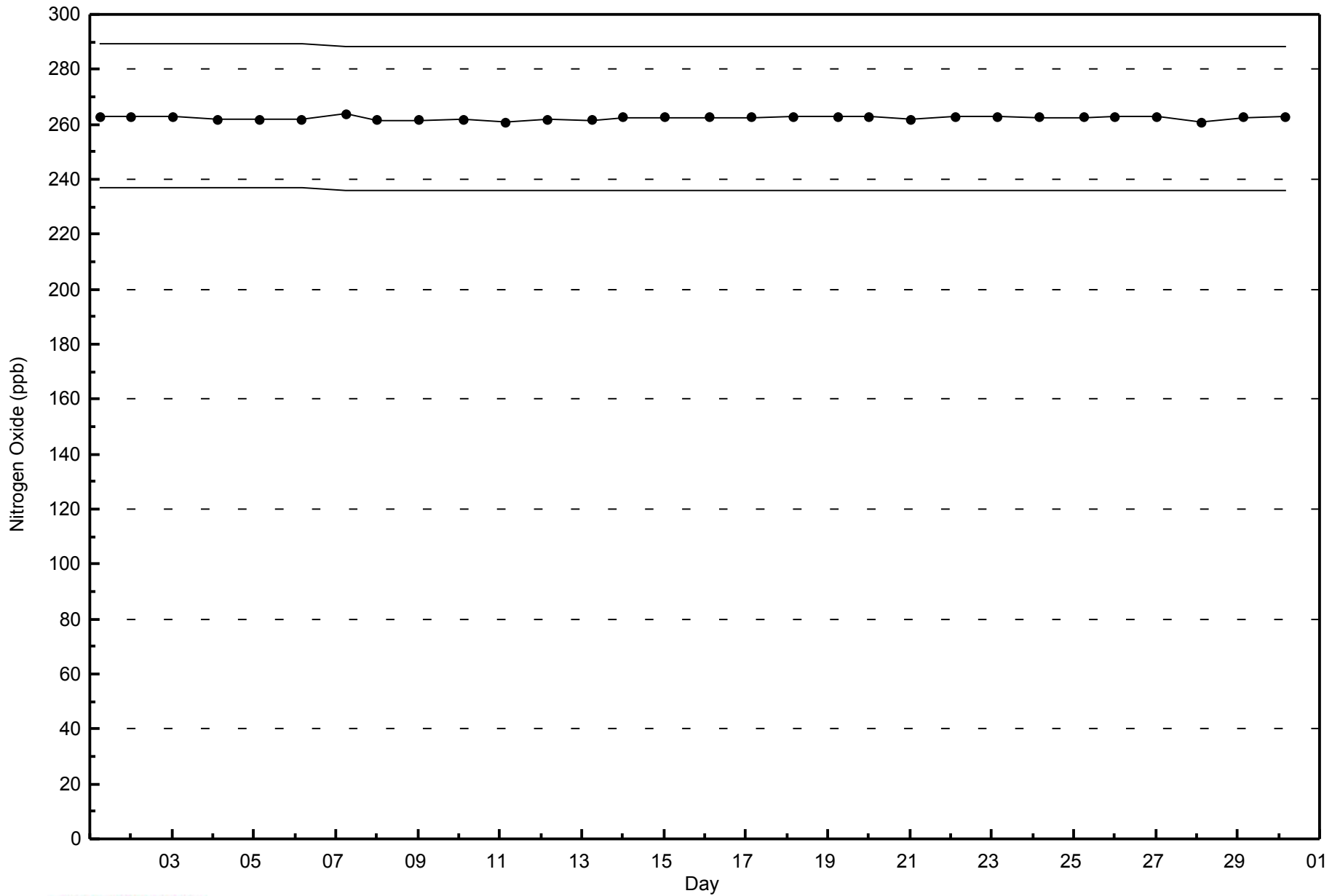
Nitrogen Oxide (NO) - ppb
Firebag - September 2014





WBEA
Span Responses

Nitrogen Oxide (NO) - ppb
Firebag - September 2014





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 27 ppb on Sep 14 05:00	Maximum Daily Average: 7.6 ppb on Sep 15
Minimum Value: 0 ppb on Sep 7 01:00	Hours of Data: 682
Maximum Diurnal Average: 6.2 ppb at hour 6	Hours of Missing Data: 38
Monthly Average: 2.7 ppb	Hours of Calibration: 38
Minimum Daily Average: 0.0 ppb on Sep 7	Percent Operational Time: 100.0
Minimum Diurnal Average: 1.0 ppb at hour 16	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 7 P ₉₉ = 22	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	2	2	3	2	4	Z	8	6	3	1	1	1	2	2	2	2	1	1	3	2	2	4	5	1	2.5	8
2-Sep	Z	3	1	0	0	0	0	1	1	1	1	3	2	2	1	1	1	0	0	0	0	0	3	3	1.0	3
3-Sep	5	Z	4	7	10	15	14	6	2	1	2	2	3	1	1	1	1	5	2	2	1	4	1	3.8	15	
4-Sep	1	1	Z	2	2	2	1	4	4	2	2	1	1	2	6	1	1	0	0	0	0	0	0	0	1.5	6
5-Sep	2	5	1	Z	5	5	3	C	C	C	C	C	0	1	1	1	1	1	1	1	0	1	2	2	1.7	5
6-Sep	3	5	8	6	Z	1	0	0	0	0	3	4	1	1	2	1	2	1	1	0	1	1	1	0	1.9	8
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	0
8-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4	9	0.8	9
9-Sep	5	Z	2	1	3	4	3	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.9	5
10-Sep	0	1	Z	1	16	26	20	14	7	3	3	4	2	1	3	2	1	3	4	3	1	1	1	1	4.9	26
11-Sep	1	2	2	Z	2	1	1	1	1	3	4	3	2	1	1	1	2	2	2	2	2	4	7	13	2.6	13
12-Sep	6	4	2	2	Z	12	6	5	2	1	1	1	1	0	0	0	1	1	1	1	1	1	2	1	2.2	12
13-Sep	3	4	2	0	0	Z	0	1	2	4	1	2	2	1	1	1	2	4	7	14	10	3	2	1	2.8	14
14-Sep	Z	4	7	12	27	23	20	6	4	5	2	1	0	1	2	2	3	4	3	4	5	3	8	6.4	27	
15-Sep	9	Z	20	25	27	20	17	13	14	6	3	1	1	1	2	2	2	3	2	2	4	2	1	7.6	27	
16-Sep	1	1	Z	4	2	2	3	4	2	1	2	3	2	2	1	1	1	1	1	1	2	2	4	4	2.0	4
17-Sep	6	4	3	Z	7	5	4	4	2	1	2	2	3	C	C	C	1	1	1	1	1	1	1	1	2.6	7
18-Sep	2	1	1	2	Z	5	7	4	2	1	1	1	1	1	1	1	1	0	5	7	7	5	9	8	3.1	9
19-Sep	3	11	2	8	7	Z	2	3	1	2	2	3	2	1	3	1	1	1	2	3	3	4	3	5	3.0	11
20-Sep	Z	3	2	3	7	9	10	11	5	1	1	3	2	3	2	2	2	2	4	5	3	12	6	1	4.2	12
21-Sep	1	Z	1	2	4	4	2	2	3	3	4	3	3	2	1	1	2	3	5	2	1	1	1	1	2.2	5
22-Sep	1	2	Z	20	13	3	7	2	2	1	1	1	1	1	1	1	3	3	3	3	6	5	6	8	4.1	20
23-Sep	8	5	6	Z	7	6	2	1	0	0	3	1	1	0	0	0	1	6	21	14	16	13	25	5.9	25	
24-Sep	23	23	3	3	Z	3	12	10	3	5	7	5	2	1	1	3	1	2	4	8	7	0	3	2	5.6	23
25-Sep	4	5	2	3	3	Z	2	3	4	3	2	2	1	0	1	1	1	0	0	0	0	0	0	0	1.5	5
26-Sep	Z	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
27-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	1	5	2	1	1	1	2	8	6	5	3	1	1.5	8
28-Sep	1	1	Z	6	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	6
29-Sep	1	1	1	Z	3	4	3	2	1	1	1	1	6	2	1	1	2	1	1	1	1	1	1	2	1.7	6
30-Sep	2	2	2	2	Z	7	8	7	4	4	4	5	1	1	0	0	0	0	0	0	1	0	0	0	2.2	8

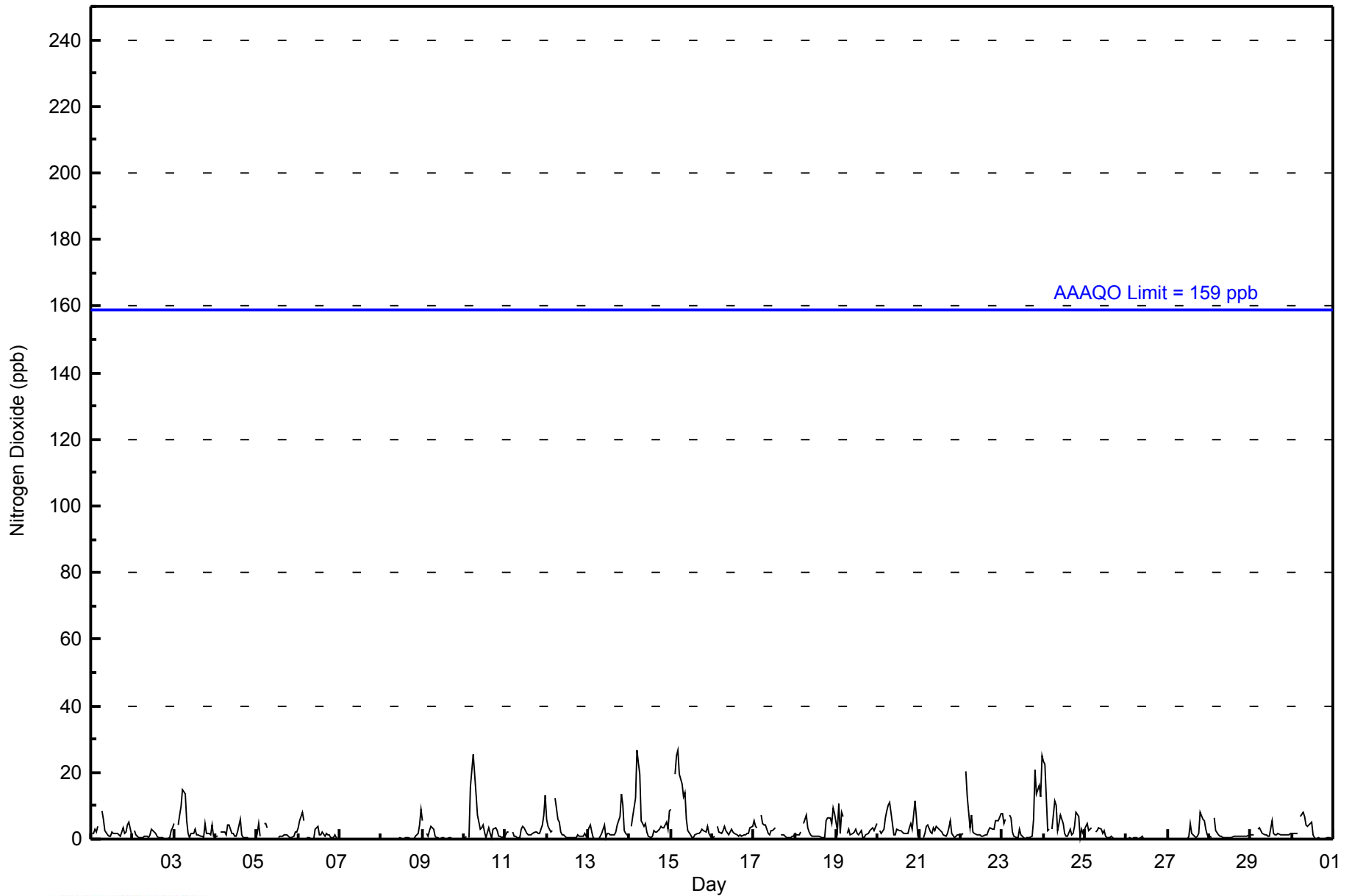
3.5	3.5	3.0	4.5	6.0	6.2	5.1	3.7	2.4	1.8	1.8	1.9	1.4	1.1	1.3	1.0	1.0	1.3	2.2	2.9	2.5	2.6	2.8	3.3	Diurnal Average	
23	23	20	25	27	26	20	14	14	6	7	5	6	5	6	3	3	4	7	21	14	16	13	25	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Firebag - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Firebag - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	673	98.68	98.68
21 - 40	9	1.32	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Firebag - September 2014

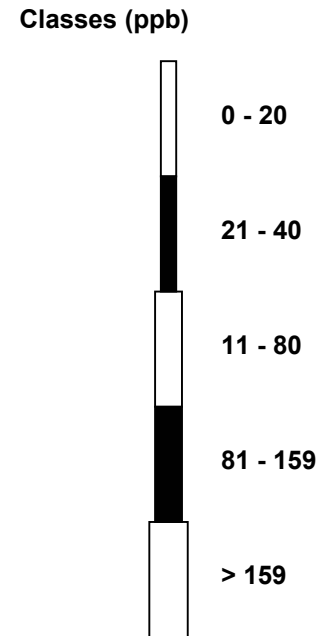
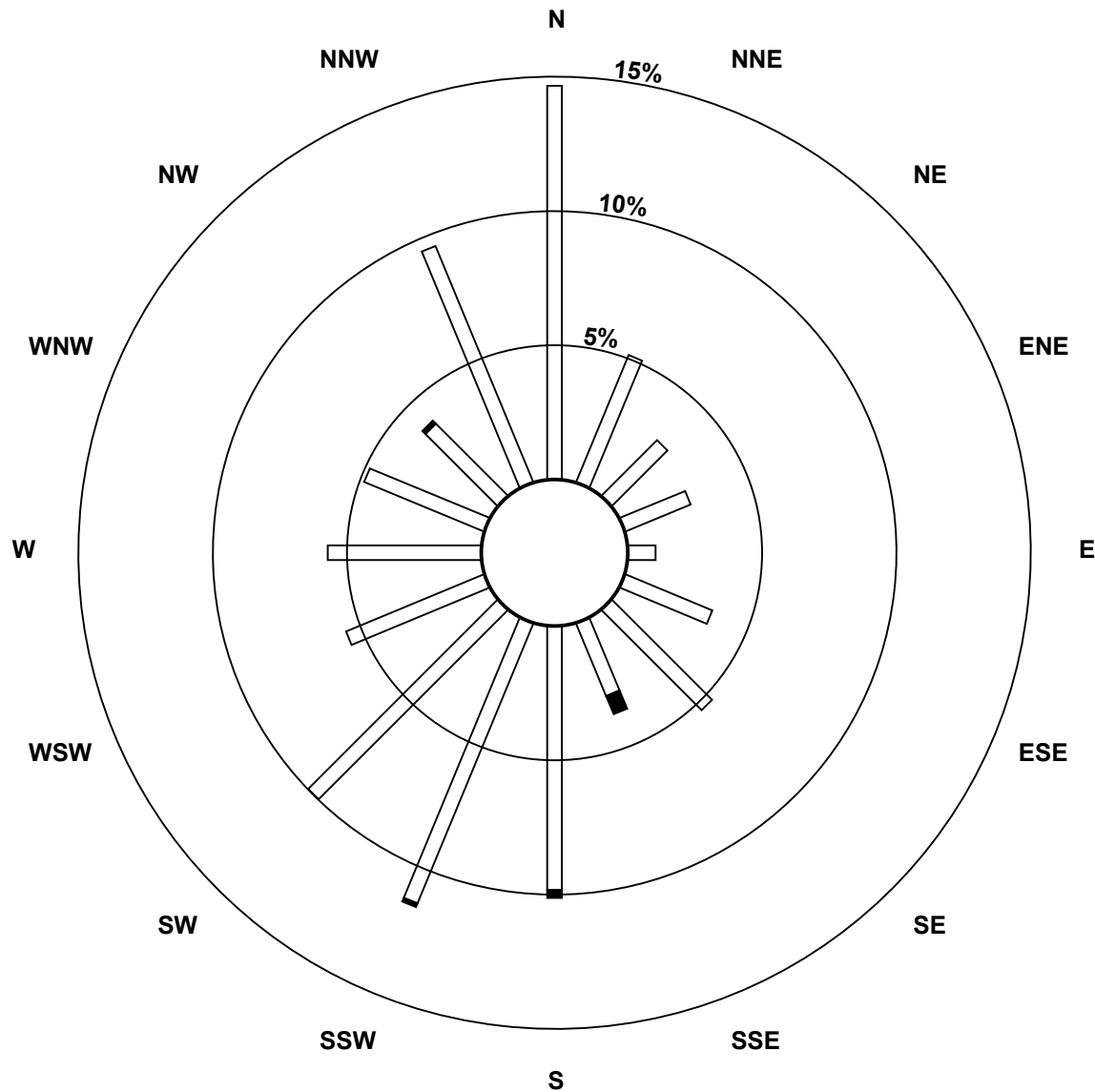
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	100	35	20	18	7	24	36	20	67	77	68	38	39	33	26	65	673
21 - 40	0	0	0	0	0	0	0	5	2	1	0	0	0	0	1	0	9
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	100	35	20	18	7	24	36	25	69	78	68	38	39	33	27	65	682

Total Number of Valid Hours: 682

Total Number of Hours: 720

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

**Nitrogen Dioxide (NO₂) - ppb
Firebag (AMS 19)**

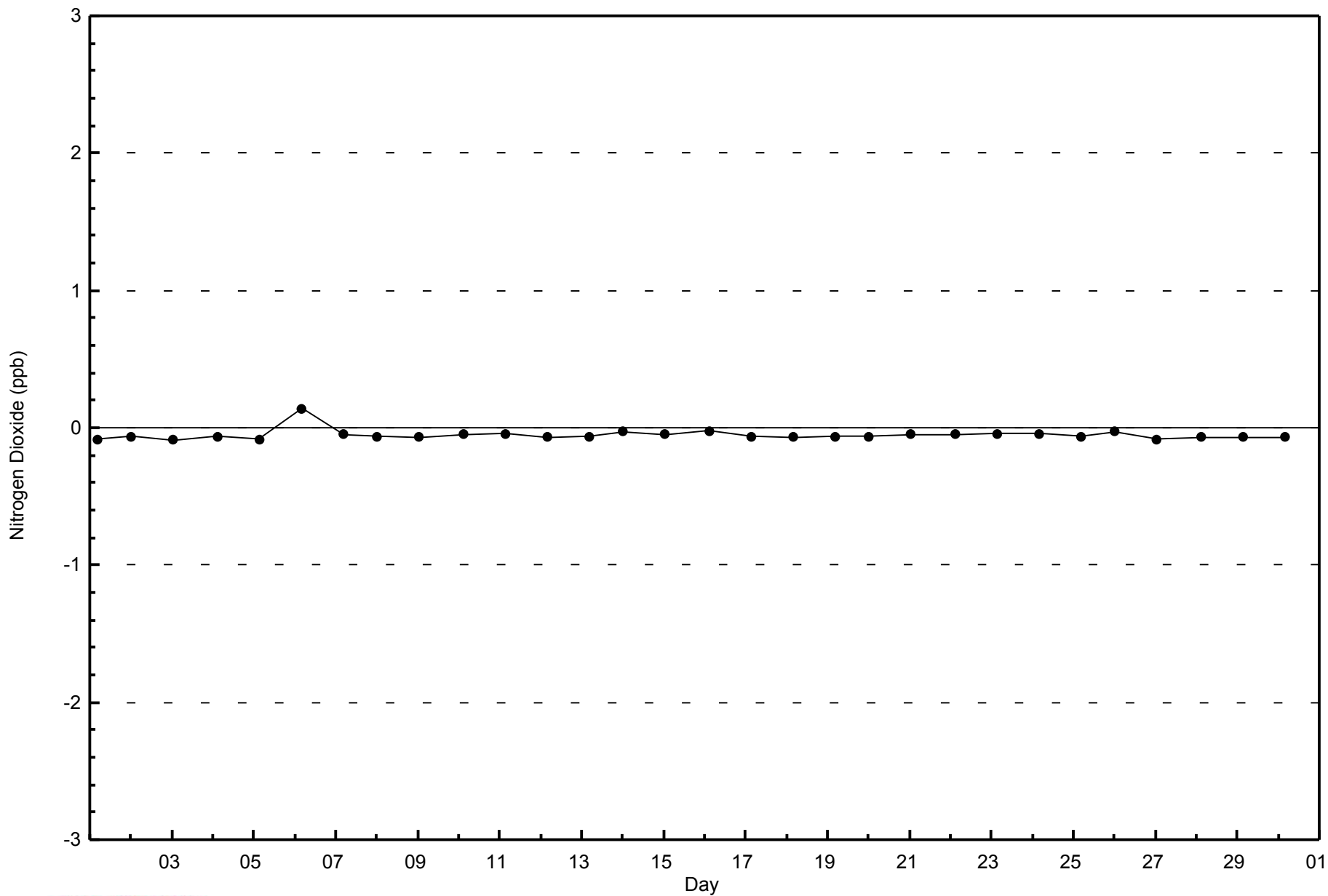


Total Number of Valid Hours: 682



WBEA
Zero Responses

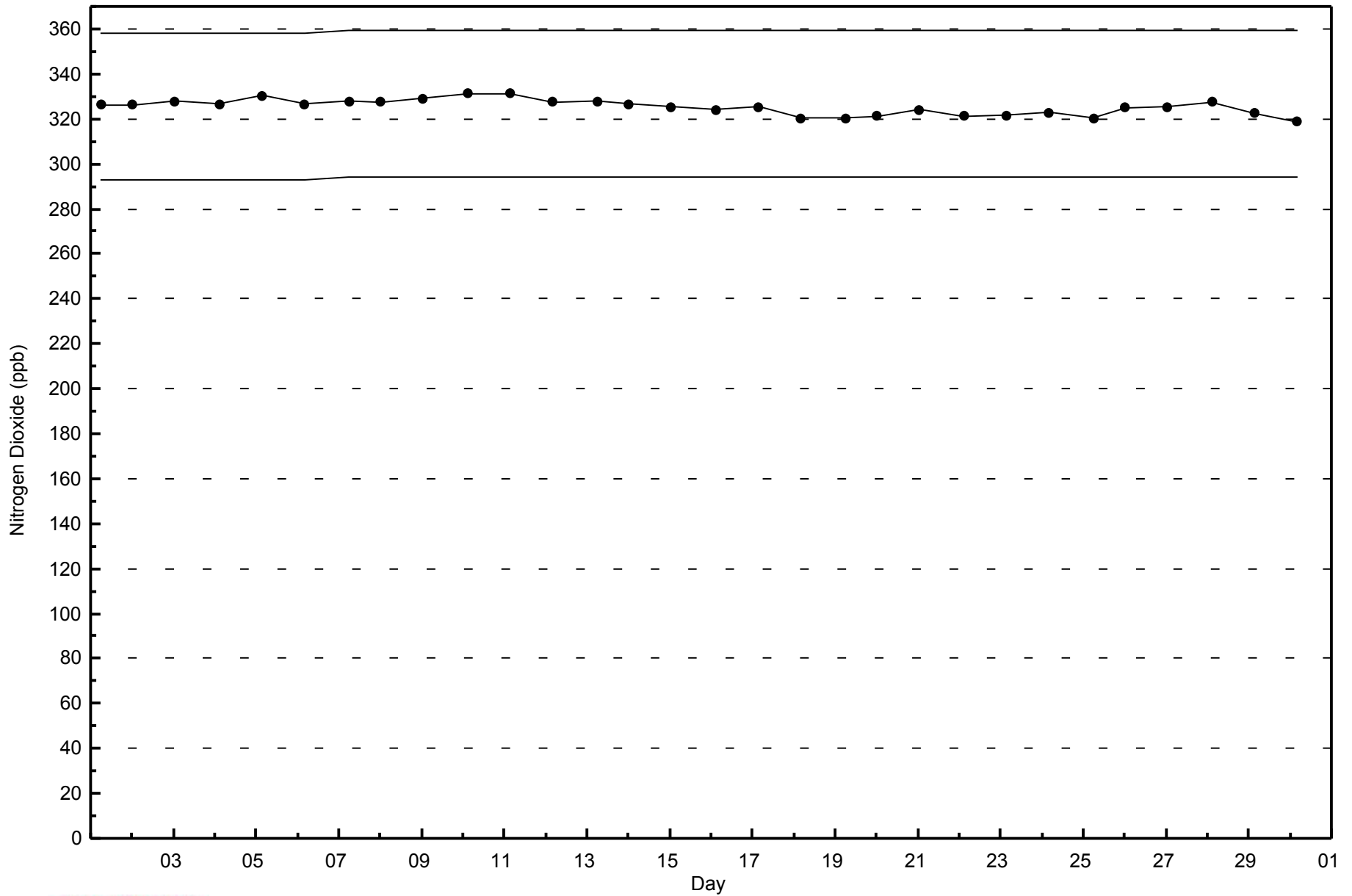
Nitrogen Dioxide (NO₂) - ppb
Firebag - September 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Firebag - September 2014



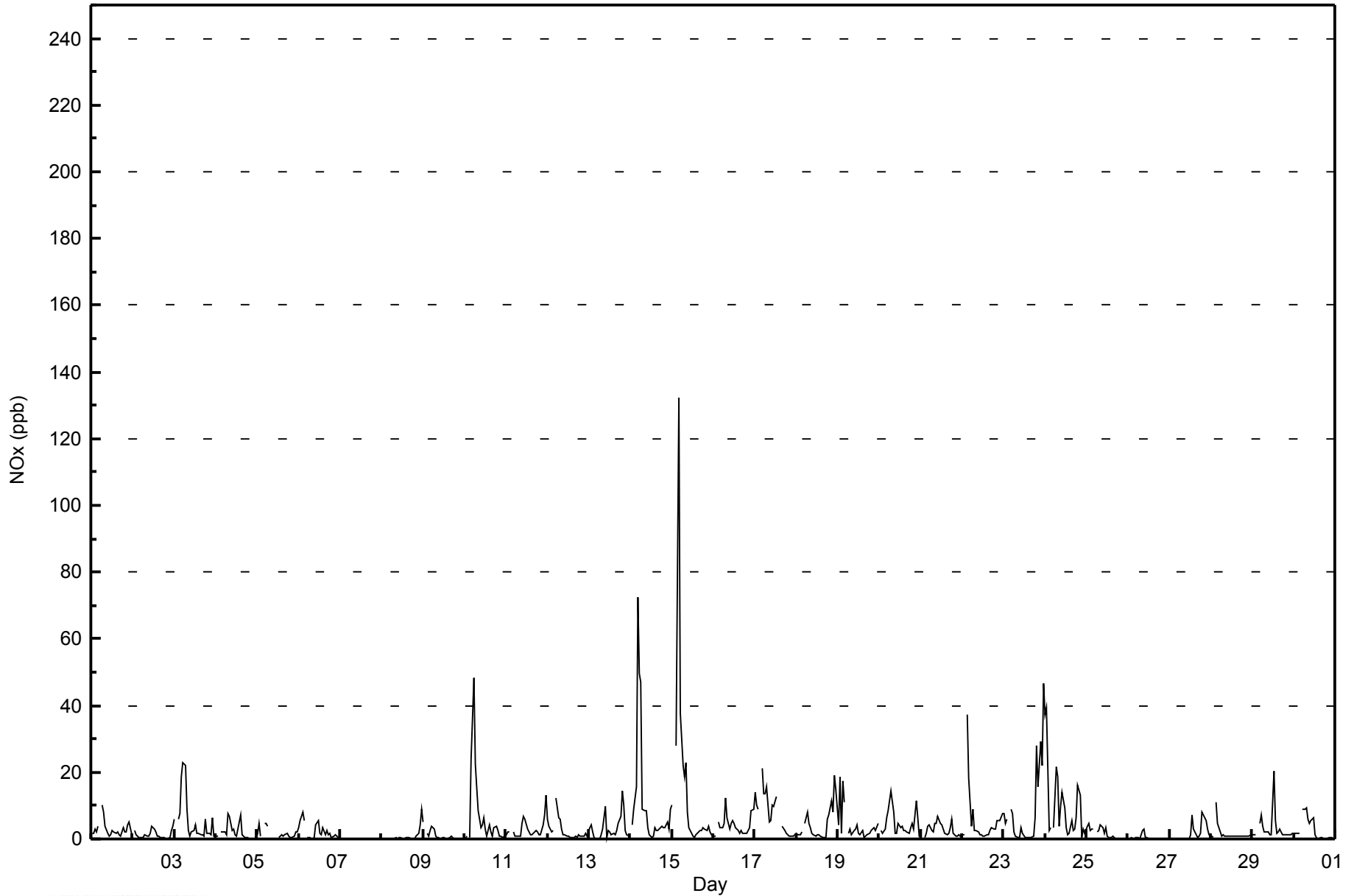


Maximum Value: 132 ppb on Sep 15 05:00																		Maximum Daily Average: 17.0 ppb on Sep 15						Hours in Service: 720		
Minimum Value: 0 ppb on Sep 7 03:00																		Minimum Daily Average: 0.0 ppb on Sep 7						Hours of Data: 682		
Maximum Diurnal Average: 13.9 ppb at hour 5																		Minimum Diurnal Average: 1.3 ppb at hour 16						Hours of Missing Data: 38		
Monthly Average: 4.1 ppb																		Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =1 Median=2 Q ₃ =4 P ₉₀ =9 P ₉₉ =47						Hours of Calibration: 38		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	2	2	3	2	4	Z	10	8	4	2	1	1	3	2	2	2	1	1	3	2	2	4	5	1	2.9	10
2-Sep	Z	2	1	0	0	0	0	1	1	1	2	4	3	2	1	1	1	0	0	0	0	0	3	4	1.2	4
3-Sep	6	Z	6	8	19	23	22	9	2	1	2	3	4	2	2	1	1	1	6	2	2	1	6	1	5.6	23
4-Sep	1	1	Z	2	2	2	1	8	7	3	3	1	1	3	7	1	1	0	0	0	0	0	0	0	2.0	8
5-Sep	2	5	1	Z	5	5	4	C	C	C	C	C	0	1	1	1	1	1	1	1	0	1	2	2	1.9	5
6-Sep	3	5	8	6	Z	0	0	0	0	0	4	5	2	1	3	1	2	1	2	0	1	1	1	0	2.2	8
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	0
8-Sep	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	2	4	9	0.8	9
9-Sep	5	Z	2	1	3	4	3	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.9	5
10-Sep	0	1	Z	0	24	48	22	15	9	3	4	6	3	1	4	2	1	3	4	3	1	1	1	1	6.8	48
11-Sep	1	2	2	Z	2	1	1	1	1	5	7	6	3	2	1	1	2	2	2	1	1	4	7	13	3.0	13
12-Sep	6	4	2	2	Z	12	6	6	3	1	1	1	1	0	0	1	1	1	1	1	1	1	2	1	2.4	12
13-Sep	3	4	2	0	0	Z	0	1	3	10	1	2	2	1	2	1	2	5	7	14	10	3	1	1	3.4	14
14-Sep	Z	4	9	16	73	50	47	9	8	9	3	1	0	1	3	2	3	3	4	3	4	5	3	9	11.6	73
15-Sep	10	Z	28	81	132	38	22	19	23	8	3	2	1	1	1	2	2	3	3	3	2	4	2	1	17.0	132
16-Sep	1	1	Z	5	3	3	5	12	6	3	5	6	5	3	2	2	3	2	2	2	3	3	8	9	4.0	12
17-Sep	14	10	9	Z	21	14	13	16	5	5	10	10	13	C	C	C	4	2	2	1	1	1	1	1	7.6	21
18-Sep	2	1	1	2	Z	5	8	5	3	2	1	1	1	1	1	1	1	0	6	7	11	8	19	15	4.4	19
19-Sep	4	18	2	17	11	Z	2	3	1	3	3	4	2	1	3	1	1	1	1	1	2	3	3	5	4.1	18
20-Sep	Z	3	2	3	7	9	11	14	8	2	2	5	4	4	3	2	2	2	3	5	3	12	6	1	4.8	14
21-Sep	1	Z	0	2	4	4	2	2	5	5	7	5	4	3	1	1	2	4	6	2	1	1	1	1	2.8	7
22-Sep	1	1	Z	37	18	4	9	2	2	2	1	1	1	1	1	1	3	3	3	3	6	5	6	8	5.2	37
23-Sep	8	5	6	Z	9	8	2	1	0	0	4	2	1	0	0	0	0	1	6	28	16	29	22	47	8.4	47
24-Sep	37	39	3	3	Z	4	22	18	4	10	14	10	3	1	2	6	2	3	6	16	13	1	3	2	9.6	39
25-Sep	4	5	2	3	3	Z	2	3	4	4	2	3	1	0	1	1	0	0	0	0	0	0	0	0	1.6	5
26-Sep	Z	0	1	0	0	0	1	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
27-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	1	7	3	1	1	1	2	8	6	5	3	1	1.8	8
28-Sep	1	1	Z	11	5	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	11
29-Sep	1	1	1	Z	5	7	4	2	2	2	1	1	20	6	2	2	3	1	1	1	1	1	1	2	3.1	20
30-Sep	2	2	2	2	Z	9	9	9	6	5	6	6	1	1	0	0	0	0	0	0	1	0	0	0	2.7	9
																		Diurnal Average								
																		Diurnal Maximum								
																		4.6 4.7 3.7 8.2 13.9 10.0 7.7 5.8 3.9 3.0 3.0 3.0 2.7 1.7 1.7 1.3 1.4 1.5 2.4 3.6 3.0 3.3 3.7 4.5								
																		37 39 28 81 132 50 47 19 23 10 14 10 20 7 7 6 4 5 7 28 16 29 22 47								
Z - zerspan																		C - Calibration								



WBEA
Hourly Averages

NOx (NO_x) - ppb
Firebag - September 2014





WBEA
Cumulative Frequency Distribution

NO_x (NO_x) - ppb
Firebag - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	659	96.63	96.63
21 - 40	16	2.35	98.97
41 - 80	5	0.73	99.71
81 - 159	1	0.15	99.85
> 159	0	0.00	99.85

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

NOx (NO_x) - ppb
Firebag - September 2014

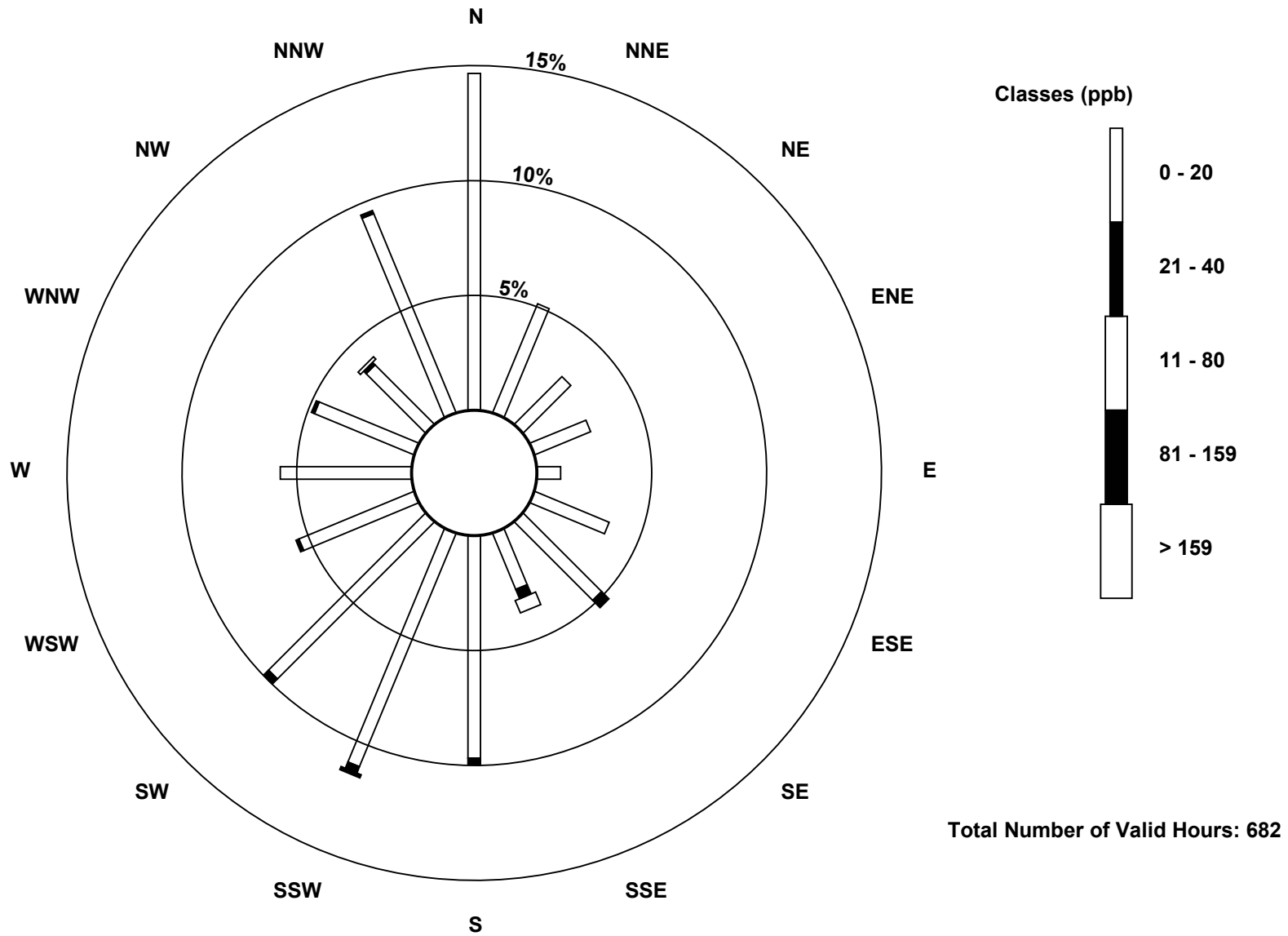
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	100	35	20	18	7	24	33	18	66	75	66	37	39	32	25	64	659
21 - 40	0	0	0	0	0	0	3	3	2	2	2	1	0	1	1	1	16
11 - 80	0	0	0	0	0	0	0	4	0	0	0	0	0	0	1	0	5
81 - 159	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	100	35	20	18	7	24	36	25	68	78	68	38	39	33	27	65	681

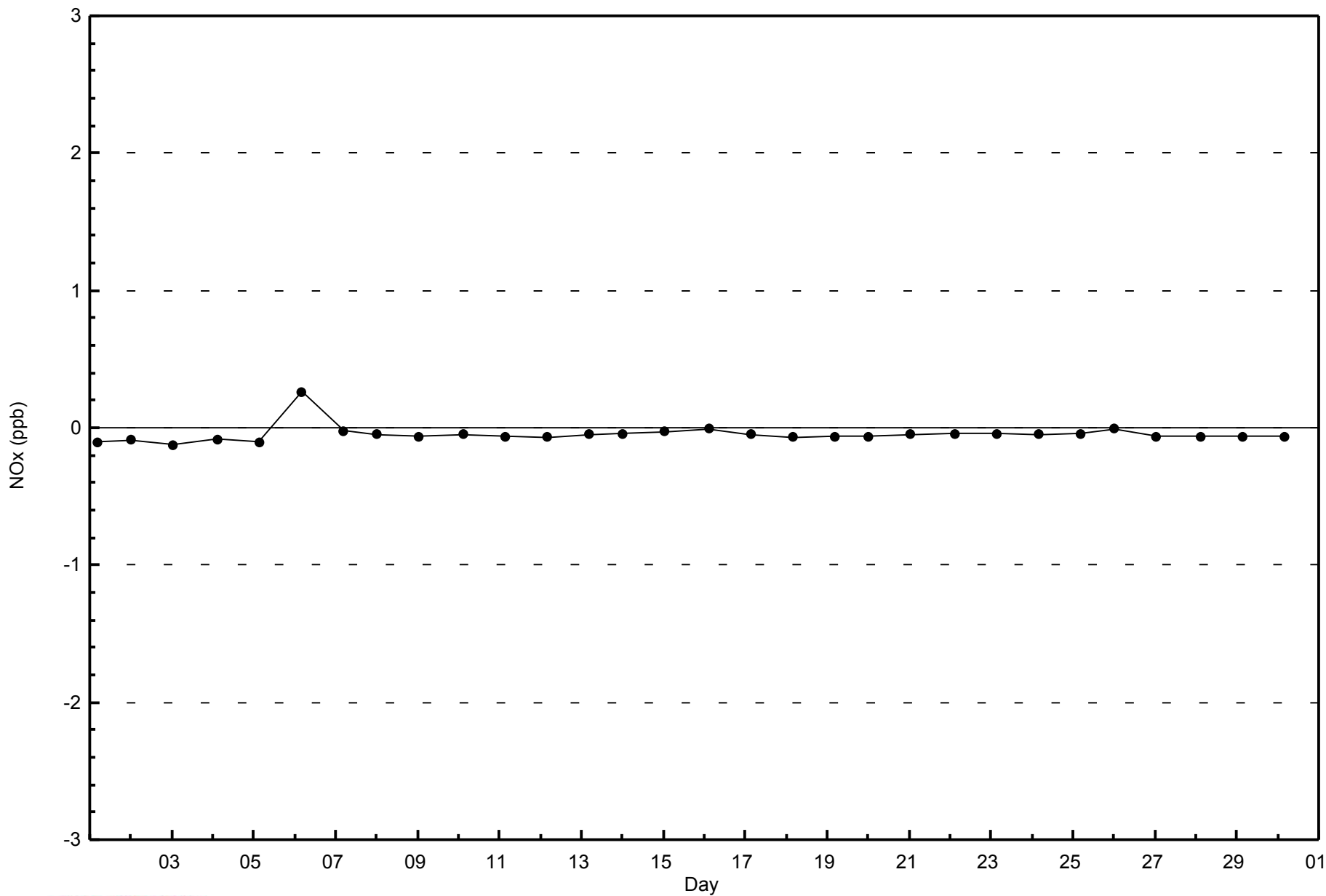
Total Number of Valid Hours: 682

Total Number of Hours: 720

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

**NO_x (NO_x) - ppb
Firebag (AMS 19)**

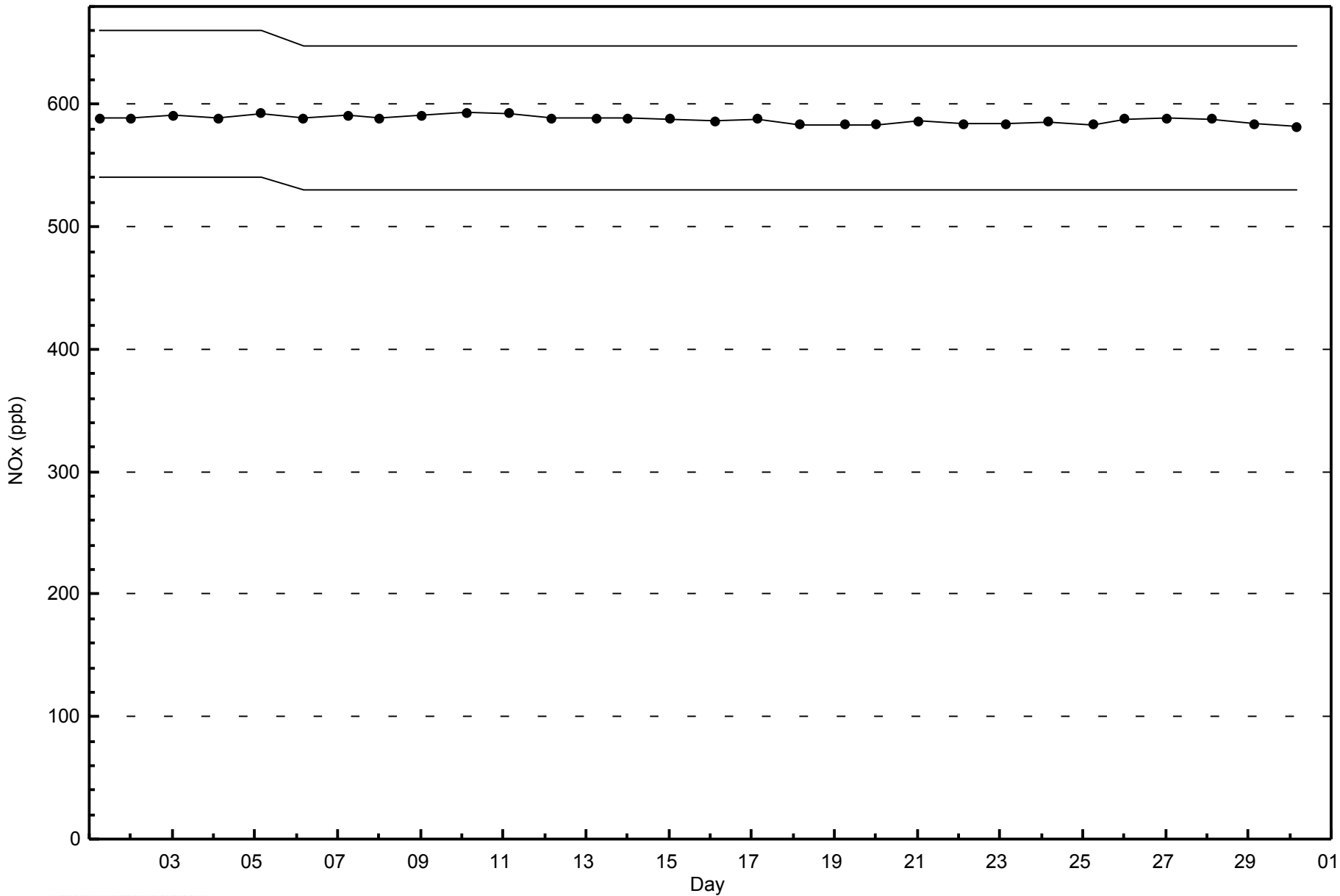






WBEA
Span Responses

NOx (NO_x) - ppb
Firebag - September 2014



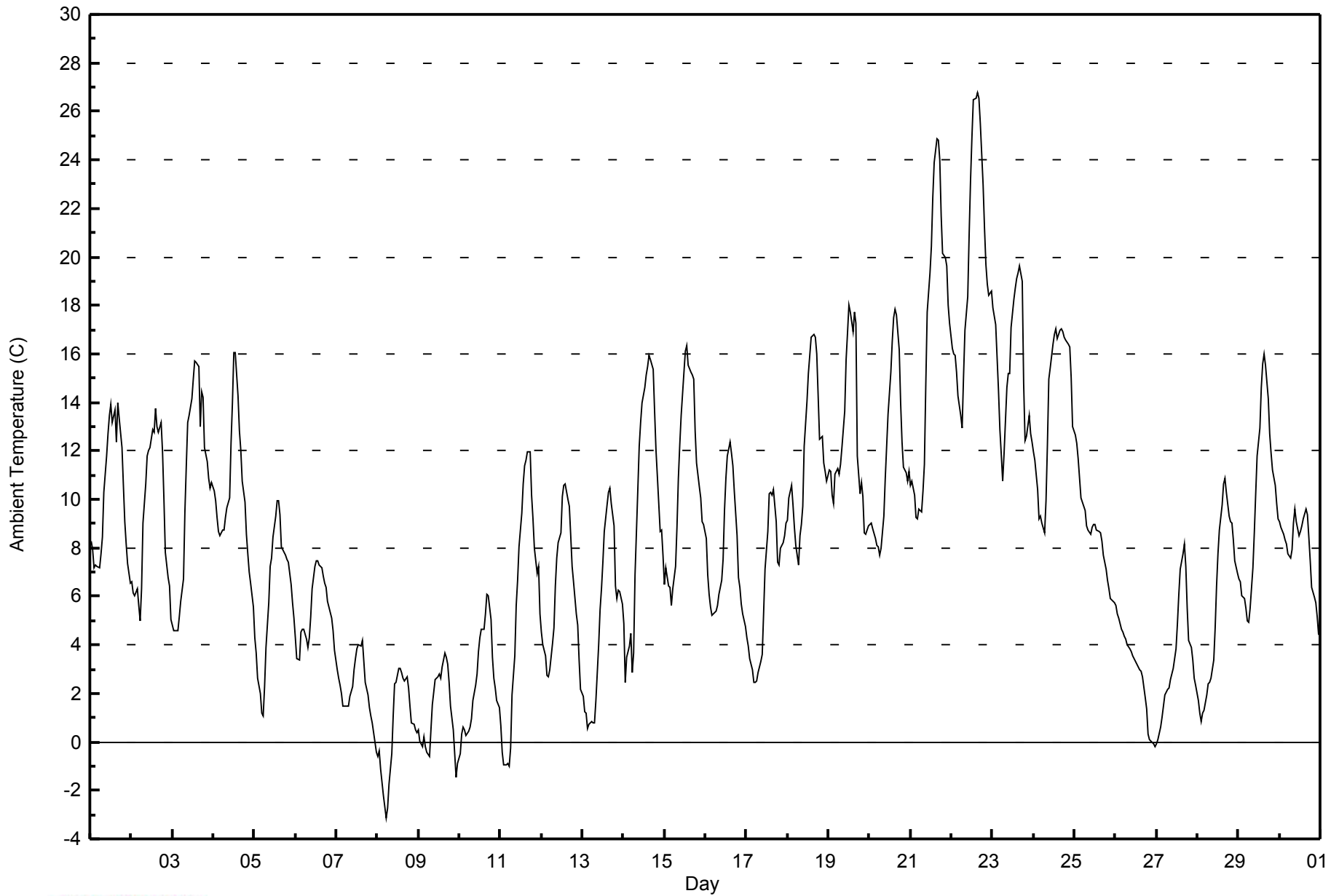


Maximum Value: 26.8 C on Sep 22 16:00		Maximum Daily Average: 19.8 C on Sep 22		Hours in Service: 720																																												
Minimum Value: -3.1 C on Sep 8 06:00		Minimum Daily Average: 0.6 C on Sep 8		Hours of Data: 720																																												
Maximum Diurnal Average: 12.2 C at hour 16		Minimum Diurnal Average: 5.1 C at hour 6		Hours of Missing Data: 0																																												
Monthly Average: 8.37 C		Percentiles: P ₁ = -1.0 P ₁₀ = 1.5 Q ₁ = 4.0 Median = 8.2 Q ₃ = 11.8 P ₉₀ = 16.0 P ₉₉ = 24.8		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	8.3	7.9	7.2	7.3	7.3	7.2	7.8	8.5	10.3	11.8	12.7	13.4	13.9	13.1	13.7	12.4	14.0	13.4	12.1	10.6	9.1	8.2	7.4	6.6	10.2	14.0																						
2-Sep	6.6	6.1	6.0	6.3	5.6	5.0	6.3	9.0	10.6	11.8	12.0	12.1	12.9	12.8	13.8	13.0	12.8	13.2	12.0	10.0	7.8	6.8	6.4	5.0	9.3	13.8																						
3-Sep	4.8	4.6	4.6	4.6	5.1	5.8	6.7	9.5	11.4	13.2	13.5	14.2	15.0	15.7	15.6	15.5	13.0	14.4	14.2	12.2	11.5	10.9	10.5	10.7	10.7	15.7																						
4-Sep	10.3	10.0	9.2	8.7	8.5	8.7	8.7	9.3	9.7	10.1	12.3	14.0	16.1	16.1	14.2	12.8	12.0	10.7	9.9	8.6	7.7	7.0	6.6	5.6	10.3	16.1																						
5-Sep	4.3	3.7	2.7	2.0	1.2	1.1	2.3	3.9	5.7	7.3	7.6	8.4	9.3	9.9	10.0	9.4	8.0	7.8	7.7	7.6	7.4	6.5	5.7	5.1	6.0	10.0																						
6-Sep	4.3	3.4	3.4	4.5	4.6	4.6	4.2	3.9	4.3	5.2	6.3	7.2	7.5	7.4	7.3	7.2	6.8	6.5	6.4	5.8	5.3	5.1	4.6	3.8	5.4	7.5																						
7-Sep	3.0	2.7	2.3	2.0	1.5	1.5	1.5	1.5	1.9	2.3	3.0	3.4	3.8	4.0	3.9	4.2	3.3	2.5	1.9	1.4	1.1	0.8	0.4	-0.4	2.2	4.2																						
8-Sep	-0.6	-0.4	-1.1	-2.2	-2.7	-3.1	-2.7	-1.7	-0.5	1.1	2.4	2.5	3.0	3.0	2.9	2.7	2.5	2.7	2.2	1.5	0.8	0.7	0.5	0.4	0.6	3.0																						
9-Sep	0.5	0.0	-0.2	0.2	-0.2	-0.4	-0.6	0.5	1.5	2.1	2.6	2.7	2.8	2.6	3.1	3.6	3.5	3.2	2.5	1.5	0.5	-0.5	-1.5	-0.9	1.2	3.6																						
10-Sep	-0.5	0.3	0.6	0.5	0.3	0.5	0.6	1.0	1.7	2.3	2.8	3.7	4.3	4.6	4.6	5.3	6.1	6.0	5.1	3.5	2.6	2.2	1.7	1.4	2.6	6.1																						
11-Sep	0.7	-0.5	-1.0	-1.0	-0.9	-1.0	-0.3	1.9	3.5	5.6	6.6	8.0	9.4	10.6	11.4	11.6	12.0	12.0	10.2	9.2	8.0	7.0	7.2	5.3	5.7	12.0																						
12-Sep	4.5	4.0	3.6	2.7	2.7	2.9	4.1	4.7	6.5	7.6	8.2	8.6	10.1	10.6	10.6	10.0	9.7	8.5	7.2	6.6	5.3	4.8	3.3	2.2	6.2	10.6																						
13-Sep	1.9	1.2	1.2	0.6	0.7	0.8	0.8	0.8	1.7	4.0	5.5	6.3	7.4	8.7	9.8	10.3	10.5	9.8	8.9	6.4	5.9	6.3	6.2	5.7	5.1	10.5																						
14-Sep	4.9	2.5	3.5	4.0	4.5	2.8	3.6	6.9	10.4	12.2	13.2	14.0	14.6	15.1	15.5	15.9	15.8	15.4	13.7	12.0	10.9	8.7	8.7	7.7	9.9	15.9																						
15-Sep	6.5	7.2	6.4	6.4	5.6	6.3	7.2	8.9	10.9	12.3	13.5	15.2	16.1	16.4	15.5	15.2	15.1	14.9	12.8	11.5	10.5	10.1	9.1	8.9	10.9	16.4																						
16-Sep	8.4	6.9	6.1	5.6	5.2	5.3	5.4	5.6	6.1	6.7	7.5	9.5	10.9	11.8	12.3	11.9	11.4	10.3	8.5	6.8	6.4	5.7	5.3	4.8	7.7	12.3																						
17-Sep	4.3	3.9	3.5	3.0	2.4	2.4	2.5	2.9	3.3	3.6	5.4	7.1	8.7	10.3	10.3	10.2	10.4	9.1	7.4	7.3	8.0	8.2	8.5	9.0	6.3	10.4																						
18-Sep	9.1	10.1	10.6	9.8	8.9	8.1	7.3	8.5	9.0	9.7	12.2	14.0	15.2	16.0	16.7	16.8	16.7	16.0	14.2	12.5	12.6	11.5	11.2	10.8	12.0	16.8																						
19-Sep	11.2	11.1	10.2	9.8	11.1	11.2	11.1	11.4	12.2	13.7	15.8	16.9	18.0	17.7	16.9	17.7	17.3	11.8	10.2	10.7	10.1	8.6	8.6	8.9	12.6	18.0																						
20-Sep	9.0	9.0	8.8	8.4	8.1	8.0	7.7	8.0	9.3	10.9	12.2	13.5	15.3	16.5	17.5	17.9	17.6	16.1	14.0	12.3	11.3	11.1	10.8	11.1	11.9	17.9																						
21-Sep	10.6	10.8	10.2	9.2	9.2	9.6	9.5	10.3	11.4	14.7	17.7	19.3	20.4	22.4	23.9	24.9	24.8	24.0	21.7	20.1	20.0	19.6	18.0	17.2	16.7	24.9																						
22-Sep	16.2	16.0	15.9	15.3	14.3	13.4	13.0	15.1	17.0	18.3	20.9	23.1	24.9	26.5	26.5	26.8	26.6	25.5	23.0	21.2	19.7	18.9	18.4	18.6	19.8	26.8																						
23-Sep	17.9	17.6	17.2	14.5	12.9	11.8	10.8	11.9	14.6	15.2	15.2	17.1	18.3	18.7	19.1	19.4	19.6	19.0	14.8	12.5	12.6	13.5	12.7	12.4	15.4	19.6																						
24-Sep	12.0	11.6	10.4	9.2	9.3	9.0	8.6	9.9	12.3	14.9	15.4	16.4	16.8	17.0	16.6	17.0	17.0	16.9	16.7	16.5	16.4	16.3	15.0	13.0	13.9	17.0																						
25-Sep	12.6	12.3	11.7	10.9	10.1	9.7	9.5	8.9	8.7	8.5	8.8	8.9	9.0	8.8	8.7	8.6	8.3	7.7	7.1	6.6	6.3	5.9	5.9	5.8	8.7	12.6																						
26-Sep	5.6	5.3	5.1	4.7	4.5	4.4	4.2	4.0	3.8	3.7	3.5	3.4	3.2	3.1	3.0	2.9	2.7	1.8	1.4	0.3	0.1	0.0	-0.1	-0.2	2.9	5.6																						
27-Sep	-0.1	0.1	0.6	1.0	1.5	1.9	2.2	2.2	2.5	2.8	3.0	3.9	4.9	6.1	7.1	7.7	8.2	7.3	5.5	4.2	3.9	3.4	2.6	2.3	3.5	8.2																						
28-Sep	1.7	1.2	0.8	1.2	1.3	1.9	2.4	2.4	2.6	3.4	4.7	6.4	7.7	8.7	9.8	10.6	10.9	10.3	9.3	9.1	9.0	8.3	7.4	6.9	5.8	10.9																						
29-Sep	6.7	6.6	6.0	5.9	5.5	5.0	5.0	5.5	7.2	8.6	10.2	11.8	13.0	14.6	15.6	16.0	15.5	14.2	12.7	11.9	11.2	10.6	9.8	9.2	9.9	16.0																						
30-Sep	9.1	8.9	8.5	8.3	8.2	7.7	7.6	7.9	9.0	9.6	9.1	8.5	8.7	8.9	9.2	9.6	9.4	8.4	7.5	6.4	6.0	5.7	5.2	4.4	8.0	9.6																						
																								6.5	6.1	5.8	5.4	5.2	5.1	5.2	6.1	7.3	8.4	9.5	10.5	11.4	11.9	12.2	12.2	12.1	11.3	10.0	8.9	8.3	7.7	7.2	6.7	Diurnal Average
																								17.9	17.6	17.2	15.3	14.3	13.4	13.0	15.1	17.0	18.3	20.9	23.1	24.9	26.5	26.5	26.8	26.6	25.5	23.0	21.2	20.0	19.6	18.4	18.6	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Firebag - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Firebag - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	28	3.89	3.89
0 - 10	437	60.69	64.58
10 - 20	237	32.92	97.50
> 20	18	2.50	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

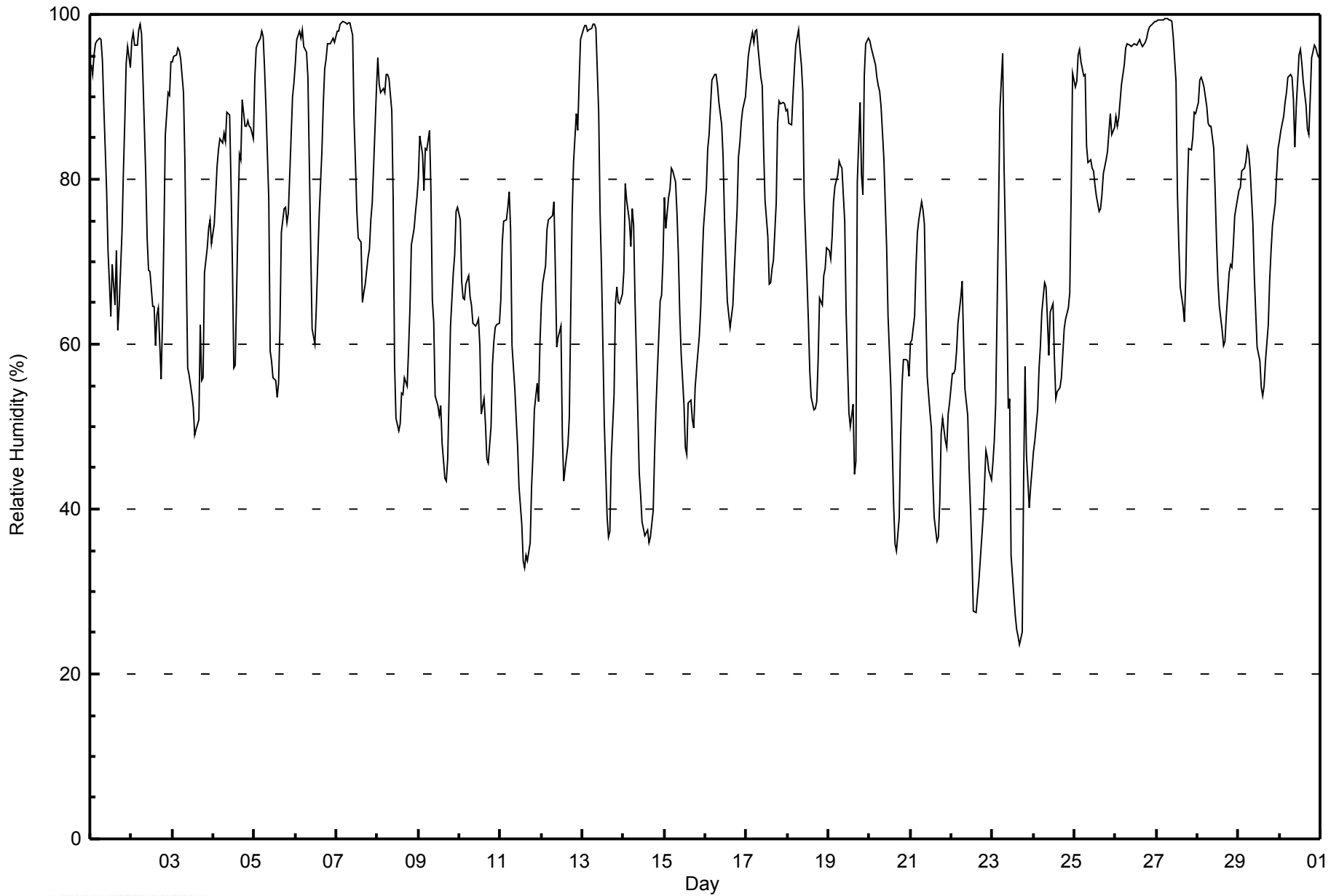
Firebag - September 2014

Maximum Value: 99 % on Sep 27 07:00																			Maximum Daily Average: 95.3 % on Sep 26						Hours in Service: 720	
Minimum Value: 24 % on Sep 23 17:00																			Minimum Daily Average: 46.8 % on Sep 22						Hours of Data: 720	
Maximum Diurnal Average: 87.6 % at hour 6																			Minimum Diurnal Average: 56.2 % at hour 15						Hours of Missing Data: 0	
Monthly Average: 73.0 %																			Percentiles: P ₁ = 29 P ₁₀ = 47 Q ₁ = 59 Median = 75 Q ₃ = 89 P ₉₀ = 96 P ₉₉ = 99						Hours of Calibration: 0	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	94	93	95	96	97	97	97	94	89	79	71	67	63	70	65	71	62	65	73	81	87	94	96	94	82.9	97
2-Sep	97	98	96	96	98	99	98	92	80	73	69	69	65	65	60	64	64	56	63	73	85	90	90	94	80.6	99
3-Sep	94	95	95	96	96	95	90	82	69	57	56	54	52	49	50	51	62	56	56	69	72	74	75	72	71.5	96
4-Sep	75	78	81	84	85	84	86	85	88	88	79	70	57	57	75	83	82	90	86	86	87	86	86	85	81.0	90
5-Sep	92	96	96	97	98	97	93	89	78	59	58	56	56	53	55	62	74	76	77	75	76	85	90	92	78.4	98
6-Sep	94	97	98	97	98	96	95	92	82	72	62	60	64	70	75	83	89	93	95	96	96	97	97	97	87.4	98
7-Sep	98	98	99	99	99	99	99	99	99	97	87	82	76	73	72	65	66	67	71	72	75	77	81	91	85.1	99
8-Sep	95	92	90	91	90	93	93	92	88	78	57	51	50	50	54	54	56	55	59	64	72	74	76	78	73.0	95
9-Sep	80	85	83	79	84	84	86	79	65	63	54	53	51	53	48	44	43	46	54	62	69	71	76	77	66.1	86
10-Sep	75	68	66	65	67	68	66	65	63	62	63	63	60	51	53	50	46	46	50	57	60	62	62	63	60.5	75
11-Sep	65	72	75	75	77	78	74	60	55	51	48	43	38	34	33	34	34	36	43	47	52	55	53	60	53.8	78
12-Sep	65	67	69	74	75	75	76	77	69	60	61	62	49	43	45	48	51	64	76	82	88	86	92	97	68.8	97
13-Sep	98	99	99	98	98	98	99	99	98	88	76	69	60	50	39	37	37	46	54	65	67	65	65	66	73.8	99
14-Sep	69	79	77	75	72	76	74	65	52	44	42	38	37	37	36	37	40	47	52	57	65	66	70	56.1	79	
15-Sep	78	74	78	79	81	81	80	76	71	64	59	53	48	47	53	53	51	50	55	57	61	64	70	74	64.8	81
16-Sep	79	84	85	89	92	93	93	91	89	87	83	75	70	65	62	63	65	69	76	83	84	87	88	90	80.9	93
17-Sep	92	95	96	98	97	98	98	96	92	91	84	77	73	67	67	69	70	77	87	90	89	89	89	88	86.3	98
18-Sep	89	87	87	90	93	96	98	96	94	91	78	68	63	57	54	52	52	53	58	66	65	68	69	72	74.8	98
19-Sep	71	70	73	77	79	81	82	82	81	75	64	58	52	50	53	44	46	80	89	80	78	93	96	97	73.0	97
20-Sep	97	96	95	94	92	91	91	89	83	77	72	63	55	48	40	36	35	39	49	55	58	58	56	56	67.8	97
21-Sep	60	60	63	69	74	75	77	76	75	65	56	52	50	44	39	36	37	41	49	51	48	47	52	53	56.2	77
22-Sep	56	56	57	59	62	66	68	61	55	51	45	40	34	28	28	29	31	34	39	43	47	46	45	44	46.8	68
23-Sep	46	48	53	76	88	92	95	81	65	52	53	34	29	27	25	25	24	25	44	57	47	40	43	45	50.6	95
24-Sep	47	48	52	57	60	64	68	67	63	59	64	65	58	53	54	55	56	59	62	63	64	66	79	93	61.5	93
25-Sep	91	92	95	96	94	93	93	84	82	82	81	81	79	78	76	76	78	81	82	83	86	88	85	86	85.2	96
26-Sep	88	86	87	91	93	94	96	96	96	96	96	96	96	97	97	96	96	97	97	98	98	99	99	99	95.3	99
27-Sep	99	99	99	99	99	99	99	99	99	99	97	92	78	72	67	65	63	68	78	84	84	85	88	88	87.6	99
28-Sep	89	92	92	92	91	89	87	86	86	84	78	72	68	65	62	60	60	63	69	70	69	72	76	78	77.1	92
29-Sep	79	79	81	81	82	84	83	81	75	68	64	60	58	55	54	55	58	62	68	71	74	77	81	84	71.4	84
30-Sep	85	86	88	89	91	92	93	92	90	84	89	95	96	94	92	89	86	85	90	95	96	96	95	95	90.9	96
																			81.2 82.3 83.4 85.3 86.8 87.6 87.5 84.2 79.0 73.2 68.2 64.0 59.5 56.7 56.2 56.2 57.1 60.6 66.5 70.9 73.1 75.3 77.3 79.2						Diurnal Average	
																			99 99 99 99 99 99 99 99 99 99 97 96 96 97 97 96 96 97 97 98 98 99 99 99						Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Firebag - September 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Firebag - September 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	37	5.14	5.14
40 - 60	156	21.67	26.81
60 - 80	233	32.36	59.17
80 - 100	294	40.83	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 38 km/h on Sep 28 14:00	Maximum Daily Speed Average: 28.2 km/h on Sep 28	Hours in Service: 720
Minimum Speed Value: 1 km/h on Sep 2 23:00	Minimum Daily Speed Average: 1.2 km/h on Sep 18	Hours of Data: 720
Maximum Diurnal Speed Average: 5.2 km/h at hour 14	Minimum Diurnal Speed Average: 2.3 km/h at hour 10	Hours of Missing Data: 0
Monthly Average Velocity: 3.2 km/h 226.3 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 8 Median = 13 Q ₃ = 18 P ₉₀ = 23 P ₉₉ = 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	W9	W10	WSW10	SW11	WSW7	WSW7	W3	SW6	NNW6	N9	NNW8	NW7	NNW10	NNW10	NNW13	WNW12	W9	W12	W9	NNE3	WNW7	WNW6	WNW4	N8	WNW6.5	WNW13
2-Sep	NNW6	N7	NNE10	N8	N8	NNE8	N6	NW5	NNW8	N12	N12	NNW12	NNW12	NNW13	NNW12	N12	NW10	NNW14	N11	N6	N3	N4	ENE1	S2	N7.9	NNW14
3-Sep	WSW2	WSW2	SW3	SW3	WSW3	WSW5	SW5	WSW6	W11	W6	WNW9	W11	W12	W14	WNW10	NW13	N17	NE7	SE6	SSW14	S12	SSW10	S7	SSW13	WSW4.7	N17
4-Sep	SSW14	SSW13	SW13	SSW11	SSW11	SSW12	SSW12	SSW10	SSW13	SW14	SW17	NNW12	NNW15	NNW12	N14	N16	NNW18	NNW17	NNW14	NNE16	N16	N14	N16	N16	WNW5.0	NNW18
5-Sep	NNW10	NNW9	NNW8	NNW6	N8	N9	NW2	WNW2	ESE2	S5	SSW10	SSW13	SSW16	SSW16	SSW19	S21	S18	S16	SSW10	SW6	N11	NE7	N6	SSW4.2	S21	
6-Sep	NW4	NW6	NW8	N11	N11	N12	N12	NNE12	NE11	NE7	E3	SSW3	SSE4	S4	SSE6	ESE7	ESE9	ESE7	ESE7	ENE10	ENE11	ENE10	ENE13	ENE16	NE5.2	ENE16
7-Sep	NE17	NE18	NE15	NE17	NE18	NE18	NE17	NNE17	NNE16	NNE15	NNE16	NNE15	NNE18	N17	N19	N20	N21	N19	N16	N16	N11	N10	N10	NNW11	NNE15.3	N21
8-Sep	NNW14	N13	N11	N9	N9	N8	N9	N10	N12	N13	N17	N16	N14	N17	NNW15	NNW16	N12	N8	N6	N7	NNW6	NNW5	NNW6	NNW6	N10.7	N17
9-Sep	N3	N5	NNW8	N4	NNW4	NNW4	NNE5	NE5	NNE7	N8	N7	N10	N13	NNW11	N8	NNW11	NNW14	N12	N5	N4	N5	N6	N5	NW4	N6.8	NNW14
10-Sep	NW6	NW4	W4	NW6	NW8	NW7	NW7	NW7	NNW8	NNW10	NNW9	NNW10	NW10	NW7	W11	WSW11	SW13	SW13	SW11	SSW14	SSW16	SSW17	SSW16	SSW17	W6.0	SSW17
11-Sep	SW17	SSW15	SSW15	SSW16	SSW17	SSW17	SW18	SW22	SW26	SW30	SW32	SW33	SW36	SW35	SW34	SW31	SW30	SW24	SW16	SW16	SW15	SW12	WSW11	WSW9	SW21.8	SW36
12-Sep	SW8	SW7	SW8	SW8	WSW7	WNW7	NNW10	NNW13	NNW19	NNW23	NNW22	NNW21	NNW24	NNW20	NNW22	NNW22	NNW16	NW13	NW12	NNW12	NW11	NNW10	NW8	WNW7	NW11.7	NNW24
13-Sep	NW8	N8	N8	N9	NNE6	N5	NNE4	ENE5	E3	SW3	W9	WSW11	W11	WSW10	NNW10	NNW11	W9	SW9	SSW6	S6	S5	SSW9	SSW8	SSW7	W3.4	WNW11
14-Sep	SSW8	SSW5	S6	S5	SSE5	SSE5	SSE6	S8	S9	S10	SSW11	SW14	SW16	WSW16	WSW16	W15	WSW14	SW11	SW8	SW6	SSW8	WSW3	SSW5	SSW4	SW7.6	SW16
15-Sep	SSW4	SSW6	SSW4	S5	SSW5	SSW5	SW6	SW4	WNW3	NNE6	ESE2	N4	N6	NNW6	NNE12	ENE11	E11	ESE12	ESE12	SE12	SE14	SE13	ESE11	ESE14	ESE3.9	ESE14
16-Sep	ESE17	ESE17	E17	E18	ESE21	ESE20	SE16	SE14	SE11	ESE9	ESE10	E11	E13	ESE14	ESE16	E17	ESE15	ESE15	SE13	SE13	SE18	SE22	SE21	SE21	ESE15.2	SE22
17-Sep	SSE22	SSE19	SSE21	SSE21	SSE22	SSE21	SSE23	SSE24	SSE25	SSE25	SSE24	SSE23	SSE22	S23	S28	S29	S28	S27	S25	S25	S23	S19	S18	S14	SSE22.7	S29
18-Sep	SSW14	SSW13	SW14	WSW9	WSW6	WNW5	NNW7	N14	N17	N12	N12	N13	NNW10	NNW10	NNW7	N7	N4	NE4	E5	ESE6	SE10	SE10	SE13	SSE15	NNW1.2	N17
19-Sep	SSE17	SSE13	SE11	SE12	S14	SSW19	SSW14	SSW15	SSW18	SW16	SW22	WSW24	WSW26	WSW27	WSW19	W23	W23	W21	W11	W25	W24	W19	W16	W20	WSW14.8	WSW27
20-Sep	W18	W17	W17	W16	WNW16	WNW15	W15	WNW16	WNW18	NW17	WNW17	WNW19	WNW19	WNW20	WNW22	WNW21	WNW18	WNW11	WSW8	SW10	SW10	SSW12	SSW13	SSW13	W14.1	WNW22
21-Sep	SSW15	SSW15	SSW17	SW17	SW14	SW16	SW17	SW19	SW16	SW16	SW20	SW23	WSW23	WSW21	W22	WSW19	WSW13	SW6	SSW9	SSW13	SSW14	SSW15	S14	S13	SW15.1	WSW23
22-Sep	S14	S16	S17	S15	S12	S14	S13	SSW17	SSW20	SSW18	SSW18	SW19	WSW19	WSW19	WSW21	SW20	SW17	SW12	SSW11	SW12	SW10	WSW10	W10	WNW13	SSW13.1	WSW21
23-Sep	W12	W15	NW13	NNE15	ESE5	NNE3	NW4	NNW7	NNW12	N13	N10	N8	N10	N8	N4	N5	WNW3	W4	SW3	S4	SE8	SE12	SE13	SSE12	NNW2.8	W15
24-Sep	SSE12	SSE12	SE12	SE12	SE14	SE14	SE12	SE14	SE16	SE16	SE20	SE19	SE20	SE23	ESE22	SE25	SE25	SE28	SE26	SSE25	SSE22	SSW20	W23	WSW11	SSE15.9	SE28
25-Sep	WSW16	WSW20	WSW21	WSW19	WSW22	WSW20	W22	WNW23	WNW23	W21	WNW20	WNW20	NW18	NNW15	NNW16	NNW14	N15	N17	N14	NNE13	NNE10	NNE15	NE11	NE12	WNW11.0	WNW23
26-Sep	NE13	NE12	ENE11	ENE14	ENE16	ENE16	ENE13	NE15	ENE17	ENE18	ENE19	ENE21	ENE18	NE20	NE17	NE21	NE23	NNE19	NNE22	NNE23	NNE20	NNE20	NNE18	NNE18	NE16.7	NE23
27-Sep	NNE18	NNE16	NNE19	NNE19	NNE17	N14	N12	N12	N11	N8	NNE7	N8	ESE3	WSW2	WSW3	SSW4	SW6	W6	SW7	SSW9	SSW11	S10	S13	SSW11	N3.7	NNE19
28-Sep	S14	S15	SSE18	S20	S24	S28	S30	S27	S28	S32	S34	S33	S35	S38	S36	S33	S33	SSW30	SSW30	SSW28	SSW31	SSW33	S27	S24	S28.2	S38
29-Sep	S26	S25	S24	S24	S21	S21	S22	S22	S23	S25	S25	S28	S31	S31	S31	S26	SSW22	SW19	SSW17	SSW20	SSW21	SW18	SW16	SSW13	S22.4	S31
30-Sep	SSW14	SSW13	SSW12	SSW10	SW9	WSW5	W4	S5	NW5	NNW13	NNW17	NNW17	NNW18	N17	N15	N14	N15	N13	N11	N9	NNW12	N11	N15	N12	NNW6.9	NNW18

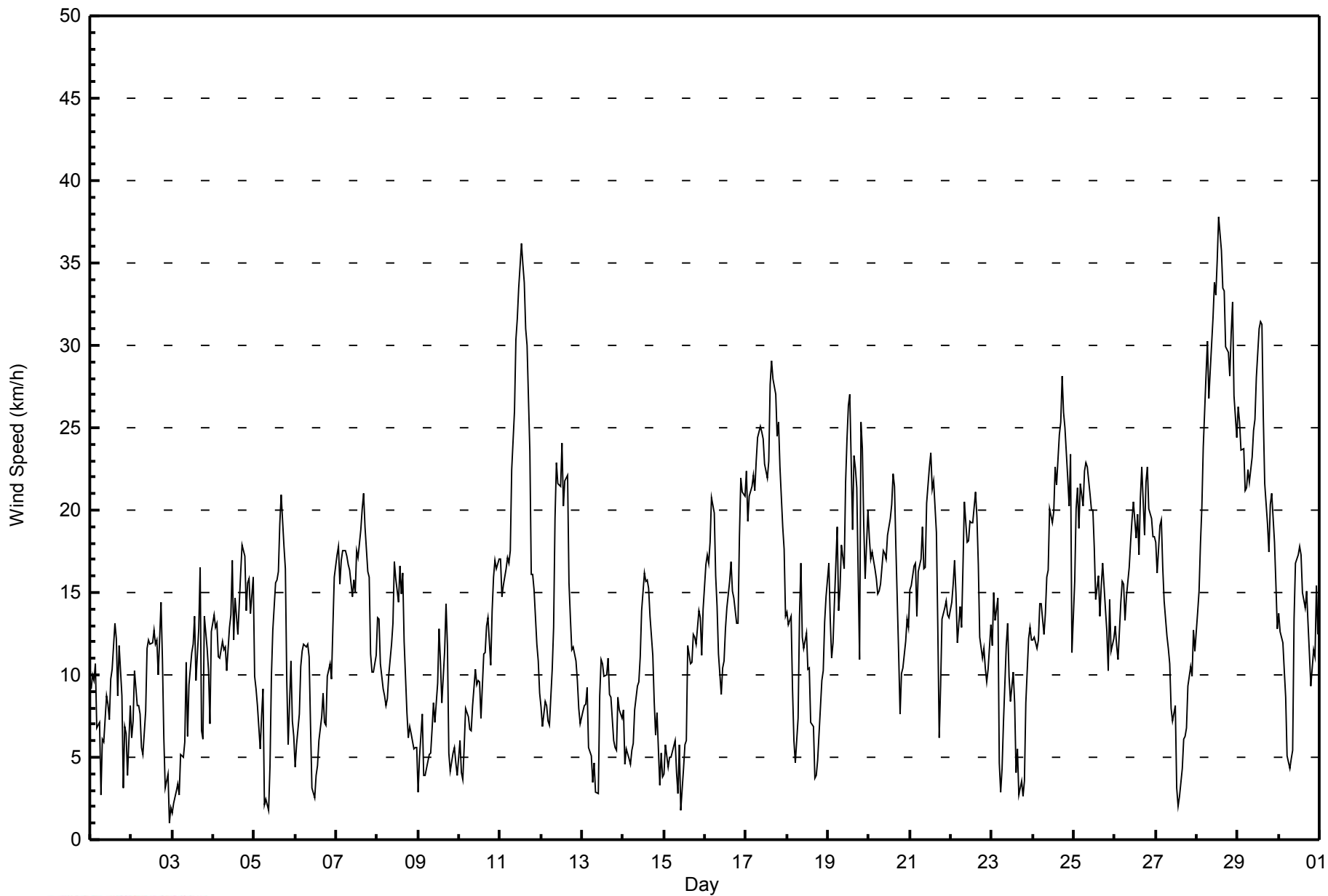
SSW4.4SSW3.9SSW3.3SSW2.7SSW3.1SSW3.1SSW3.1	SW3.0WSW2.0WSW2.3WSW3.1WSW4.0WSW4.6	W5.2	W4.9	W4.1	WSW3.1	WSW2.6SSW2.8SSW3.7SSW4.3SSW3.6SSW3.2SSW2.8	Diurnal Average																	
S26	S25	S24	S24	S24	S28	S30	S27	S28	S32	S34	SW33	SW36	S38	S36	S33	S33	SSW30	SSW30	SSW28	SSW31	SSW33	S27	S24	Diurnal Maximum

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Firebag - September 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Firebag - September 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	82	11.39	11.39
6 - 11	210	29.17	40.56
12 - 19	291	40.42	80.97
20 - 28	112	15.56	96.53
29 - 38	25	3.47	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Firebag - September 2014

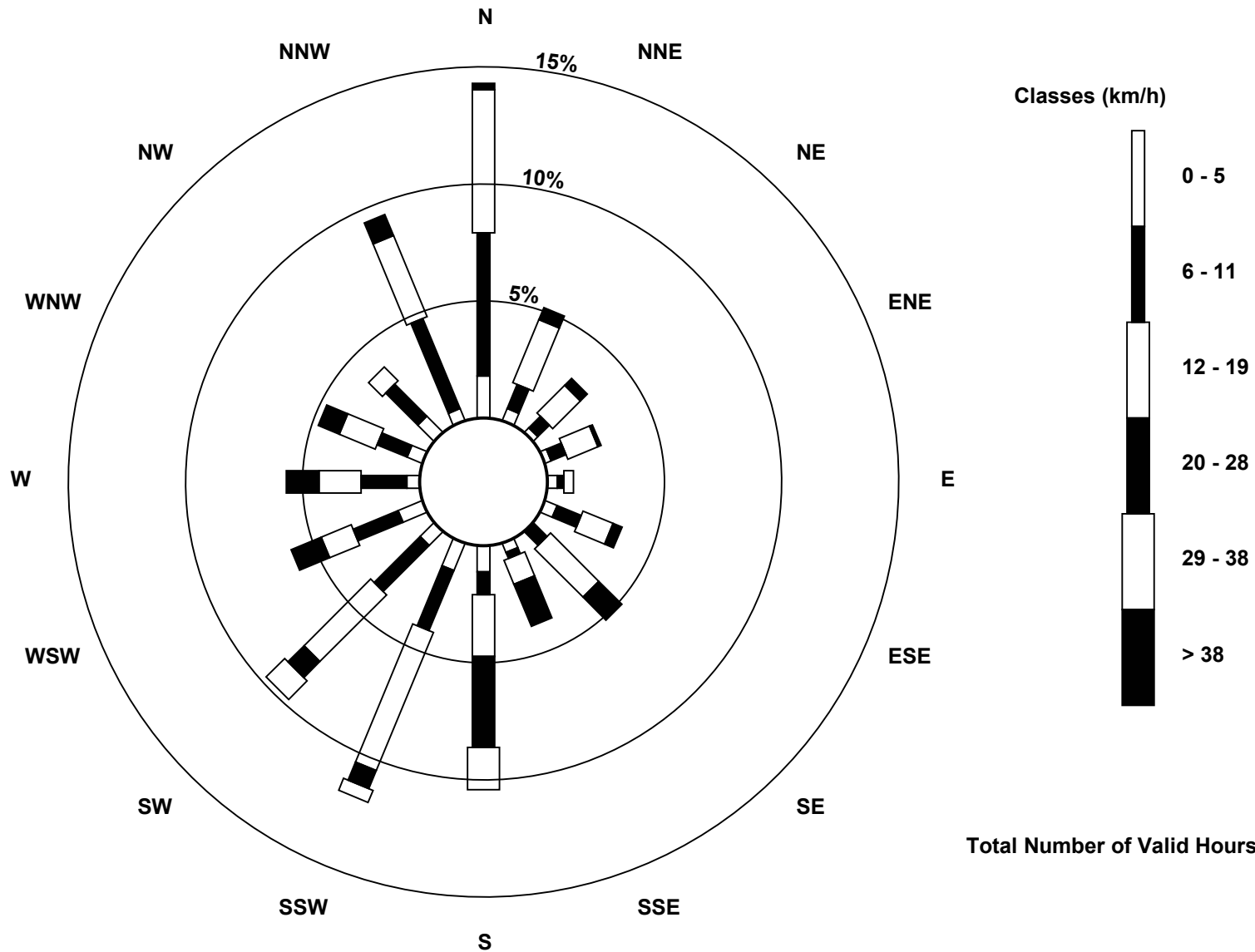
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	13	4	2	2	3	4	0	3	8	9	6	8	4	5	7	4	82
6 - 11	44	8	5	5	2	8	6	2	7	20	20	15	14	10	14	30	210
12 - 19	44	21	12	10	3	10	21	8	19	46	29	10	13	12	6	27	291
20 - 28	2	4	3	1	0	3	10	14	28	6	7	10	10	7	0	7	112
29 - 38	0	0	0	0	0	0	0	0	13	4	8	0	0	0	0	0	25
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	103	37	22	18	8	25	37	27	75	85	70	43	41	34	27	68	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Firebag (AMS 19)**





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Firebag - September 2014

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 23 20:00	Hours of Missing Data: 0
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 4 P ₉₉ = 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	1	2	1	2	2	2	3	2	3	3	3	2	3	3	4	3	2	4	3	2	2	1	4
2-Sep	2	2	1	1	1	2	1	1	2	3	3	3	4	3	4	5	3	4	3	1	0	1	1	1	5
3-Sep	1	1	1	1	1	1	1	2	2	3	3	4	3	3	3	6	5	2	3	3	2	1	3	2	6
4-Sep	2	2	2	2	1	2	2	2	3	2	3	3	4	3	4	4	4	4	4	4	3	3	3	5	5
5-Sep	1	1	2	1	1	3	1	1	1	3	3	3	3	3	3	3	3	3	2	4	1	4	1	2	4
6-Sep	1	1	2	2	3	3	2	3	2	2	2	2	2	2	2	1	2	1	1	2	2	1	4	3	4
7-Sep	3	3	3	3	3	3	3	3	4	3	3	3	4	4	4	4	5	4	3	3	2	2	2	2	5
8-Sep	2	3	3	1	1	1	1	2	2	3	4	4	5	3	4	3	3	2	2	1	1	0	0	1	5
9-Sep	1	1	1	2	1	1	1	1	2	2	2	4	3	3	3	4	3	3	1	1	1	1	1	1	4
10-Sep	1	1	2	3	2	2	1	1	1	2	2	3	3	3	3	4	4	3	2	2	2	2	2	2	4
11-Sep	3	2	2	2	2	2	3	4	5	5	5	6	5	6	6	6	6	5	3	3	2	1	2	1	6
12-Sep	1	1	2	1	1	1	2	3	4	4	4	4	5	5	5	4	4	4	3	3	5	1	1	1	5
13-Sep	1	1	1	2	1	1	2	2	1	1	3	3	3	4	3	3	3	1	1	1	1	1	1	1	4
14-Sep	1	1	1	1	1	1	2	1	2	2	3	3	4	5	4	4	3	2	1	1	1	1	1	1	5
15-Sep	1	1	1	1	0	0	1	1	2	2	1	3	3	3	3	2	2	2	2	2	3	3	2	2	3
16-Sep	3	3	5	4	5	5	4	3	2	2	2	3	3	3	3	3	3	3	3	3	4	5	5	4	5
17-Sep	4	4	4	4	4	4	4	5	4	4	4	4	4	5	5	5	4	4	3	4	4	3	2	2	5
18-Sep	2	2	2	1	2	1	2	3	3	3	3	3	3	4	3	3	2	1	1	1	1	1	2	2	4
19-Sep	2	2	3	2	4	4	2	2	3	3	4	4	5	5	4	5	7	10	3	7	7	4	3	4	10
20-Sep	3	3	3	3	3	3	3	3	3	5	4	4	4	4	5	5	5	4	1	1	1	1	2	2	5
21-Sep	2	2	3	2	2	3	2	3	3	3	3	4	4	4	4	4	4	1	2	1	2	2	2	1	4
22-Sep	2	2	2	2	1	2	2	3	3	2	2	3	3	4	4	4	3	2	1	1	1	1	1	2	4
23-Sep	3	2	3	5	3	2	1	1	2	3	3	3	4	3	3	2	1	1	0	0	4	1	2	1	5
24-Sep	2	1	2	2	2	2	2	3	3	3	4	4	4	5	4	5	5	6	5	4	4	4	5	3	6
25-Sep	3	4	4	3	3	4	5	5	5	4	4	4	4	5	3	3	3	3	3	3	2	3	2	2	5
26-Sep	2	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4
27-Sep	3	3	4	3	3	3	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	1	4
28-Sep	2	2	3	3	3	4	4	4	4	5	6	5	5	5	6	5	5	4	3	4	4	4	4	4	6
29-Sep	3	3	3	3	3	3	3	4	4	4	4	5	5	5	5	5	5	3	4	4	4	3	3	2	5
30-Sep	3	2	1	2	3	1	1	1	2	4	3	3	3	4	3	3	3	3	2	2	2	2	4	3	4
Diurnal Maximum																									



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Firebag - September 2014

Direction of Maximum Speed: 188 deg on Sep 28 14:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 186.3 deg on Sep 28	Hours of Data: 720
Direction of Minimum Speed: 67 deg on Sep 2 23:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.2 deg on Sep 18	Percent Operational Time: 100.0
Monthly Average Direction: 269.2 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	260	261	255	235	241	256	279	231	328	1	347	321	330	297	296	285	265	263	280	14	282	290	302	351	286.9
2-Sep	347	3	17	11	11	14	357	326	331	355	355	336	340	327	343	3	315	344	7	8	360	354	67	184	351.0
3-Sep	253	240	229	232	247	247	235	249	264	281	288	263	276	267	284	315	7	41	141	198	182	194	171	197	250.5
4-Sep	210	210	215	209	200	209	204	201	194	209	219	225	287	328	334	351	353	342	345	348	13	8	357	350	287.3
5-Sep	325	337	341	333	350	354	305	303	122	189	203	194	195	200	203	198	186	172	178	199	221	6	42	356	209.2
6-Sep	318	316	326	358	2	7	8	24	37	48	87	198	168	187	151	115	123	110	103	57	68	70	63	61	49.1
7-Sep	48	45	37	37	45	44	35	28	29	26	21	19	14	0	357	358	7	8	3	8	2	4	350	344	19.0
8-Sep	348	357	354	351	354	351	350	352	359	354	3	5	351	352	344	345	353	358	351	349	337	329	327	348	351.7
9-Sep	353	352	347	5	331	348	20	37	16	359	11	1	7	347	355	344	345	355	358	7	6	4	358	313	357.1
10-Sep	318	306	269	307	306	323	326	323	328	339	339	341	314	313	273	249	231	224	217	197	198	202	212	213	260.3
11-Sep	218	212	213	213	212	211	215	221	221	225	220	217	219	219	217	223	226	229	218	222	226	231	246	246	220.6
12-Sep	236	232	224	232	244	291	327	338	340	336	344	332	337	343	342	346	347	326	315	328	311	330	314	303	325.8
13-Sep	325	352	353	8	15	2	17	59	83	217	266	251	262	247	286	297	272	236	198	173	186	201	202	198	270.3
14-Sep	206	194	185	191	168	153	157	180	170	176	207	232	235	253	253	262	249	224	221	218	212	248	207	193	218.4
15-Sep	192	204	195	188	208	208	217	228	282	18	106	357	357	346	31	63	96	111	114	131	136	140	123	119	122.2
16-Sep	121	117	101	101	103	122	133	138	137	121	112	100	101	106	110	99	112	115	131	130	137	141	145	145	120.8
17-Sep	157	162	163	155	157	161	161	157	168	167	160	161	158	172	169	173	170	176	174	171	176	177	187	186	167.2
18-Sep	192	202	223	238	239	286	335	357	6	4	3	352	348	344	336	357	351	43	84	121	138	140	144	164	344.6
19-Sep	166	156	129	146	187	207	211	212	213	218	222	237	241	245	249	260	268	278	259	272	281	271	264	277	238.2
20-Sep	271	274	273	276	282	282	281	284	295	314	300	289	289	283	282	283	289	286	243	222	219	212	213	208	274.9
21-Sep	208	208	212	215	222	222	218	224	231	231	225	229	237	253	259	252	253	217	194	205	203	195	186	174	222.6
22-Sep	174	171	170	178	180	172	173	196	205	204	208	222	237	244	242	234	228	222	211	215	226	253	278	299	212.9
23-Sep	279	276	318	19	120	15	313	343	340	351	6	6	358	355	9	349	284	272	223	171	140	146	146	149	344.0
24-Sep	156	149	135	136	144	140	145	144	141	142	145	142	128	128	120	125	134	141	145	152	159	195	267	239	146.9
25-Sep	237	245	253	246	247	251	263	284	285	279	282	294	308	339	343	347	356	5	2	13	24	31	42	41	299.4
26-Sep	49	48	66	60	65	64	62	47	64	64	66	62	57	49	41	39	38	29	20	18	20	17	16	20	43.3
27-Sep	14	13	14	16	13	11	11	2	4	8	27	357	115	243	238	212	234	263	230	209	197	182	184	193	0.6
28-Sep	181	177	168	176	178	188	191	191	187	182	180	179	177	188	190	188	189	192	193	194	196	195	189	185	186.3
29-Sep	187	187	186	188	182	177	175	175	174	175	175	177	177	180	188	188	196	217	206	203	213	215	216	207	188.2
30-Sep	201	213	196	213	224	256	259	190	306	344	341	342	348	5	360	352	7	3	4	350	348	359	354	358	337.7

207.5 210.1 208.8 196.3 193.7 203.6 211.2 221.0 239.1 252.3 238.4 248.0 258.0 261.4 262.5 268.8 254.5 241.3 199.7 200.0 198.7 200.2 209.1 206.8

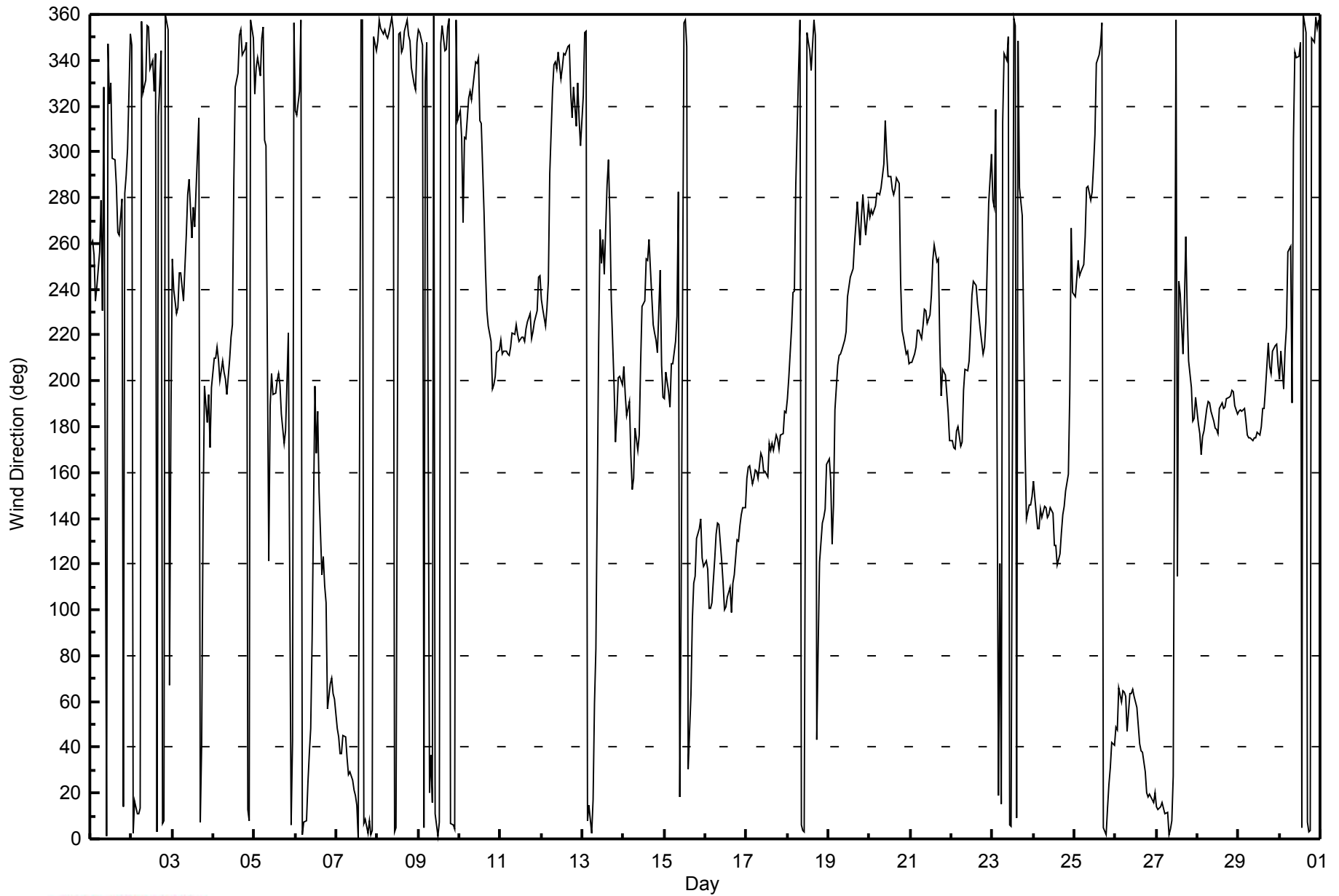
Diurnal Average

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



WBEA
Hourly Averages

Wind Direction (WD) - deg
Firebag - September 2014





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Firebag - September 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 79 deg on Sep 6 12:00			Hours of Data:	720
Minimum Value: 5 deg on Sep 10 20:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P ₁ = 5 P ₁₀ = 8 Q ₁ = 9 Median = 12 Q ₃ = 16 P ₉₀ = 27 P ₉₉ = 70				

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	9	8	10	11	24	16	60	21	45	26	35	55	36	17	19	14	23	16	12	67	12	6	34	9	67
2-Sep	13	11	5	7	11	7	16	19	20	19	21	20	21	19	35	21	20	15	10	6	7	15	75	53	75
3-Sep	22	28	14	15	17	13	11	13	12	35	29	25	30	24	24	34	21	20	32	13	10	8	50	10	50
4-Sep	9	8	7	8	6	8	10	15	19	17	14	13	30	17	19	12	13	12	11	11	11	13	13	11	30
5-Sep	10	11	10	15	7	15	69	55	70	51	25	27	17	16	11	9	10	9	11	33	33	21	13	17	70
6-Sep	14	13	13	14	13	12	12	14	12	24	75	79	53	27	32	18	14	11	16	17	12	11	13	10	79
7-Sep	10	11	11	11	10	10	10	12	11	12	13	13	14	14	15	15	14	12	13	12	12	12	9	9	15
8-Sep	11	12	13	10	7	7	10	14	14	17	19	18	27	15	15	15	14	22	20	10	5	6	6	11	27
9-Sep	16	8	9	27	47	14	16	12	22	22	34	31	18	21	36	24	14	19	15	16	14	8	13	33	47
10-Sep	8	16	32	16	9	13	11	9	11	13	16	22	23	31	17	24	17	12	13	5	6	7	8	8	32
11-Sep	8	8	8	8	8	8	8	9	10	10	11	11	11	11	11	11	10	10	8	8	7	8	8	5	11
12-Sep	9	8	9	7	18	17	12	10	12	12	16	15	18	18	16	14	14	16	11	14	21	10	8	13	21
13-Sep	11	13	11	10	15	14	46	35	37	57	26	21	23	38	29	25	33	15	16	10	11	7	8	6	57
14-Sep	5	8	7	12	12	11	14	11	9	17	21	19	18	21	23	17	15	11	7	11	8	35	10	16	35
15-Sep	8	11	8	9	15	10	11	21	39	31	61	71	44	54	21	15	15	15	14	11	11	10	11	10	71
16-Sep	10	12	17	14	14	13	14	12	12	18	17	23	19	18	15	15	16	15	12	12	12	11	11	11	23
17-Sep	11	10	10	10	10	10	9	10	9	9	12	12	15	18	10	9	10	9	8	8	8	7	7	7	18
18-Sep	10	15	9	9	20	15	18	13	14	13	18	23	26	30	50	38	40	54	21	15	9	8	10	9	54
19-Sep	7	13	12	13	12	9	13	8	8	11	13	13	14	11	10	12	20	19	9	15	12	11	11	11	20
20-Sep	10	10	10	10	11	10	10	10	13	14	21	17	17	15	14	15	13	13	27	10	10	8	8	8	27
21-Sep	7	8	7	8	10	8	8	9	8	12	10	13	12	16	14	14	10	19	5	7	7	8	6	8	19
22-Sep	6	6	7	7	7	7	8	9	8	9	9	11	14	14	13	12	10	7	7	8	9	12	8	11	14
23-Sep	14	10	21	29	49	64	14	11	10	14	16	31	33	42	69	42	61	28	28	15	9	7	7	7	69
24-Sep	7	8	11	10	8	9	9	9	11	12	12	14	12	11	12	12	10	10	9	11	25	14	20	25	
25-Sep	10	11	10	9	8	10	11	11	12	12	13	13	15	21	12	14	12	14	14	12	11	13	10	10	21
26-Sep	13	16	12	11	11	12	13	11	11	10	12	10	11	10	11	11	10	13	12	10	10	9	11	10	16
27-Sep	11	11	10	10	10	12	10	13	14	17	24	27	56	76	71	74	35	15	18	11	5	9	10	8	76
28-Sep	8	8	8	8	8	8	8	8	8	9	9	11	10	10	10	9	9	7	6	7	7	7	8	8	11
29-Sep	7	7	7	7	8	7	7	8	8	8	9	10	10	11	10	8	14	9	9	8	8	9	8	11	14
30-Sep	9	8	7	17	20	14	18	24	30	14	12	11	11	14	16	13	12	13	12	15	10	14	13	13	30

22	28	32	29	49	64	69	55	70	57	75	79	56	76	71	74	61	54	32	67	33	35	75	53	
Diurnal Maximum																								



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 5, 2014	Previous Calibration	August 13, 2014
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	7:03	End Time (MST)	11:05
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
Cal Gas Concentration	49.3 ppm	Cal Gas Expiry Date	12-Dec-16
Gas Cert Reference	SA130123A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037
DACS voltage range	NA	DACS channel #	N/A

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-606	-606
Analyzer Range (mv)	1000	1000	Lamp voltage	785	785
Calculated slope	0.999138	0.982299	Chamber temp.	44.9	44.9
Calculated intercept	-0.454282	1.534090	Pressure (mmHg)	690.1	690.1
Analyzer Background	9.8	9.5	Flow (lpm)	0.451	0.451
Analyzer Coefficient	0.996	0.973	Intensity	91	91

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	-1.0	NA
as found span	5000	58.3	574.8	591.0	0.973
calibrator zero	5000	0.0	0.0	-1.0	NA
high point	5000	58.3	574.8	583.9	0.984
second point	5000	29.1	286.9	290.3	0.988
third point	5000	14.7	144.9	145.4	0.997
calibrator zero	6000	0.0	0.0	-0.7	NA
as left zero	6000	0.0	0.0	-0.7	NA
as left span	5000	58.3	574.8	575.6	0.999
Average Correction Factor					0.990

Corrected As found 592.0 Previous response 575.8 % change -2.7%

Notes:

No Maintenance Done, Filter changed out, span adjusted

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

SO₂ Calibration Summary

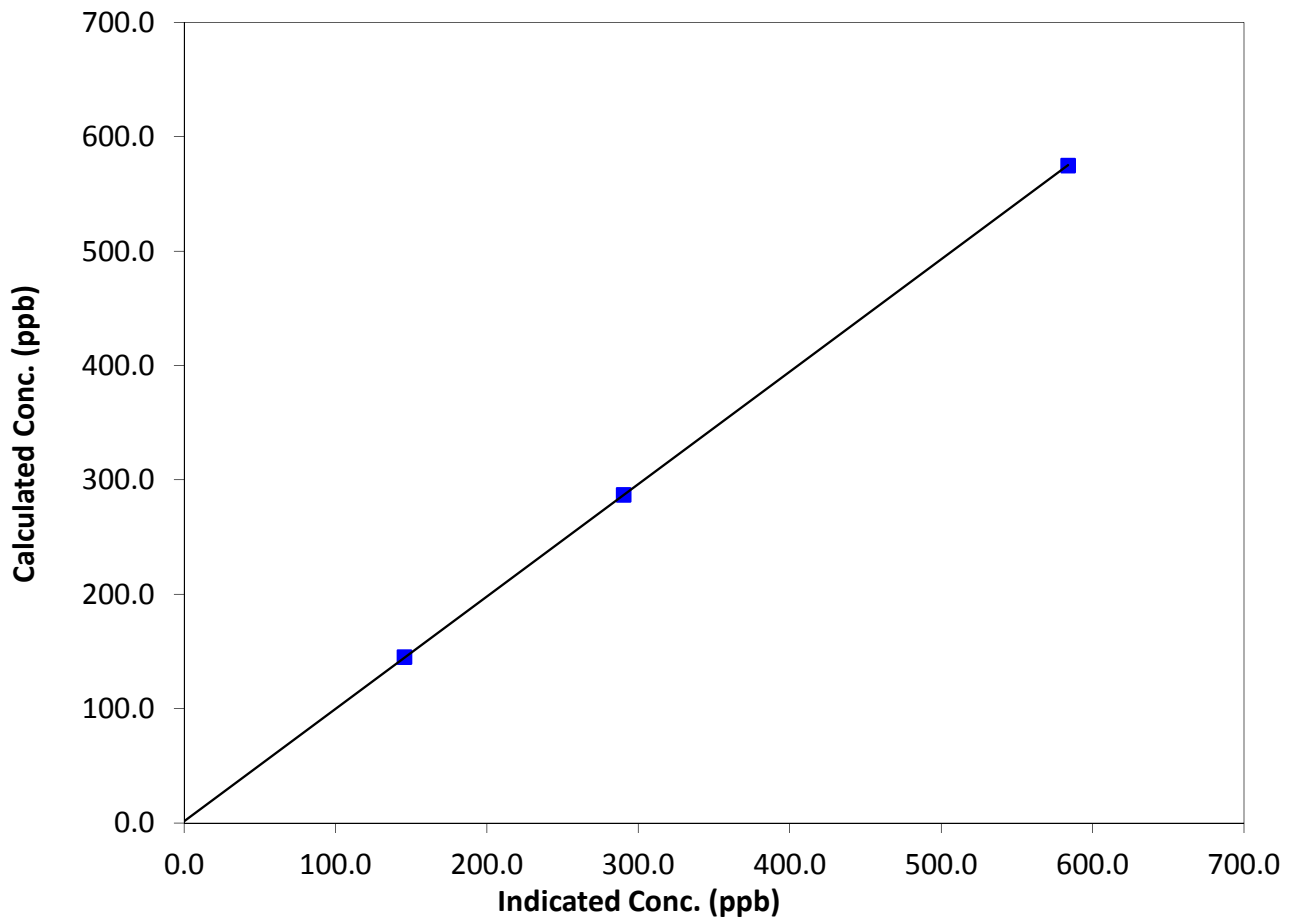
Station Information

Calibration Date	September 5, 2014	Previous Calibration	August 13, 2014
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:03	End Time (MST)	11:05
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

Calibration Data

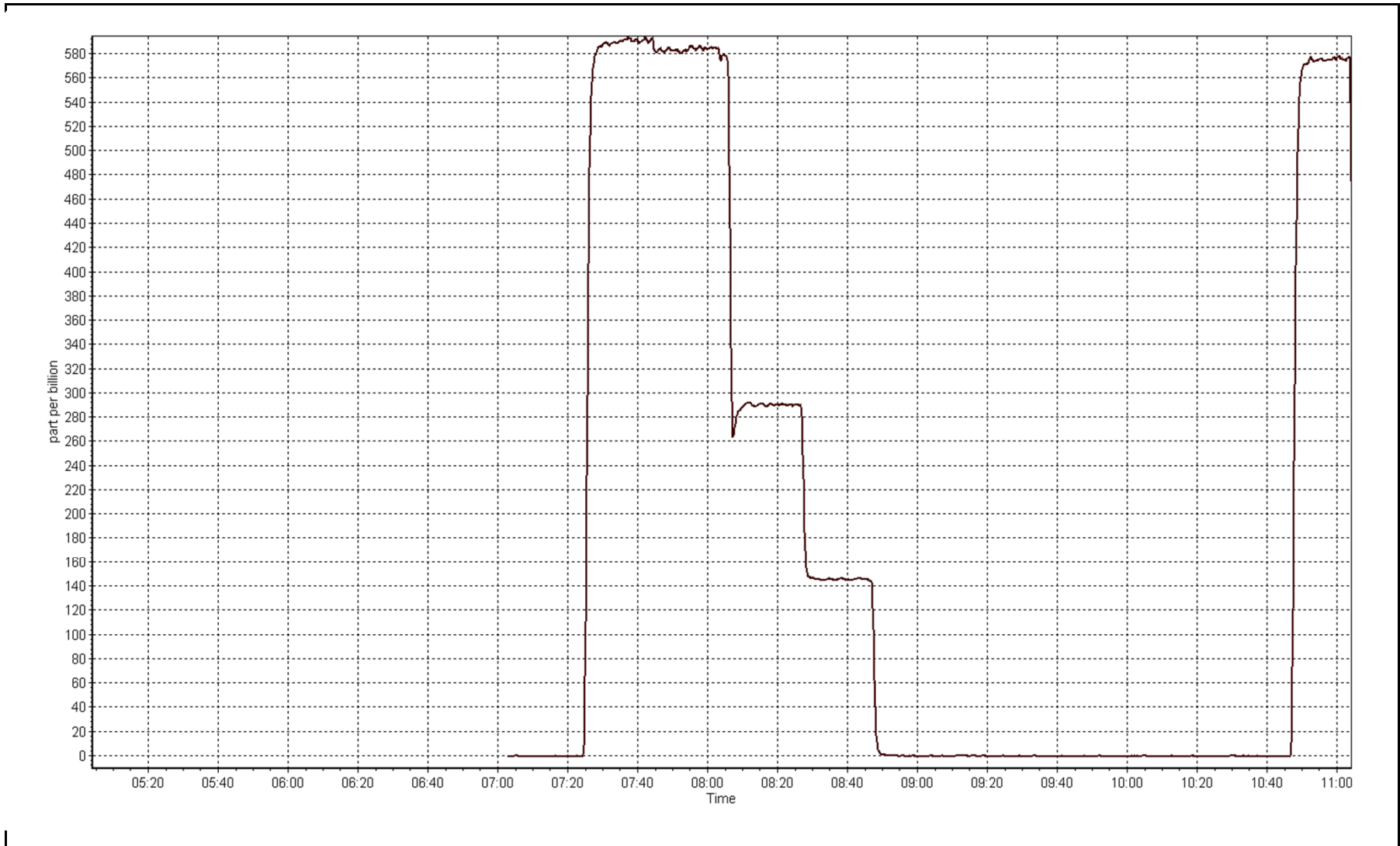
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.0	N/A	Correlation Coefficient	0.999996
574.8	583.9	0.9845		
286.9	290.3	0.9884	Slope	0.982299
144.9	145.4	0.9969		
			Intercept	1.534090

SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 5, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 8, 2014
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	13:15
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	996
Cal Gas Concentration	4.85 ppm H2S	Cal Gas Expiry Date	10-Jun-14
Gas Cert Reference	ALM066720	SO2 gas conc.	49.3 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	N/A
DACS voltage range	NA	DACS channel #	TCP/IP

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	15	15
Analyzer Range (mv)	100	100	Lamp voltage	2726	2726
Calculated slope	1.008894	1.005309	Chamber temp.	30	30
Calculated intercept	0.118945	-0.213099	Pressure	23.1	23.8
Analyzer Background	27.8	32.8	Flow	575	611
Analyzer Coefficient	0.756	0.660	Intensity	67	68
			Converter temp.	315	315

Analyzer make/model	API H2S T101	Analyzer serial #	158
Converter make/model		Converter serial #	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	NA
as found span	5000	83.3	80.8	82.7	0.977
SO2 scrubber check	5000	29.2	287.9	7.2	NA
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	83.3	80.8	80.4	1.005
second point	5000	41.7	40.4	40.7	0.994
third point	5000	21.0	20.4	20.7	0.984
calibrator zero	5000	0.0	0.0	-0.2	NA
as left zero	5000	0.0	0.0	-0.2	NA
as left span	5000	83.3	80.8	79.8	1.013
Average Correction Factor					0.994

Corrected As found	82.4	Previous response	80.0	% change	-2.9%
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Notes:

Performed leak test, scrubber replacement. Zero and span adjustments performed.

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

H2S Calibration Summary

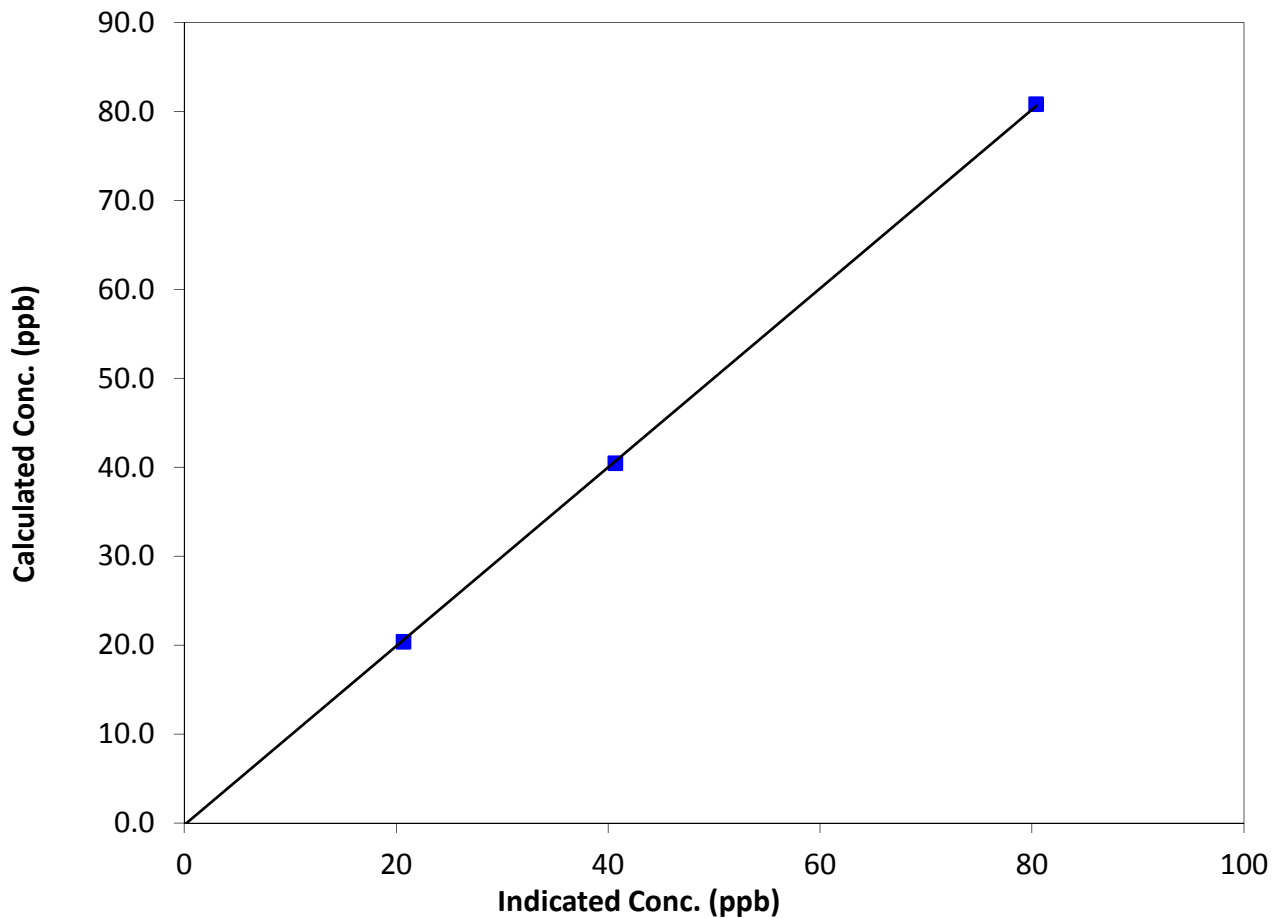
Station Information

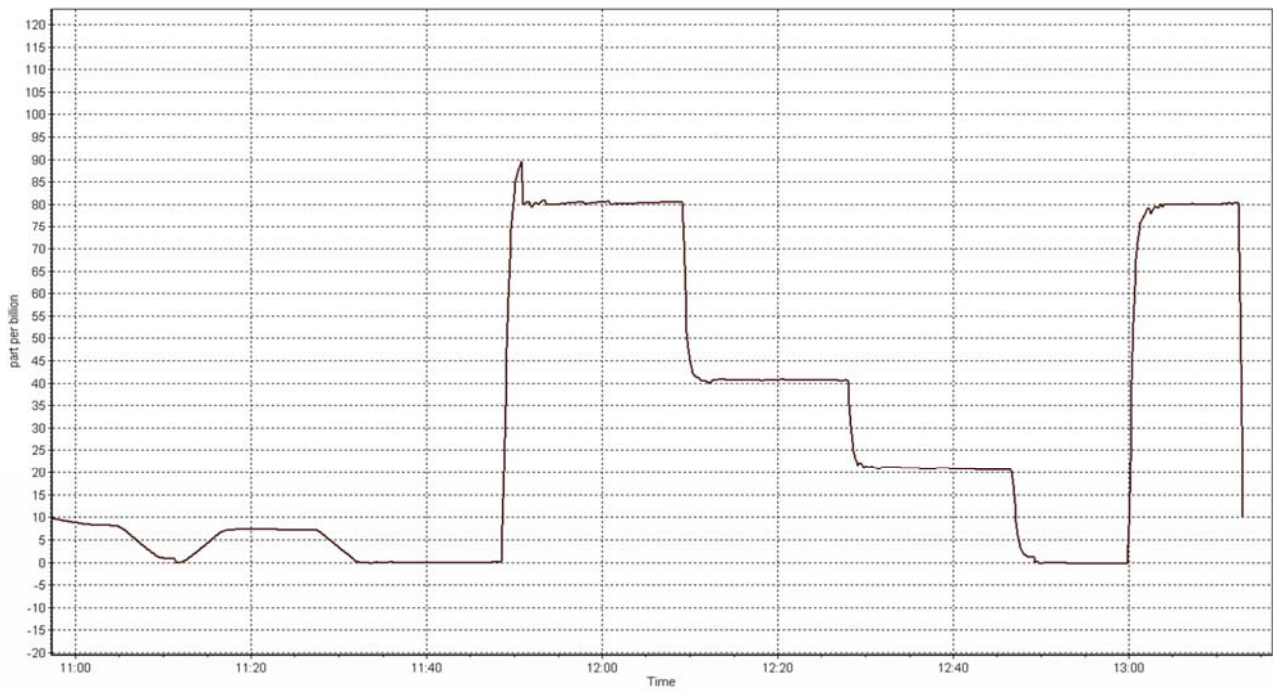
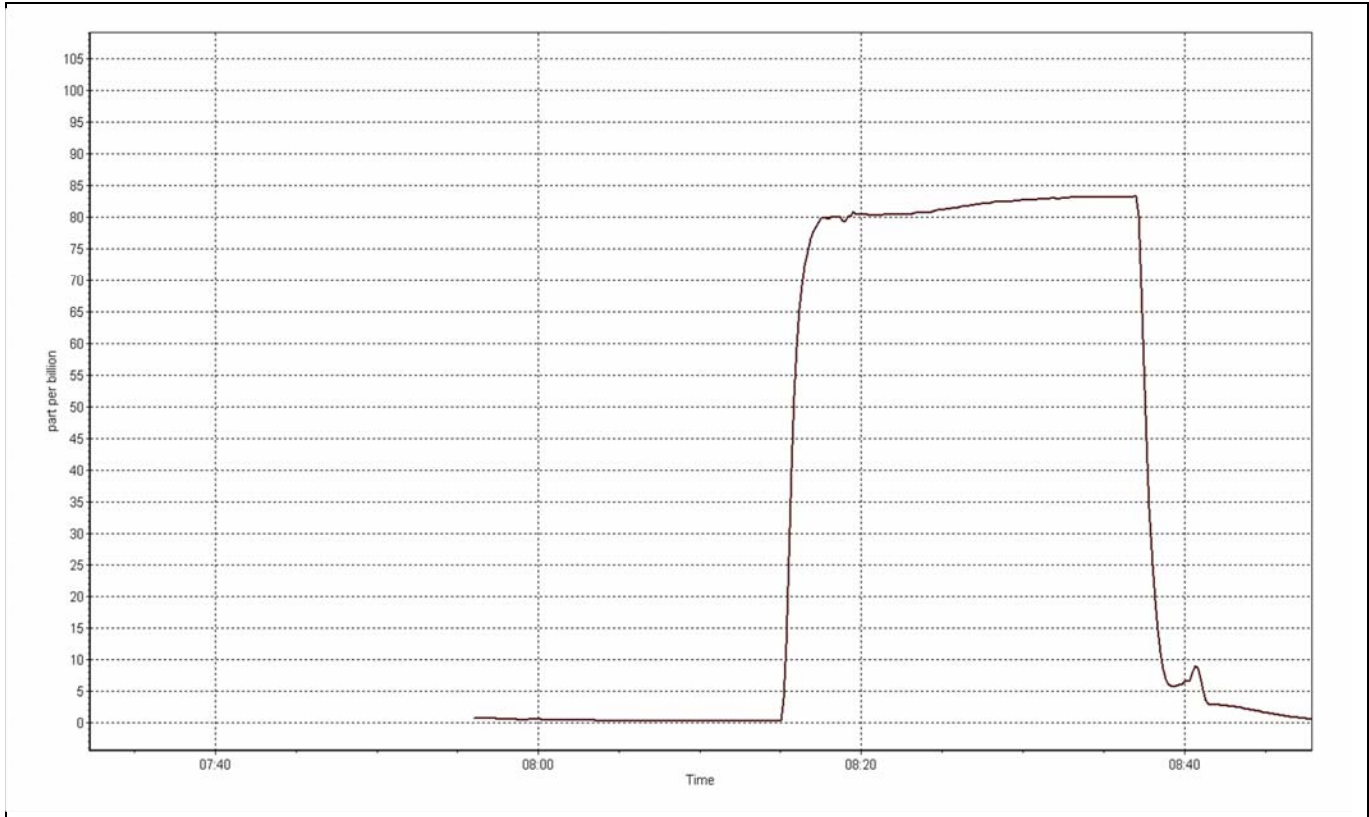
Calibration Date	September 9, 2014	Previous Calibration	August 8, 2014
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:55	End Time (MST)	13:15
Analyzer make	API H2S T101	Analyzer serial #	158

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999933
80.8	80.4	1.0050		
40.4	40.7	0.9938	Slope	1.005309
20.4	20.7	0.9841		
			Intercept	-0.213099

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Friday, September 05, 2014	Previous Calibration	Wednesday, August 13, 2014
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	7:03	End Time (MST)	11:05
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
Gas Cert Reference	SA130123A	Cal Gas Expiry Date	12-Dec-16
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037
DACS voltage range	NA	DACS channel #	NA

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	100	100	Sample Pressure	8.5	8.5
Analyzer Range (mv)	100	100	Air or Bypass press	34.9	34.9
Calculated slope	1.001638	1.000172	Fuel Pressure	22.9	22.9
Calculated intercept	-0.053268	-0.015025		3.9	3.8
				3.407	3.366

Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.02	N/A
as found span	5000	58.3	12.74	12.83	0.993
calibrator zero	5000	0.0	0.00	-0.02	N/A
high point	5000	58.3	12.74	12.73	1.000
second point	5000	29.1	6.36	6.39	0.995
third point	5000	14.7	3.21	3.26	0.985
calibrator zero	5000	0.0	0.00	0.04	N/A
as left zero	5000	0.0	0.00	0.04	N/A
as left span	5000	58.3	12.74	12.66	1.006
Average Correction Factor					0.993

Corrected As found	12.85	Previous response	12.77	% change	-0.6%
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Notes:

Filter changed, No Maintenance Done, span adjusted

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

THC Calibration Summary

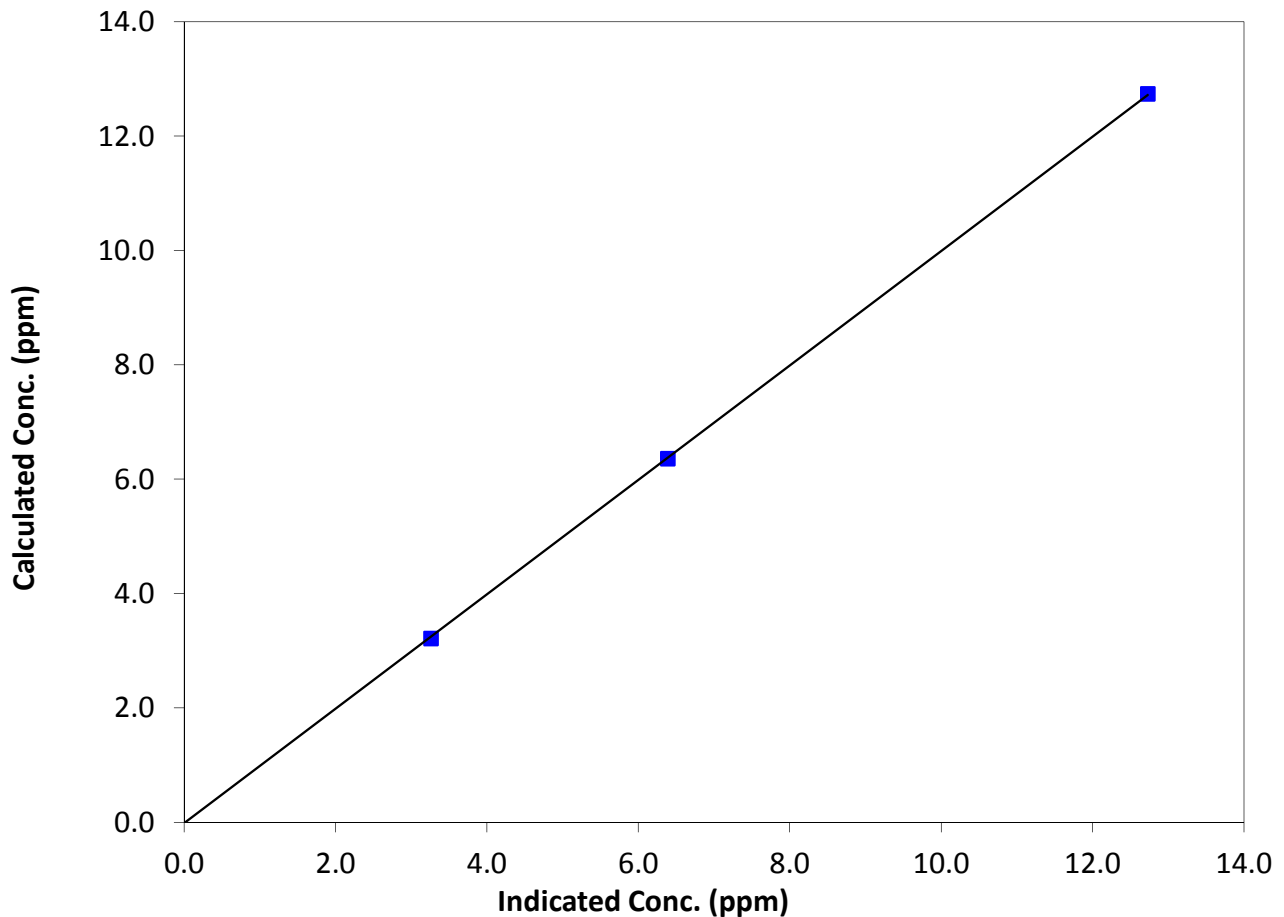
Station Information

Calibration Date	September 5, 2014	Previous Calibration	August 13, 2014
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:03	End Time (MST)	11:05
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

Calibration Data

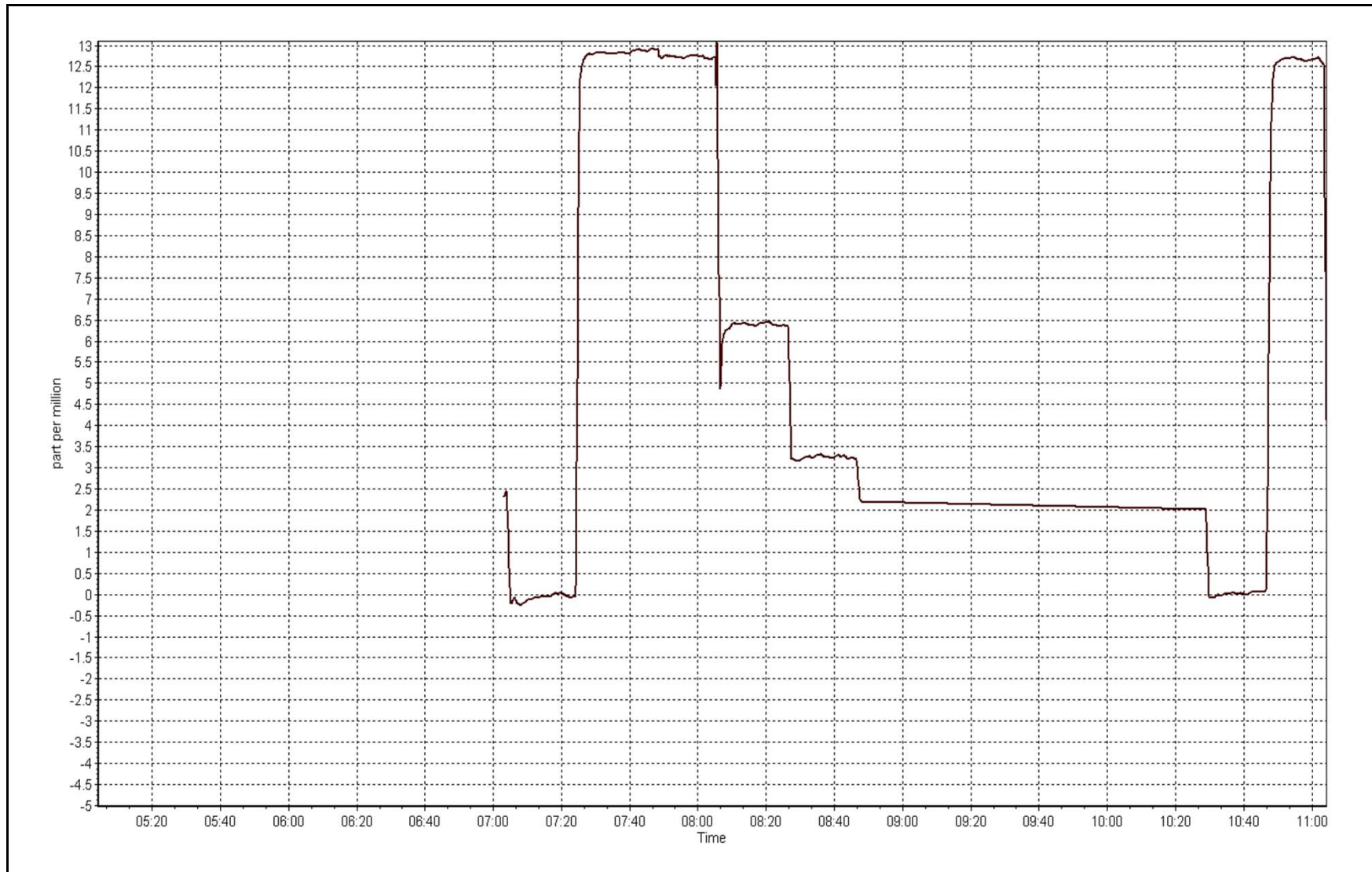
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.02	N/A	Correlation Coefficient	0.999965
12.74	12.73	1.0004		
6.36	6.39	0.9948	Slope	1.000172
3.21	3.26	0.9850		
			Intercept	-0.015025

THC Calibration Curve



THC Calibration Plot

Date: September 5, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	September 5, 2014	Previous Calibration	August 13, 2014
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	7:03	End Time (MST)	11:05
Barometric Pressure	mmHg	Station Temperature	22.0 Deg C
Calibrator	API T700	Serial Number	996
NO Cal Gas Conc	51.5 ppm	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	51.5 ppm	Cal Gas Serial #	SA130123A

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	1.009522	1.009552	1.002636
	Data Offset	-0.684258	-0.407968	0.268643
After	Data Slope	1.007183	1.007212	1.003948
	Data Offset	-0.195333	0.007981	0.428634
Channel #				
Voltage Range				

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.824	ppb	0.824	ppb
NOX coefficient	0.998	ppb	0.998	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	3.5		3.5	
NOX bkgrnd	3.6		3.6	
Nt coefficient	N/A		N/A	
Chamber Temp	50.6	Deg C	50.6	Deg C
Moly Temp	322.5	Deg C	322.5	Deg C
PMT Temp	-2.8	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	161.1	mmHg	161.1	mmHg
Sample Flow	0.645	ccm	0.645	ccm

Notes:

Filter changed out, No maintenance or adjustments made



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

September 5, 2014

Station Number:

AMS 19

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	N/A	N/A
as found span	5000	58.3	600.5	600.5	0.0	597.0	596.0	1.0	1.0058	1.0075
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	N/A	N/A
high point	5000	58.3	600.5	600.5	0.0	596.0	596.0	-0.2	1.0075	1.0075
second point	5000	29.1	299.7	299.7	0.0	298.6	298.2	0.6	1.0038	1.0051
third point	5000	14.7	151.4	151.4	0.0	150.5	149.8	0.8	1.0060	1.0107
calibrator zero	6000	0.0	0.0	0.0	0.0	0.1	0.1	-0.1	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	0.1	0.1	-0.1	N/A	N/A
as left span	5000	58.3	600.5	267.4	333.1	591.2	265.0	326.3	1.0157	1.0091
Average Correction Factor									1.0058	1.0078

Corrected As found

NO_x= 597.1

NO= 596.0

Percent Change

NO_x= -0.3%

NO= -0.1%

Previous Response

NO_x= 595.5

NO= 595.2

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

58.30

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO ₂ (300)	N/A	267.4	328.2	594.2	267.4	326.7	0.9989	1.0000	1.0046	99.5%
2nd NO ₂ (200)	N/A	374.3	221.3	594.2	374.3	220.0	0.9989	1.0000	1.0059	99.4%
3rd NO ₂ (100)	N/A	480.8	114.8	594.1	480.8	113.3	0.9991	1.0000	1.0132	98.7%
4th NO ₂ (0)	595.6	N/A	-0.5	595.1	595.6	-0.5	0.9974	1.0000	N/A	N/A
Average Correction Factor							0.9986	1.0000	1.0079	99.2%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

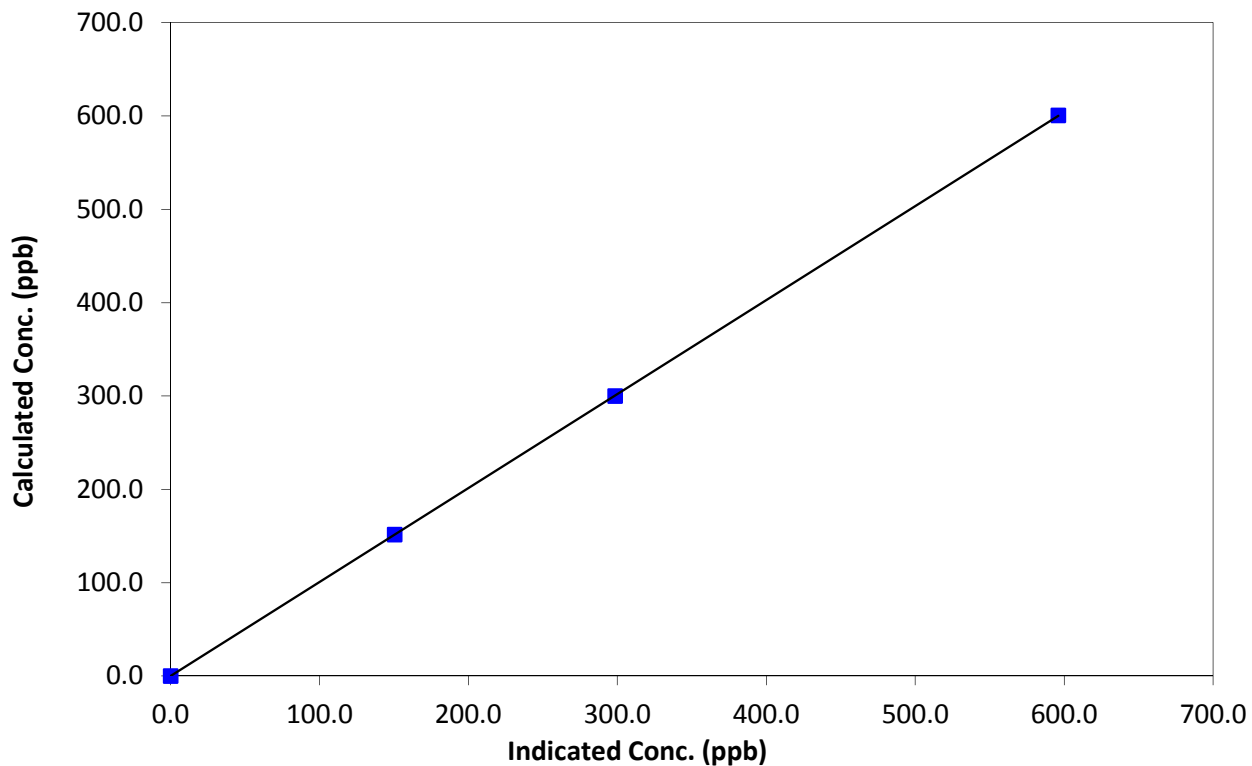
Station Information

Calibration Date	September 5, 2014	Previous Calibration	August 13, 2014
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:03	End Time (MST)	11:05
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	0.999996
600.5	596.0	1.0075		
299.7	298.6	1.0038	Slope	1.007183
151.4	150.5	1.0060		
0.0	0.1	0.0000	Intercept	-0.195333

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

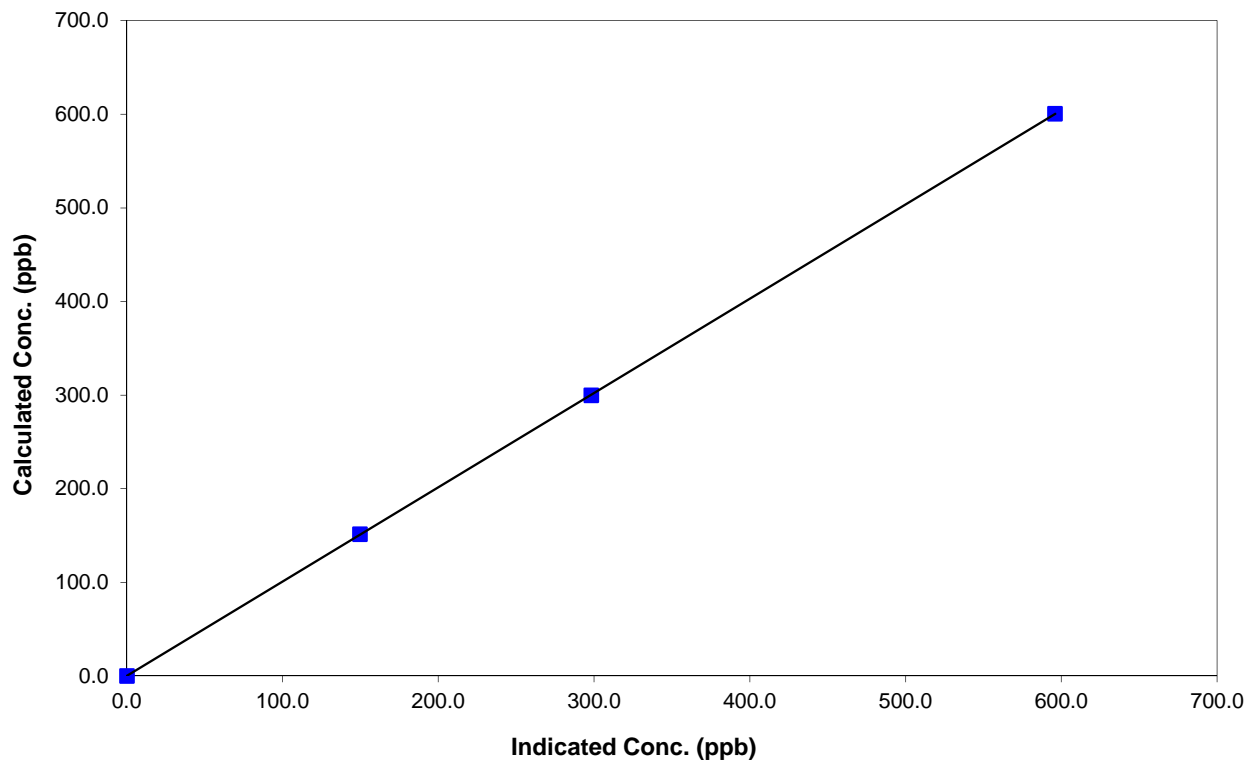
Station Information

Calibration Date	September 5, 2014	Previous Calibration	August 13, 2014
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:03	End Time (MST)	11:05
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999997
600.5	596.0	1.0075		
299.7	298.2	1.0051	Slope	1.007212
151.4	149.8	1.0107		
0.0	0.1	0.0000	Intercept	0.007981

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

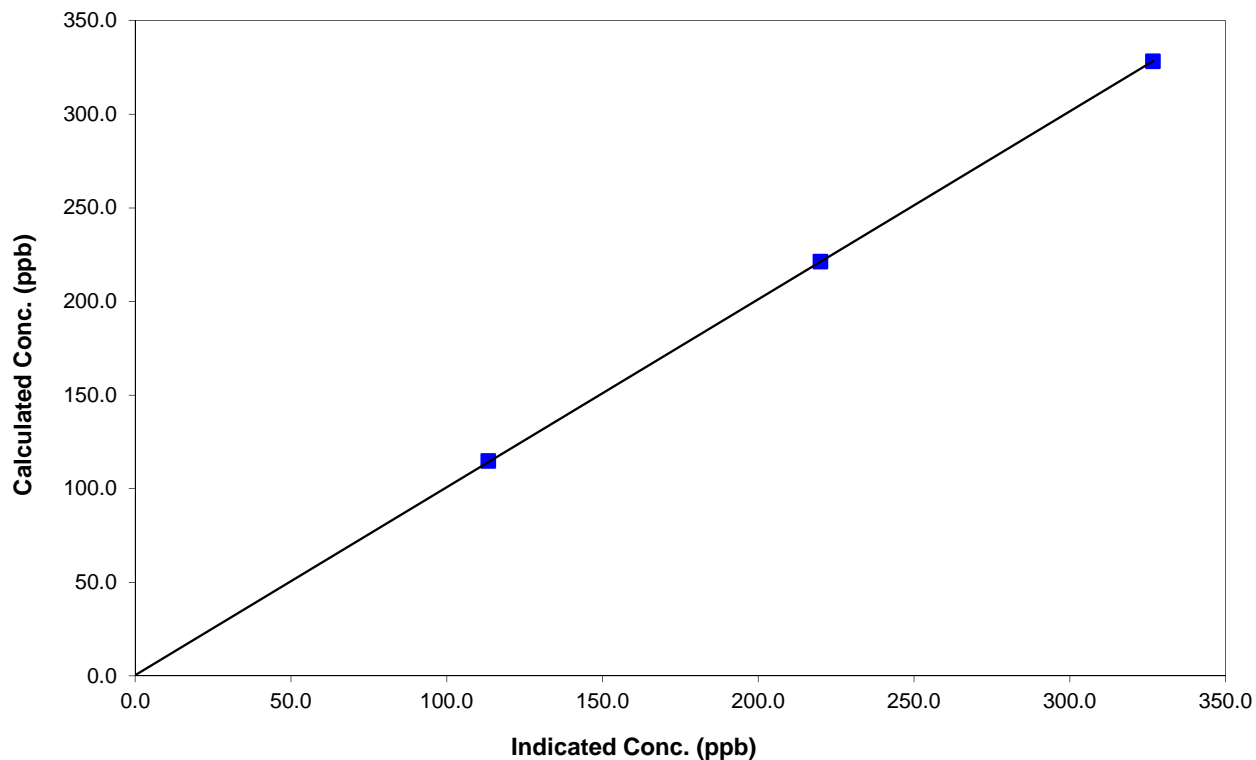
Station Information

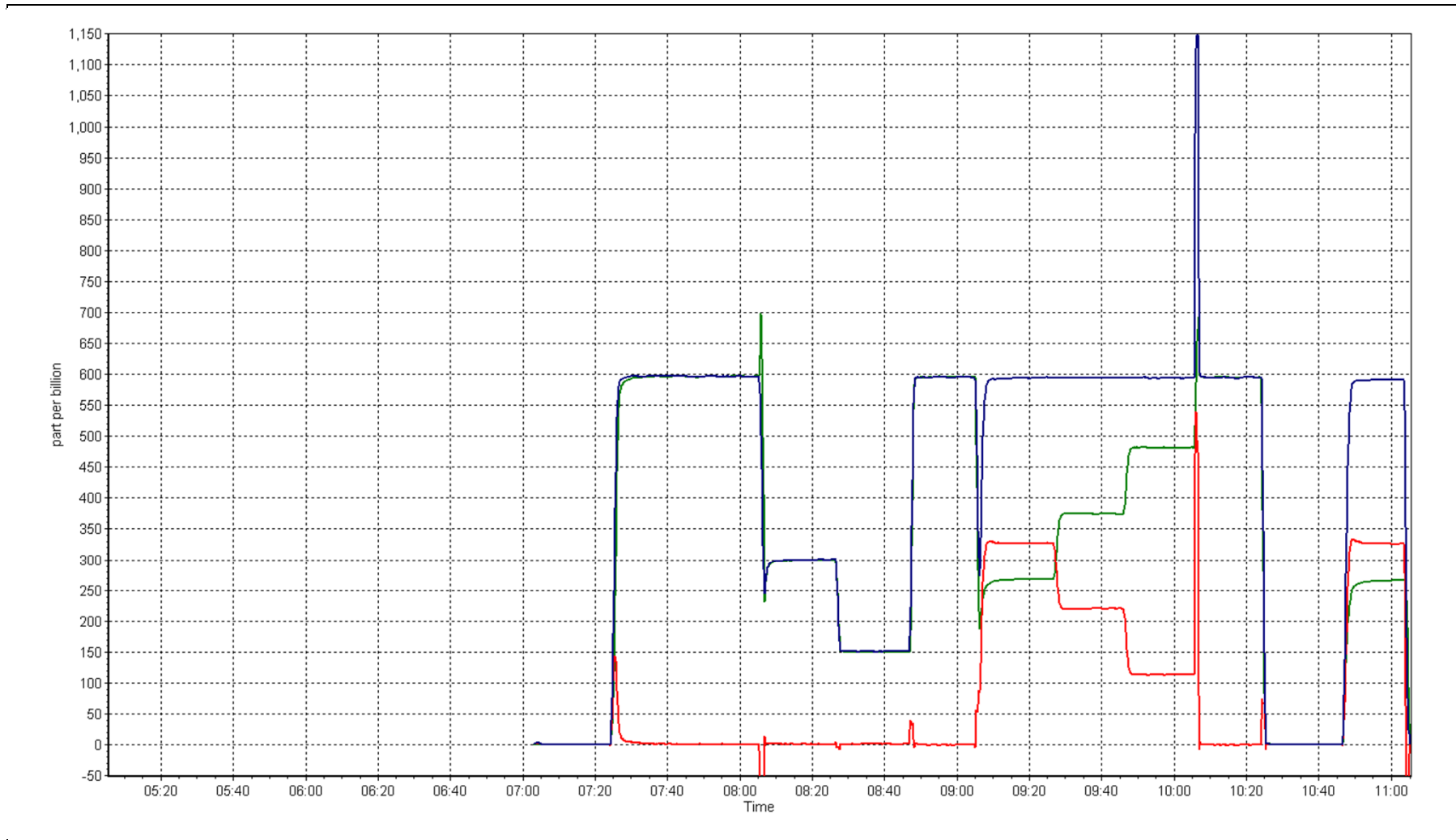
Calibration Date	September 5, 2014	Previous Calibration	August 13, 2014
Station Number	Firebag	Station Number	AMS 19
Start Time (MST)	7:03	End Time (MST)	11:05
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999990
328.2	326.7	1.0046		
221.3	220.0	1.0059	Slope	1.003948
114.8	113.3	1.0132		
			Intercept	0.428634

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 501
STATOIL LEISMER
SEPTEMBER 2014**

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

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

October 30, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
 SEPTEMBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	660	36	60	96.67	5	0	1	0
H2S (ppb) Average	681	33	39	99.17	1	0	0	0
NO2 (ppb) Average	684	36	36	100.00	14	0	3	-
NO (ppb) Average	684	36	36	100.00	34	-	3	-
NOX (ppb) Average	684	36	36	100.00	45	-	5	-
Temperature 2 m (C) Average	720	0	0	100.00	28.2	-	18.7	-
Relative Humidity (%) Average	720	0	0	100.00	100	-	-	-
Wind Speed 10 m (km/h) Average	703	0	17	97.64	27	-	-	-
Wind Direction 10 m (deg) Average	703	0	17	97.64	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
 SEPTEMBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	665	0.5	1	-	0	0	0	0	0	1	6
H2S (ppb) Average	700	0.2	0	-	0	0	0	0	0	0	1
NO2 (ppb) Average	696	1.2	1	-	0	0	0	1	2	3	12
NO (ppb) Average	696	1	2	-	0	0	0	0	1	2	26
NOX (ppb) Average	696	2.1	3	-	0	0	1	1	3	5	39
Temperature 2 m (C) Average	744	16.49	5.6	-	3.4	9.7	12.4	16.3	20.3	25	28.5
Relative Humidity (%) Average	744	66.4	18	-	24	42	51	67	82	90	99
Wind Speed 10 m (km/h) Average	725	8.1	5	-	0	3	4	7	11	15	23
Wind Direction 10 m (deg) Average	725	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
 SEPTEMBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	01 Sep 2014 03:00	25 Sep 2014 03:00	19	Stabilization after daily span
SO2	11 Sep 2014 04:00	11 Sep 2014 05:00	2	Intermittent unstable operation - excessive baseline drift
SO2	12 Sep 2014 15:00	12 Sep 2014 16:00	2	Intermittent unstable operation - excessive baseline drift
SO2	28 Sep 2014 11:00	28 Sep 2014 11:00	1	Intermittent unstable operation - excessive baseline drift
H2S	11 Sep 2014 00:00	11 Sep 2014 01:00	2	Intermittent unstable operation - excessive baseline drift
H2S	21 Sep 2014 04:00	21 Sep 2014 04:00	1	Intermittent unstable operation - excessive baseline drift
H2S	22 Sep 2014 21:00	22 Sep 2014 21:00	1	Intermittent unstable operation - excessive baseline drift
H2S	27 Sep 2014 07:00	27 Sep 2014 07:00	1	Intermittent unstable operation - excessive baseline drift
H2S	27 Sep 2014 15:00	27 Sep 2014 15:00	1	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	03 Sep 2014 21:00	03 Sep 2014 21:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	04 Sep 2014 00:00	04 Sep 2014 01:00	2	Flatline in sensor output signal
Wind Speed, Wind Direction	08 Sep 2014 00:00	08 Sep 2014 08:00	9	Flatline in sensor output signal
Wind Speed, Wind Direction	14 Sep 2014 06:00	14 Sep 2014 06:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	14 Sep 2014 08:00	14 Sep 2014 08:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	14 Sep 2014 20:00	14 Sep 2014 20:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	22 Sep 2014 22:00	22 Sep 2014 22:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	24 Sep 2014 04:00	24 Sep 2014 04:00	1	Flatline in sensor output signal

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 5 ppb on Sep 3 11:00	Maximum Daily Average: 1.2 ppb on Sep 30		Hours of Data:	660
Minimum Value: 0 ppb on Sep 8 13:00	Minimum Daily Average: 0.2 ppb on Sep 7		Hours of Missing Data:	60
Maximum Diurnal Average: 0.8 ppb at hour 11	Minimum Diurnal Average: 0.3 ppb at hour 1		Hours of Calibration:	36
Monthly Average: 0.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 3		Percent Operational Time:	96.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	Z	RE	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.3	1
2-Sep	0	Z	RE	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
3-Sep	1	Z	RE	3	1	1	1	1	1	2	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0.9	5
4-Sep	0	Z	RE	0	0	0	0	0	0	0	0	0	0	1	3	2	1	0	0	0	0	0	0	0	0.5	3
5-Sep	1	Z	RE	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.3	2
6-Sep	0	Z	RE	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.6	1
7-Sep	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Sep	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
9-Sep	1	Z	RE	1	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	--	1
10-Sep	0	Z	RE	0	0	0	1	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1
11-Sep	0	Z	RE	UO	UO	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0.3	1
12-Sep	0	Z	RE	0	0	1	0	1	1	0	1	3	2	0	UO	UO	0	0	0	0	0	0	0	0	0.6	3
13-Sep	0	Z	RE	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0.3	1
14-Sep	0	Z	RE	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
15-Sep	0	Z	RE	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.4	1
16-Sep	0	Z	RE	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
17-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
18-Sep	0	Z	RE	0	1	0	0	0	1	1	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0.5	1
19-Sep	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0.4	3
20-Sep	0	Z	0	0	0	1	1	1	2	3	2	3	1	0	0	0	0	1	0	0	0	0	0	0	0.7	3
21-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	0.3	1
22-Sep	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1
23-Sep	0	Z	3	1	1	0	0	1	0	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.7	3
24-Sep	0	Z	0	0	1	1	1	1	1	1	1	1	1	0	1	0	1	3	3	1	3	4	3	0	1.2	4
25-Sep	0	Z	RE	0	0	0	0	0	0	0	2	2	1	1	1	0	0	0	0	0	1	1	0	0	0.6	2
26-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
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	0.3	0
28-Sep	0	Z	0	0	0	0	0	0	0	0	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-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	0.4	1
30-Sep	0	Z	0	0	1	0	1	3	2	1	3	2	1	3	1	1	2	1	1	2	0	2	0	0	1.2	3

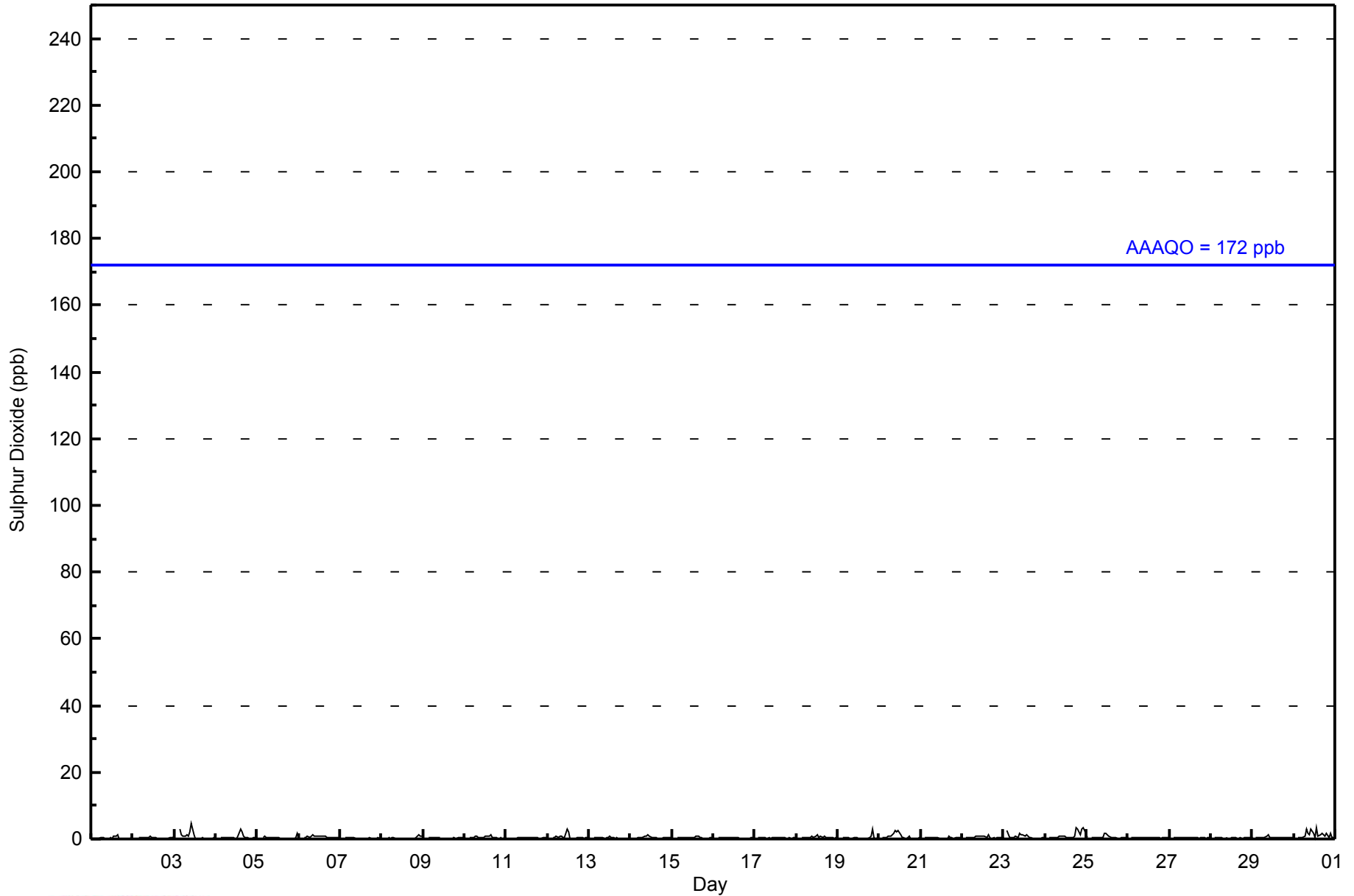
0.3	--	0.6	0.4	0.4	0.4	0.4	0.5	0.5	0.7	0.8	0.7	0.5	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	Diurnal Average	
1	--	3	3	1	1	1	3	2	3	5	3	2	3	3	2	2	1	3	3	3	3	4	3	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	660	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: 660

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer - September 2014

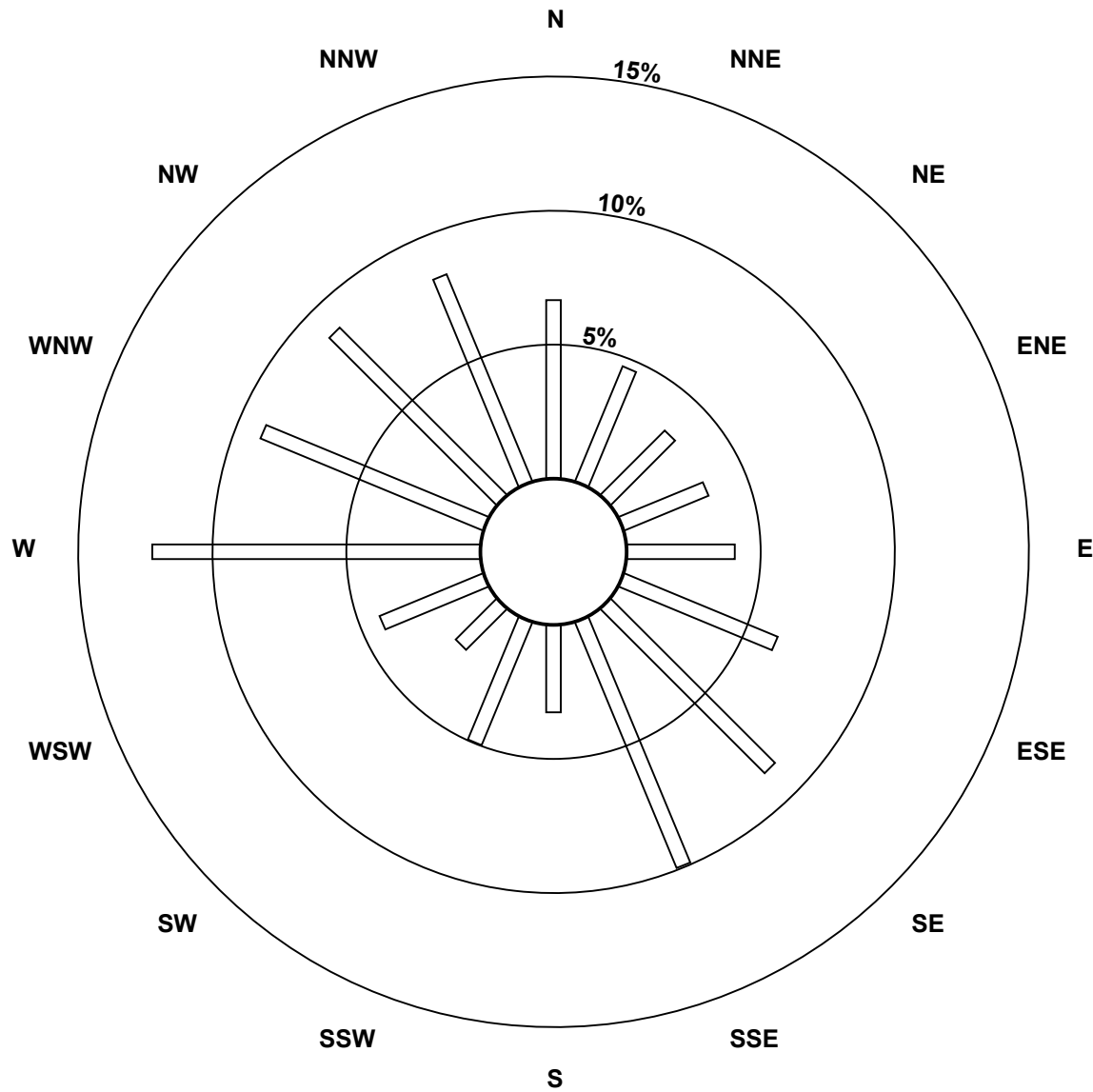
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	43	30	22	22	26	40	56	64	21	32	14	27	79	58	57	54	645
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	43	30	22	22	26	40	56	64	21	32	14	27	79	58	57	54	645

Total Number of Valid Hours: 645

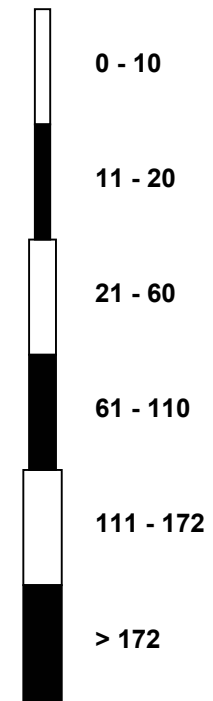
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer (AMS501)



Classes (ppb)

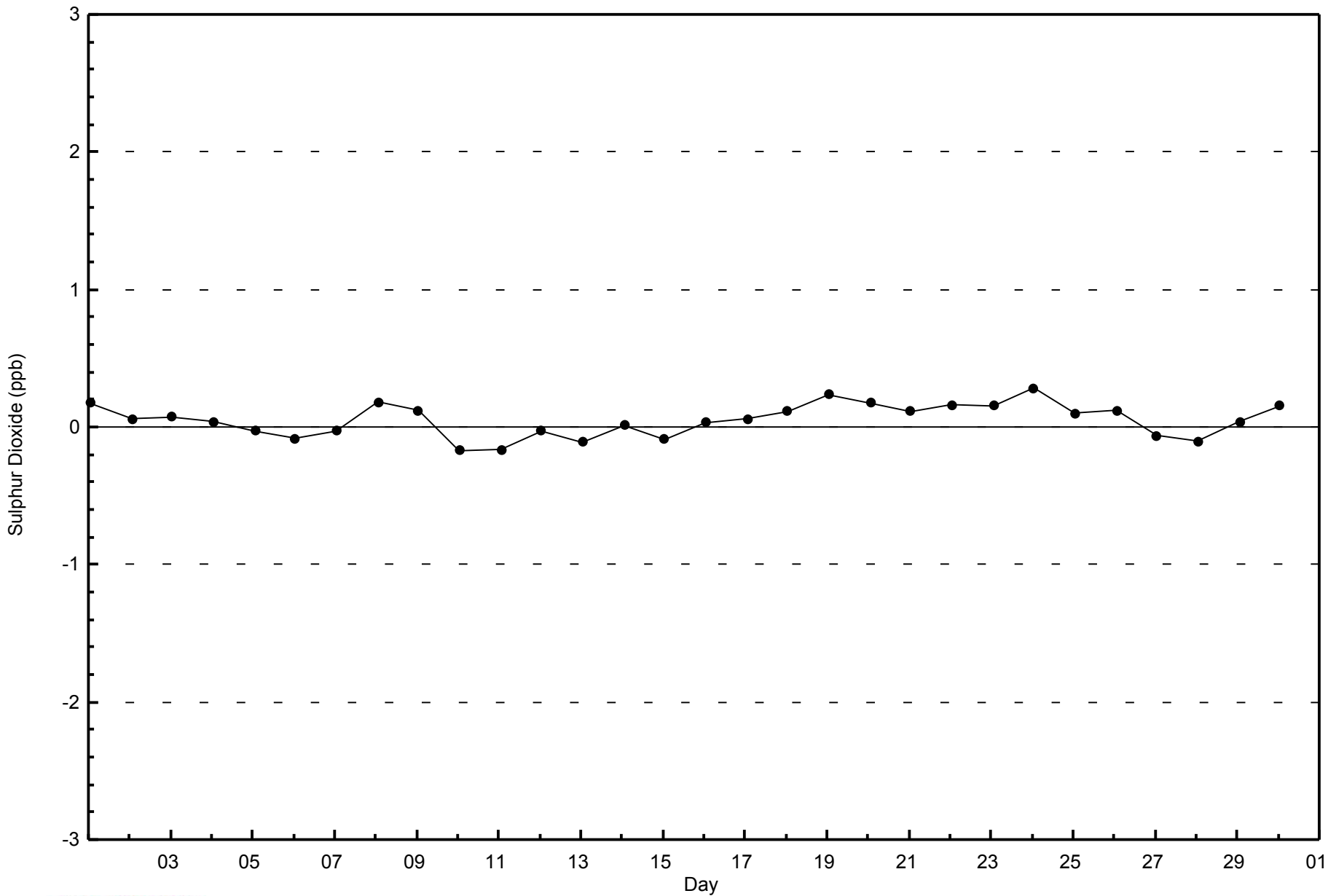


Total Number of Valid Hours: 645



WBEA
Zero Responses

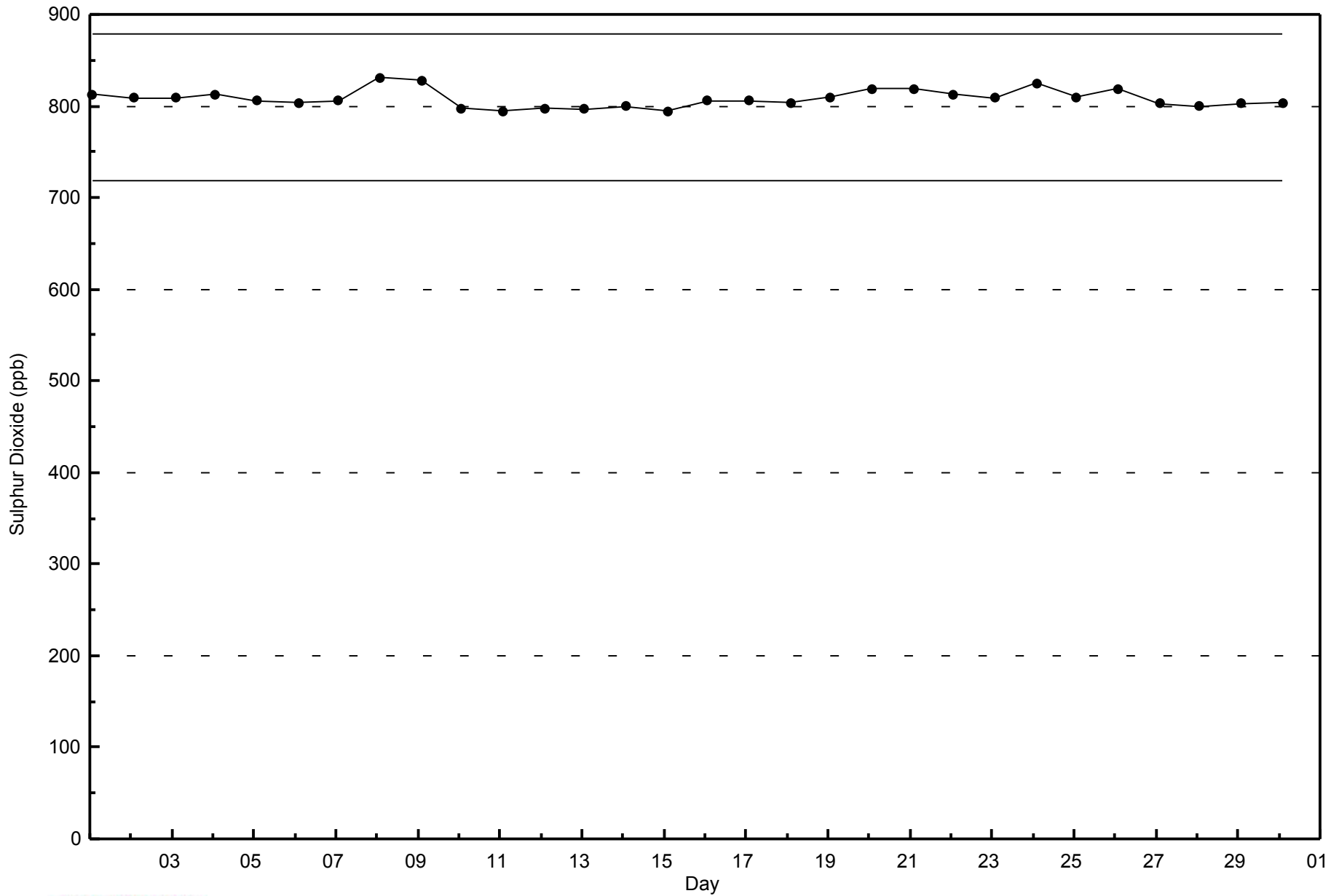
Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 1 ppb on Sep 23 08:00	Maximum Daily Average: 0.4 ppb on Sep 30		Hours of Data:	681
Minimum Value: 0 ppb on Sep 14 16:00	Minimum Daily Average: 0.1 ppb on Sep 21		Hours of Missing Data:	39
Maximum Diurnal Average: 0.2 ppb at hour 6	Minimum Diurnal Average: 0.2 ppb at hour 19		Hours of Calibration:	33
Monthly Average: 0.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1		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	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-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
3-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
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	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	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
7-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
8-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
9-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	C	C	C	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	UO	0.2	0
11-Sep	UO	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	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
13-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
14-Sep	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
15-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
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	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	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
19-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
20-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
21-Sep	0	0	Z	UO	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	UO	0	0	0.2	0
23-Sep	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
24-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	0.3	1
25-Sep	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
26-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
27-Sep	0	0	Z	0	0	0	UO	0	0	0	0	0	0	0	UO	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	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	Z	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1

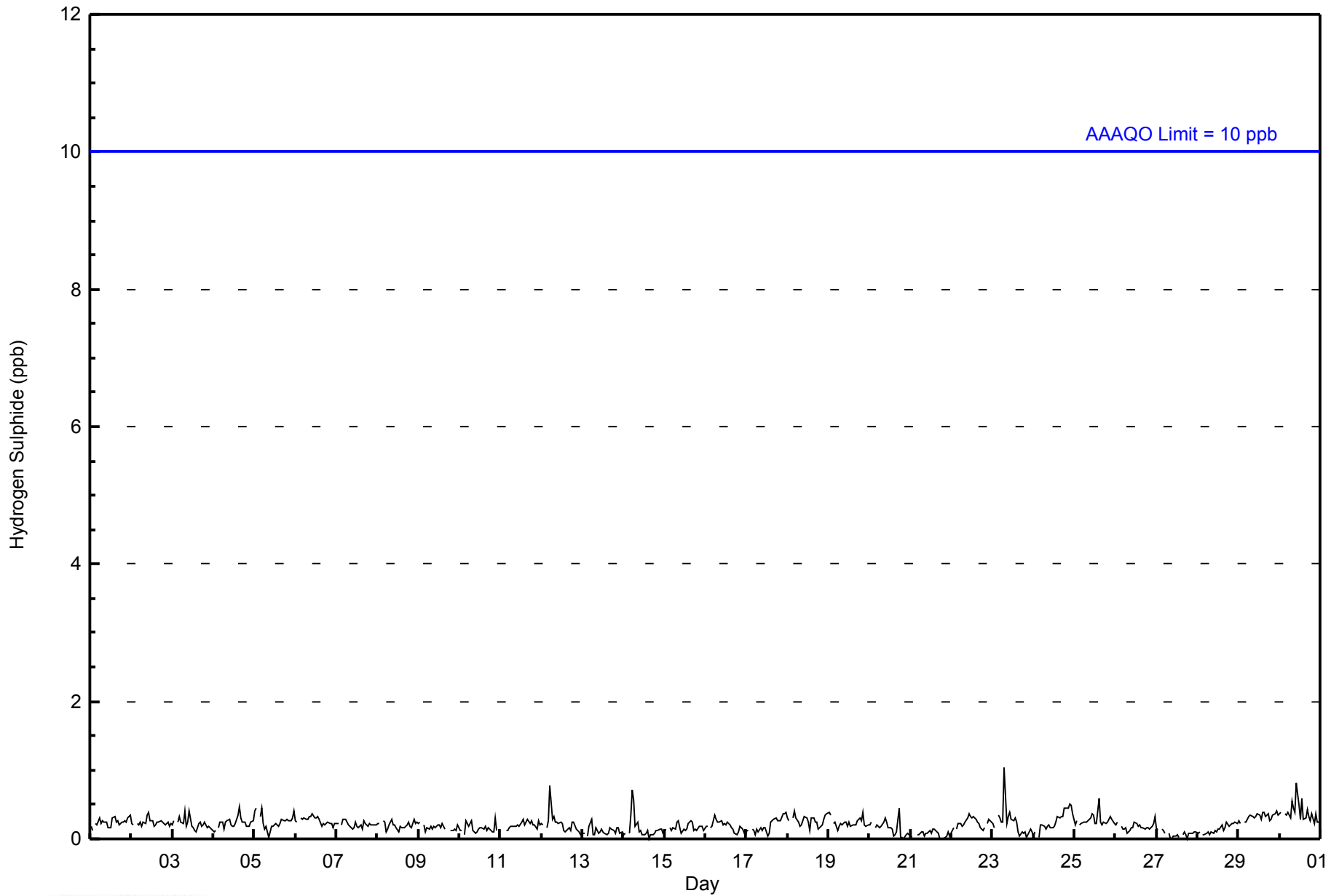
0.2	0.2	--	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average
0	0	--	0	0	1	1	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	Diurnal Maximum

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



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer - September 2014





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	681	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer - September 2014

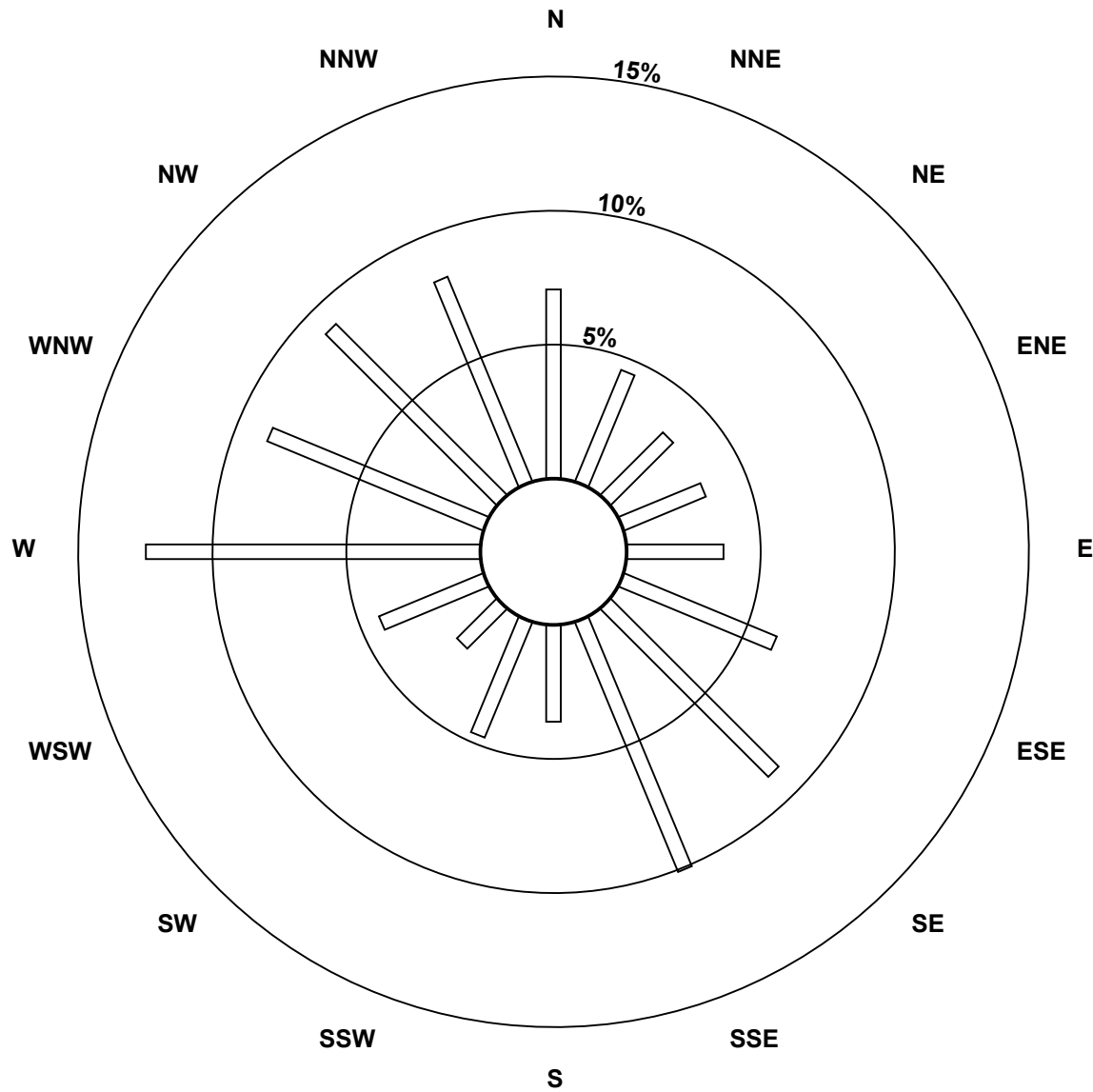
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	47	30	22	22	24	41	59	67	24	31	14	28	83	58	60	55	665
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	47	30	22	22	24	41	59	67	24	31	14	28	83	58	60	55	665

Total Number of Valid Hours: 665

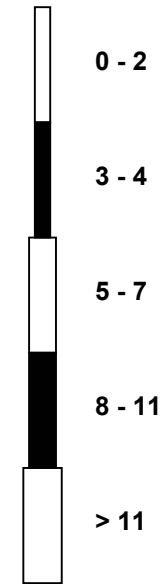
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer (AMS501)



Classes (ppb)

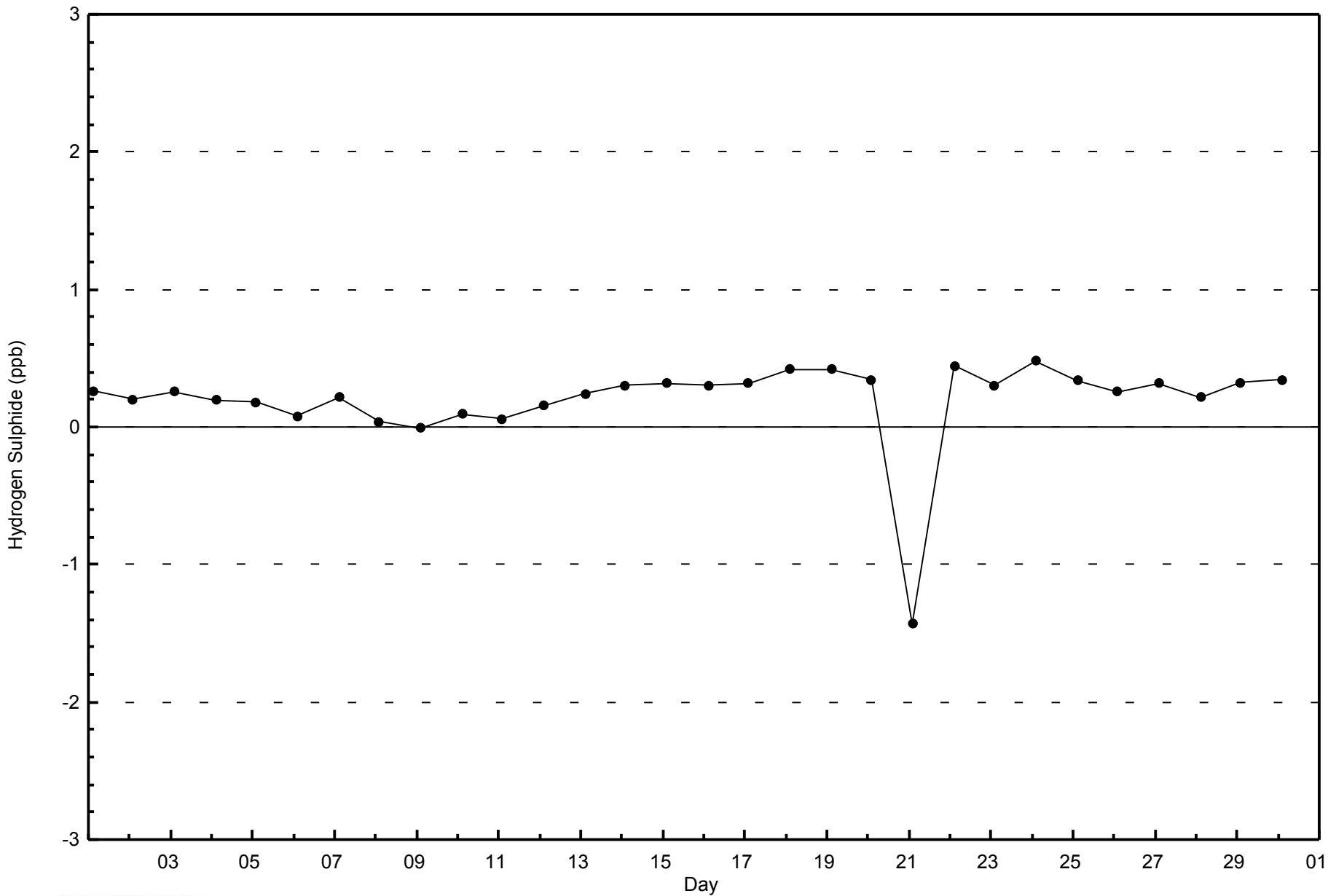


Total Number of Valid Hours: 665



WBEA
Zero Responses

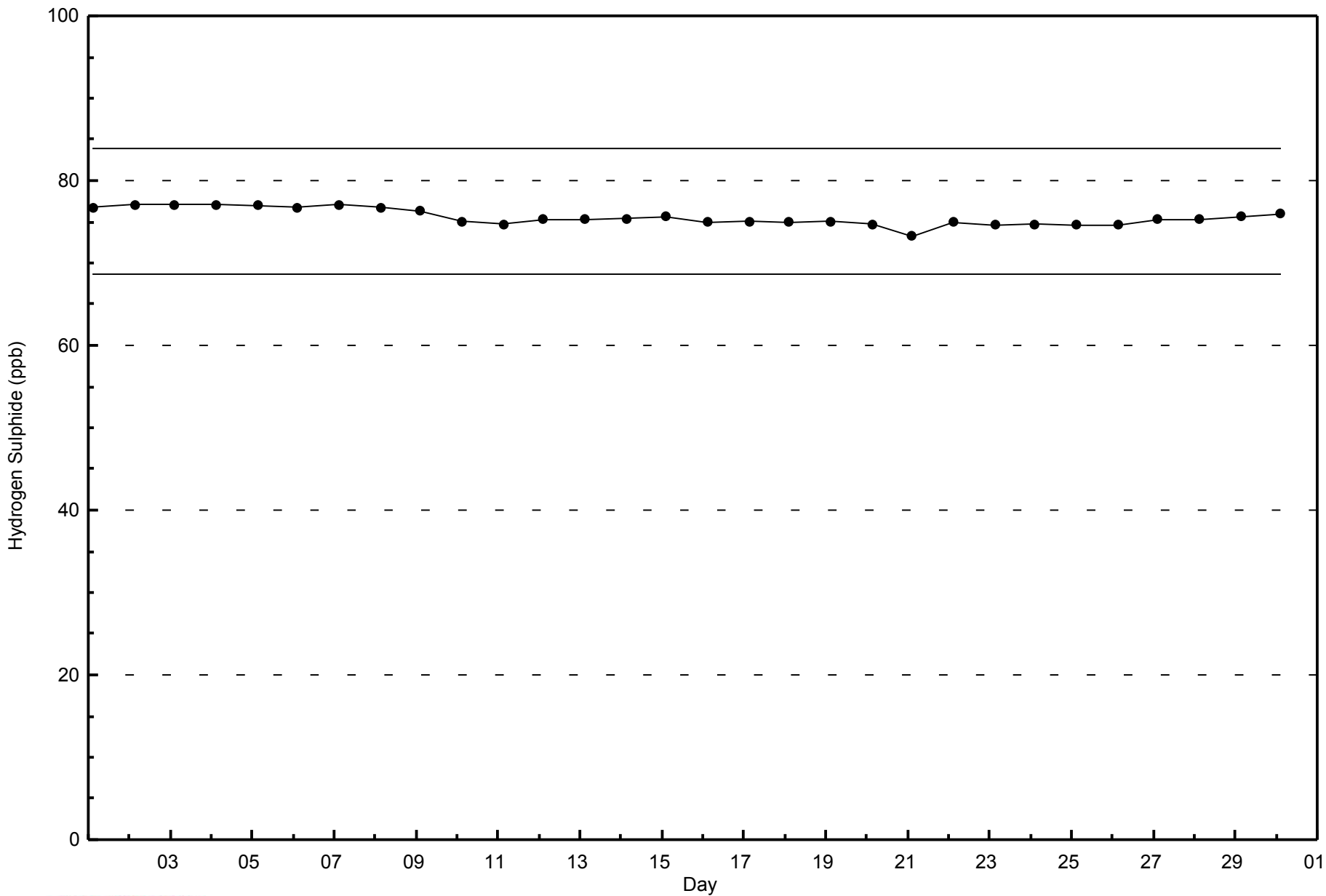
Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer - September 2014





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer - September 2014





Maximum Value: 34 ppb on Sep 23 08:00	Maximum Daily Average: 3.0 ppb on Sep 23	Hours in Service: 720
Minimum Value: 0 ppb on Sep 11 20:00	Minimum Daily Average: 0.3 ppb on Sep 28	Hours of Data: 684
Maximum Diurnal Average: 2.7 ppb at hour 6	Minimum Diurnal Average: 0.3 ppb at hour 1	Hours of Missing Data: 36
Monthly Average: 1.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 8	Hours of Calibration: 36
		Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	0	Z	0	0	0	2	1	2	1	1	1	1	2	1	2	2	0	0	0	0	0	0	3	0.9	3	
2-Sep	0	Z	0	1	2	2	1	1	1	4	1	1	1	1	1	2	2	1	1	1	1	1	1	1.2	4	
3-Sep	1	Z	1	1	2	2	2	4	1	1	4	2	1	1	1	1	1	1	1	1	1	0	0	1.3	4	
4-Sep	0	Z	0	0	3	3	1	1	2	1	0	0	1	2	5	5	3	1	1	0	0	0	0	1.3	5	
5-Sep	0	Z	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0.6	3	
6-Sep	0	Z	0	0	2	3	0	1	1	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0.9	3	
7-Sep	1	Z	0	1	2	2	1	1	1	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0.6	2	
8-Sep	0	Z	0	0	1	1	0	1	1	1	1	0	0	1	0	1	2	0	0	0	0	0	0	0.5	2	
9-Sep	0	Z	0	0	1	1	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	--	1	
10-Sep	0	Z	0	0	7	3	2	7	2	1	1	2	1	1	1	2	1	1	0	1	1	2	0	1.7	7	
11-Sep	0	Z	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.5	1	
12-Sep	0	Z	0	0	2	19	2	2	2	3	1	1	1	1	1	2	1	2	0	0	0	0	0	1.8	19	
13-Sep	0	Z	0	0	4	7	1	1	1	1	1	2	2	1	1	2	1	2	1	1	0	0	0	1.3	7	
14-Sep	0	Z	0	1	11	16	5	3	3	1	1	0	0	1	1	1	1	1	1	0	0	0	0	2.1	16	
15-Sep	0	Z	0	0	1	1	1	2	3	0	0	1	1	1	2	2	1	1	0	0	0	1	0	0.9	3	
16-Sep	0	Z	0	0	1	4	3	2	2	1	1	0	1	1	0	1	1	0	0	0	0	0	0	0.9	4	
17-Sep	0	Z	0	0	1	0	0	1	1	1	1	0	0	1	0	1	1	0	1	0	0	0	0	0.5	1	
18-Sep	0	Z	1	0	7	1	1	1	1	2	3	2	2	1	1	3	2	2	1	0	0	0	0	1.4	7	
19-Sep	0	Z	0	0	2	1	1	0	0	0	1	0	0	0	0	0	0	0	0	2	4	0	0	0.6	4	
20-Sep	0	Z	0	0	0	1	0	1	2	5	3	6	3	1	1	0	0	17	0	0	0	0	0	1.8	17	
21-Sep	0	Z	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
22-Sep	0	Z	1	0	2	1	0	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	0.8	2	
23-Sep	1	Z	3	1	1	1	1	34	4	4	6	2	1	2	2	1	1	1	0	0	1	1	0	3.0	34	
24-Sep	0	Z	1	0	7	5	2	1	1	1	1	1	1	0	1	0	1	0	0	1	4	5	2	1.5	7	
25-Sep	0	Z	0	0	0	1	1	1	1	3	7	3	3	2	13	1	2	1	0	0	0	0	0	1.8	13	
26-Sep	0	Z	0	0	0	0	0	0	1	1	0	0	1	1	1	2	1	1	0	1	1	2	2	0.7	2	
27-Sep	1	Z	1	1	3	1	1	0	1	1	1	1	1	0	0	0	0	0	0	1	1	0	0	0.7	3	
28-Sep	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1	
29-Sep	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0.4	1	
30-Sep	0	Z	0	1	1	2	2	9	5	4	9	4	1	7	1	3	2	2	1	3	1	3	0	2.7	9	

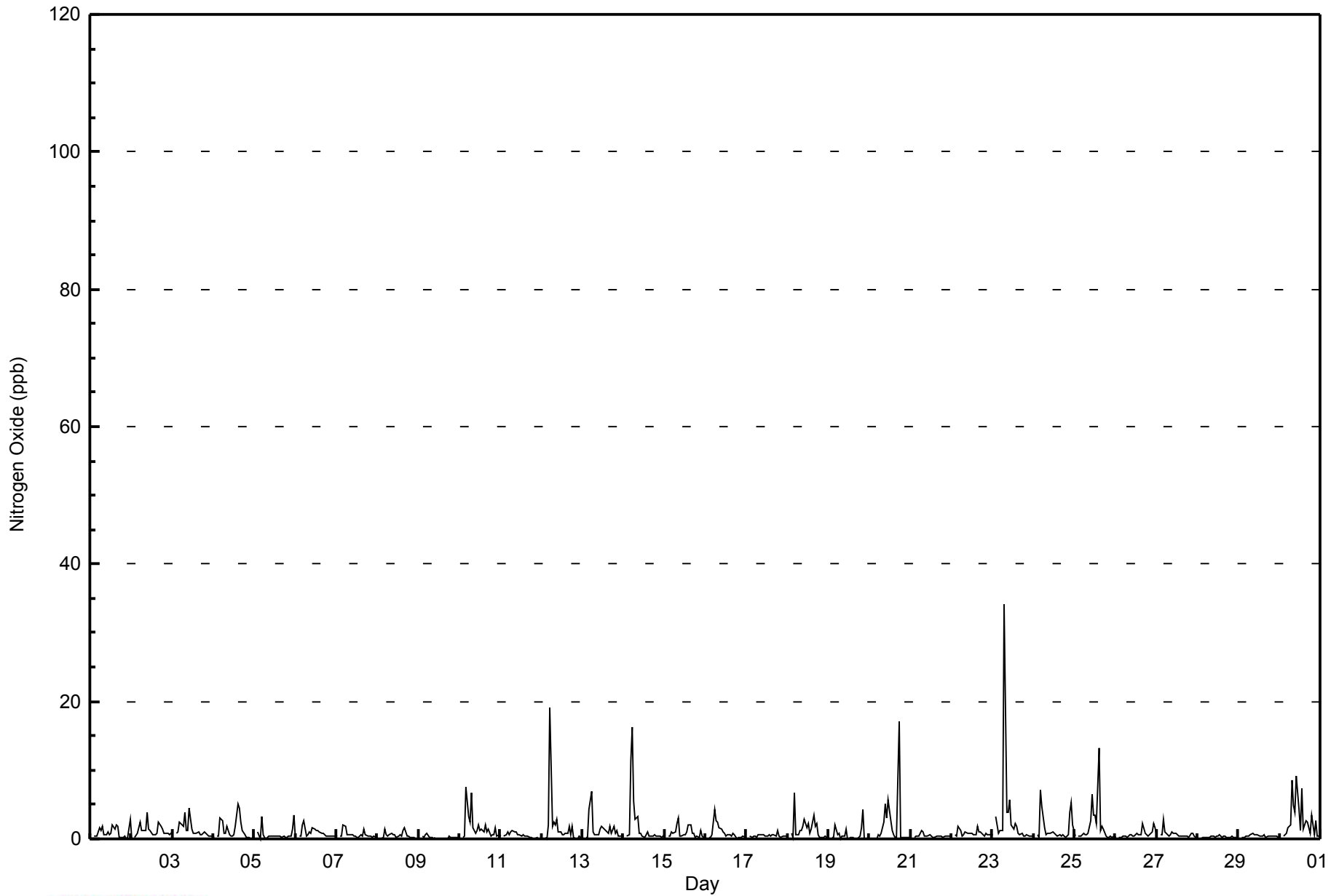
0.3	--	0.5	0.4	2.3	2.7	1.1	2.6	1.3	1.3	1.7	1.2	0.9	1.1	1.3	1.1	1.1	1.3	0.6	0.5	0.5	0.6	0.6	0.6	Diurnal Average
1	--	3	1	11	19	5	34	5	5	9	6	3	7	13	5	3	17	2	3	4	4	5	3	Diurnal Maximum

Z - zerospan C - Calibration



WBEA
Hourly Averages

Nitrogen Oxide (NO) - ppb
Statoil - Leismer - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
Statoil - Leismer - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	683	99.85	99.85
21 - 40	1	0.15	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxide (NO) - ppb
Statoil - Leismer - September 2014

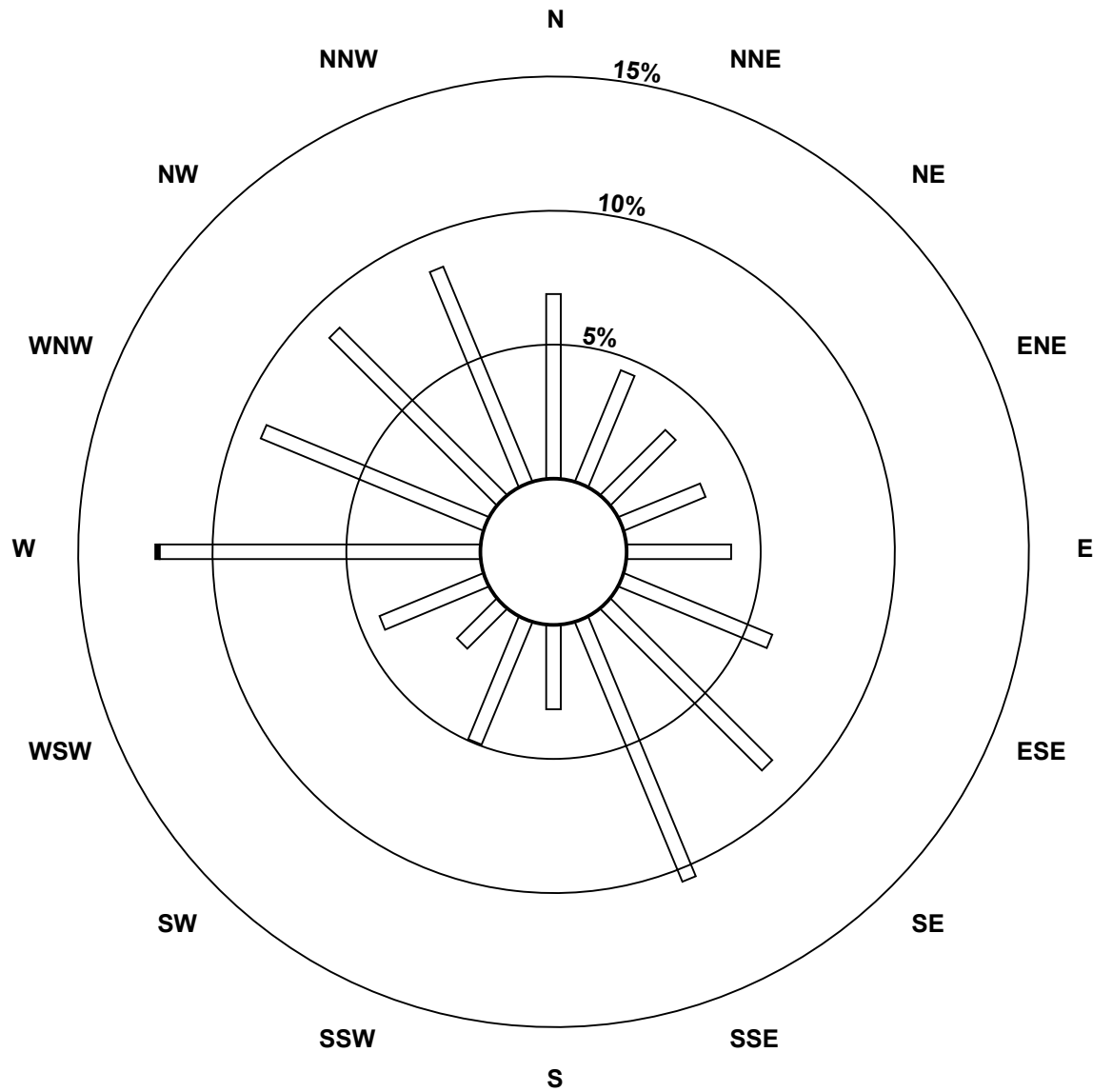
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	46	30	23	22	26	40	57	70	21	33	14	28	80	60	59	58	667
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	46	30	23	22	26	40	57	70	21	33	14	28	81	60	59	58	668

Total Number of Valid Hours: 668

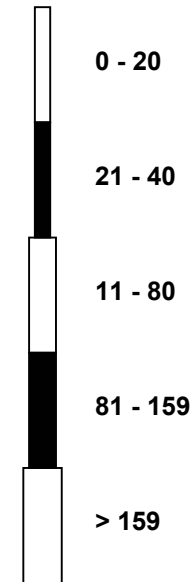
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Nitrogen Oxide (NO) - ppb
Statoil - Leismer (AMS501)



Classes (ppb)

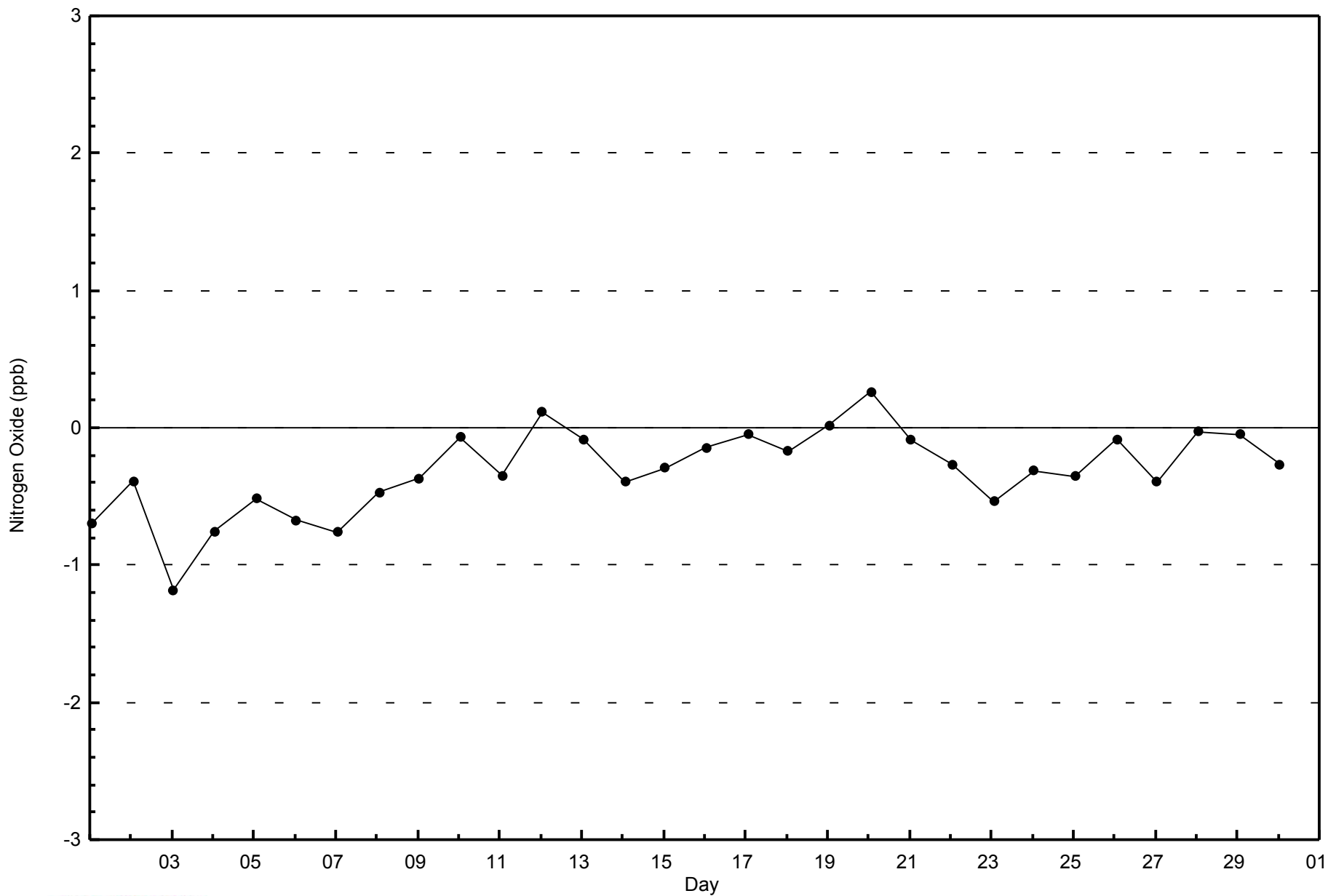


Total Number of Valid Hours: 668



WBEA
Zero Responses

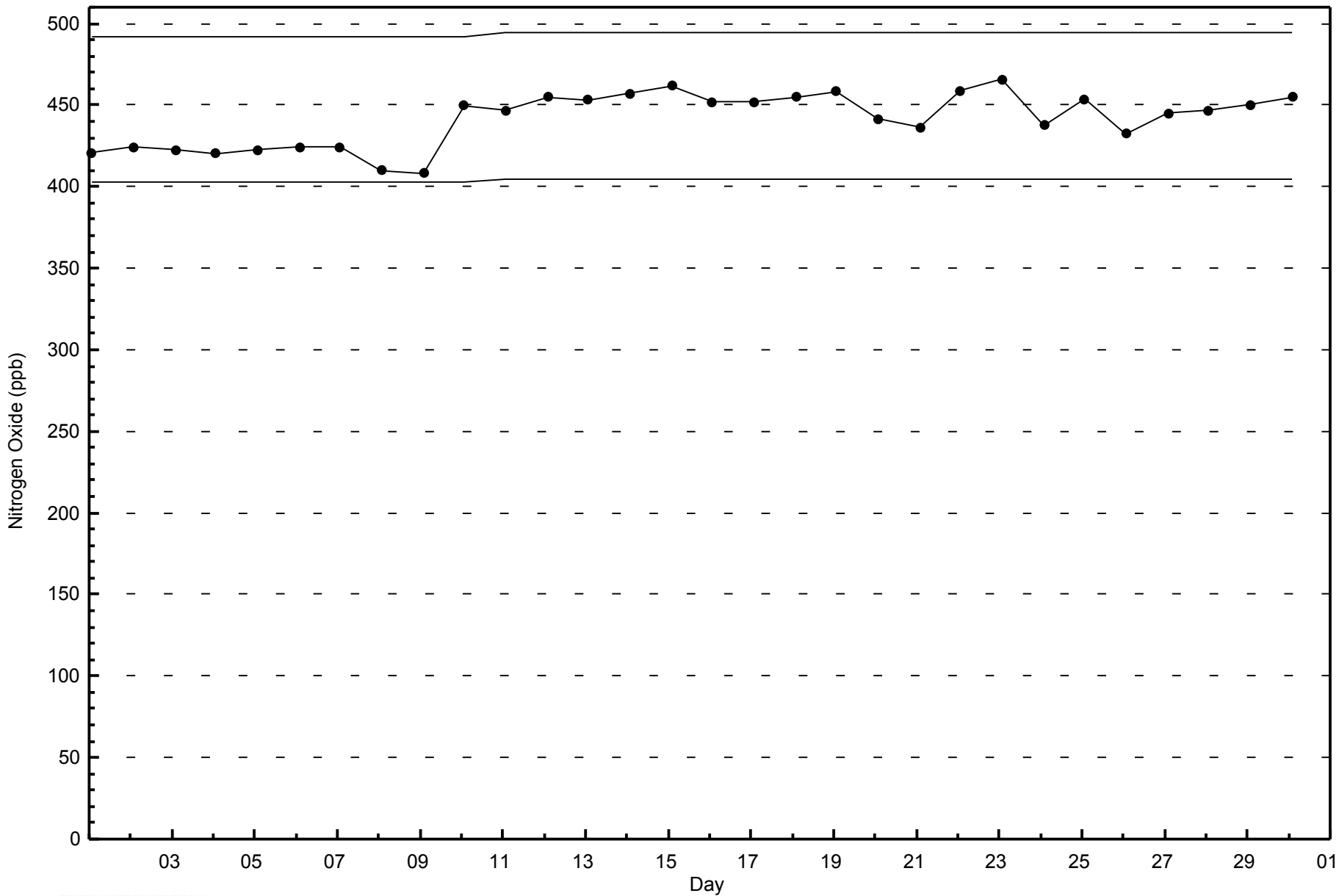
Nitrogen Oxide (NO) - ppb
Statoil - Leismer - September 2014





WBEA
Span Responses

Nitrogen Oxide (NO) - ppb
Statoil - Leismer - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 14 ppb on Sep 12 06:00	Maximum Daily Average: 2.8 ppb on Sep 10		Hours of Data:	684
Minimum Value: 0 ppb on Sep 4 00:00	Minimum Daily Average: 0.5 ppb on Sep 28		Hours of Missing Data:	36
Maximum Diurnal Average: 3.2 ppb at hour 6	Minimum Diurnal Average: 0.9 ppb at hour 1		Hours of Calibration:	36
Monthly Average: 1.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 9		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	1	Z	1	1	1	2	2	2	1	1	1	1	2	2	2	2	0	0	0	1	0	1	4	1.2	4	
2-Sep	1	Z	1	1	1	2	4	2	1	3	2	1	1	0	0	0	3	1	1	1	0	2	3	2	1.5	4
3-Sep	1	Z	2	6	5	3	2	4	1	2	5	2	0	0	1	1	0	1	4	1	0	0	0	1.8	6	
4-Sep	0	Z	0	0	2	6	2	1	1	0	0	0	0	1	5	5	3	2	1	0	1	1	0	0	1.4	6
5-Sep	1	Z	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0.5	3
6-Sep	0	Z	0	0	2	2	1	1	2	2	3	2	2	2	1	1	1	1	1	3	3	0	0	0	1.4	3
7-Sep	1	Z	0	0	1	1	1	0	1	1	0	1	0	1	1	1	2	1	1	2	2	1	1	1	0.9	2
8-Sep	1	Z	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	4	4	3	3	2	2	2	2.0	4
9-Sep	2	Z	4	5	2	2	1	2	1	0	0	C	C	C	C	C	C	1	2	1	1	3	3	3	--	5
10-Sep	2	Z	3	2	4	5	6	5	2	1	1	2	2	2	2	3	2	2	0	1	1	13	2	5	2.8	13
11-Sep	2	Z	2	2	5	4	4	2	2	2	1	1	2	1	2	2	2	1	2	1	1	2	2	2	2.0	5
12-Sep	2	Z	2	2	5	14	5	6	4	3	2	2	1	1	1	1	1	1	2	0	1	1	0	1	2.4	14
13-Sep	1	Z	1	1	4	9	4	1	1	1	1	2	2	2	1	0	3	1	3	1	3	1	0	0	1.8	9
14-Sep	0	Z	0	1	6	9	8	5	5	1	2	1	0	0	1	0	0	0	0	1	2	3	1	0	2.0	9
15-Sep	1	Z	2	1	2	4	2	3	4	0	0	0	0	1	2	2	1	1	0	0	0	1	1	1	1.2	4
16-Sep	0	Z	0	0	1	5	3	4	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.9	5
17-Sep	0	Z	0	1	0	0	0	1	0	0	1	0	0	0	1	1	1	1	2	1	1	1	1	1	0.6	2
18-Sep	1	Z	3	1	3	4	2	3	2	3	3	3	3	1	2	3	1	2	1	1	1	1	1	1	1.9	4
19-Sep	1	Z	0	4	4	3	2	1	1	1	1	0	0	0	0	0	0	0	1	4	9	1	0	0	1.5	9
20-Sep	0	Z	0	0	0	1	1	1	3	4	2	5	2	1	1	0	1	8	0	1	0	0	0	0	1.5	8
21-Sep	0	Z	0	0	0	1	6	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	6
22-Sep	0	Z	0	1	4	3	1	1	1	1	1	1	1	0	1	3	2	2	1	0	1	1	0	1	1.1	4
23-Sep	2	Z	5	1	2	1	1	11	2	3	4	2	1	2	2	1	0	1	3	5	2	1	2	1	2.4	11
24-Sep	1	Z	1	1	3	4	3	1	3	3	1	1	1	1	0	0	1	1	1	1	2	7	14	7	2.4	14
25-Sep	0	Z	3	1	0	1	2	1	1	2	5	3	3	3	7	1	1	1	0	1	1	2	1	2	1.7	7
26-Sep	2	Z	0	0	0	0	0	0	0	1	1	0	1	0	0	1	1	1	0	0	2	2	2	2	0.8	2
27-Sep	1	Z	1	1	2	1	2	1	0	1	1	0	0	0	0	0	0	1	0	0	1	1	1	1	0.7	2
28-Sep	1	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	0.5	1
29-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	0.9	1
30-Sep	1	Z	2	4	2	2	2	6	4	4	6	4	1	5	1	2	3	3	2	3	0	2	0	0	2.5	6

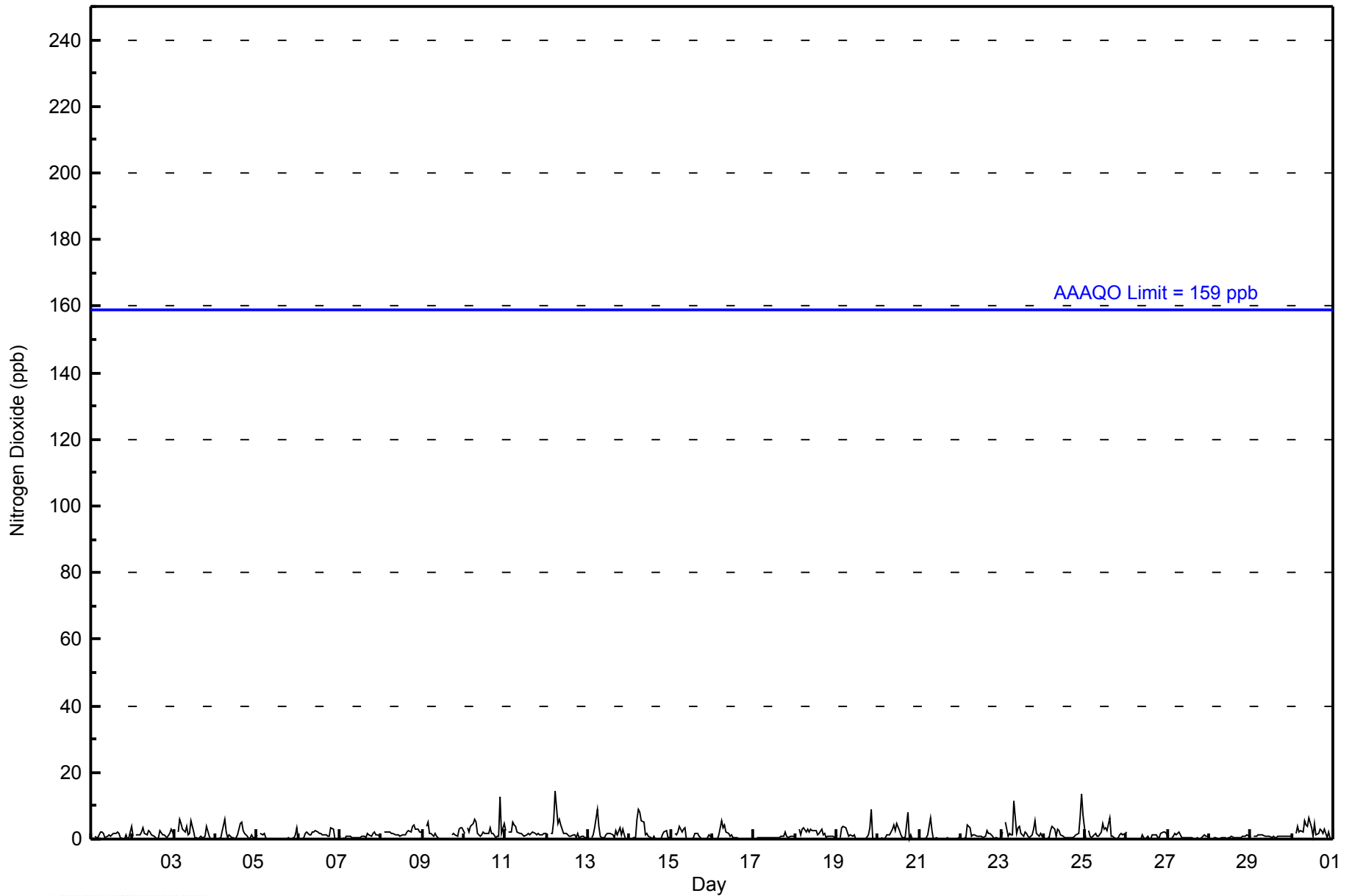
0.9	--	1.3	1.3	2.2	3.2	2.4	2.3	1.5	1.4	1.6	1.2	0.9	1.0	1.1	1.1	1.2	1.2	1.0	1.3	1.4	1.6	1.4	1.4	Diurnal Average	
2	--	5	6	6	14	8	11	5	4	6	5	3	5	7	5	3	8	4	5	9	13	14	7	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	684	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - September 2014

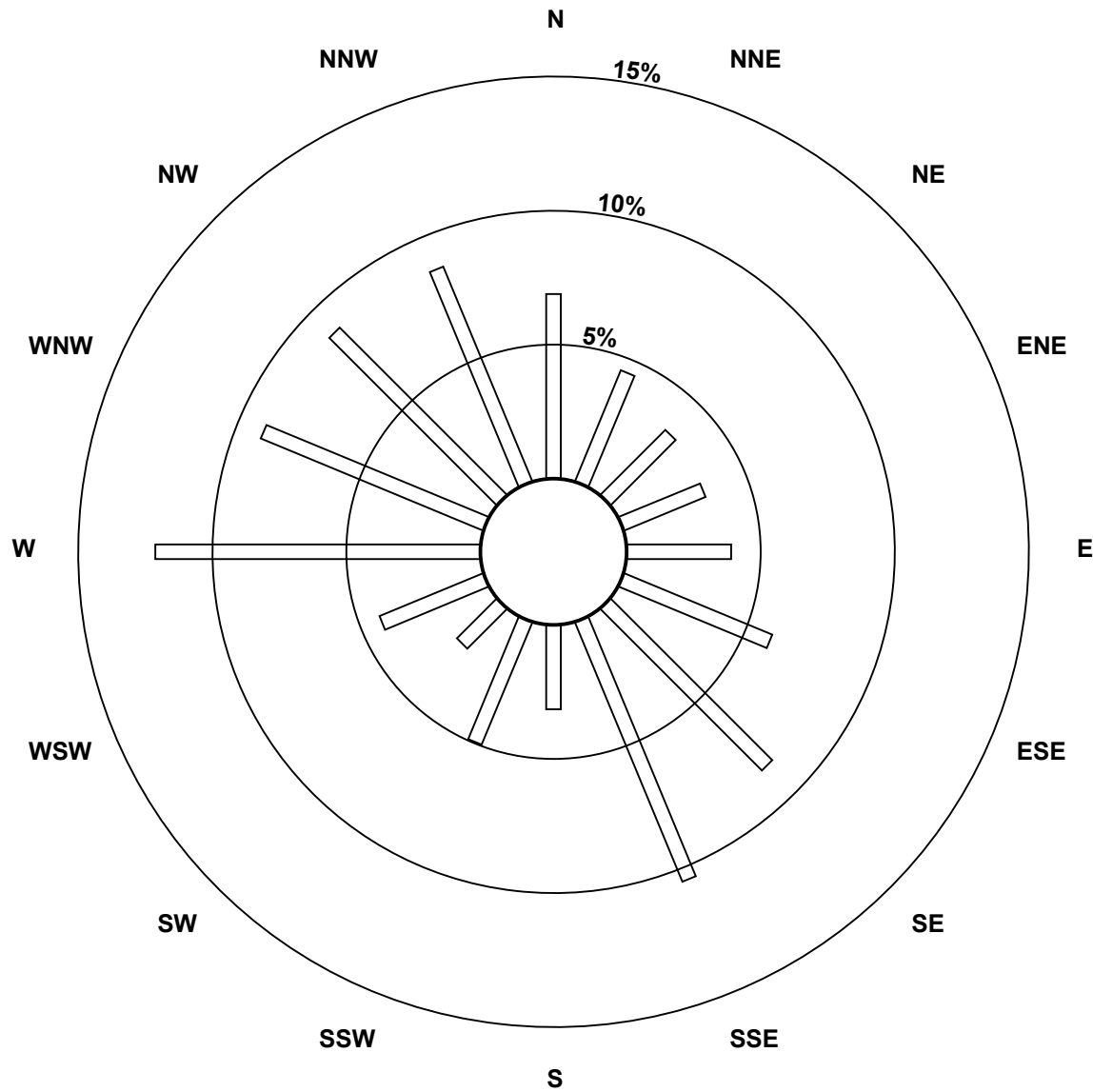
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	46	30	23	22	26	40	57	70	21	33	14	28	81	60	59	58	668
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	46	30	23	22	26	40	57	70	21	33	14	28	81	60	59	58	668

Total Number of Valid Hours: 668

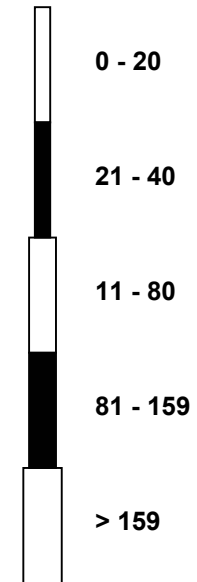
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Sep 2014

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer (AMS501)



Classes (ppb)

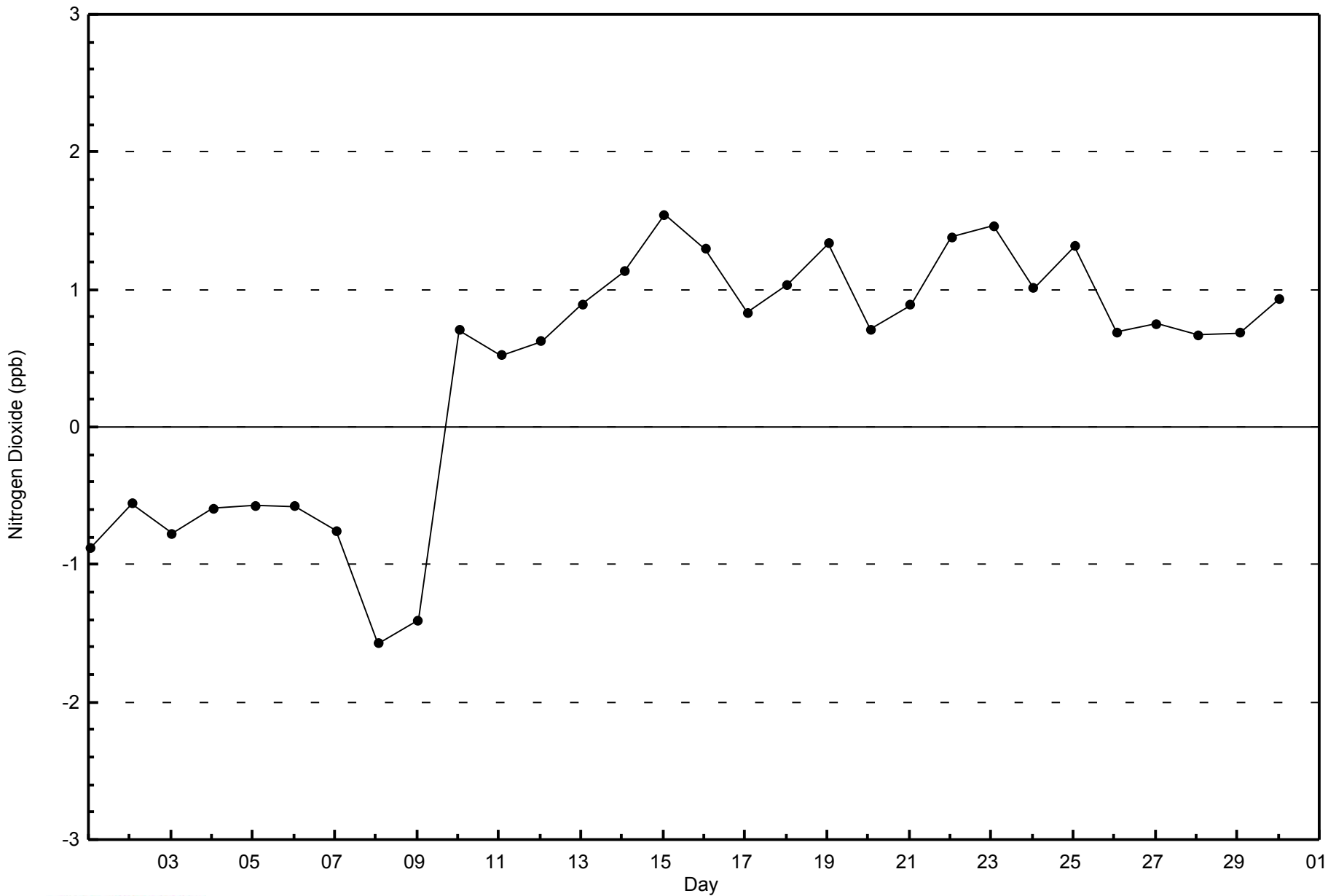


Total Number of Valid Hours: 668



WBEA
Zero Responses

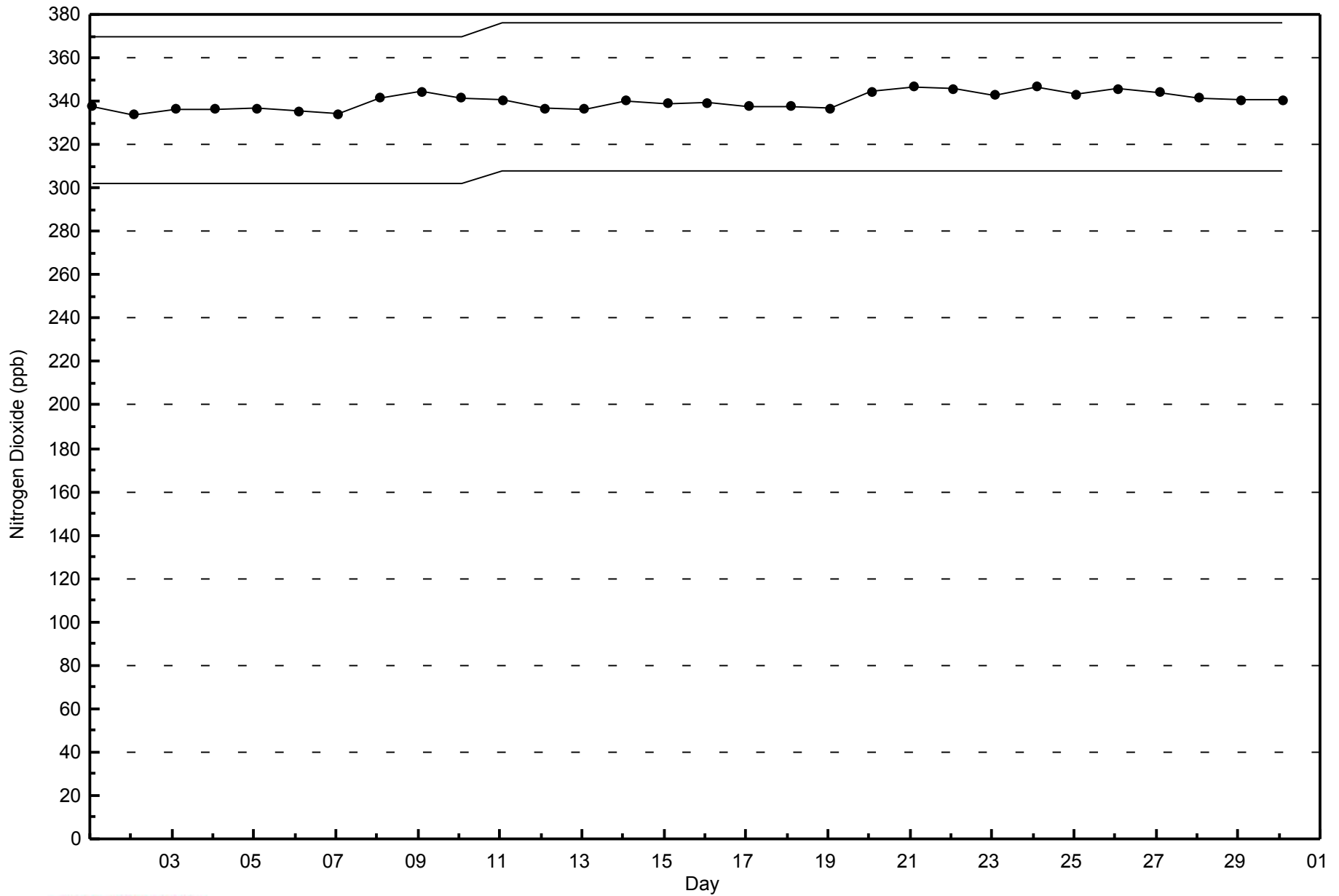
Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - September 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - September 2014





Maximum Value: 45 ppb on Sep 23 08:00	Maximum Daily Average: 5.3 ppb on Sep 23	Hours in Service: 720
Minimum Value: 0 ppb on Sep 20 00:00	Minimum Daily Average: 0.8 ppb on Sep 28	Hours of Data: 684
Maximum Diurnal Average: 5.9 ppb at hour 6	Minimum Diurnal Average: 1.2 ppb at hour 1	Hours of Missing Data: 36
Monthly Average: 2.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 17	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	1	Z	1	1	1	4	3	4	1	1	2	2	2	4	3	4	4	1	0	0	2	0	1	7	2.1	7
2-Sep	1	Z	1	2	3	5	5	3	2	7	4	2	1	1	1	1	5	3	3	2	1	2	3	3	2.7	7
3-Sep	1	Z	3	7	7	5	4	8	3	3	10	4	1	1	1	2	1	1	2	5	1	1	1	0	3.1	10
4-Sep	0	Z	1	0	5	9	3	1	3	1	1	1	1	3	10	10	5	3	1	0	1	1	1	1	2.7	10
5-Sep	1	Z	2	1	5	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	3	7	1.2	7
6-Sep	0	Z	1	1	4	5	2	2	3	3	4	4	3	3	2	2	2	2	1	4	3	1	1	1	2.3	5
7-Sep	1	Z	1	1	3	3	2	1	1	1	1	1	1	1	1	1	3	2	1	2	2	1	2	1	1.5	3
8-Sep	1	Z	2	2	4	3	2	2	2	2	2	1	1	2	2	3	4	2	4	4	3	3	2	2	2.5	4
9-Sep	2	Z	4	5	3	2	1	2	1	0	0	C	C	C	C	C	C	1	2	1	1	3	3	4	--	5
10-Sep	2	Z	3	3	11	8	8	12	3	2	3	4	3	3	2	5	3	3	1	1	1	14	2	5	4.5	14
11-Sep	3	Z	3	3	6	5	5	3	3	3	2	2	2	2	2	2	3	2	2	2	1	1	1	2	2.5	6
12-Sep	2	Z	2	2	7	33	6	8	6	6	3	3	2	2	2	2	3	1	3	1	1	1	1	1	4.2	33
13-Sep	1	Z	1	1	8	16	5	2	1	1	3	3	3	3	2	1	4	2	5	2	4	1	1	1	3.1	16
14-Sep	1	Z	1	1	17	25	13	8	8	2	2	1	1	1	2	1	1	1	1	1	3	3	1	1	4.1	25
15-Sep	1	Z	2	2	3	5	3	5	7	1	0	1	1	1	2	4	3	1	1	0	0	2	2	1	2.1	7
16-Sep	1	Z	0	0	2	10	6	7	4	3	2	2	1	1	1	1	1	1	0	0	0	0	0	0	1.8	10
17-Sep	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1.1	3
18-Sep	1	Z	3	1	10	4	3	4	3	5	5	4	5	2	3	6	3	4	1	1	1	1	1	1	3.2	10
19-Sep	2	Z	1	4	6	4	3	1	2	1	3	0	0	0	0	0	0	0	2	5	13	1	0	0	2.1	13
20-Sep	0	Z	0	0	0	2	1	2	5	9	5	10	5	3	1	1	1	25	0	2	0	0	0	0	3.3	25
21-Sep	0	Z	0	1	1	2	8	4	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	1	1.0	8
22-Sep	1	Z	1	1	6	5	1	2	2	2	2	2	2	1	1	4	3	3	1	1	1	1	1	1	1.9	6
23-Sep	3	Z	8	2	3	3	3	45	5	7	10	4	2	4	4	1	1	2	3	6	2	1	2	1	5.3	45
24-Sep	1	Z	1	1	10	8	4	2	4	3	2	2	1	1	1	1	1	1	1	1	3	11	19	9	3.9	19
25-Sep	0	Z	3	1	1	2	2	2	2	5	11	6	7	5	20	2	3	2	0	1	2	2	1	2	3.5	20
26-Sep	3	Z	0	0	1	1	0	0	1	2	1	0	2	1	1	2	3	2	1	1	3	3	4	4	1.5	4
27-Sep	2	Z	1	1	5	2	3	1	1	2	1	1	1	1	1	1	1	1	1	0	2	2	1	1	1.4	5
28-Sep	1	Z	0	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
29-Sep	1	Z	1	1	2	2	1	2	2	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1.3	2
30-Sep	1	Z	2	5	3	4	4	14	9	8	15	8	2	12	3	4	5	4	2	6	1	5	1	1	5.2	15

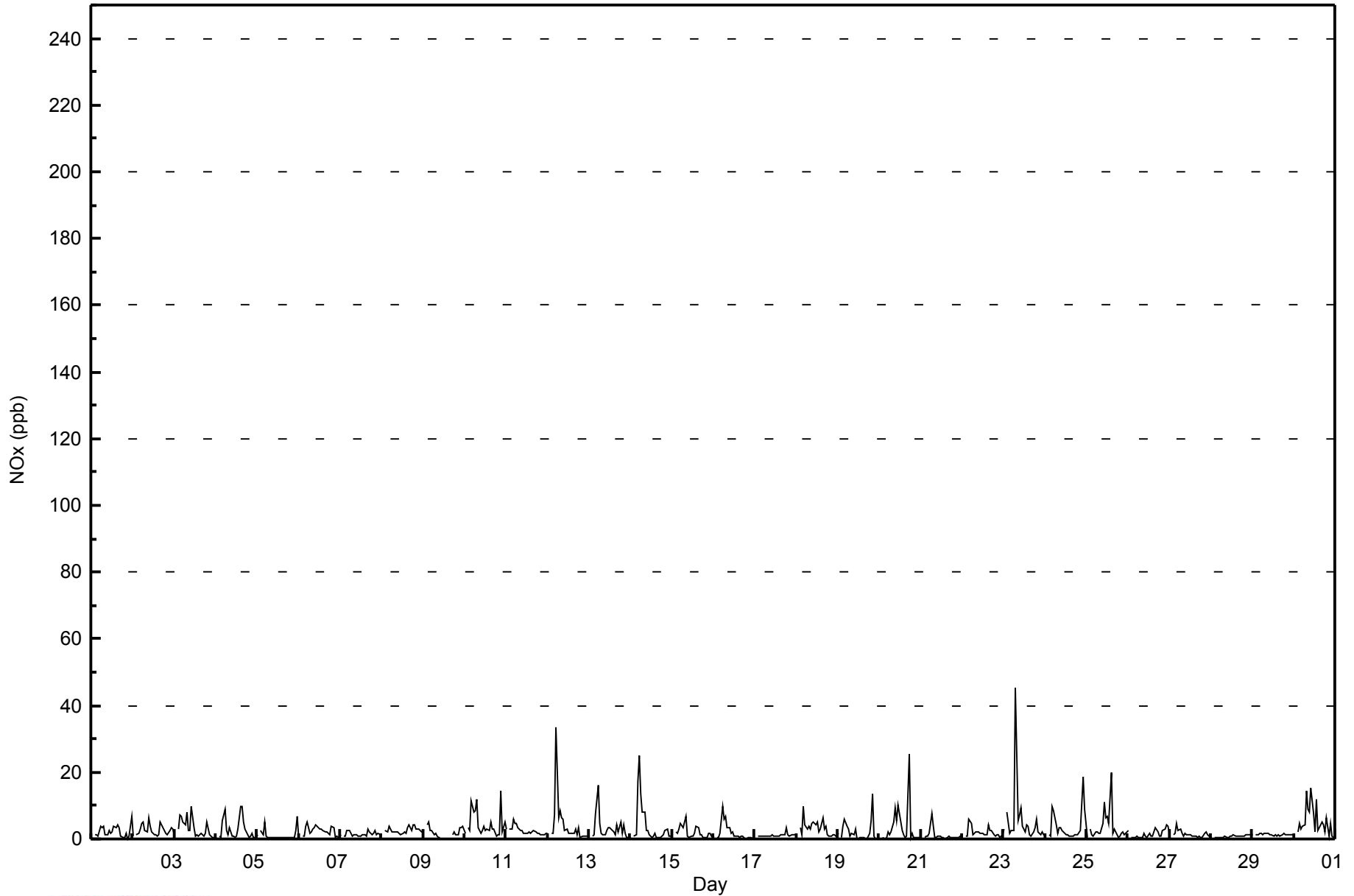
1.2	--	1.7	1.7	4.5	5.9	3.5	4.9	2.9	2.8	3.3	2.4	1.8	2.1	2.5	2.2	2.2	2.5	1.6	1.8	1.9	2.3	2.0	2.0		Diurnal Average
3	--	8	7	17	33	13	45	9	9	15	10	7	12	20	10	5	25	5	6	13	14	19	9		Diurnal Maximum

Z - zerospan C - Calibration



WBEA
Hourly Averages

NOx (NO_x) - ppb
Statoil - Leismer - September 2014





WBEA
Cumulative Frequency Distribution

NO_x (NO_x) - ppb
Statoil - Leismer - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	680	99.42	99.42
21 - 40	3	0.44	99.85
41 - 80	1	0.15	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



WBEA
Frequency Distribution

NOx (NO_x) - ppb
Statoil - Leismer - September 2014

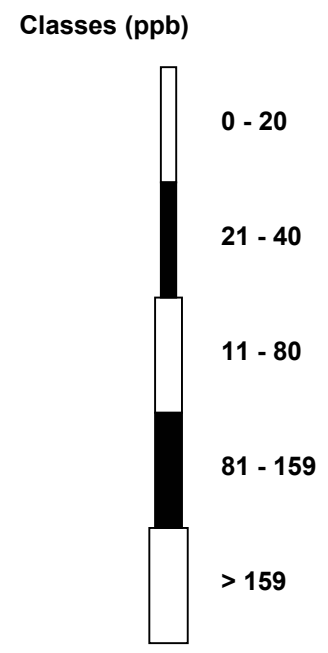
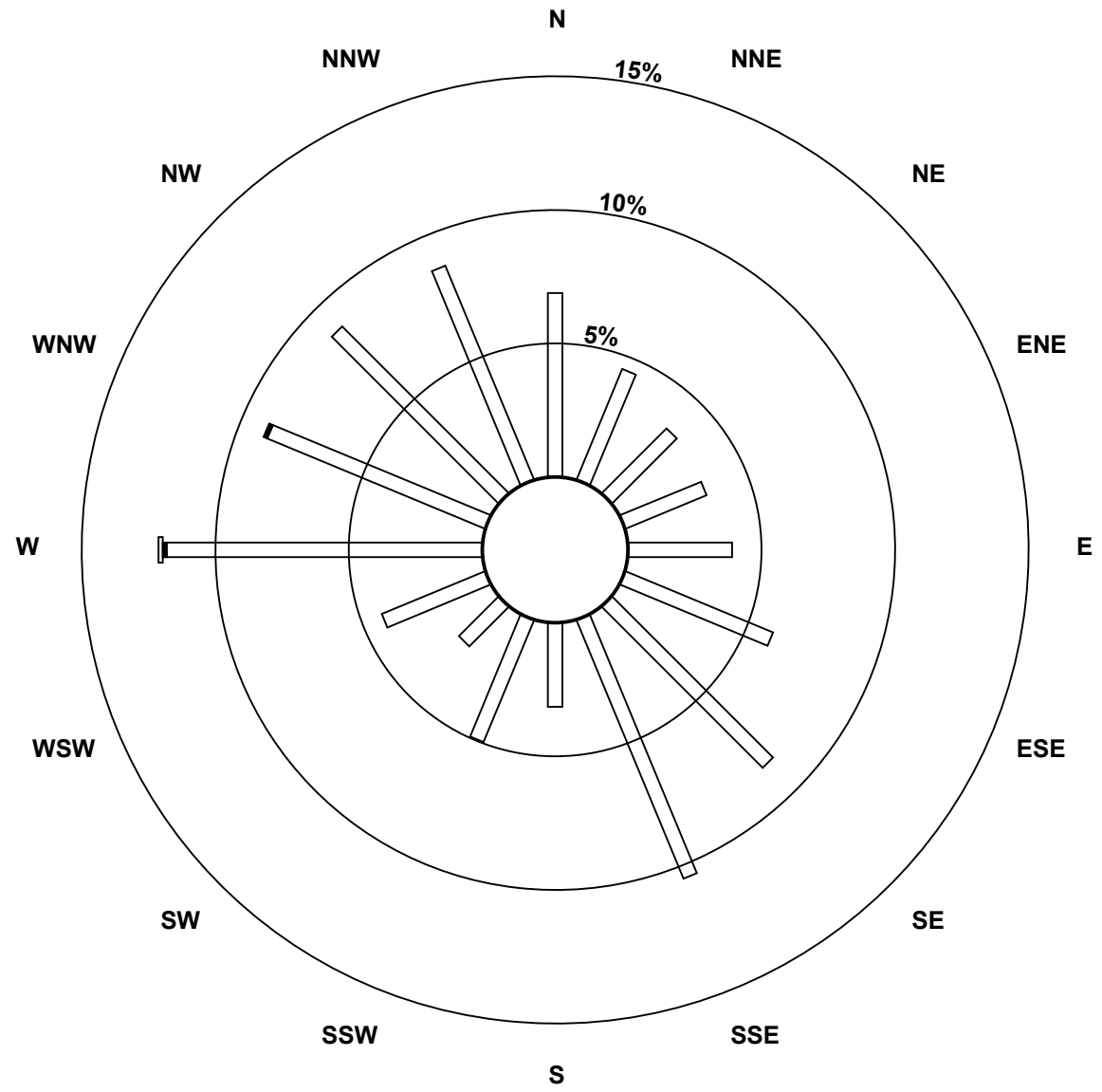
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	46	30	23	22	26	40	57	70	21	33	14	28	79	59	59	58	665
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	46	30	23	22	26	40	57	70	21	33	14	28	81	60	59	58	668

Total Number of Valid Hours: 668

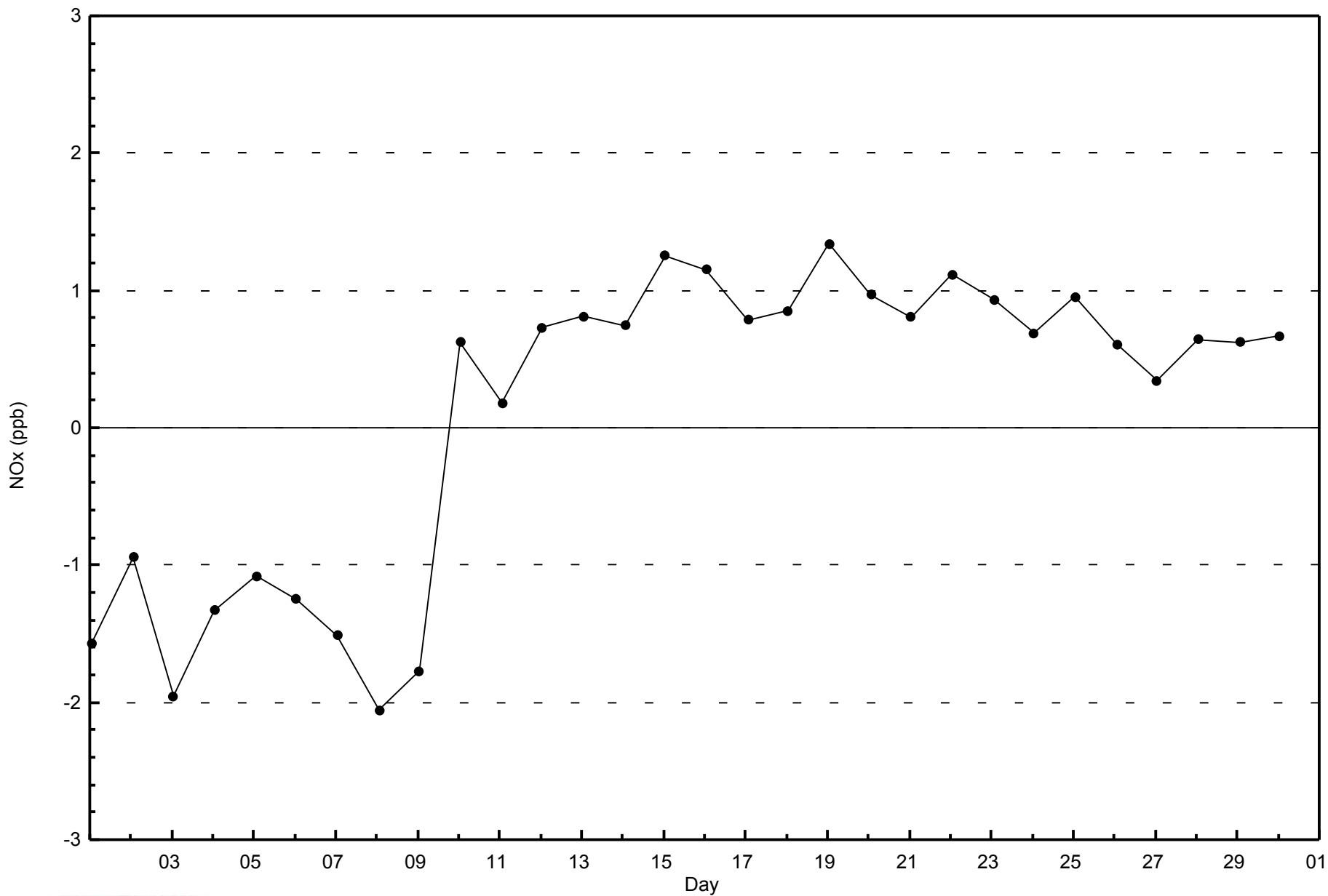
Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

NO_x (NO_x) - ppb
 Statoil - Leismer (AMS501)



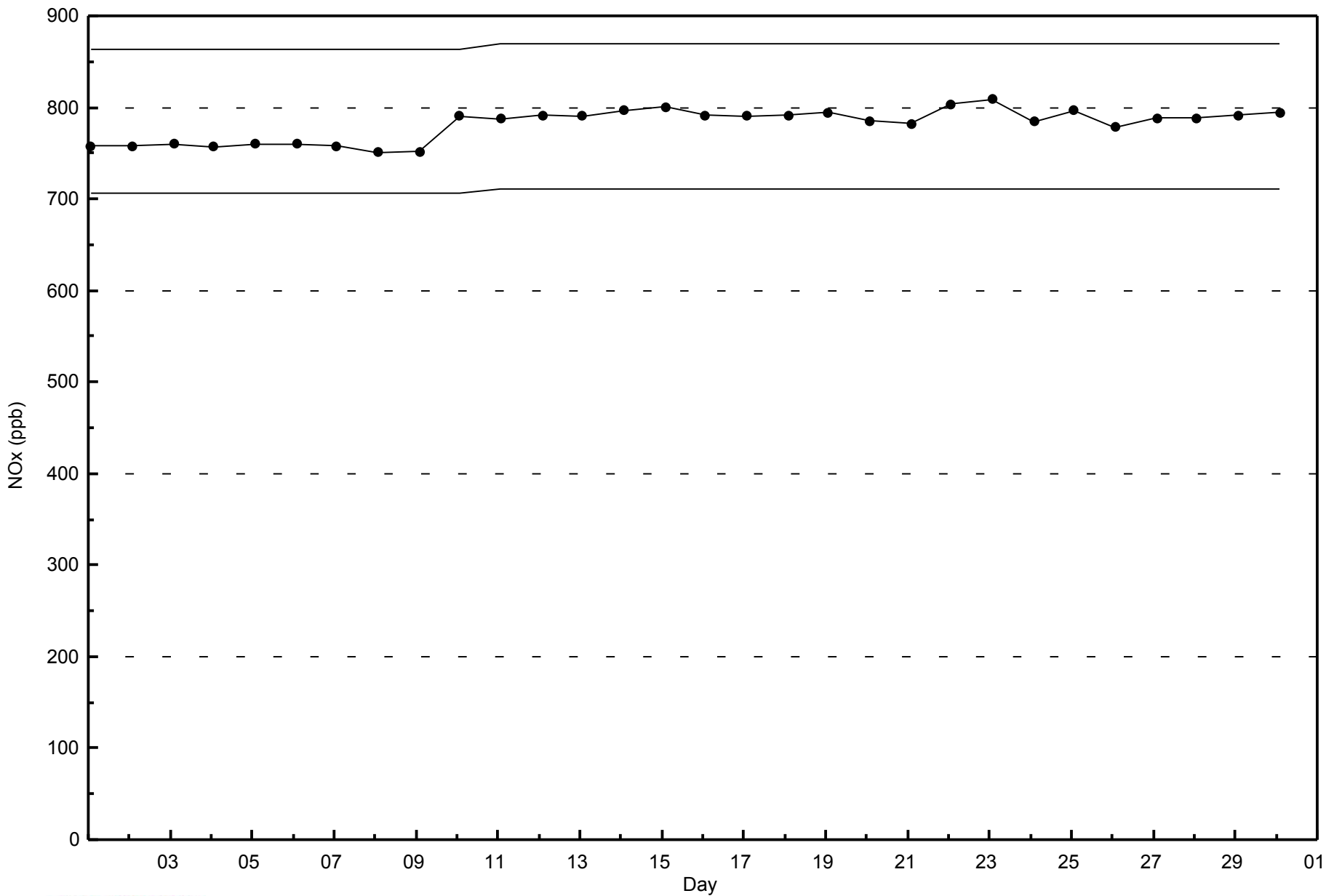
Total Number of Valid Hours: 668





WBEA
Span Responses

NOx (NO_x) - ppb
Statoil - Leismer - September 2014



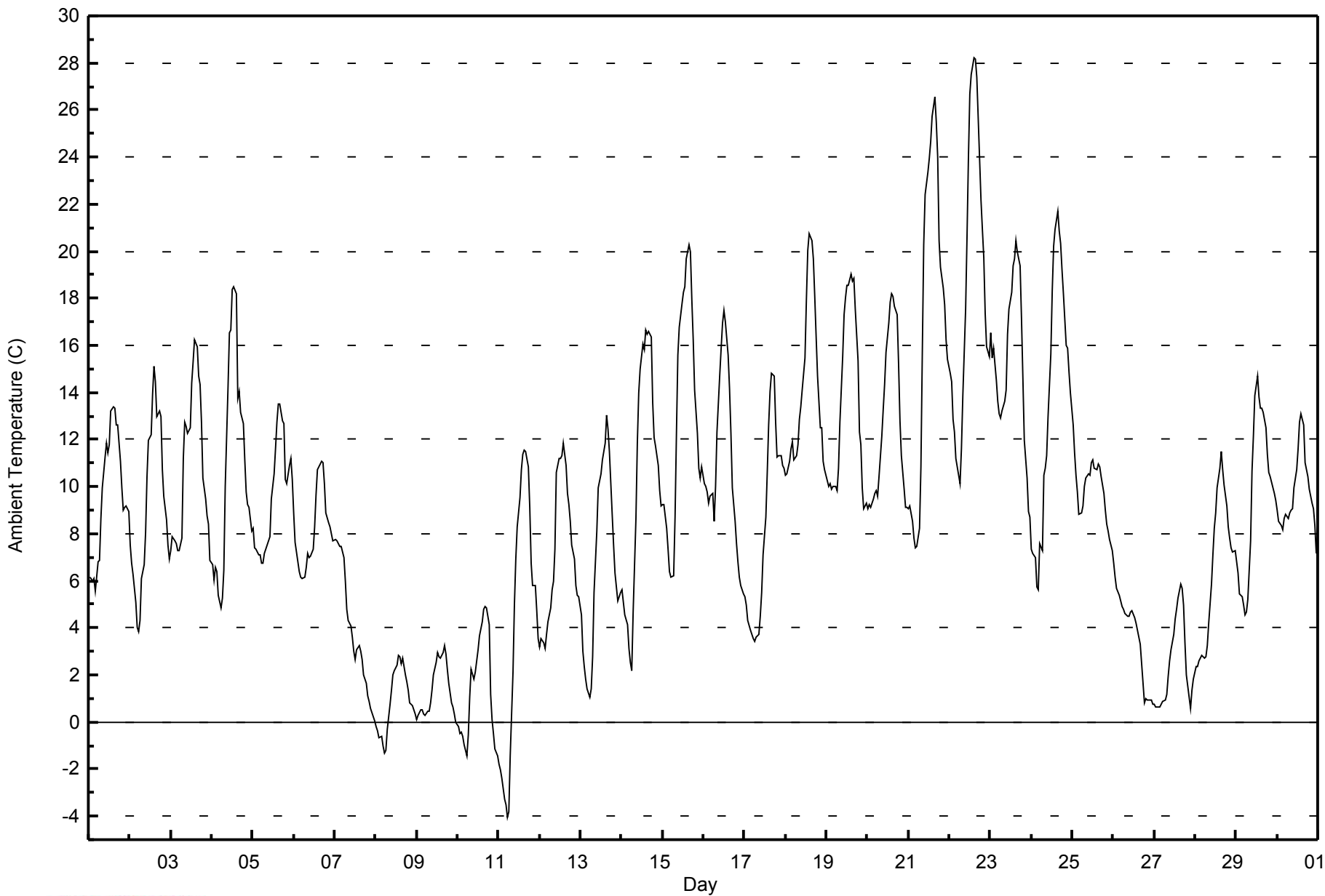


Maximum Value: 28.2 C on Sep 22 15:00		Maximum Daily Average: 18.7 C on Sep 22		Hours in Service: 720																						
Minimum Value: -4.0 C on Sep 11 06:00		Minimum Daily Average: 0.9 C on Sep 8		Hours of Data: 720																						
Maximum Diurnal Average: 13.6 C at hour 15		Minimum Diurnal Average: 5.5 C at hour 6		Hours of Missing Data: 0																						
Monthly Average: 9.11 C		Percentiles: P ₁ = -1.4 P ₁₀ = 1.4 Q ₁ = 4.9 Median = 9.1 Q ₃ = 12.6 P ₉₀ = 17.0 P ₉₉ = 25.2		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	6.1	6.1	6.0	6.1	5.6	6.8	6.9	8.6	9.9	11.2	11.8	11.5	11.8	13.2	13.4	13.3	12.6	12.6	11.1	9.9	9.0	9.1	9.2	8.9	9.6	13.4
2-Sep	7.5	6.8	6.3	5.1	4.0	3.8	4.3	6.1	6.7	8.0	10.4	12.0	12.2	13.9	15.1	14.4	13.0	13.2	13.0	10.7	9.6	8.6	7.5	7.0	9.1	15.1
3-Sep	7.3	7.9	7.7	7.6	7.3	7.3	7.8	11.2	12.7	12.5	12.3	12.5	14.4	15.3	16.2	16.0	14.7	14.3	12.7	10.4	9.5	8.8	8.4	6.8	10.9	16.2
4-Sep	6.7	6.0	6.5	6.4	5.4	4.9	5.2	6.4	10.0	14.2	16.5	16.7	18.3	18.5	18.2	13.8	14.0	13.2	12.7	11.1	9.7	9.2	9.1	8.1	10.9	18.5
5-Sep	8.2	7.4	7.3	7.1	7.1	6.8	6.8	7.1	7.5	7.7	7.9	9.5	10.6	11.6	12.7	13.5	13.5	12.8	12.6	10.3	10.2	10.9	11.2	10.3	9.6	13.5
6-Sep	8.9	7.6	6.8	6.4	6.1	6.1	6.2	6.6	7.2	7.0	7.0	7.3	8.3	9.7	10.7	10.9	11.1	11.0	10.1	8.9	8.4	8.3	8.0	7.7	8.2	11.1
7-Sep	7.8	7.7	7.5	7.5	7.5	7.0	6.0	4.8	4.3	4.1	3.6	3.0	2.6	3.1	3.3	3.0	2.7	2.0	1.6	1.1	0.9	0.6	0.4	0.0	3.8	7.8
8-Sep	-0.2	-0.3	-0.7	-0.6	-1.0	-1.3	-1.2	-0.3	0.8	1.3	2.0	2.2	2.4	2.9	2.8	2.5	2.7	2.0	1.7	1.3	0.8	0.7	0.5	0.4	0.9	2.9
9-Sep	0.1	0.3	0.5	0.5	0.4	0.3	0.4	0.4	0.8	1.4	2.0	2.5	3.0	2.8	2.7	3.0	3.2	2.9	2.2	1.6	0.8	0.6	0.3	0.0	1.4	3.2
10-Sep	-0.2	-0.5	-0.5	-0.6	-1.0	-1.4	-0.5	1.1	2.3	1.8	2.1	2.6	3.1	3.6	4.3	4.8	4.9	4.9	4.1	1.2	0.1	-0.5	-1.2	-1.4	1.4	4.9
11-Sep	-1.8	-2.0	-2.4	-3.3	-3.5	-4.0	-3.8	-1.4	2.1	5.0	6.9	8.3	9.6	10.7	11.4	11.6	11.5	10.9	9.1	6.7	5.8	5.8	4.7	3.5	4.2	11.6
12-Sep	3.2	3.6	3.4	3.1	3.7	4.3	4.9	5.6	6.0	7.3	10.6	11.2	11.2	11.3	11.8	10.9	9.7	9.2	8.5	7.5	7.0	5.8	5.4	5.3	7.1	11.8
13-Sep	4.5	3.0	2.3	1.8	1.4	1.0	1.4	2.8	5.5	8.1	9.9	10.3	10.6	11.1	11.9	13.1	12.4	11.5	8.8	7.5	6.3	5.7	5.2	5.5	6.7	13.1
14-Sep	5.6	5.1	4.6	4.1	3.2	2.5	2.2	4.7	8.6	11.9	14.0	15.0	16.0	15.8	16.6	16.5	16.6	16.3	13.6	12.1	11.7	10.9	9.8	9.2	10.3	16.6
15-Sep	9.3	9.3	8.2	7.3	6.4	6.2	6.2	8.7	12.3	15.6	16.8	17.8	18.2	18.5	19.7	20.3	20.0	18.0	16.3	14.1	12.2	10.8	10.3	10.8	13.0	20.3
16-Sep	10.1	10.0	9.8	9.3	9.6	9.7	8.5	10.0	12.3	14.7	15.9	17.0	17.5	17.0	15.6	14.1	12.3	9.9	8.5	7.6	6.8	6.1	5.8	5.5	11.0	17.5
17-Sep	5.3	5.0	4.3	3.9	3.7	3.5	3.4	3.6	3.7	4.5	5.5	7.1	8.7	10.6	12.6	14.0	14.8	14.7	12.7	11.2	11.3	11.3	10.9	10.8	8.2	14.8
18-Sep	10.5	10.6	11.1	11.6	11.9	11.1	11.3	11.8	12.9	13.4	14.1	15.5	17.9	20.0	20.7	20.4	19.7	18.1	16.4	14.7	12.5	12.5	11.1	10.7	14.2	20.7
19-Sep	10.3	10.0	10.1	9.9	10.0	10.0	9.8	10.8	12.7	15.5	17.3	18.0	18.6	18.6	19.0	18.8	18.9	17.5	15.3	12.3	11.8	10.0	9.1	9.3	13.5	19.0
20-Sep	9.1	9.2	9.1	9.5	9.7	9.8	9.6	10.4	12.2	13.3	14.3	15.7	17.0	17.8	18.2	18.1	17.7	17.3	15.2	12.8	11.3	9.9	9.1	9.1	12.7	18.2
21-Sep	9.1	9.2	8.6	7.8	7.4	7.5	8.2	10.8	15.7	20.2	22.4	23.3	24.0	24.6	25.8	26.6	25.5	24.0	20.4	19.3	18.4	17.7	16.2	15.4	17.0	26.6
22-Sep	14.8	14.5	12.9	12.3	11.2	10.5	10.1	11.6	13.9	17.5	20.7	24.0	26.7	27.5	28.2	28.2	27.4	25.6	22.1	20.9	19.7	17.4	15.9	15.5	18.7	28.2
23-Sep	16.6	15.5	15.9	14.5	13.6	13.1	12.9	13.2	13.6	14.1	16.5	17.6	18.3	19.4	19.7	20.4	20.0	19.4	17.1	14.6	12.0	10.4	8.9	8.7	15.2	20.4
24-Sep	7.3	7.2	7.0	5.7	5.6	7.6	7.3	10.5	10.8	11.3	13.0	15.6	18.3	20.2	20.9	21.7	20.9	20.3	19.2	18.2	16.0	15.9	14.9	14.0	13.7	21.7
25-Sep	12.6	11.4	10.5	9.8	8.8	8.9	9.1	10.0	10.4	10.5	11.0	11.1	10.8	10.7	11.0	10.9	10.4	9.7	9.0	8.4	8.1	7.8	7.3	9.9	9.9	12.6
26-Sep	6.8	6.1	5.7	5.4	5.1	4.9	4.8	4.6	4.5	4.5	4.7	4.7	4.5	4.2	3.9	3.6	3.3	1.6	0.8	1.0	0.9	0.9	0.8	3.7	6.8	
27-Sep	0.7	0.6	0.6	0.6	0.7	0.9	1.0	1.2	1.9	2.6	3.0	3.7	4.4	4.8	5.3	5.9	5.7	5.0	3.3	2.0	1.0	0.6	1.4	1.8	2.4	5.9
28-Sep	2.3	2.3	2.6	2.7	2.8	2.7	2.8	3.3	4.2	5.8	7.1	8.2	8.9	9.9	10.8	11.5	10.7	10.1	9.2	8.3	7.8	7.4	7.2	7.3	6.5	11.5
29-Sep	6.8	6.3	5.4	5.3	5.0	4.6	4.7	5.2	7.7	10.7	12.2	13.8	14.7	13.8	13.3	13.3	13.1	12.5	11.4	10.6	10.4	10.0	9.7	9.4	9.6	14.7
30-Sep	9.0	8.5	8.3	8.2	8.6	8.8	8.6	8.9	9.0	9.1	9.9	10.7	11.6	12.7	13.1	12.6	11.0	10.7	10.4	9.9	9.3	9.1	8.3	7.2	9.7	13.1
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Statoil - Leismer - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Statoil - Leismer - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	27	3.75	3.75
0 - 10	389	54.03	57.78
10 - 20	274	38.06	95.83
> 20	30	4.17	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

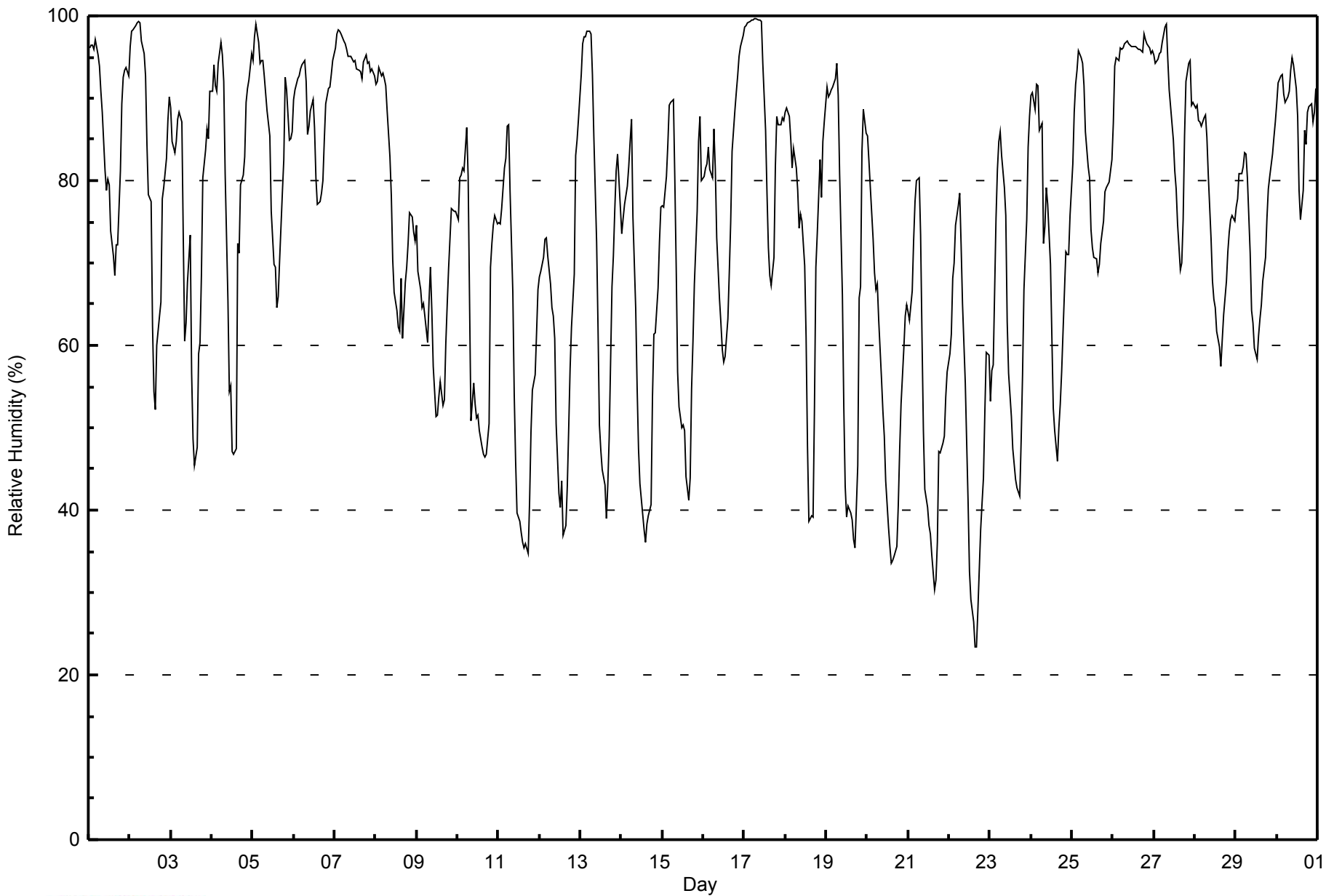


Maximum Value: 100 % on Sep 17 07:00																			Maximum Daily Average: 95.7 % on Sep 26						Hours in Service: 720		
Minimum Value: 23 % on Sep 22 17:00																			Minimum Daily Average: 51.0 % on Sep 22						Hours of Data: 720		
Maximum Diurnal Average: 87.9 % at hour 6																			Minimum Diurnal Average: 55.2 % at hour 15						Hours of Missing Data: 0		
Monthly Average: 74.2 %																			Percentiles: P ₁ = 32 P ₁₀ = 46 Q ₁ = 62 Median = 78 Q ₃ = 90 P ₉₀ = 95 P ₉₉ = 99						Hours of Calibration: 0		
																									Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	96	96	97	96	97	95	94	91	88	81	79	80	80	74	71	68	72	72	81	89	93	93	94	93	86.3	97	
2-Sep	96	98	98	99	99	99	99	97	95	93	84	78	77	62	54	52	60	64	65	78	79	83	87	90	82.9	99	
3-Sep	89	85	83	85	87	88	87	73	60	63	68	73	57	49	46	48	59	60	68	80	84	86	85	91	73.1	91	
4-Sep	91	94	92	91	94	97	95	92	81	65	54	55	47	47	47	72	71	80	81	83	90	91	92	95	79.1	97	
5-Sep	95	97	99	97	94	95	95	93	88	87	85	76	70	70	65	66	70	79	83	92	91	85	85	86	85.1	99	
6-Sep	90	91	92	93	94	94	95	92	86	87	88	90	86	80	77	77	78	80	85	89	91	91	93	95	88.1	95	
7-Sep	96	98	98	98	98	97	97	96	95	95	95	94	95	94	93	93	92	94	95	94	94	93	94	93	95.1	98	
8-Sep	92	92	94	93	93	92	92	88	83	78	70	66	64	62	62	68	61	68	70	72	76	76	74	73	77.4	94	
9-Sep	74	69	67	65	65	64	60	65	69	64	57	51	52	54	56	53	53	60	65	69	77	76	76	76	64.1	77	
10-Sep	75	80	81	82	81	86	81	66	51	55	53	51	52	50	48	47	46	47	51	70	72	75	76	75	64.5	86	
11-Sep	75	75	77	82	83	87	87	79	66	54	46	40	39	37	36	35	36	35	41	49	55	56	62	67	58.2	87	
12-Sep	68	69	71	73	73	71	68	65	64	61	51	42	40	44	37	38	43	50	57	62	69	83	85	87	61.2	87	
13-Sep	93	97	98	98	98	98	98	93	85	73	62	50	47	45	43	39	43	49	67	71	76	81	83	77	73.5	98	
14-Sep	74	75	77	79	82	85	87	76	64	55	47	43	40	38	36	38	39	41	54	61	62	67	73	77	61.2	87	
15-Sep	77	77	81	84	89	89	90	80	69	57	53	50	50	50	44	41	44	55	61	68	76	85	88	80	68.2	90	
16-Sep	81	81	82	84	81	80	86	81	73	66	63	59	58	59	63	69	75	84	88	91	93	95	96	98	78.6	98	
17-Sep	99	99	99	99	100	100	100	100	100	100	100	99	94	86	79	72	69	67	71	82	88	87	87	88	87	89.5	100
18-Sep	88	89	88	85	81	84	82	79	74	76	75	70	61	48	39	39	39	52	70	74	83	78	85	87	71.9	89	
19-Sep	91	90	91	91	91	92	94	90	81	66	52	43	39	41	40	39	36	36	45	66	67	84	89	86	68.3	94	
20-Sep	85	82	79	73	69	67	67	63	56	52	49	44	38	36	34	34	34	36	40	47	53	60	64	65	55.3	85	
21-Sep	64	63	67	73	77	80	80	73	61	50	43	40	38	37	35	30	31	36	47	47	48	49	54	57	53.3	80	
22-Sep	59	61	68	70	74	77	78	72	65	55	48	41	33	29	26	23	23	28	38	41	44	52	59	59	51.0	78	
23-Sep	53	57	58	75	81	85	86	83	79	76	63	57	51	48	46	44	43	42	49	56	67	75	84	88	64.3	88	
24-Sep	90	91	89	92	91	86	87	72	74	79	77	70	61	52	50	46	50	53	57	62	71	71	71	76	71.6	92	
25-Sep	82	88	92	93	96	95	94	91	86	82	80	74	72	71	70	69	70	72	75	79	79	79	80	82	81.4	96	
26-Sep	87	94	95	95	96	96	96	97	97	97	97	96	96	96	96	96	96	96	98	97	97	96	95	96	95.7	98	
27-Sep	95	94	95	95	96	97	99	99	95	91	89	85	81	79	75	69	70	75	85	92	94	95	89	89	88.5	99	
28-Sep	89	89	87	87	87	88	88	85	81	73	68	66	65	62	60	57	61	64	68	71	74	75	76	75	74.8	89	
29-Sep	77	78	81	81	82	83	83	80	71	64	63	60	58	61	63	65	68	71	75	79	81	83	85	87	74.1	87	
30-Sep	89	92	93	93	91	89	90	91	93	95	94	91	88	79	75	79	86	84	88	89	89	87	88	91	88.6	95	
	83.7	84.7	85.5	86.6	87.4	87.9	87.8	83.4	77.8	73.0	68.4	64.4	60.7	57.6	55.2	55.5	57.3	61.0	67.6	73.6	77.0	79.6	81.6	82.6	Diurnal Average		
	99	99	99	99	100	100	100	100	100	100	99	96	96	96	96	96	96	96	98	97	97	96	96	98	Diurnal Maximum		



WBEA
Hourly Averages

Relative Humidity (RH) - %
Statoil - Leismer - September 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Statoil - Leismer - September 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	42	5.83	5.83
40 - 60	120	16.67	22.50
60 - 80	228	31.67	54.17
80 - 100	330	45.83	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 27 km/h on Sep 20 12:00	Maximum Daily Speed Average: 16.5 km/h on Sep 20	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 3 23:00	Minimum Daily Speed Average: 1.0 km/h on Sep 5	Hours of Data: 703
Maximum Diurnal Speed Average: 3.8 km/h at hour 13	Minimum Diurnal Speed Average: 0.8 km/h at hour 19	Hours of Missing Data: 17
Monthly Average Velocity: 1.8 km/h 290.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 8 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 26	Percent Operational Time: 97.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Sep	WSW5	W6	W5	W8	W8WNW10	W6	W5	W7	W11	W11	W8	W10WNW12WNW13	NW14	NW12	NW7	WSW7	WNW2	SSW2	WSW3	WNW4	NW6					
2-Sep	NNW2	NNW5	NNW4	NNW5	NNW6	NNW5	N6	NNE6	WSW0	W1	SSW2	SE6	SE4	SE8	SSE7	E6	NNW6	NNE1	E2	NNE0	NW4	NNE6	NNE4	NNW5		
3-Sep	NW6	NNW6	N7	N6	NNW3	NNW4	N5	NW2	ENE3	NW2WNW11	WSW6	WSW9	W8	WSW8	WNW3	ESE9	NNE7	NE5	SE1	AF	ESE1	SW0	AF			
4-Sep	AF	ESE1	WNW3	WNW3	SE1	SE4	SSE3	S4	SSW4	S6	SW7	SSW7WSW11	W15WNW18WNW20	NNW10	SE2	N8	NNW13	NNW12	NW12	NW7	NNW8					
5-Sep	NW11	NW10	NW9	NNW7	NW7	WSW2	SW2	SW3	WSW5	SW3	SSE5	SE8	SE10	SE12	SSE14	SSE10	SSE8	SE6	ESE5	ENE3	S1	WNW7	NW13	NW17		
6-Sep	NW15	NW14	NNW13	NW11	N4	N4	SSE3	SE5	ESE8	E8	E10	ESE10	ESE12	ESE13	ESE10	ESE10	ESE9	ESE8	NE6	NE6	NE6	NE6	ENE5	E4		
7-Sep	NNW7	N4	N5	N8	N7	N10	N10	NNE10	NNE10	NNE11	N10	N13	NNE12	NNE12	NNE11	N11	N12	N9	N10	N15	NNW15	N15	N12	AF		
8-Sep	AF	AF	AF	AF	AF	AF	AF	AF	N12	N13	N11	N10	N10	NNW12	N10	NNW12	NNW11	NNW8	NNW6	N5	NNE4	NNE3	N5	N5		
9-Sep	NNE4	NNE6	NE5	NE5	ENE5	NE6	NE6	NE3	SE2	SE4	ESE4	SE6	S5	SE4	N3	N4	NNE3	E6	ENE5	ENE4	NE4	NNE5	NNE5	NNE5		
10-Sep	NNE5	N5	N5	N5	NNE4	NNW3	NNW7	NNW9	N10	N9	N8	NNW9	NW15	NW10	NW6	WNW4	WSW4	W3	SW3	ESE3	ESE3	SSE3	SSE3	SSE3		
11-Sep	S3	S3	SSE3	SE5	SSE3	SSE5	SSE4	S6	SSW8	SSW11	SSW14	SSW14	SSW15	SSW14	SSW16	SSW16	SSW13	SSW11	SSW7	S4	SSW5	SSW5	S4	SSE3		
12-Sep	S3	WSW3	SSW3	WSW3	NW3	WNW6	NW7	NW10	NW12	NNW12	NW16	NW19	NNW22	NW21	NW23	NNW22	NNW19	NW13	NW8	NW9	NNW10	W4	NNW6	NNW15		
13-Sep	NW6	W5	NNW5	NNW4	NW3	WNW4	WNW3	W6	W8	W9	W9WNW12WNW13WNW11	NW11	W12WNW10	WNW4	ENE2	ENE2	E2	ESE1	NE3	SE3						
14-Sep	SSE4	SE3	SSE3	W3	WSW1	AF	WNW1	AF	SSW1	SW3	S6	SSW6	SSW6	W9	W11	W9	W10	W8	NNE0	AF	SW2	WSW2	WSW3	W3		
15-Sep	W5	W4	WNW4	WNW3	W3	W4	WNW3	WNW3	W3	W7	W10	W10	W10	W14	W14WNW14	W9	ENE4	E8	ESE5	ESE3	ESE1	SE2	SSE3			
16-Sep	S4	S5	SSE4	SSE3	SW2	NW3	NNW5	NE1	ESE6	ESE6	E6	E7	E10	E11	E13	E13	ENE12	ENE11	E12	E13	E12	E12	ESE12	ESE12		
17-Sep	ESE11	ESE12	ESE11	ESE12	ESE11	SE11	SE11	SE11	SE12	SE12	SE11	SE13	SE14	SE14	SE15	SE13	SE12	SE9	ESE5	SE7	SE7	SE9	SE8	SSE6		
18-Sep	SSE3	S4	W3	W7	NW3	WSW5	SW3	W6	NW11	W6	NNW9	NW4	WNW1	NW6	NW10	NNW11	NNW9	NNE4	NE6	ENE3	E1	ENE3	N2	NNW1		
19-Sep	ESE2	S2	SSE3	WSW3	SSW2	SSE3	SE3	SSE2	WSW5WSW10	W20	W26	W26	W20WSW20	W26	W23	W25WNW26WNW19WNW14	W24	W15	W16							
20-Sep	W14	W20	W22	W23	W24WNW26	W23	W25WNW22WNW25WNW25WNW27	W27	W24	W23	W19	W17	W12	W9	S2	SE3	SE4	SE4	SSE4							
21-Sep	S5	SSE4	SSE4	S4	SSE4	SSE3	S1	SSE4	S5	SW7WSW12WSW10	SW10	SSW10	SSW9	SSW9	SSW7	SSE7	SE8	SE9	SE10	SE9	SE9	SE9				
22-Sep	ESE9	ESE7	ESE7	ESE6	ESE6	SE5	SSE3	S3	SSW5	SSW5	W4	SW3	WSW6	WSW8	W10WNW11	WNW9	W6	NW2	W5	NNW3	AF	N2	NNW8			
23-Sep	NW17	NW12	NW15	NW16	WNW8	W10	W8	W13	W13WNW11WNW11	NW12	NW9WNW11	WNW9	W6	W7	WSW4	SW2	E2	NE3	NNE2	ENE2	NE3					
24-Sep	NNE2	ENE2	E3	AF	ESE2	ESE5	ESE3	E8	E11	E12	ESE11	E14	E16	ESE18	SE17	SSE22	SE16	SSE12	SE9	E5	NW1WNW25WNW18WNW12					
25-Sep	W13	W9	WSW5	WSW6	SSW4	W10	WSW7	W14	W19	W19WNW20WNW19WNW17WNW13	NW13	NNW8	N9	N11	N8	N12	NNE10	NNE9	NNE8	NE8						
26-Sep	NE5	ENE8	ENE12	ENE12	ENE11	ENE13	ENE10	ENE11	ENE11	NE10	NE10	ENE11	NNE11	NNE11	NE10	NE7	NNW5	NNW11	NNW13	NNW14	NNW14	NNW13	NW15	NW14		
27-Sep	NNW14	NNW15	NNW14	NNW14	NNW13	NNW14	NNW15	NNW14	N12	N11	N11	N10	N8	NNE8	NE4	SE8	SE5	SE6	ESE4	SE4	ESE3	SE6	SE8			
28-Sep	SE9	SSE9	SE12	SSE13	SE13	SSE13	SSE12	SSE13	SSE17	SSE17	SSE16	SSE16	SSE15	SSE16	SSE19	S16	SSE16	SSE13	SSE12	SSE13	SSE14	SSE13	SSE12	SSE11		
29-Sep	SSE11	SSE10	SSE13	SSE12	SSE10	SSE11	SSE16	SSE15	SSE17	SSE18	SSE24	SSE20	S19	SSE18	S18	S13	SSW10	SSW10	S6	SSE8	SSE6	SSE4	SSE3	S3		
30-Sep	SE2	SSE3	SSW1	W5	WNW6	NW9	NW12	NW13	NW11	NW10WNW14WNW15	W15WNW19	NW18	NW19	NNW16	NW12	WNW9	NW18	NW12	WNW12	W10	W10					

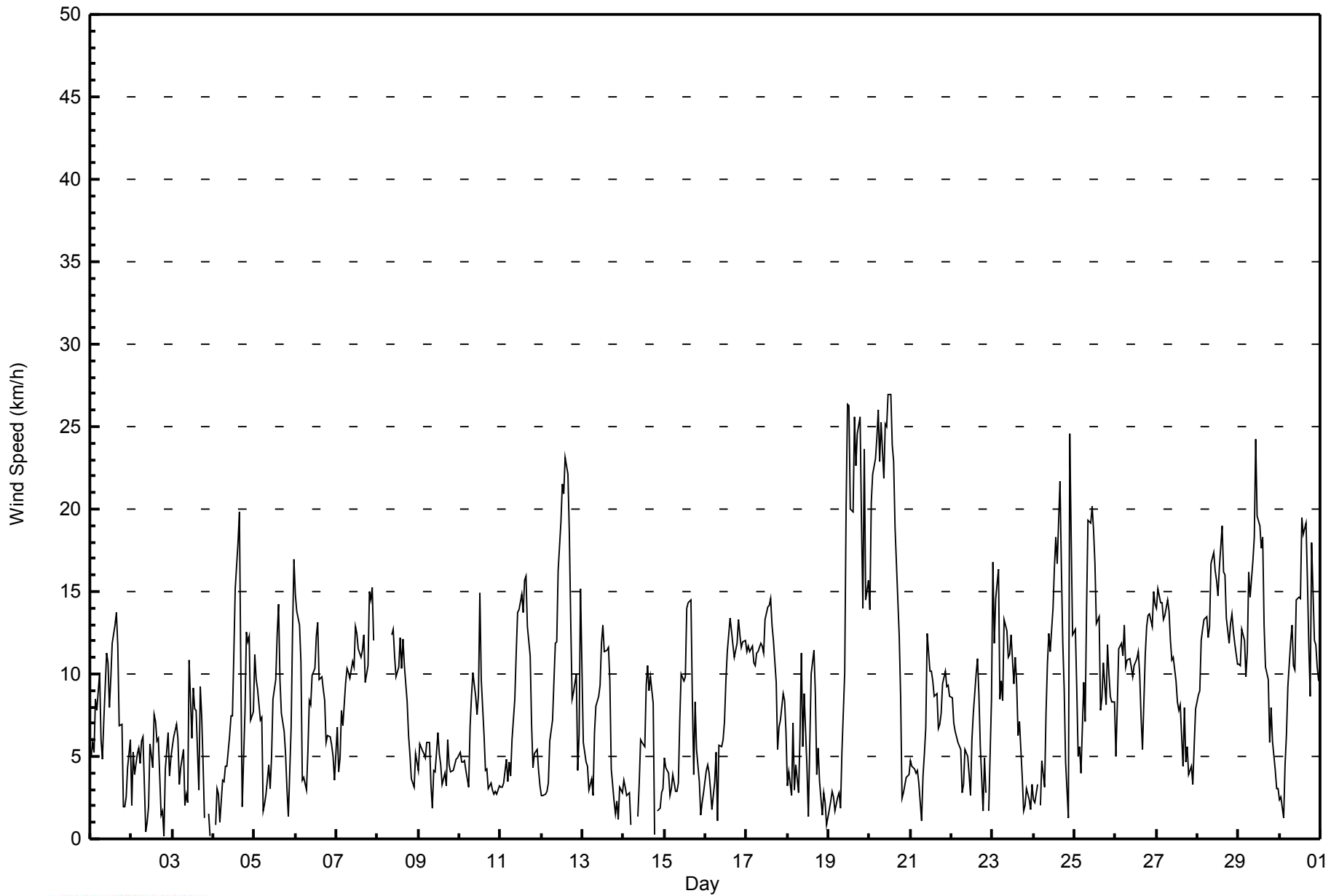
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NW17	W20	W22	W23	W24WNW26	W23WNW25WNW22WNW25WNW25WNW27	WNW27	W24	NW23	W26	W23	W25WNW26WNW19NNW15WNW25WNW18	NW17													Diurnal Maximum

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Statoil - Leismer - September 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Statoil - Leismer - September 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	245	34.85	34.85
6 - 11	258	36.70	71.55
12 - 19	166	23.61	95.16
20 - 28	34	4.84	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Statoil - Leismer - September 2014

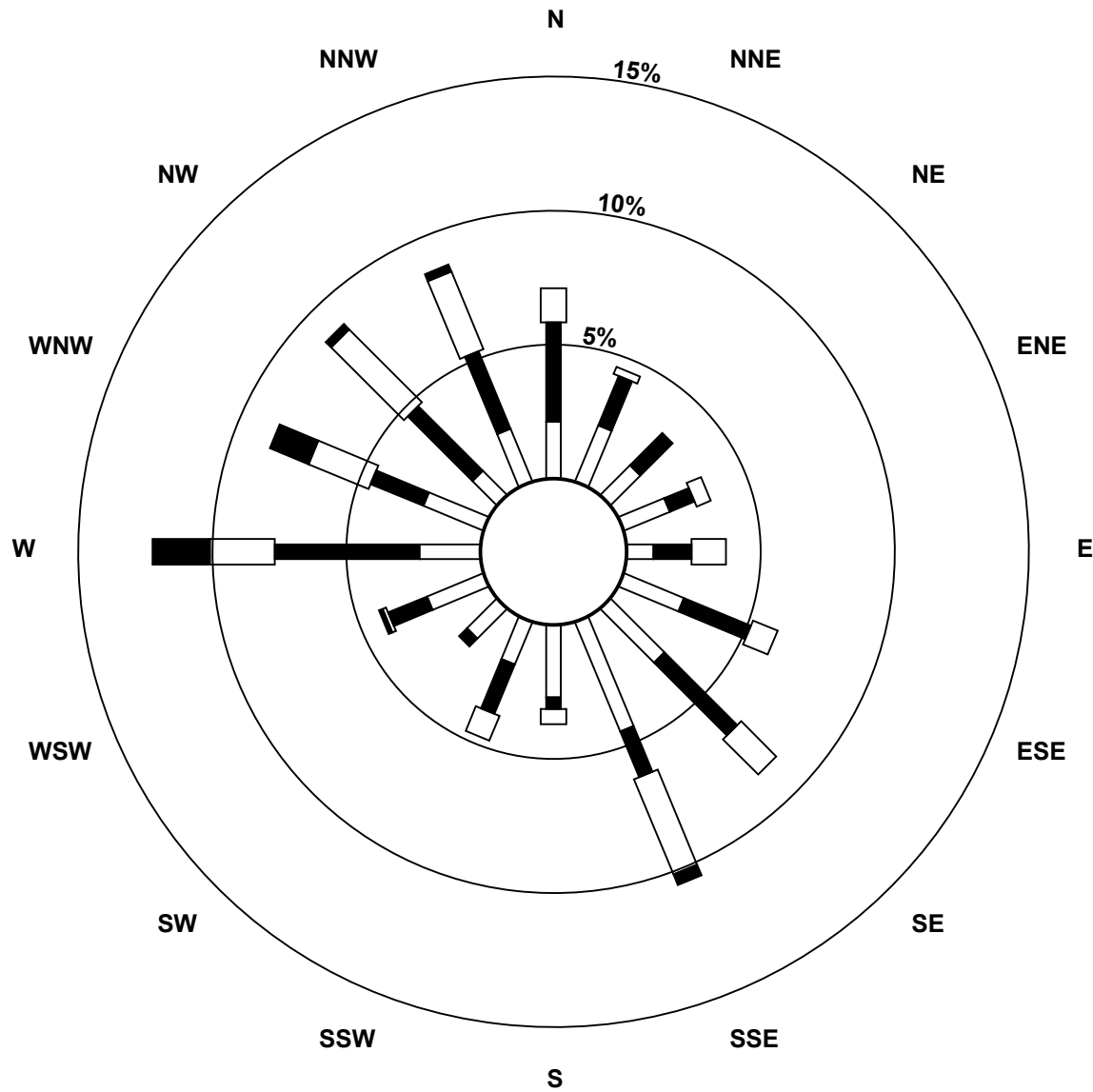
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	16	11	13	7	17	20	31	19	12	11	16	16	17	9	15	245
6 - 11	26	14	12	7	10	19	27	13	3	14	3	11	38	15	24	22	258
12 - 19	9	2	0	4	9	7	13	27	4	7	0	1	17	17	27	22	166
20 - 28	0	0	0	0	0	0	0	3	0	0	0	1	15	11	2	2	34
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	50	32	23	24	26	43	60	74	26	33	14	29	86	60	62	61	703

Total Number of Valid Hours: 703

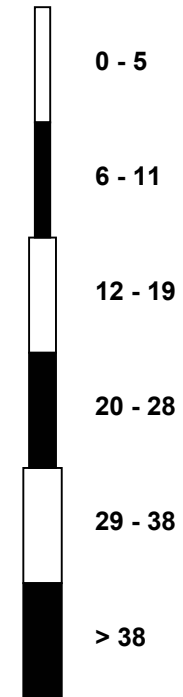
Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Statoil - Leismer (AMS501)**



Classes (km/h)



Total Number of Valid Hours: 703



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Statoil - Leismer - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 11 km/h on Sep 24 22:00	Hours of Data: 703
Minimum Value: 0 km/h on Sep 10 21:00	Hours of Missing Data: 17
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 8	Hours of Calibration: 0
	Percent Operational Time: 97.6

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

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Statoil - Leismer - September 2014

Direction of Maximum Speed: 287 deg on Sep 20 12:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 276.9 deg on Sep 20	Hours of Data: 703
Direction of Minimum Speed: 216 deg on Sep 3 23:00	Hours of Missing Data: 17
Direction of Minimum Daily Speed Average: 1.0 deg on Sep 5	Percent Operational Time: 97.6
Monthly Average Direction: 286.6 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	251	265	259	271	265	300	274	265	260	271	271	269	260	286	284	313	325	309	254	287	198	254	290	306	280.2	
2-Sep	331	344	337	333	332	328	8	27	255	273	212	138	142	128	149	82	348	28	100	16	304	31	15	329	16.0	
3-Sep	322	337	353	349	344	347	10	322	57	313	290	252	243	271	258	301	104	33	53	132	AF	118	216	AF	322.7	
4-Sep	AF	117	294	288	125	146	160	175	197	191	231	206	248	275	295	294	333	139	353	347	340	324	312	331	293.1	
5-Sep	315	316	325	342	323	255	220	228	246	216	166	129	131	134	156	161	160	142	114	76	184	285	318	307	233.1	
6-Sep	315	325	328	321	10	350	147	134	103	93	96	111	110	122	107	114	112	118	48	40	55	51	66	85	73.1	
7-Sep	345	356	351	8	355	360	0	14	20	12	3	6	15	24	15	6	1	4	354	351	348	351	350	AF	2.2	
8-Sep	AF	AF	AF	AF	AF	AF	AF	AF	AF	352	350	356	7	354	335	2	343	340	347	344	353	25	14	1	4	--
9-Sep	31	27	42	50	62	53	53	50	142	128	102	125	180	139	357	6	22	94	77	71	36	33	25	21	61.1	
10-Sep	20	0	357	358	15	337	343	337	1	353	3	348	319	324	319	282	245	275	232	115	119	153	162	158	339.9	
11-Sep	187	181	168	141	156	150	163	185	196	202	195	201	194	192	193	192	198	206	194	182	192	194	189	167	190.2	
12-Sep	183	248	212	243	308	283	309	308	320	327	320	320	328	326	324	333	330	323	322	322	334	278	337	332	321.2	
13-Sep	317	280	336	340	326	285	294	268	268	271	275	289	282	303	304	263	290	286	63	70	86	114	56	130	291.1	
14-Sep	147	144	160	278	247	AF	302	AF	202	234	188	211	213	274	267	262	264	263	23	AF	215	249	249	272	243.7	
15-Sep	267	273	296	283	264	278	282	286	281	262	272	273	268	280	279	292	277	65	91	106	121	110	132	159	275.5	
16-Sep	177	178	158	150	215	321	343	53	110	103	96	93	97	88	81	90	69	69	87	81	94	95	104	109	93.1	
17-Sep	107	110	107	110	116	126	128	129	139	139	133	143	141	134	137	131	140	136	120	127	130	142	143	158	130.1	
18-Sep	168	187	275	265	304	257	225	279	315	278	337	325	293	305	324	338	341	31	54	72	98	59	349	341	318.0	
19-Sep	121	173	156	241	202	163	142	157	246	256	262	271	264	261	257	265	260	265	290	302	286	267	264	268	265.9	
20-Sep	262	276	279	279	281	284	281	281	282	288	283	287	281	276	272	266	275	271	268	179	127	140	143	165	276.9	
21-Sep	176	166	165	169	160	152	170	150	186	221	254	240	219	207	203	212	197	157	137	135	134	142	135	129	178.8	
22-Sep	123	114	113	119	121	134	167	191	195	204	263	221	248	257	270	285	282	262	325	278	334	AF	356	327	234.2	
23-Sep	321	322	304	324	297	268	262	272	270	285	298	311	304	295	302	260	265	248	221	88	55	33	64	34	297.6	
24-Sep	32	62	100	AF	110	108	106	101	100	98	102	101	101	114	126	147	145	149	145	92	316	294	296	294	118.5	
25-Sep	270	264	239	245	209	259	251	274	274	275	288	291	295	300	325	330	355	353	1	1	12	18	29	41	302.9	
26-Sep	52	58	70	71	64	68	72	58	61	42	46	67	26	19	37	48	346	334	334	334	338	334	321	321	24.3	
27-Sep	328	334	329	332	329	331	338	345	1	9	10	7	6	352	12	53	124	124	132	118	129	115	139	136	357.3	
28-Sep	146	152	141	147	145	148	155	159	156	159	164	165	168	167	161	173	163	167	164	160	162	164	165	167	159.7	
29-Sep	160	162	155	158	161	154	151	151	154	156	155	156	174	168	172	183	195	201	180	151	158	165	159	171	163.2	
30-Sep	138	159	193	279	282	322	316	311	311	309	300	290	277	296	316	323	334	314	283	306	317	282	263	272	302.1	
	297.6	301.5	316.5	311.8	304.2	296.5	302.1	282.9	275.8	269.7	275.3	268.8	261.1	272.1	278.3	278.7	287.6	277.3	359.5	13.9	18.7	312.5	321.8	310.8		

Diurnal Average

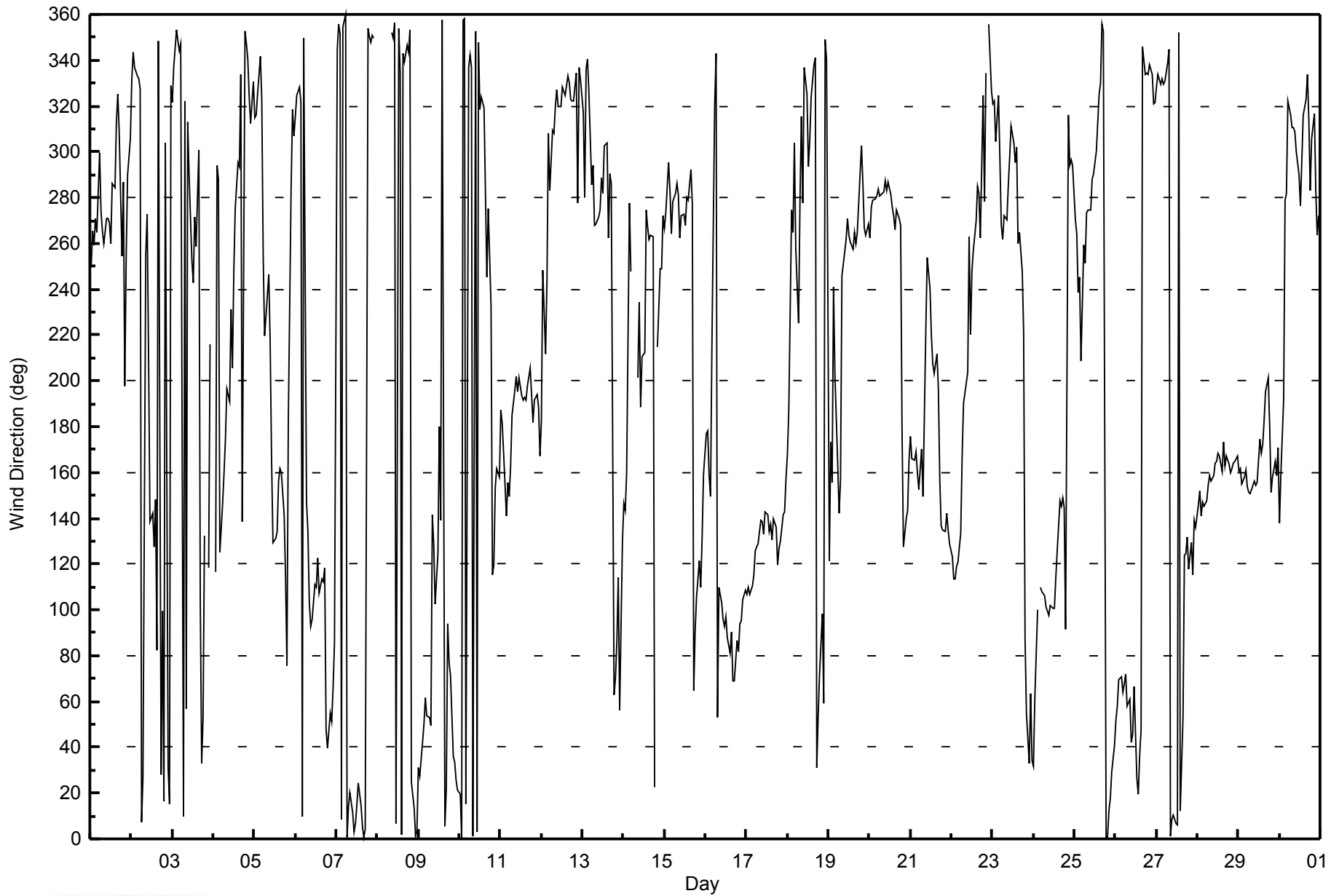
AF - Analyzer Failure

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



WBEA
Hourly Averages

Wind Direction (WD) - deg
Statoil - Leismer - September 2014





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Statoil - Leismer - September 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 100 deg on Sep 3 16:00	Hours of Data: 703
Minimum Value: 5 deg on Sep 21 20:00	Hours of Missing Data: 17
Percentiles: P ₁ = 8 P ₁₀ = 12 Q ₁ = 15 Median = 21 Q ₃ = 31 P ₉₀ = 49 P ₉₉ = 85	Hours of Calibration: 0
	Percent Operational Time: 97.6

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	20	17	19	13	15	19	21	30	33	17	15	24	18	26	19	19	16	36	16	62	50	48	24	28	62
2-Sep	31	18	22	21	20	21	19	51	89	75	75	43	49	49	44	47	27	27	53	81	44	19	56	15	89
3-Sep	17	13	15	18	29	19	10	48	49	83	31	43	35	43	35	100	21	50	21	64	AF	56	75	AF	100
4-Sep	AF	63	40	29	80	15	16	21	40	32	40	37	36	26	19	14	22	77	59	13	13	12	13	11	80
5-Sep	11	21	20	15	21	82	35	73	33	43	22	23	21	18	19	20	16	14	21	24	66	50	17	10	82
6-Sep	9	11	11	12	35	20	23	26	21	23	20	18	20	21	26	19	22	28	25	30	31	32	34	46	46
7-Sep	33	55	54	22	19	18	19	24	24	22	22	18	21	23	25	22	19	21	18	15	15	15	15	AF	55
8-Sep	AF	AF	AF	AF	AF	AF	AF	AF	20	19	22	31	20	17	25	15	15	14	15	23	20	23	18	15	31
9-Sep	18	12	21	25	20	20	30	39	55	31	37	34	32	44	51	34	60	24	20	14	18	25	23	12	60
10-Sep	13	11	14	16	19	40	27	15	26	18	20	24	15	24	49	66	60	81	33	24	22	10	16	17	81
11-Sep	29	29	18	12	14	10	17	20	24	31	27	26	25	26	24	23	23	24	17	11	16	21	28	18	31
12-Sep	21	45	45	31	25	15	16	20	13	12	12	15	18	17	18	13	14	11	10	10	20	34	22	13	45
13-Sep	20	17	25	16	20	26	46	12	14	21	36	25	22	34	32	31	22	66	30	52	35	58	41	49	66
14-Sep	14	22	20	17	50	AF	42	AF	93	65	50	55	56	34	34	24	18	14	93	AF	51	47	48	21	93
15-Sep	16	11	29	41	36	12	30	47	49	28	26	28	36	23	25	23	29	56	14	19	34	78	28	30	78
16-Sep	22	21	17	16	66	34	19	78	22	25	38	35	27	26	27	26	27	27	26	25	22	22	21	22	78
17-Sep	19	18	18	19	19	20	16	14	15	16	15	14	15	18	16	17	13	10	20	9	8	6	7	9	20
18-Sep	18	31	86	16	67	39	52	33	15	44	15	40	95	59	34	23	21	26	19	73	77	69	39	49	95
19-Sep	51	22	32	48	70	35	18	68	41	25	24	17	17	19	21	17	23	13	24	21	18	15	13	12	70
20-Sep	12	11	12	12	12	12	12	13	14	14	15	15	15	15	14	18	14	15	10	46	29	13	16	16	46
21-Sep	19	16	17	18	19	15	85	24	28	41	26	35	35	31	29	36	25	12	6	5	6	7	6	9	85
22-Sep	11	12	14	13	11	16	44	42	28	39	57	79	49	39	22	24	25	36	58	29	26	AF	60	12	79
23-Sep	9	9	15	16	27	12	12	13	13	21	22	20	30	26	34	48	25	26	78	32	17	27	65	31	78
24-Sep	35	31	20	AF	57	20	49	18	15	15	17	17	18	21	17	14	13	13	12	23	77	16	14	16	77
25-Sep	11	16	36	34	39	18	26	12	13	14	16	22	19	21	15	18	16	16	17	18	20	21	27	38	39
26-Sep	69	34	31	34	31	32	32	30	29	27	32	30	25	29	28	33	37	12	10	10	10	11	10	10	69
27-Sep	11	10	12	12	12	12	11	14	23	23	22	20	27	19	29	59	24	16	20	15	11	22	17	11	59
28-Sep	12	11	11	11	10	11	12	13	13	15	16	16	17	20	17	18	14	14	13	11	11	13	12	13	20
29-Sep	11	11	9	11	12	12	12	11	13	15	14	15	19	17	17	19	18	21	22	8	9	11	20	30	30
30-Sep	39	35	53	20	20	11	9	11	13	12	13	17	13	16	13	17	12	9	23	16	11	22	10	12	53

69	63	86	48	80	82	85	78	93	83	75	79	95	59	51	100	60	81	93	81	77	78	75	49	
Diurnal Maximum																								

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 6, 2014
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	11:07	End Time (MST)	16:00
Barometric Pressure	mmHg	Station temp.	24 Deg C
Calibrator Make/Model	API T700	Serial Number	451
Cal Gas Concentration	49.4 ppm	Cal Gas Expiry Date	10/6/2016
Gas Cert Reference	EY0000359		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8203
DACS voltage range	0-5v	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	14	14
Analyzer Range (mv)	1000	1000	Lamp voltage	3003	2971
Calculated slope	0.981343	1.010283	Chamber temp.	50.0	50.0
Calculated intercept	-1.269454	-0.612261	Pressure ("Hg)	25.2	25.2
Analyzer Background	14.2	14.2	Flow (ccpm)	649	638
Analyzer Coefficient	1.086	1.086	Intensity	74	75

Analyzer make	API T100	Analyzer serial #	720
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	0.000
as found span	5000	79.5	785.5	784.7	1.001
calibrator zero	5000	0.0	0.0	-0.2	0.000
high point	5000	79.5	785.5	777.5	1.010
second point	5000	39.8	393.2	390.7	1.006
third point	5000	20.0	197.6	196.7	1.004
calibrator zero	5000	0.0	0.0		
as left zero	5000	0.0	0.0	0.5	NA
as left span	5000	79.5	785.5	784.6	NA
Average Correction Factor					1.007

Corrected As found	784.6	Previous response	801.7	% change	2.2%
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Notes:

No adjustments, filter changed after As Found

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

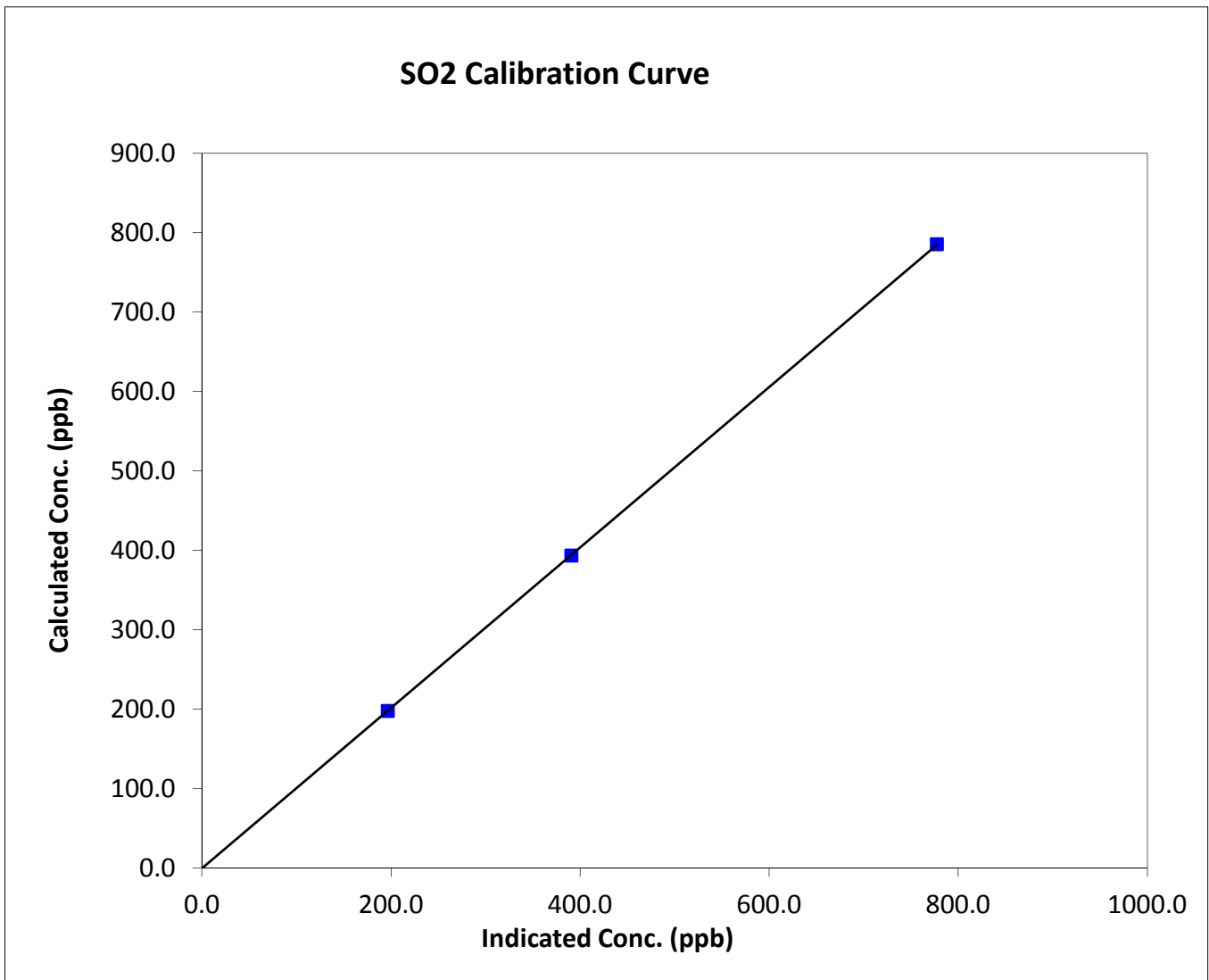
SO₂ Calibration Summary

Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 6, 2014
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	11:07	End Time (MST)	16:00
Analyzer make	API T100	Analyzer serial #	720

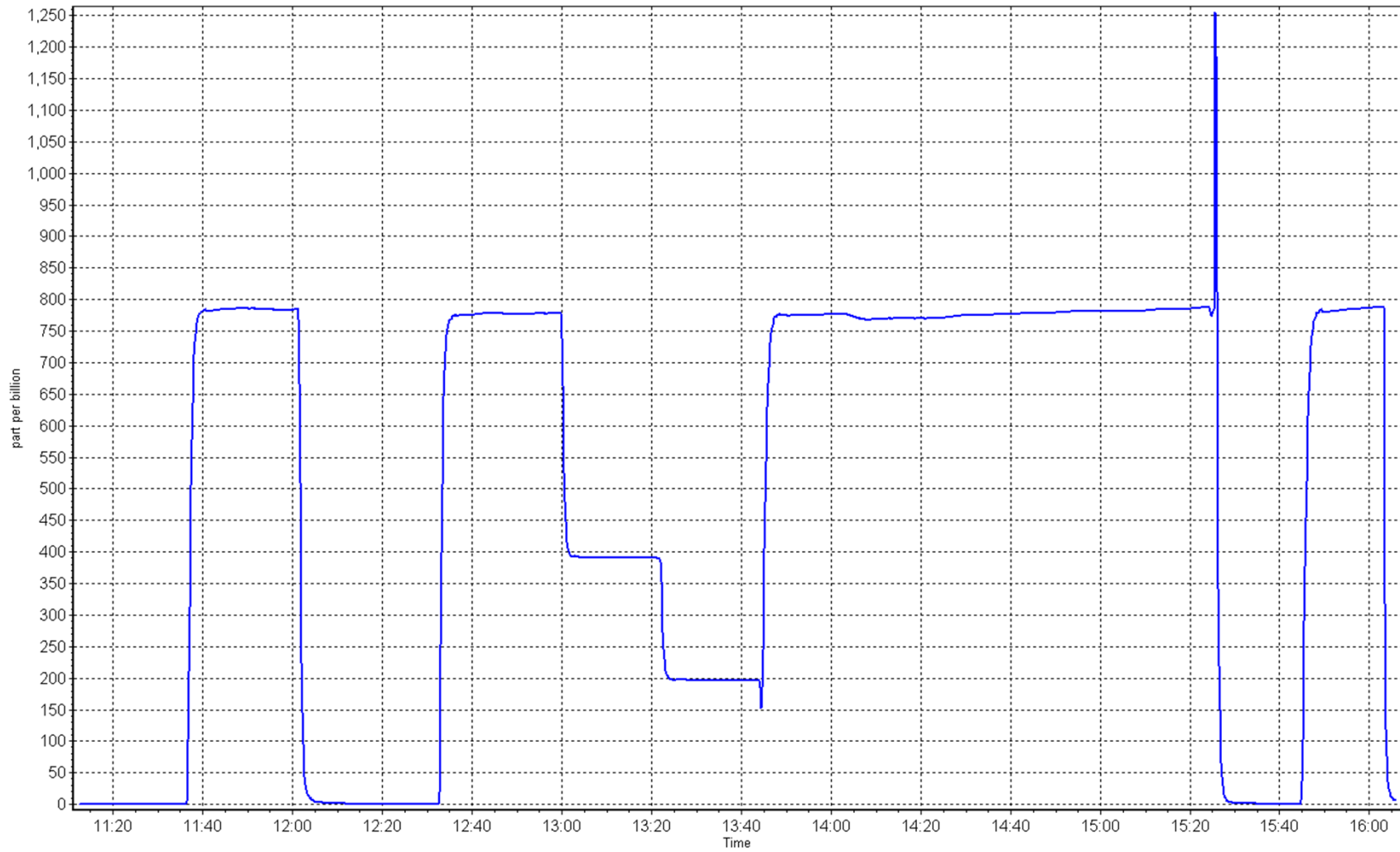
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999994
785.5	777.5	1.0102		
393.2	390.7	1.0065	Slope	1.010283
197.6	196.7	1.0045		
			Intercept	-0.612261



SO2 Calibration Plot

Date: September 9, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 11, 2014
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	16:05	End Time (MST)	18:25
Barometric Pressure	NA mmHg	Station temp.	24 Deg C
Calibrator Make/Model	API T700	Serial number	451
Cal Gas Concentration	10.2 ppm H2S	Cal Gas Expiry Date	5/30/2016
Gas Cert Reference	LL23598	SO2 gas conc.	49.4 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8203
DACS voltage range		DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	20.0	21.0
Analyzer Range (mv)	100	100	Lamp voltage	2185	2186
Calculated slope	0.992095	0.998982	Chamber temp.	50	50
Calculated intercept	-0.398783	-0.347985	Pressure	23.4	23.6
Analyzer Background	17.9	17.9	Flow	571	569
Analyzer Coefficient	0.986	0.955	Intensity	54	59
			Converter temp.	317	314

Analyzer make/model	API T101	Analyzer serial #	157
Converter make/model	Internal	Converter serial #	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	NA
as found span	5000	36.8	75.1	77.1	0.973
SO2 scrubber check	5000	20.2	199.6	4.7	NA
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	36.8	75.1	75.3	0.997
second point	5000	19.6	40.0	40.6	0.984
third point	5000	10.3	21.0	21.6	0.972
calibrator zero					
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	36.8	75.1	74.8	1.004
Average Correction Factor					0.984

Corrected As found	77.1	Previous response	76.1	% change	-1.3%
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Notes:

Small adjustment to span. Scrubber check before As Finds, filter changed after third point. Shortened As Lefts due to time constraints

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

H2S Calibration Summary

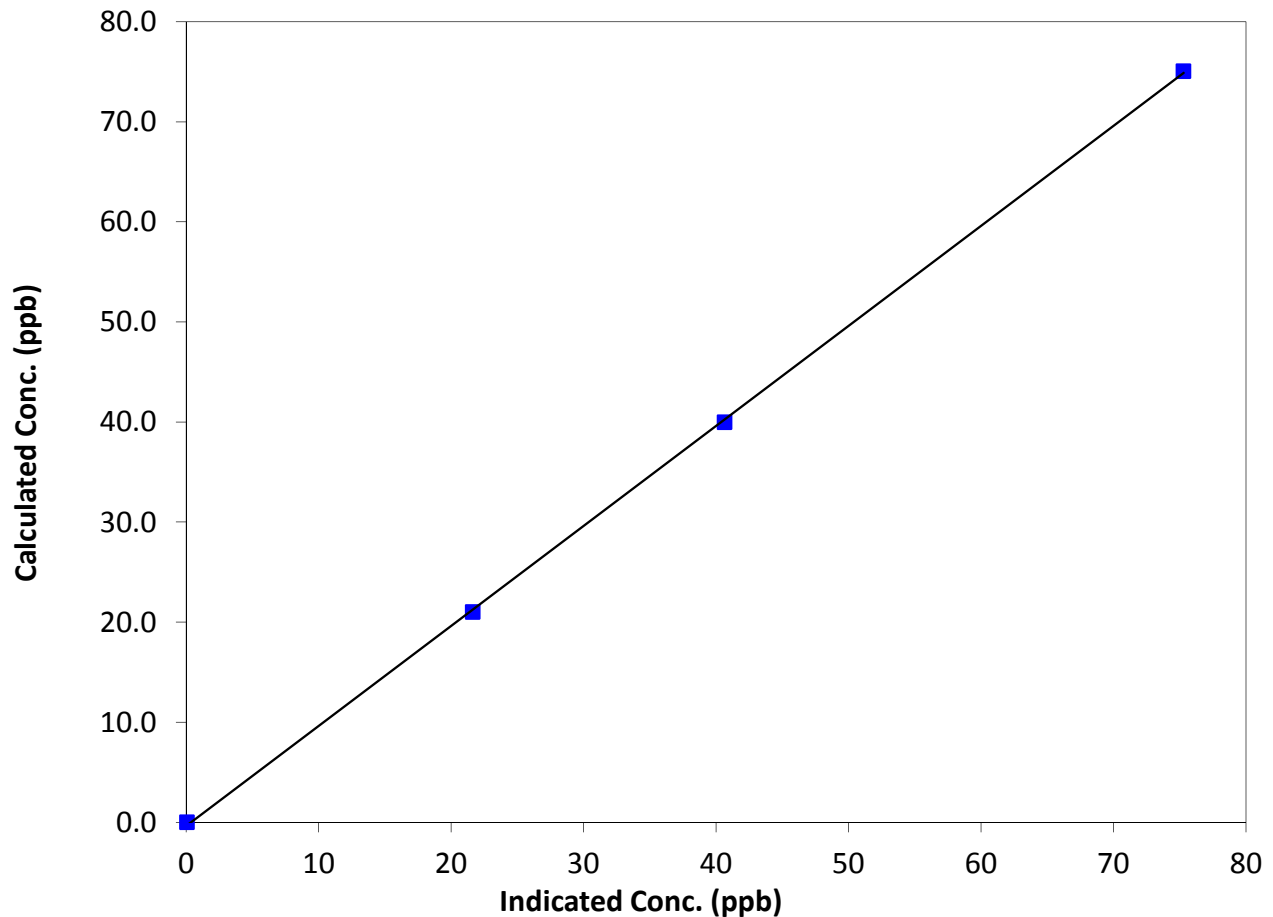
Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 11, 2014
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	16:05	End Time (MST)	18:25
Analyzer make	API T101	Analyzer serial #	157

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999919
75.1	75.3	0.9971		
40.0	40.6	0.9841	Slope	0.998982
21.0	21.6	0.9719		
			Intercept	-0.347985

H2S Calibration Curve







Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 6, 2014
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	11:10	End Time (MST)	16:48
Barometric Pressure	mmHg	Station Temperature	24.0 Deg C
Calibrator	API T700	Serial Number	451
NO Cal Gas Conc	50.3 ppm	Cal Gas Expiry Date	October 6, 2016
NOx Cal Gas Conc	50.6 ppm	Cal Gas Serial #	EY0000359

DACs Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8203
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.982683	0.980857	1.001923
	Data Offset	-0.951565	-1.033586	-1.685349
After	Data Slope	1.007383	0.998828	1.006094
	Data Offset	-1.741606	-0.870884	0.847948
Channel #				
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model	Teledyne T200	Analyzer serial #	722
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.953	ppb	0.994	ppb
NOX coefficient	0.961	ppb	0.989	ppb
		ppb		ppb
NO bkgrnd	1.1	mv	0.2	mv
NOX bkgrnd	4.5	mv	0.3	mv
Nt coefficient	N/A		NA	
Chamber Temp	16.6	Deg C	31.1	Deg C
Moly Temp	314.3	Deg C	315.0	Deg C
PMT Temp	6.8	Deg C	6.8	Deg C
O3 flow	85.0	ccm	84.0	ccm
R Cell Press	7.8	"Hg	6.6	"Hg
Sample Flow	460	ccm	459	ccm

Notes:

Zero and span adjusted. Filter changed after As Finds. As Finds out over 5%; all diagnostics look normal.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date: September 9, 2014 Station Number: AMS 501

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	1.6	-0.4	-1.1	N/A	N/A
as found span	5000	79.5	804.5	799.8	4.8	769.7	761.7	8.0	1.0453	1.0500
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	N/A	N/A
high point	5000	79.5	804.5	799.8	4.8	799.2	800.7	-1.5	1.007	0.999
second point	5000	39.8	402.8	400.4	2.4	403.0	403.4	0.0	0.999	0.993
third point	5000	20.0	202.4	201.2	1.2	204.2	202.5	1.7	0.991	0.993
calibrator zero	5000	0.0	0.0	0.0	0.0					
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.2	0.2	N/A	N/A
as left span	5000	79.5	804.5	411.0	393.5	804.9	472.9	332.1	0.9996	0.8693
Average Correction Factor									0.9990	0.9949

Corrected As found NO_x= 768.1 NO= 762.1 Percent Change NO_x= 6.7% NO= 7.1%
 Previous Response NO_x= 819.7 NO= 816.4

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 79.50 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO ₂ (400)	N/A	411.0	395.2	803.3	411.0	392.3	0.986	1.000	1.007	99.3%
2nd NO ₂ (200)	N/A	603.1	203.1	804.1	603.1	200.9	0.985	1.000	1.011	98.9%
3rd NO ₂ (100)	N/A	701.4	104.8	803.8	701.4	102.4	0.985	1.000	1.024	97.6%
4th NO ₂ (0)	806.2	N/A	-0.7	805.6	806.2	-0.5	0.983	1.000	N/A	N/A
Average Correction Factor							0.985	1.000	1.014	98.6%

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

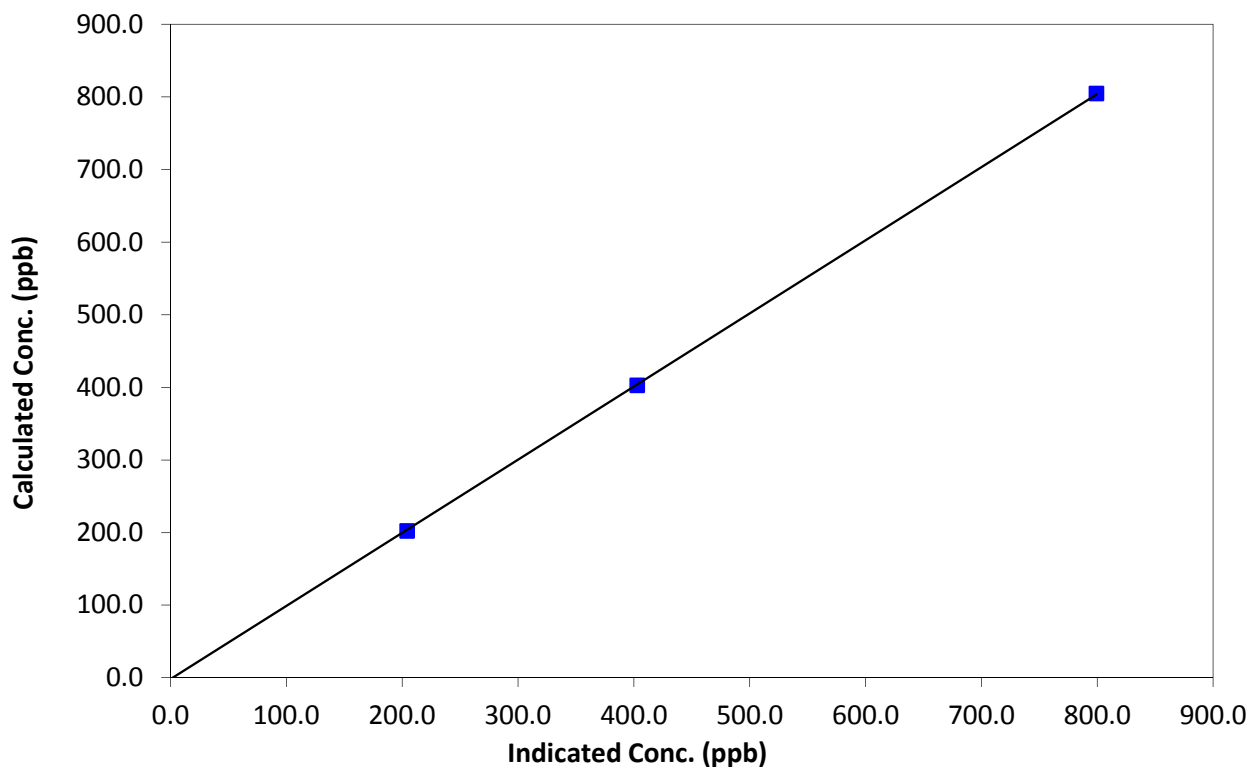
Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 6, 2014
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	11:10	End Time (MST)	16:48
Analyzer make	Teledyne T200	Analyzer serial #	722

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999972
804.5	799.2	1.0067		
402.8	403.0	0.9993	Slope	1.007383
202.4	204.2	0.9911		
0.0			Intercept	-1.741606

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

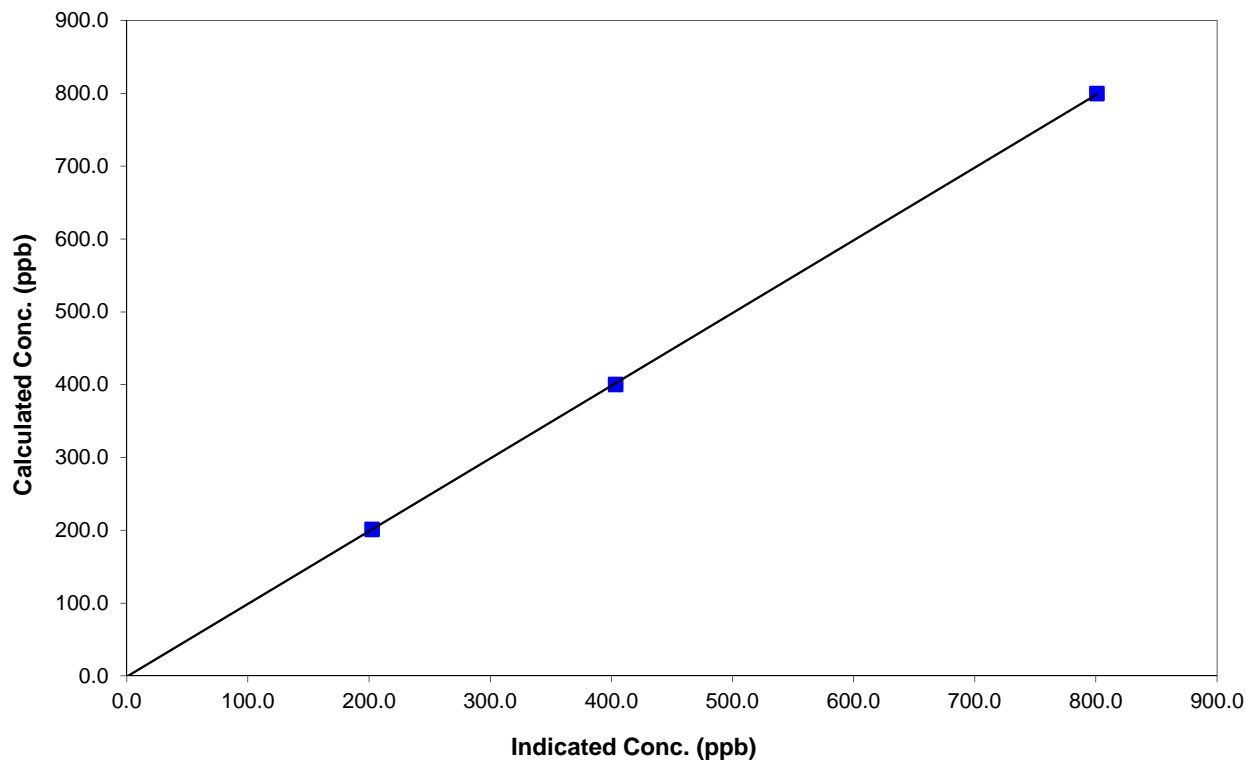
Station Information

Calibration Date	September 9, 2014	Previous Calibration	August 6, 2014
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	11:10	End Time (MST)	16:48
Analyzer make	Teledyne T200	Analyzer serial #	722

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999987
799.8	800.7	0.9989		
400.4	403.4	0.9925	Slope	0.998828
201.2	202.5	0.9934		
0.0			Intercept	-0.870884

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

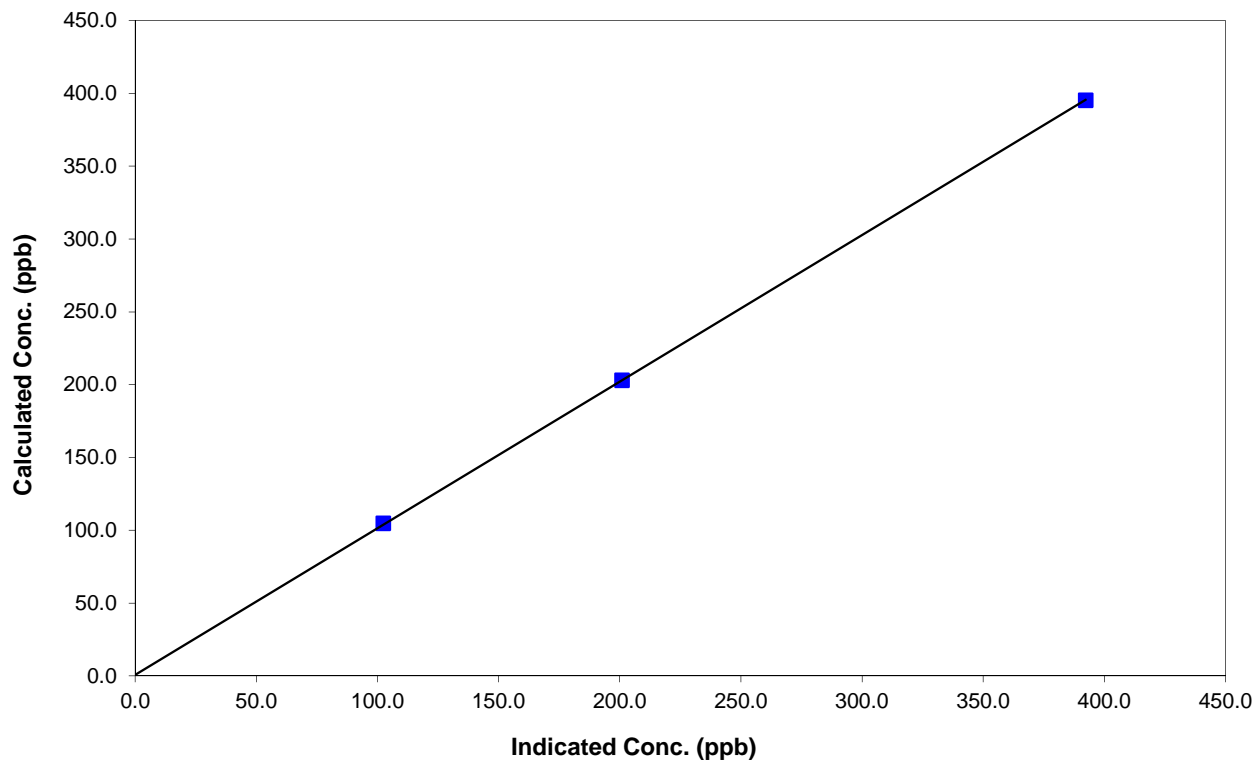
Station Information

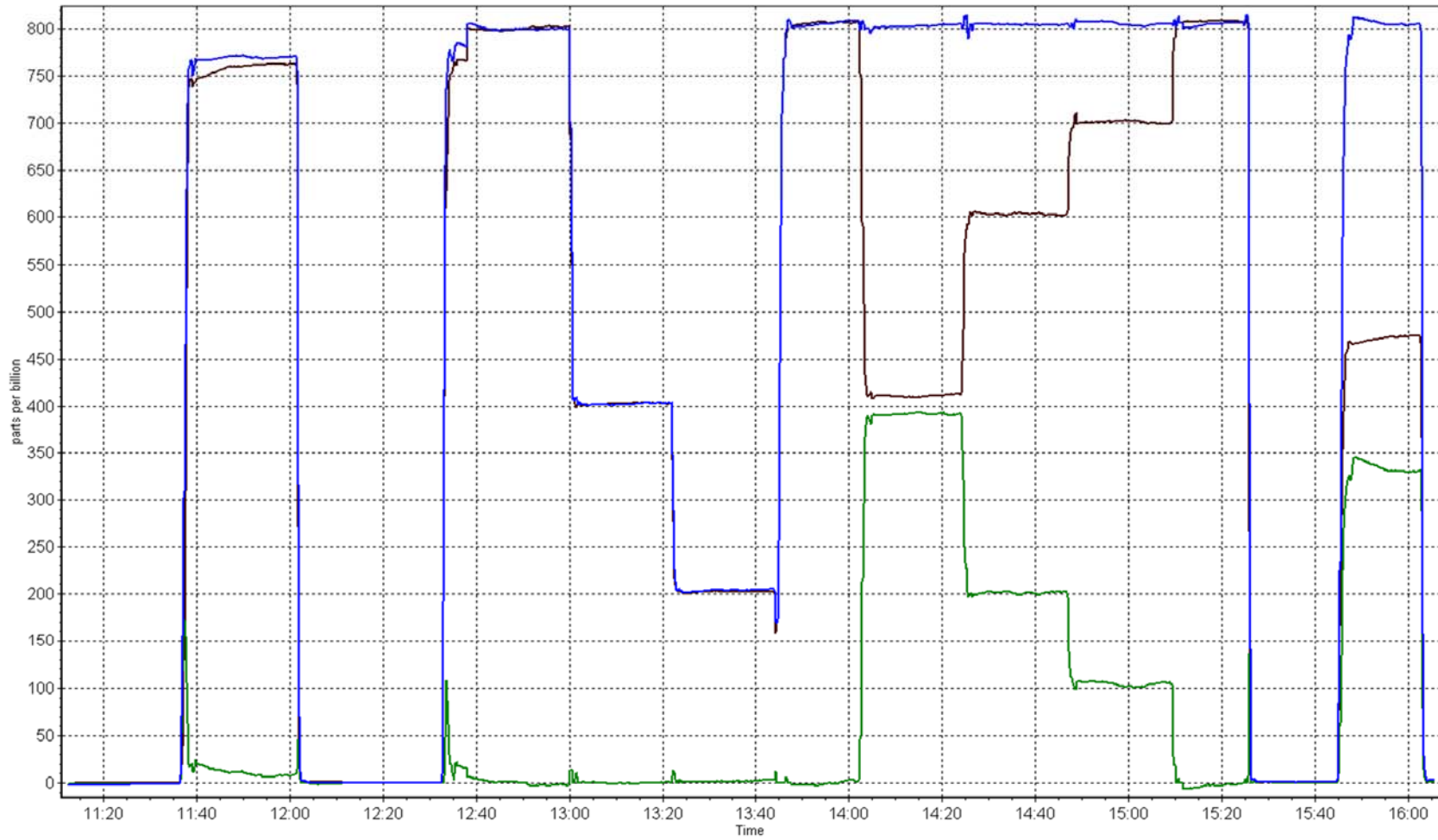
Calibration Date	September 9, 2014	Previous Calibration	August 6, 2014
Station Number	Statoil	Station Number	AMS 501
Start Time (MST)	11:10	End Time (MST)	16:48
Analyzer make	Teledyne T200	Analyzer serial #	722

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999979
395.2	392.3	1.0074		
203.1	200.9	1.0109	Slope	1.006094
104.8	102.4	1.0242		
			Intercept	0.847948

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 502
CONOCOPHILLIPS SURMONT
SEPTEMBER 2014

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

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

October 30, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
 SEPTEMBER 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	340	23	380	50.42	4	0	1	0
H2S (ppb) Average	352	21	368	51.81	2	0	1	0
NO2 (ppb) Average	354	24	366	52.50	19	0	7	-
NO (ppb) Average	354	24	366	52.50	12	-	4	-
NOX (ppb) Average	354	24	366	52.50	26	-	9	-
Temperature 2 m (C) Average	379	0	341	52.64	28.9	-	20.9	-
Relative Humidity (%) Average	379	0	341	52.64	100	-	-	-
Wind Speed 10 m (km/h) Average	378	0	342	52.50	29	-	-	-
Wind Direction 10 m (deg) Average	378	0	342	52.50	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
 SEPTEMBER 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	676	0.9	2	-	0	0	0	0	1	2	12
H2S (ppb) Average	704	0.5	1	-	0	0	0	0	1	1	3
NO2 (ppb) Average	682	3.5	3	-	0	1	2	3	5	7	26
NO (ppb) Average	682	2.5	3	-	0	0	0	2	4	6	26
NOX (ppb) Average	682	6	5	-	0	1	3	5	8	12	40
Temperature 2 m (C) Average	743	17.3	5.3	-	5.6	10.6	13.1	17.4	21.1	25	28.8
Relative Humidity (%) Average	743	61.9	16	-	25	41	49	61	73	83	100
Wind Speed 10 m (km/h) Average	741	11.9	5	-	0	5	8	11	15	19	28
Wind Direction 10 m (deg) Average	741	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
 SEPTEMBER 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	01 Sep 2014 07:00	30 Sep 2014 06:00	15	Stabilization after daily span
SO2	06 Sep 2014 06:00	20 Sep 2014 11:00	342	Station power interruption
H2S	06 Sep 2014 05:00	20 Sep 2014 15:00	347	Station power interruption
NO2, NO, NOX	06 Sep 2014 06:00	20 Sep 2014 11:00	342	Station power interruption
Temperature 2 m	06 Sep 2014 06:00	20 Sep 2014 10:00	341	Station power interruption
Relative Humidity	06 Sep 2014 06:00	20 Sep 2014 10:00	341	Station power interruption
Wind Speed, Wind Direction	01 Sep 2014 21:00	01 Sep 2014 21:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	06 Sep 2014 06:00	20 Sep 2014 10:00	341	Station power interruption

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Summary of Hour Averages

ConocoPhillips - Surmont - September 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4 ppb on Sep 2 04:00	Maximum Daily Average: 1.2 ppb on Sep 2		Hours of Data:	340
Minimum Value: 0 ppb on Sep 1 01:00	Minimum Daily Average: 0.0 ppb on Sep 1		Hours of Missing Data:	380
Maximum Diurnal Average: 0.8 ppb at hour 4	Minimum Diurnal Average: 0.4 ppb at hour 7		Hours of Calibration:	23
Monthly Average: 0.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 3		Percent Operational Time:	50.4

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	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Sep	Z	RE	0	4	3	1	1	1	2	1	1	0	0	0	0	0	0	0	0	1	4	2	1	1	2	1.2	4
3-Sep	2	Z	RE	1	1	0	0	0	1	3	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0.8	3
4-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	0.1	0
5-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	0.1	0
6-Sep	0	1	1	1	Z	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	1
7-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
8-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
9-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
10-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
11-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
12-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
13-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
14-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
15-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
16-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
17-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
18-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
19-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
20-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	C	C	C	C	C	0	0	0	0	1	1	0	0	--	1
21-Sep	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0.5	1
22-Sep	1	1	Z	RE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
23-Sep	0	0	0	Z	RE	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
24-Sep	0	0	0	0	Z	RE	1	1	1	1	C	C	0	0	1	1	1	1	1	1	1	1	1	1	1	0.5	1
25-Sep	0	1	1	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0.5	2
26-Sep	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	1
27-Sep	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	0.3	0
28-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	0.4	0
29-Sep	0	0	0	Z	RE	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0.5	1
30-Sep	0	0	0	1	Z	RE	0	0	0	1	1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0.8	2

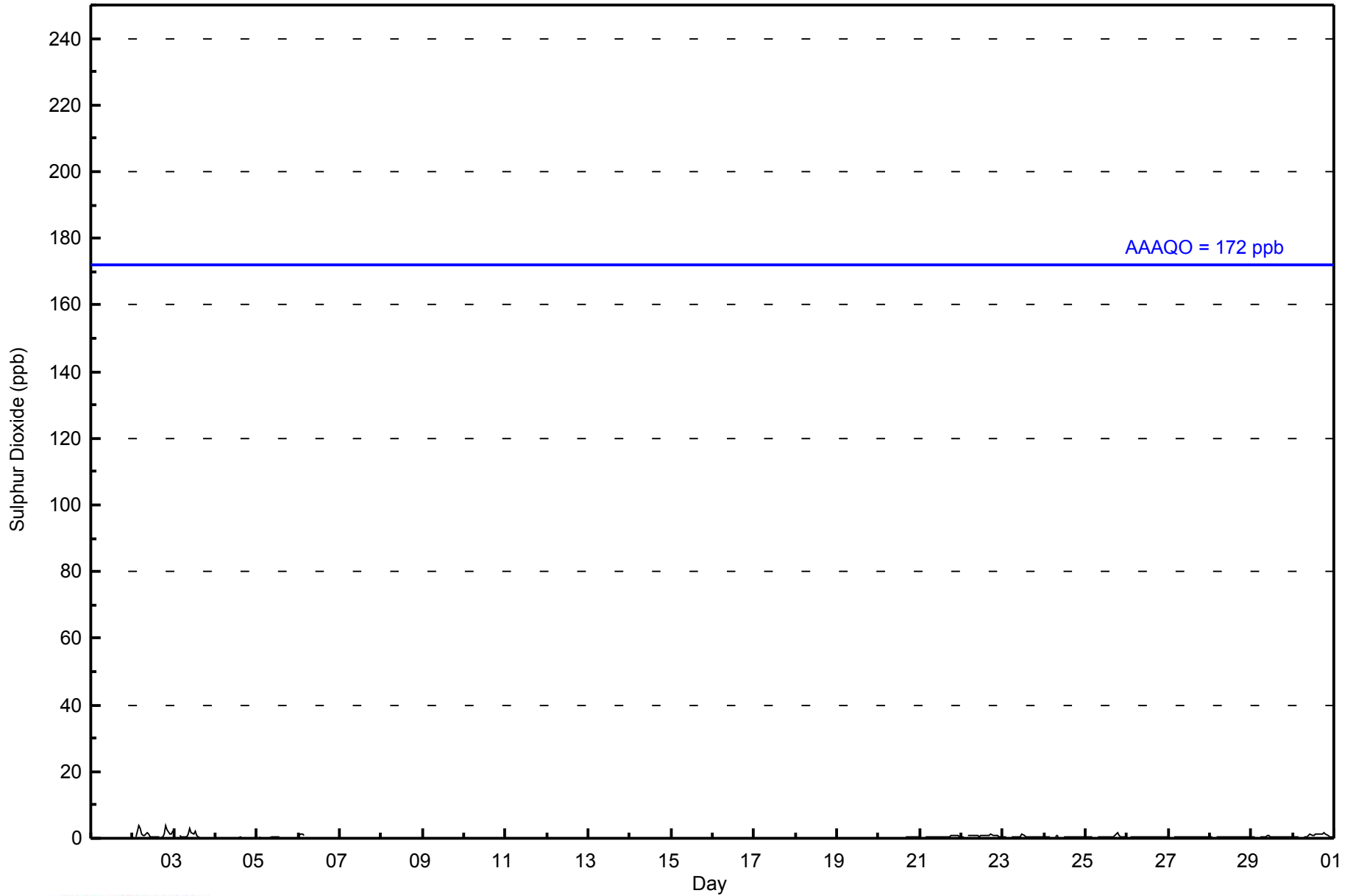
0.5	0.4	0.5	0.8	0.6	0.4	0.4	0.4	0.4	0.6	0.7	0.5	0.5	0.6	0.5	0.4	0.4	0.4	0.5	0.6	0.7	0.5	0.4	0.4	0.4	0.4	Diurnal Average	
2	1	1	4	3	1	1	1	1	2	3	2	1	2	1	1	1	1	1	1	2	4	2	1	1	2	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - September 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	340	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: 340

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - September 2014

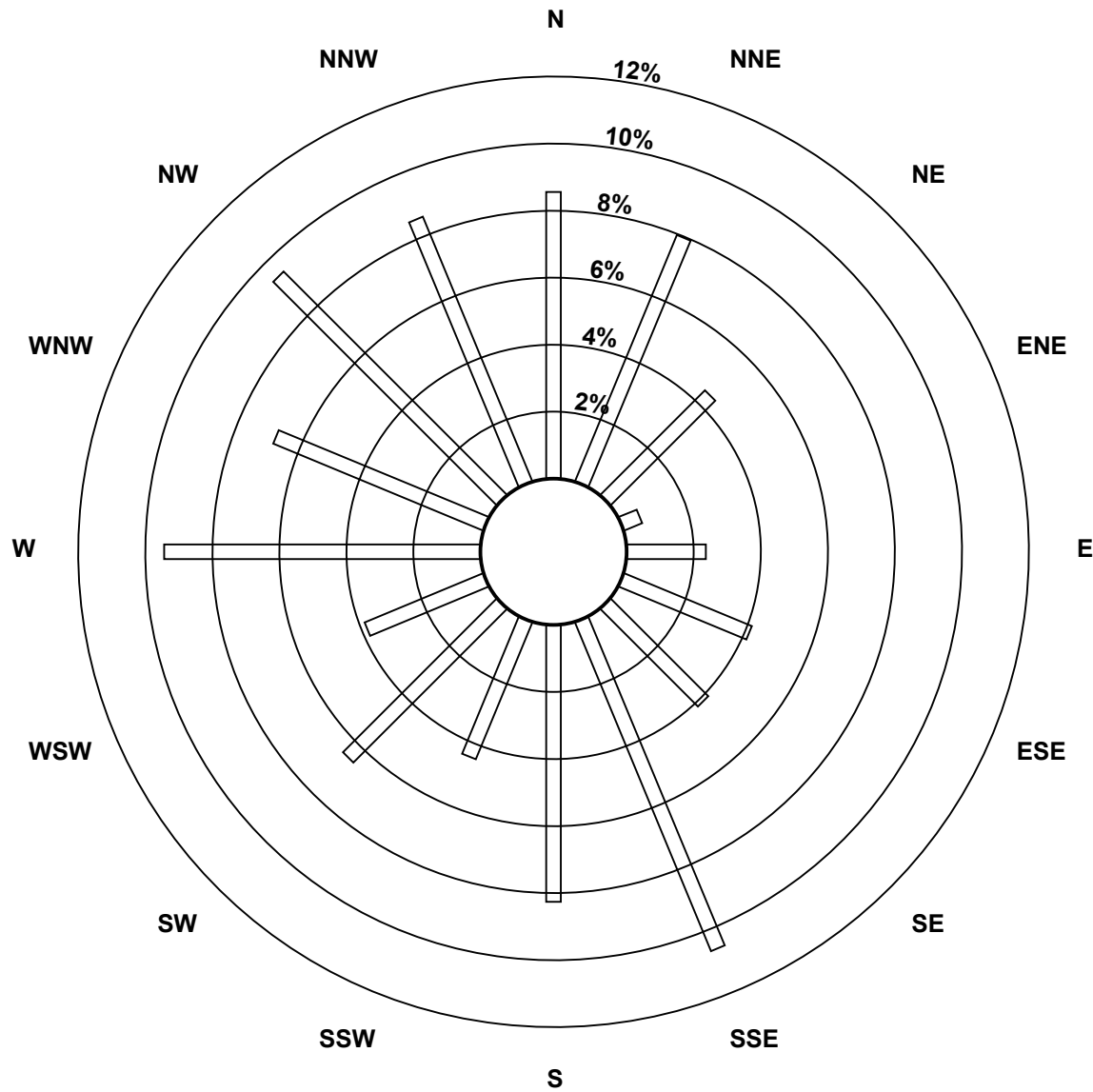
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	29	27	15	2	8	14	14	36	28	15	22	13	32	23	32	29	339
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	29	27	15	2	8	14	14	36	28	15	22	13	32	23	32	29	339

Total Number of Valid Hours: 339

Total Number of Hours: 720

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

**Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont (AMS502)**



Classes (ppb)

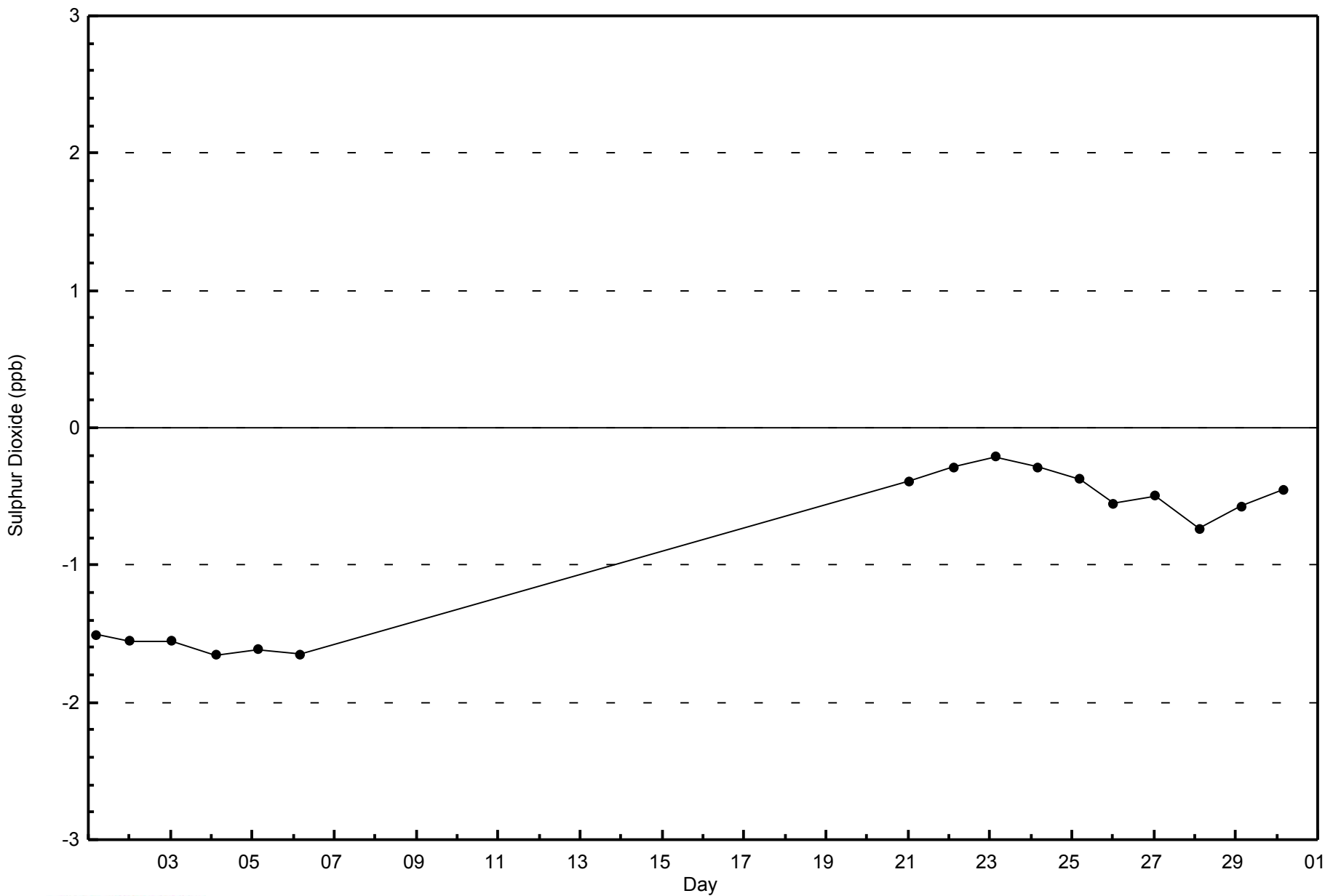


Total Number of Valid Hours: 339



WBEA
Zero Responses

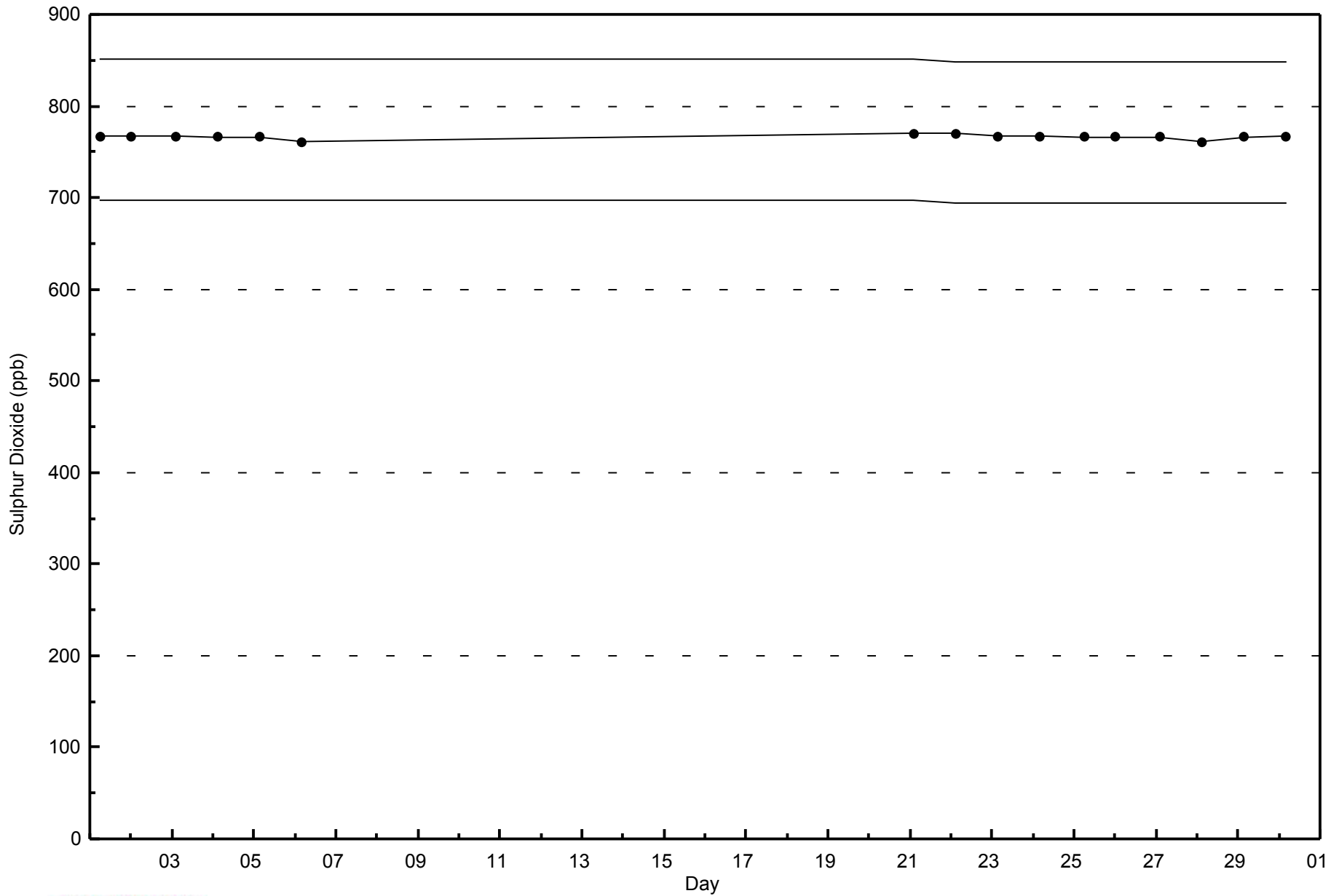
Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surrmont - September 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Sep 25 00:00	Maximum Daily Average: 1.0 ppb on Sep 25		Hours of Data:	352
Minimum Value: 0 ppb on Sep 3 20:00	Minimum Daily Average: 0.2 ppb on Sep 28		Hours of Missing Data:	368
Maximum Diurnal Average: 0.6 ppb at hour 4	Minimum Diurnal Average: 0.2 ppb at hour 15		Hours of Calibration:	21
Monthly Average: 0.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 2		Percent Operational Time:	51.8

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	1	1	1	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	1
2-Sep	0	Z	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.4	1
3-Sep	1	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
4-Sep	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.5	1
5-Sep	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0.5	2
6-Sep	1	2	2	1	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	2
7-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
8-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
9-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
10-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
11-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
12-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
13-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
14-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
15-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
16-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
17-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
18-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
19-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
20-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	C	C	C	C	0	0	0	0	0	--	0
21-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
22-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
23-Sep	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Sep	0	0	0	0	0	Z	0	0	0	0	C	C	0	0	0	0	0	0	0	0	1	2	2	0	0.4	2
25-Sep	2	1	1	1	1	2	Z	2	2	2	2	1	1	1	0	1	1	1	1	1	0	0	0	0	1.0	2
26-Sep	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
27-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	0.3	1
28-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
29-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
30-Sep	0	0	0	0	0	Z	0	0	0	1	1	1	0	0	1	1	0	1	1	1	0	0	0	0	0.5	1

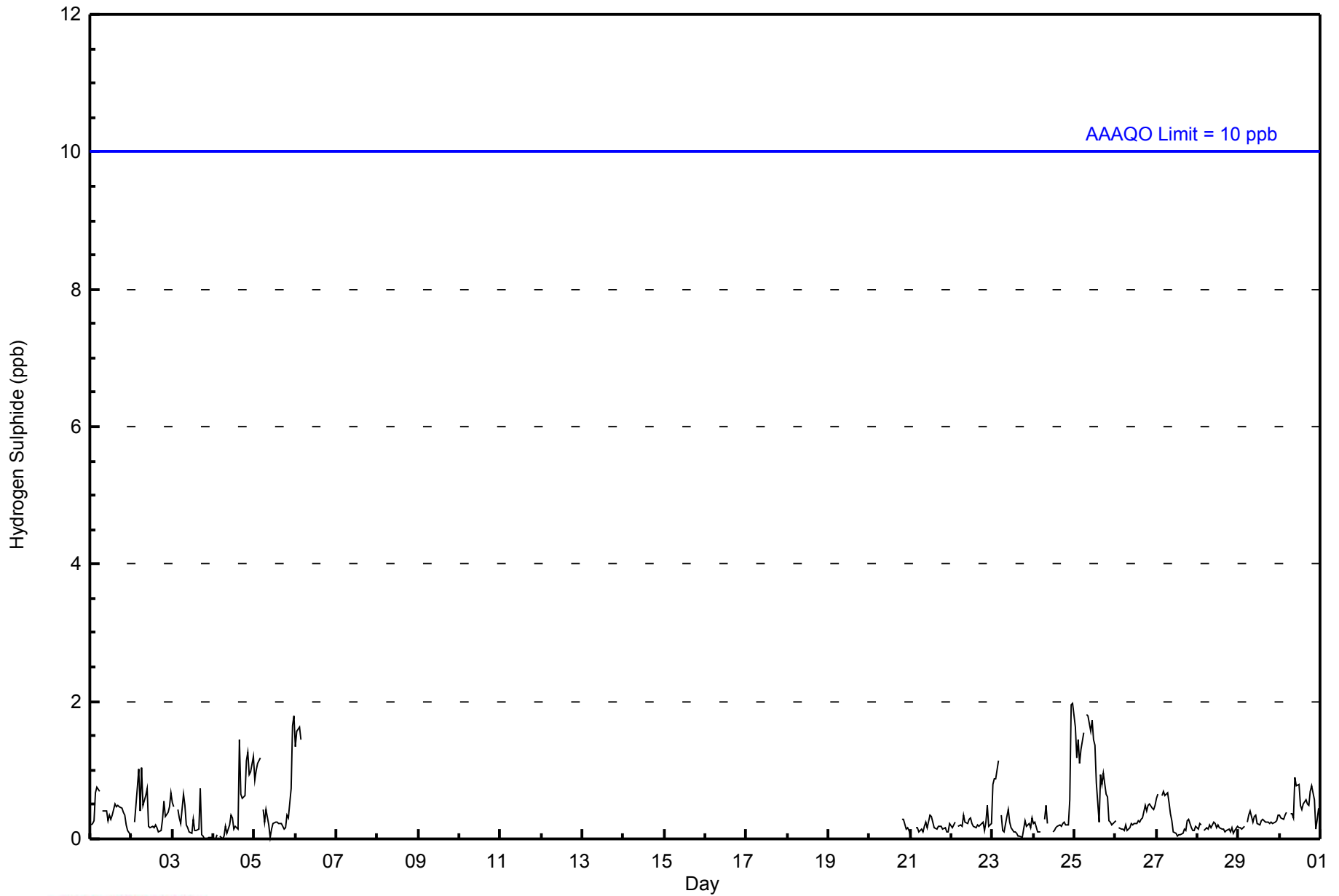
0.5	0.5	0.5	0.6	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.5	0.5	Diurnal Average	
2	2	2	1	1	2	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	2	Diurnal Maximum	

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



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - September 2014





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	352	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: 352

Total Number of Hours: 720



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - September 2014

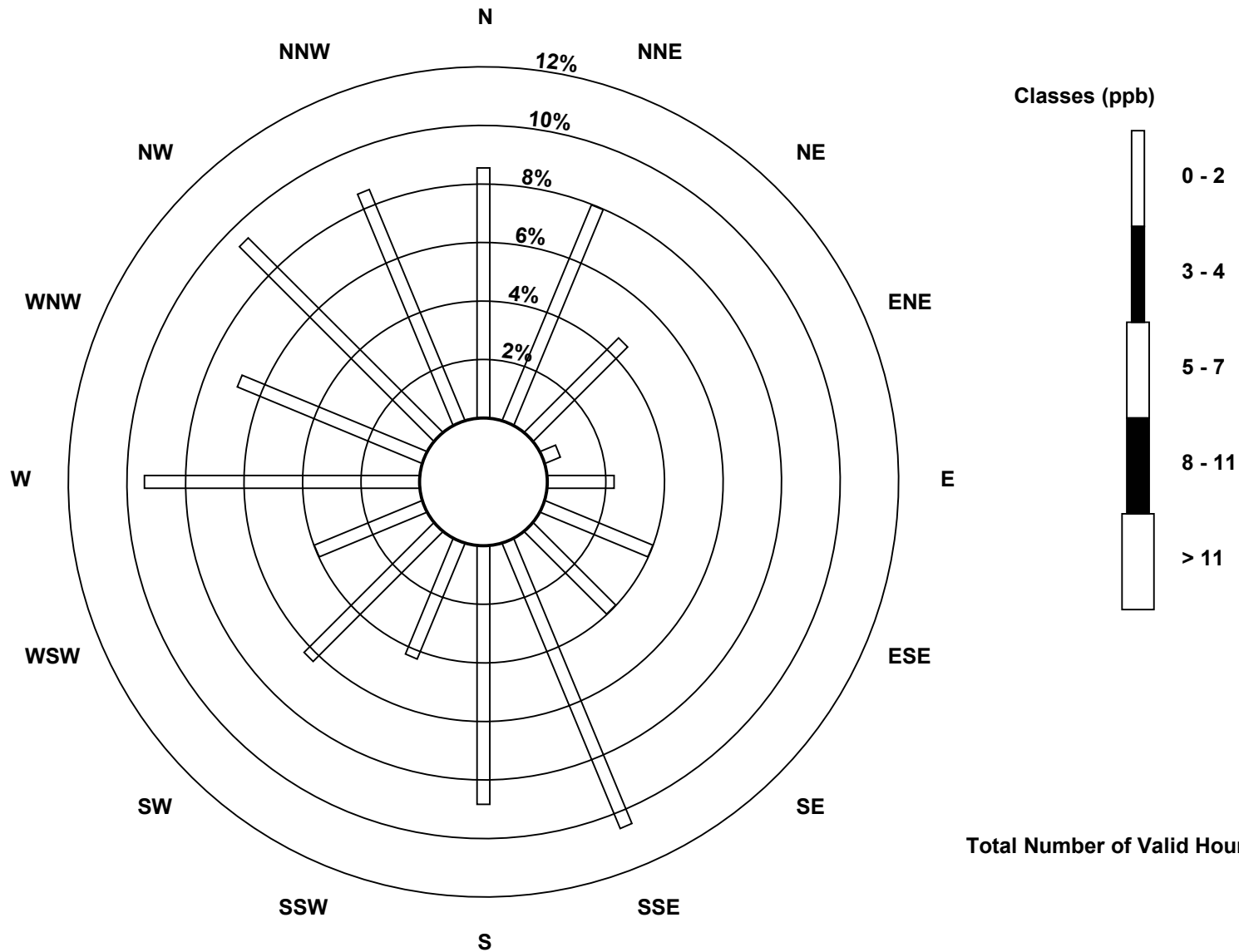
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	30	28	16	2	8	14	14	37	31	15	22	14	33	24	33	30	351
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	30	28	16	2	8	14	14	37	31	15	22	14	33	24	33	30	351

Total Number of Valid Hours: 351

Total Number of Hours: 720

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

**Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont (AMS502)**

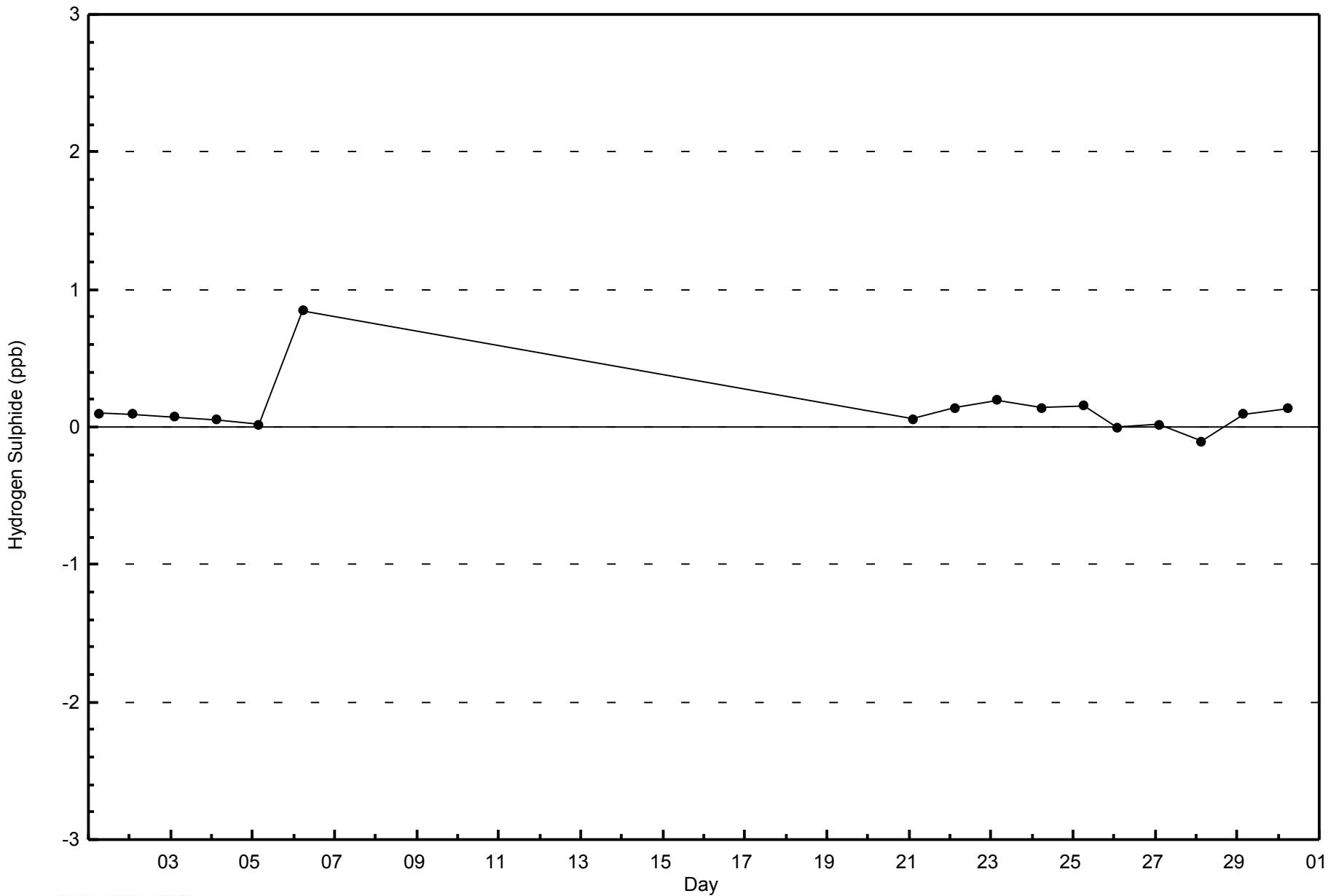


Total Number of Valid Hours: 351



WBEA
Zero Responses

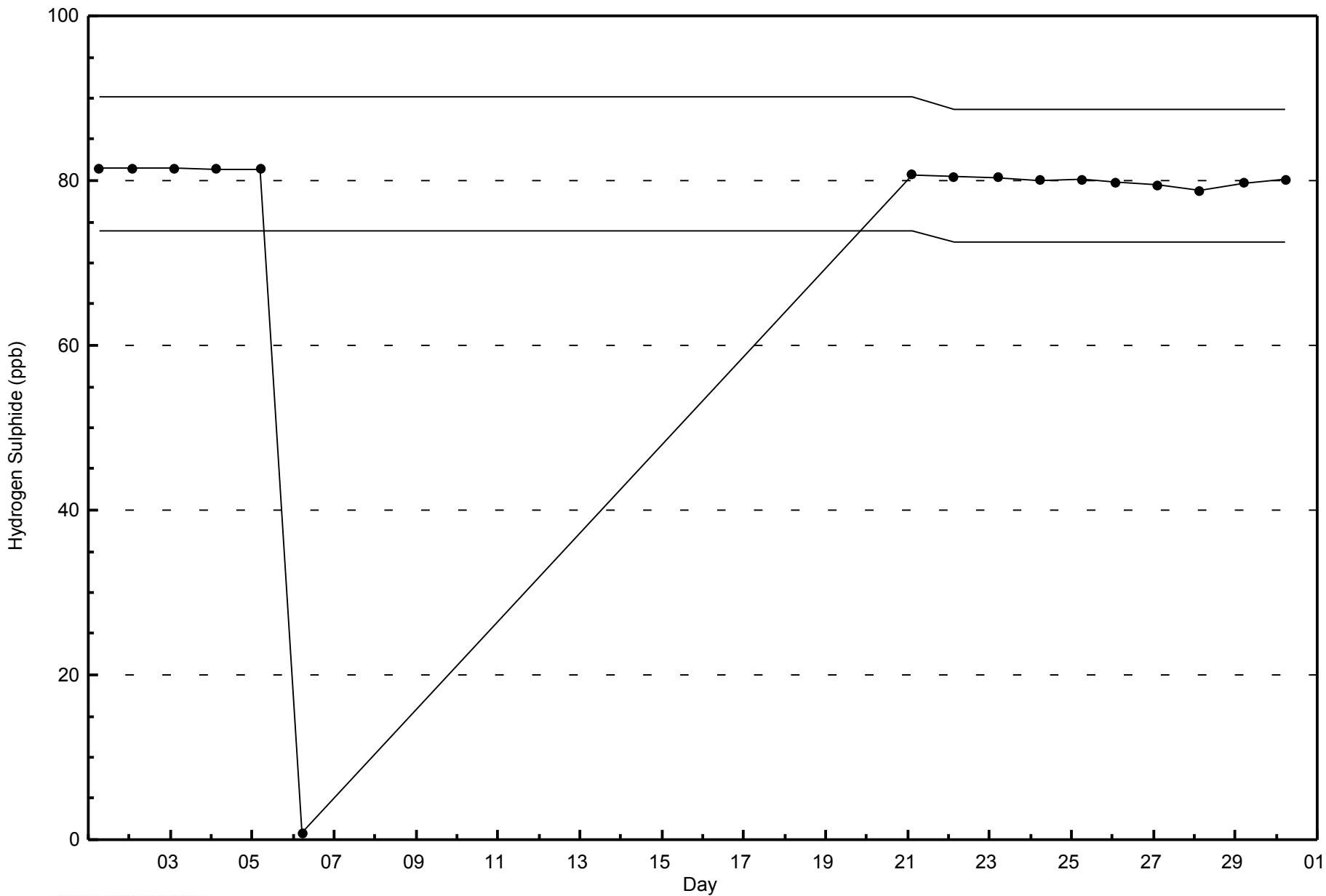
Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - September 2014





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - September 2014





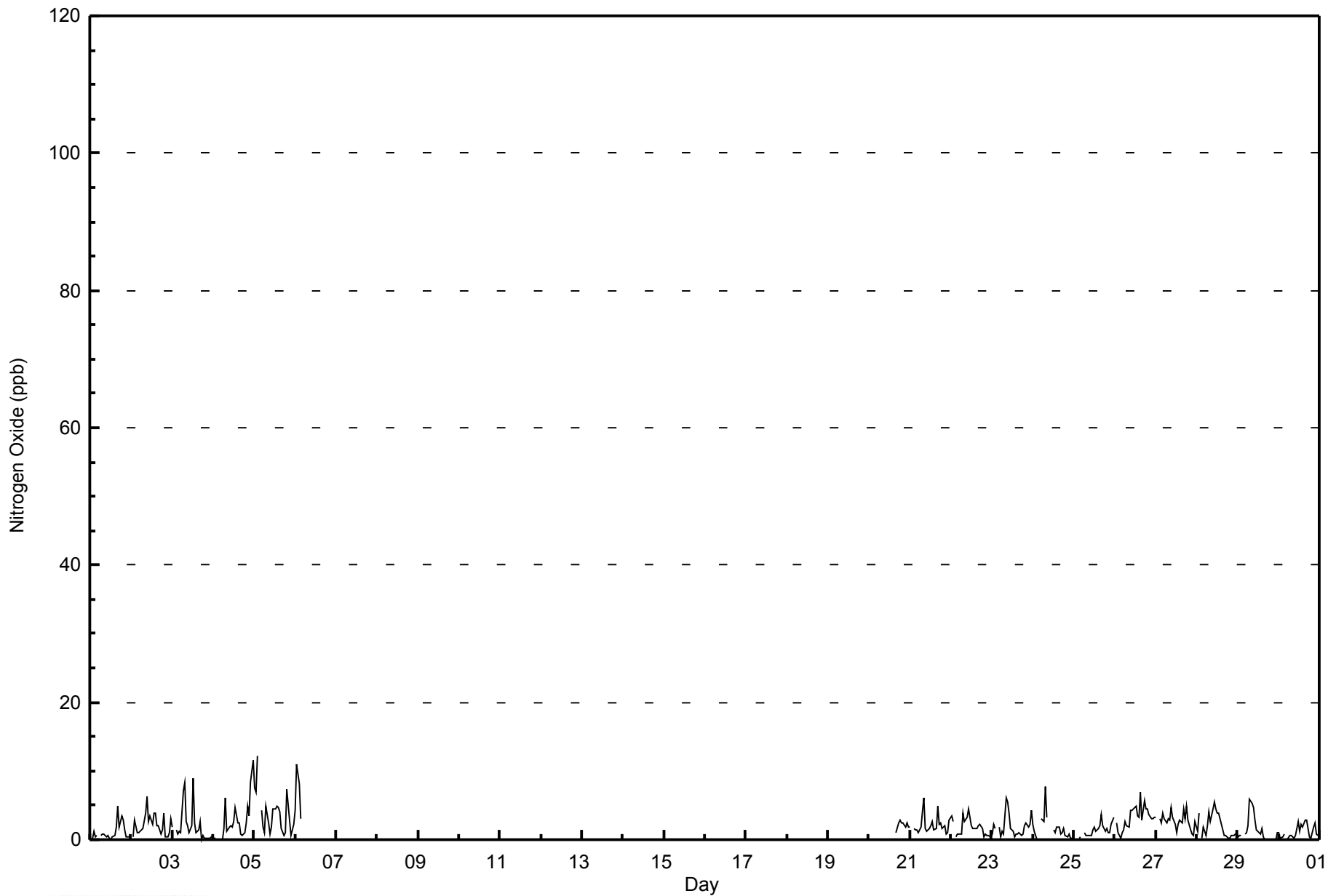
Maximum Value: 12 ppb on Sep 5 03:00																	Maximum Daily Average: 3.7 ppb on Sep 5																	Hours in Service: 720	
Minimum Value: 0 ppb on Sep 4 04:00																	Minimum Daily Average: 1.1 ppb on Sep 1																	Hours of Data: 354	
Maximum Diurnal Average: 3.6 ppb at hour 8																	Minimum Diurnal Average: 0.8 ppb at hour 4																	Hours of Missing Data: 366	
Monthly Average: 2.1 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 9																	Hours of Calibration: 24	
																																		Percent Operational Time: 52.5	
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	1	0	1	Z	1	1	1	0	1	0	0	0	1	2	5	2	4	3	1	0	0	0	1.1	5									
2-Sep	Z	0	3	1	1	1	1	2	4	6	3	3	2	4	4	2	2	1	1	4	0	0	1	3	2.2	6									
3-Sep	2	Z	1	1	1	1	7	8	3	2	1	2	9	2	1	1	3	0	1	0	0	0	0	2.1	9										
4-Sep	0	0	Z	0	0	0	2	6	1	2	2	2	3	5	2	2	1	1	1	2	5	3	8	12	2.6	12									
5-Sep	8	7	12	Z	4	2	1	5	2	1	2	5	4	5	5	4	2	1	1	7	5	1	1	2	3.7	12									
6-Sep	4	11	8	3	Z	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	11									
7-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--									
8-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--									
9-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--									
10-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--									
11-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--									
12-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--									
13-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--									
14-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--									
15-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--									
16-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--									
17-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--									
18-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--									
19-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--									
20-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	C	C	C	C	C	1	3	3	2	3	2	2	--	3									
21-Sep	2	Z	2	1	1	1	2	4	6	2	1	2	2	3	1	2	5	2	3	2	2	1	1	3	2.1	6									
22-Sep	4	3	Z	0	1	1	1	4	3	3	5	3	2	2	2	2	2	2	2	0	1	1	1	0	1.8	5									
23-Sep	1	2	2	Z	2	1	1	1	6	6	4	2	1	0	1	1	1	1	1	2	2	2	4	4	1.9	6									
24-Sep	2	1	0	0	Z	3	3	8	3	C	C	C	1	1	2	2	1	1	2	1	0	1	0	0	1.6	8									
25-Sep	0	0	0	0	0	Z	1	1	1	1	1	2	2	1	2	2	4	2	1	2	1	1	2	3	1.2	4									
26-Sep	Z	2	1	0	1	1	3	2	2	4	4	4	5	4	3	7	3	6	4	4	4	3	3	3	3.2	7									
27-Sep	3	Z	3	2	4	3	2	3	3	5	3	2	1	2	3	2	5	3	5	3	1	1	1	3	2.8	5									
28-Sep	1	4	Z	0	2	1	2	4	3	4	5	5	4	4	2	1	1	1	0	0	1	1	1	1	2.0	5									
29-Sep	0	1	1	Z	1	1	2	6	5	5	3	2	1	1	2	0	0	0	0	0	0	0	1	1	1.3	6									
30-Sep	1	0	0	1	Z	0	1	1	0	0	1	3	1	2	2	3	3	2	0	0	2	3	1	1	1.2	3									
																	Diurnal Average		Diurnal Maximum																
																	8		12																

Z - zerospan C - Calibration PF - Power Failure



WBEA
Hourly Averages

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surrmont - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	354	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: 354

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - September 2014

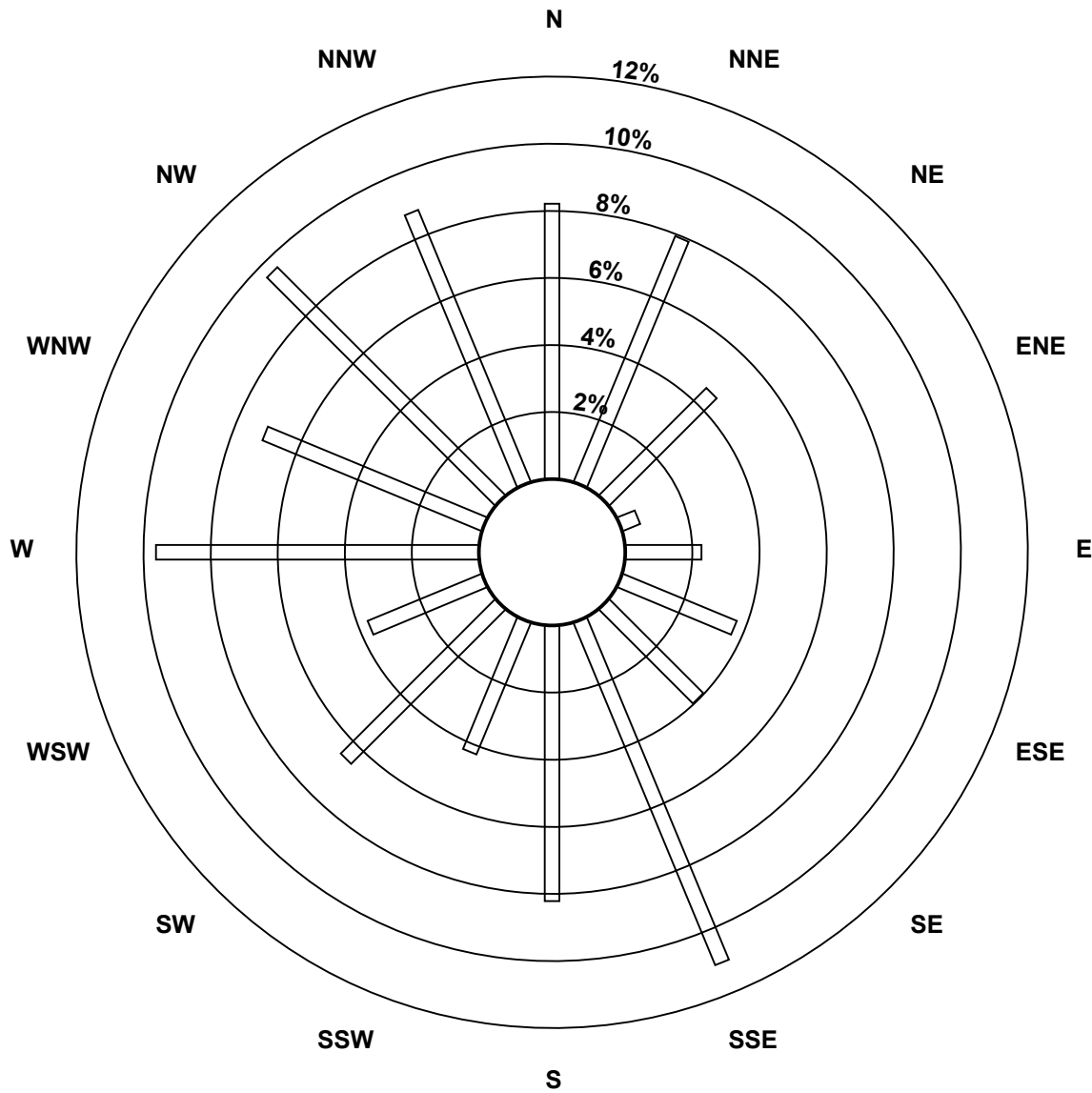
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	29	28	16	2	8	13	14	39	29	15	23	13	34	25	34	31	353
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	29	28	16	2	8	13	14	39	29	15	23	13	34	25	34	31	353

Total Number of Valid Hours: 353

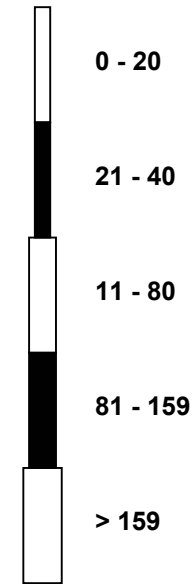
Total Number of Hours: 720

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

**Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont (AMS502)**



Classes (ppb)

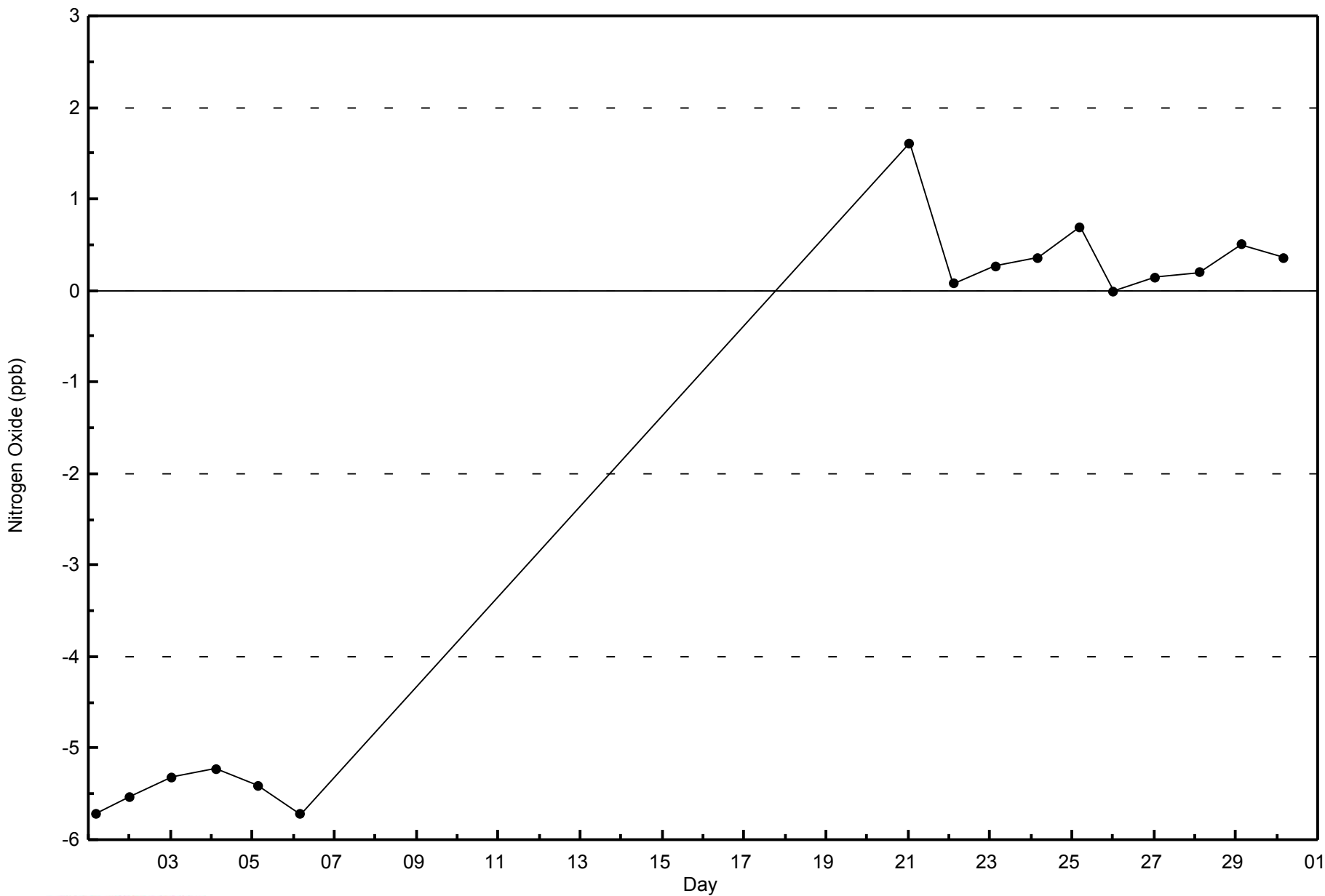


Total Number of Valid Hours: 353



WBEA
Zero Responses

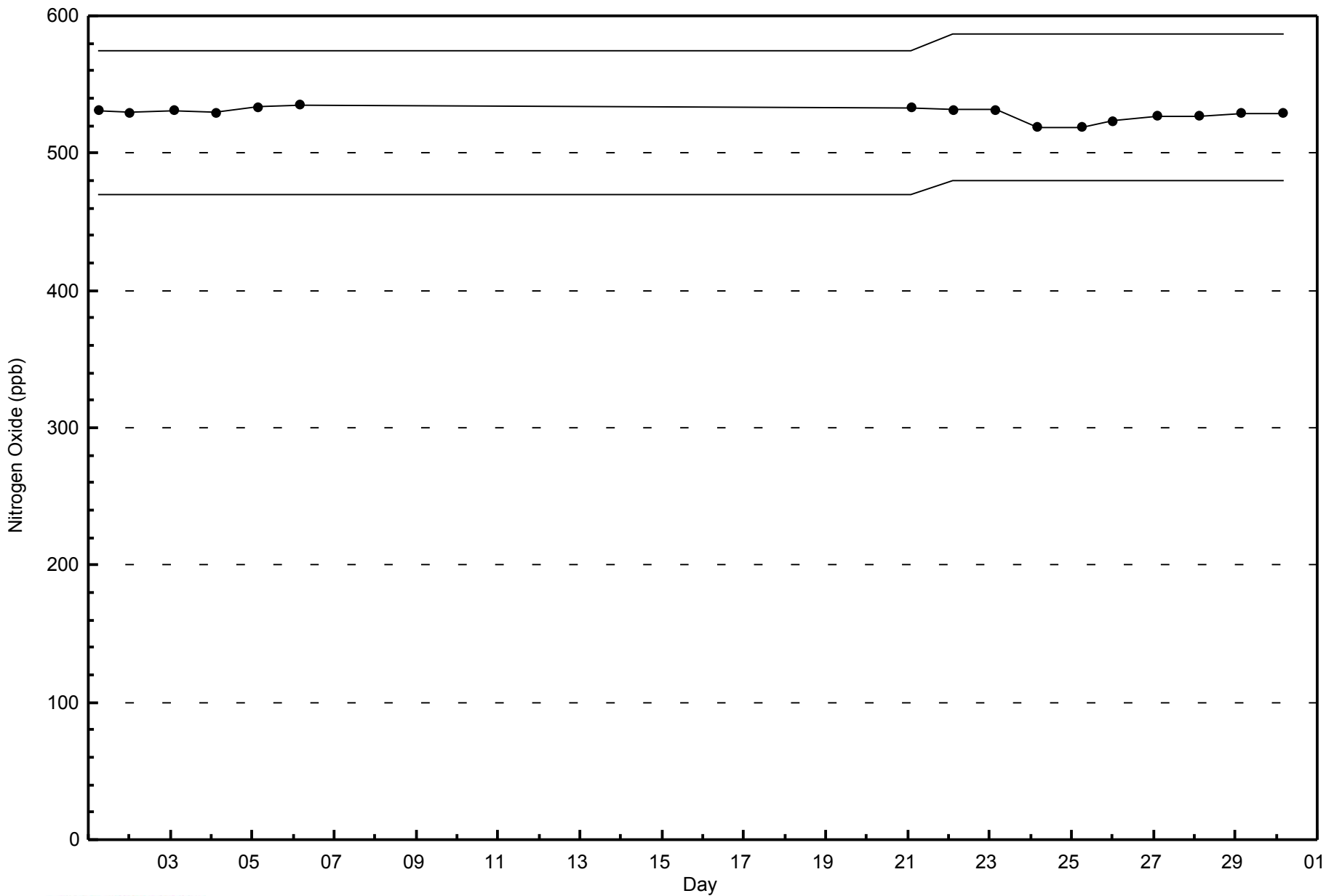
Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - September 2014





WBEA
Span Responses

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surrmont - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 19 ppb on Sep 23 20:00	Maximum Daily Average: 7.4 ppb on Sep 23		Hours of Data:	354
Minimum Value: 0 ppb on Sep 25 02:00	Minimum Daily Average: 2.2 ppb on Sep 25		Hours of Missing Data:	366
Maximum Diurnal Average: 7.2 ppb at hour 20	Minimum Diurnal Average: 2.9 ppb at hour 15		Hours of Calibration:	24
Monthly Average: 4.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 6 P ₉₀ = 9 P ₉₉ = 17		Percent Operational Time:	52.5

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	1	1	2	1	1	Z	2	2	2	1	1	1	1	1	2	3	6	3	7	8	12	3	2	1	2.7	12
2-Sep	Z	3	4	5	8	5	6	8	12	10	4	3	3	4	4	4	1	3	8	13	5	5	10	11	6.0	13
3-Sep	9	Z	8	6	4	3	7	11	4	4	2	4	12	4	2	2	3	1	2	3	2	2	1	3	4.3	12
4-Sep	2	1	Z	1	1	1	2	5	2	2	2	3	4	5	4	6	3	2	3	6	7	6	9	12	3.8	12
5-Sep	8	8	12	Z	8	6	3	7	4	2	3	5	4	5	5	5	3	2	2	13	6	1	3	4	5.2	13
6-Sep	5	9	10	9	Z	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	10
7-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
8-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
9-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
10-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
11-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
12-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
13-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
14-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
15-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
16-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
17-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
18-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
19-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
20-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	7
21-Sep	1	Z	1	1	1	1	1	2	3	1	1	1	1	2	1	2	4	5	6	5	9	4	5	9	2.8	9
22-Sep	9	11	Z	3	2	2	3	6	4	5	5	5	5	3	5	6	8	12	3	3	4	11	8	5.6	12	
23-Sep	3	8	9	Z	9	4	6	4	11	9	6	3	3	2	2	2	5	13	19	10	12	9	19	7.4	19	
24-Sep	14	14	4	3	Z	8	12	19	8	C	C	C	2	2	3	3	2	3	1	6	9	2	2	6.0	19	
25-Sep	1	0	0	1	3	Z	2	1	1	1	1	1	2	1	2	3	4	4	5	5	2	2	3	5	2.2	5
26-Sep	Z	4	1	1	1	2	2	2	1	3	3	3	3	3	2	4	3	6	6	5	5	4	5	5	3.2	6
27-Sep	5	Z	4	4	6	7	7	7	6	6	4	3	2	3	3	3	2	6	17	16	10	7	7	10	6.3	17
28-Sep	7	11	Z	3	4	3	5	9	5	7	6	4	5	6	4	3	2	3	4	4	5	4	3	3	4.8	11
29-Sep	3	3	2	Z	3	4	6	8	5	5	5	3	3	3	3	2	2	2	2	3	4	4	8	11	3.9	11
30-Sep	8	4	3	3	Z	4	4	3	2	2	3	4	3	4	5	7	7	8	6	4	4	5	3	2	4.2	8
																								Diurnal Average		
																								Diurnal Maximum		

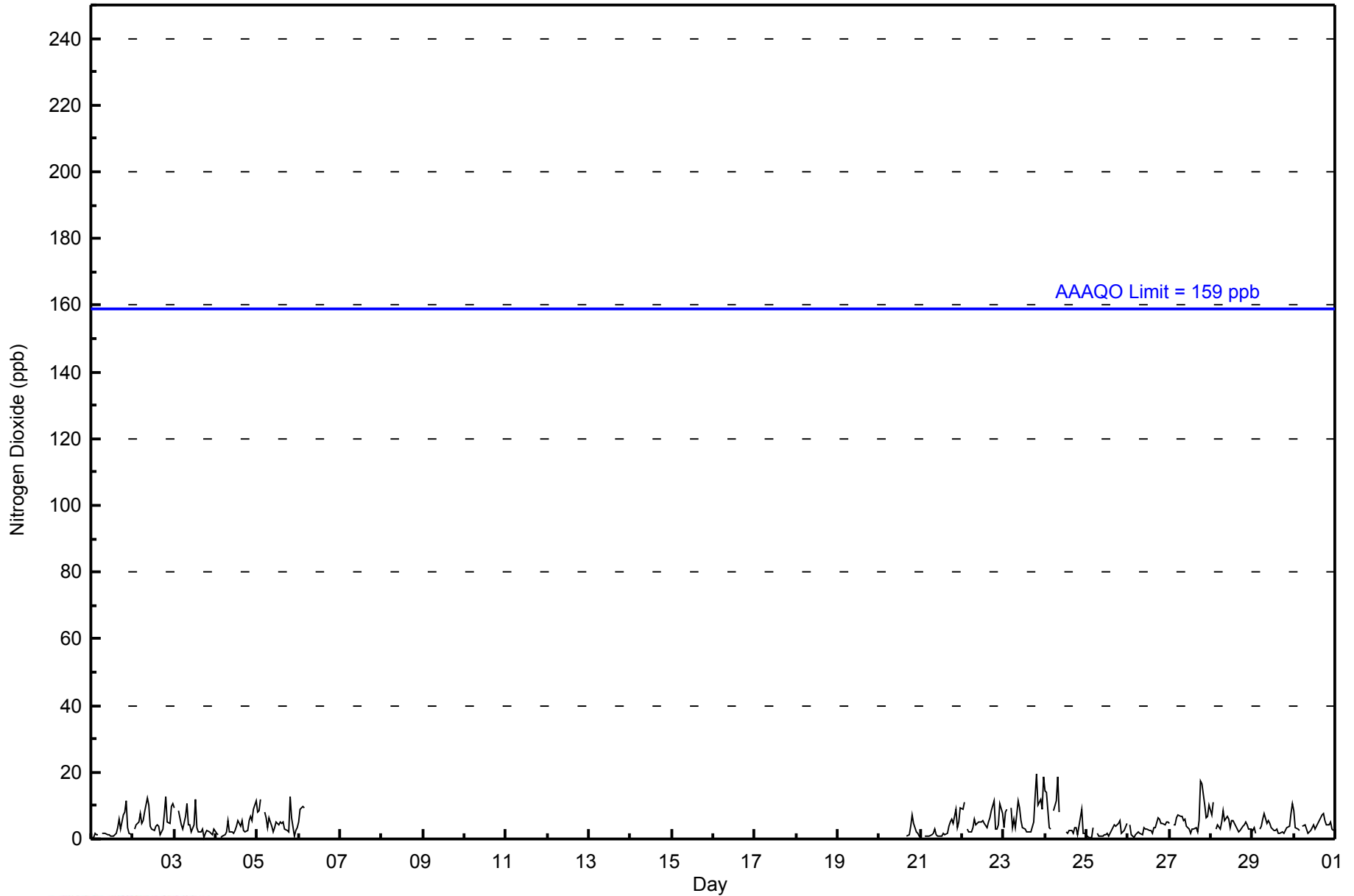
Z - zeronspan C - Calibration PF - Power Failure

Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - September 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	354	100.00	100.00
21 - 40	0	0.00	100.00
11 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 354

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - September 2014

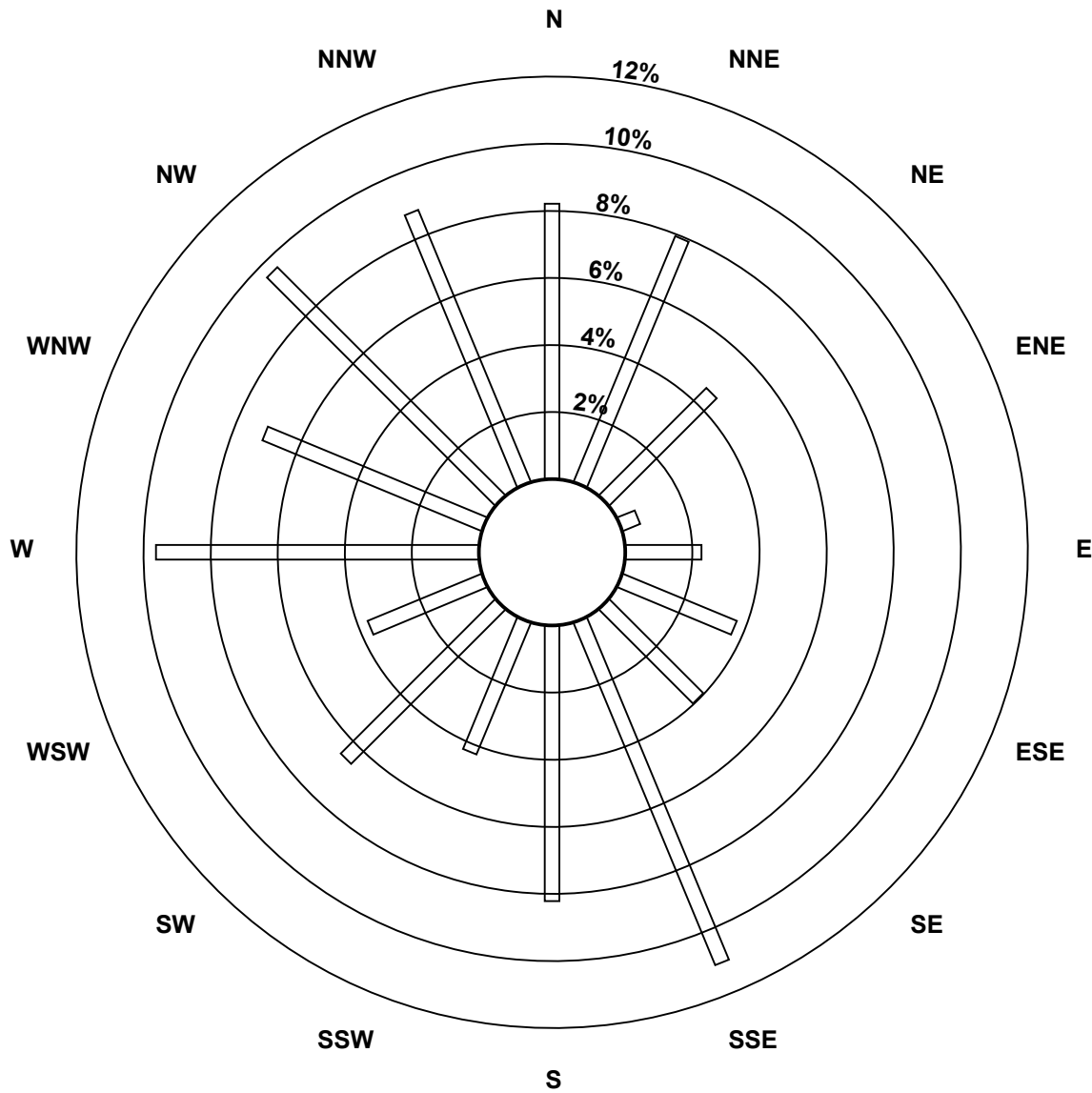
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	29	28	16	2	8	13	14	39	29	15	23	13	34	25	34	31	353
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	29	28	16	2	8	13	14	39	29	15	23	13	34	25	34	31	353

Total Number of Valid Hours: 353

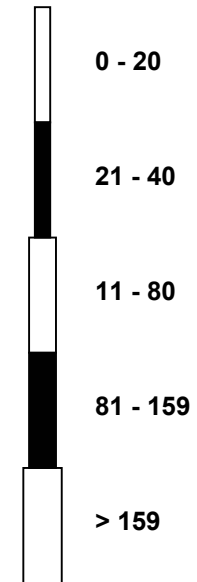
Total Number of Hours: 720

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

**Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont (AMS502)**



Classes (ppb)

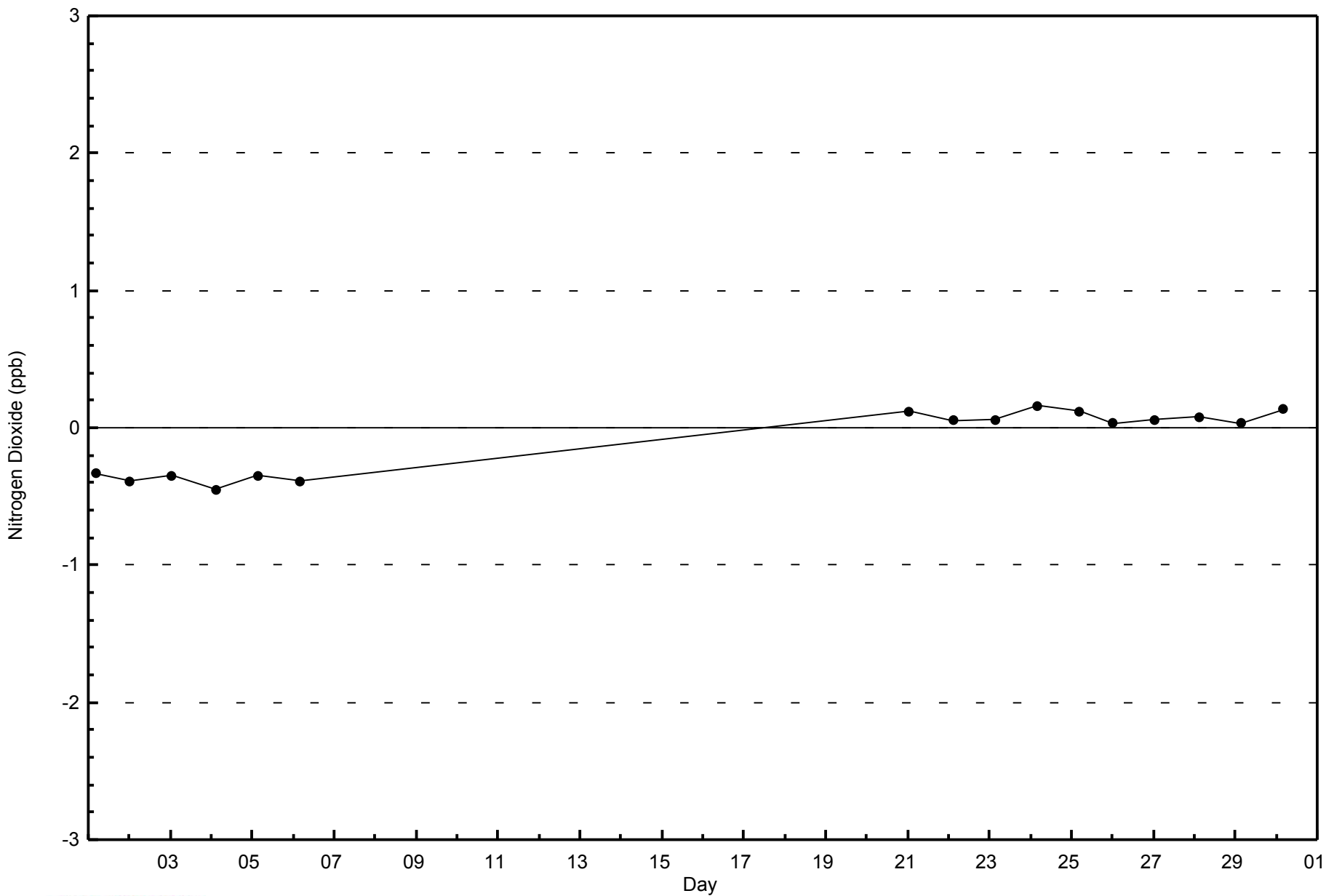


Total Number of Valid Hours: 353



WBEA
Zero Responses

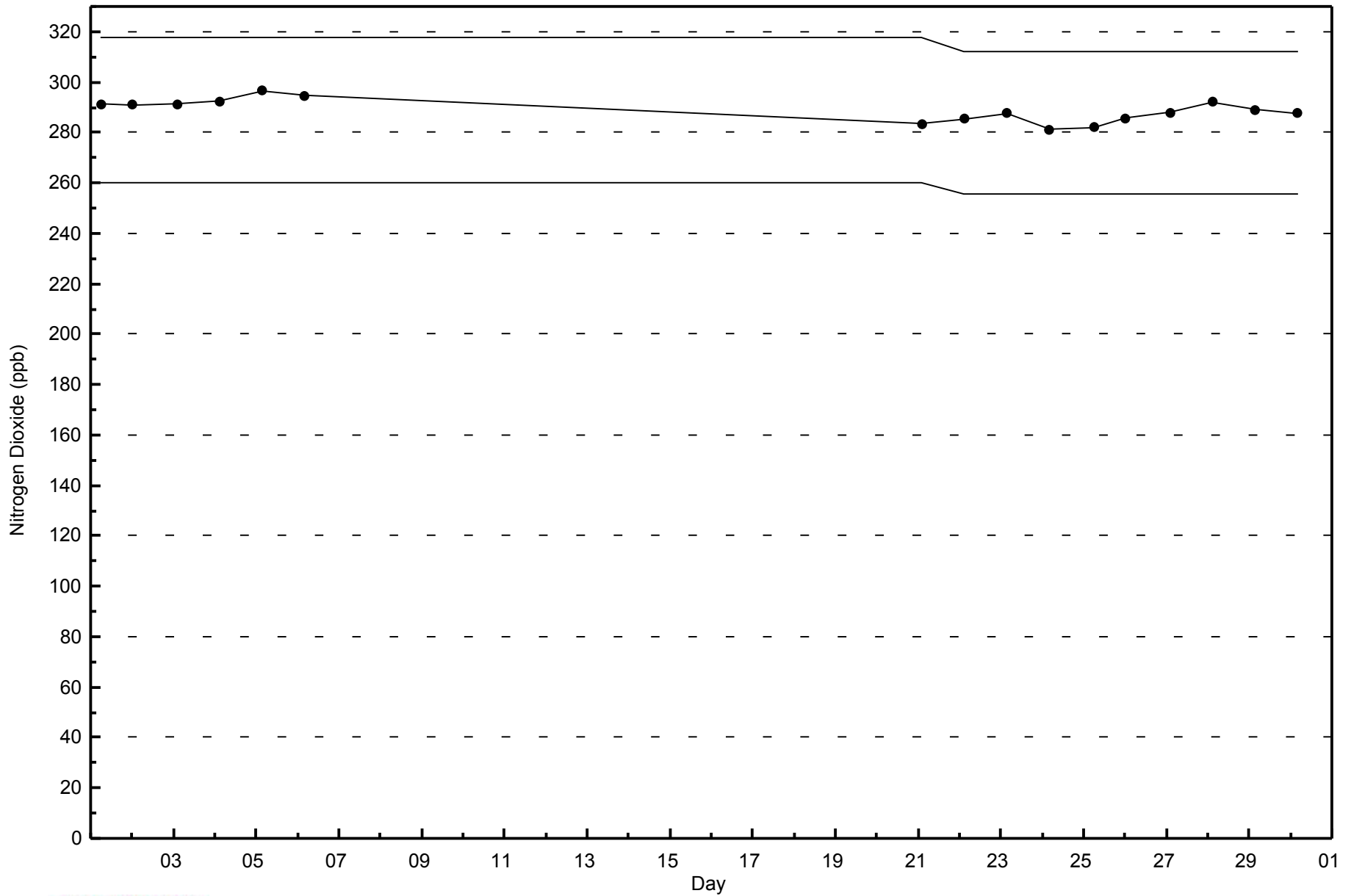
Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surrmont - September 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - September 2014





Summary of Hour Averages

ConocoPhillips - Surmont - September 2014

Maximum Value: 26 ppb on Sep 24 08:00	Maximum Daily Average: 9.3 ppb on Sep 23	Hours in Service: 720
Minimum Value: 0 ppb on Sep 25 02:00	Minimum Daily Average: 3.4 ppb on Sep 25	Hours of Data: 354
Maximum Diurnal Average: 9.7 ppb at hour 8	Minimum Diurnal Average: 4.0 ppb at hour 4	Hours of Missing Data: 366
Monthly Average: 6.7 ppb	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 6 Q ₃ = 9 P ₉₀ = 12 P ₉₉ = 23	Hours of Calibration: 24
		Percent Operational Time: 52.5

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	1	3	2	2	Z	3	3	3	2	2	1	1	1	2	5	11	5	11	11	13	4	2	2	3.8	13	
2-Sep	Z	3	7	6	9	6	7	10	16	16	7	7	5	8	8	6	3	4	9	17	6	5	11	14	8.2	17	
3-Sep	11	Z	10	7	6	4	14	19	7	6	3	6	21	6	3	4	5	1	2	3	2	2	1	4	6.4	21	
4-Sep	2	2	Z	1	1	1	4	12	3	4	4	5	6	10	6	8	3	2	4	8	11	9	17	23	6.4	23	
5-Sep	15	15	24	Z	12	8	4	11	6	3	5	9	9	10	9	9	4	3	3	20	11	2	4	6	8.9	24	
6-Sep	9	20	18	12	Z	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	20	
7-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
8-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
9-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
10-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
11-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
12-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
13-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
14-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
15-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
16-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
17-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
18-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
19-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
20-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	C	C	C	C	C	2	4	7	10	7	4	4	3	--	10
21-Sep	3	Z	2	2	2	2	3	6	9	3	2	3	3	4	3	3	8	7	8	6	11	4	6	12	5.0	12	
22-Sep	12	14	Z	3	3	3	4	10	7	8	9	8	7	6	5	6	8	11	13	3	4	5	11	8	7.4	14	
23-Sep	4	10	10	Z	4	7	4	17	15	10	5	4	3	3	3	3	6	13	21	12	14	11	23	9.3	23		
24-Sep	17	15	4	3	Z	11	14	26	11	C	C	C	4	3	4	4	3	4	5	2	7	10	2	2	7.6	26	
25-Sep	1	0	1	1	4	Z	3	2	2	2	2	3	4	2	4	5	8	6	6	7	3	3	5	8	3.4	8	
26-Sep	Z	7	2	1	2	3	5	3	3	8	7	8	8	6	5	10	6	12	10	9	9	7	8	9	6.4	12	
27-Sep	8	Z	7	7	10	11	9	10	9	10	7	5	3	5	6	6	6	9	22	19	11	7	7	13	9.1	22	
28-Sep	8	15	Z	3	6	4	7	13	8	11	11	8	9	10	6	4	3	3	4	5	6	5	4	4	6.8	15	
29-Sep	3	4	3	Z	3	5	8	14	10	10	7	5	4	3	5	2	2	2	2	3	4	4	7	12	5.2	14	
30-Sep	9	4	3	3	Z	4	5	4	2	2	3	7	4	6	6	9	10	9	6	5	6	8	4	3	5.4	10	

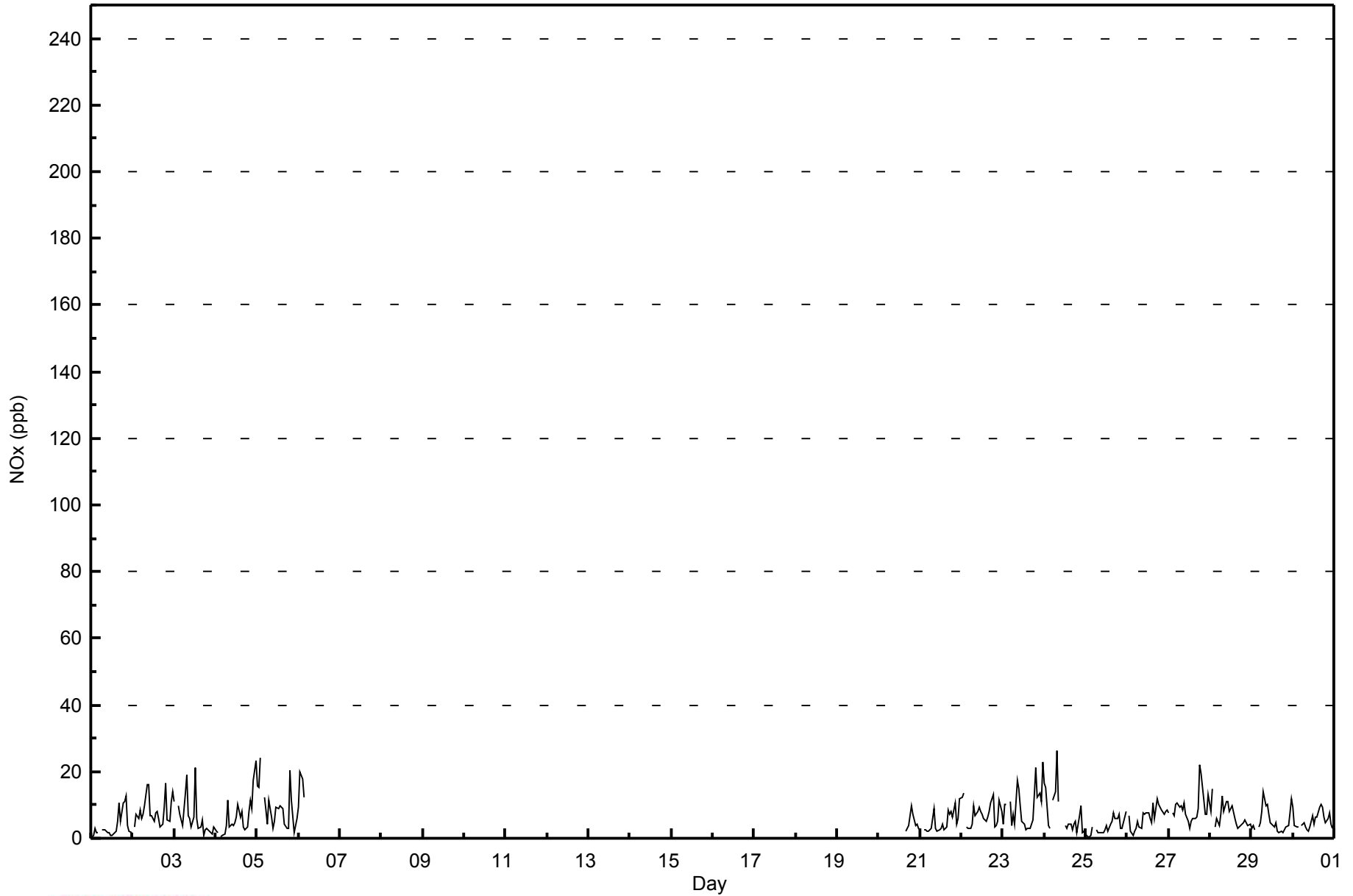
7.4	8.4	7.3	4.0	5.5	5.0	6.4	9.7	7.5	7.1	5.7	5.6	6.1	5.6	5.1	5.8	5.4	5.5	7.9	9.3	7.6	5.7	6.6	9.0	Diurnal Average	
17	20	24	12	12	11	14	26	17	16	11	9	21	10	9	10	11	12	22	21	13	14	17	23	Diurnal Maximum	

Z - zerospan C - Calibration PF - Power Failure



WBEA
Hourly Averages

NOx (NO_x) - ppb
ConocoPhillips - Surmont - September 2014





WBEA
Cumulative Frequency Distribution

NO_x (NO_x) - ppb
ConocoPhillips - Surmont - September 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	347	98.02	98.02
21 - 40	7	1.98	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 354

Total Number of Hours: 720



WBEA
Frequency Distribution

NOx (NO_x) - ppb
ConocoPhillips - Surmont - September 2014

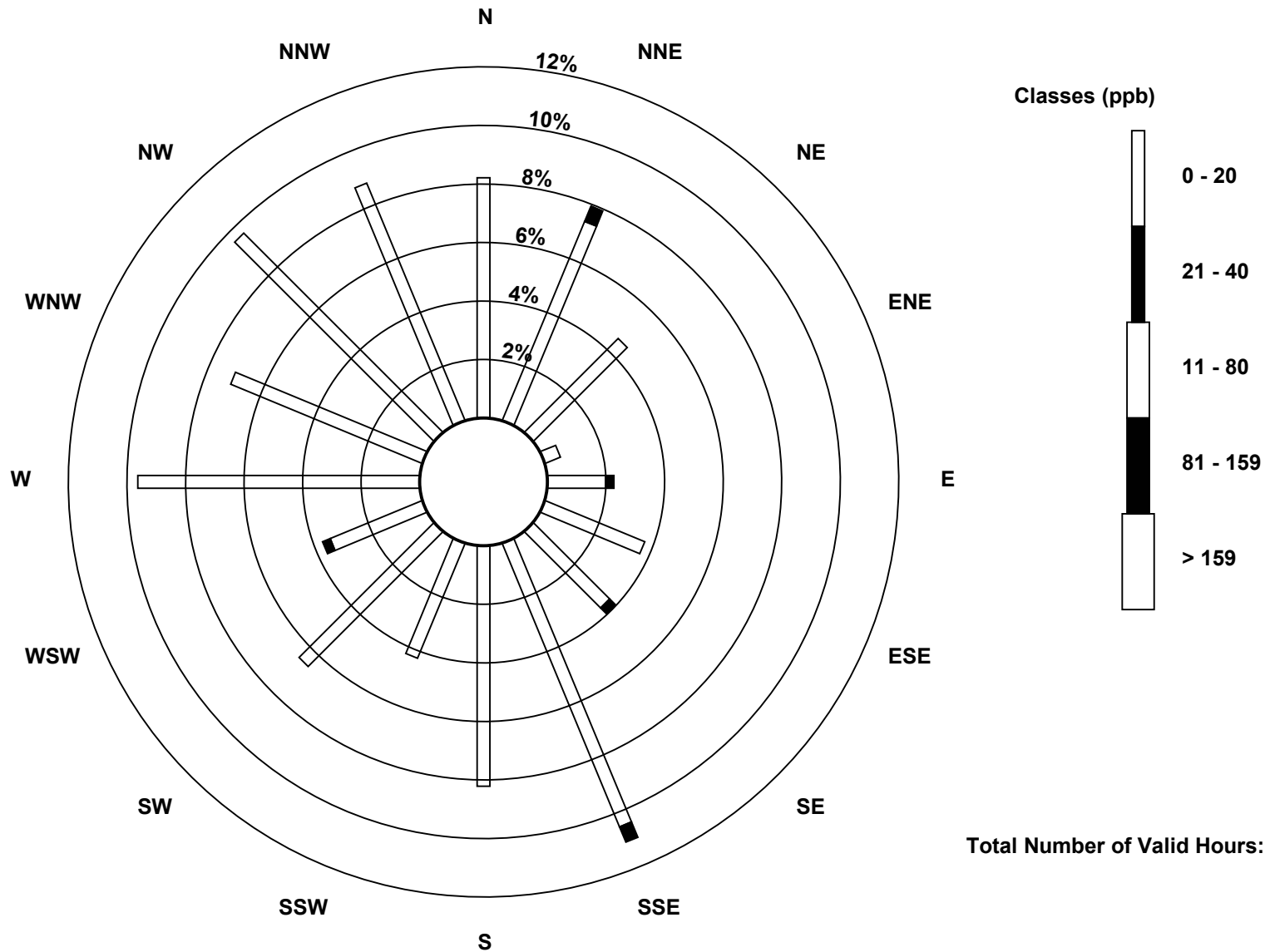
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	29	26	16	2	7	13	13	37	29	15	23	12	34	25	34	31	346
21 - 40	0	2	0	0	1	0	1	2	0	0	0	1	0	0	0	0	7
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	29	28	16	2	8	13	14	39	29	15	23	13	34	25	34	31	353

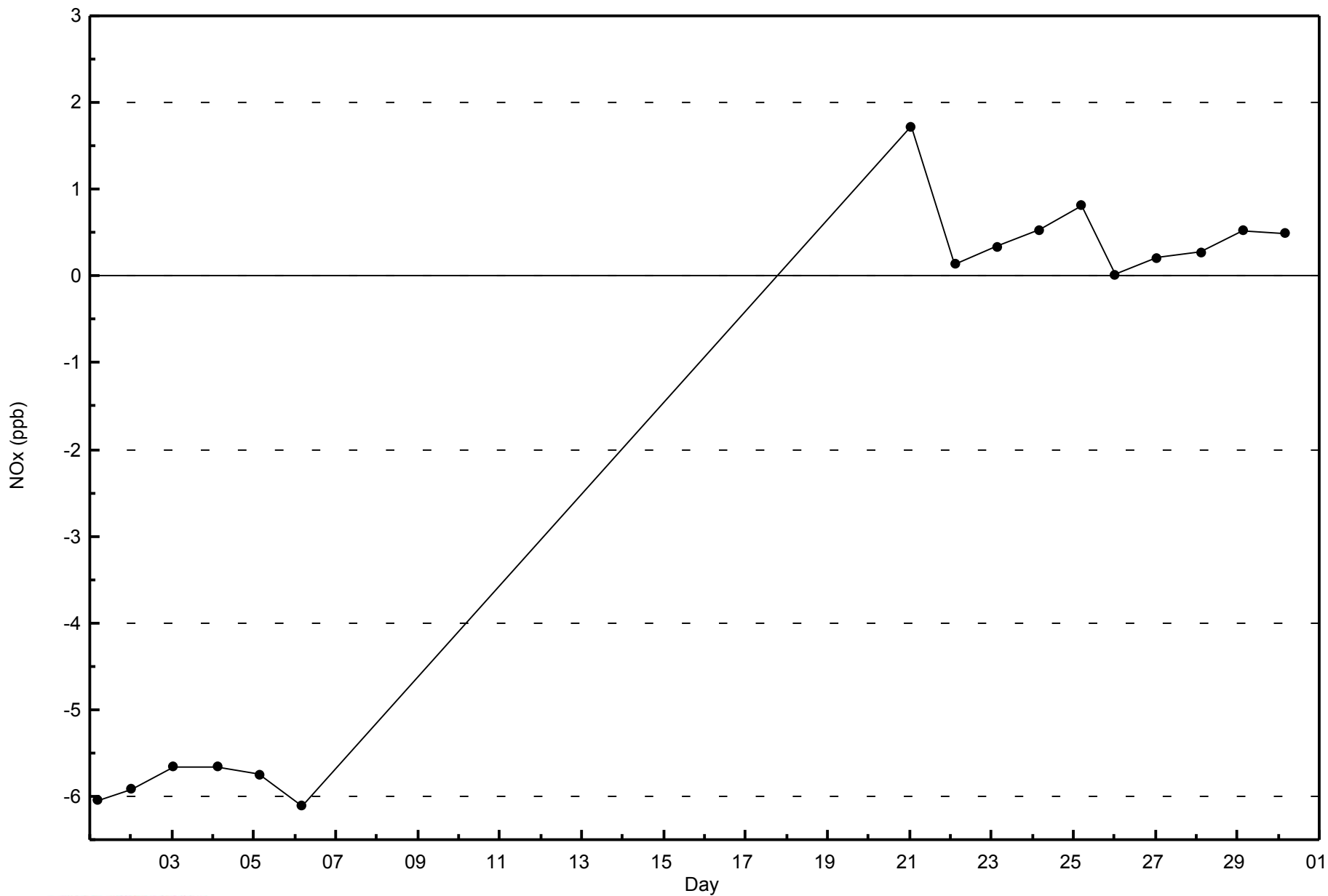
Total Number of Valid Hours: 353

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Sep 2014

NOx (NO_x) - ppb
 ConocoPhillips - Surmont (AMS502)

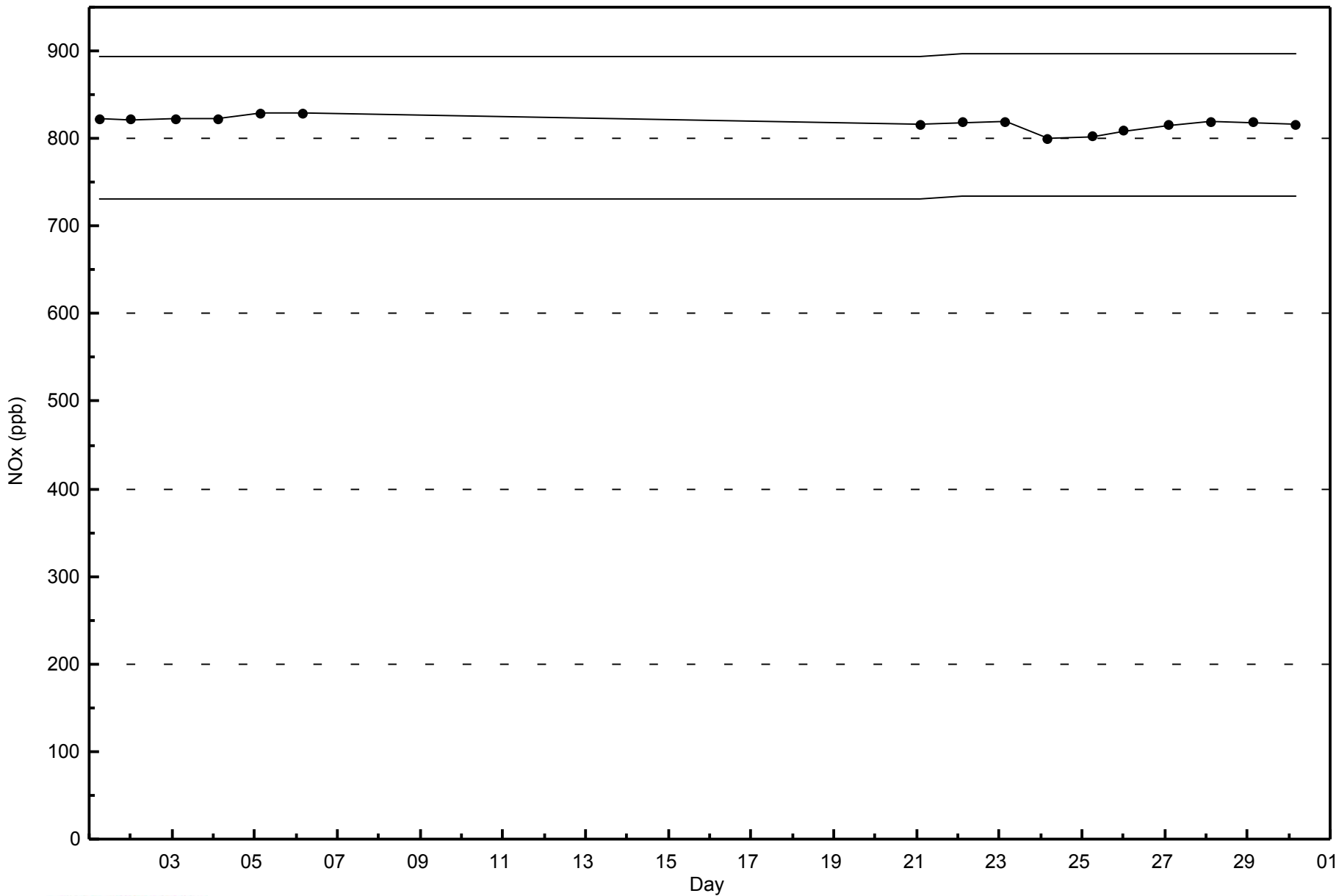






WBEA
Span Responses

NOx (NO_x) - ppb
ConocoPhillips - Surmont - September 2014





Maximum Value: 28.9 C on Sep 22 15:00	Maximum Daily Average: 20.9 C on Sep 22	Hours in Service: 720
Minimum Value: 0.2 C on Sep 27 02:00	Minimum Daily Average: 2.9 C on Sep 27	Hours of Data: 379
Maximum Diurnal Average: 14.9 C at hour 15	Minimum Diurnal Average: 8.4 C at hour 5	Hours of Missing Data: 341
Monthly Average: 11.21 C	Percentiles: P ₁ = 0.3 P ₁₀ = 4.0 Q ₁ = 7.8 Median = 10.4 Q ₃ = 14.4 P ₉₀ = 18.8 P ₉₉ = 27.0	Hours of Calibration: 0
		Percent Operational Time: 52.6

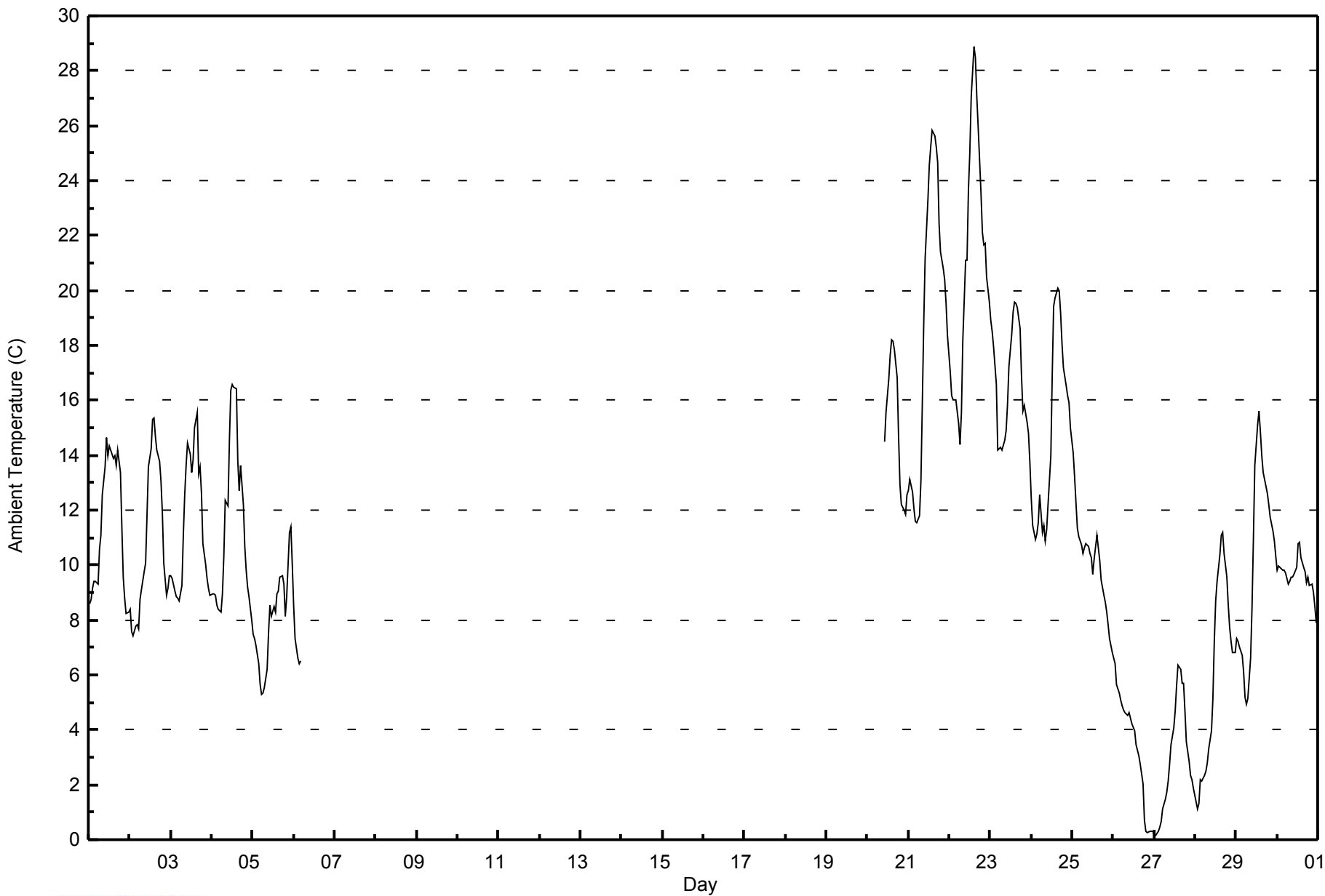
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	8.6	8.8	9.2	9.4	9.4	9.3	10.6	11.1	12.6	13.6	14.7	14.0	14.3	14.2	13.9	14.0	13.6	14.2	13.4	11.4	9.6	8.8	8.3	8.3	11.5	14.7	
2-Sep	8.4	7.6	7.4	7.8	7.8	7.7	8.7	9.1	9.8	10.0	11.8	13.6	14.2	15.3	15.4	14.7	14.2	13.8	13.1	11.9	10.1	8.9	9.2	9.6	10.8	15.4	
3-Sep	9.6	9.5	9.0	8.8	8.8	8.7	9.2	11.1	12.6	13.6	14.4	14.0	13.4	13.8	15.0	15.6	13.3	13.6	12.6	10.8	10.0	9.5	9.1	8.9	11.5	15.6	
4-Sep	9.0	8.9	8.9	8.6	8.4	8.3	8.9	10.3	12.4	12.1	14.6	16.4	16.6	16.5	16.4	13.8	12.7	13.6	12.2	10.7	9.8	9.2	8.8	8.0	11.5	16.6	
5-Sep	7.5	7.3	7.1	6.4	5.7	5.3	5.3	5.5	6.2	7.5	8.5	8.1	8.5	8.3	9.0	9.1	9.6	9.6	9.3	8.1	8.8	11.2	11.4	10.0	8.1	11.4	
6-Sep	8.5	7.3	6.6	6.4	6.5	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	8.5	
7-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
8-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
9-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
10-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
11-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
12-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
13-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
14-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
15-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
16-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
17-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
18-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
19-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--	
20-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	14.5	15.6	16.8	17.6	18.2	18.2	17.9	16.8	14.7	12.9	12.2	12.0	11.8	12.5	--	18.2
21-Sep	12.7	13.1	12.7	12.0	11.6	11.5	11.8	13.1	15.9	18.7	21.2	23.3	24.5	25.2	25.8	25.6	25.2	24.7	22.4	21.4	20.8	20.4	19.5	18.3	18.8	25.8	
22-Sep	17.0	16.2	16.0	16.0	16.0	15.2	14.4	15.5	18.2	21.1	21.1	23.7	25.0	27.0	28.9	28.5	27.1	25.9	23.6	22.1	21.7	21.7	20.5	19.6	20.9	28.9	
23-Sep	18.9	18.5	18.0	16.6	14.2	14.2	14.3	14.2	14.6	14.9	15.9	17.2	18.4	19.2	19.6	19.5	19.4	18.6	16.9	15.6	15.8	15.2	14.8	13.8	16.6	19.6	
24-Sep	12.4	11.4	11.0	11.1	11.5	12.6	11.2	11.5	10.9	11.3	12.2	14.0	16.9	19.4	19.7	20.1	20.0	19.1	18.0	17.2	16.6	16.2	15.9	15.0	14.8	20.1	
25-Sep	14.1	13.2	12.2	11.3	11.0	10.7	10.4	10.6	10.8	10.7	10.4	10.2	9.6	10.2	11.1	10.6	10.1	9.5	8.9	8.6	8.3	7.8	7.3	6.8	10.2	14.1	
26-Sep	6.6	6.4	5.7	5.3	5.1	4.9	4.7	4.7	4.5	4.6	4.4	4.2	4.0	3.5	3.3	3.0	2.8	2.0	0.7	0.3	0.2	0.3	0.3	0.3	3.4	6.6	
27-Sep	0.2	0.2	0.3	0.4	0.7	1.1	1.5	1.7	2.1	2.7	3.4	4.1	4.7	5.6	6.3	6.2	5.7	5.7	4.7	3.6	2.8	2.4	2.2	1.9	2.9	6.3	
28-Sep	1.4	1.1	1.3	2.2	2.2	2.3	2.5	2.8	3.3	4.0	5.1	7.2	8.7	9.4	10.4	11.1	11.2	10.4	9.5	8.5	7.8	7.2	6.8	6.8	6.0	11.2	
29-Sep	7.3	7.2	7.0	6.7	6.1	5.2	4.9	5.1	6.6	8.4	10.9	13.6	15.1	15.6	14.9	14.0	13.3	12.9	12.6	12.2	11.7	11.2	10.9	10.3	10.2	15.6	
30-Sep	9.8	10.0	9.9	9.8	9.8	9.7	9.3	9.4	9.6	9.6	9.7	9.9	10.8	10.8	10.3	9.9	9.8	9.4	9.6	9.3	9.3	9.0	8.5	7.9	9.6	10.8	
	9.5	9.2	8.9	8.7	8.4	8.4	8.5	9.0	10.0	10.9	12.1	13.1	13.8	14.5	14.9	14.6	14.1	13.7	12.6	11.5	11.0	10.7	10.3	9.9		Diurnal Average	
	18.9	18.5	18.0	16.6	16.0	15.2	14.4	15.5	18.2	21.1	21.2	23.7	25.0	27.0	28.9	28.5	27.1	25.9	23.6	22.1	21.7	21.7	20.5	19.6		Diurnal Maximum	

PF - Power Failure



WBEA
Hourly Averages

Ambient Temperature (AT) - C
ConocoPhillips - Surmont - September 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
ConocoPhillips - Surmont - September 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	176	46.44	46.44
10 - 20	176	46.44	92.88
> 20	27	7.12	100.00

Total Number of Valid Hours: 379

Total Number of Hours: 720



Maximum Value: 100 % on Sep 27 00:00	Maximum Daily Average: 97.5 % on Sep 26	Hours in Service: 720
Minimum Value: 29 % on Sep 22 15:00	Minimum Daily Average: 45.9 % on Sep 22	Hours of Data: 379
Maximum Diurnal Average: 82.5 % at hour 5	Minimum Diurnal Average: 58.1 % at hour 15	Hours of Missing Data: 341
Monthly Average: 71.9 %	Percentiles: P ₁ = 32 P ₁₀ = 44 Q ₁ = 58 Median = 75 Q ₃ = 86 P ₉₀ = 93 P ₉₉ = 100	Hours of Calibration: 0
		Percent Operational Time: 52.6

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	86	86	86	87	88	87	80	77	72	66	61	62	61	60	62	60	60	56	60	72	80	84	87	85	73.6	88
2-Sep	82	88	91	92	92	91	86	86	85	85	73	57	54	48	48	53	60	60	64	74	80	82	79	79	74.6	92
3-Sep	81	81	83	85	84	84	80	70	61	56	52	55	64	55	50	47	61	58	67	75	76	76	79	80	69.1	85
4-Sep	79	80	80	81	83	83	80	75	69	72	64	57	56	61	61	71	78	74	80	91	94	94	90	92	76.8	94
5-Sep	95	93	93	92	92	94	92	87	82	76	72	81	82	86	80	84	74	72	76	83	86	82	80	83	84.0	95
6-Sep	88	93	95	93	89	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	95
7-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
8-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
9-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
10-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
11-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
12-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
13-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
14-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
15-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
16-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
17-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
18-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
19-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	--
20-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	49	45	39	33	32	33	35	39	46	52	53	52	52	51	--	53
21-Sep	52	50	54	59	63	66	68	66	59	51	46	40	37	34	32	32	34	36	39	41	42	42	44	47	47.4	68
22-Sep	52	54	55	55	55	59	62	58	52	45	53	46	44	38	29	30	37	40	39	37	38	39	41	44	45.9	62
23-Sep	45	49	54	63	81	80	79	79	77	75	71	61	49	40	33	33	34	37	42	45	42	42	47	52	54.6	81
24-Sep	58	62	67	70	66	63	71	70	78	83	81	75	67	59	58	57	60	65	69	72	73	67	69	69	67.4	83
25-Sep	74	80	84	86	81	81	85	80	77	76	77	74	75	72	68	70	73	77	77	78	77	79	80	85	77.8	86
26-Sep	87	87	93	96	97	98	99	99	99	99	100	99	99	99	99	99	98	97	99	99	99	99	100	100	97.5	100
27-Sep	99	100	100	100	100	100	99	98	96	94	89	84	80	74	66	70	73	71	75	80	85	87	86	87	87.2	100
28-Sep	89	91	90	87	88	87	86	86	84	82	77	68	64	63	61	60	60	63	66	70	74	76	77	77	76.0	91
29-Sep	74	74	74	74	76	80	81	81	75	69	63	59	56	55	58	61	64	68	71	72	74	77	80	83	70.8	83
30-Sep	85	85	85	85	84	85	87	87	87	90	91	93	91	90	91	90	88	89	88	92	93	92	91	93	88.8	93

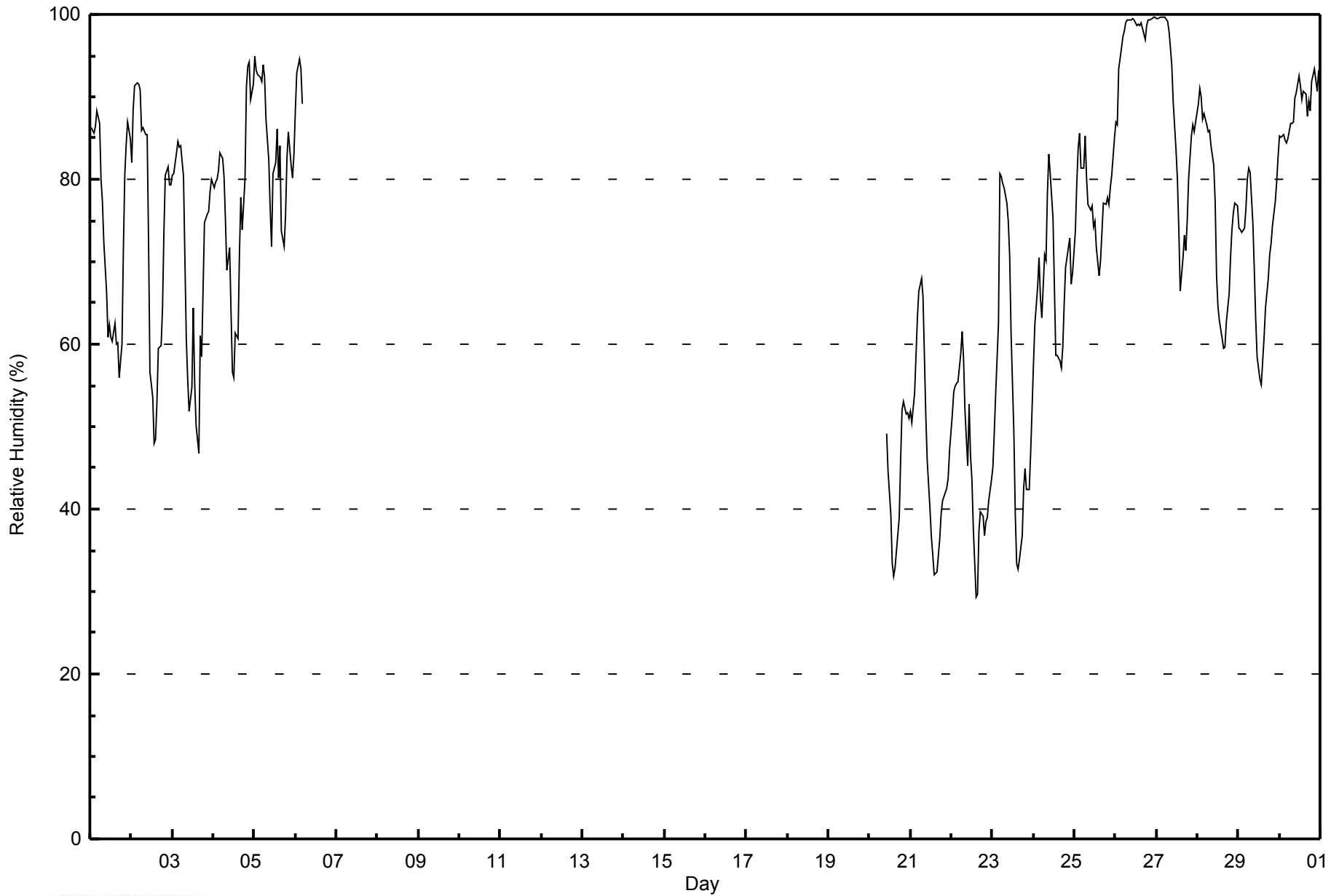
76.6	78.3	80.2	81.5	82.5	82.5	82.4	80.1	76.9	74.7	69.8	66.0	63.6	60.4	58.1	59.4	61.7	62.3	65.9	70.6	72.9	73.5	73.6	75.4	Diurnal Average	
99	100	100	100	100	100	99	99	99	99	100	99	99	99	99	99	98	97	99	99	99	99	100	100	Diurnal Maximum	

PF - Power Failure



WBEA
Hourly Averages

Relative Humidity (RH) - %
ConocoPhillips - Surmont - September 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
ConocoPhillips - Surmont - September 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	27	7.12	7.12
40 - 60	75	19.79	26.91
60 - 80	123	32.45	59.37
80 - 100	154	40.63	100.00

Total Number of Valid Hours: 379

Total Number of Hours: 720



Maximum Speed: 29 km/h on Sep 20 14:00	Maximum Daily Speed Average: 16.2 km/h on Sep 29	Hours in Service: 720
Minimum Speed Value: 0 km/h on Sep 22 16:00	Minimum Daily Speed Average: 2.2 km/h on Sep 5	Hours of Data: 378
Maximum Diurnal Speed Average: 4.7 km/h at hour 3	Minimum Diurnal Speed Average: 1.0 km/h at hour 18	Hours of Missing Data: 342
Monthly Average Velocity: 2.5 km/h 274.1 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 8 Median = 12 Q ₃ = 15 P ₉₀ = 20 P ₉₉ = 27	Percent Operational Time: 52.5

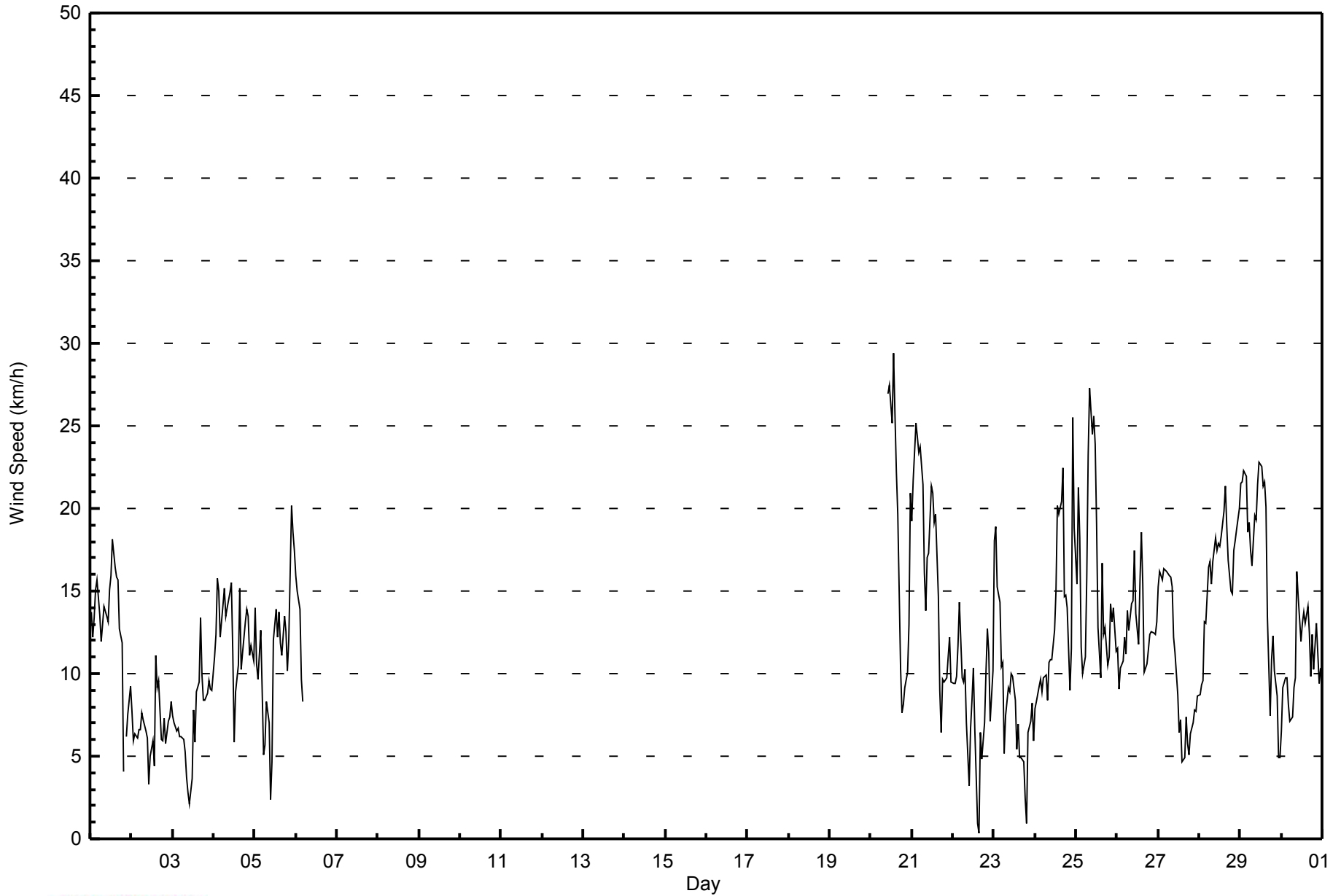
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Sep	NW14	NW12	NW13	NNW15	NNW16	NNW14	NNW12	NNW13	NNW14	NNW13	NW13	NW15	NNW16	NW18	NNW16	N16	NNE16	N13	NE12	N4	AF	WNW6	NW8	WNW9	NNW11.9	NW18	
2-Sep	NW8	NW6	NNW6	NNW6	N7	NNW7	N8	N7	NNE7	NNE6	ESE3	E5	ENE6	NE4	NE11	E9	SE10	ESE6	NE6	NNE7	NNW6	NNW7	N7	N8	NNE4.6	NE11	
3-Sep	N7	N7	NNW7	NNW7	NNW6	NNW6	NNW6	N5	NNE4	NNE3	ESE2	SSW4	WSW8	W6	NNW9	NNW10	NW13	W10	W8	W8	W9	W10	W9	W9	NNW5.5	NW13	
4-Sep	WNW11	WNW12	WNW16	WNW15	WNW12	WNW14	WNW15	WNW14	WNW14	WNW15	WNW15	WNW11	NNE6	E9	E11	NNE15	N10	N11	NNE13	NNE14	NNE13	N11	NNE12	NNE11	NNW8.6	WNW16	
5-Sep	NE14	NNE11	NNE10	NE13	NNE9	N5	N6	NE8	N7	NW2	SW5	SSW12	SSW14	SSW12	SSW14	S12	S11	SSW13	SSW13	SSW10	W12	NW20	N19	N17	WNW2.2	NW20	
6-Sep	NNE16	NE15	NNE14	N10	N8	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	NNE16	
7-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	---	
8-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	---	
9-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	---	
10-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	---	
11-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	---	
12-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	---	
13-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	---	
14-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	---	
15-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	---	
16-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	---	
17-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	---	
18-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	---	
19-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	---	
20-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	NNW27	N27	N25	N29	N26	NNW22	NW20	WNW10	SW8	SSW8	SW9	SW10	SW13	SW21	---	N29
21-Sep	SW19	SW22	SW25	SW24	SW23	SW24	SW21	SW16	SW14	WSW17	WSW17	WSW21	WSW21	SW19	SW20	SW15	SSW9	S6	S10	S10	S10	S11	S12	SSE9	SW15.3	SW25	
22-Sep	SSE9	SSE9	S10	S12	SSW14	SSW10	SSW9	SW10	SW7	WSW3	E7	ESE8	SE10	ESE7	NNE1	WNW0	ESE6	SE5	SSW7	SW10	WSW13	W11	W7	W10	SSW5.2	SSW14	
23-Sep	WNW18	WNW19	WNW15	WNW14	WNW10	W11	SW5	W7	WNW9	NW9	NW10	N10	N8	NNE5	NE7	NE5	ENE5	NE5	NNE2	E1	SE6	SSE7	SE8	SSE6	NW3.9	WNW19	
24-Sep	S8	S8	S9	S10	S9	SSE10	SSE10	SE8	SE11	SE11	ESE11	ESE13	ESE15	ESE20	ESE20	ESE22	ESE15	ESE15	SE14	SW9	SW12	W26	W19	SE8.5	W26		
25-Sep	W15	WSW21	WSW18	WSW12	W10	W11	W16	W23	W27	W25	W26	W24	W19	W13	NNW10	NW17	NNW12	NNW13	NNW11	NNW11	N14	N13	N14	NNE11	WNW12.6	W27	
26-Sep	NNE12	NE9	NE10	NE11	NE12	NE11	NNE14	NE13	NE14	NNE14	NNE17	NNE14	NNE12	N16	N19	N15	NNW10	NW11	NW11	NW12	NW13	NW12	NW12	NW13	N10.4	N19	
27-Sep	NW15	NW16	NW16	NW16	NW16	NW16	NW16	NW16	NNW15	NNW12	N11	NNW9	NNW6	NNW7	N5	E5	ESE7	SE6	SSE5	S6	S7	S8	S8	S9	NW5.8	NW16	
28-Sep	S9	SSE9	SSE10	SSE13	SE13	SSE16	SSE17	SSE15	SSE17	SSE18	SE17	SSE18	SE18	SSE18	SSE20	SSE21	SSE19	SSE17	SSE15	SSE15	SSE17	SSE18	SSE19	S20	SSE16.1	SSE21	
29-Sep	S22	S22	S22	S22	SSE19	SSE19	SSE17	SSE16	SSE20	SE19	SE21	SE23	SE23	SSE21	SSE22	S20	S13	SSW7	S11	S12	S10	SSE9	SSE5	SSE5	SSE16.2	SE23	
30-Sep	S7	SSW9	SW10	SW10	WSW8	W7	W7	W9	WSW10	W16	W15	WNW12	WNW13	NW14	NW13	NW14	NW12	W10	WNW12	W10	WNW13	WNW11	W9	W10	W9.5	W16	
W3.6 W4.3 W4.7 W4.0 W3.6WSW3.8 W3.5 W3.6 W3.1WNW3.4 NW3.4WNW2.3 NW1.3 NW1.1NNE2.2 NNE1.8 ENE1.3WSW1.0 SW1.5 SW2.3WSW3.3 W4.2 W3.6 W3.6																								Diurnal Average			
S22 SW22 SW25 SW24 SW23 SW24 SW21 W23 W27 W25NNW27 N27 N25 N29 N26 NNW22 ESE22 SSE17 SSE15 SSE15 SSE17 NW20 W26 SW21																								Diurnal Maximum			

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - September 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - September 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	28	7.41	7.41
6 - 11	160	42.33	49.74
12 - 19	147	38.89	88.62
20 - 28	42	11.11	99.74
29 - 38	1	0.26	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 378

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - September 2014

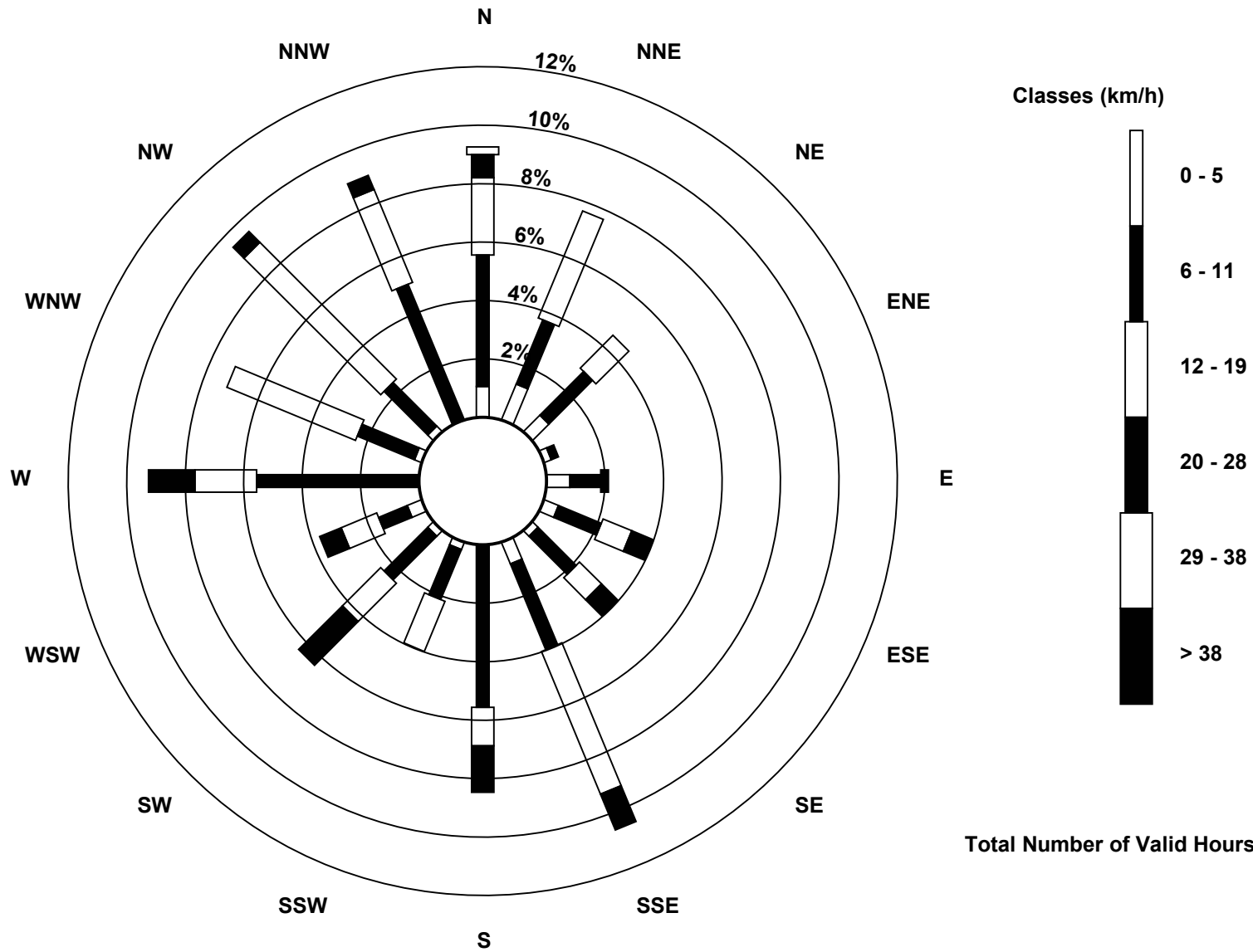
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	5	3	1	3	2	1	3	0	1	1	2	0	1	1	0	28
6 - 11	17	9	8	1	4	6	7	12	21	7	8	4	21	8	8	19	160
12 - 19	10	15	6	0	0	4	4	20	5	7	7	5	8	18	25	13	147
20 - 28	3	0	0	0	1	3	3	5	6	0	8	3	6	0	2	2	42
29 - 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	35	29	17	2	8	15	15	40	32	15	24	14	35	27	36	34	378

Total Number of Valid Hours: 378

Total Number of Hours: 720

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

**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 24 22:00			Hours of Data:	378
Minimum Value: 0 km/h on Sep 3 06:00			Hours of Missing Data:	342
			Hours of Calibration:	0
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 6			Percent Operational Time:	52.5

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

AF - Analyzer Failure PF - Power Failure



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

ConocoPhillips - Surmont - September 2014

Direction of Maximum Speed: 354 deg on Sep 20 14:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 163.4 deg on Sep 29	Hours of Data: 378
Direction of Minimum Speed: 296 deg on Sep 22 16:00	Direction of Minimum Daily Speed Average: 2.2 deg on Sep 5
Direction of Minimum Daily Speed Average: 2.2 deg on Sep 5	Hours of Missing Data: 342
Monthly Average Direction: 284.2 deg	Percent Operational Time: 52.5

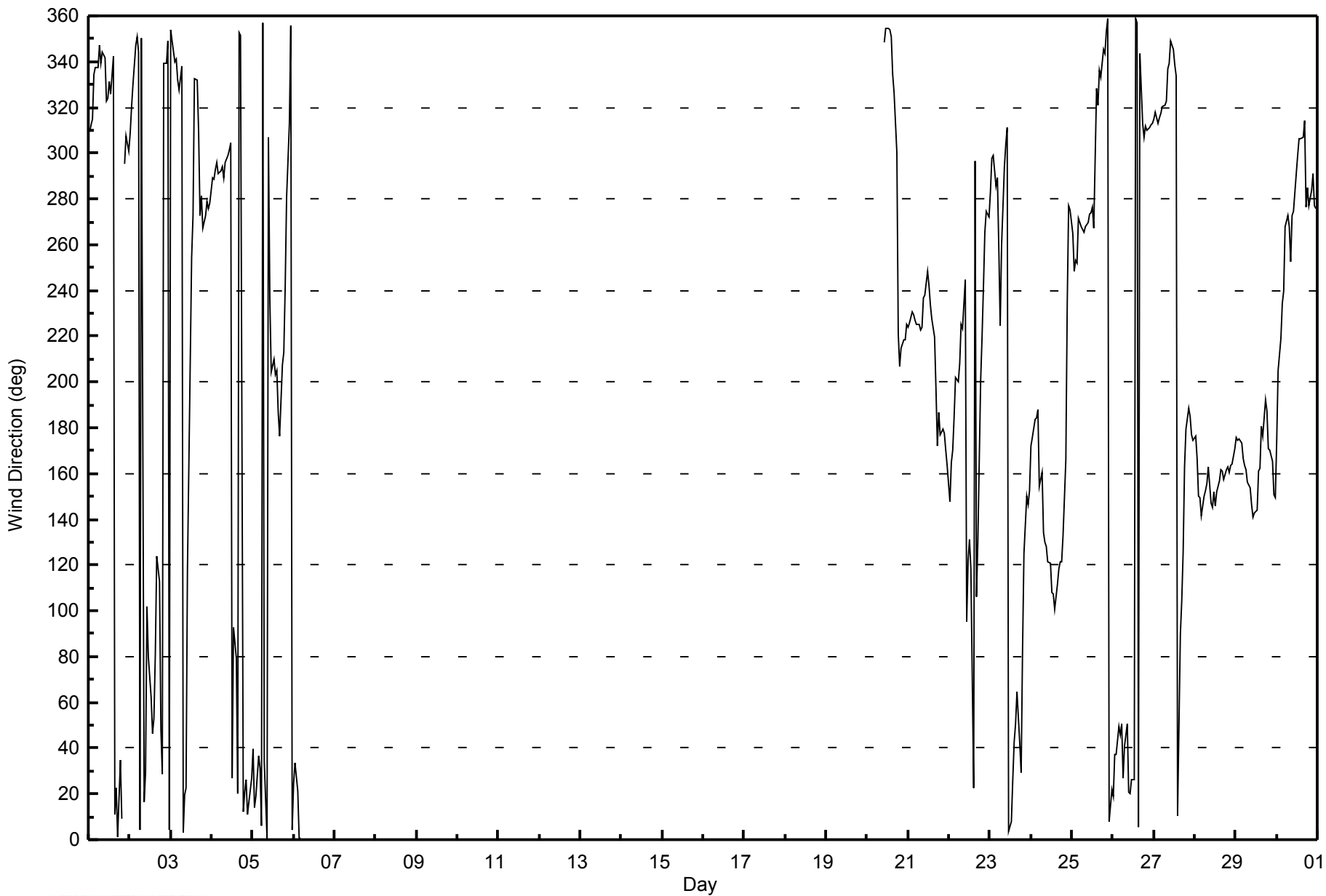
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Sep	309	312	315	334	337	338	347	339	344	342	323	324	331	326	342	11	23	1	35	9	AF	296	307	301	337.5
2-Sep	309	320	330	347	351	344	4	350	16	29	102	80	62	46	53	81	124	113	48	28	339	339	349	4	19.8
3-Sep	354	349	340	341	332	328	338	3	19	22	118	209	255	273	333	332	310	273	281	267	273	279	276	278	306.3
4-Sep	289	289	293	296	291	292	294	289	296	299	301	304	27	93	79	20	352	351	12	21	26	11	16	27	330.6
5-Sep	40	14	19	37	31	6	357	34	1	307	236	205	210	203	205	187	176	207	213	242	281	313	356	4	300.2
6-Sep	24	34	21	1	1	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
7-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
8-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
9-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
10-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
11-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
12-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
13-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
14-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
15-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
16-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
17-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
18-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
19-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
20-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	348	354	355	354	351	334	326	300	221	207	215	219	218	225	--
21-Sep	224	226	231	229	227	225	225	223	224	237	238	248	242	234	228	220	197	172	187	177	179	177	170	164	220.8
22-Sep	148	165	170	185	202	200	208	225	223	245	95	122	131	118	23	296	106	131	201	220	242	265	275	272	194.4
23-Sep	283	298	299	286	289	259	224	260	294	304	311	4	8	26	43	51	65	42	29	83	125	150	146	153	304.2
24-Sep	172	176	184	184	188	155	161	134	130	128	121	121	108	108	101	112	118	121	122	133	166	234	277	275	142.2
25-Sep	265	249	253	252	271	268	267	265	268	269	273	274	277	267	328	321	336	333	345	344	353	359	8	22	289.2
26-Sep	19	37	37	49	46	51	27	41	50	21	20	27	27	359	357	6	344	313	307	312	310	311	312	313	5.2
27-Sep	315	318	313	315	318	320	321	323	337	339	349	345	338	334	10	90	104	126	163	179	188	185	177	175	321.4
28-Sep	176	167	150	150	141	150	152	155	163	147	145	152	146	152	157	161	161	158	162	163	161	164	164	171	156.8
29-Sep	176	174	175	173	167	163	162	156	154	146	141	143	144	161	163	181	177	192	188	171	170	165	151	149	163.4
30-Sep	175	205	219	234	240	268	273	268	253	273	274	291	299	306	306	307	314	276	285	277	284	291	277	276	276.3
278.0 265.9 268.1 265.5 271.0 253.8 262.1 270.5 274.7 282.4 304.7 296.3 306.6 319.4 13.8 12.2 58.0 251.1 218.1 219.0 241.4 265.4 280.5 272.1																									
Diurnal Average																									

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



WBEA
Hourly Averages

Wind Direction (WD) - deg
ConocoPhillips - Surmont - September 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 101 deg on Sep 22 15:00			Hours of Data:	378
Minimum Value: 6 deg on Sep 22 23:00			Hours of Missing Data:	342
			Hours of Calibration:	0
Percentiles: P ₁ = 8 P ₁₀ = 10 Q ₁ = 12 Median = 15 Q ₃ = 18 P ₉₀ = 30 P ₉₉ = 78			Percent Operational Time:	52.5

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	10	16	24	14	11	11	12	11	14	17	22	16	15	12	21	30	22	18	18	68	AF	15	15	12	68
2-Sep	12	15	9	20	13	14	17	12	20	30	46	49	57	80	30	39	18	17	34	20	10	8	11	14	80
3-Sep	13	10	9	7	8	8	8	21	54	72	96	70	19	37	55	27	23	15	14	11	10	11	11	12	96
4-Sep	11	12	10	9	10	10	10	13	12	14	14	15	57	23	17	33	17	16	28	14	14	15	13	15	57
5-Sep	13	17	14	13	21	28	27	22	28	82	81	16	15	15	16	16	17	16	13	17	24	15	17	17	82
6-Sep	15	13	15	18	16	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	18
7-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
8-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
9-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
10-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
11-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
12-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
13-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
14-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
15-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
16-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
17-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
18-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
19-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
20-Sep	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	17	17	19	19	18	18	13	56	13	11	12	13	14	9	56
21-Sep	10	10	9	9	9	9	10	12	14	13	13	13	16	16	17	18	21	26	14	14	13	15	15	16	26
22-Sep	14	12	12	14	14	17	18	13	22	47	41	19	13	32	101	99	45	27	18	8	12	14	6	8	101
23-Sep	10	14	13	25	11	18	24	20	15	38	31	30	32	56	39	54	26	15	19	44	13	15	17	17	56
24-Sep	13	12	10	10	10	18	15	14	10	12	13	14	14	15	13	14	12	11	10	12	15	37	10	11	37
25-Sep	11	11	11	17	16	13	13	11	11	13	13	14	15	17	43	16	17	15	15	14	15	17	16	16	43
26-Sep	16	29	13	16	18	24	22	18	18	14	15	17	20	17	18	15	18	15	11	11	11	11	12	12	29
27-Sep	12	12	12	11	12	12	12	10	16	15	17	20	31	32	64	52	18	14	15	8	12	12	13	15	64
28-Sep	15	15	16	15	15	16	15	16	18	14	16	18	15	17	20	17	17	15	16	15	14	14	14	15	20
29-Sep	16	15	16	15	15	14	15	13	14	12	12	14	16	22	20	21	18	17	19	15	16	17	20	21	22
30-Sep	26	14	14	15	14	10	8	10	11	10	10	10	17	15	17	15	14	16	9	9	13	11	16	9	26
Diurnal Maximum																									
26 29 24 25 21 28 27 22 54 82 96 70 57 80 101 99 45 56 34 68 24 37 20 21																									

AF - Analyzer Failure PF - Power Failure



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	September 20, 2014	Previous Calibration	August 8, 2014
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	15:19
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	622
Cal Gas Concentration	51.1 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL110503		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882
DACS voltage range	n/a	DACS channel #	TCP/IP

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	17	18
Analyzer Range (mv)	1000	1000	Lamp voltage	2980	2970
Calculated slope	0.998752	0.997825	Chamber temp.	50.0	50.0
Calculated intercept	1.136453	0.818119	Pressure (mmHg)	22.6	22.4
Analyzer Background	18.7	16.9	Flow (lpm)	0.574	0.561
Analyzer Coefficient	1.023	1.022	Intensity	74	73

Analyzer make	API T100	Analyzer serial #	598
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	76.6	782.9	784.0	0.999
second point	5000	38.3	391.4	391.4	1.000
third point	5000	19.2	196.2	194.9	1.007
calibrator zero	5000	0.0	0.0		NA
as left zero	5000	0.0	0.0	-0.9	NA
as left span	6000	92.0	783.5	769.0	1.019
Average Correction Factor					1.002

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

Filter changed after as founds. Adjusted Zero.

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

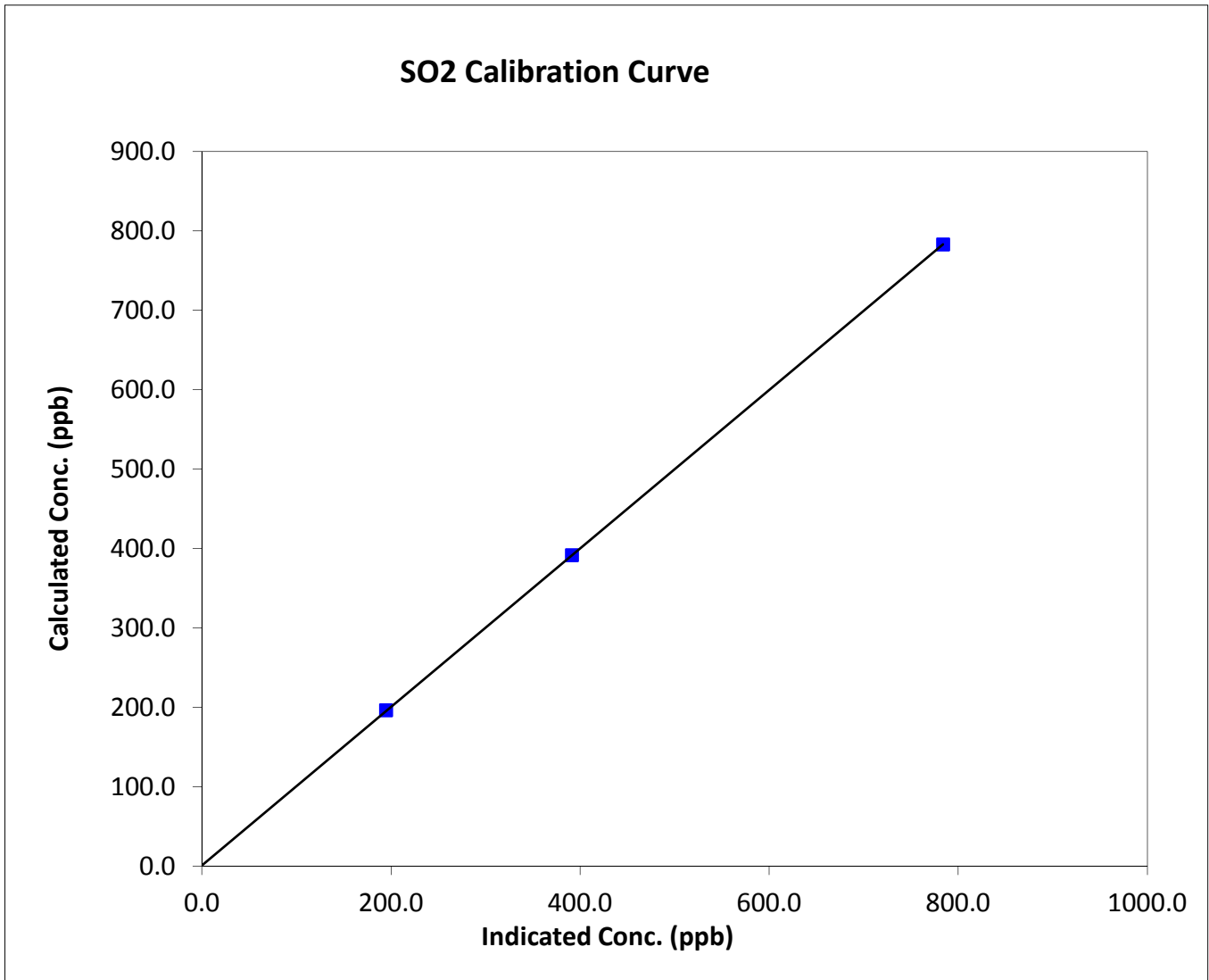
SO₂ Calibration Summary

Station Information

Calibration Date	September 20, 2014	Previous Calibration	August 8, 2014
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	10:25	End Time (MST)	15:19
Analyzer make	API T100	Analyzer serial #	598

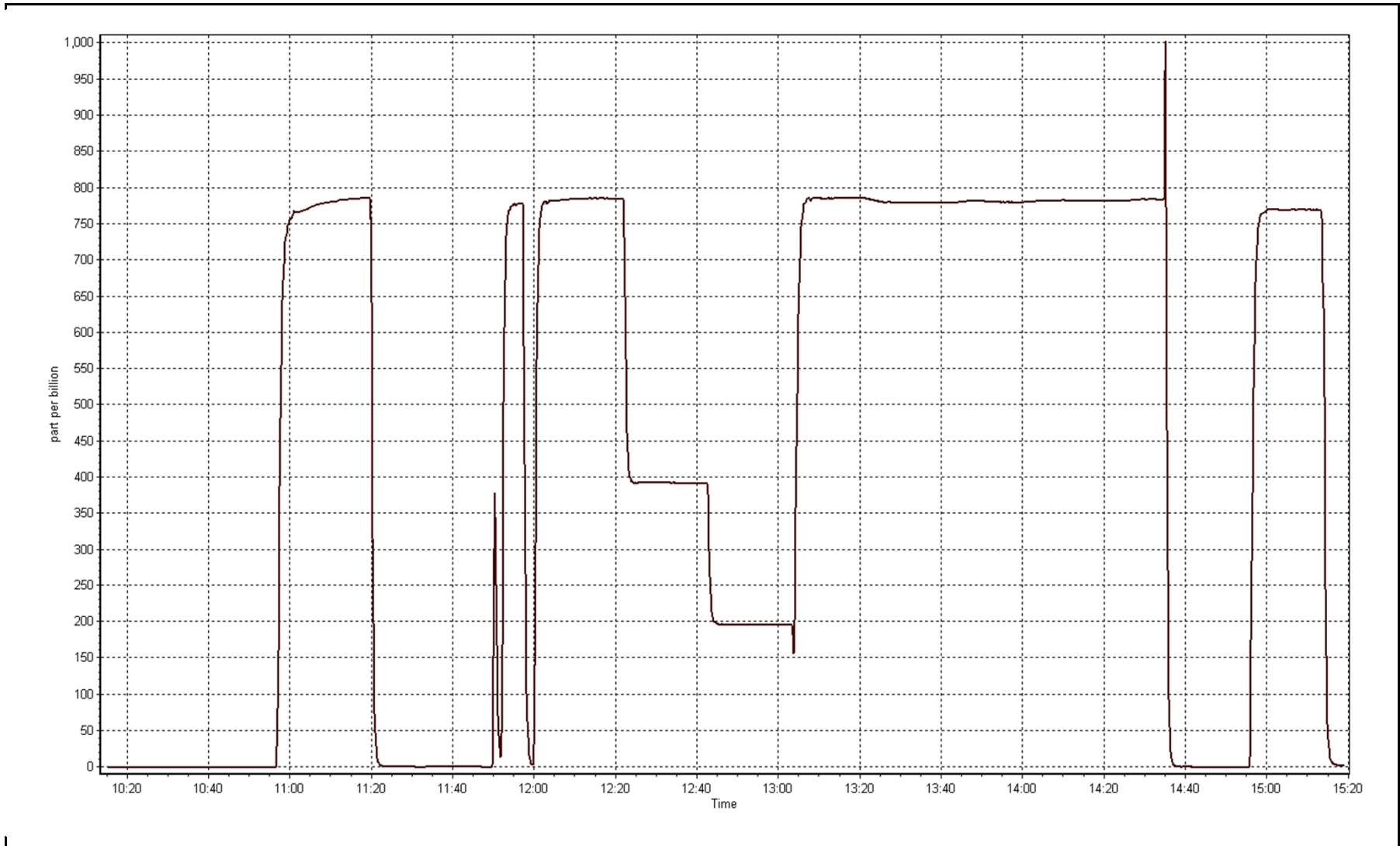
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999995
782.9	784.0	0.9985		
391.4	391.4	1.0000	Slope	0.997825
196.2	194.9	1.0069		
			Intercept	0.818119



SO2 Calibration Plot

Date: September 20, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	September 20, 2014	Previous Calibration	August 12, 2014
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	3:14	End Time (MST)	17:55
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	622
Cal Gas Concentration	10.4 ppm H2S	Cal Gas Expiry Date	30 May, 2016
Gas Cert Reference	LL34303	SO2 gas conc.	51.1 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882
DACS voltage range	n/a	DACS channel #	TC/IP

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	28	30
Analyzer Range (mv)	100	100	Lamp voltage	3733	3725
Calculated slope	0.994933	1.004623	Chamber temp.	50	50
Calculated intercept	-0.024248	0.044182	Pressure	22.9	23.0
Analyzer Background	18	18	Flow	558	559
Analyzer Coefficient	0.970	0.951	Intensity	83	90
			Converter temp.	315	317

Analyzer make/model	API T101	Analyzer serial #	197
Converter make/model	n/a	Converter serial #	n/a

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
SO2 scrubber check	5000	19.2	196.2	3.6	NA
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	38.5	80.1	79.8	1.004
second point	5000	19.3	40.1	39.7	1.010
third point	5000	12.0	25.0	24.7	1.012
calibrator zero	5000	0.0	0.0		NA
as left zero	5000	0.0	0.0	0.6	NA
as left span	5000	38.5	80.1	75.0	1.068
Average Correction Factor					1.009

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

As Found zero used as Calibrator Zero. Span adjusted. Filter changed after third point. Shortened As Lefts due to time constraints

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

H2S Calibration Summary

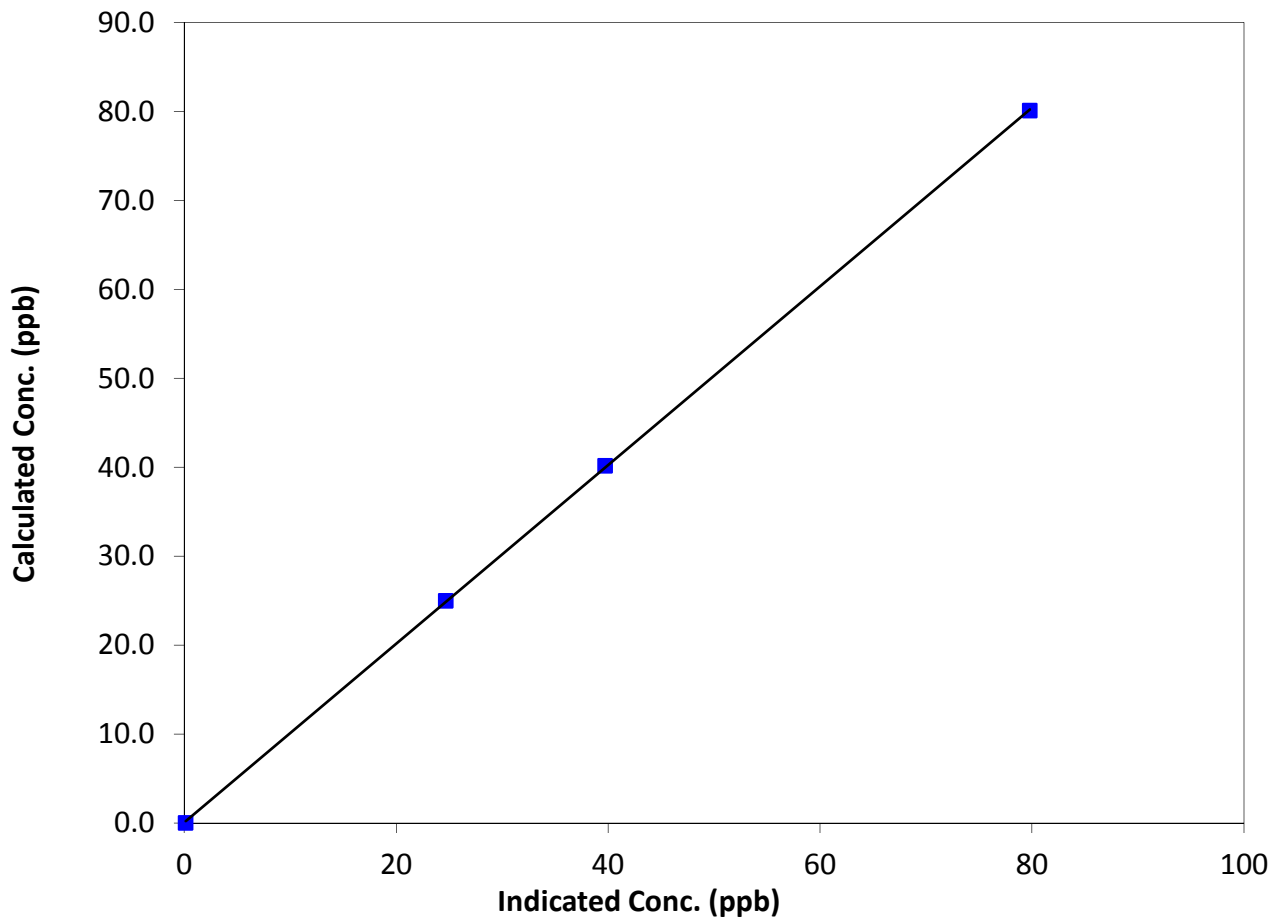
Station Information

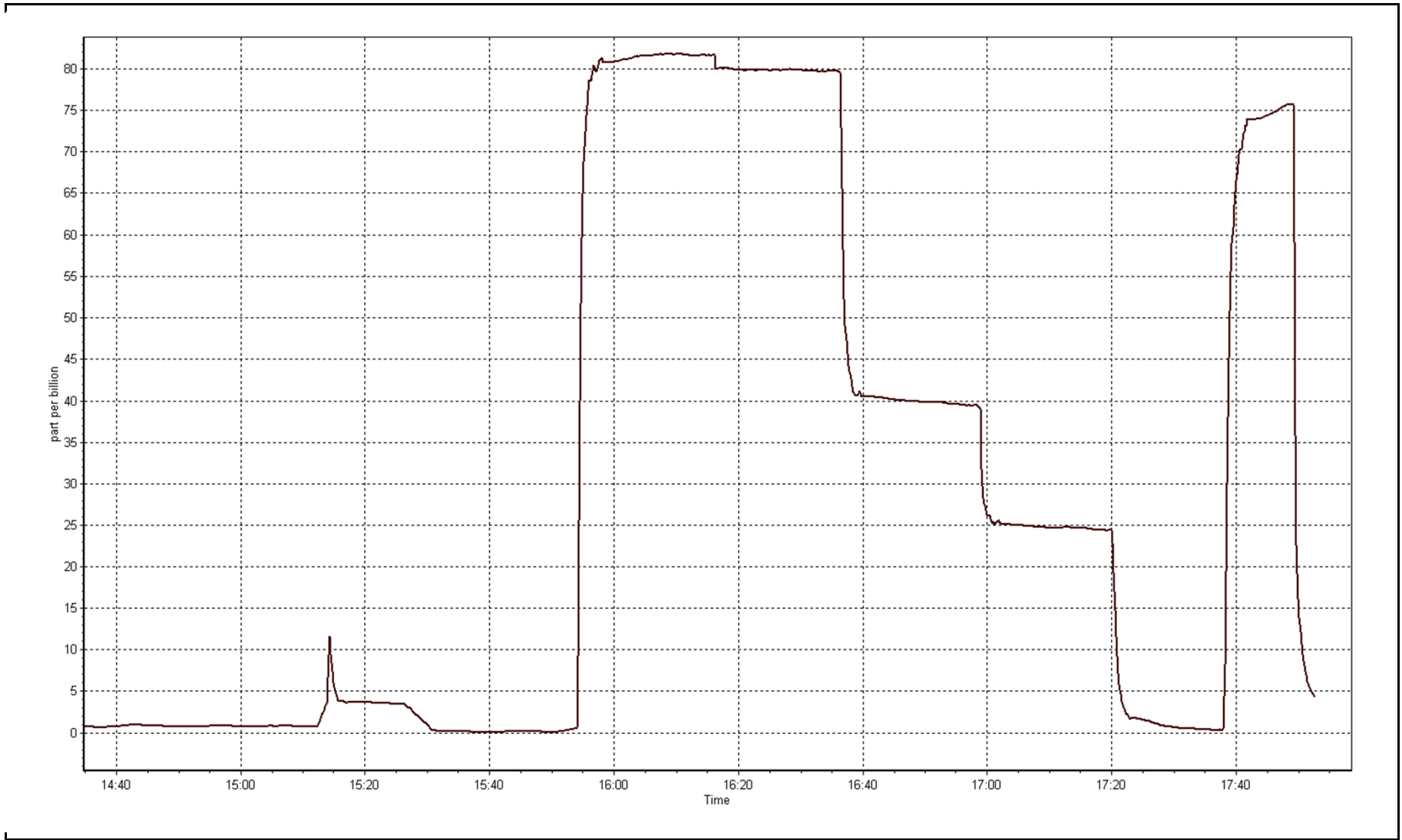
Calibration Date	September 20, 2014	Previous Calibration	August 12, 2014
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	3:14	End Time (MST)	17:55
Analyzer make	API T101	Analyzer serial #	197

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999969
80.1	79.8	1.0035		
40.1	39.7	1.0104	Slope	1.004623
25.0	24.7	1.0118		
			Intercept	0.044182

H2S Calibration Curve







Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	September 20, 2014	Previous Calibration	August 8, 2014
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	10:25	End Time (MST)	15:18
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	API T700	Serial Number	622
NO Cal Gas Conc	52.2 ppm	Cal Gas Expiry Date	May 29, 2014
NO _x Cal Gas Conc	52.4 ppm	Cal Gas Serial #	LL110503

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882
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Parameter		NO _x	NO	NO ₂
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	1.002296	1.000136	0.978191
	Data Offset	-0.569285	0.136344	0.161362
After	Data Slope	0.999540	0.998668	0.988697
	Data Offset	-0.146156	0.676972	0.071579
Channel #		TCP/IP	TCP/IP	TCP/IP
Voltage Range				

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.763	ppb	0.763	ppb
NO _x coefficient	0.997	ppb	0.997	ppb
NO ₂ coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	9.7		9.7	
NO _x bkgrnd	10.1		10.1	
PMT	-941		-941	
Chamber Temp	50.3	Deg C	50.3	Deg C
Moly Temp	322.4	Deg C	322.9	Deg C
Cooler Temp	-2.8	Deg C	-3.0	Deg C
O ₃ flow	ok	ccm		ccm
Chamber Press	194.8	mmHg	194.2	mmHg
Sample Flow	0.511	ccm	0.516	ccm

Notes:

No as founds due to extended shutdown period.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

September 20, 2014

Station Number:

AMS 502

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero										
as found span										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2	N/A	N/A
high point	5000	76.6	802.8	799.7	3.1	803.2	800.3	2.9	0.9995	0.9993
second point	5000	38.3	401.4	399.9	1.5	402.1	399.8	2.3	0.9983	1.0002
third point	5000	19.2	201.2	200.4	0.8	201.1	199.1	2.0	1.0004	1.0066
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.2	0.1	N/A	N/A
as left span	6000	92.0	803.5	527.0	276.4	804.6	526.3	278.3	0.9986	1.0013
Average Correction Factor									0.9994	1.0020

Corrected As found

NO_x=

NA

NO=

NA

Percent Change

NO_x=

N/A

NO=

N/A

Previous Response

NO_x=

NA

NO=

NA

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

76.60

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.2			N/A	
1st NO ₂ (300)	N/A	527.0	271.8	802.2	527.0	275.2	0.9856	1.0000	0.9878	101.2%
2nd NO ₂ (200)	N/A	608.2	190.6	800.7	608.2	192.4	0.9875	1.0000	0.9905	101.0%
3rd NO ₂ (100)	N/A	696.2	102.6	799.6	696.2	103.4	0.9889	1.0000	0.9927	100.7%
4th NO ₂ (0)	798.8	N/A	3.7	802.5	798.8	3.7	0.9852	1.0000	N/A	N/A
Average Correction Factor							0.9868	1.0000	0.9903	101.0%

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

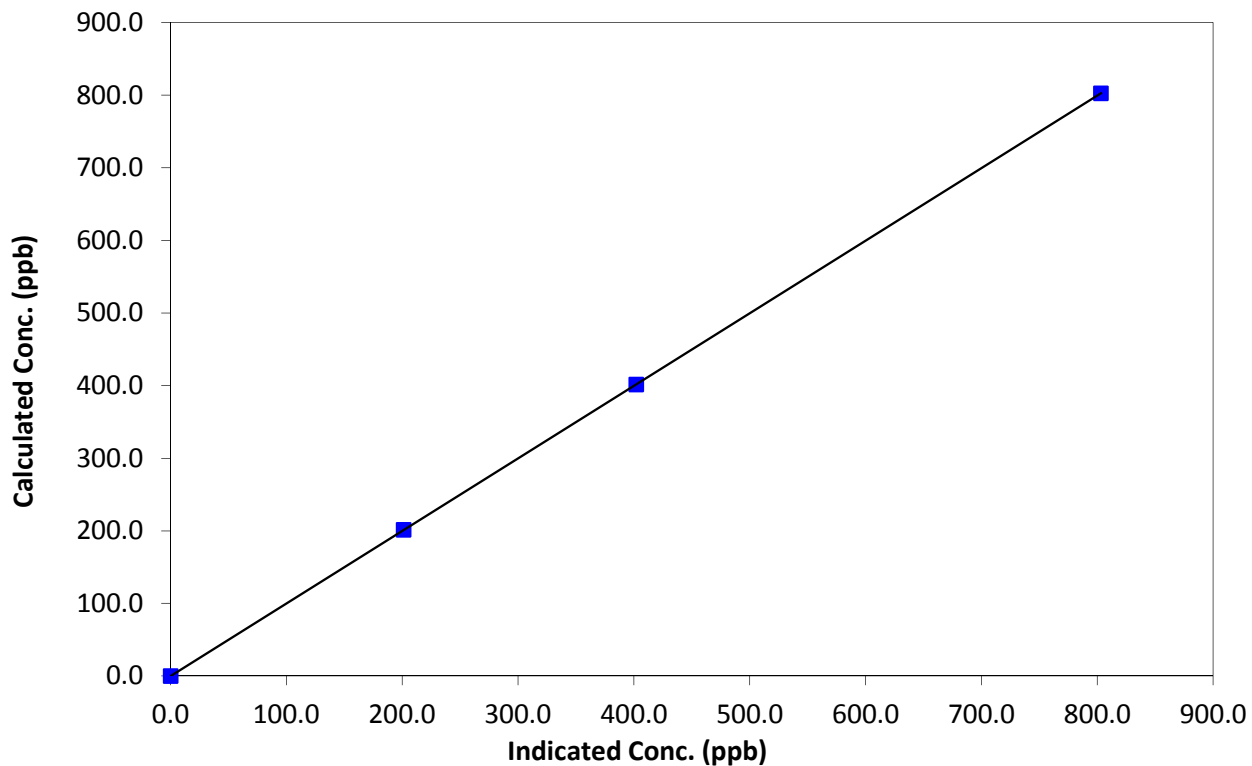
Station Information

Calibration Date	September 20, 2014	Previous Calibration	August 8, 2014
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:25	End Time (MST)	15:18
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999999
802.8	803.2	0.9995		
401.4	402.1	0.9983	Slope	0.999540
201.2	201.1	1.0004		
			Intercept	-0.146156

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

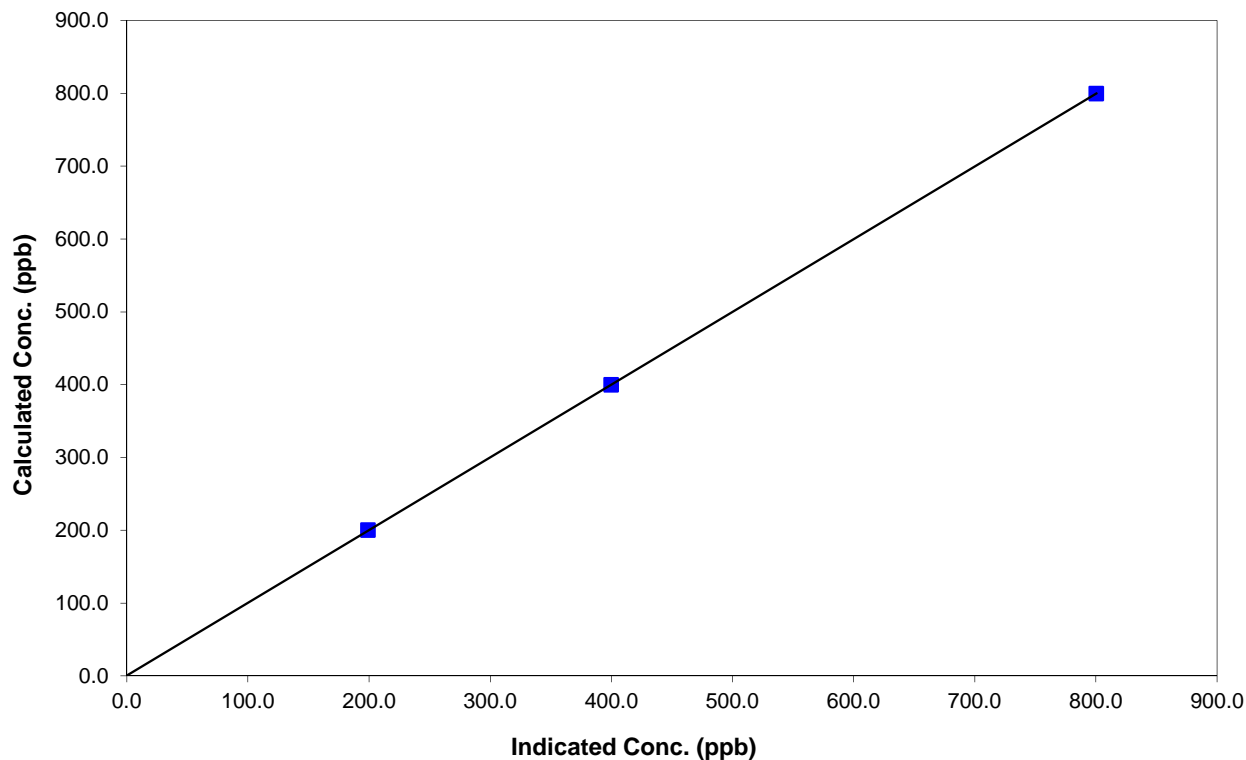
Station Information

Calibration Date	September 20, 2014	Previous Calibration	August 8, 2014
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:25	End Time (MST)	15:18
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999996
799.7	800.3	0.9993		
399.9	399.8	1.0002	Slope	0.998668
200.4	199.1	1.0066		
			Intercept	0.676972

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Station Information

Calibration Date	September 20, 2014	Previous Calibration	August 8, 2014
Station Number	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:25	End Time (MST)	15:18
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999991
271.8	275.2	0.9878		
190.6	192.4	0.9905	Slope	0.988697
102.6	103.4	0.9927		
			Intercept	0.071579

NO₂ Calibration Curve

