



*WOOD BUFFALO
ENVIRONMENTAL
ASSOCIATION*

JUNE 2014

MONTHLY REPORT



CONTINUOUS MONITORING
INTEGRATED MONITORING
July 31, 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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July 31, 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 June 2014
Wood Buffalo Environmental Association**

Enclosed is the June 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 500 – Cenovus Christina Lake

In early January 2014, WBEA commissioned a portable air monitoring station at the Cenovus Energy Christina Lake facility. The survey at this location was conducted from January 1 to June 17, 2014 to fulfill Alberta Environment's Environmental Protection and Enhancement Act facility approval number 48522-01-00. 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 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 and O₃.

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

There was 1 ambient ground level concentration of Particulate Matter (PM_{2.5}) in excess of the PM_{2.5} 24-hour air quality objective reported to Alberta Environment in real time. After data processing to account for valid analyzer response, the reported incident found not to be in exceedance of the objective.

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

Site	parameter	date/time	reference	period	units	concentration		status*
						reported	final	
AMS 2 Mildred Lake	H ₂ S	10Jun14:22:00	285130	1-hour	ppb	15	15	exc
AMS 2 Mildred Lake	H ₂ S	10Jun14:23:00	285130	1-hour	ppb	17	17	exc
AMS 5 Mannix	H ₂ S	30Jun14:24:00	286025	24-hour	ppb	3	2.6	nae
AMS 6 Patricia McInnes	PM _{2.5}	29Jun14:24:00	285987	24-hour	ug/m3	40	29.3	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 June 2014, there was one incident resulting in a compliance monitoring instrument operating less than 90 % of the time.

The total hydrocarbon (THC) analyzer at AMS 6, Patricia McInnes, operated less than 90% of the time in June, 2014. There were six issues associated with the operation of the THC analyzer, resulting in 107 hours of invalid data:

- The normal depletion and replacement of the carrier gas on June 4 and replacement of the sample lines on June 5 interrupted the normal operations of the analyzer for 2 hours.
- Setup of diagnostic information collection on the analyzer and verification of analyzer response on June 20 resulted in a maintenance period of 6 hours.
- The analyzer output signal exhibited intermittent periods of unstable operation due to sample collection and peak retention time misalignment resulting in excess noise in the analyzer response. This resulted in 17 hours of invalid data.
- The analyzer was replaced on June 21 and left in maintenance mode for the stabilization period. During this period, 48 hours of data was reported as invalid.
- Further optimization of the analyzer response was conducted via an analyzer column “bake out” process. This process affected the normal operation of the analyzer for an additional 30 hours.
- A power failure at the station on June 29 interrupted the normal operations of the analyzer for 4 hours.

After flagging and processing, data was available for 85% of the time for this reporting period. This incident was reported to Alberta Environment and Sustainable Resource Department on July 30th, 2014 (Nancy, reference number 287513).

There were no incidents of monitoring instruments not required for air quality compliance operating less than 90 % of the time in June 2014.

2.2 Intermittent Monitoring

The results for passive and integrated monitoring of PAH, VOC, RSC, precipitation, PM_{2.5} and PM₁₀ samples were not available in time for submission with this monthly 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.

Monitoring notes for 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.

Depletion and replacement of the fuel cylinder at the station on June 13 interrupted the normal operation of the THC analyzer for 2 hours.

There were three issues associated with operation of the PM_{2.5} analyzer resulting in 23 hours of invalid data. The analyzer experienced a single episode of intermittent unstable operation on June 20, resulting in 3 hours of invalid data. Maintenance to the sample inlet and flow and zero reference checks on June 23 interrupted the normal operations of the PM_{2.5} analyzer for 1 hour. A power spike at the station on June 27 affected the normal operations of the analyzer for 19 hours.

Maintenance and audit checks of the ambient temperature and relative humidity sensors on May 13 and 14 interrupted the normal operation of the sensors for 5 hours this month.

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

Station 2, Mildred Lake

No operational issues to report.

Station 3, Lower Camp B - Meteorology

Flat-lines in the output signals of all wind sensors resulted in a total of 65 hours of invalid data this month.

Flat-lines in the output signals of all temperature and relative humidity sensors resulted in a total of 73 hours of invalid data this reporting period.

Station 4, Buffalo Viewpoint

Maintenance on the daily zero and span systems and verification of analyzer response on June 6 interrupted the normal operations of the H₂S analyzer for 4 hours.

Station 5, Mannix

Maintenance and cleaning of the sample manifold on June 3rd interrupted the normal operations of the SO₂ and H₂S analyzers for 1 hour.

Maintenance on the daily zero and span systems and verification of analyzer response on June 7 interrupted the normal operations of the H₂S analyzer for 1 hour.

An aborted calibration on June 11 interrupted the normal operations of the H₂S analyzer for 2 hours.

The THC analyzer failed to meet the operational performance specifications as identified in the Air Monitoring Directive at the beginning of this reporting period. This resulted in 58 hours of data being invalidated this month.

Intermittent spikes in the output signals of the 90m elevation wind sensor resulted in 3 hours of invalid data this month.

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 30 hours this month.

A power spike at the station on June 10 affected the normal operation of the O₃ analyzer for 1 hour.

Maintenance to the sample inlet and flow and zero reference checks on June 10 interrupted the normal operations of the PM_{2.5} analyzer for 2 hours. The PM_{2.5} analyzer experienced 2 episodes of intermittent unstable operations this month, resulting in 11 hours of invalid data.

A power failure at the station on June 29 affected the normal operations of all parameters for 3 hours.

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

Station 7, Athabasca Valley

Maintenance to the sample inlet and flow and zero reference checks on June 18 interrupted the normal operations of the PM_{2.5} analyzer for 1 hour.

Maintenance and replacement of the in-situ calibrator at the station on June 25 affected the normal operation of the SO₂ and THC analyzers for 1 and 2 hours, respectively.

Station 8, Fort Chipewyan

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

Station 9, Barge Landing

Power spikes at the station during this reporting period, affected the normal operations of all air quality analyzers for 5 hours.

Maintenance and replacement of the zero-air generator at the station on June 16 affected the normal operations of the THC analyzer for 3 hours.

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

Station 11, Lower Camp

Power interruptions at the station on June 11 and 15 affected the normal operations of all parameters for 38 hours.

Maintenance on the daily zero and span systems and verification of analyzer response on June 18 interrupted the normal operations of the H₂S analyzer for 4 hours.

Station 12, Millennium Mine

Maintenance on the daily zero and span systems and verification of analyzer responses on June 16 interrupted the normal operations of the SO₂, NO₂, PM_{2.5} analyzers for 1 to 3 hours.

A tripped circuit breaker at the station on June 15 affected the normal operations of the THC analyzer for 16 hours.

Maintenance to the sample inlet, flow audits and zero reference checks on June 13 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 3 hours of invalid data this reporting period.

Station 13, Syncrude UE 1

A power spike at the station on June 26 affected the normal operations of all parameters for 1 hour.

Station 14, Anzac

Maintenance and cleaning of the glass manifold on June 17 interrupted the normal operations of the NO₂ and O₃ analyzers for 1 hour.

Maintenance and cleaning of the leaf wetness sensor on June 17 resulted in 2 hours of invalid data.

The SO₂ analyzer experienced a single episode of unstable operations on June 18 resulting in 2 hours of invalid data.

The normal operation of the O₃ analyzer was interrupted on June 20 for 4 hours due to a maintenance calibration to re-adjust the zero base line.

Depletion and replacement of the fuel gas cylinder at the station on June 25 interrupted the normal operations of the THC analyzer for 2 hours.

There were three issues associated with operation of the PM_{2.5} analyzer resulting in 14 hours of invalid data. The filter tape in the analyzer failed to advance on June 20 resulting in 6 hours of invalid data. Maintenance to the sample inlet, flow audits and zero reference checks on June 20 interrupted the normal operations of the PM_{2.5} analyzer for 1 hour. The PM_{2.5} analyzer experienced three instances of intermittent unstable operations this month, resulting in 7 hours of invalid data.

Flat-lines in the output signals of the wind sensor resulted in 37 hours of invalid data this reporting period.

Station 15, CNRL Horizon

The SO₂ analyzer experienced two episodes of unstable operations on June 2 and 14 resulting in 6 hours of invalid data.

Maintenance on the in-situ calibrator and confirmation of analyzer responses to the daily zero and span checks on June 20 and 25 interrupted the normal operations of the THC analyzer for 2 hours.

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

Station 16, Albian Muskeg River

Power spikes at the station during this reporting period, affected the normal operations of all parameters for 7 hours.

Station 17, Wapasu

Maintenance and cleaning of the sample manifold on June 10 and 11 interrupted the normal operations of all air quality analyzers for 1 hour.

Maintenance to the sample inlet, flow audits and zero reference checks on June 11 interrupted the normal operations of the PM_{2.5} analyzer for 1 hour.

Depletion and replacement of the fuel gas cylinder at the station on June 24 interrupted the normal operations of the THC analyzer for 1 hour.

Replacement of the wind speed and direction sensors at the station on June 24 affected the normal operations of these parameters for 1 hour.

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

Station 500, Cenovus Christina Lake

In early January 2014, WBEA commissioned a portable air monitoring station at the Cenovus Energy Christina Lake facility. The survey at this location was conducted from January 1 to June 17, 2014 to fulfill Alberta Environment's Environmental Protection and Enhancement Act facility approval number 48522-01-00. 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 two episodes of extended stabilization periods after daily span checks on June 2 and 8 resulting in 2 hours of invalid data.

The SO₂ and H₂S analyzers experienced a single episode of unstable operations for excessive baseline drift this month, resulting in 1 hour of invalid data for each analyzer.

Station 101, Portable

Not in operation during this reporting period.

Station 102, Portable

Not in operation during this reporting period.

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

Yours sincerely,

Aurora Atmospheric Inc.

Sanjay Prasad
Air Quality Scientist

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

JUNE 2014

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APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	6	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			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	SO2(ppb)	1	100.00	0.011	0	0.004	0
216466-00-04	SO2(ppb)	2	100.00	0.039	0	0.004	0
137467-00-00	SO2(ppb)	4	100.00	0.008	0	0.002	0
20809-01-00	SO2(ppb)	5	99.72	0.065	0	0.010	0
241311-00-00	SO2(ppb)	6	99.58	0.016	0	0.005	0
094-02-00	SO2(ppb)	7	99.86	0.011	0	0.003	0
305529-00-00	SO2(ppb)	8	100.00	0.002	0	0.001	0
026-02-00	SO2(ppb)	11	94.72	0.010	0	0.002	0
228044-00-00	SO2(ppb)	12	99.58	0.031	0	0.003	0
73203-01-00	SO2(ppb)	13	99.86	0.023	0	0.004	0
	SO2(ppb)	14	99.72	0.014	0	0.003	0
	SO2(ppb)	15	98.47	0.041	0	0.005	0
	SO2(ppb)	16	99.03	0.020	0	0.004	0
	SO2(ppb)	17	99.86	0.019	0	0.002	0
	SO2(ppb)	500	99.24	0.008	0	0.001	0
	H2S(ppb)	2	100.00	0.017	2	0.002	0
	H2S(ppb)	4	99.44	0.004	0	0.001	0
	H2S(ppb)	5	99.58	0.006	0	0.003	0
	H2S(ppb)	11	94.17	0.004	0	0.001	0
	H2S(ppb)	17	99.86	0.001	0	0.000	0
	H2S(ppb)	500	99.75	0.002	0	0.000	0
	TRS(ppb)	1	100.00	0.004	0	0.001	0
	TRS(ppb)	6	99.58	0.002	0	0.001	0
	TRS(ppb)	7	100.00	0.003	0	0.001	0
	TRS(ppb)	9	99.31	0.002	0	0.001	0
	TRS(ppb)	12	100.00	0.003	0	0.001	0
	TRS(ppb)	13	99.86	0.004	0	0.001	0
	TRS(ppb)	14	100.00	0.002	0	0.000	0
	TRS(ppb)	15	100.00	0.002	0	0.000	0
	THC(ppm)	1	99.72	2.4	-	2.0	-
	THC(ppm)	2	100.00	4.7	-	2.5	-
	THC(ppm)	4	100.00	3.8	-	2.8	-
	THC(ppm)	5	91.94	4.0	-	2.7	-
	THC(ppm)	6	85.14	2.5	-	2.1	-
	THC(ppm)	7	99.86	2.4	-	2.0	-
	THC(ppm)	9	98.89	3.2	-	2.4	-
	THC(ppm)	11	94.72	3.5	-	2.4	-
	THC(ppm)	12	97.78	4.5	-	2.7	-
	THC(ppm)	13	99.86	3.3	-	2.4	-
	THC(ppm)	14	99.72	2.3	-	2.0	-
	THC(ppm)	15	99.03	4.7	-	2.7	-
	THC(ppm)	16	99.03	5.1	-	3.4	-
	THC(ppm)	17	99.72	2.4	-	2.2	-
	O3(ppb)	1	100.00	0.0	0	0.0	-
	O3(ppb)	6	99.44	0.060	0	0.037	-
	O3(ppb)	7	100.00	0.062	0	0.032	-
	O3(ppb)	8	100.00	0.053	0	0.042	-
	O3(ppb)	13	100.00	0.050	0	0.030	-

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

JUNE 2014

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48263-00-00			PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
224816-00-03									
189942-00-02			O3(ppb)	14	99.31	0.064	0	0.036	-
206355-00-00			O3(ppb)	17	99.86	0.049	0	0.039	-
46586-00-00			NO2(ppb)	1	100.00	0.039	0	0.008	-
216466-00-04			NO2(ppb)	6	99.58	0.017	0	0.007	-
137467-00-00			NO2(ppb)	7	99.72	0.023	0	0.009	-
20809-01-00			NO2(ppb)	8	100.00	0.004	0	0.001	-
241311-00-02			NO2(ppb)	12	99.72	0.036	0	0.012	-
094-02-00			NO2(ppb)	13	99.86	0.040	0	0.008	-
305529-00-00			NO2(ppb)	14	99.86	0.013	0	0.003	-
026-02-00			NO2(ppb)	15	99.31	0.031	0	0.009	-
228044-00-00			NO2(ppb)	16	99.03	0.043	0	0.022	-
73203-01-00			NO2(ppb)	17	99.86	0.013	0	0.004	-
			NO2(ppb)	500	100.00	0.014	0	0.003	-
			CO(ppm)	7	100.00	0.200	0	0.100	-
			NH3(ppb)	1	95.83	0.000	0	0.000	-
			NH3(ppb)	6	95.42	0.000	0	0.000	-
			PM2.5(ug/m3)	1	96.39	39.5	-	23.4	0
			PM2.5(ug/m3)	6	97.78	49.8	-	29.3	0
			PM2.5(ug/m3)	7	99.86	41.8	-	24.1	0
			PM2.5(ug/m3)	8	99.86	91.7	-	28.8	0
			PM2.5(ug/m3)	12	99.72	85.1	-	25.8	0
			PM2.5(ug/m3)	13	99.86	34.1	-	21.8	0
			PM2.5(ug/m3)	14	98.06	46.6	-	27.6	0
			PM2.5(ug/m3)	15	99.44	57.2	-	27.9	0
			PM2.5(ug/m3)	16	98.89	47	-	26.1	0
			PM2.5(ug/m3)	17	99.86	44.6	-	21.6	0
			WIND	1	100.00	-	-	-	-
			WIND	2	100.00	-	-	-	-
			WIND	4	100.00	-	-	-	-
			WIND	5	100.00	-	-	-	-
			WIND	6	99.86	-	-	-	-
			WIND	7	100.00	-	-	-	-
			WIND	8	100.00	-	-	-	-
			WIND	9	99.44	-	-	-	-
			WIND	11	95.83	-	-	-	-
			WIND	12	99.58	-	-	-	-
			WIND	13	100.00	-	-	-	-
			WIND	14	94.86	-	-	-	-
			WIND	15	100.00	-	-	-	-
			WIND	16	100.00	-	-	-	-
			WIND	17	99.44	-	-	-	-
			WIND	500	100.00	-	-	-	-
									
			SIGNATURE OF ASSOCIATION REPRESENTATIVE				FOR ALBERTA ENVIRONMENT USE ONLY		

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 1
BERTHA GANTER FORT MCKAY
JUNE 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

July 31, 2014

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

JUNE 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	11	0	4	0
TRS(ppb) Average	686	34	34	100.00	4	0	1	0
THC(ppm) Average	685	33	35	99.72	2.4	-	2	-
NMHC(ppm) Average	685	33	35	99.72	0.1	-	0.005	-
CH4(ppm) Average	685	33	35	99.72	2.4	-	2	-
O3 (ppb) Average	686	34	34	100.00	44	0	30	-
NO2 (ppb) Average	685	35	35	100.00	39	0	8	-
NO (ppb) Average	685	35	35	100.00	20	-	3	-
NOX (ppb) Average	685	35	35	100.00	57	-	10	-
NH3 (ppb) Average	646	44	74	95.83	0	0	0	-
PM2.5 (ug/m3) Average	694	0	26	96.39	39.5	-	23.4	0
Wind Speed 10 m (km/h) Average	720	0	0	100.00	19	-	-	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	720	0	0	100.00	32.6	-	24.5	-
Temperature 10 m (C) Average	720	0	0	100.00	29.6	-	24.6	-
Relative Humidity (%) Average	720	0	0	100.00	100	-	-	-
Precipitation (mm) Total	720	0	0	100.00	17	-	-	-
Surface Wetness (% of range) Average	720	0	0	100.00	51	-	-	-
Global Solar Radiation (W/m2) Average	720	0	0	100.00	550	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT MCKAY (AMS 1)
 JUNE 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	1.3	2	-	0	0	0	1	1	3	11
TRS (ppb) Average	686	0.3	0	-	0	0	0	0	0	1	4
THC (ppm) Average	685	1.84	0.1	-	1.8	1.8	1.8	1.8	1.9	1.9	2.4
NMHC(ppm) Average	685	0.001	0.006	-	0	0	0	0	0	0	0.1
CH4(ppm) Average	685	1.84	0.1	-	1.8	1.8	1.8	1.8	1.9	1.9	2.4
O3 (ppb) Average	686	21.5	11	-	1	6	12	21	31	38	44
NO2 (ppb) Average	685	3.7	4	-	0	0	1	2	5	9	39
NO (ppb) Average	685	1	2	-	0	0	0	0	1	3	20
NOX (ppb) Average	685	4.8	6	-	0	0	1	3	6	11	57
NH3 (ppb) Average	646	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	694	7.27	6.2	-	0.1	1.7	3	5.9	9.5	13.9	39.5
Wind Speed 10 m (km/h) Average	720	6.4	4	-	0	2	3	6	9	12	19
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	720	19.18	6.2	-	4.6	10.6	14.3	19.1	23.8	27.6	32.6
Temperature 10 m (C) Average	720	19.04	5.4	-	6.3	11.5	15	19.4	22.9	26.2	29.6
Relative Humidity (%) Average	720	66.9	21	-	20	36	50	68	85	95	100
Precipitation (mm) Total	720	-	-	71.63	0	0	0	0	0	0	17
Surface Wetness (% of range) Average	720	4	10	-	0	0	0	0	0	17	51
Global Solar Radiation (W/m2) Average	720	144.8	166	-	0	0	2	73	262	429	550

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NMHC, CH4, THC	13 Jun 2014 11:00	13 Jun 2014 12:00	2	Maintenance - replaced fuel cylinder and relit FID
NH3	01 Jun 2014 03:00	30 Jun 2014 03:00	30	Stabilization after daily span
PM2.5	20 Jun 2014 16:00	20 Jun 2014 18:00	3	Unstable operation - baseline drift
PM2.5	23 Jun 2014 13:00	23 Jun 2014 13:00	1	Maintenance - Flow and zero check, sample head cleaning
PM2.5	26 Jun 2014 15:00	27 Jun 2014 12:00	19	Station power failure and FID flame out

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 11 ppb on Jun 14 11:00	Maximum Daily Average: 3.8 ppb on Jun 18		Hours of Data:	686
Minimum Value: 0 ppb on Jun 3 00:00	Minimum Daily Average: 0.3 ppb on Jun 21		Hours of Missing Data:	34
Maximum Diurnal Average: 2.8 ppb at hour 11	Minimum Diurnal Average: 0.6 ppb at hour 5		Hours of Calibration:	34
Monthly Average: 1.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 10		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	1	Z	1	1	1	1	1	1	1	1	1	3	4	9	9	9	7	4	1	1	1	1	1	1	2.5	9
2-Jun	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
3-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
4-Jun	0	Z	0	0	0	0	1	1	1	1	0	0	0	1	1	0	1	1	1	1	1	1	1	1	0.5	1
5-Jun	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
6-Jun	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
7-Jun	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-Jun	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	4	2	4	5	4	2	1	1	1	1	1.7	5
9-Jun	1	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	2
10-Jun	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0.6	1
11-Jun	0	Z	1	0	0	0	0	0	1	1	1	3	1	2	2	1	1	1	1	2	1	0	0	0	0.9	3
12-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0.4	1
13-Jun	1	Z	1	1	1	1	0	1	1	1	0	1	1	1	1	1	2	3	2	2	1	1	1	1	0.9	3
14-Jun	1	Z	1	1	0	1	5	8	11	11	11	6	3	3	3	3	4	1	2	2	1	0	1	1	3.4	11
15-Jun	1	Z	1	1	1	2	3	6	8	10	8	5	4	4	4	2	2	2	2	1	2	1	1	1	3.0	10
16-Jun	1	Z	1	1	0	0	0	1	1	5	10	6	3	1	1	0	0	0	0	0	0	0	0	0	1.4	10
17-Jun	0	Z	0	1	1	0	0	0	1	2	6	2	C	C	C	C	2	2	5	9	2	1	1	1	2.0	9
18-Jun	1	Z	1	1	0	0	1	3	7	9	4	10	10	7	4	9	3	4	3	1	4	3	2	3	3.8	10
19-Jun	2	Z	1	1	1	1	1	1	5	7	6	8	2	1	1	1	1	1	1	1	1	1	1	1	2.0	8
20-Jun	1	Z	1	0	1	0	1	1	1	1	2	7	5	2	2	2	1	1	0	0	1	0	0	0	1.3	7
21-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
22-Jun	1	Z	1	1	1	1	1	0	1	0	1	1	0	1	1	1	1	0	0	0	1	0	0	0	0.5	1
23-Jun	0	Z	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
24-Jun	1	Z	1	1	1	1	1	2	7	8	8	7	5	2	2	2	5	3	3	3	2	2	2	2	3.0	8
25-Jun	2	Z	1	1	1	1	2	3	3	8	8	8	5	4	2	3	1	1	1	1	1	1	1	1	2.5	8
26-Jun	1	Z	1	1	0	1	1	1	1	1	6	3	1	1	1	1	1	1	1	1	0	1	0	0	1.0	6
27-Jun	0	Z	0	0	1	0	0	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	0.8	2
28-Jun	0	Z	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
29-Jun	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
30-Jun	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0.6	1

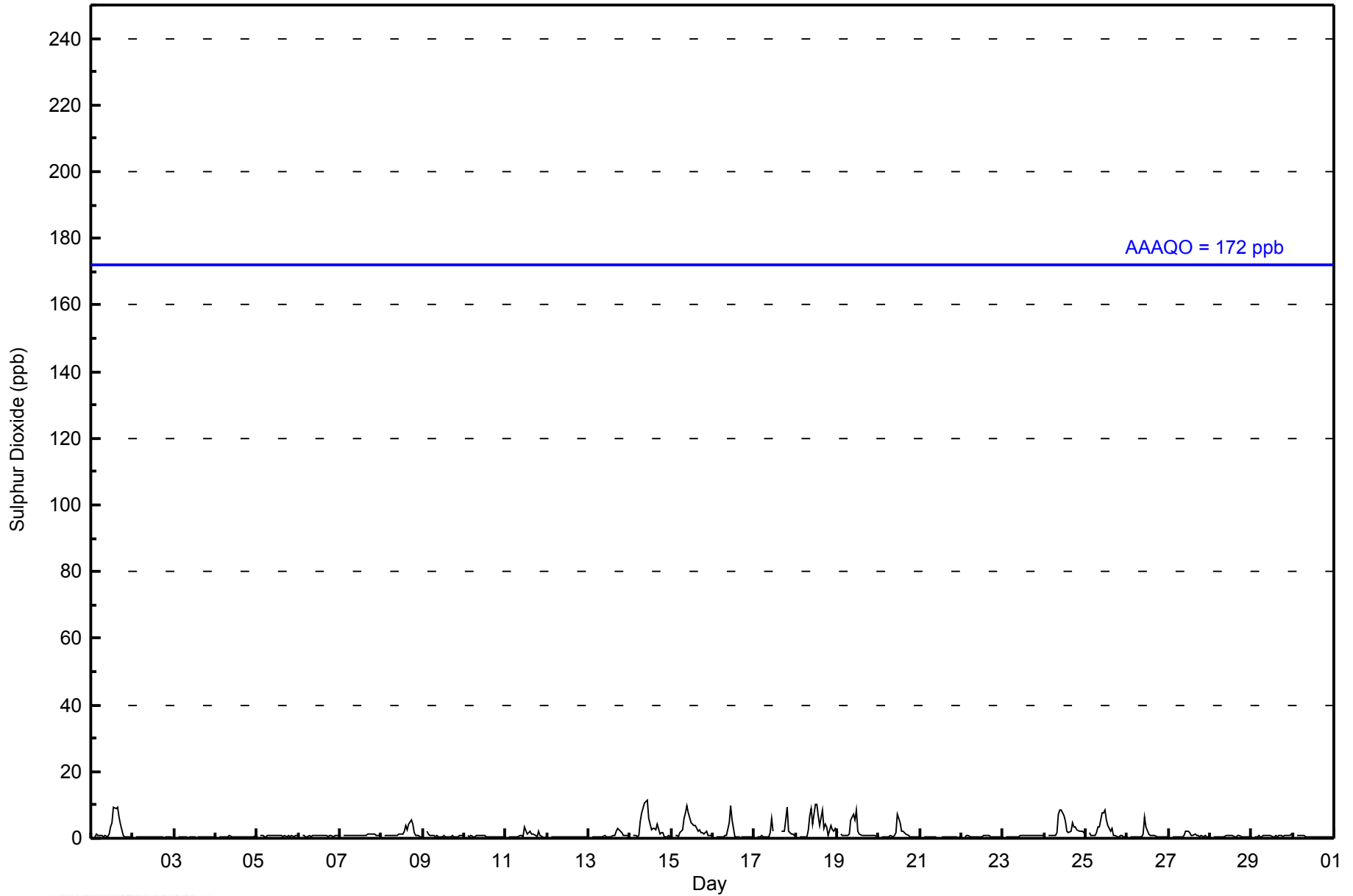
0.7	--	0.7	0.6	0.6	0.6	0.8	1.2	1.9	2.5	2.8	2.7	1.9	1.6	1.5	1.6	1.5	1.3	1.2	1.1	0.8	0.7	0.7	0.7	0.7	Diurnal Average
2	--	2	1	1	2	5	8	11	11	11	10	10	9	9	9	7	5	5	9	4	3	2	3	3	Diurnal Maximum

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
Fort McKay - Bertha Ganter - June 2014





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	683	99.56	99.56
11 - 20	3	0.44	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



WBEA
Frequency Distribution

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

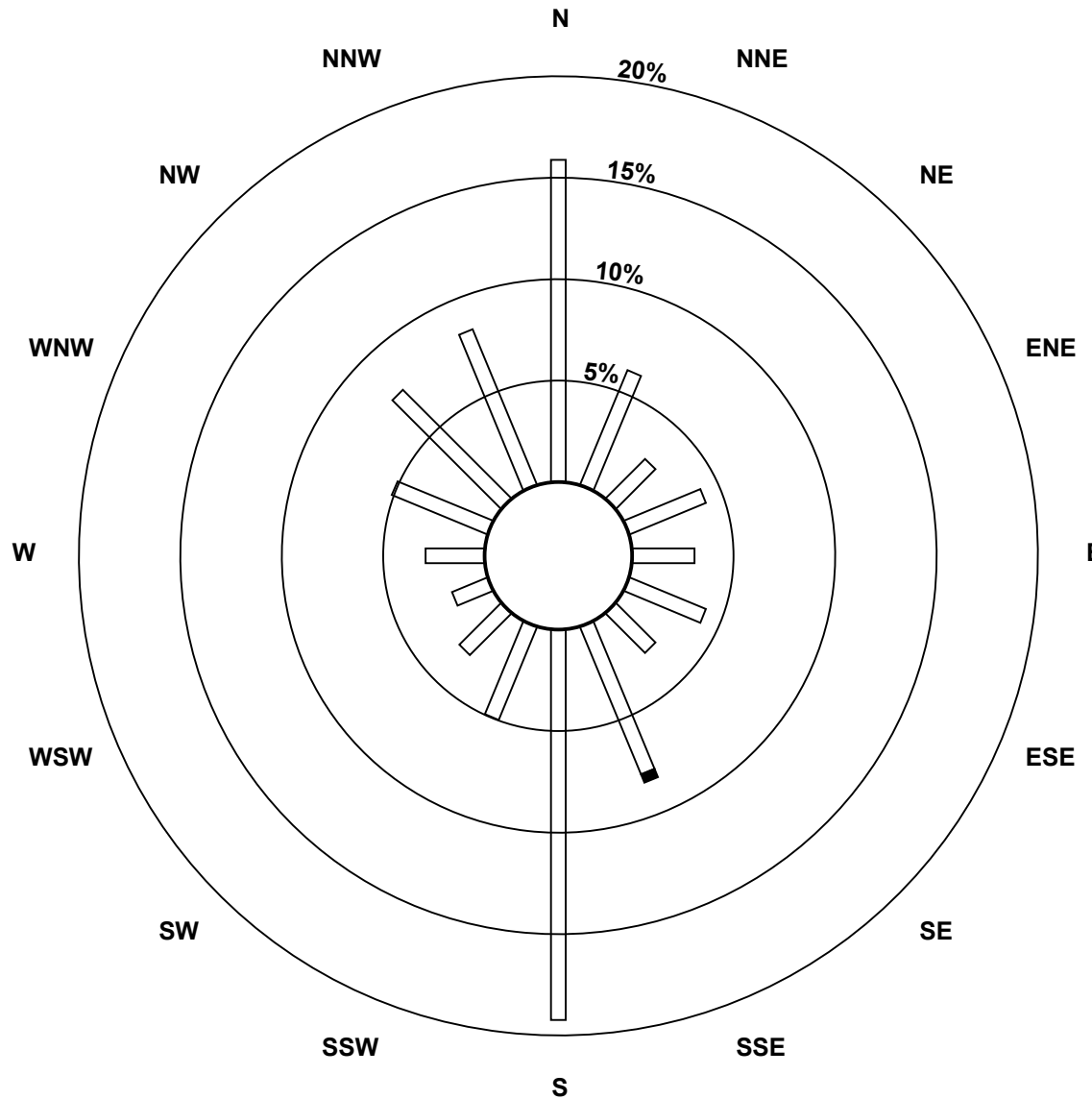
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	109	42	19	28	21	28	19	54	132	34	20	13	20	35	52	57	683
11 - 20	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	109	42	19	28	21	28	19	57	132	34	20	13	20	35	52	57	686

Total Number of Valid Hours: 686

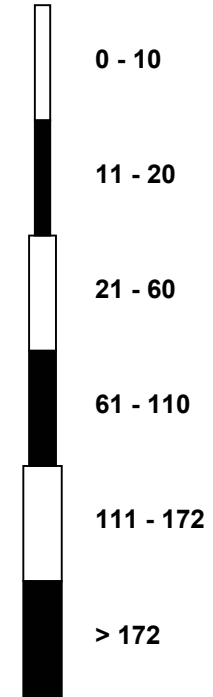
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

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



Classes (ppb)

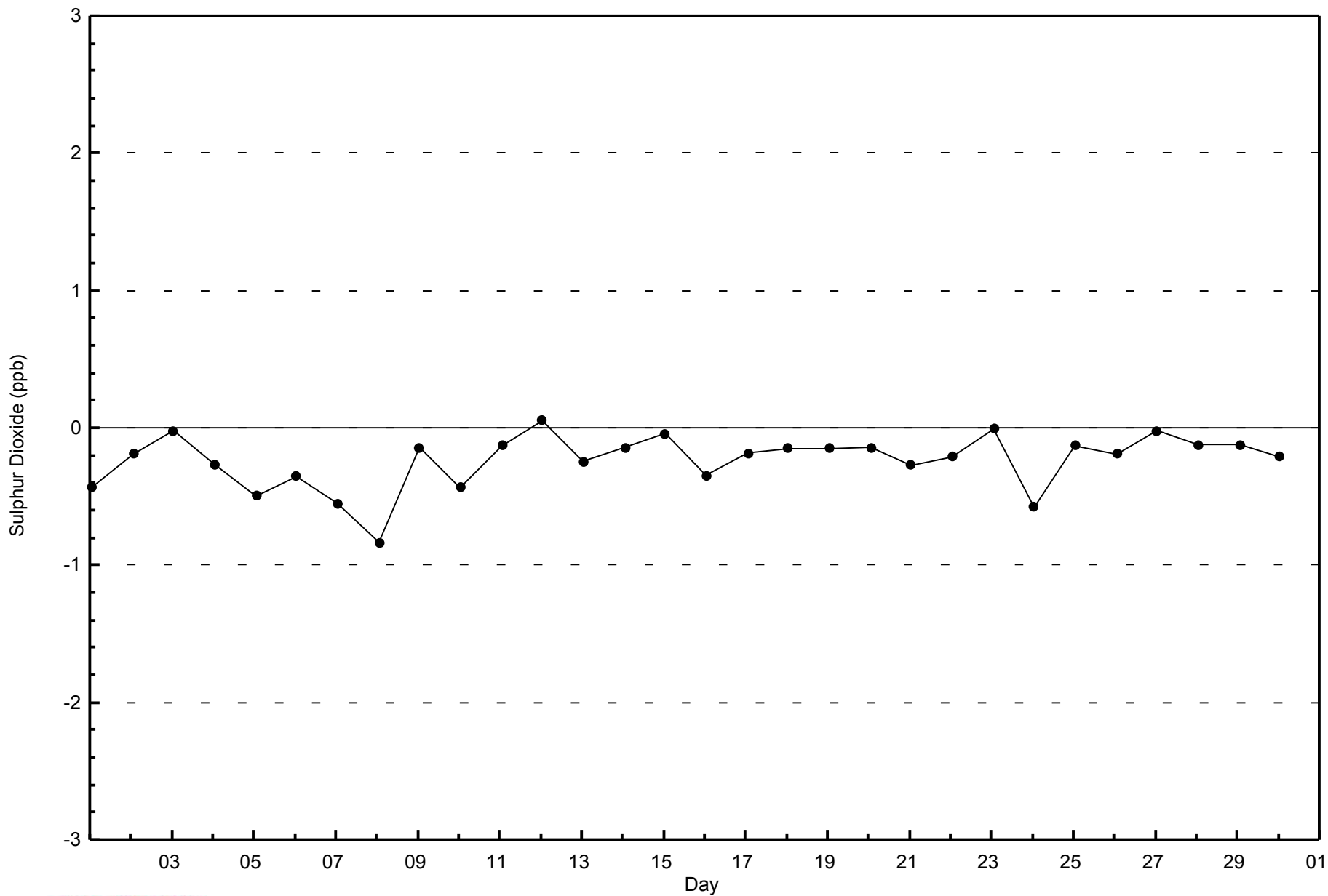


Total Number of Valid Hours: 686



WBEA
Zero Responses

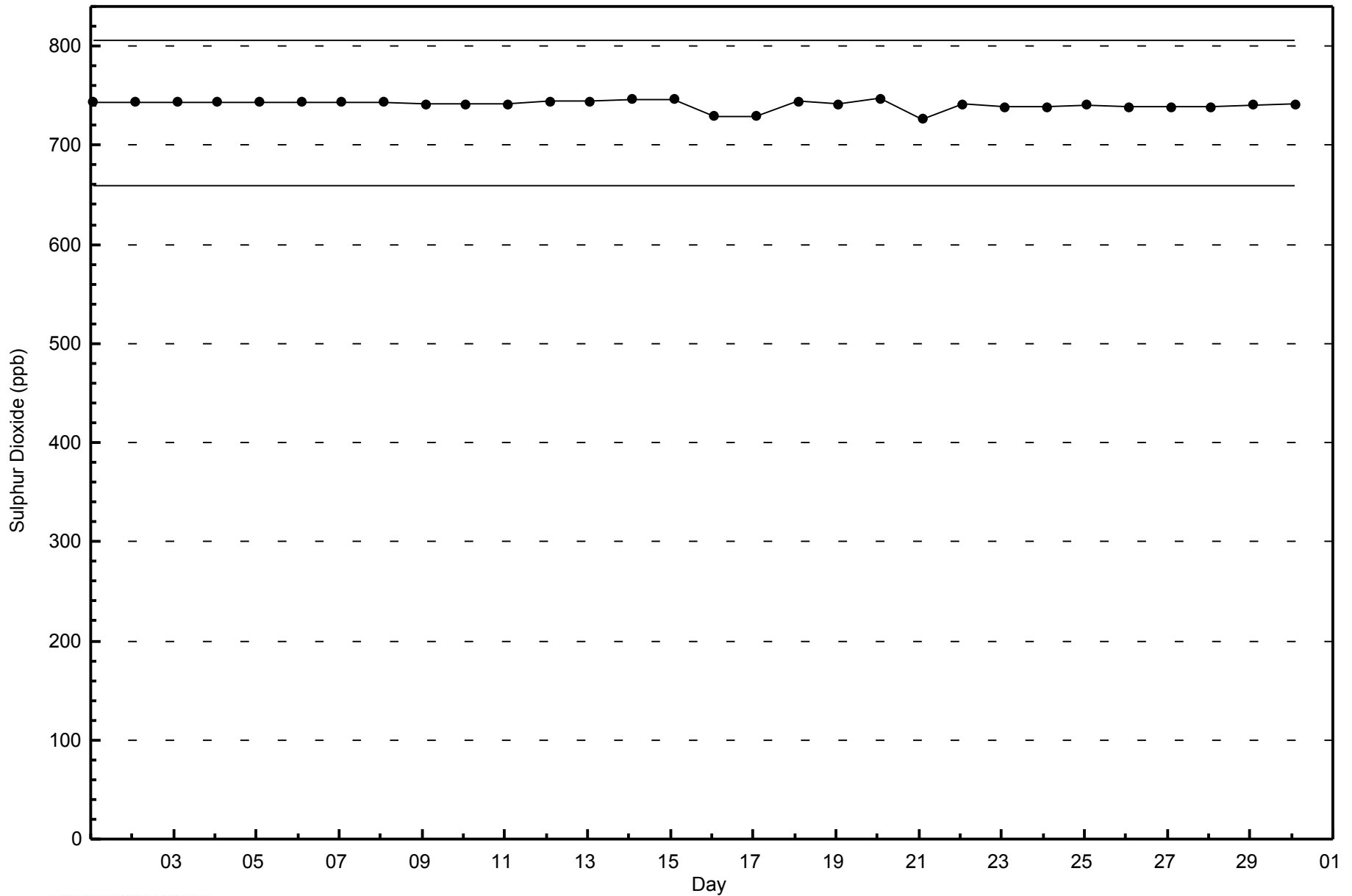
Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - June 2014





WBEA
Span Responses

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



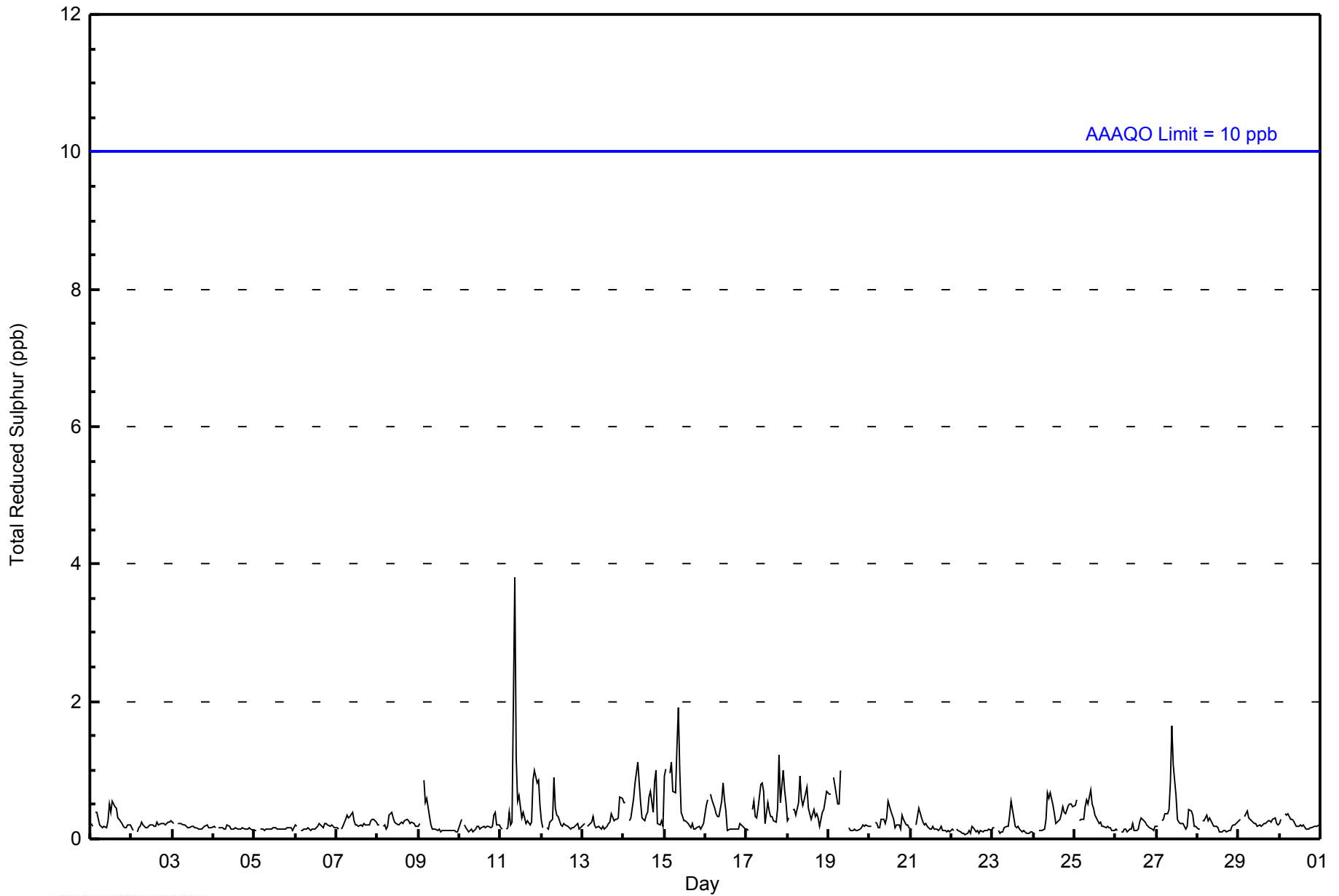


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																	Hours in Service: 720									
Maximum Value: 4 ppb on Jun 11 09:00																	Maximum Daily Average: 0.6 ppb on Jun 11									
Minimum Value: 0 ppb on Jun 22 09:00																	Minimum Daily Average: 0.1 ppb on Jun 22									
Maximum Diurnal Average: 0.5 ppb at hour 9																	Minimum Diurnal Average: 0.2 ppb at hour 18									
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 = 1									
																	Hours of Data: 686									
																	Hours of Missing Data: 34									
																	Hours of Calibration: 34									
																	Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	0	0	Z	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1
2-Jun	0	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-Jun	0	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-Jun	0	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-Jun	0	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
6-Jun	0	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-Jun	0	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-Jun	0	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-Jun	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
10-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Jun	0	0	Z	0	0	0	0	0	4	1	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0.6	4
12-Jun	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
13-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
14-Jun	1	1	Z	0	0	0	1	1	1	1	1	0	0	0	1	1	0	1	1	0	0	0	0	0	0.5	1
15-Jun	1	1	Z	1	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
16-Jun	0	1	Z	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
17-Jun	0	0	Z	0	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	1	1	1	1	1	0.5	1
18-Jun	0	0	Z	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0.5	1
19-Jun	1	1	Z	1	1	1	1	1	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
20-Jun	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
21-Jun	0	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-Jun	0	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-Jun	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
24-Jun	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	1
25-Jun	0	1	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
26-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
28-Jun	0	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-Jun	0	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-Jun	0	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
																								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
Fort McKay - Bertha Ganter - June 2014





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	685	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: 686

Total Number of Hours: 720



WBEA
Frequency Distribution

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

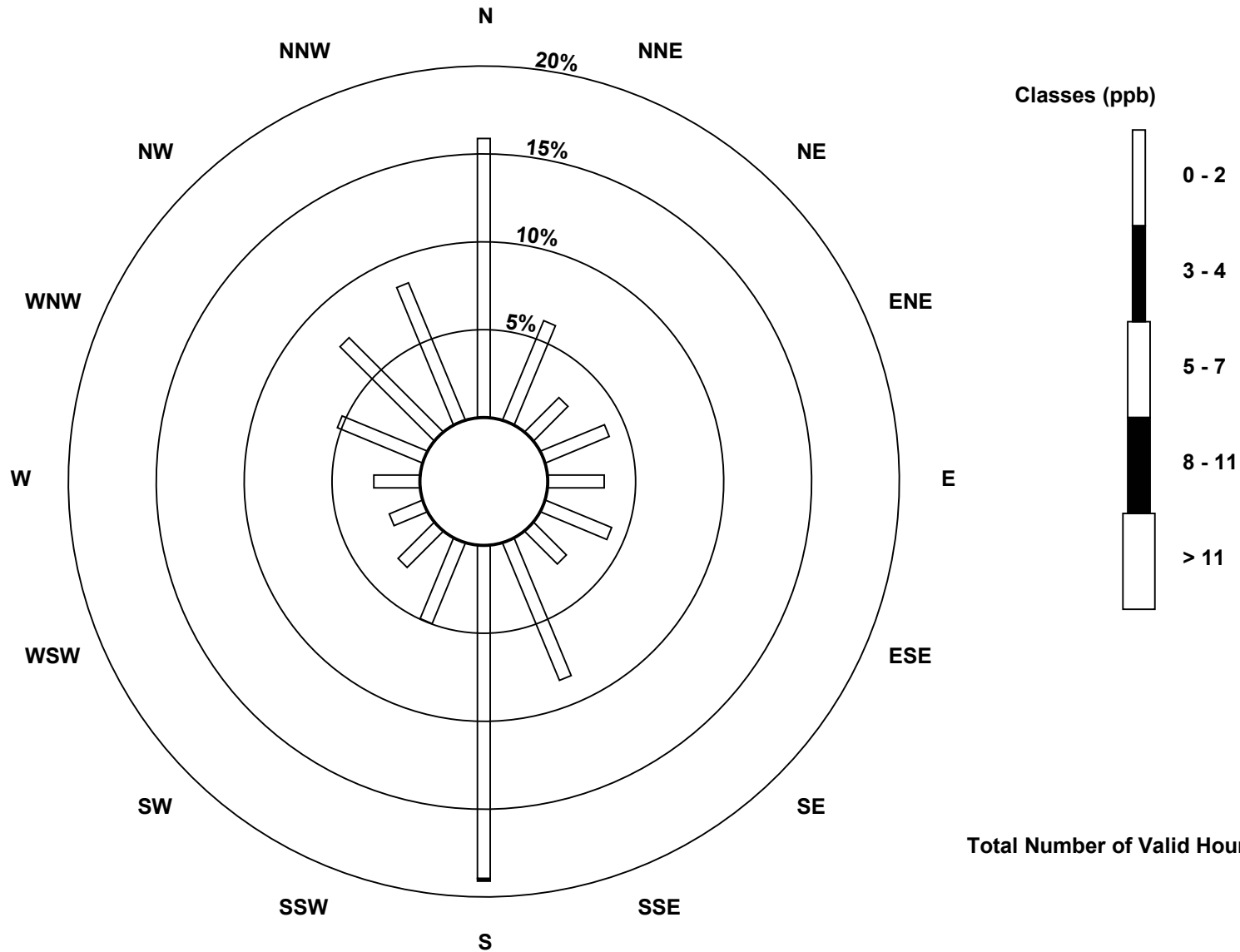
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	109	42	19	27	22	28	18	58	130	34	20	14	18	36	52	58	685
3 - 4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	109	42	19	27	22	28	18	58	131	34	20	14	18	36	52	58	686

Total Number of Valid Hours: 686

Total Number of Hours: 720

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

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

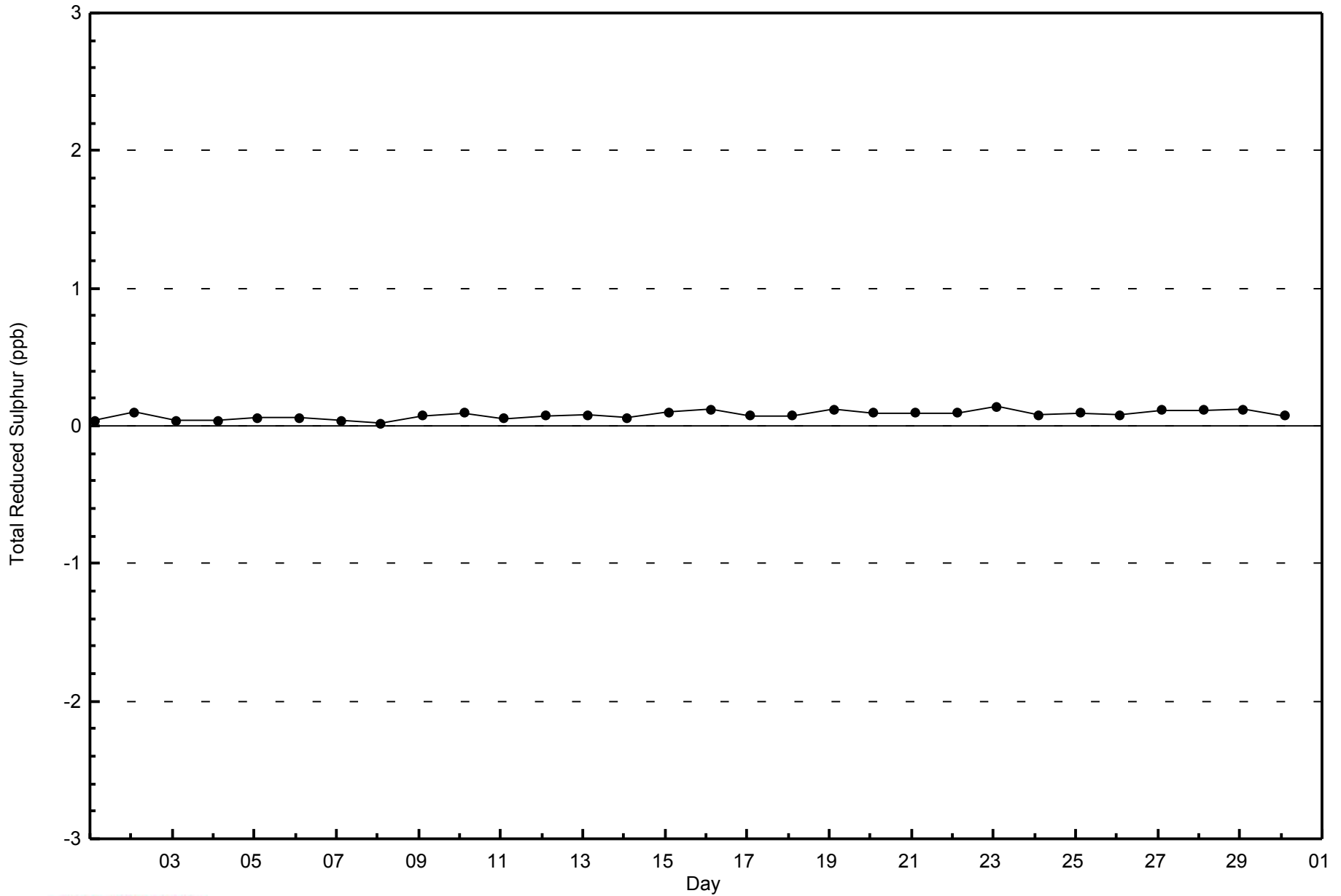


Total Number of Valid Hours: 686



WBEA
Zero Responses

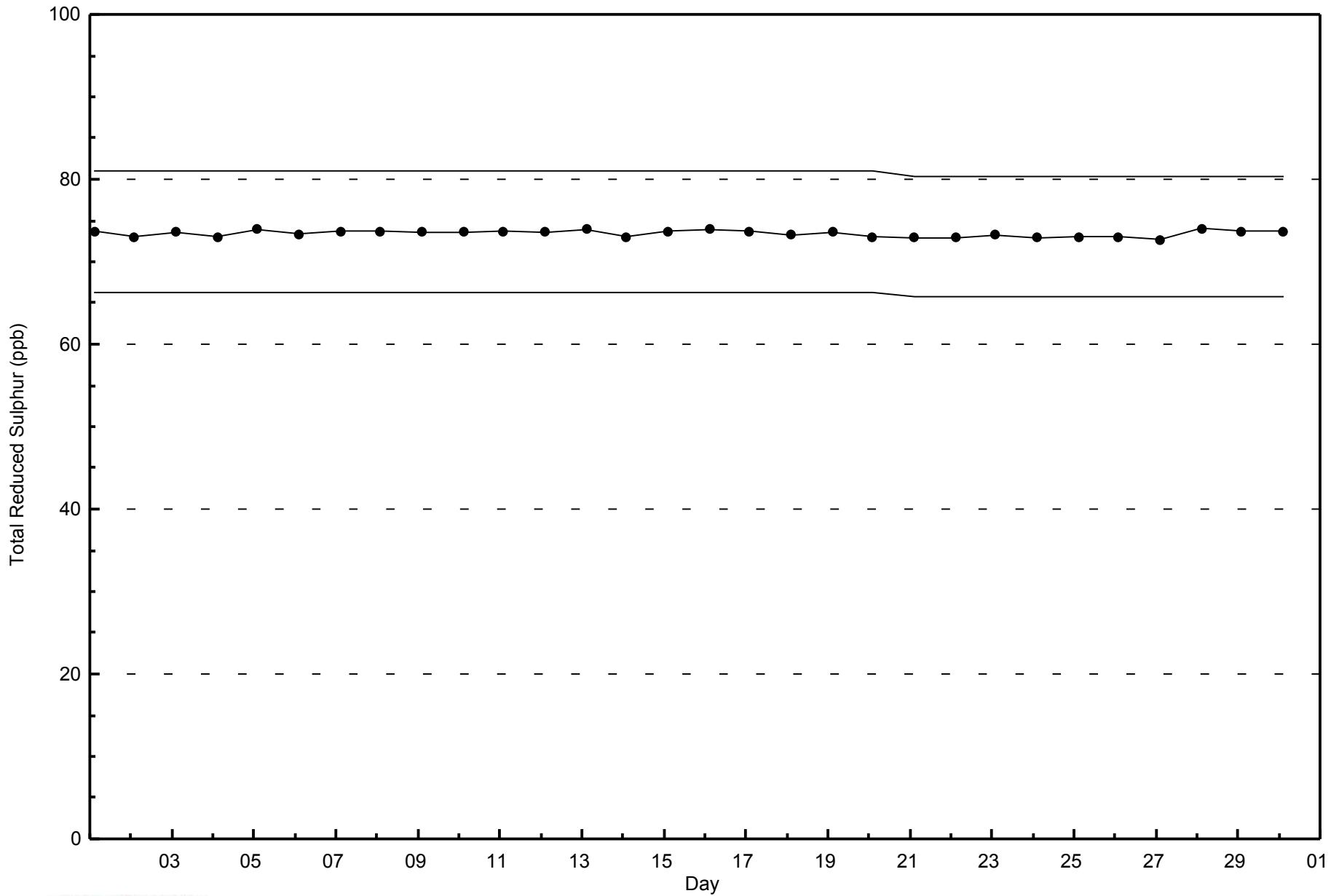
Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - June 2014





WBEA
Span Responses

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





Wood Buffalo Environmental Association
 Summary of Hour Averages

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

Maximum Value: 2.4 ppm on Jun 27 10:00	Maximum Daily Average: 2.0 ppm on Jun 27	Hours in Service: 720
Minimum Value: 1.8 ppm on Jun 2 14:00	Minimum Daily Average: 1.8 ppm on Jun 4	Hours of Data: 685
Maximum Diurnal Average: 1.9 ppm at hour 6	Minimum Diurnal Average: 1.8 ppm at hour 18	Hours of Missing Data: 35
Monthly Average: 1.84 ppm	Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.8 Median = 1.8 Q ₃ = 1.9 P ₉₀ = 1.9 P ₉₉ = 2.1	Hours of Calibration: 33
		Percent Operational Time: 99.7

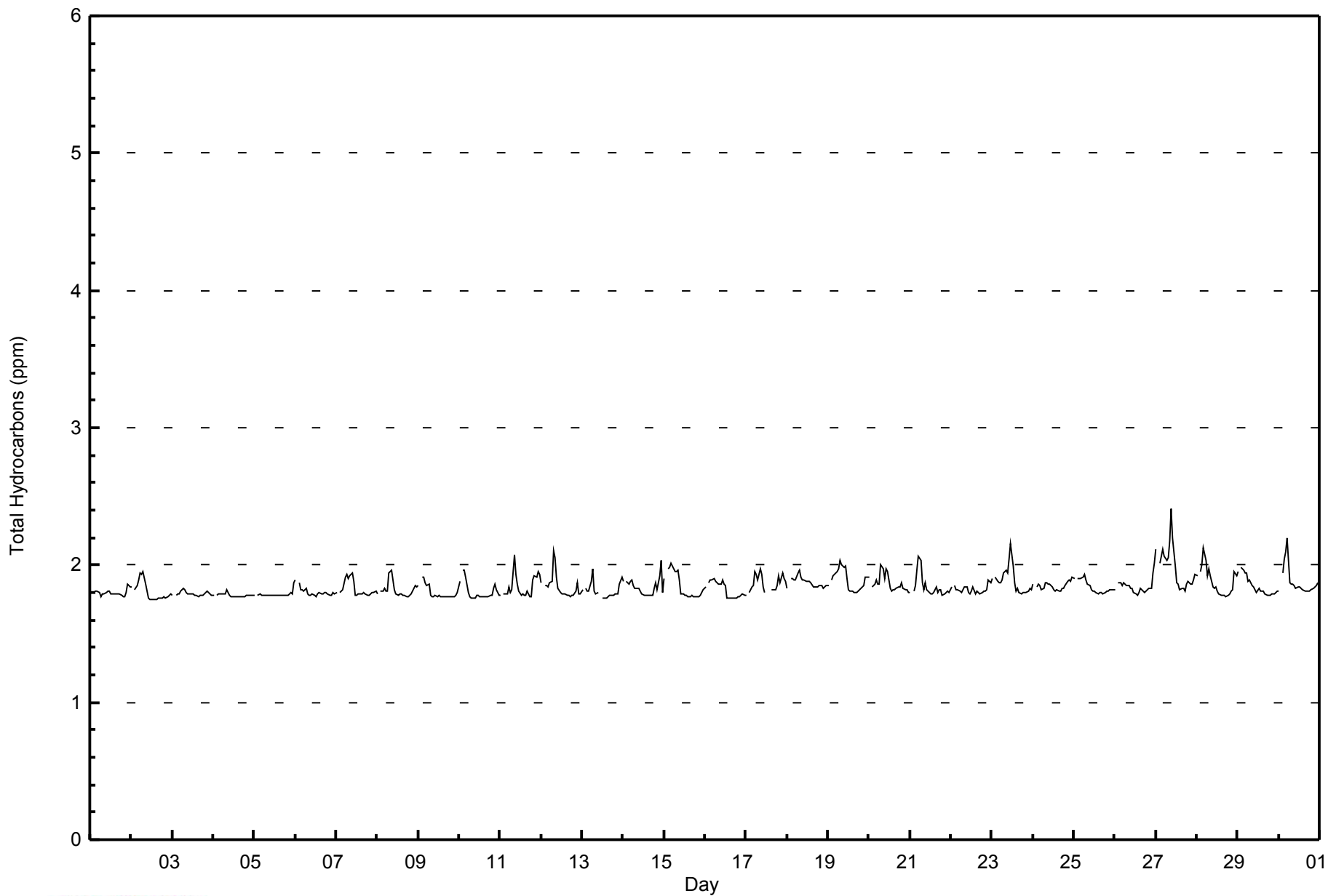
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																											
1-Jun	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8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

Z - zerspan C - Calibration M - Maintenance



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	669	97.66	97.66
2.1 - 3.0	16	2.34	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - June 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	109	41	19	25	19	28	19	57	131	33	19	13	19	34	49	54	669
2.1 - 3.0	0	1	0	1	2	0	0	0	2	1	1	0	1	1	3	3	16
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	109	42	19	26	21	28	19	57	133	34	20	13	20	35	52	57	685

Total Number of Valid Hours: 685

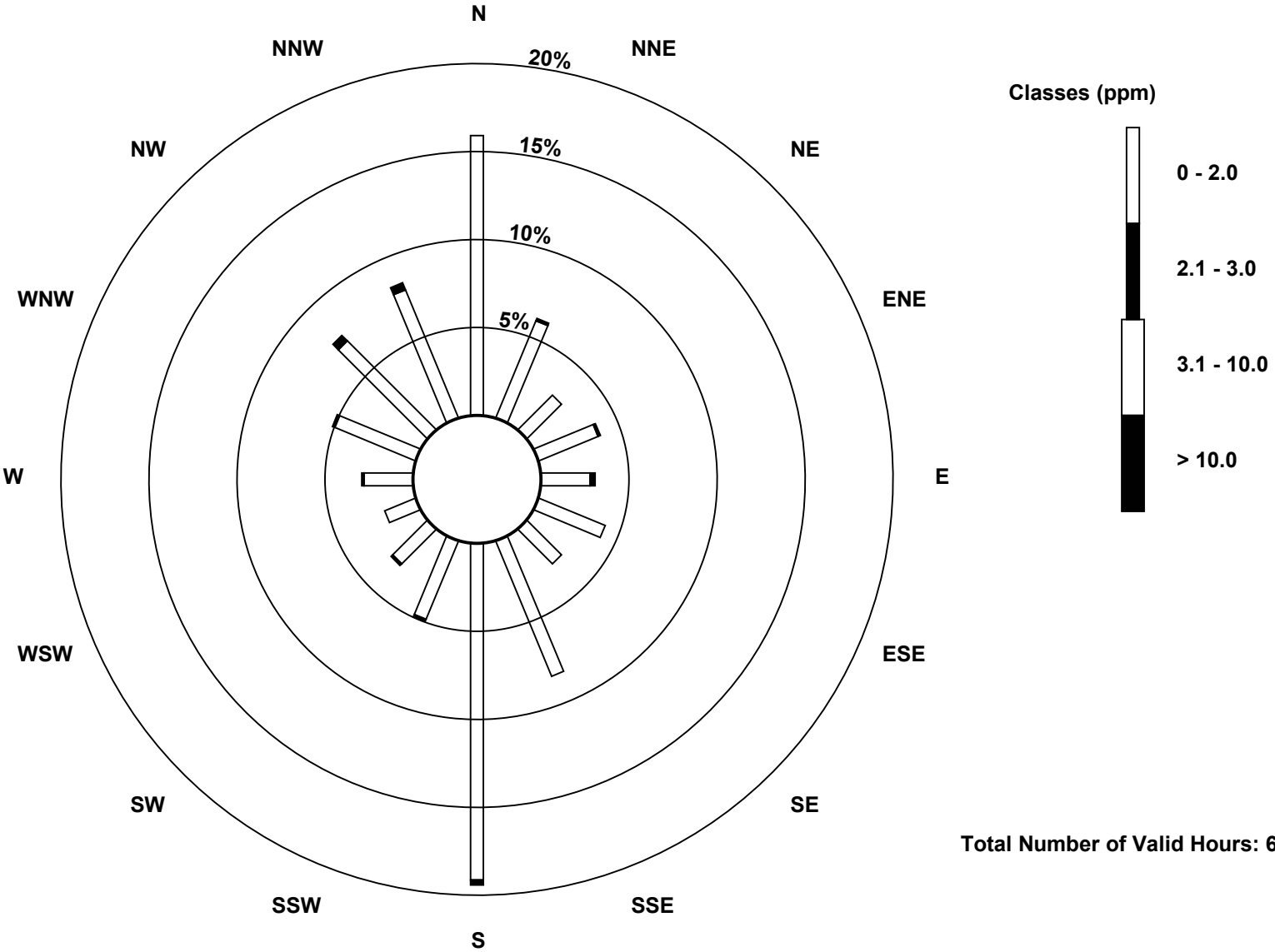
Total Number of Hours: 720

Wood Buffalo Environmental Association

Wind Rose Jun 2014

Total Hydrocarbons (THC) - ppm

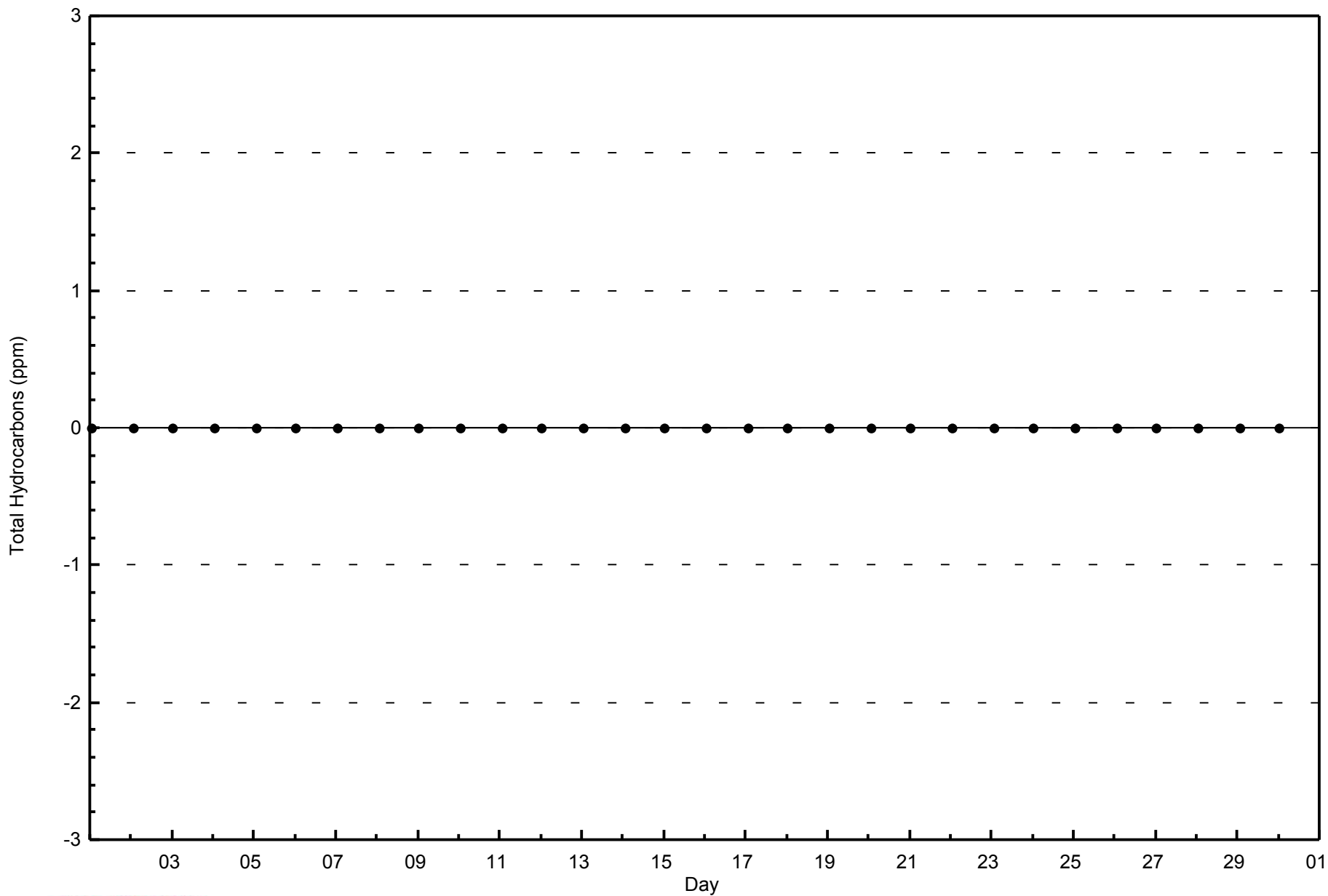
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

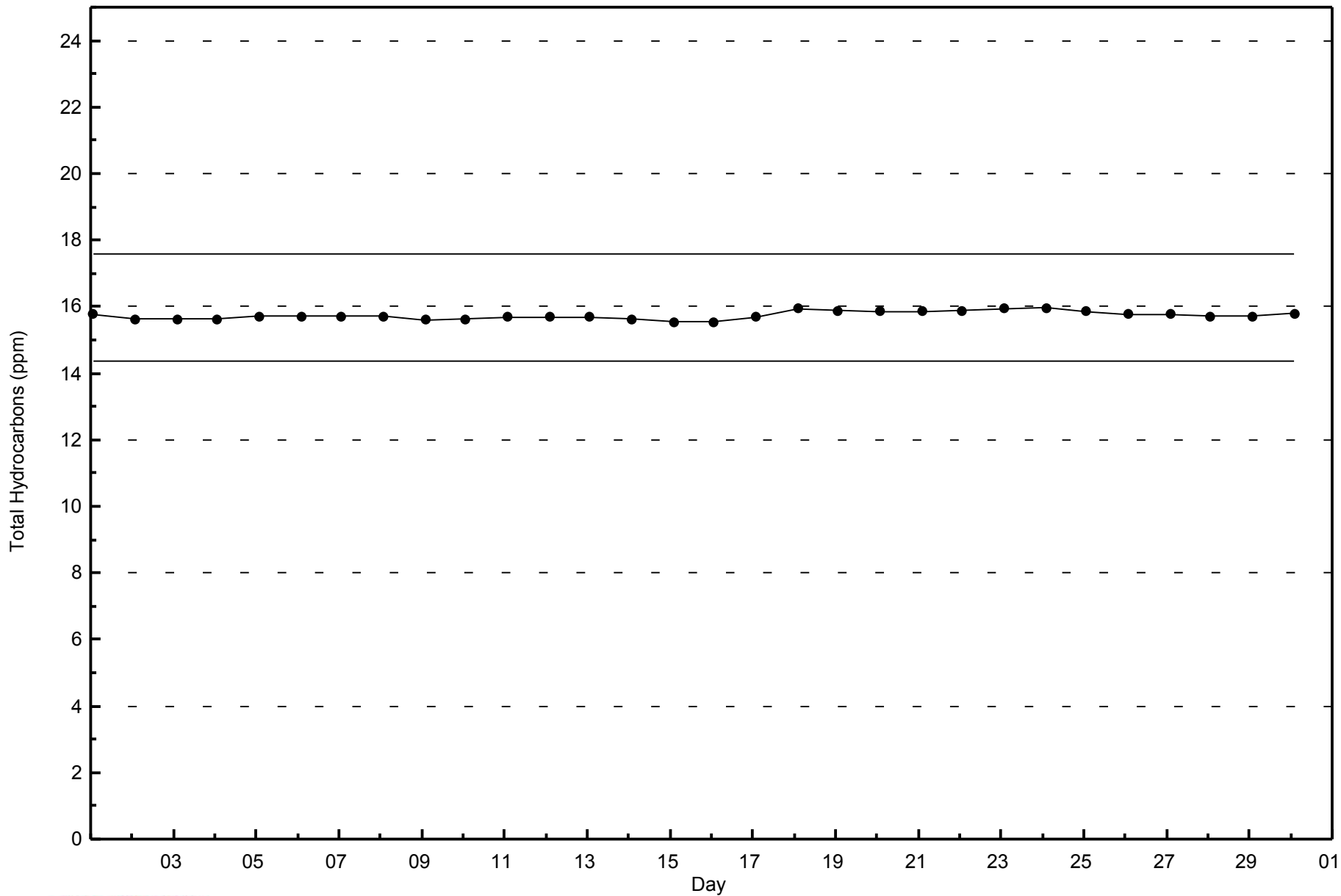
Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - June 2014





WBEA
Span Responses

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





Wood Buffalo Environmental Association
 Summary of Hour Averages

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

Maximum Value: 0.100 ppm on Jun 26 23:00 Minimum Value: 0.000 ppm on Jun 1 01:00 Maximum Diurnal Average: 0.006 ppm at hour 23 Monthly Average: 0.001 ppm	Maximum Daily Average: 0.005 ppm on Jun 26 Minimum Daily Average: 0.000 ppm on Jun 1 Minimum Diurnal Average: 0.000 ppm 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 = 0.0	Hours in Service: 720 Hours of Data: 685 Hours of Missing Data: 35 Hours of Calibration: 33 Percent Operational Time: 99.7
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Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
2-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
3-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
4-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
5-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
6-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
7-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
8-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
9-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
10-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
11-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
12-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
13-Jun	0.000	Z	0.000	0.000	0.000	0.005	0.041	0.000	0.000	0.000	M	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
14-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
16-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
17-Jun	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	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
18-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
19-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.012	0.002	0.034
20-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.018	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.021
21-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.043	0.001	0.002	0.043
23-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.003	0.003	0.000	0.020	0.056	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.056
24-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.007	0.005	0.100	
27-Jun	0.005	Z	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.015	0.037	0.000	0.015	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.037
28-Jun	0.000	Z	0.000	0.000	0.005	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.006	0.006
29-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30-Jun	0.000	Z	0.000	0.000	0.007	0.077	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.077	0.077

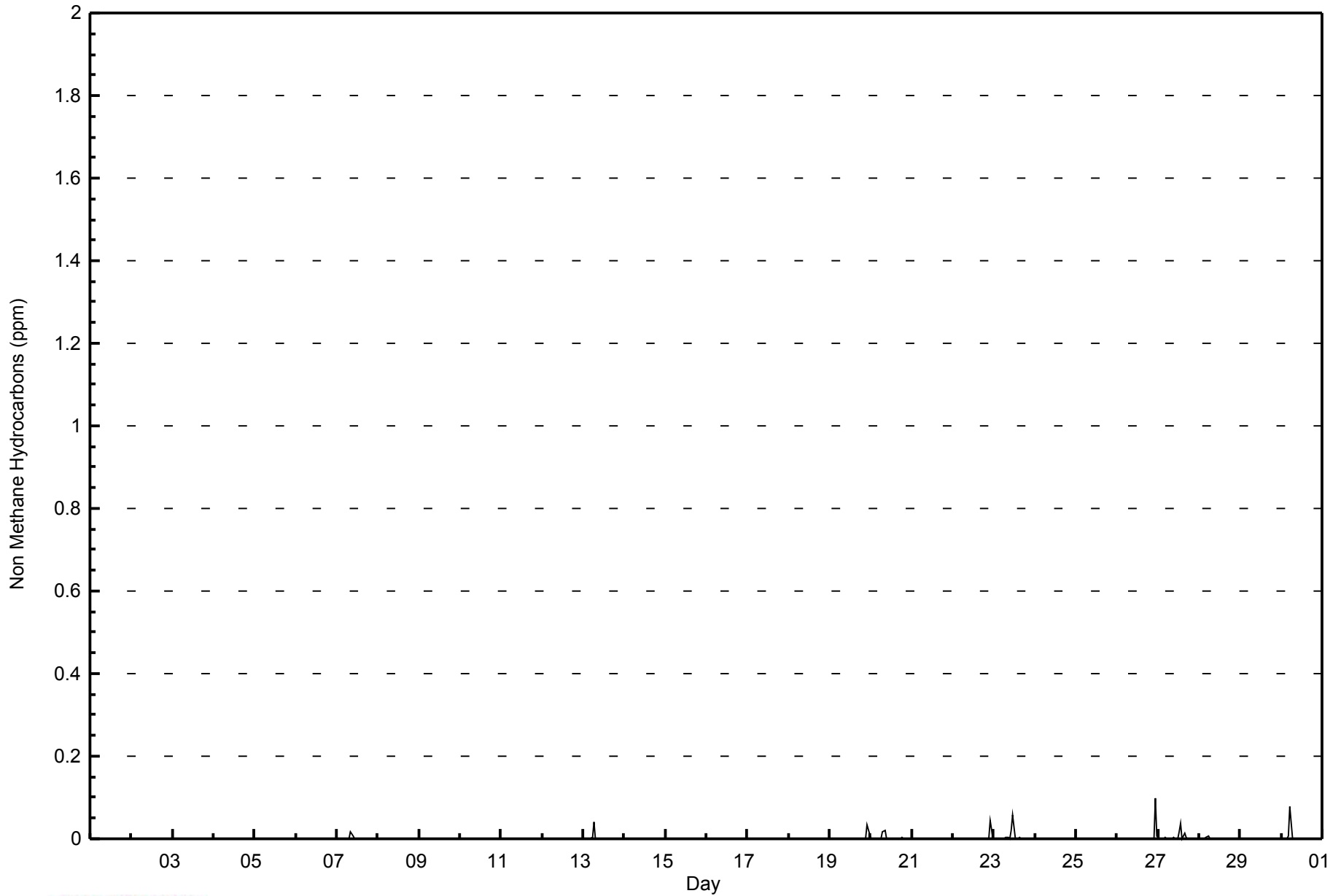
0.000	--	0.000	0.000	0.000	0.003	0.001	0.001	0.001	0.000	0.001	0.002	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.001	Diurnal Average	
0.005	--	0.000	0.000	0.007	0.077	0.041	0.018	0.021	0.005	0.020	0.056	0.015	0.037	0.000	0.015	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.012	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	668	97.52	97.52
0.006 - 0.05	14	2.04	99.56
0.06 - 0.1	3	0.44	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



WBEA
Frequency Distribution

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

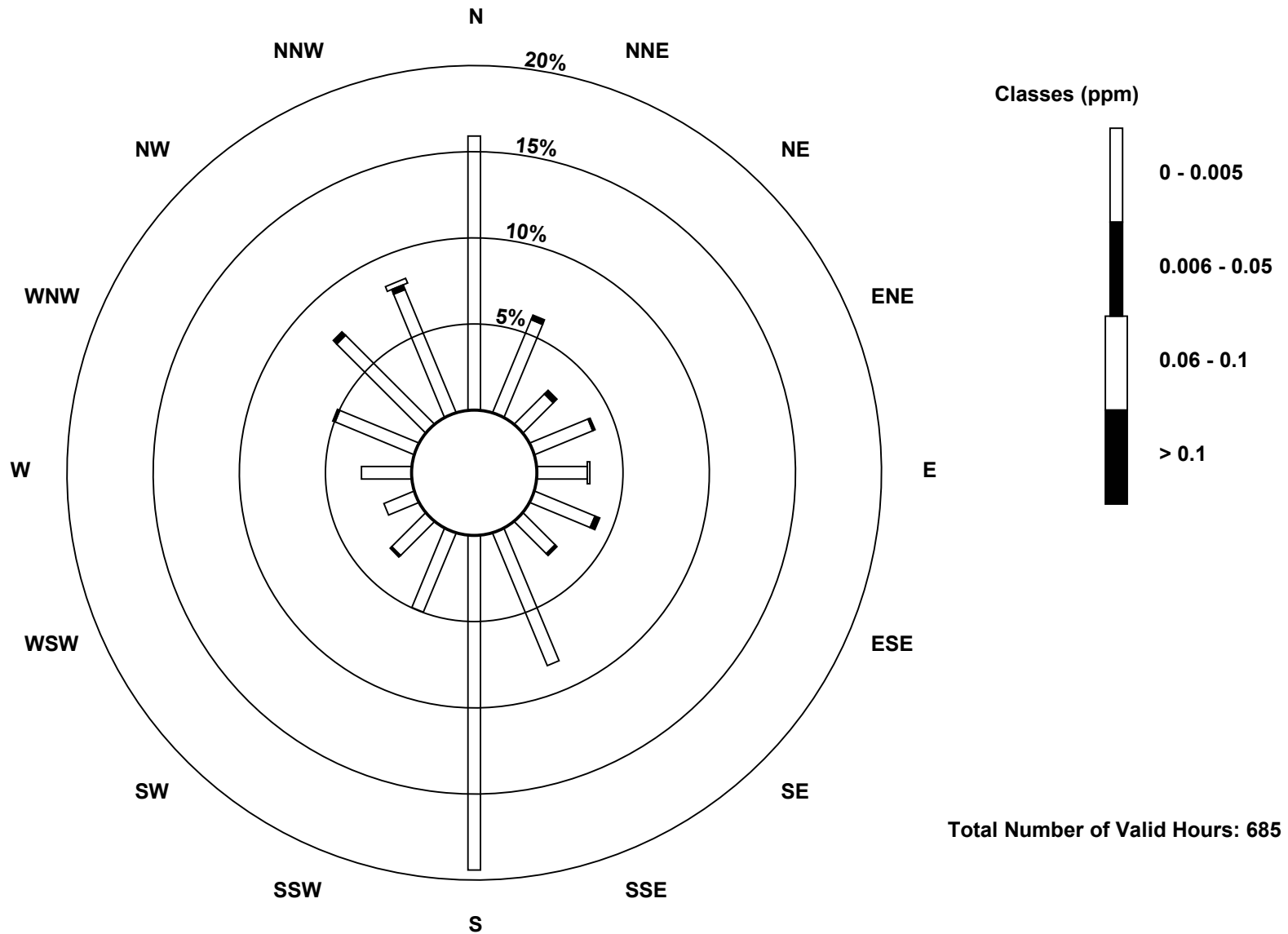
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	109	40	17	25	20	26	18	57	133	34	19	13	20	34	50	53	668
0.006 - 0.05	0	2	2	1	0	2	1	0	0	0	1	0	0	1	2	2	14
0.06 - 0.1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	3
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	109	42	19	26	21	28	19	57	133	34	20	13	20	35	52	57	685

Total Number of Valid Hours: 685

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

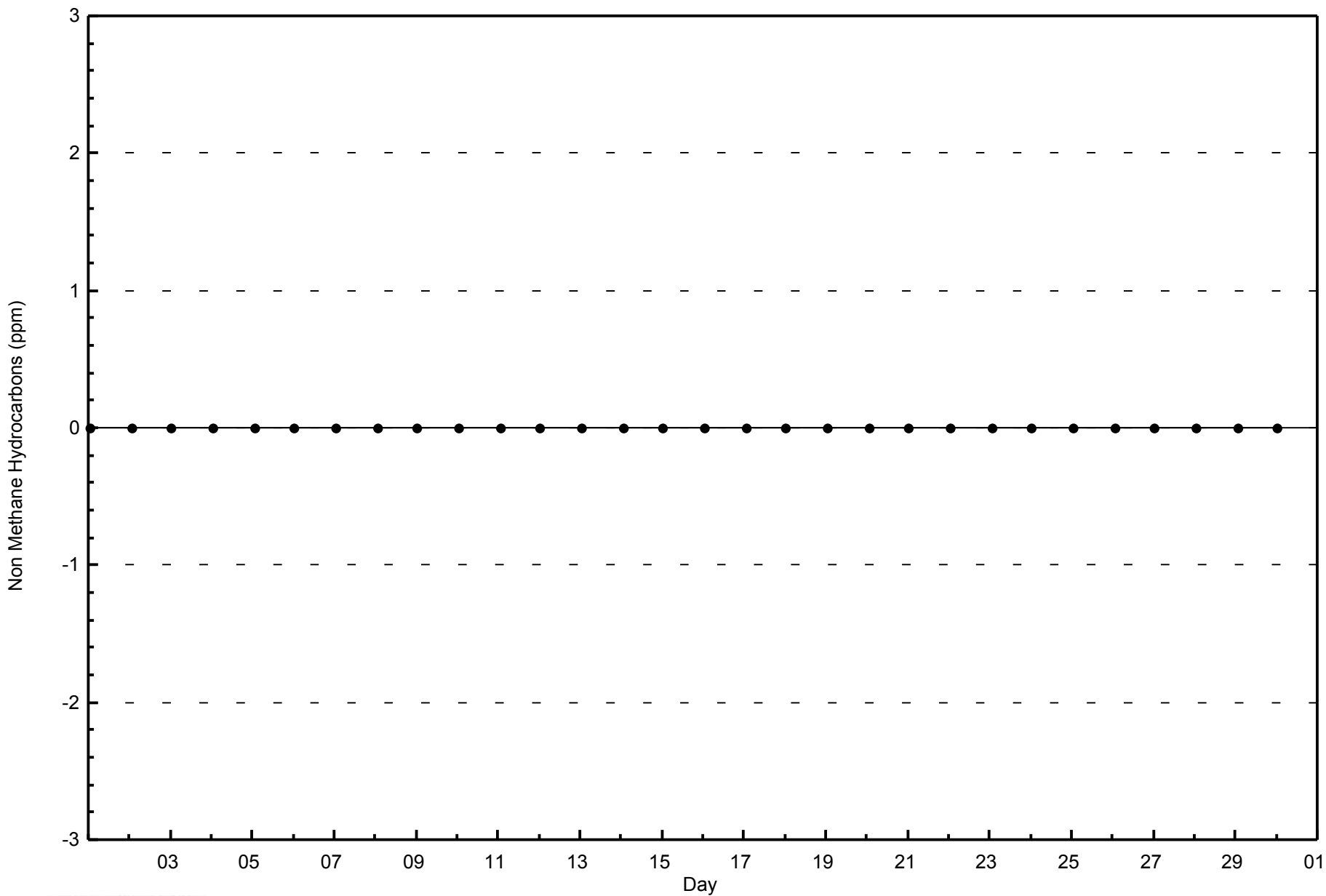
Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

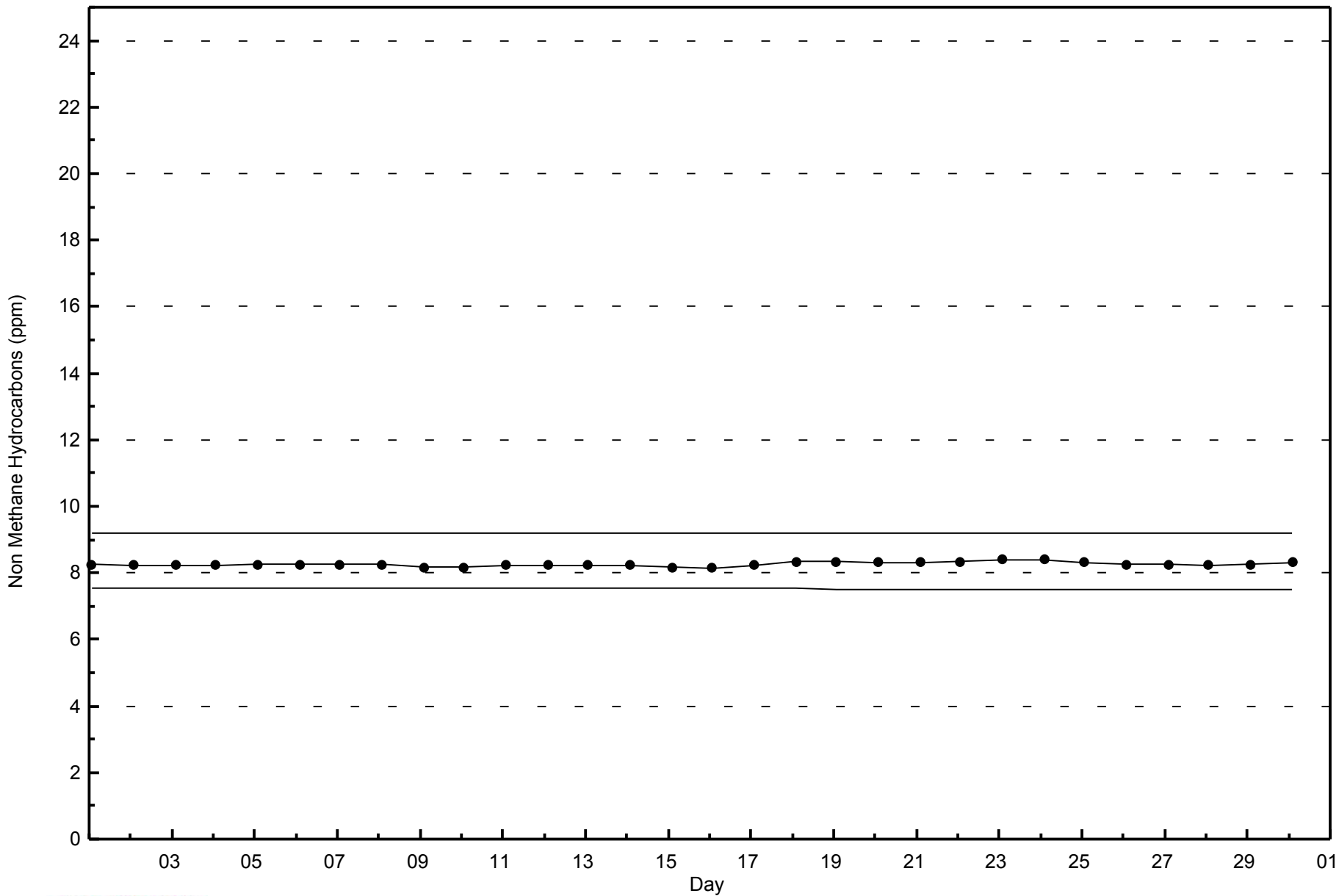
Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - June 2014





WBEA
Span Responses

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

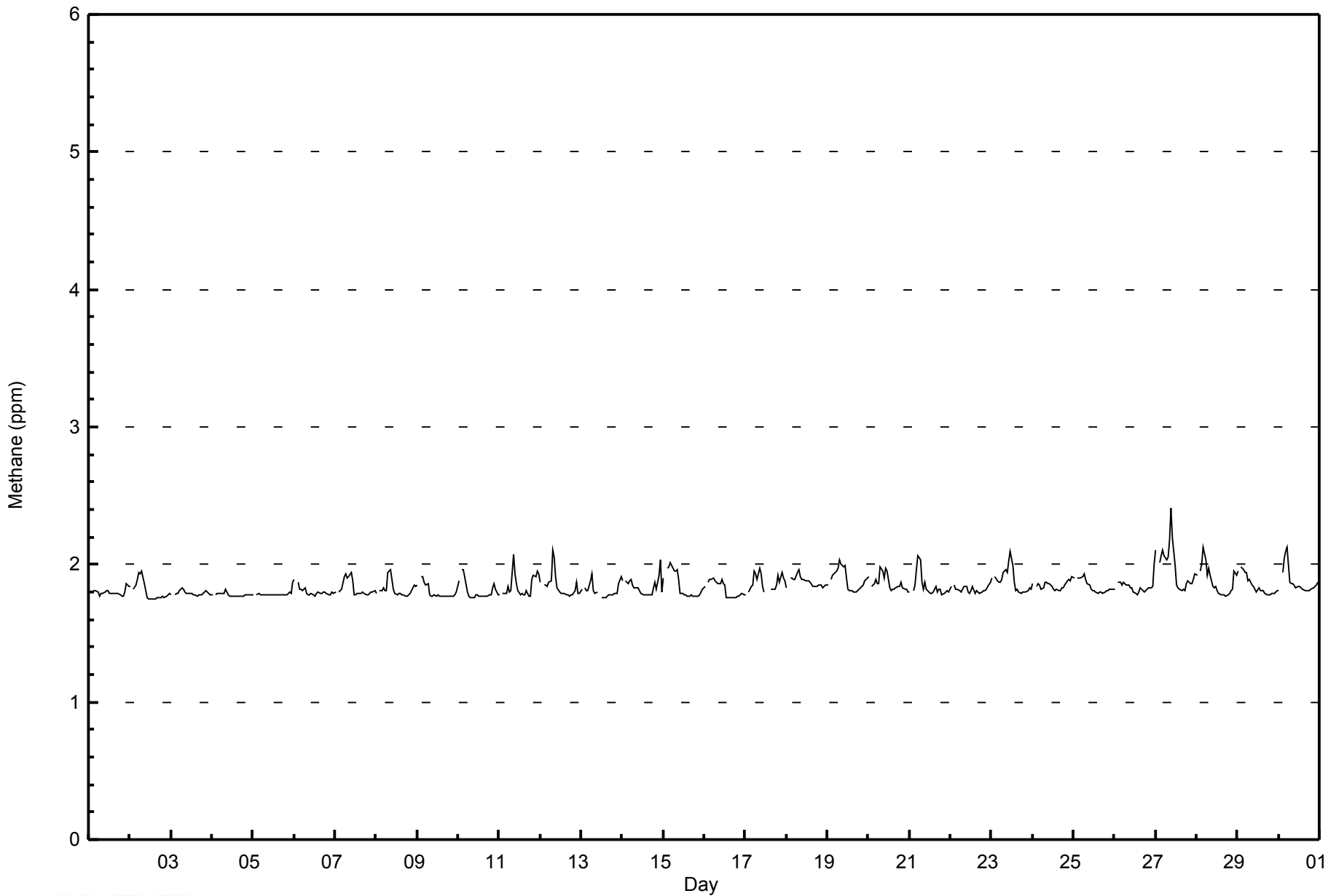
Fort McKay - Bertha Ganter - June 2014

Number of Exceedences (AAQO):		1-hr: 0		24-hr: 0		Hours in Service: 720																			Daily Average		Daily Maximum
Maximum Value: 2.4 ppm on Jun 27 10:00		Maximum Daily Average: 2.0 ppm on Jun 27		Hours of Data: 685																			Daily Average		Daily Maximum		
Minimum Value: 1.8 ppm on Jun 2 14:00		Minimum Daily Average: 1.8 ppm on Jun 4		Hours of Missing Data: 35																			Daily Average		Daily Maximum		
Maximum Diurnal Average: 1.9 ppm at hour 6		Minimum Diurnal Average: 1.8 ppm at hour 18		Hours of Calibration: 33																			Daily Average		Daily Maximum		
Monthly Average: 1.84 ppm		Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.8 Median = 1.8 Q ₃ = 1.9 P ₉₀ = 1.9 P ₉₉ = 2.1		Percent Operational Time: 99.7																			Daily Average		Daily Maximum		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jun	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.9		
2-Jun	1.8	Z	1.8	1.8	1.9	1.9	1.9	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	
3-Jun	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
4-Jun	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
5-Jun	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8
6-Jun	1.9	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	1.8	1.8	1.8	1.8	1.9
7-Jun	1.8	Z	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9
8-Jun	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.9	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	2.0	
9-Jun	1.8	Z	1.9	1.9	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	1.8	1.8	1.8	1.9	1.9
10-Jun	1.9	Z	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	2.0	
11-Jun	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	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	2.1	
12-Jun	1.9	Z	1.9	1.9	1.8	1.9	1.9	2.1	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	2.1	
13-Jun	1.8	Z	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	M	M	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
14-Jun	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	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	2.0	1.8	2.0	
15-Jun	1.9	Z	2.0	2.0	2.0	2.0	1.9	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0
16-Jun	1.8	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9
17-Jun	1.8	Z	1.8	1.8	1.8	2.0	1.9	1.9	2.0	1.9	1.8	1.8	C	C	C	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0	
18-Jun	1.8	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	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	2.0	
19-Jun	1.9	Z	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	
20-Jun	1.9	Z	1.8	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	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	2.0	
21-Jun	1.8	Z	1.8	1.8	2.0	2.1	2.0	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	
22-Jun	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	1.8	1.8	1.9	1.9	
23-Jun	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.1	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.1	
24-Jun	1.9	Z	1.8	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	
25-Jun	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	
26-Jun	1.8	Z	1.9	1.9	1.9	1.9	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	2.0	2.0	2.0	
27-Jun	2.1	Z	2.0	2.1	2.1	2.1	2.0	2.1	2.2	2.4	2.2	2.0	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	2.4	
28-Jun	1.9	Z	2.0	2.0	2.1	2.0	1.9	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	1.9	1.9	2.1	
29-Jun	2.0	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	
30-Jun	1.8	Z	1.9	2.0	2.1	2.1	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.1	
		1.9	--	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	Diurnal Average
		2.1	--	2.0	2.1	2.1	2.1	2.0	2.1	2.2	2.4	2.2	2.1	2.0	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	2.0	2.0	Diurnal Maximum
Z - zerspan		C - Calibration					M - Maintenance																				



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	669	97.66	97.66
2.1 - 3.0	16	2.34	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



WBEA
Frequency Distribution

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

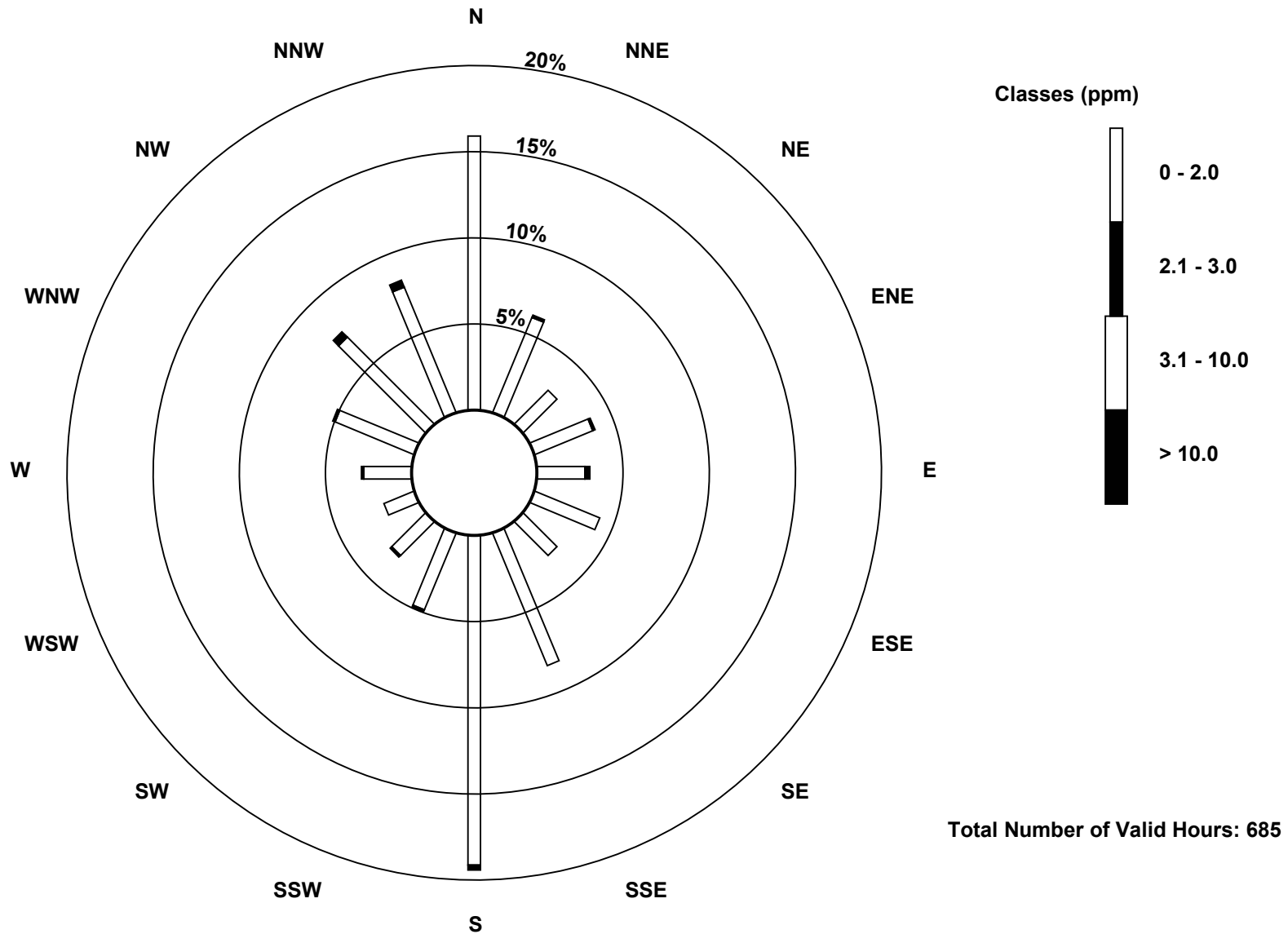
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	109	41	19	25	19	28	19	57	131	33	19	13	19	34	49	54	669
2.1 - 3.0	0	1	0	1	2	0	0	0	2	1	1	0	1	1	3	3	16
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	109	42	19	26	21	28	19	57	133	34	20	13	20	35	52	57	685

Total Number of Valid Hours: 685

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

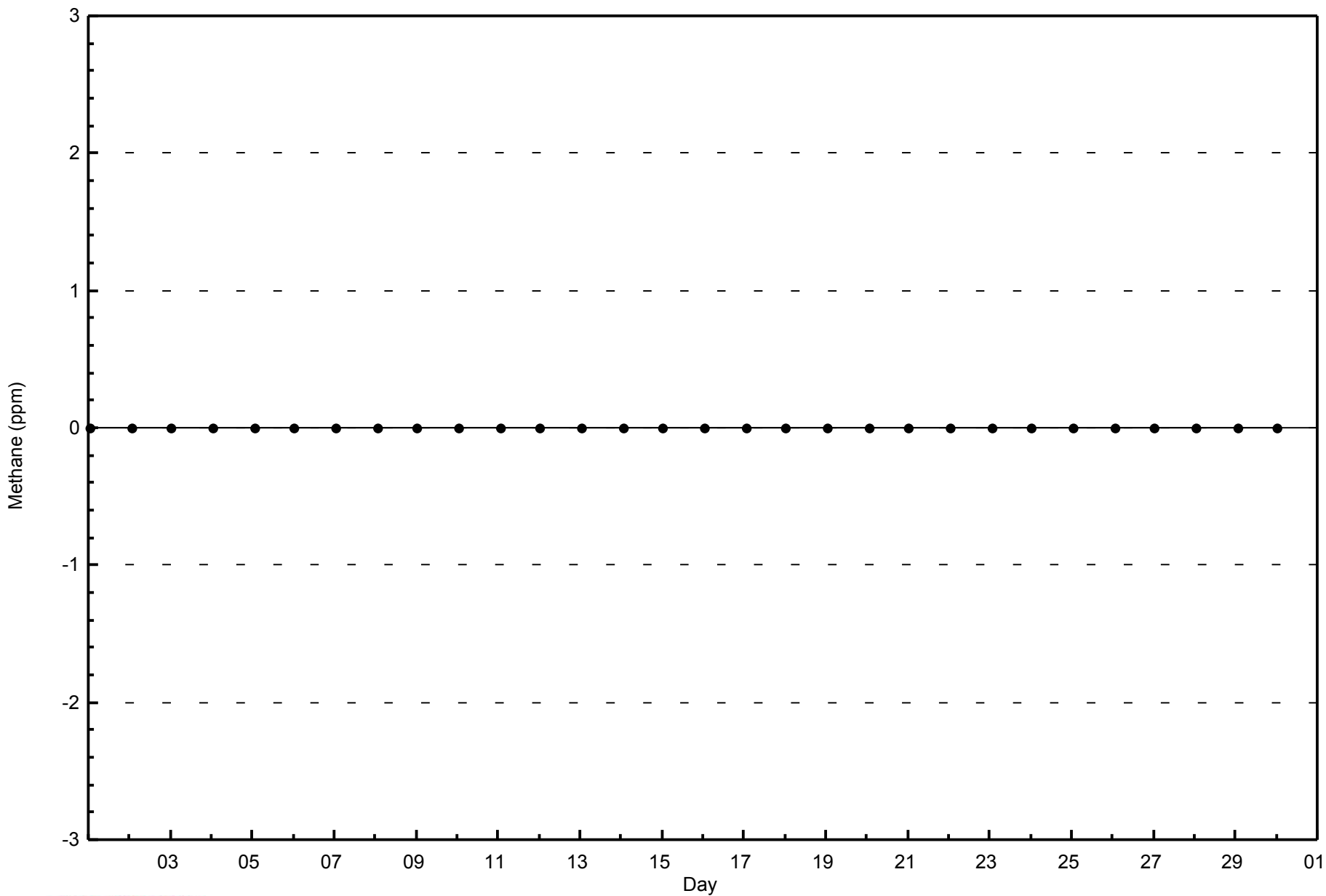
Methane (CH₄) - ppm
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

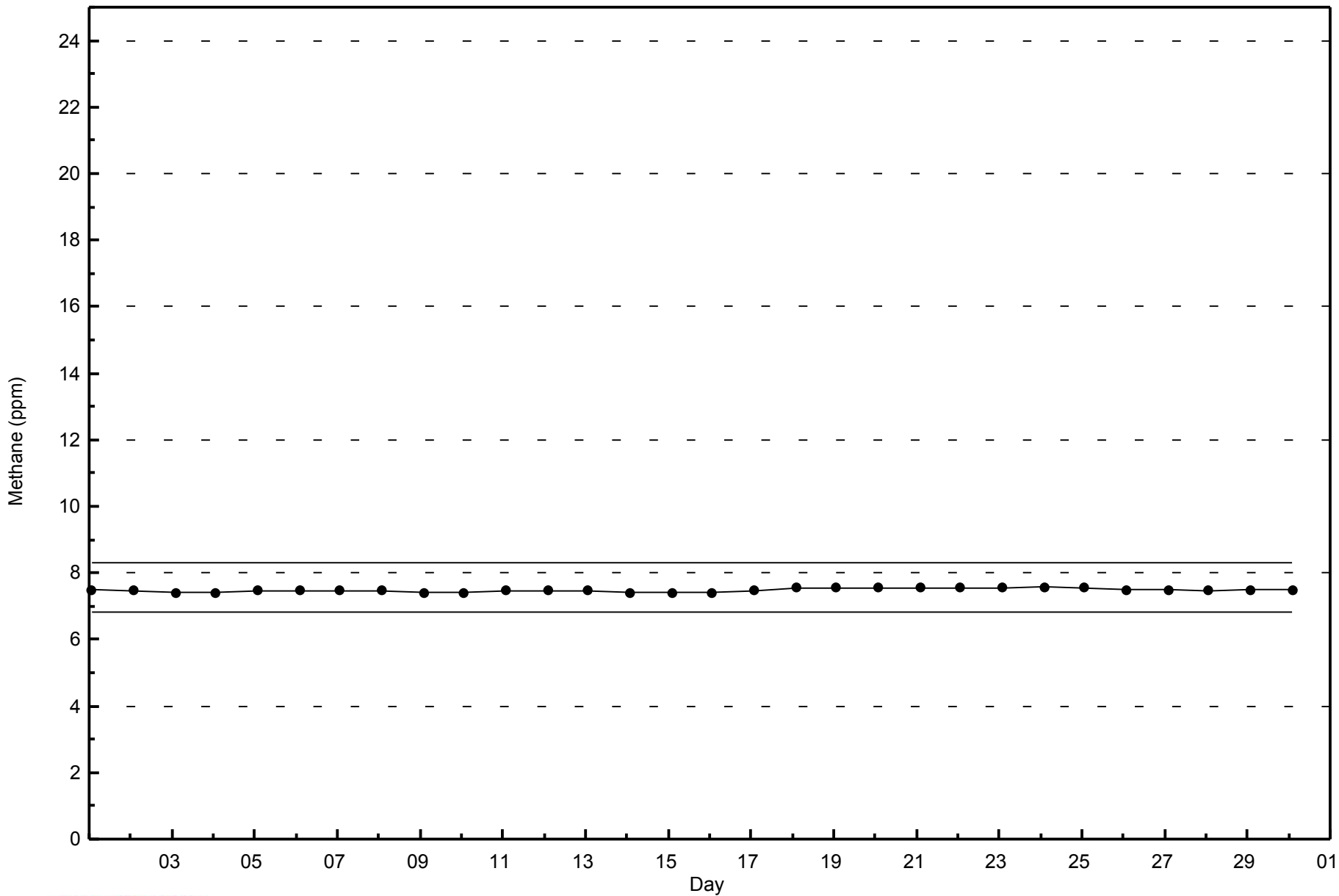
Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - June 2014





WBEA
Span Responses

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



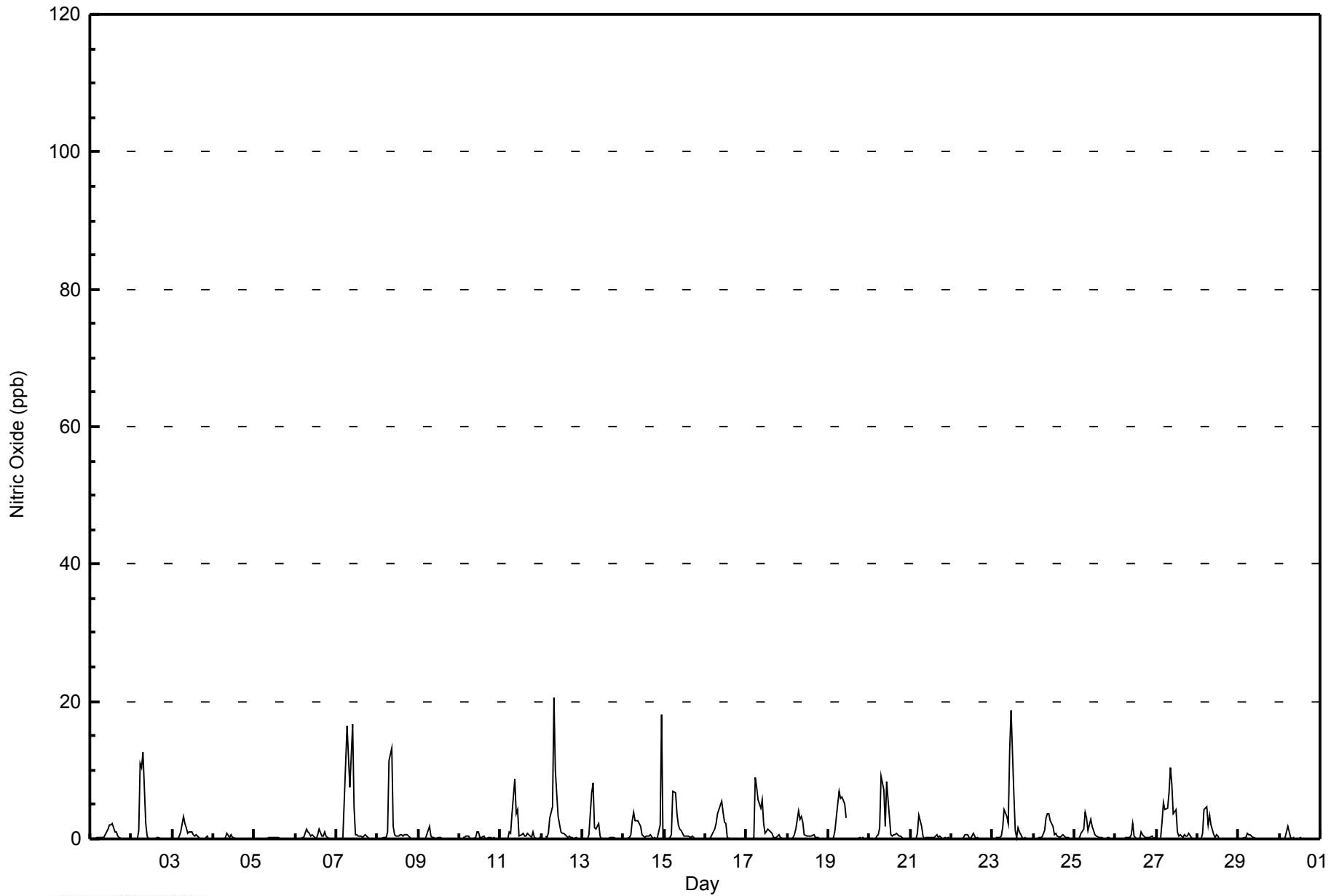


Maximum Value: 20 ppb on Jun 12 08:00														Maximum Daily Average: 3.1 ppb on Jun 7														Hours in Service: 720	
Minimum Value: 0 ppb on Jun 1 20:00														Minimum Daily Average: 0.1 ppb on Jun 5														Hours of Data: 685	
Maximum Diurnal Average: 4.0 ppb at hour 8														Minimum Diurnal Average: 0.0 ppb at hour 24														Hours of Missing Data: 35	
Monthly Average: 1.0 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 13														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-Jun	0	Z	0	0	0	0	0	0	0	1	1	2	2	2	1	1	1	0	0	0	0	0	0	0	0.5	2			
2-Jun	0	Z	0	0	1	11	10	13	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	13			
3-Jun	0	Z	0	0	0	1	3	2	2	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.6	3			
4-Jun	0	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1			
5-Jun	0	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-Jun	0	Z	0	0	0	0	1	1	1	0	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0.4	1			
7-Jun	0	Z	0	0	0	11	17	12	8	17	5	1	1	0	0	0	0	1	0	0	0	0	0	0	3.1	17			
8-Jun	0	Z	0	0	0	0	1	11	13	2	1	0	0	1	1	0	1	1	0	0	0	0	0	0	1.4	13			
9-Jun	0	Z	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2			
10-Jun	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
11-Jun	0	Z	0	0	0	1	1	4	9	4	4	0	1	1	0	0	1	0	0	1	0	0	0	0	1.2	9			
12-Jun	0	Z	0	0	1	3	5	20	10	7	3	1	1	1	1	0	0	0	0	0	0	0	0	0	2.3	20			
13-Jun	0	Z	0	0	1	7	8	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	8			
14-Jun	0	Z	0	0	1	3	4	3	3	2	2	1	0	0	0	0	1	0	0	0	0	2	18	0	1.7	18			
15-Jun	0	Z	0	0	1	7	7	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	7			
16-Jun	0	Z	0	0	1	1	2	4	4	5	4	2	2	0	0	0	0	0	0	0	0	0	0	0	1.2	5			
17-Jun	0	Z	0	0	0	9	8	6	4	6	2	1	2	1	1	1	0	0	0	1	0	0	0	0	1.8	9			
18-Jun	0	Z	0	0	1	1	4	3	3	2	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0.8	4			
19-Jun	0	Z	0	0	1	5	7	6	6	5	3	C	C	C	C	C	0	0	0	0	0	0	0	0	1.9	7			
20-Jun	0	Z	0	0	0	1	2	9	7	2	8	6	1	0	1	1	1	0	0	0	0	0	0	0	1.7	9			
21-Jun	0	Z	0	0	1	3	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	3			
22-Jun	0	Z	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1			
23-Jun	0	Z	0	0	0	0	2	4	3	2	13	19	7	1	0	2	1	0	0	0	0	0	0	0	2.4	19			
24-Jun	0	Z	0	0	0	0	1	3	4	4	3	2	1	1	0	0	0	1	0	0	0	0	0	0	0.9	4			
25-Jun	0	Z	0	0	1	1	4	3	1	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.8	4			
26-Jun	0	Z	0	0	0	0	0	0	0	1	2	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	2			
27-Jun	0	Z	0	3	5	4	5	7	10	8	4	4	1	0	1	0	1	0	0	1	0	0	0	0	2.4	10			
28-Jun	0	Z	0	1	4	5	2	3	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.8	5			
29-Jun	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1			
30-Jun	0	Z	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2			
														0.1 -- 0.1 0.2 0.7 2.6 3.2 4.0 3.3 2.6 2.1 1.6 0.7 0.4 0.4 0.3 0.3 0.2 0.1 0.1 0.1 0.1 0.1 0.6 0.0														Diurnal Average	
														0 -- 0 3 5 11 17 20 13 17 13 19 7 2 1 2 1 1 1 0 1 0 2 18 0														Diurnal Maximum	
Z - zerospan C - Calibration																													



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	685	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



WBEA
Frequency Distribution

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

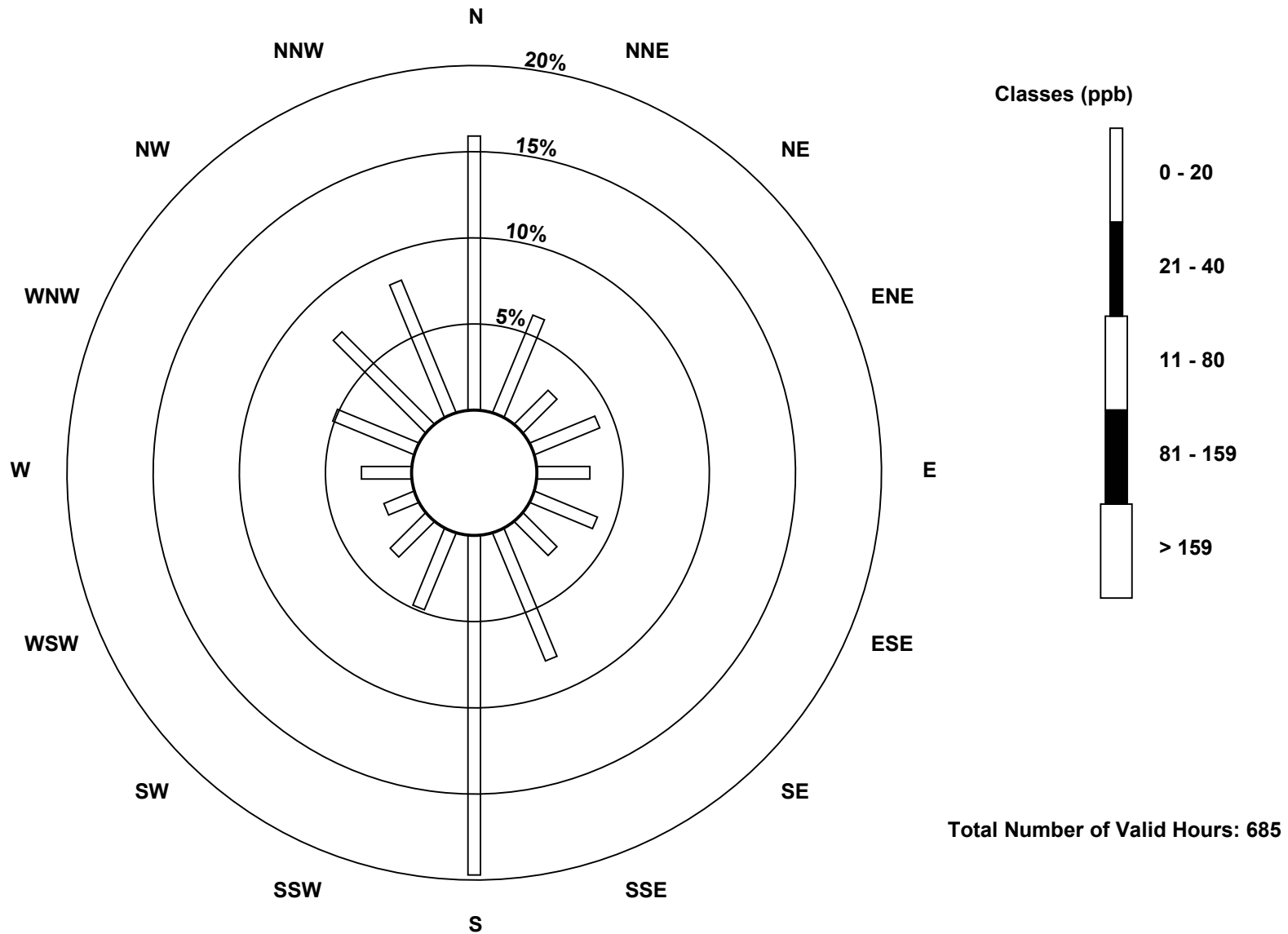
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	109	42	19	28	21	27	19	55	135	33	20	13	20	35	52	57	685
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	109	42	19	28	21	27	19	55	135	33	20	13	20	35	52	57	685

Total Number of Valid Hours: 685

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

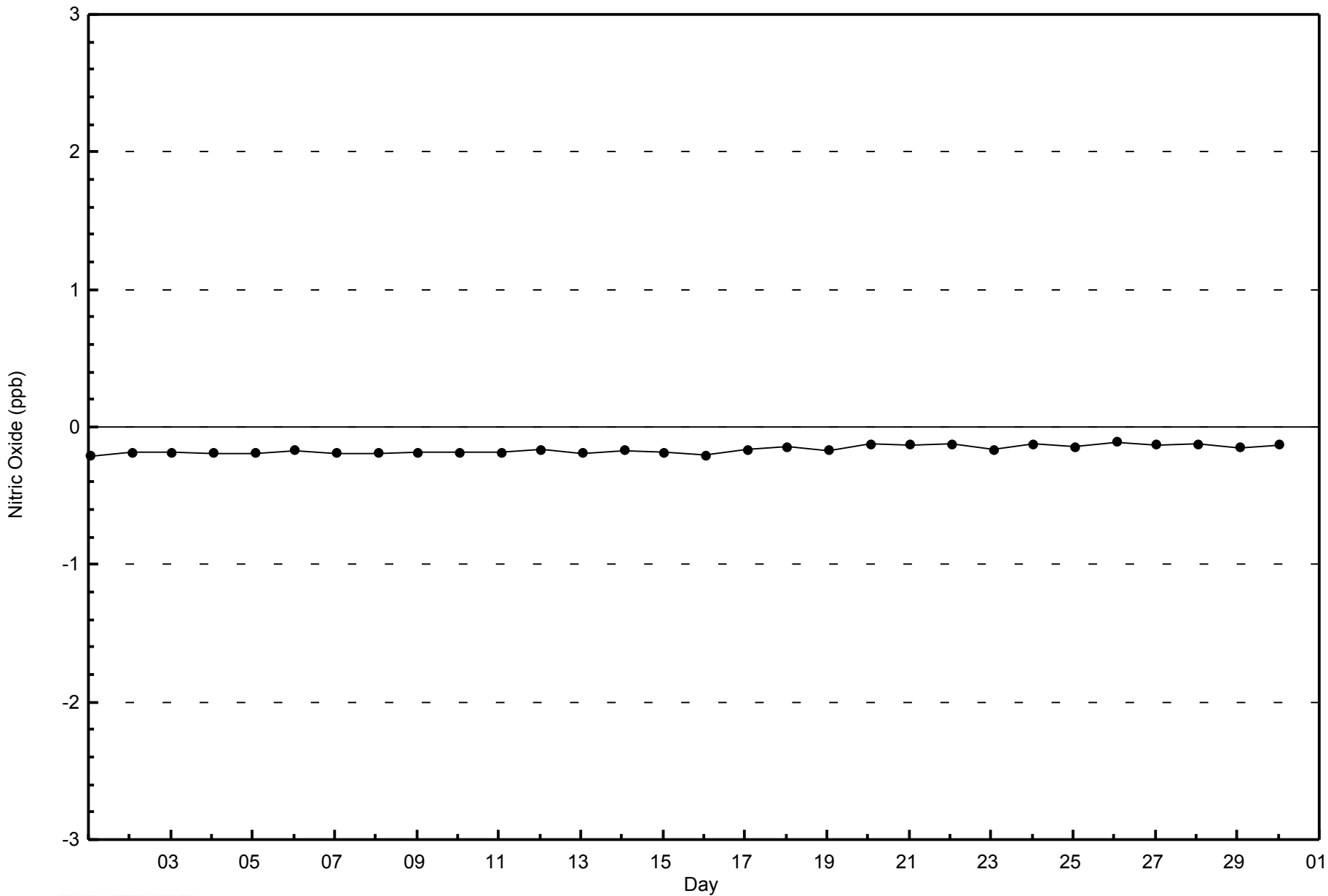
Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

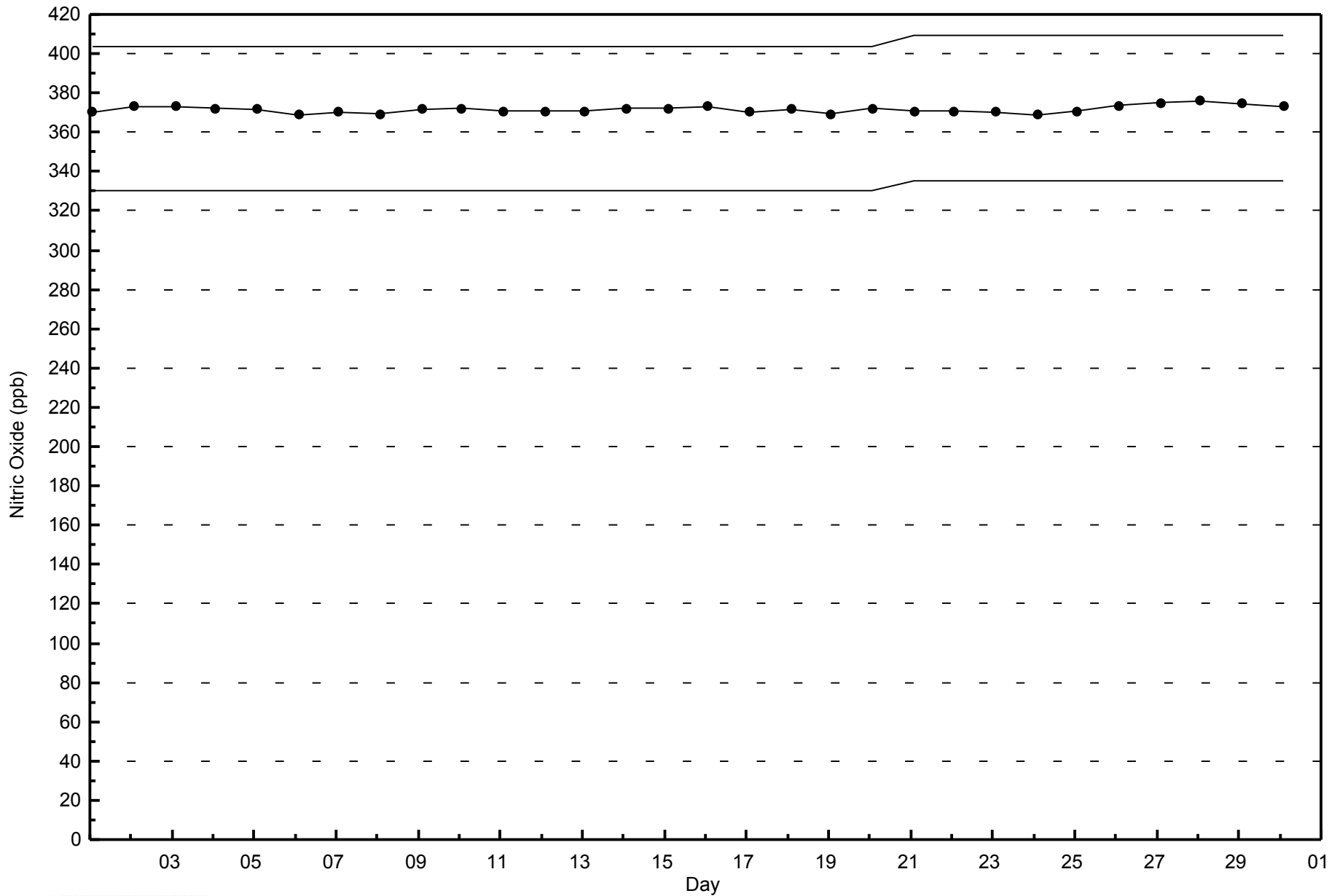
Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter - June 2014





WBEA
Span Responses

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





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 39 ppb on Jun 14 23:00	Maximum Daily Average: 8.0 ppb on Jun 14		Hours of Data:	685
Minimum Value: 0 ppb on Jun 3 18:00	Minimum Daily Average: 0.6 ppb on Jun 4		Hours of Missing Data:	35
Maximum Diurnal Average: 6.1 ppb at hour 7	Minimum Diurnal Average: 1.6 ppb at hour 18		Hours of Calibration:	35
Monthly Average: 3.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 9 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-Jun	7	Z	2	6	5	3	1	2	2	4	4	6	4	6	5	4	3	3	2	1	1	1	5	7	3.6	7
2-Jun	3	Z	1	2	5	13	14	13	3	1	1	0	1	1	0	2	2	1	1	1	1	2	1	1	2.9	14
3-Jun	3	Z	4	5	6	5	7	4	3	2	1	1	1	1	1	0	0	0	0	1	6	3	1	0	2.5	7
4-Jun	1	Z	1	1	1	1	1	1	3	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0.6	3
5-Jun	0	Z	0	0	0	1	0	0	1	0	1	1	1	1	1	0	0	0	0	0	1	2	1	6	0.7	6
6-Jun	8	Z	6	1	1	1	2	2	2	1	2	1	0	2	4	2	1	4	5	3	2	1	1	2	2.3	8
7-Jun	2	Z	1	3	3	9	14	13	16	20	11	2	2	2	2	3	3	2	1	2	2	3	3	3	5.1	20
8-Jun	1	Z	2	2	2	1	2	11	15	5	3	2	2	2	3	2	3	4	4	4	5	10	12	9	4.5	15
9-Jun	10	Z	7	5	5	9	13	5	2	2	1	2	1	1	1	1	1	0	0	0	1	1	1	2	3.0	13
10-Jun	11	Z	18	13	8	3	1	0	0	1	3	3	1	1	2	1	1	2	2	2	5	9	3	1	4.0	18
11-Jun	0	Z	0	0	1	6	4	5	11	8	7	4	4	3	4	4	7	3	3	9	5	5	5	7	4.5	11
12-Jun	7	Z	3	2	3	4	7	17	14	12	9	3	3	3	2	1	2	1	2	2	8	10	3	5	5.3	17
13-Jun	9	Z	5	3	4	12	13	4	4	6	2	1	1	0	1	2	2	2	2	2	2	3	5	12	4.1	13
14-Jun	13	Z	9	8	7	9	9	6	6	6	6	3	2	2	2	2	3	1	2	2	9	34	39	5	8.0	39
15-Jun	12	Z	13	9	7	16	14	11	8	7	5	2	2	2	3	2	3	2	2	2	3	5	6	6	5.8	16
16-Jun	6	Z	4	4	4	4	4	7	8	11	11	9	9	1	1	1	1	1	1	3	3	4	2	1	4.2	11
17-Jun	1	Z	2	4	5	21	18	14	13	14	8	3	4	4	3	3	2	2	5	8	4	4	3	4	6.5	21
18-Jun	4	Z	4	3	2	2	6	5	6	6	3	2	3	2	2	3	2	3	3	2	3	3	3	3	3.2	6
19-Jun	3	Z	8	9	8	11	12	11	13	13	10	C	C	C	C	C	1	1	4	4	4	3	3	8	7.0	13
20-Jun	8	Z	3	5	5	3	6	13	11	4	9	10	4	3	3	3	3	4	4	4	4	5	2	0	5.1	13
21-Jun	0	Z	0	1	8	12	10	3	1	2	2	1	1	1	2	3	1	2	1	0	0	0	0	0	2.2	12
22-Jun	1	Z	1	1	1	0	0	0	1	1	1	0	1	2	0	1	1	0	0	1	1	1	3	6	1.1	6
23-Jun	8	Z	5	2	0	1	1	3	4	5	16	20	12	5	3	6	2	1	1	1	0	0	0	1	4.2	20
24-Jun	2	Z	3	6	4	2	4	7	7	7	6	4	3	2	1	2	3	4	3	3	4	8	8	10	4.5	10
25-Jun	10	Z	8	10	7	6	9	6	4	6	6	4	3	2	2	2	2	1	1	2	3	1	0	0	4.1	10
26-Jun	0	Z	0	0	0	1	1	1	1	1	5	1	1	1	2	5	3	1	1	2	2	2	1	4	1.5	5
27-Jun	3	Z	4	5	4	4	5	6	13	15	11	10	5	5	4	3	3	2	3	7	5	4	3	6	5.6	15
28-Jun	3	Z	2	6	5	5	3	5	5	2	2	3	3	0	0	0	1	0	0	0	1	2	7	6	2.7	7
29-Jun	6	Z	7	4	3	4	2	2	1	1	1	1	0	0	0	1	1	0	0	0	0	0	1	3	1.7	7
30-Jun	1	Z	9	13	12	9	1	1	1	1	0	0	1	0	0	0	1	1	0	0	0	0	0	0	2.2	13

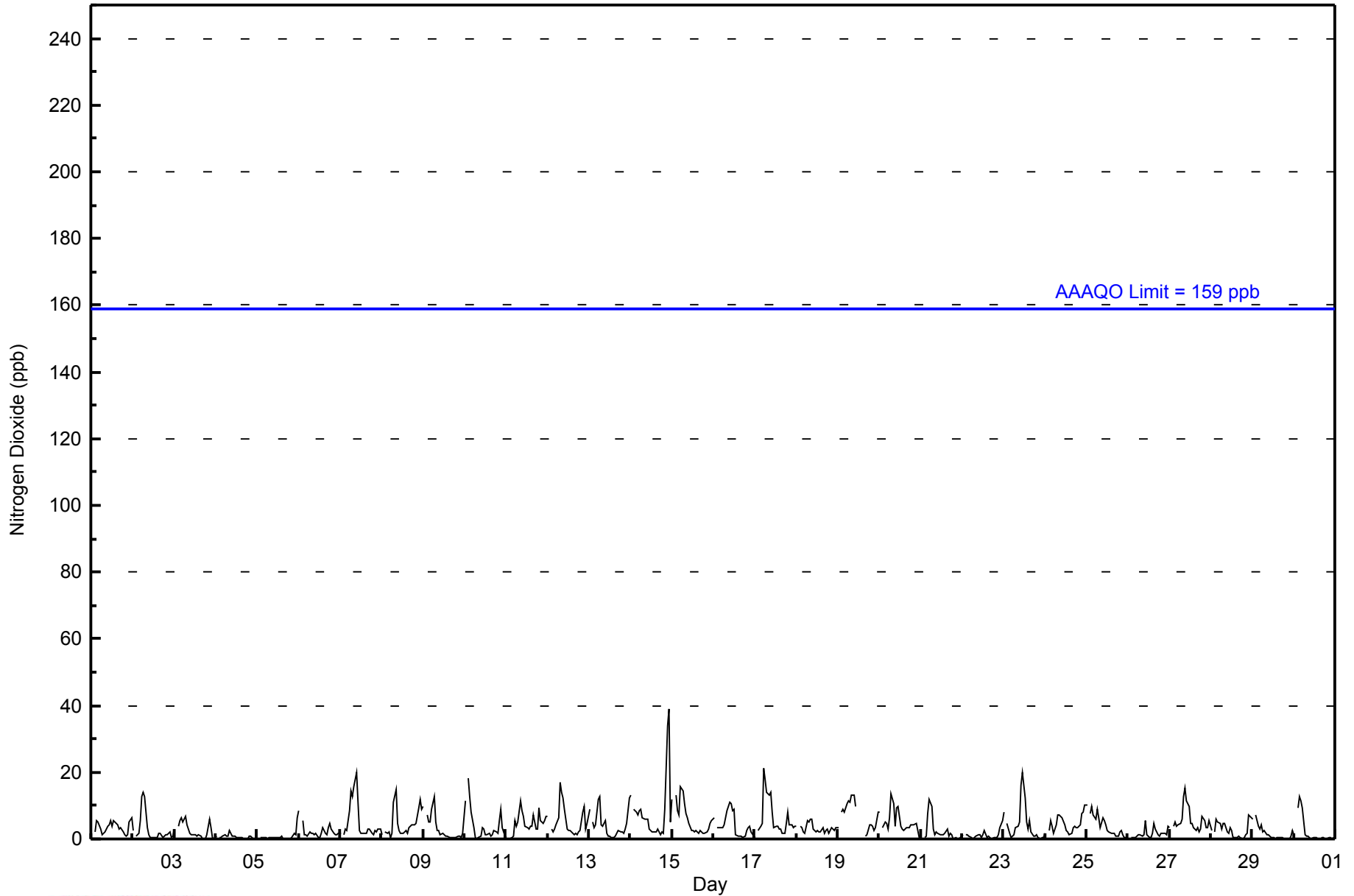
4.8	--	4.4	4.4	4.2	5.8	6.1	6.0	5.9	5.5	4.9	3.4	2.5	1.9	1.8	1.9	1.9	1.6	1.8	2.3	2.9	4.0	4.1	3.9	Diurnal Average	
13	--	18	13	12	21	18	17	16	20	16	20	12	6	5	6	7	4	5	9	9	34	39	12	Diurnal Maximum	

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	682	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: 685

Total Number of Hours: 720



WBEA
Frequency Distribution

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

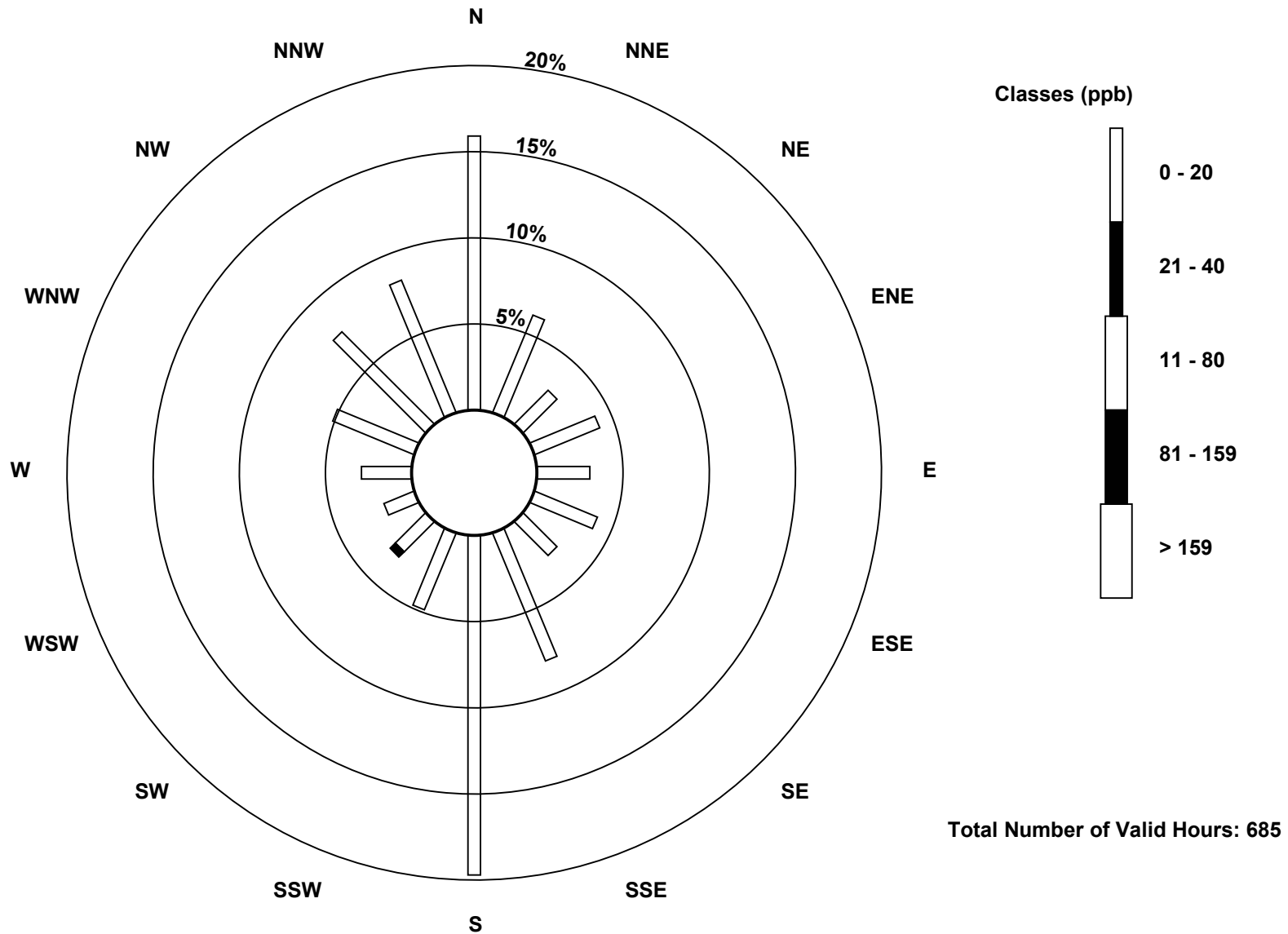
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	109	42	19	28	21	27	19	55	135	33	17	13	20	35	52	57	682
21 - 40	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	109	42	19	28	21	27	19	55	135	33	20	13	20	35	52	57	685

Total Number of Valid Hours: 685

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

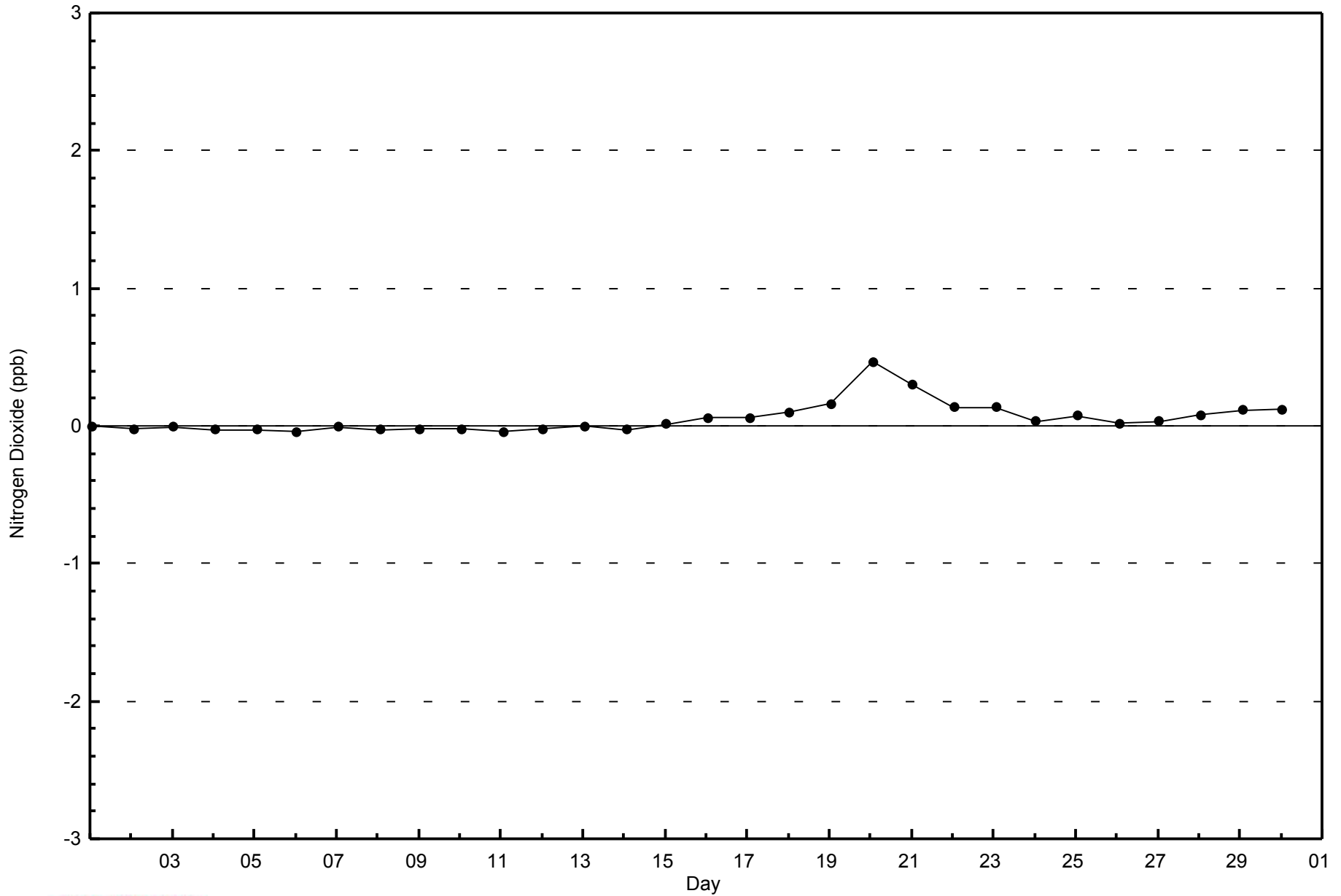
Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

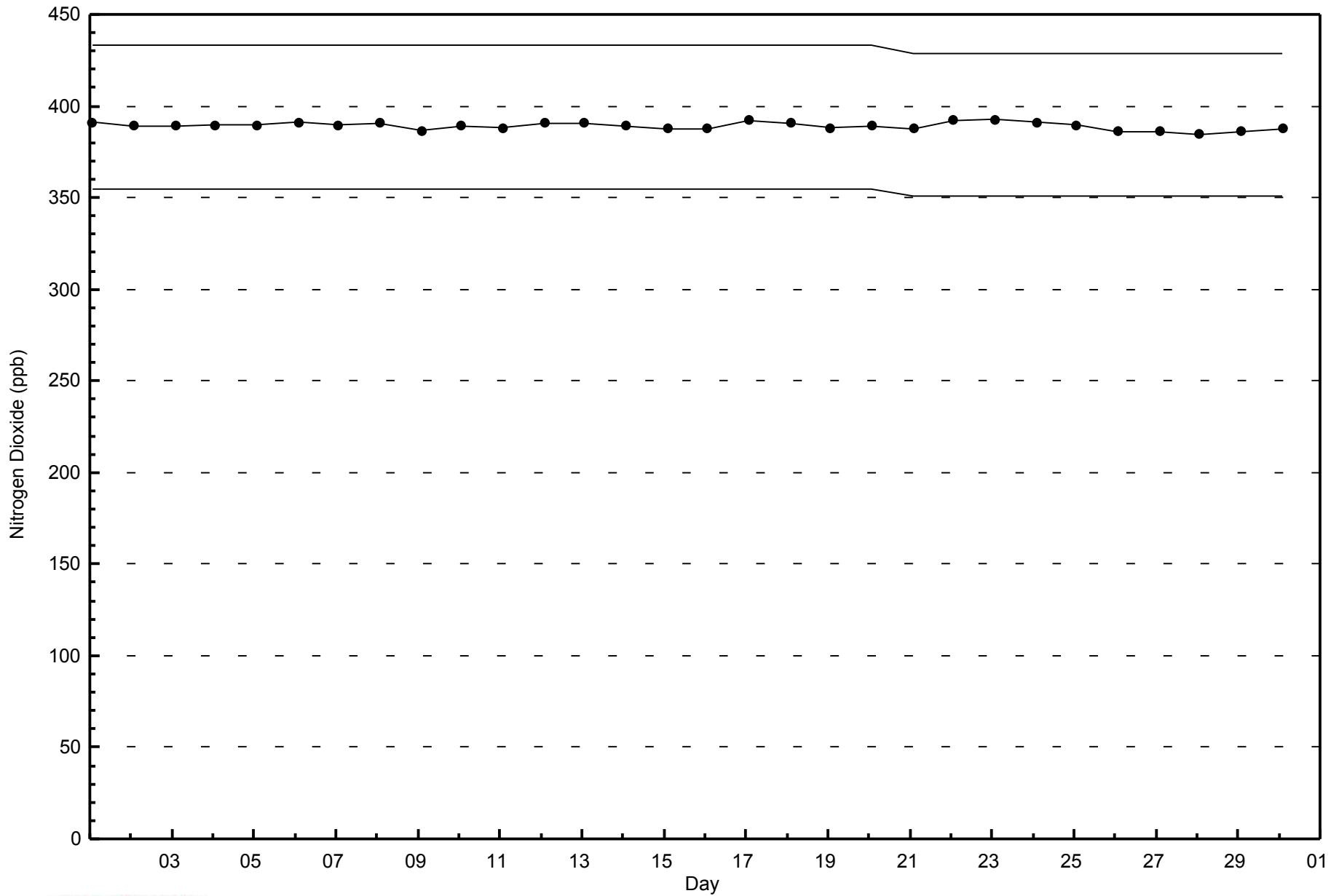
Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - June 2014





WBEA
Span Responses

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





Maximum Value: 57 ppb on Jun 14 23:00	Maximum Daily Average: 9.7 ppb on Jun 14	Hours in Service: 720
Minimum Value: 0 ppb on Jun 5 01:00	Minimum Daily Average: 0.7 ppb on Jun 4	Hours of Data: 685
Maximum Diurnal Average: 10.0 ppb at hour 8	Minimum Diurnal Average: 1.8 ppb at hour 18	Hours of Missing Data: 35
Monthly Average: 4.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 6 P ₉₀ = 11 P ₉₉ = 30	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-Jun	7	Z	2	6	5	3	1	2	3	5	5	8	6	8	6	5	4	4	2	1	1	1	5	6	4.2	8
2-Jun	3	Z	1	2	7	24	24	25	6	1	1	0	1	1	0	2	2	1	1	1	1	2	1	1	4.6	25
3-Jun	3	Z	4	5	6	6	10	7	4	3	2	2	2	1	2	1	0	0	0	1	6	3	1	0	3.0	10
4-Jun	1	Z	1	1	1	1	1	1	3	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0.7	3
5-Jun	0	Z	0	0	0	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	6	0.7	6
6-Jun	8	Z	6	1	1	1	3	3	3	2	2	1	0	2	5	2	2	5	5	3	2	1	1	2	2.7	8
7-Jun	2	Z	1	3	3	19	31	24	23	37	16	3	2	2	2	3	3	2	1	3	2	3	3	3	8.3	37
8-Jun	1	Z	2	2	2	1	3	23	28	6	3	2	2	3	3	2	4	5	4	4	5	9	12	9	5.9	28
9-Jun	10	Z	7	5	5	9	15	5	3	3	1	2	1	1	1	1	0	0	0	0	1	1	1	1	3.2	15
10-Jun	11	Z	18	13	8	4	0	0	0	1	4	4	2	2	2	1	1	3	2	2	5	9	3	1	4.2	18
11-Jun	0	Z	0	0	1	7	5	9	20	12	11	4	4	4	4	4	8	3	3	10	5	5	5	7	5.8	20
12-Jun	7	Z	3	2	4	7	11	38	24	19	12	4	3	3	3	1	2	1	2	2	8	10	3	5	7.6	38
13-Jun	9	Z	5	3	5	19	21	6	5	8	2	1	1	1	0	1	2	3	2	2	2	3	5	12	5.1	21
14-Jun	13	Z	9	8	8	11	13	9	9	8	8	4	2	3	3	2	4	1	2	1	9	36	57	5	9.7	57
15-Jun	12	Z	13	9	8	22	21	14	10	8	6	3	3	3	3	2	3	2	2	2	2	3	4	6	6.9	22
16-Jun	6	Z	4	4	4	5	7	10	13	17	15	11	11	1	1	1	1	1	1	3	3	4	2	1	5.4	17
17-Jun	1	Z	2	4	5	30	25	20	18	20	10	4	5	5	4	4	2	2	5	9	4	4	3	4	8.3	30
18-Jun	4	Z	4	3	3	3	10	8	9	8	4	3	3	3	3	4	2	3	3	2	3	3	3	3	4.0	10
19-Jun	3	Z	8	9	9	16	19	17	19	18	13	C	C	C	C	C	1	1	5	4	4	3	3	8	8.9	19
20-Jun	8	Z	3	5	5	4	8	23	18	6	18	15	5	3	3	3	4	4	5	4	4	5	2	0	6.7	23
21-Jun	0	Z	0	1	9	15	12	3	1	3	2	1	1	2	2	3	1	2	1	0	1	0	0	0	2.6	15
22-Jun	1	Z	1	1	1	0	0	1	1	2	1	0	2	3	0	1	0	0	0	1	1	1	3	6	1.3	6
23-Jun	8	Z	5	2	1	1	3	7	7	7	29	39	19	6	3	7	3	1	1	1	0	0	1	1	6.6	39
24-Jun	2	Z	2	6	4	2	5	10	11	10	9	6	3	3	2	2	4	5	4	4	4	8	8	10	5.4	11
25-Jun	10	Z	8	10	8	7	13	9	5	9	7	6	3	3	2	2	2	1	1	2	3	1	0	0	4.9	13
26-Jun	0	Z	0	0	0	1	2	1	1	2	7	2	1	1	2	6	3	1	1	2	2	2	1	4	1.8	7
27-Jun	4	Z	4	7	9	8	9	13	23	23	15	14	6	5	4	3	4	2	3	8	6	4	3	6	8.0	23
28-Jun	3	Z	2	7	9	9	5	8	7	3	2	4	3	0	0	0	1	0	0	0	1	2	7	6	3.5	9
29-Jun	6	Z	7	4	3	5	3	3	2	1	1	1	0	0	0	0	1	0	0	0	0	0	1	2	1.8	7
30-Jun	1	Z	9	13	12	11	1	1	1	1	0	1	1	0	0	0	1	1	0	0	0	0	0	0	2.4	13

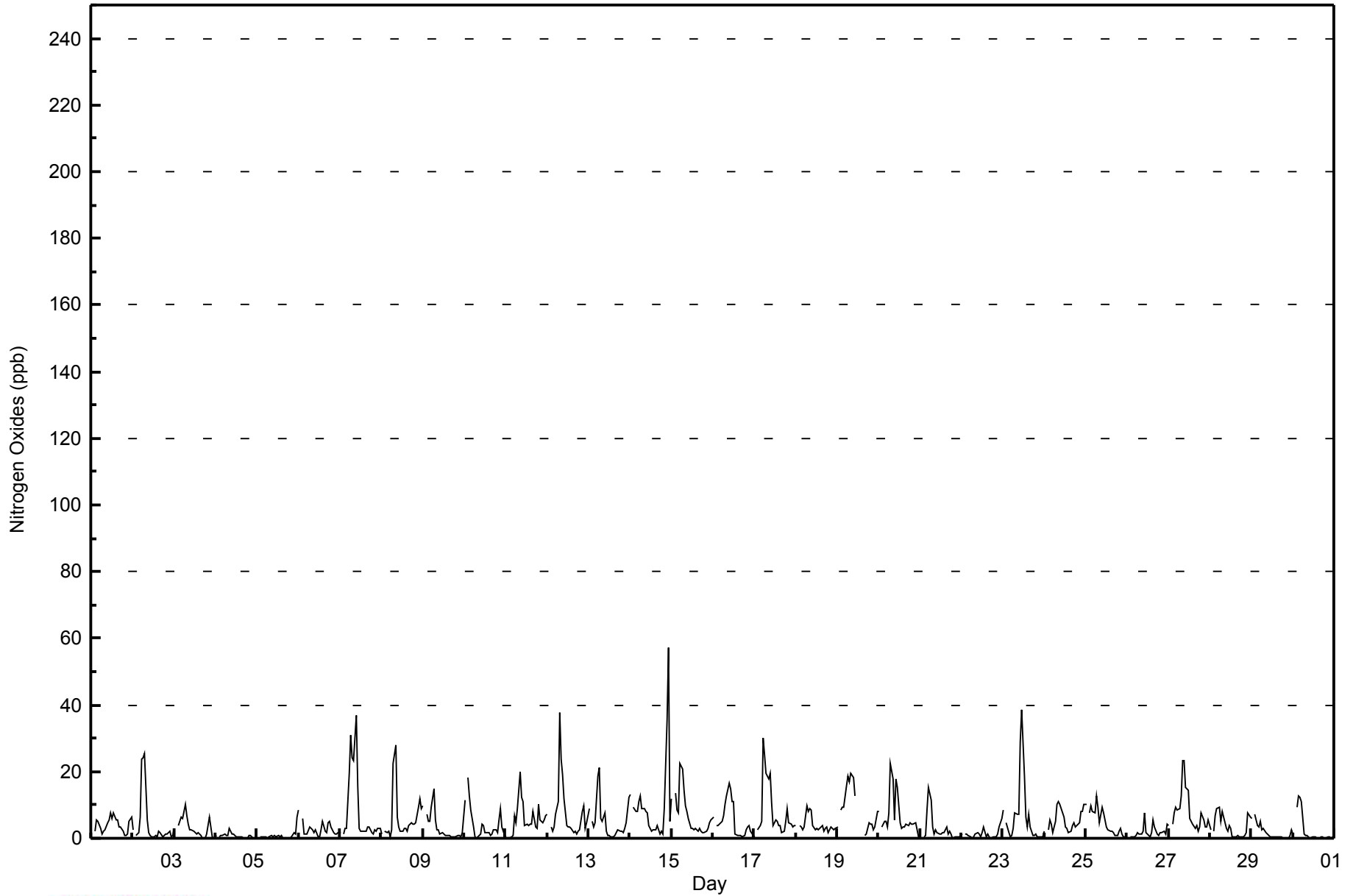
4.8	--	4.5	4.5	4.9	8.4	9.3	10.0	9.2	8.1	7.0	5.0	3.2	2.4	2.1	2.2	2.1	1.8	2.0	2.4	3.0	4.1	4.7	3.9	Diurnal Average	
13	--	18	13	12	30	31	38	28	37	29	39	19	8	6	7	8	5	5	10	9	36	57	12	Diurnal Maximum	

Z - zerospan C - Calibration



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	662	96.64	96.64
21 - 40	22	3.21	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: 685

Total Number of Hours: 720



WBEA
Frequency Distribution

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

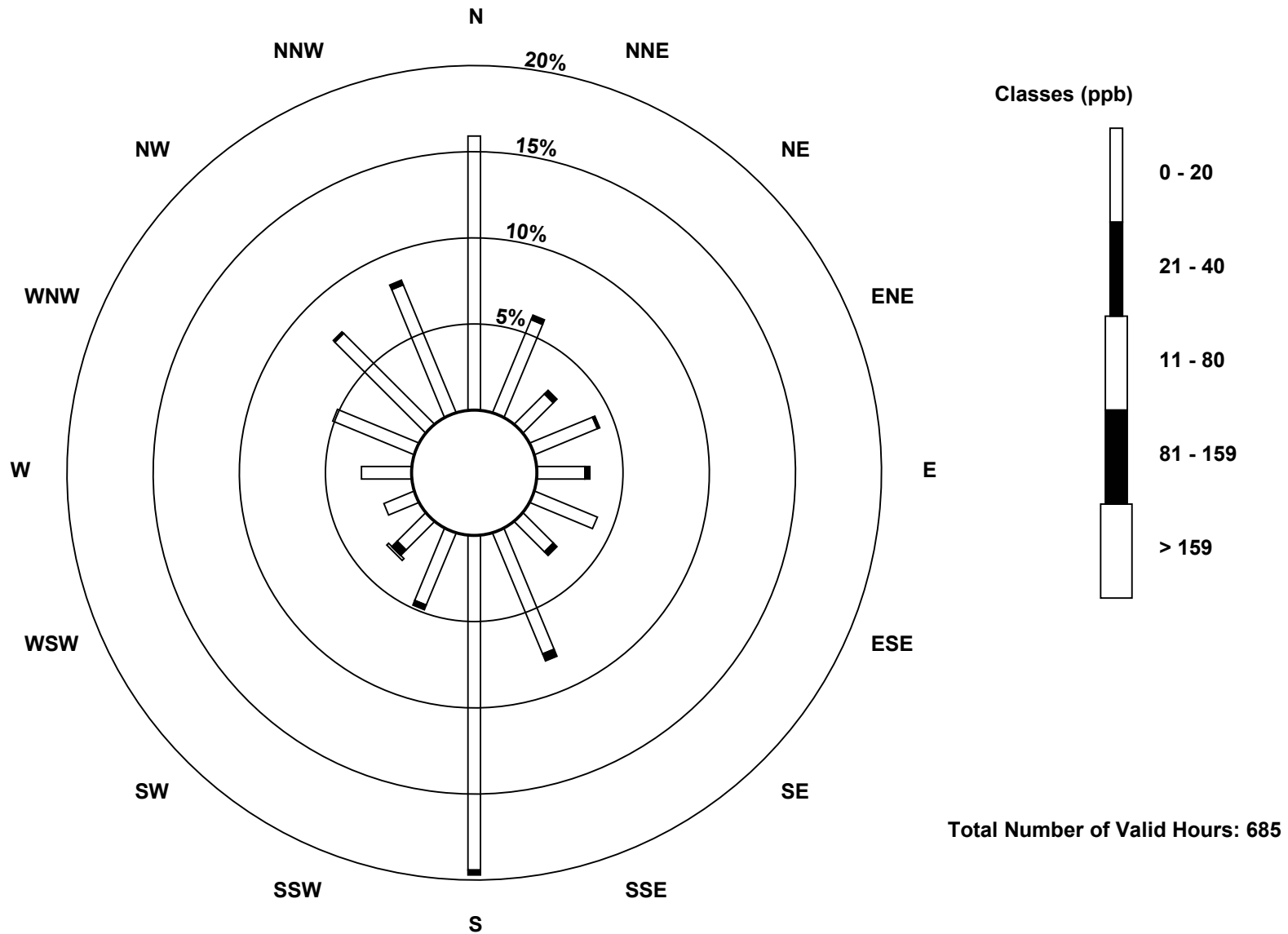
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	109	40	17	27	19	27	17	52	133	31	16	13	20	35	51	55	662
21 - 40	0	2	2	1	2	0	2	3	2	2	3	0	0	0	1	2	22
11 - 80	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	109	42	19	28	21	27	19	55	135	33	20	13	20	35	52	57	685

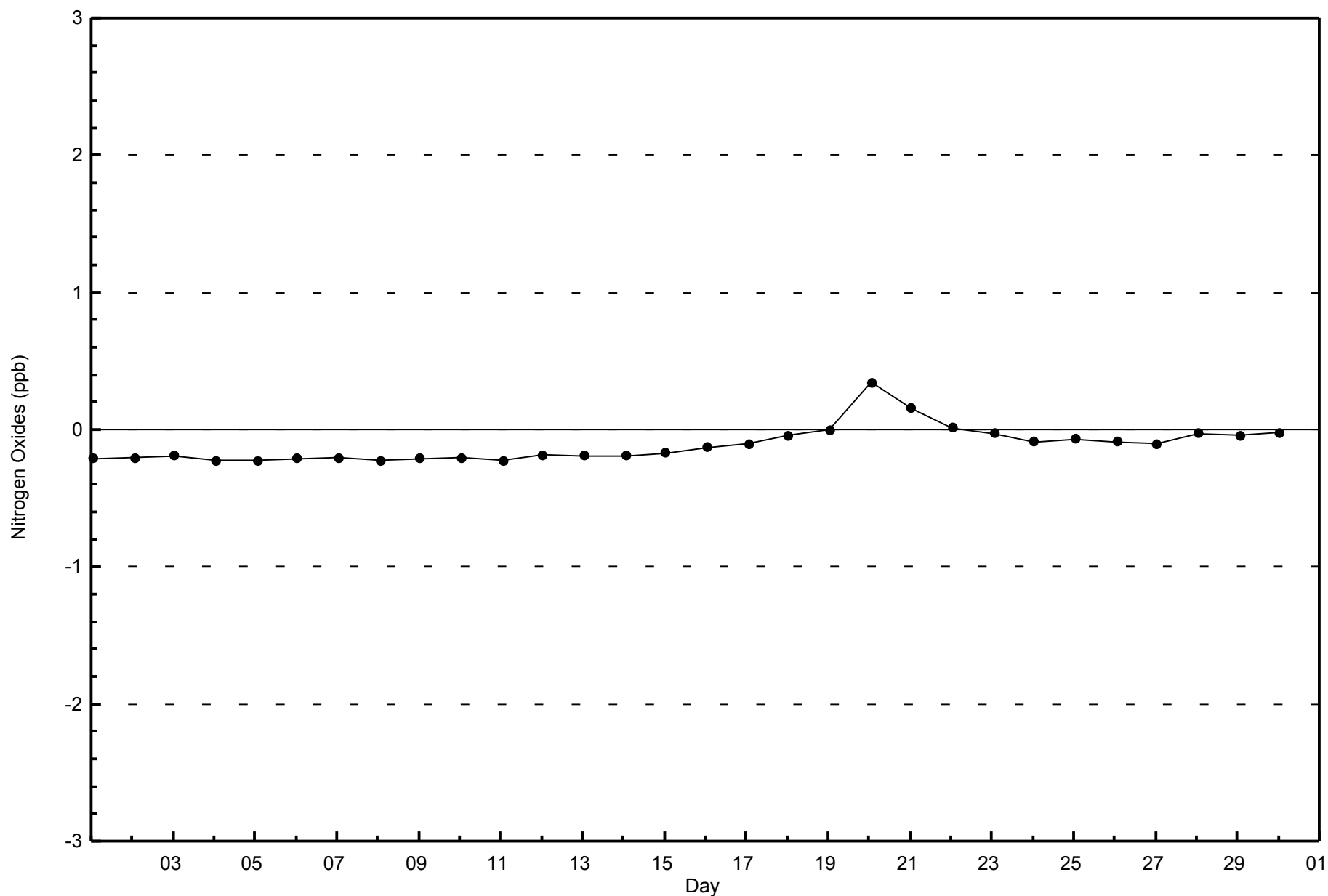
Total Number of Valid Hours: 685

Total Number of Hours: 720

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

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

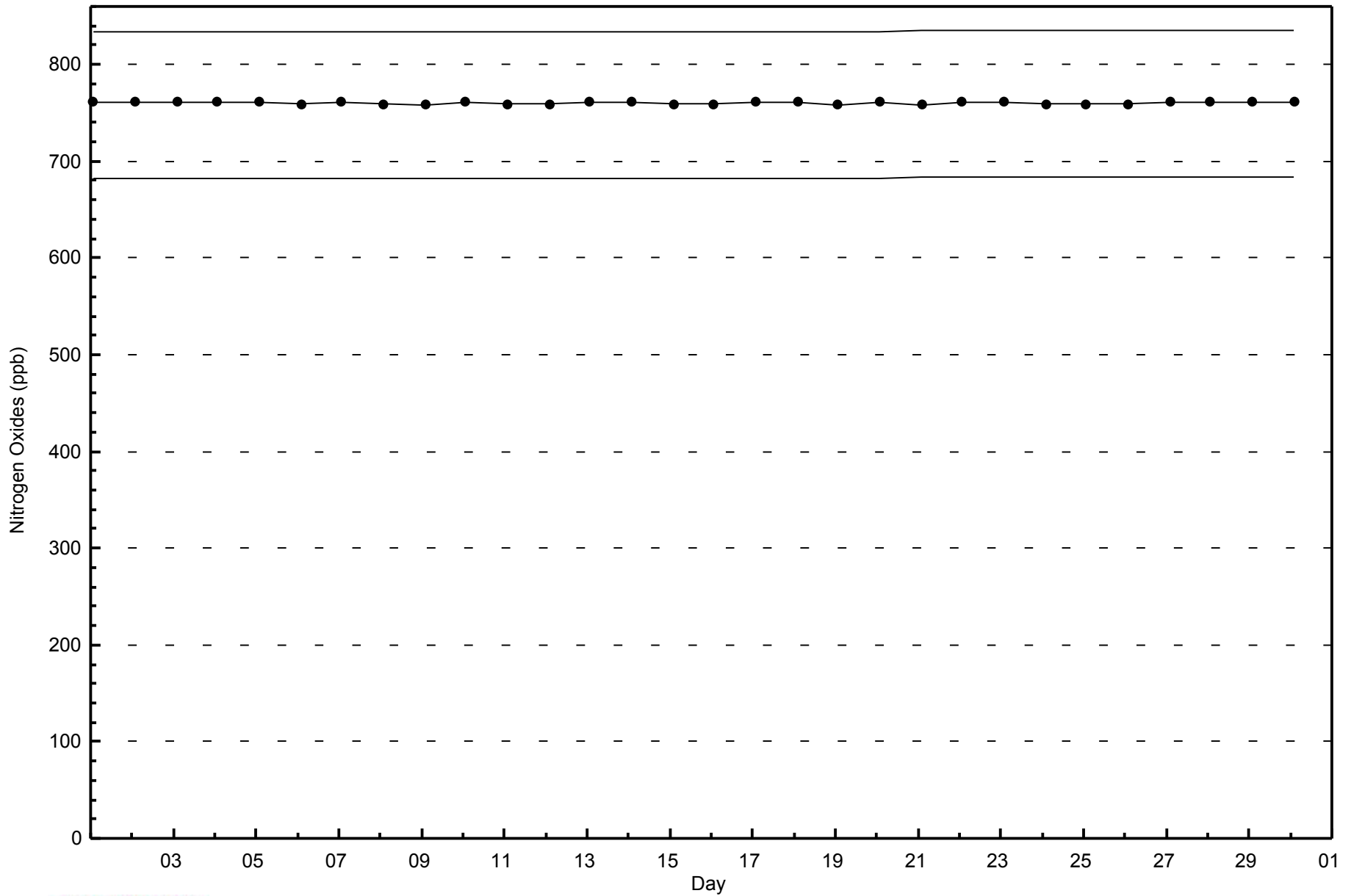






WBEA
Span Responses

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Fort McKay - Bertha Ganter - June 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 44 ppb on Jun 15 14:00	Maximum Daily Average: 30.0 ppb on Jun 15		Hours of Data:	686
Minimum Value: 1 ppb on Jun 27 04:00	Minimum Daily Average: 11.0 ppb on Jun 21		Hours of Missing Data:	34
Maximum Diurnal Average: 32.5 ppb at hour 15	Minimum Diurnal Average: 9.1 ppb at hour 6		Hours of Calibration:	34
Monthly Average: 21.5 ppb	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 12 Median = 21 Q ₃ = 31 P ₉₀ = 38 P ₉₉ = 43		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	17	Z	27	18	12	17	25	25	26	21	22	24	27	32	35	35	38	38	39	43	32	26	19	18	26.7	43
2-Jun	11	Z	7	5	6	1	4	8	18	22	30	35	37	38	39	33	36	36	40	42	36	28	22	16	23.9	42
3-Jun	18	Z	20	19	17	16	15	17	17	15	14	16	16	15	15	17	16	17	15	13	8	9	12	13	15.3	20
4-Jun	13	Z	14	14	13	12	11	10	9	15	20	21	24	25	26	26	26	25	25	25	24	23	24	24	19.5	26
5-Jun	21	Z	20	21	22	21	22	24	28	30	30	30	30	30	30	29	30	31	28	26	23	17	14	11	24.7	31
6-Jun	9	Z	7	9	7	10	15	21	23	25	25	28	30	29	29	31	32	30	28	28	27	21	17	18	21.7	32
7-Jun	14	Z	13	13	9	4	4	9	9	5	14	28	33	33	34	37	34	35	34	26	21	22	19	18	20.4	37
8-Jun	20	Z	14	12	11	17	19	12	15	33	36	38	38	39	40	41	41	40	39	37	33	27	23	24	28.2	41
9-Jun	24	Z	24	24	21	13	8	16	17	19	24	24	26	31	34	36	38	38	38	35	31	29	20	14	25.4	38
10-Jun	11	Z	11	13	15	22	29	38	38	38	36	37	39	36	38	40	38	37	39	32	26	20	21	26	29.5	40
11-Jun	25	Z	25	23	20	15	18	16	15	19	22	28	26	34	31	32	28	32	31	27	24	16	6	3	22.4	34
12-Jun	3	Z	3	3	4	4	10	7	16	19	23	30	32	32	34	35	38	40	38	38	29	18	23	19	21.6	40
13-Jun	15	Z	11	9	8	8	14	26	28	29	37	39	40	39	40	41	42	42	39	37	35	31	23	13	28.1	42
14-Jun	13	Z	14	14	11	11	17	23	25	29	32	39	41	41	40	40	40	43	41	41	35	9	3	33	27.6	43
15-Jun	20	Z	15	15	12	11	17	26	35	40	37	41	43	44	43	43	42	40	39	35	32	25	19	13	30.0	44
16-Jun	11	Z	8	5	5	5	6	12	16	19	25	30	31	36	37	35	34	34	33	31	27	23	26	27	22.4	37
17-Jun	26	Z	24	19	18	4	7	9	11	13	20	26	27	28	32	33	32	31	28	21	23	19	19	16	21.1	33
18-Jun	14	Z	4	3	2	2	6	15	20	26	31	31	33	35	38	36	38	38	37	37	34	31	29	26	24.7	38
19-Jun	24	Z	13	8	6	5	8	13	11	9	14	17	24	30	32	31	29	27	25	21	12	6	6	3	16.2	32
20-Jun	3	Z	14	11	7	8	11	7	8	11	9	11	18	19	19	17	17	15	13	13	15	8	8	11	11.9	19
21-Jun	6	Z	6	8	5	2	4	10	10	12	15	18	18	18	18	20	17	13	16	14	8	5	5	7	11.0	20
22-Jun	6	Z	7	10	9	7	7	6	6	12	19	20	19	22	25	24	24	27	26	22	19	18	18	9	15.7	27
23-Jun	2	Z	3	3	3	3	4	4	9	C	C	C	C	40	26	21	22	26	22	15	8	3	2	2	11.6	40
24-Jun	1	Z	7	7	9	15	13	15	18	23	27	31	34	33	34	35	35	32	33	32	28	21	18	13	22.4	35
25-Jun	15	Z	13	10	6	6	11	20	27	28	33	36	38	39	38	37	31	20	20	18	11	5	6	6	20.5	39
26-Jun	4	Z	2	3	4	7	9	13	16	19	23	31	34	37	36	22	18	15	13	13	8	5	3	1	14.7	37
27-Jun	1	Z	1	1	1	3	3	5	9	13	22	29	41	36	36	34	35	31	30	26	24	9	9	7	17.5	41
28-Jun	4	Z	3	2	2	5	10	15	23	32	39	42	44	33	36	39	40	35	33	31	21	19	12	14	23.3	44
29-Jun	8	Z	7	4	8	10	14	20	25	28	34	33	29	29	30	32	32	32	31	29	27	30	30	27	23.8	34
30-Jun	27	Z	12	7	7	10	19	21	22	23	23	22	24	27	30	31	31	30	29	24	17	15	10		21.2	31

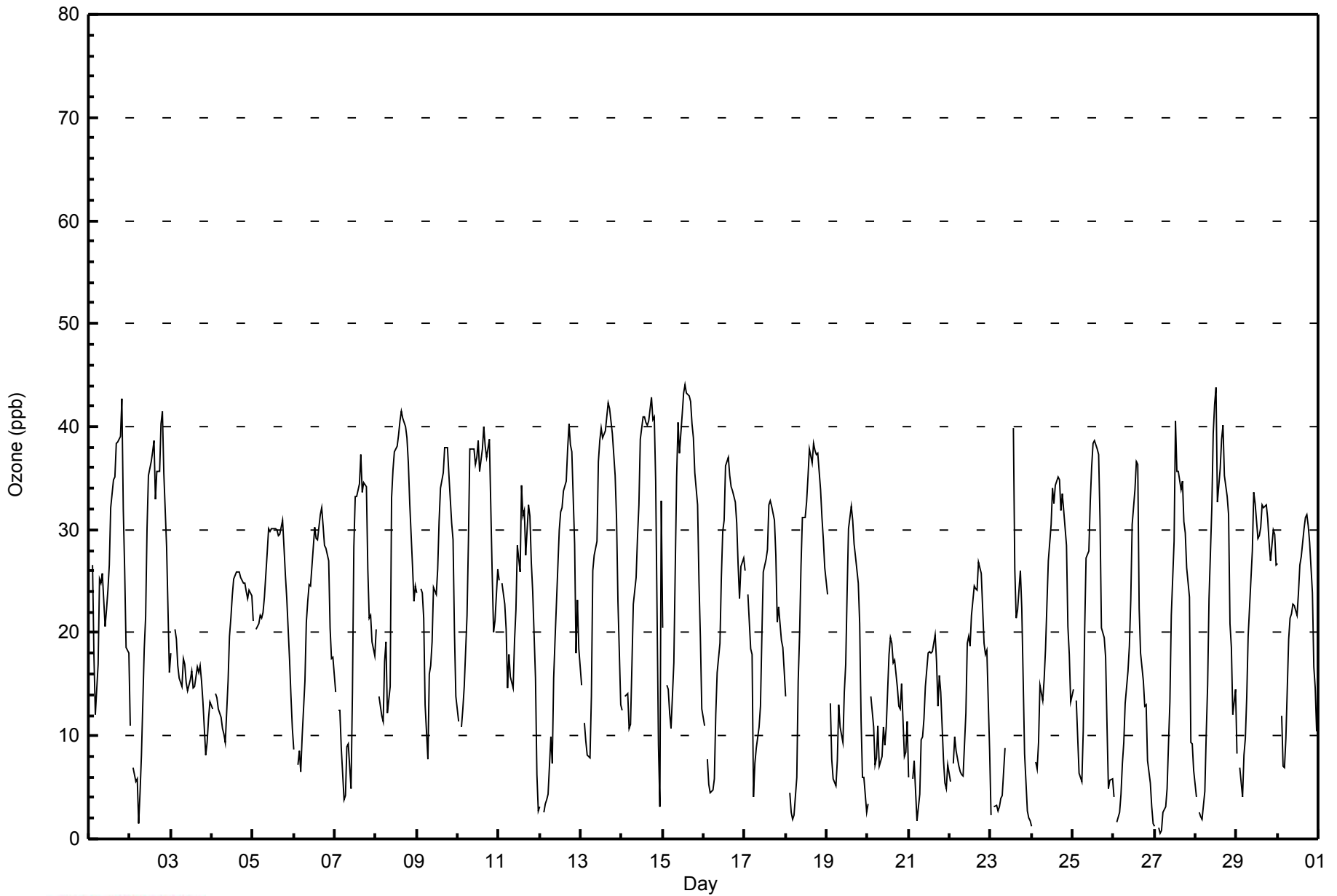
12.9	--	11.6	10.3	9.3	9.1	12.0	15.5	18.3	21.6	25.4	28.7	30.8	32.0	32.5	32.1	31.8	31.1	30.1	27.9	23.4	18.0	15.7	14.7		Diurnal Average
27	--	27	24	22	22	29	38	38	40	39	42	44	44	43	43	42	43	41	43	36	31	30	33		Diurnal Maximum

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	330	48.10	48.11
21 - 50	356	51.90	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 McKay - Bertha Ganter - June 2014

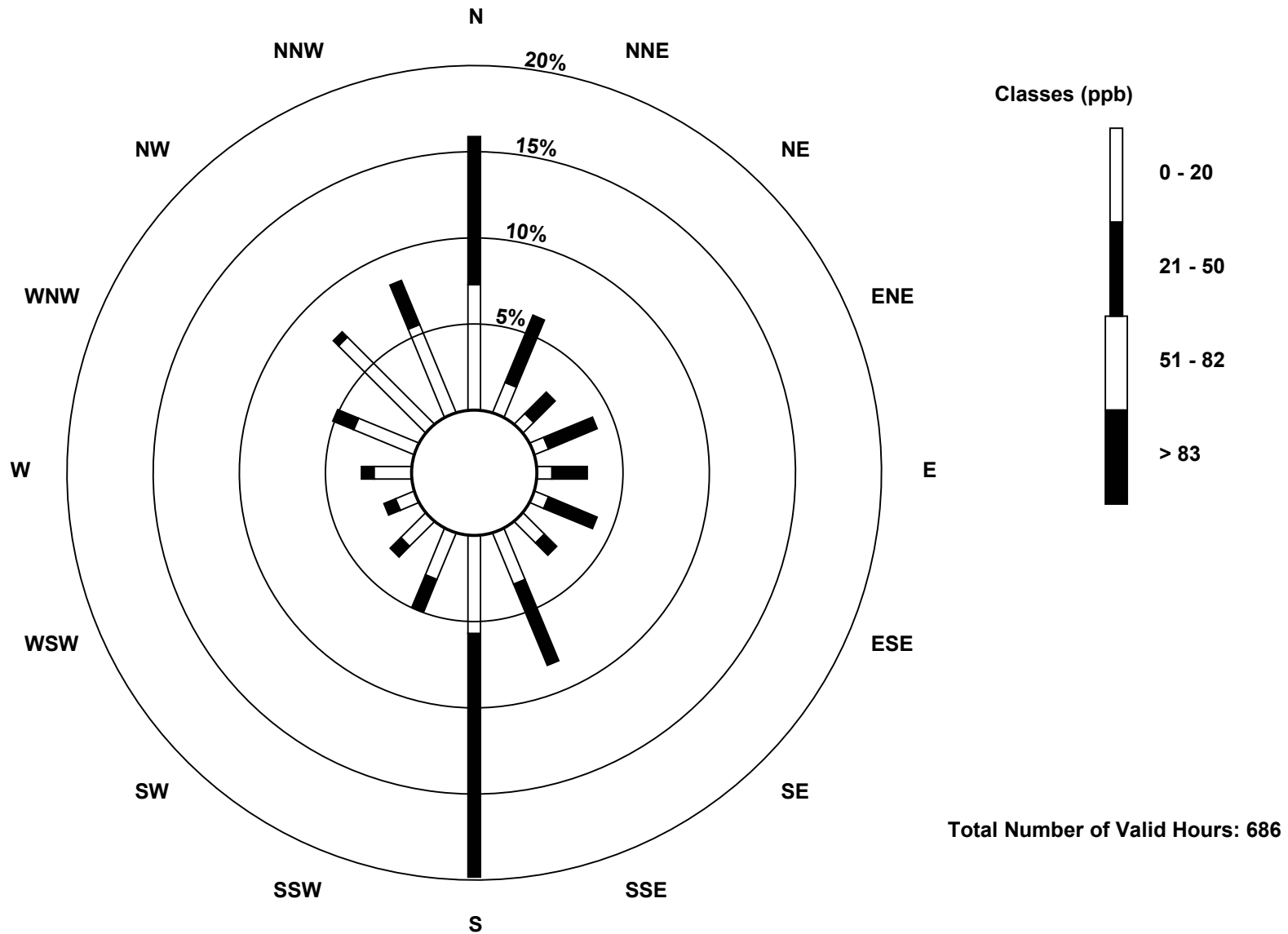
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	50	13	6	6	6	6	12	22	39	20	14	8	15	26	49	38	330
21 - 50	59	29	12	21	14	21	7	35	97	14	6	5	5	9	3	19	356
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	109	42	18	27	20	27	19	57	136	34	20	13	20	35	52	57	686

Total Number of Valid Hours: 686

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

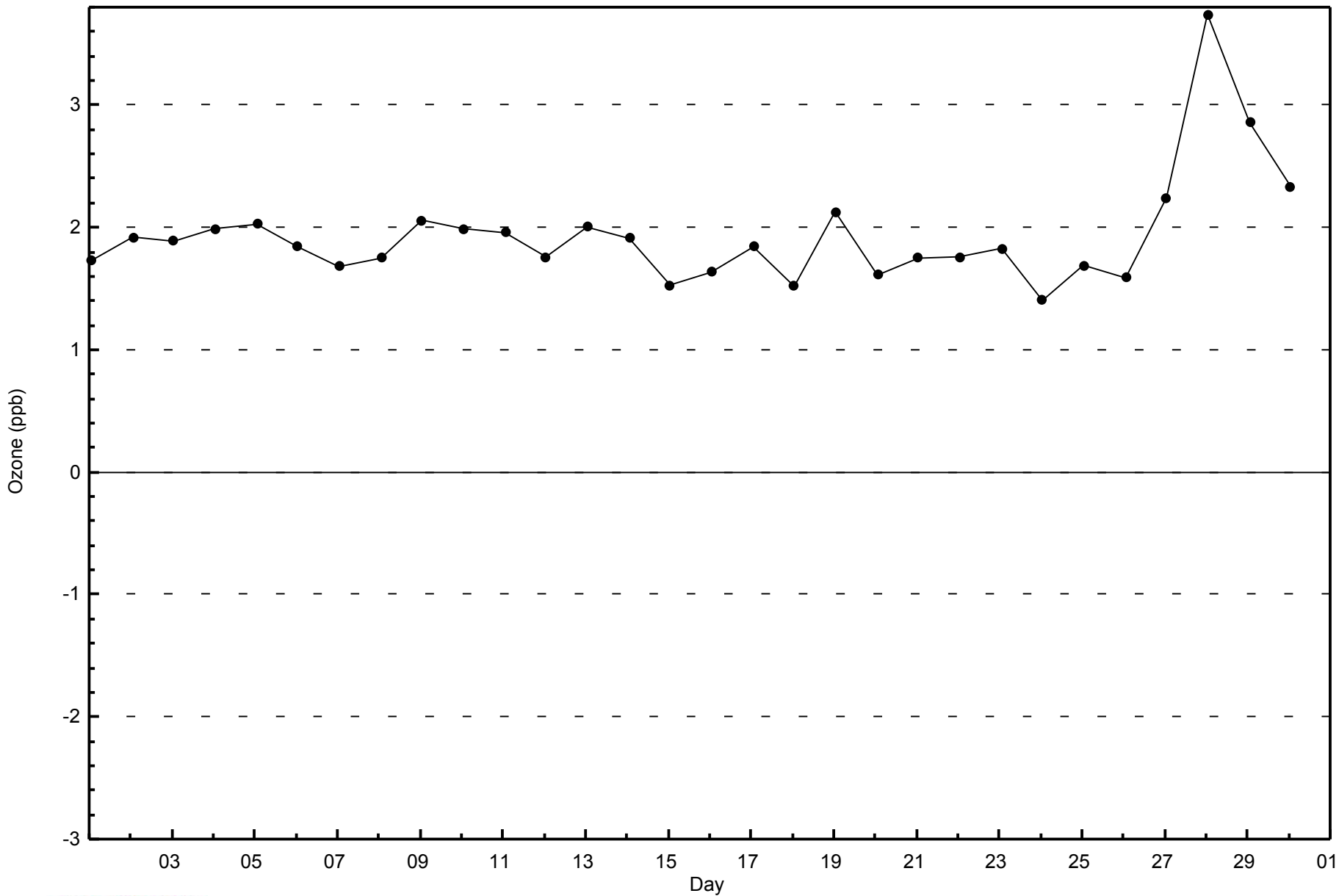
Ozone (O₃) - ppb
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

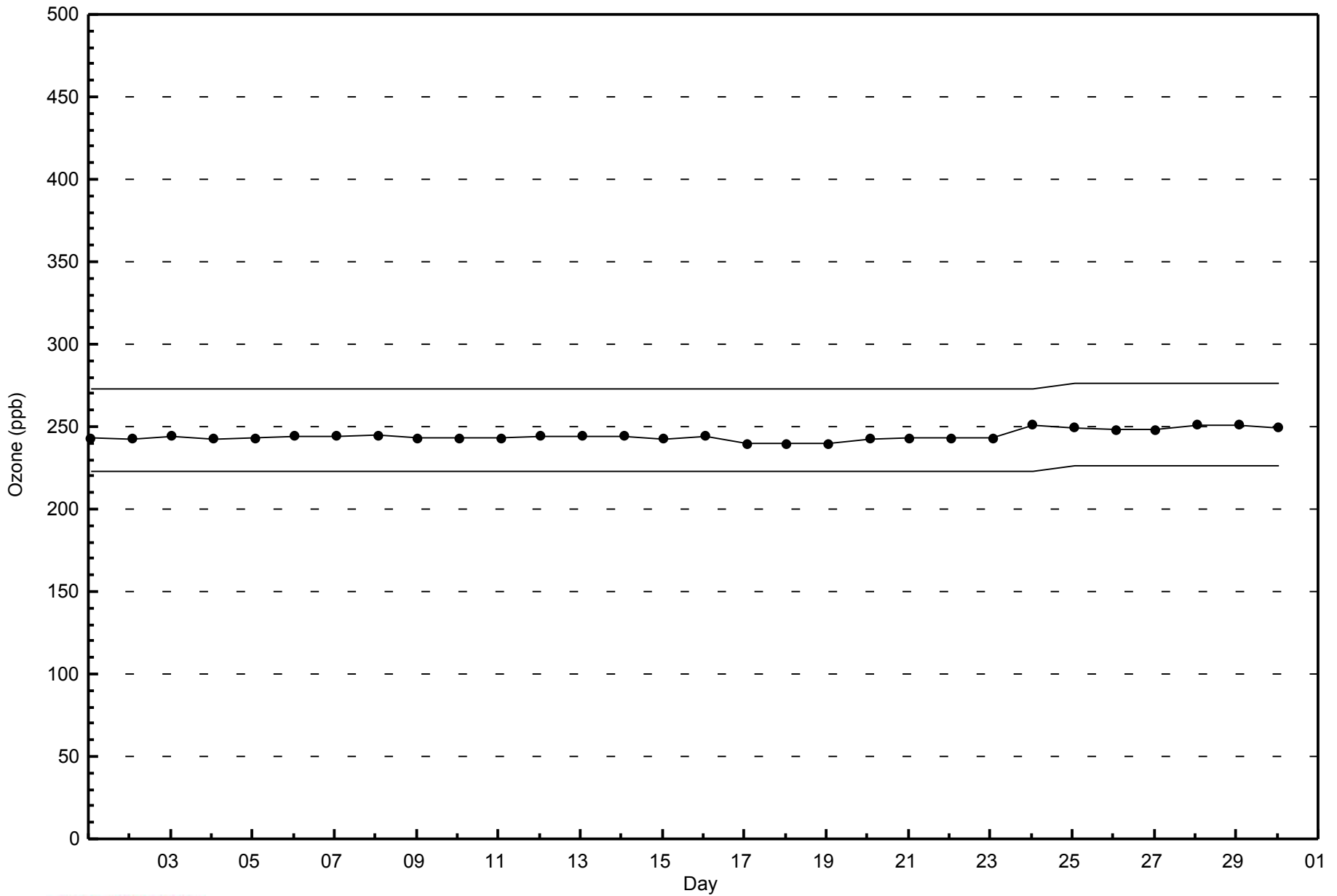
Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - June 2014





WBEA
Span Responses

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 (PM_{2.5}) - µg/m³

Fort McKay - Bertha Ganter - June 2014

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 720																								
Maximum Value: 39.5 µg/m ³ on Jun 29 11:00		Maximum Daily Average: 23.4 µg/m ³ on Jun 29																								
Minimum Value: 0.1 µg/m ³ on Jun 20 19:00		Hours of Data: 694																								
Maximum Diurnal Average: 9.4 µg/m ³ at hour 4		Hours of Missing Data: 26																								
Monthly Average: 7.27 µg/m ³		Hours of Calibration: 0																								
Minimum Daily Average: 1.2 µg/m ³ on Jun 4		Percent Operational Time: 96.4																								
Minimum Diurnal Average: 5.5 µg/m ³ at hour 14																										
Percentiles: P ₁ = 0.4 P ₁₀ = 1.7 Q ₁ = 3.0 Median = 5.9 Q ₃ = 9.5 P ₉₀ = 13.9 P ₉₉ = 33.1																										
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-Jun	5.5	4.2	3.4	4.3	1.8	0.8	0.5	0.7	0.7	0.9	0.9	1.1	1.1	1.9	4.3	5.2	4.6	6.1	5.4	2.6	2.8	3.1	5.4	7.6	3.1	7.6
2-Jun	7.1	7.4	8.4	10.7	13.1	10.4	3.2	1.6	1.4	2.9	1.9	2.2	3.9	4.2	4.4	6.6	3.4	3.1	2.7	3.7	4.6	7.1	7.3	6.2	5.3	13.1
3-Jun	1.6	2.0	3.1	4.4	4.5	4.2	4.7	3.8	2.2	2.7	5.2	12.6	4.3	3.3	6.0	6.4	3.3	3.0	3.9	1.9	0.5	0.4	0.6	0.9	3.6	12.6
4-Jun	1.4	1.4	1.3	1.2	1.2	1.2	1.0	0.9	1.3	1.0	1.0	1.1	1.2	1.4	1.4	1.5	1.4	1.3	1.3	1.2	1.2	1.3	1.3	1.4	1.2	1.5
5-Jun	2.0	3.0	3.0	2.8	2.4	2.1	2.0	2.1	2.6	2.7	2.7	2.8	2.6	2.5	2.6	2.2	2.2	2.0	1.9	1.7	2.0	2.4	2.3	2.6	2.4	3.0
6-Jun	3.7	4.3	3.9	3.4	3.1	2.9	2.3	1.8	1.6	1.9	2.1	1.7	1.5	2.1	2.5	2.6	2.2	2.8	2.9	3.9	6.0	5.4	6.9	5.5	3.2	6.9
7-Jun	7.4	7.9	6.2	5.7	5.5	6.5	7.3	6.7	4.7	7.2	5.1	3.3	2.4	2.2	2.8	3.1	3.4	4.0	3.5	3.4	4.4	5.6	8.7	9.1	5.3	9.1
8-Jun	6.3	9.1	6.7	6.8	9.4	4.0	4.0	6.1	6.0	4.5	3.9	3.3	3.9	5.4	6.7	5.6	7.8	10.6	13.4	13.2	29.4	16.8	12.3	14.2	8.7	29.4
9-Jun	10.8	9.6	9.1	10.2	7.8	3.3	3.2	3.6	3.8	1.8	1.6	2.9	3.1	2.4	2.2	3.5	3.7	3.8	3.6	2.9	3.4	4.5	4.7	5.3	4.6	10.8
10-Jun	7.7	6.6	6.8	7.5	7.5	6.5	5.0	2.6	2.6	2.8	3.2	3.2	2.8	2.7	2.4	2.2	3.6	4.4	4.1	5.8	8.4	8.2	8.0	7.1	5.1	8.4
11-Jun	6.9	7.3	6.8	7.6	7.3	6.9	4.7	5.0	6.0	3.2	2.7	11.8	9.7	3.2	3.3	4.7	7.1	6.8	7.5	6.7	7.1	8.1	8.6	10.0	6.6	11.8
12-Jun	27.1	15.9	13.4	16.1	11.3	9.9	3.5	2.9	4.3	5.0	5.7	4.5	4.4	4.5	4.1	4.4	2.9	2.5	2.5	4.0	8.0	7.3	7.5	7.2	7.5	27.1
13-Jun	8.0	8.3	8.0	7.1	7.0	8.1	7.7	4.2	3.4	3.7	2.8	2.6	2.5	2.1	1.7	2.0	3.1	3.7	5.5	6.9	11.4	18.0	18.0	15.2	6.7	18.0
14-Jun	12.0	12.7	11.7	11.8	10.9	10.2	8.2	3.9	7.6	11.6	11.4	5.2	4.4	6.5	7.9	7.2	8.9	8.3	11.7	10.7	17.1	31.0	32.5	8.5	11.3	32.5
15-Jun	14.9	14.3	13.7	12.2	15.4	13.9	14.6	21.0	21.8	17.0	9.1	6.5	6.6	5.9	6.3	6.2	8.3	8.4	8.6	10.5	11.9	8.5	10.5	10.9	11.5	21.8
16-Jun	12.3	10.5	10.0	10.4	10.7	10.5	8.9	9.7	11.9	10.8	12.8	11.2	11.5	5.8	5.9	5.2	5.2	6.8	7.8	7.0	7.0	12.3	5.9	2.3	8.8	12.8
17-Jun	1.1	2.6	4.9	7.0	4.8	7.0	7.5	6.0	5.0	12.0	10.5	9.0	9.0	11.4	8.9	11.9	9.7	7.1	15.2	21.4	4.3	3.5	4.5	5.6	7.9	21.4
18-Jun	3.6	9.7	13.1	12.7	8.2	3.5	1.5	3.8	13.9	20.6	9.5	6.3	7.2	8.8	11.4	11.3	9.0	8.5	11.3	17.6	10.2	6.6	6.9	5.7	9.2	20.6
19-Jun	3.6	4.8	6.5	4.9	6.5	9.4	5.6	8.7	9.8	5.9	8.0	8.1	2.1	1.0	2.3	2.5	1.9	1.7	4.9	3.3	2.3	1.5	3.4	5.8	4.8	9.8
20-Jun	3.7	2.5	5.9	3.7	4.9	7.1	5.6	3.1	5.5	5.6	2.9	5.8	3.6	3.0	1.9	UO	UO	UO	0.1	0.7	1.1	1.6	3.1	1.7	3.5	7.1
21-Jun	2.4	4.6	3.4	6.1	9.2	4.2	6.3	7.3	4.1	5.8	3.0	2.3	2.7	2.4	1.5	3.8	5.4	3.4	2.3	0.5	1.4	0.8	0.3	0.4	3.5	9.2
22-Jun	1.8	1.7	1.3	1.1	1.2	0.3	0.4	0.5	0.2	0.7	1.3	1.5	1.3	2.0	4.2	12.0	8.5	4.9	10.3	13.9	8.1	3.2	2.3	4.5	3.6	13.9
23-Jun	3.9	6.0	13.5	13.2	13.3	15.0	9.8	10.1	9.2	8.3	10.9	8.0	M	7.5	8.5	7.0	3.5	1.6	2.8	3.0	1.8	1.5	4.3	5.4	7.3	15.0
24-Jun	5.6	9.6	14.2	13.8	7.9	7.6	9.7	9.2	8.3	6.6	3.3	2.5	5.9	10.5	10.8	13.3	14.6	12.4	10.4	13.8	10.3	7.9	5.7	9.5	9.3	14.6
25-Jun	8.9	6.3	7.0	8.9	7.1	6.9	8.7	13.0	14.9	12.0	5.2	5.8	9.6	11.1	14.2	20.9	10.1	4.1	2.9	2.5	1.8	1.9	3.4	3.9	8.0	20.9
26-Jun	3.4	3.9	7.5	7.1	4.4	3.0	4.1	7.8	7.0	4.1	10.7	6.7	4.5	4.6	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	10.7
27-Jun	PF	PF	PF	PF	PF	PF	PF	PF	PF	M	M	M	10.4	11.2	10.1	8.1	11.8	18.0	11.6	7.5	10.4	8.2	9.5	14.7	--	18.0
28-Jun	14.2	14.1	16.1	12.3	8.5	10.9	8.2	5.6	8.7	6.0	7.3	9.4	11.3	7.2	3.9	3.4	5.3	10.2	9.5	10.9	12.5	17.9	30.2	33.1	11.5	33.1
29-Jun	32.0	24.8	28.3	25.6	24.0	26.0	29.2	22.2	19.4	24.3	39.5	26.3	24.2	19.4	24.6	33.2	30.2	21.5	15.2	13.4	11.2	13.0	16.2	17.9	23.4	39.5
30-Jun	21.2	25.5	34.9	34.3	37.8	34.1	25.1	15.9	14.8	8.6	4.5	7.4	8.4	8.9	9.6	9.9	8.2	8.2	8.5	6.3	7.3	8.7	8.0	9.5	15.2	37.8
																								Diurnal Average		
																								Diurnal Maximum		
																								8.3 32.0		
																								8.3 25.5		
																								9.4 34.9		
																								9.4 34.3		
																								8.8 37.8		
																								8.1 34.1		
																								7.0 29.2		
																								6.5 22.2		
																								7.0 21.8		
																								6.9 24.3		
																								6.5 39.5		
																								6.0 26.3		
																								5.7 24.2		
																								5.5 19.4		
																								6.1 24.6		
																								7.4 33.2		
																								6.8 30.2		
																								6.4 21.5		
																								6.6 15.2		
																								6.9 21.4		
																								7.2 29.4		
																								7.5 31.0		
																								8.2 32.5		
																								8.0 33.1		

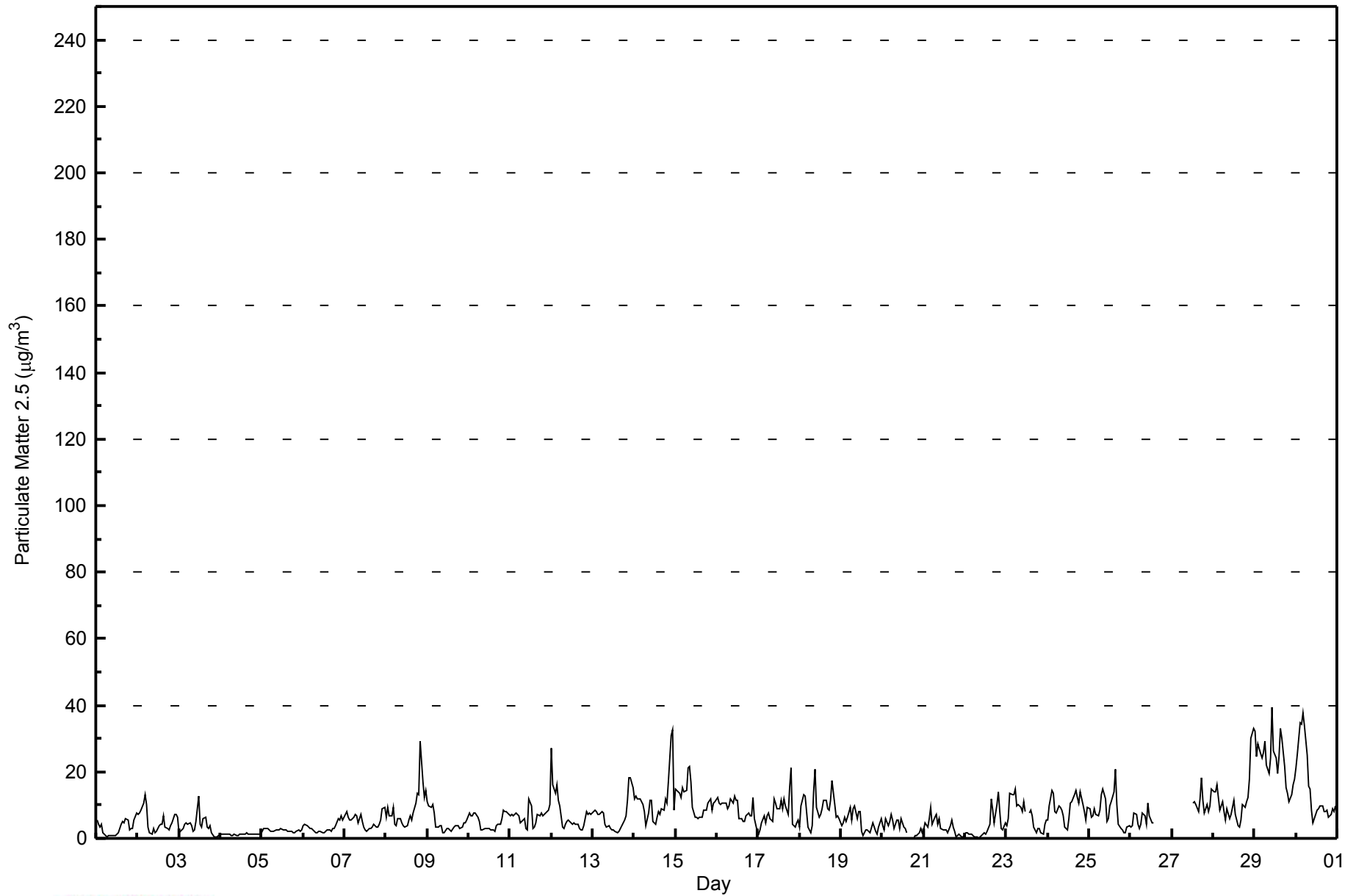
M - Maintenance UO - Unstable Operation PF - Power Failure

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 - Bertha Ganter - June 2014





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	302	43.52	43.52
6 - 15	317	45.68	89.19
16 - 25	30	4.32	93.52
26 - 80	20	2.88	96.40
> 81.0	0	0.00	96.40

Total Number of Valid Hours: 694

Total Number of Hours: 720



WBEA
Frequency Distribution

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

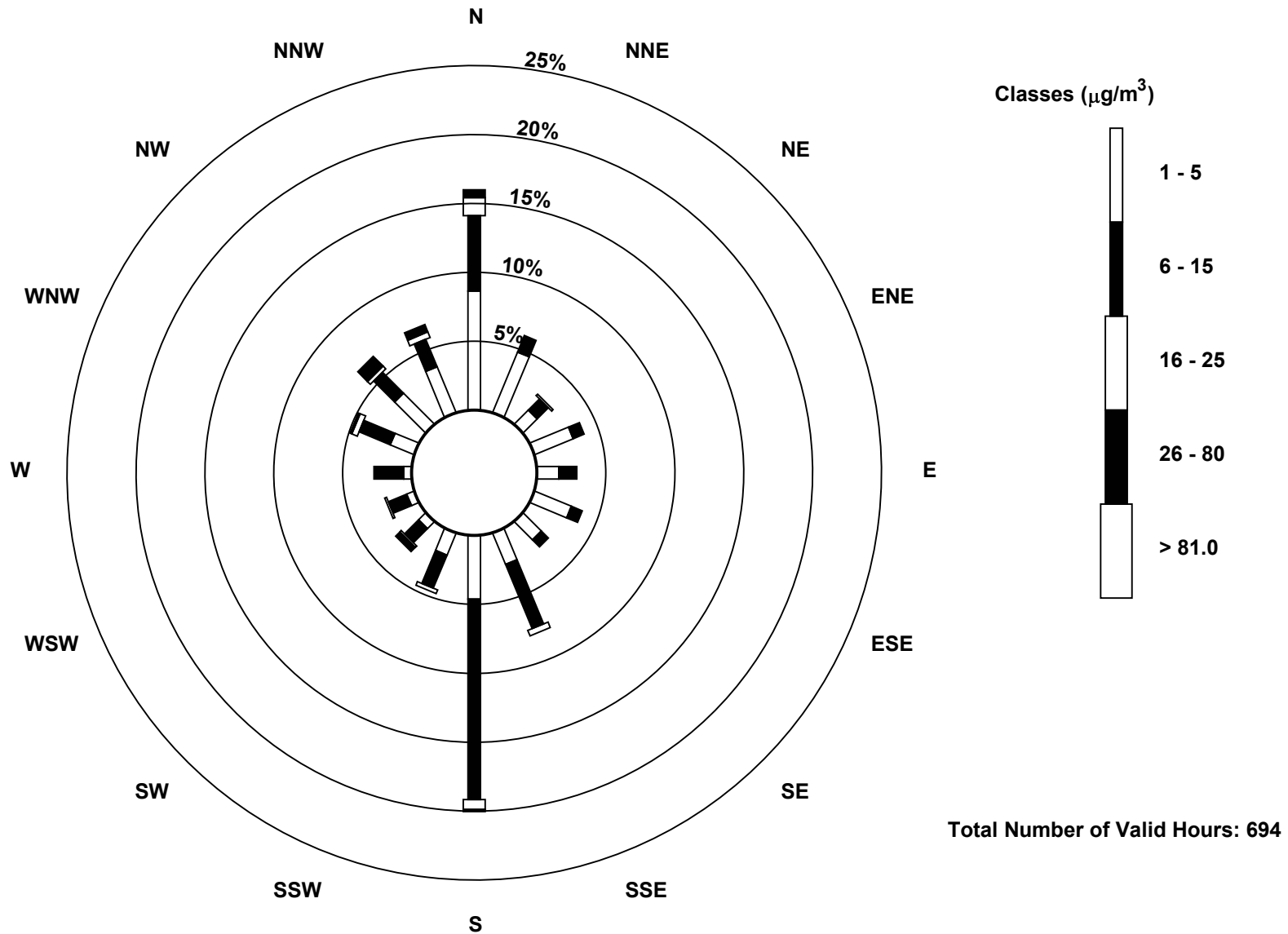
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	60	33	10	21	11	20	13	17	32	12	5	4	4	13	22	25	302
6 - 15	38	9	8	6	9	6	5	35	101	18	10	10	15	17	15	15	317
16 - 25	9	0	1	0	0	0	0	3	5	2	1	1	0	3	2	3	30
26 - 80	4	0	0	0	0	0	0	0	1	0	3	0	0	1	7	4	20
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	111	42	19	27	20	26	18	55	139	32	19	15	19	34	46	47	669

Total Number of Valid Hours: 694

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Jun 2014

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





Summary of Hour Averages

Fort McKay - Bertha Ganter - June 2014

Number of Exceedences (AAAQO): 1-hr: 0	Maximum Value: 0 ppb on Jun 1 01:00	Maximum Daily Average: 0.0 ppb on Jun 1	Hours in Service: 720
Minimum Value: 0 ppb on Jun 1 01:00	Minimum Daily Average: 0.0 ppb on Jun 1	Minimum Diurnal Average: 0.0 ppb at hour 1	Hours of Data: 646
Maximum Diurnal Average: 0.0 ppb at hour 1	Minimum Diurnal Average: 0.0 ppb at hour 1	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 0	Hours of Missing Data: 74
Monthly Average: 0.0 ppb			Hours of Calibration: 44
			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-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
5-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
6-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
7-Jun	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
8-Jun	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
9-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-Jun	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
11-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
14-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
16-Jun	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
17-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
18-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
19-Jun	0	Z	RE	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	C	C	0.0	0
20-Jun	C	C	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
25-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
26-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
28-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Jun	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0

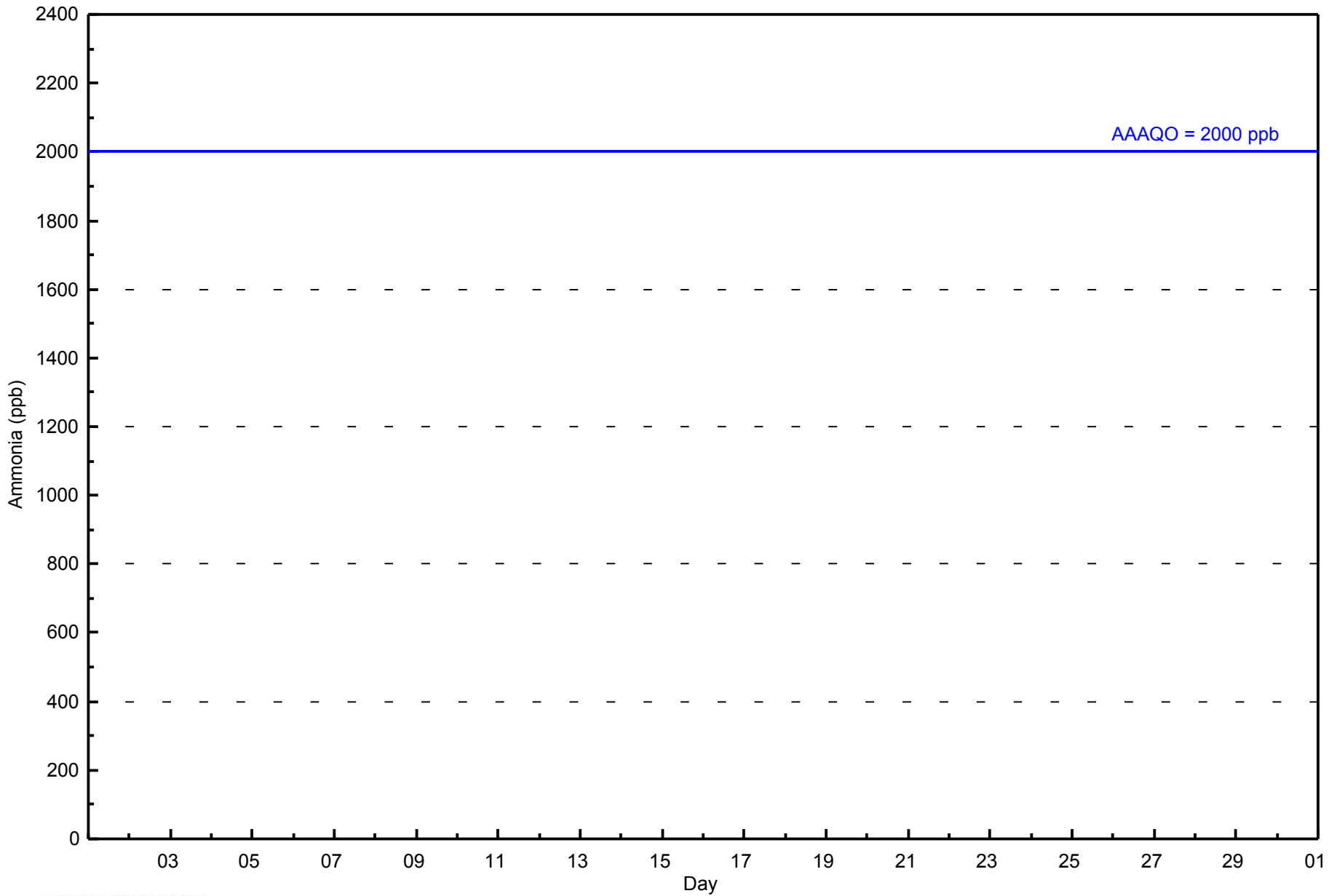
0.0	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
0	--	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	646	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: 646

Total Number of Hours: 720



WBEA
Frequency Distribution

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

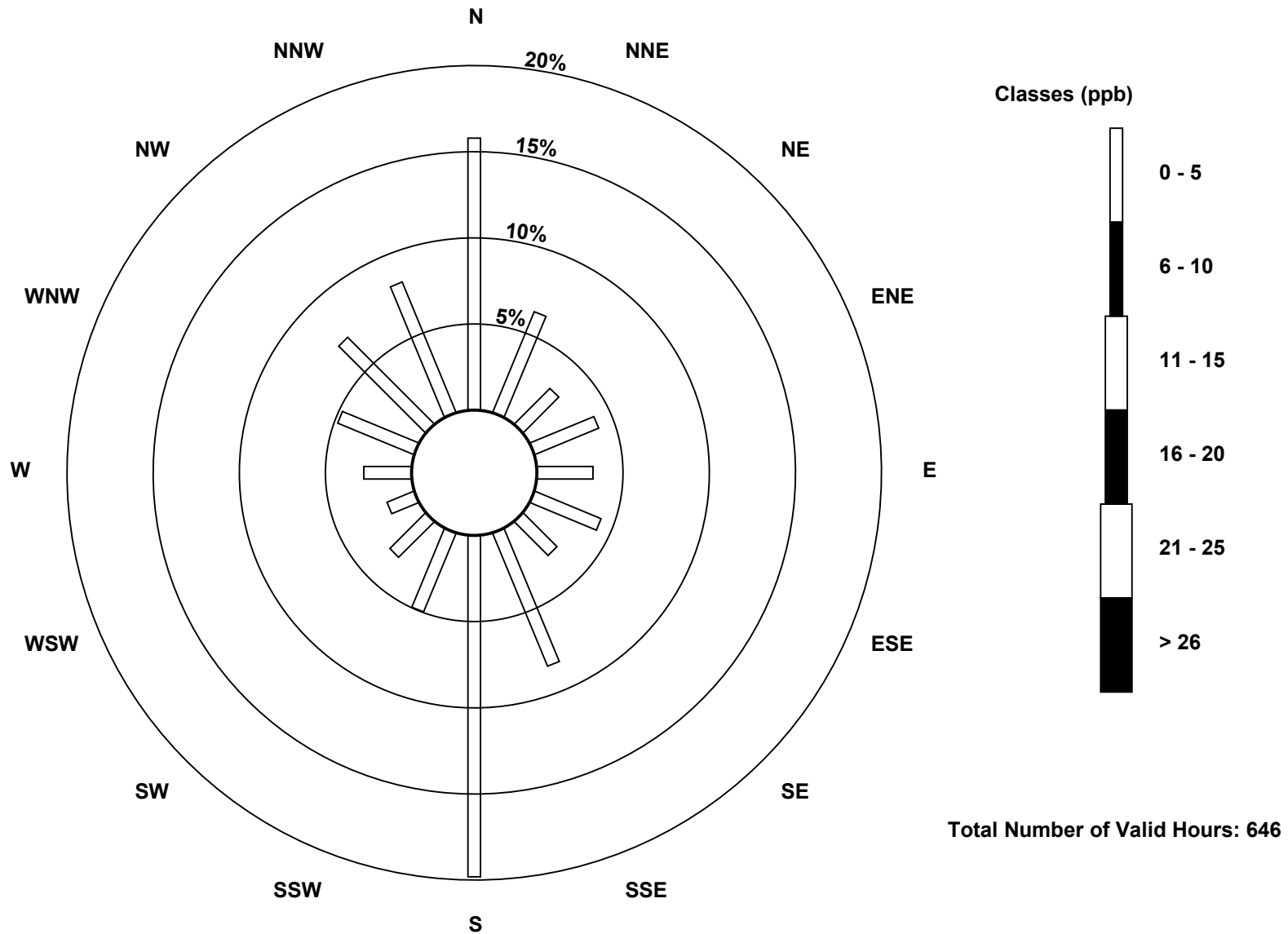
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	102	41	19	26	21	27	18	54	128	32	19	11	18	31	46	53	646
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	102	41	19	26	21	27	18	54	128	32	19	11	18	31	46	53	646

Total Number of Valid Hours: 646

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

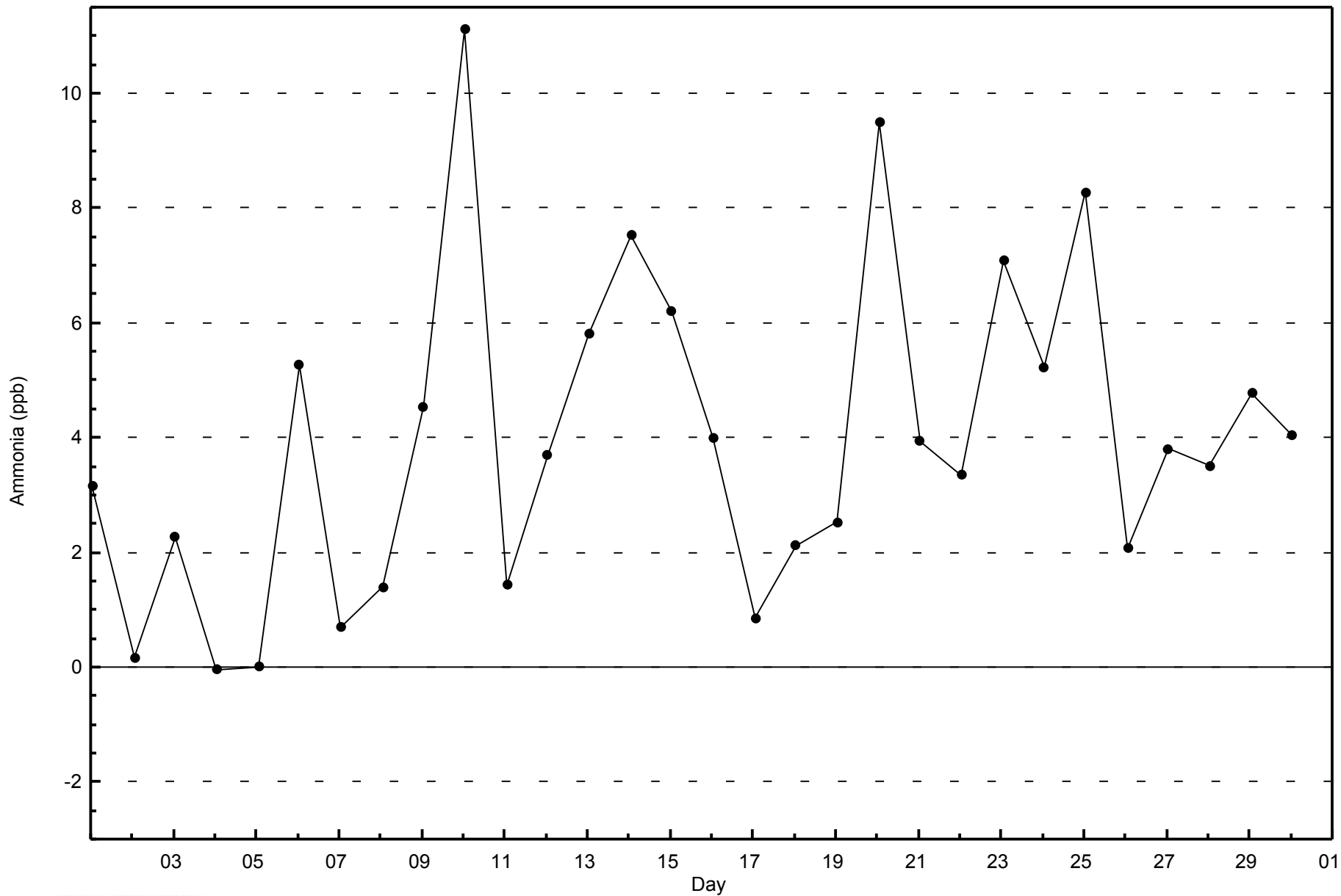
Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

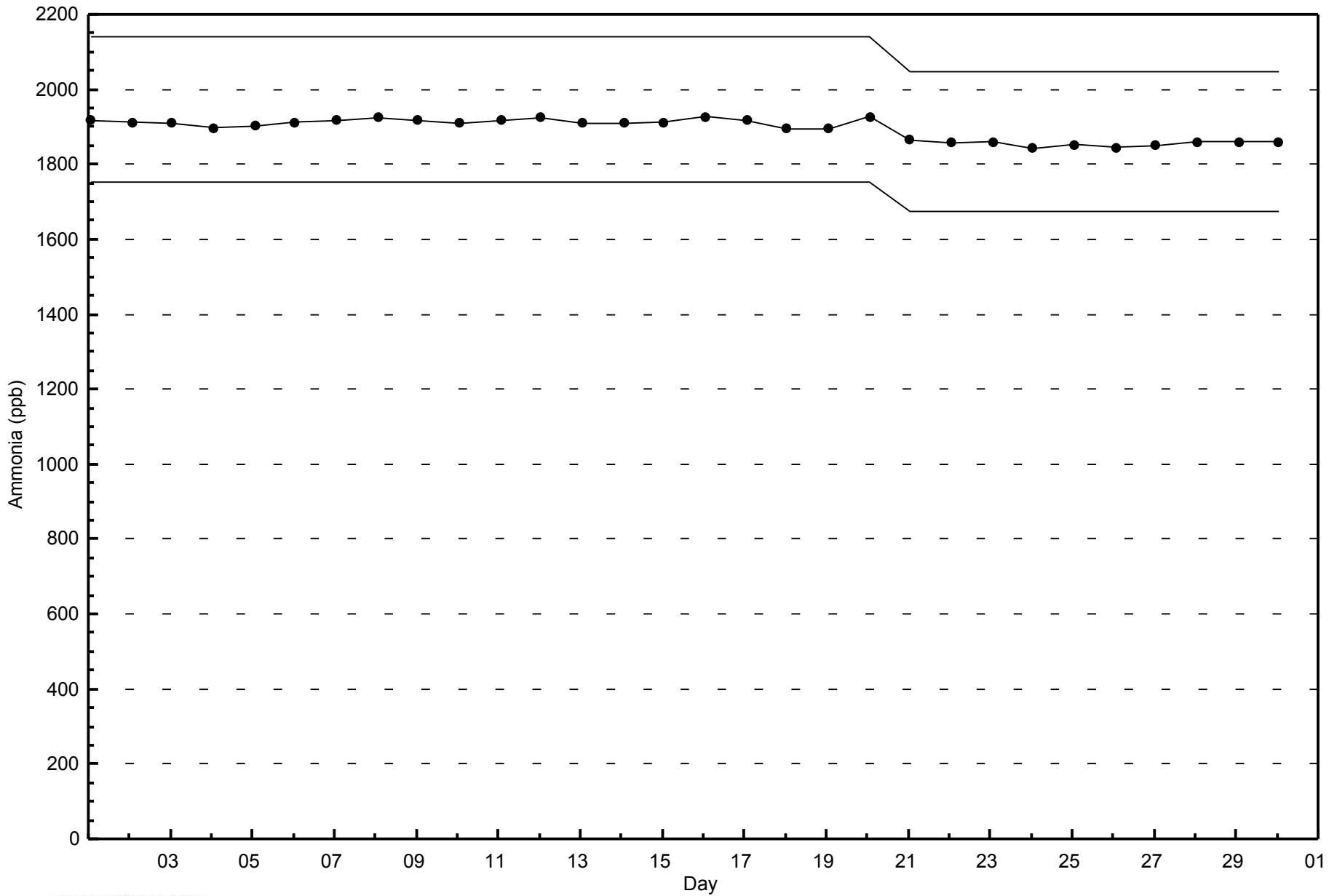
Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - June 2014





WBEA
Span Responses

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



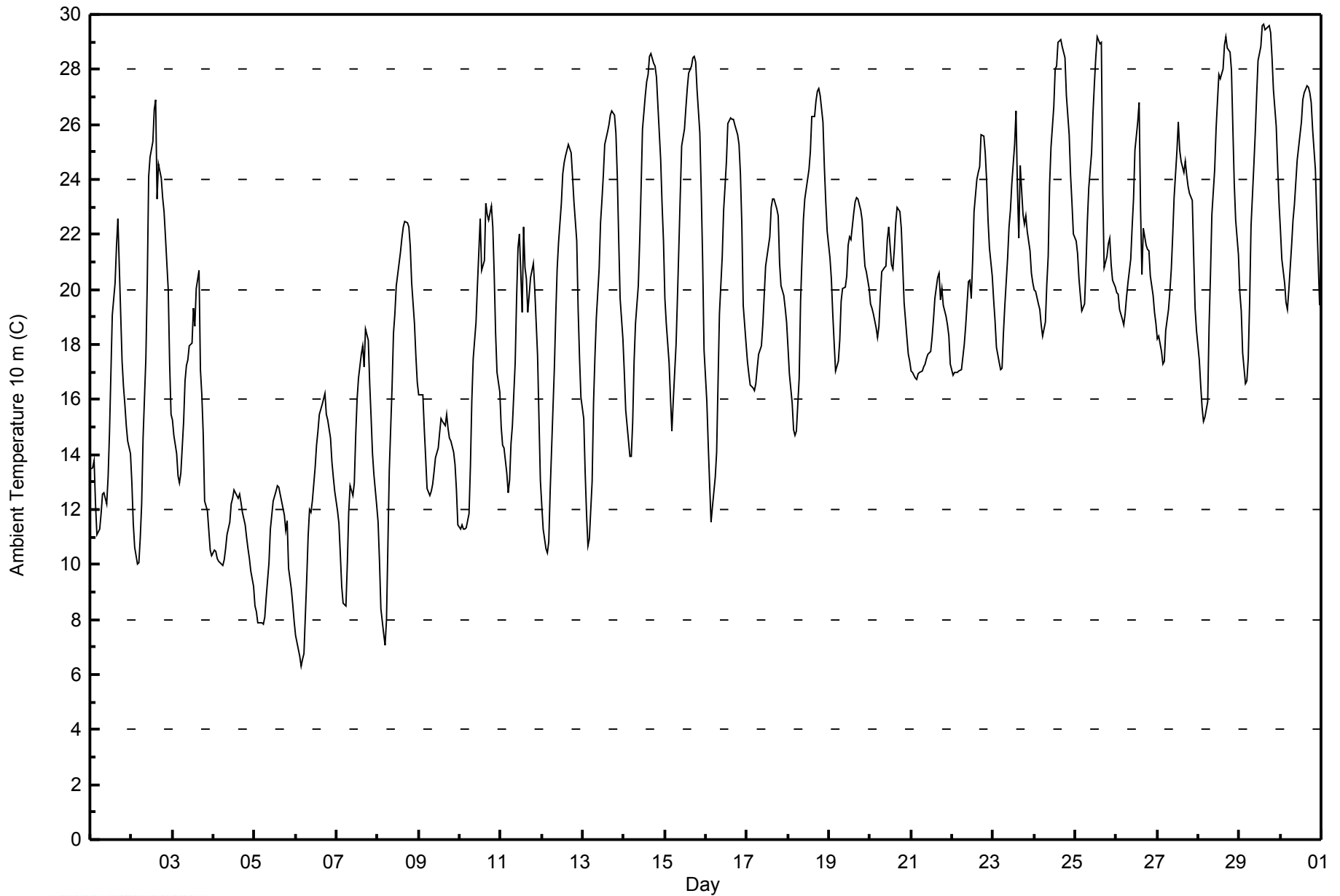


Maximum Value: 29.6 C on Jun 29 15:00		Maximum Daily Average: 24.6 C on Jun 29		Hours in Service: 720																							
Minimum Value: 6.3 C on Jun 6 04:00		Minimum Daily Average: 10.2 C on Jun 5		Hours of Data: 720																							
Maximum Diurnal Average: 23.0 C at hour 16		Minimum Diurnal Average: 13.9 C at hour 5		Hours of Missing Data: 0																							
Monthly Average: 19.04 C		Percentiles: P ₁ = 7.4 P ₁₀ = 11.5 Q ₁ = 15.0 Median = 19.4 Q ₃ = 22.9 P ₉₀ = 26.2 P ₉₉ = 29.1		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-Jun	13.5	13.5	13.8	12.2	11.1	11.3	11.9	12.5	12.6	12.2	13.2	14.8	16.9	19.1	20.2	21.5	22.6	20.8	17.4	16.5	15.8	15.1	14.5	14.0	15.3	22.6	
2-Jun	12.9	11.5	10.6	10.0	10.1	11.0	12.2	14.6	17.5	20.2	24.1	24.8	25.4	26.6	26.9	23.3	24.6	24.0	23.3	22.8	21.9	20.0	17.3	15.5	18.8	26.9	
3-Jun	15.3	14.7	14.0	13.2	12.9	13.3	15.2	16.7	17.2	17.5	18.0	18.1	19.3	18.6	20.0	20.7	17.1	16.2	14.7	12.3	11.9	11.2	10.5	10.3	15.4	20.7	
4-Jun	10.5	10.5	10.2	10.1	10.1	10.0	10.2	10.6	11.1	11.5	12.2	12.4	12.7	12.6	12.4	12.6	12.3	11.9	11.4	11.0	10.6	10.2	9.8	9.2	11.1	12.7	
5-Jun	8.5	8.3	7.9	7.9	7.9	7.8	8.1	8.8	10.0	11.3	11.8	12.3	12.6	12.9	12.8	12.6	12.3	11.8	11.2	11.6	9.9	9.1	8.5	8.0	10.2	12.9	
6-Jun	7.4	7.1	6.7	6.3	6.5	6.8	9.5	11.0	12.0	11.9	12.3	13.5	14.3	14.9	15.4	15.8	16.0	16.2	15.5	15.2	14.6	13.7	13.2	12.6	12.0	16.2	
7-Jun	12.0	11.5	10.4	9.2	8.6	8.5	10.0	11.9	12.8	12.5	12.9	14.7	16.0	16.8	17.6	18.0	17.2	18.6	18.2	16.6	15.3	14.0	13.3	12.1	13.7	18.6	
8-Jun	11.5	10.1	8.4	7.5	7.1	8.0	10.7	13.4	16.5	18.4	19.1	20.1	20.9	21.3	21.9	22.3	22.5	22.4	22.3	21.5	20.3	18.8	17.6	16.6	16.6	22.5	
9-Jun	16.2	16.2	16.2	14.9	13.9	12.7	12.5	12.6	12.9	13.4	13.9	14.3	14.8	15.3	15.2	15.0	15.4	14.9	14.6	14.5	14.1	13.6	12.7	11.4	14.2	16.2	
10-Jun	11.3	11.4	11.3	11.3	11.3	11.9	13.6	15.9	17.5	18.8	20.1	21.3	22.6	20.7	21.1	23.1	22.7	22.5	23.0	22.3	20.5	18.4	17.0	16.3	17.7	23.1	
11-Jun	15.0	14.3	14.2	13.3	12.6	13.1	14.4	15.1	17.3	19.7	21.5	22.0	19.1	22.3	20.8	20.4	19.2	20.4	20.7	20.9	20.0	17.6	15.3	13.1	17.6	22.3	
12-Jun	12.1	11.3	10.6	10.4	10.8	12.6	15.7	17.1	19.1	20.8	21.7	23.2	24.2	24.6	24.8	25.3	25.1	25.0	24.1	23.2	21.8	19.3	17.5	16.1	19.0	25.3	
13-Jun	15.3	13.3	11.8	10.7	10.9	13.0	15.8	17.5	19.0	20.8	22.4	23.2	24.1	25.2	25.7	26.0	26.3	26.5	26.4	25.7	24.1	21.8	19.7	18.2	20.2	26.5	
14-Jun	17.0	15.6	15.1	14.0	13.9	15.2	17.4	18.8	20.2	21.8	23.7	25.9	27.1	27.6	27.8	28.5	28.6	28.2	28.1	27.7	26.7	24.7	23.1	21.8	22.4	28.6	
15-Jun	19.7	18.8	17.3	16.1	14.8	15.9	18.0	19.7	21.5	23.4	25.2	25.9	26.6	27.3	27.9	28.1	28.4	28.5	28.3	27.3	25.7	23.5	21.1	17.8	22.8	28.5	
16-Jun	15.9	14.4	12.9	11.6	12.1	13.2	14.1	16.6	19.1	21.2	22.9	23.7	24.7	26.1	26.2	26.2	26.2	26.0	25.6	25.3	24.2	22.4	19.4	18.0	20.3	26.2	
17-Jun	17.4	16.9	16.5	16.4	16.3	16.6	17.1	17.6	17.9	18.7	19.8	20.8	21.6	21.9	23.0	23.3	23.3	22.9	22.7	20.9	20.1	19.8	19.3	18.8	19.6	23.3	
18-Jun	17.9	16.9	15.9	14.9	14.7	14.8	16.8	19.6	21.1	22.5	23.3	24.0	24.3	25.0	26.3	26.3	26.8	27.2	27.3	27.0	26.1	24.4	23.2	22.1	22.0	27.3	
19-Jun	21.2	20.4	19.1	18.0	17.0	17.4	18.2	19.6	20.0	20.1	20.5	21.6	21.9	21.8	22.8	23.2	23.3	23.3	22.9	22.5	21.6	20.9	20.6	20.1	20.7	23.3	
20-Jun	19.5	19.3	19.1	18.6	18.2	18.7	19.7	20.6	20.8	20.8	21.8	22.3	20.9	20.8	21.5	22.4	23.0	22.8	22.2	20.9	19.5	18.2	17.6	17.4	20.3	23.0	
21-Jun	17.0	17.0	16.8	16.7	16.9	17.0	17.0	17.2	17.3	17.5	17.6	17.7	18.3	18.9	19.7	20.4	20.6	19.6	20.0	19.4	19.0	18.7	18.3	17.3	18.2	20.6	
22-Jun	16.9	17.0	17.0	17.0	17.0	17.1	17.5	18.0	18.7	20.3	20.3	19.7	21.1	22.8	24.0	24.2	24.5	25.6	25.6	25.0	23.9	22.5	21.5	20.5	20.7	25.6	
23-Jun	19.6	18.9	17.9	17.3	17.1	17.1	18.4	19.4	21.2	22.2	22.9	23.9	25.3	26.5	23.7	21.9	24.5	22.7	22.4	22.7	22.1	21.4	20.6	20.2	21.2	26.5	
24-Jun	20.0	19.9	19.5	19.3	18.7	18.3	18.8	20.2	21.2	23.8	25.2	26.7	28.0	28.1	29.0	29.1	28.8	28.6	28.4	27.0	25.6	24.2	23.1	22.0	23.9	29.1	
25-Jun	21.8	21.3	20.4	19.8	19.2	19.5	20.9	22.5	23.7	25.0	26.4	27.5	28.4	29.2	28.9	29.0	23.6	20.8	21.2	21.6	21.8	20.9	20.4	20.1	23.1	29.2	
26-Jun	19.9	19.8	19.3	18.9	18.7	19.1	19.7	20.3	21.1	22.3	23.3	25.1	26.1	26.8	23.0	20.5	22.2	21.6	21.5	21.4	20.5	19.8	19.1	18.7	21.2	26.8	
27-Jun	18.2	18.3	17.8	17.3	17.4	18.5	19.3	20.0	20.8	22.0	23.3	25.0	26.1	25.1	24.7	24.3	24.7	24.2	23.7	23.5	23.3	21.2	19.3	18.5	21.5	26.1	
28-Jun	17.4	16.5	15.7	15.2	15.4	15.9	18.6	20.5	22.7	24.4	25.9	26.9	27.8	27.7	28.0	28.9	29.2	28.8	28.6	28.0	25.9	23.9	22.5	21.2	23.2	29.2	
29-Jun	19.9	19.2	17.7	16.6	16.7	17.5	19.6	22.3	24.5	25.7	27.0	28.3	28.8	29.6	29.6	29.4	29.5	29.6	29.3	28.4	27.3	26.0	24.5	23.2	24.6	29.6	
30-Jun	22.2	21.1	20.2	19.5	19.3	20.0	21.6	22.5	23.1	23.9	24.7	25.6	26.1	26.9	27.2	27.4	27.4	27.2	26.8	25.8	24.3	22.6	21.1	19.4	23.6	27.4	
		16.1	15.5	14.8	14.1	13.9	14.4	15.7	17.1	18.3	19.5	20.6	21.5	22.2	22.8	22.9	23.0	22.9	22.6	22.3	21.6	20.6	19.3	18.1	17.0	Diurnal Average	
		22.2	21.3	20.4	19.8	19.3	20.0	21.6	22.5	24.5	25.7	27.0	28.3	28.8	29.6	29.6	29.4	29.5	29.6	29.3	28.4	27.3	26.0	24.5	23.2	Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	31	4.31	4.31
10 - 20	361	50.14	54.44
> 20	328	45.56	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

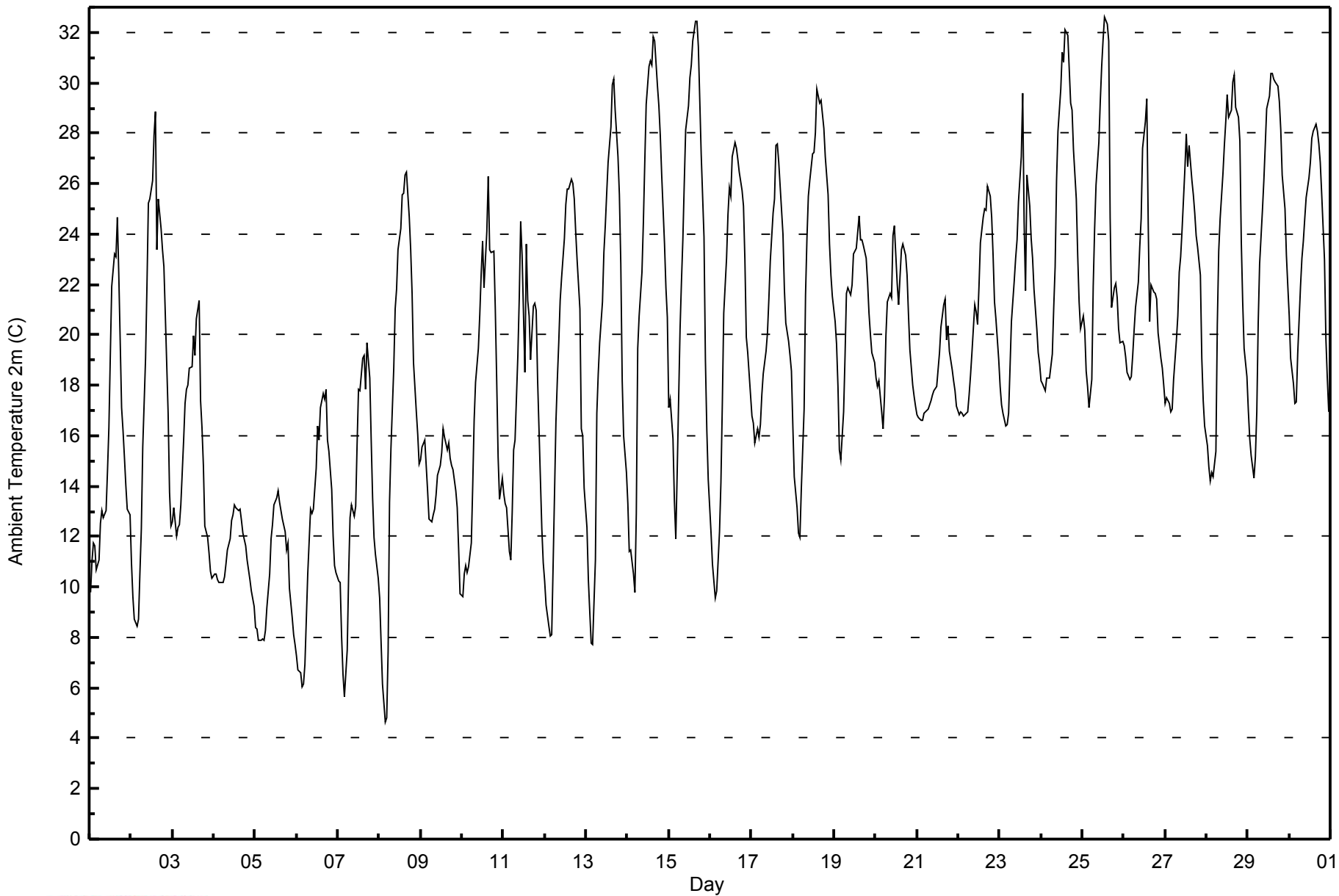


Maximum Value: 32.6 C on Jun 25 14:00																				Maximum Daily Average: 24.5 C on Jun 24					Hours in Service: 720																							
Minimum Value: 4.6 C on Jun 8 04:00																				Minimum Daily Average: 10.4 C on Jun 5					Hours of Data: 720																							
Maximum Diurnal Average: 24.8 C at hour 15																				Minimum Diurnal Average: 12.6 C at hour 5					Hours of Missing Data: 0																							
Monthly Average: 19.18 C																				Percentiles: P ₁ = 6.5 P ₁₀ = 10.6 Q ₁ = 14.3 Median = 19.1 Q ₃ = 23.8 P ₉₀ = 27.6 P ₉₉ = 31.7					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-Jun	9.8	11.0	11.7	11.7	10.7	11.1	12.5	13.0	12.8	13.0	14.6	16.4	19.2	21.9	23.2	23.1	24.6	22.5	17.1	16.2	15.2	14.0	13.1	12.9	15.5	24.6																						
2-Jun	11.0	9.6	8.7	8.4	8.7	10.5	12.3	15.6	19.1	22.0	25.2	25.4	26.1	27.9	28.9	23.4	25.4	24.2	23.4	22.7	20.8	16.9	13.8	12.4	18.4	28.9																						
3-Jun	12.6	13.1	12.0	12.4	12.4	13.3	15.8	17.3	17.8	18.0	18.7	18.8	19.9	19.2	20.7	21.4	17.4	16.3	14.8	12.4	12.0	11.4	10.6	10.4	15.4	21.4																						
4-Jun	10.5	10.5	10.3	10.2	10.2	10.2	10.4	10.9	11.4	11.9	12.6	12.9	13.3	13.2	13.0	13.1	12.7	12.1	11.6	11.1	10.7	10.3	9.8	9.2	11.3	13.3																						
5-Jun	8.4	8.3	7.9	7.9	7.9	7.9	8.3	9.2	10.5	11.9	12.5	13.3	13.5	13.8	13.4	13.0	12.7	12.2	11.5	11.8	10.0	8.8	8.1	7.7	10.4	13.8																						
6-Jun	7.3	6.7	6.6	6.1	6.1	6.9	10.5	11.8	13.1	12.9	13.1	14.7	16.4	15.8	17.1	17.7	17.5	17.8	15.8	15.4	13.9	12.0	10.8	10.6	12.4	17.8																						
7-Jun	10.2	10.2	8.1	6.5	5.6	7.5	10.4	12.7	13.2	12.8	13.2	15.7	17.9	17.8	19.0	19.2	17.8	19.7	18.3	15.8	13.5	12.0	11.3	10.3	13.3	19.7																						
8-Jun	9.6	7.8	6.2	4.6	4.8	7.5	13.4	15.5	18.7	21.0	21.8	23.4	24.2	25.6	25.6	26.4	26.4	24.7	23.4	21.7	18.9	17.0	16.1	14.9	17.5	26.4																						
9-Jun	15.0	15.5	15.8	14.8	13.8	12.7	12.6	12.9	13.1	13.6	14.4	14.8	15.3	16.3	15.9	15.4	15.7	15.1	14.8	14.7	13.8	13.1	11.5	9.7	14.2	16.3																						
10-Jun	9.6	10.5	10.9	10.6	10.8	11.8	14.0	16.6	18.1	19.5	20.8	22.5	23.7	21.8	24.1	26.3	23.4	23.3	23.3	21.0	18.2	15.2	13.5	14.3	17.6	26.3																						
11-Jun	13.7	13.3	13.1	11.4	11.1	13.0	15.4	15.8	19.2	21.5	24.5	23.1	18.5	23.6	21.4	20.8	19.0	21.1	21.2	20.9	18.2	14.3	12.3	11.0	17.4	24.5																						
12-Jun	10.3	9.3	8.4	8.1	8.1	10.8	16.6	18.2	19.7	21.4	22.2	23.8	25.2	25.8	25.8	26.2	26.0	25.4	24.1	23.0	21.1	16.3	16.0	13.9	18.6	26.2																						
13-Jun	12.3	10.3	9.0	7.8	7.7	11.1	16.9	18.5	19.7	21.3	23.3	24.3	25.6	26.9	28.2	29.9	30.2	28.9	27.1	25.5	22.8	18.2	16.0	14.5	19.8	30.2																						
14-Jun	13.3	11.4	11.5	10.5	9.8	12.9	19.5	20.8	22.5	24.5	26.8	29.1	30.7	30.9	30.7	31.8	31.7	29.9	29.1	27.9	26.4	23.6	21.8	20.7	22.8	31.8																						
15-Jun	17.1	17.4	15.9	13.4	11.9	14.6	20.2	22.1	23.8	26.0	28.1	29.1	30.2	30.7	31.6	32.4	32.4	31.4	29.3	27.2	23.9	19.0	16.2	14.3	23.3	32.4																						
16-Jun	12.2	10.9	10.2	9.6	9.8	12.2	14.1	17.3	20.8	23.0	24.8	25.8	25.5	27.1	27.6	27.4	26.9	26.4	25.7	25.1	23.0	19.9	19.3	17.6	20.1	27.6																						
17-Jun	16.8	16.5	15.7	16.3	16.0	16.4	17.6	18.4	19.4	20.1	21.4	22.9	24.9	25.4	27.5	27.6	26.9	25.0	24.0	21.8	20.5	19.8	19.2	18.5	20.8	27.6																						
18-Jun	16.4	14.4	13.1	12.2	12.0	13.9	17.1	21.6	23.8	25.5	26.1	27.2	27.3	28.0	29.7	29.2	29.3	28.8	28.2	27.1	25.6	23.6	22.4	21.5	22.7	29.7																						
19-Jun	20.5	19.6	18.0	15.4	15.0	17.0	19.1	21.7	21.9	21.6	22.0	23.2	23.3	23.4	24.7	23.8	23.8	23.6	23.0	22.1	20.8	20.0	19.3	18.9	20.9	24.7																						
20-Jun	18.3	18.0	18.2	16.9	16.3	17.6	20.0	21.3	21.6	21.5	23.9	24.3	22.0	21.2	22.3	23.4	23.6	23.2	22.4	20.8	19.4	18.0	17.6	17.2	20.4	24.3																						
21-Jun	16.8	16.7	16.6	16.6	16.9	16.9	17.1	17.2	17.4	17.6	17.8	18.0	18.6	19.3	20.3	21.2	21.4	19.8	20.3	19.3	18.6	18.2	17.8	17.2	18.2	21.4																						
22-Jun	16.8	16.9	16.9	16.8	16.8	16.9	17.6	18.4	19.3	21.2	20.9	20.4	21.9	23.7	24.7	25.0	25.0	25.9	25.5	24.7	23.2	21.3	20.6	19.0	20.8	25.9																						
23-Jun	18.0	17.2	16.9	16.4	16.4	16.9	18.7	20.5	22.2	23.0	23.7	25.3	27.1	29.6	24.5	21.7	26.4	25.1	23.8	23.0	21.8	20.3	19.3	18.9	21.5	29.6																						
24-Jun	18.2	18.1	17.8	18.3	18.3	19.3	21.1	22.7	26.1	28.1	29.8	31.2	30.8	32.1	31.9	30.5	29.2	28.9	27.3	25.4	23.2	21.3	20.3	20.3	24.5	32.1																						
25-Jun	20.8	20.2	18.6	17.9	17.1	18.2	21.9	24.2	25.9	27.6	29.2	30.7	31.7	32.6	32.3	31.6	24.7	21.1	21.8	22.0	21.5	20.3	19.7	19.8	23.8	32.6																						
26-Jun	19.6	19.1	18.5	18.3	18.3	19.2	20.2	21.1	22.1	23.5	24.6	27.4	28.4	29.4	24.4	20.5	22.0	21.7	21.6	21.4	20.1	19.1	18.7	18.0	21.6	29.4																						
27-Jun	17.3	17.5	17.3	16.9	17.0	18.2	19.8	20.7	22.5	23.1	24.1	26.6	28.0	26.7	27.5	26.1	25.6	24.8	24.0	23.5	22.4	19.1	17.4	16.4	21.8	28.0																						
28-Jun	15.6	14.8	14.2	14.5	14.4	15.4	20.4	23.3	24.6	26.4	27.5	28.5	29.5	28.7	28.9	30.0	30.3	29.0	28.6	27.7	23.7	21.3	19.4	18.3	23.1	30.3																						
29-Jun	17.0	15.9	15.2	14.3	15.2	16.9	20.5	22.8	24.9	26.1	27.5	29.0	29.5	30.4	30.4	30.2	30.0	29.8	29.3	28.2	26.3	25.0	23.2	21.9	24.1	30.4																						
30-Jun	20.8	19.1	18.1	17.3	17.4	19.2	21.9	23.1	23.7	24.6	25.4	26.3	26.8	27.8	28.1	28.3	28.1	27.5	26.9	25.6	23.0	19.9	18.3	16.9	23.1	28.3																						
																								14.5	14.0	13.4	12.7	12.6	13.8	16.5	18.1	19.5	20.7	22.0	23.1	23.9	24.5	24.8	24.6	24.2	23.5	22.6	21.6	19.8	17.7	16.5	15.6	Diurnal Average
																								20.8	20.2	18.6	18.3	18.3	19.2	21.9	24.2	25.9	27.6	29.2	30.7	31.7	32.6	32.3	32.4	32.4	31.4	29.3	28.2	26.4	25.0	23.2	21.9	Diurnal Maximum



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	47	6.53	6.53
10 - 20	350	48.61	55.14
> 20	323	44.86	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

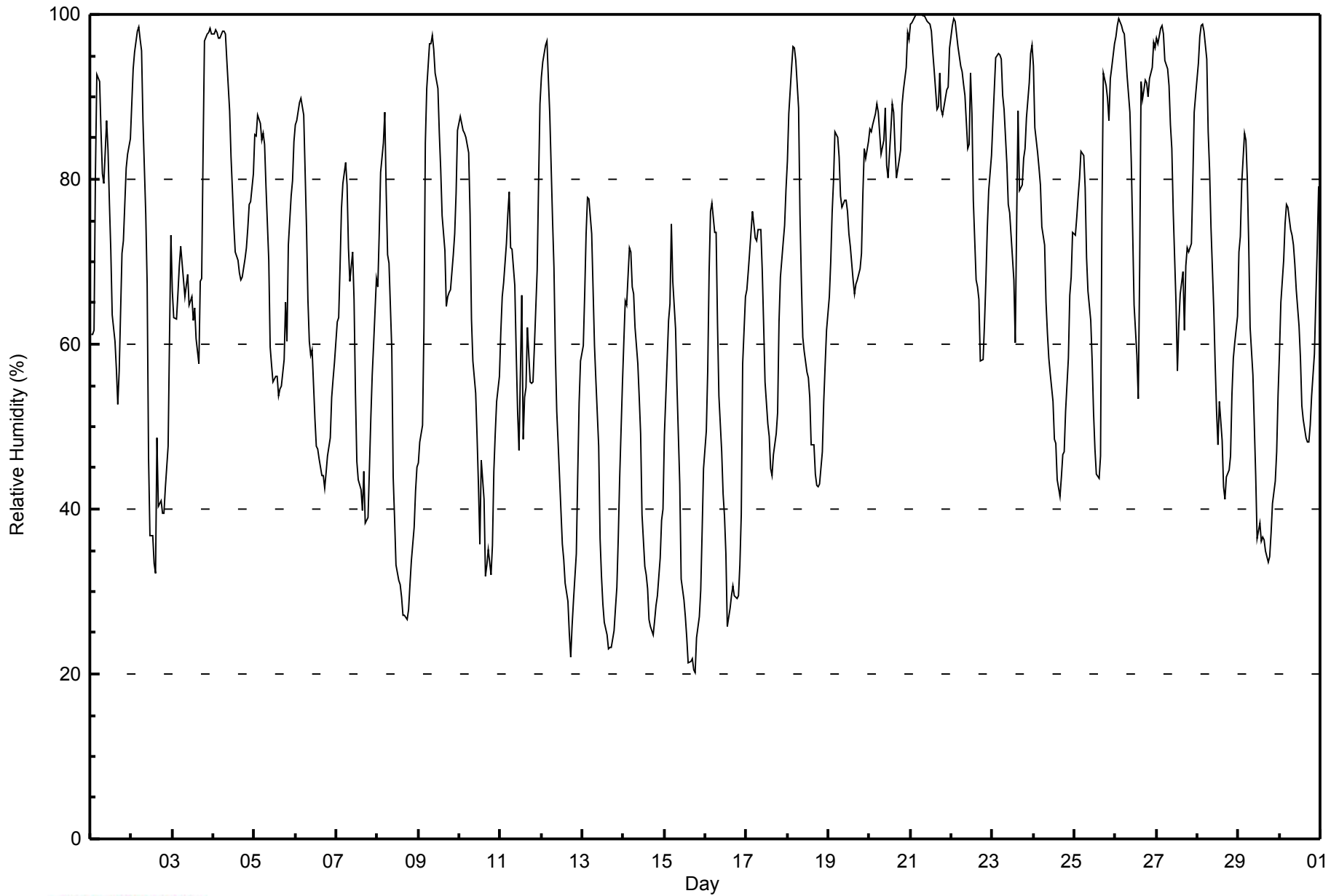


Maximum Value: 100 % on Jun 21 04:00																			Maximum Daily Average: 95.7 % on Jun 21						Hours in Service: 720																									
Minimum Value: 20 % on Jun 15 19:00																			Minimum Daily Average: 40.1 % on Jun 15						Hours of Data: 720																									
Maximum Diurnal Average: 86.4 % at hour 5																			Minimum Diurnal Average: 51.5 % at hour 15						Hours of Missing Data: 0																									
Monthly Average: 66.9 %																			Percentiles: P ₁ = 23 P ₁₀ = 36 Q ₁ = 50 Median = 68 Q ₃ = 85 P ₉₀ = 95 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-Jun	61	61	62	81	93	92	86	81	79	87	84	77	71	64	60	57	53	57	71	73	77	81	83	85	73.9	93																								
2-Jun	89	93	95	98	99	97	96	87	76	67	46	37	37	33	32	49	40	41	39	39	42	48	61	73	63.2	99																								
3-Jun	66	63	63	66	70	72	68	66	67	69	65	66	63	64	61	58	68	68	83	97	98	98	98	98	73.0	98																								
4-Jun	98	98	98	97	97	98	98	98	94	88	83	79	74	71	70	69	68	68	70	72	74	77	77	81	83.2	98																								
5-Jun	85	85	88	87	85	86	84	79	70	60	58	55	56	56	54	55	55	58	65	60	72	78	80	85	70.6	88																								
6-Jun	87	87	89	90	89	88	74	65	60	59	59	51	48	47	46	44	44	43	44	46	49	54	56	58	61.5	90																								
7-Jun	63	63	69	76	80	82	79	72	68	71	65	54	46	44	42	40	45	38	39	45	51	56	60	68	59.0	82																								
8-Jun	67	73	81	84	88	78	71	70	59	44	39	33	31	31	29	27	27	27	28	31	34	38	42	45	49.1	88																								
9-Jun	46	48	50	62	84	91	97	97	97	96	93	91	86	81	76	71	65	66	66	67	71	73	78	86	76.5	97																								
10-Jun	88	87	86	86	85	83	76	63	58	54	49	43	36	46	41	32	33	35	32	36	45	49	53	56	56.3	88																								
11-Jun	62	66	67	72	76	79	72	72	67	59	52	47	66	48	54	55	62	55	55	55	60	69	80	89	64.1	89																								
12-Jun	92	94	96	97	92	88	75	69	59	52	48	40	36	34	31	29	25	22	26	29	35	44	53	58	55.2	97																								
13-Jun	60	66	73	78	78	73	67	60	56	48	36	32	29	26	25	23	23	25	28	30	36	44	55	55	45.6	78																								
14-Jun	60	65	65	72	71	67	66	62	58	54	49	39	33	32	30	27	26	25	27	28	29	34	39	40	45.7	72																								
15-Jun	49	54	63	65	75	68	62	55	49	43	31	29	27	24	21	22	22	21	20	24	27	30	37	45	40.1	75																								
16-Jun	50	57	69	76	77	74	74	62	54	47	42	39	35	26	28	30	31	29	29	29	33	39	58	66	48.0	77																								
17-Jun	67	69	71	76	75	73	73	74	74	69	62	55	50	49	45	44	47	49	52	63	68	72	74	79	63.7	79																								
18-Jun	82	88	94	96	96	94	89	76	68	61	59	57	56	54	48	48	44	43	43	43	47	53	57	62	64.8	96																								
19-Jun	66	70	76	80	86	85	83	78	77	77	77	76	73	72	68	66	67	68	69	71	78	84	82	85	75.6	86																								
20-Jun	86	86	87	88	89	88	86	83	85	89	82	80	86	89	88	84	80	82	84	89	91	94	98	97	87.0	98																								
21-Jun	99	99	100	100	100	100	100	100	100	100	99	99	98	95	93	89	89	93	89	88	90	91	91	96	95.7	100																								
22-Jun	99	99	99	98	96	94	93	91	90	84	84	93	88	77	68	67	65	58	58	62	68	74	79	83	82.0	99																								
23-Jun	87	91	95	95	95	90	88	82	77	76	73	68	60	75	88	79	79	83	84	88	92	95	96	96	84.6	96																								
24-Jun	94	86	83	81	79	74	72	65	61	58	56	53	48	48	44	42	44	47	47	52	58	66	68	74	62.5	94																								
25-Jun	73	75	78	80	83	83	79	71	66	63	58	52	47	44	44	47	76	93	91	90	87	92	94	97	73.4	97																								
26-Jun	97	99	99	99	98	98	95	93	88	82	74	65	59	53	69	92	90	92	92	90	92	94	97	96	87.5	99																								
27-Jun	97	96	98	99	98	94	93	91	87	84	76	65	57	63	66	69	62	69	72	71	72	80	88	90	80.7	99																								
28-Jun	94	97	99	99	98	95	86	81	74	64	58	52	48	53	48	43	41	44	45	46	54	58	60	63	66.7	99																								
29-Jun	71	73	80	86	85	80	72	62	56	50	44	37	38	36	37	36	35	34	34	37	41	43	47	54	52.8	86																								
30-Jun	59	65	70	74	77	77	74	73	72	70	67	62	58	53	51	49	48	48	50	54	59	65	72	79	63.6	79																								
																								76.4	78.5	81.4	84.6	86.4	84.8	80.9	76.1	71.7	67.5	62.4	57.7	54.9	52.5	51.5	51.6	51.7	52.5	54.3	56.7	60.6	65.4	70.0	74.5	Diurnal Average		
																								99	99	100	100	100	100	100	100	100	100	99	99	98	95	93	92	90	93	92	97	98	98	98	98	98	Diurnal Maximum	



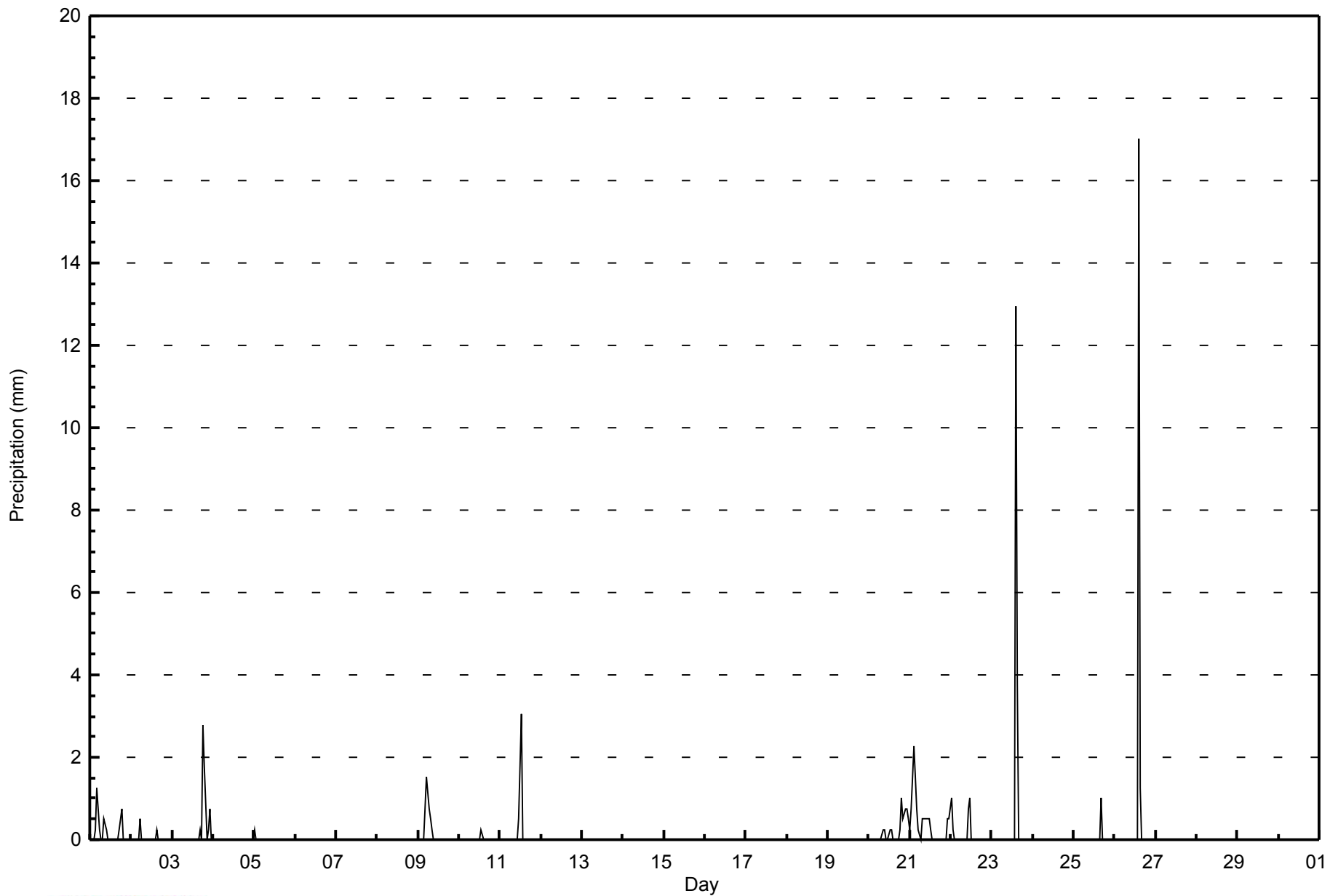
WBEA
Hourly Averages

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





Maximum Value: 17.0 mm on Jun 26 15:00																				Maximum Daily Total: 18.3 mm on Jun 26					Hours in Service: 720	
Minimum Value: 0.0 mm on Jun 1 01:00																				Minimum Daily Total: 0.0 mm on Jun 4					Hours of Data: 720	
Maximum Diurnal Total: 30.0 mm at hour 15																				Minimum Diurnal Total: 0.3 mm at hour 18					Hours of Missing Data: 0	
Monthly Total: 71.63 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 = 1.4					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-Jun	0.0	0.0	0.0	0.3	1.3	0.3	0.0	0.0	0.5	0.3	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	3.6	1.3
2-Jun	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	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.5
3-Jun	0.0	0.0	0.0	0.0	0.0	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	2.8	1.8	0.0	0.3	0.8	0.0	5.8	2.8
4-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	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
6-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.8	1.5	0.8	0.5	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	3.8	1.5
10-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
11-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	3.0
12-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.3	1.0	0.5	0.8	0.8	0.5	4.8	1.0
21-Jun	0.3	0.8	2.3	1.5	0.8	0.3	0.0	0.5	0.5	0.5	0.5	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	9.7	2.3
22-Jun	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.0
23-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.8	13.0
24-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0
26-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.3	17.0
27-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
																								Diurnal Average		
																								Diurnal Maximum		





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	683	94.86	94.86
0.4 - 0.5	13	1.81	96.67
0.6 - 0.7	0	0.00	96.67
0.8 - 1.4	15	2.08	98.75
1.5 - 10	7	0.97	99.72
> 10	2	0.28	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

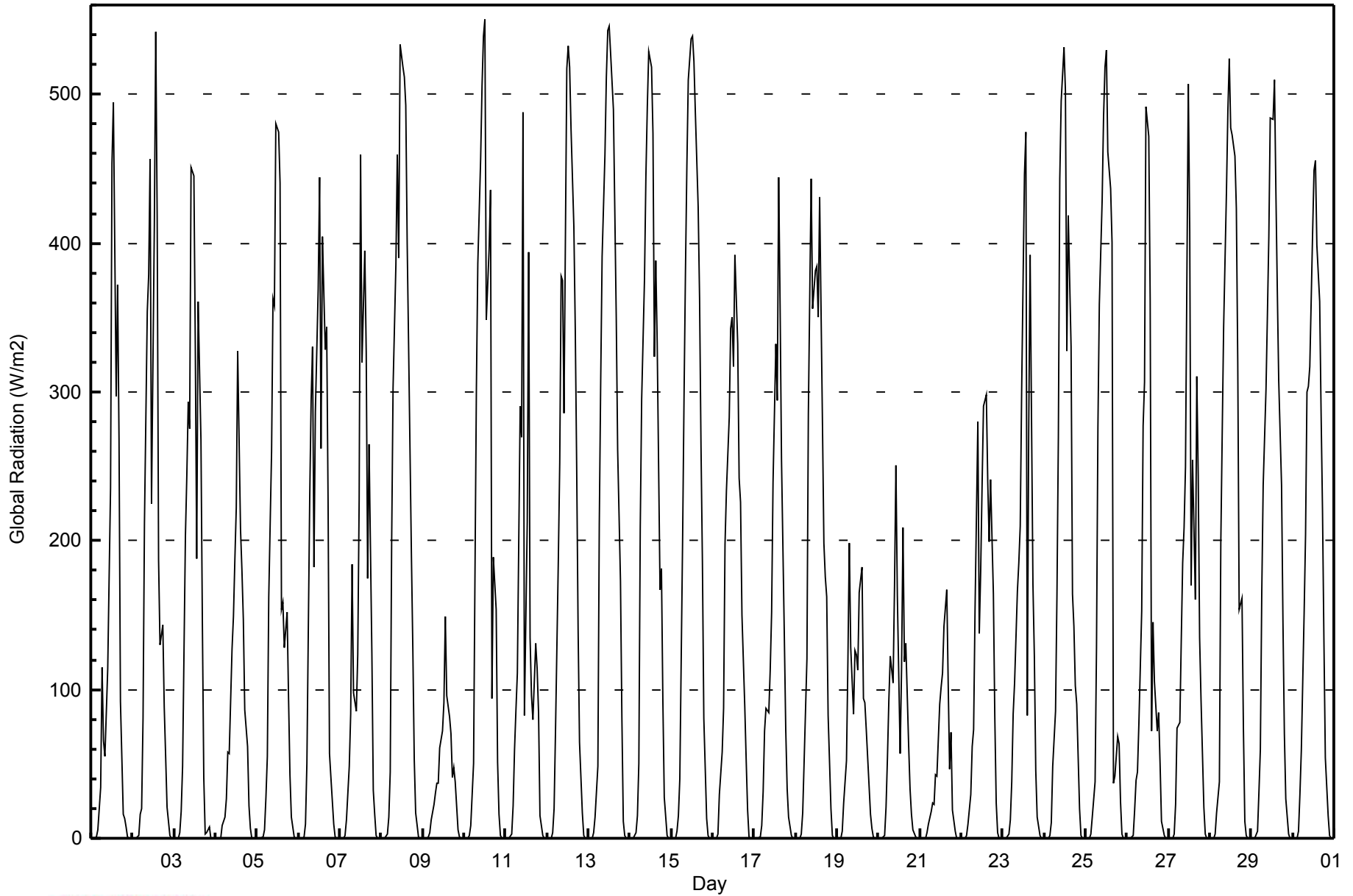


Maximum Value: 550 W/m2 on Jun 10 13:00		Maximum Daily Average: 223.0 W/m2 on Jun 13		Hours in Service: 720																							
Minimum Value: 0 W/m2 on Jun 25 01:00		Minimum Daily Average: 37.4 W/m2 on Jun 9		Hours of Data: 720																							
Maximum Diurnal Average: 387.2 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 1		Hours of Missing Data: 0																							
Monthly Average: 144.8 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 2 Median = 73 Q ₃ = 262 P ₉₀ = 429 P ₉₉ = 536		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-Jun	0	0	0	1	6	35	115	66	55	114	175	235	454	495	297	372	267	92	16	13	8	1	0	0	117.3	495	
2-Jun	0	0	0	2	16	20	80	211	354	379	456	225	412	542	418	187	130	143	89	55	21	2	0	0	156.0	542	
3-Jun	0	0	0	4	18	49	203	244	293	275	451	445	331	188	361	268	145	41	3	4	8	0	0	0	138.8	451	
4-Jun	0	0	0	0	9	14	27	58	57	127	149	187	222	328	208	180	148	86	62	22	7	0	0	0	78.7	328	
5-Jun	0	0	0	1	6	28	55	163	260	362	358	480	475	441	154	159	128	152	95	43	14	1	0	0	140.5	480	
6-Jun	0	0	0	1	10	50	229	294	330	182	287	369	444	262	405	328	344	226	57	41	10	1	0	0	161.3	444	
7-Jun	0	0	0	2	13	49	84	185	98	86	123	228	460	320	394	326	175	265	125	32	16	2	0	0	124.3	460	
8-Jun	0	0	0	2	14	44	198	302	385	459	390	534	519	511	492	399	331	190	128	53	17	1	0	0	207.2	534	
9-Jun	0	0	0	1	4	12	23	30	37	37	60	73	91	149	96	82	70	41	48	38	6	1	0	0	37.4	149	
10-Jun	0	0	0	2	9	50	178	303	387	457	506	539	550	348	396	436	94	189	154	51	16	2	0	0	194.4	550	
11-Jun	0	0	0	3	22	60	86	111	291	270	488	83	212	393	135	96	80	131	114	84	15	2	0	0	111.5	488	
12-Jun	0	0	0	4	20	72	187	253	377	375	285	517	533	518	476	411	342	248	140	64	17	2	0	0	201.8	533	
13-Jun	0	0	0	4	14	48	212	308	391	460	512	543	546	528	490	420	350	261	173	81	11	2	0	0	223.0	546	
14-Jun	0	0	0	3	15	51	209	295	376	445	492	529	519	474	323	388	332	167	182	93	27	2	0	0	205.1	529	
15-Jun	0	0	0	4	15	40	202	298	380	452	510	537	539	522	488	425	363	263	186	81	13	2	0	0	221.7	539	
16-Jun	0	0	0	3	29	58	87	198	233	283	342	350	317	392	333	242	226	150	89	52	19	1	0	0	141.9	392	
17-Jun	0	0	0	1	9	31	72	88	85	113	152	239	332	294	444	358	255	136	73	33	14	2	0	0	113.7	444	
18-Jun	0	0	0	3	17	51	120	284	365	443	356	381	385	350	431	278	198	175	162	83	20	2	0	0	171.1	443	
19-Jun	0	0	0	5	24	52	118	198	128	84	126	124	113	165	182	94	91	73	35	16	7	1	0	0	68.2	198	
20-Jun	0	0	0	2	21	54	93	123	104	169	251	163	56	114	209	119	131	62	33	16	6	1	0	0	72.0	251	
21-Jun	0	0	0	0	4	9	18	23	23	43	42	90	101	111	142	167	104	46	71	19	5	0	0	0	42.5	167	
22-Jun	0	0	0	2	9	30	62	73	152	280	137	179	237	290	298	240	199	241	165	82	24	4	0	0	112.7	298	
23-Jun	0	0	0	3	12	38	83	105	166	185	210	300	446	474	83	274	392	171	123	45	15	2	0	0	130.2	474	
24-Jun	0	0	0	2	10	49	85	163	270	443	496	532	502	328	419	330	164	143	102	91	19	2	0	0	172.9	532	
25-Jun	0	0	0	3	15	38	128	276	358	429	485	519	530	461	437	400	37	42	69	63	24	3	0	0	179.9	530	
26-Jun	0	0	0	2	19	38	44	77	153	277	307	491	471	362	72	146	105	72	84	50	11	2	0	0	116.0	491	
27-Jun	0	0	0	3	23	74	77	133	185	209	250	507	408	169	254	160	311	244	135	93	21	3	0	0	135.8	507	
28-Jun	0	0	0	3	17	38	199	273	344	435	488	524	478	472	458	424	320	154	162	74	11	2	0	0	203.2	524	
29-Jun	0	0	0	5	31	59	165	238	301	353	404	484	483	510	435	369	307	237	145	71	26	3	0	0	192.8	510	
30-Jun	0	0	0	5	29	59	152	204	300	303	317	407	449	456	399	361	285	220	133	55	15	2	0	0	172.9	456	
		0.0	0.0	0.1	2.5	15.3	43.4	119.7	185.9	241.3	284.3	320.2	360.5	387.2	365.6	324.3	281.3	214.2	155.4	105.0	53.2	14.8	1.6	0.0	0.0	Diurnal Average	
		0	0	0	5	31	74	229	308	391	460	512	543	550	542	492	436	392	265	186	93	27	4	0	0	Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	269	37.36	37.36
21 - 100	134	18.61	55.97
101 - 300	166	23.06	79.03
301 - 600	151	20.97	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: 19 km/h on Jun 3 17:00	Maximum Daily Speed Average: 10.3 km/h on Jun 3	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 18 07:00	Minimum Daily Speed Average: 0.3 km/h on Jun 20	Hours of Data: 720
Maximum Diurnal Speed Average: 2.8 km/h at hour 12	Minimum Diurnal Speed Average: 0.2 km/h at hour 7	Hours of Missing Data: 0
Monthly Average Velocity: 0.5 km/h 130.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 6 Q ₃ = 9 P ₉₀ = 12 P ₉₉ = 16	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jun	NE3	E4	SE6	SE2	ENE3	SSE3	SSE7	S6	S10	SSE6	SSE5	SSE7	SSE7	SSE9	SSE7	WNW1	S2	S13	S9	WNW7	S2	S4	W4	SW2	S4.0	S13	
2-Jun	W2	WSW2	WSW2	S4	SSW4	SW3	S6	SSW7	SSW8	S7	WSW6	W6WNW10	W10	WSW8	W5	ESE7	NNE11	NNE8	N9	N6	NNW2	N4	NNW3	W2.1	NNE11		
3-Jun	N6	NNE5	N6	N7	N7	N7	NNE7	N10	N12	N14	N14	NNE15	NNE15	N12	NNE13	N14	N19	N17	N10	N10	NNE6	N8	NNW10	N7	N10.3	N19	
4-Jun	N4	N5	N5	N6	N5	NNW5	NW4	NW3	N2	N7	N8	NNE9	NNE11	NNE14	NNE12	NNE12	N14	N14	N12	NNE10	N9	N9	N10	N11	N8.2	N14	
5-Jun	N10	N11	N11	N12	N10	N10	N11	N11	NNE12	NE11	NNE13	NNE12	NNE11	NNE9	N11	N13	N10	N6	N7	NW6	NNW4	NW4	NW5	N9.2	N13		
6-Jun	NNW4	NW3	NW3	NW2	WNW3	WNW4	NNW4	ENE6	ENE7	NNW3	ENE6	ENE6	ESE6	ENE7	E6	E8	ENE8	ESE7	ENE4	E3	ESE4	ESE2	E1	SE1	ENE2.8	ENE8	
7-Jun	SSW2	S2	ENE3	N4	N2	N5	NW1	NNW1	NNE5	NNW6	N7	E4	ESE3	NNW5	NNE4	N4	NNW9	NNW4	N5	NNW5	NW6	NW2	NW1	SW4	N2.6	NNW9	
8-Jun	W3	WSW2	S2	SSW2	SSW3	SSW5	SSW5	SE7	SSE9	SSE11	SSE10	S12	S11	S12	SSE12	S11	SSE12	SSE11	S11	SSE8	S5	S6	S6	S6	S7.2	S12	
9-Jun	S8	S8	S9	SSW8	S7	SE5	ESE3	ESE3	NNW1	SE4	SSE7	SE7	ESE7	SE11	SE11	ESE11	ESE13	ESE13	ESE10	ESE7	ENE3	ESE4	NNE3	N4	SE5.5	ESE13	
10-Jun	N5	N5	N6	N5	N4	NNW3	N5	NNE8	NNE8	NNE8	NE9	ENE7	NE7	SE6	SSE9	S3	ENE5	ESE5	S2	SW1	WSW3	WNW4	WNW4	WNW5	NNE2.4	SSE9	
11-Jun	WNW5	WNW7	WNW6	S4	S4	S5	SSW6	SSW6	S9	SSE9	SSE13	SSE7	S6	S14	ESE13	S9	ESE3	SSW7	S6	SSW6	SSW3	WSW4	WSW2	W3	S4.7	S14	
12-Jun	SW3	WSW2	SW3	SW4	WSW1	SSE1	NNE2	E1	NNE5	NE6	NE6	NNE9	ENE8	ENE9	NE11	NNE12	NE11	NNE10	NNE9	NE8	NNE6	N6	N7	N5	NNE4.5	NNE12	
13-Jun	N5	NNW5	NW3	NNW4	N4	N4	NE4	ENE4	NNE4	NE7	ENE7	ENE7	E6	E5	SSE3	SSW8	S7	S6	S8	S8	S7	SSW5	S4	S5	SE1.3	S8	
14-Jun	S3	SSE3	S5	SSE2	WNW2	WNW1	SSE8	S12	SSE11	SSE10	SSE11	S13	S16	S16	S14	S15	S17	S15	S11	S12	SSW10	SW7	SW8	SSW6	S9.0	S17	
15-Jun	S7	S8	SSW6	SSW3	SSW2	SSE5	SSE8	SSE7	SSE7	SSE8	S16	S14	S11	S12	S12	S12	S9	S10	S9	S5	SSW3	SSW2	W2	W2	S7.6	S16	
16-Jun	NW2	WNW3	W3	W2	W2	W2	WNW1	S3	S5	SW3	WNW1	N4	ENE8	E7	E9	E7	ENE10	E8	E8	E5	S5	SSW9	SSW6	ESE1.6	ENE10		
17-Jun	W4	S4	S6	S7	SSW4	SW3	SE2	SE2	S6	S6	SSE8	S11	S13	S12	S10	S10	S11	SSE9	S10	S8	S6	S7	S8	S7	S6.9	S13	
18-Jun	S4	S2	S3	WSW2	WNW2	NNW1	SE0	SSE10	SSE10	S11	S12	S19	S15	S17	S17	SSE18	SSE15	SSE15	S13	S11	S11	S9	S10	S11	S9.6	S19	
19-Jun	S9	S8	S5	SW2	SE2	S3	SSE5	S8	S9	S8	S6	S7	SSE12	SSE6	SSW2	ESE1	N4	NNW4	NE3	NNW1	N1	NNW2	NW3	NW3	S3.0	SSE12	
20-Jun	NW4	N5	N6	NNW3	NW3	N3	NNE3	ENE3	SE3	E3	SSE6	S5	SE2	ENE1	ENE2	SE1	E1	E2	SSW4	SW4	SW4	NNW1	NW4	NNW2	NNE0.3	SSE6	
21-Jun	N1	N1	NNE2	N3	N2	NW2	NW4	NW4	NNW4	N3	NNW3	N4	NNW3	NNW3	NW4	NW5	WNW5	NW7	NW7	NW6	NW5	NW4	NW3	NW4	NW3.4	NW7	
22-Jun	N3	WNW2	WNW3	WNW5	WNW2	WNW5	NNW2	W2	NW5	NNW5	N6	NW4	NW5	NNW6	NNW9	NNW10	N6	N8	NNE8	N7	N5	NE3	NNE3	NW2	NNW4.2	NNW10	
23-Jun	WNW3	WNW4	W1	WNW1	WNW1	W1	NW2	SSE3	SSE0	ENE3	NE3	E1	ESE3	SSE7	ENE7	NE6	SE5	SSE11	SSE5	ESE2	ESE3	ENE2	E2	ESE1	ESE1.4	SSE11	
24-Jun	ESE2	SSE4	SSE6	SSE7	SE9	SSE9	SSE7	S9	S11	S10	S12	S13	S13	S14	S16	S9	S7	S12	S12	S9	S7	SSW5	S6	S6	S9.1	S16	
25-Jun	S8	S6	S6	S5	W2	NE0	S8	S12	SSE13	S12	S15	S15	S16	S15	S16	WNW2	W7	NW2	SSW4	S3	NE1	WNW3	NW2	NW3	S6.0	S16	
26-Jun	NNE1	SW1	WSW2	W2	WSW2	WSW1	S2	SW3	SW3	WNW3	WSW5	SW6	SW5	SW7	SSW14	WSW2	WNW4	NNW5	NNW3	NNW3	NW3	NNW4	NNW3	NNW4	WSW2.2	SSW14	
27-Jun	NNW3	WNW3	WNW3	WNW3	NW3	NW3	WNW3	SSW2	S6	SW2	ENE2	ESE3	ESE4	SE6	S8	SW3	N10	NE8	NE6	NE5	E2	NW4	NNW3	NNW2	N0.8	N10	
28-Jun	NW3	NW3	WNW4	NW3	W2	WNW3	S2	SSE5	SSE4	SE6	ESE8	E6	ENE7	N11	N8	N7	N8	N8	N9	N7	NNW5	NW5	NNW7	NW4	N2.9	N11	
29-Jun	WNW2	NW4	NW4	NW4	WNW4	NW3	NW1	N8	N9	N9	N10	N14	N15	N15	N14	N16	N16	N14	N13	N10	NNW9	NNW10	NNW8	NNW8	N8.6	N16	
30-Jun	NNW7	NW6	NW5	NNW5	NNW5	NNW5	N9	N10	N9	N9	N9	N10	NNE11	NNE11	N11	N11	N11	NNE10	NNE10	N8	N7	NNW5	NNW5	NW3	WNW3	N7.3	NNE11

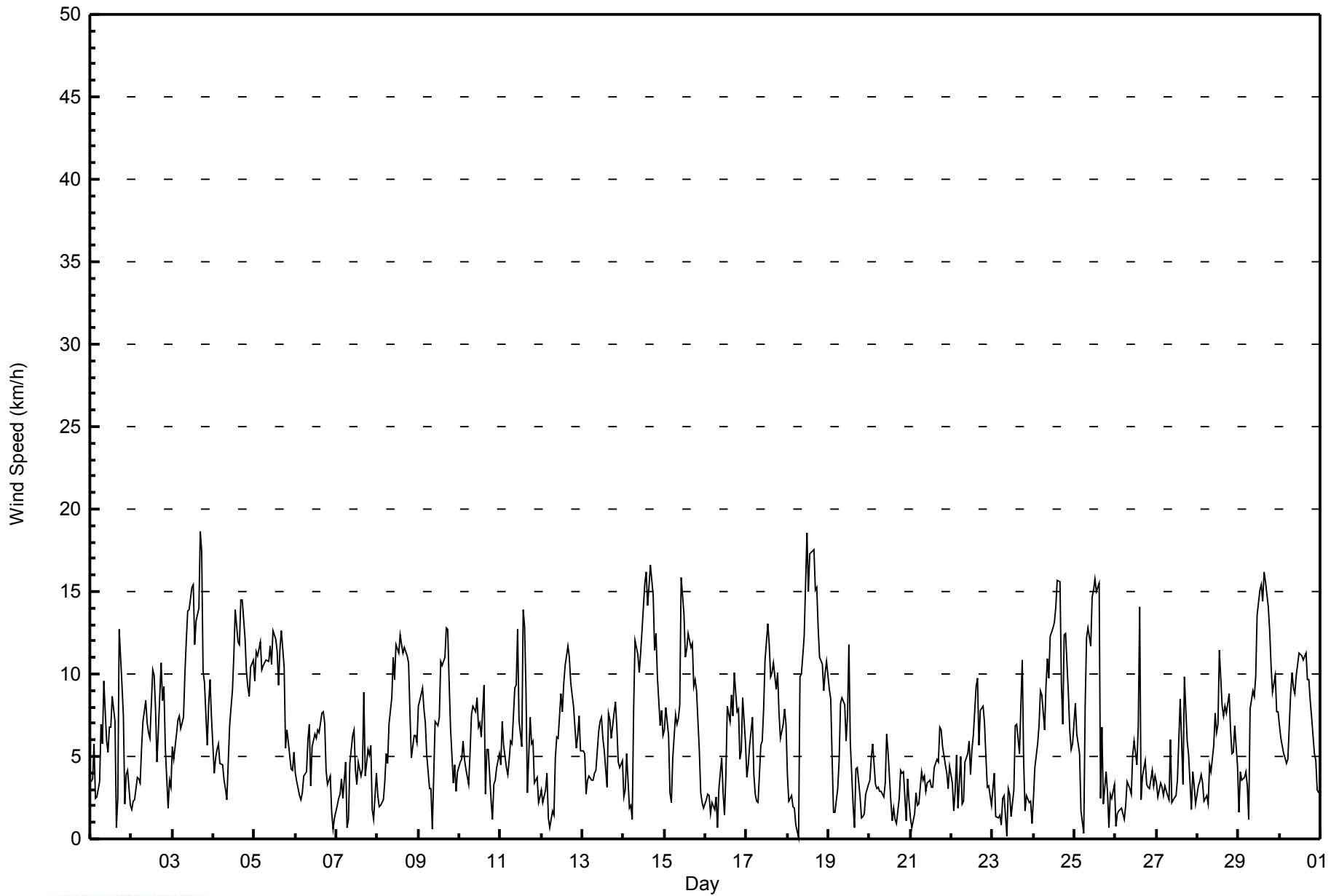
WNW1.1	W1.1	W0.8	WNW1.0	NW0.9	NW0.9	SSE0.2	SE1.5	SE1.8	ESE1.6	SE2.2	SE2.8	SE2.5	SE2.4	SE2.8	E0.9	ENE1.7	ENE1.8	ESE1.0	ENE0.4	NNW0.4	NNW1.1	WNW1.7	WNW1.6	Diurnal Average	
N10	N11	N11	N12	N10	N10	N11	S12	SSE13	N14	S16	S19	S16	S17	S17	SSE18	N19	N17	S13	S12	S11	NNW10	N10	N11	Diurnal Maximum	

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	348	48.33	48.33
6 - 11	288	40.00	88.33
12 - 19	84	11.67	100.00
20 - 28	0	0.00	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

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

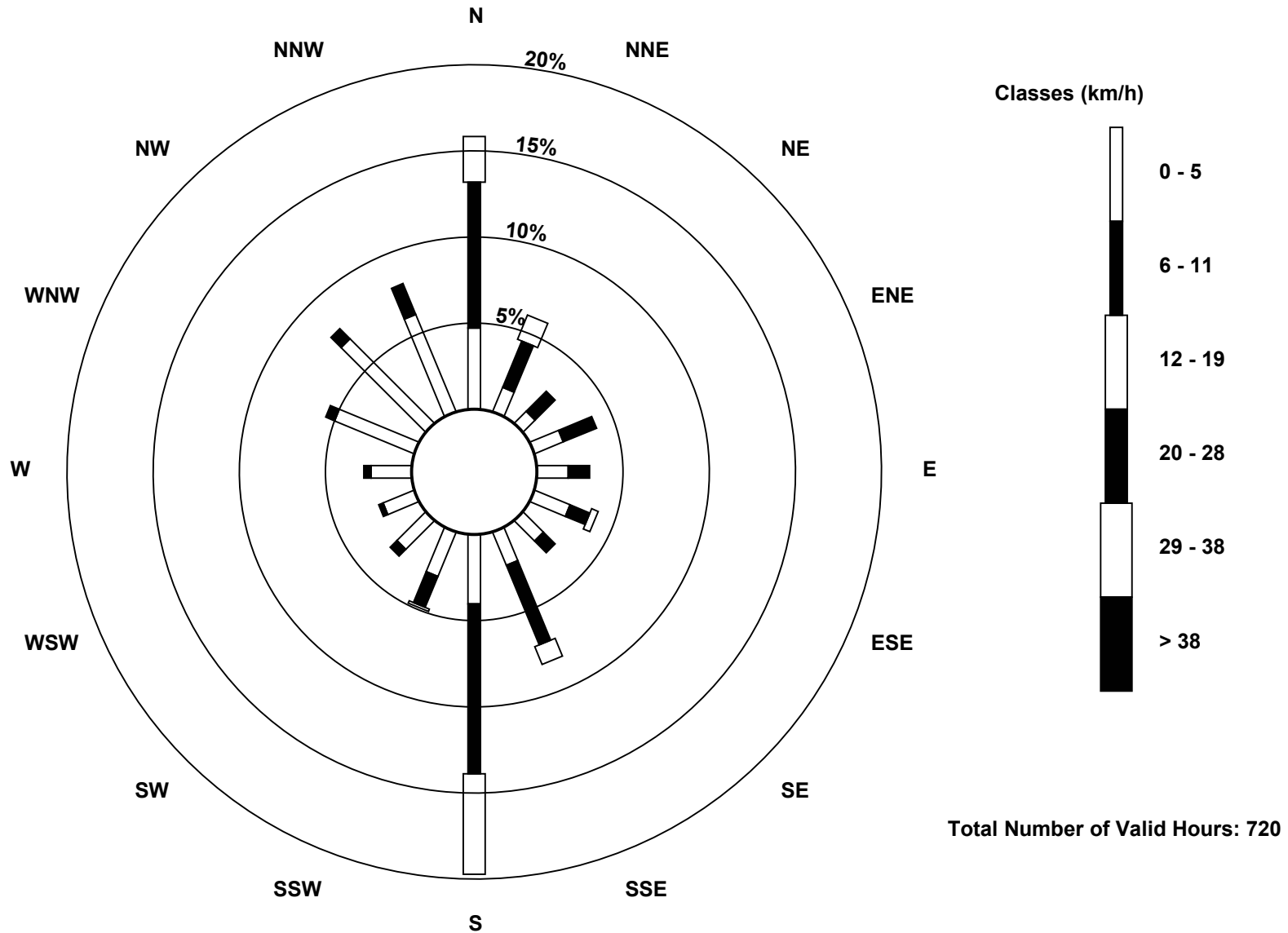
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	34	11	7	13	13	16	12	15	29	20	17	14	17	36	50	44	348
6 - 11	61	21	12	15	9	9	7	36	71	14	4	2	3	4	6	14	288
12 - 19	19	11	0	0	0	3	0	8	42	1	0	0	0	0	0	0	84
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	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	114	43	19	28	22	28	19	59	142	35	21	16	20	40	56	58	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

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





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

Diurnal Maximum



Direction of Maximum Speed: 352 deg on Jun 3 17:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 4.9 deg on Jun 3	Hours of Data: 720
Direction of Minimum Speed: 135 deg on Jun 18 07:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.3 deg on Jun 20	Percent Operational Time: 100.0
Monthly Average Direction: 280.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	39	92	137	138	72	159	154	170	169	161	168	155	165	166	157	294	171	188	188	283	170	176	280	216	169.1
2-Jun	261	249	240	188	193	214	190	205	209	176	239	275	285	266	244	261	121	17	12	8	357	336	349	339	263.7
3-Jun	2	14	4	5	6	9	18	8	10	9	10	21	13	6	13	6	352	358	358	6	13	355	328	350	4.9
4-Jun	5	349	3	356	0	341	316	315	358	349	4	20	17	13	13	14	8	11	9	19	8	1	359	358	5.2
5-Jun	357	2	1	360	7	1	0	6	10	21	35	24	26	12	18	358	359	1	353	355	319	339	321	312	4.4
6-Jun	327	318	319	314	292	303	338	73	68	346	59	69	111	67	89	80	75	103	69	85	106	107	87	136	63.2
7-Jun	203	191	74	1	353	351	318	334	13	346	349	87	115	346	28	357	336	335	6	332	317	314	319	227	350.2
8-Jun	268	244	175	197	192	196	195	144	150	154	168	171	184	172	167	182	166	168	175	165	180	176	180	170	172.9
9-Jun	171	183	184	193	185	145	102	112	341	142	159	131	123	129	128	112	115	114	114	115	76	113	16	350	134.3
10-Jun	6	1	3	1	352	337	1	19	18	25	51	64	49	139	158	171	57	116	178	218	254	285	285	289	27.2
11-Jun	286	296	297	184	186	183	193	194	173	165	157	155	191	179	120	177	109	195	181	192	194	256	256	263	183.3
12-Jun	231	247	230	215	241	158	21	98	30	43	39	29	58	66	49	16	52	29	33	41	17	350	356	350	31.0
13-Jun	360	343	320	330	355	7	39	68	28	44	60	62	94	93	147	193	181	191	179	190	190	194	185	190	124.5
14-Jun	172	161	171	154	303	288	166	172	163	164	165	171	172	170	173	177	181	188	191	191	203	215	218	211	180.1
15-Jun	169	181	196	206	192	162	168	149	148	149	173	170	172	188	190	174	181	174	184	182	183	199	194	270	176.3
16-Jun	316	303	273	277	276	264	320	282	180	178	218	289	7	66	93	93	79	78	93	89	91	187	209	199	109.1
17-Jun	280	190	185	188	197	234	145	125	180	176	165	170	177	179	175	175	178	167	182	181	182	183	184	182	179.5
18-Jun	179	181	190	250	301	345	135	165	167	171	171	170	174	171	169	168	168	167	171	180	177	186	183	181	173.3
19-Jun	184	186	187	217	144	188	167	173	176	172	190	176	152	168	203	121	353	347	56	335	357	330	307	315	178.5
20-Jun	326	351	0	345	312	353	15	66	125	92	153	169	144	77	59	129	81	100	209	216	224	327	305	330	22.2
21-Jun	351	351	19	2	4	321	310	324	332	350	345	357	339	348	313	310	290	320	318	319	312	309	310	308	324.7
22-Jun	349	293	286	301	302	299	331	276	309	334	11	309	312	340	348	335	8	9	18	9	359	39	30	318	342.2
23-Jun	287	297	272	293	286	275	309	159	155	76	48	95	117	159	69	45	128	153	162	114	106	63	95	111	115.4
24-Jun	106	147	151	151	146	152	156	170	177	179	172	170	177	174	175	177	182	189	176	178	186	187	194	183	172.1
25-Jun	186	177	176	189	278	53	182	177	168	177	179	174	180	180	182	302	268	322	196	172	41	303	318	307	185.7
26-Jun	19	228	242	275	252	240	169	222	228	290	254	225	229	225	200	254	299	333	331	340	312	328	342	344	258.5
27-Jun	331	298	303	296	307	310	289	206	181	235	64	107	114	124	170	226	351	34	51	54	80	315	332	341	1.8
28-Jun	307	304	291	321	266	284	169	157	155	141	102	95	76	3	5	9	360	352	353	4	328	324	339	321	1.5
29-Jun	282	306	308	306	303	305	321	358	5	2	5	9	4	357	0	357	9	10	1	349	339	340	342	343	353.8
30-Jun	335	325	326	335	338	329	356	4	8	11	0	21	14	359	355	2	20	18	7	351	343	336	311	290	357.1

301.3 280.7 269.8 290.3 307.4 301.7 165.2 144.2 141.9 120.4 127.7 124.2 129.3 139.5 136.4 96.8 60.1 72.8 104.0 63.7 281.3 289.5 293.3 285.6

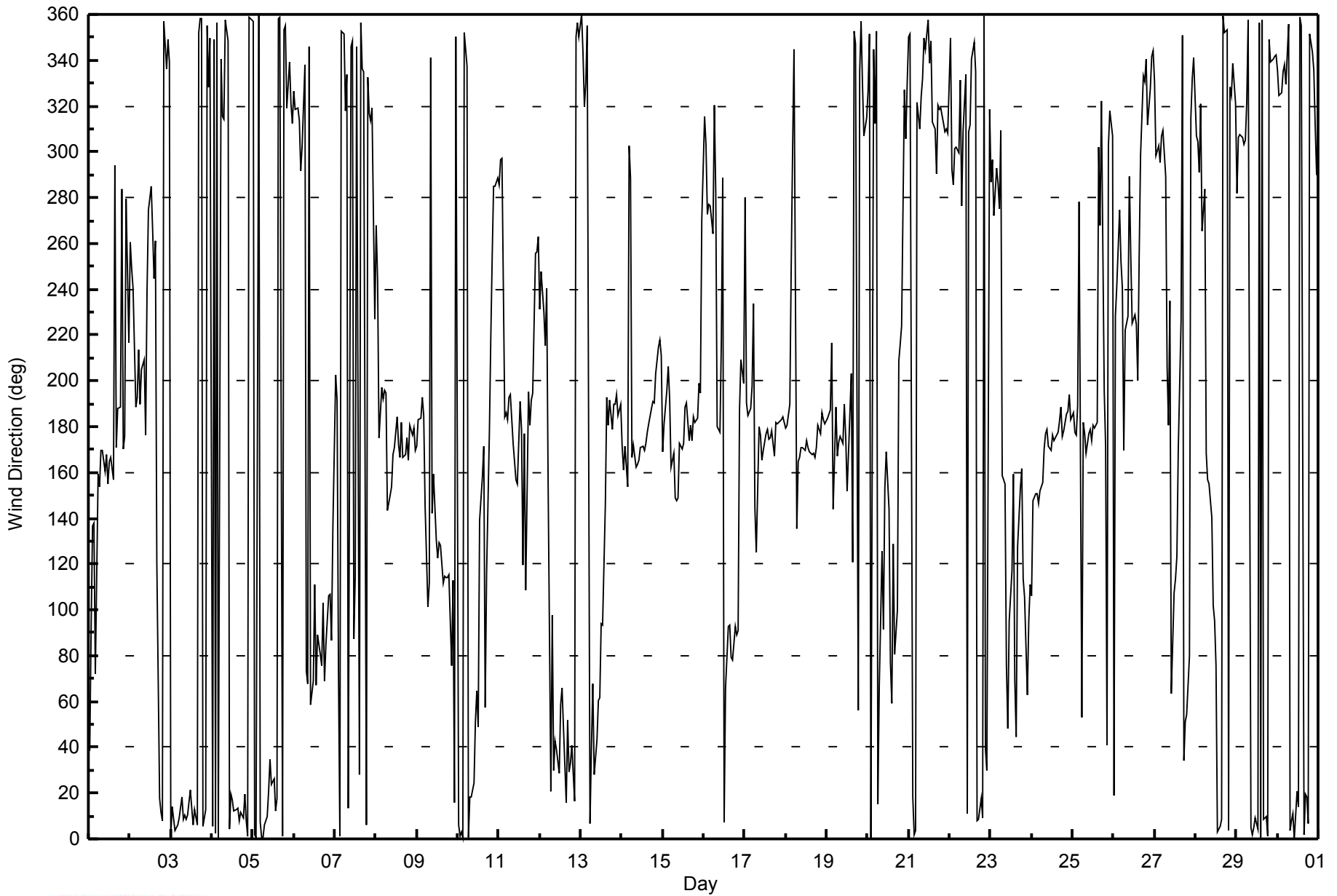
Diurnal Average

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



WBEA
Hourly Averages

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





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Fort McKay - Bertha Ganter - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on Jun 23 09:00 Minimum Value: 10 deg on Jun 30 22:00 Percentiles: P ₁ = 14 P ₁₀ = 17 Q ₁ = 21 Median = 30 Q ₃ = 46 P ₉₀ = 68 P ₉₉ = 93																			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-Jun	38	53	23	70	47	60	20	27	22	25	36	27	43	30	45	100	75	30	34	41	74	68	32	58	100
2-Jun	71	62	35	29	33	28	24	25	30	32	55	57	41	49	57	56	42	38	38	30	25	46	29	28	71
3-Jun	25	47	23	24	27	29	41	30	30	33	37	37	35	33	34	38	29	30	29	35	41	26	21	29	47
4-Jun	39	32	31	27	33	24	20	33	49	31	31	40	38	35	41	37	32	31	34	35	31	29	28	26	49
5-Jun	27	29	29	29	30	30	29	35	38	43	47	43	40	43	40	32	30	31	41	27	21	25	22	18	47
6-Jun	25	23	24	36	42	33	49	51	50	82	53	56	62	53	49	51	46	40	36	37	24	60	91	78	91
7-Jun	70	76	68	45	49	22	82	91	43	24	21	56	73	62	78	84	29	75	38	18	12	68	52	35	91
8-Jun	59	48	47	35	20	20	37	15	19	16	36	30	35	37	31	35	21	18	15	16	16	16	16	17	59
9-Jun	16	16	15	16	23	17	46	67	82	26	17	17	22	19	25	26	23	24	22	29	51	26	74	19	82
10-Jun	25	25	23	20	23	41	27	38	44	51	52	61	57	61	31	85	47	39	67	85	26	19	19	28	85
11-Jun	49	28	55	35	41	16	23	16	17	14	14	55	68	24	31	57	82	19	19	24	25	20	33	23	82
12-Jun	22	62	22	16	85	95	69	93	55	52	52	43	59	48	45	41	47	49	47	47	43	16	25	20	95
13-Jun	18	16	38	19	22	33	62	63	63	48	57	52	69	67	93	38	46	46	21	17	15	15	17	15	93
14-Jun	43	31	15	69	50	81	19	18	18	22	20	21	23	20	21	26	20	20	19	19	18	19	22	26	81
15-Jun	19	18	20	27	31	22	20	19	17	20	20	26	30	30	24	24	23	24	20	16	15	21	36	62	62
16-Jun	26	24	33	70	39	43	24	87	33	56	69	88	76	51	48	41	46	42	30	29	25	49	31	17	88
17-Jun	49	39	20	18	30	64	65	52	19	20	17	22	19	20	23	21	22	18	20	18	15	17	16	15	65
18-Jun	18	17	13	29	55	28	92	20	19	21	19	18	18	18	17	18	17	17	16	14	16	15	14	12	92
19-Jun	15	15	23	55	24	27	23	20	17	16	21	23	25	38	91	83	33	27	48	60	79	70	23	18	91
20-Jun	21	19	22	25	24	22	69	56	98	41	32	26	95	79	80	77	77	41	29	16	27	86	29	53	98
21-Jun	38	67	59	32	58	35	16	24	25	33	27	37	36	35	28	26	39	19	21	20	17	17	32	28	67
22-Jun	30	72	39	23	81	28	53	32	22	43	59	27	25	36	29	27	43	37	38	39	29	48	44	34	81
23-Jun	17	15	60	66	67	79	49	24	104	57	66	93	82	38	42	40	70	24	27	70	37	33	37	83	104
24-Jun	28	23	14	13	15	15	17	17	18	24	18	18	23	17	19	18	23	21	18	16	17	16	16	16	28
25-Jun	14	16	15	20	71	90	16	18	20	21	18	18	18	21	20	88	71	63	36	39	82	21	37	33	90
26-Jun	73	47	43	41	54	54	47	29	51	81	50	54	81	45	31	64	32	23	26	28	19	14	20	20	81
27-Jun	21	30	20	20	18	18	30	42	21	73	59	79	77	20	21	52	44	50	49	44	73	13	28	45	79
28-Jun	44	22	22	39	34	41	71	29	32	38	44	44	51	37	46	51	40	30	30	29	16	21	12	25	71
29-Jun	74	19	19	17	23	30	91	26	35	37	39	39	34	34	35	32	34	38	30	27	21	21	22	22	91
30-Jun	19	18	20	19	22	22	26	33	38	39	37	39	37	38	35	35	37	41	36	28	18	10	22	25	41
	74	76	68	70	85	95	92	93	104	82	69	93	95	79	93	100	82	75	67	85	82	86	91	83	
Diurnal Maximum																									



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 12, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	12:00	End Time (MST)	14:51
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11571008
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	731	732
Calculated slope	0.994438	0.995967	Chamber temp.	43.0	42.9
Calculated intercept	1.076576	1.827848	Pressure (mmHg)	701.5	714.2
Analyzer Background	37.9	37.8	Flow (lpm)	0.493	0.500
Analyzer Coefficient	0.757	0.754	Intensity	35750	35750

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	-0.8	NA
as found span	5500	81.5	755.7	758.4	0.996
calibrator zero	5500	0.0	0.0	-0.8	NA
high point	5500	81.5	755.7	757.6	0.998
second point	5500	45.7	423.8	423.0	1.002
third point	5500	22.8	211.4	209.4	1.010
calibrator zero	5500	0.0	0.0	-0.8	NA
as left zero	5500	0.0	0.0	-0.2	NA
as left span	5500	81.5	755.7	756.2	0.999
Average Correction Factor					1.003

Corrected As found	759.2	Previous response	758.9	% change	-0.04%
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Notes:

THC span required slight adjustment. SO₂ span was adjusted simultaneously, adjustment was minor. No issues.

Calibration Performed By: Zack Eastman



Wood Buffalo Environmental Association

SO₂ Calibration Summary

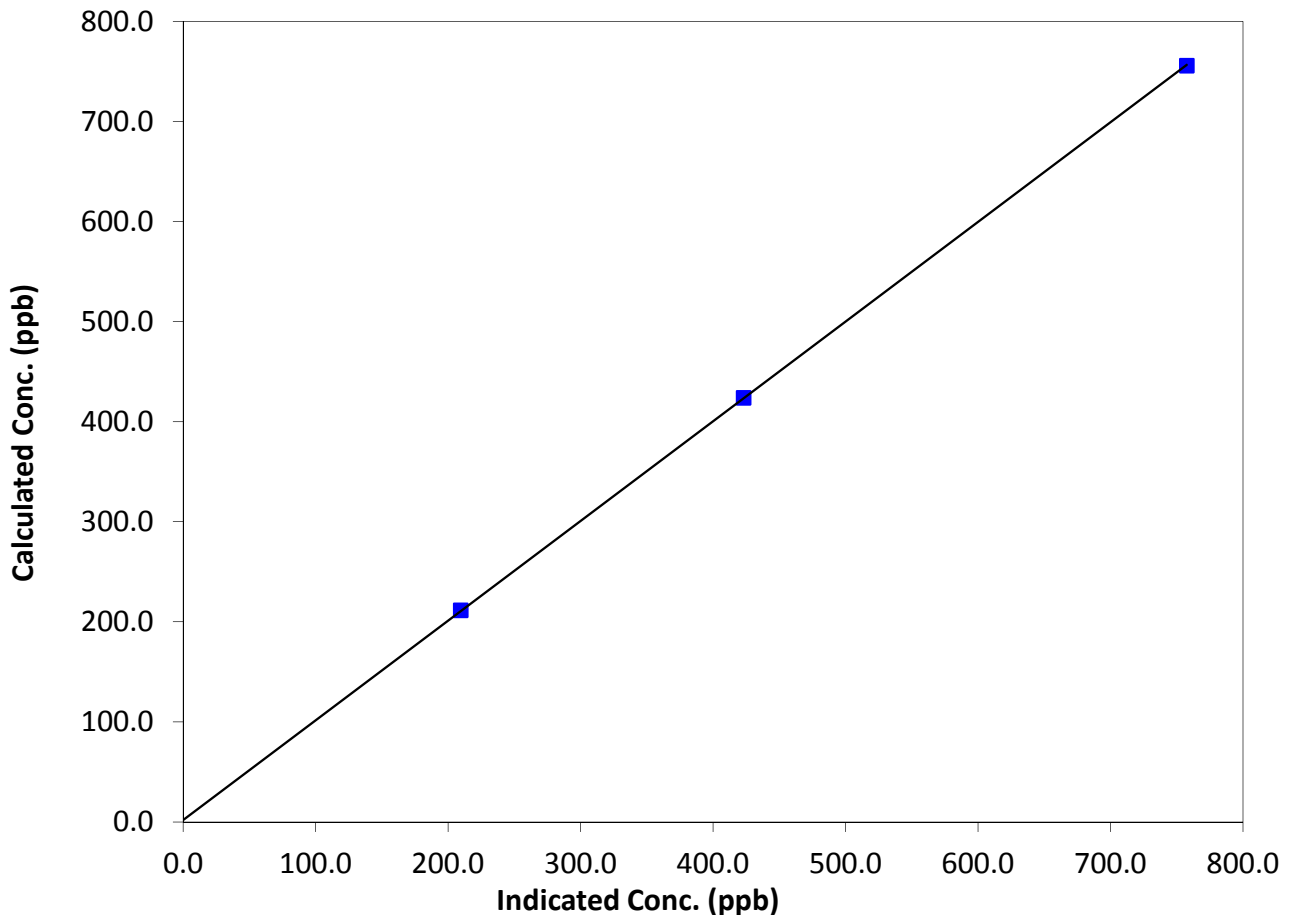
Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 12, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:00	End Time (MST)	14:51
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	-0.8	N/A	Correlation Coefficient	0.999990
755.7	757.6	0.9975		
423.8	423.0	1.0018	Slope	0.995967
211.4	209.4	1.0096		
			Intercept	1.827848

SO₂ Calibration Curve



SO2 Calibration Plot

Date: June 17, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	June 19, 2014	Previous Calibration	May 13, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	8:10	End Time (MST)	10:58
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11571008
Cal Gas Concentration	10.6 ppm H2S	Cal Gas Expiry Date	Dec 21 2012
Gas Cert Reference	LL27480	SO2 gas conc.	51.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2403
DACS voltage range	5000	DACS channel #	2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-859	-859
Analyzer Range (input)	5000	5000	Lamp voltage	1173	1159
Calculated slope	1.000346	1.007667	Chamber temp.	45	45
Calculated intercept	0.010104	-0.087633	Pressure	665.7	690.5
Analyzer Background	1.78	1.78	Flow	0.415	0.434
Analyzer Coefficient	0.989	0.989	Intensity	78	80
			Converter temp.	800	800

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6500	0.0	0.0	0.13	NA
as found span	6500	46.0	75.0	74.6	1.005
SO2 scrubber check	5500	22.8	211.4	0.8	NA
calibrator zero	6500	0.0	0.0	0.1	NA
high point	6500	46.0	75.0	74.6	1.005
second point	6500	24.6	40.1	39.6	1.012
third point	6500	12.3	20.1	20.1	0.998
calibrator zero	6500	0.0	0.0	0.1	NA
as left zero	6500	0.0	0.0	0.4	NA
as left span	6500	46.0	75.0	75.9	0.988
Average Correction Factor					1.005

Corrected As found	74.5	Previous response	75.0	% change	0.6%
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Notes:

No adjustments made.

Calibration Performed By:

Zack Eastman



Wood Buffalo Environmental Association

TRS Calibration Summary

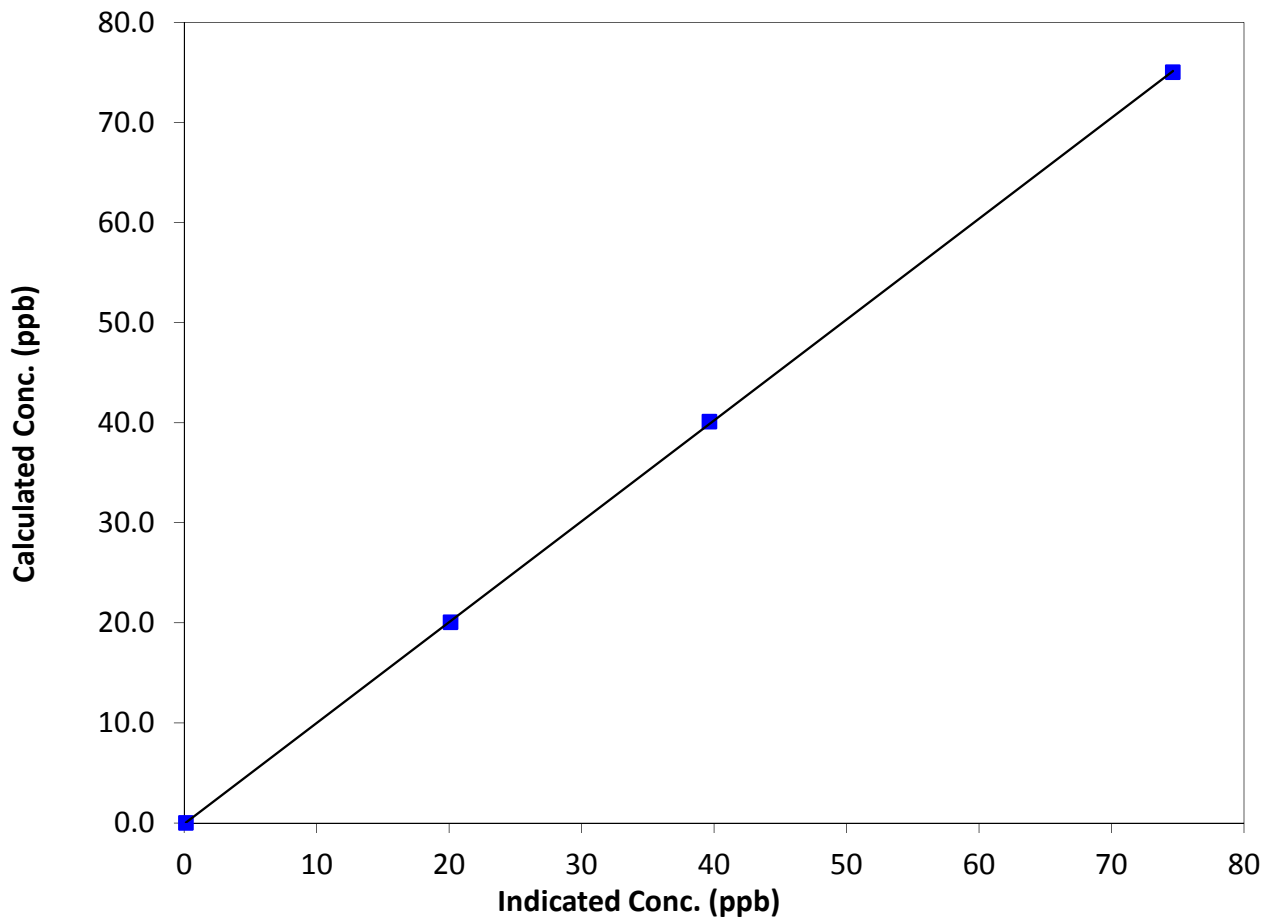
Station Information

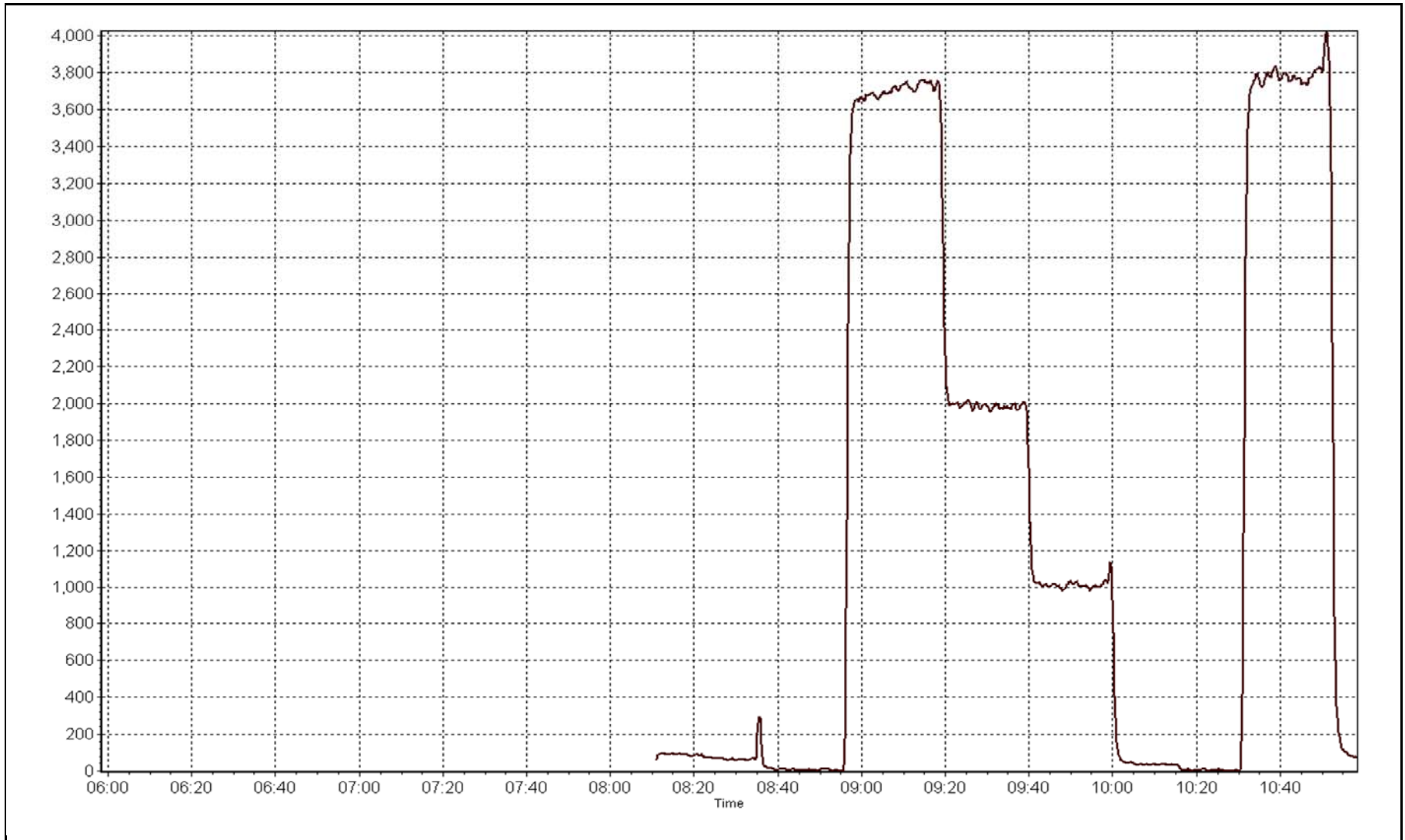
Calibration Date	June 19, 2014	Previous Calibration	May 13, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:10	End Time (MST)	10:58
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999970
75.0	74.6	1.0050		
40.1	39.6	1.0120	Slope	1.007667
20.1	20.1	0.9979		
			Intercept	-0.087633

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Tuesday, June 17, 2014	Prev Calibration	Monday, May 12, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	12:00	End Time (MST)	14:51
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	11571108
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	33.8	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	42.2	42.2
THC Calc slope	1.000578	1.000368	Air Pressure	32.2	32.2
THC Calc intercept	0.025548	0.029584			
NMHC Calc slope	1.000389	1.001787			
NMHC Calc intercept	0.011002	0.010629			

Analyzer make Thermo 55i Analyzer serial # 1331259520

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	N/A
as found span	5500	81.5	15.95	15.67	1.018
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	81.5	15.95	15.94	1.001
second point	5500	45.7	8.94	8.88	1.007
third point	5500	22.8	4.46	4.41	1.012
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	15.91	1.003
Average Correction Factor					1.007

Corrected As found 15.67 Previous response 15.92 % change 1.6%

Notes:

Span adjusted slightly. No issues detected.

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	8.24	1.019
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	4.67	1.008
third point	5500	22.8	2.35	2.33	1.008
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	8.35	1.005
Average Correction Factor					1.006

Corrected As found 8.24 Previous response 8.38 % change 1.7%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	N/A
as found span	5500	81.5	7.56	7.44	1.016
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	81.5	7.56	7.56	1.000
second point	5500	45.7	4.24	4.20	1.009
third point	5500	22.8	2.11	2.09	1.012
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	7.55	1.001
Average Correction Factor					

Corrected As found 7.44 Previous response 7.54 % change 1.3%



Wood Buffalo Environmental Association

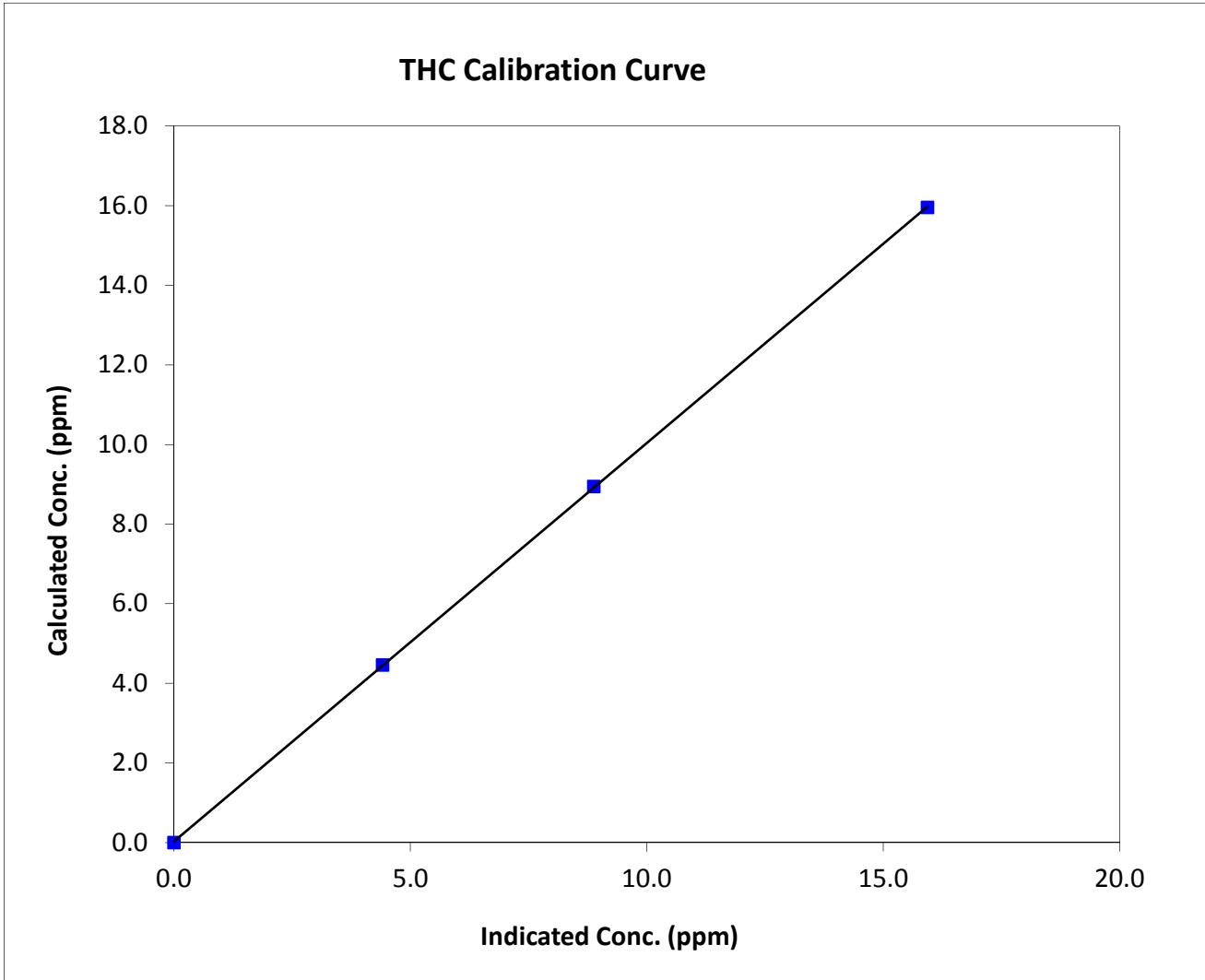
THC Calibration Summary

Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 12, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:00	End Time (MST)	14:51
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	0.999979
15.95	15.94	1.0007		
8.94	8.88	1.0073	Slope	1.000368
4.46	4.41	1.0119		
			Intercept	0.029584





Wood Buffalo Environmental Association

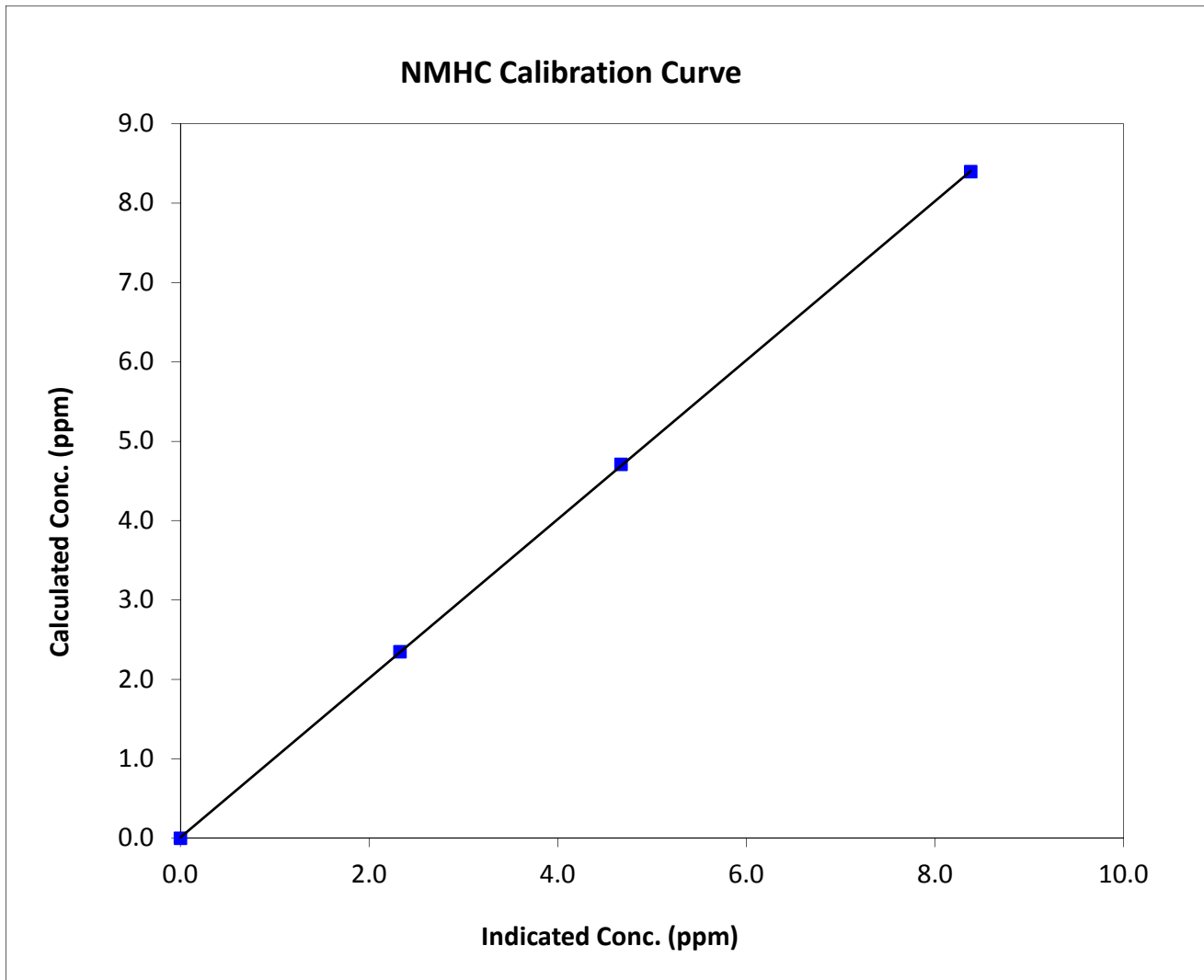
NMHC Calibration Summary

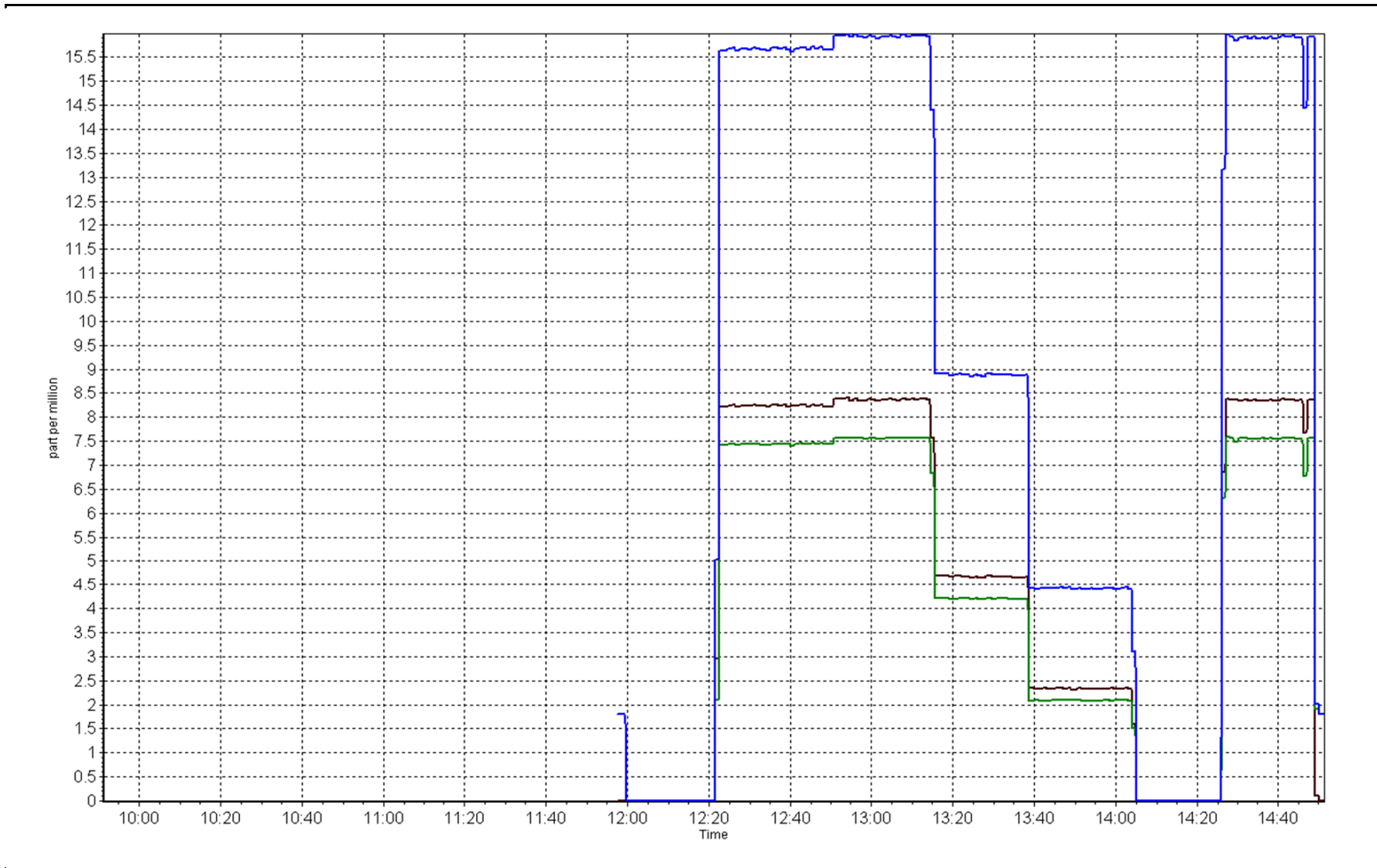
Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 12, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:00	End Time (MST)	14:51
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	0.999985
8.39	8.38	1.0017		
4.71	4.67	1.0079	Slope	1.001787
2.35	2.33	1.0079		
			Intercept	0.010629







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	June 23, 2014	Previous Calibration	May 13, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	13:00
Barometric Pressure	N/A mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11571008
NO2 calibration used	Thursday, June 19, 2014	Transfer Standard	na
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2403
DACS voltage range	5000	DACS channel #	Diff 7

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	28.0	28.0
Analyzer Range (input)	5000	5000	Lamp temp.	56.7	56.7
Calculated slope	1.015891	0.997711	Pressure	714.0	714.0
Calculated intercept	-1.360809	-0.647508	Flow cell A	0.886	0.886
Analyzer Background	-1.5	-1.6	Flow cell B	0.758	0.758
Analyzer Coefficient	1.127	1.152	Cell A Intensity	44xxx	44xxx
			Cell B Intensity	51xxx	51xxx

Analyzer make Thermo 49C Analyzer serial # 49C-60861-328

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.00	0.0	-0.4	N/A
as found span	5000	1.10	391.0	382.1	1.023
calibrator zero	5500	0.00	0.0	-0.4	N/A
high point	5000	1.10	391.0	391.5	0.999
second point	5000	0.60	202.0	205.0	0.985
third point	5000	0.35	106.0	107.1	0.990
calibrator zero	5500	0.00	0.0	-0.4	N/A
as left zero	N/A	0.00	0.0	1.8	N/A
as left span	N/A	Level 1	N/A	253.0	
Average Correction Factor					0.991

Corrected As found 382.5 Previous response 386.2 % change 1.0%

Notes:

Span adjusted. Daily zero reference is stable but a little high as compared to calibrator zero air. Charcoal replacement required next visit.

Calibration Performed By: Zack Eastman



Wood Buffalo Environmental Association

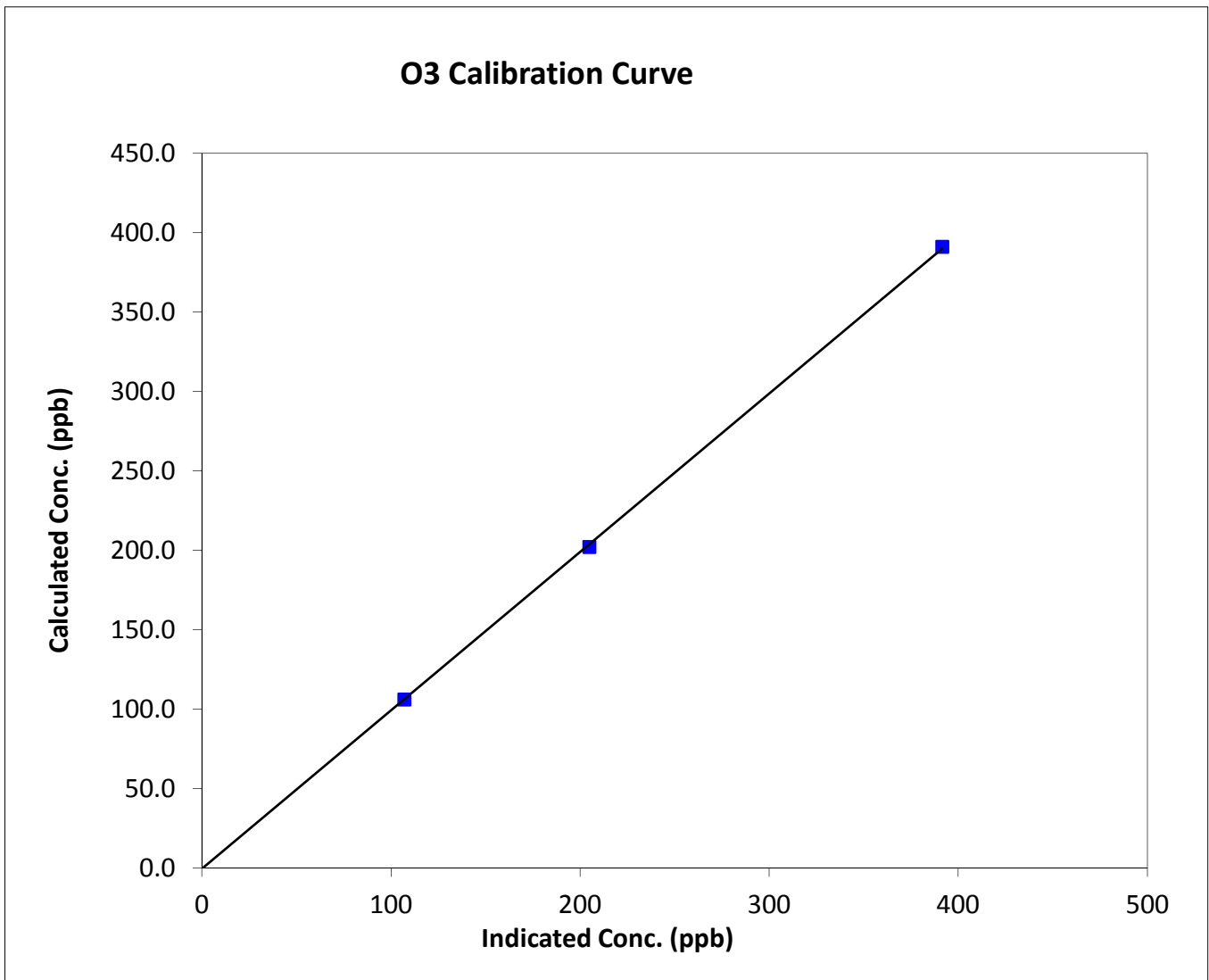
O₃ Calibration Summary

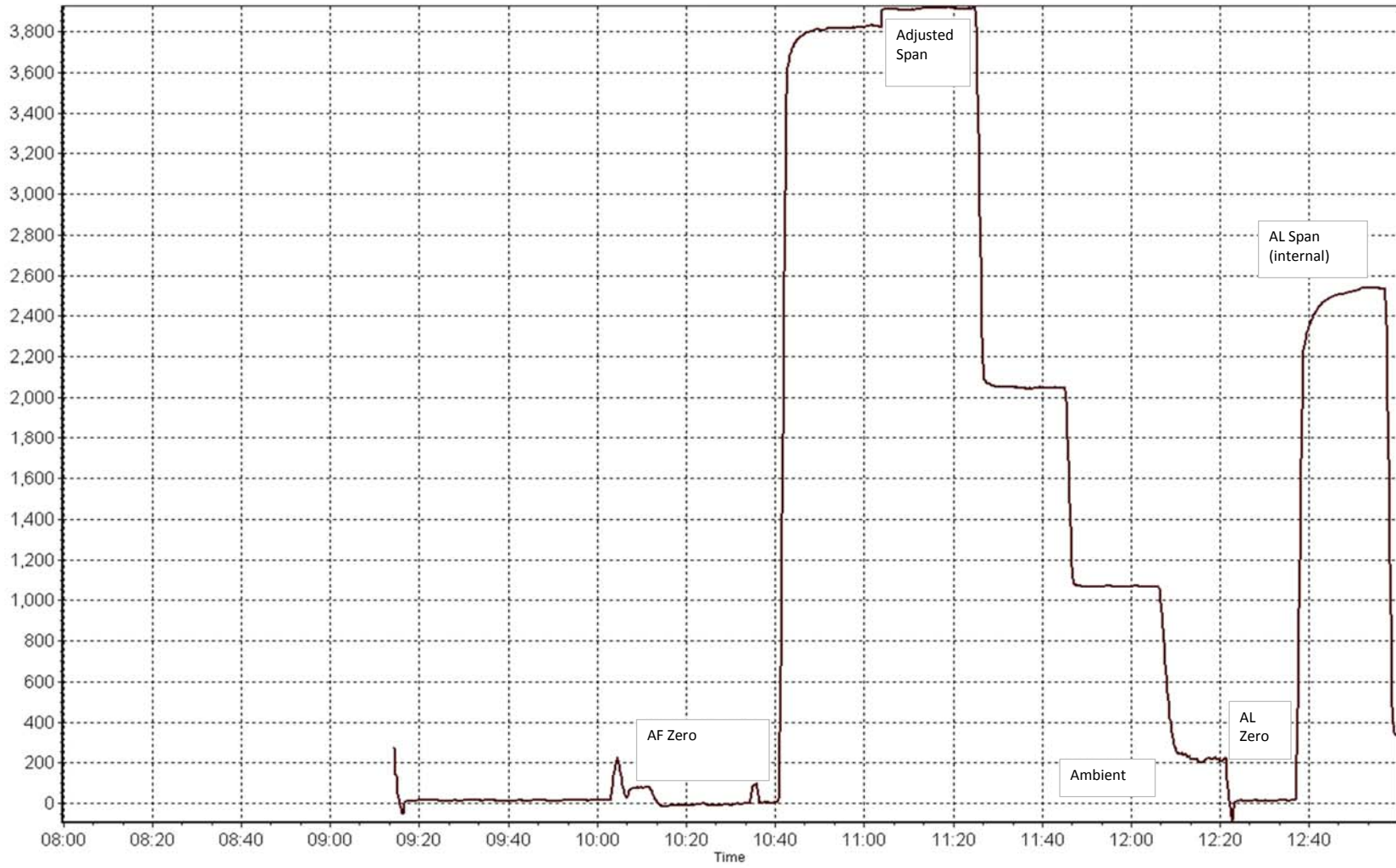
Station Information

Calibration Date	Monday, June 23, 2014	Previous Calibration	May 13, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:15	End Time (MST)	13:00
Analyzer make	Thermo 49C	Analyzer serial #	49C-60861-328

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999930
391.0	391.5	0.9987		
202.0	205.0	0.9854	Slope	0.997711
106.0	107.1	0.9897		
			Intercept	-0.647508







Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	June 19, 2014	Previous Calibration	May 12, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	11:40	End Time (MST)	15:52
Barometric Pressure	n/a mmHg	Station Temperature	21.0 Deg C
Calibrator	SABIO 4010	Serial Number	11571108
NO Cal Gas Conc	50.6 ppm	Cal Gas Expiry Date	May 29th 2014
NOx Cal Gas Conc	50.6 ppm	Cal Gas Serial #	LL107923

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2403
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	5000	5000	5000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.992808	0.993542	1.000236
	Data Offset	0.523692	0.522704	0.371052
After	Data Slope	0.992987	0.994069	1.002745
	Data Offset	0.211763	0.133987	-0.244021
Channel #				
Voltage Range		0-5000mv	0-5000mv	0-5000mv

Analyzer Information

Analyzer make/model	Thermo 42i NO/NO2/NOx Analyzer	Analyzer serial #	1218153357
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.866	ppb	0.866	ppb
NOx coefficient	0.999	ppb	0.999	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	6.0		6.0	
NOx bkgrnd	6.2		6.2	
Nt coefficient				
Chamber Temp	50.6	Deg C	50.6	Deg C
Moly Temp	326.0	Deg C	326.0	Deg C
PMT Temp	-3.0	Deg C	-3.0	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	205.5	mmHg	205.5	mmHg
Sample Flow	0.505	ccm	0.505	ccm

Notes:

No adjustments made.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

June 19, 2014

Station Number:

AMS 1

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	5500	0.0	0.0	0.0	0.0	-0.2	-0.2	0.1	N/A	N/A
as found span	5500	81.5	749.8	749.8	0.0	755.0	754.0	1.0	0.993	0.994
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.2	-0.2	0.1	N/A	N/A
high point	5500	81.5	749.8	749.8	0.0	755.0	754.0	1.0	0.993	0.994
second point	5500	45.7	420.4	420.4	0.0	423.0	423.0	0.5	0.994	0.994
third point	5500	22.8	209.8	209.8	0.0	211.0	211.0	0.2	0.994	0.994
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.2	-0.2	0.1	N/A	N/A
as left zero	5500	0.0	0.0	0.0	0.0	0.1	-0.1	0.2	N/A	N/A
as left span	5500	81.5	749.8	365.0	384.8	760.0	368.0	393.0	0.987	0.992
Average Correction Factor									0.994	0.994

Corrected As found

NO_x= 755.2

NO= 754.2

Percent Change

NO_x= -0.1%

NO= 0.0%

Previous Response

NO_x= 754.7

NO= 754.2

GPT Calibration Data

Dilution Flow

5500

ccm

Source Gas Flow

81.50

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	365.0	391.0	756.0	365.0	390.0	0.977	1.000	1.003	99.7%
2nd NO ₂ (200)	N/A	554.0	202.0	757.0	554.0	202.0	0.976	1.000	1.000	100.0%
3rd NO ₂ (100)	N/A	650.0	106.0	757.0	650.0	106.0	0.976	1.000	1.000	100.0%
4th NO ₂ (0)	756.0	N/A	0.0	756.0	756.0	0.4	0.977	1.000	N/A	N/A
Average Correction Factor							0.977	1.000	1.001	99.9%

Calibration Performed By:

Zack Eastman



Wood Buffalo Environmental Association

NO_x Calibration Summary

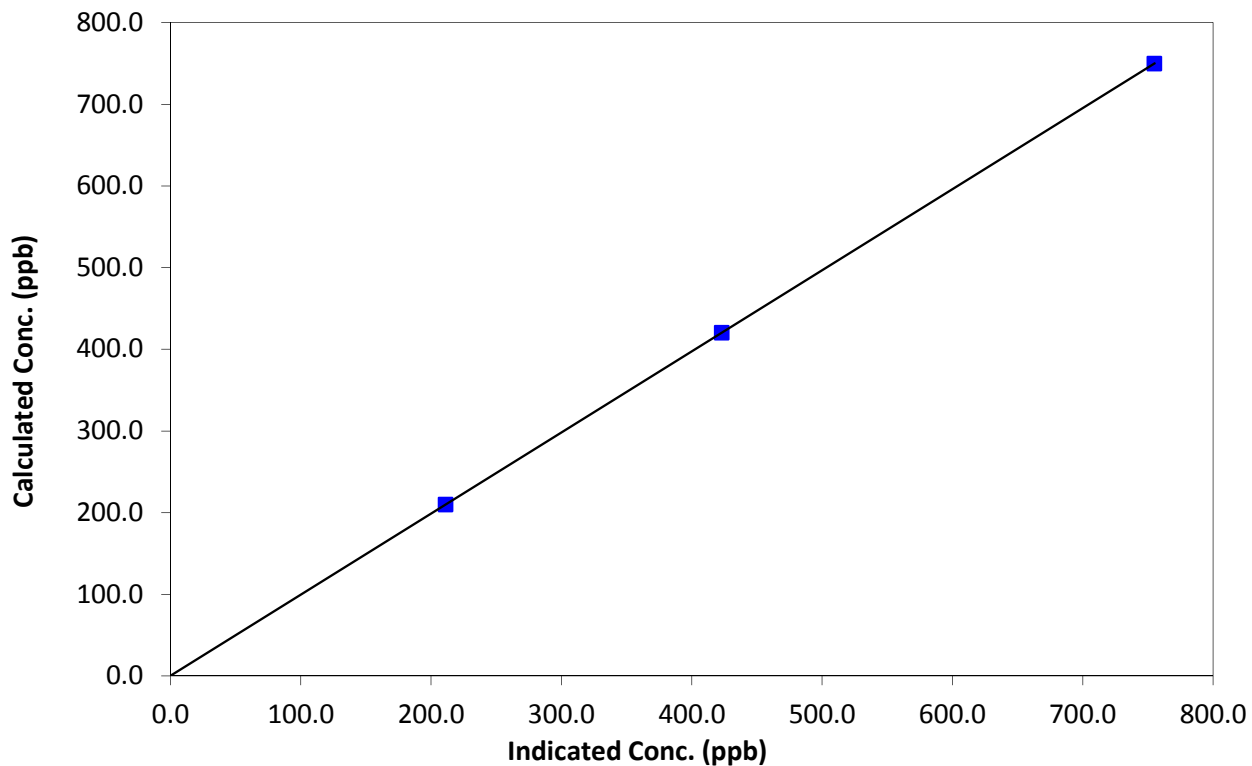
Station Information

Calibration Date	June 19, 2014	Previous Calibration	May 12, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	11:40	End Time (MST)	15:52
Analyzer make	Thermo 42i NO/NO2/NOx Analyzer	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	1.000000
749.8	755.0	0.9931		
420.4	423.0	0.9939	Slope	0.992987
209.8	211.0	0.9941		
0.0	-0.2	0.0000	Intercept	0.211763

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

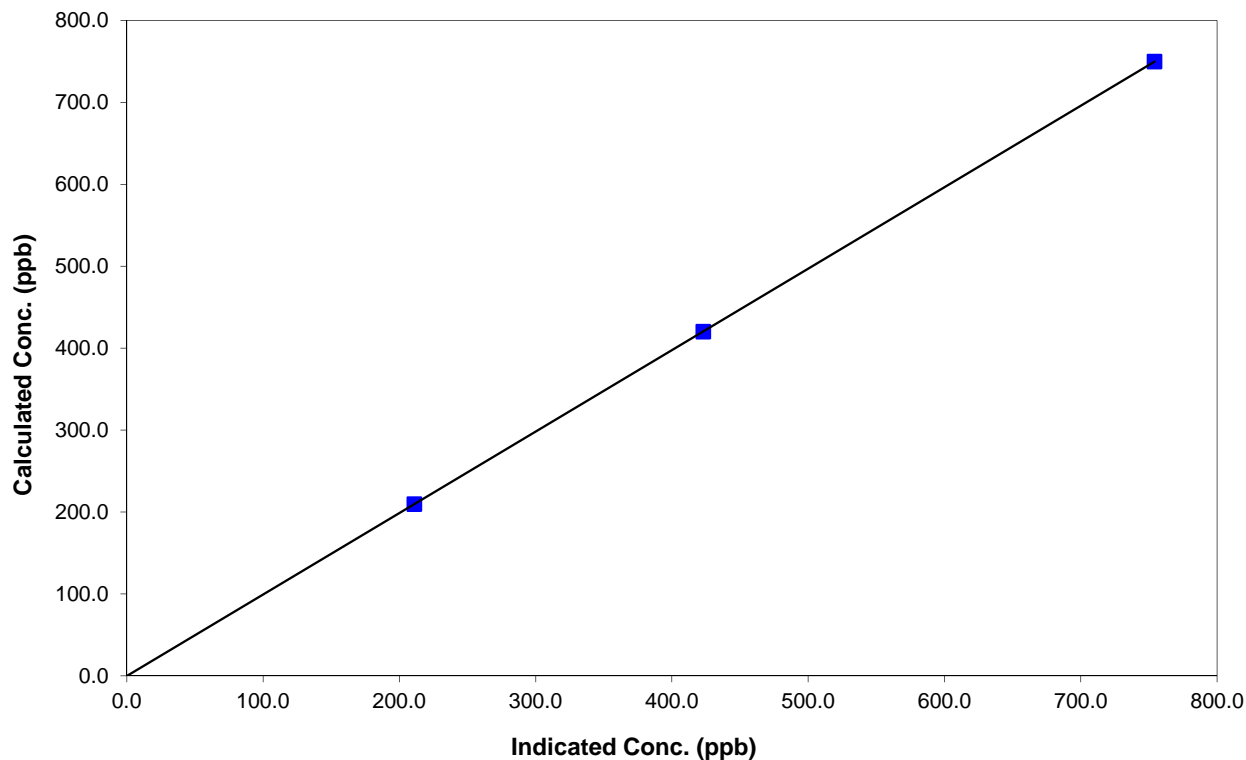
Station Information

Calibration Date	June 19, 2014	Previous Calibration	May 12, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	11:40	End Time (MST)	15:52
Analyzer make	Thermo 42i NO/NO2/NOx Analyzer	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	1.000000
749.8	754.0	0.9944		
420.4	423.0	0.9939	Slope	0.994069
209.8	211.0	0.9941		
0.0	-0.2	0.0000	Intercept	0.133987

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

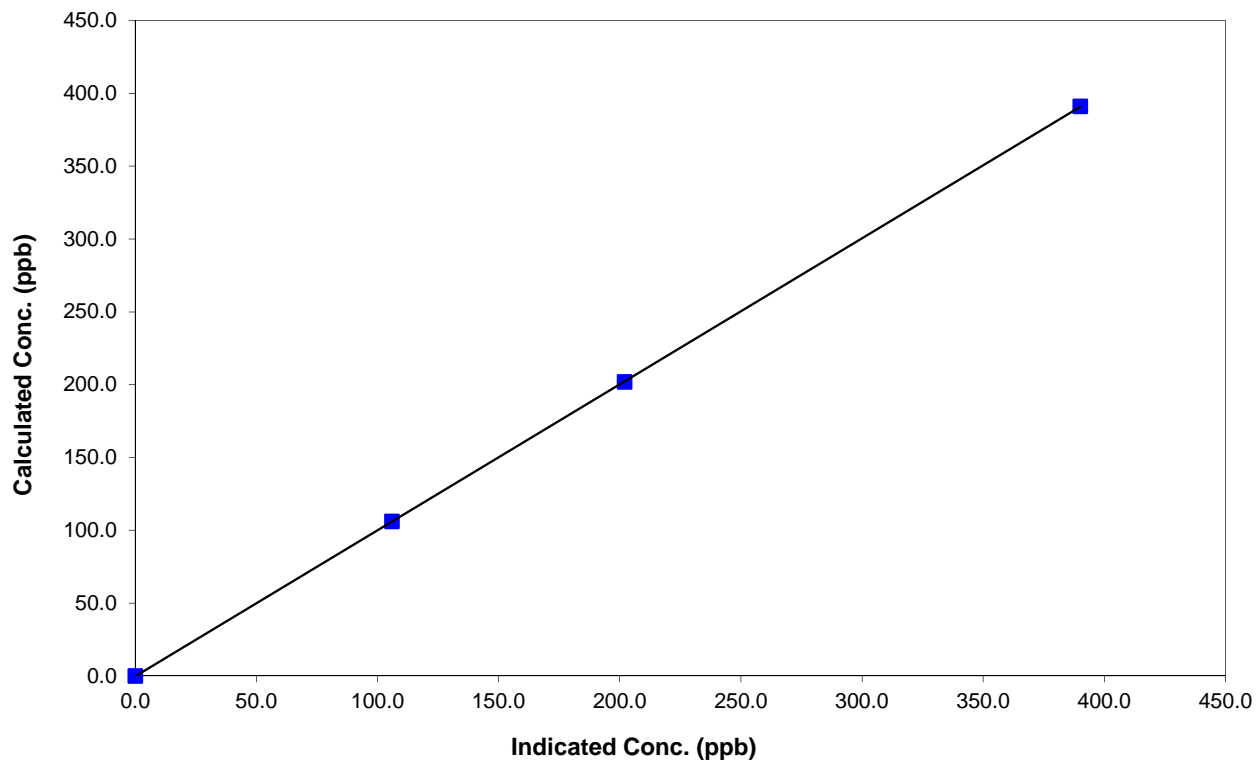
Station Information

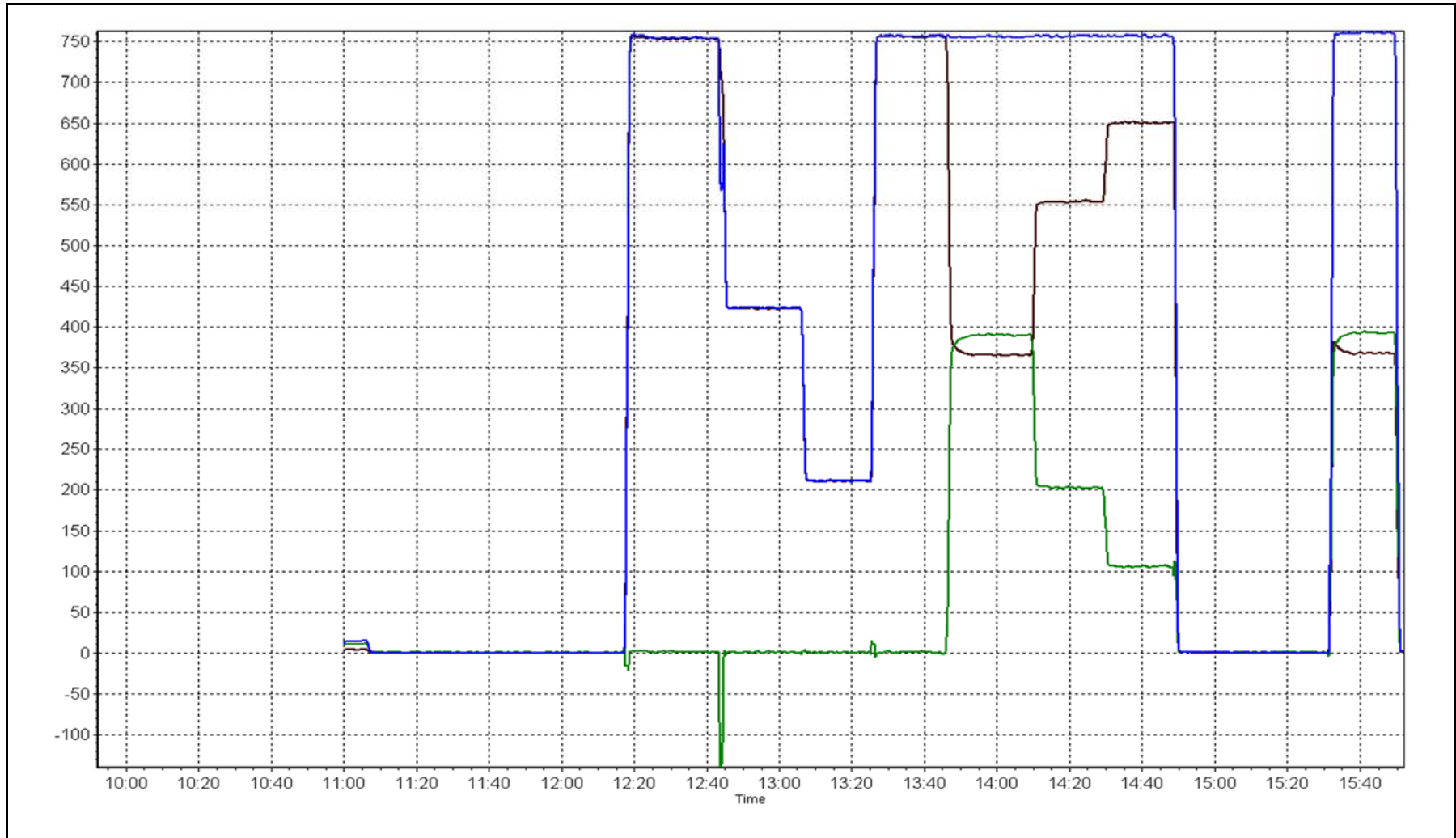
Calibration Date	June 19, 2014	Previous Calibration	May 12, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	11:40	End Time (MST)	15:52
Analyzer make	Thermo 42i NO/NO ₂ /NO _x Analyzer	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999998
391.0	390.0	1.0026		
202.0	202.0	1.0000	Slope	1.002745
106.0	106.0	1.0000		
			Intercept	-0.244021

NO₂ Calibration Curve







Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date	June 19, 2014	Previous Calibration	May 14, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	16:00	End Time (MST)	18:50
Barometric Pressure	N/A mmHg	Station Temperature	21.0 Deg C
Calibrator	Sabio 4010	Serial Number	224632
NH3 Cal Gas Conc	192 ppm	Cal Gas Expiry Date	March 3rd 2012
NOx Cal Gas Conc	50.6 ppm	Cal Gas Serial #	LL156612

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2403
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Parameter		Nt	NOx	NH3
MV conversion	Analyzer Range (ppb)	2500	1000	2500
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.998988	0.000000	0.999545
	Data Offset	-20.654946	749.800000	-6.298805
After	Data Slope	0.990039	1.007425	0.998116
	Data Offset	-2.899200	0.566777	-0.757279
Channel #		NA	6	7
Voltage Range		NA	0-5000mv	0-5000mv

Analyzer Information

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

Test Point	before		after	
Concentration range	0-2500	ppb	0-2500	ppb
Nt Slope	1.170		1.196	
NOX Slope	1.174		1.192	
NH3 coefficient			0.958	
NO coefficient	1.171		1.175	
NO2 coefficient			1.000	
No bkgnd	-0.3	mV	0.0	mV
Nt bkgnd	0.0	mV	0.1	mV
NOX bkgnd	-0.2	mV	0.0	
NhH3 conv temp	825	DegC	825	Deg C
Chamber Temp	49.9	Deg C	50.0	Deg C
Moly Temp	315.4	Deg C	314.5	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	85.0	ccm	85.0	ccm
R Cell Press	4.0	mmHg	4.1	mmHg
PMT Voltage	664.0	v	664.0	v
Sample Flow 1 NO	550.0	ccm	546.0	ccm
Sample Flow 2 Nox	520.0	ccm	516.0	ccm
Sample Flow 3 Nt	n/a	ccm	n/a	ccm

Notes:

Zero adjusted, NT NO response not adjusted. NH3 span response adjusted. Initial span response is a little slow to reach a stable high point.



Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date:

June 19, 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	5000	0.0	0.0	0.0	0.0	1.4	1.8	-1.0	NA	NA
as found NO	5500	81.5	749.8	749.8	NA	747.0	752.4	-13.5	1.004	NA
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.8	-0.5	-0.6	NA	NA
high NO point	5500	81.5	749.8	749.8	NA	745.2	746.6	-3.5	1.006	NA
NO/O ₃ point	5500	81.5	749.8	749.8	NA	739.0	740.8	-4.5	1.015	NA
as found NH ₃	6500	67.7	1999.8	NA	1999.8	2037.5	6.8	2021.0	0.981	0.989
first NH ₃	6500	67.7	1999.8	NA	1999.8	2020.5	7.2	2002.5	0.990	0.999
second NH ₃	6500	33.9	1001.4	NA	1001.4	1017.5	3.9	1008.0	0.984	0.993
third NH ₃	6500	16.9	499.2	NA	499.2	510.0	4.0	500.0	0.979	0.998
as left zero	0									
as left span										
Average Correction Factor									1.0104	0.9968

Corrected As found

Nt = 745.6 ppb

NH₃ = 2022.0 ppb

Previous response

Nt = 771.2 ppb

NH₃ = 2007.0 ppb

Nt percent change 3.4%

NH₃ percent change -0.7%

Converter efficiency 95.8%

Calibration Performed By:

Zach Eastman



Wood Buffalo Environmental Association

NH3 Calibration Summary

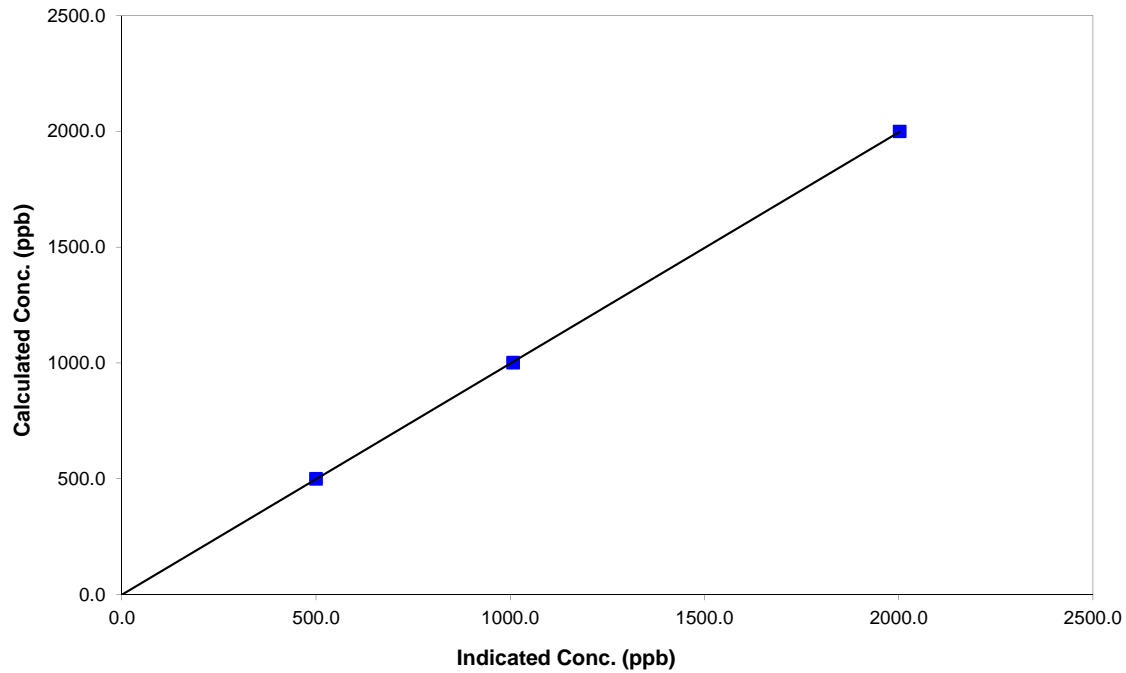
Station Information

Calibration Date	June 19, 2014	Previous Calibration	May 14, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	16:00	End Time (MST)	18:50
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	-0.6	N/A	Correlation Coefficient	0.999990
1999.8	2002.5	0.9986		
1001.4	1008.0	0.9934	Slope	0.998116
499.2	500.0	0.9984		
			Intercept	-0.757279

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

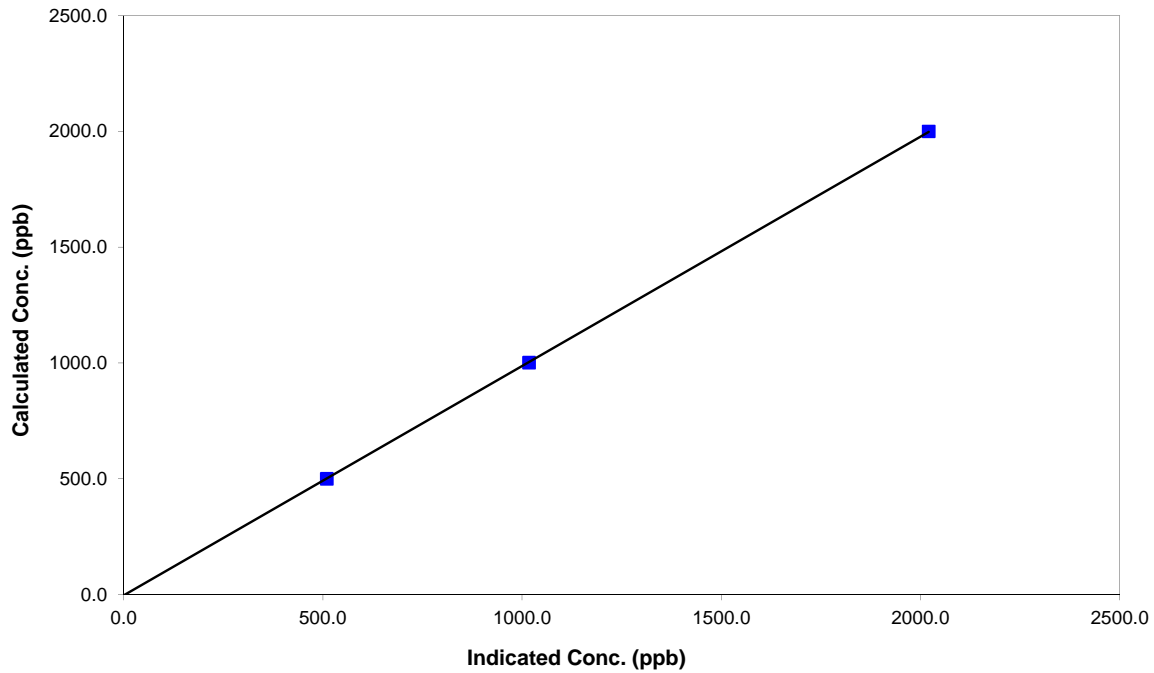
Station Information

Calibration Date	June 19, 2014	Previous Calibration	May 14, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	16:00	End Time (MST)	18:50
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	-0.8	N/A	Correlation Coefficient	0.999983
1999.8	2020.5	0.9897		
1001.4	1017.5	0.9841	Slope	0.990039
499.2	510.0	0.9788		
			Intercept	-2.899200

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

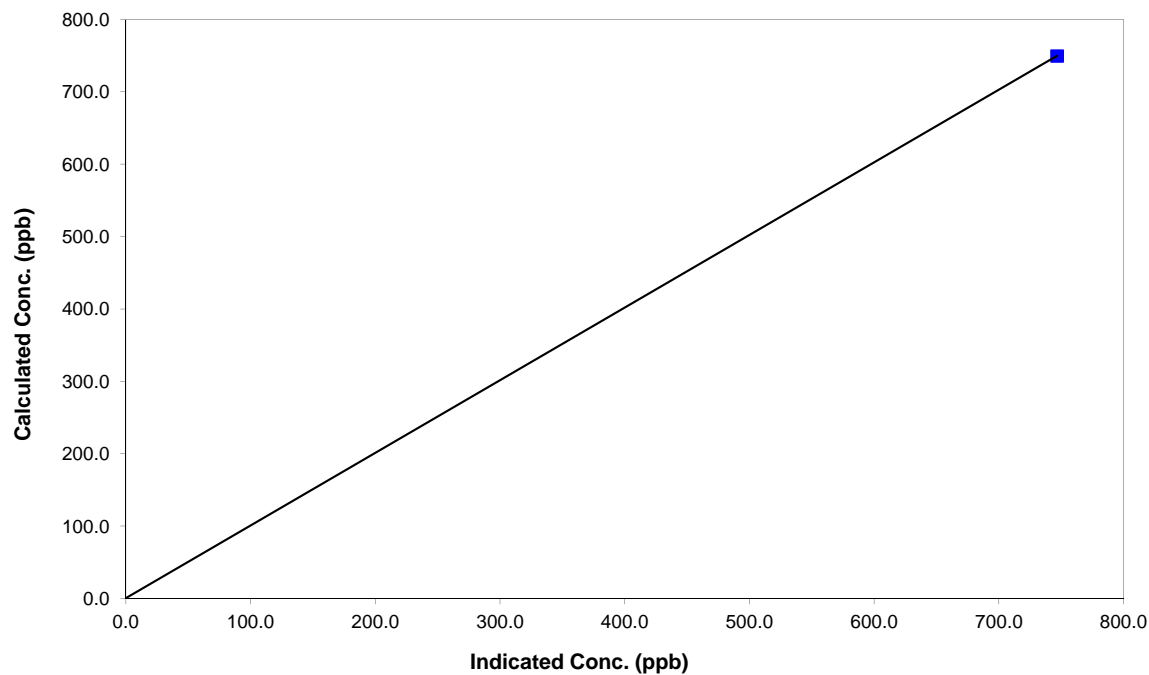
Station Information

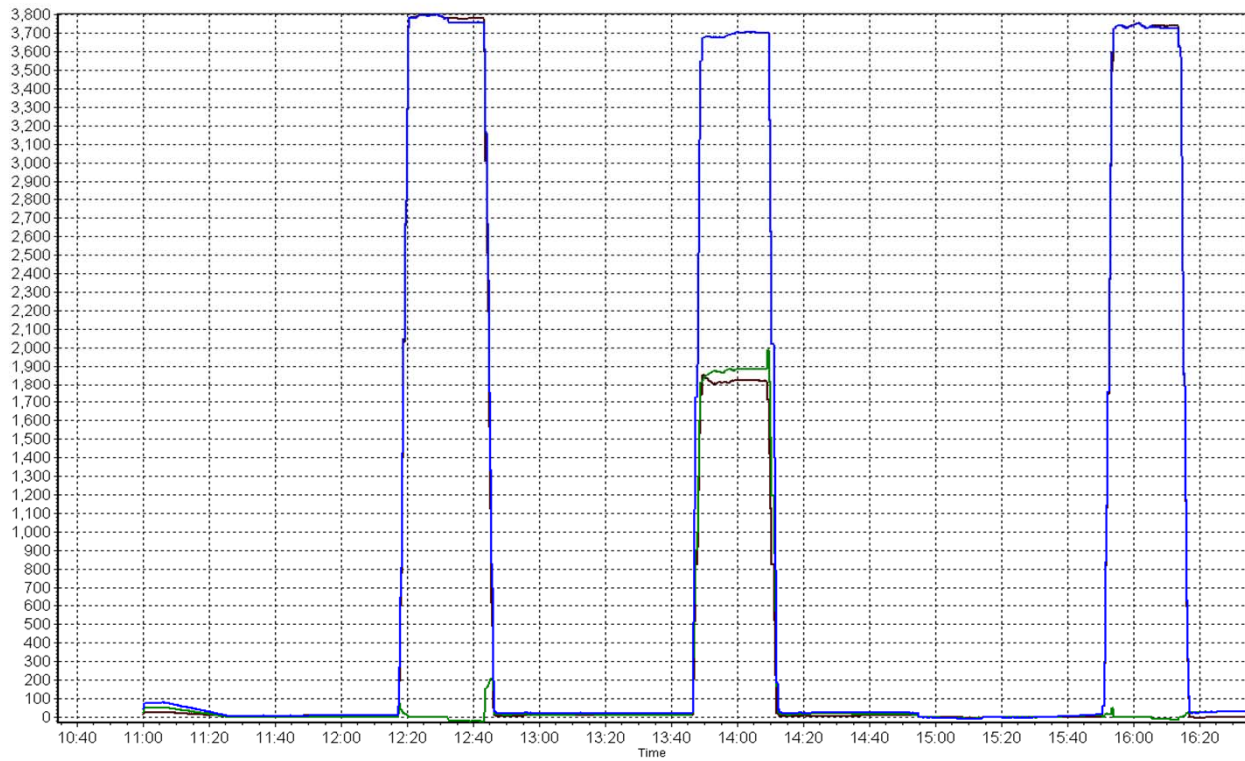
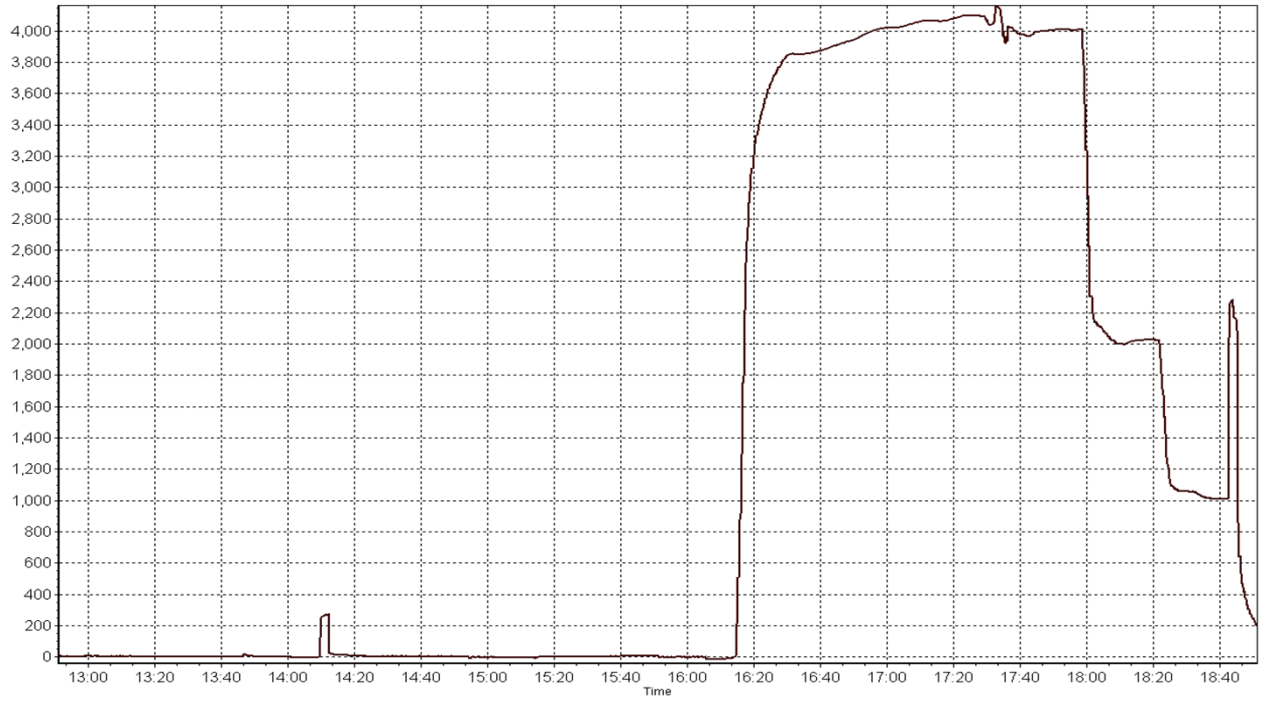
Calibration Date	June 19, 2014	Previous Calibration	May 14, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	16:00	End Time (MST)	18:50
Analyzer make	API T201	Analyzer serial #	152

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	0.999954
749.8	746.6	1.0043		
749.8	740.8	1.0121	Slope	1.007425
			Intercept	0.566777

NOx Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 2
MILDRED LAKE
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
 JUNE 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	687	33	33	100.00	39	0	4	0
H2S (ppb) Average	686	34	34	100.00	17	2	2	0
THC (ppm) Average	687	33	33	100.00	4.7	-	2.5	-
Temperature (C) Average	720	0	0	100.00	27.1	-	22.1	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	28	-	-	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
 JUNE 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	687	1.2	3	-	0	0	0	0	1	3	39
H2S (ppb) Average	686	0.6	1	-	0	0	0	0	1	1	17
THC (ppm) Average	687	2.22	0.3	-	1.9	2	2.1	2.1	2.3	2.5	4.7
Temperature 2 m (C) Average	720	16.73	5.3	-	4.8	9.5	13.1	17.1	20.5	23.8	27.1
Wind Speed 10 m (km/h) Average	720	9.5	5	-	0	4	6	9	12	16	28
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
-----------	-----------------	---------------	---------------------	-------

No operational issues to report

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Summary of Hour Averages

Mildred Lake - June 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 39 ppb on Jun 1 01:00	Maximum Daily Average: 4.2 ppb on Jun 1		Hours of Data:	687
Minimum Value: 0 ppb on Jun 5 04:00	Minimum Daily Average: 0.1 ppb on Jun 5		Hours of Missing Data:	33
Maximum Diurnal Average: 2.3 ppb at hour 10	Minimum Diurnal Average: 0.5 ppb at hour 19		Hours of Calibration:	33
Monthly Average: 1.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 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-Jun	39	Z	9	4	6	2	5	7	1	1	1	1	11	1	1	1	0	0	0	3	1	1	4	0	4.2	39
2-Jun	0	Z	0	0	0	0	0	0	0	0	3	10	4	7	0	0	0	0	0	0	0	0	0	0	1.2	10
3-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
5-Jun	0	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-Jun	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
7-Jun	0	Z	0	2	1	0	0	4	15	23	1	1	1	1	1	1	0	0	1	1	1	0	0	0	2.4	23
8-Jun	0	Z	0	0	0	0	0	1	2	2	3	1	1	3	1	2	3	1	1	2	2	3	5	4	1.7	5
9-Jun	5	Z	1	0	0	0	1	0	2	5	2	3	2	2	0	0	0	0	0	0	0	0	0	0	1.1	5
10-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	0.3	1
11-Jun	1	Z	20	2	1	1	2	1	1	0	1	2	1	1	2	1	1	1	3	1	1	0	0	0	1.9	20
12-Jun	0	Z	0	0	0	0	0	0	1	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
13-Jun	0	Z	0	0	0	2	0	0	0	0	1	2	2	3	6	3	7	2	0	0	0	0	3	1	1.5	7
14-Jun	1	Z	2	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
15-Jun	0	Z	1	1	1	2	2	4	8	7	0	1	2	3	3	0	2	2	1	0	2	2	1	1	2.0	8
16-Jun	2	Z	0	0	1	0	0	3	4	3	16	8	6	4	1	1	0	0	0	0	1	0	0	1	2.3	16
17-Jun	2	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
18-Jun	0	Z	0	0	1	1	1	1	1	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0.4	1
19-Jun	2	Z	4	1	1	2	2	2	2	1	1	5	1	14	4	2	0	0	0	0	0	0	0	0	2.1	14
20-Jun	0	Z	0	0	0	0	0	0	3	3	3	2	1	1	2	14	1	1	1	0	0	0	0	1	1.5	14
21-Jun	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
22-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0.2	1
23-Jun	0	Z	0	0	0	1	0	0	0	0	0	1	11	12	6	1	1	0	2	2	1	1	1	1	1.8	12
24-Jun	4	Z	3	2	4	5	3	1	2	1	5	2	1	1	0	1	1	0	0	0	1	1	2	2	1.8	5
25-Jun	1	Z	2	1	2	1	1	1	1	1	1	1	1	1	2	6	2	1	1	1	1	0	0	0	1.2	6
26-Jun	0	Z	0	0	0	0	0	0	5	10	3	3	4	3	1	1	2	1	1	1	1	1	0	0	1.6	10
27-Jun	0	Z	0	0	0	0	1	1	1	1	5	9	12	8	2	2	1	1	0	0	0	0	0	0	2.0	12
28-Jun	0	Z	0	0	0	0	1	1	2	3	1	1	1	1	0	0	1	1	0	0	0	0	1	1	0.6	3
29-Jun	0	Z	1	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0.5	1
30-Jun	2	Z	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2

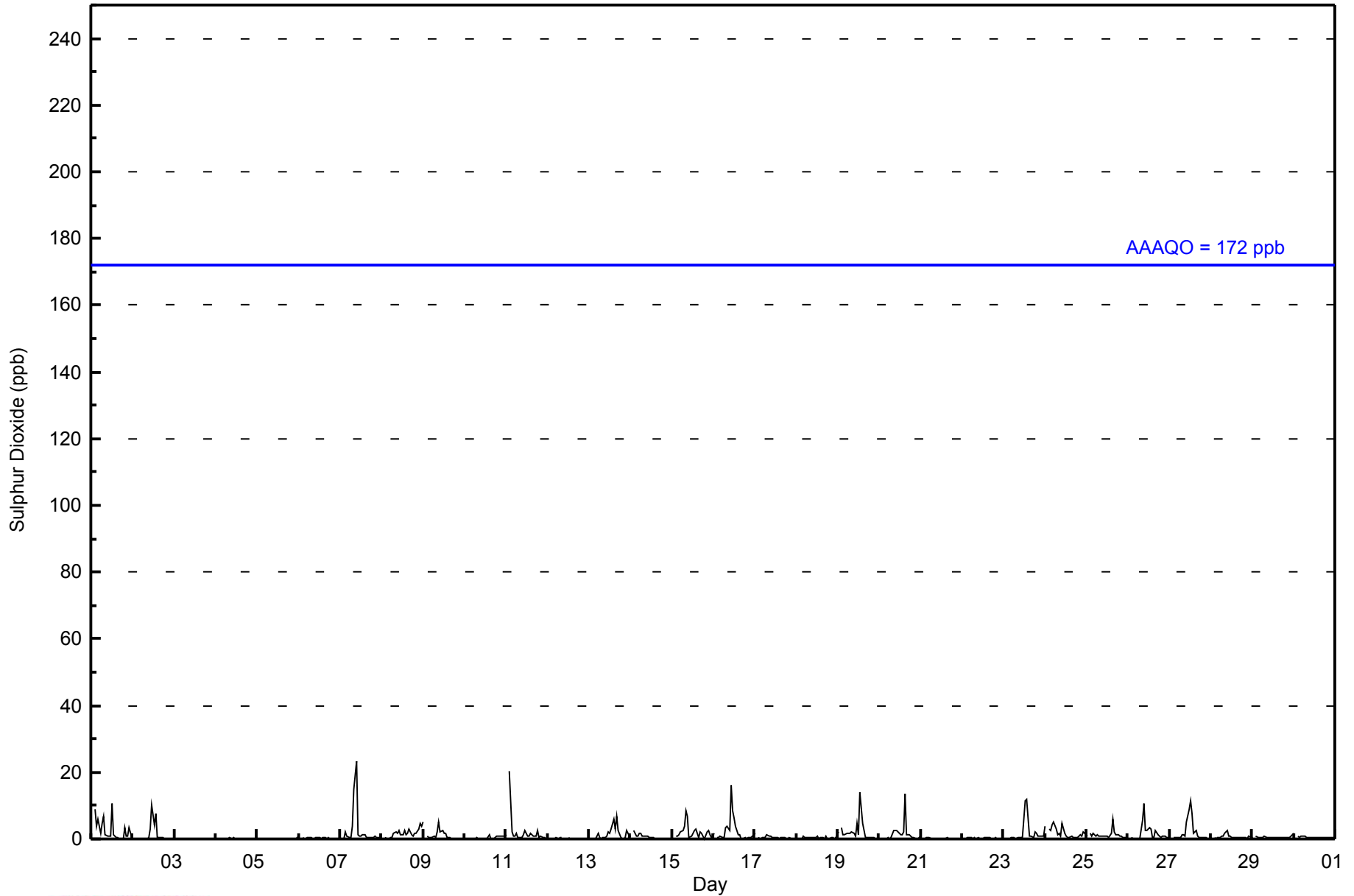
2.0	--	1.6	0.6	0.8	0.7	0.8	1.1	1.8	2.3	1.7	1.9	2.2	2.3	1.2	1.3	0.9	0.5	0.5	0.5	0.5	0.5	0.5	0.7	0.5	Diurnal Average	
39	--	20	4	6	5	5	7	15	23	16	10	12	14	6	14	7	2	3	3	3	2	3	5	4	Diurnal Maximum	

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	676	98.40	98.40
11 - 20	9	1.31	99.71
21 - 60	2	0.29	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 687

Total Number of Hours: 720



WBEA
Frequency Distribution

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

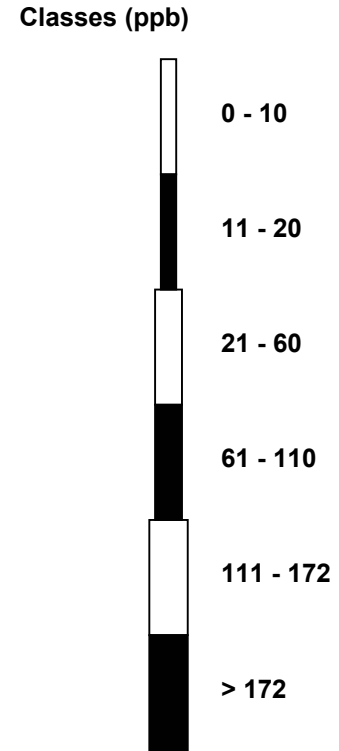
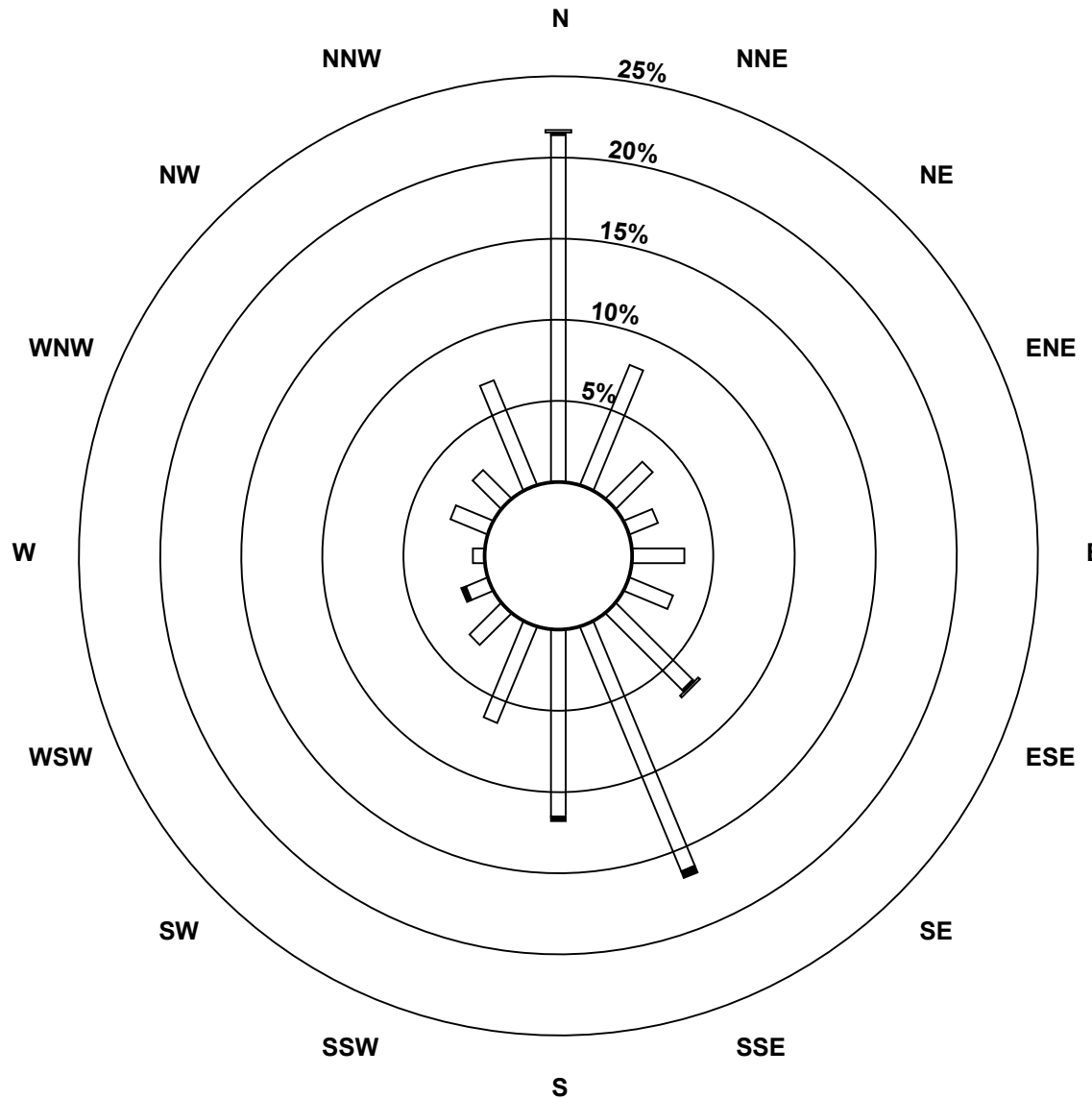
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	147	55	22	13	22	20	46	112	79	44	19	10	5	17	17	48	676
11 - 20	1	0	0	0	0	0	1	3	2	0	0	2	0	0	0	0	9
21 - 60	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	149	55	22	13	22	20	48	115	81	44	19	12	5	17	17	48	687

Total Number of Valid Hours: 687

Total Number of Hours: 720

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

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

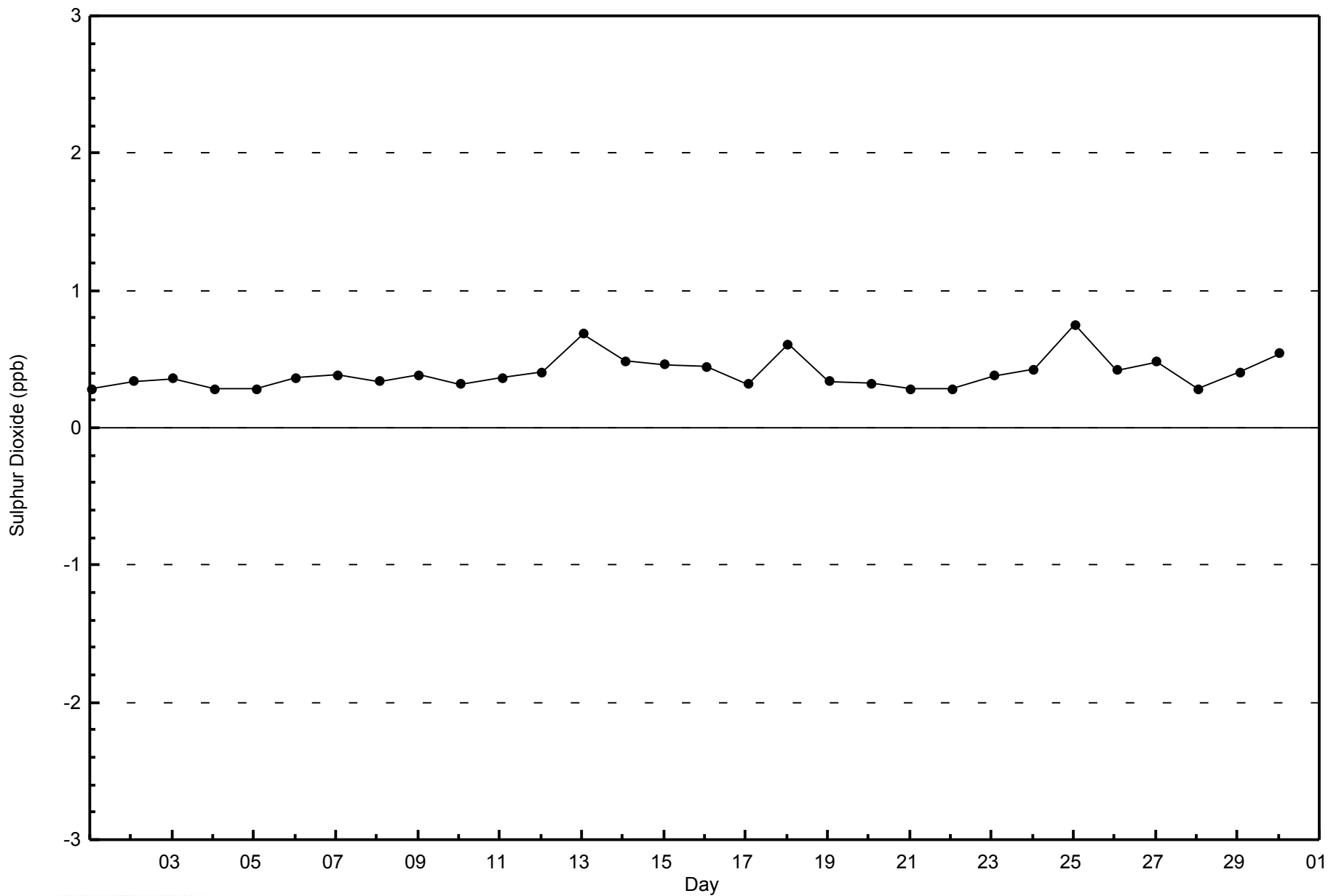


Total Number of Valid Hours: 687



WBEA
Zero Responses

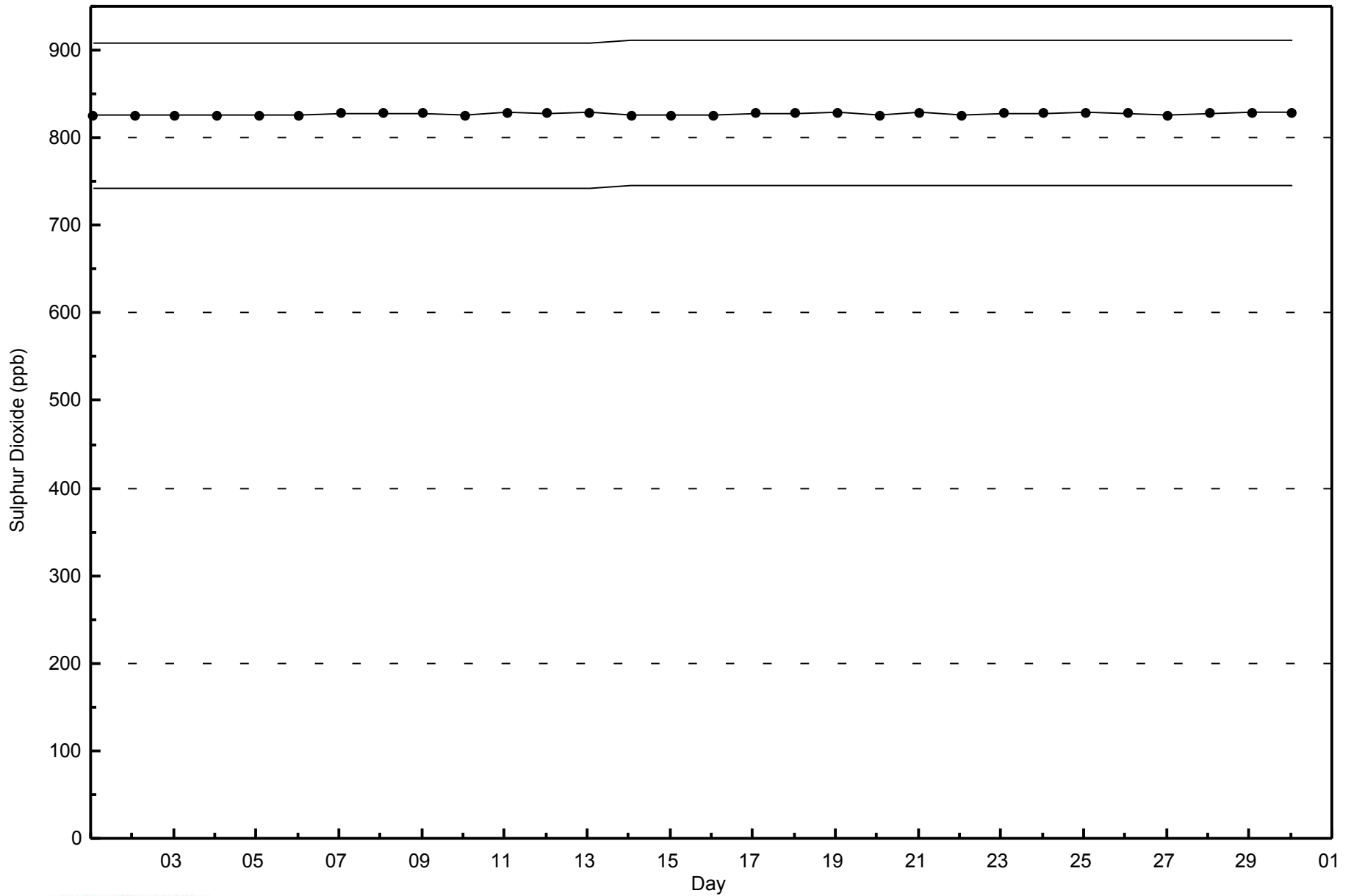
Sulphur Dioxide (SO₂) - ppb
Mildred Lake - June 2014





WBEA
Span Responses

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





Summary of Hour Averages

Mildred Lake - June 2014

Number of Exceedences (AAAQO):	1-hr: 2	24-hr: 0	Hours in Service:	720
Maximum Value: 17 ppb on Jun 10 23:00	Maximum Daily Average: 2.5 ppb on Jun 10		Hours of Data:	686
Minimum Value: 0 ppb on Jun 2 16:00	Minimum Daily Average: 0.2 ppb on Jun 4		Hours of Missing Data:	34
Maximum Diurnal Average: 1.1 ppb at hour 23	Minimum Diurnal Average: 0.3 ppb at hour 16		Hours of Calibration:	34
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:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jun	1	1	Z	1	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0.4	1	
2-Jun	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1	
3-Jun	0	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-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
6-Jun	0	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-Jun	0	0	Z	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
8-Jun	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.4	1	
9-Jun	1	1	Z	0	1	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
10-Jun	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	1	15	17	10	2.5	17	
11-Jun	1	1	Z	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	1	1	1	0.5	1	
12-Jun	1	1	Z	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2	
13-Jun	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	1	0.5	3	
14-Jun	2	1	Z	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2	
15-Jun	1	2	Z	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0.9	2	
16-Jun	2	2	Z	1	1	1	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2	
17-Jun	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1	
18-Jun	0	0	Z	1	2	1	1	1	1	1	1	1	0	0	1	0	1	0	1	0	0	1	2	1	2	0.9	2
19-Jun	2	2	Z	2	2	2	2	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1.0	2	
20-Jun	0	0	Z	0	0	0	0	0	1	2	1	1	1	1	1	1	1	0	1	1	1	1	2	5	0.9	5	
21-Jun	3	1	Z	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0.6	3	
22-Jun	0	0	Z	2	1	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	3	
23-Jun	0	0	Z	1	2	4	3	1	1	1	0	0	1	1	0	0	0	0	0	1	0	0	1	1	0.9	4	
24-Jun	1	1	Z	1	0	1	0	1	1	1	1	0	0	0	0	0	0	0	1	1	1	2	1	2	0.7	2	
25-Jun	2	2	Z	0	1	1	1	1	1	1	0	0	0	0	1	0	1	2	1	1	1	0	0	0	0.8	2	
26-Jun	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.4	1	
27-Jun	0	0	Z	0	0	1	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.6	2	
28-Jun	0	0	Z	1	1	1	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	3	
29-Jun	0	0	Z	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4	
30-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	

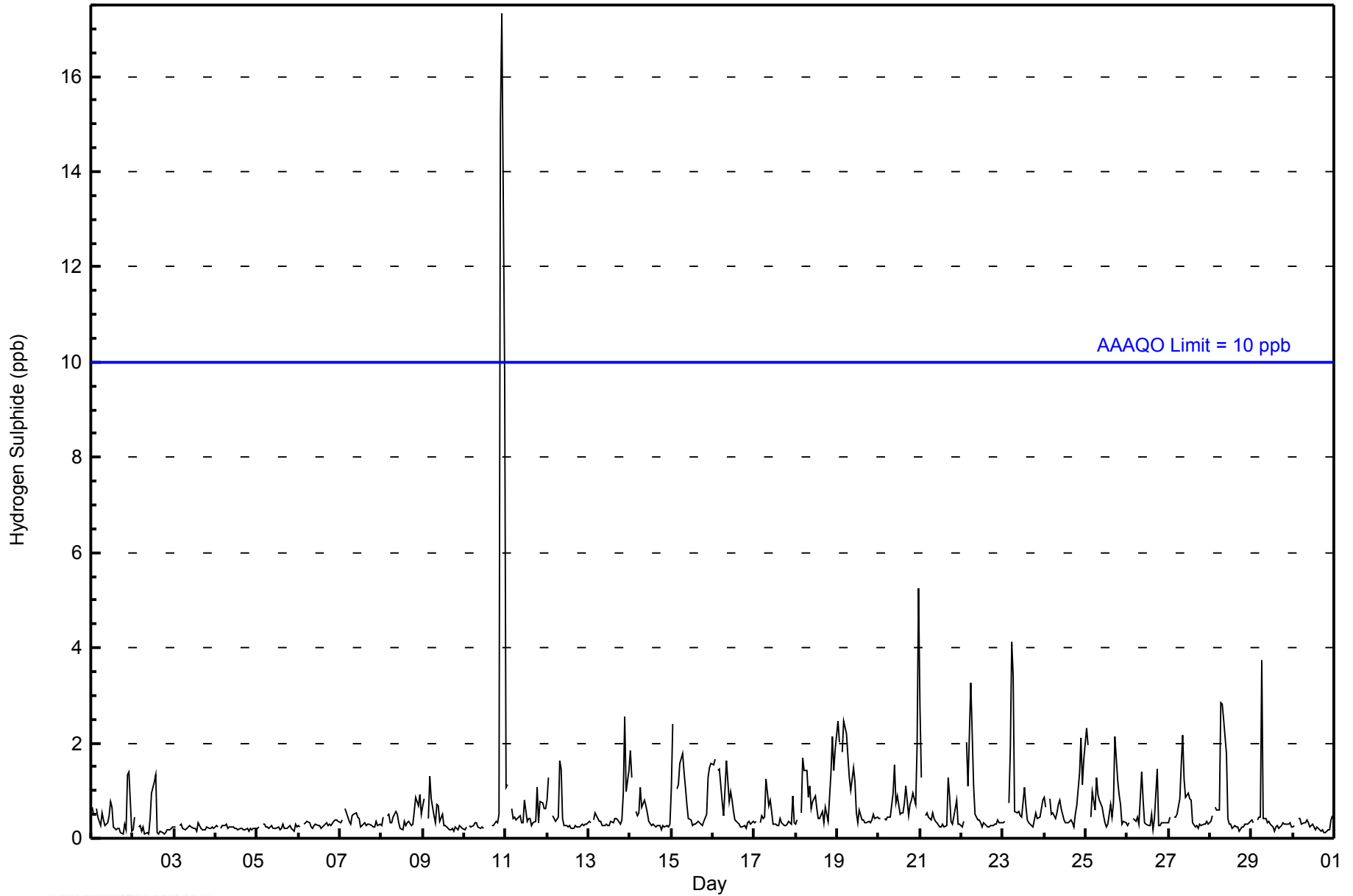
0.7	0.7	--	0.6	0.7	0.8	0.9	0.7	0.8	0.6	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.5	1.1	1.1	1.0	Diurnal Average	
3	2	--	2	2	4	4	3	2	2	1	1	1	1	1	1	1	2	1	1	1	15	17	10	Diurnal Maximum	

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
Mildred Lake - June 2014





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	674	98.25	98.25
3 - 4	8	1.17	99.42
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: 686

Total Number of Hours: 720



WBEA
Frequency Distribution

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

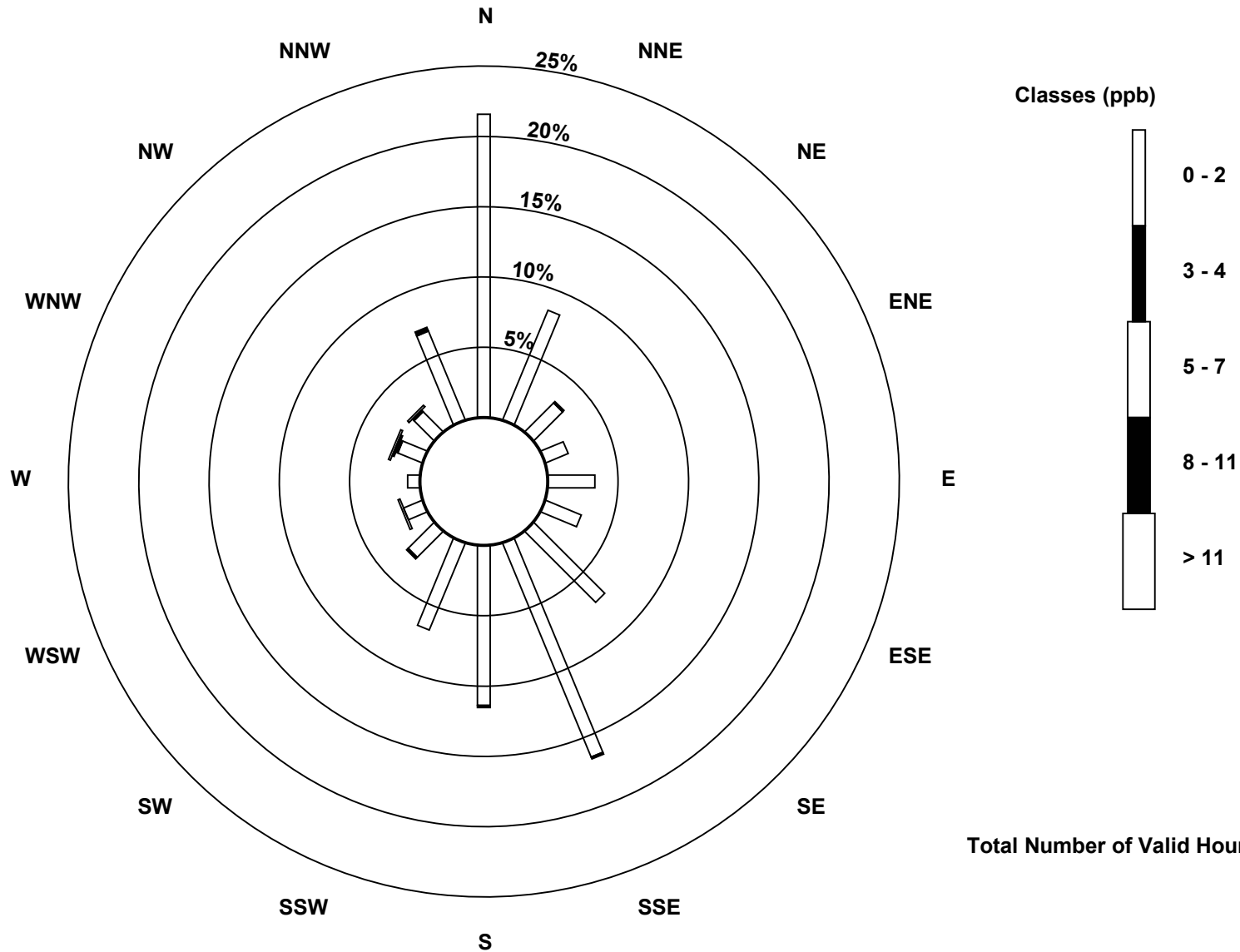
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	148	58	20	12	23	19	49	113	78	46	18	10	6	13	14	47	674
3 - 4	0	0	1	0	0	0	0	1	1	0	1	0	0	1	1	2	8
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
> 11	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2
Totals	148	58	21	12	23	19	49	114	79	46	19	11	6	16	16	49	686

Total Number of Valid Hours: 686

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

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

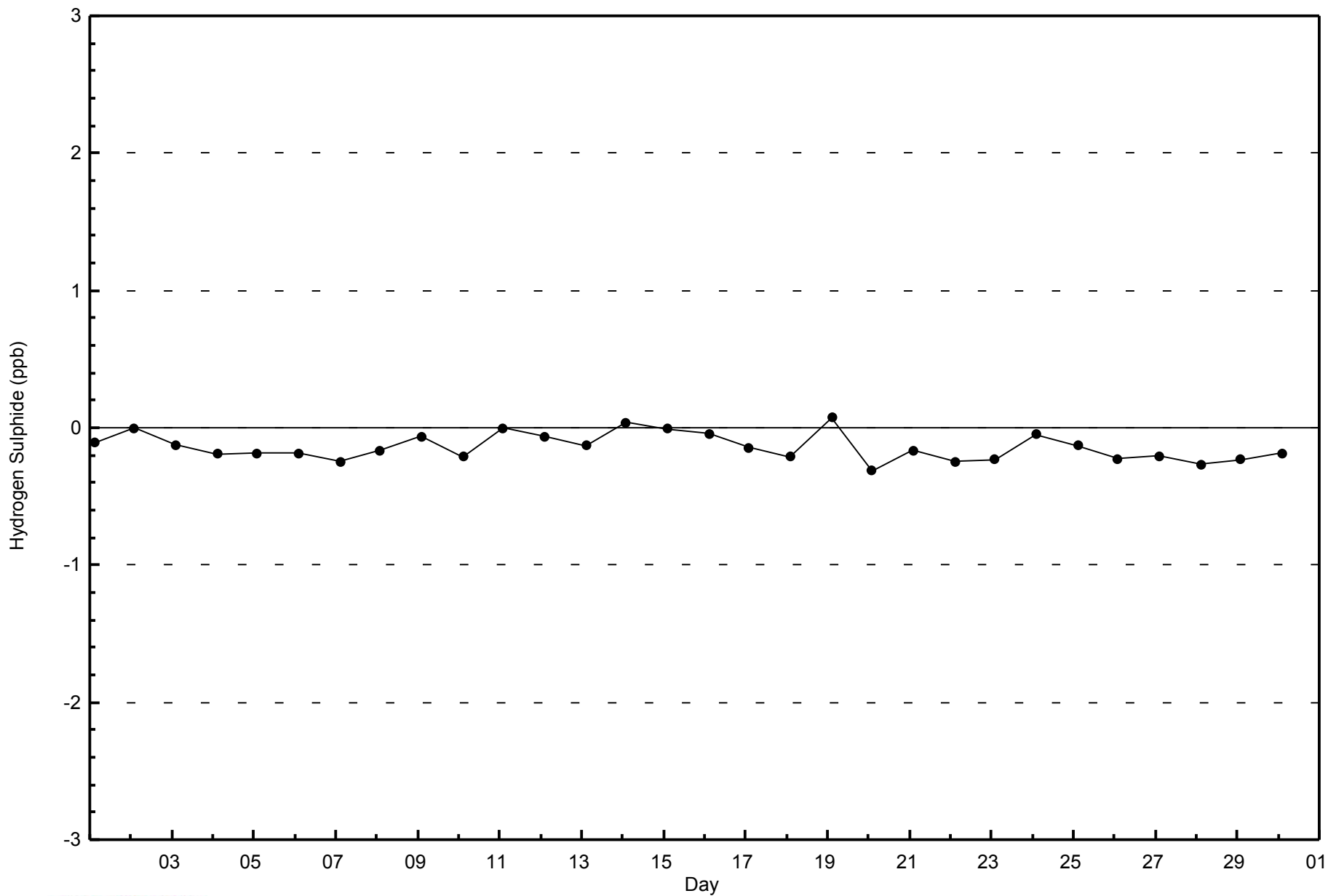


Total Number of Valid Hours: 686



WBEA
Zero Responses

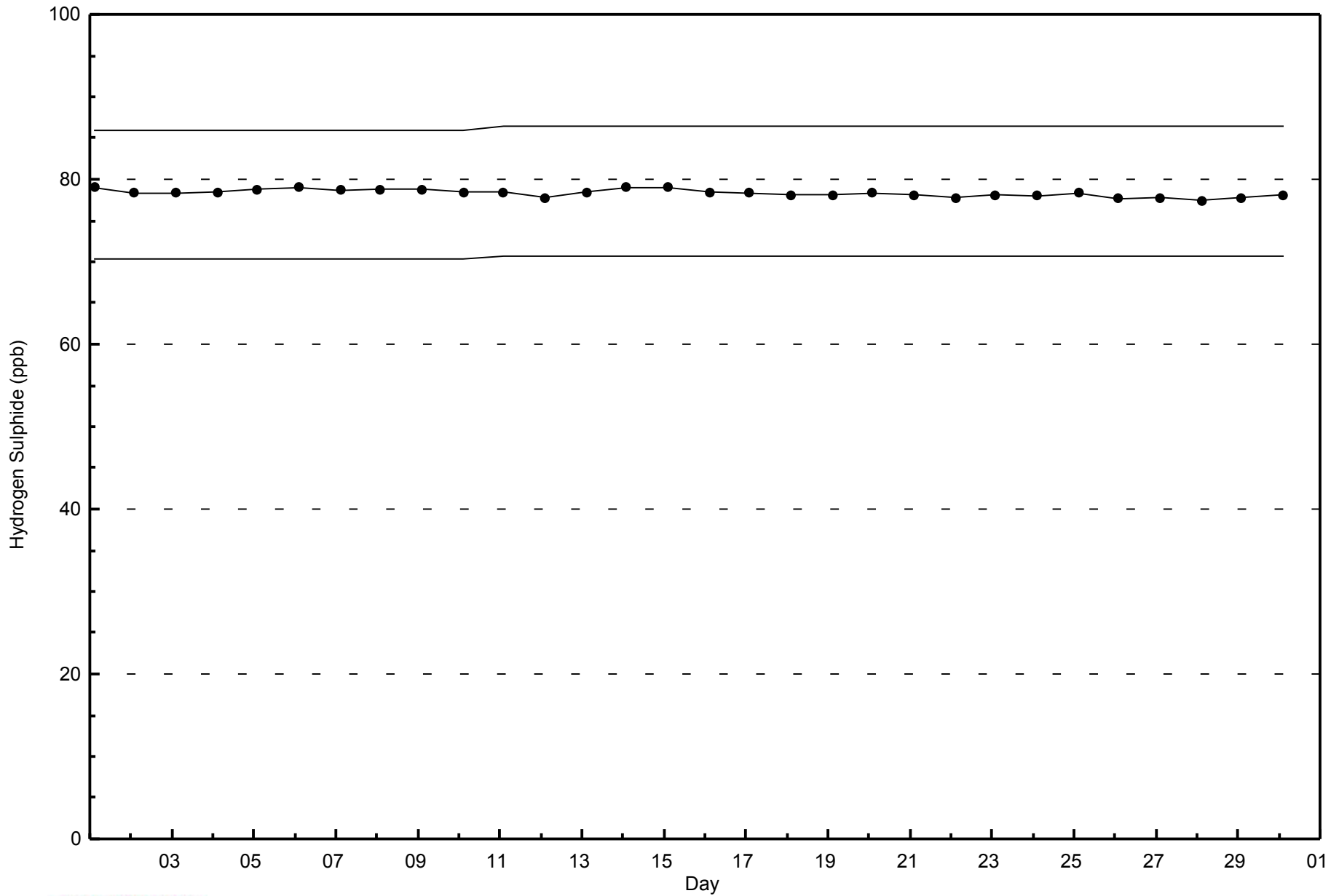
Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - June 2014





WBEA
Span Responses

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



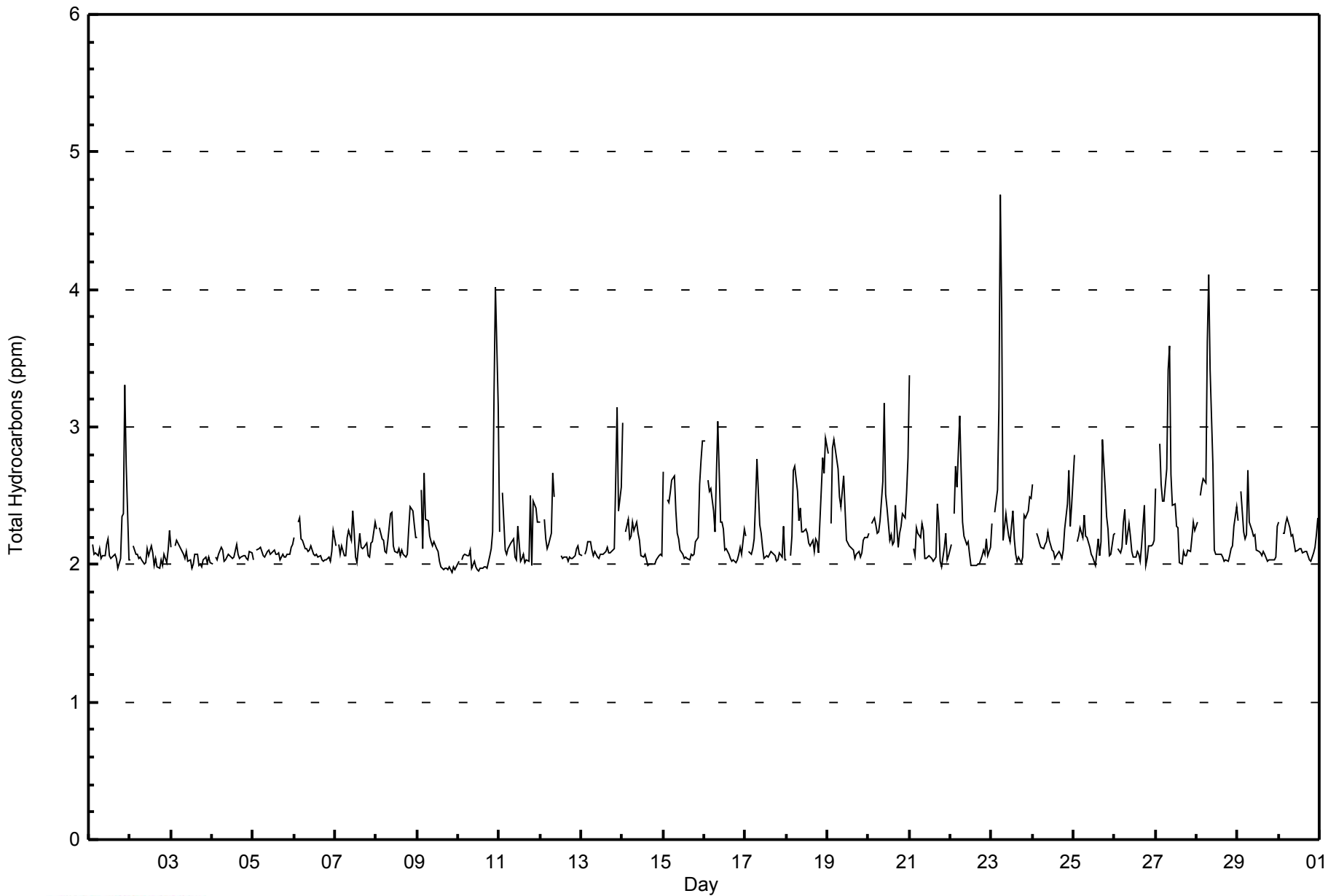


Maximum Value: 4.7 ppm on Jun 23 06:00		Maximum Daily Average: 2.5 ppm on Jun 23		Hours in Service: 720																							
Minimum Value: 1.9 ppm on Jun 9 21:00		Minimum Daily Average: 2.1 ppm on Jun 2		Hours of Data: 687																							
Maximum Diurnal Average: 2.4 ppm at hour 7		Minimum Diurnal Average: 2.1 ppm at hour 16		Hours of Missing Data: 33																							
Monthly Average: 2.22 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.1 Q ₃ = 2.3 P ₉₀ = 2.5 P ₉₉ = 3.4		Hours of Calibration: 33																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jun	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.2	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.4	2.4	3.3	2.7	2.0	2.2	3.3	
2-Jun	2.0	Z	2.1	2.1	2.1	2.0	2.1	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	2.1	2.0	2.1	2.3	2.1	2.3	
3-Jun	2.1	Z	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.2	
4-Jun	2.0	Z	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	
5-Jun	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
6-Jun	2.2	Z	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.3	2.1	2.3	
7-Jun	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.4	2.2	2.0	2.0	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.3	2.1	2.4	
8-Jun	2.3	Z	2.3	2.2	2.2	2.1	2.1	2.2	2.4	2.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.4	2.4	2.3	2.2	2.2	2.4	
9-Jun	2.2	Z	2.5	2.1	2.7	2.3	2.3	2.2	2.2	2.1	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.1	2.7	
10-Jun	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	3.2	4.0	3.1	2.2	4.0	
11-Jun	2.2	Z	2.5	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.0	2.3	2.0	2.0	2.1	2.0	2.0	2.0	2.5	2.0	2.5	2.4	2.3	2.3	2.2	2.5	
12-Jun	2.3	Z	2.3	2.2	2.1	2.1	2.2	2.7	2.5	C	C	C	2.1	2.0	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.7	
13-Jun	2.1	Z	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.6	3.1	2.4	2.6	2.2	3.1	
14-Jun	3.0	Z	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	3.0	
15-Jun	2.7	Z	2.5	2.4	2.5	2.6	2.6	2.4	2.2	2.2	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.6	2.8	2.9	2.3	2.9	
16-Jun	2.9	Z	2.6	2.5	2.5	2.4	2.2	2.7	3.0	2.3	2.3	2.3	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.3	2.3	3.0	
17-Jun	2.2	Z	2.1	2.1	2.1	2.2	2.5	2.8	2.3	2.2	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.3	2.0	2.2	2.8	
18-Jun	2.0	Z	2.1	2.2	2.7	2.7	2.5	2.3	2.4	2.2	2.2	2.3	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.1	2.5	2.8	2.7	2.9	2.3	2.9	
19-Jun	2.8	Z	2.3	2.8	2.9	2.8	2.7	2.5	2.4	2.6	2.4	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.9	
20-Jun	2.2	Z	2.3	2.3	2.3	2.2	2.2	2.3	2.6	3.2	2.5	2.4	2.2	2.2	2.1	2.2	2.4	2.1	2.2	2.3	2.4	2.3	2.5	2.8	2.4	3.2	
21-Jun	3.4	Z	2.1	2.1	2.3	2.2	2.2	2.3	2.3	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.4	2.3	2.0	2.0	2.1	2.2	2.0	2.1	2.2	3.4	
22-Jun	2.1	Z	2.4	2.7	2.6	3.1	2.7	2.3	2.2	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.1	2.1	2.2	3.1	
23-Jun	2.3	Z	2.4	2.5	3.1	4.7	3.8	2.2	2.4	2.3	2.2	2.2	2.4	2.2	2.1	2.0	2.1	2.0	2.1	2.4	2.3	2.4	2.5	2.5	2.5	4.7	
24-Jun	2.6	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.1	2.3	2.4	2.7	2.3	2.4	2.2	2.7	
25-Jun	2.8	Z	2.2	2.2	2.3	2.2	2.4	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.2	2.1	2.2	2.9	2.6	2.3	2.3	2.1	2.1	2.2	2.2	2.9	
26-Jun	2.2	Z	2.1	2.1	2.1	2.3	2.4	2.1	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.4	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.4	
27-Jun	2.6	Z	2.9	2.6	2.5	2.5	2.7	3.4	3.6	2.7	2.4	2.4	2.3	2.3	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.4	3.6	
28-Jun	2.3	Z	2.5	2.6	2.6	2.6	3.6	4.1	3.4	2.7	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.3	2.4	2.4	4.1	
29-Jun	2.3	Z	2.5	2.2	2.2	2.2	2.7	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.2	2.7	
30-Jun	2.3	Z	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.3	2.2	2.3	
		2.4	--	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	Diurnal Average		
		3.4	--	2.9	2.8	3.1	4.7	3.8	4.1	3.6	3.2	2.5	2.4	2.4	2.3	2.2	2.2	2.4	2.9	2.6	2.4	2.6	3.3	4.0	3.1	Diurnal Maximum	
Z - zerospan		C - Calibration																									



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	140	20.38	20.38
2.1 - 3.0	531	77.29	97.67
3.1 - 10.0	16	2.33	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 687

Total Number of Hours: 720



WBEA
Frequency Distribution

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

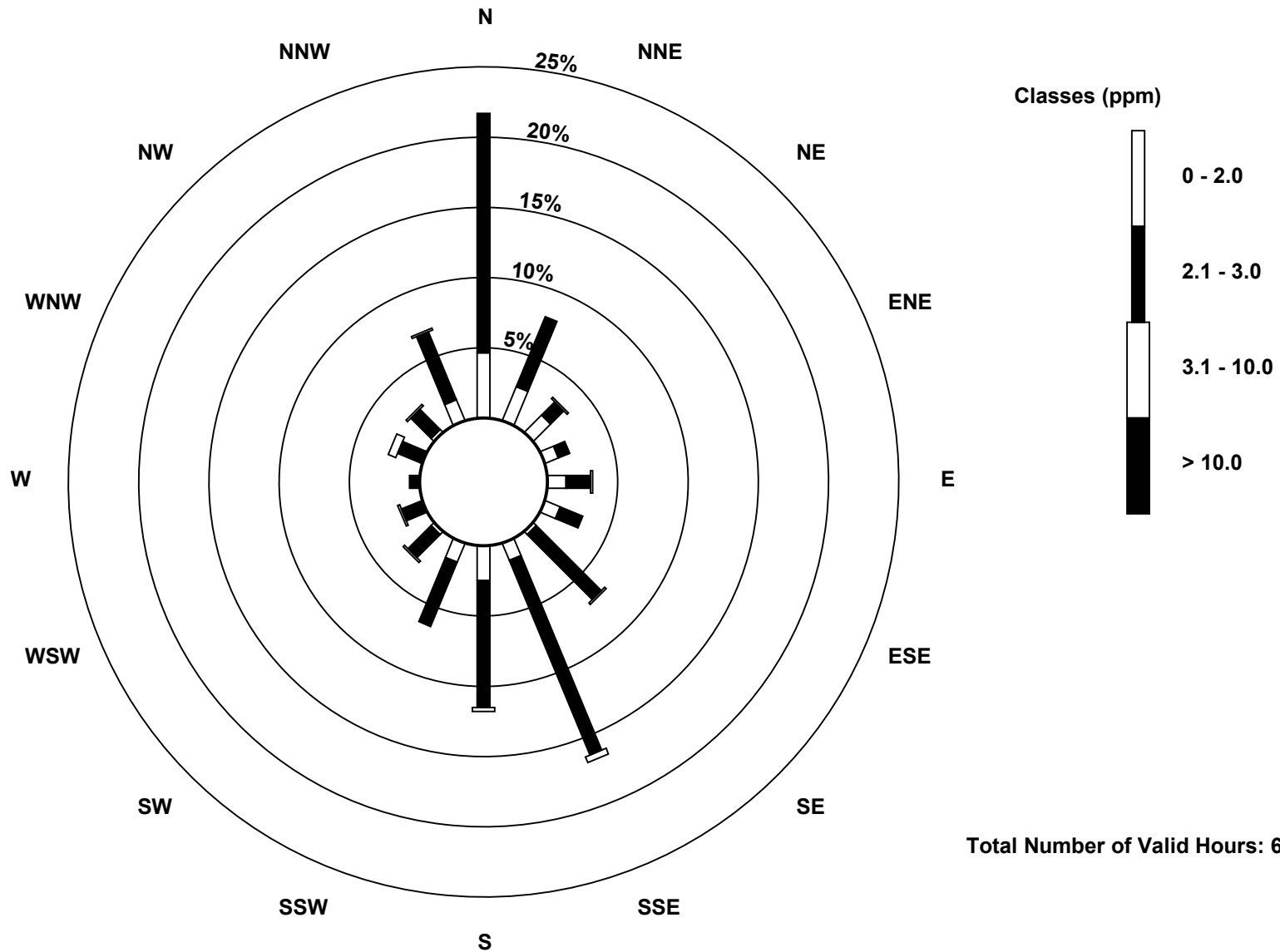
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	32	18	12	7	9	8	2	9	17	10	2	0	0	1	2	11	140
2.1 - 3.0	117	37	9	6	12	12	45	103	62	34	16	11	5	12	14	36	531
3.1 - 10.0	0	0	1	0	1	0	1	3	2	0	1	1	0	4	1	1	16
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	149	55	22	13	22	20	48	115	81	44	19	12	5	17	17	48	687

Total Number of Valid Hours: 687

Total Number of Hours: 720

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

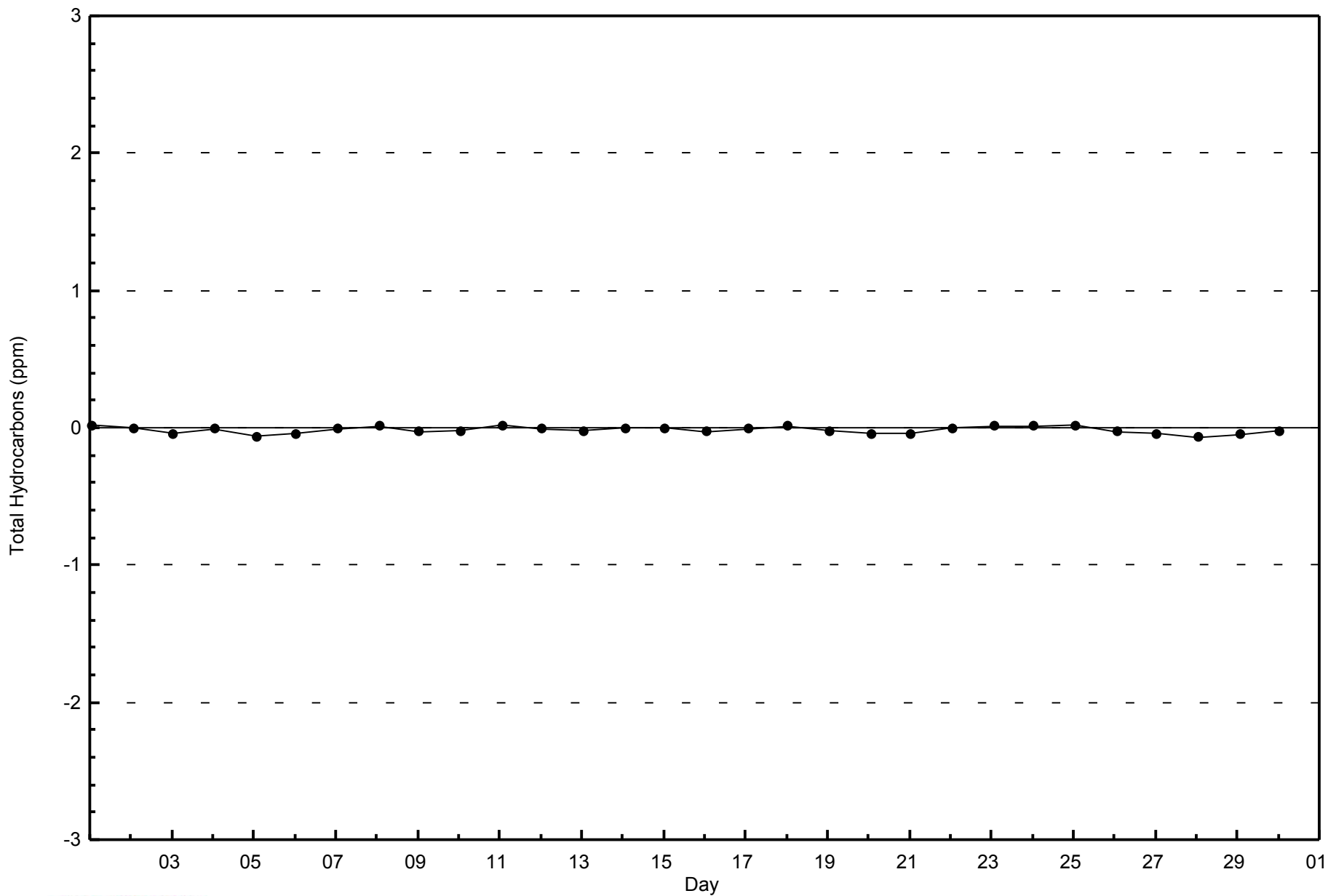
**Total Hydrocarbons (THC) - ppm
Mildred Lake (AMS 2)**





WBEA
Zero Responses

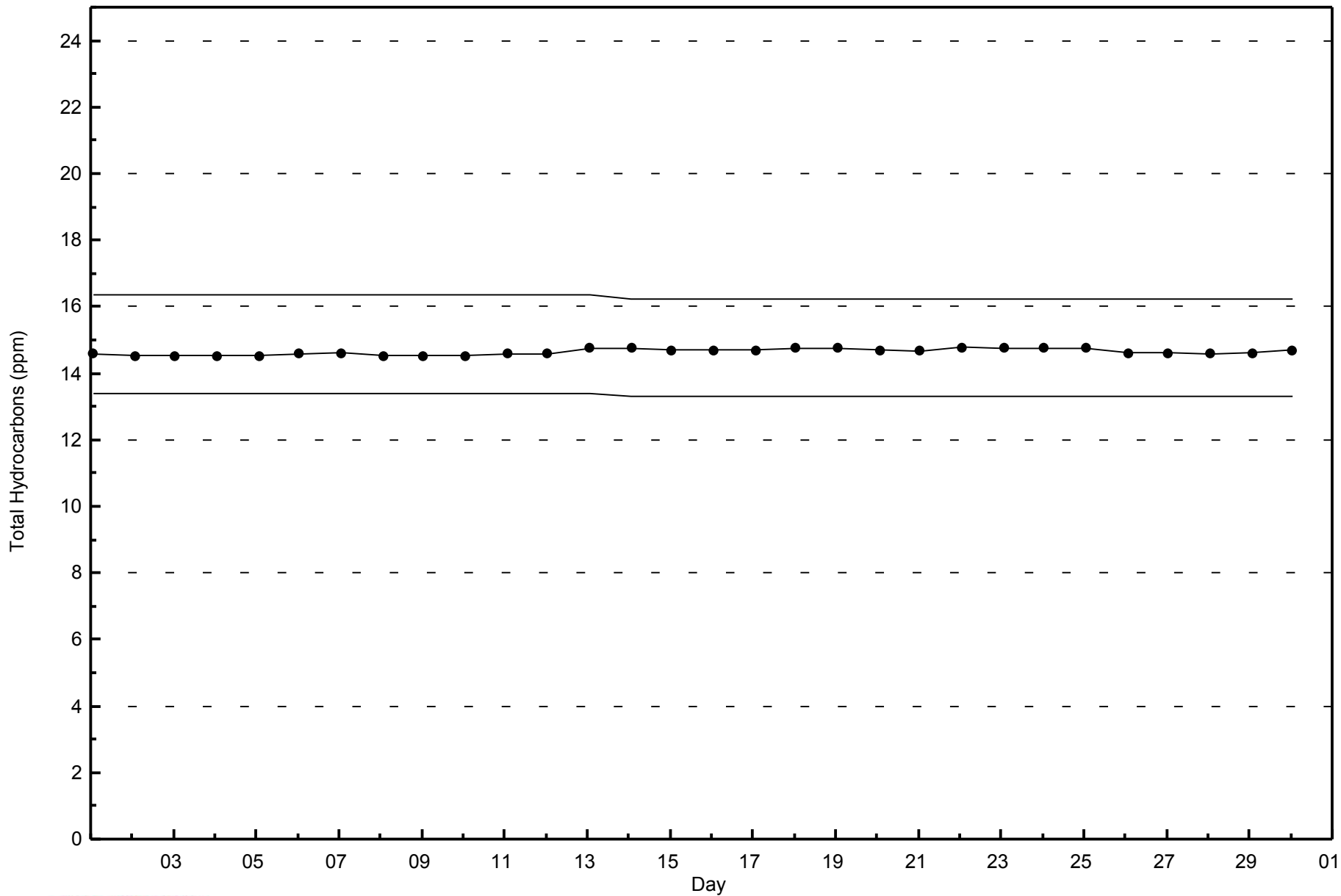
Total Hydrocarbons (THC) - ppm
Mildred Lake - June 2014





WBEA
Span Responses

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

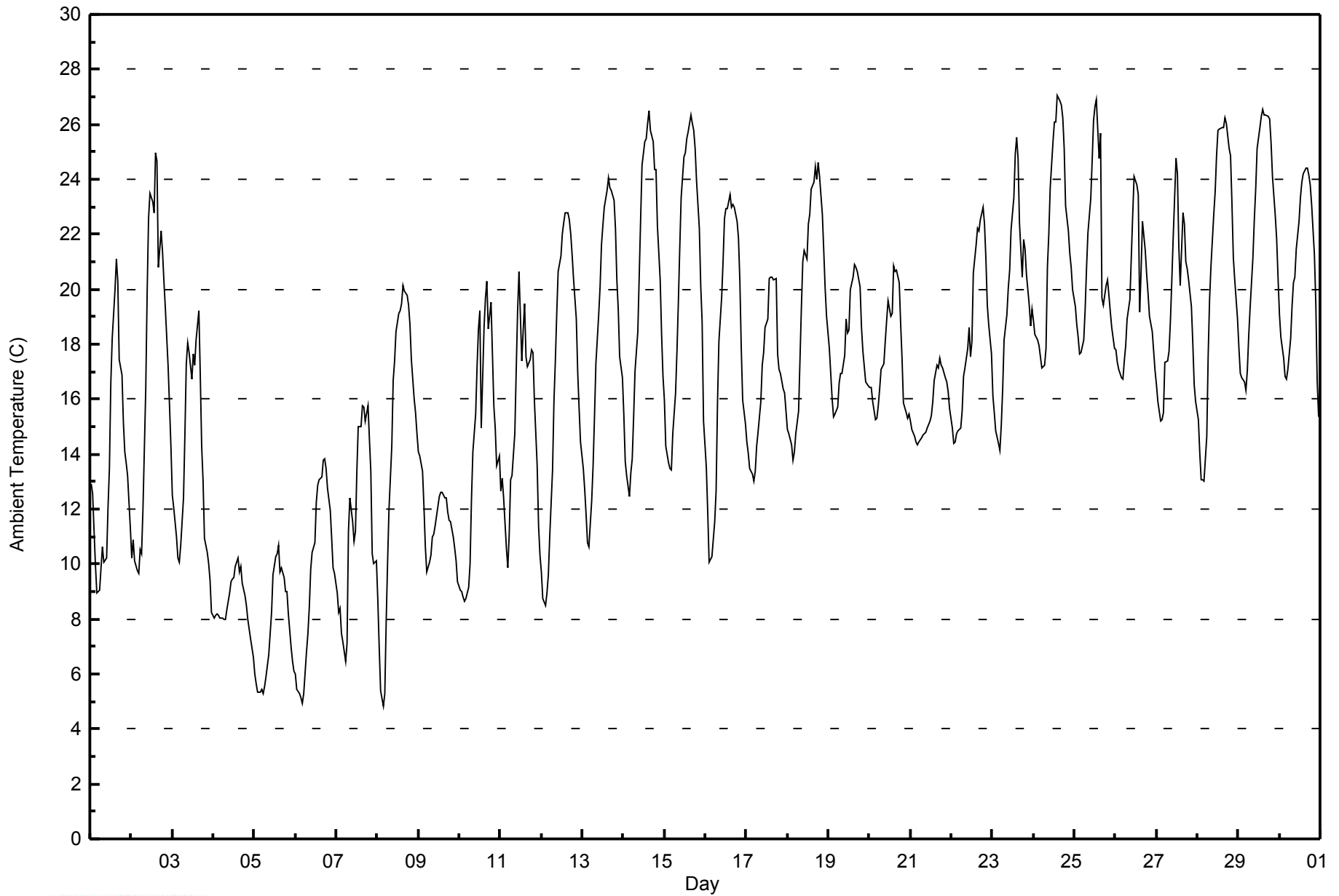
Mildred Lake - June 2014

Maximum Value: 27.1 C on Jun 24 15:00 Maximum Daily Average: 22.1 C on Jun 29 Minimum Value: 4.8 C on Jun 8 04:00 Minimum Daily Average: 7.6 C on Jun 5 Maximum Diurnal Average: 21.0 C at hour 16 Minimum Diurnal Average: 12.0 C at hour 5 Monthly Average: 16.73 C Percentiles: P ₁ = 5.3 P ₁₀ = 9.5 Q ₁ = 13.1 Median = 17.1 Q ₃ = 20.5 P ₉₀ = 23.8 P ₉₉ = 26.5																						Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jun	12.9	12.6	11.2	10.0	9.0	9.0	9.9	10.6	10.0	10.2	12.1	13.5	16.6	18.2	20.0	21.1	20.3	17.5	16.9	15.2	14.1	13.7	13.2	11.3	13.7	21.1																						
2-Jun	10.2	10.9	10.1	9.8	9.7	10.5	10.4	12.0	16.4	19.9	22.6	23.5	23.2	22.8	25.0	24.7	20.8	22.1	21.4	20.3	19.3	17.2	15.8	14.3	17.2	25.0																						
3-Jun	12.5	12.1	11.0	10.2	10.1	10.7	12.4	14.7	17.3	18.1	17.7	16.7	17.7	17.2	18.2	19.2	16.9	14.3	13.0	11.0	10.4	10.0	9.4	8.2	13.7	19.2																						
4-Jun	8.0	8.1	8.2	8.1	8.0	8.0	8.0	8.0	8.4	8.9	9.3	9.5	9.5	9.9	10.2	9.7	9.9	9.3	8.9	8.5	8.0	7.6	7.3	6.6	8.6	10.2																						
5-Jun	6.0	5.7	5.4	5.3	5.4	5.3	5.5	5.9	6.7	7.5	8.2	9.6	10.3	10.4	10.7	9.7	9.8	9.5	9.0	9.0	8.2	7.0	6.4	6.1	7.6	10.7																						
6-Jun	6.0	5.5	5.3	5.1	4.9	5.3	6.8	7.5	8.4	9.8	10.4	10.8	12.2	12.9	13.1	13.2	13.8	13.8	13.5	12.7	12.0	10.9	9.9	9.6	9.7	13.8																						
7-Jun	9.0	8.2	8.4	7.5	7.1	6.5	7.1	11.2	12.4	11.5	10.8	11.2	13.4	15.0	15.0	15.8	15.7	15.2	15.8	14.5	13.4	10.4	10.0	10.1	11.5	15.8																						
8-Jun	8.7	7.0	5.4	4.8	5.3	7.9	10.1	12.0	14.3	16.7	17.4	18.5	19.1	19.2	19.5	20.1	19.9	19.8	19.4	18.7	17.5	16.0	15.5	14.8	14.5	20.1																						
9-Jun	14.1	13.9	13.4	12.1	10.6	9.7	10.0	10.3	11.0	11.1	11.4	12.1	12.5	12.6	12.6	12.4	12.4	11.9	11.6	11.6	11.0	10.6	10.1	9.4	11.6	14.1																						
10-Jun	9.0	9.0	8.8	8.6	8.8	9.2	10.0	12.4	14.1	15.5	17.2	18.5	19.2	15.0	18.6	19.7	20.3	18.6	19.6	17.6	15.7	15.0	13.6	13.9	14.5	20.3																						
11-Jun	12.7	13.1	12.4	10.6	9.9	11.1	13.0	13.2	14.8	17.0	19.2	20.7	17.4	18.5	19.5	17.5	17.2	17.4	17.8	17.7	16.0	13.6	11.4	10.3	15.1	20.7																						
12-Jun	9.7	8.8	8.5	8.9	9.6	11.0	13.4	15.9	17.4	19.1	20.6	21.2	22.0	22.4	22.8	22.8	22.5	22.0	21.3	20.4	18.9	17.0	15.6	14.4	16.9	22.8																						
13-Jun	13.5	12.7	11.8	10.8	10.6	12.3	13.6	15.4	17.3	19.1	20.1	21.6	22.3	23.0	23.6	24.1	23.7	23.6	23.2	22.2	20.3	19.3	17.6	16.8	18.3	24.1																						
14-Jun	15.4	13.7	13.2	12.5	13.3	13.8	15.4	17.0	18.5	20.5	22.5	24.5	25.4	25.5	26.0	26.5	25.8	25.4	24.4	24.4	22.3	20.3	18.3	16.8	20.1	26.5																						
15-Jun	16.0	14.3	13.7	13.5	13.4	14.7	16.2	17.7	19.5	21.5	23.4	24.8	25.0	25.5	25.7	26.3	26.0	25.8	25.1	24.0	22.2	20.1	18.8	15.2	20.4	26.3																						
16-Jun	13.5	11.9	10.1	10.2	10.3	11.6	12.6	15.9	18.1	19.7	21.1	22.6	22.9	23.5	23.0	23.1	23.0	22.5	21.9	20.3	17.8	16.0	15.1	17.9	23.5																							
17-Jun	14.5	14.0	13.5	13.3	13.0	13.4	14.3	14.8	15.9	17.2	17.7	18.6	18.9	20.4	20.4	20.5	20.4	20.4	17.6	17.1	16.9	16.4	16.2	15.5	16.7	20.5																						
18-Jun	14.9	14.7	14.4	13.8	14.1	14.8	15.6	17.5	19.3	21.0	21.4	21.1	22.4	22.7	23.7	23.9	24.5	24.0	24.6	24.1	22.8	21.4	20.0	19.0	19.8	24.6																						
19-Jun	17.8	16.9	16.0	15.4	15.5	15.7	16.6	16.9	16.9	17.6	18.9	18.4	18.5	20.0	20.5	20.9	20.8	20.7	20.1	18.6	17.8	17.2	16.6	16.5	17.9	20.9																						
20-Jun	16.4	16.4	15.9	15.3	15.3	15.8	16.4	17.1	17.3	18.1	18.9	19.6	19.0	19.1	20.9	20.7	20.7	20.2	18.8	17.5	15.8	15.5	15.3	15.4	17.6	20.9																						
21-Jun	15.2	14.9	14.6	14.4	14.3	14.4	14.6	14.7	14.7	14.8	15.0	15.2	15.4	15.9	16.7	17.2	17.1	17.5	17.2	17.1	16.8	16.7	16.3	15.7	15.7	17.5																						
22-Jun	15.0	14.4	14.4	14.8	14.9	15.0	15.6	16.9	17.1	17.9	18.6	17.5	18.1	20.6	21.6	22.2	22.1	22.5	23.0	22.4	21.1	19.4	18.7	17.7	18.4	23.0																						
23-Jun	16.1	15.5	14.9	14.4	14.2	15.0	16.4	18.2	19.1	20.1	20.7	22.2	23.4	24.9	25.5	24.8	22.4	20.4	21.8	21.4	20.5	19.4	18.7	19.3	19.5	25.5																						
24-Jun	18.9	18.3	18.2	17.9	17.6	17.1	17.2	17.8	20.8	22.0	23.7	25.4	26.1	26.1	27.1	26.8	26.7	26.3	25.1	23.0	22.1	21.3	20.8	20.0	21.9	27.1																						
25-Jun	19.4	18.7	18.3	17.7	17.7	18.1	19.3	20.8	22.0	23.3	24.6	26.1	26.6	26.9	24.8	25.7	19.7	19.4	20.2	20.3	19.8	19.1	18.6	17.9	21.0	26.9																						
26-Jun	17.8	17.3	17.1	16.8	16.7	17.4	17.9	18.9	19.6	21.2	22.7	24.1	23.8	23.4	19.2	20.7	22.5	21.4	20.5	19.8	19.0	18.5	17.7	17.0	19.6	24.1																						
27-Jun	16.5	15.9	15.2	15.2	15.5	17.3	17.4	17.7	18.9	20.3	21.9	24.8	24.2	21.5	20.1	22.8	22.4	21.0	20.7	20.4	19.4	18.0	16.5	15.9	19.2	24.8																						
28-Jun	15.3	14.0	13.1	13.1	13.0	14.7	17.6	19.6	20.9	22.7	23.5	24.9	25.8	25.8	25.9	25.9	26.2	26.0	25.1	24.9	23.1	21.2	20.3	18.9	20.9	26.2																						
29-Jun	17.9	16.9	16.8	16.6	16.3	17.0	18.3	19.3	21.1	22.5	23.6	25.1	25.9	26.3	26.5	26.4	26.3	26.3	26.2	25.3	24.1	22.7	21.8	20.4	22.1	26.5																						
30-Jun	19.1	18.2	17.5	16.8	16.8	17.1	18.2	19.4	20.2	20.5	21.5	22.5	23.3	23.9	24.2	24.4	24.4	24.2	23.8	23.1	21.3	19.5	16.6	15.3	20.5	24.4																						
																								13.7	13.1	12.6	12.1	12.0	12.6	13.7	15.0	16.3	17.5	18.6	19.5	20.0	20.3	20.7	21.0	20.5	20.0	19.6	18.8	17.7	16.4	15.4	14.6	Diurnal Average
																								19.4	18.7	18.3	17.9	17.7	18.1	19.3	20.8	22.0	23.3	24.6	26.1	26.6	26.9	27.1	26.8	26.7	26.3	26.2	25.3	24.1	22.7	21.8	20.4	Diurnal Maximum



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	92	12.78	12.78
10 - 20	417	57.92	70.69
> 20	211	29.31	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 28 km/h on Jun 3 17:00	Maximum Daily Speed Average: 15.6 km/h on Jun 3	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 11 23:00	Minimum Daily Speed Average: 1.6 km/h on Jun 2	Hours of Data: 720
Maximum Diurnal Speed Average: 3.9 km/h at hour 18	Minimum Diurnal Speed Average: 0.4 km/h at hour 23	Hours of Missing Data: 0
Monthly Average Velocity: 1.6 km/h 81.9 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 12 P ₉₀ = 16 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-Jun	SE14	SE14	SSE13	SSE11	SE15	SE14	SE17	SSE21	SSE19	SSE16	S13	SSE11	SSE12	SSE8	S6	SSE9	S12	SSW11	SW6	WNW12	S4	S8	S6	S4	SSE9.9	SSE21
2-Jun	SSW4	S5	SSW6	S7	SSW8	S7	SSW8	SSW8	SSW8	SSW5	SW6	WNW7	WNW12	W12	SW10	WNW2	ENE8	NNE11	NNE15	N13	N9	N8	N7	N6	W1.6	NNE15
3-Jun	N8	N8	N11	N9	N13	N12	N12	N12	NNE14	N20	N23	NNE26	NNE18	NNE14	NNE16	NNE19	N28	N27	N20	NNE17	NNE15	NNE13	NNW14	NNW14	N15.6	N28
4-Jun	NNE9	N7	N6	N8	NNE7	N7	N9	N9	N7	NNW10	N11	N11	N16	N20	N21	NNE19	N19	N19	N19	N18	NNE14	N14	N11	N13	N12.6	N21
5-Jun	N15	N16	N17	N16	N14	N17	N18	N18	N17	NNE15	NNE11	NNE18	N19	N20	N17	N14	N17	N16	N16	N11	N11	NNW8	NNW6	NNW8	N14.7	N20
6-Jun	NNW8	NNW8	NNW7	N6	N5	NNW7	N8	NNW6	NNW5	NW6	NNW7	NNE6	NNW5	NW5	NE6	NE8	NE7	NE6	NNE7	ENE7	E5	E6	E6	E5	NNE4.7	NNW8
7-Jun	ENE5	E6	ESE6	E6	NE3	N7	N8	NNW4	N5	N10	N12	NNE10	E10	NE1	WNW9	NW8	NW8	NW11	NW8	N6	NNW6	N1	SSW4	SW4	N3.8	N12
8-Jun	WSW3	SSW2	S3	S3	SSW4	SSW7	SSW7	S6	S7	S8	SSW5	S9	S7	SSE9	SSE8	S8	SE10	SSE11	SSE10	SSE11	SSE10	SE12	SE12	SE13	SSE7.1	SE13
9-Jun	SE10	SSE12	S12	S10	SSE6	ESE10	ESE8	ESE7	SE6	SE9	SE11	SE16	SE16	SE17	ESE18	ESE19	ESE20	ESE19	ESE16	E12	E8	ENE5	NE6	NNE7	ESE10.2	ESE20
10-Jun	NNE8	NNE7	NNE9	NNE9	N9	N9	N8	N11	N13	N14	NE13	NNE13	NE12	SE9	NW8	N9	NE12	ENE10	SSW5	W5	W5	WNW6	WSW4	WNW7	NNE6.0	N14
11-Jun	WSW6	W9	WSW7	WSW6	SW7	SW5	SSW4	SSW7	S7	SW7	S9	S8	SSE6	SSW10	SE14	ESE10	NE4	SSE5	S7	S6	S4	SSW5	S0	SE2	SSW4.6	SE14
12-Jun	NW1	S2	S5	SSW6	SSW5	SW4	S3	SW4	N3	NNE10	NNE13	NNE13	NNE11	NE12	NNE16	NE15	NNE16	NE15	NE14	NE11	NNE8	NNE9	NNE9	ENE7	NNE6.2	NNE16
13-Jun	E8	E7	E7	ENE6	E6	ESE9	E9	ESE10	SE9	SSE10	SSE9	S10	S12	SSE11	SSE8	S8	SSE7	SSE10	SSE11	S12	S9	SSE11	SE10	SSE10	SE7.6	S12
14-Jun	SSE9	SE8	SE9	SE10	SSE18	SSE15	SSE13	S13	SSE14	SSE14	SSE14	SSE16	SSE16	S16	S15	SSW15	S17	S15	SSW14	SSW12	SSW10	SSW10	SSW8	SSW7	S12.0	SSE18
15-Jun	S8	SE6	SSE8	SSE9	SE7	SSE9	SSE12	SE10	SE11	SE11	SSE16	S11	SSE9	SSE12	SSE12	S11	SSE11	SSE9	SSE11	SSE13	SSE12	SE9	SSE7	S5	SSE9.7	SSE16
16-Jun	SSE5	SSW3	ENE4	E2	NE2	NNE3	ENE2	SSW3	SW4	S10	S8	SSW9	SSE7	SW5	SW6	ENE3	E9	E12	ENE11	E9	ESE7	SSW11	SW10	WSW8	SSE2.7	E12
17-Jun	SW6	SSW4	S6	S6	SW6	SW3	ESE4	SE5	S7	SSE10	SSE11	SSE13	SSE15	S12	S9	S11	SSE12	S9	S14	S7	S10	S10	S10	S10	S8.3	SSE15
18-Jun	S8	S10	S8	S6	SSE8	SSE9	SSE10	S12	S10	SSE13	SSE17	SSE16	SSE19	S18	SSE19	SSE19	S19	SSE19	S16	S14	SSE18	SSE17	SSE14	SSE11	SSE13.5	SSE19
19-Jun	SSE11	SSE11	SSE10	S8	SSE8	S5	SSE6	SSE9	SE6	SSE7	SSE12	SE11	SE12	SSE9	SE7	SE8	ESE6	E6	NE3	N4	NNW2	NW1	NW2	N3	SE5.5	SSE12
20-Jun	N7	N10	N7	N5	N7	NNE6	NNE5	NNE4	SE4	E6	ESE7	SSE7	SE7	SE10	SSE9	SE8	SSE8	SE8	S9	S8	SSW6	WSW2	WNW3	NW4	ESE2.1	SE10
21-Jun	NNW4	NNW4	NNE5	NNE6	NE6	NNE6	N7	N7	N9	N9	N8	NNW10	NNW10	N9	NNW9	N7	WNW10	NW12	NW12	NNW11	NW8	NNW7	N7	NNW8	NNW7.4	NW12
22-Jun	N8	N6	WNW5	WNW8	WNW8	WNW7	NW6	NNW7	NNW7	NNW9	N11	N10	NNW10	NNW13	NNW15	NNW17	NNW14	N13	N12	NNE10	N7	N5	NNE6	NNE4	NNW8.4	NNW17
23-Jun	N3	N4	N4	NNW2	WNW0	NW3	NE2	N4	NNE6	NE3	ESE4	S3	S8	SSE7	SE9	ENE5	ESE13	E15	SE10	SE8	SE4	ESE3	SE5	SE7	ESE3.3	E15
24-Jun	SE8	SE11	SSE13	SE13	SSE16	SE15	SSE18	SSE17	SSE15	SSE15	SSE12	SSE13	S16	S16	S18	SSE13	S13	S11	S19	SSE11	SSE14	SSE12	SSE15	SSE14	SSE13.8	S19
25-Jun	SSE16	SSE13	SE12	SE11	SSE10	SSE12	SSE14	SSE15	SSE14	SSE15	SSE18	SSE16	SSE17	S18	SSE8	SSE12	W15	NE2	SSW4	SE4	S5	SSW6	SSW4	SW4	SSE9.8	SSE18
26-Jun	SSW4	SSW3	SSW5	SSW5	SSW4	SSW5	SSW4	SW4	WNW4	WNW6	W6	WSW7	WSW6	SSW9	S12	ESE4	SW2	NNW9	N12	N9	N8	N7	N5	N8	W1.8	S12
27-Jun	N6	N3	N2	N4	NNE4	E2	SSE3	SE5	SSE5	SSW2	WSW2	WSW5	WSW2	ENE6	E9	NE6	N13	NE13	NNE10	NNE9	NNE5	N6	N5	N6	NNE3.3	NNE13
28-Jun	N7	NNE2	N3	N4	N4	E1	S3	SW2	SSE3	WNW3	NNW6	NW4	NNW5	N11	N12	N12	N12	N12	NNW10	N11	N5	NNW8	N9	N9	N5.8	N12
29-Jun	N9	N8	N10	N12	N8	NNW5	NNW7	N10	N12	N14	N14	N17	N21	NNE21	N23	N23	N23	N18	N18	N16	NNW12	NNW13	NNW13	NNW12	N14.0	N23
30-Jun	NNW12	NNW12	NNW10	NNW12	NNW11	NNW11	N13	N15	N15	N16	N14	N16	N18	N16	N16	N15	NNE15	NNE12	NNE12	N9	N7	N7	N5	N5	N11.9	N18

ENE1.1	E1.2	ESE1.4	E1.1	ESE1.4	E1.4	E1.8	SE1.6	SE1.5	E1.4	ESE1.6	ESE2.0	ESE2.5	ESE2.3	E2.2	ENE3.0	NE3.2	NE3.9	NE2.3	NE2.4	ENE1.3	E0.6	ENE0.4	NNE0.9	Diurnal Average
SSE16	N16	N17	N16	SSE18	N17	SSE18	SSE21	SSE19	N20	N23	NNE26	N21	NNE21	N23	N23	N28	N27	N20	N18	SSE18	SSE17	SSE15	SSE14	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

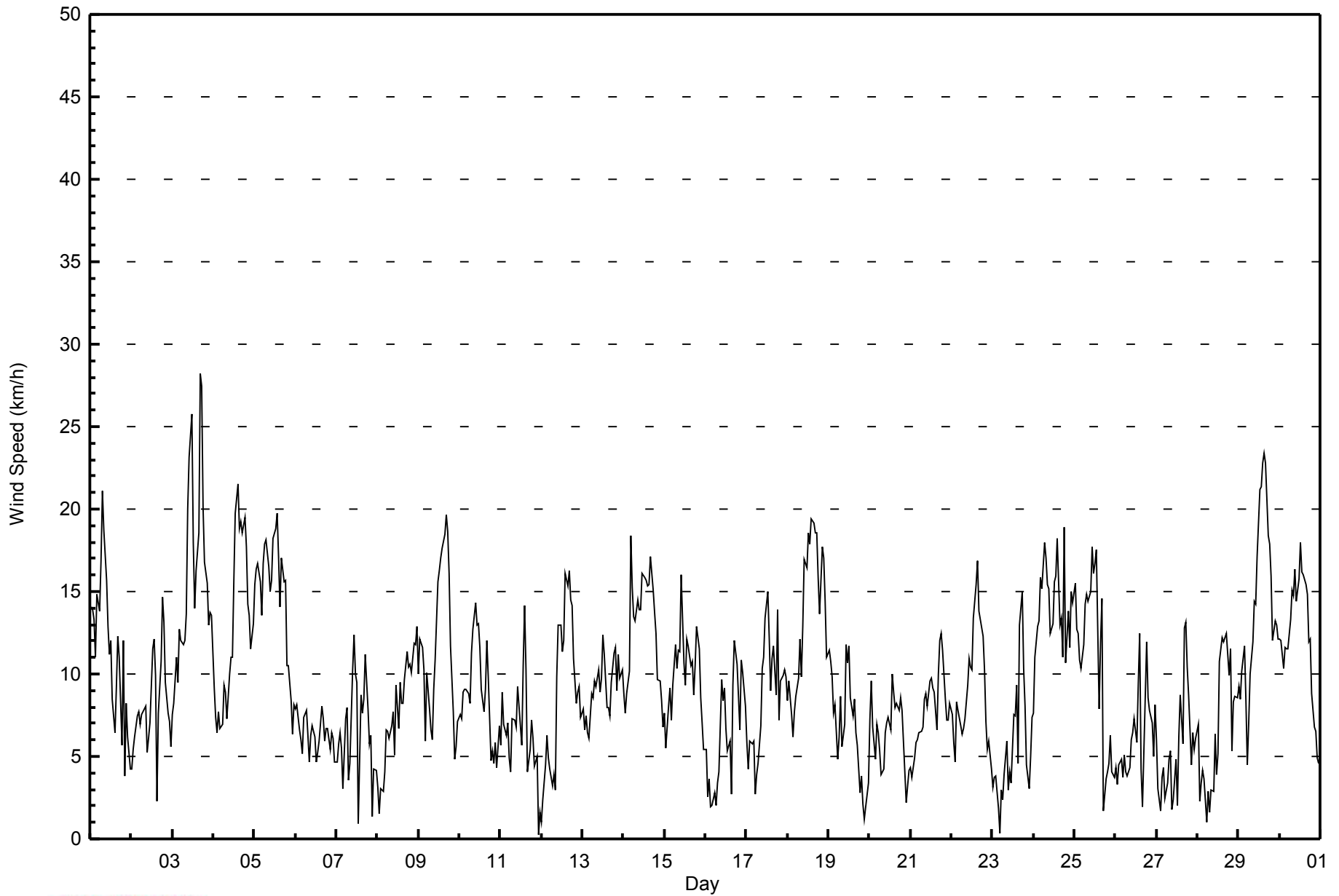
Wind Speed (WS) - km/h
Mildred Lake - June 2014

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	145	20.14	20.14
6 - 11	346	48.06	68.19
12 - 19	213	29.58	97.78
20 - 28	16	2.22	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

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

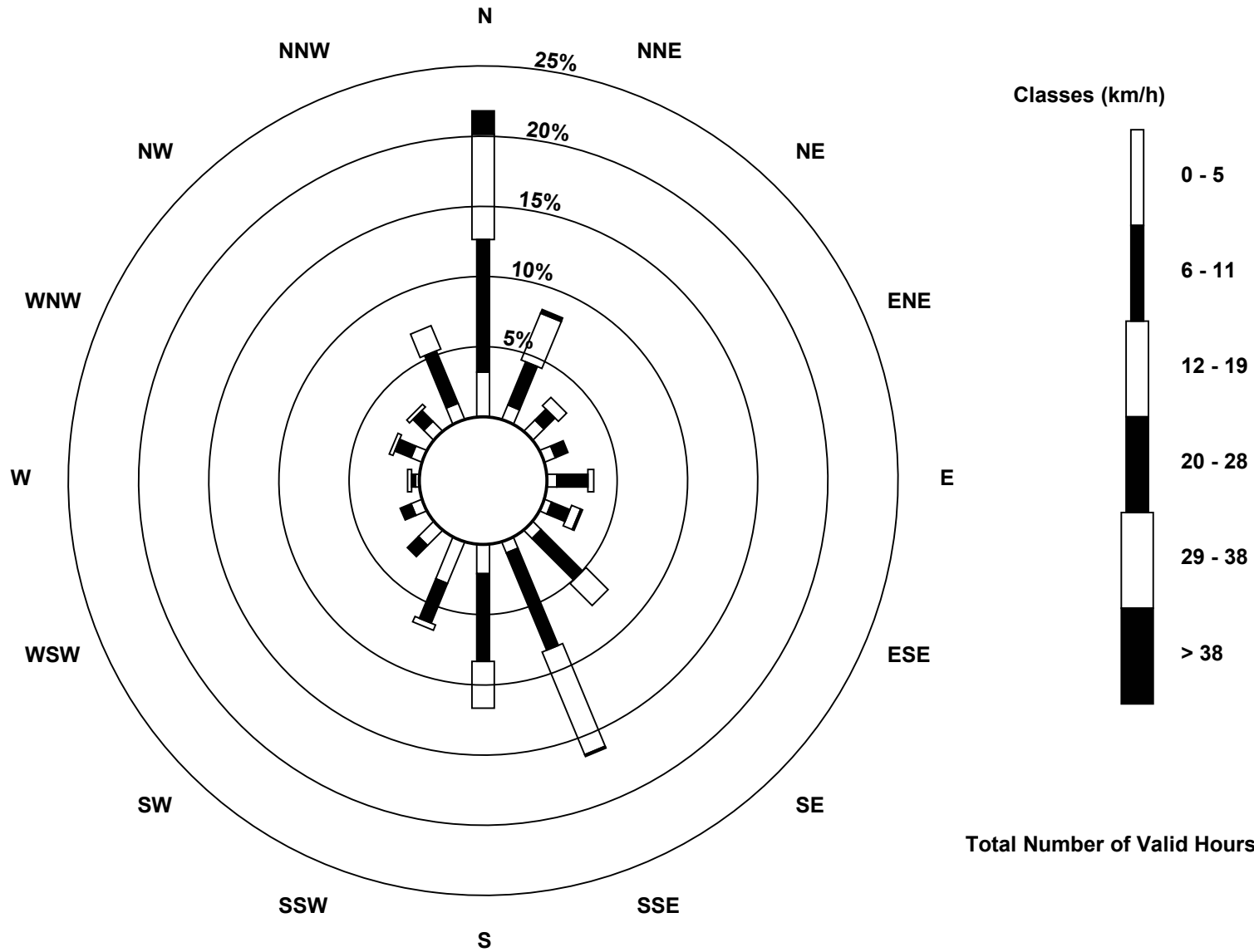
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	23	8	8	6	5	4	6	6	15	23	11	6	2	6	7	9	145
6 - 11	68	24	8	7	16	10	30	54	45	22	8	6	2	9	8	29	346
12 - 19	54	26	6	0	3	5	16	57	24	3	0	0	2	2	2	13	213
20 - 28	12	2	0	0	0	1	0	1	0	0	0	0	0	0	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	157	60	22	13	24	20	52	118	84	48	19	12	6	17	17	51	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

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



Total Number of Valid Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Mildred Lake - June 2014

Direction of Maximum Speed: 360 deg on Jun 3 17:00 Direction of Maximum Daily Speed Average: 9.1 deg on Jun 3	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0
Direction of Minimum Speed: 186 deg on Jun 11 23:00 Direction of Minimum Daily Speed Average: 1.6 deg on Jun 2	Percent Operational Time: 100.0
Monthly Average Direction: 252.4 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-Jun	137	141	152	148	126	127	127	153	153	155	174	163	155	153	174	168	174	206	220	295	190	171	189	174	157.8
2-Jun	199	184	196	190	195	187	204	203	200	200	217	286	291	272	216	300	66	22	22	4	360	1	9	11	270.7
3-Jun	1	9	5	11	11	11	9	9	13	3	7	12	20	16	16	17	360	5	6	24	26	31	334	342	9.1
4-Jun	23	360	5	352	17	5	4	351	2	343	352	11	10	11	8	14	7	10	5	10	15	10	7	1	6.6
5-Jun	0	2	8	8	8	2	1	3	5	12	20	18	11	8	1	7	358	359	2	354	352	346	339	340	3.6
6-Jun	343	341	335	350	357	343	354	336	338	326	341	32	331	326	49	43	45	46	24	62	82	99	100	87	13.6
7-Jun	61	95	112	101	52	358	1	338	349	355	356	19	79	34	290	306	315	305	309	356	347	10	211	235	353.6
8-Jun	242	201	181	178	206	195	203	185	179	184	199	181	190	164	151	170	146	149	153	153	147	143	146	137	165.1
9-Jun	129	160	172	175	152	123	110	115	137	130	129	133	129	125	115	112	114	112	109	100	92	70	44	13	121.5
10-Jun	22	17	25	13	8	4	3	359	359	5	35	27	48	125	325	353	54	77	202	259	262	290	253	282	11.7
11-Jun	251	281	258	239	228	230	207	195	188	217	185	184	148	198	136	115	42	167	191	182	170	199	186	146	192.6
12-Jun	308	178	189	193	207	223	186	217	359	26	22	23	23	39	19	34	29	49	47	38	21	16	13	73	32.2
13-Jun	88	83	82	74	79	112	93	114	144	162	160	186	171	164	168	185	155	153	165	174	172	159	141	148	145.1
14-Jun	158	135	127	128	156	154	161	169	162	161	158	154	166	170	182	200	191	185	196	206	206	198	200	199	171.9
15-Jun	170	143	157	149	140	148	158	142	144	135	166	190	159	147	147	173	148	152	152	155	148	141	150	179	153.8
16-Jun	167	208	77	85	52	14	59	213	215	187	189	194	160	236	216	57	81	79	71	84	107	208	231	249	159.2
17-Jun	228	208	172	186	214	219	117	142	191	160	167	161	163	177	183	169	164	184	189	188	184	185	175	178	177.2
18-Jun	190	172	179	176	150	154	154	169	173	165	162	167	162	171	163	164	174	160	179	172	163	165	165	155	166.4
19-Jun	158	157	153	170	163	170	149	153	138	161	165	138	130	147	126	127	117	97	40	352	334	307	320	351	144.2
20-Jun	1	9	7	2	6	14	21	33	138	92	116	147	127	144	167	137	149	139	188	169	198	240	301	312	114.0
21-Jun	345	348	20	33	38	19	354	0	351	357	351	343	345	354	341	352	301	320	326	331	326	331	351	337	344.9
22-Jun	356	349	298	291	289	295	323	340	332	344	353	9	347	341	348	342	348	349	9	13	3	10	30	16	345.8
23-Jun	355	354	350	332	300	321	44	355	16	49	120	173	179	157	146	70	105	98	126	138	135	109	125	130	110.2
24-Jun	134	141	150	145	148	145	154	153	162	163	147	161	176	176	174	157	169	190	177	166	162	160	157	157	160.2
25-Jun	163	148	142	146	148	147	161	164	166	165	162	159	157	174	154	147	259	36	195	135	186	205	201	225	164.3
26-Jun	194	203	192	199	206	200	192	233	283	291	260	247	248	197	170	122	235	331	355	2	5	4	357	355	266.5
27-Jun	4	10	8	8	13	84	147	139	168	192	250	250	246	78	84	47	355	34	32	33	20	354	359	6	29.2
28-Jun	8	16	359	6	1	97	189	224	166	289	340	313	335	353	8	349	355	353	343	357	1	343	351	352	351.3
29-Jun	349	352	350	351	354	335	337	358	0	8	354	11	7	15	2	5	2	10	1	354	346	341	343	346	358.6
30-Jun	338	337	331	340	340	340	350	360	358	3	355	3	0	6	6	10	15	28	15	11	350	355	8	0	358.2

68.2 79.1 103.3 97.9 103.5 98.3 100.5 125.5 129.0 92.8 105.1 101.6 103.9 122.1 94.4 65.5 48.7 53.5 47.1 39.6 69.1 82.6 56.7 15.0

Diurnal Average

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

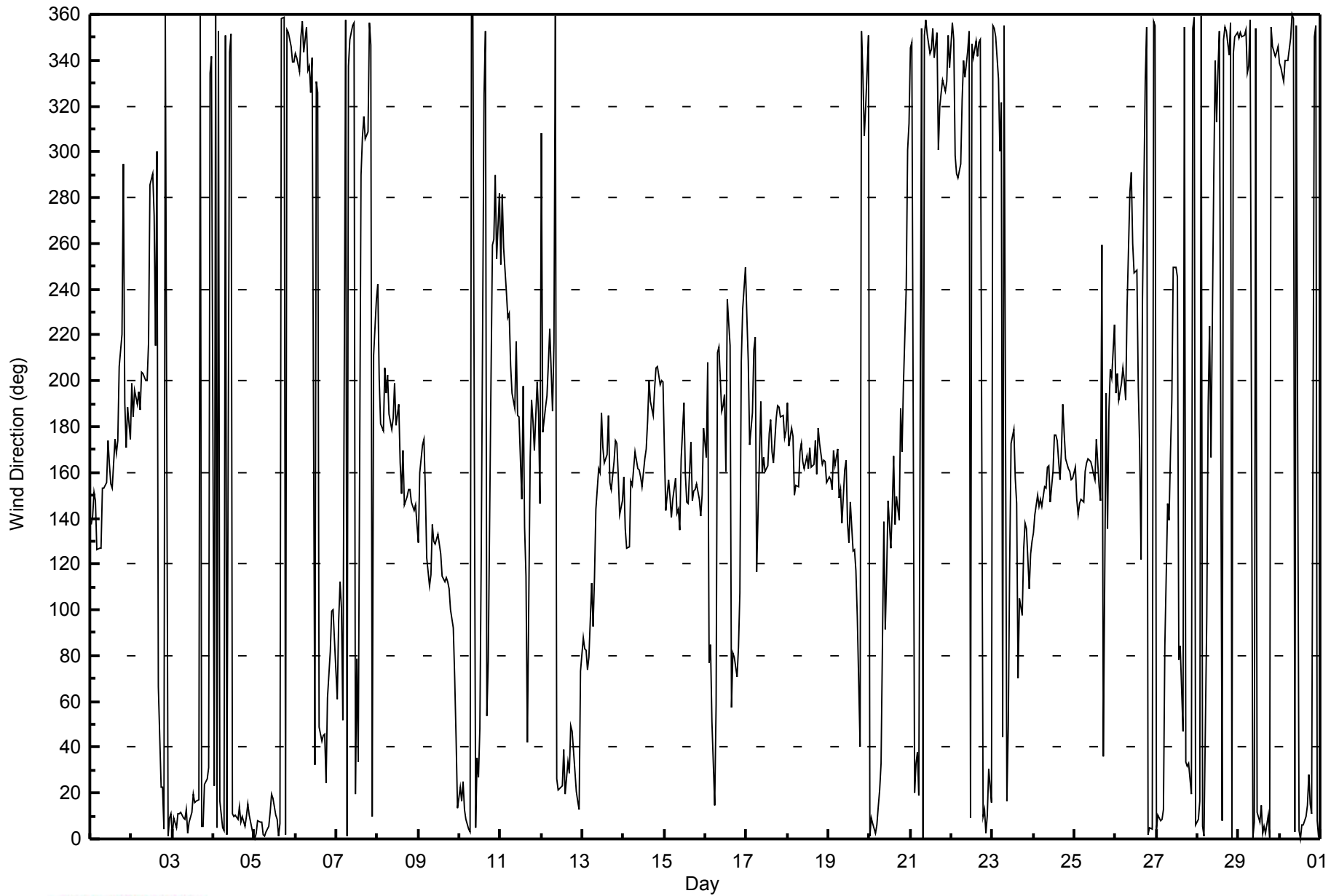
Mildred Lake - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Jun 16 16:00		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 7 deg on Jun 3 03:00																									
Percentiles: P ₁ = 8 P ₁₀ = 13 Q ₁ = 15 Median = 19 Q ₃ = 30 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-Jun	17	20	18	18	15	16	16	15	14	15	18	18	24	28	35	29	18	24	26	27	70	21	27	24	70
2-Jun	27	19	14	14	15	35	25	21	18	39	41	46	22	29	22	79	26	24	18	11	9	9	9	16	79
3-Jun	13	13	7	12	12	12	12	14	17	15	16	16	18	20	17	16	15	14	16	17	16	19	23	17	23
4-Jun	18	19	20	24	19	18	10	13	13	18	15	16	15	15	17	19	15	15	13	14	16	14	16	12	24
5-Jun	12	11	13	13	14	12	12	12	16	19	20	22	21	20	21	15	14	13	15	14	19	15	16	13	22
6-Jun	10	8	13	11	14	9	13	36	66	42	50	54	75	61	59	37	61	56	24	19	14	15	11	26	75
7-Jun	28	20	47	36	52	16	13	54	53	18	14	21	43	95	32	44	43	25	34	20	11	88	28	41	95
8-Jun	46	85	54	63	25	19	16	26	28	27	72	39	55	35	37	39	31	25	17	14	19	18	16	17	85
9-Jun	18	14	20	34	22	14	18	46	26	18	19	19	17	19	16	15	16	15	15	17	16	23	15	12	46
10-Jun	16	22	20	13	10	13	25	19	19	21	29	30	32	54	50	37	33	25	41	30	17	16	26	32	54
11-Jun	25	22	30	40	31	39	45	20	23	29	22	43	53	25	38	53	80	79	31	31	23	20	101	62	101
12-Jun	72	53	9	13	16	41	34	35	79	31	23	28	34	34	21	26	25	22	19	18	17	13	14	28	79
13-Jun	14	20	16	21	15	18	27	29	30	31	42	43	27	29	48	51	38	30	16	18	13	16	17	16	51
14-Jun	14	13	16	18	12	15	15	18	14	16	19	19	25	23	22	22	17	18	15	17	15	13	14	21	25
15-Jun	24	48	16	20	18	17	15	19	20	24	20	31	34	31	38	28	36	36	28	16	18	16	20	23	48
16-Jun	21	25	38	42	44	23	56	37	39	22	25	29	72	46	42	102	23	21	18	15	18	31	25	24	102
17-Jun	31	37	22	18	23	60	47	35	26	19	17	16	15	21	28	23	22	22	16	16	16	17	16	17	60
18-Jun	16	15	22	31	16	21	25	16	25	21	19	16	17	16	19	17	17	14	17	15	11	12	12	15	31
19-Jun	13	12	12	18	15	33	19	19	22	21	18	20	21	36	46	24	23	22	50	34	48	57	34	21	57
20-Jun	19	12	13	13	11	13	17	46	49	45	25	29	32	27	33	24	20	19	19	19	17	21	37	35	49
21-Jun	21	25	19	21	31	27	13	13	13	12	13	14	13	13	16	15	21	20	13	11	13	13	16	12	31
22-Jun	14	21	24	16	21	21	20	19	16	17	19	22	15	16	17	16	17	17	20	16	11	12	14	18	24
23-Jun	32	29	13	86	92	51	58	27	24	59	39	81	31	45	39	76	18	13	23	20	17	31	20	14	92
24-Jun	17	21	16	18	17	17	16	15	17	16	25	25	20	19	18	19	20	28	19	26	13	14	13	13	28
25-Jun	11	16	17	16	15	18	13	15	18	16	16	21	21	23	34	35	36	91	49	36	35	19	27	31	91
26-Jun	56	53	16	22	23	17	35	40	54	43	43	41	50	43	34	51	77	25	13	8	9	9	13	9	77
27-Jun	13	26	41	16	13	58	37	25	26	75	68	58	84	72	22	28	22	20	18	20	32	10	13	10	84
28-Jun	9	65	31	29	32	77	53	96	64	74	40	83	68	32	30	28	22	24	12	13	18	8	9	7	96
29-Jun	8	7	8	9	9	21	20	15	16	17	15	21	19	21	17	17	17	18	15	14	12	10	10	11	21
30-Jun	9	8	9	9	9	9	12	12	15	16	20	19	19	21	20	19	20	21	16	16	10	9	8	11	21
	72	85	54	86	92	77	58	96	79	75	72	83	84	95	59	102	80	91	50	36	70	88	101	62	
	Diurnal Maximum																								



WBEA
Hourly Averages

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



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 12, 2014	Previous Calibration	May 12 2014
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:02	End Time (MST)	11:55
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	904	901
Calculated slope	0.998214	0.999544	Chamber temp.	44.5	44.5
Calculated intercept	0.631330	-0.083236	Pressure (mmHg)	713.5	702.5
Analyzer Background	26.4	26.6	Flow (lpm)	0.547	0.540
Analyzer Coefficient	0.909	0.909	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	0.3	NA
as found span	5000	69.9	830.4	830.8	1.000
calibrator zero	5000	0.0	0.0	0.3	0.000
high point	5000	69.9	830.4	830.8	1.000
second point	5000	35.4	420.6	421.2	0.998
third point	5000	17.7	210.3	209.9	1.002
calibrator zero				0.3	
as left zero	5000	0.0	0.0	1.1	0.000
as left span	5000	69.9	830.4	834.5	0.995
Average Correction Factor					1.000

Corrected As found 830.5 Previous response 831.3 % change 0.1%

Notes:

No adjustments.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

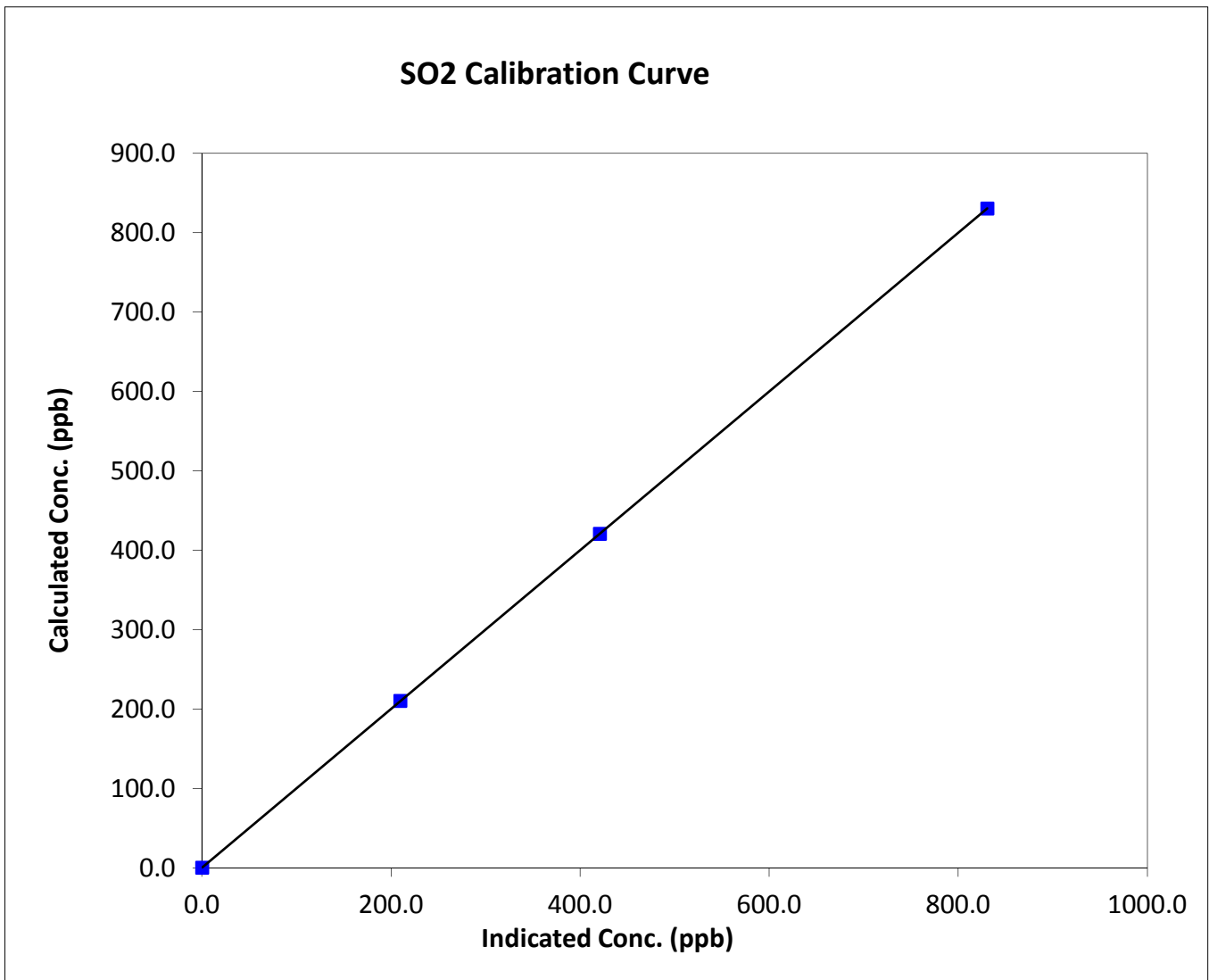
SO₂ Calibration Summary

Station Information

Calibration Date	June 12, 2014	Previous Calibration	May 12 2014
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	9:02	End Time (MST)	11:55
Analyzer make	TEI 43c	Analyzer serial #	43c-77879-387

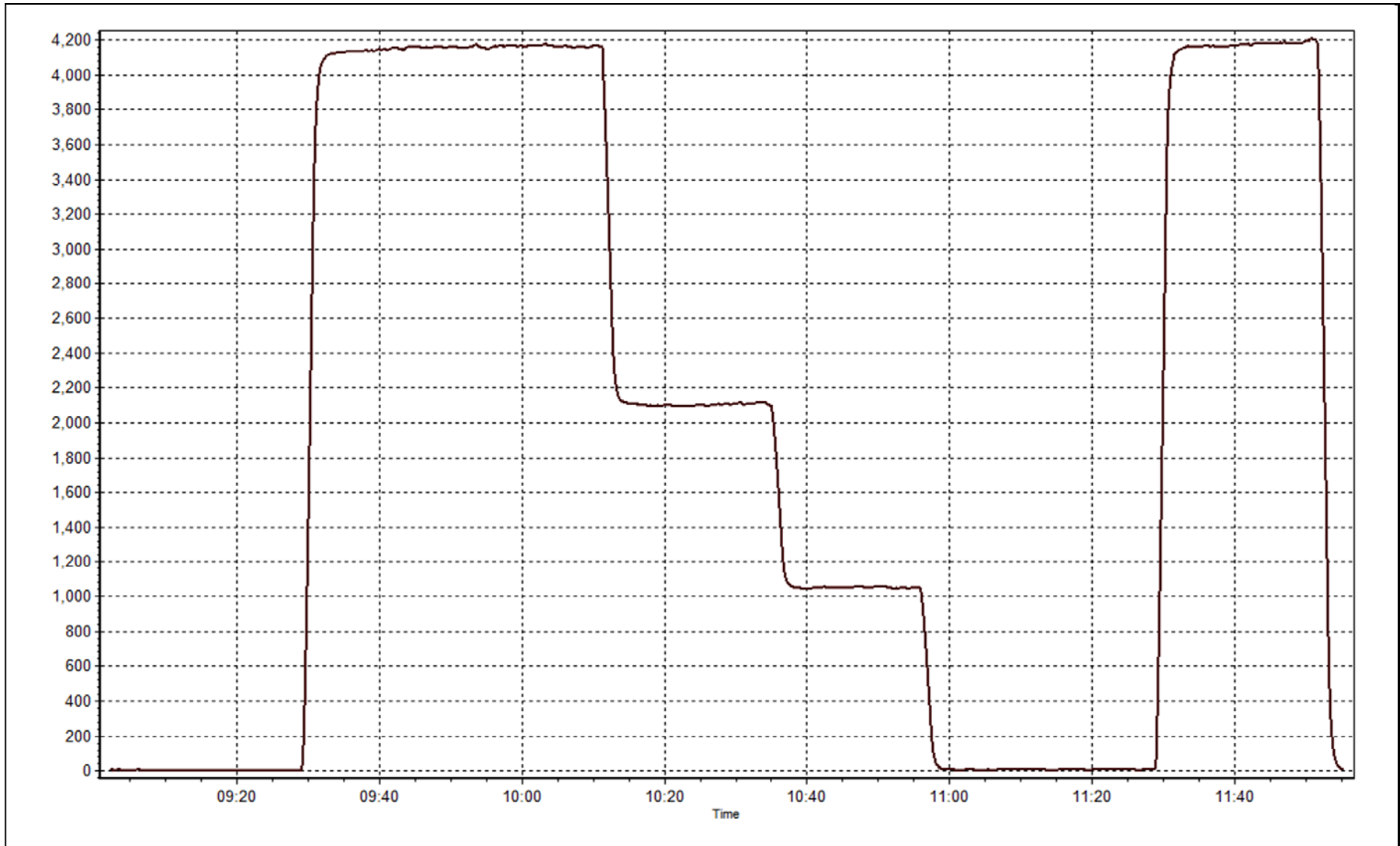
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999999
830.4	830.8	0.9995		
420.6	421.2	0.9985	Slope	0.999544
210.3	209.9	1.0017		
			Intercept	-0.083236



SO2 Calibration Plot

Date: June 12, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	June 10, 2014	Previous Calibration	May 13, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	12:20	End Time (MST)	14:58
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	777	777
Calculated slope	1.007058	1.005166	Chamber temp.	45	45
Calculated intercept	-0.026854	0.096105	Pressure	556.7	553.6
Analyzer Background	12.5	12.5	Flow	1.027	1.024
Analyzer Coefficient	0.875	0.875	Intensity	88	88
			Converter temp.	325	324

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	-0.1	NA
as found span	4000	57.2	79.9	79.5	1.006
SO2 scrubber check	5000	17.7	210.3	-0.1	NA
calibrator zero	4000	0.0	0.0	-0.1	NA
high point	4000	57.2	79.9	79.5	1.006
second point	4000	28.6	40.0	39.6	1.010
third point	4000	14.3	20.0	19.8	1.007
calibrator zero				-0.1	
as left zero	5000	0.0	0.0	0.0	NA
as left span	4000	57.2	79.9	79.4	1.007
Average Correction Factor					1.008

Corrected As found	79.6	Previous response	79.4	% change	-0.2%
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Notes:

As Finds used as Calibrator Zero and High Point. Scrubber check and filter replacement after as finds.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

H2S Calibration Summary

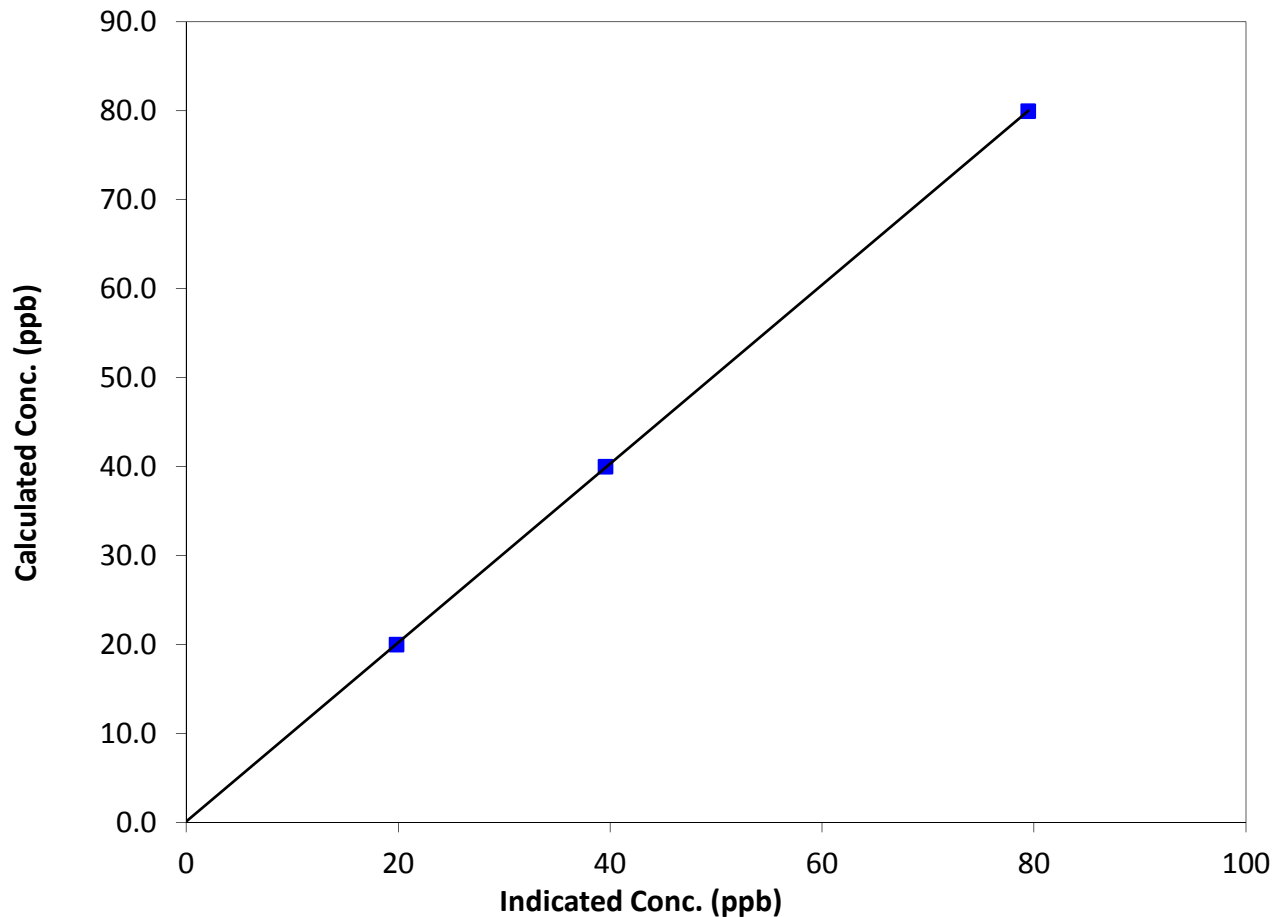
Station Information

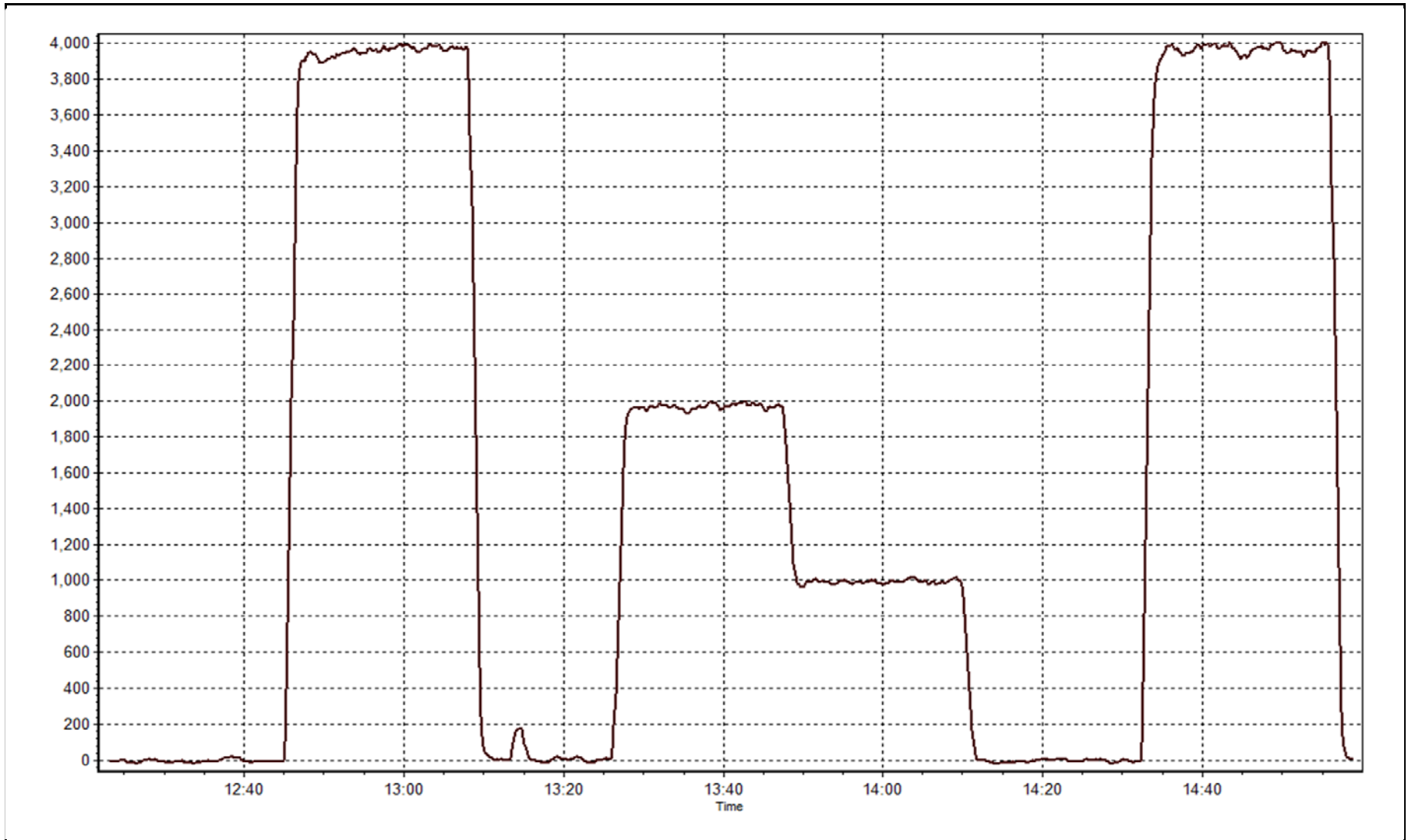
Calibration Date	June 10, 2014	Previous Calibration	May 13, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	12:20	End Time (MST)	14:58
Analyzer make	TEI 450i	Analyzer serial #	815129107

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999995
79.9	79.5	1.0058		
40.0	39.6	1.0104	Slope	1.005166
20.0	19.8	1.0073		
			Intercept	0.096105

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Thursday, June 12, 2014	Previous Calibration	Monday, May 12, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:02	End Time (MST)	11:55
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	1.001461	0.998328	Fuel Pressure	25.7	25.7
Calculated intercept	-0.011958	0.031797			
BKG	2.56	2.59			
COEF	4.925	4.987			

Analyzer make 51i-LT Analyzer serial # 1300156231

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.02	N/A
as found span	5000	69.9	14.83	14.61	1.015
calibrator zero	5000	0.0	0.00	-0.02	N/A
high point	5000	69.9	14.83	14.82	1.001
second point	5000	35.4	7.51	7.51	1.000
third point	5000	17.7	3.75	3.70	1.015
calibrator zero				-0.02	
as left zero	5000	0.0	0.00	-0.02	N/A
as left span	5000	69.9	14.83	14.80	1.002
Average Correction Factor					1.005

Corrected As found 14.63 Previous response 14.82 % change 1.3%

Notes:

Span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

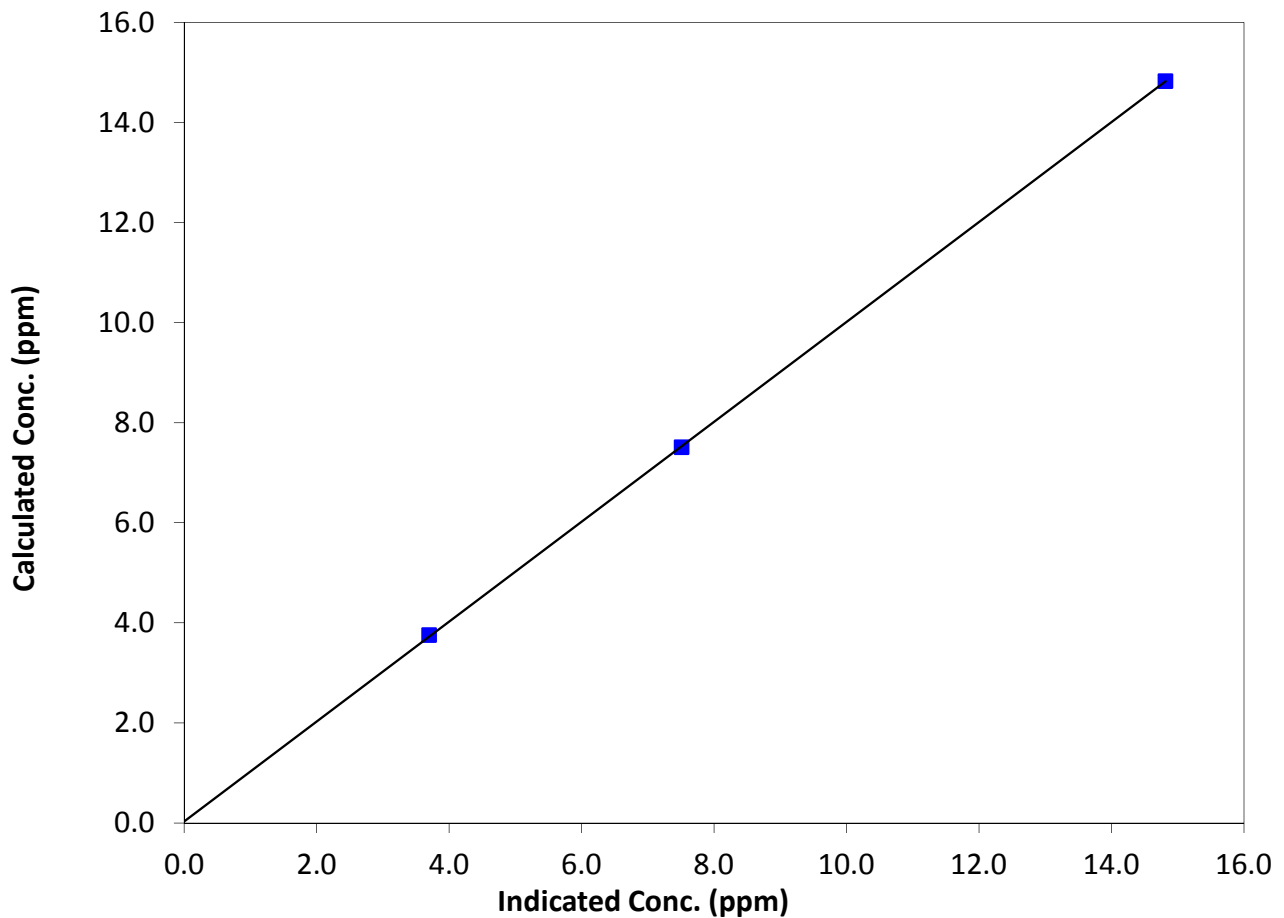
Station Information

Calibration Date	June 12, 2014	Previous Calibration	May 12, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	9:02	End Time (MST)	11:55
Analyzer make	51i-LT	Analyzer serial #	1300156231

Calibration Data

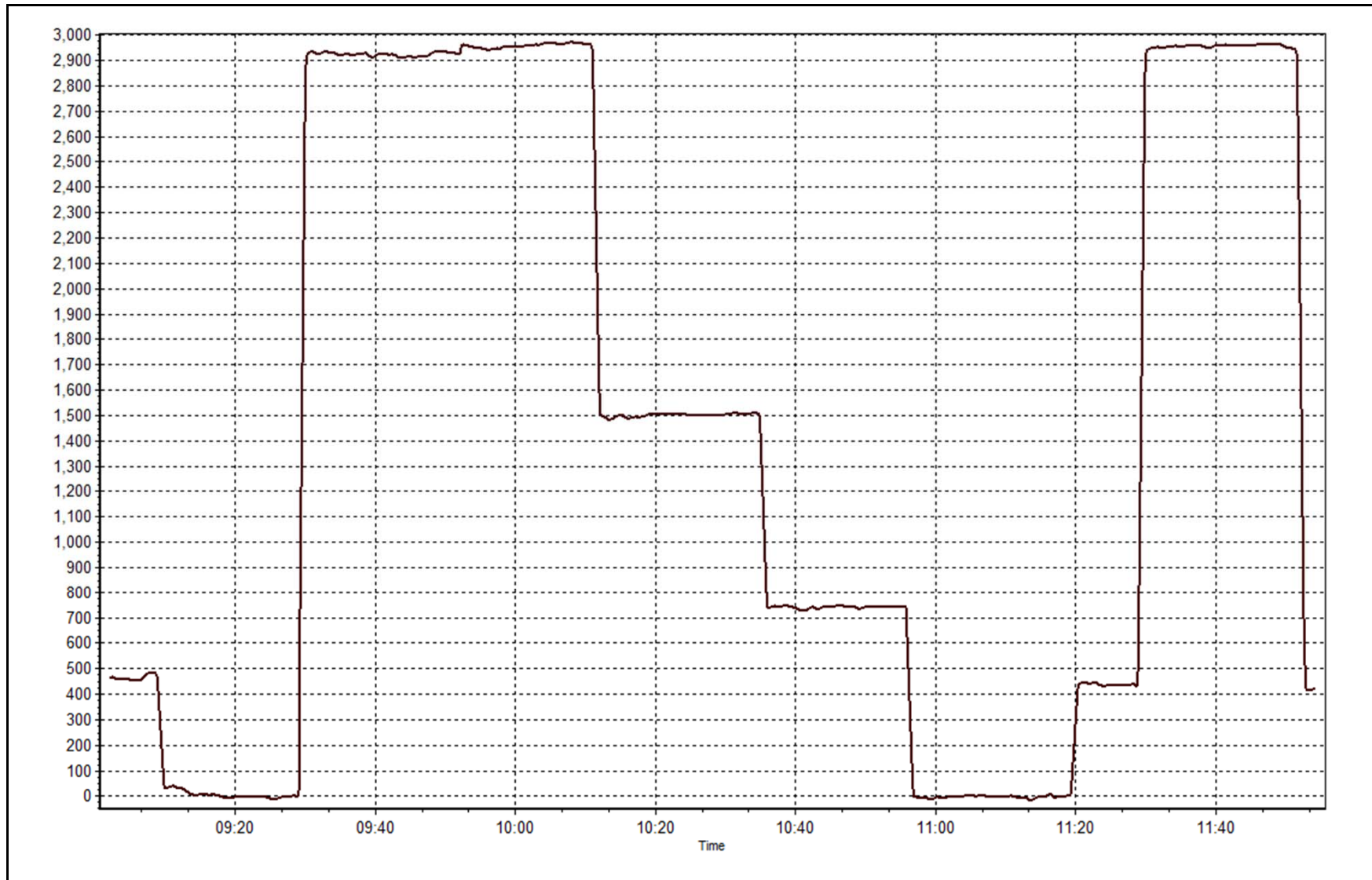
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.02	N/A	Correlation Coefficient	0.999987
14.83	14.82	1.0007		
7.51	7.51	0.9997	Slope	0.998328
3.75	3.70	1.0153		
			Intercept	0.031797

THC Calibration Curve



THC Calibration Plot

Date: June 12, 2014



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 3
LOWER CAMP METEOROLOGY
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
 JUNE 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	719	0	1	99.86	26.4	-	21.8	-
Temperature 45 m (C) Average	719	0	1	99.86	26.4	-	21.7	-
Temperature 100 m (C) Average	650	0	70	90.28	25.5	-	21.4	-
Temperature 167 m (C) Average	719	0	1	99.86	25.2	-	21.6	-
Relative Humidity 20 m (%) Average	719	0	1	99.86	98	-	-	-
Relative Humidity 45 m (%) Average	719	0	1	99.86	99	-	-	-
Relative Humidity 100 m (%) Average	649	0	71	90.14	98	-	-	-
Relative Humidity 167 m (%) Average	719	0	1	99.86	96	-	-	-
Wind Speed 20 m (km/h) Average	718	0	2	99.72	22	-	-	-
Wind Speed 45 m (km/h) Average	718	0	2	99.72	29	-	-	-
Wind Speed 100 m (km/h) Average	664	0	56	92.22	41	-	-	-
Wind Speed 167 m (km/h) Average	715	0	5	99.31	45	-	-	-
Wind Direction 20 m (deg) Average	718	0	2	99.72	-	-	-	-
Wind Direction 45 m (deg) Average	718	0	2	99.72	-	-	-	-
Wind Direction 100 m (deg) Average	664	0	56	92.22	-	-	-	-
Wind Direction 167 m (deg) Average	715	0	5	99.31	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	718	0	2	99.72	1.3	-	-	-
Vertical Wind Speed 45 m (km/h) Average	718	0	2	99.72	1.4	-	-	-
Vertical Wind Speed 100 m (km/h) Average	664	0	56	92.22	2.2	-	-	-
Vertical Wind Speed 167 m (km/h) Average	715	0	5	99.31	3.2	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
 JUNE 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	719	16.68	5	-	5.1	9.6	13.1	17.1	20.3	23.2	26.4
Temperature 45 m (C) Average	719	16.6	5	-	5	9.4	13.2	17.1	20.2	23	26.4
Temperature 100 m (C) Average	650	16.08	4.8	-	4.6	9.1	12.9	16.4	19.6	22.2	25.5
Temperature 167 m (C) Average	719	16.15	4.8	-	4.3	9	13.4	16.7	19.7	22	25.2
Relative Humidity 20 m (%) Average	719	64.5	20	-	17	35	49	66	80	91	98
Relative Humidity 45 m (%) Average	719	64	20	-	16	35	48	66	80	90	99
Relative Humidity 100 m (%) Average	649	61.9	20	-	16	33	47	63	78	87	98
Relative Humidity 167 m (%) Average	719	60	19	-	16	33	46	61	75	85	96
Wind Speed 20 m (km/h) Average	718	7.6	5	-	0	2	4	7	11	15	22
Wind Speed 45 m (km/h) Average	718	10	6	-	0	3	5	9	14	19	29
Wind Speed 100 m (km/h) Average	664	14.3	8	-	1	5	8	13	19	26	41
Wind Speed 167 m (km/h) Average	715	16.9	9	-	0	6	10	16	23	30	45
Wind Direction 20 m (deg) Average	718	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	718	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	664	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	715	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	718	-0.19	0.4	-	-1.6	-0.7	-0.5	-0.2	0.1	0.3	1.3
Vertical Wind Speed 45 m (km/h) Average	718	0.02	0.5	-	-1.5	-0.6	-0.3	0	0.4	0.7	1.4
Vertical Wind Speed 100 m (km/h) Average	664	0.2	0.5	-	-0.8	-0.2	-0.1	0.1	0.4	0.8	2.2
Vertical Wind Speed 167 m (km/h) Average	715	0.38	0.7	-	-1.4	-0.4	-0.1	0.2	0.8	1.5	3.2

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Temperature, Relative Humidity 20 m	10 Jun 2014 11:00	10 Jun 2014 11:00	1	Flatline in sensor output signal
Temperature, Relative Humidity 45 m	10 Jun 2014 11:00	10 Jun 2014 11:00	1	Flatline in sensor output signal
Temperature, Relative Humidity 100 m	01 Jun 2014 16:00	01 Jun 2014 17:00	2	Flatline in sensor output signal
Temperature, Relative Humidity 100 m	02 Jun 2014 14:00	02 Jun 2014 15:00	2	Flatline in sensor output signal
Temperature, Relative Humidity 100 m	02 Jun 2014 16:00	02 Jun 2014 16:00	1	Flatline in sensor output signal
Temperature, Relative Humidity 100 m	03 Jun 2014 11:00	03 Jun 2014 11:00	1	Flatline in sensor output signal
Temperature, Relative Humidity 100 m	04 Jun 2014 05:00	04 Jun 2014 11:00	7	Flatline in sensor output signal
Temperature, Relative Humidity 100 m	08 Jun 2014 17:00	08 Jun 2014 17:00	1	Flatline in sensor output signal
Temperature, Relative Humidity 100 m	10 Jun 2014 11:00	10 Jun 2014 11:00	1	Flatline in sensor output signal
Temperature, Relative Humidity 100 m	10 Jun 2014 17:00	10 Jun 2014 23:00	7	Flatline in sensor output signal
Temperature, Relative Humidity 100 m	11 Jun 2014 13:00	11 Jun 2014 13:00	1	Flatline in sensor output signal
Temperature, Relative Humidity 100 m	23 Jun 2014 15:00	25 Jun 2014 13:00	47	Flatline in sensor output signal
Temperature, Relative Humidity 167 m	10 Jun 2014 11:00	10 Jun 2014 11:00	1	Flatline in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	10 Jun 2014 10:00	10 Jun 2014 11:00	2	Flatline in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	10 Jun 2014 10:00	10 Jun 2014 11:00	2	Flatline in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	10 Jun 2014 10:00	10 Jun 2014 11:00	2	Flatline in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	10 Jun 2014 17:00	10 Jun 2014 23:00	7	Flatline in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	23 Jun 2014 15:00	25 Jun 2014 13:00	47	Flatline in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	03 Jun 2014 20:00	03 Jun 2014 20:00	1	Intermittent unstable operation
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	07 Jun 2014 03:00	07 Jun 2014 03:00	1	Intermittent unstable operation
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	10 Jun 2014 10:00	10 Jun 2014 11:00	2	Flatline in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	10 Jun 2014 18:00	10 Jun 2014 18:00	1	Intermittent unstable operation

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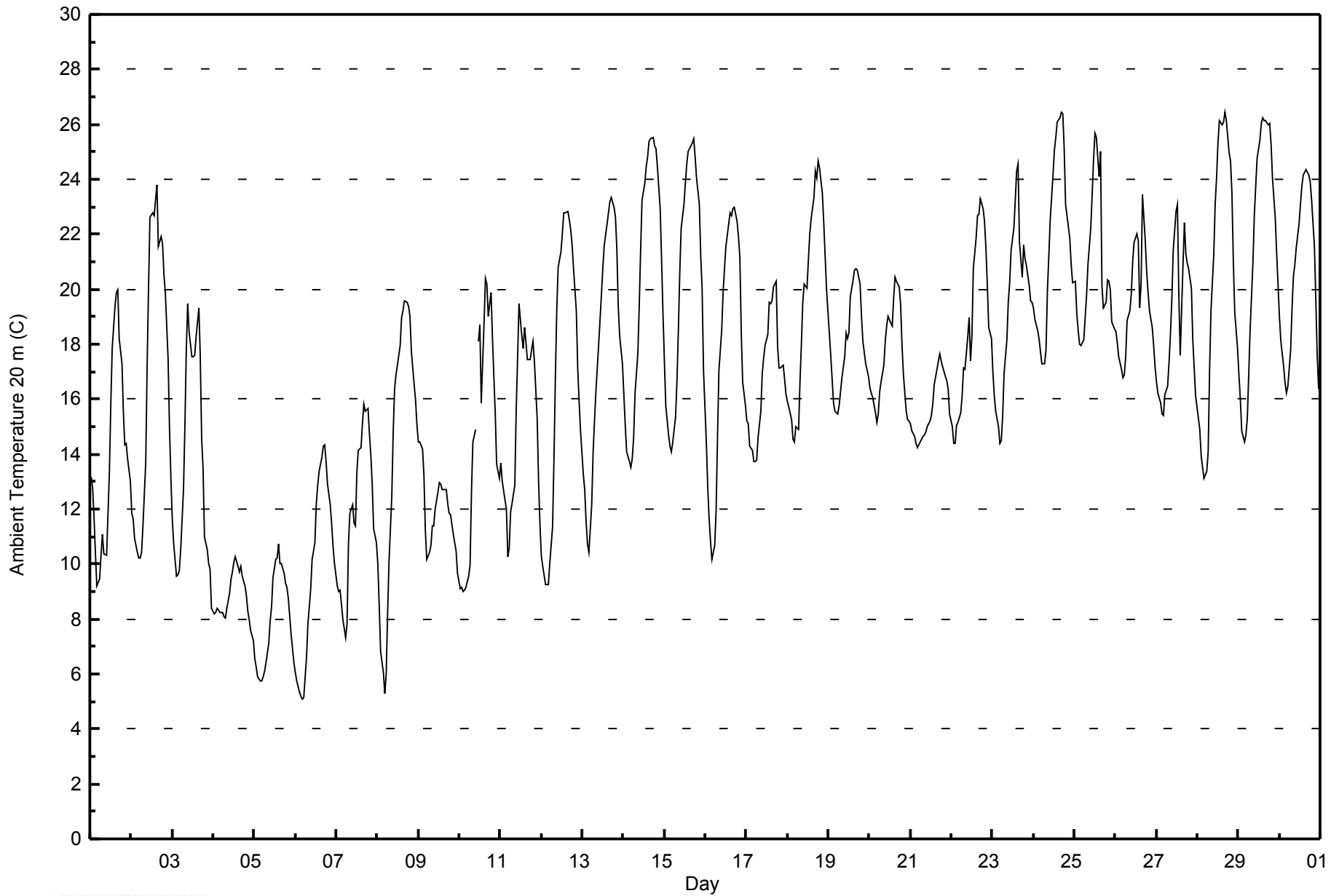


Maximum Value: 26.4 C on Jun 24 17:00		Maximum Daily Average: 21.8 C on Jun 24		Hours in Service: 720																																												
Minimum Value: 5.1 C on Jun 6 05:00		Minimum Daily Average: 7.9 C on Jun 5		Hours of Data: 719																																												
Maximum Diurnal Average: 20.6 C at hour 16		Minimum Diurnal Average: 12.1 C at hour 5		Hours of Missing Data: 1																																												
Monthly Average: 16.68 C		Percentiles: P ₁ = 5.7 P ₁₀ = 9.6 Q ₁ = 13.1 Median = 17.1 Q ₃ = 20.3 P ₉₀ = 23.2 P ₉₉ = 26.1		Hours of Calibration: 0																																												
				Percent Operational Time: 99.9																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jun	13.2	12.8	11.7	10.4	9.2	9.4	10.3	11.1	10.4	10.3	11.8	13.4	15.8	17.9	19.4	19.9	20.0	18.2	17.3	15.5	14.3	14.4	13.9	13.0	13.9	20.0																						
2-Jun	11.9	11.6	10.9	10.4	10.2	10.2	10.4	11.4	13.7	17.2	20.1	22.6	22.8	22.7	23.3	23.8	21.6	21.9	21.7	20.5	19.9	17.4	14.9	13.1	16.8	23.8																						
3-Jun	11.6	10.7	9.6	9.6	9.7	10.5	12.7	15.0	17.8	19.5	18.5	17.5	17.6	18.2	19.3	17.5	14.5	13.5	11.0	10.5	10.0	9.8	8.4	13.8	19.5																							
4-Jun	8.2	8.2	8.4	8.4	8.3	8.2	8.1	8.0	8.4	8.9	9.5	9.7	10.1	10.3	9.9	9.7	9.9	9.6	9.2	8.8	8.3	8.0	7.6	7.2	8.8	10.3																						
5-Jun	6.5	6.3	5.9	5.7	5.7	5.9	6.1	6.4	7.1	7.9	8.4	9.5	10.2	10.2	10.7	10.0	10.0	9.7	9.3	9.2	8.8	7.4	6.9	6.4	7.9	10.7																						
6-Jun	6.1	5.7	5.3	5.2	5.1	5.1	6.6	7.8	8.4	9.1	10.2	10.8	12.2	12.9	13.4	13.9	14.3	14.3	13.7	12.9	12.2	11.4	10.6	10.0	9.9	14.3																						
7-Jun	9.2	9.0	9.0	8.5	8.0	7.3	7.8	10.7	11.9	12.1	11.5	11.4	13.3	14.1	14.3	15.1	15.8	15.6	15.7	14.7	14.0	12.9	11.3	10.8	11.8	15.8																						
8-Jun	10.0	8.5	6.8	6.0	5.3	6.0	8.2	10.1	12.5	14.8	16.4	16.9	17.6	18.0	19.0	19.2	19.6	19.5	19.4	19.0	17.8	16.5	16.0	15.1	14.1	19.6																						
9-Jun	14.4	14.5	14.2	13.2	11.2	10.2	10.4	10.7	11.4	11.4	12.0	12.6	13.0	12.9	12.7	12.7	12.7	12.2	11.9	11.8	11.1	10.8	10.5	9.7	12.0	14.5																						
10-Jun	9.1	9.1	9.0	9.1	9.2	9.6	10.0	12.6	14.5	14.9	MS	18.1	18.7	15.9	18.8	20.4	20.2	19.0	19.9	18.2	16.8	15.5	13.6	13.1	14.6	20.4																						
11-Jun	13.7	13.0	12.7	12.0	10.3	10.6	11.9	12.2	12.9	15.6	17.5	19.5	18.3	17.9	18.6	18.0	17.4	17.4	17.8	18.1	17.4	15.3	13.0	11.5	15.1	19.5																						
12-Jun	10.3	9.9	9.3	9.3	9.2	10.0	11.3	13.8	16.7	19.2	20.8	21.4	22.0	22.8	22.8	22.8	22.5	22.1	21.6	20.7	19.2	17.2	15.9	14.9	16.9	22.8																						
13-Jun	13.3	12.7	11.5	10.7	10.4	12.2	14.0	15.2	16.3	18.0	18.9	19.8	20.8	21.6	22.4	22.8	23.2	23.3	23.0	22.6	21.4	19.4	18.3	17.3	17.9	23.3																						
14-Jun	16.2	15.0	14.1	13.7	13.5	13.8	14.6	16.2	17.7	19.4	21.4	23.2	23.8	24.4	24.8	25.4	25.5	25.5	25.2	25.1	24.5	23.0	21.0	19.1	20.3	25.5																						
15-Jun	17.4	15.8	14.7	14.3	14.1	14.4	15.4	16.7	18.5	20.6	22.2	23.1	23.8	24.5	25.0	25.2	25.3	25.5	24.8	24.1	23.1	21.2	20.0	17.0	20.3	25.5																						
16-Jun	14.4	12.8	11.6	10.8	10.2	10.7	11.9	14.6	17.0	18.5	19.9	20.7	21.6	22.0	22.8	22.7	22.9	23.0	22.5	21.9	21.1	18.4	16.7	15.8	17.7	23.0																						
17-Jun	15.2	15.1	14.3	14.1	13.7	13.7	13.8	14.6	15.6	16.9	17.5	18.0	18.3	19.5	19.5	19.6	20.1	20.3	17.9	17.1	17.1	17.2	16.7	16.2	16.8	20.3																						
18-Jun	15.9	15.7	15.3	14.6	14.4	15.0	14.9	16.6	18.0	19.5	20.2	20.1	21.0	22.0	22.6	23.3	24.3	24.1	24.7	24.4	23.5	22.4	21.2	20.0	19.7	24.7																						
19-Jun	18.4	17.6	16.7	15.8	15.6	15.4	15.8	16.3	16.8	17.6	18.4	18.2	18.4	19.7	20.4	20.7	20.7	20.7	20.2	19.0	18.1	17.7	17.3	16.8	18.0	20.7																						
20-Jun	16.4	16.2	16.1	15.5	15.1	15.5	16.3	16.6	17.2	18.1	18.7	19.0	18.8	18.6	19.7	20.4	20.3	20.1	19.4	17.9	16.9	15.6	15.3	15.2	17.5	20.4																						
21-Jun	15.1	14.9	14.6	14.4	14.2	14.3	14.6	14.6	14.7	14.8	15.0	15.2	15.4	15.8	16.5	17.1	17.4	17.7	17.4	17.2	16.8	16.7	16.3	15.5	15.7	17.7																						
22-Jun	15.0	14.4	14.4	15.1	15.2	15.5	16.1	17.1	17.1	18.2	19.0	17.4	18.3	20.7	21.9	22.7	22.7	23.3	22.9	22.5	21.5	20.2	18.6	18.2	18.7	23.3																						
23-Jun	17.0	16.1	15.5	15.0	14.4	14.5	15.4	17.0	18.2	19.5	20.3	21.4	22.2	23.2	24.3	24.6	21.7	20.4	21.6	21.1	20.9	20.2	19.6	19.5	19.3	24.6																						
24-Jun	19.3	18.9	18.5	18.2	17.8	17.3	17.3	17.8	19.9	21.2	22.5	24.1	25.1	25.5	26.1	26.2	26.4	26.4	25.1	23.1	22.3	21.9	20.9	20.3	21.8	26.4																						
25-Jun	20.3	19.1	18.5	18.0	17.9	18.2	19.0	19.8	20.9	22.2	23.4	24.7	25.7	25.5	24.1	25.0	20.1	19.3	19.5	20.3	20.3	20.0	18.8	18.5	20.8	25.7																						
26-Jun	18.5	18.1	17.6	17.1	16.8	16.9	17.5	18.9	19.2	19.8	21.0	21.7	22.0	21.8	19.3	20.2	23.4	21.8	20.7	19.9	19.2	18.6	18.0	17.2	19.4	23.4																						
27-Jun	16.6	16.2	15.9	15.4	15.4	16.2	16.5	17.4	18.4	19.6	21.4	22.8	23.1	19.8	17.6	20.9	22.4	21.3	20.9	20.7	20.1	18.1	17.1	16.1	18.8	23.1																						
28-Jun	15.3	14.9	13.9	13.5	13.1	13.3	14.1	17.0	19.2	21.3	23.1	24.1	25.3	26.1	26.0	26.1	26.4	26.1	25.0	24.6	23.5	21.0	19.2	17.9	20.4	26.4																						
29-Jun	16.9	16.0	14.8	14.4	14.7	15.3	16.9	18.5	20.9	22.7	23.8	24.7	25.4	26.0	26.3	26.1	26.1	26.0	26.0	25.3	24.0	22.6	21.3	20.1	21.5	26.3																						
30-Jun	19.0	18.1	17.2	16.6	16.2	16.5	17.8	19.3	20.5	20.9	21.5	22.4	23.1	23.7	24.2	24.3	24.3	24.2	23.9	23.2	21.6	19.6	17.6	16.4	20.5	24.3																						
																								14.1	13.6	12.9	12.5	12.1	12.4	13.2	14.5	15.7	17.0	18.1	18.8	19.5	19.8	20.1	20.6	20.5	20.1	19.7	19.0	18.2	17.0	15.9	15.0	Diurnal Average
																								20.3	19.1	18.5	18.2	17.9	18.2	19.0	19.8	20.9	22.7	23.8	24.7	25.7	26.1	26.3	26.2	26.4	26.4	26.0	25.3	24.5	23.0	21.3	20.3	Diurnal Maximum
MS - Missing																																																



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	85	11.82	11.82
10 - 20	437	60.78	72.60
> 20	197	27.40	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720

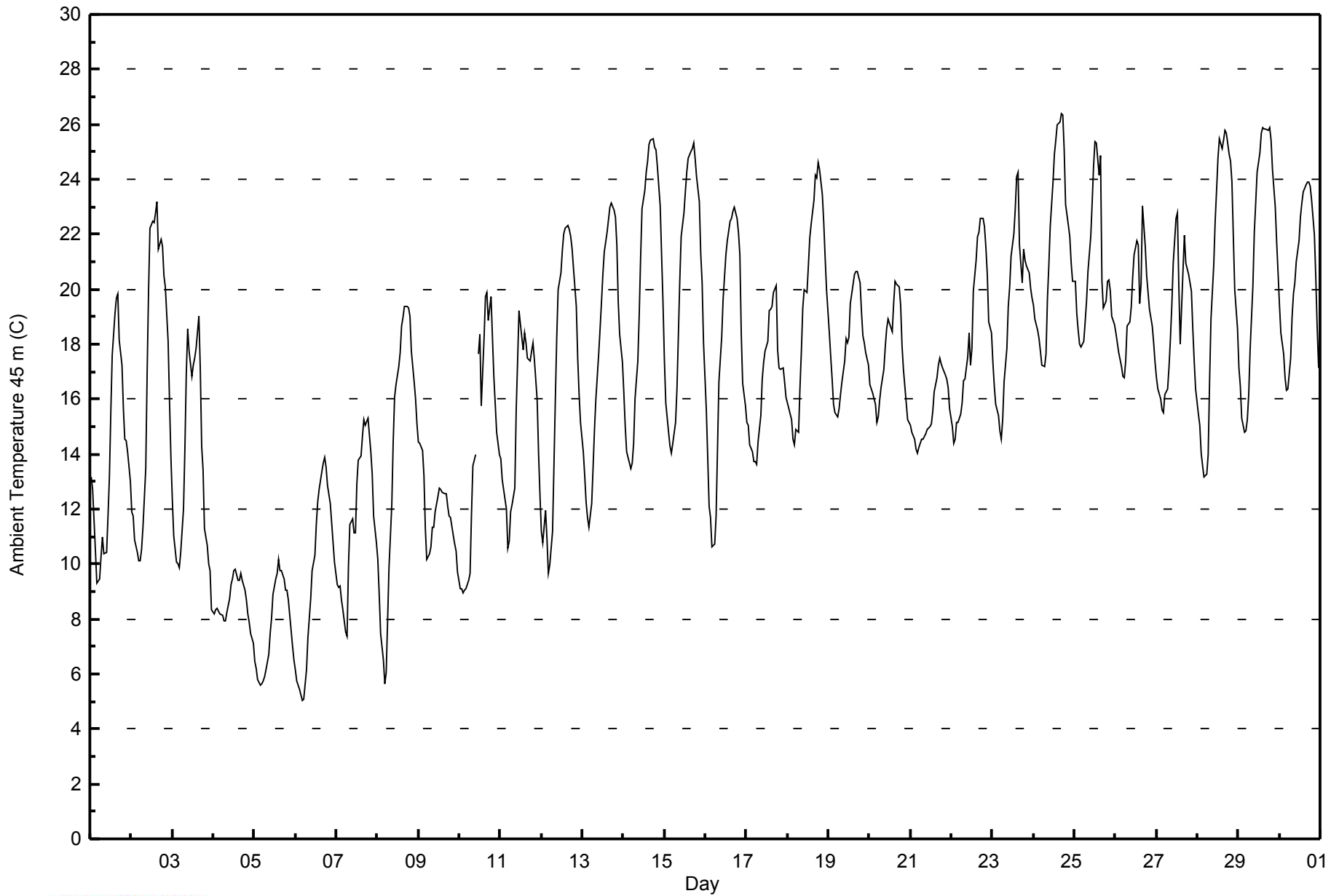


Maximum Value: 26.4 C on Jun 24 17:00		Maximum Daily Average: 21.7 C on Jun 24		Hours in Service: 720																																													
Minimum Value: 5.0 C on Jun 6 05:00		Minimum Daily Average: 7.7 C on Jun 5		Hours of Data: 719																																													
Maximum Diurnal Average: 20.3 C at hour 16		Minimum Diurnal Average: 12.2 C at hour 5		Hours of Missing Data: 1																																													
Monthly Average: 16.60 C		Percentiles: P ₁ = 5.7 P ₁₀ = 9.4 Q ₁ = 13.2 Median = 17.1 Q ₃ = 20.2 P ₉₀ = 23.0 P ₉₉ = 25.8		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-Jun	13.2	12.7	11.6	10.5	9.3	9.5	10.3	11.0	10.4	10.4	11.7	13.2	15.5	17.6	19.1	19.7	19.8	18.2	17.2	15.7	14.5	14.5	14.1	13.0	13.9	19.8																							
2-Jun	11.9	11.8	10.9	10.4	10.1	10.1	10.5	11.3	13.5	17.0	19.9	22.2	22.5	22.4	22.8	23.2	21.5	21.8	21.5	20.5	20.1	18.1	15.9	13.9	16.8	23.2																							
3-Jun	12.4	11.0	10.1	10.0	9.8	10.4	12.0	14.2	16.9	18.6	17.7	16.8	17.2	17.5	17.9	19.0	17.1	14.3	13.4	11.3	10.7	10.0	9.8	8.3	13.6	19.0																							
4-Jun	8.2	8.3	8.4	8.3	8.2	8.1	8.0	7.9	8.3	8.8	9.3	9.5	9.7	9.8	9.4	9.4	9.7	9.4	9.1	8.7	8.2	7.9	7.5	7.1	8.6	9.8																							
5-Jun	6.5	6.2	5.8	5.6	5.6	5.7	5.9	6.1	6.7	7.5	8.0	8.9	9.5	9.7	10.1	9.8	9.8	9.5	9.1	9.0	8.7	7.6	7.0	6.5	7.7	10.1																							
6-Jun	6.2	5.8	5.4	5.2	5.0	5.1	6.2	7.3	8.0	8.8	9.8	10.3	11.4	12.3	12.7	13.4	13.7	13.9	13.5	12.9	12.2	11.5	10.8	10.1	9.6	13.9																							
7-Jun	9.2	9.2	9.2	8.7	8.3	7.5	7.4	9.9	11.4	11.6	11.1	11.1	12.9	13.8	13.9	14.7	15.3	15.1	15.3	14.7	14.1	13.3	11.7	10.8	11.7	15.3																							
8-Jun	10.2	8.9	7.5	6.5	5.6	6.0	7.9	9.8	12.1	14.4	16.1	16.5	17.2	17.7	18.7	19.0	19.4	19.4	19.3	19.0	17.8	16.7	16.0	15.1	14.0	19.4																							
9-Jun	14.4	14.4	14.1	13.2	11.3	10.2	10.4	10.6	11.3	11.3	11.9	12.5	12.8	12.7	12.6	12.6	12.6	12.1	11.8	11.7	11.1	10.7	10.5	9.7	11.9	14.4																							
10-Jun	9.1	9.1	8.9	9.0	9.1	9.4	9.6	11.8	13.6	14.0	MS	17.6	18.4	15.8	18.2	19.7	19.9	18.9	19.7	18.3	16.9	15.8	14.8	14.0	14.4	19.9																							
11-Jun	13.8	13.1	12.7	12.0	10.6	10.8	11.9	12.2	12.8	15.6	17.4	19.2	18.3	17.8	18.4	18.1	17.5	17.4	17.7	18.0	17.4	16.0	14.1	12.5	15.2	19.2																							
12-Jun	11.2	10.8	12.0	10.9	9.7	10.0	11.2	13.6	16.0	18.2	20.0	20.6	21.4	22.0	22.2	22.3	22.2	21.9	21.4	20.7	19.4	17.5	16.2	15.1	16.9	22.3																							
13-Jun	14.1	13.2	12.2	11.7	11.3	12.2	13.5	14.9	16.0	17.6	18.5	19.5	20.5	21.4	22.1	22.5	23.0	23.1	22.9	22.6	21.6	19.5	18.4	17.3	17.9	23.1																							
14-Jun	16.2	15.0	14.1	13.7	13.5	13.7	14.4	16.0	17.4	19.1	21.2	22.9	23.6	24.2	24.7	25.3	25.4	25.5	25.2	25.1	24.5	23.0	21.3	19.5	20.2	25.5																							
15-Jun	17.5	15.9	14.8	14.3	14.0	14.4	15.2	16.4	18.3	20.3	21.9	22.8	23.5	24.2	24.7	25.0	25.1	25.3	24.8	24.1	23.2	21.3	20.2	18.1	20.2	25.3																							
16-Jun	15.6	13.9	12.1	11.7	10.6	10.7	11.7	14.2	16.6	18.2	19.6	20.5	21.3	21.8	22.5	22.6	22.8	23.0	22.6	22.1	21.3	18.3	16.6	15.8	17.7	23.0																							
17-Jun	15.1	15.0	14.3	14.1	13.7	13.7	13.6	14.5	15.4	16.7	17.3	17.7	18.1	19.2	19.3	19.4	19.9	20.1	17.8	17.1	17.1	17.1	16.6	16.1	16.6	20.1																							
18-Jun	15.9	15.6	15.3	14.6	14.4	14.9	14.8	16.4	17.8	19.3	20.0	19.9	20.9	21.9	22.4	23.2	24.2	24.0	24.6	24.4	23.5	22.4	21.2	20.0	19.6	24.6																							
19-Jun	18.4	17.5	16.7	15.8	15.5	15.3	15.7	16.2	16.6	17.4	18.2	18.1	18.2	19.5	20.2	20.5	20.6	20.6	20.2	19.2	18.3	18.0	17.7	17.2	18.0	20.6																							
20-Jun	16.5	16.4	16.2	15.8	15.2	15.4	15.9	16.4	17.1	17.9	18.6	18.9	18.6	18.5	19.5	20.3	20.2	20.1	19.4	18.0	17.1	15.9	15.3	15.2	17.4	20.3																							
21-Jun	15.0	14.8	14.5	14.2	14.0	14.2	14.5	14.5	14.6	14.7	14.9	15.0	15.1	15.6	16.3	16.8	17.2	17.5	17.3	17.1	16.9	16.7	16.4	15.7	15.6	17.5																							
22-Jun	15.0	14.4	14.5	15.2	15.2	15.4	15.9	16.7	16.7	17.6	18.4	17.2	17.9	19.9	21.1	21.9	22.1	22.6	22.6	22.3	21.5	20.6	18.8	18.4	18.4	22.6																							
23-Jun	17.4	16.5	15.8	15.4	14.9	14.6	15.2	16.6	17.8	19.4	20.1	21.2	22.0	23.0	24.1	24.3	21.6	20.2	21.5	21.1	20.9	20.6	20.0	19.7	19.3	24.3																							
24-Jun	19.4	18.9	18.5	18.2	17.7	17.2	17.2	17.7	19.6	20.9	22.3	23.9	24.9	25.4	26.0	26.1	26.4	26.3	25.0	23.1	22.3	21.9	20.9	20.3	21.7	26.4																							
25-Jun	20.3	19.1	18.5	18.0	17.9	18.1	18.8	19.6	20.7	21.9	23.2	24.4	25.4	25.3	24.1	24.8	20.3	19.3	19.6	20.3	20.3	19.9	19.0	18.7	20.7	25.4																							
26-Jun	18.4	18.0	17.7	17.2	16.9	16.8	17.4	18.6	18.8	19.4	20.5	21.3	21.8	21.6	19.5	20.2	23.0	21.6	20.5	19.9	19.3	18.7	18.0	17.3	19.3	23.0																							
27-Jun	16.8	16.4	16.0	15.6	15.5	16.2	16.4	17.2	18.2	19.4	20.9	22.6	22.8	20.1	18.0	20.7	22.0	21.0	20.7	20.5	19.9	18.5	17.4	16.4	18.7	22.8																							
28-Jun	15.5	15.1	14.0	13.6	13.2	13.3	14.0	16.6	18.9	20.9	22.5	23.6	24.8	25.5	25.1	25.4	25.8	25.7	24.9	24.7	23.9	21.9	20.0	18.6	20.3	25.8																							
29-Jun	17.2	16.5	15.3	14.8	14.8	15.2	16.1	17.8	20.2	22.1	23.1	24.3	25.0	25.7	25.9	25.8	25.8	25.8	25.9	25.4	24.3	23.0	21.7	20.6	21.3	25.9																							
30-Jun	19.4	18.4	17.6	16.8	16.3	16.4	17.5	19.0	19.8	20.2	21.0	21.8	22.6	23.1	23.6	23.8	23.9	23.9	23.8	23.2	21.9	20.4	18.6	17.2	20.4	23.9																							
																								14.3	13.7	13.2	12.7	12.2	12.4	13.0	14.2	15.4	16.6	17.8	18.5	19.1	19.5	19.8	20.3	20.3	19.9	19.6	19.0	18.3	17.3	16.2	15.3	Diurnal Average	
																								20.3	19.1	18.5	18.2	17.9	18.1	18.8	19.6	20.7	22.1	23.2	24.4	25.4	25.7	26.0	26.1	26.4	26.3	25.9	25.4	24.5	23.0	21.7	20.6	Diurnal Maximum	
MS - Missing																																																	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	88	12.24	12.24
10 - 20	439	61.06	73.30
> 20	192	26.70	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



Maximum Value: 25.5 C on Jun 29 19:00	Maximum Daily Average: 21.4 C on Jun 29	Hours in Service: 720
Minimum Value: 4.6 C on Jun 6 06:00	Minimum Daily Average: 7.0 C on Jun 5	Hours of Data: 650
Maximum Diurnal Average: 19.4 C at hour 17	Minimum Diurnal Average: 12.1 C at hour 6	Hours of Missing Data: 70
Monthly Average: 16.08 C	Percentiles: P ₁ = 5.1 P ₁₀ = 9.1 Q ₁ = 12.9 Median = 16.4 Q ₃ = 19.6 P ₉₀ = 22.2 P ₉₉ = 25.0	Hours of Calibration: 0
		Percent Operational Time: 90.3

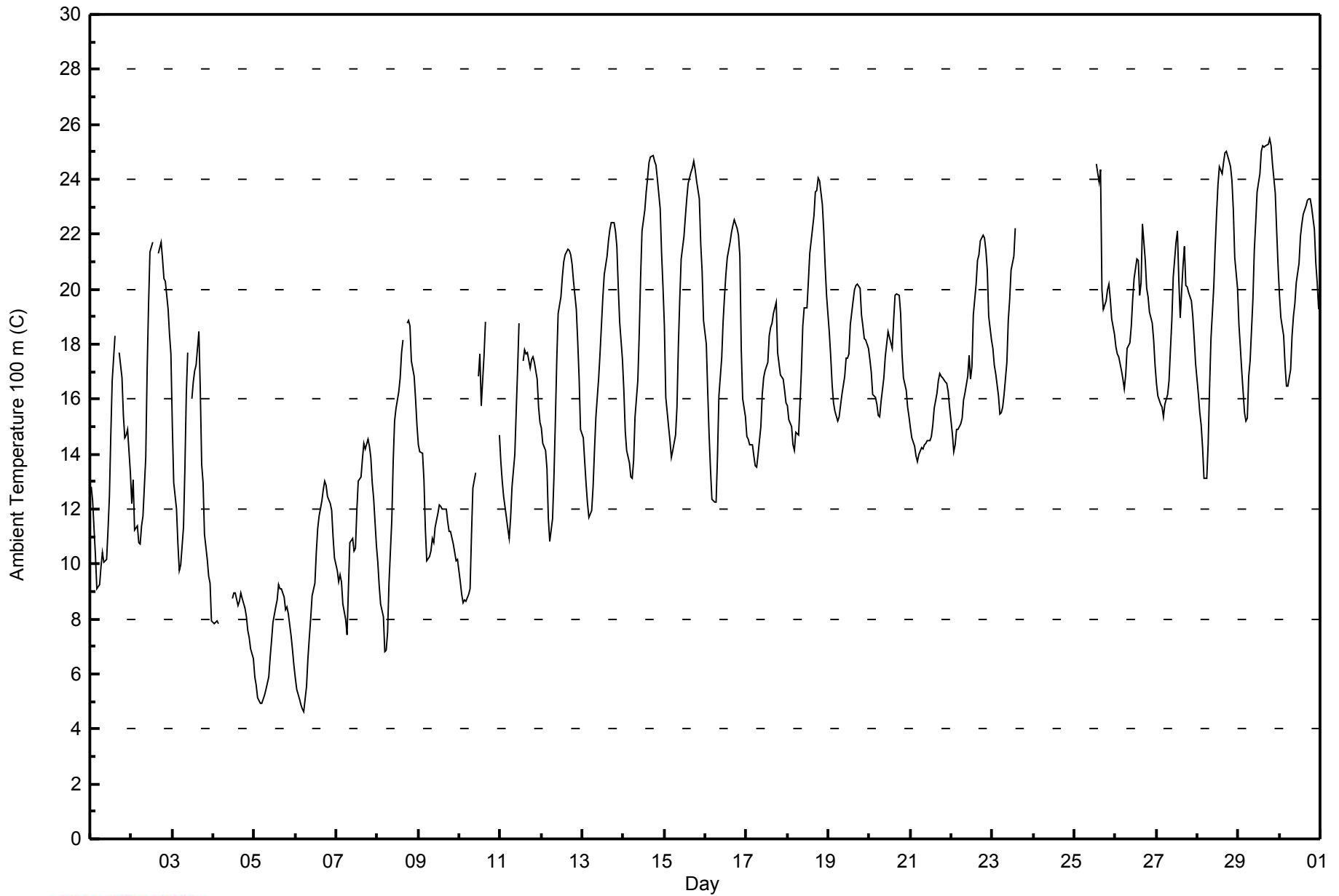
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Jun	12.8	12.3	11.3	10.3	9.1	9.3	9.9	10.4	10.1	10.2	11.2	12.5	14.7	16.7	18.3	MS	MS	17.7	16.8	15.4	14.6	14.7	14.9	13.3	13.0	18.3																								
2-Jun	12.2	13.1	11.2	11.4	10.8	10.8	11.4	11.8	13.9	17.1	19.4	21.3	21.7	MS	MS	AF	21.3	21.7	21.1	20.4	20.3	19.3	18.3	17.7	16.5	21.7																								
3-Jun	15.1	12.9	12.0	10.7	9.8	10.0	11.4	13.5	16.2	17.7	MS	16.0	16.6	17.0	17.2	18.5	16.4	13.7	12.9	11.1	10.1	9.6	9.3	7.9	13.3	18.5																								
4-Jun	7.8	7.9	7.9	7.8	AF	AF	AF	AF	AF	AF	AF	8.7	8.9	9.0	8.5	8.6	8.9	8.7	8.4	8.1	7.6	7.3	6.9	6.6	--	9.0																								
5-Jun	5.9	5.6	5.1	4.9	4.9	5.1	5.3	5.4	5.9	6.6	7.2	7.9	8.4	8.7	9.3	9.1	9.1	8.8	8.4	8.5	8.2	7.4	6.9	6.3	7.0	9.3																								
6-Jun	5.8	5.4	5.1	4.9	4.7	4.6	5.5	6.6	7.3	8.0	8.8	9.3	10.4	11.3	11.7	12.3	12.7	13.0	12.8	12.4	12.2	12.0	11.0	10.2	9.1	13.0																								
7-Jun	9.7	9.4	9.6	9.3	8.6	8.0	7.4	9.1	10.8	10.9	10.5	10.6	11.9	13.0	13.2	13.8	14.4	14.2	14.5	14.3	13.9	13.0	12.4	10.7	11.4	14.5																								
8-Jun	10.1	9.2	8.5	8.1	6.8	6.9	7.5	9.3	11.6	13.7	15.2	15.7	16.3	16.8	17.7	18.2	AF	18.7	18.9	18.7	17.4	16.8	16.0	15.1	13.6	18.9																								
9-Jun	14.3	14.1	14.0	13.1	11.3	10.1	10.3	10.5	11.0	10.8	11.4	11.9	12.1	12.1	12.0	12.0	12.0	11.5	11.2	11.2	10.7	10.4	10.1	10.2	11.6	14.3																								
10-Jun	9.4	8.9	8.6	8.7	8.7	8.9	9.1	11.0	12.8	13.3	AF	16.8	17.6	15.8	17.6	18.8	AF	AF	AF	AF	AF	AF	AF	14.7	--	18.8																								
11-Jun	13.7	13.0	12.5	11.7	11.3	10.9	11.7	12.8	14.0	15.5	17.1	18.7	AF	17.4	17.8	17.7	17.7	17.1	17.4	17.5	17.4	16.7	15.7	15.2	15.2	18.7																								
12-Jun	14.9	14.4	14.1	13.5	11.6	10.8	11.7	13.2	15.2	17.4	19.1	19.7	20.4	21.0	21.2	21.5	21.4	21.2	20.9	20.3	19.3	18.1	16.8	14.9	17.2	21.5																								
13-Jun	14.6	13.7	12.9	12.2	11.7	12.0	12.8	14.2	15.4	16.8	17.7	18.7	19.8	20.6	21.2	21.7	22.2	22.4	22.4	22.1	21.5	20.1	18.8	17.5	17.6	22.4																								
14-Jun	16.3	14.8	14.1	13.7	13.2	13.1	13.8	15.4	16.7	18.3	20.4	22.1	22.9	23.5	24.1	24.6	24.8	24.9	24.6	24.5	24.0	22.9	21.3	20.1	19.8	24.9																								
15-Jun	18.7	16.1	15.0	14.5	13.9	14.1	14.7	15.7	17.9	19.6	21.1	21.9	22.6	23.3	23.9	24.3	24.4	24.6	24.3	24.0	23.3	21.7	20.6	18.8	20.0	24.6																								
16-Jun	18.0	16.3	14.7	13.4	12.4	12.3	12.3	14.0	16.1	17.5	18.8	19.7	20.6	21.1	21.7	22.1	22.3	22.5	22.2	22.0	21.2	17.8	16.0	15.3	17.9	22.5																								
17-Jun	14.6	14.5	14.3	14.4	13.9	13.6	13.5	14.0	15.0	16.2	16.8	17.0	17.4	18.3	18.6	18.7	19.1	19.5	17.7	17.3	16.9	16.7	16.3	15.9	16.3	19.5																								
18-Jun	15.8	15.2	15.0	14.3	14.1	14.8	14.7	15.8	17.1	18.7	19.3	19.3	20.3	21.3	21.8	22.7	23.5	23.6	24.0	23.9	23.1	22.1	20.9	19.8	19.2	24.0																								
19-Jun	18.4	17.6	16.5	15.9	15.6	15.2	15.4	15.8	16.2	16.8	17.5	17.5	17.7	18.7	19.6	20.0	20.1	20.2	20.0	19.1	18.7	18.2	18.1	17.9	17.8	20.2																								
20-Jun	17.4	17.0	16.2	16.1	15.8	15.4	15.4	15.9	16.8	17.5	18.0	18.5	18.1	17.9	18.8	19.8	19.8	19.8	19.1	17.6	16.8	16.3	15.7	15.4	17.3	19.8																								
21-Jun	15.0	14.6	14.3	13.9	13.8	14.0	14.3	14.2	14.4	14.4	14.5	14.5	14.7	15.1	15.7	16.2	16.7	17.0	16.8	16.8	16.6	16.6	16.3	15.7	15.2	17.0																								
22-Jun	14.7	14.1	14.3	14.9	14.9	15.1	15.3	16.0	16.2	16.9	17.6	16.7	17.2	19.1	20.2	21.0	21.3	21.8	22.0	21.9	21.4	20.7	19.0	18.2	17.9	22.0																								
23-Jun	17.8	17.2	16.9	16.1	15.5	15.5	15.7	16.2	17.4	18.9	19.6	20.7	21.2	22.2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	22.2																								
24-Jun	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-Jun	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	24.6	23.9	24.4	20.0	19.3	19.6	20.0	20.2	19.6	18.9	18.4	--	24.6																						
26-Jun	17.9	17.6	17.5	17.0	16.7	16.4	16.9	17.9	18.1	18.7	19.6	20.4	21.1	21.0	19.8	20.2	22.4	21.0	20.1	19.7	19.2	18.7	18.2	17.2	18.9	22.4																								
27-Jun	16.6	16.1	15.8	15.7	15.4	15.8	16.2	16.7	17.8	18.9	20.4	21.7	22.1	20.4	19.0	20.8	21.6	20.1	20.1	19.9	19.6	19.0	18.2	17.3	18.5	22.1																								
28-Jun	16.2	15.5	15.1	14.2	13.1	13.1	14.4	16.4	18.2	20.1	21.5	22.7	23.8	24.5	24.2	24.6	25.0	25.0	24.7	24.5	23.9	22.9	21.2	20.0	20.2	25.0																								
29-Jun	18.7	17.9	17.0	15.5	15.2	15.3	16.8	17.4	19.6	21.4	22.4	23.6	24.2	25.0	25.2	25.2	25.2	25.3	25.5	25.2	24.6	23.5	22.1	20.9	21.4	25.5																								
30-Jun	19.8	19.0	18.3	17.2	16.5	16.5	17.1	18.3	19.0	19.5	20.2	21.0	21.9	22.4	22.8	23.0	23.2	23.3	23.3	23.0	22.1	21.0	20.2	19.3	20.3	23.3																								
																								14.4	13.7	13.1	12.6	12.2	12.1	12.6	13.6	14.8	16.0	17.0	17.3	18.0	18.5	18.7	19.2	19.4	19.1	18.9	18.5	18.0	17.1	16.3	15.4	Diurnal Average		
																								19.8	19.0	18.3	17.2	16.7	16.5	17.1	18.3	19.6	21.4	22.4	23.6	24.2	25.0	25.2	25.2	25.2	25.2	25.3	25.5	25.2	24.6	23.5	22.1	20.9	Diurnal Maximum	

AF - Analyzer Failure MS - Missing



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	83	12.77	12.77
10 - 20	420	64.62	77.38
> 20	147	22.62	100.00

Total Number of Valid Hours: 650

Total Number of Hours: 720

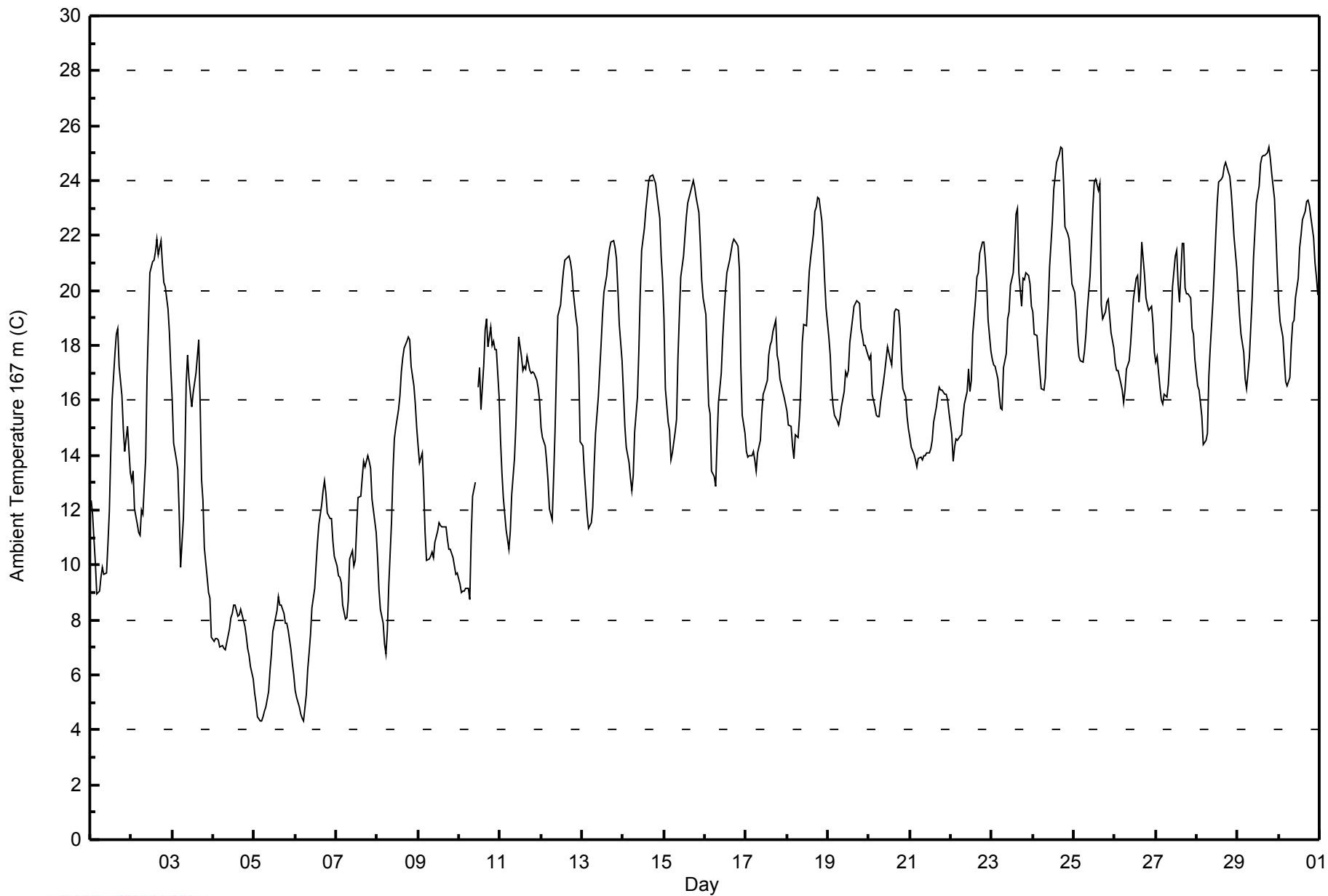


Maximum Value: 25.2 C on Jun 29 19:00		Maximum Daily Average: 21.6 C on Jun 29		Hours in Service: 720																																												
Minimum Value: 4.3 C on Jun 5 04:00		Minimum Daily Average: 6.5 C on Jun 5		Hours of Data: 719																																												
Maximum Diurnal Average: 19.2 C at hour 16		Minimum Diurnal Average: 12.4 C at hour 6		Hours of Missing Data: 1																																												
Monthly Average: 16.15 C		Percentiles: P ₁ = 4.6 P ₁₀ = 9.0 Q ₁ = 13.4 Median = 16.7 Q ₃ = 19.7 P ₉₀ = 22.0 P ₉₉ = 24.9		Hours of Calibration: 0																																												
				Percent Operational Time: 99.9																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jun	12.3	11.9	10.9	10.1	9.0	9.0	9.6	9.9	9.6	9.7	10.8	11.9	14.1	16.0	17.7	18.4	18.6	17.2	16.2	15.0	14.2	14.6	15.1	13.4	13.1	18.6																						
2-Jun	13.1	13.4	12.0	11.5	11.2	11.1	12.0	11.9	13.9	16.9	18.8	20.7	21.0	21.1	21.4	21.9	21.3	21.8	21.0	20.3	20.1	19.3	18.4	17.2	17.1	21.9																						
3-Jun	16.0	14.5	13.8	13.5	11.9	9.9	11.7	13.7	16.6	17.6	16.8	15.7	16.3	16.6	17.0	18.2	15.9	13.1	12.3	10.7	9.5	9.0	8.8	7.4	13.6	18.2																						
4-Jun	7.2	7.3	7.3	7.3	7.0	7.1	7.0	6.9	7.2	7.7	8.1	8.2	8.5	8.5	8.1	8.2	8.4	8.2	7.8	7.4	7.0	6.7	6.3	5.9	7.5	8.5																						
5-Jun	5.3	5.0	4.5	4.3	4.3	4.5	4.7	4.9	5.4	6.2	6.8	7.6	8.1	8.3	8.9	8.6	8.5	8.3	7.9	7.9	7.6	6.9	6.4	6.0	6.5	8.9																						
6-Jun	5.4	5.2	4.8	4.6	4.4	4.3	5.3	6.2	6.8	7.5	8.5	9.2	10.0	10.9	11.5	12.2	12.7	13.1	12.6	11.9	11.7	11.7	10.9	10.3	8.8	13.1																						
7-Jun	10.0	9.6	9.5	9.4	8.5	8.0	8.1	8.7	10.2	10.5	10.0	10.2	11.4	12.5	12.5	13.2	13.8	13.6	14.0	13.8	13.5	12.4	12.0	11.2	11.1	14.0																						
8-Jun	10.3	9.1	8.4	7.9	7.1	6.7	7.6	9.3	11.6	13.4	14.6	15.0	15.7	16.2	17.0	17.5	17.9	18.1	18.3	18.2	17.2	16.5	15.9	15.0	13.5	18.3																						
9-Jun	14.3	13.7	14.1	12.8	11.2	10.2	10.2	10.3	10.5	10.3	10.8	11.2	11.5	11.5	11.4	11.4	11.4	10.9	10.6	10.6	10.3	10.0	9.7	9.7	11.2	14.3																						
10-Jun	9.3	9.0	9.0	9.1	9.1	9.2	8.7	11.0	12.5	13.0	MS	16.5	17.2	15.6	17.3	18.6	19.0	18.0	18.7	18.0	18.1	17.9	17.8	16.1	14.3	19.0																						
11-Jun	14.6	13.4	12.5	11.3	11.0	10.6	11.2	12.6	13.9	15.1	16.8	18.3	17.6	17.1	17.2	17.2	17.6	17.1	17.0	17.0	17.0	16.7	16.4	16.0	15.2	18.3																						
12-Jun	15.0	14.6	14.3	13.8	13.1	12.1	11.7	13.2	14.8	17.1	19.1	19.5	20.2	20.7	21.1	21.2	21.2	21.1	20.7	20.0	19.0	18.6	17.2	14.5	17.2	21.2																						
13-Jun	14.4	13.4	12.6	11.8	11.3	11.6	12.1	13.6	14.8	16.1	17.1	18.1	19.1	19.9	20.5	21.1	21.5	21.8	21.8	21.6	21.1	20.1	18.8	17.4	17.1	21.8																						
14-Jun	16.3	15.0	14.3	13.7	13.2	12.7	13.3	14.9	16.1	17.8	19.9	21.5	22.3	22.9	23.4	23.9	24.1	24.2	24.0	23.9	23.4	22.6	21.3	20.4	19.4	24.2																						
15-Jun	18.9	16.4	15.2	14.9	13.8	14.1	14.8	15.3	17.5	19.1	20.5	21.2	22.0	22.7	23.2	23.6	23.8	24.0	23.8	23.4	22.8	21.7	20.4	19.7	19.7	24.0																						
16-Jun	19.1	17.4	15.8	15.5	13.4	13.2	12.8	14.5	15.9	17.0	18.2	19.2	20.0	20.6	21.1	21.4	21.7	21.9	21.7	21.6	20.8	17.3	15.5	14.8	17.9	21.9																						
17-Jun	14.1	13.9	14.0	14.0	14.1	13.8	13.4	14.1	14.5	15.6	16.2	16.4	16.7	17.6	18.0	18.1	18.5	18.9	17.6	17.4	16.8	16.3	16.1	15.9	15.9	18.9																						
18-Jun	15.6	15.1	15.1	14.3	13.9	14.7	14.6	15.4	16.5	18.1	18.8	18.7	19.7	20.7	21.2	22.1	22.9	23.0	23.4	23.4	22.6	21.6	20.4	19.4	18.8	23.4																						
19-Jun	18.3	17.7	16.4	15.8	15.4	15.2	15.1	15.3	15.7	16.3	17.0	16.9	17.1	18.1	19.0	19.4	19.5	19.6	19.5	18.6	18.3	18.0	18.0	17.6	17.4	19.6																						
20-Jun	17.5	17.6	16.2	15.7	15.4	15.4	15.4	15.9	16.6	17.0	17.5	17.9	17.5	17.3	18.3	19.2	19.3	19.2	18.6	17.2	16.4	16.1	15.4	15.0	17.0	19.3																						
21-Jun	14.7	14.3	14.1	13.8	13.6	13.9	13.9	13.8	14.0	14.0	14.1	14.1	14.2	14.6	15.2	15.7	16.2	16.5	16.4	16.4	16.2	16.2	16.0	15.6	14.9	16.5																						
22-Jun	14.7	13.8	14.3	14.6	14.5	14.7	14.8	15.3	15.9	16.3	17.2	16.3	16.7	18.4	19.7	20.5	20.7	21.4	21.7	21.8	21.1	20.3	18.9	17.8	17.6	21.8																						
23-Jun	17.5	17.3	17.2	16.8	16.1	15.7	15.6	17.2	17.7	18.9	19.2	20.2	20.6	21.6	22.8	23.0	20.6	19.4	20.4	20.4	20.6	20.5	20.2	19.4	19.1	23.0																						
24-Jun	19.2	18.4	18.4	17.7	17.0	16.4	16.4	16.8	18.3	19.4	20.8	22.5	23.7	24.2	24.7	25.0	25.2	25.2	23.9	22.3	22.0	21.9	21.1	20.2	20.9	25.2																						
25-Jun	19.9	19.3	18.2	17.6	17.4	17.4	17.8	18.4	19.3	20.6	21.8	23.1	23.9	24.1	23.6	23.9	19.5	18.9	19.2	19.6	19.7	19.1	18.4	17.9	19.9	24.1																						
26-Jun	17.4	17.1	17.1	16.6	16.3	15.9	16.4	17.1	17.5	18.0	18.9	19.7	20.4	20.5	19.6	20.3	21.7	20.5	19.7	19.5	19.3	19.4	18.8	17.7	18.6	21.7																						
27-Jun	17.4	17.6	16.5	16.0	15.8	16.2	16.1	16.6	17.5	18.6	20.1	21.2	21.5	20.2	19.6	21.7	21.7	20.1	19.9	19.9	19.7	18.6	18.4	17.5	18.7	21.7																						
28-Jun	16.6	16.4	15.9	15.4	14.4	14.6	14.8	16.9	17.9	19.7	20.9	22.1	23.2	24.0	24.1	24.2	24.5	24.7	24.3	24.2	23.6	22.8	22.0	20.8	20.3	24.7																						
29-Jun	19.9	19.1	18.4	17.7	16.8	16.4	17.0	17.5	19.7	21.2	22.2	23.2	23.8	24.6	24.9	24.9	24.9	25.0	25.2	24.8	24.3	23.3	22.1	20.7	21.6	25.2																						
30-Jun	19.6	18.9	18.3	17.5	16.7	16.5	16.8	18.0	18.8	18.9	19.7	20.5	21.6	22.0	22.6	22.9	23.2	23.3	23.1	22.7	21.9	21.0	20.5	19.8	20.2	23.3																						
																								14.8	14.2	13.6	13.2	12.6	12.4	12.6	13.5	14.6	15.6	16.6	17.2	17.8	18.3	18.7	19.2	19.2	18.9	18.7	18.3	17.9	17.2	16.6	15.7	Diurnal Average
																								19.9	19.3	18.4	17.7	17.4	17.4	17.8	18.4	19.7	21.2	22.2	23.2	23.9	24.6	24.9	25.0	25.2	25.2	25.2	24.8	24.3	23.3	22.1	20.8	Diurnal Maximum
MS - Missing																																																



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	98	13.63	13.63
10 - 20	460	63.98	77.61
> 20	161	22.39	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720

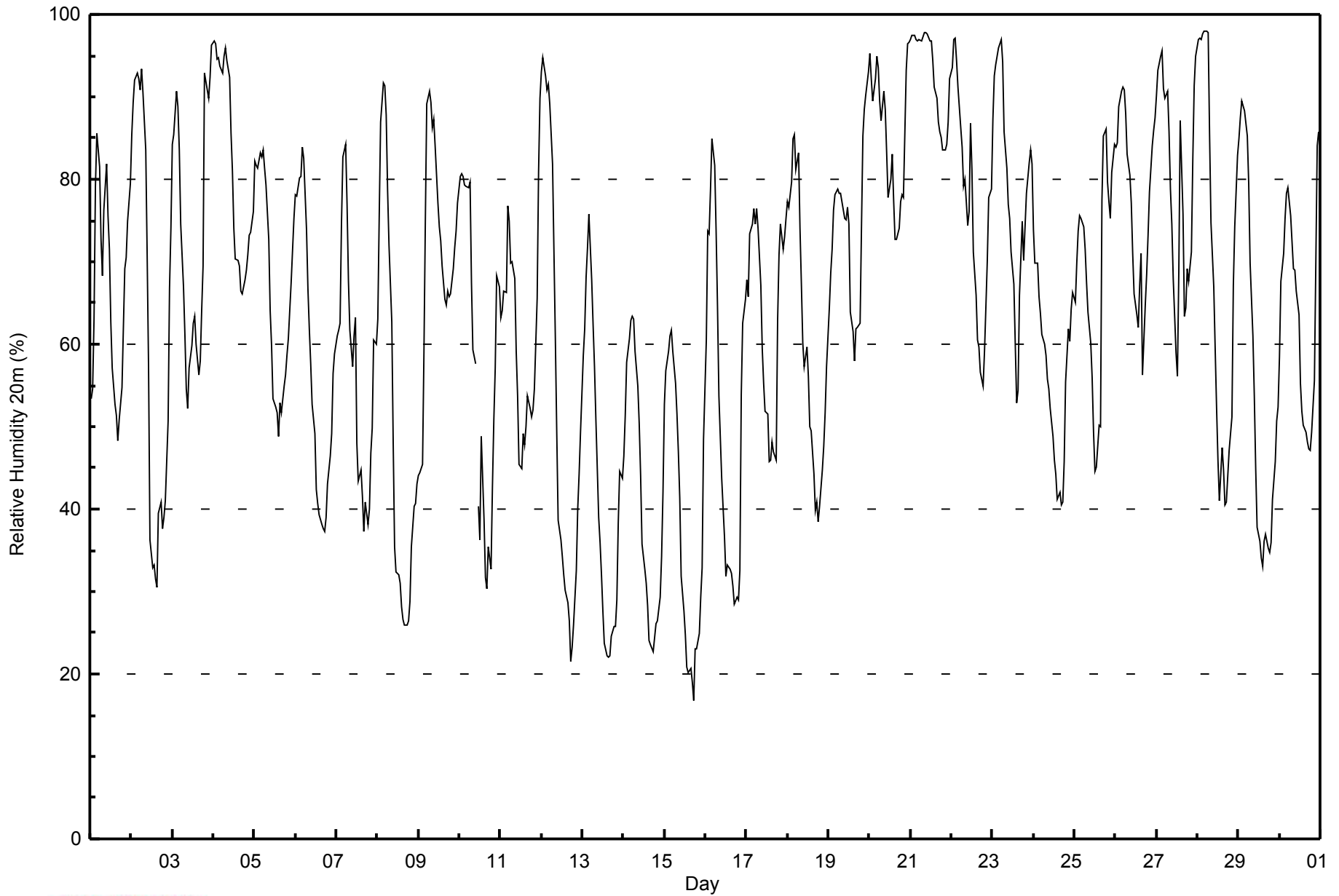


Maximum Value: 98 % on Jun 28 06:00																		Maximum Daily Average: 92.8 % on Jun 21						Hours in Service: 720																									
Minimum Value: 17 % on Jun 15 18:00																		Minimum Daily Average: 37.9 % on Jun 15						Hours of Data: 719																									
Maximum Diurnal Average: 83.6 % at hour 5																		Minimum Diurnal Average: 47.8 % at hour 17						Hours of Missing Data: 1																									
Monthly Average: 64.5 %																		Percentiles: P ₁ = 22 P ₁₀ = 35 Q ₁ = 49 Median = 66 Q ₃ = 80 P ₉₀ = 91 P ₉₉ = 97						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-Jun	53	55	63	79	86	81	73	68	76	82	76	72	63	57	53	51	48	51	55	62	69	71	75	80	66.6	86																							
2-Jun	85	89	92	93	92	91	93	90	84	71	57	36	33	33	31	31	39	41	38	39	41	51	67	74	62.2	93																							
3-Jun	84	85	91	89	84	74	67	61	55	52	57	60	63	63	60	56	58	64	69	93	91	90	92	96	73.1	96																							
4-Jun	97	96	95	95	94	93	95	96	94	92	86	81	74	70	70	69	66	66	68	69	71	73	74	76	81.7	97																							
5-Jun	82	82	81	83	83	84	81	79	73	64	60	53	52	52	49	53	52	55	56	59	61	67	71	75	67.0	84																							
6-Jun	78	78	80	80	84	83	74	67	62	58	53	49	42	41	39	38	38	37	39	43	46	49	57	59	57.2	84																							
7-Jun	61	62	63	75	83	84	77	68	62	57	61	63	48	43	45	42	37	41	38	40	47	50	60	60	56.9	84																							
8-Jun	63	75	87	92	91	88	79	72	63	48	36	32	32	31	28	27	26	26	26	29	35	40	41	43	50.4	92																							
9-Jun	44	44	45	59	75	89	91	89	86	87	84	77	74	73	69	65	65	66	66	66	69	72	74	77	71.2	91																							
10-Jun	80	81	80	79	79	79	80	67	59	58	MS	40	36	49	39	32	30	35	33	43	51	57	68	67	57.5	81																							
11-Jun	63	64	66	66	77	75	70	70	68	59	54	45	45	49	48	50	54	52	51	52	55	66	81	90	61.2	90																							
12-Jun	93	95	93	91	91	89	82	71	61	49	39	36	34	32	30	29	27	22	23	26	33	40	44	49	53.3	95																							
13-Jun	59	62	68	72	76	68	62	57	51	39	36	32	28	24	22	22	25	26	26	29	38	45	44	44	43.0	76																							
14-Jun	46	51	58	61	63	63	63	59	55	50	44	36	33	31	28	24	24	23	24	26	26	29	34	42	41.4	63																							
15-Jun	53	57	59	61	62	59	55	52	47	41	32	28	25	21	20	21	19	17	23	23	25	29	33	48	37.9	62																							
16-Jun	61	74	73	79	85	82	74	65	54	44	40	37	32	33	33	32	31	28	29	29	33	54	62	65	51.1	85																							
17-Jun	68	66	73	75	76	75	76	74	67	60	55	52	52	46	46	48	47	46	63	71	74	72	73	75	63.7	76																							
18-Jun	77	77	80	85	85	81	83	74	67	60	57	60	56	50	49	44	40	41	38	40	45	48	52	57	60.3	85																							
19-Jun	64	69	71	76	78	79	78	78	77	75	75	77	75	64	62	58	62	62	63	74	85	88	90	93	73.9	93																							
20-Jun	95	92	89	92	95	94	89	87	91	89	83	78	80	83	78	73	73	74	77	78	78	93	96	97	85.6	97																							
21-Jun	97	97	97	97	97	97	97	97	98	98	98	97	97	94	91	90	87	86	85	84	84	84	87	92	92.8	98																							
22-Jun	94	97	97	94	91	86	84	79	80	74	76	87	81	71	66	61	60	57	55	59	65	70	78	79	76.7	97																							
23-Jun	87	92	94	96	97	97	94	86	81	77	75	71	67	60	53	54	66	75	70	74	78	82	84	82	78.9	97																							
24-Jun	74	70	70	66	64	61	60	59	56	55	52	49	46	44	41	42	41	41	46	55	62	60	64	66	56.0	74																							
25-Jun	65	70	74	76	75	74	72	68	64	60	56	49	45	45	50	50	78	85	86	80	77	75	81	84	68.3	86																							
26-Jun	84	84	89	91	91	91	88	83	80	77	71	66	63	62	67	71	56	65	68	73	78	84	86	88	77.4	91																							
27-Jun	90	93	95	96	91	90	91	86	79	75	68	59	56	69	87	76	63	64	69	68	71	82	91	95	79.3	96																							
28-Jun	97	97	97	98	98	98	98	85	75	67	59	52	46	41	47	45	41	41	47	49	51	67	74	83	68.9	98																							
29-Jun	85	87	90	88	87	85	79	70	61	54	45	38	36	34	33	36	37	35	35	36	41	46	51	52	55.9	90																							
30-Jun	58	68	71	75	78	79	76	72	69	69	66	64	55	52	50	49	48	47	47	49	56	70	84	86	64.2	86																							
																								74.6	77.0	79.4	81.9	83.6	82.3	79.3	74.4	69.8	64.7	60.4	55.9	52.3	50.6	49.5	47.9	47.8	48.9	50.5	53.8	57.6	63.3	69.0	72.5	Diurnal Average	
																								97	97	97	98	98	98	98	97	98	98	98	97	97	94	91	90	87	86	86	93	91	93	96	97	Diurnal Maximum	
MS - Missing																																																	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	2	0.28	0.28
20 - 40	101	14.05	14.33
40 - 60	182	25.31	39.64
60 - 80	250	34.77	74.41
80 - 100	184	25.59	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720

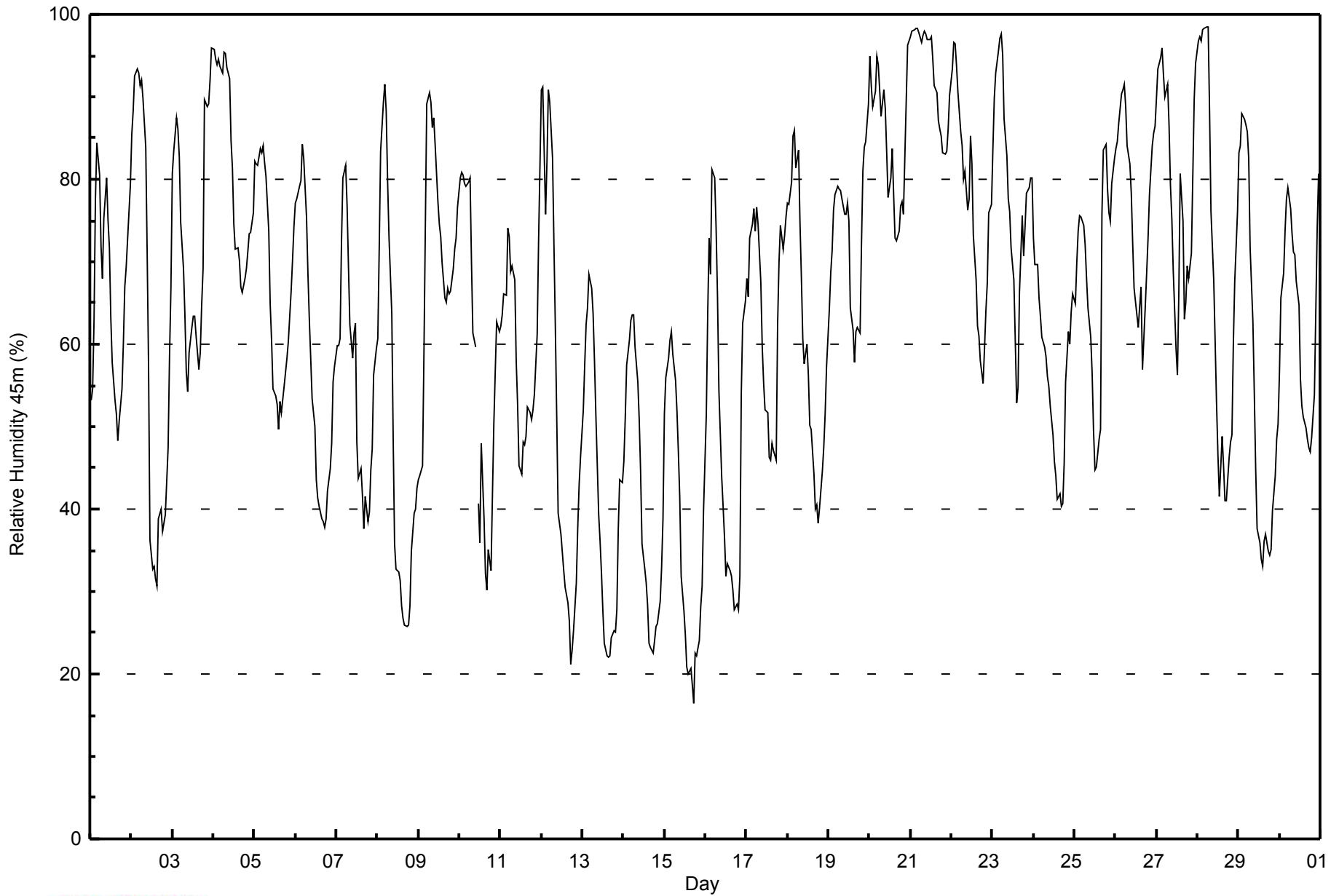


Maximum Value: 99 % on Jun 28 06:00																		Maximum Daily Average: 92.9 % on Jun 21																		Hours in Service: 720													
Minimum Value: 16 % on Jun 15 18:00																		Minimum Daily Average: 37.1 % on Jun 15																		Hours of Data: 719													
Maximum Diurnal Average: 83.0 % at hour 5																		Minimum Diurnal Average: 47.8 % at hour 17																		Hours of Missing Data: 1													
Monthly Average: 64.0 %																		Percentiles: P ₁ = 22 P ₁₀ = 35 Q ₁ = 48 Median = 66 Q ₃ = 80 P ₉₀ = 90 P ₉₉ = 98																		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-Jun	53	55	63	78	84	80	72	68	75	80	75	72	63	58	53	52	48	51	55	60	67	69	73	79	66.0	84																							
2-Jun	85	88	93	93	93	91	92	90	84	71	58	36	33	33	31	31	39	40	37	38	39	47	59	67	61.2	93																							
3-Jun	81	83	87	86	83	75	69	63	57	54	59	62	63	63	61	57	59	65	69	90	89	89	92	96	73.0	96																							
4-Jun	96	95	94	95	94	93	95	95	94	92	85	81	75	71	72	70	67	66	68	69	71	73	74	76	81.7	96																							
5-Jun	82	82	82	84	83	84	82	80	74	65	61	55	54	53	50	53	52	55	57	58	60	67	70	74	67.3	84																							
6-Jun	77	78	79	80	84	82	75	69	63	58	53	50	43	41	40	39	38	38	39	42	45	48	55	57	57.3	84																							
7-Jun	60	60	61	72	80	82	77	70	62	58	61	62	48	44	45	42	38	41	38	40	45	47	56	59	56.2	82																							
8-Jun	61	72	83	89	91	88	80	73	64	48	36	33	32	31	28	27	26	26	26	28	35	40	40	42	50.0	91																							
9-Jun	44	44	45	59	74	89	90	89	86	87	84	77	75	73	70	66	65	67	66	66	69	72	73	77	71.1	90																							
10-Jun	80	81	80	79	79	80	80	70	61	60	MS	41	36	48	39	32	30	35	33	42	50	57	63	62	57.3	81																							
11-Jun	62	64	66	66	74	73	69	69	68	58	53	45	44	48	48	49	52	52	51	52	54	61	72	82	59.7	82																							
12-Jun	91	91	76	82	91	89	82	72	62	51	40	37	35	33	30	29	26	21	23	25	31	38	43	46	51.8	91																							
13-Jun	52	57	62	64	68	67	64	58	51	39	36	32	28	24	22	22	22	24	25	25	28	37	44	43	41.5	68																							
14-Jun	46	51	58	61	63	64	64	60	56	51	44	36	33	31	28	24	23	23	24	26	26	29	33	39	41.2	64																							
15-Jun	52	56	58	60	62	59	56	52	47	41	32	28	25	21	20	21	19	16	22	22	24	28	31	40	37.1	62																							
16-Jun	51	64	73	68	81	80	74	66	54	44	40	37	32	33	33	32	30	28	28	28	32	54	63	65	49.6	81																							
17-Jun	68	66	73	75	76	74	77	75	67	60	55	52	52	46	46	48	47	46	62	70	74	72	73	75	63.7	77																							
18-Jun	77	77	80	85	86	81	84	75	68	61	58	60	56	50	50	44	40	41	38	40	45	47	52	57	60.5	86																							
19-Jun	64	69	71	76	78	79	79	79	78	76	76	77	75	64	62	58	62	62	61	72	81	84	85	89	73.2	89																							
20-Jun	95	91	89	91	95	94	91	88	91	89	83	78	80	84	78	73	73	74	77	77	76	89	96	97	85.3	97																							
21-Jun	97	98	98	98	98	98	97	97	98	98	97	97	97	95	91	91	87	86	85	83	83	83	86	90	92.9	98																							
22-Jun	93	97	96	94	90	86	84	80	81	76	78	85	82	73	68	62	61	58	55	59	64	67	76	77	76.8	97																							
23-Jun	84	90	93	96	97	98	95	87	83	78	76	72	68	61	53	55	66	76	71	74	78	79	80	80	78.6	98																							
24-Jun	73	70	70	66	63	61	60	58	56	55	53	49	46	44	41	42	40	41	46	55	61	60	64	66	55.8	73																							
25-Jun	65	70	74	76	75	74	72	68	64	61	56	49	45	45	48	50	76	84	84	79	76	75	79	83	67.9	84																							
26-Jun	84	85	87	90	91	92	89	84	82	78	72	67	64	62	65	67	57	65	69	73	78	84	86	87	77.3	92																							
27-Jun	90	93	95	96	93	90	92	87	79	75	69	60	56	66	81	75	63	65	70	68	71	80	90	94	79.0	96																							
28-Jun	97	97	97	98	98	99	98	88	76	68	60	53	46	41	49	45	41	41	46	48	49	60	68	76	68.3	99																							
29-Jun	83	84	88	87	87	86	82	72	63	54	45	38	36	34	33	36	37	35	34	35	40	44	49	50	55.4	88																							
30-Jun	57	66	69	74	78	79	76	73	71	71	68	65	56	53	51	50	48	47	47	49	54	64	74	81	63.3	81																							
																								73.3	75.7	78.0	80.6	83.0	82.2	79.9	75.2	70.5	65.2	60.8	56.1	52.6	50.8	49.5	47.9	47.8	48.9	50.2	53.2	56.5	61.5	66.5	70.2	Diurnal Average	
																								97	98	98	98	98	99	98	97	98	98	97	97	97	95	91	91	87	86	85	90	89	89	96	97	Diurnal Maximum	
MS - Missing																																																	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	2	0.28	0.28
20 - 40	106	14.74	15.02
40 - 60	179	24.90	39.92
60 - 80	250	34.77	74.69
80 - 100	182	25.31	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 100m (RH100m) - %

Lower Camp Met Tower - June 2014

Maximum Value: 98 % on Jun 21 05:00	Maximum Daily Average: 92.5 % on Jun 21	Hours in Service: 720
Minimum Value: 16 % on Jun 15 18:00	Minimum Daily Average: 34.4 % on Jun 15	Hours of Data: 649
Maximum Diurnal Average: 79.4 % at hour 6	Minimum Diurnal Average: 47.5 % at hour 16	Hours of Missing Data: 71
Monthly Average: 61.9 %	Percentiles: P ₁ = 20 P ₁₀ = 33 Q ₁ = 47 Median = 63 Q ₃ = 78 P ₉₀ = 87 P ₉₉ = 98	Hours of Calibration: 0
		Percent Operational Time: 90.1

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-Jun	52	54	62	74	81	78	70	67	73	77	74	72	64	59	54	AF	AF	AF	54	58	63	64	62	73	65.9	81
2-Jun	81	75	87	83	85	85	83	85	78	65	56	36	32	AF	AF	AF	AF	37	36	36	35	40	42	45	60.1	87
3-Jun	58	67	68	72	78	75	70	65	57	55	60	63	64	63	62	57	60	65	70	89	89	90	93	96	70.2	96
4-Jun	96	95	95	96	AF	AF	AF	AF	AF	AF	AF	83	76	73	73	71	67	67	68	70	72	74	74	76	--	96
5-Jun	83	83	83	85	85	86	84	82	75	66	61	56	55	53	50	53	51	55	57	58	60	66	68	73	67.8	86
6-Jun	76	78	79	81	84	84	77	70	65	60	55	51	44	42	41	40	39	38	38	40	40	41	49	51	56.9	84
7-Jun	52	54	54	63	71	74	72	70	63	59	61	61	49	44	45	42	38	42	39	39	42	47	48	57	53.5	74
8-Jun	58	62	66	70	81	81	80	73	62	46	36	33	33	31	28	27	AF	25	25	26	33	36	36	38	47.2	81
9-Jun	40	43	45	60	70	86	88	87	86	88	85	78	76	74	71	66	66	67	67	67	68	71	72	72	70.4	88
10-Jun	77	79	80	79	79	80	81	71	63	62	AF	41	35	42	37	32	AF	AF	AF	AF	AF	AF	AF	54	--	81
11-Jun	58	60	64	66	66	69	67	63	61	55	50	44	AF	46	47	47	47	49	50	52	52	55	59	61	55.9	69
12-Jun	61	61	60	63	73	81	78	72	63	51	40	37	35	33	30	28	26	20	22	24	28	33	39	45	45.9	81
13-Jun	49	51	56	59	63	65	64	59	52	39	36	32	27	24	22	22	22	24	24	24	25	34	38	40	39.6	65
14-Jun	43	49	54	58	62	64	64	60	56	51	44	35	32	31	28	23	23	22	23	25	25	27	31	33	40.2	64
15-Jun	39	51	53	56	59	57	55	51	45	41	31	27	24	20	19	20	18	16	21	19	20	24	27	31	34.4	59
16-Jun	32	39	42	46	53	50	58	60	52	43	39	35	32	33	32	31	29	27	27	25	31	54	63	65	41.6	65
17-Jun	68	66	68	68	71	70	72	74	66	59	54	52	52	47	46	48	48	46	57	63	71	70	71	74	61.6	74
18-Jun	74	77	78	84	85	79	81	75	69	61	58	60	56	50	49	44	40	40	38	40	44	47	51	56	59.9	85
19-Jun	63	67	70	73	76	78	78	78	78	77	77	78	75	65	62	58	62	62	58	68	70	76	76	78	71.0	78
20-Jun	80	82	87	87	87	89	92	89	90	87	84	78	81	85	79	73	71	72	75	76	75	82	90	92	82.5	92
21-Jun	95	97	98	98	98	98	96	98	97	97	96	97	97	96	93	92	88	87	85	83	82	81	83	87	92.5	98
22-Jun	93	97	97	94	90	86	85	82	82	78	80	86	84	76	70	64	62	59	55	59	62	63	71	76	77.1	97
23-Jun	78	82	83	88	92	90	87	84	79	76	72	68	62	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	92
24-Jun	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-Jun	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	46	46	48	75	79	78	75	72	74	78	82	--	82
26-Jun	84	85	86	89	90	93	90	87	84	80	74	69	64	62	58	60	57	64	68	71	76	79	82	87	76.7	93
27-Jun	91	95	95	94	95	92	90	85	80	76	70	61	57	61	65	61	57	66	70	68	71	75	80	84	76.6	95
28-Jun	89	89	90	95	98	98	97	88	78	69	61	53	47	42	49	46	41	41	44	45	46	50	54	57	65.3	98
29-Jun	59	61	66	77	79	79	70	68	62	53	43	37	35	33	32	35	36	34	33	34	37	41	44	48	49.8	79
30-Jun	54	58	63	68	73	74	75	74	72	72	69	66	56	53	51	50	48	47	46	47	49	53	55	60	59.7	75

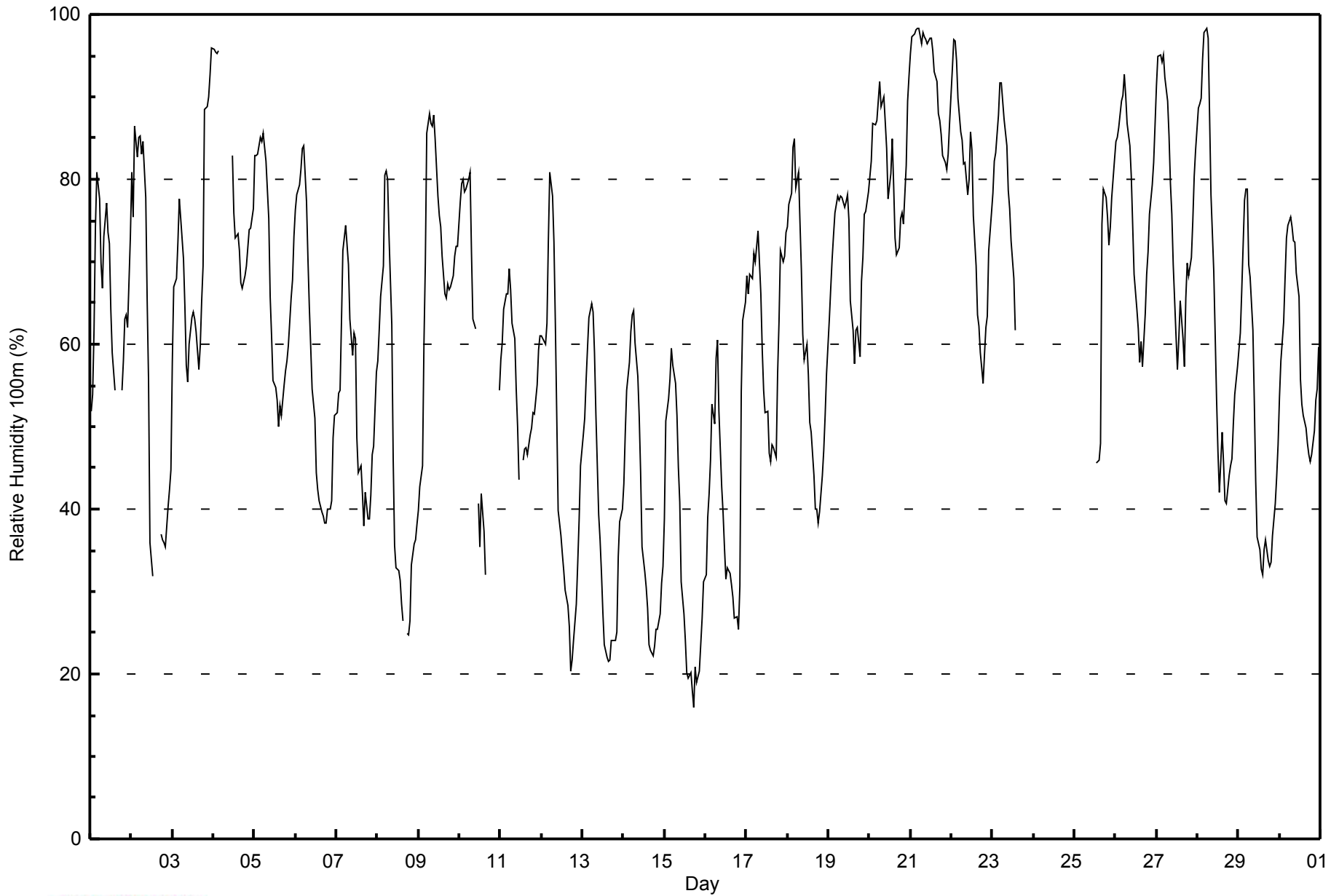
67.3	69.9	72.5	75.9	78.6	79.4	78.0	74.8	70.1	64.7	60.5	56.9	53.7	51.6	49.7	47.5	48.8	48.1	49.2	51.1	53.3	57.3	60.6	64.0	Diurnal Average	
96	97	98	98	98	98	97	98	97	97	96	97	97	96	93	92	88	87	85	89	89	90	93	96	Diurnal Maximum	

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	4	0.62	0.62
20 - 40	109	16.80	17.41
40 - 60	168	25.89	43.30
60 - 80	235	36.21	79.51
80 - 100	133	20.49	100.00

Total Number of Valid Hours: 649

Total Number of Hours: 720

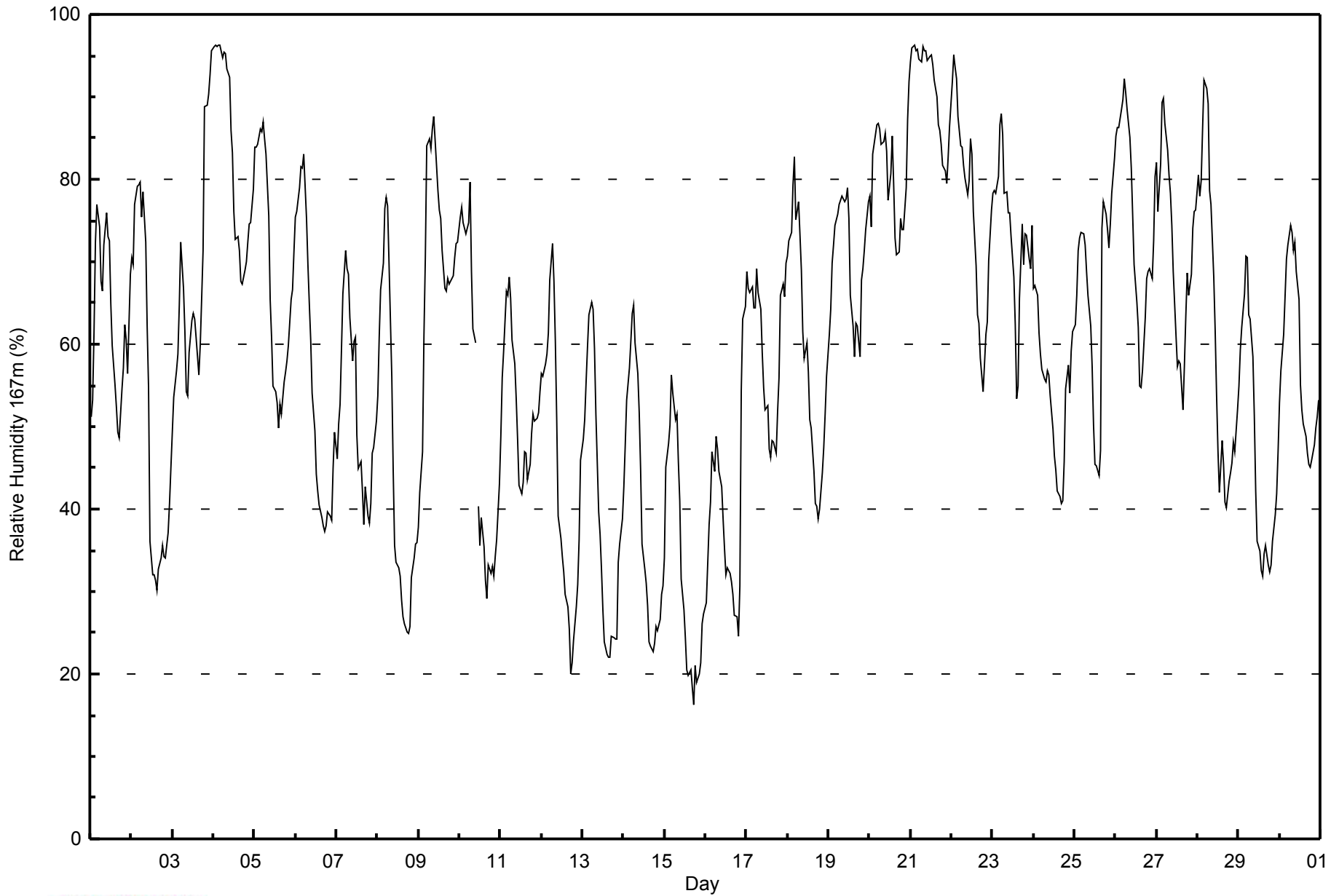


Maximum Value: 96 % on Jun 4 04:00																		Maximum Daily Average: 90.9 % on Jun 21																		Hours in Service: 720													
Minimum Value: 16 % on Jun 15 18:00																		Minimum Daily Average: 33.0 % on Jun 15																		Hours of Data: 719													
Maximum Diurnal Average: 75.8 % at hour 6																		Minimum Diurnal Average: 46.6 % at hour 16																		Hours of Missing Data: 1													
Monthly Average: 60.0 %																		Percentiles: P ₁ = 20 P ₁₀ = 33 Q ₁ = 46 Median = 61 Q ₃ = 75 P ₉₀ = 85 P ₉₉ = 96																		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-Jun	51	53	62	72	77	74	68	66	72	76	73	73	65	60	55	52	49	49	55	57	62	61	56	68	62.8	77																							
2-Jun	71	70	77	79	79	80	75	78	72	62	55	36	32	32	31	30	33	34	36	34	34	37	41	45	52.2	80																							
3-Jun	49	54	57	59	65	72	67	62	54	54	59	63	64	63	61	56	60	66	71	89	89	90	93	96	67.1	96																							
4-Jun	96	96	96	96	96	95	95	95	93	92	86	83	76	73	73	71	68	67	69	70	72	75	75	79	82.9	96																							
5-Jun	84	84	84	86	86	87	85	83	76	65	61	55	54	53	50	53	51	55	57	58	60	65	67	71	67.9	87																							
6-Jun	75	76	79	82	81	83	75	70	65	60	54	50	44	42	40	39	38	37	38	40	39	39	45	49	55.9	83																							
7-Jun	46	50	53	59	66	71	69	69	63	58	60	61	49	45	46	42	38	43	39	38	41	47	47	51	52.1	71																							
8-Jun	54	61	67	70	76	78	77	70	56	45	36	34	33	32	29	27	26	25	25	26	32	34	36	36	45.1	78																							
9-Jun	38	42	47	61	71	84	85	84	86	88	85	79	76	75	71	67	66	68	67	68	68	71	72	72	70.4	88																							
10-Jun	75	77	75	74	73	75	80	69	62	60	MS	40	36	39	35	31	29	33	32	33	32	34	36	43	51.1	80																							
11-Jun	49	56	59	66	66	68	66	61	58	53	49	43	42	43	47	47	43	45	49	51	51	51	52	54	52.9	68																							
12-Jun	57	56	58	59	61	68	72	68	60	51	39	36	34	32	30	28	25	20	21	24	28	31	36	46	43.4	72																							
13-Jun	48	51	55	60	64	65	64	59	52	40	37	33	28	24	22	22	22	25	24	24	24	34	36	39	39.6	65																							
14-Jun	43	48	53	57	60	64	65	60	56	52	45	36	33	31	28	24	23	23	24	26	25	27	30	31	40.1	65																							
15-Jun	34	45	48	50	56	54	51	52	46	41	32	28	24	21	20	21	18	16	21	19	20	21	26	27	33.0	56																							
16-Jun	29	33	38	41	47	45	49	47	45	43	39	35	32	33	32	31	30	27	27	25	31	54	63	65	39.2	65																							
17-Jun	69	67	66	67	64	64	69	66	64	59	55	52	53	47	46	48	48	47	52	56	66	67	66	70	59.5	70																							
18-Jun	71	73	74	79	83	75	77	73	69	62	58	60	57	51	50	45	41	40	39	40	44	47	51	56	58.9	83																							
19-Jun	61	64	70	72	74	76	77	77	78	77	78	79	75	66	62	58	63	62	58	68	69	71	74	77	70.4	79																							
20-Jun	78	74	83	85	87	87	86	84	85	86	83	77	81	85	79	73	71	71	75	74	74	79	87	92	80.7	92																							
21-Jun	94	96	96	96	96	95	94	96	96	96	94	95	95	94	92	90	87	86	84	82	81	79	83	86	90.9	96																							
22-Jun	92	95	94	92	88	84	84	82	80	78	80	85	83	76	70	64	63	58	54	58	61	63	70	76	76.2	95																							
23-Jun	78	79	78	80	87	88	85	78	79	76	76	73	68	62	53	55	66	75	70	73	73	70	69	74	73.6	88																							
24-Jun	67	67	66	61	59	57	56	55	57	56	54	50	46	45	42	41	41	41	46	55	57	54	59	62	53.9	67																							
25-Jun	62	66	71	73	74	73	72	69	66	62	57	50	45	45	44	47	74	77	76	74	72	75	78	83	66.1	83																							
26-Jun	85	86	86	89	90	92	91	88	85	81	76	70	65	62	55	55	57	63	68	69	69	68	73	80	75.1	92																							
27-Jun	82	76	82	89	90	87	84	81	78	74	69	61	57	58	58	52	57	63	69	66	68	74	76	76	72.0	90																							
28-Jun	81	78	80	86	92	91	89	79	77	68	62	54	47	42	48	45	41	40	43	44	46	48	47	52	61.7	92																							
29-Jun	55	59	62	66	71	71	64	63	58	51	42	36	35	32	32	35	36	33	32	33	36	39	42	47	47.1	71																							
30-Jun	53	57	61	66	70	72	74	74	71	72	69	65	55	52	50	49	47	45	45	46	48	50	51	53	58.2	74																							
																								64.2	66.3	69.2	72.5	75.0	75.8	74.8	71.9	68.6	64.6	60.7	56.4	52.8	50.5	48.4	46.6	47.0	47.9	48.9	50.6	52.5	55.2	57.9	61.9	Diurnal Average	
																								96	96	96	96	96	95	95	96	96	96	94	95	95	94	92	90	87	86	84	89	89	90	93	96	Diurnal Maximum	
MS - Missing																																																	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	5	0.70	0.70
20 - 40	124	17.25	17.94
40 - 60	212	29.49	47.43
60 - 80	268	37.27	84.70
80 - 100	110	15.30	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



Maximum Speed: 22 km/h on Jun 1 08:00	Maximum Daily Speed Average: 15.2 km/h on Jun 18	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 16 02:00	Minimum Daily Speed Average: 1.2 km/h on Jun 2	Hours of Data: 718
Maximum Diurnal Speed Average: 2.9 km/h at hour 6	Minimum Diurnal Speed Average: 0.7 km/h at hour 20	Hours of Missing Data: 2
Monthly Average Velocity: 1.7 km/h 124.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 11 P ₉₀ = 15 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-Jun	SE15	SE15	SE10	SE14	SE9	SE8	SE15	SE22	SE15	SE12	SE10	SE7	SE12	SSE7	SSE7	SSE8	SSE15	S11	SSW8	WNW6	SE10	SSE8	SE7	SSE2	SE9.7	SE22	
2-Jun	E3	SSE10	SE6	SE10	SE9	SE9	SE5	SE8	SE8	SE8	SSE3	WSW7	W12	W13WSW11	W9	NE5	NNW7	N11	NNW7	NNW6	NNW3	NNW1	NW3	S1.2	W13		
3-Jun	NNW2	NNW1	N2	N4	NNW4	NW4	NNW6	N7	N9	NNW11	N17	N18	N15	NNW7	N13	N14	NNW18	N21	NNW13	NNE9	N10	N6	NW8	NW9	NNW9.4	N21	
4-Jun	N6	NW5	NNW5	NNW5	N7	NNW5	N5	NNW6	NNW4	NNW5	NNW7	N9	N14	N17	N16	N14	N16	N14	N15	N12	NNE8	N7	N8	NNW11	N9.2	N17	
5-Jun	NNW9	NNW11	N12	N12	N13	NNW12	NNW10	N12	N13	N14	N15	N15	N17	NNW13	NNW12	NNW13	NNW11	NNW11	NNW7	NNW7	NW6	NW5	NW5	NNW11.0	N17		
6-Jun	NNW5	NW5	NW4	NW3	NNE1	NW3	N4	NNW3	NW3	WSW6	N4	NNE6	NNW7	NNW4	NNW5	NNE4	NNW5	NNE2	NNE4	NE4	E3	E3	NNE2	NE1	N2.8	NNW7	
7-Jun	N2	E2	E2	SE5	NW3	NNW5	NNW3	NNE2	NNW6	NNW9	N5	ENE6	SW4	WSW9	W8	WNW5	WNW11	WNW5	WNW2	S1	WNW4	S4	SW4	NW2.4	WNW11		
8-Jun	SSW4	SE4	SE3	ESE2	ESE3	ESE7	SE6	SSE7	SE7	SSE8	SE6	SE7	SE8	SSE9	SSE5	SE9	SE9	SSE8	SSE7	SSE9	SSE7	SE11	SE13	SE15	SE7.0	SE15	
9-Jun	SE15	SSE16	SSE16	SSE12	SE6	SE9	SE6	ESE3	SSE6	SE11	SE11	SE16	SE15	SE15	ESE15	ESE15	ESE16	ESE15	ESE12	E9	E5	ENE4	NNE3	NNE5	SE9.5	ESE16	
10-Jun	NNE6	N5	NNE7	NNE8	NNE7	NNW4	NNW4	N7	NNW8	AF	AF	N8	NE9	ESE8	NW6	NNW7	NNE9	ENE5	WSW4	WSW9	WNW5	NW2	S1	WSW2	N3.7	NNE9	
11-Jun	W10	W10	SW6	S6	SE6	SSE5	SE6	SE8	SE10	SSE3	SE8	SE11	S6	S11	SE14	ESE7	NE3	SSE4	SE6	SSE6	SE7	SE2	N2	S1	SSE4.6	SE14	
12-Jun	N1	SSE1	SE3	SE5	ESE5	ESE4	SE4	S2	NW1	NNW5	N10	N11	N8	N9	NNE10	NNE10	NNE12	NNE11	NNE10	NNE9	N6	NNE6	NNW4	NNE3	NNE4.6	NNE12	
13-Jun	NNE4	NE5	NNE4	NNW5	N4	ESE6	ENE3	SSE3	S5	SE10	SSE9	SSE10	S8	SSE8	SSE8	SSE9	SSE8	SSE7	SE11	SSE11	SSE11	SSE8	SSE9	SSE11	SE5.6	SSE11	
14-Jun	SE11	SSE11	SE11	SE14	SE14	SE14	SSE13	SSE12	SSE12	SSE13	SSE13	SSE13	SSE16	SSE17	SSE16	S16	S16	S15	SSW12	SSW14	SSW11	S10	S11	SSE11	SSE12.3	SSE17	
15-Jun	SSE14	ESE4	ESE5	SE10	SE9	SE14	SSE15	SE10	SSE11	SSE11	SSE11	SE11	SE11	SE11	SE11	SE19	SSE11	SE11	SSE8	SE13	SE13	SE12	SSE6	SE7	ESE1	SE9.8	SSE15
16-Jun	NNW1	NNE0	NNW1	N3	NNW2	NNW2	WNW1	NNW1	SE3	SSE8	SSE5	SSE11	SSE12	SE5	WSW4	SE2	ENE7	ENE10	ENE6	E6	SE7	SSW12	SW10	WSW6	SSE2.4	SSE12	
17-Jun	S4	S4	SE5	SE6	SE2	SSE1	E2	SSE4	SSE6	SSE6	SE9	SE10	SE10	SE8	SSE10	SSE11	SSE8	S7	SSW13	SE7	S9	S11	S12	SSE10	SSE7.0	SSW13	
18-Jun	SSE11	SSE13	SSE10	SSE4	SE3	SSE12	SE9	SE10	SSE11	SSE13	SSE20	SSE16	SSE19	SSE20	SSE19	SSE21	SSE21	SSE19	SSE18	SSE20	SSE19	SSE22	SSE22	SSE17	SSE15.2	SSE22	
19-Jun	SE10	SSE12	SE10	SE8	SE6	SE6	SSE7	SSE8	SSE6	SE5	SE12	SE10	SE11	SE8	SE7	SSE6	ESE3	ESE4	NE2	NNW3	NW1	NNW1	NW3	NNW2	SE5.3	SE12	
20-Jun	NNW3	NNW6	NW3	N1	NNW2	NNW1	N2	ESE0	S1	NE2	SE5	SE7	SE8	SSE7	SE6	SE6	SE6	SE8	SSE6	SSE6	SSE3	NNW3	NNW1	N2	SE2.0	SE8	
21-Jun	NNW2	NNW1	NNE2	N3	N2	NNW4	NW4	NNW4	NNW6	NNW6	NW6	NW6	NNW5	NNW6	NNW5	NNW3	WNW7	NW9	NW8	NW6	NW5	NNW3	N2	NW3	NW4.3	NW9	
22-Jun	NNW5	NW4	W3	N2	NW4	NNW2	NW2	WNW3	N5	NW7	NNW6	NNW6	NNW8	NNW10	NNW10	NNW11	NNW11	NNW10	NNW9	N8	NNW6	NNE3	NW2	N3	NNW5.6	NNW11	
23-Jun	N1	NW1	N1	NNW1	NE1	N2	NNW2	N2	N2	SSW2	SSE2	SSW3	SSE6	SSE8	SE10	E4	ESE8	E7	SSE5	SSE7	SE3	SE1	ESE2	SE3	SE2.3	SSE10	
24-Jun	ESE8	SE14	SE16	SE17	SE16	SE17	SE15	SE12	SE11	SE12	SE12	SE12	SSE15	S15	S17	SSE11	SSE14	S16	S16	SSE12	SSE12	SSE14	SSE12	SSE16	SSE13.4	S17	
25-Jun	SSE20	SE13	SE13	SE11	SE12	SE13	SE10	SSE15	SSE11	SE14	SE15	SE15	SE15	S17	SSE5	SSE9	WSW14	N2	ENE2	SE3	S5	S5	ESE4	S2	SSE9.0	SSE20	
26-Jun	S4	SSW2	SE2	SE2	ESE4	SE4	SE3	W2	W6	W7	W7	W7	W6	S9	SSW7	NNE3	WNW2	WNW6	NNW7	NNW4	NNW4	NNW3	NW2	NW4	W1.8	S9	
27-Jun	NW3	NNW2	NNW2	N1	ENE1	W0	SE3	SE4	SE5	ESE1	NNE1	SSW3	WSW5	ESE9	NNE2	NNW1	NNW8	NNE9	NNE7	N6	NW3	NNW3	WSW1	N2	NNE1.3	ESE9	
28-Jun	N0	ENE1	NNW2	NW2	E1	NNE1	ESE1	E0	SW3	SW3	W6	W7	WNW3	N6	N9	NNW8	NNW8	NNW9	NW7	NNW8	NNW4	NNW4	NNW3	N1	NW3.2	N9	
29-Jun	WSW1	NW2	NW4	NW4	NNW1	ESE0	N3	NNW4	NNW8	NNW9	NNW10	NNW15	N15	N17	N19	N17	NNW18	NNW17	NNW15	NNW12	NNW9	NNW8	NNW6	NNW6	NNW9.0	N19	
30-Jun	NNW6	N3	NNW3	NNW3	NNW3	NNW3	NNW6	NNW8	N10	NNW10	NNW9	NNW10	N12	NNW12	N12	N11	N11	N11	N10	N8	NNW4	N3	NW1	NNW1	NNW6.9	N12	

SE2.0 SE2.2 SE2.2 ESE2.7 ESE2.4 SE2.9 ESE2.4 SE2.5 SE2.1 SE2.1 SE2.0 ESE1.9 ESE2.4 SE2.6 SE1.3 E1.3 NE1.2 NE1.5 NE0.8 E0.7 SE1.4 SSE1.4 SSE1.8 SSE1.1	Diurnal Average
SSE20 SSE16 SE16 SE17 SE16 SE17 SE15 SE22 SE15 SE14 SSE20 N18 SSE19 SSE20 N19 SSE21 SSE21 N21 SSE18 SSE20 SSE19 SSE22 SSE22 SSE17	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Jun 25 16:00	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 Jun 29 06:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8	

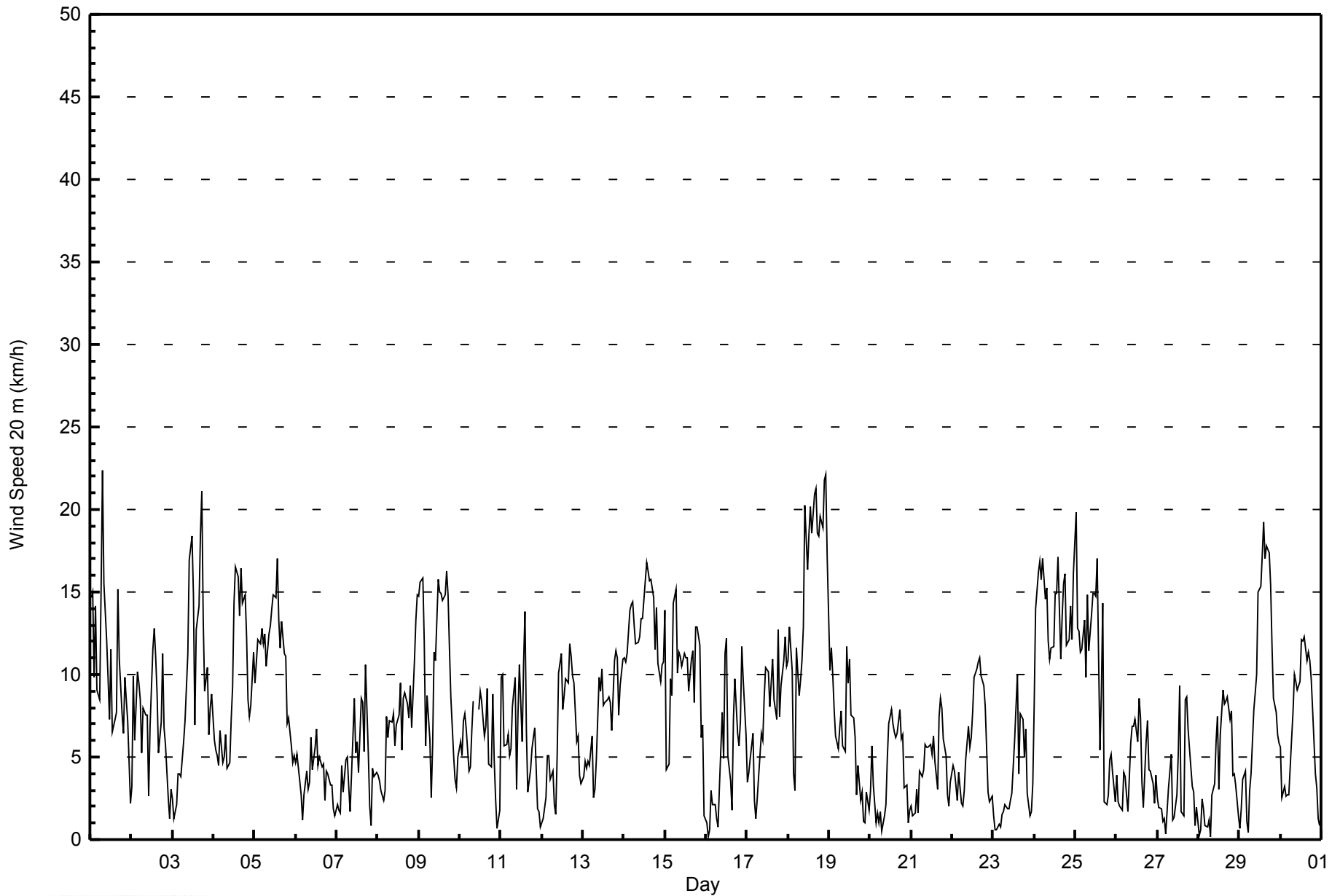
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	4	4	5	5	4	4	6	6	5	5	4	3	4	3	3	3	6	4	3	5	3	3	4	1	6	
2-Jun	3	4	3	3	3	4	3	2	2	3	2	4	5	6	5	4	5	7	5	4	2	2	1	1	7	
3-Jun	1	1	2	2	2	2	2	3	3	5	6	7	6	4	4	5	7	8	6	5	5	3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

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

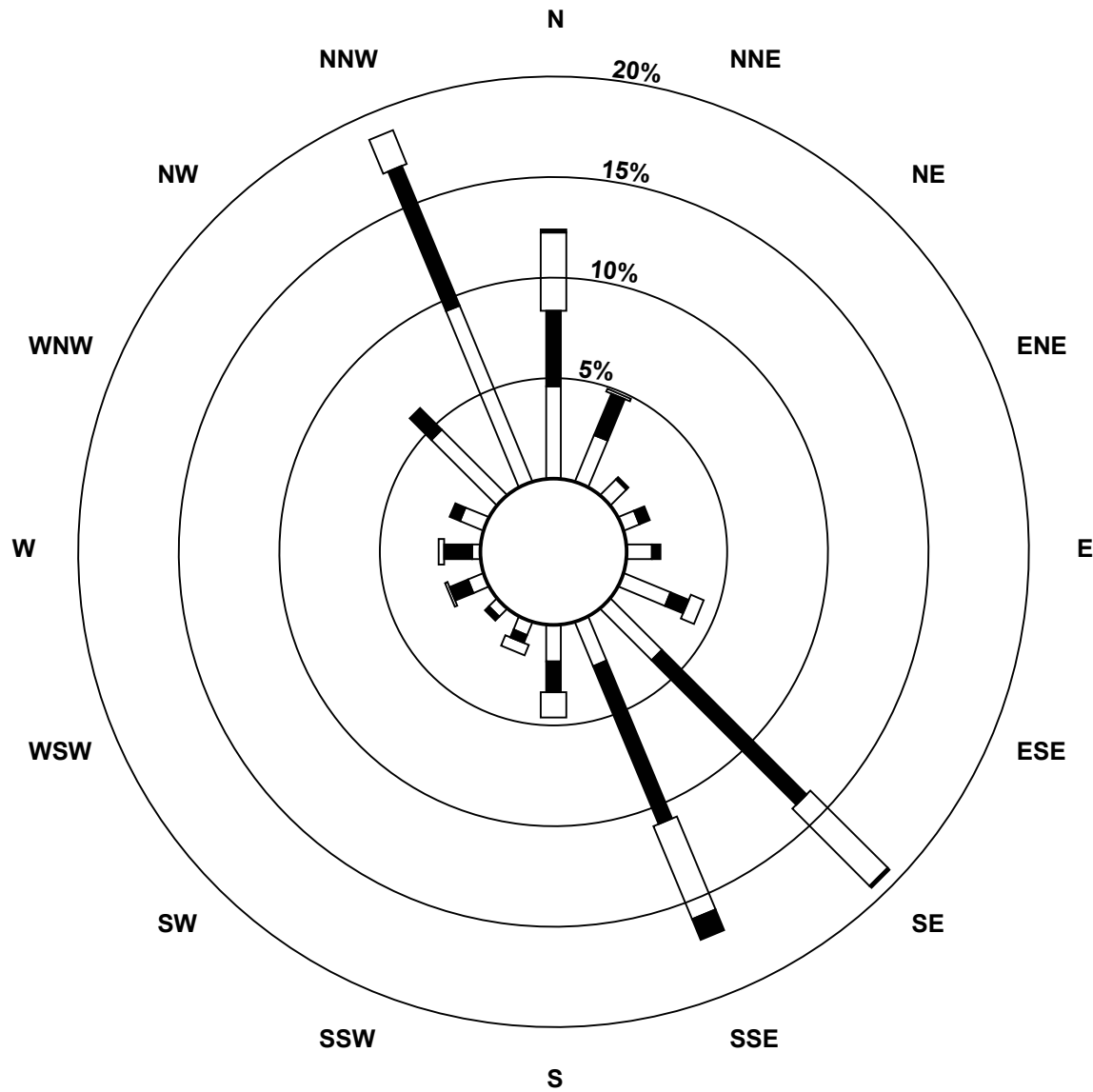
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	276	38.44	38.44
6 - 11	294	40.95	79.39
12 - 19	138	19.22	98.61
20 - 28	10	1.39	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 718

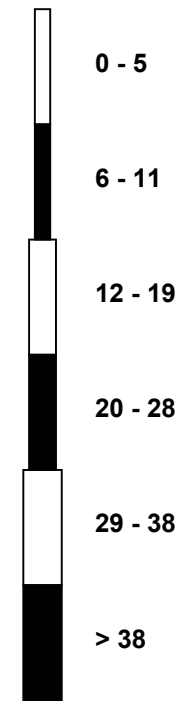
Total Number of Hours: 720

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

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



Classes (km/h)



Total Number of Valid Hours: 718



Maximum Speed: 29 km/h on Jun 1 08:00	Maximum Daily Speed Average: 17.4 km/h on Jun 18	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 27 06:00	Minimum Daily Speed Average: 1.0 km/h on Jun 2	Hours of Data: 718
Maximum Diurnal Speed Average: 3.5 km/h at hour 4	Minimum Diurnal Speed Average: 0.9 km/h at hour 24	Hours of Missing Data: 2
Monthly Average Velocity: 1.8 km/h 109.9 deg	Percentiles: P ₁ = 0 P ₁₀ = 3 Q ₁ = 5 Median = 9 Q ₃ = 14 P ₉₀ = 19 P ₉₉ = 25	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-Jun	SE19	SE19	SE13	SE20	SE12	SE12	SE20	SE29	SE21	SE16	SE12	SE10	SE14	SSE8	SSE8	SSE9	SSE16	S13	SSW10	WNW9	SE11	SSE11	SE10	SSE3	SE12.3	SE29	
2-Jun	E5	SSE13	SE8	SE13	SE12	SE11	SE8	SE10	SE9	SE8	SSE3	WSW9	W15	W17	WSW14	W11	NE10	NNW10	N17	NNW11	NNW10	NNW5	NNW3	NW4	SSW1.0	W17	
3-Jun	NNW4	NNW3	N6	N7	NNW6	NW6	NNW8	N9	N11	NNW15	N23	N25	N21	NNW10	N17	N19	NNW27	N29	NNW20	NNE14	N15	N9	NNW11	NW12	NNW13.4	N29	
4-Jun	N9	NW8	NNW7	NNW6	N9	NNW7	N7	NNW9	NNW6	NNW7	NNW11	N13	N19	N23	N22	N19	N23	N20	N20	N20	N17	NNE13	N11	N12	NNW16	N13.0	N23
5-Jun	NNW14	NNW15	N17	N16	N18	NNW17	NNW17	NNW15	N17	N18	N19	N20	N20	N23	NNW19	NNW16	NNW19	NNW16	NNW15	NNW10	NNW10	NW9	NW7	NW8	NNW15.5	N23	
6-Jun	NNW7	NW8	NW5	NW4	NNE2	NW4	N5	NNW4	NW5	WSW7	N6	NNE7	NNW8	NNW6	NNW7	NNE6	NNW6	NNE4	NNE6	NE7	E6	E6	NNE2	NE2	N3.9	NNW8	
7-Jun	N2	E3	E3	SE7	NW3	NNW7	NNW7	NNW4	NNE3	NNW9	NNW13	N8	ENE8	SW4	WSW11	W11	WNW7	WNW14	WNW7	WNW2	S1	WNW6	S7	SW6	NW3.1	WNW14	
8-Jun	SSW5	SE4	SE5	ESE4	ESE4	ESE9	SE7	SSE8	SE8	SSE8	SE6	SE8	SE9	SSE11	SSE6	SE10	SE10	SSE10	SSE8	SSE10	SSE7	SE16	SE19	SE20	SE8.5	SE20	
9-Jun	SE20	SSE18	SSE19	SSE13	SE8	SE12	SE9	ESE5	SSE8	SE15	SE14	SE20	SE20	SE19	ESE19	ESE20	ESE22	ESE20	ESE16	E12	E8	ENE6	NNE5	NNE9	ESE12.5	ESE22	
10-Jun	NNE9	N8	NNE11	NNE12	NNE10	NNW6	NNW6	N8	NNW11	AF	AF	N11	NE13	ESE11	NW8	NNW9	NNE13	ENE7	WSW6	WSW13	WNW8	NW4	S3	WSW6	N5.3	NNE13	
11-Jun	W16	W15	SW8	S6	SE8	SSE5	SE5	SE10	SE12	SSE4	SE9	SE13	S8	S12	SE17	ESE10	NE5	SSE5	SE7	SSE7	SE8	SE4	N2	S0	SSE5.6	SE17	
12-Jun	N1	SSE1	SE2	SE8	ESE8	ESE5	SE4	S2	NW2	NNW6	N13	N15	N11	N12	NNE14	NNE15	NNE17	NNE16	NNE16	NNE15	N10	NNE12	NNW6	NNE5	NNE6.9	NNE17	
13-Jun	NNE5	NE7	NNE5	NNW4	N4	ESE9	ENE4	SSE3	S5	SE12	SSE10	SSE12	S9	SSE9	SSE10	SSE10	SSE10	SSE8	SE13	SSE13	SSE13	SSE9	SSE12	SSE15	SE6.8	SSE15	
14-Jun	SE16	SSE14	SE16	SE20	SE20	SE19	SSE16	SSE13	SSE14	SSE15	SSE15	SSE15	SSE18	SSE19	SSE19	S17	S18	S16	SSW14	SSW17	SSW13	S11	S12	SSE13	SSE14.9	SE20	
15-Jun	SSE17	ESE7	ESE7	SE13	SE11	SSE17	SSE18	SE13	SSE13	SSE13	SSE13	SE13	SE13	SE13	SE13	SE11	SE13	SE14	SSE10	SE17	SE18	SE16	SE17	SE10	ESE6	SE12.3	SE18
16-Jun	NNW1	NNE0	NNW0	N3	NNW4	NNW4	WNW1	NNW1	SE4	SSE9	SSE6	SSE13	SSE14	SE6	WSW5	SE2	ENE11	ENE16	ENE10	E9	SE10	SSW15	SW12	WSW9	SE2.9	ENE16	
17-Jun	S4	S5	SE6	SE8	SE3	SSE2	E4	SSE5	SSE8	SSE7	SE12	SE13	SE12	SE10	SSE11	SSE13	SSE10	S9	SSW15	SE9	S11	S12	S13	SSE12	SSE8.4	SSW15	
18-Jun	SSE13	SSE15	SSE12	SSE6	SE5	SSE14	SE12	SE12	SSE13	SSE14	SSE23	SSE19	SSE21	SSE22	SSE22	SSE24	SSE23	SSE21	SSE20	SSE22	SSE21	SSE24	SSE24	SSE20	SSE17.4	SSE24	
19-Jun	SE13	SSE14	SE14	SE10	SE9	SE8	SSE8	SSE9	SSE7	SE7	SE15	SE12	SE14	SE10	SE10	SSE8	ESE4	ESE6	NE4	NNW4	NW3	NNW1	NW3	NNW3	SE6.8	SE15	
20-Jun	NNW5	NNW9	NW5	N3	NNW3	NNW2	N2	ESE0	S2	NE4	SE6	SE9	SE10	SSE9	SE8	SE8	SE9	SE11	SSE8	SSE8	SSE5	NNW3	NNW2	N2	SE2.4	SE11	
21-Jun	NNW3	NNW3	NNE3	N5	N3	NNW6	NW6	NNW7	NNW9	NNW9	NW8	NW8	NNW7	NNW9	NNW7	NNW4	WNW10	NW12	NW11	NW9	NW7	NNW4	N4	NW6	NW6.4	NW12	
22-Jun	NNW7	NW6	W5	N3	NW6	NNW3	NW3	WNW4	N6	NW9	NNW8	NNW9	NNW10	NNW13	NNW14	NNW15	NNW15	NNW13	NNW14	N12	NNW9	NNE5	NW3	N4	NNW7.8	NNW15	
23-Jun	N3	NW2	N1	NNW2	NE2	N3	NNW2	N2	N2	SSW2	SSE2	SSW3	SSE7	SSE9	SE12	E6	ESE11	E11	SSE6	SSE8	SE4	SE4	ESE4	SE5	SE3.0	SSE12	
24-Jun	ESE12	SE19	SE22	SE23	SE22	SE23	SE20	SE21	SE15	SE14	SE14	SE15	SSE17	S16	S19	SSE13	SSE15	S16	S18	SSE13	SSE15	SSE17	SSE15	SSE20	SSE16.6	SE23	
25-Jun	SSE22	SE17	SE17	SE16	SE15	SE18	SE12	SSE18	SSE15	SE18	SE18	SE18	SE19	SE18	S20	SSE6	SSE11	WSW20	N3	ENE2	SE4	S6	S6	ESE5	S3	SSE11.3	SSE22
26-Jun	S4	SSW3	SE3	SE3	ESE5	SE4	SE3	W2	W8	W9	W9	W9	W8	S9	SSW10	NNE4	WNW2	WNW9	NNW11	NNW7	NNW7	NNW6	NW5	NW6	W2.5	NNW11	
27-Jun	NW5	NNW2	NNW3	N2	ENE2	W0	SE4	SE5	SE6	ESE2	NNE2	SSW3	WSW6	ESE13	NNE3	NNW2	NNW12	NNE12	NNE10	N8	NW5	NNW6	WSW1	N3	NNE2.1	ESE13	
28-Jun	N1	ENE0	NNW3	NW2	E0	NNE1	ESE2	E1	SW3	SW4	W8	W9	WNW4	N8	N12	NNW11	NNW11	NNW12	NW11	NNW12	NNW6	NNW7	NNW7	N5	NNW4.7	N12	
29-Jun	WSW1	NW3	NW5	NW7	NNW3	ESE1	N4	NNW5	NNW11	NNW12	NNW14	NNW21	N22	N24	N27	N24	NNW26	NNW25	NNW22	NNW18	NNW14	NNW13	NNW11	NNW11	NNW13.1	N27	
30-Jun	NNW10	N5	NNW6	NNW5	NNW4	NNW5	NNW9	NNW11	N14	NNW14	NNW13	NNW14	N16	NNW16	N17	N15	N16	N15	N14	N12	NNW8	N7	NW3	NNW1	NNW10.3	N17	

SE2.0 SE2.4 ESE2.7 ESE3.5 ESE3.2 ESE3.5 ESE2.9 SE2.9 SE2.3 SE2.2 ESE1.9 ESE1.9 ESE2.6 SE2.5 ESE1.2 ENE1.7 NNE2.4 NNE2.8 NNE2.0 NE1.3 ESE1.0 SE1.0 SSE1.7 SSE0.9	Diurnal Average
SSE22 SE19 SE22 SE23 SE22 SE23 SE20 SE29 SE21 N18 N23 N25 N22 N24 N27 N24 NNW27 N29 NNW22 SSE22 SSE21 SSE24 SSE24 SE20	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on Jun 25 16:00	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 Jun 29 06:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 8	

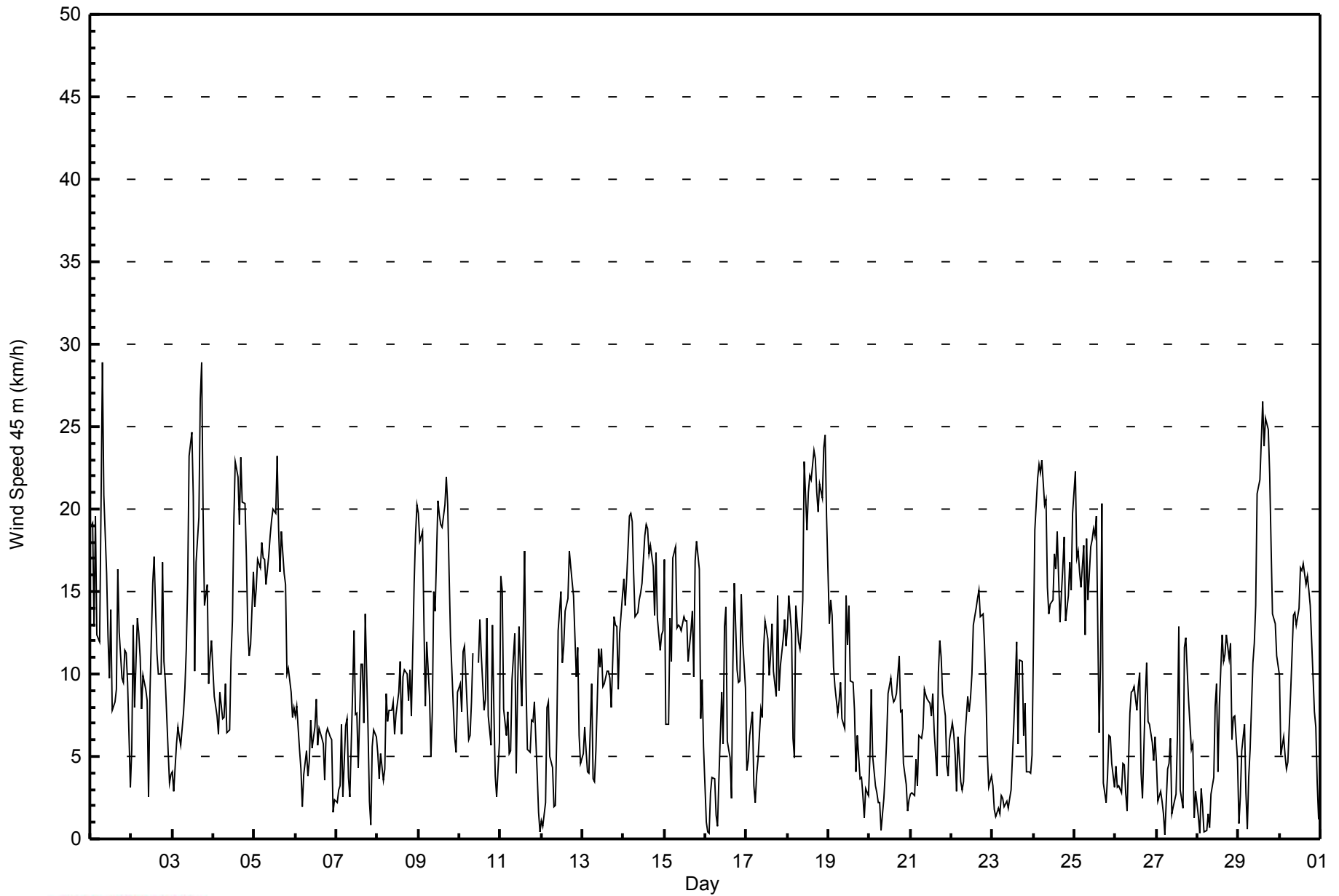
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	4	5	6	6	5	5	7	6	5	5	4	4	5	3	3	3	6	4	3	6	3	3	4	2	7
2-Jun	3	4	3	3	3	4	4	2	2	2	2	5	6	7	5	5	7	10	5	4	2	2	1	1	10
3-Jun	2	2	2	2	2	2	2	3	3	5	6	7	6	4	4	5	8	9	6	6	5	3	4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

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	186	25.91	25.91
6 - 11	261	36.35	62.26
12 - 19	213	29.67	91.92
20 - 28	56	7.80	99.72
29 - 38	2	0.28	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 718

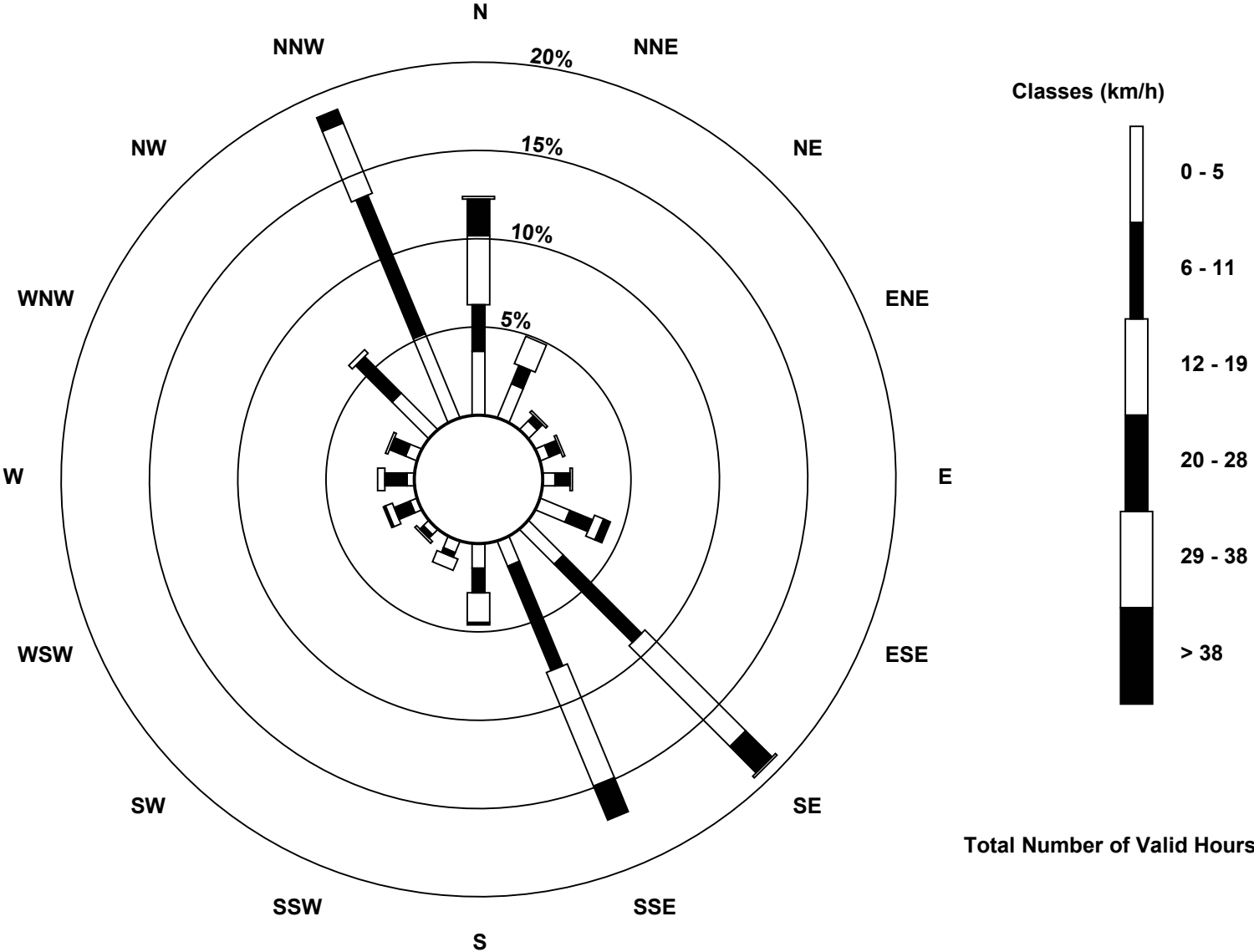
Total Number of Hours: 720

Wood Buffalo Environmental Association

Wind Rose Jun 2014

Wind Speed 45 m (WS45m) - km/h

Lower Camp Met Tower (AMS 3)



Total Number of Valid Hours: 718



Wood Buffalo Environmental Association
Summary of Hour Averages

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

Maximum Speed: 41 km/h on Jun 3 18:00	Maximum Daily Speed Average: 22.4 km/h on Jun 18	Hours in Service: 720
Minimum Speed Value: 1 km/h on Jun 16 08:00	Minimum Daily Speed Average: 1.8 km/h on Jun 2	Hours of Data: 664
Maximum Diurnal Speed Average: 5.8 km/h at hour 18	Minimum Diurnal Speed Average: 0.4 km/h at hour 24	Hours of Missing Data: 56
Monthly Average Velocity: 2.3 km/h 76.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 8 Median = 13 Q ₃ = 19 P ₉₀ = 26 P ₉₉ = 35	Percent Operational Time: 92.2

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-Jun	SE29	SE28	SE23	SE30	SE24	SE21	SE31	SSE41	SE32	SE27	SE21	SE16	SE19	SSE9	SSE9	SSE10	S19	SSW16	SW11	WNW17	SSE11	SSE16	S12	SSE8	SSE18.2	SSE41	
2-Jun	SSE12	S14	SSE11	S10	S11	SSE9	SSW8	S7	S6	S5	WSW3	WSW11	W21	W22	WSW15	WNW12	NE17	N16	NNE25	N20	N16	N12	N8	N8	WNW1.8	NNE25	
3-Jun	NNW12	N11	N12	NNE11	N12	N10	N9	N11	N14	N19	N30	N32	N30	N16	N22	N27	N37	N41	N30	NNE24	N22	NNE15	NNW16	NNW18	N19.6	N41	
4-Jun	NNE12	NNW12	N11	N10	N13	N12	N11	NNW14	NNW10	NNW9	N16	N18	N26	N31	N30	N27	N32	NNE29	N29	N25	NNE18	N17	N18	N23	N18.7	N32	
5-Jun	N22	N22	N24	N24	N26	N24	N24	N22	N24	N26	N26	N27	N27	N31	N25	N23	N27	N22	N22	NNW15	N16	NNW13	NNW12	NNW13	N22.1	N31	
6-Jun	NNW13	NNW13	NNW9	NNW7	NNW4	NNW5	N6	NNW5	NW6	W8	N8	NNE8	N11	NNW8	N9	NNE8	N8	NNE6	NE9	ENE12	E13	ESE16	SE10	ESE11	NNE5.2	ESE16	
7-Jun	ESE10	SE10	SE9	SE15	ESE5	NE4	N10	NNW5	N3	NNW11	NNW16	N11	ENE10	SW3	W12	WNW13	NW9	WNW17	NW8	N4	NNW3	NW6	SW12	SW15	NW2.3	WNW17	
8-Jun	SW7	SSW3	SSW4	SW5	SSW4	S6	SSE8	SE8	SE8	SSE8	SE6	SSE8	SE9	SE13	SSE8	SE12	SE13	SE14	SSE11	SSE14	SE13	SSE29	SSE33	SE34	SSE10.9	SE34	
9-Jun	SE34	SSE26	SSE22	S15	SSE14	SE21	SE18	SE14	SE15	SE22	SE21	SE30	SE28	SE28	ESE27	ESE31	ESE34	ESE31	ESE25	ESE18	ESE15	E12	ENE8	NE18	SE20.0	ESE34	
10-Jun	NE21	NE16	NE20	NE21	NE17	NNE11	N9	N11	N15	AF	AF	NNE15	NE18	ESE18	NNW9	NNW11	AF	AF	AF	AF	AF	AF	AF	W19	---	NE21	
11-Jun	WSW25	W24	WSW16	SW12	SW10	SW10	SW7	S6	S8	SW6	SSE9	SSE14	S10	SSW14	SE21	SE16	E10	SE7	SSE9	SSE8	SSE9	SSW5	SSW2	S2	SSW6.9	WSW25	
12-Jun	W6	WSW10	WSW8	SSW5	SSW5	S3	E2	SSW1	NNW3	N8	N16	N19	NNE13	NNE16	NNE19	NE21	NNE24	NNE23	NNE22	NNE21	NNE18	NE26	NE17	ENE7	NNE9.7	NE26	
13-Jun	SE12	ESE15	ESE12	SE10	SE8	SE19	ESE7	SE4	SSE6	SE15	SSE13	SSE14	SSE10	SSE12	SSE13	SE12	SE12	SE11	SE18	SSE16	SSE18	SE22	SE27	SSE27	SE13.5	SE27	
14-Jun	SSE27	SE24	SE29	SE34	SE33	SE31	SSE24	SSE16	SSE17	SSE18	SSE18	SSE20	SSE24	SSE24	SSE23	S19	S19	S18	SSW16	SSW21	SSW17	SSW16	SSW17	SSW17	SSE20.0	SE34	
15-Jun	SSE23	SSE14	SE10	SE19	SE16	SSE20	SSE19	SE19	SE15	SE15	SSE17	SE17	SE18	SE18	SE13	SSE15	SE18	SSE12	SE23	SE29	SE29	SE18	SSE15	SSE14	SSE17.6	SE29	
16-Jun	SSE15	SSE2	SE11	SE9	E2	NNE2	NE2	SW1	SSE6	SSE12	SSE8	SSE16	SSE17	ESE6	W6	E5	ENE16	ENE22	ENE17	E18	SE16	SW24	SW18	WSW14	SE6.5	SW24	
17-Jun	SW8	SSW5	SSE7	SSE7	S5	SSW4	ESE4	SE8	SSE11	SSE11	SE17	SE19	SE17	SE13	SSE14	SSE16	SSE13	S10	SSW17	SSE10	S14	S15	S17	S16	SSE10.7	SE19	
18-Jun	SSE18	SSE17	SSE15	SSE14	SE14	SSE23	SSE18	SSE16	SSE15	SSE16	SSE26	SSE24	SSE26	SSE25	SSE30	SSE29	SSE26	SSE27	S22	SSE23	SSE27	SSE31	SSE32	SSE27	SSE22.4	SSE32	
19-Jun	SSE18	SSE21	SSE21	SSE18	SSE16	SSE14	SSE13	SE14	SSE11	SSE9	SE21	SE17	SE21	SE13	SE14	SE11	ESE7	ESE9	ESE7	NNE3	N4	NW3	NNW4	NNW6	SE10.6	SSE21	
20-Jun	NNW11	N16	N10	NNW9	N10	N8	N3	ENE2	SSE6	E7	SE9	SE11	SE13	SE12	SE12	SE14	SE16	SE17	SSE12	SSE11	S5	WSW4	W6	WNW6	SE3.4	SE17	
21-Jun	NNW4	NNW6	N6	NNE9	NE8	N9	NNW10	N11	N15	NNW14	NNW13	NNW12	NNW11	NNW12	NNW9	NNW6	WNW15	NW18	NW18	NW16	NW15	NW11	NNW10	NNW11	NNW10.4	NW18	
22-Jun	NNW13	N10	WNW9	W8	W13	WNW7	NW4	WNW4	NNW6	NNW10	NNW10	N12	NNW12	NNW15	NNW19	NNW19	NNW20	NNW18	N20	N17	N15	NE10	NE9	NNE7	NNW10.4	NNW20	
23-Jun	NNE6	N7	NNW7	NW4	NW2	WNW6	NW3	NW3	NNW4	W1	SSE2	SW2	SSE10	SE12	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	SE12	
24-Jun	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-Jun	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SSE23	SSE10	SSE16	WSW28	N3	W1	SSE6	S11	SSW9	SSW5	SW7	---	WSW28
26-Jun	SSW6	SSW6	SSW4	S4	S4	SSE4	SSE2	W2	W9	W9	W11	W11	W10	SSW12	SSW13	NNE2	WNW1	NW12	NNW16	N13	N12	N10	N9	NNW12	WNW3.9	NNW16	
27-Jun	N8	N3	NNW5	NNW6	N6	E2	SE8	SE6	SE6	ESE1	N2	WSW3	WSW6	ESE16	ENE6	N4	N15	NNE18	NE16	NNE13	N6	NNW11	NNW8	N11	NNE4.5	NNE18	
28-Jun	N8	ENE2	NNW3	NNW7	NNW4	SW1	E1	NNE2	W2	WSW4	W10	W10	NW6	NNW11	N17	NNW14	NNW14	NNW17	NNW17	N19	NNE12	NNW14	NNW17	NNW14	NNW8.3	N19	
29-Jun	NNW13	NNW12	NNW17	NNW17	NNW12	NW6	NW8	NNW10	N15	N17	N21	N30	N31	N35	N37	N34	N36	N35	N32	N30	NNW27	NNW27	NNW24	NNW21	N22.4	N37	
30-Jun	NNW22	NNW17	NNW17	NNW14	NNW10	NNW13	NNW16	N17	N18	NNW17	NNW17	NNW20	N23	N22	N22	N22	N22	N22	NNE21	N19	N13	N11	N9	N6	N16.6	N23	

SE2.1 ESE1.6 ESE1.9 ESE2.9 ESE2.6 SE2.8 ESE2.6 ESE2.2 ESE1.7 ESE1.8 ENE2.1 ENE3.0 E3.9 E3.5 ENE2.8 ENE3.6 NNE4.5 NNE5.8 NNE5.6 NE4.8 ENE3.1 E1.8 SE1.4 W0.4	Diurnal Average
SE34 SE28 SE29 SE34 SE33 SE31 SE31 SSE41 SE32 SE27 N30 N32 N31 N35 N37 N34 N37 N41 N32 N30 SE29 SSE31 SSE33 SE34	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 14 km/h on Jun 25 16:00	Hours of Data: 664
Minimum Value: 1 km/h on Jul 1 00:00	Hours of Missing Data: 56
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 11	Hours of Calibration: 0
	Percent Operational Time: 92.2

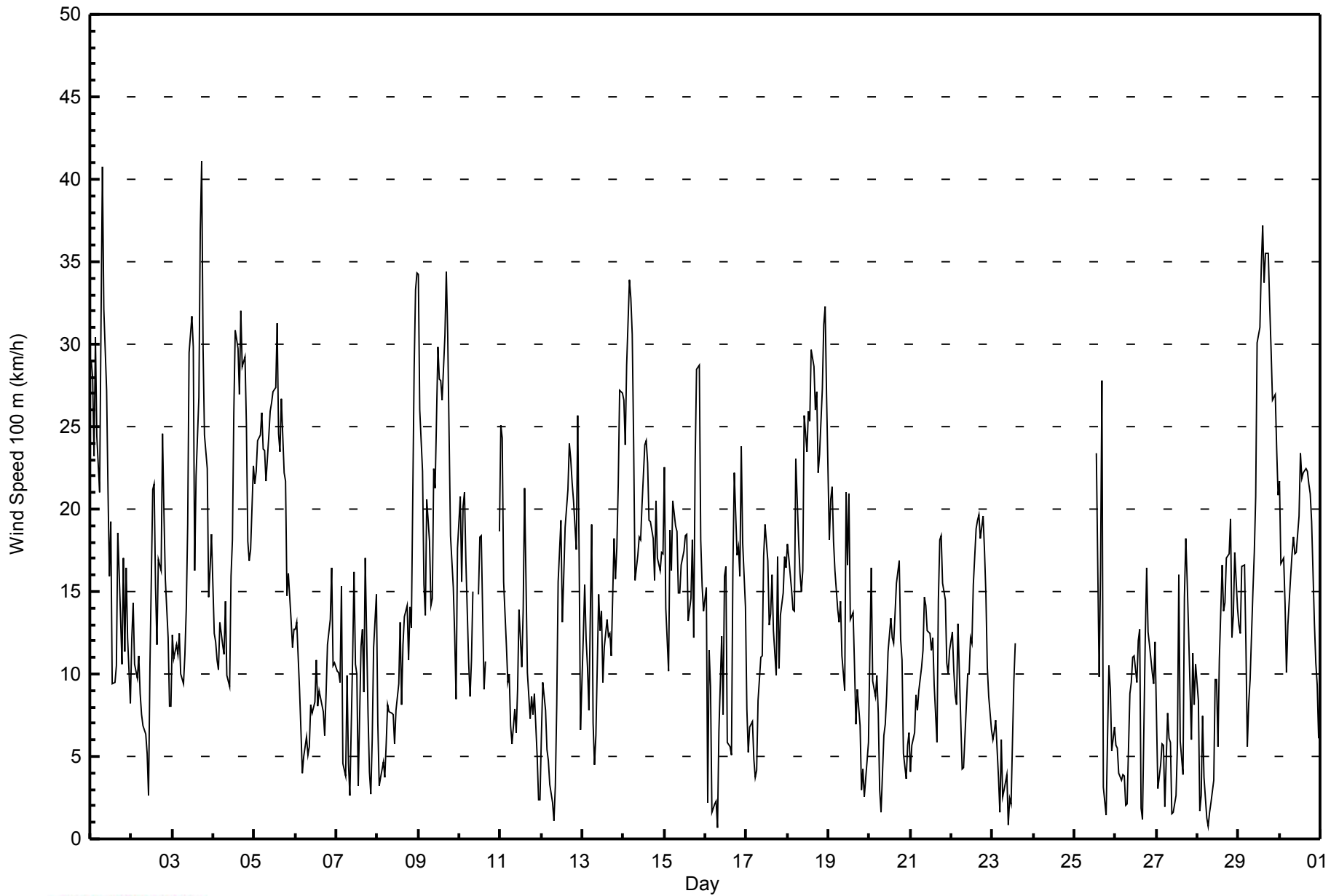
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	4	4	7	5	4	5	6	4	4	4	3	5	4	3	4	3	7	5	4	8	6	3	6	3	8
2-Jun	3	3	2	2	2	5	3	2	2	2	2	5	5	8	4	7	7	12	5	4	2	2	1	2	12
3-Jun	3	2	2	2	2	3	2	2	2	5	4	4	5	4	3	5	7	7	6	6	4	3	5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

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

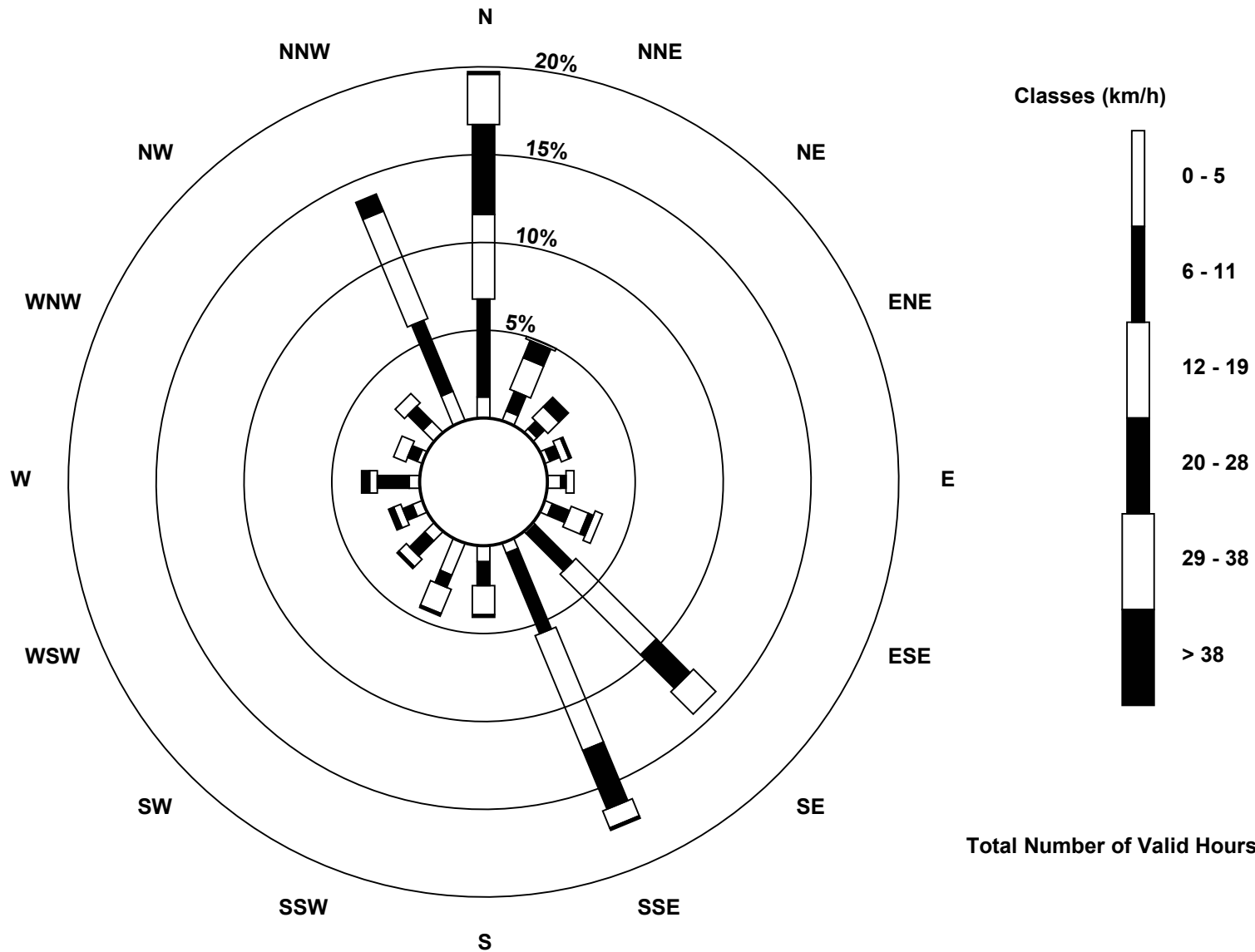
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	81	12.20	12.20
6 - 11	194	29.22	41.42
12 - 19	239	35.99	77.41
20 - 28	106	15.96	93.37
29 - 38	42	6.33	99.70
> 38	2	0.30	100.00

Total Number of Valid Hours: 664

Total Number of Hours: 720

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

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



Total Number of Valid Hours: 664



Wood Buffalo Environmental Association
Summary of Hour Averages

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

Maximum Speed: 45 km/h on Jun 3 18:00	Maximum Daily Speed Average: 27.0 km/h on Jun 24	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 26 16:00	Minimum Daily Speed Average: 1.6 km/h on Jun 7	Hours of Data: 715
Maximum Diurnal Speed Average: 5.6 km/h at hour 18	Minimum Diurnal Speed Average: 1.9 km/h at hour 24	Hours of Missing Data: 5
Monthly Average Velocity: 3.0 km/h 107.2 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 10 Median = 16 Q ₃ = 23 P ₉₀ = 30 P ₉₉ = 39	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-Jun	SE35	SE34	SE28	SE35	SE33	SE27	SE38	SE43	SE37	SE31	SE23	SE17	SE20	SSE10	SSE9	SSE10	S21	SSW20	SW12WNNW23	SSE8	SSE18	S13	S11	SSE20.6	SE43	
2-Jun	S17	SSW13	SSW10	SSW8	SSW11	SSW9	SW11	SW13	SW11	SW8	WSW6WSW13	W23	W24WSW17WNNW14	NE16	N19	NNE26	N25	N17	NNE14	NE12	NE12	W3.7	NNE26			
3-Jun	NE11	ENE9	ENE9	NE13	NNE18	NNE14	N11	N12	NNE13	N19	N29	N32	N30	N17	N22	N26	N40	N45	N34	UO	NNE27	NNE19	NNW18	NNW22	N20.1	N45
4-Jun	NNE15	N13	N13	NNW12	N15	N14	N13	N17	NNW13	NNW12	NNW18	N19	N27	N32	N30	N28	N33	NNE30	N31	N27	NNE20	N20	N20	N25	N20.4	N33
5-Jun	N24	N25	N27	N28	N29	N26	N26	N24	N26	N28	N27	N28	N28	N32	N26	N26	NNW29	N25	N23	NNW18	N18	N14	N14	NNW16	N24.2	N32
6-Jun	NNW16	NNW14	N10	NNW7	NNW7	NNW7	NNW7	NNW6	NW6	W8	N9	N8	NNW12	NNW9	N9	NNE8	N8	NNE7	NE8	ENE13	E14	ESE18	SE16	SE15	NNE5.6	ESE18
7-Jun	SE17	SE17	UO	SE18	SE12	SE5	NNW4	WNNW5	NW2	NNW11	NNW17	NNE11	ENE10	SW3	W12WNNW13	NW9WNNW17	NW9	N6	NNW6	NNW7	SW9	SW20	WNNW1.6	SW20		
8-Jun	SW13	SW5	SW3	WSW8	WSW8	SW8	SSW6	S5	SSE5	SSE6	SSE4	SSE7	SE8	SE13	SSE8	SE11	SE14	SE15	SSE12	SSE17	SE21	SE34	SSE34	SSE39	SSE10.9	SSE39
9-Jun	SSE39	SSE28	S22	S19	S12	SE22	SE23	SE21	SE18	SE27	SE25	SE31	SE30	ESE30	ESE30	ESE34	ESE38	ESE35	ESE28	ESE22	ESE20	E17	E11	NE17	SE22.4	SSE39
10-Jun	NE23	NE20	NE29	NE29	NE26	NE14	N11	N12	NNW15	AF	AF	NNE16	NE19	E22	NNW9	NNW12	NNE20	UO	WSW5WSW13	W14WNNW15	WNNW15	W25	NNE9.9	NE29		
11-Jun	W32	W28	W27WSW17	WSW16	WSW16	SW12	SW10	SW12	SW13	SSW7	SSE12	S10	SW17	SE21	ESE17	E9	ESE8	S10	S8	S8	SW10	WSW9	W7	SW9.2	W32	
12-Jun	WNNW11	W15	W6	SW7	SW10	SW10	SW4	WSW2	NW4	N9	N15	N20	NNE13	NNE17	NNE19	NE21	NNE25	NNE24	NNE23	NNE23	NE25	NE34	ENE25	E12	NNE10.1	NE34
13-Jun	SE19	ESE20	SE17	SE17	SE14	SE23	ESE10	ESE6	SE7	SE15	SE13	SSE14	SSE10	SSE12	SSE13	SE13	SE13	SE12	SE18	S18	SSE22	SE30	SSE32	SSE28	SE16.0	SSE32
14-Jun	SSE26	SSE27	SSE31	SSE35	SE37	SE35	SSE24	SSE16	SSE16	SSE17	SSE19	SSE21	SSE24	SSE25	SSE23	S22	S23	S21	SSW20	SSW25	SSW24	SSW28	SSW30	SW30	S22.6	SE37
15-Jun	S22	S17	S11	SSE18	SSE18	SSE18	S16	SE18	SE14	SE15	SSE16	SE18	SE19	SE19	SE14	SSE15	SE18	SSE13	SE24	SE29	SE30	SE28	SSE17	SSE16	SSE18.0	SE30
16-Jun	SSE16	S8	SE14	SE16	SE9	SE8	SSE4	SSE8	SSE11	SSE12	SSE9	SSE16	SSE16	E5	W5	E6	ENE18	ENE24	ENE21	ESE22	SE18	SW30	SW22WSW18	SE8.8	SW30	
17-Jun	SW11	SSW7	S7	S8	SSW8	SSW4	E3	SSE11	SSE13	SSE12	SE18	SE20	SE18	SE13	SSE14	SSE16	SSE13	S12	SSW19	S13	SSW18	S19	S25	S23	SSE12.1	S25
18-Jun	S21	S18	S17	SSE16	SSE15	SSE24	SSE18	SSE17	SSE14	SSE17	SSE26	SSE24	SSE27	SSE27	SSE31	SSE29	S29	SSE28	S26	S25	SSE29	SSE35	SSE35	SSE29	SSE23.9	SSE35
19-Jun	SSE21	SSE22	SSE20	SSE15	SSE15	SSE14	SSE13	SE18	SSE11	SSE10	SE23	SE17	SE22	SE14	SE15	SE11	ESE8	ESE11	ESE8	NE3	N3	N3	NE7	NNE9	SE11.1	SE23
20-Jun	NNE12	NNE21	NNE13	NNE7	NNE8	NNE9	NNE4	NE2	SSE10	ESE8	SE9	SSE12	SE14	SE13	SE13	SE16	SE17	SE18	SSE14	SSE13	SSW9	SW8	W10	W10	ESE5.0	NNE21
21-Jun	NW6	NW9	N9	NE14	NE14	NNE14	N12	N14	N16	N15	N15	NNW16	NNW15	NNW15	NNW11	NW9WNNW16	NW21	NW23	NW20	NW19	NW15	NNW14	NNW15	NNW13.0	NW23	
22-Jun	NNW18	N13	NW10	W14	W18WNNW12	NW6	WNNW6	NW7	NNW11	NNW11	N14	NNW13	NNW17	NNW20	NNW21	NNW19	N21	N18	N17	ENE13	NE16	NE8	NNW11.8	NNW21		
23-Jun	ENE5	NNE3	NNW5	NW7	WNNW4	WNNW8	NW5	N7	N7	N1	SE2	SSW2	SE10	SE11	SE16	E9	ESE19	E23	SE14	SE17	SSE11	SSE9	SSE11	SE15	ESE5.1	E23
24-Jun	SE27	SE36	SSE38	SE40	SE41	SE41	SE38	SE36	SE23	SE20	SE20	SE21	SSE21	S21	S23	SSE20	S20	S22	S24	SSE21	SSE26	SSE25	SSE31	SSE30	SSE27.0	SE41
25-Jun	SSE35	SSE29	SSE34	SE33	SSE30	SSE32	SSE21	SSE25	SE24	SE26	SE27	SE27	SE27	SSE27	SSE26	SSE14	SSE21WSW33	W3	WS5	SSE8	S11	SSW12	SSW9	SW11	SSE19.0	SSE35
26-Jun	SW8	SW6	SSW6	SSW5	SW4	S3	SW2	W3	W8	W9	W12	W12	W11	SSW14	SSW13	W0	WSW2	NW12	NNW16	N14	N15	NNE15	NE8	N6	WNNW3.6	NNW16
27-Jun	N8	ENE6	ESE3	W3	W2	ESE4	SE8	SE7	S6	SSW1	NW1	WSW3	W5	E14	ENE8	N6	NNW16	NNE20	NE16	NNE14	N5	NNW11	NNW12	N15	NNE4.4	NNE20
28-Jun	NNE12	ENE9	ENE2	WNNW3	NNW6	WNNW5	SW5	WNNW1	WNNW2	WNNW3	WNNW10	WNNW9	NW7	NNW11	N17	NNW14	NNW15	NNW18	NNW19	N21	NNE16	N19	N24	N18	NNW9.4	N24
29-Jun	N17	N16	N21	N25	N19	N11	NW12	N13	N18	N19	N23	N33	N33	N37	N40	N36	N38	N39	N36	N35	NNW32	NNW34	NNW31	NNW27	N26.5	N40
30-Jun	NNW28	NNW25	NNW25	NNW23	NNW19	NNW21	NNW22	N20	N19	NNW19	NNW19	NNW22	N25	N23	N23	N24	N23	N22	NNE22	N21	N19	NNE19	NNE14	NNE9	N20.4	NNW28

SE4.3	SE4.1	SE3.8	SE5.0	SE4.6	SE5.0	SE3.4	SE3.8	SE2.8	ESE2.9	ESE3.0	E3.9	E4.4	ESE3.5	E2.7	ENE3.9	NE4.4	NE5.6	NE4.4	NE3.2	E3.3	ESE3.0	SE2.9	S1.9	Diurnal Average
SSE39	SE36	SSE38	SE40	SE41	SE41	SE38	SE43	SE37	SE31	N29	N33	N33	N37	N40	N36	N40	N45	N36	N35	NNW32	SSE35	SSE35	SSE39	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 14 km/h on Jun 25 16:00	Hours in Service: 720 Hours of Data: 715 Hours of Missing Data: 5 Hours of Calibration: 0 Percent Operational Time: 99.3
Minimum Value: 1 km/h on Jun 19 21:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P 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-Jun	3	3	7	5	4	6	6	4	3	4	4	5	4	3	4	2	8	5	3	8	6	3	3	4	8
2-Jun	3	3	2	2	2	3	4	3	2	2	3	5	5	7	4	7	8	12	6	4	2	2	2	2	12
3-Jun	2	1	3	2	3	4	2	2	3	4	3	4	4	4	3	5	7	6	6	UO	5	4	5	4	7
4-Jun	3	3	4	2	3	3	3	1	2	3	3	4	5	4	5	5	5	5	5	4	4	5	4	4	5
5-Jun	4	6	4	4	5	5	5	4	4	5	4	5	5	5	6	7	6	5	8	3	3	2	2	1	8
6-Jun	1	2	1	1	1	1	2	2	2	3	3	3	4	4	3	4	3	4	3	1	1	1	2	3	4
7-Jun	2	2	UO	5	5	3	2	1	1	5	3	3	4	2	5	3	5	4	4	2	2	2	5	2	5
8-Jun	3	2	1	2	1	2	1	1	1	2	2	3	4	4	3	4	3	3	3	4	4	3	4	3	4
9-Jun	3	6	5	4	3	6	2	6	6	4	5	5	5	6	7	6	6	7	6	5	3	3	2	1	7
10-Jun	3	4	3	1	2	5	3	2	4	AF	AF	6	6	13	8	5	9	UO	4	3	1	3	2	4	13
11-Jun	2	2	3	4	3	4	3	3	4	3	2	3	5	5	6	10	9	6	4	3	1	2	1	1	10
12-Jun	3	2	4	2	2	3	2	2	2	4	3	4	4	4	5	5	4	5	4	3	5	1	9	5	9
13-Jun	5	4	4	3	3	5	3	3	3	4	4	5	3	4	4	4	3	3	4	3	4	4	3	4	5
14-Jun	4	3	3	3	2	3	4	3	3	3	5	5	6	6	6	5	6	4	3	6	4	4	7	9	9
15-Jun	3	4	5	4	3	3	3	3	2	2	5	5	5	5	7	5	4	4	4	2	2	3	4	3	7
16-Jun	3	2	5	3	1	2	2	3	4	5	2	3	4	6	3	5	5	5	5	2	5	6	5	4	6
17-Jun	3	2	2	2	2	1	2	3	3	3	3	3	3	4	4	3	3	3	8	3	3	4	2	5	8
18-Jun	3	1	1	4	3	5	3	4	2	4	5	5	5	6	7	4	5	6	4	4	4	4	4	6	7
19-Jun	5	4	3	2	3	3	3	1	3	3	3	3	4	5	5	4	2	6	4	2	1	2	2	1	6
20-Jun	4	2	3	1	1	1	1	4	4	2	3	3	3	5	5	3	2	2	4	4	3	2	2	2	5
21-Jun	1	1	2	4	4	4	1	1	1	1	1	2	2	2	3	1	4	2	4	2	3	2	1	2	4
22-Jun	2	4	2	2	3	2	2	2	3	2	4	2	2	3	4	4	3	3	3	3	2	2	3	2	4
23-Jun	1	1	1	1	2	1	2	1	2	1	2	2	4	3	3	3	8	4	4	3	4	2	2	2	8
24-Jun	4	4	4	3	2	3	2	3	4	3	3	4	4	4	4	5	4	4	5	4	7	5	4	5	7
25-Jun	4	4	2	2	3	3	3	4	3	3	4	4	4	4	5	8	14	11	4	2	2	2	3	4	14
26-Jun	3	1	1	2	2	1	1	2	3	2	3	3	2	12	9	1	3	2	3	1	1	1	2	3	12
27-Jun	2	1	3	1	1	2	2	1	1	1	1	2	2	11	2	1	9	5	4	4	2	2	1	1	11
28-Jun	3	3	3	2	2	1	2	1	2	2	4	3	3	4	4	3	3	3	2	2	3	3	1	2	4
29-Jun	1	1	1	2	4	2	3	2	3	3	4	7	6	7	7	6	6	5	5	4	2	2	2	1	7
30-Jun	2	2	2	1	2	2	2	3	2	3	3	5	5	4	4	4	4	3	3	3	1	2	3	2	5

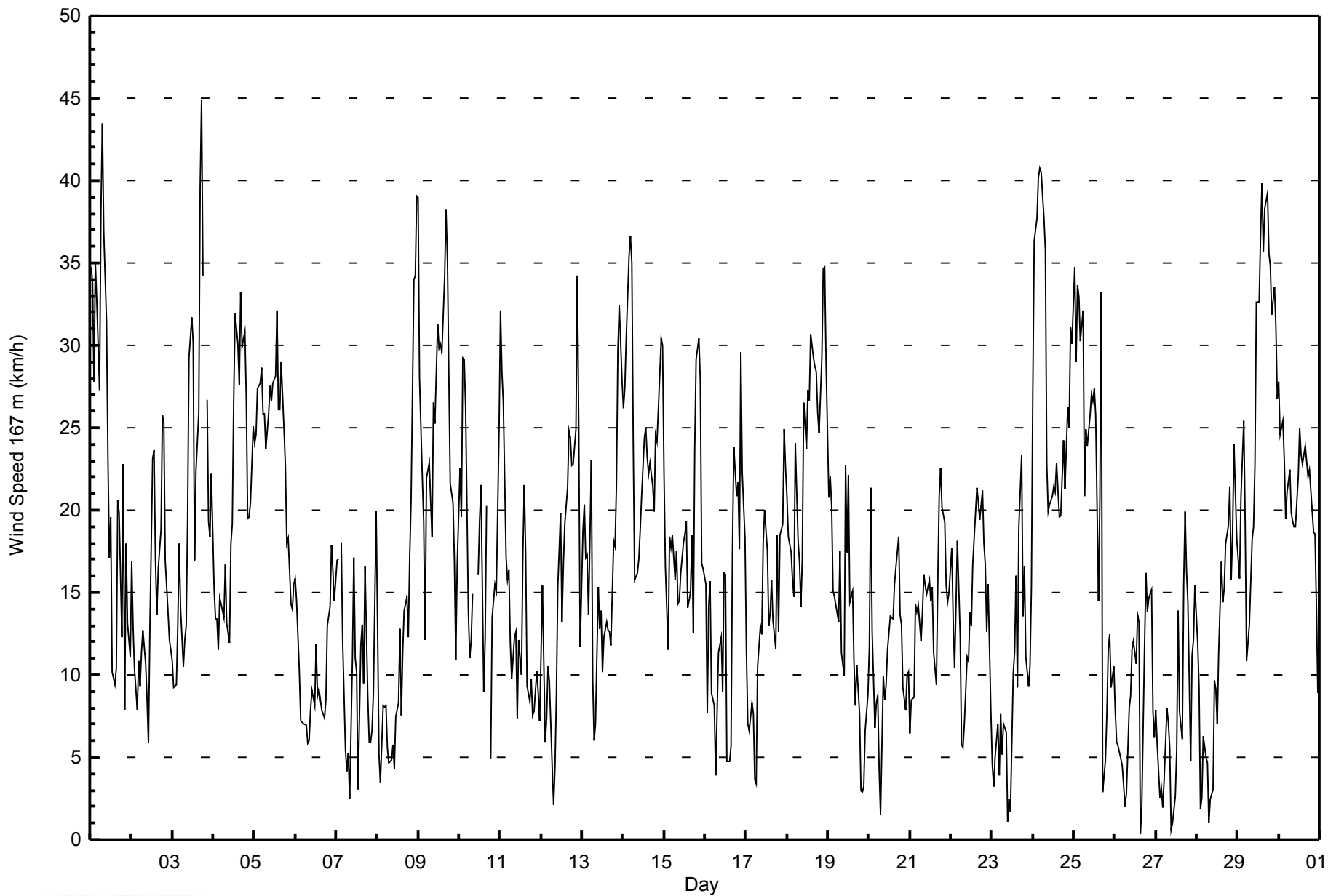
5	6	7	5	5	6	6	6	6	6	5	5	7	6	13	9	14	11	12	8	8	7	6	9	9	
Diurnal Maximum																									

AF - Analyzer Failure UO - Unstable Operation



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

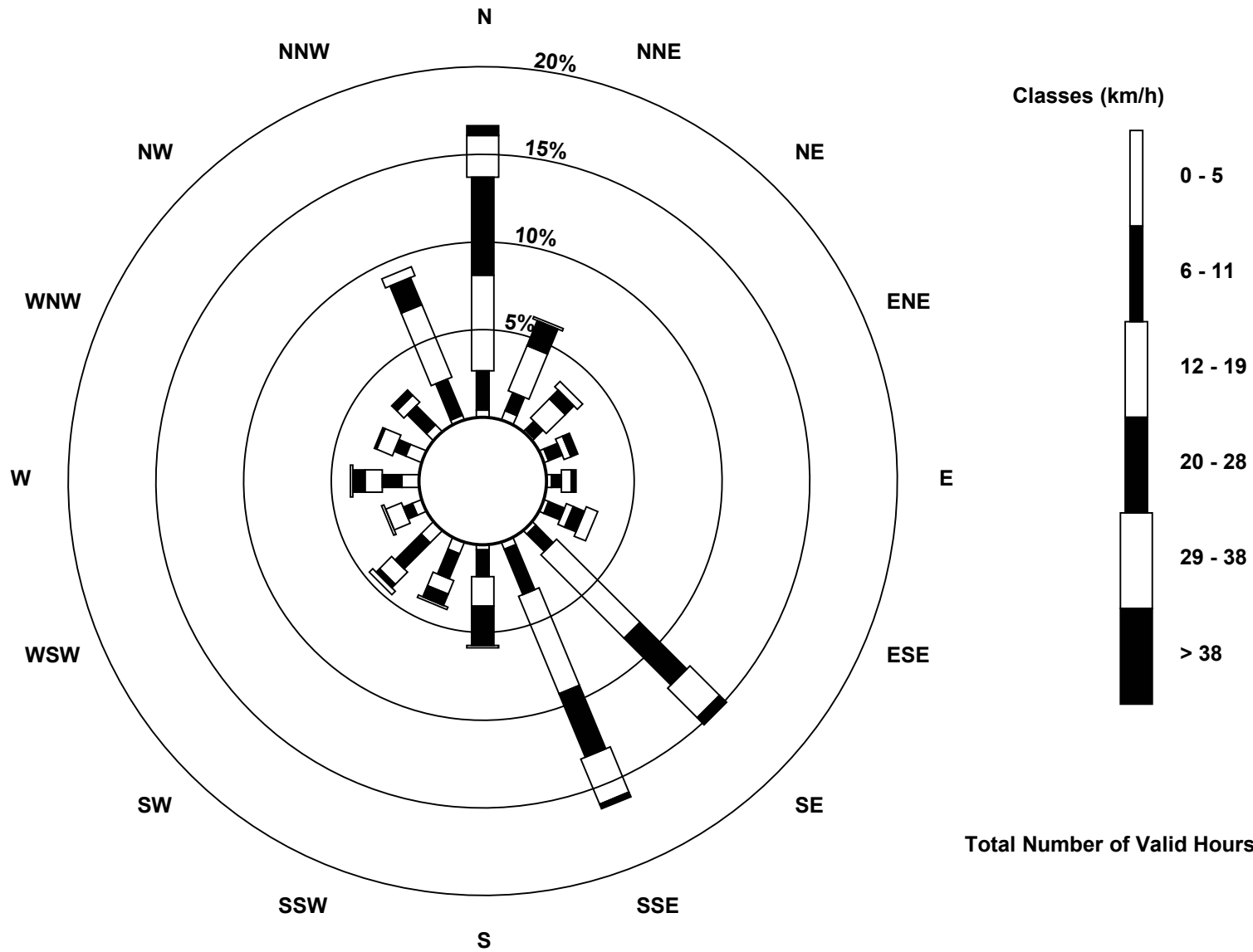
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	57	7.97	7.97
6 - 11	157	21.96	29.93
12 - 19	253	35.38	65.31
20 - 28	165	23.08	88.39
29 - 38	73	10.21	98.60
> 38	10	1.40	100.00

Total Number of Valid Hours: 715

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 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 - June 2014

Direction of Maximum Speed: 145 deg on Jun 1 08:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 158.4 deg on Jun 18	Hours of Data: 718
Direction of Minimum Speed: 16 deg on Jun 16 02:00	Direction of Minimum Daily Speed Average: 1.2 deg on Jun 2
Direction of Minimum Daily Speed Average: 1.2 deg on Jun 2	Hours of Missing Data: 2
Monthly Average Direction: 339.4 deg	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	137	132	142	135	132	135	136	145	136	135	142	139	139	147	148	148	166	184	209	291	142	148	146	152	145.6
2-Jun	101	147	142	144	146	131	144	141	132	137	149	249	275	259	239	271	37	343	5	342	345	342	342	313	187.2
3-Jun	333	335	349	353	338	324	342	349	349	339	350	349	354	348	353	351	342	349	340	18	356	356	317	324	346.9
4-Jun	360	325	346	340	3	340	353	330	337	348	342	353	356	354	355	359	358	6	352	1	12	1	356	347	353.8
5-Jun	340	348	359	356	358	347	346	343	349	1	355	359	357	356	348	347	343	342	346	340	346	321	315	315	348.7
6-Jun	328	325	311	305	21	309	349	341	305	255	10	12	341	341	348	14	348	28	30	56	81	97	17	35	350.9
7-Jun	354	85	94	135	325	337	329	344	26	341	335	349	74	221	254	270	303	296	302	290	173	292	190	218	305.9
8-Jun	211	135	130	122	114	123	130	147	145	147	130	136	142	148	162	144	141	148	160	161	164	139	142	134	143.9
9-Jun	134	156	156	160	136	128	125	106	147	135	130	139	136	124	118	113	111	107	107	99	82	72	26	15	125.7
10-Jun	16	10	26	17	14	348	340	349	343	AF	AF	5	48	109	319	327	14	77	242	254	287	307	177	250	357.8
11-Jun	259	261	235	180	140	150	139	135	135	162	137	140	172	186	131	122	54	152	143	148	143	132	1	171	156.6
12-Jun	353	150	137	132	119	122	144	182	318	340	352	356	9	358	21	25	18	18	13	20	7	16	346	20	18.2
13-Jun	32	40	16	345	356	102	74	153	171	140	160	158	174	167	149	149	147	147	144	166	154	156	155	147	145.9
14-Jun	142	147	140	136	133	135	152	162	153	149	158	150	150	155	157	178	179	182	194	203	202	182	172	162	160.8
15-Jun	149	123	107	131	137	150	150	143	152	147	157	144	142	126	151	161	143	159	141	144	137	165	145	123	144.8
16-Jun	335	16	338	352	339	328	303	336	145	153	161	153	157	137	254	130	73	69	68	80	135	206	216	248	148.1
17-Jun	185	181	132	135	124	163	92	147	154	147	137	137	141	141	160	148	160	181	193	142	172	172	169	166	156.7
18-Jun	160	156	153	148	142	152	140	146	152	159	158	157	159	163	151	158	164	162	166	160	163	165	163	157	158.4
19-Jun	143	147	142	146	140	132	147	154	148	146	139	145	141	143	138	150	105	123	48	338	312	336	319	339	140.7
20-Jun	331	344	305	352	335	346	350	102	169	45	144	137	134	152	130	134	145	135	157	156	147	341	347	358	132.8
21-Jun	342	337	25	360	351	328	321	338	329	330	324	325	329	337	340	341	290	304	316	316	317	329	352	323	325.5
22-Jun	334	326	281	358	314	329	310	298	358	322	343	342	337	327	336	335	327	333	347	354	347	13	316	2	335.0
23-Jun	1	323	359	331	42	357	339	4	5	206	167	210	152	151	146	86	117	93	150	152	133	125	105	130	130.7
24-Jun	120	130	135	135	137	136	139	132	132	140	135	146	162	177	174	153	168	171	169	162	159	153	153	150	149.2
25-Jun	155	145	139	135	136	137	141	148	147	137	144	141	137	170	163	165	248	5	72	134	177	190	119	171	150.0
26-Jun	177	194	132	127	109	129	144	271	266	267	274	277	270	179	201	28	287	301	334	342	341	340	322	309	269.3
27-Jun	315	327	332	356	58	261	132	144	138	115	24	201	246	106	32	347	346	14	20	7	320	346	258	351	18.7
28-Jun	1	72	344	312	91	14	115	81	214	229	267	259	303	349	350	339	334	335	324	344	335	346	339	354	326.1
29-Jun	258	319	316	317	339	102	354	343	347	347	344	348	352	352	351	355	347	347	347	338	327	332	341	338	345.2
30-Jun	330	351	333	343	336	336	347	347	349	335	335	338	351	348	349	352	1	358	3	353	334	350	314	341	347.2

139.1	138.4	126.9	122.6	107.9	124.2	121.7	133.2	129.8	136.9	126.0	121.3	121.9	140.5	125.6	94.9	48.6	39.8	41.0	94.0	140.3	160.0	163.0	156.0
Diurnal Average																							

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 107 deg on Jun 20 08:00	Hours in Service: 720 Hours of Data: 718 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7
Minimum Value: 8 deg on Jun 18 02:00	
Percentiles: P ₁ = 10 P ₁₀ = 15 Q ₁ = 19 Median = 25 Q ₃ = 40 P ₉₀ = 69 P ₉₉ = 95	

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	15	15	27	18	25	23	17	13	16	21	20	30	23	32	27	20	18	21	12	62	20	18	44	41	62
2-Jun	49	15	18	14	13	27	59	16	16	17	69	37	25	22	21	45	64	52	28	22	20	37	81	25	81
3-Jun	57	74	52	21	28	31	24	22	18	23	18	18	23	32	20	19	21	21	22	41	25	33	27	23	74
4-Jun	29	28	28	38	23	33	31	21	24	28	25	25	22	22	24	24	22	23	23	23	27	29	28	20	38
5-Jun	22	23	23	24	23	23	23	23	23	26	23	24	26	24	23	26	22	21	24	25	26	15	19	16	26
6-Jun	18	20	18	25	69	31	39	52	67	39	58	43	44	60	66	57	50	93	46	28	23	34	58	77	93
7-Jun	72	70	85	81	73	22	27	41	69	26	22	28	47	70	24	41	47	28	68	82	80	31	49	31	85
8-Jun	53	29	30	56	76	11	18	14	17	16	38	40	35	26	53	28	28	25	15	13	15	18	16	15	76
9-Jun	17	13	20	14	23	19	27	81	81	17	20	17	19	23	20	24	24	24	26	25	29	31	28	26	81
10-Jun	27	40	32	24	28	41	36	27	30	AF	AF	40	38	60	35	38	41	61	30	15	40	60	85	102	102
11-Jun	24	22	42	21	31	37	21	15	14	59	30	19	43	31	28	73	75	77	36	27	9	59	71	73	77
12-Jun	88	72	53	19	15	29	19	38	82	39	25	28	39	39	38	38	32	33	29	24	22	24	59	55	88
13-Jun	46	42	43	36	17	37	61	47	23	22	26	19	28	35	47	30	22	40	15	19	9	13	18	16	61
14-Jun	16	15	18	20	17	19	16	15	15	17	17	18	21	19	19	20	19	18	11	12	10	14	13	17	21
15-Jun	13	56	61	17	17	10	11	19	12	14	22	22	30	27	37	30	18	26	19	16	17	13	14	59	61
16-Jun	101	98	95	25	24	18	79	89	85	25	33	16	16	82	64	78	35	33	31	21	34	15	16	27	101
17-Jun	45	22	24	12	78	90	48	31	20	24	20	19	21	29	23	13	21	23	15	21	16	16	10	14	90
18-Jun	11	8	12	45	67	22	20	17	19	16	14	14	14	13	17	12	13	14	12	9	10	10	9	11	67
19-Jun	16	10	15	15	23	17	17	15	20	21	19	20	20	23	30	23	31	29	38	30	63	86	24	37	86
20-Jun	40	17	16	64	40	62	45	107	79	69	24	23	18	26	25	22	18	16	19	22	58	19	61	44	107
21-Jun	22	37	46	42	67	39	24	25	19	20	20	22	26	20	26	28	25	21	21	19	18	45	37	27	67
22-Jun	21	23	25	46	41	55	52	48	27	23	34	26	24	25	27	26	22	23	22	22	15	23	60	28	60
23-Jun	60	89	78	74	79	37	53	36	77	39	42	26	28	19	19	70	52	35	34	16	63	82	76	29	89
24-Jun	18	15	16	16	15	16	18	17	21	21	22	21	19	15	15	21	15	13	21	16	16	12	14	11	22
25-Jun	10	14	18	17	17	17	19	16	21	20	18	18	20	21	76	70	34	56	40	43	46	18	29	52	76
26-Jun	29	42	52	86	31	21	42	75	31	30	35	32	30	55	49	33	69	31	20	16	17	21	51	20	86
27-Jun	22	39	58	56	44	99	44	17	20	88	79	46	31	78	85	76	19	32	32	28	24	22	84	38	99
28-Jun	94	96	39	70	75	76	72	99	72	56	39	32	77	46	29	29	25	22	15	18	30	13	13	56	99
29-Jun	76	41	16	20	78	87	57	30	23	21	21	22	24	23	22	23	20	19	19	20	17	16	14	16	87
30-Jun	15	32	23	38	22	27	22	25	23	25	24	24	25	21	21	25	23	24	27	21	15	16	50	56	56
	101	98	95	86	79	99	79	107	85	88	79	46	77	82	85	78	75	93	68	82	80	86	85	102	

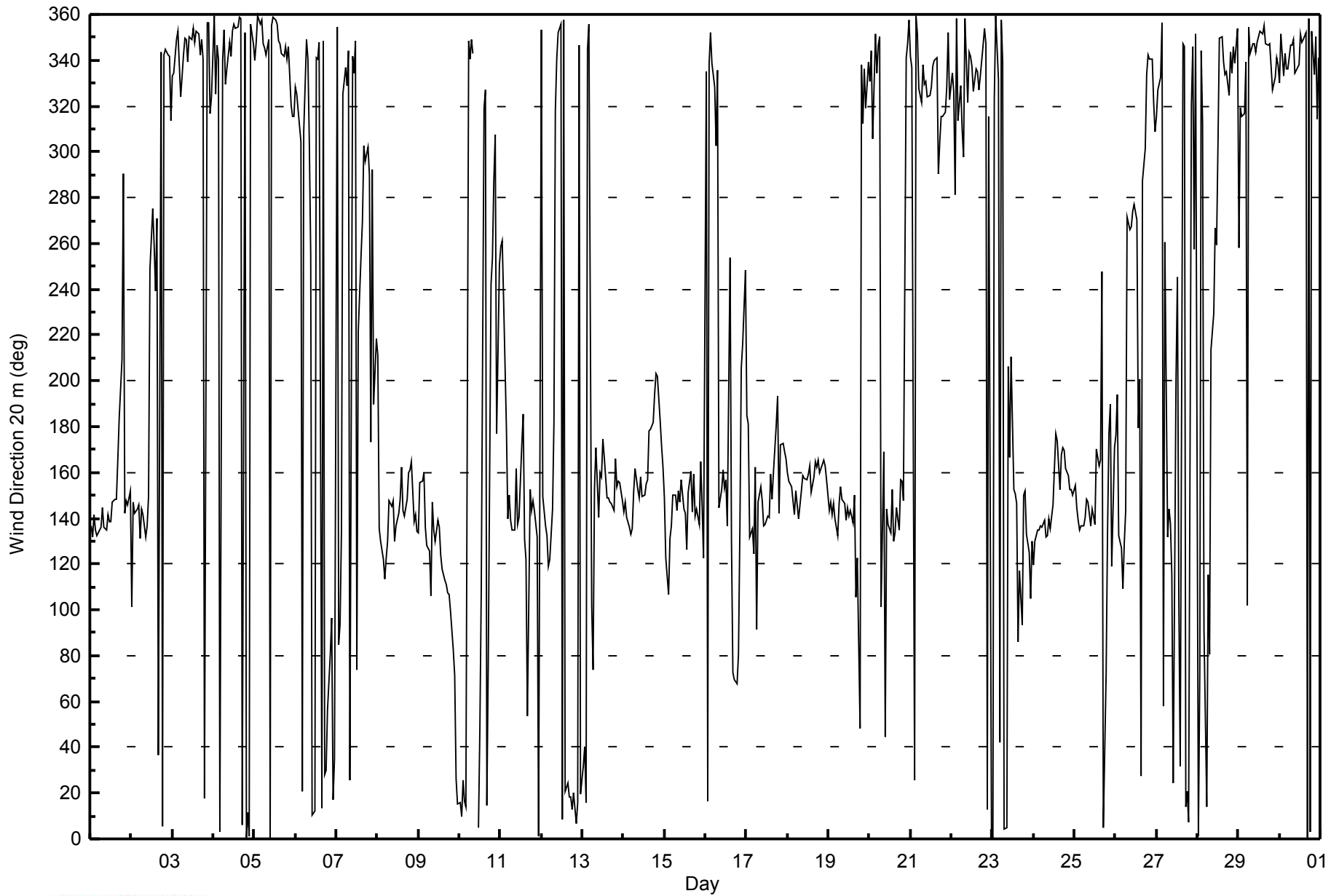
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 146 deg on Jun 1 08:00 Direction of Maximum Daily Speed Average: 159.7 deg on Jun 18	Hours in Service: 720 Hours of Data: 718 Hours of Missing Data: 2
Direction of Minimum Speed: 14 deg on Jun 27 06:00 Direction of Minimum Daily Speed Average: 1.0 deg on Jun 2	Percent Operational Time: 99.7
Monthly Average Direction: 346.5 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-Jun	138	135	141	139	132	136	139	146	138	138	142	138	139	148	149	150	168	188	209	291	145	151	151	149	147.0
2-Jun	123	149	145	146	146	133	148	146	135	138	163	252	277	261	240	275	50	358	15	349	348	356	341	335	178.0
3-Jun	332	345	360	358	349	341	350	356	355	344	356	355	2	354	358	359	348	355	346	21	1	5	321	328	353.1
4-Jun	7	334	353	347	8	345	357	335	342	353	346	360	5	1	2	6	4	13	359	7	18	8	1	354	0.2
5-Jun	345	355	5	2	5	353	351	348	356	8	3	7	6	2	354	355	348	346	354	346	353	331	327	324	355.2
6-Jun	337	335	325	325	16	326	357	348	310	258	4	16	346	346	354	18	357	30	42	61	87	102	72	75	1.3
7-Jun	36	111	102	130	357	350	338	356	30	347	339	355	69	225	259	275	311	299	309	316	201	299	211	222	315.9
8-Jun	220	154	148	144	134	132	132	143	144	147	129	138	143	148	167	143	140	145	161	163	163	139	142	138	145.7
9-Jun	136	156	160	164	141	129	126	111	147	136	133	141	137	125	119	114	114	109	110	102	88	78	44	26	125.6
10-Jun	27	19	35	25	25	358	349	357	347	AF	AF	14	49	110	324	333	19	64	248	253	278	299	246	254	3.5
11-Jun	258	261	243	189	151	169	155	137	140	176	142	143	171	189	131	122	67	145	143	150	144	137	337	178	162.9
12-Jun	314	186	158	147	135	128	140	189	322	350	360	1	10	6	28	31	27	27	24	27	19	27	18	38	26.6
13-Jun	72	75	60	44	44	115	76	144	164	140	157	158	172	163	148	147	147	145	144	166	157	157	147	143	141.9
14-Jun	139	143	138	136	134	137	150	162	152	148	159	148	149	157	158	179	180	183	193	203	201	186	177	169	160.2
15-Jun	150	131	116	135	137	148	150	142	150	146	154	145	142	129	151	160	144	157	142	144	139	161	148	141	144.7
16-Jun	142	12	225	7	353	341	329	319	147	153	158	152	157	128	262	119	76	73	70	86	135	208	218	251	139.5
17-Jun	196	182	138	142	140	196	92	144	153	148	139	138	140	139	159	148	159	182	193	145	174	173	171	167	157.4
18-Jun	162	161	157	147	136	153	139	146	153	160	159	157	160	165	151	160	167	162	169	163	165	167	165	159	159.7
19-Jun	143	146	143	147	141	135	146	151	148	146	141	143	140	144	138	149	111	124	69	350	344	283	314	334	140.4
20-Jun	343	351	326	359	347	8	357	68	167	57	143	140	137	151	132	137	143	136	155	155	152	352	5	336	125.1
21-Jun	358	343	29	9	16	338	331	346	336	335	328	329	333	340	344	347	293	305	319	318	321	326	353	335	331.4
22-Jun	344	337	285	339	306	324	320	303	2	328	348	348	340	330	341	338	329	337	353	3	354	27	346	10	340.3
23-Jun	2	350	357	315	311	354	359	358	3	210	159	212	152	149	146	86	115	91	144	149	131	137	122	132	125.0
24-Jun	126	135	136	137	140	139	141	136	133	139	135	143	161	176	173	151	169	173	168	161	157	153	149	150	148.7
25-Jun	157	143	140	136	139	140	142	148	144	138	144	142	138	169	161	163	251	17	73	137	174	192	139	190	150.8
26-Jun	180	197	145	148	123	129	142	273	268	272	277	278	274	186	204	26	292	303	339	343	343	348	337	327	281.9
27-Jun	335	347	340	351	16	14	138	146	139	107	29	208	252	105	41	336	349	21	28	17	335	346	322	353	20.3
28-Jun	12	51	354	342	30	352	106	62	226	239	271	261	307	351	355	343	337	340	332	348	0	347	347	355	334.4
29-Jun	355	319	343	340	355	328	356	347	353	353	348	353	358	1	357	3	352	351	352	343	336	337	342	340	350.9
30-Jun	336	350	339	349	344	347	347	351	355	338	338	342	356	353	354	358	6	6	13	360	341	350	344	323	352.1
	130.8	132.8	120.7	119.5	109.6	121.4	116.1	126.1	120.1	123.8	108.4	103.2	106.3	123.2	96.0	73.7	38.4	37.5	38.2	55.8	106.1	134.1	155.9	144.9	

Diurnal Average

AF - Analyzer Failure

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 100 deg on Jun 28 05:00	Hours in Service: 720 Hours of Data: 718 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7
Minimum Value: 6 deg on Jun 18 02:00	
Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 14 Median = 19 Q ₃ = 30 P ₉₀ = 56 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-Jun	11	12	22	13	19	15	12	10	11	14	16	24	18	27	25	18	16	19	12	57	20	15	27	33	57
2-Jun	30	12	13	9	8	23	44	13	12	13	62	37	17	16	15	47	38	52	20	16	13	14	22	25	62
3-Jun	33	57	15	10	20	20	17	15	15	19	14	13	17	25	14	14	16	17	14	32	17	25	24	17	57
4-Jun	23	19	21	36	19	25	22	15	18	18	19	19	16	17	18	17	16	17	18	19	21	23	15	36	
5-Jun	16	17	17	18	16	18	17	17	17	19	18	18	21	18	20	23	17	15	17	20	23	11	16	11	23
6-Jun	11	12	12	18	47	26	32	43	48	37	45	33	36	54	52	44	38	85	38	17	12	24	77	65	85
7-Jun	81	50	62	54	86	19	18	33	54	19	16	20	38	67	19	37	37	22	65	68	78	16	29	20	86
8-Jun	35	19	17	27	22	10	13	11	11	14	32	41	28	22	40	22	27	22	12	9	17	13	12	10	41
9-Jun	13	13	15	15	14	15	20	75	66	12	15	13	13	19	16	18	17	18	19	17	15	18	20	13	75
10-Jun	15	30	19	14	16	28	27	21	20	AF	AF	33	29	68	30	37	31	56	32	9	29	38	82	66	82
11-Jun	12	12	32	19	27	36	24	13	9	55	30	15	42	29	26	67	63	69	29	24	8	18	53	89	89
12-Jun	59	71	40	24	7	23	18	39	71	34	21	21	29	30	29	27	24	22	18	14	14	11	65	50	71
13-Jun	37	40	39	34	22	26	52	42	19	19	25	17	27	29	34	25	19	38	12	16	8	10	13	12	52
14-Jun	11	12	13	14	13	14	13	12	15	15	15	16	19	17	16	17	16	10	12	11	12	11	12	15	19
15-Jun	13	49	54	12	14	8	10	14	11	12	19	18	26	23	30	28	14	23	15	11	11	15	9	11	54
16-Jun	89	78	94	37	13	12	88	89	85	22	29	13	13	80	60	72	23	19	20	11	29	14	15	21	94
17-Jun	44	19	21	11	67	83	25	26	18	19	15	17	17	25	21	12	18	20	14	19	13	14	7	14	83
18-Jun	10	6	9	33	48	18	15	14	16	13	12	13	13	11	15	11	10	12	9	8	8	8	7	11	48
19-Jun	13	8	10	10	16	11	12	12	12	15	16	15	15	18	25	15	24	23	31	29	30	63	18	30	63
20-Jun	31	12	14	29	26	34	33	97	75	54	18	17	15	21	19	15	13	11	16	20	29	33	62	37	97
21-Jun	17	19	32	31	49	32	15	21	12	13	12	14	18	13	21	25	18	15	17	13	15	24	23	16	49
22-Jun	15	18	18	48	34	56	39	45	25	18	26	24	18	20	22	19	16	17	17	17	11	19	67	21	67
23-Jun	40	72	65	65	69	21	40	35	72	48	42	27	23	15	18	54	39	21	26	13	49	34	38	20	72
24-Jun	14	11	11	11	11	12	12	11	15	15	18	17	18	12	11	19	12	9	20	16	14	11	12	10	20
25-Jun	9	11	11	12	13	14	15	11	17	15	15	13	16	19	71	60	31	50	79	34	24	14	29	39	79
26-Jun	25	23	41	48	28	20	42	70	23	23	27	21	26	56	37	28	63	29	15	11	11	13	31	14	70
27-Jun	17	43	44	23	34	81	27	15	15	94	63	56	26	77	64	69	16	21	23	21	19	12	64	27	94
28-Jun	62	91	38	70	100	80	59	83	70	53	30	23	71	38	24	22	19	18	11	14	29	13	7	11	100
29-Jun	76	22	10	14	44	63	31	21	14	16	16	17	19	19	17	18	16	14	13	14	11	10	10	9	76
30-Jun	10	17	14	23	15	15	16	20	17	18	17	19	19	16	17	21	18	19	21	17	11	6	29	39	39

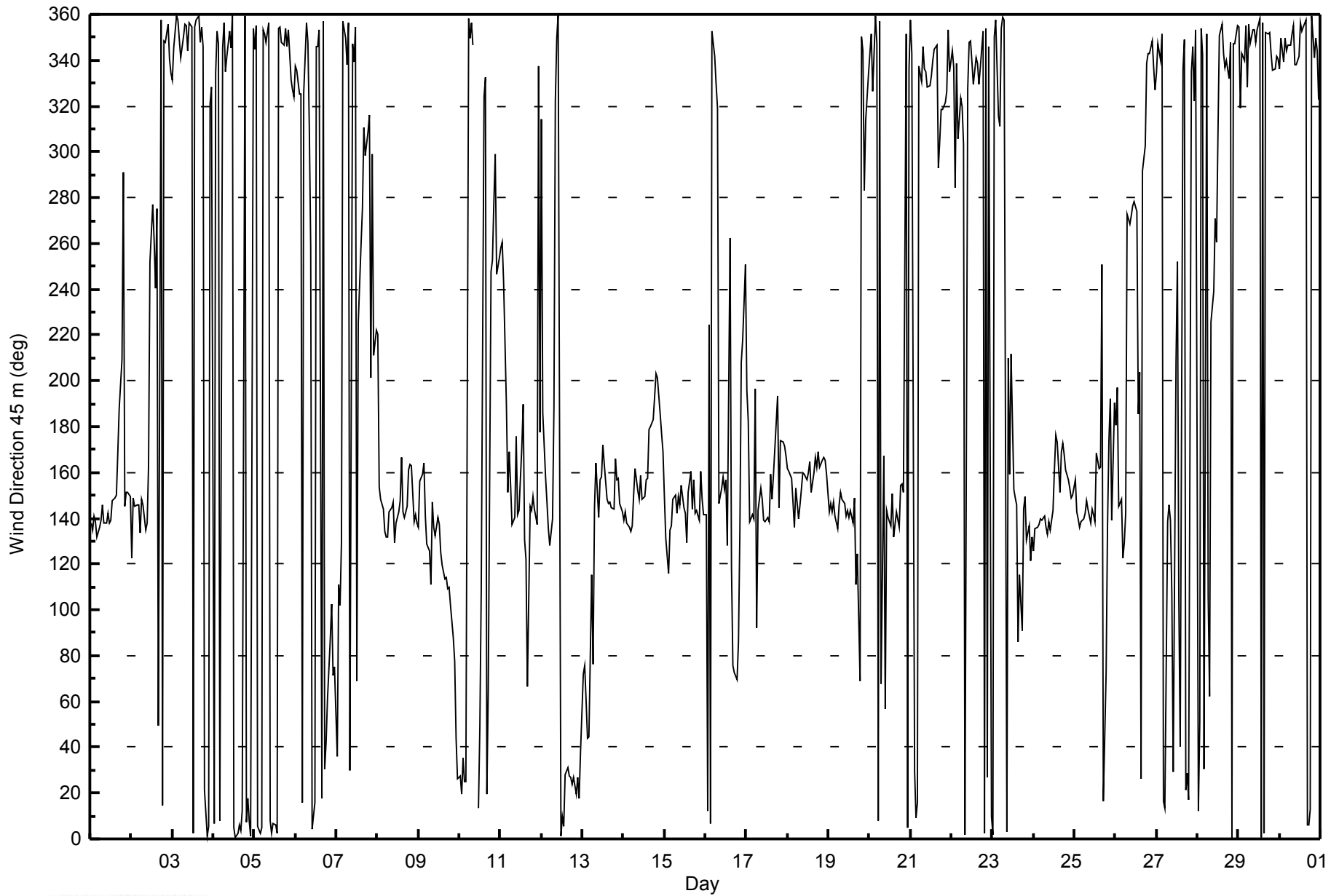
89	91	94	70	100	83	88	97	85	94	63	56	71	80	71	72	63	85	79	68	78	63	82	89	
Diurnal Maximum																								

AF - Analyzer Failure



WBEA
Hourly Averages

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





Direction of Maximum Speed: 357 deg on Jun 3 18:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 161.1 deg on Jun 18	Hours of Data: 664
Direction of Minimum Speed: 229 deg on Jun 16 08:00	Direction of Minimum Daily Speed Average: 1.8 deg on Jun 2
Direction of Minimum Speed: 229 deg on Jun 16 08:00	Hours of Missing Data: 56
Monthly Average Direction: 327.2 deg	Percent Operational Time: 92.2

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-Jun	143	142	142	145	134	139	140	148	144	144	145	142	139	150	156	154	172	194	214	292	151	159	171	159	150.5	
2-Jun	157	170	167	173	174	166	194	187	178	172	245	254	278	262	240	287	55	11	18	359	358	357	10	11	288.6	
3-Jun	348	3	1	14	4	1	353	356	0	350	2	360	9	1	5	6	350	357	351	26	11	15	327	331	359.4	
4-Jun	12	348	4	349	10	355	4	344	344	348	350	5	5	3	5	7	7	13	2	9	17	9	5	0	3.4	
5-Jun	352	2	7	6	8	359	356	355	360	10	7	9	5	6	355	359	350	350	358	347	356	346	347	333	359.4	
6-Jun	338	342	340	343	347	340	0	347	323	262	360	14	350	346	357	18	2	25	39	64	92	113	131	123	16.5	
7-Jun	116	129	131	139	113	39	354	333	360	347	343	5	70	221	262	282	318	299	320	353	340	318	230	226	319.7	
8-Jun	221	207	205	226	192	185	147	138	139	151	138	148	145	145	164	143	140	141	156	159	144	147	148	146	151.9	
9-Jun	144	156	167	178	152	137	131	126	146	142	137	143	139	127	120	117	118	113	113	106	102	97	75	40	129.1	
10-Jun	42	38	42	34	37	16	0	357	350	AF	AF	23	51	104	333	335	AF	AF	AF	AF	AF	AF	AF	261	--	
11-Jun	255	262	257	231	226	233	218	191	188	224	159	147	170	204	134	125	79	128	159	161	161	197	201	191	194.8	
12-Jun	277	256	240	210	199	178	101	203	332	351	6	4	16	15	30	35	33	32	30	32	32	35	53	76	24.4	
13-Jun	125	120	120	126	134	134	106	124	149	137	149	153	166	159	149	146	146	146	146	168	156	144	146	149	143.3	
14-Jun	147	145	142	142	142	142	147	163	154	151	161	148	150	158	161	183	184	188	195	211	207	202	200	200	163.1	
15-Jun	168	151	149	144	144	152	154	143	144	141	155	146	139	133	152	159	144	155	143	146	146	144	158	149	148.0	
16-Jun	147	147	132	131	99	29	46	229	158	152	154	152	155	117	270	99	78	74	75	101	141	218	225	252	140.0	
17-Jun	223	199	161	168	189	210	103	146	157	148	143	139	140	138	160	149	158	184	197	162	185	179	175	171	163.4	
18-Jun	167	168	168	149	141	159	147	153	156	162	160	158	158	166	152	161	168	160	173	166	165	166	164	162	161.1	
19-Jun	154	153	147	148	150	152	148	143	147	151	143	141	140	144	138	144	113	123	106	21	352	310	329	347	142.6	
20-Jun	347	8	350	342	352	1	360	74	150	97	141	146	135	145	137	140	143	138	153	158	184	240	261	286	125.7	
21-Jun	342	344	9	32	40	8	346	352	349	344	341	335	335	337	338	330	295	307	316	317	320	318	347	333	335.7	
22-Jun	347	350	295	281	274	295	323	301	335	328	343	358	338	330	339	337	332	337	359	10	9	52	42	19	341.5	
23-Jun	27	355	342	325	321	294	313	317	335	262	154	224	147	145	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
24-Jun	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-Jun	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	168	158	161	252	351	270	152	180	205	199	227	--
26-Jun	205	213	208	191	176	156	158	273	271	276	273	276	275	194	212	18	282	305	342	355	355	9	358	343	291.8	
27-Jun	353	357	347	346	355	84	141	143	145	110	6	237	255	102	58	357	349	25	34	27	355	346	346	349	19.3	
28-Jun	8	65	331	346	339	218	100	26	261	254	280	276	314	343	357	338	336	344	337	356	16	342	344	348	340.5	
29-Jun	342	345	343	348	348	325	314	339	358	358	354	357	3	4	360	5	357	357	357	349	344	340	342	342	352.5	
30-Jun	336	333	329	333	332	335	342	354	358	341	341	345	360	355	356	360	10	11	17	9	0	359	7	8	352.8	

125.0	119.0	113.5	117.9	105.3	126.7	106.6	111.4	103.7	105.1	77.5	72.4	79.8	99.3	60.3	57.5	33.1	27.6	28.2	36.7	68.2	97.2	139.3	264.9
Diurnal Average																							

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 104 deg on Jun 26 17:00	Hours of Data: 664
Minimum Value: 2 deg on Jun 29 03:00	Hours of Missing Data: 56
Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 9 Median = 13 Q ₃ = 20 P ₉₀ = 36 P ₉₉ = 82	Hours of Calibration: 0
	Percent Operational Time: 92.2

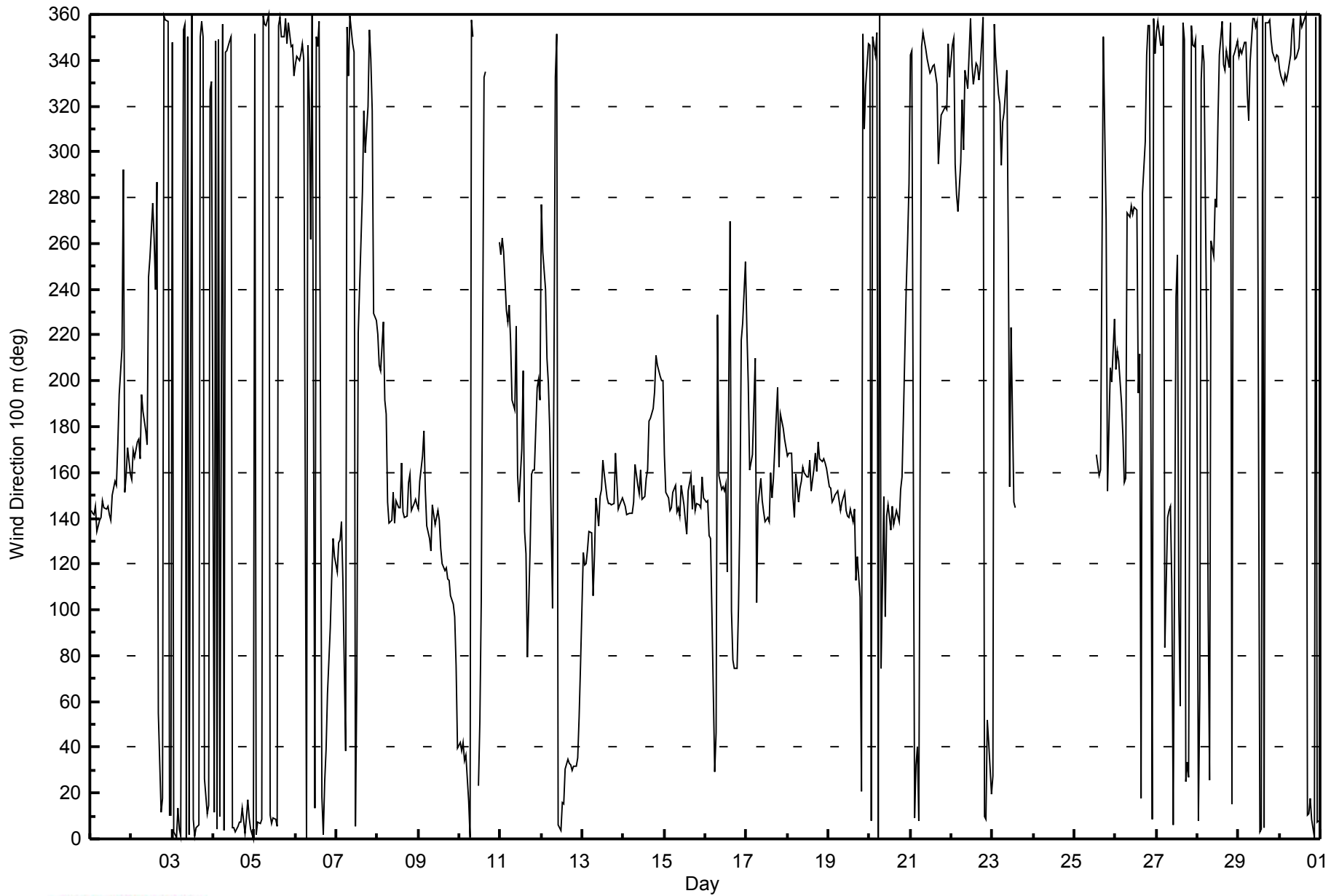
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	5	6	11	6	9	9	7	3	4	5	6	11	10	24	25	13	12	17	15	27	44	9	14	15	44	
2-Jun	15	10	9	8	8	22	24	16	15	23	65	27	13	12	13	47	20	28	10	12	11	7	15	10	65	
3-Jun	4	10	7	16	9	12	11	10	10	13	10	8	10	17	9	8	12	10	9	22	10	16	26	12	26	
4-Jun	17	15	11	26	9	16	13	7	10	16	13	10	8	10	9	10	9	8	9	8	9	12	14	9	26	
5-Jun	10	10	8	9	8	10	11	11	10	10	9	11	14	10	14	14	10	10	11	16	18	10	13	5	18	
6-Jun	7	7	7	8	29	12	19	36	36	26	38	17	32	33	22	32	25	67	32	10	8	9	10	18	67	
7-Jun	13	16	30	20	56	51	15	27	44	13	11	12	31	66	16	33	29	14	62	45	86	21	15	10	86	
8-Jun	16	17	15	20	17	20	13	7	7	15	28	37	30	16	32	19	16	14	12	12	11	5	3	3	37	
9-Jun	4	9	19	24	9	8	7	13	20	6	8	5	7	11	10	9	10	10	10	9	7	11	19	9	24	
10-Jun	8	17	11	7	8	16	20	12	16	AF	AF	24	24	18	36	24	AF	AF	AF	AF	AF	AF	AF	9	36	
11-Jun	4	5	15	15	20	13	20	30	21	24	31	14	38	27	26	54	49	63	26	26	13	18	30	33	63	
12-Jun	18	14	5	15	16	48	42	83	44	31	15	16	23	22	22	18	14	14	11	8	7	4	44	39	83	
13-Jun	14	10	15	11	12	7	30	32	19	16	21	16	27	25	29	22	12	20	7	15	10	7	3	4	32	
14-Jun	4	5	4	3	3	5	6	11	12	11	13	13	15	14	15	16	17	15	11	11	10	11	14	17	17	
15-Jun	12	20	49	13	7	5	6	4	6	9	19	13	15	15	25	25	8	22	12	3	3	8	7	6	49	
16-Jun	3	38	7	9	46	35	45	93	50	14	19	10	10	80	47	62	13	12	10	6	24	10	11	12	93	
17-Jun	24	21	21	9	36	38	40	13	12	10	6	7	9	18	18	9	14	20	13	20	12	15	5	10	40	
18-Jun	6	6	7	15	10	9	6	10	13	11	11	12	11	9	12	10	9	10	8	8	6	6	5	6	15	
19-Jun	8	7	3	4	5	6	5	5	7	11	6	9	8	11	20	13	16	13	15	42	12	34	29	11	42	
20-Jun	8	8	9	4	7	10	20	82	58	29	9	13	10	17	10	6	5	5	14	17	25	26	11	15	82	
21-Jun	19	12	21	16	32	27	8	11	7	6	7	9	10	9	13	18	15	11	9	8	11	10	11	8	32	
22-Jun	7	13	18	19	15	26	31	35	22	14	20	16	11	12	16	14	11	13	13	10	6	15	19	19	35	
23-Jun	13	14	9	32	73	14	38	22	36	71	47	66	23	9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	73	
24-Jun	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-Jun	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	18	41	38	25	59	79	22	14	11	25	23	79
26-Jun	25	9	23	31	24	29	60	71	14	16	16	15	21	47	19	69	104	21	8	4	5	7	15	3	104	
27-Jun	11	18	11	7	11	61	9	8	16	87	70	71	28	74	24	42	13	15	13	12	14	4	7	7	87	
28-Jun	13	67	34	11	29	77	102	48	61	47	25	22	69	26	16	18	13	14	6	12	15	7	3	4	102	
29-Jun	3	4	2	4	8	18	18	11	9	11	10	12	12	12	13	12	10	9	8	7	4	4	3	3	18	
30-Jun	5	4	4	6	8	7	9	16	10	15	12	13	11	12	11	13	11	11	13	8	6	7	5	7	16	
Diurnal Maximum																										
25 67 49 32 73 77 102 93 61 87 70 71 69 80 47 69 104 67 79 45 86 34 44 39																										

AF - Analyzer Failure



WBEA
Hourly Averages

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





Maximum Value: 1.3 km/h on Jun 18 23:00		Maximum Daily Average: 0.7 km/h on Jun 18		Hours in Service: 720																						
Minimum Value: -1.6 km/h on Jun 3 12:00		Minimum Daily Average: -0.8 km/h on Jun 5		Hours of Data: 718																						
Maximum Diurnal Average: -0.1 km/h at hour 23		Minimum Diurnal Average: -0.4 km/h at hour 18		Hours of Missing Data: 2																						
Monthly Average: -0.19 km/h		Percentiles: P ₁ = -1.4 P ₁₀ = -0.7 Q ₁ = -0.5 Median = -0.2 Q ₃ = 0.1 P ₉₀ = 0.3 P ₉₉ = 1.0		Hours of Calibration: 0																						
				Percent Operational Time: 99.7																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	-0.1	-0.2	0.1	0.0	-0.1	0.1	0.1	0.4	0.1	-0.1	0.3	0.3	0.0	0.0	-0.2	0.1	0.5	0.2	-0.1	-0.5	0.2	0.2	0.2	-0.2	0.1	0.5
2-Jun	-0.3	0.2	-0.1	0.3	0.0	-0.1	0.0	0.2	0.1	0.3	0.1	-0.1	-0.5	-0.6	-0.5	-0.5	-0.5	-0.7	-0.5	-0.5	-0.4	-0.2	-0.1	-0.3	-0.2	0.3
3-Jun	-0.3	-0.2	-0.2	-0.4	-0.4	-0.4	-0.6	-0.8	-0.9	-0.8	-1.4	-1.6	-1.0	-0.5	-1.2	-1.1	-0.9	-1.6	-0.7	-0.6	-0.7	-0.4	-0.5	-0.6	-0.7	-0.2
4-Jun	-0.6	-0.4	-0.5	-0.4	-0.7	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.4	-0.6	-1.4	-1.2	-1.0	-1.1	-1.1	-1.1	-0.9	-0.6	-0.6	-0.6	-0.8	-0.7	-0.3
5-Jun	-0.6	-0.7	-1.1	-0.9	-1.1	-0.7	-0.9	-0.9	-0.4	-0.9	-0.8	-1.1	-1.3	-1.1	-1.2	-1.1	-1.0	-0.8	-0.7	-0.8	-0.5	-0.5	-0.5	-0.5	-0.8	-0.4
6-Jun	-0.5	-0.4	-0.5	-0.4	-0.1	-0.4	-0.5	-0.5	-0.3	-0.4	-0.3	-0.5	-0.6	-0.2	-0.4	-0.3	-0.2	-0.1	-0.4	-0.6	-0.3	-0.2	-0.2	-0.3	-0.3	-0.1
7-Jun	-0.4	-0.2	-0.3	-0.2	-0.4	-0.6	-0.4	-0.4	-0.1	-0.4	-0.3	-0.3	-0.5	-0.5	-0.6	-0.5	-0.4	-0.7	-0.4	-0.3	-0.2	-0.4	0.0	-0.1	-0.4	0.0
8-Jun	-0.1	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.2	0.5	0.2	0.0	0.6	0.0	0.1	0.6
9-Jun	0.0	0.8	0.7	0.6	0.0	-0.1	-0.2	-0.2	0.1	0.0	-0.1	0.3	0.4	0.1	-0.4	-0.4	-0.5	-0.5	-0.5	-0.3	-0.5	-0.4	-0.3	-0.4	-0.1	0.8
10-Jun	-0.6	-0.5	-0.6	-0.6	-0.6	-0.4	-0.4	-0.8	-0.6	AF	AF	-0.5	-0.9	-0.3	-0.5	-0.8	-1.0	-0.1	-0.2	-0.5	-0.4	-0.4	0.0	-0.2	-0.5	0.0
11-Jun	-0.5	-0.5	-0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.0	-0.1	0.2	0.1	0.2	0.0	-0.5	-0.4	0.0	-0.1	0.0	0.2	0.0	-0.1	0.0	0.0	0.2
12-Jun	-0.1	0.0	0.0	0.0	0.1	-0.1	0.0	0.0	0.3	-0.5	-1.3	-1.0	-0.8	-0.7	-0.7	-0.6	-0.9	-1.0	-0.7	-0.9	-0.5	-0.4	-0.6	-0.5	-0.4	0.3
13-Jun	-0.3	-0.5	-0.5	-0.6	-0.4	-0.3	-0.3	0.0	0.0	0.0	0.4	0.1	0.1	0.1	0.2	0.0	0.1	0.1	0.2	0.5	0.4	0.3	0.4	0.3	0.0	0.5
14-Jun	0.1	0.3	0.0	0.1	-0.3	0.0	0.2	0.5	0.4	0.6	0.5	0.5	0.4	0.8	0.5	0.7	0.5	0.4	0.1	-0.1	-0.1	0.3	0.5	0.5	0.3	0.8
15-Jun	0.4	-0.2	-0.3	0.0	0.0	0.3	0.4	0.3	0.1	0.4	0.5	0.3	0.2	-0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.1	0.2	0.1	0.0	0.2	0.5
16-Jun	-0.1	0.0	-0.1	-0.2	-0.2	-0.3	-0.3	-0.1	0.0	0.3	0.3	0.2	0.3	0.0	-0.1	-0.3	-0.6	-0.7	-0.5	-0.6	-0.1	0.1	-0.1	-0.3	-0.1	0.3
17-Jun	0.1	0.1	-0.1	0.1	-0.1	-0.1	-0.3	-0.1	0.1	0.1	0.1	0.3	0.1	0.0	0.3	0.2	0.0	0.3	0.1	0.1	0.3	0.4	0.6	0.6	0.1	0.6
18-Jun	0.5	0.6	0.4	0.0	-0.3	0.6	0.0	0.1	0.5	0.5	0.7	0.6	0.6	1.0	0.6	1.1	1.1	0.7	1.1	1.0	1.2	1.2	1.3	0.8	0.7	1.3
19-Jun	-0.1	0.1	0.2	0.3	-0.1	0.0	0.0	0.3	0.0	0.0	0.2	0.2	0.3	0.3	0.1	0.1	-0.2	-0.1	-0.3	-0.4	-0.2	-0.2	-0.4	-0.2	0.0	0.3
20-Jun	-0.3	-0.4	-0.4	-0.1	-0.2	-0.2	-0.3	-0.1	-0.2	-0.3	0.1	-0.2	0.0	0.2	0.0	0.0	0.2	-0.1	0.1	0.2	0.1	-0.4	-0.2	-0.3	-0.1	0.2
21-Jun	-0.3	-0.2	-0.2	-0.4	-0.4	-0.4	-0.4	-0.3	-0.4	-0.4	-0.5	-0.4	-0.3	-0.6	-0.4	-0.3	-0.5	-0.6	-0.6	-0.6	-0.5	-0.4	-0.2	-0.3	-0.4	-0.2
22-Jun	-0.4	-0.4	-0.3	-0.2	-0.4	-0.3	-0.2	-0.2	-0.6	-0.6	-0.3	-0.5	-0.7	-0.8	-0.8	-0.9	-0.9	-1.0	-0.6	-0.5	-0.4	-0.3	-0.3	-0.3	-0.5	-0.2
23-Jun	-0.2	-0.2	-0.2	-0.2	-0.1	-0.2	-0.2	-0.5	-0.3	0.0	0.0	-0.1	0.3	0.0	0.3	-0.3	-0.2	-0.4	0.2	0.1	-0.1	0.0	-0.2	-0.1	-0.1	0.3
24-Jun	-0.2	-0.1	0.2	0.2	0.3	0.3	0.5	0.1	-0.4	0.3	0.0	0.3	0.5	0.7	0.5	0.4	0.7	0.8	0.5	0.5	0.4	0.4	0.3	0.6	0.3	0.8
25-Jun	0.9	0.5	0.1	-0.1	0.2	0.2	0.1	0.4	0.5	0.3	0.3	0.4	0.2	0.4	0.0	0.0	-0.6	-0.4	-0.3	-0.2	0.1	0.1	0.0	-0.1	0.1	0.9
26-Jun	0.1	-0.1	-0.1	0.0	-0.1	-0.2	-0.1	-0.1	-0.4	-0.3	-0.2	-0.4	-0.5	0.3	-0.1	-0.3	0.0	-0.4	-0.6	-0.3	-0.4	-0.4	-0.3	-0.4	-0.2	0.3
27-Jun	-0.3	-0.3	-0.2	-0.1	-0.2	-0.2	-0.1	0.1	0.1	-0.1	0.1	0.0	-0.4	-0.5	-0.3	-0.3	-0.7	-0.8	-0.6	-0.5	-0.4	-0.3	-0.1	-0.3	-0.3	0.1
28-Jun	-0.1	-0.2	-0.3	-0.3	-0.1	-0.2	-0.1	-0.2	-0.2	0.1	-0.2	-0.3	-0.3	-0.5	-0.8	-0.8	-0.7	-0.7	-0.8	-0.5	-0.5	-0.4	-0.3	-0.2	-0.4	0.1
29-Jun	-0.1	-0.2	-0.4	-0.5	-0.2	-0.1	-0.4	-0.4	-0.9	-0.7	-0.7	-1.3	-1.1	-1.4	-1.5	-1.4	-1.3	-1.4	-1.2	-1.0	-0.8	-0.7	-0.4	-0.5	-0.8	-0.1
30-Jun	-0.5	-0.3	-0.3	-0.4	-0.4	-0.3	-0.4	-0.5	-0.8	-0.6	-0.6	-0.6	-0.9	-1.3	-1.1	-0.8	-0.9	-0.9	-0.8	-0.5	-0.4	-0.3	-0.1	-0.1	-0.6	-0.1
																								Diurnal Average		
																								Diurnal Maximum		
																								0.9 0.8 0.7 0.6 0.3 0.6 0.5 0.5 0.5 0.6 0.7 0.6 0.6 1.0 0.6 1.1 1.1 0.8 1.1 1.0 1.2 1.2 1.3 0.8		
AF - Analyzer Failure																										



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 4.6 km/h on Jun 3 18:00	Hours of Data: 718
Minimum Value: 0.1 km/h on Jul 1 00:00	Hours of Missing Data: 2
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.9 Median = 1.5 Q ₃ = 2.1 P ₉₀ = 2.8 P ₉₉ = 3.8	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-Jun	2.7	2.6	2.2	2.7	2.1	1.8	3.0	3.9	2.7	2.5	2.1	1.8	2.4	1.7	1.7	1.5	1.7	1.3	0.8	1.7	1.0	1.3	1.1	0.5	3.9
2-Jun	1.0	1.6	1.1	1.7	1.5	1.5	1.1	1.2	1.5	1.6	1.3	1.7	2.5	2.4	2.0	2.4	2.1	2.3	3.0	1.5	1.0	0.5	0.2	0.3	3.0
3-Jun	0.3	0.3	0.5	0.6	0.8	1.0	1.4	1.6	2.0	2.6	3.4	3.8	3.4	1.8	2.6	2.9	4.0	4.6	3.2	2.6	2.6	1.7	1.8	1.9	4.6
4-Jun	1.5	1.1	1.3	1.1	1.5	1.3	1.4	1.5	1.2	1.1	1.8	2.3	3.2	3.7	3.7	3.2	3.8	3.5	3.3	3.0	2.2	1.8	2.1	2.6	3.8
5-Jun	2.2	2.5	2.9	2.8	2.8	2.8	2.7	2.5	2.9	3.3	3.2	3.6	3.6	4.0	3.0	2.9	2.9	2.5	2.8	1.7	1.7	0.9	0.8	0.8	4.0
6-Jun	0.9	1.0	0.4	0.4	0.5	0.5	1.2	1.3	1.2	1.5	1.7	1.9	2.1	2.0	1.9	1.9	1.7	1.9	1.3	1.0	0.7	0.8	0.5	0.6	2.1
7-Jun	0.6	0.5	0.9	1.4	0.7	0.8	1.2	1.3	1.1	1.5	2.0	1.2	2.1	1.6	1.7	2.0	1.7	2.3	1.8	0.6	0.5	0.5	0.8	0.8	2.3
8-Jun	0.7	0.3	0.4	0.4	0.5	1.0	1.3	1.3	1.7	1.8	1.8	2.0	2.0	1.9	2.0	1.8	1.8	1.5	0.9	1.0	0.9	2.0	2.7	2.7	2.7
9-Jun	3.0	2.2	1.8	1.4	1.0	1.7	1.4	1.2	1.5	2.2	2.3	3.0	3.2	3.2	3.1	3.4	3.8	3.4	2.9	2.1	1.3	0.9	0.8	1.2	3.8
10-Jun	1.5	1.4	2.0	1.9	1.7	1.2	1.2	1.6	2.2	AF	AF	2.5	2.6	2.4	1.9	1.9	2.7	2.6	1.0	1.3	1.3	0.7	0.4	1.0	2.7
11-Jun	2.0	1.9	1.6	1.0	1.0	1.2	1.1	1.2	1.5	1.1	1.5	2.0	1.4	1.7	2.8	2.3	1.5	1.2	1.2	1.2	0.5	0.3	0.2	0.2	2.8
12-Jun	0.2	0.3	0.2	0.5	0.7	0.6	0.8	0.9	1.3	1.7	2.3	2.8	2.3	2.5	2.9	3.0	3.3	3.1	2.6	2.4	1.3	1.5	1.2	0.7	3.3
13-Jun	0.8	1.1	1.0	0.7	0.5	1.7	1.2	1.2	1.1	2.0	1.8	1.8	1.6	1.7	1.9	1.9	1.7	1.4	1.8	1.3	1.1	0.8	1.8	2.2	2.2
14-Jun	2.2	2.0	2.3	3.1	3.0	2.9	2.4	1.7	2.1	2.4	2.2	2.3	2.7	2.6	2.4	1.8	1.8	1.6	1.5	1.5	1.3	1.0	0.9	1.1	3.1
15-Jun	1.9	1.3	1.2	1.8	1.4	2.1	2.1	2.3	1.9	1.9	2.0	2.2	2.4	2.6	2.2	2.0	2.1	1.5	2.4	2.4	2.1	0.7	0.9	0.3	2.6
16-Jun	0.2	0.2	0.2	0.4	0.2	0.3	0.5	0.8	1.2	1.6	1.4	1.9	1.9	1.9	1.5	1.1	2.1	2.9	1.9	1.2	1.3	1.8	1.4	1.2	2.9
17-Jun	0.9	0.6	0.7	0.7	0.6	0.7	0.7	1.1	1.2	1.3	1.8	2.1	2.0	2.0	1.6	1.8	1.5	1.2	1.4	1.2	1.0	1.2	1.3	1.2	2.1
18-Jun	1.2	1.4	1.3	1.2	1.1	1.9	1.8	1.8	1.9	1.8	2.6	2.3	2.5	2.3	2.9	2.5	2.1	2.3	1.9	1.8	1.9	2.1	2.0	2.2	2.9
19-Jun	1.6	1.6	1.6	1.3	1.4	1.0	1.3	1.1	1.1	1.1	2.4	1.9	2.3	1.8	1.6	1.1	0.7	1.2	0.5	0.3	0.2	0.3	0.4	0.3	2.4
20-Jun	0.4	1.0	0.5	0.2	0.3	0.4	0.6	0.7	0.9	1.1	1.0	1.3	1.6	1.4	1.5	1.4	1.3	1.5	0.9	1.0	0.7	0.4	0.2	0.4	1.6
21-Jun	0.3	0.3	0.5	0.7	0.7	0.9	0.8	1.0	1.2	1.2	1.2	1.3	1.4	1.4	1.1	0.7	1.6	1.8	1.7	1.2	1.0	0.6	0.4	0.5	1.8
22-Jun	0.9	0.9	0.5	0.7	1.2	0.7	0.7	1.0	1.2	1.6	1.6	1.5	1.8	2.4	2.6	2.7	2.4	2.2	2.1	1.8	0.9	0.4	0.5	0.4	2.7
23-Jun	0.2	0.3	0.2	0.2	0.3	0.2	0.6	0.8	0.8	0.8	0.9	1.1	1.4	1.4	1.9	1.7	2.3	2.1	1.2	0.9	0.8	0.3	0.4	0.5	2.3
24-Jun	1.6	2.4	3.1	3.2	3.2	3.4	3.1	3.0	2.5	2.2	2.4	2.2	2.2	1.6	1.8	2.1	1.4	1.6	2.2	1.3	1.5	1.7	1.9	2.3	3.4
25-Jun	2.3	2.4	2.5	2.2	2.4	2.9	2.0	2.7	2.5	3.0	2.9	3.1	3.2	2.2	1.1	1.8	2.8	0.7	0.5	0.6	0.7	0.6	0.5	0.4	3.2
26-Jun	0.6	0.4	0.3	0.3	0.5	0.8	0.8	1.0	1.5	1.8	2.0	1.8	1.5	2.0	1.1	1.1	1.2	1.3	1.6	0.8	0.7	0.5	0.6	0.5	2.0
27-Jun	0.4	0.2	0.3	0.2	0.2	0.3	0.6	1.0	1.1	0.8	1.4	1.3	1.3	2.6	0.7	0.9	1.9	2.4	2.0	1.5	0.5	0.3	0.2	0.2	2.6
28-Jun	0.2	0.3	0.4	0.4	0.3	0.4	0.8	0.9	1.1	1.4	1.8	1.9	1.9	2.0	2.2	2.1	1.9	2.0	1.2	1.6	0.7	0.4	0.4	0.3	2.2
29-Jun	0.2	0.2	0.4	0.7	0.6	0.2	0.8	1.1	1.7	1.9	2.4	3.2	3.6	4.0	4.0	3.8	3.9	3.6	3.2	2.6	1.7	1.4	1.0	1.0	4.0
30-Jun	0.9	0.6	0.5	0.6	0.4	0.5	1.5	2.0	2.2	2.3	2.2	2.4	2.8	2.6	2.7	2.5	2.5	2.4	2.4	1.9	0.6	0.3	0.2	0.1	2.8

3.0	2.6	3.1	3.2	3.2	3.4	3.1	3.9	2.9	3.3	3.4	3.8	3.6	4.0	4.0	3.8	4.0	4.6	3.3	3.0	2.6	2.1	2.7	2.7	
Diurnal Maximum																								

AF - Analyzer Failure



Maximum Value: 1.4 km/h on Jun 18 21:00		Maximum Daily Average: 0.8 km/h on Jun 18		Hours in Service: 720																						
Minimum Value: -1.5 km/h on Jun 3 11:00		Minimum Daily Average: -0.7 km/h on Jun 5		Hours of Data: 718																						
Maximum Diurnal Average: 0.1 km/h at hour 10		Minimum Diurnal Average: -0.2 km/h at hour 18		Hours of Missing Data: 2																						
Monthly Average: 0.02 km/h		Percentiles: P ₁ = -1.2 P ₁₀ = -0.6 Q ₁ = -0.3 Median = 0.0 Q ₃ = 0.4 P ₉₀ = 0.7 P ₉₉ = 1.1		Hours of Calibration: 0																						
				Percent Operational Time: 99.7																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	0.7	0.4	0.8	0.5	0.4	0.4	0.7	1.2	0.6	0.8	0.7	0.5	0.6	0.3	0.2	0.3	0.7	0.3	0.0	-0.5	0.6	0.6	0.8	-0.1	0.5	1.2
2-Jun	-0.3	1.1	0.1	0.7	0.5	0.4	0.2	0.8	0.4	0.7	0.5	-0.1	-0.8	-0.6	-0.2	-0.5	-0.2	-0.5	-0.4	-0.4	-0.3	-0.1	-0.1	-0.2	0.0	1.1
3-Jun	-0.2	-0.1	-0.1	-0.3	-0.3	-0.3	-0.7	-0.7	-0.7	-0.8	-1.5	-1.3	-0.7	-0.5	-0.9	-1.0	-1.1	-1.3	-0.7	-0.5	-0.6	-0.4	-0.6	-0.6	-0.7	-0.1
4-Jun	-0.4	-0.4	0.0	-0.5	-0.4	-0.2	-0.1	-0.3	-0.2	-0.2	-0.4	-0.4	-1.2	-1.2	-1.0	-0.9	-1.1	-1.0	-1.1	-0.7	-0.4	-0.2	-0.6	-1.2	-0.6	0.0
5-Jun	-0.6	-0.6	-0.9	-0.7	-1.0	-0.8	-1.0	-0.6	-0.5	-0.6	-1.0	-0.9	-0.8	-1.2	-0.9	-0.8	-0.6	-0.7	-0.6	-0.4	-0.3	-0.5	-0.5	-0.5	-0.7	-0.3
6-Jun	-0.5	-0.5	-0.4	-0.4	-0.2	-0.3	-0.3	-0.4	-0.2	-0.1	0.0	-0.2	-0.5	0.1	-0.2	0.0	0.1	0.1	-0.3	-0.2	0.0	0.1	0.0	0.0	-0.2	0.1
7-Jun	-0.3	0.0	-0.2	-0.2	-0.3	-0.6	-0.4	0.0	0.1	-0.4	-0.5	-0.2	-0.1	-0.4	-0.5	-0.6	-0.2	-0.8	-0.3	-0.2	-0.1	-0.4	0.2	-0.1	-0.3	0.2
8-Jun	0.0	0.2	0.2	0.1	0.2	0.4	0.3	0.4	0.3	0.5	0.3	0.3	0.3	0.5	0.0	0.3	0.6	0.5	0.4	0.5	0.5	0.6	1.1	0.7	0.4	1.1
9-Jun	0.8	1.3	0.9	0.7	0.4	0.3	0.1	0.1	0.5	0.6	0.4	1.0	1.0	0.6	0.3	0.4	0.5	0.3	0.1	0.0	-0.2	-0.1	-0.2	-0.2	0.4	1.3
10-Jun	-0.1	-0.2	-0.3	-0.1	-0.3	-0.1	-0.3	-0.8	-0.6	AF	AF	-0.3	-0.6	0.3	-0.4	-0.5	-0.9	0.0	-0.1	-0.3	-0.5	-0.3	0.0	0.1	-0.3	0.3
11-Jun	0.0	-0.5	0.0	0.2	0.7	0.3	0.4	0.6	0.7	0.3	0.3	0.6	0.4	0.4	0.7	0.0	-0.1	0.1	0.1	0.2	0.5	0.3	0.0	0.0	0.2	0.7
12-Jun	0.0	0.0	0.1	0.5	0.9	0.2	0.3	0.2	0.6	-0.3	-0.9	-0.8	-0.3	-0.3	-0.2	-0.5	-0.5	-0.6	-0.6	-0.6	-0.3	-0.2	-0.4	-0.3	-0.2	0.9
13-Jun	-0.1	-0.3	-0.2	-0.1	0.0	0.2	0.0	0.1	0.1	0.5	0.6	0.3	0.2	0.1	0.4	0.2	0.4	0.4	0.6	0.6	0.7	0.4	0.8	0.6	0.3	0.8
14-Jun	0.5	0.6	0.4	0.7	0.6	0.6	0.6	0.8	0.6	0.8	0.7	1.0	1.0	1.1	0.7	0.5	0.6	0.3	0.1	-0.1	-0.1	0.2	0.4	0.8	0.6	1.1
15-Jun	0.8	0.2	-0.1	0.4	0.3	0.7	0.9	0.6	0.6	0.8	0.9	0.9	0.8	0.5	0.6	0.5	0.4	0.4	0.5	0.6	0.7	0.3	0.5	0.3	0.5	0.9
16-Jun	0.1	0.1	0.0	0.0	-0.1	-0.2	-0.2	0.1	0.3	0.6	0.5	0.6	0.4	0.4	0.1	-0.1	-0.3	-0.4	-0.2	-0.2	0.2	0.3	0.0	-0.1	0.1	0.6
17-Jun	0.3	0.2	0.2	0.3	0.2	0.1	-0.2	0.1	0.1	0.3	0.6	0.9	0.6	0.5	0.7	0.5	0.2	0.3	0.1	0.5	0.6	0.5	0.6	0.6	0.4	0.9
18-Jun	0.6	0.8	0.9	0.4	-0.1	1.1	0.2	0.4	0.6	0.8	0.8	0.9	0.8	1.3	1.2	1.1	1.0	0.9	0.8	0.8	1.4	1.3	1.2	1.1	0.8	1.4
19-Jun	0.3	0.5	0.6	0.5	0.3	0.2	0.3	0.5	0.3	0.2	0.6	0.6	0.7	0.4	0.5	0.5	0.0	0.1	-0.1	-0.3	-0.1	-0.1	-0.3	-0.2	0.2	0.7
20-Jun	-0.2	-0.4	-0.4	-0.1	-0.2	-0.1	-0.1	0.0	-0.1	-0.2	0.4	0.2	0.3	0.4	0.4	0.3	0.5	0.4	0.3	0.6	0.3	-0.3	-0.1	-0.2	0.1	0.6
21-Jun	-0.2	-0.1	-0.1	-0.3	-0.2	-0.4	-0.2	-0.2	-0.3	-0.3	-0.5	-0.4	-0.1	-0.7	-0.3	-0.2	-0.4	-0.7	-0.6	-0.6	-0.5	-0.4	-0.1	-0.2	-0.3	-0.1
22-Jun	-0.4	-0.3	-0.3	-0.1	-0.2	-0.2	0.0	0.0	-0.4	-0.6	-0.2	-0.4	-0.9	-0.7	-0.7	-0.8	-0.9	-0.7	-0.6	-0.6	-0.5	-0.2	-0.2	-0.2	-0.4	0.0
23-Jun	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.1	0.2	0.0	0.6	0.4	0.5	0.0	0.2	0.1	0.3	0.3	0.2	0.4	0.1	0.1	0.1	0.6
24-Jun	0.3	0.5	1.0	0.8	0.9	0.9	1.0	0.9	0.4	0.8	0.6	0.8	0.9	0.8	0.5	0.7	0.5	0.6	0.6	0.6	0.9	0.9	0.9	1.0	0.7	1.0
25-Jun	1.4	0.9	0.9	0.6	0.8	0.8	0.6	0.8	0.8	1.0	1.1	0.9	1.1	0.5	0.3	0.2	-0.6	-0.4	0.0	0.0	0.3	0.3	0.3	0.1	0.5	1.4
26-Jun	0.2	0.0	0.2	0.2	0.2	0.0	0.0	0.2	-0.4	-0.4	0.0	-0.4	-0.3	0.5	0.1	-0.1	0.3	-0.5	-0.4	-0.2	-0.3	-0.4	-0.3	-0.4	-0.1	0.5
27-Jun	-0.3	-0.1	-0.2	-0.1	0.0	-0.1	0.0	0.3	0.3	0.2	0.4	0.2	-0.2	0.1	-0.3	-0.1	-0.6	-0.4	-0.1	-0.3	-0.4	-0.3	0.0	-0.1	-0.1	0.4
28-Jun	0.0	-0.1	-0.2	-0.1	0.0	0.0	0.1	-0.2	0.0	0.2	-0.1	-0.1	0.0	-0.4	-0.5	-0.7	-0.6	-0.7	-0.7	-0.6	-0.3	-0.4	-0.2	-0.1	-0.2	0.2
29-Jun	0.0	-0.1	-0.2	-0.4	-0.1	0.0	-0.2	-0.2	-0.8	-0.5	-0.6	-1.1	-0.9	-1.4	-1.1	-1.2	-1.3	-1.2	-1.1	-0.8	-0.7	-0.6	-0.5	-0.5	-0.7	0.0
30-Jun	-0.5	-0.2	-0.2	-0.2	-0.3	-0.1	-0.4	-0.5	-0.8	-0.7	-0.6	-0.5	-0.7	-1.1	-0.9	-0.6	-0.7	-0.7	-0.6	-0.5	-0.5	-0.3	-0.1	0.0	-0.5	0.0
																								Diurnal Average		
																								Diurnal Maximum		
0.1 0.1 0.1 0.1 0.1 0.1 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.0 0.0 -0.1 -0.1 -0.2 -0.2 -0.1 0.0 0.0 0.1 0.0																										
1.4 1.3 1.0 0.8 0.9 1.1 1.0 1.2 0.8 1.0 1.1 1.0 1.1 1.3 1.2 1.1 1.0 0.9 0.8 0.8 1.4 1.3 1.2 1.1																										
AF - Analyzer Failure																										



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 4.5 km/h on Jun 3 18:00	Hours of Data: 718
Minimum Value: 0.1 km/h on Jul 1 00:00	Hours of Missing Data: 2
Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 1.0 Median = 1.6 Q ₃ = 2.3 P ₉₀ = 2.9 P ₉₉ = 3.9	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-Jun	2.6	2.4	2.1	2.6	2.2	1.7	3.0	3.8	2.8	2.5	2.1	1.8	2.4	1.8	1.9	1.7	2.1	1.7	1.0	2.1	1.1	1.4	1.2	0.7	3.8
2-Jun	1.3	1.6	1.1	1.6	1.5	1.4	1.1	1.1	1.4	1.4	1.3	1.9	2.5	2.6	1.8	2.3	2.2	2.5	3.0	1.9	1.1	0.4	0.3	0.3	3.0
3-Jun	0.4	0.4	0.6	0.6	0.9	1.1	1.4	1.6	1.9	2.8	3.4	3.5	3.7	2.0	2.6	3.0	4.1	4.5	3.3	2.9	2.6	1.9	2.0	2.0	4.5
4-Jun	1.5	1.2	1.4	1.2	1.7	1.4	1.5	1.6	1.3	1.2	2.0	2.4	3.4	3.7	3.8	3.4	3.8	3.8	3.5	3.2	2.3	2.2	2.2	2.6	3.8
5-Jun	2.5	2.8	3.0	3.1	3.1	3.0	2.8	2.7	3.1	3.7	3.2	3.6	3.5	4.0	3.2	2.8	3.1	2.6	2.8	2.0	1.9	1.0	1.0	0.8	4.0
6-Jun	1.1	1.2	0.4	0.5	0.6	0.5	1.3	1.4	1.4	1.7	1.8	1.9	2.2	2.0	2.1	2.0	1.9	2.1	1.5	1.0	0.7	0.9	0.7	0.8	2.2
7-Jun	0.8	0.8	1.1	1.6	0.8	0.8	1.2	1.5	1.2	1.6	2.1	1.4	2.4	1.7	1.8	2.1	1.9	2.4	2.0	0.6	0.6	0.5	0.9	1.1	2.4
8-Jun	0.8	0.4	0.4	0.4	0.5	0.8	1.3	1.3	1.6	1.7	2.1	2.0	2.2	2.2	2.0	2.0	2.1	1.7	1.0	1.2	1.2	2.0	3.0	2.6	3.0
9-Jun	2.8	2.3	1.9	1.4	1.1	1.7	1.6	1.5	1.6	2.2	2.2	3.2	3.1	3.4	3.3	3.8	4.0	3.7	3.0	2.3	1.4	1.0	0.8	1.2	4.0
10-Jun	1.5	1.5	1.9	2.0	1.8	1.3	1.3	1.6	2.2	AF	AF	2.4	2.7	2.5	2.0	2.3	2.8	2.6	1.0	1.2	1.4	0.9	0.5	1.4	2.8
11-Jun	2.2	2.1	1.7	1.1	1.1	1.2	1.1	1.1	1.3	1.3	1.4	2.0	1.6	1.8	2.8	2.2	1.5	1.3	1.3	1.2	0.6	0.5	0.3	0.1	2.8
12-Jun	0.2	0.3	0.3	0.6	0.6	0.7	0.9	1.0	1.4	1.7	2.1	2.7	2.5	2.7	3.1	3.0	3.5	3.0	2.7	2.3	1.4	1.5	1.5	0.8	3.5
13-Jun	1.0	1.4	1.2	0.8	0.6	1.8	1.3	1.4	1.3	2.1	1.9	2.0	1.8	1.9	2.2	2.0	1.9	1.5	1.8	1.5	1.1	1.0	2.1	2.3	2.3
14-Jun	2.3	2.2	2.4	3.0	2.9	3.0	2.5	1.9	2.1	2.4	2.4	2.6	2.8	3.0	2.6	2.2	2.3	2.0	1.5	1.7	1.4	1.0	1.1	1.1	3.0
15-Jun	2.0	1.5	1.4	1.8	1.5	2.1	2.1	2.4	1.8	1.9	2.3	2.4	2.7	2.6	2.3	2.3	2.1	1.6	2.4	2.6	2.2	1.1	1.1	0.5	2.7
16-Jun	0.4	0.2	0.3	0.5	0.2	0.3	0.5	0.9	1.5	1.7	1.6	1.8	1.9	2.2	1.7	1.2	2.1	2.9	1.9	1.1	1.4	1.8	1.6	1.5	2.9
17-Jun	1.1	0.7	0.7	0.8	0.6	0.9	0.6	1.1	1.3	1.4	1.9	2.4	2.1	2.1	1.7	1.6	1.8	1.3	1.6	1.3	1.2	1.3	1.4	1.3	2.4
18-Jun	1.3	1.4	1.3	1.4	1.4	2.1	1.8	2.0	2.0	2.1	2.7	2.4	2.6	2.6	3.3	2.8	2.5	2.6	2.4	2.0	2.3	2.5	2.5	2.3	3.3
19-Jun	1.7	1.6	1.7	1.4	1.5	1.1	1.3	1.1	1.0	1.1	2.3	2.0	2.4	1.8	1.6	1.1	0.7	1.1	0.4	0.3	0.2	0.3	0.5	0.3	2.4
20-Jun	0.3	1.1	0.5	0.3	0.4	0.5	0.7	0.7	0.9	1.1	1.0	1.2	1.5	1.6	1.5	1.4	1.5	1.3	1.1	1.2	0.9	0.3	0.3	0.5	1.6
21-Jun	0.3	0.4	0.6	0.8	0.9	0.9	0.9	1.0	1.3	1.3	1.3	1.4	1.6	1.4	1.2	0.8	1.7	1.9	1.8	1.4	1.1	0.6	0.5	0.5	1.9
22-Jun	1.0	0.9	0.6	0.9	1.5	0.8	0.9	1.2	1.2	1.8	1.7	1.8	1.7	2.5	2.9	2.7	2.5	2.5	2.3	1.9	1.1	0.3	0.6	0.5	2.9
23-Jun	0.3	0.3	0.1	0.2	0.3	0.2	0.6	0.8	0.9	0.9	1.0	1.1	1.6	1.6	1.8	1.7	2.5	2.2	1.3	0.9	0.9	0.5	0.6	0.7	2.5
24-Jun	1.6	2.2	2.9	3.0	3.1	3.3	3.3	2.9	2.6	2.5	2.4	2.4	2.4	2.1	2.2	2.0	1.7	1.9	2.3	1.5	1.8	1.9	2.1	2.5	3.3
25-Jun	2.6	2.6	2.6	2.3	2.4	3.0	2.1	2.8	2.6	3.1	3.0	2.9	3.1	2.4	1.3	2.3	2.8	0.7	0.4	0.7	0.8	0.7	0.6	0.6	3.1
26-Jun	0.6	0.5	0.4	0.4	0.5	0.8	0.8	1.1	1.6	2.0	2.2	2.1	1.5	2.2	1.0	0.9	1.4	1.4	1.7	1.0	0.9	0.6	0.8	0.6	2.2
27-Jun	0.4	0.2	0.4	0.3	0.2	0.3	0.5	1.1	1.1	0.9	1.5	1.4	1.5	2.8	0.7	0.9	1.9	2.6	2.2	1.6	0.6	0.3	0.3	0.3	2.8
28-Jun	0.2	0.3	0.3	0.5	0.4	0.5	0.8	0.9	1.2	1.6	2.1	2.0	2.1	2.1	2.4	2.2	2.1	2.0	1.3	1.8	0.8	0.3	0.4	0.3	2.4
29-Jun	0.3	0.2	0.4	0.8	0.7	0.3	0.8	1.2	1.7	2.1	2.5	3.4	3.8	4.2	4.2	3.9	3.7	4.0	3.5	2.9	2.0	1.7	1.4	1.3	4.2
30-Jun	1.1	0.8	0.7	0.7	0.5	0.7	1.6	2.0	2.3	2.5	2.3	2.7	3.0	2.6	2.8	2.8	2.8	2.4	2.6	1.9	0.7	0.3	0.2	0.1	3.0

2.8	2.8	3.0	3.1	3.1	3.3	3.3	3.3	3.8	3.1	3.7	3.4	3.6	3.8	4.2	4.2	3.9	4.1	4.5	3.5	3.2	2.6	2.5	3.0	2.6	
Diurnal Maximum																									

AF - Analyzer Failure



Maximum Value: 2.2 km/h on Jun 14 04:00																	Maximum Daily Average: 0.8 km/h on Jun 18										Hours in Service: 720	
Minimum Value: -0.8 km/h on Jun 7 14:00																	Minimum Daily Average: -0.1 km/h on Jun 21										Hours of Data: 664	
Maximum Diurnal Average: 0.3 km/h at hour 1																	Minimum Diurnal Average: 0.1 km/h at hour 18										Hours of Missing Data: 56	
Monthly Average: 0.20 km/h																	Percentiles: P ₁ = -0.5 P ₁₀ = -0.2 Q ₁ = -0.1 Median = 0.1 Q ₃ = 0.4 P ₉₀ = 0.8 P ₉₉ = 1.6										Hours of Calibration: 0	
																											Percent Operational Time: 92.2	
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-Jun	0.6	0.2	1.5	0.7	0.8	0.6	0.5	0.7	0.2	1.4	1.1	0.6	0.6	-0.1	-0.1	0.0	0.3	-0.1	-0.1	-0.1	0.4	0.7	0.6	-0.5	0.4	1.5		
2-Jun	0.0	0.6	-0.4	0.2	-0.1	0.0	-0.1	0.1	0.1	0.2	0.3	-0.1	-0.5	0.4	0.1	-0.1	0.1	0.1	0.5	0.3	0.1	0.1	0.0	0.0	0.1	0.6		
3-Jun	0.1	0.1	0.1	-0.3	0.2	0.2	-0.1	-0.2	-0.1	-0.1	-0.1	-0.4	0.4	0.4	0.0	0.2	-0.2	-0.4	-0.2	0.6	0.2	-0.1	0.0	-0.4	0.0	0.6		
4-Jun	0.1	0.1	0.8	0.0	0.5	0.3	0.5	-0.2	-0.1	0.3	0.1	0.3	-0.1	0.1	0.4	0.0	-0.1	-0.2	0.0	0.9	0.1	0.5	0.0	0.2	0.2	0.9		
5-Jun	0.2	0.7	0.4	0.4	-0.1	0.3	0.5	0.6	0.4	0.2	-0.1	-0.2	0.3	-0.4	-0.3	0.1	-0.1	0.3	0.3	-0.1	0.4	0.0	-0.1	-0.1	0.2	0.7		
6-Jun	-0.2	-0.1	-0.1	0.1	0.0	0.0	0.2	-0.3	-0.2	0.1	0.2	-0.2	-0.4	0.6	-0.4	0.1	0.3	0.4	-0.2	-0.1	0.1	0.4	0.7	0.7	0.1	0.7		
7-Jun	0.4	0.1	-0.2	0.4	0.0	-0.2	-0.2	-0.1	0.6	-0.1	-0.2	0.0	0.4	-0.8	-0.4	-0.4	0.5	-0.3	0.5	-0.1	0.2	-0.2	1.2	0.5	0.1	1.2		
8-Jun	0.2	0.0	0.0	0.1	-0.1	0.0	0.3	-0.1	0.0	0.0	0.2	0.1	0.0	0.3	-0.3	0.3	0.9	0.6	0.2	0.6	1.1	1.2	1.6	0.8	0.3	1.6		
9-Jun	1.7	1.6	0.7	0.7	0.6	0.3	0.9	0.7	0.8	0.8	0.7	1.0	1.3	0.7	0.3	0.1	0.0	0.4	0.0	-0.3	0.1	0.0	-0.1	0.3	0.6	1.7		
10-Jun	0.2	0.4	-0.1	0.1	0.1	0.7	0.1	-0.4	-0.1	AF	AF	-0.3	-0.4	0.3	0.5	0.2	AF	AF	AF	AF	AF	AF	AF	1.4	--	1.4		
11-Jun	2.1	0.9	0.9	0.4	0.0	-0.5	-0.6	-0.1	-0.1	0.3	0.1	0.5	0.1	0.2	0.6	-0.1	0.3	0.2	0.1	0.0	0.0	-0.1	0.0	0.0	0.2	2.1		
12-Jun	-0.2	0.1	0.0	-0.1	-0.2	0.0	0.0	0.4	0.4	-0.3	-0.3	0.2	-0.3	0.2	0.8	0.3	0.0	-0.3	0.0	-0.4	0.1	0.2	0.4	-0.3	0.0	0.8		
13-Jun	0.0	0.1	0.2	0.3	0.2	0.8	0.6	-0.1	0.1	0.4	0.0	0.2	-0.1	-0.3	-0.2	0.4	0.1	0.1	0.5	0.6	0.8	1.4	1.9	1.2	0.4	1.9		
14-Jun	1.0	1.0	1.9	2.2	1.6	1.1	1.3	1.4	1.3	1.4	0.9	1.4	1.6	1.1	1.0	-0.3	0.0	-0.3	-0.2	0.1	-0.2	-0.3	-0.2	0.3	0.8	2.2		
15-Jun	0.8	1.0	0.3	0.5	-0.5	0.1	0.6	0.7	0.5	0.3	1.0	0.7	1.0	0.8	0.4	0.5	-0.1	0.2	0.8	0.8	0.9	0.8	0.2	0.7	0.6	1.0		
16-Jun	0.7	0.0	0.4	0.3	0.0	0.0	0.1	0.1	0.4	0.3	0.4	0.1	-0.2	1.0	0.8	0.3	0.0	-0.3	-0.2	0.0	-0.2	1.1	0.9	0.8	0.3	1.1		
17-Jun	0.6	-0.1	0.1	-0.2	0.1	0.4	-0.2	0.6	0.5	0.3	0.8	1.1	0.7	0.9	0.7	0.4	-0.1	-0.3	0.0	0.3	0.2	0.1	0.0	0.5	0.3	1.1		
18-Jun	0.5	0.3	0.6	1.4	1.2	1.5	0.6	0.9	0.6	1.0	0.9	1.8	1.5	1.1	1.5	0.8	0.2	1.2	-0.3	0.2	1.0	0.1	0.0	1.2	0.8	1.8		
19-Jun	0.4	0.2	0.1	0.5	0.6	0.4	0.4	0.3	0.1	-0.1	1.1	0.8	0.6	-0.1	0.2	0.3	-0.1	0.1	-0.2	0.0	0.0	-0.1	-0.2	-0.1	0.2	1.1		
20-Jun	-0.1	0.0	-0.1	0.0	-0.1	-0.1	0.0	-0.1	0.2	0.1	0.2	-0.1	0.5	0.7	0.3	0.1	0.8	0.6	0.6	0.4	-0.2	0.0	-0.1	-0.4	0.1	0.8		
21-Jun	-0.1	-0.1	0.0	-0.1	0.1	0.2	0.1	0.0	0.1	0.0	-0.1	-0.3	-0.2	-0.1	-0.3	-0.3	-0.2	-0.3	-0.2	-0.2	-0.3	-0.4	0.0	-0.1	-0.1	0.2		
22-Jun	-0.1	0.0	-0.3	-0.4	1.3	-0.2	0.0	0.4	-0.1	-0.3	0.1	0.3	-0.4	0.0	-0.1	-0.1	-0.7	0.1	-0.1	0.6	0.2	0.0	0.1	-0.2	0.0	1.3		
23-Jun	0.1	0.0	0.1	0.0	0.0	-0.2	-0.1	-0.1	0.2	0.2	0.0	-0.3	0.4	-0.2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.4		
24-Jun	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-Jun	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.4		
26-Jun	0.1	-0.1	0.1	0.0	0.1	-0.2	-0.1	0.5	-0.4	-0.4	0.3	-0.2	0.0	0.4	0.0	-0.1	0.7	-0.3	-0.1	0.2	0.1	0.0	0.1	0.0	0.0	0.7		
27-Jun	0.1	0.0	-0.1	-0.1	0.0	-0.1	0.0	-0.1	-0.3	0.2	0.0	1.1	-0.1	0.0	-0.5	-0.3	-0.3	0.4	0.6	0.2	-0.1	0.0	0.1	-0.1	0.0	1.1		
28-Jun	0.0	-0.1	0.0	0.1	0.0	-0.1	-0.1	-0.2	0.3	0.0	1.0	0.5	0.4	0.1	-0.5	-0.1	-0.3	-0.1	-0.3	0.1	0.1	-0.1	-0.1	0.0	0.0	1.0		
29-Jun	0.1	0.0	-0.1	0.3	-0.1	-0.2	-0.2	0.0	-0.3	0.0	-0.2	-0.1	0.2	0.2	-0.2	0.0	-0.1	-0.1	0.2	-0.2	0.0	0.1	-0.1	0.0	0.0	0.3		
30-Jun	0.1	-0.1	0.2	0.1	0.0	-0.2	-0.2	-0.3	-0.3	0.0	0.0	0.2	0.2	-0.1	-0.4	-0.2	-0.2	-0.2	-0.2	0.1	0.0	-0.1	0.0	0.1	-0.1	0.2		
																								Diurnal Average				
																								Diurnal Maximum				
0.3 0.3 0.2 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.3 0.3 0.1 0.1 0.1 0.1 0.1 0.2 0.2 0.2 0.3 0.2																								2.1 1.6 1.9 2.2 1.6 1.5 1.3 1.4 1.3 1.4 1.1 1.8 1.6 1.1 1.5 0.8 0.9 1.2 0.8 0.9 1.1 1.4 1.9 1.4				
AF - Analyzer Failure																												



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4.0 km/h on Jun 9 18:00			Hours of Data:	664
Minimum Value: 0.1 km/h on Jun 19 21:00			Hours of Missing Data:	56
Percentiles: $P_1 = 0.2$ $P_{10} = 0.5$ $Q_1 = 0.9$ Median = 1.5 $Q_3 = 2.3$ $P_{90} = 2.8$ $P_{99} = 3.7$			Hours of Calibration:	0
			Percent Operational Time:	92.2

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

AF - Analyzer Failure



Maximum Value: 3.2 km/h on Jun 16 22:00																	Maximum Daily Average: 1.6 km/h on Jun 14										Hours in Service: 720	
Minimum Value: -1.4 km/h on Jun 22 17:00																	Minimum Daily Average: -0.2 km/h on Jun 30										Hours of Data: 715	
Maximum Diurnal Average: 0.6 km/h at hour 4																	Minimum Diurnal Average: 0.1 km/h at hour 15										Hours of Missing Data: 5	
Monthly Average: 0.38 km/h																	Percentiles: P ₁ = -0.9 P ₁₀ = -0.4 Q ₁ = -0.1 Median = 0.2 Q ₃ = 0.8 P ₉₀ = 1.5 P ₉₉ = 2.6										Hours of Calibration: 0	
																											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-Jun	1.5	0.8	2.5	1.3	2.5	1.8	1.8	1.4	0.7	2.2	1.3	0.9	0.7	0.1	0.3	0.0	0.2	0.6	0.3	-0.3	0.3	1.0	0.6	-0.4	0.9	2.5		
2-Jun	0.3	0.5	0.1	0.4	0.5	0.2	0.4	0.8	0.5	0.1	0.3	-0.2	-0.6	0.7	0.2	0.1	0.4	0.1	0.8	0.1	0.0	0.1	0.0	0.1	0.2	0.8		
3-Jun	0.2	0.1	0.1	0.0	0.4	0.2	-0.1	0.2	-0.1	0.0	-0.3	-0.5	0.3	0.5	-0.3	0.3	-0.1	-0.8	-0.4	UO	0.2	-0.4	-0.3	-0.7	-0.1	0.5		
4-Jun	0.3	0.0	0.7	0.0	0.3	0.1	0.5	-0.2	-0.5	-0.1	-0.1	0.1	0.1	-0.2	0.5	-0.1	-0.1	-0.1	0.1	0.9	0.1	0.4	-0.1	0.0	0.1	0.9		
5-Jun	-0.1	0.9	0.3	0.1	-0.4	0.4	0.4	0.5	0.2	0.1	-0.3	-0.5	0.3	-0.4	-0.7	-0.2	-0.4	0.0	0.0	0.0	0.2	-0.1	-0.4	0.0	0.0	0.9		
6-Jun	-0.2	-0.1	-0.1	0.0	-0.3	-0.3	-0.2	-0.2	-0.4	-0.3	0.2	-0.5	-1.0	0.4	-0.7	0.3	0.2	0.1	0.0	0.2	0.6	1.2	1.5	1.3	0.1	1.5		
7-Jun	1.3	0.8	UO	1.3	0.4	0.2	-0.2	-0.5	0.2	0.0	-0.4	-0.3	0.8	-1.1	-0.6	-0.5	0.6	-0.1	0.5	0.2	0.4	-0.2	1.1	1.3	0.2	1.3		
8-Jun	1.6	0.4	0.1	0.0	0.1	0.2	0.3	0.1	0.0	-0.1	-0.6	0.0	0.0	-0.1	-0.3	0.3	1.1	0.6	0.7	1.5	2.8	1.9	1.9	1.3	0.6	2.8		
9-Jun	2.6	2.0	0.8	0.8	0.5	0.9	1.8	2.1	1.2	1.4	1.4	1.3	1.9	1.6	1.3	1.4	1.4	1.7	1.0	0.4	0.9	0.6	0.3	0.5	1.2	2.6		
10-Jun	0.8	1.4	0.4	0.4	0.7	1.1	0.1	-0.2	0.2	AF	AF	-0.9	-0.5	0.8	0.2	0.3	-0.4	UO	-0.1	0.4	0.1	-0.7	-0.1	1.1	0.2	1.4		
11-Jun	2.2	1.1	2.0	1.0	0.4	-0.6	-0.4	0.0	0.5	0.9	-0.1	0.1	0.2	0.9	0.7	0.5	0.6	0.6	0.2	-0.1	-0.1	0.4	0.1	-0.1	0.5	2.2		
12-Jun	-0.4	-0.3	-0.2	0.2	0.3	0.4	0.1	0.3	0.0	-0.4	-0.8	0.5	-0.5	0.0	0.9	0.6	0.1	-0.2	0.2	-0.3	0.5	0.9	1.6	0.2	0.2	1.6		
13-Jun	0.5	0.9	0.7	0.9	0.6	1.4	1.1	-0.5	0.1	0.4	-0.2	0.2	-0.5	-0.6	-1.0	0.6	-0.3	0.0	0.6	0.5	1.6	2.6	2.6	1.5	0.6	2.6		
14-Jun	1.2	1.7	2.7	3.1	2.6	2.1	2.0	1.3	1.2	1.2	1.2	1.9	2.4	1.4	1.3	-0.1	0.6	0.4	0.8	1.2	1.3	1.6	2.0	2.6	1.6	3.1		
15-Jun	0.6	1.3	0.4	1.0	-0.9	-0.5	-0.1	0.5	0.1	0.0	1.6	0.8	1.5	0.8	0.6	0.5	-0.4	0.3	1.0	1.1	1.2	1.7	-0.2	0.7	0.6	1.7		
16-Jun	0.4	0.0	0.8	1.0	0.4	0.2	0.0	0.2	0.4	0.3	0.3	-0.4	-0.5	1.8	0.5	0.7	0.2	0.3	0.3	1.1	0.3	3.2	1.9	1.4	0.6	3.2		
17-Jun	1.4	0.0	0.2	0.0	0.2	0.1	0.0	0.8	1.2	0.2	0.9	1.6	1.0	1.3	1.1	0.5	0.1	0.1	1.4	0.5	1.4	0.7	-0.1	0.4	0.6	1.6		
18-Jun	0.3	0.1	0.2	1.6	1.7	1.6	1.2	1.1	0.7	0.8	1.0	2.1	2.0	0.9	1.9	0.8	-0.2	1.5	-0.6	0.3	1.0	0.2	0.4	1.2	0.9	2.1		
19-Jun	0.4	0.5	0.3	0.3	0.4	0.4	0.6	0.8	0.4	-0.1	1.6	0.8	0.7	-0.3	0.3	0.3	0.1	0.1	0.1	-0.1	0.0	-0.1	0.0	0.1	0.3	1.6		
20-Jun	0.0	0.1	0.0	0.0	-0.1	-0.1	-0.1	0.2	0.7	0.5	0.3	0.1	0.7	1.1	0.3	0.3	1.2	0.6	1.2	0.8	-0.2	0.3	-0.3	-0.1	0.3	1.2		
21-Jun	-0.2	-0.3	-0.1	0.2	0.5	0.5	0.1	-0.2	0.2	0.0	-0.1	-0.6	-0.6	-0.4	-0.3	-0.5	0.0	-0.6	-0.4	-0.3	-0.5	-0.6	-0.1	-0.4	-0.2	0.5		
22-Jun	-0.1	-0.2	-0.3	-0.3	2.3	-0.4	-0.2	0.4	-0.3	-0.3	-0.1	0.1	-0.7	-0.2	-0.3	-0.3	-1.4	0.2	-0.3	0.6	0.1	0.3	0.4	0.0	0.0	2.3		
23-Jun	0.0	0.0	0.0	-0.1	-0.1	-0.3	-0.2	-0.1	0.1	0.2	-0.1	-0.2	0.4	-0.5	-0.6	0.6	1.7	1.4	0.4	0.0	0.4	0.1	0.2	0.2	0.1	1.7		
24-Jun	0.7	0.6	2.4	2.1	2.1	1.9	1.6	1.3	1.7	1.9	1.0	1.3	0.5	-0.2	-0.4	1.8	-0.2	-0.4	0.9	0.6	1.7	0.7	2.0	1.3	1.1	2.4		
25-Jun	1.2	1.7	2.2	2.4	2.6	2.6	1.7	1.6	2.4	0.9	1.9	1.1	1.0	-0.1	0.2	0.2	1.2	0.0	-0.1	0.2	0.5	1.2	1.0	0.7	1.2	2.6		
26-Jun	0.4	0.2	0.6	0.3	0.4	-0.2	-0.3	0.4	-0.2	-0.4	-0.2	-0.2	-0.1	0.5	0.4	-0.1	0.4	-0.4	-0.2	-0.1	0.0	0.2	0.0	-0.1	0.1	0.6		
27-Jun	-0.1	0.1	0.1	-0.1	0.0	0.1	0.2	-0.2	-0.4	0.2	-0.2	1.3	-0.4	0.5	-0.4	-0.5	-0.6	0.5	0.7	0.2	-0.1	-0.2	0.0	-0.2	0.0	1.3		
28-Jun	0.1	0.1	0.0	0.0	-0.1	-0.1	0.1	-0.1	-0.2	-0.1	1.3	0.0	0.3	0.0	-0.9	0.1	-0.7	-0.5	-0.4	-0.1	0.2	-0.2	-0.2	0.0	-0.1	1.3		
29-Jun	0.2	0.0	-0.1	0.5	0.2	-0.2	-0.4	-0.1	-0.2	0.0	-0.5	-0.3	0.3	0.1	-0.4	-0.1	-0.6	-0.5	-0.1	-0.5	-0.3	-0.1	-0.2	-0.2	-0.1	0.5		
30-Jun	-0.1	-0.4	-0.1	0.0	-0.3	-0.4	-0.2	-0.4	-0.9	-0.1	-0.1	-0.2	0.3	-0.1	-0.9	-0.4	-0.3	-0.3	-0.3	-0.2	0.0	0.2	0.1	0.2	-0.2	0.3		
																								Diurnal Average				
																								Diurnal Maximum				
0.6 0.5 0.6 0.6 0.6 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.1 0.2 0.1 0.2 0.3 0.3 0.5 0.6 0.5 0.5																								Diurnal Average				
2.6 2.0 2.7 3.1 2.6 2.6 2.0 2.1 2.4 2.2 1.9 2.1 2.4 1.8 1.9 1.8 1.7 1.7 1.4 1.5 2.8 3.2 2.6 2.6																								Diurnal Maximum				
AF - Analyzer Failure UO - Unstable Operation																												



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 4.7 km/h on Jun 5 13:00	Hours of Data: 715
Minimum Value: 0.1 km/h on Jun 19 21:00	Hours of Missing Data: 5
Percentiles: P ₁ = 0.3 P ₁₀ = 0.5 Q ₁ = 0.9 Median = 1.7 Q ₃ = 2.4 P ₉₀ = 3.1 P ₉₉ = 4.0	Hours of Calibration: 0
	Percent Operational Time: 99.3

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	2.2	2.1	2.6	2.3	2.0	1.8	2.6	2.4	1.9	2.4	2.4	1.9	2.9	2.0	2.2	1.7	1.9	1.7	1.7	2.1	1.7	1.3	0.8	0.9	2.9
2-Jun	0.9	1.0	0.8	0.6	0.8	1.0	1.3	1.3	1.2	1.3	1.6	2.4	2.1	2.9	2.0	2.4	1.8	2.2	3.3	1.5	1.1	0.5	1.1	0.8	3.3
3-Jun	0.6	0.5	0.4	0.6	0.8	1.3	1.0	1.1	1.5	2.3	2.8	3.0	3.2	1.8	1.9	2.5	3.3	3.6	3.0	UO	3.1	2.7	2.1	1.9	3.6
4-Jun	1.2	1.4	1.6	1.0	1.6	1.8	1.6	0.9	1.1	1.5	2.2	2.4	2.9	3.4	3.5	3.3	3.5	3.4	3.4	3.5	2.1	2.1	2.0	2.7	3.5
5-Jun	2.7	3.3	3.1	3.3	3.2	3.4	3.5	2.8	3.2	3.2	3.1	3.7	4.7	3.8	3.7	2.5	2.9	2.9	2.8	2.2	1.8	0.9	1.6	0.6	4.7
6-Jun	0.6	0.3	0.4	0.3	0.7	0.6	1.3	1.9	2.1	2.3	2.8	1.9	2.9	3.1	2.8	2.6	2.8	3.0	1.8	0.6	0.3	0.4	0.9	1.1	3.1
7-Jun	0.6	1.1	UO	1.8	1.1	0.8	0.5	0.9	1.3	1.4	1.7	1.2	3.2	2.4	2.2	2.4	2.5	2.9	2.9	0.9	1.1	1.0	2.0	2.4	3.2
8-Jun	1.5	0.8	0.5	0.6	0.5	0.6	0.5	0.3	0.5	1.0	1.7	2.7	2.8	3.0	2.8	3.0	3.1	2.2	1.8	2.1	2.2	1.7	2.5	2.3	3.1
9-Jun	2.6	2.5	1.5	1.7	0.8	0.9	1.1	1.4	2.2	2.2	2.4	2.7	3.2	3.8	3.8	3.9	3.9	4.0	3.2	2.2	1.4	1.2	0.6	0.6	4.0
10-Jun	0.7	1.0	1.1	1.0	0.9	1.0	1.3	2.1	3.4	AF	AF	3.6	3.6	2.7	2.4	3.1	3.6	UO	1.1	0.7	0.8	0.9	0.9	1.3	3.6
11-Jun	1.0	0.9	1.7	1.7	1.4	1.6	1.4	1.0	1.0	1.6	1.3	2.0	2.3	2.2	2.3	2.1	2.0	1.4	1.6	1.2	0.7	1.2	0.6	0.5	2.3
12-Jun	0.6	0.8	0.5	0.7	0.7	0.9	0.4	0.9	1.6	2.1	2.5	3.4	3.2	3.9	4.4	4.5	4.4	3.5	3.0	1.9	1.3	0.3	1.9	1.7	4.5
13-Jun	2.3	2.3	1.9	1.7	1.4	1.7	1.9	1.6	1.9	2.5	2.7	2.8	3.0	3.0	3.0	2.9	2.6	2.4	2.3	1.4	1.9	1.6	1.7	2.2	3.0
14-Jun	2.3	2.2	2.1	2.2	2.1	2.4	2.4	2.5	2.6	2.5	3.0	3.2	3.9	3.8	3.1	2.2	2.6	1.8	1.3	2.0	1.5	1.1	1.1	1.8	3.9
15-Jun	1.0	1.2	1.2	1.8	2.2	1.6	1.2	1.7	2.0	2.0	3.0	3.1	3.9	3.6	2.7	3.0	3.0	2.1	2.3	1.8	1.6	1.9	1.4	1.1	3.9
16-Jun	1.3	0.4	0.5	0.6	0.4	0.7	0.4	0.6	1.4	1.5	1.7	2.2	2.7	2.9	2.2	2.7	2.9	2.9	2.0	1.1	1.9	2.1	1.7	1.4	2.9
17-Jun	1.3	1.0	0.5	0.5	0.6	1.1	0.5	1.1	1.6	2.0	1.9	2.1	2.4	2.8	2.1	1.9	2.2	1.5	0.9	0.7	1.0	1.0	0.6	1.3	2.8
18-Jun	0.9	0.6	0.5	1.5	1.9	1.2	1.5	1.6	1.8	2.7	3.5	2.7	3.7	3.3	3.6	3.3	2.7	3.1	1.5	2.3	2.4	2.3	2.0	2.1	3.7
19-Jun	2.0	1.3	1.4	1.2	1.2	1.0	1.0	1.0	0.9	1.6	1.9	1.7	1.8	2.2	1.8	1.5	1.1	1.5	0.6	0.6	0.1	0.3	0.7	0.5	2.2
20-Jun	0.4	0.6	0.7	0.5	0.5	0.4	0.3	0.6	1.2	1.2	1.0	1.4	1.7	1.9	1.7	1.5	0.8	1.0	1.8	1.7	0.8	0.7	1.1	1.0	1.9
21-Jun	0.5	0.6	0.7	0.9	1.6	1.4	0.7	0.8	1.1	0.5	0.6	1.0	1.1	0.9	1.0	0.9	1.4	1.3	1.4	1.1	1.3	0.9	0.6	0.7	1.6
22-Jun	0.5	1.0	0.8	1.6	2.1	1.3	1.0	1.9	1.1	1.8	2.2	1.4	1.8	3.1	3.4	3.0	2.6	2.5	1.7	2.0	0.9	0.6	0.9	0.7	3.4
23-Jun	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.3	0.4	0.7	0.6	1.3	1.8	2.0	2.1	3.0	2.2	2.2	2.0	1.3	1.6	1.2	1.3	1.6	3.0
24-Jun	1.9	1.8	3.1	2.0	1.6	1.4	1.5	1.4	2.0	2.4	2.7	2.7	3.1	2.2	2.3	2.5	1.8	1.6	2.3	1.9	2.4	2.1	2.3	2.5	3.1
25-Jun	2.7	2.1	1.9	1.5	2.0	2.2	2.1	2.3	2.3	3.1	3.0	2.9	3.7	2.5	1.7	2.3	2.3	1.1	0.6	0.7	0.7	0.6	0.7	1.1	3.7
26-Jun	1.0	0.7	0.7	0.8	0.7	0.5	0.6	1.5	1.8	2.2	3.1	2.6	2.3	2.2	1.4	0.5	1.5	1.0	0.9	0.4	0.4	0.4	0.4	0.5	3.1
27-Jun	0.4	0.3	0.4	0.4	0.2	0.3	0.4	0.7	0.9	0.7	1.3	2.0	1.7	2.5	0.6	0.6	1.6	2.8	2.5	1.9	0.6	0.2	0.5	0.2	2.8
28-Jun	0.5	0.6	0.4	0.3	0.5	0.3	0.4	0.4	1.2	1.4	2.7	2.7	3.1	3.4	3.2	3.1	2.5	2.1	1.1	1.3	0.8	0.6	0.3	0.3	3.4
29-Jun	0.3	0.3	0.3	0.4	0.8	0.4	1.5	1.0	1.8	2.0	2.2	3.2	4.1	4.0	3.9	3.9	3.7	3.0	3.0	2.5	1.2	0.6	0.6	0.5	4.1
30-Jun	0.5	0.9	0.8	0.6	0.9	0.7	1.3	1.6	1.7	2.6	2.8	2.8	2.7	2.8	2.6	2.8	2.7	2.4	2.4	1.4	0.7	0.6	0.3	0.4	2.8

2.7	3.3	3.1	3.3	3.2	3.4	3.5	2.8	3.4	3.2	3.5	3.7	4.7	4.0	4.4	4.5	4.4	4.0	3.4	3.5	3.1	2.7	2.5	2.7	
Diurnal Maximum																								

AF - Analyzer Failure UO - Unstable Operation

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 4
BUFFALO VIEWPOINT
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)
 JUNE 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	8	0	2	0
H2S (ppb) Average	676	40	44	99.44	4	0	1	0
THC (ppm) Average	685	35	35	100.00	3.8	-	2.8	-
Temperature (C) Average	720	0	0	100.00	26.9	-	-	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	37	-	-	-
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)
 JUNE 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	0.3	1	-	0	0	0	0	0	0	0	8
H2S (ppb) Average	676	0.3	0	-	0	0	0	0	0	0	1	4
THC (ppm) Average	685	2.3	0.3	-	2	2.1	2.2	2.2	2.3	2.5	2.5	3.8
Temperature 2 m (C) Average	720	16.14	5.1	-	3.6	9.1	12.3	16.3	20	23	23	26.9
Wind Speed 10 m (km/h) Average	720	10.8	6	-	0	5	7	9	13	19	19	37
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	06 Jun 2014 10:00	06 Jun 2014 13:00	4	Maintenance - verify analyzer response

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 8 ppb on Jun 6 15:00	Maximum Daily Average: 1.9 ppb on Jun 6		Hours of Data:	685
Minimum Value: 0 ppb on Jun 15 05:00	Minimum Daily Average: 0.1 ppb on Jun 15		Hours of Missing Data:	35
Maximum Diurnal Average: 0.6 ppb at hour 13	Minimum Diurnal Average: 0.2 ppb at hour 7		Hours of Calibration:	35
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 = 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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	1	0	0	0	0	0	0	0	0	0	0.2	1
6-Jun	0	Z	0	0	0	0	0	1	1	2	5	4	7	5	8	4	2	1	1	1	0	1	0	0	1.9	8
7-Jun	0	Z	0	0	0	0	0	0	1	2	1	0	0	1	2	7	2	1	0	0	0	0	0	0	0.9	7
8-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Jun	0	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-Jun	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
11-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.3	2
13-Jun	0	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-Jun	0	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-Jun	0	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-Jun	0	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
17-Jun	0	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-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.3	1
20-Jun	0	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-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
23-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-Jun	0	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-Jun	0	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-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	2	1	1	1	0	0	0	0	0	0	0.5	2
28-Jun	0	Z	0	0	0	0	0	0	0	1	2	4	6	2	1	1	1	1	1	0	0	0	0	0	1.0	6
29-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
30-Jun	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1

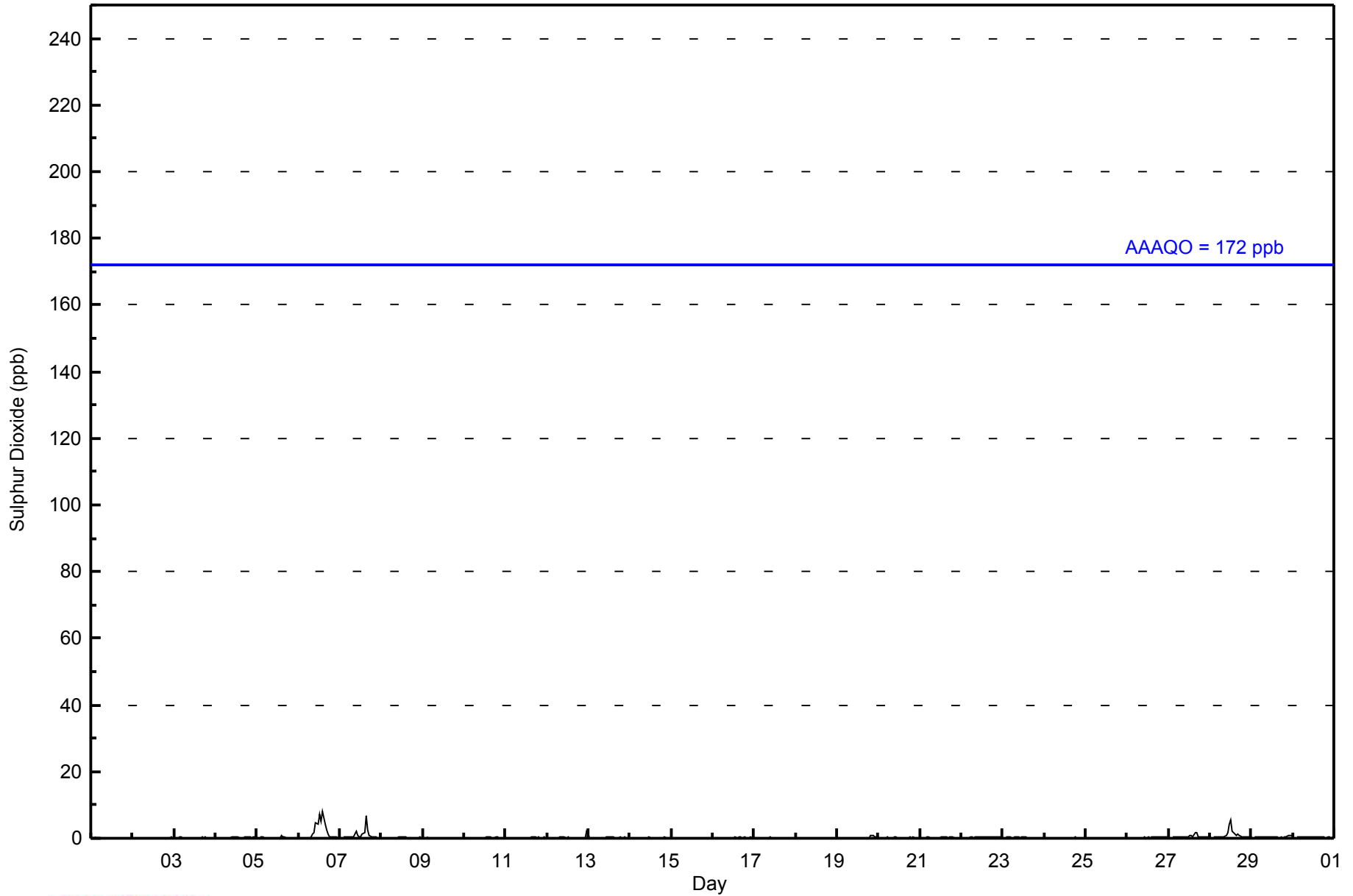
0.2	--	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.6	0.5	0.6	0.6	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.3	Diurnal Average
1	--	0	0	0	0	0	0	1	1	2	5	4	7	5	8	7	2	1	1	1	1	1	1	2	Diurnal Maximum

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	685	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: 685

Total Number of Hours: 720



WBEA
Frequency Distribution

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

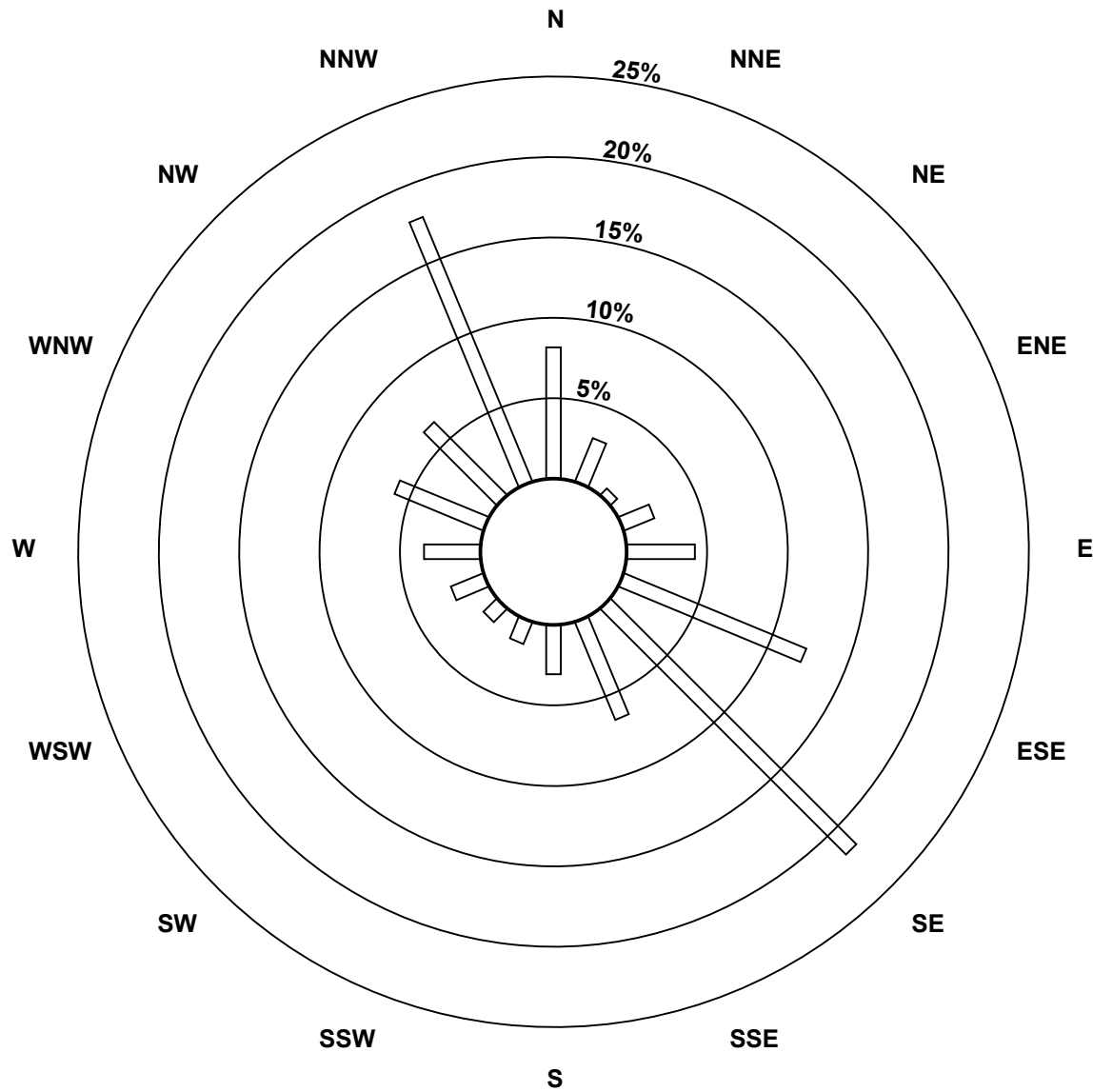
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	56	20	4	14	29	84	148	45	21	10	8	15	24	41	44	122	685
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	56	20	4	14	29	84	148	45	21	10	8	15	24	41	44	122	685

Total Number of Valid Hours: 685

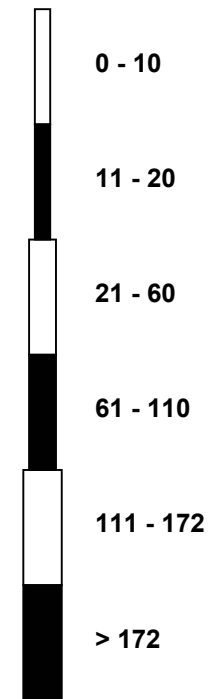
Total Number of Hours: 720

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

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



Classes (ppb)

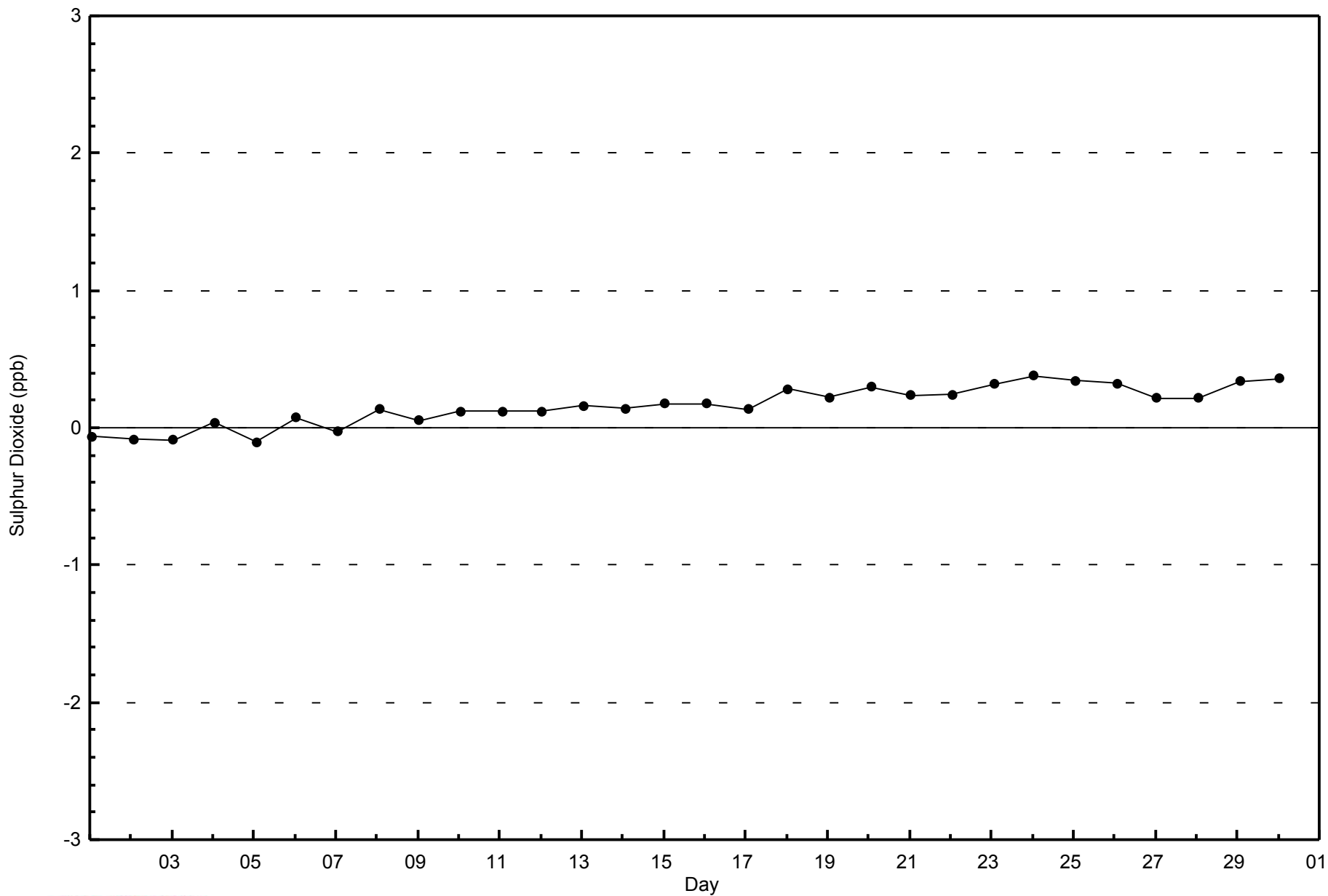


Total Number of Valid Hours: 685



WBEA
Zero Responses

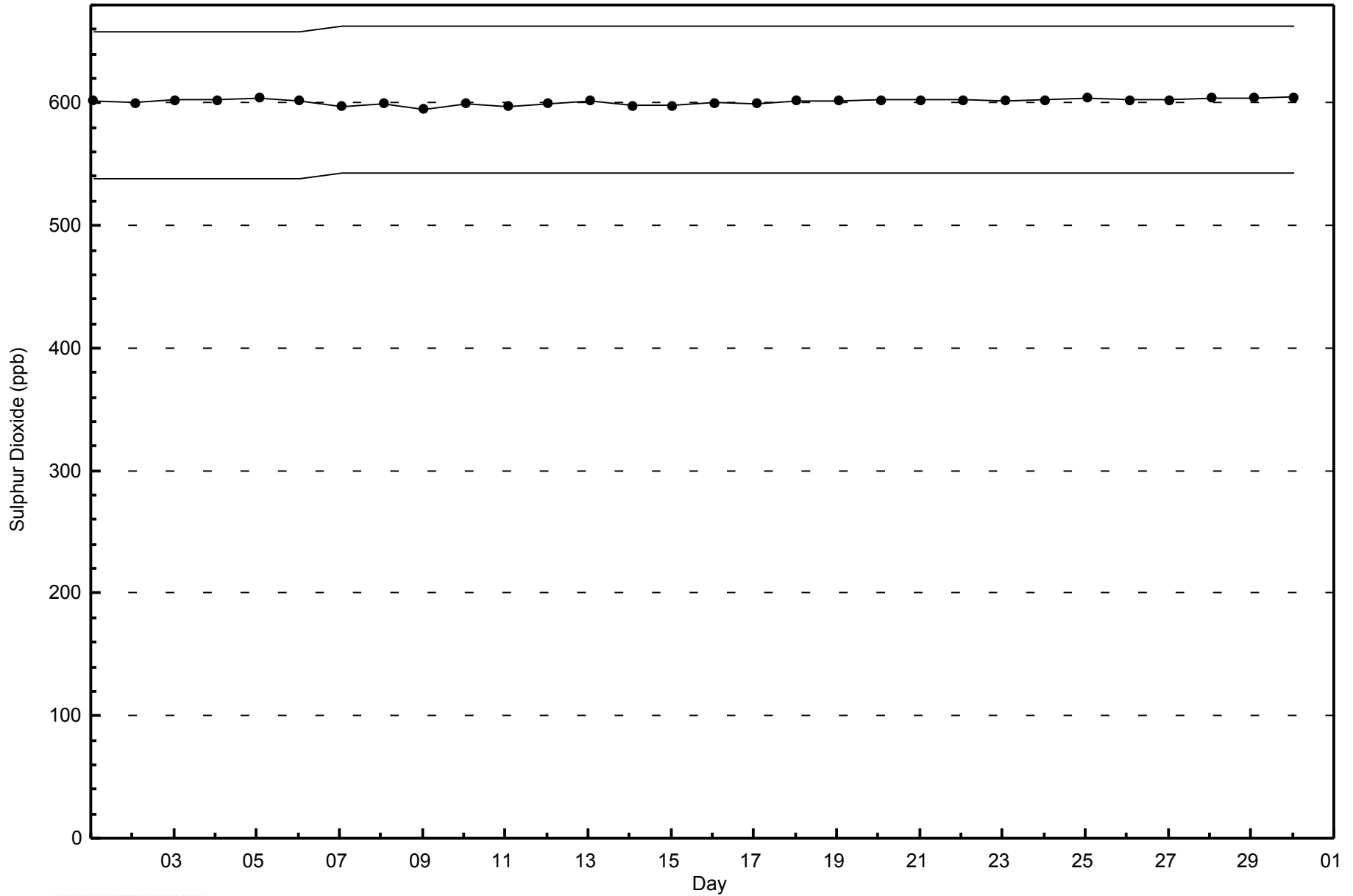
Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - June 2014





WBEA
Span Responses

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



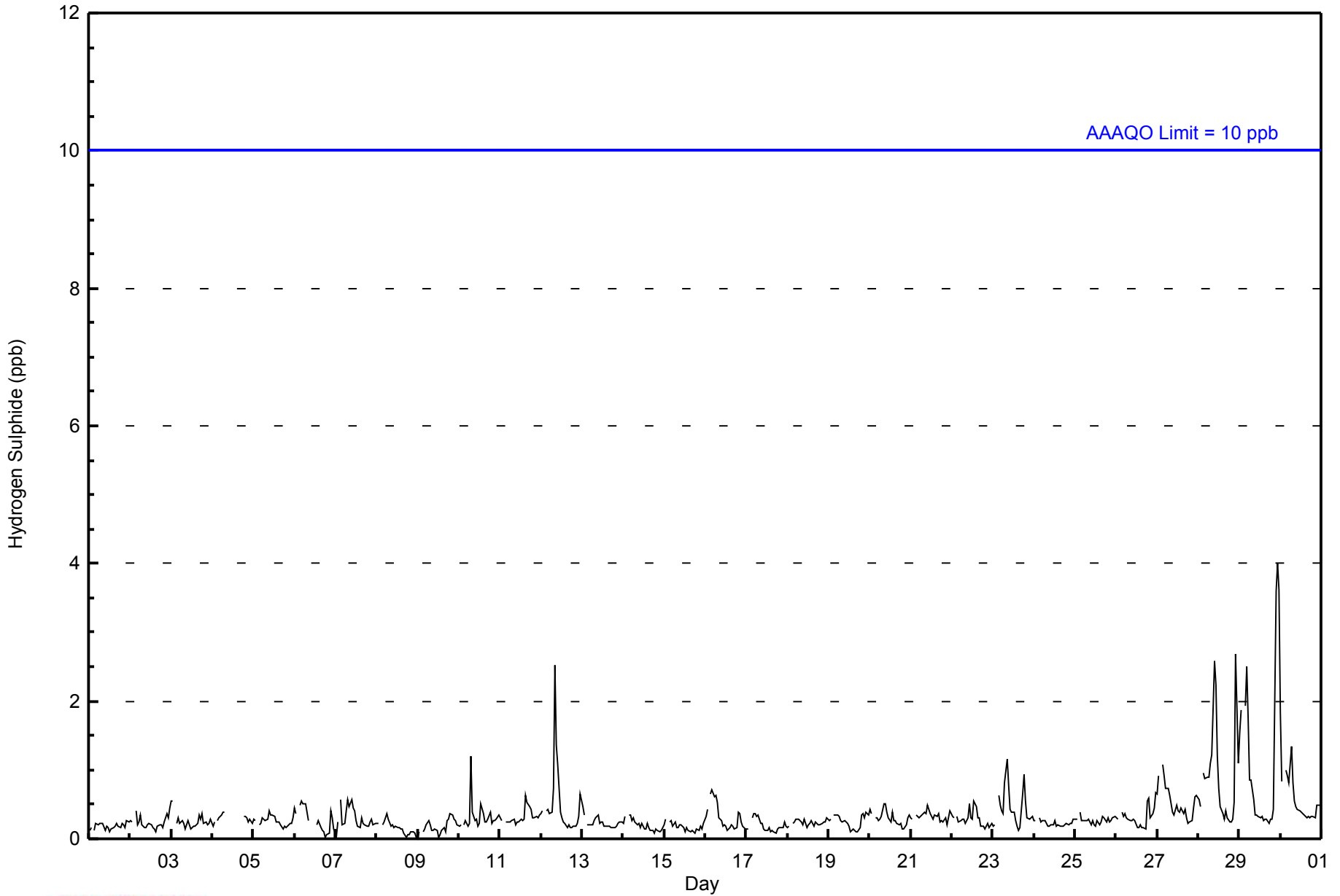


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 720																																		
Maximum Value: 4 ppb on Jun 29 23:00														Maximum Daily Average: 1.2 ppb on Jun 29										Hours of Data: 676																								
Minimum Value: 0 ppb on Jun 9 01:00														Minimum Daily Average: 0.2 ppb on Jun 8										Hours of Missing Data: 44																								
Maximum Diurnal Average: 0.5 ppb at hour 23														Minimum Diurnal Average: 0.2 ppb at hour 18										Hours of Calibration: 40																								
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 = 3										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-Jun	0	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-Jun	0	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-Jun	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
4-Jun	0	0	Z	0	0	0	0	0	C	C	C	C	C	C	C	C	C	C	0	0	0	0	0	0	--	0																						
5-Jun	0	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-Jun	0	0	Z	0	1	1	1	0	0	M	M	M	M	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
7-Jun	0	0	Z	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
8-Jun	0	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-Jun	0	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-Jun	0	0	Z	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1																						
11-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.3	1																						
12-Jun	0	0	Z	0	0	0	0	1	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	3																						
13-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
14-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
15-Jun	0	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-Jun	0	0	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																						
17-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
19-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
20-Jun	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
21-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1																						
23-Jun	0	0	Z	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.5	1																						
24-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
25-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0.3	1																						
27-Jun	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.5	1																						
28-Jun	1	0	Z	1	1	1	1	1	1	3	2	1	1	0	0	0	0	0	0	0	0	1	3	1	0.9	3																						
29-Jun	2	2	Z	2	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	1.2	4																						
30-Jun	2	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2																						
																								0.4	0.4	--	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.5	0.4	Diurnal Average
																								2	2	--	2	3	2	1	1	3	3	2	1	1	1	0	1	1	1	1	1	0	4	4	4	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	669	98.96	98.96
3 - 4	7	1.04	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
Buffalo Viewpoint - June 2014

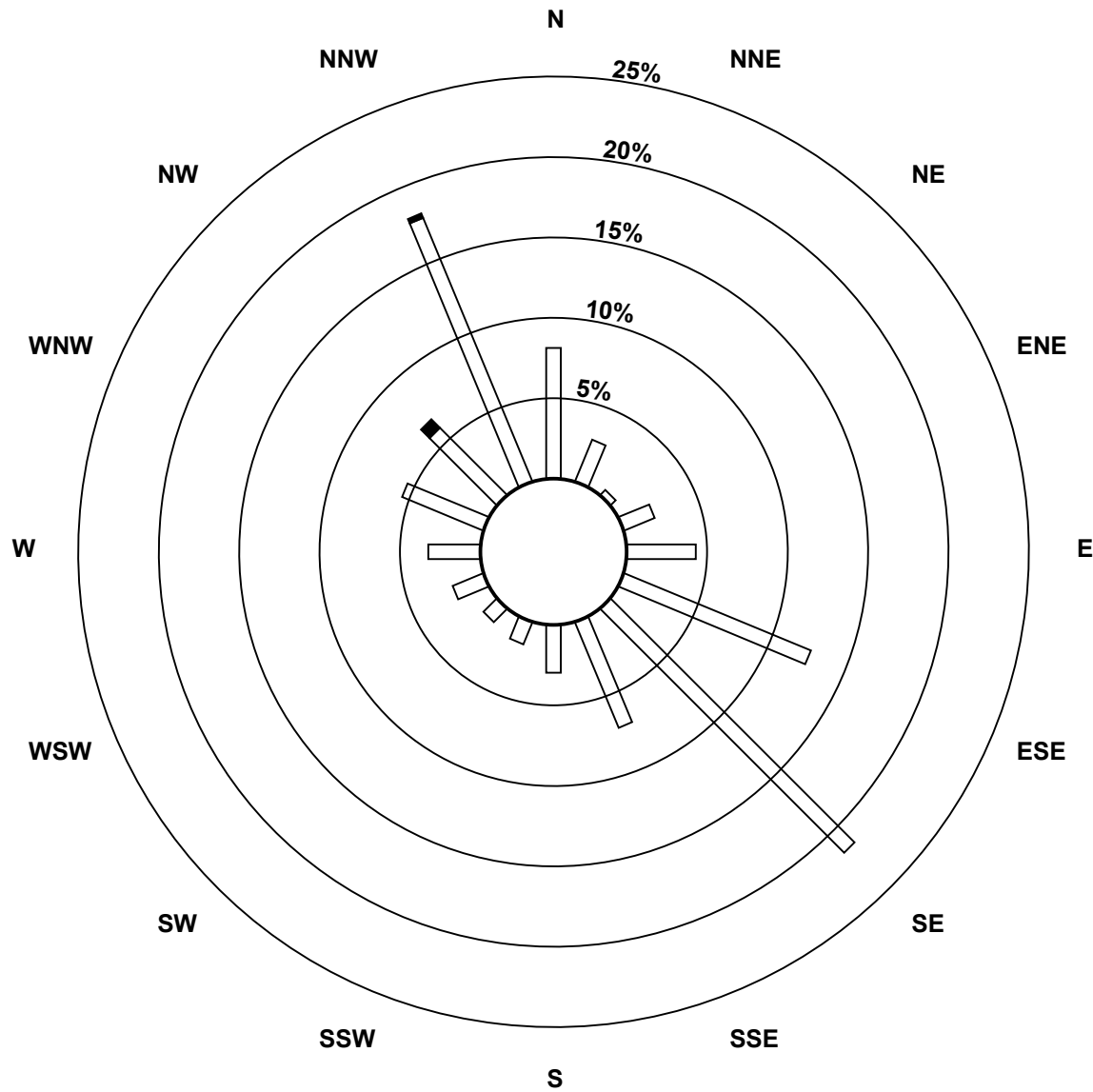
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	55	19	3	14	29	85	145	48	20	10	8	14	22	37	40	120	669
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	7
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	19	3	14	29	85	145	48	20	10	8	14	22	37	45	122	676

Total Number of Valid Hours: 676

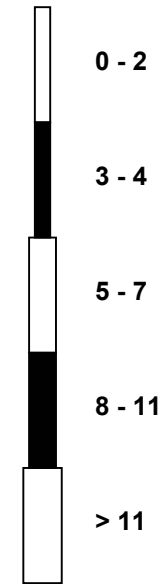
Total Number of Hours: 720

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

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



Classes (ppb)

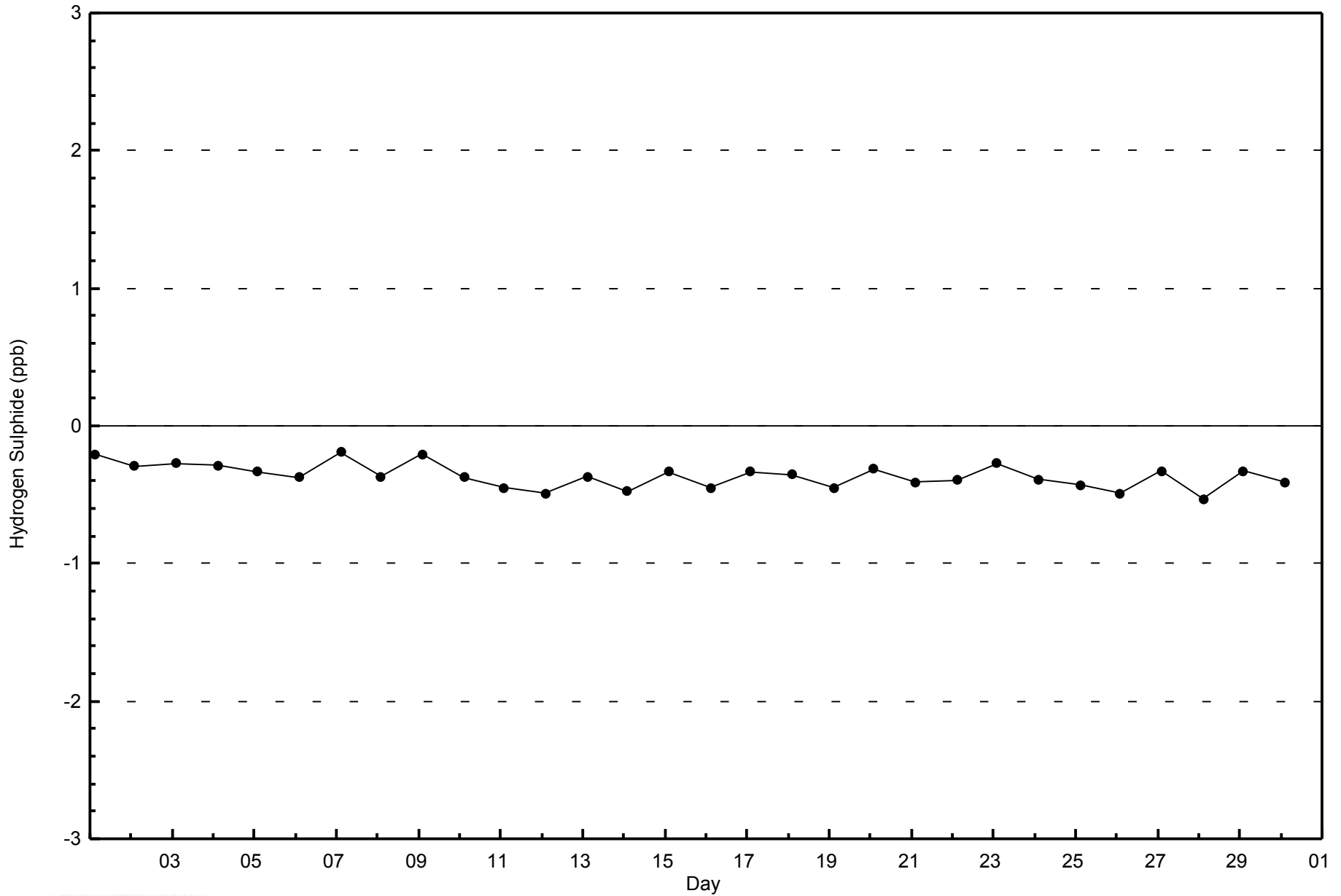


Total Number of Valid Hours: 676



WBEA
Zero Responses

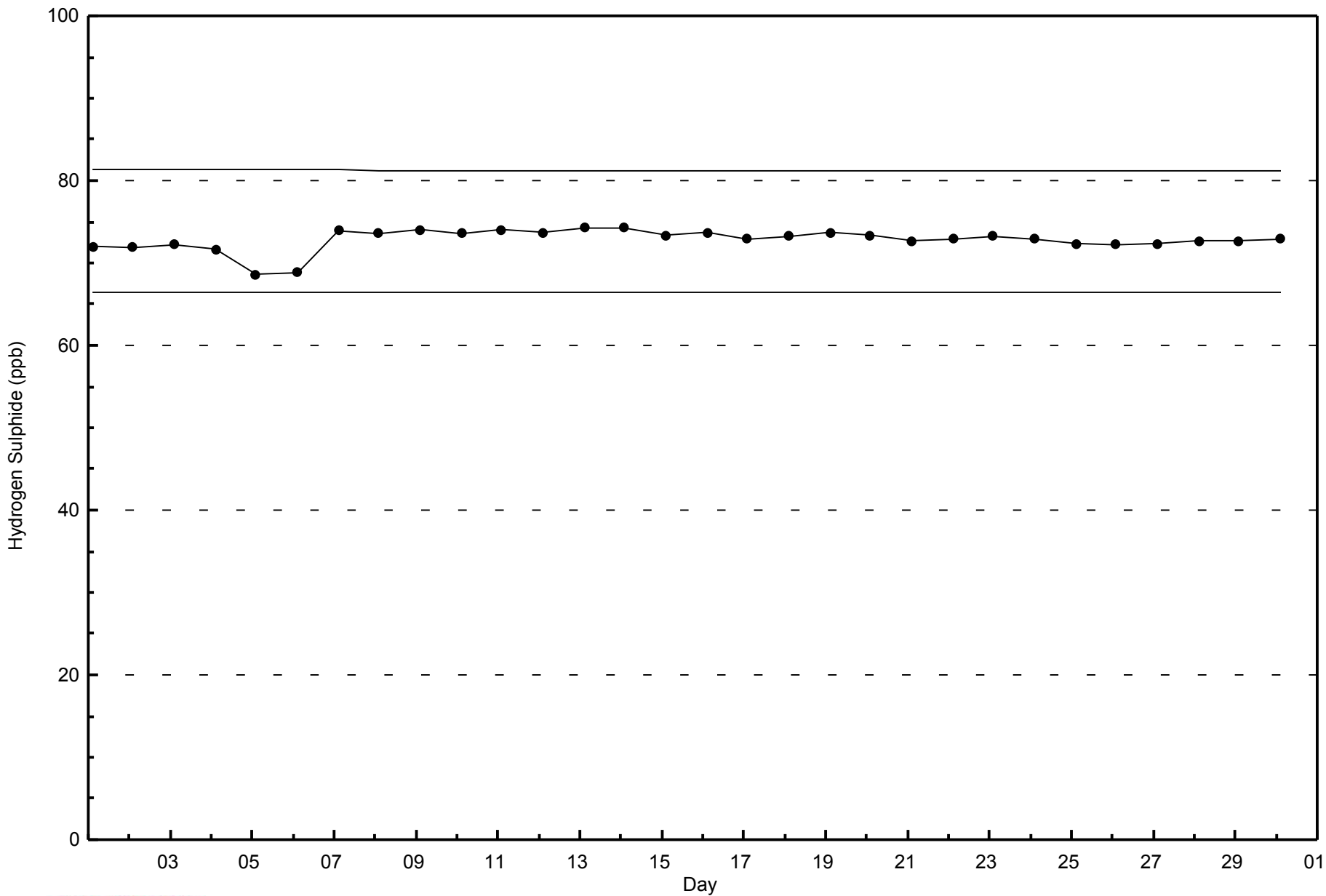
Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - June 2014





WBEA
Span Responses

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





Summary of Hour Averages

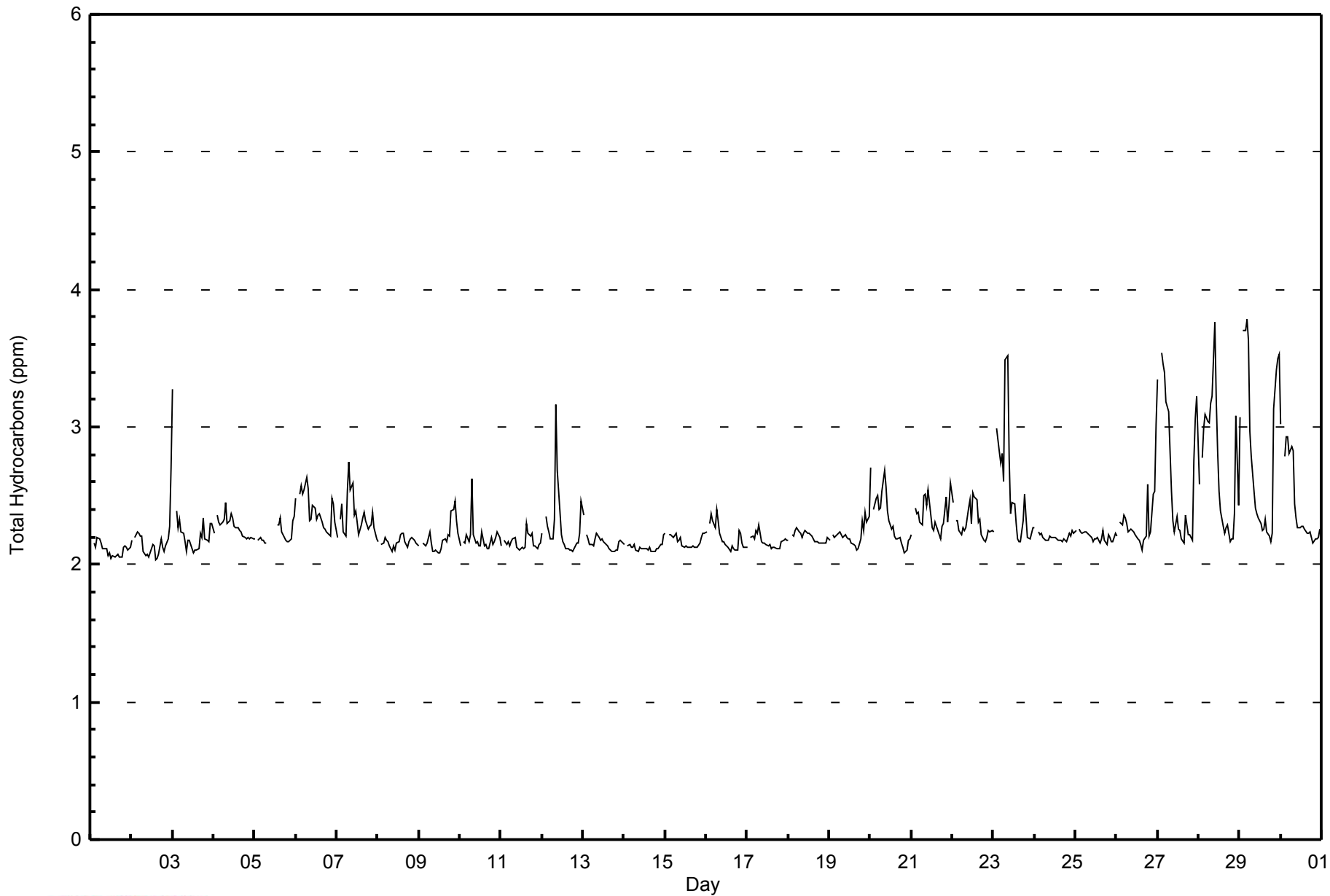
Buffalo Viewpoint - June 2014

Table with columns: Day, Hourly Period Ending At (MST) [1-24], Daily Average, Daily Maximum. Includes summary statistics like Maximum Value: 3.8 ppm on Jun 29 05:00, Minimum Value: 2.0 ppm on Jun 2 15:00, and Percentiles: P1=2.1, P10=2.1, Q1=2.2, Median=2.2, Q3=2.3, P90=2.5, P99=3.5.



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	3	0.44	0.44
2.1 - 3.0	655	95.62	96.06
3.1 - 10.0	27	3.94	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
Buffalo Viewpoint - June 2014

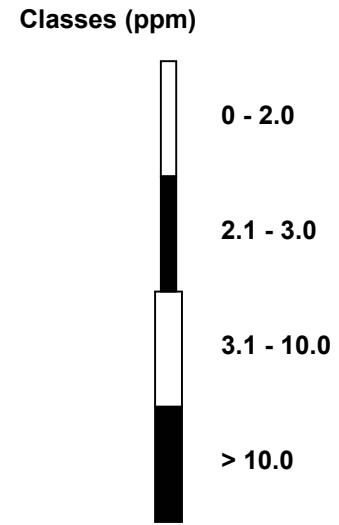
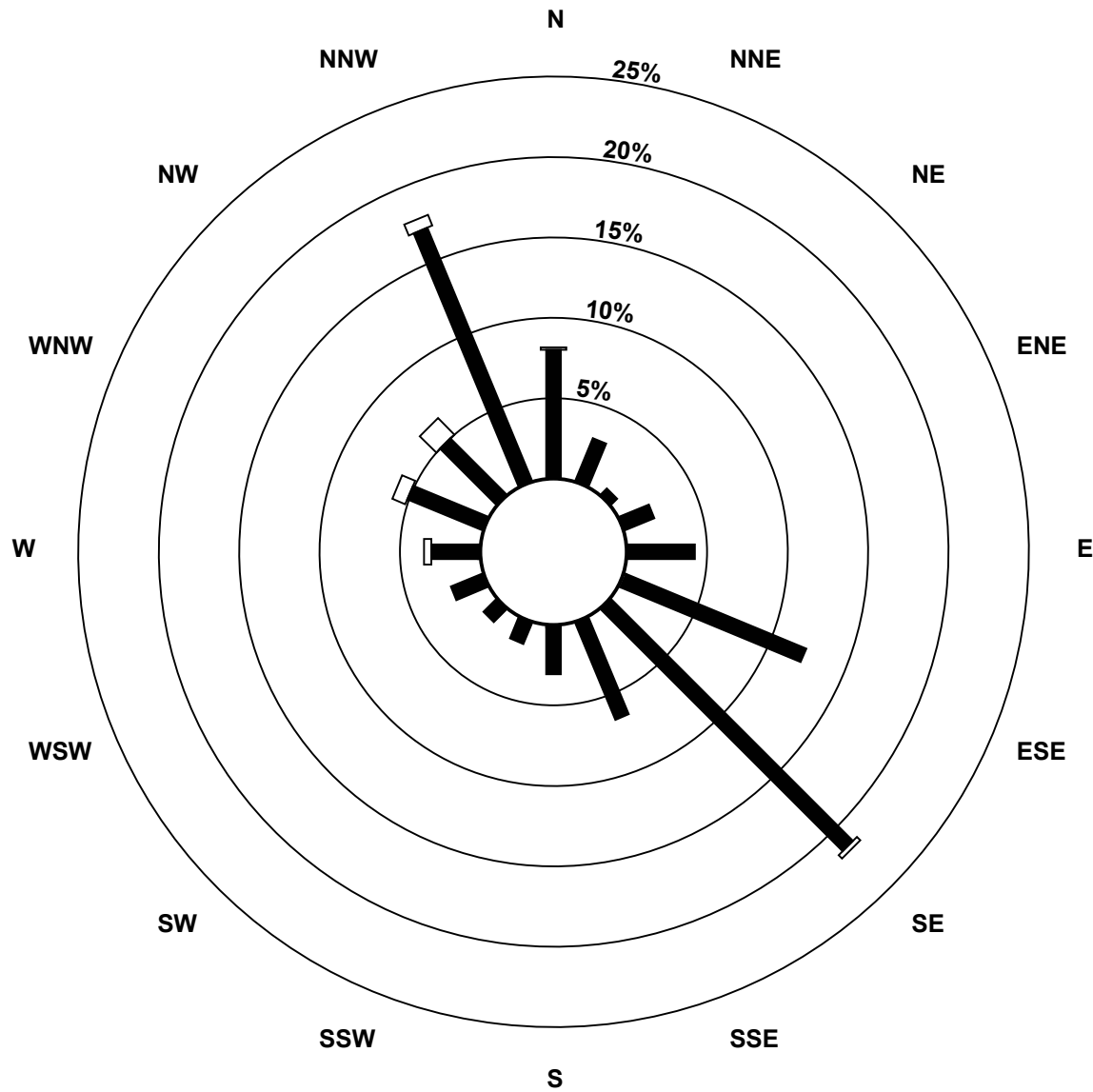
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	3
2.1 - 3.0	55	20	4	14	29	83	146	45	20	10	8	15	20	35	34	117	655
3.1 - 10.0	1	0	0	0	0	0	2	0	0	0	0	0	3	6	10	5	27
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	20	4	14	29	84	148	45	21	10	8	15	24	41	44	122	685

Total Number of Valid Hours: 685

Total Number of Hours: 720

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

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

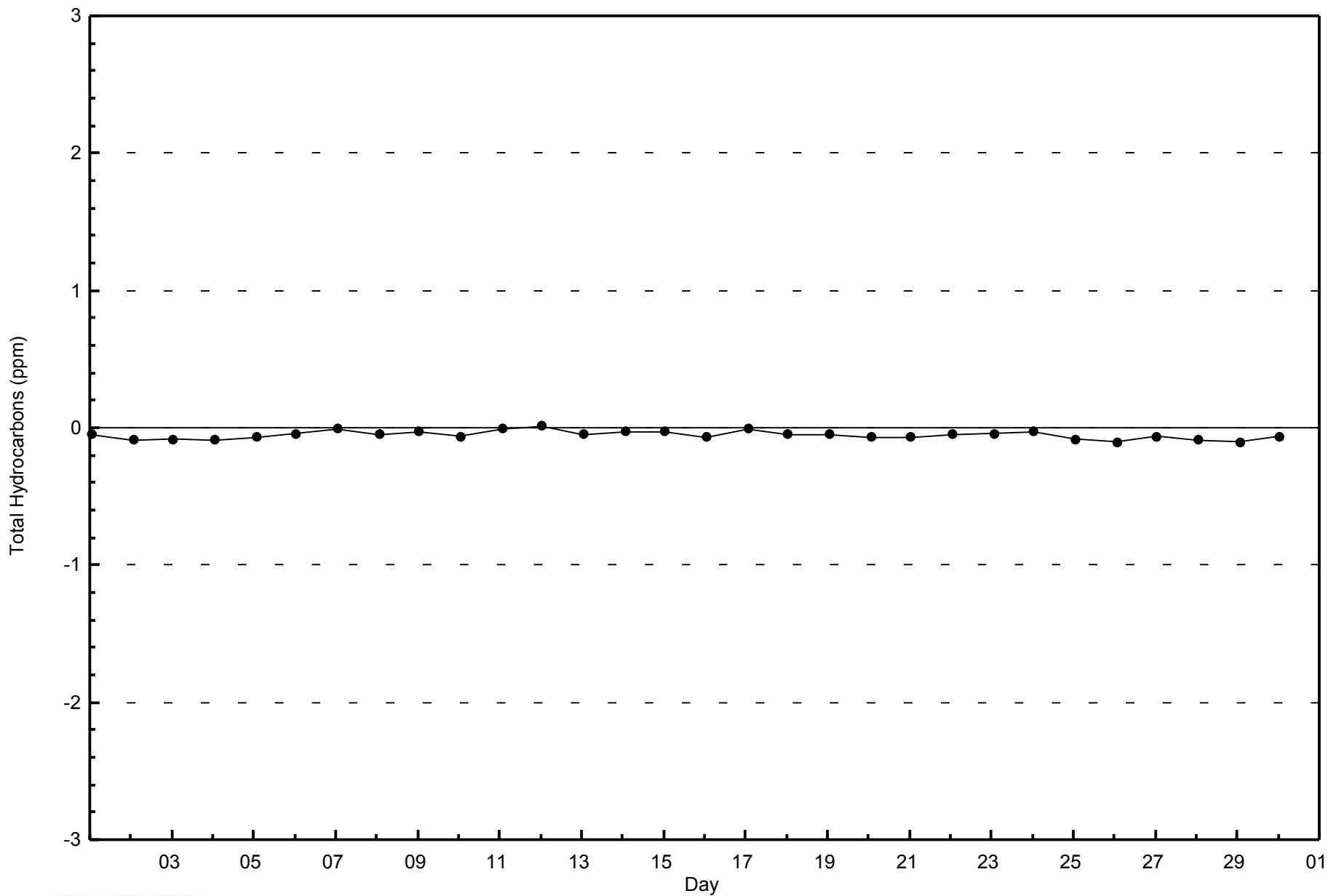


Total Number of Valid Hours: 685



WBEA
Zero Responses

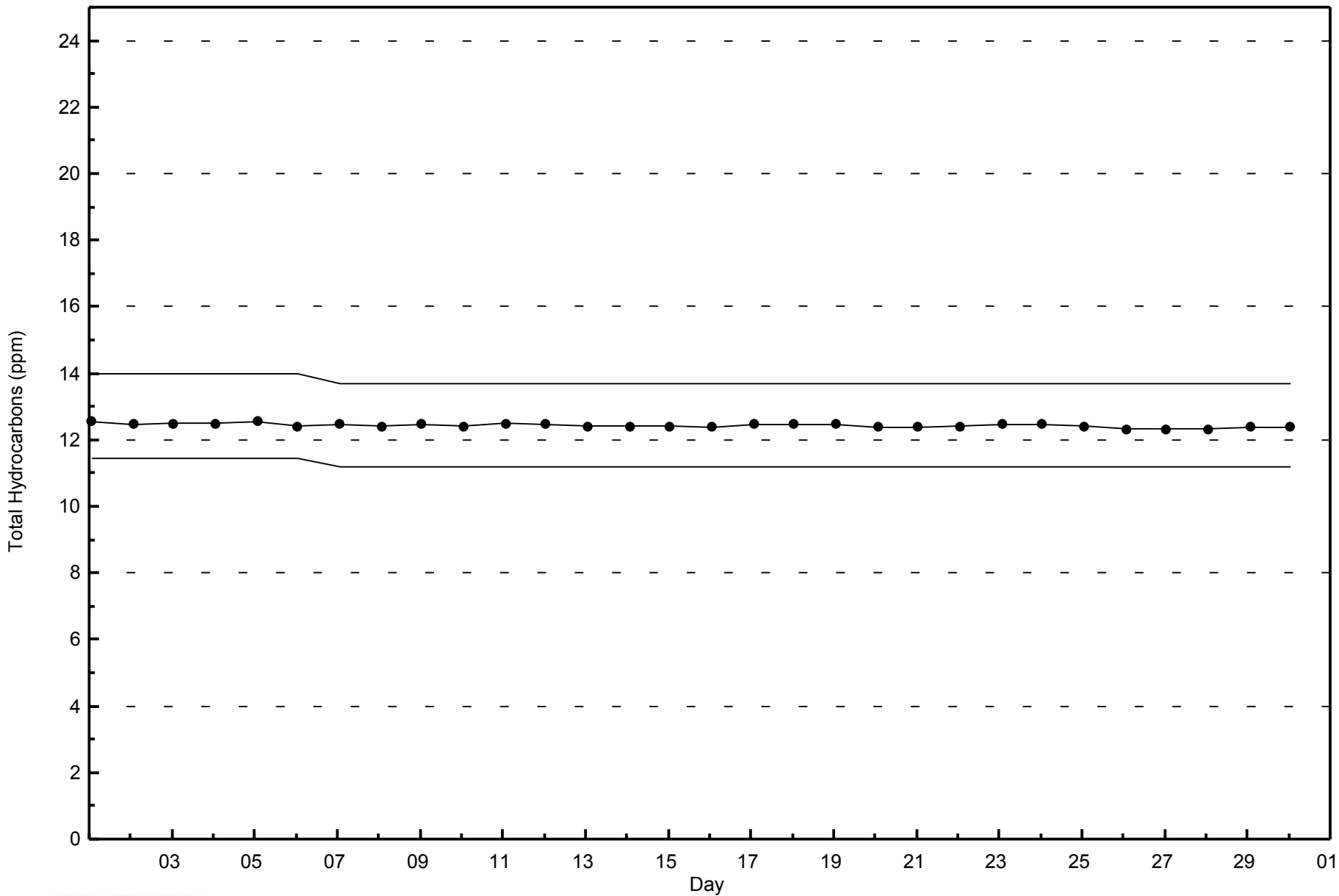
Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - June 2014





WBEA
Span Responses

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



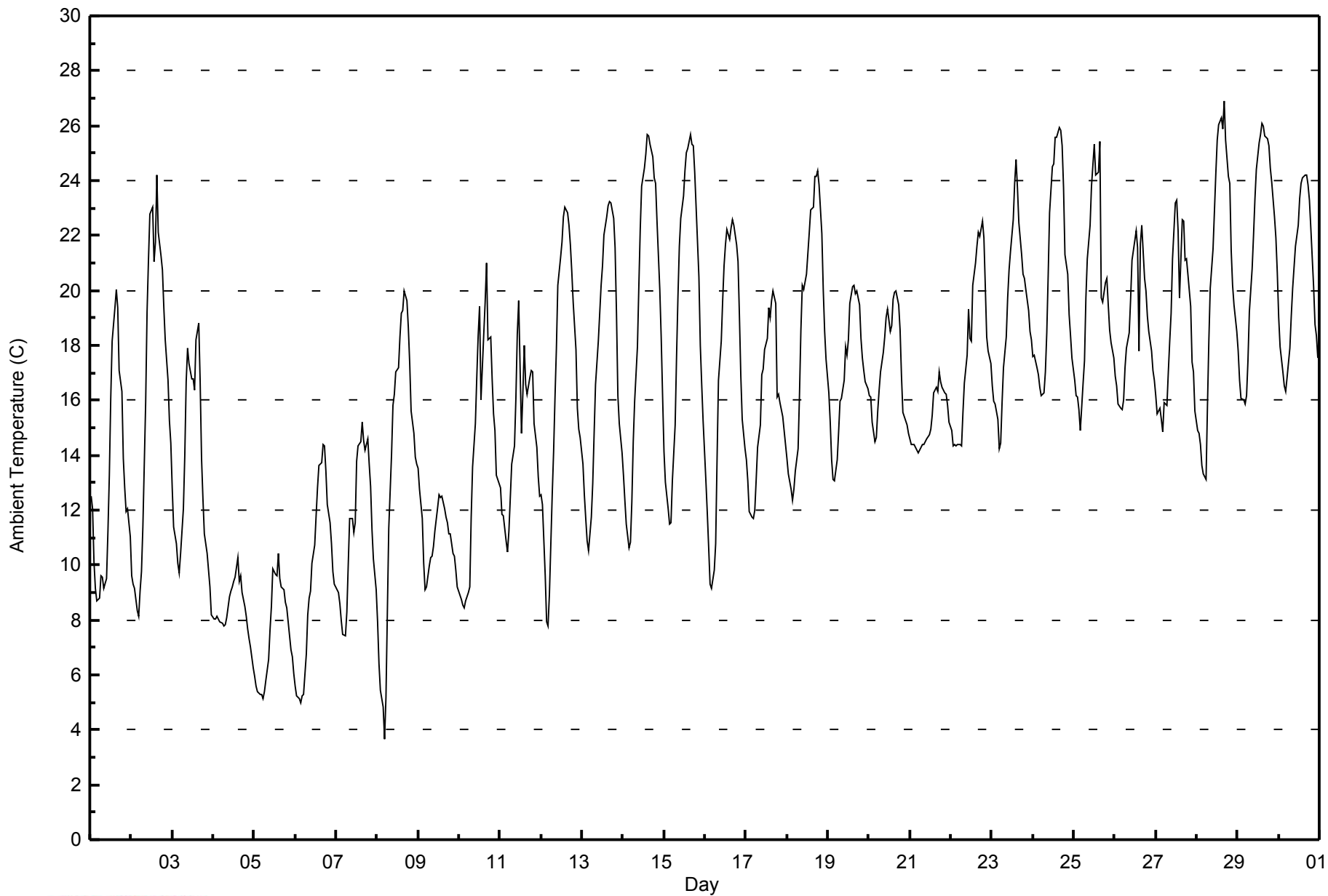


Maximum Value: 26.9 C on Jun 28 17:00 Maximum Daily Average: 21.6 C on Jun 29																						Hours in Service: 720 Hours of Data: 720				
Minimum Value: 3.6 C on Jun 8 05:00 Minimum Daily Average: 7.4 C on Jun 5																						Hours of Missing Data: 0 Hours of Calibration: 0				
Maximum Diurnal Average: 20.5 C at hour 16 Minimum Diurnal Average: 11.2 C at hour 5																						Percent Operational Time: 100.0				
Monthly Average: 16.14 C Percentiles: P ₁ = 5.2 P ₁₀ = 9.1 Q ₁ = 12.3 Median = 16.3 Q ₃ = 20.0 P ₉₀ = 23.0 P ₉₉ = 25.8																										
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-Jun	12.5	12.0	10.1	9.1	8.7	8.8	9.6	9.6	9.1	9.5	11.3	13.3	16.1	18.2	19.4	20.0	19.3	17.1	16.3	13.9	12.8	12.0	12.0	11.0	13.0	20.0
2-Jun	9.6	9.3	9.2	8.3	8.1	9.0	9.8	11.4	15.9	19.2	21.1	22.8	23.0	21.1	21.8	24.2	22.1	21.3	20.8	19.4	18.2	16.7	15.3	14.4	16.3	24.2
3-Jun	12.8	11.4	10.8	10.1	9.7	10.4	12.0	14.0	16.7	17.9	17.3	16.8	16.4	18.2	18.8	16.7	13.9	12.4	11.1	10.4	9.8	9.2	8.2	13.4	18.8	
4-Jun	8.0	8.0	8.1	8.0	7.9	7.9	7.8	7.9	8.1	8.8	9.1	9.2	9.4	9.6	10.3	9.4	9.6	9.0	8.5	8.1	7.7	7.3	7.0	6.3	8.4	10.3
5-Jun	5.9	5.6	5.4	5.3	5.3	5.2	5.4	5.8	6.6	7.6	8.5	9.9	9.7	9.6	10.4	9.5	9.2	9.1	8.6	8.4	7.9	6.9	6.7	6.0	7.4	10.4
6-Jun	5.6	5.2	5.1	5.0	5.2	5.3	6.8	8.2	8.8	9.0	10.1	10.7	11.8	12.8	13.6	13.7	14.4	14.3	13.4	12.2	11.6	10.8	9.8	9.3	9.7	14.4
7-Jun	9.1	9.0	8.6	8.0	7.5	7.4	8.3	10.0	11.7	11.7	11.2	11.5	13.8	14.4	14.5	15.2	14.5	14.2	14.6	13.7	12.9	11.3	10.2	9.1	11.3	15.2
8-Jun	7.9	6.4	5.5	4.8	3.6	5.2	8.3	11.4	14.1	15.8	16.2	17.0	17.2	18.3	19.2	19.3	20.0	19.6	18.6	17.3	15.6	14.8	14.0	13.7	13.5	20.0
9-Jun	13.5	12.7	11.7	10.1	9.1	9.2	9.9	10.3	10.3	10.7	11.2	12.1	12.6	12.5	12.5	12.0	11.8	11.5	11.2	11.2	10.4	10.3	9.8	9.2	11.1	13.5
10-Jun	8.9	8.7	8.6	8.5	8.7	9.0	9.2	11.7	13.6	15.1	16.8	18.3	19.4	16.0	18.4	19.6	21.0	18.2	18.3	16.8	15.5	14.9	13.3	13.0	14.2	21.0
11-Jun	12.8	11.8	11.8	10.9	10.5	11.2	12.4	13.7	14.4	16.1	18.4	19.6	14.8	16.3	18.0	16.6	16.2	16.9	17.1	17.0	15.2	14.3	13.2	12.5	14.6	19.6
12-Jun	12.5	12.2	9.6	7.9	7.8	8.9	12.5	14.1	16.1	17.9	20.2	21.2	21.8	22.7	23.0	22.8	22.4	21.7	20.7	19.6	17.9	15.7	15.0	14.6	16.6	23.0
13-Jun	13.7	12.6	11.7	10.9	10.5	11.8	13.0	14.8	16.6	18.1	19.2	20.2	20.9	22.0	22.7	23.1	23.3	23.2	22.6	21.6	19.2	16.2	15.2	14.1	17.4	23.3
14-Jun	13.3	12.4	11.5	10.6	10.8	12.3	14.5	16.0	18.0	20.1	22.2	23.8	24.5	25.0	25.7	25.6	25.3	24.9	24.1	23.9	22.5	20.1	18.3	16.2	19.2	25.7
15-Jun	14.1	13.0	12.1	11.5	11.5	13.1	15.1	17.6	19.8	21.6	22.6	23.4	24.3	25.0	25.2	25.7	25.3	25.3	24.3	23.0	20.5	18.0	16.6	15.3	19.3	25.7
16-Jun	13.0	11.9	10.7	9.3	9.1	9.8	10.8	13.9	16.7	18.2	19.6	20.9	21.7	22.2	21.9	22.3	22.6	22.4	21.7	21.1	19.1	16.9	15.3	14.2	16.9	22.6
17-Jun	13.8	13.1	11.9	11.7	11.7	12.0	13.1	14.3	15.1	16.9	17.1	17.9	18.3	19.4	19.0	19.6	20.0	19.5	16.1	16.2	15.9	15.4	14.9	14.4	15.7	20.0
18-Jun	13.9	13.3	12.8	12.3	12.8	13.4	14.2	16.2	18.6	20.2	20.0	20.6	21.4	22.1	22.9	23.0	24.2	24.1	24.3	23.8	22.1	20.0	18.5	17.5	18.8	24.3
19-Jun	16.3	15.2	13.9	13.1	13.1	13.8	14.8	16.0	16.1	16.7	17.9	17.6	18.2	19.5	20.1	20.2	19.9	20.0	19.5	18.3	17.5	17.1	16.7	16.4	17.0	20.2
20-Jun	16.2	16.1	15.2	14.5	14.7	15.6	16.4	17.0	17.8	18.3	19.0	19.3	18.5	18.7	19.7	19.9	20.0	19.5	18.5	16.9	15.5	15.2	15.1	14.8	17.2	20.0
21-Jun	14.6	14.4	14.4	14.3	14.2	14.1	14.3	14.4	14.4	14.5	14.6	14.8	15.0	15.5	16.3	16.5	16.3	17.0	16.7	16.5	16.3	16.2	15.8	15.2	15.3	17.0
22-Jun	14.9	14.3	14.4	14.3	14.4	14.4	14.4	15.5	16.6	17.7	19.3	18.2	18.2	20.2	21.0	21.6	22.1	22.0	22.5	21.9	20.1	18.3	17.8	17.3	18.0	22.5
23-Jun	16.5	16.0	15.8	15.3	14.2	14.5	15.9	17.2	18.3	19.7	20.7	21.4	22.6	23.9	24.7	23.7	22.5	21.3	20.6	20.4	20.0	19.3	18.5	18.2	19.2	24.7
24-Jun	17.6	17.7	17.2	16.9	16.5	16.2	16.3	17.0	18.4	20.5	22.8	24.5	24.6	25.6	25.6	25.9	25.8	25.3	23.8	21.3	20.6	19.1	18.4	17.6	20.6	25.9
25-Jun	16.8	16.2	16.1	15.7	14.9	16.6	17.5	19.7	21.1	22.4	23.8	24.6	25.3	24.2	24.3	25.4	19.7	19.6	20.3	20.5	19.5	18.5	18.1	17.5	19.9	25.4
26-Jun	16.9	16.5	15.9	15.7	15.6	16.0	17.2	17.9	18.5	19.7	21.1	21.5	22.2	21.5	17.8	21.7	22.4	20.4	20.0	19.1	18.5	17.8	17.1	16.7	18.7	22.4
27-Jun	16.2	15.5	15.7	15.3	14.9	15.9	15.8	17.0	18.2	19.2	21.2	23.2	23.3	22.2	19.7	22.6	22.5	21.1	21.2	20.6	19.4	17.4	17.0	15.6	18.8	23.3
28-Jun	14.9	14.8	14.4	13.6	13.3	13.1	15.8	18.1	20.1	21.5	22.9	24.3	25.5	26.0	26.3	25.9	26.9	25.5	24.2	23.9	21.4	20.2	19.5	18.5	20.4	26.9
29-Jun	17.8	16.7	16.1	16.0	15.8	16.1	17.5	19.2	20.8	22.0	23.3	24.4	25.4	25.7	26.1	26.0	25.6	25.5	25.3	24.5	23.9	22.7	21.9	20.6	21.6	26.1
30-Jun	19.0	17.9	17.1	16.5	16.3	16.8	17.9	19.1	20.1	20.8	21.6	22.4	23.4	23.9	24.1	24.2	24.2	23.8	23.3	22.3	20.1	18.7	18.4	17.6	20.4	24.2
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	110	15.28	15.28
10 - 20	432	60.00	75.28
> 20	178	24.72	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 37 km/h on Jun 29 17:00	Maximum Daily Speed Average: 23.2 km/h on Jun 5	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 27 05:00	Minimum Daily Speed Average: 1.5 km/h on Jun 2	Hours of Data: 720
Maximum Diurnal Speed Average: 6.3 km/h at hour 18	Minimum Diurnal Speed Average: 0.3 km/h at hour 3	Hours of Missing Data: 0
Monthly Average Velocity: 2.5 km/h 21.6 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 7 Median = 9 Q ₃ = 13 P ₉₀ = 19 P ₉₉ = 32	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	ESE18	ESE15	SE11	SE13	ESE12	ESE11	ESE16	SE16	SE12	SE13	SE10	ESE11	ESE11	SE7	SE7	ESE9	SSE14	SSE11	SSW6	NNW16	SE6	SE8	S5	SSE7	SE9.3	ESE18
2-Jun	SE8	SE7	SSE7	SE8	SE9	SE5	SE8	SSE8	S6	SW7	W8	W11	W15	W11	S6	W8	NNE15	NNW11	N21	N18	N11	NNW5	NNW5	NW5	NW1.5	N21
3-Jun	NNW6	NNW6	N11	N13	N13	N14	N12	N14	NNW16	NNW24	NNW29	NNW33	N25	NNW14	N22	N25	NNW35	NNW32	NNW25	N24	N21	N17	NW18	NW17	NNW18.9	NNW35
4-Jun	N14	NNW10	NNW8	NNW11	NNW12	NNW9	NNW10	NW10	NNW11	NNW16	NNW17	NNW17	N20	N28	N31	NNW30	NNW31	NNW29	NNW29	NNW29	NNW25	NNW22	NNW22	NNW25	NNW18.9	N31
5-Jun	NNW25	NNW29	NNW27	NNW25	NNW26	NNW30	NNW27	NNW27	NNW27	N23	N23	N25	NNW24	NNW27	NNW24	NNW21	NNW25	NNW26	NNW25	NNW18	NNW24	NNW13	NW11	NNW23.2	NNW30	
6-Jun	NW11	NW10	WNW8	WNW5	WNW5	NW8	NW7	WNW8	NW5	NNW5	NW6	NNE6	NW6	WNW5	N5	NNE6	N9	NNE8	NNE8	NE9	ENE8	E6	SE7	ESE6	NNW4.2	NW11
7-Jun	ESE5	ESE6	NE7	ESE10	SE5	NNE3	NNW6	NNW6	N7	NNW9	NNW19	N15	NNE13	NNW8	WNW12	W8	NW9	WNW14	W10	W4	SSE4	W4	S7	S8	NNW3.5	NNW19
8-Jun	SSE4	SSE7	SE6	SSE7	SSE7	SE8	SE6	SSE4	ESE5	ESE6	ENE1	E8	E5	ENE5	ENE7	ESE3	E8	ESE9	ESE8	ESE8	SE9	SE11	SE11	SE12	ESE6.2	SE12
9-Jun	SE13	SSE11	SSE7	SSE9	ESE6	ESE9	ESE8	SSE5	SE6	SE13	SE11	ESE17	ESE19	ESE18	E16	E18	E17	E18	E15	ENE11	ENE10	ENE10	ENE9	N10	ESE10.4	ESE19
10-Jun	NNE12	N11	N13	N14	NNE12	N9	N8	NNW8	NNW15	NNW18	N13	NNW13	N13	E11	NW10	NNW13	N12	NNE11	SSW6	SSW8	WSW7	WSW8	SW6	WSW10	N7.2	NNW18
11-Jun	WSW11	WNW9	WSW12	SW9	SSW6	SW8	SW6	S5	SE6	S6	SE7	E10	ESE3	SW7	ESE12	E11	SE6	E4	SSE10	SE7	SE8	SE6	SSE4	SSE2	SSE3.8	ESE12
12-Jun	NNW4	W4	S7	SSE10	SE10	SSE6	S1	WNW5	NW6	NW6	NNW8	NNW17	N15	N15	N18	N19	N21	N19	N20	N18	N14	N13	NNE12	ENE9	N8.2	N21
13-Jun	ESE6	E4	E4	E7	E9	E8	E10	E9	E10	ESE8	ESE9	ESE9	E8	ESE7	ESE8	E9	E9	ESE8	ESE10	SE10	ESE7	ESE8	SE9	SE10	ESE7.8	SE10
14-Jun	SE11	SE12	SE12	SE11	SE12	SSE8	SE11	SE12	SE12	SE12	ESE13	SE12	SE13	SE13	SSE14	S14	SSE16	SSE14	SSE12	S12	S9	SSE9	S9	SSE8	SSE11.2	SSE16
15-Jun	SE10	SE9	SE8	SE11	SE11	SE11	SE9	ESE8	E10	ESE12	ESE14	ESE13	ESE11	E11	ESE11	E9	ESE12	ESE8	ESE13	ESE12	ESE9	ESE8	SE6	SE8	ESE9.8	ESE14
16-Jun	SSE7	SSE6	ESE6	S7	SSE3	SSE3	SSE4	S4	SE6	SE6	ESE6	ESE9	SE8	ESE7	WSW5	WNW7	NNE9	NE13	NE13	E9	SE7	S12	S9	SW6	SE3.6	NE13
17-Jun	SSW7	SSE5	SE8	SE7	SSE7	SSE5	ENE3	SE7	SE7	ESE9	ESE9	ESE11	ESE11	ESE9	ESE8	ESE10	SE9	SSE8	SSE10	SE5	SE8	SE9	SE9	SE9	SE7.3	ESE11
18-Jun	SE8	SE9	SE7	SE6	SE8	SE10	SE9	SE10	SE9	SE13	SE15	SE15	SE16	SE16	SE17	SE17	SE18	SE16	SE15	SE12	SE13	SE12	SE12	SE12	SE12.2	SE18
19-Jun	SE11	SE10	SE8	SSE6	SE7	SE6	SE7	SE10	SE7	SE8	SE11	ESE10	ESE13	ESE9	ESE9	ESE8	SE6	ESE5	ENE2	NNE3	WSW1	SSW3	WSW4	WSW5	SE6.0	ESE13
20-Jun	NW5	NNW13	NNW9	NNW9	N8	NNW6	NNW5	NNW1	SE5	SSE3	ESE6	SE8	ESE9	ESE8	SE9	ESE8	ESE8	ESE10	SE8	SE8	SE4	SSW2	WSW5	W6	E2.0	NNW13
21-Jun	W6	WNW8	WNW7	N9	NNE8	N9	NNW8	NW8	NW9	NW10	NNW9	NW10	NW12	NW10	NW9	NW7	W14	WNW14	WNW15	WNW13	WNW10	WNW8	WNW9	NW10	NW8.8	WNW15
22-Jun	NNW12	NNW9	WNW7	W9	WSW9	W10	W9	W7	WNW9	WNW10	NNW11	N12	NNW12	NW11	NNW15	NNW16	NNW15	NNW17	NNW16	NNW16	NNW11	N8	NNE8	N6	NW9.4	NNW17
23-Jun	N5	NW4	W6	W6	S4	W3	WNW3	WNW3	NW3	NNE4	N4	WNW2	ESE7	ESE10	ESE11	SE10	ESE8	ENE12	E7	SE6	ESE4	SE4	SE6	SE6	ESE2.4	ENE12
24-Jun	ESE8	SE11	SE13	SE12	SE12	SE15	SE14	SE14	SE13	ESE13	E12	ESE12	SE13	SE15	SE15	SE13	SSE11	SSE9	SSE13	SE10	SE11	SE9	SE9	SE10	SE11.6	SE15
25-Jun	SE11	SE11	SE12	SE11	SE9	SE11	SE9	SE12	SE12	ESE13	ESE15	ESE13	ESE14	SE15	ESE8	SE14	WSW15	WSW3	SSE2	S7	S7	SSE6	SSE3	SSW4	SE8.6	WSW15
26-Jun	SE5	SSE5	SE4	S5	SSE5	SE4	SSW4	SW5	W9	WNW10	WNW10	WNW11	WNW8	SSE7	SE8	NNE5	WSW7	WNW9	NW10	NNW9	NNW7	NNW7	NNW6	WNW7	WNW2.8	WNW11
27-Jun	NW7	NNW5	W4	W3	NW0	SE2	SE5	SE6	ESE5	SSW3	NNW3	NNW7	NW4	ENE7	ENE7	NNW7	NW14	N18	NNE15	NNE11	NNW4	NNW6	WNW5	NNW8	N3.9	N18
28-Jun	NNW6	NNW1	W4	WSW4	WNW3	SSE4	SSE3	W1	N5	NNW5	NW5	NW5	NW5	NNW6	NNW16	NNW13	NNW11	NNW16	NNW15	NNW19	NNW10	NW10	NW9	N5	NNW6.6	NNW19
29-Jun	NW6	NW8	WNW10	WNW11	NW7	WNW8	WNW10	NNW13	NNW18	NNW19	NNW18	NNW27	NNW30	NNW30	NNW31	NNW32	NNW37	NNW33	NNW32	NNW29	NNW26	NW23	NW24	NW20	NNW20.4	NNW37
30-Jun	WNW16	WNW15	WNW14	WNW14	WNW11	NW13	NW14	NNW21	NNW21	NNW20	NNW20	NNW19	NNW23	NNW21	NNW20	NNW21	NNW21	N18	N17	NNW15	NNW13	N11	NNE6	N4	NNW15.1	NNW23

ENE0.6	NNE0.8	ENE0.3	SE0.8	E1.8	E1.0	ENE0.9	ENE0.7	NNE2.0	NNE2.3	NNE3.7	NNE4.9	NNE4.5	NE3.5	NNE4.3	NNE4.7	N5.4	N6.3	N5.2	N4.9	NNE3.1	NNE1.6	N0.8	NW0.8	Diurnal Average
NNW25	NNW29	NNW27	NNW25	NNW26	NNW30	NNW27	NNW27	NNW27	NNW24	NNW29	NNW33	NNW30	NNW30	NNW31	NNW32	NNW37	NNW33	NNW32	NNW29	NNW26	NW23	NW24	NNW25	Diurnal Maximum

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

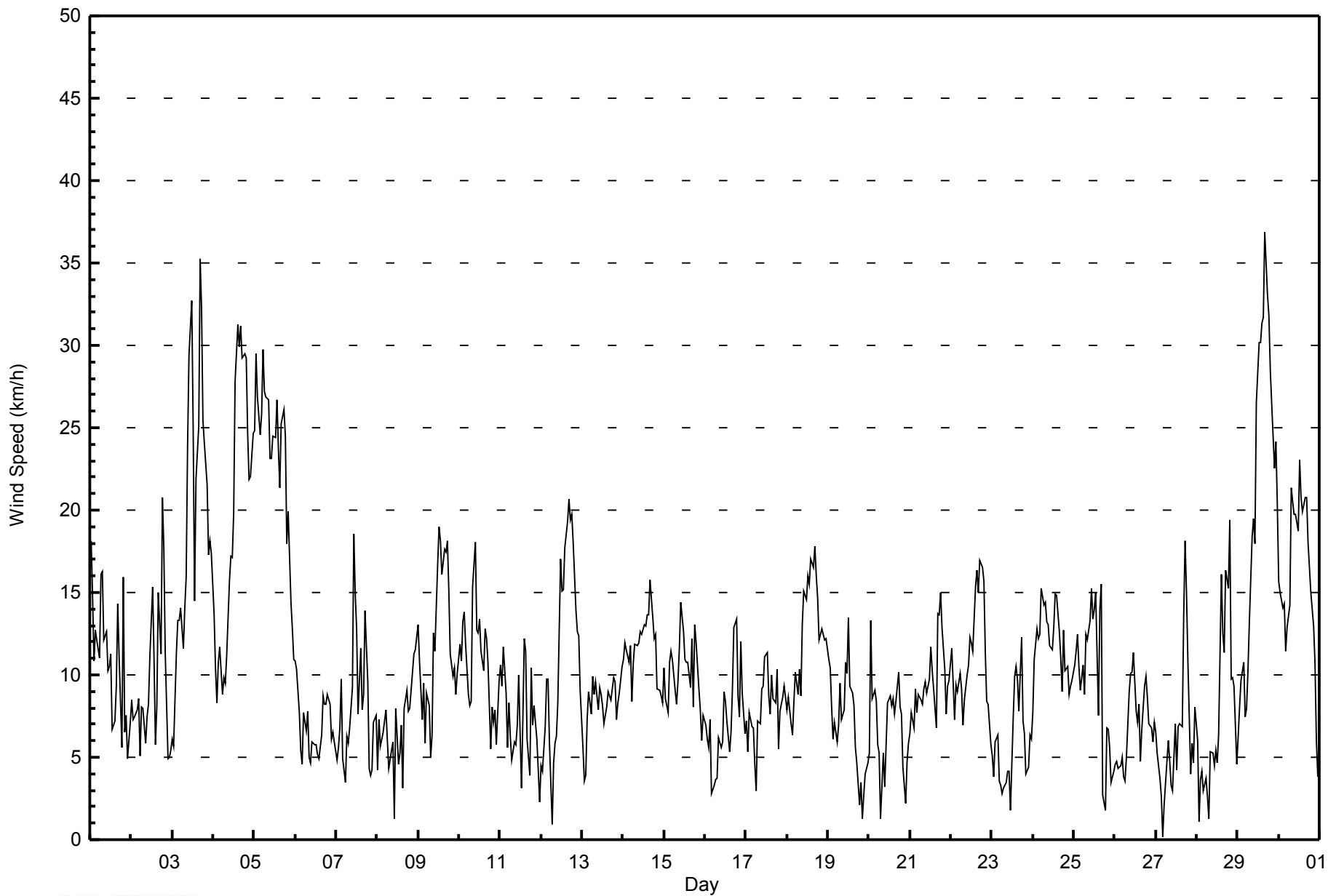


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Jun 2 14:00 Minimum Value: 1 km/h on Jun 19 22:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7																		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	111	15.42	15.42
6 - 11	366	50.83	66.25
12 - 19	175	24.31	90.56
20 - 28	48	6.67	97.22
29 - 38	20	2.78	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

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

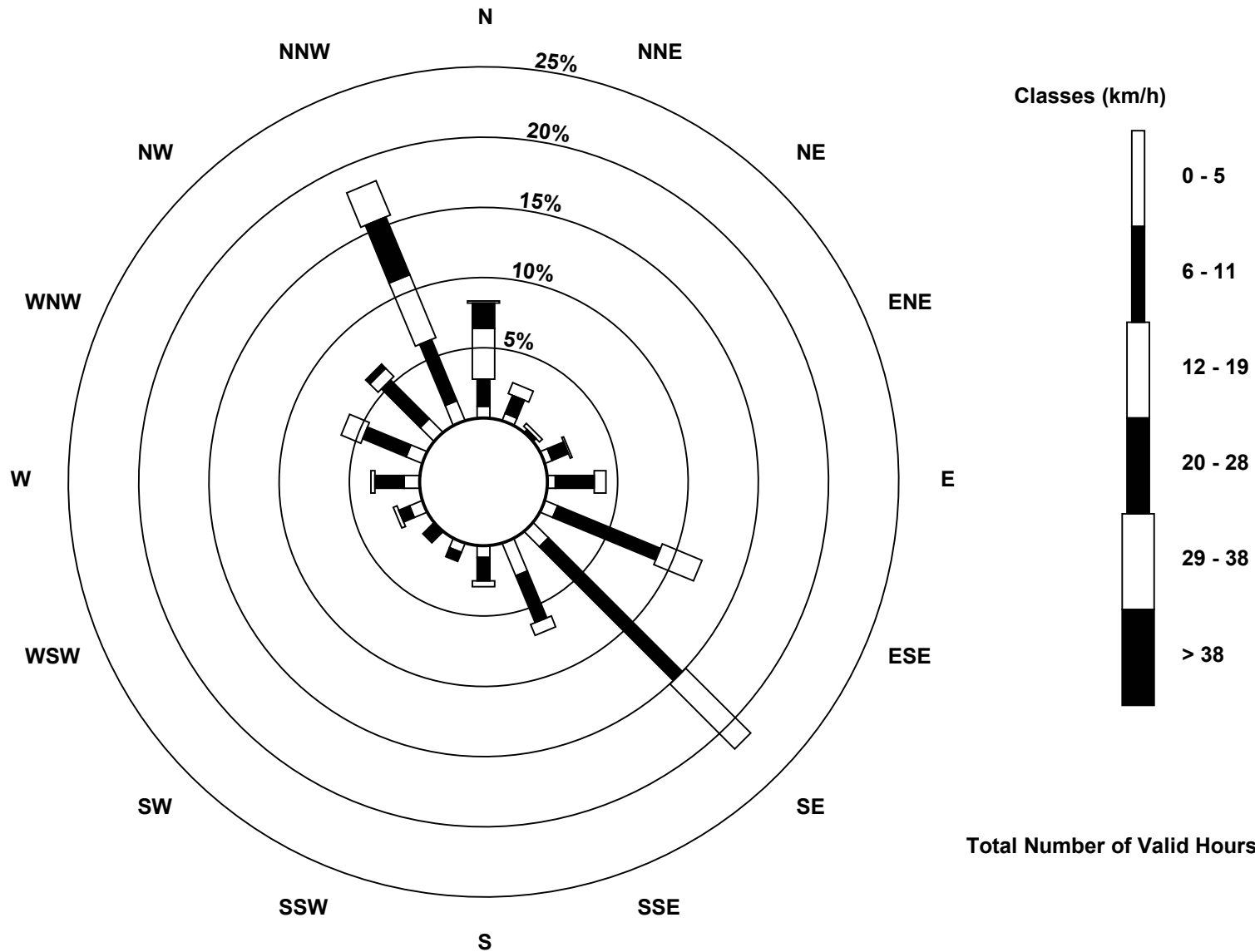
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	4	0	4	4	7	11	18	6	5	1	7	8	9	10	11	111
6 - 11	14	10	2	9	20	57	97	26	12	5	7	6	15	24	28	34	366
12 - 19	26	6	2	1	6	22	47	6	3	0	0	2	2	11	6	35	175
20 - 28	13	0	0	0	0	0	0	0	0	0	0	0	0	0	3	32	48
29 - 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	20
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	60	20	4	14	30	86	155	50	21	10	8	15	25	44	47	131	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

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



Total Number of Valid Hours: 720



Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 338 deg on Jun 29 17:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 342.4 deg on Jun 5	Hours of Data: 720
Direction of Minimum Speed: 314 deg on Jun 27 05:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.5 deg on Jun 2	Percent Operational Time: 100.0
Monthly Average Direction: 330.9 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-Jun	119	117	128	126	108	118	120	132	127	135	137	117	116	132	131	121	147	160	201	292	142	134	174	159	131.7
2-Jun	139	141	148	143	146	141	142	157	175	218	260	274	269	279	184	261	23	345	3	351	352	336	347	320	304.2
3-Jun	336	346	7	4	357	3	357	355	345	340	339	344	350	345	354	351	334	337	338	5	5	5	309	310	346.0
4-Jun	354	333	336	329	347	338	344	321	292	298	330	342	356	349	350	346	347	348	343	345	348	347	344	340	341.9
5-Jun	335	340	344	344	344	339	339	341	341	353	353	354	344	345	335	346	341	344	346	344	342	333	342	307	342.4
6-Jun	308	305	300	296	294	305	307	301	320	344	323	12	314	290	3	16	7	19	20	44	60	90	129	117	343.5
7-Jun	121	102	47	112	134	24	319	338	353	330	344	3	21	342	294	279	314	296	274	271	167	265	180	169	332.8
8-Jun	152	157	126	157	147	139	142	167	123	111	63	94	87	74	58	104	85	105	112	120	129	132	131	132	121.8
9-Jun	132	147	156	167	120	104	110	148	143	132	128	115	111	106	97	95	96	92	89	77	69	72	65	8	105.7
10-Jun	17	11	9	11	14	360	354	327	347	343	354	348	10	80	310	339	359	25	194	199	237	246	224	249	349.9
11-Jun	241	282	258	230	207	229	224	173	144	187	132	97	120	227	108	80	125	80	159	133	126	146	168	164	168.6
12-Jun	336	270	172	152	132	149	177	295	326	321	340	345	351	353	359	1	3	4	6	5	4	10	24	68	2.8
13-Jun	108	84	98	100	96	98	101	96	85	106	110	105	100	113	115	91	91	108	117	128	121	123	142	146	108.5
14-Jun	145	141	138	140	143	154	146	138	132	126	120	135	136	143	162	170	150	159	160	175	172	168	170	151	148.4
15-Jun	135	131	143	130	125	127	131	107	101	107	118	111	102	99	102	99	111	102	112	119	122	123	140	145	117.3
16-Jun	153	160	116	175	157	168	153	182	136	132	119	117	127	109	248	294	25	40	38	83	132	188	188	236	130.9
17-Jun	196	157	140	140	163	157	72	142	146	110	118	109	106	102	112	112	126	164	151	136	141	137	138	139	132.8
18-Jun	140	135	135	138	138	135	137	137	128	129	128	130	133	141	125	137	144	136	146	144	136	134	138	138	135.8
19-Jun	136	137	146	148	143	146	142	134	132	131	127	113	111	109	113	115	144	120	75	32	239	200	251	256	131.0
20-Jun	320	348	343	338	349	341	342	342	131	149	112	124	111	120	142	112	113	120	139	132	128	200	258	265	92.4
21-Jun	272	298	302	358	28	2	340	323	321	313	330	322	311	319	313	317	279	289	303	296	296	293	302	315	312.7
22-Jun	345	340	287	263	252	270	271	261	284	303	329	354	343	305	328	327	331	338	344	347	348	350	15	10	324.2
23-Jun	353	317	280	266	174	261	292	289	322	25	9	295	103	115	110	133	107	78	98	129	115	141	125	127	105.4
24-Jun	123	127	133	133	130	130	133	134	129	122	101	107	144	137	136	130	164	165	151	133	131	131	136	138	133.1
25-Jun	142	134	130	137	146	138	138	142	129	123	121	117	117	142	111	142	238	247	152	172	179	156	160	193	141.3
26-Jun	142	153	145	178	155	143	197	235	278	290	286	285	287	155	126	25	258	289	312	343	346	328	347	298	281.9
27-Jun	308	337	278	272	314	133	128	124	117	201	332	341	311	60	58	348	326	6	16	14	345	332	282	337	355.7
28-Jun	348	331	259	255	295	159	147	277	358	339	315	315	313	341	343	337	329	337	337	341	343	324	313	353	331.7
29-Jun	307	311	296	296	315	299	292	335	342	348	341	337	340	343	336	332	338	337	337	335	330	323	326	324	331.8
30-Jun	300	295	296	299	297	306	318	338	341	346	347	338	341	340	339	343	344	350	351	347	339	352	20	10	333.9

61.3	32.2	66.4	137.2	99.8	83.3	71.0	56.6	26.3	20.4	21.9	25.5	30.4	39.0	25.2	17.1	2.1	6.1	8.1	7.2	20.1	18.0	354.4	314.4
Diurnal Average																							

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

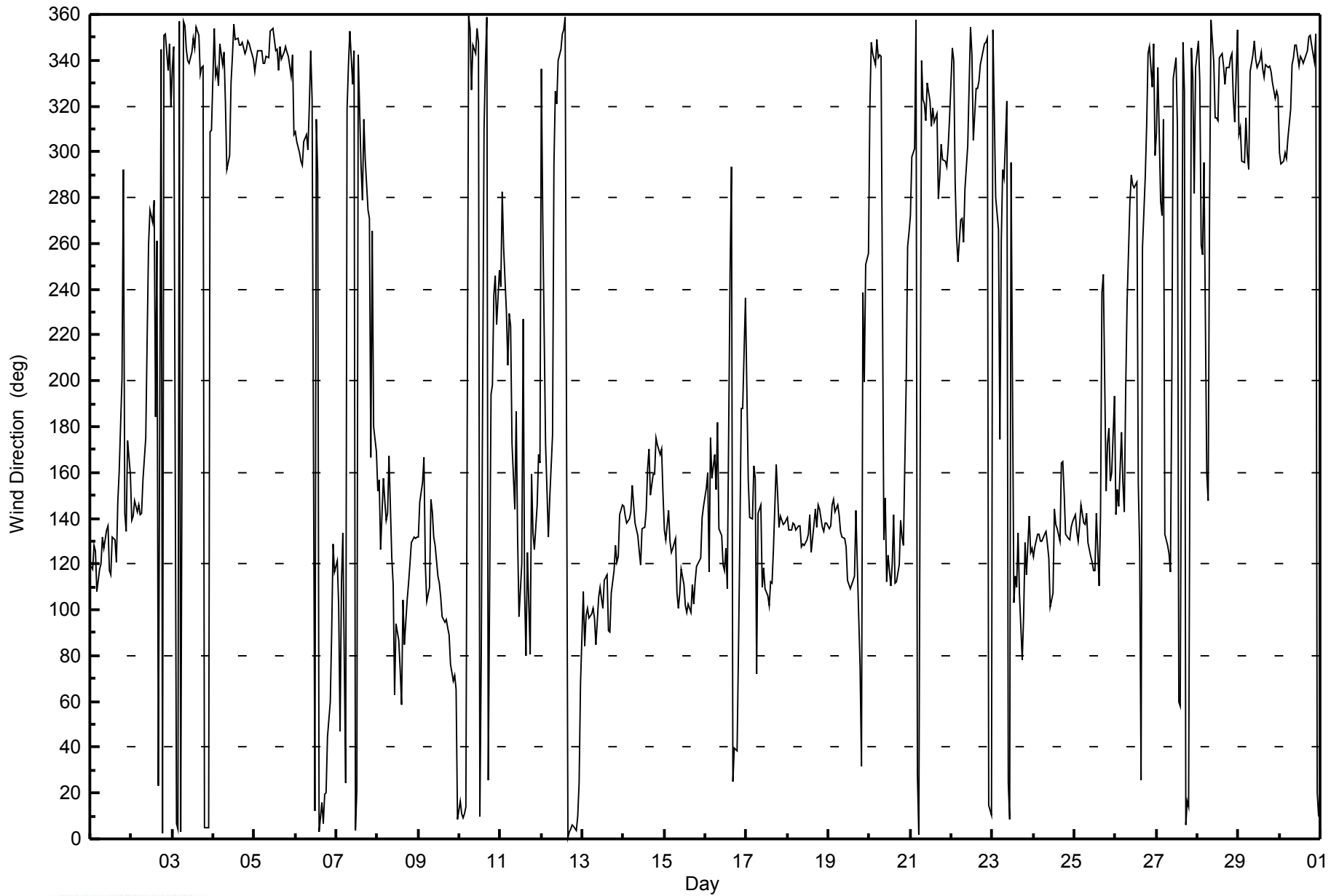
Wind Direction (WD) - deg
Buffalo Viewpoint - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on Jun 27 05:00 Minimum Value: 6 deg on Jun 3 00:00 Percentiles: P ₁ = 8 P ₁₀ = 11 Q ₁ = 15 Median = 20 Q ₃ = 27 P ₉₀ = 46 P ₉₉ = 86		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-Jun	17	18	22	21	19	22	18	18	18	21	21	21	23	47	37	31	23	25	32	14	53	25	34	17	53
2-Jun	16	24	11	17	17	55	27	22	37	32	34	26	22	64	39	40	23	62	15	12	12	19	19	6	64
3-Jun	20	18	10	12	10	12	12	12	11	11	10	10	12	18	13	13	12	15	21	16	12	13	20	14	21
4-Jun	14	19	20	18	12	16	12	16	15	15	14	17	12	11	11	12	12	11	11	11	11	11	12	9	20
5-Jun	12	9	11	11	11	10	10	10	9	12	13	15	15	13	18	14	12	11	10	11	13	13	11	14	18
6-Jun	9	9	10	11	16	11	18	29	58	55	48	54	55	58	73	54	37	25	23	18	15	20	13	15	73
7-Jun	21	27	36	20	32	50	32	30	25	22	10	20	20	46	21	32	22	14	19	55	51	60	17	25	60
8-Jun	34	12	25	13	13	10	27	42	37	56	91	41	56	56	45	88	40	27	22	15	15	17	17	19	91
9-Jun	18	21	38	33	20	18	18	32	27	19	21	20	19	21	21	20	20	20	20	19	17	17	17	15	38
10-Jun	13	16	14	13	14	14	20	27	10	12	22	24	27	55	32	15	28	60	30	11	21	13	25	19	60
11-Jun	20	16	20	24	46	31	26	46	24	38	40	42	84	63	33	43	58	60	22	19	11	14	29	62	84
12-Jun	32	33	20	15	7	21	86	28	33	36	44	15	17	17	18	18	16	15	13	13	11	11	15	22	86
13-Jun	22	54	52	17	19	20	23	27	29	40	33	35	50	49	46	37	32	28	21	19	12	11	14	16	54
14-Jun	17	16	15	18	18	21	24	22	24	22	25	34	27	27	28	25	24	22	21	20	17	15	15	22	34
15-Jun	23	19	35	16	11	15	20	25	21	24	26	28	41	33	38	32	25	29	21	18	15	12	17	11	41
16-Jun	19	14	25	9	77	24	31	25	43	51	46	31	39	54	43	26	41	21	18	19	20	21	20	21	77
17-Jun	18	25	11	15	15	41	64	22	23	22	23	21	25	30	24	25	28	23	21	21	18	19	18	18	64
18-Jun	18	16	15	16	19	20	20	22	27	22	23	21	24	23	23	22	23	22	22	19	18	17	17	16	27
19-Jun	16	16	17	20	17	26	19	19	19	20	22	21	21	23	25	23	22	31	49	31	76	30	23	29	76
20-Jun	59	8	12	7	14	11	15	86	38	58	27	23	24	34	31	26	22	19	20	19	11	47	32	39	86
21-Jun	24	12	19	14	26	23	13	14	12	12	14	17	14	16	18	20	15	15	12	12	12	14	12	16	26
22-Jun	13	14	16	14	18	15	18	18	18	16	25	15	14	22	16	14	18	11	11	12	9	12	16	18	25
23-Jun	15	35	13	19	44	26	74	30	44	36	34	96	32	30	27	40	48	20	25	20	35	27	14	14	96
24-Jun	16	18	19	18	18	17	18	19	21	22	24	28	26	25	24	28	23	27	21	18	17	14	17	16	28
25-Jun	17	16	16	18	18	20	23	23	25	22	22	25	22	22	29	38	21	50	86	22	17	18	23	19	86
26-Jun	25	16	19	23	20	23	39	32	21	19	21	21	34	52	38	45	49	16	19	11	28	18	18	11	52
27-Jun	12	26	26	42	97	44	18	17	26	47	73	37	50	91	57	34	23	18	16	17	48	14	25	17	97
28-Jun	22	80	32	46	55	49	43	83	25	41	51	52	62	68	15	19	24	15	11	10	8	18	19	79	83
29-Jun	35	15	8	9	13	15	14	19	12	13	14	13	13	16	13	12	11	11	11	11	11	11	12	13	35
30-Jun	11	10	10	11	12	11	16	13	11	13	13	14	12	14	14	13	14	14	13	13	8	8	15	18	18
Diurnal Maximum																									
59 80 52 46 97 55 86 86 58 58 91 96 84 91 73 88 58 62 86 55 76 60 34 79																									



WBEA
Hourly Averages

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



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 5, 2014	Previous Calibration	May 15, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	8:30	End Time (MST)	12:00
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	828	824
Calculated slope	0.996331	0.999072	Chamber temp.	45.0	45.3
Calculated intercept	-0.386412	-0.684088	Pressure (mmHg)	688.6	696.4
Analyzer Background	9.4	9.1	Flow (lpm)	0.489	0.495
Analyzer Coefficient	0.946	0.929	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	0.0	NA
as found span	5000	58.8	599.8	608.2	0.986
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	58.8	599.8	600.3	0.999
second point	5000	29.4	299.9	302.4	0.992
third point	5000	14.7	149.9	150.3	0.998
calibrator zero	5000	0.0	0.0	0.2	0.000
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	58.8	599.8	601.0	0.998
Average Correction Factor					0.996

Corrected As found 608.2 Previous response 602.4 % change -1.0%

Notes:

Adjusted span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

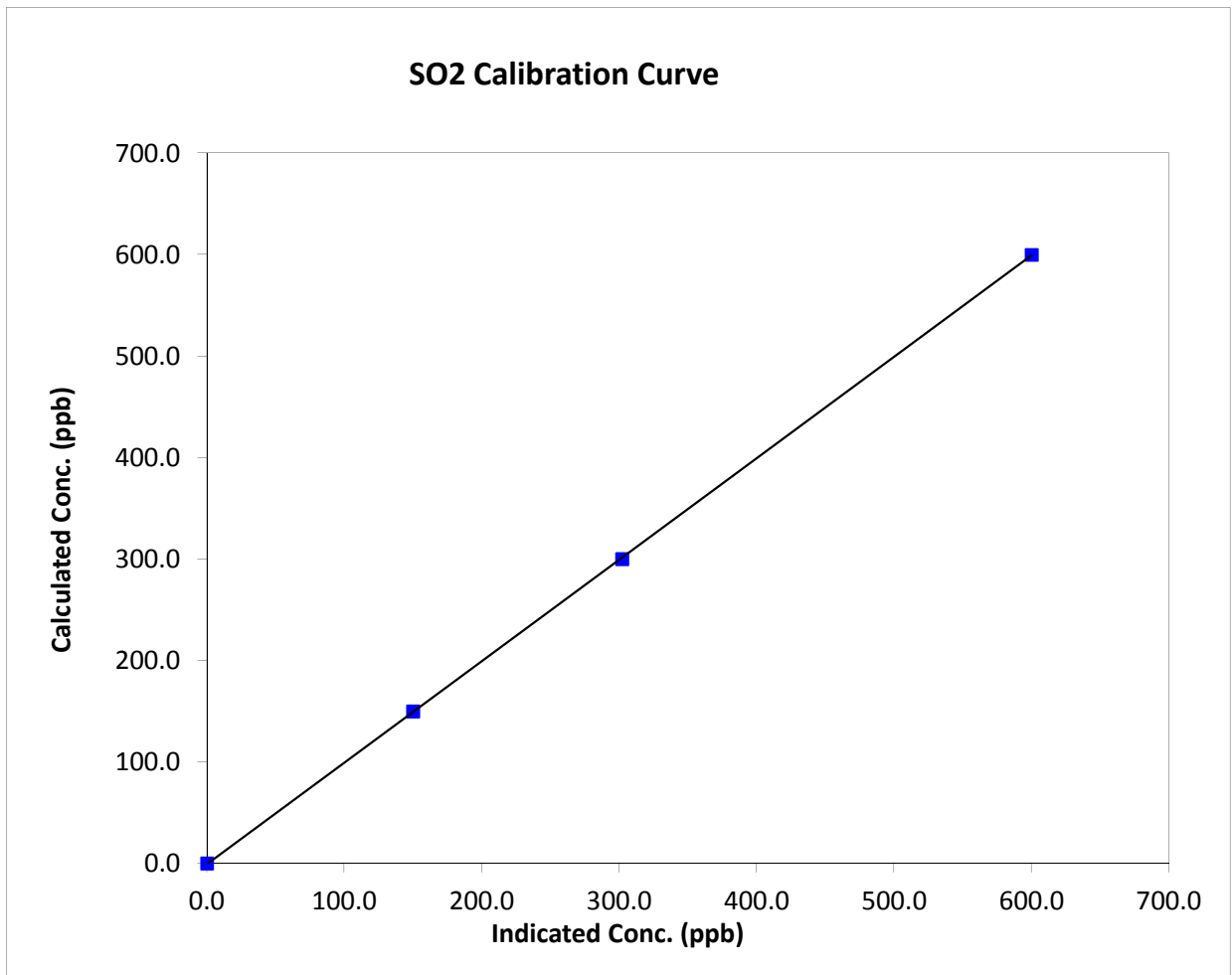
SO₂ Calibration Summary

Station Information

Calibration Date	June 5, 2014	Previous Calibration	May 15, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	8:30	End Time (MST)	12:00
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

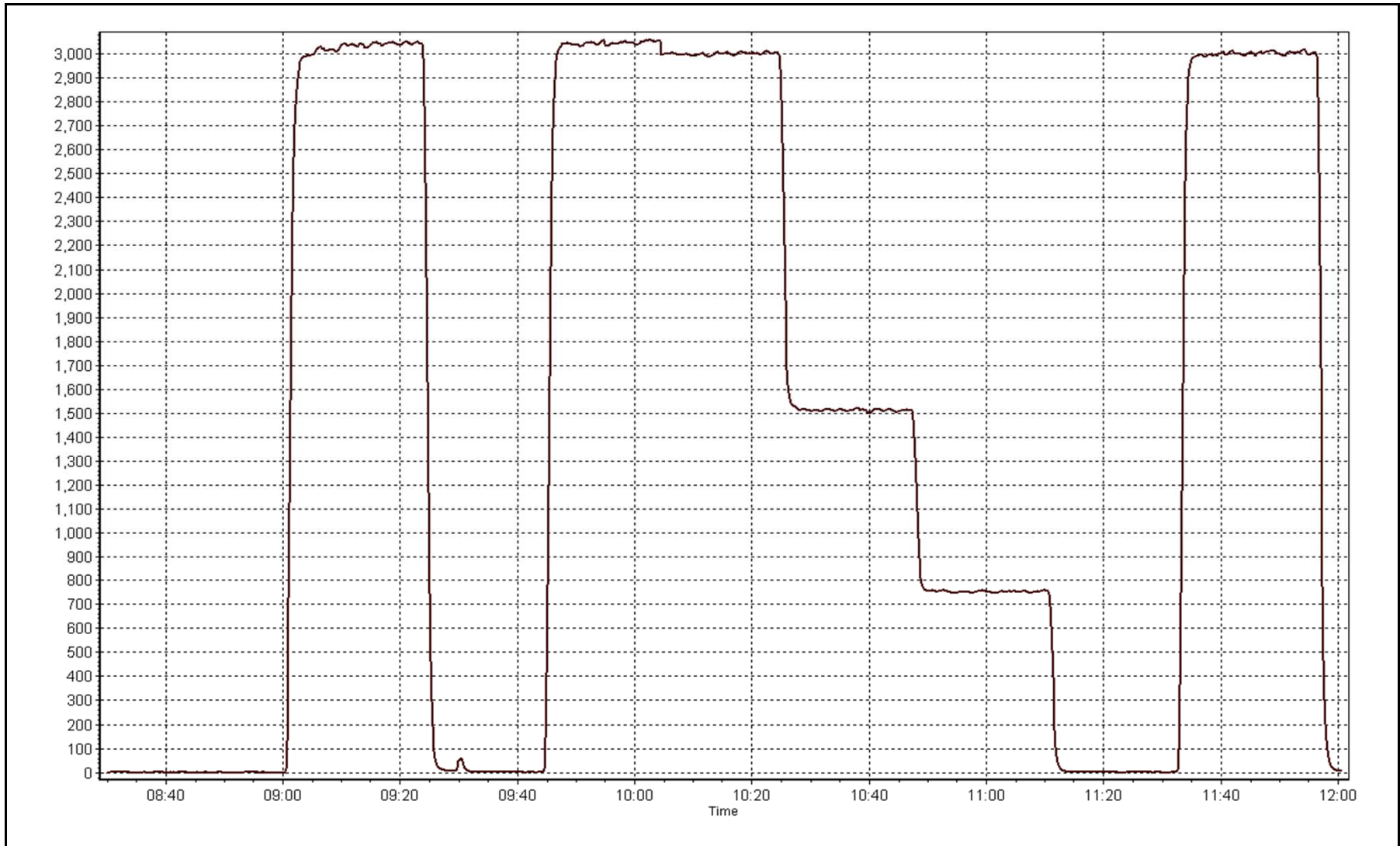
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999983
599.8	600.3	0.9991		
299.9	302.4	0.9916	Slope	0.999072
149.9	150.3	0.9975		
			Intercept	-0.684088



SO2 Calibration Plot

Date: June 5, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	June 4, 2014	Previous Calibration	May 14, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	8:30	End Time (MST)	14:45
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	876	873
Calculated slope	0.992113	1.001169	Chamber temp.	45	45
Calculated intercept	-0.338776	-0.564698	Pressure	540.3	551.1
Analyzer Background	16.4	15.5	Flow	1.035	1.053
Analyzer Coefficient	1.025	0.959	Intensity	94	94
			Converter temp.	331	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	-0.3	NA
as found span	6000	46.2	75.1	74.7	1.005
SO2 scrubber check	5000	29.4	299.9	3.2	NA
calibrator zero	6000	0.0	0.0	0.0	NA
high point	6000	46.2	75.1	75.1	1.000
second point	6000	25.9	42.1	43.0	0.978
third point	6000	15.4	25.0	26.2	0.957
calibrator zero	6000	0.0	0.0	0.0	NA
as left zero	5000	0.6	1.2	1.1	NA
as left span	6000	46.2	75.1	75.8	0.991
Average Correction Factor					0.978

Corrected As found	75.0	Previous response	76.0	% change	1.3%
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Notes:

Zero and span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

H2S Calibration Summary

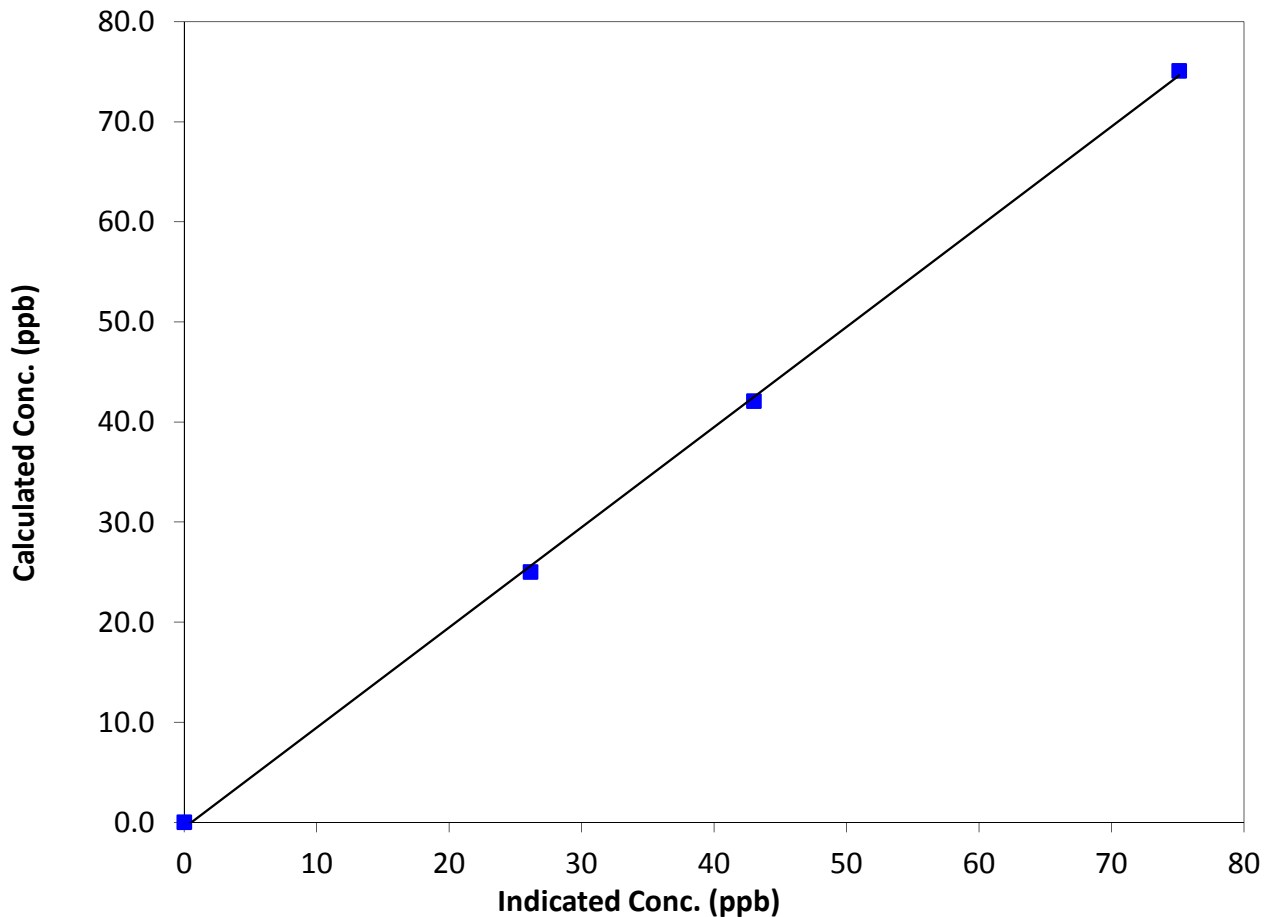
Station Information

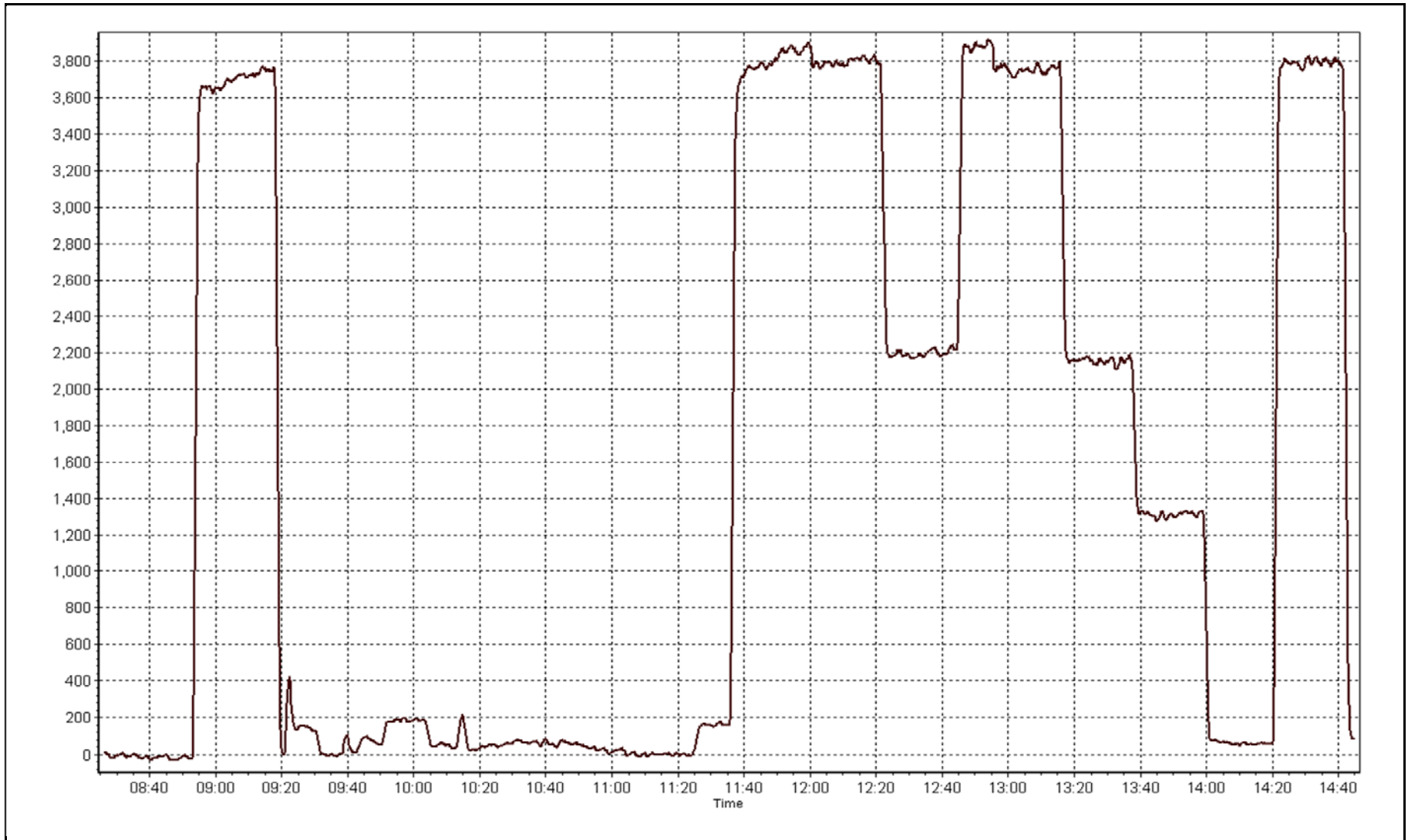
Calibration Date	June 4, 2014	Previous Calibration	May 14, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	8:30	End Time (MST)	14:45
Analyzer make	TEI 450i	Analyzer serial #	1336160094

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999655
75.1	75.1	0.9995		
42.1	43.0	0.9785	Slope	1.001169
25.0	26.2	0.9569		
			Intercept	-0.564698

H2S Calibration Curve







Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	June 6, 2014	Previous Calibration	June 4, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	12:05
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	-615
Analyzer Range (mv)	5000	5000	Lamp voltage	873	872
Calculated slope	0.992113	0.974091	Chamber temp.	45	45
Calculated intercept	-0.338776	0.109770	Pressure	551.1	546.3
Analyzer Background	15.5	16.7	Flow	1.053	1.046
Analyzer Coefficient	0.959	1.023	Intensity	94	94
			Converter temp.	328	329

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	NA
as found span	6000	46.2	75.1	70.3	1.067
SO2 scrubber check	5000	29.4	299.9	2.7	NA
calibrator zero	6000	0.0	0.0	-0.4	NA
high point	6000	46.2	75.1	76.7	0.979
second point	6000	25.9	42.1	43.4	0.969
third point	6000	15.4	25.0	25.8	0.972
calibrator zero	6000	0.0	0.0	-0.4	NA
as left zero	5000	0.0	0.0	-0.5	NA
as left span	6000	46.2	75.1	79.0	0.950
Average Correction Factor					0.973

Corrected As found	70.7	Previous response	76.0	% change	7.5%
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Notes:

Readjusting after maintenance on June 04, 2014. Span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

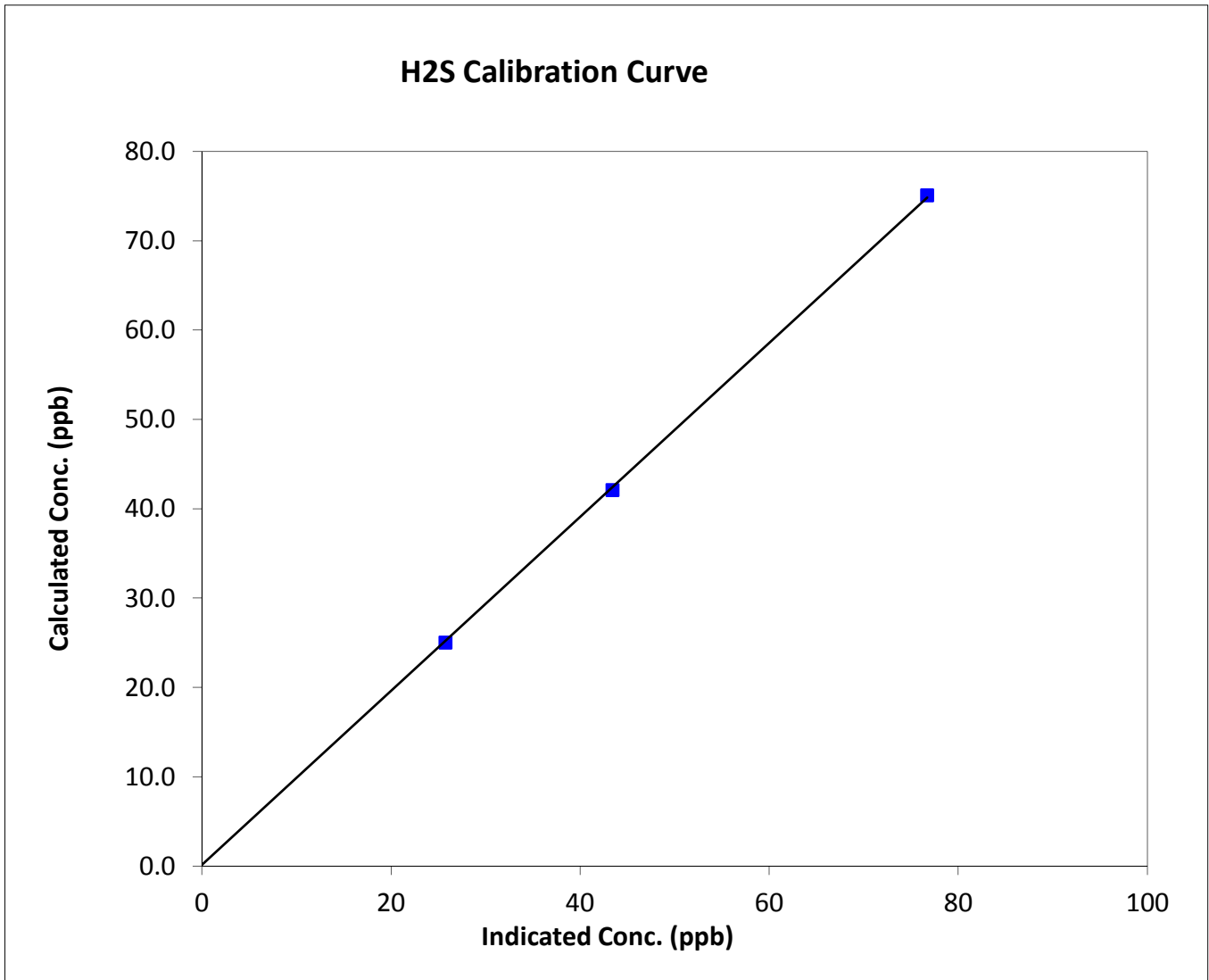
H2S Calibration Summary

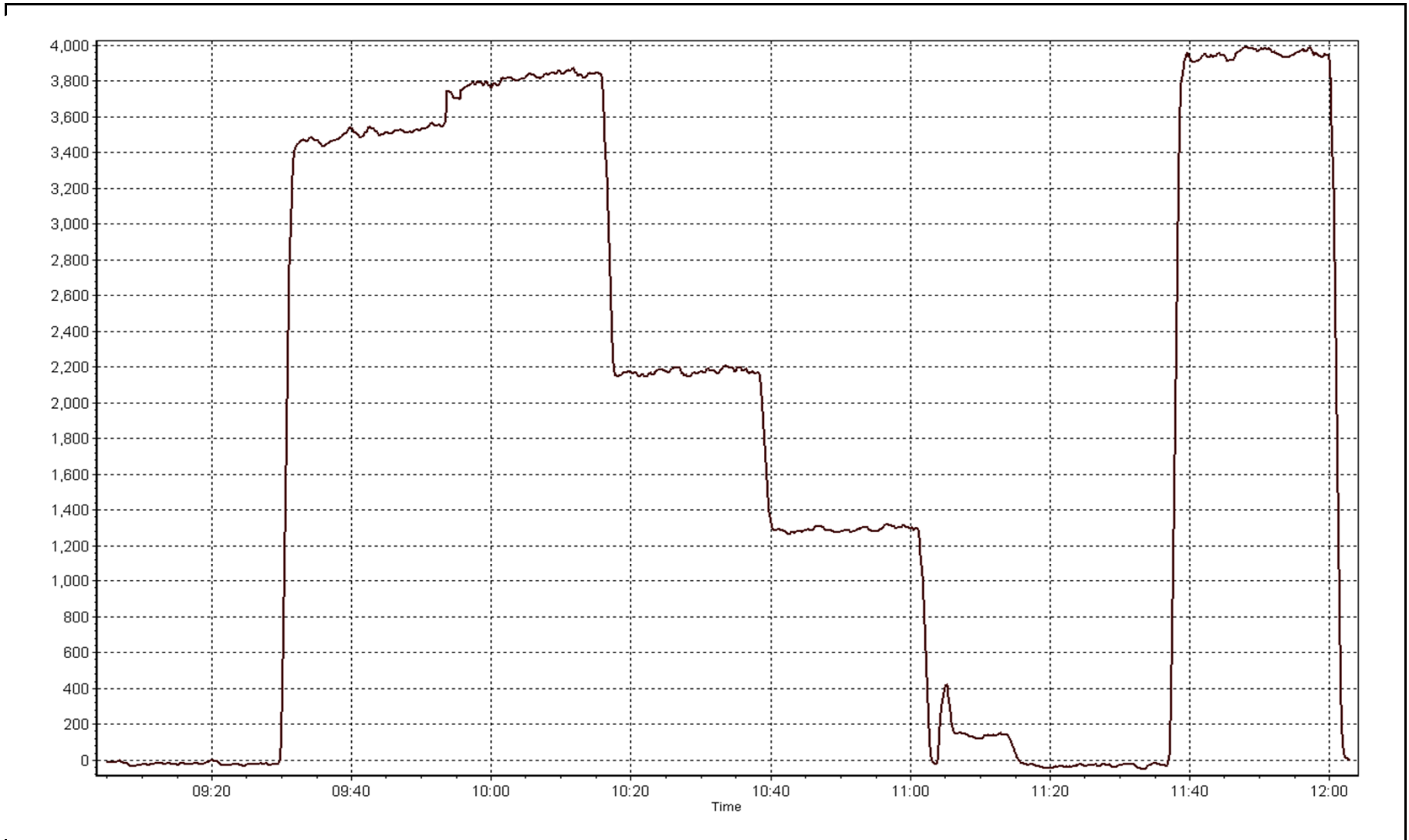
Station Information

Calibration Date	June 6, 2014	Previous Calibration	June 4, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	9:05	End Time (MST)	12:05
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	0.999917
75.1	76.7	0.9786		
42.1	43.4	0.9693	Slope	0.974091
25.0	25.8	0.9717		
			Intercept	0.109770







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Thursday, June 05, 2014	Previous Calibration	Thursday, May 15, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	8:30	End Time (MST)	12:00
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	0.994852	0.998540	Fuel Pressure	15.7	19.9
Calculated intercept	-0.021375	-0.022158			
BKG	1.7	1.7			
COEF	4.203	4.182			

Analyzer make TEI 51i-LT Analyzer serial # 1201650671

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.04	N/A
as found span	5000	58.8	12.56	12.55	1.001
calibrator zero	5000	0.0	0.00	-0.04	N/A
high point	5000	58.8	12.56	12.55	1.000
second point	5000	29.4	6.28	6.38	0.984
third point	5005	14.7	3.14	3.19	0.982
calibrator zero				-0.04	
as left zero	5000	0.0	0.00	0.05	N/A
as left span	5000	58.8	12.56	12.59	0.998
Average Correction Factor					0.989

Corrected As found 12.59 Previous response 12.64 % change 0.5%

Notes:

H2 cylinder changed after as founds. Adjusted span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

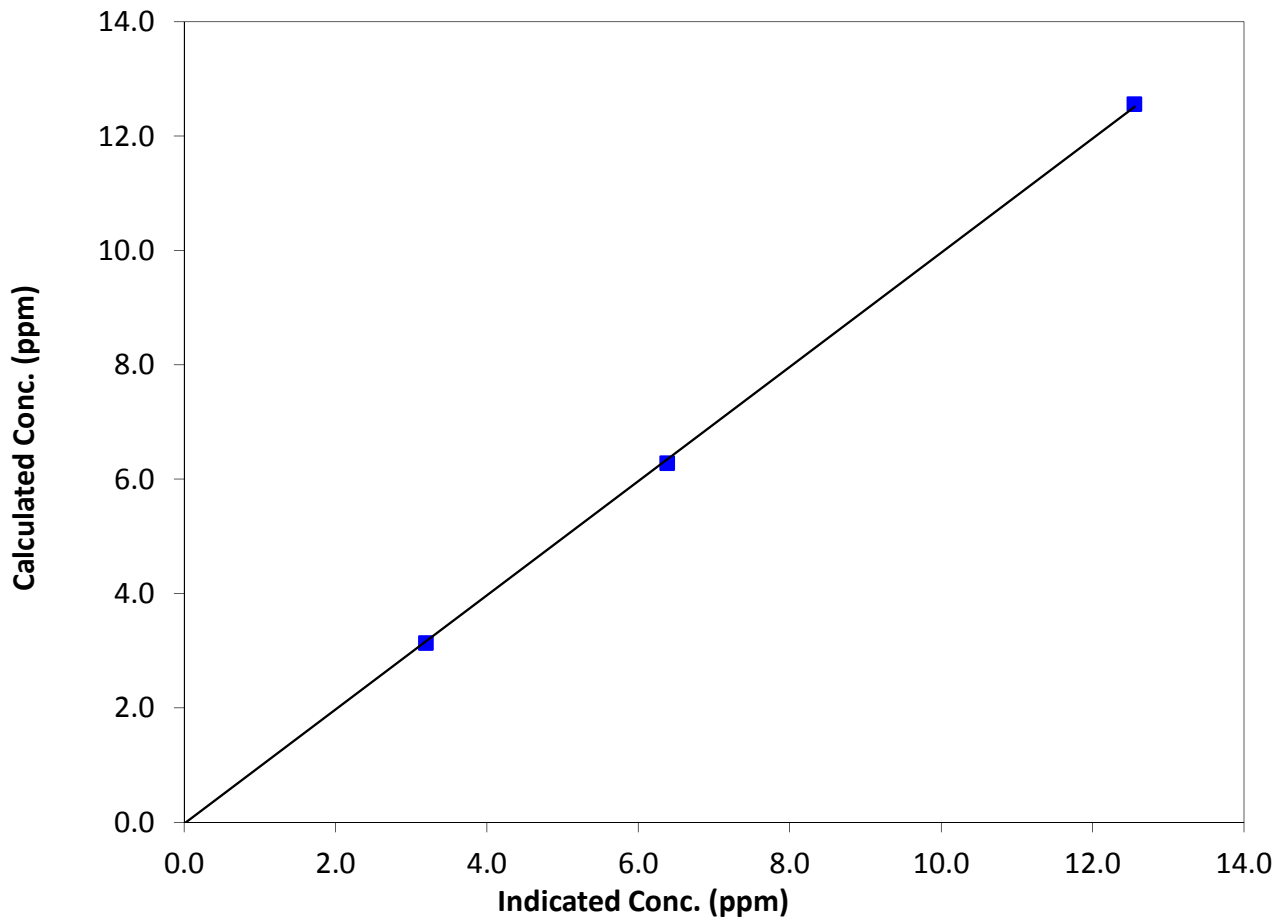
Station Information

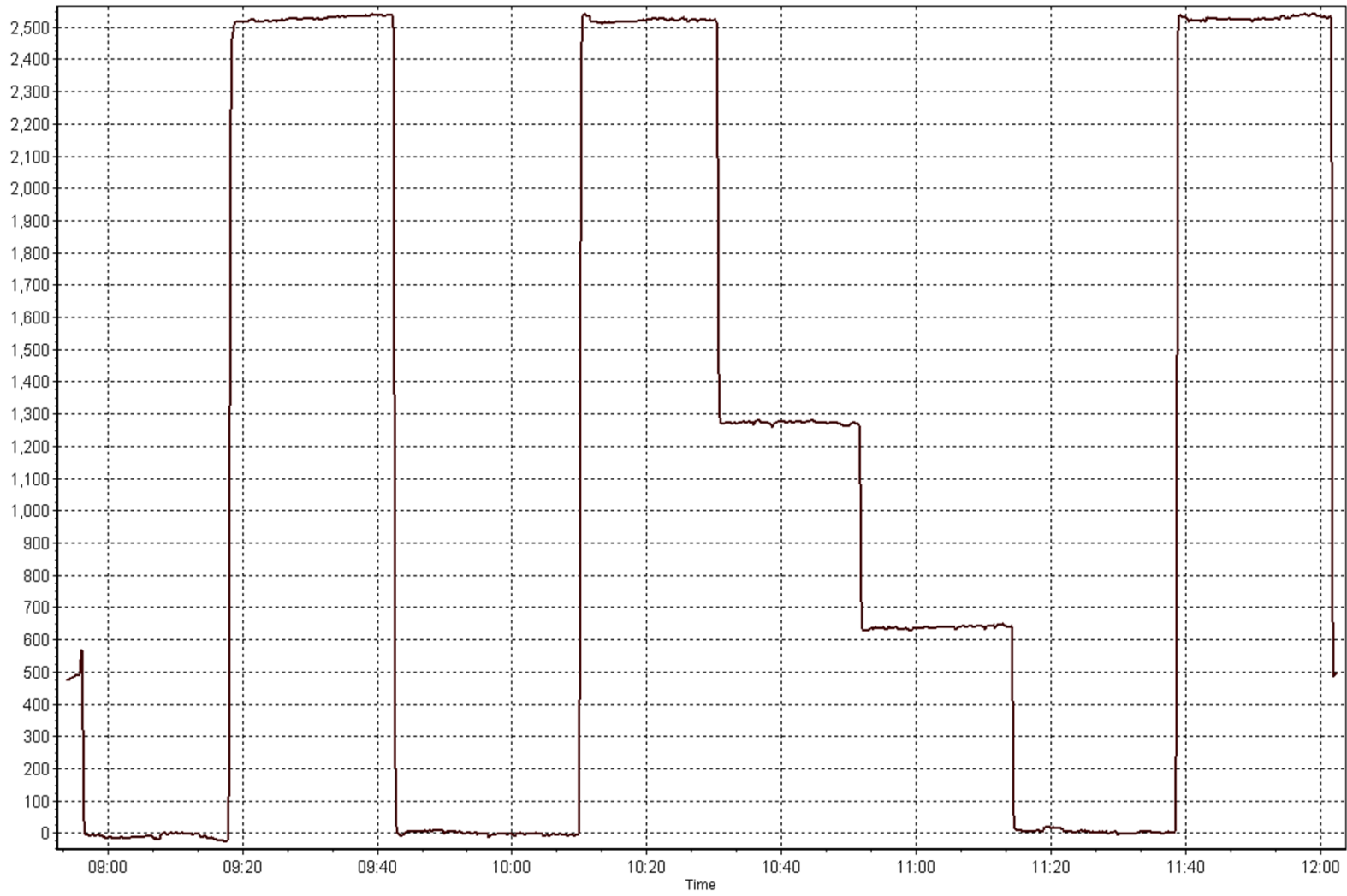
Calibration Date	June 5, 2014	Previous Calibration	May 15, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	8:30	End Time (MST)	12:00
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	N/A	Correlation Coefficient	0.999872
12.56	12.55	1.0002		
6.28	6.38	0.9842	Slope	0.998540
3.14	3.19	0.9818		
			Intercept	-0.022158

THC Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 5
MANNIX
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)

JUNE 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	33	35	99.72	65	0	10	0
H2S (ppb) Average	683	34	37	99.58	6	0	3	0
THC (ppm) Average	624	38	96	91.94	4	-	2.7	-
Temperature 2 m (C) Average	720	0	0	100.00	26.5	-	21.6	-
Temperature 20 m (C) Average	720	0	0	100.00	26	-	21.9	-
Temperature 45 m (C) Average	720	0	0	100.00	25.6	-	21.7	-
Temperature 75 m (C) Average	720	0	0	100.00	25.3	-	21.6	-
Temperature 90 m (C) Average	720	0	0	100.00	25.2	-	21.5	-
Relative Humidity 2 m (%) Average	720	0	0	100.00	97	-	-	-
Relative Humidity 20 m (%) Average	720	0	0	100.00	98	-	-	-
Relative Humidity 45 m (%) Average	720	0	0	100.00	98	-	-	-
Relative Humidity 75 m (%) Average	720	0	0	100.00	98	-	-	-
Relative Humidity 90 m (%) Average	720	0	0	100.00	98	-	-	-
Wind Speed 20 m (km/h) Average	720	0	0	100.00	29	-	-	-
Wind Speed 45 m (km/h) Average	720	0	0	100.00	39	-	-	-
Wind Speed 75 m (km/h) Average	720	0	0	100.00	44	-	-	-
Wind Speed 90 m (km/h) Average	717	0	3	99.58	45	-	-	-
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	717	0	3	99.58	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	720	0	0	100.00	1.1	-	-	-
Vertical Wind Speed 45 m (km/h) Average	720	0	0	100.00	1.4	-	-	-
Vertical Wind Speed 75 m (km/h) Average	720	0	0	100.00	1.4	-	-	-
Vertical Wind Speed 90 m (km/h) Average	717	0	3	99.58	2.9	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
 JUNE 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	2	5	-	0	0	0	1	1	5	65
H2S (ppb) Average	683	0.7	1	-	0	0	0	0	1	1	6
THC (ppm) Average	624	2.37	0.3	-	2	2.2	2.2	2.3	2.4	2.7	4
Temperature 2 m (C) Average	720	16.25	5	-	4.7	9.2	12.4	16.4	19.9	22.9	26.5
Temperature 20 m (C) Average	720	16.3	4.9	-	4.8	9.1	12.8	16.8	19.9	22.6	26
Temperature 45 m (C) Average	720	16.17	4.9	-	4.6	8.9	12.9	16.7	19.7	22.3	25.6
Temperature 75 m (C) Average	720	16.05	4.8	-	4.3	8.8	13.1	16.7	19.5	22.1	25.3
Temperature 90 m (C) Average	720	15.99	4.8	-	4.2	8.7	13.3	16.6	19.5	22	25.2
Relative Humidity 2 m (%) Average	720	65.5	20	-	21	38	51	67	81	91	97
Relative Humidity 20 m (%) Average	720	62.4	20	-	17	33	48	64	78	89	98
Relative Humidity 45 m (%) Average	720	61.3	20	-	17	33	47	63	77	87	98
Relative Humidity 75 m (%) Average	720	61.1	20	-	17	32	47	63	77	86	98
Relative Humidity 90 m (%) Average	720	61.2	20	-	17	33	47	63	77	86	98
Wind Speed 20 m (km/h) Average	720	9.4	5	-	0	4	6	9	12	16	29
Wind Speed 45 m (km/h) Average	720	13.6	7	-	1	5	9	13	18	23	39
Wind Speed 75 m (km/h) Average	720	15	8	-	0	5	9	14	20	26	44
Wind Speed 90 m (km/h) Average	717	16.4	8	-	0	5	10	16	22	28	45
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	717	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	720	0.05	0.3	-	-0.9	-0.3	-0.2	0.1	0.3	0.4	1.1
Vertical Wind Speed 45 m (km/h) Average	720	0.26	0.5	-	-1.4	-0.3	0	0.2	0.6	0.8	1.4
Vertical Wind Speed 75 m (km/h) Average	720	0.13	0.4	-	-1.1	-0.3	-0.1	0.1	0.3	0.6	1.4
Vertical Wind Speed 90 m (km/h) Average	717	0.45	0.7	-	-1.6	-0.4	0	0.4	0.9	1.4	2.9

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	03 Jun 2014 13:00	03 Jun 2014 13:00	1	Maintenance - sample manifold cleaned
SO2	07 Jun 2014 10:00	07 Jun 2014 10:00	1	Maintenance - check daily zero and span response
H2S	03 Jun 2014 13:00	03 Jun 2014 13:00	1	Maintenance - sample manifold cleaned
H2S	11 Jun 2014 09:00	11 Jun 2014 10:00	2	Maintenance - aborted cal to address network issue
THC	01 Jun 2014 01:00	03 Jun 2014 10:00	58	Analyzer failed calibration as per AMD criteria
Wind Speed. Wind Direction, Vertical Wind Speed 90 m	03 Jun 2014 13:00	03 Jun 2014 13:00	1	Intermittent unstable operation
Wind Speed. Wind Direction, Vertical Wind Speed 90 m	03 Jun 2014 20:00	03 Jun 2014 20:00	1	Intermittent unstable operation
Wind Speed. Wind Direction, Vertical Wind Speed 90 m	10 Jun 2014 18:00	10 Jun 2014 18:00	1	Intermittent unstable operation

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Summary of Hour Averages

Mannix - June 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 65 ppb on Jun 28 10:00	Maximum Daily Average: 9.9 ppb on Jun 3		Hours of Data:	685
Minimum Value: 0 ppb on Jun 13 13:00	Minimum Daily Average: 0.2 ppb on Jun 13		Hours of Missing Data:	35
Maximum Diurnal Average: 5.3 ppb at hour 10	Minimum Diurnal Average: 0.8 ppb at hour 1		Hours of Calibration:	33
Monthly Average: 2.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 5 P ₉₉ = 26		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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	0	0.4	1	
2-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	1	11	3	4	2	1	1.4	11	
3-Jun	1	Z	1	1	2	7	7	9	3	1	18	23	M	14	11	3	7	1	1	12	43	21	28	1	9.9	43
4-Jun	3	Z	1	0	2	1	0	0	1	2	1	0	0	1	6	12	11	10	6	5	2	8	7	1	3.5	12
5-Jun	1	Z	12	4	10	2	0	1	1	17	11	16	6	2	1	1	1	1	2	1	3	1	1	0	4.2	17
6-Jun	0	Z	1	1	1	0	1	6	1	1	2	2	5	5	4	3	3	3	3	1	1	0	1	1	2.0	6
7-Jun	1	Z	1	1	1	1	1	1	1	M	12	4	1	4	9	12	9	8	22	8	5	2	1	1	4.7	22
8-Jun	1	Z	0	1	0	0	0	0	0	3	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0.7	3
9-Jun	0	Z	1	0	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	1
10-Jun	0	Z	0	0	0	1	9	9	2	10	2	1	1	0	12	0	2	3	1	2	1	0	0	0	2.4	12
11-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	2	1	0	0	0	0	0	0	0	0.3	2
12-Jun	0	Z	0	0	0	0	0	0	37	32	4	5	6	2	4	3	1	0	0	0	0	0	0	0	4.3	37
13-Jun	0	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-Jun	0	Z	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
15-Jun	0	Z	0	0	1	1	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	0	1	0	0.5	1
16-Jun	0	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
17-Jun	0	Z	0	1	1	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.4	1
18-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Jun	0	Z	1	32	10	6	3	2	2	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	2.6	32
21-Jun	0	Z	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	3	3	2	2	5	1.1	5
22-Jun	1	Z	0	0	0	0	0	1	2	1	1	0	0	0	0	0	1	0	0	3	0	1	1	1	0.6	3
23-Jun	1	Z	1	0	0	0	1	2	8	7	3	1	1	0	0	0	0	0	0	0	0	0	0	0	1.2	8
24-Jun	0	Z	0	1	0	0	0	1	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0.4	1
25-Jun	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
26-Jun	1	Z	1	0	1	1	0	1	1	1	1	0	1	1	0	1	1	1	1	1	9	5	2	1	1.2	9
27-Jun	1	Z	1	1	1	0	0	0	0	4	13	4	2	5	3	10	3	1	1	1	2	1	1	1	2.4	13
28-Jun	1	Z	0	0	1	1	1	1	14	65	27	8	3	2	1	2	1	1	1	1	2	1	21	6.8	65	
29-Jun	6	Z	1	1	3	14	4	3	9	8	2	7	8	5	6	5	6	1	0	2	3	1	1	1	4.2	14
30-Jun	2	Z	1	1	1	1	1	2	1	1	1	1	3	4	1	0	17	13	1	1	2	1	0	1	2.5	17

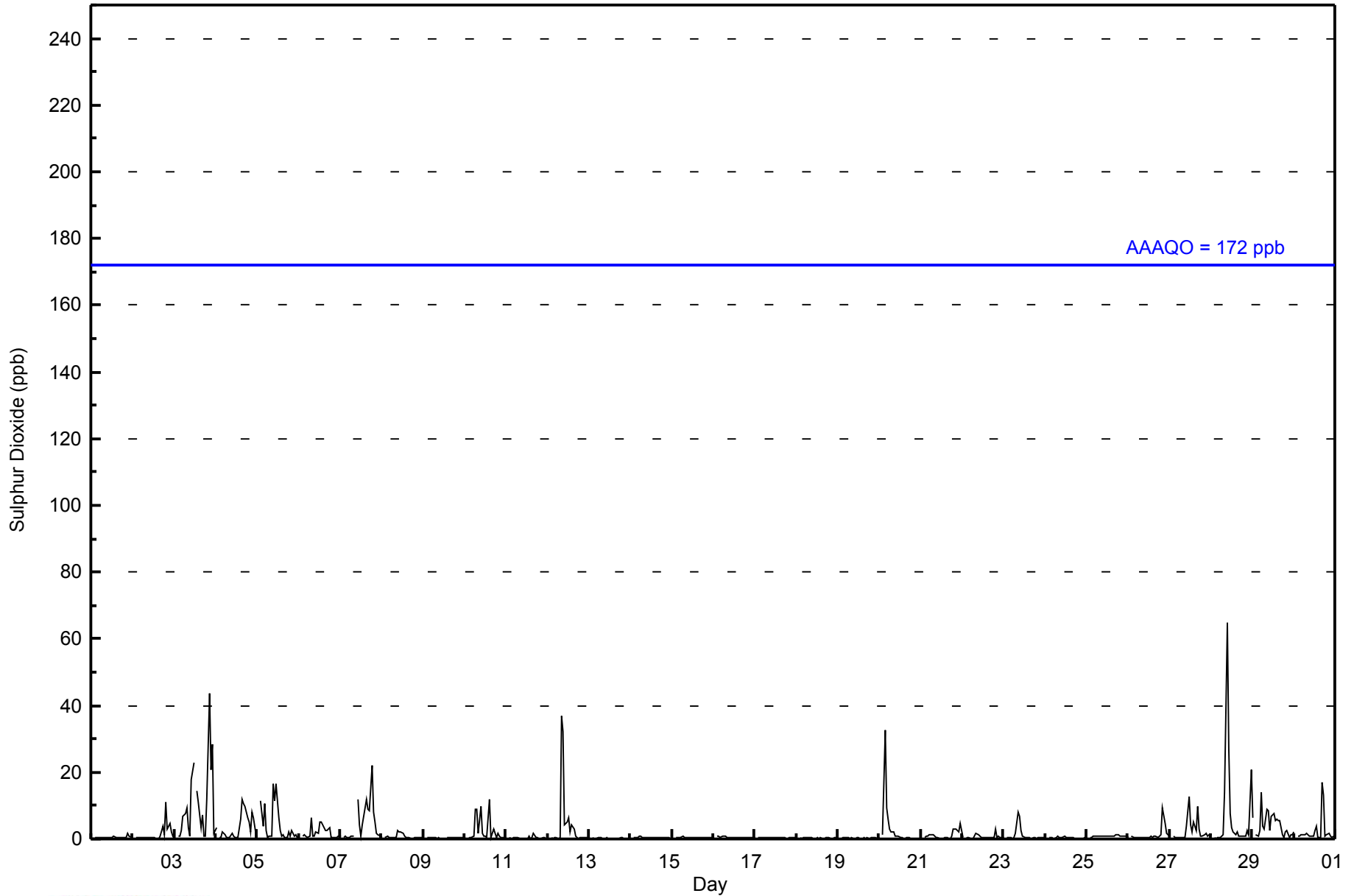
0.8	--	0.9	1.7	1.3	1.4	1.2	1.5	2.9	5.3	3.2	3.1	1.6	1.7	2.2	1.7	2.5	1.8	1.6	1.9	2.7	1.9	1.8	1.3	Diurnal Average	
6	--	12	32	10	14	9	9	37	65	27	23	8	14	12	12	17	13	22	12	43	21	28	21	Diurnal Maximum	

Z - zerspan 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 - June 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	655	95.62	95.62
11 - 20	19	2.77	98.39
21 - 60	10	1.46	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
Mannix - June 2014

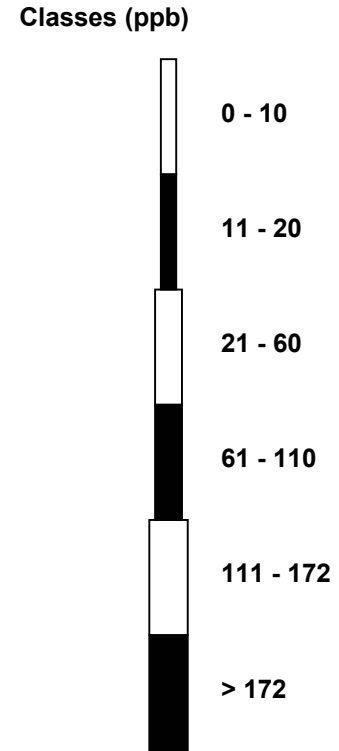
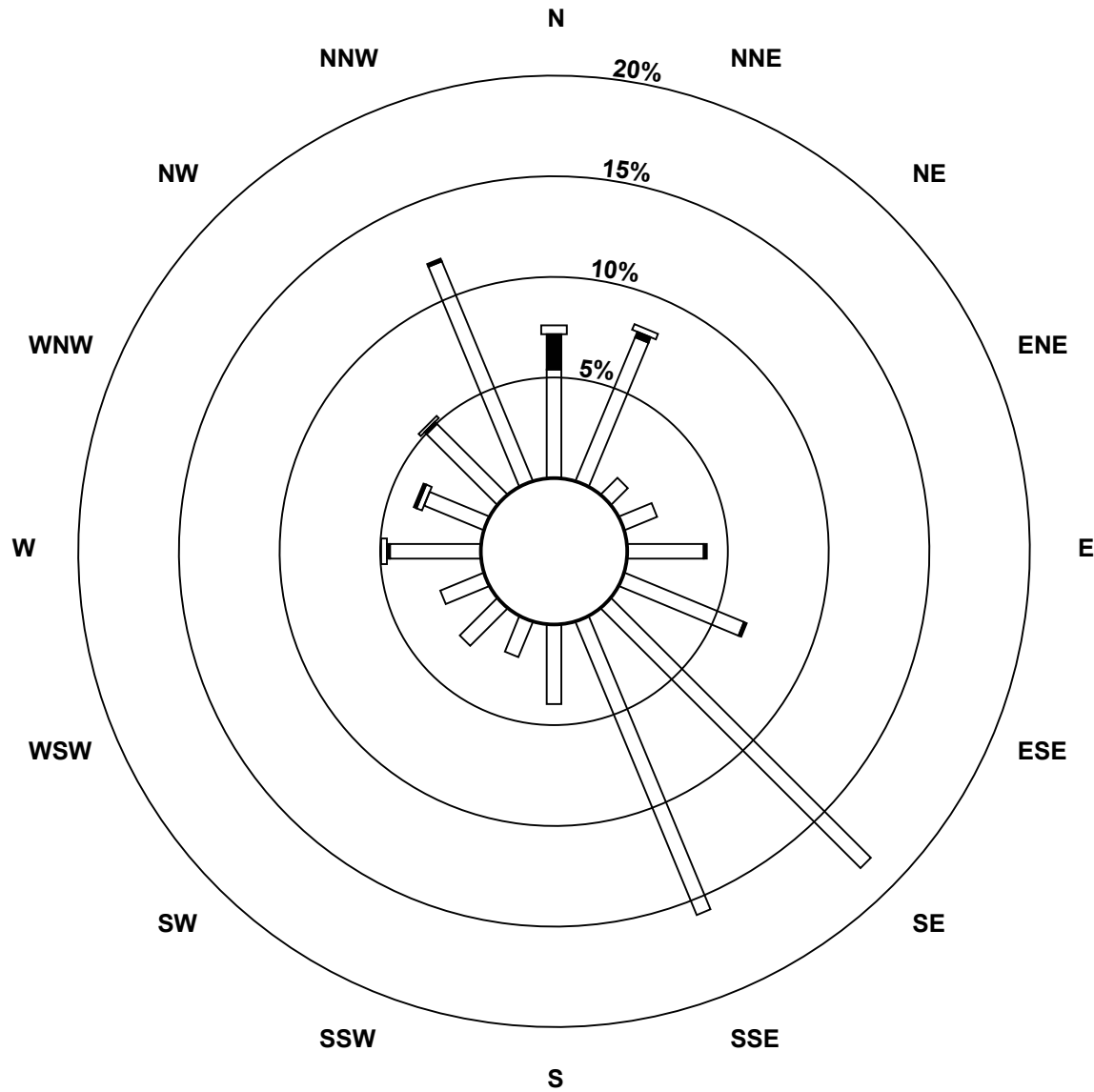
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	37	53	8	12	26	44	125	108	27	13	18	16	31	22	34	81	655
11 - 20	12	2	0	0	1	1	0	0	0	0	0	0	1	0	1	1	19
21 - 60	3	2	0	0	0	0	0	0	0	0	0	0	2	2	1	0	10
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	52	57	8	12	27	45	125	108	27	13	18	16	34	25	36	82	685

Total Number of Valid Hours: 685

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

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

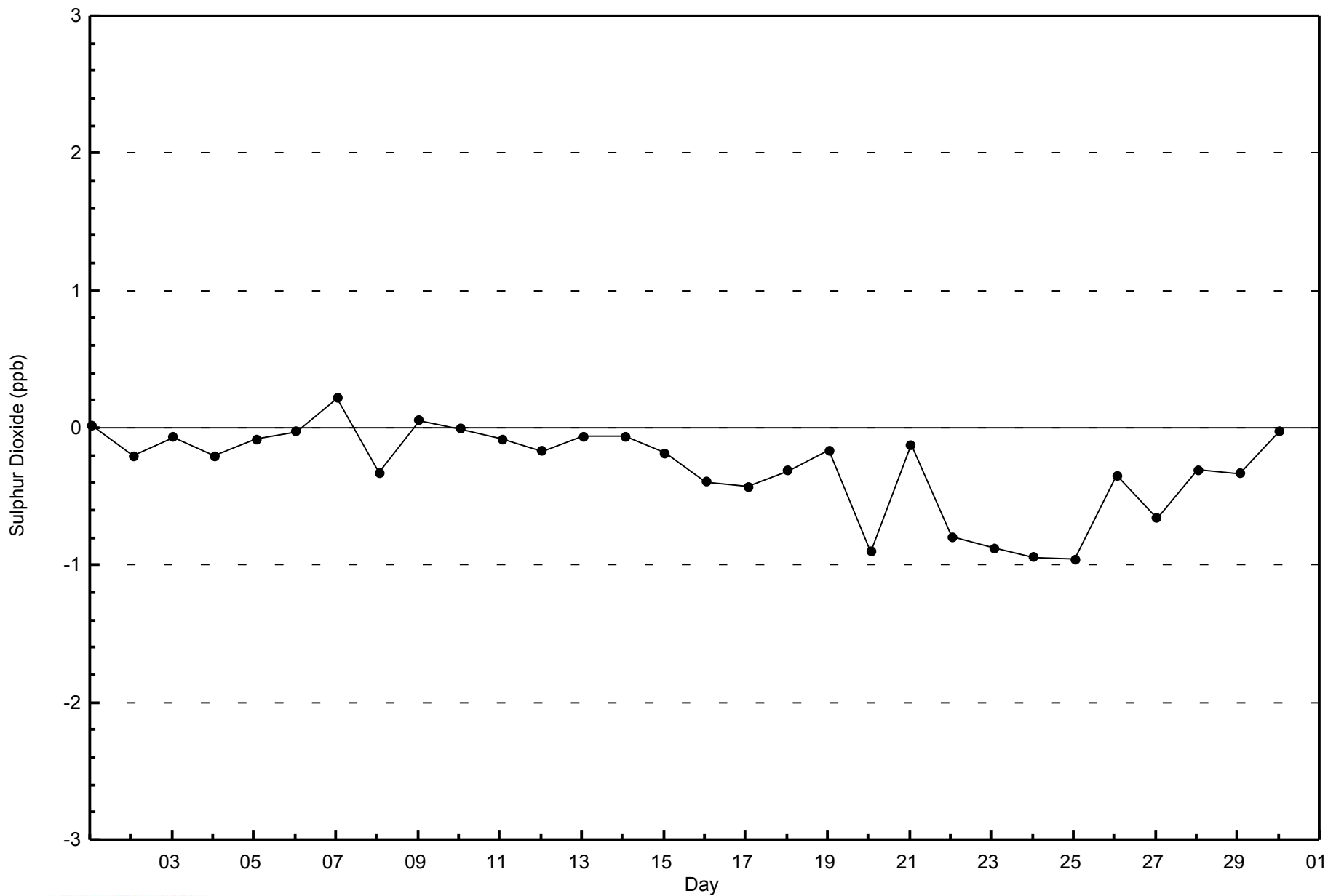


Total Number of Valid Hours: 685



WBEA
Zero Responses

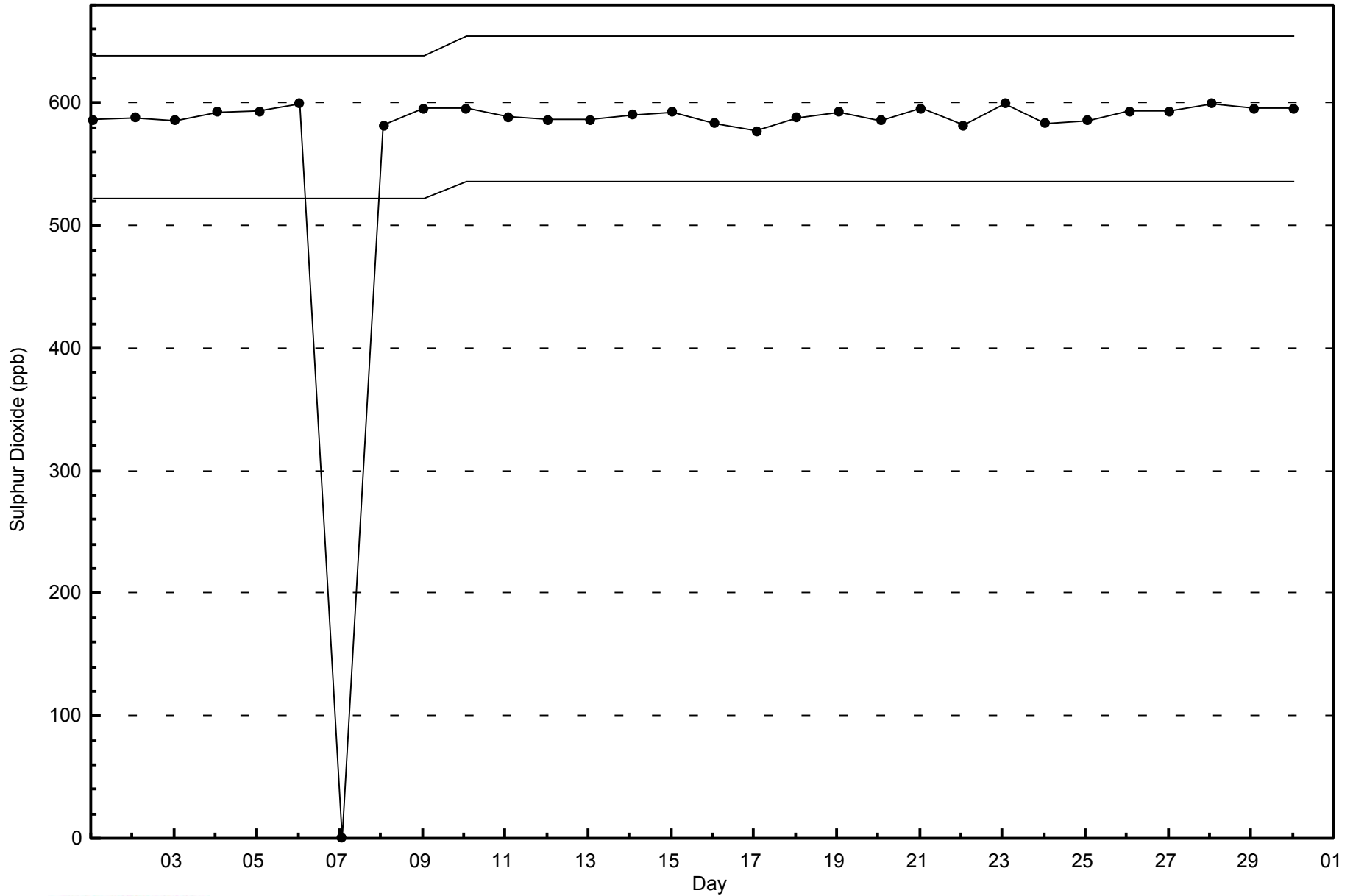
Sulphur Dioxide (SO₂) - ppb
Mannix - June 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Mannix - June 2014





Summary of Hour Averages

Mannix - June 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 6 ppb on Jun 28 02:00	Maximum Daily Average: 2.6 ppb on Jun 30		Hours of Data:	683
Minimum Value: 0 ppb on Jun 2 16:00	Minimum Daily Average: 0.2 ppb on Jun 13		Hours of Missing Data:	37
Maximum Diurnal Average: 2.4 ppb at hour 3	Minimum Diurnal Average: 0.4 ppb at hour 16		Hours of Calibration:	34
Monthly Average: 0.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 5		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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.2	1	
2-Jun	0	1	Z	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	2	0.5	2	
3-Jun	1	1	Z	3	4	3	2	2	1	1	1	1	M	1	1	0	1	0	1	1	1	1	1	1	1.3	4	
4-Jun	1	1	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
5-Jun	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
6-Jun	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1	
7-Jun	0	0	Z	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.5	1	
8-Jun	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
9-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1	
10-Jun	1	0	Z	0	1	1	1	1	1	1	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0.6	1	
11-Jun	0	0	Z	1	1	1	1	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
12-Jun	0	1	Z	0	1	1	0	0	1	3	1	C	C	C	C	0	0	0	0	0	0	0	1	0	0.6	3	
13-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
14-Jun	0	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-Jun	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
16-Jun	0	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.5	1	
17-Jun	0	0	Z	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1	
18-Jun	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
19-Jun	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1	
20-Jun	0	3	Z	3	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	3	
21-Jun	0	0	Z	1	1	1	1	1	2	1	1	1	2	1	2	1	0	0	1	0	1	0	1	1	1.0	2	
22-Jun	2	2	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	0	0.7	2	
23-Jun	1	2	Z	1	1	1	1	3	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.9	3	
24-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
25-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0.4	1	
26-Jun	1	1	Z	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	1	1	1	2	1	2	0.7	2
27-Jun	2	4	Z	1	1	1	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1	1	1	3	2	1.0	4
28-Jun	3	6	1	Z	3	3	2	2	6	6	2	1	1	0	0	0	1	1	2	2	1	2	3	1	2.2	6	
29-Jun	1	2	Z	2	1	3	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	4	5	5	4	1.9	5
30-Jun	5	6	3	Z	6	6	4	2	1	1	1	1	1	1	1	1	1	1	1	2	4	3	4	6	2.6	6	

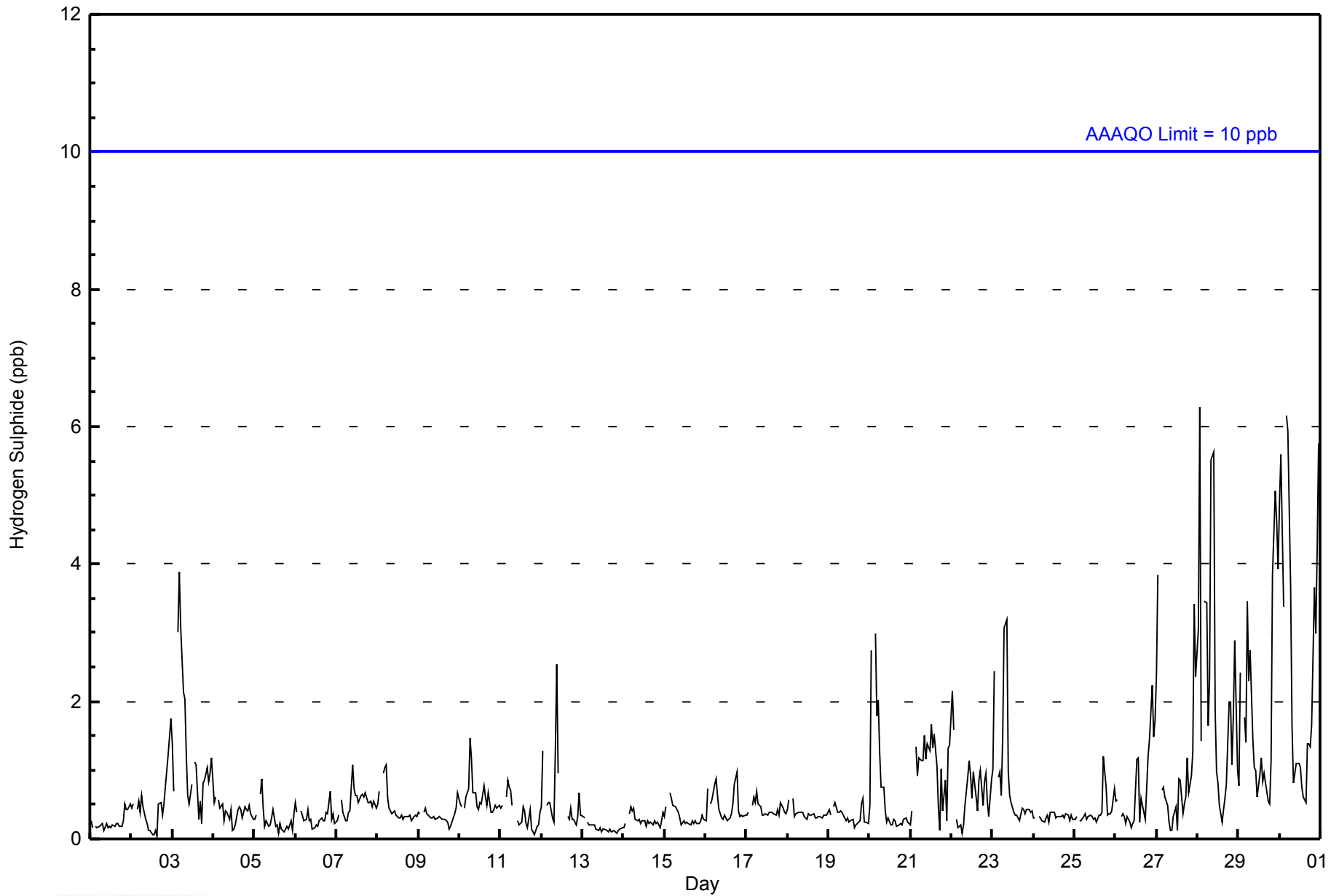
0.8	1.2	2.4	0.7	1.0	1.0	0.8	0.8	0.8	0.7	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.7	0.8	0.9	0.9	Diurnal Average	
5	6	3	3	6	6	4	3	6	6	2	1	2	1	2	1	1	1	2	2	4	5	5	6	Diurnal Maximum	

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



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Mannix - June 2014





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mannix - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	650	95.17	95.17
3 - 4	23	3.37	98.54
5 - 7	10	1.46	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

Hydrogen Sulphide (H₂S) - ppb
Mannix - June 2014

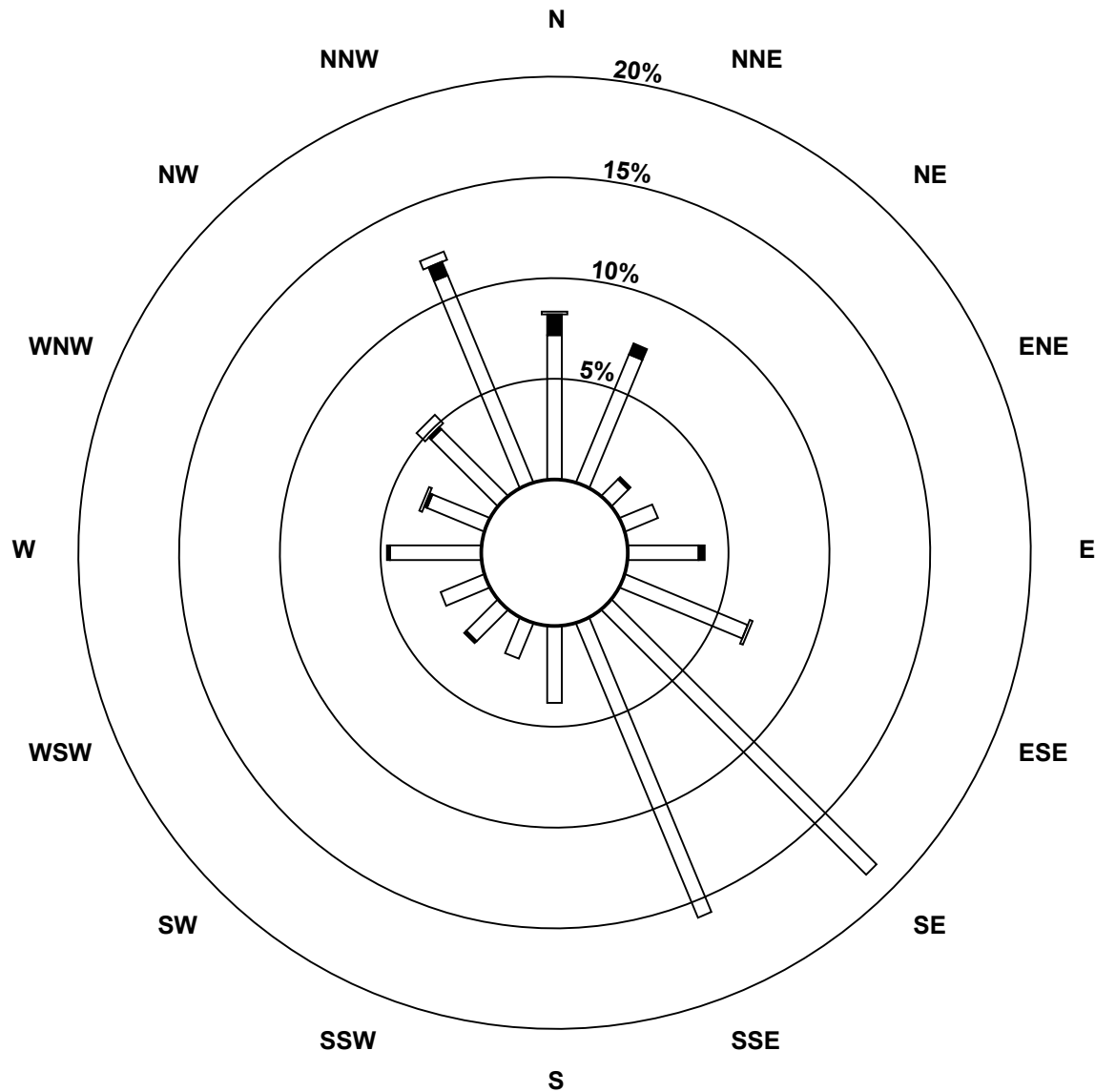
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	49	47	8	12	24	45	127	108	26	13	15	16	31	21	32	76	650
3 - 4	7	4	1	0	2	0	0	0	0	0	1	0	1	1	1	5	23
5 - 7	1	0	0	0	0	1	0	0	0	0	0	0	0	1	4	3	10
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	57	51	9	12	26	46	127	108	26	13	16	16	32	23	37	84	683

Total Number of Valid Hours: 683

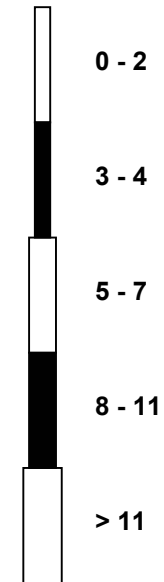
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

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



Classes (ppb)

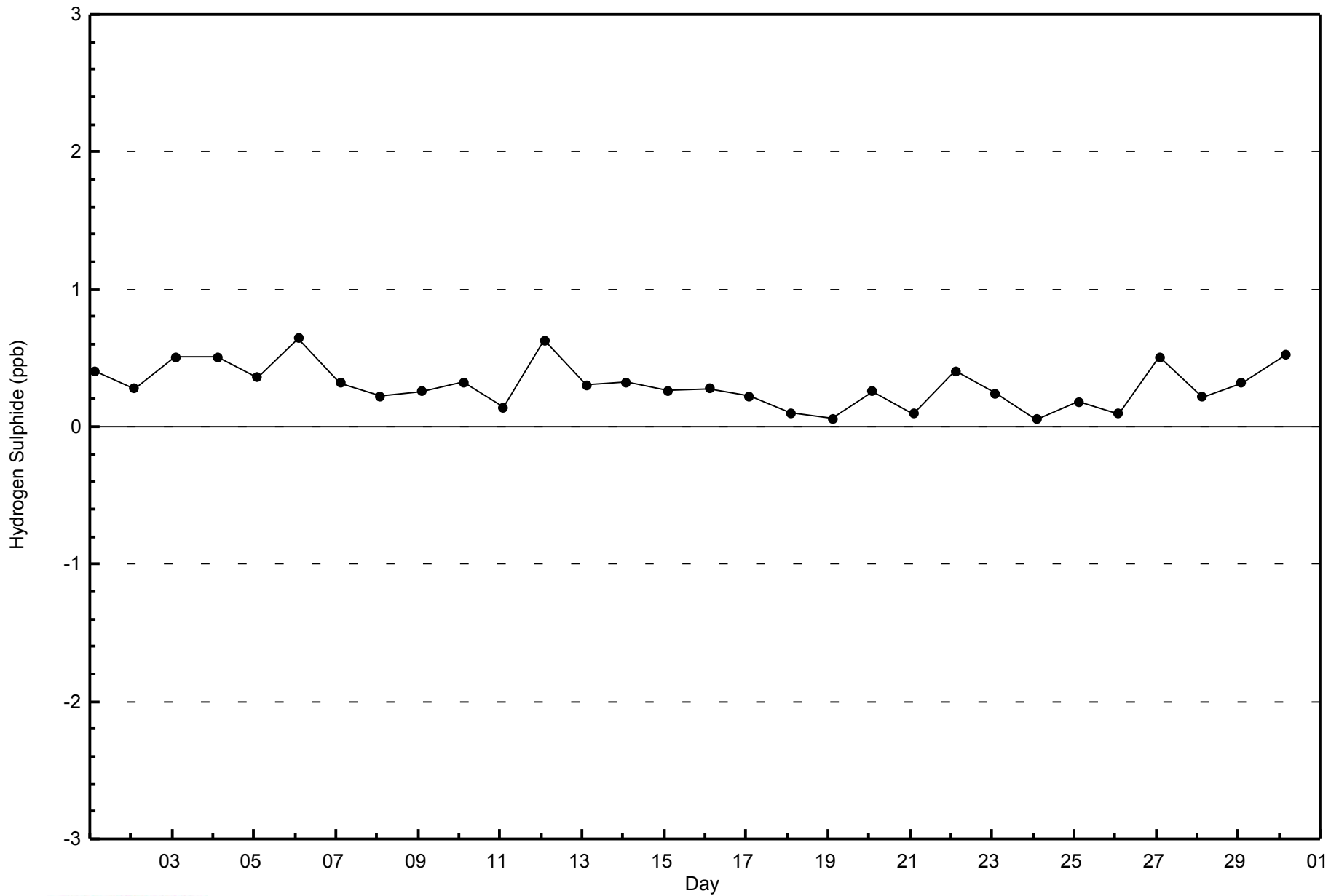


Total Number of Valid Hours: 683



WBEA
Zero Responses

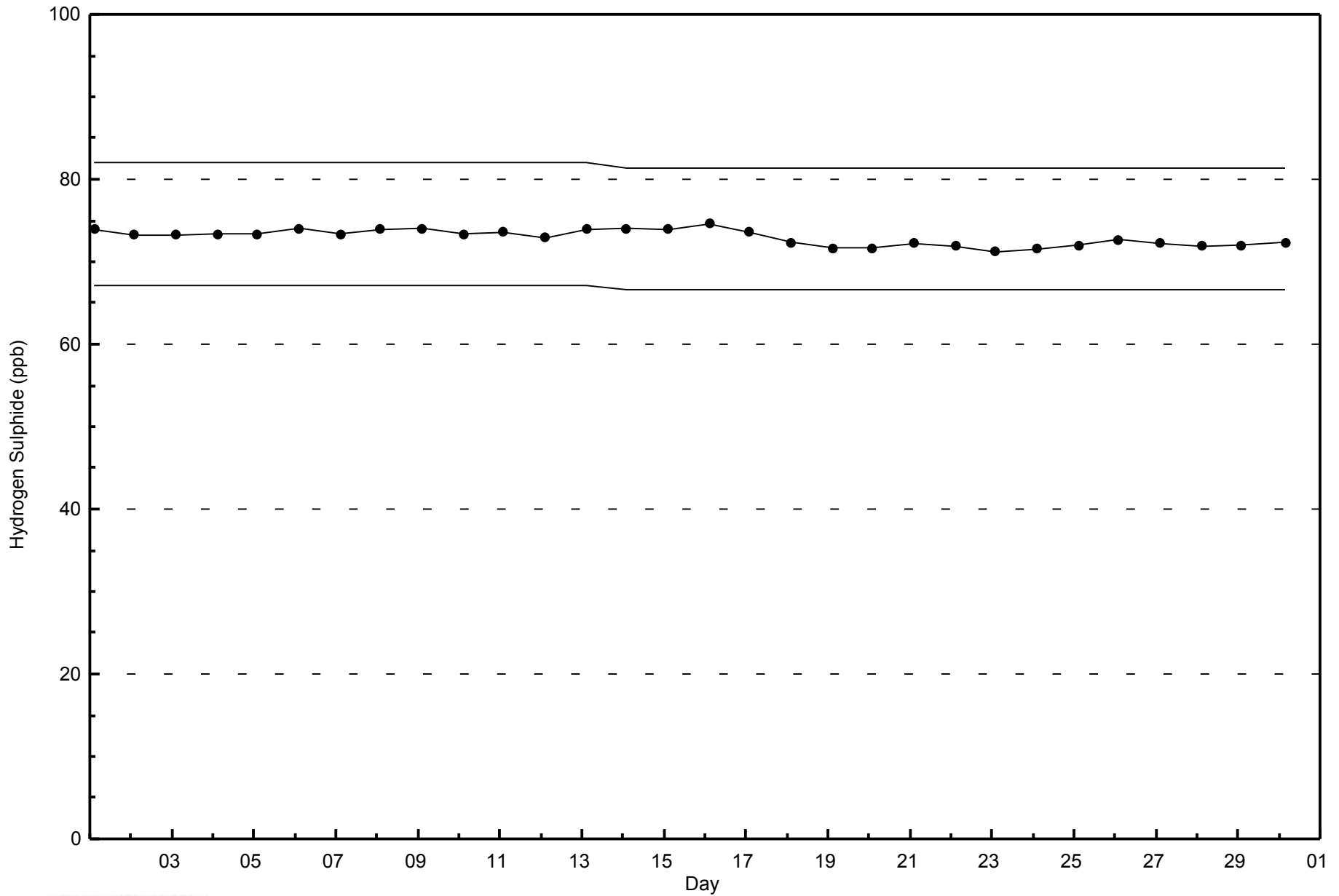
Hydrogen Sulphide (H₂S) - ppb
Mannix - June 2014





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Mannix - June 2014



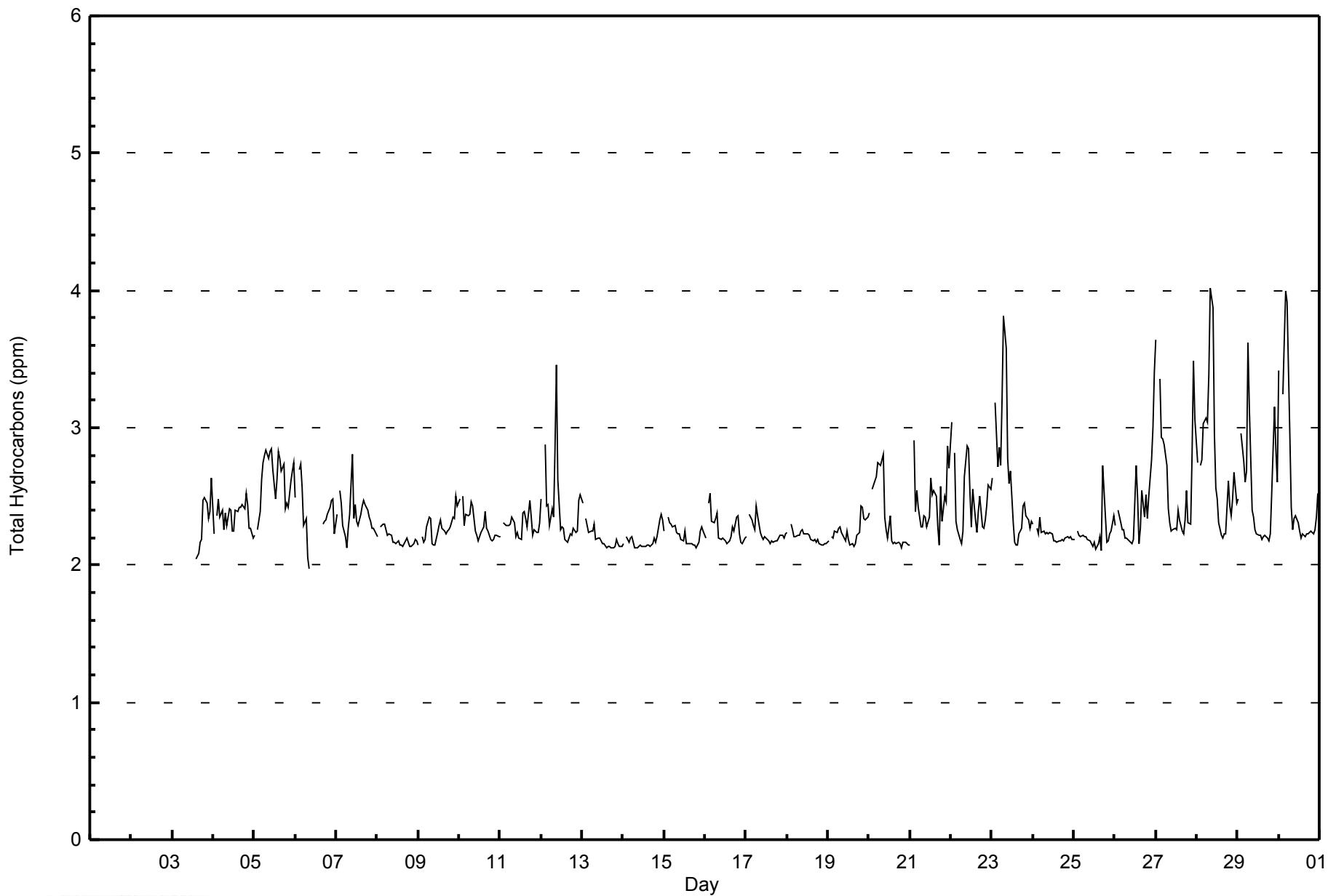


Maximum Value: 4.0 ppm on Jun 28 09:00		Maximum Daily Average: 2.7 ppm on Jun 28		Hours in Service: 720																													
Minimum Value: 2.0 ppm on Jun 6 09:00		Minimum Daily Average: 2.2 ppm on Jun 14		Hours of Data: 624																													
Maximum Diurnal Average: 2.6 ppm at hour 3		Minimum Diurnal Average: 2.2 ppm at hour 15		Hours of Missing Data: 96																													
Monthly Average: 2.37 ppm		Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.4 P ₉₀ = 2.7 P ₉₉ = 3.5		Hours of Calibration: 38																													
				Percent Operational Time: 91.9																													
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-Jun	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-Jun	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-Jun	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	2.0	2.1	2.2	2.2	2.5	2.5	2.5	2.3	2.4	2.6	--	2.6							
4-Jun	2.2	Z	2.4	2.5	2.3	2.4	2.3	2.4	2.3	2.4	2.4	2.2	2.2	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.3	2.3	2.2	2.4	2.4	2.5							
5-Jun	2.2	Z	2.3	2.4	2.6	2.7	2.8	2.8	2.8	2.8	2.9	2.7	2.5	2.6	2.8	2.8	2.7	2.7	2.4	2.5	2.4	2.6	2.7	2.7	2.6	2.9							
6-Jun	2.5	Z	2.7	2.7	2.6	2.3	2.3	2.1	2.0	C	C	C	C	C	C	C	2.3	2.3	2.3	2.4	2.4	2.5	2.5	2.2	--	2.7							
7-Jun	2.4	Z	2.5	2.4	2.3	2.2	2.1	2.3	2.4	2.8	2.3	2.4	2.3	2.3	2.4	2.4	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.4	2.8							
8-Jun	2.2	Z	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3							
9-Jun	2.1	Z	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.1	2.1	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.5	2.4	2.3	2.5							
10-Jun	2.5	Z	2.5	2.3	2.4	2.4	2.4	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5							
11-Jun	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.4	2.4	2.3	2.3	2.5	2.4	2.2	2.3	2.2	2.2	2.3	2.3	2.5							
12-Jun	2.5	Z	2.9	2.4	2.4	2.3	2.4	2.3	2.9	3.5	2.6	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.5	2.5	2.4	3.5							
13-Jun	2.4	Z	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.4							
14-Jun	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.3	2.4	2.3	2.3	2.2	2.4							
15-Jun	2.3	Z	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.4							
16-Jun	2.2	Z	2.5	2.5	2.3	2.3	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.2	2.2	2.2	2.2	2.3	2.5							
17-Jun	2.2	Z	2.4	2.3	2.3	2.3	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4							
18-Jun	2.2	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.3							
19-Jun	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.4	2.4	2.3	2.3	2.3	2.2	2.4							
20-Jun	2.4	Z	2.6	2.6	2.6	2.7	2.7	2.7	2.8	2.4	2.3	2.2	2.4	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.4	2.8							
21-Jun	2.1	Z	2.9	2.4	2.5	2.4	2.3	2.3	2.4	2.3	2.3	2.4	2.6	2.5	2.5	2.5	2.3	2.1	2.6	2.3	2.5	2.5	2.9	2.7	2.4	2.9							
22-Jun	3.0	Z	2.8	2.3	2.3	2.2	2.2	2.2	2.6	2.9	2.9	2.5	2.3	2.5	2.3	2.2	2.4	2.5	2.3	2.3	2.3	2.4	2.6	2.5	2.5	3.0							
23-Jun	2.6	Z	3.2	2.7	2.9	2.7	3.2	3.8	3.6	2.8	2.6	2.7	2.3	2.2	2.1	2.1	2.2	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.6	3.8							
24-Jun	2.3	Z	2.3	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	2.2	2.2	2.2	2.2	2.3							
25-Jun	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.1	2.7	2.3	2.2	2.2	2.2	2.2	2.4	2.2	2.7							
26-Jun	2.3	Z	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.7	2.5	2.2	2.3	2.5	2.4	2.5	2.3	2.5	2.8	3.0	3.4	2.4	3.4							
27-Jun	3.6	Z	3.4	2.9	2.9	2.9	2.7	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.2	2.3	2.5	2.3	2.3	2.8	3.5	3.1	2.6	3.6							
28-Jun	2.7	Z	2.7	2.8	3.0	3.1	3.0	3.4	4.0	3.9	3.0	2.6	2.5	2.3	2.2	2.2	2.2	2.2	2.6	2.4	2.4	2.5	2.7	2.5	2.7	4.0							
29-Jun	2.5	Z	3.0	2.8	2.6	2.7	3.6	3.1	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	3.2	2.8	2.6	2.5	3.6							
30-Jun	3.4	Z	3.2	3.6	4.0	3.9	2.9	2.4	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.5	2.6	2.6	4.0							
		2.4	--	2.6	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	Diurnal Average							
		3.6	--	3.4	3.6	4.0	3.9	3.6	3.8	4.0	3.9	3.0	2.7	2.7	2.6	2.8	2.8	2.7	2.7	2.6	2.5	2.5	3.2	3.5	3.4	Diurnal Maximum							
Z - zerspan		C - Calibration				AF - Analyzer Failure																											



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Mannix - June 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	2	0.32	0.32
2.1 - 3.0	600	96.15	96.47
3.1 - 10.0	22	3.53	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 624

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - June 2014

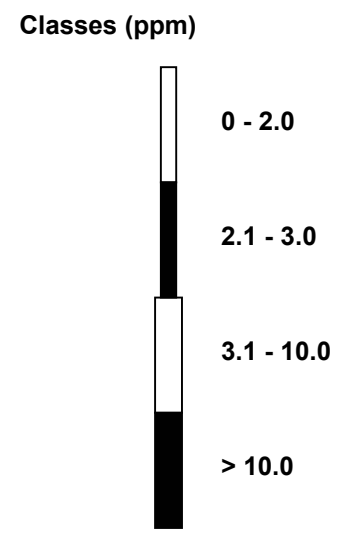
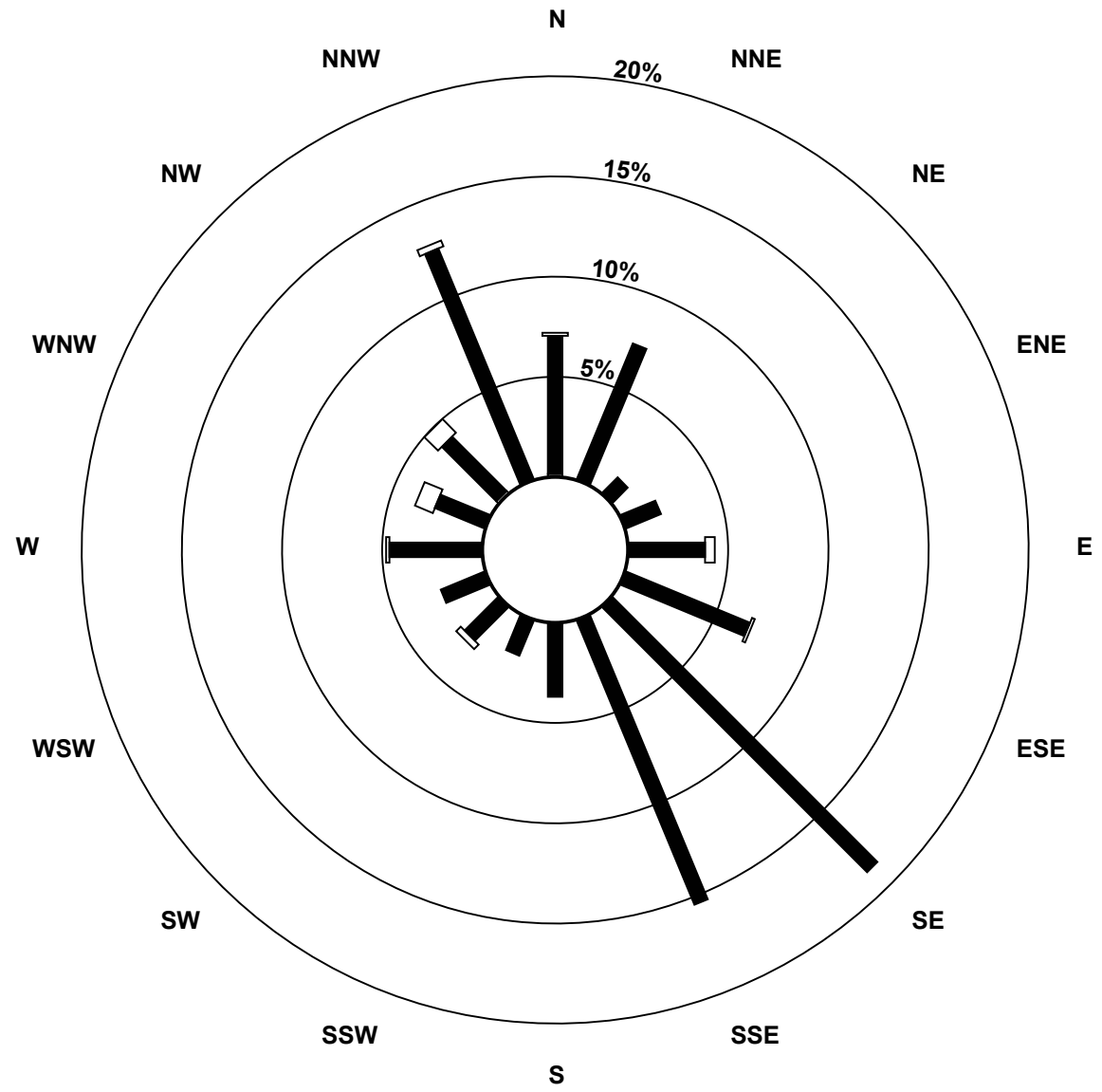
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
2.1 - 3.0	43	46	7	12	24	42	117	96	23	12	15	15	29	17	24	78	600
3.1 - 10.0	1	0	0	0	3	1	0	0	0	0	2	0	1	6	6	2	22
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	45	46	7	12	27	43	117	96	23	12	17	15	30	23	31	80	624

Total Number of Valid Hours: 624

Total Number of Hours: 720

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

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



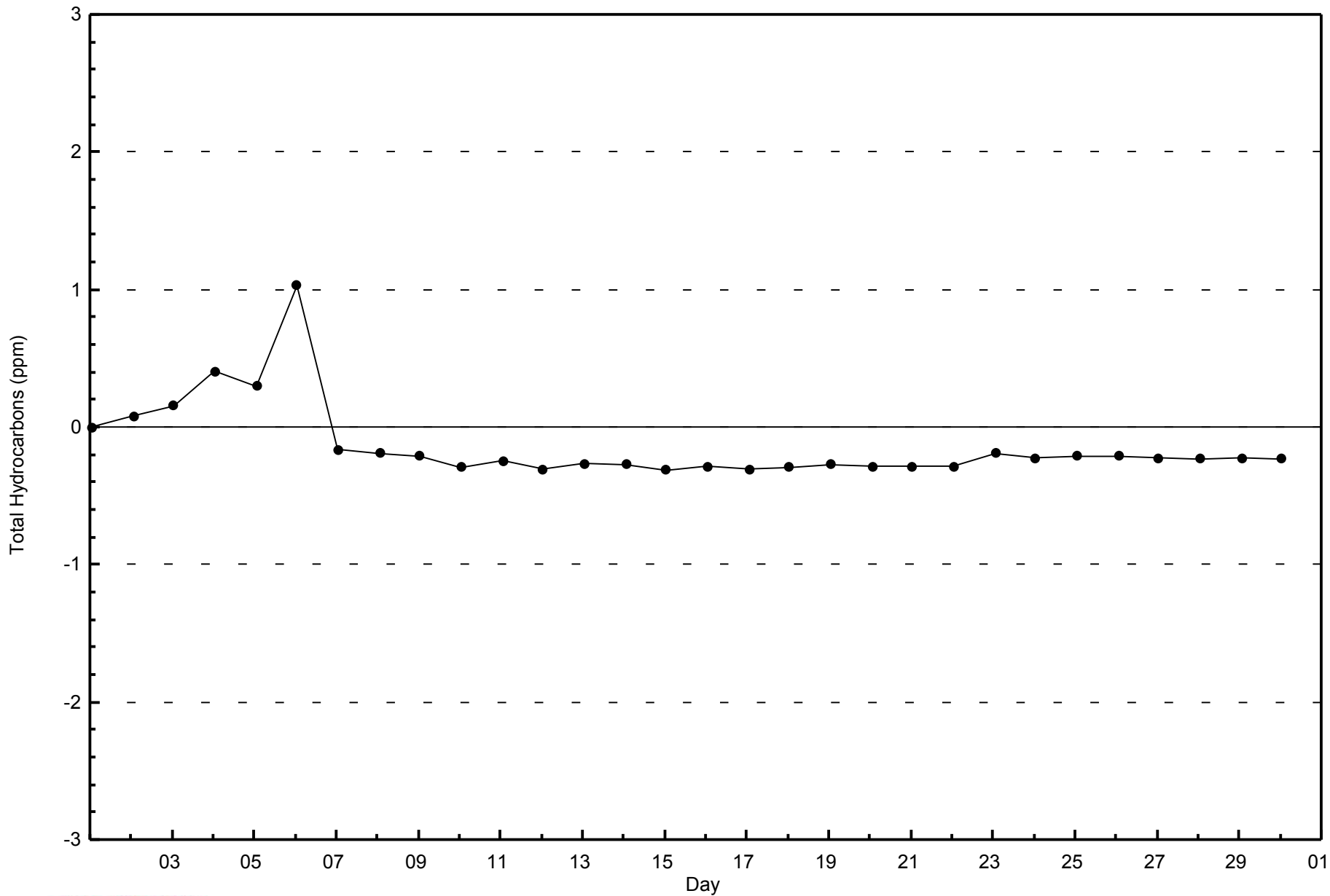
Total Number of Valid Hours: 624



WBEA
Zero Responses

Total Hydrocarbons (THC) - ppm

Mannix - June 2014

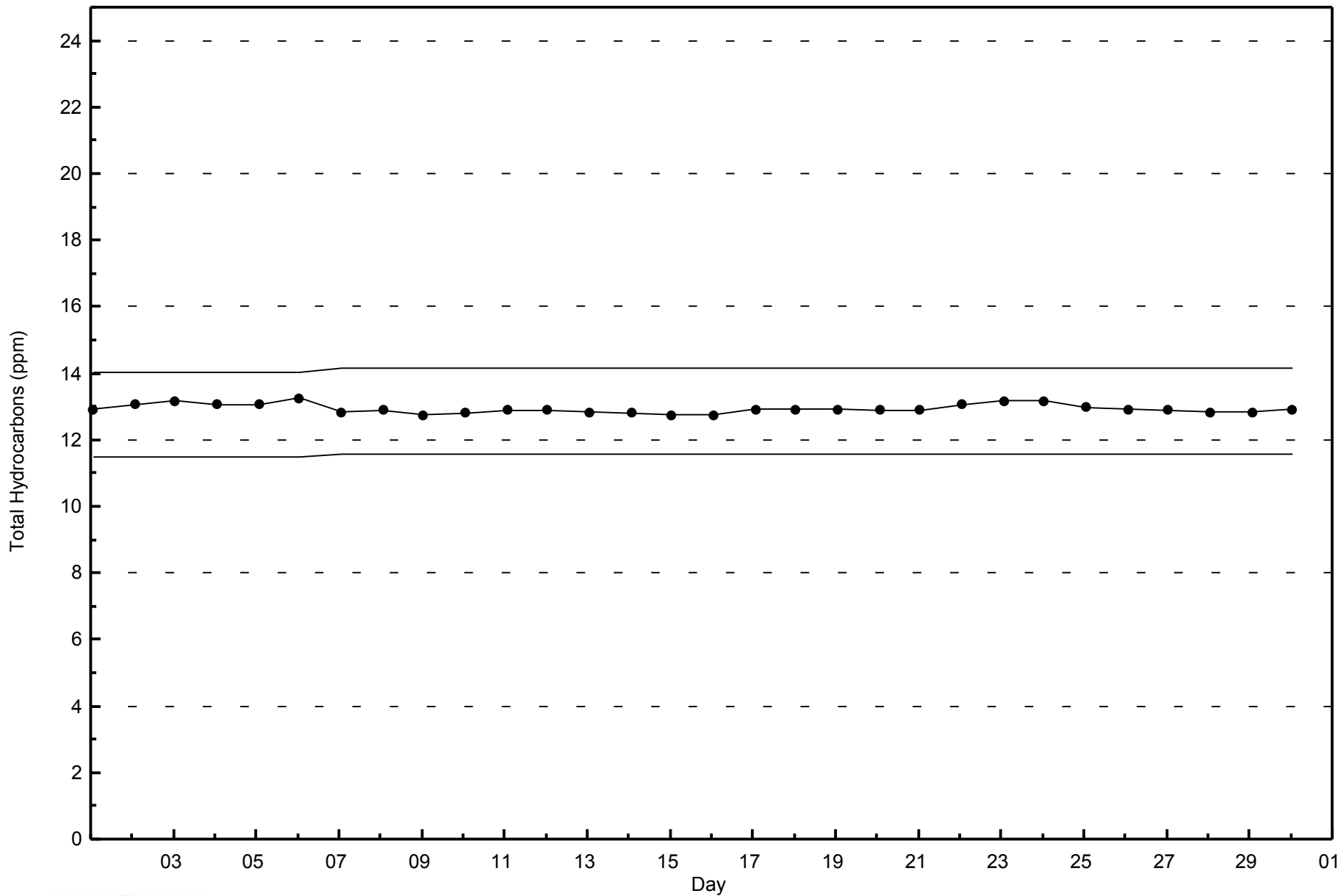




WBEA
Span Responses

Total Hydrocarbons (THC) - ppm

Mannix - June 2014



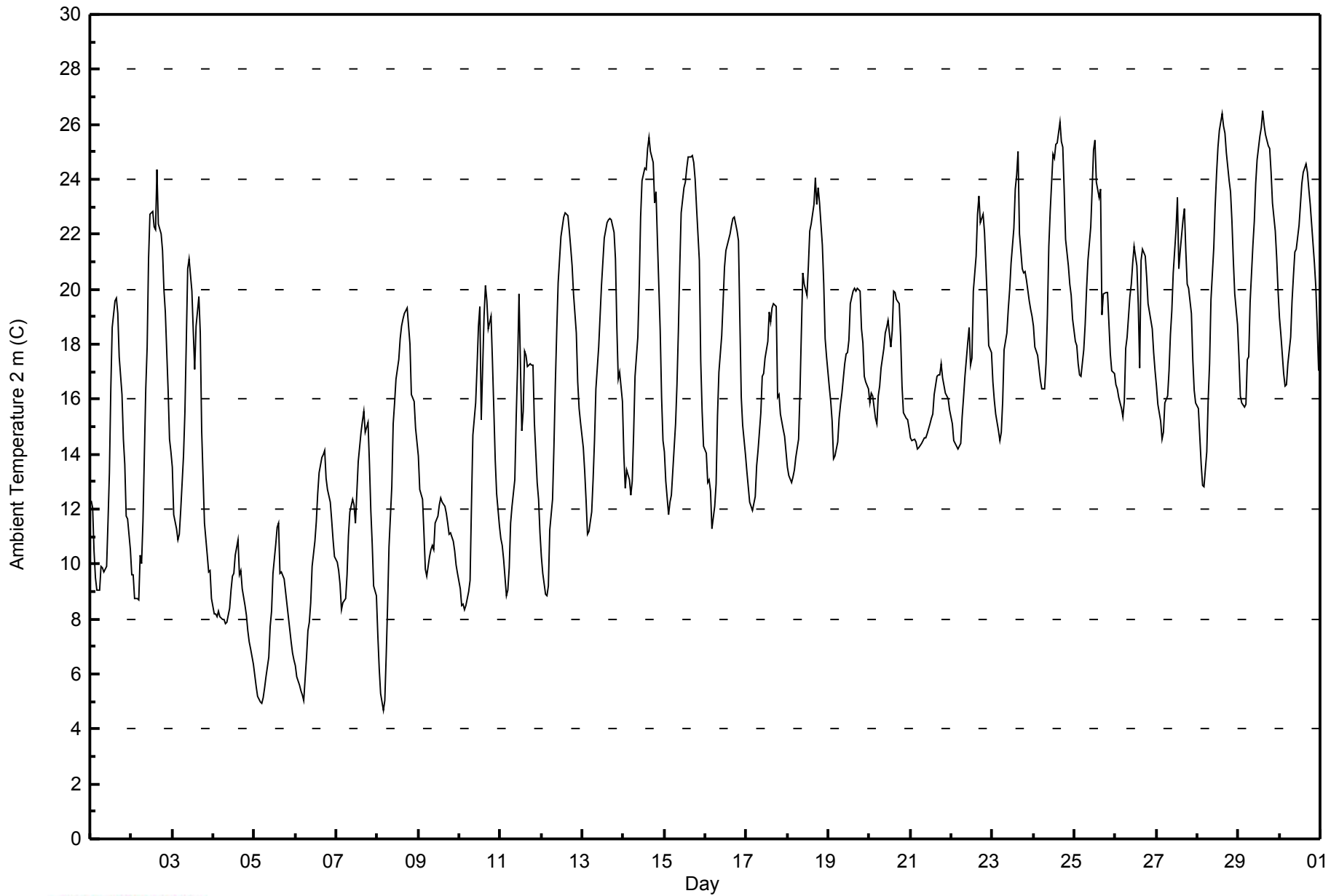


Maximum Value: 26.5 C on Jun 29 15:00		Maximum Daily Average: 21.6 C on Jun 29		Hours in Service: 720																																													
Minimum Value: 4.7 C on Jun 8 04:00		Minimum Daily Average: 7.7 C on Jun 5		Hours of Data: 720																																													
Maximum Diurnal Average: 20.5 C at hour 16		Minimum Diurnal Average: 11.7 C at hour 5		Hours of Missing Data: 0																																													
Monthly Average: 16.25 C		Percentiles: P ₁ = 5.2 P ₁₀ = 9.2 Q ₁ = 12.4 Median = 16.4 Q ₃ = 19.9 P ₉₀ = 22.9 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-Jun	12.3	12.1	10.5	9.5	9.0	9.1	9.9	9.9	9.7	9.9	11.5	13.3	16.4	18.6	19.6	19.7	19.1	17.6	16.2	14.5	13.6	11.8	11.6	10.5	13.2	19.7																							
2-Jun	9.6	9.6	8.8	8.7	8.7	10.3	10.0	11.6	16.4	17.9	21.1	22.7	22.9	22.3	22.2	24.4	22.4	22.0	21.4	20.0	19.2	16.3	14.5	14.1	16.5	24.4																							
3-Jun	13.5	11.8	11.3	10.9	11.1	11.9	13.9	15.5	18.1	20.8	21.1	19.9	18.4	17.1	18.7	19.7	18.4	14.8	13.2	11.5	10.3	9.7	9.8	8.8	14.6	21.1																							
4-Jun	8.2	8.2	8.1	8.3	8.1	8.0	8.0	7.8	7.9	8.4	9.0	9.5	9.7	10.3	10.9	9.6	9.8	9.1	8.5	8.1	7.6	7.2	6.9	6.3	8.5	10.9																							
5-Jun	5.9	5.5	5.2	5.0	5.0	5.1	5.5	5.9	6.6	7.7	8.3	9.6	10.7	11.3	11.5	9.7	9.7	9.5	9.0	8.6	8.1	7.2	6.7	6.5	7.7	11.5																							
6-Jun	6.3	5.9	5.6	5.4	5.3	5.1	6.6	7.6	7.9	8.6	9.9	10.8	11.5	12.5	13.3	13.9	14.0	14.1	13.1	12.7	12.3	11.6	10.9	10.3	9.8	14.1																							
7-Jun	10.1	9.7	9.3	8.3	8.6	8.7	9.6	11.0	11.9	12.3	12.1	11.5	12.6	13.8	14.8	15.2	15.6	14.8	15.1	13.7	11.9	10.7	9.2	8.8	11.6	15.6																							
8-Jun	7.4	6.2	5.3	4.7	5.0	6.6	8.5	10.6	12.8	15.1	15.9	16.7	17.5	18.2	18.7	18.9	19.1	19.3	18.7	18.0	16.2	15.9	14.9	14.4	13.5	19.3																							
9-Jun	13.9	12.7	12.3	11.1	9.8	9.6	10.3	10.5	10.7	10.5	11.5	11.8	12.1	12.4	12.2	12.1	11.8	11.5	11.1	11.2	10.8	10.5	10.0	9.6	11.3	13.9																							
10-Jun	9.1	8.5	8.6	8.3	8.5	9.0	9.4	12.1	14.7	15.9	17.2	18.7	19.4	15.2	19.0	20.1	19.6	18.6	19.0	17.4	15.6	13.8	12.6	11.4	14.2	20.1																							
11-Jun	10.9	10.7	10.2	8.9	9.0	9.9	11.5	12.1	13.1	15.4	17.3	19.8	14.9	15.6	17.7	17.6	17.2	17.3	17.3	17.3	15.2	13.0	12.4	11.1	14.0	19.8																							
12-Jun	10.3	9.7	8.9	8.9	9.2	11.2	12.3	14.3	16.6	18.5	20.3	21.9	22.3	22.6	22.8	22.7	22.1	21.5	20.8	19.8	18.4	16.6	15.7	15.2	16.8	22.8																							
13-Jun	14.2	13.4	12.3	11.1	11.2	11.9	13.1	14.5	16.4	17.9	19.0	20.1	21.0	21.9	22.4	22.5	22.6	22.5	22.1	21.1	18.6	16.7	17.0	15.9	17.5	22.6																							
14-Jun	14.0	12.8	13.4	13.1	12.5	13.0	14.7	16.8	18.2	20.2	22.6	24.0	24.4	24.4	25.1	25.5	25.0	24.6	23.1	23.6	21.8	18.5	16.1	14.5	19.2	25.5																							
15-Jun	14.1	13.0	11.8	12.3	12.5	13.4	15.1	16.5	18.5	20.8	22.8	23.7	23.9	24.4	24.8	24.8	24.8	24.6	24.0	23.0	21.0	17.4	15.5	14.3	19.0	24.8																							
16-Jun	14.1	13.0	13.1	12.7	11.3	12.1	12.9	15.4	17.0	18.3	19.5	20.8	21.4	21.6	22.0	22.3	22.6	22.6	22.1	21.8	18.9	16.1	15.1	14.0	17.5	22.6																							
17-Jun	13.4	12.8	12.2	11.9	12.2	12.5	13.6	14.2	15.5	16.8	16.9	17.5	18.1	19.2	18.8	19.3	19.5	19.4	16.1	16.2	15.5	14.9	14.6	14.1	15.6	19.5																							
18-Jun	13.5	13.2	13.0	13.1	13.4	13.9	14.5	16.3	18.4	20.6	20.2	19.8	20.8	22.1	22.4	23.1	24.0	23.1	23.7	23.1	21.6	20.2	18.2	17.6	18.7	24.0																							
19-Jun	16.4	15.9	15.2	13.8	13.9	14.4	15.3	15.8	16.2	17.3	17.6	17.7	18.2	19.5	19.9	20.0	19.9	20.0	19.9	18.5	18.1	16.8	16.6	16.4	17.2	20.0																							
20-Jun	15.8	16.2	16.1	15.3	15.1	16.1	16.5	17.1	17.9	18.4	18.6	18.9	17.9	18.5	19.9	19.9	19.6	19.5	18.3	16.5	15.5	15.3	15.3	15.0	17.2	19.9																							
21-Jun	14.6	14.5	14.6	14.4	14.2	14.3	14.4	14.5	14.6	14.6	14.7	15.1	15.3	15.4	16.2	16.8	16.9	16.9	17.3	16.8	16.2	16.1	16.0	15.6	15.4	17.3																							
22-Jun	15.1	14.5	14.4	14.3	14.2	14.4	15.3	16.1	16.8	18.1	18.6	17.3	17.5	19.9	21.2	22.7	23.4	22.4	22.7	22.1	20.8	19.6	17.9	17.7	18.2	23.4																							
23-Jun	16.6	15.9	15.5	14.8	14.5	14.8	15.9	17.8	18.4	19.3	20.0	21.0	22.2	23.7	24.2	25.0	22.0	20.8	20.6	20.6	20.3	19.6	19.3	19.0	19.2	25.0																							
24-Jun	18.7	17.9	17.6	17.1	16.7	16.4	16.4	17.3	19.1	21.6	22.8	24.9	24.8	25.3	25.3	26.1	25.4	25.2	23.6	21.8	20.8	20.2	19.8	18.9	21.0	26.1																							
25-Jun	18.1	17.9	17.3	16.9	16.8	17.8	18.7	20.0	21.0	22.3	23.7	25.1	25.4	23.9	23.3	23.7	19.1	19.8	19.9	19.9	18.8	17.6	17.0	16.9	20.0	25.4																							
26-Jun	16.5	16.4	16.1	15.7	15.4	15.9	17.9	18.3	19.7	20.2	20.9	21.6	20.8	19.4	17.1	21.0	21.5	21.2	20.4	19.5	19.2	18.6	17.7	17.0	18.7	21.6																							
27-Jun	16.5	15.8	15.2	14.6	14.8	15.9	16.1	17.0	18.3	19.2	20.6	22.2	23.3	20.8	21.4	22.5	22.9	21.4	20.2	20.0	19.1	17.4	16.3	15.9	18.6	23.3																							
28-Jun	15.7	14.6	13.6	12.9	12.8	14.1	16.0	17.3	19.6	21.5	23.0	24.2	25.2	25.8	26.4	25.9	25.7	25.0	24.0	23.6	22.5	21.0	19.8	18.7	20.4	26.4																							
29-Jun	17.6	16.1	15.9	15.7	15.8	17.4	17.6	19.5	21.6	22.5	23.9	24.7	25.6	25.9	26.5	26.0	25.6	25.2	25.1	24.3	23.1	22.1	21.1	19.9	21.6	26.5																							
30-Jun	19.0	18.4	16.9	16.5	16.5	17.3	18.3	19.6	20.5	21.3	21.5	22.3	23.1	23.8	24.2	24.6	24.3	23.7	23.1	22.4	20.9	20.1	18.7	17.0	20.6	24.6																							
																								13.4	12.8	12.3	11.8	11.7	12.3	13.3	14.4	15.8	17.1	18.1	18.9	19.2	19.5	20.1	20.5	20.1	19.6	19.0	18.2	17.1	15.7	14.9	14.2	Diurnal Average	
																								19.0	18.4	17.6	17.1	16.8	17.8	18.7	20.0	21.6	22.5	23.9	25.1	25.6	25.9	26.5	26.1	25.7	25.2	25.1	24.3	23.1	22.1	21.1	19.9	Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	102	14.17	14.17
10 - 20	442	61.39	75.56
> 20	176	24.44	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

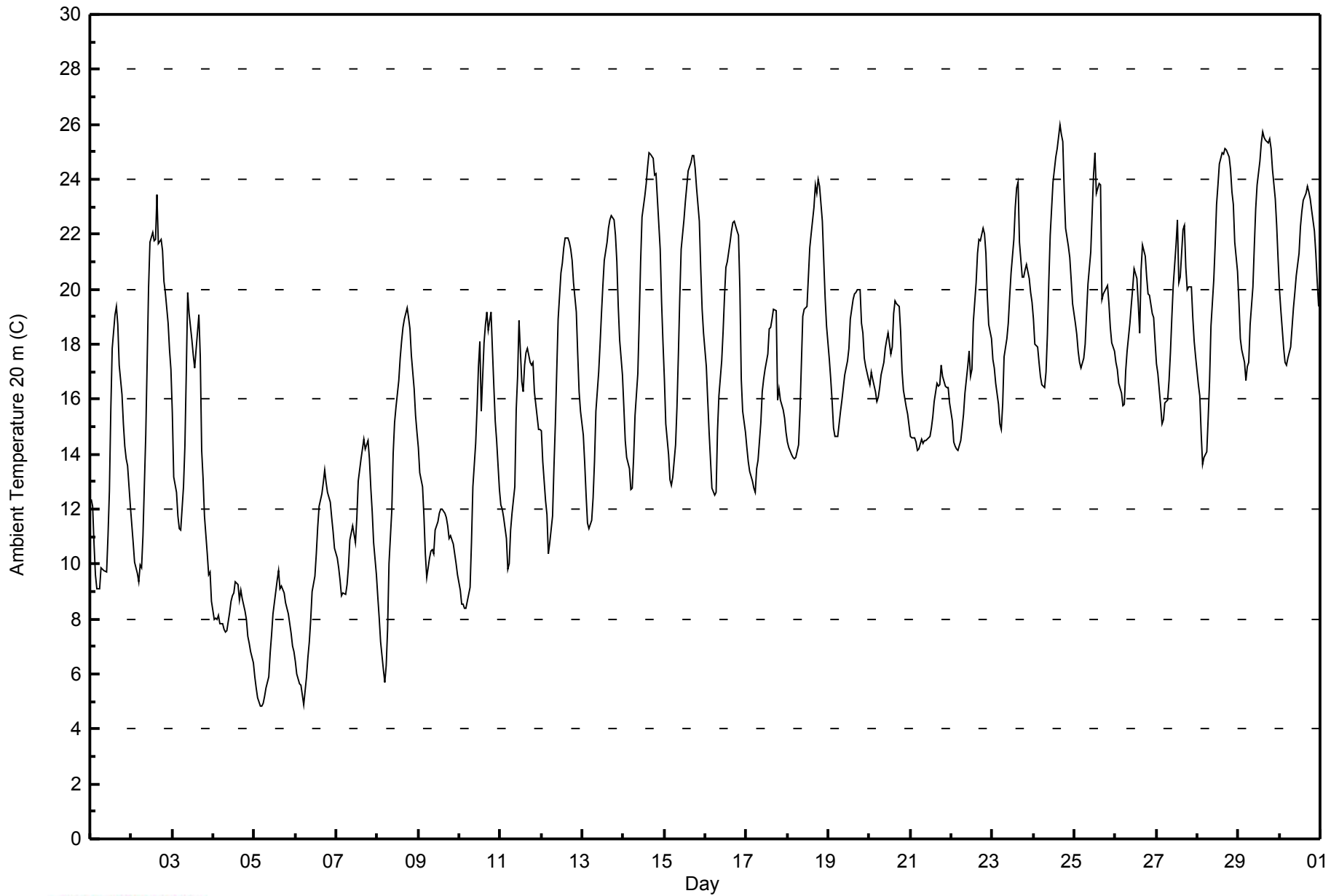


Maximum Value: 26.0 C on Jun 24 16:00		Maximum Daily Average: 21.9 C on Jun 29		Hours in Service: 720																																												
Minimum Value: 4.8 C on Jun 5 04:00		Minimum Daily Average: 7.2 C on Jun 5		Hours of Data: 720																																												
Maximum Diurnal Average: 20.0 C at hour 16		Minimum Diurnal Average: 12.1 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 16.30 C		Percentiles: P ₁ = 5.5 P ₁₀ = 9.1 Q ₁ = 12.8 Median = 16.8 Q ₃ = 19.9 P ₉₀ = 22.6 P ₉₉ = 25.4		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-Jun	12.4	12.1	10.7	9.6	9.1	9.1	9.8	9.8	9.8	9.7	11.0	12.6	15.6	17.9	19.1	19.3	18.7	17.3	16.2	15.1	14.3	13.8	13.6	12.1	13.3	19.3																						
2-Jun	11.5	10.8	10.1	9.7	9.3	9.9	9.9	11.0	14.7	17.4	20.0	21.7	22.0	21.8	21.8	23.4	21.7	21.8	21.4	20.3	19.9	18.7	17.8	17.1	16.8	23.4																						
3-Jun	15.5	13.2	12.6	11.7	11.3	11.3	12.8	14.3	17.0	19.9	19.1	18.1	17.6	17.1	17.8	19.1	17.6	14.2	13.1	11.7	10.4	9.6	9.7	8.6	14.3	19.9																						
4-Jun	8.0	8.0	8.0	8.2	7.9	7.8	7.6	7.5	7.6	8.3	8.6	8.9	8.9	9.3	9.3	8.7	9.1	8.7	8.3	8.0	7.4	7.1	6.8	6.4	8.1	9.3																						
5-Jun	5.9	5.5	5.1	4.8	4.8	4.9	5.2	5.5	5.9	6.7	7.4	8.2	9.0	9.4	9.8	9.1	9.2	9.0	8.6	8.4	8.2	7.5	7.0	6.8	7.2	9.8																						
6-Jun	6.5	6.0	5.6	5.6	5.3	4.9	5.9	6.6	7.1	8.0	9.0	9.5	10.4	11.4	12.1	12.5	13.0	13.4	13.0	12.6	12.2	11.7	11.2	10.6	9.3	13.4																						
7-Jun	10.2	9.9	9.4	8.8	8.9	8.9	9.2	9.9	10.9	11.4	11.1	10.8	11.7	13.0	13.8	14.2	14.5	14.2	14.5	13.8	12.8	11.9	10.8	9.6	11.4	14.5																						
8-Jun	8.8	8.1	7.2	6.1	5.7	6.3	7.6	10.0	12.0	14.0	15.2	15.7	16.7	17.5	18.1	18.6	18.9	19.3	19.0	18.6	17.6	16.4	15.4	14.8	13.6	19.3																						
9-Jun	14.2	13.3	12.8	11.7	10.4	9.5	10.2	10.5	10.5	10.4	11.2	11.5	11.9	12.0	12.0	11.9	11.7	11.4	11.0	11.0	10.7	10.4	10.0	9.6	11.2	14.2																						
10-Jun	9.0	8.5	8.5	8.4	8.4	8.9	9.2	10.8	12.8	14.4	15.7	17.2	18.1	15.5	18.0	18.7	19.2	18.5	19.2	17.8	16.5	15.2	14.5	12.7	14.0	19.2																						
11-Jun	12.1	12.0	11.7	10.9	9.8	10.0	11.2	11.8	12.8	15.6	16.8	18.9	16.6	16.3	17.3	17.7	17.8	17.3	17.2	17.3	16.3	15.4	14.9	14.9	14.7	18.9																						
12-Jun	14.9	13.7	12.3	11.8	10.4	10.8	11.8	13.5	15.1	17.0	18.9	20.6	20.9	21.5	21.8	21.8	21.7	21.4	21.1	20.3	19.2	17.6	16.3	15.6	17.1	21.8																						
13-Jun	14.7	13.7	12.5	11.5	11.3	11.6	12.4	13.7	15.5	17.0	18.0	19.1	20.1	21.1	21.7	22.2	22.5	22.7	22.5	22.0	21.0	19.4	18.2	16.9	17.6	22.7																						
14-Jun	15.7	14.5	13.9	13.5	12.7	12.8	13.9	15.4	16.9	18.8	21.0	22.6	23.4	23.8	24.5	24.9	24.9	24.8	24.2	24.2	23.3	21.4	19.5	18.0	19.5	24.9																						
15-Jun	16.7	15.1	14.0	13.1	12.9	13.2	14.3	15.7	17.6	19.7	21.5	22.5	23.2	23.8	24.3	24.6	24.8	24.8	24.4	23.7	22.5	20.7	19.3	18.4	19.6	24.8																						
16-Jun	17.2	16.0	14.8	13.8	12.8	12.5	12.6	14.8	16.1	17.4	18.5	19.7	20.8	21.0	21.7	22.1	22.4	22.5	22.1	22.0	20.0	16.7	15.6	14.8	17.8	22.5																						
17-Jun	14.2	13.8	13.4	13.0	12.8	12.6	13.5	13.8	15.1	16.3	16.7	17.1	17.6	18.6	18.6	18.9	19.3	19.2	16.0	16.4	16.0	15.6	15.3	14.8	15.8	19.3																						
18-Jun	14.5	14.3	14.0	13.9	13.8	13.9	14.3	15.6	17.3	19.0	19.3	19.4	20.4	21.5	22.0	23.0	23.8	23.5	24.0	23.8	22.5	21.0	19.7	18.6	18.9	24.0																						
19-Jun	17.5	16.7	15.9	15.0	14.7	14.7	15.1	15.5	16.0	16.9	17.1	17.4	17.8	18.9	19.6	19.9	19.9	20.0	20.0	18.7	18.4	17.5	17.2	16.7	17.4	20.0																						
20-Jun	16.5	17.0	16.7	16.3	15.9	16.0	16.4	16.9	17.3	17.9	18.2	18.4	17.7	17.9	19.1	19.6	19.5	19.4	18.5	17.0	16.3	15.7	15.4	15.0	17.3	19.6																						
21-Jun	14.6	14.6	14.6	14.4	14.1	14.2	14.5	14.4	14.5	14.5	14.6	14.7	15.0	15.3	15.9	16.6	16.5	16.5	17.2	16.8	16.5	16.4	16.4	15.9	15.4	17.2																						
22-Jun	15.2	14.5	14.3	14.2	14.2	14.5	14.9	15.5	16.2	17.2	17.8	16.8	17.1	18.8	20.3	21.3	21.8	21.8	22.2	22.0	21.3	19.8	18.7	18.2	17.9	22.2																						
23-Jun	17.4	17.1	16.6	15.8	15.1	14.9	15.8	17.5	18.2	18.7	19.7	20.6	21.8	23.0	23.7	23.9	21.7	20.4	20.5	20.7	20.9	20.4	19.9	19.5	19.3	23.9																						
24-Jun	18.9	18.0	17.9	17.4	16.9	16.5	16.4	17.0	18.3	20.3	22.0	23.9	24.3	24.8	25.1	26.0	25.6	25.4	23.6	22.2	21.6	21.1	20.4	19.5	21.0	26.0																						
25-Jun	18.8	18.4	17.7	17.3	17.1	17.5	18.0	19.1	20.2	21.4	22.8	24.2	25.0	23.5	23.8	23.8	19.6	19.8	20.0	20.2	19.5	18.6	18.0	17.8	20.1	25.0																						
26-Jun	17.3	17.1	16.6	16.2	15.8	15.8	17.1	17.8	18.8	19.4	20.0	20.7	20.4	19.5	18.4	20.7	21.6	21.2	20.4	19.8	19.8	19.1	18.9	18.1	18.8	21.6																						
27-Jun	17.3	17.0	15.7	15.1	15.2	15.9	16.0	16.7	17.7	19.0	20.1	21.6	22.5	20.3	20.5	22.2	22.3	20.8	20.0	20.1	20.1	19.0	18.1	17.5	18.8	22.5																						
28-Jun	16.5	16.1	14.8	13.6	13.9	14.1	15.3	16.7	18.7	20.4	21.6	23.1	23.8	24.6	25.0	24.9	25.1	25.1	24.8	24.3	23.5	23.1	21.7	20.6	20.5	25.1																						
29-Jun	19.5	18.2	17.8	17.4	16.7	17.2	17.3	18.7	20.1	21.6	22.9	23.8	24.7	25.3	25.7	25.5	25.4	25.3	25.5	25.1	24.3	23.3	22.3	21.1	21.9	25.7																						
30-Jun	20.0	19.2	17.8	17.4	17.2	17.5	17.9	18.6	19.3	19.9	20.5	21.3	22.3	22.9	23.2	23.5	23.7	23.6	23.3	22.9	22.1	21.3	20.3	19.4	20.6	23.7																						
																								14.4	13.7	13.1	12.5	12.1	12.3	12.9	13.8	15.0	16.3	17.2	18.0	18.6	18.9	19.5	20.0	19.8	19.4	19.1	18.6	17.8	16.9	16.1	15.3	Diurnal Average
																								20.0	19.2	17.9	17.4	17.2	17.5	18.0	19.1	20.2	21.6	22.9	24.2	25.0	25.3	25.7	26.0	25.6	25.4	25.5	25.1	24.3	23.3	22.3	21.1	Diurnal Maximum



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	100	13.89	13.89
10 - 20	445	61.81	75.69
> 20	175	24.31	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

Mannix - June 2014

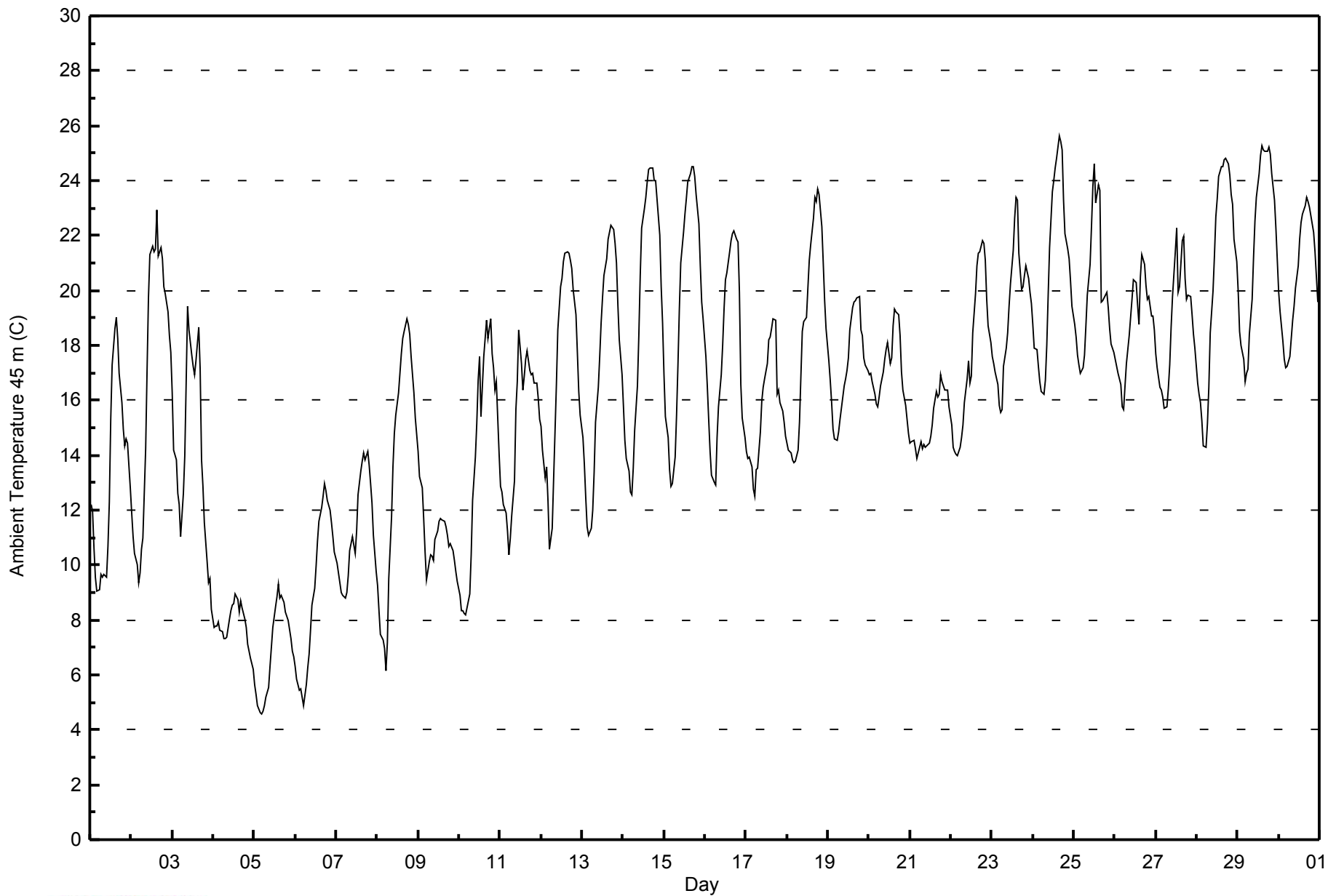
Maximum Value: 25.6 C on Jun 24 16:00																				Maximum Daily Average: 21.7 C on Jun 29					Hours in Service: 720																							
Minimum Value: 4.6 C on Jun 5 05:00																				Minimum Daily Average: 6.9 C on Jun 5					Hours of Data: 720																							
Maximum Diurnal Average: 19.6 C at hour 16																				Minimum Diurnal Average: 12.2 C at hour 6					Hours of Missing Data: 0																							
Monthly Average: 16.17 C																				Percentiles: P ₁ = 5.2 P ₁₀ = 8.9 Q ₁ = 12.9 Median = 16.7 Q ₃ = 19.7 P ₉₀ = 22.3 P ₉₉ = 25.0					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-Jun	12.2	11.9	10.6	9.6	9.0	9.1	9.7	9.6	9.6	9.5	10.7	12.3	15.3	17.3	18.6	19.0	18.3	17.0	15.9	15.0	14.3	14.6	14.4	12.8	13.2	19.0																						
2-Jun	11.9	11.0	10.4	10.0	9.4	9.7	10.6	11.0	14.2	17.1	19.7	21.3	21.6	21.4	21.5	22.9	21.3	21.5	21.1	20.2	19.9	19.2	18.4	17.7	16.8	22.9																						
3-Jun	16.3	14.2	13.8	12.6	12.2	11.0	12.6	14.0	16.7	19.4	18.6	17.6	17.2	17.0	17.4	18.7	17.2	13.8	12.9	11.6	10.1	9.4	9.5	8.4	14.3	19.4																						
4-Jun	7.8	7.8	7.8	7.9	7.6	7.6	7.3	7.3	7.4	8.0	8.4	8.6	8.6	8.9	8.7	8.3	8.7	8.4	8.0	7.7	7.1	6.9	6.6	6.2	7.8	8.9																						
5-Jun	5.7	5.3	4.9	4.6	4.6	4.7	4.9	5.2	5.6	6.3	7.0	7.7	8.5	8.8	9.3	8.8	8.9	8.6	8.3	8.1	8.0	7.3	6.8	6.7	6.9	9.3																						
6-Jun	6.3	5.8	5.5	5.5	5.2	4.9	5.6	6.2	6.8	7.6	8.5	9.1	10.0	10.9	11.6	12.1	12.5	13.0	12.7	12.3	12.0	11.6	11.0	10.5	9.0	13.0																						
7-Jun	10.1	9.7	9.3	9.0	8.9	8.8	9.0	9.6	10.5	11.0	10.7	10.4	11.3	12.5	13.4	13.8	14.1	13.8	14.1	13.6	13.0	12.3	11.1	9.8	11.2	14.1																						
8-Jun	9.2	8.3	7.5	7.3	6.9	6.1	7.2	9.5	11.8	13.6	14.8	15.5	16.3	17.0	17.7	18.3	18.5	19.0	18.8	18.4	17.6	16.3	15.3	14.8	13.6	19.0																						
9-Jun	14.1	13.2	12.8	11.7	10.5	9.5	10.1	10.3	10.3	10.2	11.0	11.3	11.6	11.7	11.6	11.6	11.4	11.1	10.7	10.8	10.5	10.2	9.8	9.4	11.1	14.1																						
10-Jun	8.9	8.3	8.4	8.2	8.2	8.7	8.9	10.4	12.3	13.9	15.2	16.7	17.6	15.4	17.6	18.3	18.9	18.3	18.9	17.7	17.2	16.4	16.7	14.0	14.0	18.9																						
11-Jun	12.9	12.6	12.2	11.9	11.3	10.3	11.0	11.8	13.1	15.7	16.7	18.5	17.4	16.4	16.9	17.5	17.8	17.1	17.0	17.0	16.6	16.6	16.1	15.3	15.0	18.5																						
12-Jun	15.0	14.2	13.2	13.6	12.3	10.6	11.3	13.1	14.9	16.6	18.5	20.1	20.5	21.1	21.4	21.4	21.1	20.8	20.0	19.1	17.8	16.3	15.4	17.1	17.1	21.4																						
13-Jun	14.6	13.7	12.4	11.4	11.1	11.3	12.0	13.4	15.2	16.5	17.6	18.8	19.7	20.5	21.2	21.9	22.1	22.4	22.2	21.7	21.0	19.5	18.2	17.0	17.3	22.4																						
14-Jun	15.8	14.5	13.9	13.4	12.7	12.5	13.5	14.9	16.5	18.3	20.6	22.3	23.0	23.4	24.0	24.4	24.5	24.4	24.0	24.0	23.3	22.0	20.1	18.8	19.4	24.5																						
15-Jun	16.9	15.4	14.7	13.5	12.9	13.0	13.9	15.4	17.3	19.3	21.0	22.1	22.8	23.4	23.9	24.3	24.5	24.5	24.2	23.5	22.4	20.9	19.6	19.0	19.5	24.5																						
16-Jun	17.6	16.5	15.3	14.1	13.3	13.0	12.9	14.6	15.7	16.9	18.0	19.3	20.4	20.6	21.4	21.8	22.1	22.2	21.9	21.8	19.9	16.6	15.4	14.7	17.8	22.2																						
17-Jun	14.1	13.9	13.9	13.6	12.8	12.5	13.5	13.5	14.9	16.0	16.5	16.8	17.3	18.2	18.3	18.6	19.0	18.9	16.2	16.4	15.9	15.6	15.2	14.7	15.7	19.0																						
18-Jun	14.4	14.2	14.1	13.8	13.7	13.8	14.2	15.2	16.9	18.5	18.9	19.0	20.1	21.1	21.7	22.6	23.4	23.2	23.7	23.5	22.3	21.0	19.6	18.6	18.7	23.7																						
19-Jun	17.4	16.7	15.9	14.9	14.6	14.5	14.9	15.3	15.7	16.5	16.8	17.1	17.5	18.6	19.4	19.6	19.6	19.8	19.8	18.5	18.4	17.5	17.3	17.1	17.2	19.8																						
20-Jun	16.9	17.0	16.7	16.2	15.9	15.8	16.1	16.5	17.0	17.5	17.8	18.1	17.4	17.5	18.7	19.3	19.2	19.1	18.4	17.0	16.3	15.8	15.3	14.8	17.1	19.3																						
21-Jun	14.4	14.5	14.6	14.3	13.9	14.1	14.5	14.3	14.4	14.3	14.3	14.4	14.7	15.1	15.7	16.3	16.1	16.2	17.0	16.7	16.4	16.4	16.4	15.8	15.2	17.0																						
22-Jun	15.1	14.3	14.1	14.0	14.0	14.3	14.6	15.1	15.9	16.8	17.4	16.6	16.9	18.5	19.9	20.9	21.3	21.4	21.8	21.7	21.1	19.7	18.7	18.1	17.6	21.8																						
23-Jun	17.6	17.3	17.0	16.6	15.8	15.5	15.7	17.2	17.9	18.5	19.4	20.2	21.5	22.6	23.4	23.3	21.3	20.1	20.2	20.5	20.9	20.4	19.9	19.5	19.3	23.4																						
24-Jun	18.8	17.9	17.8	17.3	16.7	16.3	16.2	16.7	18.0	19.8	21.6	23.6	24.0	24.4	24.8	25.6	25.4	25.1	23.3	22.1	21.5	21.2	20.3	19.4	20.7	25.6																						
25-Jun	18.7	18.3	17.7	17.3	17.0	17.2	17.7	18.7	19.8	20.9	22.3	23.8	24.6	23.2	23.8	23.6	19.6	19.6	19.8	19.9	19.4	18.6	18.1	17.8	19.9	24.6																						
26-Jun	17.5	17.2	17.0	16.6	15.8	15.6	16.6	17.4	18.4	19.0	19.7	20.4	20.3	19.5	18.8	20.5	21.3	21.0	20.2	19.7	19.8	19.1	19.1	18.6	18.7	21.3																						
27-Jun	17.7	17.2	16.5	16.4	16.1	15.7	15.8	16.4	17.3	18.7	19.8	21.4	22.3	19.9	20.1	21.8	22.0	20.4	19.7	19.8	19.8	19.1	18.4	17.9	18.8	22.3																						
28-Jun	16.6	16.2	15.9	15.3	14.4	14.3	15.1	16.5	18.4	20.0	21.3	22.7	23.3	24.2	24.5	24.5	24.8	24.8	24.6	24.2	23.5	23.2	21.8	21.0	20.5	24.8																						
29-Jun	20.0	18.5	18.0	17.5	16.7	17.0	17.1	18.4	19.7	21.2	22.5	23.4	24.2	24.9	25.3	25.1	25.1	25.1	25.2	25.0	24.3	23.3	22.3	21.1	21.7	25.3																						
30-Jun	19.9	19.2	18.2	17.5	17.2	17.3	17.6	18.3	18.9	19.4	20.1	20.9	21.9	22.5	22.8	23.1	23.4	23.2	23.0	22.7	22.1	21.4	20.5	19.6	20.4	23.4																						
																								14.5	13.8	13.3	12.8	12.3	12.2	12.7	13.5	14.7	15.9	16.8	17.7	18.3	18.5	19.1	19.6	19.4	19.1	18.8	18.4	17.8	17.0	16.3	15.5	Diurnal Average
																								20.0	19.2	18.2	17.5	17.2	17.3	17.7	18.7	19.8	21.2	22.5	23.8	24.6	24.9	25.3	25.6	25.4	25.1	25.2	25.0	24.3	23.3	22.3	21.1	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature 45 m (AT45m) - C

Mannix - June 2014





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	99	13.75	13.75
10 - 20	461	64.03	77.78
> 20	160	22.22	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

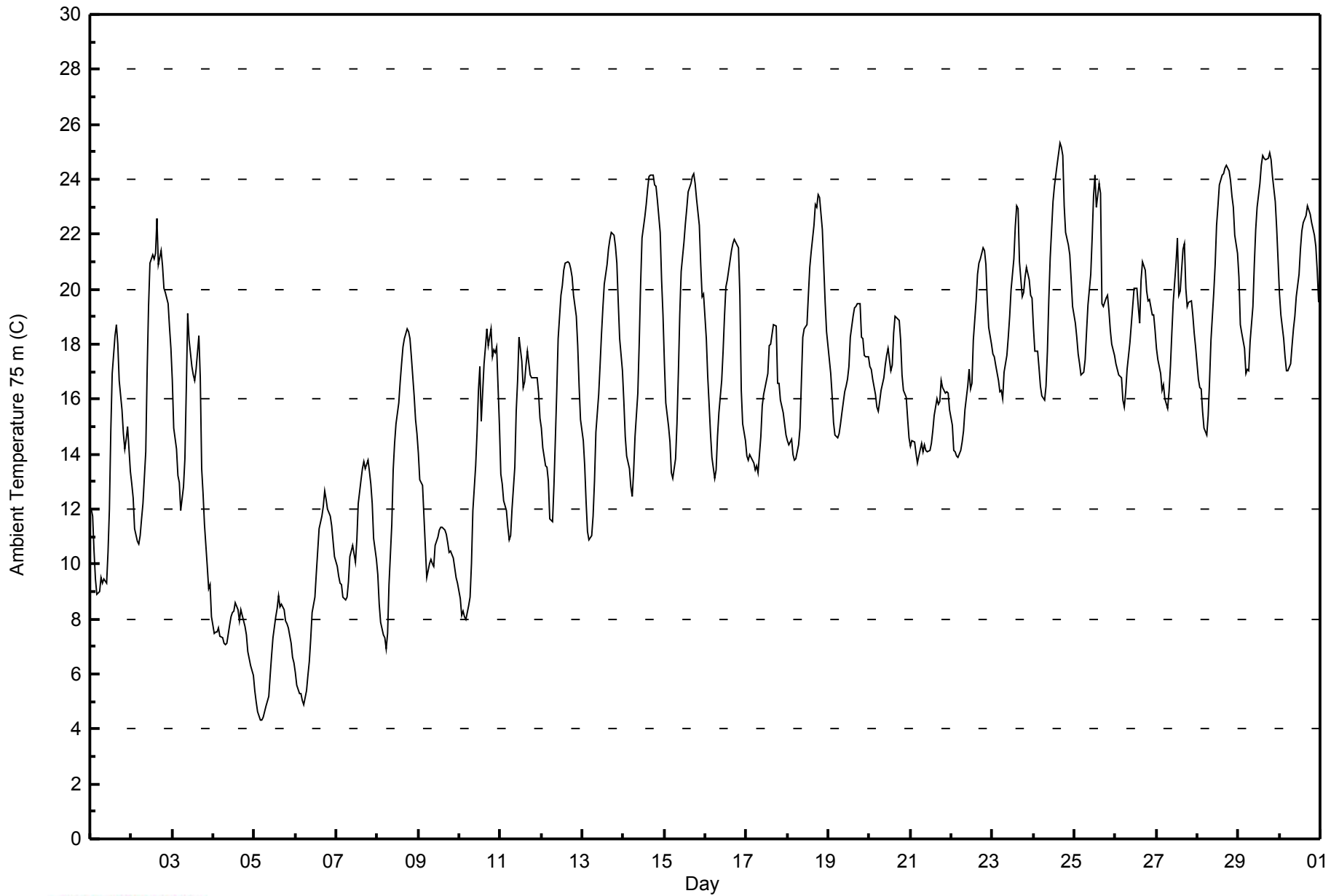
Mannix - June 2014

Maximum Value: 25.3 C on Jun 24 16:00		Maximum Daily Average: 21.6 C on Jun 29		Hours in Service: 720																																												
Minimum Value: 4.3 C on Jun 5 05:00		Minimum Daily Average: 6.5 C on Jun 5		Hours of Data: 720																																												
Maximum Diurnal Average: 19.3 C at hour 16		Minimum Diurnal Average: 12.3 C at hour 6		Hours of Missing Data: 0																																												
Monthly Average: 16.05 C		Percentiles: P ₁ = 5.0 P ₁₀ = 8.8 Q ₁ = 13.1 Median = 16.7 Q ₃ = 19.5 P ₉₀ = 22.1 P ₉₉ = 24.7		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-Jun	12.0	11.7	10.5	9.4	8.9	9.0	9.5	9.3	9.5	9.3	10.4	12.0	14.8	16.9	18.3	18.7	18.0	16.7	15.6	14.7	14.2	14.6	15.0	13.4	13.0	18.7																						
2-Jun	12.9	12.4	11.3	10.8	10.7	11.1	11.7	12.2	14.1	17.0	19.4	20.9	21.3	21.1	21.3	22.6	20.9	21.4	20.8	20.0	19.9	19.5	18.6	17.8	17.1	22.6																						
3-Jun	16.7	14.9	14.2	13.2	13.0	12.0	12.8	13.8	16.4	19.1	18.1	17.2	16.9	16.7	17.1	18.3	16.8	13.5	12.6	11.4	9.9	9.1	9.2	8.1	14.2	19.1																						
4-Jun	7.5	7.5	7.5	7.7	7.4	7.3	7.1	7.1	7.1	7.8	8.1	8.3	8.3	8.6	8.3	7.9	8.3	8.1	7.7	7.4	6.8	6.6	6.3	5.9	7.5	8.6																						
5-Jun	5.4	5.0	4.6	4.3	4.3	4.4	4.6	4.8	5.2	6.0	6.6	7.3	8.1	8.4	8.9	8.5	8.6	8.3	8.0	7.8	7.7	7.1	6.6	6.4	6.5	8.9																						
6-Jun	6.0	5.6	5.3	5.3	5.0	4.9	5.4	5.9	6.5	7.3	8.2	8.8	9.6	10.5	11.3	11.8	12.1	12.7	12.4	12.0	11.7	11.4	10.8	10.3	8.8	12.7																						
7-Jun	9.9	9.6	9.3	9.2	8.8	8.7	8.8	9.3	10.2	10.7	10.4	10.1	10.9	12.2	13.1	13.5	13.7	13.5	13.8	13.4	12.9	12.2	10.9	10.2	11.0	13.8																						
8-Jun	9.6	8.5	7.9	7.4	7.3	6.9	7.5	9.2	11.5	13.4	14.4	15.1	15.9	16.6	17.3	17.9	18.2	18.6	18.4	18.2	17.5	16.1	15.3	14.7	13.5	18.6																						
9-Jun	14.0	13.1	12.9	11.8	10.6	9.5	10.0	10.2	10.0	9.9	10.7	11.0	11.2	11.3	11.3	11.3	11.1	10.8	10.4	10.5	10.2	9.9	9.5	9.3	10.9	14.0																						
10-Jun	8.8	8.1	8.3	8.1	8.0	8.5	8.8	10.0	12.0	13.6	14.8	16.3	17.2	15.2	17.3	17.9	18.6	17.9	18.6	17.5	17.8	17.7	17.9	15.0	13.9	18.6																						
11-Jun	13.3	12.9	12.3	11.9	11.3	10.9	11.0	12.0	13.5	15.6	16.7	18.3	17.4	16.4	16.6	17.2	17.8	16.9	16.8	16.8	16.8	16.8	16.2	15.3	15.0	18.3																						
12-Jun	15.0	14.2	13.6	13.5	13.0	11.6	11.6	12.9	14.6	16.2	18.2	19.8	20.1	20.7	21.0	21.0	21.0	20.7	20.4	19.8	19.0	17.9	16.5	15.3	17.0	21.0																						
13-Jun	14.5	13.6	12.3	11.2	10.9	11.0	11.8	13.0	14.8	16.2	17.2	18.4	19.3	20.2	20.9	21.5	21.8	22.1	22.0	21.6	20.9	19.5	18.2	17.0	17.1	22.1																						
14-Jun	15.9	14.6	14.0	13.5	12.8	12.5	13.4	14.6	16.2	18.1	20.2	21.9	22.6	23.1	23.7	24.1	24.2	24.2	23.8	23.8	23.3	22.1	20.3	19.1	19.2	24.2																						
15-Jun	17.3	15.9	15.0	14.5	13.3	13.1	13.8	15.1	16.9	19.0	20.6	21.7	22.4	23.0	23.5	23.9	24.1	24.2	23.8	23.3	22.3	20.9	19.7	19.8	19.5	24.2																						
16-Jun	18.2	16.9	15.8	14.7	13.9	13.1	13.4	14.6	15.5	16.7	17.7	19.0	20.1	20.3	21.0	21.4	21.7	21.8	21.6	21.5	19.8	16.3	15.1	14.5	17.7	21.8																						
17-Jun	13.9	13.8	14.0	13.8	13.7	13.4	13.6	13.3	14.6	15.7	16.2	16.4	17.0	17.9	18.0	18.3	18.7	18.6	16.6	16.6	16.0	15.5	15.1	14.7	15.6	18.7																						
18-Jun	14.5	14.3	14.6	14.0	13.8	13.8	14.3	14.9	16.6	18.3	18.5	18.7	19.8	20.8	21.3	22.3	23.1	23.0	23.4	23.3	22.2	20.8	19.5	18.5	18.5	23.4																						
19-Jun	17.5	16.9	16.1	15.1	14.7	14.6	14.7	15.1	15.5	16.3	16.5	16.7	17.2	18.3	19.0	19.3	19.4	19.5	19.5	18.3	18.2	17.6	17.5	17.5	17.1	19.5																						
20-Jun	17.2	17.1	16.7	16.2	15.7	15.5	15.9	16.3	16.8	17.3	17.6	17.9	17.0	17.3	18.4	19.0	19.0	18.9	18.1	16.9	16.3	16.1	15.3	14.6	17.0	19.0																						
21-Jun	14.3	14.5	14.4	14.0	13.7	14.0	14.4	14.1	14.3	14.1	14.1	14.2	14.4	14.8	15.4	16.0	15.8	15.9	16.7	16.4	16.2	16.3	16.2	15.6	15.0	16.7																						
22-Jun	15.1	14.1	14.1	14.0	13.9	14.1	14.5	14.8	15.6	16.5	17.1	16.4	16.6	18.1	19.6	20.5	21.0	21.1	21.5	21.4	20.9	19.6	18.6	18.0	17.4	21.5																						
23-Jun	17.7	17.5	17.3	16.7	16.3	16.3	16.0	17.0	17.6	18.2	19.0	20.0	21.1	22.3	23.0	22.9	21.0	19.7	19.9	20.5	20.8	20.3	19.8	19.7	19.2	23.0																						
24-Jun	18.6	17.7	17.8	17.2	16.5	16.1	16.0	16.5	17.7	19.6	21.1	23.2	23.7	24.1	24.5	25.3	25.2	24.9	23.0	22.1	21.6	21.2	20.3	19.4	20.6	25.3																						
25-Jun	18.7	18.2	17.6	17.3	16.9	17.0	17.4	18.4	19.4	20.5	21.9	23.4	24.1	23.0	23.8	23.5	19.5	19.4	19.7	19.8	19.2	18.5	18.0	17.6	19.7	24.1																						
26-Jun	17.3	17.1	16.9	16.8	15.9	15.7	16.3	17.1	18.0	18.7	19.4	20.0	20.0	19.4	18.8	20.4	21.0	20.7	20.0	19.6	19.6	19.1	19.1	18.5	18.6	21.0																						
27-Jun	17.8	17.4	16.9	16.3	16.5	16.0	15.7	16.3	17.2	18.4	19.5	21.0	21.9	19.8	19.9	21.4	21.7	20.1	19.4	19.5	19.6	19.0	18.4	17.9	18.6	21.9																						
28-Jun	16.7	16.4	16.4	15.6	14.9	14.7	15.4	16.7	18.1	19.9	20.9	22.3	23.0	23.8	24.2	24.2	24.4	24.5	24.3	23.9	23.4	23.0	22.0	21.3	20.4	24.5																						
29-Jun	20.4	18.7	18.4	17.9	17.0	17.1	17.1	18.1	19.4	20.9	22.2	23.0	23.8	24.5	24.9	24.8	24.7	24.8	24.9	24.7	24.1	23.2	22.2	21.1	21.6	24.9																						
30-Jun	19.8	19.1	18.2	17.5	17.0	17.0	17.3	17.9	18.6	19.0	19.7	20.6	21.5	22.1	22.4	22.7	23.0	22.9	22.7	22.4	22.0	21.6	20.7	19.5	20.2	23.0																						
																								14.5	13.9	13.5	13.0	12.5	12.3	12.7	13.4	14.4	15.6	16.5	17.3	17.9	18.2	18.8	19.3	19.1	18.8	18.5	18.2	17.7	17.0	16.3	15.5	Diurnal Average
																								20.4	19.1	18.4	17.9	17.0	17.1	17.4	18.4	19.4	20.9	22.2	23.4	24.1	24.5	24.9	25.3	25.2	24.9	24.9	24.7	24.1	23.2	22.2	21.3	Diurnal Maximum



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	100	13.89	13.89
10 - 20	468	65.00	78.89
> 20	152	21.11	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

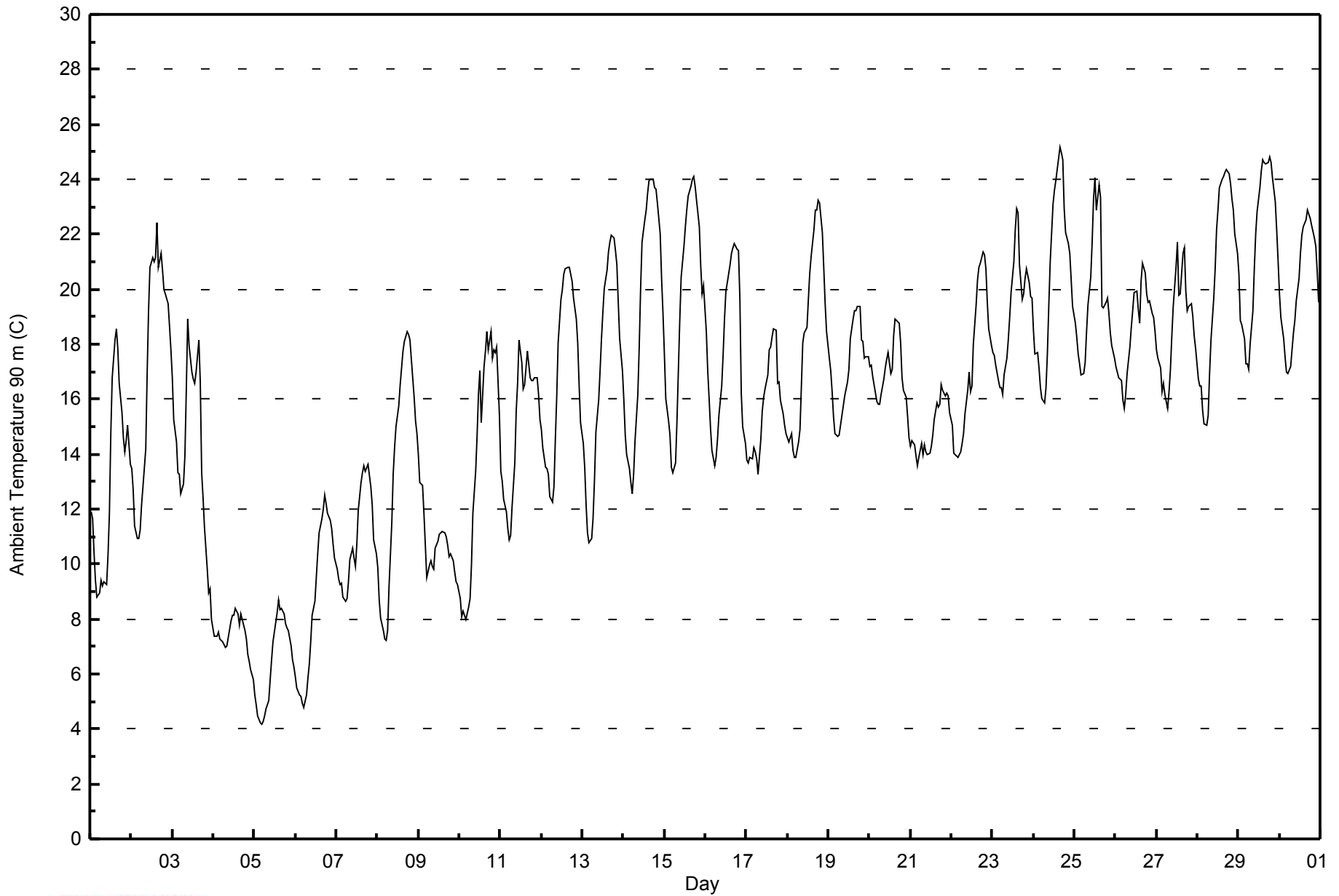
Mannix - June 2014

Maximum Value: 25.2 C on Jun 24 16:00		Maximum Daily Average: 21.5 C on Jun 29		Hours in Service: 720																																													
Minimum Value: 4.2 C on Jun 5 05:00		Minimum Daily Average: 6.4 C on Jun 5		Hours of Data: 720																																													
Maximum Diurnal Average: 19.1 C at hour 16		Minimum Diurnal Average: 12.4 C at hour 6		Hours of Missing Data: 0																																													
Monthly Average: 15.99 C		Percentiles: P ₁ = 4.9 P ₁₀ = 8.7 Q ₁ = 13.3 Median = 16.6 Q ₃ = 19.5 P ₉₀ = 22.0 P ₉₉ = 24.6		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-Jun	11.9	11.6	10.4	9.4	8.8	9.0	9.4	9.2	9.4	9.3	10.3	11.9	14.7	16.8	18.1	18.6	17.9	16.6	15.5	14.6	14.1	14.5	15.0	13.6	12.9	18.6																							
2-Jun	13.5	12.7	11.4	10.9	10.9	11.2	12.1	12.8	14.2	16.9	19.2	20.8	21.1	21.0	21.1	22.4	20.8	21.3	20.7	20.0	19.9	19.5	18.7	17.8	17.1	22.4																							
3-Jun	16.8	15.2	14.5	13.3	13.3	12.5	12.9	13.9	16.3	18.9	18.0	17.0	16.7	16.6	17.0	18.2	16.6	13.3	12.4	11.4	9.8	9.0	9.1	8.0	14.2	18.9																							
4-Jun	7.4	7.4	7.4	7.5	7.2	7.2	7.1	7.0	7.0	7.6	7.9	8.1	8.2	8.4	8.2	7.8	8.2	8.0	7.6	7.3	6.7	6.4	6.2	5.8	7.4	8.4																							
5-Jun	5.3	4.9	4.5	4.2	4.2	4.3	4.5	4.7	5.1	5.8	6.5	7.2	7.9	8.2	8.7	8.3	8.4	8.2	7.8	7.7	7.6	7.0	6.5	6.3	6.4	8.7																							
6-Jun	5.9	5.5	5.2	5.2	4.9	4.8	5.3	5.8	6.3	7.2	8.1	8.7	9.5	10.4	11.1	11.6	12.0	12.5	12.2	11.9	11.6	11.3	10.7	10.2	8.7	12.5																							
7-Jun	9.8	9.5	9.3	9.3	8.8	8.6	8.7	9.3	10.2	10.6	10.2	9.9	10.7	12.0	12.9	13.3	13.6	13.4	13.6	13.2	12.8	12.1	10.9	10.4	11.0	13.6																							
8-Jun	9.9	8.7	8.0	7.6	7.3	7.2	7.6	9.1	11.5	13.3	14.2	15.0	15.8	16.5	17.2	17.8	18.1	18.5	18.3	18.1	17.5	16.1	15.2	14.7	13.5	18.5																							
9-Jun	14.0	13.0	12.9	11.8	10.7	9.5	10.0	10.1	9.9	9.8	10.6	10.9	11.1	11.2	11.2	11.1	11.0	10.7	10.3	10.4	10.1	9.7	9.4	9.2	10.8	14.0																							
10-Jun	8.7	8.1	8.3	8.1	8.0	8.4	8.7	10.0	11.9	13.4	14.6	16.1	17.0	15.1	17.2	17.7	18.4	17.8	18.4	17.5	17.8	17.7	17.9	15.4	13.9	18.4																							
11-Jun	13.4	13.0	12.3	11.9	11.3	10.9	11.0	12.1	13.7	15.5	16.6	18.2	17.4	16.4	16.5	17.1	17.7	16.8	16.7	16.7	16.8	16.8	16.2	15.2	15.0	18.2																							
12-Jun	14.9	14.2	13.5	13.5	13.3	12.5	12.3	12.8	14.6	16.1	18.1	19.6	20.0	20.5	20.8	20.8	20.8	20.6	20.3	19.7	18.9	18.1	16.5	15.2	17.0	20.8																							
13-Jun	14.4	13.5	12.2	11.1	10.8	10.9	11.7	13.0	14.8	16.0	17.1	18.2	19.2	20.0	20.7	21.3	21.7	22.0	21.9	21.4	20.9	19.5	18.2	17.0	17.0	22.0																							
14-Jun	16.0	14.7	14.0	13.5	13.0	12.6	13.3	14.5	16.2	17.9	20.0	21.7	22.5	22.9	23.5	23.9	24.0	24.0	23.7	23.6	23.1	22.0	20.4	19.1	19.2	24.0																							
15-Jun	17.6	16.0	15.2	14.7	13.5	13.3	13.7	15.2	17.0	18.9	20.5	21.6	22.3	22.9	23.4	23.7	24.0	24.1	23.7	23.2	22.3	20.9	19.8	20.1	19.5	24.1																							
16-Jun	18.4	17.0	16.0	15.0	14.1	13.6	13.9	14.5	15.4	16.5	17.6	18.9	19.9	20.3	20.9	21.3	21.5	21.7	21.5	21.4	19.7	16.2	15.0	14.4	17.7	21.7																							
17-Jun	13.8	13.7	13.9	13.8	14.2	14.1	13.8	13.3	14.5	15.6	16.1	16.4	16.9	17.8	17.9	18.2	18.6	18.5	16.6	16.7	16.0	15.5	15.0	14.7	15.6	18.6																							
18-Jun	14.6	14.4	14.8	14.1	13.9	13.9	14.4	14.9	16.5	18.0	18.4	18.6	19.6	20.6	21.2	22.2	22.9	22.9	23.2	23.1	22.1	20.8	19.5	18.4	18.5	23.2																							
19-Jun	17.5	17.0	16.3	15.4	14.8	14.7	14.7	15.1	15.4	16.1	16.4	16.6	17.1	18.2	18.9	19.2	19.2	19.4	19.4	18.2	18.1	17.5	17.5	17.5	17.1	19.4																							
20-Jun	17.2	17.2	16.8	16.2	15.9	15.8	15.8	16.2	16.7	17.1	17.4	17.7	16.9	17.1	18.3	18.9	18.9	18.8	18.0	16.8	16.3	16.1	15.4	14.6	16.9	18.9																							
21-Jun	14.3	14.5	14.4	13.9	13.6	13.9	14.4	14.0	14.3	14.1	14.0	14.0	14.3	14.7	15.3	15.9	15.7	15.8	16.5	16.3	16.1	16.2	16.1	15.5	14.9	16.5																							
22-Jun	15.0	14.0	14.0	13.9	13.9	14.1	14.4	14.7	15.5	16.3	17.0	16.3	16.5	18.0	19.4	20.4	20.8	21.0	21.3	21.3	20.8	19.5	18.6	17.9	17.3	21.3																							
23-Jun	17.7	17.6	17.2	16.7	16.4	16.4	16.2	16.9	17.5	18.1	19.0	19.9	21.0	22.1	22.9	22.8	20.9	19.6	19.8	20.4	20.8	20.2	19.7	19.7	19.1	22.9																							
24-Jun	18.5	17.7	17.7	17.1	16.4	16.0	15.9	16.4	17.7	19.4	21.0	23.1	23.6	24.0	24.4	25.2	25.0	24.7	22.9	22.1	21.7	21.3	20.3	19.4	20.5	25.2																							
25-Jun	18.8	18.2	17.6	17.3	16.9	16.9	17.4	18.4	19.4	20.4	21.7	23.3	24.0	22.9	23.8	23.3	19.4	19.3	19.5	19.7	19.1	18.4	17.9	17.5	19.6	24.0																							
26-Jun	17.2	17.0	16.8	16.7	16.0	15.7	16.2	16.9	17.9	18.6	19.2	19.9	19.9	19.3	18.8	20.3	20.9	20.6	19.9	19.5	19.6	19.1	19.0	18.4	18.5	20.9																							
27-Jun	17.8	17.5	17.1	16.2	16.6	16.2	15.7	16.3	17.1	18.3	19.4	20.8	21.7	19.8	19.9	21.3	21.5	19.9	19.2	19.4	19.5	19.0	18.3	17.9	18.6	21.7																							
28-Jun	16.7	16.5	16.5	15.6	15.1	15.0	15.4	16.9	18.1	19.7	20.7	22.1	22.9	23.7	24.0	24.1	24.3	24.4	24.2	23.8	23.3	22.9	22.0	21.3	20.4	24.4																							
29-Jun	20.5	18.9	18.7	18.2	17.3	17.3	17.1	18.0	19.2	20.7	22.0	22.9	23.7	24.3	24.7	24.6	24.6	24.6	24.8	24.6	24.0	23.2	22.2	21.1	21.5	24.8																							
30-Jun	19.8	19.0	18.2	17.5	17.0	16.9	17.2	17.8	18.4	18.9	19.6	20.4	21.3	22.0	22.3	22.5	22.9	22.7	22.6	22.3	21.9	21.6	20.7	19.5	20.1	22.9																							
																								14.6	13.9	13.5	13.0	12.6	12.4	12.7	13.3	14.4	15.5	16.4	17.2	17.8	18.1	18.7	19.1	19.0	18.7	18.4	18.1	17.6	16.9	16.3	15.5	Diurnal Average	
																								20.5	19.0	18.7	18.2	17.3	17.3	17.4	18.4	19.4	20.7	22.0	23.3	24.0	24.3	24.7	25.2	25.0	24.7	24.8	24.6	24.0	23.2	22.2	21.3	Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	104	14.44	14.44
10 - 20	469	65.14	79.58
> 20	147	20.42	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

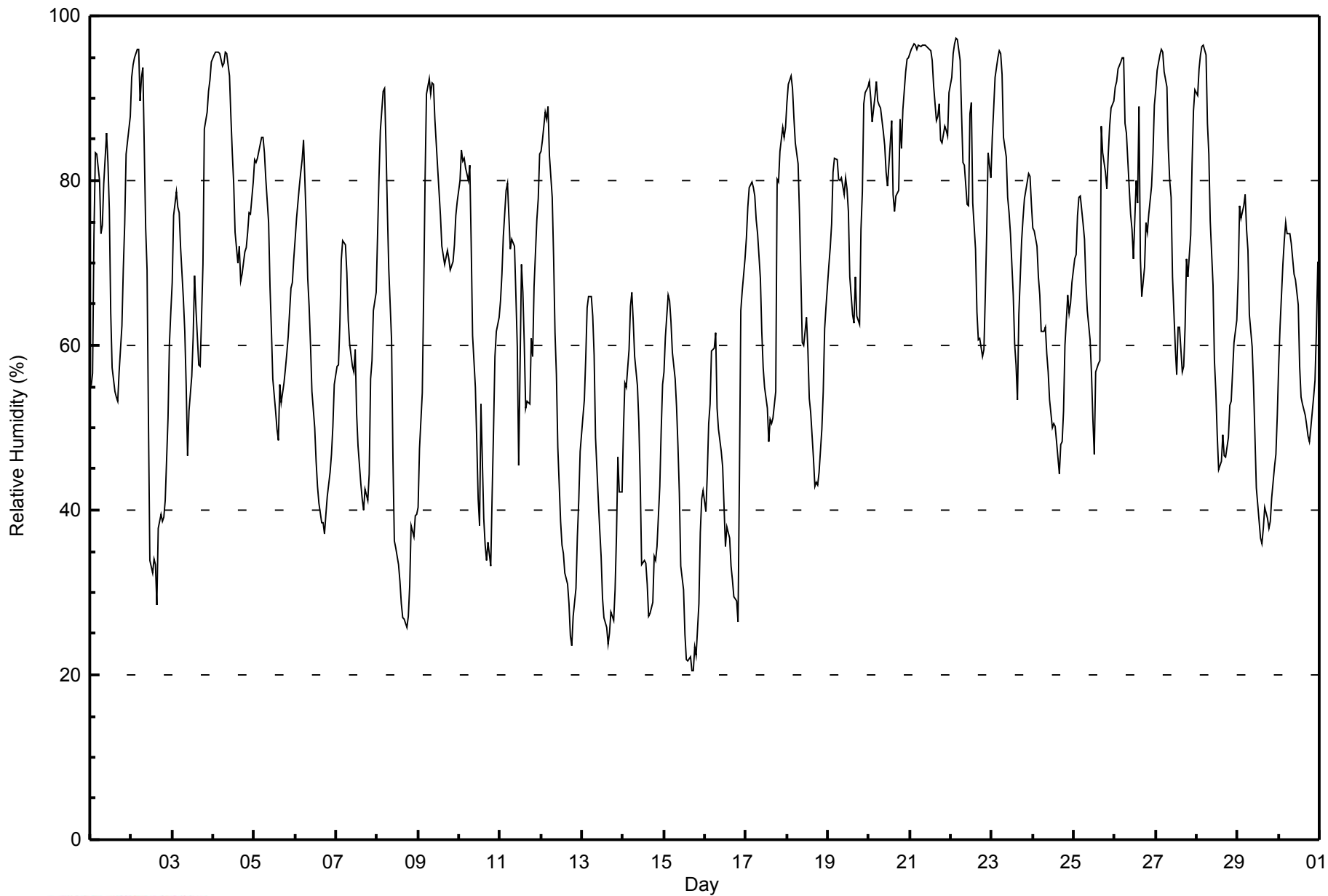


Maximum Value: 97 % on Jun 22 04:00																		Maximum Daily Average: 92.5 % on Jun 21						Hours in Service: 720		
Minimum Value: 21 % on Jun 15 17:00																		Minimum Daily Average: 40.0 % on Jun 15						Hours of Data: 720		
Maximum Diurnal Average: 82.7 % at hour 5																		Minimum Diurnal Average: 49.3 % at hour 16						Hours of Missing Data: 0		
Monthly Average: 65.5 %																		Percentiles: P ₁ = 24 P ₁₀ = 38 Q ₁ = 51 Median = 67 Q ₃ = 81 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-Jun	55	57	74	83	83	80	73	75	80	86	82	76	64	57	54	54	53	57	62	69	75	83	85	88	71.0	88
2-Jun	92	94	95	96	96	90	93	94	74	69	51	34	32	34	33	29	38	39	39	39	41	51	60	64	61.6	96
3-Jun	68	76	79	77	76	72	66	62	55	47	52	56	61	69	64	58	57	63	70	86	88	91	92	94	69.9	94
4-Jun	95	96	96	96	95	94	94	96	95	93	88	83	80	74	70	72	68	69	71	72	74	76	76	80	83.4	96
5-Jun	83	82	83	84	85	85	83	80	75	67	62	56	52	50	48	55	53	55	57	59	61	67	68	71	67.6	85
6-Jun	73	75	79	81	83	85	75	68	65	60	54	50	46	43	41	38	39	37	40	42	45	47	50	55	57.1	85
7-Jun	58	58	63	70	73	72	69	63	60	57	57	60	52	48	43	41	40	42	41	44	56	58	64	67	56.5	73
8-Jun	73	80	86	91	91	84	76	69	61	46	36	35	33	31	29	27	27	26	27	31	38	37	39	39	50.6	91
9-Jun	40	48	54	66	80	91	92	91	92	92	87	81	79	76	72	70	71	71	70	69	70	72	76	77	74.5	92
10-Jun	80	84	82	83	82	80	82	72	61	55	48	41	38	53	39	36	34	36	33	42	50	59	62	63	58.1	84
11-Jun	65	69	73	79	80	76	72	73	72	66	60	45	70	67	60	52	53	53	61	59	67	75	78	83	67.0	83
12-Jun	84	85	88	87	89	83	78	71	61	56	48	39	36	35	32	31	29	25	24	27	31	37	41	47	52.6	89
13-Jun	51	53	58	65	66	66	64	59	49	41	38	34	29	27	26	24	25	28	27	30	37	46	42	42	42.8	66
14-Jun	50	55	55	59	65	66	63	59	55	51	43	33	34	33	31	27	29	34	34	36	43	50	55	55	45.3	66
15-Jun	57	61	66	65	63	59	56	53	48	42	33	30	25	22	22	22	21	21	23	22	29	37	41	42	40.0	66
16-Jun	40	44	51	53	59	60	62	52	50	47	45	40	36	38	37	33	32	29	29	26	44	64	67	71	46.2	71
17-Jun	73	77	79	80	79	78	75	74	68	62	57	55	52	48	51	51	51	54	80	80	84	86	85	87	69.4	87
18-Jun	89	92	93	91	88	85	82	76	68	60	60	63	59	53	52	46	43	43	43	45	50	54	62	65	65.1	93
19-Jun	70	72	75	81	83	83	80	80	80	78	80	79	76	68	64	63	68	64	63	74	79	89	91	91	76.3	91
20-Jun	92	90	87	90	92	90	89	89	86	84	81	79	85	87	78	76	78	79	87	84	89	93	95	95	86.5	95
21-Jun	95	96	97	96	96	96	96	96	96	96	96	96	96	95	92	87	88	89	85	85	87	86	85	91	92.5	97
22-Jun	93	95	97	97	97	95	88	82	82	77	77	88	89	77	72	64	61	61	59	60	66	74	83	80	79.7	97
23-Jun	85	89	92	95	96	95	93	85	83	78	76	74	66	60	58	53	64	73	75	78	79	81	80	77	78.6	96
24-Jun	74	74	72	68	66	62	62	59	57	53	50	51	50	48	44	48	48	48	52	60	66	64	65	68	59.3	74
25-Jun	70	71	76	78	78	75	73	68	64	61	57	51	47	57	58	58	87	83	81	79	83	87	89	90	71.6	90
26-Jun	91	92	94	94	95	95	87	86	79	76	74	70	80	77	89	71	66	69	75	74	76	79	83	89	81.8	95
27-Jun	91	93	95	96	96	93	91	84	80	78	68	60	56	62	62	57	57	62	71	68	73	82	89	91	77.4	96
28-Jun	90	94	95	96	96	95	87	83	75	67	58	54	49	45	46	49	47	46	49	53	53	57	60	63	67.0	96
29-Jun	68	77	76	77	78	74	72	64	60	55	49	43	39	37	36	38	40	39	38	39	42	45	47	52	53.4	78
30-Jun	58	62	70	73	75	74	74	72	70	69	68	65	58	54	53	52	50	49	48	50	54	56	62	70	61.8	75
	73.5	76.4	79.3	81.6	82.7	81.0	78.2	74.5	70.1	65.8	61.3	57.5	55.6	54.2	52.0	49.3	50.5	51.4	53.8	56.0	60.7	65.9	68.9	71.6	Diurnal Average	
	95	96	97	97	97	96	96	96	96	96	96	96	96	95	92	87	88	89	87	86	89	93	95	95	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Mannix - June 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Mannix - June 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	94	13.06	13.06
40 - 60	185	25.69	38.75
60 - 80	245	34.03	72.78
80 - 100	196	27.22	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



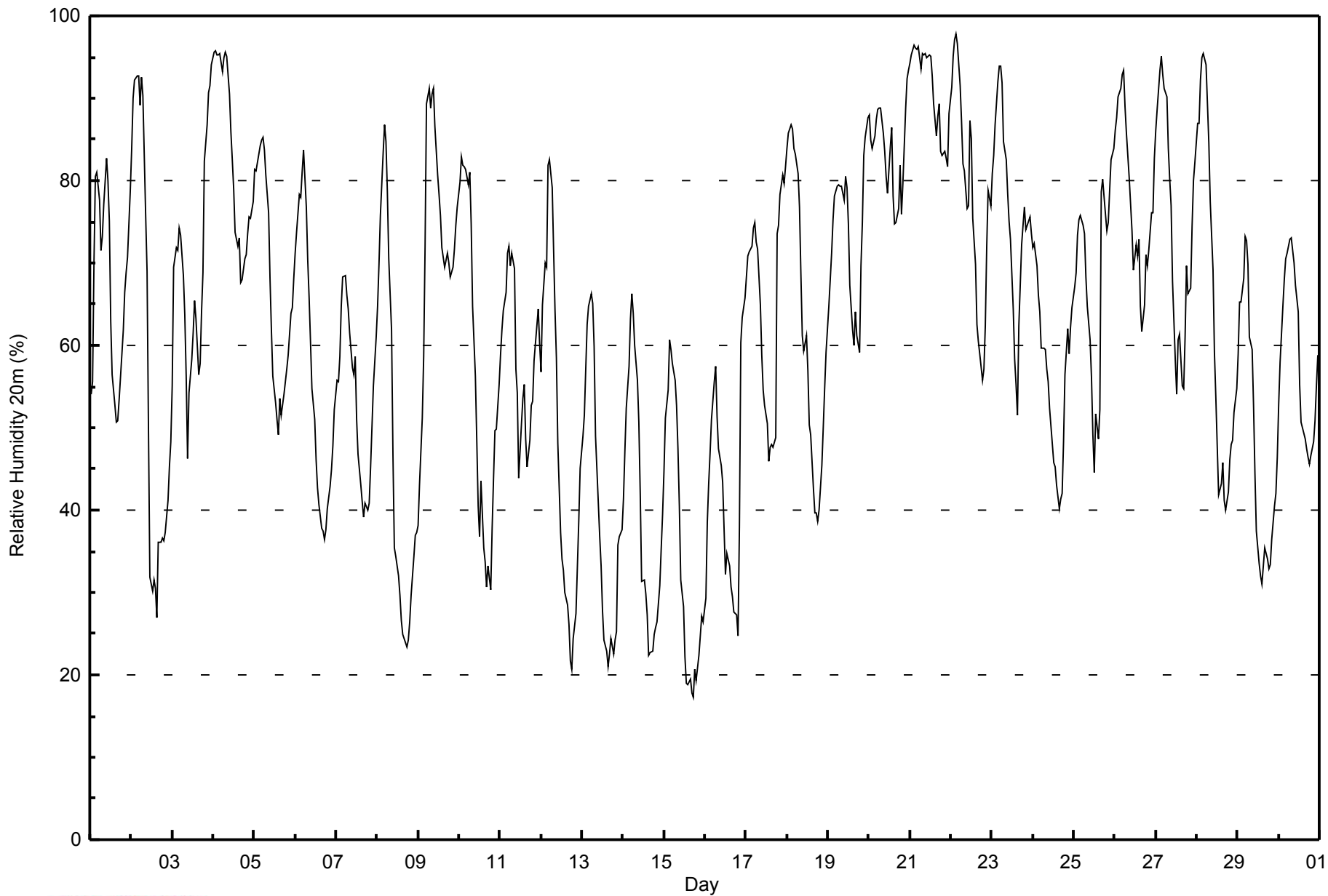
Maximum Value: 98 % on Jun 22 04:00																		Maximum Daily Average: 91.1 % on Jun 21																		Hours in Service: 720													
Minimum Value: 17 % on Jun 15 18:00																		Minimum Daily Average: 35.0 % on Jun 15																		Hours of Data: 720													
Maximum Diurnal Average: 79.7 % at hour 6																		Minimum Diurnal Average: 46.7 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 62.4 %																		Percentiles: P ₁ = 21 P ₁₀ = 33 Q ₁ = 48 Median = 64 Q ₃ = 78 P ₉₀ = 89 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-Jun	54	56	70	81	81	78	71	73	77	83	80	75	63	57	53	51	51	53	59	62	66	69	71	79	67.1	83																							
2-Jun	84	90	92	93	93	89	93	90	76	69	50	32	30	31	30	27	36	36	37	36	37	41	45	48	57.8	93																							
3-Jun	55	69	72	72	74	73	68	64	56	46	54	58	61	65	63	56	58	64	69	82	87	91	92	94	68.6	94																							
4-Jun	96	96	95	95	95	93	95	96	95	91	86	83	79	74	72	73	68	68	71	71	73	76	75	78	83.0	96																							
5-Jun	81	81	82	84	85	85	84	81	76	68	62	56	53	51	49	53	52	54	56	57	59	64	65	68	66.9	85																							
6-Jun	71	74	78	78	81	84	77	70	66	60	55	51	46	43	41	38	37	36	38	40	43	45	48	52	56.3	84																							
7-Jun	56	56	59	65	68	69	66	64	62	57	56	59	51	47	43	41	39	41	40	41	45	50	55	61	53.8	69																							
8-Jun	65	70	76	83	87	85	79	71	62	47	35	34	32	30	27	25	24	23	24	26	30	34	37	37	47.6	87																							
9-Jun	38	43	51	59	72	89	91	89	90	91	87	81	78	76	72	69	70	71	70	68	69	72	75	77	72.9	91																							
10-Jun	80	83	82	82	81	79	81	75	65	56	48	41	37	43	35	34	31	33	30	38	44	50	50	55	55.5	83																							
11-Jun	59	62	64	66	71	72	70	71	69	57	54	44	50	54	55	49	45	48	53	53	58	62	64	60	58.9	72																							
12-Jun	57	65	70	69	82	82	79	71	64	58	48	37	34	33	30	28	26	22	21	24	27	33	39	45	47.8	82																							
13-Jun	49	51	57	63	65	66	65	60	49	41	37	33	28	24	23	21	22	24	23	24	25	36	37	38	40.0	66																							
14-Jun	41	47	52	57	63	66	64	60	56	51	42	31	31	30	27	22	23	23	25	26	27	31	35	40	40.5	66																							
15-Jun	45	51	55	61	60	58	56	53	47	41	32	28	22	19	19	19	18	17	21	19	22	25	27	27	35.0	61																							
16-Jun	29	39	43	47	51	56	58	51	47	45	43	38	32	35	33	31	29	28	27	25	38	60	63	66	42.3	66																							
17-Jun	68	71	71	72	74	75	72	72	65	59	55	53	50	46	48	48	48	49	74	74	78	81	80	82	65.2	82																							
18-Jun	84	86	87	86	84	83	81	77	69	61	59	61	57	50	49	42	40	40	39	40	45	50	55	59	61.8	87																							
19-Jun	65	68	71	75	78	79	79	79	79	78	81	79	75	67	62	60	64	61	59	70	75	83	85	88	73.4	88																							
20-Jun	88	85	84	85	87	89	89	89	86	84	80	79	84	86	78	75	75	77	82	76	80	89	92	93	83.8	93																							
21-Jun	94	95	96	96	96	96	94	95	95	95	95	95	95	93	89	85	88	89	84	83	84	83	82	88	91.1	96																							
22-Jun	91	95	97	98	97	92	87	82	81	77	77	87	85	75	70	63	61	59	56	57	62	72	79	77	78.2	98																							
23-Jun	81	83	87	92	94	94	92	85	83	78	75	73	64	58	55	52	62	72	75	77	74	75	76	74	76.3	94																							
24-Jun	72	72	70	66	64	60	60	60	57	56	52	48	46	45	43	40	41	42	48	56	62	59	62	65	56.1	72																							
25-Jun	67	69	73	75	76	75	74	68	65	61	56	49	45	52	49	52	79	80	76	74	75	79	83	84	68.1	84																							
26-Jun	86	88	90	91	93	93	89	86	80	77	74	69	72	71	73	65	62	65	71	70	72	76	76	83	78.0	93																							
27-Jun	86	89	93	95	93	91	90	84	80	77	68	58	54	61	61	55	55	61	70	66	67	74	80	82	74.6	95																							
28-Jun	87	87	92	95	95	94	89	85	78	69	59	54	48	42	43	46	41	40	42	46	48	48	52	55	64.0	95																							
29-Jun	59	65	65	68	73	73	70	61	59	53	44	37	34	32	31	33	36	34	33	33	36	41	42	46	48.3	73																							
30-Jun	53	58	65	68	71	71	73	73	71	70	67	64	55	51	50	49	47	46	46	47	48	51	55	59	58.7	73																							
																								68.0	71.4	74.7	77.3	79.5	79.7	77.8	74.5	70.2	65.2	60.4	56.3	53.1	51.3	49.1	46.7	47.6	48.6	50.5	52.1	55.3	59.9	62.5	65.3	Diurnal Average	
																								96	96	97	98	97	96	95	96	95	95	95	95	95	93	89	85	88	89	84	83	87	91	92	94	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity 20m (RH20m) - %

Mannix - June 2014





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	6	0.83	0.83
20 - 40	111	15.42	16.25
40 - 60	201	27.92	44.17
60 - 80	241	33.47	77.64
80 - 100	161	22.36	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

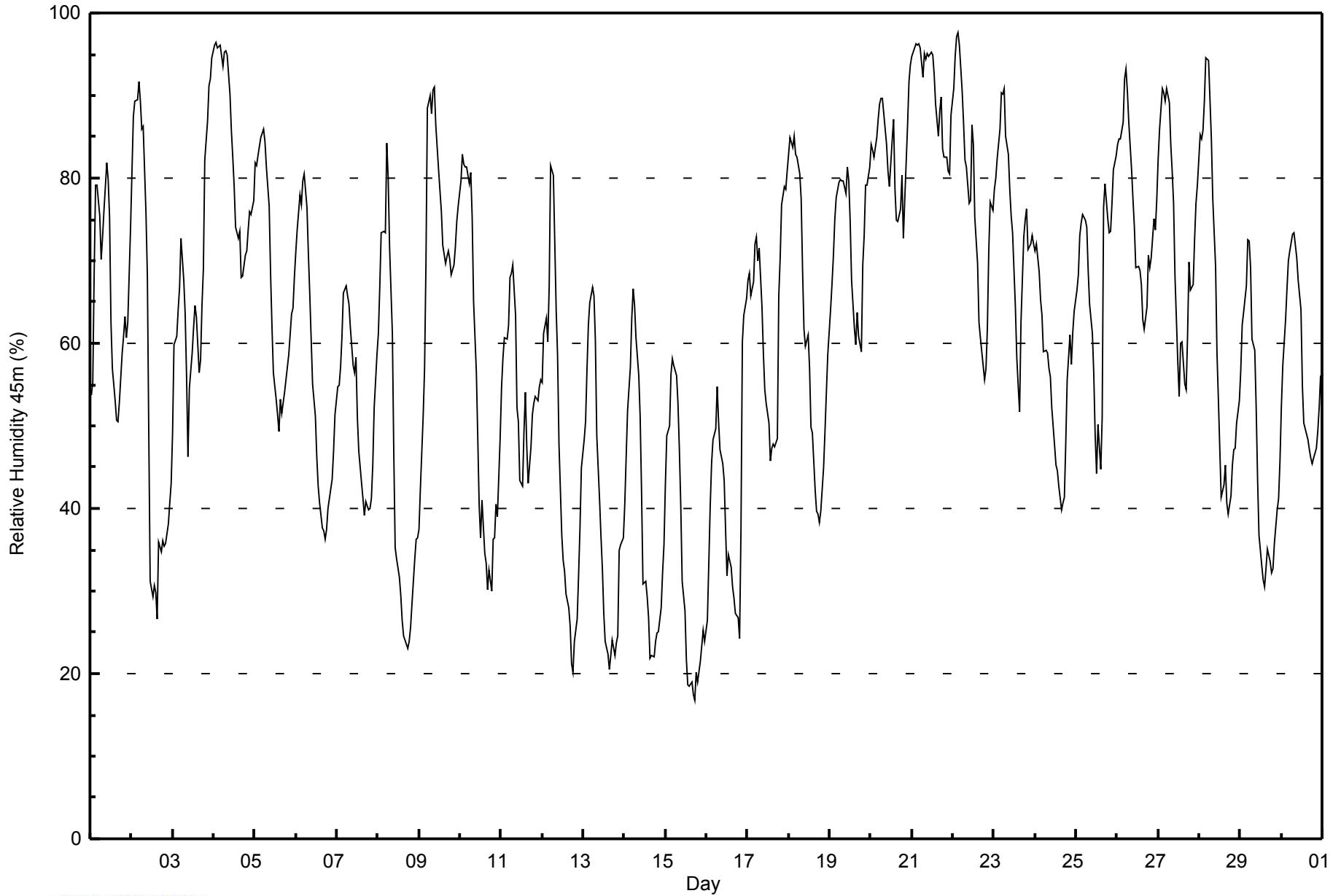


Maximum Value: 98 % on Jun 22 04:00																		Maximum Daily Average: 90.8 % on Jun 21																		Hours in Service: 720	
Minimum Value: 17 % on Jun 15 18:00																		Minimum Daily Average: 33.9 % on Jun 15																		Hours of Data: 720	
Maximum Diurnal Average: 78.8 % at hour 6																		Minimum Diurnal Average: 46.4 % at hour 16																		Hours of Missing Data: 0	
Monthly Average: 61.3 %																		Percentiles: P ₁ = 20 P ₁₀ = 33 Q ₁ = 47 Median = 63 Q ₃ = 77 P ₉₀ = 87 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-Jun	54	55	69	79	79	75	70	73	76	82	80	75	63	57	53	51	51	53	59	61	63	61	63	74	65.6	82											
2-Jun	81	87	89	89	92	89	86	86	76	68	49	31	29	31	30	27	36	35	36	35	36	38	41	43	55.9	92											
3-Jun	49	60	61	64	67	73	68	64	56	46	55	59	62	65	63	56	58	65	69	82	87	91	92	95	66.9	95											
4-Jun	96	96	96	96	94	95	95	95	90	86	82	79	74	73	74	68	68	71	71	74	76	76	77	83.2	96												
5-Jun	82	82	83	85	85	86	84	81	77	68	62	56	53	51	49	53	52	54	56	57	59	64	64	68	67.1	86											
6-Jun	71	74	78	77	80	80	76	71	66	61	55	51	46	43	41	38	37	36	37	40	42	44	47	51	55.9	80											
7-Jun	55	55	57	61	66	67	66	65	62	57	56	58	51	47	43	41	39	41	40	40	41	45	52	59	52.7	67											
8-Jun	61	67	73	74	73	84	80	72	61	47	35	34	32	29	26	25	24	23	24	26	29	34	36	36	46.1	84											
9-Jun	37	42	51	57	70	89	90	88	91	91	87	81	79	76	72	70	71	71	70	68	69	72	75	77	72.6	91											
10-Jun	80	83	82	81	81	79	81	75	65	57	48	40	36	41	35	33	30	32	30	36	36	40	39	49	53.8	83											
11-Jun	55	58	61	60	62	68	68	69	63	52	51	43	43	49	54	48	43	47	51	53	54	53	55	56	54.9	69											
12-Jun	55	61	63	60	67	81	80	72	64	59	48	37	34	32	30	28	26	21	20	24	27	32	38	45	46.0	81											
13-Jun	48	51	57	62	65	67	66	60	49	41	37	33	27	24	22	21	22	24	22	24	25	35	36	37	39.7	67											
14-Jun	41	46	52	57	63	67	64	61	56	51	42	31	31	29	27	22	22	22	24	25	25	28	32	36	39.7	67											
15-Jun	43	49	50	56	58	57	56	53	47	40	31	28	22	19	18	19	17	17	20	19	22	23	25	24	33.9	58											
16-Jun	27	33	40	45	48	50	55	50	47	45	43	37	32	34	33	30	29	27	27	24	37	60	63	65	41.1	65											
17-Jun	68	68	66	68	72	73	70	71	64	59	54	53	50	46	47	48	48	48	66	70	77	79	79	81	63.5	81											
18-Jun	83	85	84	85	83	83	81	77	69	62	60	61	57	50	49	42	40	39	38	40	45	49	54	59	61.4	85											
19-Jun	64	67	70	75	78	80	80	80	80	78	81	80	75	68	62	60	64	61	59	69	73	79	79	81	72.6	81											
20-Jun	84	83	83	85	87	89	90	90	86	84	81	79	85	87	79	75	75	76	80	73	77	86	92	94	83.3	94											
21-Jun	95	95	96	96	96	96	92	95	94	95	95	95	95	93	89	85	88	90	83	83	83	81	81	88	90.8	96											
22-Jun	91	95	97	98	96	91	87	82	81	77	77	87	84	75	70	63	61	59	56	57	62	71	77	76	77.8	98											
23-Jun	79	80	82	86	90	90	91	85	83	79	75	73	64	58	55	52	63	73	75	76	71	72	73	72	74.9	91											
24-Jun	71	72	69	65	63	59	59	59	57	56	52	48	45	45	43	40	41	41	48	56	61	57	61	64	55.5	72											
25-Jun	66	68	73	75	76	75	74	69	65	61	56	49	44	50	45	51	76	79	75	73	74	77	81	83	67.3	83											
26-Jun	84	85	85	87	92	93	91	87	81	77	74	69	69	69	67	63	62	64	71	69	70	75	74	77	76.5	93											
27-Jun	82	86	91	90	89	91	89	84	81	77	68	58	54	60	60	55	54	61	70	66	67	73	77	79	73.5	91											
28-Jun	85	85	86	89	95	94	89	85	78	69	59	53	47	41	43	45	41	39	42	45	47	47	50	53	62.8	95											
29-Jun	57	62	64	67	73	72	69	60	59	52	44	37	33	31	31	33	35	34	32	33	36	40	41	46	47.5	73											
30-Jun	52	57	63	67	70	71	73	73	72	70	68	64	55	50	50	48	47	46	45	46	47	49	52	56	58.1	73											
	66.5	69.6	72.3	74.6	77.1	78.8	77.4	74.5	70.0	65.1	60.3	56.1	52.5	50.8	48.6	46.4	47.3	48.3	49.9	51.4	53.8	57.7	60.2	63.3	Diurnal Average												
	96	96	97	98	96	96	95	95	95	95	95	95	95	93	89	85	88	90	83	83	87	91	92	95	Diurnal Maximum												



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	6	0.83	0.83
20 - 40	119	16.53	17.36
40 - 60	200	27.78	45.14
60 - 80	246	34.17	79.31
80 - 100	149	20.69	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

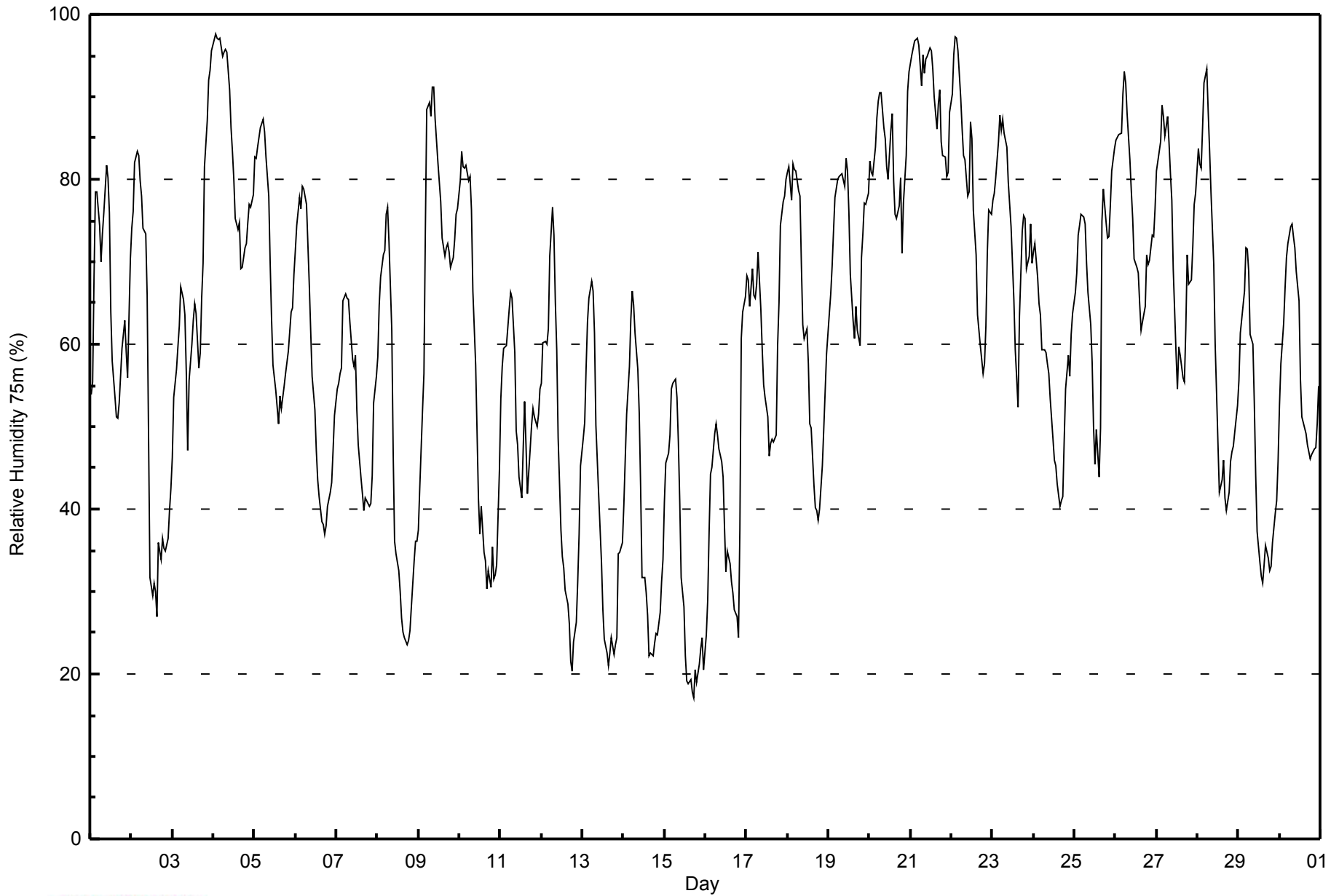
Mannix - June 2014

Maximum Value: 98 % on Jun 4 02:00																		Maximum Daily Average: 91.1 % on Jun 21																		Hours in Service: 720																
Minimum Value: 17 % on Jun 15 18:00																		Minimum Daily Average: 33.1 % on Jun 15																		Hours of Data: 720																
Maximum Diurnal Average: 76.8 % at hour 6																		Minimum Diurnal Average: 47.0 % at hour 16																		Hours of Missing Data: 0																
Monthly Average: 61.1 %																		Percentiles: P ₁ = 20 P ₁₀ = 32 Q ₁ = 47 Median = 63 Q ₃ = 77 P ₉₀ = 86 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-Jun	54	55	68	78	78	74	70	73	76	82	80	76	64	58	54	51	51	53	60	61	63	59	56	70	65.2	82																										
2-Jun	74	76	82	83	83	80	78	74	73	66	49	32	30	31	30	27	36	34	36	35	35	36	40	43	52.6	83																										
3-Jun	46	53	57	60	62	67	65	64	57	47	56	60	63	65	64	57	59	66	70	81	87	92	93	96	66.1	96																										
4-Jun	97	98	97	97	97	95	96	96	95	91	86	83	80	75	74	75	69	69	72	72	75	77	77	78	84.2	98																										
5-Jun	83	83	84	86	87	87	86	83	78	70	63	58	54	52	50	54	52	55	56	58	59	64	64	68	68.1	87																										
6-Jun	71	74	78	76	79	79	77	72	67	62	56	52	47	44	41	38	38	37	38	40	42	43	47	51	56.3	79																										
7-Jun	55	55	56	57	65	66	66	65	63	58	57	59	52	48	44	42	40	41	41	40	41	44	53	56	52.6	66																										
8-Jun	58	65	68	71	71	76	77	72	62	47	36	35	32	30	27	25	24	24	24	25	28	34	36	36	45.1	77																										
9-Jun	37	43	52	56	74	88	89	88	91	91	87	82	80	77	73	71	72	72	71	69	70	73	76	77	73.3	91																										
10-Jun	80	83	81	81	82	80	80	76	66	58	49	41	37	40	35	34	30	33	31	35	32	32	33	45	53.1	83																										
11-Jun	53	57	60	60	62	64	66	66	59	50	48	44	41	47	53	48	42	47	50	52	51	50	51	55	53.2	66																										
12-Jun	55	60	60	60	62	71	77	73	65	59	49	37	34	33	30	29	26	21	20	24	26	31	37	45	45.2	77																										
13-Jun	49	50	57	63	66	68	66	61	50	42	38	34	28	24	23	21	23	24	22	24	24	35	35	36	40.0	68																										
14-Jun	41	46	52	57	63	66	65	61	57	52	43	32	32	30	27	22	23	22	24	25	25	28	31	34	39.8	66																										
15-Jun	41	46	47	49	55	55	56	54	48	41	32	28	22	19	19	19	18	17	21	19	21	23	24	21	33.1	56																										
16-Jun	25	29	37	44	45	49	50	49	47	46	44	38	32	35	33	31	30	28	27	24	38	61	64	66	40.5	66																										
17-Jun	68	68	65	69	66	66	67	71	64	59	55	54	51	46	48	49	48	49	60	65	74	77	78	80	62.4	80																										
18-Jun	81	81	77	82	81	81	79	78	70	62	61	62	58	50	50	43	40	40	39	40	45	50	54	59	60.9	82																										
19-Jun	64	66	70	74	78	80	80	80	81	79	83	81	76	69	63	61	65	62	60	71	73	77	77	78	72.7	83																										
20-Jun	82	81	80	84	88	90	91	90	86	85	82	80	86	88	80	76	75	77	80	71	77	83	91	93	83.1	93																										
21-Jun	94	95	97	97	97	96	91	95	93	95	95	96	96	93	90	86	89	91	85	83	83	80	81	88	91.1	97																										
22-Jun	90	95	97	97	96	90	86	83	82	78	79	87	85	76	71	64	62	60	56	58	62	71	76	76	78.2	97																										
23-Jun	78	78	80	85	88	86	87	86	84	80	77	74	65	59	56	52	63	74	76	75	69	71	75	70	74.5	88																										
24-Jun	71	72	68	65	64	59	59	59	58	57	53	49	46	45	43	40	41	42	48	55	59	56	61	64	55.5	72																										
25-Jun	66	69	73	74	76	75	75	70	66	62	58	50	45	50	44	50	75	79	75	73	73	77	81	84	67.5	84																										
26-Jun	85	85	85	86	90	93	92	88	82	79	75	70	69	69	65	62	63	65	71	70	70	73	73	76	76.5	93																										
27-Jun	81	82	85	89	88	85	88	84	81	77	69	59	55	60	59	56	55	62	71	67	68	72	77	78	72.8	89																										
28-Jun	84	82	81	86	92	93	88	84	79	70	60	54	48	42	44	46	41	40	42	46	47	48	49	53	62.4	93																										
29-Jun	56	61	63	67	72	72	69	61	60	53	44	37	34	32	31	33	36	34	33	33	36	40	41	46	47.6	72																										
30-Jun	53	58	63	67	71	72	74	75	73	72	69	65	56	51	51	49	48	47	46	47	47	47	50	55	58.5	75																										
	65.7		68.2		70.7		73.3		75.8		76.8		76.3		74.4		70.4		65.6		61.1		56.9		53.3		51.3		49.0		47.0		47.8		48.8		50.1		51.3		53.4		56.8		59.4		62.5		Diurnal Average			
	97		98		97		97		97		96		96		96		95		95		95		95		96		96		93		90		86		89		91		85		83		87		92		93		96		Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	6	0.83	0.83
20 - 40	116	16.11	16.94
40 - 60	213	29.58	46.53
60 - 80	245	34.03	80.56
80 - 100	140	19.44	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

Mannix - June 2014

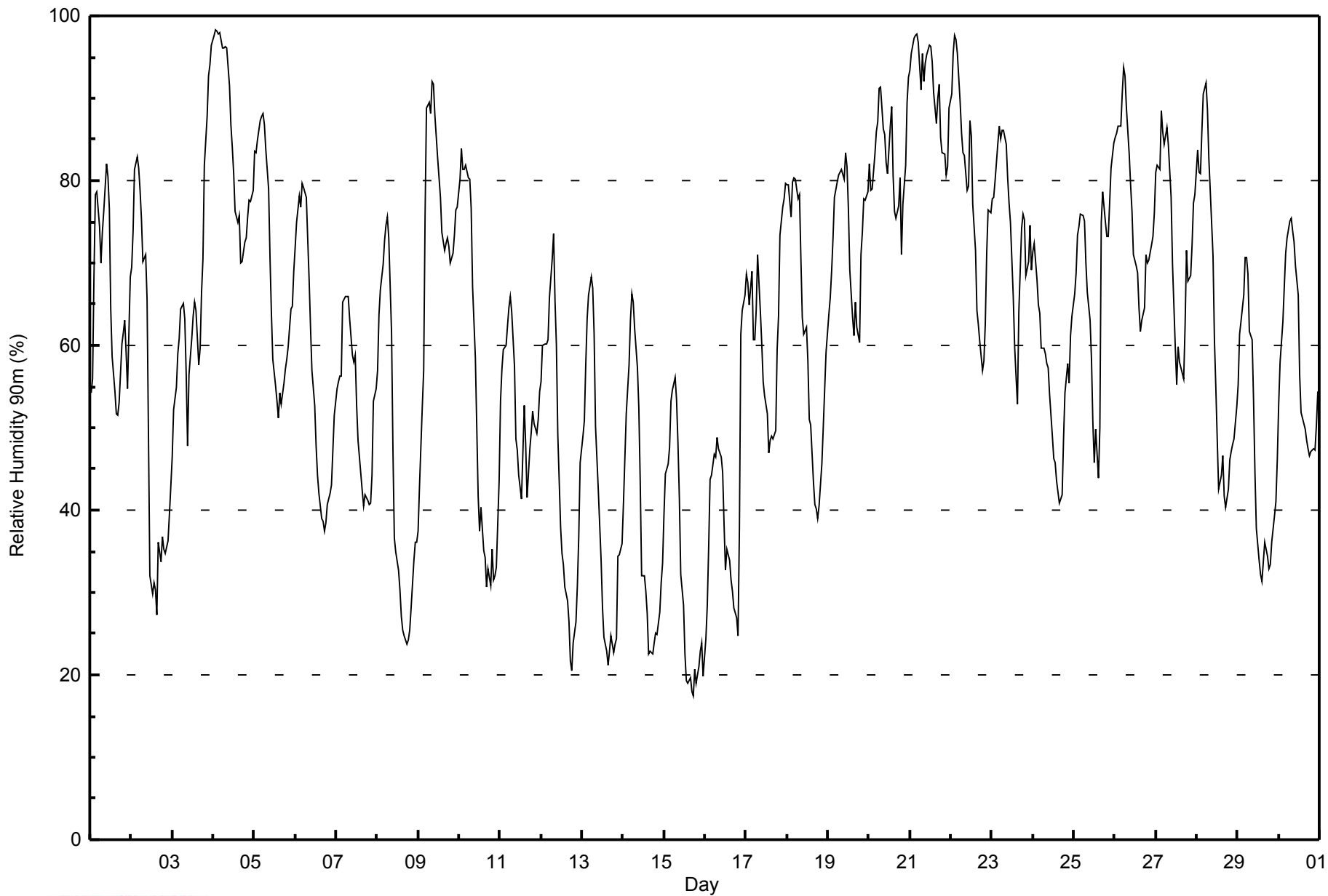
Maximum Value: 98 % on Jun 4 02:00																		Maximum Daily Average: 91.5 % on Jun 21																		Hours in Service: 720													
Minimum Value: 17 % on Jun 15 18:00																		Minimum Daily Average: 32.8 % on Jun 15																		Hours of Data: 720													
Maximum Diurnal Average: 76.2 % at hour 6																		Minimum Diurnal Average: 47.5 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 61.2 %																		Percentiles: P ₁ = 20 P ₁₀ = 33 Q ₁ = 47 Median = 63 Q ₃ = 77 P ₉₀ = 86 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-Jun	54	56	68	78	79	74	70	74	76	82	80	77	64	59	54	52	51	53	60	62	63	59	55	68	65.4	82																							
2-Jun	70	74	81	83	82	79	75	70	71	66	49	32	30	31	30	27	36	34	37	35	35	36	40	43	51.9	83																							
3-Jun	46	52	55	59	61	64	65	63	57	48	56	61	64	65	64	58	60	66	70	82	88	93	94	96	66.2	96																							
4-Jun	98	98	98	98	98	96	96	96	96	92	87	84	81	76	75	76	70	70	73	73	76	78	77	79	85.0	98																							
5-Jun	84	83	85	87	88	88	87	84	79	71	64	58	55	53	51	54	53	55	57	58	60	64	65	69	68.9	88																							
6-Jun	72	75	78	77	80	79	78	73	68	62	57	53	48	44	42	39	39	37	38	41	42	43	47	52	56.8	80																							
7-Jun	55	56	56	56	65	66	66	66	63	59	58	59	53	49	44	42	40	42	41	41	41	44	53	55	52.9	66																							
8-Jun	57	64	67	70	73	75	76	73	62	47	37	35	33	30	27	25	25	24	24	25	28	34	36	36	45.1	76																							
9-Jun	38	43	53	57	76	89	89	88	92	92	88	83	80	78	74	71	72	73	72	70	71	73	76	77	74.0	92																							
10-Jun	80	84	81	81	82	80	80	77	67	58	50	42	38	40	35	34	31	33	31	35	31	32	33	43	53.3	84																							
11-Jun	53	57	59	60	62	65	66	64	57	49	47	44	41	47	53	48	42	47	50	52	51	49	51	54	52.9	66																							
12-Jun	56	60	60	60	61	66	71	73	65	60	49	38	35	33	31	29	26	22	20	24	26	31	37	46	45.0	73																							
13-Jun	49	51	58	63	66	68	67	61	50	42	38	34	28	25	23	21	23	25	23	24	24	34	35	36	40.3	68																							
14-Jun	41	46	52	58	63	66	65	62	57	52	43	32	32	30	27	23	23	22	24	25	25	28	31	34	40.1	66																							
15-Jun	39	44	46	48	53	55	56	53	48	41	32	29	22	19	19	20	18	17	21	19	21	23	24	20	32.8	56																							
16-Jun	24	29	36	44	44	47	46	49	48	47	45	38	33	35	34	32	30	28	27	25	38	61	64	66	40.3	66																							
17-Jun	69	68	65	69	61	61	64	71	64	60	56	54	52	47	48	49	49	50	59	64	73	77	78	80	61.9	80																							
18-Jun	80	80	76	80	80	80	78	78	70	63	61	62	58	51	50	43	41	40	39	41	46	50	55	59	60.9	80																							
19-Jun	64	66	69	73	78	80	81	81	81	80	83	82	77	69	63	61	65	62	60	71	74	78	78	79	73.1	83																							
20-Jun	82	79	79	83	86	87	91	91	86	86	82	81	87	89	81	76	75	77	80	71	77	82	89	93	83.0	93																							
21-Jun	93	95	97	98	98	97	91	96	92	94	95	96	96	94	91	87	90	92	85	83	83	81	82	89	91.5	98																							
22-Jun	91	95	98	97	95	90	86	83	83	79	79	87	85	77	72	64	63	60	57	58	63	71	76	76	78.6	98																							
23-Jun	78	78	80	85	87	85	86	86	84	80	77	75	66	60	56	53	64	74	76	75	68	70	75	69	74.5	87																							
24-Jun	71	72	68	65	64	60	60	59	58	57	54	49	46	46	44	41	42	49	54	58	55	61	64	64	55.7	72																							
25-Jun	66	69	73	74	76	76	75	70	66	63	58	50	46	50	44	50	75	79	75	73	73	77	82	85	67.7	85																							
26-Jun	85	86	87	87	91	94	93	89	83	80	76	71	70	69	65	62	63	65	71	70	70	72	73	76	76.9	94																							
27-Jun	81	82	81	89	86	84	87	84	81	78	70	60	55	60	58	57	56	62	72	68	68	72	77	78	72.7	89																							
28-Jun	84	81	81	86	90	92	89	83	79	71	61	55	49	43	44	47	42	40	43	46	47	48	49	53	62.5	92																							
29-Jun	55	61	63	66	71	71	69	62	61	53	45	38	34	32	31	34	36	34	33	33	36	39	41	46	47.7	71																							
30-Jun	53	58	63	67	71	73	75	75	74	73	70	66	56	52	51	50	48	47	47	47	47	47	50	54	59.0	75																							
																								65.6	68.0	70.4	73.2	75.5	76.2	75.9	74.5	70.7	66.2	61.6	57.5	53.8	51.8	49.4	47.5	48.2	49.2	50.5	51.5	53.5	56.8	59.5	62.4	Diurnal Average	
																								98	98	98	98	98	97	96	96	96	94	95	96	96	94	91	87	90	92	85	83	88	93	94	96	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity 90m (RH90m) - %

Mannix - June 2014





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	7	0.97	0.97
20 - 40	113	15.69	16.67
40 - 60	206	28.61	45.28
60 - 80	253	35.14	80.42
80 - 100	141	19.58	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 29 km/h on Jun 3 18:00	Maximum Daily Speed Average: 16.6 km/h on Jun 5	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 12 08:00	Minimum Daily Speed Average: 1.2 km/h on Jun 7	Hours of Data: 720
Maximum Diurnal Speed Average: 4.4 km/h at hour 18	Minimum Diurnal Speed Average: 0.4 km/h at hour 24	Hours of Missing Data: 0
Monthly Average Velocity: 1.5 km/h 78.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 12 P ₉₀ = 16 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-Jun	SE14	SE15	SE13	SE11	ESE12	ESE14	SE16	SE20	SE15	SE12	SSE10	SE9	SE9	SSE6	SSE6	SSE9	SSE19	S10	SW5	NW3	SE6	SSE9	S8	S6	SE9.8	SE20
2-Jun	SSE9	SSE8	SSE8	SSE8	SSE9	SSE6	SSE7	SSW9	S7	ESE5	W5	W13	W19	WNW18	WSW9	W11	NNE17	NNE11	NNE21	N15	NNE8	N4	NNE4	N5	NW1.2	NNE21
3-Jun	NNE5	NNE3	NNE9	NNE9	N7	N5	NNE4	NNE9	NNE9	NE10	N17	N20	N15	N7	N12	N17	NNW23	NNW29	NNW22	NNE27	NNE23	NNE13	NW11	NW17	N12.6	NNW29
4-Jun	N9	NNW8	NNW9	NW7	N8	NNW9	NNW9	NNW10	NNW8	NNW12	NNW13	NNW14	NNW16	NNW19	N20	N18	N22	N19	N17	N18	NNE18	NNE14	N14	NNW17	N13.1	N22
5-Jun	NNW17	NNW20	N18	N21	N19	NNW19	NNW19	NNW17	NNW17	N17	N17	N19	N18	NNW22	NNW19	NNW16	NNW18	NNW18	NNW17	NNW12	NNW13	NNW9	NNW11	NW10	NNW16.6	NNW22
6-Jun	NNW11	NNW6	WNW5	WNW5	W3	WSW5	WNW2	NNW4	NW4	NW4	NW5	NW6	WNW7	NNW6	NW7	NNW8	NNW6	NNW5	NE7	ENE9	ENE8	E8	SE7	SE6	NNW3.0	NNW11
7-Jun	ESE5	ESE7	E9	ESE10	SE7	ESE5	SSW1	W4	WNW3	N6	NNW12	NNE13	ENE14	ENE4	NW2	W8	NW8	WNW11	WNW12	WNW7	SSE7	SW7	SW7	WSW8	NNW1.2	ENE14
8-Jun	SW4	SSW4	SSE3	SSE5	S4	SSE4	SSE4	SE4	SE5	SE6	E4	ESE4	E8	SE7	E8	E9	ESE7	E8	SE7	SE9	SE11	SE16	SE15	SE15	SE6.4	SE16
9-Jun	SE14	SSE11	SSE9	SSE10	SE6	ESE9	ESE9	ESE7	SSE11	SE13	SE15	SE18	SE19	ESE17	ESE17	ESE17	ESE18	E17	E15	E13	E11	E11	ENE7	NNE10	ESE11.3	SE19
10-Jun	NNE10	N10	NNE12	NNE14	NNE11	NNE9	N7	NNW7	NNW11	NNE11	NNE13	NNE11	NNE16	NNE8	NW7	NW13	N13	NE13	WSW5	WSW11	W10	W9	WSW10	WSW12	N7.1	NNE16
11-Jun	WSW12	WSW11	SSW4	S5	SSE8	SSE5	SSE3	SE3	S5	SW7	SSE5	SE10	SW5	ESE5	ESE11	E12	SE3	ESE5	S7	S5	SSE7	S5	SSW4	SW3	S4.3	E12
12-Jun	WSW2	N3	W3	SW6	SSE7	SSE4	ESE2	WSW0	WNW4	W5	W4	NNE9	NNE11	NNE12	NNE14	NNE15	NNE17	NNE17	NNE17	NNE15	NNE13	NNE14	NE10	E9	NNE6.2	NNE17
13-Jun	ESE8	ESE9	ESE9	SE8	ESE10	SE9	ESE8	ESE8	ESE10	ESE7	ESE8	E4	ESE2	SE7	SSE8	ESE8	ESE8	SE9	SSE11	SSE10	SSE9	SSE11	SSE15	SSE14	SE8.4	SSE15
14-Jun	SSE12	SSE12	SE15	SE15	SE10	SE12	SE11	SSE11	SSE11	SE12	SSE14	SE14	SE14	SSE14	SSE13	S15	SSE16	S14	S9	SSW12	S9	S7	SSE8	SSE9	SSE11.5	SSE16
15-Jun	SSE10	SSE9	SSE7	SE10	SE11	SE12	SE8	SE9	SE10	SE10	SE8	SE8	ESE12	SE12	ESE10	ESE10	SE10	SE14	SE14	SE15	SE11	SSE9	SSE8	SSE9	SE9.8	SE15
16-Jun	SE6	SE5	ESE5	SE5	SSE3	SW2	SW2	S2	SSE8	SSE6	SSE7	SSE8	SE9	SE11	SE9	ENE8	ENE11	ENE18	ENE16	ESE10	SSE9	SSW11	SW11	SW6	SE4.9	ENE18
17-Jun	SSW4	SSE5	SSE6	S6	SW5	SW3	E1	SSE8	SSE8	SSE9	SE11	SE11	SE9	SE8	SE8	SE8	SSE7	S9	SSW7	SSE6	S8	SSE8	SSE9	SSE6	SSE6.4	SE11
18-Jun	SSE7	SSE7	SSE8	SSE8	SSE7	SSE10	SE9	SE8	SSE11	SSE12	SE18	SE14	SE16	SSE17	SE18	SSE19	SSE19	SSE17	SSE15	SSE14	SSE14	SSE15	SSE13	SSE11	SSE12.8	SSE19
19-Jun	SE10	SE12	SE11	SE8	SSE5	SSE5	SE5	SE6	SSE3	SSE4	SE12	SE12	SE11	SE7	SE9	SSE6	SSE5	ESE8	NE4	NE3	SSW3	W3	W6	W6	SE5.4	SE12
20-Jun	NNW4	N9	NNE8	N4	NNE3	NNE1	SE1	SE3	SSE4	SSE6	SSE6	SSE7	ESE6	SSE7	SE9	SE8	SE8	SE8	SSE7	SE7	SSE3	WSW5	W7	W10	SSE2.3	W10
21-Jun	W9	WNW5	NW3	NNE8	N6	N7	NNW8	N8	NNW9	NNW9	NNW9	NNW9	NW9	NW9	NW8	NW7	W13	WNW14	WNW13	WNW11	WNW10	WNW7	NNW7	NW6	NW7.4	WNW14
22-Jun	NNW7	NNW7	W9	W11	W10	W12	W9	W9	W7	WNW8	NW7	N7	NNW8	NW12	NNW13	NNW13	NW13	NW14	NNW12	N10	N9	E4	NE3	NNE6	NW7.1	NW14
23-Jun	NNE4	N3	WNW2	W3	WSW5	W6	NW2	E1	E4	E1	E3	ESE3	ESE4	ESE10	SE9	S9	ESE13	E13	ESE8	ESE6	SSE4	SSE3	SE6	SE8	ESE3.2	E13
24-Jun	SE12	SE13	SE16	SE10	SE13	SE13	SE13	SE10	SE12	SE11	SE10	SE10	SE10	SSE15	SSE16	SSE13	SE11	SSE12	SSE13	S12	SE9	SE12	SE14	SE13	SE12.0	SE16
25-Jun	SE13	SE14	SE12	SE11	SE11	SE13	SE10	SE13	SE13	SE14	SE13	SE13	SE15	SE14	ESE7	SSE15	WSW14	E3	SE4	SSE6	S7	S6	SSE3	S4	SE9.4	SE15
26-Jun	S4	S4	S4	S5	SSW4	S4	SSW3	SSE4	SW3	W5	W7	WNW6	NNW6	SSW5	WSW4	N4	E3	NW5	NW7	NNW6	N5	NNE5	ENE2	WNW4	W1.6	W7
27-Jun	NW3	NE1	SW4	WSW4	SW1	SE2	SE4	SSE4	SSE4	SE2	NE3	E4	W5	ENE12	NNE6	NE4	N7	NNE16	NNE14	NNE10	NW3	WNW4	NW3	N6	NNE2.6	NNE16
28-Jun	NNE5	N2	W5	WSW4	NNW2	SW2	E2	E3	ESE1	WNW2	W4	W2	NW7	NW8	NNW10	NNW11	NNW10	NNW11	NW11	NNW9	NNE8	NNW9	N8	N10	NNW4.8	NW11
29-Jun	N7	NW3	NNW8	NNW9	N6	N4	WNW8	NNW9	NNW11	N14	NNW11	N18	N19	N21	N23	N23	NNW21	NNW21	NNW18	NNW16	NNW15	NNW15	NNW15	NNW13	NNW13.2	N23
30-Jun	NW12	NW12	WNW10	WNW9	NW9	NW10	NNW10	NNW11	NNW13	NNW14	NNW13	NNW13	N15	N15	NNW15	NNW14	N13	NNE15	NNE15	NNE12	N10	NNE12	NNE8	NNW3	NNW10.8	NNE15

SE1.0 ESE1.6 SE1.7 SE1.8 SE1.9 SE2.0 ESE1.5 ESE1.7 SE1.7 ESE1.5 ENE1.5 ENE2.4 ENE2.9 ENE2.0 ENE2.3 NE2.3 NE3.0 NNE4.4 NNE3.2 NE3.0 ENE1.8 ESE1.2 SSE0.8 SW0.4	Diurnal Average
NNW17 NNW20 N18 N21 N19 NNW19 NNW19 SE20 NNW17 N17 SE18 N20 N19 NNW22 N23 N23 NNW23 NNW29 NNW22 NNE27 NNE23 SE16 SE15 NNW17	Diurnal Maximum

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

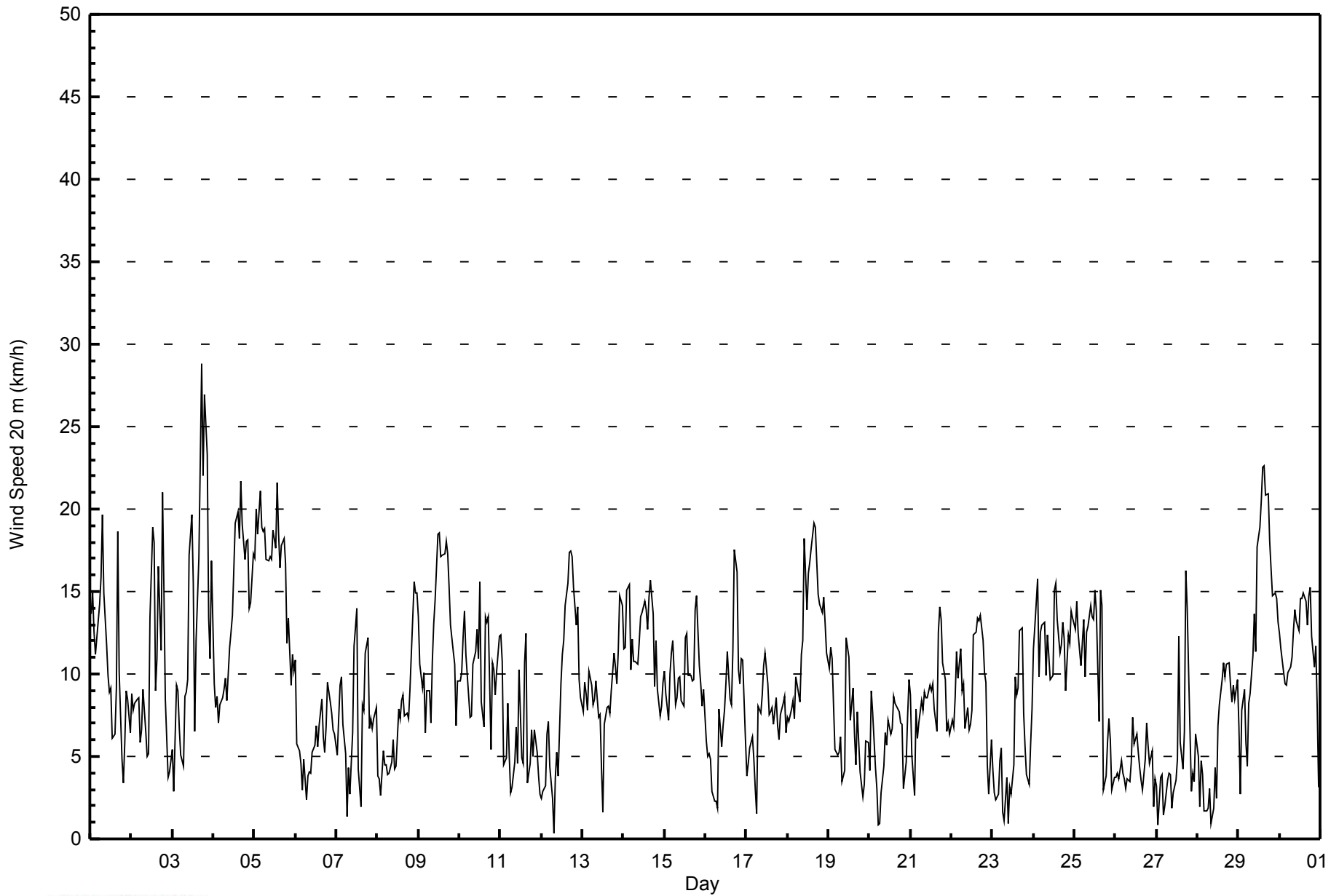


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Jun 10 14:00 Minimum Value: 1 km/h on Jun 20 06:00 Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 8																		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	170	23.61	23.61
6 - 11	333	46.25	69.86
12 - 19	199	27.64	97.50
20 - 28	17	2.36	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 20 m (WS20m) - km/h

Mannix - June 2014

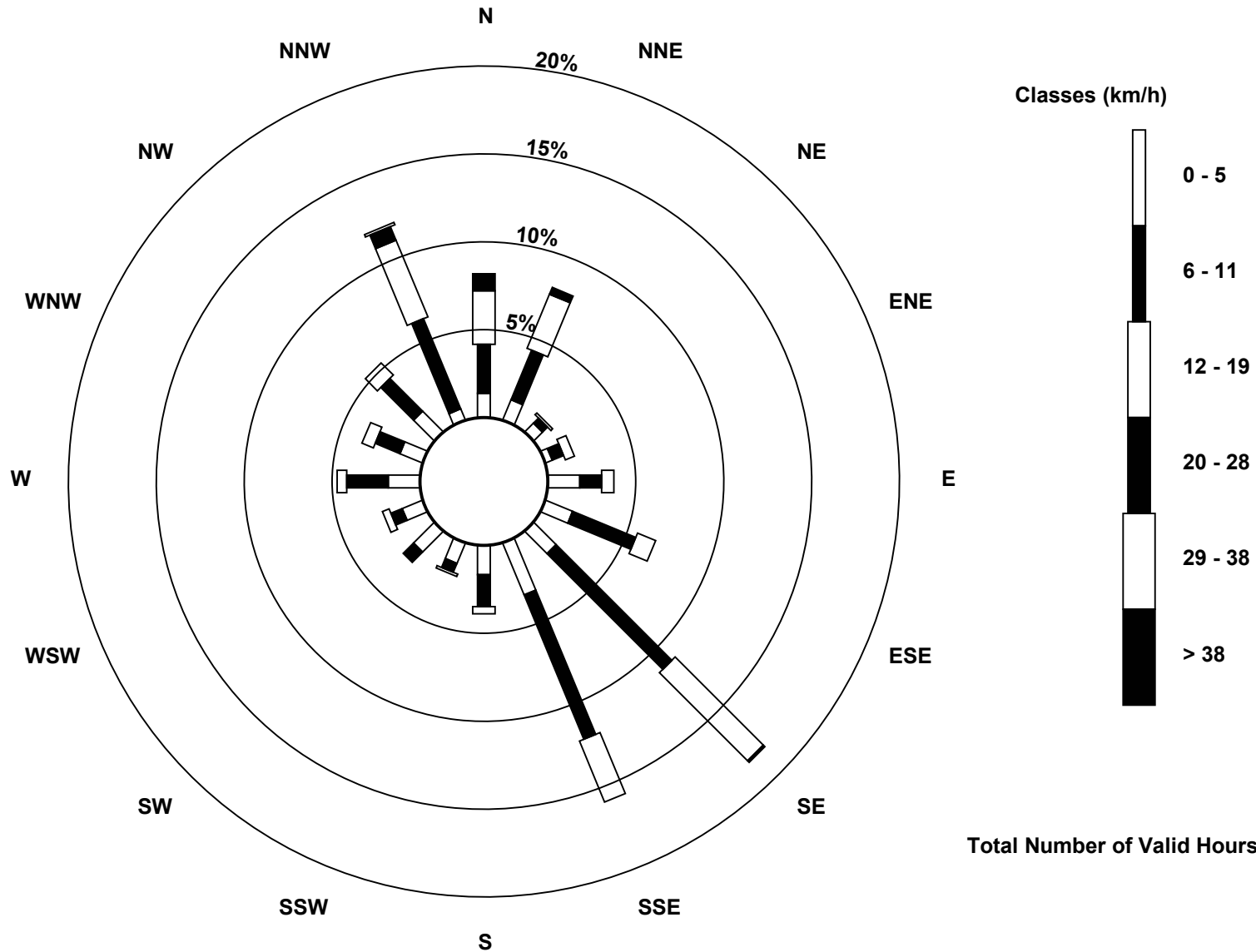
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	10	9	5	3	13	12	13	23	12	9	12	9	13	10	12	5	170
6 - 11	20	22	3	5	9	28	67	64	13	4	6	5	17	11	19	40	333
12 - 19	22	24	1	4	5	8	51	27	3	1	0	3	4	5	7	34	199
20 - 28	7	3	0	0	0	0	1	0	0	0	0	0	0	0	0	6	17
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	59	58	9	12	27	48	132	114	28	14	18	17	34	26	38	86	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

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



Total Number of Valid Hours: 720



Maximum Speed: 39 km/h on Jun 3 18:00	Maximum Daily Speed Average: 22.8 km/h on Jun 5	Hours in Service: 720
Minimum Speed Value: 1 km/h on Jun 28 06:00	Minimum Daily Speed Average: 0.7 km/h on Jun 2	Hours of Data: 720
Maximum Diurnal Speed Average: 5.7 km/h at hour 18	Minimum Diurnal Speed Average: 0.7 km/h at hour 24	Hours of Missing Data: 0
Monthly Average Velocity: 2.2 km/h 81.9 deg	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 9 Median = 13 Q ₃ = 18 P ₉₀ = 23 P ₉₉ = 31	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jun	SE19	SE20	SE18	SE15	ESE17	ESE19	SE21	SE27	SE21	SE16	SE13	SE12	SE11	S8	SSE8	SSE12	SSE24	S17	SSW7	NW5	SE8	SSE15	SSE16	S15	SE13.9	SE27	
2-Jun	SSE16	SSE14	SSE16	SSE16	SSE15	SSE9	S8	S16	S9	SE5	W6	W15	W21WNW21WSW11	W12	NNE21	NNE15	NNE28	N22	NNE13	N10	NNE9	NNE10	NNE10	WNW0.7	NNE28		
3-Jun	NNE10	NE5	NE12	NNE14	NNE12	N8	N4	NNE9	NNE10	NE11	N22	N26	N21	N9	N15	N23	NNW31	NNW39	NNW30	NNE36	NNE31	NNE18	NW14	NW21	N16.9	NNW39	
4-Jun	N13	NNW11	NNW12	NNW10	N11	NNW12	NNW13	NNW14	NNW12	NNW15	NNW18	N19	NNW22	N26	N26	N25	N30	N27	N23	N25	NNE24	NNE19	N20	NNW25	N18.1	N30	
5-Jun	NNW23	NNW28	N26	N28	N26	NNW26	NNW26	NNW23	NNW22	N23	N23	N25	N23	NNW28	NNW24	NNW22	NNW25	NNW25	N23	NNW17	NNW19	NNW15	NNW17	NNW15	NNW22.8	N28	
6-Jun	NNW15	NNW9	WNW8	NW5	WNW4	W5	NW3	NNW5	NW5	NW5	NW7	NNW6	NW8	NNW7	NW8	NNW11	NNW9	NNW7	NE8	ENE11	ENE10	E11	SE10	SE10	N4.2	NNW15	
7-Jun	ESE7	ESE10	E11	ESE16	SE11	SE8	S2	W4	WNW3	N8	NNW15	NNE16	NE16	NE6	NW3	W9	NNW11	WNW14	WNW15	NW8	SSE11	SW10	SW13	SW13	NNW0.8	NNE16	
8-Jun	SW7	SSW7	SSE4	S4	SSW6	SSE5	SSE4	SE5	SE5	SE7	E4	ESE6	E9	SE9	E10	ESE10	ESE10	ESE9	SE9	SE13	SE18	SE22	SE22	SE23	SE8.4	SE23	
9-Jun	SE21	SSE17	S14	SSE16	SE11	ESE14	ESE12	SE10	SSE15	SE19	SE20	SE24	SE24	ESE22	ESE22	ESE23	ESE23	E24	E20	E17	E14	E14	ENE8	NNE14	ESE15.5	E24	
10-Jun	NNE15	NNE14	NNE17	NNE20	NNE16	NNE12	N11	NNW11	NNW15	N15	NNE16	NNE15	NNE19	NNE12	NW9	NW17	N18	NNE17	SW6	WSW13	W15	W16	W16	W20	N9.9	NNE20	
11-Jun	WSW19	WSW18	SW9	SW9	SSW11	S8	S5	S4	S8	SW11	S7	SE14	SSW10	SE6	ESE14	E16	SE5	ESE6	S12	S8	SSE12	SSW14	SSW8	WSW7	S6.9	WSW19	
12-Jun	WSW4	NNW7	NNW10	SW9	S11	SSE7	SSE3	SSW1	WNW4	WNW6	WNW4	N12	NNE14	NNE16	NNE18	NNE20	NNE22	NNE23	NNE23	NNE21	NNE19	NNE22	NE15	E12	NNE8.2	NNE23	
13-Jun	ESE11	ESE13	ESE13	SE11	ESE14	ESE12	ESE11	ESE10	ESE11	ESE9	ESE9	E5	ESE3	SE9	SSE11	ESE10	ESE9	SE12	SE15	SSE15	SE15	SE19	SE22	SSE22	SE11.7	SE22	
14-Jun	SSE19	SSE19	SE23	SE22	SE16	SE17	SE15	SSE15	SE14	SE16	SSE19	SE19	SE19	SSE20	SSE20	S24	SSE23	S23	S19	SSW24	S20	S18	S17	SSE19	SSE18.3	SSW24	
15-Jun	SSE18	SSE17	SSE15	SE18	SE17	SE19	SSE12	SE11	SE13	SE12	SE12	SE11	ESE15	SE16	ESE12	ESE13	ESE12	SE13	SE18	SE20	SE17	SSE16	SSE16	SSE18	SE14.6	SE20	
16-Jun	SE13	SE8	ESE10	ESE7	SE5	SE2	S1	SSE2	SSE11	SSE8	SSE10	SSE11	SE12	SE15	SE11	ENE10	ENE13	NE22	ENE21	ESE14	SSE16	SSW22	SW17	SW10	SE7.2	ENE22	
17-Jun	SW6	S7	SSE10	SSE11	SSW8	SW5	ESE2	SSE12	SSE12	SSE12	SE14	SE15	SE12	SE10	SE11	SE10	SSE10	S15	SSW15	SSE11	S16	SSE15	SSE15	SSE12	SSE10.2	S16	
18-Jun	SSE14	SSE14	SSE16	SSE14	SSE12	SSE16	SE14	SE11	SSE15	SSE17	SE24	SE19	SE22	SSE24	SE24	SSE27	SSE26	SSE24	SSE23	SSE21	SSE21	SSE23	SSE21	SSE18	SSE19.1	SSE27	
19-Jun	SSE17	SE19	SE18	SE14	SSE10	SE7	SE7	SE8	SSE6	SSE6	SE16	ESE15	SE14	SE10	SE12	SE9	SSE7	ESE11	ENE5	NE4	S2	W4	W8	W8	SE7.9	SE19	
20-Jun	NNW8	N15	NNE13	N7	NNE4	N1	SSE1	SSE3	SSE7	SSE9	SSE8	SSE10	ESE8	SSE10	SE11	SE11	SE11	SE11	SSE12	SE12	SSE7	SW7	W10	W12	SE3.3	NNE15	
21-Jun	W11	NNW10	NNW4	NNE11	NNE9	N11	N15	N13	NNW16	NNW14	NNW14	NNW15	NW16	NW16	NW13	NW11	WNW16	WNW18	WNW20	WNW17	WNW16	WNW11	NNW12	NNW11	NW12.0	WNW20	
22-Jun	NNW13	NNW12	NNW12	W14	W13	W14	W11	W10	WNW9	NW11	NW10	N10	NNW11	NW17	NNW18	NNW19	NNW19	NW20	NNW18	N14	NNE15	ENE6	NE4	NNE9	NW10.3	NW20	
23-Jun	NNE6	N4	NNW3	NW4	WNW6	WNW9	NNW3	NE1	ENE4	E1	E4	SE4	ESE6	ESE12	SE11	S16	ESE16	E15	ESE9	ESE8	SSE8	SSE7	SE10	SE13	ESE4.3	S16	
24-Jun	SE18	SE20	SE23	SE15	SE18	SE19	SE18	SE15	SE17	SE15	SE13	SE13	SSE22	SSE24	SSE19	SE15	SSE18	SSE20	S21	SE15	SE20	SE19	SE21	SE20	SE17.7	SSE24	
25-Jun	SSE21	SE22	SE20	SE20	SE17	SE20	SE14	SE17	SE17	SE19	SE17	SE17	SE19	SSE23	SSE23	SE11	SSE25	WSW20	ENE4	SE5	SSE8	S15	S13	S7	SSW6	SSE14.1	SSE25
26-Jun	S6	S6	S8	S9	SSW7	SSW7	S5	S5	SW5	W6	W9	WNW8	NNW9	S9	SW7	NNW4	E3	NW8	NW11	NNW10	N8	NNE9	E5	NW3	W2.0	NW11	
27-Jun	NW7	NNE3	WSW2	W2	ENE2	SE3	SE5	SE4	SSE5	SSE2	NE3	ENE4	W6	ENE15	NNE8	NE5	N9	NNE22	NNE18	NNE13	NNW4	NW8	NNW8	N12	NNE4.3	NNE22	
28-Jun	NNE9	NE4	SW2	NW2	N4	NNW1	SE1	E2	ESE1	WNW2	W4	W3	NW10	NW11	NNW14	NNW16	NNW15	NNW16	NW17	NNW15	NNE13	N15	N15	N17	NNW7.6	NW17	
29-Jun	N13	NNW8	NNW15	N18	N11	N8	NNW12	NNW14	N17	N19	NNW18	N25	N28	N29	N32	N32	NNW31	N30	NNW28	NNW26	NNW24	NNW24	NNW24	NNW23	NNW20.8	N32	
30-Jun	NNW21	NW20	NW18	NW17	NW16	NNW17	NNW17	NNW17	NNW18	NNW20	NNW19	NNW19	N21	N21	NNW21	NNW22	N18	NNE20	NNE21	NNE17	N17	NNE19	NNE13	NNE6	NNW16.9	NNW22	

ESE2.0	ESE2.6	SE3.0	SE3.0	SE3.0	ESE2.8	ESE2.0	ESE2.3	ESE2.3	ESE2.0	ENE2.2	ENE3.5	ENE3.9	ENE2.9	ENE3.2	NE3.0	NE4.1	NNE5.7	NNE3.9	NE4.1	E2.7	SE2.0	SSE1.6	S0.7	Diurnal Average	
NNW23	NNW28	N26	N28	N26	NNW26	NNW26	SE27	NNW22	N23	SE24	N26	N28	N29	N32	N32	NNW31	NNW39	NNW30	NNE36	NNE31	NNW24	NNW24	NNW25	Diurnal Maximum	

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



Summary of Hour Standard Deviations

Mannix - June 2014

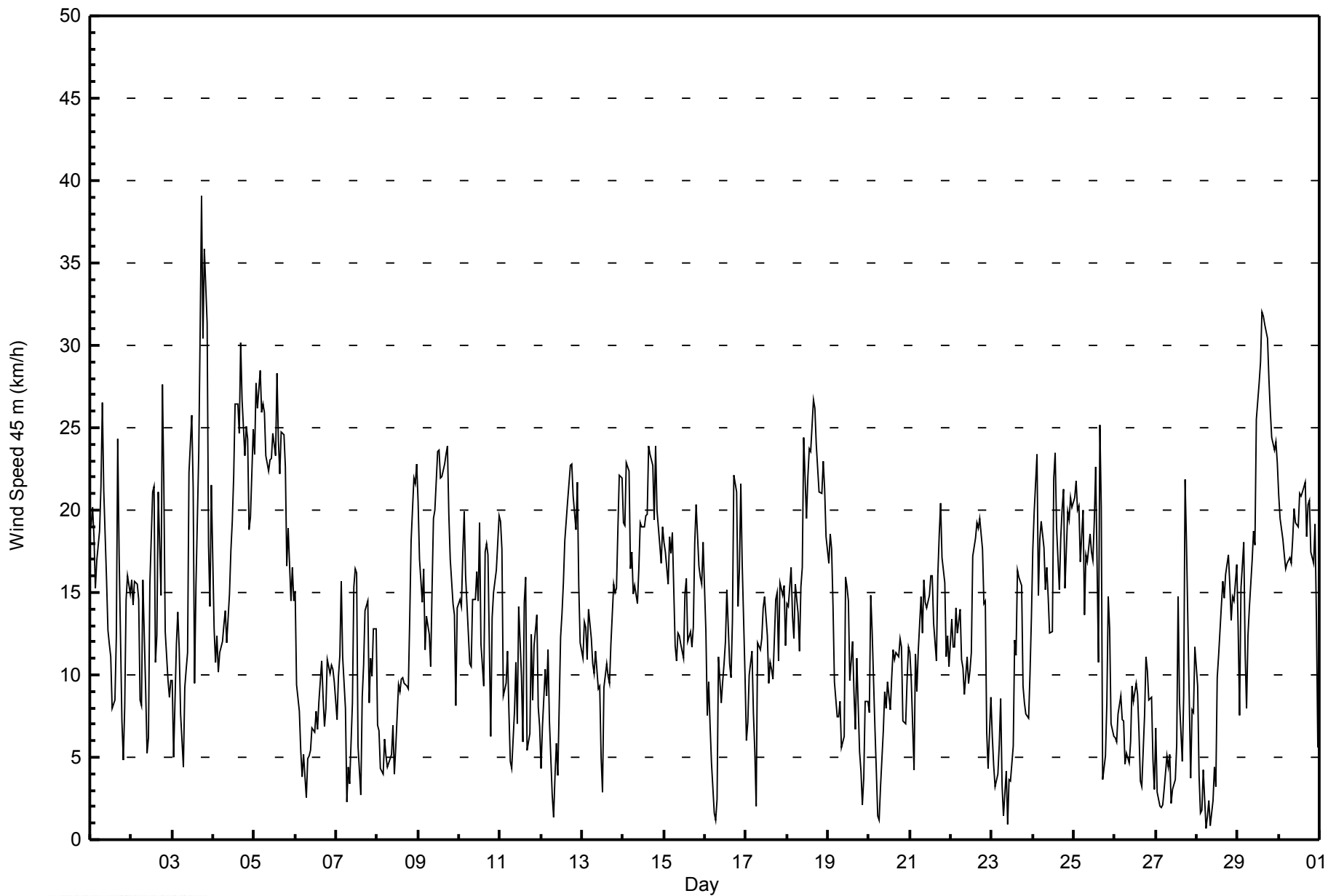
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 16 km/h on Jun 25 16:00 Minimum Value: 1 km/h on Jun 27 02:00 Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 9																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	5	6	5	5	4	4	7	6	4	5	3	4	4	4	4	4	7	4	3	5	4	2	3	2	7
2-Jun	1	2	1	1	2	3	4	3	3	2	4	5	4	11	4	4	7	4	5	6	3	2	2	2	11
3-Jun	2	2	2	2	3	2	2	3	2	3	5	5	7	4	4	4	7	8	8	7	7	6	8	4	8
4-Jun	4	3	3	2	3	3	2	3	3	4	4	4	4	5	6	7	6	6	6	6	5	5	6	6	7
5-Jun	6	5	6	7	6	5	5	6	4	5	6	6	6	7	6	6	5	6	6	4	4	4	3	3	7
6-Jun	3	4	4	1	2	2	2	2	2	3	3	3	4	4	4	3	3	3	3	2	2	2	3	3	4
7-Jun	2	3	3	5	3	3	2	2	1	3	4	4	3	4	3	3	4	3	2	4	3	3	2	1	5
8-Jun	4	1	3	2	1	1	1	2	2	2	3	4	4	4	3	4	3	3	3	3	3	4	4	5	5
9-Jun	5	4	3	5	2	3	3	3	3	5	5	5	6	7	6	6	7	7	6	4	3	4	3	3	7
10-Jun	3	3	4	3	3	3	3	3	4	4	5	5	6	14	5	5	4	13	5	2	2	2	1	2	14
11-Jun	1	3	3	2	2	2	1	2	3	2	3	5	10	5	6	7	7	5	3	4	2	1	3	3	10
12-Jun	1	2	2	1	1	4	1	2	2	2	3	5	4	5	5	4	5	4	4	4	3	3	5	5	5
13-Jun	4	4	5	4	4	4	4	3	4	4	4	4	3	5	5	4	4	5	4	3	3	3	4	4	5
14-Jun	3	4	4	4	3	4	3	4	3	4	5	6	6	6	7	5	5	5	4	5	3	2	2	3	7
15-Jun	3	4	3	2	3	3	2	3	3	4	5	5	5	6	5	5	6	4	5	4	4	3	2	2	6
16-Jun	3	2	2	2	2	2	1	3	4	4	3	4	5	6	5	4	5	5	4	4	7	3	4	2	7
17-Jun	2	2	2	1	2	3	2	3	3	3	3	3	4	4	3	3	3	9	5	4	2	2	2	2	9
18-Jun	2	2	2	3	3	3	3	3	5	4	5	5	6	6	5	7	6	5	4	5	5	5	4	4	7
19-Jun	3	3	3	3	2	2	2	2	2	2	4	5	4	4	4	2	3	5	3	2	2	1	1	1	5
20-Jun	2	3	4	2	1	1	1	3	2	2	3	2	3	3	3	3	3	2	2	3	2	1	2	2	4
21-Jun	2	3	2	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	2	3	2	2	3	4
22-Jun	3	4	2	2	2	2	4	2	2	2	3	3	3	3	5	4	3	4	4	4	3	5	2	4	5
23-Jun	1	1	1	2	2	3	2	1	2	2	2	2	3	4	4	6	6	4	3	3	2	1	2	4	6
24-Jun	4	5	4	6	6	5	5	3	3	4	4	5	5	5	5	4	4	5	3	3	3	3	4	4	6
25-Jun	4	4	3	3	4	4	3	4	5	5	5	5	6	4	3	16	11	3	2	2	3	2	3	2	16
26-Jun	2	2	1	1	1	3	2	2	2	2	4	3	2	10	6	2	1	4	3	3	2	1	2	2	10
27-Jun	2	1	2	1	1	1	2	1	2	1	2	2	4	7	5	3	4	5	4	2	2	1	1	3	7
28-Jun	3	2	1	1	2	1	1	1	1	2	3	4	4	4	4	4	3	3	3	4	4	2	4	2	4
29-Jun	2	2	3	3	3	3	4	3	4	5	5	6	8	7	7	7	6	7	6	5	4	4	4	4	8
30-Jun	4	3	2	2	2	3	4	4	4	3	3	4	5	6	5	4	5	4	4	4	4	3	3	1	6
Diurnal Maximum																									



WBEA
Hourly Averages

Wind Speed 45 m (WS45m) - km/h

Mannix - June 2014





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	90	12.50	12.50
6 - 11	210	29.17	41.67
12 - 19	280	38.89	80.56
20 - 28	129	17.92	98.47
29 - 38	10	1.39	99.86
> 38	1	0.14	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed 45 m (WS45m) - km/h

Mannix - June 2014

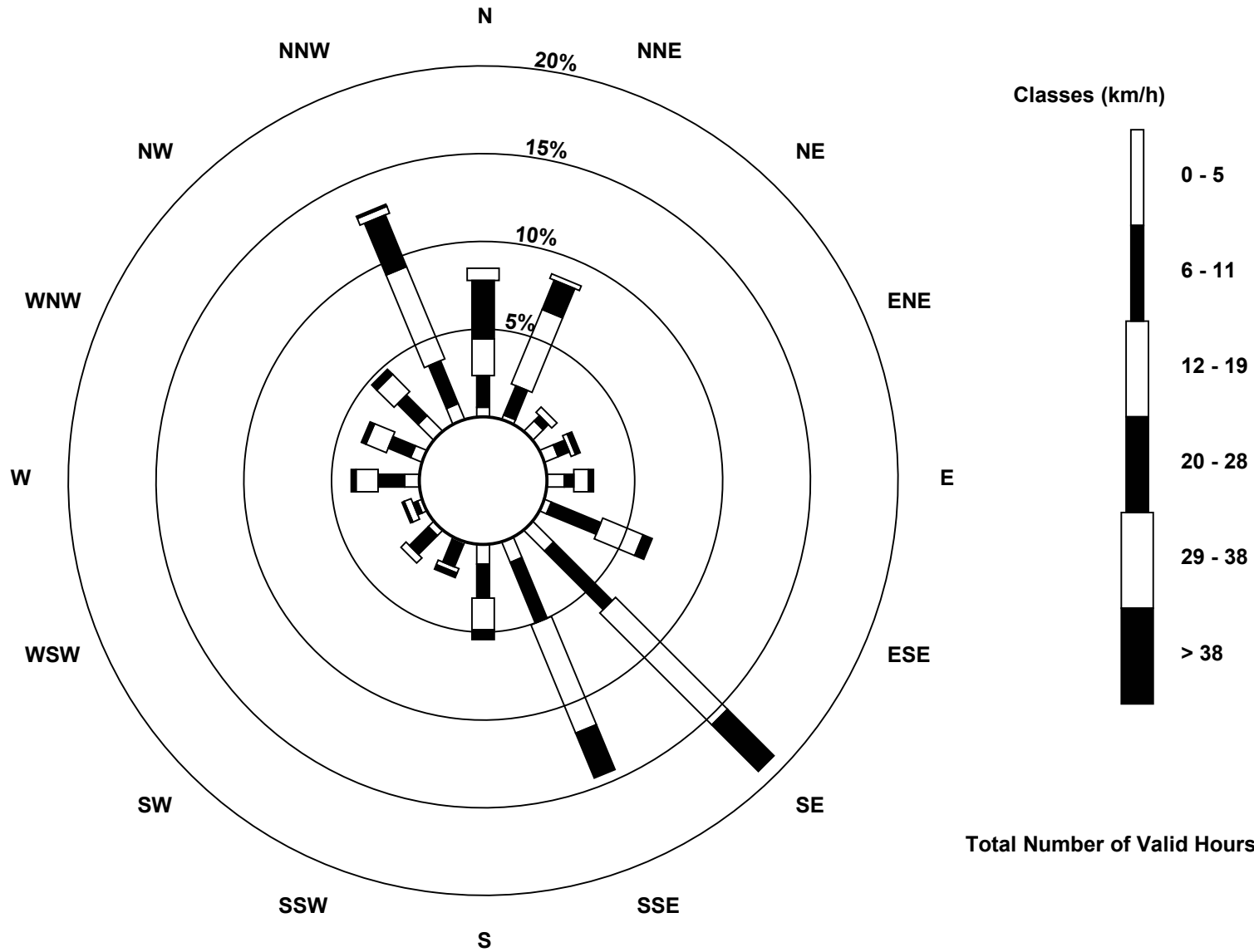
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	2	6	6	7	3	12	9	8	1	3	2	6	5	9	7	90
6 - 11	13	13	3	5	4	22	34	27	14	10	11	2	11	10	12	19	210
12 - 19	15	33	3	2	6	18	65	48	13	2	3	3	9	9	10	41	280
20 - 28	24	13	0	2	2	4	27	20	4	2	0	1	2	2	3	23	129
29 - 38	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3	10
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Totals	61	63	12	15	19	47	138	104	39	15	17	8	28	26	34	94	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

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





Maximum Speed: 44 km/h on Jun 3 18:00	Maximum Daily Speed Average: 25.5 km/h on Jun 5	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 28 09:00	Minimum Daily Speed Average: 0.6 km/h on Jun 7	Hours of Data: 720
Maximum Diurnal Speed Average: 6.4 km/h at hour 18	Minimum Diurnal Speed Average: 1.4 km/h at hour 24	Hours of Missing Data: 0
Monthly Average Velocity: 2.5 km/h 78.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 9 Median = 14 Q ₃ = 20 P ₉₀ = 26 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-Jun	SE17	SE18	SE20	SE16	ESE13	ESE13	SE18	SE27	SE24	SE17	SE14	SSE13	SE10	SSE8	SSE9	SSE13	SSE26	S20	SSW8	NW5	SE7	SSE14	SSE17	S19	SE14.0	SE27
2-Jun	SSE22	S20	S17	SSE12	S15	S11	SSW7	SSW17	SSW10	SSE6	W7	W16	W22WNW22WSW12	W13	NNE24	NNE16	NNE31	N26	NNE16	NNE13	NE11	NE13	WNW1.3	NNE31		
3-Jun	NE12	ENE5	ENE11	NE14	NNE11	NNE10	NNE4	NNE9	NNE11	NE12	N23	N28	N25	N12	N17	NNE26	N34	NNW44	NNW35	NNE41	NNE36	NNE21	NW16	NW23	N18.2	NNW44
4-Jun	N16	NNW12	NNW14	NNW11	N13	NNW14	NNW15	NNW16	NNW14	NNW16	NNW20	N21	N24	N29	N29	N27	N34	N30	N26	N28	NNE27	NNE21	N22	NNW29	N20.5	N34
5-Jun	NNW26	N32	N29	N32	N29	N30	N29	N26	NNW25	N25	N26	N27	N25	N31	NNW26	NNW25	NNW27	NNW27	N25	NNW19	NNW21	NNW18	NNW20	NNW16	N25.5	N32
6-Jun	NNW17	NNW12	NW9	NNW6	NNW4	NW5	NNW3	N5	NW5	NW6	NW7	NNW6	NW8	NNW7	NW8	N11	N9	NNW7	NE9	ENE12	ENE12	E10	SE10	SE10	N4.8	NNW17
7-Jun	ESE6	ESE8	E10	ESE14	SE11	SE8	SSE3	W4	W3	N8	NNW17	NNE18	NE17	ENE6	NW2	W8	NNW1	WNW14	WNW15	NW9	SSE10	SSW11	SSW15	SW18	NW0.6	NNE18
8-Jun	SSW10	SSW7	S6	SW3	WSW4	SSE3	SSE4	SSE5	SE5	SE6	E4	SE6	E9	SE8	ESE8	ESE9	ESE9	ESE9	SE8	SE15	SE23	SE26	SE26	SE27	SE8.8	SE27
9-Jun	SE26	SSE21	S18	SSE21	SSE13	SE11	ESE11	SE10	SSE18	SE18	SE18	SE22	SE18	ESE17	ESE19	ESE19	ESE21	E23	E19	E17	E14	E15	E8	NNE18	ESE14.9	SE26
10-Jun	NNE18	NNE16	NNE22	NNE24	NNE19	NNE15	N13	NNW11	NNW15	NNE16	NNE18	NNE16	NNE21	NNE15	NNW10	NW18	N20	NNE19	SW7	WSW15	W16	W19	W18	W26	N11.3	W26
11-Jun	WSW24	W23	WSW14	WSW13	SSW12	SW8	SW5	SW6	SSW9	SW13	S8	SE14	SSW11	SE6	SE16	E14	SE6	E7	S15	S10	S12	SSW14	SW9	WSW10	SSW7.7	WSW24
12-Jun	W6	NW8	W12	SW9	SSW11	S11	SSW4	SSW3	WNW4	WNW6	WNW4	N13	NNE14	NNE16	NNE20	NNE22	NNE24	NNE25	NNE26	NNE25	NNE23	NNE29	NE20	E14	NNE9.3	NNE29
13-Jun	ESE11	ESE12	ESE11	ESE9	ESE11	SE10	ESE9	ESE9	ESE10	ESE8	ESE9	E5	ESE4	SE9	SE11	ESE9	ESE8	SE11	SE16	SSE17	SE20	SE24	SE27	SSE29	SE12.0	SSE29
14-Jun	SE26	SSE26	SE30	SE28	SE21	SE21	SSE17	SE16	SE15	SE17	SSE20	SE19	SE19	SSE20	SSE21	S25	SSE26	S25	S23	S27	S24	SSW23	S22	S21	SSE21.0	SE30
15-Jun	SSE25	SSE23	S20	SSE23	SSE24	SSE24	SSE14	SE11	SE12	SE11	SE12	SE10	ESE13	SE14	ESE11	SE12	ESE10	SE12	SE16	SE22	SE20	SE21	SSE21	SSE25	SE16.5	SSE25
16-Jun	SSE17	SSE10	SE8	SE6	ESE4	ENE3	E3	SE3	SSE12	SSE9	SSE10	SSE12	SE11	SE14	SE10	ENE10	ENE15	ENE25	ENE24	ESE12	SSE20	SSW25	SW20	SW12	SE7.7	SSW25
17-Jun	SW7	SSW6	SSE10	SE11	SSE10	SSW6	E3	SSE14	SSE14	SSE12	SE14	SE13	SE11	SE9	SE11	SE10	SSE10	S16	S17	SSE15	S20	SSE19	SSE19	SSE16	SSE11.4	S20
18-Jun	SSE20	SSE21	S23	SSE19	SSE17	SSE22	SE18	SSE13	SSE16	SSE17	SE25	SE20	SE23	SSE25	SE24	SSE29	SSE28	SSE27	SSE25	SSE24	SSE26	SSE29	SSE27	SSE24	SSE22.5	SSE29
19-Jun	SSE23	SSE25	SSE24	SE20	SE13	SE9	SE8	SE8	SSE7	SSE7	SE15	SE12	SE12	SE9	SE11	SE9	SSE7	ESE10	ENE6	ENE5	ESE1	WNW3	WNW8	NW7	SE8.9	SSE25
20-Jun	N11	NNE20	NNE16	N9	N5	NNW3	S1	SSE3	SSE7	SSE9	SSE8	SSE10	ESE7	SSE10	SE11	SE11	SE12	SE12	SSE15	SE13	SSE11	SSW10	W12	W13	SE3.5	NNE20
21-Jun	WNW14	NW10	N5	NNE13	NNE11	N14	N19	N15	N20	NNW18	NNW17	NNW17	NW18	NW17	NW14	NW12	WNW17	WNW19	NW22	WNW19	NW18	NW13	NNW15	NNW12	NNW13.8	NW22
22-Jun	NNW18	NNW14	WNW13	W16	W15	W16	NNW12	W10	WNW9	NNW11	NNW10	N11	NNW12	NW17	NNW19	NNW20	NNW19	NNW21	NNW19	NNE16	NNE18	NE7	NE6	NE9	NNW11.5	NNW21
23-Jun	ENE6	NNE4	N4	N4	NW4	NW8	NNW7	NNE2	ENE4	ENE1	E3	SE4	ESE6	ESE11	SE10	S17	SE13	E15	ESE8	SE7	SSE11	SSE10	SE10	SE14	ESE4.4	S17
24-Jun	SE19	SE22	SE29	SE18	SE17	SE18	SE17	SE17	SE17	SE14	SE11	SE12	SSE24	SSE25	SSE20	SE15	SSE20	SSE22	S24	SSE19	SSE25	SSE25	SE26	SE26	SSE19.7	SE29
25-Jun	SSE28	SE27	SE25	SE25	SE21	SE22	SE15	SE17	SE16	SE17	SE15	SE15	SE16	SSE25	SE12	S29	SW24	E4	SE5	SSE10	S18	S16	S10	SSW7	SSE15.7	S29
26-Jun	SSW6	S5	S6	S7	S10	SSW8	S5	S6	SW5	W6	W9	WNW9	NNW9	S9	SW8	NNW2	E3	NW7	NW12	N13	N11	NNE11	E6	NNE1	W1.7	N13
27-Jun	NNW7	NNE4	ESE2	SSE2	ESE1	ESE3	SE4	SE4	SSE5	SSE2	NE3	ENE3	W6	ENE16	NNE10	NE5	N9	NNE24	NNE20	NNE14	N3	NW7	NNW9	N14	NNE4.9	NNE24
28-Jun	NNE11	ENE8	ENE2	NNE1	N3	NNW2	SSW1	SE1	E0	NW2	WNW4	W3	NW10	NW12	NNW15	NNW16	NNW15	NNW17	NNW19	N18	NNE17	N17	N20	N19	N8.5	N20
29-Jun	N15	N12	N20	N24	N16	N12	NW13	NNW16	N18	N21	NNW19	N28	N30	N32	N35	N35	N35	N34	N32	NNW30	NNW30	NNW30	NNW31	NNW30	N24.6	N35
30-Jun	NNW26	NW23	NW22	NW21	NW20	NNW20	NNW20	NNW19	NNW19	NNW21	NNW21	NNW20	N23	N22	NNW22	NNW23	N20	NNE22	NNE23	NNE20	NNE21	NNE25	NNE17	NE6	N19.3	NNW26

ESE3.0	SE3.1	SE3.6	ESE3.6	ESE3.2	ESE2.6	E1.7	ESE2.1	ESE2.3	E1.9	ENE2.3	NE3.8	NE4.1	ENE3.2	NE3.5	NE3.2	NNE4.7	NNE6.4	NNE4.6	NE4.6	E3.6	ESE2.6	SE2.2	SSE1.4	Diurnal Average
SSE28	N32	SE30	N32	N29	N30	NNW29	SE27	NNW25	N25	N26	N28	N30	N32	N35	N35	N35	NNW44	NNW35	NNE41	NNE36	NNW30	NNW31	NNW30	Diurnal Maximum

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



Summary of Hour Standard Deviations

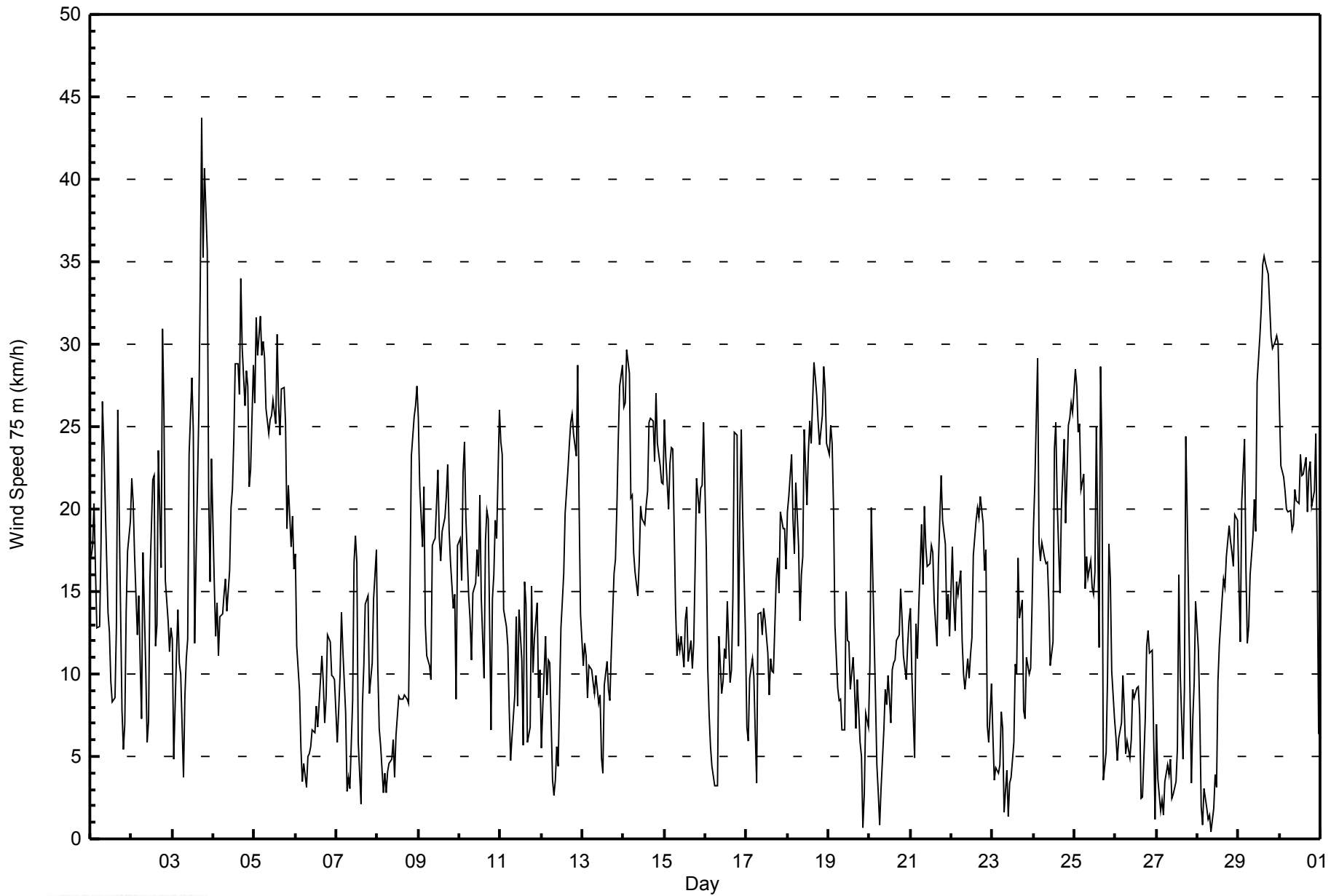
Mannix - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 19 km/h on Jun 25 16:00																	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 Jun 26 04:00																									
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P 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-Jun	7	7	6	7	4	4	8	8	5	6	3	4	4	4	4	4	7	3	3	6	4	2	2	2	8
2-Jun	1	2	3	1	2	4	4	2	3	2	3	5	4	11	3	4	7	4	5	5	3	1	3	2	11
3-Jun	3	2	2	3	2	3	2	3	2	3	5	5	7	5	4	3	8	8	9	7	6	5	8	4	9
4-Jun	3	3	3	2	3	3	2	3	3	5	3	5	5	5	6	7	6	5	6	6	5	6	6	6	7
5-Jun	6	5	6	7	6	5	5	6	4	5	7	6	6	7	6	6	5	6	7	4	4	4	3	2	7
6-Jun	2	4	4	2	2	2	2	2	2	3	3	3	3	3	4	3	3	3	3	2	2	3	4	4	4
7-Jun	3	3	5	5	4	3	2	2	1	3	4	3	3	5	3	3	4	3	2	4	4	4	2	2	5
8-Jun	4	3	1	2	1	1	1	2	2	3	3	4	3	4	3	4	3	4	4	3	3	5	4	5	5
9-Jun	4	4	3	5	2	4	4	4	4	6	7	7	7	6	6	6	7	7	6	4	4	4	3	3	7
10-Jun	4	3	4	2	3	3	3	3	3	4	5	5	7	15	6	5	4	14	5	2	2	1	1	3	15
11-Jun	1	2	4	2	2	1	1	3	4	2	4	5	10	5	7	6	7	5	3	4	3	2	2	2	10
12-Jun	2	1	2	1	1	4	1	2	2	2	4	4	4	5	5	4	5	4	3	3	2	3	6	6	6
13-Jun	5	4	4	3	3	4	3	3	4	4	3	4	4	5	5	4	4	5	4	3	3	3	4	4	5
14-Jun	3	3	4	4	5	5	3	4	4	5	6	6	7	8	5	5	4	3	5	3	3	2	3	8	
15-Jun	3	4	3	3	2	4	3	3	3	4	5	5	5	6	5	6	5	4	6	5	4	4	3	1	6
16-Jun	3	1	2	2	2	1	1	3	5	3	3	4	5	6	5	4	5	5	4	4	6	3	5	3	6
17-Jun	2	2	2	2	3	2	2	3	3	3	4	4	4	4	3	3	3	10	6	4	2	2	2	4	10
18-Jun	2	2	2	3	3	3	4	3	5	5	5	5	7	7	6	7	6	5	4	5	5	4	4	4	7
19-Jun	2	3	2	3	3	2	2	2	2	2	5	5	4	4	4	2	4	5	3	2	2	2	1	2	5
20-Jun	4	4	5	2	1	1	1	3	2	2	3	2	2	4	4	4	3	3	3	4	2	2	1	2	5
21-Jun	2	3	3	3	3	3	3	3	2	3	3	4	3	3	3	2	3	3	3	2	3	2	2	4	4
22-Jun	3	4	2	2	2	2	5	2	2	2	2	2	3	3	4	4	3	3	4	4	4	7	3	4	7
23-Jun	2	2	1	1	2	1	1	1	3	2	1	2	3	4	4	7	6	5	3	4	2	2	2	6	7
24-Jun	6	7	4	8	7	7	6	4	4	4	5	5	4	5	6	4	5	5	4	3	3	4	4	4	8
25-Jun	4	4	3	3	3	5	4	5	6	7	6	6	7	4	5	19	11	3	2	2	3	2	4	2	19
26-Jun	2	1	1	1	1	3	2	2	2	2	4	3	2	10	6	2	1	4	3	3	2	1	2	2	10
27-Jun	2	1	1	1	1	1	2	1	2	1	2	2	3	7	5	2	4	5	4	2	3	2	1	3	7
28-Jun	3	3	1	2	1	1	1	1	1	2	3	4	4	3	4	4	4	3	3	5	5	3	4	2	5
29-Jun	2	2	3	2	3	4	4	3	4	5	5	6	8	7	7	7	6	6	6	5	4	4	4	3	8
30-Jun	4	2	2	2	2	3	4	4	4	2	3	4	5	5	4	5	5	4	4	4	5	2	3	2	5
																	Diurnal Maximum								



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	79	10.97	10.97
6 - 11	195	27.08	38.06
12 - 19	236	32.78	70.83
20 - 28	173	24.03	94.86
29 - 38	35	4.86	99.72
> 38	2	0.28	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

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

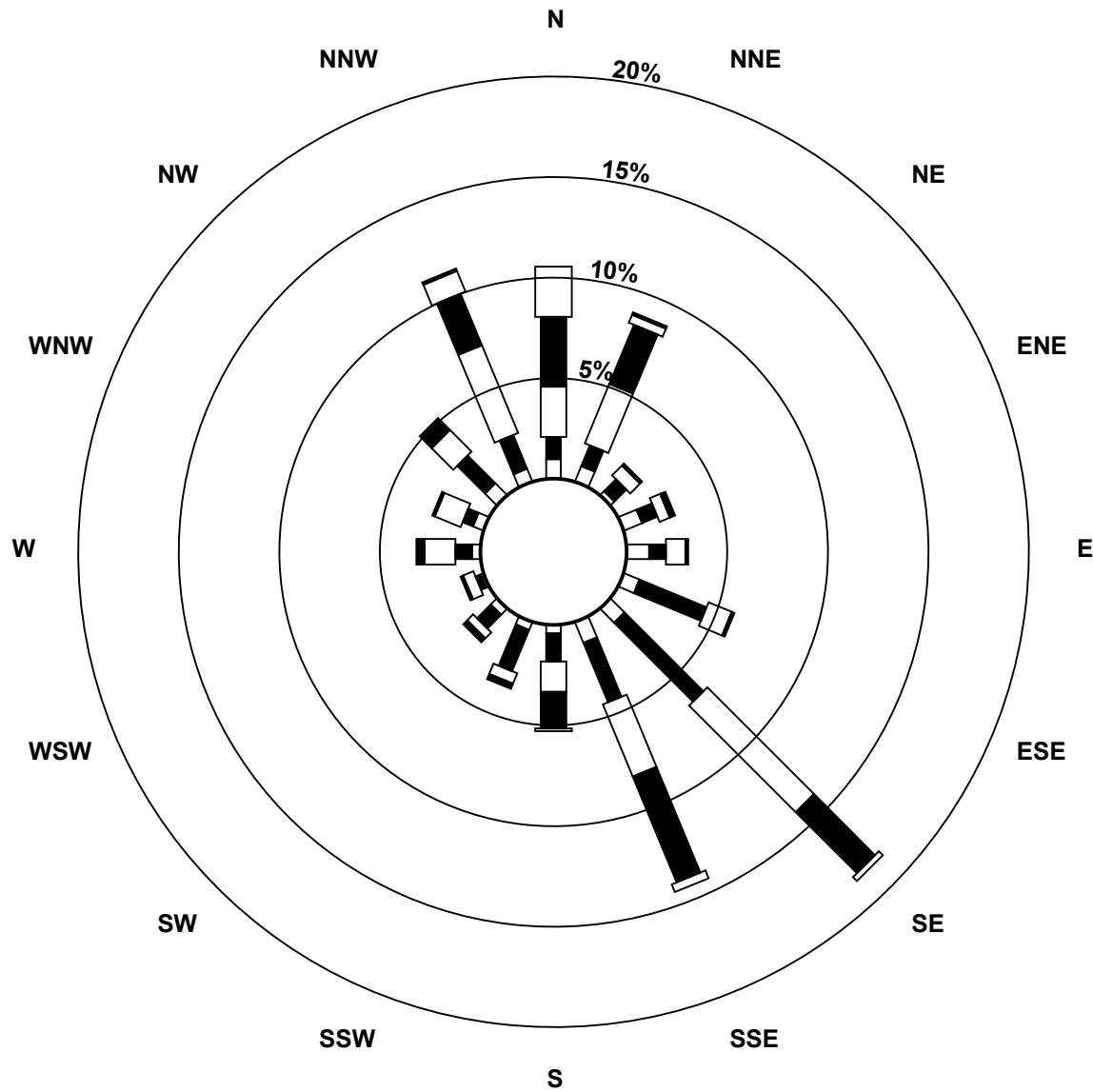
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	7	6	2	7	8	6	7	8	3	3	3	1	3	4	6	5	79
6 - 11	8	8	6	6	6	26	40	23	10	16	7	2	6	4	14	13	195
12 - 19	18	23	5	4	7	9	54	28	11	4	3	4	11	10	11	34	236
20 - 28	25	23	1	2	1	1	31	41	13	2	2	1	3	1	6	20	173
29 - 38	18	3	0	0	0	0	2	3	1	0	0	0	0	0	0	8	35
> 38	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
Totals	76	64	14	19	22	42	134	103	38	25	15	8	23	19	37	81	720

Total Number of Valid Hours: 720

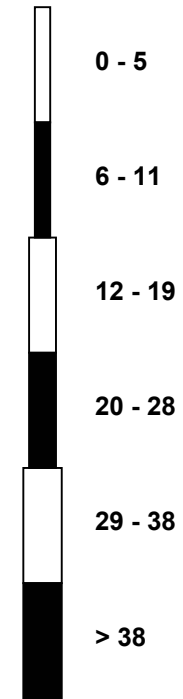
Total Number of Hours: 720

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

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



Classes (km/h)



Total Number of Valid Hours: 720



Maximum Speed: 45 km/h on Jun 3 18:00	Maximum Daily Speed Average: 26.6 km/h on Jun 5	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 28 09:00	Minimum Daily Speed Average: 0.3 km/h on Jun 7	Hours of Data: 717
Maximum Diurnal Speed Average: 6.3 km/h at hour 18	Minimum Diurnal Speed Average: 2.1 km/h at hour 24	Hours of Missing Data: 3
Monthly Average Velocity: 3.0 km/h 82.3 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 10 Median = 16 Q ₃ = 22 P ₉₀ = 28 P ₉₉ = 36	Percent Operational Time: 99.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jun	ESE22	ESE23	SE24	SE22	ESE24	ESE25	ESE26	SE30	SE27	SE19	SE15	SE14	ESE12	SSE9	SSE9	SSE14	SSE27	S21	SSW8	WNW6	SE7	SE14	SSE17	SSE20	SE16.6	SE30	
2-Jun	SSE23	S20	S15	SSE10	S12	S10	SSW9	SSW17	SSW11	S6	W7	W15	W21	WNW22	WSW12	WSW13	NNE25	N17	NNE32	N28	N17	NNE15	NE13	NNE14	WNW2.2	NNE32	
3-Jun	NE13	E6	ENE11	NE14	NE10	NNE10	NNE3	NNE8	NNE11	NE12	N24	N29	UO	N13	N18	N26	NNW35	NNW45	NNW37	UO	N37	N22	NW16	NW24	N17.0	NNW45	
4-Jun	N17	NNW13	NNW15	NW11	N14	NNW15	NNW15	NNW17	NNW15	NNW17	NNW21	NNW22	NNW25	NNW30	N30	N28	N35	N31	N28	N30	NNE29	N22	N24	NNW30	NNW21.4	N35	
5-Jun	NNW28	NNW33	N31	NNW33	N31	NNW32	NNW31	NNW28	NNW26	N26	N27	N27	N26	NNW31	NNW27	NNW25	NNW29	NNW29	NNW29	NNW26	NNW20	NNW23	NNW19	NNW21	NW17	NNW26.6	NNW33
6-Jun	NW18	NNW13	NW9	NNW6	NNW4	NW5	NNW4	NNW5	NW5	NW6	NW7	NNW7	NW8	NNW7	NW9	NNW11	NNW10	NNW7	NNE9	ENE13	ENE13	E15	ESE12	ESE12	N4.9	NW18	
7-Jun	ESE8	ESE11	E13	ESE18	ESE14	ESE11	SSE3	WSW4	W3	N8	NNW17	N19	NE17	NE6	NW2	W8	NW11	WNW14	W15	WNW9	SSE9	SSW11	SSW16	SSW20	ENE0.3	SSW20	
8-Jun	SSW13	SSW7	SSW4	WSW4	WSW5	S2	SSE4	SSE5	SE5	SE7	E4	ESE7	E9	ESE10	E10	ESE10	ESE10	E10	ESE10	SE16	SE25	SE28	SE29	SE31	SE9.5	SE31	
9-Jun	SE29	SSE24	S19	SSE24	SSE13	ESE16	ESE16	ESE15	SE19	ESE21	SE22	SE25	ESE24	ESE27	E29	E29	E31	E30	E25	E21	E17	E17	ENE9	NNE19	ESE19.1	E31	
10-Jun	NNE20	NNE16	NNE24	NNE26	NNE21	NNE16	N14	NNW11	NNW15	N16	N18	N16	NNE22	NNE14	NNW10	NW18	N21	UO	SW6	WSW15	W15	W18	W18	W28	NNW11.8	W28	
11-Jun	WSW26	WSW25	WSW16	WSW15	SW12	WSW9	SW5	SW8	SSW10	SW15	S9	SE15	SSW16	SE5	ESE17	E19	ESE7	E7	S17	S11	S13	SSW14	SW9	WSW11	SSW8.4	WSW26	
12-Jun	W6	NW8	W12	SW9	SSW10	S11	SSW5	SW3	WNW3	WNW6	WNW5	N13	NNE15	NNE16	NNE20	NNE23	NNE25	NNE26	NNE27	NNE26	NNE25	NNE32	NE23	E18	NNE9.8	NNE32	
13-Jun	ESE16	ESE19	ESE18	ESE14	ESE19	ESE15	ESE13	E11	E13	ESE10	ESE10	E5	ESE5	SE10	SE12	ESE11	ESE10	SE13	SE17	SE18	SE22	SE27	SE31	SE32	ESE15.0	SE32	
14-Jun	SE30	SE30	SE34	SE32	SE25	SE25	SE19	SE17	SE16	SE18	SSE21	SE21	SE21	SE22	SSE22	S26	SSE27	SSE26	S24	S28	S25	S25	S24	S23	SSE22.7	SE34	
15-Jun	SSE28	SSE25	S22	SSE23	SSE27	SSE26	SE16	SE13	SE13	SE13	SE13	SE12	ESE17	ESE16	ESE13	ESE14	ESE13	SE14	SE19	SE24	SE22	SE24	SE25	SE28	SE18.4	SE28	
16-Jun	SE19	SE13	ESE13	ESE10	ESE9	ENE5	ESE7	SE5	SE13	SSE9	SSE10	SE12	SE13	SE16	ESE11	ENE11	ENE16	NE26	NE26	ESE19	SSE22	SSW26	SW21	SW13	SE9.3	NE26	
17-Jun	SW7	SSW6	SE9	SE11	SE11	S6	E5	SE15	SE15	SSE13	SE15	SE15	SE13	SE10	SE12	SE11	SE11	SSE16	S17	SSE17	S22	SSE21	SSE21	SSE18	SSE12.2	S22	
18-Jun	SSE23	SSE24	SSE26	SSE22	SSE20	SSE25	SE21	SE15	SE17	SE18	SE26	SE22	SE26	SE27	SE26	SSE31	SSE29	SE29	SSE27	SSE26	SSE29	SSE32	SSE31	SSE28	SSE24.7	SSE32	
19-Jun	SE27	SE28	SE27	SE23	SE15	SE11	SE10	SE10	SE8	SE7	SE17	ESE18	ESE16	SE10	SE13	SE10	SE7	ESE13	ENE6	NE5	NE1	NW3	NW7	NNW7	SE10.5	SE28	
20-Jun	N12	N22	NNE17	N9	N5	NNW3	SW0	SSE3	SE8	SSE9	SE9	SE10	ESE9	SSE11	SE12	SE12	SE13	SE14	SSE17	SE14	SSE13	SSW10	W12	W14	SE4.0	NNE22	
21-Jun	W15	NW11	NNW6	N14	NNE12	N15	N21	N16	NNW22	NNW19	NNW18	NNW18	NW18	NW18	NW15	NW12	W17	WNW19	WNW22	WNW20	WNW18	WNW14	NNW16	NNW13	NW14.5	WNW22	
22-Jun	NNW19	NNW16	NNW13	W16	W16	W17	WNW13	W10	WNW9	NW11	NW10	N11	NNW13	NW17	NNW20	NNW21	NW19	NW21	NNW20	N17	N18	ENE8	NE6	NE10	NW12.0	NW21	
23-Jun	ENE6	NNE4	NNW4	NNW5	NW5	NW7	NNW8	N2	NE4	NE2	E4	SE4	ESE6	ESE13	SE12	S18	ESE18	E18	ESE11	ESE11	SSE13	SSE11	SE11	SE18	ESE5.5	ESE18	
24-Jun	SE22	SE25	SE33	SE22	ESE22	ESE21	SE20	SE19	SE18	SE16	ESE13	SE14	SSE25	SSE26	SSE21	SE17	SSE21	SSE23	SSE26	SE22	SE28	SE29	SE30	SE30	SE22.1	SE33	
25-Jun	SE33	SE31	SE28	SE29	SE24	SE25	SE17	SE19	SE19	SE20	SE18	SE18	ESE21	SSE27	SE15	SSE31	SW25	E4	SE5	SE10	S19	S17	S12	SSW8	SE17.6	SE33	
26-Jun	SSW7	S4	S6	S6	S10	S7	S5	SSE6	SSW5	W6	W9	WNW8	NNW9	SSE6	SW8	NW2	E2	NW7	NW12	NNW13	N12	NNE12	E9	ENE1	W1.5	NNW13	
27-Jun	NW6	N3	ESE4	SE3	ESE1	ESE4	ESE6	SE4	SE5	SSE3	NE3	ENE3	WSW5	ENE17	NNE10	NE5	N9	N26	NNE21	NNE15	N3	NW7	NW10	NNW15	NNE5.1	N26	
28-Jun	NNE13	NE10	NE3	N1	N2	WNW3	WSW2	S1	N0	WNW2	W4	WSW4	NW10	NW12	NNW15	NNW16	NNW16	NNW17	NW19	NNW19	NNE19	NNW17	NNW22	N20	NNW9.0	NNW22	
29-Jun	N16	N14	N21	N26	N19	N14	NW13	NNW17	NNW19	N21	NNW19	NNW28	N31	N33	N36	N37	NNW37	NNW36	NNW34	NNW32	NNW32	NNW33	NNW34	NNW34	NNW26.2	NNW37	
30-Jun	NNW28	NW24	NW23	NW23	NW21	NNW21	NNW21	NNW20	NNW19	NNW22	NNW21	NNW21	N24	NNW23	NNW23	NNW24	N20	N23	N24	N21	N23	N26	NNE18	NE7	NNW20.3	NNW28	

ESE3.8	ESE3.9	ESE4.5	ESE4.5	ESE4.4	ESE3.8	E2.4	ESE2.5	ESE2.7	E2.1	ENE2.6	NE4.1	ENE4.1	ENE3.8	ENE4.0	NE3.6	NNE5.0	NNE6.3	NNE4.7	NE4.0	E4.0	ESE3.2	SE2.7	SE2.1	Diurnal Average	
SE33	NNW33	SE34	NNW33	N31	NNW32	NNW31	SE30	SE27	N26	N27	N29	N31	N33	N36	N37	NNW37	NNW45	NNW37	NNW32	N37	NNW33	NNW34	NNW34	Diurnal Maximum	

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



Summary of Hour Standard Deviations

Mannix - June 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 20 km/h on Jun 25 16:00			Hours of Data:	717
Minimum Value: 1 km/h on Jun 26 03:00			Hours of Missing Data:	3
			Hours of Calibration:	0
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 9			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-Jun	5	5	5	6	5	5	6	7	5	6	3	4	4	4	4	4	7	4	4	6	4	1	2	2	7	
2-Jun	2	3	3	1	2	4	4	1	3	2	4	5	3	11	3	4	7	4	4	5	3	1	3	2	11	
3-Jun	3	1	3	3	2	3	2	3	2	3	5	5	UO	5	4	3	8	7	9	UO	6	5	8	4	9	
4-Jun	3	3	2	2	3	3	2	3	3	4	3	5	5	5	6	7	6	5	6	6	5	6	6	6	7	
5-Jun	6	5	6	7	6	5	5	5	4	5	6	6	6	7	6	6	5	6	7	4	4	4	3	2	7	
6-Jun	2	4	4	2	2	1	2	2	2	3	3	3	3	3	4	3	3	3	3	2	2	3	3	3	4	
7-Jun	3	3	4	3	3	3	3	2	1	3	4	3	4	5	3	3	4	3	2	4	4	4	3	2	5	
8-Jun	4	3	1	2	1	2	1	2	1	3	3	4	4	4	3	5	3	4	3	3	3	4	3	5	5	
9-Jun	4	4	3	5	2	3	3	4	4	4	5	6	5	7	7	8	7	8	7	4	4	4	3	4	8	
10-Jun	4	4	4	2	3	3	3	3	4	4	4	5	7	16	6	5	4	UO	5	2	2	1	1	3	16	
11-Jun	1	2	4	2	2	2	2	3	4	2	4	5	9	5	7	8	8	5	3	4	3	2	2	2	9	
12-Jun	2	1	2	1	1	2	2	1	2	2	4	4	4	5	5	4	4	4	3	3	2	3	6	6	6	
13-Jun	5	5	6	4	4	4	5	4	4	4	4	4	4	5	5	4	4	5	4	3	3	3	4	3	6	
14-Jun	3	3	3	4	4	4	3	4	3	4	4	6	6	6	8	5	5	4	3	5	3	3	3	3	8	
15-Jun	2	4	3	3	3	3	3	2	3	4	5	5	6	6	5	6	6	4	5	4	3	4	3	2	6	
16-Jun	3	1	3	3	3	1	2	3	5	3	3	4	5	5	5	5	5	5	4	4	6	4	5	3	6	
17-Jun	2	1	2	3	3	2	3	3	3	3	3	3	3	4	3	3	3	10	6	3	2	2	2	4	10	
18-Jun	2	1	2	2	3	3	3	4	4	4	5	5	6	7	5	7	6	4	4	5	4	4	4	4	7	
19-Jun	2	2	2	3	3	2	2	2	2	3	4	6	5	4	4	2	4	5	3	2	1	2	1	2	6	
20-Jun	4	3	5	2	1	1	1	3	3	2	3	2	3	4	3	3	3	2	3	4	2	2	2	2	5	
21-Jun	2	2	3	3	3	3	2	3	2	3	3	4	3	3	3	2	4	2	3	2	3	2	2	4	4	
22-Jun	3	4	2	2	2	2	5	2	2	2	2	2	3	3	4	4	3	3	4	4	4	6	3	4	6	
23-Jun	3	2	1	1	1	1	1	2	2	2	2	2	3	4	3	6	6	4	3	3	2	2	2	5	6	
24-Jun	5	5	3	7	5	5	4	3	3	4	4	5	5	4	5	5	4	5	5	4	3	3	4	3	7	
25-Jun	3	3	2	2	3	4	3	4	4	5	4	5	5	4	4	20	12	3	2	3	3	2	4	2	20	
26-Jun	2	1	1	1	1	3	2	2	2	2	3	2	2	10	6	2	2	4	3	3	2	1	2	2	10	
27-Jun	2	1	2	2	1	1	1	1	2	1	2	2	3	8	5	3	4	4	4	4	2	3	3	1	3	8
28-Jun	3	3	1	2	1	1	1	1	1	2	3	4	4	3	4	4	4	3	3	5	5	3	3	2	5	
29-Jun	2	2	2	2	3	5	4	3	4	5	6	6	8	7	7	7	6	6	6	5	4	3	3	3	8	
30-Jun	5	2	2	2	2	3	3	4	4	2	3	4	4	6	4	5	5	4	3	4	5	2	3	3	6	

Diurnal Maximum

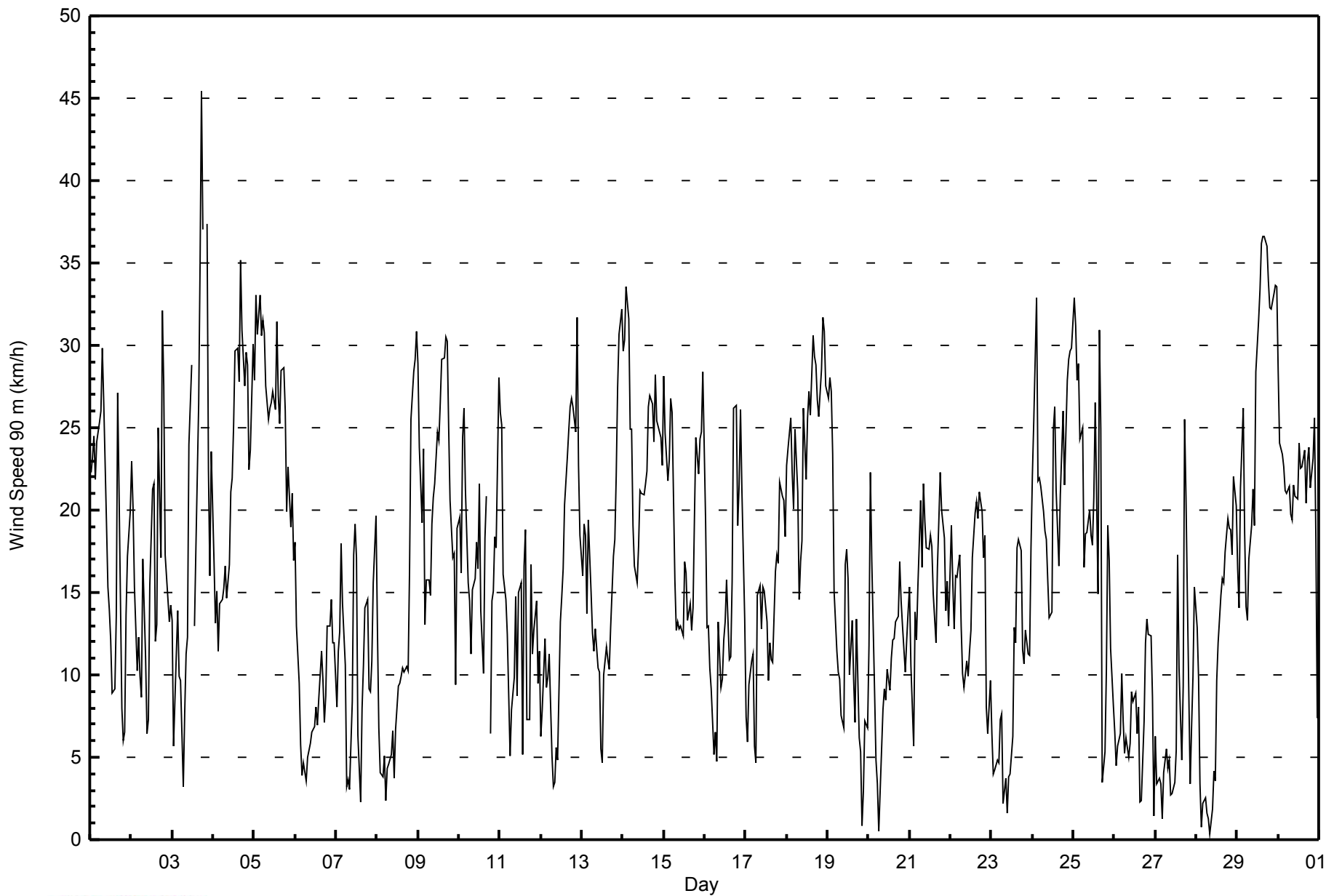
UO - Unstable Operation



WBEA
Hourly Averages

Wind Speed 90 m (WS90m) - km/h

Mannix - June 2014





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	76	10.60	10.60
6 - 11	153	21.34	31.94
12 - 19	240	33.47	65.41
20 - 28	185	25.80	91.21
29 - 38	62	8.65	99.86
> 38	1	0.14	100.00

Total Number of Valid Hours: 717

Total Number of Hours: 720



WBEA
Frequency Distribution

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

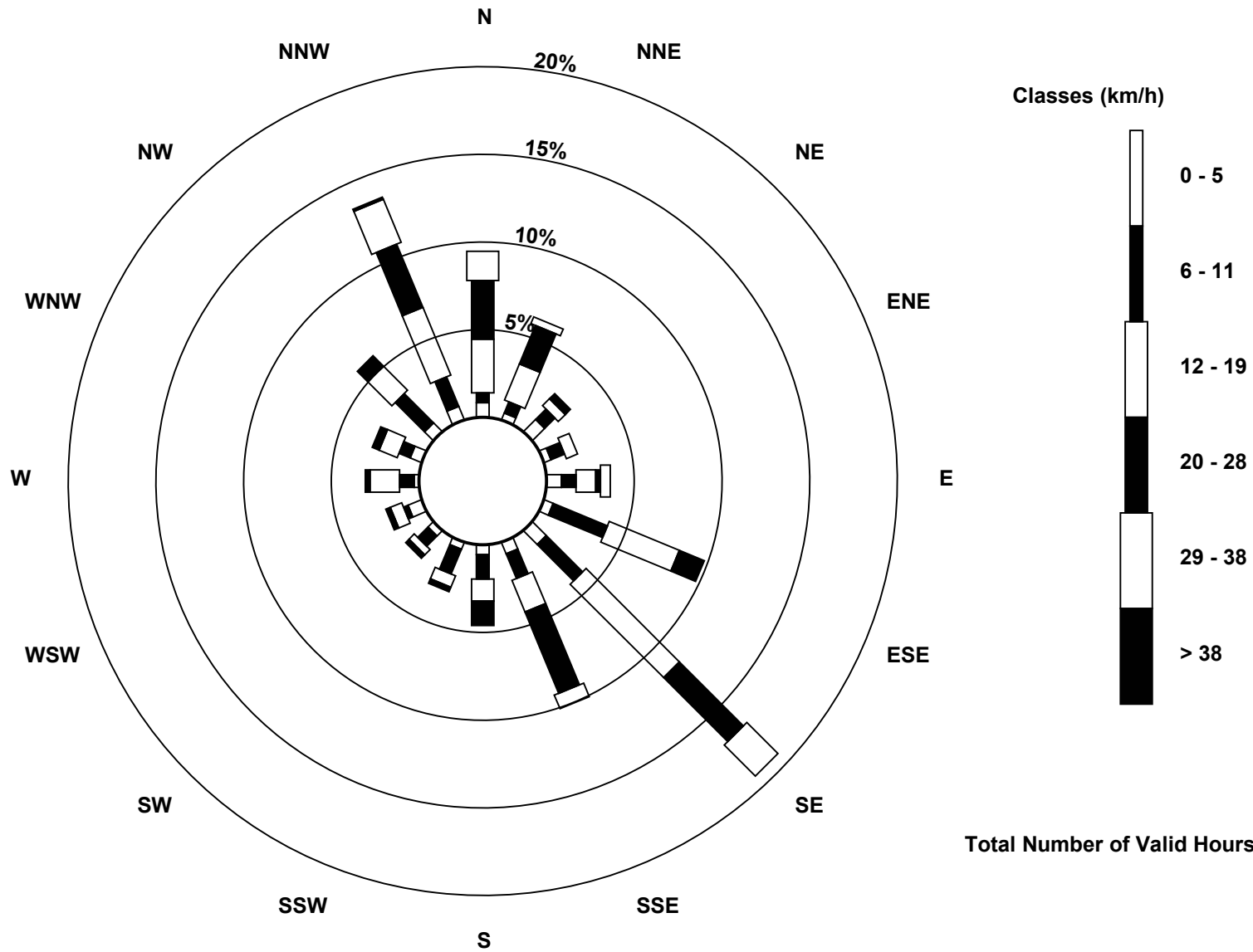
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	3	7	3	6	4	8	5	4	3	3	6	2	5	5	6	76
6 - 11	4	5	6	6	6	24	21	11	10	11	6	2	6	5	17	13	153
12 - 19	22	16	4	5	8	31	54	14	9	5	3	5	12	8	14	30	240
20 - 28	24	17	3	0	2	11	37	36	10	2	2	2	2	3	6	28	185
29 - 38	12	3	0	0	4	0	18	6	0	0	0	0	0	0	0	19	62
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Totals	68	44	20	14	26	70	138	72	33	21	14	15	22	21	42	97	717

Total Number of Valid Hours: 717

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Jun 2014

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



Total Number of Valid Hours: 717



Direction of Maximum Speed: 342 deg on Jun 3 18:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 346.2 deg on Jun 5	Hours of Data: 720
Direction of Minimum Speed: 247 deg on Jun 12 08:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.2 deg on Jun 7	Percent Operational Time: 100.0
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-Jun	129	129	140	133	112	111	125	135	137	144	149	145	129	165	152	153	161	183	224	323	145	160	171	170	142.6
2-Jun	157	149	159	157	161	157	154	194	184	117	275	279	273	289	241	266	30	23	19	3	14	11	19	11	305.0
3-Jun	20	27	21	20	2	0	12	14	22	45	350	356	1	360	358	7	345	342	336	18	12	17	318	313	358.9
4-Jun	358	338	334	326	357	335	336	333	336	291	339	346	344	346	352	360	351	2	4	4	19	13	8	341	350.3
5-Jun	341	344	353	349	353	345	343	344	343	356	4	3	353	345	345	337	342	347	346	332	343	337	336	326	346.2
6-Jun	327	341	285	291	273	245	287	345	319	314	320	326	303	342	304	340	345	343	40	72	68	96	131	130	343.2
7-Jun	108	104	80	115	132	122	204	281	288	353	343	13	57	57	317	267	323	298	287	303	166	226	227	239	338.3
8-Jun	224	205	161	166	182	151	154	136	135	135	86	109	90	129	93	101	108	96	132	140	146	140	142	139	132.5
9-Jun	141	153	167	157	139	117	109	123	154	133	132	137	132	121	107	106	103	99	99	95	92	84	72	25	117.6
10-Jun	20	11	21	13	16	18	10	339	338	12	17	14	27	17	326	313	349	34	241	256	263	268	256	250	348.9
11-Jun	248	245	193	180	165	159	159	146	172	225	148	141	215	123	114	90	134	104	180	184	165	188	195	227	170.4
12-Jun	243	357	267	219	168	161	110	247	285	277	281	12	19	19	24	20	25	24	18	20	18	19	37	92	20.1
13-Jun	114	106	113	127	121	124	109	106	102	121	112	92	115	132	149	108	119	142	147	154	149	147	147	148	128.3
14-Jun	149	149	141	140	132	136	146	158	147	144	156	144	144	152	162	176	164	170	188	195	191	179	162	157	156.4
15-Jun	151	158	158	138	143	142	143	131	134	138	145	141	112	124	120	121	118	139	136	140	143	154	153	147	137.9
16-Jun	139	139	120	131	156	226	220	175	154	157	166	160	132	141	124	74	64	58	59	107	166	201	225	228	131.5
17-Jun	212	167	164	170	218	230	99	158	153	156	138	137	132	143	139	143	152	176	199	156	171	161	164	161	158.5
18-Jun	159	160	161	148	150	148	145	141	153	151	146	143	144	152	145	154	154	149	161	155	151	151	155	150	150.8
19-Jun	145	144	146	146	157	152	142	143	151	161	142	124	129	144	135	147	156	119	56	53	203	275	275	261	144.2
20-Jun	330	6	12	352	12	12	132	141	162	153	148	153	110	154	145	139	144	145	162	145	168	249	270	272	149.5
21-Jun	273	293	322	21	11	5	342	0	338	332	328	331	316	320	322	312	280	285	297	292	295	282	337	319	316.7
22-Jun	339	330	276	259	260	264	275	274	279	301	319	3	335	306	334	334	323	320	341	9	11	80	35	20	316.9
23-Jun	16	351	287	279	252	266	308	85	81	80	99	111	117	122	139	175	119	85	102	103	158	153	135	131	122.0
24-Jun	133	130	141	133	127	130	132	139	143	143	124	138	158	162	158	140	162	163	170	140	146	143	143	143	144.0
25-Jun	146	143	139	136	142	136	144	139	134	131	131	137	130	165	121	165	239	79	141	147	176	171	167	185	146.5
26-Jun	181	177	187	187	207	188	193	164	219	272	280	300	339	192	240	356	94	306	312	335	359	13	65	286	267.6
27-Jun	304	55	232	249	214	124	143	148	154	135	47	80	259	65	14	49	7	15	27	18	315	299	310	358	21.4
28-Jun	14	3	259	251	344	229	98	85	105	287	271	261	309	310	342	333	344	345	322	348	14	348	354	355	336.2
29-Jun	349	319	340	343	349	350	289	340	347	9	343	350	355	6	354	353	345	347	344	338	332	328	334	334	345.2
30-Jun	323	307	301	302	310	323	331	340	337	331	331	334	0	351	342	341	5	14	19	14	6	16	18	347	344.0

124.5 121.3 132.7 137.3 130.2 129.5 117.5 118.2 126.4 110.7 77.7 64.3 60.5 78.1 60.0 46.3 34.8 30.5 19.9 38.7 70.1 110.7 153.0 229.5

Diurnal Average

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

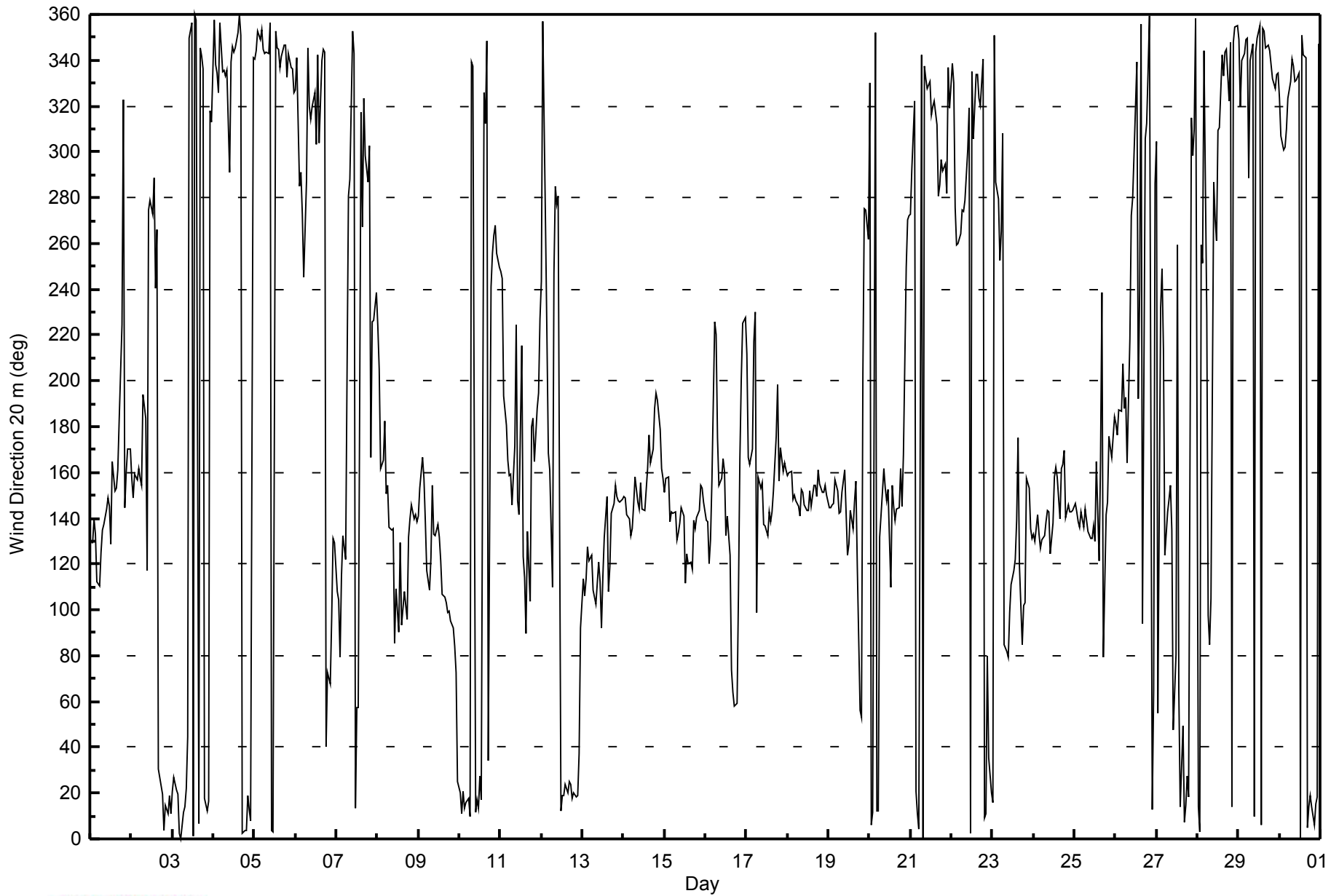


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on Jun 13 13:00 Minimum Value: 4 deg on Jun 10 21:00 Percentiles: P ₁ = 8 P ₁₀ = 13 Q ₁ = 15 Median = 19 Q ₃ = 29 P ₉₀ = 46 P ₉₉ = 88																		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 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-Jun	13	14	16	26	15	14	16	11	11	16	15	19	22	50	48	25	14	18	46	85	18	12	21	15	85
2-Jun	12	12	10	11	13	38	51	17	23	33	74	17	14	17	18	25	32	23	12	16	15	29	19	32	74
3-Jun	40	54	9	13	19	28	32	14	18	21	17	17	20	46	23	13	19	16	15	13	13	16	34	13	54
4-Jun	25	28	18	33	16	22	15	15	21	15	16	16	14	15	17	18	15	17	20	19	14	19	23	14	33
5-Jun	15	13	16	15	15	15	14	15	15	22	20	19	22	18	18	17	16	13	16	14	19	15	14	14	22
6-Jun	12	27	21	26	54	21	64	45	46	66	44	45	43	55	50	34	53	42	35	12	12	17	15	20	66
7-Jun	19	23	22	33	27	31	69	27	60	34	17	19	22	80	86	34	33	17	16	50	15	26	16	11	86
8-Jun	60	31	37	15	17	18	21	26	22	25	64	79	31	44	32	39	30	33	17	11	12	10	10	12	79
9-Jun	14	17	38	21	12	21	19	28	15	13	13	12	13	18	17	16	16	17	17	14	15	18	17	14	38
10-Jun	13	13	14	11	12	14	22	24	24	28	24	31	21	88	49	17	33	45	63	12	4	6	8	7	88
11-Jun	6	10	37	31	11	18	34	49	37	14	43	21	83	76	46	35	93	49	25	33	20	18	31	48	93
12-Jun	59	38	30	28	10	28	28	90	52	40	61	38	24	24	24	21	17	14	13	11	10	10	21	24	90
13-Jun	18	16	19	15	16	19	25	21	23	33	34	63	97	51	36	31	32	25	16	16	11	11	12	12	97
14-Jun	13	13	11	10	12	11	14	19	20	19	20	22	18	23	32	26	26	23	19	19	18	18	15	14	32
15-Jun	14	18	16	12	11	13	16	13	14	20	39	43	25	24	30	33	39	23	15	13	13	14	12	11	43
16-Jun	11	8	13	20	26	32	33	61	26	37	28	33	28	21	31	30	21	16	14	18	23	18	17	24	61
17-Jun	19	16	14	14	33	38	91	16	17	17	13	14	19	29	21	21	26	23	20	24	18	16	15	16	91
18-Jun	14	15	14	14	13	13	14	15	18	22	16	16	16	18	16	17	18	14	18	15	14	14	14	14	22
19-Jun	11	11	12	14	16	15	19	16	23	29	14	18	17	23	18	18	38	30	41	41	49	17	8	18	49
20-Jun	39	14	14	23	21	60	67	50	44	26	23	20	23	25	21	15	16	16	17	16	36	29	11	8	67
21-Jun	13	18	33	17	24	30	19	19	16	17	19	20	19	21	19	19	17	12	18	14	20	13	32	27	33
22-Jun	23	20	15	9	9	9	13	14	31	22	26	29	23	17	21	22	21	18	20	18	18	48	75	26	75
23-Jun	23	37	31	28	14	18	48	79	46	95	37	51	47	24	20	36	32	23	19	19	22	31	12	14	95
24-Jun	14	13	12	18	15	13	12	13	14	17	21	23	21	20	18	22	18	16	24	18	15	12	11	11	24
25-Jun	13	12	11	12	13	13	15	14	15	16	17	22	18	20	23	37	29	84	20	16	20	17	42	27	84
26-Jun	23	14	19	19	21	25	45	29	38	40	28	33	20	89	70	61	43	36	27	22	23	12	49	22	89
27-Jun	37	64	31	17	65	39	19	20	23	57	79	42	67	55	47	48	36	21	15	15	42	21	27	35	79
28-Jun	31	67	19	25	67	69	81	31	94	86	70	79	39	32	28	27	25	22	18	20	23	16	16	11	94
29-Jun	25	46	17	14	21	31	18	20	20	19	25	19	21	20	20	19	18	16	16	16	15	14	15	15	46
30-Jun	17	14	13	15	15	17	18	21	19	18	19	23	25	22	20	20	21	16	14	14	15	12	9	40	40
																		60 67 38 33 67 69 91 90 94 95 79 79 97 89 86 61 93 84 63 85 49 48 75 48							
Diurnal Maximum																									



WBEA
Hourly Averages

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





Summary of Hour Averages

Mannix - June 2014

Direction of Maximum Speed: 345 deg on Jun 3 18:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 348.6 deg on Jun 5	Hours of Data: 720
Direction of Minimum Speed: 331 deg on Jun 28 06:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.7 deg on Jun 2	Percent Operational Time: 100.0
Monthly Average Direction: 311.9 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-Jun	128	128	137	133	115	114	125	134	136	142	146	146	125	169	152	155	161	183	210	312	138	150	163	174	143.1
2-Jun	162	155	162	161	161	165	170	190	188	135	272	281	274	291	242	266	28	19	18	4	14	11	29	32	297.2
3-Jun	27	41	40	31	13	4	6	13	25	46	353	358	4	7	359	9	347	345	339	18	12	16	320	316	1.9
4-Jun	0	342	336	328	357	339	340	337	339	295	342	349	347	349	354	1	354	3	5	6	19	12	8	345	352.4
5-Jun	344	348	356	352	358	347	346	347	345	358	5	3	355	348	346	339	344	347	349	336	345	339	341	328	348.6
6-Jun	330	338	300	314	303	279	320	347	322	319	324	336	308	338	309	346	347	346	36	70	68	100	131	129	350.0
7-Jun	111	109	86	115	129	126	181	278	286	355	345	13	56	55	311	273	330	301	288	304	165	218	219	231	348.7
8-Jun	225	194	160	180	198	155	151	142	135	130	85	123	94	129	99	106	109	102	129	139	145	140	143	140	136.3
9-Jun	140	153	174	158	140	121	114	126	151	133	132	135	129	119	108	105	104	99	99	94	93	84	74	26	119.0
10-Jun	24	14	22	16	18	18	9	341	340	11	19	15	27	25	326	315	353	32	235	251	263	271	269	260	349.0
11-Jun	253	256	231	226	194	187	178	182	185	231	169	142	205	124	122	92	133	102	178	187	166	194	209	245	188.3
12-Jun	258	329	283	222	186	168	153	205	289	289	287	9	19	20	23	20	26	25	19	22	21	21	42	96	18.1
13-Jun	112	109	115	125	121	123	109	106	105	122	111	100	119	136	149	108	119	142	144	153	146	144	145	148	129.3
14-Jun	147	148	140	139	133	135	145	159	146	143	156	144	143	154	163	179	167	172	189	192	190	187	174	168	159.7
15-Jun	154	162	166	145	148	144	148	131	134	136	145	140	112	124	122	122	118	138	132	137	142	151	154	150	140.8
16-Jun	142	138	121	120	128	126	186	158	150	156	165	157	131	141	125	75	63	56	60	107	167	201	223	230	134.2
17-Jun	222	177	165	157	198	232	109	158	152	156	136	134	133	140	139	141	152	177	195	163	175	165	166	162	161.0
18-Jun	160	160	163	150	153	150	144	143	154	152	145	143	144	152	145	154	156	150	163	156	151	152	155	152	152.0
19-Jun	147	145	146	146	153	146	139	137	154	161	140	123	128	141	134	145	153	118	63	56	191	271	279	281	142.5
20-Jun	346	11	13	360	13	350	159	148	161	155	148	151	113	154	143	139	141	143	161	143	164	228	272	278	143.4
21-Jun	280	302	336	18	17	7	349	360	344	340	336	334	320	322	326	315	285	290	302	300	301	295	337	328	323.2
22-Jun	342	336	290	264	267	269	279	277	288	308	325	0	336	312	336	338	327	325	343	11	13	71	48	27	324.5
23-Jun	31	10	336	326	289	298	331	39	78	80	95	124	116	123	136	177	123	87	103	110	160	161	134	130	119.6
24-Jun	132	130	141	134	127	129	129	137	142	141	126	136	161	163	158	141	163	164	172	143	146	145	143	144	144.7
25-Jun	148	145	138	136	140	135	143	139	133	130	130	134	128	165	128	168	238	74	141	147	178	175	183	197	148.7
26-Jun	182	174	180	184	199	192	191	170	214	275	281	302	339	188	235	347	91	311	319	344	5	15	83	318	261.9
27-Jun	325	15	250	277	75	127	136	144	153	151	44	77	261	62	13	49	6	15	27	21	331	312	328	358	18.5
28-Jun	17	43	226	312	5	331	141	97	123	292	274	261	315	316	346	335	345	347	325	347	16	350	350	358	344.1
29-Jun	359	344	346	349	352	356	303	344	351	10	345	352	356	8	356	354	348	349	348	341	336	333	337	340	348.2
30-Jun	330	316	314	315	318	328	335	343	341	335	336	337	1	352	345	345	7	14	18	16	10	16	21	13	346.9

117.4 120.0 130.5 124.7 123.8 121.3 109.2 118.8 121.6 105.5 72.5 61.3 57.4 78.8 59.4 50.1 34.3 32.5 22.9 43.2 88.2 129.6 151.4 179.0

Diurnal Average

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



Summary of Hour Standard Deviations

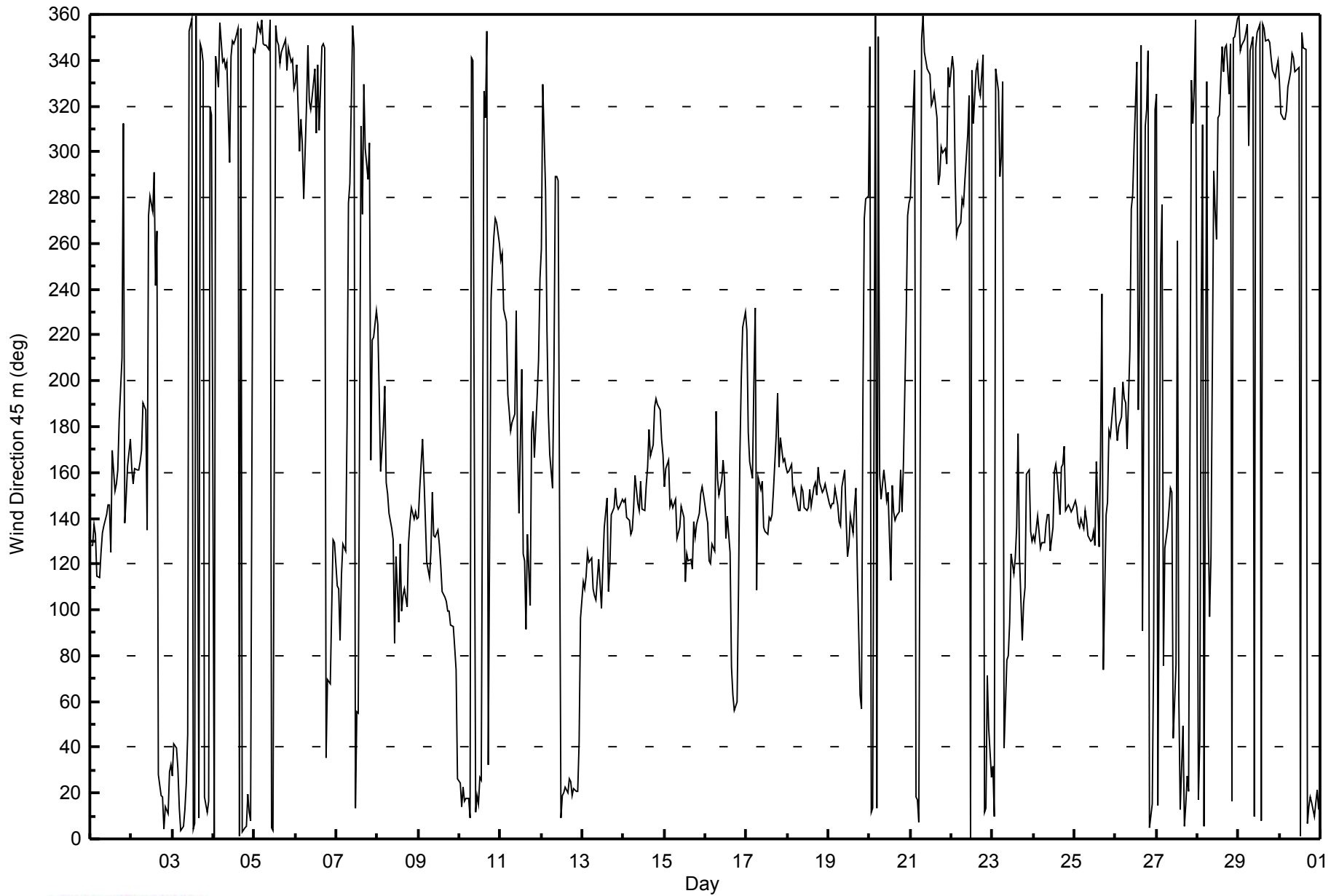
Mannix - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 94 deg on Jun 23 10:00 Minimum Value: 3 deg on Jun 11 01:00 Percentiles: P ₁ = 5 P ₁₀ = 8 Q ₁ = 10 Median = 14 Q ₃ = 23 P ₉₀ = 41 P ₉₉ = 86																		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-Jun	8	9	11	20	10	8	11	7	7	14	10	17	17	43	35	18	11	11	43	73	17	8	15	6	73
2-Jun	9	6	5	5	6	34	40	9	17	31	57	16	12	14	15	25	29	21	8	13	11	12	10	9	57
3-Jun	21	33	8	11	15	15	28	11	15	17	12	11	14	37	18	7	16	13	12	10	9	11	30	10	37
4-Jun	22	26	12	29	13	18	9	10	17	12	11	10	10	11	11	14	10	13	16	16	9	14	19	9	29
5-Jun	10	8	10	10	10	10	10	11	11	18	15	15	19	14	13	13	11	9	11	9	16	10	10	10	19
6-Jun	8	18	22	27	54	31	66	36	39	53	36	44	37	55	49	27	45	40	34	10	8	12	10	15	66
7-Jun	15	17	21	30	19	21	63	30	42	24	11	14	18	71	88	34	29	14	14	48	8	25	12	7	88
8-Jun	19	16	24	26	11	23	15	20	18	20	67	62	27	37	24	34	26	27	13	8	8	7	7	7	67
9-Jun	8	11	37	15	6	14	14	20	10	7	8	8	8	13	12	12	12	11	13	10	13	16	15	10	37
10-Jun	9	9	9	6	8	9	15	16	18	21	16	26	19	82	40	13	30	48	55	9	5	5	4	6	82
11-Jun	3	5	22	12	9	14	24	44	37	7	40	15	77	82	43	31	86	43	18	27	19	11	12	24	86
12-Jun	46	26	9	25	15	19	23	73	51	35	57	30	18	18	19	16	13	10	8	8	6	6	21	19	73
13-Jun	14	12	13	10	10	13	19	17	18	28	27	69	77	45	26	24	30	20	12	11	7	7	8	8	77
14-Jun	7	7	7	6	7	7	9	11	14	11	15	16	15	17	24	19	21	15	8	9	7	7	9	10	24
15-Jun	9	10	13	7	7	8	10	10	11	16	28	35	21	21	27	28	33	19	11	7	9	8	7	5	35
16-Jun	5	7	9	9	12	41	71	73	18	24	21	22	23	15	25	26	21	13	12	12	18	9	12	17	73
17-Jun	11	17	12	7	34	24	73	9	10	11	8	10	13	26	15	15	21	17	13	18	8	11	6	9	73
18-Jun	7	6	5	8	8	8	9	11	12	16	11	10	12	13	12	12	14	10	11	10	9	9	8	9	16
19-Jun	7	6	7	9	9	10	12	11	15	18	11	13	13	17	13	12	30	23	32	29	83	33	7	17	83
20-Jun	35	8	8	13	18	41	54	68	39	19	16	14	20	18	18	11	11	10	10	10	21	27	10	7	68
21-Jun	10	11	28	12	18	20	11	13	8	10	11	14	10	10	11	11	14	7	11	7	14	9	25	24	28
22-Jun	15	14	13	7	5	8	12	12	25	16	19	21	17	11	14	15	14	11	14	12	12	46	48	13	48
23-Jun	15	20	27	26	11	13	35	66	41	94	33	45	34	21	15	27	29	20	14	15	14	26	4	8	94
24-Jun	9	8	7	13	9	8	7	7	10	13	17	16	12	13	17	10	9	17	14	10	8	8	8	7	17
25-Jun	8	8	6	5	8	7	9	9	11	11	11	18	14	15	17	34	21	85	15	11	12	9	32	21	85
26-Jun	17	11	10	17	19	17	28	23	34	37	25	27	13	87	59	60	42	36	23	17	12	9	22	60	87
27-Jun	18	37	86	58	60	27	13	17	13	48	78	42	64	64	38	47	26	16	10	10	43	17	12	17	86
28-Jun	14	65	64	85	50	86	68	38	94	89	75	75	30	25	19	19	18	15	11	14	15	10	10	6	94
29-Jun	11	21	7	6	10	22	14	12	11	15	17	13	15	15	15	14	12	10	10	9	8	8	8	8	22
30-Jun	10	6	6	6	8	9	10	12	12	10	12	15	20	16	14	13	16	12	10	9	9	6	5	16	20
																		46 65 86 85 60 86 73 73 94 94 78 75 77 87 88 60 86 85 55 73 83 46 48 60							
Diurnal Maximum																									



WBEA
Hourly Averages

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





Direction of Maximum Speed: 347 deg on Jun 3 18:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 350.6 deg on Jun 5	Hours of Data: 720
Direction of Minimum Speed: 96 deg on Jun 28 09:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.6 deg on Jun 7	Percent Operational Time: 100.0
Monthly Average Direction: 320.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	130	130	138	135	117	119	128	136	138	141	145	147	125	167	154	155	160	182	205	308	135	148	158	171	145.6
2-Jun	167	169	173	167	170	184	206	198	193	168	273	281	275	292	242	262	28	16	20	5	17	18	40	39	287.7
3-Jun	40	69	65	55	33	23	21	19	33	48	356	1	6	10	3	12	349	347	342	18	14	17	325	319	6.5
4-Jun	3	346	338	330	357	342	343	340	338	297	343	349	351	356	2	355	5	6	7	20	12	9	348	354.2	
5-Jun	346	350	359	354	359	350	349	349	347	359	6	4	356	350	348	341	345	348	350	339	348	342	345	330	350.6
6-Jun	332	337	315	335	335	305	341	349	319	318	323	345	310	343	313	349	353	348	37	70	71	99	132	132	356.1
7-Jun	119	117	91	117	128	129	167	269	279	359	346	15	56	58	316	273	331	302	287	305	168	213	213	216	325.4
8-Jun	207	192	182	234	250	166	153	156	140	128	91	126	99	129	104	111	111	105	130	139	143	140	143	141	139.7
9-Jun	142	154	179	158	156	128	123	126	148	133	133	135	129	120	107	104	103	98	98	92	91	84	82	31	121.3
10-Jun	33	22	28	22	24	22	11	342	341	12	19	17	29	30	333	317	356	32	234	248	267	278	280	264	353.3
11-Jun	256	259	249	239	213	230	215	216	204	235	184	143	212	134	124	91	132	99	175	189	175	203	232	248	205.7
12-Jun	266	325	280	228	199	174	198	213	299	299	297	11	21	22	22	21	28	26	21	24	25	26	53	97	20.1
13-Jun	111	111	116	121	121	125	111	107	104	121	114	97	123	138	146	109	120	142	144	151	143	141	144	147	130.8
14-Jun	145	148	142	139	137	138	147	157	146	144	155	146	144	153	161	178	166	171	188	191	190	192	187	179	160.7
15-Jun	159	167	174	158	157	149	154	139	140	138	145	140	113	125	122	124	117	139	132	137	141	146	151	150	145.6
16-Jun	147	147	124	125	115	73	96	135	148	155	163	155	133	142	124	73	63	57	62	109	167	202	222	235	134.9
17-Jun	229	193	153	138	159	205	99	154	152	154	137	134	135	139	140	141	151	174	189	166	180	167	166	161	159.6
18-Jun	158	164	169	154	155	153	142	147	152	150	144	144	146	153	145	154	155	151	162	155	152	153	155	154	153.0
19-Jun	150	147	147	145	146	142	140	136	148	154	140	125	129	137	133	142	149	117	65	60	120	296	303	322	139.5
20-Jun	3	16	19	9	10	346	172	159	158	154	148	150	112	156	144	139	140	142	157	142	162	211	269	280	137.2
21-Jun	284	314	350	16	23	10	354	1	350	346	340	336	323	324	326	317	287	291	306	303	305	304	340	335	328.2
22-Jun	346	340	302	273	272	273	287	280	292	311	329	358	336	316	336	340	330	328	345	13	16	55	45	40	328.7
23-Jun	57	24	351	351	314	322	342	22	69	71	92	130	114	123	135	177	128	87	107	126	159	160	141	134	119.4
24-Jun	135	134	142	139	130	132	133	137	140	143	129	136	160	162	158	144	161	162	172	148	147	147	144	146	146.4
25-Jun	149	146	139	138	141	137	143	140	135	133	133	135	130	163	134	170	236	95	144	149	180	180	190	208	152.0
26-Jun	193	177	182	175	191	193	190	172	215	273	279	300	337	185	230	333	99	313	323	351	8	25	91	23	263.0
27-Jun	333	17	115	166	102	118	131	138	149	159	48	74	259	61	20	49	8	17	29	23	350	318	330	356	23.5
28-Jun	21	59	74	16	6	330	211	140	96	306	284	263	314	318	348	338	347	347	328	349	18	351	351	4	349.0
29-Jun	8	354	357	357	1	5	317	346	353	10	348	355	357	9	357	356	350	350	351	343	339	337	341	344	351.8
30-Jun	336	323	322	323	325	333	338	346	344	338	338	339	2	351	347	347	8	16	19	18	13	17	31	37	350.5

123.5 126.3 129.4 119.4 121.7 116.5 93.9 120.2 116.9 94.9 59.8 52.5 46.1 68.9 52.5 45.6 31.3 31.6 25.0 43.1 87.5 120.2 137.8 152.6

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: 106 deg on Jun 28 09:00	Hours of Data: 720
Minimum Value: 2 deg on Jun 10 23:00	Hours of Missing Data: 0
Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 8 Median = 13 Q ₃ = 20 P ₉₀ = 38 P ₉₉ = 84	Hours of Calibration: 0
	Percent Operational Time: 100.0

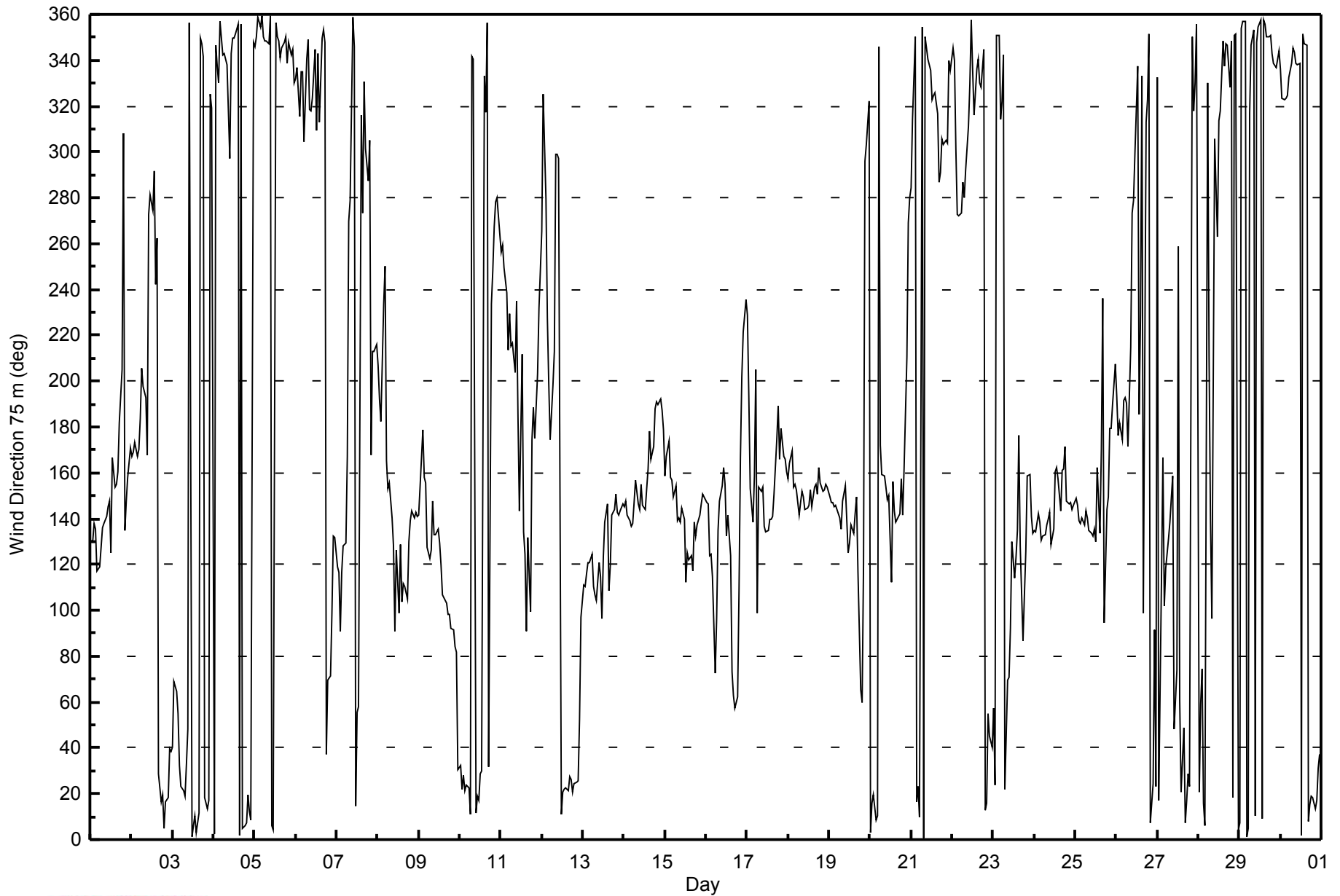
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	9	9	9	17	12	11	11	6	6	11	10	15	16	35	30	16	10	11	41	70	33	7	10	5	70
2-Jun	6	6	5	8	7	35	40	12	14	33	43	15	12	14	13	26	28	21	6	10	9	8	7	6	43
3-Jun	13	30	11	11	18	21	33	18	15	16	11	9	11	32	14	5	15	11	11	9	7	10	31	10	33
4-Jun	20	25	11	26	11	17	7	8	15	12	9	8	8	9	10	12	8	12	15	15	8	13	17	7	26
5-Jun	9	8	9	9	9	8	8	10	9	16	13	13	17	12	13	12	9	8	11	8	15	8	9	10	17
6-Jun	7	13	28	21	28	28	53	32	33	48	38	48	35	58	44	25	42	32	32	8	6	14	11	14	58
7-Jun	16	16	24	26	18	16	56	40	49	23	10	13	16	77	95	33	30	13	12	47	13	20	10	7	95
8-Jun	11	16	10	61	18	39	20	22	19	20	64	54	25	33	23	30	24	26	13	7	5	5	5	5	64
9-Jun	6	9	38	12	10	12	15	17	8	7	8	7	9	14	13	12	12	11	12	10	12	14	16	9	38
10-Jun	7	10	8	5	8	10	13	15	16	19	14	21	17	75	36	13	28	46	51	8	12	5	2	7	75
11-Jun	2	4	15	7	6	8	25	36	39	7	33	13	78	85	42	28	69	42	16	23	20	10	10	9	85
12-Jun	44	22	6	26	12	8	20	50	47	35	56	28	16	15	17	15	11	8	6	6	4	3	19	17	56
13-Jun	15	14	14	13	11	13	17	17	17	24	25	67	68	43	27	20	29	18	12	9	4	4	6	5	68
14-Jun	5	4	4	4	5	5	7	9	11	9	13	14	14	15	21	19	19	14	7	7	6	5	8	12	21
15-Jun	8	8	11	6	4	5	9	10	10	13	24	33	20	19	24	25	33	17	10	6	7	6	5	2	33
16-Jun	6	7	13	12	14	22	24	46	15	20	26	17	21	15	23	26	17	12	11	14	18	8	12	13	46
17-Jun	11	27	18	5	25	20	37	9	8	10	7	8	12	20	14	12	17	15	11	13	7	12	5	8	37
18-Jun	5	5	4	7	7	6	7	9	10	13	9	9	11	11	11	11	13	9	10	8	6	7	6	7	13
19-Jun	4	3	4	6	8	7	10	9	12	16	11	13	12	15	12	10	25	20	24	23	78	47	12	16	78
20-Jun	21	7	7	12	14	25	76	61	38	16	14	13	21	17	17	10	9	9	8	9	15	24	12	6	76
21-Jun	7	14	22	10	14	17	6	9	5	8	8	12	8	9	11	10	13	7	11	6	12	7	22	21	22
22-Jun	12	10	12	8	6	6	14	13	21	15	18	19	14	10	13	14	12	10	13	11	9	46	38	13	46
23-Jun	15	16	17	31	24	11	16	62	33	100	30	38	31	19	15	25	26	21	17	16	8	16	6	7	100
24-Jun	7	6	5	11	9	8	6	5	8	11	15	14	14	9	12	15	9	9	16	11	7	6	6	6	16
25-Jun	5	5	3	3	5	5	8	8	9	9	10	15	13	14	16	32	13	72	12	10	11	8	19	17	72
26-Jun	18	18	13	11	12	11	20	19	31	30	26	23	13	84	47	70	47	42	20	15	8	14	16	77	84
27-Jun	17	28	63	50	57	23	11	17	17	47	82	49	65	64	31	46	23	15	8	8	48	22	8	14	82
28-Jun	10	16	41	101	42	52	68	62	106	95	77	76	31	21	18	18	17	14	10	14	10	10	8	5	106
29-Jun	5	9	4	3	6	20	11	10	11	13	16	12	14	13	14	12	11	9	8	8	6	6	6	6	20
30-Jun	10	6	5	5	6	8	9	10	10	9	11	15	18	15	13	11	14	11	8	7	7	4	8	14	18

Diurnal Maximum



WBEA
Hourly Averages

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 102 deg on Jun 20 07:00	Hours of Data: 717
Minimum Value: 1 deg on Jun 16 00:00	Hours of Missing Data: 3
Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 8 Median = 12 Q ₃ = 19 P ₉₀ = 36 P ₉₉ = 93	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-Jun	7	7	9	15	7	6	8	6	5	11	9	15	17	35	31	15	9	11	41	65	55	6	11	5	65
2-Jun	4	5	7	9	9	32	38	14	14	33	38	15	11	13	12	24	26	21	5	9	8	7	6	6	38
3-Jun	18	28	16	13	18	24	40	26	15	16	10	8	UO	31	13	5	15	11	9	UO	7	9	31	9	40
4-Jun	18	24	10	24	10	17	7	7	15	12	9	8	7	9	9	12	7	11	14	14	7	12	16	7	24
5-Jun	8	8	8	9	8	8	8	10	8	15	13	12	17	11	13	11	9	7	10	8	15	8	8	9	17
6-Jun	6	12	27	18	23	24	42	32	30	47	35	40	33	53	40	24	40	32	33	7	6	12	10	11	53
7-Jun	13	11	23	21	15	13	54	43	45	22	9	13	16	71	93	31	30	13	11	45	18	20	10	8	93
8-Jun	6	18	14	32	13	47	20	24	22	23	66	55	29	33	23	29	23	26	12	7	5	5	5	6	66
9-Jun	6	9	38	9	12	8	11	14	8	5	8	6	7	10	10	10	11	10	11	10	12	13	16	9	38
10-Jun	7	10	8	4	9	12	12	15	15	18	14	20	15	75	36	12	27	UO	52	8	10	5	3	7	75
11-Jun	2	3	12	6	6	7	25	22	36	8	30	12	48	93	42	30	69	43	16	21	19	10	10	7	93
12-Jun	41	20	5	22	9	5	15	36	45	30	57	27	15	15	16	14	10	7	5	5	3	3	19	15	57
13-Jun	13	10	11	10	7	11	16	17	19	25	28	69	65	43	26	20	30	19	11	9	4	4	6	5	69
14-Jun	4	4	4	4	4	5	7	8	11	8	12	14	15	15	21	20	19	13	7	7	6	5	8	12	21
15-Jun	7	8	10	6	4	4	8	10	10	14	27	35	21	20	24	23	28	18	9	5	7	6	4	1	35
16-Jun	7	6	9	5	14	16	11	38	14	22	27	16	21	16	28	28	17	12	12	11	18	8	11	11	38
17-Jun	12	26	22	5	18	23	48	8	8	11	8	9	14	24	14	12	17	14	12	11	7	13	4	8	48
18-Jun	4	3	4	6	7	5	7	9	10	12	9	10	11	11	11	11	13	8	9	8	6	6	5	6	13
19-Jun	3	3	3	6	7	8	10	8	11	16	12	10	11	17	12	12	27	18	24	22	77	36	13	16	77
20-Jun	15	7	7	12	12	22	102	66	38	16	15	12	20	18	17	10	9	9	8	9	14	24	14	5	102
21-Jun	6	12	21	9	13	16	5	9	4	7	8	11	7	8	10	9	13	7	11	6	11	6	21	20	21
22-Jun	11	8	11	9	6	5	13	13	19	14	18	18	14	10	13	14	12	10	12	11	8	44	38	15	44
23-Jun	16	15	17	24	17	12	12	56	55	94	32	41	38	18	16	25	25	20	14	12	6	13	8	5	94
24-Jun	7	5	5	10	5	6	4	5	8	12	15	17	14	9	11	15	8	9	16	11	7	5	6	5	17
25-Jun	4	4	3	2	5	4	8	9	9	8	9	15	12	14	15	32	12	73	14	12	11	8	12	15	73
26-Jun	18	20	15	12	9	12	20	18	32	30	29	22	13	93	48	70	50	43	18	13	6	17	13	83	93
27-Jun	17	33	33	35	54	24	8	16	18	45	84	53	65	61	31	49	22	14	7	7	51	22	6	14	84
28-Jun	11	11	31	97	44	36	56	74	100	101	73	72	31	20	18	17	17	14	9	13	9	10	8	5	101
29-Jun	4	7	3	2	4	19	10	10	10	12	15	13	14	12	14	11	10	9	8	7	5	5	5	5	19
30-Jun	10	5	5	5	6	8	9	10	10	8	11	15	17	14	12	11	14	11	7	6	6	4	10	11	17

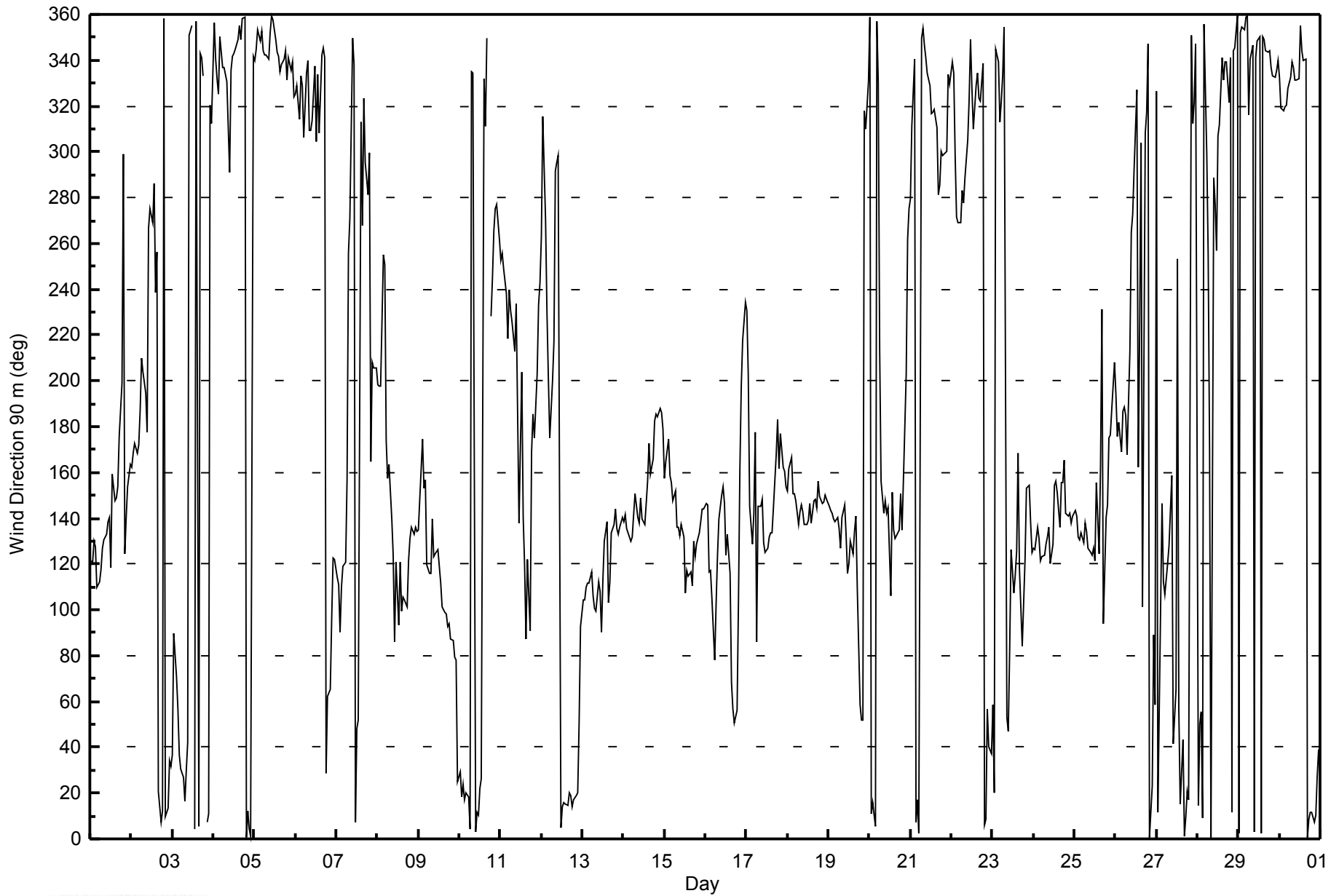
41	33	38	97	54	47	102	74	100	101	84	72	65	93	93	70	69	73	52	65	77	44	38	83	
Diurnal Maximum																								

UO - Unstable Operation



WBEA
Hourly Averages

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





Summary of Hour Averages

Mannix - June 2014

Maximum Value: 1.1 km/h on Jun 16 18:00		Maximum Daily Average: 0.4 km/h on Jun 9		Hours in Service: 720																							
Minimum Value: -0.9 km/h on Jun 3 18:00		Minimum Daily Average: -0.4 km/h on Jun 29		Hours of Data: 720																							
Maximum Diurnal Average: 0.1 km/h at hour 13		Minimum Diurnal Average: 0.0 km/h at hour 24		Hours of Missing Data: 0																							
Monthly Average: 0.05 km/h		Percentiles: P ₁ = -0.7 P ₁₀ = -0.3 Q ₁ = -0.2 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 0.4 P ₉₉ = 0.8		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jun	0.2	0.2	0.4	0.3	0.4	0.6	0.4	0.4	0.3	0.3	0.2	0.3	0.5	0.4	0.3	0.4	0.5	0.0	0.2	-0.1	0.2	0.2	0.1	0.2	0.3	0.6	
2-Jun	0.3	0.4	0.4	0.3	0.3	0.2	0.1	-0.1	0.1	0.4	0.2	-0.1	0.1	-0.2	0.0	0.0	0.2	0.0	-0.4	-0.3	-0.1	-0.1	-0.1	-0.2	0.1	0.4	
3-Jun	-0.1	0.0	-0.1	-0.1	-0.3	0.0	0.1	0.0	-0.3	0.3	-0.1	-0.1	-0.2	-0.1	-0.3	-0.3	-0.7	-0.9	-0.7	-0.5	-0.3	0.0	-0.5	-0.7	-0.2	0.3	
4-Jun	-0.1	-0.2	-0.3	-0.2	-0.2	-0.1	-0.3	-0.2	-0.2	-0.3	-0.2	-0.3	-0.4	-0.4	-0.2	-0.3	-0.5	-0.3	-0.3	-0.3	-0.1	-0.1	-0.2	-0.4	-0.2	-0.1	
5-Jun	-0.4	-0.5	-0.1	-0.6	-0.4	-0.4	-0.3	-0.3	-0.5	-0.2	-0.1	-0.3	-0.2	-0.7	-0.4	-0.5	-0.4	-0.5	-0.3	-0.2	-0.3	-0.1	-0.2	-0.3	-0.3	-0.1	
6-Jun	-0.4	0.0	0.1	-0.1	-0.1	-0.2	-0.2	-0.1	0.0	0.0	0.0	-0.1	-0.2	-0.1	-0.1	0.0	0.0	-0.1	0.2	0.7	0.6	0.3	0.2	0.2	0.0	0.7	
7-Jun	0.2	0.5	0.6	0.4	0.2	0.3	-0.1	-0.1	-0.1	-0.1	-0.2	0.0	0.4	0.2	0.1	-0.4	-0.1	-0.3	0.1	0.0	0.1	-0.1	-0.1	-0.1	0.1	0.6	
8-Jun	0.0	-0.1	-0.1	-0.2	-0.2	0.1	0.3	0.3	0.1	0.1	0.2	0.3	0.6	0.2	0.5	0.3	0.5	0.6	0.2	0.2	0.3	0.2	0.2	0.5	0.2	0.6	
9-Jun	0.3	0.4	0.3	0.2	0.2	0.4	0.4	0.5	0.2	0.3	0.1	0.2	0.3	0.4	0.5	0.7	0.8	1.0	0.6	0.8	0.5	0.7	0.6	0.1	0.4	1.0	
10-Jun	0.0	-0.2	-0.1	-0.3	-0.1	0.0	-0.1	0.0	-0.3	0.0	0.0	0.1	0.4	-0.1	-0.1	-0.6	-0.3	0.1	0.0	0.3	0.2	0.1	0.0	-0.3	-0.1	0.4	
11-Jun	-0.3	-0.4	-0.2	-0.3	-0.2	0.0	0.3	0.2	0.1	-0.2	0.3	0.1	0.0	0.2	0.6	0.4	0.1	0.2	0.2	0.1	0.1	-0.1	-0.2	0.0	0.0	0.6	
12-Jun	0.0	-0.1	0.0	-0.1	0.0	0.3	0.3	0.1	0.0	0.0	-0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.1	-0.2	0.0	-0.2	-0.3	0.2	0.6	0.0	0.6	
13-Jun	0.2	0.7	0.4	0.3	0.4	0.4	0.6	0.5	0.5	0.2	0.3	0.5	-0.1	0.3	0.5	0.3	0.2	0.3	0.3	0.2	0.2	0.3	0.2	0.4	0.3	0.7	
14-Jun	0.4	0.3	0.4	0.3	0.2	0.2	0.3	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.3	0.4	0.3	0.1	0.0	-0.1	0.0	0.3	0.4	0.3	0.5	
15-Jun	0.5	0.3	0.4	0.4	0.3	0.2	0.3	-0.1	0.2	0.2	0.2	0.2	0.3	0.6	0.2	0.4	0.5	0.4	0.1	0.3	0.2	0.3	0.4	0.3	0.4	0.3	0.6
16-Jun	0.2	0.0	0.1	0.0	0.0	-0.2	-0.1	0.1	0.1	0.1	-0.2	0.0	0.5	0.1	0.6	0.2	0.6	1.1	1.0	0.2	0.2	0.1	-0.3	0.0	0.2	1.1	
17-Jun	-0.2	0.0	0.1	0.1	-0.1	-0.1	0.1	0.3	0.3	0.3	0.1	0.1	0.2	0.1	0.4	0.1	0.0	0.0	0.0	0.2	0.2	0.3	0.4	0.2	0.1	0.4	
18-Jun	0.4	0.4	0.4	0.3	0.3	0.3	0.1	0.1	0.2	0.5	0.3	0.4	0.4	0.5	0.2	0.7	0.6	0.5	0.4	0.4	0.4	0.5	0.6	0.5	0.4	0.7	
19-Jun	0.3	0.2	0.3	0.3	0.2	0.1	0.1	0.0	0.1	0.2	0.2	0.3	0.3	0.1	0.3	0.0	0.3	0.3	0.1	0.2	-0.2	0.0	0.1	0.0	0.1	0.3	
20-Jun	-0.3	-0.2	-0.2	-0.2	0.0	0.1	0.1	0.1	0.0	0.1	0.2	0.0	0.4	0.3	0.1	0.1	0.3	0.2	0.2	0.1	-0.1	0.1	0.1	0.2	0.1	0.4	
21-Jun	0.2	-0.1	-0.1	0.0	-0.1	-0.1	-0.2	-0.1	-0.1	-0.2	-0.4	-0.3	-0.2	-0.3	-0.2	-0.1	0.2	-0.5	-0.5	-0.5	-0.3	0.0	-0.2	-0.2	-0.2	0.2	
22-Jun	-0.3	-0.2	0.2	0.1	0.1	0.2	0.1	0.0	0.1	-0.3	-0.3	-0.2	-0.5	-0.8	-0.4	-0.5	-0.7	-0.8	-0.5	-0.2	-0.1	0.0	0.0	-0.1	-0.2	0.2	
23-Jun	0.0	-0.1	-0.2	-0.1	-0.3	0.0	0.0	0.2	0.3	0.2	0.2	0.2	0.2	0.2	-0.1	0.1	0.5	0.8	0.4	0.4	0.1	0.1	0.2	0.2	0.1	0.8	
24-Jun	0.2	0.3	0.4	0.3	0.3	0.3	0.0	0.3	0.2	0.2	0.5	0.2	0.2	0.4	0.4	0.3	0.2	0.3	0.1	0.3	0.3	0.3	0.3	0.1	0.3	0.5	
25-Jun	0.4	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.4	0.2	0.2	0.5	0.4	0.4	0.1	-0.2	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.5	
26-Jun	-0.1	-0.1	-0.1	-0.1	-0.2	0.0	0.1	0.2	0.1	0.0	0.0	0.0	-0.2	-0.1	0.0	0.1	0.3	-0.1	-0.2	-0.2	-0.2	-0.1	0.0	-0.3	0.0	0.3	
27-Jun	-0.1	0.0	-0.2	-0.2	0.0	0.2	0.2	0.1	0.0	0.2	-0.1	0.1	0.1	0.8	-0.2	0.0	0.1	-0.1	0.3	-0.1	0.0	-0.1	-0.2	-0.3	0.0	0.8	
28-Jun	-0.1	0.0	-0.3	-0.2	-0.1	0.0	0.2	0.2	0.0	-0.1	-0.1	0.5	0.0	-0.2	-0.2	-0.4	-0.3	-0.4	-0.5	-0.1	-0.1	-0.4	-0.3	-0.5	-0.1	0.5	
29-Jun	-0.3	-0.1	-0.2	-0.1	-0.2	-0.2	-0.2	-0.1	-0.2	-0.3	-0.1	-0.6	-0.4	-0.3	-0.6	-0.6	-0.5	-0.8	-0.5	-0.5	-0.6	-0.9	-0.5	-0.4	-0.4	-0.1	
30-Jun	-0.8	-0.7	-0.6	-0.5	-0.5	-0.5	-0.4	-0.1	-0.4	-0.7	-0.7	-0.3	-0.1	-0.2	-0.5	-0.4	-0.1	-0.2	-0.2	-0.2	-0.3	-0.3	-0.2	-0.2	-0.4	-0.1	
																								Diurnal Average			
																								Diurnal Maximum			
																								0.0 0.5			
																								0.0 0.7			
																								0.1 0.6			
																								0.0 0.4			
																								0.0 0.4			
																								0.1 0.6			
																								0.1 0.6			
																								0.1 0.5			
																								0.0 0.5			
																								0.1 0.5			
																								0.0 0.5			
																								0.1 0.5			
																								0.1 0.6			
																								0.1 0.8			
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																								0.0 0.8			
																								0.1 1.1			
																								0.0 1.0			
																								0.0 0.8			
																								0.0 0.6			
																								0.0 0.7			
																								0.0 0.6			



Summary of Hour Standard Deviations

Mannix - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.9 km/h on Jun 29 16:00		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 Jun 27 02:00																									
Percentiles: P ₁ = 0.3 P ₁₀ = 0.7 Q ₁ = 1.1 Median = 1.6 Q ₃ = 2.2 P ₉₀ = 2.7 P ₉₉ = 3.4																									
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-Jun	2.4	2.6	2.1	2.0	2.3	2.5	2.7	2.8	2.1	1.7	1.6	1.7	2.0	2.2	1.7	1.7	2.5	1.8	1.2	1.1	0.8	0.8	1.0	0.7	2.8
2-Jun	0.9	1.0	1.0	1.0	1.2	1.0	1.1	1.5	1.6	1.3	1.6	1.7	1.9	2.0	1.3	1.8	2.6	1.9	2.7	2.2	1.0	0.5	0.3	0.5	2.7
3-Jun	0.5	0.3	0.6	0.9	0.9	1.1	0.9	1.4	1.6	1.9	2.9	3.2	2.8	1.4	2.0	2.6	3.3	3.9	3.2	3.4	3.1	2.0	1.6	1.9	3.9
4-Jun	1.5	1.3	1.4	1.2	1.4	1.5	1.4	1.6	1.3	1.5	2.0	2.3	2.5	2.9	3.3	3.0	3.4	3.2	2.8	2.9	2.6	2.2	2.3	2.7	3.4
5-Jun	2.5	2.9	3.2	3.2	3.2	2.9	2.9	2.6	2.7	2.8	2.8	3.1	3.0	3.5	3.1	2.5	2.8	2.8	2.5	1.8	2.1	1.5	1.7	1.4	3.5
6-Jun	1.5	1.1	0.9	0.6	0.6	0.7	1.0	1.2	1.2	1.3	1.6	1.7	1.8	1.9	2.0	2.1	1.9	1.6	1.3	1.3	1.1	1.1	1.2	1.0	2.1
7-Jun	1.0	1.2	1.2	1.9	1.2	1.0	0.8	1.2	1.2	1.4	1.9	2.1	2.3	2.0	1.8	1.7	1.7	1.6	1.6	1.3	1.2	0.8	0.8	0.8	2.3
8-Jun	0.4	0.4	0.2	0.4	0.6	0.8	1.1	1.3	1.4	1.5	1.7	2.0	2.1	2.1	1.9	2.0	1.8	1.6	1.3	1.3	1.7	2.1	2.1	2.2	2.2
9-Jun	2.1	1.9	1.7	1.7	1.0	1.5	1.5	1.6	1.8	2.3	2.4	2.6	3.1	3.3	3.2	3.2	3.3	3.1	2.8	2.0	1.7	1.6	1.0	1.4	3.3
10-Jun	1.4	1.4	1.8	1.9	1.6	1.3	1.3	1.7	2.2	2.3	2.5	2.5	2.7	2.3	1.9	2.2	2.3	2.6	1.1	1.0	0.4	0.4	0.3	0.8	2.7
11-Jun	0.9	1.1	0.9	0.6	0.8	0.8	0.8	0.8	1.0	1.0	1.3	2.0	2.0	1.6	2.2	1.9	1.6	1.3	1.5	1.3	0.9	0.6	0.4	0.4	2.2
12-Jun	0.4	0.3	0.4	0.8	0.9	0.9	0.7	1.0	1.4	1.5	1.6	2.2	2.2	2.3	2.7	2.6	2.5	2.5	2.3	2.1	1.6	1.7	1.5	1.6	2.7
13-Jun	1.6	1.8	2.0	1.6	2.1	2.0	2.0	1.6	1.9	1.9	2.0	1.9	1.7	2.0	1.9	2.0	1.8	1.8	1.9	1.7	1.3	1.7	2.2	2.2	2.2
14-Jun	1.9	1.9	2.3	2.1	1.7	1.8	1.8	2.1	2.0	2.3	2.5	2.6	2.6	2.6	2.7	3.0	2.8	2.7	2.2	2.6	1.8	1.2	1.3	1.5	3.0
15-Jun	1.7	1.5	1.2	1.5	1.7	2.0	1.6	1.6	1.9	1.9	2.1	2.2	2.5	2.4	2.3	2.2	2.1	2.0	2.3	2.3	1.7	1.6	1.2	1.3	2.5
16-Jun	0.9	0.3	0.8	0.6	0.5	0.3	0.6	0.9	1.6	1.6	1.8	1.9	2.1	2.1	2.0	1.6	1.8	2.5	2.2	2.0	1.9	2.3	1.9	1.0	2.5
17-Jun	0.6	0.6	0.8	1.0	0.8	0.7	0.7	1.5	1.5	1.6	1.8	2.0	1.9	1.8	1.5	1.6	1.5	1.9	1.6	1.2	1.5	1.5	1.7	1.1	2.0
18-Jun	1.3	1.4	1.4	1.4	1.2	1.7	1.5	1.6	2.1	2.4	2.7	2.3	2.7	2.9	2.8	3.2	3.0	2.8	2.7	2.4	2.3	2.5	2.4	2.0	3.2
19-Jun	1.5	1.5	1.6	1.4	1.0	0.8	1.0	1.1	0.7	1.0	2.0	2.2	2.2	1.6	1.8	1.2	1.0	1.6	0.7	0.7	0.3	0.4	0.5	0.6	2.2
20-Jun	0.7	1.3	1.2	0.4	0.3	0.3	0.5	0.9	1.3	1.2	1.3	1.4	1.4	1.6	1.8	1.5	1.4	1.3	1.4	1.3	0.4	0.5	0.7	1.0	1.8
21-Jun	1.0	0.9	0.5	1.2	1.1	1.3	1.6	1.5	1.9	1.8	1.8	2.0	2.0	2.1	1.8	1.5	1.7	1.9	2.2	1.8	1.6	1.0	1.4	1.2	2.2
22-Jun	1.5	1.5	1.0	1.2	1.0	1.1	1.3	1.3	1.3	1.7	1.5	1.4	1.6	2.1	2.5	2.7	2.4	2.3	2.3	1.8	1.6	1.1	0.4	0.8	2.7
23-Jun	0.4	0.3	0.3	0.4	0.6	0.7	0.7	0.8	1.0	1.0	1.1	1.1	1.4	2.1	1.8	2.4	2.4	2.1	1.4	0.9	0.7	0.5	0.8	1.4	2.4
24-Jun	2.1	2.4	2.4	1.8	2.3	2.4	2.3	1.7	2.0	2.1	2.2	2.1	2.7	2.8	2.4	2.2	2.2	2.4	2.5	1.6	2.0	1.7	2.0	1.9	2.8
25-Jun	2.2	2.3	2.0	2.0	1.8	2.2	1.8	2.1	2.4	2.6	2.6	2.6	2.8	2.7	1.4	3.5	2.4	0.8	0.7	1.0	1.5	1.1	0.5	0.5	3.5
26-Jun	0.4	0.4	0.5	0.7	0.6	0.8	1.0	1.0	1.1	1.4	1.6	1.5	1.1	1.9	0.8	1.2	1.0	1.1	1.4	1.3	0.8	0.7	0.4	0.4	1.9
27-Jun	0.4	0.2	0.4	0.4	0.4	0.5	0.7	0.8	0.9	0.8	1.2	1.4	1.5	2.2	1.6	1.6	1.6	2.7	2.2	1.5	0.6	0.6	0.4	0.9	2.7
28-Jun	0.8	0.3	0.4	0.3	0.4	0.5	0.8	1.1	1.2	1.4	1.6	1.6	2.0	2.0	2.3	2.2	2.1	2.0	2.0	1.9	1.4	1.5	1.5	1.4	2.3
29-Jun	0.9	0.5	1.5	1.8	1.2	0.9	1.4	2.0	2.3	2.3	2.6	3.4	3.7	3.5	3.8	3.9	3.8	3.7	3.4	3.2	2.8	2.4	2.7	2.5	3.9
30-Jun	2.2	1.9	1.5	1.5	1.6	2.0	2.3	2.4	2.4	2.6	2.4	2.5	2.8	2.8	2.8	2.9	2.5	2.4	2.2	2.0	1.8	1.7	1.0	0.3	2.9
	2.5	2.9	3.2	3.2	3.2	2.9	2.9	2.8	2.7	2.8	2.9	3.4	3.7	3.5	3.8	3.9	3.8	3.9	3.4	3.4	3.1	2.5	2.7	2.7	
	Diurnal Maximum																								



Summary of Hour Averages

Mannix - June 2014

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



Summary of Hour Standard Deviations

Mannix - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.0 km/h on Jun 3 18:00		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 Jun 26 02:00																									
Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 1.1 Median = 1.7 Q ₃ = 2.4 P ₉₀ = 2.9 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-Jun	2.4	2.5	2.1	2.2	2.4	2.1	2.8	2.6	2.1	1.7	1.9	2.0	2.5	2.4	2.2	1.9	2.5	1.6	1.4	1.4	0.7	0.3	0.6	0.5	2.8
2-Jun	0.7	0.9	0.7	0.6	0.8	0.9	0.8	1.0	1.7	1.4	2.1	2.0	2.3	2.2	1.7	2.3	2.6	2.3	2.4	2.1	0.9	0.5	0.5	0.6	2.6
3-Jun	0.4	0.5	0.5	0.8	0.7	1.1	1.0	1.6	1.9	2.1	3.2	3.5	3.2	1.5	2.2	2.3	3.7	4.0	3.8	3.6	3.2	2.1	1.7	2.2	4.0
4-Jun	1.7	1.4	1.5	1.2	1.5	1.7	1.3	1.6	1.4	1.5	2.3	2.4	2.6	3.0	3.6	3.3	3.5	3.3	2.9	3.1	2.6	2.6	2.5	2.8	3.6
5-Jun	2.9	3.2	3.6	3.5	3.3	3.3	3.2	3.2	3.0	3.5	2.9	3.6	3.7	3.9	3.5	2.7	3.1	2.8	2.6	2.0	2.4	1.6	1.9	1.5	3.9
6-Jun	1.6	1.4	1.0	0.7	0.7	0.6	1.1	1.6	1.5	1.6	2.1	2.1	2.4	2.4	2.5	2.8	2.4	2.2	1.6	1.4	1.2	1.1	1.2	1.0	2.8
7-Jun	1.1	1.1	1.2	1.5	1.0	1.2	1.0	1.6	1.8	1.7	2.2	2.1	2.6	2.3	2.1	2.3	2.3	1.9	2.0	1.5	1.0	0.6	0.4	0.6	2.6
8-Jun	0.3	0.3	0.2	0.5	0.3	0.7	1.1	1.3	1.6	1.9	2.0	2.5	2.5	2.5	2.5	2.5	2.3	2.0	1.4	1.1	1.7	2.2	2.0	2.2	2.5
9-Jun	2.1	1.8	1.6	1.4	0.8	1.2	1.5	1.7	1.7	2.0	2.3	2.5	2.8	3.4	3.5	3.5	3.4	3.3	2.8	2.2	1.9	1.7	1.3	1.3	3.5
10-Jun	1.4	1.1	1.7	1.5	1.4	1.3	1.3	2.0	2.6	3.0	2.9	3.0	3.0	2.7	2.4	2.6	2.4	2.6	1.2	0.9	0.3	0.3	0.1	0.4	3.0
11-Jun	0.4	0.9	1.2	0.8	0.4	0.6	0.8	0.8	0.8	0.8	1.1	2.3	2.6	1.8	2.1	2.0	1.8	1.3	1.3	1.1	0.5	0.2	0.3	0.6	2.6
12-Jun	0.5	0.3	0.4	0.3	0.4	0.7	0.7	1.1	1.7	1.8	1.9	2.8	2.5	2.7	3.0	2.9	2.7	2.6	2.1	2.1	1.4	1.5	1.7	2.1	3.0
13-Jun	2.0	2.0	2.2	1.7	2.2	2.3	2.4	2.0	2.2	2.2	2.6	2.3	2.4	2.5	2.4	2.4	2.1	2.2	2.1	1.7	1.3	1.7	2.3	2.3	2.6
14-Jun	2.0	2.0	2.2	2.0	1.4	1.6	2.0	2.2	2.2	2.5	2.6	2.8	3.1	2.6	3.0	3.1	3.0	2.5	1.8	2.1	1.5	0.9	0.8	0.9	3.1
15-Jun	1.6	1.2	1.0	1.1	1.6	1.8	1.8	1.4	1.7	2.2	2.7	2.9	2.9	2.6	2.7	2.7	2.4	2.1	2.4	2.1	1.6	1.9	1.2	0.9	2.9
16-Jun	0.7	0.3	0.7	0.6	0.5	0.3	0.4	1.0	1.9	2.0	2.0	2.1	2.5	2.7	2.3	1.9	2.1	2.7	2.3	2.1	1.7	1.9	1.7	1.1	2.7
17-Jun	0.6	0.4	0.4	0.4	0.4	0.6	0.8	1.5	1.6	1.7	1.6	1.9	2.2	2.3	1.8	1.9	1.8	1.7	0.9	1.1	1.0	1.2	1.1	0.8	2.3
18-Jun	1.0	1.2	0.9	1.2	1.2	1.7	1.5	1.8	2.2	2.8	2.8	2.4	2.8	3.3	2.9	3.2	3.1	2.8	2.4	2.4	2.6	2.6	2.4	2.0	3.3
19-Jun	1.6	1.5	1.5	1.4	0.8	0.6	1.0	1.2	1.0	1.3	2.2	2.4	2.1	2.1	2.1	1.5	1.2	1.8	0.9	0.8	0.3	0.2	0.3	0.4	2.4
20-Jun	0.7	1.3	1.0	0.4	0.2	0.3	0.6	0.9	1.4	1.2	1.6	1.6	1.6	1.9	2.0	1.9	1.6	1.4	1.3	1.2	0.4	0.4	0.6	0.9	2.0
21-Jun	0.9	0.5	0.5	1.2	1.3	1.4	1.4	1.4	1.7	1.7	1.8	2.0	2.1	2.1	1.9	1.6	1.5	1.6	1.9	1.4	1.3	0.7	1.3	1.1	2.1
22-Jun	1.5	1.6	0.6	0.9	0.7	0.9	1.1	1.3	1.4	2.0	1.9	1.3	1.4	2.1	3.0	3.1	2.7	2.4	2.2	1.9	1.5	1.0	0.6	0.6	3.1
23-Jun	0.3	0.3	0.3	0.4	0.3	0.4	0.6	1.0	1.2	1.2	1.3	1.5	2.0	2.4	2.0	2.6	2.6	2.3	1.4	0.8	0.7	0.5	0.4	1.1	2.6
24-Jun	1.9	2.1	2.4	1.8	2.3	2.1	1.8	1.7	2.1	2.4	2.6	2.4	2.5	2.6	2.4	2.2	1.8	2.0	2.2	1.2	2.0	1.7	2.1	2.0	2.6
25-Jun	2.4	2.3	1.7	1.6	1.8	2.0	1.9	2.4	2.3	2.5	2.6	2.9	3.0	2.2	1.3	3.0	2.2	1.0	0.8	0.9	1.1	0.6	0.4	0.4	3.0
26-Jun	0.4	0.1	0.2	0.2	0.4	0.7	1.3	1.4	1.6	1.9	2.0	1.9	1.1	1.8	0.9	1.4	1.2	1.1	1.2	1.1	0.9	0.8	0.7	0.3	2.0
27-Jun	0.3	0.2	0.4	0.4	0.2	0.5	0.8	0.9	1.2	0.9	1.4	1.9	2.0	2.1	1.9	2.0	2.1	2.7	2.4	1.5	0.6	0.3	0.3	0.8	2.7
28-Jun	0.7	0.3	0.3	0.3	0.3	0.4	0.8	0.9	1.2	1.6	1.9	2.1	2.5	2.6	2.7	2.7	2.5	1.9	1.9	2.0	1.3	1.2	1.5	0.9	2.7
29-Jun	0.5	0.7	1.1	1.5	1.1	0.9	1.0	2.1	2.6	2.4	2.9	3.5	3.7	3.9	3.9	3.7	3.9	3.9	3.5	3.1	2.6	2.5	2.8	2.5	3.9
30-Jun	2.1	1.6	1.1	1.2	1.4	1.9	2.4	2.5	2.4	2.5	2.4	2.9	3.1	3.1	3.0	3.1	2.9	2.5	2.3	1.9	2.0	1.5	0.8	0.3	3.1
	2.9	3.2	3.6	3.5	3.3	3.3	3.2	3.2	3.0	3.5	3.2	3.6	3.7	3.9	3.9	3.7	3.9	4.0	3.8	3.6	3.2	2.6	2.8	2.8	
	Diurnal Maximum																								



Summary of Hour Averages

Mannix - June 2014

Maximum Value: 1.4 km/h on Jun 10 13:00		Maximum Daily Average: 0.4 km/h on Jun 18		Hours in Service: 720																																												
Minimum Value: -1.1 km/h on Jun 8 11:00		Minimum Daily Average: -0.1 km/h on Jun 29		Hours of Data: 720																																												
Maximum Diurnal Average: 0.3 km/h at hour 13		Minimum Diurnal Average: 0.0 km/h at hour 24		Hours of Missing Data: 0																																												
Monthly Average: 0.13 km/h		Percentiles: P ₁ = -0.7 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-Jun	-0.8	-0.2	0.2	0.3	0.2	-0.2	0.1	-0.3	-0.3	0.1	0.1	-0.1	0.7	0.8	1.0	0.3	0.4	0.3	0.4	0.0	0.1	0.1	0.3	0.4	0.2	1.0																						
2-Jun	0.6	0.5	0.2	0.2	0.2	0.0	-0.1	-0.3	0.2	0.4	0.4	0.1	-0.2	-0.1	-0.3	0.3	0.4	0.3	0.1	0.0	0.1	0.2	0.1	0.2	0.1	0.6																						
3-Jun	0.2	0.2	0.2	0.4	0.1	0.3	0.5	0.1	0.1	0.4	0.2	0.8	1.1	0.3	0.4	-0.2	-0.2	-0.6	-0.1	0.0	0.1	0.1	0.2	0.1	0.2	1.1																						
4-Jun	0.1	0.3	-0.1	0.3	0.1	0.3	-0.2	-0.4	-0.3	0.2	-0.2	-0.4	-0.5	-0.5	0.0	0.4	-0.5	0.3	0.5	0.6	0.0	0.6	0.2	-0.6	0.0	0.6																						
5-Jun	-0.2	-0.4	0.9	-0.1	0.8	-0.3	-0.3	0.1	0.0	0.5	0.8	0.4	0.4	-0.6	0.2	-0.5	-0.3	-0.4	-0.4	-0.4	0.2	0.3	-0.2	-0.1	0.0	0.9																						
6-Jun	-0.1	0.8	0.7	0.1	0.1	0.2	-0.4	0.2	0.0	0.0	0.5	-0.2	0.3	-0.3	0.6	0.4	0.3	0.1	0.4	0.4	0.6	0.4	0.3	0.0	0.2	0.8																						
7-Jun	0.5	0.5	0.1	-0.2	0.2	0.1	-0.1	0.4	-0.5	0.1	-0.1	0.3	0.5	0.0	0.2	-0.2	0.4	0.1	0.7	0.5	0.1	0.0	-0.2	-0.3	0.1	0.7																						
8-Jun	0.0	0.0	0.1	0.0	-0.1	0.0	0.0	0.1	-0.2	0.2	-1.1	0.2	0.9	0.4	0.2	0.0	0.3	0.4	0.2	-0.1	-0.2	-0.3	-0.2	-0.3	0.0	0.9																						
9-Jun	-0.1	0.6	0.4	0.5	0.3	0.2	0.2	0.9	-0.1	-0.2	-0.5	-0.5	-0.7	0.1	-0.2	0.5	0.7	0.8	0.6	0.5	0.3	0.3	0.8	0.2	0.2	0.9																						
10-Jun	0.2	0.3	0.4	0.2	0.4	0.2	-0.1	0.1	0.3	0.9	0.0	0.4	1.4	0.0	1.0	0.5	0.2	0.1	-0.3	0.0	-0.1	0.0	0.0	-0.4	0.2	1.4																						
11-Jun	-0.5	-0.2	0.0	-0.3	-0.4	-0.1	0.2	0.1	-0.3	-0.4	0.1	0.1	-0.5	0.1	0.8	0.1	0.3	0.1	0.2	0.1	0.0	-0.1	-0.1	-0.1	0.0	0.8																						
12-Jun	-0.2	0.1	0.1	-0.1	-0.2	0.0	0.0	0.1	0.2	0.4	-0.3	0.3	-0.2	0.2	0.9	0.3	0.2	0.1	0.2	0.3	0.2	0.3	0.4	-0.1	0.1	0.9																						
13-Jun	0.1	1.0	0.8	0.6	0.2	0.8	0.7	0.3	0.2	-0.2	0.3	1.3	-0.1	0.4	0.4	0.2	-0.1	0.4	0.1	0.1	-0.2	-0.2	-0.3	-0.1	0.3	1.3																						
14-Jun	0.0	0.0	-0.2	-0.1	-0.3	-0.3	0.1	0.6	0.5	0.0	0.6	0.2	0.7	1.0	1.0	0.8	0.3	0.5	0.1	-0.1	0.0	-0.1	0.2	0.3	0.2	1.0																						
15-Jun	0.8	0.6	0.6	0.6	0.7	0.4	0.7	0.0	0.4	0.2	0.6	1.2	0.7	-0.1	0.2	0.5	0.0	-0.2	-0.2	-0.4	-0.2	0.0	0.2	0.2	0.3	1.2																						
16-Jun	0.2	0.0	0.0	-0.2	0.2	0.0	0.3	0.2	0.0	-0.1	-0.3	-0.1	0.7	-0.7	1.0	-0.1	0.7	0.8	0.9	0.1	0.1	-0.2	-0.3	-0.2	0.1	1.0																						
17-Jun	-0.1	0.0	0.2	0.1	0.0	-0.1	0.3	0.2	0.4	0.4	-0.3	-0.4	0.1	0.4	0.3	0.3	0.0	0.4	-0.1	0.4	0.2	0.3	0.5	0.2	0.2	0.5																						
18-Jun	0.6	0.6	0.6	0.4	0.3	0.2	-0.1	0.0	0.4	0.9	-0.4	0.2	-0.2	1.0	-0.4	0.7	0.6	-0.1	0.6	0.6	0.3	0.4	0.7	0.6	0.4	1.0																						
19-Jun	0.2	-0.1	0.0	0.2	0.1	0.0	0.0	-0.3	0.0	0.8	-0.1	-0.2	0.2	0.1	0.0	-0.4	0.4	0.1	0.1	0.2	0.1	0.1	0.4	0.2	0.1	0.8																						
20-Jun	-0.3	0.2	0.2	0.1	0.0	0.0	0.1	0.4	0.3	0.1	0.1	-0.1	0.2	0.7	-0.2	0.0	-0.3	0.0	0.3	-0.2	0.1	-0.1	-0.1	0.1	0.1	0.7																						
21-Jun	0.1	0.3	0.2	0.4	-0.1	0.1	0.1	0.0	0.1	-0.2	-0.5	-0.2	0.4	0.3	0.3	0.7	0.6	0.0	0.6	0.4	0.1	0.3	0.1	0.0	0.2	0.7																						
22-Jun	0.0	-0.4	0.3	0.2	0.0	-0.1	0.0	-0.3	0.1	0.1	0.0	-0.3	-0.2	-0.2	-0.1	0.1	-0.3	-0.4	-0.2	0.5	0.4	0.2	0.1	0.1	0.0	0.5																						
23-Jun	0.2	0.1	0.0	0.1	-0.1	0.0	-0.1	0.5	0.5	0.3	0.1	0.0	0.3	-0.1	-0.4	0.1	0.4	0.6	0.2	0.2	0.3	0.2	0.0	-0.3	0.1	0.6																						
24-Jun	-0.2	-0.1	0.0	0.2	-0.2	-0.2	-0.2	-0.2	-0.2	0.1	0.2	0.6	-0.1	0.5	0.4	0.1	0.2	0.4	0.3	0.1	0.0	0.1	-0.1	0.1	0.1	0.6																						
25-Jun	0.2	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	0.2	-0.1	-0.4	-0.3	0.0	0.1	0.2	0.1	0.5	-0.6	0.5	0.1	0.0	0.3	0.1	-0.1	-0.1	0.0	0.5																						
26-Jun	0.0	0.0	0.0	0.0	-0.1	0.1	0.0	0.4	0.0	0.2	0.3	-0.3	-0.3	-0.3	-0.1	0.3	0.4	0.4	0.2	0.2	0.2	0.4	0.2	0.2	0.1	0.4																						
27-Jun	0.2	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.0	0.1	0.3	-0.4	0.8	0.4	0.1	0.4	0.7	0.1	0.9	0.3	0.1	0.2	0.0	0.0	0.2	0.9																						
28-Jun	0.1	0.1	0.1	0.2	0.0	0.1	0.1	0.1	-0.3	0.2	-0.3	1.4	0.7	-0.2	0.1	0.1	0.1	-0.2	0.1	0.4	0.3	-0.6	0.4	-0.2	0.1	1.4																						
29-Jun	0.3	0.2	0.2	0.1	0.2	0.2	0.5	0.1	0.2	0.0	1.0	-0.2	0.2	0.4	-0.3	-0.2	-0.7	-0.6	-0.4	-0.6	-0.6	-0.7	-0.6	-0.7	-0.1	1.0																						
30-Jun	-0.6	-0.4	-0.3	-0.3	-0.2	-0.1	0.1	0.4	-0.2	-0.7	-0.6	0.4	0.3	0.2	-0.2	-0.2	1.4	0.4	0.0	0.6	1.0	0.4	0.3	0.2	0.1	1.4																						
																								0.0	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.2	0.3	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	Diurnal Average
																								0.8	1.0	0.9	0.6	0.8	0.8	0.7	0.9	0.5	0.9	1.0	1.4	1.4	1.0	1.0	0.8	1.4	0.8	0.9	0.6	1.0	0.6	0.8	0.6	Diurnal Maximum



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.7 km/h on Jun 9 17:00 Minimum Value: 0.2 km/h on Jun 10 23:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 1.0 Median = 1.7 Q ₃ = 2.5 P ₉₀ = 3.1 P ₉₉ = 4.0																								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-Jun	2.4	2.6	2.3	2.5	3.0	2.8	2.9	2.7	2.0	1.7	1.8	1.9	2.8	2.7	2.6	2.1	2.5	1.8	1.5	1.6	0.9	0.3	0.4	0.7	3.0
2-Jun	0.4	0.6	0.5	0.4	0.7	0.7	0.9	0.7	1.6	1.6	2.3	2.5	2.4	2.5	1.8	2.6	2.3	2.4	2.2	2.0	0.8	0.5	0.4	0.7	2.6
3-Jun	0.4	0.9	0.4	0.7	0.7	1.2	1.0	1.6	1.9	2.3	3.2	3.6	3.1	1.5	2.3	1.8	3.2	3.6	3.5	3.5	2.8	2.0	1.5	2.0	3.6
4-Jun	1.4	1.4	1.4	1.2	1.4	1.7	1.2	1.4	1.4	1.5	2.1	2.1	2.4	3.0	3.5	3.3	3.2	3.5	3.0	3.0	2.4	2.7	2.6	2.3	3.5
5-Jun	2.7	3.1	3.8	3.5	3.4	3.1	3.1	3.1	2.9	3.5	3.1	3.6	4.0	4.0	3.9	2.5	3.0	2.7	2.6	2.0	2.3	1.6	1.8	1.5	4.0
6-Jun	1.4	1.5	1.1	0.8	0.8	0.6	1.2	1.7	1.6	1.9	2.6	2.5	2.9	2.7	2.8	3.3	2.7	2.7	1.8	1.3	1.1	1.9	1.5	1.2	3.3
7-Jun	1.5	1.7	1.7	1.7	1.4	1.6	0.9	1.6	1.7	2.1	2.1	1.9	2.9	2.5	2.5	2.6	2.0	2.3	1.7	1.1	0.8	0.4	0.4	2.9	
8-Jun	0.2	0.3	0.3	0.5	0.3	0.5	0.8	1.2	1.4	2.2	2.4	3.4	2.9	3.0	2.8	3.0	2.7	2.4	1.6	1.0	1.3	2.0	1.8	2.2	3.4
9-Jun	1.9	1.7	1.4	1.3	0.6	1.7	2.1	2.2	1.7	1.9	2.4	2.5	2.6	3.7	4.4	4.6	4.7	4.7	3.8	2.8	2.3	2.0	1.5	0.9	4.7
10-Jun	1.1	1.1	1.5	1.2	1.3	1.2	1.2	2.2	3.0	3.5	3.3	3.3	3.3	3.0	2.7	2.7	2.3	2.5	1.3	0.7	0.3	0.2	0.2	0.4	3.5
11-Jun	0.4	1.0	1.4	1.0	0.5	0.5	0.8	0.9	0.7	0.8	1.0	2.4	3.0	2.1	2.3	2.8	1.9	1.3	1.1	1.0	0.4	0.2	0.4	0.7	3.0
12-Jun	0.8	0.4	0.3	0.3	0.2	0.4	0.5	1.1	1.8	2.1	2.1	3.3	2.8	3.2	3.4	2.9	2.6	2.3	1.9	1.8	0.9	0.9	1.8	2.6	3.4
13-Jun	2.8	2.9	3.0	2.1	2.4	2.4	2.8	2.5	2.8	2.5	3.1	2.6	2.8	3.0	2.8	3.0	2.5	2.5	2.1	1.6	1.0	1.5	2.1	2.0	3.1
14-Jun	1.7	1.6	1.7	1.5	1.5	1.5	1.7	2.5	2.2	2.6	2.9	3.0	3.5	3.1	3.3	3.5	2.8	2.5	1.6	2.1	1.4	1.0	1.1	1.1	3.5
15-Jun	1.3	0.8	1.0	0.8	1.1	1.4	1.6	1.3	1.7	2.2	3.2	3.4	3.5	3.1	3.1	3.2	3.0	2.3	1.3	1.9	1.4	1.8	1.0	0.4	3.5
16-Jun	0.3	0.3	1.4	1.1	1.2	0.5	0.7	1.1	2.1	2.1	2.3	2.6	2.9	2.9	2.7	2.2	2.4	2.5	2.1	2.8	1.5	1.7	1.5	1.1	2.9
17-Jun	0.7	0.5	0.5	0.5	0.3	0.4	0.9	1.3	1.5	2.0	1.7	2.0	2.5	2.8	2.0	2.3	2.0	1.7	0.7	0.9	0.8	1.0	0.9	0.6	2.8
18-Jun	0.7	0.8	0.5	1.0	1.1	1.4	1.2	1.7	2.4	3.0	2.7	2.5	2.9	3.4	3.1	3.4	3.2	2.5	2.3	2.2	2.2	2.3	2.2	1.9	3.4
19-Jun	1.2	0.9	1.0	0.9	0.6	0.4	1.0	1.1	0.9	1.5	2.3	2.5	2.4	2.2	2.2	1.5	1.2	2.2	1.1	0.9	0.4	0.2	0.5	0.5	2.5
20-Jun	0.9	1.2	0.7	0.5	0.2	0.3	0.5	0.8	1.4	1.3	1.7	1.6	1.8	2.2	2.1	1.9	1.3	1.4	1.2	1.1	0.4	0.4	0.7	0.9	2.2
21-Jun	0.8	0.4	0.5	1.1	1.4	1.2	1.1	1.5	1.4	1.5	1.6	1.8	2.1	1.9	1.8	1.8	1.6	1.6	2.0	1.3	1.2	0.7	1.2	1.0	2.1
22-Jun	1.3	1.4	0.6	0.8	0.7	0.8	1.2	1.2	1.5	2.1	2.0	1.4	1.4	2.1	3.0	3.3	3.0	2.4	2.1	1.7	1.3	1.2	0.7	0.4	3.3
23-Jun	0.3	0.2	0.2	0.2	0.2	0.2	0.5	0.9	1.2	1.2	1.5	1.7	2.4	2.7	2.1	2.7	3.0	2.6	1.8	1.2	0.7	0.5	0.5	1.1	3.0
24-Jun	1.8	1.8	2.1	1.7	2.0	2.0	1.6	1.6	2.0	2.6	2.7	2.8	2.3	2.5	2.5	2.4	1.9	2.0	2.1	1.0	1.7	1.4	1.7	1.8	2.8
25-Jun	2.1	2.0	1.3	1.3	1.4	1.9	1.8	2.4	2.5	2.3	2.7	3.2	3.2	2.1	1.6	2.9	2.0	1.1	0.8	0.8	1.0	0.5	0.3	0.5	3.2
26-Jun	0.6	0.2	0.2	0.2	0.3	0.6	1.4	1.5	1.8	2.2	2.3	2.0	1.1	2.0	1.1	1.4	1.3	1.2	1.2	0.9	0.9	0.6	1.2	0.4	2.3
27-Jun	0.3	0.3	0.4	0.4	0.3	0.7	0.7	0.9	0.9	0.9	1.6	2.1	2.3	2.3	1.8	2.4	2.4	2.5	2.4	1.5	0.6	0.3	0.3	0.8	2.5
28-Jun	0.6	0.4	0.5	0.3	0.3	0.3	0.8	0.9	1.3	1.8	2.0	2.2	2.9	3.2	3.2	3.0	2.7	2.1	1.9	1.9	1.2	1.4	1.6	1.0	3.2
29-Jun	0.7	0.7	0.8	1.1	0.9	0.9	1.2	2.1	2.6	2.3	3.1	3.7	3.9	4.0	3.9	3.8	3.7	3.7	3.2	2.9	2.3	2.2	2.2	2.0	4.0
30-Jun	1.7	1.5	1.2	1.1	1.3	1.7	2.4	2.4	2.5	2.5	2.4	3.3	3.1	3.4	3.1	3.0	3.3	2.6	2.2	1.8	2.0	0.9	0.4	0.6	3.4
2.8 3.1 3.8 3.5 3.4 3.1 3.1 3.1 3.0 3.5 3.3 3.7 4.0 4.0 4.4 4.6 4.7 4.7 3.8 3.5 2.8 2.7 2.6 2.6																									
Diurnal Maximum																									



Summary of Hour Averages

Mannix - June 2014

Maximum Value: 2.9 km/h on Jun 21 19:00		Maximum Daily Average: 1.3 km/h on Jun 21		Hours in Service: 720																						
Minimum Value: -1.6 km/h on Jun 8 11:00		Minimum Daily Average: -0.3 km/h on Jun 9		Hours of Data: 717																						
Maximum Diurnal Average: 0.7 km/h at hour 19		Minimum Diurnal Average: 0.2 km/h at hour 11		Hours of Missing Data: 3																						
Monthly Average: 0.45 km/h		Percentiles: P ₁ = -1.1 P ₁₀ = -0.4 Q ₁ = 0.0 Median = 0.4 Q ₃ = 0.9 P ₉₀ = 1.4 P ₉₉ = 2.2		Hours of Calibration: 0																						
				Percent Operational Time: 99.6																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	-1.5	-1.0	-0.1	-0.1	-0.7	-0.7	-0.7	-0.8	-0.5	-0.2	0.0	-0.2	-0.1	0.8	1.0	0.4	1.0	1.2	0.9	0.6	0.1	0.2	0.7	1.2	0.1	1.2
2-Jun	1.3	1.0	0.6	0.3	0.5	0.3	0.5	0.4	0.6	0.4	1.2	1.6	2.1	2.2	0.6	1.6	0.2	0.3	0.0	0.6	0.1	0.2	-0.2	-0.2	0.7	2.2
3-Jun	-0.2	-0.2	-0.2	-0.1	-0.1	0.2	0.4	0.0	-0.2	-0.1	1.2	1.7	UO	0.4	0.8	-0.2	1.4	1.7	2.3	UO	0.3	0.0	1.5	2.2	0.6	2.3
4-Jun	0.4	0.9	0.8	1.1	0.6	1.1	0.5	0.4	0.4	1.8	0.8	0.5	0.6	0.8	1.3	1.2	0.9	0.9	1.3	1.1	0.0	1.1	0.5	0.8	0.8	1.8
5-Jun	1.0	1.2	2.1	1.4	2.1	1.1	1.1	1.5	1.2	1.5	1.5	1.3	1.4	0.8	1.7	0.8	1.2	0.9	0.9	0.7	1.4	1.4	0.9	1.1	1.3	2.1
6-Jun	1.1	1.9	1.5	0.4	0.3	0.5	-0.4	0.5	0.3	0.5	0.9	-0.2	0.8	-0.3	1.1	1.0	0.7	0.2	0.3	-0.1	-0.1	-0.3	-0.1	-0.4	0.4	1.9
7-Jun	0.1	-0.2	-0.6	-1.1	-0.2	-0.4	-0.1	0.6	-0.4	0.2	0.7	0.5	-0.2	-0.5	0.5	0.5	0.9	1.5	2.1	1.5	0.3	0.6	0.4	0.5	0.3	2.1
8-Jun	0.4	0.3	0.1	0.2	0.3	0.1	0.0	0.2	-0.3	-0.2	-1.6	-0.2	0.1	-0.1	-0.5	-0.8	-0.3	-0.2	-0.2	-0.2	0.2	-0.3	0.1	-0.1	-0.1	0.4
9-Jun	0.2	1.3	1.3	1.3	0.6	-0.5	-0.5	0.3	0.0	-1.1	-1.2	-1.0	-1.6	-0.9	-1.1	-0.7	-0.5	-0.6	-0.5	-0.3	-0.3	-0.4	0.2	-0.1	-0.3	1.3
10-Jun	-0.3	0.1	0.0	0.0	0.0	-0.1	0.0	0.6	1.1	1.1	-0.1	0.4	1.3	-0.2	1.5	2.2	0.9	UO	0.2	1.2	1.4	2.1	2.0	2.5	0.8	2.5
11-Jun	1.9	2.3	1.5	0.7	0.2	0.5	0.5	0.4	0.1	0.6	0.4	0.1	-0.3	0.2	0.7	-0.7	0.2	-0.1	0.8	0.4	0.4	0.4	0.5	0.8	0.5	2.3
12-Jun	0.3	0.8	1.4	0.5	0.2	0.2	0.2	0.2	0.4	0.8	0.1	0.6	-0.3	0.0	0.9	0.1	-0.1	-0.2	0.0	0.1	0.0	-0.2	-0.3	-0.8	0.2	1.4
13-Jun	-0.6	0.0	0.0	0.0	-0.4	0.1	-0.1	-0.5	-0.5	-0.7	-0.3	1.0	-0.2	0.4	0.4	-0.6	-0.6	0.2	0.2	0.5	0.2	0.0	0.1	0.5	0.0	1.0
14-Jun	0.6	0.6	0.3	0.0	-0.4	-0.3	0.4	0.9	0.7	0.1	0.9	0.3	0.6	1.4	1.5	1.7	1.1	1.5	1.2	1.2	1.2	1.1	1.2	1.0	0.8	1.7
15-Jun	1.8	1.4	1.4	1.2	1.6	1.3	1.1	0.0	0.5	0.1	0.2	1.0	-0.1	-1.0	-0.5	-0.2	-0.8	-0.4	-0.8	-0.5	0.0	0.4	0.7	1.0	0.4	1.8
16-Jun	0.7	0.3	-0.5	-0.7	-0.1	-0.2	-0.1	0.1	0.0	-0.1	0.0	0.0	0.3	-0.7	0.3	-0.5	0.0	-0.1	-0.2	-0.8	0.8	0.9	0.8	0.7	0.0	0.9
17-Jun	0.2	0.2	0.2	-0.2	0.2	0.1	0.1	0.4	0.6	0.5	-0.6	-0.7	-0.2	0.0	0.0	0.1	0.0	1.1	0.6	0.9	1.1	1.0	1.2	0.7	0.3	1.2
18-Jun	1.2	1.6	1.5	1.0	0.8	0.7	0.2	0.2	0.5	1.1	-0.3	0.2	-0.1	1.5	-0.2	1.3	1.2	0.5	1.3	1.1	1.0	1.2	1.6	1.3	0.8	1.6
19-Jun	0.9	0.6	0.7	0.7	0.2	0.1	0.0	-0.6	-0.1	0.9	-0.3	-0.9	-0.4	-0.2	-0.4	-0.6	0.4	-0.4	-0.2	0.0	0.0	0.3	1.0	0.5	0.1	1.0
20-Jun	-0.2	0.3	0.1	0.1	0.0	0.2	0.1	0.3	0.2	0.2	0.0	-0.1	-0.4	0.8	-0.5	-0.3	-0.3	-0.1	0.6	-0.3	0.4	0.5	1.1	1.5	0.2	1.5
21-Jun	1.7	1.4	0.5	0.3	-0.3	0.2	0.9	0.5	1.0	0.6	0.5	1.0	1.9	1.9	1.5	1.7	2.2	2.1	2.9	2.5	2.0	1.9	1.1	0.8	1.3	2.9
22-Jun	1.1	0.4	1.7	1.8	1.5	1.6	1.2	0.5	0.9	0.9	0.5	0.1	0.7	1.3	1.3	1.4	1.2	1.1	0.9	0.8	0.4	-0.2	-0.2	-0.1	0.9	1.8
23-Jun	0.0	0.0	0.1	0.2	0.2	0.5	0.3	0.4	0.1	0.2	-0.1	-0.2	-0.3	-0.8	-0.8	0.7	-0.1	-0.3	-0.4	-0.1	0.5	0.5	0.1	-0.7	0.0	0.7
24-Jun	-0.6	-0.6	0.7	0.2	-1.0	-0.7	-0.8	-0.4	-0.3	0.1	-0.4	0.2	0.5	1.1	0.8	-0.2	0.6	1.0	1.1	0.5	0.6	0.8	0.3	0.7	0.2	1.1
25-Jun	1.0	0.6	0.1	0.0	0.2	-0.3	0.0	0.1	-0.4	-0.9	-0.8	-0.5	-0.6	0.9	-0.2	1.2	1.2	0.3	0.0	0.2	1.0	0.7	0.4	0.2	0.2	1.2
26-Jun	0.3	0.1	0.2	0.1	0.3	0.2	0.2	0.4	0.2	0.7	1.0	0.4	0.1	0.3	0.3	0.3	0.0	1.1	1.2	0.7	0.3	0.3	-0.2	0.2	0.4	1.2
27-Jun	0.5	0.1	0.1	0.0	0.0	-0.1	-0.1	0.0	0.0	0.1	0.1	-0.8	1.2	-0.2	0.0	0.2	0.8	0.1	0.5	0.1	0.2	0.8	0.8	0.6	0.2	1.2
28-Jun	0.0	-0.2	-0.1	0.1	0.1	0.3	0.1	-0.1	-0.4	0.4	0.0	1.7	1.3	0.6	0.6	0.9	0.8	0.7	1.5	1.4	0.5	0.0	1.5	0.1	0.5	1.7
29-Jun	0.5	0.8	0.9	1.1	0.7	0.4	1.6	0.8	1.1	0.3	1.9	0.9	1.6	0.8	1.0	1.4	0.9	1.0	1.3	1.2	1.4	1.4	1.4	1.0	1.1	1.9
30-Jun	1.3	1.5	1.6	1.4	1.5	1.4	1.3	1.4	0.9	0.5	0.7	1.8	0.9	1.2	1.0	1.2	2.1	0.4	0.0	0.8	1.4	0.4	0.0	0.0	1.0	2.1
																								Diurnal Average		
																								Diurnal Maximum		
UO - Unstable Operation																										



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4.2 km/h on Jun 5 13:00			Hours of Data:	717
Minimum Value: 0.2 km/h on Jun 27 05:00			Hours of Missing Data:	3
Percentiles: P ₁ = 0.3 P ₁₀ = 0.5 Q ₁ = 1.0 Median = 1.7 Q ₃ = 2.4 P ₉₀ = 3.1 P ₉₉ = 3.9			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-Jun	2.5	2.5	2.1	2.5	2.4	2.3	2.8	2.8	1.9	1.8	1.8	1.9	2.4	2.7	2.7	2.2	2.5	1.8	1.6	1.8	0.9	0.3	0.5	0.8	2.8	
2-Jun	0.5	0.8	0.7	0.5	0.8	0.6	1.2	0.7	1.4	1.7	2.4	2.4	2.5	2.9	1.9	2.8	2.3	2.2	2.1	1.9	0.8	0.4	0.4	0.8	2.9	
3-Jun	0.4	0.8	0.4	0.5	0.8	1.3	1.0	1.7	2.0	2.3	3.1	3.7	UO	1.5	2.4	1.9	3.3	3.4	3.5	UO	3.0	2.0	1.7	2.0	3.7	
4-Jun	1.3	1.5	1.3	1.3	1.6	1.8	1.2	1.4	1.4	1.5	2.1	2.1	2.4	3.0	3.7	3.4	3.2	3.6	3.2	3.1	2.5	2.9	2.7	2.2	3.7	
5-Jun	2.6	3.1	3.9	3.7	3.6	3.1	3.0	3.2	2.7	3.6	3.3	3.8	4.2	4.0	3.9	2.5	3.0	2.5	2.5	2.0	2.2	1.5	1.8	1.6	4.2	
6-Jun	1.4	1.4	1.5	0.9	0.9	0.7	1.2	1.8	1.7	2.0	2.6	2.6	3.1	2.9	3.1	3.5	2.9	2.8	2.0	1.1	0.9	1.2	1.3	1.1	3.5	
7-Jun	1.2	1.4	1.5	1.5	1.1	1.5	0.9	1.7	1.7	2.2	2.0	2.1	2.9	2.5	2.6	2.6	2.6	2.0	2.2	2.0	1.2	1.1	0.5	0.4	2.9	
8-Jun	0.3	0.3	0.3	0.5	0.3	0.4	0.8	1.1	1.2	1.8	2.3	3.2	2.5	2.8	2.3	2.5	2.2	2.1	1.4	0.9	1.3	2.0	1.8	2.1	3.2	
9-Jun	1.8	1.7	1.4	1.3	0.7	1.3	1.7	1.8	1.8	1.9	2.5	2.5	2.7	3.1	3.3	3.4	3.4	3.4	2.8	2.2	1.8	1.6	1.3	0.7	3.4	
10-Jun	1.1	1.2	1.5	1.2	1.3	1.3	1.3	2.1	3.2	3.7	3.5	3.6	3.6	2.6	2.8	2.6	2.6	UO	1.4	0.8	0.3	0.3	0.2	0.6	3.7	
11-Jun	0.5	1.1	1.6	1.1	0.6	0.6	0.8	1.0	0.7	0.9	0.9	2.4	3.7	2.3	2.1	2.2	1.8	1.3	1.1	1.0	0.4	0.3	0.5	0.8	3.7	
12-Jun	0.9	0.5	0.5	0.5	0.3	0.4	0.5	1.1	1.8	2.2	2.3	3.6	3.0	3.4	3.7	3.1	2.9	2.4	1.8	1.7	0.9	0.8	1.7	2.2	3.7	
13-Jun	2.4	2.4	2.4	1.8	2.1	2.2	2.2	2.0	2.4	2.3	2.7	2.5	3.0	2.9	2.9	2.5	2.4	2.5	2.2	1.7	0.8	1.4	2.1	1.9	3.0	
14-Jun	1.5	1.3	1.5	1.3	1.3	1.3	1.6	2.6	2.4	2.6	3.0	3.1	3.7	3.3	3.5	3.5	2.9	2.5	1.5	2.0	1.5	1.1	1.2	1.2	3.7	
15-Jun	1.2	0.8	1.1	0.9	1.0	1.2	1.5	1.2	1.6	2.0	3.0	3.4	2.9	2.8	2.7	3.0	2.6	2.4	2.1	1.7	1.3	1.8	0.9	0.3	3.4	
16-Jun	0.3	0.3	0.9	1.1	0.9	0.6	0.5	1.2	2.1	2.3	2.4	2.7	2.8	2.9	2.4	2.1	2.3	2.3	1.8	2.0	1.5	1.9	1.6	1.2	2.9	
17-Jun	0.8	0.6	0.6	0.5	0.4	0.4	0.8	1.3	1.5	2.0	1.6	1.8	2.5	2.8	1.9	2.3	2.1	1.8	0.6	0.8	0.7	0.9	1.0	0.7	2.8	
18-Jun	0.6	0.6	0.4	0.9	1.0	1.2	1.0	1.7	2.4	3.3	2.7	2.4	2.9	3.4	3.2	3.4	3.4	2.5	2.3	2.1	2.1	2.3	2.0	1.8	3.4	
19-Jun	1.0	0.7	0.8	0.7	0.6	0.4	0.9	1.0	0.9	1.7	2.4	2.2	2.2	2.0	2.1	1.4	1.2	1.8	1.1	0.8	0.5	0.4	0.7	0.7	2.4	
20-Jun	0.9	1.1	0.6	0.5	0.2	0.4	0.5	0.8	1.2	1.2	1.7	1.7	1.5	2.3	2.2	1.9	1.3	1.4	1.2	1.2	0.5	0.5	0.9	1.1	2.3	
21-Jun	0.7	0.6	0.7	1.1	1.4	1.3	1.0	1.6	1.2	1.3	1.6	1.9	2.0	1.9	1.8	1.6	1.4	1.4	1.8	1.2	1.3	0.8	1.3	1.3	2.0	
22-Jun	1.2	1.4	0.6	0.9	0.8	0.9	1.2	1.1	1.5	2.1	2.1	1.4	1.5	2.2	3.0	3.3	3.1	2.5	2.2	1.8	1.3	1.0	0.7	0.4	3.3	
23-Jun	0.3	0.2	0.3	0.3	0.3	0.4	0.6	1.0	1.0	1.3	1.4	1.7	2.2	2.4	2.1	3.0	2.8	2.1	1.2	1.1	0.7	0.5	0.5	1.0	3.0	
24-Jun	1.7	1.6	1.9	1.7	2.0	2.0	1.5	1.4	1.9	2.7	2.5	2.8	2.5	2.4	2.6	2.5	1.8	1.9	2.1	1.0	1.5	1.3	1.7	1.6	2.8	
25-Jun	1.7	1.7	1.0	0.9	1.1	1.6	1.8	2.6	2.5	2.3	2.6	3.1	3.0	2.2	1.3	3.0	2.3	1.0	0.6	0.9	1.0	0.5	0.4	0.6	3.1	
26-Jun	0.7	0.2	0.3	0.2	0.3	0.6	1.4	1.5	1.8	2.3	2.4	2.2	1.2	2.1	1.3	1.4	1.1	1.2	1.2	0.9	1.0	0.5	0.9	0.4	2.4	
27-Jun	0.5	0.3	0.4	0.4	0.2	0.5	0.6	0.8	0.8	0.8	1.6	1.9	2.4	2.2	1.7	2.4	2.7	2.4	2.5	1.5	0.7	0.5	0.5	0.9	2.7	
28-Jun	0.7	0.4	0.5	0.3	0.2	0.4	0.7	0.7	1.2	1.8	2.2	2.3	3.0	3.4	3.4	3.1	2.7	2.3	1.9	1.9	1.2	1.6	1.6	1.3	3.4	
29-Jun	0.9	0.7	0.7	0.9	1.0	0.9	1.2	2.1	2.7	2.4	3.0	3.7	4.2	4.1	4.0	3.9	3.6	3.6	3.1	2.8	2.2	1.9	2.1	1.8	4.2	
30-Jun	1.7	1.6	1.4	1.3	1.4	1.9	2.3	2.4	2.5	2.5	2.6	3.4	3.1	3.5	3.2	3.2	3.4	2.8	2.2	1.8	2.0	0.8	0.4	0.6	3.5	
	2.6	3.1	3.9	3.7	3.6	3.1	3.0	3.2	3.2	3.7	3.5	3.8	4.2	4.1	4.0	3.9	3.6	3.6	3.5	3.1	3.0	2.9	2.7	2.2		
Diurnal Maximum																										

UO - Unstable Operation



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 9, 2014	Previous Calibration	May 9, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	11:05	End Time (MST)	13:38
Barometric Pressure	724 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	-645	-645
Analyzer Range (mv)	5000	5000	Lamp voltage	804	804
Calculated slope	1.010329	0.999850	Chamber temp.	44.4	44.3
Calculated intercept	-0.037976	0.250721	Pressure (mmHg)	691.0	690.4
Analyzer Background	16.5	16.5	Flow (lpm)	0.499	0.499
Analyzer Coefficient	0.776	0.776	Intensity	25xxx	25xxx

Analyzer make TEI 43C Analyzer serial # 613516797

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	58.8	599.8	599.0	1.001
calibrator zero	5000	0.0	0.0	-0.2	0.000
high point	5000	58.8	599.8	599.0	1.001
second point	5000	29.4	299.9	301.6	0.994
third point	5000	14.7	149.9	148.3	1.011
calibrator zero					
as left zero	5000	0.0	0.0	0.1	0.000
as left span	5000	58.8	599.8	609.5	0.984
Average Correction Factor					1.002

Corrected As found 599.1 Previous response 593.7 % change -0.9%

Notes:

No adjustments. As Finds used for Calibrator Zero and High Point.

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

SO₂ Calibration Summary

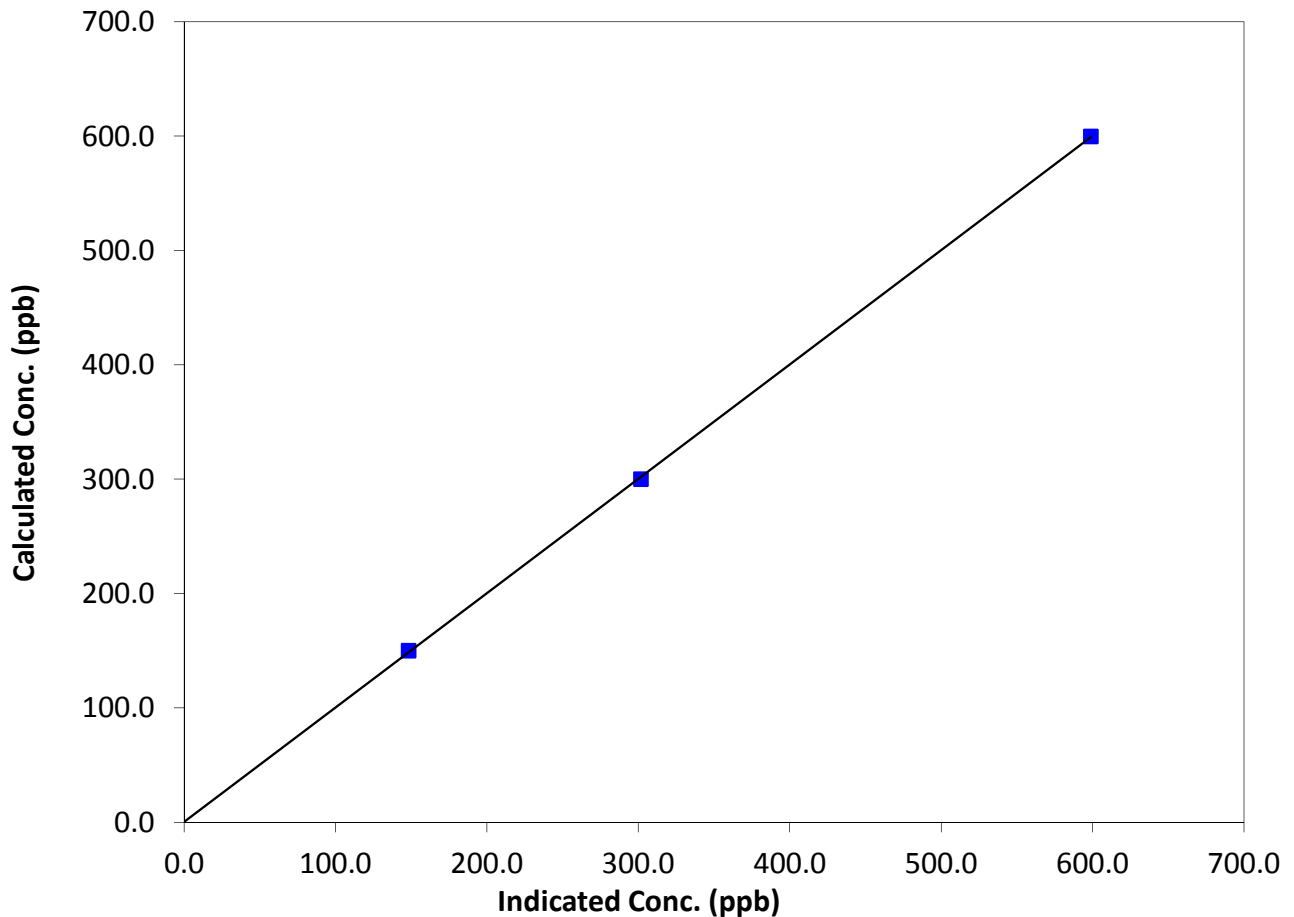
Station Information

Calibration Date	June 9, 2014	Previous Calibration	May 9, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:05	End Time (MST)	13:38
Analyzer make	TEI 43C	Analyzer serial #	613516797

Calibration Data

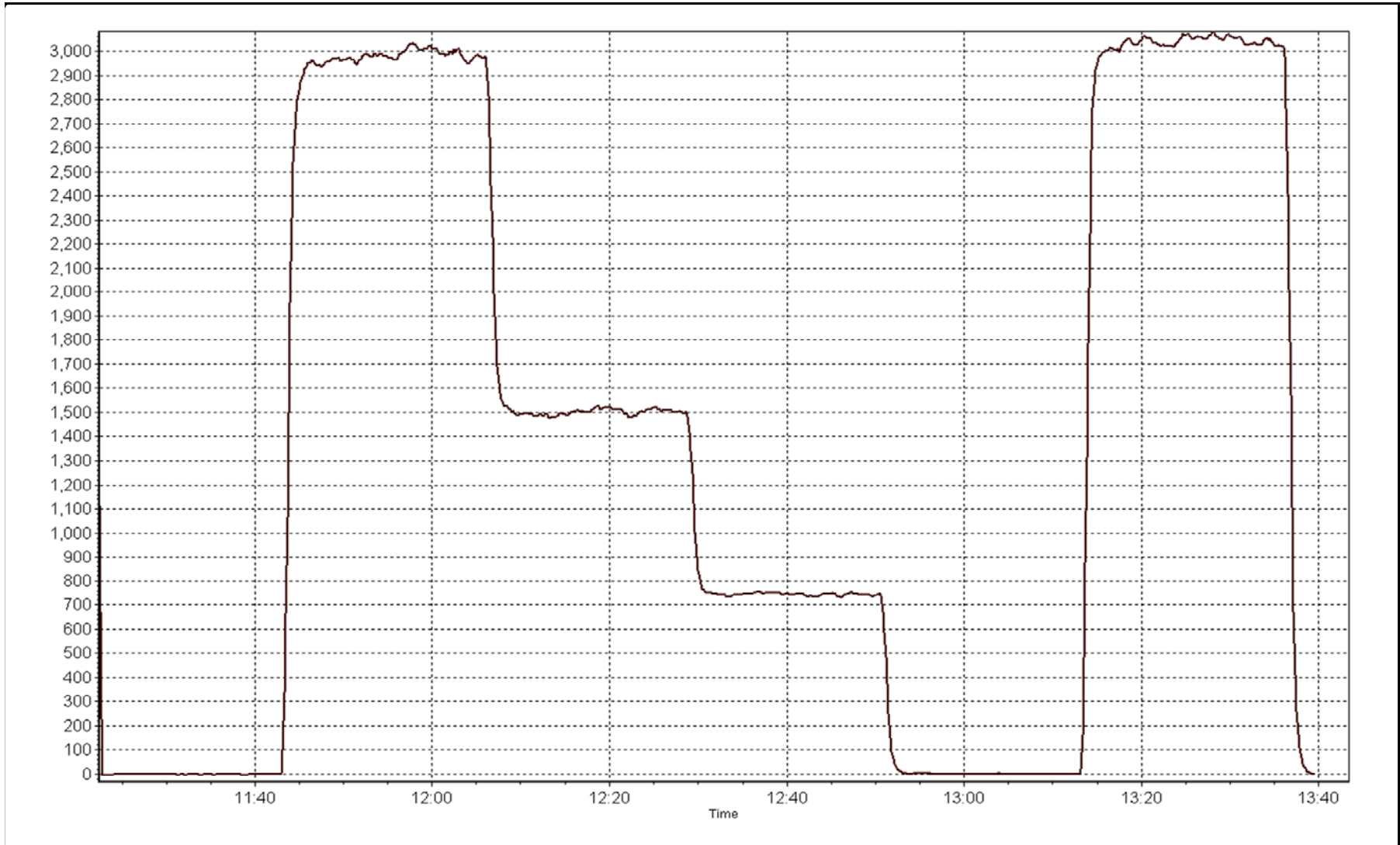
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999968
599.8	599.0	1.0013		
299.9	301.6	0.9942	Slope	0.999850
149.9	148.3	1.0110		
			Intercept	0.250721

SO₂ Calibration Curve



SO2 Calibration Plot

Date: June 9, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	June 12, 2014	Previous Calibration	May 8, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	11:42	End Time (MST)	14:12
Barometric Pressure	734 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	885	881
Calculated slope	0.993062	1.006188	Chamber temp.	45	45
Calculated intercept	-0.175412	-0.285667	Pressure	487.1	490.2
Analyzer Background	14.7	14.6	Flow	1.016	1.021
Analyzer Coefficient	1.110	1.11	Intensity (%)	115	115
			Converter temp.	325	327

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.22	NA
as found span	5000	36.8	75.1	74.7	1.004
SO2 scrubber check	5000	29.4	299.9	2.0	NA
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	36.8	75.1	74.7	1.004
second point	5000	20.6	42.0	42.4	0.991
third point	5000	12.3	25.1	25.1	1.000
calibrator zero					
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	36.8	75.1	74.9	1.003
Average Correction Factor					0.999

Corrected As found	74.5	Previous response	75.8	% change	1.7%
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Notes:

As Finds used for calibrator zero and high point. Scrubber check after third point. No adjustments needed

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

H2S Calibration Summary

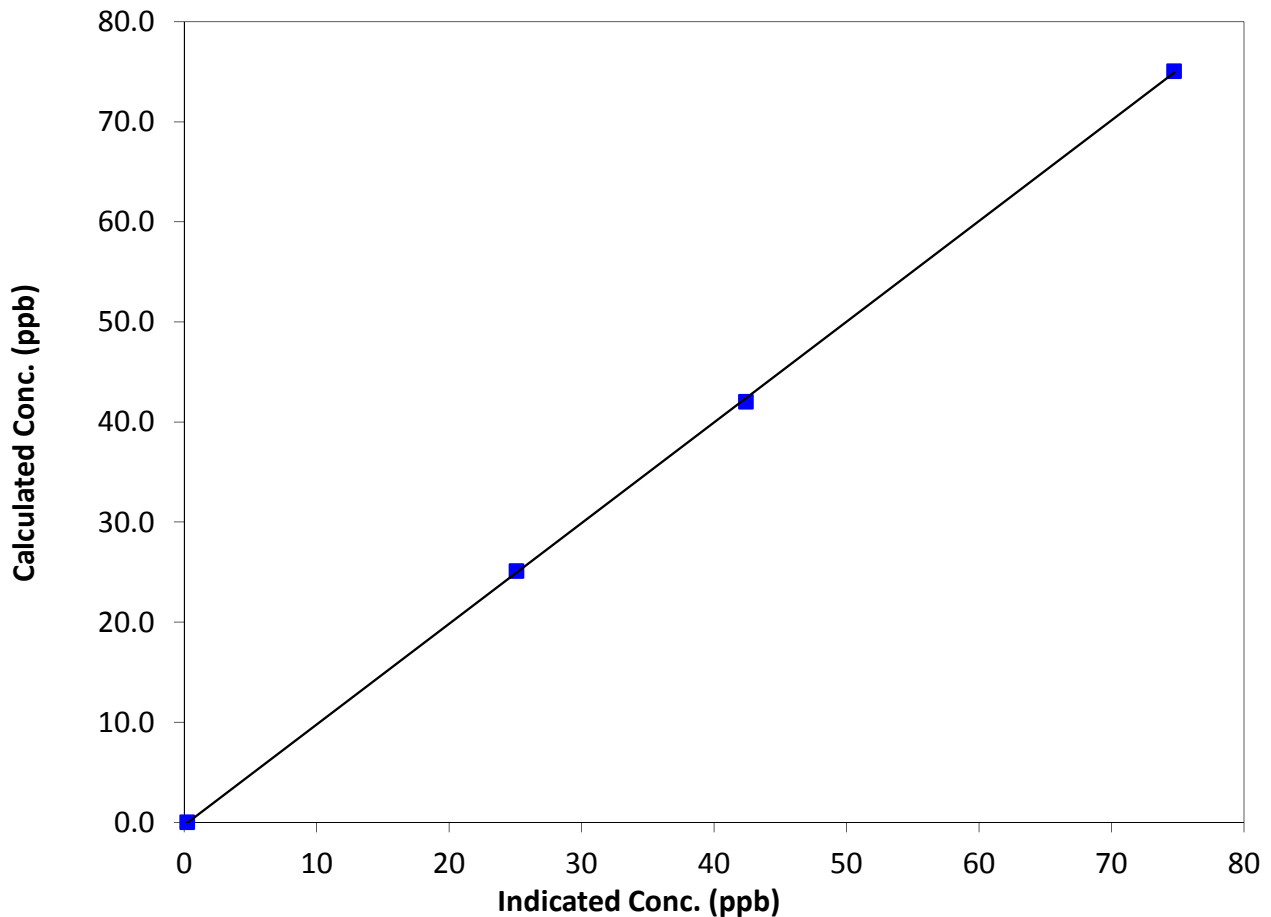
Station Information

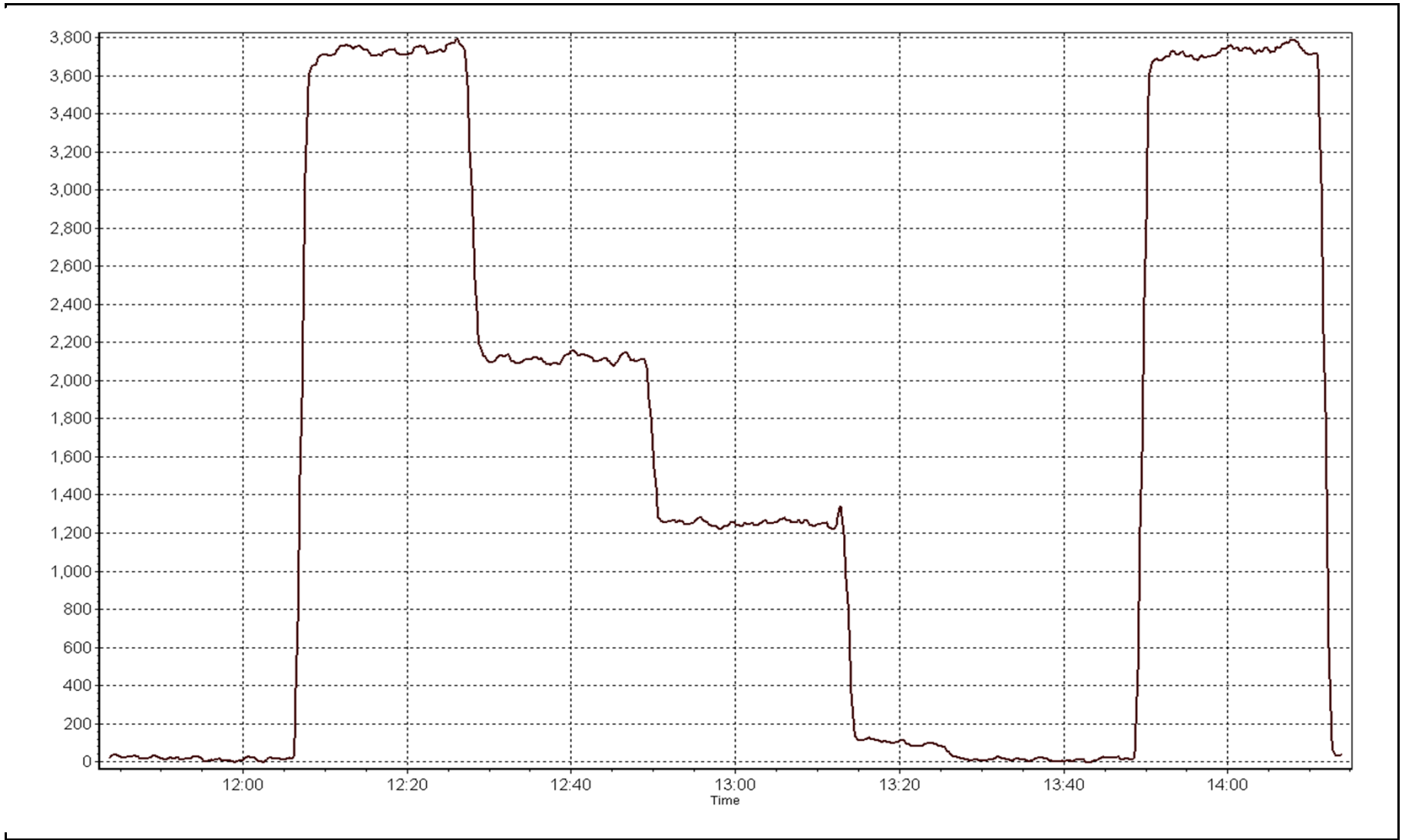
Calibration Date	June 12, 2014	Previous Calibration	May 8, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:42	End Time (MST)	14:12
Analyzer make	TEI 450i	Analyzer serial #	815129108

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999943
75.1	74.7	1.0044		
42.0	42.4	0.9911	Slope	1.006188
25.1	25.1	1.0001		
			Intercept	-0.285667

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Tuesday, June 03, 2014	Previous Calibration	Thursday, May 29, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	13:00
Barometric Pressure	725 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	8.8	8.7
Analyzer Range (mv)	5000	5000	Air	38.0	38.0
Calculated slope	0.995738	1.005976	Fuel Pressure	26.3	26.3
Calculated intercept	0.125299	0.006046	Detector Temp	151.5	125.0
Bkg	0.000000	0.18	Flame Temp	141.0	151.7
Slope	4.910000	4.803			

Analyzer make	TEI 51i-LT	Analyzer serial #	1327059295
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.35	N/A
as found span	5000	58.8	12.72	13.20	0.964
calibrator zero	5000	0.0	0.00	-0.03	N/A
high point	5000	58.8	12.72	12.60	1.009
second point	5000	29.0	6.27	6.32	0.993
third point	5000	14.7	3.18	3.12	1.019
calibrator zero	5000	0.0	0.00		N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	58.8	12.72	12.82	0.992
Average Correction Factor					1.007

Corrected As found	12.84	Previous response	12.65	% change	-1.5%
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Notes:

After As Finds, Adjusted voltage range from 10 to 5v. More precise zero now. Zero and span both adjusted. Filter changed during As Lefts.

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

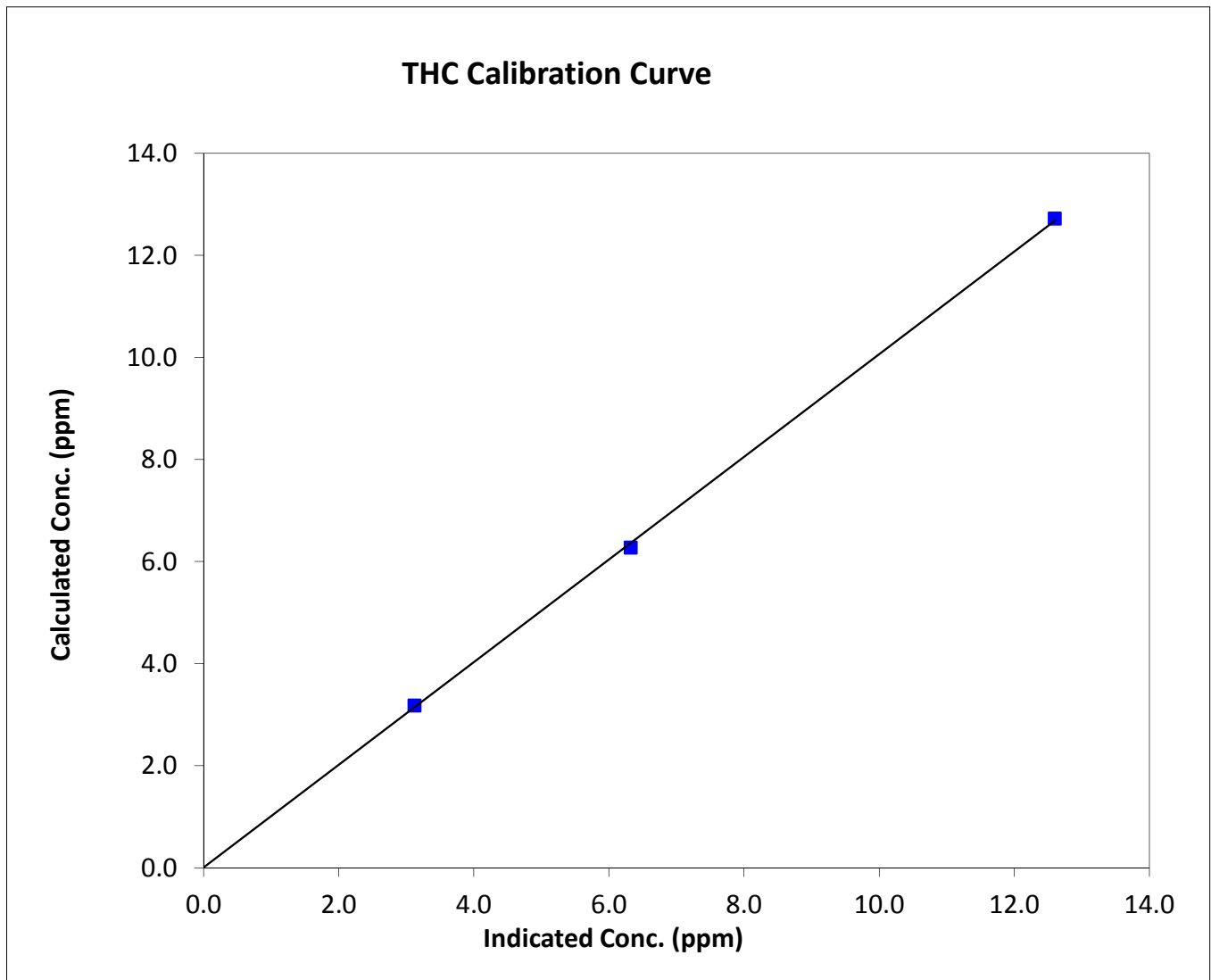
THC Calibration Summary

Station Information

Calibration Date	June 3, 2014	Previous Calibration	May 29, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:10	End Time (MST)	13:00
Analyzer make	TEI 51i-LT	Analyzer serial #	1327059295

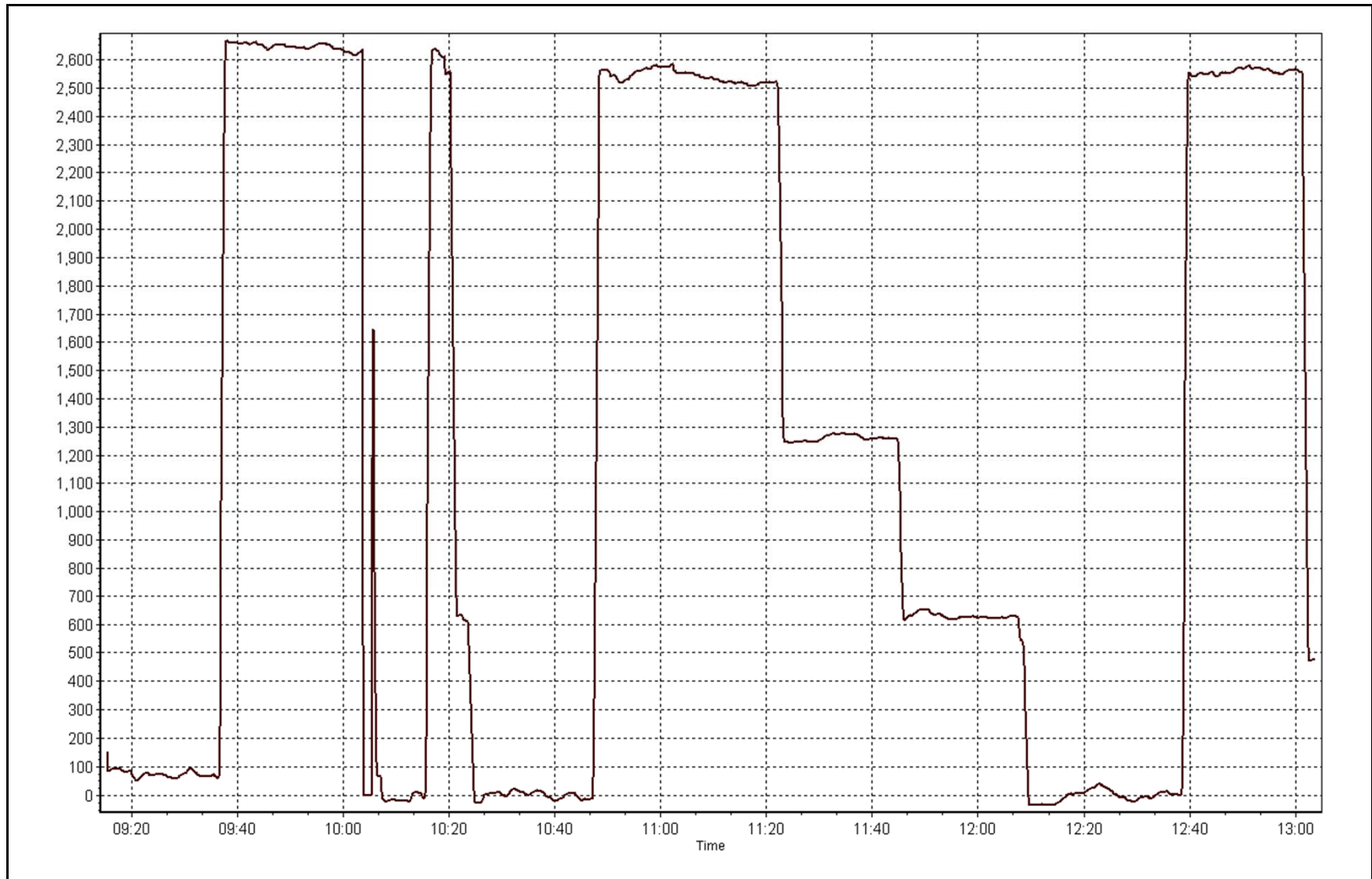
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	N/A	Correlation Coefficient	0.999872
12.72	12.60	1.0094		
6.27	6.32	0.9925	Slope	1.005976
3.18	3.12	1.0191		
			Intercept	0.006046



THC Calibration Plot

Date: June 3, 2014





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Friday, June 06, 2014	Previous Calibration	Tuesday, June 03, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Removal		
Start Time (MST)	9:55	End Time (MST)	12:00
Barometric Pressure	725 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	8.7	8.7
Analyzer Range (mv)	5000	5000	Air	38.0	38.0
Calculated slope	1.005976	1.081201	Fuel Pressure	26.3	26.3
Calculated intercept	0.006046	-0.140448	Detector Temp	125.0	125.0
Bkg	0.180000	0.18	Flame Temp	151.5	151.7
Slope	4.803000	4.803			

Analyzer make TEI 51i-LT Analyzer serial # 1327059295

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.13	N/A
as found span	5000	58.8	12.72	11.89	1.069
calibrator zero	5000	0.0	0.00	0.13	N/A
high point	5000	58.8	12.72	11.89	1.069
second point	5000	29.0	6.27		
third point	5000	14.7	3.18		
calibrator zero	5000	0.0	0.00		N/A
as left zero	5000	0.0	0.00		N/A
as left span	5000	58.8	12.72		
Average Correction Factor					1.069

Corrected As found 11.76 Previous response 12.64 % change 7.4%

Notes:

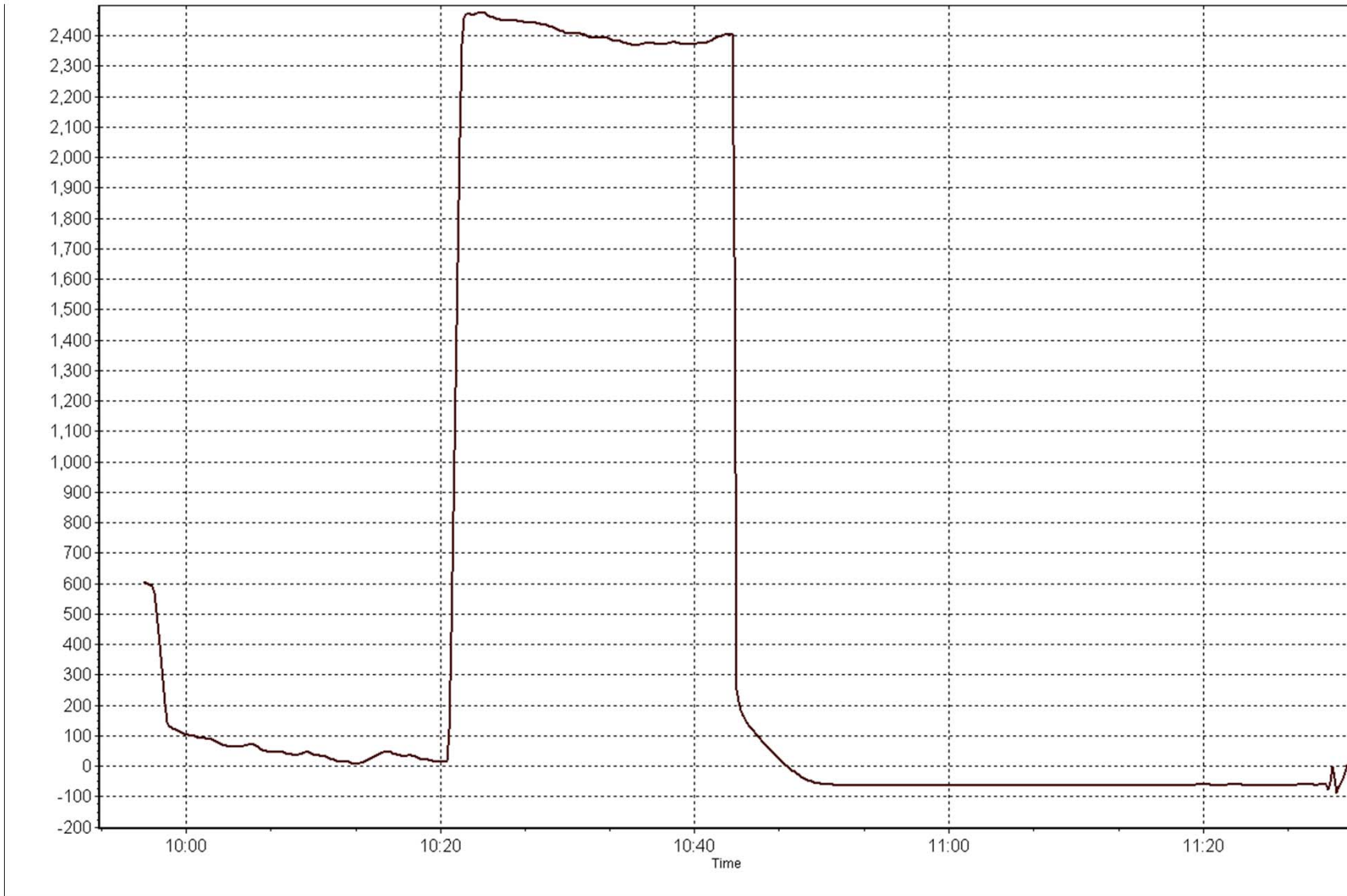
Removal cal, instrument not performing as it should. Will take back to shop for testing

Calibration Performed By:

Ryan Power

THC Calibration Plot

Date: June 6, 2014





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Friday, June 06, 2014	Previous Calibration	NA
Station Name	Mannix	Station Number	AMS 5
Reason:	Install		
Start Time (MST)	12:35	End Time (MST)	14:54
Barometric Pressure	725 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	na	11.6
Analyzer Range (mv)	5000	5000	Air	na	41.7
Calculated slope	na	0.992457	Fuel Pressure	na	20.2
Calculated intercept	na	0.036129	Detector Temp	na	124.8
Bkg	na	2.45	Flame Temp	na	164.1
Slope	na	1.778			

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		N/A
as found span	5000	58.8	12.72		
calibrator zero	5000	0.0	0.00	-0.04	N/A
high point	5000	58.8	12.72	12.75	0.997
second point	5000	29.0	6.27	6.36	0.986
third point	5000	14.7	3.18	3.13	1.017
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	12.92	0.984
Average Correction Factor					1.000

Corrected As found NA Previous response NA % change NA

Notes:

New analyzer installed. Removed unit sn: 1327059295, to be taken to shop for testing.

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

THC Calibration Summary

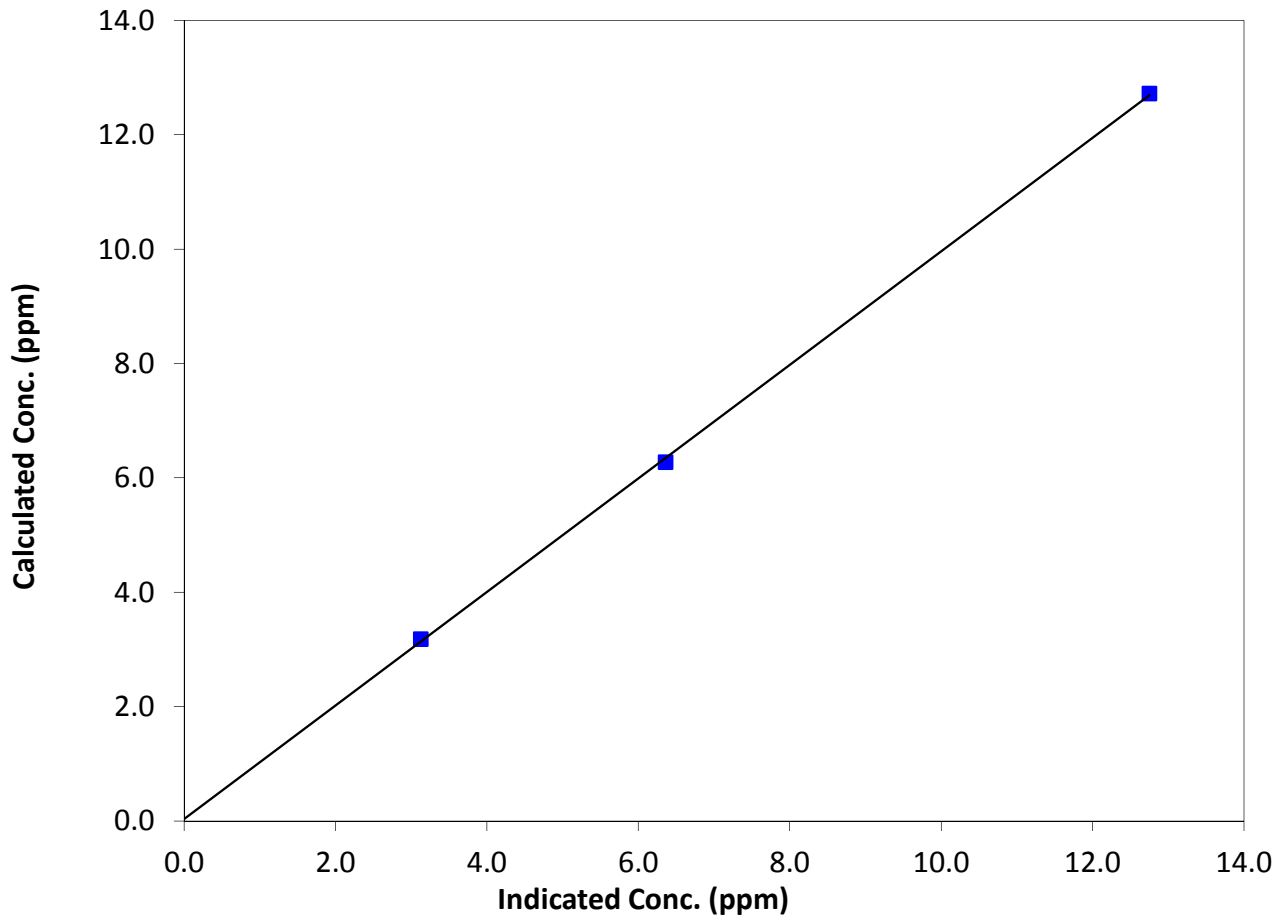
Station Information

Calibration Date	June 6, 2014	Previous Calibration	NA
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	12:35	End Time (MST)	14:54
Analyzer make	TEI 51i-LT	Analyzer serial #	1317958295

Calibration Data

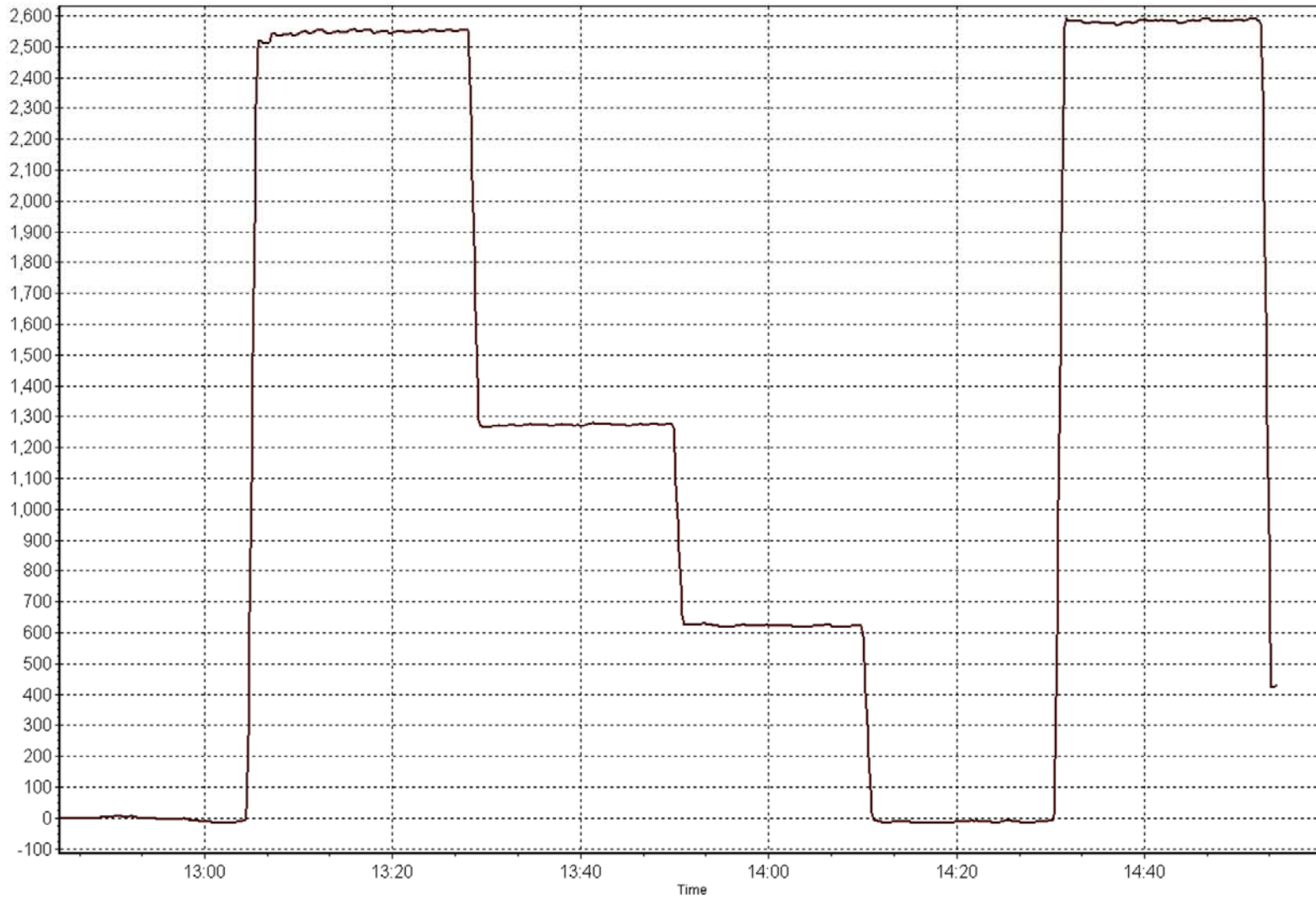
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	N/A	Correlation Coefficient	0.999907
12.72	12.75	0.9974		
6.27	6.36	0.9863	Slope	0.992457
3.18	3.13	1.0175		
			Intercept	0.036129

THC Calibration Curve



THC Calibration Plot

Date: June 6, 2014



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 6
PATRICIA MCINNES
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)

JUNE 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	36	39	99.58	16	0	5	0
TRS (ppb) Average	682	35	38	99.58	2	0	1	0
THC (ppm) Average	581	32	139	85.14	2.5	-	2.1	-
NMHC(ppm) Average	581	32	139	85.14	0.268	-	0.046	-
CH4(ppm) Average	581	32	139	85.14	2.5	-	2.1	-
O3 (ppb) Average	680	36	40	99.44	60	0	37	-
NO2 (ppb) Average	681	36	39	99.58	17	0	7	-
NO (ppb) Average	681	36	39	99.58	12	-	3	-
NOX (ppb) Average	681	36	39	99.58	25	-	9	-
NH3 (ppb) Average	648	39	72	95.42	0	0	0	-
PM2.5 (ug/m3) Average	704	0	16	97.78	49.8	-	29.3	0
Temperature 2 m (C) Average	720	0	0	100.00	26.4	-	21.3	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	-	-
Wind Speed 10 m (km/h) Average	719	0	1	99.86	27	-	-	-
Wind Direction 10 m (deg) Average	719	0	1	99.86	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
 JUNE 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	1.2	2	-	0	0	0	0	1	3	16
TRS (ppb) Average	682	0.3	0	-	0	0	0	0	0	0	2
THC (ppm) Average	581	1.96	0.1	-	1.9	1.9	1.9	1.9	2	2.1	2.5
NMHC(ppm) Average	581	0.002	0.02	-	0	0	0	0	0	0	0.268
CH4(ppm) Average	581	1.96	0.1	-	1.9	1.9	1.9	1.9	2	2.1	2.5
O3 (ppb) Average	680	26.9	10	-	2	13	20	27	34	40	60
NO2 (ppb) Average	681	3	3	-	0	1	1	2	4	7	17
NO (ppb) Average	681	1.1	2	-	0	0	0	1	1	2	12
NOX (ppb) Average	681	4.1	4	-	0	1	2	3	5	9	25
NH3 (ppb) Average	648	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	704	7.35	6.9	-	0.1	2.3	3.5	5.3	8.8	13.4	49.8
Temperature 2 m (C) Average	720	15.91	5.3	-	2.9	8.8	11.8	16	20	23	26.4
Relative Humidity (%) Average	720	65	21	-	18	36	48	67	82	93	98
Wind Speed 10 m (km/h) Average	719	9.5	5	-	0	4	6	9	12	17	27
Wind Direction 10 m (deg) Average	719	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	29 Jun 2014 18:00	29 Jun 2014 20:00	3	Station Power Failure
NMHC, CH4, THC	05 Jun 2014 14:00	05 Jun 2014 15:00	2	Maintenance - replaced carrier gas
NMHC, CH4, THC	19 Jun 2014 10:00	19 Jun 2014 15:00	6	Maintenance - setup diagnostic information collection
NMHC, CH4, THC	20 Jun 2014 17:00	21 Jun 2014 09:00	17	Analyzer failure - retention time misalignment
NMHC, CH4, THC	21 Jun 2014 10:00	21 Jun 2014 15:00	6	Maintenance - replace analyzer
NMHC, CH4, THC	21 Jun 2014 16:00	23 Jun 2014 09:00	42	Analyzer Failure - stabilization period after install
NMHC, CH4, THC	23 Jun 2014 10:00	24 Jun 2014 15:00	30	Maintenance - column bake out
NMHC, CH4, THC	29 Jun 2014 18:00	29 Jun 2014 21:00	4	Station Power Failure
O3	10 Jun 2014 10:00	10 Jun 2014 10:00	1	Power spike
NH3	01 Jun 2014 05:00	30 Jun 2014 05:00	30	Stabilization after daily span
PM2.5	04 Jun 2014 12:00	04 Jun 2014 12:00	1	Unstable operation - baseline drift
PM2.5	04 Jun 2014 19:00	05 Jun 2014 04:00	10	Unstable operation - baseline drift
PM2.5	10 Jun 2014 11:00	10 Jun 2014 12:00	2	Flow and zero reference checks, sample head cleaning
Wind Speed, Wind Direction	23 Jun 2014 23:00	23 Jun 2014 23:00	1	Flatline in sensor output signal

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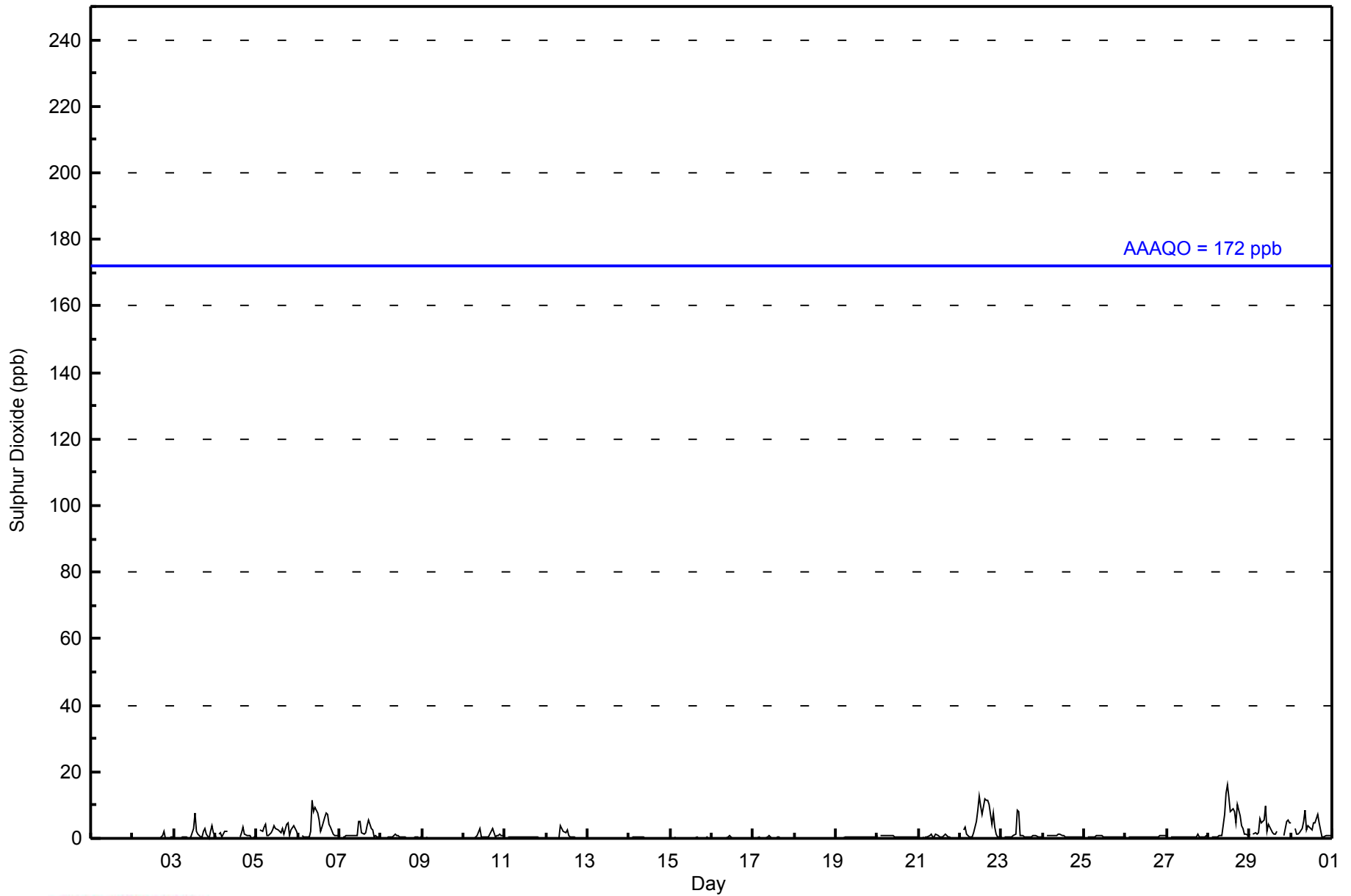


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 720																																		
Maximum Value: 16 ppb on Jun 28 12:00														Maximum Daily Average: 5.0 ppb on Jun 22																																		
Minimum Value: 0 ppb on Jun 2 14:00														Minimum Daily Average: 0.0 ppb on Jun 13																																		
Maximum Diurnal Average: 2.2 ppb at hour 12														Minimum Diurnal Average: 0.5 ppb at hour 5																																		
Monthly Average: 1.2 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 11																																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0.2	2																						
3-Jun	0	Z	0	0	0	0	0	0	0	0	0	3	8	2	1	0	0	2	3	1	0	2	4	2	1.4	8																						
4-Jun	0	Z	1	2	0	2	2	2	C	C	C	C	C	C	1	0	2	3	1	1	1	0	0	1	--	3																						
5-Jun	0	Z	3	2	3	4	1	1	1	3	4	3	2	2	2	3	1	4	5	1	2	4	3	2	2.5	5																						
6-Jun	1	Z	1	1	1	1	1	2	12	8	9	8	6	2	4	6	7	7	4	4	1	1	1	1	3.7	12																						
7-Jun	1	Z	1	1	1	1	1	1	1	1	1	5	5	1	1	2	4	5	3	2	0	1	1	0	1.7	5																						
8-Jun	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																						
9-Jun	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																						
10-Jun	0	Z	0	0	0	0	0	0	1	3	0	0	0	0	0	1	2	3	0	1	1	1	1	1	0.8	3																						
11-Jun	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
12-Jun	0	Z	0	0	0	0	0	0	4	3	2	2	3	1	0	0	0	0	0	0	0	0	0	0	0.7	4																						
13-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																						
14-Jun	0	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-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
17-Jun	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
18-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.4	1																						
20-Jun	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																						
21-Jun	0	Z	0	0	0	1	1	1	1	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0.5	1																						
22-Jun	0	Z	3	3	1	0	0	0	2	5	9	13	10	7	12	11	11	10	4	7	3	1	0	0	5.0	13																						
23-Jun	0	Z	0	0	0	0	1	1	1	9	8	1	1	1	1	0	1	1	1	1	1	1	1	1	1.3	9																						
24-Jun	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.7	1																						
25-Jun	0	Z	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																						
26-Jun	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	0.6	1																						
27-Jun	1	Z	1	0	1	1	1	1	1	1	1	0	0	1	1	0	1	1	1	0	0	0	1	1	0.6	1																						
28-Jun	1	Z	1	0	0	1	1	1	1	7	13	16	12	8	9	8	5	10	7	4	3	1	1	1	4.8	16																						
29-Jun	1	Z	1	2	1	2	6	5	5	10	2	4	3	2	1	1	2	PF	PF	PF	1	5	6	5	3.2	10																						
30-Jun	5	Z	3	1	1	2	3	5	8	2	4	3	3	5	5	7	5	3	1	1	1	1	1	1	3.0	8																						
																								0.5	--	0.6	0.6	0.5	0.6	0.7	0.8	1.5	2.0	2.1	2.2	2.0	1.2	1.4	1.6	1.5	1.8	1.2	0.9	0.6	0.7	0.8	0.6	Diurnal Average
																								5	--	3	3	3	4	6	5	12	10	13	16	12	8	12	11	11	10	7	7	3	5	6	5	Diurnal Maximum
Z - zerospan C - Calibration PF - Power Failure																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	673	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: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

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

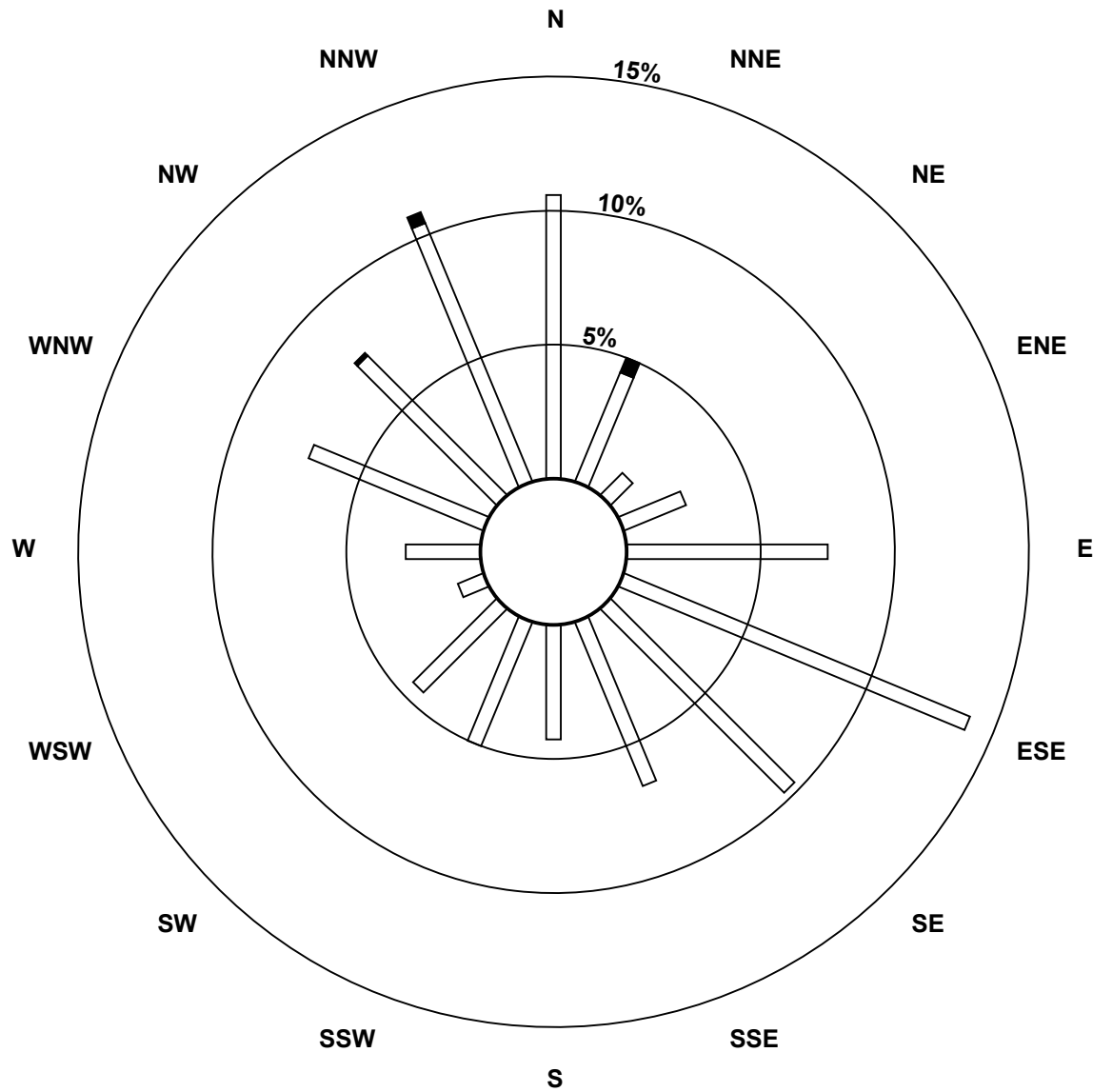
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	72	30	8	17	51	95	66	45	29	34	30	7	19	48	50	71	672
11 - 20	0	4	0	0	0	0	0	0	0	0	0	0	0	0	1	3	8
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	72	34	8	17	51	95	66	45	29	34	30	7	19	48	51	74	680

Total Number of Valid Hours: 680

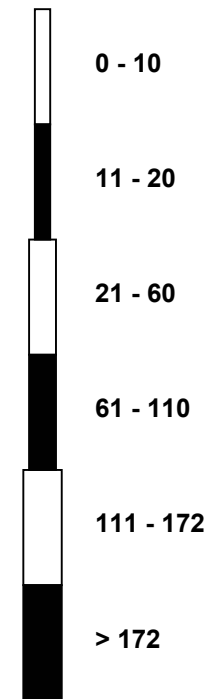
Total Number of Hours: 720

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

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



Classes (ppb)

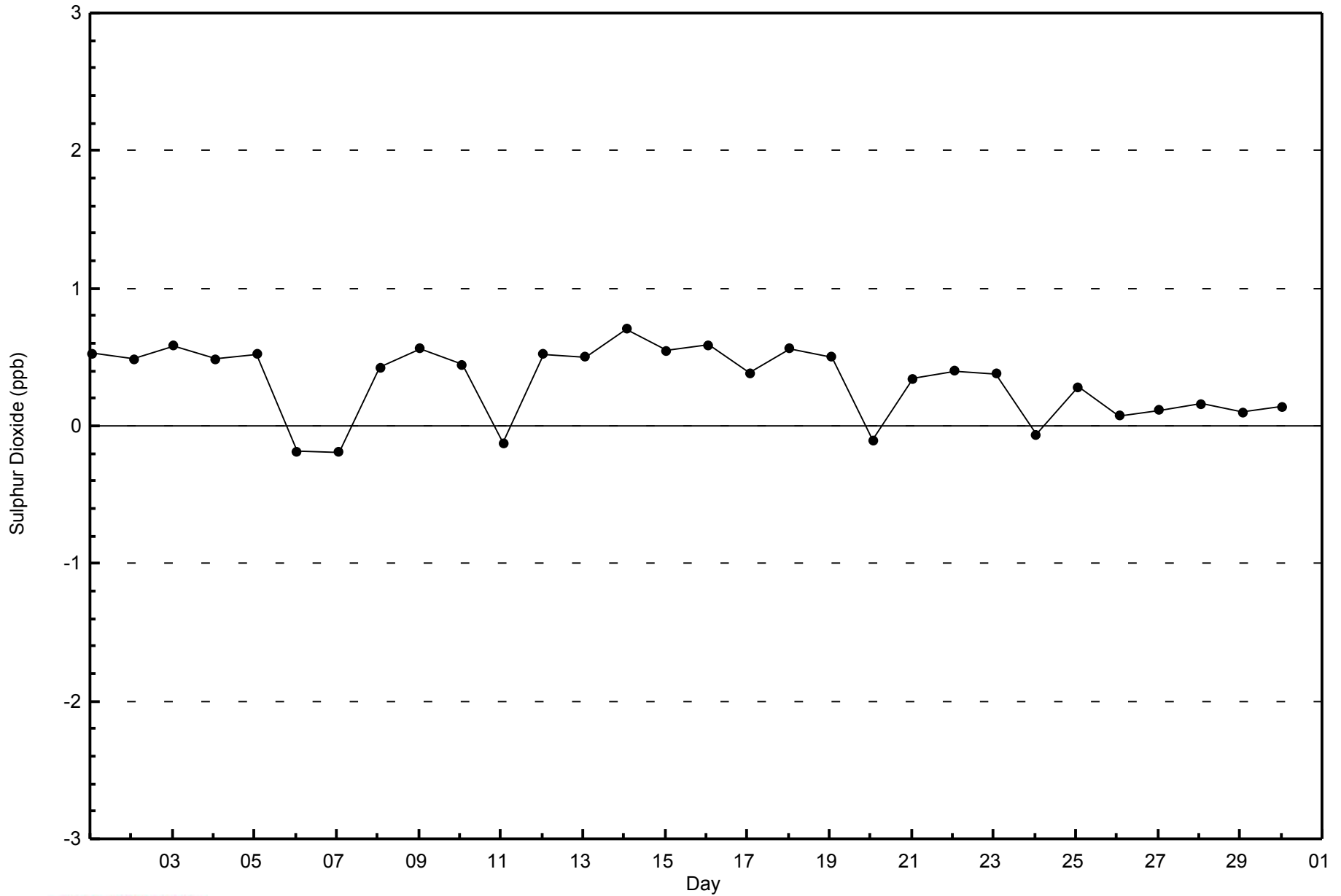


Total Number of Valid Hours: 680



WBEA
Zero Responses

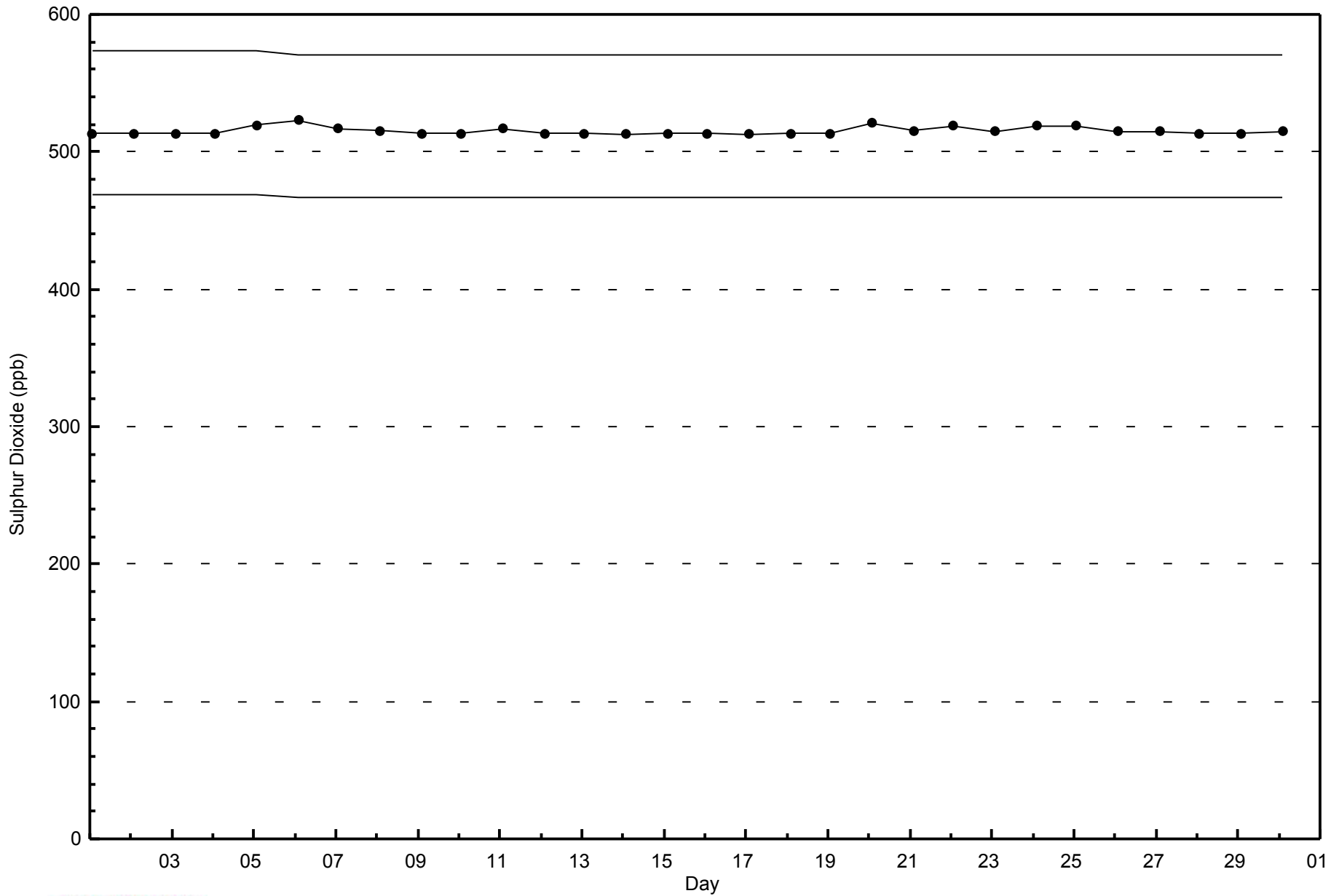
Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - June 2014





WBEA
Span Responses

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



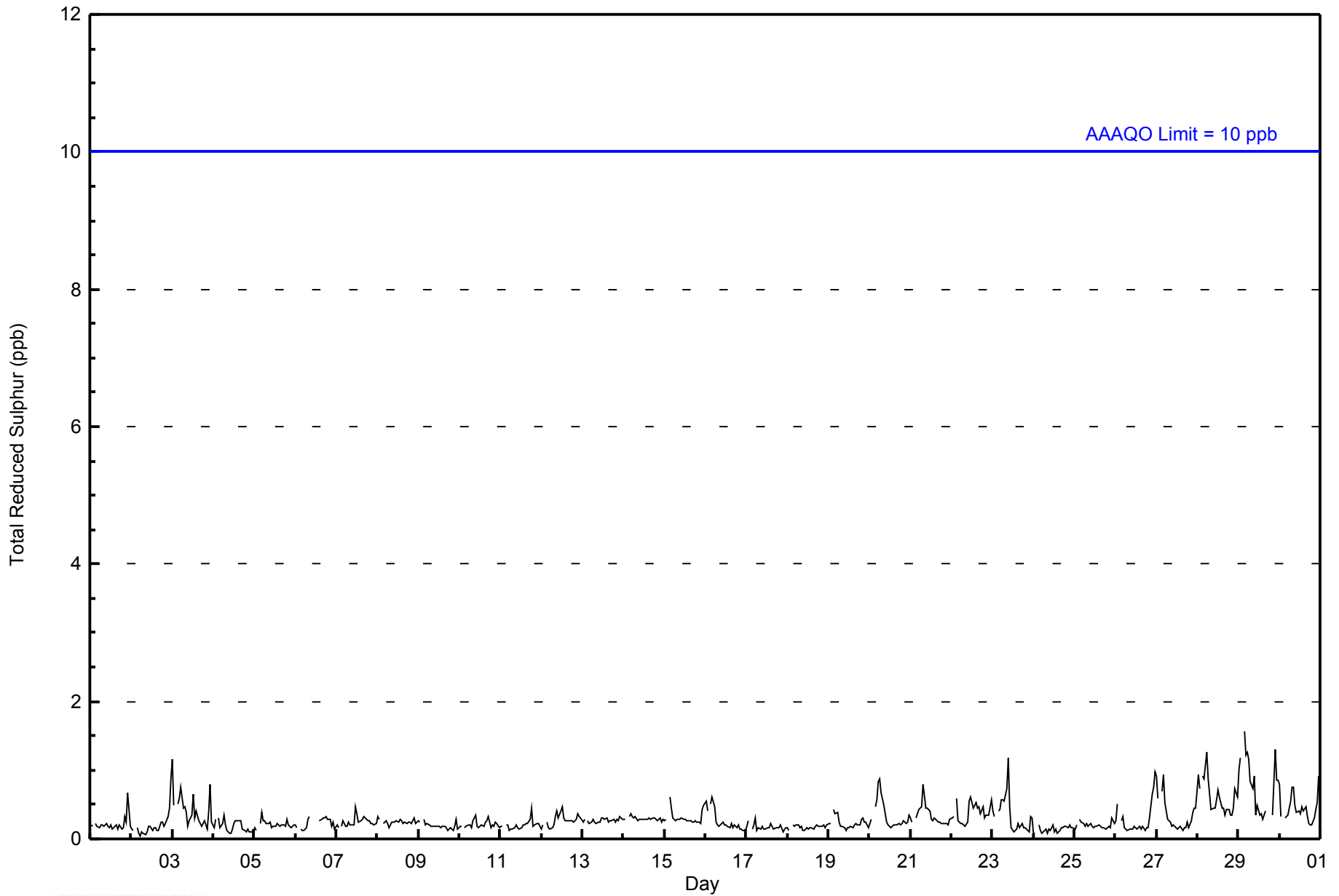


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 720																																				
Maximum Value: 2 ppb on Jun 29 04:00														Maximum Daily Average: 0.8 ppb on Jun 29										Hours of Data: 682																										
Minimum Value: 0 ppb on Jun 2 06:00														Minimum Daily Average: 0.1 ppb on Jun 24										Hours of Missing Data: 38																										
Maximum Diurnal Average: 0.4 ppb at hour 4														Minimum Diurnal Average: 0.2 ppb at hour 20										Hours of Calibration: 35																										
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: 99.6																										
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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1																								
2-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1																								
3-Jun	1	0	Z	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0.4	1																								
4-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
6-Jun	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0																								
7-Jun	0	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-Jun	0	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-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
11-Jun	0	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-Jun	0	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-Jun	0	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																								
14-Jun	0	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-Jun	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
16-Jun	1	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
17-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
19-Jun	0	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-Jun	0	0	Z	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
21-Jun	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
22-Jun	0	0	Z	1	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	1	0.4	1																								
23-Jun	0	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
24-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																								
25-Jun	0	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-Jun	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1																								
27-Jun	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
28-Jun	1	1	Z	1	1	1	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	0.6	1																								
29-Jun	1	1	Z	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	PF	PF	PF	0	1	1	1	0.8	2																							
30-Jun	1	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1																								
																								0.4	0.3	--	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.3	Diurnal Average		
																								1	1	--	2	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	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

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	682	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

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

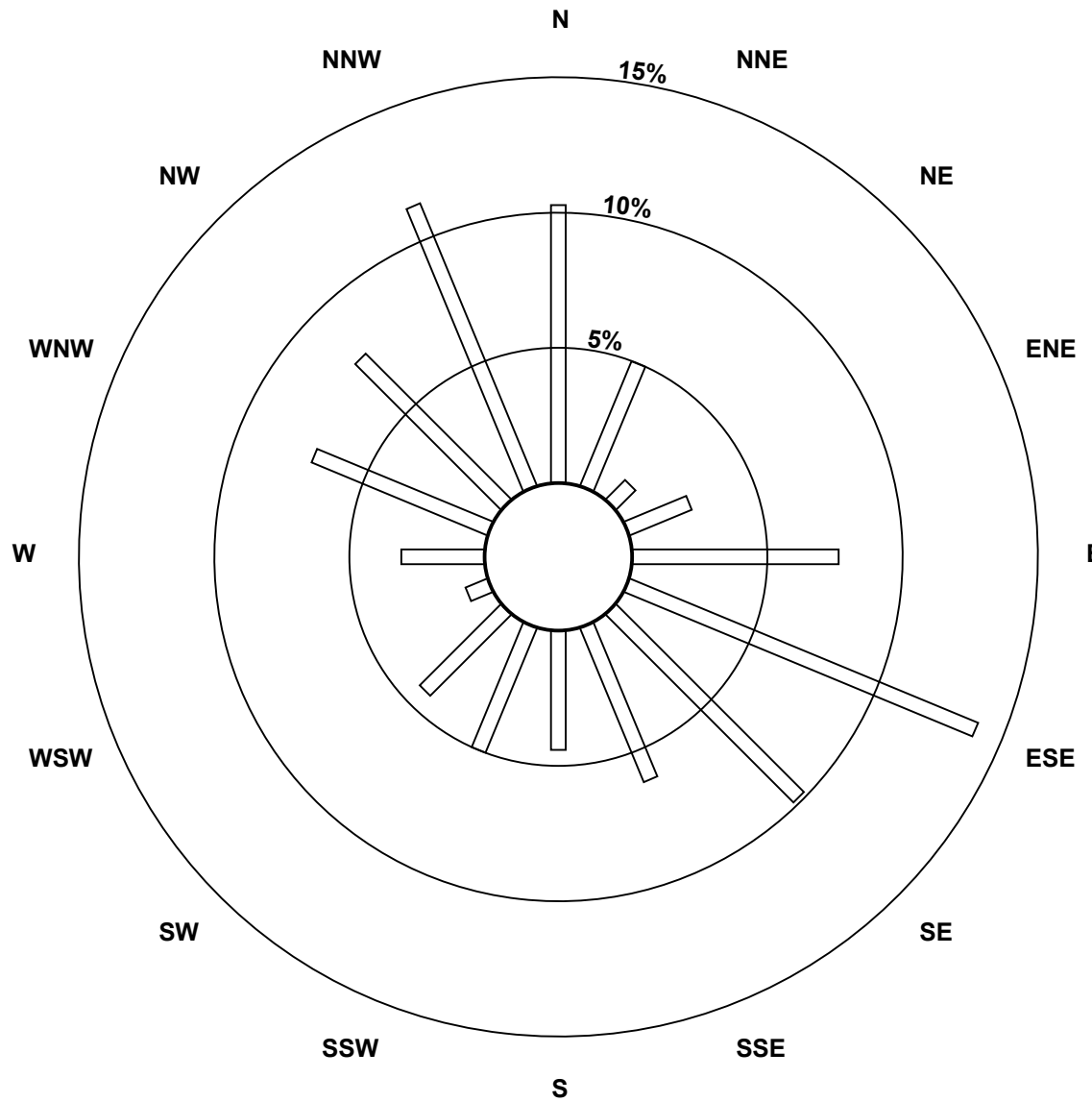
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	70	34	7	17	52	95	67	42	30	34	29	6	21	48	52	77	681
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	70	34	7	17	52	95	67	42	30	34	29	6	21	48	52	77	681

Total Number of Valid Hours: 681

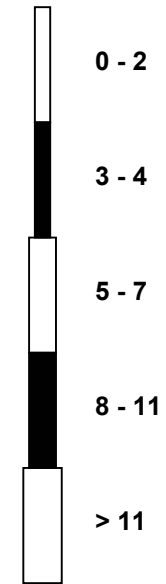
Total Number of Hours: 720

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

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



Classes (ppb)

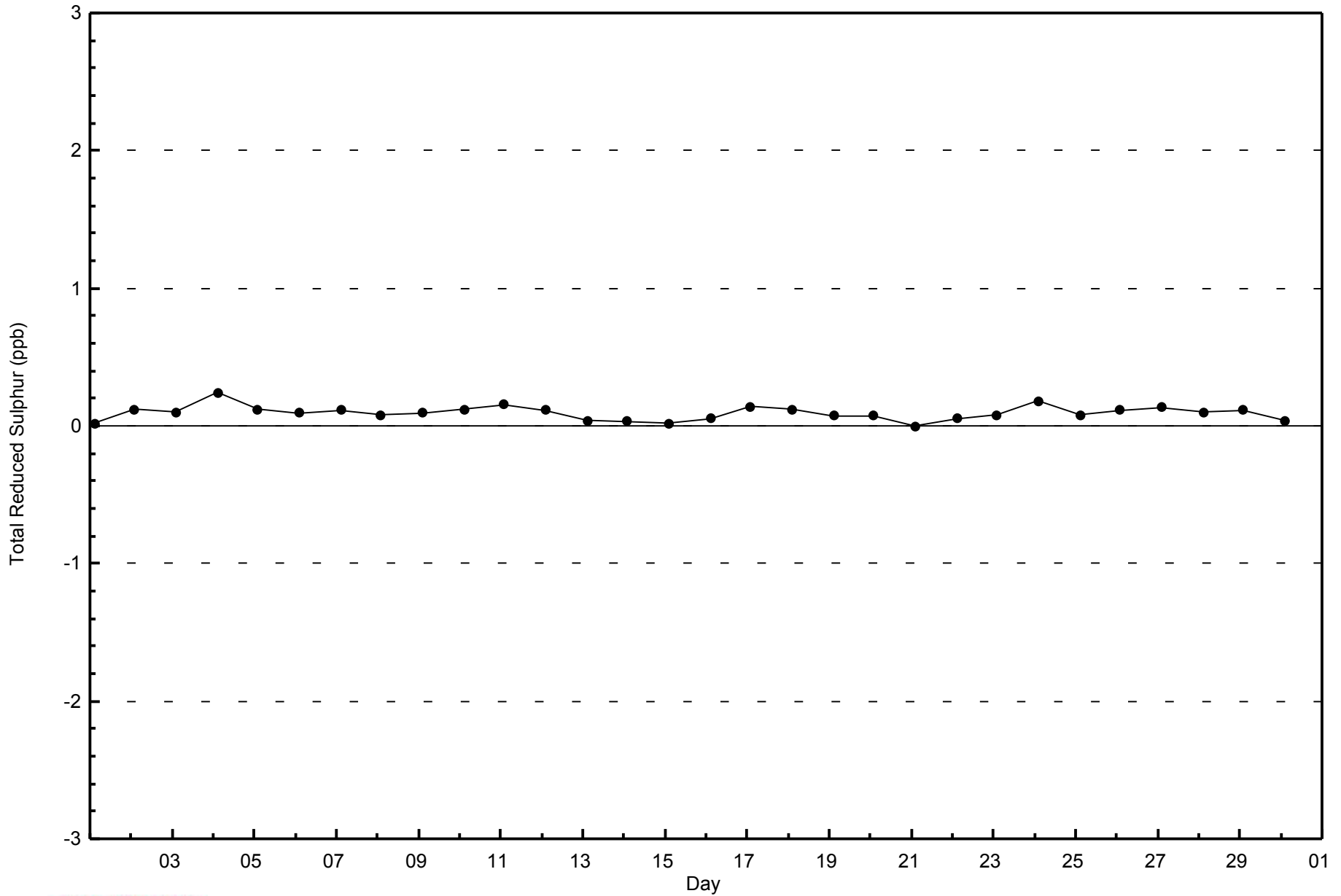


Total Number of Valid Hours: 681



WBEA
Zero Responses

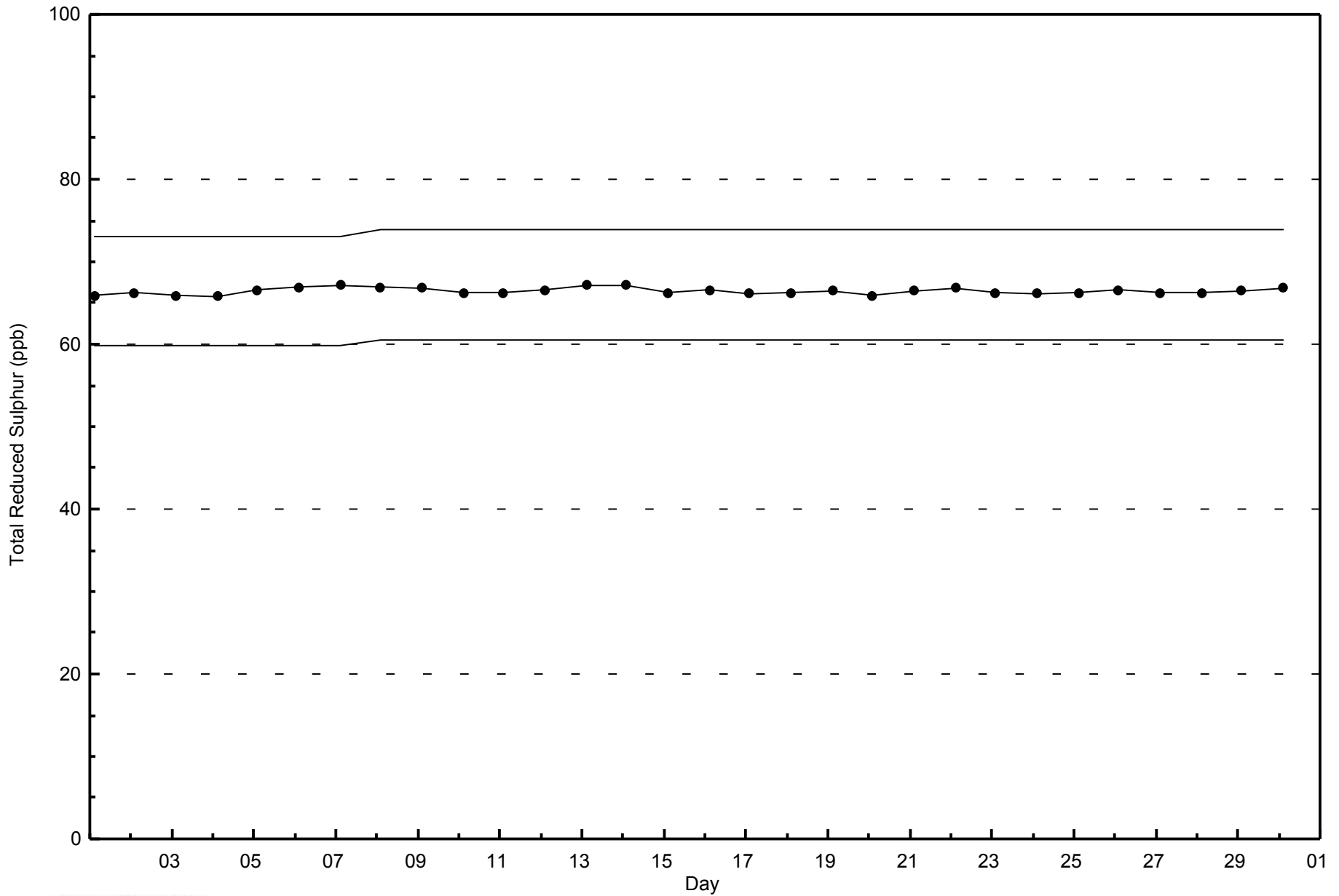
Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - June 2014





WBEA
Span Responses

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



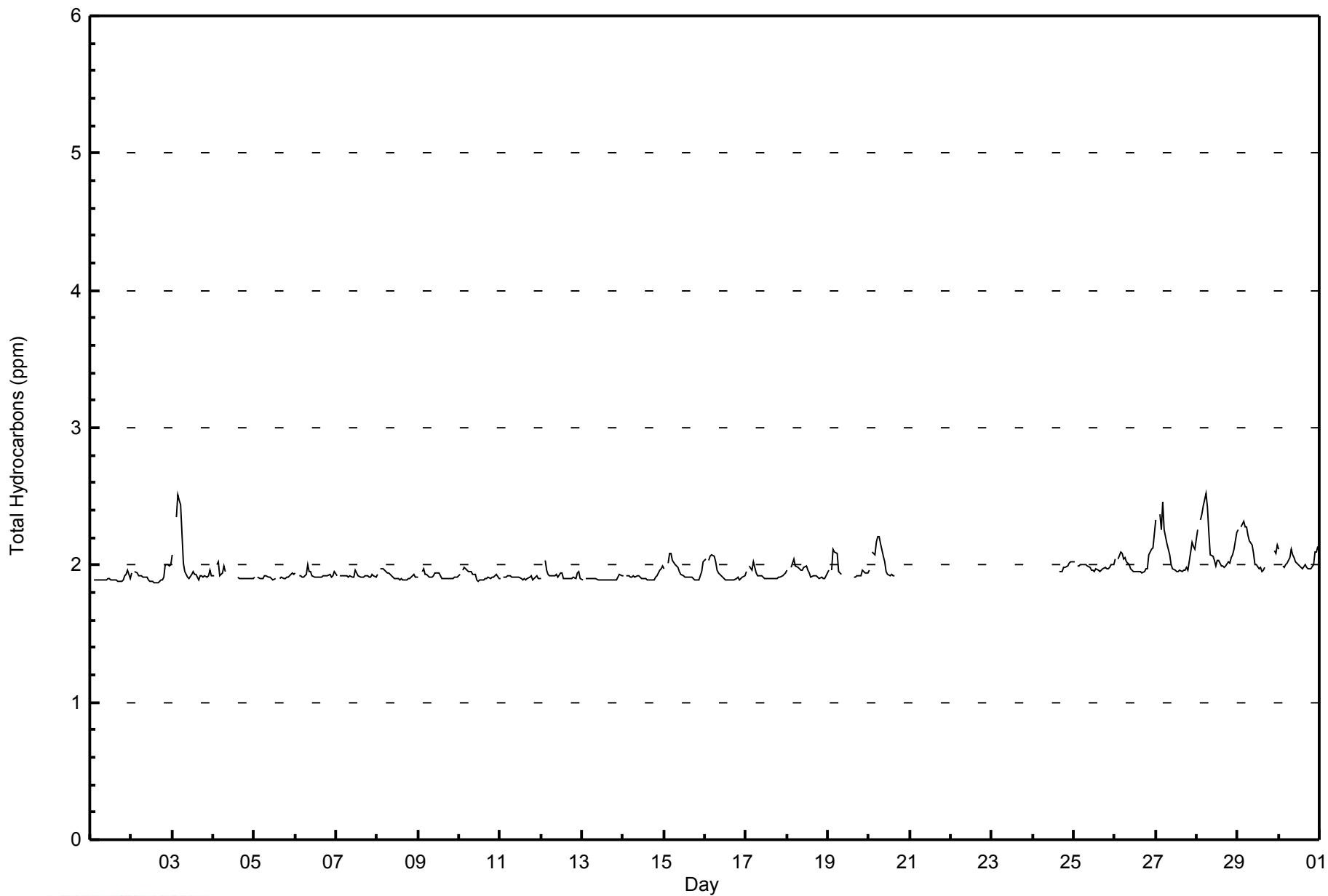


Maximum Value: 2.5 ppm on Jun 28 06:00		Maximum Daily Average: 2.1 ppm on Jun 28		Hours in Service: 720																						
Minimum Value: 1.9 ppm on Jun 2 17:00		Minimum Daily Average: 1.9 ppm on Jun 13		Hours of Data: 581																						
Maximum Diurnal Average: 2.0 ppm at hour 5		Minimum Diurnal Average: 1.9 ppm at hour 16		Hours of Missing Data: 139																						
Monthly Average: 1.96 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.4		Hours of Calibration: 32																						
				Percent Operational Time: 85.1																						
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-Jun	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	1.9	2.0	
2-Jun	1.9	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	2.0
3-Jun	2.1	Z	2.3	2.5	2.5	2.4	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.5
4-Jun	1.9	Z	2.0	2.0	1.9	1.9	2.0	1.9	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
5-Jun	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	M	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
6-Jun	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0
7-Jun	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
8-Jun	1.9	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
9-Jun	1.9	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	2.0
10-Jun	1.9	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
11-Jun	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
12-Jun	1.9	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	2.0	1.9	1.9	2.0
13-Jun	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
14-Jun	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0
15-Jun	2.0	Z	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	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1
16-Jun	2.0	Z	2.0	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	2.1
17-Jun	1.9	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
18-Jun	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	2.0
19-Jun	2.0	Z	2.0	2.1	2.1	2.1	1.9	1.9	1.9	M	M	M	M	M	M	M	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.1
20-Jun	2.0	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.2
21-Jun	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
22-Jun	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-Jun	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--
24-Jun	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
25-Jun	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
26-Jun	2.0	Z	2.0	2.1	2.1	2.0	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	2.0	2.0	2.1	2.1	2.1	2.2	2.0
27-Jun	2.3	Z	2.4	2.3	2.5	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.1	2.1
28-Jun	2.3	Z	2.3	2.4	2.4	2.5	2.4	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.1
29-Jun	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1
30-Jun	2.1	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0
		2.0	--	2.0	2.0	2.0	2.0	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	2.0	Diurnal Average
		2.3	--	2.4	2.5	2.5	2.5	2.4	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.2	Diurnal Maximum
Z - zerospan		C - Calibration				M - Maintenance				AF - Analyzer Failure				PF - Power Failure												



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	509	87.61	87.61
2.1 - 3.0	72	12.39	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 581

Total Number of Hours: 720



WBEA
Frequency Distribution

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

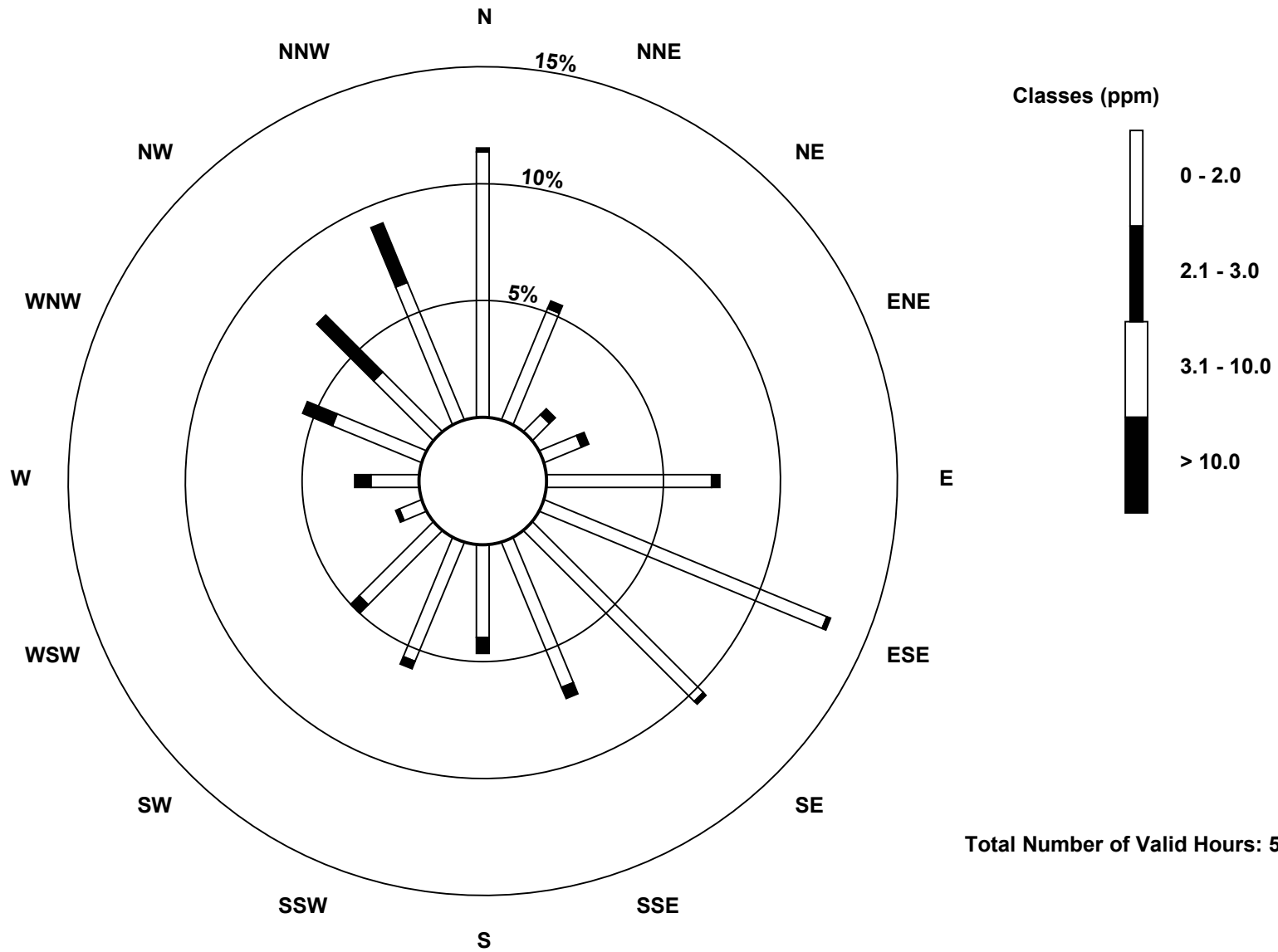
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	66	30	6	10	41	76	60	39	23	32	26	6	12	24	21	37	509
2.1 - 3.0	1	2	2	2	2	1	1	3	4	2	3	1	4	8	20	16	72
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	67	32	8	12	43	77	61	42	27	34	29	7	16	32	41	53	581

Total Number of Valid Hours: 581

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

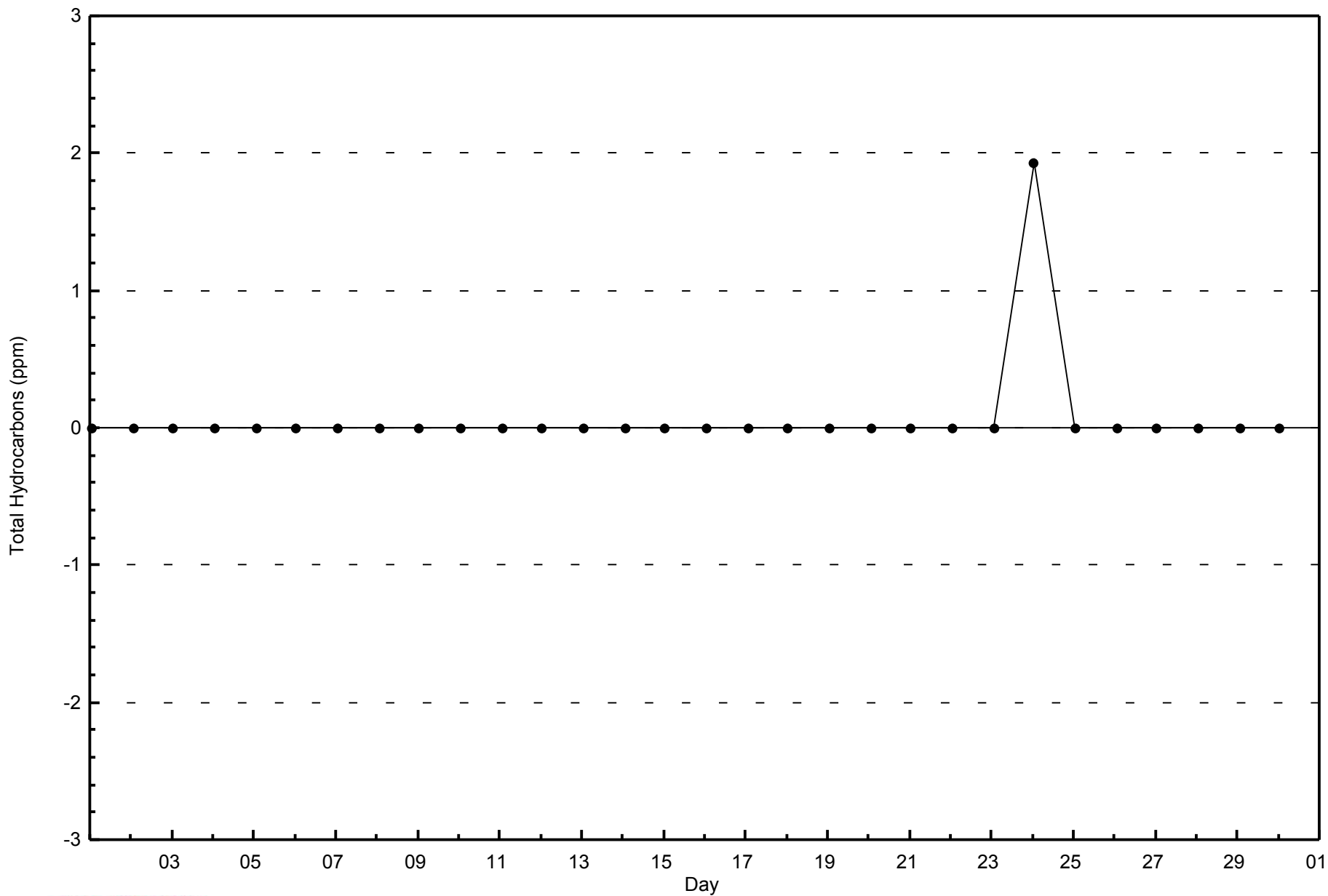
Total Hydrocarbons (THC) - ppm
Patricia McInnes (AMS 6)





WBEA
Zero Responses

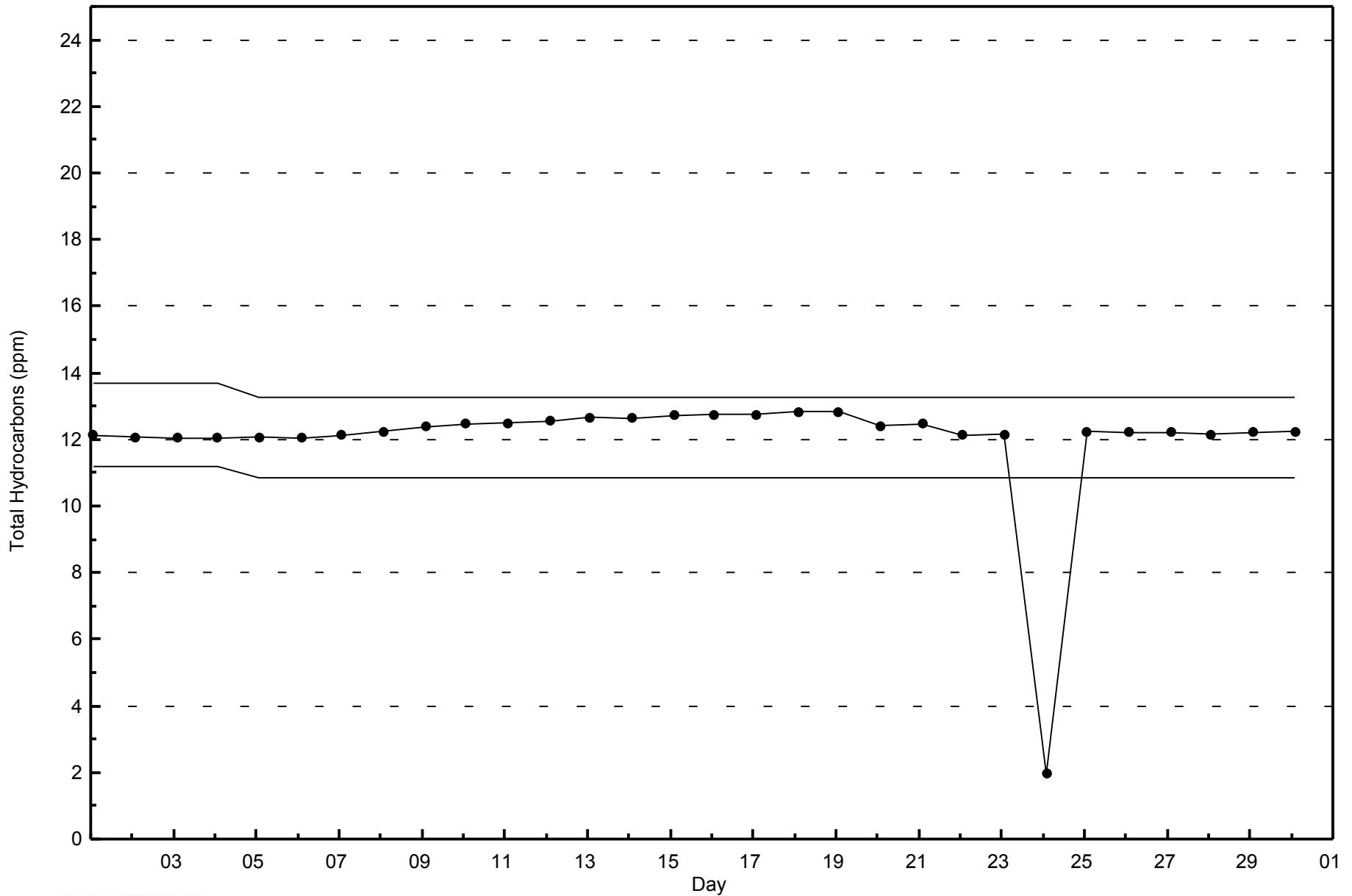
Total Hydrocarbons (THC) - ppm
Patricia McInnes - June 2014





WBEA
Span Responses

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



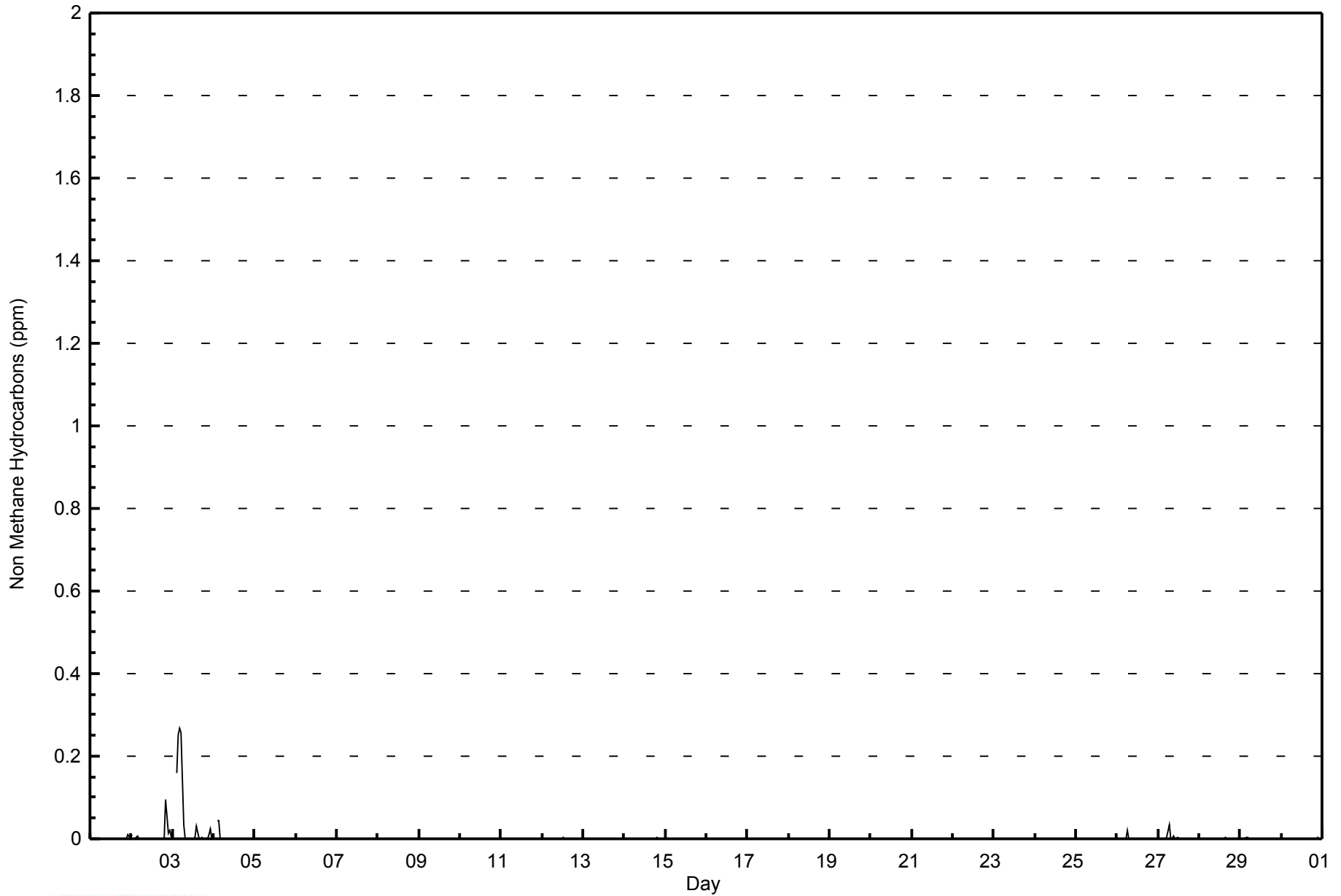


Maximum Value: 0.268 ppm on Jun 3 05:00		Maximum Daily Average: 0.046 ppm on Jun 3		Hours in Service: 720																							
Minimum Value: 0.000 ppm on Jun 1 01:00		Minimum Daily Average: 0.000 ppm on Jun 5		Hours of Data: 581																							
Maximum Diurnal Average: 0.012 ppm at hour 4		Minimum Diurnal Average: 0.000 ppm at hour 9		Hours of Missing Data: 139																							
Monthly Average: 0.002 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.0		Hours of Calibration: 32																							
				Percent Operational Time: 85.1																							
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-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.001	0.010		
2-Jun	0.012	Z	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.095	0.015	0.020	0.008	0.007	0.095	
3-Jun	0.020	Z	0.160	0.251	0.268	0.258	0.034	0.000	0.000	0.000	0.000	0.000	0.002	0.030	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.009	0.024	0.000	0.046	0.268	
4-Jun	0.000	Z	0.043	0.044	0.000	0.000	0.000	0.000	C	C	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.044	
5-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	M	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
6-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
7-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
8-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
9-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
10-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
11-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
12-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	
13-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
14-Jun	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	0.005	0.000	0.000	0.000	0.000	0.005	
15-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
16-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
17-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
18-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
19-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	M	M	M	M	M	M	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.000	
20-Jun	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	AF	AF	AF	AF	AF	AF	AF	AF	--	0.000	
21-Jun	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
22-Jun	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-Jun	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	--	
24-Jun	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0.000	0.000	0.000	0.002	0.000	0.000	0.002	0.000	0.000	--	0.002	
25-Jun	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
26-Jun	0.003	Z	0.000	0.000	0.000	0.000	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.021	
27-Jun	0.000	Z	0.000	0.001	0.000	0.004	0.033	0.000	0.000	0.008	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.033	
28-Jun	0.000	Z	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	
29-Jun	0.000	Z	0.002	0.003	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	PF	PF	PF	PF	0.000	0.000	0.001	0.001	0.004	
30-Jun	0.000	Z	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.004	0.000	0.000	0.000	0.004	
		0.001	--	0.008	0.012	0.010	0.010	0.003	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.001	0.002	0.000	Diurnal Average		
		0.020	--	0.160	0.251	0.268	0.258	0.034	0.001	0.000	0.008	0.000	0.002	0.004	0.002	0.030	0.003	0.002	0.002	0.002	0.005	0.095	0.015	0.024	0.008	Diurnal Maximum	
Z - zerspan		C - Calibration					M - Maintenance					AF - Analyzer Failure					PF - Power Failure										



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	560	96.39	96.39
0.006 - 0.05	16	2.75	99.14
0.06 - 0.1	1	0.17	99.31
> 0.1	4	0.69	100.00

Total Number of Valid Hours: 581

Total Number of Hours: 720



WBEA
Frequency Distribution

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

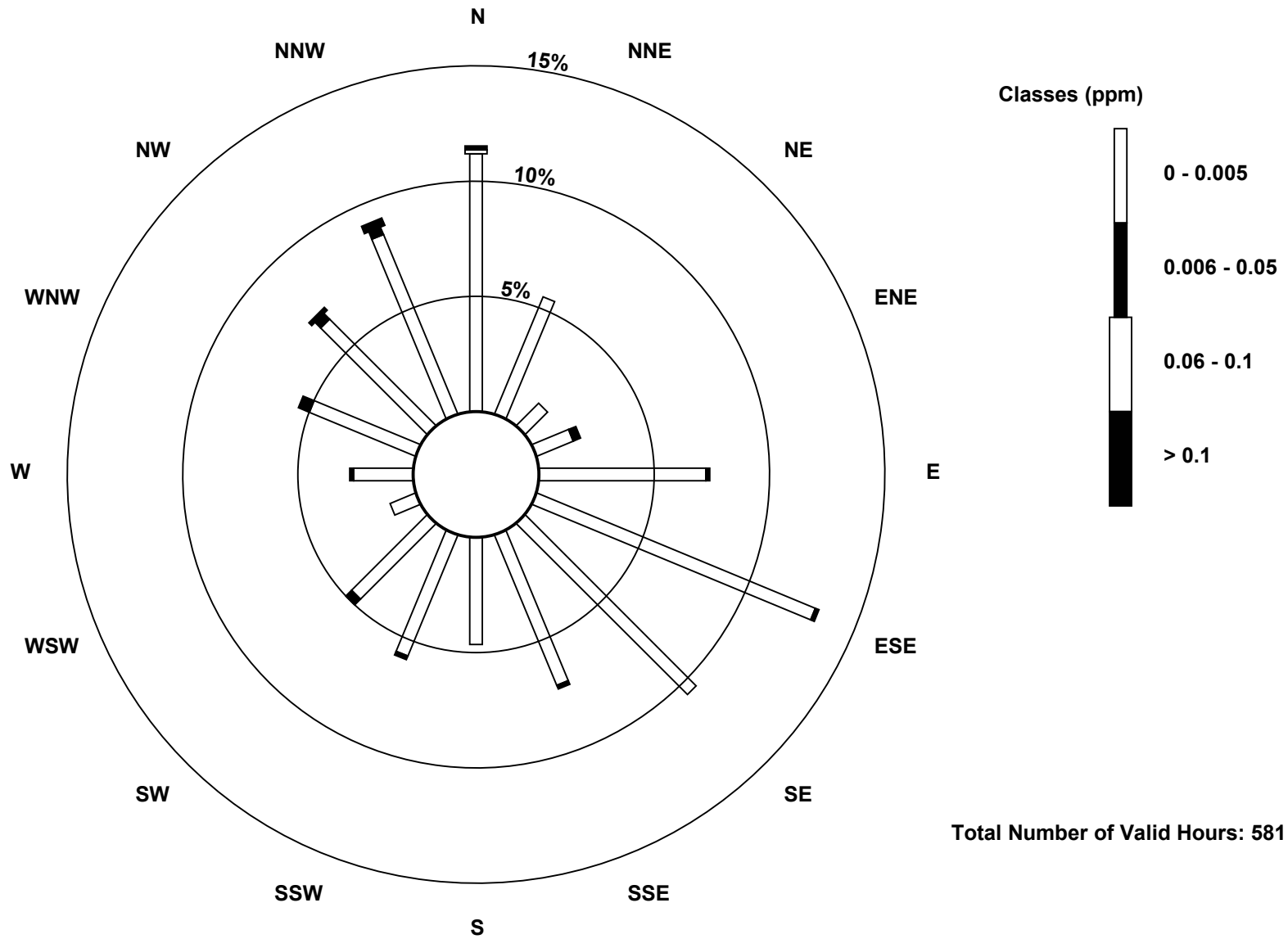
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	65	32	8	10	42	76	61	41	27	33	27	7	15	29	38	49	560
0.006 - 0.05	0	0	0	2	1	1	0	1	0	1	2	0	1	3	2	2	16
0.06 - 0.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 0.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4
Totals	67	32	8	12	43	77	61	42	27	34	29	7	16	32	41	53	581

Total Number of Valid Hours: 581

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

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

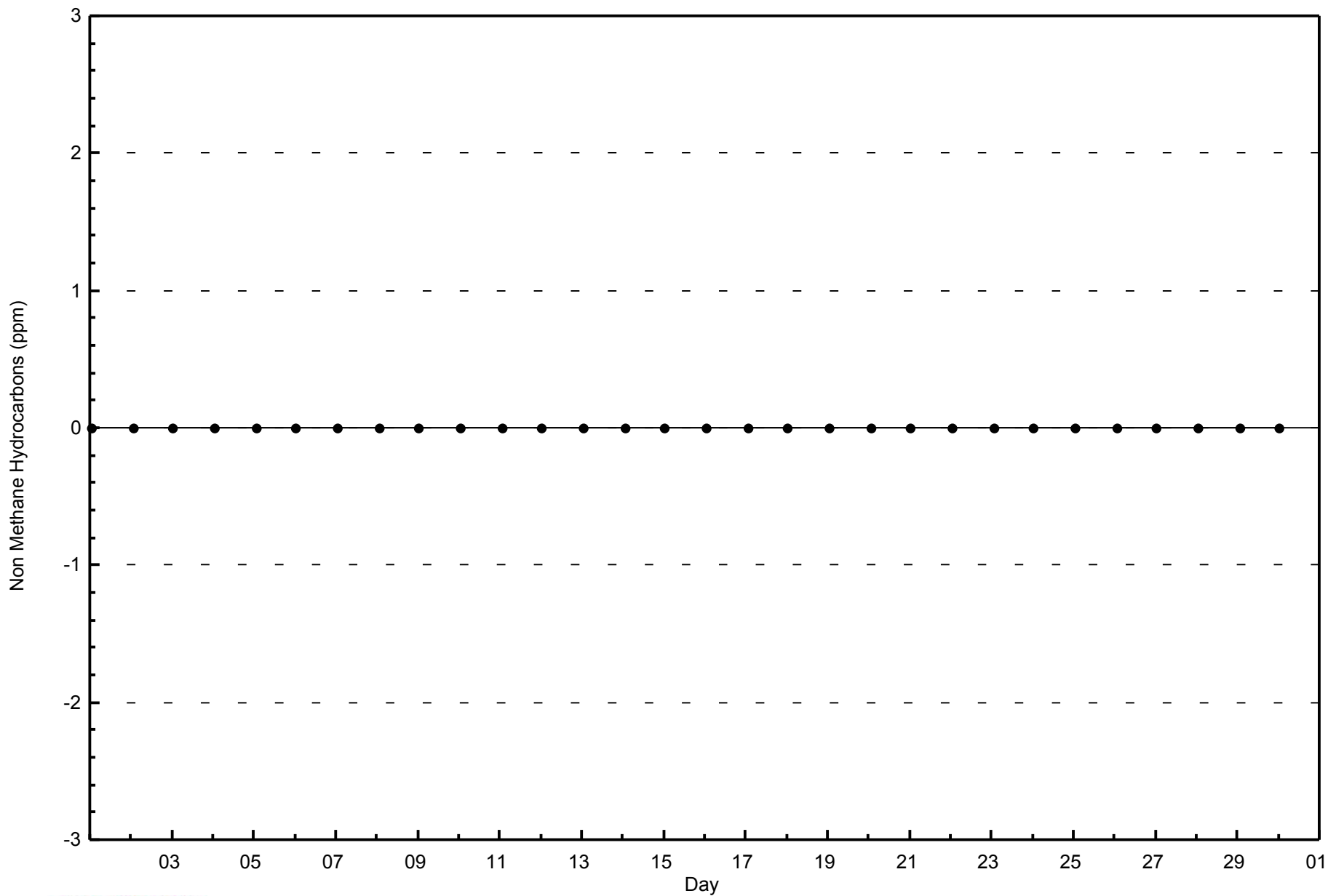




WBEA
Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - June 2014

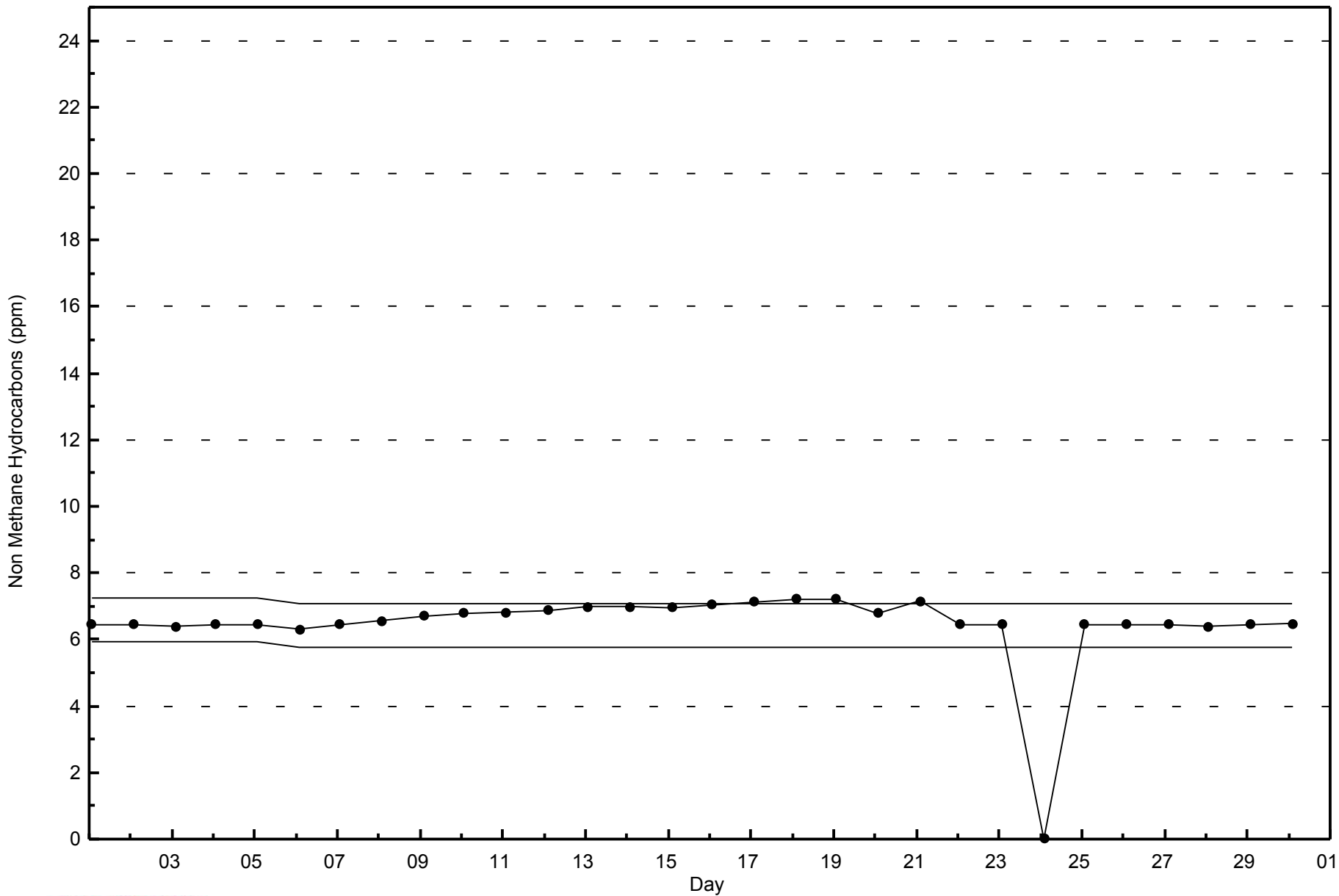




WBEA
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - June 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2.5 ppm on Jun 28 06:00	Maximum Daily Average: 2.1 ppm on Jun 28		Hours of Data:	581
Minimum Value: 1.9 ppm on Jun 2 17:00	Minimum Daily Average: 1.9 ppm on Jun 13		Hours of Missing Data:	139
Maximum Diurnal Average: 2.0 ppm at hour 5	Minimum Diurnal Average: 1.9 ppm at hour 16		Hours of Calibration:	32
Monthly Average: 1.96 ppm	Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.4		Percent Operational Time:	85.1

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-Jun	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	1.9	2.0	
2-Jun	1.9	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	
3-Jun	2.1	Z	2.2	2.3	2.2	2.2	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	2.3	
4-Jun	1.9	Z	2.0	2.0	1.9	1.9	2.0	1.9	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
5-Jun	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	M	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
6-Jun	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	
7-Jun	1.9	Z	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	
8-Jun	1.9	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
9-Jun	1.9	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	2.0	
10-Jun	1.9	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
11-Jun	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	
12-Jun	1.9	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	2.0	1.9	1.9	2.0	
13-Jun	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
14-Jun	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	
15-Jun	2.0	Z	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	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	
16-Jun	2.0	Z	2.0	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	2.1	
17-Jun	1.9	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
18-Jun	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	2.0	
19-Jun	2.0	Z	2.0	2.1	2.1	2.1	1.9	1.9	1.9	M	M	M	M	M	M	M	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.1	
20-Jun	2.0	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	AF	AF	AF	AF	AF	AF	AF	AF	2.2	
21-Jun	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
22-Jun	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-Jun	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	
24-Jun	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
25-Jun	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	
26-Jun	2.0	Z	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	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.2	2.2	
27-Jun	2.3	Z	2.4	2.3	2.5	2.3	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.1	2.5	
28-Jun	2.3	Z	2.3	2.4	2.4	2.5	2.4	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.5	
29-Jun	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	PF	PF	PF	PF	2.1	2.1	2.3	
30-Jun	2.1	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	

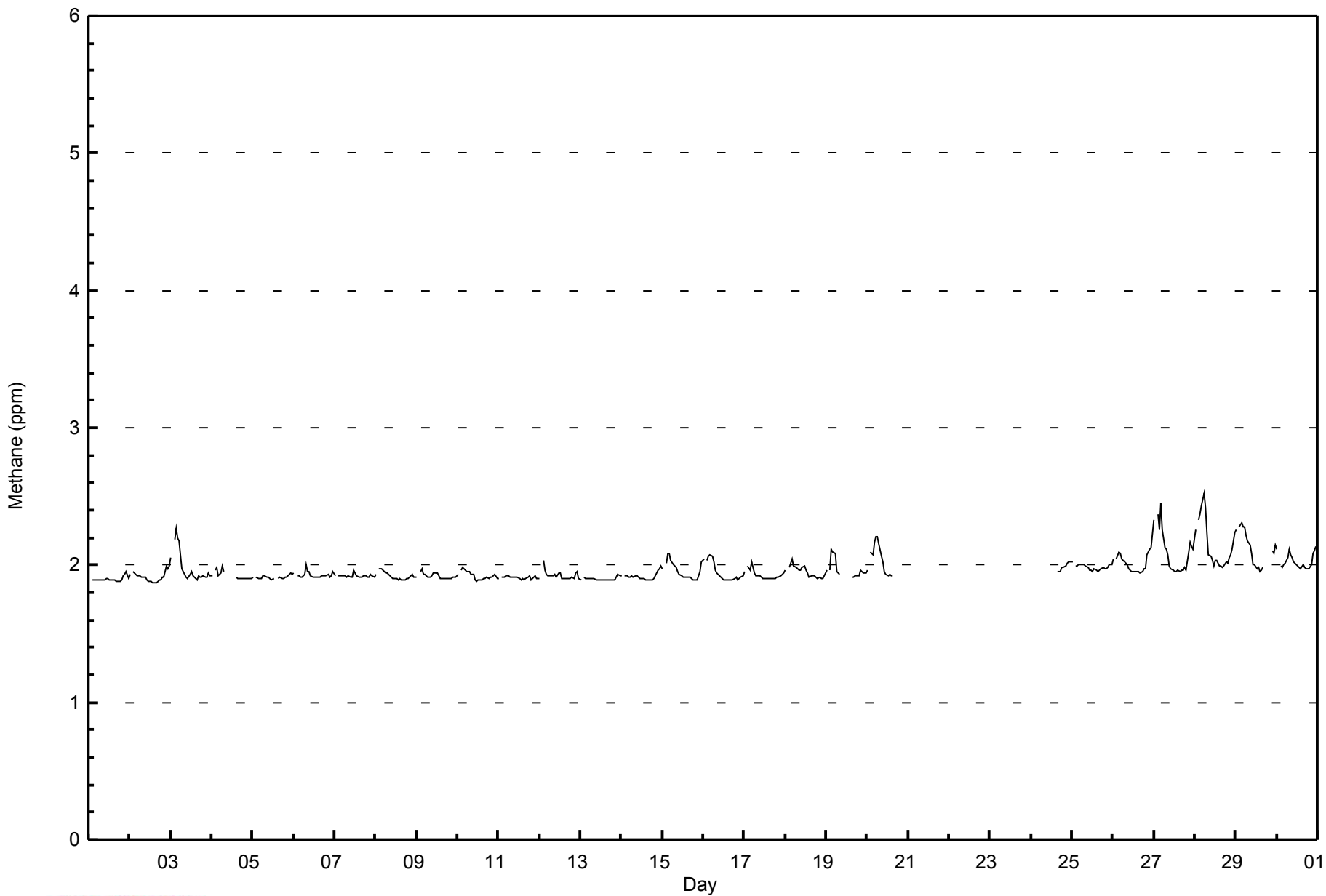
2.0	--	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	Diurnal Average	
2.3	--	2.4	2.4	2.5	2.5	2.4	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.2	Diurnal Maximum

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



WBEA
Hourly Averages

Methane (CH₄) - ppm
Patricia McInnes - June 2014





WBEA
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	510	87.78	87.78
2.1 - 3.0	71	12.22	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 581

Total Number of Hours: 720



WBEA
Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - June 2014

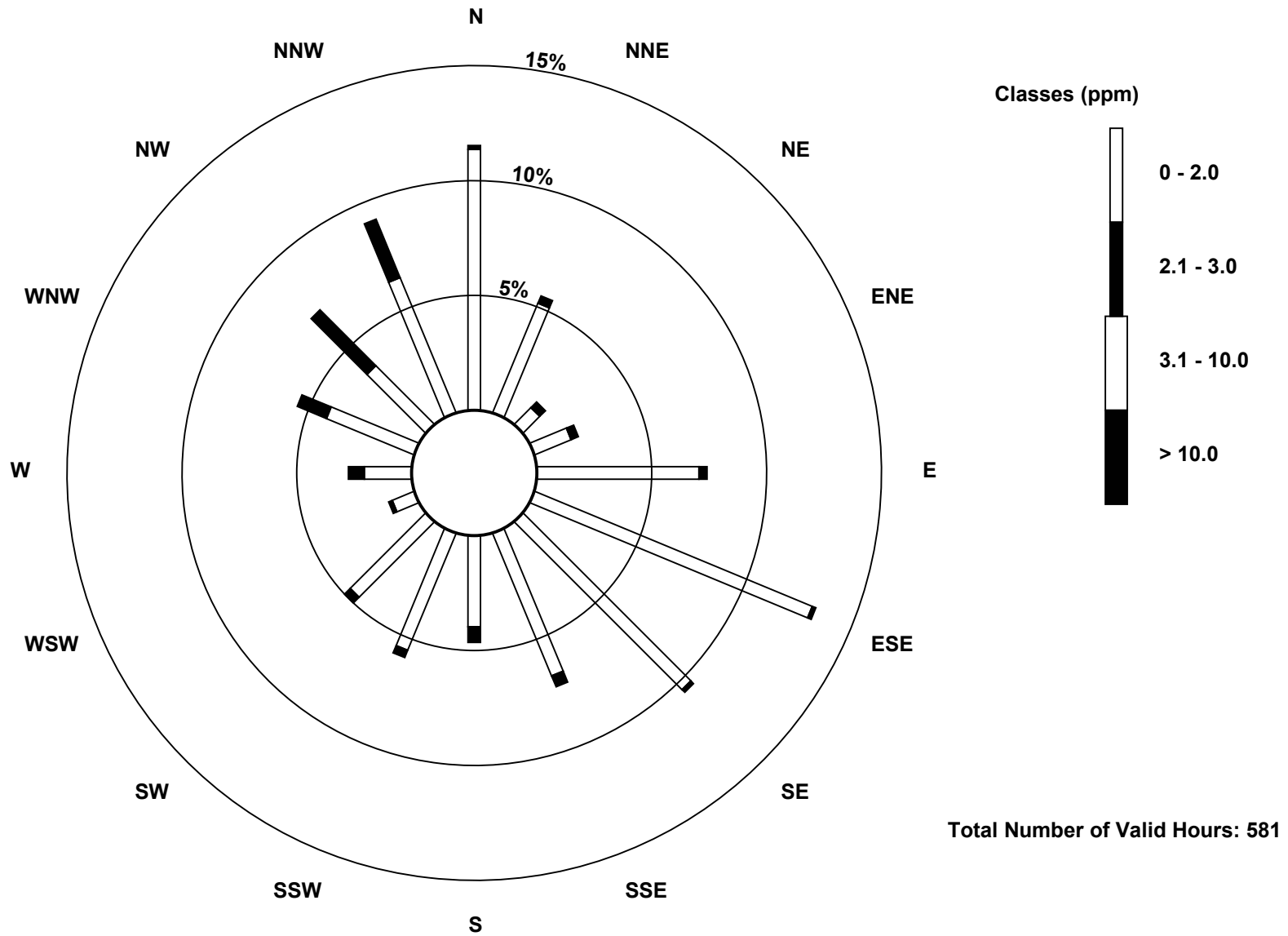
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	66	30	6	10	41	76	60	39	23	32	27	6	12	24	21	37	510
2.1 - 3.0	1	2	2	2	2	1	1	3	4	2	2	1	4	8	20	16	71
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	67	32	8	12	43	77	61	42	27	34	29	7	16	32	41	53	581

Total Number of Valid Hours: 581

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

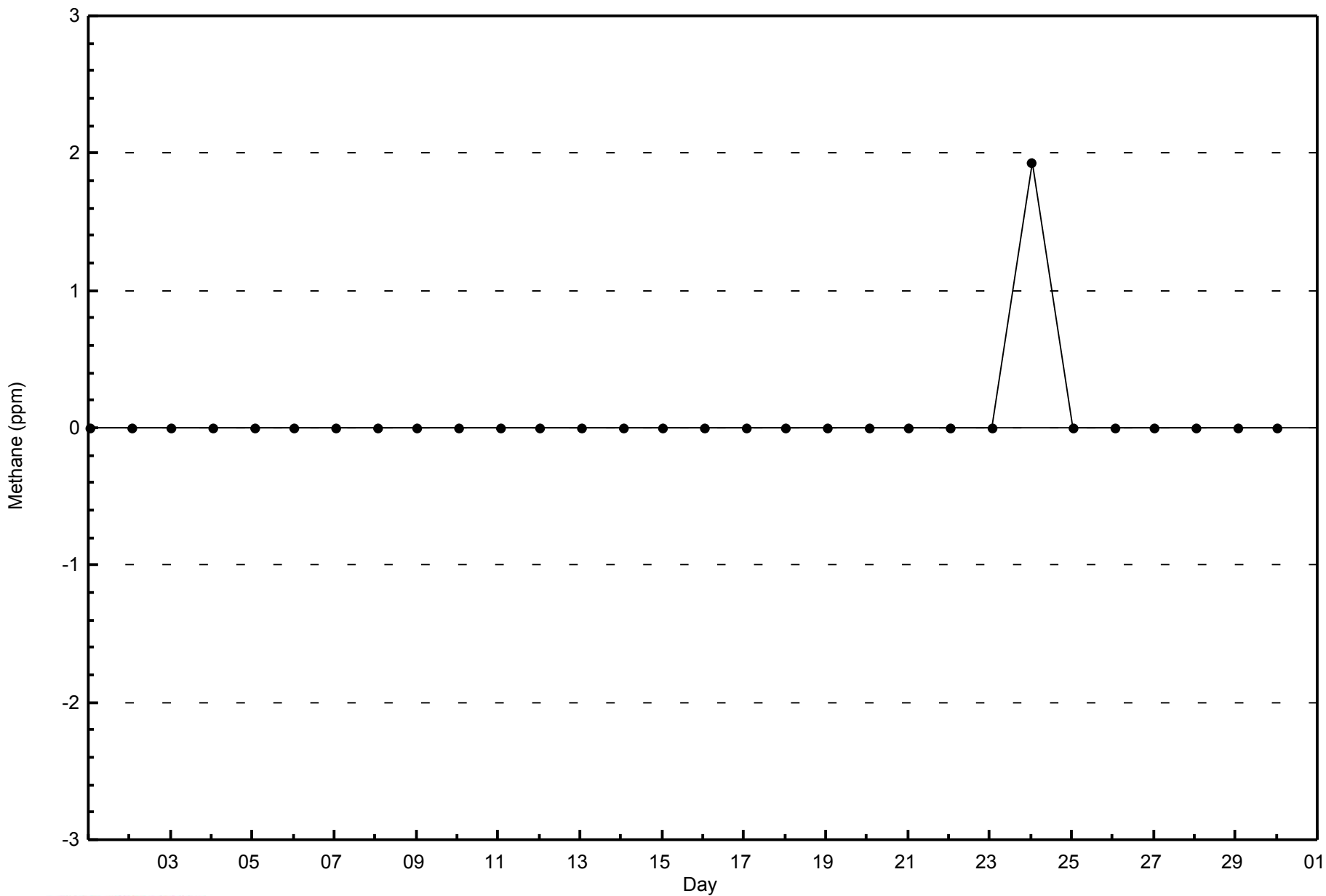
Methane (CH₄) - ppm
Patricia McInnes (AMS 6)





WBEA
Zero Responses

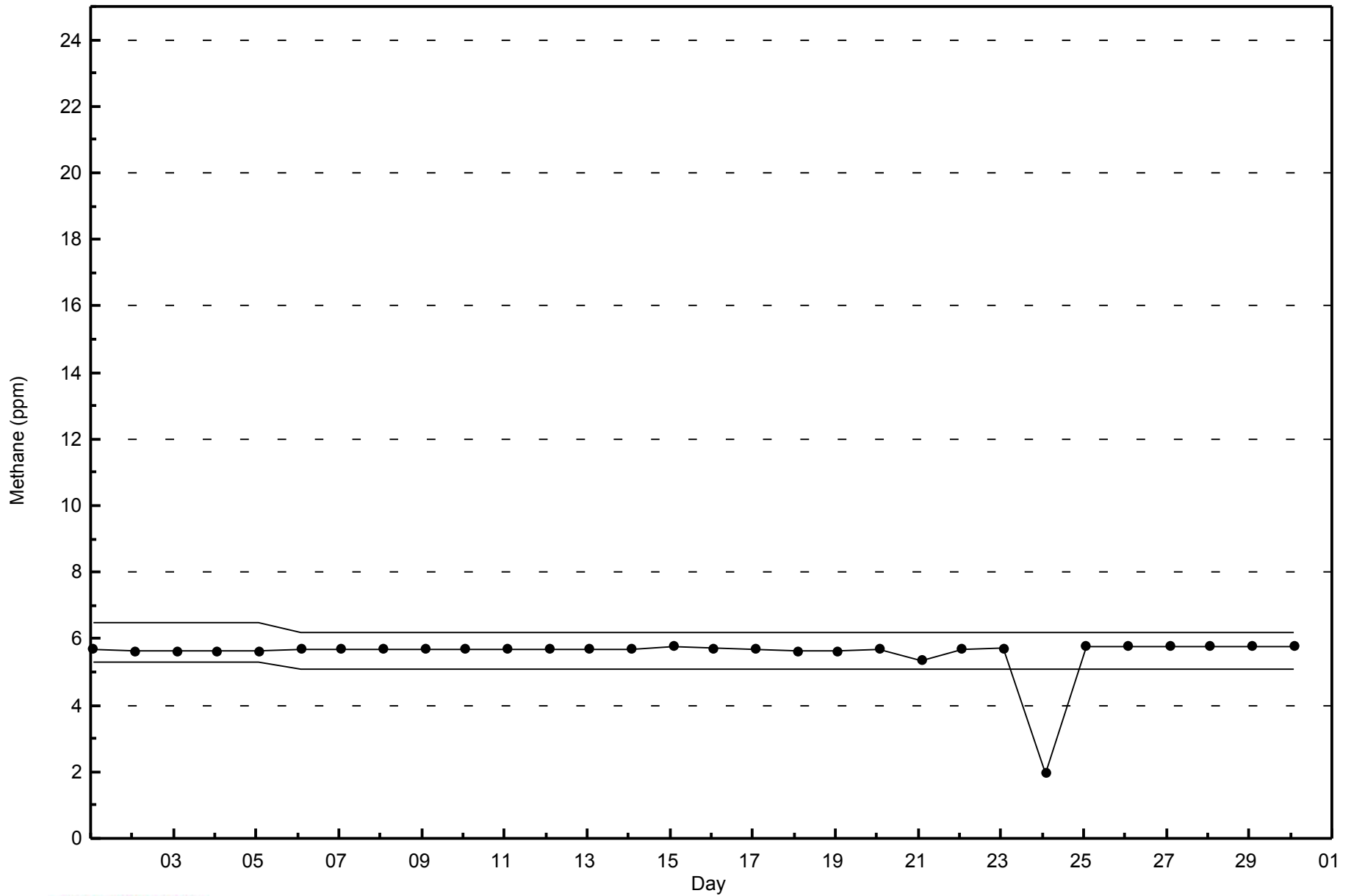
Methane (CH₄) - ppm
Patricia McInnes - June 2014





WBEA
Span Responses

Methane (CH₄) - ppm
Patricia McInnes - June 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 60 ppb on Jun 28 16:00	Maximum Daily Average: 37.0 ppb on Jun 14		Hours of Data:	680
Minimum Value: 2 ppb on Jun 28 04:00	Minimum Daily Average: 16.6 ppb on Jun 23		Hours of Missing Data:	40
Maximum Diurnal Average: 36.4 ppb at hour 16	Minimum Diurnal Average: 15.6 ppb at hour 5		Hours of Calibration:	36
Monthly Average: 26.9 ppb	Percentiles: P ₁ = 4 P ₁₀ = 13 Q ₁ = 20 Median = 27 Q ₃ = 34 P ₉₀ = 40 P ₉₉ = 47		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-Jun	37	36	Z	34	32	31	30	30	29	29	29	32	35	36	38	37	45	43	46	41	34	26	21	28	33.8	46
2-Jun	24	21	Z	16	15	14	17	22	24	25	35	38	40	44	45	45	45	42	39	34	36	30	23	20	30.1	45
3-Jun	15	16	Z	6	6	10	22	23	29	37	41	31	15	14	31	39	30	17	16	15	15	11	8	11	19.9	41
4-Jun	12	9	Z	11	13	12	9	13	17	17	19	20	20	23	25	26	24	24	24	23	23	23	23	22	18.8	26
5-Jun	22	22	Z	23	20	20	21	22	C	C	C	C	C	C	33	32	31	30	29	31	28	24	21	19	--	33
6-Jun	17	18	Z	21	21	20	19	19	22	24	28	29	31	32	32	33	32	34	32	31	27	28	26	26	26.1	34
7-Jun	23	22	Z	19	23	24	27	28	28	32	32	33	31	34	38	39	36	37	36	35	32	31	29	29	30.4	39
8-Jun	24	17	Z	14	13	19	22	23	30	36	38	40	41	42	42	43	43	43	42	41	40	38	36	36	33.1	43
9-Jun	34	32	Z	23	22	21	23	24	25	23	24	27	32	35	38	36	34	36	37	37	37	37	35	34	30.7	38
10-Jun	30	27	Z	18	18	20	22	22	31	PF	41	41	42	41	43	43	43	39	42	40	36	34	28	35	33.4	43
11-Jun	35	32	Z	29	28	27	26	27	31	29	27	29	33	36	36	37	30	28	25	30	25	17	27	29	29.3	37
12-Jun	30	23	Z	18	20	20	23	27	32	30	36	37	45	46	44	41	39	39	40	37	34	29	25	35	32.7	46
13-Jun	35	34	Z	30	27	27	28	30	33	36	37	38	40	42	44	45	45	42	42	38	35	34	36	35	36.2	45
14-Jun	33	30	Z	26	26	25	24	24	26	33	42	43	42	43	44	45	44	44	44	45	45	42	40	38	37.0	45
15-Jun	37	35	Z	24	15	24	32	34	38	42	43	44	44	44	44	43	41	40	37	37	35	32	26	21	35.4	44
16-Jun	20	20	Z	14	12	9	12	18	22	28	31	33	31	32	32	33	33	33	30	26	30	30	31	29	25.6	33
17-Jun	25	20	Z	19	13	16	18	22	25	26	28	29	30	30	32	32	32	26	22	19	16	17	18	16	23.1	32
18-Jun	15	14	Z	8	5	9	9	12	18	23	26	30	35	38	40	40	42	41	41	39	34	33	31	27	26.5	42
19-Jun	20	22	Z	10	8	9	15	16	16	18	17	20	25	31	32	29	27	26	28	25	24	20	19	19	20.6	32
20-Jun	18	16	Z	6	3	3	5	8	11	15	24	27	24	23	25	22	20	16	18	24	21	22	22	19	17.0	27
21-Jun	19	16	Z	18	18	12	14	19	22	24	26	27	26	27	26	25	26	24	23	23	19	18	16	16	21.1	27
22-Jun	16	13	Z	17	21	19	17	16	17	20	22	23	26	28	32	35	31	32	30	27	22	18	17	12	22.2	35
23-Jun	12	12	Z	7	4	6	5	10	12	18	17	21	30	31	34	27	25	21	21	17	11	17	12	11	16.6	34
24-Jun	15	12	Z	15	18	19	20	21	22	25	29	32	31	32	34	35	33	34	27	25	25	27	26	24	25.2	35
25-Jun	23	22	Z	17	16	16	17	19	22	28	33	35	34	29	34	34	34	32	30	36	32	28	26	26	27.1	36
26-Jun	24	18	Z	9	10	11	12	13	19	23	27	28	32	30	31	37	37	36	31	28	15	18	14	12	22.4	37
27-Jun	11	7	Z	4	3	4	4	9	17	29	31	35	31	32	30	27	34	37	33	30	25	17	17	16	21.0	37
28-Jun	12	9	Z	2	3	4	9	14	27	28	39	47	55	58	58	60	53	48	42	41	35	29	25	18	31.1	60
29-Jun	15	12	Z	10	11	10	15	22	25	30	35	41	42	37	36	37	38	PF	PF	PF	31	26	19	21	25.8	42
30-Jun	21	29	Z	26	25	24	22	21	26	28	31	32	31	34	36	36	35	34	33	31	29	25	24	20	28.4	36

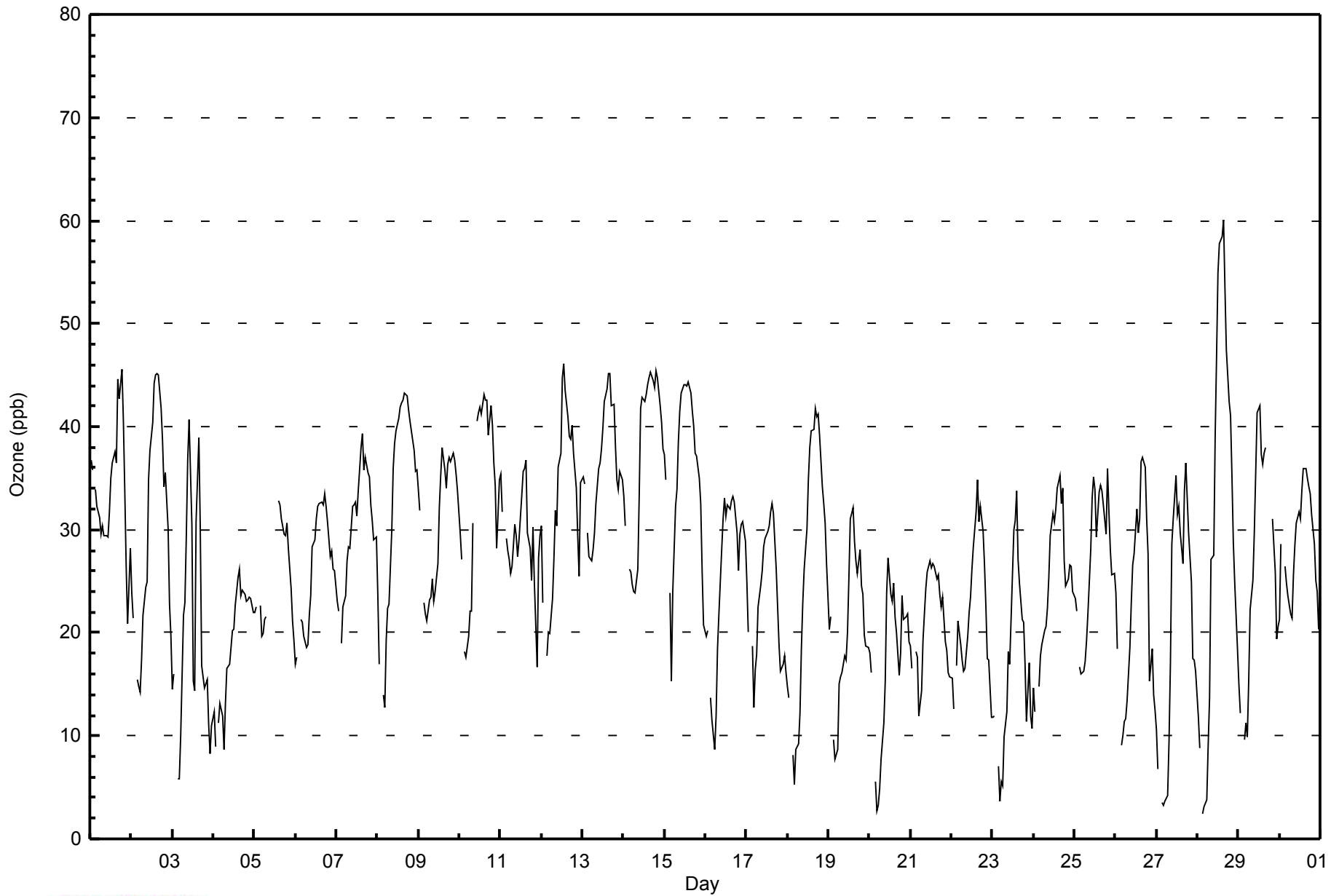
22.4	20.6	--	16.4	15.6	16.1	18.0	20.3	24.0	27.0	30.6	32.5	33.7	34.7	36.3	36.4	35.4	33.7	32.4	31.2	28.4	26.1	24.1	23.4	Diurnal Average	
37	36	--	34	32	31	32	34	38	42	43	47	55	58	58	60	53	48	46	45	45	42	40	38	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Patricia McInnes - June 2014





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	189	27.79	27.79
21 - 50	486	71.47	99.26
51 - 82	5	0.74	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - June 2014

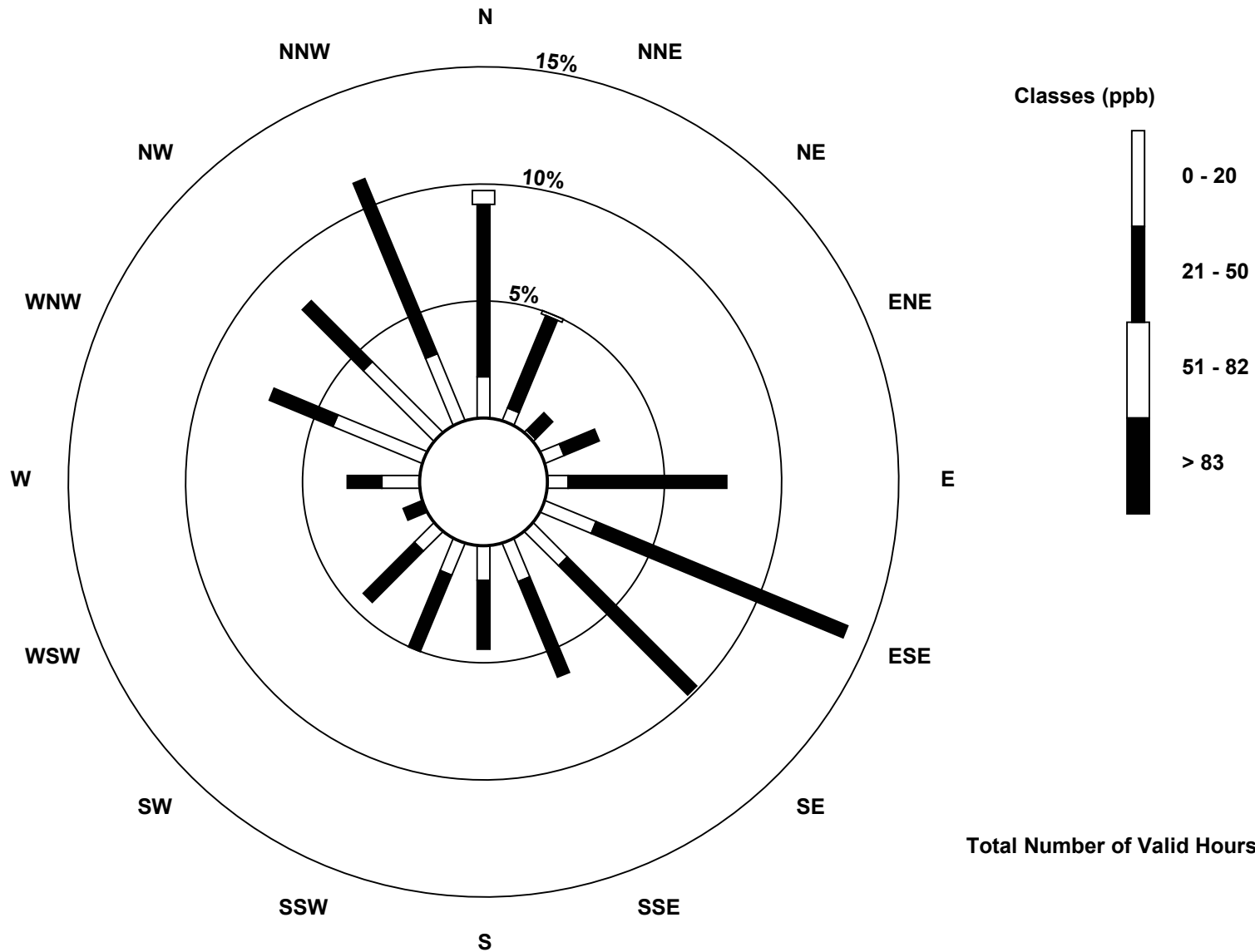
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	12	4	1	6	6	16	14	12	10	10	8	0	11	28	29	21	188
21 - 50	50	29	7	11	46	79	53	30	20	24	21	6	10	20	25	55	486
51 - 82	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	34	8	17	52	95	67	42	30	34	29	6	21	48	54	76	679

Total Number of Valid Hours: 679

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Ozone (O₃) - ppb
Patricia McInnes (AMS 6)

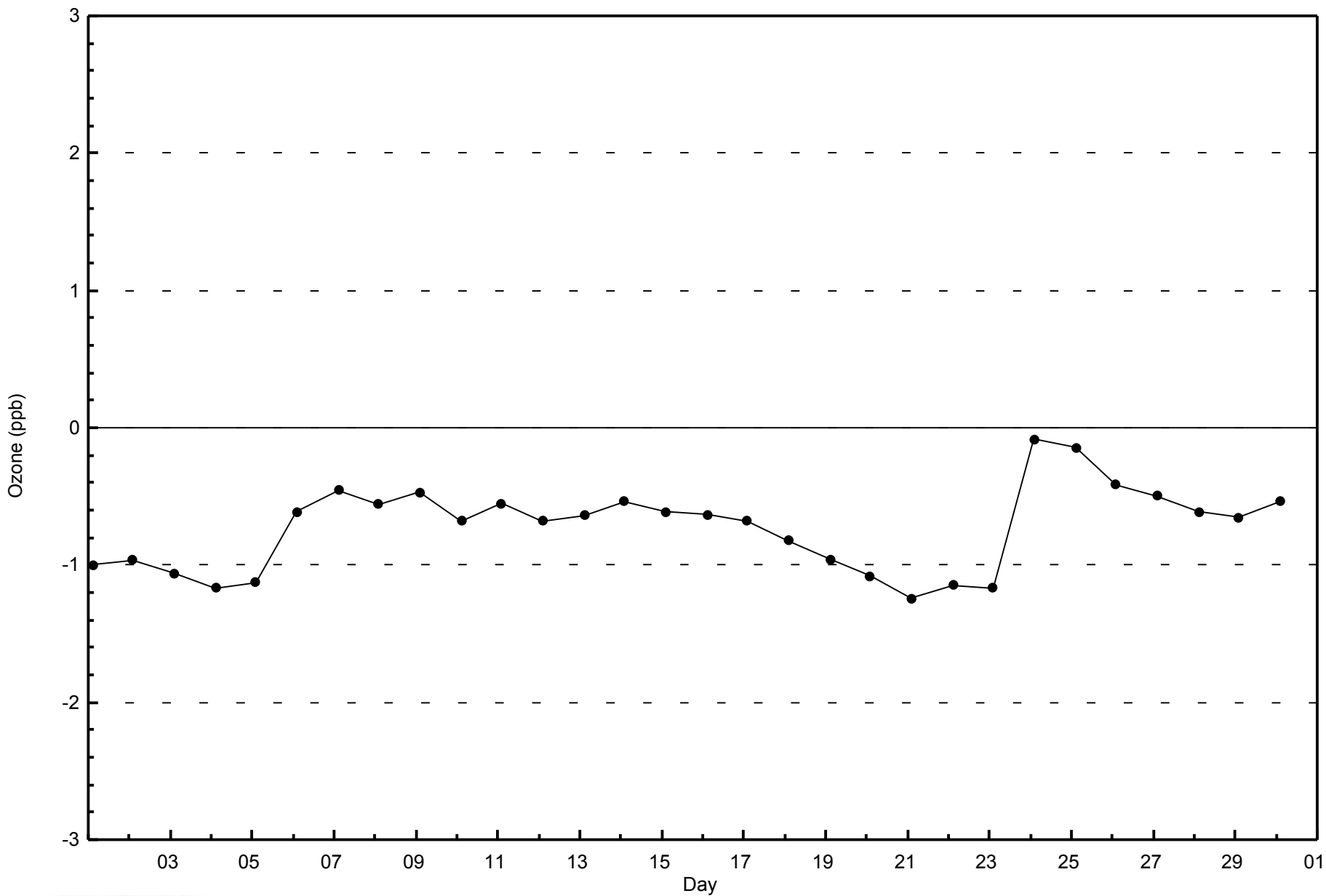


Total Number of Valid Hours: 679



WBEA
Zero Responses

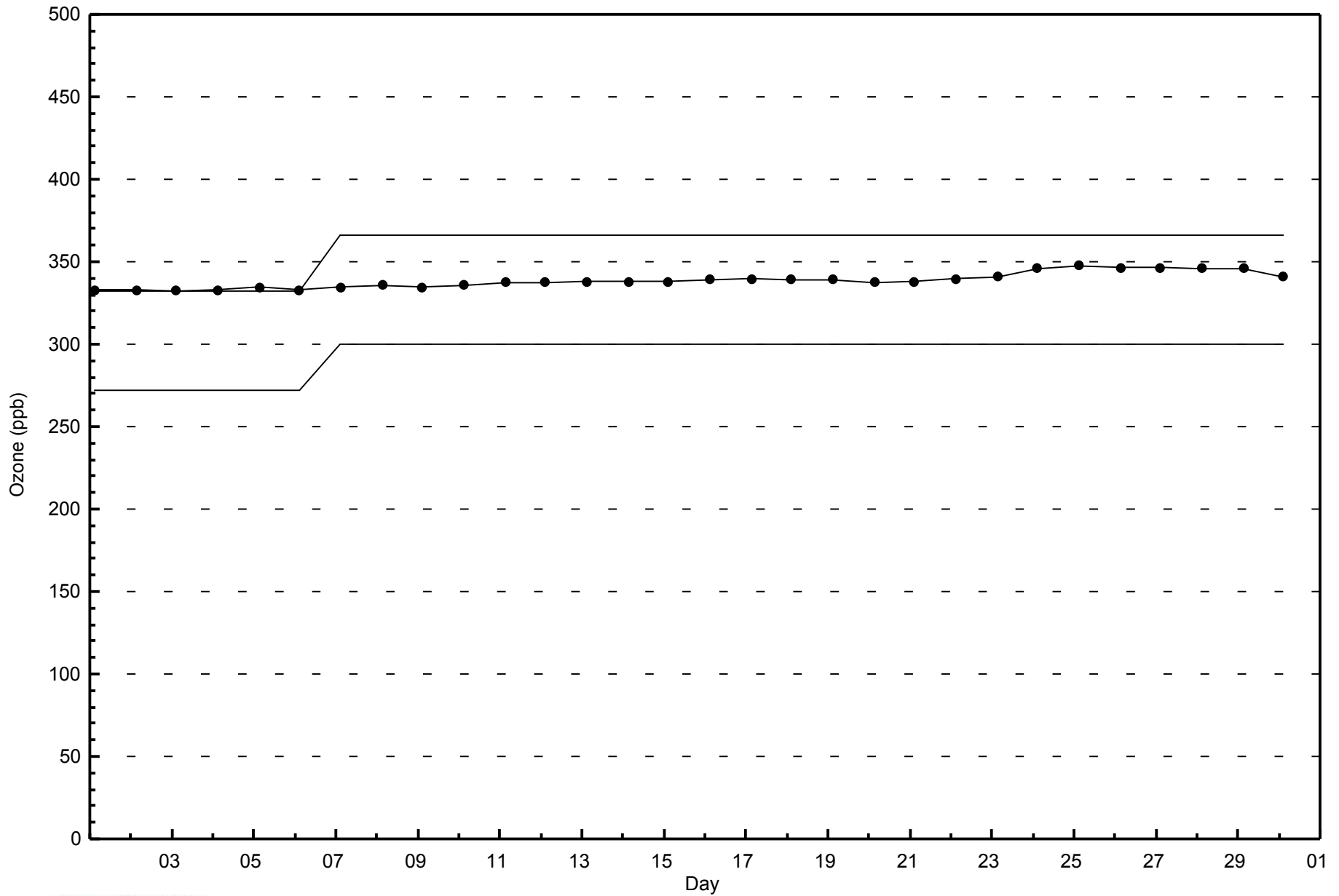
Ozone (O₃) - ppb
Patricia McInnes - June 2014





WBEA
Span Responses

Ozone (O₃) - ppb
Patricia McInnes - June 2014





Wood Buffalo Environmental Association
Summary of Hour Averages

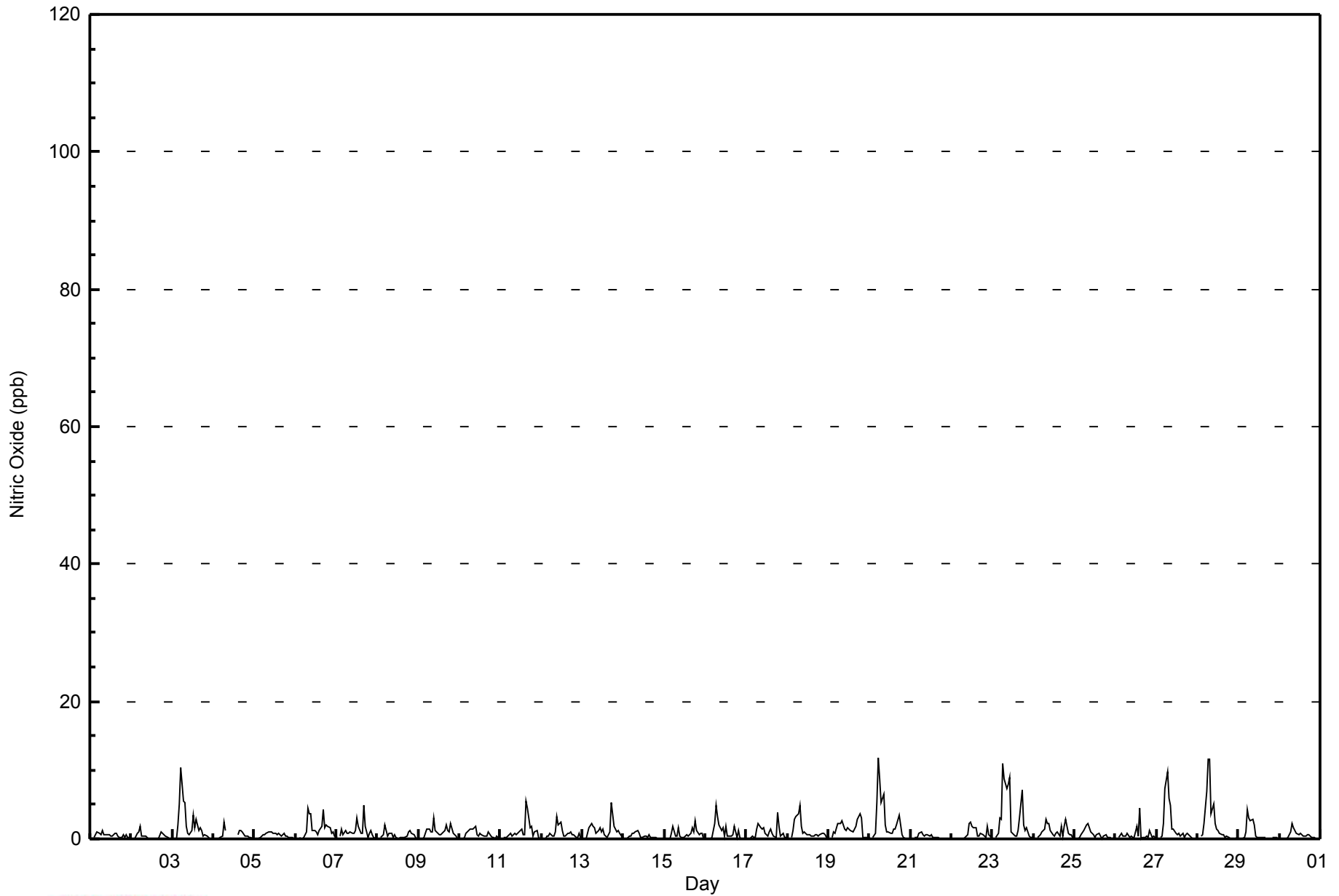
Nitric Oxide (NO) - ppb
Patricia McInnes - June 2014

Maximum Value: 12 ppb on Jun 20 06:00																		Maximum Daily Average: 3.1 ppb on Jun 23						Hours in Service: 720																									
Minimum Value: 0 ppb on Jun 2 14:00																		Minimum Daily Average: 0.3 ppb on Jun 21						Hours of Data: 681																									
Maximum Diurnal Average: 2.7 ppb at hour 7																		Minimum Diurnal Average: 0.1 ppb at hour 1						Hours of Missing Data: 39																									
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 = 9						Hours of Calibration: 36																									
																		Percent Operational Time: 99.6																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jun	0	Z	0	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	1	0	1	0	0	0.5	1																								
2-Jun	0	Z	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.4	2																								
3-Jun	0	Z	0	2	5	10	5	5	2	1	1	3	2	3	1	2	1	1	1	0	0	0	0	2.0	10																								
4-Jun	0	Z	0	0	0	0	2	1	C	C	C	C	C	C	1	1	1	1	0	0	0	0	0	--	2																								
5-Jun	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0.5	1																								
6-Jun	0	Z	0	0	0	0	1	5	4	4	1	1	1	1	2	4	2	2	2	2	2	1	1	1.5	5																								
7-Jun	0	Z	0	1	1	1	1	1	1	1	1	3	2	1	1	5	2	0	1	1	1	1	0	1.1	5																								
8-Jun	0	Z	0	1	2	1	0	1	1	0	1	0	0	0	0	0	0	1	1	1	1	1	0	0.5	2																								
9-Jun	0	Z	0	0	1	1	2	1	1	3	1	1	1	1	1	2	1	1	2	1	1	1	0	1.0	3																								
10-Jun	0	Z	0	0	1	1	1	2	1	2	1	0	1	1	0	0	0	1	0	0	0	0	0	0.6	2																								
11-Jun	0	Z	0	0	0	1	1	0	1	1	1	1	1	1	5	4	2	2	0	1	1	1	0	1.1	5																								
12-Jun	0	Z	0	0	0	1	0	1	1	3	2	2	1	0	0	1	1	1	1	1	0	0	1	0.8	3																								
13-Jun	0	Z	0	1	2	2	2	2	1	1	2	1	1	1	0	1	1	5	2	2	1	1	1	1.2	5																								
14-Jun	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1																								
15-Jun	0	Z	0	0	1	2	0	0	2	0	0	0	0	1	0	1	2	1	3	1	1	1	1	0.8	3																								
16-Jun	0	Z	0	0	0	2	5	3	2	1	2	0	2	0	0	0	1	2	0	1	0	0	0	1.0	5																								
17-Jun	0	Z	0	0	0	0	1	2	2	1	2	1	0	1	1	1	0	0	4	2	0	1	0	1.0	4																								
18-Jun	0	Z	0	1	3	3	4	5	2	1	1	1	1	1	0	0	1	1	0	1	1	1	1	1.2	5																								
19-Jun	0	Z	0	1	1	2	2	2	3	2	1	2	1	1	1	1	2	3	4	3	0	0	0	1.4	4																								
20-Jun	0	Z	0	1	5	12	9	5	7	2	1	1	1	1	2	1	2	3	2	1	0	0	0	2.4	12																								
21-Jun	0	Z	0	0	0	1	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1																								
22-Jun	0	Z	0	0	0	0	0	0	0	1	2	2	2	2	2	0	0	1	1	0	0	2	1	0.7	2																								
23-Jun	0	Z	0	1	3	3	11	9	7	8	9	1	1	1	0	1	3	7	2	1	2	0	0	3.1	11																								
24-Jun	0	Z	0	1	1	1	1	3	2	2	1	1	0	1	1	0	2	1	2	3	1	1	1	1.1	3																								
25-Jun	0	Z	0	0	1	1	2	2	2	1	1	0	1	1	0	0	0	0	1	0	0	0	0	0.7	2																								
26-Jun	0	Z	0	1	0	0	0	1	0	0	0	0	2	0	5	0	0	0	0	0	1	0	0	0.6	5																								
27-Jun	0	Z	0	0	2	7	10	6	5	1	2	1	1	1	0	1	0	1	1	1	0	0	0	1.7	10																								
28-Jun	0	Z	0	1	2	7	12	12	4	5	2	2	1	1	1	1	0	0	0	0	0	0	0	2.2	12																								
29-Jun	0	Z	0	0	1	4	3	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	4																								
30-Jun	0	Z	0	0	0	0	1	2	2	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0.5	2																								
																								0.1	--	0.1	0.5	1.2	2.4	2.7	2.6	2.0	1.7	1.3	0.8	1.0	0.7	0.8	0.9	1.2	1.3	1.1	0.9	0.5	0.4	0.3	0.1	Diurnal Average	
																								0	--	0	2	5	12	12	12	7	8	9	2	3	2	5	5	5	5	7	4	3	2	2	1	0	Diurnal Maximum
Z - zerospan C - Calibration PF - Power Failure																																																	



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Patricia McInnes - June 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Patricia McInnes - June 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
Patricia McInnes - June 2014

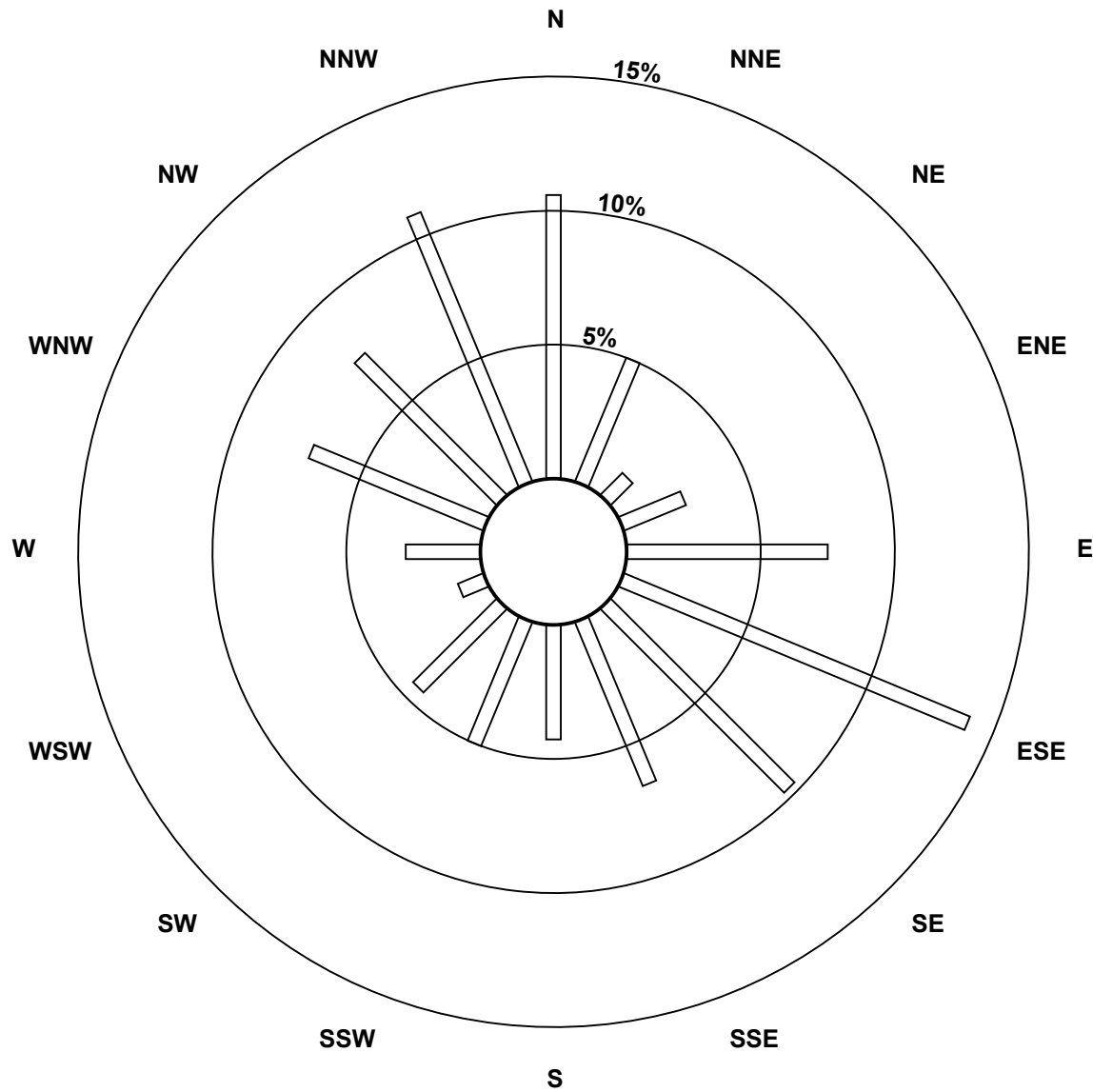
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	72	34	8	17	51	95	66	45	29	34	30	7	19	48	51	74	680
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	72	34	8	17	51	95	66	45	29	34	30	7	19	48	51	74	680

Total Number of Valid Hours: 680

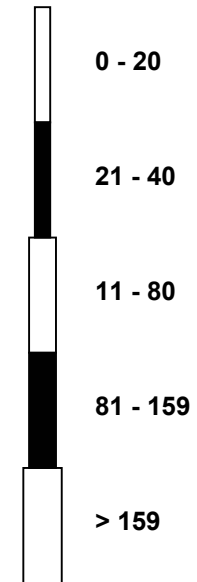
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Nitric Oxide (NO) - ppb
Patricia McInnes (AMS 6)



Classes (ppb)

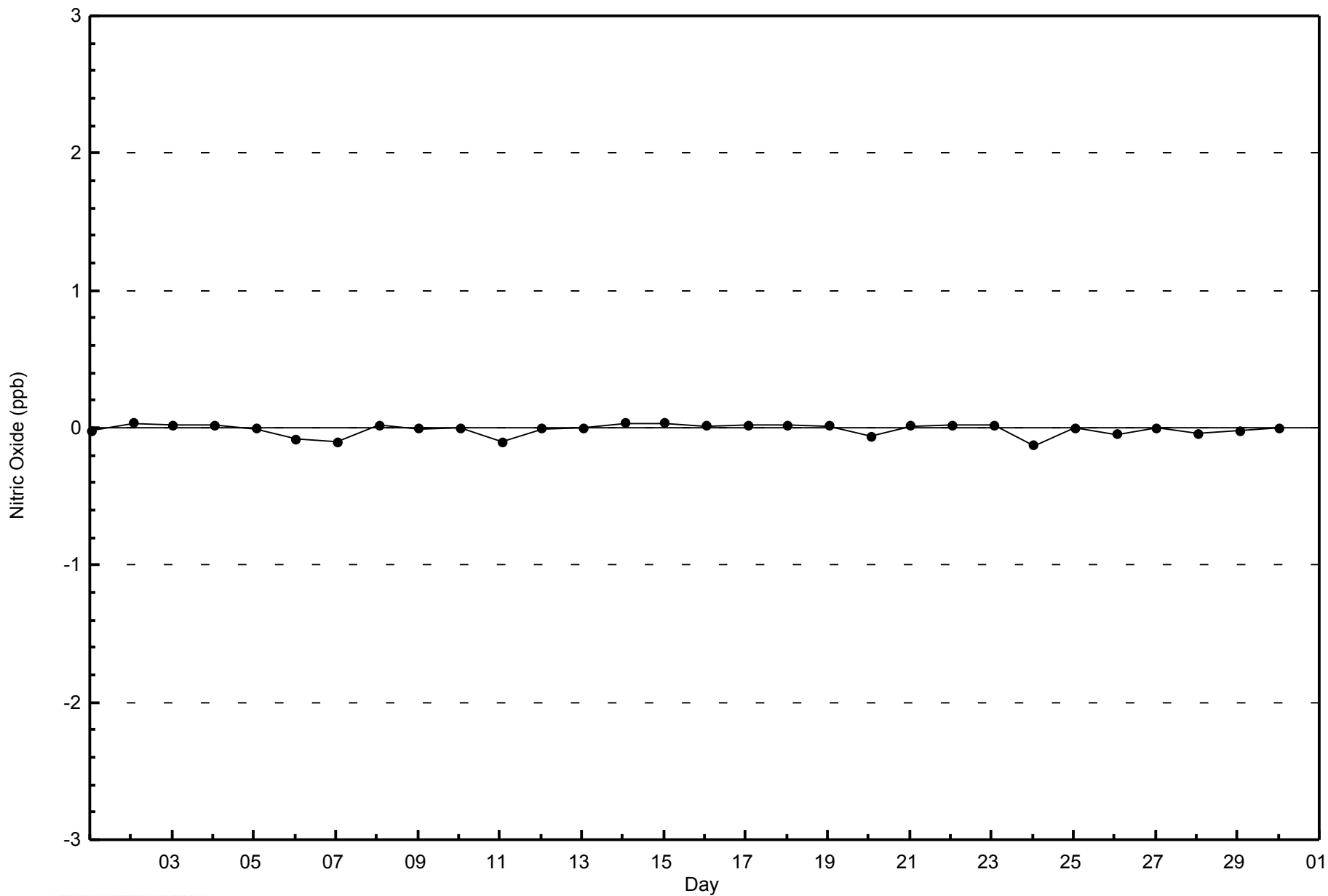


Total Number of Valid Hours: 680



WBEA
Zero Responses

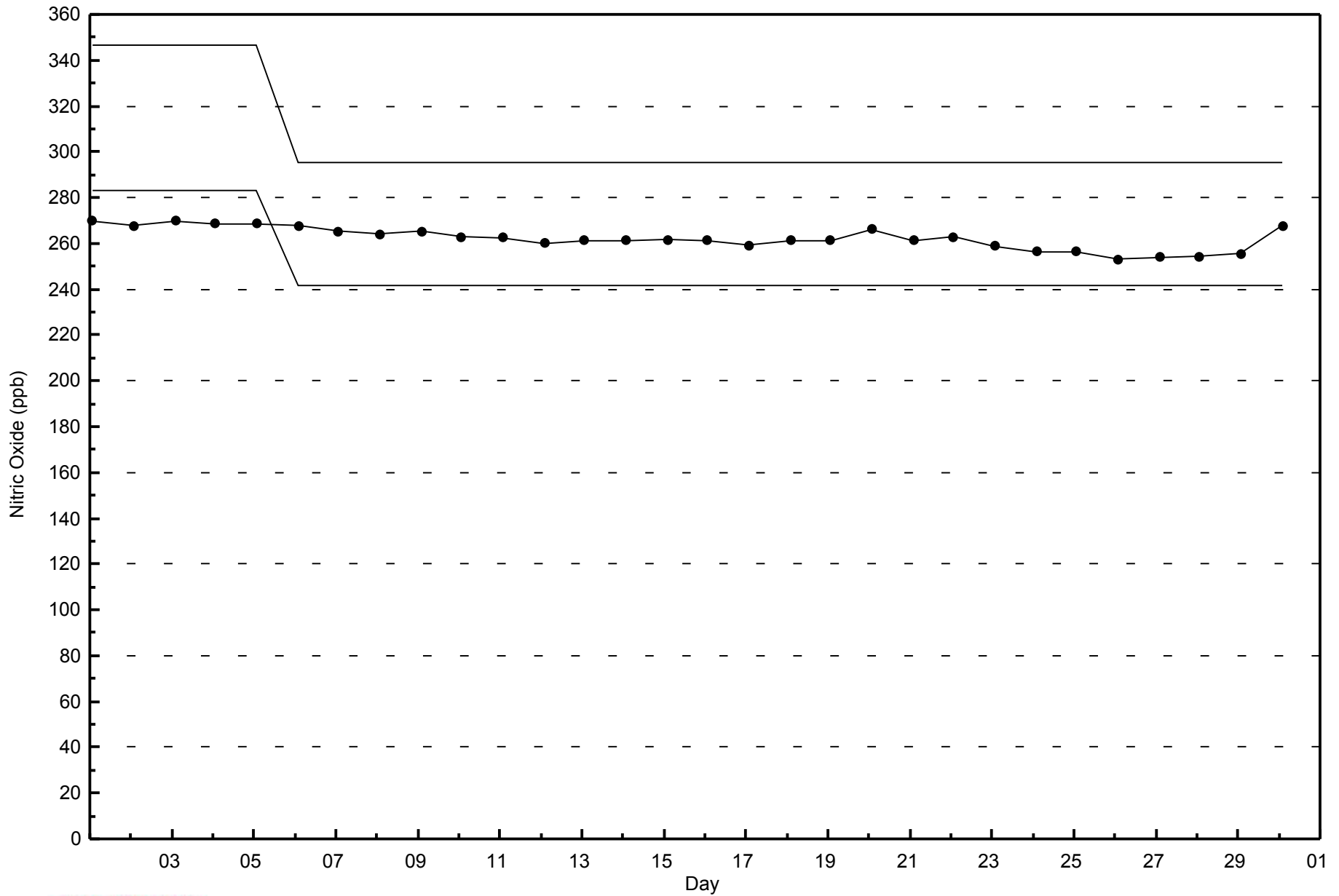
Nitric Oxide (NO) - ppb
Patricia McInnes - June 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Patricia McInnes - June 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Patricia McInnes - June 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 17 ppb on Jun 3 05:00	Maximum Daily Average: 6.8 ppb on Jun 29		Hours of Data:	681
Minimum Value: 0 ppb on Jun 21 18:00	Minimum Daily Average: 1.3 ppb on Jun 14		Hours of Missing Data:	39
Maximum Diurnal Average: 4.6 ppb at hour 6	Minimum Diurnal Average: 1.7 ppb at hour 15		Hours of Calibration:	36
Monthly Average: 3.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 7 P ₉₉ = 13		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-Jun	0	Z	0	2	2	2	1	2	2	2	1	1	1	1	2	3	2	1	2	3	4	4	4	2	2.0	4
2-Jun	4	Z	2	3	3	3	1	1	1	0	0	0	0	0	0	0	0	4	4	6	8	6	3	3	2.3	8
3-Jun	3	Z	3	17	17	15	10	8	3	2	2	4	8	5	6	4	6	3	4	5	3	5	6	3	6.1	17
4-Jun	2	Z	5	4	2	4	8	4	C	C	C	C	C	C	2	2	4	3	2	2	2	1	2	2	--	8
5-Jun	2	Z	3	2	4	4	2	3	2	3	1	1	2	1	2	2	2	2	2	1	2	2	3	3	2.2	4
6-Jun	5	Z	1	0	0	0	2	5	5	5	3	3	2	1	2	4	6	5	6	7	8	5	6	4	3.6	8
7-Jun	3	Z	2	5	3	3	1	1	1	2	2	4	5	3	2	3	6	5	3	4	5	6	3	1	3.2	6
8-Jun	2	Z	4	6	7	3	1	1	1	1	1	1	0	0	0	0	0	1	3	4	4	4	2	1	2.0	7
9-Jun	1	Z	3	3	4	6	5	3	3	3	2	1	1	1	1	2	3	1	2	2	2	2	2	1	2.4	6
10-Jun	4	Z	7	11	10	8	7	7	3	4	1	1	2	2	1	1	2	4	2	1	3	1	3	0	3.7	11
11-Jun	0	Z	1	2	1	1	2	1	1	2	1	2	3	3	2	4	10	8	8	2	7	8	1	0	3.0	10
12-Jun	0	Z	5	4	2	2	1	1	2	6	4	5	4	2	2	2	2	3	4	5	7	7	11	1	3.4	11
13-Jun	0	Z	0	3	3	3	3	2	1	2	1	0	1	1	0	1	1	5	2	3	3	4	4	3	2.0	5
14-Jun	2	Z	2	2	2	2	1	1	2	1	1	0	1	1	0	1	1	1	1	1	1	3	2	3	1.3	3
15-Jun	1	Z	3	2	5	6	1	1	1	1	1	0	1	1	1	1	1	2	1	2	2	3	8	4	2.2	8
16-Jun	1	Z	1	1	1	4	7	5	2	2	3	1	2	0	0	0	1	3	1	3	0	0	0	1	1.7	7
17-Jun	0	Z	2	3	2	1	3	4	3	2	2	1	1	1	1	1	1	1	2	3	2	2	2	2	1.7	4
18-Jun	2	Z	2	5	7	5	4	4	2	1	2	2	1	1	1	1	1	1	1	2	3	3	2	2	2.4	7
19-Jun	5	Z	3	6	5	5	5	5	5	3	3	2	2	2	2	2	4	5	4	5	3	1	1	1	3.4	6
20-Jun	1	Z	2	4	7	10	9	7	7	4	2	3	2	1	2	3	3	4	4	3	2	0	1	1	3.5	10
21-Jun	0	Z	1	1	3	10	10	6	4	4	3	2	2	1	1	1	1	0	0	0	0	0	0	0	2.2	10
22-Jun	1	Z	3	3	2	1	0	0	0	2	5	6	6	4	5	4	4	5	5	4	3	6	5	3	3.3	6
23-Jun	1	Z	3	4	5	6	12	11	11	13	10	1	1	1	1	4	7	8	6	8	8	4	4	2	5.7	13
24-Jun	1	Z	1	2	2	2	2	4	3	3	2	2	2	2	2	1	4	3	4	6	4	6	5	2	2.8	6
25-Jun	2	Z	1	2	2	2	2	2	3	2	2	1	1	2	3	1	0	1	2	1	2	3	1	2	1.8	3
26-Jun	1	Z	2	5	2	1	0	1	0	0	0	0	1	1	3	0	1	1	3	2	12	7	6	4	2.3	12
27-Jun	7	Z	9	8	6	8	7	5	6	3	4	2	2	2	1	1	1	3	5	3	1	1	2	2	3.8	9
28-Jun	1	Z	7	7	5	5	11	11	7	9	6	6	6	5	5	5	3	5	4	2	2	1	2	7	5.3	11
29-Jun	9	Z	15	13	11	14	11	8	8	6	2	3	2	1	1	1	2	PF	PF	PF	2	5	12	13	6.8	15
30-Jun	10	Z	2	1	1	2	4	6	5	4	3	2	2	2	2	2	3	2	2	2	3	2	1	2	2.9	10

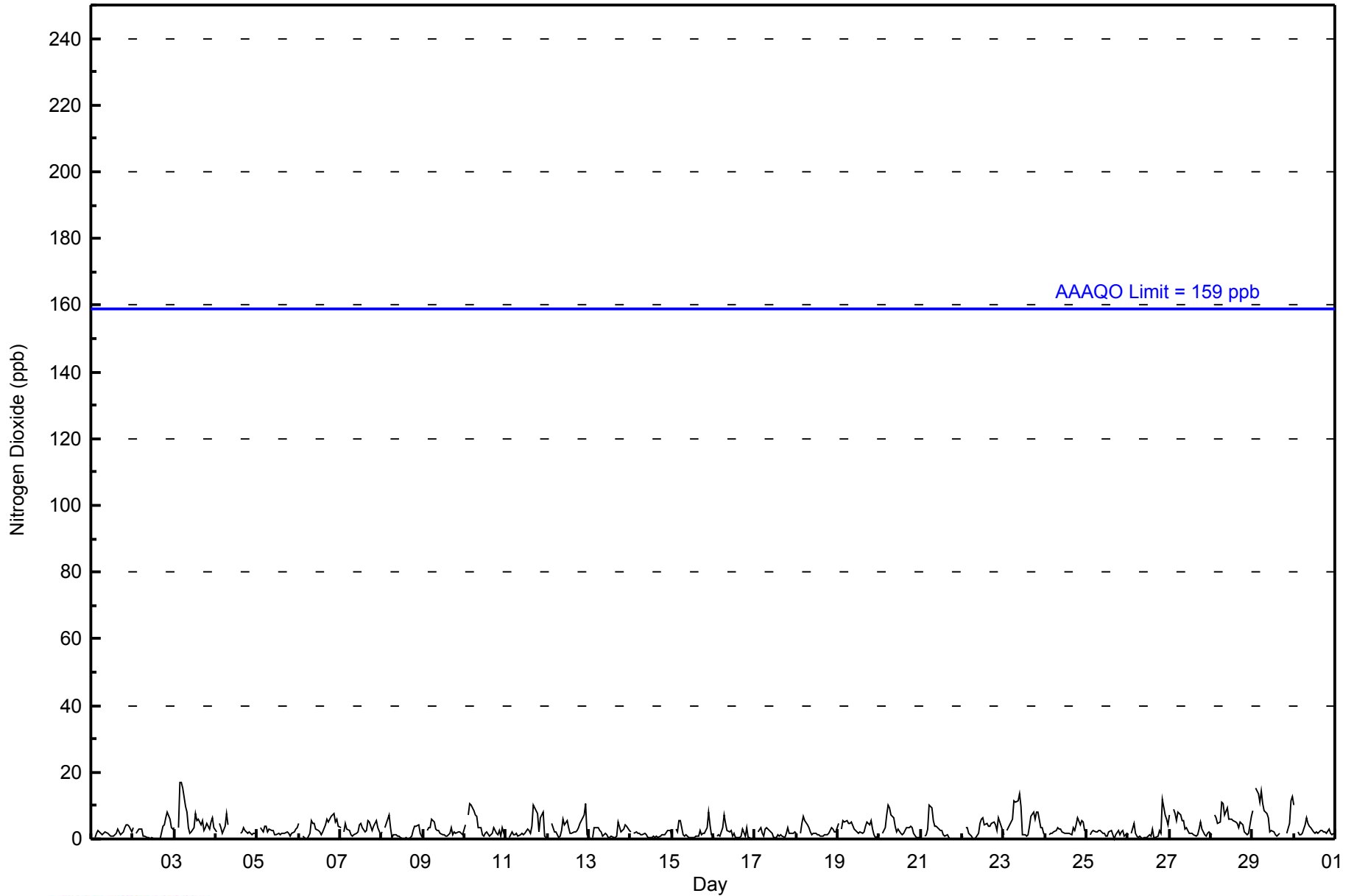
2.5	--	3.1	4.3	4.2	4.6	4.4	4.0	3.3	3.1	2.4	2.0	2.1	1.7	1.7	1.9	2.7	3.0	3.1	3.2	3.6	3.6	3.3	2.4	Diurnal Average	
10	--	15	17	17	15	12	11	11	13	10	6	8	5	6	5	10	8	8	8	12	8	12	13	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - June 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
Patricia McInnes - June 2014

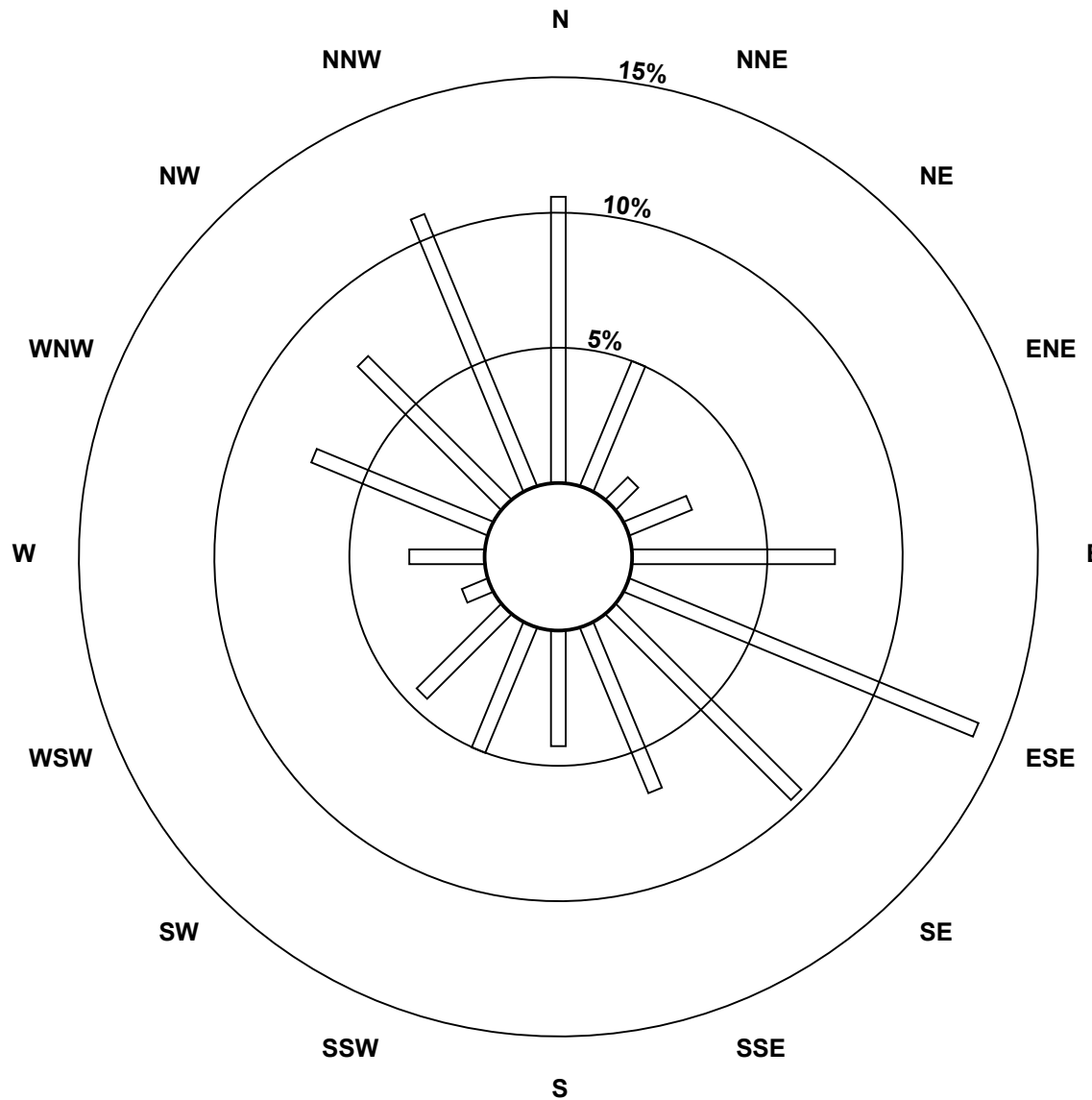
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	72	34	8	17	51	95	66	45	29	34	30	7	19	48	51	74	680
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	72	34	8	17	51	95	66	45	29	34	30	7	19	48	51	74	680

Total Number of Valid Hours: 680

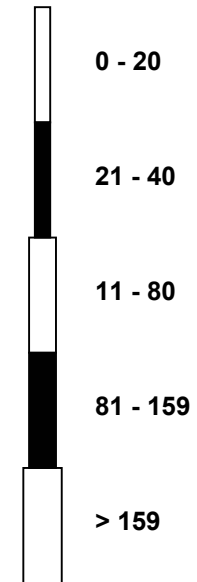
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes (AMS 6)



Classes (ppb)

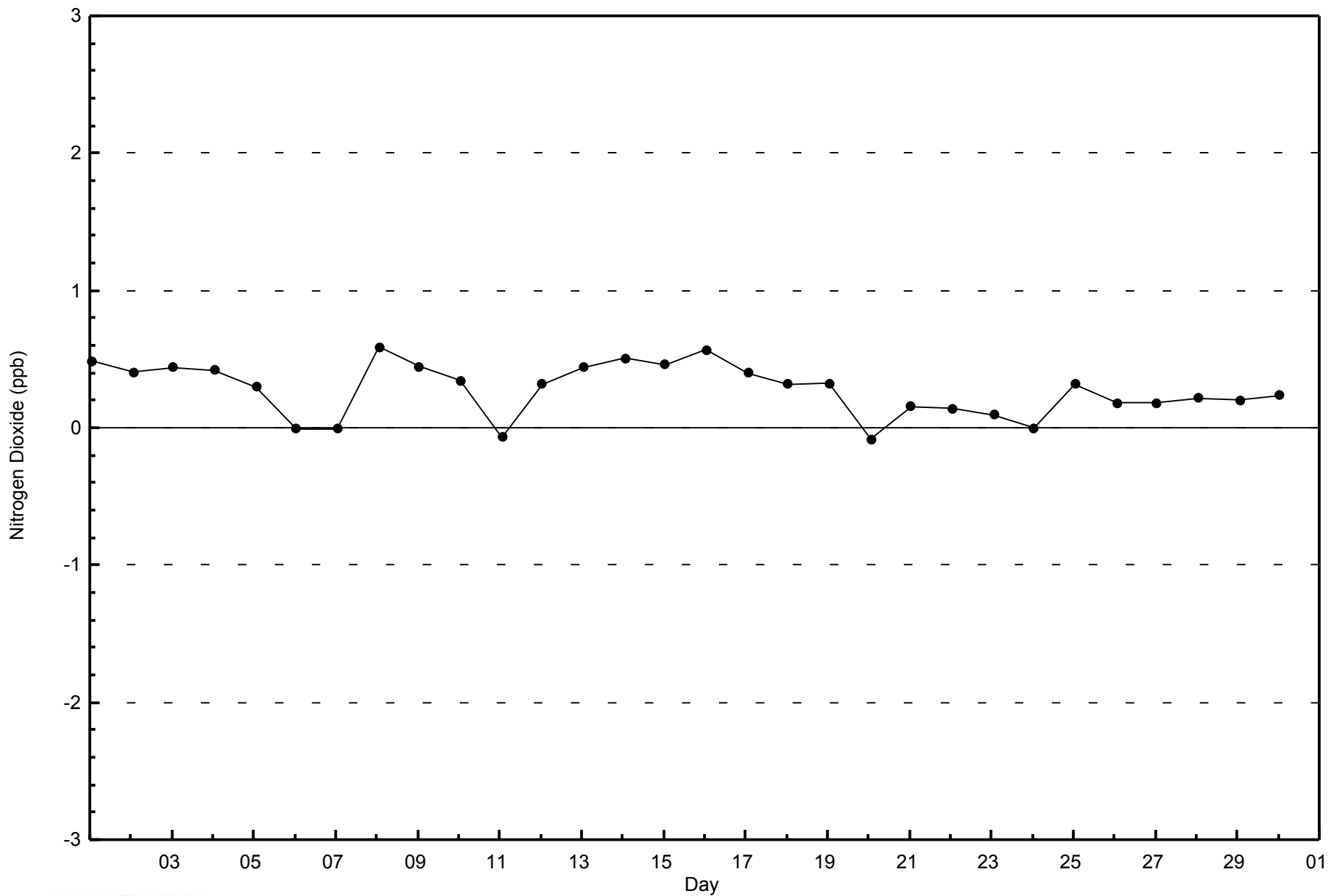


Total Number of Valid Hours: 680



WBEA
Zero Responses

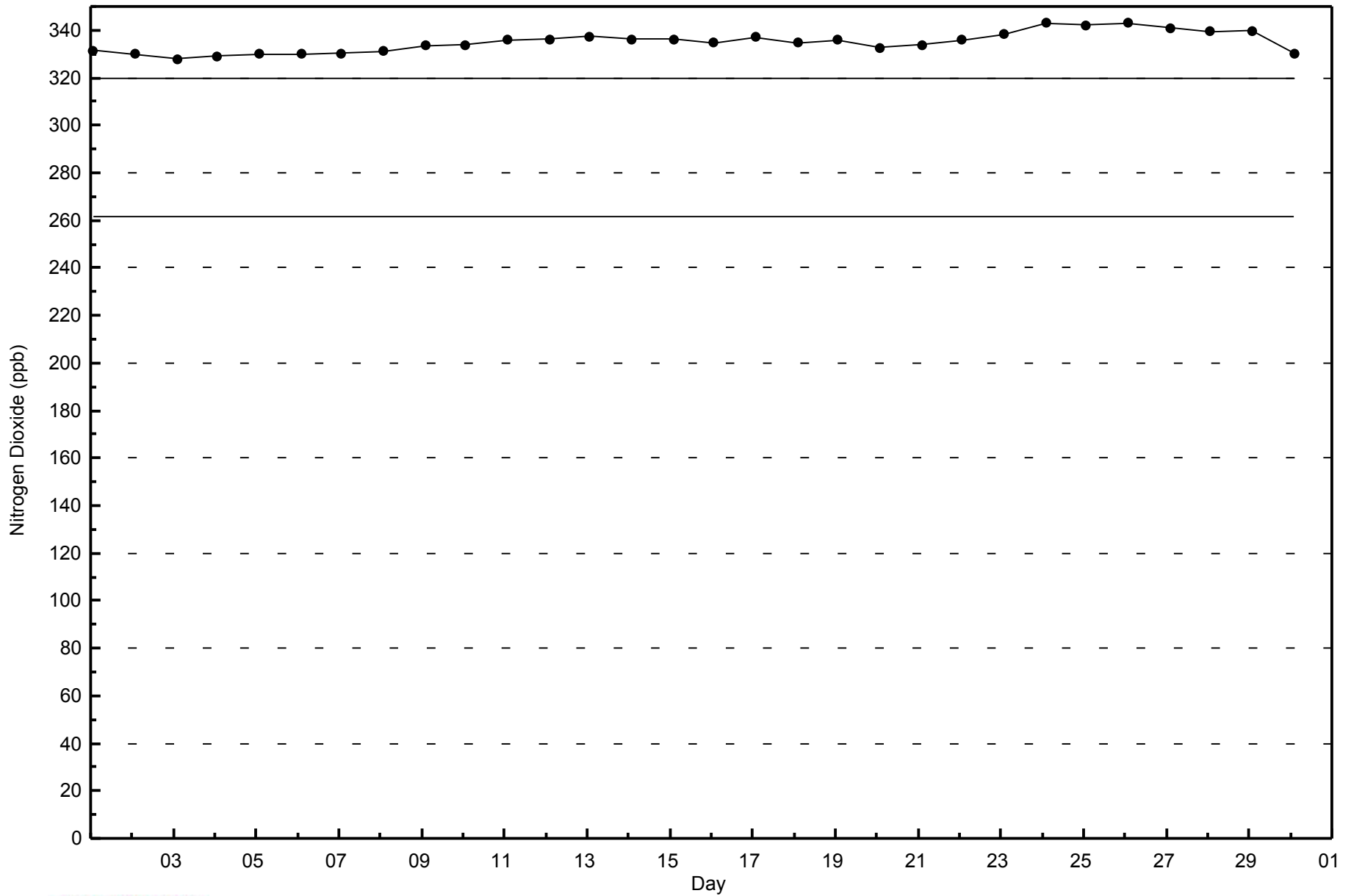
Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - June 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - June 2014





Wood Buffalo Environmental Association
Summary of Hour Averages

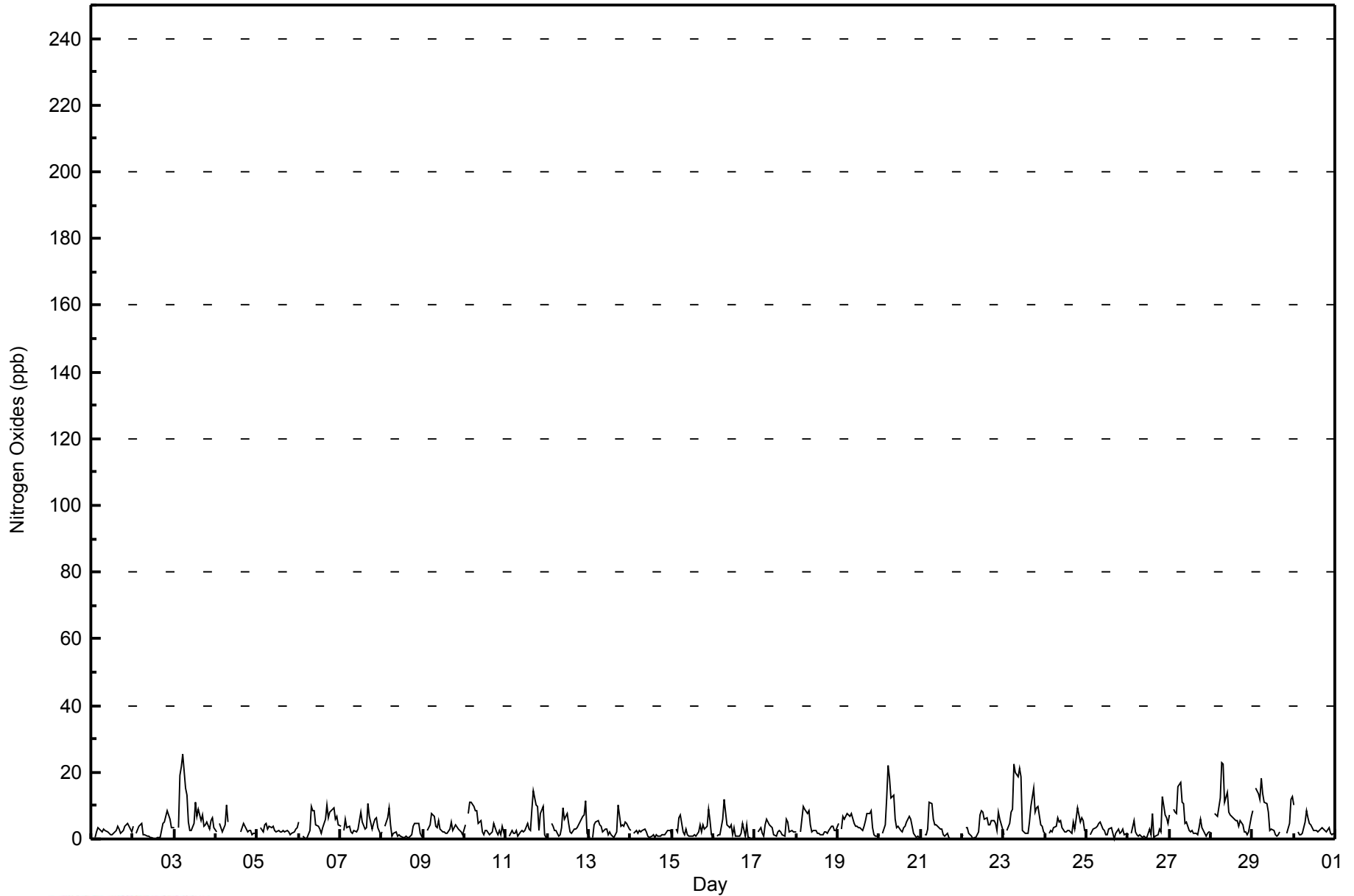
Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - June 2014

Maximum Value: 25 ppb on Jun 3 06:00																	Maximum Daily Average: 8.8 ppb on Jun 23							Hours in Service: 720																									
Minimum Value: 0 ppb on Jun 21 18:00																	Minimum Daily Average: 1.7 ppb on Jun 14							Hours of Data: 681																									
Maximum Diurnal Average: 7.1 ppb at hour 7																	Minimum Diurnal Average: 2.4 ppb at hour 14							Hours of Missing Data: 39																									
Monthly Average: 4.1 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 9 P ₉₉ = 21							Hours of Calibration: 36		Percent Operational Time: 99.6																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jun	0	Z	1	2	3	3	2	3	3	2	2	1	1	1	3	4	3	2	2	4	4	5	4	2	2.5	5																							
2-Jun	4	Z	2	4	4	5	1	1	1	1	0	0	0	0	0	0	0	5	5	7	8	6	4	3	2.7	8																							
3-Jun	3	Z	3	19	22	25	15	13	5	3	3	5	11	7	9	5	7	4	4	5	3	5	6	3	8.1	25																							
4-Jun	2	Z	5	4	2	4	10	5	C	C	C	C	C	C	2	3	5	4	2	3	2	1	2	2	--	10																							
5-Jun	2	Z	3	2	4	5	3	4	3	4	2	2	2	2	2	2	2	3	2	1	2	2	3	4	2.7	5																							
6-Jun	5	Z	1	0	0	0	3	10	8	8	4	4	3	2	3	6	10	6	8	9	9	6	7	4	5.1	10																							
7-Jun	4	Z	2	6	3	4	2	2	2	2	3	6	8	5	3	3	10	7	3	5	6	6	4	1	4.2	10																							
8-Jun	2	Z	4	7	9	4	1	2	2	1	1	1	0	0	1	0	0	1	4	5	5	5	2	1	2.5	9																							
9-Jun	1	Z	3	3	4	8	7	4	4	6	3	2	2	2	2	3	5	2	3	4	3	3	2	1	3.3	8																							
10-Jun	4	Z	8	11	11	10	9	8	5	5	2	1	2	3	1	2	2	5	2	1	3	1	4	1	4.4	11																							
11-Jun	0	Z	1	2	2	2	2	1	2	2	2	3	4	3	2	9	15	10	10	3	8	10	1	1	4.1	15																							
12-Jun	0	Z	5	4	3	3	1	1	3	9	6	8	5	2	2	3	3	4	4	5	7	7	11	2	4.2	11																							
13-Jun	0	Z	1	4	5	6	4	4	2	3	3	1	2	1	1	1	2	10	4	4	4	5	5	3	3.3	10																							
14-Jun	2	Z	2	3	2	2	2	2	3	2	1	1	1	1	0	1	1	1	1	1	1	3	2	3	1.7	3																							
15-Jun	1	Z	3	2	6	7	2	1	3	1	1	1	1	1	1	2	4	2	4	3	4	9	5	1	2.9	9																							
16-Jun	1	Z	1	1	1	6	12	8	4	3	4	1	4	1	1	1	2	5	1	4	1	0	0	1	2.7	12																							
17-Jun	0	Z	2	4	2	1	4	6	4	4	3	1	1	2	2	2	1	1	6	5	2	2	2	2	2.6	6																							
18-Jun	2	Z	2	6	10	9	8	8	4	2	3	2	2	2	1	1	2	2	2	3	4	4	3	2	3.6	10																							
19-Jun	5	Z	3	7	6	8	7	7	8	5	4	4	3	3	3	4	6	8	8	8	3	1	1	1	4.8	8																							
20-Jun	1	Z	2	4	12	22	18	12	13	6	3	4	3	2	3	4	5	7	6	4	2	0	1	0	5.9	22																							
21-Jun	0	Z	1	1	3	11	10	6	4	4	4	3	3	1	1	2	1	0	0	0	0	0	0	0	2.5	11																							
22-Jun	1	Z	3	3	2	1	0	0	0	2	7	8	8	6	6	4	4	5	5	5	3	8	6	3	4.0	8																							
23-Jun	1	Z	3	5	8	9	22	20	19	21	19	2	2	2	2	5	10	15	8	9	10	4	4	2	8.8	22																							
24-Jun	2	Z	2	2	2	3	4	6	5	5	4	2	2	3	3	2	5	3	6	9	5	6	6	3	3.9	9																							
25-Jun	2	Z	1	2	3	3	4	5	5	3	2	1	1	3	3	1	0	2	3	2	2	3	1	2	2.4	5																							
26-Jun	1	Z	2	5	2	1	1	1	0	1	0	0	3	1	8	0	1	1	3	2	13	7	6	5	2.9	13																							
27-Jun	7	Z	9	8	8	15	17	11	10	5	5	2	2	3	2	2	1	4	6	3	2	1	2	2	5.5	17																							
28-Jun	2	Z	7	7	7	12	23	22	11	14	8	7	7	6	6	5	4	5	4	2	2	1	2	7	7.5	23																							
29-Jun	8	Z	15	14	12	18	14	11	11	8	2	3	2	1	1	1	2	PF	PF	PF	2	5	12	13	7.7	18																							
30-Jun	10	Z	2	1	1	2	5	9	6	5	4	3	3	2	2	3	3	3	2	2	3	2	1	2	3.4	10																							
																								2.6	--	3.2	4.8	5.3	7.0	7.1	6.5	5.3	4.8	3.6	2.8	3.1	2.4	2.5	2.8	3.9	4.3	4.2	4.1	4.1	4.0	3.6	2.5	Diurnal Average	
																								10	--	15	19	22	25	23	22	19	21	19	8	11	7	9	9	15	15	10	9	13	10	12	13	Diurnal Maximum	
Z - zerspan																								C - Calibration				PF - Power Failure																					



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	674	98.97	98.97
21 - 40	7	1.03	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: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - June 2014

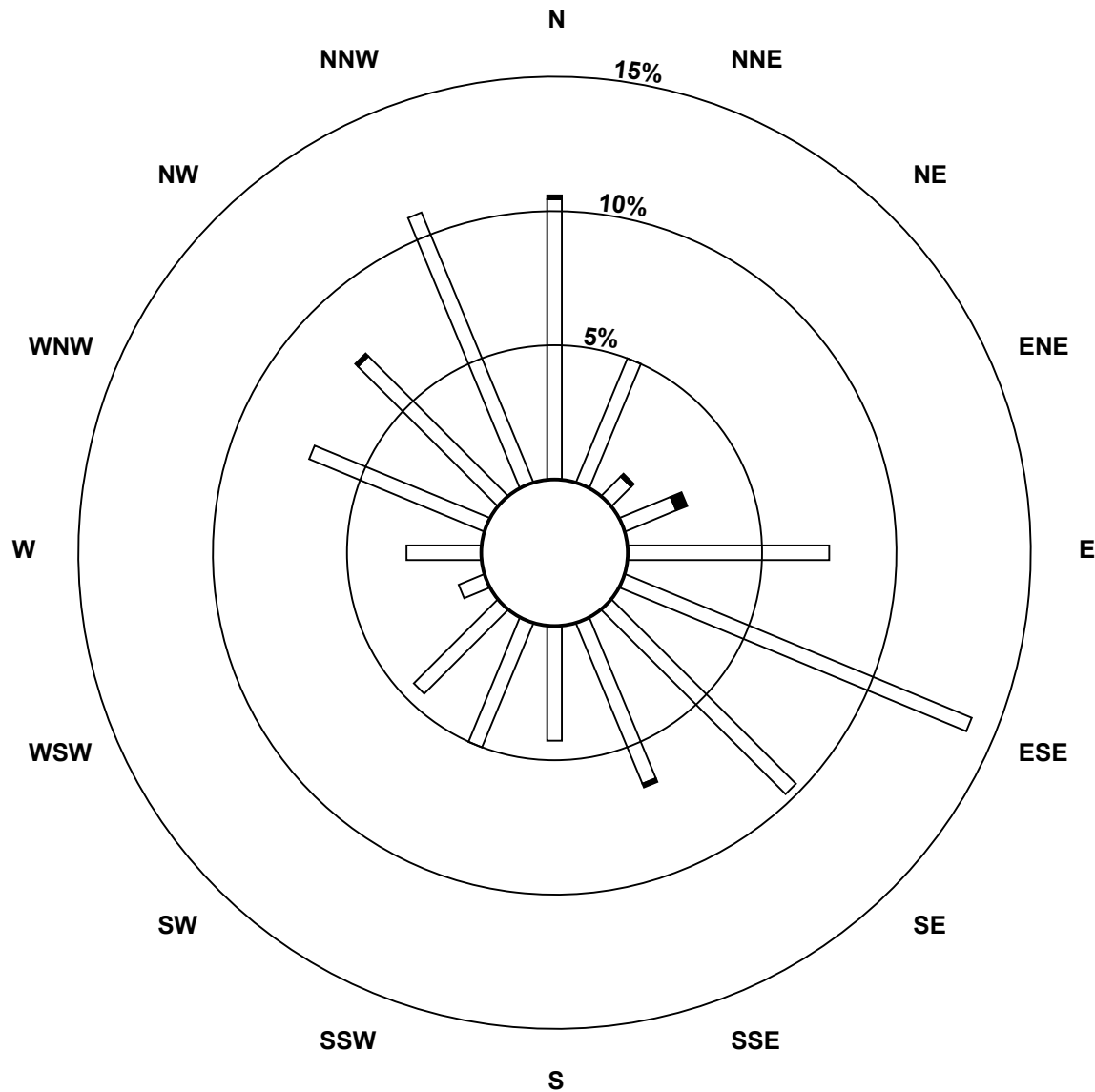
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	71	34	7	14	51	95	66	44	29	34	30	7	19	48	50	74	673
21 - 40	1	0	1	3	0	0	0	1	0	0	0	0	0	0	1	0	7
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	72	34	8	17	51	95	66	45	29	34	30	7	19	48	51	74	680

Total Number of Valid Hours: 680

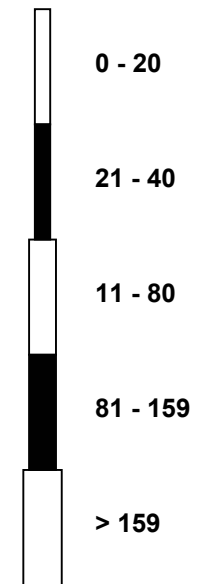
Total Number of Hours: 720

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

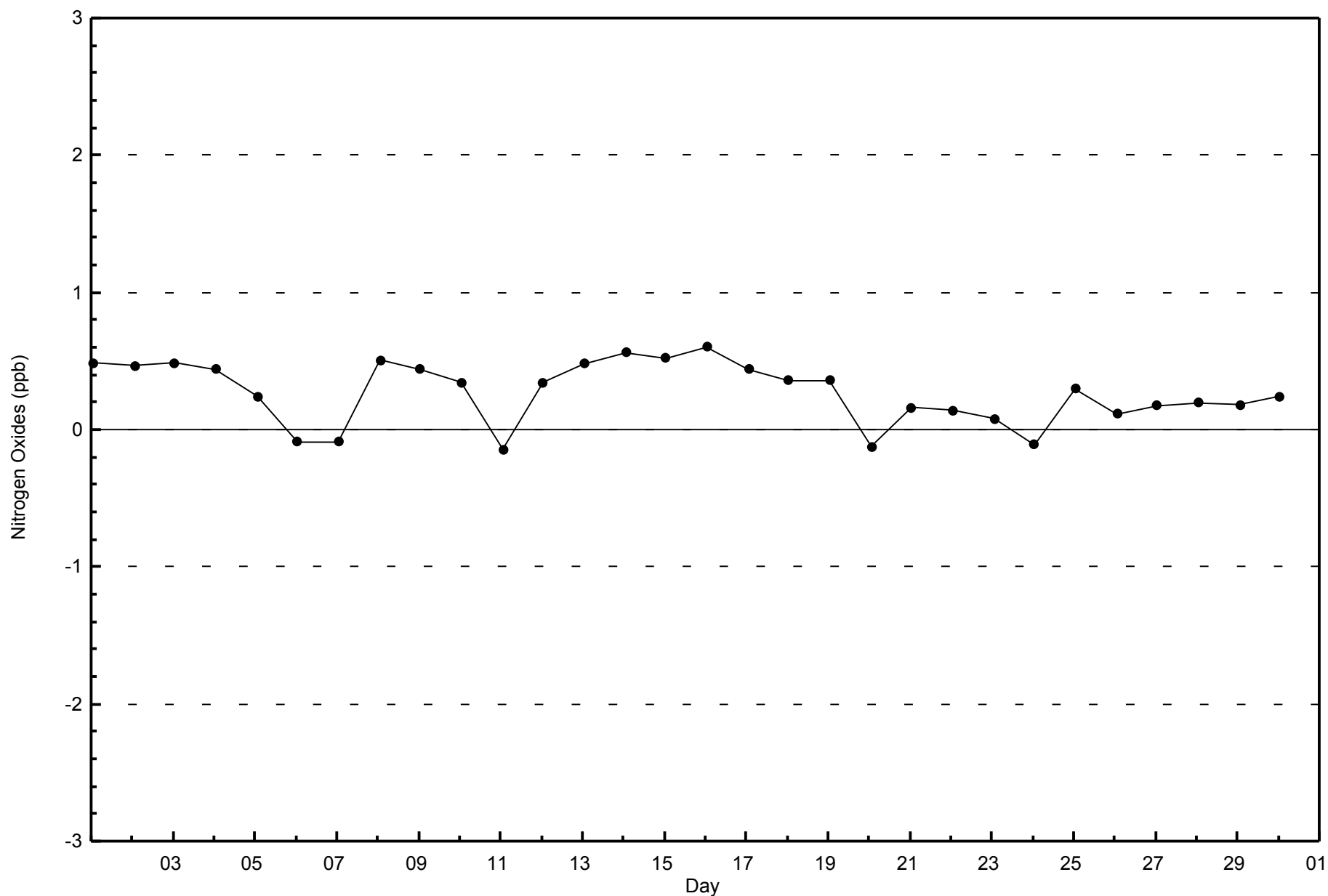
**Nitrogen Oxides (NO_x) - ppb
Patricia McInnes (AMS 6)**



Classes (ppb)



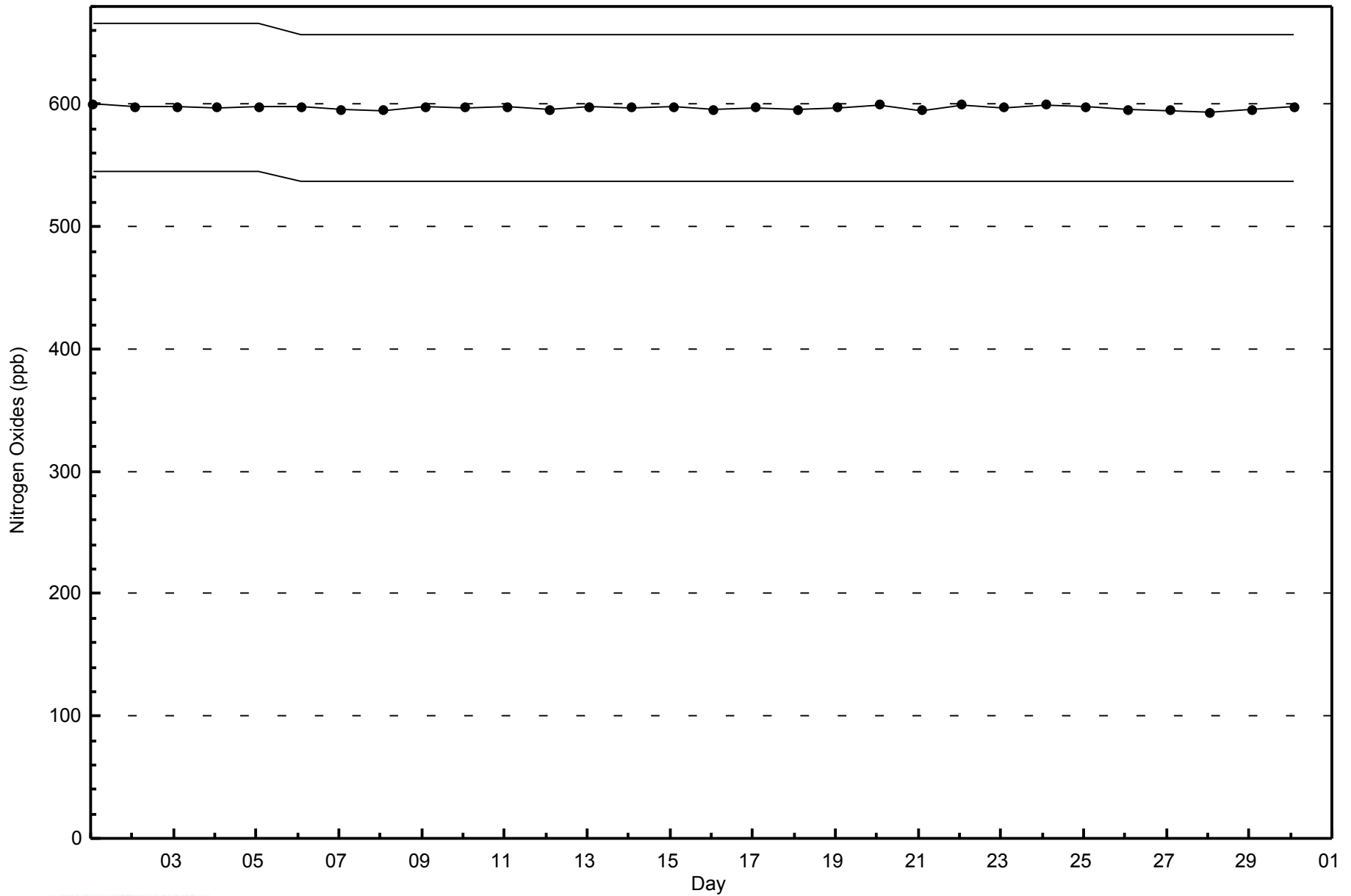
Total Number of Valid Hours: 680





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - June 2014





Number of Exceedences (AAQO):	1-hr: 0	Hours in Service:	720
Maximum Value: 0 ppb on Jun 1 01:00	Maximum Daily Average: 0.0 ppb on Jun 1	Hours of Data:	648
Minimum Value: 0 ppb on Jun 1 01:00	Minimum Daily Average: 0.0 ppb on Jun 1	Hours of Missing Data:	72
Maximum Diurnal Average: 0.0 ppb at hour 1	Minimum Diurnal Average: 0.0 ppb at hour 1	Hours of Calibration:	39
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:	95.4

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-Jun	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
2-Jun	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
3-Jun	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-Jun	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
5-Jun	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
6-Jun	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
7-Jun	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
8-Jun	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
9-Jun	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-Jun	0	0	0	Z	RE	0	0	0	C	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	--	0
11-Jun	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Jun	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-Jun	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
14-Jun	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-Jun	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-Jun	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
17-Jun	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
18-Jun	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
19-Jun	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
20-Jun	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
21-Jun	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-Jun	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-Jun	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-Jun	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
25-Jun	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
26-Jun	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
27-Jun	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-Jun	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-Jun	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	PF	PF	PF	0	0	0	0.0	0
30-Jun	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0

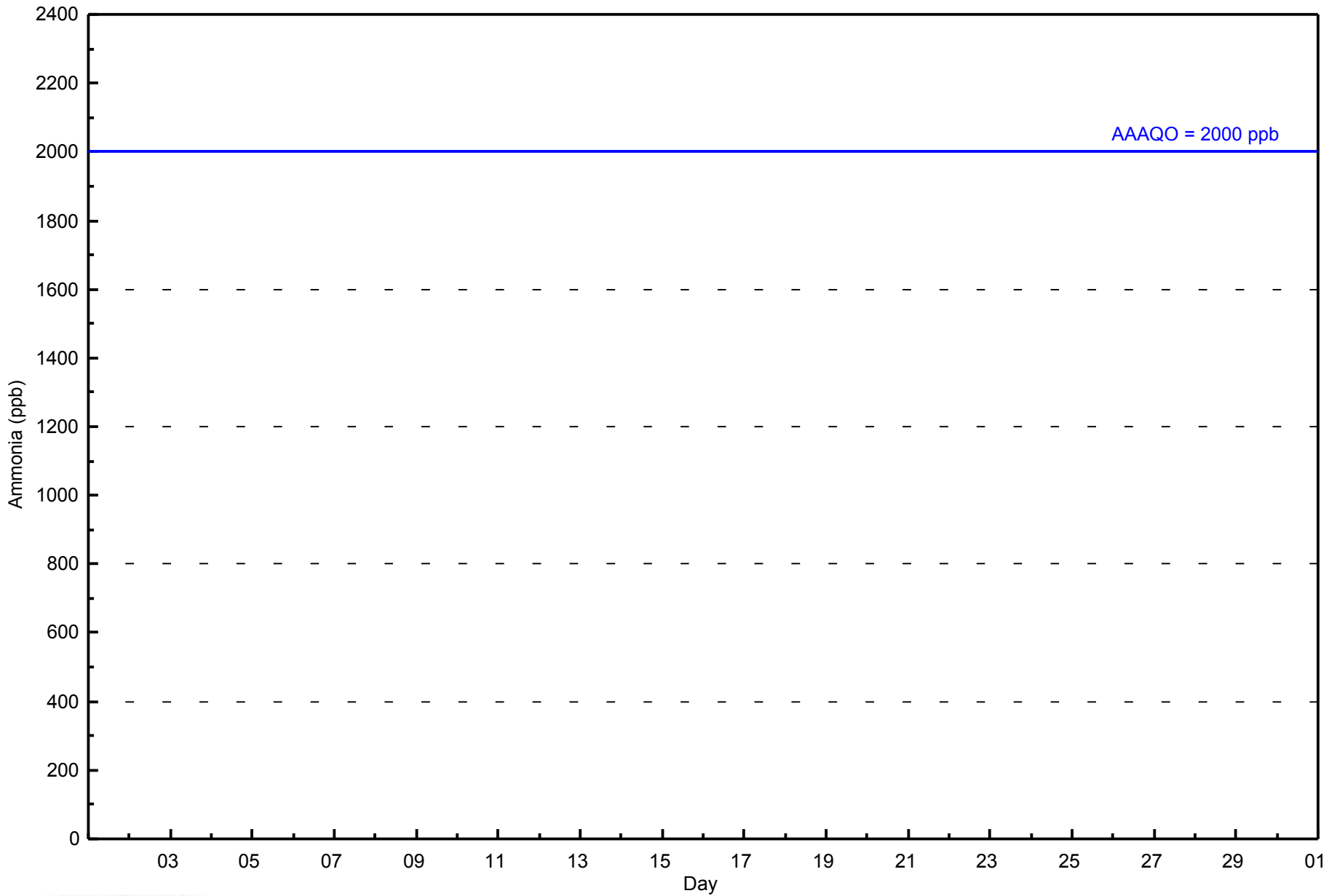
0.0	0.0	0.0	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
0	0	0	--	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

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



WBEA
Hourly Averages

Ammonia (NH₃) - ppb
Patricia McInnes - June 2014





WBEA
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	648	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: 648

Total Number of Hours: 720



WBEA
Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - June 2014

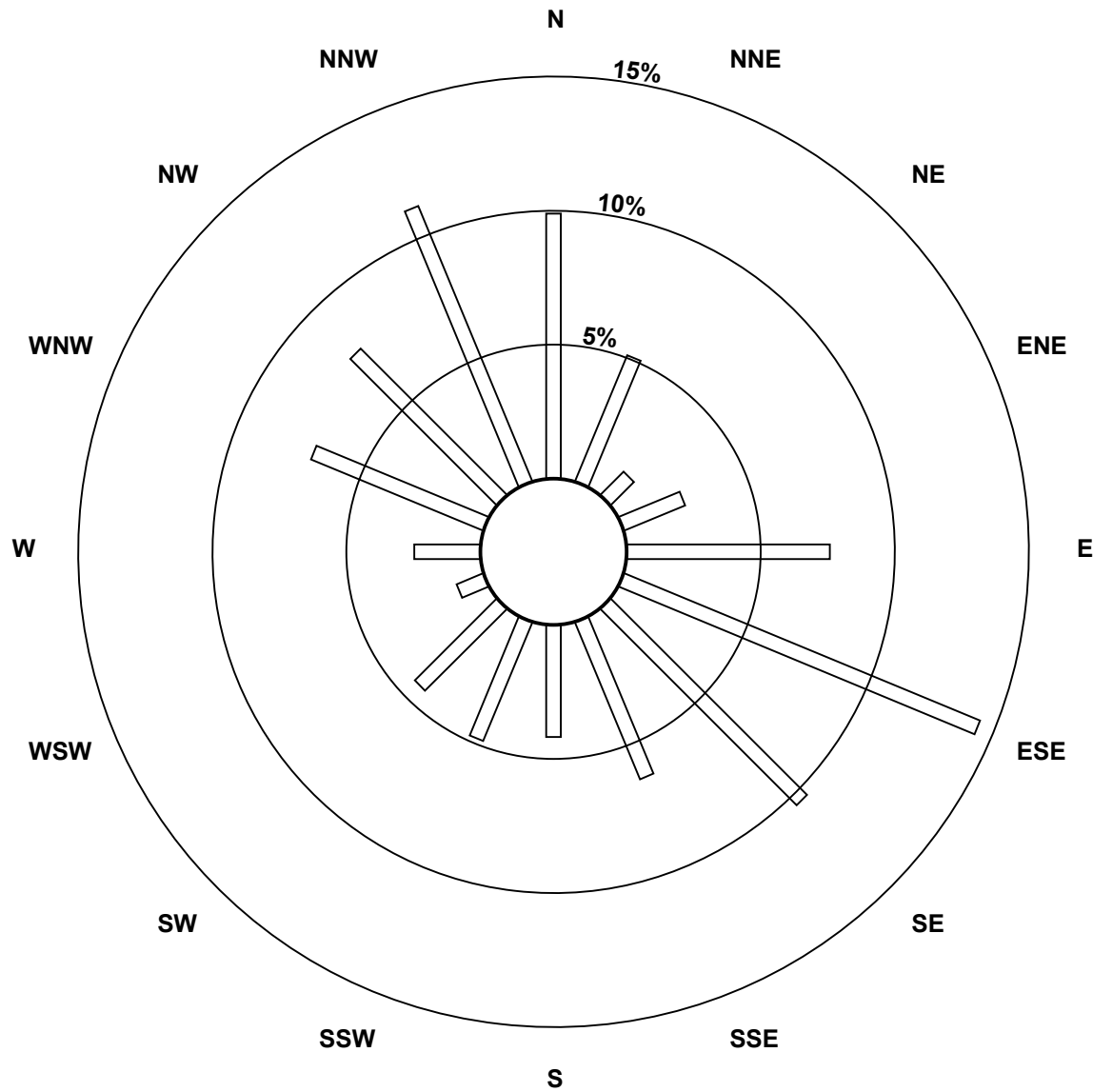
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	64	33	8	16	49	93	67	41	27	31	28	7	16	45	50	72	647
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 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	64	33	8	16	49	93	67	41	27	31	28	7	16	45	50	72	647

Total Number of Valid Hours: 647

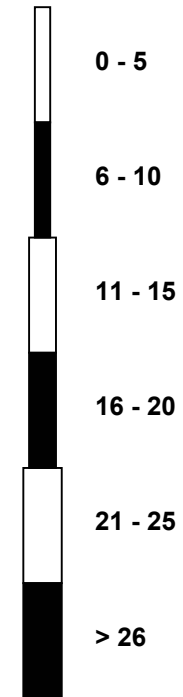
Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Jun 2014

Ammonia (NH₃) - ppb
 Patricia McInnes (AMS 6)



Classes (ppb)

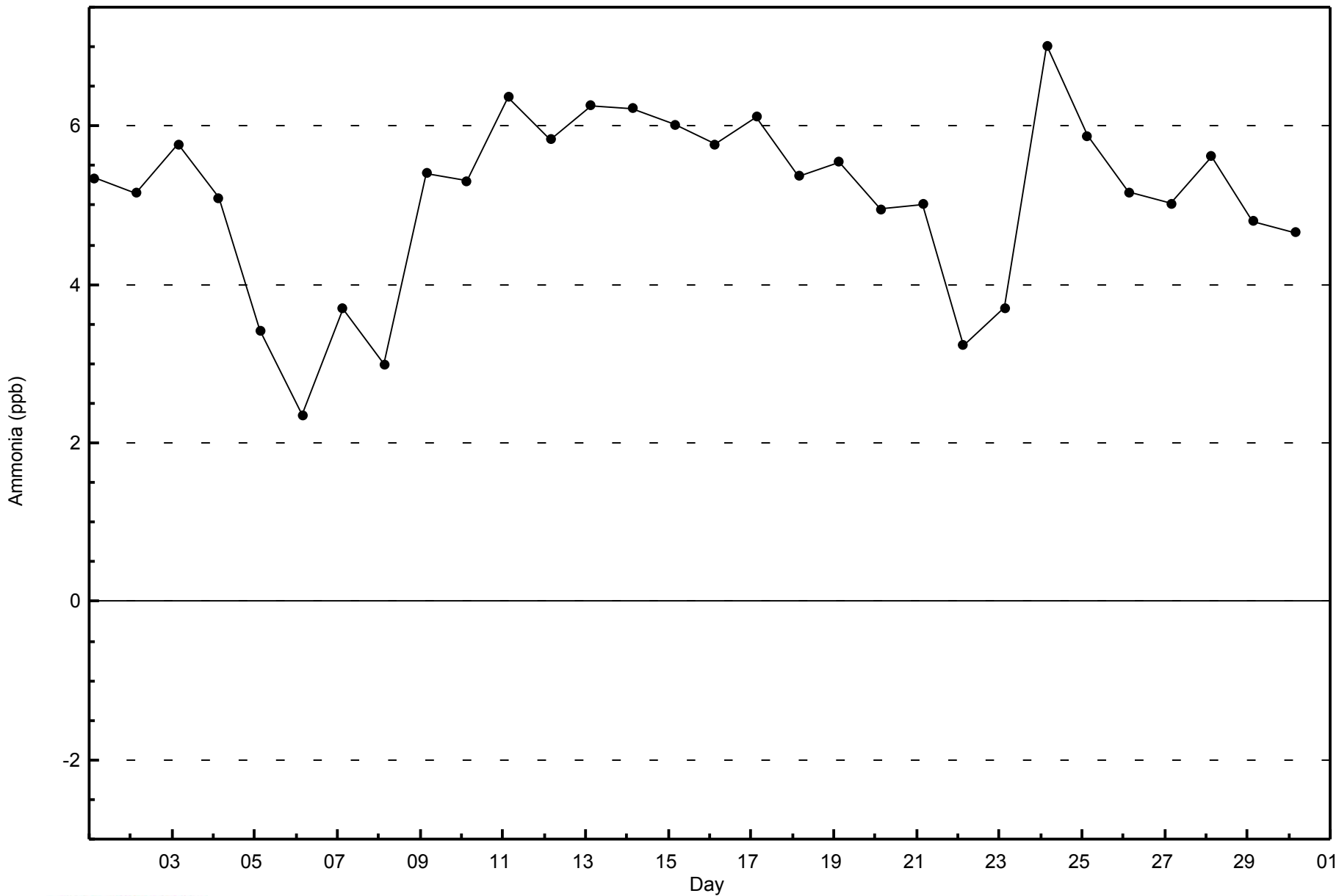


Total Number of Valid Hours: 647



WBEA
Zero Responses

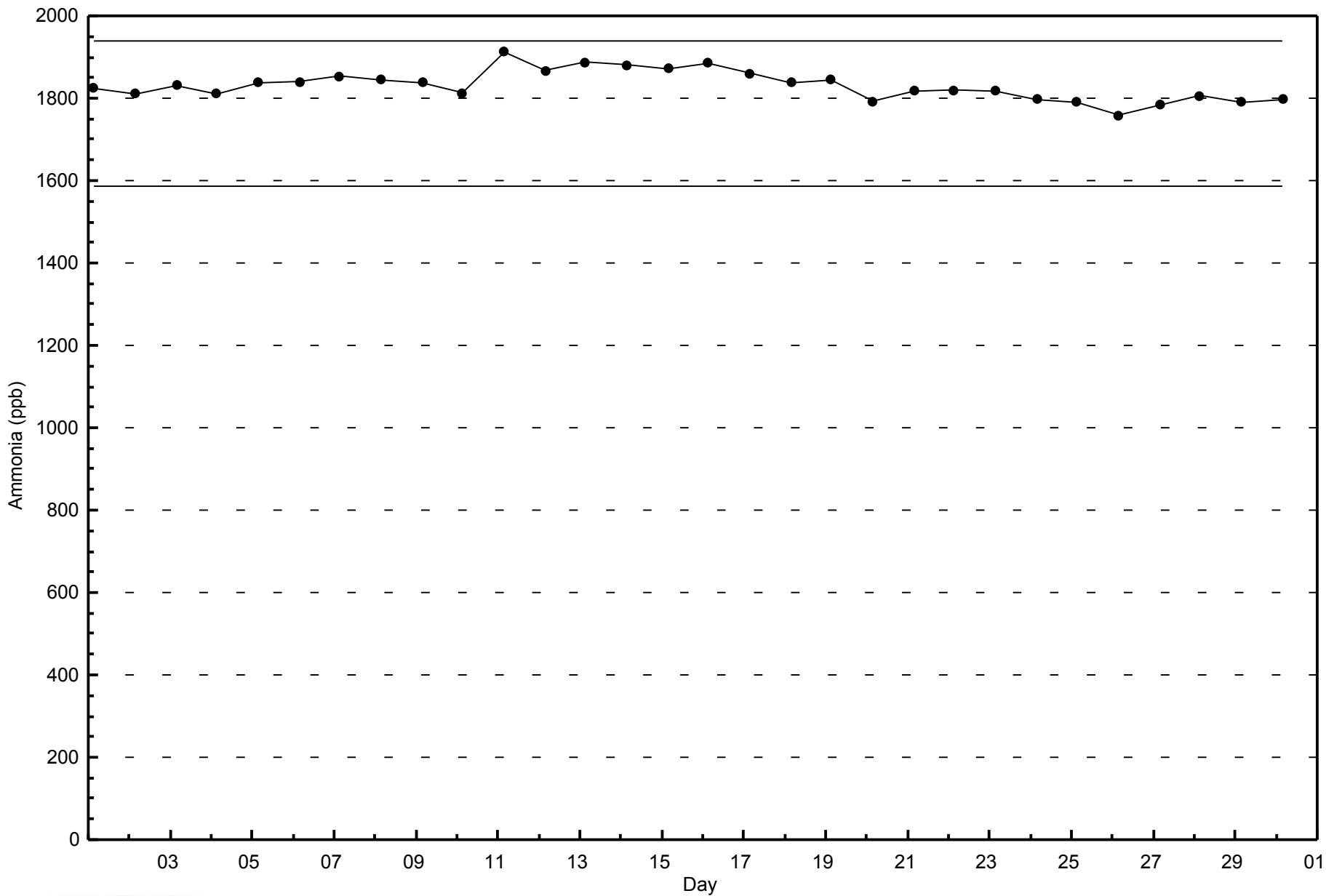
Ammonia (NH₃) - ppb
Patricia McInnes - June 2014





WBEA
Span Responses

Ammonia (NH₃) - ppb
Patricia McInnes - June 2014





Summary of Hour Averages

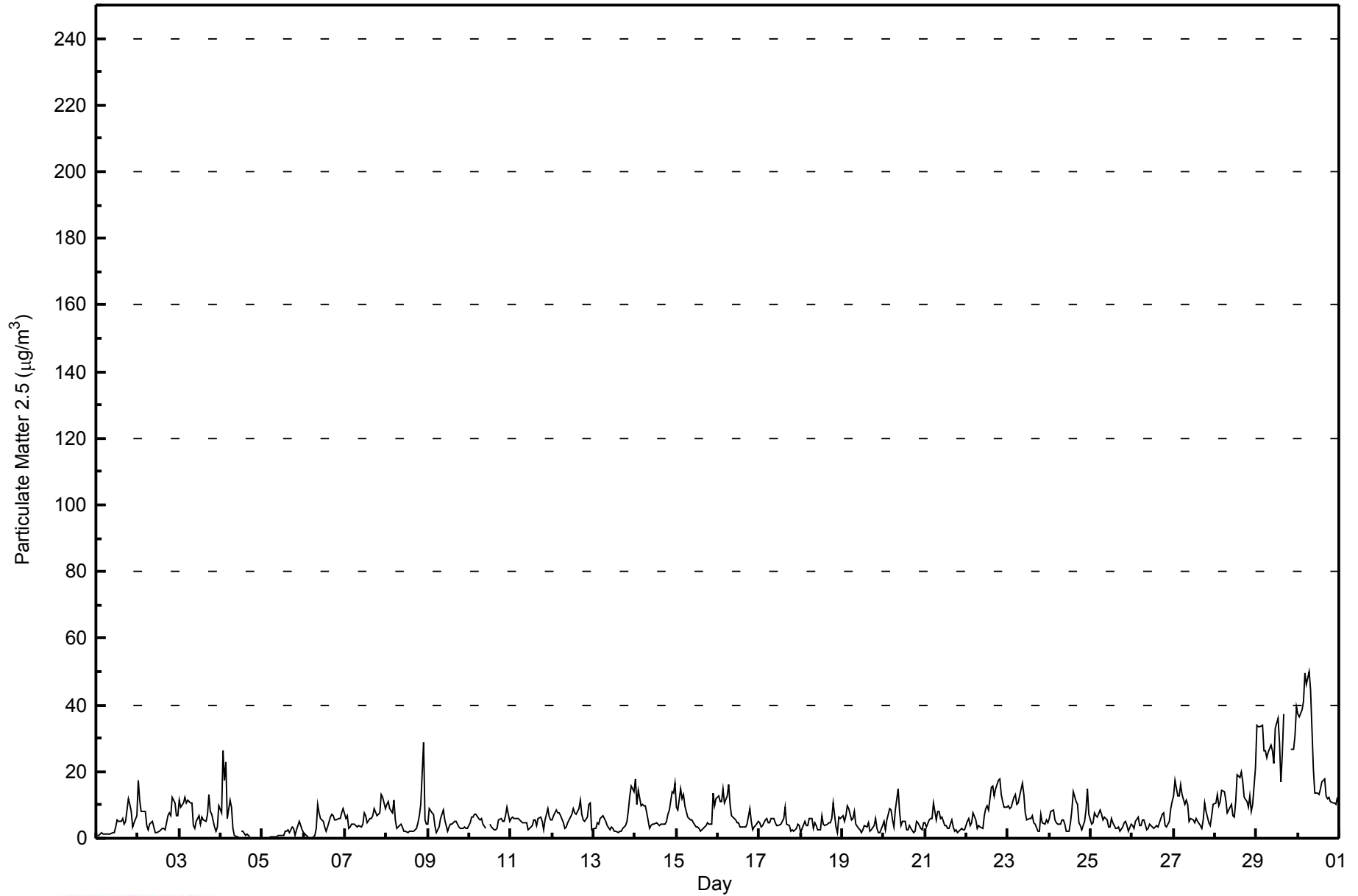
Patricia McInnes - June 2014

Number of Exceedences (AAAQO):		24-hr: 0		Hours in Service:		720																																										
Maximum Value: 49.8 µg/m ³ on Jun 30 07:00		Maximum Daily Average: 29.3 µg/m ³ on Jun 29		Hours of Data:		704																																										
Minimum Value: 0.1 µg/m ³ on Jun 6 06:00		Minimum Daily Average: 1.7 µg/m ³ on Jun 5		Hours of Missing Data:		16																																										
Maximum Diurnal Average: 10.1 µg/m ³ at hour 4		Minimum Diurnal Average: 5.0 µg/m ³ at hour 11		Hours of Calibration:		0																																										
Monthly Average: 7.35 µg/m ³		Percentiles: P ₁ = 0.4 P ₁₀ = 2.3 Q ₁ = 3.5 Median = 5.3 Q ₃ = 8.8 P ₉₀ = 13.4 P ₉₉ = 37.7		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-Jun	0.7	1.0	1.4	1.7	1.4	1.2	1.1	1.1	1.2	1.7	1.8	3.4	5.4	5.0	5.0	6.0	4.1	5.3	11.8	10.2	8.1	3.5	4.5	6.7	3.9	11.8																						
2-Jun	17.3	11.3	8.0	8.0	8.1	3.9	2.5	4.2	5.1	3.5	1.7	1.8	2.2	2.5	2.8	2.8	2.6	6.8	7.6	6.7	12.2	10.7	6.7	6.7	6.1	17.3																						
3-Jun	11.6	9.4	10.7	12.1	10.8	11.4	10.6	10.8	3.8	3.1	5.0	6.9	4.4	6.3	5.3	5.0	7.1	13.1	8.0	7.4	3.4	2.3	3.3	9.6	7.6	13.1																						
4-Jun	7.8	26.4	17.5	22.7	5.9	11.5	9.5	3.0	0.7	0.4	0.3	UO	2.2	2.1	0.7	1.5	0.7	0.4	UO	UO	UO	UO	UO	UO	—	26.4																						
5-Jun	UO	UO	UO	UO	0.2	0.3	0.4	0.6	0.6	0.8	0.7	0.7	1.0	2.2	2.2	2.5	1.6	3.3	2.9	1.0	2.5	5.1	3.6	2.5	1.7	5.1																						
6-Jun	1.7	1.2	0.5	0.2	0.1	0.1	0.7	2.8	10.0	7.7	6.1	5.0	3.4	2.0	3.3	6.5	7.4	6.9	5.6	5.7	6.1	5.8	7.8	9.0	4.4	10.0																						
7-Jun	5.8	6.7	3.0	3.5	4.2	4.3	3.8	3.4	3.6	3.5	4.2	7.8	7.0	4.9	5.7	6.1	6.7	9.0	6.9	7.1	7.8	13.1	12.1	9.1	6.2	13.1																						
8-Jun	10.4	11.0	9.0	7.5	11.4	5.5	3.1	3.5	4.3	3.2	2.2	1.9	1.8	2.0	2.1	2.0	1.9	3.1	4.9	6.9	10.0	28.9	5.5	4.2	6.1	28.9																						
9-Jun	4.2	8.8	7.7	7.3	3.9	1.8	3.2	5.9	7.1	8.5	5.4	2.2	3.5	4.2	4.4	4.9	4.9	4.3	3.6	3.1	3.1	3.3	3.1	2.8	4.6	8.8																						
10-Jun	4.7	6.5	6.5	7.4	7.3	6.0	5.4	5.8	4.3	2.9	M	M	4.1	3.5	2.7	2.6	3.0	5.5	5.8	5.0	4.9	6.7	9.2	5.0	5.2	9.2																						
11-Jun	5.7	6.4	5.9	5.9	5.8	5.5	5.2	4.5	4.5	4.8	2.7	3.0	3.8	5.3	5.5	3.7	6.0	6.4	5.2	2.5	5.5	9.0	6.4	5.6	5.2	9.0																						
12-Jun	5.6	6.7	8.4	7.6	7.4	6.7	4.7	2.8	3.5	4.6	5.6	7.2	8.7	7.7	7.3	8.8	11.5	7.2	5.3	4.9	6.4	10.3	10.7	2.7	6.8	11.5																						
13-Jun	2.9	2.9	4.7	4.4	5.8	6.6	6.0	5.1	3.9	2.6	3.2	2.9	2.3	2.1	1.9	2.1	2.3	3.1	3.7	5.2	8.6	12.7	15.7	13.9	5.2	15.7																						
14-Jun	18.0	10.2	14.6	9.6	10.1	9.6	9.7	7.7	2.9	3.8	4.0	4.2	4.5	4.4	3.8	4.2	4.4	4.3	5.1	7.1	8.6	13.8	13.5	16.7	8.1	18.0																						
15-Jun	9.2	8.6	14.6	11.7	13.2	9.6	6.2	5.8	5.4	5.5	4.7	3.5	3.4	3.0	2.3	3.1	3.6	3.7	4.7	4.2	4.4	13.6	9.8	11.7	6.9	14.6																						
16-Jun	12.7	11.1	10.9	14.7	10.5	12.8	16.0	10.2	7.0	5.7	5.6	4.7	4.8	3.4	3.2	3.2	3.4	4.1	8.9	4.9	2.7	3.2	3.8	5.1	7.2	16.0																						
17-Jun	4.5	3.5	3.7	5.5	5.9	4.5	4.7	6.0	5.9	4.7	4.0	3.9	4.2	4.9	5.8	9.2	4.3	3.7	1.9	2.6	2.0	2.8	4.4	4.0	4.4	9.2																						
18-Jun	1.9	3.0	5.1	3.9	3.7	6.0	5.8	3.1	4.5	3.8	2.5	2.4	6.9	4.1	3.8	4.4	4.5	4.6	6.0	10.7	3.2	1.8	6.5	5.7	4.5	10.7																						
19-Jun	6.9	5.2	6.9	9.9	8.7	5.4	6.1	7.9	4.1	2.9	2.5	1.7	2.5	3.6	3.4	4.6	2.3	2.3	4.0	5.7	2.9	1.7	1.8	4.0	4.5	9.9																						
20-Jun	5.1	2.7	5.4	8.8	8.4	5.6	3.5	8.7	14.8	8.0	3.9	5.1	4.9	2.7	2.5	3.9	3.1	1.5	2.1	5.2	4.5	2.9	2.4	4.6	5.0	14.8																						
21-Jun	4.7	3.3	5.7	5.7	5.9	10.4	5.5	8.2	8.0	6.1	6.2	3.6	3.6	2.9	2.8	5.3	3.5	2.0	2.5	1.7	2.6	2.9	2.5	2.4	4.5	10.4																						
22-Jun	5.1	5.9	3.7	4.6	7.5	5.5	2.9	3.9	3.3	3.1	6.7	9.0	9.7	8.3	15.3	15.8	12.9	14.6	17.3	17.8	13.0	10.8	9.5	9.3	9.0	17.8																						
23-Jun	9.8	8.8	9.3	12.5	13.3	10.0	10.6	12.8	16.6	13.1	7.5	5.7	5.8	5.8	6.6	4.6	4.4	2.3	2.3	7.4	4.9	4.2	5.3	4.7	7.8	16.6																						
24-Jun	5.9	7.9	8.4	5.3	4.5	4.4	4.0	5.6	5.5	4.4	2.2	2.3	4.7	8.6	13.8	11.2	10.2	4.5	3.6	2.5	4.9	8.6	14.9	7.2	6.5	14.9																						
25-Jun	4.3	4.5	7.7	7.0	6.3	8.5	7.2	5.3	6.5	5.6	3.4	3.6	5.7	4.9	2.8	2.8	3.3	2.2	3.4	4.7	5.0	4.0	2.2	4.0	4.8	8.5																						
26-Jun	3.8	3.2	5.2	6.5	3.7	3.8	5.3	5.5	2.4	3.1	4.1	3.7	2.9	3.5	3.6	3.3	4.7	7.1	7.6	3.8	3.3	5.0	8.7	10.8	4.8	10.8																						
27-Jun	12.6	17.2	12.6	12.8	15.9	13.3	10.1	11.6	10.4	5.3	6.0	5.3	4.8	5.8	5.0	3.9	2.8	5.5	10.6	8.2	4.6	3.8	7.0	10.4	8.6	17.2																						
28-Jun	10.7	13.2	9.6	11.2	14.2	14.2	11.3	7.8	8.6	10.3	6.7	6.5	11.1	19.1	18.2	20.0	16.9	12.1	10.9	9.3	12.6	8.1	10.3	21.3	12.3	21.3																						
29-Jun	34.0	33.3	33.5	34.0	26.2	26.2	24.3	25.9	27.8	26.2	22.5	33.2	36.0	29.0	16.8	25.4	37.1	PF	PF	PF	26.8	26.8	30.9	39.5	29.3	39.5																						
30-Jun	37.1	36.3	38.4	41.2	49.5	46.0	49.8	44.7	32.7	20.6	13.7	13.7	13.1	14.7	17.0	17.9	12.9	11.9	12.4	11.0	10.7	10.7	10.4	12.3	24.1	49.8																						
																								9.1	9.5	9.6	10.1	9.3	8.7	8.0	7.8	7.3	6.0	5.0	5.5	6.0	6.0	5.9	6.6	6.5	5.5	6.2	6.2	6.7	8.1	8.0	8.7	Diurnal Average
																								37.1	36.3	38.4	41.2	49.5	46.0	49.8	44.7	32.7	26.2	22.5	33.2	36.0	29.0	18.2	25.4	37.1	14.6	17.3	17.8	26.8	28.9	30.9	39.5	Diurnal Maximum
M - Maintenance																								UO - Unstable Operation				PF - Power Failure																				
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - June 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - June 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	344	48.86	48.86
6 - 15	284	40.34	89.20
16 - 25	25	3.55	92.76
26 - 80	28	3.98	96.73
> 81.0	0	0.00	96.73

Total Number of Valid Hours: 704

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Patricia McInnes - June 2014

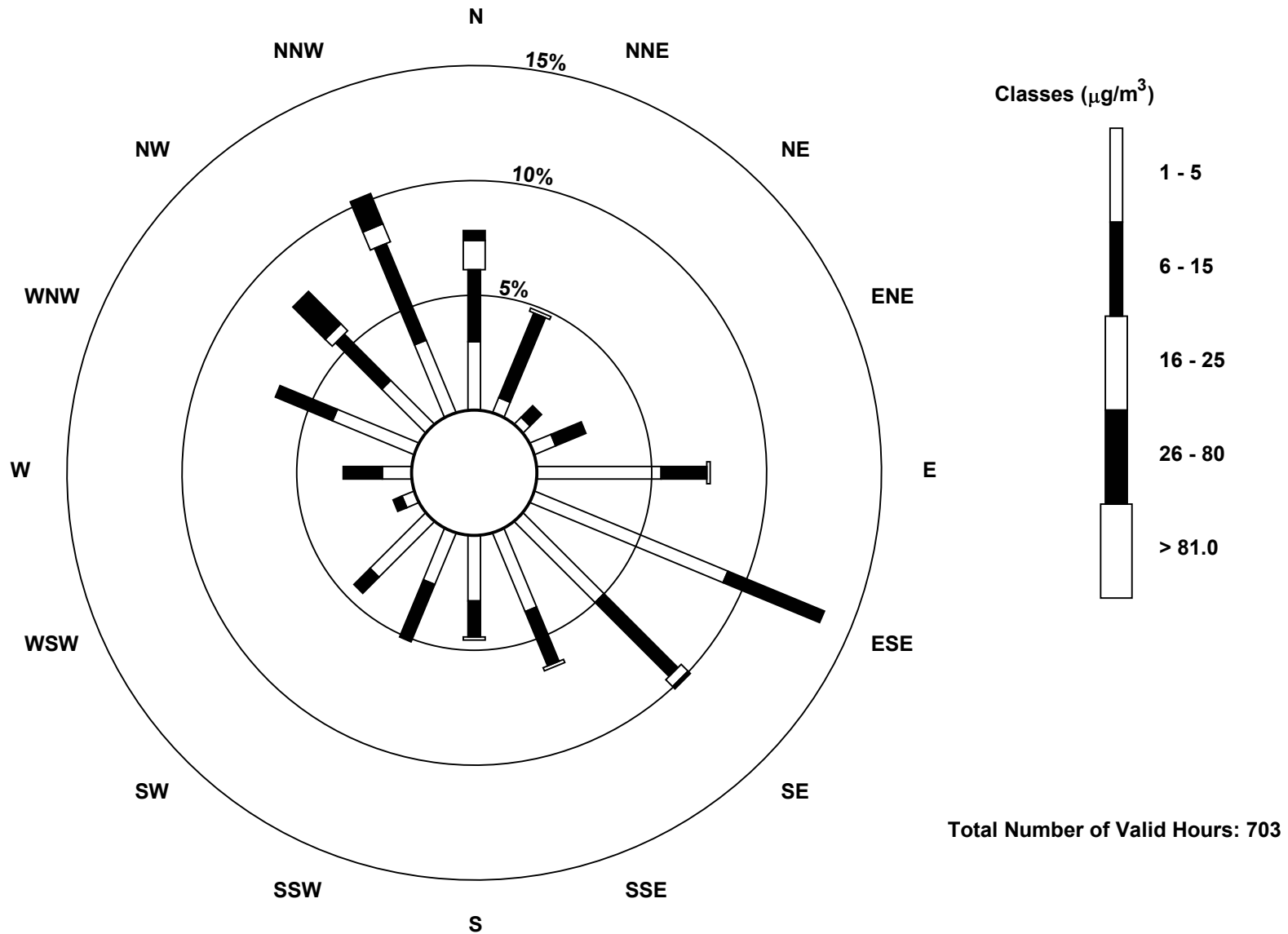
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	21	5	3	7	38	64	35	26	20	17	24	4	9	27	19	24	343
6 - 15	22	28	5	10	14	32	32	18	11	19	7	3	12	19	20	32	284
16 - 25	9	1	0	0	1	0	3	1	1	0	0	0	0	0	3	6	25
26 - 80	3	0	0	0	0	0	1	0	0	0	0	0	0	0	14	10	28
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	34	8	17	53	96	71	45	32	36	31	7	21	46	56	72	680

Total Number of Valid Hours: 703

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Jun 2014

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
 Patricia McInnes (AMS 6)



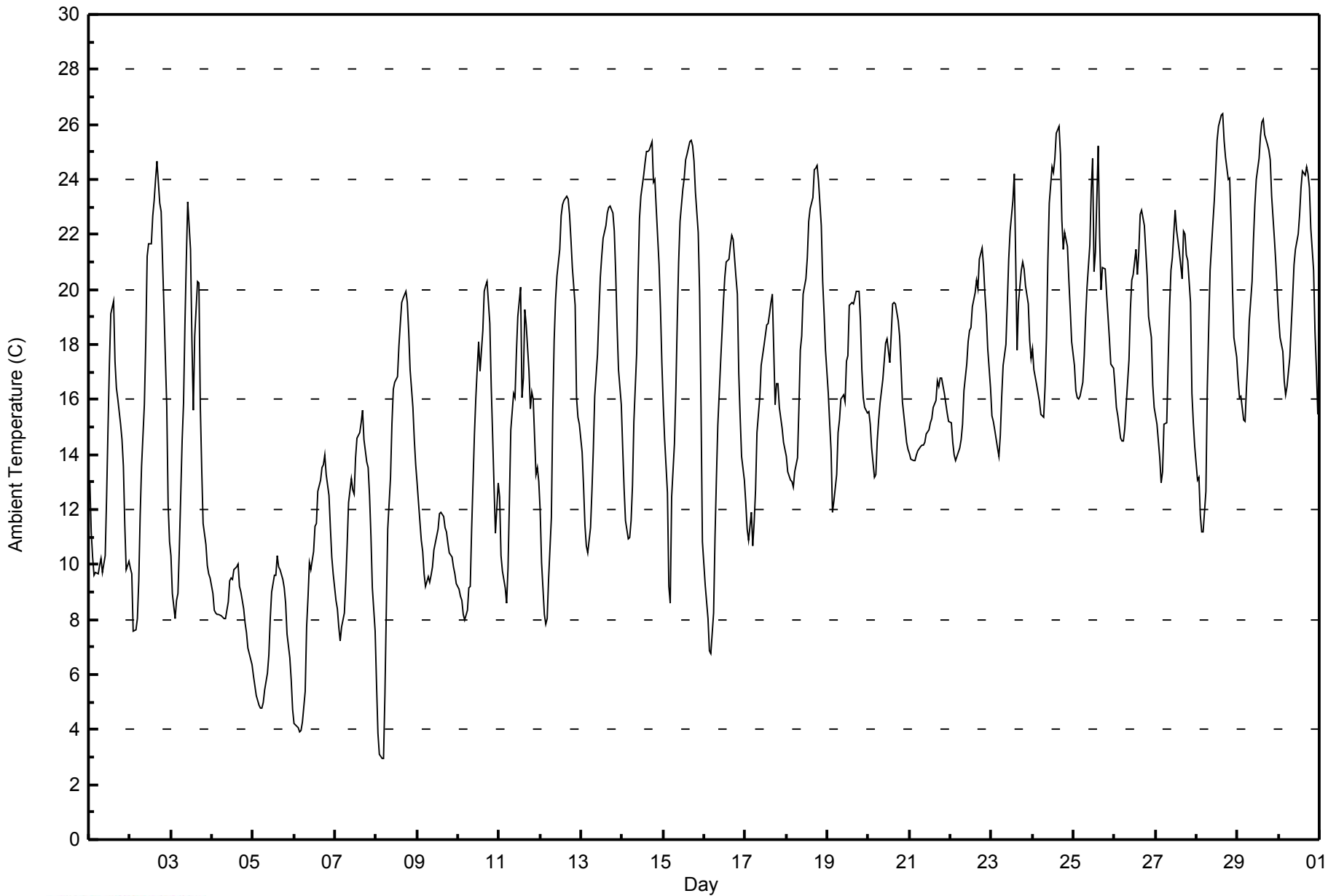


Maximum Value: 26.4 C on Jun 28 16:00 Maximum Daily Average: 21.3 C on Jun 29																						Hours in Service: 720 Hours of Data: 720																										
Minimum Value: 2.9 C on Jun 8 04:00 Minimum Daily Average: 7.2 C on Jun 5 Maximum Diurnal Average: 20.1 C at hour 17 Minimum Diurnal Average: 10.6 C at hour 5 Monthly Average: 15.91 C Percentiles: P ₁ = 4.1 P ₁₀ = 8.8 Q ₁ = 11.8 Median = 16.0 Q ₃ = 20.0 P ₉₀ = 23.0 P ₉₉ = 25.5																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jun	13.1	11.2	10.3	9.6	9.7	9.6	10.0	10.2	9.7	10.3	12.5	14.9	17.3	19.1	19.6	17.4	16.4	16.0	15.1	14.6	13.6	11.4	9.8	10.1	13.0	19.6																						
2-Jun	9.9	9.7	7.6	7.6	8.0	9.4	11.8	13.6	15.8	18.1	21.2	21.7	21.7	22.7	23.2	24.0	24.7	23.1	22.9	21.0	19.3	15.7	12.1	10.8	16.5	24.7																						
3-Jun	10.3	9.0	8.0	8.7	9.0	10.6	14.5	15.8	18.7	21.1	23.2	21.5	18.2	15.6	18.3	20.3	20.2	15.8	13.5	11.5	10.7	10.0	9.7	9.5	14.3	23.2																						
4-Jun	9.0	8.3	8.2	8.2	8.2	8.1	8.1	8.0	8.0	8.6	9.4	9.5	9.4	9.8	9.9	10.0	9.2	9.0	8.4	7.9	7.5	6.9	6.7	6.4	8.5	10.0																						
5-Jun	6.0	5.6	5.3	4.9	4.8	4.8	5.0	5.4	6.0	6.7	8.1	9.0	9.6	9.6	10.3	9.9	9.8	9.5	9.1	8.6	7.5	6.6	5.8	4.7	7.2	10.3																						
6-Jun	4.2	4.2	4.1	3.9	3.9	4.3	5.4	7.7	8.8	10.1	9.8	10.5	11.4	11.5	12.7	13.1	13.5	13.7	14.0	13.3	12.5	11.4	10.3	9.7	9.3	14.0																						
7-Jun	8.7	8.4	7.7	7.2	7.8	8.3	9.4	10.8	12.3	13.1	12.7	12.5	13.9	14.6	14.8	15.2	15.6	14.5	13.7	13.5	12.5	11.0	9.2	7.6	11.5	15.6																						
8-Jun	5.7	3.9	3.1	2.9	3.0	5.3	8.4	11.3	13.2	15.1	16.4	16.6	16.8	18.0	18.8	19.5	19.7	19.9	19.5	18.5	17.1	15.7	14.5	13.6	13.2	19.9																						
9-Jun	13.0	12.2	10.9	10.5	9.7	9.2	9.6	9.4	9.6	9.9	10.5	11.0	11.3	11.9	11.9	11.7	11.3	11.2	10.8	10.4	10.3	9.9	9.7	9.3	10.6	13.0																						
10-Jun	9.1	8.8	8.7	8.2	8.0	8.3	9.2	9.2	11.3	14.7	16.1	17.1	18.1	17.0	18.5	19.9	20.2	20.3	18.8	16.5	14.7	12.9	11.1	13.0	13.7	20.3																						
11-Jun	12.4	10.3	9.8	9.2	8.6	9.9	12.3	14.9	16.2	16.0	17.7	19.0	20.1	16.1	16.8	19.3	18.7	17.0	15.7	16.3	16.0	13.3	13.5	13.0	14.7	20.1																						
12-Jun	12.0	10.1	8.2	7.8	8.0	9.4	11.7	15.6	18.1	19.6	20.5	21.4	22.7	23.1	23.2	23.4	23.3	22.7	21.8	20.8	19.4	16.1	15.4	15.1	17.1	23.4																						
13-Jun	14.1	12.9	11.5	10.7	10.4	11.4	12.7	14.2	16.1	17.7	19.1	20.4	21.2	21.9	22.3	22.8	23.0	23.0	22.8	22.1	20.6	18.7	17.1	15.8	17.6	23.0																						
14-Jun	14.3	12.7	11.6	10.9	11.0	11.6	12.9	15.2	17.7	20.4	22.6	23.4	24.1	24.6	25.0	25.1	25.4	23.9	24.0	22.9	20.9	19.3	17.3	19.2	19.2	25.4																						
15-Jun	15.8	14.5	12.6	9.2	8.6	12.5	14.4	16.3	18.8	21.0	22.5	23.6	24.0	24.7	24.9	25.4	25.4	25.2	24.6	23.6	22.0	19.9	15.8	10.8	19.0	25.4																						
16-Jun	9.3	8.6	8.0	6.9	6.8	8.2	11.0	13.1	15.1	17.3	18.4	19.5	20.5	21.0	21.1	21.6	22.0	21.8	20.4	19.8	16.9	15.3	13.9	13.1	15.4	22.0																						
17-Jun	12.3	11.3	10.9	11.9	10.7	11.5	12.7	14.8	16.1	17.2	17.6	18.0	18.7	18.7	19.1	19.5	19.8	15.8	16.6	16.6	15.7	15.0	14.4	14.2	15.4	19.8																						
18-Jun	13.9	13.4	13.0	13.0	12.8	13.4	13.9	15.7	17.8	18.3	19.8	20.4	21.1	22.5	22.9	23.3	24.3	24.4	24.5	24.0	22.3	20.3	19.1	17.8	18.8	24.5																						
19-Jun	16.2	15.2	14.2	11.9	12.3	13.3	14.8	15.2	16.0	16.2	15.9	17.4	17.6	19.4	19.5	19.5	19.7	20.0	19.9	18.9	17.1	16.1	15.7	15.5	16.6	20.0																						
20-Jun	15.6	15.1	14.2	13.2	13.3	14.5	15.3	15.9	16.7	17.4	18.0	18.2	17.4	18.3	19.5	19.5	19.5	18.9	18.3	17.2	15.9	15.0	14.4	14.2	16.5	19.5																						
21-Jun	14.0	13.8	13.8	13.8	14.0	14.1	14.3	14.3	14.3	14.4	14.7	14.9	15.1	15.3	15.7	16.0	16.7	16.5	16.8	16.8	16.2	15.9	15.5	15.2	15.1	16.8																						
22-Jun	15.1	14.5	14.0	13.8	13.9	14.3	14.5	15.1	16.3	17.3	18.1	18.5	18.6	19.4	19.9	20.3	20.0	21.1	21.5	20.8	19.8	19.1	17.9	16.4	17.5	21.5																						
23-Jun	15.4	15.2	14.9	14.2	13.9	14.7	16.1	17.2	18.0	19.5	21.1	22.1	23.3	24.2	21.1	17.8	19.5	20.7	21.0	20.7	20.1	19.5	18.1	17.5	18.6	24.2																						
24-Jun	17.8	17.1	16.5	16.2	15.9	15.5	15.4	16.5	18.2	21.1	23.1	24.5	24.3	24.8	25.7	26.0	24.9	22.5	21.4	22.1	21.6	20.4	19.3	18.1	20.4	26.0																						
25-Jun	17.3	16.3	16.1	16.0	16.1	16.7	17.6	19.0	20.1	21.6	23.6	24.8	20.6	21.4	25.2	21.9	20.0	20.8	20.7	19.8	19.0	18.2	17.3	17.2	19.5	25.2																						
26-Jun	16.5	15.7	15.4	14.6	14.5	14.5	14.9	15.8	17.5	19.3	20.4	20.6	21.5	20.5	21.4	22.8	22.9	22.3	21.4	20.5	19.0	18.3	16.5	15.7	18.4	22.9																						
27-Jun	15.4	15.1	13.9	13.0	13.4	15.1	15.2	17.4	19.3	20.7	21.2	22.9	22.2	21.7	21.4	20.4	22.1	22.0	21.3	21.1	19.5	16.2	15.1	14.3	18.3	22.9																						
28-Jun	13.1	13.2	11.8	11.2	11.2	12.6	16.4	18.6	20.7	22.4	23.2	24.3	25.4	26.0	26.3	26.4	25.4	24.8	24.0	24.0	22.4	20.0	18.3	17.6	20.0	26.4																						
29-Jun	16.7	16.1	16.1	15.3	15.2	16.4	17.4	18.8	20.3	21.8	23.1	24.0	24.8	25.6	26.1	26.2	25.6	25.3	25.1	24.7	23.4	21.8	20.9	19.9	21.3	26.2																						
30-Jun	19.0	18.3	17.7	16.7	16.2	16.5	17.5	18.6	19.7	20.9	21.5	22.0	22.7	23.7	24.3	24.2	24.5	24.2	23.7	22.2	20.7	18.5	17.1	15.4	20.2	24.5																						
																								12.8	12.0	11.3	10.7	10.6	11.5	12.7	14.1	15.5	16.9	18.1	18.8	19.1	19.4	20.0	20.1	20.1	19.6	19.0	18.4	17.2	15.7	14.5	13.6	Diurnal Average
																								19.0	18.3	17.7	16.7	16.2	16.7	17.6	19.0	20.7	22.4	23.6	24.8	25.4	26.0	26.3	26.4	25.6	25.4	25.1	24.7	23.4	21.8	20.9	19.9	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Patricia McInnes - June 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Patricia McInnes - June 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	125	17.36	17.36
10 - 20	414	57.50	74.86
> 20	181	25.14	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

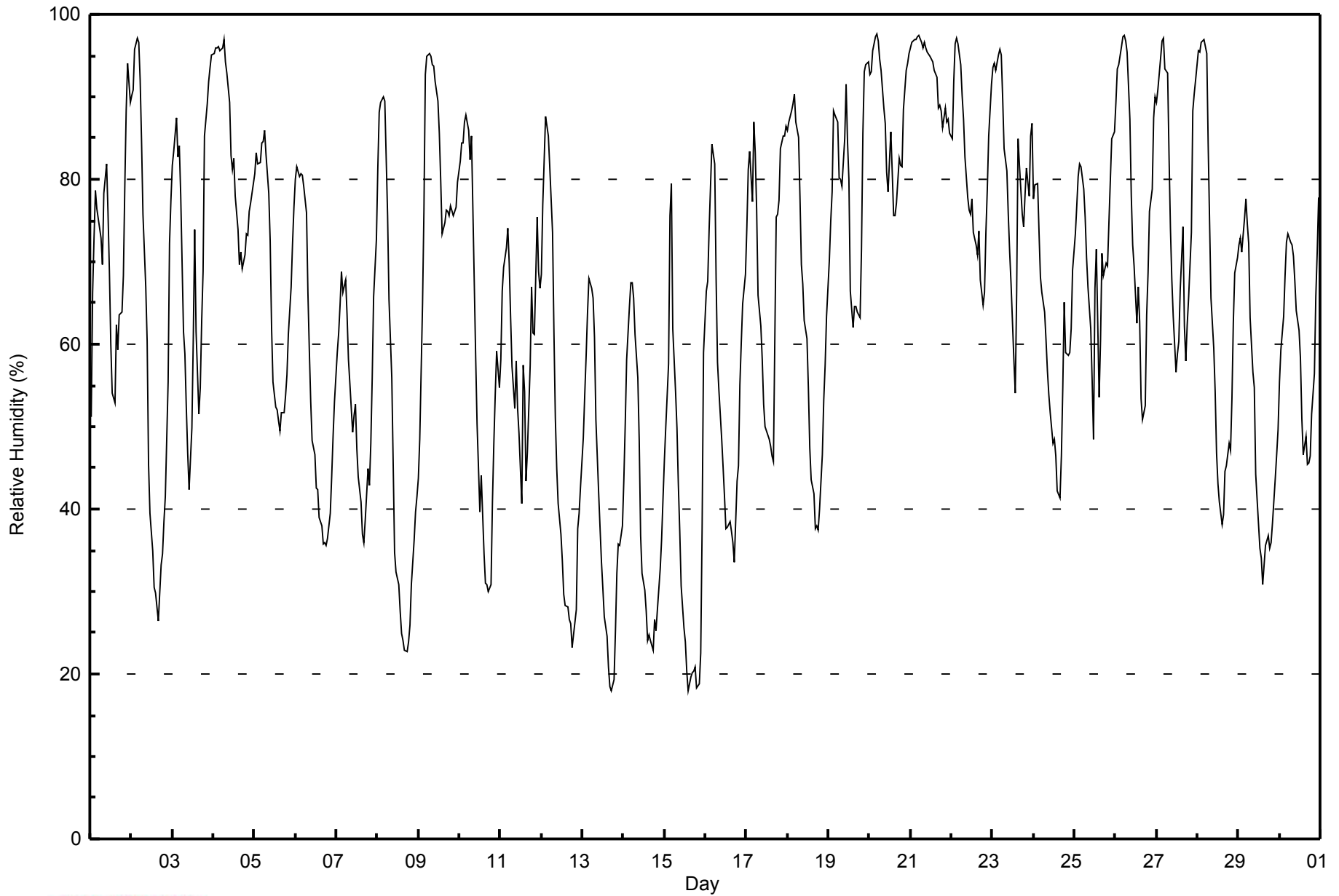


Maximum Value: 98 % on Jun 20 05:00																		Maximum Daily Average: 93.0 % on Jun 21																		Hours in Service: 720													
Minimum Value: 18 % on Jun 13 18:00																		Minimum Daily Average: 38.0 % on Jun 15																		Hours of Data: 720													
Maximum Diurnal Average: 85.2 % at hour 5																		Minimum Diurnal Average: 48.7 % at hour 17																		Hours of Missing Data: 0													
Monthly Average: 65.0 %																		Percentiles: P ₁ = 20 P ₁₀ = 36 Q ₁ = 48 Median = 67 Q ₃ = 82 P ₉₀ = 93 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-Jun	51	66	73	79	76	74	73	70	78	82	76	69	60	54	53	62	59	64	64	68	79	88	94	89	70.9	94																							
2-Jun	90	91	96	97	97	92	85	76	67	60	45	39	35	30	30	28	26	33	35	38	41	55	72	77	59.9	97																							
3-Jun	82	83	87	83	84	78	61	59	52	47	42	50	61	74	62	52	55	63	69	85	89	92	94	95	70.7	95																							
4-Jun	95	96	96	96	96	96	97	94	93	89	83	81	82	78	74	70	71	69	71	73	73	76	77	79	83.6	97																							
5-Jun	81	83	82	82	84	85	86	83	78	73	62	55	52	52	51	50	52	52	54	56	61	67	72	77	67.9	86																							
6-Jun	80	82	80	81	81	79	76	66	59	53	48	47	42	42	39	38	36	36	36	36	39	44	49	53	55.1	82																							
7-Jun	59	61	65	69	66	68	64	58	55	49	51	53	47	44	41	37	36	39	45	43	48	56	66	73	53.8	73																							
8-Jun	81	88	89	90	90	83	76	65	56	45	35	32	31	28	25	24	23	23	24	26	31	36	40	41	49.2	90																							
9-Jun	44	48	65	76	93	95	95	95	94	94	92	89	86	80	73	75	76	76	76	77	76	76	77	80	79.4	95																							
10-Jun	82	84	84	87	88	86	82	85	76	58	50	45	40	44	35	31	31	30	31	41	48	54	59	55	58.6	88																							
11-Jun	58	66	69	72	74	70	63	57	52	58	52	49	41	57	54	43	47	57	67	61	61	75	69	67	60.1	75																							
12-Jun	68	77	88	86	85	82	74	61	51	45	41	37	34	30	28	28	27	26	23	25	28	38	39	43	48.5	88																							
13-Jun	49	54	58	64	68	67	66	61	51	42	38	34	30	27	25	21	18	18	19	25	32	36	36	38	40.6	68																							
14-Jun	44	50	58	65	68	67	66	61	56	48	37	32	30	28	24	25	24	23	27	25	28	33	36	41	41.5	68																							
15-Jun	46	50	58	76	79	62	54	50	43	37	31	26	24	20	18	20	20	20	21	18	19	23	38	59	38.0	79																							
16-Jun	66	68	74	79	84	82	68	58	54	48	45	42	38	38	39	37	36	34	43	45	55	60	65	68	55.3	84																							
17-Jun	74	81	83	77	87	83	76	66	62	58	53	50	49	48	48	46	46	75	76	77	84	85	85	86	69.1	87																							
18-Jun	86	87	88	89	90	87	85	78	70	67	63	61	55	47	44	42	38	38	37	40	47	53	58	63	63.0	90																							
19-Jun	70	75	78	88	88	87	80	80	79	85	92	85	80	66	62	65	65	64	63	71	86	93	94	94	78.7	94																							
20-Jun	93	93	96	97	98	97	95	93	89	87	81	78	86	81	76	76	77	82	82	81	88	93	94	95	87.8	98																							
21-Jun	96	97	97	97	97	97	97	96	97	96	95	95	95	94	93	92	89	89	88	86	89	87	87	86	93.0	97																							
22-Jun	85	92	96	97	96	94	90	87	83	78	76	76	78	74	72	71	74	68	65	66	74	79	85	91	81.1	97																							
23-Jun	94	94	93	95	96	95	90	84	81	76	71	67	58	54	66	85	82	76	74	78	81	78	85	87	80.8	96																							
24-Jun	78	79	80	74	68	66	64	60	57	54	52	48	48	46	42	41	46	55	65	59	59	59	62	69	59.6	80																							
25-Jun	73	77	80	82	81	79	75	71	67	62	56	49	67	71	54	60	71	68	70	69	75	80	85	86	71.1	86																							
26-Jun	89	93	94	96	97	97	97	96	87	78	72	70	63	67	63	53	51	52	64	69	76	79	87	90	78.3	97																							
27-Jun	89	91	95	97	97	93	93	83	74	68	63	57	59	60	67	74	62	58	62	66	74	88	90	92	77.2	97																							
28-Jun	96	95	97	97	97	95	84	75	66	59	54	47	43	41	38	39	45	45	48	47	53	63	69	70	65.1	97																							
29-Jun	72	73	71	75	78	75	72	63	57	55	44	41	35	34	31	33	36	37	35	36	38	44	47	50	51.3	78																							
30-Jun	55	59	63	68	72	73	72	72	71	68	64	62	58	51	47	49	45	46	46	52	56	66	71	78	61.1	78																							
																								74.2	77.8	81.2	83.7	85.2	82.8	78.5	73.5	68.5	64.0	58.8	55.5	53.5	52.1	49.0	48.9	48.7	50.5	52.6	54.8	59.6	65.2	69.4	72.4	Diurnal Average	
																								96	97	97	97	98	97	97	96	97	96	95	95	95	94	93	92	89	89	88	86	89	93	94	95	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Patricia McInnes - June 2014





Maximum Speed: 27 km/h on Jun 3 18:00	Maximum Daily Speed Average: 16.6 km/h on Jun 5	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 20 05:00	Minimum Daily Speed Average: 2.6 km/h on Jun 2	Hours of Data: 719
Maximum Diurnal Speed Average: 4.5 km/h at hour 13	Minimum Diurnal Speed Average: 0.3 km/h at hour 6	Hours of Missing Data: 1
Monthly Average Velocity: 1.9 km/h 37.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 12 P ₉₀ = 17 P ₉₉ = 24	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jun	ESE17	ESE18	ESE15	E13	E14	E14	E12	ESE14	ESE14	SE13	SE12	SE11	SSE9	ESE8	E6	SE11	SE11	SW13	SSW9	N2	N8	SW1	SW4	SSW8	SE7.9	ESE18	
2-Jun	SSE4	S5	SSW3	SSW7	SSW5	SSW6	SW6	SSW8	SSW10	S11	SW11	NW6	NNW10	NNW10	NNW13	NW9	NW8	NNE19	NNE15	NNE16	N8	NNW5	WNW4	W3	WNW2.6	NNE19	
3-Jun	WNW4	NW5	NNW6	NNW7	NW5	N6	ENE4	E8	E9	ESE10	NNE7	NNW19	NW13	NNE11	ENE11	NE11	N16	NNW27	NNW27	N24	N18	NNW12	WNW8	NW14	N8.7	NNW27	
4-Jun	NNW10	NNW10	NW10	NW9	NW8	WNW8	NW9	NW12	NW14	NNW15	NW15	NW14	NNW15	NNW17	N19	N22	N19	N18	N17	N13	N18	N16	N14	N12	NNW12.9	N22	
5-Jun	NNW16	NNW17	N19	N21	N19	N19	NNW17	NNW17	NNW20	N17	N22	N22	N20	NNW21	N21	NNW20	N19	NNW21	NNW17	NNW15	NNW9	NW7	NW7	WNW7	NNW16.6	N22	
6-Jun	WNW7	WNW8	WNW9	WNW5	WNW5	WNW8	NNW6	N5	NNE10	NE10	NW10	NNW10	N9	NW6	NNE8	ENE6	NE9	NNE7	E7	NE8	ENE8	E7	ESE6	ESE7	N4.0	NW10	
7-Jun	ESE5	E7	ESE7	ENE6	SE8	SSE8	SE8	SE9	ESE6	NE4	N9	N12	NNE14	NNE11	NNE9	NNE9	NNE10	N4	W7	ESE4	ESE9	SSE8	SSW8	SW7	ENE3.4	NNE14	
8-Jun	SSW3	S3	S3	S4	SSE4	S5	S4	SE5	SE6	SSE6	E3	N7	NW6	SSW3	SSE8	W1	S7	SSE6	SE8	ESE12	ESE12	SE11	ESE12	ESE14	SE4.6	ESE14	
9-Jun	SE12	SE8	SSE4	S4	ESE6	ESE11	ESE8	SSE6	SE11	ESE12	ESE15	ESE15	ESE17	ESE21	E20	E19	E20	E21	E19	E15	E11	ENE9	ENE7	NNE8	ESE11.4	E21	
10-Jun	N11	N9	N9	N11	N11	NNW10	NNW10	N8	NNW6	N17	N18	N17	N15	N16	NNW20	N15	NNW16	NNE19	N18	WNW10	WNW9	WNW8	WSW7	W16	NNW11.0	NNW20	
11-Jun	W13	SSW9	SW12	SSW7	SW12	SW10	SW7	SW9	W6	SSW8	SE7	ESE11	ENE9	NNW12	WNW8	WNW5	ESE5	E2	SW6	SSW7	S4	SW5	SW9	WSW9	SW4.6	W13	
12-Jun	WSW10	ESE2	SE1	SW5	SW4	SSW7	SW7	NW2	E2	NE7	NNE9	NNE9	NNE11	NNE13	NNE15	NNE16	NNE18	N21	N20	NNE14	NNE10	NNW10	NNE9	E8	NNE6.3	N21	
13-Jun	E10	E9	E9	E8	E8	E8	E12	ESE11	ESE11	ESE11	E9	E8	ENE7	ESE6	ESE8	ESE10	ESE10	ESE10	E10	E12	ESE11	ESE10	SE10	SE12	ESE9.2	SE12	
14-Jun	SE9	SE9	SE8	SE8	ESE11	SE11	ESE10	ESE8	ESE7	SE8	SE13	SSE11	SSE12	SSE15	S17	SSE17	S16	S15	SSW13	SSW15	SSW12	SSW8	SSW8	S8	SSE9.7	SSE17	
15-Jun	SSW8	S7	SSE4	SSE1	S3	SSE7	SSE10	SSE9	SSE9	SE7	E9	E12	ESE11	ESE15	SE10	ESE12	ESE12	ESE14	ESE15	ESE15	ESE11	SE8	SSE3	W3	SE7.8	ESE15	
16-Jun	W3	W2	NW1	NW4	NW2	W1	SE3	SE6	ESE12	ESE9	ESE10	ESE8	E11	ESE8	SE8	SSE1	SW2	SSE6	W3	SE4	SSW16	SW11	WSW9	SSW5	SSE3.1	SSW16	
17-Jun	SSW0	SE1	S1	SE4	W5	WNW4	SE6	ESE7	SE8	ESE10	ESE12	ESE14	ESE11	ESE11	SE10	SSE9	SSE9	SW11	SW6	SSE7	SSW6	SSE9	S6	SSE5	SE5.3	ESE14	
18-Jun	S4	SSW4	S4	SSE5	SSE5	SE7	SE7	SE8	SE10	SE12	SE15	SE15	SE15	SE16	SSE19	SSE16	SSE18	SSE16	SSE16	SSE15	SE11	SE11	SE10	SE6	SSE10.6	SSE19	
19-Jun	SSE6	SE6	SE6	S2	S2	SSE1	ESE6	ESE5	ESE6	ESE8	E8	E12	E9	ESE12	ESE12	ESE9	ESE8	E10	E8	ENE8	NNW4	WNW6	WNW5	WNW3	ESE4.9	ESE12	
20-Jun	N6	W4	WSW2	W2	NNE0	SSE1	S4	SSW4	SE7	SSE8	SE7	ESE7	SE9	SE6	ESE8	ESE11	ESE10	ESE9	ESE7	S6	SW6	W7	WNW5	WNW5	SE3.0	ESE11	
21-Jun	NW6	NNW4	N6	N6	NNW8	NNW8	N8	N10	NNW10	NNW11	NNW10	NNW12	NNW11	NNW11	NW12	NW9	NNW13	WNW12	WNW8	NW11	WNW7	WNW7	WNW6	NW8	NNW8.3	WNW13	
22-Jun	NNW7	NW6	WNW7	WNW8	NNW11	W9	WNW9	NW5	NW8	NW8	NNW11	NNW10	NNW13	NNW14	NNW13	NNW12	NW6	NNW4	NNE6	NNW7	WNW5	ENE5	ENE3	NNW5	NNW7.0	NNW14	
23-Jun	WNW3	WNW4	WNW5	WNW2	W2	NW1	ENE2	NNE5	E5	ENE4	E6	ESE9	ESE11	ESE12	SSE10	NNW5	E8	ENE8	ESE5	SSE4	SSE4	S5	AF	ESE5	E2.7	ESE12	
24-Jun	SE9	SE10	ESE12	SE11	ESE13	ESE11	ESE10	ESE11	E12	ESE10	E12	ESE15	SE16	SE16	SE16	SE16	SE16	SE11	SSW11	S7	SE8	SSE8	SE9	SE9	ESE9	SE10.6	SE16
25-Jun	ESE7	ESE7	SE8	ESE10	ESE11	SE12	SE11	ESE13	E13	ESE14	ESE14	SE15	S10	N2	E6	S18	WSW13	N3	S6	S12	S8	SSW7	SW4	S5	SE6.8	S18	
26-Jun	SW3	SW5	SSW4	SSW2	SW4	SW6	SW7	SSW3	SW6	WSW5	W6	SW9	SW10	S14	W8	W6	SSW6	SSW8	NNW7	N10	NNW6	NNW5	WNW3	NW6	WSW3.9	S14	
27-Jun	NNW6	N5	NW3	WNW3	NNW3	NNE3	ESE4	E4	E5	E6	E6	E3	E11	WNW2	WNW6	WNW7	N7	N10	NNE17	NNE13	NW4	WNW5	WNW7	WNW3	N3.4	NNE17	
28-Jun	NW4	NW2	SW2	W3	W3	WNW1	NE2	ENE3	ENE3	NE6	NNE8	NNE7	NNE9	N11	N14	N16	N13	N12	NNW9	NNW10	NNW8	NW9	NW7	NW8	N5.7	N16	
29-Jun	NW8	NW9	NW11	NW6	NW11	NW10	NW9	NNW14	NNW17	NNW16	N20	NNW20	N24	N24	N26	N23	N25	NNW26	NNW23	NNW18	NNW17	NW13	NW15	NW14	NNW16.2	NNW26	
30-Jun	NW15	NW15	NW14	NW13	NW13	NW13	NNW15	NNW16	NNW16	NNW17	NNW18	NNW18	NNW18	N18	N17	NNW16	N17	N16	N14	NNW11	NNW9	NW7	NW8	WNW7	NNW13.4	NNW18	

NNW0.9	N0.4	NNW0.6	NNW0.7	NNW0.5	NE0.3	ESE1.3	E2.1	E2.7	E3.3	NE4.2	NE4.5	NE4.5	NE4.3	NE3.5	NNE3.1	NNE3.5	NNE4.2	NNE3.8	NNE3.1	N1.4	NW0.6	W1.4	W1.3	Diurnal Average	
ESE17	ESE18	N19	N21	N19	N19	NNW17	NNW17	NNW20	N17	N22	N22	N24	N24	N26	N23	N25	NNW27	NNW27	N24	N18	N16	NW15	W16	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
Patricia McInnes - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Jun 10 14:00	Hours in Service: 720 Hours of Data: 719 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9
Minimum Value: 1 km/h on Jun 20 05:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 4 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-Jun	4	4	5	3	3	3	4	4	3	4	3	3	3	3	3	4	4	4	5	3	2	1	1	1	5
2-Jun	1	1	1	2	2	2	2	2	2	2	4	4	2	4	4	4	5	4	5	5	2	2	1	1	5
3-Jun	1	1	1	2	1	2	1	2	2	3	3	5	4	4	3	3	5	6	6	6	4	5	3	3	6
4-Jun	3	3	2	2	1	2	2	3	3	3	3	3	3	3	4	5	4	4	4	3	4	4	4	3	5
5-Jun	4	3	6	5	4	5	3	3	4	4	5	5	5	5	5	5	4	4	4	3	2	1	1	1	6
6-Jun	1	1	2	1	1	1	1	2	3	4	3	3	4	4	4	3	3	3	3	2	2	2	1	2	4
7-Jun	2	2	2	2	4	4	2	3	2	2	3	3	4	5	4	4	4	2	3	4	2	2	1	2	5
8-Jun	1	1	1	1	1	1	1	1	2	3	3	3	2	4	4	3	4	4	2	2	2	2	2	3	4
9-Jun	3	2	2	3	2	2	2	2	3	3	3	3	4	5	6	5	4	5	5	4	3	2	2	2	6
10-Jun	2	2	3	2	2	2	2	2	3	5	4	4	5	10	4	4	5	6	6	2	1	1	4	3	10
11-Jun	3	3	3	2	2	3	2	2	4	2	2	3	5	7	10	5	2	3	3	2	2	1	1	1	10
12-Jun	2	2	1	1	1	2	2	1	1	3	3	3	4	4	3	4	4	4	4	3	3	2	3	2	4
13-Jun	3	2	2	2	2	2	3	3	3	4	3	4	4	5	4	4	4	3	3	3	2	2	2	3	5
14-Jun	3	2	1	2	2	2	2	2	2	2	4	5	5	5	5	5	4	4	4	4	3	1	2	1	5
15-Jun	2	1	1	1	1	2	2	2	2	2	4	5	5	5	4	4	4	3	4	3	2	1	2	1	5
16-Jun	1	2	2	1	1	2	2	3	4	3	3	3	4	4	4	2	2	3	1	4	4	2	1	2	4
17-Jun	1	1	1	1	1	2	3	3	2	3	3	3	3	3	3	2	3	5	2	1	2	2	1	1	5
18-Jun	1	1	1	1	2	2	1	2	2	2	4	4	4	5	5	5	5	4	4	3	2	2	2	1	5
19-Jun	1	1	2	1	1	1	2	1	1	4	2	3	3	4	4	3	2	3	2	2	1	1	1	2	4
20-Jun	2	1	1	1	1	1	2	1	2	2	2	2	3	2	2	2	2	2	2	1	1	1	2	2	3
21-Jun	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	1	2	1	1	3
22-Jun	2	1	1	2	2	2	2	3	2	2	2	3	2	3	3	3	2	2	2	2	1	3	1	1	3
23-Jun	2	1	1	2	1	2	1	1	1	2	2	3	3	4	8	2	2	2	2	2	1	1	AF	4	8
24-Jun	2	2	2	2	3	3	2	4	2	3	3	4	3	4	4	4	4	8	2	2	2	1	2	1	8
25-Jun	1	1	2	2	2	3	2	3	3	3	4	4	6	2	4	5	6	2	3	3	2	1	2	1	6
26-Jun	2	2	2	2	2	2	1	1	2	2	3	2	3	3	3	3	3	2	3	2	2	2	1	1	3
27-Jun	1	2	1	1	1	1	1	2	1	2	2	3	3	2	3	2	2	3	3	4	1	1	2	2	4
28-Jun	2	2	1	1	1	1	1	2	2	3	3	3	4	5	5	4	3	3	2	2	1	1	1	1	5
29-Jun	1	2	1	2	1	1	2	3	4	4	4	4	5	5	6	6	6	6	6	6	4	3	2	3	6
30-Jun	2	2	2	2	2	2	3	3	3	4	4	4	4	5	4	4	4	3	3	2	1	1	1	2	5
	4	4	6	5	4	5	4	4	4	5	5	5	6	10	10	6	6	8	6	6	4	5	4	4	

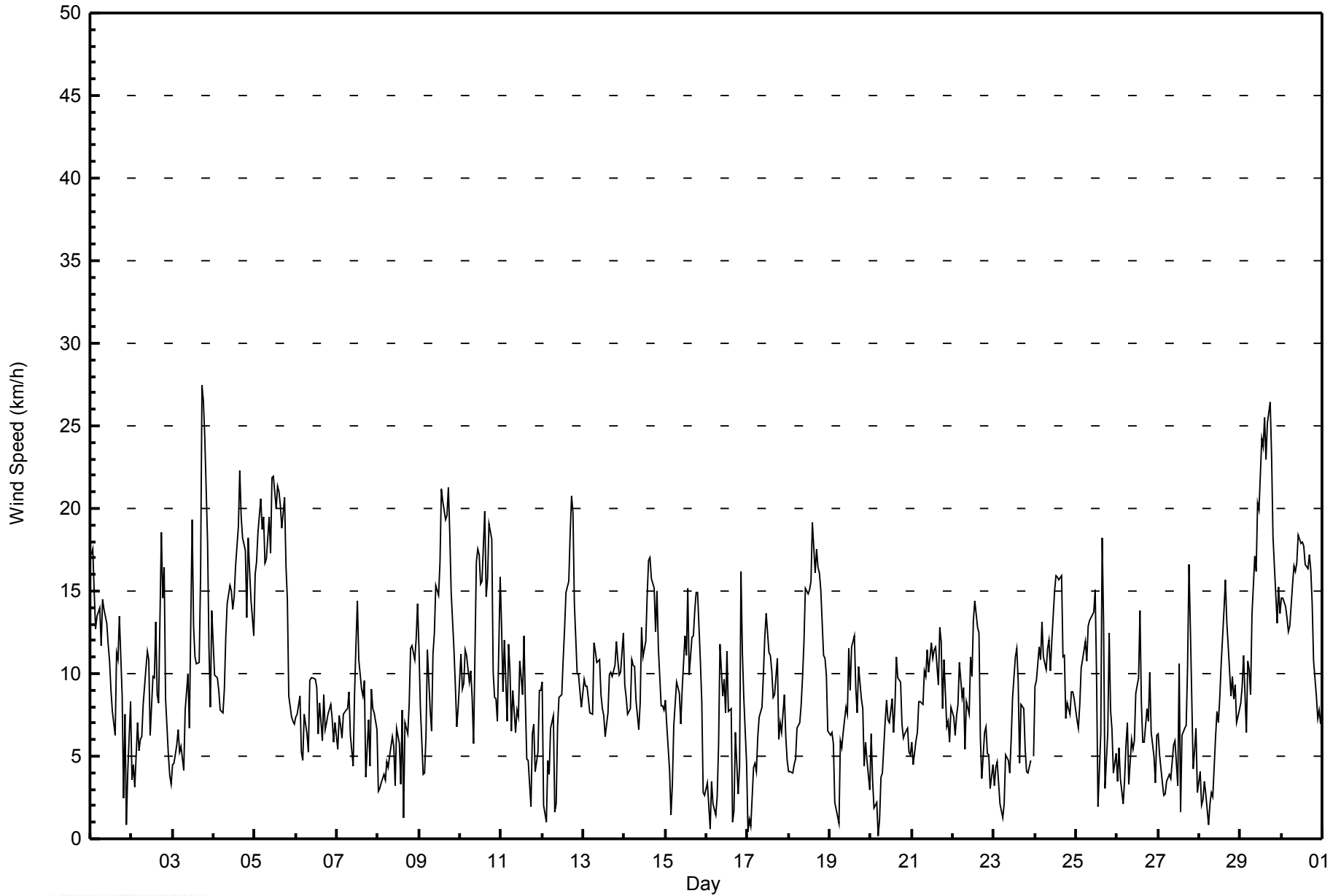
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Patricia McInnes - June 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Patricia McInnes - June 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	148	20.58	20.58
6 - 11	361	50.21	70.79
12 - 19	181	25.17	95.97
20 - 28	29	4.03	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Patricia McInnes - June 2014

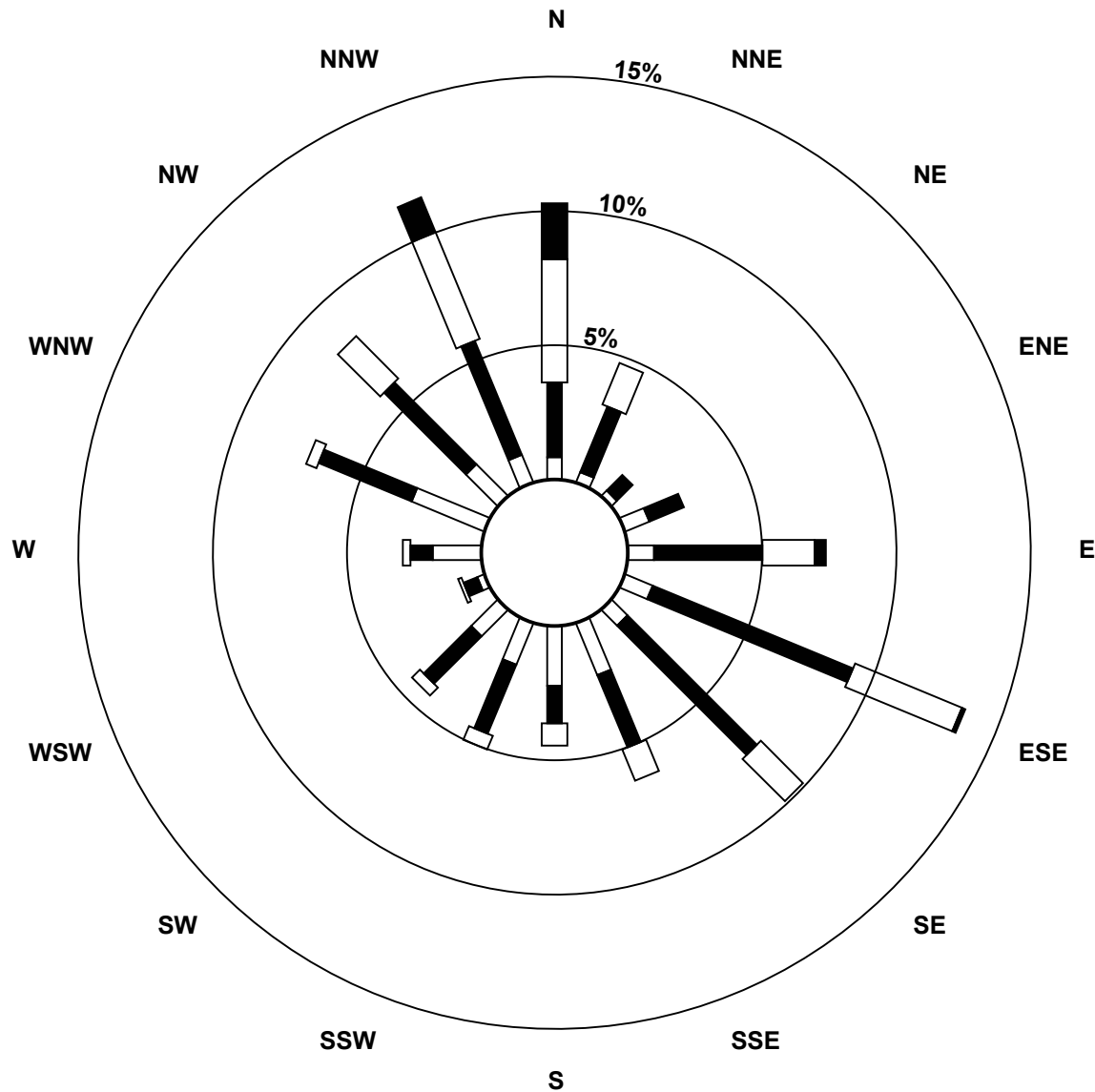
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	3	2	7	7	8	6	15	16	12	10	2	13	21	12	8	148
6 - 11	20	19	6	10	29	58	49	21	10	20	18	4	6	27	31	33	361
12 - 19	33	12	0	0	14	31	16	9	6	4	3	1	2	3	16	31	181
20 - 28	15	0	0	0	3	1	0	0	0	0	0	0	0	0	0	10	29
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	74	34	8	17	53	98	71	45	32	36	31	7	21	51	59	82	719

Total Number of Valid Hours: 719

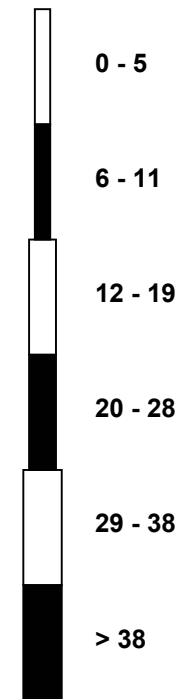
Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Jun 2014

Wind Speed (WS) - km/h
 Patricia McInnes (AMS 6)



Classes (km/h)



Total Number of Valid Hours: 719



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Patricia McInnes - June 2014

Direction of Maximum Speed: 335 deg on Jun 3 18:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 346.5 deg on Jun 5	Hours of Data: 719
Direction of Minimum Speed: 16 deg on Jun 20 05:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 2.6 deg on Jun 2	Percent Operational Time: 99.9
Monthly Average Direction: 312.3 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-Jun	114	121	116	97	90	90	98	114	122	128	139	130	147	104	81	146	145	221	202	349	350	227	224	209	124.7
2-Jun	156	184	206	207	198	193	220	205	197	186	235	309	295	292	339	324	312	23	18	19	10	336	290	264	297.7
3-Jun	287	309	331	337	313	357	71	86	100	110	19	341	324	12	78	44	3	335	335	5	349	342	286	324	354.1
4-Jun	345	333	305	314	320	298	313	315	304	300	308	322	345	348	351	359	0	2	5	353	5	1	3	356	340.7
5-Jun	341	345	357	354	351	354	343	342	340	351	0	360	4	339	351	332	350	348	341	346	328	323	316	299	346.5
6-Jun	300	294	296	297	286	297	328	353	24	38	323	345	349	310	26	77	56	33	84	52	65	100	117	117	7.8
7-Jun	102	89	106	71	131	160	132	138	114	50	5	359	23	23	30	25	19	358	281	117	104	147	207	226	71.1
8-Jun	212	185	184	181	167	179	173	127	127	160	98	5	311	194	155	278	190	163	131	117	118	125	120	119	140.7
9-Jun	127	143	158	190	119	102	115	148	126	120	118	114	108	103	101	91	88	86	87	85	84	74	60	24	101.8
10-Jun	8	7	3	349	352	346	346	350	343	11	2	8	358	7	341	355	340	20	353	296	283	282	250	271	347.3
11-Jun	270	211	229	207	215	223	220	234	268	193	139	116	63	346	286	285	123	95	235	204	190	215	232	237	224.1
12-Jun	240	112	141	214	232	205	214	314	82	37	16	22	20	16	16	18	9	9	12	19	346	30	95	13.6	
13-Jun	96	84	79	89	99	98	99	105	107	118	86	95	57	104	117	122	117	113	98	100	108	117	126	131	104.0
14-Jun	127	127	126	124	123	126	119	122	123	135	144	160	157	159	190	166	187	177	203	201	192	193	204	182	161.1
15-Jun	198	175	168	152	179	151	152	157	163	124	89	97	110	116	143	106	111	108	111	103	110	127	163	265	126.4
16-Jun	274	276	321	304	311	270	133	124	115	114	110	113	98	109	135	162	224	155	262	143	208	224	240	208	155.6
17-Jun	213	139	169	130	261	292	144	118	125	111	103	107	108	118	124	151	165	225	219	164	204	152	171	168	143.1
18-Jun	173	208	174	153	149	127	134	138	140	144	125	127	145	143	161	159	160	163	167	149	130	134	143	143	147.9
19-Jun	152	133	145	188	183	156	116	114	117	123	99	95	97	105	121	103	106	80	99	78	340	298	282	291	108.4
20-Jun	1	264	248	279	16	150	186	192	125	166	140	122	126	137	122	111	106	118	115	181	234	275	287	300	144.0
21-Jun	314	333	7	352	347	347	350	351	341	336	342	342	335	334	323	315	300	302	282	306	295	293	301	311	325.8
22-Jun	336	326	302	290	286	280	291	317	305	311	334	329	348	343	338	331	312	341	16	327	291	58	64	337	324.2
23-Jun	298	293	295	298	272	305	75	21	80	66	92	106	103	102	164	334	88	65	117	165	168	176	AF	114	100.6
24-Jun	131	126	115	124	116	119	119	115	99	102	100	123	140	125	137	142	128	199	172	138	162	134	130	120	128.3
25-Jun	121	119	128	121	123	125	124	107	100	106	118	126	190	4	96	191	254	355	174	187	183	192	221	174	141.8
26-Jun	233	231	197	193	236	230	216	211	232	252	278	224	220	190	262	259	211	197	343	351	343	341	298	314	245.9
27-Jun	342	354	325	286	327	14	103	80	85	89	82	83	97	294	294	289	354	7	15	23	323	300	296	288	7.1
28-Jun	318	308	223	267	269	285	42	70	75	40	23	19	28	360	358	2	357	353	339	327	328	307	304	318	348.8
29-Jun	313	320	324	324	325	326	326	331	343	347	6	340	1	354	358	349	349	339	341	338	333	323	323	324	340.9
30-Jun	318	315	309	305	306	313	328	342	339	344	340	334	342	356	354	347	11	5	3	334	334	318	312	302	335.9

330.3 10.5 344.1 339.7 328.5 54.6 103.2 82.6 83.4 79.7 52.4 46.3 44.7 40.9 38.1 33.1 31.9 20.4 15.6 31.0 9.3 316.4 266.7 275.5

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
Patricia McInnes - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 106 deg on Jun 8 16:00	Hours of Data: 719
Minimum Value: 4 deg on Jun 10 21:00	Hours of Missing Data: 1
Percentiles: P ₁ = 7 P ₁₀ = 12 Q ₁ = 14 Median = 19 Q ₃ = 31 P ₉₀ = 51 P ₉₉ = 87	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-Jun	13	15	14	13	13	12	17	14	13	17	21	24	35	44	42	18	21	23	58	87	15	87	20	11	87
2-Jun	37	34	16	15	15	22	29	18	22	21	44	58	35	30	21	39	47	13	13	11	17	13	45	38	58
3-Jun	37	22	18	10	12	28	44	23	24	26	48	15	24	39	29	21	20	17	19	21	15	15	23	15	48
4-Jun	19	19	12	18	18	16	15	13	12	12	15	21	15	18	16	16	16	14	14	15	15	15	17	16	21
5-Jun	13	14	15	15	15	16	12	12	14	16	17	17	19	17	19	17	20	16	15	17	9	10	8	9	20
6-Jun	7	8	7	14	10	9	17	51	35	40	35	38	39	66	43	57	30	51	29	19	21	12	14	17	66
7-Jun	20	15	21	40	52	44	23	25	44	71	28	27	25	46	36	40	34	63	31	62	21	17	20	12	71
8-Jun	30	29	25	19	29	22	29	24	27	59	81	51	50	83	55	106	62	67	35	12	11	12	12	12	106
9-Jun	15	18	60	38	26	12	14	28	16	14	13	15	15	14	14	13	14	14	13	14	15	16	23	17	60
10-Jun	12	20	15	18	14	13	13	16	53	22	18	21	25	37	22	24	21	15	22	11	4	8	33	10	53
11-Jun	10	23	11	25	9	18	26	19	56	20	40	22	32	46	82	83	55	84	45	27	48	15	10	8	84
12-Jun	7	72	84	29	24	16	17	76	77	37	24	39	27	29	25	19	16	15	14	12	10	9	44	13	84
13-Jun	13	13	10	13	14	16	15	19	21	29	39	52	63	81	59	42	36	28	21	14	12	11	12	12	81
14-Jun	11	11	13	12	12	13	12	20	29	30	25	36	37	26	24	21	27	26	17	15	15	14	13	13	37
15-Jun	16	22	34	80	21	13	13	18	32	47	42	31	47	28	43	34	26	23	19	13	13	10	60	25	80
16-Jun	18	46	93	18	48	73	35	30	19	26	27	41	30	52	37	97	81	36	53	87	15	13	12	24	97
17-Jun	100	83	65	39	22	40	20	18	23	21	19	18	24	22	30	28	33	31	31	21	20	23	13	18	100
18-Jun	15	12	19	20	25	14	16	17	23	17	19	18	20	24	18	15	23	18	17	15	12	13	13	12	25
19-Jun	13	9	30	48	39	86	21	15	19	26	18	18	28	30	16	19	18	15	17	17	25	18	40	65	86
20-Jun	19	39	49	27	54	56	40	51	25	24	26	30	30	26	33	15	14	18	26	22	12	13	13	15	56
21-Jun	25	12	15	19	19	18	28	14	12	10	13	13	12	11	12	12	14	12	19	12	12	18	20	15	28
22-Jun	11	15	10	14	10	13	14	27	18	25	16	20	17	16	18	18	25	70	40	12	14	46	40	21	70
23-Jun	50	18	10	61	54	69	57	25	27	46	40	32	31	31	70	42	32	16	32	24	36	20	AF	47	70
24-Jun	14	18	12	14	13	15	15	15	16	22	20	26	15	15	16	16	18	33	36	19	20	9	10	11	36
25-Jun	10	14	11	11	13	13	17	14	15	19	20	23	65	78	50	28	17	55	50	16	18	21	46	24	78
26-Jun	31	17	38	72	31	16	23	50	41	55	61	23	27	27	27	44	43	23	50	15	17	19	12	19	72
27-Jun	11	16	32	58	23	32	25	32	35	32	30	75	23	96	29	14	31	16	13	15	39	9	17	39	96
28-Jun	29	74	42	30	41	79	76	60	82	39	33	56	41	42	27	19	22	19	20	10	11	7	11	8	82
29-Jun	5	7	7	10	6	8	10	13	14	20	17	19	20	20	19	21	18	15	14	12	10	10	9	8	21
30-Jun	9	9	10	9	9	11	10	15	16	16	19	19	17	20	24	18	17	18	16	9	8	17	9	9	24

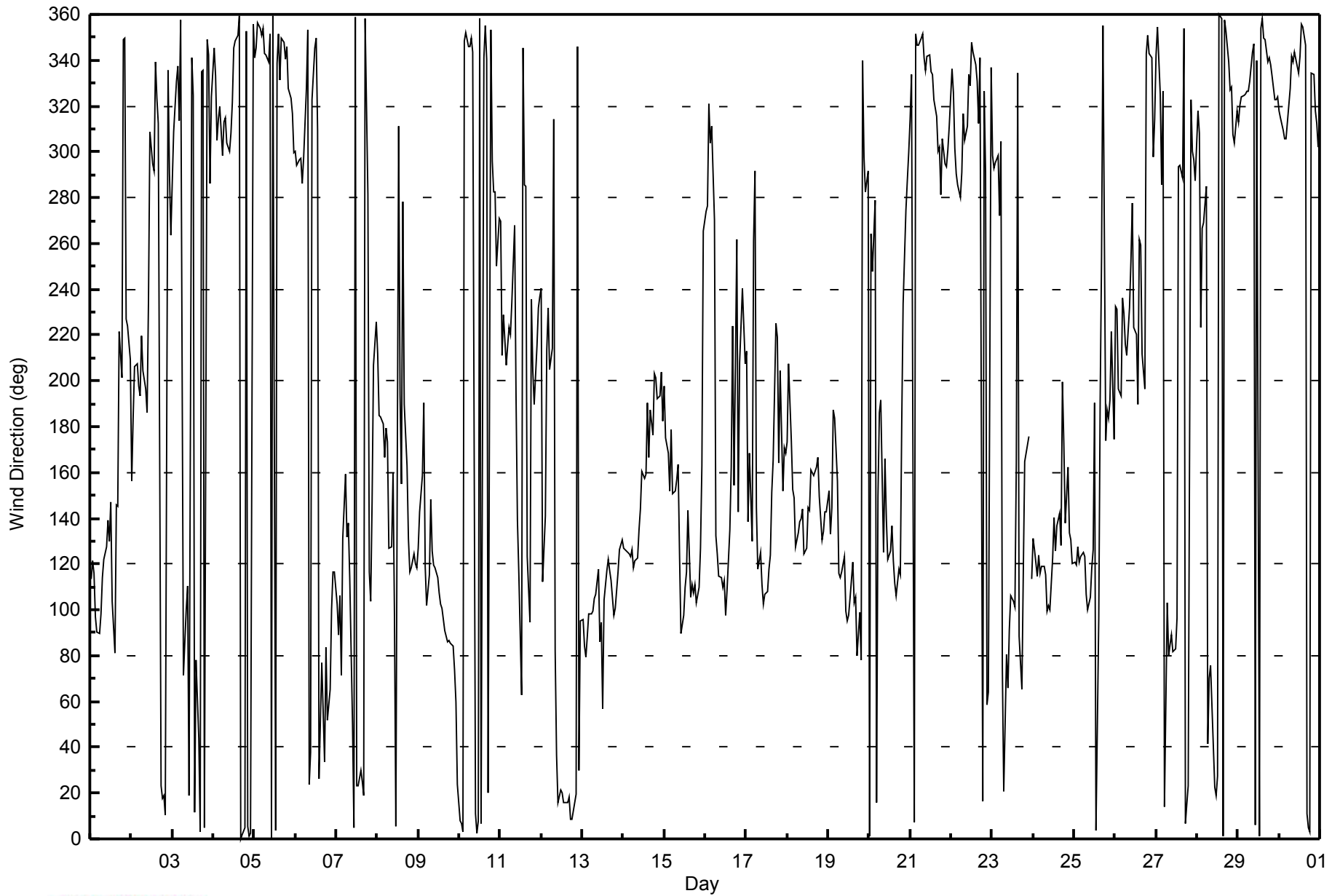
100	83	93	80	54	86	76	76	82	71	81	75	65	96	82	106	81	84	58	87	48	87	60	65	
Diurnal Maximum																								

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Patricia McInnes - June 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 4, 2014	Previous Calibration	May 2, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	13:50
Barometric Pressure	n/a mmHg	Station temp.	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	-670	-670
Analyzer Range (mv)	5000	5000	Lamp voltage	761	755
Calculated slope	0.996696	0.991458	Chamber temp.	44.9	45.0
Calculated intercept	0.681037	0.357213	Pressure (mmHg)	697.3	691.0
Analyzer Background	4.7	4.7	Flow (lpm)	0.431	0.436
Analyzer Coefficient	1.144	1.144	Intensity	93	93

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	0.0	NA
as found span	5000	55.3	519.8	521.5	0.997
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	55.3	519.8	524.0	0.992
second point	5000	27.7	260.4	262.4	0.992
third point	5000	13.9	130.7	130.8	0.999
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	55.3	519.8	524.8	0.991
Average Correction Factor					0.994

Corrected As found 521.4 Previous response 520.9 % change -0.1%

Notes:

changed filter after as founds

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

SO₂ Calibration Summary

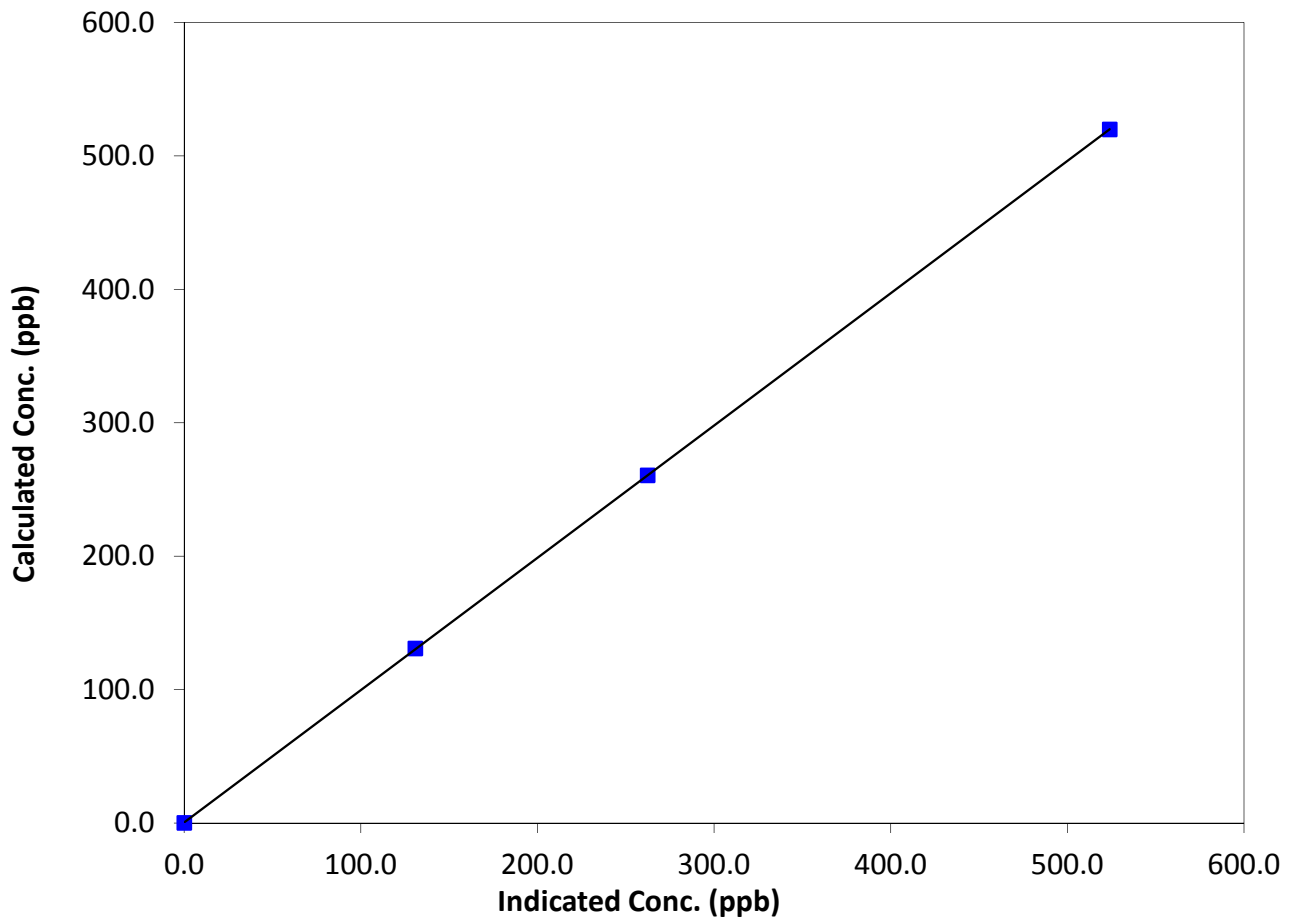
Station Information

Calibration Date	June 4, 2014	Previous Calibration	May 2, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	13:50
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

Calibration Data

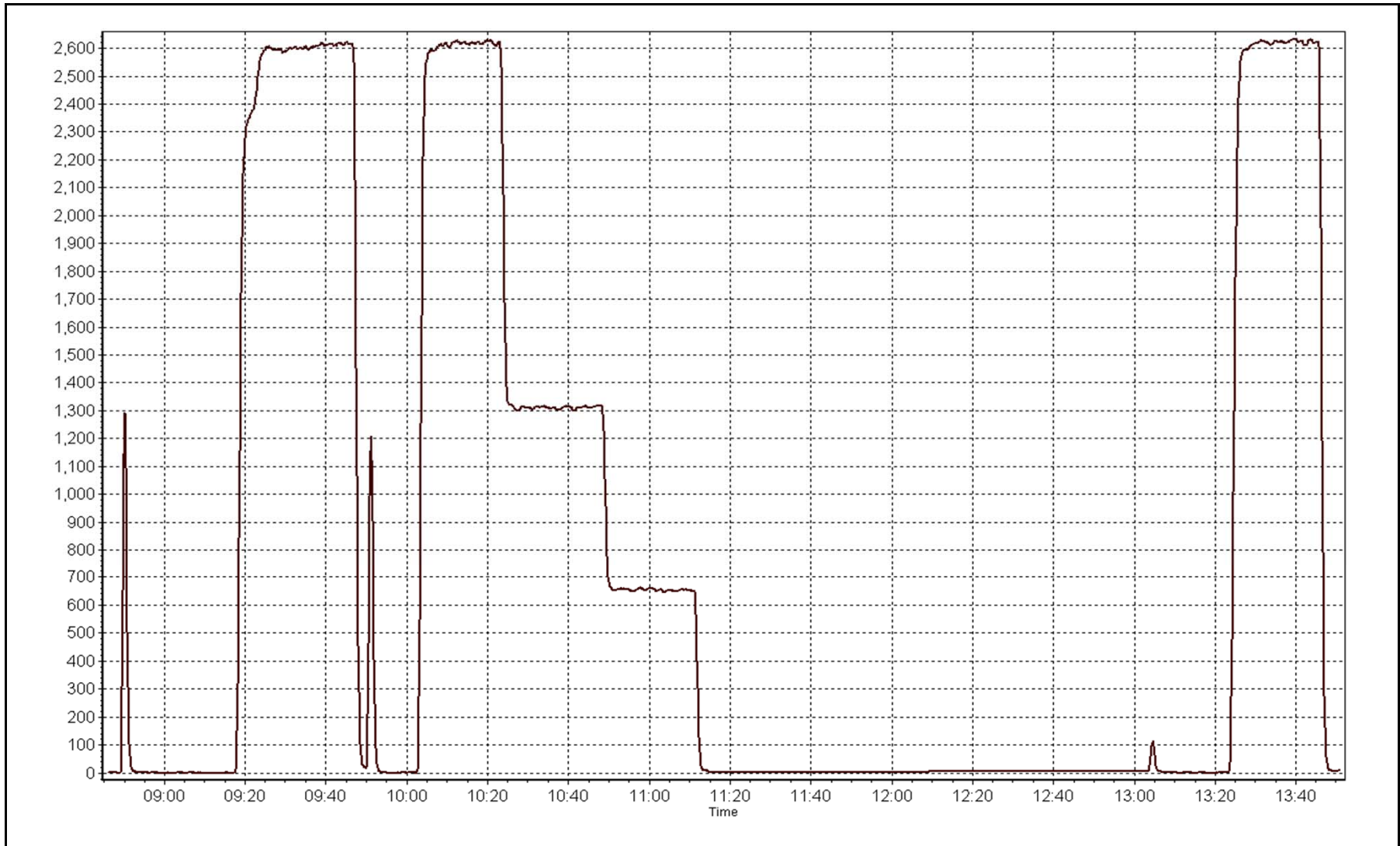
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999997
519.8	524.0	0.9920		
260.4	262.4	0.9923	Slope	0.991458
130.7	130.8	0.9987		
			Intercept	0.357213

SO₂ Calibration Curve



SO2 Calibration Plot

Date: June 4, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	June 6, 2014	Previous Calibration	May 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	13:05
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	1220
Cal Gas Concentration	4.84 ppm H2S	Cal Gas Expiry Date	June 10 2014
Gas Cert Reference	ALM009562	SO2 gas conc.	47.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	0-5000mV	DACS channel #	SE 2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-657	-657
Analyzer Range (input)	5000	5000	Lamp voltage	856	849
Calculated slope	1.002814	0.996696	Chamber temp.	45	45
Calculated intercept	0.110472	0.031721	Pressure	704.2	713.2
Analyzer Background	13.5	13.5	Flow	0.485	0.497
Analyzer Coefficient	1.171	1.187	Intensity	114	114
			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	0.1	NA
as found span	5000	36.2	70.2	68.8	1.021
SO2 scrubber check	5000	21.3	200.2	0.4	NA
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	72.3	70.0	70.3	0.996
second point	5000	36.3	35.1	35.1	1.000
third point	5000	18.7	18.1	18.0	1.005
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	72.3	70.0	70.5	0.993
Average Correction Factor					1.000

Corrected As found	68.7	Previous response	69.9	% change	1.8%
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Notes:

Scrubber check done at 0940. Replaced sample lines and removed unused external vacuum sensor. Adjusted span.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

TRS Calibration Summary

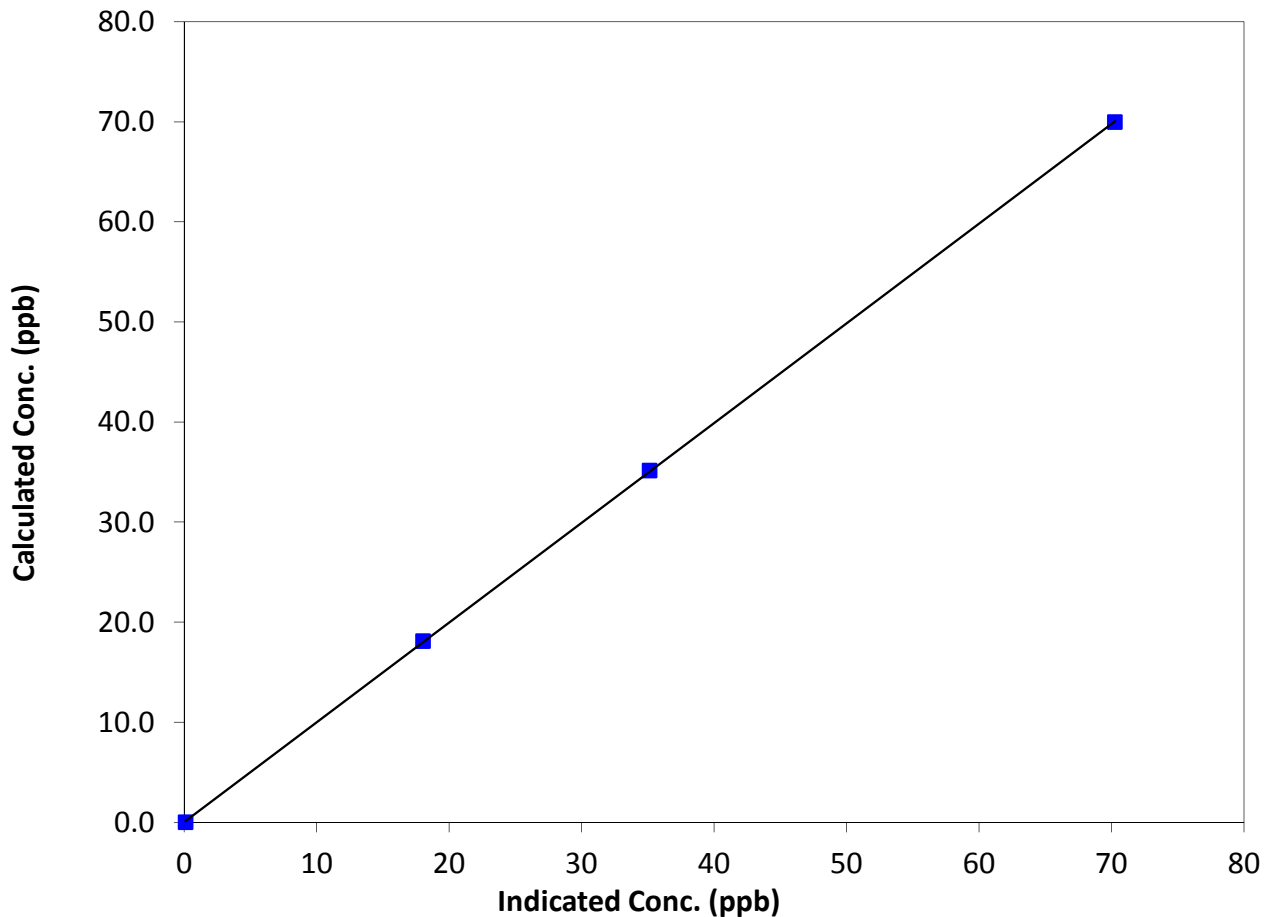
Station Information

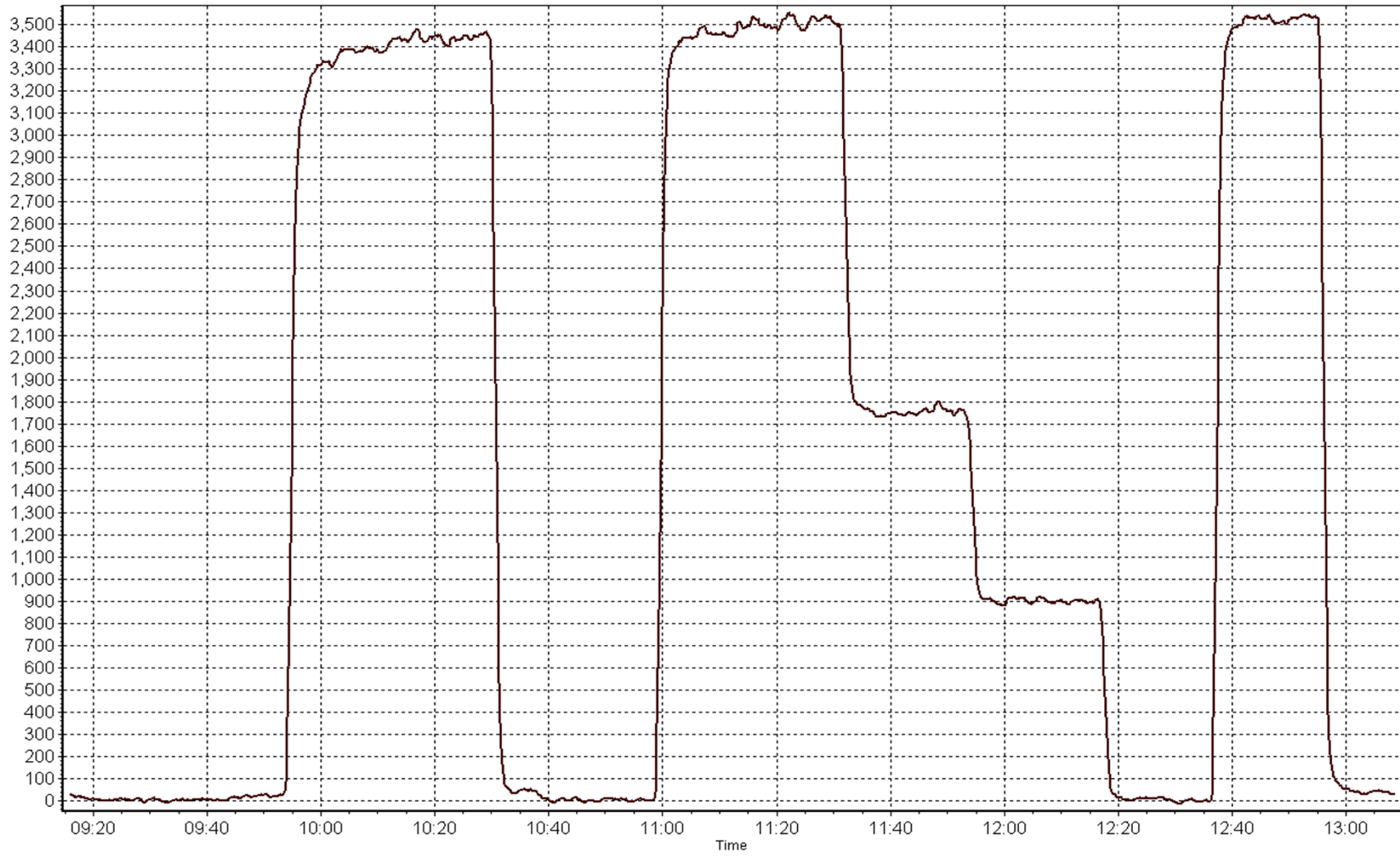
Calibration Date	June 6, 2014	Previous Calibration	May 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:15	End Time (MST)	13:05
Analyzer make	TEI 43i	Analyzer serial #	1008841398

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999984
70.0	70.3	0.9961		
35.1	35.1	1.0002	Slope	0.996696
18.1	18.0	1.0045		
			Intercept	0.031721

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Wednesday, June 04, 2014	Prev Calibration	Friday, May 02, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	13:50
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	37.4	35.7
THC Range (input)	50	50	Flame Temp	384.5	383.0
NMHC Range (ppm)	50	50	Carrier Pressure	33.8	33.8
NMHC Range (input)	50	50	Fuel Pressure	40.3	40.3
THC Calc slope	0.999284	1.003359	Air Pressure	28.2	28.2
THC Calc intercept	0.000745	0.016789			
NMHC Calc slope	1.000406	1.002201			
NMHC Calc intercept	-0.007332	0.002644			

Analyzer make Thermo 55i Analyzer serial # 1118148495

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	N/A
as found span	5000	55.3	12.08	11.97	1.009
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	12.08	12.03	1.004
second point	5000	27.7	6.05	6.01	1.007
third point	5000	13.9	3.04	2.99	1.016
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	12.02	1.005
Average Correction Factor					1.009

Corrected As found 11.97 Previous response 12.09 % change 1.0%

Notes:

changed filter holder and filter after as founds.

Calibration Performed By: Michael Martineau



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	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	6.40	1.003
second point	5000	27.7	3.21	3.21	1.001
third point	5000	13.9	1.61	1.60	1.008
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	6.39	1.004
Average Correction Factor					1.004

Corrected As found 6.36 Previous response 6.42 % change 1.0%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	55.3	5.66	5.60	1.011
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	5.66	5.63	1.006
second point	5000	27.7	2.84	2.80	1.013
third point	5000	13.9	1.42	1.40	1.017
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	5.63	1.006
Average Correction Factor					

Corrected As found 5.60 Previous response 5.67 % change 1.2%



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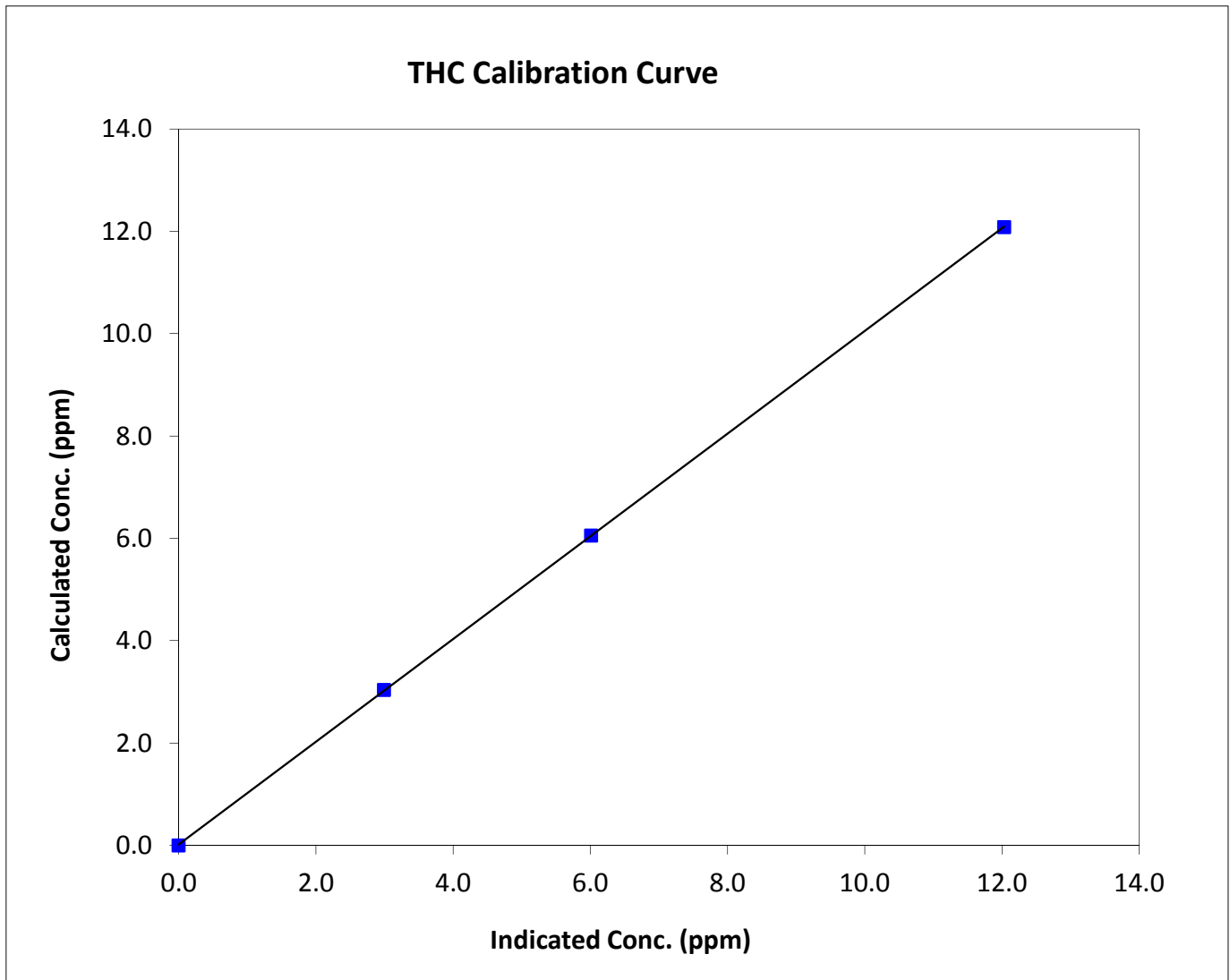
THC Calibration Summary

Station Information

Calibration Date	June 4, 2014	Previous Calibration	May 2, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	13:50
Analyzer make	Thermo 55i	Analyzer serial #	1118148495

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
12.08	12.03	1.0042		
6.05	6.01	1.0068	Slope	1.003359
3.04	2.99	1.0155		
			Intercept	0.016789





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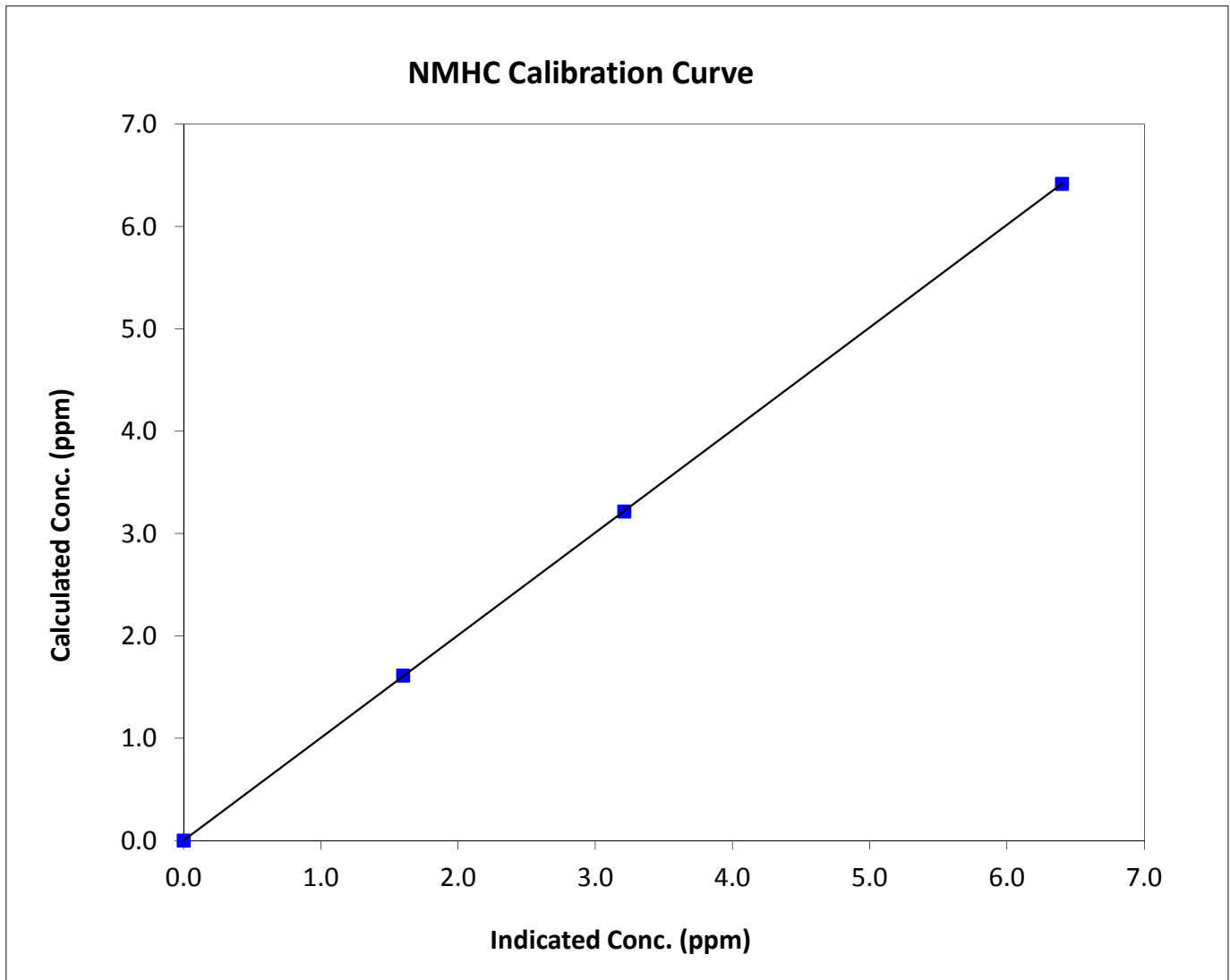
NMHC Calibration Summary

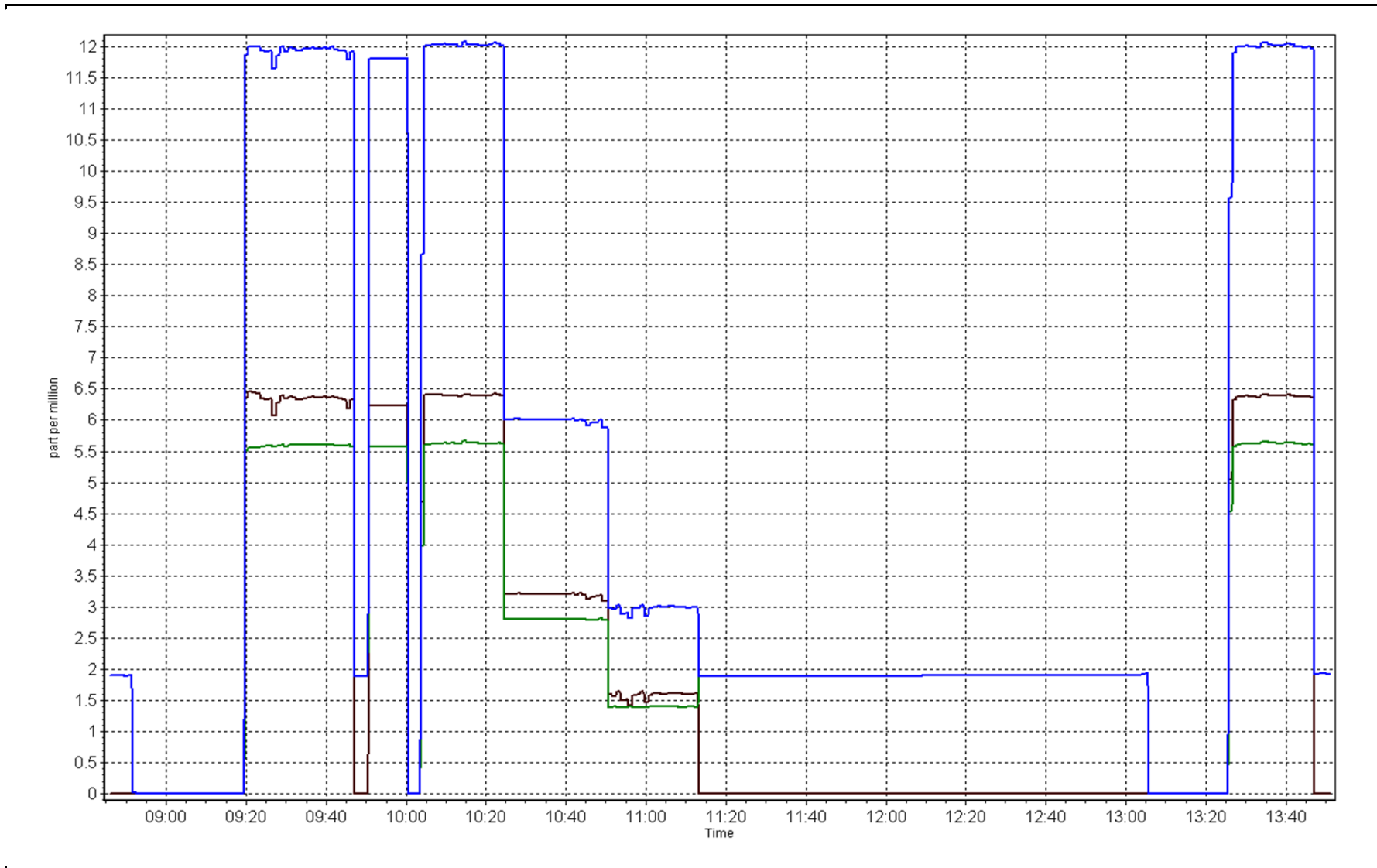
Station Information

Calibration Date	June 4, 2014	Previous Calibration	May 2, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	13:50
Analyzer make	Thermo 55i	Analyzer serial #	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999996
6.42	6.40	1.0027		
3.21	3.21	1.0014	Slope	1.002201
1.61	1.60	1.0082		
			Intercept	0.002644







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THC / NMHC Calibration Report

Station Information

Calibration Date	Saturday, June 21, 2014	Prev Calibration	Thursday, June 19, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Removal		
Start Time (MST)	9:10	End Time (MST)	10:40
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	API T700	Serial Number	1220
Gas Cert Reference	SA130110A	Cal Gas Expiry Date	Monday, December 12, 2016
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	32.5	32.5
THC Range (input)	50	50	Flame Temp	387.7	387.7
NMHC Range (ppm)	50	50	Carrier Pressure	33.8	33.8
NMHC Range (input)	50	50	Fuel Pressure	40.3	40.3
THC Calc slope	0.995901	0.944969	Air Pressure	28.2	28.2
THC Calc intercept	0.000000	0.148482			
NMHC Calc slope	0.991896	0.872158			
NMHC Calc intercept	0.000000	0.110455			

Analyzer make Thermo 55i Analyzer serial # 1118148495

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	12.70	0.951
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	12.08	12.70	0.951
second point	5000	27.7	6.05	6.16	0.982
third point	5000	13.9	3.04	2.91	1.043
calibrator zero					
as left zero					
as left span					
Average Correction Factor					0.992

Corrected As found 12.70 Previous response 12.13 % change -4.5%

Notes:

Removal calibration due to actuator valve issues.

Calibration Performed By: Michael Martineau



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	55.3	6.42	7.29	0.881
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	6.42	7.29	0.881
second point	5000	27.7	3.21	3.50	0.918
third point	5000	13.9	1.61	1.60	1.008
calibrator zero					
as left zero					
as left span					
Average Correction Factor					0.936

Corrected As found 7.29 Previous response 6.47 % change -11.2%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	55.3	5.66	5.41	1.046
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	5.66	5.41	1.046
second point	5000	27.7	2.84	2.66	1.066
third point	5000	13.9	1.42	1.31	1.087
calibrator zero					
as left zero					
as left span					
Average Correction Factor					

Corrected As found 5.41 Previous response 5.66 % change 4.5%



Wood Buffalo Environmental Association

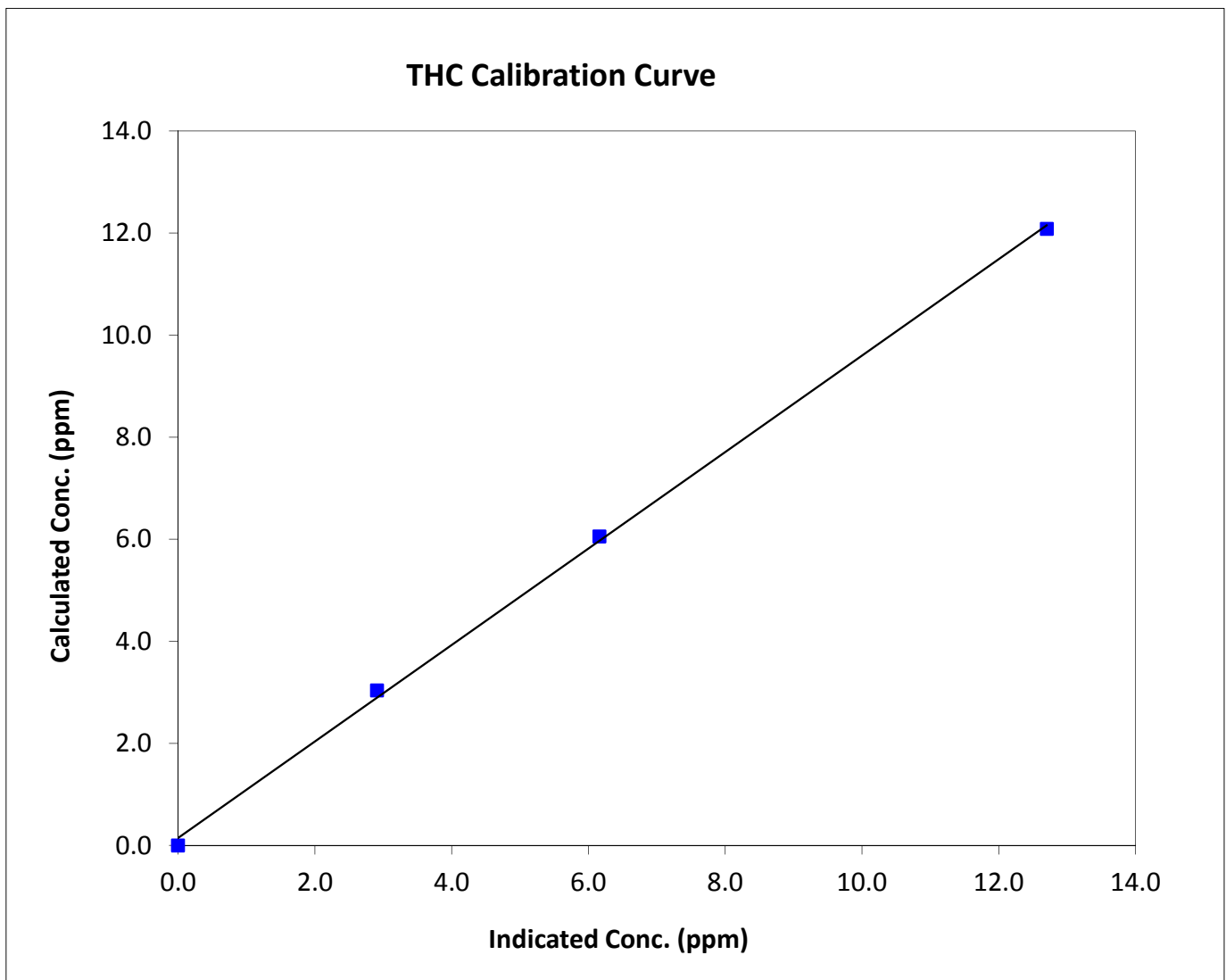
THC Calibration Summary

Station Information

Calibration Date	June 21, 2014	Previous Calibration	June 19, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	10:40
Analyzer make	Thermo 55i	Analyzer serial #	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999337
12.08	12.70	0.9511		
6.05	6.16	0.9823	Slope	0.944969
3.04	2.91	1.0435		
			Intercept	0.148482





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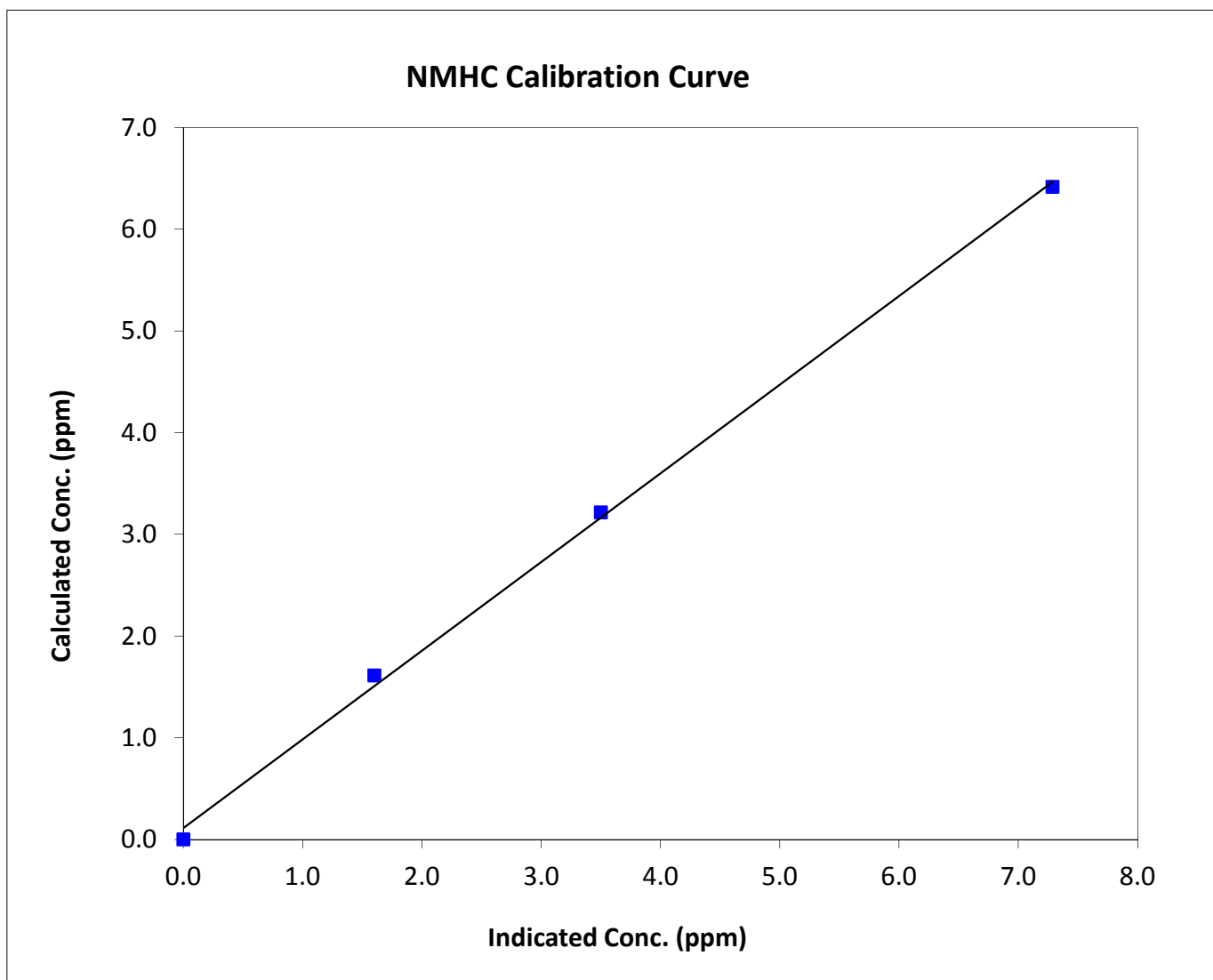
NMHC Calibration Summary

Station Information

Calibration Date	June 21, 2014	Previous Calibration	June 19, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	10:40
Analyzer make	Thermo 55i	Analyzer serial #	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.998726
6.42	7.29	0.8807		
3.21	3.50	0.9185	Slope	0.872158
1.61	1.60	1.0082		
			Intercept	0.110455







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Saturday, June 21, 2014	Prev Calibration	n/a
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Install		
Start Time (MST)	11:00	End Time (MST)	14:15
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	n/a	34.3
THC Range (input)	50	50	Flame Temp	n/a	405.0
NMHC Range (ppm)	50	50	Carrier Pressure	n/a	34.5
NMHC Range (input)	50	50	Fuel Pressure	n/a	42.3
THC Calc slope		0.995005	Air Pressure	n/a	32.4
THC Calc intercept		0.107977			
NMHC Calc slope		0.993110			
NMHC Calc intercept		0.105086			

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					
as found span					
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	12.08	12.08	1.000
second point	5000	27.7	6.05	5.93	1.020
third point	5000	13.9	3.04	2.83	1.073
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	12.10	0.998
Average Correction Factor					1.031

Corrected As found NA Previous response NA % change NA

Notes:

Calibration Performed By: Michael Martineau



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	6.42	6.40	1.003
second point	5000	27.7	3.21	3.09	1.040
third point	5000	13.9	1.61	1.41	1.144
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	6.42	1.000
Average Correction Factor					1.062

Corrected As found NA Previous response NA % change NA

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	5.66	5.68	0.997
second point	5000	27.7	2.84	2.84	0.999
third point	5000	13.9	1.42	1.42	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	55.3	5.66	5.68	0.997
Average Correction Factor					

Corrected As found NA Previous response NA % change NA



Wood Buffalo Environmental Association

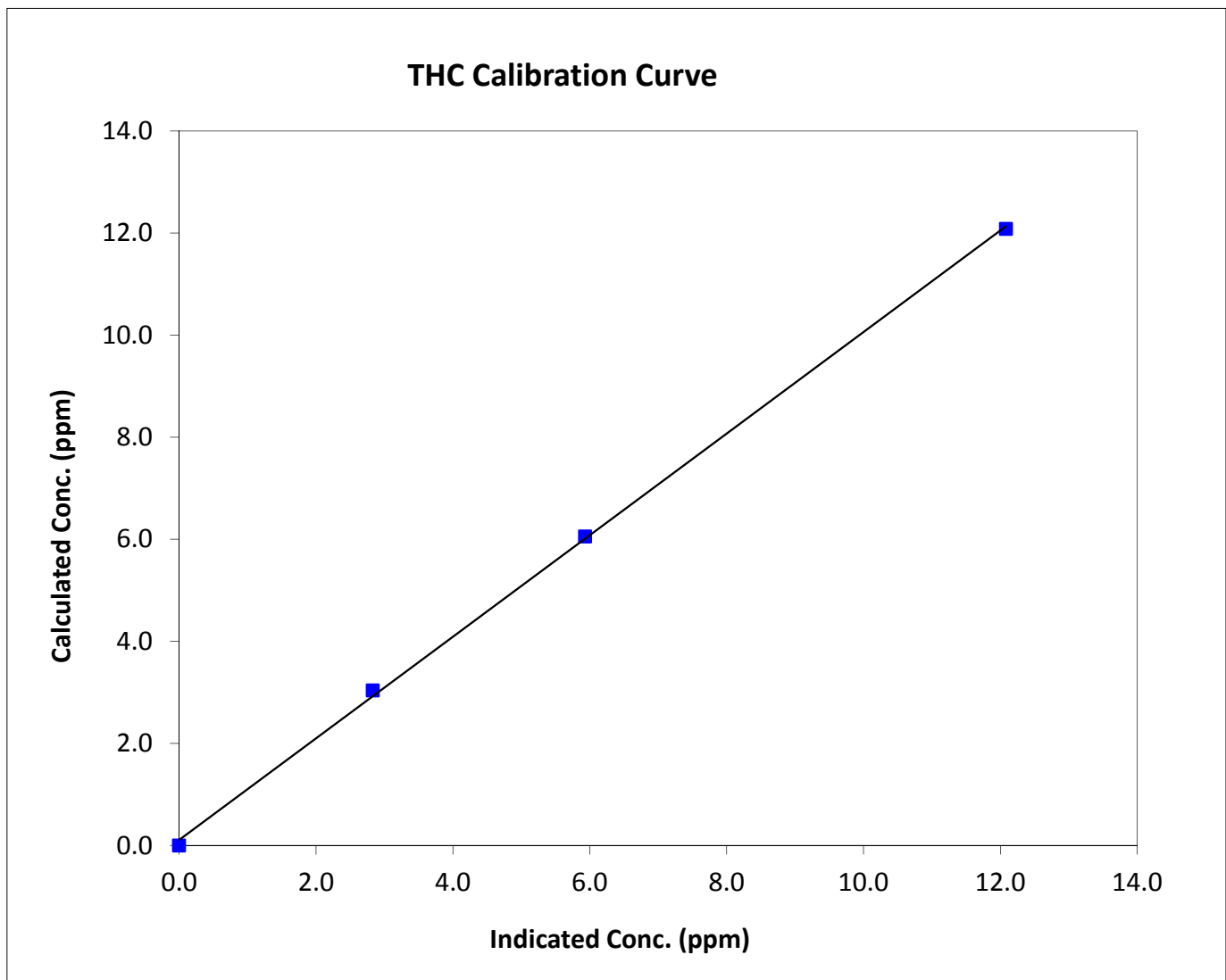
THC Calibration Summary

Station Information

Calibration Date	June 21, 2014	Previous Calibration	n/a
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	11:00	End Time (MST)	14:15
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	0.999644
12.08	12.08	1.0000		
6.05	5.93	1.0204	Slope	0.995005
3.04	2.83	1.0730		
			Intercept	0.107977





Wood Buffalo Environmental Association

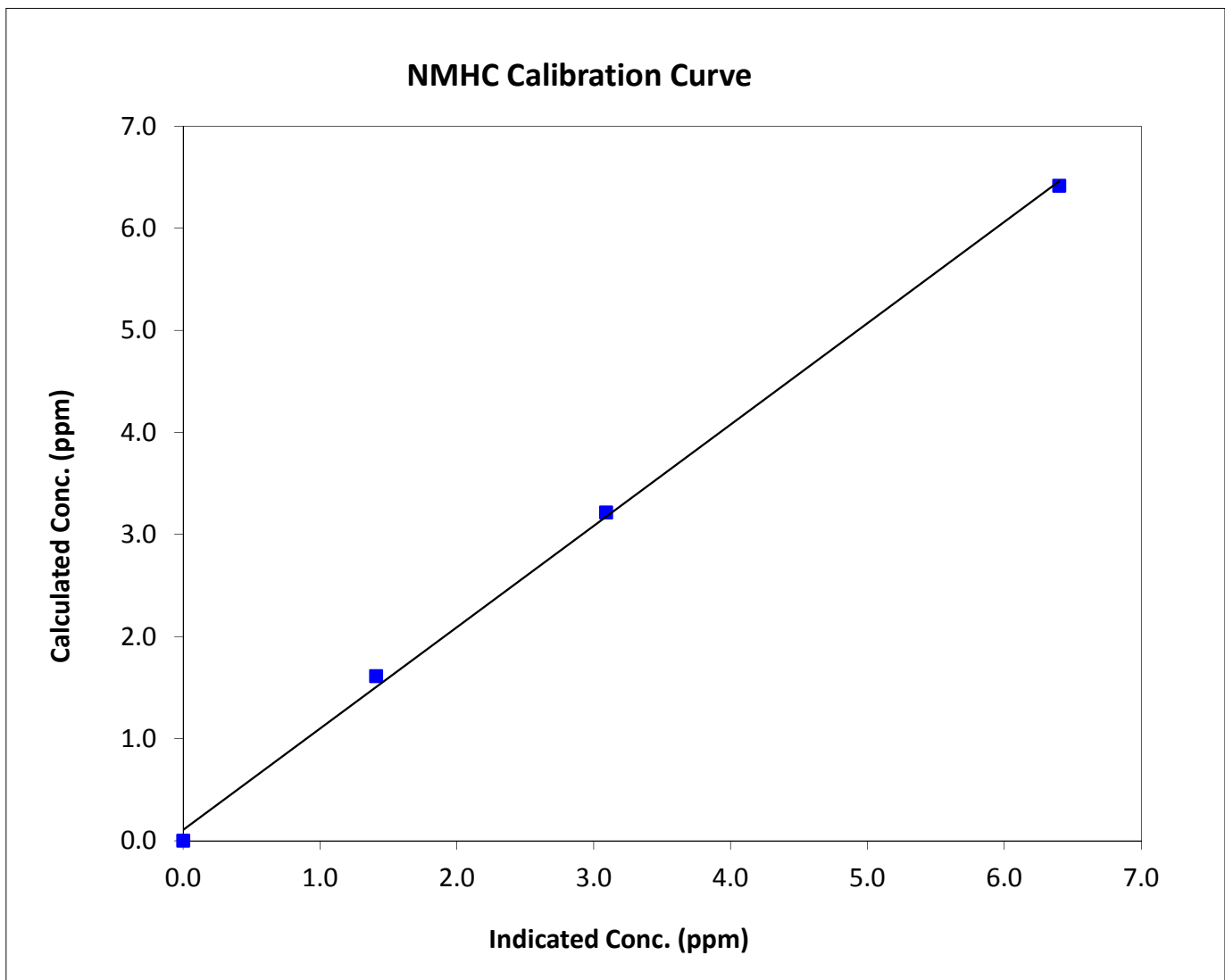
NMHC Calibration Summary

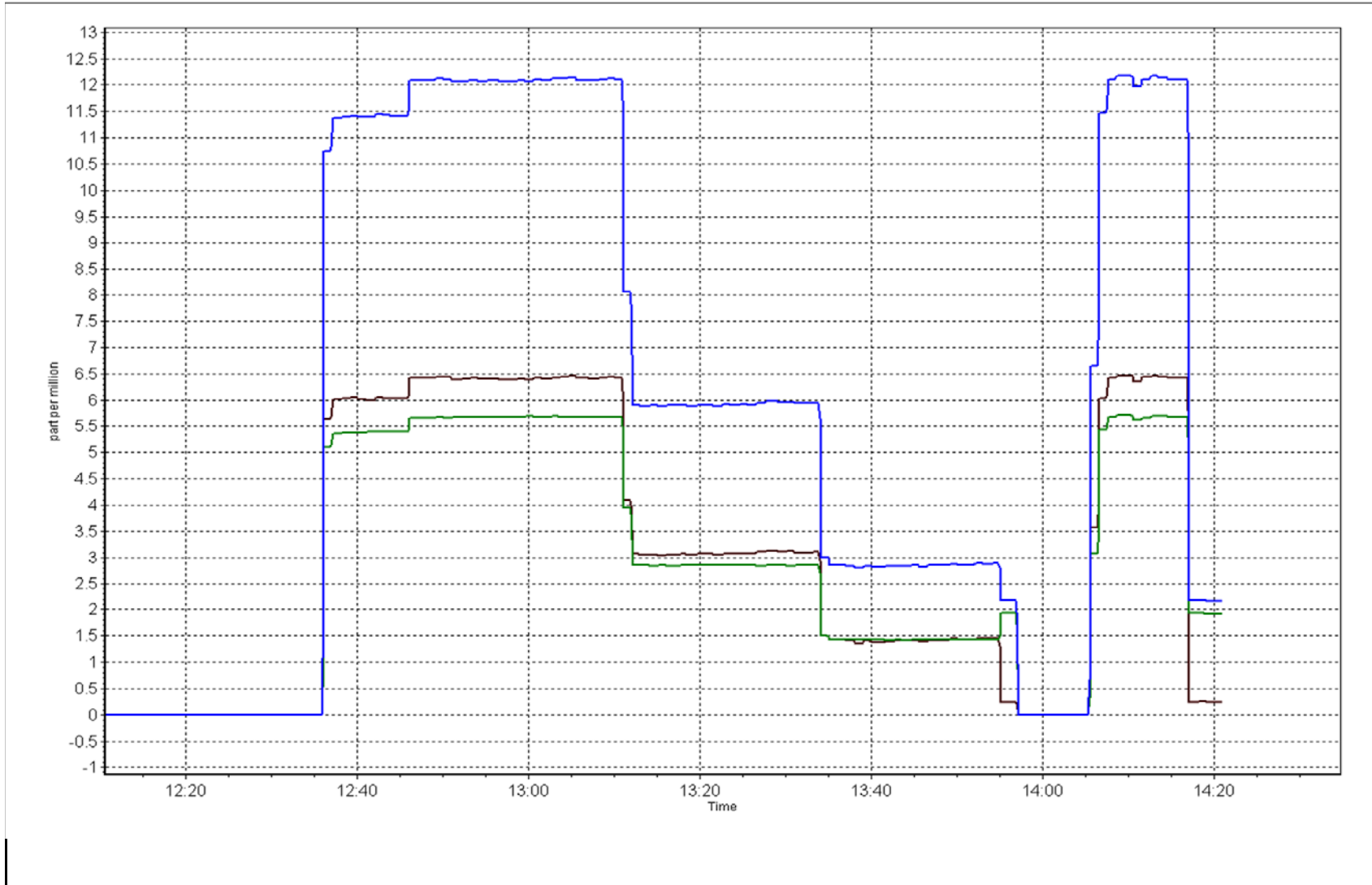
Station Information

Calibration Date	June 21, 2014	Previous Calibration	n/a
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	11:00	End Time (MST)	14:15
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	0.998836
6.42	6.40	1.0027		
3.21	3.09	1.0403	Slope	0.993110
1.61	1.41	1.1440		
			Intercept	0.105086







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Monday, June 23, 2014	Prev Calibration	Saturday, June 21, 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 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	34.3	34.3
THC Range (input)	50	50	Flame Temp	405.0	405.0
NMHC Range (ppm)	50	50	Carrier Pressure	34.5	34.5
NMHC Range (input)	50	50	Fuel Pressure	42.3	42.3
THC Calc slope	0.995005	0.995827	Air Pressure	32.4	32.4
THC Calc intercept	0.107977	0.080306			
NMHC Calc slope	0.993110	0.992551			
NMHC Calc intercept	0.105086	0.081376			

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	12.19	0.991
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	12.08	12.09	0.999
second point	5000	27.7	6.05	5.95	1.017
third point	5000	13.8	3.01	2.87	1.050
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		
Average Correction Factor					1.022

Corrected As found 12.19 Previous response 12.03 % change -1.3%

Notes:

Calibration Performed By: Michael Martineau



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	55.3	6.42	6.50	0.987
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	6.42	6.42	1.000
second point	5000	27.7	3.21	3.12	1.030
third point	5000	13.8	1.60	1.45	1.104
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		
Average Correction Factor					1.045

Corrected As found 6.50 Previous response 6.36 % change -2.2%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	55.3	5.66	5.70	0.993
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	5.66	5.67	0.999
second point	5000	27.7	2.84	2.83	1.002
third point	5000	13.8	1.41	1.42	0.994
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		
Average Correction Factor					

Corrected As found 5.70 Previous response 5.68 % change -0.4%



Wood Buffalo Environmental Association

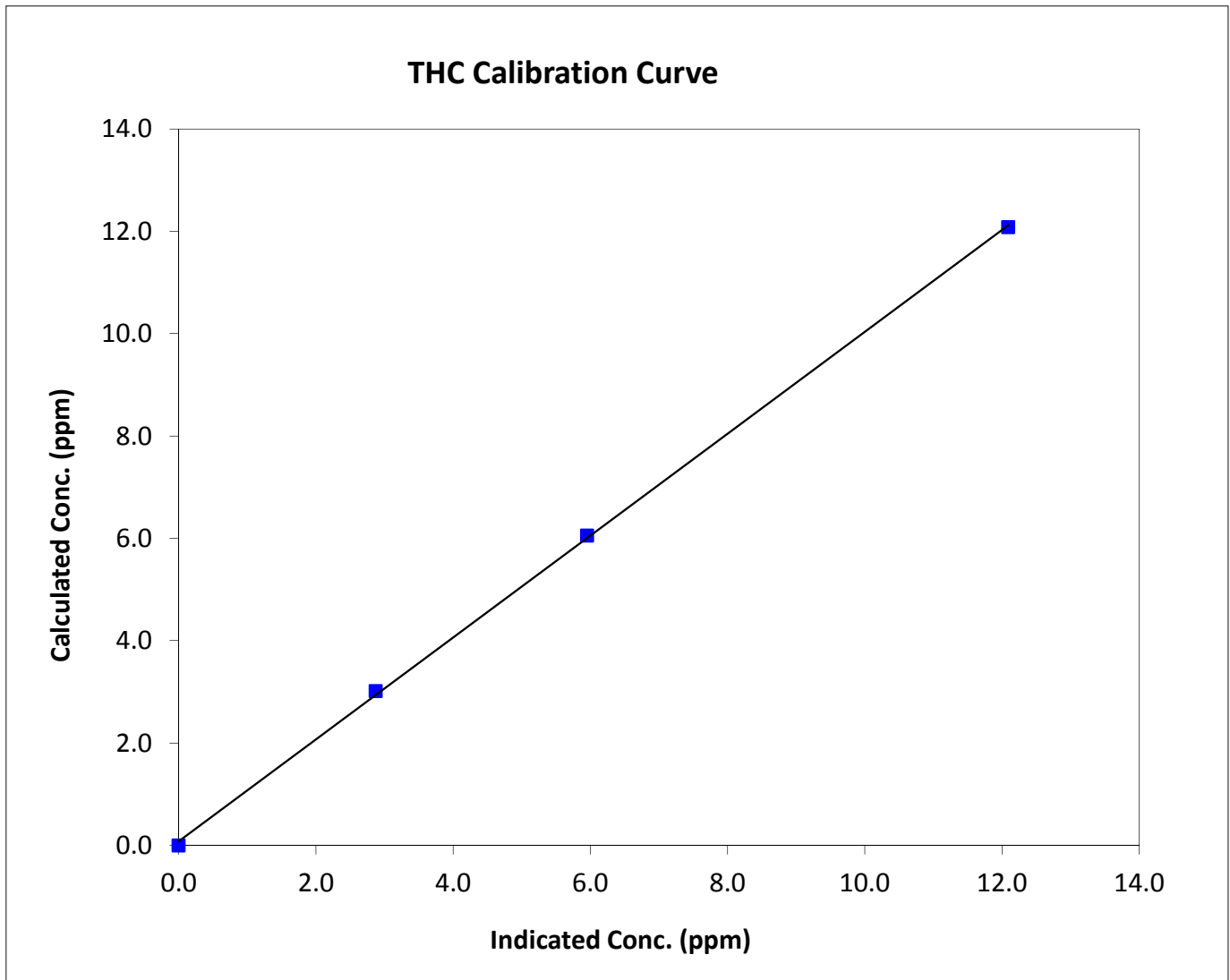
THC Calibration Summary

Station Information

Calibration Date	June 23, 2014	Previous Calibration	June 21, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	
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	0.999803
12.08	12.09	0.9992		
6.05	5.95	1.0166	Slope	0.995827
3.01	2.87	1.0504		
			Intercept	0.080306





Wood Buffalo Environmental Association

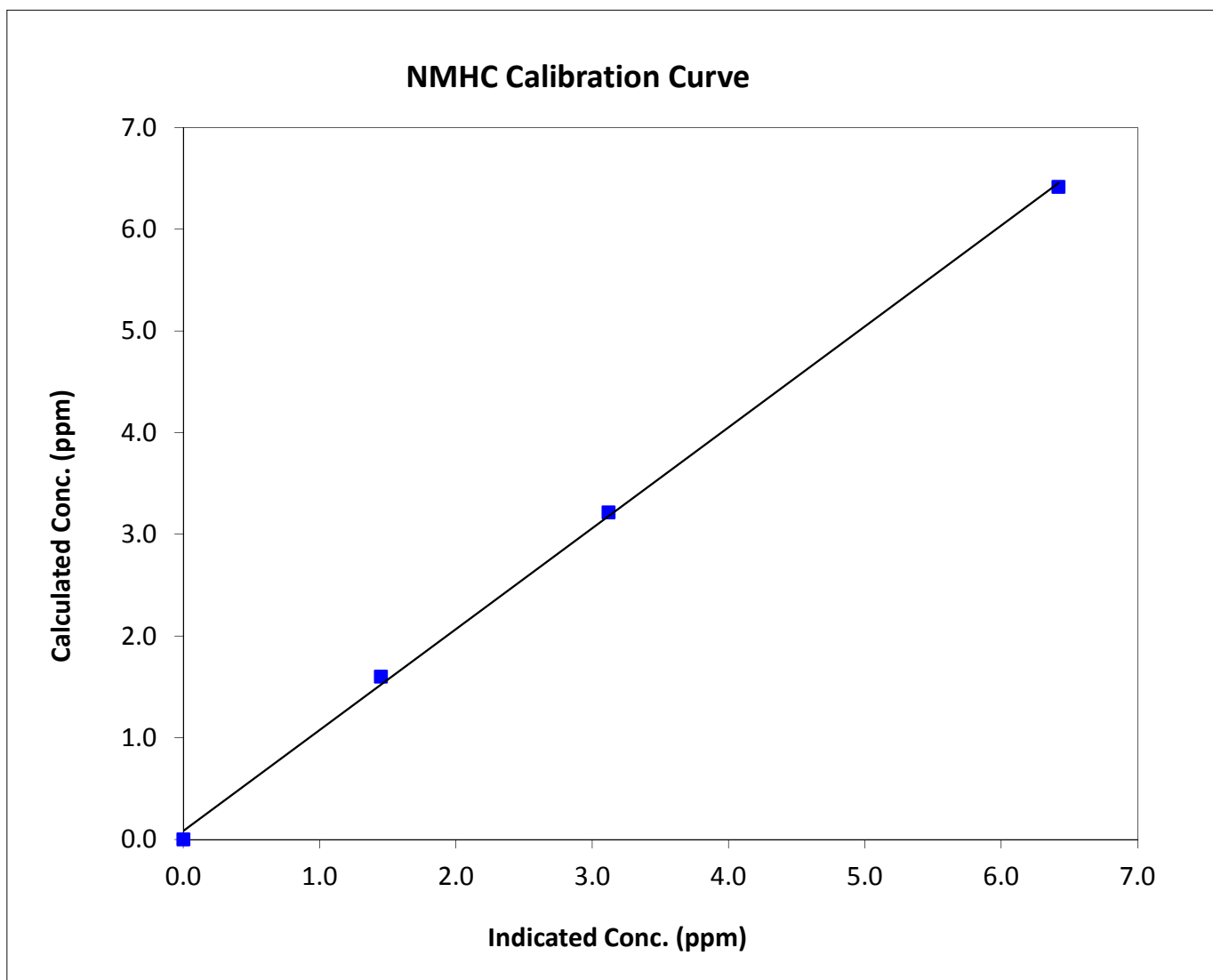
NMHC Calibration Summary

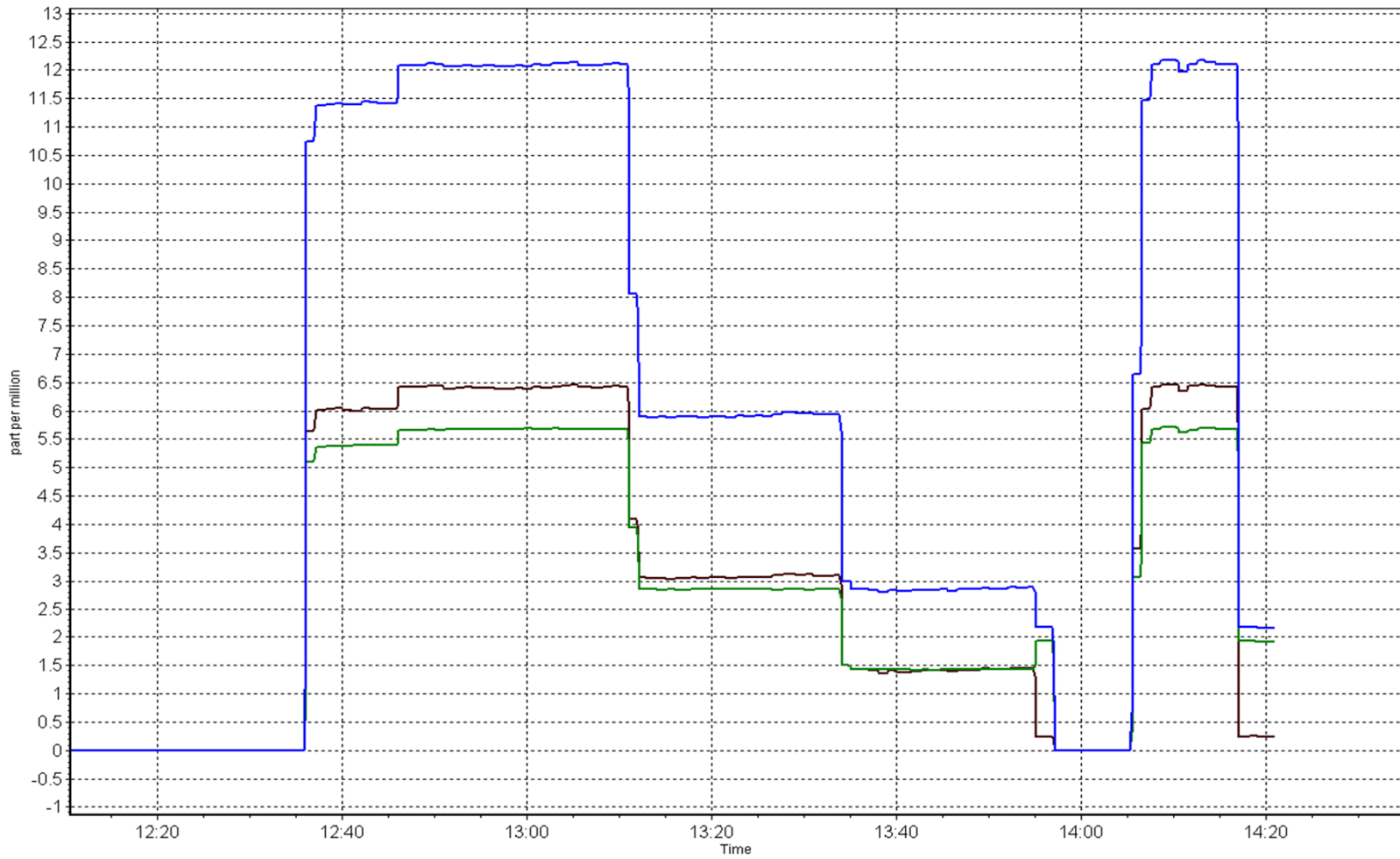
Station Information

Calibration Date	June 23, 2014	Previous Calibration	June 21, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	
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	0.999299
6.42	6.42	0.9996		
3.21	3.12	1.0303	Slope	0.992551
1.60	1.45	1.1045		
			Intercept	0.081376







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THC / NMHC Calibration Report

Station Information

Calibration Date	Tuesday, June 24, 2014	Prev Calibration	Monday, June 23, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Other: <input type="text"/> repair		
Start Time (MST)	12:00	End Time (MST)	13:55
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	34.3	34.8
THC Range (input)	50	50	Flame Temp	405.0	405.0
NMHC Range (ppm)	50	50	Carrier Pressure	34.5	34.5
NMHC Range (input)	50	50	Fuel Pressure	42.3	42.3
THC Calc slope	0.995827	0.991608	Air Pressure	32.4	32.4
THC Calc intercept	0.080306	0.035924			
NMHC Calc slope	0.992551	0.993313			
NMHC Calc intercept	0.081376	0.038804			

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					
as found span					
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	12.08	12.17	0.993
second point	5000	27.7	6.05	6.03	1.003
third point	5000	13.8	3.01	2.98	1.012
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	12.22	0.989
Average Correction Factor					1.003

Corrected As found NA Previous response NA % change NA

Notes:

Column bake was performed yesterday. Adjusted zero chromatogram and span.

Calibration Performed By: Michael Martineau



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	6.42	6.44	0.996
second point	5000	27.7	3.21	3.17	1.014
third point	5000	13.8	1.60	1.54	1.040
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	6.38	1.006
Average Correction Factor					1.017

Corrected As found NA Previous response NA % change NA

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	5.66	5.73	0.989
second point	5000	27.7	2.84	2.86	0.992
third point	5000	13.8	1.41	1.44	0.981
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	5.76	0.983
Average Correction Factor					

Corrected As found NA Previous response NA % change NA



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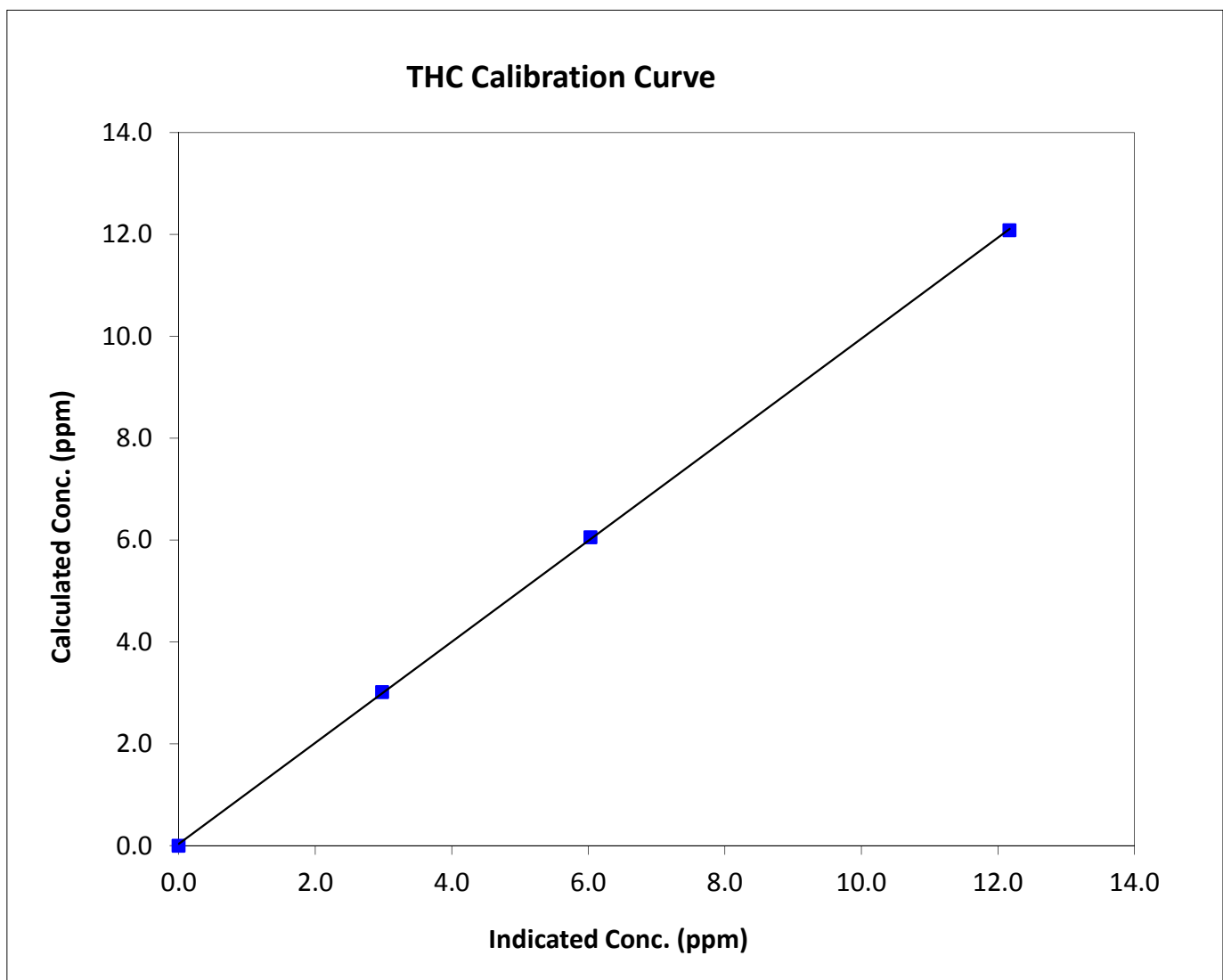
THC Calibration Summary

Station Information

Calibration Date	June 24, 2014	Previous Calibration	June 23, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	12:00	End Time (MST)	13:55
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	0.999954
12.08	12.17	0.9926		
6.05	6.03	1.0035	Slope	0.991608
3.01	2.98	1.0116		
			Intercept	0.035924





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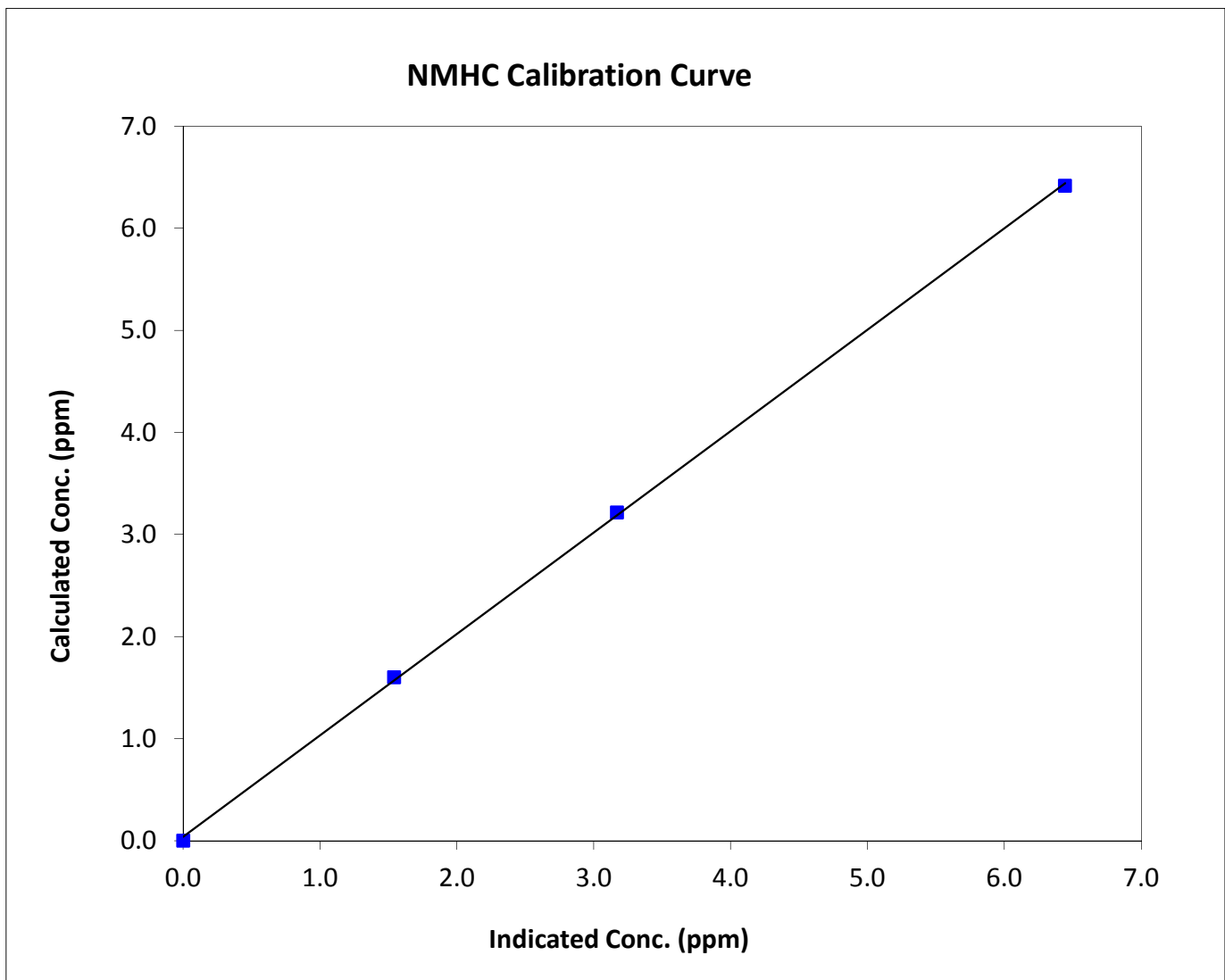
NMHC Calibration Summary

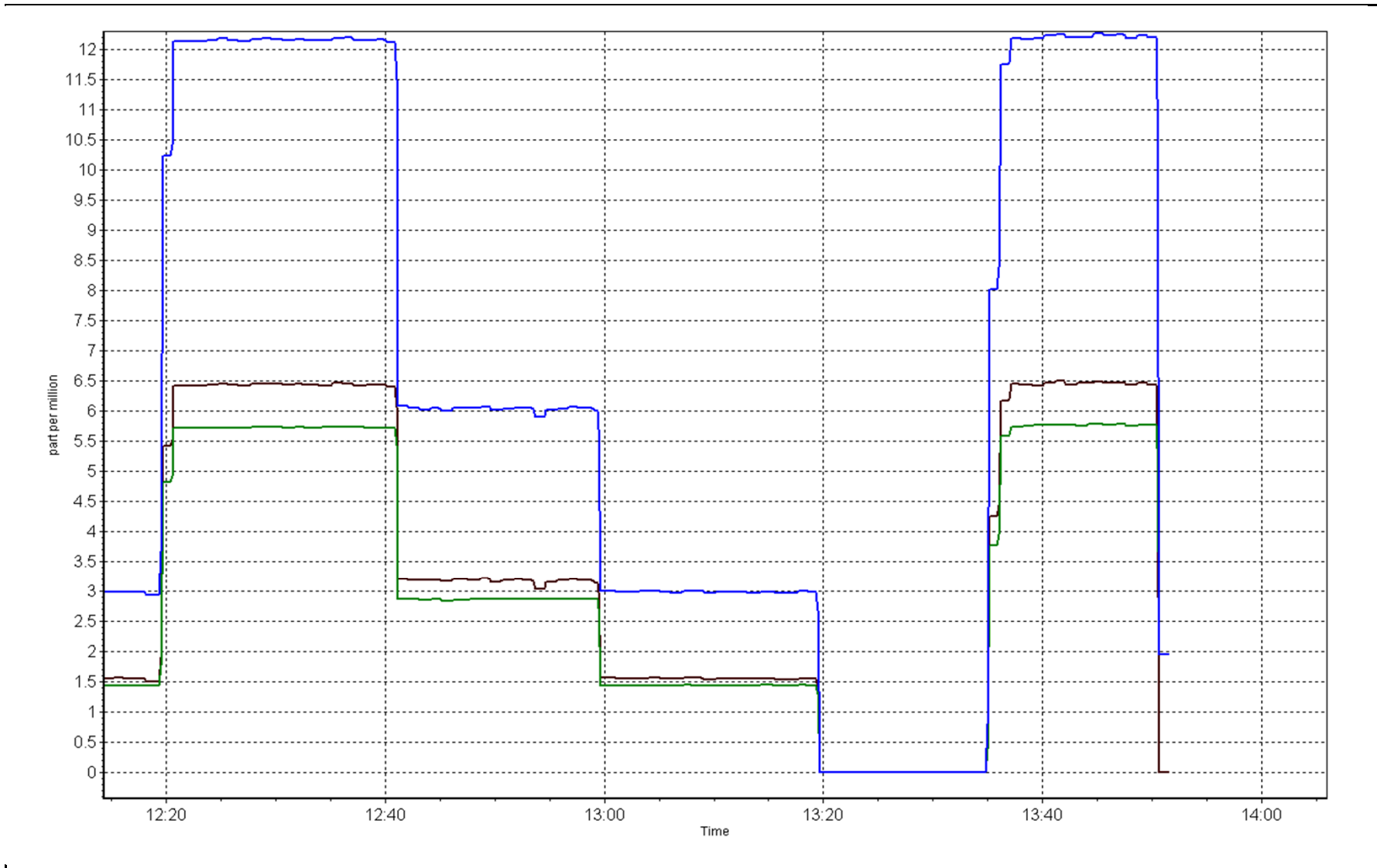
Station Information

Calibration Date	June 24, 2014	Previous Calibration	June 23, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	12:00	End Time (MST)	13:55
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	0.999833
6.42	6.44	0.9961		
3.21	3.17	1.0141	Slope	0.993313
1.60	1.54	1.0399		
			Intercept	0.038804







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O₃ Calibration Report

Station Information

Calibration Date	June 5, 2014	Previous Calibration	May 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:10	End Time (MST)	13:15
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Make/Model	API T700	Serial Number	1220
NO2 calibration used	Wednesday, June 04, 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	31.1
Analyzer Range (input)	5000	5000	Lamp temp.	53.6	53.6
Calculated slope	1.009579	0.992648	Pressure	692.9	675.7
Calculated intercept	-0.894105	0.951856	Flow cell A	0.628	0.613
Analyzer Background	0.0	0.0	Flow cell B	0.648	0.633
Analyzer Coefficient	0.984	0.984	Cell A Intensity	92638	94000
			Cell B Intensity	84675	87350

Analyzer make Thermo 49i Analyzer serial # 1300156234

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	0.000	0.0	-0.5	N/A
as found span	5000	0.950	328.1	328.3	1.000
calibrator zero	5000	0.000	0.0	-0.5	N/A
high point	5000	0.953	328.1	329.3	0.996
second point	5000	0.542	224.4	226.1	0.992
third point	5000	0.324	116.7	115.3	1.012
calibrator zero	5000	0.000	0.0	-0.5	N/A
as left zero	5000	0.000	0.0	0.0	N/A
as left span	5000	0.950	328.1	333.8	0.983
Average Correction Factor					1.000

Corrected As found 328.8 Previous response 325.9 % change -0.9%

Notes:

Changed inlet filter & holder. Changed out zero/span and sample line. Cleaned optical bench.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

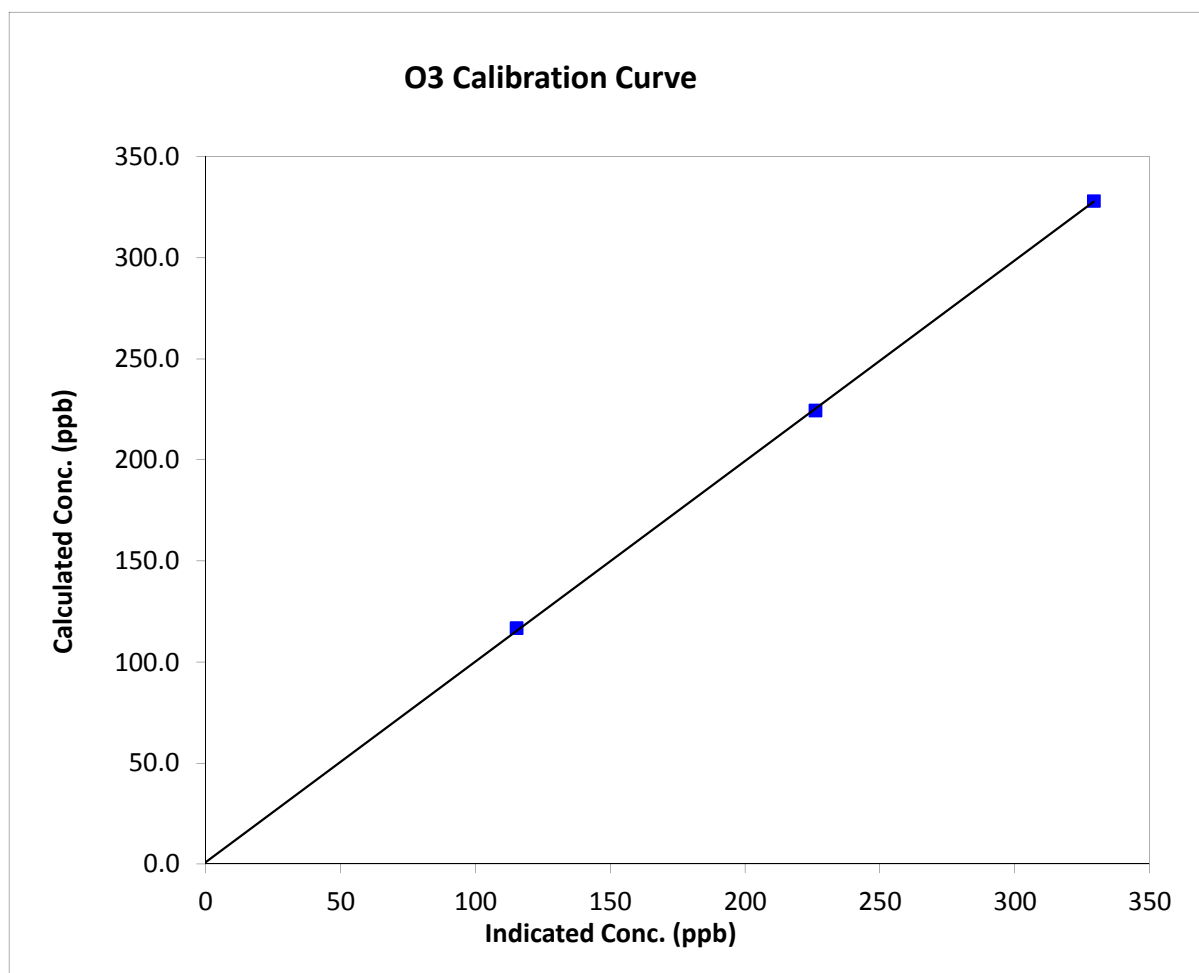
O₃ Calibration Summary

Station Information

Calibration Date	Thursday, June 05, 2014	Previous Calibration	May 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:10	End Time (MST)	13:15
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	N/A	Correlation Coefficient	0.999951
328.1	329.3	0.9963		
224.4	226.1	0.9924	Slope	0.992648
116.7	115.3	1.0118		
			Intercept	0.951856



O3 Calibration Plot

Date: June 5, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	June 4, 2014	Previous Calibration	May 2, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	8:50	End Time (MST)	13:50
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
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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	1.000939	1.001262	1.003731
	Data Offset	0.841305	1.126035	1.084613
After	Data Slope	0.998429	0.997574	1.003184
	Data Offset	-0.255526	0.304495	1.691898
IP address:		192.168.1.42		
Voltage Range		N/A		

Analyzer Information

Analyzer make/model	Thermo Scientific 42i	Analyzer serial #	1218153460
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.988		0.988	
NOX coefficient	0.993		0.993	
NO2 coefficient	1		1.000	
NO bkgrnd	2.7		2.7	
NOX bkgrnd	3.2		3.2	
Chamber Temp	50.4	Deg C	50.6	Deg C
Moly Temp	327.6	Deg C	325.0	Deg C
PMT Temp	-3	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	179.4	mmHg	177.0	mmHg
Sample Flow	814	ccm	802	ccm

Notes:

changed filter holder and filter after as founds.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

June 4, 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	-0.1	0.0	-0.1	N/A	N/A
as found span	5000	55.3	601.7	601.7	0.0	599.4	597.5	1.8	1.0038	1.0069
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	N/A	N/A
high point	5000	55.3	601.7	601.7	0.0	602.4	603.1	-0.7	0.9988	0.9976
second point	5000	27.7	301.4	301.4	0.0	303.0	301.6	1.4	0.9947	0.9993
third point	5000	13.9	151.2	151.2	0.0	152.0	150.6	1.4	0.9950	1.0040
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	0.4	-0.1	0.5	N/A	N/A
as left span	5000	55.3	601.7	279.0	322.6	602.1	275.6	326.4	0.9993	1.0124
Average Correction Factor									0.9962	1.0003

Corrected As found

NO_x= 599.5

NO= 597.5

Percent Change

NO_x= 0.1%

NO= 0.4%

Previous Response

NO_x= 600.3

NO= 599.8

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

55.30

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	279.0	328.1	605.3	279.0	326.3	0.9831	1.0000	1.0053	99.5%
2nd NO ₂ (200)	N/A	382.7	224.4	604.5	382.7	221.7	0.9845	1.0000	1.0120	98.8%
3rd NO ₂ (100)	N/A	490.4	116.7	602.7	490.4	112.3	0.9874	1.0000	1.0393	96.2%
4th NO ₂ (0)	607.1	N/A	-2.1	605.0	607.1	-2.1	0.9837	1.0000	N/A	N/A
Average Correction Factor							0.9847	1.0000	1.0189	98.2%

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

NO_x Calibration Summary

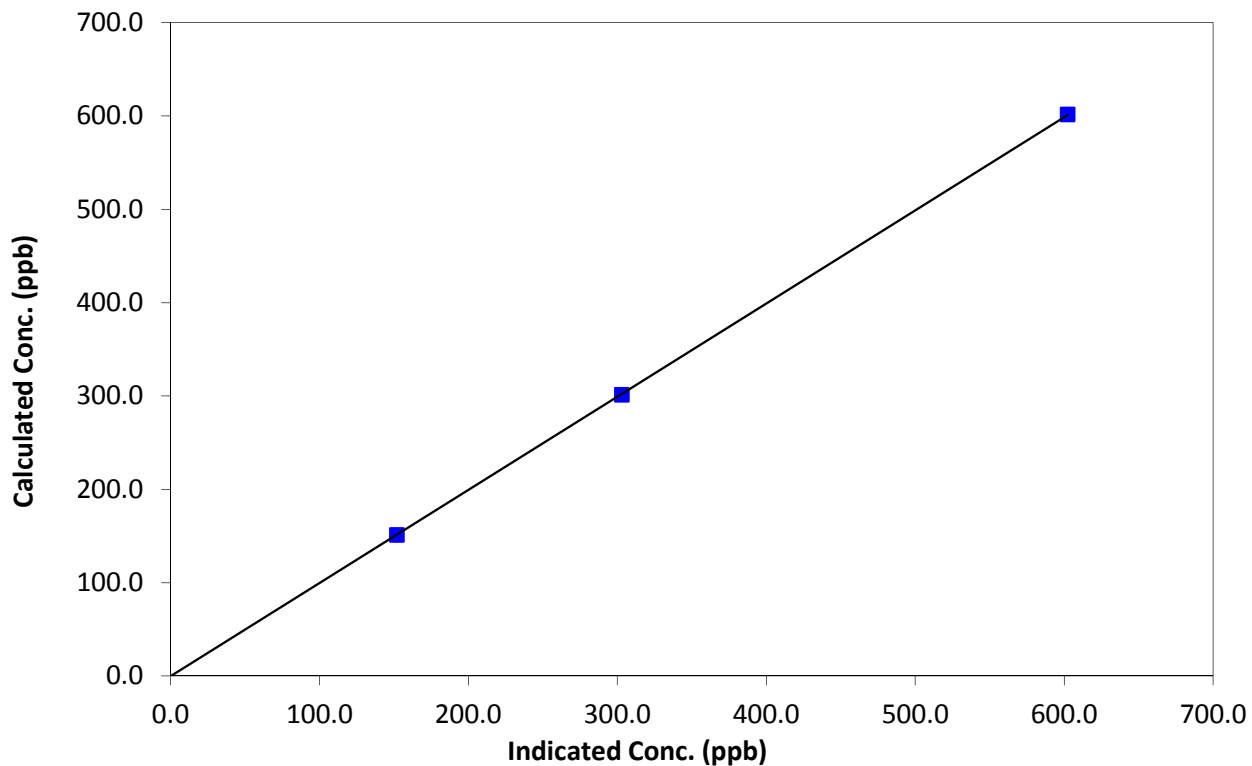
Station Information

Calibration Date	June 4, 2014	Previous Calibration	May 2, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	13:50
Analyzer make	Thermo Scientific 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999995
601.7	602.4	0.9988		
301.4	303.0	0.9947	Slope	0.998429
151.2	152.0	0.9950		
0.0	-0.1	0.0000	Intercept	-0.255526

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

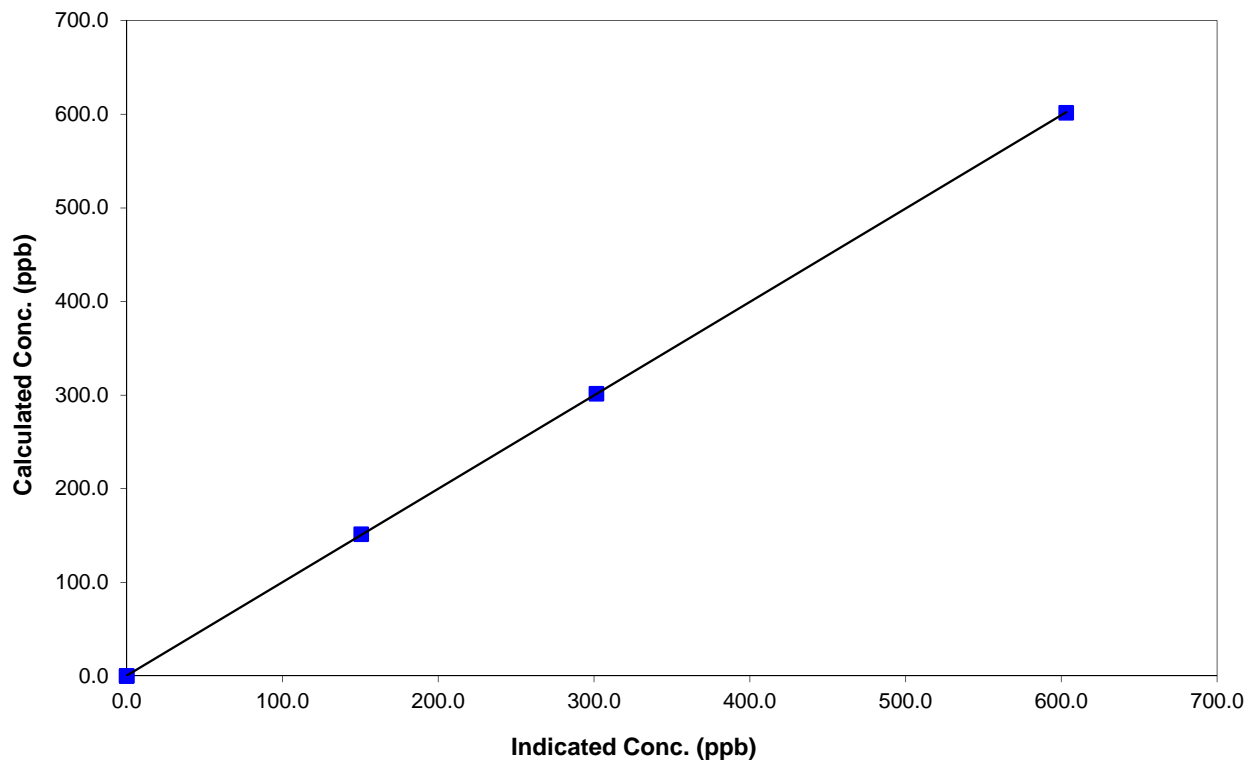
Station Information

Calibration Date	June 4, 2014	Previous Calibration	May 2, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	13:50
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	0.999997
601.7	603.1	0.9976		
301.4	301.6	0.9993	Slope	0.997574
151.2	150.6	1.0040		
0.0	0.0	#DIV/0!	Intercept	0.304495

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

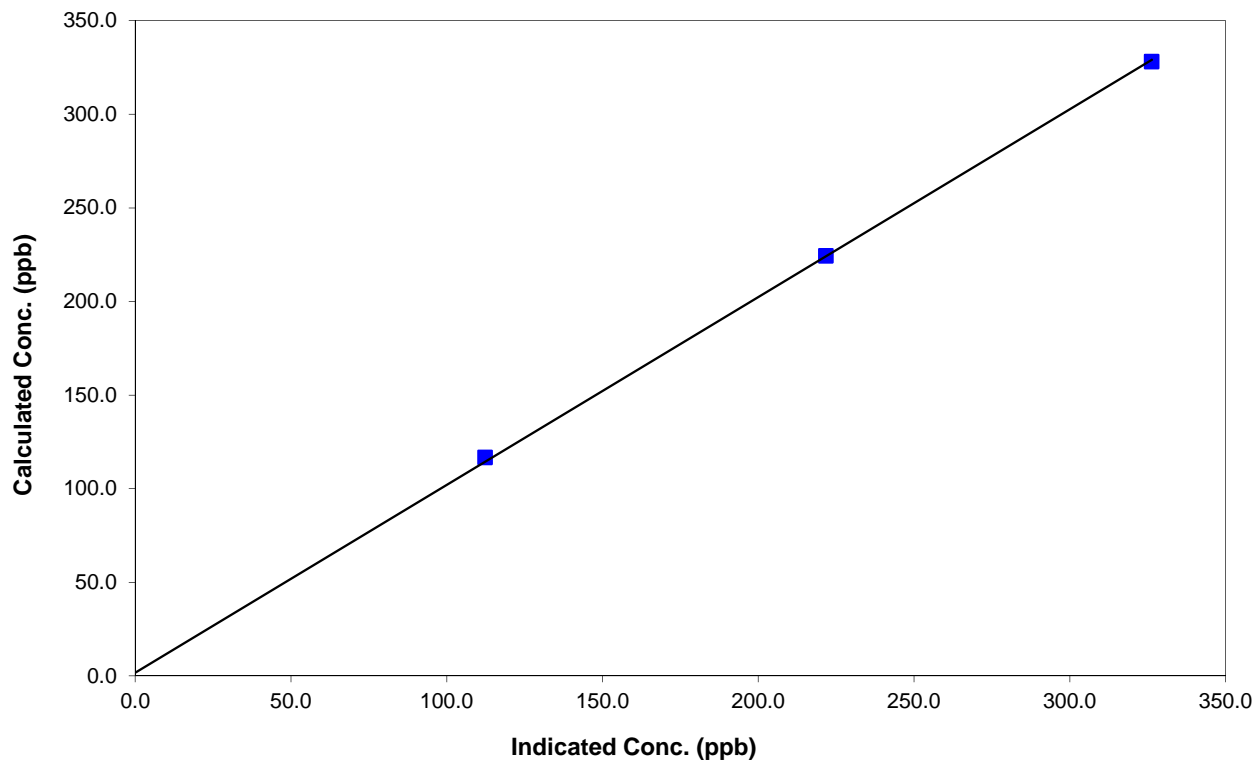
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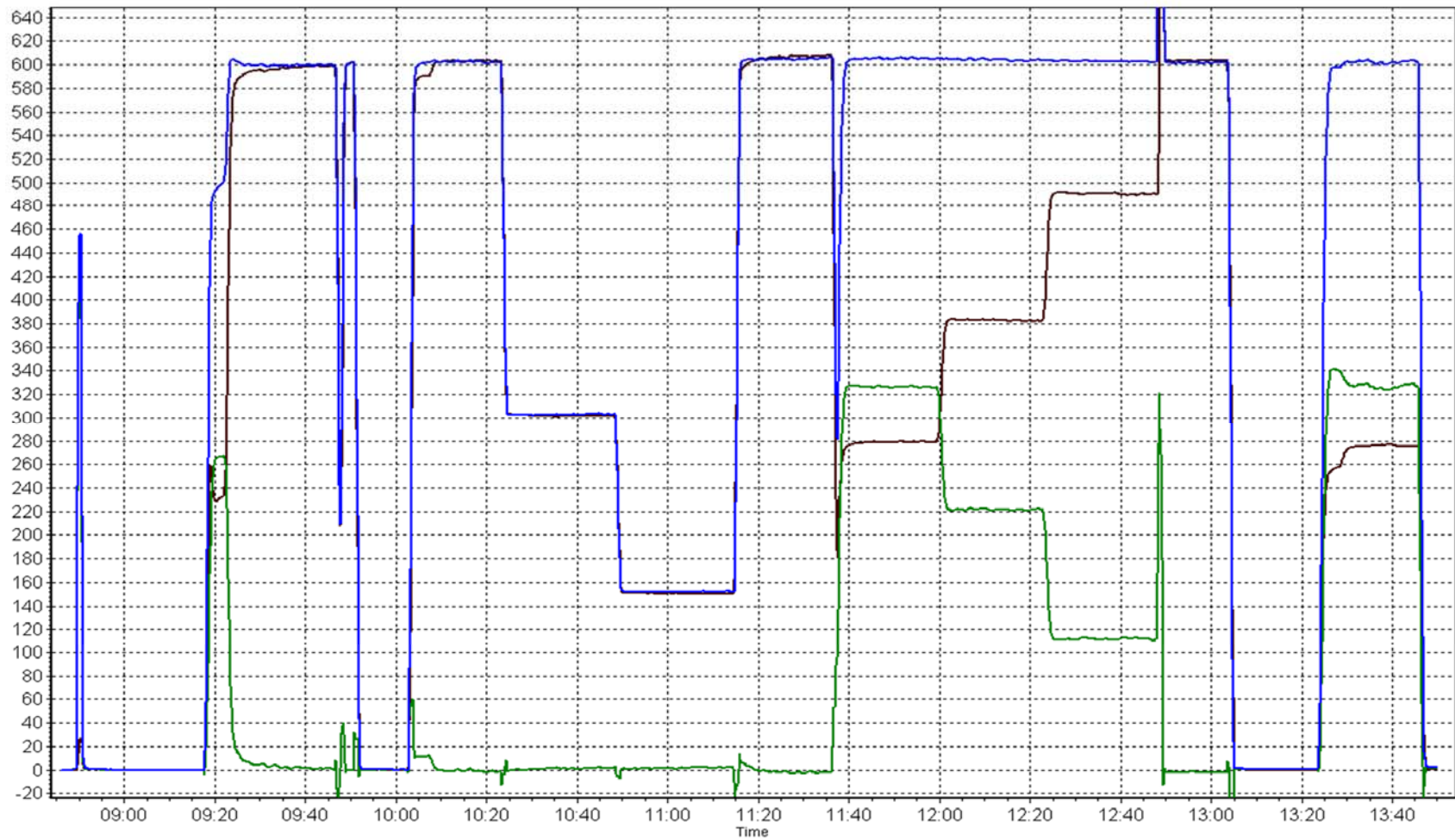
Calibration Date	June 4, 2014	Previous Calibration	May 2, 2014
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	13:50
Analyzer make	Thermo Scientific 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999844
328.1	326.3	1.0053		
224.4	221.7	1.0120	Slope	1.003184
116.7	112.3	1.0393		
			Intercept	1.691898

NO₂ Calibration Curve







Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date	June 10, 2014	Previous Calibration	May 9, 2014
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	13:30
Barometric Pressure	725 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)	5000	5000	5000
Before	Data Slope	0.982807	0.999398	0.984365
	Data Offset	8.034752	0.096316	6.391942
After	Data Slope	0.997441	1.000236	0.997996
	Data Offset	10.650759	0.060020	10.541662
Channel #				
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	0.886	ppb	0.887	ppb
NOx coefficient	0.904	ppb	0.905	ppb
NH3 coefficient	0.910		0.910	
NO coefficient	0.881		0.899	
NO2 coefficient	1.000	ppb	1.000	ppb
No bkgnd	5.8		5.8	
Nt bkgnd	8.6		8.6	
NOx bkgnd	5.1		5.0	
NH3 conv temp	774	DegC	780	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	322.0	Deg C	322.0	Deg C
PMT Temp	-8.7	Deg C	-8.6	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	120.3	mmHg	119.3	mmHg
PMT Voltage	-838.0	v	-839.0	v
Sample Flow 1 NO	446.0	ccm	444.0	ccm
Sample Flow 2 Nox	493.0	ccm	490.0	ccm
Sample Flow 3 Nt	497.0	ccm	495.0	ccm

Notes:

Adjusted NO/Nox/Nt span.



Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date:

June 10, 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	-1.8	0.0	-1.8	NA	NA
as found NO	5000	55.2	600.6	600.6	NA	590.2	588.8	1.4	1.018	NA
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	NA	NA
high NO point	5000	55.2	600.6	600.6	NA	600.3	600.3	0.0	1.000	NA
NO/O ₃ point	5000	55.2	600.6	600.6	NA	600.6	600.4	0.2	1.000	NA
as found NH ₃	5000	52.8	2006.4	NA	2006.4	2005.9	0.9	2005.0	1.000	1.001
first NH ₃	5000	52.8	2006.4	NA	2006.4	2005.9	0.9	2005.0	1.000	1.001
second NH ₃	5000	26.3	999.4	NA	999.4	986.2	0.7	985.5	1.013	1.014
third NH ₃	5000	13.3	505.4	NA	505.4	485.4	-0.1	485.5	1.041	1.041
as left zero						0.0				
as left span						0.0				
Average Correction Factor									1.0002	1.0186

Corrected As found

Nt = 592.1 ppb

NH₃ = 2006.8 ppb

Previous response

Nt = 603.0 ppb

NH₃ = 2031.9 ppb

Nt percent change 1.9%

NH₃ percent change 1.2%

Converter efficiency 91.0%

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

NH3 Calibration Summary

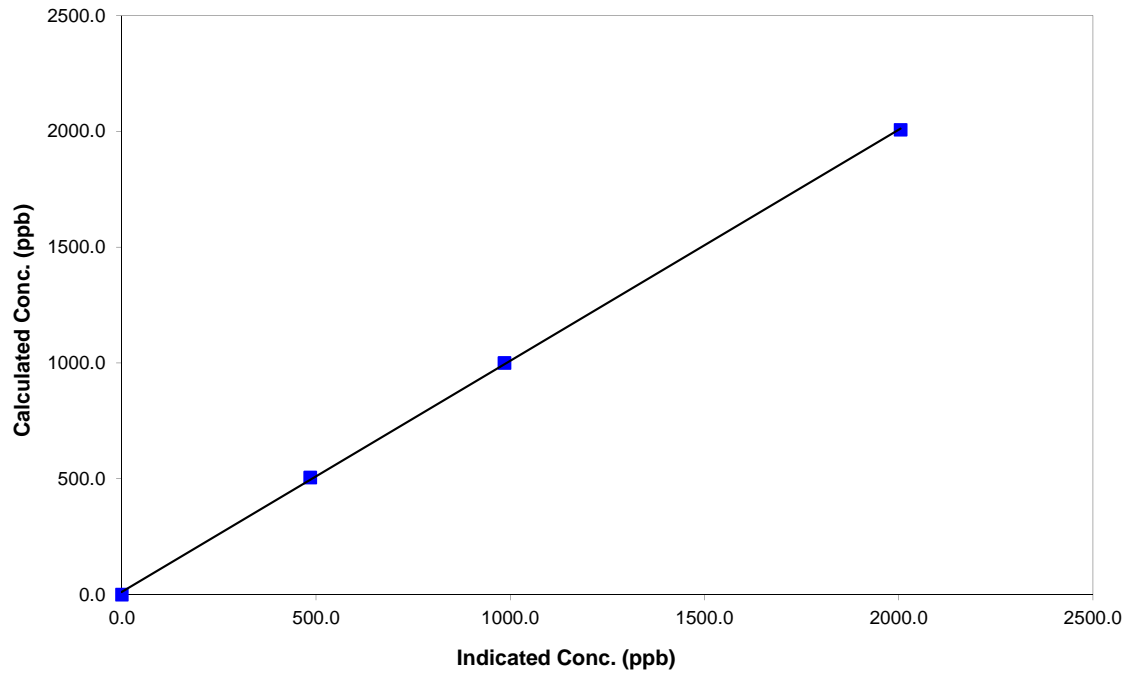
Station Information

Calibration Date	June 10, 2014	Previous Calibration	May 9, 2014
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	13:30
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	0.999876
2006.4	2005.0	1.0007		
999.4	985.5	1.0141	Slope	0.997996
505.4	485.5	1.0410		
			Intercept	10.541662

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

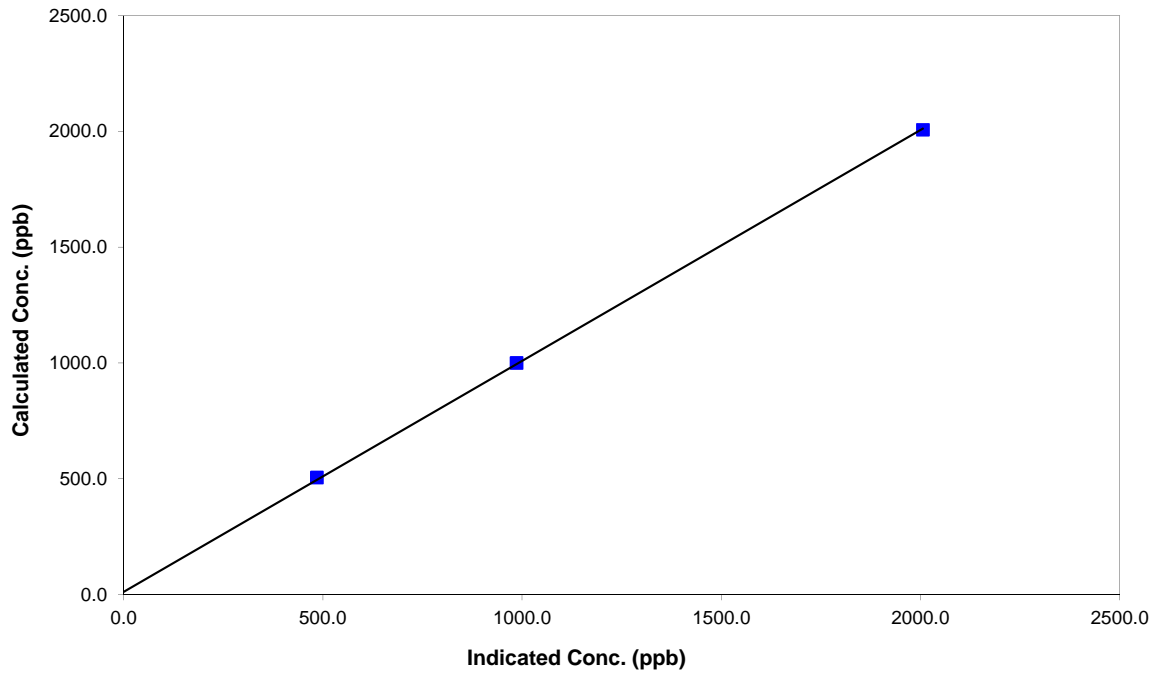
Station Information

Calibration Date	June 10, 2014	Previous Calibration	May 9, 2014
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	13:30
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	-0.1	N/A	Correlation Coefficient	0.999875
2006.4	2005.9	1.0002		
999.4	986.2	1.0134	Slope	0.997441
505.4	485.4	1.0411		
	0.0		Intercept	10.650759

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

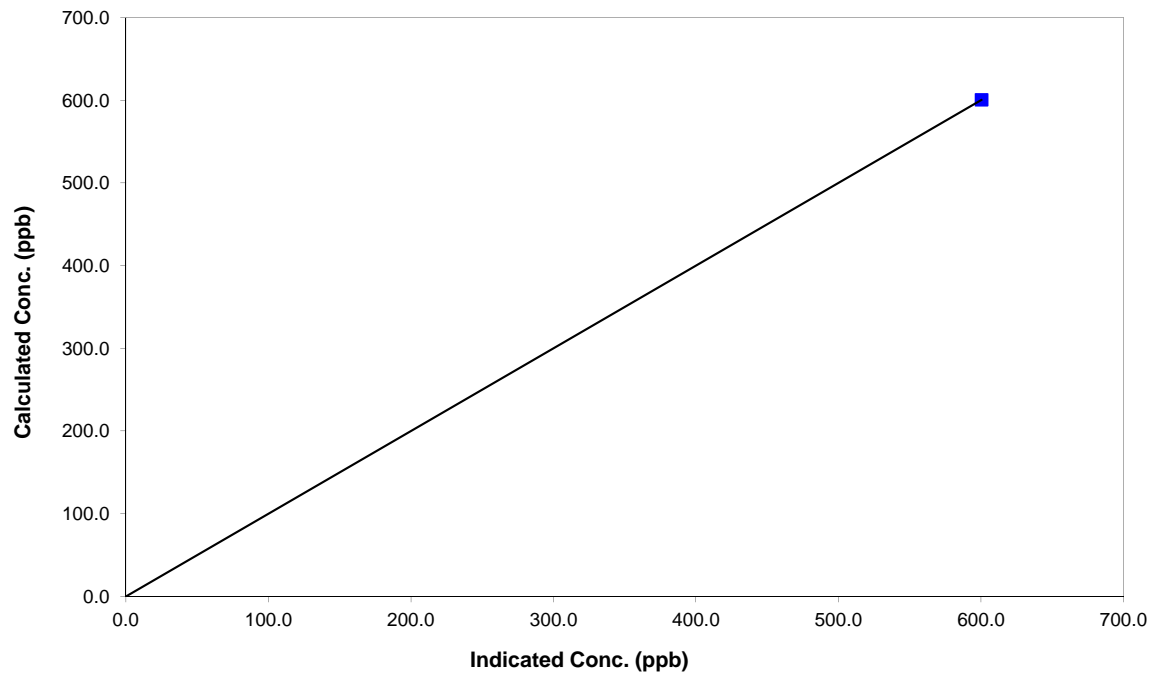
Station Information

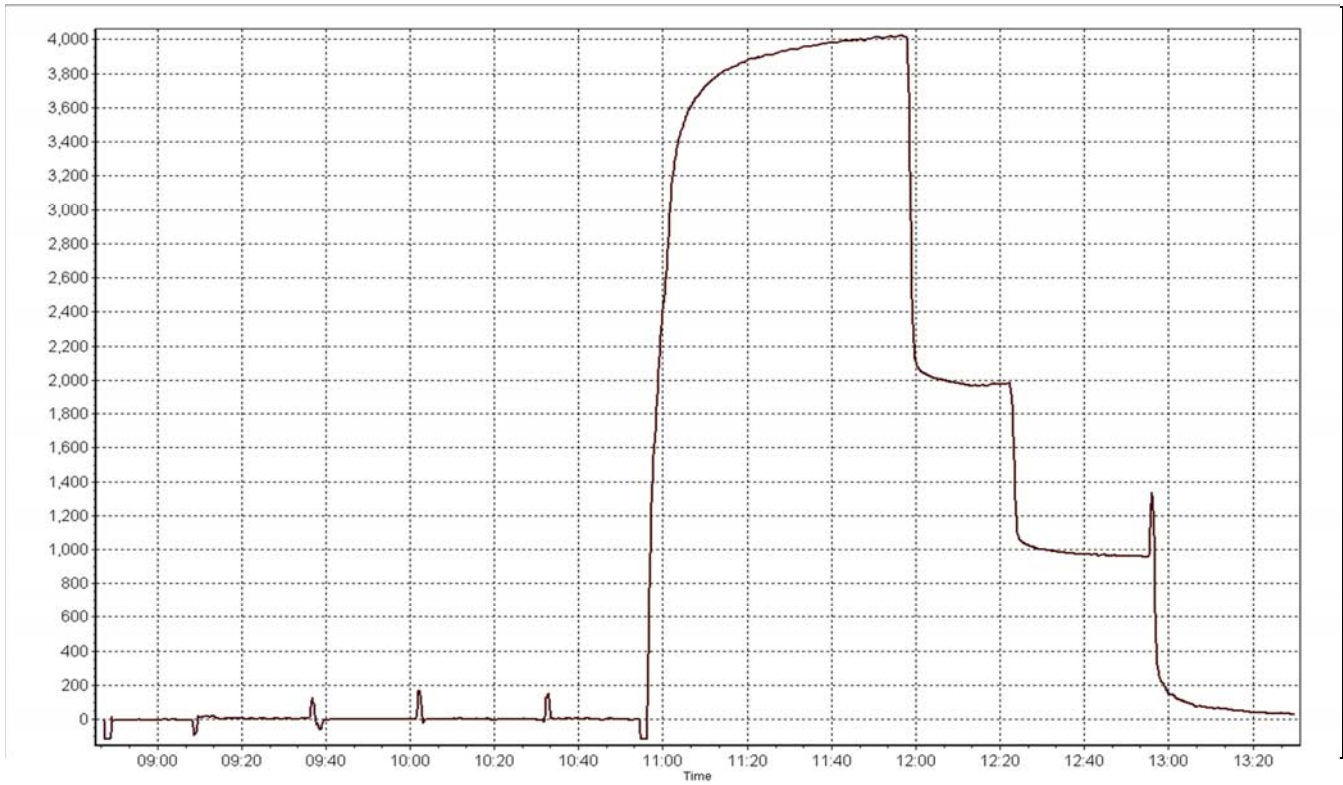
Calibration Date	June 10, 2014	Previous Calibration	May 9, 2014
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	13:30
Analyzer make	Thermo 17c	Analyzer serial #	622817829

NO_x Calibration Information

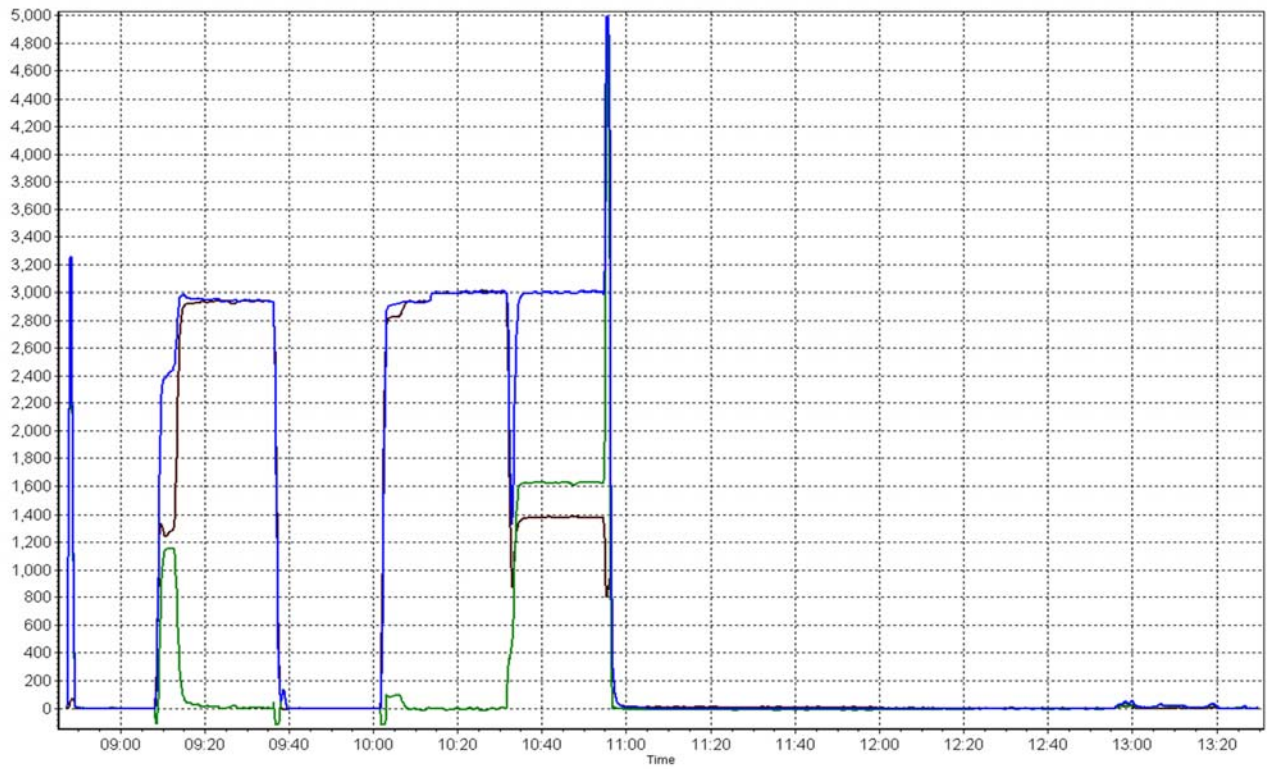
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	1.000000
600.6	600.3	1.0004		
600.6	600.4	1.0003		
			Slope	1.000236
			Intercept	0.060020

NO_x Calibration Curve





NH₃ above, Nox below



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 7
ATHABASCA VALLEY
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)

JUNE 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	11	0	3	0
TRS (ppb) Average	682	38	38	100.00	3	0	1	0
THC (ppm) Average	683	36	37	99.86	2.4	-	2	-
NMHC (ppm) Average	683	36	37	99.86	0.131	-	0.04	-
CH4(ppm) Average	683	36	37	99.86	2.3	-	2	-
O3 (ppb) Average	686	34	34	100.00	62	0	32	-
NO2 (ppb) Average	682	36	38	99.72	23	0	9	-
NO (ppb) Average	682	36	38	99.72	17	-	4	-
NOX (ppb) Average	682	36	38	99.72	33	-	12	-
PM2.5 (ug/m3) Average	719	0	1	99.86	41.8	-	24.1	0
CO(ppm) Average	687	33	33	100.00	0.2	0	0.1	-
Temperature 2 m (C) Average	720	0	0	100.00	27.6	-	21.7	-
Barometric Pressure (inHg) Average	720	0	0	100.00	29.1	-	-	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	-	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	28	-	-	-
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)
 JUNE 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	0.8	1	-	0	0	0	0	1	2	11
TRS (ppb) Average	682	0.4	0	-	0	0	0	0	0	1	3
THC (ppm) Average	683	1.92	0.1	-	1.8	1.9	1.9	1.9	1.9	2	2.4
NMHC (ppm) Average	683	0.012	0.018	-	0	0	0	0	0	0	0.131
CH4(ppm) Average	683	1.91	0.1	-	1.8	1.9	1.9	1.9	1.9	2	2.3
O3 (ppb) Average	686	23.7	11	-	0	8	15	24	32	39	62
NO2 (ppb) Average	682	4.8	3	-	0	2	3	4	6	9	23
NO (ppb) Average	682	1.5	2	-	0	0	0	1	2	4	17
NOX (ppb) Average	682	6.3	5	-	0	2	3	5	8	13	33
PM2.5 (ug/m3) Average	719	8.87	5.7	-	0.8	3.2	5.2	7.8	10.9	14.8	41.8
CO(ppm) Average	687	0.08	0	-	0	0	0.1	0.1	0.1	0.1	0.2
Temperature 2 m (C) Average	720	16.8	5.2	-	4.3	9.7	12.9	16.9	20.7	23.8	27.6
Barometric Pressure (inHg) Average	720	28.89	0.1	-	28.6	28.7	28.8	28.9	29	29.1	29.1
Relative Humidity (%) Average	720	65.8	21	-	17	36	51	69	82	92	98
Wind Speed 10 m (km/h) Average	720	7.5	5	-	0	2	4	7	10	14	28
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
JUNE 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	25 Jun 2014 09:00	25 Jun 2014 09:00	1	Maintenance on in-situ calibration and response check
NMHC, CH4, THC	25 Jun 2014 08:00	25 Jun 2014 09:00	2	Maintenance on in-situ calibration and response check
PM2.5	18 Jun 2014 13:00	18 Jun 2014 13:00	1	Flow and zero reference checks, sample head cleaning

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 11 ppb on Jun 28 13:00	Maximum Daily Average: 3.1 ppb on Jun 6		Hours of Data:	683
Minimum Value: 0 ppb on Jun 12 03:00	Minimum Daily Average: 0.2 ppb on Jun 11		Hours of Missing Data:	37
Maximum Diurnal Average: 1.3 ppb at hour 13	Minimum Diurnal Average: 0.4 ppb at hour 6		Hours of Calibration:	36
Monthly Average: 0.8 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:	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-Jun	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
2-Jun	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0.4	2
3-Jun	0	0	0	Z	0	0	0	1	1	0	0	1	1	2	1	1	0	3	3	2	0	0	1	1	0.8	3
4-Jun	1	2	3	Z	2	1	1	3	0	0	0	1	2	4	2	3	1	0	0	0	0	0	0	0	1.2	4
5-Jun	1	1	0	Z	0	0	0	0	1	1	0	0	1	2	3	4	4	2	4	6	6	1	1	1	1.6	6
6-Jun	1	1	1	Z	0	0	1	1	4	3	4	6	8	7	5	6	6	6	4	3	1	1	0	0	3.1	8
7-Jun	0	0	0	Z	0	0	1	1	1	1	0	0	1	1	1	1	2	4	5	1	1	1	1	0	1.0	5
8-Jun	0	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
9-Jun	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Jun	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	2	1	0	1	1	0	0	0	0.5	2
11-Jun	0	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-Jun	0	0	0	Z	0	0	0	0	0	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0.5	3
13-Jun	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Jun	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
15-Jun	0	0	0	Z	0	0	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
16-Jun	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
17-Jun	0	0	0	Z	0	0	0	0	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0.5	1
18-Jun	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
19-Jun	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
20-Jun	0	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
21-Jun	0	0	0	Z	0	0	1	1	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0.4	1
22-Jun	0	0	0	Z	2	1	0	0	1	4	4	3	3	3	4	7	3	1	2	2	2	1	1	1	2.0	7
23-Jun	0	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
24-Jun	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Jun	0	0	0	Z	0	0	1	1	M	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
26-Jun	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Jun	0	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
28-Jun	0	0	0	Z	0	0	0	0	0	1	2	2	11	9	9	7	4	6	7	4	1	1	1	1	2.9	11
29-Jun	0	0	1	Z	1	1	1	1	5	2	1	1	1	1	0	1	1	2	3	3	1	1	1	2	1.3	5
30-Jun	3	3	2	Z	1	1	2	4	4	7	7	3	2	2	1	2	3	1	1	1	0	0	0	1	2.2	7

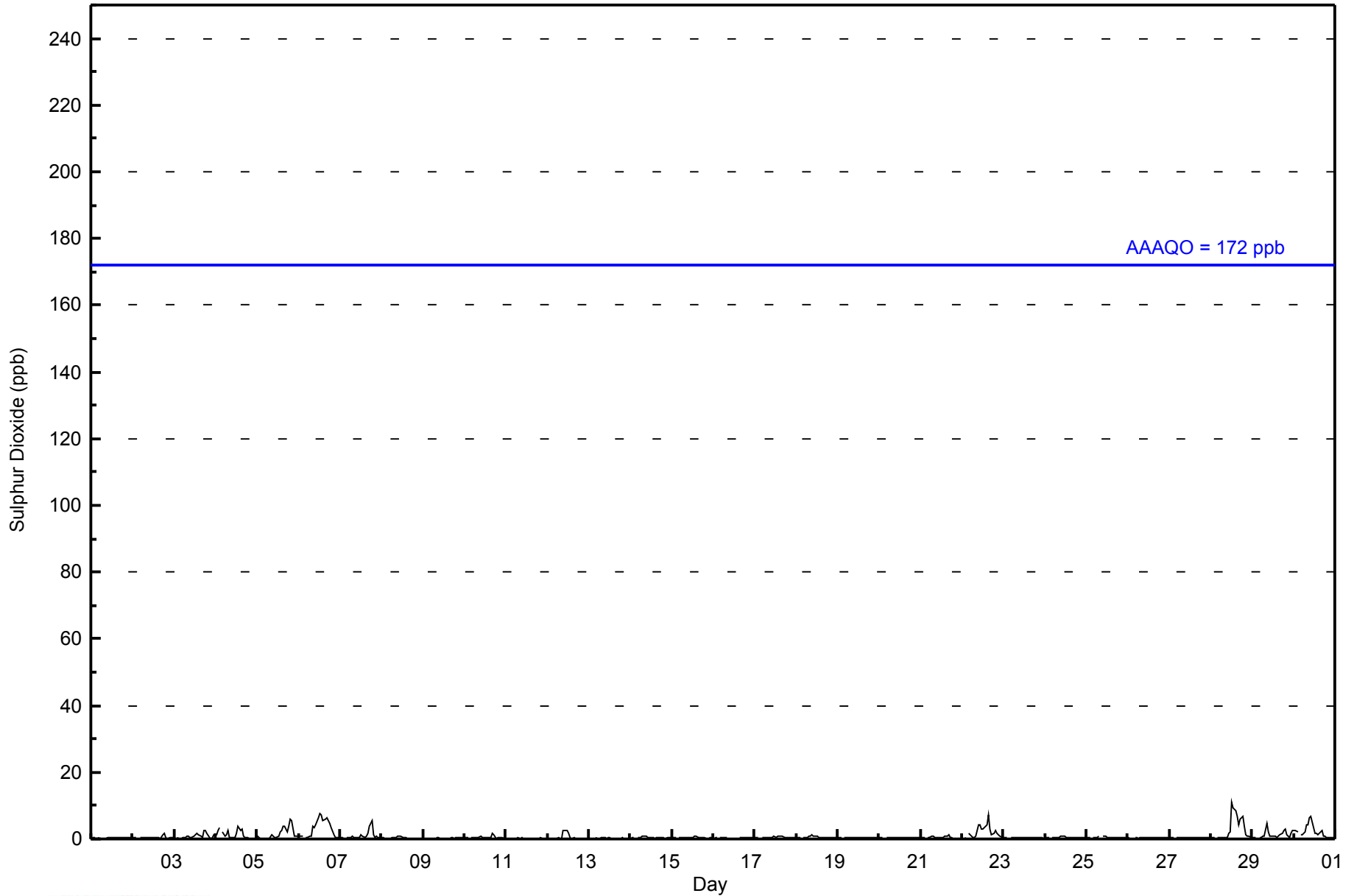
0.4	0.5	0.5	--	0.4	0.4	0.4	0.6	0.9	1.1	1.1	1.0	1.3	1.3	1.2	1.3	1.1	1.1	1.2	0.9	0.6	0.4	0.4	0.4	Diurnal Average	
3	3	3	--	2	1	2	4	5	7	7	6	11	9	9	7	6	6	7	6	6	1	1	2	Diurnal Maximum	

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
Athabasca Valley - June 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	682	99.85	99.85
11 - 20	1	0.15	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - June 2014

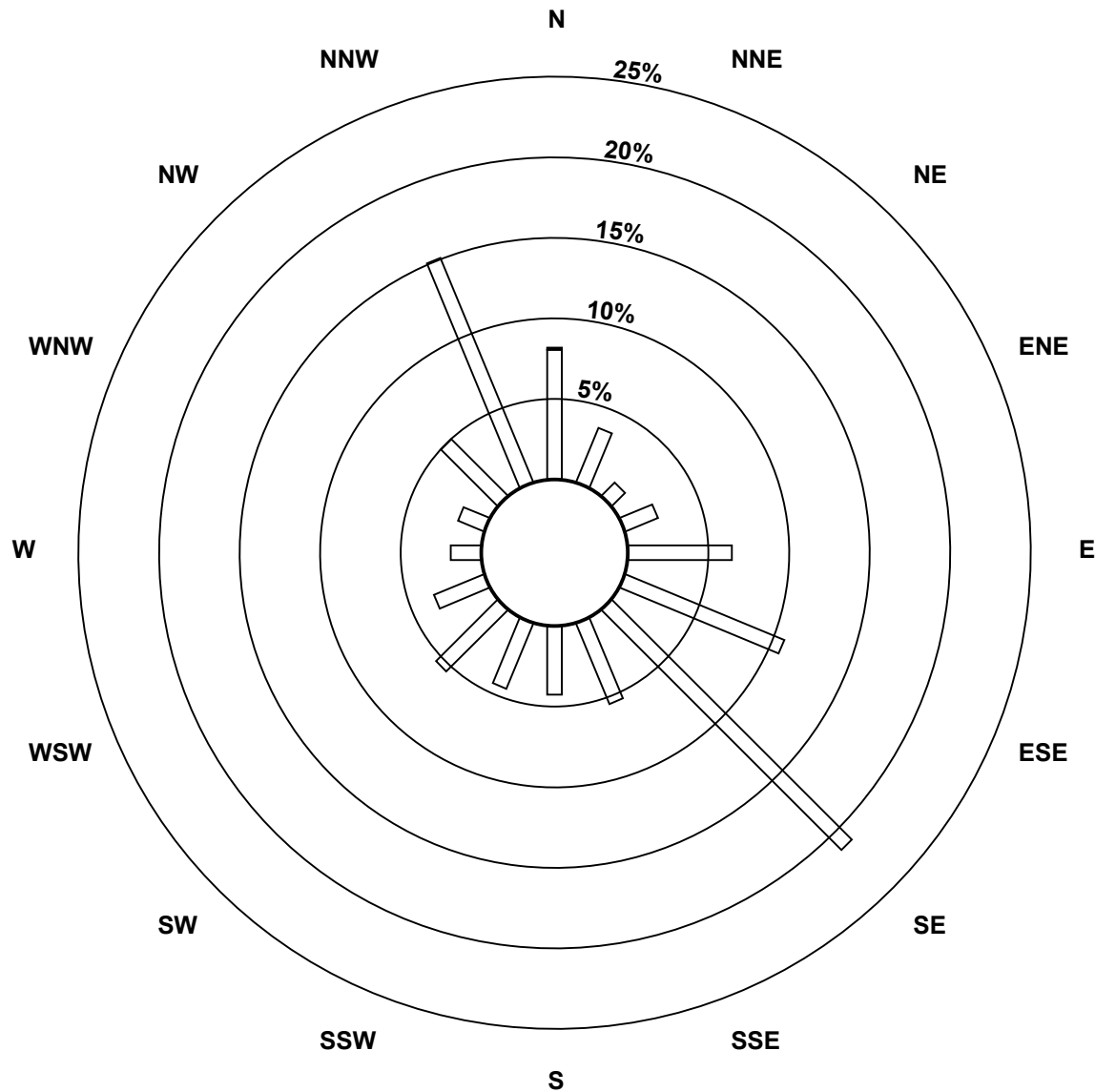
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	55	25	8	15	44	73	144	37	29	30	37	23	13	12	34	103	682
11 - 20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	25	8	15	44	73	144	37	29	30	37	23	13	12	34	103	683

Total Number of Valid Hours: 683

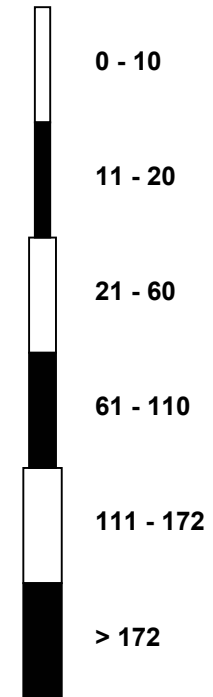
Total Number of Hours: 720

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

**Sulphur Dioxide (SO₂) - ppb
Athabasca Valley (AMS 7)**



Classes (ppb)

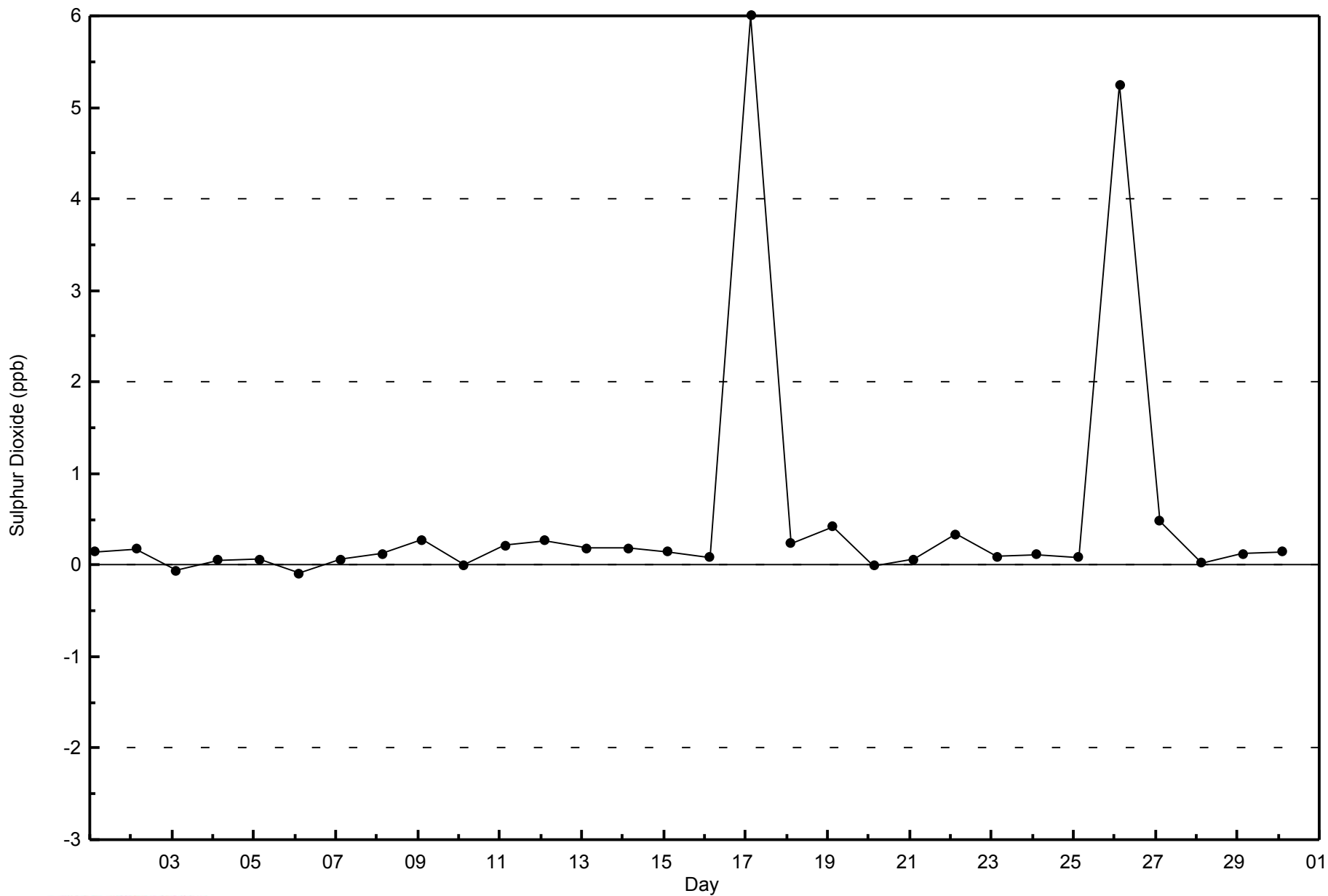


Total Number of Valid Hours: 683



WBEA
Zero Responses

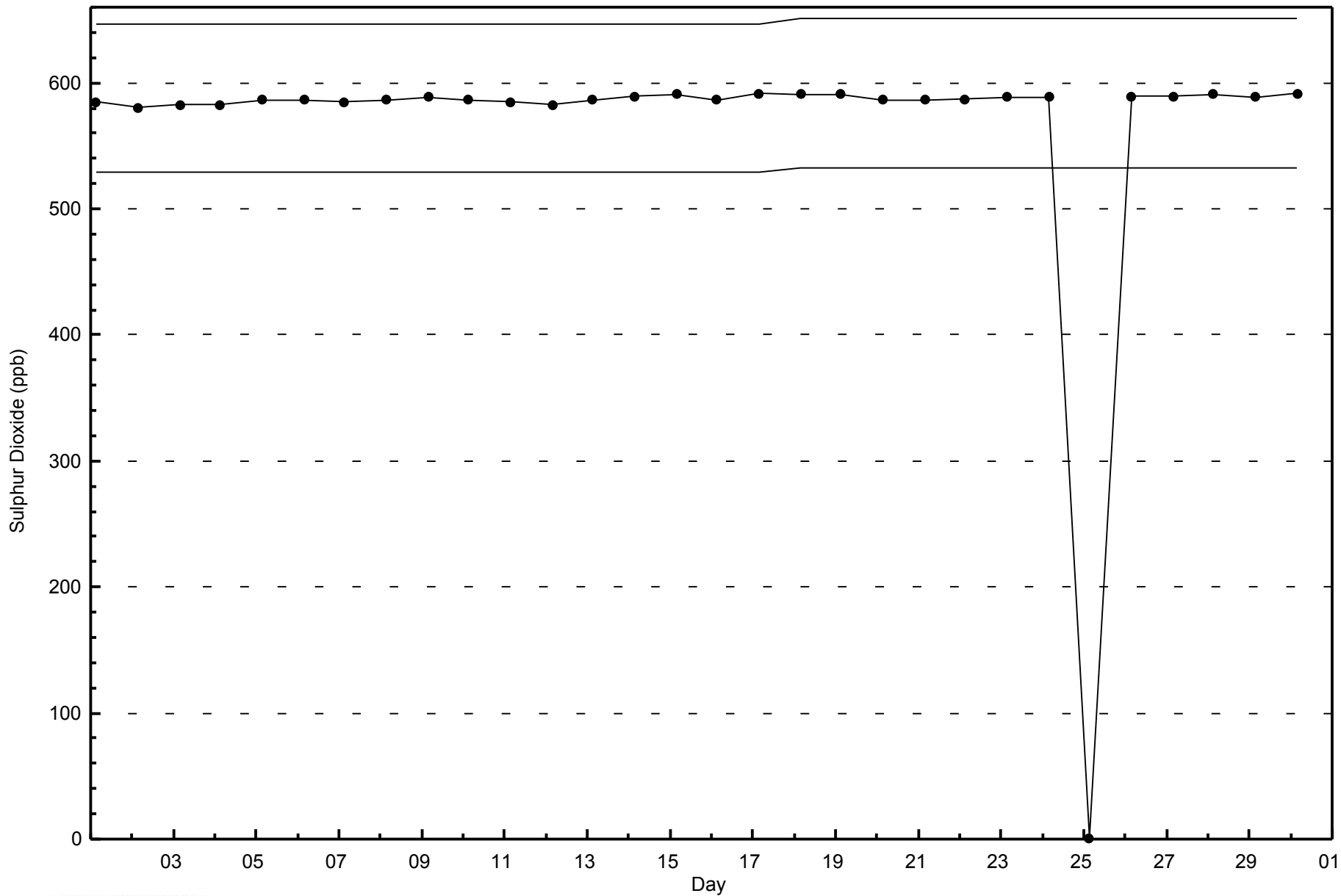
Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - June 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - June 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 3 ppb on Jun 30 22:00	Maximum Daily Average: 1.1 ppb on Jun 30		Hours of Data:	682
Minimum Value: 0 ppb on Jun 21 19:00	Minimum Daily Average: 0.1 ppb on Jun 9		Hours of Missing Data:	38
Maximum Diurnal Average: 0.5 ppb at hour 8	Minimum Diurnal Average: 0.3 ppb at hour 16		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 = 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-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1	
2-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Jun	0	0	0	3	Z	1	1	1	1	1	0	0	0	1	0	0	0	1	0	0	1	1	1	1	0.7	3	
4-Jun	0	1	0	0	Z	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1	
5-Jun	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.4	1	
6-Jun	0	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
7-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
8-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
9-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
10-Jun	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
11-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
12-Jun	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1	
13-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
14-Jun	0	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	
15-Jun	0	0	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
16-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
17-Jun	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0	
18-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
19-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
20-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
21-Jun	0	1	1	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
22-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
23-Jun	1	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	1	1	1	1	1	1	1	0.5	1	
24-Jun	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0.5	1	
25-Jun	1	1	1	1	Z	1	0	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.5	1	
26-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	0.5	1	
27-Jun	1	1	1	1	Z	1	1	1	1	1	1	1	0	0	1	0	0	1	1	0	0	1	0	1	0.5	1	
28-Jun	1	0	0	0	Z	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
29-Jun	1	1	1	1	Z	1	2	2	1	1	0	0	0	0	0	0	0	0	0	1	2	1	1	2	0.9	2	
30-Jun	2	2	1	1	Z	1	1	1	1	1	1	1	1	0	1	1	1	1	0	3	1	3	1	1	1.1	3	

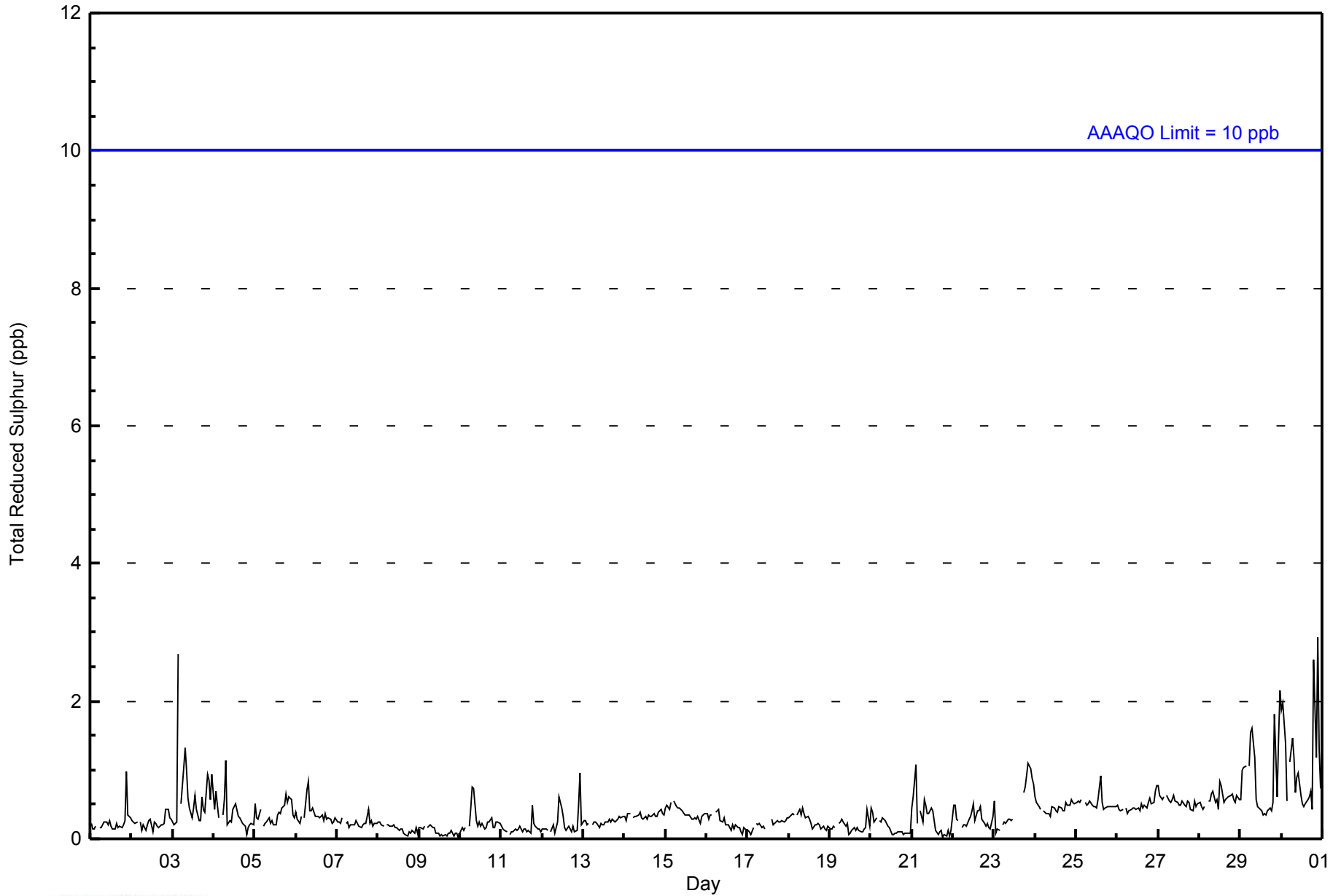
0.4	0.4	0.4	0.4	--	0.4	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.4	0.4	Diurnal Average	
2	2	1	3	--	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	3	2	3	1	2	Diurnal Maximum	

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
Athabasca Valley - June 2014





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	679	99.56	99.56
3 - 4	3	0.44	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - June 2014

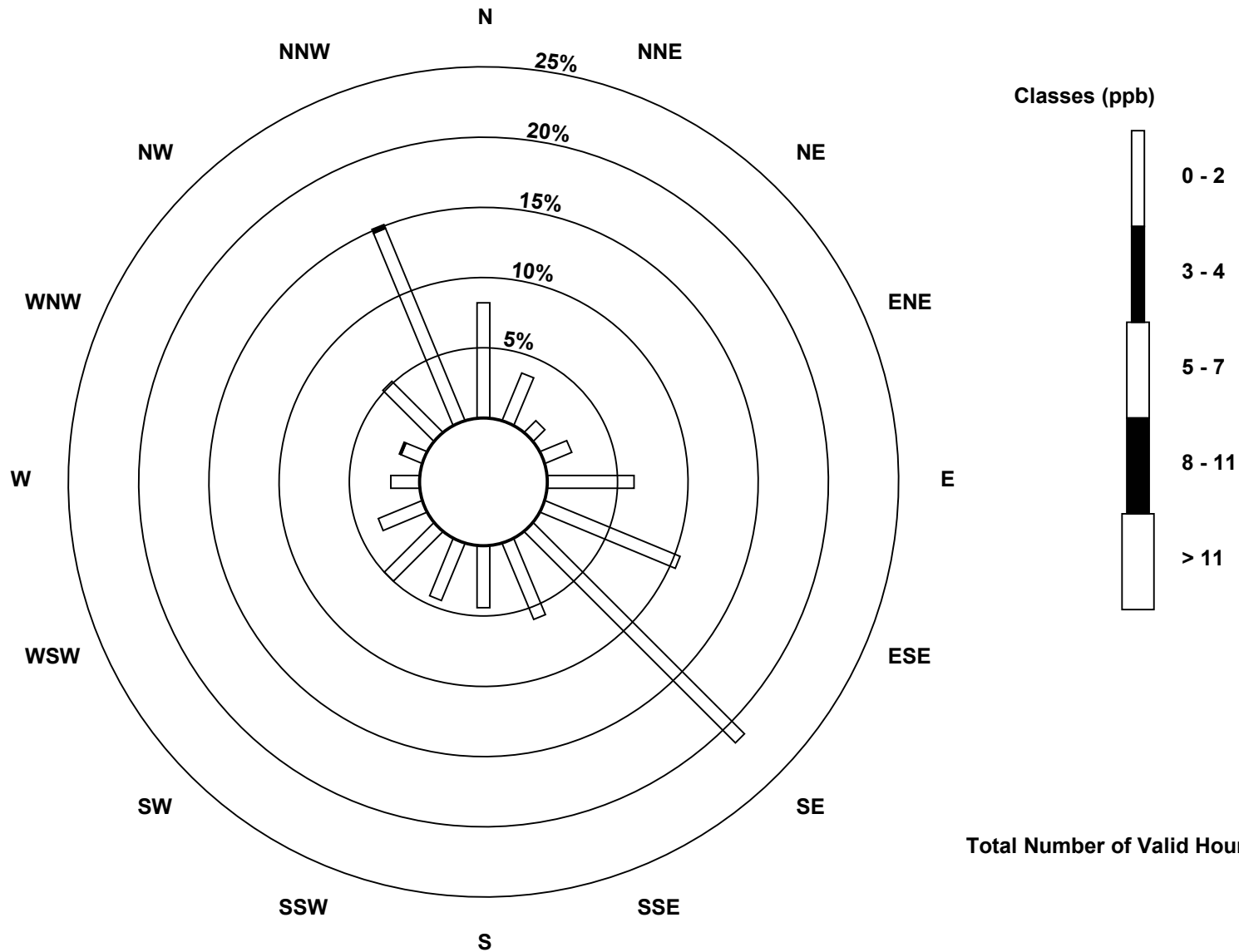
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	56	25	8	14	42	71	145	40	30	30	34	23	14	11	35	101	679
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	3
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	25	8	14	42	71	145	40	30	30	34	23	14	12	35	103	682

Total Number of Valid Hours: 682

Total Number of Hours: 720

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

**Total Reduced Sulphur (TRS) - ppb
Athabasca Valley (AMS 7)**

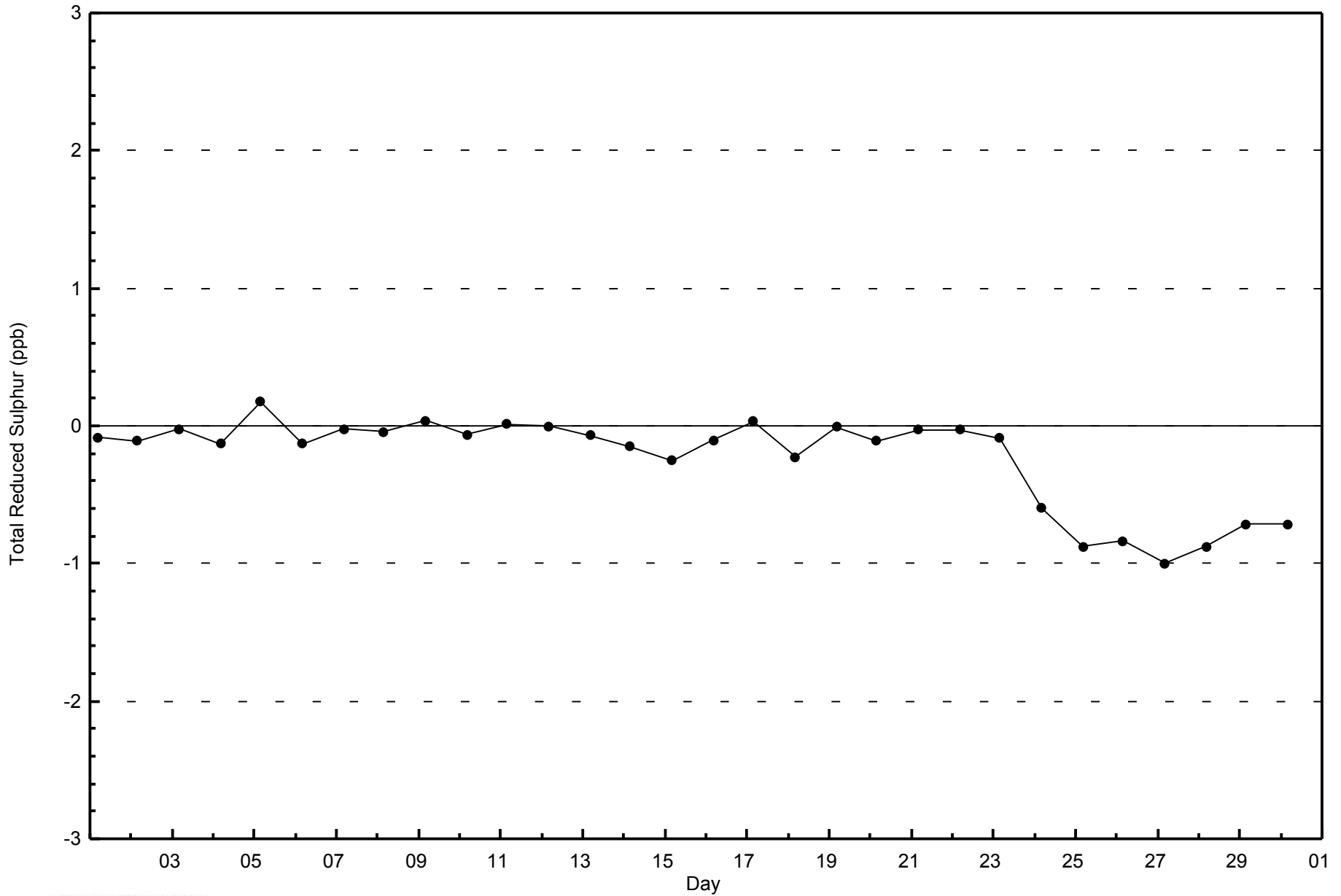


Total Number of Valid Hours: 682



WBEA
Zero Responses

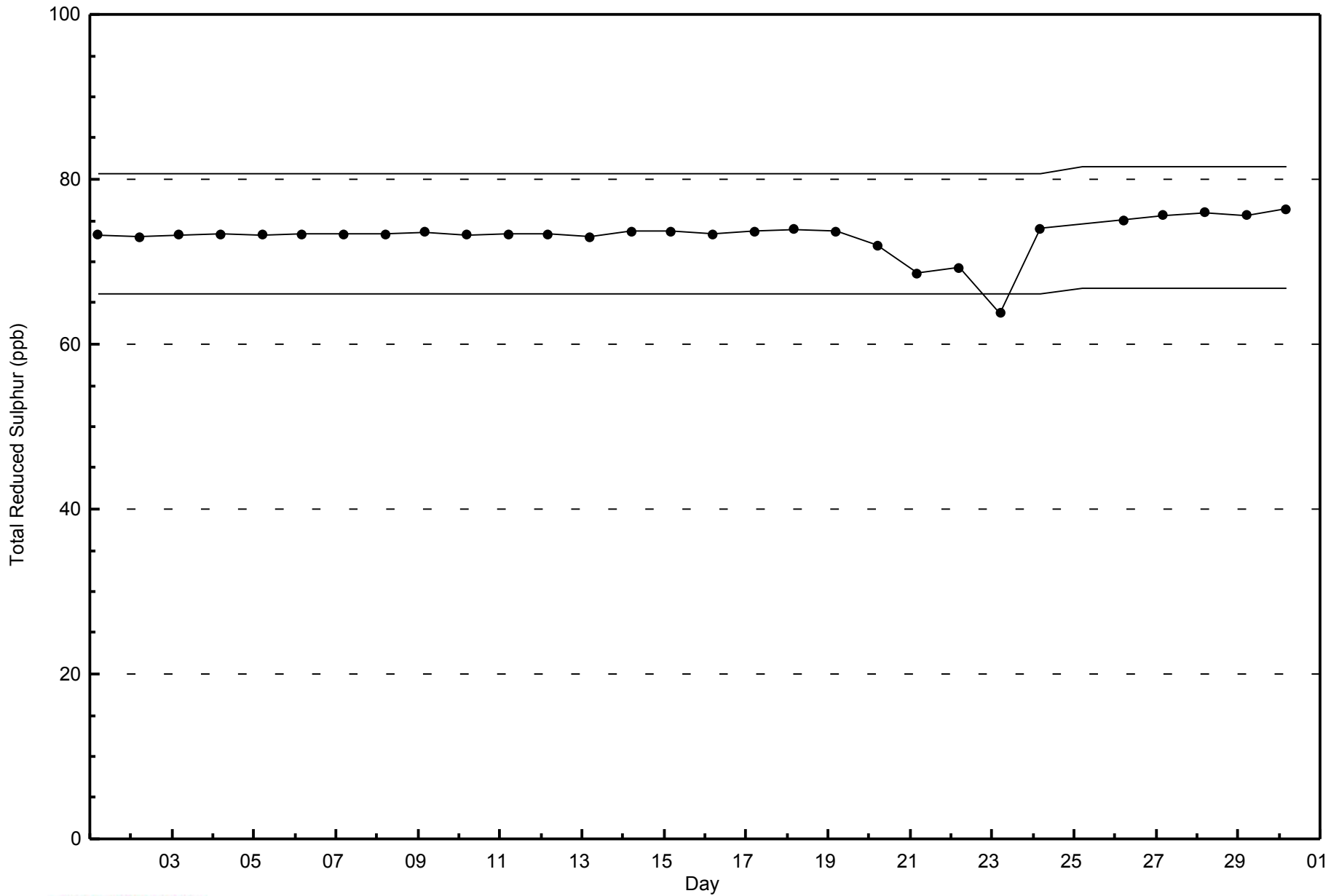
Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - June 2014





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - June 2014





Summary of Hour Averages

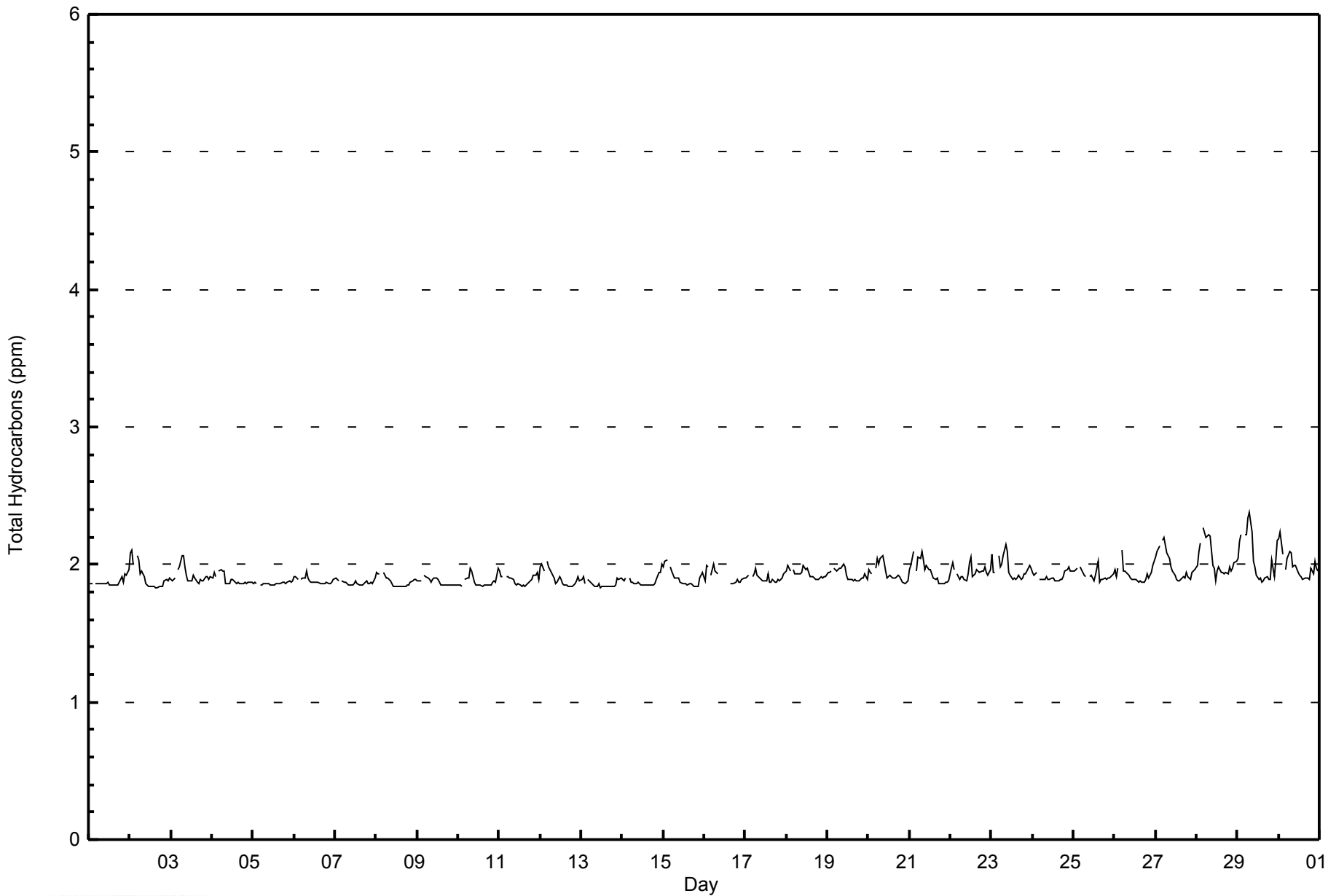
Athabasca Valley - June 2014

Maximum Value: 2.4 ppm on Jun 29 08:00		Maximum Daily Average: 2.0 ppm on Jun 29		Hours in Service: 720																							
Minimum Value: 1.8 ppm on Jun 2 17:00		Minimum Daily Average: 1.9 ppm on Jun 13		Hours of Data: 683																							
Maximum Diurnal Average: 2.0 ppm at hour 5		Minimum Diurnal Average: 1.9 ppm at hour 16		Hours of Missing Data: 37																							
Monthly Average: 1.92 ppm		Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 1.9 P ₉₀ = 2.0 P ₉₉ = 2.2		Hours of Calibration: 36																							
				Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jun	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	1.8	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	
2-Jun	2.1	2.1	2.0	Z	2.1	2.0	1.9	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.1
3-Jun	1.9	1.9	1.9	Z	2.0	2.0	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	
4-Jun	1.9	1.9	1.9	Z	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
5-Jun	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
6-Jun	1.9	1.9	1.9	Z	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
7-Jun	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	
8-Jun	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	
9-Jun	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	
10-Jun	1.9	1.8	1.8	Z	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	2.0	1.9	2.0	
11-Jun	2.0	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
12-Jun	2.0	2.0	1.9	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	
13-Jun	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	
14-Jun	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	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	1.9	2.0	
15-Jun	2.0	2.0	2.0	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	
16-Jun	1.9	2.0	2.0	Z	1.9	2.0	2.0	1.9	1.9	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
17-Jun	1.9	1.9	1.9	Z	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
18-Jun	1.9	2.0	2.0	Z	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
19-Jun	1.9	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	1.9	1.9	1.9	2.0	
20-Jun	2.0	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	
21-Jun	2.0	2.0	2.1	Z	2.0	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	1.9	1.9	1.9	1.9	2.1	
22-Jun	2.0	2.0	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	1.9	1.9	2.0	2.0	1.9	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.1	
23-Jun	2.1	1.9	1.9	Z	2.1	2.0	2.0	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	
24-Jun	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	1.9	2.0	2.0	
25-Jun	1.9	2.0	2.0	Z	2.0	1.9	1.9	1.9	M	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	2.0	
26-Jun	2.0	1.9	2.0	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	2.0	2.0	1.9	2.1	
27-Jun	2.1	2.1	2.1	Z	2.2	2.2	2.1	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	2.2	
28-Jun	2.0	2.1	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.0	2.0	1.9	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	2.3	
29-Jun	2.0	2.2	2.2	Z	2.2	2.2	2.3	2.4	2.2	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	2.2	2.0	2.4	
30-Jun	2.2	2.2	2.1	Z	2.0	2.0	2.1	2.1	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	2.0	2.0	2.0	2.0	2.2	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan		C - Calibration						M - Maintenance																			



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Athabasca Valley - June 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Athabasca Valley - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	640	93.70	93.70
2.1 - 3.0	43	6.30	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 - June 2014

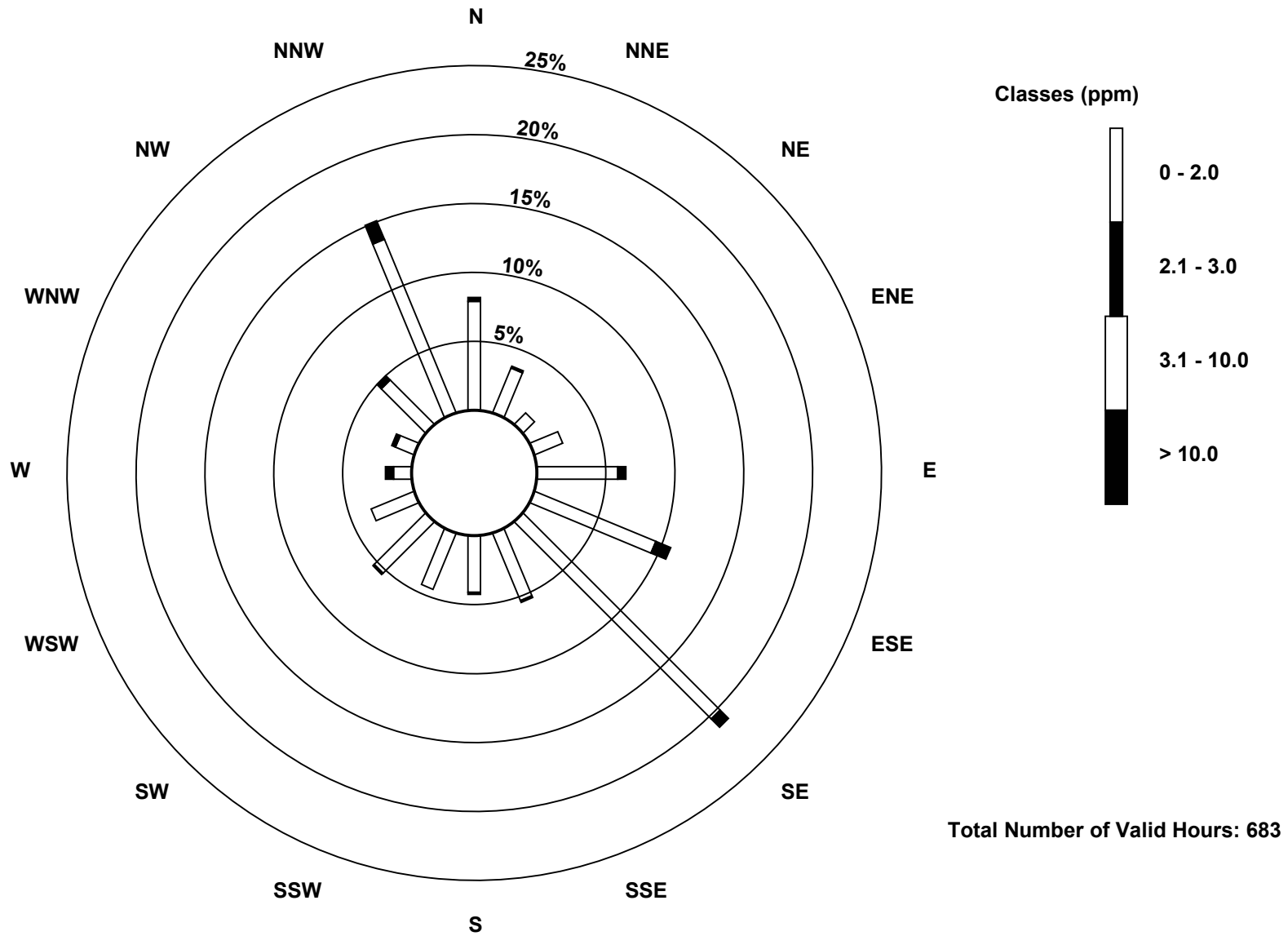
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	54	24	8	15	40	65	138	36	28	30	36	23	9	10	31	93	640
2.1 - 3.0	2	1	0	0	4	8	6	1	1	0	1	0	4	2	3	10	43
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	25	8	15	44	73	144	37	29	30	37	23	13	12	34	103	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

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

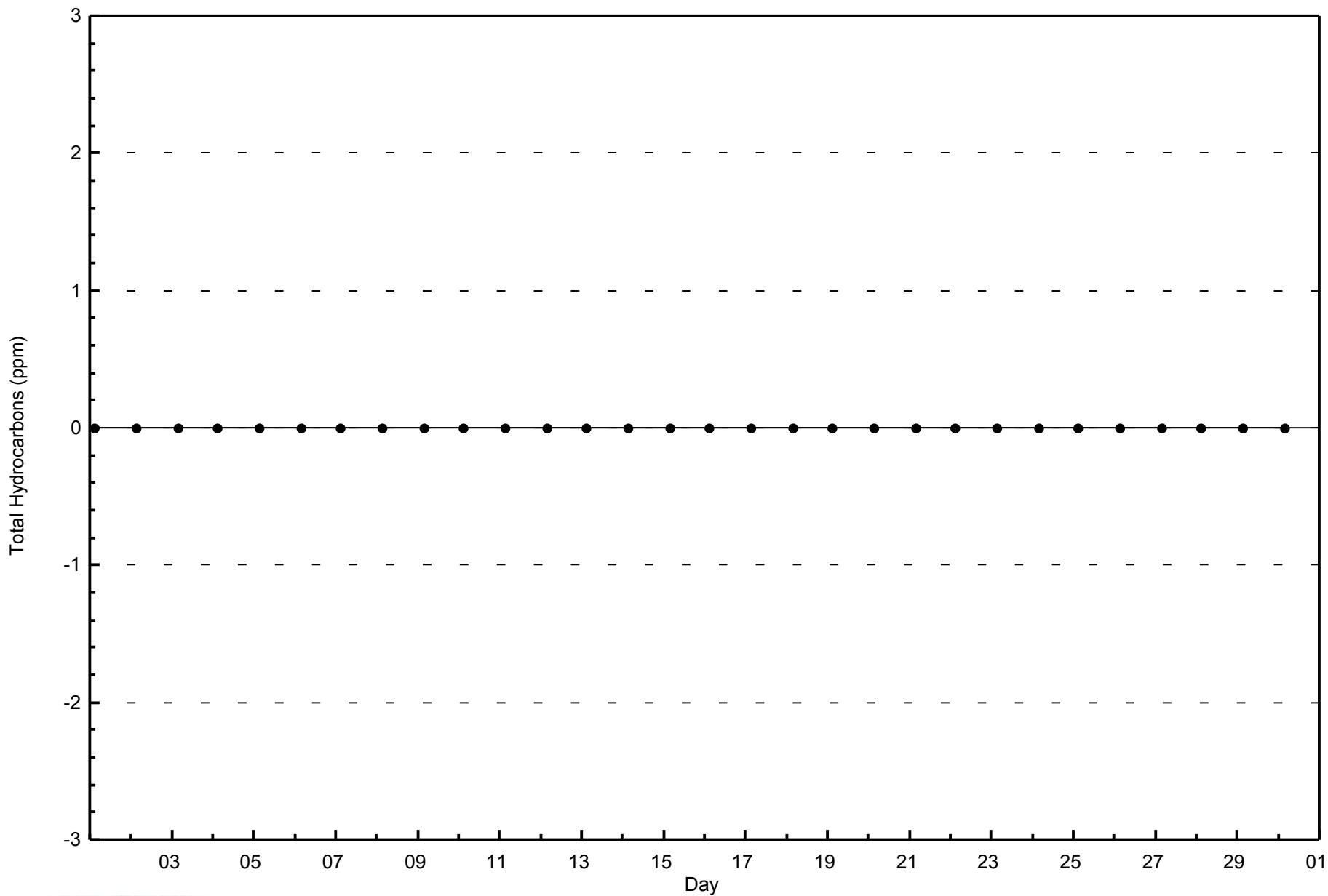
**Total Hydrocarbons (THC) - ppm
Athabasca Valley (AMS 7)**





WBEA
Zero Responses

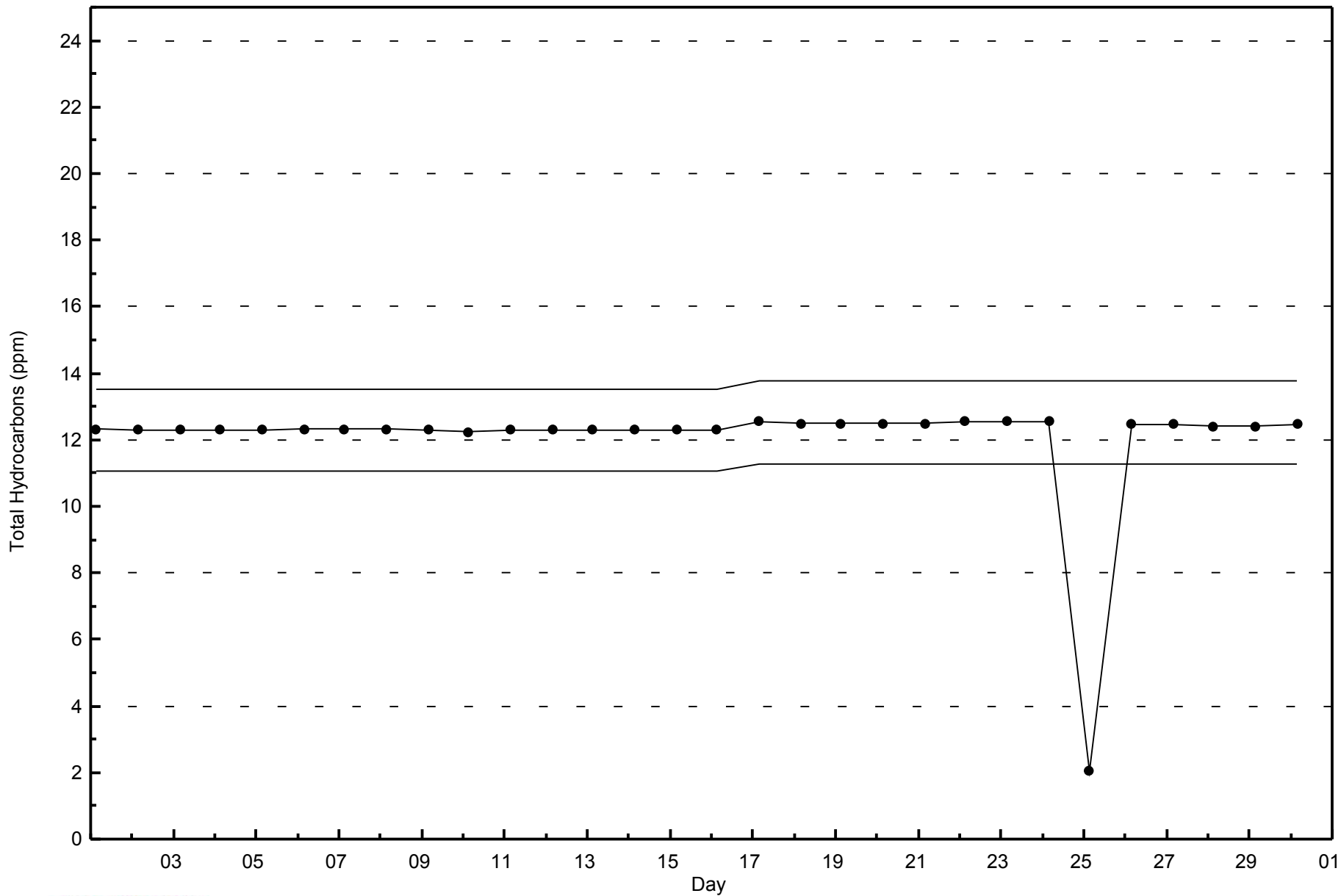
Total Hydrocarbons (THC) - ppm
Athabasca Valley - June 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Athabasca Valley - June 2014





Maximum Value: 0.131 ppm on Jun 29 08:00	Maximum Daily Average: 0.040 ppm on Jun 29	Hours in Service: 720
Minimum Value: 0.000 ppm on Jun 1 01:00	Minimum Daily Average: 0.000 ppm on Jun 5	Hours of Data: 683
Maximum Diurnal Average: 0.020 ppm at hour 9	Minimum Diurnal Average: 0.005 ppm at hour 16	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: 36
		Percent Operational Time: 99.9

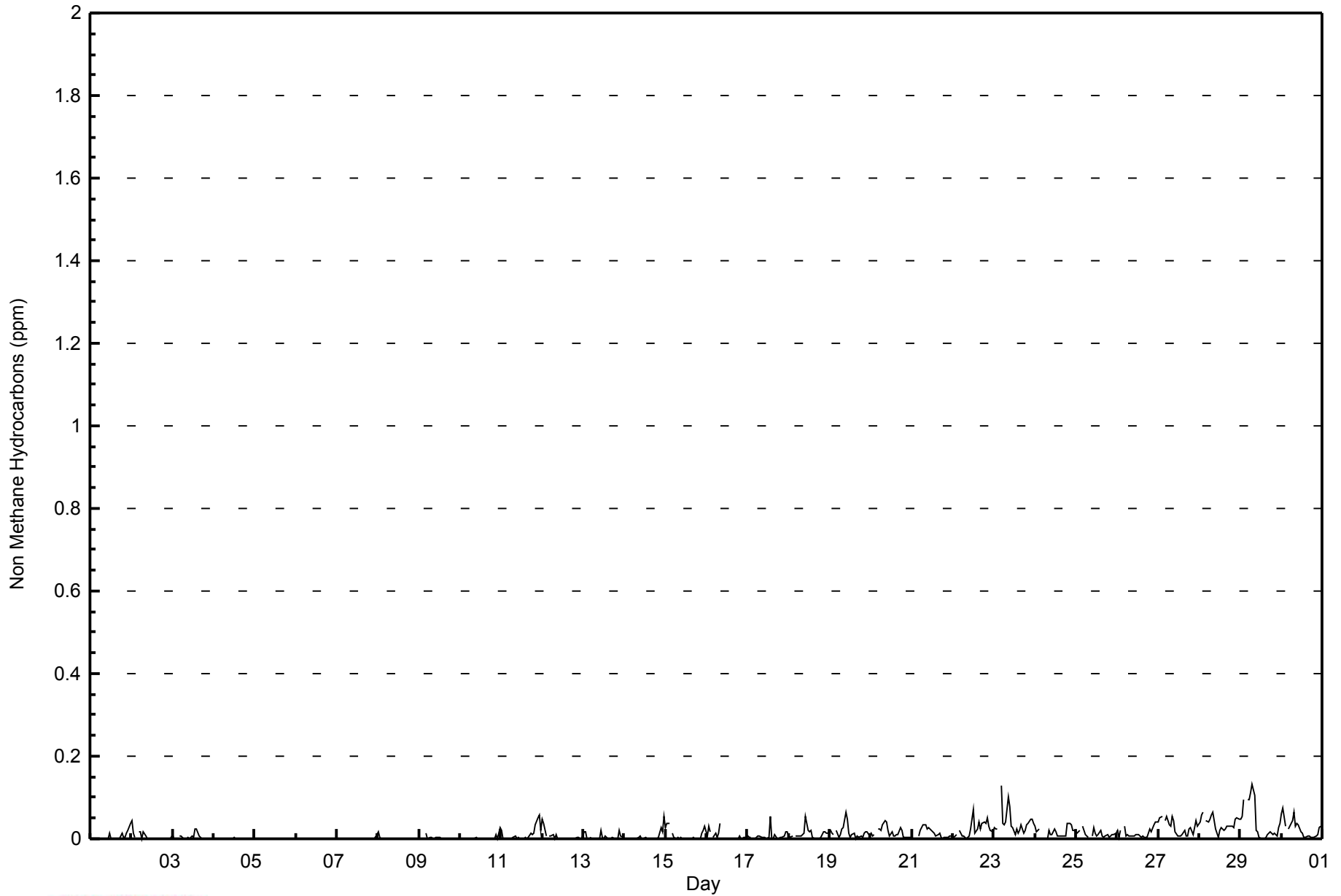
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jun	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.001	0.002	0.000	0.000	0.013	0.004	0.002	0.015	0.021	0.036	0.005	0.036																							
2-Jun	0.043	0.012	0.005	Z	0.016	0.016	0.001	0.017	0.007	0.000	0.002	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.005	0.005	0.043																							
3-Jun	0.010	0.001	0.000	Z	0.007	0.006	0.000	0.001	0.001	0.002	0.001	0.005	0.004	0.024	0.023	0.007	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.024																							
4-Jun	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002																							
5-Jun	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																							
6-Jun	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																							
7-Jun	0.001	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009																							
8-Jun	0.019	0.005	0.001	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.019																							
9-Jun	0.000	0.000	0.000	Z	0.014	0.001	0.002	0.002	0.000	0.001	0.003	0.003	0.003	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.014																							
10-Jun	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.001	0.026	0.002	0.026																							
11-Jun	0.019	0.001	0.001	Z	0.000	0.000	0.001	0.002	0.008	0.000	0.002	0.001	0.001	0.001	0.003	0.001	0.002	0.013	0.012	0.014	0.034	0.051	0.058	0.020	0.011	0.058																							
12-Jun	0.048	0.039	0.006	Z	0.008	0.008	0.009	0.001	0.009	0.002	0.000	0.000	0.001	0.001	0.000	0.000	0.001	0.001	0.000	0.000	0.004	0.002	0.000	0.000	0.006	0.048																							
13-Jun	0.017	0.016	0.002	Z	0.005	0.000	0.000	0.000	0.000	0.000	0.021	0.002	0.002	0.005	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.021	0.006	0.003	0.004	0.021																							
14-Jun	0.001	0.000	0.000	Z	0.000	0.000	0.001	0.000	0.002	0.006	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.028	0.017	0.053	0.005	0.053																							
15-Jun	0.026	0.038	0.038	Z	0.014	0.003	0.000	0.003	0.001	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.014	0.022	0.032	0.009	0.038																							
16-Jun	0.007	0.031	0.018	Z	0.002	0.012	0.003	0.014	0.037	C	C	C	C	C	C	0.000	0.000	0.000	0.000	0.007	0.000	0.001	0.002	0.004	--	0.037																							
17-Jun	0.006	0.004	0.004	Z	0.000	0.005	0.006	0.007	0.004	0.002	0.003	0.001	0.002	0.056	0.000	0.000	0.009	0.000	0.000	0.005	0.003	0.006	0.017	0.015	0.007	0.056																							
18-Jun	0.006	0.003	0.007	Z	0.007	0.008	0.006	0.007	0.011	0.014	0.053	0.022	0.017	0.021	0.005	0.001	0.001	0.000	0.001	0.005	0.018	0.016	0.014	0.012	0.011	0.053																							
19-Jun	0.021	0.013	0.011	Z	0.019	0.005	0.011	0.024	0.028	0.065	0.046	0.014	0.005	0.010	0.015	0.001	0.007	0.002	0.007	0.005	0.015	0.018	0.016	0.007	0.016	0.065																							
20-Jun	0.015	0.005	0.012	Z	0.023	0.025	0.020	0.035	0.045	0.040	0.021	0.008	0.016	0.008	0.008	0.009	0.010	0.026	0.019	0.002	0.003	0.003	0.003	0.002	0.016	0.045																							
21-Jun	0.004	0.001	0.002	Z	0.006	0.019	0.034	0.033	0.033	0.023	0.028	0.021	0.018	0.013	0.007	0.009	0.014	0.004	0.001	0.003	0.005	0.003	0.006	0.006	0.013	0.034																							
22-Jun	0.002	0.006	0.011	Z	0.019	0.007	0.008	0.003	0.002	0.007	0.024	0.048	0.071	0.015	0.024	0.040	0.025	0.037	0.041	0.039	0.050	0.031	0.021	0.017	0.024	0.071																							
23-Jun	0.026	0.025	0.024	Z	0.128	0.039	0.035	0.040	0.102	0.077	0.032	0.026	0.011	0.024	0.013	0.019	0.034	0.012	0.019	0.034	0.036	0.046	0.047	0.038	0.038	0.128																							
24-Jun	0.029	0.017	0.025	Z	0.002	0.001	0.000	0.002	0.021	0.010	0.009	0.024	0.017	0.007	0.007	0.006	0.007	0.006	0.008	0.038	0.036	0.035	0.022	0.019	0.015	0.038																							
25-Jun	0.014	0.017	0.020	Z	0.029	0.009	0.005	0.005	M	0.007	0.026	0.014	0.006	0.009	0.019	0.006	0.004	0.006	0.009	0.005	0.008	0.010	0.010	0.014	0.011	0.029																							
26-Jun	0.020	0.004	0.021	Z	0.030	0.007	0.009	0.006	0.005	0.005	0.006	0.009	0.009	0.007	0.004	0.007	0.005	0.002	0.014	0.024	0.019	0.033	0.040	0.039	0.014	0.040																							
27-Jun	0.040	0.050	0.053	Z	0.045	0.055	0.033	0.030	0.056	0.044	0.018	0.008	0.008	0.008	0.011	0.021	0.008	0.008	0.023	0.027	0.011	0.028	0.042	0.032	0.029	0.056																							
28-Jun	0.041	0.059	0.065	Z	0.045	0.041	0.048	0.057	0.064	0.025	0.014	0.003	0.022	0.028	0.019	0.025	0.032	0.032	0.029	0.031	0.029	0.047	0.050	0.047	0.037	0.065																							
29-Jun	0.048	0.056	0.094	Z	0.096	0.094	0.112	0.131	0.103	0.021	0.016	0.004	0.001	0.001	0.000	0.002	0.009	0.016	0.012	0.011	0.015	0.007	0.026	0.037	0.040	0.131																							
30-Jun	0.061	0.074	0.031	Z	0.024	0.031	0.045	0.065	0.030	0.036	0.035	0.018	0.013	0.005	0.003	0.006	0.006	0.005	0.005	0.002	0.007	0.011	0.026	0.030	0.025	0.074																							
																								0.017	0.016	0.015	--	0.018	0.013	0.013	0.016	0.020	0.014	0.012	0.009	0.008	0.008	0.006	0.005	0.006	0.006	0.007	0.009	0.010	0.014	0.016	0.017	Diurnal Average	
																								0.061	0.074	0.094	--	0.128	0.094	0.112	0.131	0.103	0.077	0.053	0.048	0.071	0.056	0.024	0.040	0.034	0.037	0.041	0.039	0.050	0.051	0.058	0.053	Diurnal Maximum	

Z - zerspan C - Calibration M - Maintenance



WBEA
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - June 2014





WBEA
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	371	54.32	54.32
0.006 - 0.05	290	42.46	96.78
0.06 - 0.1	22	3.22	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - June 2014

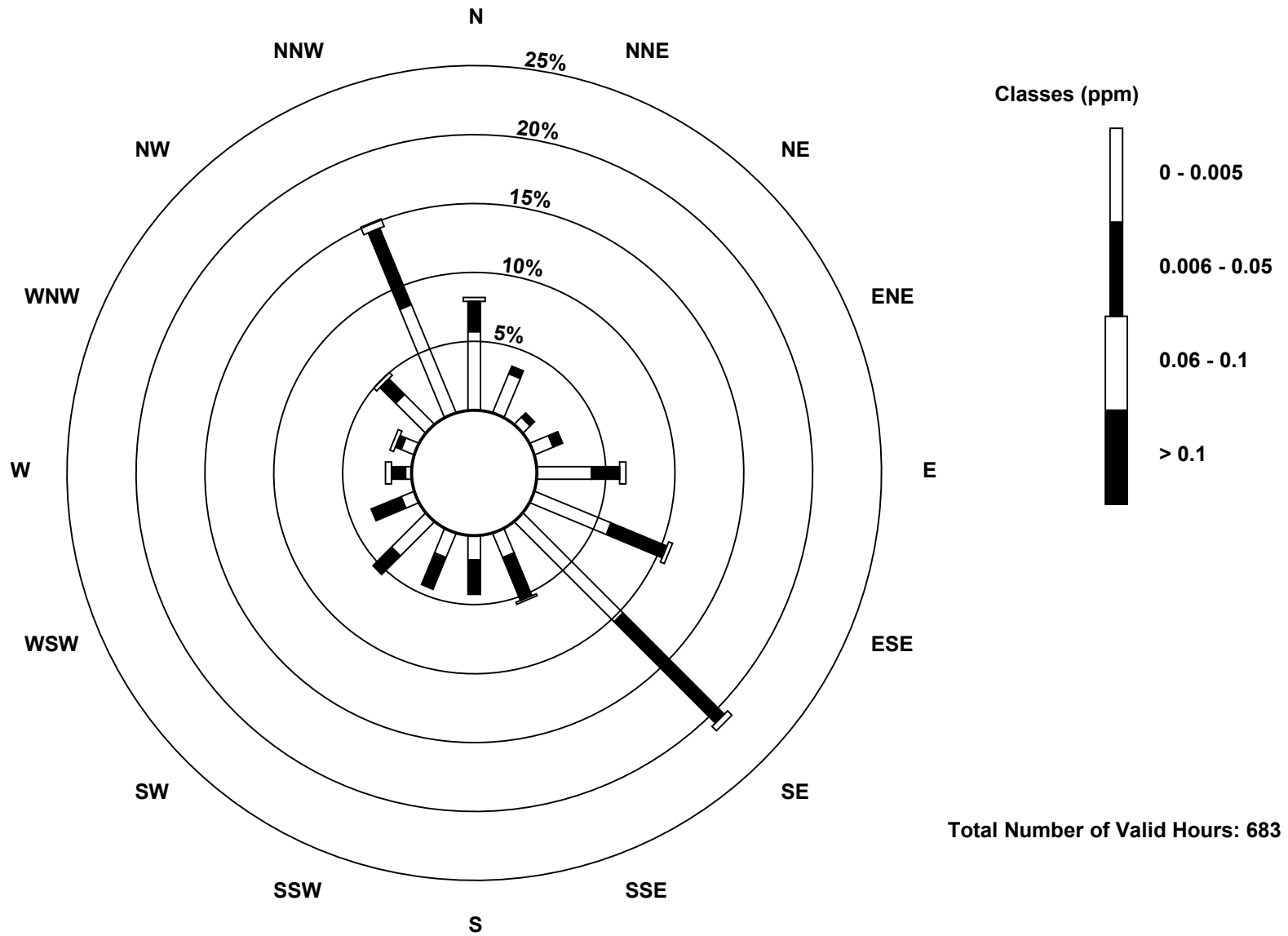
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	39	21	5	10	27	41	70	13	12	13	24	7	3	7	21	58	371
0.006 - 0.05	15	4	3	5	14	30	71	23	17	17	13	16	7	3	11	41	290
0.06 - 0.1	2	0	0	0	3	2	3	1	0	0	0	0	3	2	2	4	22
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	25	8	15	44	73	144	37	29	30	37	23	13	12	34	103	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

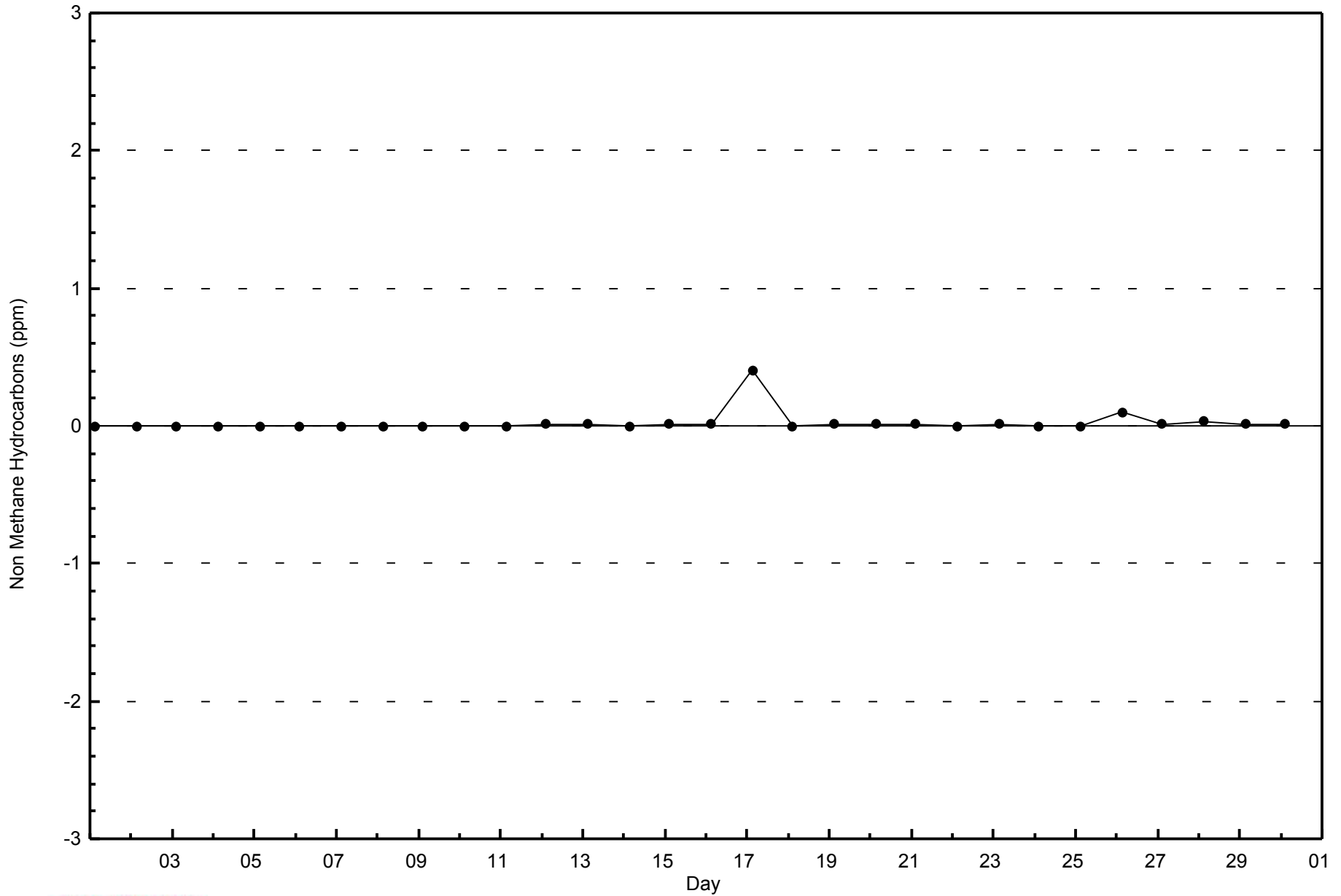
Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley (AMS 7)





WBEA
Zero Responses

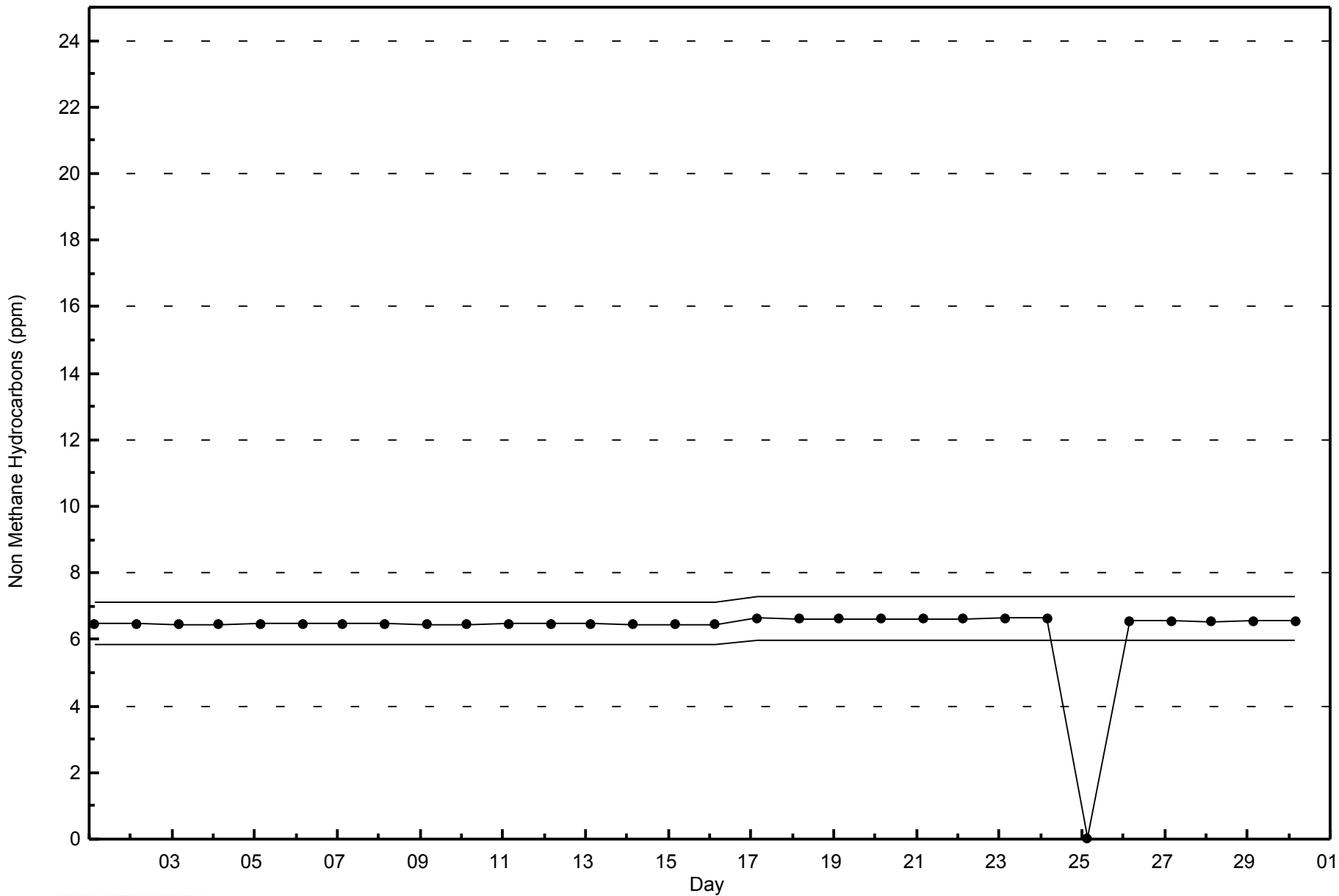
Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - June 2014





WBEA
Span Responses

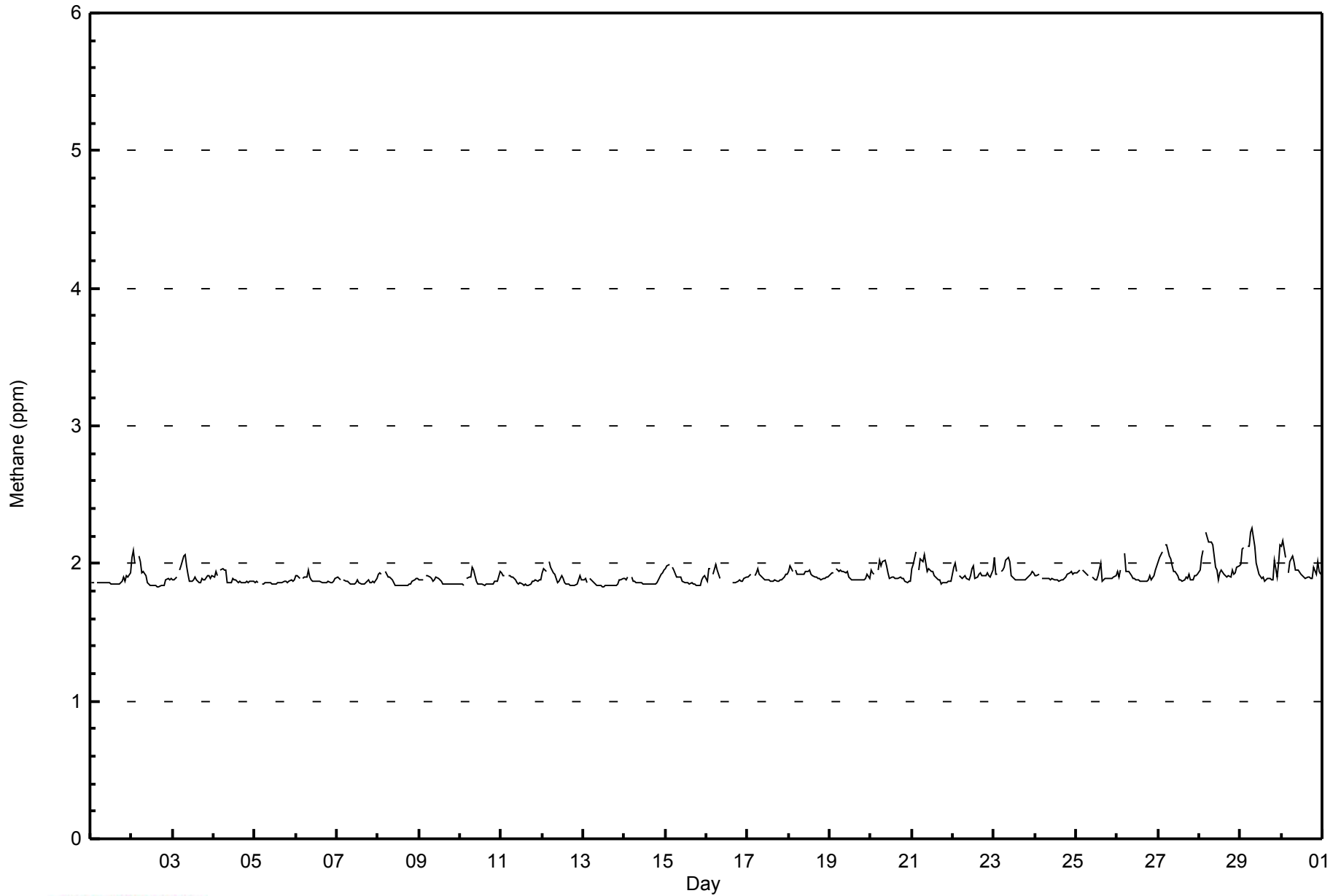
Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - June 2014





WBEA
Hourly Averages

Methane (CH₄) - ppm
Athabasca Valley - June 2014





WBEA
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Athabasca Valley - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	655	95.90	95.90
2.1 - 3.0	28	4.10	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 - June 2014

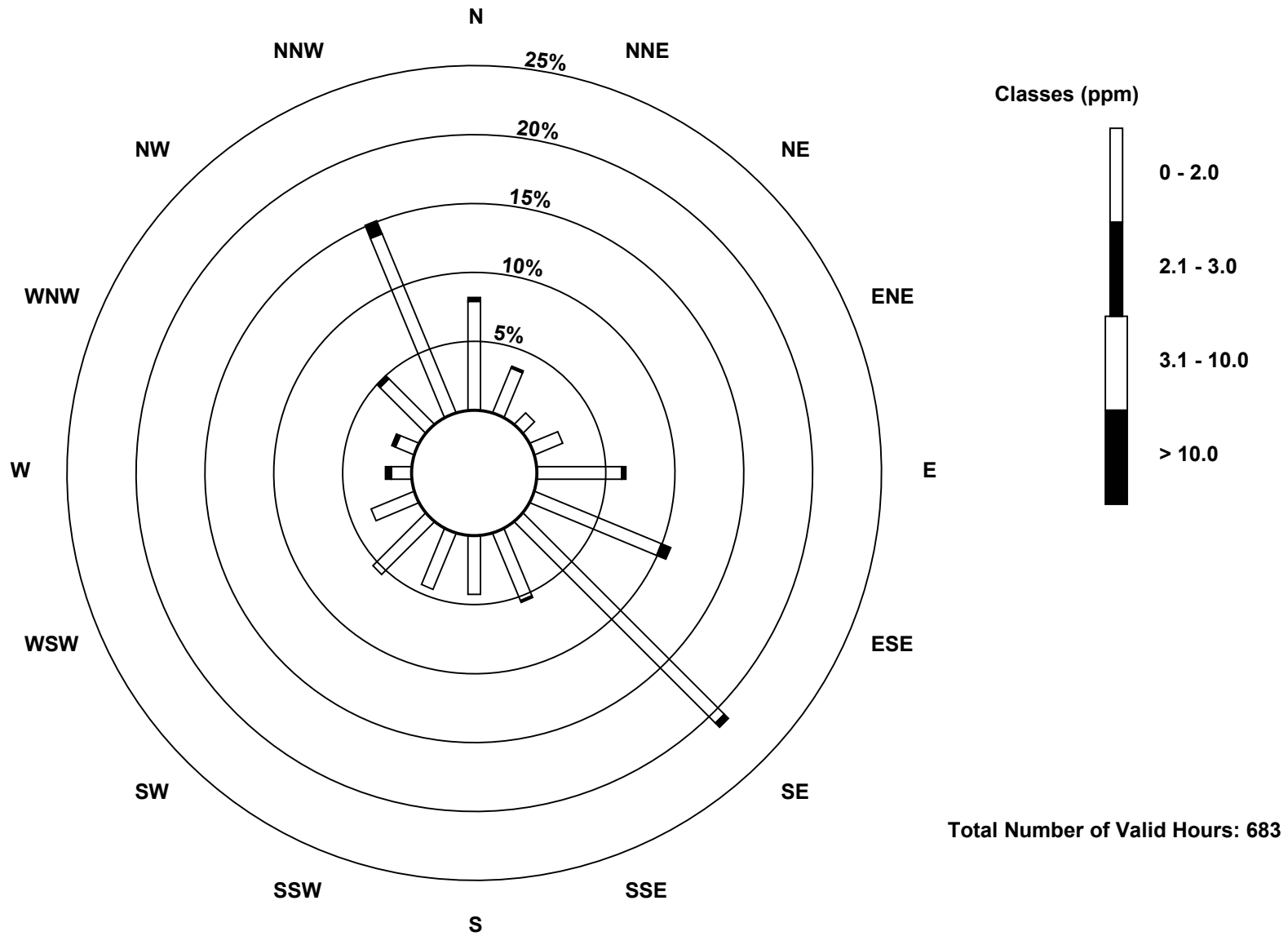
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	54	24	8	15	42	68	141	36	29	30	37	23	10	10	32	96	655
2.1 - 3.0	2	1	0	0	2	5	3	1	0	0	0	0	3	2	2	7	28
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	25	8	15	44	73	144	37	29	30	37	23	13	12	34	103	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

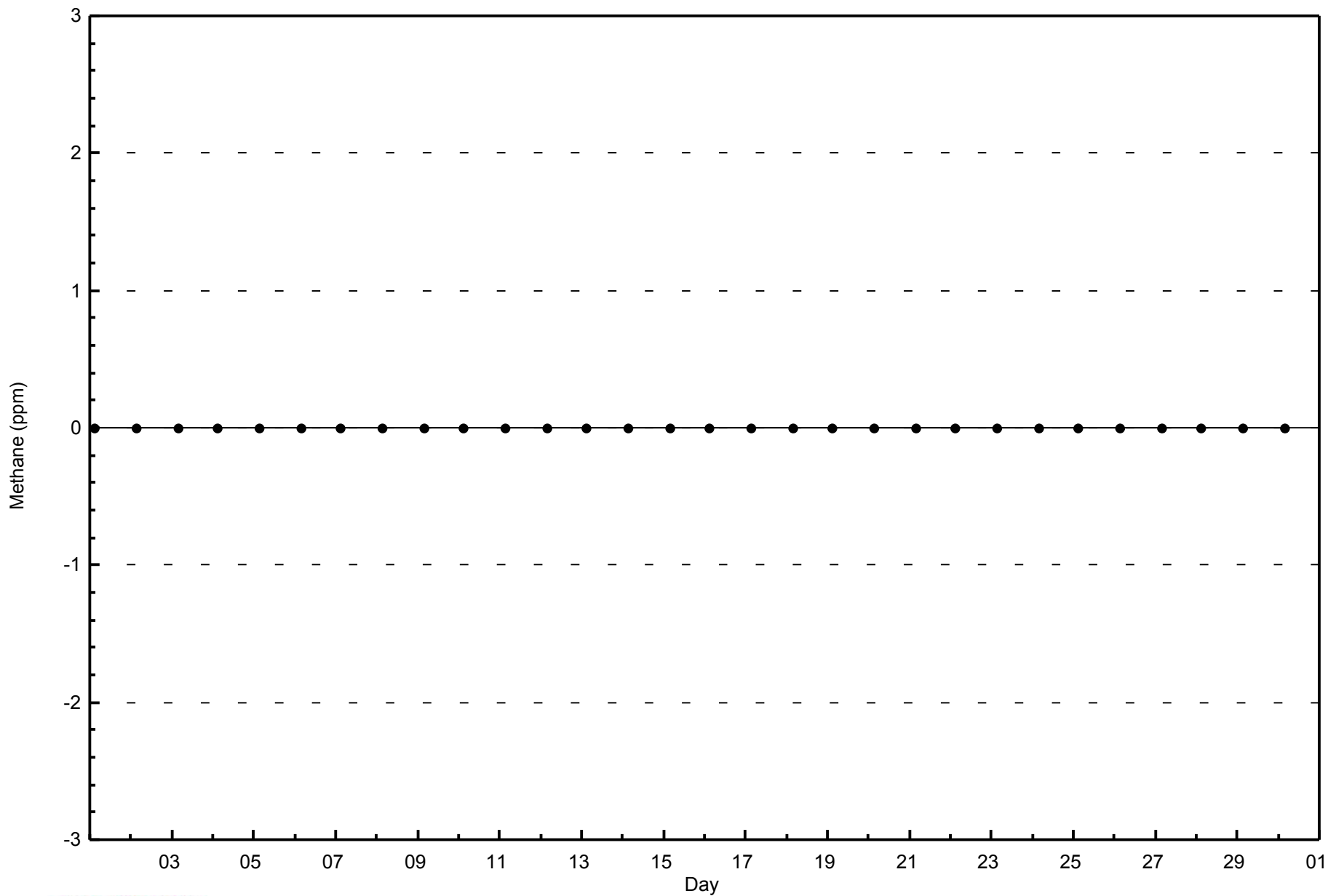
Methane (CH₄) - ppm
Athabasca Valley (AMS 7)





WBEA
Zero Responses

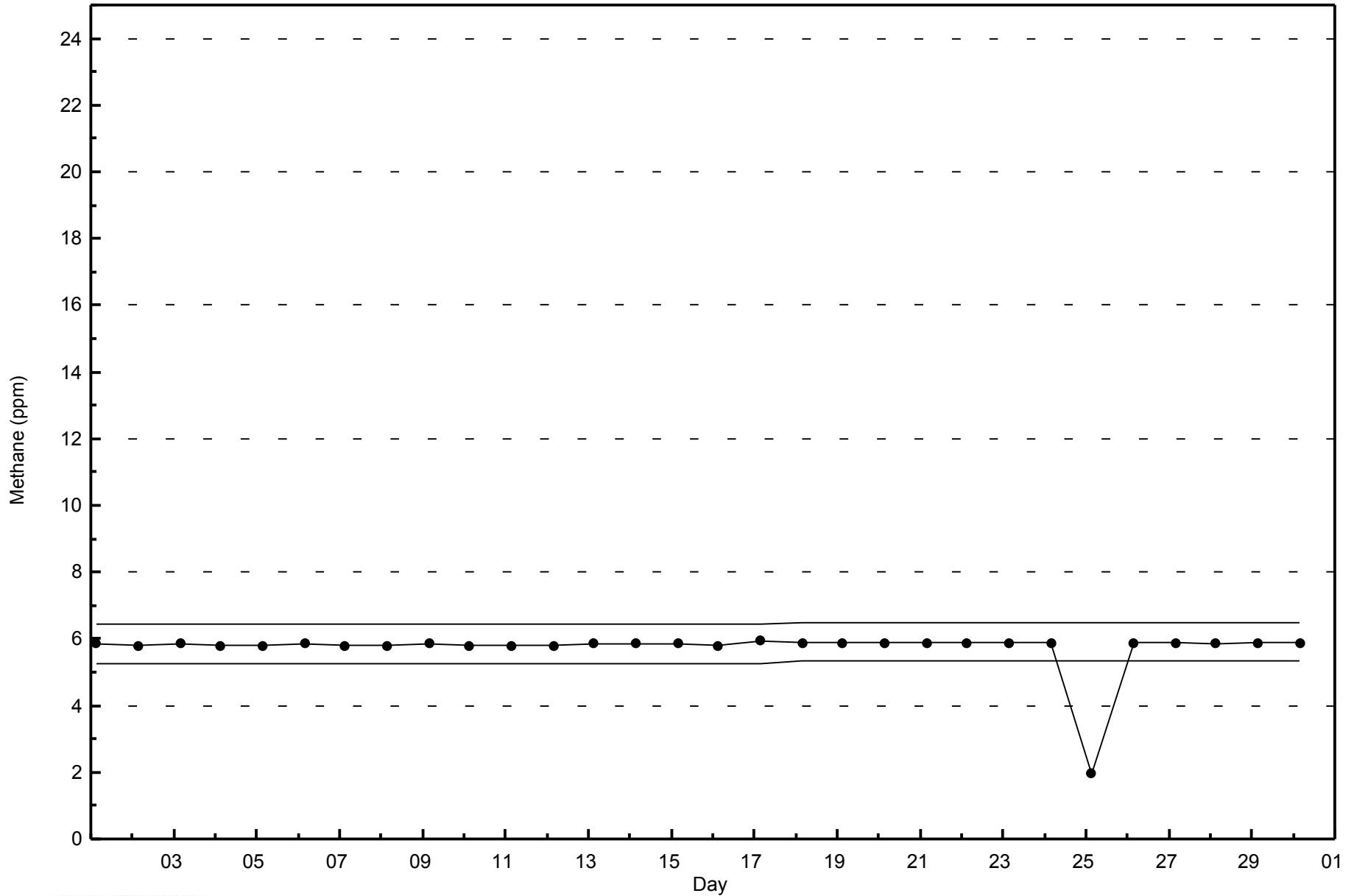
Methane (CH₄) - ppm
Athabasca Valley - June 2014





WBEA
Span Responses

Methane (CH₄) - ppm
Athabasca Valley - June 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 62 ppb on Jun 28 14:00	Maximum Daily Average: 32.4 ppb on Jun 14		Hours of Data:	686
Minimum Value: 0 ppb on Jun 23 05:00	Minimum Daily Average: 11.5 ppb on Jun 23		Hours of Missing Data:	34
Maximum Diurnal Average: 34.8 ppb at hour 16	Minimum Diurnal Average: 11.4 ppb at hour 5		Hours of Calibration:	34
Monthly Average: 23.7 ppb	Percentiles: P ₁ = 2 P ₁₀ = 8 Q ₁ = 15 Median = 24 Q ₃ = 32 P ₉₀ = 39 P ₉₉ = 47		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	36	34	31	Z	29	27	28	28	27	25	29	32	34	36	37	36	43	39	30	29	32	21	13	8	29.7	43
2-Jun	3	9	10	Z	2	4	9	9	16	23	27	36	35	40	45	45	45	43	40	39	36	23	18	16	24.9	45
3-Jun	17	14	9	Z	8	9	10	14	20	28	37	34	19	12	21	34	36	16	14	12	13	12	10	8	17.7	37
4-Jun	10	6	7	Z	7	7	7	8	15	17	18	19	18	20	23	24	24	24	23	20	22	21	21	20	16.6	24
5-Jun	22	23	24	Z	23	23	23	24	24	26	29	32	32	32	32	32	30	30	28	28	25	21	18	20	26.1	32
6-Jun	13	10	16	Z	16	14	13	17	20	25	28	28	30	30	32	35	36	33	34	32	30	26	23	18	24.3	36
7-Jun	16	17	17	Z	20	20	22	26	26	32	33	26	29	34	34	37	39	38	36	35	31	29	29	21	28.2	39
8-Jun	13	12	9	Z	5	7	12	15	20	30	37	40	40	43	44	43	42	43	42	39	32	32	32	33	28.9	44
9-Jun	33	32	30	Z	18	16	17	17	21	17	21	27	32	35	38	37	37	38	38	38	39	37	36	34	29.8	39
10-Jun	32	30	29	Z	20	20	21	13	21	36	39	40	39	40	43	42	42	41	41	40	34	24	23	9	31.3	43
11-Jun	10	16	18	Z	13	13	16	15	18	24	27	29	32	32	28	34	30	27	22	24	11	11	10	9	20.3	34
12-Jun	4	5	7	Z	4	5	8	14	15	29	35	35	45	46	44	42	40	39	34	39	34	26	23	29	26.2	46
13-Jun	24	22	30	Z	18	22	24	28	32	35	35	37	39	40	43	43	40	43	42	38	34	24	25	26	32.2	43
14-Jun	26	27	25	Z	21	24	23	22	24	31	39	39	40	41	41	43	43	41	40	42	36	21	28	27	32.4	43
15-Jun	26	20	17	Z	17	19	24	27	31	37	41	43	42	44	43	42	41	39	38	38	35	24	18	17	31.5	44
16-Jun	18	13	13	Z	11	9	10	10	16	26	31	29	29	30	30	31	28	29	23	28	24	22	21	21	22.3	31
17-Jun	19	16	15	Z	12	12	10	16	C	C	C	C	28	28	29	31	28	26	22	19	15	16	12	11	19.2	31
18-Jun	9	8	9	Z	6	6	7	11	15	16	24	26	30	33	36	37	39	38	38	35	31	29	23	22	23.0	39
19-Jun	20	19	17	Z	7	11	8	6	6	11	10	19	25	32	30	28	24	26	28	25	19	14	10	15	17.8	32
20-Jun	11	11	9	Z	2	3	3	5	8	10	20	22	18	20	21	20	16	11	13	19	18	20	19	16	13.7	22
21-Jun	14	13	14	Z	12	6	9	12	17	21	22	27	26	24	24	24	25	26	22	22	19	18	14	9	18.2	27
22-Jun	9	12	16	Z	17	17	15	16	16	19	23	25	27	27	33	35	29	23	23	22	17	19	17	14	20.5	35
23-Jun	7	6	5	Z	0	1	2	3	4	8	15	17	27	27	31	19	19	22	19	11	9	5	2	5	11.5	31
24-Jun	8	10	8	Z	15	17	17	17	19	24	28	31	30	31	33	33	33	33	29	21	18	17	21	20	22.4	33
25-Jun	22	19	14	Z	9	14	18	19	23	28	31	36	32	28	27	32	33	33	32	33	30	25	24	20	25.4	36
26-Jun	18	15	11	Z	5	10	10	12	15	23	24	22	27	27	31	30	32	32	28	29	25	19	12	8	20.3	32
27-Jun	7	4	2	Z	1	1	4	6	10	20	23	31	26	26	26	24	31	36	32	32	29	17	17	13	18.1	36
28-Jun	10	5	2	Z	2	3	4	7	12	30	39	47	55	62	59	62	55	47	42	36	33	22	20	16	29.1	62
29-Jun	11	3	0	Z	1	4	6	10	22	30	33	40	41	37	36	36	37	36	35	35	28	21	20	19	23.5	41
30-Jun	13	12	19	Z	19	18	20	23	26	28	29	31	31	33	35	34	34	34	33	31	29	19	15	16	25.2	35

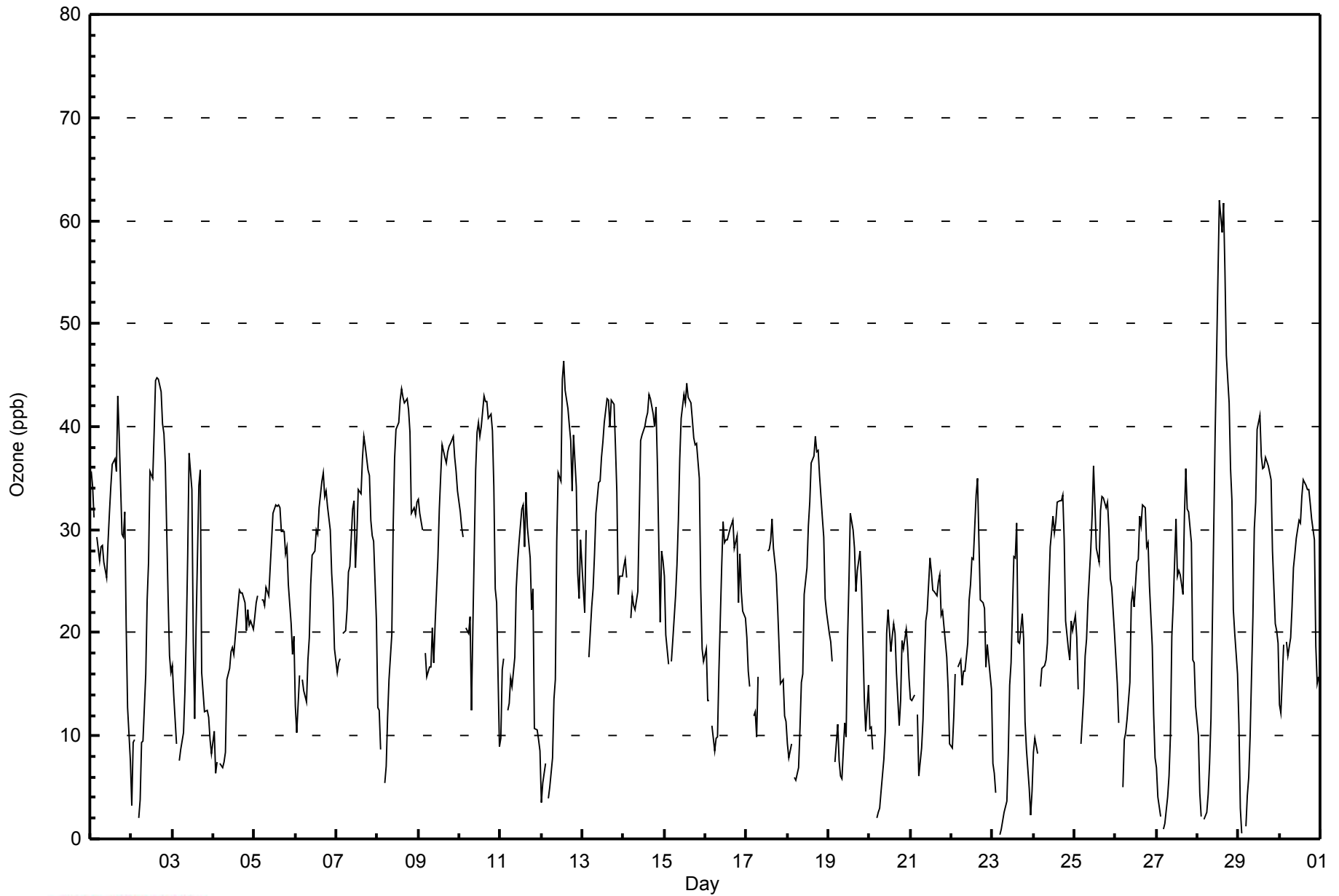
16.0	14.9	14.5	--	11.4	12.0	13.3	15.0	18.5	24.5	28.5	31.0	31.9	33.0	34.2	34.8	34.4	32.8	30.9	29.6	26.3	21.2	19.2	17.3	Diurnal Average	
36	34	31	--	29	27	28	28	32	37	41	47	55	62	59	62	55	47	42	42	39	37	36	34	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Athabasca Valley - June 2014





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	282	41.11	41.11
21 - 50	399	58.16	99.27
51 - 82	5	0.73	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
Athabasca Valley - June 2014

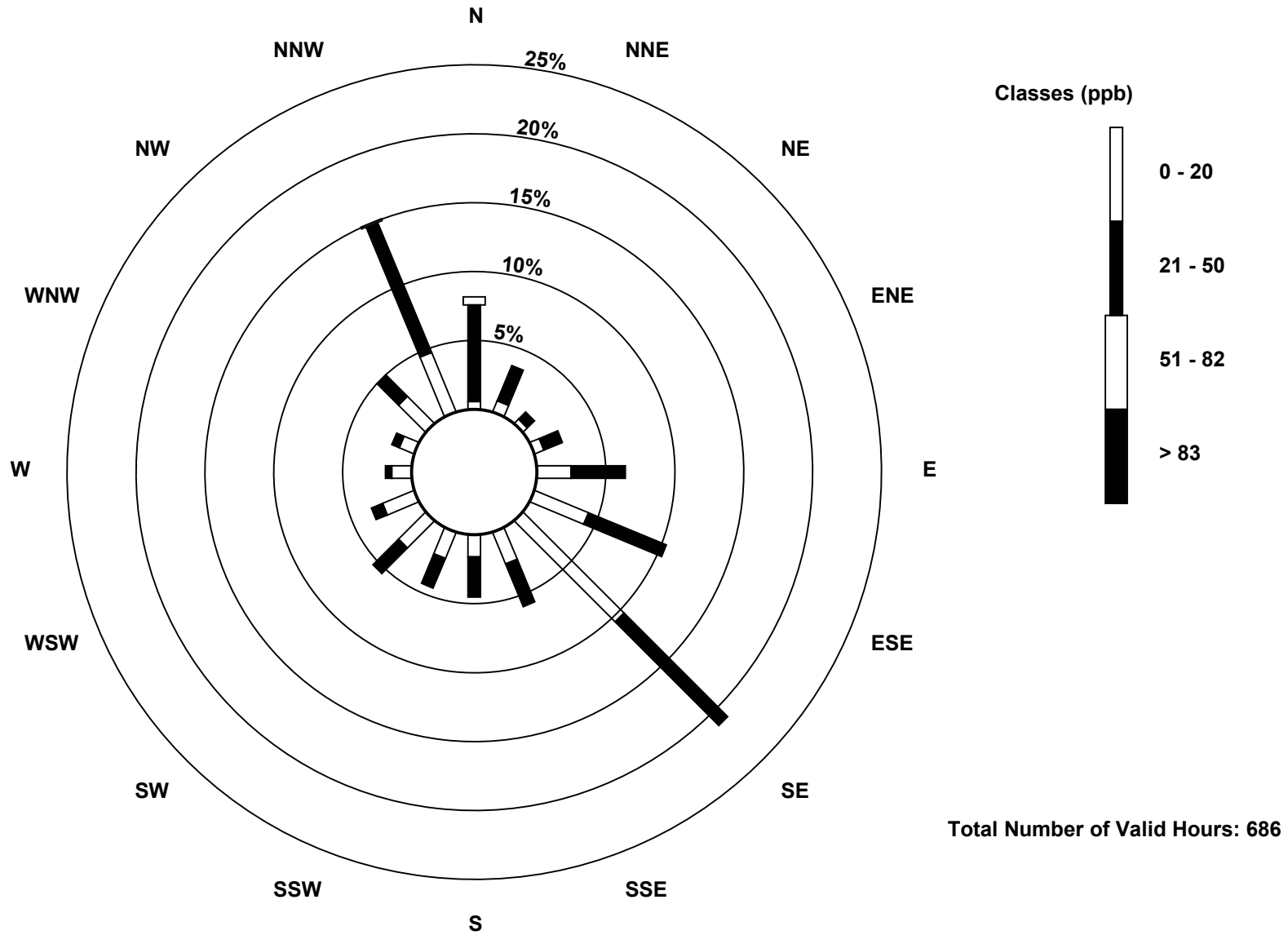
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	4	6	3	5	17	29	71	17	11	14	19	17	10	8	19	32	282
21 - 50	48	19	5	10	27	42	73	23	20	16	18	6	3	4	15	70	399
51 - 82	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	25	8	15	44	71	144	40	31	30	37	23	13	12	34	103	686

Total Number of Valid Hours: 686

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

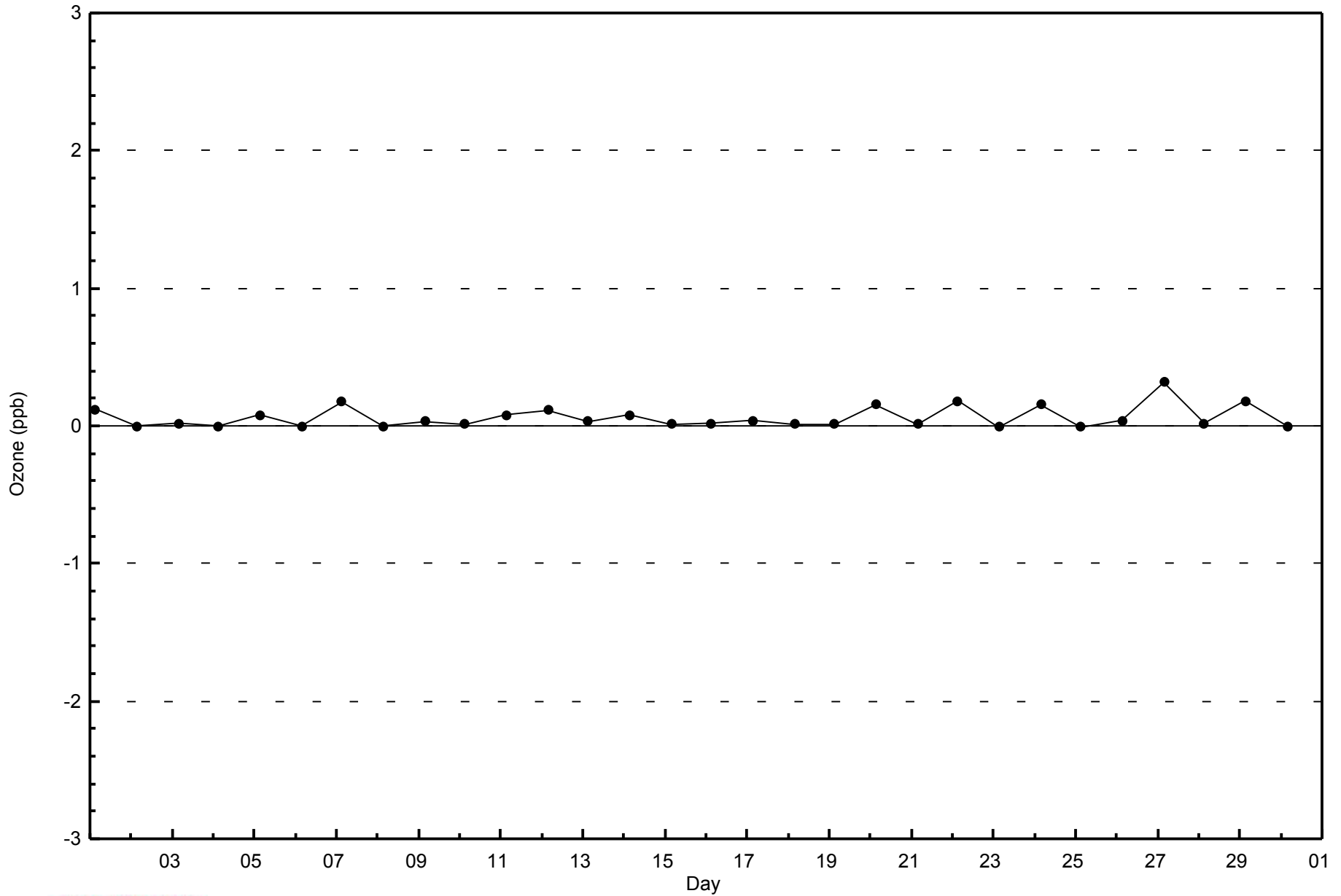
Ozone (O₃) - ppb
Athabasca Valley (AMS 7)





WBEA
Zero Responses

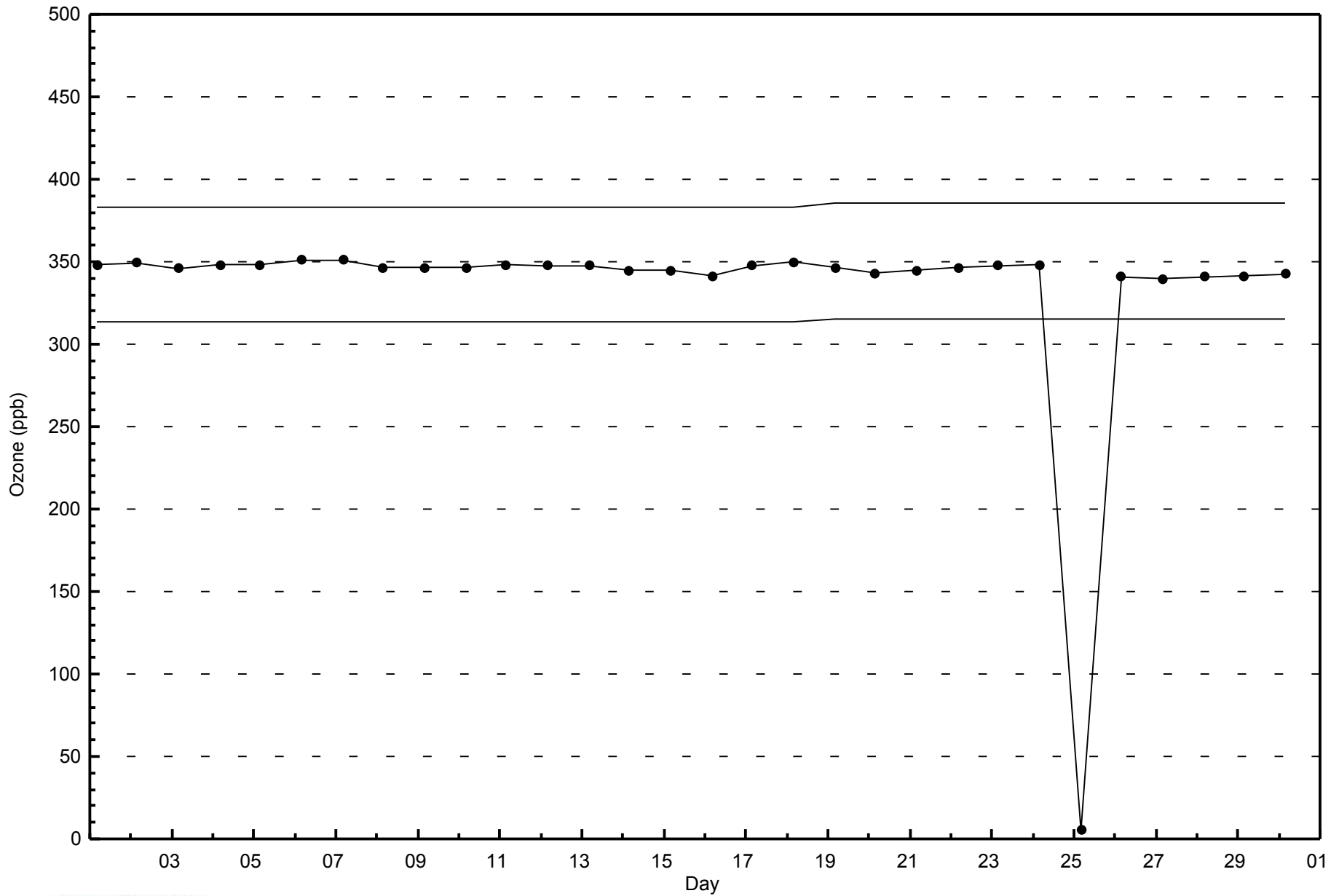
Ozone (O₃) - ppb
Athabasca Valley - June 2014





WBEA
Span Responses

Ozone (O₃) - ppb
Athabasca Valley - June 2014



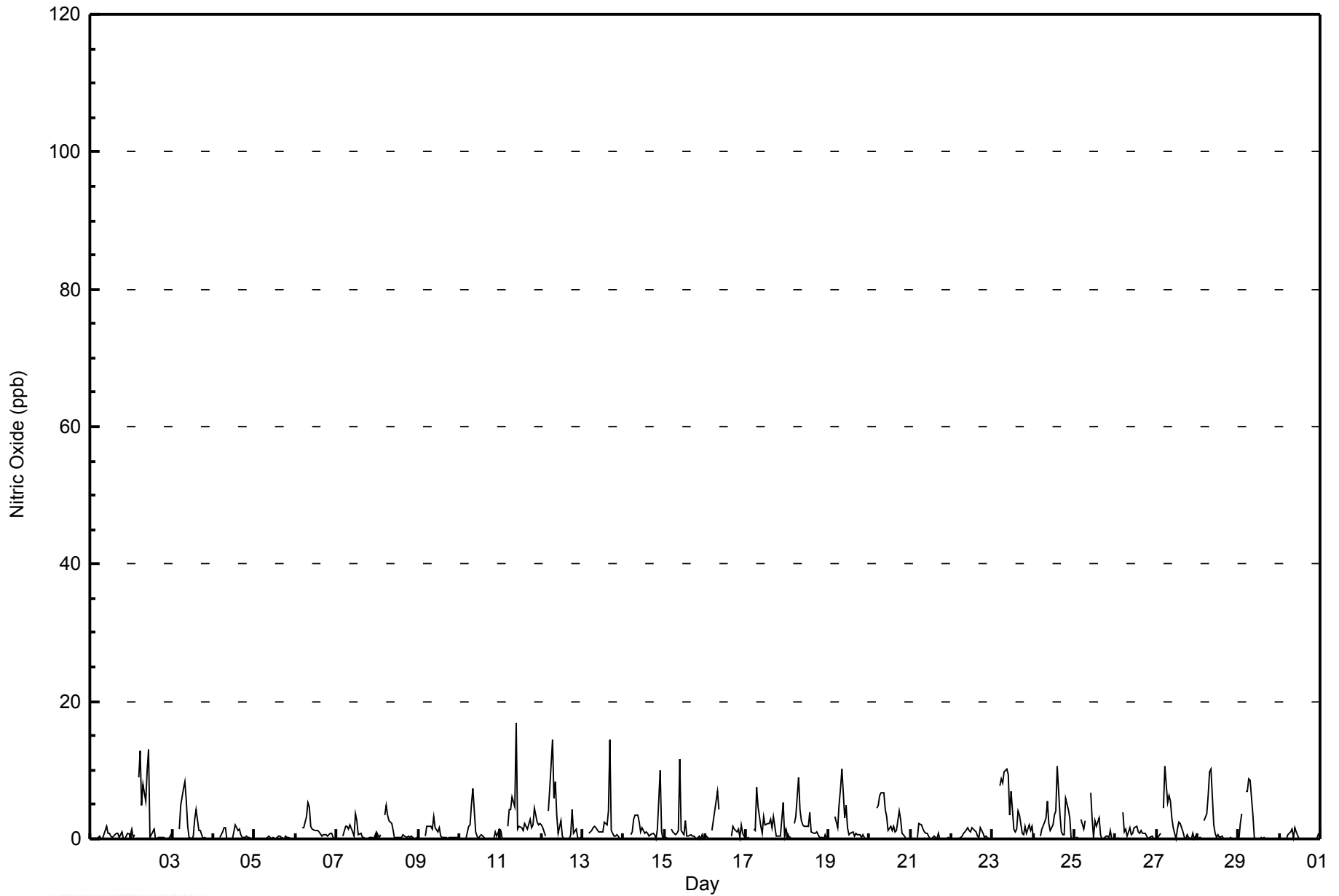


Maximum Value: 17 ppb on Jun 11 10:00														Maximum Daily Average: 3.7 ppb on Jun 23														Hours in Service: 720																				
Minimum Value: 0 ppb on Jun 1 01:00														Minimum Daily Average: 0.1 ppb on Jun 5														Hours of Data: 682																				
Maximum Diurnal Average: 4.3 ppb at hour 8														Minimum Diurnal Average: 0.2 ppb at hour 2														Hours of Missing Data: 38																				
Monthly Average: 1.5 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 4 P ₉₉ = 10														Hours of Calibration: 36																				
																												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-Jun	0	0	0	Z	0	0	0	0	1	2	1	1	0	0	1	1	1	0	1	0	0	0	1	1	0.5	2																						
2-Jun	1	0	1	Z	9	13	5	8	6	10	13	0	1	1	0	0	0	0	0	0	0	0	0	1	3.0	13																						
3-Jun	0	0	0	Z	1	5	7	8	5	2	0	0	0	3	4	1	1	1	0	0	0	0	0	1.7	8																							
4-Jun	0	0	0	Z	0	1	2	2	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	0.5	2																							
5-Jun	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																							
6-Jun	0	0	0	Z	2	2	3	5	5	2	1	1	1	1	1	0	1	1	1	0	1	1	0	1.3	5																							
7-Jun	0	0	0	Z	0	2	2	2	2	1	0	4	3	1	1	0	0	0	0	0	0	0	0	0.8	4																							
8-Jun	1	0	1	Z	3	5	3	3	2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1.0	5																							
9-Jun	0	0	0	Z	0	2	2	2	1	3	2	1	2	0	0	0	0	0	0	0	0	0	0	0.8	3																							
10-Jun	0	0	0	Z	0	2	2	5	7	1	0	0	1	0	0	0	0	0	0	0	0	1	0	1.0	7																							
11-Jun	1	0	0	Z	2	4	4	6	5	17	1	2	2	1	2	2	1	3	2	2	5	3	2	3.0	17																							
12-Jun	2	2	0	Z	4	7	14	6	8	3	1	3	0	0	0	0	1	4	1	2	0	0	0	2.6	14																							
13-Jun	0	0	0	Z	1	1	2	2	2	1	1	1	1	2	2	4	15	1	0	0	1	0	0	1.6	15																							
14-Jun	0	0	0	Z	1	1	3	3	3	2	1	2	1	1	1	0	1	1	1	0	1	10	1	1.5	10																							
15-Jun	0	0	0	Z	1	1	1	1	1	12	1	1	3	0	1	1	0	0	0	0	0	0	1	1.1	12																							
16-Jun	0	0	0	Z	1	4	5	7	4	C	C	C	C	C	C	0	2	1	1	1	0	2	1	--	7																							
17-Jun	0	0	0	Z	1	1	8	5	2	1	3	2	2	2	3	2	3	0	0	0	1	5	0	1.9	8																							
18-Jun	1	0	0	Z	2	3	9	4	3	2	2	2	2	4	1	1	1	1	1	0	0	0	1	1.7	9																							
19-Jun	0	0	0	Z	3	2	5	7	10	3	5	2	1	1	1	0	1	1	1	0	1	0	0	1.9	10																							
20-Jun	0	0	0	Z	5	5	6	7	7	4	3	1	2	1	2	1	1	4	3	1	1	0	0	2.3	7																							
21-Jun	0	0	0	Z	0	2	2	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0.4	2																							
22-Jun	0	0	0	Z	0	0	0	1	1	2	1	1	2	1	1	0	0	2	1	0	0	0	0	0.6	2																							
23-Jun	0	0	0	Z	8	9	8	10	10	9	4	7	1	1	4	4	1	1	1	2	1	2	1	3.7	10																							
24-Jun	0	0	0	Z	0	1	3	3	6	2	1	2	3	4	11	3	1	1	1	6	4	3	0	2.4	11																							
25-Jun	0	0	0	Z	3	1	3	M	M	7	3	0	3	2	3	1	0	0	0	0	1	0	0	1.3	7																							
26-Jun	0	0	0	Z	4	1	1	0	2	1	1	2	2	1	1	1	1	1	0	0	0	0	0	0.8	4																							
27-Jun	0	0	1	Z	4	11	5	6	5	3	2	0	2	2	2	1	0	0	1	0	0	1	0	2.1	11																							
28-Jun	0	0	0	Z	3	4	6	10	10	2	1	0	1	0	0	0	0	0	0	0	0	0	0	1.6	10																							
29-Jun	0	2	4	Z	7	7	9	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.8	9																							
30-Jun	0	0	0	Z	0	1	1	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	1	0.3	2																							
																								0.2	0.2	0.2	--	2.2	3.2	4.1	4.3	3.9	3.3	1.7	1.2	1.2	1.2	1.4	0.9	1.2	0.7	0.7	0.6	0.6	1.0	0.3	0.4	Diurnal Average
																								2	2	4	--	9	13	14	10	10	17	13	7	3	4	11	4	15	4	4	6	5	10	2	2	Diurnal Maximum
Z - zerospan																								C - Calibration				M - Maintenance																				



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Athabasca Valley - June 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	682	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: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - June 2014

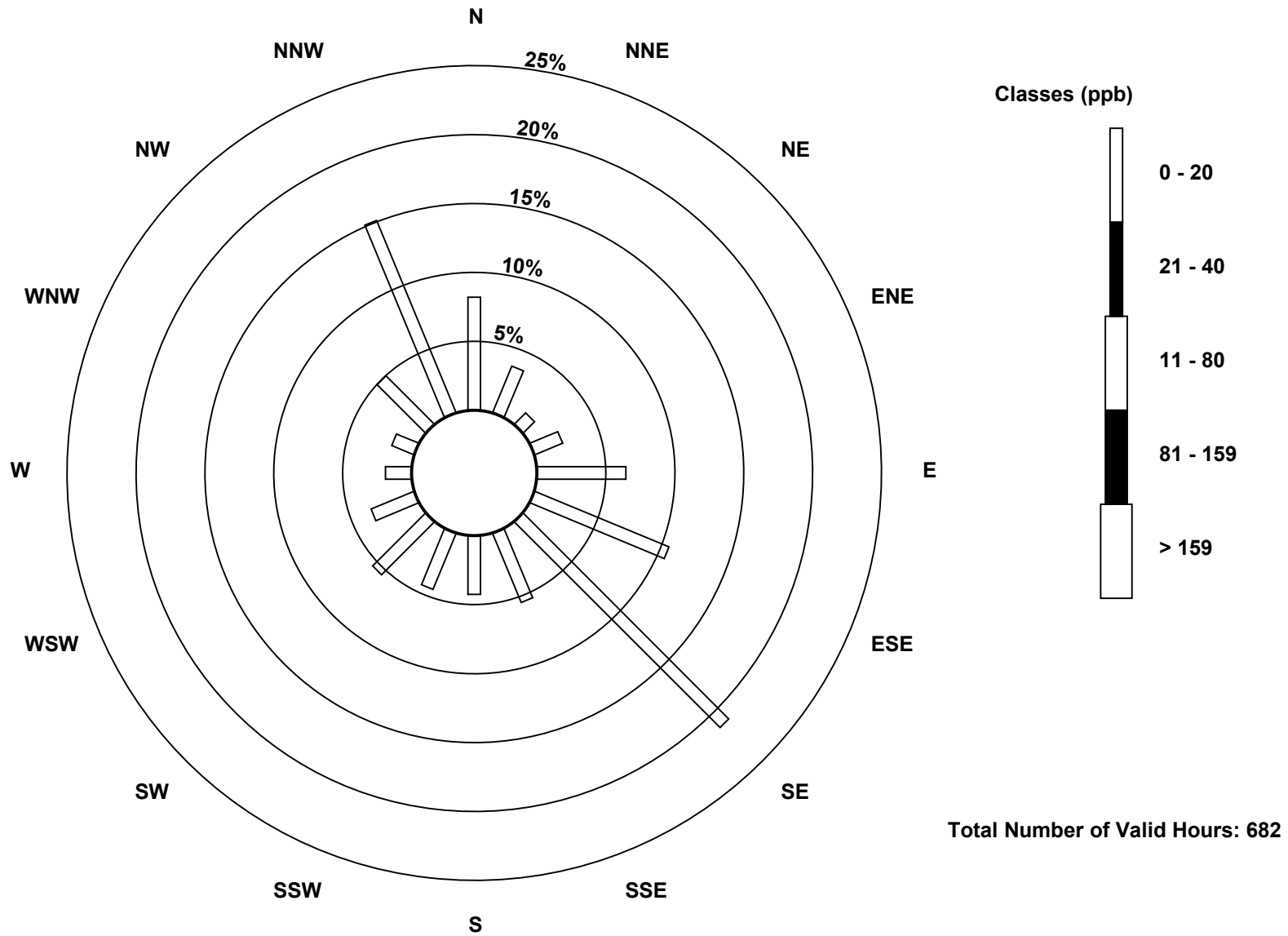
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	56	25	8	15	44	72	144	37	29	30	37	23	13	12	34	103	682
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	25	8	15	44	72	144	37	29	30	37	23	13	12	34	103	682

Total Number of Valid Hours: 682

Total Number of Hours: 720

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

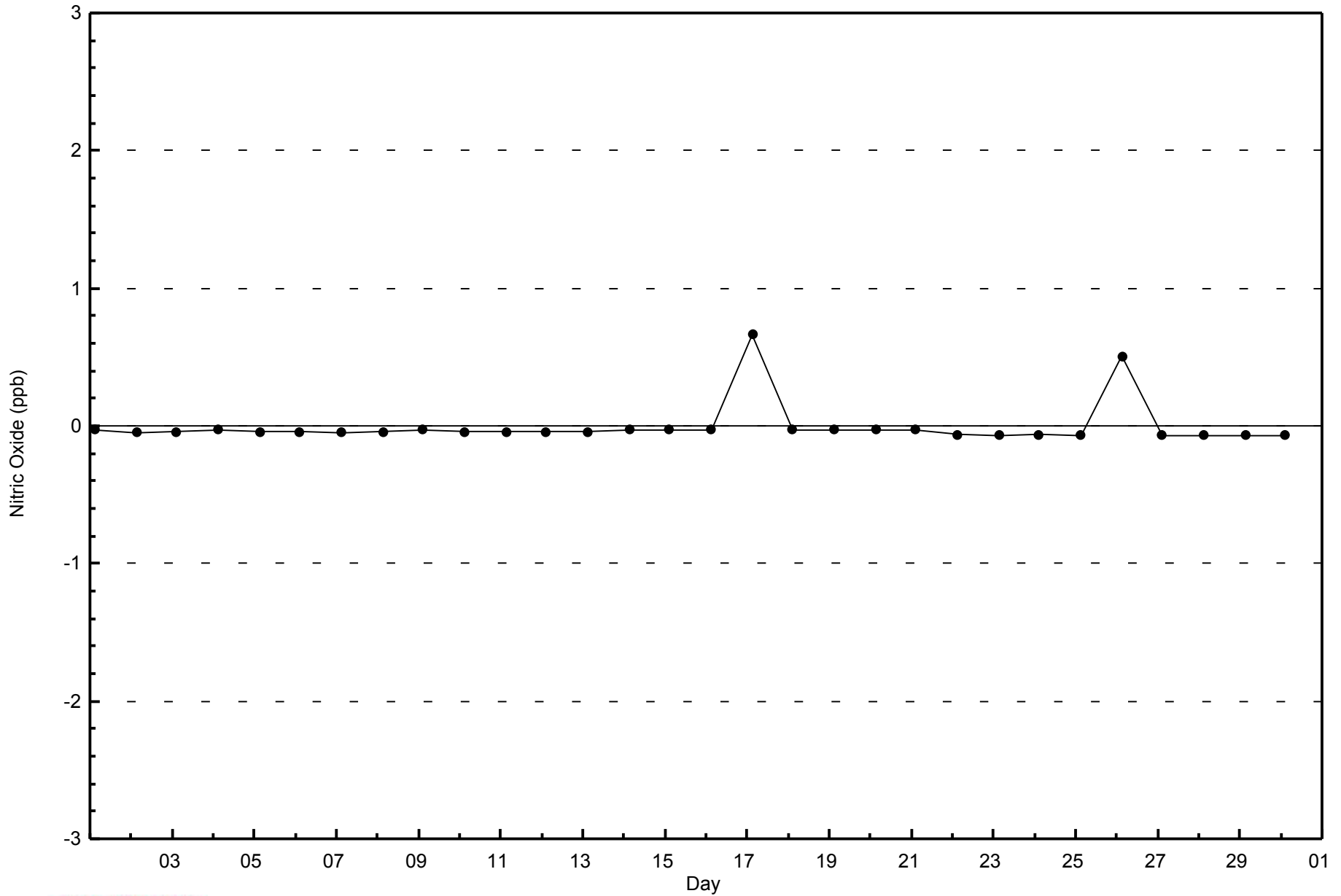
**Nitric Oxide (NO) - ppb
Athabasca Valley (AMS 7)**





WBEA
Zero Responses

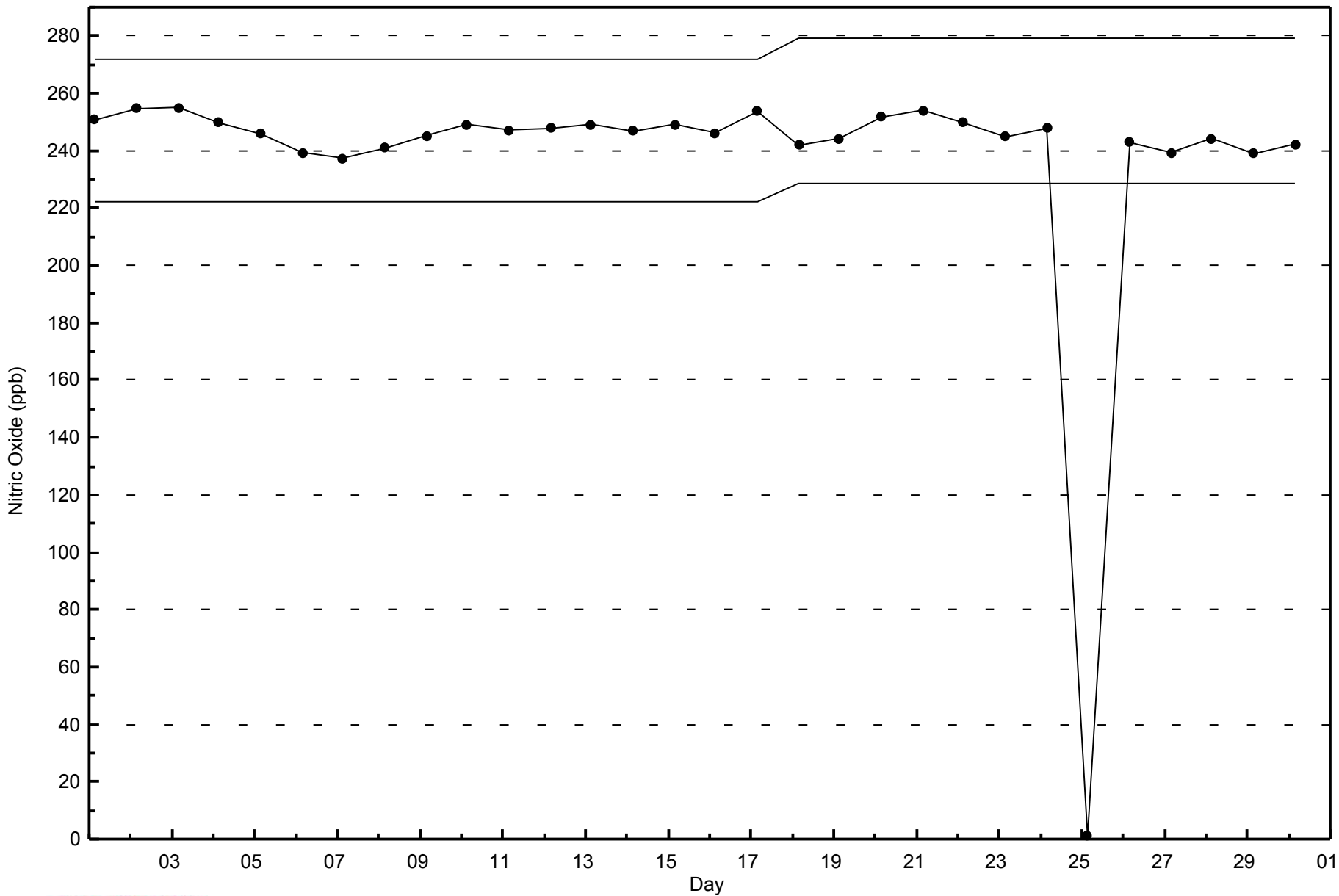
Nitric Oxide (NO) - ppb
Athabasca Valley - June 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Athabasca Valley - June 2014



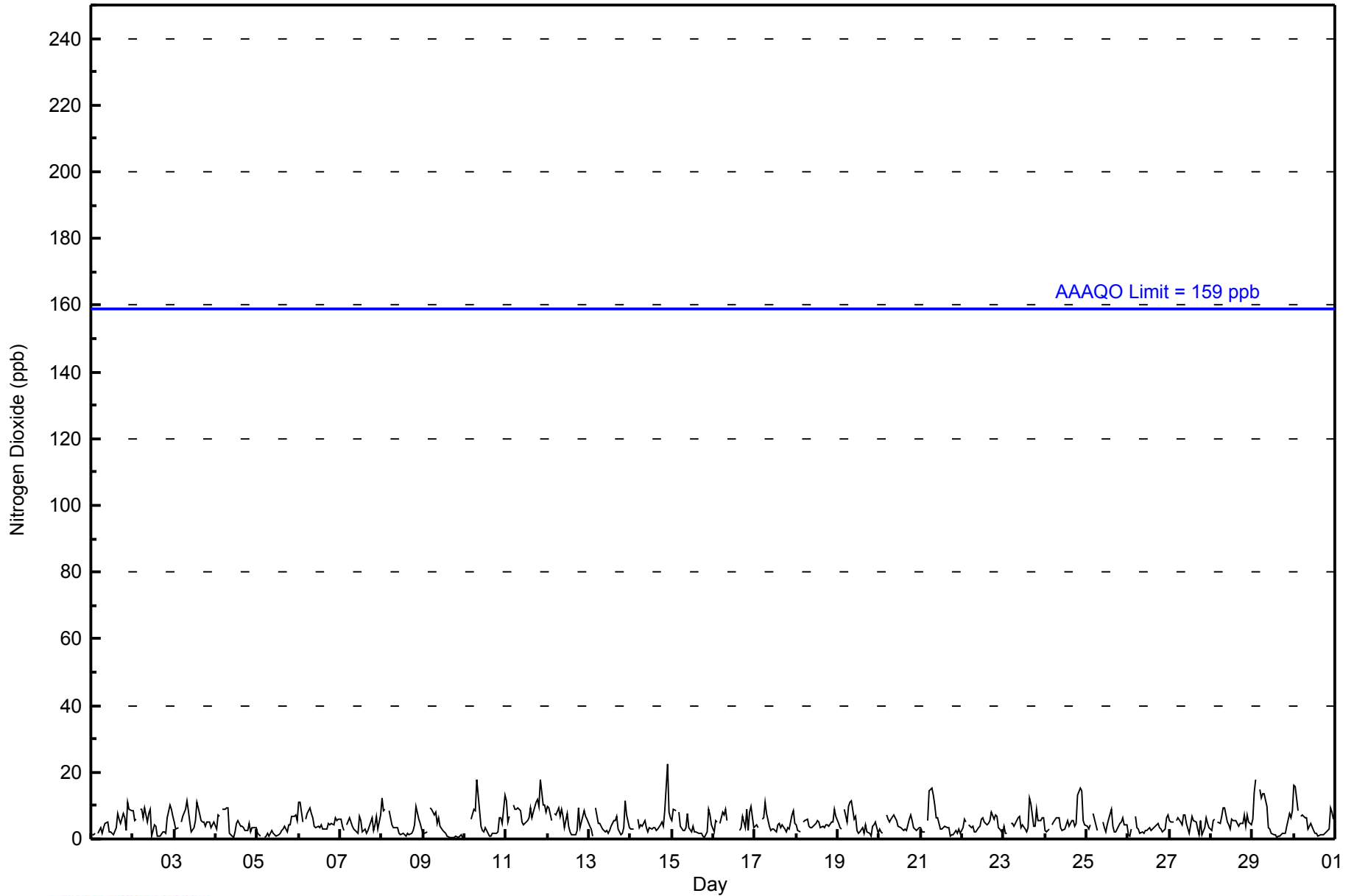


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 720																																							
Maximum Value: 23 ppb on Jun 14 22:00										Maximum Daily Average: 8.6 ppb on Jun 11										Hours of Data: 682																													
Minimum Value: 0 ppb on Jun 10 02:00										Minimum Daily Average: 2.8 ppb on Jun 5										Hours of Missing Data: 38																													
Maximum Diurnal Average: 7.1 ppb at hour 22										Minimum Diurnal Average: 3.1 ppb at hour 12										Hours of Calibration: 36																													
Monthly Average: 4.8 ppb										Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 4 Q ₃ = 6 P ₉₀ = 9 P ₉₉ = 15										Percent Operational Time: 99.7																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jun	1	1	2	Z	2	3	2	3	5	5	2	2	2	1	3	8	6	5	8	7	3	11	9	8	4.2	11																							
2-Jun	8	6	6	Z	9	9	6	9	5	8	9	1	4	4	1	1	1	2	2	2	6	10	9	7	5.4	10																							
3-Jun	5	3	3	Z	5	7	9	11	9	5	2	3	5	11	9	6	5	5	4	5	5	3	4	5	5.7	11																							
4-Jun	3	7	7	Z	9	9	9	9	2	1	1	2	5	6	4	4	3	3	3	5	2	4	3	3	4.4	9																							
5-Jun	2	1	1	Z	1	1	2	1	2	2	1	1	1	2	2	3	4	2	4	4	7	7	7	6	2.8	7																							
6-Jun	11	11	5	Z	6	8	9	8	6	4	4	4	4	4	3	3	3	5	4	5	4	6	6	6	5.5	11																							
7-Jun	6	4	2	Z	4	6	5	4	3	2	2	7	5	2	3	2	2	4	6	3	4	7	3	7	4.1	7																							
8-Jun	12	8	9	Z	8	6	4	3	3	3	2	1	2	1	1	2	1	2	3	4	10	6	5	3	4.3	12																							
9-Jun	2	2	2	Z	9	9	7	8	5	6	4	3	2	2	1	1	0	0	1	1	0	1	1	0	2.9	9																							
10-Jun	0	0	0	Z	6	9	8	18	13	4	3	2	3	3	1	1	2	2	2	2	6	7	5	13	4.7	18																							
11-Jun	11	5	7	Z	10	9	9	10	9	5	4	5	5	6	10	6	8	11	12	10	18	10	10	8	8.6	18																							
12-Jun	10	9	5	Z	8	7	9	7	9	7	4	8	4	2	1	1	1	3	9	3	7	8	7	6	5.9	10																							
13-Jun	4	3	1	Z	10	5	5	4	3	2	2	2	3	4	6	5	7	3	1	2	4	11	7	3	4.1	11																							
14-Jun	3	3	3	Z	6	3	4	4	6	4	2	4	3	3	4	2	3	4	5	4	8	23	8	6	5.0	23																							
15-Jun	6	9	9	Z	8	4	3	3	3	8	4	2	4	2	2	2	2	2	1	1	2	9	7	4	4.1	9																							
16-Jun	2	6	5	Z	5	8	7	9	6	C	C	C	C	C	C	3	3	7	3	9	3	8	10	4	--	10																							
17-Jun	4	4	3	Z	6	6	11	8	4	3	3	3	2	4	5	3	4	3	2	4	3	7	8	5	4.6	11																							
18-Jun	4	2	2	Z	5	6	6	4	3	4	4	5	5	5	4	4	4	4	4	4	5	5	9	7	4.5	9																							
19-Jun	5	3	3	Z	9	5	10	11	11	6	7	3	2	2	3	2	4	2	2	1	4	4	5	2	4.6	11																							
20-Jun	3	2	2	Z	7	6	5	6	7	6	5	4	3	3	3	3	3	6	7	5	4	3	3	4	4.3	7																							
21-Jun	3	2	2	Z	6	15	15	13	10	7	6	3	3	3	4	3	3	1	1	1	3	2	3	2	4.8	15																							
22-Jun	4	6	5	Z	4	4	4	2	2	3	4	6	7	5	4	5	6	8	6	7	7	3	3	2	4.6	8																							
23-Jun	4	2	2	Z	5	5	4	5	6	7	4	4	3	2	3	12	11	4	4	9	5	6	6	6	5.1	12																							
24-Jun	3	2	3	Z	4	5	7	6	6	3	2	3	4	5	4	5	5	4	5	13	15	15	5	4	5.7	15																							
25-Jun	4	3	4	Z	8	4	3	M	M	5	3	2	4	6	9	4	2	2	4	5	5	6	4	4	4.4	9																							
26-Jun	1	1	3	Z	7	3	3	2	2	2	2	3	4	3	3	3	4	5	4	3	2	3	6	7	3.3	7																							
27-Jun	6	5	5	Z	5	7	5	4	7	7	5	2	4	7	5	5	3	1	6	1	4	6	5	3	4.7	7																							
28-Jun	2	5	6	Z	5	5	7	9	9	5	4	3	6	5	5	5	4	5	5	7	4	7	5	4	5.3	9																							
29-Jun	6	14	18	Z	15	12	13	14	10	3	3	2	1	1	1	1	1	2	2	2	4	8	6	9	6.4	18																							
30-Jun	16	16	9	Z	7	7	6	6	3	4	5	2	2	2	1	1	1	1	2	2	3	9	8	6	5.2	16																							
																								5.0	4.9	4.5	--	6.6	6.4	6.6	6.9	5.8	4.5	3.5	3.1	3.5	3.7	3.5	3.5	3.6	3.5	4.0	4.3	5.2	7.1	5.9	5.1	Diurnal Average	
																								16	16	18	--	15	15	15	18	13	8	9	8	7	11	10	12	11	11	12	13	18	23	10	13	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																	



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	681	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: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - June 2014

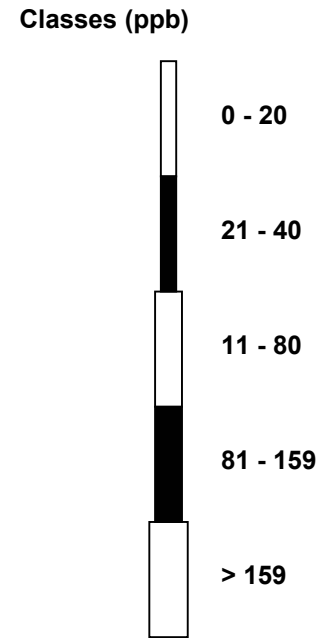
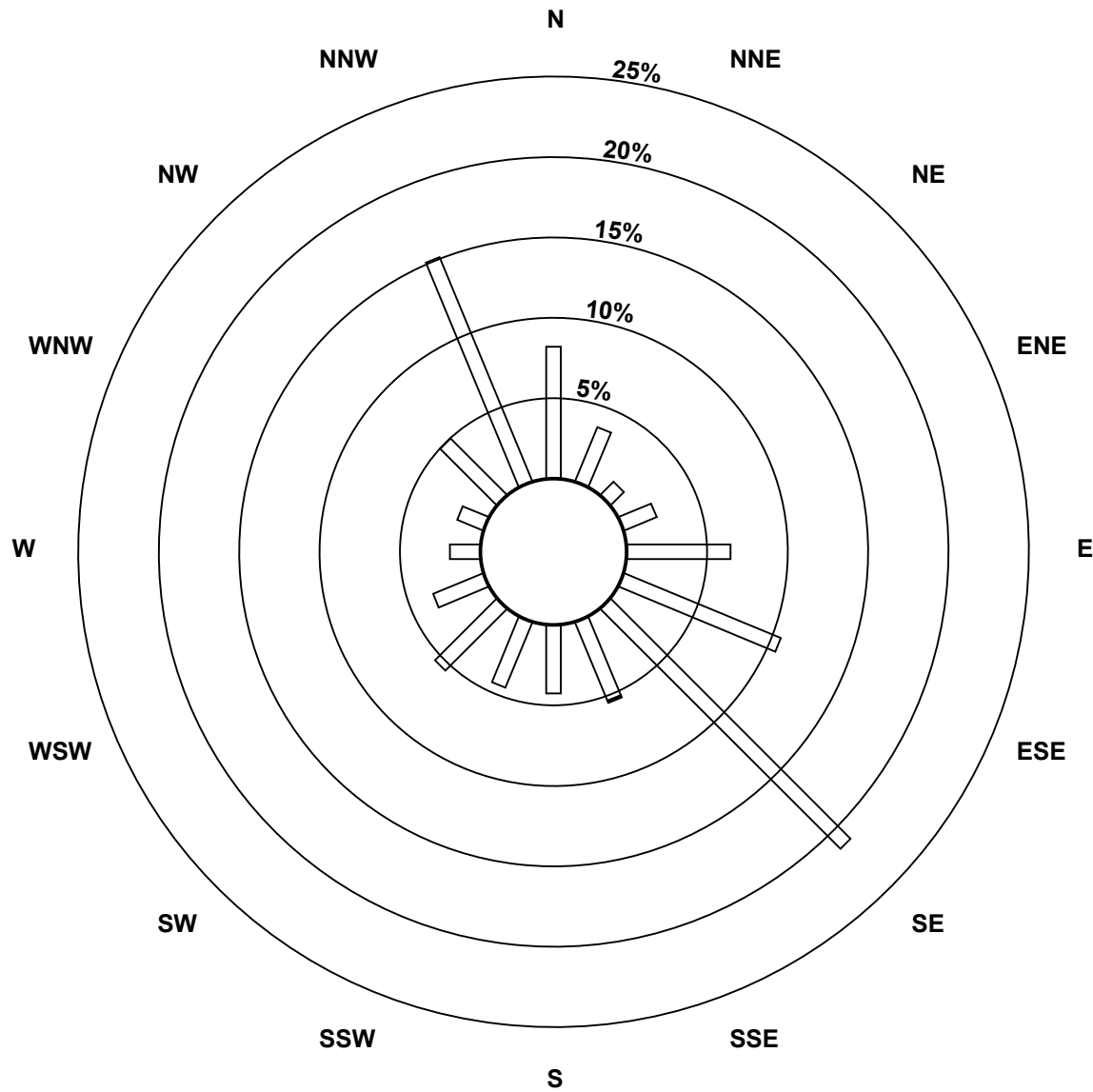
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	56	25	8	15	44	72	144	36	29	30	37	23	13	12	34	103	681
21 - 40	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	25	8	15	44	72	144	37	29	30	37	23	13	12	34	103	682

Total Number of Valid Hours: 682

Total Number of Hours: 720

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

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley (AMS 7)**

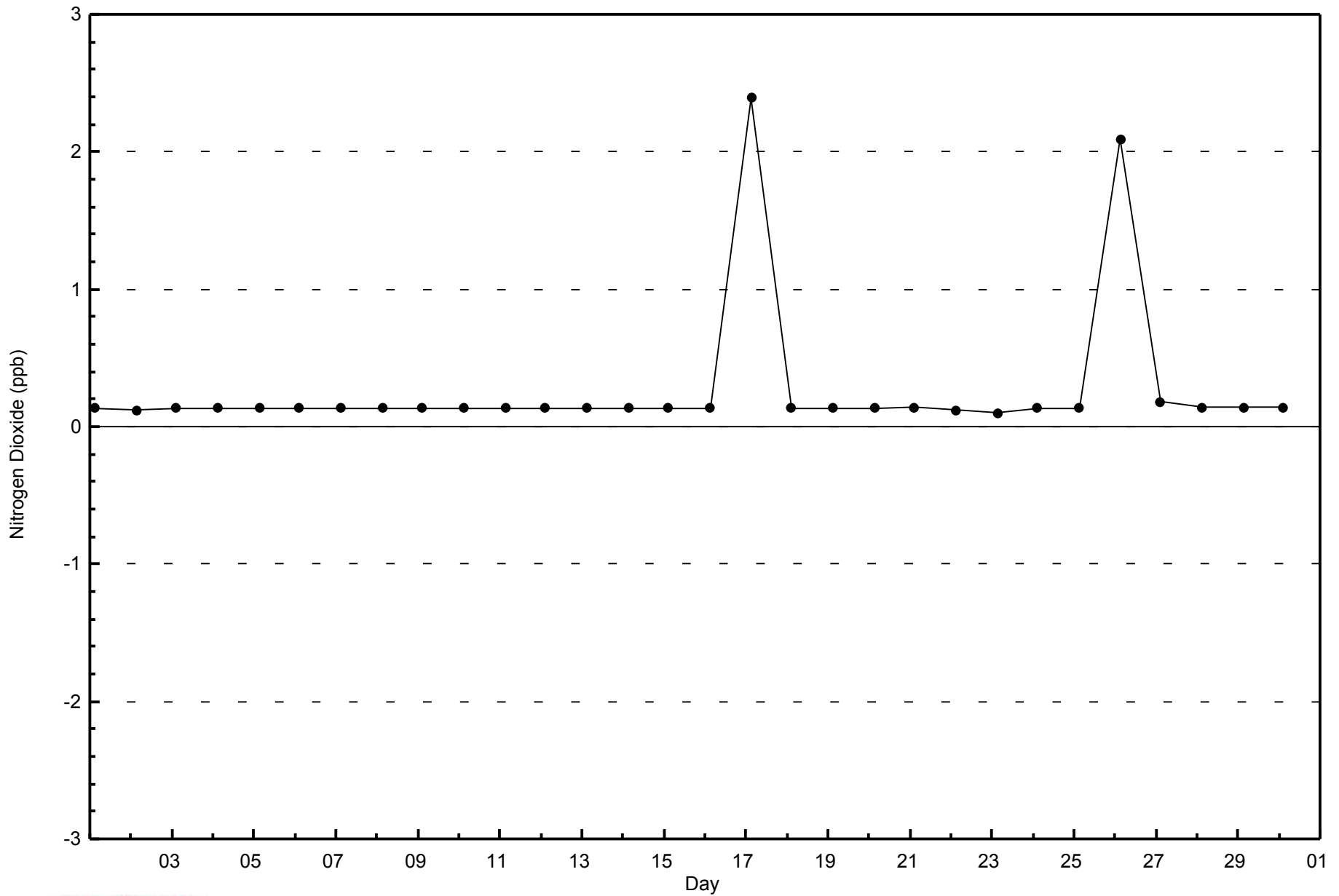


Total Number of Valid Hours: 682



WBEA
Zero Responses

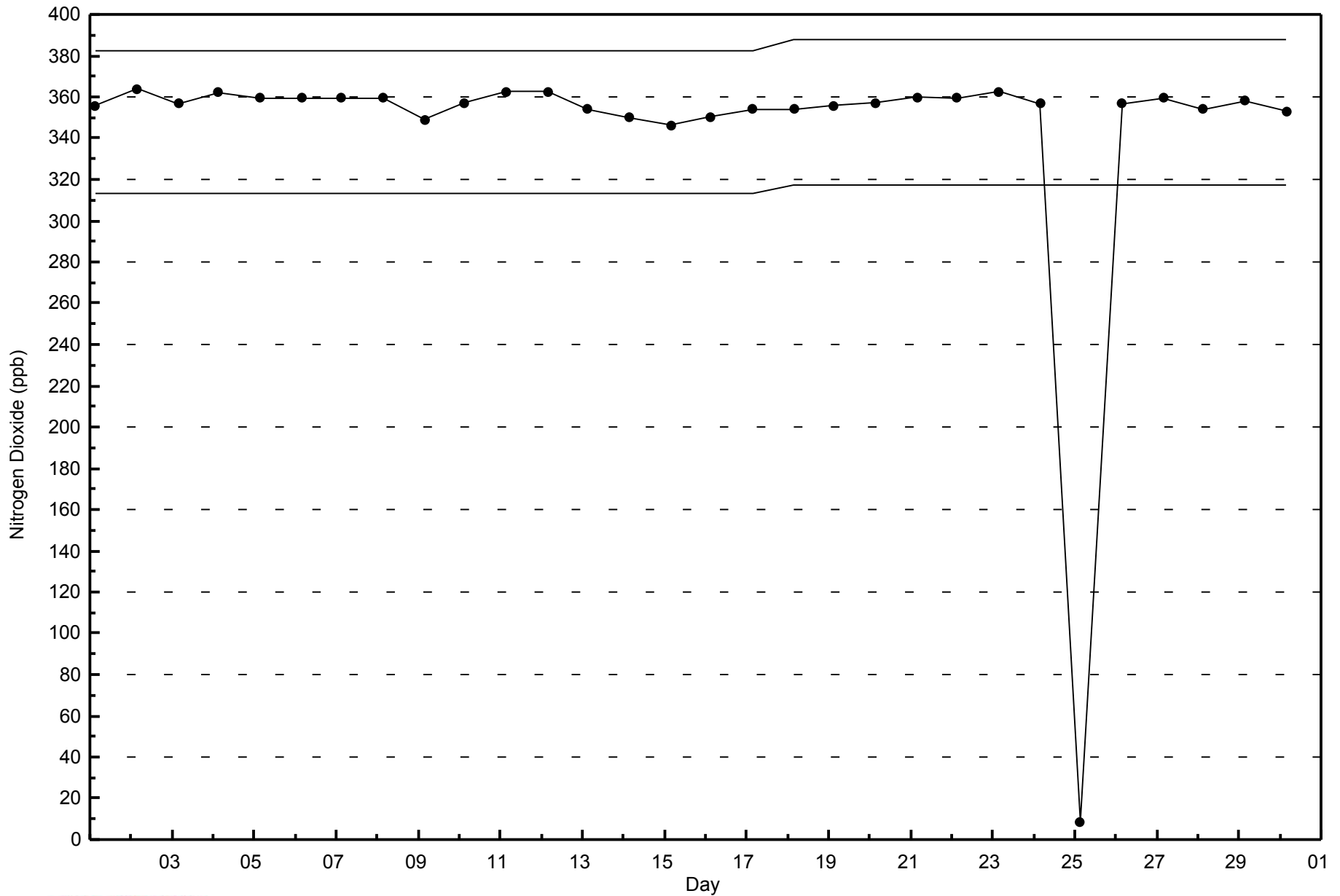
Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - June 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - June 2014





Wood Buffalo Environmental Association
Summary of Hour Averages

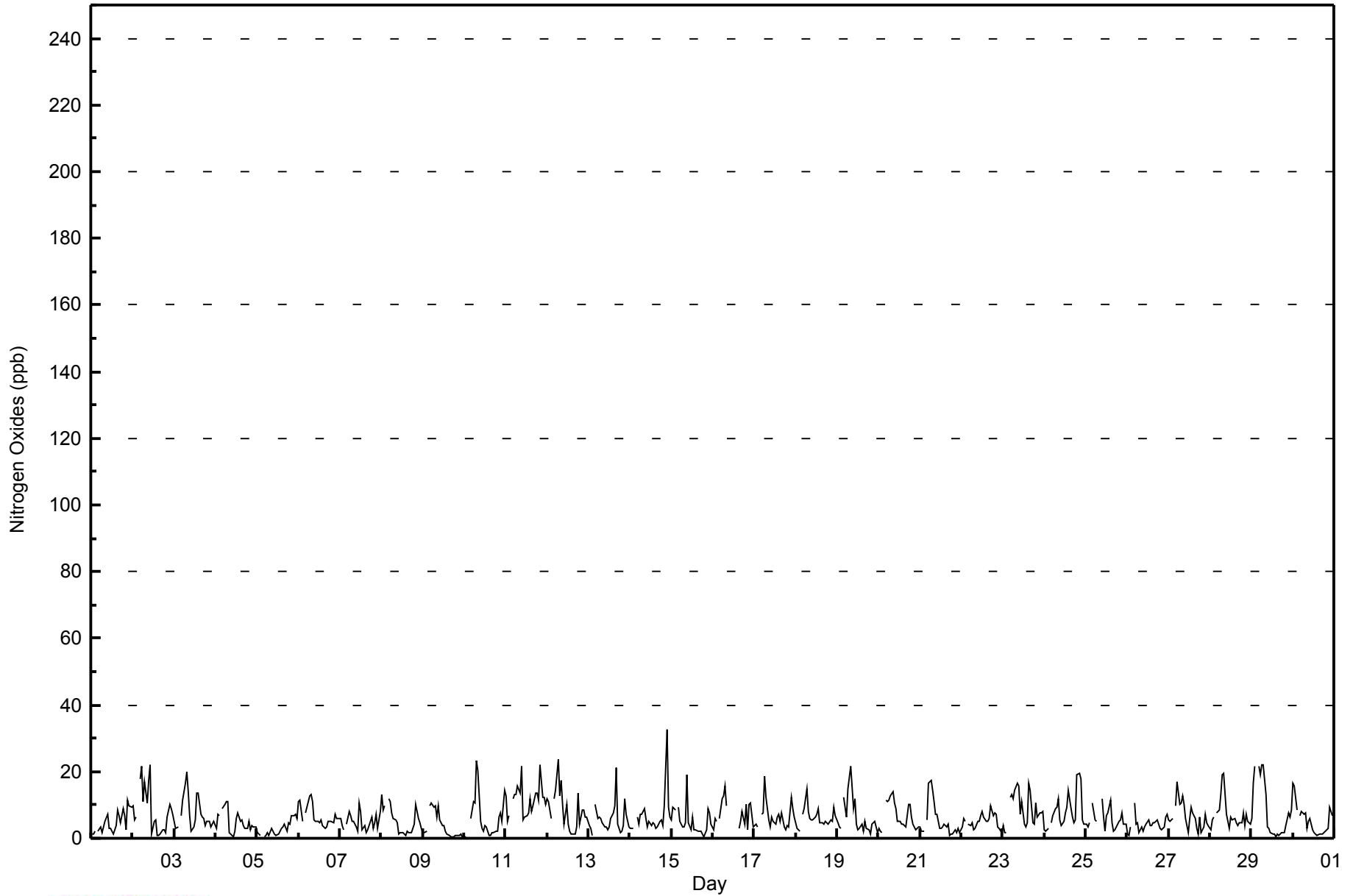
Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - June 2014

Maximum Value: 33 ppb on Jun 14 22:00										Maximum Daily Average: 11.5 ppb on Jun 11										Hours in Service: 720						
Minimum Value: 0 ppb on Jun 10 02:00										Minimum Daily Average: 2.9 ppb on Jun 5										Hours of Data: 682						
Maximum Diurnal Average: 11.2 ppb at hour 8										Minimum Diurnal Average: 4.2 ppb at hour 18										Hours of Missing Data: 38						
Monthly Average: 6.3 ppb										Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 P ₉₀ = 13 P ₉₉ = 22										Hours of Calibration: 36						
																				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-Jun	1	1	2	Z	2	3	2	3	5	7	3	3	2	1	4	8	7	5	9	7	3	11	10	9	4.7	11
2-Jun	10	6	7	Z	18	22	11	17	11	17	22	1	5	6	1	1	1	2	3	2	6	10	9	7	8.4	22
3-Jun	5	3	3	Z	7	11	16	20	14	7	2	3	6	14	13	7	6	6	4	5	5	3	4	5	7.4	20
4-Jun	3	7	7	Z	9	10	11	11	2	1	1	2	6	8	5	5	4	3	3	5	2	4	3	3	4.9	11
5-Jun	2	1	1	Z	1	1	2	1	3	2	1	1	1	2	3	3	4	2	5	4	7	7	7	6	2.9	7
6-Jun	11	11	5	Z	7	9	13	13	11	6	5	5	5	6	4	3	3	5	5	5	5	7	6	6	6.8	13
7-Jun	6	4	2	Z	4	8	7	5	5	3	2	11	8	3	4	2	2	4	6	3	5	7	3	8	4.9	11
8-Jun	13	9	10	Z	12	11	8	6	6	5	1	2	2	1	1	2	2	2	3	4	10	6	5	3	5.3	13
9-Jun	2	2	2	Z	10	11	9	10	6	10	5	4	4	2	1	1	1	1	1	1	1	1	1	1	3.7	11
10-Jun	0	0	0	Z	6	11	11	23	20	5	3	2	4	3	1	1	2	2	2	2	6	8	5	14	5.7	23
11-Jun	13	5	7	Z	12	13	13	16	13	22	6	6	7	8	12	8	10	14	14	12	22	12	12	10	11.5	22
12-Jun	12	11	6	Z	12	15	24	13	17	10	4	10	4	2	1	1	1	3	14	4	8	9	7	6	8.4	24
13-Jun	4	3	1	Z	10	6	6	6	5	3	3	3	4	6	8	10	21	4	2	2	4	12	7	3	5.7	21
14-Jun	3	3	3	Z	7	4	7	7	9	6	3	5	4	5	4	3	4	5	6	4	10	33	9	6	6.5	33
15-Jun	6	9	9	Z	9	5	3	3	5	19	5	3	6	2	3	2	2	2	1	1	3	9	8	4	5.1	19
16-Jun	3	6	5	Z	6	12	13	15	10	C	C	C	C	C	C	3	5	8	4	10	3	10	11	4	--	15
17-Jun	4	4	3	Z	7	7	19	12	5	3	6	5	4	6	7	5	7	3	2	4	3	12	9	6	6.5	19
18-Jun	5	3	2	Z	7	9	15	8	6	6	6	6	7	9	5	5	4	5	5	4	5	5	9	7	6.2	15
19-Jun	5	3	3	Z	12	7	15	18	22	9	12	4	3	3	4	2	5	3	3	1	4	5	5	2	6.5	22
20-Jun	3	2	2	Z	11	11	11	13	14	11	9	5	5	4	4	4	4	10	10	6	4	2	3	4	6.7	14
21-Jun	3	2	2	Z	6	17	17	15	11	7	7	3	3	4	4	3	4	1	1	1	2	1	3	2	5.2	17
22-Jun	4	6	5	Z	4	4	4	3	3	5	5	7	8	6	5	5	6	10	7	8	7	3	3	2	5.2	10
23-Jun	4	2	2	Z	12	13	12	15	16	16	7	11	4	3	5	16	14	5	4	11	6	8	8	8	8.8	16
24-Jun	3	2	3	Z	5	7	9	9	12	6	4	5	8	9	14	9	7	5	5	19	20	18	5	4	8.1	20
25-Jun	4	3	5	Z	11	6	5	M	M	12	6	2	7	7	12	5	2	2	4	5	5	7	4	4	5.7	12
26-Jun	1	1	3	Z	11	4	4	2	4	2	3	4	5	4	4	5	5	6	4	3	3	3	6	7	4.1	11
27-Jun	5	5	6	Z	10	17	10	11	13	10	6	2	6	9	7	6	3	1	6	2	3	7	5	4	6.7	17
28-Jun	2	5	6	Z	8	8	13	19	20	7	5	3	7	6	6	5	4	5	4	8	4	7	5	4	7.0	20
29-Jun	6	16	22	Z	22	19	22	22	13	4	3	2	1	1	1	1	1	2	2	2	4	8	6	8	8.1	22
30-Jun	16	16	9	Z	7	8	7	8	3	5	6	3	2	1	1	1	1	2	2	2	3	9	8	7	5.5	16
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerspan C - Calibration M - Maintenance																										



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	669	98.09	98.09
21 - 40	13	1.91	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 Oxides (NO_x) - ppb
Athabasca Valley - June 2014

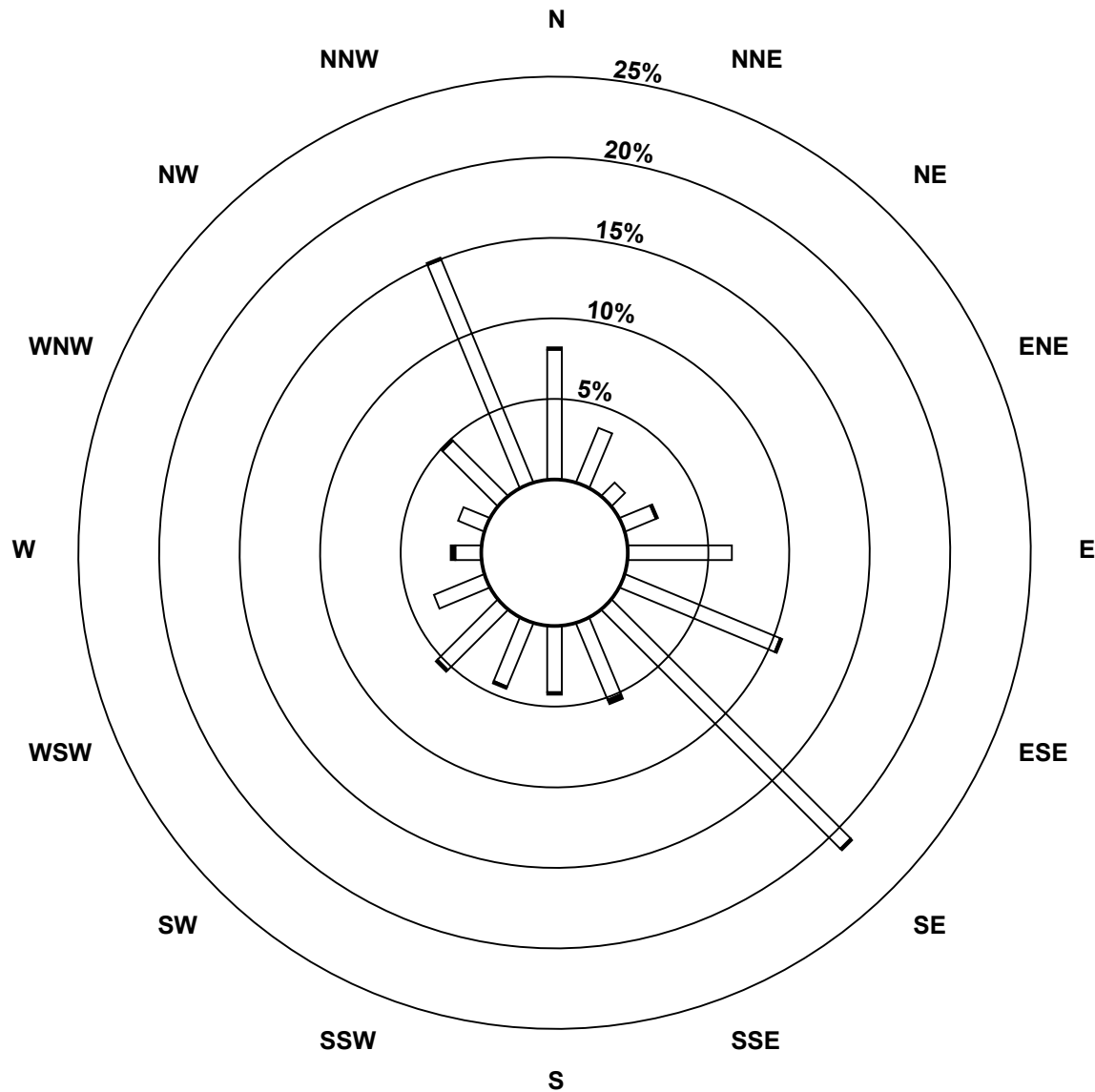
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	55	25	8	14	44	71	143	35	28	29	36	23	11	12	33	102	669
21 - 40	1	0	0	1	0	1	1	2	1	1	1	0	2	0	1	1	13
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	25	8	15	44	72	144	37	29	30	37	23	13	12	34	103	682

Total Number of Valid Hours: 682

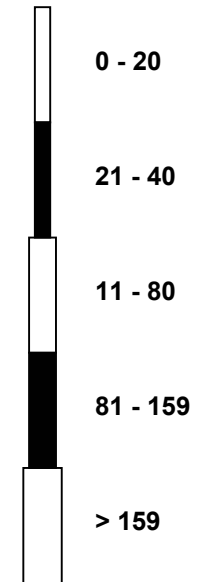
Total Number of Hours: 720

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

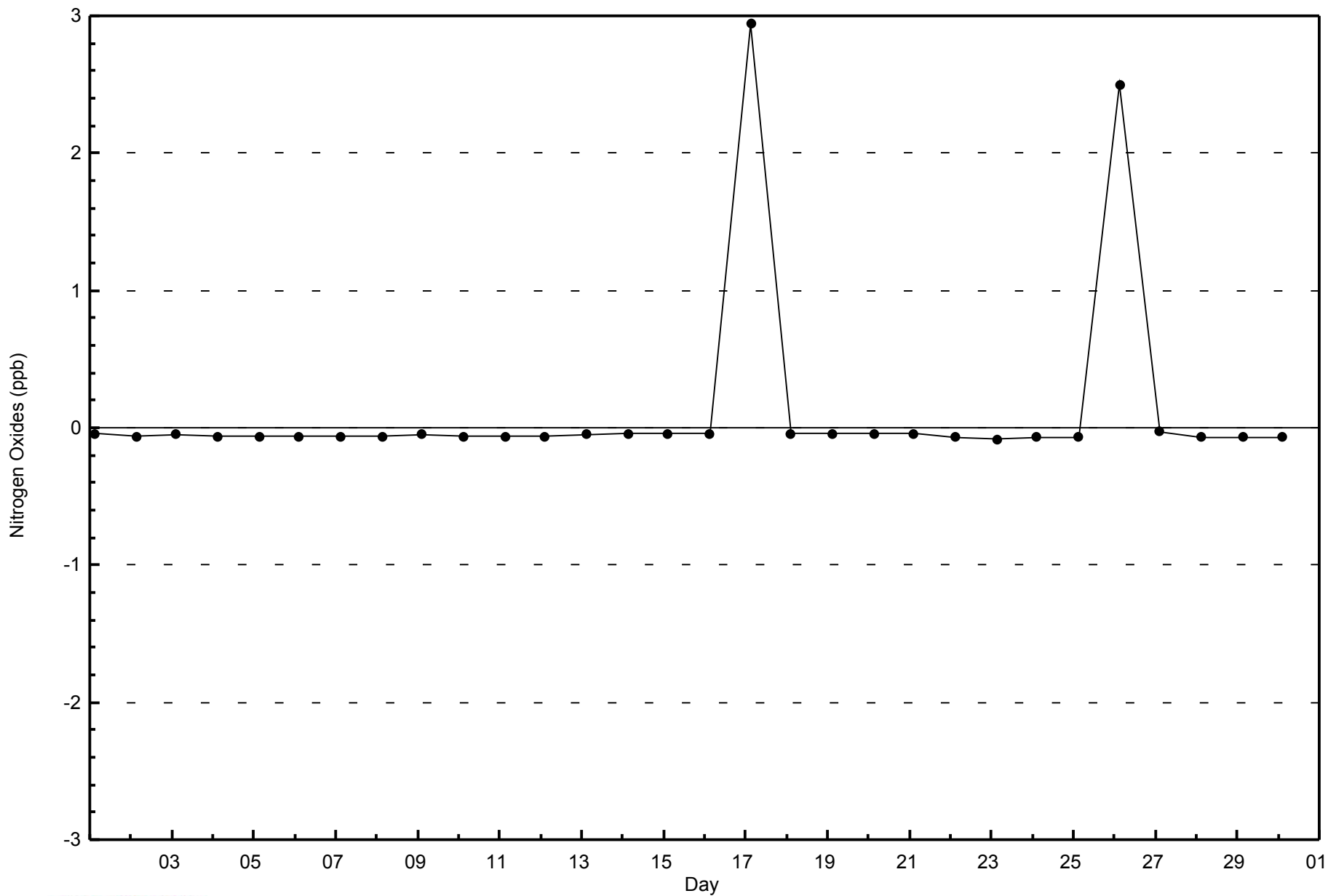
**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley (AMS 7)**



Classes (ppb)



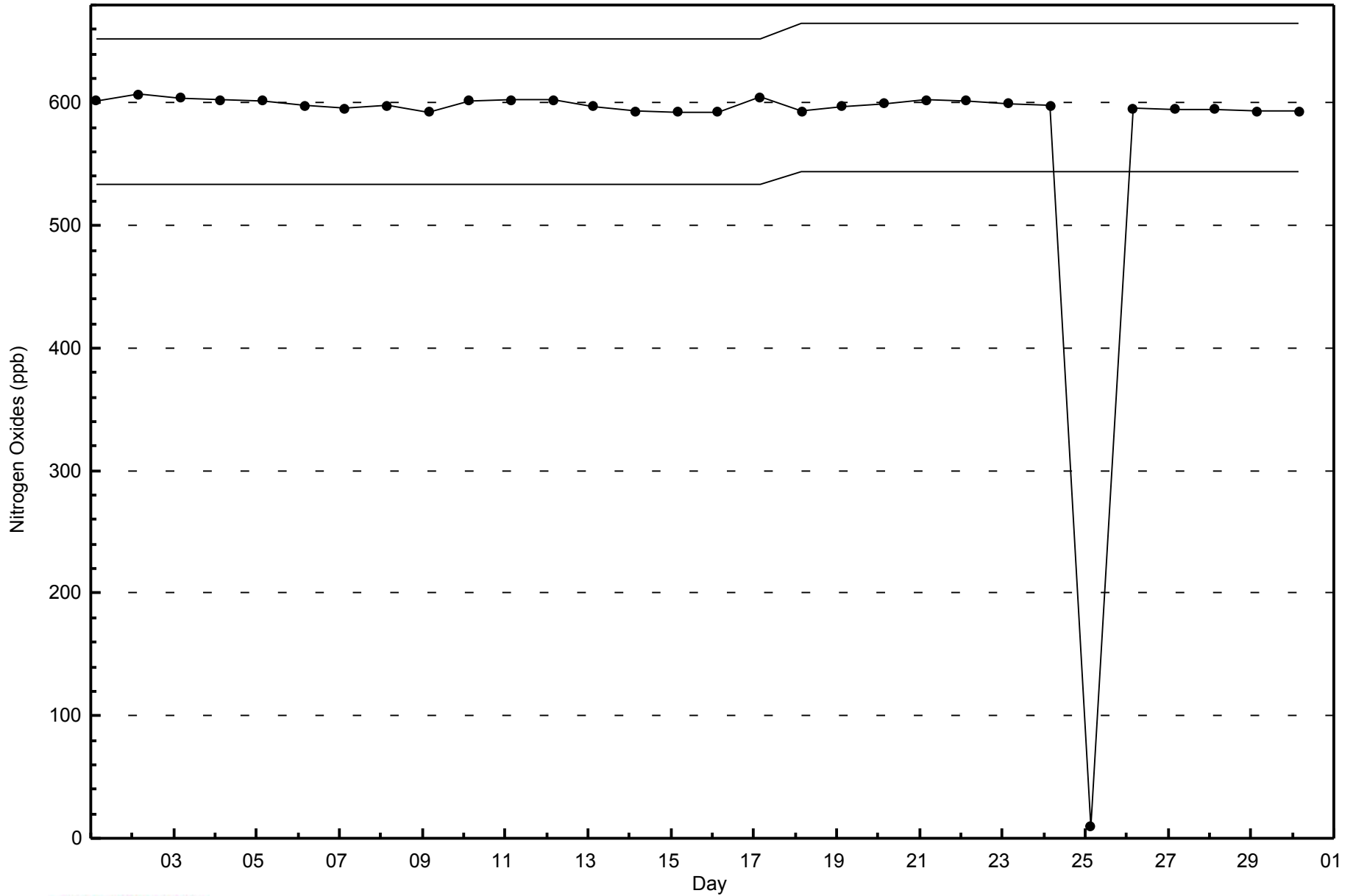
Total Number of Valid Hours: 682





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - June 2014





Summary of Hour Averages

Athabasca Valley - June 2014

Number of Exceedences (AAAQO): 24-hr: 0	Hours in Service: 720
Maximum Value: 41.8 µg/m ³ on Jun 30 07:00	Maximum Daily Average: 24.1 µg/m ³ on Jun 29
Minimum Value: 0.8 µg/m ³ on Jun 5 05:00	Hours of Data: 719
Maximum Diurnal Average: 10.5 µg/m ³ at hour 5	Hours of Missing Data: 1
Monthly Average: 8.87 µg/m ³	Hours of Calibration: 0
Minimum Daily Average: 2.9 µg/m ³ on Jun 5	Percent Operational Time: 99.9
Minimum Diurnal Average: 7.5 µg/m ³ at hour 11	
Percentiles: P ₁ = 1.0 P ₁₀ = 3.2 Q ₁ = 5.2 Median = 7.8 Q ₃ = 10.9 P ₉₀ = 14.8 P ₉₉ = 29.6	

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-Jun	5.4	5.8	6.2	5.0	4.8	4.7	4.0	3.7	3.6	2.9	3.0	5.9	7.9	7.5	7.9	12.5	9.1	9.5	9.4	9.0	9.9	12.7	13.5	17.6	7.6	17.6																							
2-Jun	19.5	10.8	9.8	11.9	12.2	8.7	4.7	8.6	9.5	6.9	9.4	7.0	8.4	8.2	5.9	5.5	5.0	5.4	5.6	4.8	4.9	5.4	3.7	5.5	7.8	19.5																							
3-Jun	8.8	11.5	11.9	16.4	9.9	9.6	9.1	9.1	6.5	6.8	7.6	10.3	7.8	8.7	8.0	9.8	11.2	14.8	15.3	13.1	6.2	4.7	5.6	6.8	9.6	16.4																							
4-Jun	6.5	12.0	13.1	19.5	14.6	13.9	8.6	5.2	3.6	3.1	2.7	2.7	2.9	2.7	3.2	3.6	3.2	2.9	2.5	1.8	1.4	1.1	1.0	5.6	19.5																								
5-Jun	0.9	0.9	0.9	0.8	0.8	0.9	1.1	1.0	1.2	1.3	1.3	1.5	1.9	2.9	4.4	7.2	7.0	6.4	6.3	5.9	6.0	3.9	2.7	2.3	2.9	7.2																							
6-Jun	2.4	2.2	1.7	1.5	1.6	1.6	2.7	2.1	3.5	4.0	5.3	7.7	9.0	9.9	9.0	10.7	10.6	9.7	9.9	9.9	9.8	9.5	9.5	11.2	6.5	11.2																							
7-Jun	9.5	6.3	3.8	3.1	2.9	3.5	3.8	4.4	5.0	5.2	5.2	7.0	8.5	7.7	9.0	9.3	9.5	11.8	12.9	8.3	9.0	10.3	9.9	11.9	7.4	12.9																							
8-Jun	10.6	8.6	8.2	6.3	6.5	5.7	5.2	5.6	6.7	7.3	5.1	5.5	5.5	6.5	6.5	7.6	8.0	8.2	8.9	9.4	12.2	10.2	9.0	8.5	7.6	12.2																							
9-Jun	8.7	8.9	7.7	8.1	25.5	6.7	7.6	9.6	8.9	6.7	7.6	7.4	7.9	7.5	8.1	8.2	6.9	5.2	4.4	4.3	3.8	3.8	3.6	3.2	7.5	25.5																							
10-Jun	3.4	3.2	3.1	3.7	3.9	3.7	3.4	4.1	5.9	6.7	7.4	6.8	6.5	5.5	4.7	4.9	5.1	6.9	6.7	6.3	7.6	11.9	9.5	15.1	6.1	15.1																							
11-Jun	14.9	11.7	9.6	7.2	6.8	5.9	6.2	7.4	6.7	7.5	9.4	11.5	12.5	10.0	7.4	9.5	12.3	12.3	11.1	7.5	14.0	11.9	11.9	12.4	9.9	14.9																							
12-Jun	14.6	13.7	14.4	13.7	10.6	8.6	8.5	7.6	10.2	8.4	10.4	11.9	12.3	10.9	9.5	8.4	8.3	6.6	6.7	6.1	8.4	7.7	6.2	6.0	9.6	14.6																							
13-Jun	7.0	9.0	6.4	6.9	7.2	6.1	5.6	4.4	4.0	3.3	3.3	3.5	4.2	4.4	5.6	6.4	8.8	7.5	6.8	8.1	10.7	15.8	12.7	10.7	7.0	15.8																							
14-Jun	10.7	9.7	10.3	10.7	10.8	9.4	9.7	7.5	6.9	9.6	11.7	10.3	12.4	12.2	10.3	8.8	7.9	7.7	9.3	7.8	9.6	14.7	13.6	12.0	10.1	14.7																							
15-Jun	12.2	13.2	12.8	12.5	11.1	10.0	8.7	7.1	6.9	7.9	7.6	7.2	8.6	7.5	7.9	8.8	8.6	7.9	7.1	6.3	6.5	22.6	13.7	16.3	10.0	22.6																							
16-Jun	9.9	10.6	16.1	12.7	12.5	14.0	14.3	15.5	13.7	12.8	12.3	10.3	8.7	7.7	7.5	6.4	7.8	9.8	14.7	15.2	13.8	13.7	10.3	11.9	11.7	16.1																							
17-Jun	16.5	8.3	9.3	9.6	11.1	8.0	13.3	12.7	11.8	8.1	10.1	11.7	11.4	11.6	9.3	6.7	8.8	11.8	4.5	3.6	3.4	4.6	6.1	4.3	9.0	16.5																							
18-Jun	6.4	7.4	6.0	8.2	9.7	8.6	11.9	10.5	7.8	7.6	7.0	8.4	M	8.0	7.6	8.2	9.1	7.8	6.2	4.8	4.5	7.0	7.7	7.3	7.7	11.9																							
19-Jun	6.2	6.0	8.1	8.7	8.8	9.5	9.4	14.0	11.2	5.5	4.4	1.6	3.2	7.4	7.3	4.2	2.8	3.7	6.4	5.7	3.1	2.5	2.8	3.8	6.1	14.0																							
20-Jun	3.0	2.8	6.7	6.8	9.2	10.9	14.4	8.8	5.7	6.4	4.1	6.0	4.1	3.3	4.7	5.1	1.7	1.4	1.4	1.9	3.4	2.1	2.4	3.3	5.0	14.4																							
21-Jun	2.7	3.6	5.0	3.4	7.1	6.4	8.0	9.4	6.8	9.1	6.6	6.4	6.4	3.2	4.7	8.2	7.7	2.3	2.9	1.8	2.9	2.5	3.0	2.4	5.1	9.4																							
22-Jun	2.8	4.5	6.7	11.4	6.0	6.0	5.3	4.0	5.2	4.0	5.3	8.5	8.8	7.9	15.8	22.3	15.2	18.8	18.3	23.4	27.0	13.4	8.8	8.3	10.7	27.0																							
23-Jun	11.7	12.9	13.8	11.8	16.1	15.3	14.0	13.2	12.9	9.6	7.4	7.0	7.3	6.6	9.5	11.9	5.7	3.4	2.4	3.9	2.9	2.5	2.7	5.6	8.8	16.1																							
24-Jun	6.8	5.3	3.7	3.0	3.3	3.6	4.2	4.6	5.0	4.0	3.5	4.7	9.3	15.6	19.9	13.2	10.9	10.0	9.7	9.9	12.5	12.7	7.7	5.7	7.9	19.9																							
25-Jun	6.5	10.0	6.6	7.4	10.2	9.7	10.9	8.5	6.4	8.4	12.2	13.2	10.9	9.5	7.5	6.7	3.4	4.2	6.5	6.0	6.3	4.8	4.4	5.6	7.7	13.2																							
26-Jun	2.8	2.6	3.6	5.1	7.6	7.7	6.3	4.9	5.7	3.2	2.9	4.4	5.1	3.1	4.8	5.0	3.9	5.8	4.8	4.5	3.5	5.1	7.9	10.4	5.0	10.4																							
27-Jun	10.7	10.2	14.4	9.5	9.6	11.2	7.3	8.4	9.0	6.3	6.2	5.1	6.6	4.9	5.8	4.2	7.8	5.8	13.7	8.5	7.1	9.4	8.7	11.6	8.4	14.4																							
28-Jun	11.5	18.0	21.7	17.1	14.4	15.0	11.2	16.7	16.3	7.4	6.2	7.6	12.6	14.4	12.4	12.2	10.5	9.8	10.1	10.6	10.6	12.8	11.5	14.0	12.7	21.7																							
29-Jun	16.4	22.4	29.3	26.6	25.4	27.4	24.3	23.3	27.7	27.9	23.7	30.5	37.0	31.9	17.6	20.6	26.6	23.6	24.3	22.6	18.6	16.0	15.9	19.7	24.1	37.0																							
30-Jun	22.6	26.2	29.3	29.8	35.3	38.0	41.8	40.4	27.1	23.2	15.3	14.4	15.7	16.2	18.0	16.1	11.5	11.0	11.7	8.8	10.2	9.5	9.9	21.4	21.0	41.8																							
																								9.1	9.3	10.0	9.9	10.5	9.7	9.5	9.4	8.7	7.7	7.5	8.2	9.1	8.8	8.7	9.1	8.5	8.4	8.7	8.0	8.3	8.8	7.9	9.2	Diurnal Average	
																								22.6	26.2	29.3	29.8	35.3	38.0	41.8	40.4	27.7	27.9	23.7	30.5	37.0	31.9	19.9	22.3	26.6	23.6	24.3	23.4	27.0	22.6	15.9	21.4	Diurnal Maximum	

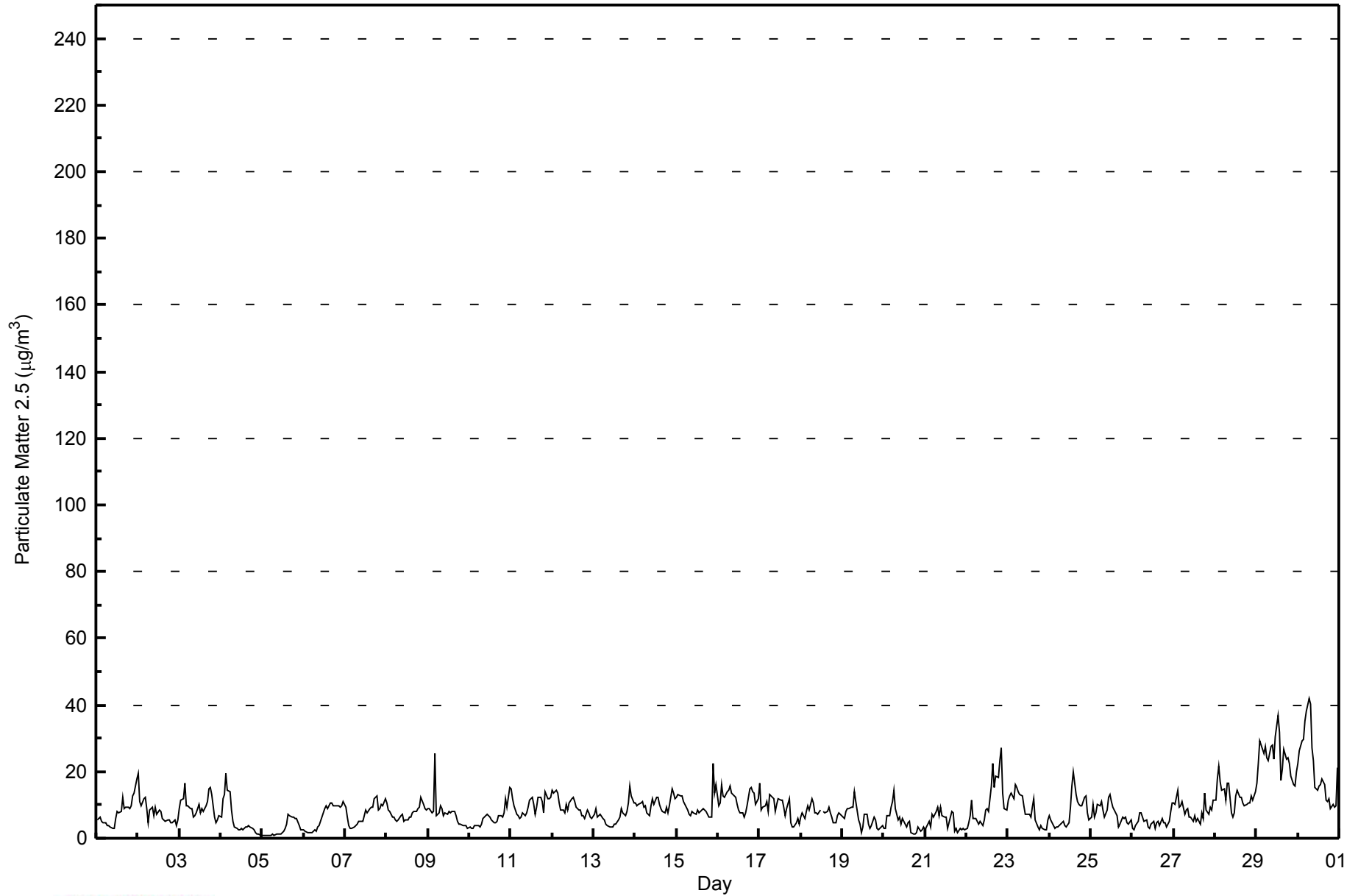
M - Maintenance

Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - June 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - June 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	186	25.87	25.87
6 - 15	462	64.26	90.13
16 - 25	45	6.26	96.38
26 - 80	19	2.64	99.03
> 81.0	0	0.00	99.03

Total Number of Valid Hours: 719

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - µg/m³
Athabasca Valley - June 2014

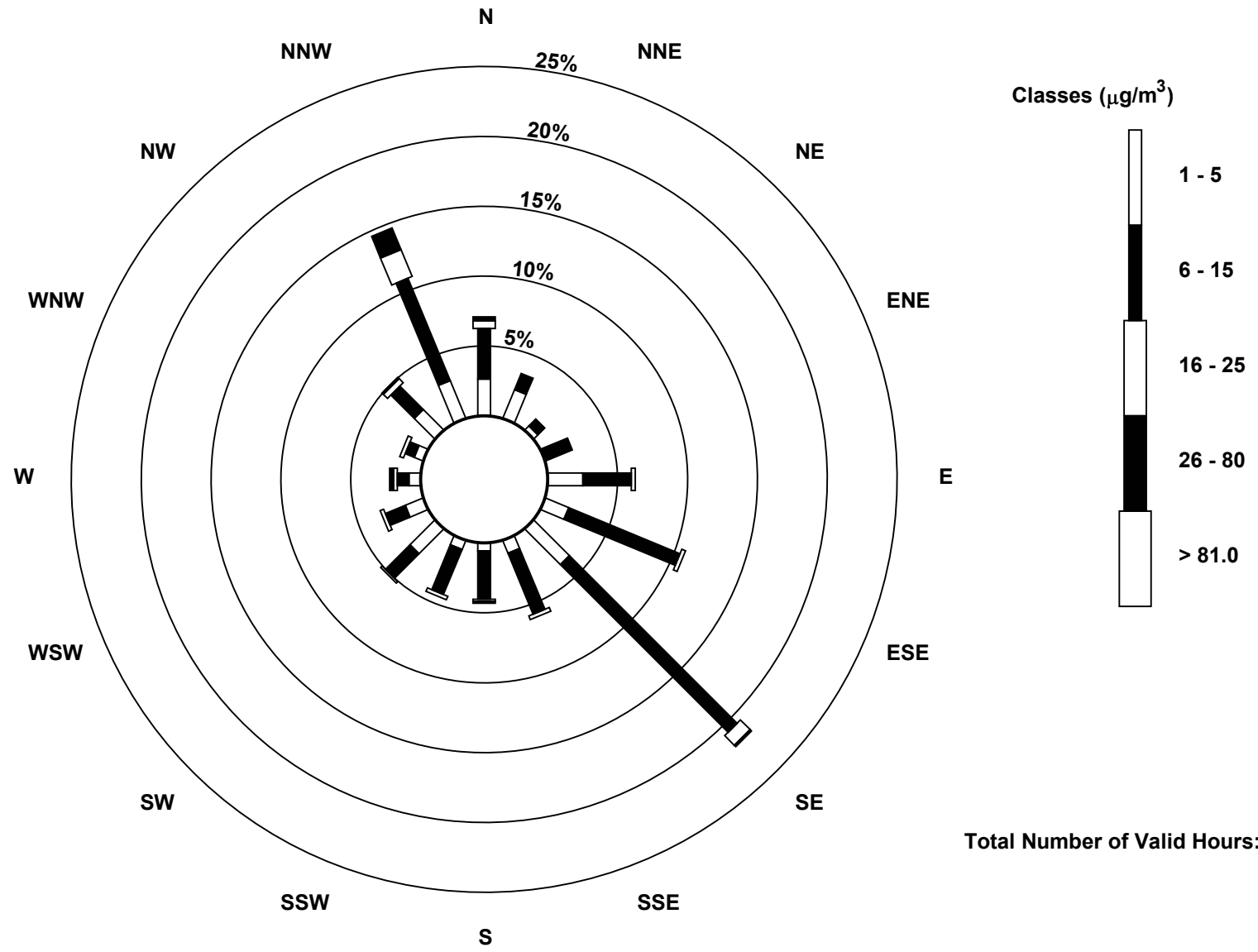
Concentration Ranges (µg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	19	16	3	0	18	13	26	7	4	5	18	10	6	5	15	21	186
6 - 15	26	9	5	15	25	62	122	34	25	25	18	11	6	5	17	57	462
16 - 25	4	0	0	0	2	2	7	2	1	2	1	2	2	2	3	15	45
26 - 80	2	0	0	0	0	0	1	0	1	0	0	0	2	0	1	12	19
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	51	25	8	15	45	77	156	43	31	32	37	23	16	12	36	105	712

Total Number of Valid Hours: 719

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Athabasca Valley (AMS 7)

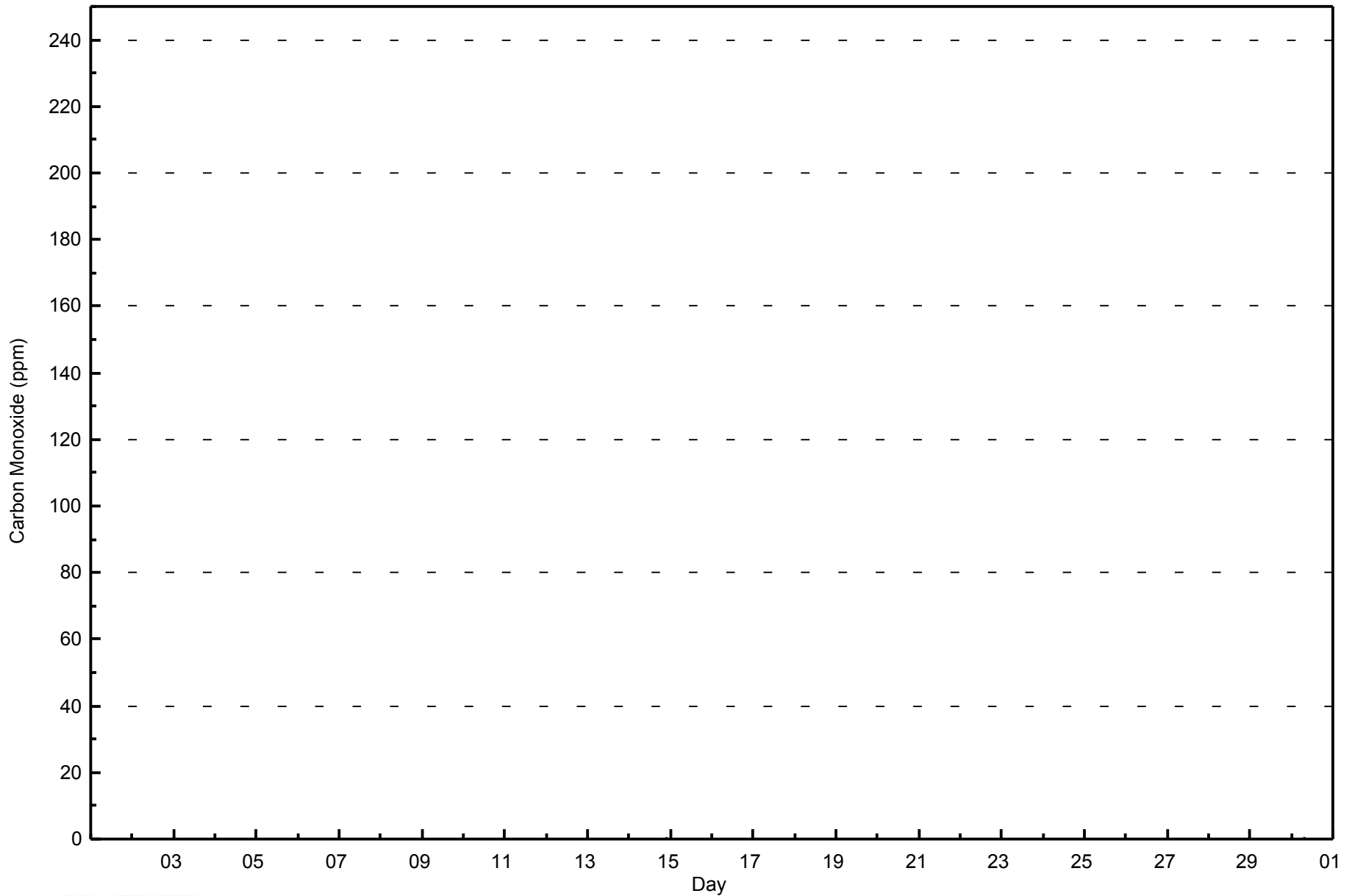


Total Number of Valid Hours: 719



WBEA
Hourly Averages

Carbon Monoxide (CO) - ppm
Athabasca Valley - June 2014





WBEA
Cumulative Frequency Distribution

Carbon Monoxide (CO) - ppm
Athabasca Valley - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	687	100.00	100.00
0.4 - 0.5	0	0.00	100.00
0.6 - 0.7	0	0.00	100.00
0.8 - 1.4	0	0.00	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 687

Total Number of Hours: 720



WBEA
Frequency Distribution

Carbon Monoxide (CO) - ppm
Athabasca Valley - June 2014

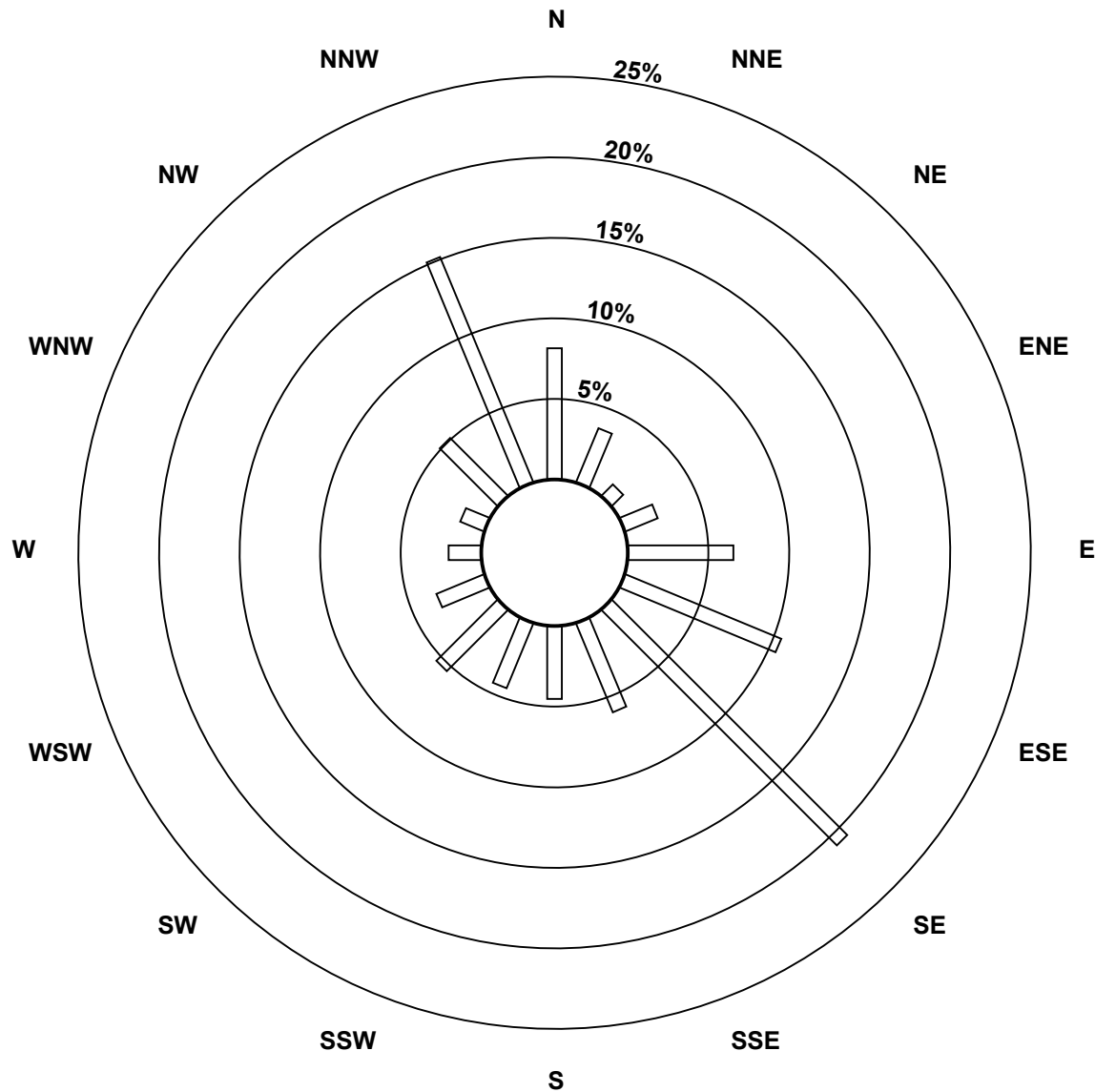
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	56	25	7	15	45	72	142	41	31	30	37	22	14	11	35	104	687
0.4 - 0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.6 - 0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.8 - 1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.5 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	25	7	15	45	72	142	41	31	30	37	22	14	11	35	104	687

Total Number of Valid Hours: 687

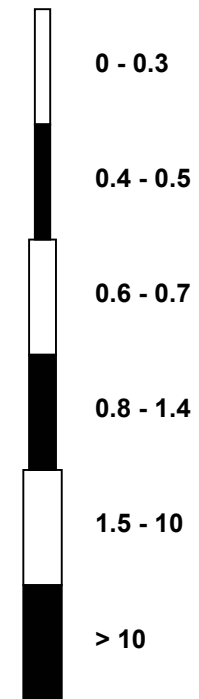
Total Number of Hours: 720

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

**Carbon Monoxide (CO) - ppm
Athabasca Valley (AMS 7)**



Classes (ppm)

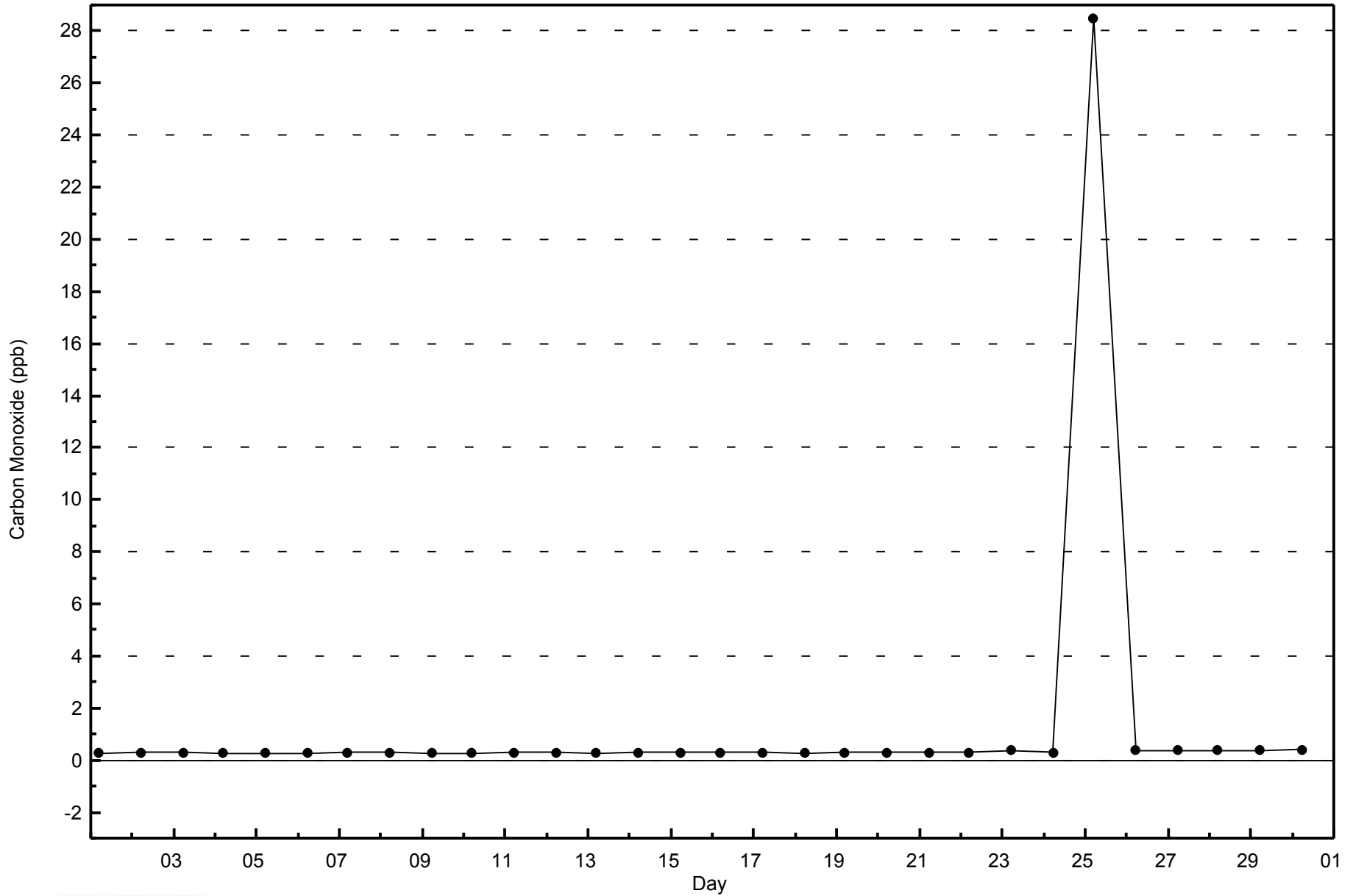


Total Number of Valid Hours: 687



WBEA
Zero Responses

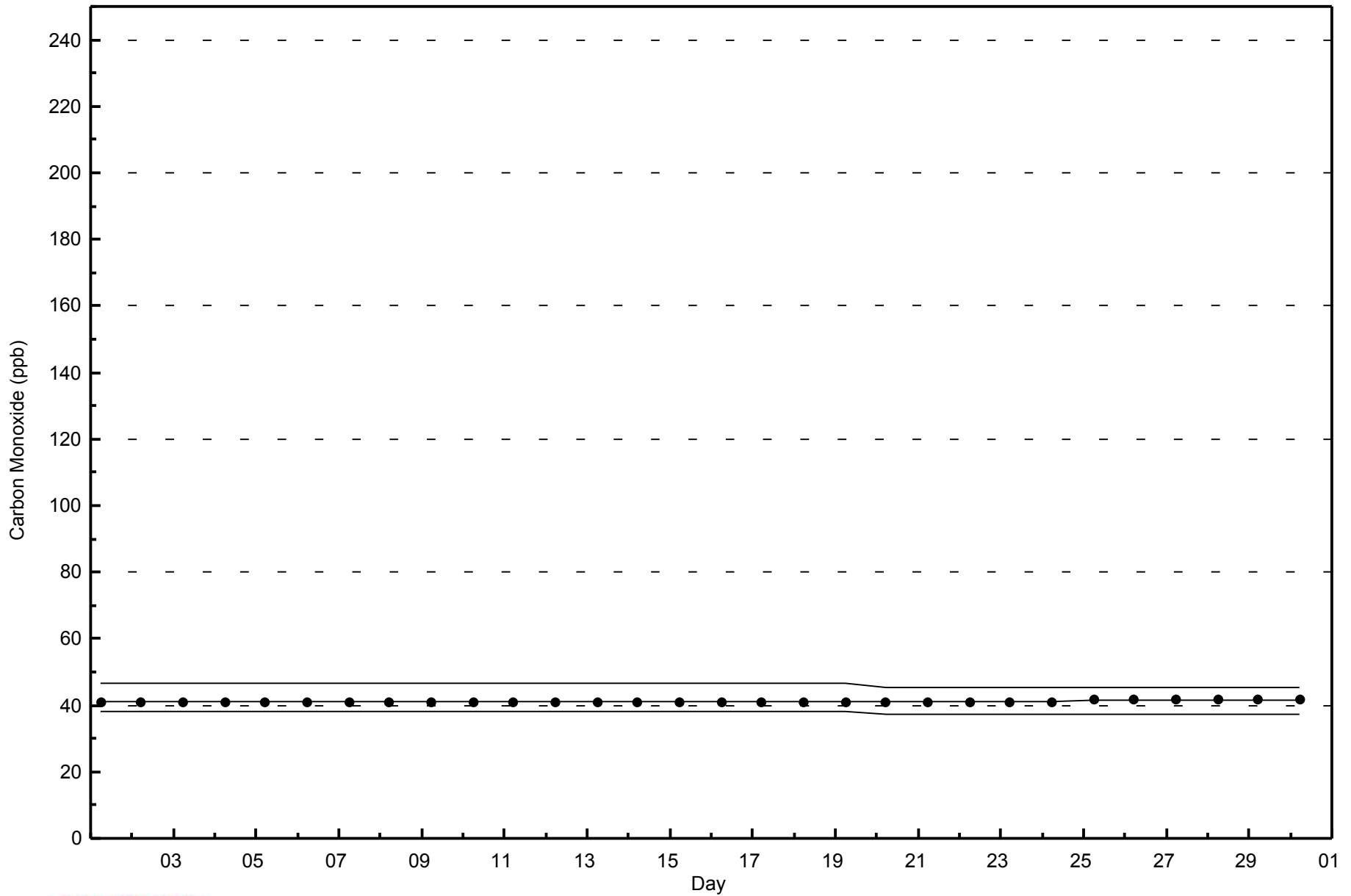
Carbon Monoxide (CO) - ppb
Athabasca Valley - June 2014





WBEA
Span Responses

Carbon Monoxide (CO) - ppb
Athabasca Valley - June 2014



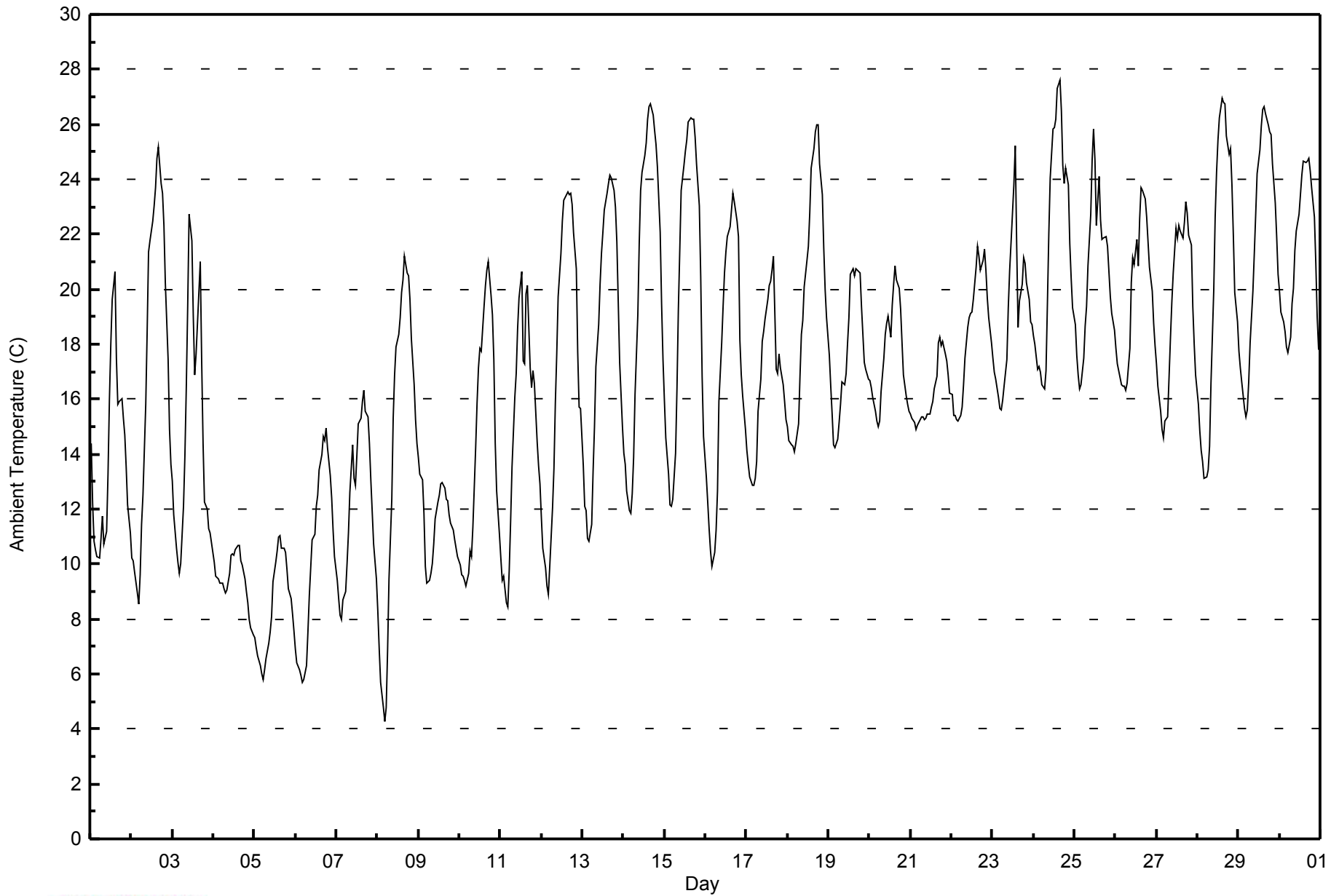


Maximum Value: 27.6 C on Jun 24 16:00		Maximum Daily Average: 21.7 C on Jun 24		Hours in Service: 720																																												
Minimum Value: 4.3 C on Jun 8 05:00		Minimum Daily Average: 8.4 C on Jun 5		Hours of Data: 720																																												
Maximum Diurnal Average: 21.0 C at hour 17		Minimum Diurnal Average: 11.9 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 16.80 C		Percentiles: P ₁ = 5.9 P ₁₀ = 9.7 Q ₁ = 12.9 Median = 16.9 Q ₃ = 20.7 P ₉₀ = 23.8 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-Jun	14.4	12.2	10.8	10.5	10.3	10.2	10.9	11.7	10.7	11.2	13.3	15.9	18.0	19.6	20.6	17.5	15.8	15.9	16.0	15.3	14.7	13.5	12.1	11.2	13.9	20.6																						
2-Jun	10.2	10.1	9.7	9.0	8.5	9.6	11.5	12.5	15.8	18.5	21.4	21.8	22.5	23.1	23.7	24.7	25.2	23.9	23.5	22.3	20.2	17.4	14.9	13.6	17.2	25.2																						
3-Jun	13.0	11.8	10.6	10.1	9.7	10.0	12.1	14.0	16.4	19.4	22.7	21.8	19.0	16.9	17.6	19.9	21.0	17.4	14.4	12.3	12.0	11.3	11.1	10.8	14.8	22.7																						
4-Jun	10.0	9.5	9.5	9.5	9.3	9.3	9.1	8.9	9.1	9.7	10.3	10.4	10.3	10.5	10.7	10.7	10.1	10.0	9.5	9.0	8.6	8.0	7.7	7.4	9.5	10.7																						
5-Jun	7.3	7.0	6.7	6.3	6.0	5.8	6.1	6.6	7.1	7.5	8.1	9.4	10.1	10.5	11.0	11.1	10.6	10.6	10.4	9.8	9.1	8.8	8.2	7.6	8.4	11.1																						
6-Jun	6.9	6.4	6.1	5.9	5.7	5.8	6.3	7.5	8.8	9.9	10.9	11.1	12.1	12.5	13.4	14.0	14.6	14.5	14.9	14.2	13.2	12.4	11.2	10.3	10.4	14.9																						
7-Jun	9.4	8.7	8.1	8.0	8.7	9.0	10.0	11.2	12.6	14.3	13.1	12.9	13.9	15.1	15.3	15.9	16.3	15.5	15.3	14.4	13.1	11.9	10.7	9.5	12.2	16.3																						
8-Jun	8.3	6.9	5.7	4.8	4.3	4.8	6.9	9.4	12.3	15.3	16.9	17.9	18.4	19.0	19.9	20.4	21.2	20.6	20.5	19.6	18.2	16.5	15.2	14.4	14.1	21.2																						
9-Jun	13.9	13.3	13.1	11.8	9.9	9.3	9.4	9.7	10.0	10.7	11.7	12.3	12.5	12.9	13.0	12.7	12.3	12.3	11.8	11.5	11.2	10.9	10.6	10.3	11.5	13.9																						
10-Jun	10.0	9.6	9.5	9.4	9.2	9.6	10.5	10.3	11.4	14.2	15.9	17.1	17.9	17.7	19.4	20.2	20.7	21.0	19.8	19.1	17.4	14.4	12.7	11.1	14.5	21.0																						
11-Jun	10.2	9.4	9.5	8.6	8.4	9.8	11.6	13.5	16.1	16.9	18.6	19.7	20.7	17.4	17.3	19.8	20.1	17.1	16.4	17.0	16.6	14.4	13.6	12.9	14.8	20.7																						
12-Jun	11.7	10.6	9.9	9.2	8.9	9.9	12.0	13.5	15.9	17.7	19.8	21.3	22.5	23.3	23.3	23.5	23.5	23.5	23.1	22.1	20.8	17.7	15.7	15.7	17.3	23.5																						
13-Jun	13.6	12.1	11.9	10.9	10.8	11.5	13.4	15.0	17.2	18.7	20.2	21.3	22.1	22.9	23.5	23.9	24.1	24.0	23.6	23.0	21.7	19.5	17.3	15.0	18.2	24.1																						
14-Jun	14.0	13.6	12.7	11.9	11.8	12.5	13.9	16.2	19.1	21.6	23.6	24.2	24.9	25.3	26.2	26.6	26.7	26.3	25.8	25.3	24.4	22.1	19.5	17.5	20.2	26.7																						
15-Jun	16.0	14.6	13.3	12.2	12.1	12.4	14.0	16.4	19.3	21.4	23.6	24.5	25.0	25.4	26.1	26.3	26.2	26.2	25.5	24.6	23.0	20.5	16.8	14.6	20.0	26.3																						
16-Jun	13.2	12.2	11.3	10.5	9.9	10.4	11.3	12.7	15.9	18.0	19.4	20.6	21.3	21.9	22.3	22.9	23.5	23.2	22.5	21.9	18.1	16.9	16.1	14.9	17.1	23.5																						
17-Jun	14.2	13.6	13.2	12.9	12.9	13.1	13.7	15.6	16.7	18.1	18.5	18.9	19.6	20.2	20.3	20.7	21.2	17.1	16.9	17.7	17.1	16.5	15.9	15.3	16.7	21.2																						
18-Jun	15.0	14.5	14.4	14.3	14.1	14.4	15.1	16.8	18.3	18.9	20.1	21.1	21.6	22.8	24.4	25.1	25.7	26.0	26.0	24.6	23.4	21.5	20.0	19.0	19.9	26.0																						
19-Jun	17.6	16.5	15.5	14.3	14.2	14.5	15.1	15.8	16.6	16.6	16.9	18.0	19.0	20.6	20.8	20.5	20.7	20.7	20.6	19.4	18.4	17.3	17.1	16.7	17.6	20.8																						
20-Jun	16.7	16.4	16.1	15.5	15.2	15.0	15.2	16.3	17.5	18.4	18.8	19.0	18.3	19.4	20.2	20.8	20.3	20.0	19.3	18.1	16.9	16.1	15.8	15.6	17.5	20.8																						
21-Jun	15.4	15.3	15.1	14.9	15.1	15.2	15.4	15.3	15.2	15.3	15.5	15.5	15.7	15.9	16.4	16.8	18.1	18.3	17.9	18.1	17.6	17.4	16.9	16.2	16.2	18.3																						
22-Jun	16.1	15.4	15.4	15.2	15.2	15.4	15.7	16.5	17.5	18.6	19.0	19.1	19.2	19.6	20.8	21.5	21.2	20.7	21.0	21.5	20.7	19.7	18.9	18.1	18.4	21.5																						
23-Jun	17.5	17.0	16.7	16.1	15.6	15.6	16.0	16.5	17.5	19.3	20.7	21.7	23.8	25.2	21.7	18.6	19.6	20.2	21.1	21.0	20.3	19.6	18.8	18.7	19.1	25.2																						
24-Jun	18.3	18.0	17.1	17.2	17.0	16.5	16.4	17.0	19.5	22.0	24.1	25.8	25.9	26.2	27.3	27.6	26.5	24.5	23.9	24.4	23.8	21.7	20.4	19.3	21.7	27.6																						
25-Jun	18.7	17.6	16.9	16.4	16.5	17.5	18.6	19.4	20.9	22.7	24.7	25.8	24.7	22.3	24.1	22.6	21.8	21.9	21.9	21.6	20.6	19.8	19.1	18.5	20.6	25.8																						
26-Jun	17.9	17.3	17.0	16.5	16.5	16.5	16.3	16.6	17.8	20.2	21.1	20.9	21.8	20.9	22.6	23.7	23.6	23.3	22.6	21.7	20.8	19.9	18.8	18.0	19.7	23.7																						
27-Jun	17.3	16.5	15.6	14.9	14.6	15.2	15.4	16.8	18.2	19.5	20.6	22.2	21.9	22.3	22.1	21.9	22.4	23.2	22.8	22.0	21.6	19.4	18.0	16.9	19.2	23.2																						
28-Jun	15.8	14.8	14.2	13.7	13.1	13.2	13.4	14.3	16.6	20.0	22.6	24.2	25.4	26.2	27.0	26.8	26.7	25.6	24.9	25.1	23.8	22.0	19.9	18.8	20.3	27.0																						
29-Jun	17.7	17.1	16.6	15.7	15.4	15.6	16.6	18.0	19.9	21.3	22.7	24.2	25.1	25.9	26.5	26.6	26.4	26.0	25.7	25.6	24.6	23.2	21.9	20.6	21.6	26.6																						
30-Jun	19.9	19.1	18.8	18.4	17.9	17.7	18.3	19.5	20.1	21.4	22.1	22.7	23.4	24.2	24.6	24.6	24.6	24.7	24.3	23.7	22.6	20.9	19.0	17.8	21.3	24.7																						
																								14.0	13.2	12.7	12.2	11.9	12.2	13.0	14.1	15.7	17.2	18.6	19.4	19.9	20.2	20.7	20.9	21.0	20.5	20.1	19.5	18.5	17.0	15.8	14.9	Diurnal Average
																								19.9	19.1	18.8	18.4	17.9	17.7	18.6	19.5	20.9	22.7	24.7	25.8	25.9	26.2	27.3	27.6	26.7	26.3	26.0	25.6	24.6	23.2	21.9	20.6	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Athabasca Valley - June 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Athabasca Valley - June 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	83	11.53	11.53
10 - 20	424	58.89	70.42
> 20	213	29.58	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Barometric Pressure (BP) - %

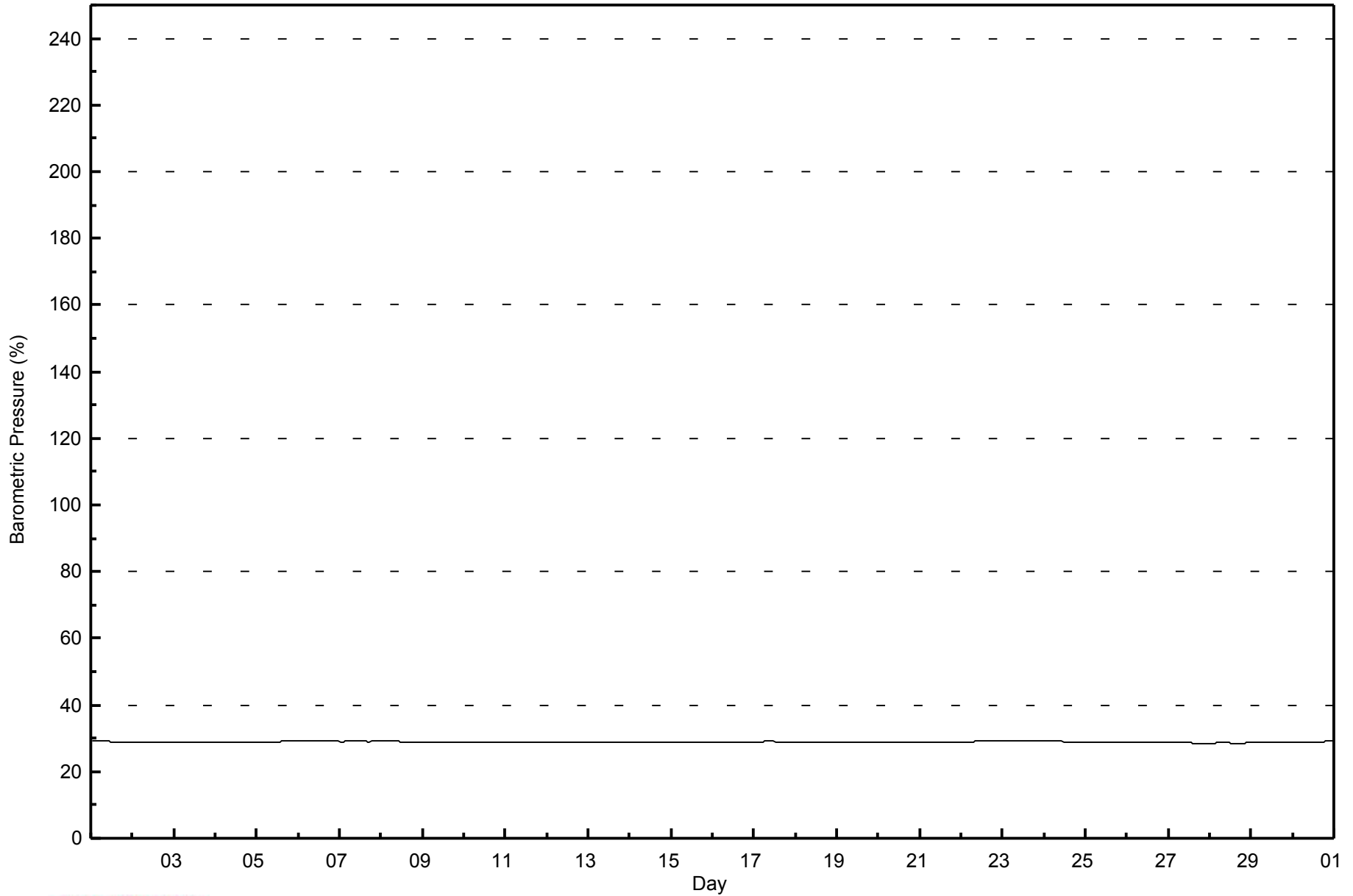
Athabasca Valley - June 2014

Maximum Value: 29.1 % on Jun 23 09:00															Maximum Daily Average: 29.1 % on Jun 23															Hours in Service: 720	
Minimum Value: 28.6 % on Jun 28 16:00															Minimum Daily Average: 28.6 % on Jun 28															Hours of Data: 720	
Maximum Diurnal Average: 28.9 % at hour 8															Minimum Diurnal Average: 28.9 % at hour 17															Hours of Missing Data: 0	
Monthly Average: 28.89 %															Percentiles: P ₁ = 28.6 P ₁₀ = 28.7 Q ₁ = 28.8 Median = 28.9 Q ₃ = 29.0 P ₉₀ = 29.1 P ₉₉ = 29.1															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-Jun	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	28.9	29.0	28.9	28.9	28.9	28.9	29.0	28.9	28.9	28.9	29.0	29.1	29.1	29.0	29.1			
2-Jun	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9		
3-Jun	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		
4-Jun	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		
5-Jun	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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.1		
6-Jun	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1		
7-Jun	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	29.1	29.1	29.1	29.1	29.1	29.0	29.1	29.1		
8-Jun	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	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	29.0	29.1	29.1		
9-Jun	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7		
10-Jun	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0		
11-Jun	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	29.0	29.0	29.0		
12-Jun	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0		
13-Jun	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	29.0		
14-Jun	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8		
15-Jun	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8		
16-Jun	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0		
17-Jun	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	29.0	29.0	29.0		
18-Jun	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	29.0		
19-Jun	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		
20-Jun	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		
21-Jun	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0		
22-Jun	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	29.0	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		
23-Jun	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1		
24-Jun	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	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		
25-Jun	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.7	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		
26-Jun	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8		
27-Jun	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	28.7		
28-Jun	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		
29-Jun	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8		
30-Jun	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1		
																								Diurnal Average							
																								Diurnal Maximum							



WBEA
Hourly Averages

Barometric Pressure (BP) - %
Athabasca Valley - June 2014



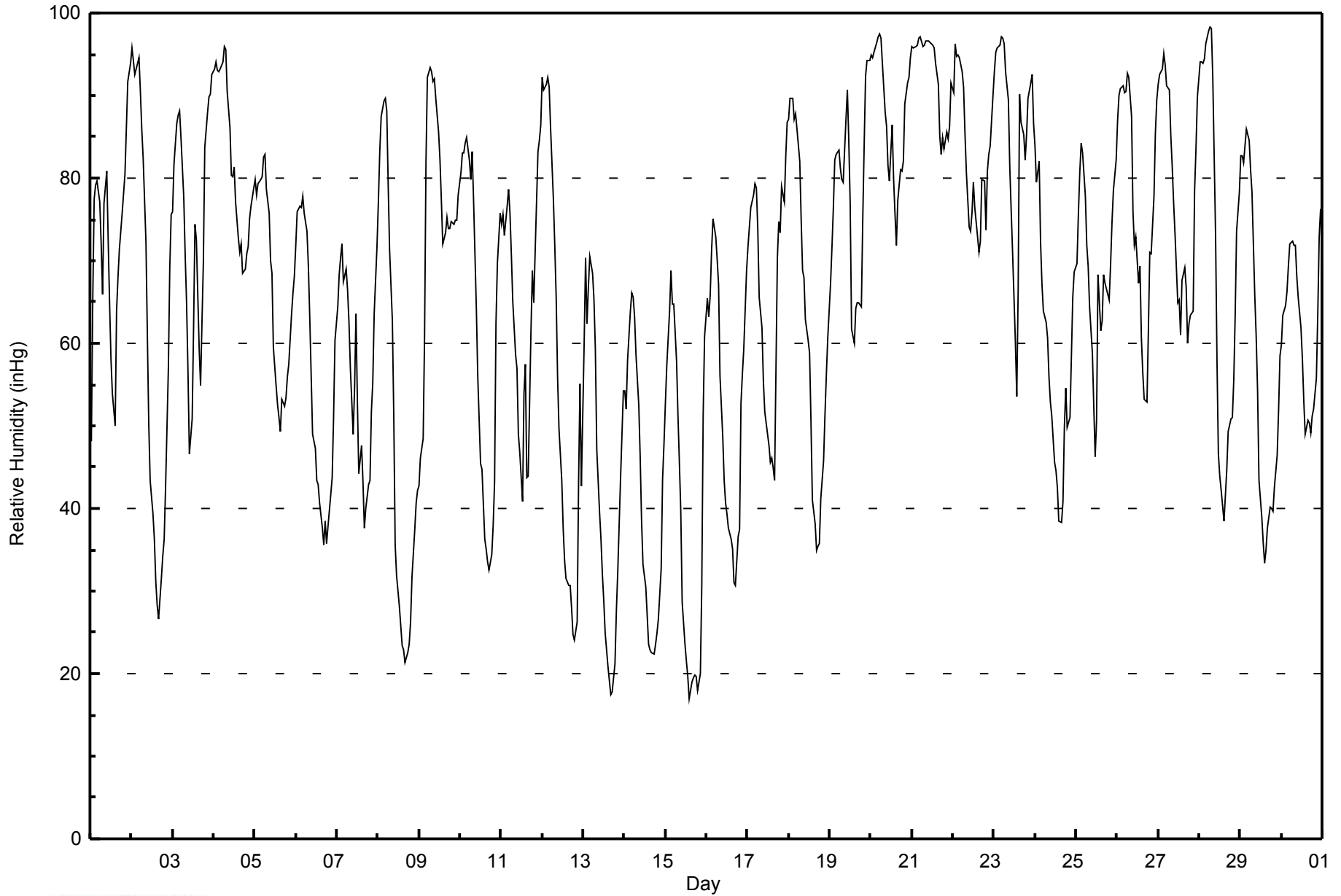


Maximum Value: 98 inHg on Jun 28 07:00																			Maximum Daily Average: 92.4 inHg on Jun 21						Hours in Service: 720																								
Minimum Value: 17 inHg on Jun 15 15:00																			Minimum Daily Average: 39.0 inHg on Jun 15						Hours of Data: 720																								
Maximum Diurnal Average: 83.5 inHg at hour 5																			Minimum Diurnal Average: 49.0 inHg at hour 17						Hours of Missing Data: 0																								
Monthly Average: 65.8 inHg																			Percentiles: P ₁ = 20 P ₁₀ = 36 Q ₁ = 51 Median = 69 Q ₃ = 82 P ₉₀ = 92 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-Jun	48	66	77	79	80	77	72	66	77	81	73	65	58	54	50	64	68	71	76	78	80	86	92	94	72.1	94																							
2-Jun	96	94	93	94	94	91	86	82	72	61	50	43	39	36	31	28	27	32	34	36	42	57	69	76	61.0	96																							
3-Jun	76	82	87	88	88	85	78	71	65	57	47	51	62	74	72	59	55	63	70	84	88	90	90	92	73.8	92																							
4-Jun	93	94	93	93	93	94	96	96	90	86	80	80	81	77	73	71	72	68	69	71	72	75	77	79	82.2	96																							
5-Jun	80	78	79	80	80	83	83	79	76	70	68	59	55	53	51	49	53	52	53	56	57	64	66	68	66.4	83																							
6-Jun	72	76	77	76	78	76	74	69	63	56	49	47	43	43	41	38	36	38	36	38	42	44	51	60	55.1	78																							
7-Jun	64	68	70	72	67	69	67	62	57	49	55	64	53	44	48	43	38	40	43	43	52	55	64	72	56.6	72																							
8-Jun	77	83	88	89	90	88	79	71	63	51	36	32	28	26	23	23	21	23	24	26	32	37	41	42	49.7	90																							
9-Jun	43	46	48	61	82	92	93	93	92	92	90	86	82	77	72	73	75	74	74	75	74	75	75	78	75.9	93																							
10-Jun	81	83	83	84	85	82	80	83	77	64	56	51	46	45	36	35	34	33	34	38	43	62	70	76	60.8	85																							
11-Jun	74	76	73	77	79	76	71	65	59	57	49	47	41	54	57	44	44	62	69	65	71	83	85	86	65.1	86																							
12-Jun	92	91	91	92	91	86	77	72	66	56	50	43	38	34	32	31	31	28	25	24	26	43	55	43	54.8	92																							
13-Jun	60	70	62	67	70	69	65	59	47	39	36	32	29	25	21	19	17	18	21	28	32	38	44	54	42.7	70																							
14-Jun	54	52	58	64	66	66	63	59	53	46	38	33	31	27	24	23	22	22	24	25	27	33	44	48	41.7	66																							
15-Jun	53	57	64	69	65	65	58	51	46	40	29	24	22	20	17	19	19	20	20	18	20	31	51	61	39.0	69																							
16-Jun	65	63	66	71	75	73	70	67	56	49	43	41	39	38	36	35	31	31	37	37	53	56	59	69	52.5	75																							
17-Jun	72	74	76	78	79	79	74	66	62	55	52	50	48	46	46	45	43	70	75	73	79	77	83	87	66.2	87																							
18-Jun	87	90	90	87	88	86	82	75	69	68	63	60	59	51	41	38	35	35	36	41	46	51	56	61	62.3	90																							
19-Jun	67	72	76	82	83	83	81	80	80	87	91	85	77	62	60	64	65	65	64	75	84	92	94	94	77.7	94																							
20-Jun	95	95	95	96	97	97	97	94	88	86	82	80	86	80	76	72	77	81	81	82	89	92	92	95	87.7	97																							
21-Jun	96	96	96	96	97	97	96	96	97	97	97	96	96	96	94	91	85	83	85	84	86	85	86	92	92.4	97																							
22-Jun	90	96	95	95	95	93	91	85	81	74	74	76	79	76	73	71	72	80	80	74	81	83	84	90	82.8	96																							
23-Jun	93	95	96	96	97	97	96	93	90	81	76	71	60	54	67	90	87	85	82	85	90	92	93	87	85.5	97																							
24-Jun	84	79	82	72	67	64	63	61	56	53	51	46	45	43	39	38	41	50	55	50	51	58	66	69	57.5	84																							
25-Jun	70	76	81	84	83	78	72	69	64	59	52	46	51	68	61	63	68	67	66	65	69	75	78	82	68.7	84																							
26-Jun	87	90	91	91	90	90	93	92	87	76	72	73	67	69	61	56	53	53	62	71	71	78	86	89	77.0	93																							
27-Jun	91	93	93	95	94	91	91	85	81	77	73	65	65	61	68	69	67	60	62	63	64	78	84	90	77.6	95																							
28-Jun	94	94	94	94	96	98	98	98	92	73	58	47	44	42	38	42	45	49	51	51	56	63	74	78	69.6	98																							
29-Jun	83	83	82	86	85	85	81	78	66	61	54	43	39	36	33	35	38	40	40	40	43	46	52	59	57.8	86																							
30-Jun	60	63	65	66	69	72	72	72	72	68	66	62	58	53	49	51	50	49	51	52	56	64	73	76	62.1	76																							
																								76.6	79.1	80.7	82.5	83.5	82.7	79.9	76.3	71.4	65.6	60.3	56.6	54.0	52.0	49.7	49.3	49.0	51.4	53.2	54.9	59.2	65.5	71.0	74.8	Diurnal Average	
																								96	96	96	96	97	98	98	98	97	97	97	96	96	96	94	91	87	85	85	85	90	92	94	95	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - inHg
Athabasca Valley - June 2014





Maximum Speed: 28 km/h on Jun 3 18:00	Maximum Daily Speed Average: 15.0 km/h on Jun 5	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 23 16:00	Minimum Daily Speed Average: 0.7 km/h on Jun 27	Hours of Data: 720
Maximum Diurnal Speed Average: 3.3 km/h at hour 18	Minimum Diurnal Speed Average: 0.7 km/h at hour 21	Hours of Missing Data: 0
Monthly Average Velocity: 1.3 km/h 61.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 10 P ₉₀ = 14 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-Jun	SE14	SE11	SE5	ESE6	ESE3	ESE6	ESE8	SE8	SE11	SE8	SE11	ESE8	ESE10	E8	SE5	S12	SSE6	SSW6	SE9	NNW1	N6	SSW2	S2	SE3	SE6.0	SE14	
2-Jun	SE4	SE9	SE8	SE7	SE5	SSE5	E4	SE6	SSW3	SW9	SSW9	NW5	SSW3	ESE8	N6	N6	N9	NE13	NNE10	NNE12	NNW4	WNW3	SW1	SW2	E1.5	NE13	
3-Jun	W3	WSW4	SW1	NNW2	ENE2	NE2	NNE2	NNW3	NNW5	NNW5	N10	N14	NNW12	NE4	ENE2	ESE2	NNE7	NNW28	NNW26	N16	NNW16	NNW10	WNW9	NW12	NNW7.1	NNW28	
4-Jun	NNW11	NW9	NW10	NW13	NW11	NNW10	NNW10	NNW12	NW15	NW18	NW17	NNW15	NNW13	NNW14	N15	N19	N14	N15	NNE14	NNE11	NNE13	NNE12	NNE13	NNE10	NNW11.6	N19	
5-Jun	N13	N16	N20	N18	N17	N18	N16	N17	N14	N16	N16	N18	N19	NNW19	N19	NNW20	NNW16	NNW18	NNW17	N13	N5	NW8	NW8	NW8	N15.0	N20	
6-Jun	NW7	W5	W6	W4	SW5	WSW4	NW3	NNW5	NE6	N7	NNW9	N10	N8	NNW6	NNW6	NNW7	NNW6	NW5	N5	NE4	E5	ESE5	ESE5	ESE5	NNW3.4	N10	
7-Jun	SE4	ESE4	SE6	E4	SE9	SSE7	ESE4	E7	E8	E5	N6	S5	ENE8	NE6	E7	ENE2	N7	NW6	NNW5	E8	ESE7	SSE5	SSW7	SE3	ESE3.1	SE9	
8-Jun	SE3	SE5	SE4	SE5	SE5	SE6	SE7	ESE6	E4	ENE3	NNE4	WSW2	SW4	ENE4	ENE5	ENE6	SE6	E7	ESE9	ESE7	SE7	SE9	SE10	SE11	ESE4.8	SE11	
9-Jun	SE13	SE13	SE10	SE8	SE8	SE10	SE10	SSE9	SE12	SSE9	SE12	SE12	SE14	ESE16	ESE19	E18	E18	E20	E16	E13	E12	E5	NE3	NNE6	ESE10.7	E20	
10-Jun	NNE8	NNE6	NNE8	NNE9	NNE9	NNE9	N9	NNW9	NNW7	NNW14	NNW15	NNW15	N6	NNW12	NNW18	NNW17	NNW16	N16	N12	NW8	WSW3	SSW3	SSW4	SE5	N8.4	NNW18	
11-Jun	SE8	SE10	SE7	SE8	SE8	ESE6	ESE5	SE7	ESE2	SW9	S3	ESE7	ENE8	NNE9	SW2	ESE4	E2	E4	WSW3	ESE4	S1	SSW1	SSE2	SW1	SE3.4	SE10	
12-Jun	SE2	SE3	SE4	SE3	ESE4	SE4	ESE3	ENE6	ENE2	NW2	NNW7	NNW10	NNW12	NNW14	NNW16	NNW15	NNW15	N14	NNE12	NNE9	NNE5	N6	NW3	SE3	N5.0	NNW16	
13-Jun	NNE2	NE3	E4	SSE2	SE2	SE4	SE5	SE11	SE10	SE11	SSE6	E6	SSE7	S10	SSE11	SSE9	SE10	ESE8	E9	ESE10	ESE6	SE6	SE6	ESE5	SE6.2	SE11	
14-Jun	ESE7	SE7	SE7	SE4	SE7	SE11	SE12	SE10	SE7	SE8	ESE9	SE6	SE10	SSE14	S12	SW15	SSW11	S9	S9	SSW9	SSE7	SSE5	S3	SE9	SSE7.5	SSW15	
15-Jun	SE7	SE6	SE6	SE6	SE7	SE10	SE11	SE11	ESE7	ENE4	ESE8	SE7	ESE9	ESE14	SE11	ESE8	SE11	SE11	ESE12	ESE12	ESE6	SE5	SE5	SSE1	SSW1	ESE7.6	ESE14
16-Jun	S1	ENE1	SSE3	SSW2	SW3	SE2	SE4	E3	ESE5	ESE7	SSE10	SSE5	S4	SSE8	S7	SW3	S4	S7	E5	SE7	SW14	SSW5	S3	E1	SSE3.7	SW14	
17-Jun	S1	SE4	SE5	SE5	SW3	SSW2	SE4	SE4	SE7	ESE8	ESE9	ESE9	E8	SE9	ESE10	ESE6	SE6	SW11	SW6	SSW2	SW3	SSE7	SSE6	S4	SE4.5	SW11	
18-Jun	S4	SW3	SE2	SE5	SSE6	SE7	SE8	SE11	ESE9	SE11	SE12	SE12	SE10	SE10	SSE13	S14	SSE14	S12	SSE12	SE15	SE11	SE10	SSE7	SSE5	SE8.8	SE15	
19-Jun	SE5	SE9	SE5	SE3	S2	ESE2	SE3	E2	ENE2	SE6	ESE1	E8	E7	SE12	SE10	E9	ESE6	E8	ESE7	ENE2	E0	WSW4	WSW4	SSW2	ESE3.9	SE12	
20-Jun	NNW2	WSW6	SW2	SSW1	SSW1	SE4	SSW3	ESE3	SE6	SSW5	SE4	SE5	SE6	ESE4	ESE7	ESE8	E7	SE6	SSE5	SSW6	SW7	SW5	SW3	WSW3	SSE2.8	ESE8	
21-Jun	NW5	NNW7	NNW6	NW5	NNW6	NW8	N5	NNW9	NNW10	NW11	NNW9	NNW11	NNW9	NNW9	NNW10	NW8	WNW13	NW17	WNW7	WNW11	WNW9	WNW7	WSW2	WSW4	NW7.7	NW17	
22-Jun	NW5	NW6	NW7	W8	W6	W4	W3	NW4	NNW7	NNW7	N7	N7	NNW11	N10	NNW11	NNW11	NNW3	SE5	SSW1	WSW2	S5	ESE5	ESE4	NNW2	NNW3.9	NNW11	
23-Jun	SW2	SSE1	S1	ESE3	ESE3	SE2	E3	ESE4	E4	ESE5	SSE8	SSE7	SE9	SSW11	E0	E3	W2	NW2	E1	SW3	SSE2	SE3	SE5	SSE2.9	SSW11		
24-Jun	SE5	SE5	SE5	SE9	SE8	SE6	SE7	SE6	ESE6	ESE10	ESE11	SE14	SSE14	SE12	SSE14	SSE13	SSE11	SSW5	S5	SSE7	SSE6	SE6	SE10	SE8	SE8.1	SSE14	
25-Jun	SE6	ESE6	ESE3	SE2	SE7	SE9	SE12	ESE13	SE11	SE11	ESE13	ESE15	S10	NW5	NW3	S12	W8	N4	SE3	SSW8	S5	SSW4	SE2	SSW3	SE5.0	ESE15	
26-Jun	SW0	SW5	S2	SSE4	SSE4	SSW3	SSW4	WSW3	SW7	WSW3	SW10	SW12	SW11	SW12	SW8	SW9	SW9	SW8	WSW3	N6	NNE4	NNE1	WSW4	WSW4	SW4.6	SW12	
27-Jun	W1	S0	ESE2	SSE3	ESE3	ESE2	SE3	E3	E1	WNW3	NNW4	NW1	E9	S1	SW5	SW5	NNW5	NNW10	N10	NNE9	NNW3	WSW3	SW4	SW4	N0.7	NNW10	
28-Jun	E1	SE1	E2	ESE4	ESE4	ESE3	E3	WNW2	NW2	NW3	NNW8	NNW7	N8	N9	N11	NNW13	N11	N8	N5	NNW5	NNW4	W3	WSW5	WSW4	N3.4	NNW13	
29-Jun	WSW5	NNW6	NW8	W5	W6	W6	W3	N6	N11	NNW13	NNW16	NNW20	NNW19	N20	N20	NNW22	NNW21	NNW18	NNW16	NNW13	NNW11	NW6	N5	NNW5	NNW10.8	NNW22	
30-Jun	NNW7	NNW6	NNW9	NNW12	NNW10	NNW9	NNW11	NNW11	NNW14	N11	NNW14	NNW17	NNW18	NNW16	NNW17	NNW17	NNW16	NNW14	NNW11	NNW10	N6	WNW3	WSW5	SW6	NNW10.5	NNW18	

ESE1.1	SE1.5	ESE1.0	ESE0.9	SE1.4	ESE1.9	ESE2.4	E2.4	ENE2.2	NE1.1	NE2.1	NE2.4	NE2.4	NE2.9	NE1.9	N1.7	NNE2.5	N3.3	NNE2.8	NE2.7	ENE0.7	SSE0.8	S1.2	SSE0.9	Diurnal Average
SE14	N16	N20	N18	N17	N18	N16	N17	NW15	NW18	NW17	NNW20	NNW19	N20	N20	NNW22	NNW21	NNW28	NNW26	N16	NNW16	NNE12	NNE13	NW12	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

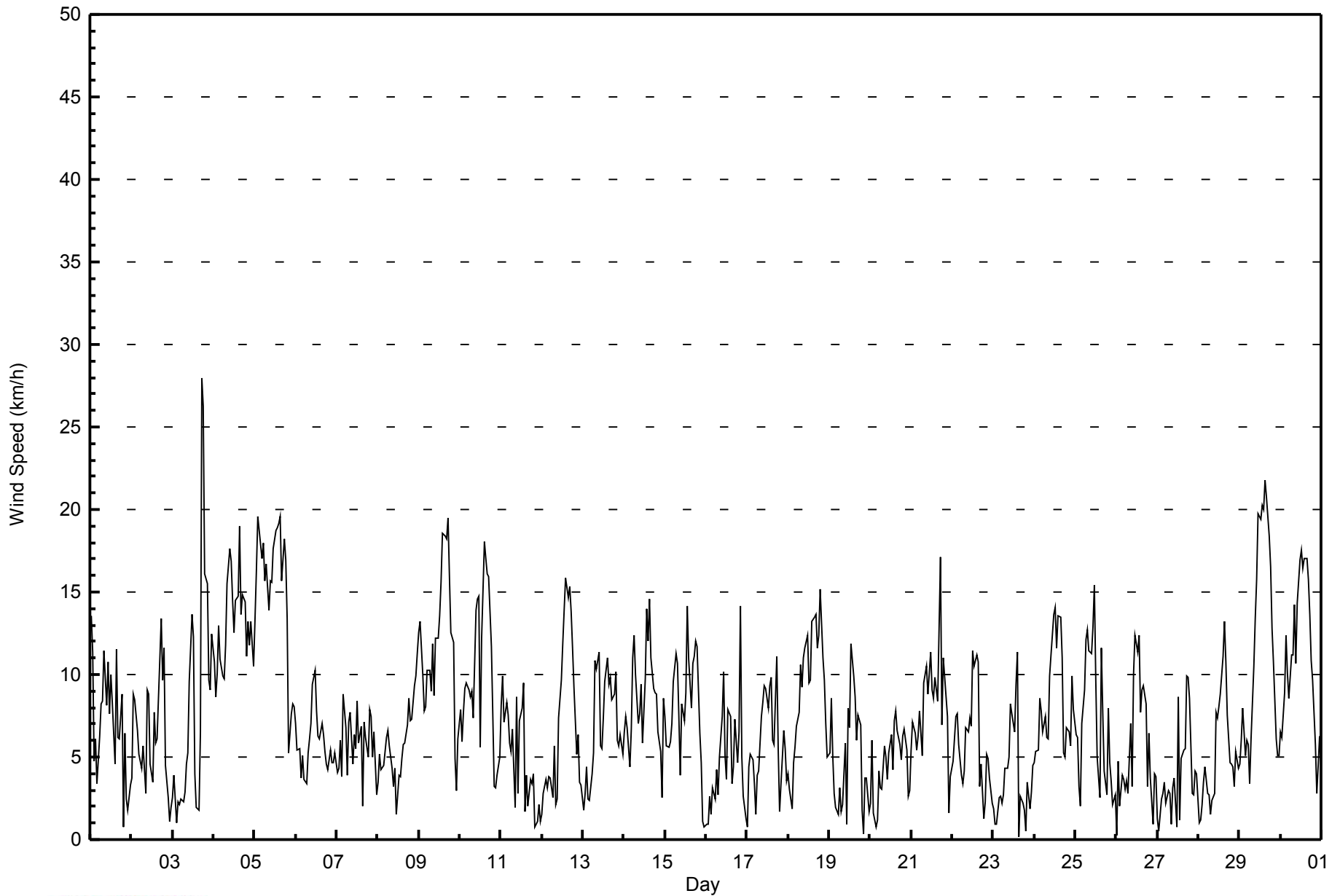
Wind Speed (WS) - km/h
Athabasca Valley - June 2014

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Athabasca Valley - June 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Athabasca Valley - June 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	283	39.31	39.31
6 - 11	307	42.64	81.94
12 - 19	120	16.67	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: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Athabasca Valley - June 2014

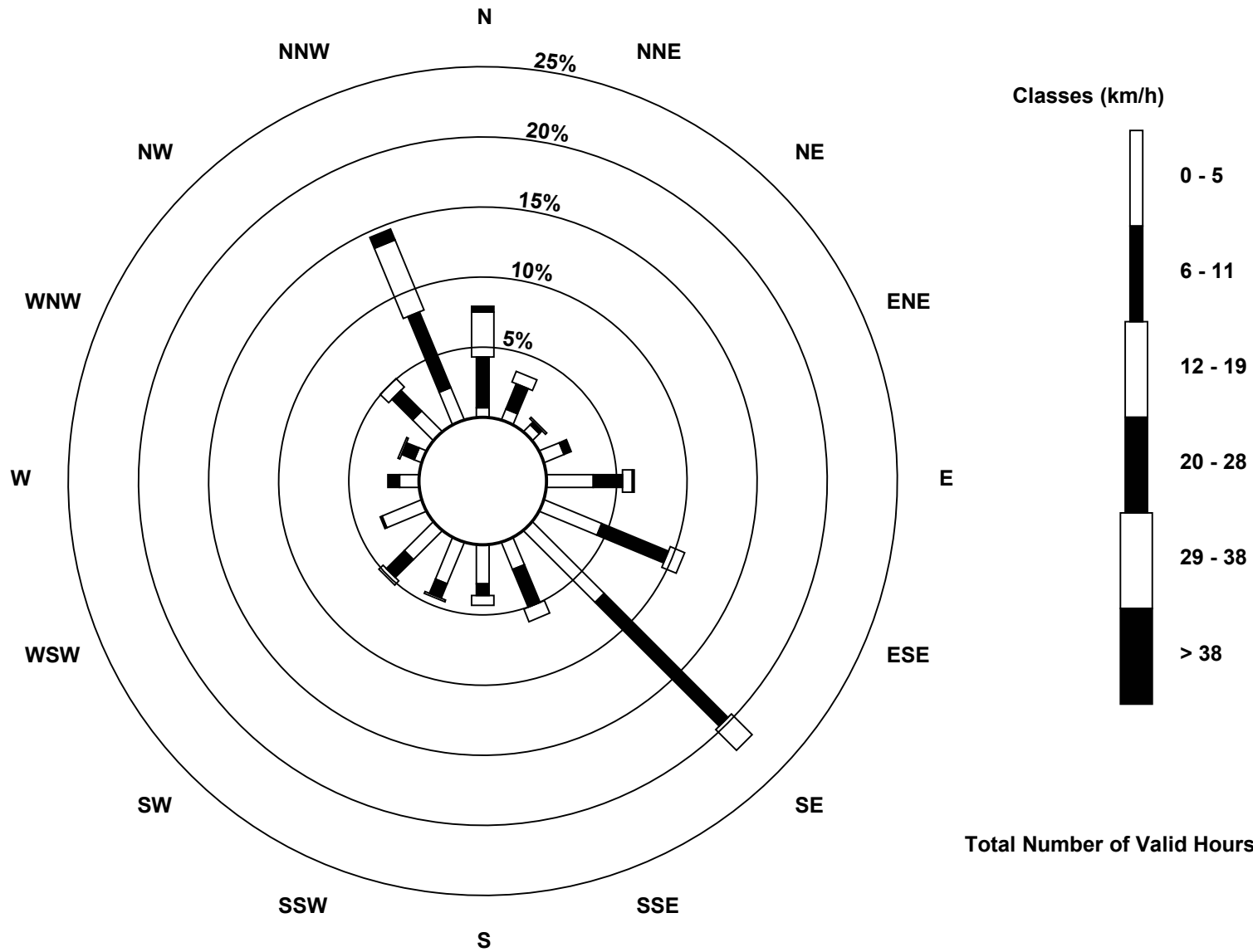
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	6	5	11	24	32	52	15	20	23	21	22	10	4	15	18	283
6 - 11	26	14	2	4	15	37	90	21	6	8	13	1	6	7	15	42	307
12 - 19	23	6	1	0	5	8	15	7	5	1	3	0	0	1	6	39	120
20 - 28	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	6	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	57	26	8	15	45	77	157	43	31	32	37	23	16	12	36	105	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Athabasca Valley (AMS 7)**



Total Number of Valid Hours: 720



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Athabasca Valley - June 2014

Direction of Maximum Speed: 337 deg on Jun 3 18:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 351.6 deg on Jun 5	Hours of Data: 720
Direction of Minimum Speed: 101 deg on Jun 23 16:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.7 deg on Jun 27	Percent Operational Time: 100.0
Monthly Average Direction: 324.1 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-Jun	128	128	131	110	115	111	105	126	134	145	132	117	113	95	139	173	152	194	143	333	355	192	184	139	130.7
2-Jun	124	135	135	142	145	147	91	132	203	222	212	325	197	104	349	10	6	43	21	13	348	295	225	222	84.0
3-Jun	265	244	236	348	78	53	19	337	333	330	349	355	328	36	73	116	17	337	333	4	342	337	294	326	341.0
4-Jun	348	324	313	308	313	294	330	332	306	309	315	331	337	348	1	352	5	6	13	22	17	19	19	15	342.7
5-Jun	352	6	352	357	4	358	2	359	1	357	360	353	349	347	349	345	348	344	345	355	354	321	318	313	351.6
6-Jun	326	278	275	270	236	251	325	347	40	355	345	359	355	347	343	337	332	319	353	45	87	121	118	120	344.7
7-Jun	124	119	146	94	144	160	123	93	88	91	3	189	67	36	96	71	352	322	332	96	116	159	204	126	102.8
8-Jun	145	137	132	136	132	130	130	110	81	57	20	243	226	61	59	78	142	100	114	115	128	133	134	138	119.3
9-Jun	141	140	142	140	137	138	146	155	141	147	139	125	126	113	105	95	91	96	97	95	95	99	38	22	117.0
10-Jun	27	27	17	19	14	13	359	335	328	340	342	339	7	342	344	338	343	355	355	316	254	201	192	133	350.0
11-Jun	141	134	135	130	134	121	120	132	109	228	181	109	73	12	234	120	92	81	237	117	181	195	159	214	128.0
12-Jun	132	130	145	144	121	130	104	76	62	309	346	337	344	345	343	341	345	1	16	28	33	358	320	132	3.0
13-Jun	26	51	94	153	138	124	129	142	129	144	157	95	156	171	156	151	139	122	99	103	112	134	127	112	131.3
14-Jun	121	134	142	144	140	144	144	145	141	124	111	139	139	147	180	214	194	188	190	206	163	158	175	127	156.4
15-Jun	136	143	145	140	137	131	135	134	105	60	111	136	121	113	132	117	131	127	109	102	104	125	161	197	123.5
16-Jun	185	76	147	198	226	138	135	94	116	106	151	156	181	153	183	218	173	172	100	137	219	197	175	88	161.7
17-Jun	172	128	133	140	217	206	140	141	135	118	106	107	100	135	111	121	144	222	225	205	221	167	156	187	143.2
18-Jun	190	217	137	146	147	139	141	135	121	133	130	137	134	137	168	170	154	169	155	134	136	132	148	154	145.9
19-Jun	140	135	129	132	189	103	139	81	75	130	122	101	90	127	128	87	103	91	102	68	87	242	248	201	118.2
20-Jun	334	237	226	205	193	132	202	112	140	209	142	128	126	114	109	119	101	135	154	208	226	226	227	257	159.6
21-Jun	325	331	334	321	339	325	350	337	335	325	337	345	341	348	331	316	301	316	286	303	287	299	244	252	321.8
22-Jun	311	323	318	277	276	268	278	323	345	344	355	349	343	353	338	330	342	126	212	250	179	105	102	338	329.3
23-Jun	234	164	185	115	118	135	96	113	98	119	158	161	151	140	192	101	83	275	316	95	214	161	134	145	149.0
24-Jun	134	139	124	133	128	132	139	137	114	115	105	134	150	146	149	152	157	199	185	159	155	144	144	145	141.5
25-Jun	139	119	122	129	129	131	132	122	125	126	115	115	173	323	312	185	276	358	146	204	182	212	140	194	141.5
26-Jun	234	223	174	156	148	204	196	252	217	241	224	224	215	225	226	222	226	225	240	355	14	15	246	247	224.0
27-Jun	260	170	123	149	117	123	142	82	91	291	329	324	94	173	235	227	332	342	359	32	348	251	236	229	351.0
28-Jun	101	124	96	121	121	107	80	300	306	314	345	348	5	353	359	346	357	352	349	344	338	270	243	248	350.5
29-Jun	255	300	310	265	276	267	266	350	354	347	343	341	347	351	352	347	348	347	344	345	338	320	351	328	338.3
30-Jun	334	330	327	327	331	335	340	348	347	357	346	343	342	342	343	344	343	345	344	342	355	301	245	235	339.0

104.8	124.8	102.7	112.6	124.6	123.0	110.3	89.2	75.7	48.1	37.7	37.2	51.1	48.7	34.4	8.6	13.5	4.1	21.2	43.1	58.9	163.8	181.7	164.8
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
Athabasca Valley - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Jun 23 20:00	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0
Minimum Value: 9 deg on Jun 30 04:00	
Percentiles: P ₁ = 10 P ₁₀ = 14 Q ₁ = 18 Median = 25 Q ₃ = 40 P ₉₀ = 66 P ₉₉ = 93	

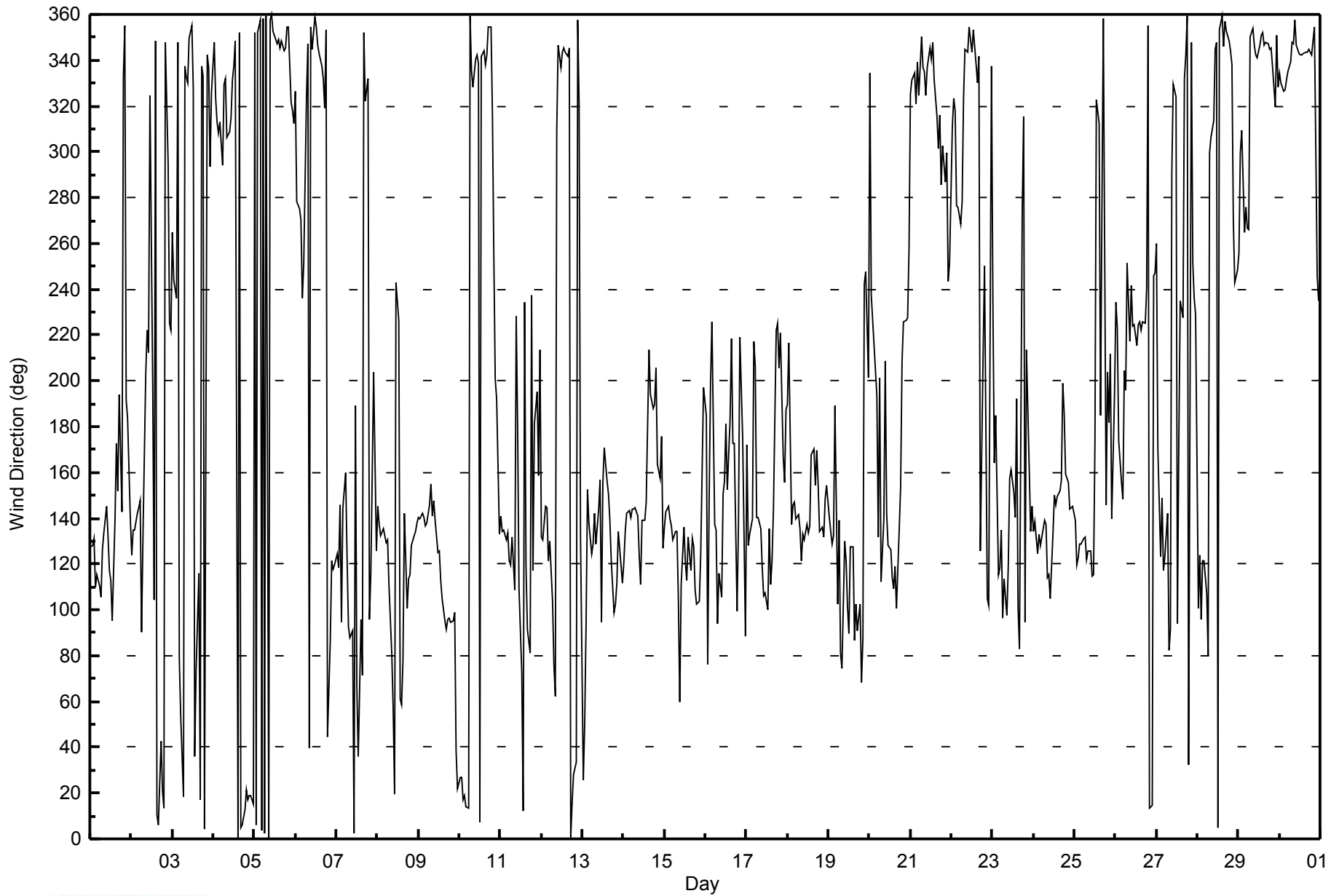
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	17	27	50	42	46	26	23	21	15	27	20	30	31	33	58	28	40	29	18	92	27	53	56	54	92
2-Jun	22	13	12	13	14	18	54	15	78	13	15	47	70	34	66	49	36	23	29	17	25	37	91	85	91
3-Jun	77	14	96	34	35	66	49	31	11	13	14	19	38	94	73	89	42	16	19	30	19	15	17	21	96
4-Jun	17	27	14	17	14	17	16	15	9	12	14	15	19	20	20	19	26	20	20	19	21	21	19	21	27
5-Jun	22	18	19	22	20	21	21	20	21	25	21	21	19	19	19	20	18	16	19	20	27	13	11	11	27
6-Jun	16	27	24	39	30	40	47	30	35	30	26	22	30	37	35	34	49	36	44	44	26	23	25	24	49
7-Jun	42	31	34	58	33	40	54	28	36	65	40	52	45	61	56	97	34	25	28	44	25	42	22	33	97
8-Jun	23	15	25	20	12	10	12	29	27	55	51	91	77	58	52	66	66	39	24	21	19	15	16	15	91
9-Jun	15	15	19	13	18	14	17	19	16	18	17	19	19	22	21	18	16	16	17	18	19	30	26	13	30
10-Jun	19	23	20	17	19	17	24	18	19	14	17	14	64	39	16	14	16	21	23	26	25	69	63	26	69
11-Jun	11	11	11	12	11	25	25	18	77	24	71	39	24	67	98	71	77	77	78	39	83	80	59	85	98
12-Jun	55	27	31	35	20	13	54	11	64	26	14	19	14	16	15	12	16	20	19	22	18	20	72	53	72
13-Jun	47	31	26	45	45	33	42	20	23	25	66	65	50	47	27	29	33	36	22	20	21	20	21	23	66
14-Jun	25	19	17	26	18	14	13	16	25	30	29	71	37	23	36	30	35	28	24	29	22	17	58	13	71
15-Jun	14	16	25	27	18	13	13	14	27	67	48	68	46	28	32	43	32	29	21	19	20	27	66	92	92
16-Jun	80	79	49	62	58	62	31	57	49	28	23	50	75	41	38	61	70	31	24	30	28	34	41	66	80
17-Jun	86	18	17	21	29	87	48	38	24	24	23	30	33	27	28	58	57	27	23	83	28	23	30	42	87
18-Jun	31	53	54	25	35	19	17	18	26	19	18	18	28	35	25	25	26	33	28	16	15	15	17	24	54
19-Jun	17	13	47	42	56	66	41	69	54	20	92	25	24	27	28	17	24	15	22	67	97	51	42	77	97
20-Jun	45	17	81	86	42	27	37	70	37	35	45	43	35	82	28	24	19	28	40	16	10	12	21	41	86
21-Jun	24	15	13	21	33	20	28	12	13	11	17	16	13	17	14	11	17	14	17	26	24	21	75	31	75
22-Jun	31	20	12	22	31	33	24	37	15	20	21	16	14	19	15	15	61	52	83	69	52	29	39	44	83
23-Jun	79	87	89	57	31	49	74	33	27	32	28	28	41	33	65	95	53	33	27	99	86	61	52	27	99
24-Jun	30	31	17	19	18	22	22	25	27	24	23	34	21	20	22	23	29	65	49	22	22	26	13	15	65
25-Jun	18	23	28	57	19	18	17	21	21	24	24	23	49	54	77	30	36	25	73	28	28	36	60	55	77
26-Jun	94	18	49	30	19	27	39	69	16	56	19	10	22	11	12	11	12	10	79	19	29	59	13	24	94
27-Jun	84	84	35	45	24	51	29	54	91	18	15	72	17	84	38	28	26	15	23	26	33	73	63	67	91
28-Jun	77	72	39	26	23	35	31	53	26	22	13	19	24	21	22	16	21	19	18	17	34	29	24	17	77
29-Jun	19	21	17	22	21	17	28	16	19	18	13	12	18	20	20	19	19	18	18	18	13	14	18	18	28
30-Jun	16	12	9	9	10	10	12	17	18	20	18	14	16	16	14	14	14	16	16	13	17	35	16	31	35

94	87	96	86	58	87	74	70	91	67	92	91	77	94	98	97	77	77	83	99	97	80	91	92	
Diurnal Maximum																								



WBEA
Hourly Averages

Wind Direction (WD) - deg
Athabasca Valley - June 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 16, 2014	Previous Calibration	May 20, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	14:10
Barometric Pressure	733 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	802	799
Calculated slope	1.001679	0.988668	Chamber temp.	43.6	43.6
Calculated intercept	1.645538	1.640008	Pressure (mmHg)	711.4	710.6
Analyzer Background	10.4	10.4	Flow (lpm)	0.522	0.520
Analyzer Coefficient	0.814	0.814	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	0.0	NA
as found span	5000	58.8	597.4	597.1	1.001
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	58.8	597.4	603.6	0.990
second point	5000	29.4	298.7	299.1	0.999
third point	5000	14.7	149.4	148.2	1.008
calibrator zero	6000	0.0	0.0	0.0	NA
as left zero	6000	0.0	0.0	0.7	NA
as left span	5000	58.8	597.4	605.3	0.987
Average Correction Factor					0.999

Corrected As found 597.1 Previous response 594.8 % change -0.4%

Notes:

no adjustments required.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

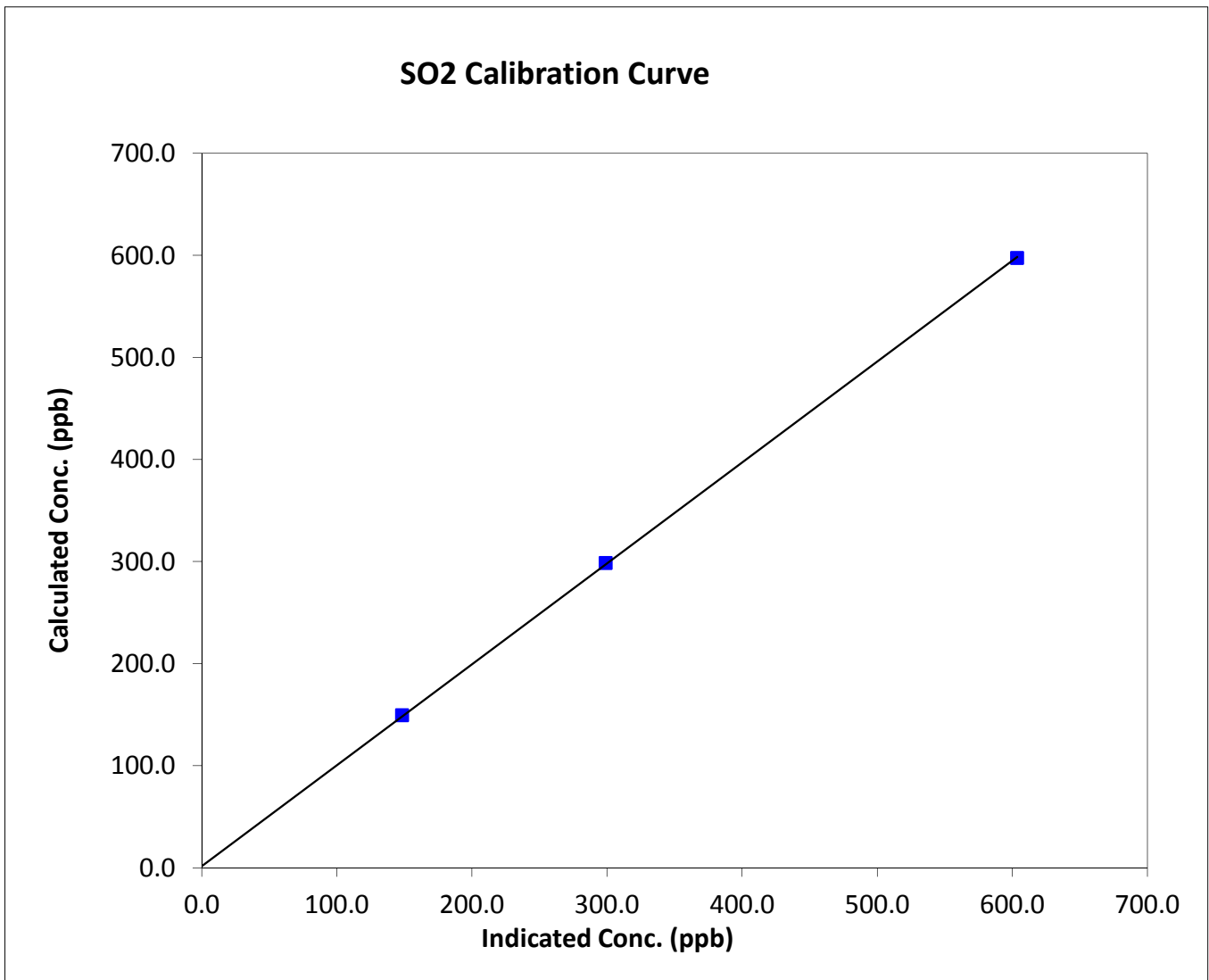
SO₂ Calibration Summary

Station Information

Calibration Date	June 16, 2014	Previous Calibration	May 20, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:15	End Time (MST)	14:10
Analyzer make	Thermo 43c	Analyzer serial #	607415781

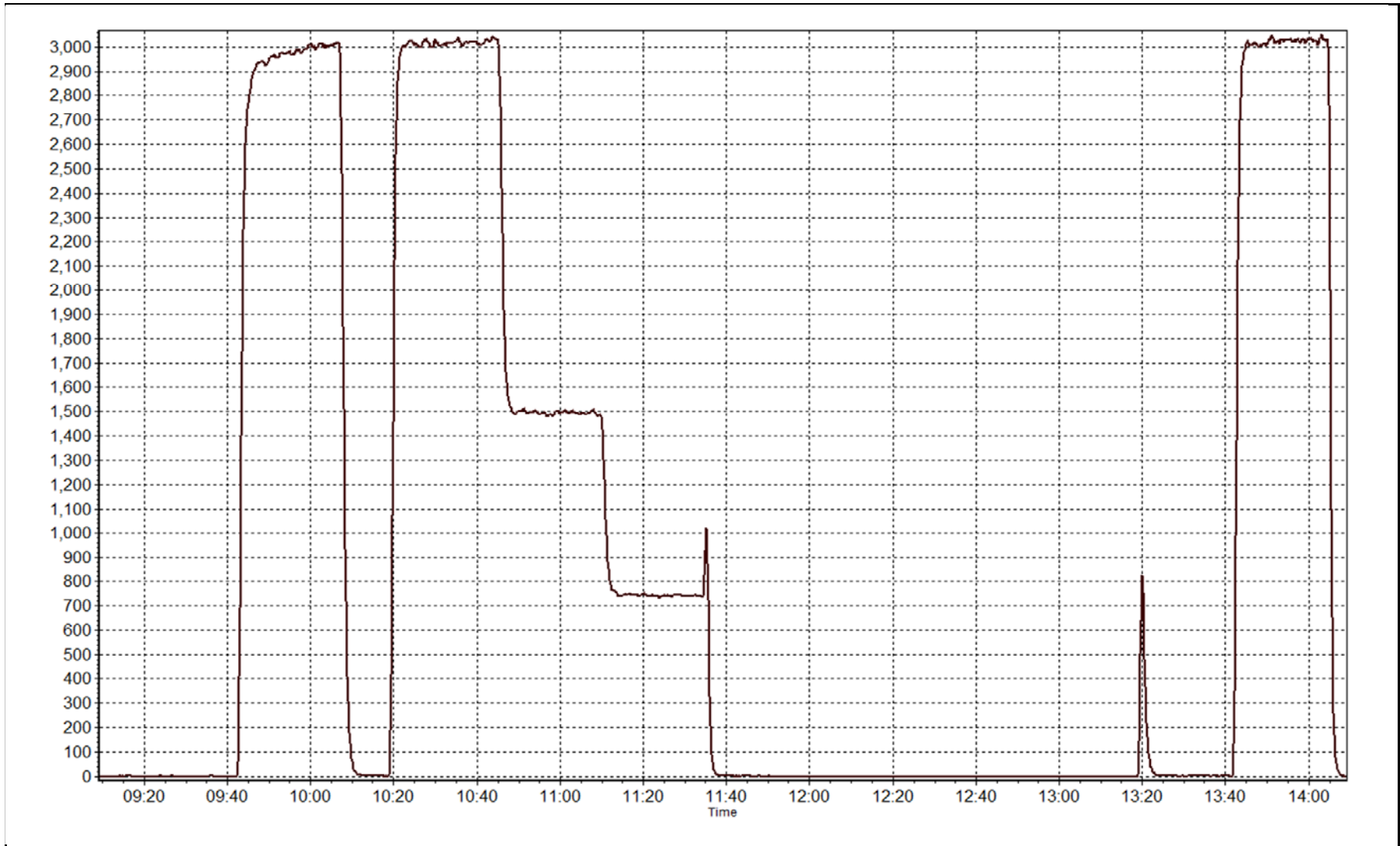
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999964
597.4	603.6	0.9897		
298.7	299.1	0.9988	Slope	0.988668
149.4	148.2	1.0080		
			Intercept	1.640008



SO2 Calibration Plot

Date: June 16, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 21, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	13:25
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	03/11/2009
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	810	810
Calculated slope	1.014238	1.010960	Chamber temp.	44	44
Calculated intercept	0.112929	0.257640	Pressure	675.0	690.9
Analyzer Background	16.4	16.4	Flow	0.470	0.477
Analyzer Coefficient	0.984	0.984	Intensity	43500	43500
			Converter temp.	800	800

Analyzer make/model	TEI 45C	Analyzer serial #	630718530
Converter make/model	CDN-101	Converter serial #	468

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	-0.2	NA
as found span	6000	79.8	75.0	74.0	1.013
SO2 scrubber check	5000	8.9	90.4	-0.1	NA
calibrator zero	6000	0.0	0.0	-0.2	NA
high point	6000	79.8	75.0	74.0	1.013
second point	6000	44.7	42.0	41.2	1.020
third point	6000	26.6	25.0	24.4	1.023
calibrator zero	5000	0.0	0.0	-0.2	NA
as left zero	5000	0.0	0.0	0.0	NA
as left span	6000	79.8	75.0	74.2	1.010
Average Correction Factor					1.019

Corrected As found	74.2	Previous response	73.8	% change	-0.5%
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Notes:

No adjustments required.

Calibration Performed By:

Mike Martineau



Wood Buffalo Environmental Association

TRS Calibration Summary

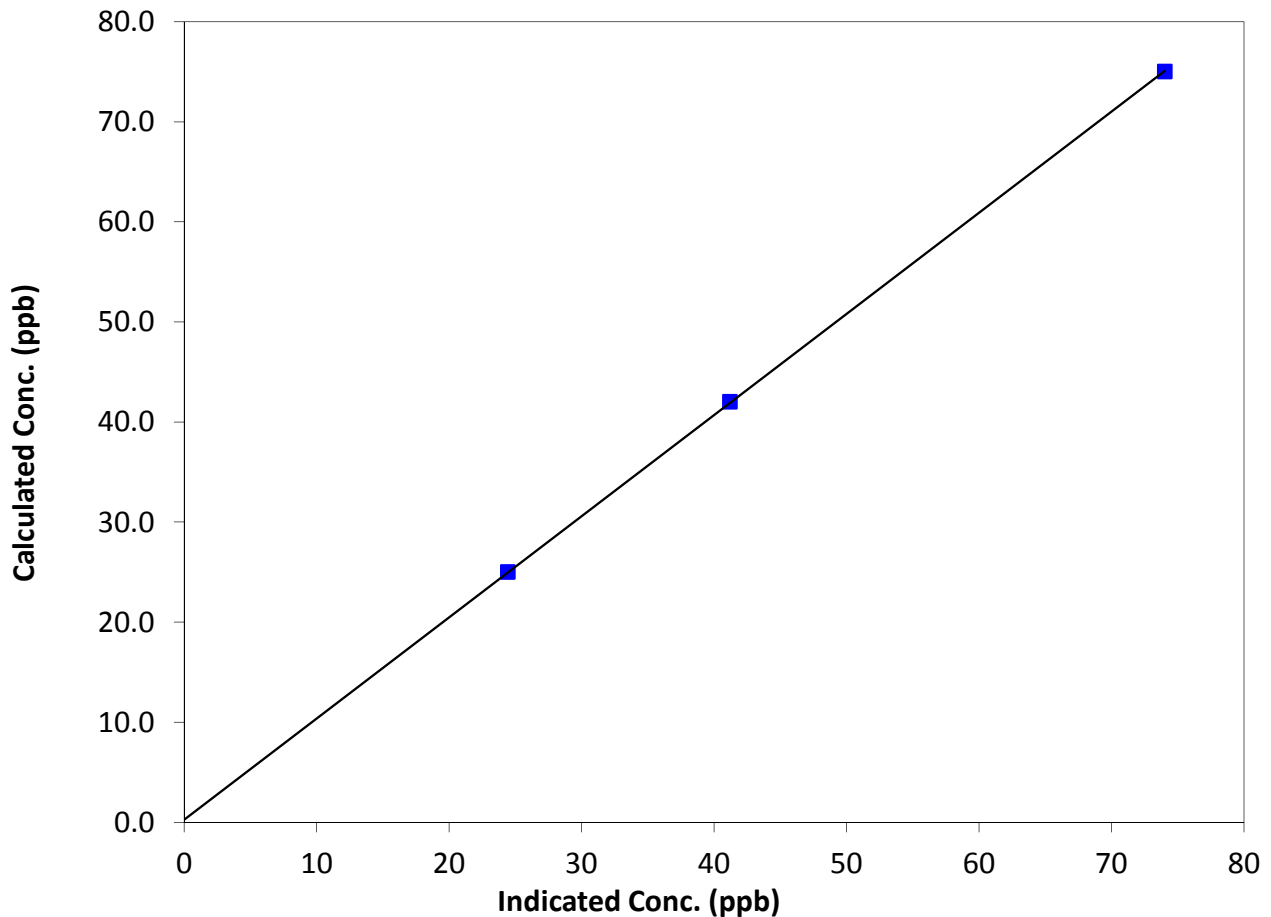
Station Information

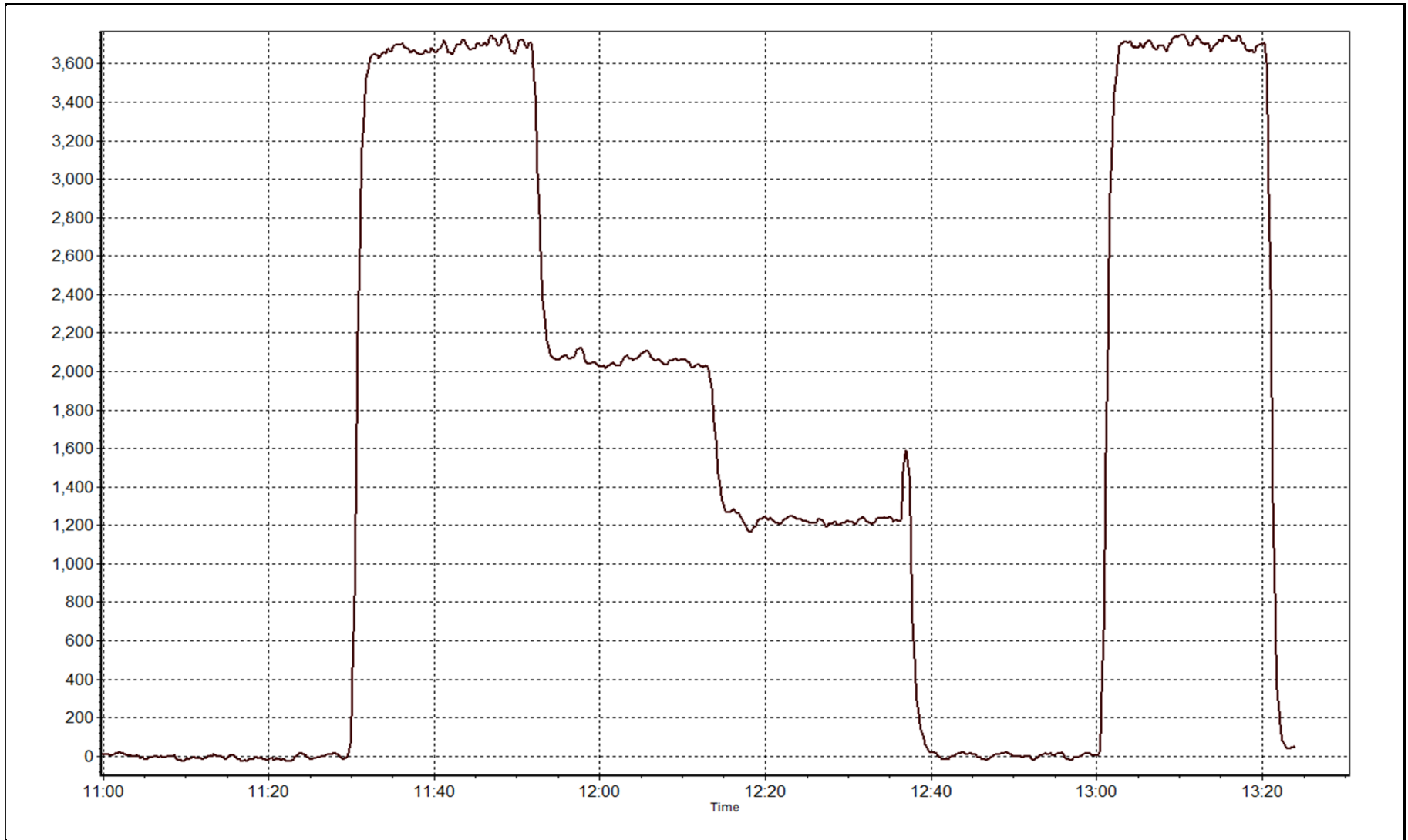
Calibration Date	June 17, 2014	Previous Calibration	May 21, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	11:00	End Time (MST)	13:25
Analyzer make	TEI 45C	Analyzer serial #	630718530

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999992
75.0	74.0	1.0134		
42.0	41.2	1.0199	Slope	1.010960
25.0	24.4	1.0231		
			Intercept	0.257640

TRS Calibration Curve







Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	June 23, 2014	Previous Calibration	June 17, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	12:15	End Time (MST)	16:10
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	03/11/2009
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	810	809
Calculated slope	1.010960	0.987786	Chamber temp.	44	44
Calculated intercept	0.257640	0.440287	Pressure	690.9	692.6
Analyzer Background	16.4	17.7	Flow	0.477	0.478
Analyzer Coefficient	0.984	1.026	Intensity	43500	43500
			Converter temp.	800	815

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	-0.1	NA
as found span	6000	79.8	75.0	70.2	1.069
SO2 scrubber check	5000	8.9	90.4		NA
calibrator zero	6000	0.0	0.0	-0.2	NA
high point	6000	79.8	75.0	75.6	0.992
second point	6000	44.7	42.0	42.1	0.998
third point	6000	26.6	25.0	24.5	1.020
calibrator zero	5000	0.0	0.0	-0.2	NA
as left zero	5000	0.0	0.0	-0.5	NA
as left span	6000	79.8	75.0	77.4	0.970
Average Correction Factor					1.003

Corrected As found	70.2	Previous response	73.9	% change	5.3%
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Notes:

Converter replaced after as founds. Zero and span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

TRS Calibration Summary

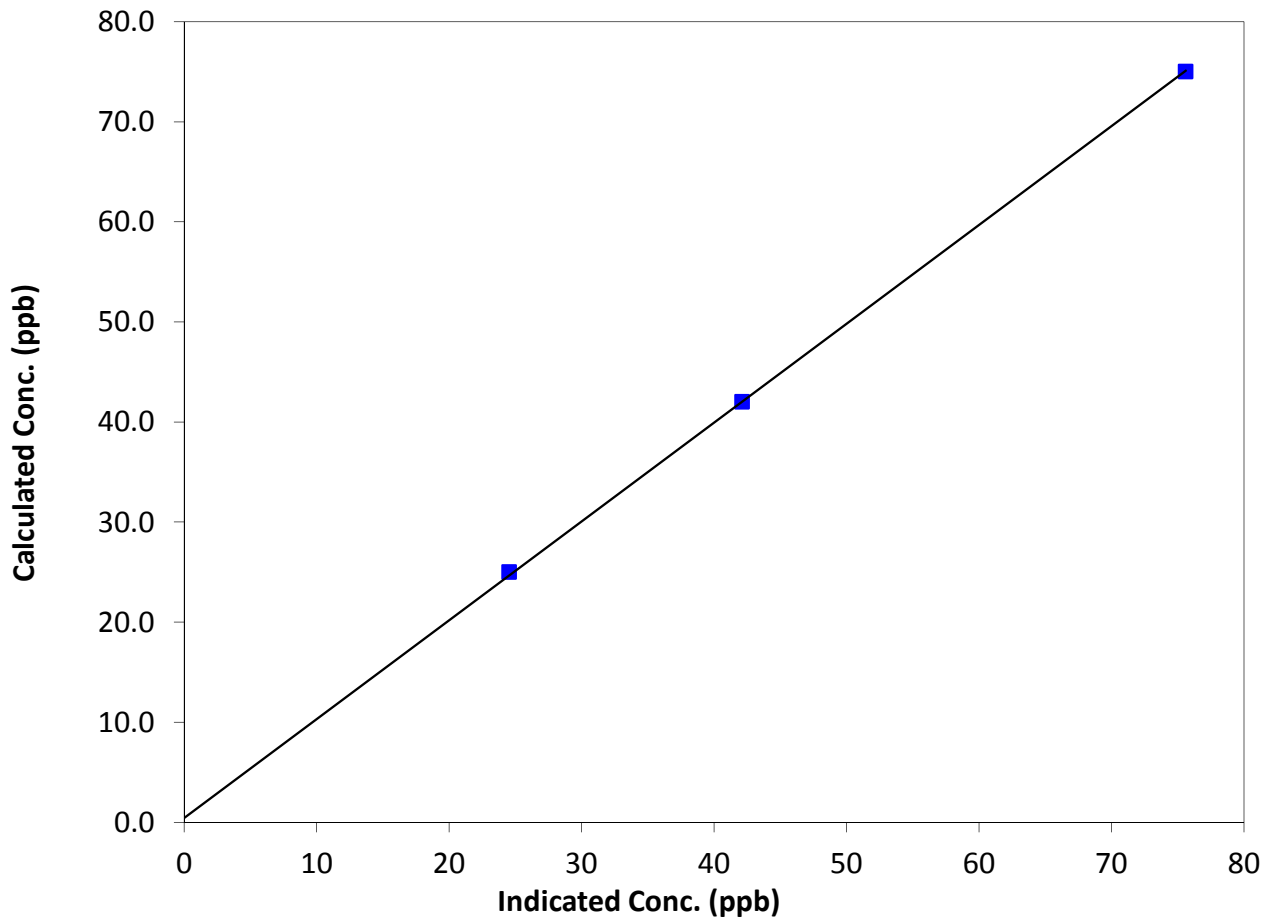
Station Information

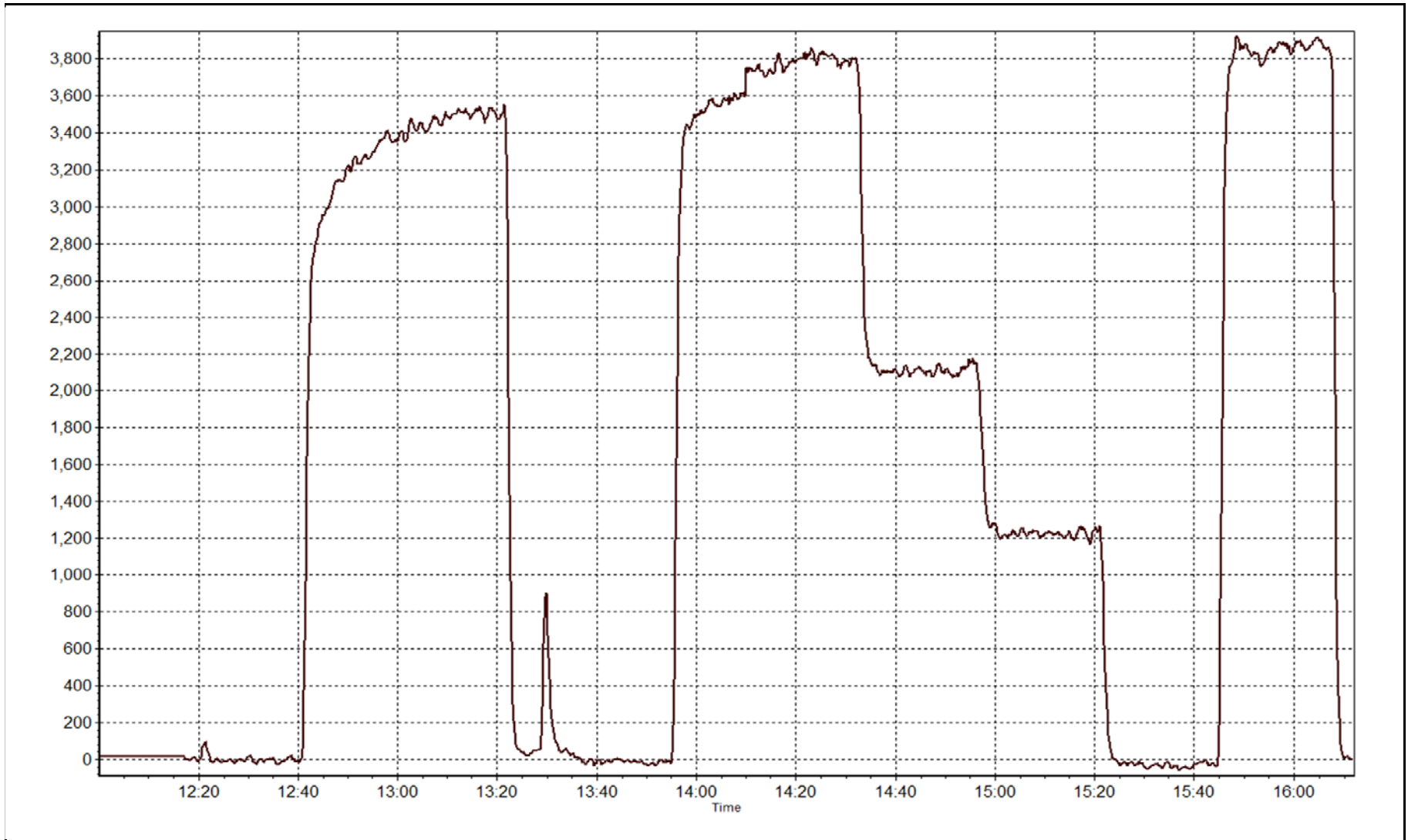
Calibration Date	June 23, 2014	Previous Calibration	June 17, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	12:15	End Time (MST)	16:10
Analyzer make	TEI 45C	Analyzer serial #	630718530

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999939
75.0	75.6	0.9922		
42.0	42.1	0.9979	Slope	0.987786
25.0	24.5	1.0198		
			Intercept	0.440287

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	June-16-14	Prev Calibration	May-20-14
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	14:10
Barometric Pressure	733 mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
Gas Cert Reference	LL 105142	Cal Gas Expiry Date	October-10-13
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	33.0	30.6
THC Range (input)	50	50	Flame Temp	389.0	386.9
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	1.015789	1.000372	Air Pressure	32.5	32.5
THC Calc intercept	0.024504	0.022108			
NMHC Calc slope	1.018620	1.000091			
NMHC Calc intercept	0.016382	0.016083			

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	12.27	1.019
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	58.8	12.50	12.49	1.001
second point	5000	29.4	6.25	6.20	1.008
third point	5000	14.7	3.13	3.09	1.011
calibrator zero	6000	0.0	0.00	0.00	N/A
as left zero	6000	0.0	0.00	0.00	N/A
as left span	5000	58.8	12.50	12.49	1.001
Average Correction Factor					1.007

Corrected As found 12.27 Previous response 12.28 % change 0.1%

Notes:

changed nitrogen cylinder and 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	6.46	1.021
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	58.8	6.60	6.59	1.001
second point	5000	29.4	3.30	3.27	1.009
third point	5000	14.7	1.65	1.62	1.018
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	6.60	1.000
Average Correction Factor					1.009

Corrected As found 6.46 Previous response 6.46 % change 0.0%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	58.8	5.90	5.82	1.014
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	2.94	1.004
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	5.89	1.002
Average Correction Factor					

Corrected As found 5.82 Previous response 5.82 % change 0.0%



Wood Buffalo Environmental Association

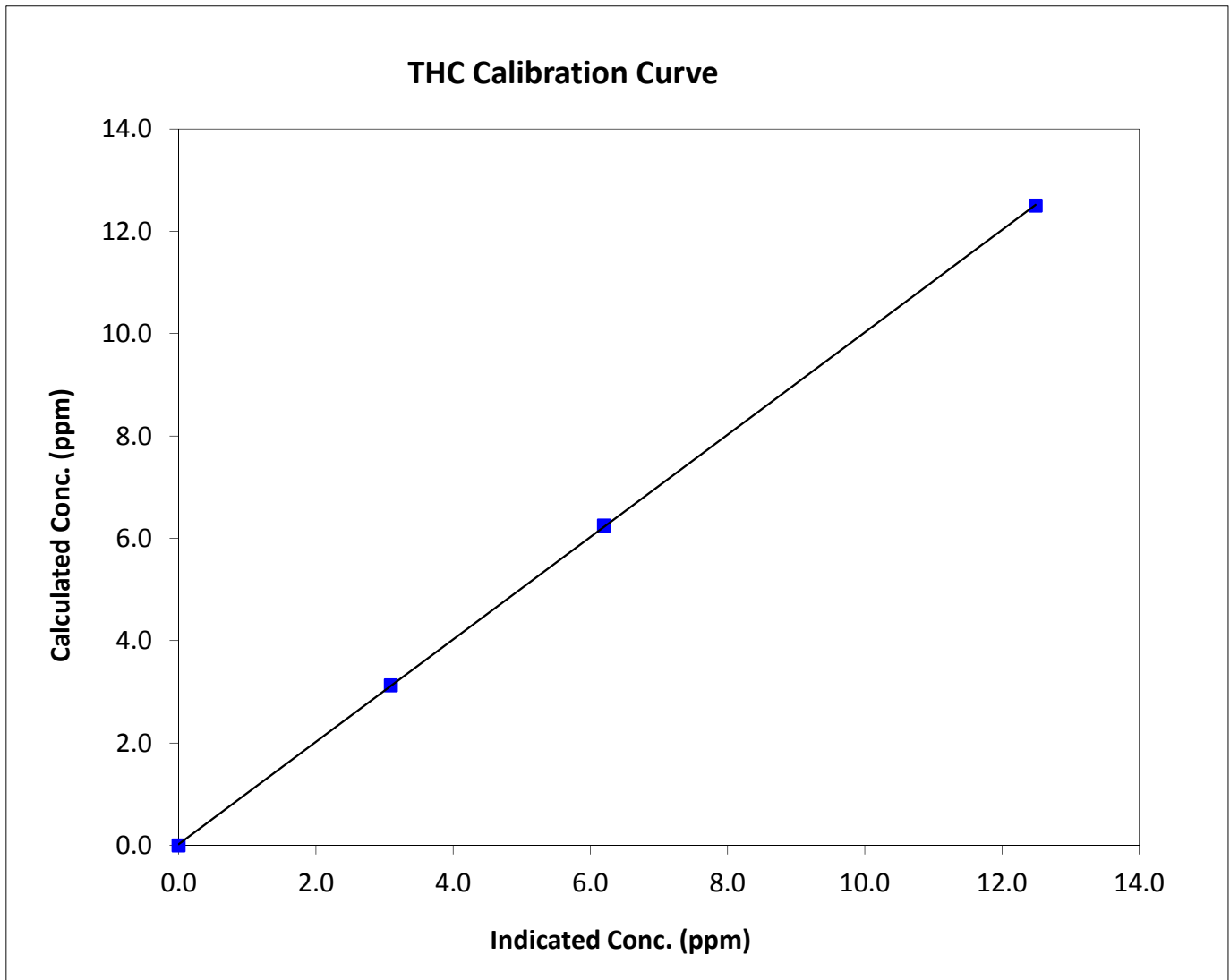
THC Calibration Summary

Station Information

Calibration Date	June 16, 2014	Previous Calibration	May 20, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:15	End Time (MST)	14:10
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	0.999982
12.50	12.49	1.0009		
6.25	6.20	1.0081	Slope	1.000372
3.13	3.09	1.0114		
			Intercept	0.022108





Wood Buffalo Environmental Association

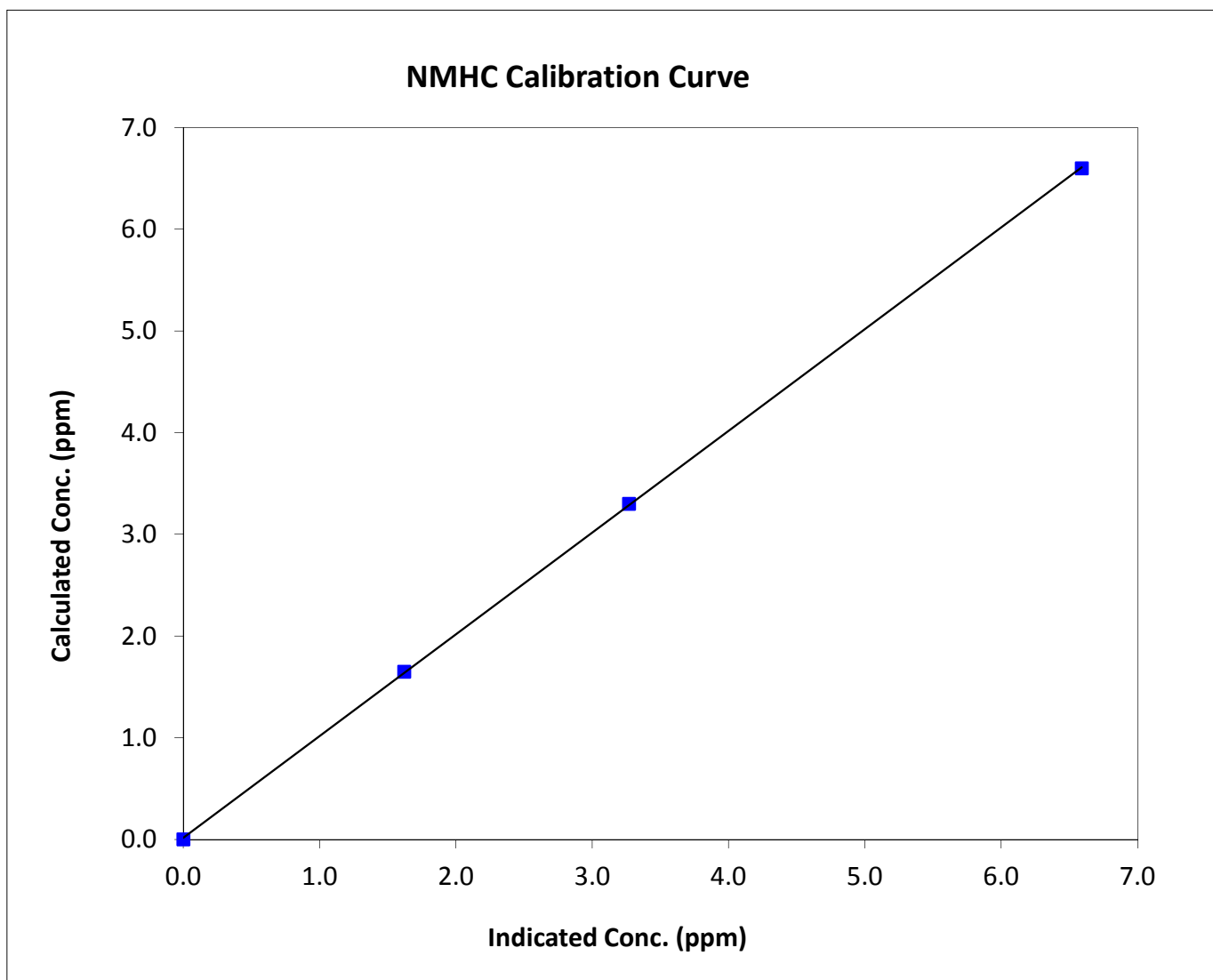
NMHC Calibration Summary

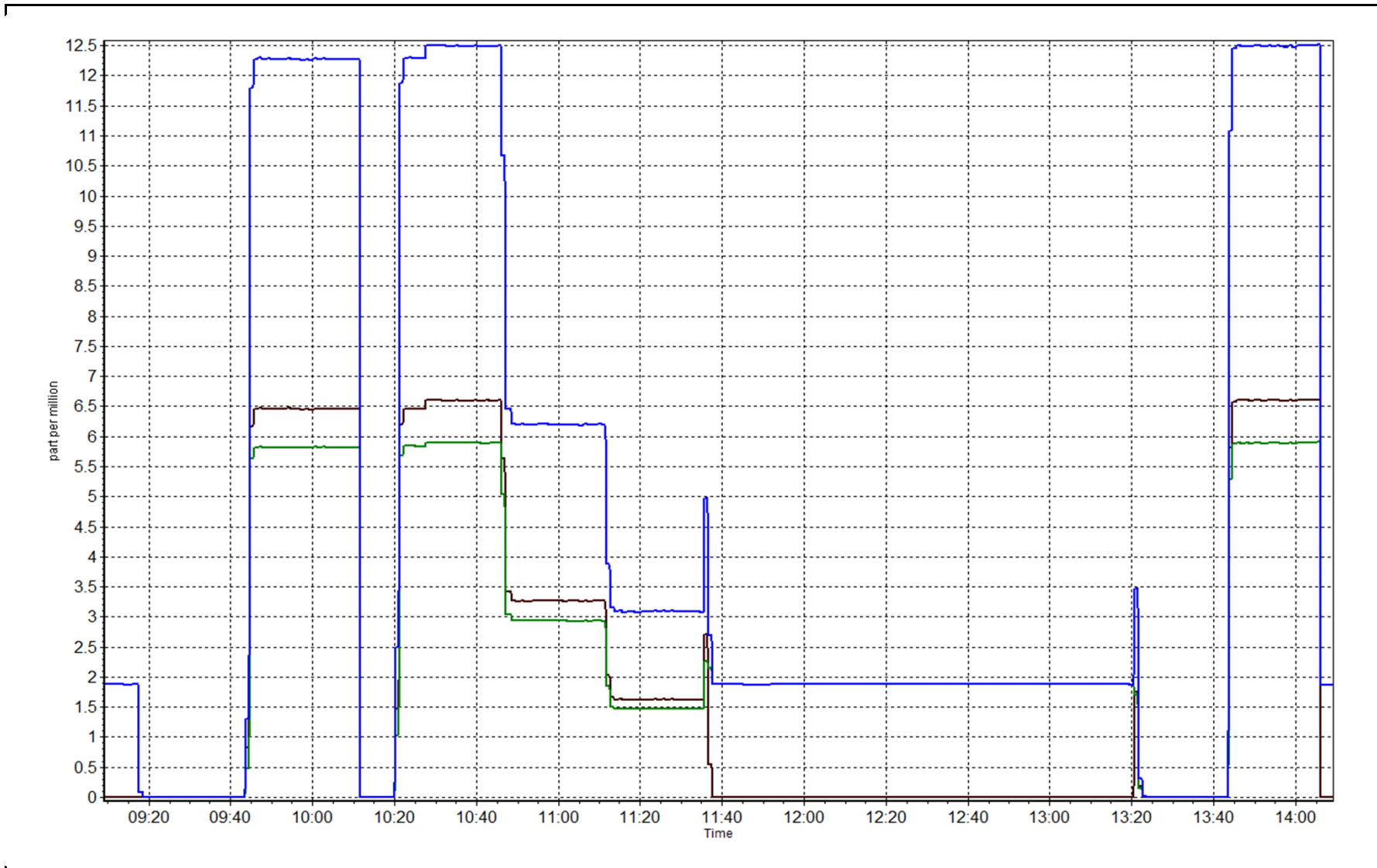
Station Information

Calibration Date	June 16, 2014	Previous Calibration	May 20, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:15	End Time (MST)	14:10
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	0.999972
6.60	6.59	1.0011		
3.30	3.27	1.0088	Slope	1.000091
1.65	1.62	1.0181		
			Intercept	0.016083







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 21, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:20	End Time (MST)	11:00
Barometric Pressure	737 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
NO2 calibration used	May-20-14	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.	27.9	28.8
Analyzer Range (input)	5000	5000	Lamp temp.	70.8	70.8
Calculated slope	0.997887	1.006107	Pressure	714.1	720.6
Calculated intercept	0.358600	0.230348	Flow cell A	0.675	0.679
Analyzer Background	-0.2	-0.2	Flow cell B	0.741	0.745
Analyzer Coefficient	1.053	1.053	Cell A Intensity	106600	106700
			Cell B Intensity	89600	89700

Analyzer make TEI 49C Analyzer serial # 607415760

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.0	N/A
as found span	5000	N/A	353.2	351.3	1.006
calibrator zero	5000	0.00	0.0	0.0	N/A
high point	5000	N/A	353.2	351.3	1.006
second point	5000	N/A	180.1	177.8	1.013
third point	5000	N/A	90.3	89.8	1.005
calibrator zero	5000	0.00	0.0	0.0	N/A
as left zero	5000	0.00	0.0	0.0	N/A
as left span	5000	N/A	353.2	349.0	1.012
Average Correction Factor					1.008

Corrected As found 351.2 Previous response 353.6 % change 0.7%

Notes:

No adjustments required.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

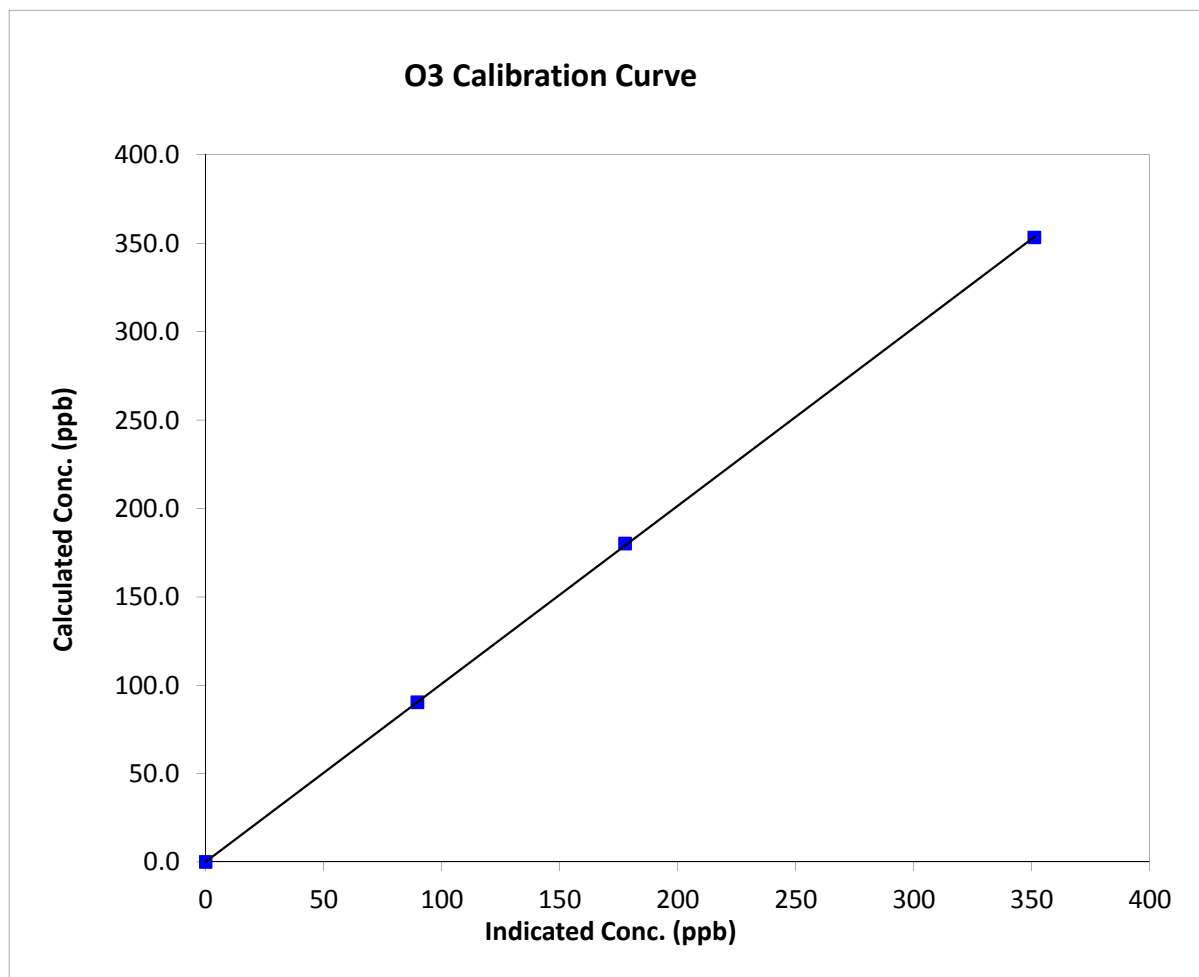
O₃ Calibration Summary

Station Information

Calibration Date	June-17-14	Previous Calibration	May 21, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:20	End Time (MST)	11:00
Analyzer make	TEI 49C	Analyzer serial #	607415760

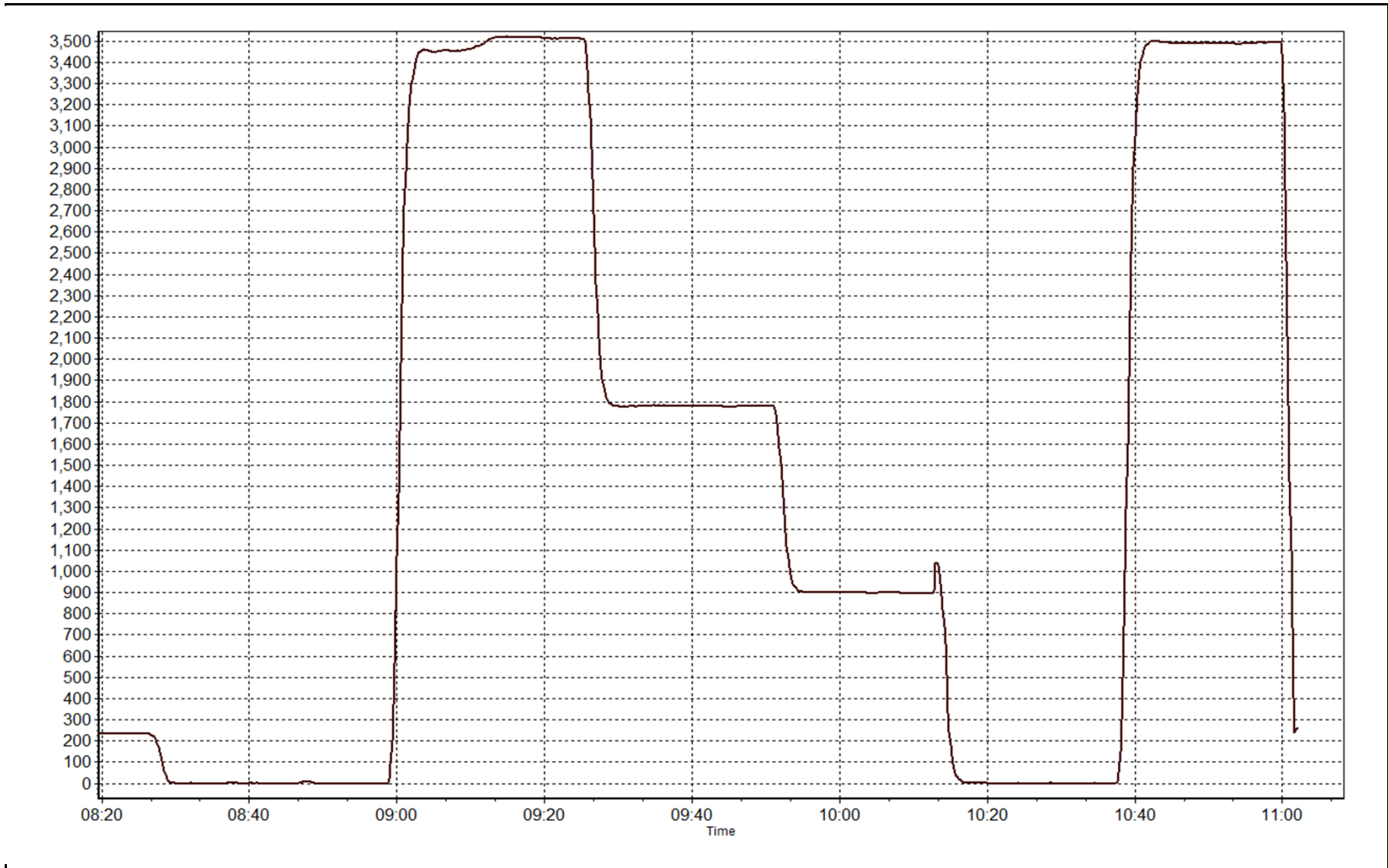
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999980
353.2	351.3	1.0055		
180.1	177.8	1.0130	Slope	1.006107
90.3	89.8	1.0054		
			Intercept	0.230348



O3 Calibration Plot

Date: June 17, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	June 16, 2014	Previous Calibration	May 20, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	9:15	End Time (MST)	14:10
Barometric Pressure	733 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	1.006384	1.011884	0.992421
	Data Offset	1.498589	1.443239	-1.267257
After	Data Slope	1.000049	0.998286	0.998003
	Data Offset	1.505401	1.403243	-0.143664
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	0.867	ppb	0.884	ppb
NOx coefficient	1.007	ppb	1.001	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	3.7		3.7	
NOx bkgrnd	3.9		4.0	
Nt coefficient	n/a		n/a	
Chamber Temp	49.7	Deg C	49.7	Deg C
Moly Temp	323.0	Deg C	322.0	Deg C
PMT Temp	-3.6	Deg C	-3.6	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	161.7	mmHg	160.2	mmHg
Sample Flow	0.756	ccm	0.751	ccm

Notes:

adjusted span



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

June 16, 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	595.8	590.2	5.8	1.0106	1.0162
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	602.2	600.9	1.4	0.9999	0.9982
second point	5000	29.4	301.1	299.9	1.2	297.4	297.1	0.4	1.0122	1.0092
third point	5000	14.7	150.5	149.9	0.6	146.6	146.5	0.2	1.0267	1.0236
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	0.2	N/A	N/A
as left span	5000	58.8	602.1	247.1	355.1	600.3	252.1	348.2	1.0030	0.9801
Average Correction Factor									1.0129	1.0103

Corrected As found NO_x= 595.8 NO= 590.3 Percent Change NO_x= 0.2% NO= 0.2%
 Previous Response NO_x= 596.8 NO= 591.3

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 58.80 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 (300)	N/A	247.1	353.2	601.2	247.1	354.1	0.9899	1.0000	0.9976	100.2%
2nd NO ₂ (200)	N/A	420.2	180.1	600.5	420.2	180.6	0.9910	1.0000	0.9972	100.3%
3rd NO ₂ (100)	N/A	510.0	90.3	600.5	510.0	90.7	0.9910	1.0000	0.9959	100.4%
4th NO ₂ (0)	600.3	N/A	0.7	601.0	600.3	1.0	0.9903	1.0000	N/A	N/A
Average Correction Factor							0.9906	1.0000	0.9969	100.3%

Calibration Performed By: Michael Martineau



Wood Buffalo Environmental Association

NO_x Calibration Summary

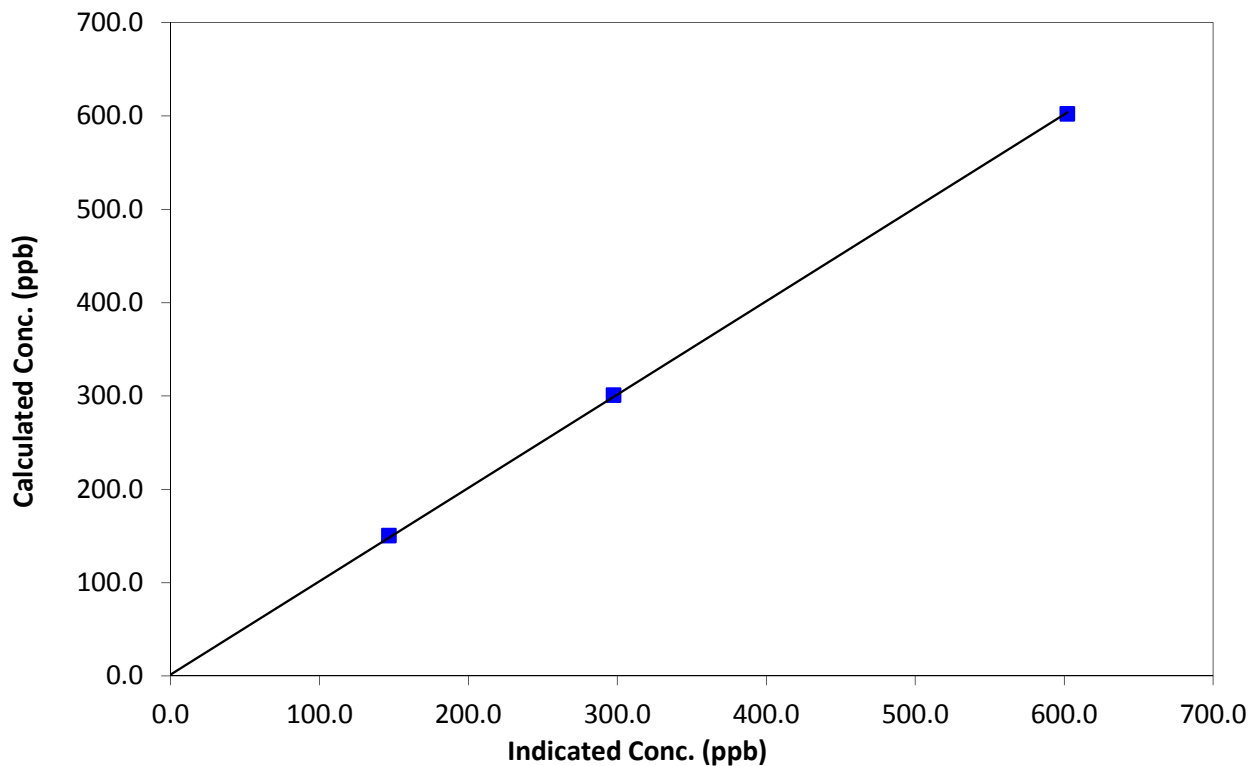
Station Information

Calibration Date	June 16, 2014	Previous Calibration	May 20, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:15	End Time (MST)	14:10
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	0.999933
602.1	602.2	0.9999		
301.1	297.4	1.0122	Slope	1.000049
150.5	146.6	1.0267		
0.0	-0.1	0.0000	Intercept	1.505401

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

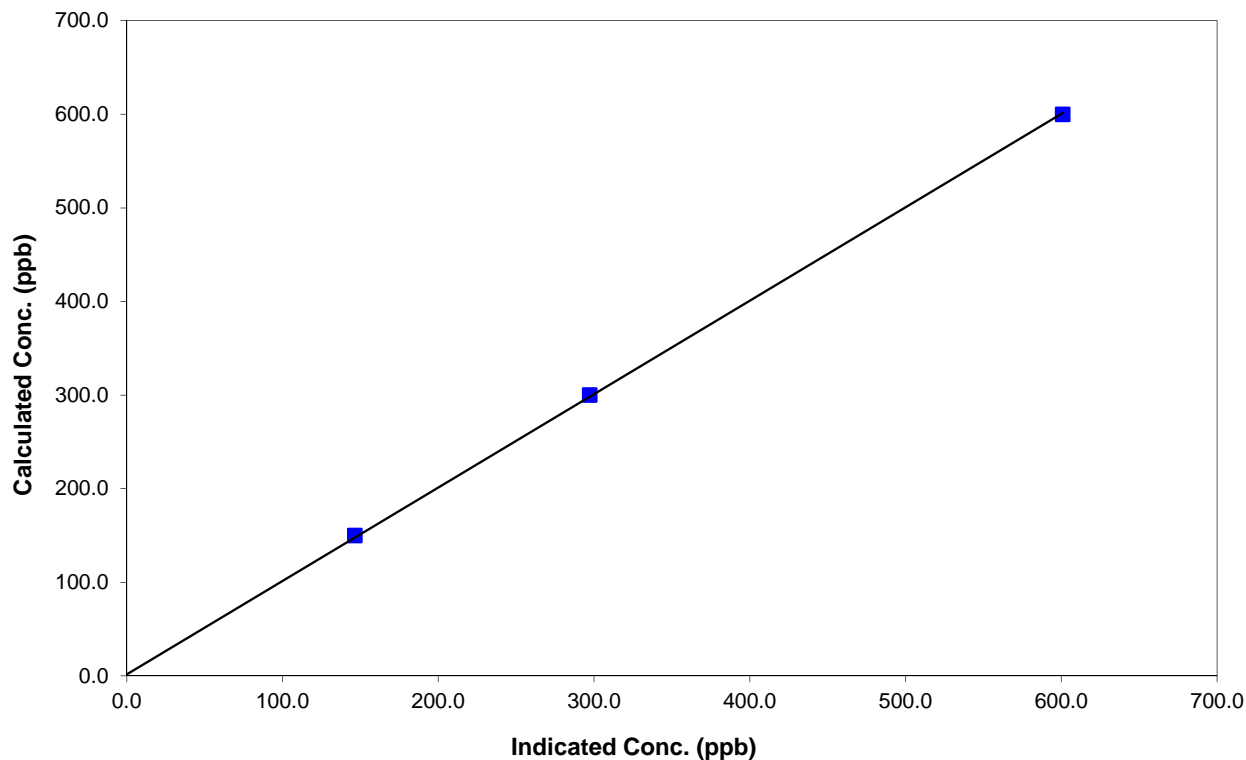
Station Information

Calibration Date	June 16, 2014	Previous Calibration	May 20, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:15	End Time (MST)	14:10
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	0.999942
599.8	600.9	0.9982		
299.9	297.1	1.0092	Slope	0.998286
149.9	146.5	1.0236		
0.0	-0.1	0.0000	Intercept	1.403243

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

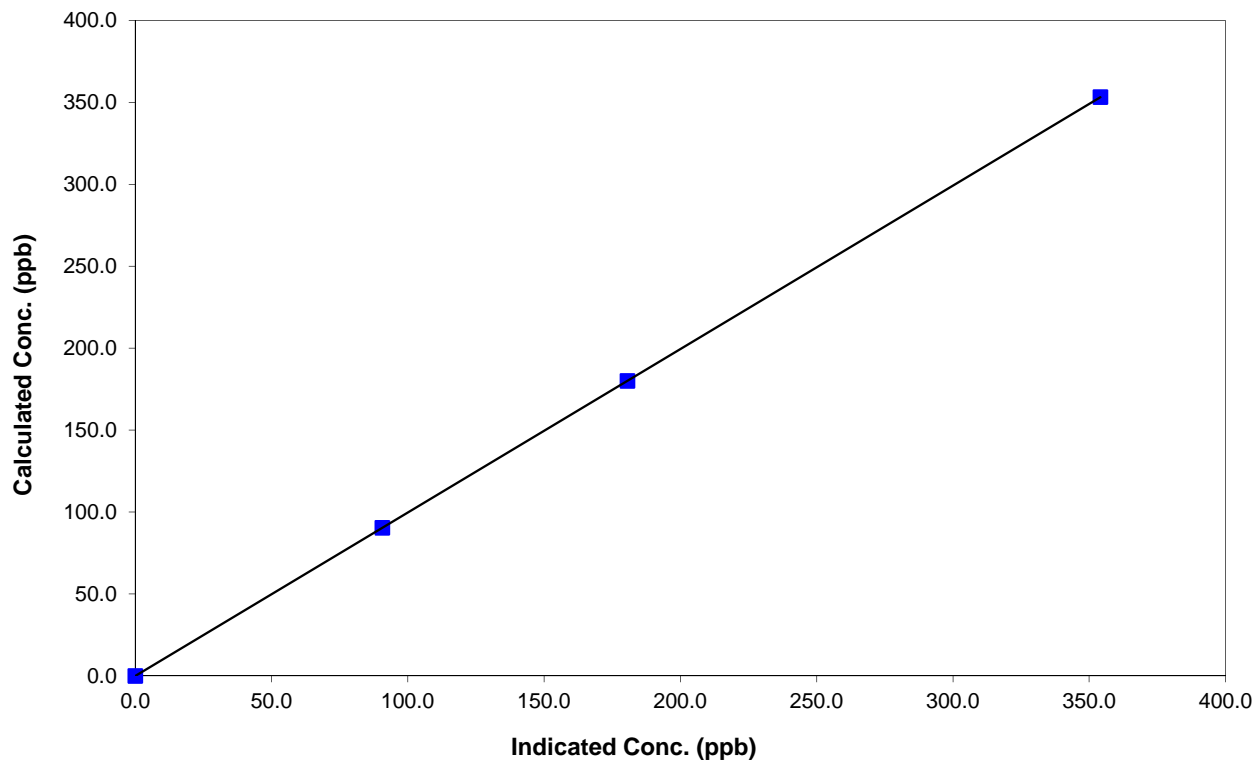
Station Information

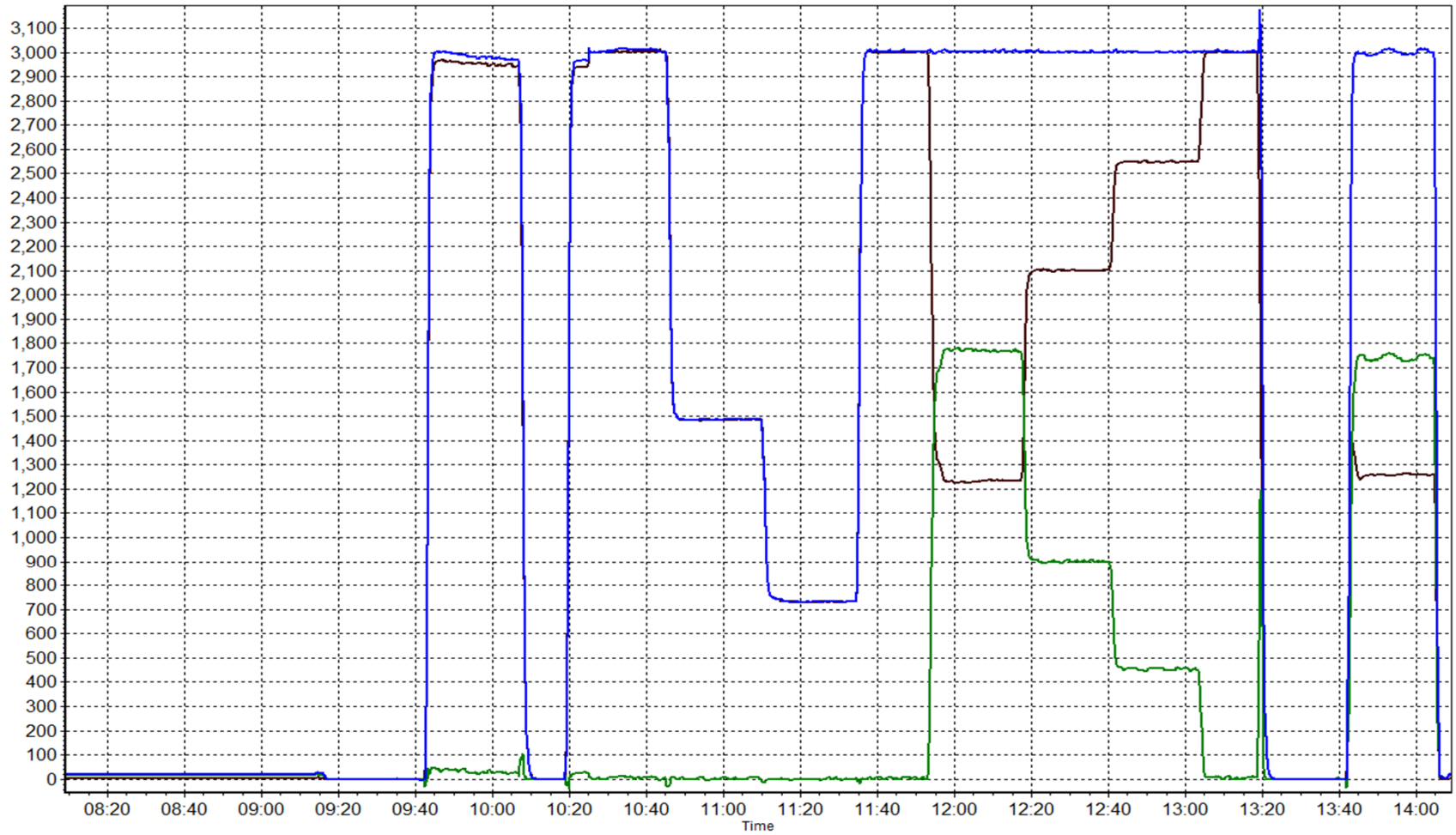
Calibration Date	June 16, 2014	Previous Calibration	May 20, 2014
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:15	End Time (MST)	14:10
Analyzer make	Thermo 42c	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	1.000000
353.2	354.1	0.9976		
180.1	180.6	0.9972	Slope	0.998003
90.3	90.7	0.9959		
			Intercept	-0.143664

NO₂ Calibration Curve







Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Calibration Date	June 18, 2014	Previous Calibration	May 22, 2014
Station Name	Athabasca Valley	Station Number	7
Reason:	Routine	Install	Removal
Start Time (MST)	9:20	End Time (MST)	11:50
Barometric Pressure	734 mmHg	Station temp.	20 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
Cal Gas Concentration	3060 ppm	Cal Gas Expiry Date	27/04/2015
Gas Cert Reference	LL 85940		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5563
DACS voltage range	0-5V	DACS channel #	11

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	50	50	Chamber temp.	48.0	48.0
Analyzer Range (mv)	5000	5000	Pressure	711.5	711.9
Calculated slope	1.001276	0.999357	Flow	1.262	1.262
Calculated intercept	0.136283	0.039886	Intensity	200300	200300
Analyzer Background	1.614	1.614	S/R ratio	1.166000	1.165000
Analyzer Coefficient	1.020	1.020			

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	0.1	N/A
as found span	5000	67.60	41.4	41.5	0.998
calibrator zero	5000	0.00	0.0	0.1	N/A
high point	5000	67.60	41.4	41.5	0.998
second point	5000	34.20	20.9	20.7	1.010
third point	5000	14.70	9.0	8.9	1.012
calibrator zero	6000	0.00	0.0	0.1	N/A
as left zero	6000	0.00	0.0	0.1	N/A
as left span	5000	67.60	41.4	41.4	0.999
Average Correction Factor					1.006

Corrected As found 41.4 Previous response 41.3 % change -0.2%

Notes:
no adjustments required.

Calibration Performed By: Michael Martineau



Wood Buffalo Environmental Association

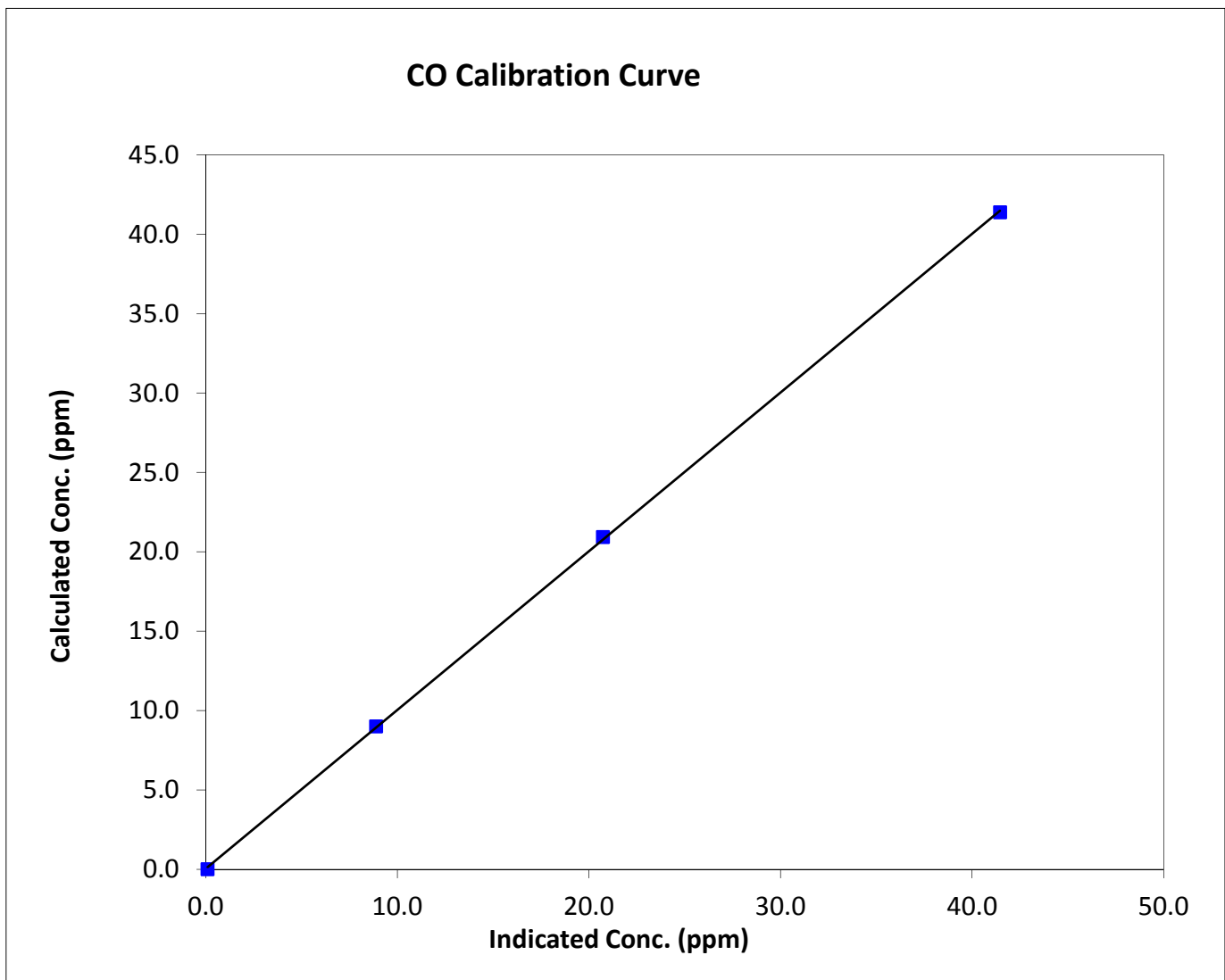
CO Calibration Summary

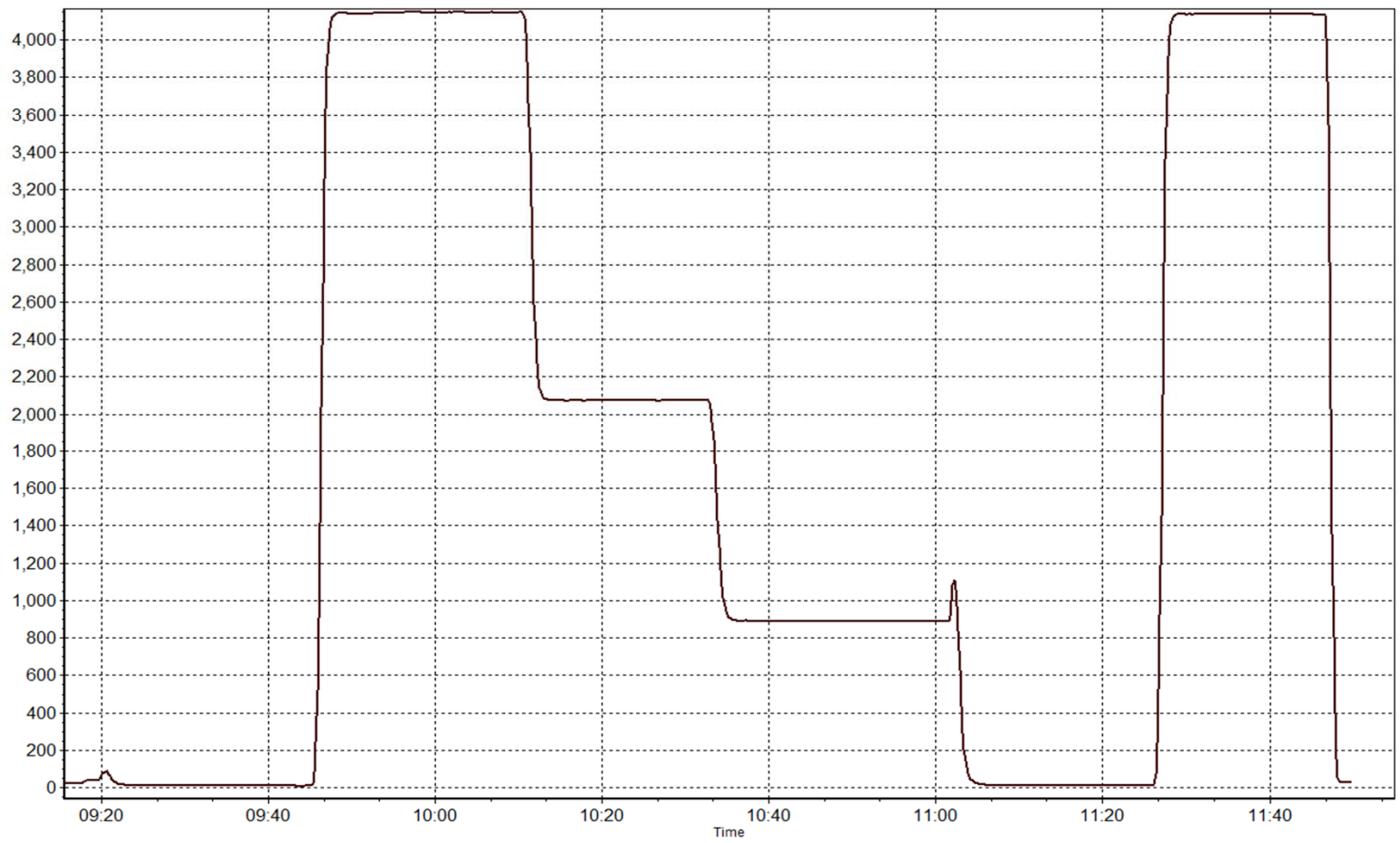
Station Information

Calibration Date	June 18, 2014	Previous Calibration	May 22, 2014
Station Name	Athabasca Valley	Station Number	7
Start Time (MST)	9:20	End Time (MST)	11:50
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	0.1	N/A	Correlation Coefficient	0.999931
41.4	41.5	0.9979		
20.9	20.7	1.0097	Slope	0.999357
9.0	8.9	1.0120		
			Intercept	0.039886





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 8
FORT CHIPEWYAN
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
 JUNE 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	2	0	1	0
O3(ppb) Average	687	33	33	100.00	53	0	42	-
NO2(ppb) Average	683	37	37	100.00	4	0	1	-
NO(ppb) Average	683	37	37	100.00	1	-	0	-
NOX(ppb) Average	683	37	37	100.00	4	-	1	-
PM2.5(ug/m3) Average	719	0	1	99.86	91.7	-	28.8	0
Wind Speed 10 m (km/h) Average	720	0	0	100.00	36	-	-	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	720	0	0	100.00	27.4	-	22.2	-
Relative Humidity (%) Average	720	0	0	100.00	97	-	-	-
Precipitation (mm) Total	720	0	0	100.00	6.6	-	-	-
Global Solar Radiation (W/m2) Average	720	0	0	100.00	920	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
 JUNE 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	0.1	0	-	0	0	0	0	0	0	0	2
O3(ppb) Average	687	29.2	7	-	11	20	24	29	33	38	53	53
NO2(ppb) Average	683	0.3	0	-	0	0	0	0	0	1	4	4
NO(ppb) Average	683	0.1	0	-	0	0	0	0	0	0	1	1
NOX(ppb) Average	683	0.4	1	-	0	0	0	0	0	1	4	4
PM2.5(ug/m3) Average	719	5.44	7.5	-	0	0.9	2.3	4.3	6.1	8	91.7	91.7
Wind Speed 10 m (km/h) Average	720	14.8	7	-	0	6	9	15	20	24	36	36
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	720	16.2	5.7	-	2.9	6.8	11.9	17.5	20.2	22.8	27.4	27.4
Relative Humidity (%) Average	720	64.3	18	-	19	40	52	66	77	87	97	97
Precipitation (mm) Total	720	-	-	34.29	0	0	0	0	0	0	6.6	6.6
Global Solar Radiation (W/m2) Average	720	285.8	299	-	0	0	8	179	534	776	920	920

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
JUNE 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	04 Jun 2014 18:00	04 Jun 2014 18:00	1	Flow and zero reference checks, sample head cleaning

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Jun 19 07:00	Maximum Daily Average: 0.7 ppb on Jun 19		Hours of Data:	683
Minimum Value: 0 ppb on Jun 3 20:00	Minimum Daily Average: 0.0 ppb on Jun 3		Hours of Missing Data:	37
Maximum Diurnal Average: 0.2 ppb at hour 8	Minimum Diurnal Average: 0.1 ppb at hour 24		Hours of Calibration:	37
Monthly Average: 0.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Jun	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	--	0
5-Jun	0	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-Jun	0	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-Jun	0	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-Jun	0	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
9-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
11-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
14-Jun	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0.4	1
15-Jun	0	Z	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Jun	0	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-Jun	0	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-Jun	1	Z	1	1	1	1	1	0	1	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	0.6	1
19-Jun	0	Z	0	1	2	2	2	2	2	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.7	2
20-Jun	0	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-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-Jun	0	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
24-Jun	0	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-Jun	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
26-Jun	0	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-Jun	0	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-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Jun	0	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

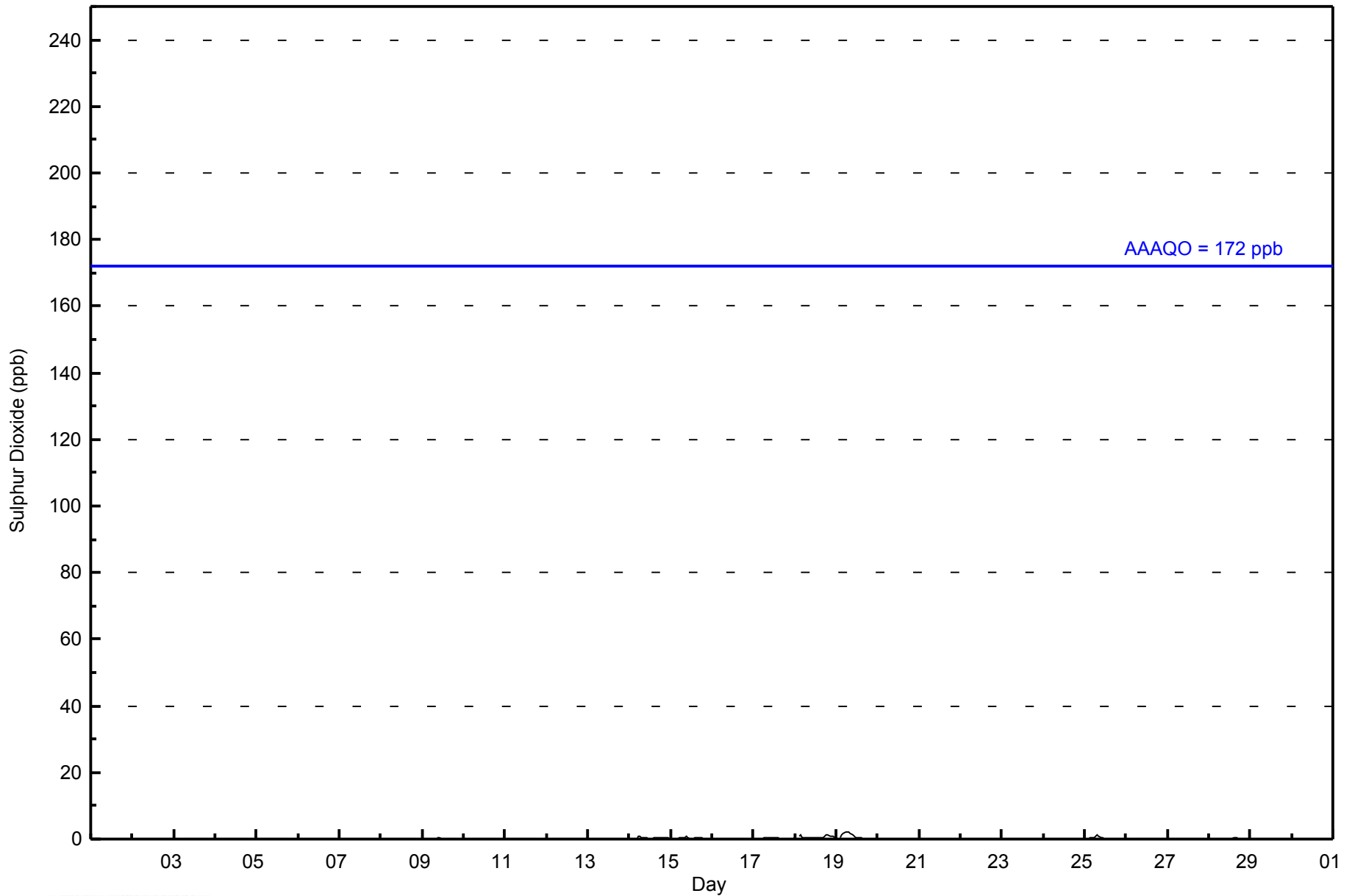
0.1	--	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average
1	--	1	1	2	2	2	2	2	2	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	Diurnal Maximum

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort Chipeywan - June 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipeywan - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	683	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipeywan - June 2014

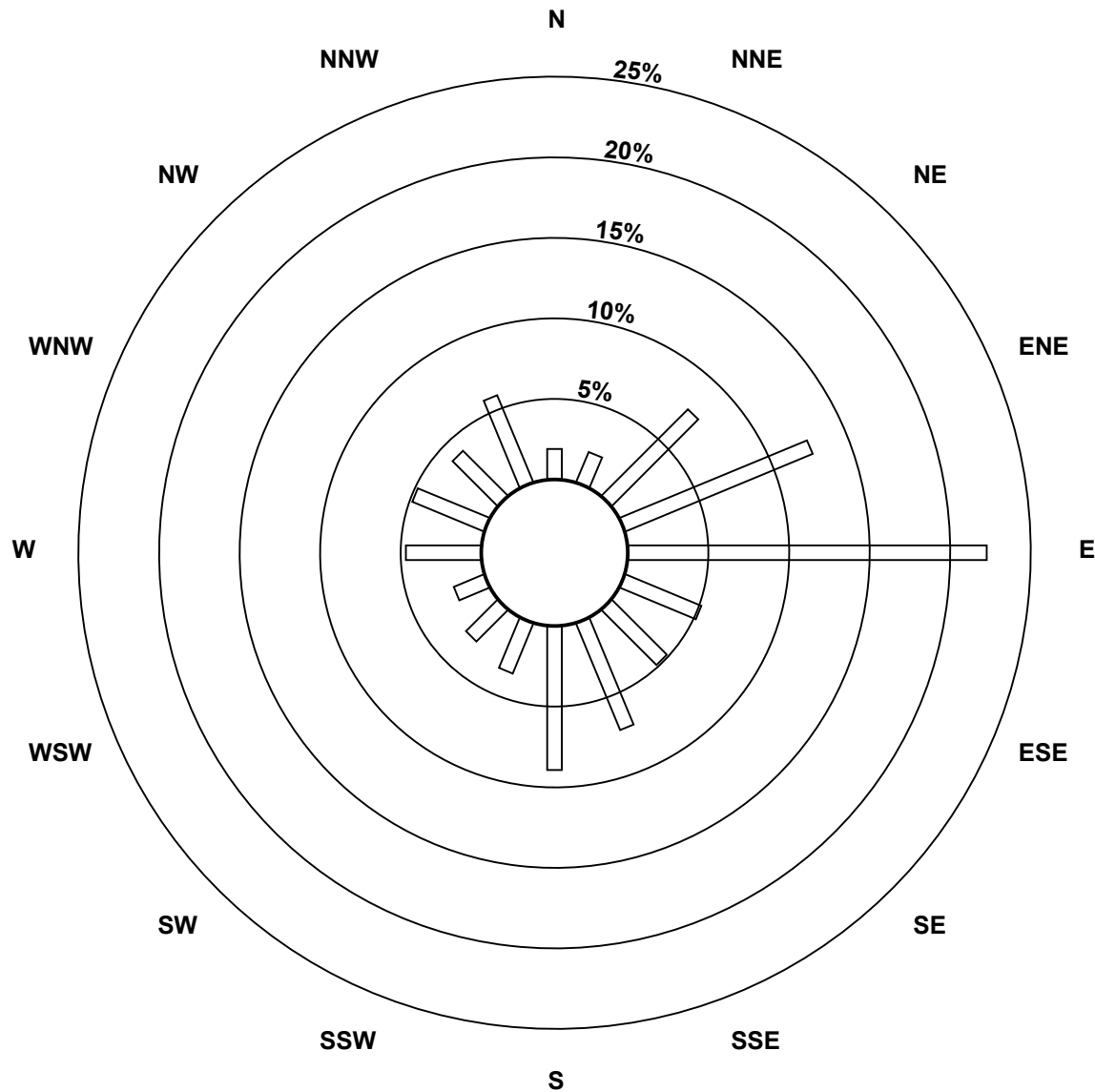
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	13	14	52	86	152	35	33	49	61	23	19	14	32	33	27	40	683
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	13	14	52	86	152	35	33	49	61	23	19	14	32	33	27	40	683

Total Number of Valid Hours: 683

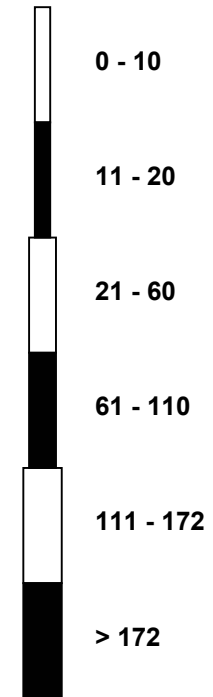
Total Number of Hours: 720

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

**Sulphur Dioxide (SO₂) - ppb
Fort Chipeywan (AMS 8)**



Classes (ppb)

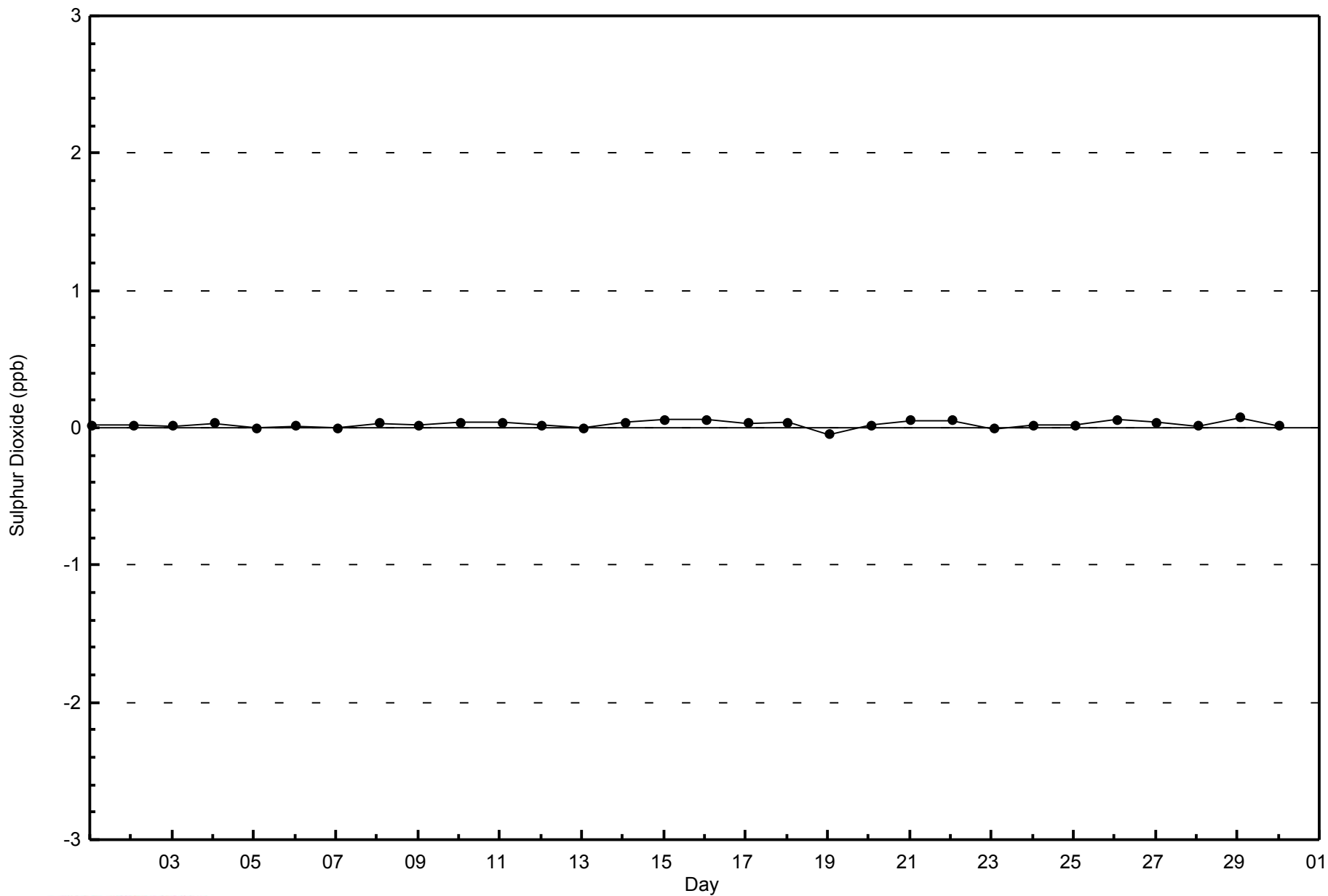


Total Number of Valid Hours: 683



WBEA
Zero Responses

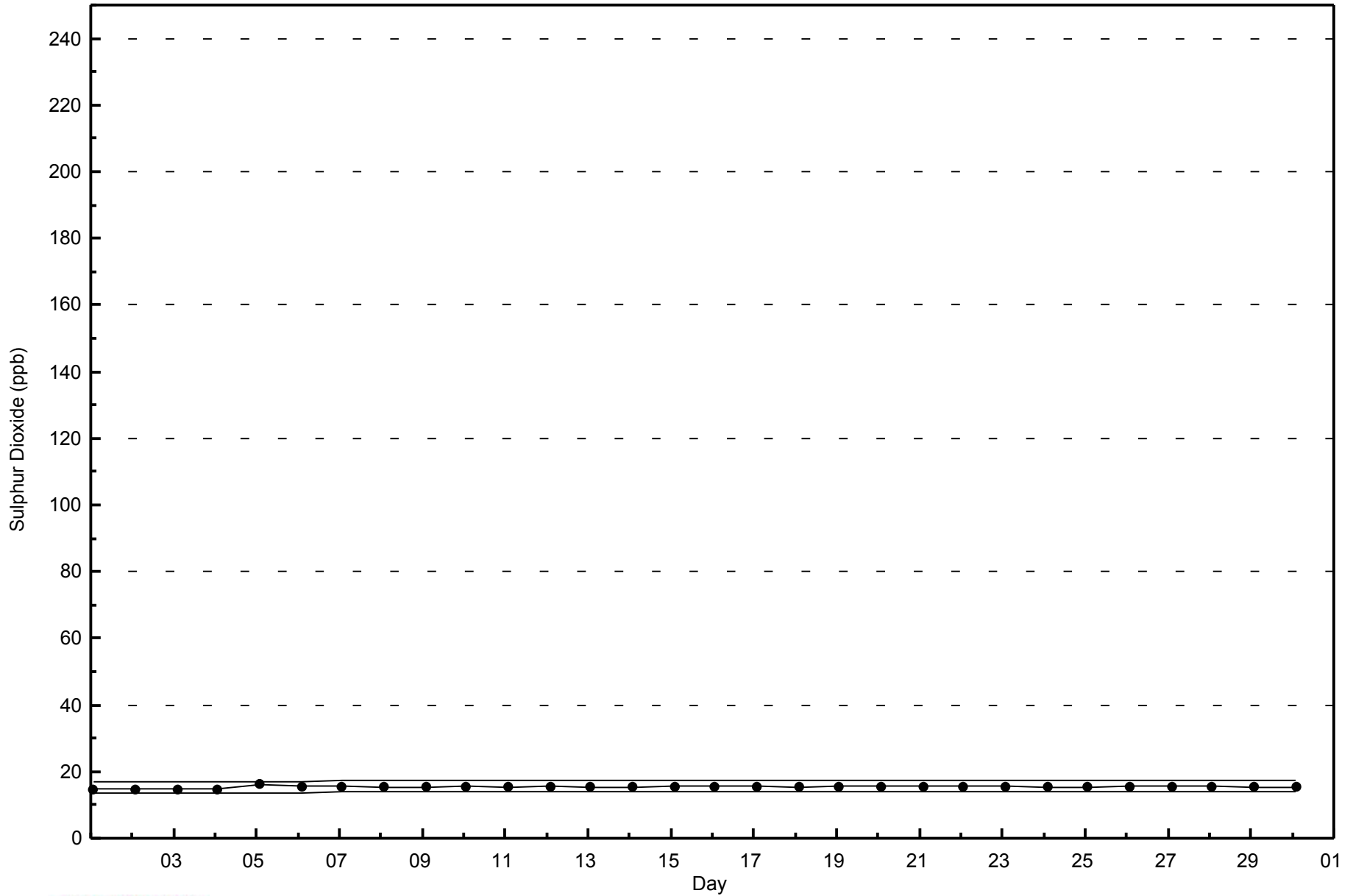
Sulphur Dioxide (SO₂) - ppb
Fort Chipeywan - June 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort Chiheywan - June 2014





Summary of Hour Averages

Maximum Value: 1 ppb on Jun 18 08:00	Maximum Daily Average: 0.2 ppb on Jun 18	Hours in Service: 720
Minimum Value: 0 ppb on Jun 8 01:00	Minimum Daily Average: 0.0 ppb on Jun 16	Hours of Data: 683
Maximum Diurnal Average: 0.2 ppb at hour 8	Minimum Diurnal Average: 0.0 ppb at hour 3	Hours of Missing Data: 37
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: 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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
2-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Jun	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
5-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
6-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
8-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
9-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
11-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
14-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Jun	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	0	0.1	1
16-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
17-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Jun	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
19-Jun	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
20-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Jun	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	0	0.1	1
28-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0

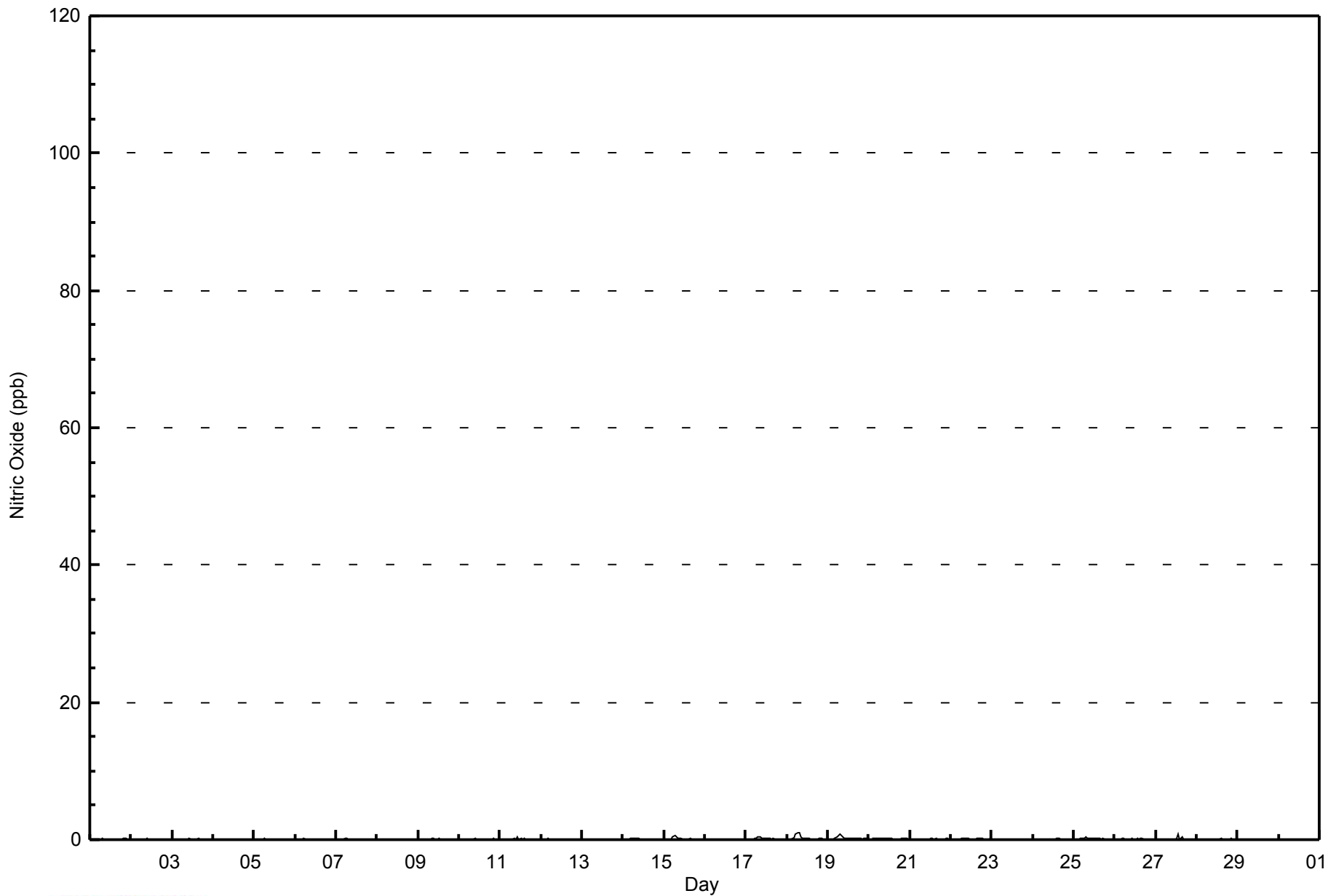
0.0	--	0.0	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	Diurnal Average
0	--	0	0	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

Z - zerospan C - Calibration



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Fort Chipeywan - June 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipeywan - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	683	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipeywan - June 2014

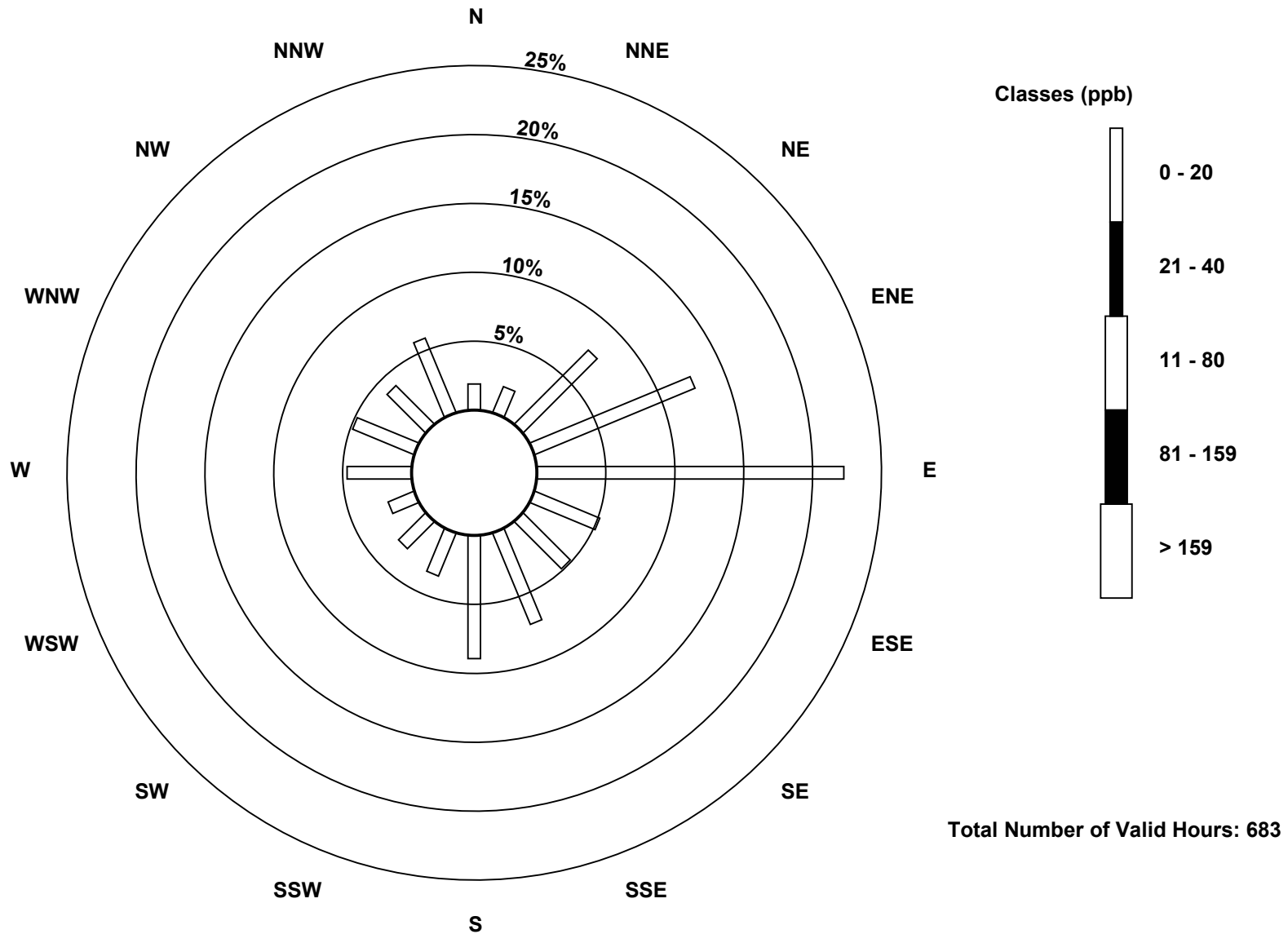
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	13	14	52	86	152	35	33	49	61	23	19	14	32	33	27	40	683
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	14	52	86	152	35	33	49	61	23	19	14	32	33	27	40	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

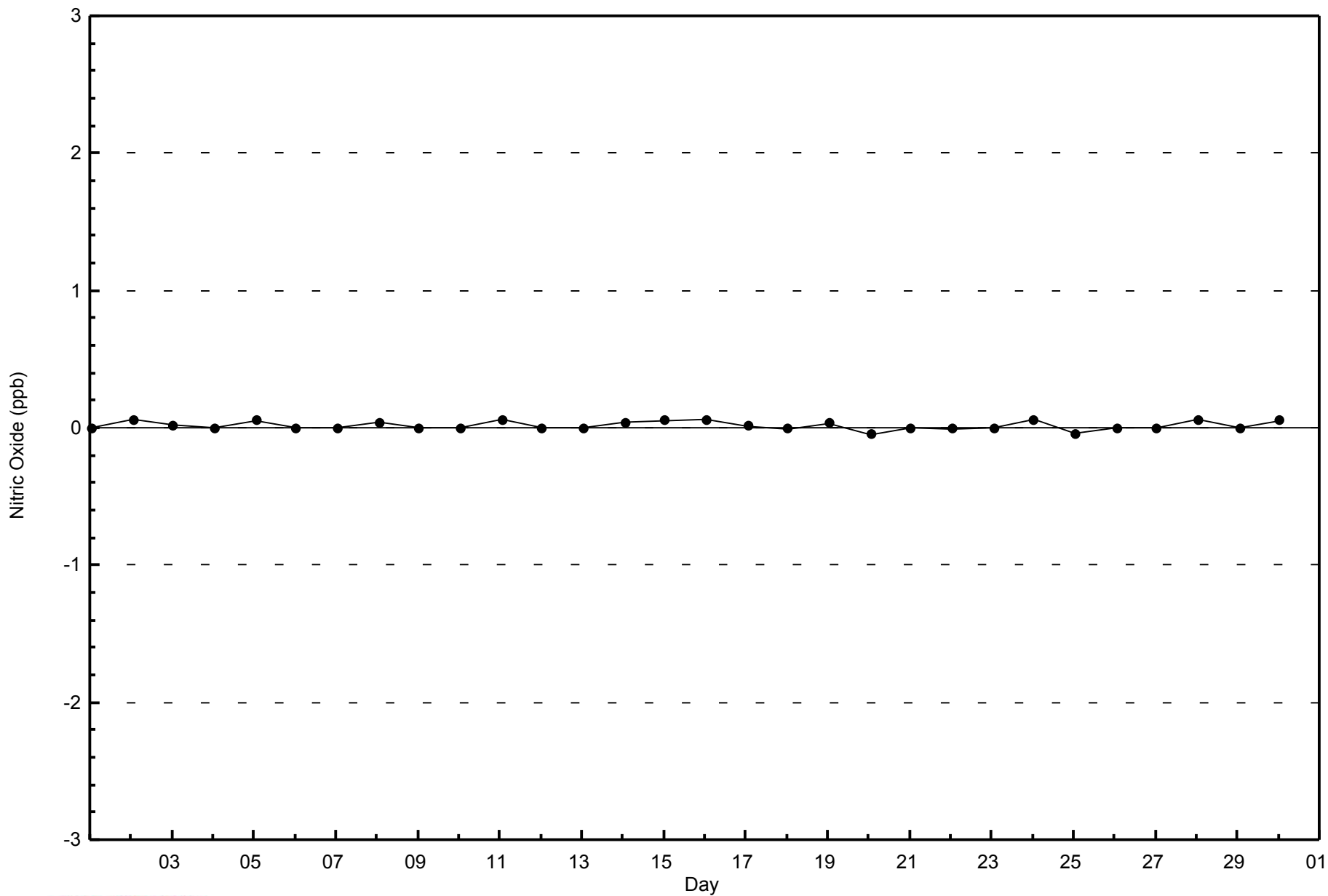
Nitric Oxide (NO) - ppb
Fort Chipeywan (AMS 8)





WBEA
Zero Responses

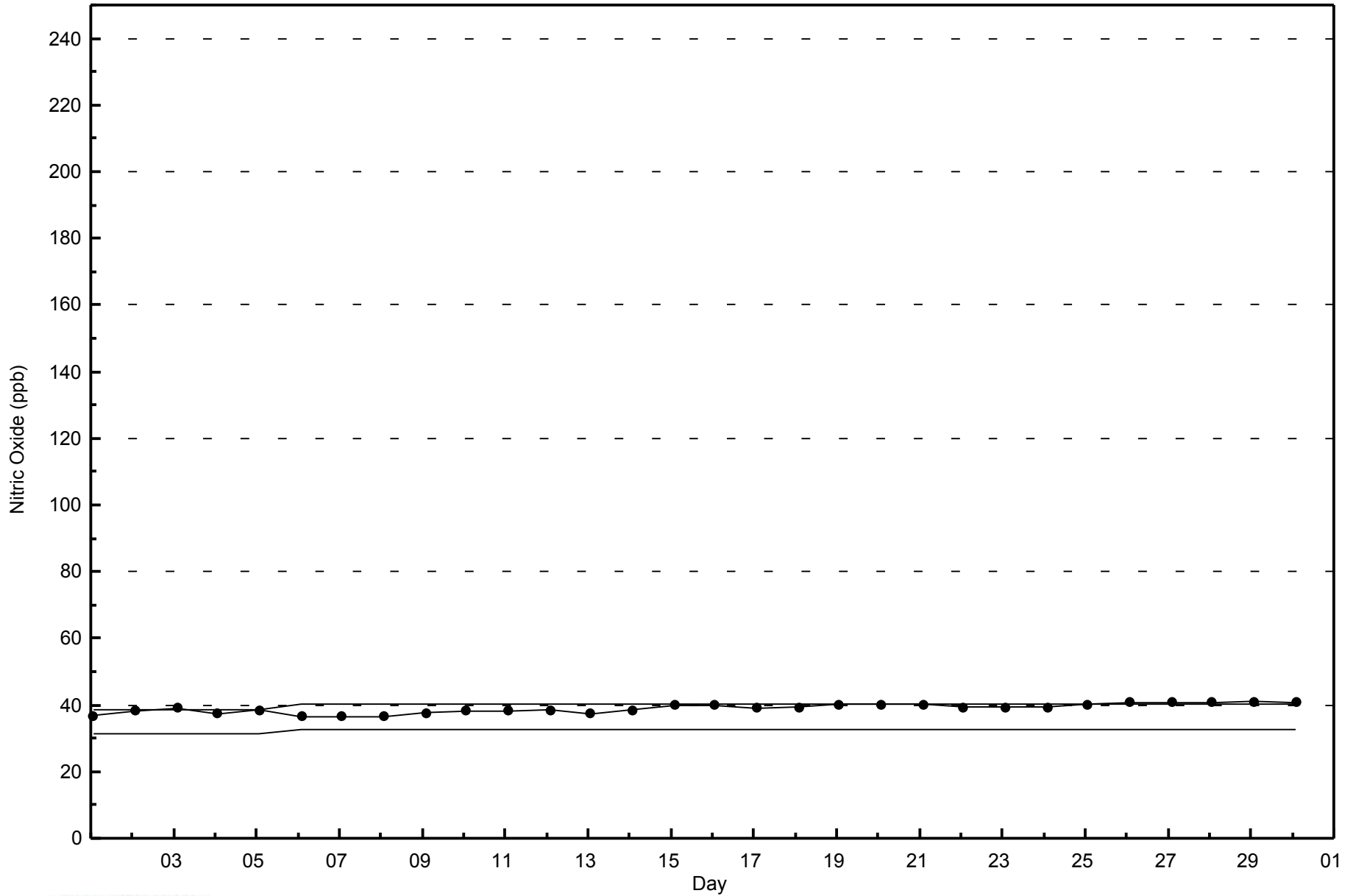
Nitric Oxide (NO) - ppb
Fort Chipecywan - June 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Fort Chipecywan - June 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4 ppb on Jun 18 04:00	Maximum Daily Average: 1.1 ppb on Jun 18		Hours of Data:	683
Minimum Value: 0 ppb on Jun 1 01:00	Minimum Daily Average: 0.0 ppb on Jun 16		Hours of Missing Data:	37
Maximum Diurnal Average: 0.6 ppb at hour 4	Minimum Diurnal Average: 0.2 ppb at hour 17		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 = 1 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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.2	1	
2-Jun	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
3-Jun	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
4-Jun	0	Z	1	0	0	0	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	1
5-Jun	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1	
6-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1	
7-Jun	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.2	1	
8-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1	
10-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1	
11-Jun	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1	
12-Jun	0	Z	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2	
13-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1	
14-Jun	0	Z	1	3	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0.7	3	
15-Jun	0	Z	0	0	1	2	2	2	2	1	1	1	1	0	1	1	1	1	0	0	1	0	0	0	0.8	2	
16-Jun	0	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-Jun	0	Z	0	0	0	0	1	1	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	2	
18-Jun	1	Z	2	4	2	2	2	2	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1.1	4	
19-Jun	0	Z	1	1	2	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	2	1	0.8	2	
20-Jun	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.3	1	
21-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
22-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	0.3	3	
23-Jun	0	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-Jun	0	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-Jun	0	Z	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0.5	1	
26-Jun	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1	
27-Jun	1	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	1	1	1	0	0	0.4	1	
28-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0.3	1	
29-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0.2	1	
30-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	

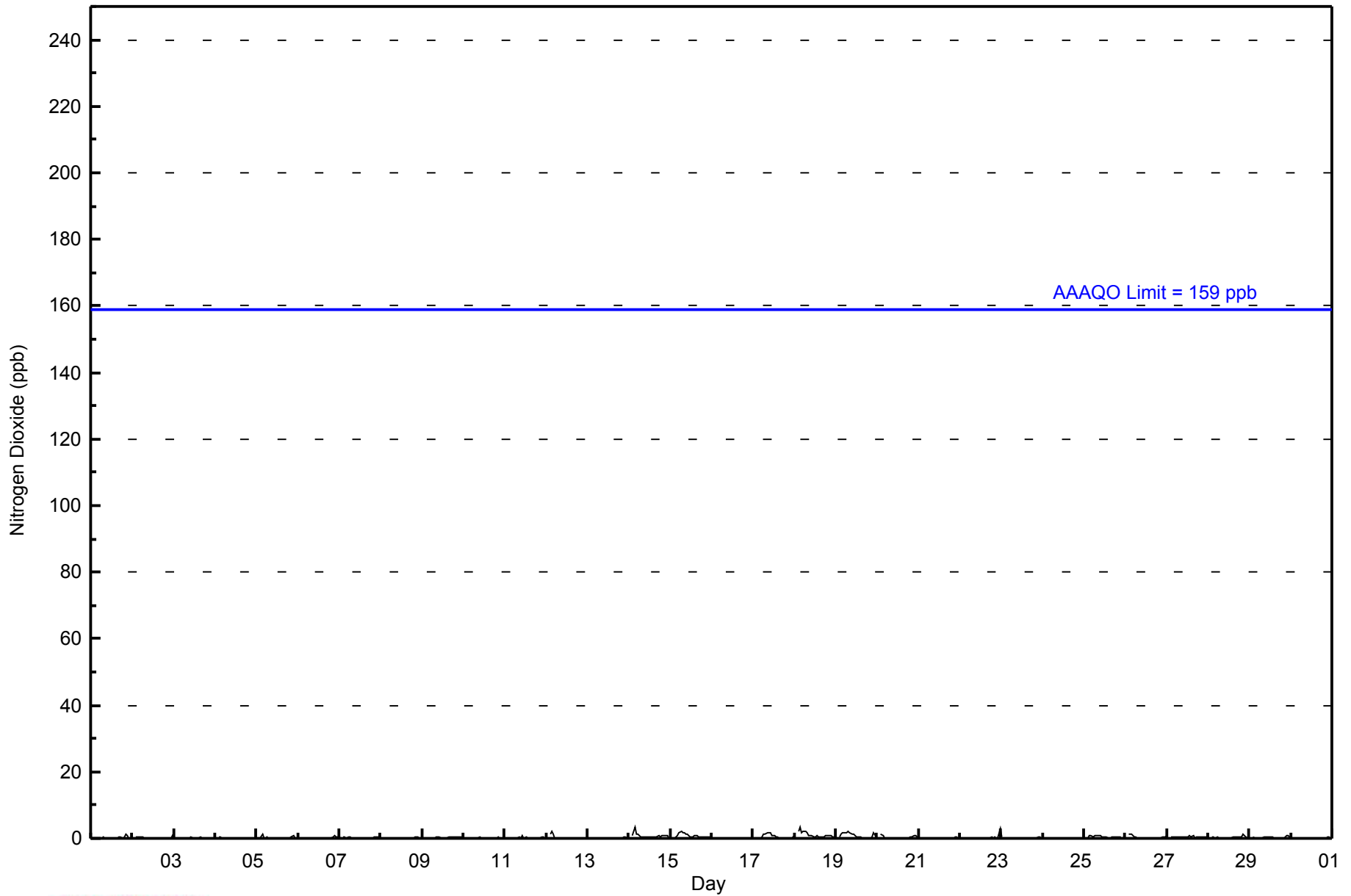
0.2	--	0.4	0.6	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	Diurnal Average	
1	--	2	4	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	3	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort Chipeywan - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort Chipeywan - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	683	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort Chipeywan - June 2014

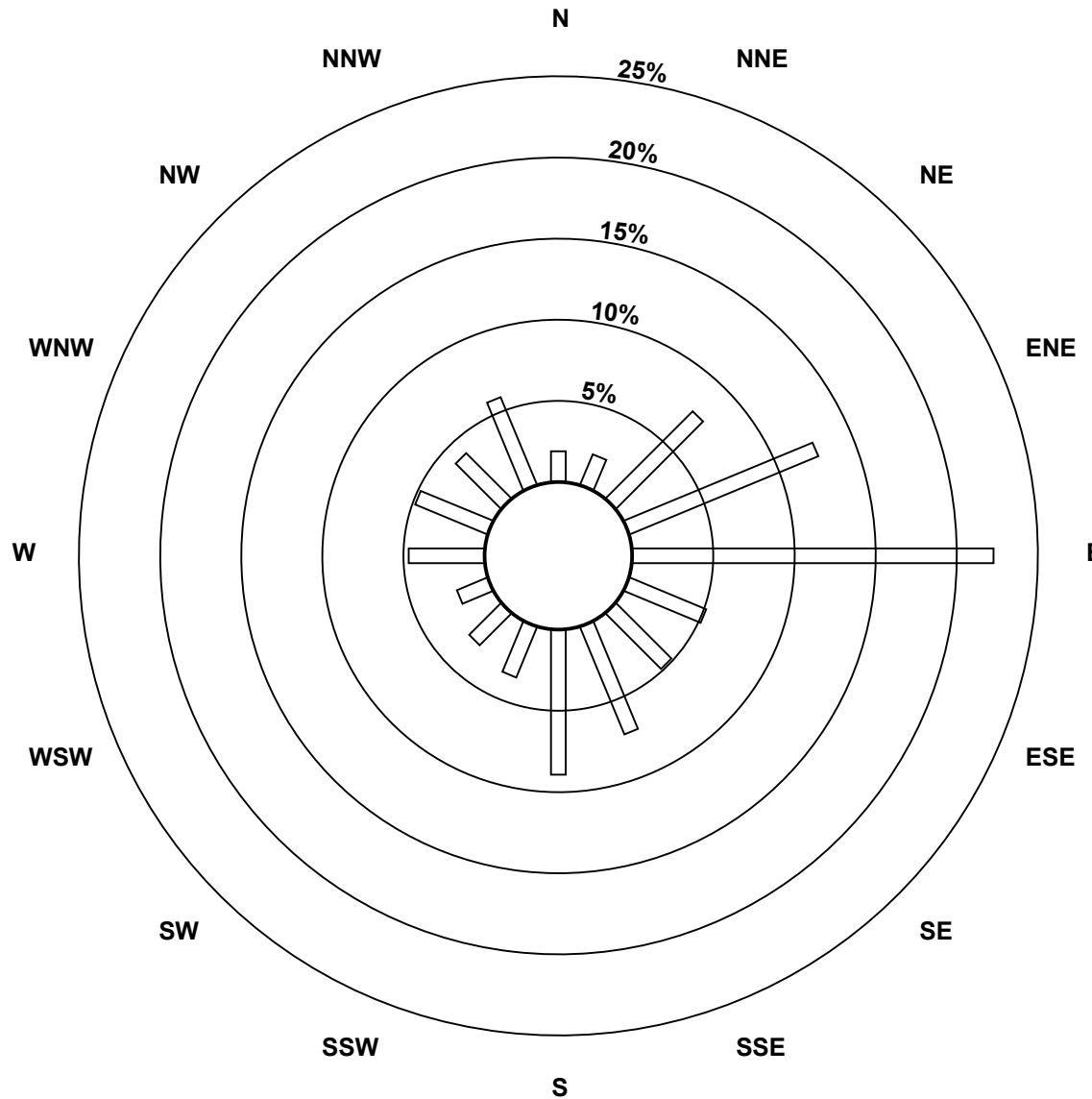
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	13	14	52	86	152	35	33	49	61	23	19	14	32	33	27	40	683
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	14	52	86	152	35	33	49	61	23	19	14	32	33	27	40	683

Total Number of Valid Hours: 683

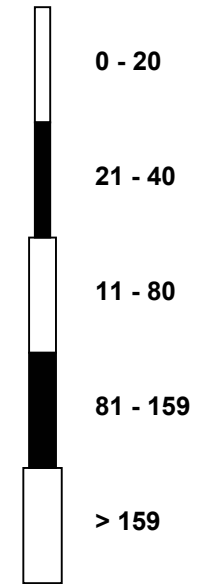
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Nitrogen Dioxide (NO₂) - ppb
Fort Chipeywan (AMS 8)



Classes (ppb)

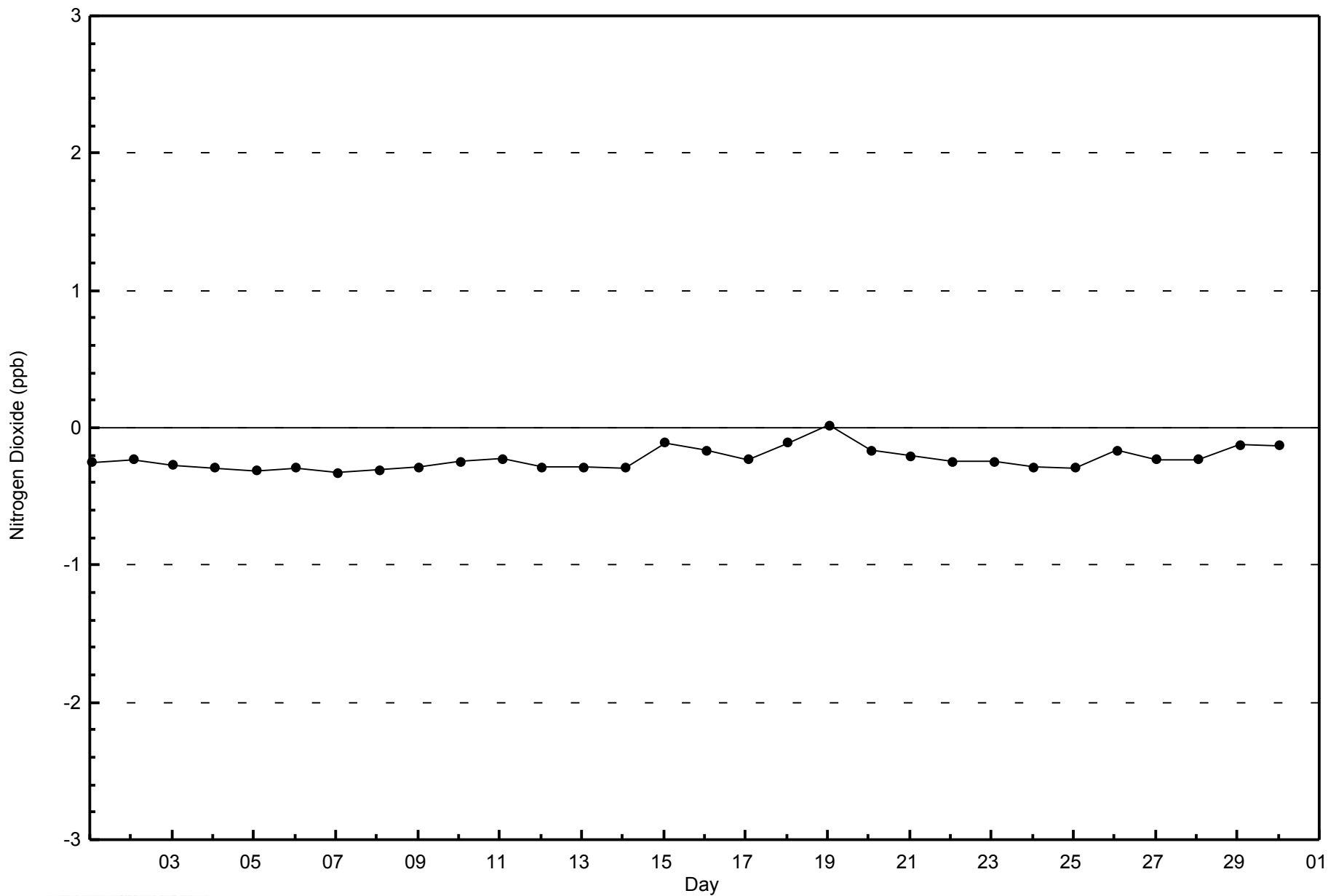


Total Number of Valid Hours: 683



WBEA
Zero Responses

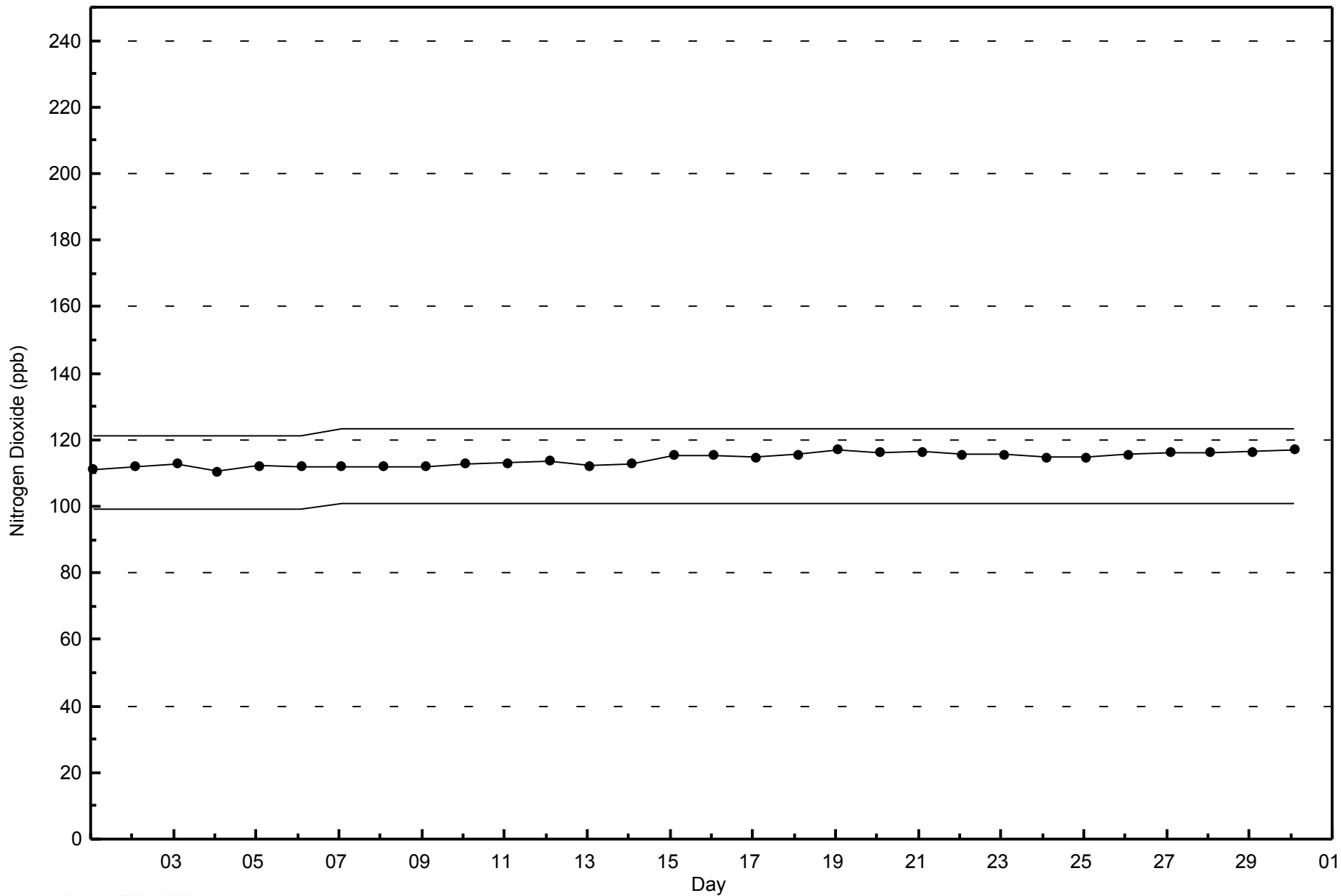
Nitrogen Dioxide (NO₂) - ppb
Fort Chipeywan - June 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Fort Chipecywan - June 2014



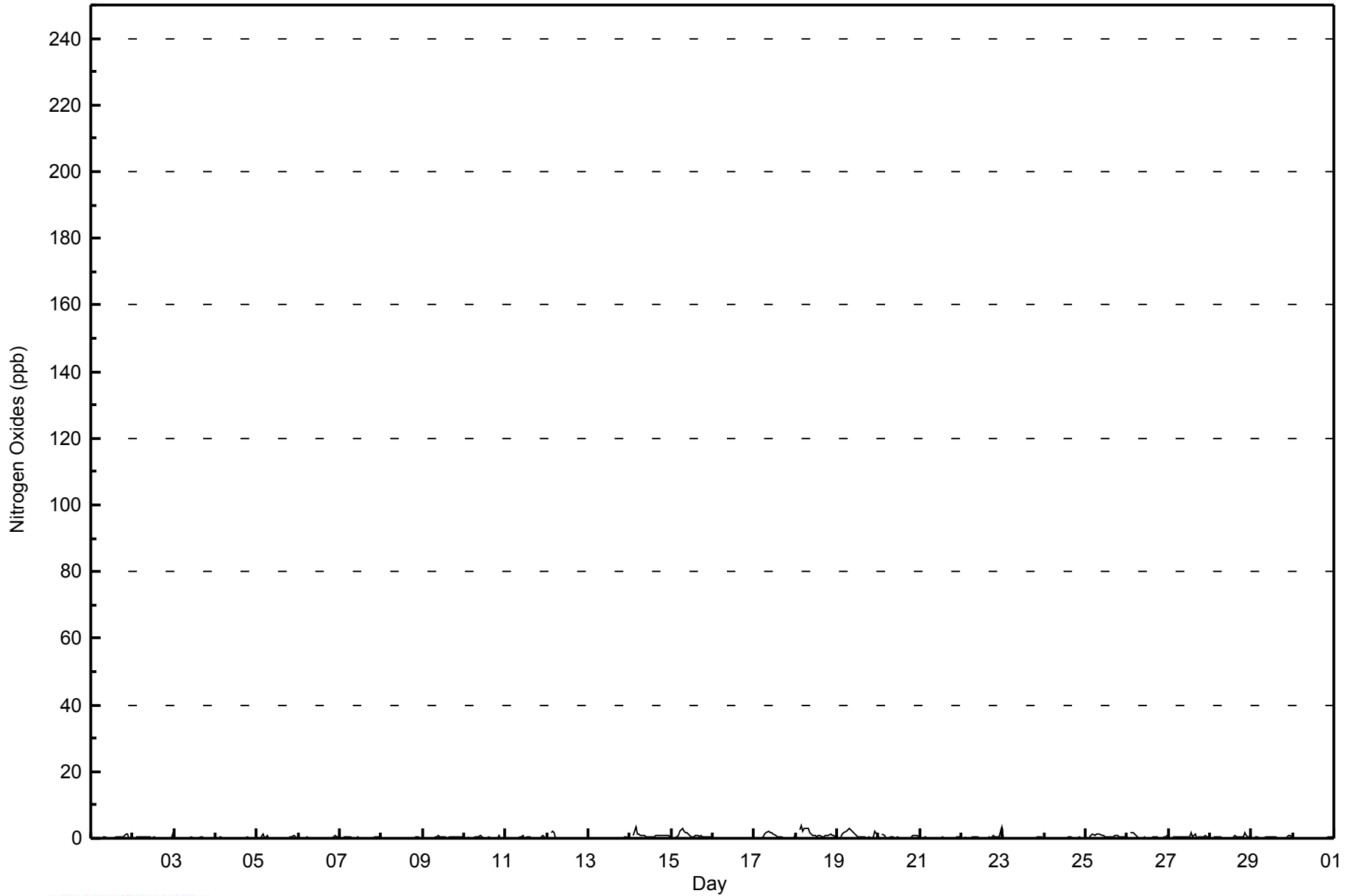


Maximum Value: 4 ppb on Jun 18 04:00																	Maximum Daily Average: 1.3 ppb on Jun 18																	Hours in Service: 720															
Minimum Value: 0 ppb on Jun 14 01:00																	Minimum Daily Average: 0.1 ppb on Jun 16																	Hours of Data: 683															
Maximum Diurnal Average: 0.6 ppb at hour 4																	Minimum Diurnal Average: 0.2 ppb at hour 17																	Hours of Missing Data: 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																	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-Jun	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																							
2-Jun	1	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1																							
3-Jun	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
4-Jun	0	Z	1	0	0	0	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	--	1																							
5-Jun	0	Z	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1																							
6-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.2	1																							
7-Jun	1	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1																							
8-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1																							
10-Jun	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1																							
11-Jun	0	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1																							
12-Jun	0	Z	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																							
13-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1																							
14-Jun	0	Z	1	3	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0.8	3																							
15-Jun	0	Z	0	0	1	2	3	2	2	2	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0.9	3																							
16-Jun	0	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-Jun	0	Z	0	0	0	1	1	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0.6	2																							
18-Jun	1	Z	2	4	2	3	3	3	2	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1.3	4																							
19-Jun	0	Z	1	1	2	2	3	3	2	2	1	1	1	0	0	0	0	0	0	0	0	0	2	1	1.0	3																							
20-Jun	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.4	1																							
21-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1																							
22-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	0.4	3																							
23-Jun	0	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-Jun	0	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-Jun	0	Z	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0.6	1																							
26-Jun	0	Z	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	2																							
27-Jun	1	Z	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	1	1	1	1	1	0	0	0.5	2																							
28-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	1	0	0	0.4	2																							
29-Jun	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0.3	1																							
30-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
																								0.2	--	0.4	0.6	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.4	0.5	0.4	0.4	Diurnal Average	
																								1	--	2	4	2	3	3	3	3	2	2	2	1	1	2	1	1	1	1	1	1	2	1	2	3	Diurnal Maximum
Z - zerospan C - Calibration																																																	



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort Chipecywan - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	683	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort Chipeywan - June 2014

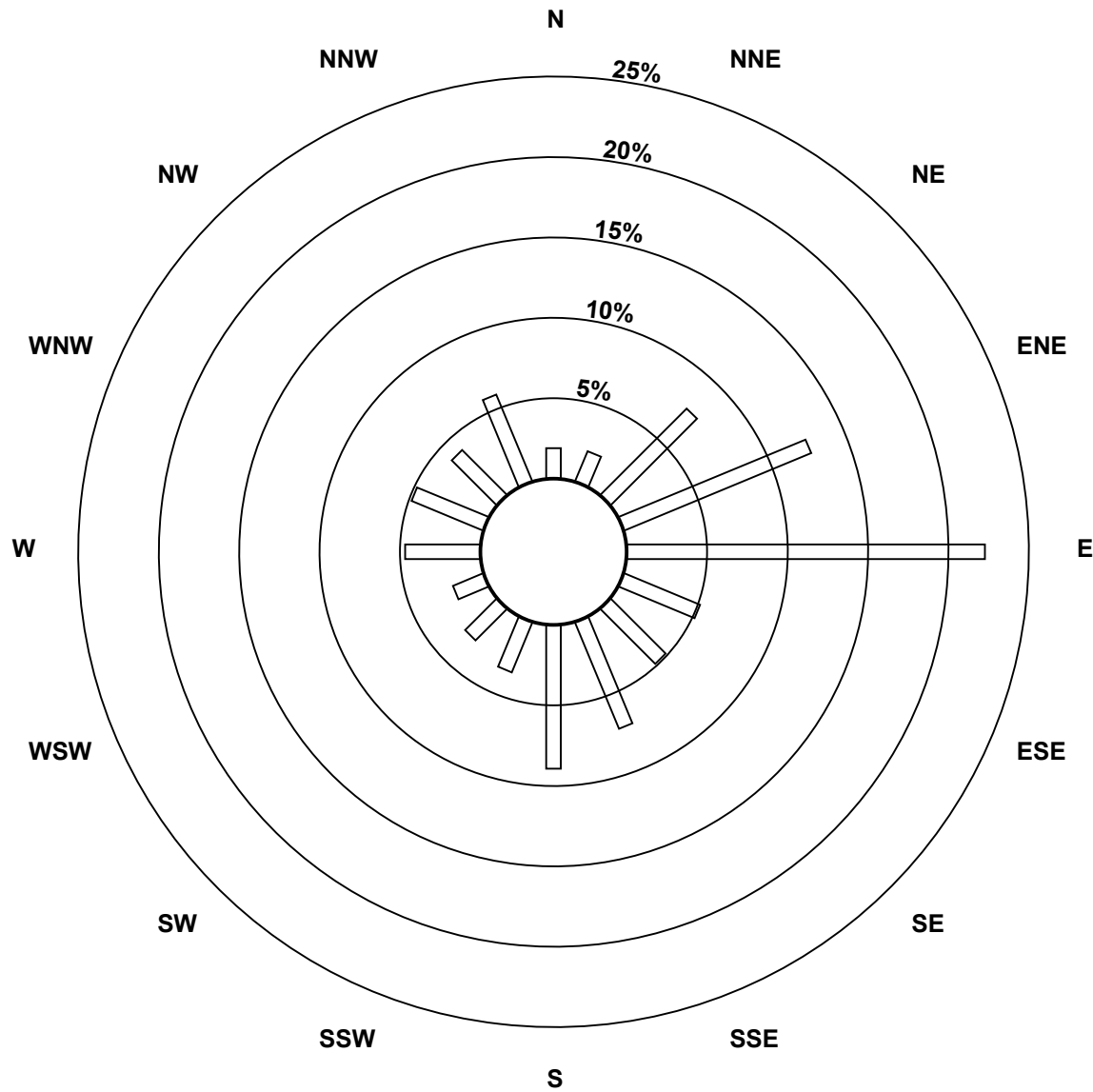
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	13	14	52	86	152	35	33	49	61	23	19	14	32	33	27	40	683
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	14	52	86	152	35	33	49	61	23	19	14	32	33	27	40	683

Total Number of Valid Hours: 683

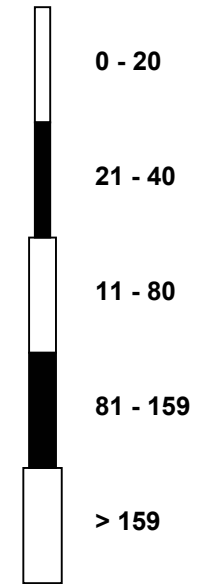
Total Number of Hours: 720

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

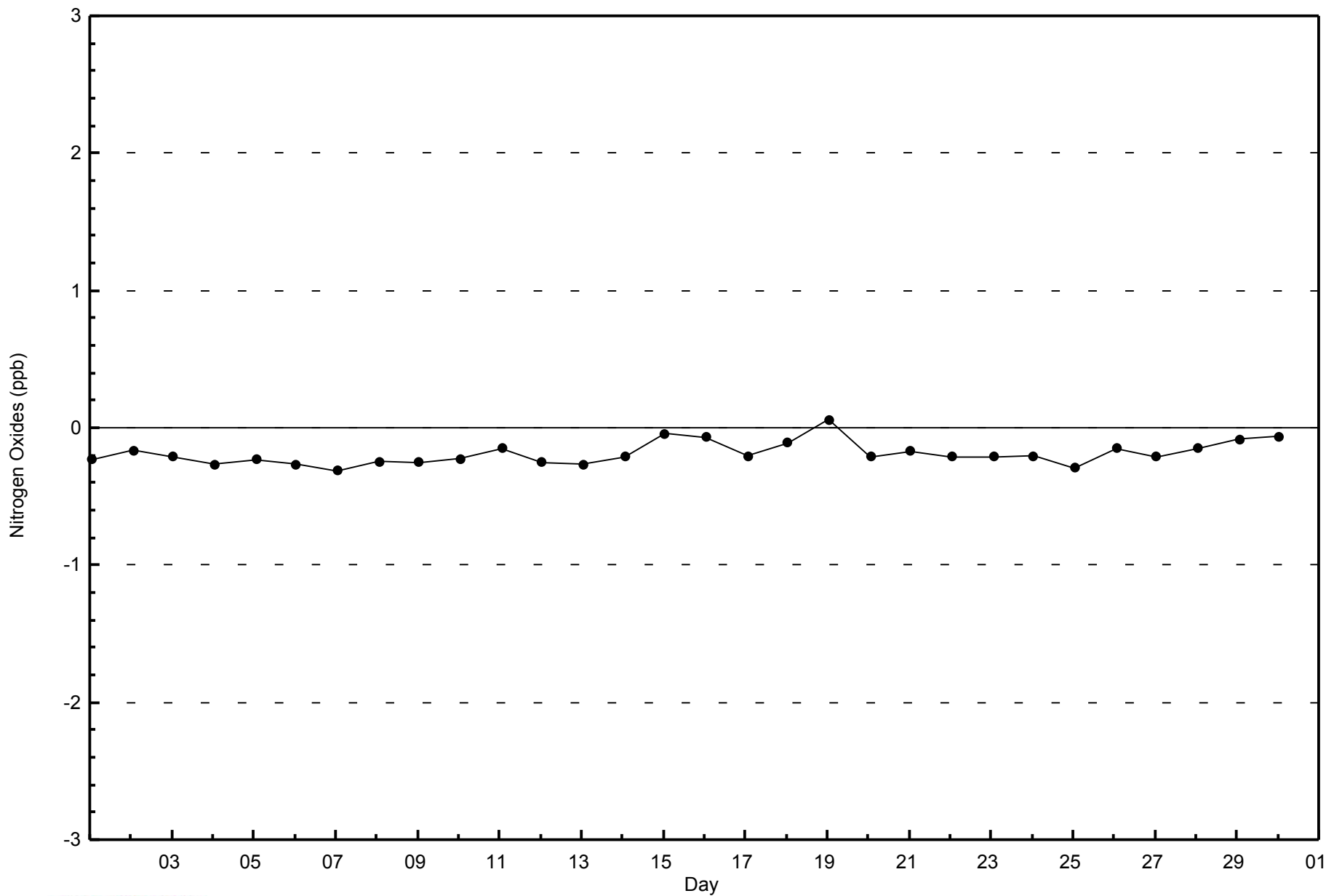
**Nitrogen Oxides (NO_x) - ppb
Fort Chipeywan (AMS 8)**



Classes (ppb)



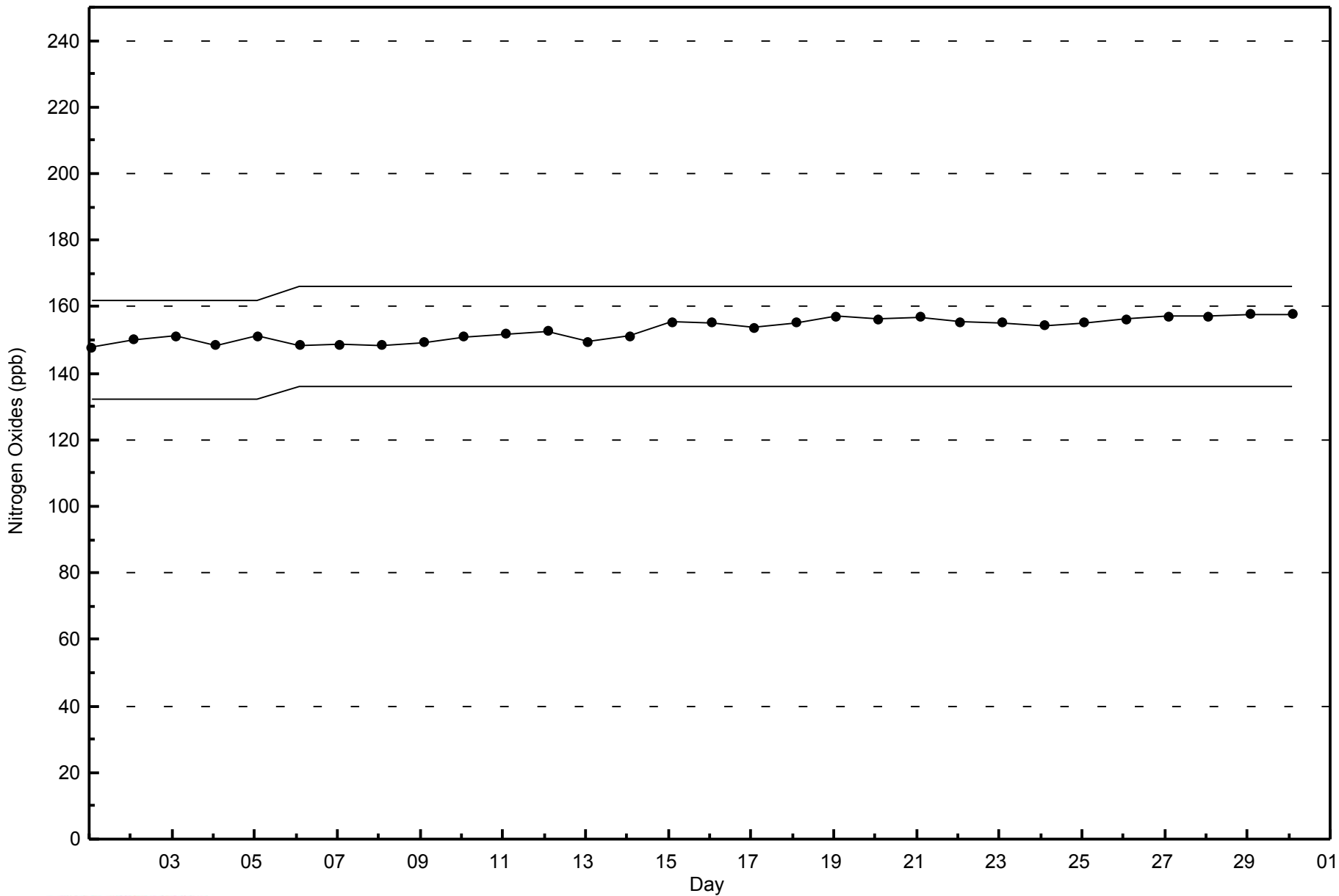
Total Number of Valid Hours: 683





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort Chipecywan - June 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 53 ppb on Jun 15 11:00	Maximum Daily Average: 42.4 ppb on Jun 15		Hours of Data:	687
Minimum Value: 11 ppb on Jun 28 09:00	Minimum Daily Average: 18.2 ppb on Jun 22		Hours of Missing Data:	33
Maximum Diurnal Average: 34.1 ppb at hour 19	Minimum Diurnal Average: 24.6 ppb at hour 6		Hours of Calibration:	33
Monthly Average: 29.2 ppb	Percentiles: P ₁ = 13 P ₁₀ = 20 Q ₁ = 24 Median = 29 Q ₃ = 33 P ₉₀ = 38 P ₉₉ = 48		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	38	37	Z	35	33	33	33	36	37	37	38	39	39	40	39	40	42	42	39	36	34	35	36	36	37.1	42
2-Jun	34	31	Z	30	30	29	27	31	29	28	28	31	33	34	37	35	38	40	38	35	32	27	25	22	31.4	40
3-Jun	21	20	Z	19	18	17	17	19	18	18	18	19	20	19	18	19	20	22	24	25	26	25	25	20.4	26	
4-Jun	27	28	Z	32	32	30	29	29	29	29	31	30	29	27	26	25	C	C	C	24	24	23	24	23	27.7	32
5-Jun	26	29	Z	28	24	22	21	26	26	26	28	30	28	29	27	27	27	28	28	24	23	19	18	17	25.3	30
6-Jun	18	20	Z	19	19	21	23	23	23	24	26	28	33	34	35	33	33	33	32	33	32	29	29	28	27.4	35
7-Jun	27	26	Z	30	28	26	25	27	28	32	31	31	30	28	29	28	28	29	32	32	32	31	30	28	29.1	32
8-Jun	31	30	Z	29	29	28	26	26	26	26	26	27	26	26	28	28	31	33	34	35	35	33	31	31	29.3	35
9-Jun	31	31	Z	33	33	33	32	31	30	31	34	34	35	33	33	42	37	36	39	38	39	35	34	35	34.3	42
10-Jun	35	32	Z	31	30	33	32	34	38	38	38	34	41	38	40	42	42	44	43	43	40	37	34	36	37.2	44
11-Jun	36	36	Z	33	29	28	30	31	32	32	34	37	38	39	37	38	39	41	43	42	40	39	36	34	35.8	43
12-Jun	34	29	Z	27	26	27	25	25	25	26	26	27	29	31	33	35	35	34	32	32	31	30	29	28	29.4	35
13-Jun	27	27	Z	26	26	26	25	25	25	26	28	30	27	27	28	30	31	31	32	32	32	31	31	31	28.5	32
14-Jun	30	30	Z	27	30	30	31	32	33	34	35	36	40	44	47	48	48	49	48	48	44	42	41	34	38.4	49
15-Jun	31	30	Z	32	29	28	30	34	40	46	53	47	47	50	47	48	48	50	52	49	47	47	46	43	42.4	53
16-Jun	41	37	Z	28	28	27	28	27	27	27	28	32	34	32	33	33	33	33	33	33	33	33	33	32	31.5	41
17-Jun	31	28	Z	29	28	27	24	25	28	30	31	31	31	33	35	33	32	32	32	32	31	30	29	28	30.0	35
18-Jun	27	26	Z	20	19	19	20	22	25	28	30	32	37	41	41	40	41	42	43	41	39	38	36	36	32.3	43
19-Jun	33	31	Z	27	25	24	24	26	31	36	37	36	33	33	31	29	30	31	32	32	34	29	25	25	30.2	37
20-Jun	24	27	Z	30	28	26	24	23	23	21	20	19	20	22	28	31	31	29	27	24	22	22	22	21	24.6	31
21-Jun	22	20	Z	23	27	32	33	31	31	33	29	24	22	24	25	25	24	21	20	22	22	19	16	15	24.3	33
22-Jun	14	13	Z	11	14	13	13	14	19	20	21	20	19	19	19	21	24	28	27	20	17	16	20	18	18.2	28
23-Jun	21	21	Z	22	23	22	20	17	16	15	15	15	17	20	23	25	28	30	33	33	31	30	31	31	23.5	33
24-Jun	27	20	Z	19	21	25	27	27	28	27	27	27	27	28	28	28	28	28	28	29	30	33	27	25	26.7	33
25-Jun	24	24	Z	25	26	24	25	29	32	33	34	36	39	38	36	37	38	40	41	39	37	35	32	26	32.5	41
26-Jun	23	21	Z	17	16	15	17	22	22	20	19	18	20	22	26	27	28	29	29	26	24	23	23	19	22.1	29
27-Jun	19	20	Z	25	19	17	17	20	22	23	28	31	33	38	37	31	31	32	32	31	32	29	19	20	26.3	38
28-Jun	24	20	Z	24	23	13	14	13	11	12	15	17	15	16	29	32	37	36	37	34	31	31	28	28	23.4	37
29-Jun	26	24	Z	22	22	22	21	22	24	28	30	33	34	34	33	34	35	35	35	36	35	36	34	31	29.8	36
30-Jun	28	26	Z	21	21	23	24	23	27	29	30	30	30	30	28	26	26	25	25	25	24	23	23	23	26.0	30

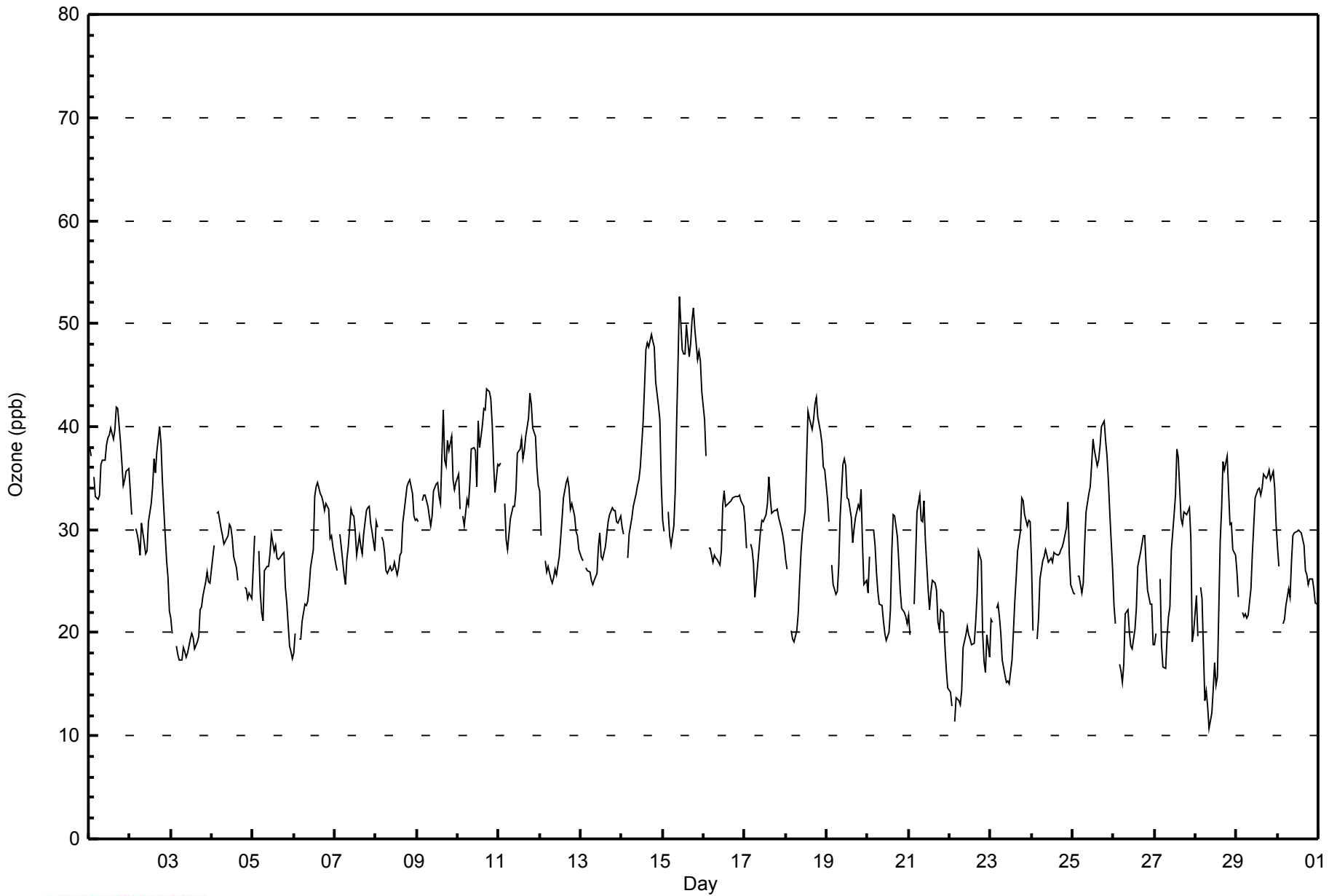
27.7	26.5	--	25.8	25.2	24.6	24.7	25.7	26.9	27.9	28.9	29.5	30.2	30.9	32.1	32.3	33.1	33.9	34.1	32.8	31.9	30.4	28.9	27.7	Diurnal Average	
41	37	--	35	33	33	33	36	40	46	53	47	47	47	50	48	48	50	52	49	47	47	46	43	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Fort Chipeywan - June 2014





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort Chipeywan - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	89	12.95	12.95
21 - 50	596	86.75	99.71
51 - 82	2	0.29	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 687

Total Number of Hours: 720



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Fort Chipewyan - June 2014

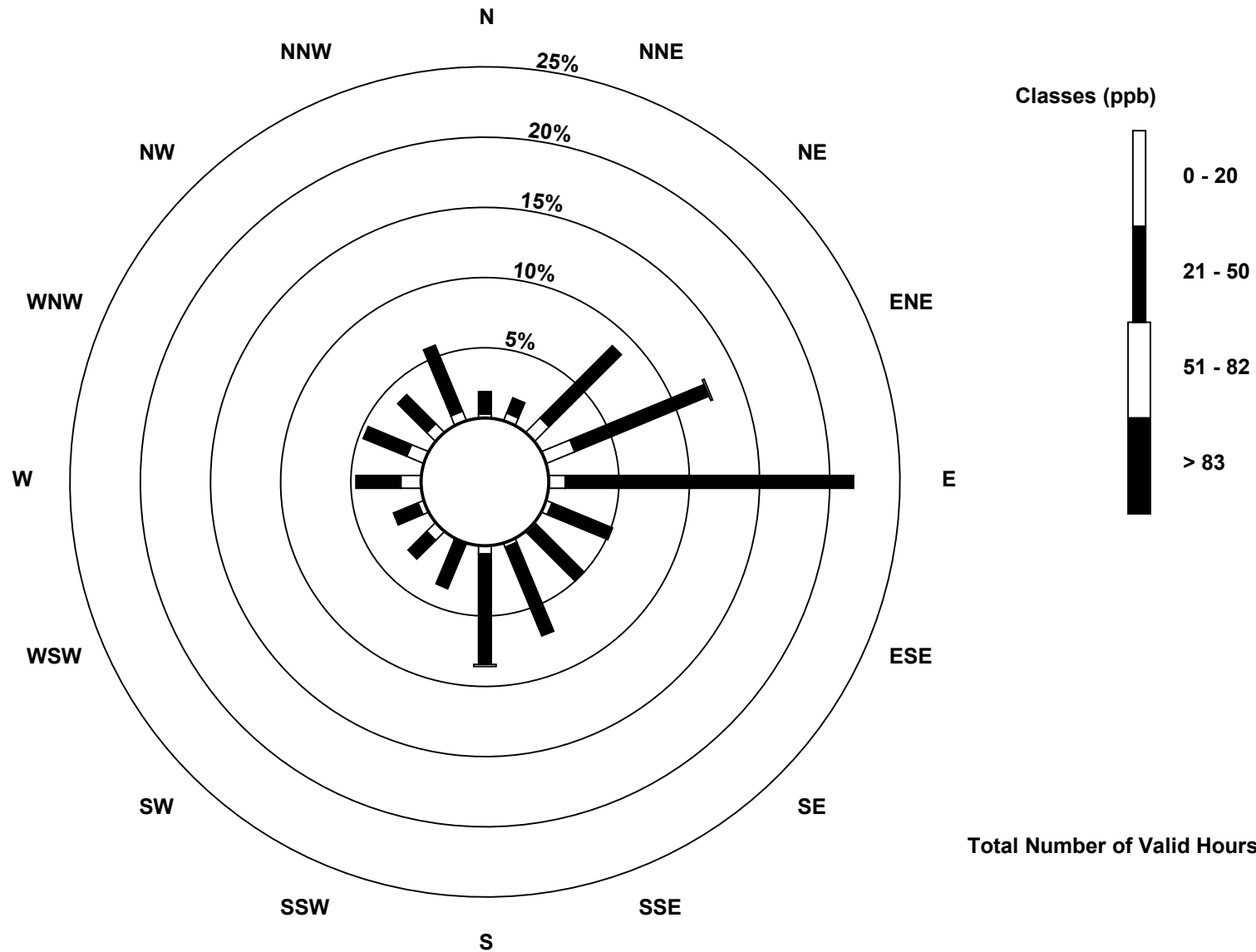
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	2	4	10	15	8	3	1	2	4	1	6	3	10	9	6	5	89
21 - 50	11	8	50	71	141	32	33	47	54	23	13	13	22	23	20	35	596
51 - 82	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	2
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	12	60	87	149	35	34	49	59	24	19	16	32	32	26	40	687

Total Number of Valid Hours: 687

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Ozone (O₃) - ppb
Fort Chipeywan (AMS 8)

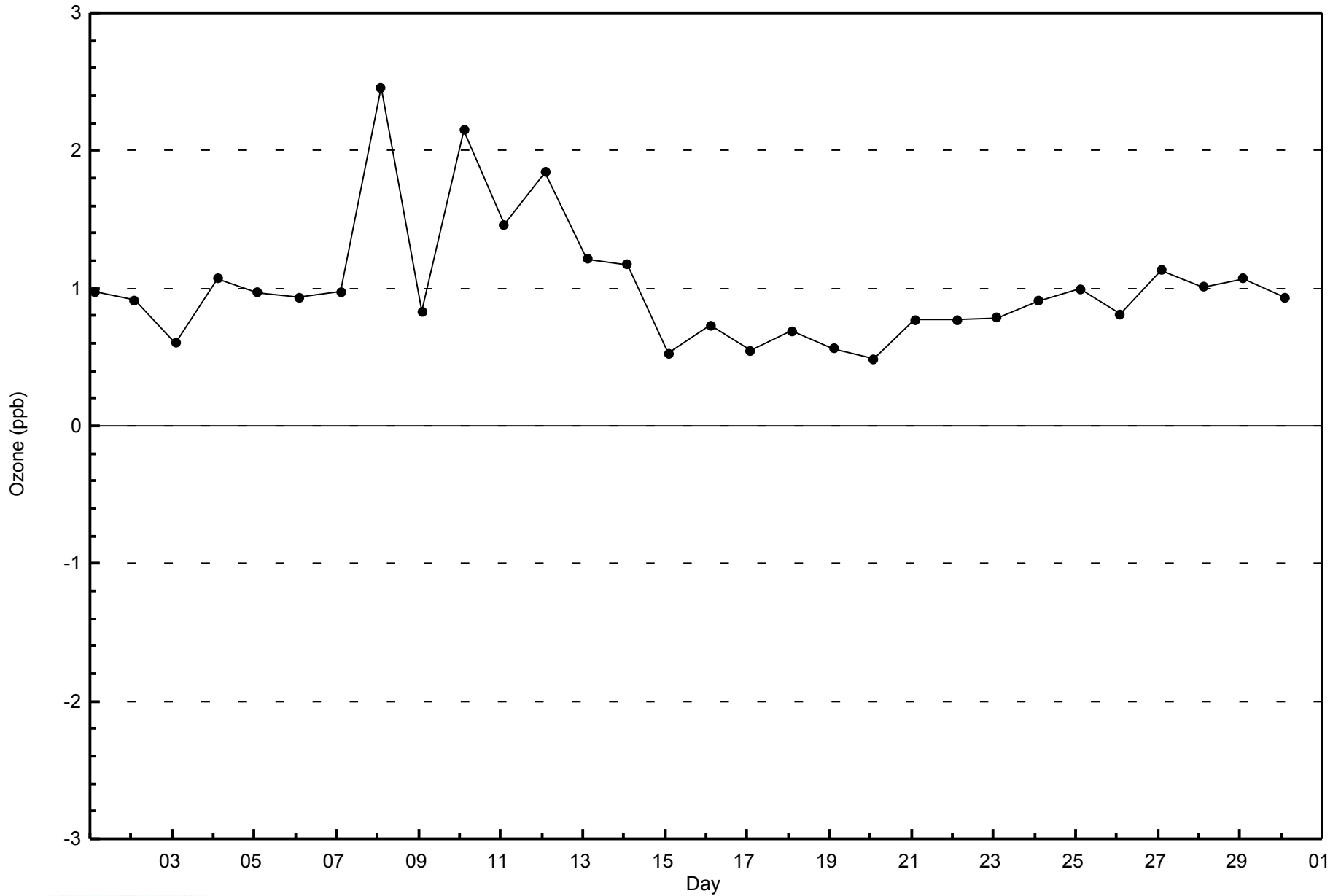


Total Number of Valid Hours: 687



WBEA
Zero Responses

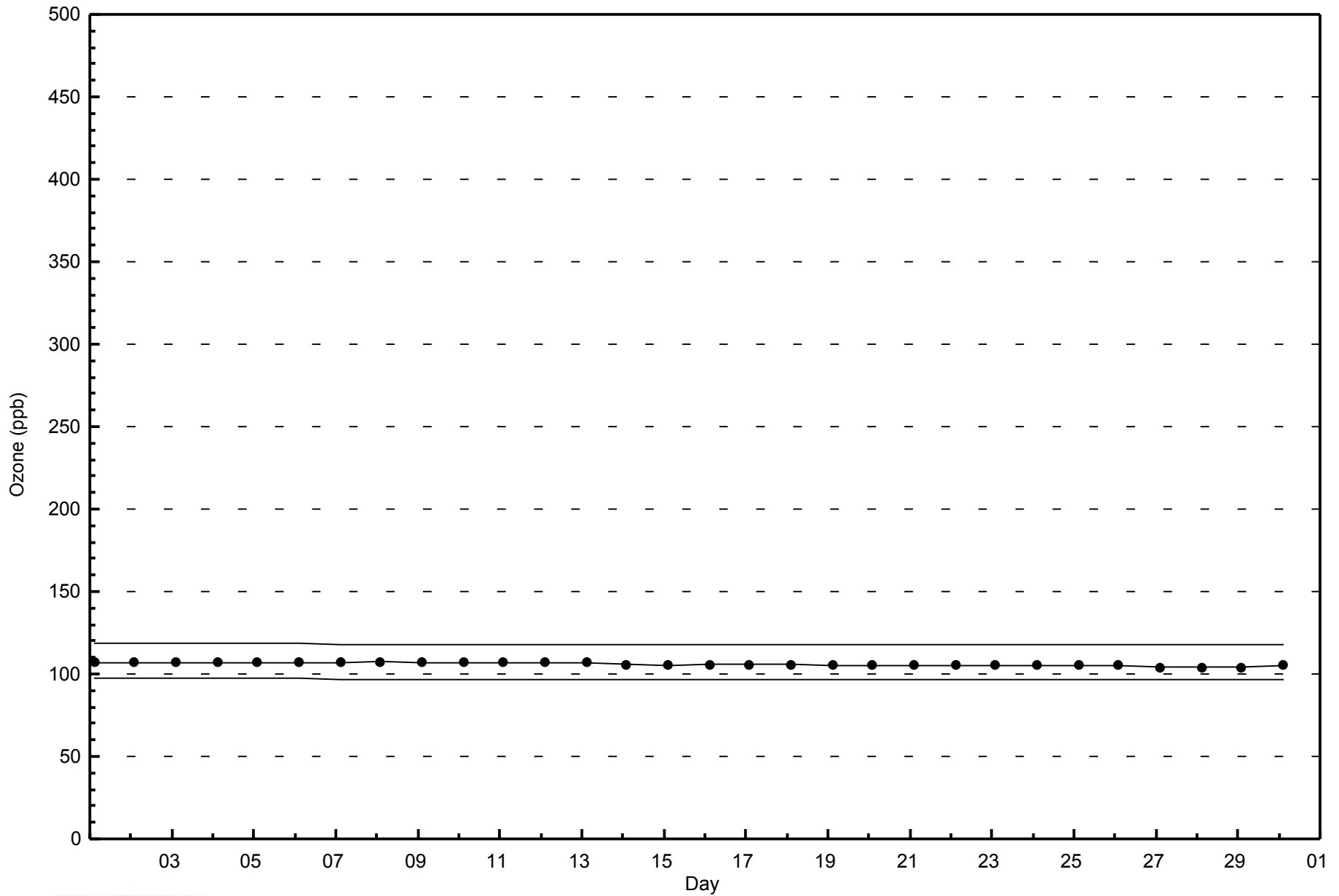
Ozone (O₃) - ppb
Fort Chipeywan - June 2014





WBEA
Span Responses

Ozone (O₃) - ppb
Fort Chipeywan - June 2014





Summary of Hour Averages

Fort Chiipaywan - June 2014

Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 91.7 µg/m ³ on Jun 29 23:00	Maximum Daily Average: 28.8 µg/m ³ on Jun 29	Hours of Data:	719
Minimum Value: 0.0 µg/m ³ on Jun 5 15:00	Minimum Daily Average: 0.4 µg/m ³ on Jun 5	Hours of Missing Data:	1
Maximum Diurnal Average: 7.8 µg/m ³ at hour 23	Minimum Diurnal Average: 3.6 µg/m ³ at hour 19	Hours of Calibration:	0
Monthly Average: 5.44 µg/m ³	Percentiles: P ₁ = 0.1 P ₁₀ = 0.9 Q ₁ = 2.3 Median = 4.3 Q ₃ = 6.1 P ₉₀ = 8.0 P ₉₉ = 34.3	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-Jun	4.1	4.3	3.4	3.2	3.0	2.4	1.8	1.6	1.9	2.0	2.1	2.1	2.1	2.3	2.9	3.7	4.1	3.7	3.0	2.7	2.8	3.3	3.5	4.2	2.9	4.3
2-Jun	5.8	8.2	9.3	9.4	9.0	7.7	6.2	5.4	4.7	4.7	4.4	4.8	3.4	2.4	1.4	1.0	0.7	0.8	1.0	1.5	1.3	1.1	1.0	1.0	4.0	9.4
3-Jun	0.7	0.7	0.2	0.2	0.2	0.2	0.4	1.1	1.3	0.9	0.6	0.4	0.3	0.3	0.1	0.1	0.2	0.4	0.8	0.7	0.7	0.8	0.8	0.8	0.5	1.3
4-Jun	0.9	0.9	1.1	1.4	1.2	1.1	0.8	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.7	0.2	0.3	M	0.1	0.0	0.1	0.2	0.1	0.2	0.5	1.4
5-Jun	0.6	0.8	1.0	1.0	0.7	0.6	0.4	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.2	0.6	0.7	0.8	0.6	0.1	0.2	0.5	0.1	0.4	1.0
6-Jun	0.2	1.0	0.3	0.1	0.1	0.0	0.0	0.0	0.3	0.7	0.8	0.9	1.2	1.4	1.4	1.3	1.2	1.2	1.2	1.2	1.8	4.1	3.2	2.3	1.1	4.1
7-Jun	2.8	2.4	1.9	1.8	2.0	1.5	2.0	2.2	2.2	2.1	1.9	1.9	1.8	1.9	1.9	2.0	2.0	2.0	2.2	2.5	3.3	4.8	4.4	4.2	2.4	4.8
8-Jun	3.8	3.4	3.1	2.9	3.1	4.7	4.4	3.6	2.9	2.9	2.6	2.4	2.2	1.9	2.0	2.0	2.2	2.3	2.4	2.6	3.0	3.5	3.0	2.4	2.9	4.7
9-Jun	3.3	4.3	5.0	4.0	3.7	3.8	4.3	4.6	4.7	4.8	4.6	4.1	4.4	4.0	3.7	4.1	4.4	4.0	3.2	3.7	4.0	4.7	4.3	7.0	4.3	7.0
10-Jun	4.6	4.8	5.3	4.9	4.9	4.1	4.0	2.9	2.4	2.5	2.1	2.3	3.7	4.0	4.3	2.9	1.6	2.2	2.9	3.4	4.3	5.1	5.9	6.1	3.8	6.1
11-Jun	7.1	7.3	7.4	8.2	7.6	6.8	4.7	4.1	5.1	5.4	5.1	4.4	4.4	4.4	4.3	2.5	1.6	1.6	1.6	1.8	2.4	3.9	7.3	3.5	4.7	8.2
12-Jun	2.9	3.6	3.7	3.7	3.2	2.5	2.3	2.0	2.2	2.1	2.9	3.0	3.1	3.0	2.4	2.4	2.1	1.8	1.6	1.6	1.8	2.7	2.9	2.9	2.6	3.7
13-Jun	3.1	3.3	3.1	1.6	1.7	1.8	2.3	3.5	3.3	3.2	2.9	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.6	4.0	3.8	2.5	2.6	4.0
14-Jun	5.4	8.4	9.1	10.4	7.1	6.6	6.1	6.0	5.8	5.4	5.0	4.6	3.7	3.8	4.3	4.7	5.8	6.2	6.3	6.6	6.7	6.3	6.7	5.4	6.1	10.4
15-Jun	6.0	6.7	6.3	6.0	6.0	6.7	6.4	6.2	5.0	5.7	5.0	3.4	3.6	3.2	3.6	4.7	4.9	5.0	4.7	4.6	5.1	5.3	5.8	5.9	5.2	6.7
16-Jun	7.3	7.5	7.6	6.8	7.1	6.6	5.5	5.6	5.2	5.4	4.4	2.9	2.3	2.6	2.7	2.8	3.2	3.3	3.5	3.2	3.3	3.3	3.6	3.4	4.5	7.6
17-Jun	4.5	6.1	5.5	5.2	5.5	5.5	6.7	7.3	7.4	8.3	7.5	6.6	6.5	6.0	4.3	3.5	3.9	3.4	3.5	3.9	3.5	3.8	4.3	4.8	5.3	8.3
18-Jun	6.4	7.6	7.4	8.4	5.9	6.1	5.8	5.2	4.9	4.6	4.6	4.6	4.8	5.2	4.7	4.5	4.9	5.4	5.9	5.8	6.1	6.9	7.5	6.2	5.8	8.4
19-Jun	4.9	4.3	4.7	5.7	7.1	8.2	8.9	8.8	8.5	9.4	9.2	8.7	6.9	6.8	5.5	4.5	3.3	3.9	3.1	3.1	2.9	4.0	9.6	4.6	6.1	9.6
20-Jun	4.8	4.7	6.9	5.1	6.1	6.8	7.1	6.8	8.1	8.0	7.8	7.6	7.0	5.7	3.4	3.8	3.5	3.7	4.0	4.6	6.5	6.8	7.7	6.2	5.9	8.1
21-Jun	6.1	7.1	7.2	6.8	7.6	8.1	9.2	9.4	8.7	7.7	7.0	7.1	5.8	6.1	7.1	8.2	8.3	8.0	5.7	5.1	5.5	5.4	6.0	6.3	7.1	9.4
22-Jun	7.1	8.7	10.0	9.4	7.5	7.0	18.3	27.1	24.4	21.2	5.3	4.0	4.2	3.5	3.4	2.8	2.4	2.0	1.8	6.0	7.3	6.2	5.2	5.5	8.3	27.1
23-Jun	4.9	5.2	5.4	5.4	5.2	5.7	5.1	4.4	4.4	4.7	4.3	4.2	3.7	3.2	2.7	2.3	1.9	1.5	1.6	1.8	2.1	2.5	3.3	3.1	3.7	5.7
24-Jun	2.8	4.5	5.9	5.8	5.2	3.5	2.9	2.4	2.3	2.9	3.2	4.0	4.2	4.3	5.0	4.5	4.7	5.1	5.2	5.1	5.4	5.4	6.7	8.0	4.5	8.0
25-Jun	8.7	9.5	9.2	8.0	7.5	7.8	7.9	7.4	7.6	6.6	4.8	3.6	3.0	2.9	2.9	2.6	3.5	4.8	4.3	4.6	5.5	4.1	3.0	3.1	5.5	9.5
26-Jun	3.5	4.0	4.6	5.2	4.4	3.8	2.9	1.7	2.1	3.4	4.0	5.0	6.1	4.5	2.5	2.8	2.7	2.0	2.1	1.6	2.0	2.6	1.8	1.8	3.2	6.1
27-Jun	2.5	2.7	6.5	7.8	6.6	6.8	5.9	7.6	7.4	7.0	6.5	5.9	5.0	6.1	7.0	6.5	5.8	6.1	5.6	4.7	4.4	5.4	5.1	4.4	5.8	7.8
28-Jun	4.7	5.3	5.4	5.7	5.8	5.5	6.2	7.2	6.8	7.6	7.5	7.6	8.0	16.3	71.1	40.2	29.5	16.3	14.6	16.6	16.9	18.2	19.9	20.3	15.1	71.1
29-Jun	22.9	30.0	32.9	29.6	26.9	22.2	19.8	24.4	36.7	29.4	26.5	36.5	32.3	32.1	19.2	14.3	10.6	7.7	8.4	3.3	7.1	59.8	91.7	66.1	28.8	91.7
30-Jun	63.3	36.3	7.3	8.6	6.6	5.7	5.3	5.7	5.2	4.9	5.4	5.1	4.7	4.8	4.7	5.0	5.1	4.8	4.2	4.2	4.4	5.2	5.0	5.0	9.0	63.3

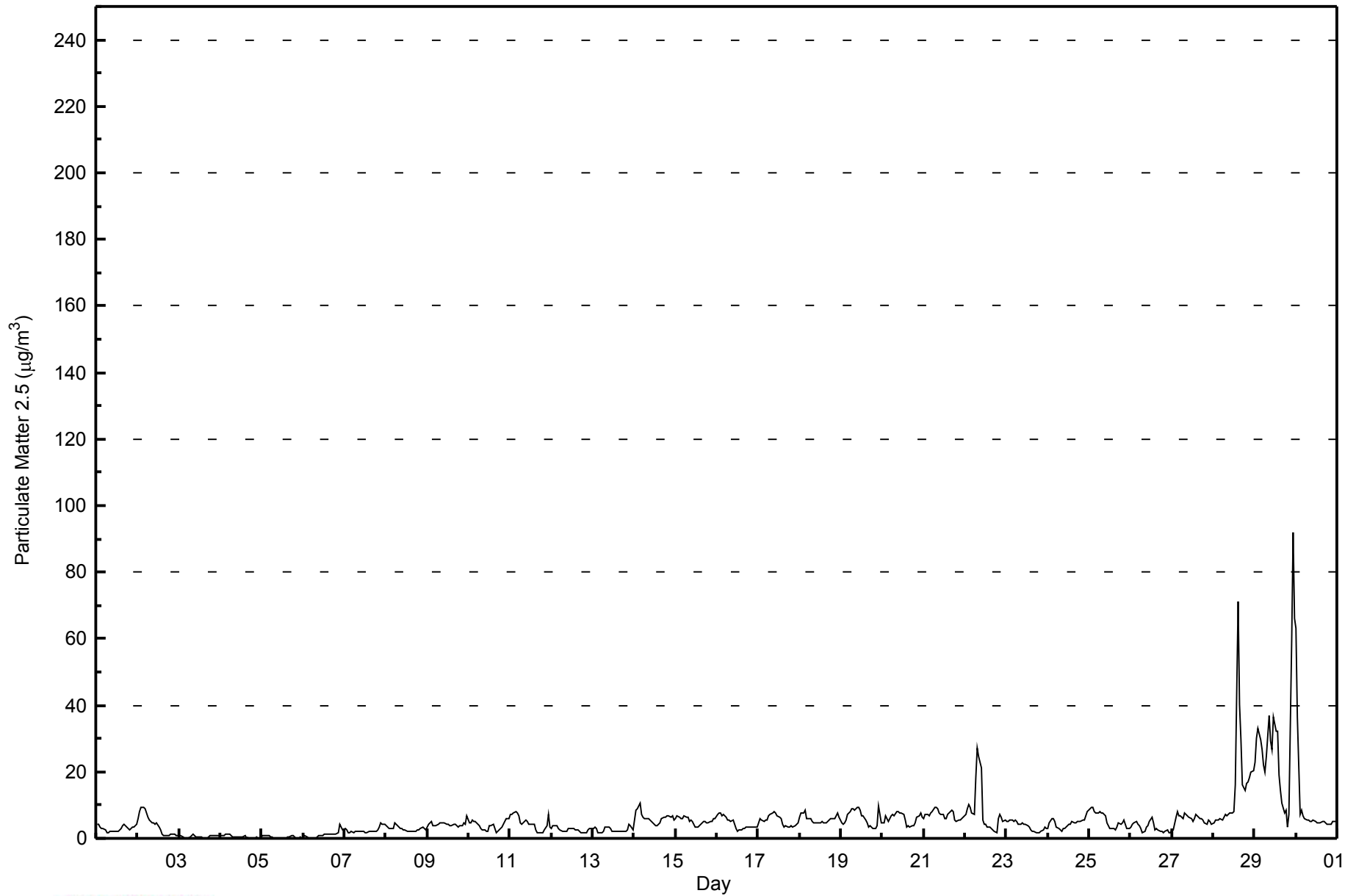
6.9	6.8	6.2	6.1	5.6	5.3	5.4	5.8	6.1	5.8	4.9	5.0	4.7	4.9	6.0	4.7	4.2	3.9	3.6	3.7	4.1	6.3	7.8	6.6	Diurnal Average	
63.3	36.3	32.9	29.6	26.9	22.2	19.8	27.1	36.7	29.4	26.5	36.5	32.3	32.1	71.1	40.2	29.5	16.3	14.6	16.6	16.9	59.8	91.7	66.1	Diurnal Maximum	

M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipeywan - June 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipeywan - June 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	419	58.28	58.28
6 - 15	187	26.01	84.28
16 - 25	15	2.09	86.37
26 - 80	18	2.50	88.87
> 81.0	1	0.14	89.01

Total Number of Valid Hours: 719

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipeywan - June 2014

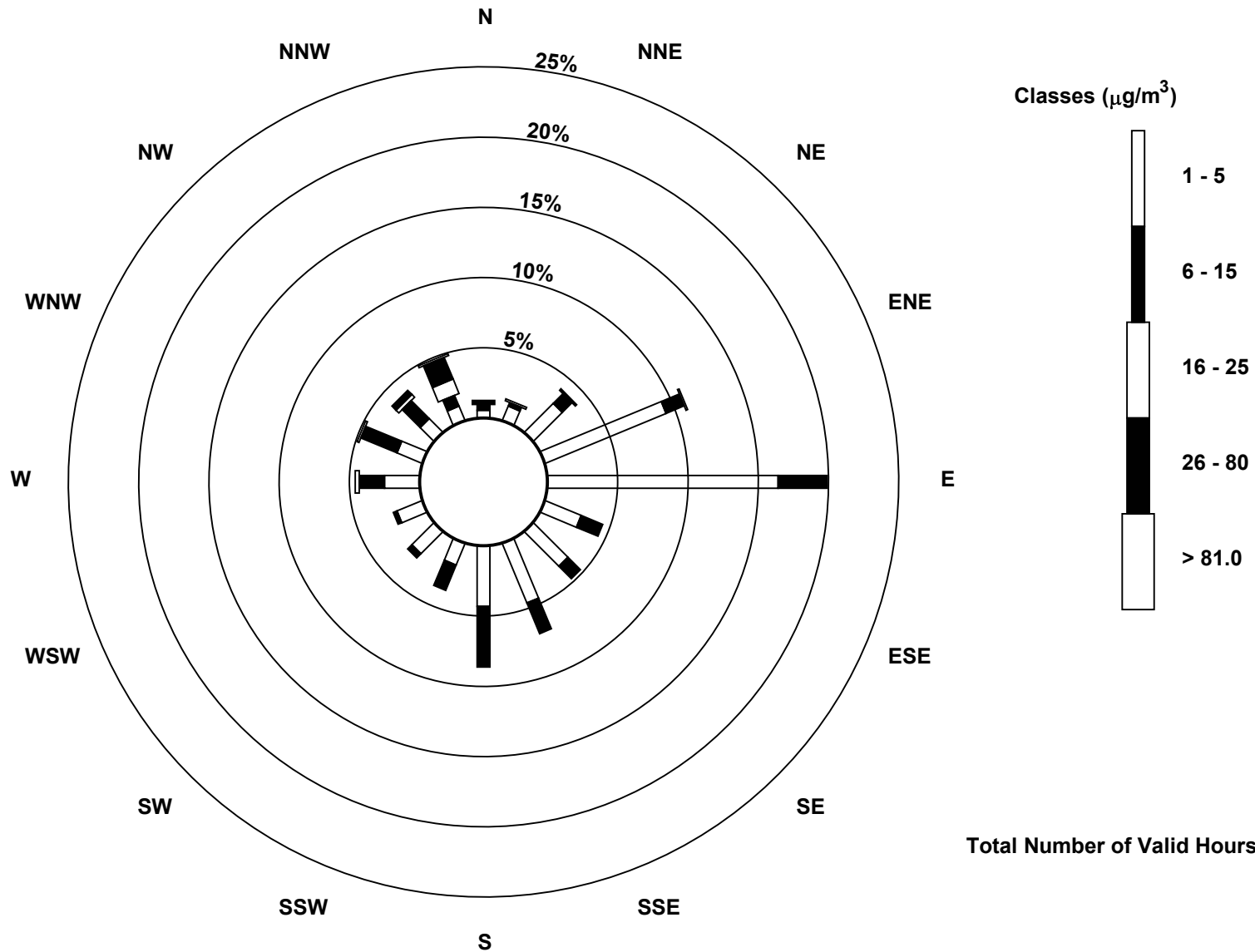
Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	4	8	21	67	118	20	25	33	31	12	16	14	18	14	10	8	419
6 - 15	3	2	7	10	25	12	9	17	31	14	3	2	13	20	13	6	187
16 - 25	0	1	0	1	0	0	0	0	0	0	0	0	2	1	2	8	15
26 - 80	2	0	1	0	0	0	0	0	0	0	0	0	0	0	3	12	18
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Totals	9	11	29	78	143	32	34	50	62	26	19	16	33	35	28	35	640

Total Number of Valid Hours: 719

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Jun 2014

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
 Fort Chipeywan (AMS 8)



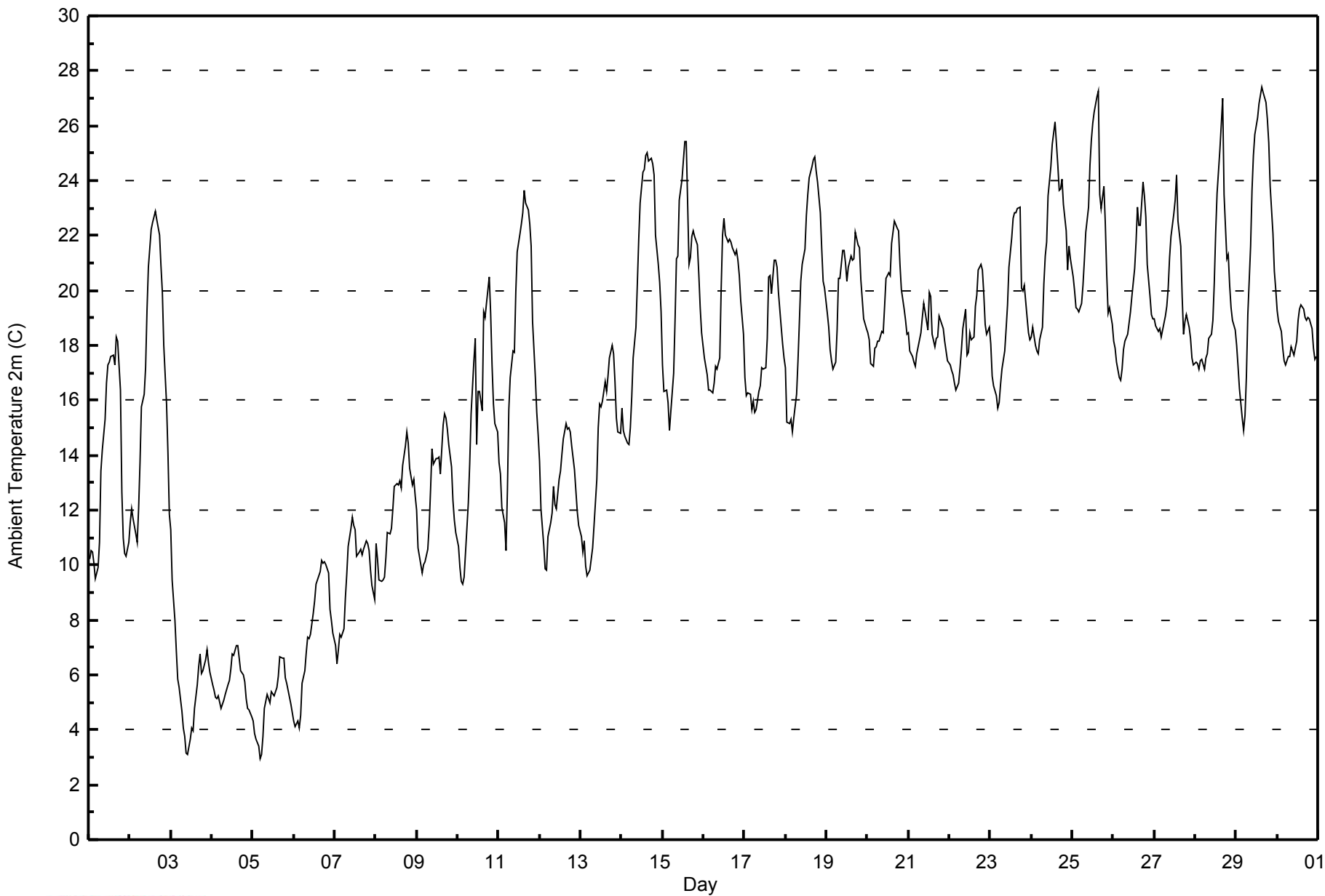


Maximum Value: 27.4 C on Jun 29 16:00		Maximum Daily Average: 22.2 C on Jun 25		Hours in Service: 720																																												
Minimum Value: 2.9 C on Jun 5 05:00		Minimum Daily Average: 5.0 C on Jun 5		Hours of Data: 720																																												
Maximum Diurnal Average: 18.9 C at hour 16		Minimum Diurnal Average: 12.9 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 16.20 C		Percentiles: P ₁ = 3.8 P ₁₀ = 6.8 Q ₁ = 11.9 Median = 17.5 Q ₃ = 20.2 P ₉₀ = 22.8 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-Jun	10.2	10.5	10.5	10.1	9.5	9.9	10.9	13.4	14.2	15.3	16.6	17.3	17.4	17.6	17.7	17.3	18.3	18.2	16.4	12.7	11.0	10.4	10.3	10.8	13.6	18.3																						
2-Jun	11.5	12.1	11.7	11.1	10.8	12.0	13.8	15.8	16.2	17.2	19.3	20.8	22.2	22.5	22.7	22.9	22.6	22.0	20.9	19.9	18.0	15.9	14.1	11.8	17.0	22.9																						
3-Jun	11.3	9.5	8.0	6.9	5.8	5.5	4.7	4.0	3.8	3.1	3.1	3.7	4.1	4.0	4.8	5.7	6.3	6.7	6.1	6.2	6.5	6.9	6.4	6.1	5.8	11.3																						
4-Jun	5.7	5.4	5.2	5.1	5.2	4.8	4.9	5.1	5.3	5.6	5.8	6.2	6.8	6.7	7.1	7.1	6.6	6.2	6.0	5.8	5.1	4.8	4.7	4.5	5.6	7.1																						
5-Jun	4.3	3.9	3.7	3.4	2.9	3.1	3.8	4.8	5.3	5.1	5.0	5.4	5.2	5.4	5.5	5.9	6.6	6.6	6.6	5.9	5.7	5.2	4.9	4.6	5.0	6.6																						
6-Jun	4.3	4.1	4.3	4.1	4.5	5.7	6.1	6.8	7.4	7.3	7.5	8.2	8.7	9.3	9.4	9.8	10.2	10.1	10.1	10.0	9.7	8.4	8.0	7.5	7.6	10.2																						
7-Jun	7.1	6.4	6.9	7.5	7.4	7.7	8.8	9.7	10.7	11.3	11.7	11.4	11.3	10.3	10.5	10.6	10.4	10.6	10.9	10.8	10.5	9.8	9.2	8.8	9.6	11.7																						
8-Jun	10.8	10.2	9.5	9.4	9.5	9.6	10.3	11.2	11.1	11.3	12.0	12.9	13.0	12.9	13.1	12.8	13.6	14.3	14.8	14.5	13.5	12.9	13.1	12.5	12.0	14.8																						
9-Jun	12.0	10.6	10.0	9.7	10.0	10.1	10.6	11.4	12.8	14.3	13.7	13.9	13.9	13.3	15.1	15.5	15.3	14.9	14.4	13.6	12.4	11.7	11.2	12.7	15.5																							
10-Jun	10.7	9.9	9.4	9.3	9.6	11.3	12.2	13.7	15.5	17.4	18.2	14.4	16.3	16.3	15.6	19.2	19.0	19.5	20.5	19.2	17.3	15.9	15.1	14.9	15.0	20.5																						
11-Jun	13.7	13.3	12.1	11.6	10.5	12.7	15.6	16.9	17.8	17.8	19.9	21.4	22.1	22.4	22.8	23.6	23.2	22.9	22.4	21.6	18.9	16.8	15.6	14.8	17.9	23.6																						
12-Jun	13.8	12.1	10.7	9.8	9.8	11.0	11.5	11.9	12.9	12.2	12.1	13.1	13.4	14.0	14.6	15.1	15.0	15.0	14.9	14.3	13.5	12.7	11.9	11.5	12.8	15.1																						
13-Jun	11.0	10.5	10.9	10.0	9.6	9.8	10.2	10.6	11.5	13.1	15.0	15.9	15.7	16.0	16.7	16.3	16.9	17.5	18.0	17.7	16.7	15.4	14.8	14.8	13.9	18.0																						
14-Jun	15.7	14.9	14.7	14.4	14.4	15.0	16.1	17.5	18.7	20.2	21.8	23.2	24.3	24.4	24.9	25.0	24.7	24.8	24.6	24.2	22.0	20.9	20.3	19.2	20.3	25.0																						
15-Jun	17.3	16.3	16.3	15.9	14.9	15.6	17.0	18.9	21.2	21.2	23.3	24.0	24.7	25.4	25.4	20.9	21.2	21.9	22.2	22.0	21.6	20.6	19.4	18.4	20.2	25.4																						
16-Jun	17.5	17.2	16.9	16.4	16.4	16.3	16.6	17.2	17.1	17.6	20.0	22.0	22.6	22.0	21.7	21.8	21.7	21.6	21.3	21.4	21.1	20.5	19.6	18.4	19.4	22.6																						
17-Jun	16.8	16.1	16.3	16.2	15.7	16.0	15.6	15.7	16.3	16.5	17.2	17.1	17.2	18.3	20.5	20.6	19.9	21.1	21.1	20.8	19.9	18.6	18.1	17.5	17.9	21.1																						
18-Jun	17.2	15.2	15.2	15.3	14.8	15.4	16.2	17.4	18.9	20.3	21.0	21.5	22.7	23.5	24.1	24.5	24.8	24.9	24.3	24.0	22.8	21.5	20.4	20.1	20.2	24.9																						
19-Jun	19.1	18.7	17.8	17.4	17.1	17.4	18.6	20.5	20.5	21.5	21.5	21.0	20.3	20.8	21.3	21.1	21.2	22.1	21.6	21.6	20.4	19.7	19.0	18.6	19.9	22.1																						
20-Jun	18.4	18.2	17.3	17.3	17.9	18.0	18.2	18.1	18.5	18.5	19.4	20.4	20.6	20.5	21.7	22.1	22.5	22.3	22.2	21.0	20.0	19.3	18.9	18.4	19.6	22.5																						
21-Jun	18.5	17.8	17.6	17.4	17.2	17.7	18.2	18.5	19.0	19.5	19.2	18.6	19.9	19.8	18.4	18.0	18.3	18.3	19.1	18.9	18.6	18.2	17.8	17.4	18.4	19.9																						
22-Jun	17.3	17.1	16.9	16.6	16.4	16.6	17.2	17.9	18.6	19.3	17.7	17.7	18.5	18.2	18.3	19.4	19.9	20.7	21.0	20.7	19.9	18.7	18.4	18.6	18.4	21.0																						
23-Jun	18.1	16.9	16.5	16.2	15.7	15.9	16.6	17.1	17.8	18.6	19.5	20.9	21.9	22.6	22.8	23.0	23.0	23.0	20.1	20.0	20.2	19.0	18.5	18.2	19.2	23.0																						
24-Jun	18.3	18.7	18.0	17.8	17.7	18.2	18.6	20.2	21.3	21.8	23.4	24.5	25.3	25.7	26.1	24.6	23.6	23.7	24.0	23.2	22.2	20.7	21.6	21.1	21.7	26.1																						
25-Jun	20.5	20.0	19.4	19.3	19.2	19.5	20.2	21.1	22.1	23.0	24.6	25.5	26.1	26.5	27.0	27.3	23.5	23.0	23.8	22.4	20.6	19.2	19.4	18.8	22.2	27.3																						
26-Jun	18.1	17.9	17.4	16.8	16.7	17.1	17.8	18.2	18.4	18.8	19.2	19.8	20.8	21.8	23.1	22.3	22.4	23.9	23.5	22.7	20.9	19.8	19.1	19.0	19.8	23.9																						
27-Jun	19.0	18.7	18.5	18.6	18.3	18.6	19.0	19.4	20.1	21.2	22.0	22.8	23.3	24.2	22.5	21.6	19.8	18.4	18.9	19.1	18.6	18.3	17.6	17.3	19.8	24.2																						
28-Jun	17.4	17.3	17.2	17.4	17.5	17.1	17.5	17.7	18.2	18.4	18.9	20.3	22.1	23.5	25.1	26.1	27.0	23.5	21.1	21.3	20.2	19.4	18.9	18.6	20.1	27.0																						
29-Jun	18.0	17.2	16.4	15.3	14.9	15.5	16.9	19.1	21.6	23.6	24.9	25.7	26.3	26.8	27.1	27.4	27.2	26.8	26.2	25.4	23.8	22.1	20.7	20.1	22.0	27.4																						
30-Jun	19.3	18.9	18.5	17.9	17.5	17.3	17.6	17.6	17.9	17.8	17.6	18.1	18.9	19.3	19.5	19.3	19.0	18.9	19.0	18.6	17.9	17.5	17.6	18.4	19.5	19.5																						
																								14.4	13.9	13.5	13.1	12.9	13.3	14.0	14.9	15.7	16.3	17.0	17.6	18.2	18.5	18.8	18.9	18.8	18.8	18.5	18.0	17.1	16.1	15.5	15.0	Diurnal Average
																								20.5	20.0	19.4	19.3	19.2	19.5	20.2	21.1	22.1	23.6	24.9	25.7	26.3	26.8	27.1	27.4	27.2	26.8	26.2	25.4	23.8	22.1	21.6	21.1	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Fort Chipeywan - June 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature 2m (AT 2m) - C
Fort Chipeywan - June 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	120	16.67	16.67
10 - 20	409	56.81	73.47
> 20	191	26.53	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

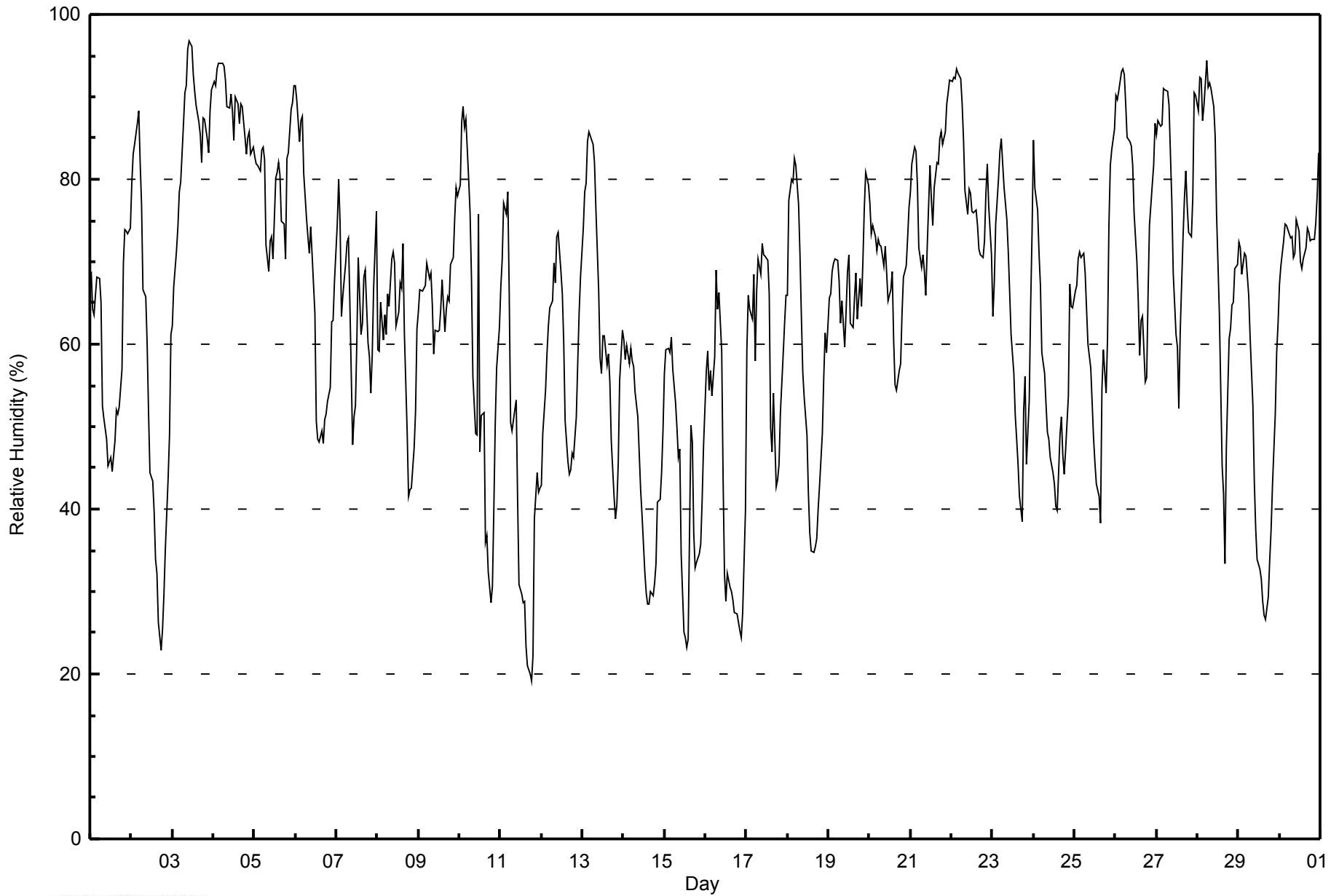


Maximum Value: 97 % on Jun 3 11:00																		Maximum Daily Average: 89.0 % on Jun 4																		Hours in Service: 720													
Minimum Value: 19 % on Jun 11 19:00																		Minimum Daily Average: 42.6 % on Jun 16																		Hours of Data: 720													
Maximum Diurnal Average: 76.3 % at hour 5																		Minimum Diurnal Average: 52.7 % at hour 18																		Hours of Missing Data: 0													
Monthly Average: 64.3 %																		Percentiles: P ₁ = 24 P ₁₀ = 40 Q ₁ = 52 Median = 66 Q ₃ = 77 P ₉₀ = 87 P ₉₉ = 94																		Hours of Calibration: 0													
																																				Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jun	69	64	64	66	68	68	65	53	51	49	45	46	46	45	48	52	52	52	57	70	74	74	73	74	59.3	74																							
2-Jun	79	83	84	87	88	82	77	67	66	60	52	44	43	40	34	32	26	23	25	30	35	44	49	61	54.7	88																							
3-Jun	62	67	71	74	79	80	87	91	91	96	97	96	93	91	89	87	85	82	88	87	85	83	88	91	85.0	97																							
4-Jun	92	91	93	94	94	94	94	92	89	89	90	88	85	90	89	87	89	89	85	83	85	86	83	84	89.0	94																							
5-Jun	83	82	82	81	83	84	82	72	69	73	73	70	80	81	82	80	75	75	70	83	83	88	89	91	79.7	91																							
6-Jun	91	90	84	87	88	81	75	73	71	74	71	64	51	48	48	49	48	51	51	53	55	63	63	68	66.5	91																							
7-Jun	75	80	75	63	66	70	72	73	65	48	51	53	60	70	61	63	68	69	60	58	54	59	67	76	64.8	80																							
8-Jun	59	59	65	60	63	61	66	65	70	71	70	62	64	68	67	72	61	49	42	42	42	47	52	62	60.1	72																							
9-Jun	64	67	67	67	67	70	68	69	65	59	62	61	62	64	68	61	64	66	65	70	71	75	79	78	67.0	79																							
10-Jun	79	87	89	86	87	80	76	68	56	49	49	76	47	51	52	36	37	32	29	31	40	50	57	62	58.6	89																							
11-Jun	67	70	77	76	78	66	50	49	52	53	41	31	30	29	29	23	21	20	19	22	39	44	42	43	44.7	78																							
12-Jun	43	49	54	59	62	64	65	70	67	73	74	69	66	60	51	46	44	45	47	46	51	58	64	68	58.1	74																							
13-Jun	74	78	80	85	86	85	84	82	76	66	58	56	61	61	57	59	55	48	42	39	41	46	56	62	64.0	86																							
14-Jun	61	58	60	58	59	58	57	54	51	47	42	39	32	30	28	29	30	29	31	33	41	41	44	49	44.3	61																							
15-Jun	57	59	59	59	61	57	53	50	46	47	35	25	24	23	24	50	48	37	33	34	35	36	41	48	43.4	61																							
16-Jun	57	59	54	57	54	58	69	64	66	59	44	32	29	32	31	30	29	27	27	26	25	24	28	40	42.6	69																							
17-Jun	59	66	64	63	69	58	66	70	68	72	71	71	70	66	50	47	54	43	44	45	52	59	63	66	60.6	72																							
18-Jun	66	78	80	80	83	82	77	71	63	57	54	49	42	37	35	35	35	36	40	43	49	56	61	59	56.9	83																							
19-Jun	66	66	69	70	70	70	68	62	65	60	64	69	71	63	62	66	69	63	68	65	70	76	81	79	67.9	81																							
20-Jun	77	73	74	73	71	73	72	72	70	72	69	65	67	69	60	55	54	57	58	64	68	70	73	77	68.0	77																							
21-Jun	78	82	84	83	79	72	69	71	69	66	72	82	77	74	79	82	82	85	86	84	86	89	91	92	79.8	92																							
22-Jun	92	92	92	93	93	92	89	85	79	76	79	78	76	76	74	71	71	71	71	73	78	82	77	71	80.7	93																							
23-Jun	63	67	75	80	83	85	82	79	75	71	66	61	56	51	48	45	42	39	52	56	45	53	65	73	63.1	85																							
24-Jun	85	79	76	71	67	59	56	53	49	48	46	44	43	40	40	49	51	47	44	47	54	67	65	64	56.1	85																							
25-Jun	66	67	70	71	71	71	69	64	60	57	53	49	46	43	41	38	55	59	54	61	74	82	84	86	62.1	86																							
26-Jun	90	90	91	93	93	93	89	85	85	84	82	76	70	65	59	63	63	55	56	66	74	79	82	87	77.9	93																							
27-Jun	86	87	87	87	91	91	91	89	83	77	69	61	60	52	62	73	78	81	77	74	73	78	91	90	78.5	91																							
28-Jun	88	92	92	87	89	94	91	92	91	89	85	76	70	64	45	42	33	47	61	62	65	65	69	70	73.3	94																							
29-Jun	72	72	68	71	71	68	66	61	52	43	38	34	33	32	29	27	27	29	34	37	43	52	59	63	49.2	72																							
30-Jun	67	70	73	75	74	74	73	73	71	71	75	74	70	69	70	72	74	74	72	73	73	75	78	83	73.0	83																							
																								72.3	74.2	75.1	75.2	76.3	74.6	73.3	70.6	67.8	65.2	62.5	60.1	57.5	56.2	53.8	54.2	54.1	52.7	52.9	55.2	58.7	63.4	67.0	70.5	Diurnal Average	
																								92	92	93	94	94	94	94	92	91	96	97	96	93	91	89	87	89	89	88	87	86	89	91	92	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Fort Chipeywan - June 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Fort Chipeywan - June 2014

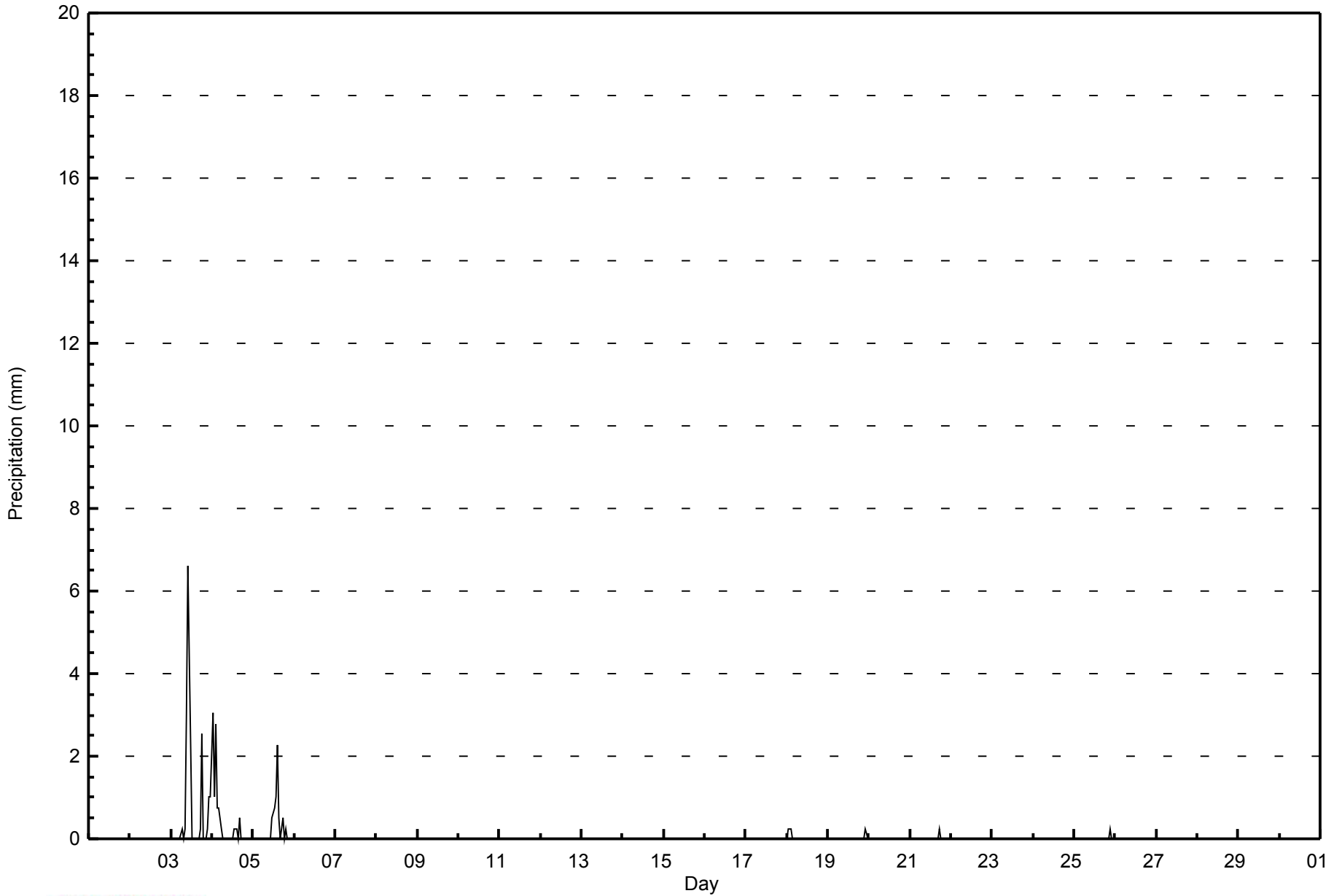
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	2	0.28	0.28
20 - 40	74	10.28	10.56
40 - 60	185	25.69	36.25
60 - 80	309	42.92	79.17
80 - 100	150	20.83	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 6.6 mm on Jun 3 11:00		Maximum Daily Total: 17.5 mm on Jun 3		Hours in Service: 720																								
Minimum Value: 0.0 mm on Jun 1 01:00		Minimum Daily Total: 0.0 mm on Jun 1		Hours of Data: 720																								
Maximum Diurnal Total: 6.6 mm at hour 11		Minimum Diurnal Total: 0.0 mm at hour 8		Hours of Missing Data: 0																								
Monthly Total: 34.29 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 = 2.3		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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	3.0	6.6	2.3	0.0	0.0	0.0	0.0	0.3	2.5	0.0	0.0	0.3	1.0	1.0	0.0	0.0	17.5	6.6	
4-Jun	3.0	1.0	2.8	0.8	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7	3.0	
5-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.8	1.0	2.3	0.5	0.0	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	5.8	2.3	
6-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	
19-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.3	
20-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	
22-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
26-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	1.3	3.0	0.8	0.8	0.3	0.3	0.0	0.3	3.0	6.6	2.8	0.8	1.3	2.5	0.5	0.5	1.0	2.5	0.3	0.0	0.5	1.3	1.0	Diurnal Average		
		3.0	1.0	2.8	0.8	0.8	0.3	0.3	0.0	0.3	3.0	6.6	2.3	0.8	1.0	2.3	0.5	0.5	0.5	2.5	0.3	0.0	0.3	1.0	1.0	Diurnal Maximum		





WBEA
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort Chipeywan - June 2014

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	702	97.50	97.50
0.4 - 0.5	4	0.56	98.06
0.6 - 0.7	0	0.00	98.06
0.8 - 1.4	7	0.97	99.03
1.5 - 10	7	0.97	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

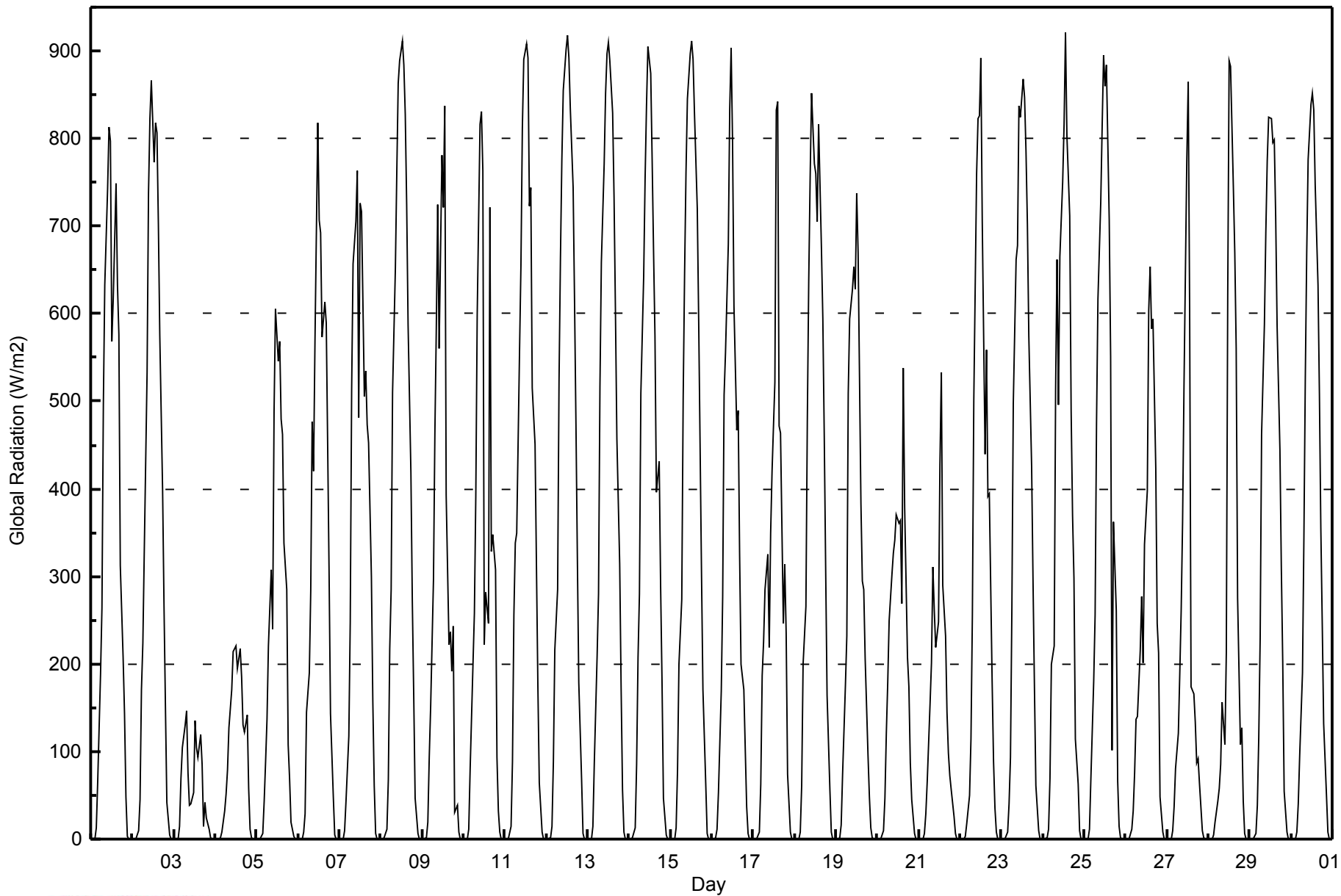


Maximum Value: 920 W/m2 on Jun 24 14:00		Maximum Daily Average: 390.7 W/m2 on Jun 12		Hours in Service: 720																						
Minimum Value: 0 W/m2 on Jun 10 00:00		Minimum Daily Average: 54.4 W/m2 on Jun 3		Hours of Data: 720																						
Maximum Diurnal Average: 697.3 W/m2 at hour 13		Minimum Diurnal Average: 0.1 W/m2 at hour 24		Hours of Missing Data: 0																						
Monthly Average: 285.8 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 8 Median = 179 Q ₃ = 534 P ₉₀ = 776 P ₉₉ = 902		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-Jun	0	0	1	13	66	189	265	496	632	743	814	797	569	616	749	633	576	312	207	143	49	4	0	0	328.1	814
2-Jun	0	0	0	10	45	171	223	328	534	738	822	866	773	818	806	702	574	398	265	151	41	4	1	0	344.6	866
3-Jun	0	0	1	15	69	104	131	147	76	39	40	53	135	105	93	119	86	14	43	25	11	1	0	0	54.4	147
4-Jun	0	0	0	2	9	32	52	78	127	170	214	218	220	196	218	186	130	123	142	58	11	2	0	0	91.1	220
5-Jun	0	0	0	6	44	89	137	221	307	239	488	605	546	568	480	462	339	284	109	69	20	4	0	0	209.1	605
6-Jun	0	0	0	9	28	145	190	284	476	420	569	818	707	693	574	613	590	450	304	144	49	5	0	0	294.5	818
7-Jun	0	0	1	10	43	118	248	513	657	706	764	482	726	717	505	534	474	452	299	158	61	7	0	0	311.5	764
8-Jun	0	1	1	12	67	217	285	511	652	762	863	889	911	885	827	724	587	418	272	164	47	6	0	0	379.3	911
9-Jun	0	0	1	19	93	152	296	464	583	724	560	781	722	838	393	222	236	191	243	31	38	8	0	0	274.8	838
10-Jun	0	0	0	12	80	200	257	392	598	816	831	764	222	282	246	722	329	347	308	94	32	7	0	0	272.5	831
11-Jun	0	0	0	14	89	256	338	350	557	655	812	890	908	891	723	744	515	451	310	175	64	8	0	0	364.5	908
12-Jun	0	0	1	14	89	215	286	524	663	776	856	902	919	893	835	744	614	473	321	178	67	7	1	0	390.7	919
13-Jun	0	0	1	14	86	210	280	518	658	771	852	897	910	889	830	732	601	458	315	174	56	7	1	0	385.8	910
14-Jun	0	0	1	13	85	208	281	509	643	753	838	904	874	776	671	574	396	431	291	180	47	5	1	0	353.3	904
15-Jun	0	0	1	12	78	200	274	504	645	761	845	897	911	891	829	720	591	448	303	170	63	7	0	0	381.3	911
16-Jun	0	0	1	11	54	169	276	507	555	680	834	903	795	609	466	490	325	200	170	103	38	6	0	0	299.7	903
17-Jun	0	0	1	8	62	186	226	285	325	219	349	420	522	832	842	471	464	246	314	236	74	8	1	0	253.8	842
18-Jun	0	0	0	8	61	200	265	479	638	755	852	772	760	706	816	675	593	460	310	164	57	8	1	0	357.5	852
19-Jun	0	0	1	16	74	175	232	509	595	628	654	629	738	669	384	294	285	206	96	49	13	2	0	0	260.4	738
20-Jun	0	0	1	10	47	120	179	250	303	326	341	370	361	363	270	537	378	207	175	87	45	6	0	0	182.4	537
21-Jun	0	0	0	6	28	66	155	201	310	261	219	248	428	533	289	231	144	98	72	56	26	6	0	0	140.8	533
22-Jun	0	0	0	3	17	50	114	256	501	760	823	825	892	705	439	559	391	395	181	89	35	8	1	0	293.5	892
23-Jun	0	0	0	8	40	93	265	498	662	678	838	824	867	848	785	702	576	424	294	173	61	9	1	0	360.3	867
24-Jun	0	0	1	11	70	199	221	513	662	496	665	751	816	920	803	712	490	370	298	114	62	9	0	0	341.0	920
25-Jun	0	0	1	11	70	180	255	475	616	729	815	896	861	885	707	550	101	363	261	66	15	2	1	0	327.4	896
26-Jun	0	0	1	11	33	76	137	140	216	277	202	337	398	605	653	582	594	424	246	213	48	8	0	0	216.7	653
27-Jun	0	0	0	9	37	80	120	189	262	362	516	777	864	606	174	165	133	87	91	64	10	2	0	0	189.5	864
28-Jun	0	0	0	4	20	43	59	86	156	108	213	622	889	883	744	670	561	275	108	127	43	7	0	0	234.1	889
29-Jun	0	0	1	7	39	116	230	463	588	693	775	825	823	795	799	709	587	444	310	201	54	8	1	0	352.7	825
30-Jun	0	0	0	7	40	94	190	345	529	670	776	838	851	833	747	633	507	355	246	132	50	7	0	0	327.2	851
		0.2	0.1	0.6	10.2	55.4	145.1	215.6	367.7	490.8	557.1	634.6	693.3	697.3	695.0	589.9	547.1	425.5	326.8	230.0	126.2	42.9	6.0	0.4	0.1	Diurnal Average
		0	1	1	19	93	256	338	524	663	816	863	904	919	920	842	744	614	473	321	236	74	9	1	0	Diurnal Maximum



WBEA
Hourly Averages

Global Radiation (GR) - W/m²
Fort Chipeywan - June 2014





WBEA
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Fort Chipeywan - June 2014

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	220	30.56	30.56
21 - 100	87	12.08	42.64
101 - 300	140	19.44	62.08
301 - 600	122	16.94	79.03
601 - 900	142	19.72	98.75
> 900	9	1.25	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 36 km/h on Jun 3 19:00	Maximum Daily Speed Average: 25.2 km/h on Jun 3	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 27 04:00	Minimum Daily Speed Average: 1.6 km/h on Jun 27	Hours of Data: 720
Maximum Diurnal Speed Average: 11.0 km/h at hour 14	Minimum Diurnal Speed Average: 4.6 km/h at hour 5	Hours of Missing Data: 0
Monthly Average Velocity: 6.9 km/h 94.0 deg	Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 9 Median = 15 Q ₃ = 20 P ₉₀ = 24 P ₉₉ = 33	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	ESE15	SE18	SE18	SE16	SSE14	SE16	SE13	SSE20	SSE21	SSE20	SSE22	S21	SSE18	S21	S27	SSE21	S20	S19	SE11	E9	ESE7	ESE10	E10	E7	SSE14.9	S27
2-Jun	SE4	S6	S7	SW8	SSW7	SSW8	SW8	WSW12	WSW13	W13	NW12	WNW14	NW13	NNW14	NNW14	NNW13	NNW13	NNW12	N10	N12	NNE10	NNE10	NNE10	NE10	NW5.3	WNW14
3-Jun	NE20	ENE27	ENE33	ENE34	ENE31	ENE24	NE23	NE27	NE19	NNE17	NE24	NE24	ENE25	NE28	NE23	NE27	NE22	NE18	ENE36	NE30	NE27	NE26	NE26	NE22	NE25.2	ENE36
4-Jun	NE21	NE20	NNE17	NE23	NE27	NE32	NE29	NE27	NE26	NE24	NE23	NE22	NE19	NE15	NE15	NE16	ENE16	NE17	ENE17	ENE20	ENE16	NE13	NE13	NE13	NE19.9	NE13
5-Jun	NE16	NE14	NE12	NE11	NNE8	N6	NNE5	NE10	ENE9	E16	E15	E15	E6	ESE8	E10	ESE5	SE8	ESE7	E8	N4	N4	NNW4	NNW5	NNW6	ENE6.9	NE16
6-Jun	N6	NE6	NE9	ENE10	E7	SSE10	S7	SE3	E5	E12	E14	E16	E17	E16	E17	E15	E18	E18	E13	ENE13	ENE9	ENE8	ENE8	E10.2	E18	
7-Jun	ENE8	ENE9	E5	SE3	ENE4	ENE3	E5	ESE10	ESE9	SE13	ESE15	E19	E19	E22	E21	E22	E20	E20	E21	E18	E16	ENE12	ENE12	E11	E12.9	E22
8-Jun	ESE17	SE15	SE15	SE17	SE11	SE7	ESE9	E10	E15	E15	E16	E19	E20	E20	E20	E23	E23	E23	E20	ENE20	ENE17	ENE18	E23	E23	E16.2	E23
9-Jun	E23	E20	E15	E17	E21	E26	E25	E23	E19	E17	E20	E22	E20	E21	E25	SE11	SSW12	SW11	SW11	SE8	SW7	WNW6	WNW7	W9	E11.6	E26
10-Jun	W9	WNW9	WNW9	NW7	WNW10	NW10	NW11	WNW10	NW12	NW10	N3	E17	ENE8	ESE8	W4	SW7	ESE4	S3	SW8	WSW8	SW5	SW6	WSW9	W8	WNW3.9	E17
11-Jun	W10	W14	W11	WNW11	WNW10	WNW10	WNW7	W10	W11	WSW15	W13	W15	WSW20	WSW20	W15	NW14	NNW13	N13	NNW12	N9	NE5	ENE4	NE10	NE11	WNW7.9	WSW20
12-Jun	NNE15	NNE13	NNE12	NNE6	NE7	ENE14	ENE16	E18	ENE19	E28	E32	E33	E34	E33	ENE33	ENE30	ENE33	ENE32	ENE29	ENE26	ENE23	ENE23	ENE21	ENE23	ENE22.0	E34
13-Jun	ENE25	ENE26	E25	ENE23	ENE25	E26	E24	E24	E20	E22	E24	E21	E22	E22	E21	E22	E21	ENE19	ENE17	ENE13	ENE12	ENE8	ESE9	E17	E20.0	E26
14-Jun	SE15	SSE17	S18	S21	S22	S23	S22	S27	S26	S23	S22	SSE23	SSE25	SSE27	S26	S22	S19	SSE20	SSE18	S18	S15	S16	S22	S22	S20.7	SSE27
15-Jun	SSW13	SSW9	S18	S18	SSW9	SSW10	SSW11	SSW8	S8	SE13	S18	SSW25	SSW21	S16	SSE16	E22	E19	E25	ENE27	ENE26	ENE21	ENE19	ENE17	E14	SE8.9	ENE27
16-Jun	E15	E11	E9	ESE10	SE8	ESE11	E17	E13	E15	E22	E22	E21	E21	ENE24	ENE24	ENE25	ENE25	ENE26	ENE26	ENE23	NE20	NE18	NE16	E15	ENE17.4	ENE26
17-Jun	E11	ENE9	E11	E11	E13	SE12	SE8	ESE11	ESE12	E17	E16	E17	E17	E16	SE12	SSE17	SE16	S21	S22	S22	S15	S12	S13	S16	SE11.6	S22
18-Jun	S19	SSW19	S19	SSE16	S16	S18	S20	S20	S20	S18	SSE21	SSE24	SSE22	S21	SSW21	SSW18	SSW18	SSW13	SSE16	S13	SSE11	S12	SSE15	S17	S17.1	SSE24
19-Jun	S16	S21	S16	SSW18	SSW14	SSW8	S6	SSE7	ESE10	ESE8	E11	E14	E23	E24	E17	E15	E16	SE17	SE14	SE18	SE15	E7	E7	NE10	SE10.0	E24
20-Jun	NE12	NE19	NNE14	NE12	NE15	ENE16	ENE13	ENE16	E21	E22	E21	E14	E19	ESE14	S11	SSE11	S11	SSW5	W4	WNW6	WNW6	NW7	NW7	NW7	ENE7.7	E22
21-Jun	WNW6	WNW8	WNW10	NW13	NW14	NW13	NW11	WNW11	WNW11	WNW9	W10	WNW11	WNW9	ENE5	E9	ESE7	ESE6	W3	W8	W9	WNW9	WNW8	WNW8	WNW9	WNW6.6	NW14
22-Jun	NW8	NW8	NW7	W6	W6	WNW8	WNW9	NW9	NW11	NNE5	E16	E17	E16	E25	E21	ESE15	ESE13	E13	E1	NW6	NNW7	N9	NNE12	NNE15	NE4.8	E25
23-Jun	NE16	NE11	ENE16	E21	E20	ENE13	ENE18	ENE22	ENE24	ENE23	ENE25	ENE24	ENE26	ENE31	ENE30	ENE31	ENE27	ENE24	ESE18	E10	ENE9	E6	E9	E12	ENE18.9	ENE31
24-Jun	ESE14	SE18	SSE17	SSE17	SSE19	SSE21	S23	SSE18	SSE20	SSE17	SSE16	SSE20	SSE18	SSE20	SSE22	ESE18	E21	E21	E22	E19	E17	E16	SE15	SSE18	SE15.8	S23
25-Jun	SSE19	SSE18	SSE17	S17	S21	S21	S25	S27	SSE26	SSE26	SSE22	SSE25	SSE24	SSE21	SSE17	SSE17	W13	WNW13	WNW9	WSW8	S14	ESE4	SSE10	SSW7	S15.0	S27
26-Jun	WSW5	SSW9	SSW10	SW12	SW10	SW10	SW11	SW13	SW13	SW11	W6	W5	S4	WNW4	WSW3	SE7	ESE7	SW7	W6	SW11	W8	W4	W3	SSW1	SW5.9	SW13
27-Jun	ESE1	WSW2	WNW2	N0	SW3	ENE1	ESE4	ESE6	E4	SE3	ESE3	NE5	SE8	SSE5	SE6	SE10	S18	WSW9	NW4	NNW5	NNW6	WSW3	WSW6	W5	S1.6	S18
28-Jun	WSW3	WSW5	NW4	NW5	WNW5	NW5	NNW6	WNW5	WNW5	W4	WNW6	W8	W8	W9	NNW6	NW8	NW10	ENE25	ENE11	W5	NW6	NNW6	NNW9	NNW10	NW4.3	ENE25
29-Jun	NNW10	NNW11	NNW13	NNW16	NNW15	NNW15	NNW12	NNW9	NNW9	NNW12	NNW16	NNW17	NNW15	NNW16	NNW19	NNW17	N17	NNW14	NNW15	NNW14	NNW13	NNW11	NNW10	N11	NNW13.5	NNW19
30-Jun	N9	NE14	NE16	NE18	NE17	NE15	NE18	ENE21	ENE21	E28	E29	E21	E18	E17	E15	E18	E21	E19	E17	E15	ENE11	ENE8	ENE9	ENE8	ENE15.4	E29

E5.6	E5.0	E5.0	E4.8	E4.6	ESE4.8	ESE5.1	ESE5.8	ESE6.1	ESE8.4	E9.9	ESE10.0	ESE10.4	ESE11.0	ESE9.5	E10.0	E8.9	E8.7	E8.3	ENE6.4	ENE5.8	ENE5.6	ENE5.4	ENE5.3	Diurnal Average
ENE25	ENE27	ENE33	ENE34	ENE31	NE32	NE29	S27	SSE26	E28	E32	E33	E34	E33	ENE33	ENE31	ENE33	ENE32	ENE36	NE30	NE27	NE26	NE26	E23	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

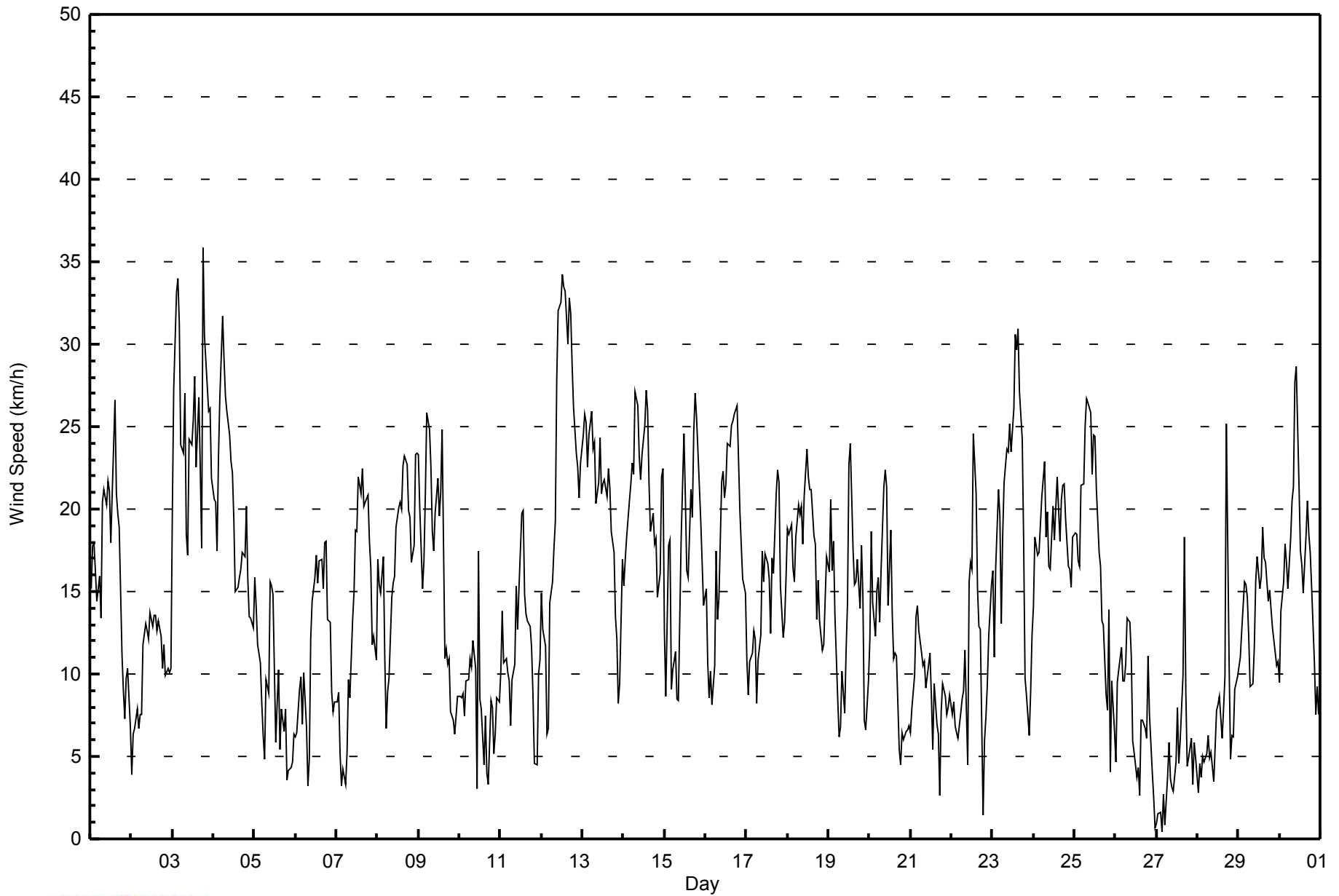
Wind Speed (WS) - km/h
Fort Chipewyan - June 2014

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Fort Chipeywan - June 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort Chipeywan - June 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	62	8.61	8.61
6 - 11	208	28.89	37.50
12 - 19	254	35.28	72.78
20 - 28	176	24.44	97.22
29 - 38	20	2.78	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Fort Chipeywan - June 2014

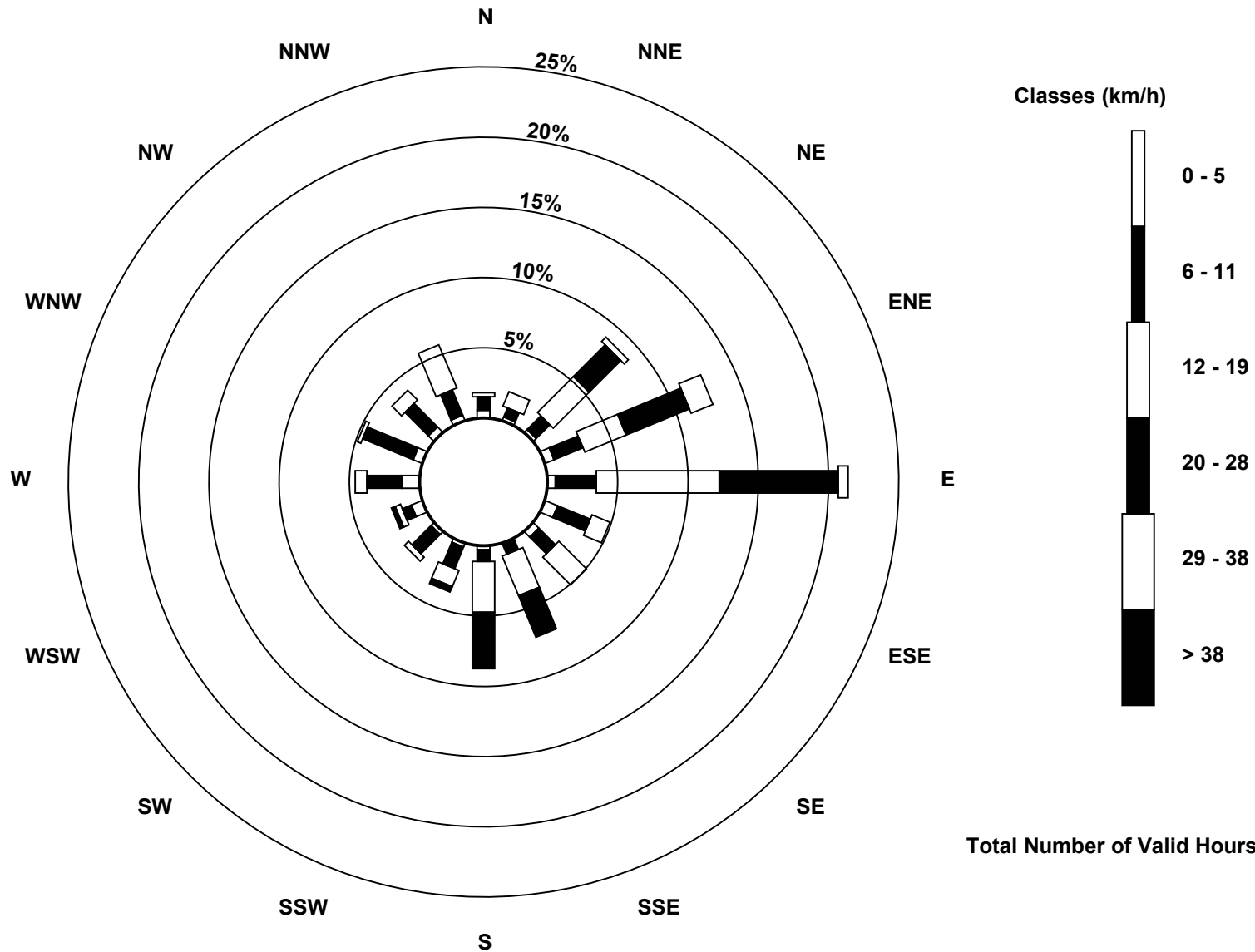
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	2	2	5	4	7	4	1	2	2	2	6	9	5	4	3	62
6 - 11	7	5	10	16	21	18	12	5	6	12	14	5	18	28	17	14	208
12 - 19	2	8	26	23	63	10	20	22	26	9	3	3	6	2	7	24	254
20 - 28	0	0	23	35	61	0	0	23	29	3	0	2	0	0	0	0	176
29 - 38	0	0	3	12	5	0	0	0	0	0	0	0	0	0	0	0	20
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	15	64	91	154	35	36	51	63	26	19	16	33	35	28	41	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Fort Chipeywan (AMS 8)**



Total Number of Valid Hours: 720



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort Chipewyan - June 2014

Direction of Maximum Speed: 63 deg on Jun 3 19:00 Direction of Maximum Daily Speed Average: 51.4 deg on Jun 3	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0
Direction of Minimum Speed: 350 deg on Jun 27 04:00 Direction of Minimum Daily Speed Average: 1.6 deg on Jun 27	Percent Operational Time: 100.0
Monthly Average Direction: 255.4 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	105	133	140	144	148	132	128	166	166	160	166	174	168	172	169	163	170	175	138	91	102	108	100	91	150.7
2-Jun	127	187	191	215	206	203	226	251	256	280	304	295	317	346	340	343	348	345	351	11	19	15	15	53	319.9
3-Jun	56	57	62	61	62	58	53	56	45	30	41	47	68	55	34	40	37	50	63	46	45	52	48	41	51.4
4-Jun	39	40	32	41	44	47	46	45	46	48	54	55	47	45	50	53	61	52	64	71	63	50	48	48	49.0
5-Jun	50	42	38	42	25	11	16	49	77	90	87	101	90	106	98	116	127	114	95	7	11	348	337	348	64.7
6-Jun	359	42	51	58	82	164	177	136	100	96	91	96	93	97	94	94	98	92	89	92	75	65	60	65	88.6
7-Jun	74	69	97	128	73	77	90	104	123	126	105	93	94	91	85	89	89	89	85	81	79	74	78	80	89.7
8-Jun	122	133	143	140	130	124	111	94	92	95	95	94	94	93	93	91	86	84	80	77	66	67	79	83	95.1
9-Jun	83	80	81	81	91	87	82	83	84	89	90	92	94	96	91	142	206	217	227	141	232	303	283	275	94.9
10-Jun	275	286	291	305	298	309	310	303	310	320	358	94	63	106	281	215	114	188	230	245	214	233	244	259	282.7
11-Jun	268	259	277	292	292	284	292	265	260	253	271	280	249	242	260	316	343	349	346	350	35	63	55	50	288.8
12-Jun	32	27	25	22	34	62	70	90	77	90	82	82	86	84	76	67	66	67	61	57	57	60	59	61	68.2
13-Jun	71	78	81	76	78	80	82	84	87	83	85	89	91	92	91	93	88	77	66	57	58	59	105	94	81.8
14-Jun	126	168	180	182	180	179	175	179	180	172	171	164	164	159	171	177	191	154	158	177	187	177	170	190	172.6
15-Jun	203	205	186	181	207	207	198	199	185	146	179	206	192	175	161	90	88	81	73	67	61	58	68	82	134.8
16-Jun	85	82	90	102	129	103	95	94	91	87	85	86	85	71	64	64	62	58	57	57	53	48	55	81	74.2
17-Jun	82	72	85	87	89	132	128	117	109	91	99	89	93	96	136	154	139	174	169	174	174	175	172	172	129.5
18-Jun	182	195	170	163	169	179	185	181	187	182	157	153	167	187	207	213	205	195	166	174	166	172	153	171	178.6
19-Jun	177	180	190	193	199	201	189	165	116	109	95	95	91	85	91	88	91	131	130	138	129	85	80	47	127.2
20-Jun	46	44	31	35	55	69	65	68	81	84	87	80	89	108	175	161	172	195	274	294	302	316	308	321	71.8
21-Jun	296	301	296	312	322	313	304	291	296	297	277	290	303	72	98	102	106	278	280	280	284	303	300	294	301.4
22-Jun	306	326	324	279	276	288	302	312	311	27	97	96	98	91	90	102	103	97	101	319	345	2	18	33	49.6
23-Jun	43	52	76	83	80	74	75	76	78	73	77	74	64	73	70	67	62	59	114	92	60	81	87	98	73.3
24-Jun	104	134	147	149	152	166	171	165	157	161	163	164	163	157	155	110	87	82	83	83	87	98	145	155	136.4
25-Jun	156	157	158	180	181	175	181	181	168	159	163	160	161	155	160	162	267	289	285	249	177	114	153	205	172.9
26-Jun	239	199	201	215	231	224	221	230	232	233	260	280	179	302	251	129	103	233	281	228	265	276	273	201	228.5
27-Jun	109	247	284	350	228	62	104	107	85	143	120	35	127	156	125	136	179	243	305	329	335	247	244	260	169.8
28-Jun	243	239	316	314	286	305	329	297	283	277	285	275	270	274	332	320	326	63	77	261	315	330	329	337	318.5
29-Jun	333	340	344	341	345	347	342	342	339	344	339	346	344	329	331	346	353	346	333	331	338	340	341	355	341.1
30-Jun	349	35	47	43	46	47	55	65	63	83	91	97	94	97	99	93	88	90	88	87	77	67	72	78	74.0

81.9	92.7	99.2	100.3	98.3	105.0	103.8	110.4	108.9	103.8	100.9	102.2	104.5	102.8	102.8	96.0	90.5	86.1	83.5	76.8	67.8	60.6	73.1	77.2
Diurnal Average																							

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

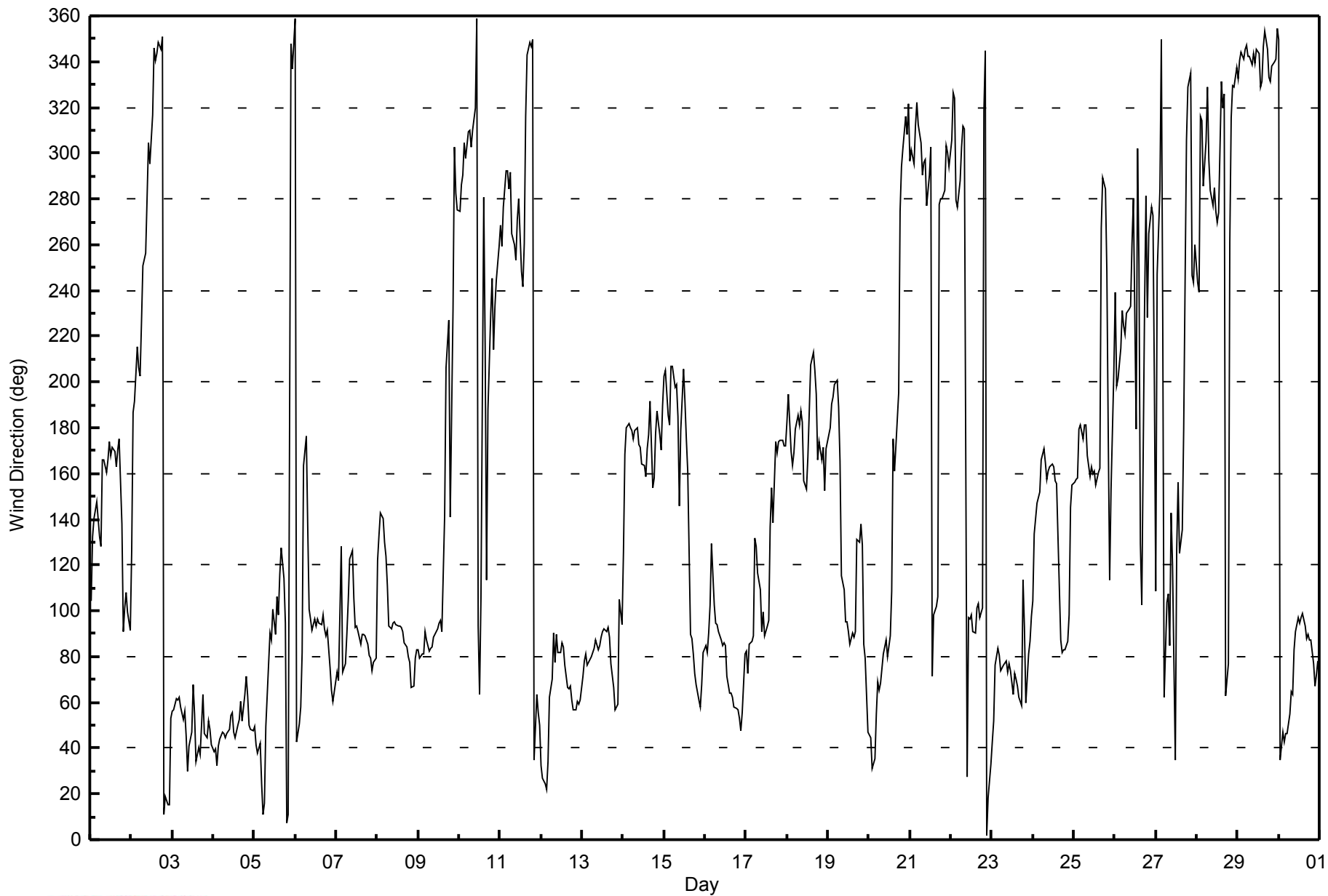
Wind Direction (WD) - deg
Fort Chiheywan - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 85 deg on Jun 22 19:00																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 3 deg on Jun 9 13:00																									
Percentiles: P ₁ = 4 P ₁₀ = 6 Q ₁ = 8 Median = 12 Q ₃ = 18 P ₉₀ = 29 P ₉₉ = 77																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Jun	9	8	5	6	7	10	31	11	12	12	16	15	13	13	12	13	14	11	38	10	14	6	11	23	38
2-Jun	33	16	11	12	21	13	15	19	20	21	29	25	30	29	32	30	28	28	25	23	20	16	16	21	33
3-Jun	11	9	8	9	9	11	11	10	14	18	13	14	13	18	21	17	24	14	10	13	11	10	10	12	24
4-Jun	11	12	14	13	12	12	12	12	11	12	11	11	15	15	15	11	18	11	11	9	11	11	11	12	18
5-Jun	10	11	11	12	21	19	21	17	21	14	11	14	48	21	43	35	19	25	24	26	18	20	13	14	48
6-Jun	23	17	8	7	39	9	16	35	18	10	7	6	7	7	6	6	7	7	6	7	7	8	6	7	39
7-Jun	9	10	26	21	33	15	12	7	11	8	7	7	5	5	6	4	4	4	5	5	6	9	8	9	33
8-Jun	10	5	8	7	10	17	9	7	3	3	3	4	5	5	5	4	5	6	6	10	9	8	7	5	17
9-Jun	5	6	7	16	6	5	7	5	5	5	4	4	3	4	6	56	9	10	20	64	45	17	20	11	64
10-Jun	9	6	7	9	10	14	15	18	22	32	77	6	77	60	70	17	34	54	15	11	10	13	14	13	77
11-Jun	14	12	13	14	11	17	23	17	21	19	24	24	19	15	27	32	30	29	26	24	48	18	9	10	48
12-Jun	11	14	17	20	15	12	11	15	14	5	7	8	5	7	9	9	8	9	9	9	9	9	8	8	20
13-Jun	9	6	7	7	6	6	6	6	8	8	6	5	4	4	6	5	4	10	9	9	9	8	22	6	22
14-Jun	19	15	7	5	6	8	9	8	9	11	10	12	17	11	14	18	17	7	11	10	5	7	11	19	19
15-Jun	8	18	6	8	13	11	11	10	12	13	25	13	18	18	22	6	6	5	8	8	9	8	10	10	25
16-Jun	5	12	29	23	29	10	8	6	6	6	5	4	6	11	9	9	10	9	9	8	8	8	8	11	29
17-Jun	11	11	11	13	16	10	14	6	10	12	9	6	4	5	33	30	29	11	10	10	12	10	7	9	33
18-Jun	7	12	8	8	11	7	7	9	12	14	13	10	19	18	15	17	15	22	16	7	9	8	8	8	22
19-Jun	11	7	6	8	10	10	11	21	9	15	5	3	4	6	5	5	4	14	12	7	12	13	14	9	21
20-Jun	10	10	14	16	12	10	10	10	9	7	6	10	6	39	26	21	23	37	34	13	14	16	32	19	39
21-Jun	17	17	16	17	22	21	18	16	20	21	16	16	17	82	10	7	18	84	14	13	15	14	14	16	84
22-Jun	16	16	45	22	16	14	14	18	19	70	8	5	5	5	5	7	9	6	85	21	17	18	16	13	85
23-Jun	12	10	10	6	10	17	8	8	8	9	9	11	10	10	9	8	10	10	30	20	10	17	13	6	30
24-Jun	13	8	7	8	9	11	10	11	12	12	13	13	14	12	11	26	5	6	6	5	8	8	22	7	26
25-Jun	8	7	9	11	8	8	7	8	11	10	13	11	13	14	12	14	39	15	17	36	14	60	18	33	60
26-Jun	21	9	7	13	12	12	11	10	10	12	22	25	42	60	78	16	13	36	29	12	19	12	55	83	83
27-Jun	70	41	46	54	16	55	22	12	17	52	31	67	14	40	42	13	38	33	21	26	21	34	18	17	70
28-Jun	25	13	37	22	39	16	23	28	20	25	16	19	26	24	43	36	31	21	19	25	13	20	12	15	43
29-Jun	14	14	17	15	16	18	17	20	27	27	28	28	30	29	25	27	29	27	22	24	23	23	22	20	30
30-Jun	19	18	10	11	11	12	13	12	14	8	5	5	7	7	8	7	6	5	5	5	9	10	10	16	19
	70	41	46	54	39	55	31	35	27	70	77	67	77	82	78	56	39	84	85	64	48	60	55	83	
	Diurnal Maximum																								



WBEA
Hourly Averages

Wind Direction (WD) - deg
Fort Chipeywan - June 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 4, 2014	Previous Calibration	May 15, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	10:45	End Time (MST)	16:00
Barometric Pressure	760 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	0.997488	0.977624	Chamber temp.	50.0	50.0
Calculated intercept	-0.074333	-0.079155	Pressure (in Hg)	26.7	26.5
Analyzer Background	6.9	6.9	Flow (lpm)	0.631	0.624
Analyzer Coefficient	0.955	1.008	UV Lamp (mV)	4405	4409

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	0.02	NA
as found span	5000	36.7	18.0	16.5	1.091
calibrator zero	5000	0.0	0.0	0.02	NA
high point	5000	36.7	18.0	18.4	0.976
second point	5000	19.8	9.7	10.1	0.965
third point	5000	9.9	4.9	5.1	0.951
calibrator zero	5000	0.0	0.0		NA
as left zero	5000	0.0	0.0	0.0	NA
as left span	5000	36.6	17.9	16.8	NA
Average Correction Factor					0.964

Corrected As found	16.5	Previous response	18.1	% change	9.9%
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Notes:

Span adjusted, filter changed during As Lefts. Span very slow to reach peak. Will address next trip

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

SO₂ Calibration Summary

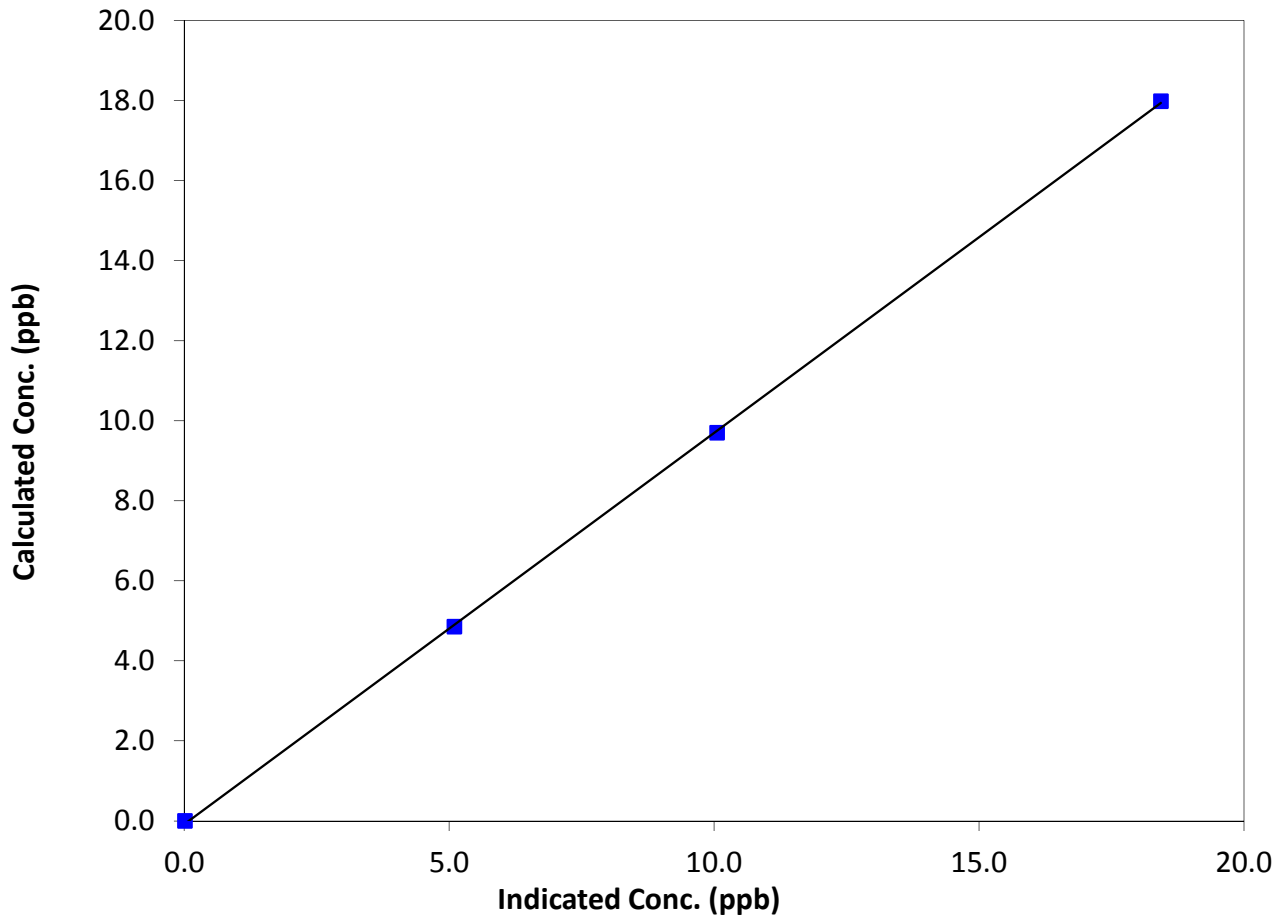
Station Information

Calibration Date	June 4, 2014	Previous Calibration	May 15, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:45	End Time (MST)	16:00
Analyzer make	T100u	Analyzer serial #	138

Calibration Data

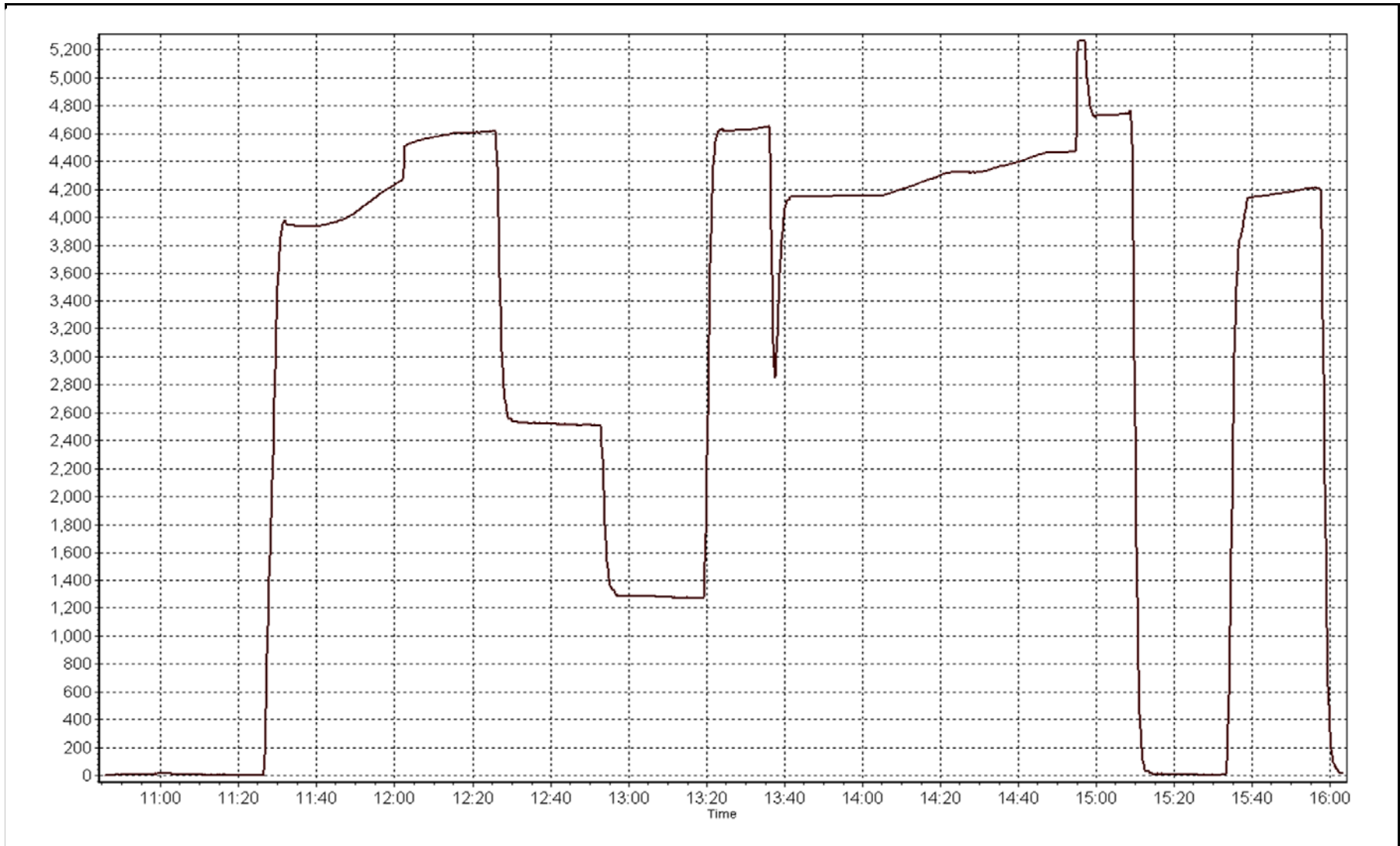
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999935
18.0	18.4	0.9756		
9.7	10.1	0.9648	Slope	0.977624
4.9	5.1	0.9512		
			Intercept	-0.079155

SO₂ Calibration Curve



SO2 Calibration Plot

Date: June 4, 2014





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	June 4, 2014	Previous Calibration	May 15, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	16:04	End Time (MST)	18:30
Barometric Pressure	760 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	API T700	Serial Number	747
NO2 calibration used	Wednesday, June 04, 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)	27.9	27.9
Analyzer Range (input)	5000	5000	Lamp temp. (Deg C)	58.0	58.0
Calculated slope	1.003423	1.025464	Pressure (in Hg)	26.9	27.0
Calculated intercept	-0.629753	-1.393676	Flow cell (LPM)	0.744	0.744
Analyzer Background	-0.50	-0.5	Cell A Intensity	NA	NA
Analyzer Coefficient	0.979	0.979	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	1.2	N/A
as found span	5000	197 -- 810	107.5	106.0	1.014
calibrator zero	5000	0.00	0.0	1.2	N/A
high point	5000	197 -- 810	107.5	106.0	1.014
second point	5000	148 -- 772	81.5	81.0	1.006
third point	5000	93 -- 715	53.6	53.8	0.997
calibrator zero	5000	0.00	0.0		N/A
as left zero	5000	0.00	0.0	0.7	N/A
as left span	5000	198 -- 813	110.0	106.9	N/A
Average Correction Factor					1.006

Corrected As found 104.7 Previous response 107.8 % change 2.9%

Notes:

No adjustments.

Calibration Performed By:

Zack Eastman



Wood Buffalo Environmental Association

O₃ Calibration Summary

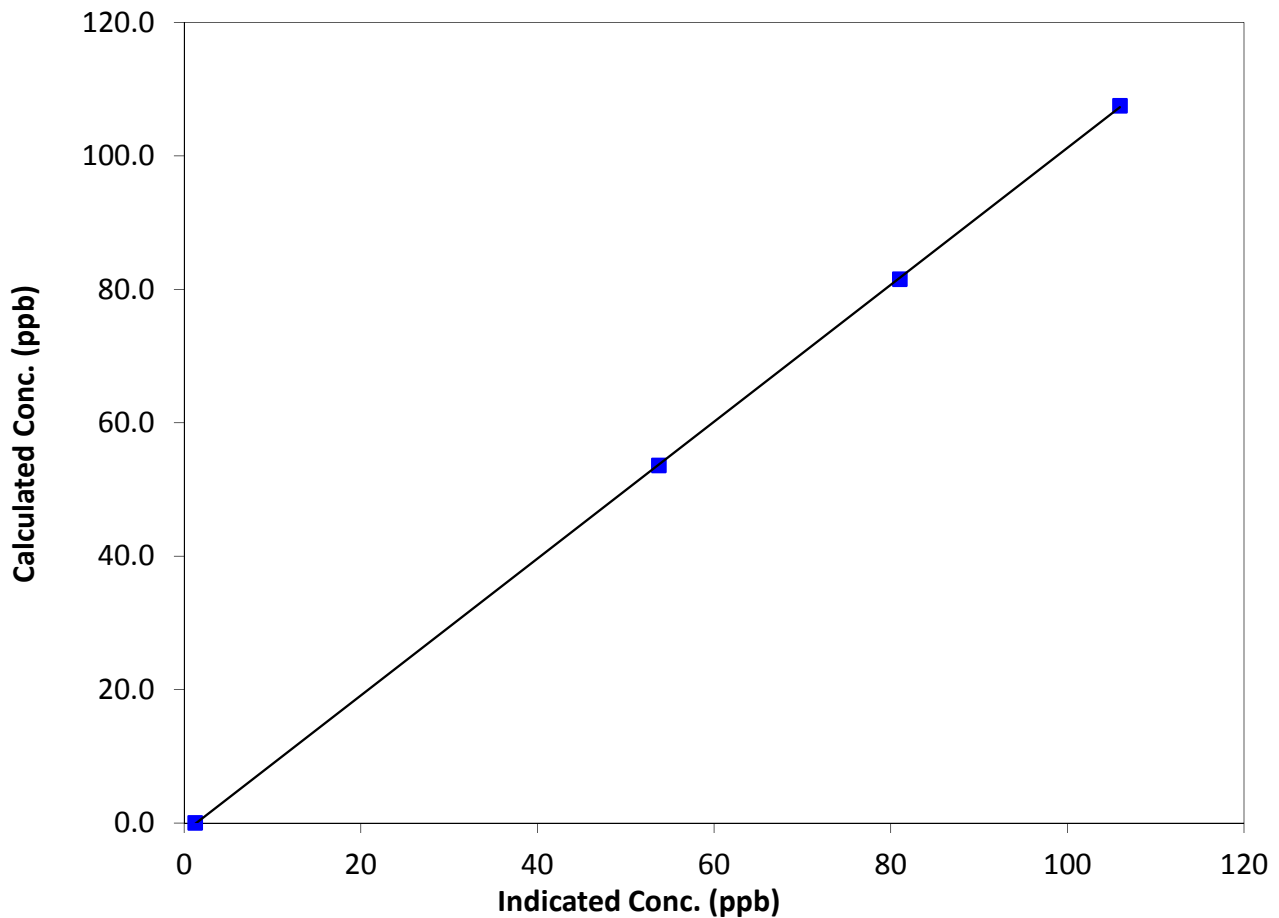
Station Information

Calibration Date	Wednesday, June 04, 2014	Previous Calibration	May 15, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	16:04	End Time (MST)	18:30
Analyzer make	API T400	Analyzer serial #	1020

Calibration Data

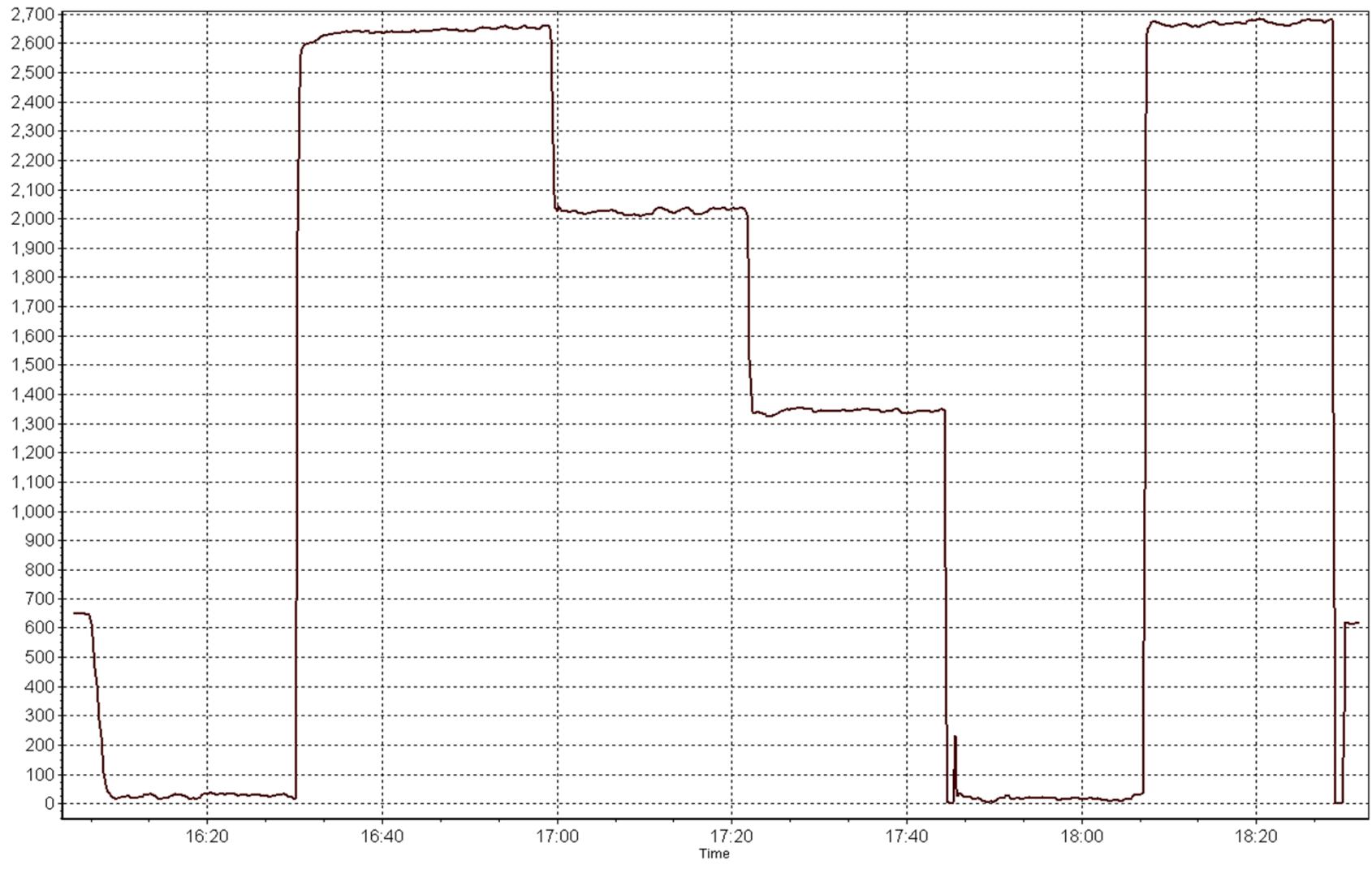
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.2	N/A	Correlation Coefficient	0.999979
107.5	106.0	1.0145		
81.5	81.0	1.0056	Slope	1.025464
53.6	53.8	0.9970		
			Intercept	-1.393676

O₃ Calibration Curve



O3 Calibration Plot

Date: June 4, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	June 4, 2014	Previous Calibration	May 15, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	10:45	End Time (MST)	16:00
Barometric Pressure	760 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	1.009771	1.012323	0.976154
	Data Offset	0.352501	0.402088	0.182038
After	Data Slope	0.994159	0.991732	0.981245
	Data Offset	0.334688	0.502583	-0.003137
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	1.249	mv	1.249	mv
NO _x coefficient	1.253	mv	1.264	mv
NO bkgnd	-0.1	mv	-0.1	mv
NO _x bkgnd	0.4	mv	0.4	mv
Chamber Temp	40	Deg C	40	Deg C
Moly Temp	314.2	Deg C	317	Deg C
PMT Temp	5.1	Deg C	5.1	Deg C
O ₃ flow	88	ccm	88	ccm
R Cell Press	2.6	mmHg	2.6	mmHg
Sample Flow	1114	ccm	1099	ccm
PMT Voltage	-807.0	V	-807.0	V

Notes: Span adjusted slightly. Filter changed during As Lefts



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

June 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	-0.3	0.0	-0.3	N/A	N/A
as found span	5000	36.7	149.0	148.3	0.7	148.6	148.9	-0.4	1.003	0.996
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	0.0	-0.3	N/A	N/A
high point	5000	36.7	149.0	148.3	0.7	150.0	149.0	0.8	0.993	0.995
second point	5000	19.8	80.4	80.0	0.4	80.0	79.8	0.3	1.004	1.003
third point	5000	9.9	40.2	40.0	0.2	40.1	39.7	0.3	1.003	1.008
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	-0.2	0.1	-0.3	NA	NA
as left span	5000	36.6	148.6	147.9	0.7	148.8	40.1	108.5	NA	NA
Average Correction Factor									1.000	1.002

Corrected As found
Previous Response

NO_x= 148.9
NO_x= 150.1

NO= 148.9
NO= 149.7

Percent Change

NO_x= 0.8%

NO= 0.5%

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 36.90 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 (100ppb O ₃)	N/A	41.3	107.5	150.4	41.3	109.1	0.991	1.000	0.985	101.5%
2nd NO ₂ (75ppb O ₃)	N/A	67.2	81.5	150.5	67.2	83.3	0.990	1.000	0.979	102.2%
3rd NO ₂ (50ppb O ₃)	N/A	95.1	53.6	150.3	95.1	55.2	0.991	1.000	0.972	102.9%
4th NO ₂ (0ppb O ₃)	148.8	N/A	0.5	149.2	148.8	0.4	0.998	1.000	N/A	N/A
Average Correction Factor							0.993	1.000	0.978	102.2%

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

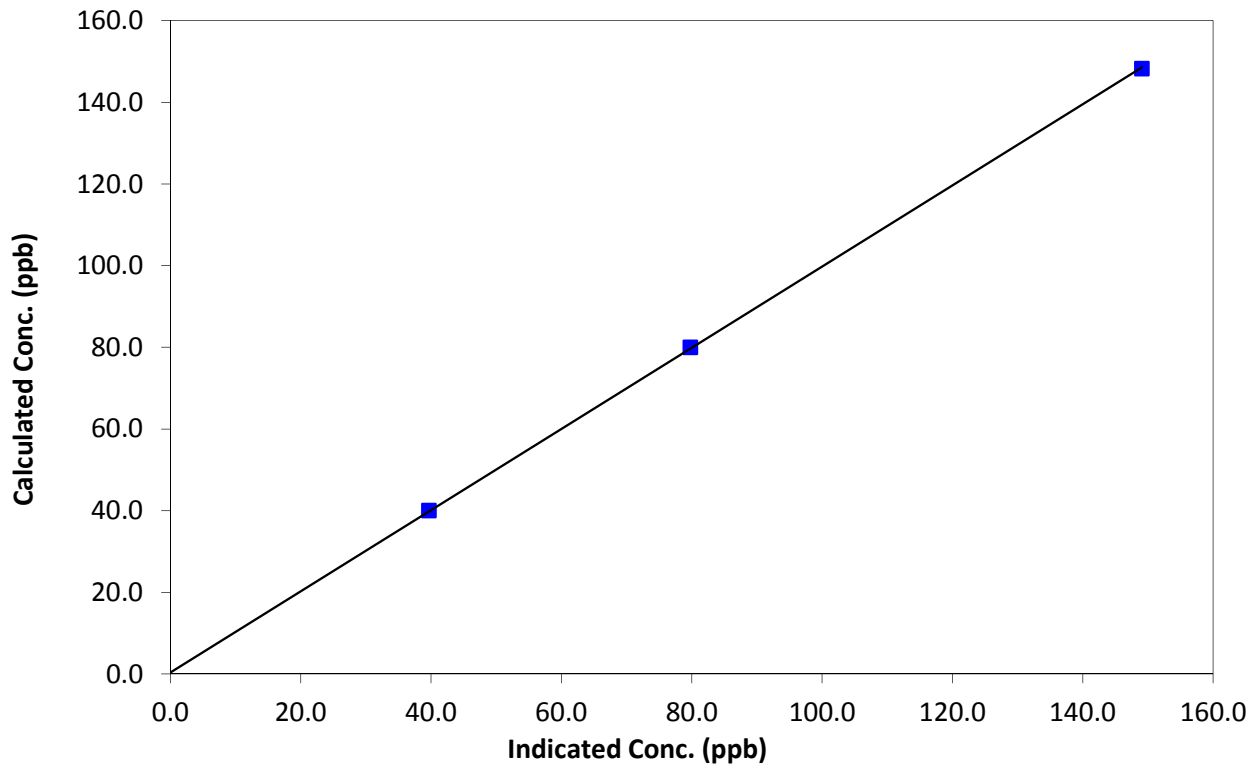
Station Information

Calibration Date	June 4, 2014	Previous Calibration	May 15, 2014
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:45	End Time (MST)	16:00
Analyzer make	API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999973
148.3	149.0	0.9948		
80.0	79.8	1.0028	Slope	0.994159
40.0	39.7	1.0079		
			Intercept	0.334688

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

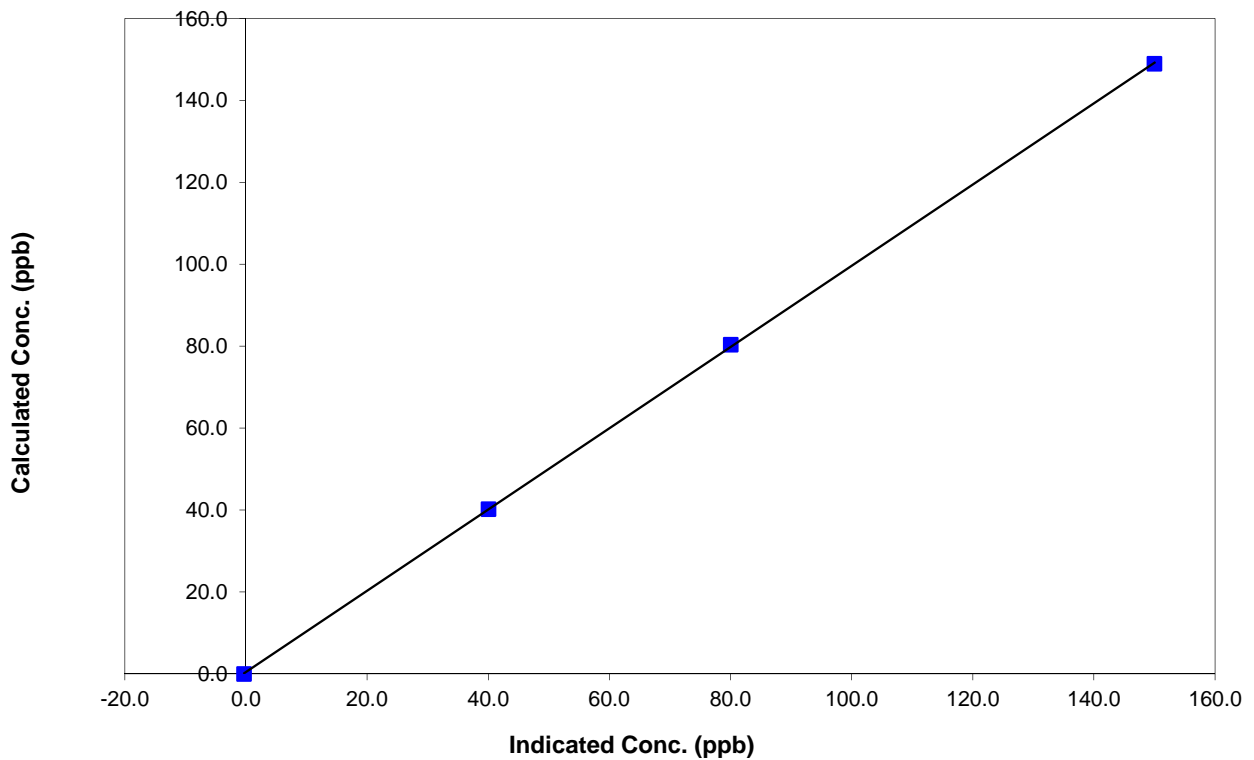
Station Information

Calibration Date	June 4, 2014	Previous Calibration	May 15, 2014
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:45	End Time (MST)	16:00
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	-0.3	N/A	Correlation Coefficient	0.999970
149.0	150.0	0.9933		
80.4	80.0	1.0043	Slope	0.991732
40.2	40.1	1.0035		
			Intercept	0.502583

NO Calibration Curve





Wood Buffalo Environmental Association

NO2 Calibration Summary

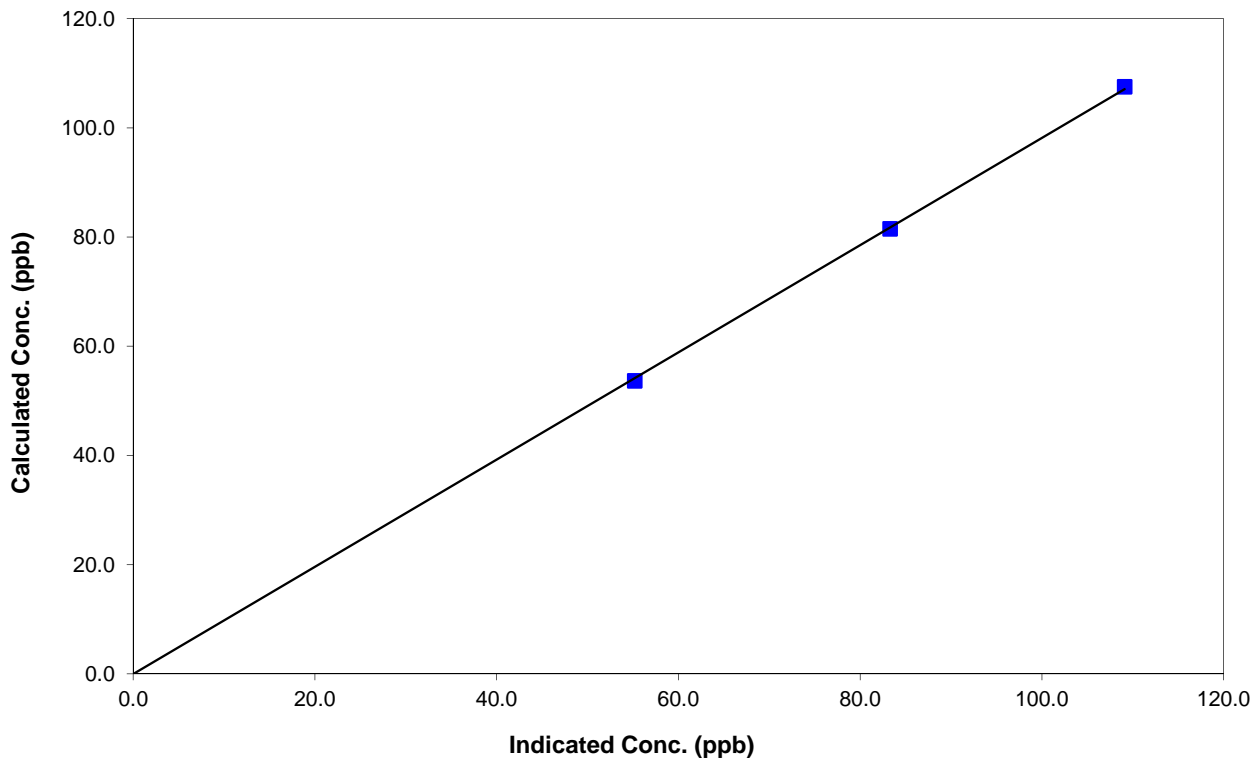
Station Information

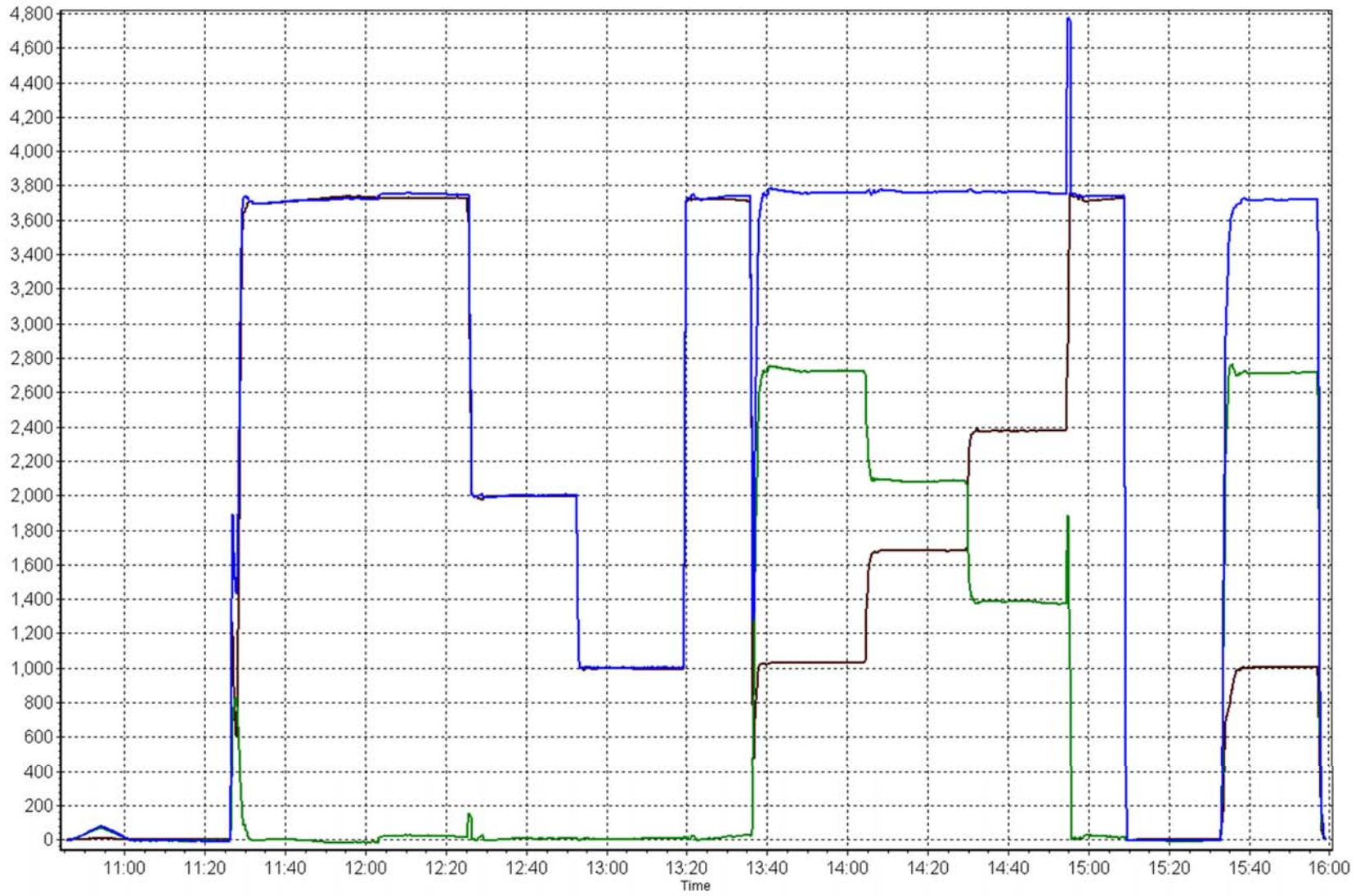
Calibration Date	June 4, 2014	Previous Calibration	May 15, 2014
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:45	End Time (MST)	16:00
Analyzer make	API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999904
107.5	109.1	0.9852		
81.5	83.3	0.9785	Slope	0.981245
53.6	55.2	0.9717		
			Intercept	-0.003137

NO2 Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 9
BARGE LANDING
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
 JUNE 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	675	40	45	99.31	2	0	1	0
THC(ppm) Average	675	37	45	98.89	3.2	-	2.4	-
Temperature (C) Average	720	0	0	100.00	30.1	-	23.2	-
Wind Speed 10 m (km/h) Average	716	0	4	99.44	18	-	-	-
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 - BARGE LANDING (AMS 9)
 JUNE 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	675	0.3	0	-	0	0	0	0	0	1	2
THC(ppm) Average	675	2.12	0.2	-	1.9	1.9	2	2.1	2.2	2.4	3.2
Temperature (C) Average	720	18.03	5.7	-	5.2	10.5	13.7	18	22.3	26	30.1
Wind Speed 10 m (km/h) Average	716	5.9	3	-	0	2	3	5	8	11	18
Wind Direction 10 m (deg) Average	716	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
JUNE 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	26 Jun 2014 15:00	26 Jun 2014 15:00	1	Power spike
TRS	26 Jun 2014 17:00	26 Jun 2014 17:00	1	Power spike
TRS	26 Jun 2014 22:00	26 Jun 2014 22:00	1	Power spike
TRS	27 Jun 2014 14:00	27 Jun 2014 15:00	2	Power spike
THC	16 Jun 2014 11:00	16 Jun 2014 13:00	3	Maintenance - replaced zero air generator
THC	26 Jun 2014 15:00	26 Jun 2014 15:00	1	Power spike
THC	26 Jun 2014 17:00	26 Jun 2014 17:00	1	Power spike
THC	26 Jun 2014 22:00	26 Jun 2014 22:00	1	Power spike
THC	27 Jun 2014 14:00	27 Jun 2014 15:00	2	Power spike
Wind Speed, Wind Direction	21 Jun 2014 01:00	21 Jun 2014 01:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	23 Jun 2014 01:00	23 Jun 2014 01:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	27 Jun 2014 05:00	27 Jun 2014 05:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	27 Jun 2014 22:00	27 Jun 2014 22:00	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: 2 ppb on Jun 14 23:00	Maximum Daily Average: 0.6 ppb on Jun 27		Hours of Data:	675
Minimum Value: 0 ppb on Jun 1 02:00	Minimum Daily Average: 0.0 ppb on Jun 5		Hours of Missing Data:	45
Maximum Diurnal Average: 0.4 ppb at hour 8	Minimum Diurnal Average: 0.1 ppb at hour 15		Hours of Calibration:	40
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 = 1		Percent Operational Time:	99.3

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jun	0	0	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-Jun	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	0.2	1
3-Jun	0	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
5-Jun	0	0	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-Jun	0	0	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-Jun	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	0.2	1
8-Jun	0	0	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-Jun	0	0	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-Jun	0	0	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-Jun	0	0	Z	0	0	1	1	1	C	C	C	C	C	C	C	0	0	0	0	1	1	0	0	1	--	1	
12-Jun	1	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.5	1	
13-Jun	0	0	Z	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
14-Jun	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0.4	2	
15-Jun	1	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
16-Jun	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	
17-Jun	0	0	Z	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1	
18-Jun	1	0	Z	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
19-Jun	0	0	Z	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
20-Jun	0	0	Z	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
21-Jun	0	0	Z	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
22-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
23-Jun	1	0	Z	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
24-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
25-Jun	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	
26-Jun	0	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-Jun	0	0	Z	0	1	1	1	1	1	2	1	0	0	PF	PF	0	0	1	1	1	1	0	1	0	0.6	2	
28-Jun	0	0	Z	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
29-Jun	0	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
30-Jun	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	

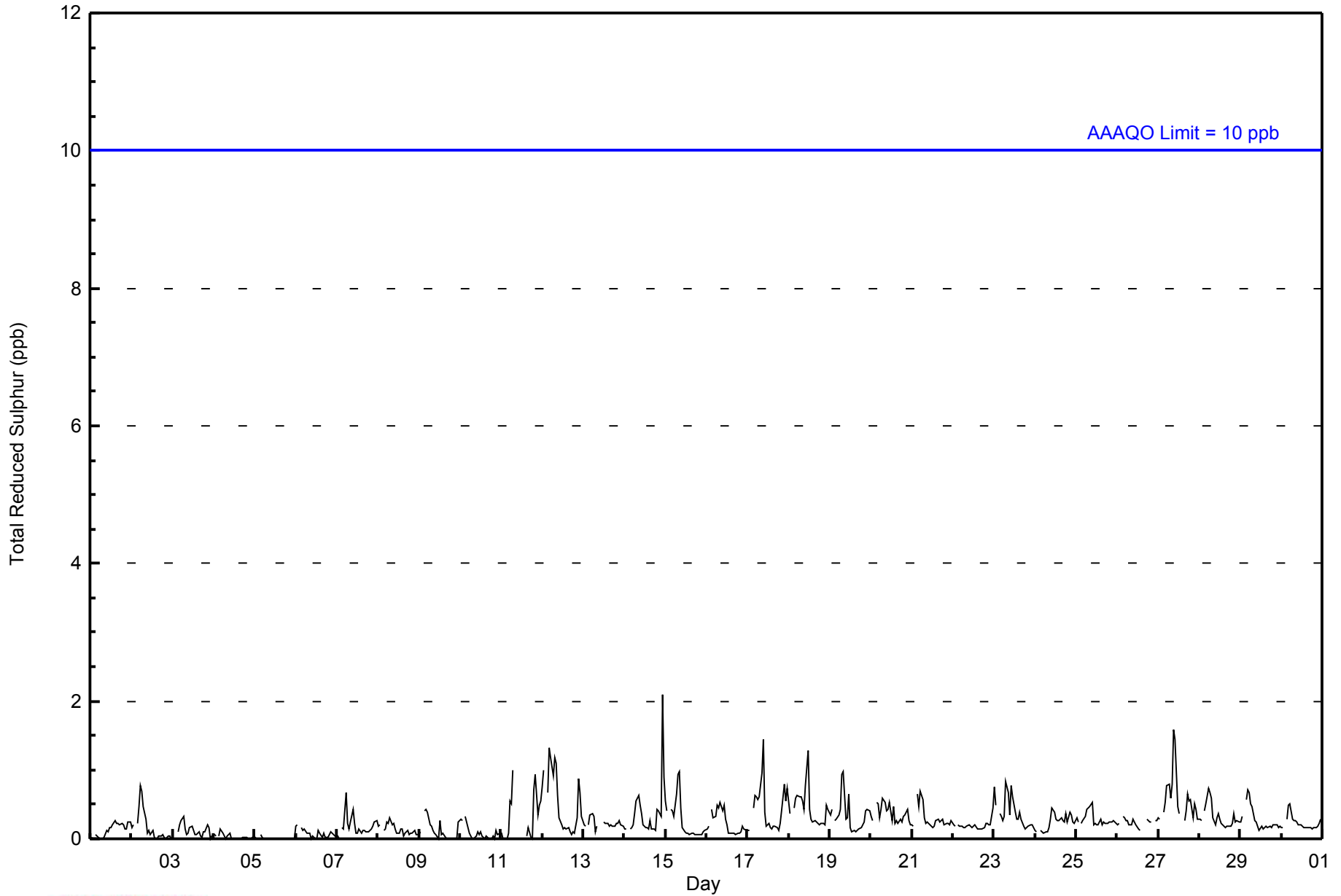
0.2	0.2	--	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	Diurnal Average	
1	1	--	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	1	1	1	1	1	1	2	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Barge Landing - June 2014





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - June 2014

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

Total Number of Valid Hours: 675

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - June 2014

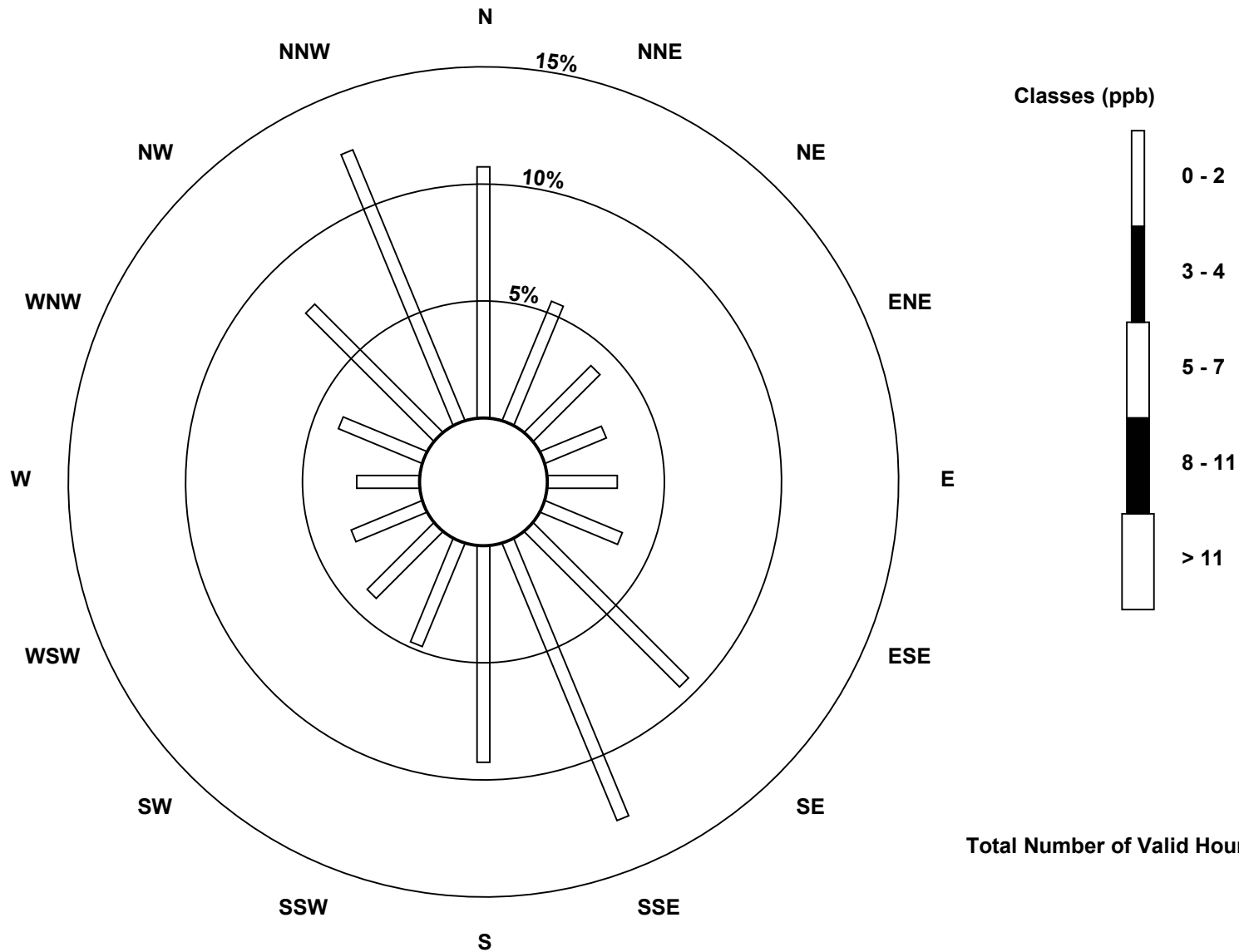
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	72	37	27	19	20	24	63	86	62	32	27	22	18	26	52	84	671
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	72	37	27	19	20	24	63	86	62	32	27	22	18	26	52	84	671

Total Number of Valid Hours: 671

Total Number of Hours: 720

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

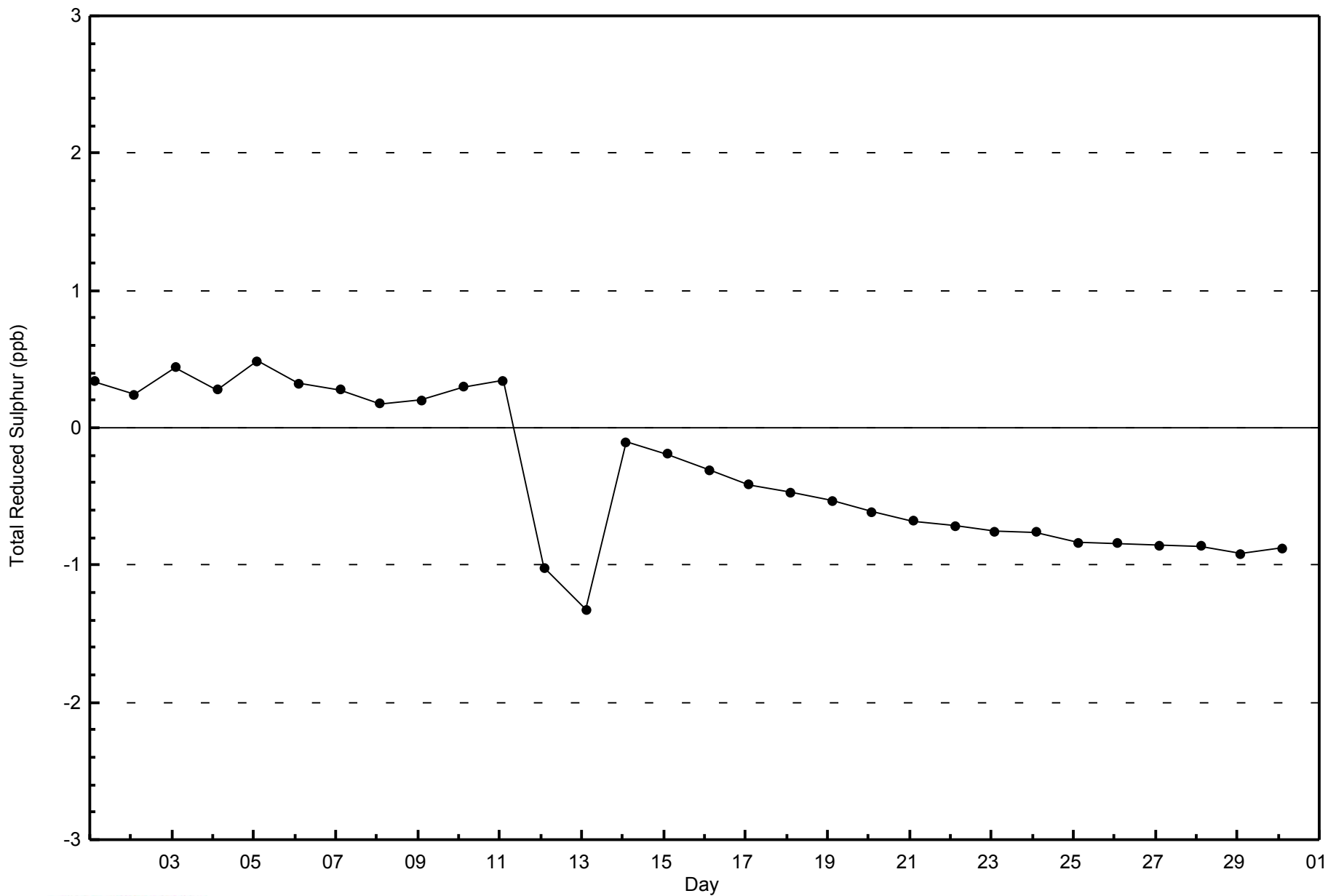
**Total Reduced Sulphur (TRS) - ppb
Barge Landing (AMS 9)**





WBEA
Zero Responses

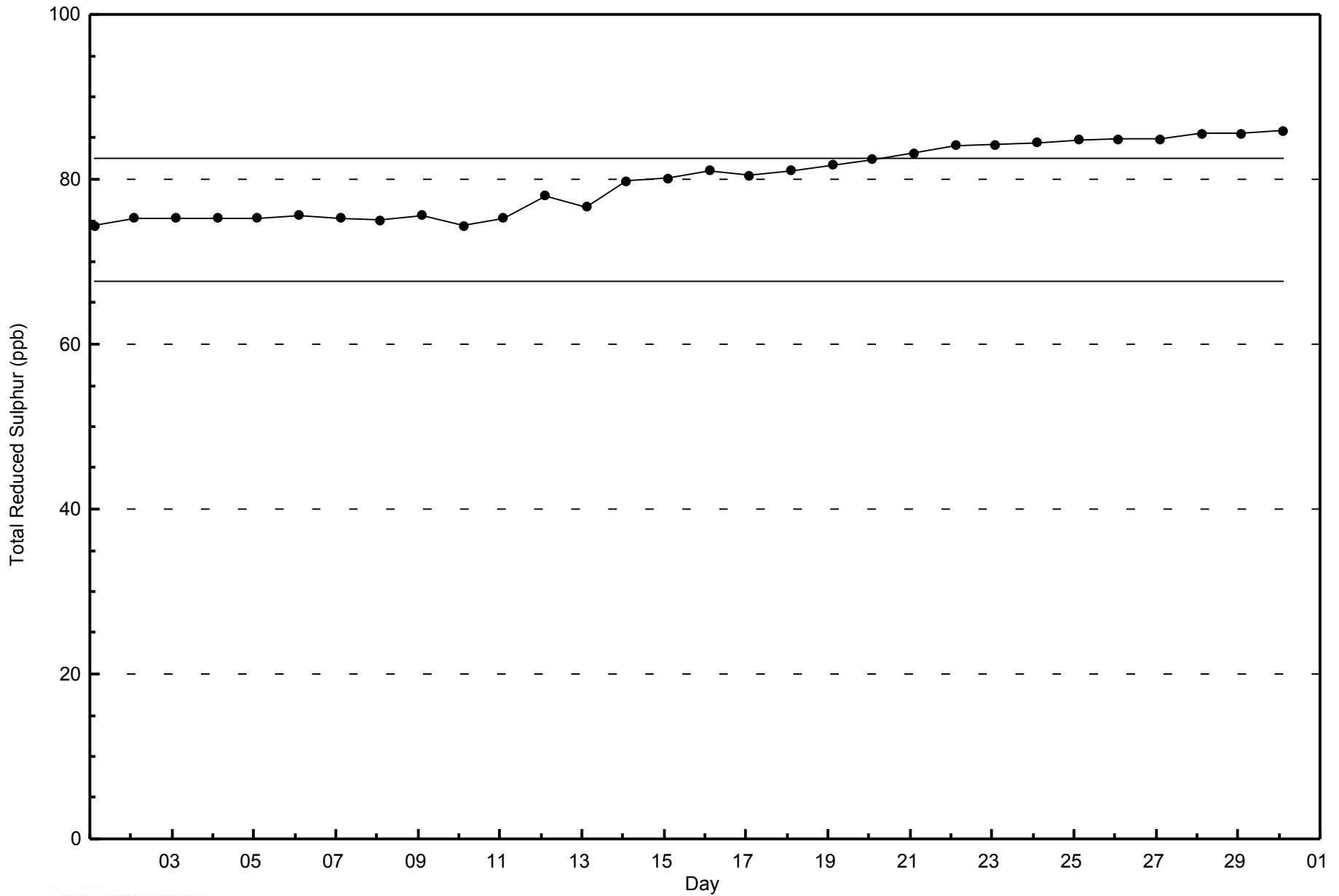
Total Reduced Sulphur (TRS) - ppb
Barge Landing - June 2014





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Barge Landing - June 2014



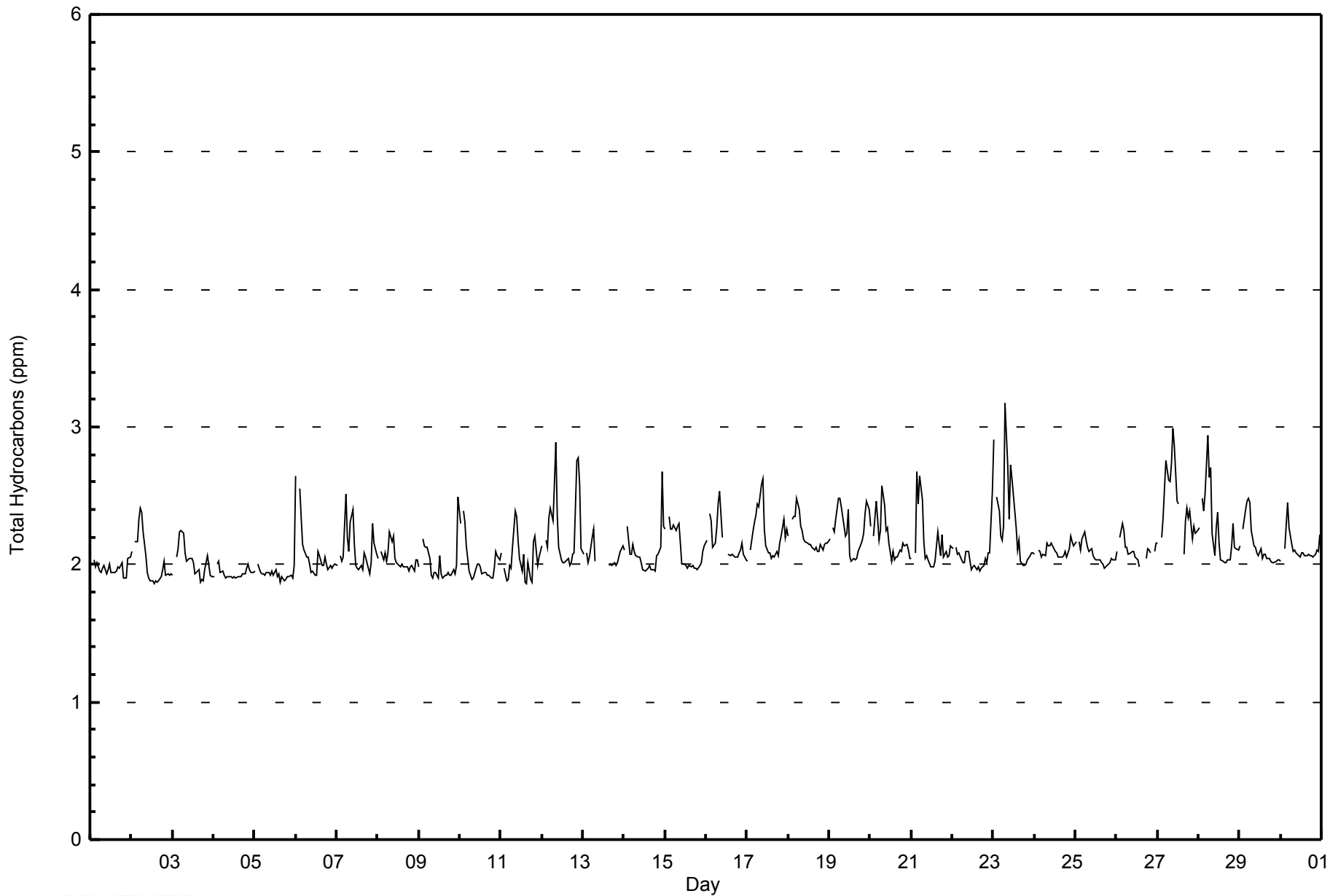


Maximum Value: 3.2 ppm on Jun 23 08:00		Maximum Daily Average: 2.4 ppm on Jun 27		Hours in Service: 720																						
Minimum Value: 1.9 ppm on Jun 11 16:00		Minimum Daily Average: 1.9 ppm on Jun 5		Hours of Data: 675																						
Maximum Diurnal Average: 2.3 ppm at hour 6		Minimum Diurnal Average: 2.0 ppm at hour 15		Hours of Missing Data: 45																						
Monthly Average: 2.12 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: 37																						
				Percent Operational Time: 98.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	2.0	Z	2.0	2.0	2.0	2.0	1.9	2.0	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.1	2.0	2.1
2-Jun	2.1	Z	2.2	2.2	2.3	2.4	2.4	2.2	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.4
3-Jun	1.9	Z	2.1	2.1	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.1	2.0	1.9	1.9	2.0	2.2	
4-Jun	1.9	Z	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	
5-Jun	2.0	Z	2.0	1.9	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	2.0	2.0	
6-Jun	2.6	Z	2.5	2.3	2.1	2.1	2.1	2.0	2.0	1.9	2.0	1.9	1.9	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.6	
7-Jun	2.0	Z	2.1	2.0	2.1	2.5	2.2	2.1	2.3	2.4	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	1.9	2.0	2.3	2.2	2.1	2.5	
8-Jun	2.0	Z	2.1	2.0	2.1	2.0	2.1	2.2	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.2	
9-Jun	2.0	Z	2.2	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.5	2.0	2.5	
10-Jun	2.3	Z	2.4	2.3	2.1	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.0	2.0	2.4	
11-Jun	2.1	Z	2.0	1.9	1.9	2.0	2.0	2.1	2.4	2.4	2.2	2.0	1.9	2.1	1.9	1.9	2.0	1.9	1.9	2.2	2.2	2.0	2.1	2.1	2.4	
12-Jun	2.1	Z	2.2	2.1	2.3	2.4	2.3	2.6	2.9	2.4	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.8	2.8	2.6	2.1	2.9	
13-Jun	2.1	Z	2.1	2.0	2.1	2.2	2.3	2.0	C	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.3	
14-Jun	2.1	Z	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.7	2.3	2.7	
15-Jun	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.3	
16-Jun	2.2	Z	2.4	2.3	2.1	2.2	2.3	2.4	2.5	2.2	M	M	M	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.1	2.0	2.5		
17-Jun	2.0	Z	2.1	2.2	2.3	2.4	2.4	2.4	2.6	2.6	2.3	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.2	2.3	2.6	
18-Jun	2.2	Z	2.3	2.3	2.4	2.5	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	2.1	2.2	2.2	2.2	2.5	
19-Jun	2.2	Z	2.3	2.2	2.3	2.5	2.5	2.4	2.3	2.2	2.2	2.4	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.4	2.5	2.4	2.5	
20-Jun	2.3	Z	2.2	2.5	2.3	2.2	2.3	2.6	2.4	2.2	2.3	2.2	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.0	2.6	
21-Jun	2.0	Z	2.1	2.7	2.4	2.6	2.5	2.2	2.0	2.1	2.0	2.0	2.0	2.0	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.7	
22-Jun	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.5	2.1	2.5	
23-Jun	2.9	Z	2.5	2.4	2.2	2.2	2.3	3.2	2.7	2.3	2.7	2.6	2.4	2.3	2.1	2.2	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	3.2	
24-Jun	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	
25-Jun	2.2	Z	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	
26-Jun	2.1	Z	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	PF	2.0	PF	2.0	2.1	2.1	2.1	PF	2.1	2.2	2.3	
27-Jun	2.2	Z	2.2	2.3	2.5	2.8	2.6	2.6	2.7	3.0	2.9	2.5	2.4	PF	PF	2.1	2.3	2.4	2.3	2.4	2.2	2.3	2.2	2.2	3.0	
28-Jun	2.3	Z	2.5	2.4	2.5	2.9	2.6	2.7	2.2	2.1	2.3	2.4	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.1	2.1	2.1	2.9	
29-Jun	2.1	Z	2.3	2.4	2.5	2.5	2.4	2.2	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	2.5	
30-Jun	2.0	Z	2.1	2.3	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	2.1	2.1	2.2	2.5	
		2.1	--	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	Diurnal Average	
		2.9	--	2.5	2.7	2.5	2.9	2.6	3.2	2.9	3.0	2.9	2.6	2.4	2.3	2.1	2.2	2.3	2.4	2.3	2.4	2.8	2.8	2.7	2.5	Diurnal Maximum
Z - zerspan		C - Calibration					M - Maintenance					PF - Power Failure														



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Barge Landing - June 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	294	43.56	43.56
2.1 - 3.0	380	56.30	99.85
3.1 - 10.0	1	0.15	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 675

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - June 2014

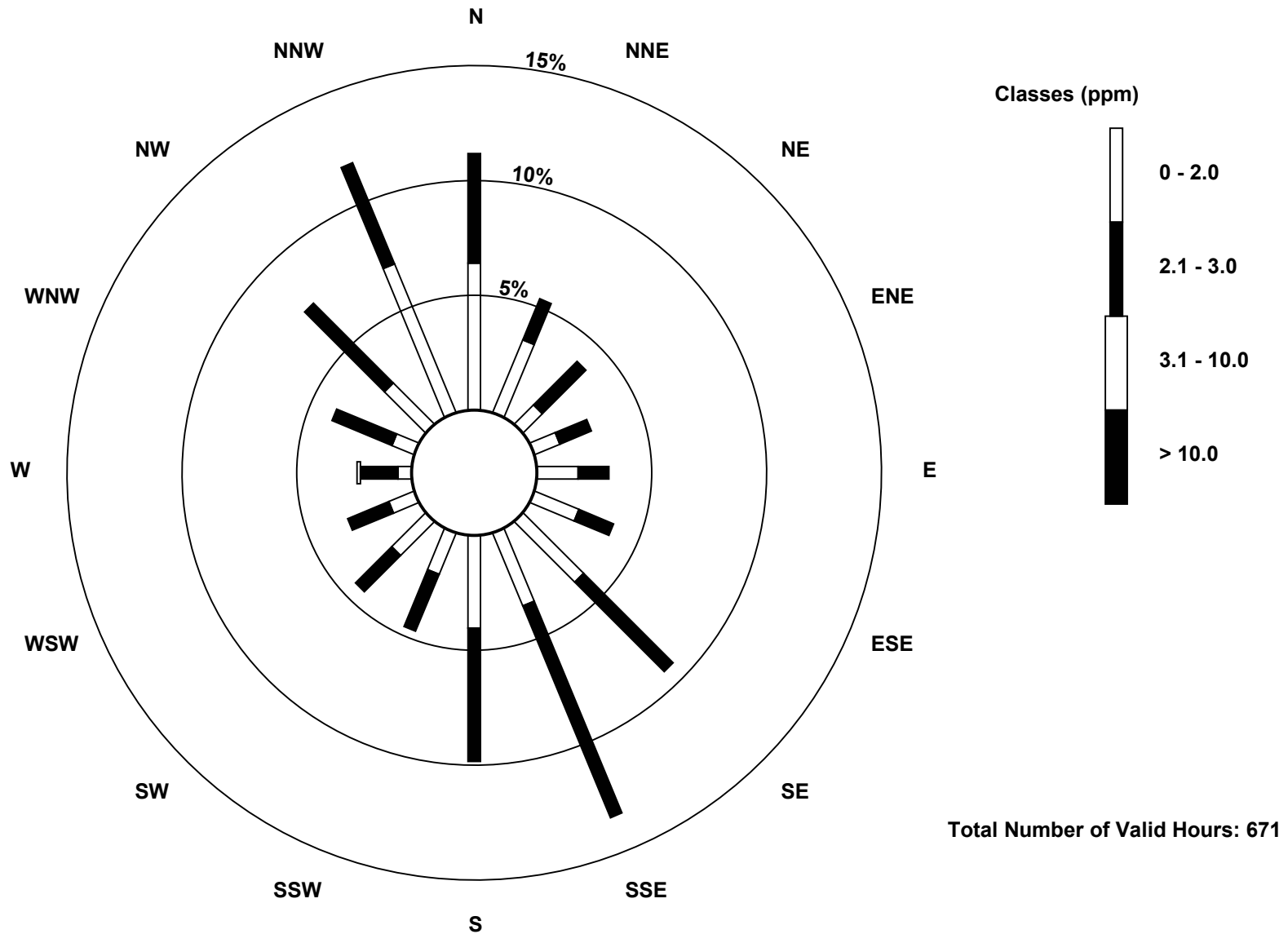
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	43	23	8	8	12	14	25	23	27	13	14	8	4	7	17	47	293
2.1 - 3.0	32	13	18	10	9	11	37	67	39	18	15	13	11	19	33	32	377
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	75	36	26	18	21	25	62	90	66	31	29	21	16	26	50	79	671

Total Number of Valid Hours: 671

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

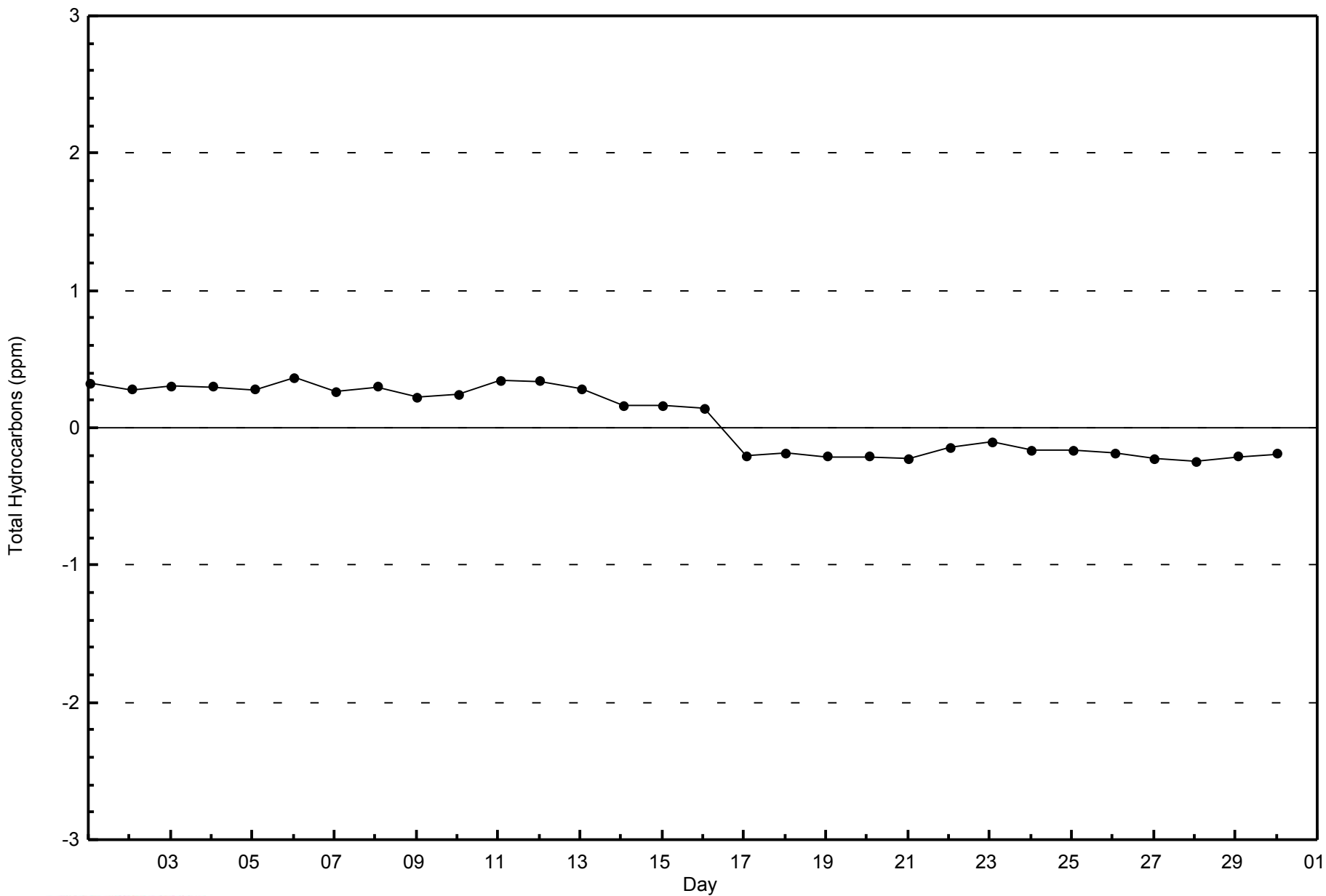
Total Hydrocarbons (THC) - ppm
Barge Landing (AMS 9)





WBEA
Zero Responses

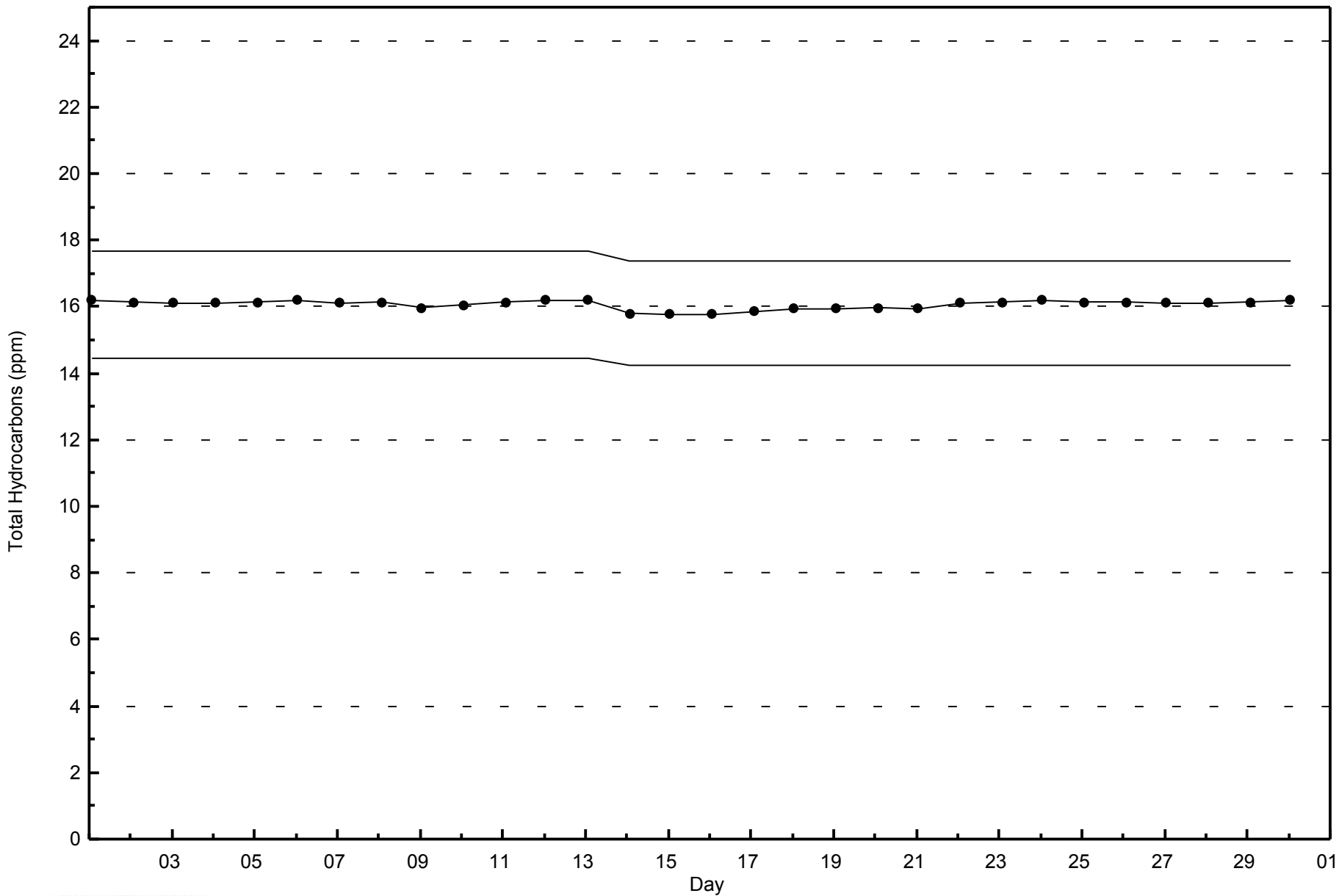
Total Hydrocarbons (THC) - ppm
Barge Landing - June 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Barge Landing - June 2014



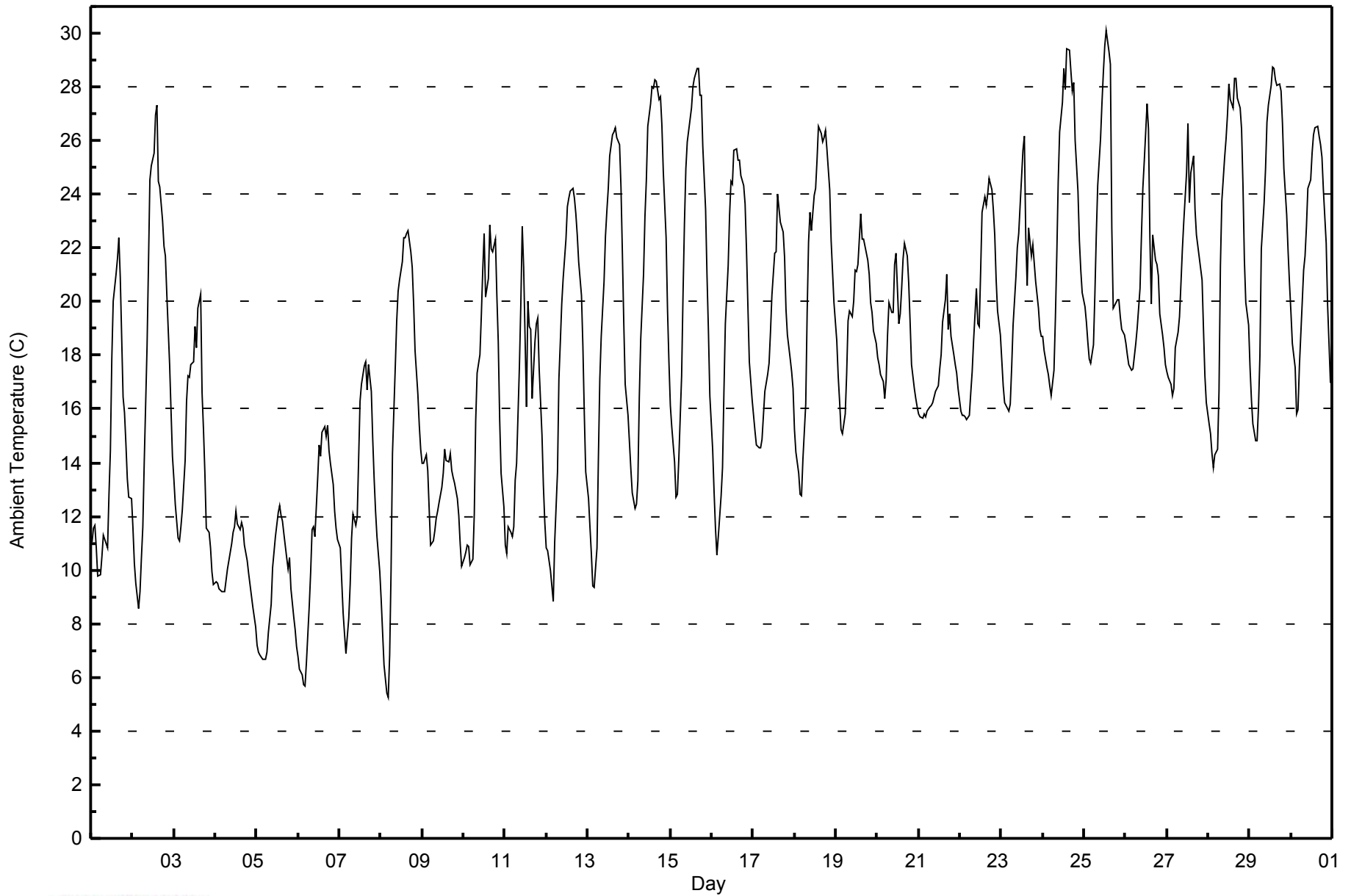


Maximum Value: 30.1 C on Jun 25 14:00		Maximum Daily Average: 23.2 C on Jun 24		Hours in Service: 720																							
Minimum Value: 5.2 C on Jun 8 05:00		Minimum Daily Average: 9.1 C on Jun 5		Hours of Data: 720																							
Maximum Diurnal Average: 22.7 C at hour 15		Minimum Diurnal Average: 12.4 C at hour 5		Hours of Missing Data: 0																							
Monthly Average: 18.03 C		Percentiles: P ₁ = 6.6 P ₁₀ = 10.5 Q ₁ = 13.7 Median = 18.0 Q ₃ = 22.3 P ₉₀ = 26.0 P ₉₉ = 28.6		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-Jun	11.0	11.6	11.7	10.8	9.8	9.8	10.5	11.3	11.2	10.8	12.8	14.4	17.8	20.0	21.0	21.6	22.4	20.9	16.4	15.9	14.7	13.4	12.7	12.6	14.4	22.4	
2-Jun	11.6	10.2	9.5	8.6	9.2	10.4	11.6	14.0	18.3	21.4	24.5	25.1	25.5	26.9	27.3	24.5	24.3	23.0	22.1	21.7	20.3	17.6	15.9	14.3	18.2	27.3	
3-Jun	13.4	12.5	11.2	11.1	11.6	12.2	14.1	16.3	17.2	17.2	17.7	17.8	19.1	18.3	19.8	20.3	16.6	15.2	13.6	11.5	11.4	10.8	9.9	9.5	14.5	20.3	
4-Jun	9.6	9.5	9.3	9.2	9.2	9.2	9.6	10.1	10.4	11.0	11.4	11.6	12.2	11.7	11.5	11.7	11.5	10.9	10.4	9.9	9.5	9.0	8.6	7.9	10.2	12.2	
5-Jun	7.2	6.9	6.8	6.7	6.7	6.7	6.9	7.7	8.7	10.1	10.6	11.3	12.2	12.4	12.1	11.8	11.4	10.5	10.0	10.5	9.3	8.2	7.8	7.1	9.1	12.4	
6-Jun	6.8	6.3	6.1	5.7	5.7	6.6	8.7	9.9	11.5	11.6	11.2	13.4	14.7	14.3	15.1	15.3	15.0	15.4	14.5	14.0	13.2	12.2	11.6	11.1	11.2	15.4	
7-Jun	10.8	9.6	8.4	7.6	6.9	8.2	9.5	11.2	12.1	11.7	12.0	14.1	16.3	16.9	17.6	17.8	16.7	17.7	16.7	14.9	13.4	12.2	11.2	9.9	12.6	17.8	
8-Jun	8.9	7.6	6.5	5.4	5.2	6.8	10.0	14.4	17.6	19.3	20.4	20.8	21.5	22.4	22.4	22.5	22.6	21.9	21.3	19.9	18.2	16.6	15.4	14.5	15.9	22.6	
9-Jun	14.0	14.0	14.3	13.7	12.3	10.9	11.1	11.4	11.9	12.2	12.5	13.1	13.6	14.5	14.1	14.0	14.4	13.7	13.5	13.3	12.6	12.0	11.0	10.1	12.8	14.5	
10-Jun	10.5	10.7	10.9	10.9	10.2	10.4	12.1	15.5	17.3	18.0	19.5	21.2	22.6	20.2	20.8	22.9	22.0	21.8	22.3	20.2	18.5	15.6	13.6	12.4	16.7	22.9	
11-Jun	11.0	10.6	11.6	11.4	11.2	11.6	13.3	14.0	17.6	19.9	22.8	21.3	16.1	20.0	19.1	18.9	16.4	18.5	19.2	19.4	17.5	15.0	13.1	11.8	15.9	22.8	
12-Jun	10.8	10.7	10.0	9.4	8.8	11.0	13.7	17.1	18.5	19.9	20.9	22.3	23.5	23.9	24.1	24.2	23.9	23.3	22.5	21.5	20.2	18.3	15.8	13.6	17.8	24.2	
13-Jun	12.7	11.6	10.6	9.4	9.3	10.8	14.2	17.1	18.7	20.8	22.4	23.4	24.2	25.4	26.2	26.3	26.5	26.1	25.9	24.3	21.8	19.2	16.9	15.7	19.1	26.5	
14-Jun	14.8	13.7	12.9	12.3	12.5	13.3	16.4	18.6	21.0	23.2	24.5	26.5	27.4	28.0	27.9	28.3	28.2	27.5	27.6	26.6	24.9	22.4	19.7	17.7	21.5	28.3	
15-Jun	16.2	15.3	14.1	12.7	12.8	14.2	17.3	20.3	22.9	25.0	26.0	26.8	27.2	28.0	28.3	28.7	28.7	27.7	27.7	25.8	23.5	21.0	18.9	16.5	21.9	28.7	
16-Jun	14.5	12.9	11.5	10.6	11.2	12.8	13.8	16.6	19.2	21.3	23.2	24.5	24.4	25.6	25.7	25.3	25.3	24.7	24.3	23.6	21.9	19.8	17.7	16.3	19.5	25.7	
17-Jun	15.8	15.2	14.7	14.6	14.6	14.9	15.8	16.7	17.3	17.7	18.9	20.3	21.8	21.8	24.0	23.5	23.0	22.6	21.6	19.7	18.8	17.9	17.4	16.8	18.5	24.0	
18-Jun	15.3	14.4	13.6	12.8	12.8	14.1	16.2	19.6	22.2	23.3	22.6	23.9	24.2	25.3	26.5	26.3	25.9	26.1	26.4	25.7	24.2	22.3	21.1	20.0	21.0	26.5	
19-Jun	18.5	17.2	16.3	15.2	15.1	15.8	17.3	19.3	19.6	19.5	20.0	21.2	21.1	21.4	23.3	22.3	22.3	22.1	21.5	21.0	20.0	19.6	18.9	18.4	19.5	23.3	
20-Jun	17.9	17.7	17.3	17.0	16.4	17.1	18.7	20.0	19.6	19.6	21.4	21.8	19.2	19.5	20.5	21.6	22.2	21.7	20.7	19.2	17.7	16.8	16.4	16.1	19.0	22.2	
21-Jun	15.8	15.7	15.6	15.8	15.7	15.9	16.1	16.1	16.2	16.4	16.7	16.9	17.5	18.0	19.2	20.1	21.0	19.0	19.5	18.7	18.0	17.7	17.3	16.7	17.3	21.0	
22-Jun	15.9	15.8	15.7	15.7	15.6	15.8	16.6	17.4	18.6	20.5	19.2	19.1	21.1	23.4	23.9	23.6	24.0	24.6	24.2	23.4	22.5	20.8	19.7	18.7	19.8	24.6	
23-Jun	17.8	16.9	16.2	16.0	15.9	16.2	17.5	19.1	20.9	22.0	22.6	23.6	25.6	26.2	22.4	20.6	22.8	21.7	22.1	21.4	20.8	19.8	18.9	18.7	20.2	26.2	
24-Jun	18.7	18.2	17.5	17.3	16.9	16.5	17.5	19.4	21.7	24.5	26.3	27.4	28.7	27.9	29.4	29.4	28.6	27.8	28.1	26.0	24.1	22.3	21.1	20.3	23.2	29.4	
25-Jun	19.8	19.2	18.5	17.9	17.7	18.4	20.3	22.5	24.3	26.0	27.4	28.5	29.6	30.1	29.3	28.9	22.8	19.8	20.0	20.0	20.1	19.4	18.9	18.7	22.4	30.1	
26-Jun	18.4	18.0	17.7	17.5	17.5	18.0	18.5	19.0	20.5	22.4	24.2	25.2	27.4	26.4	22.4	19.9	22.5	21.6	21.4	21.0	19.5	18.7	18.3	17.7	20.6	27.4	
27-Jun	17.4	17.2	16.9	16.5	16.8	18.3	18.9	19.4	20.7	21.9	23.0	24.8	26.6	23.7	24.8	25.4	23.4	22.5	22.0	21.6	20.8	19.0	17.2	16.2	20.6	26.6	
28-Jun	15.5	15.1	14.4	13.8	14.3	14.5	16.6	21.3	23.7	25.4	26.1	27.0	28.1	27.5	27.2	28.3	28.3	27.6	27.2	26.4	24.3	21.5	20.0	19.1	22.2	28.3	
29-Jun	17.5	16.3	15.5	14.8	14.8	16.1	18.0	21.9	23.7	25.0	26.7	27.3	28.1	28.7	28.7	28.3	28.0	28.1	27.8	26.7	25.0	23.2	21.9	20.7	23.0	28.7	
30-Jun	19.6	18.5	17.5	15.8	16.0	17.6	20.0	21.2	21.7	22.8	24.2	24.5	25.5	26.2	26.5	26.5	26.2	25.9	25.4	24.1	22.2	19.8	18.4	17.0	21.8	26.5	
		14.2	13.6	13.1	12.5	12.4	13.1	14.7	16.6	18.2	19.3	20.4	21.3	22.1	22.5	22.7	22.6	22.2	21.7	21.2	20.3	19.0	17.4	16.2	15.2	Diurnal Average	
		19.8	19.2	18.5	17.9	17.7	18.4	20.3	22.5	24.3	26.0	27.4	28.5	29.6	30.1	29.4	29.4	28.7	28.1	28.1	26.7	25.0	23.2	21.9	20.7	Diurnal Maximum	



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Barge Landing - June 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Barge Landing - June 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	59	8.19	8.19
10 - 20	393	54.58	62.78
> 20	268	37.22	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 18 km/h on Jun 3 17:00	Maximum Daily Speed Average: 8.9 km/h on Jun 18	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 1 17:00	Minimum Daily Speed Average: 0.2 km/h on Jun 20	Hours of Data: 716
Maximum Diurnal Speed Average: 1.6 km/h at hour 12	Minimum Diurnal Speed Average: 0.3 km/h at hour 10	Hours of Missing Data: 4
Monthly Average Velocity: 0.6 km/h 102.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 P ₉₀ = 11 P ₉₉ = 14	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-Jun	E3	ESE3	S3	SE4	ESE2	SE3	SE7	SSE6	SSE7	SE7	S5	SSE6	S5	W3	SW3	NNW3	SSE0	S9	S10	WSW11	SSE2	SE5	WSW3	SW4	S3.5	WSW11	
2-Jun	SSE1	SSW2	SSW2	S4	S5	S4	S6	SSW8	SW9	SW7	SW7	WSW9	WSW14	WSW12	SW10	SW5	E5	N11	N10	N10	NNW5	NE1	N2	NNW2	SW2.6	WSW14	
3-Jun	NNW5	NNW4	N4	N5	N5	NNE6	NNE8	N8	N10	N12	NNE13	NNE14	NNE14	N10	N12	N13	NNW18	NNW17	NNW10	N6	NNE7	NNW6	NW8	NNW7	N8.9	NNW18	
4-Jun	N5	NNW5	N5	NNW4	N6	NNW6	NNW3	NW3	NNW3	NNW6	N7	N10	N13	NNE14	N13	N12	N13	N12	N12	N12	N9	N9	N9	NNW10	N8.2	NNE14	
5-Jun	N10	N9	N9	N9	N10	N10	N10	N10	NNE10	N11	NNE11	NNE12	NNE13	N11	NNE9	NNW11	NNW10	NNW10	NNW5	N6	NW5	NNW4	NNW4	NW5	N8.5	NNE13	
6-Jun	NW5	NW3	WNW3	W2	W2	WNW3	NW3	NNE5	ENE6	NNW2	NE4	NE4	NNE6	NE6	NE6	NE7	NE6	ENE5	ENE3	E4	E4	ESE3	E4	E3	NE2.6	ENE7	
7-Jun	E3	S2	E2	ENE3	NE2	N3	E3	ENE1	N3	NNW6	NNW6	ENE4	ESE5	NNW5	NNW6	NW6	NW7	NW6	NNW4	NNW4	NW4	WNW3	W3	S4	NNW2.1	NW7	
8-Jun	WSW2	SW3	SW3	SE4	SSE4	SSW5	SW4	SW5	SW6	SSW5	SSW4	SSW7	SSW7	SSW9	S9	S8	S7	S7	SSE8	SE9	SE9	SE9	SE10	SE9	S5.4	SE10	
9-Jun	SE9	SSE8	SSE9	S7	SSE6	SE6	E5	ESE3	SW1	SSE5	SE5	SE6	ESE7	SE12	ESE10	E9	ESE11	ESE10	ESE9	E6	E4	E3	NNE3	N4	ESE5.6	SE12	
10-Jun	NE5	NE5	NE7	NNE5	NNW3	NNW4	NNW5	NNW6	N7	NNE8	NNE9	NNE7	NNE8	ENE3	ESE7	N4	NE6	ESE4	NNW1	SSE1	SW4	WSW3	SSW1	S3	NNE3.0	NNE9	
11-Jun	SSE2	WSW4	W5	SW5	SW5	S4	SSW5	SSW5	S7	S6	S8	SE5	SSE6	SSE10	ESE12	SE9	ENE3	S6	S5	S5	SE3	SSW3	SSE3	S2	S4.2	ESE12	
12-Jun	SSW4	SSW3	S4	SSW4	S1	SSW1	WSW2	WNW3	NNE5	NNE7	NNE7	NNE8	NNE9	NNE9	NE10	NE11	NE11	NNE12	NNE11	NE10	NNE8	NNE6	NNW4	NNW4	NNE4.5	NNE12	
13-Jun	NNW3	NNW5	NNW4	NNW3	NNW3	N3	NNE4	NNE5	NE6	NE6	NE7	ENE5	NW3	SW3	SSW5	SSW6	S6	S7	S6	SSE6	SE6	SE6	SSE7	ENE0.9	S7		
14-Jun	SE6	SE8	SE8	SE8	S4	SW2	SSE10	SSE10	S8	S7	SSE9	SSE12	SSE13	SSE13	S11	S12	S13	S12	S11	S9	S8	S6	SSE6	SE6	SSE8.3	S13	
15-Jun	SE6	SE8	SSE5	ESE4	SE6	SE5	S6	S5	S5	SSE6	SSE12	S12	SSE11	SSE9	SSW11	SSW8	SSE8	SE6	SSE9	SE7	SE7	SE6	SE6	SE3	SSE6.7	SSE12	
16-Jun	E2	N2	ESE1	ESE2	E2	SE1	NW3	WNW3	W3	W4	W4	WNW4	NW6	ENE7	E7	E7	ENE7	ENE10	ENE8	ENE7	E3	SSE6	SSW10	SSW7	E1.5	ENE10	
17-Jun	SW4	S4	S5	S6	S4	SSW2	SE2	ESE2	S5	SSE5	SE6	SE8	SSE9	SSE9	SSW6	S8	S8	SSW8	S8	S7	SSE5	SSE6	SSE7	SSE6	SSE5.4	SSE9	
18-Jun	SE4	SE6	SE7	SE4	SSE2	SE2	SSE3	SSE9	S6	SSE7	SSE9	SSE15	SSE14	SSE15	SSE15	SSE14	SSE14	SSE14	SSE11	SSE9	SSE11	SSE10	SSE9	SSE8	SSE8.9	SSE15	
19-Jun	SSE7	SE7	SE6	SE3	SE5	SE4	SSE4	S6	SSE5	SSE6	SSW3	W2	SE9	SE3	WNW4	NW3	NW4	NNW4	ENE2	NW1	ENE1	ENE1	NW1	NW2	SSE2.0	SE9	
20-Jun	NNW3	NNW4	N4	N5	WNW1	NNW3	NNW2	NE2	ESE2	ESE3	SSE5	SSE5	S3	SE2	SE3	S0	WNW2	ESE2	S4	SSE4	SSW3	W2	WNW3	W1	SSE0.2	SSE5	
21-Jun	AF	W1	N1	NE2	NE3	NE1	WNW2	NW3	NW4	NNW3	NW3	NW4	NW4	NW3	WNW3	WNW3	WNW4	NW5	NW6	WNW4	NW4	WNW3	W2	WNW2	NW2.7	NW6	
22-Jun	NNW3	WSW2	SW4	WSW3	S1	WSW4	WNW1	SW4	WNW4	NW5	NNW4	WNW3	NW4	NW5	NNW8	NNW7	NNW6	N7	NNE8	N7	N5	NE4	NE4	N1	NNW2.9	NNE8	
23-Jun	AF	W1	SW2	WSW2	SW2	SW2	WNW2	W1	NW2	NW2	NNE3	NNE3	NW3	NW3	NE5	ENE5	ESE7	SE12	SE9	ESE4	ESE3	E3	ESE4	ESE5	ESE1.5	SE12	
24-Jun	ESE6	SE6	SE8	SE7	SE9	SE9	SE10	SSE9	SSE7	SSE8	SSE9	SSE10	SSE10	SSE11	SSE12	SSE10	SSE12	SSE10	S8	SSE12	SSE11	SE8	SSE7	SE7	SE9	SSE8.8	SSE12
25-Jun	SE8	SE8	SE8	SE7	SSE3	S2	SSE7	SSE12	SSE10	S9	SSE11	SSE12	SSE10	SSE13	S12	NNW1	SW12	WNW3	S3	SE4	S1	W2	WNW1	WNW2	SSE5.6	SSE13	
26-Jun	SE1	SE2	SSE2	S2	SSW1	SSW2	S2	SSW3	SW3	WSW5	WSW7	SW7	WSW7	SW6	S10	S3	W5	NW5	NW5	NNW4	NW3	NW4	NW4	NW4	WSW2.4	S10	
27-Jun	NW3	NNW3	NW3	WNW2	AF	WNW2	WSW3	S3	SSW4	WSW4	NNW3	NE4	NW4	SSW4	SSE6	WSW5	N8	NE9	NNE7	NE5	E2	AF	NW3	NNW1	NNW1.1	NE9	
28-Jun	NW1	NW1	WSW2	WNW3	W2	SW4	SW3	WSW2	W2	N2	NE4	NE4	NNW4	NNW9	NNW6	NNW7	NNW7	NNW6	NNW7	N7	NNW4	NW4	NNW5	NNW3	NNW3.2	NNW9	
29-Jun	NW2	NNW1	NW2	NW2	NW3	W2	WSW1	NNW5	N8	N7	NNW9	N11	N12	N13	N12	N13	N15	N14	N13	NNW9	NNW7	NNW7	NNW6	NNW7	NNW7.2	N15	
30-Jun	NW7	NW5	NW3	NW2	NW2	NW3	NNW6	N9	N8	N8	NNW8	N10	N9	N9	N8	N9	N9	N9	N8	NNW7	NNW4	NNW3	NNW3	WSW1	NNW5.9	N10	

E0.6 SSE0.7 SSE0.8 SSE0.8 SE0.7 SW0.5 S0.7 S0.8SSW0.5ENE0.3 E0.7 E1.6 E1.2 ESE1.1 ESE1.2 NE0.9NNE1.5 NE1.6 ENE1.3 ENE1.0 E0.9 ESE0.9 SSE0.3 SSE0.4	Diurnal Average
N10 N9 N9 N9 N10 N10 N10 SSE12 NNE10 N12 NNE13 SSE15 NNE14 SSE15 SSE15 SSE14NNW18NNW17 N13 N12 SSE11 SSE10 SSW10NNW10	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Barge Landing - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Jun 25 17:00	Hours in Service: 720 Hours of Data: 716 Hours of Missing Data: 4 Hours of Calibration: 0 Percent Operational Time: 99.4
Minimum Value: 1 km/h on Jun 11 23:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 5	

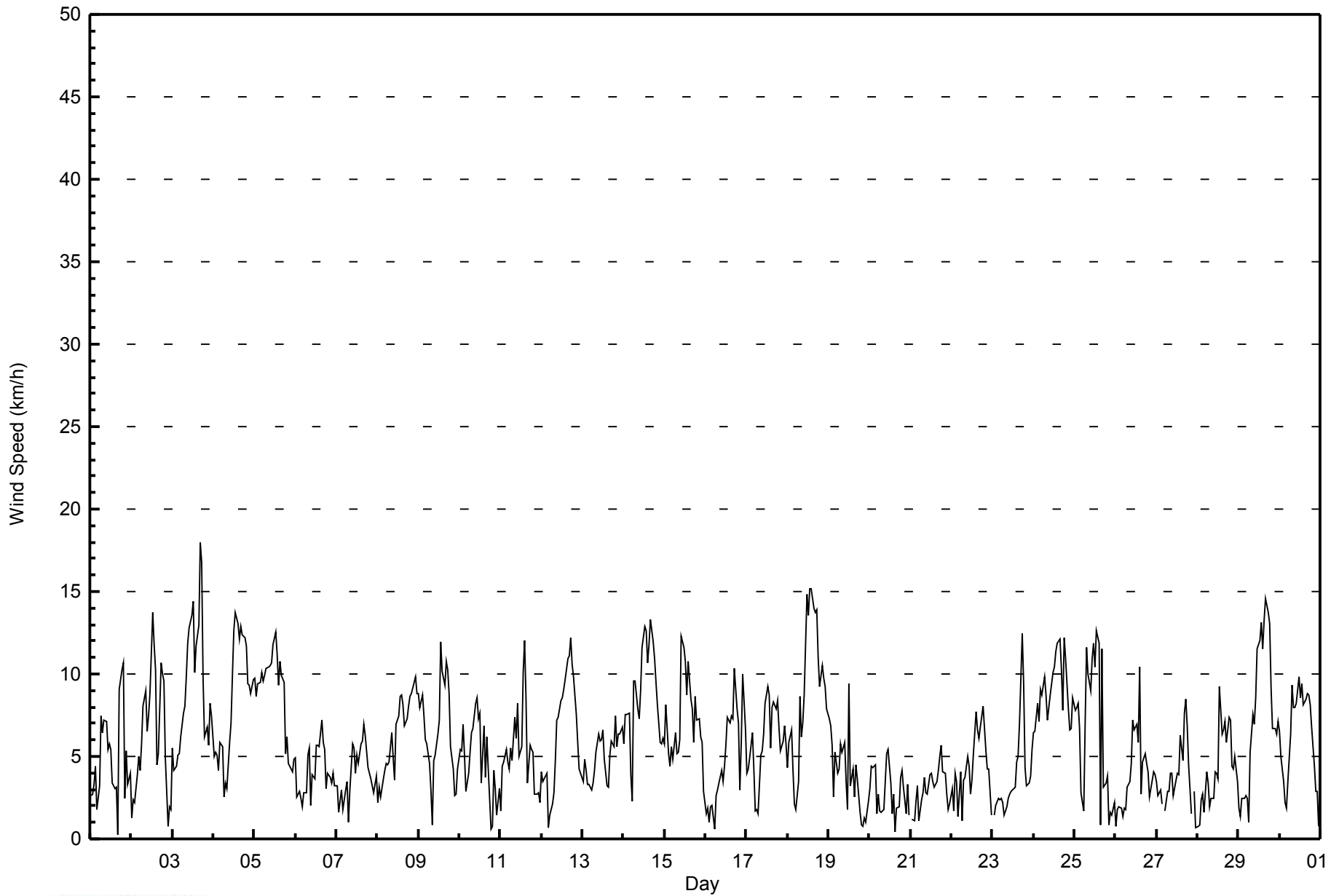
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	1	1	2	3	1	2	3	2	2	2	2	3	2	2	2	2	2	5	4	4	2	2	1	1	5
2-Jun	1	1	1	1	1	1	2	3	2	2	2	4	5	5	4	3	2	4	3	3	2	1	1	2	5
3-Jun	1	1	1	1	2	2	2	2	3	3	4	4	4	3	4	4	6	6	3	4	3	2	2	2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

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Barge Landing - June 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Barge Landing - June 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	374	52.23	52.23
6 - 11	288	40.22	92.46
12 - 19	54	7.54	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: 716

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Barge Landing - June 2014

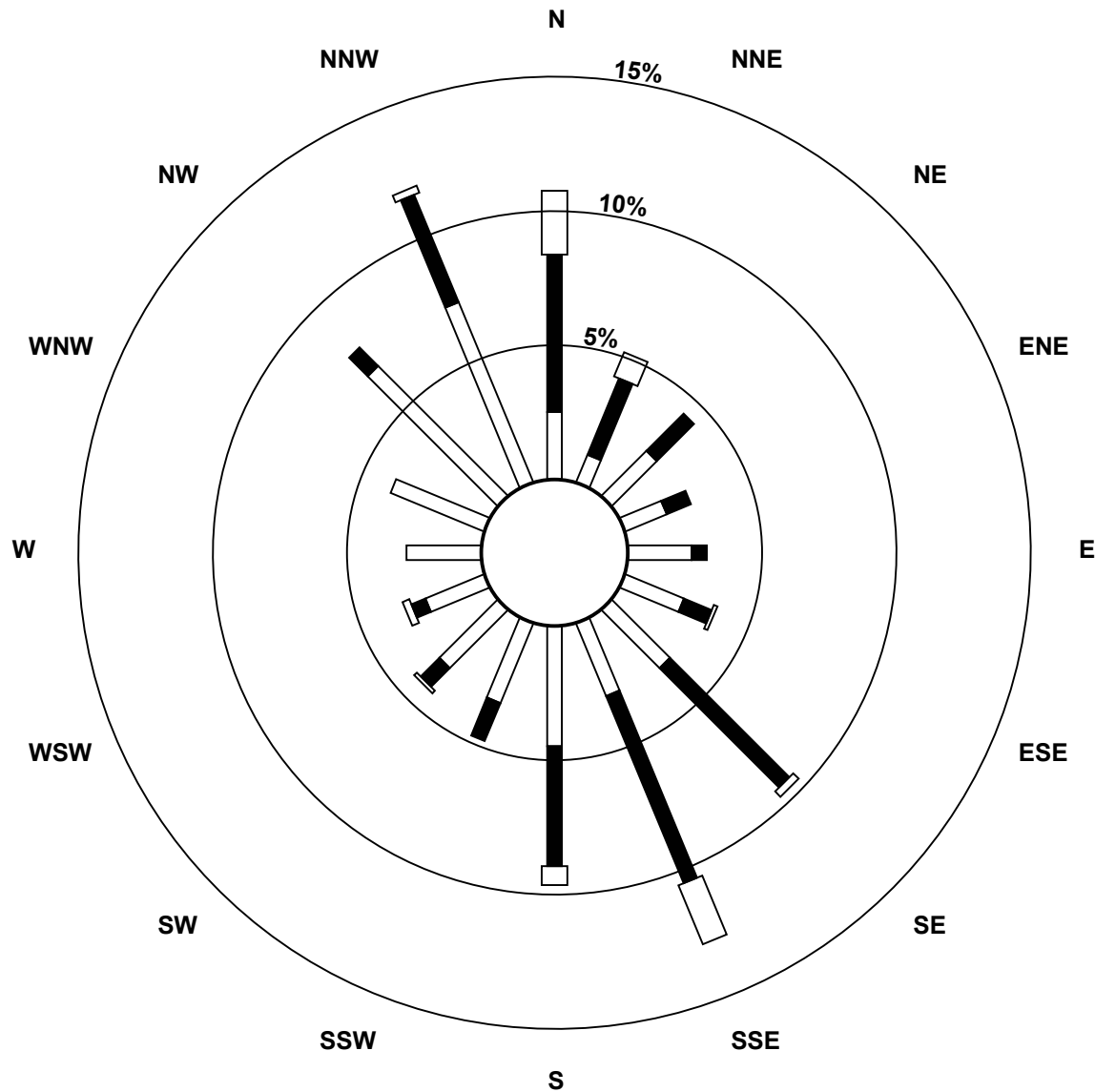
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	18	8	17	12	17	17	22	21	32	23	22	17	20	27	49	52	374
6 - 11	42	22	14	7	4	8	45	54	32	11	7	4	0	0	7	31	288
12 - 19	17	7	0	0	0	1	2	17	5	0	1	2	0	0	0	2	54
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	77	37	31	19	21	26	69	92	69	34	30	23	20	27	56	85	716

Total Number of Valid Hours: 716

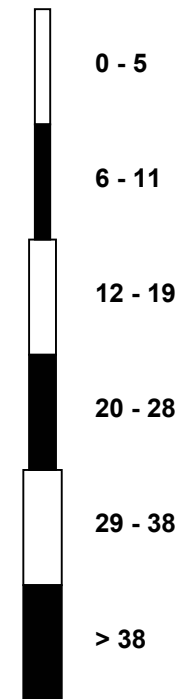
Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Barge Landing (AMS 9)**



Classes (km/h)



Total Number of Valid Hours: 716



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Barge Landing - June 2014

Direction of Maximum Speed: 339 deg on Jun 3 17:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 153.8 deg on Jun 18	Hours of Data: 716
Direction of Minimum Speed: 154 deg on Jun 1 17:00	Hours of Missing Data: 4
Direction of Minimum Daily Speed Average: 0.2 deg on Jun 20	Percent Operational Time: 99.4
Monthly Average Direction: 290.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	96	120	171	144	109	146	130	150	155	143	180	152	174	276	235	330	154	188	189	239	148	138	257	223	172.7
2-Jun	164	207	195	171	171	172	178	202	219	223	225	245	240	245	229	219	96	8	6	8	339	52	7	336	235.0
3-Jun	346	340	349	356	357	14	14	358	2	6	15	21	15	352	4	360	339	340	341	350	33	343	320	343	357.3
4-Jun	0	344	353	341	1	343	336	309	329	344	1	10	9	12	6	2	0	6	6	10	8	2	354	347	360.0
5-Jun	349	356	355	350	360	358	350	356	17	11	19	20	22	11	16	347	345	343	347	349	321	340	333	309	358.4
6-Jun	312	313	299	280	272	284	316	25	70	335	39	36	24	41	48	56	41	70	66	90	88	104	93	90	39.9
7-Jun	101	170	86	75	42	351	84	57	0	335	330	71	112	344	329	316	316	323	328	335	312	296	276	191	344.9
8-Jun	258	218	228	146	158	205	217	215	229	196	211	199	204	192	180	184	171	169	151	139	137	136	139	139	174.8
9-Jun	142	151	160	175	152	131	94	106	221	154	139	128	119	124	114	100	103	102	104	94	83	97	31	4	120.7
10-Jun	45	39	35	27	335	332	345	339	354	25	30	29	29	78	122	355	52	111	338	155	230	250	212	179	26.2
11-Jun	154	237	266	231	217	176	199	195	178	171	185	129	153	168	108	145	62	189	173	173	143	197	152	191	172.5
12-Jun	197	204	186	200	182	195	258	295	19	19	25	26	22	29	36	37	36	28	30	36	32	15	340	334	25.6
13-Jun	346	336	334	346	346	334	0	32	18	35	55	35	52	73	316	227	207	206	173	180	171	149	140	150	70.7
14-Jun	139	140	137	145	174	228	159	164	182	179	162	147	151	159	169	188	175	186	184	182	191	182	158	132	166.3
15-Jun	146	136	152	118	134	143	172	185	183	164	156	169	168	162	192	194	151	141	155	145	145	134	138	138	157.7
16-Jun	94	2	104	107	99	128	304	303	274	264	265	296	323	63	86	82	67	69	75	76	90	149	197	204	83.8
17-Jun	236	182	172	173	184	198	139	122	175	162	130	139	161	152	205	186	170	193	177	181	158	149	160	149	168.3
18-Jun	132	137	136	125	147	136	149	159	171	157	166	166	160	158	152	152	151	153	156	161	150	152	153	151	153.8
19-Jun	149	146	146	145	130	145	149	169	162	153	199	262	130	135	282	317	324	330	64	324	65	75	323	319	151.7
20-Jun	328	341	353	8	295	336	339	37	111	102	149	150	171	134	131	175	302	116	191	163	197	266	292	264	151.7
21-Jun	AF	269	351	44	39	38	302	326	317	337	315	305	311	320	299	286	288	305	310	302	310	289	275	296	311.9
22-Jun	332	240	235	247	184	258	302	235	286	318	348	297	315	311	335	330	341	360	14	9	358	56	50	7	332.4
23-Jun	AF	261	230	245	232	233	295	281	322	324	19	18	309	310	46	64	109	126	129	123	113	94	113	121	107.1
24-Jun	122	141	136	136	137	144	143	152	161	163	168	153	155	154	165	161	160	171	152	162	144	150	144	144	151.8
25-Jun	146	138	134	144	162	181	164	165	159	171	153	163	154	157	175	338	231	287	189	137	172	279	285	298	165.0
26-Jun	143	145	163	181	209	208	170	207	231	241	249	231	242	223	190	170	265	314	324	331	314	320	315	316	245.5
27-Jun	326	336	305	285	AF	302	256	183	193	244	331	51	316	202	156	239	4	34	26	43	80	AF	313	333	335.2
28-Jun	320	318	258	291	265	221	224	256	265	355	45	43	339	333	327	342	328	328	345	8	345	323	327	327	330.1
29-Jun	318	330	309	321	318	267	240	329	359	1	344	10	3	356	352	357	360	355	350	341	338	336	330	327	348.3
30-Jun	324	313	321	304	322	304	330	356	4	359	342	1	354	356	357	0	6	5	357	337	347	333	344	244	348.4
	90.8	147.1	152.7	149.6	139.3	218.5	169.8	189.2	197.8	67.4	95.1	93.3	96.1	106.1	120.1	38.8	29.3	39.0	72.2	73.9	91.7	115.0	159.6	168.6	

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
Barge Landing - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 107 deg on Jun 1 17:00	Hours in Service: 720 Hours of Data: 716 Hours of Missing Data: 4 Hours of Calibration: 0 Percent Operational Time: 99.4
Minimum Value: 6 deg on Jun 18 03:00	
Percentiles: P ₁ = 11 P ₁₀ = 18 Q ₁ = 24 Median = 29 Q ₃ = 41 P ₉₀ = 59 P ₉₉ = 89	

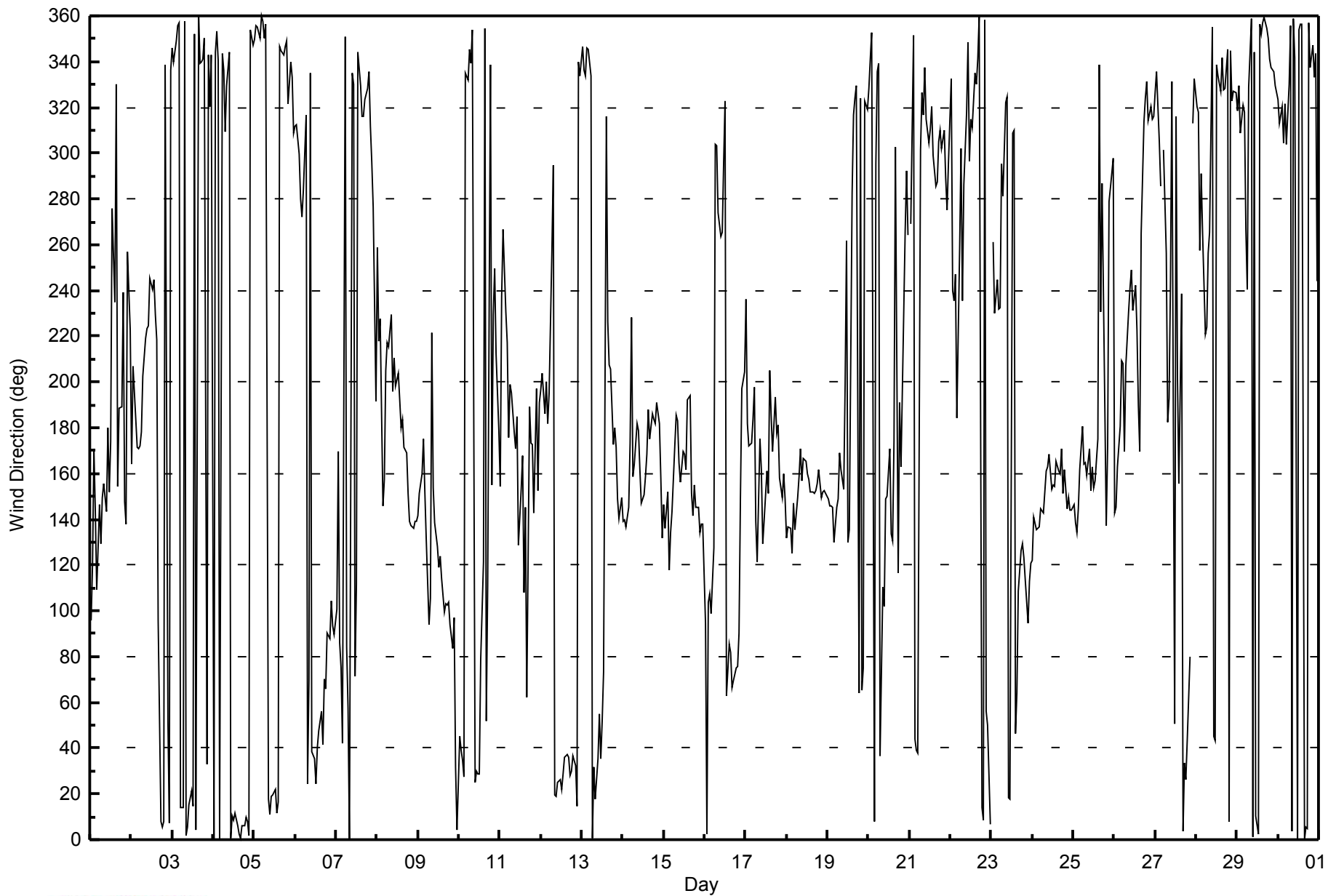
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	28	47	55	41	42	41	20	27	26	21	36	37	60	73	80	63	107	53	22	26	73	20	40	35	107
2-Jun	70	27	42	26	25	28	23	24	25	35	31	37	22	38	33	66	32	27	29	28	40	73	68	65	73
3-Jun	19	46	23	21	22	22	25	30	25	27	25	24	25	27	26	31	24	24	26	53	43	27	21	25	53
4-Jun	29	25	29	21	27	25	43	31	48	31	27	28	28	25	27	27	26	25	24	23	25	24	24	24	48
5-Jun	24	24	25	25	27	26	25	27	24	29	25	26	26	32	29	28	27	27	28	29	23	24	22	16	32
6-Jun	16	22	26	22	25	27	58	38	35	75	57	67	48	49	40	33	32	37	39	23	24	21	23	27	75
7-Jun	42	86	45	30	52	47	32	91	41	20	22	50	46	71	46	40	26	34	29	18	20	24	43	38	91
8-Jun	55	20	58	25	21	32	29	35	32	67	78	61	59	55	45	50	53	34	23	15	12	14	14	13	78
9-Jun	16	19	21	23	28	18	23	34	80	24	22	20	17	17	21	23	23	22	21	24	26	33	38	24	80
10-Jun	22	25	21	26	26	32	24	31	33	29	30	33	37	69	52	66	57	76	90	76	19	24	66	43	90
11-Jun	74	23	37	33	32	27	25	31	29	36	33	52	73	37	25	36	87	27	24	28	29	30	23	44	87
12-Jun	20	30	26	22	89	49	41	53	35	26	26	28	29	28	26	24	25	23	21	20	21	21	45	28	89
13-Jun	30	15	18	23	23	18	36	40	36	40	38	44	42	64	81	94	73	56	44	27	19	11	10	14	94
14-Jun	12	12	11	12	37	45	25	30	38	44	36	28	33	33	41	33	30	30	27	29	25	22	22	13	45
15-Jun	31	11	27	14	12	24	34	41	51	44	36	34	38	50	37	54	45	43	35	19	14	9	11	24	54
16-Jun	29	47	46	38	22	85	25	35	36	39	60	39	38	39	33	31	28	25	21	20	21	35	24	25	85
17-Jun	33	29	28	23	35	57	65	53	28	32	22	26	34	33	78	44	34	33	28	25	20	18	21	18	78
18-Jun	8	8	6	10	15	53	34	30	48	49	33	27	25	28	27	27	22	23	24	24	19	19	20	19	53
19-Jun	13	13	14	29	14	23	26	36	34	28	54	66	24	80	49	47	20	19	40	39	60	49	61	24	80
20-Jun	15	18	18	24	50	18	34	69	92	27	39	29	46	60	64	104	67	38	28	22	31	49	26	72	104
21-Jun	AF	55	64	38	41	58	25	25	23	29	26	22	28	27	41	33	45	28	25	27	28	26	42	25	64
22-Jun	37	62	20	26	64	30	61	24	33	32	49	37	38	47	27	26	32	31	26	26	24	31	25	31	64
23-Jun	AF	39	53	33	31	33	42	53	59	53	66	64	68	69	45	34	39	16	20	26	21	14	17	12	69
24-Jun	13	15	13	15	15	18	16	24	31	35	36	37	36	26	31	27	29	30	25	25	18	23	15	15	37
25-Jun	16	14	13	18	34	49	22	29	31	34	31	31	37	32	33	99	55	49	40	27	86	43	34	29	99
26-Jun	67	12	31	58	51	36	33	28	44	43	34	50	38	46	34	57	41	22	21	24	19	18	15	18	67
27-Jun	16	19	20	30	AF	34	30	35	42	36	52	50	45	53	38	46	49	25	26	29	45	AF	11	61	61
28-Jun	59	84	33	49	48	19	26	66	68	75	59	56	71	28	29	35	29	29	29	29	26	9	12	52	84
29-Jun	71	25	17	24	25	33	74	28	27	30	29	28	31	30	30	29	28	26	27	24	21	19	18	17	74
30-Jun	17	15	45	32	68	26	25	27	29	31	28	30	32	32	32	32	31	28	27	22	19	14	15	77	77
Diurnal Maximum																									

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Barge Landing - June 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	June 6, 2014	Previous Calibration	May 1, 2014
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	8:30	End Time (MST)	10:20
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	-536	-536
Analyzer Range (input)	5000	5000	Lamp voltage	853	851
Calculated slope	1.007497	1.051463	Chamber temp.	45	45
Calculated intercept	-0.415640	-0.558541	Pressure	568.5	567.8
Analyzer Background	20	20	Flow	0.326	0.326
Analyzer Coefficient	1.237	1.237	Intensity	39300	39300
			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	0.4	NA
as found span	5000	83.7	79.8	76.4	1.045
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.4	NA
high point	5000	83.7	79.8	76.4	1.045
second point	5000	41.9	40.0	38.7	1.033
third point	5000	21.0	20.0	19.6	1.021
calibrator zero	6000	0.0	0.0	0.3	NA
as left zero					
as left span					
Average Correction Factor					1.033

Corrected As found	76.0	Previous response	79.7	% change	4.9%
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Notes:

Removal Calibration.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

TRS Calibration Summary

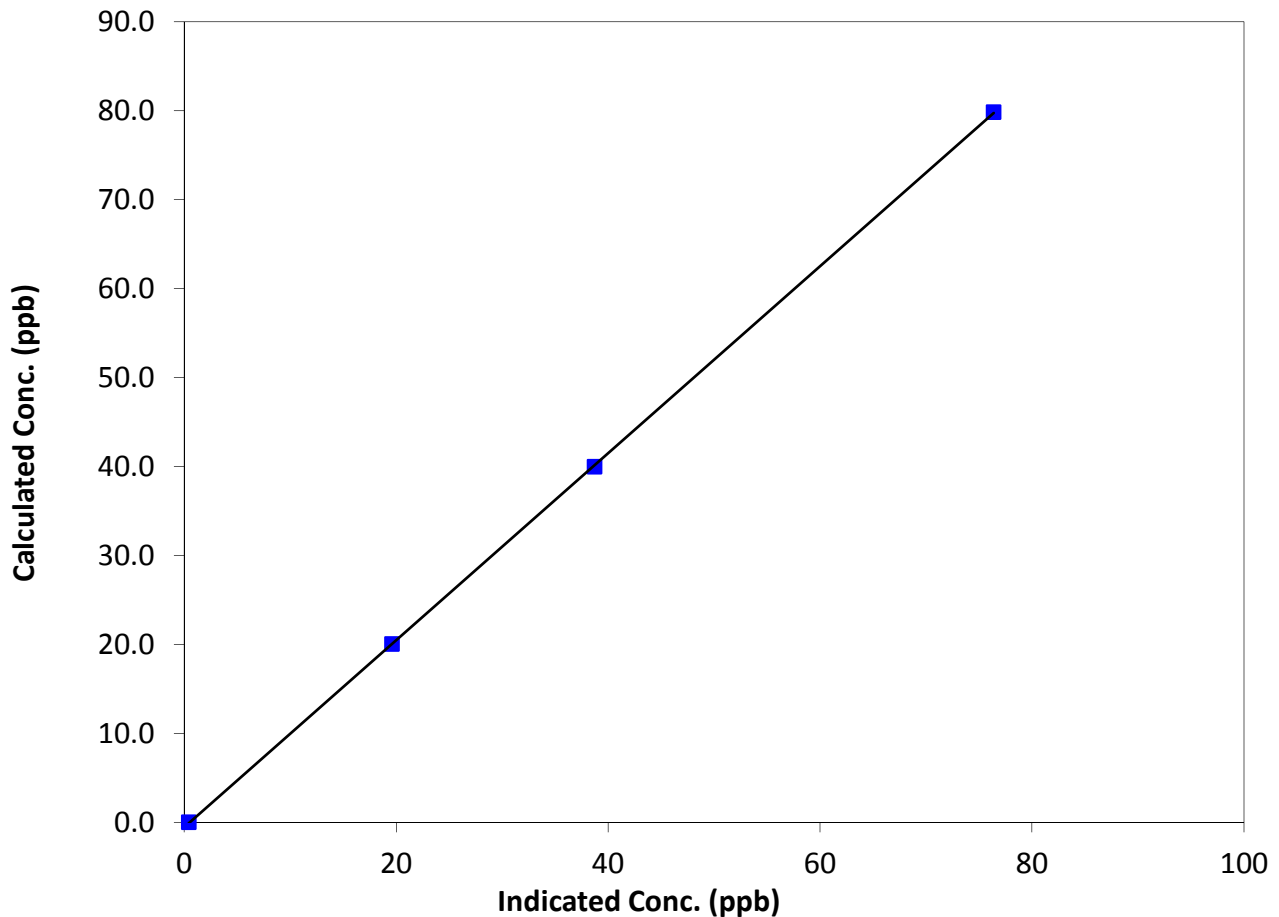
Station Information

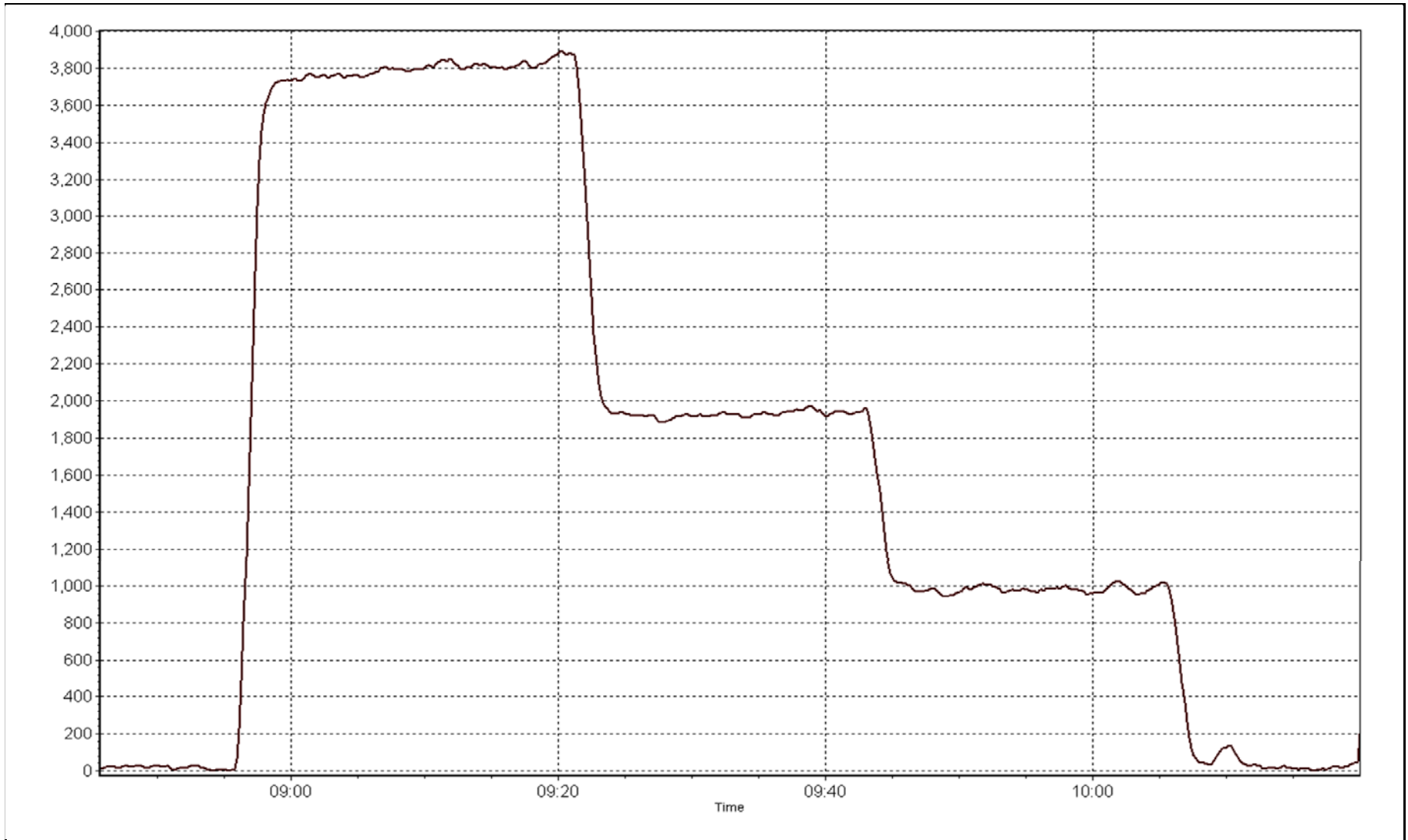
Calibration Date	June 6, 2014	Previous Calibration	May 1, 2014
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	8:30	End Time (MST)	10:20
Analyzer make	Thermo 45C	Analyzer serial #	328702540

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999984
79.8	76.4	1.0454		
40.0	38.7	1.0325	Slope	1.051463
20.0	19.6	1.0212		
			Intercept	-0.558541

TRS Calibration Curve







Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	June 11, 2014	Previous Calibration	N/A
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Install		
Start Time (MST)	11:00	End Time (MST)	13:50
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	N/A	-690
Analyzer Range (input)	5000	5000	Lamp voltage	N/A	1155
Calculated slope	NA	0.990216	Chamber temp.	N/A	45
Calculated intercept	NA	0.068133	Pressure	N/A	565.8
Analyzer Background	N/A	5.07	Flow	N/A	0.367
Analyzer Coefficient	N/A	1.106	Intensity	N/A	90
			Converter temp.	N/A	850

Analyzer make/model	Thermo 43i TLE	Analyzer serial #	1331259320
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					
as found span					
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	83.8	79.9	80.7	0.990
second point	5000	41.9	40.0	40.2	0.993
third point	5000	21.0	20.0	20.1	0.998
calibrator zero	6000	0.0	0.0		NA
as left zero	6000	0.0	0.0	-0.4	NA
as left span	5000	83.7	79.8	80.4	0.993
Average Correction Factor					0.994

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

Install calibration. Filter changed before calibration. Adjusted Zero and span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

TRS Calibration Summary

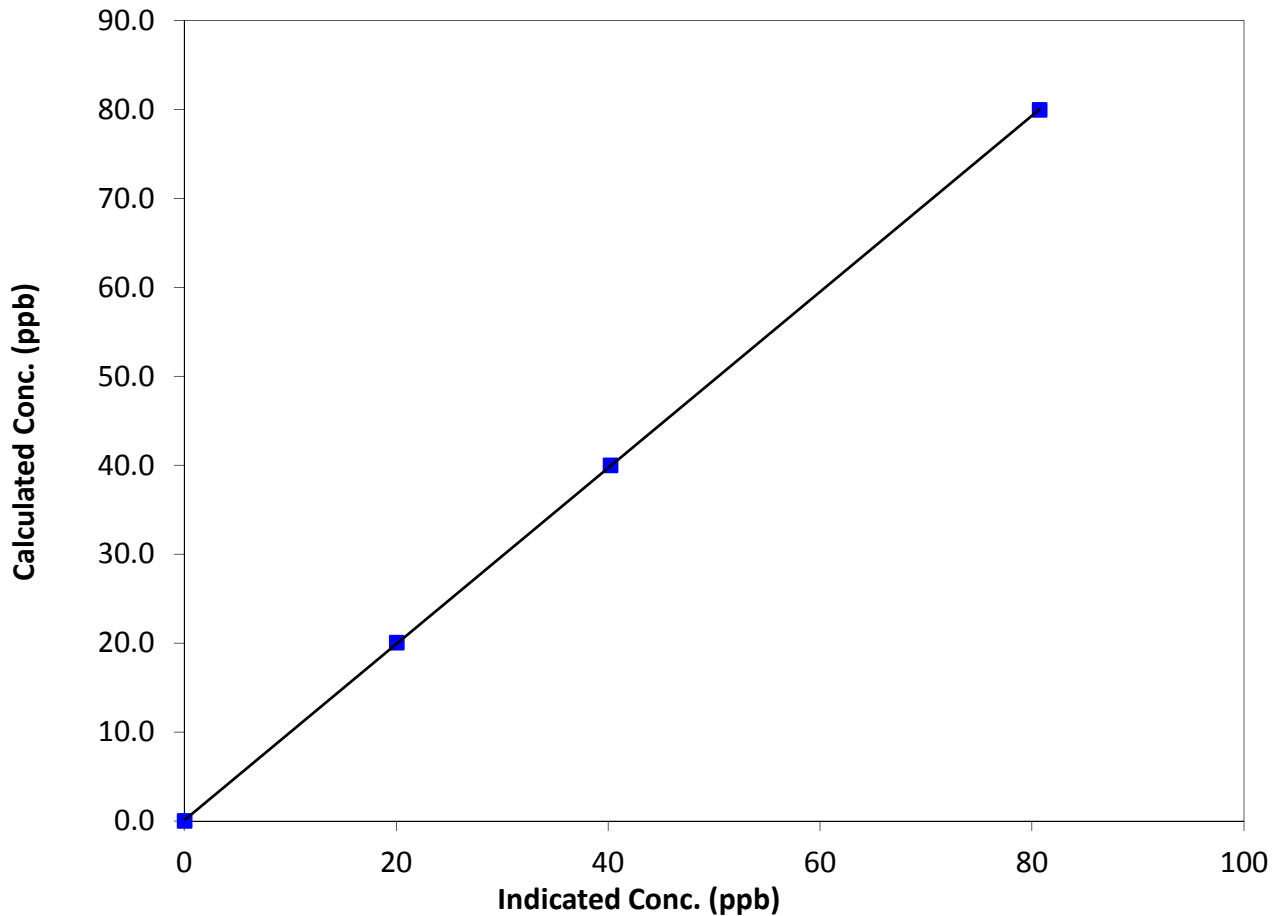
Station Information

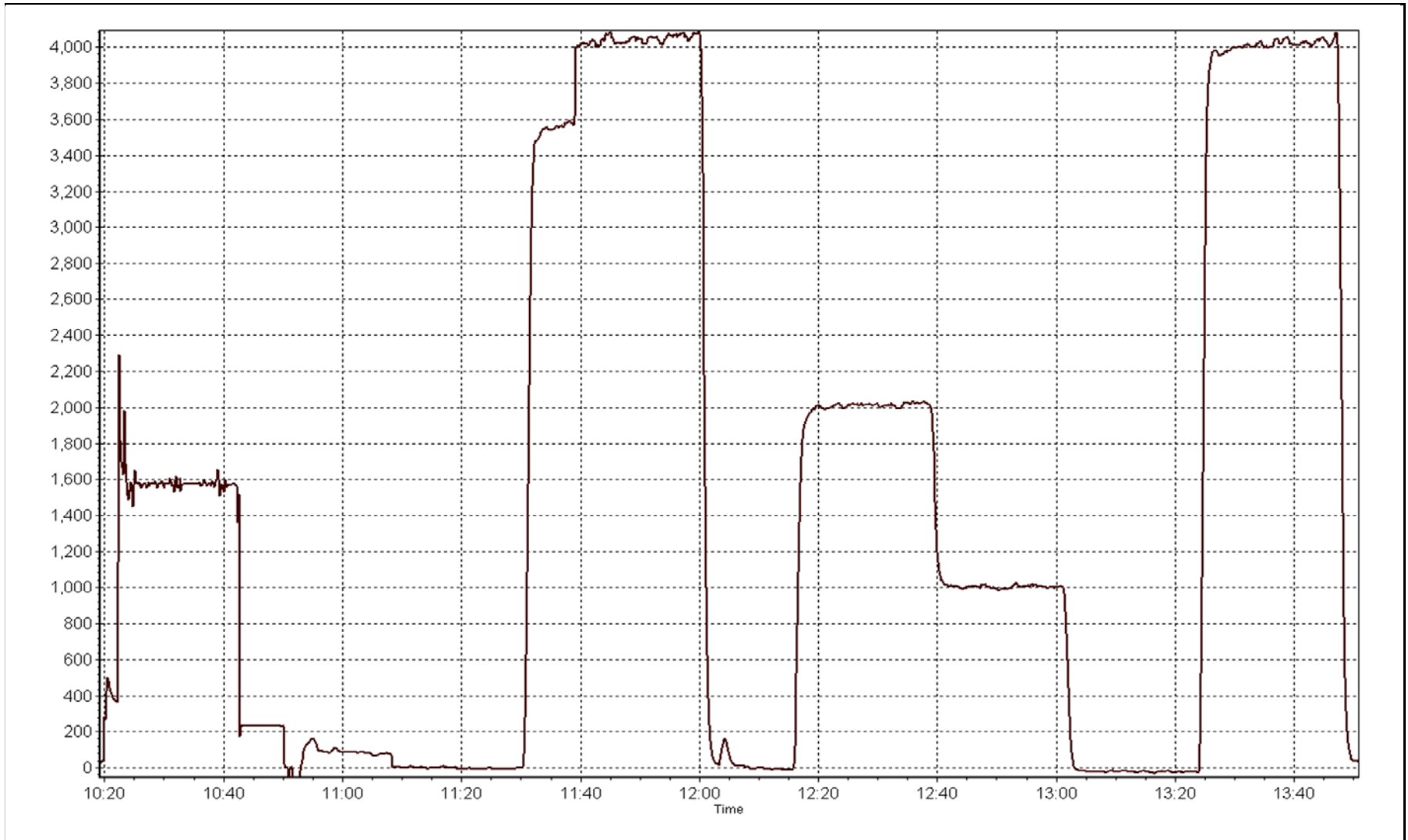
Calibration Date	June 11, 2014	Previous Calibration	
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	11:00	End Time (MST)	13:50
Analyzer make	Thermo 43i TLE	Analyzer serial #	1331259320

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999993
79.9	80.7	0.9904		
40.0	40.2	0.9934	Slope	0.990216
20.0	20.1	0.9985		
			Intercept	0.068133

TRS Calibration Curve







Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	June 13, 2014	Previous Calibration	June 11, 2014
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Other: Baseline check		
Start Time (MST)	9:00	End Time (MST)	11:00
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	-690	-690
Analyzer Range (input)	5000	5000	Lamp voltage	1155	1110
Calculated slope	0.990216	0.992529	Chamber temp.	45	45
Calculated intercept	0.068133	-0.073249	Pressure	566	565.5
Analyzer Background	5.07	3.69	Flow	0	0.367
Analyzer Coefficient	1.106	1.127	Intensity	90	90
			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	-1.4	NA
as found span	5000	83.8	79.9	76.8	1.041
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	83.8	79.9	80.6	0.992
second point					
third point					
calibrator zero					
as left zero					
as left span					
Average Correction Factor					0.992

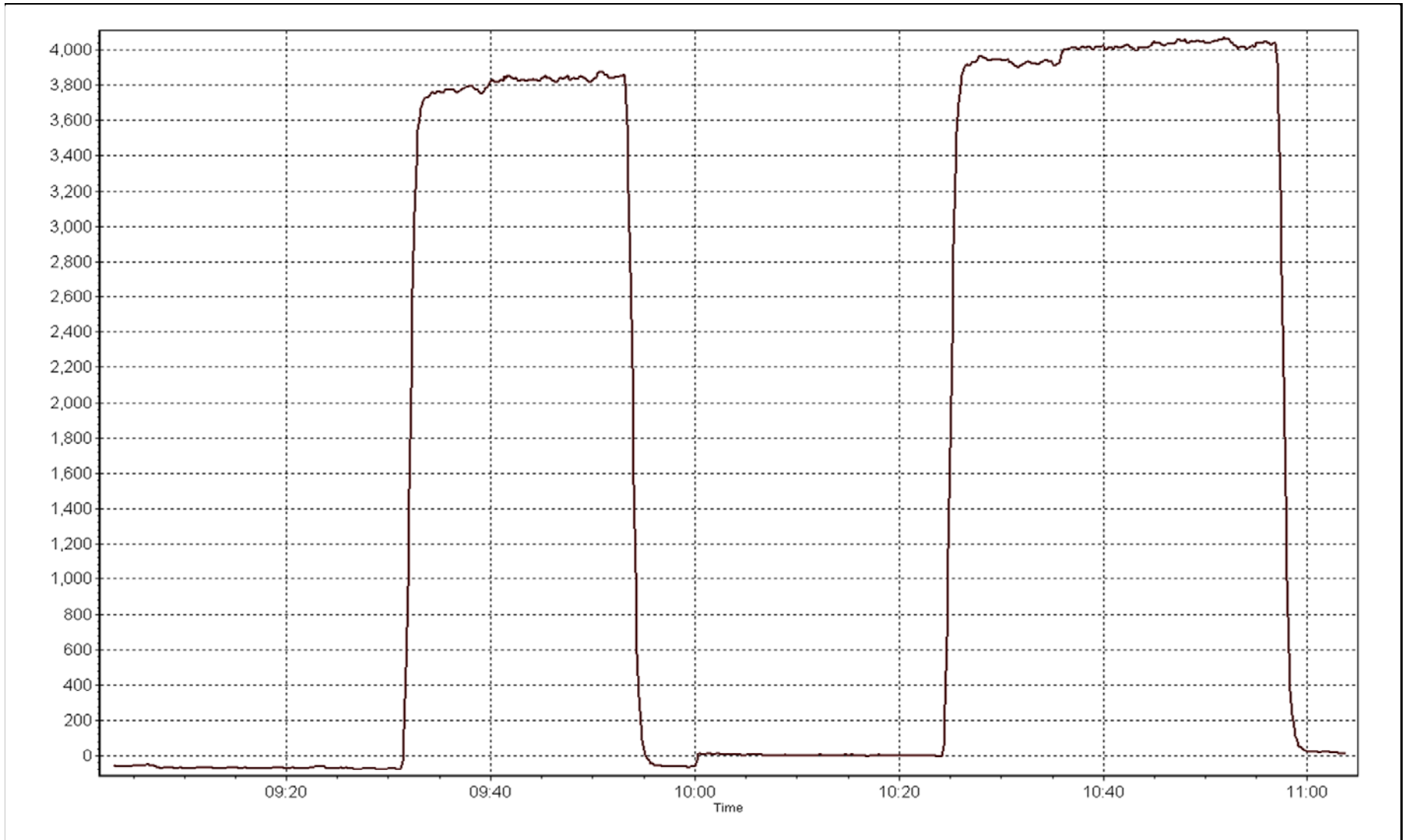
Corrected As found	78.1	Previous response	80.7	% change	3.2%
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Notes:

Adjusted Zero and span.

Calibration Performed By:

Devin Russell





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Friday, June 13, 2014	Previous Calibration	Friday, May 02, 2014
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	8:15	End Time (MST)	14:00
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	0.989185	0.992187	Fuel Pressure	24.1	24.1
Calculated intercept	0.007979	0.054199	BKG	6.10	6.11
			COEF	4.505	4.370

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	0.21	N/A
as found span	6000	89.8	15.71	15.94	0.986
calibrator zero	6000	0.0	0.00	-0.03	N/A
high point	6000	89.8	15.71	15.79	0.994
second point	6000	48.0	8.40	8.38	1.002
third point	6000	18.0	3.15	3.11	1.013
calibrator zero	6000	0.0	0.00	-0.03	N/A
as left zero	6000	0.0	0.00	-0.05	N/A
as left span	6000	89.8	15.71	15.80	0.994
Average Correction Factor					1.003

Corrected As found	15.72	Previous response	15.87	% change	1.0%
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Notes:

Filter Changed and pump replaced after as founds. Zero and span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

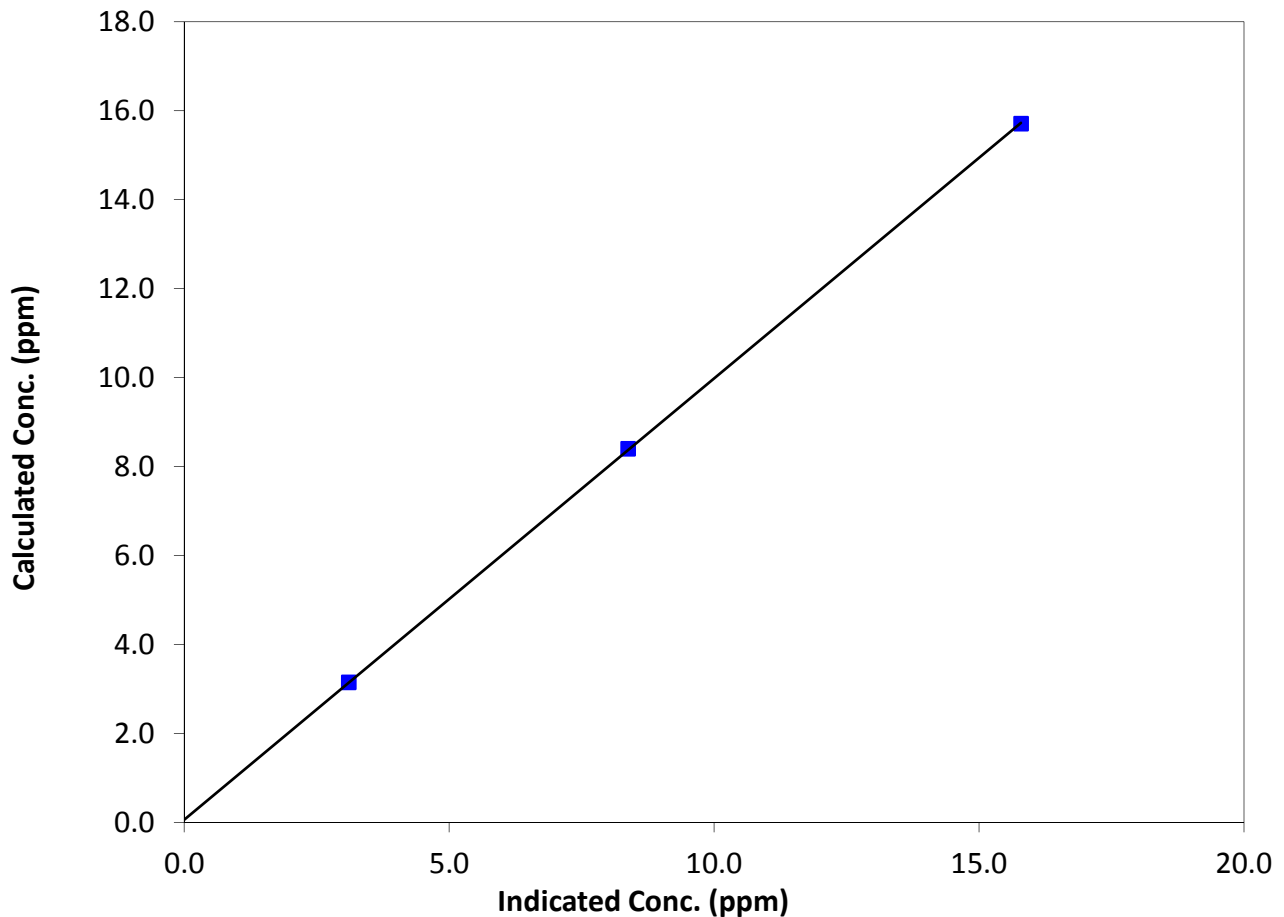
Station Information

Calibration Date	June 13, 2014	Previous Calibration	May 2, 2014
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	8:15	End Time (MST)	14:00
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

Calibration Data

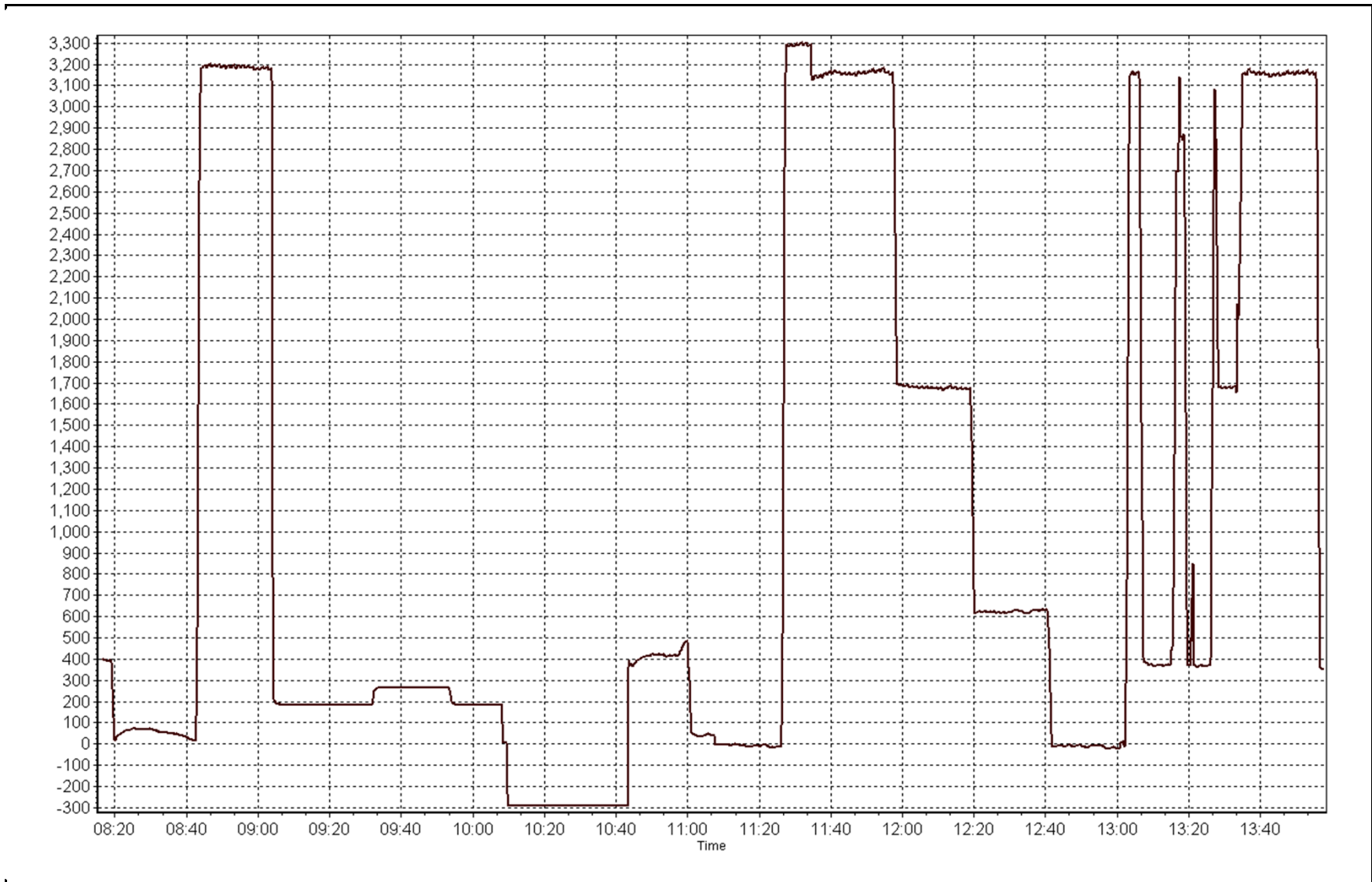
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	N/A	Correlation Coefficient	0.999987
15.71	15.79	0.9945		
8.40	8.38	1.0022	Slope	0.992187
3.15	3.11	1.0132		
			Intercept	0.054199

THC Calibration Curve



THC Calibration Plot

Date: June 13, 2014





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Monday, June 16, 2014	Previous Calibration	Friday, June 13, 2014
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	12:05
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	1.011081	0.988827	Fuel Pressure	24.1	24.1
Calculated intercept	-0.035222	0.192821	BKG	6.11	6.11
			COEF	4.370	4.370

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	0.03	N/A
as found span	6000	89.8	15.71	15.70	1.000
calibrator zero	6000	0.0	0.00	-0.20	N/A
high point	6000	89.8	15.71	15.69	1.001
second point					
third point					
calibrator zero					
as left zero	6000	0.0	0.00	-0.20	N/A
as left span	6000	89.8	15.71	15.69	1.001
Average Correction Factor					1.001

Corrected As found	15.67	Previous response	15.57	% change	-0.6%
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Notes:

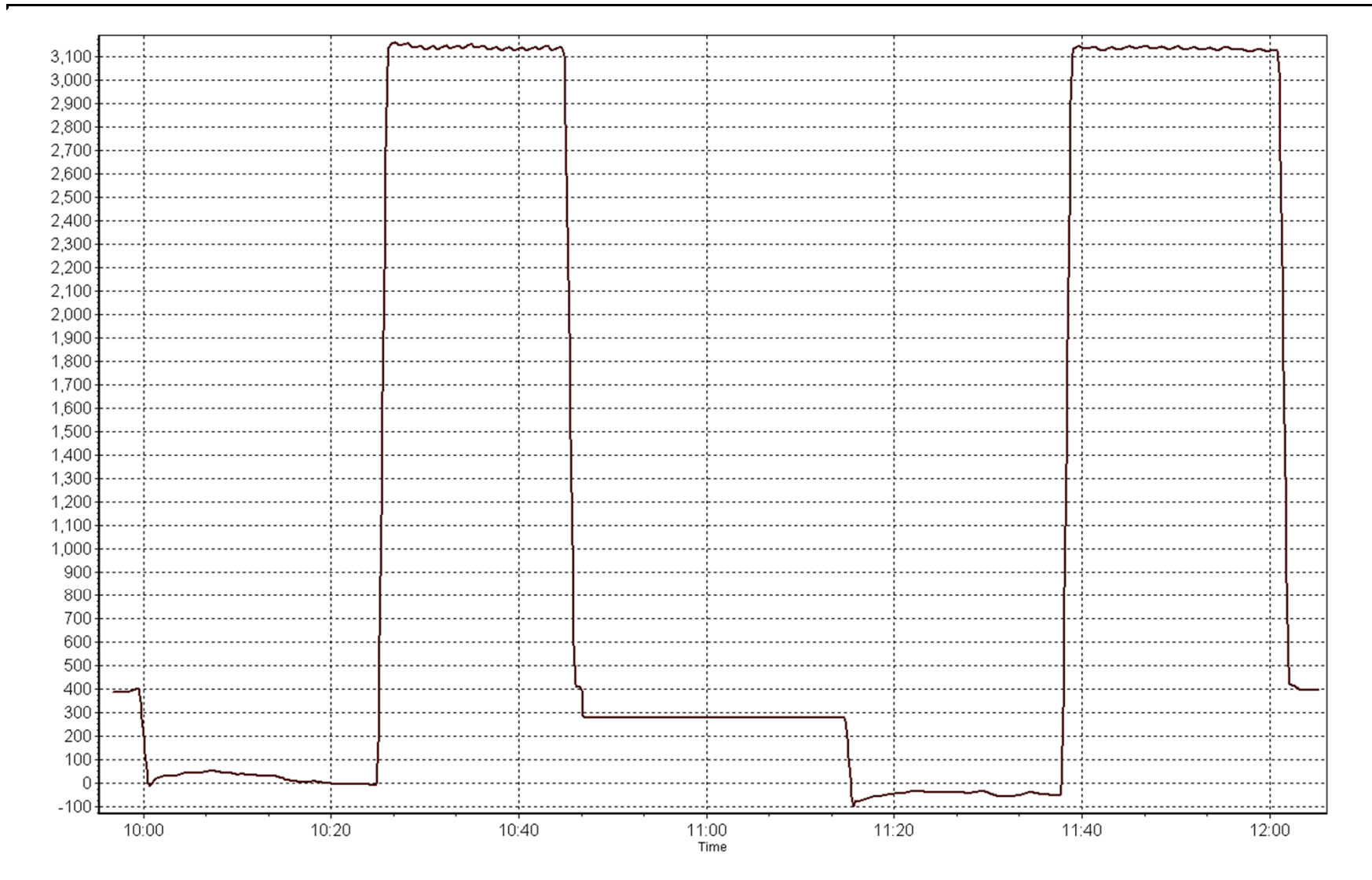
Zero air generator replaced. No adjustments.

Calibration Performed By:

Devin Russell

THC Calibration Plot

Date: June 16, 2014



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 11
LOWER CAMP
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)

JUNE 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	648	34	72	94.72	10	0	2	0
H2S (ppb) Average	645	33	75	94.17	4	0	1	0
THC (ppm) Average	648	34	72	94.72	3.5	-	2.4	-
Temperature (C) Average	690	0	30	95.83	27.9	-	22.2	-
Wind Speed 10 m (km/h) Average	690	0	30	95.83	25	-	-	-
Wind Direction 10 m (deg) Average	690	0	30	95.83	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
 JUNE 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	648	0.4	1	-	0	0	0	0	0	1	10
H2S (ppb) Average	645	0.4	0	-	0	0	0	0	0	1	4
THC (ppm) Average	648	2.19	0.2	-	1.9	1.9	2	2.1	2.3	2.5	3.5
Temperature 2 m (C) Average	690	17.06	5.3	-	5.1	9.8	13.4	17.3	21.2	24.2	27.9
Wind Speed 10 m (km/h) Average	690	8.4	5	-	0	2	4	8	11	16	25
Wind Direction 10 m (deg) Average	690	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
JUNE 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	10 Jun 2014 09:00	11 Jun 2014 15:00	30	Station power interruption and restart period
SO2	15 Jun 2014 12:00	15 Jun 2014 19:00	8	Station power interruption
H2S	11 Jun 2014 14:00	11 Jun 2014 15:00	1	Additional stabilization period following power interruption
H2S	15 Jun 2014 12:00	15 Jun 2014 18:00	7	Station power interruption
H2S	18 Jun 2014 08:00	18 Jun 2014 11:00	4	Maintenance - verify analyzer response - missed daily span
THC	15 Jun 2014 12:00	15 Jun 2014 19:00	8	Station power interruption

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Summary of Hour Averages

Lower Camp - June 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 10 ppb on Jun 18 12:00	Maximum Daily Average: 2.2 ppb on Jun 18		Hours of Data:	648
Minimum Value: 0 ppb on Jun 1 05:00	Minimum Daily Average: 0.0 ppb on Jun 4		Hours of Missing Data:	72
Maximum Diurnal Average: 1.1 ppb at hour 13	Minimum Diurnal Average: 0.0 ppb at hour 5		Hours of Calibration:	34
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 = 6		Percent Operational Time:	94.7

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-Jun	0	Z	0	0	0	0	0	2	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0.4	2
2-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0.2	2
3-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
5-Jun	0	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-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	4	2	0	0	1	4	6	0	0	0	0	0	1	0	0	0.8	6
8-Jun	0	Z	0	0	0	0	0	0	1	1	2	2	3	3	1	1	1	0	0	0	0	0	1	0	0.8	3
9-Jun	0	Z	0	0	0	0	0	0	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.1	1	
10-Jun	0	Z	0	0	0	0	0	0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	0
11-Jun	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	M	M	M	0	0	1	0	0	0	0	0	0	--	1	
12-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.1	1
13-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	5	3	3	3	2	1	1	0	1	0	0	0.9	5	
14-Jun	0	Z	0	0	0	0	0	1	2	3	3	4	5	7	4	1	1	0	1	1	1	1	0	1.6	7	
15-Jun	0	Z	0	0	0	0	2	0	0	0	1	PF	PF	PF	PF	PF	PF	PF	PF	PF	1	0	0	--	2	
16-Jun	0	Z	0	0	0	0	0	4	1	4	8	7	3	1	1	0	0	0	0	0	0	1	1	1.4	8	
17-Jun	1	Z	0	0	0	0	0	0	0	1	2	1	1	3	2	1	0	0	0	0	0	0	0	0.6	3	
18-Jun	0	Z	0	0	0	0	0	0	0	0	4	10	4	4	2	3	3	6	1	5	5	1	1	2.2	10	
19-Jun	1	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
20-Jun	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
22-Jun	0	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	
23-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
24-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
25-Jun	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
26-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
27-Jun	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.1	1	
28-Jun	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
29-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
30-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	

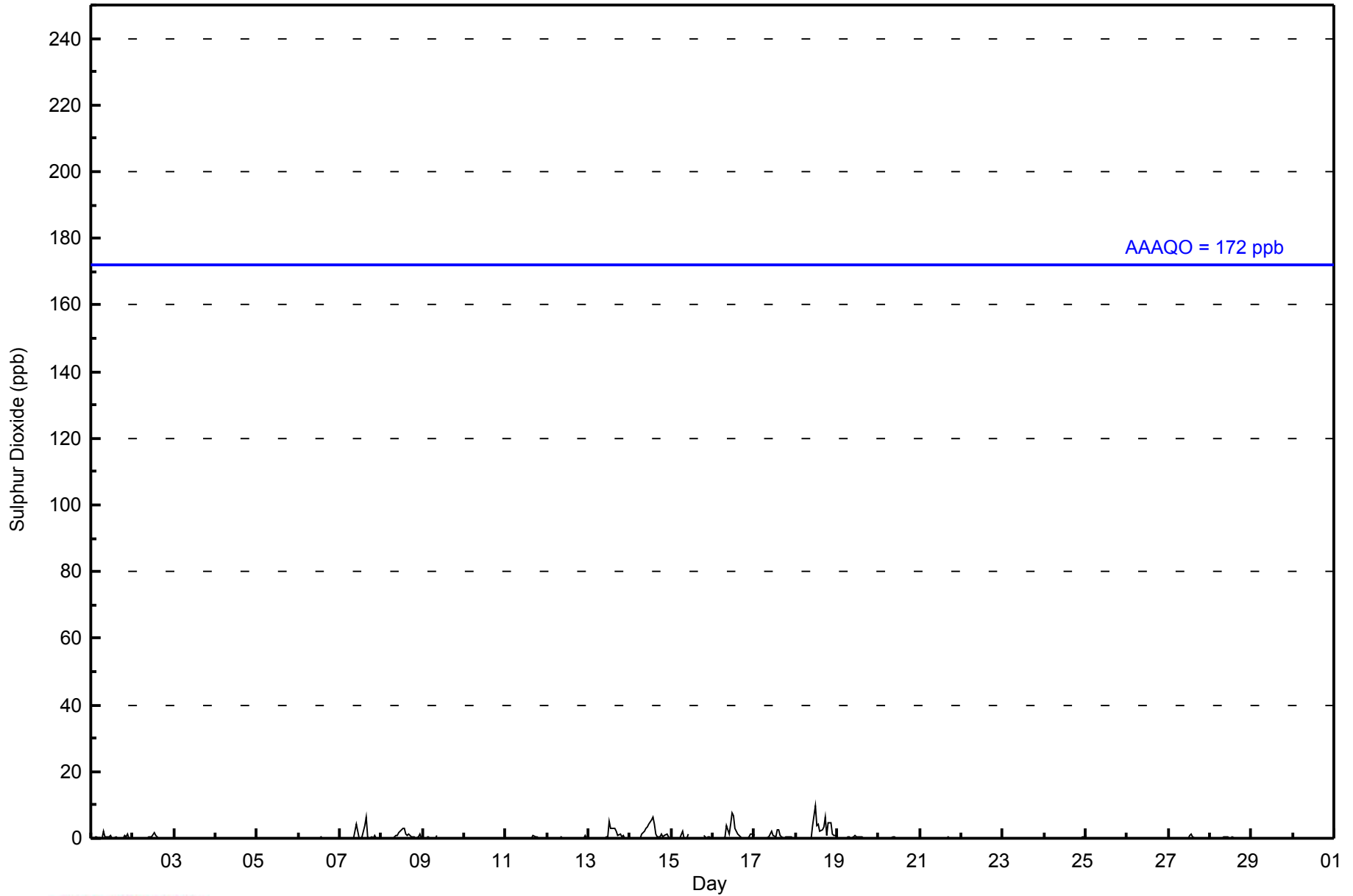
0.1	--	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.5	0.8	1.0	1.1	1.0	0.7	0.6	0.4	0.3	0.2	0.3	0.3	0.2	0.2	0.1	Diurnal Average	
1	--	0	0	0	0	2	2	4	4	4	10	7	7	4	6	3	6	1	5	5	1	1	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Lower Camp - June 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Lower Camp - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	648	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: 648

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Lower Camp - June 2014

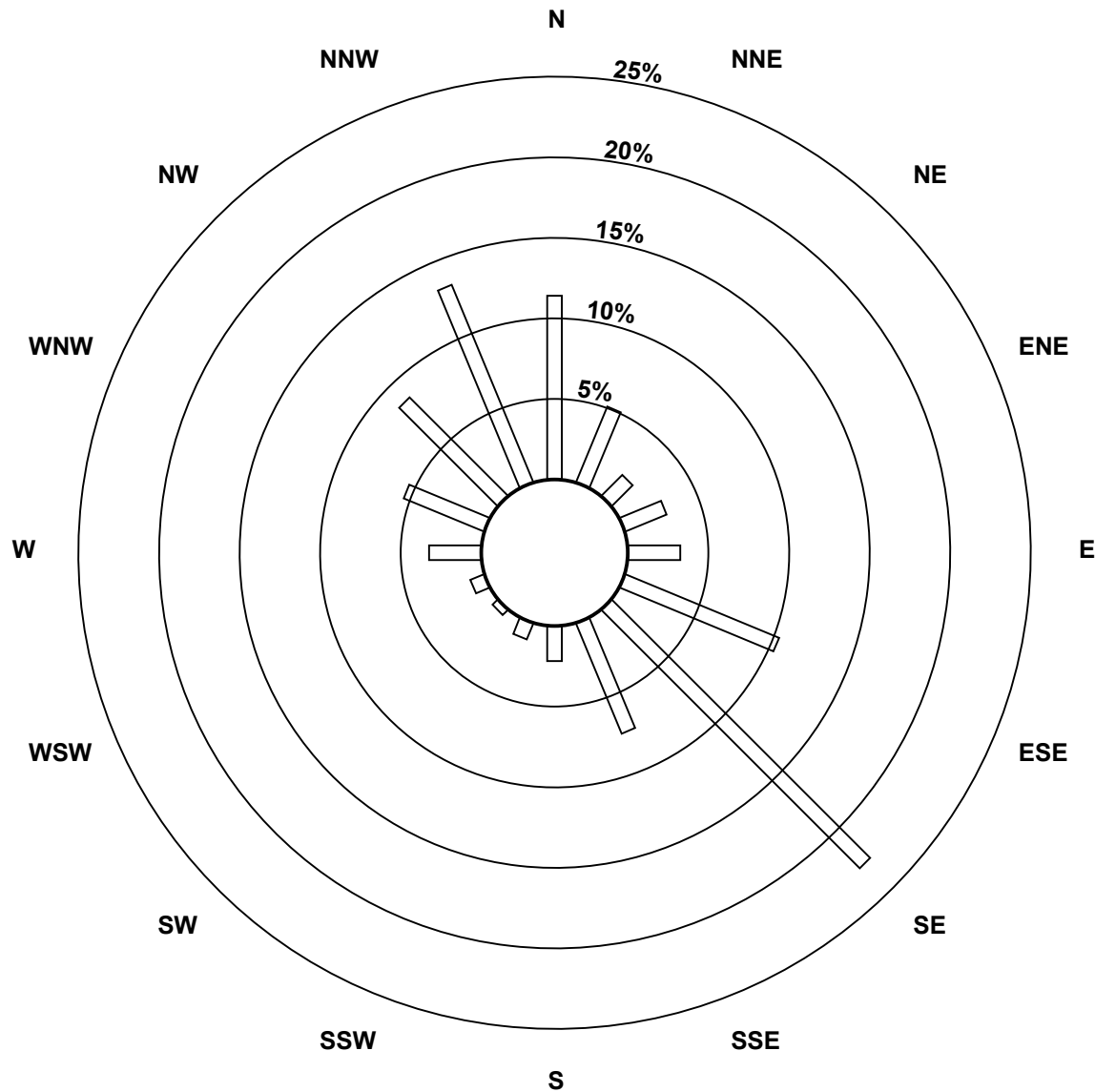
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	74	33	12	18	21	67	147	48	14	7	3	6	21	35	56	86	648
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	74	33	12	18	21	67	147	48	14	7	3	6	21	35	56	86	648

Total Number of Valid Hours: 648

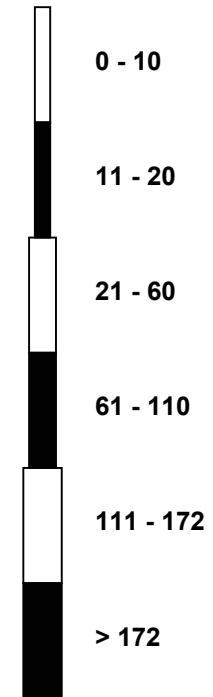
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Sulphur Dioxide (SO₂) - ppb
Lower Camp (AMS 11)



Classes (ppb)

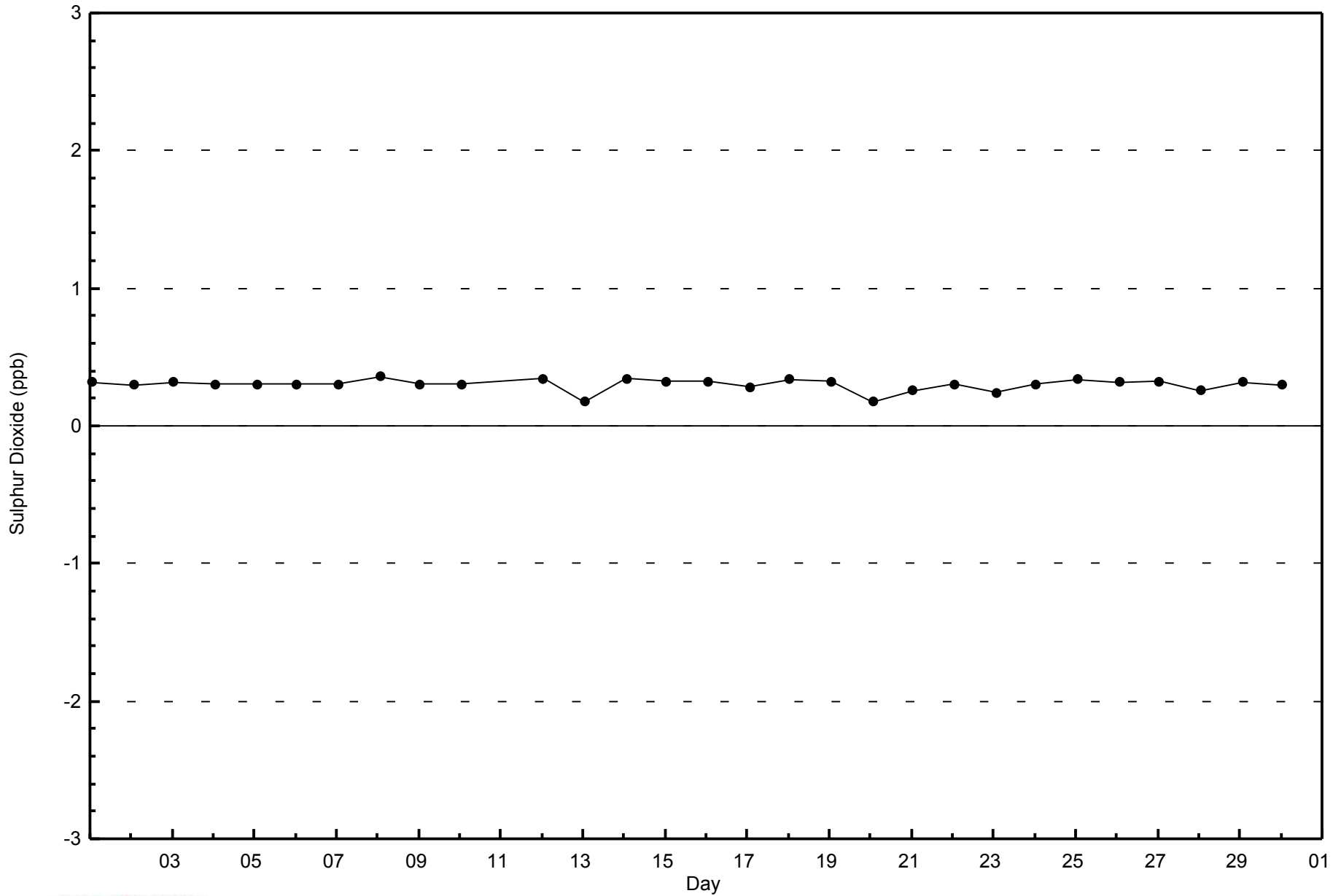


Total Number of Valid Hours: 648



WBEA
Zero Responses

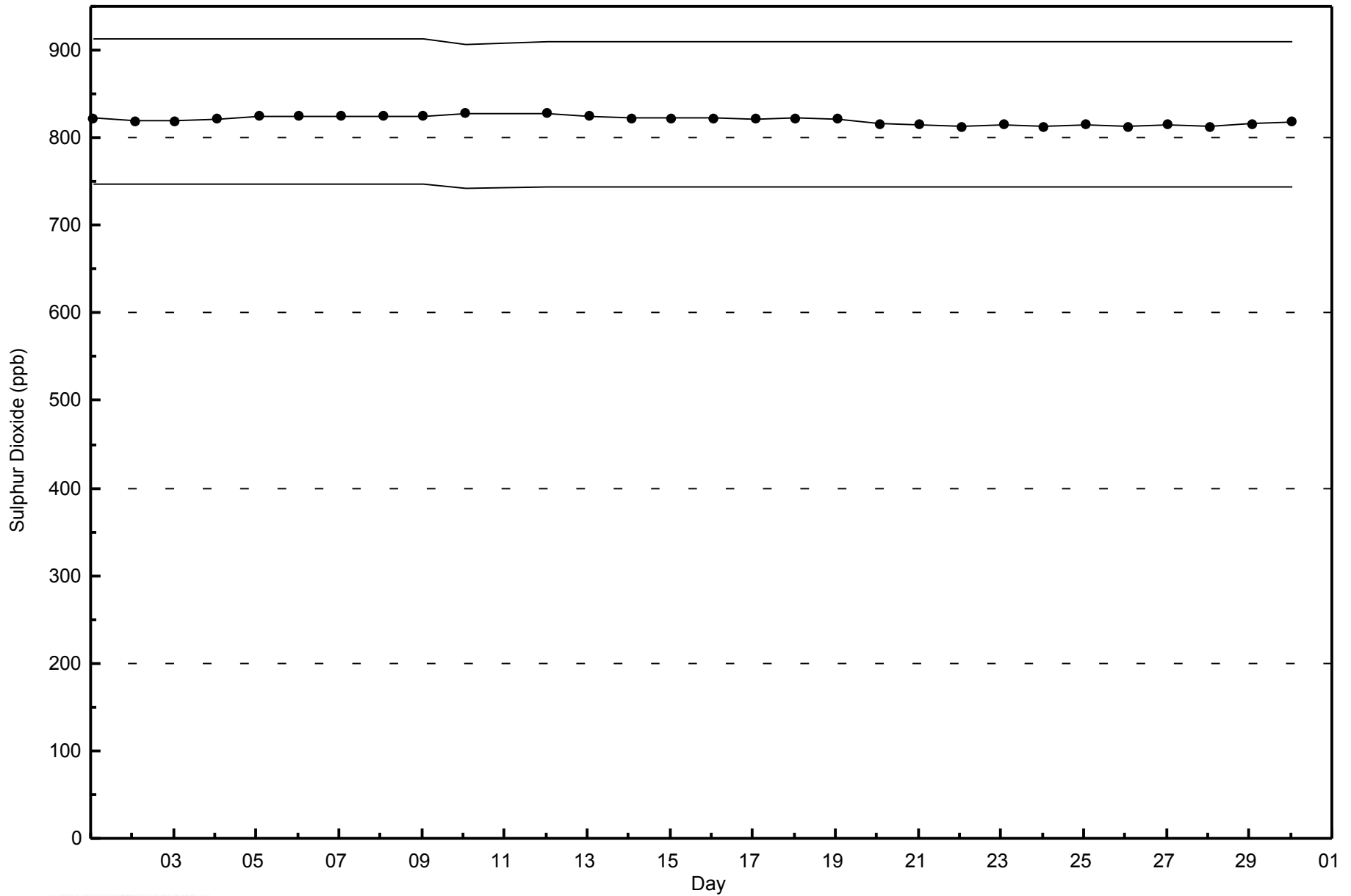
Sulphur Dioxide (SO₂) - ppb
Lower Camp - June 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Lower Camp - June 2014





Summary of Hour Averages

Lower Camp - June 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4 ppb on Jun 26 15:00	Maximum Daily Average: 0.8 ppb on Jun 14		Hours of Data:	645
Minimum Value: 0 ppb on Jun 17 18:00	Minimum Daily Average: 0.1 ppb on Jun 5		Hours of Missing Data:	75
Maximum Diurnal Average: 0.5 ppb at hour 23	Minimum Diurnal Average: 0.3 ppb at hour 18		Hours of Calibration:	33
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:	94.2

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

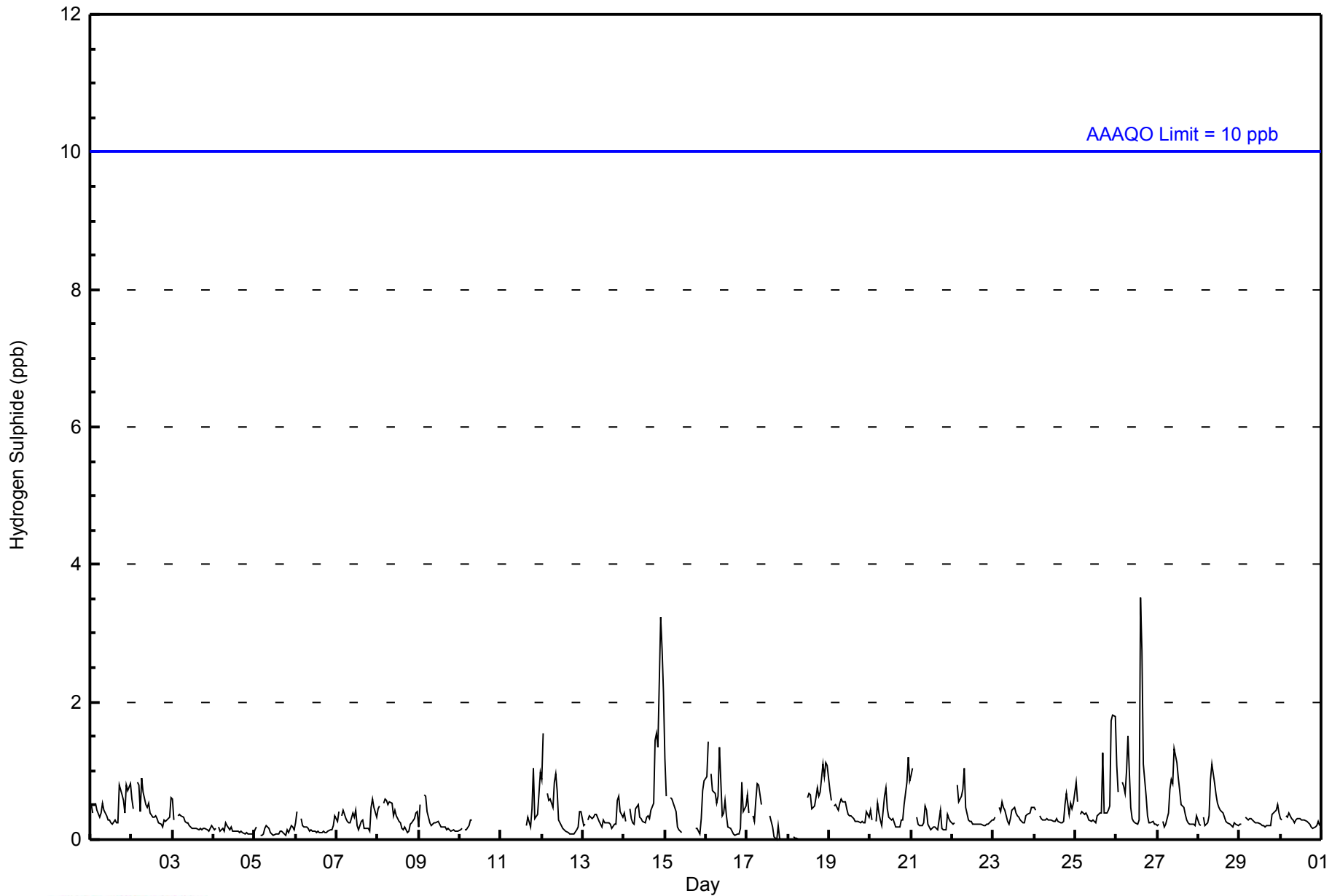
0.5	0.4	--	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	Diurnal Average		
1	2	--	1	1	1	1	1	1	1	1	1	1	1	1	4	3	1	1	1	1	2	1	3	3	2	Diurnal Maximum	

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



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - June 2014





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	641	99.38	99.38
3 - 4	4	0.62	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: 645

Total Number of Hours: 720



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - June 2014

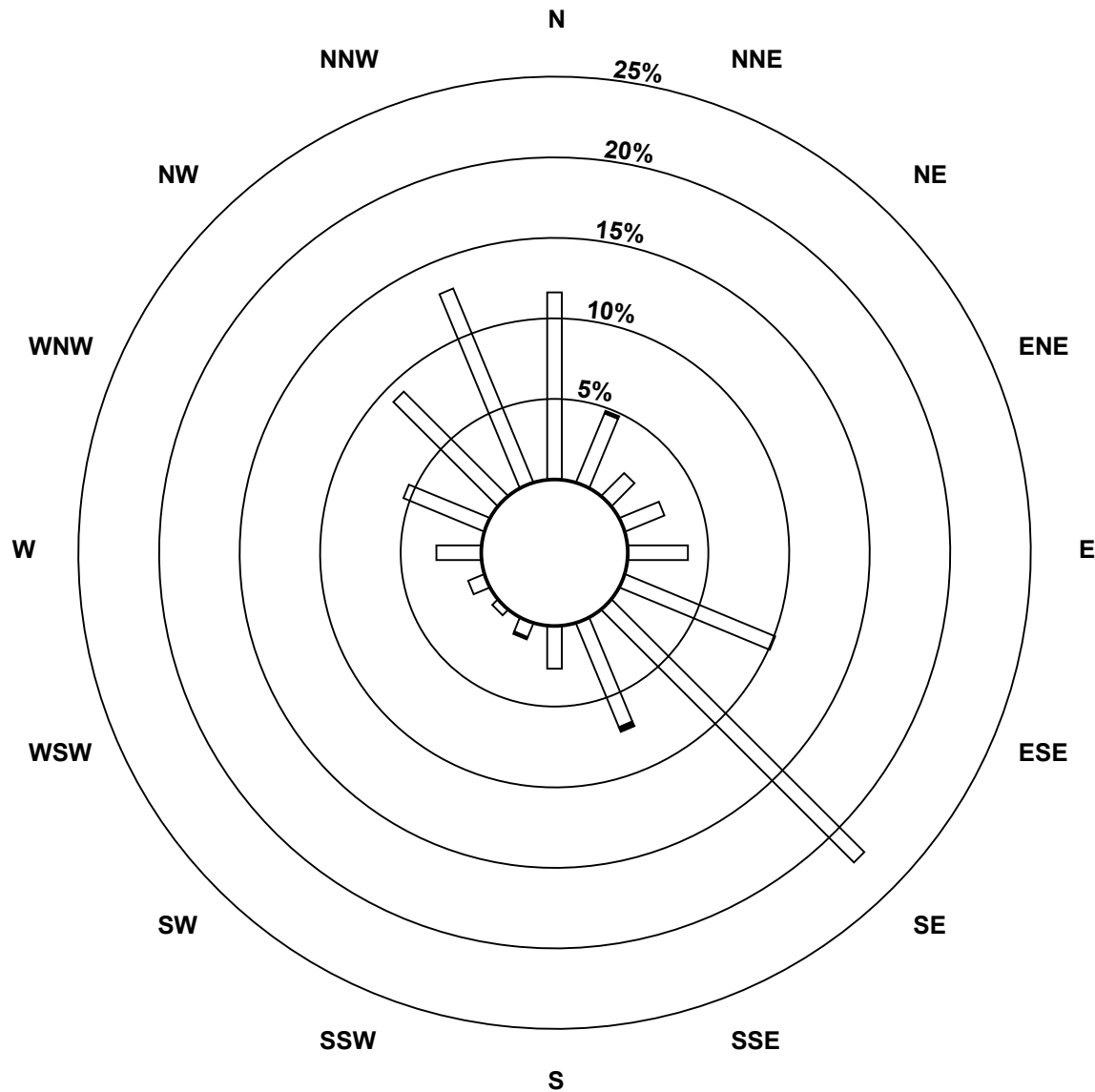
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	75	30	13	17	24	65	143	45	17	6	3	7	18	35	59	84	641
3 - 4	0	1	0	0	0	0	0	2	0	1	0	0	0	0	0	0	4
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	75	31	13	17	24	65	143	47	17	7	3	7	18	35	59	84	645

Total Number of Valid Hours: 645

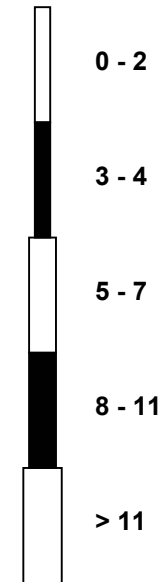
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Hydrogen Sulphide (H₂S) - ppb
Lower Camp (AMS 11)



Classes (ppb)

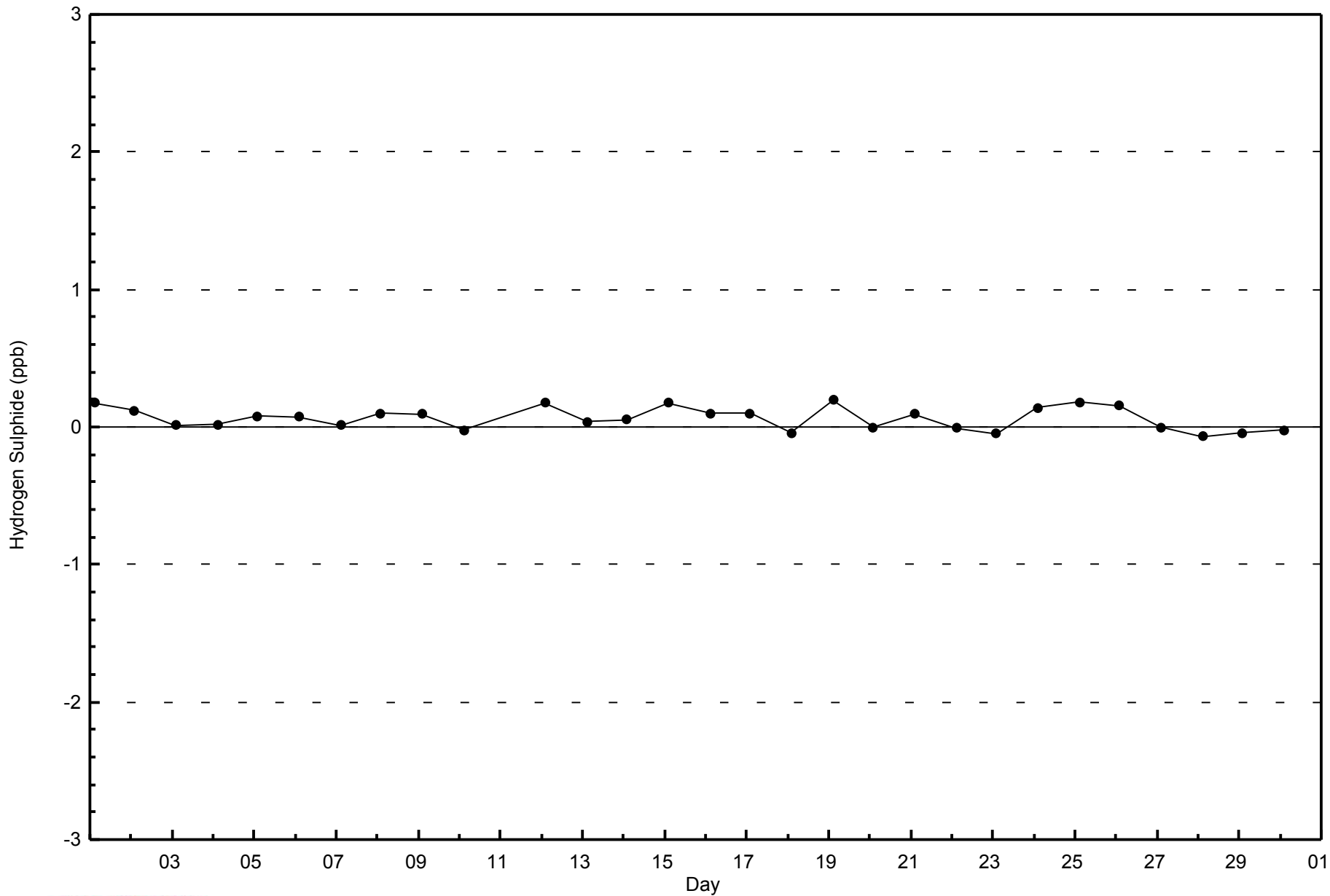


Total Number of Valid Hours: 645



WBEA
Zero Responses

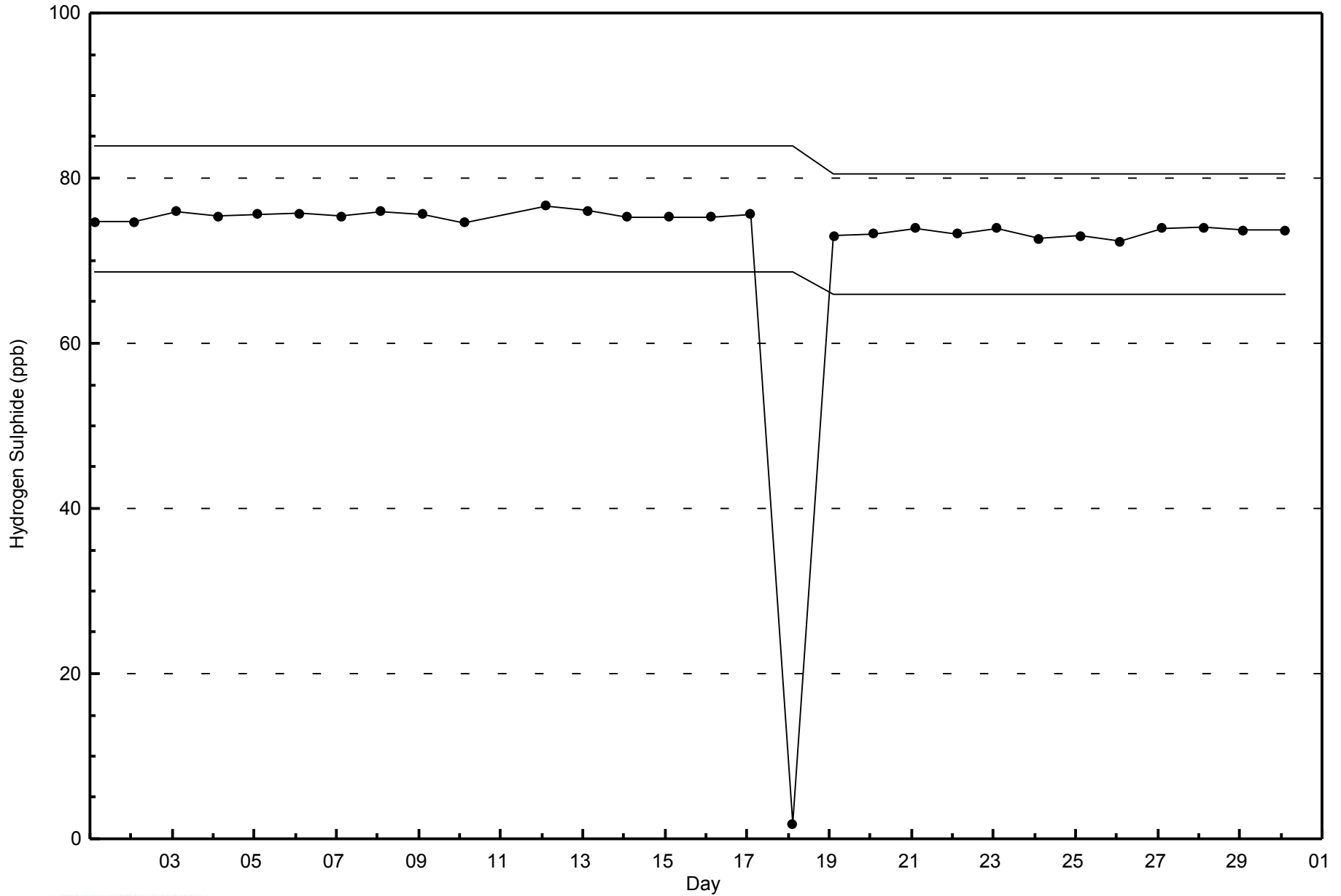
Hydrogen Sulphide (H₂S) - ppb
Lower Camp - June 2014





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - June 2014



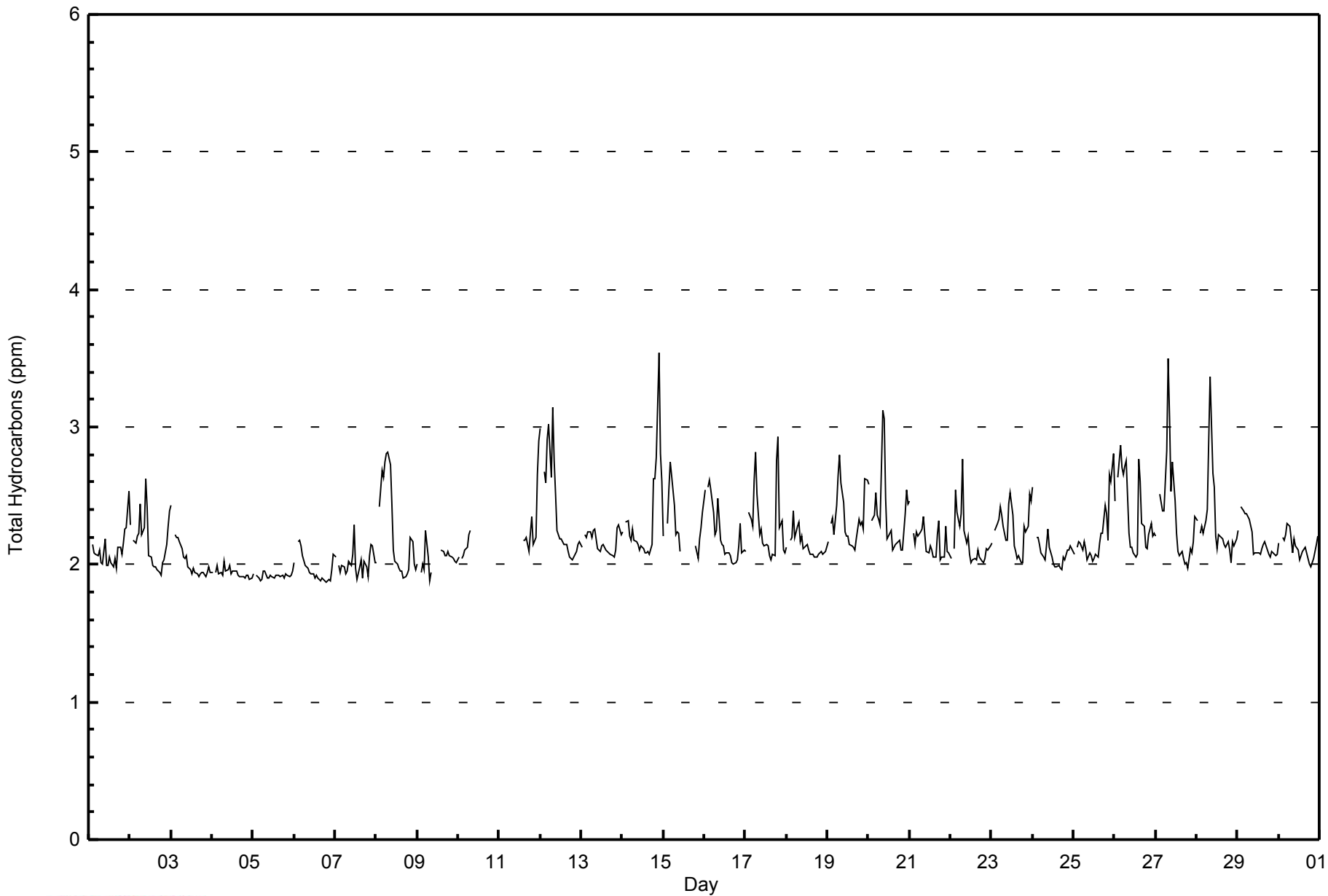


Maximum Value: 3.5 ppm on Jun 14 22:00																		Maximum Daily Average: 2.4 ppm on Jun 12						Hours in Service: 720			
Minimum Value: 1.9 ppm on Jun 6 20:00																		Minimum Daily Average: 1.9 ppm on Jun 5						Hours of Data: 648			
Maximum Diurnal Average: 2.4 ppm at hour 8																		Minimum Diurnal Average: 2.1 ppm at hour 17						Hours of Missing Data: 72			
Monthly Average: 2.19 ppm																		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.3 P ₉₀ = 2.5 P ₉₉ = 3.0						Hours of Calibration: 34			
																								Percent Operational Time: 94.7			
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-Jun	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.2	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.3	2.3	2.5	2.1	2.5	
2-Jun	2.3	Z	2.2	2.2	2.2	2.2	2.4	2.2	2.3	2.6	2.4	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.2	2.3	2.4	2.2	2.6	
3-Jun	2.4	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.1	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.4		
4-Jun	1.9	Z	1.9	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
5-Jun	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
6-Jun	2.0	Z	2.2	2.2	2.1	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	1.9	2.0	2.1	2.0	2.2		
7-Jun	2.1	Z	2.0	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.1	2.3	2.0	1.9	2.0	2.0	1.9	2.0	2.0	1.9	2.1	2.1	2.1	2.0	2.3		
8-Jun	2.0	Z	2.4	2.7	2.6	2.7	2.8	2.8	2.7	2.4	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.2	2.2	2.0	2.0	2.2	2.8		
9-Jun	2.0	Z	1.9	2.0	2.0	2.2	2.1	1.9	1.9	C	C	C	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.2		
10-Jun	2.1	Z	2.0	2.1	2.1	2.1	2.2	2.2	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	2.2		
11-Jun	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	M	M	M	2.2	2.2	2.2	2.1	2.2	2.4	2.1	2.2	2.7	2.9	--	2.9	
12-Jun	3.0	Z	2.7	2.6	2.9	3.0	2.6	3.1	2.8	2.5	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.4	3.1		
13-Jun	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.3	2.2	2.2	2.3		
14-Jun	2.2	Z	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.6	2.6	2.8	3.5	2.8	2.6	2.3	3.5	
15-Jun	2.2	Z	2.3	2.5	2.7	2.6	2.4	2.2	2.2	2.2	2.1	PF	PF	PF	PF	PF	PF	PF	PF	PF	2.1	2.0	2.2	2.3	2.4	--	2.7
16-Jun	2.5	Z	2.6	2.6	2.5	2.4	2.2	2.3	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.3	2.1	2.1	2.2	2.6		
17-Jun	2.1	Z	2.4	2.3	2.3	2.6	2.8	2.5	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.8	2.9	2.3	2.3	2.1	2.1	2.3	2.9
18-Jun	2.1	Z	2.2	2.2	2.4	2.2	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	
19-Jun	2.2	Z	2.3	2.3	2.2	2.4	2.6	2.8	2.6	2.4	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.6	2.6	2.3	2.8	
20-Jun	2.6	Z	2.3	2.4	2.5	2.4	2.3	2.3	3.1	3.1	2.5	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.4	2.5	2.4	2.4	3.1	
21-Jun	2.5	Z	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.0	2.1	2.1	2.3	2.1	2.1	2.2	2.5	
22-Jun	2.0	Z	2.1	2.5	2.4	2.3	2.4	2.8	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.8	
23-Jun	2.2	Z	2.2	2.3	2.3	2.4	2.4	2.3	2.2	2.2	2.4	2.5	2.4	2.1	2.1	2.0	2.1	2.0	2.0	2.3	2.2	2.3	2.5	2.5	2.3	2.5	
24-Jun	2.6	Z	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.6	
25-Jun	2.1	Z	2.1	2.2	2.2	2.1	2.2	2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.4	2.4	2.2	2.7	2.6	2.8	2.2	2.8	
26-Jun	2.5	Z	2.6	2.9	2.7	2.7	2.7	2.8	2.2	2.1	2.1	2.1	2.1	2.1	2.8	2.6	2.3	2.3	2.1	2.1	2.2	2.3	2.2	2.2	2.4	2.9	
27-Jun	2.2	Z	2.5	2.5	2.4	2.4	2.8	3.5	3.1	2.5	2.7	2.5	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.4	3.5	
28-Jun	2.3	Z	2.2	2.3	2.2	2.3	2.4	2.9	3.4	2.7	2.6	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.0	2.2	2.1	2.2	2.3	3.4	
29-Jun	2.2	Z	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	
30-Jun	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.2	2.1	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.3	
																		2.2						Diurnal Average			
																		3.0						Diurnal Maximum			
Z - zerspan			C - Calibration			M - Maintenance			PF - Power Failure																		



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Lower Camp - June 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	176	27.16	27.16
2.1 - 3.0	465	71.76	98.92
3.1 - 10.0	7	1.08	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 648

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - June 2014

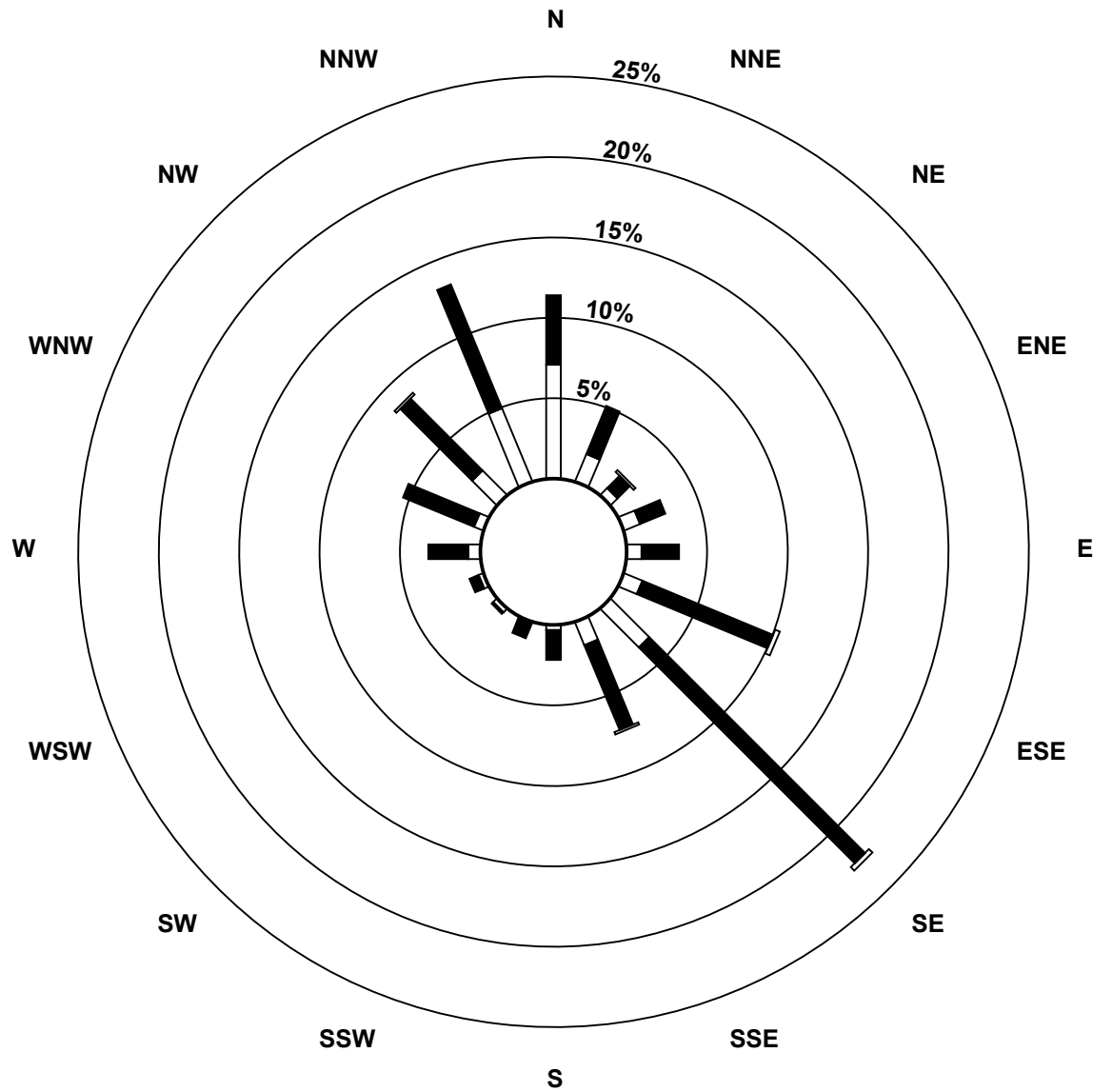
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	46	12	4	7	6	8	22	10	2	0	2	2	5	4	14	32	176
2.1 - 3.0	28	21	7	11	15	57	123	37	12	7	1	4	16	31	41	54	465
3.1 - 10.0	0	0	1	0	0	2	2	1	0	0	0	0	0	0	1	0	7
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	74	33	12	18	21	67	147	48	14	7	3	6	21	35	56	86	648

Total Number of Valid Hours: 648

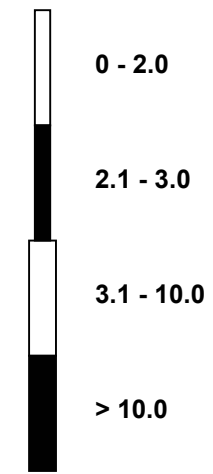
Total Number of Hours: 720

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

**Total Hydrocarbons (THC) - ppm
Lower Camp (AMS 11)**



Classes (ppm)

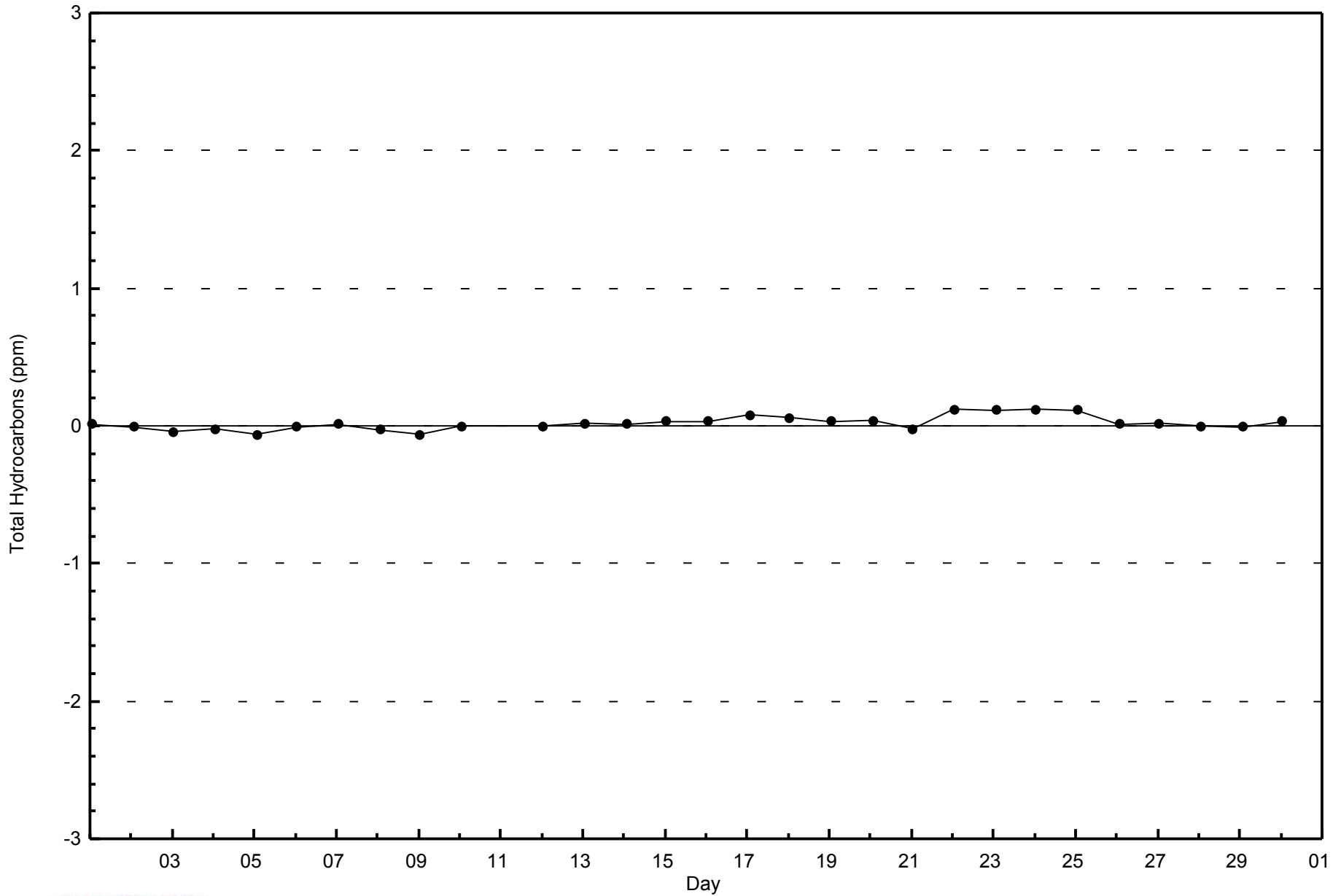


Total Number of Valid Hours: 648



WBEA
Zero Responses

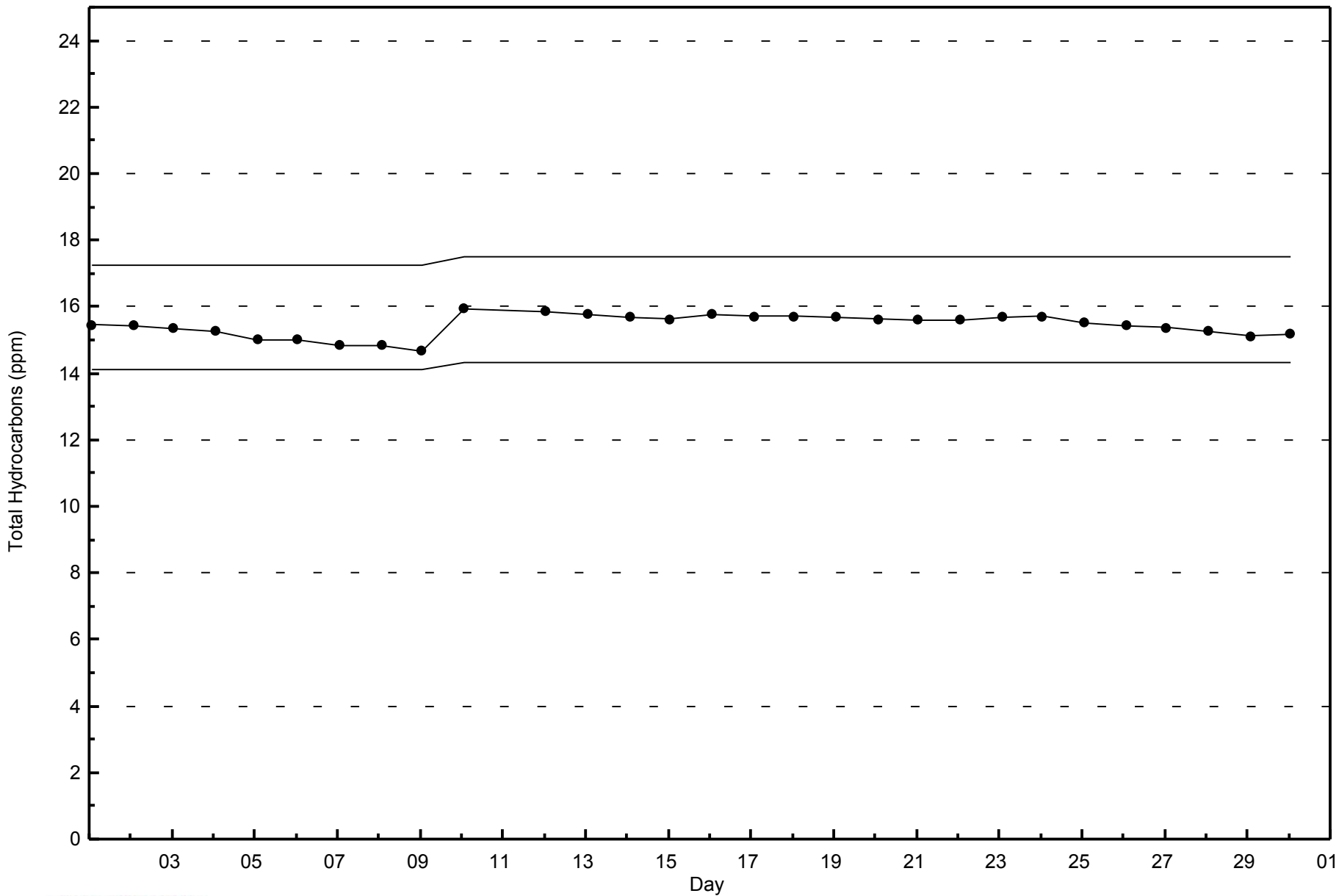
Total Hydrocarbons (THC) - ppm
Lower Camp - June 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Lower Camp - June 2014



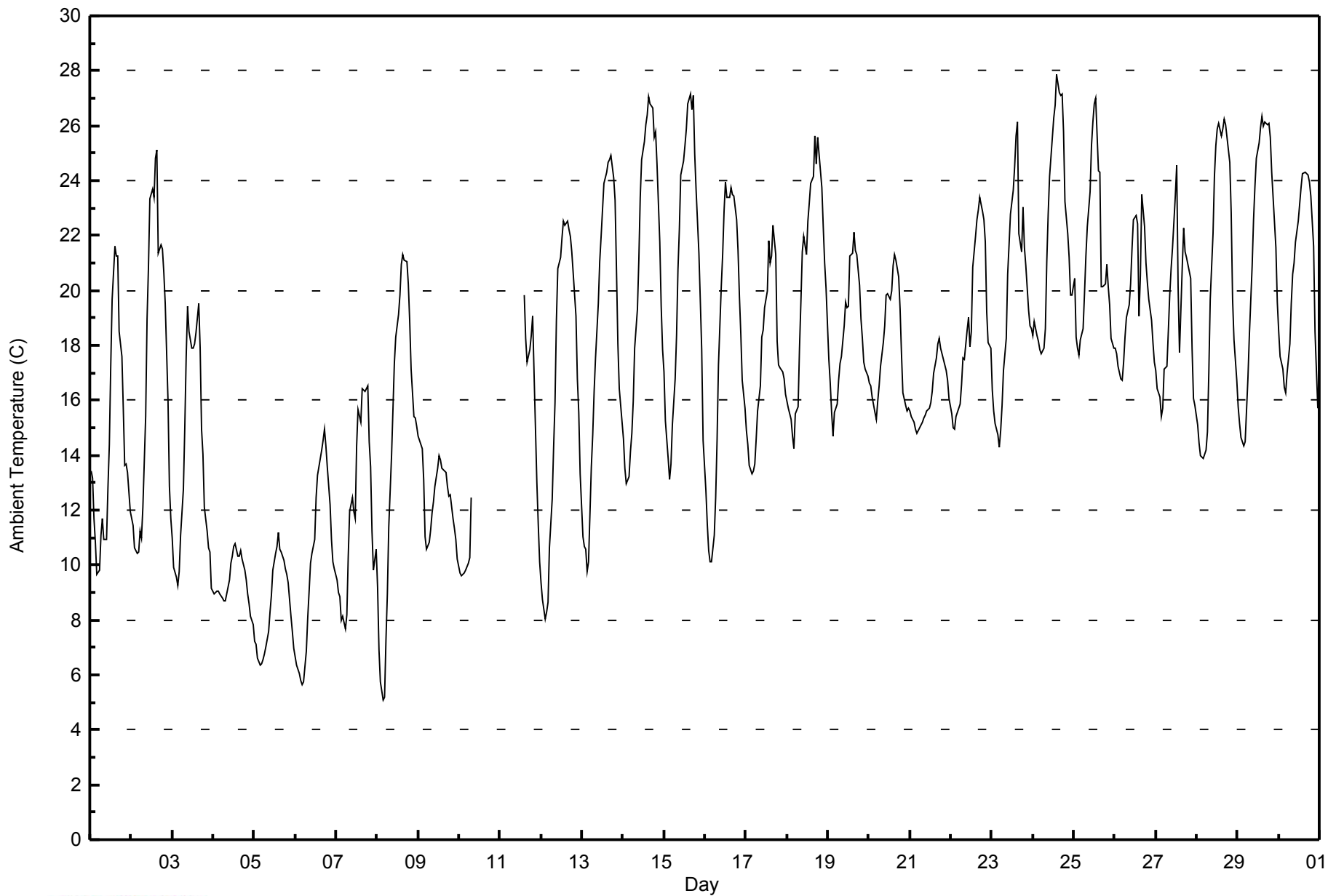


Maximum Value: 27.9 C on Jun 24 15:00		Maximum Daily Average: 22.2 C on Jun 24		Hours in Service: 720																																												
Minimum Value: 5.1 C on Jun 8 04:00		Minimum Daily Average: 8.5 C on Jun 5		Hours of Data: 690																																												
Maximum Diurnal Average: 21.4 C at hour 16		Minimum Diurnal Average: 12.3 C at hour 5		Hours of Missing Data: 30																																												
Monthly Average: 17.06 C		Percentiles: P ₁ = 6.4 P ₁₀ = 9.8 Q ₁ = 13.4 Median = 17.3 Q ₃ = 21.2 P ₉₀ = 24.2 P ₉₉ = 27.0		Hours of Calibration: 0																																												
				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-Jun	13.4	13.2	11.7	10.8	9.7	9.8	11.1	11.7	10.9	11.0	12.8	14.4	17.3	19.7	21.6	21.2	21.2	18.5	17.6	15.7	13.6	13.7	13.4	12.0	14.4	21.6																						
2-Jun	11.7	11.5	10.6	10.4	10.5	11.2	11.0	12.1	15.4	19.0	20.8	23.4	23.7	23.4	24.8	25.1	21.3	21.7	21.5	20.7	19.5	15.9	12.9	11.7	17.1	25.1																						
3-Jun	11.0	9.9	9.5	9.3	9.7	11.1	12.8	15.0	17.6	19.4	18.5	17.9	17.9	18.0	18.5	19.5	17.9	15.0	14.0	12.1	11.2	10.6	10.5	9.2	14.0	19.5																						
4-Jun	8.9	9.0	9.0	9.1	8.9	8.8	8.7	8.7	8.9	9.5	10.1	10.3	10.7	10.8	10.3	10.3	10.5	10.2	9.8	9.5	8.9	8.6	8.2	7.8	9.4	10.8																						
5-Jun	7.2	7.1	6.6	6.4	6.4	6.6	6.8	7.0	7.6	8.3	8.9	9.8	10.4	10.7	11.2	10.6	10.5	10.2	9.9	9.7	9.4	8.1	7.6	7.0	8.5	11.2																						
6-Jun	6.7	6.4	6.1	5.8	5.6	5.8	6.9	8.1	9.0	10.1	10.4	10.9	12.4	13.3	13.6	14.2	14.5	15.0	14.3	13.6	12.2	10.9	10.1	9.9	10.2	15.0																						
7-Jun	9.5	9.0	8.9	8.0	8.1	7.7	8.2	10.3	11.9	12.5	11.9	11.7	14.4	15.6	15.2	16.4	16.4	16.3	16.5	14.5	13.6	11.3	9.8	10.6	12.0	16.5																						
8-Jun	9.2	6.9	5.8	5.1	5.2	7.3	8.9	11.4	14.0	15.6	17.3	18.3	19.1	19.8	20.9	21.3	21.1	21.0	20.3	18.8	17.1	15.4	15.3	15.0	14.6	21.3																						
9-Jun	14.7	14.5	14.2	13.1	11.0	10.6	10.8	11.3	11.9	12.3	12.9	13.5	14.0	13.8	13.5	13.4	13.4	12.9	12.5	12.6	11.7	11.4	10.9	10.2	12.5	14.7																						
10-Jun	9.7	9.6	9.7	9.7	9.8	10.1	10.2	12.5	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	12.5																						
11-Jun	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	M	M	M	19.8	18.2	17.4	17.9	18.3	19.1	17.0	13.0	11.5	10.1	--	19.8																						
12-Jun	9.4	8.7	8.0	8.3	8.7	10.6	12.4	14.3	15.9	18.9	20.8	21.2	21.9	22.5	22.4	22.5	22.2	22.0	21.4	20.7	19.0	16.8	15.5	13.3	16.6	22.5																						
13-Jun	11.0	10.7	10.6	9.8	10.1	13.6	14.8	16.3	17.5	19.5	21.1	22.0	22.9	23.9	24.3	24.7	24.8	24.9	24.1	23.3	20.7	18.0	16.4	15.2	18.3	24.9																						
14-Jun	14.6	13.5	13.0	13.2	14.1	14.8	16.0	17.9	19.3	21.1	23.4	24.8	25.4	26.1	26.4	27.0	26.8	26.7	25.6	25.8	24.6	21.8	19.4	17.8	20.8	27.0																						
15-Jun	17.1	15.3	13.9	13.1	13.7	15.1	16.8	18.4	20.8	22.2	24.2	24.7	25.3	25.9	26.8	27.1	26.6	27.1	25.0	23.7	21.4	19.7	17.9	14.5	20.7	27.1																						
16-Jun	12.7	11.5	10.5	10.1	10.1	11.1	12.4	14.5	17.3	20.1	21.3	22.9	23.9	23.4	23.4	23.7	23.5	23.5	22.6	21.5	19.8	18.4	16.7	15.7	17.9	23.9																						
17-Jun	14.9	14.4	13.6	13.3	13.4	13.7	14.6	15.6	16.5	18.3	18.6	19.4	20.0	21.8	21.0	21.3	22.4	21.3	18.1	17.3	17.2	17.1	16.8	16.2	17.4	22.4																						
18-Jun	16.0	15.7	15.3	14.7	14.2	15.5	15.8	17.9	19.6	21.4	22.0	21.3	22.5	23.2	23.9	24.2	25.6	24.6	25.6	25.0	23.8	22.3	21.0	20.1	20.5	25.6																						
19-Jun	17.5	16.6	15.6	14.7	15.5	15.9	16.7	17.3	17.6	18.7	19.6	19.4	19.4	21.3	21.4	22.1	21.5	21.3	20.2	18.9	18.3	17.4	17.1	16.9	18.4	22.1																						
20-Jun	16.6	16.5	16.1	15.5	15.3	15.9	16.5	17.3	18.1	18.7	19.8	19.9	19.7	20.0	20.9	21.3	21.1	20.5	19.3	17.7	16.3	15.8	15.6	15.7	17.9	21.3																						
21-Jun	15.6	15.4	15.2	15.0	14.8	14.9	15.1	15.2	15.4	15.5	15.6	15.7	15.9	16.3	17.0	17.6	18.1	18.3	17.9	17.7	17.3	17.1	16.7	16.0	16.2	18.3																						
22-Jun	15.5	15.0	15.0	15.4	15.6	15.9	16.6	17.5	17.5	18.6	19.0	18.0	18.5	20.9	22.0	22.6	23.0	23.4	22.9	22.6	21.8	19.2	18.1	17.9	18.8	23.4																						
23-Jun	16.4	15.6	15.1	14.8	14.3	14.9	15.8	17.1	18.3	20.6	21.7	22.8	23.6	24.5	25.6	26.1	22.0	21.4	23.0	21.6	20.9	19.3	18.7	18.6	19.7	26.1																						
24-Jun	18.3	18.8	18.4	18.1	17.9	17.7	17.9	18.6	21.1	22.8	24.2	25.6	26.3	26.8	27.9	27.2	27.1	27.2	25.8	23.3	22.1	21.2	19.8	19.8	22.2	27.9																						
25-Jun	20.4	18.3	17.9	17.7	18.2	18.6	19.9	21.2	22.3	23.6	25.3	26.1	26.8	27.0	24.3	24.3	20.1	20.1	20.2	20.9	20.1	19.5	18.2	17.9	21.2	27.0																						
26-Jun	17.9	17.7	17.2	16.8	16.7	17.4	18.3	19.0	19.5	20.2	21.5	22.6	22.7	22.4	19.1	20.6	23.5	22.3	21.0	20.3	19.7	18.9	18.1	17.4	19.6	23.5																						
27-Jun	17.1	16.4	16.1	15.4	15.7	17.1	17.2	18.5	19.9	20.8	21.6	23.4	24.5	20.1	17.7	20.9	22.3	21.4	21.2	20.9	20.5	17.9	16.1	15.8	19.1	24.5																						
28-Jun	15.1	14.4	14.0	14.0	13.9	14.2	14.9	17.0	19.7	22.1	24.1	25.3	25.9	26.1	25.6	25.9	26.3	26.0	25.1	24.7	22.8	19.7	18.2	16.8	20.5	26.3																						
29-Jun	15.8	15.1	14.7	14.3	14.5	15.7	16.8	18.4	20.9	22.6	23.8	24.8	25.4	25.9	26.3	26.0	26.1	26.0	26.1	25.6	24.3	22.5	21.5	19.6	21.4	26.3																						
30-Jun	18.5	17.6	17.1	16.5	16.3	17.0	18.0	19.5	20.6	21.0	21.8	22.5	23.2	23.8	24.3	24.3	24.3	24.2	24.0	23.4	21.6	18.5	17.1	15.7	20.4	24.3																						
																								13.9	13.3	12.7	12.4	12.3	13.1	13.9	15.2	16.6	18.0	19.0	19.7	20.5	21.0	21.0	21.4	21.1	20.7	20.1	19.3	18.1	16.5	15.5	14.6	Diurnal Average
																								20.4	18.8	18.4	18.1	18.2	18.6	19.9	21.2	22.3	23.6	25.3	26.1	26.8	27.0	27.9	27.2	27.1	27.2	26.1	25.8	24.6	22.5	21.5	20.1	Diurnal Maximum
M - Maintenance																								PF - Power Failure																								



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Lower Camp - June 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Lower Camp - June 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	77	11.16	11.16
10 - 20	397	57.54	68.70
> 20	216	31.30	100.00

Total Number of Valid Hours: 690

Total Number of Hours: 720



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Lower Camp - June 2014

Maximum Speed: 25 km/h on Jun 9 17:00	Maximum Daily Speed Average: 14.3 km/h on Jun 5	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 7 00:00	Minimum Daily Speed Average: 1.3 km/h on Jun 2	Hours of Data: 690
Maximum Diurnal Speed Average: 3.8 km/h at hour 18	Minimum Diurnal Speed Average: 0.3 km/h at hour 24	Hours of Missing Data: 30
Monthly Average Velocity: 2.1 km/h 77.2 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 8 Q ₃ = 11 P ₉₀ = 16 P ₉₉ = 22	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-Jun	SE18	ESE18	ESE12	SE17	ESE15	ESE12	SE20	SE24	ESE19	ESE16	ESE12	ESE11	SE14	SE8	SE8	SE8	SSE11	S7	SSW6	WNNW7	SE7	SE8	SE7	SSE3	SE11.0	SE24
2-Jun	SE10	SE10	SE8	SE10	SE10	SE11	SE6	SE8	SE9	SE9	ESE4	W9	W14WSW16	SW11	W11	NE12	NNW7	NNE17	NNW8	NNW4	WNNW2	ENE1	WNNW2	SSE1.3	NNE17	
3-Jun	NW1	NE1	NNW3	NW3	WNNW4	NW6	NW7	NNW8	N10	NNW14	N19	NNW18	N18	NNW8	N14	N16	NNW20	NNW24	NNW16	NNE11	N12	N8	NW11	NW12	NNW10.4	NNW24
4-Jun	N7	NW8	N8	NNW7	N9	NNW7	N8	NW9	NNW7	NNW7	NNW10	N12	N17	N20	N21	N18	N20	N19	N17	N18	NNE13	N11	N11	N14	N12.3	N21
5-Jun	NNW13	N17	N16	N16	N17	N15	NNW14	NNW14	N18	N18	N18	N19	N19	N21	NNW17	NNW15	NNW17	NNW15	N14	NNW10	N10	NW8	NW7	WNNW6	N14.3	N21
6-Jun	NW7	NW7	NW5	NW4	NNE2	NW3	NNW6	N5	WNNW6	W7	N6	NNE7	N9	NNW6	N7	NNE8	NNW6	NNE6	NE6	ENE7	E5	E4	E2	S0	N4.0	N9
7-Jun	NNE2	E0	ESE1	ESE5	NW3	NW6	NW7	N5	NNE3	NNW8	NNW12	NNW7	ENE9	W3	W10	W11	NW7WNNW14	WNNW6	WSW2	SSE2	NW2	ESE2	SW1	NW3.2	WNNW14	
8-Jun	S2	ESE2	ESE3	ESE2	ESE2	ESE8	SE9	SE8	SE8	SE8	E5	SE7	SE9	ESE11	SE9	SE9	SE11	SE8	SSE5	SSE5	SSE5	ESE12	SE13	SE17	SE7.4	SE17
9-Jun	SE18	SE11	SSE10	SSE7	SE7	ESE10	ESE9	E9	SE8	SE15	ESE18	SE20	SE22	ESE23	ESE20	ESE22	ESE25	ESE22	ESE18	E14	E8	ENE7	NE6	NNE8	ESE13.0	ESE25
10-Jun	NNE8	N5	NE11	NNE10	NNE9	NNW5	NNW6	N7	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	---	NE11
11-Jun	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	M	M	M	ESE16	ESE11	ENE5	SE3	SE6	SE6	ESE3	SE1	WNNW1	E1	---	ESE16
12-Jun	N1	E1	ESE3	ESE4	ESE4	ESE6	SE6	ESE4	N4	NW7	N10	N14	N9	N11	NNE16	NE17	NNE18	NNE17	NNE16	NNE12	N7	NNE7	NNE3	NNE2	NNE6.7	NNE18
13-Jun	NE2	NE4	NW3	WNNW6	NW4	ESE13	ESE8	SE5	SE6	ESE10	SE8	SE9	SE8	SE8	SE10	ESE9	SE9	SE8	SE10	SSE7	SSE7	SSE6	SE8	SE9	SE5.8	ESE13
14-Jun	ESE11	SE8	ESE14	ESE18	ESE21	ESE21	SE13	SE9	SE10	SE11	SE11	SE13	SE15	SE14	SE12	S11	SSE10	S10	S8	SSW9	S7	SSE6	SSE6	SSE8	SE10.7	ESE21
15-Jun	SE10	SE8	SE5	SE10	SE9	SE12	SE11	SE13	SE10	SE11	SE10	SE11	SE13	ESE15	SE9	SE10	SE12	SE8	SE14	SE12	SE5	SE4	SE5	N1	SE9.7	ESE15
16-Jun	NNE2	S0	NNE1	WNNW2	WNNW3	WNNW4	NNW2	NNW3	E3	SE8	SE7	SE9	SE10	ESE4	WNNW6	E3	ENE12	ENE15	ENE11	ENE8	SE5	SSW9	SSW8	WSW6	ESE2.5	ENE15
17-Jun	SSE3	S3	SE4	SE5	SE2	E2	ENE4	SE7	SE6	SE7	SE11	SE13	SE11	SE9	SE8	SE9	SE7	S6	S7	SE6	SSE6	SSE7	S8	SSE6	SE6.2	SE13
18-Jun	SSE7	SSE8	SSE7	SE7	SE7	SE10	SE11	SE9	SE9	SE9	SSE14	SE12	SE13	SSE14	SE15	SSE14	SSE13	SSE12	SSE11	SSE12	SSE12	SSE12	SSE11	SSE10	SSE10.7	SE15
19-Jun	SE6	SE7	SE6	SE6	SE8	ESE8	SE7	SE7	SE6	SE6	SE14	SE10	SE13	SE9	ESE10	SE6	E5	ESE6	NE2	NW2	W1	NNW0	WNNW3	NW2	SE5.4	SE14
20-Jun	NW3	NW5	W6	NNW1	NNW3	NNW2	N3	E1	ESE3	NE4	SE6	ESE8	SE10	SE8	ESE11	ESE9	SE7	ESE10	SSE4	SE6	SSE3	NW2	NW2	NNW2	ESE2.5	ESE11
21-Jun	NNW3	NNW3	NNE3	N4	N3	NW4	NW5	NNW7	NW8	NW8	NW9	NW9	NW9	NNW8	NNW7	NNW4	W10WNNW13	NW12	NW9	NW6	NW3	N2	WNNW4	NW6.0	WNNW13	
22-Jun	NW6	NW5	W4	W7	W7	WNNW7	W7	WNNW6	N7	NW8	NNW8	NNW9	NNW9	NW13	NNW13	NNW13	NW14	NNW12	NNW11	N10	NNW7	N2	SW2	NNE1	NW7.0	NW14
23-Jun	N1	WSW1	ENE0	ENE1	NE1	NW2	NNW2	N3	NNE3	E2	ESE3	E2	SE8	SE8	SE10	E8	E11	E10	SE5	SSE4	ESE4	SE2	NNW1	E2	ESE2.9	E11
24-Jun	ESE7	ESE17	SE17	SE18	SE17	SE20	SE18	ESE21	ESE18	SE13	ESE14	SE13	SSE11	SSE10	SSE10	SE11	SSE8	S9	SSE11	SSE8	SSE8	SE8	SE8	SE11	SE12.3	ESE21
25-Jun	SE13	SE10	SE12	ESE13	SE13	SE15	SE12	SE13	SE15	SE16	SE15	SE16	SE18	SSE12	SSE2	SSE4WSW17	N3	ENE2	SE3	SSE5	S4	SE2	SSW2	SE8.3	SE18	
26-Jun	S3	S3	ESE2	S1	ESE3	ESE3	E3	NNE2	W7	WNNW9	WNNW10	WNNW10	W8	SSW6	SSW4	NNE4	NNW3	WNNW8	NNW10	NNW5	NW5	NW4	WNNW4	WNNW5	WNNW2.7	WNNW10
27-Jun	WNNW4	NW3	NNW2	NNE1	NE2	NNW0	SE4	SE5	SE6	ESE3	N3	NW3	WSW6	ESE11	NE1	N2	NNW10	NNE15	NNE11	N9	NW5	WNNW3	WNNW1	NNW1	NNE2.2	NNE15
28-Jun	W1	E1	NNW3	WNNW1	NNE2	ENE2	E3	ENE3	NW3	W3	WSW9	W10	WNNW6	NNW8	NNW12	NNW10	NNW9	NNW10	NW8	NNW8	NNW4	NW2	W3	ENE0	NW3.9	NNW12
29-Jun	ENE1	N1	W5	WNNW5	NNE1	NE2	N4	NNW5	NNW8	NNW11	NNW12	NNW17	N18	N21	N21	N21	NNW19	NNW19	NNW17	NNW15	NNW11	NW8	NW8	WNNW5	NNW10.1	N21
30-Jun	WNNW6	WNNW3	WNNW5	NW4	NW4	NW5	NNW7	NNW10	NNW11	NNW13	NNW12	NNW13	N15	N14	NNW14	N14	N15	N13	N13	N10	NW6	NW2	NW2	ENE2	NNW8.4	N15

ESE2.0 ESE2.1 E2.1 ESE2.6 E2.8 ESE3.3 E3.0 E2.9 E2.6 E2.3 ENE2.4 ENE2.4 E3.3 E2.6 ENE2.7 NE3.3 NE3.2 NNE3.8 NNE3.4 NNE2.3 ENE1.1 SE0.8 SSE0.7 SE0.3	Diurnal Average
ESE18 ESE18 SE17 ESE18 ESE21 ESE21 SE20 SE24 ESE19 N18 N19 SE20 SE22 ESE23 N21 ESE22 ESE25 NNW24 ESE18 N18 NNE13 ESE12 SE13 SE17	Diurnal Maximum

M - Maintenance PF - Power 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 - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Jun 2 18:00	Hours in Service: 720 Hours of Data: 690 Hours of Missing Data: 30 Hours of Calibration: 0 Percent Operational Time: 95.8
Minimum Value: 1 km/h on Jun 21 01:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 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-Jun	4	3	7	5	4	4	5	5	4	5	4	4	4	2	3	2	4	3	2	5	2	2	2	2	7
2-Jun	2	3	2	2	2	3	4	2	2	2	2	4	4	8	4	4	6	9	4	4	1	2	1	2	9
3-Jun	1	1	1	1	1	1	1	1	2	5	4	5	5	3	3	4	6	7	4	5	4	3	4	3	7
4-Jun	3	2	2	2	2	2	2	2	2	2	3	3	5	5	5	4	5	4	4	4	3	2	3	4	5
5-Jun	4	4	3	4	4	5	4	4	4	4	4	4	6	5	5	6	5	4	5	3	3	1	2	1	6
6-Jun	1	2	1	1	2	2	2	2	2	3	3	2	3	3	3	4	3	4	3	2	1	2	2	2	4
7-Jun	2	2	2	4	3	2	2	1	2	3	3	2	4	3	4	3	3	3	3	1	1	3	2	2	4
8-Jun	1	1	1	2	2	2	2	2	1	1	2	3	4	3	3	3	3	3	2	2	2	3	4	4	4
9-Jun	4	4	4	3	2	3	4	4	6	4	5	5	5	5	5	5	5	4	4	3	2	1	2	1	6
10-Jun	2	2	2	2	2	2	2	2	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	2
11-Jun	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	M	M	M	6	8	4	2	3	3	1	1	1	1	8
12-Jun	1	2	1	1	1	2	1	1	1	3	3	4	3	5	5	5	4	4	4	3	2	2	3	1	5
13-Jun	1	2	2	2	1	3	4	1	2	3	3	3	3	4	4	4	3	3	3	3	2	2	4	3	4
14-Jun	3	3	3	4	4	4	4	3	3	4	4	5	6	5	5	4	4	4	3	3	3	2	1	2	6
15-Jun	2	3	3	3	3	3	3	3	2	2	4	4	5	5	4	5	4	3	4	3	4	1	2	1	5
16-Jun	1	1	1	1	1	1	2	1	3	2	2	3	3	4	2	3	4	4	4	2	2	4	3	3	4
17-Jun	1	1	1	1	2	1	1	4	3	3	3	3	3	3	3	3	2	2	4	3	2	3	3	2	4
18-Jun	2	2	2	2	2	3	3	3	3	3	5	4	5	5	6	5	5	4	4	4	4	4	4	4	6
19-Jun	3	2	2	1	2	2	3	2	2	2	3	3	4	3	3	2	1	4	2	1	1	1	1	1	4
20-Jun	2	2	1	2	1	1	1	3	3	3	3	3	3	3	3	3	3	2	1	2	2	2	2	1	3
21-Jun	1	1	1	2	2	2	1	2	1	2	1	2	2	2	2	1	4	3	3	2	2	2	1	1	4
22-Jun	1	1	2	2	4	2	2	2	2	2	2	2	2	3	3	4	3	3	3	3	2	1	1	1	4
23-Jun	1	1	1	1	1	1	1	1	2	1	1	1	4	2	3	3	6	3	3	2	3	1	1	2	6
24-Jun	5	4	4	5	4	4	4	4	4	4	4	4	4	4	4	5	3	3	4	3	3	3	3	3	5
25-Jun	4	3	3	3	4	4	4	4	4	5	4	4	6	5	5	3	6	7	1	2	1	2	1	1	7
26-Jun	1	1	1	1	1	2	1	1	2	2	3	2	3	6	5	1	2	3	2	1	1	1	1	1	6
27-Jun	1	1	2	1	1	1	2	1	2	2	1	2	2	8	2	1	4	3	3	3	1	1	1	1	8
28-Jun	1	1	1	1	1	2	1	1	1	2	3	3	3	3	4	3	3	3	2	3	2	1	1	1	4
29-Jun	1	1	1	1	1	1	2	2	2	3	3	5	5	6	6	6	5	5	5	4	2	2	2	1	6
30-Jun	1	1	1	1	1	1	2	3	3	4	3	3	4	4	4	3	4	4	4	3	1	1	1	1	4

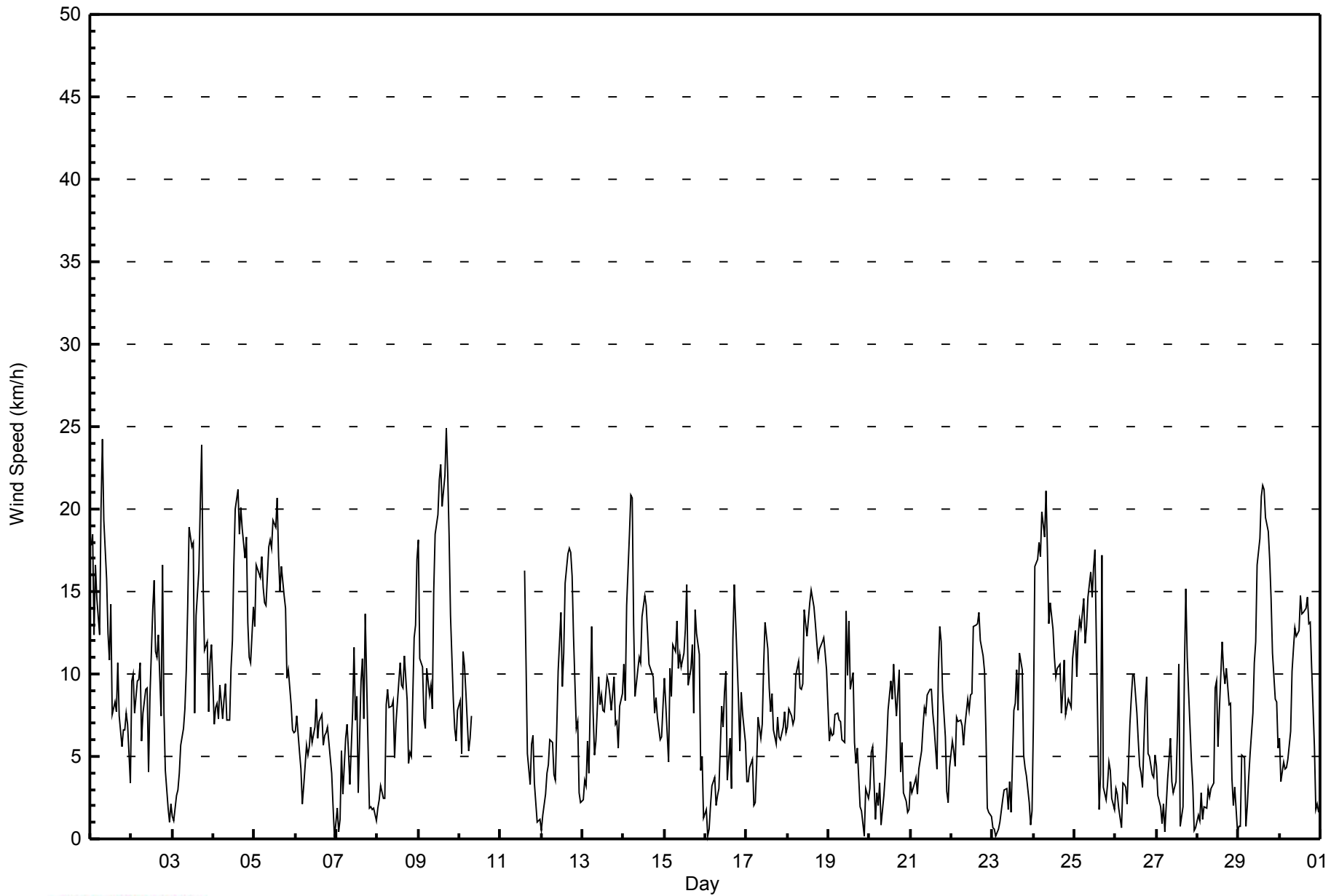
5	4	7	5	4	5	5	5	5	6	5	5	6	6	8	6	8	7	9	5	5	4	4	4	4	
Diurnal Maximum																									

M - Maintenance PF - Power Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Lower Camp - June 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Lower Camp - June 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	215	31.16	31.16
6 - 11	306	44.35	75.51
12 - 19	147	21.30	96.81
20 - 28	22	3.19	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 690

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Lower Camp - June 2014

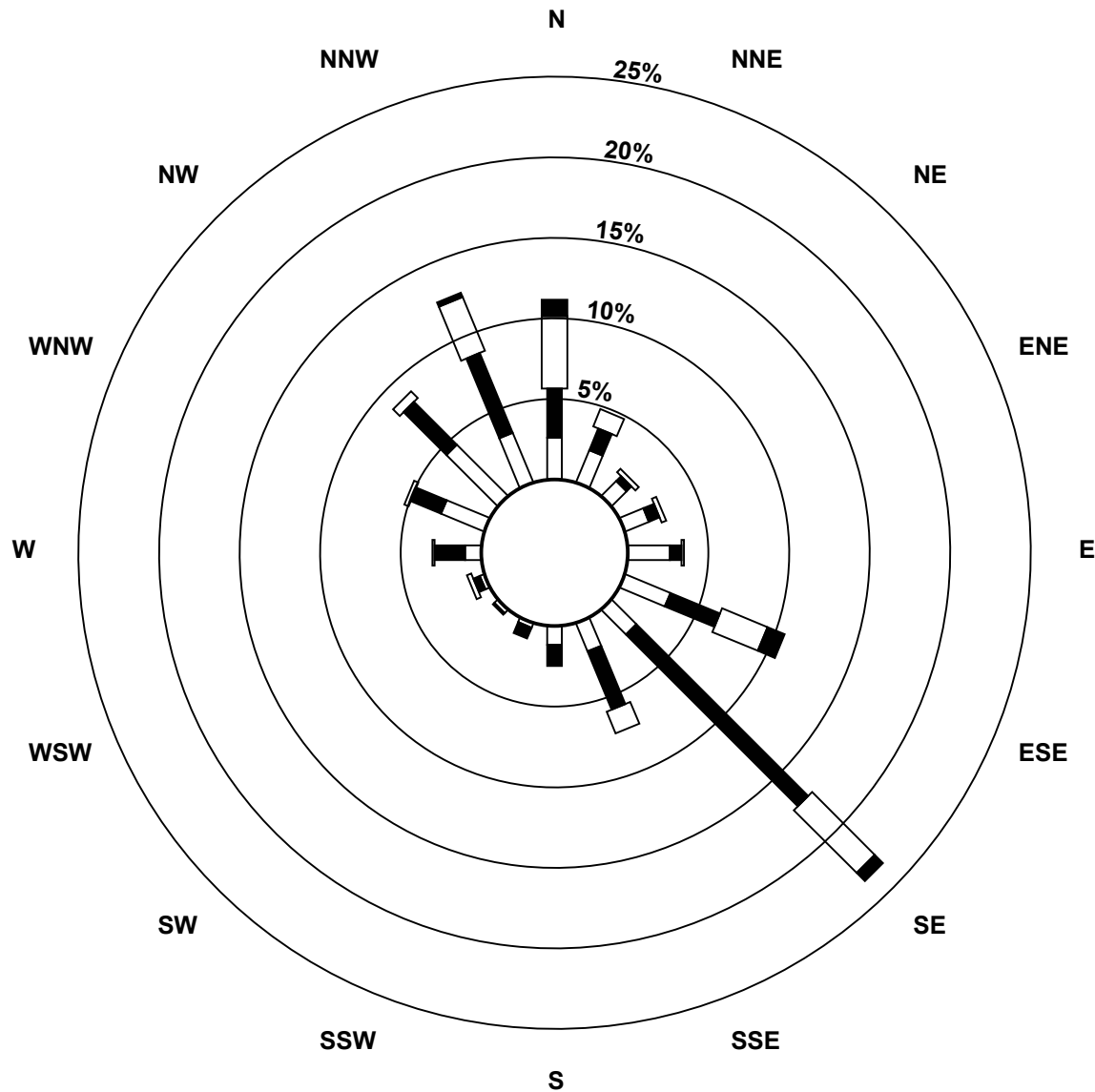
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	18	15	9	11	18	21	15	13	8	2	2	2	7	20	31	23	215
6 - 11	21	10	3	5	5	23	104	27	9	5	1	3	13	14	26	37	306
12 - 19	31	8	2	2	1	21	38	10	0	0	0	2	1	2	4	25	147
20 - 28	7	0	0	0	0	8	5	0	0	0	0	0	0	0	0	2	22
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	77	33	14	18	24	73	162	50	17	7	3	7	21	36	61	87	690

Total Number of Valid Hours: 690

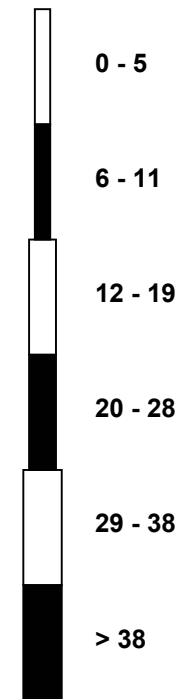
Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Lower Camp (AMS 11)**



Classes (km/h)



Total Number of Valid Hours: 690



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Lower Camp - June 2014

Direction of Maximum Speed: 108 deg on Jun 9 17:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 350.9 deg on Jun 5	Hours of Data: 690
Direction of Minimum Speed: 180 deg on Jun 7 00:00	Direction of Minimum Daily Speed Average: 1.3 deg on Jun 2
Direction of Minimum Speed: 180 deg on Jun 7 00:00	Hours of Missing Data: 30
Monthly Average Direction: 339.5 deg	Percent Operational Time: 95.8

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	127	120	123	124	117	120	124	134	123	121	123	122	125	126	130	134	159	177	209	285	142	139	140	152	130.3
2-Jun	136	140	132	136	132	124	134	130	136	140	115	265	272	256	236	280	50	338	12	339	337	298	62	295	155.7
3-Jun	324	52	327	321	302	313	323	345	350	334	351	346	356	344	350	355	338	345	335	24	354	358	307	314	342.9
4-Jun	357	322	351	345	5	336	3	326	332	347	340	2	358	359	1	8	1	11	358	4	16	10	357	351	357.2
5-Jun	346	0	1	0	1	355	348	346	356	4	354	4	3	353	346	343	340	340	352	337	355	318	306	301	350.9
6-Jun	322	321	318	307	14	318	348	350	285	268	358	14	350	336	349	19	341	12	37	57	86	99	84	180	352.2
7-Jun	27	99	104	122	312	309	316	356	27	343	334	346	74	276	275	273	307	288	292	250	166	317	120	228	315.4
8-Jun	174	116	120	112	102	123	129	135	138	134	97	131	125	123	134	127	127	133	155	151	158	123	129	129	129.7
9-Jun	124	146	152	159	144	112	105	101	134	128	120	129	127	117	110	106	108	108	104	98	89	73	38	24	114.2
10-Jun	25	3	34	28	27	341	334	351	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--
11-Jun	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	M	M	M	121	112	59	125	125	128	106	139	297	88	--
12-Jun	11	98	106	110	106	109	134	111	358	326	353	355	359	10	24	38	25	27	18	25	8	20	33	13	25.2
13-Jun	47	45	319	303	316	103	110	128	131	120	131	136	144	137	125	121	133	128	132	160	147	160	134	128	127.5
14-Jun	121	130	119	121	120	119	131	146	142	135	145	134	131	140	143	178	164	174	180	198	190	165	156	150	141.2
15-Jun	142	133	129	132	124	126	133	133	135	134	134	130	124	114	133	144	125	144	127	128	124	164	138	6	130.6
16-Jun	21	175	18	302	291	303	341	346	93	130	129	134	137	118	301	89	70	67	72	74	129	200	210	242	105.7
17-Jun	156	171	129	124	134	92	77	124	135	128	125	127	124	129	145	133	144	172	181	136	161	162	171	165	139.7
18-Jun	160	152	148	131	125	145	124	132	144	146	147	143	144	151	136	150	158	150	162	157	153	160	159	153	147.7
19-Jun	133	137	130	138	130	118	127	134	129	128	124	129	127	127	121	132	100	102	38	305	271	329	301	305	125.8
20-Jun	304	323	274	330	329	338	359	100	122	49	128	120	124	130	118	120	127	118	152	145	155	314	319	331	117.5
21-Jun	338	347	24	359	2	311	306	333	323	325	315	315	317	327	335	334	281	297	306	304	307	319	359	302	317.3
22-Jun	320	317	270	274	277	283	275	290	353	318	342	346	340	318	333	334	319	332	346	355	342	359	215	12	323.0
23-Jun	6	247	57	59	50	311	335	350	15	85	117	96	126	127	126	90	101	85	130	158	113	146	331	80	104.4
24-Jun	109	122	124	126	131	130	129	121	121	128	122	129	152	166	163	134	164	170	154	155	147	142	140	140	134.8
25-Jun	146	127	126	123	126	130	130	135	129	127	132	129	125	159	160	150	249	360	62	131	166	177	136	203	137.0
26-Jun	172	176	109	177	104	104	101	14	276	286	283	282	281	192	198	26	347	297	332	329	326	316	300	292	293.8
27-Jun	301	313	346	25	36	347	130	128	129	111	356	308	258	102	56	359	346	14	30	4	321	289	303	334	13.7
28-Jun	271	99	343	288	13	74	83	71	310	278	257	266	302	339	348	333	332	332	319	341	344	319	280	75	323.0
29-Jun	76	1	278	289	16	51	349	333	344	347	336	344	355	354	350	360	346	344	345	330	318	317	323	302	341.5
30-Jun	297	303	300	320	320	317	333	338	346	333	327	332	355	349	343	349	359	0	8	349	311	315	313	58	340.8
108.3 108.1 98.9 107.2 94.9 104.7 98.4 97.4 95.6 89.8 74.2 70.7 82.4 82.1 62.1 55.2 34.4 23.9 27.7 31.9 70.0 125.9 150.0 126.4																									

Diurnal Average

M - Maintenance PF - Power 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 - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 104 deg on Jun 7 02:00	Hours of Data: 690
Minimum Value: 11 deg on Jun 24 08:00	Hours of Missing Data: 30
Percentiles: P ₁ = 12 P ₁₀ = 16 Q ₁ = 20 Median = 26 Q ₃ = 38 P ₉₀ = 67 P ₉₉ = 95	Hours of Calibration: 0
	Percent Operational Time: 95.8

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-Jun	15	12	30	18	16	22	13	14	13	17	16	23	17	32	36	20	32	33	26	72	28	22	21	47	72
2-Jun	18	16	20	16	16	20	59	18	17	16	59	50	16	18	23	37	32	56	18	29	46	61	81	65	81
3-Jun	67	46	45	38	28	25	19	22	19	23	20	20	19	36	19	18	21	22	19	42	22	30	27	18	67
4-Jun	29	18	19	38	16	26	18	14	17	21	22	21	19	20	19	18	19	17	20	17	14	21	24	20	38
5-Jun	21	17	16	18	16	20	21	20	20	20	21	22	23	21	24	25	20	19	22	22	23	13	27	20	27
6-Jun	16	15	18	32	76	56	35	39	35	38	58	26	41	52	38	42	50	53	34	19	19	43	78	97	97
7-Jun	78	104	98	69	67	24	21	35	58	30	20	21	38	78	24	31	37	16	70	86	76	74	84	103	104
8-Jun	87	48	30	36	73	18	15	17	16	15	52	46	39	24	36	25	18	23	30	25	35	23	23	17	87
9-Jun	15	29	27	32	21	20	24	29	72	18	14	17	15	16	14	14	13	13	14	14	15	20	18	12	72
10-Jun	14	42	17	11	15	32	34	25	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	42
11-Jun	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	M	M	M	25	68	70	81	38	32	29	94	81	79	94
12-Jun	71	78	35	29	21	23	18	37	42	32	25	20	32	35	24	20	19	21	16	14	17	15	93	47	93
13-Jun	77	69	64	35	38	15	34	22	18	27	32	32	37	37	29	24	24	21	20	34	22	24	35	30	77
14-Jun	23	26	15	14	12	11	25	35	29	27	32	25	22	30	30	39	34	36	32	31	27	24	20	20	39
15-Jun	21	29	63	20	26	19	22	20	21	17	25	22	29	17	34	40	19	36	17	20	26	26	27	63	63
16-Jun	39	92	70	60	26	21	44	42	64	20	21	26	27	91	43	67	25	16	20	14	43	36	35	47	92
17-Jun	37	33	26	27	80	63	20	21	33	26	20	18	21	26	42	24	32	37	46	29	26	27	31	33	80
18-Jun	29	25	24	30	28	29	17	25	33	33	29	27	29	28	28	28	31	32	29	28	27	29	29	31	33
19-Jun	33	28	25	18	28	16	22	27	23	22	18	24	20	19	19	19	23	20	50	86	84	89	34	39	89
20-Jun	49	26	16	61	21	35	30	102	83	56	25	25	18	25	16	16	23	13	31	33	56	54	49	56	102
21-Jun	29	31	31	41	64	46	21	23	12	15	12	12	13	17	23	28	20	14	16	14	16	58	41	29	64
22-Jun	24	25	15	21	30	21	21	27	28	19	23	28	22	18	26	24	16	20	21	19	15	20	73	80	80
23-Jun	74	80	89	84	64	31	50	40	40	36	35	77	21	18	19	42	38	21	34	43	51	61	91	71	91
24-Jun	57	16	18	17	19	17	18	11	15	20	19	20	32	33	36	28	33	34	32	32	32	31	33	25	57
25-Jun	29	27	23	19	23	22	23	26	22	18	21	20	15	39	95	80	29	66	49	31	26	29	39	66	95
26-Jun	30	30	59	80	41	47	46	46	22	24	22	22	31	62	68	22	39	27	19	14	15	20	31	25	80
27-Jun	21	23	63	51	43	79	34	20	23	39	48	50	27	81	96	70	17	19	21	18	25	26	85	82	96
28-Jun	69	87	38	88	56	85	45	47	51	66	28	24	52	34	24	26	21	22	15	17	48	45	25	97	97
29-Jun	79	82	13	28	86	61	39	32	22	20	19	22	25	22	25	23	22	21	22	16	11	13	13	17	86
30-Jun	16	32	21	28	21	18	19	20	19	22	19	22	21	21	20	21	22	23	21	20	20	51	30	34	51

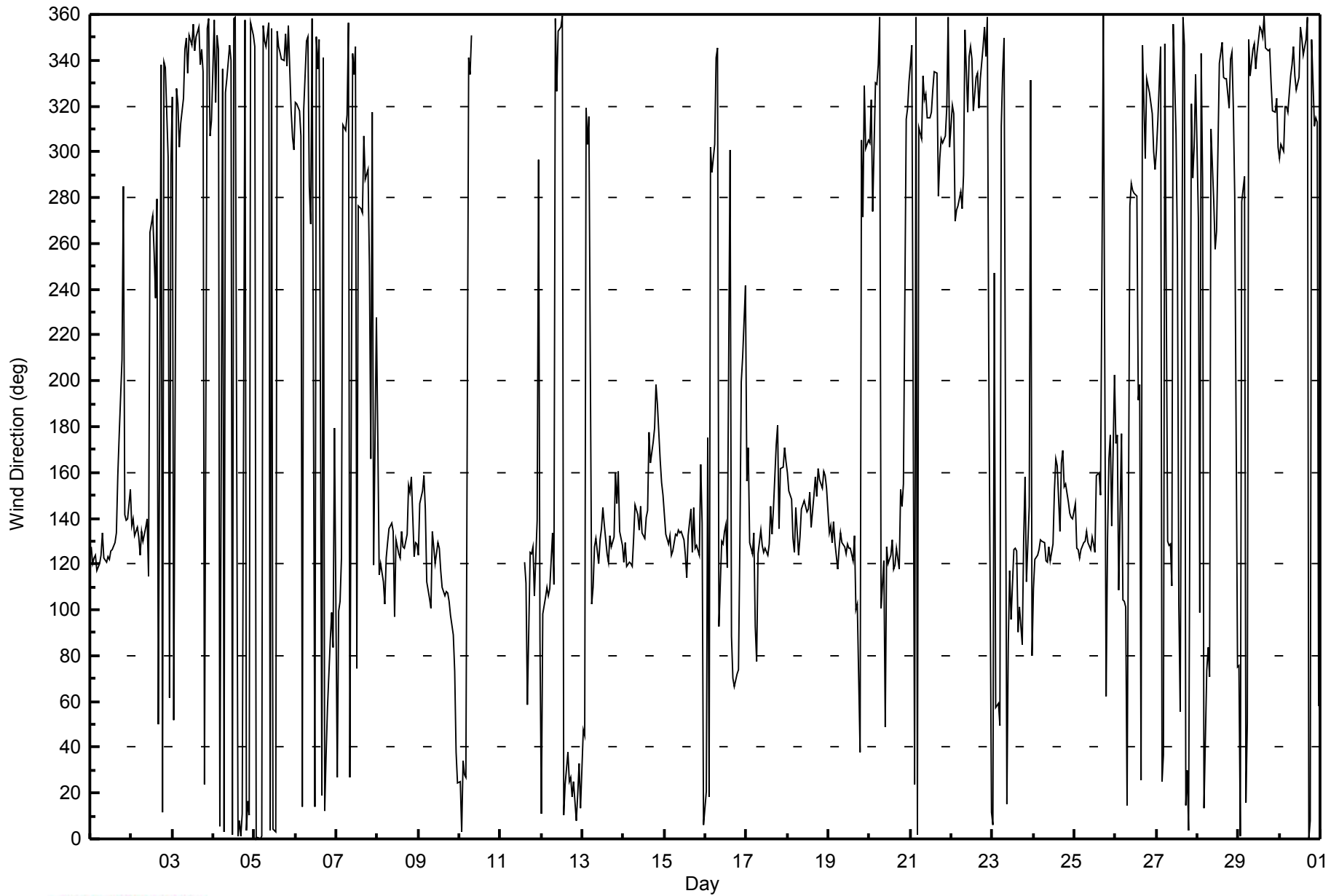
87	104	98	88	86	85	59	102	83	66	59	77	52	91	96	80	70	81	70	86	84	94	93	103	
Diurnal Maximum																								

M - Maintenance PF - Power Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Lower Camp - June 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 9, 2014	Previous Calibration	May-08-14
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	12:55
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	-558	-558
Analyzer Range (mv)	5000	5000	Lamp voltage	877	876
Calculated slope	0.998996	0.994161	Chamber temp.	45.1	45.1
Calculated intercept	1.393682	0.157525	Pressure (mmHg)	715.2	718.0
Analyzer Background	20.8	20.7	Flow (lpm)	0.498	0.506
Analyzer Coefficient	0.988	0.988	Intensity	34xxx	34xxx

Analyzer make TEI 43C Analyzer serial # 518112184

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	5001	80.9	829.9	830.9	0.999
calibrator zero	5000	0.0	0.0	0.4	NA
high point	5001	80.9	829.9	835.0	0.994
second point	5000	40.9	419.6	421.1	0.997
third point	5002	20.4	209.2	210.2	0.995
calibrator zero	5000	0.0	0.0	1.0	NA
as left zero	5000	0.0	0.0	1.0	NA
as left span	5000	80.9	830.0	837.2	0.991
Average Correction Factor					0.995

Corrected As found 830.5 Previous response 829.3 % change -0.1%

Notes:

Good calibration.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

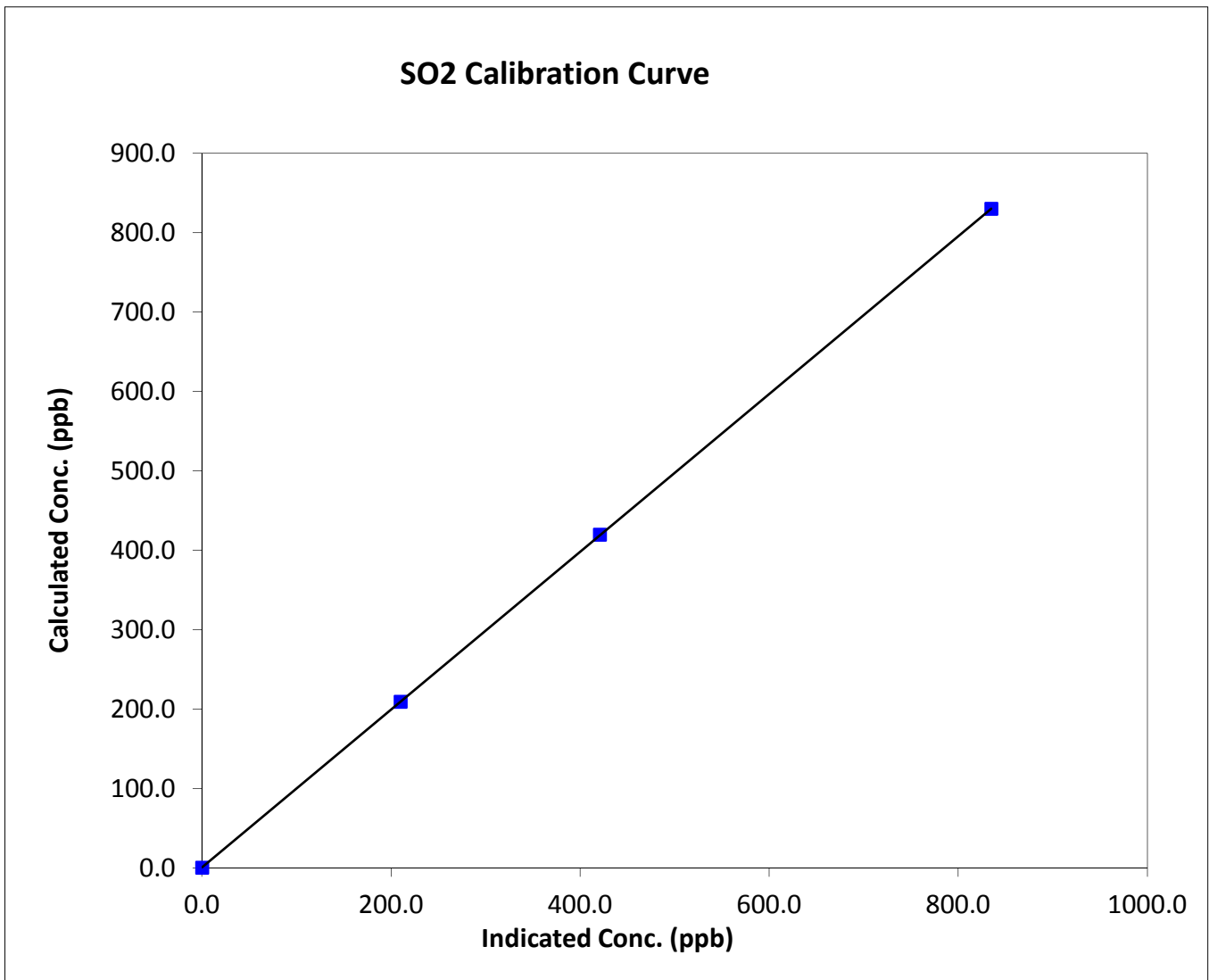
SO₂ Calibration Summary

Station Information

Calibration Date	June 9, 2014	Previous Calibration	May-08-14
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:20	End Time (MST)	12:55
Analyzer make	TEI 43C	Analyzer serial #	518112184

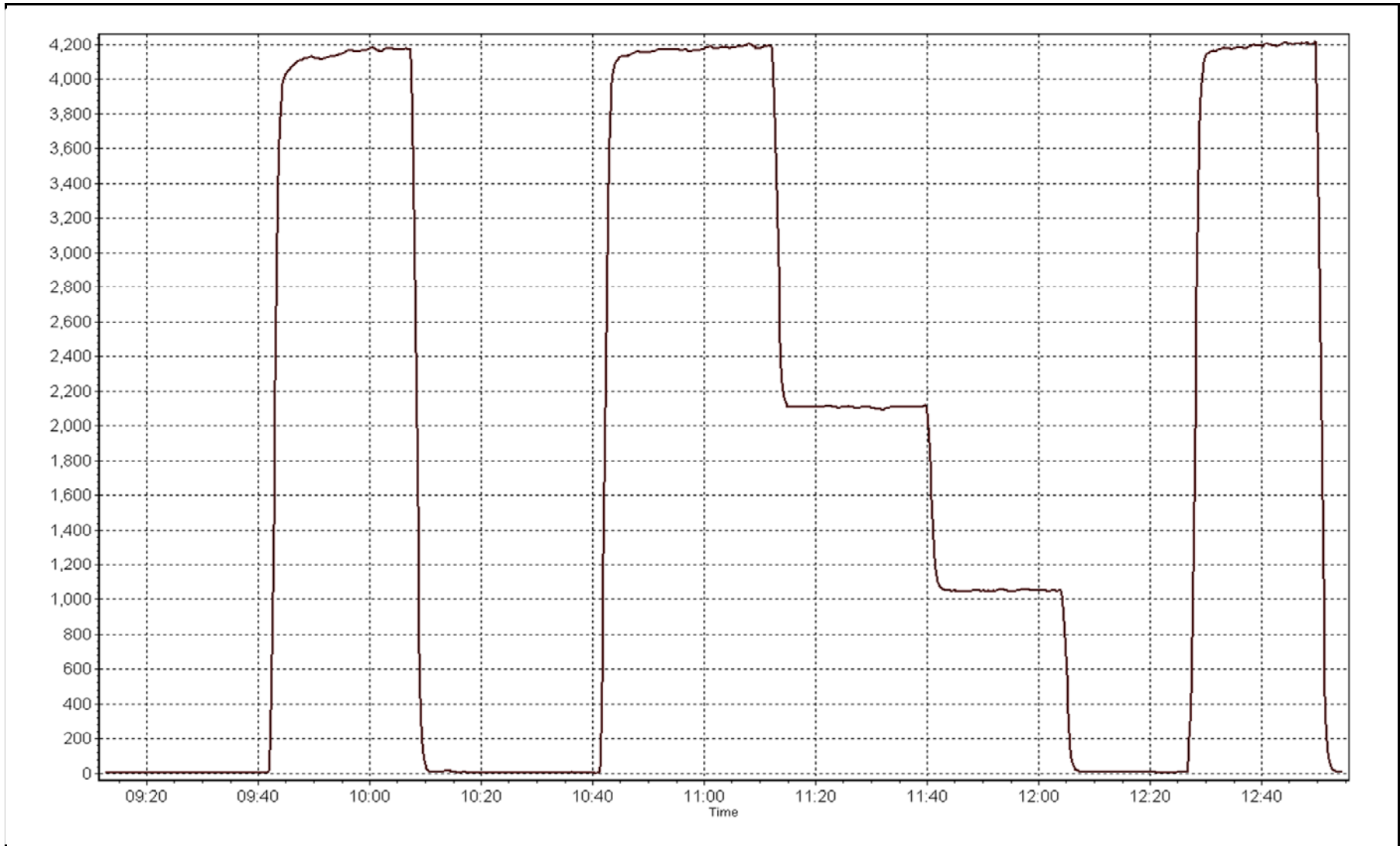
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999997
829.9	835.0	0.9938		
419.6	421.1	0.9966	Slope	0.994161
209.2	210.2	0.9955		
			Intercept	0.157525



SO2 Calibration Plot

Date: June 9, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 5, 2014
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:30
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)	-680	-681
Analyzer Range (mv)	5000	5000	Lamp voltage (v)	997	974
Calculated slope	0.996240	1.002757	Chamber temp. (deg C)	45	45
Calculated intercept	-0.236073	-0.098674	Pressure (mmHg)	647.8	617.9
Analyzer Background	1.52	1.52	Flow(LPM)	0.417	0.426
Analyzer Coefficient	0.885	0.858	Intensity(%)	89	90
			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	76.6	0.979
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	74.9	1.001
second point	5002	19.4	39.9	39.9	1.002
third point	5002	9.7	20.0	20.0	0.999
calibrator zero	5000	0.0	0.0	0.1	NA
as left zero	5000	0.0	0.0	0.0	NA
as left span	4999	36.4	75.0	75.3	0.996
Average Correction Factor					1.001

Corrected As found 76.4 Previous response 75.5 % change -1.2%

Notes:

Adjusted span.

Calibration Performed By: _____ Devin Russell



Wood Buffalo Environmental Association

H2S Calibration Summary

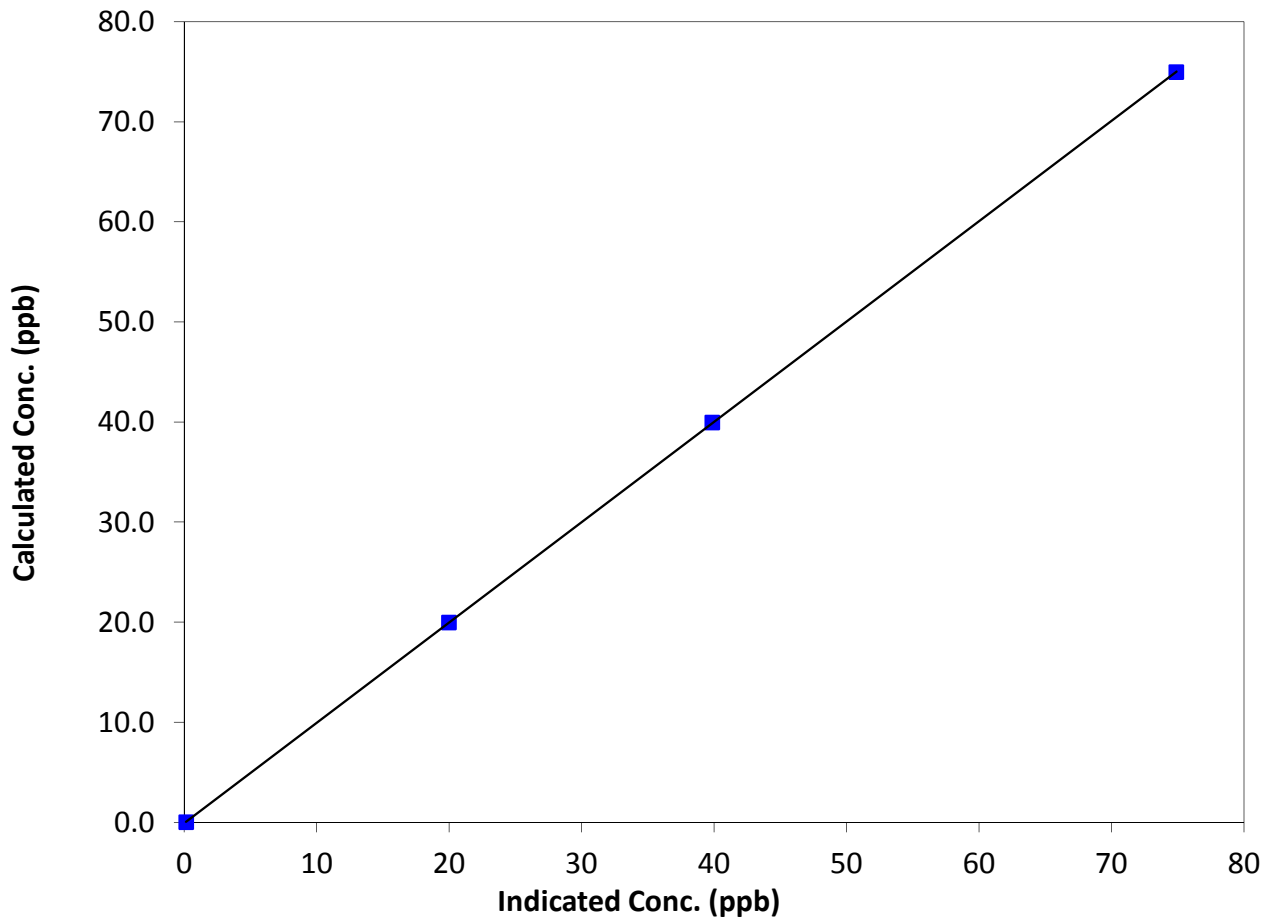
Station Information

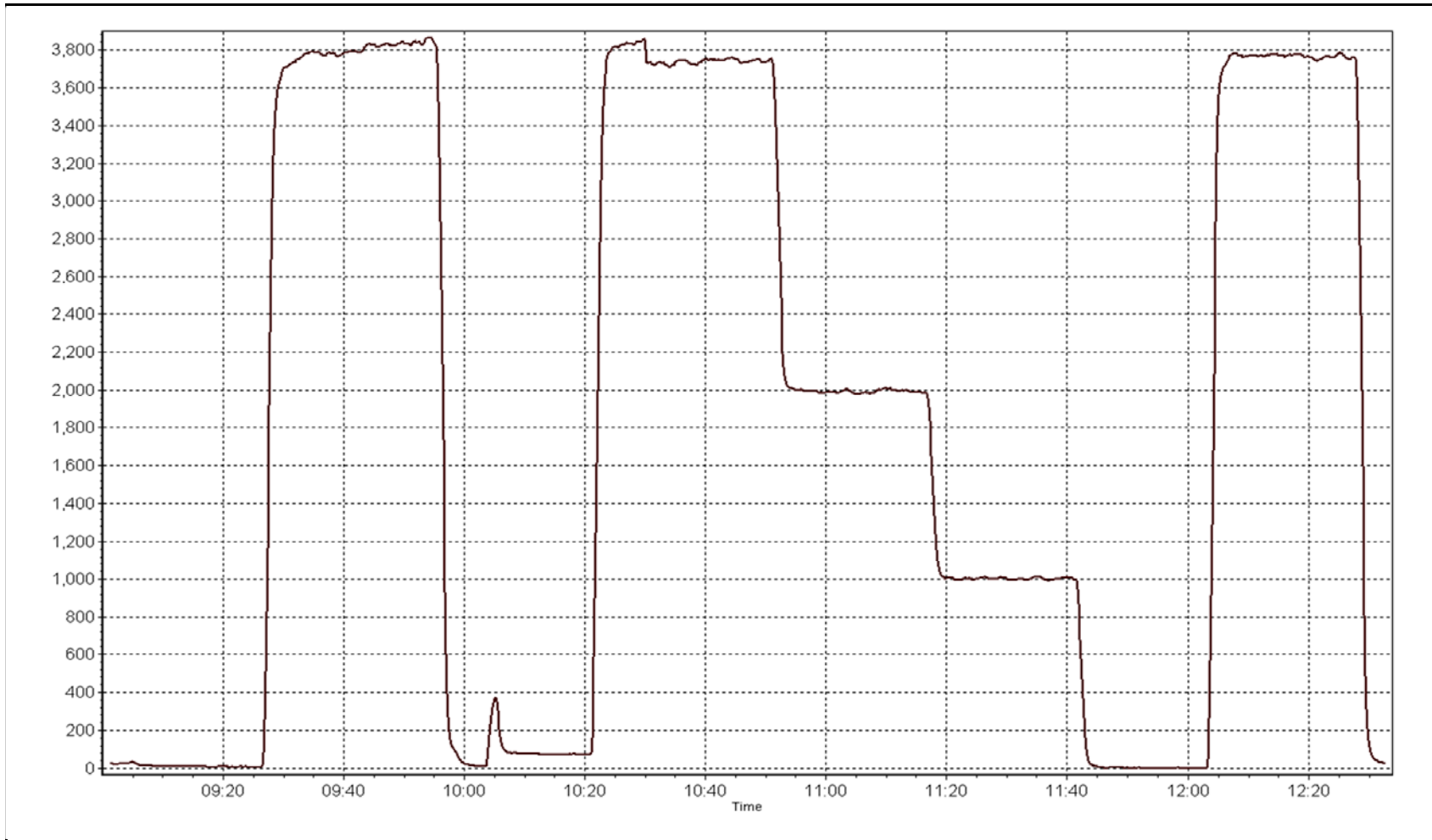
Calibration Date	June 17, 2014	Previous Calibration	May 5, 2014
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:00	End Time (MST)	12:30
Analyzer make	Thermo 43i	Analyzer serial #	1008841400

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999997
75.0	74.9	1.0009		
39.9	39.9	1.0020	Slope	1.002757
20.0	20.0	0.9989		
			Intercept	-0.098674

H2S Calibration Curve





SO2
scrubber



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	June 18, 2014	Previous Calibration	June 17, 2014
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Other: <input type="checkbox"/> Operational check <input checked="" type="checkbox"/>		
Start Time (MST)	8:20	End Time (MST)	9:40
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)	974	974
Calculated slope	1.007473	1.006726	Chamber temp. (deg C)	45	45
Calculated intercept	-0.165603	-0.122821	Pressure (mmHg)	617.9	599.5
Analyzer Background	1.52	1.52	Flow(LPM)	0.426	0.414
Analyzer Coefficient	0.858	0.858	Intensity(%)	90	90
			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	74.6	1.005
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	36.4	75.0	74.6	1.005
second point					
third point					
calibrator zero					
as left zero	5000	0.0	0.0	0.1	NA
as left span	4999	36.4	75.0	74.6	1.005
Average Correction Factor					1.005
Corrected As found	74.5	Previous response	74.6	% change	0.1%

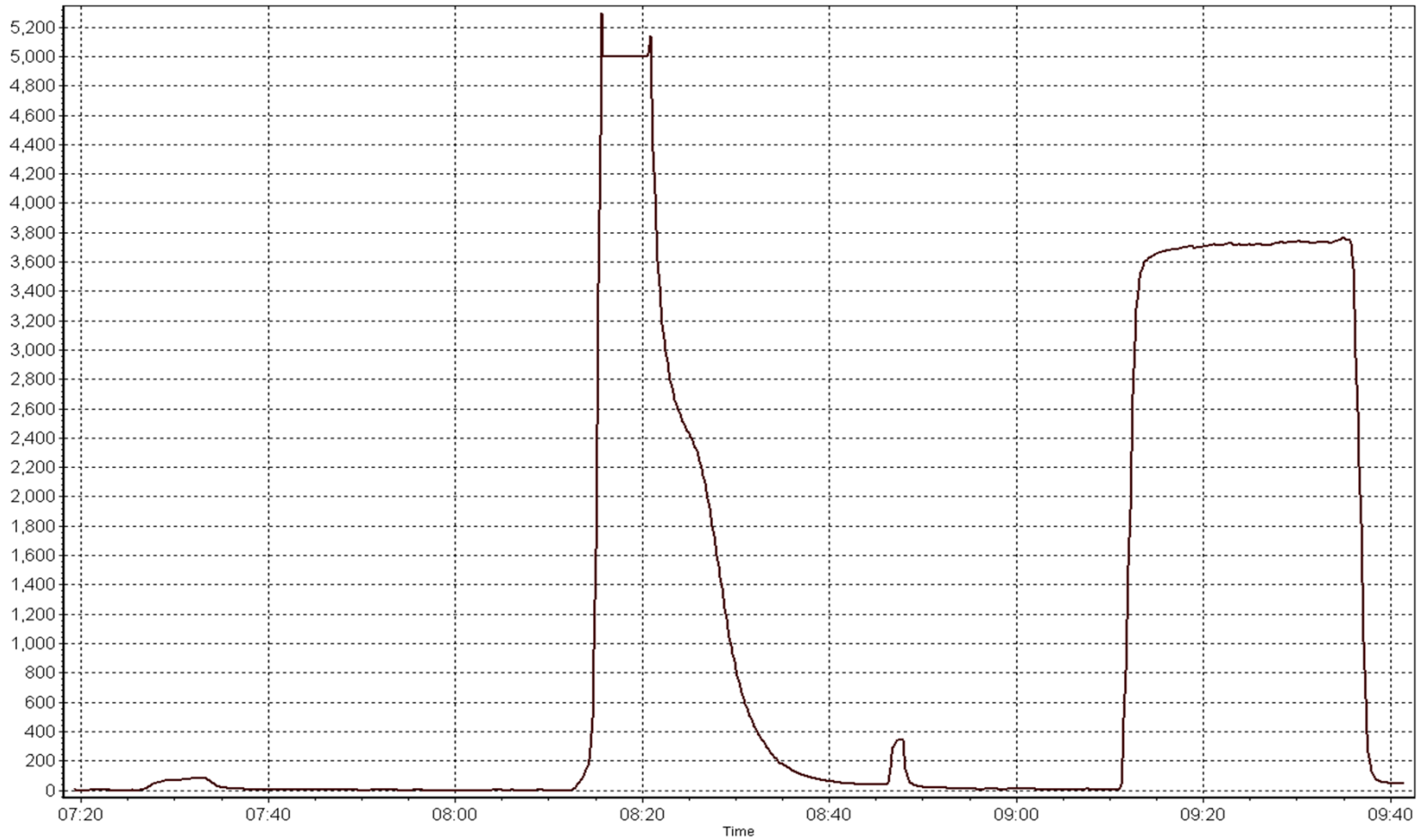
Notes:

No adjustments.

Calibration Performed By: Devin Russell

H2S Calibration Plot

Date: June 18, 2014



SO2
scrubber



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Monday, June 09, 2014	Previous Calibration	May-08-14
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	12:55
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	8.1	8.2
Analyzer Range (mv)	5000	5000	Air or Bypass press	37.8	37.8
Calculated slope	1.001880	1.003754	Fuel Pressure	25.2	24.2
Calculated intercept	0.021272	0.014635			

Analyzer make 51i-LT Analyzer serial # 1218153580

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.14	N/A
as found span	5001	80.9	17.37	15.88	1.094
calibrator zero	5000	0.0	0.00	-0.01	N/A
high point	5001	80.9	17.37	17.30	1.004
second point	5000	40.9	8.78	8.70	1.010
third point	5002	20.4	4.38	4.36	1.004
calibrator zero	5000	0.0	0.00	-0.01	N/A
as left zero	5000	0.0	0.00	-0.01	N/A
as left span	5000	80.9	17.37	17.42	0.997
Average Correction Factor					1.006

Corrected As found 16.03 Previous response 17.32 % change 8.0%

Notes:

Adjusted zero and span adjusted. Diagnostics all appear within normal specifications.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

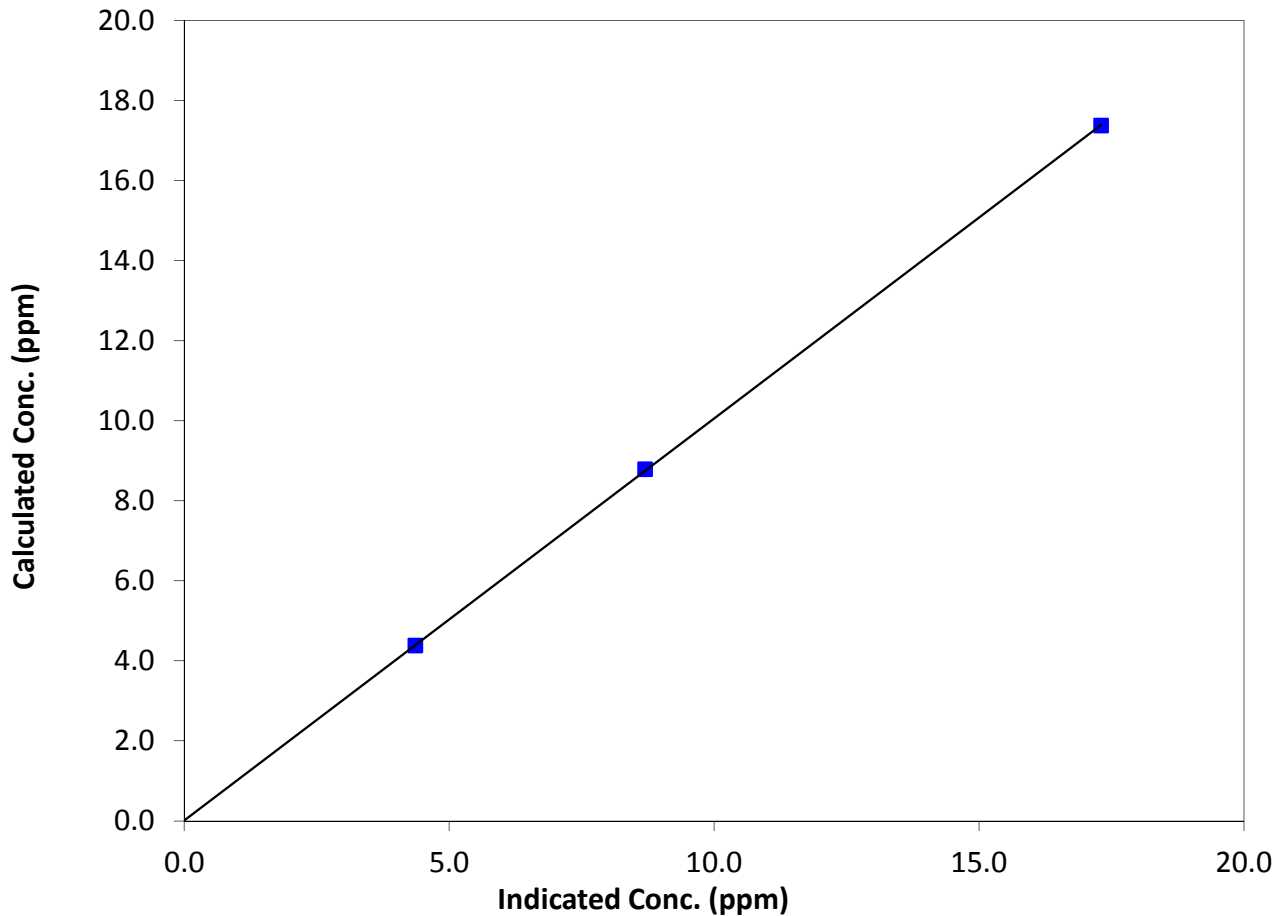
Station Information

Calibration Date	June 9, 2014	Previous Calibration	May-08-14
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:20	End Time (MST)	12:55
Analyzer make	51i-LT	Analyzer serial #	1218153580

Calibration Data

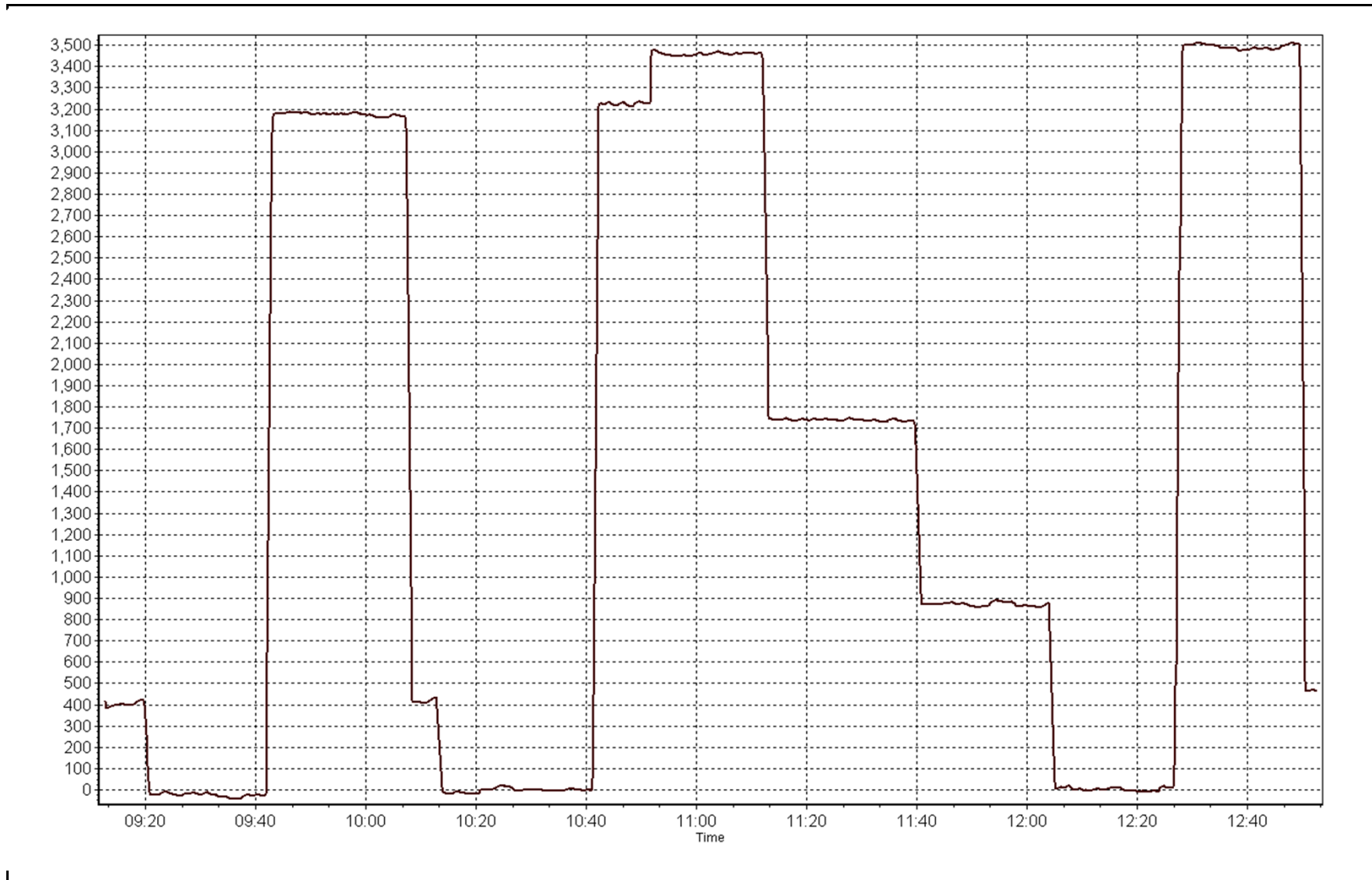
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	N/A	Correlation Coefficient	0.999989
17.37	17.30	1.0038		
8.78	8.70	1.0095	Slope	1.003754
4.38	4.36	1.0036		
			Intercept	0.014635

THC Calibration Curve



THC Calibration Plot

Date: June 9, 2014



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 12
MILLENNIUM MINE
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)

JUNE 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	36	39	99.58	31	0	3	0
TRS(ppb) Average	687	33	33	100.00	3	0	1	0
THC(ppm) Average	670	34	50	97.78	4.5	-	2.7	-
NO2(ppb) Average	682	36	38	99.72	36	0	12	-
NO(ppb) Average	682	36	38	99.72	166	-	17	-
NOX(ppb) Average	682	36	38	99.72	187	-	26	-
PM2.5(ug/m3) Average	718	0	2	99.72	85.1	-	25.8	0
Temperature 2 m (C) Average	720	0	0	100.00	27.7	-	21.3	-
Wind Speed 10 m (km/h) Average	717	0	3	99.58	25	-	-	-
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 - MILLENNIUM MINE (AMS 12)
 JUNE 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	0.5	2	-	0	0	0	0	0	1	31
TRS(ppb) Average	687	0.2	0	-	0	0	0	0	0	1	3
THC(ppm) Average	670	2.35	0.3	-	2	2.1	2.1	2.2	2.4	2.7	4.5
NO2(ppb) Average	682	8.1	7	-	0	1	2	6	13	19	36
NO(ppb) Average	682	5.2	13	-	0	0	1	1	4	11	166
NOX(ppb) Average	682	13.3	18	-	0	2	3	7	18	31	187
PM2.5(ug/m3) Average	718	9.08	10.4	-	0.8	2.1	3.9	6.4	10.1	16.9	85.1
Temperature 2 m (C) Average	720	16.23	5.3	-	4.5	8.9	12.4	16.3	20.3	23.4	27.7
Wind Speed 10 m (km/h) Average	717	7.9	5	-	0	3	5	7	10	14	25
Wind Direction 10 m (deg) Average	717	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -MILLENNIUM MINE (AMS 12)
JUNE 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	16 Jun 2014 10:00	16 Jun 2014 12:00	3	Maintenance - verify analyzer response after missed daily span
THC	15 Jun 2014 21:00	16 Jun 2014 12:00	16	Analyzer power interruption after AC failed
NO2, NO, NOX	16 Jun 2014 11:00	16 Jun 2014 12:00	2	Maintenance - verify analyzer response after missed daily span
PM2.5	13 Jun 2014 10:00	13 Jun 2014 10:00	1	Maintenance - Flow and zero check, sample head cleaning
PM2.5	16 Jun 2014 11:00	16 Jun 2014 11:00	1	Maintenance - verify analyzer response
Wind Speed, Wind Direction	02 Jun 2014 22:00	02 Jun 2014 23:00	2	Flatline in sensor output signal
Wind Speed, Wind Direction	20 Jun 2014 06:00	20 Jun 2014 06:00	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: 31 ppb on Jun 28 11:00	Maximum Daily Average: 3.4 ppb on Jun 28		Hours of Data:	681
Minimum Value: 0 ppb on Jun 4 01:00	Minimum Daily Average: 0.1 ppb on Jun 4		Hours of Missing Data:	39
Maximum Diurnal Average: 1.8 ppb at hour 11	Minimum Diurnal Average: 0.2 ppb at hour 24		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 = 7		Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
2-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.3	1
3-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
5-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Jun	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
7-Jun	0	Z	0	0	0	0	0	1	4	9	6	1	0	1	1	4	6	10	5	0	0	0	0	0	2.1	10
8-Jun	0	Z	0	0	0	0	0	0	1	3	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0.7	4
9-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	1	0	0.3	1
11-Jun	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
12-Jun	1	Z	1	1	1	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	--	1
13-Jun	0	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-Jun	0	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-Jun	0	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
16-Jun	0	Z	0	0	0	0	0	0	0	0	M	M	M	0	0	0	0	0	0	0	0	0	0	0	0.4	0
17-Jun	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
18-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
19-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Jun	0	Z	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
21-Jun	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0.4	1
22-Jun	0	Z	0	0	0	0	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
23-Jun	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
24-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1
26-Jun	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0.4	1
27-Jun	0	Z	0	0	0	0	1	0	0	0	2	4	3	1	1	1	0	0	0	0	0	0	0	0	0.8	4
28-Jun	0	Z	0	0	0	0	0	1	1	7	31	13	10	7	1	1	1	1	0	0	0	0	0	0	3.4	31
29-Jun	0	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
30-Jun	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1

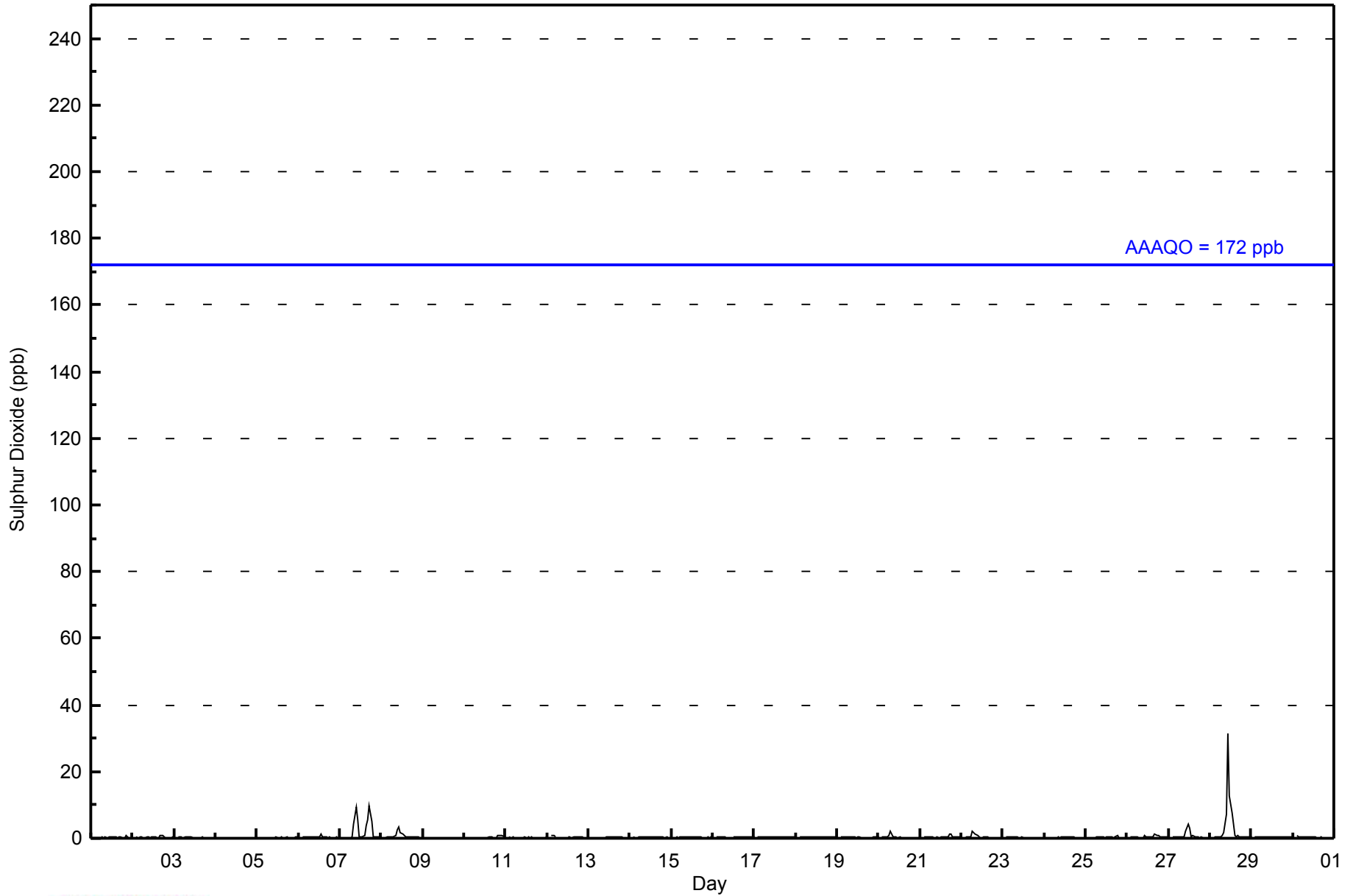
0.2	--	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.9	1.8	0.9	0.7	0.6	0.3	0.4	0.5	0.6	0.5	0.2	0.3	0.2	0.2	0.2	0.2	Diurnal Average
1	--	1	1	1	1	2	2	4	9	31	13	10	7	1	4	6	10	5	1	1	1	1	0	Diurnal Maximum	

Z - zerspan 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
Millennium - June 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Millennium - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	679	99.71	99.71
11 - 20	1	0.15	99.85
21 - 60	1	0.15	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Millennium - June 2014

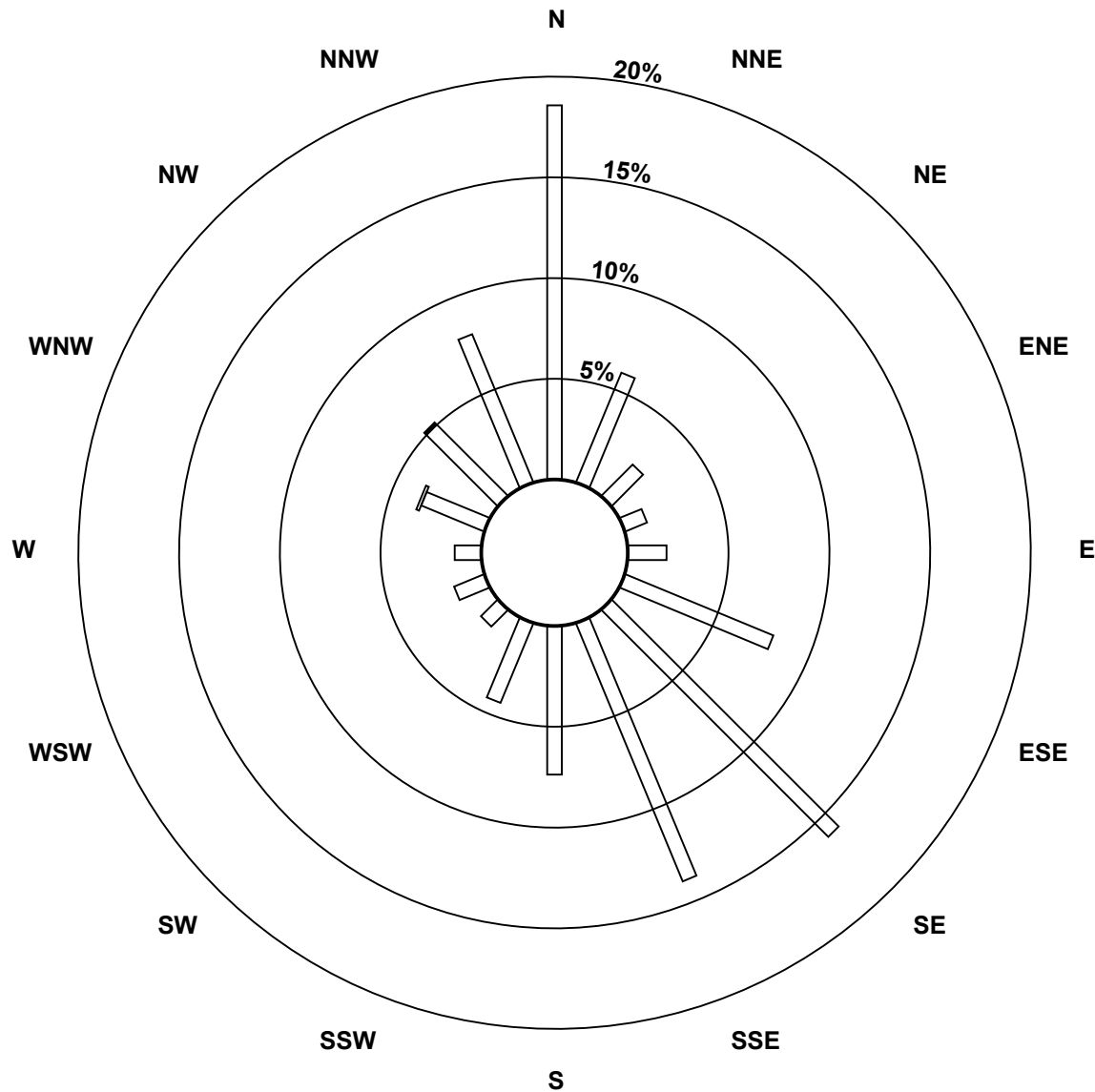
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	126	40	15	8	13	54	108	94	50	29	8	11	9	23	34	54	676
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	126	40	15	8	13	54	108	94	50	29	8	11	9	24	35	54	678

Total Number of Valid Hours: 678

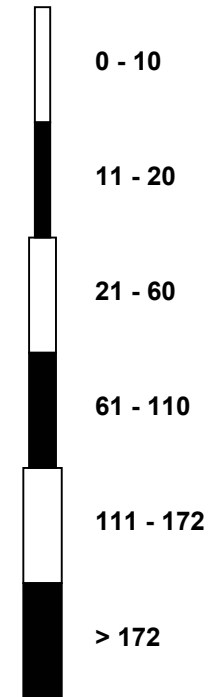
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Sulphur Dioxide (SO₂) - ppb
Millennium (AMS 12)



Classes (ppb)

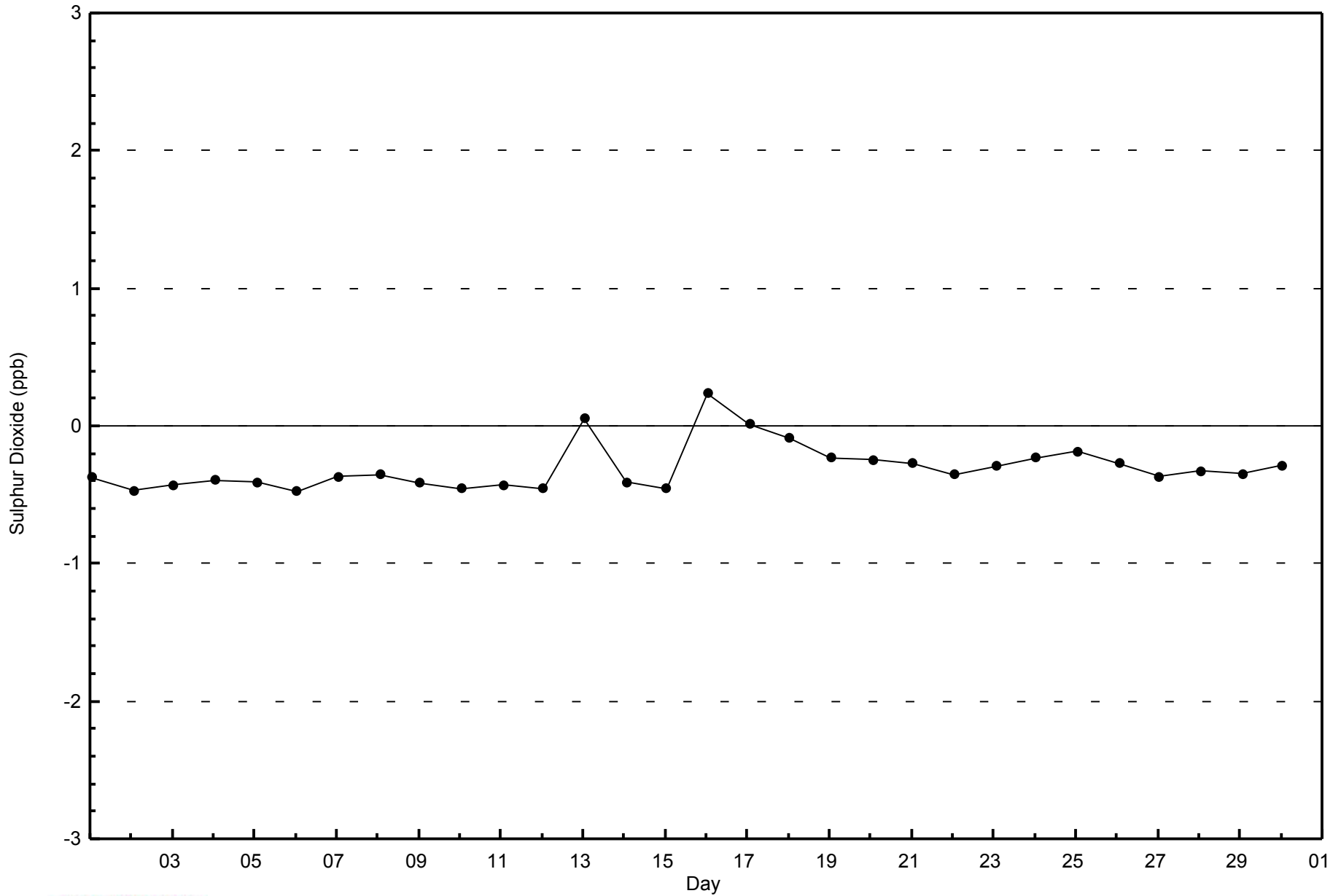


Total Number of Valid Hours: 678



WBEA
Zero Responses

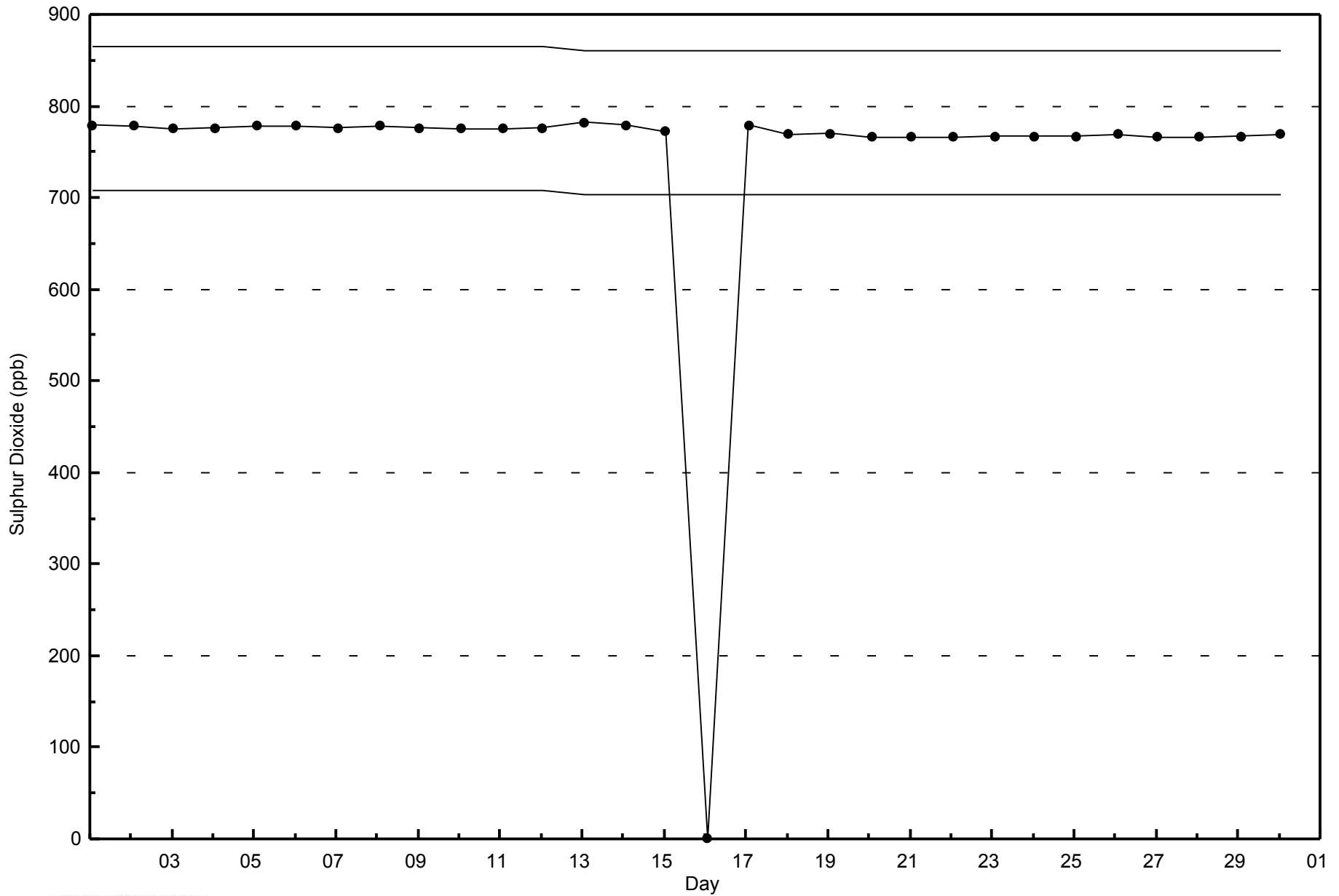
Sulphur Dioxide (SO₂) - ppb
Millennium - June 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Millennium - June 2014





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 3 ppb on Jun 29 22:00	Maximum Daily Average: 0.7 ppb on Jun 29
Minimum Value: 0 ppb on Jun 1 11:00	Hours of Data: 687
Maximum Diurnal Average: 0.4 ppb at hour 8	Hours of Missing Data: 33
Monthly Average: 0.2 ppb	Hours of Calibration: 33
Minimum Daily Average: 0.0 ppb on Jun 4	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.1 ppb at hour 14	
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-Jun	0	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-Jun	0	0	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-Jun	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
4-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
5-Jun	0	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
6-Jun	0	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-Jun	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
8-Jun	0	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-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.1	1
11-Jun	0	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-Jun	1	1	Z	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
13-Jun	0	0	Z	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Jun	0	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-Jun	0	0	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
17-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1
20-Jun	0	0	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.5	2
21-Jun	3	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0.5	3
22-Jun	0	0	Z	1	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
23-Jun	0	0	Z	1	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
24-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	1	1	0	0	1	0	0	0	0	0	0.3	1
27-Jun	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
28-Jun	0	0	Z	1	1	1	1	1	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0.6	2
29-Jun	0	1	Z	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	1	3	2	1	0.7	3
30-Jun	1	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1

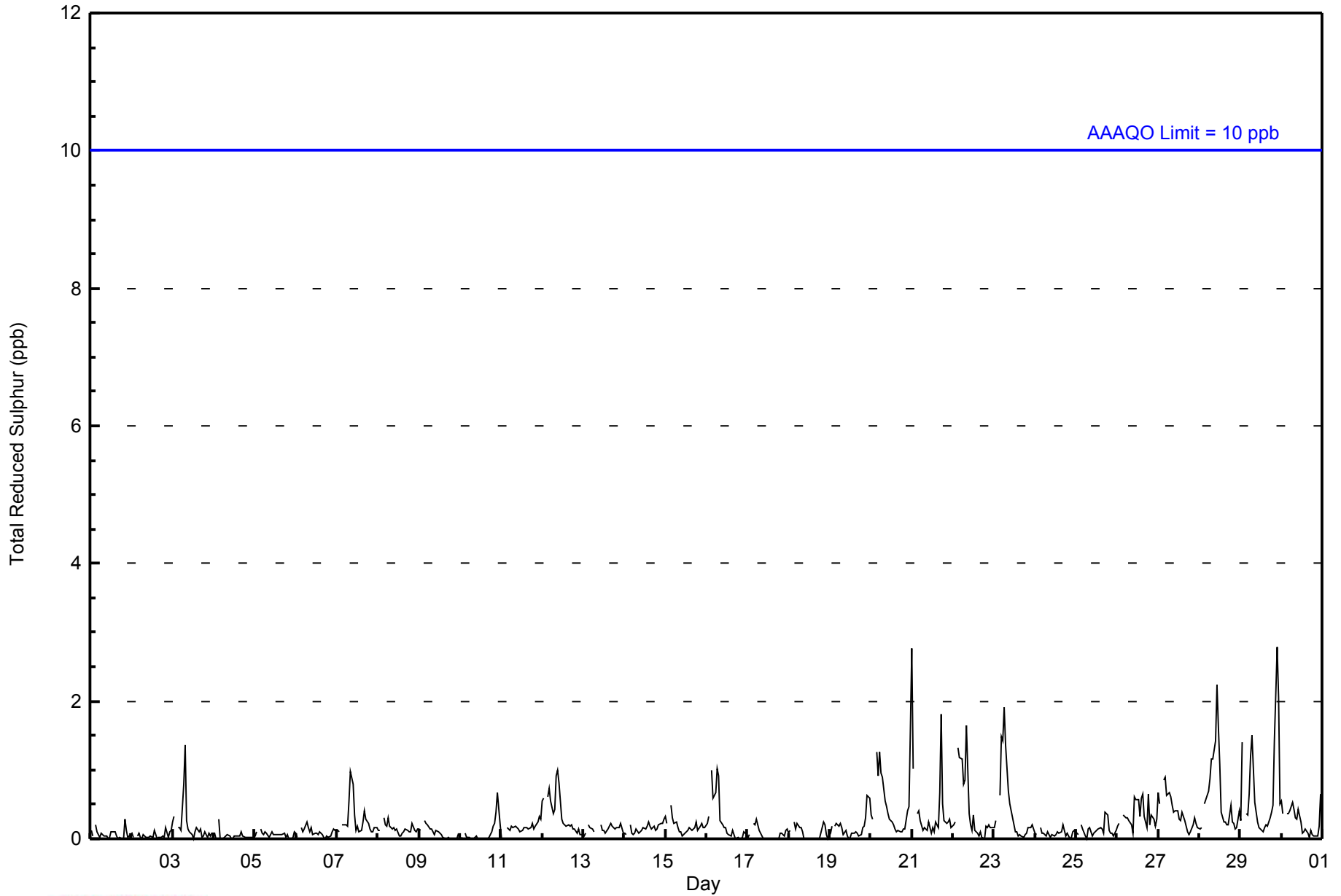
0.3	0.2	--	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	Diurnal Average
3	1	--	1	1	1	2	2	2	1	2	2	1	0	1	1	1	2	1	0	1	3	2	2	2	Diurnal Maximum

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



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Millennium - June 2014





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Millennium - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	685	99.71	99.71
3 - 4	2	0.29	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 687

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Millennium - June 2014

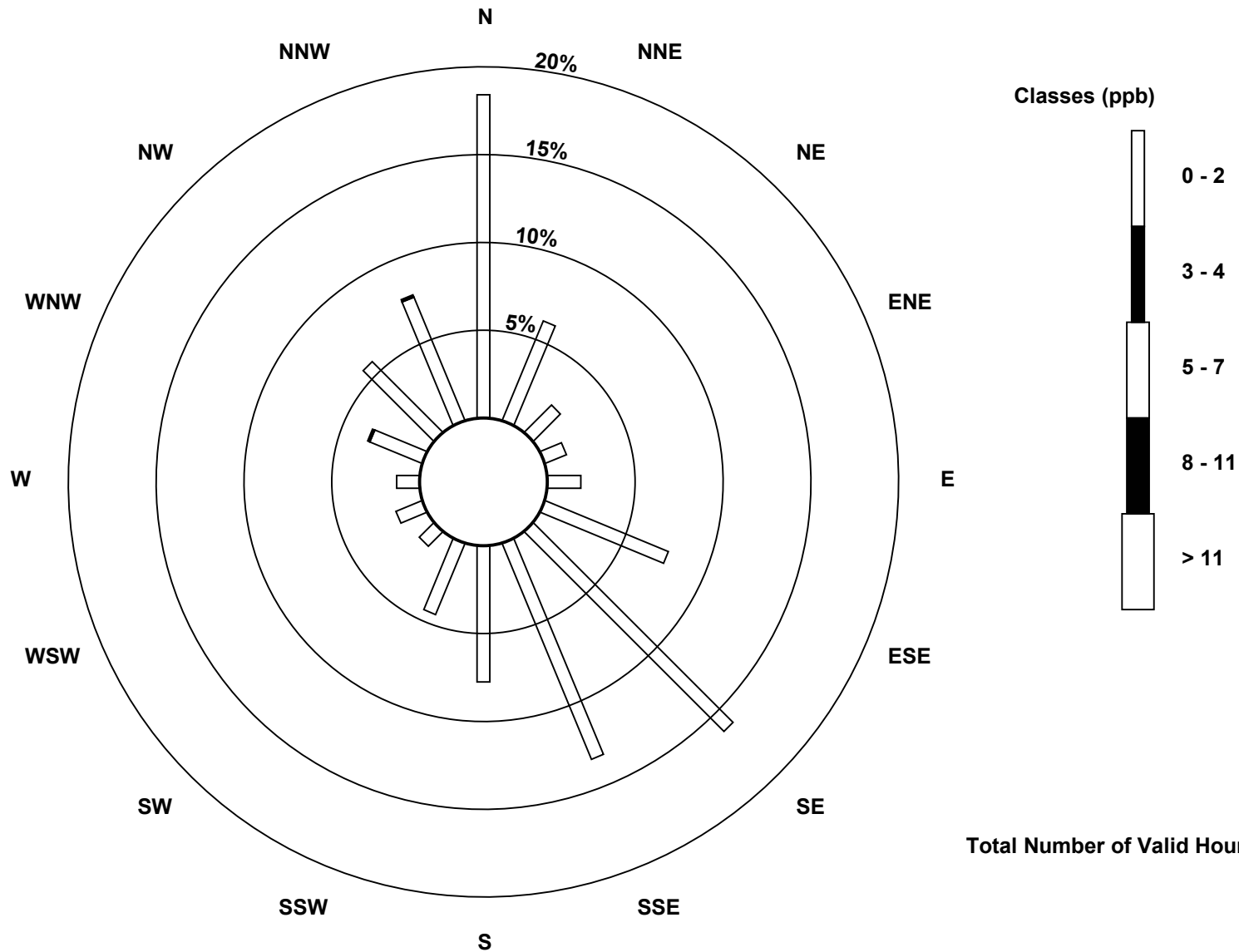
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	126	42	15	9	13	52	110	91	53	30	8	11	9	22	39	52	682
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	126	42	15	9	13	52	110	91	53	30	8	11	9	23	39	53	684

Total Number of Valid Hours: 684

Total Number of Hours: 720

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

**Total Reduced Sulphur (TRS) - ppb
Millennium (AMS 12)**

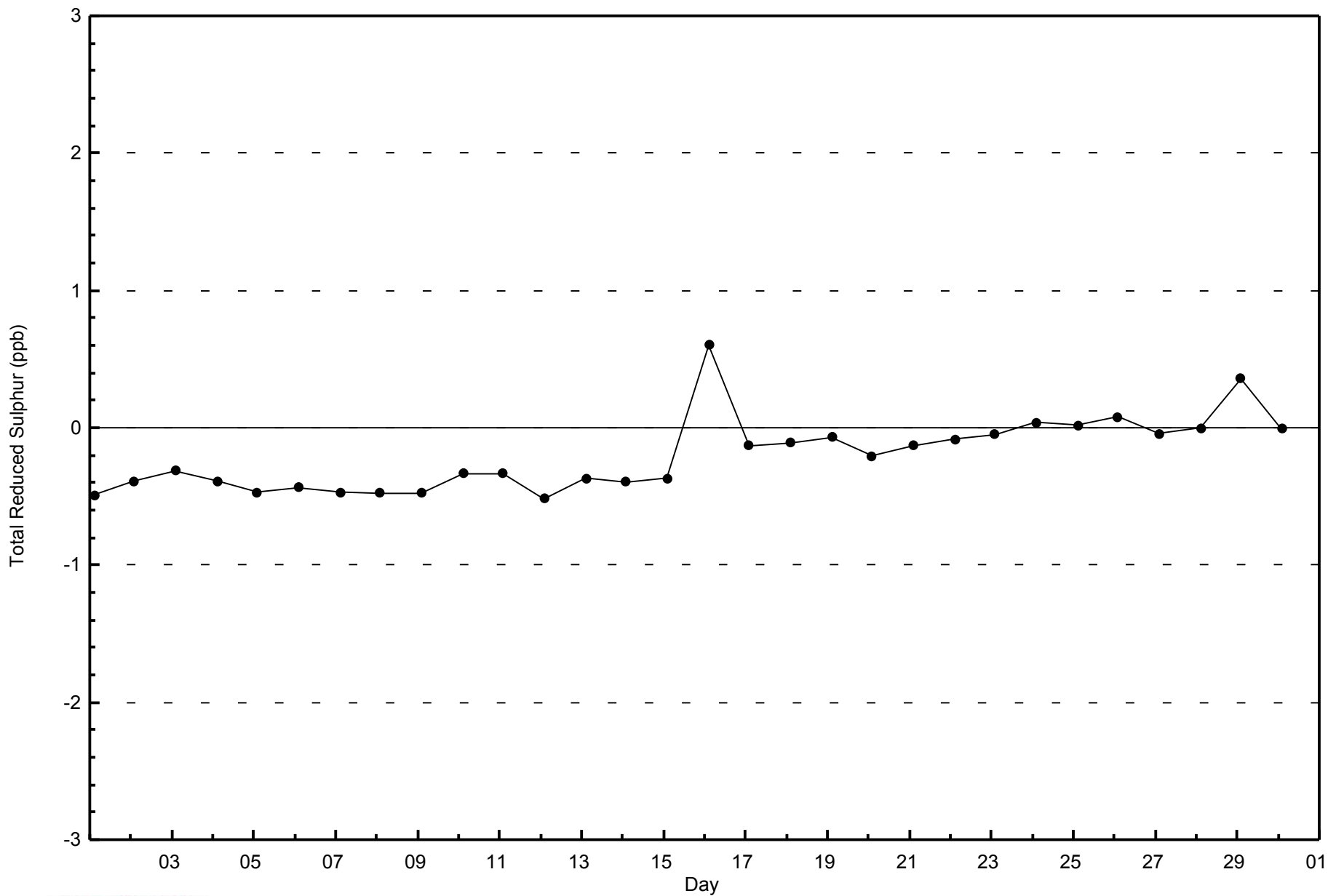


Total Number of Valid Hours: 684



WBEA
Zero Responses

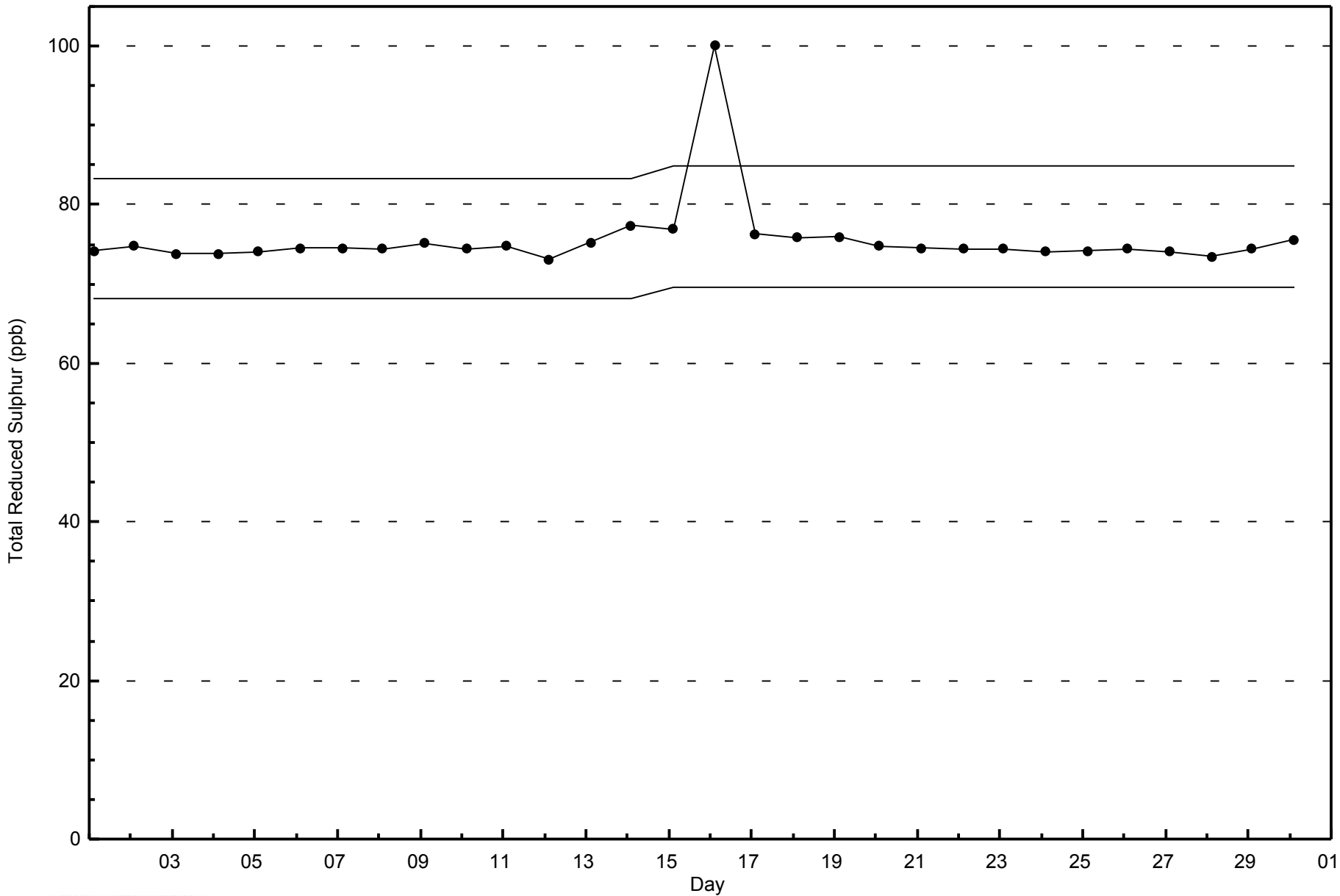
Total Reduced Sulphur (TRS) - ppb
Millennium - June 2014





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Millennium - June 2014



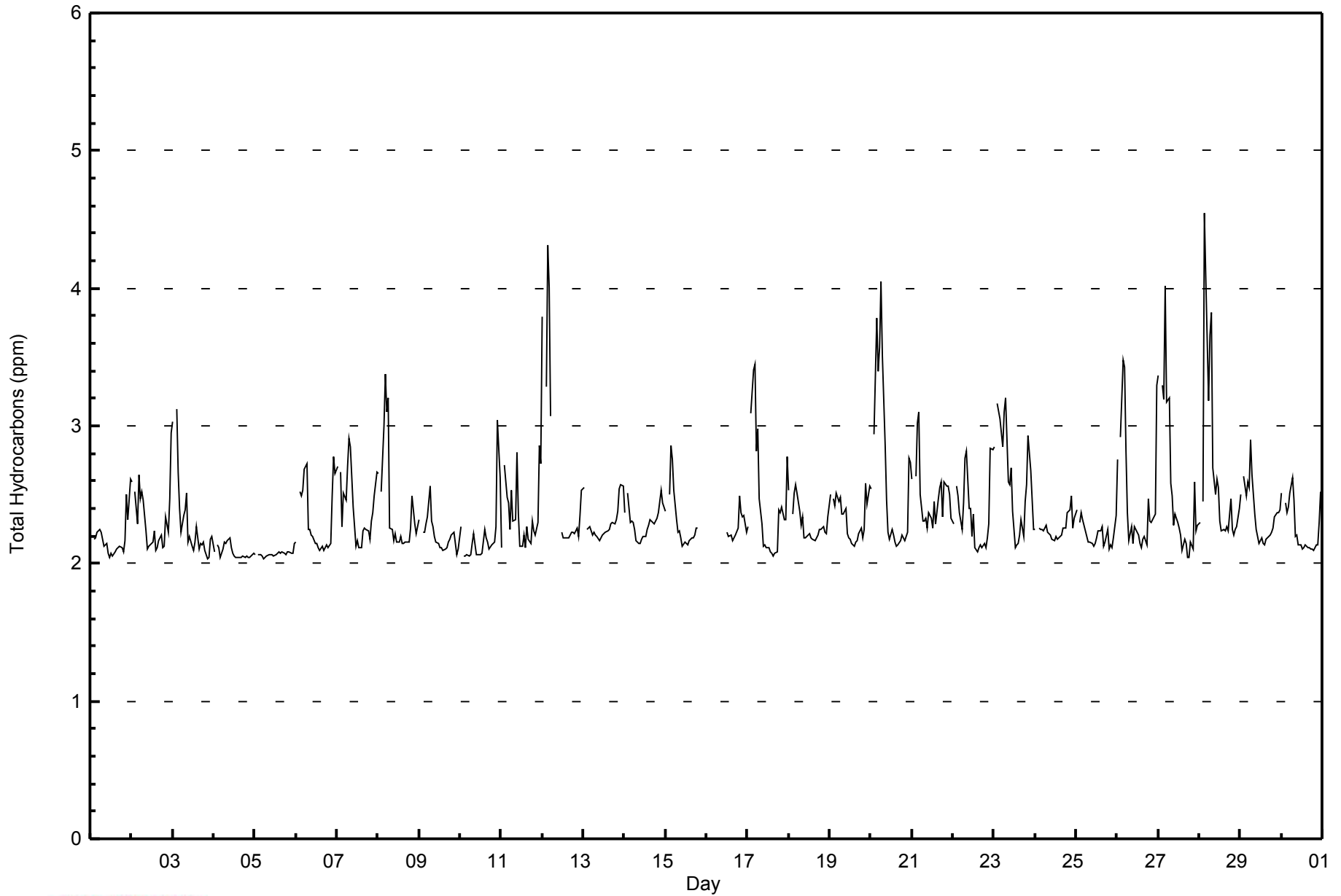


Maximum Value: 4.5 ppm on Jun 28 04:00		Maximum Daily Average: 2.7 ppm on Jun 28		Hours in Service: 720																							
Minimum Value: 2.0 ppm on Jun 3 21:00		Minimum Daily Average: 2.1 ppm on Jun 5		Hours of Data: 670																							
Maximum Diurnal Average: 2.7 ppm at hour 5		Minimum Diurnal Average: 2.2 ppm at hour 15		Hours of Missing Data: 50																							
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 = 2.7 P ₉₉ = 3.8		Hours of Calibration: 34																							
				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-Jun	2.2	Z	2.2	2.2	2.2	2.3	2.2	2.2	2.1	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5	2.3	2.6	2.2	2.6	
2-Jun	2.6	Z	2.5	2.3	2.6	2.5	2.5	2.5	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.3	2.2	2.5	3.0	2.3	3.0	
3-Jun	3.0	Z	3.1	2.7	2.4	2.2	2.3	2.4	2.5	2.2	2.2	2.1	2.1	2.2	2.3	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.2	2.2	2.3	3.1	
4-Jun	2.1	Z	2.1	2.1	2.0	2.1	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.2	
5-Jun	2.1	Z	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	2.1	
6-Jun	2.2	Z	2.5	2.5	2.5	2.7	2.7	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	2.5	2.8	2.7	2.3	2.8	
7-Jun	2.7	Z	2.7	2.3	2.5	2.5	2.7	2.9	2.8	2.4	2.3	2.1	2.2	2.1	2.1	2.2	2.3	2.2	2.2	2.2	2.3	2.4	2.5	2.7	2.4	2.9	
8-Jun	2.7	Z	2.5	3.0	3.4	3.1	3.2	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.5	2.3	2.2	2.3	2.4	3.4	
9-Jun	2.3	Z	2.2	2.2	2.3	2.3	2.6	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.6	
10-Jun	2.3	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	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.3	3.0	2.6	2.2	3.0	
11-Jun	2.1	Z	2.7	2.5	2.4	2.2	2.5	2.3	2.3	2.8	2.4	2.1	2.1	2.2	2.1	2.3	2.2	2.1	2.3	2.2	2.2	2.3	2.9	2.7	2.4	2.9	
12-Jun	3.8	Z	3.3	4.3	4.0	3.1	C	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.5	2.6	4.3	
13-Jun	2.6	Z	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.6	2.6	2.3	2.6	
14-Jun	2.4	Z	2.5	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.4	2.4	2.3	2.5	
15-Jun	2.4	Z	2.5	2.9	2.8	2.5	2.3	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	PF	PF	PF	PF	2.3	2.9	
16-Jun	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.4	2.3	2.3	2.2	--	2.5	
17-Jun	2.3	Z	3.1	3.4	3.4	2.8	3.0	2.5	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.4	2.3	2.3	2.8	2.4	3.4	
18-Jun	2.5	Z	2.4	2.5	2.6	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.6	
19-Jun	2.5	Z	2.5	2.4	2.5	2.4	2.5	2.4	2.4	2.4	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.6	2.4	2.6	2.3	2.6	
20-Jun	2.5	Z	2.9	3.8	3.4	3.6	4.0	3.5	2.9	2.5	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.8	2.7	2.6	4.0	
21-Jun	2.6	Z	2.6	3.0	3.1	2.5	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.4	2.3	2.5	2.6	2.6	2.3	2.6	2.6	2.6	2.5	2.3	2.5	3.1	
22-Jun	2.3	Z	2.6	2.5	2.4	2.3	2.4	2.8	2.8	2.4	2.4	2.2	2.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.8	2.8	2.4	2.8	
23-Jun	2.8	Z	3.2	3.1	3.0	2.8	3.1	3.2	2.6	2.6	2.7	2.4	2.1	2.1	2.1	2.2	2.3	2.2	2.5	2.6	2.9	2.7	2.5	2.2	2.6	3.2	
24-Jun	2.2	Z	2.3	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	2.3	2.3	2.3	2.4	2.4	2.5	2.3	2.3	2.3	2.5	
25-Jun	2.4	Z	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.3	2.2	2.4	
26-Jun	2.8	Z	2.9	3.5	3.4	2.8	2.4	2.2	2.3	2.1	2.3	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.5	2.3	2.3	2.3	2.4	3.3	2.5	3.5	
27-Jun	3.4	Z	3.3	3.2	4.0	3.2	3.2	2.6	2.5	2.3	2.4	2.3	2.3	2.2	2.1	2.2	2.1	2.0	2.0	2.2	2.1	2.6	2.2	2.3	2.5	4.0	
28-Jun	2.3	Z	2.4	4.5	4.1	3.2	3.7	3.8	2.7	2.5	2.6	2.6	2.3	2.2	2.3	2.2	2.3	2.2	2.5	2.3	2.2	2.2	2.3	2.4	2.7	4.5	
29-Jun	2.5	Z	2.6	2.5	2.6	2.6	2.9	2.6	2.4	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.9	
30-Jun	2.5	Z	2.4	2.4	2.4	2.5	2.6	2.5	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	2.3	2.5	2.3	2.6	
		2.5	--	2.6	2.7	2.7	2.5	2.6	2.5	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.5	Diurnal Average		
		3.8	--	3.3	4.5	4.1	3.6	4.0	3.8	2.9	2.8	2.7	2.6	2.4	2.4	2.3	2.5	2.6	2.6	2.5	2.6	2.9	2.7	3.0	3.3	Diurnal Maximum	
Z - zerspan		C - Calibration					PF - Power Failure																				



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Millennium - June 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Millennium - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	15	2.24	2.24
2.1 - 3.0	619	92.39	94.63
3.1 - 10.0	36	5.37	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 670

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Millennium - June 2014

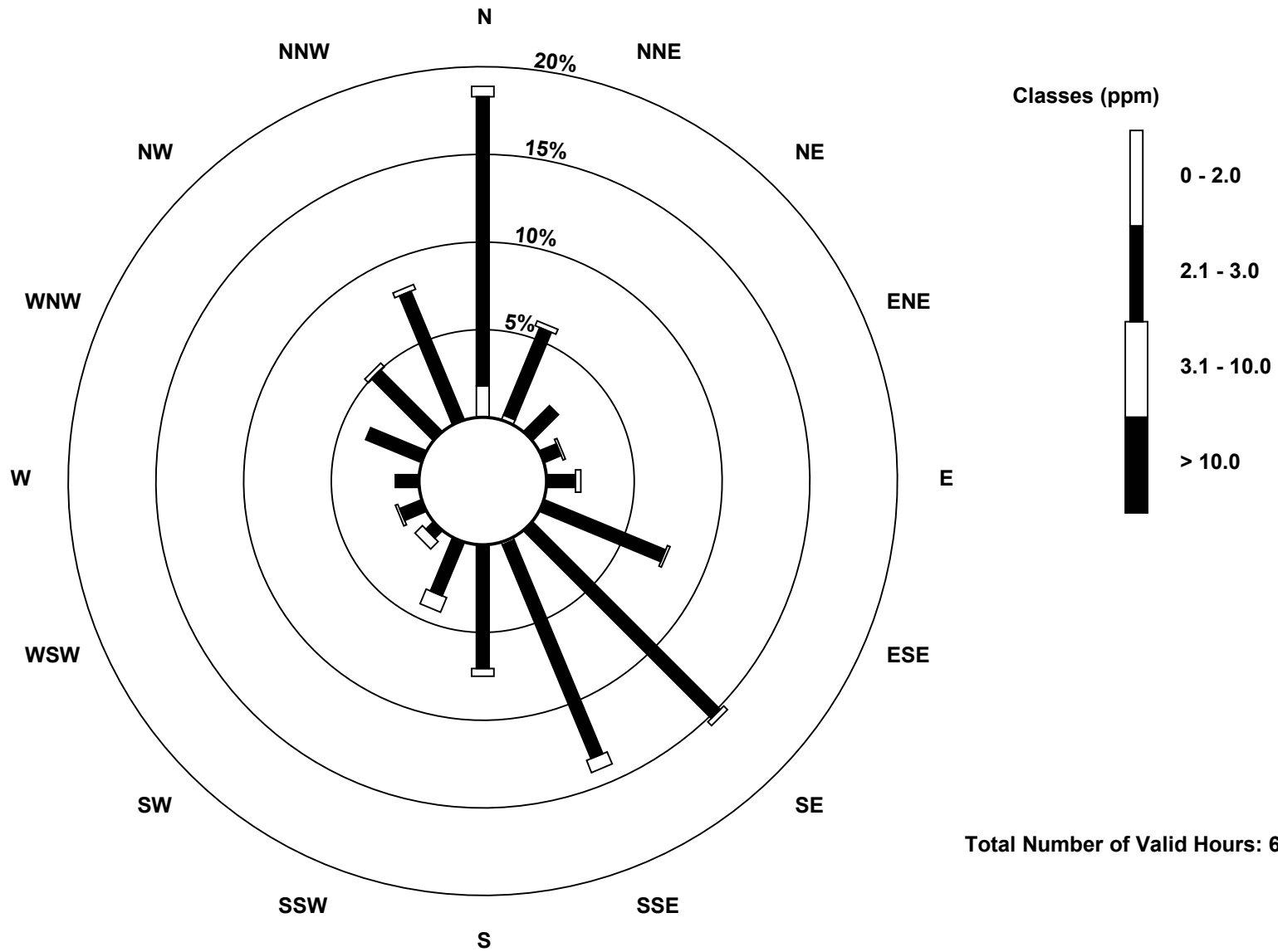
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	12	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	15
2.1 - 3.0	110	36	14	7	11	50	101	88	47	22	4	9	9	23	33	53	617
3.1 - 10.0	4	2	0	1	2	1	2	5	3	6	4	1	0	0	2	2	35
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	126	40	14	8	13	51	103	94	50	28	8	10	9	23	35	55	667

Total Number of Valid Hours: 667

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

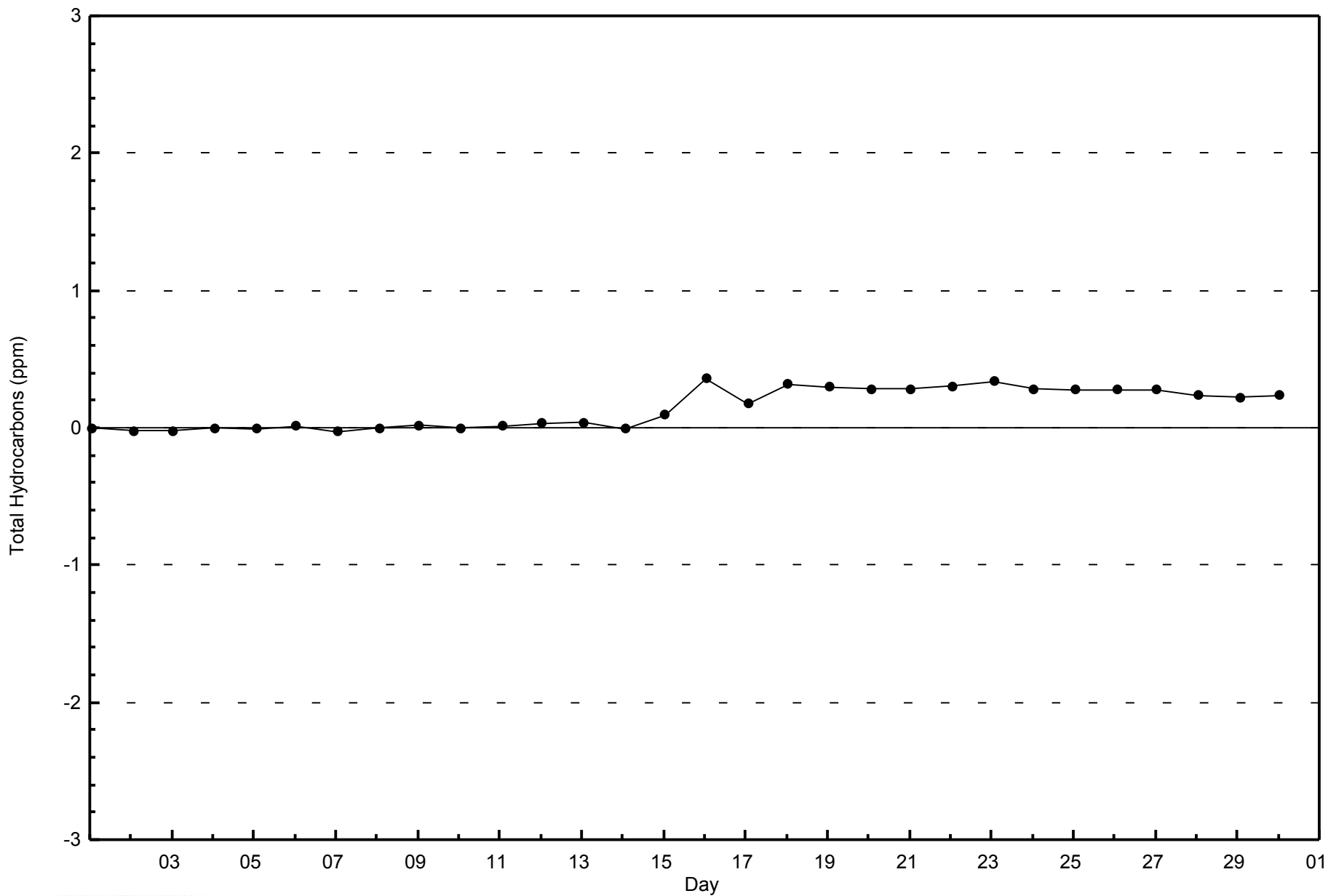
Total Hydrocarbons (THC) - ppm
Millennium (AMS 12)





WBEA
Zero Responses

Total Hydrocarbons (THC) - ppm
Millennium - June 2014

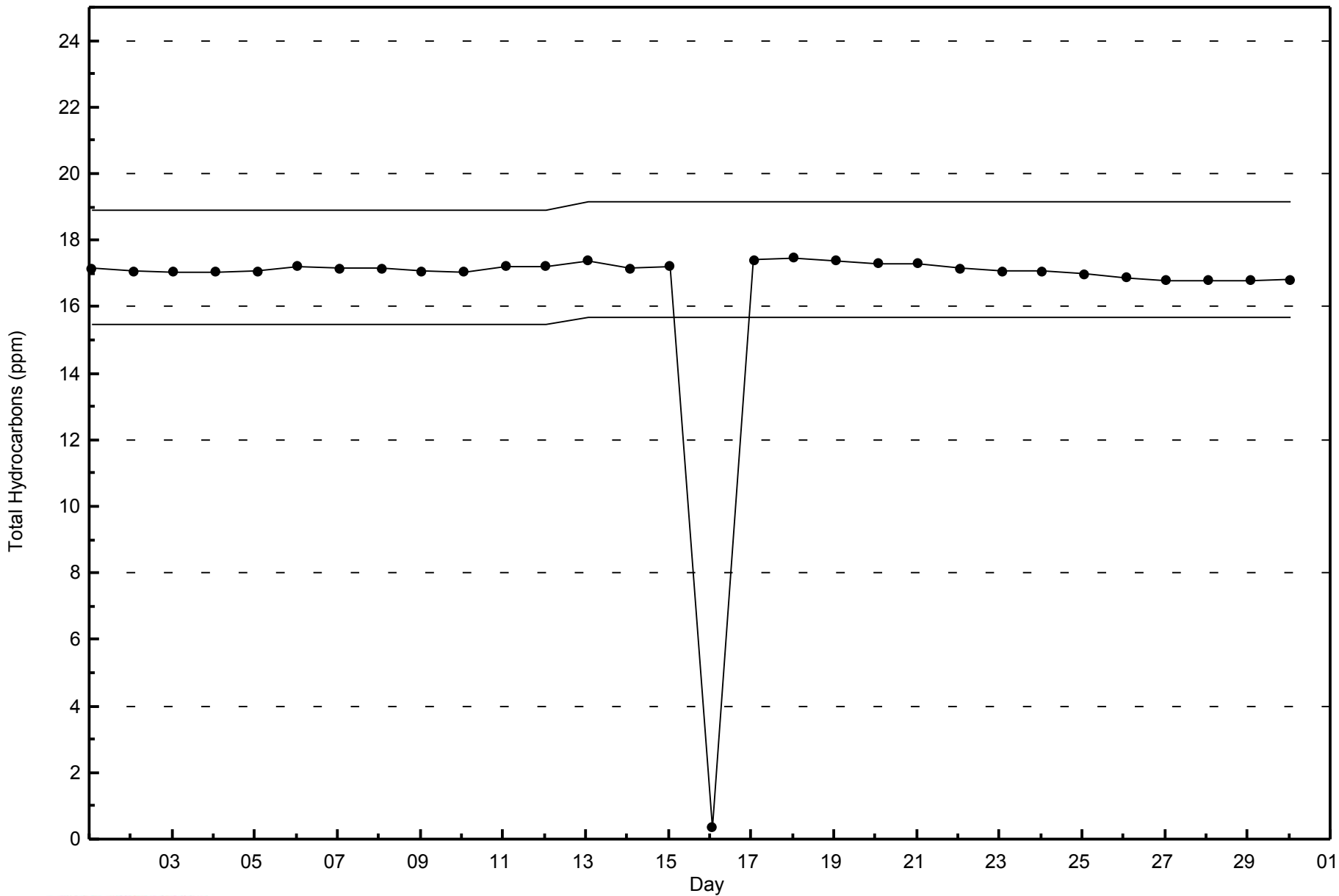




WBEA
Span Responses

Total Hydrocarbons (THC) - ppm

Millennium - June 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

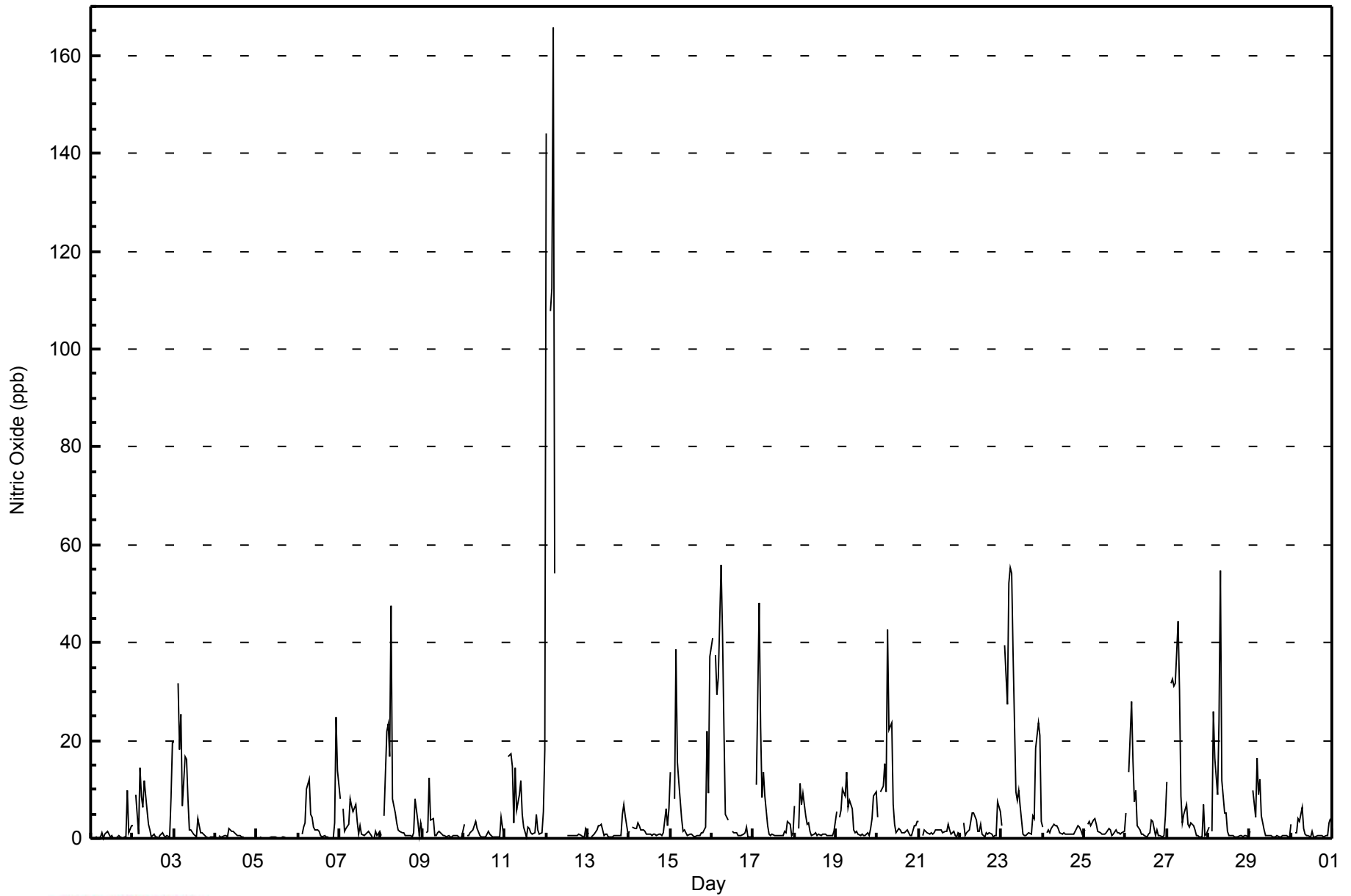
Millennium - June 2014

Maximum Value: 166 ppb on Jun 12 05:00																		Maximum Daily Average: 16.7 ppb on Jun 23						Hours in Service: 720			
Minimum Value: 0 ppb on Jun 1 03:00																		Minimum Daily Average: 0.1 ppb on Jun 5						Hours of Data: 682			
Maximum Diurnal Average: 17.0 ppb at hour 5																		Minimum Diurnal Average: 0.7 ppb at hour 20						Hours of Missing Data: 38			
Monthly Average: 5.2 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 4 P ₉₀ = 11 P ₉₉ = 55						Hours of Calibration: 36			
																		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-Jun	0	Z	0	0	0	0	1	0	1	2	1	0	0	0	0	0	1	0	0	0	0	10	1	2	0.9	10	
2-Jun	3	Z	9	1	14	9	6	12	6	3	2	0	1	0	0	0	1	1	1	0	0	0	8	20	4.2	20	
3-Jun	20	Z	32	18	25	7	17	16	8	2	2	1	1	0	4	1	1	1	1	0	0	0	0	0	6.8	32	
4-Jun	0	Z	1	0	0	0	1	0	2	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	2	
5-Jun	0	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-Jun	0	Z	1	2	3	10	12	5	4	2	2	2	1	0	0	0	0	0	0	0	0	3	25	14	3.8	25	
7-Jun	8	Z	6	1	2	3	8	7	6	7	3	1	2	1	1	1	1	1	0	0	0	1	1	1	2.7	8	
8-Jun	0	Z	5	22	23	17	47	8	5	3	2	2	1	1	1	1	1	0	1	8	3	1	3	6.8	47		
9-Jun	1	Z	1	1	12	4	4	1	1	1	1	1	1	1	0	1	0	0	1	1	0	0	0	0	1.5	12	
10-Jun	3	Z	0	1	1	2	3	3	2	0	0	0	0	0	1	1	0	0	0	0	0	0	4	0	1.1	4	
11-Jun	0	Z	17	17	15	3	15	6	9	12	5	2	0	2	2	1	1	1	5	2	1	1	6	18	6.1	18	
12-Jun	144	Z	108	112	166	54	C	C	C	C	C	C	0	0	1	1	1	1	1	1	1	0	0	2	--	166	
13-Jun	1	Z	0	0	1	2	3	2	3	1	1	1	0	0	1	0	1	0	1	5	7	5	1	1	1.5	7	
14-Jun	1	Z	2	2	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	6	3	6	1.8	6	
15-Jun	14	Z	8	39	16	12	4	1	2	1	1	1	1	1	1	1	1	1	1	1	2	22	9	37	7.5	39	
16-Jun	41	Z	38	29	33	56	42	22	5	4	M	M	1	1	1	1	1	1	1	1	2	0	0	0	13.3	56	
17-Jun	0	Z	11	48	23	8	13	9	3	1	1	1	1	1	0	1	1	0	1	1	3	3	0	1	5.7	48	
18-Jun	7	Z	2	11	7	9	5	3	3	1	1	1	1	1	1	1	1	1	1	0	1	1	1	2	2.6	11	
19-Jun	5	Z	4	6	10	9	14	6	8	6	2	1	1	1	1	1	1	1	1	0	2	4	9	10	4.4	14	
20-Jun	4	Z	10	11	15	10	43	22	24	7	3	1	2	2	1	1	1	2	1	1	1	3	3	3	7.3	43	
21-Jun	3	Z	0	2	2	1	1	1	1	1	2	2	2	2	1	1	1	3	2	1	1	1	0	1	1.4	3	
22-Jun	1	Z	3	0	1	2	4	5	5	4	2	1	3	1	0	1	1	1	1	0	1	1	7	6	2.2	7	
23-Jun	3	Z	39	27	52	55	54	38	10	8	10	7	1	1	1	1	1	1	5	4	18	23	21	3	16.7	55	
24-Jun	2	Z	1	2	1	2	3	3	2	2	1	1	1	1	1	1	1	1	1	1	3	2	2	1	1.5	3	
25-Jun	2	Z	3	4	2	4	4	3	2	1	1	1	1	1	2	2	1	1	2	1	1	1	1	1	1.7	4	
26-Jun	5	Z	14	28	16	7	10	3	2	1	1	1	0	1	1	4	3	1	2	1	0	0	1	5	4.6	28	
27-Jun	11	Z	32	33	31	32	44	30	9	3	5	7	3	2	3	2	2	0	1	0	0	7	1	1	11.3	44	
28-Jun	2	Z	1	26	16	9	24	55	12	5	5	1	1	1	1	0	0	0	1	1	0	1	1	0	7.1	55	
29-Jun	1	Z	10	4	16	9	12	5	2	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2.9	16	
30-Jun	3	Z	1	1	4	3	6	2	1	1	0	0	1	0	0	1	0	1	0	0	1	0	3	4	1.6	6	
		9.6	--	12.0	15.0	17.0	11.4	13.8	9.3	4.7	2.8	1.9	1.4	1.0	0.8	0.9	0.9	0.8	0.8	1.0	0.7	1.8	3.4	3.8	4.8	Diurnal Average	
		144	--	108	112	166	56	54	55	24	12	10	7	3	2	4	4	3	3	5	4	18	23	25	37	Diurnal Maximum	
Z - zerspan		C - Calibration					M - Maintenance																				



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Millennium - June 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Millennium - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	638	93.55	93.55
21 - 40	28	4.11	97.65
41 - 80	12	1.76	99.41
81 - 159	3	0.44	99.85
> 159	1	0.15	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Millennium - June 2014

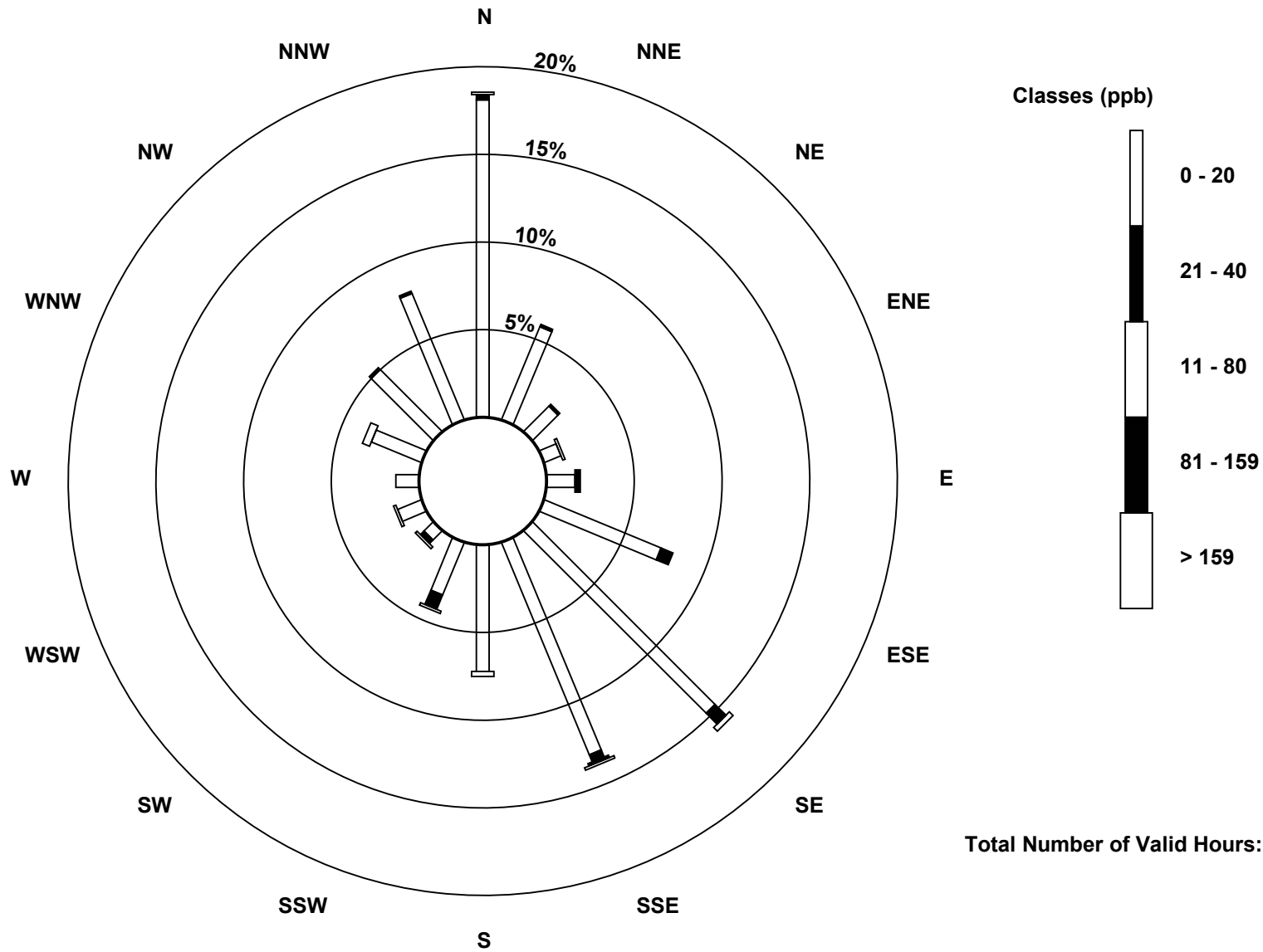
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	123	39	14	7	11	49	100	89	49	22	5	10	9	21	34	53	635
21 - 40	2	1	1	0	0	5	6	3	0	6	2	0	0	0	1	1	28
11 - 80	1	0	0	1	0	0	2	0	2	1	1	1	0	3	0	0	12
81 - 159	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	3
> 159	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Totals	126	40	15	8	13	54	108	94	51	29	8	11	9	24	35	54	679

Total Number of Valid Hours: 679

Total Number of Hours: 720

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

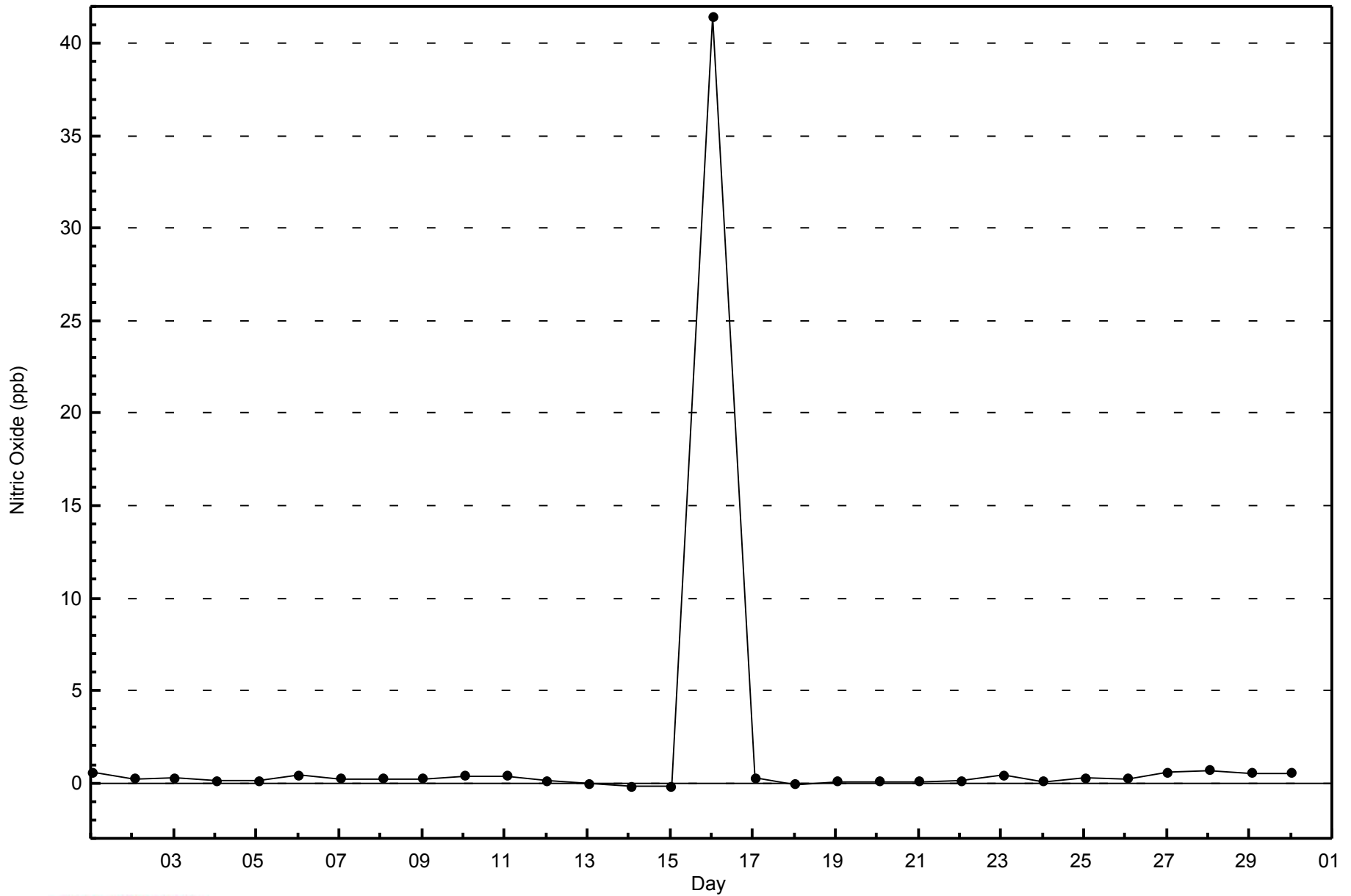
**Nitric Oxide (NO) - ppb
Millennium (AMS 12)**





WBEA
Zero Responses

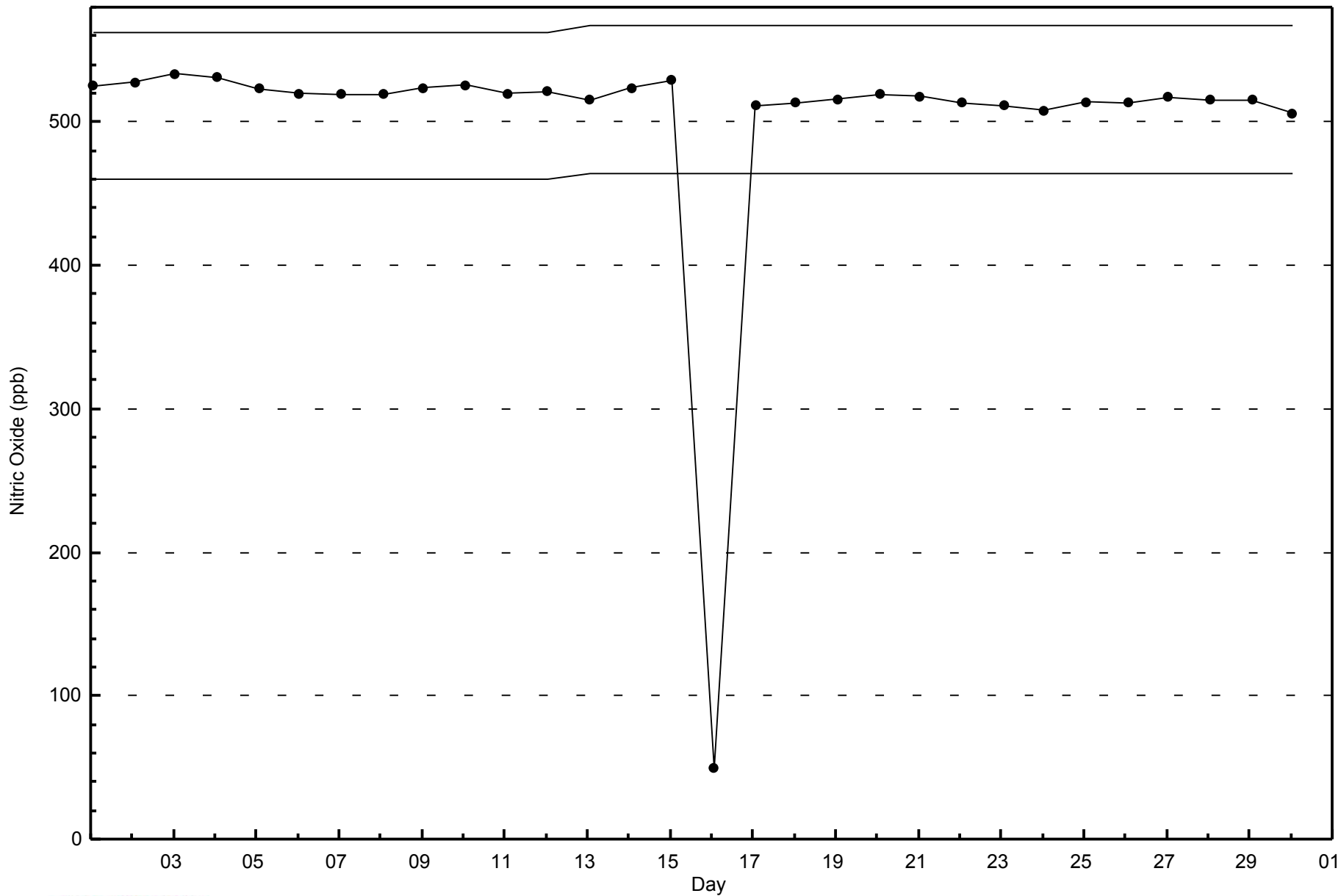
Nitric Oxide (NO) - ppb
Millennium - June 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Millennium - June 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 36 ppb on Jun 1 22:00	Maximum Daily Average: 12.4 ppb on Jun 11		Hours of Data:	682
Minimum Value: 0 ppb on Jun 13 14:00	Minimum Daily Average: 1.8 ppb on Jun 5		Hours of Missing Data:	38
Maximum Diurnal Average: 15.9 ppb at hour 1	Minimum Diurnal Average: 2.0 ppb at hour 14		Hours of Calibration:	36
Monthly Average: 8.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 6 Q ₃ = 13 P ₉₀ = 19 P ₉₉ = 29		Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	13	Z	12	12	6	7	7	3	6	7	3	2	1	1	1	3	3	4	3	4	10	36	29	23	8.5	36
2-Jun	21	Z	20	12	15	12	14	10	6	5	4	1	2	2	1	1	2	4	3	4	10	14	29	32	9.7	32
3-Jun	29	Z	23	21	20	11	12	12	11	4	4	1	2	3	6	3	3	2	5	4	2	4	5	4	8.3	29
4-Jun	6	Z	7	5	3	5	5	3	6	5	5	3	2	1	1	1	2	1	2	2	1	3	2	2	3.1	7
5-Jun	2	Z	2	1	2	3	2	1	1	1	1	1	1	1	1	2	2	1	1	2	3	4	2	7	1.8	7
6-Jun	10	Z	15	17	15	14	13	8	6	5	6	4	3	1	1	2	1	2	3	2	1	13	28	27	8.6	28
7-Jun	27	Z	23	11	19	15	15	12	11	15	9	3	5	2	1	4	6	7	4	3	8	21	16	19	11.1	27
8-Jun	18	Z	18	19	15	15	20	10	9	6	4	3	3	3	2	2	2	3	3	8	28	25	16	22	11.0	28
9-Jun	20	Z	16	16	22	19	20	4	5	7	4	3	3	2	2	2	2	3	4	4	8	7	1	15	8.2	22
10-Jun	24	Z	14	13	14	12	11	6	4	1	1	1	1	1	3	2	2	1	1	3	6	12	21	8	7.0	24
11-Jun	3	Z	18	21	20	10	15	12	13	17	9	4	3	8	5	7	8	7	18	10	9	18	26	23	12.4	26
12-Jun	30	Z	28	24	21	16	C	C	C	C	C	C	1	1	0	0	0	0	0	1	3	2	11	21	--	30
13-Jun	16	Z	4	6	7	7	6	4	5	0	1	2	1	0	0	1	1	1	0	3	20	26	21	16	6.3	26
14-Jun	19	Z	19	18	11	9	5	3	2	2	1	1	1	1	1	1	1	2	3	4	10	25	19	26	7.9	26
15-Jun	28	Z	23	27	24	20	10	4	4	3	1	2	1	1	1	1	1	1	5	6	17	31	25	29	11.5	31
16-Jun	30	Z	28	25	20	23	19	18	8	7	M	M	1	1	1	0	0	0	4	7	17	4	3	2	10.3	30
17-Jun	3	Z	18	21	18	16	15	9	7	1	1	1	1	0	1	1	1	2	7	6	14	11	6	12	7.5	21
18-Jun	15	Z	11	13	13	13	8	4	4	2	1	2	3	2	2	2	2	3	4	2	8	8	9	14	6.3	15
19-Jun	20	Z	17	18	16	13	13	9	12	9	3	3	4	1	1	3	1	2	7	2	7	13	15	17	8.9	20
20-Jun	10	Z	14	13	9	9	13	11	11	7	4	2	4	2	1	2	2	5	5	5	2	11	13	15	7.4	15
21-Jun	14	Z	7	18	16	12	4	6	5	4	5	5	5	2	3	3	7	7	7	7	6	8	6	10	7.1	18
22-Jun	7	Z	10	6	9	8	6	7	7	5	3	5	4	2	1	2	2	3	3	2	6	9	16	10	5.7	16
23-Jun	10	Z	9	8	11	13	18	17	13	13	15	10	2	1	1	2	5	3	8	8	11	12	12	9	9.1	18
24-Jun	10	Z	8	11	8	8	9	5	3	3	1	1	2	1	1	2	3	3	4	8	15	17	15	12	6.5	17
25-Jun	13	Z	14	15	11	10	8	5	3	2	2	1	1	1	3	6	5	2	6	4	8	10	14	16	7.0	16
26-Jun	13	Z	17	14	11	9	10	5	3	2	2	1	1	4	5	7	9	3	9	6	8	9	7	14	7.4	17
27-Jun	15	Z	17	14	15	18	16	19	14	9	10	12	8	6	7	8	6	3	3	3	4	15	15	17	11.0	19
28-Jun	17	Z	6	10	8	7	11	23	16	13	16	8	4	3	3	2	2	2	5	4	4	15	15	16	9.0	23
29-Jun	18	Z	19	19	19	13	15	11	4	2	2	2	1	1	1	1	2	2	2	3	7	11	7	9	7.5	19
30-Jun	18	Z	16	13	15	13	13	6	2	2	1	1	1	1	1	1	1	1	1	1	5	7	22	21	7.0	22

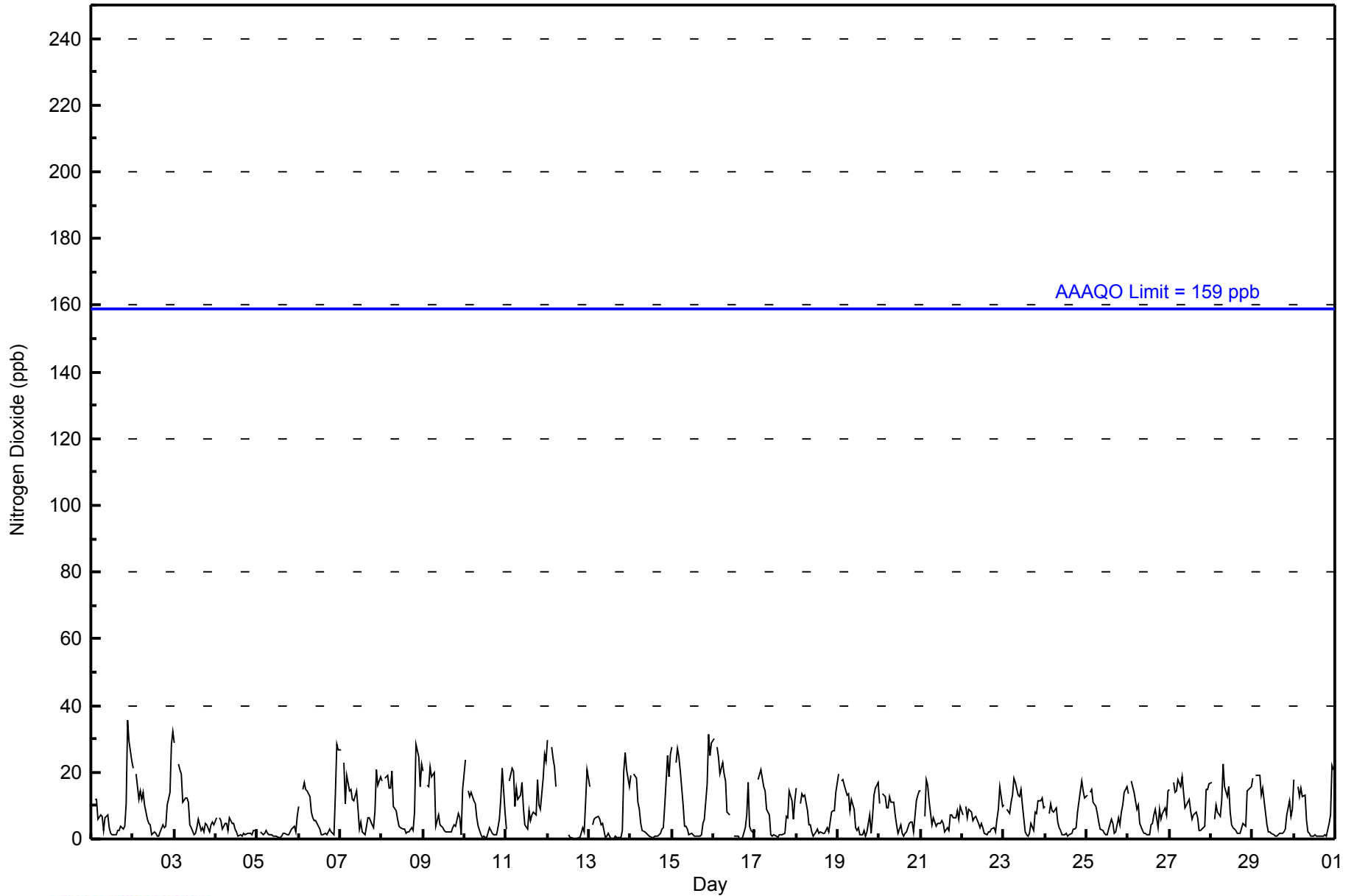
15.9	--	15.0	14.6	13.8	11.9	11.5	8.5	7.0	5.5	4.2	3.0	2.4	2.0	2.1	2.3	2.5	2.6	4.3	4.2	8.7	13.3	14.1	15.5	Diurnal Average	
30	--	28	27	24	23	20	23	16	17	16	12	8	8	7	8	9	7	18	10	28	36	29	32	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Millennium - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Millennium - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	635	93.11	93.11
21 - 40	47	6.89	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
Millennium - June 2014

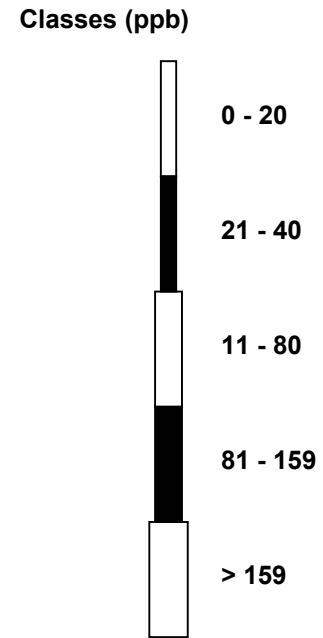
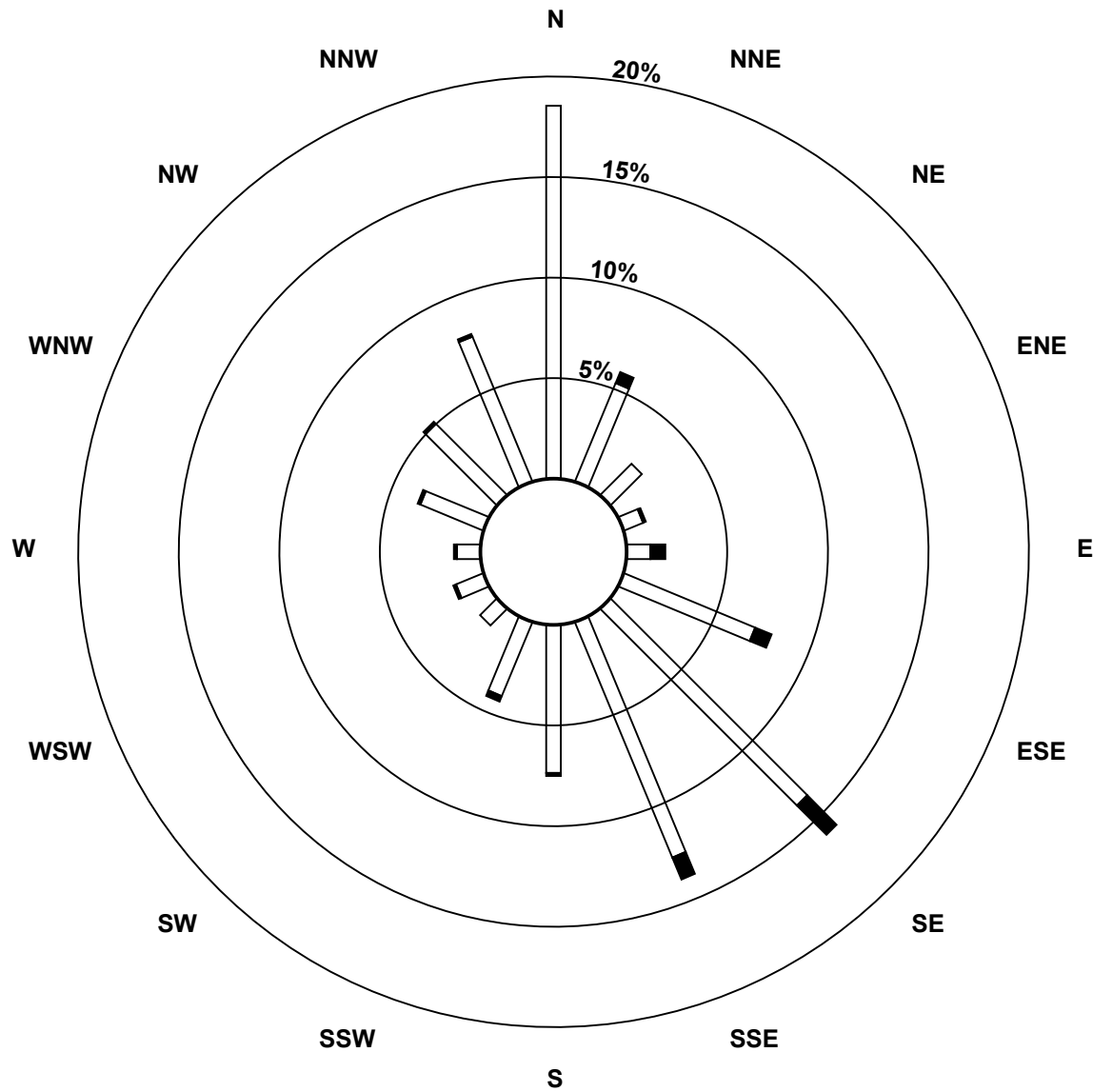
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	126	36	15	7	8	48	94	86	50	27	8	10	8	23	34	53	633
21 - 40	0	4	0	1	5	6	14	8	1	2	0	1	1	1	1	1	46
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	126	40	15	8	13	54	108	94	51	29	8	11	9	24	35	54	679

Total Number of Valid Hours: 679

Total Number of Hours: 720

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

**Nitrogen Dioxide (NO₂) - ppb
Millennium (AMS 12)**

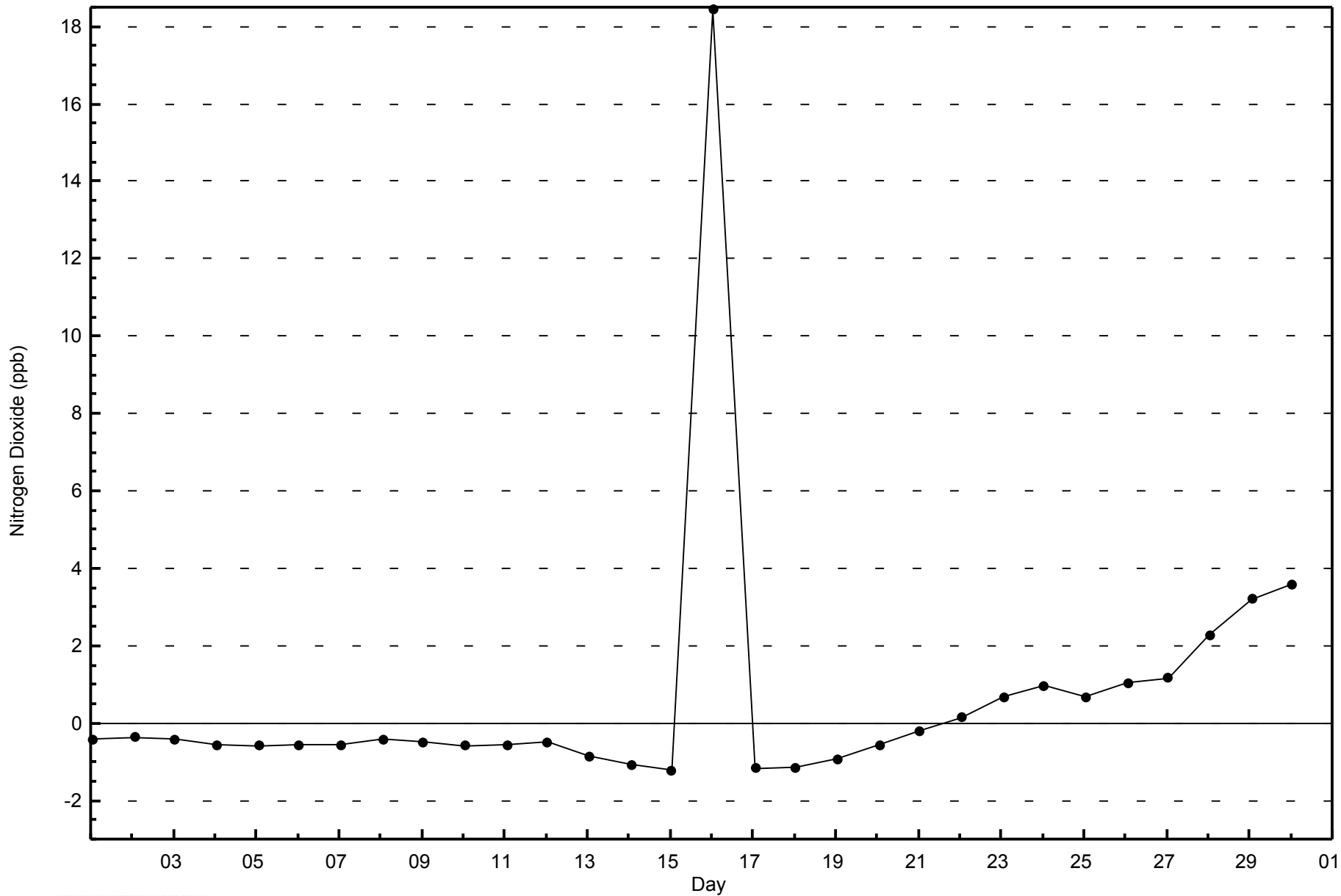


Total Number of Valid Hours: 679



WBEA
Zero Responses

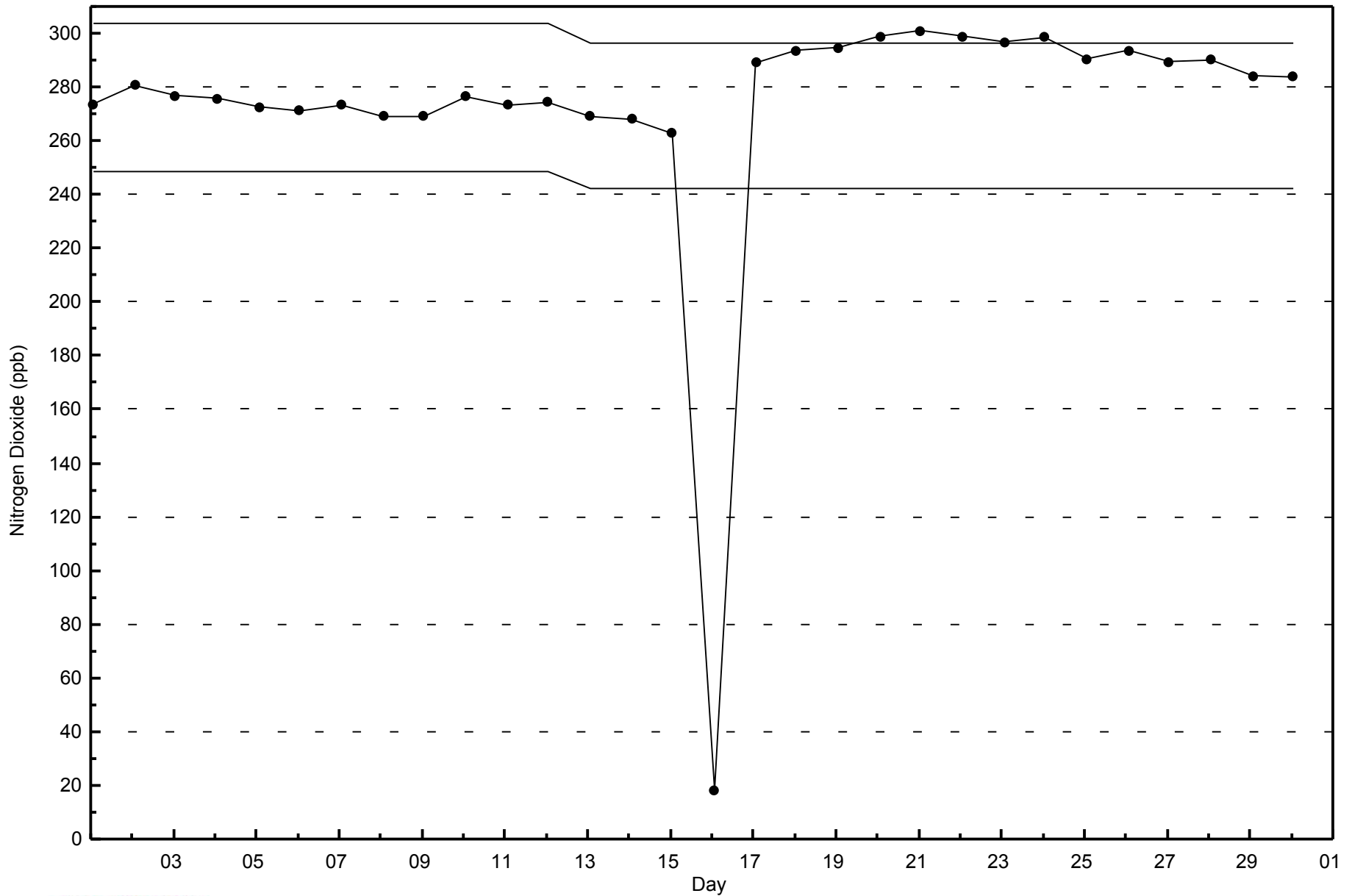
Nitrogen Dioxide (NO₂) - ppb
Millennium - June 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Millennium - June 2014



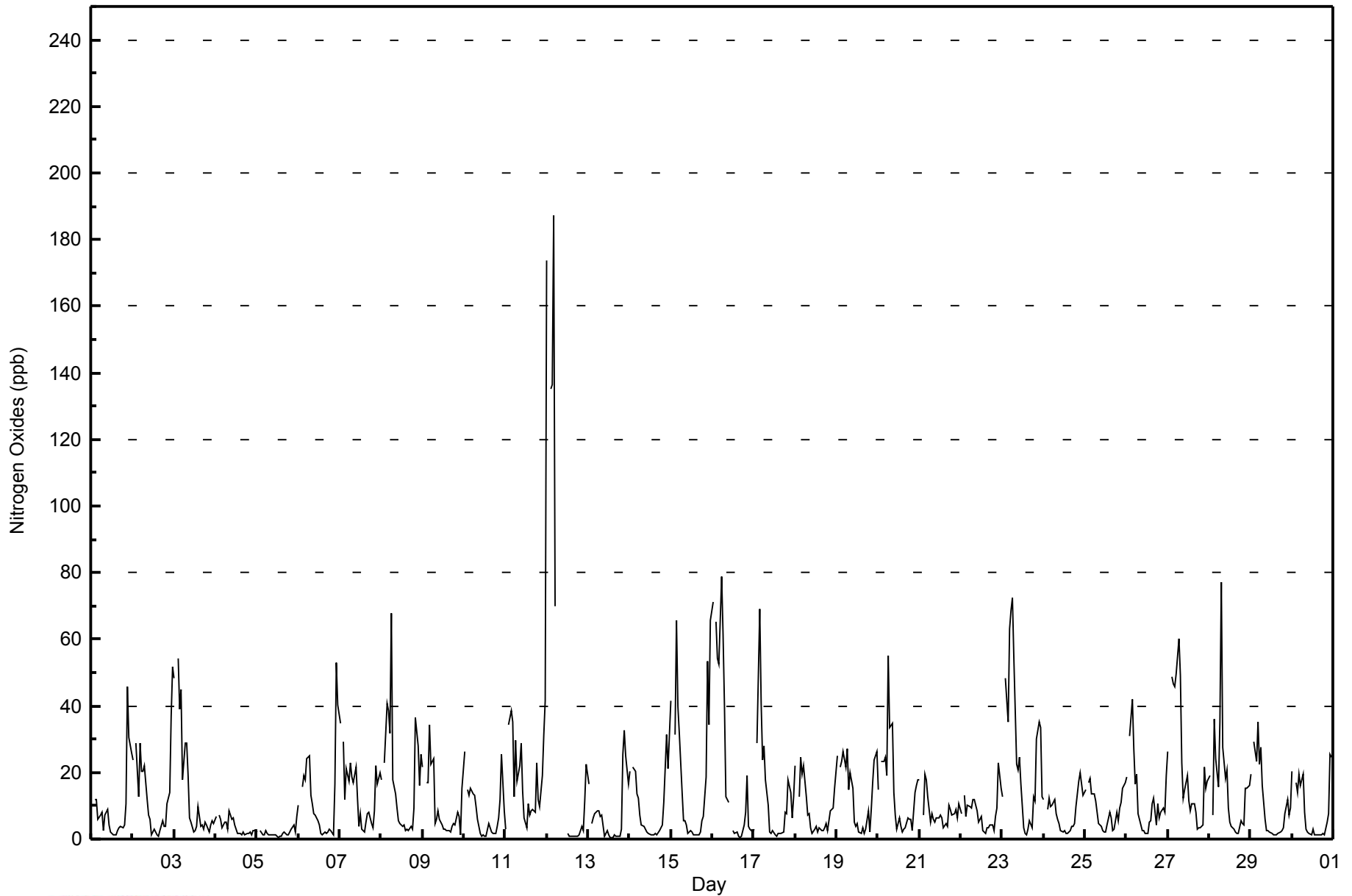


Maximum Value: 187 ppb on Jun 12 05:00																		Maximum Daily Average: 25.8 ppb on Jun 23																		Hours in Service: 720			
Minimum Value: 0 ppb on Jun 13 14:00																		Minimum Daily Average: 2.0 ppb on Jun 5																		Hours of Data: 682			
Maximum Diurnal Average: 30.8 ppb at hour 5																		Minimum Diurnal Average: 2.8 ppb at hour 14																		Hours of Missing Data: 38			
Monthly Average: 13.3 ppb																		Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 7 Q ₃ = 18 P ₉₀ = 31 P ₉₉ = 71																		Hours of Calibration: 36			
																																				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-Jun	13	Z	12	12	6	7	8	3	7	9	4	2	2	1	1	3	3	4	3	4	11	46	30	26	9.4	46													
2-Jun	24	Z	29	13	29	21	20	22	12	7	6	1	3	2	1	1	3	6	4	4	10	14	37	52	13.9	52													
3-Jun	48	Z	54	39	45	18	29	29	19	6	5	2	2	4	10	4	4	3	5	4	2	4	5	5	15.1	54													
4-Jun	7	Z	7	6	3	5	5	3	8	6	6	4	3	2	2	1	2	1	2	2	2	1	2	2	3.6	8													
5-Jun	2	Z	2	1	1	3	2	1	1	1	1	1	1	1	1	2	2	1	1	2	3	4	2	7	2.0	7													
6-Jun	10	Z	16	19	18	24	25	13	11	8	7	6	4	2	1	2	2	2	3	2	1	17	53	40	12.4	53													
7-Jun	35	Z	29	12	21	17	23	19	17	22	12	4	8	3	2	5	7	8	5	3	8	22	17	20	13.8	35													
8-Jun	18	Z	23	41	38	32	68	18	14	9	6	5	4	4	3	3	3	4	3	9	36	28	16	25	17.8	68													
9-Jun	22	Z	17	17	34	22	24	4	6	9	6	4	3	3	3	3	2	4	5	4	8	7	1	15	9.7	34													
10-Jun	26	Z	15	13	15	13	13	10	6	2	1	1	1	1	4	3	2	2	2	4	6	12	25	8	8.1	26													
11-Jun	3	Z	34	39	35	13	30	17	22	29	14	7	3	11	7	8	9	8	23	12	10	19	31	41	18.5	41													
12-Jun	174	Z	135	137	187	70	C	C	C	C	C	C	2	1	1	1	1	1	1	1	4	3	11	23	--	187													
13-Jun	16	Z	5	6	7	8	8	7	7	1	2	2	1	0	1	1	1	1	1	3	25	33	25	17	7.8	33													
14-Jun	20	Z	22	20	13	12	7	4	4	3	2	2	2	1	1	1	2	1	2	3	4	11	31	21	32	9.7	32												
15-Jun	41	Z	31	66	40	32	14	5	6	4	2	3	2	1	1	1	1	2	6	7	19	53	34	66	19.0	66													
16-Jun	71	Z	65	54	53	79	61	40	13	11	M	M	2	2	2	1	1	1	4	8	19	4	3	2	23.6	79													
17-Jun	3	Z	29	69	41	24	28	18	10	2	1	2	1	1	2	2	2	2	8	8	18	14	7	13	13.2	69													
18-Jun	22	Z	13	25	19	22	13	7	8	3	2	3	4	2	3	2	2	3	5	3	9	9	9	15	8.9	25													
19-Jun	25	Z	21	23	26	22	27	15	20	15	5	4	5	2	2	3	2	3	8	2	9	17	24	26	13.3	27													
20-Jun	15	Z	23	23	25	19	55	34	35	14	7	3	6	4	2	3	4	6	6	6	3	14	16	18	14.7	55													
21-Jun	18	Z	7	20	18	13	5	8	6	5	6	6	7	6	4	5	4	10	9	7	8	9	6	11	8.6	20													
22-Jun	8	Z	13	7	10	10	9	12	12	9	5	6	7	3	2	3	3	4	4	2	7	9	23	15	7.9	23													
23-Jun	13	Z	48	35	63	69	73	55	23	21	25	17	3	2	1	3	6	4	13	12	30	35	33	13	25.8	73													
24-Jun	12	Z	9	12	10	10	12	8	6	5	3	2	3	2	2	3	4	4	5	10	17	20	16	13	8.0	20													
25-Jun	15	Z	17	18	14	14	12	8	5	4	3	2	2	4	8	6	2	3	8	5	9	11	15	17	8.7	18													
26-Jun	19	Z	31	42	27	17	20	7	4	3	2	2	2	5	5	11	12	4	10	6	8	9	8	19	11.9	42													
27-Jun	26	Z	49	47	46	49	60	49	23	12	15	19	11	8	11	10	8	3	3	3	4	22	15	17	22.3	60													
28-Jun	19	Z	7	36	24	16	35	77	27	18	21	9	5	4	3	2	2	2	5	5	4	15	15	16	16.1	77													
29-Jun	20	Z	29	23	35	22	28	16	6	3	3	2	2	1	1	1	2	2	2	4	8	12	7	9	10.4	35													
30-Jun	21	Z	17	14	19	16	20	8	3	2	2	1	3	1	1	1	1	1	2	1	5	8	25	25	8.6	25													
25.5		--	27.0	29.6	30.8	23.3	25.3	17.8	11.7	8.3	6.2	4.4	3.4	2.8	2.9	3.2	3.3	3.4	5.3	5.0	10.5	16.7	17.9	20.3	Diurnal Average														
174		--	135	137	187	79	73	77	35	29	25	19	11	11	11	11	12	10	23	12	36	53	53	66	Diurnal Maximum														
Z - zerspan		C - Calibration					M - Maintenance																																



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Millennium - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Millennium - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	544	79.77	79.77
21 - 40	98	14.37	94.13
41 - 80	36	5.28	99.41
81 - 159	2	0.29	99.71
> 159	2	0.29	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Millennium - June 2014

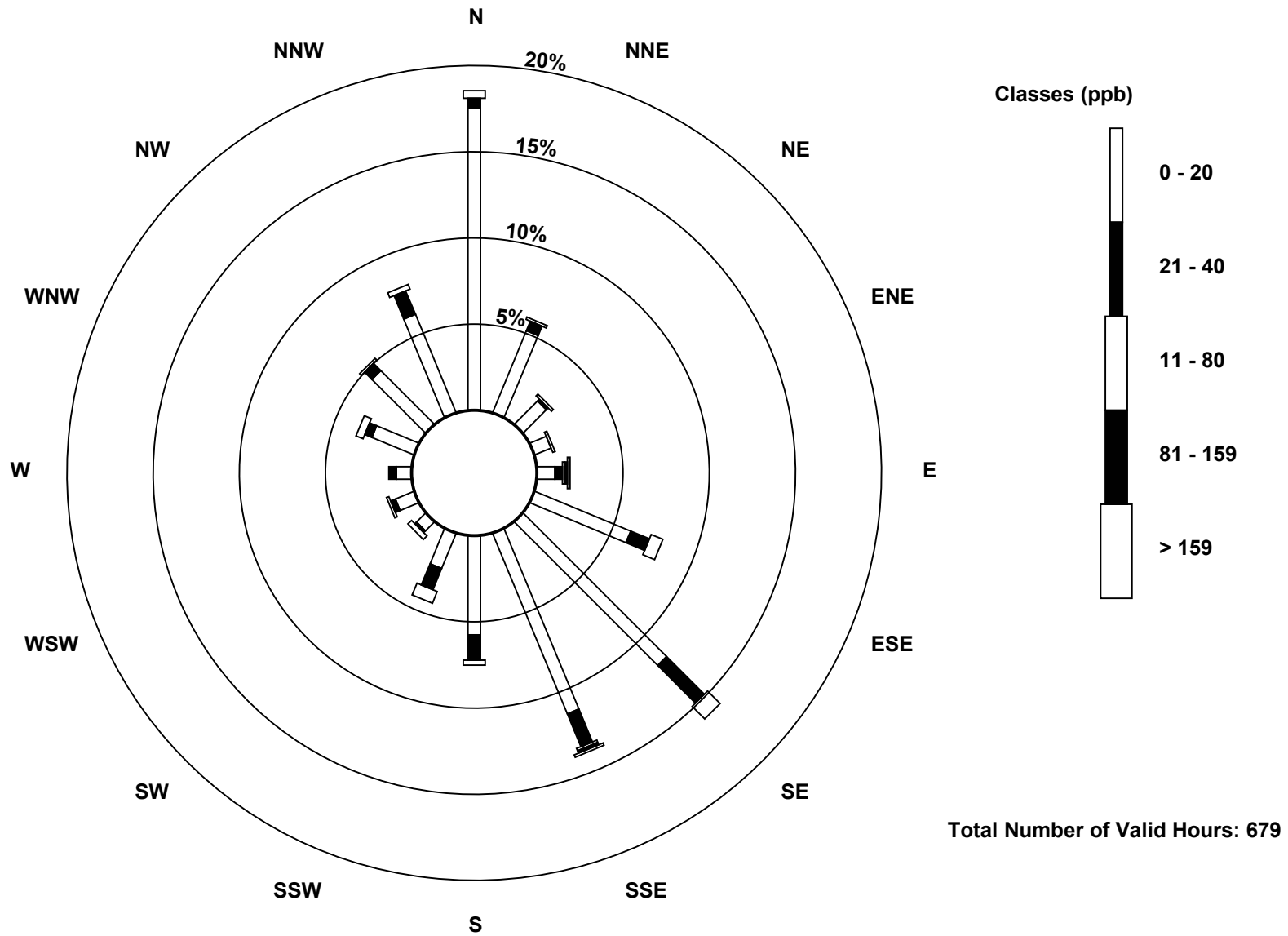
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	119	35	13	7	7	41	80	77	39	15	5	8	6	18	30	42	542
21 - 40	4	4	1	0	3	8	21	14	10	9	1	2	3	3	4	10	97
11 - 80	3	1	1	1	1	5	7	1	2	5	2	1	0	3	1	2	36
81 - 159	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2
> 159	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2
Totals	126	40	15	8	13	54	108	94	51	29	8	11	9	24	35	54	679

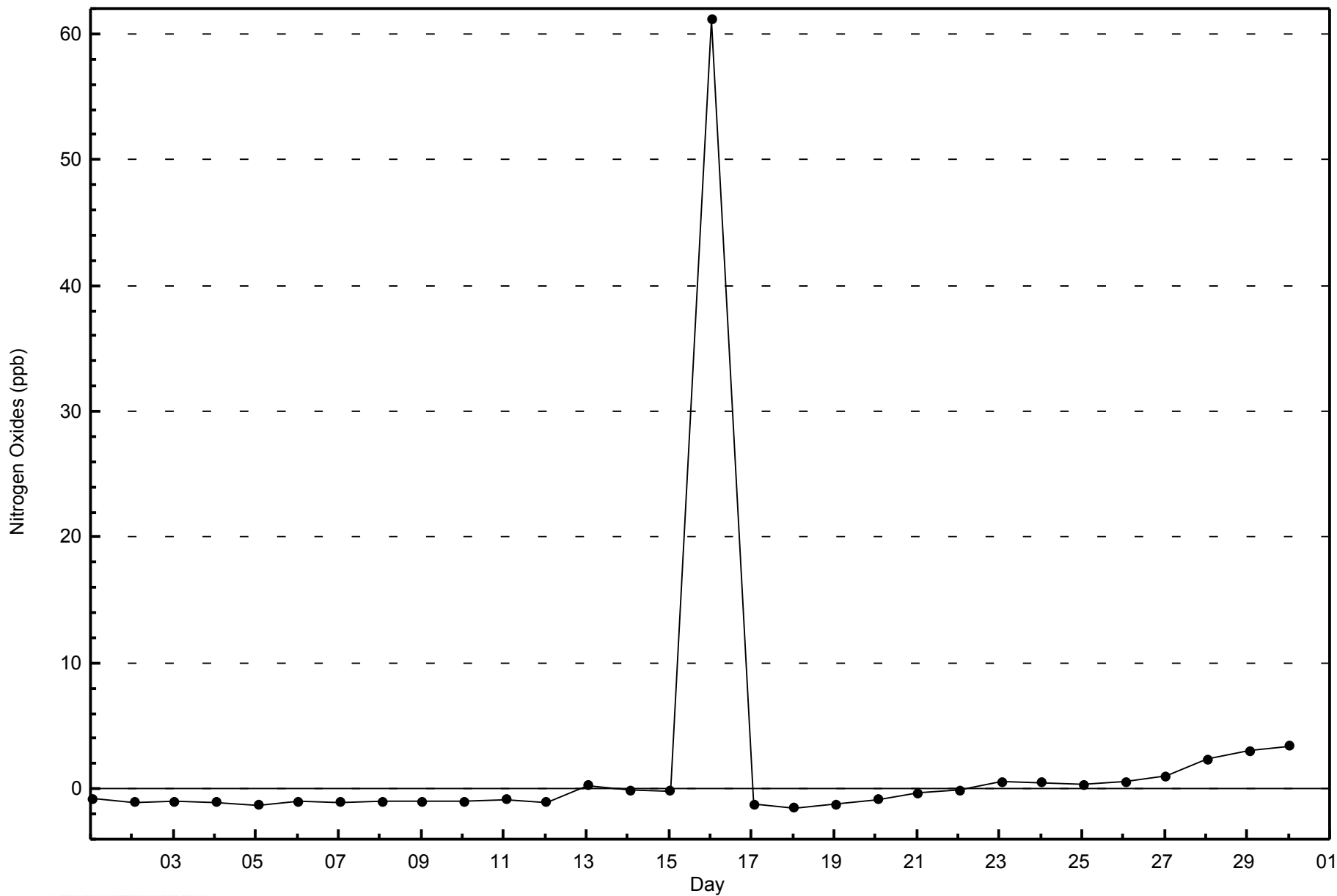
Total Number of Valid Hours: 679

Total Number of Hours: 720

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

**Nitrogen Oxides (NO_x) - ppb
Millennium (AMS 12)**

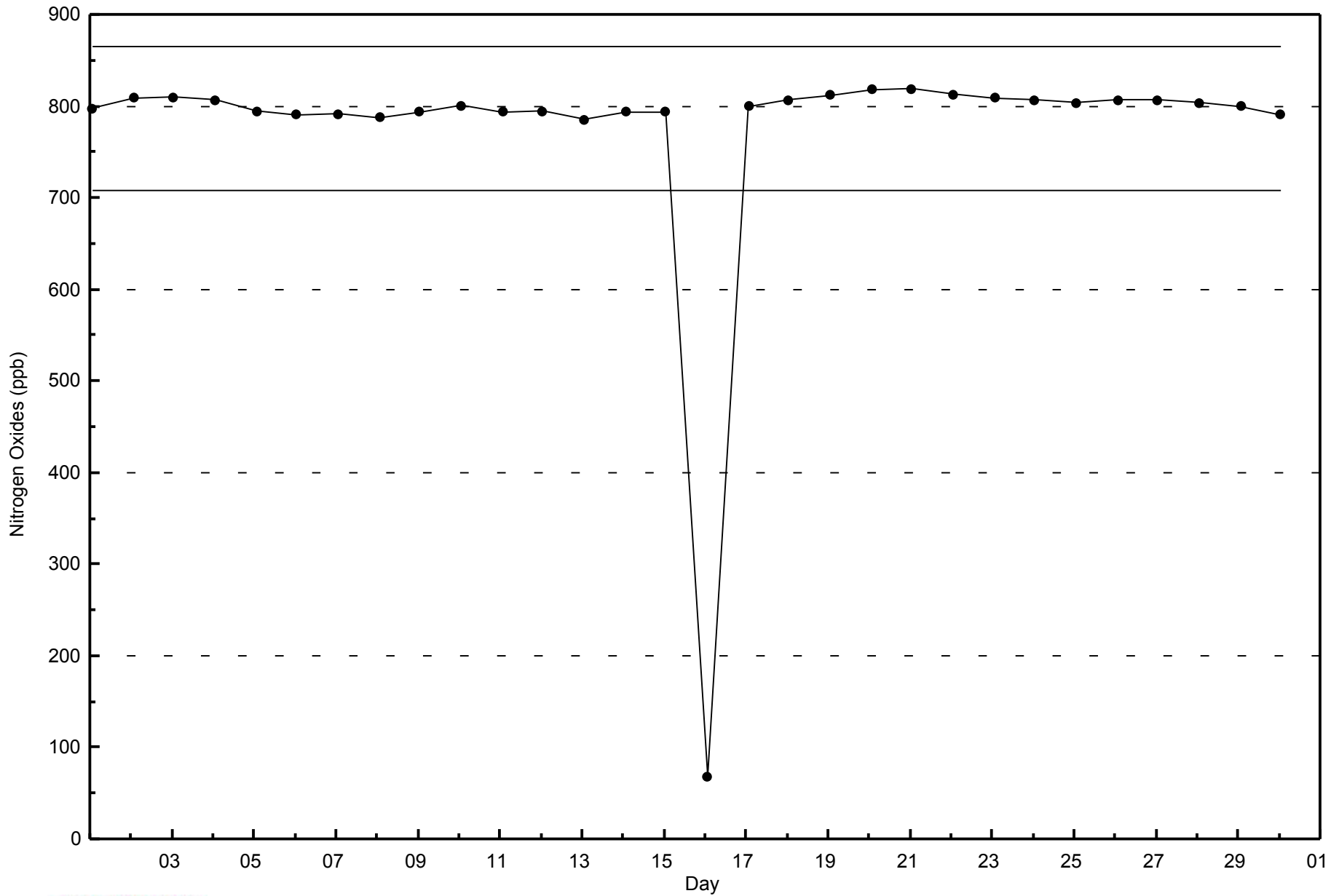






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Millennium - June 2014





Summary of Hour Averages

Millennium - June 2014

Number of Exceedences (AAAQO): 24-hr: 0	Hours in Service: 720
Maximum Value: 85.1 µg/m ³ on Jun 16 01:00	Maximum Daily Average: 25.8 µg/m ³ on Jun 16
Minimum Value: 0.8 µg/m ³ on Jun 1 11:00	Hours of Data: 718
Maximum Diurnal Average: 14.1 µg/m ³ at hour 1	Hours of Missing Data: 2
Monthly Average: 9.08 µg/m ³	Hours of Calibration: 0
Minimum Daily Average: 1.9 µg/m ³ on Jun 4	Percent Operational Time: 99.7
Minimum Diurnal Average: 5.7 µg/m ³ at hour 14	
Percentiles: P ₁ = 1.0 P ₁₀ = 2.1 Q ₁ = 3.9 Median = 6.4 Q ₃ = 10.1 P ₉₀ = 16.9 P ₉₉ = 70.1	

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-Jun	4.5	4.4	4.2	2.2	1.2	1.1	1.0	0.9	0.9	1.0	0.8	1.2	1.5	2.0	1.8	2.7	5.3	8.5	9.1	8.2	4.4	3.4	6.1	10.4	3.6	10.4																							
2-Jun	9.3	5.5	4.8	7.1	11.5	8.3	6.8	6.7	3.1	2.0	2.8	2.7	3.3	5.2	3.9	5.0	5.8	7.6	6.2	5.2	8.4	10.6	13.4	14.7	6.6	14.7																							
3-Jun	9.6	11.7	8.0	6.9	8.0	7.8	8.4	6.1	5.6	4.9	5.6	4.1	5.3	7.8	4.7	1.7	4.0	7.2	6.5	6.8	2.4	1.9	2.2	2.3	5.8	11.7																							
4-Jun	2.1	3.2	5.0	3.9	4.0	4.0	1.7	1.0	1.2	1.5	1.1	1.0	1.1	1.3	1.7	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.2	1.2	1.9	5.0																							
5-Jun	1.3	1.4	1.4	1.3	1.4	1.7	1.8	1.8	1.7	1.9	2.1	2.1	2.0	2.1	2.4	2.6	2.5	2.5	2.5	2.3	2.4	2.1	1.8	2.4	2.0	2.6																							
6-Jun	2.8	3.2	4.1	4.0	4.8	5.2	4.1	2.2	1.8	1.9	1.9	1.9	1.9	1.8	1.9	2.0	2.0	2.1	2.3	3.1	3.1	4.6	5.6	6.3	3.1	6.3																							
7-Jun	4.7	4.2	4.3	4.6	5.3	4.9	5.5	4.8	7.0	5.7	8.7	3.3	3.6	3.4	3.6	4.6	6.1	8.8	10.1	4.9	4.9	7.0	9.0	10.3	5.8	10.3																							
8-Jun	8.9	9.9	10.7	11.7	11.5	10.5	8.9	4.6	4.5	5.9	4.7	4.5	5.2	5.4	4.4	3.8	4.1	4.8	4.7	7.5	16.1	9.0	6.9	9.5	7.4	16.1																							
9-Jun	11.0	7.1	10.3	8.2	5.5	2.2	1.9	2.6	3.8	2.8	2.0	2.8	3.6	3.9	4.5	4.9	4.5	3.9	3.2	2.9	3.3	3.5	2.5	3.3	4.3	11.0																							
10-Jun	4.1	5.0	5.5	5.1	5.7	5.4	4.1	2.7	2.5	2.3	2.4	2.7	3.2	3.1	3.4	3.2	2.5	2.8	3.3	4.3	7.7	11.2	13.3	9.6	4.8	13.3																							
11-Jun	6.7	5.6	8.7	7.2	6.0	5.9	8.3	7.8	7.1	5.9	3.9	3.4	4.0	5.4	2.4	2.5	4.6	4.5	6.1	6.0	4.9	5.5	9.3	10.4	5.9	10.4																							
12-Jun	13.3	13.5	14.0	18.2	15.6	11.0	9.3	9.6	10.2	14.0	11.0	7.3	7.2	6.0	5.1	4.5	4.5	4.7	3.6	3.6	7.0	6.4	7.1	10.2	9.0	18.2																							
13-Jun	6.4	5.9	4.2	4.1	3.9	3.7	3.6	3.1	2.5	M	2.1	2.6	2.1	1.7	2.2	2.8	2.2	2.2	2.2	4.2	20.6	12.8	8.5	6.9	4.8	20.6																							
14-Jun	10.0	7.3	7.9	7.2	7.2	6.8	4.5	2.5	2.9	4.0	4.5	4.8	5.4	5.9	7.1	11.6	5.7	8.4	11.8	10.2	23.7	78.3	45.0	31.9	13.1	78.3																							
15-Jun	25.9	16.2	33.5	25.4	18.6	17.5	9.4	10.4	11.0	8.0	8.6	6.7	6.9	4.4	5.7	8.1	5.4	8.5	7.9	18.7	33.0	52.9	36.6	68.0	18.6	68.0																							
16-Jun	85.1	72.3	37.3	75.6	84.9	22.0	19.3	28.3	27.9	15.5	M	8.6	8.5	6.5	7.8	4.6	5.5	8.9	9.5	7.7	20.0	9.3	23.0	5.7	25.8	85.1																							
17-Jun	79.4	10.1	24.3	9.8	13.2	9.9	9.8	9.9	7.4	5.1	4.6	5.5	5.2	6.3	5.9	6.9	5.8	15.9	7.8	2.6	3.4	6.1	5.0	7.0	11.1	79.4																							
18-Jun	7.7	7.6	8.9	6.9	6.1	8.5	8.1	16.0	10.2	7.4	5.3	6.2	8.9	8.3	68.6	19.2	79.2	15.2	10.2	10.0	14.3	44.0	20.1	12.0	17.0	79.2																							
19-Jun	12.9	24.3	17.8	7.7	10.1	11.6	6.9	5.1	5.9	10.5	3.7	3.4	3.6	2.4	2.0	3.0	3.9	2.7	6.7	8.8	2.2	4.4	8.3	14.5	7.6	24.3																							
20-Jun	12.4	7.7	7.9	9.2	12.4	15.6	13.0	15.7	13.1	12.9	8.4	6.6	2.1	1.2	1.8	0.9	0.9	1.2	1.9	2.5	3.2	5.3	7.4	8.4	7.2	15.7																							
21-Jun	10.0	14.3	8.3	10.3	15.6	8.4	6.9	8.8	9.1	7.4	6.4	5.8	3.5	4.2	5.8	6.0	7.8	6.6	4.8	3.7	4.4	5.2	3.5	4.7	7.1	15.6																							
22-Jun	6.0	11.8	8.3	14.0	11.0	5.4	6.6	6.1	7.0	5.0	5.1	4.7	2.8	4.5	8.1	11.1	11.6	10.1	10.4	9.3	7.9	5.0	5.2	5.3	7.6	14.0																							
23-Jun	5.9	7.9	7.3	7.1	13.2	16.5	13.1	16.9	14.8	15.8	12.2	6.1	2.2	2.6	2.4	3.8	5.0	3.4	2.0	1.6	2.6	4.1	5.9	7.9	7.5	16.9																							
24-Jun	9.4	8.8	8.2	7.6	5.5	4.6	4.8	4.3	4.6	4.8	3.9	2.8	4.9	6.6	8.2	8.7	11.6	16.7	12.7	11.3	6.4	5.4	6.9	5.7	7.3	16.7																							
25-Jun	5.5	7.1	9.1	9.2	8.7	8.7	6.3	5.2	5.0	6.0	4.3	4.3	4.0	14.4	13.0	18.6	5.1	3.6	2.3	1.5	2.6	3.3	4.9	6.3	6.6	18.6																							
26-Jun	7.0	6.5	9.2	11.5	10.1	11.1	8.3	6.2	6.5	8.0	7.1	4.8	6.3	6.5	6.9	7.7	7.1	7.0	7.8	3.1	5.1	9.4	8.3	14.6	7.7	14.6																							
27-Jun	14.1	9.3	12.5	13.9	18.7	13.4	17.6	13.1	14.2	7.9	9.3	9.5	9.8	11.2	7.1	3.6	3.0	4.3	4.9	4.0	3.7	3.4	5.0	7.0	9.2	18.7																							
28-Jun	5.8	5.6	7.8	14.4	13.8	8.4	16.9	17.2	7.7	11.5	17.0	17.8	14.1	10.7	12.9	12.6	8.3	5.2	10.4	10.4	12.2	15.3	19.1	22.7	12.4	22.7																							
29-Jun	14.8	16.6	20.1	24.7	28.6	29.7	34.3	36.2	26.5	23.4	27.5	37.1	31.4	15.9	15.1	26.4	31.3	28.9	23.3	17.2	13.8	14.7	22.3	25.7	24.4	37.1																							
30-Jun	26.3	22.4	28.6	33.4	39.1	44.7	39.9	28.6	15.6	11.7	7.8	7.9	10.2	11.5	10.9	9.7	8.8	8.2	7.5	6.7	8.2	9.3	7.8	9.7	17.3	44.7																							
																								14.1	11.2	11.4	12.4	13.4	10.5	9.7	9.5	8.0	7.4	6.4	6.1	5.8	5.7	7.7	6.8	8.5	7.2	6.8	6.3	8.4	11.8	10.7	11.8	Diurnal Average	
																								85.1	72.3	37.3	75.6	84.9	44.7	39.9	36.2	27.9	23.4	27.5	37.1	31.4	15.9	68.6	26.4	79.2	28.9	23.3	18.7	33.0	78.3	45.0	68.0	Diurnal Maximum	

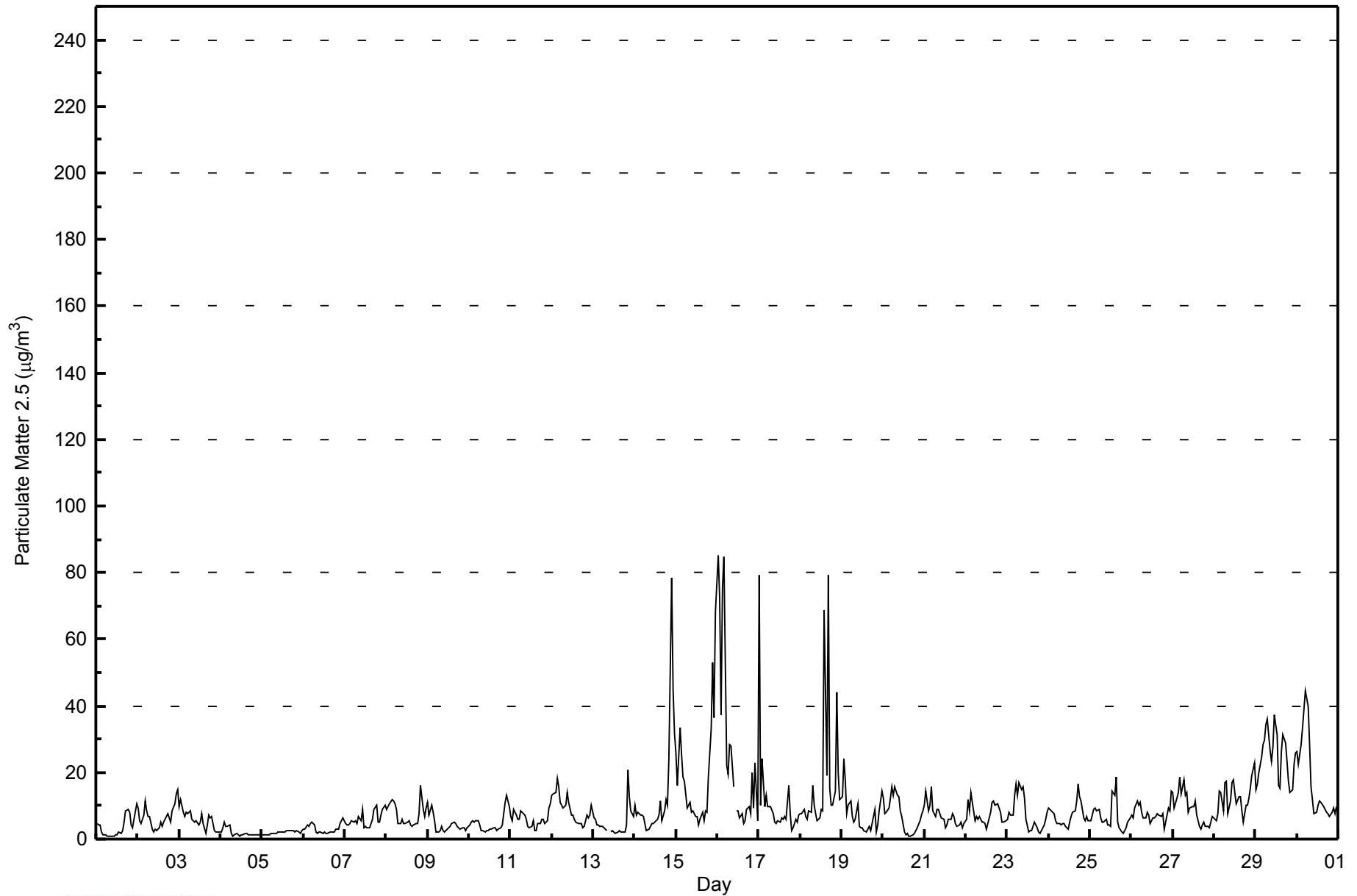
M - Maintenance

Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Millennium - June 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Millennium - June 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	300	41.78	41.78
6 - 15	324	45.13	86.91
16 - 25	48	6.69	93.59
26 - 80	37	5.15	98.75
> 81.0	2	0.28	99.03

Total Number of Valid Hours: 718

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Millennium - June 2014

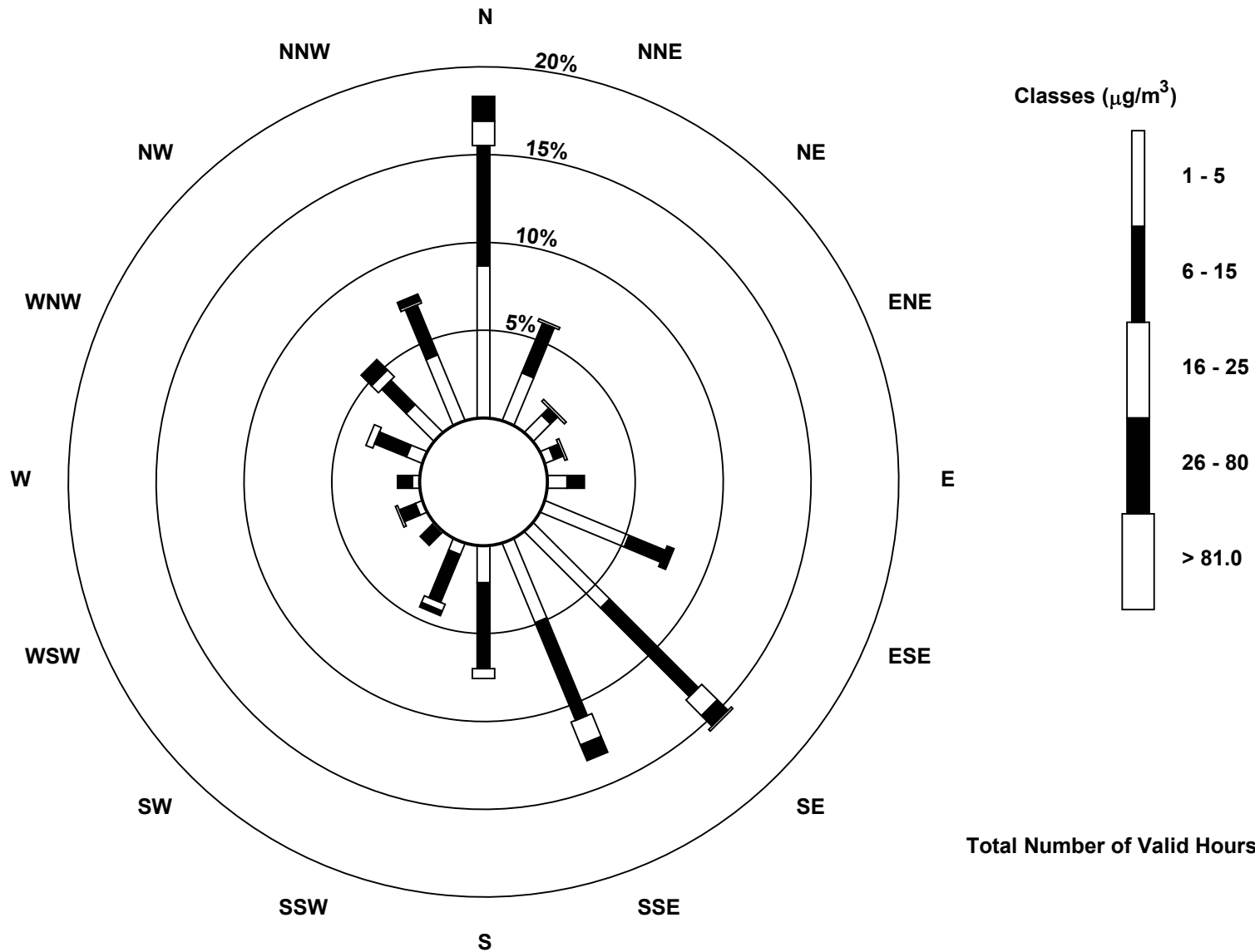
Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	62	21	10	4	8	37	44	35	15	5	1	3	3	7	16	29	300
6 - 15	49	22	4	4	7	16	51	43	35	21	7	7	6	14	14	22	322
16 - 25	10	1	0	1	0	0	9	10	4	3	0	1	0	3	4	1	47
26 - 80	10	0	0	0	0	3	6	7	0	2	0	0	0	0	6	3	37
> 81.0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2
Totals	131	44	15	9	15	56	111	95	54	31	8	11	9	24	40	55	708

Total Number of Valid Hours: 715

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Jun 2014

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
 Millennium (AMS 12)



Total Number of Valid Hours: 715

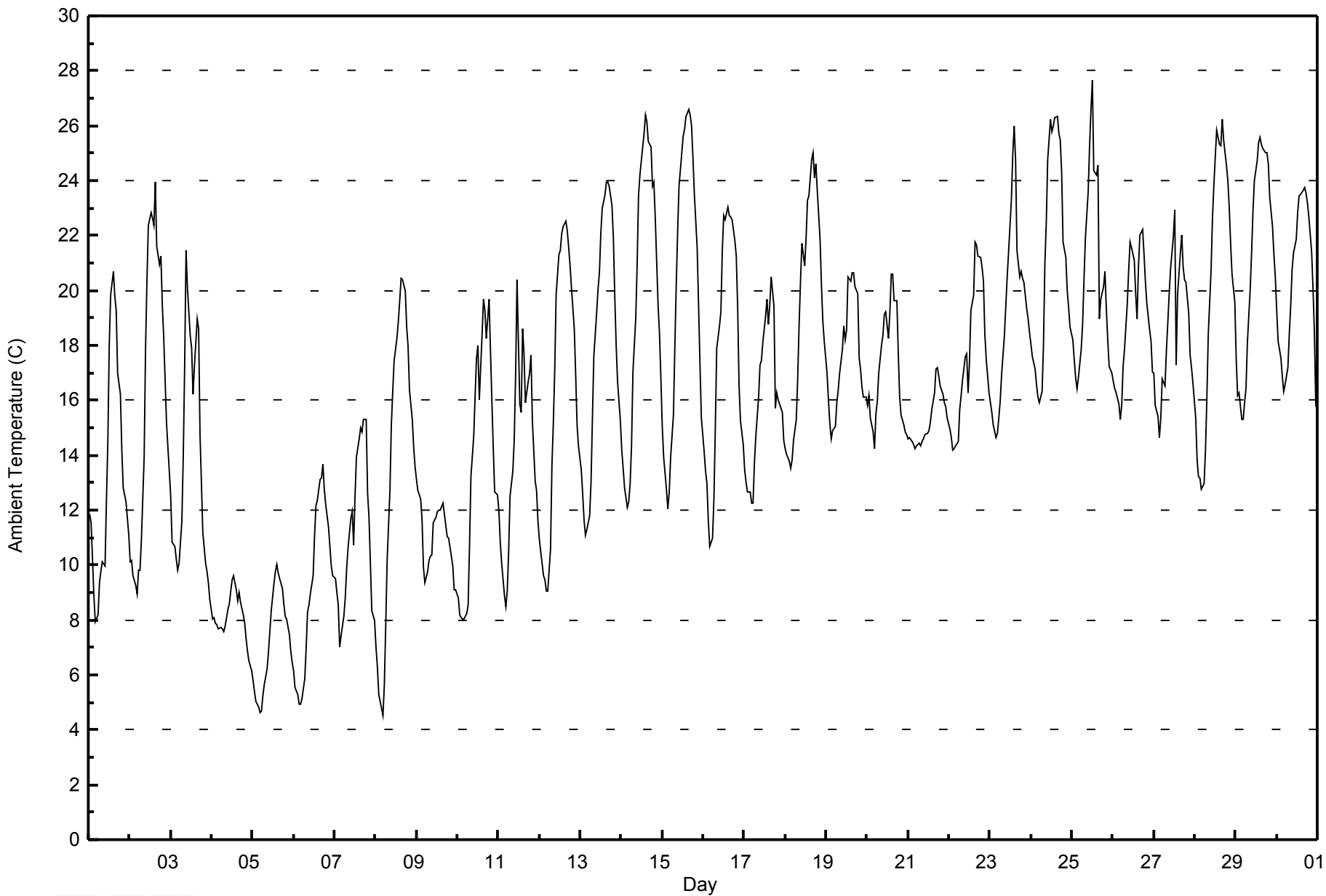


Maximum Value: 27.7 C on Jun 25 13:00		Maximum Daily Average: 21.3 C on Jun 24		Hours in Service: 720																																													
Minimum Value: 4.5 C on Jun 8 05:00		Minimum Daily Average: 7.2 C on Jun 5		Hours of Data: 720																																													
Maximum Diurnal Average: 20.6 C at hour 16		Minimum Diurnal Average: 11.5 C at hour 5		Hours of Missing Data: 0																																													
Monthly Average: 16.23 C		Percentiles: P ₁ = 5.0 P ₁₀ = 8.9 Q ₁ = 12.4 Median = 16.3 Q ₃ = 20.3 P ₉₀ = 23.4 P ₉₉ = 26.3		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-Jun	11.8	11.5	10.2	8.9	7.9	8.2	9.3	9.8	10.1	10.0	12.3	14.5	18.0	19.8	20.7	19.8	19.3	17.0	16.2	14.2	12.8	12.6	12.3	11.1	13.3	20.7																							
2-Jun	10.1	10.2	9.6	9.2	9.0	9.8	9.8	10.9	13.9	17.9	20.4	22.4	22.8	22.6	22.4	24.0	21.6	21.0	21.2	19.5	18.3	15.2	14.3	13.4	16.2	24.0																							
3-Jun	12.5	10.8	10.7	10.2	9.8	10.1	11.6	13.9	17.2	21.5	20.1	18.3	17.9	16.2	17.3	18.9	18.6	14.7	13.0	11.2	10.1	9.8	9.4	8.8	13.9	21.5																							
4-Jun	8.1	8.1	7.9	7.8	7.7	7.7	7.7	7.6	7.8	8.4	8.6	9.0	9.4	9.6	9.1	8.7	9.0	8.6	8.2	7.9	7.3	6.9	6.5	6.1	8.1	9.6																							
5-Jun	5.8	5.4	5.0	4.8	4.6	4.7	5.3	5.6	6.2	6.8	7.6	8.3	9.4	9.8	10.0	9.7	9.5	9.1	8.6	8.1	8.1	7.5	6.9	6.5	7.2	10.0																							
6-Jun	6.1	5.6	5.3	4.9	4.9	5.2	5.9	7.0	8.3	8.6	9.0	9.6	11.0	12.2	12.3	13.1	13.2	13.7	12.7	12.2	11.4	10.7	10.0	9.6	9.3	13.7																							
7-Jun	9.5	9.0	8.6	7.0	7.4	8.2	8.8	9.9	10.6	11.7	11.9	10.7	12.5	14.0	14.6	15.0	14.8	15.3	15.3	12.6	11.7	10.1	8.3	8.0	11.1	15.3																							
8-Jun	7.0	6.3	5.3	4.8	4.5	5.6	7.9	10.2	12.7	15.1	16.3	17.4	18.2	18.9	19.6	20.4	20.4	20.0	18.6	17.9	16.4	15.3	14.3	13.6	13.6	20.4																							
9-Jun	13.1	12.7	12.4	11.6	9.9	9.4	9.8	10.1	10.3	10.4	11.5	11.7	12.0	12.0	12.0	12.2	11.8	11.5	11.0	11.0	10.3	10.0	9.1	9.1	11.0	13.1																							
10-Jun	8.8	8.2	8.1	8.0	8.0	8.2	8.5	10.7	13.2	14.7	16.2	17.5	18.0	16.0	18.4	19.7	19.3	18.3	19.7	17.8	16.0	14.2	12.6	12.6	13.9	19.7																							
11-Jun	12.0	10.8	10.1	8.9	8.5	9.1	10.5	12.5	13.4	14.5	17.0	20.4	15.9	15.5	18.6	17.7	15.9	16.7	17.0	17.6	15.3	13.1	12.7	11.6	14.0	20.4																							
12-Jun	10.9	10.5	9.6	9.5	9.1	9.1	10.6	13.6	15.2	17.1	19.8	21.3	21.5	22.1	22.3	22.5	22.2	21.6	20.9	20.1	18.6	16.9	15.1	14.3	16.4	22.5																							
13-Jun	13.5	12.6	11.6	11.1	11.3	11.8	13.0	15.4	17.6	19.2	20.0	20.7	22.1	23.0	23.5	24.0	24.0	23.8	23.1	21.9	19.8	18.0	16.7	15.3	18.0	24.0																							
14-Jun	14.2	13.5	12.8	12.1	12.3	13.0	14.4	17.0	19.0	20.9	23.4	24.2	25.2	25.7	26.4	26.2	25.4	25.2	23.8	24.0	22.6	19.5	18.5	16.8	19.8	26.4																							
15-Jun	15.0	13.9	12.8	12.1	12.7	13.9	15.5	17.9	20.2	22.1	23.8	25.0	25.6	25.9	26.4	26.6	26.4	26.0	24.8	23.5	21.5	19.5	17.3	15.4	20.2	26.6																							
16-Jun	14.1	13.4	13.0	11.6	10.7	11.0	12.4	15.0	17.9	18.7	19.2	21.4	22.7	22.6	23.0	22.8	22.7	22.6	21.8	21.2	19.4	16.5	15.3	14.4	17.6	23.0																							
17-Jun	13.5	13.0	12.7	12.6	12.3	12.3	13.7	14.7	16.1	17.3	17.4	18.1	19.1	19.7	18.7	19.5	20.5	19.4	15.7	16.3	16.0	15.7	15.6	14.5	16.0	20.5																							
18-Jun	14.3	14.0	13.8	13.5	13.8	14.6	15.3	16.8	18.8	20.3	21.7	20.9	21.9	23.3	23.5	24.8	25.0	24.1	24.6	23.7	21.9	20.2	18.9	18.1	19.5	25.0																							
19-Jun	17.0	16.0	15.2	14.6	14.9	15.0	15.9	16.4	17.0	17.8	18.7	18.2	18.5	20.5	20.3	20.6	20.6	20.2	19.9	17.5	17.2	16.5	16.1	16.1	17.5	20.6																							
20-Jun	15.8	16.2	15.3	14.8	14.3	15.5	16.0	17.0	18.0	18.4	19.1	19.2	18.3	19.2	20.6	20.6	19.6	19.6	17.7	16.1	15.5	15.1	14.8	14.8	17.1	20.6																							
21-Jun	14.6	14.7	14.5	14.4	14.2	14.3	14.5	14.4	14.5	14.6	14.8	14.8	14.9	15.2	15.7	16.3	17.2	17.2	16.9	16.5	16.2	15.9	15.8	15.4	15.3	17.2																							
22-Jun	15.0	14.7	14.2	14.3	14.3	14.5	15.7	16.2	16.7	17.6	17.7	16.3	17.4	19.3	19.8	21.7	21.7	21.2	21.2	20.9	20.4	18.4	17.5	16.3	17.6	21.7																							
23-Jun	15.9	15.6	15.1	14.7	14.8	15.4	16.0	16.9	18.3	19.4	20.5	21.4	23.3	25.0	26.0	24.7	21.4	20.5	20.7	20.4	20.3	19.3	19.0	18.4	19.3	26.0																							
24-Jun	18.0	17.6	17.1	16.6	16.1	15.9	16.3	18.1	21.0	22.5	24.7	26.3	25.8	26.0	26.3	26.4	25.7	25.5	24.3	21.7	21.2	20.0	19.4	18.7	21.3	26.4																							
25-Jun	18.2	17.5	16.8	16.4	16.8	17.9	18.7	20.4	21.9	23.6	25.3	26.6	27.7	24.4	24.2	24.6	19.0	19.7	20.1	20.7	19.3	18.2	17.2	17.0	20.5	27.7																							
26-Jun	16.7	16.4	16.3	15.9	15.3	15.8	17.3	17.8	19.5	20.8	21.7	21.5	21.1	19.9	19.0	20.8	22.0	22.2	21.3	20.3	19.5	18.6	18.1	17.1	19.0	22.2																							
27-Jun	17.0	15.8	15.4	14.7	15.4	16.8	16.5	17.8	18.8	19.9	20.8	21.9	22.9	17.3	19.8	21.4	22.0	20.9	20.4	20.3	19.2	17.6	17.2	16.6	18.6	22.9																							
28-Jun	15.3	13.8	13.2	13.2	12.8	13.0	14.2	16.1	18.4	20.7	22.7	23.8	24.9	25.8	25.3	25.3	26.2	25.5	24.6	24.0	23.0	21.7	20.6	19.6	20.2	26.2																							
29-Jun	17.5	16.2	16.3	15.3	15.3	15.9	16.4	18.1	20.0	21.3	22.9	24.0	24.7	25.4	25.6	25.3	25.2	25.0	25.0	24.6	23.4	22.3	21.3	20.5	21.1	25.6																							
30-Jun	19.3	18.2	17.5	16.9	16.3	16.6	17.2	18.4	19.4	20.7	21.4	21.8	22.9	23.4	23.5	23.7	23.7	23.5	23.2	22.7	21.4	20.1	18.4	15.8	20.2	23.7																							
																								13.4	12.7	12.2	11.7	11.5	11.9	12.8	14.2	15.7	17.1	18.2	18.9	19.5	19.7	20.2	20.6	20.1	19.7	19.1	18.2	17.1	15.8	15.0	14.2	Diurnal Average	
																								19.3	18.2	17.5	16.9	16.8	17.9	18.7	20.4	21.9	23.6	25.3	26.6	27.7	26.0	26.4	26.6	26.4	26.0	25.0	24.6	23.4	22.3	21.3	20.5	Diurnal Maximum	



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Millennium - June 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Millennium - June 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	113	15.69	15.69
10 - 20	416	57.78	73.47
> 20	191	26.53	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
Millennium - June 2014

Maximum Speed: 25 km/h on Jun 3 20:00	Maximum Daily Speed Average: 16.0 km/h on Jun 5	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 23 10:00	Minimum Daily Speed Average: 0.8 km/h on Jun 2	Hours of Data: 717
Maximum Diurnal Speed Average: 4.5 km/h at hour 18	Minimum Diurnal Speed Average: 1.1 km/h at hour 24	Hours of Missing Data: 3
Monthly Average Velocity: 2.0 km/h 62.6 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 14 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-Jun	ESE14	ESE12	SE9	ESE11	ESE12	ESE11	ESE15	SE17	SE15	SE12	SE11	SSE9	SE9	SSE7	SE7	SSE6	S12	S9	SSW7	WSW2	SE5	SE5	SSE4	SSW2	SE8.6	SE17
2-Jun	SSE4	SE5	SSE4	SSE4	S5	S5	S6	S6	S7	SSE5	SSW3	WNW6	WNW9	WNW10	W8	WSW8	NNE17	N8	NNE18	NNE12	NNE7	AF	AF	NW1	NW0.8	NNE18
3-Jun	NNW1	E1	NNE6	NNE6	NNW6	N5	NNW5	NNW7	N5	E6	N13	N20	N18	N1	NW7	N13	N14	N22	NNW15	NNE25	NNE20	N9	NW7	NW10	N9.3	NNE25
4-Jun	N10	N8	NNW7	NNW9	N9	NNW6	NNW7	NNW8	NNW8	NW7	NNW10	N14	N17	N21	N20	N22	N21	N22	N17	N18	N18	N15	NNE12	N13	N13.0	N22
5-Jun	N15	N16	N20	N17	N19	N16	N16	N16	N17	N18	N21	N20	N22	N21	N19	N16	NNW13	N15	N18	NNW9	N12	N13	N12	NNW7	N16.0	N22
6-Jun	N9	N9	N7	N4	N4	WNW3	NNW5	NNW6	NNW4	NW4	NNW4	N6	N6	NNW6	NNW7	NNE7	NNE7	NNE7	NE7	ENE6	ENE6	E6	ESE7	ESE6	N4.3	N9
7-Jun	ESE7	ESE7	E6	SE9	ESE8	E4	WNW2	NNW5	N7	NNW5	NNW9	N15	NE12	NE6	N4	NNW5	N6	WNW7	NW7	S2	SSW7	SSW4	S4	SSW5	NNE1.9	N15
8-Jun	S4	S3	S3	SSW4	SSW5	S4	S4	S4	SSE4	SSE5	NE4	SSE4	SSE5	E6	SE5	ESE7	SE4	SE6	SE6	SE9	SE10	SE12	SE12	SE13	SE5.2	SE13
9-Jun	SE11	SE9	SE5	SSE6	SE5	ESE8	ESE8	ESE9	ESE10	SE12	ESE15	ESE16	ESE17	ESE16	ESE13	ESE15	ESE16	ESE14	ESE12	E9	E7	ENE6	NE4	NNE9	ESE9.7	ESE17
10-Jun	NNE10	NNE9	NNE12	NNE13	NNE12	NNE9	N10	NNW7	N10	N14	N12	NNE11	NNE17	N13	NNW8	NW9	N13	NE17	NW4	WSW6	W5	W5	W4	WSW6	N8.1	NE17
11-Jun	WSW5	SSW4	SSW5	SSE4	S4	SE4	SSE3	S5	S4	SSW5	SSE4	SSE8	S4	SE3	SE8	E6	ESE2	NE5	S6	S5	SSE3	S3	S3	E1	SSE3.4	SE8
12-Jun	E2	ENE1	E1	SSE4	SSE4	SSW3	S3	S3	NNE3	NW5	NW6	NNW8	N12	N11	N14	NNE16	NNE17	NNE16	NNE15	NNE14	NNE11	NNE12	NE9	E8	NNE6.1	NNE17
13-Jun	ESE9	ESE9	ESE11	ESE12	ESE14	SE11	SE5	SE6	ESE6	ESE7	SE6	SSE5	SE6	SE5	SSE6	SSE7	SSE6	SE7	SE7	SSE7	SSE6	SE10	SE11	SE10	SE7.7	ESE14
14-Jun	SE8	SE10	ESE11	ESE12	ESE14	SE16	SE14	SSE8	SSE7	SSE8	SSE9	SSE9	SSE10	SSE10	S12	S13	S14	S12	S11	S10	S9	SSE5	SSE7	SSE8	SSE9.4	SE16
15-Jun	SE7	SE6	SSE4	SE8	SE9	SE9	SSE7	SSE7	SSE7	SSE7	SSE10	SE10	SE8	SE7	SSE7	SE8	SE8	SSE9	SE11	SE11	SE9	SE9	SE8	ESE6	SE7.9	SE11
16-Jun	SE5	SE5	ESE5	ESE2	NE2	NW3	WSW2	SSW3	SE10	S6	SSW5	SE5	SE8	ESE6	ESE6	NE7	NE10	ENE12	ENE11	ESE9	SSE8	SSW13	SSW7	SW4	SE3.5	SSW13
17-Jun	SSW3	SSW2	SSE3	SE4	SW5	SSW4	E2	S6	SE6	S7	SE8	SSE7	SE8	S7	SSE5	SSE6	SSE6	SSW8	SW8	S5	S7	SSE6	S6	S4	S5.0	SSW8
18-Jun	SSE3	SSE4	SSE4	SE6	SE6	SE7	SE7	SSE6	S7	S8	SSE11	SSE11	SSE12	SSE12	SSE13	SSE13	SSE13	SSE10	SSE10	SSE10	SSE9	SSE9	SSE8	SE9	SSE8.3	SSE13
19-Jun	SE9	SE9	SE8	SE8	SE4	SE5	SE5	SE7	SE4	SSE5	SE9	SE12	SE10	SE9	SE8	ESE5	ESE6	ESE7	NNE2	WNW1	WSW1	W2	W4	W4	SE4.9	SE12
20-Jun	N3	NNE8	N5	N4	NW2	AF	SW3	SSE2	SSE3	S5	S5	SE5	ESE7	S7	S6	SE8	SSE6	SE7	SSE6	S4	SSW2	NNW1	NW1	WNW2	SSE1.9	NNE8
21-Jun	WNW3	N4	N5	NNE8	NNE10	NNE8	N8	N9	N9	N10	N10	NNW7	NNW6	NW7	NW6	NW6	NW6	WNW8	NW7	NW8	NW7	WNW4	NNW5	NNW5	NNW6.1	NNE10
22-Jun	NNW5	NW5	WNW4	WSW4	W5	W6	WNW5	NW6	WNW4	NNW5	NW5	N4	NW6	NW9	NW8	NNW8	NNW7	N8	N8	N10	N8	SE5	NE3	N1	NW4.7	N10
23-Jun	NNE3	N3	N2	NW1	WNW3	WNW3	N4	N2	NNE2	NW0	ESE1	SSE1	SSE6	SE7	SE8	SSW11	ESE13	ENE9	ESE6	ESE4	ESE6	SE4	SE5	SE9	ESE2.6	ESE13
24-Jun	SE11	SE13	SE11	SE10	ESE9	ESE10	SE12	SE11	ESE10	SE10	SE10	SSE10	SSE10	SSE9	SSE9	SSE10	SSE8	SSE11	SSE12	SSE8	SE11	SE9	SE11	SE10	SE9.9	SE13
25-Jun	SSE9	SE10	SE8	SE9	SE10	SE12	SE11	SSE9	SE12	SE13	SSE10	SE12	S12	SSE5	S14	SW6	NNE4	SSW1	S4	S7	S5	SE2	SSW4	SSE7.2	S14	
26-Jun	SW1	S2	SSW2	SSW3	SSW3	S4	S4	SSW5	S5	WSW4	WNW6	WNW6	WNW3	SSE6	WNW2	N7	NNE6	NNW2	NNW6	NW4	NNW3	NE3	ESE2	N1	W0.9	N7
27-Jun	NNW4	NNE1	SSE2	SSW3	SSW2	ESE2	S2	SE3	S3	SE1	NNE3	N6	NNE4	ENE7	N8	NNW5	N7	N16	NNE15	NE9	NNW2	NNW4	N5	N6	NNE3.3	N16
28-Jun	NE3	E3	ESE0	SW2	WSW2	SW3	SE1	ENE2	N4	NNW4	WNW3	NW4	WNW6	NW6	N12	N12	NW9	NW8	NNW7	N10	N9	N7	N8	N6	NNW4.3	N12
29-Jun	NNW4	NW5	NNW6	N8	N7	NNW5	NW6	NNW7	N14	N15	N16	N19	N23	N24	N22	N22	N22	N20	N20	N14	NNW10	NNW10	N11	N13	N13.2	N24
30-Jun	NNW9	NW7	NW7	NW7	NW6	NW7	NW6	N10	N13	NNW10	N12	N14	N16	N16	N14	N15	N16	N16	N15	N13	N9	NNE8	NNE7	WSW1	N10.1	N16

E1.9	E2.2	E1.9	E2.4	E2.0	ESE2.0	ESE1.5	ESE1.3	E1.9	E1.2	NE1.8	NE2.7	NE3.3	NE2.1	NE2.2	NE2.6	NE3.6	NNE4.5	NNE3.6	NE2.9	NE1.7	E1.6	E1.6	E1.1	Diurnal Average		
N15	N16	N20	N17	N19	N16	N16	SE17	N17	N18	N21	N20	N23	N24	N22	N22	N22	N22	N22	N20	NNE25	NNE20	N15	NNE12	SE13	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 - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Jun 10 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 Jun 2 04:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 7	

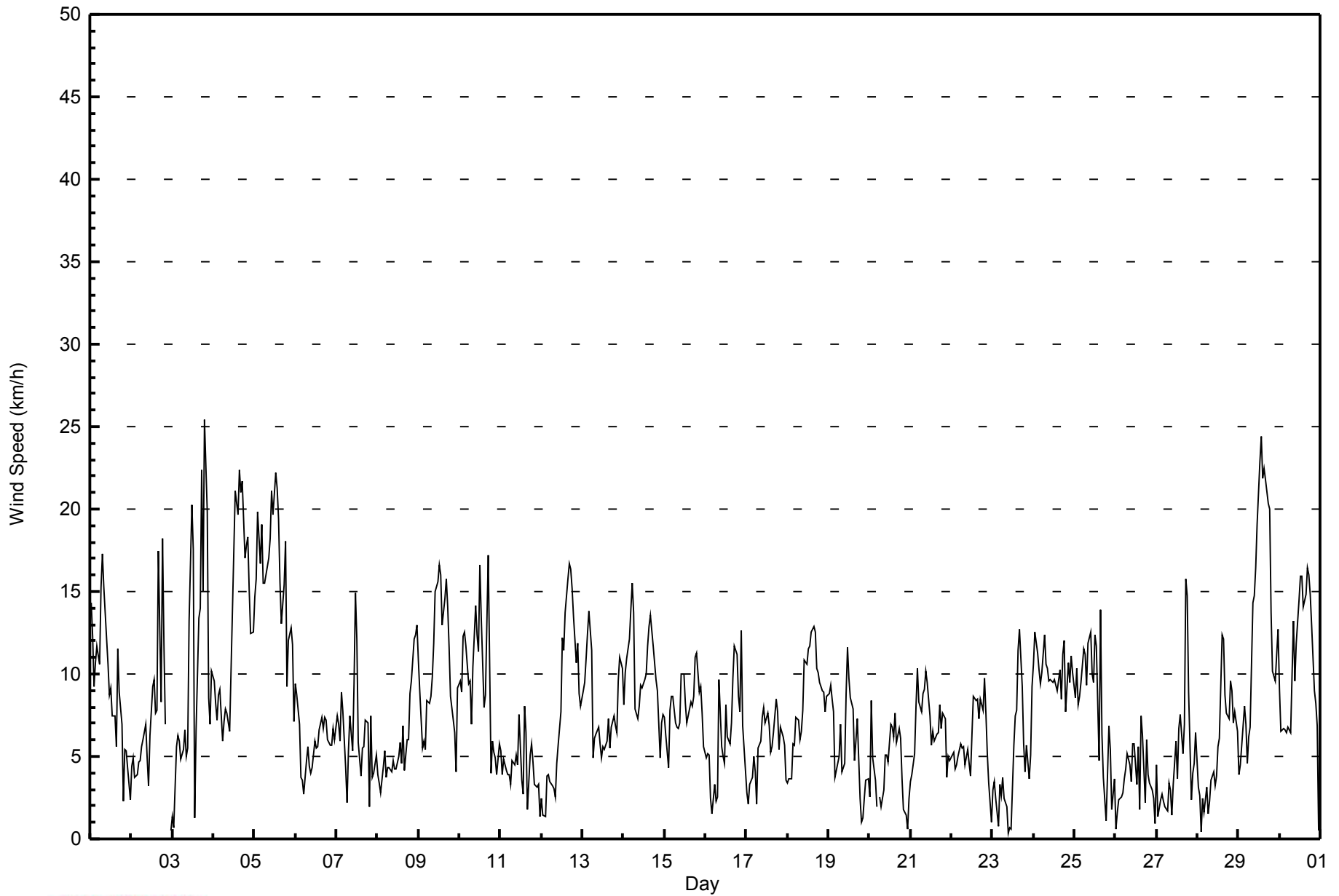
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	4	3	3	4	3	3	5	5	4	4	4	3	3	2	3	2	4	3	3	2	2	2	2	3	5
2-Jun	1	1	1	1	1	2	3	2	2	2	2	3	4	4	4	3	7	3	4	5	2	AF	AF	2	7
3-Jun	2	2	1	2	2	2	2	2	2	2	5	5	5	3	3	3	6	7	7	8	4	5	3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

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Millennium - June 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Millennium - June 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	236	32.91	32.91
6 - 11	338	47.14	80.06
12 - 19	122	17.02	97.07
20 - 28	21	2.93	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
Millennium - June 2014

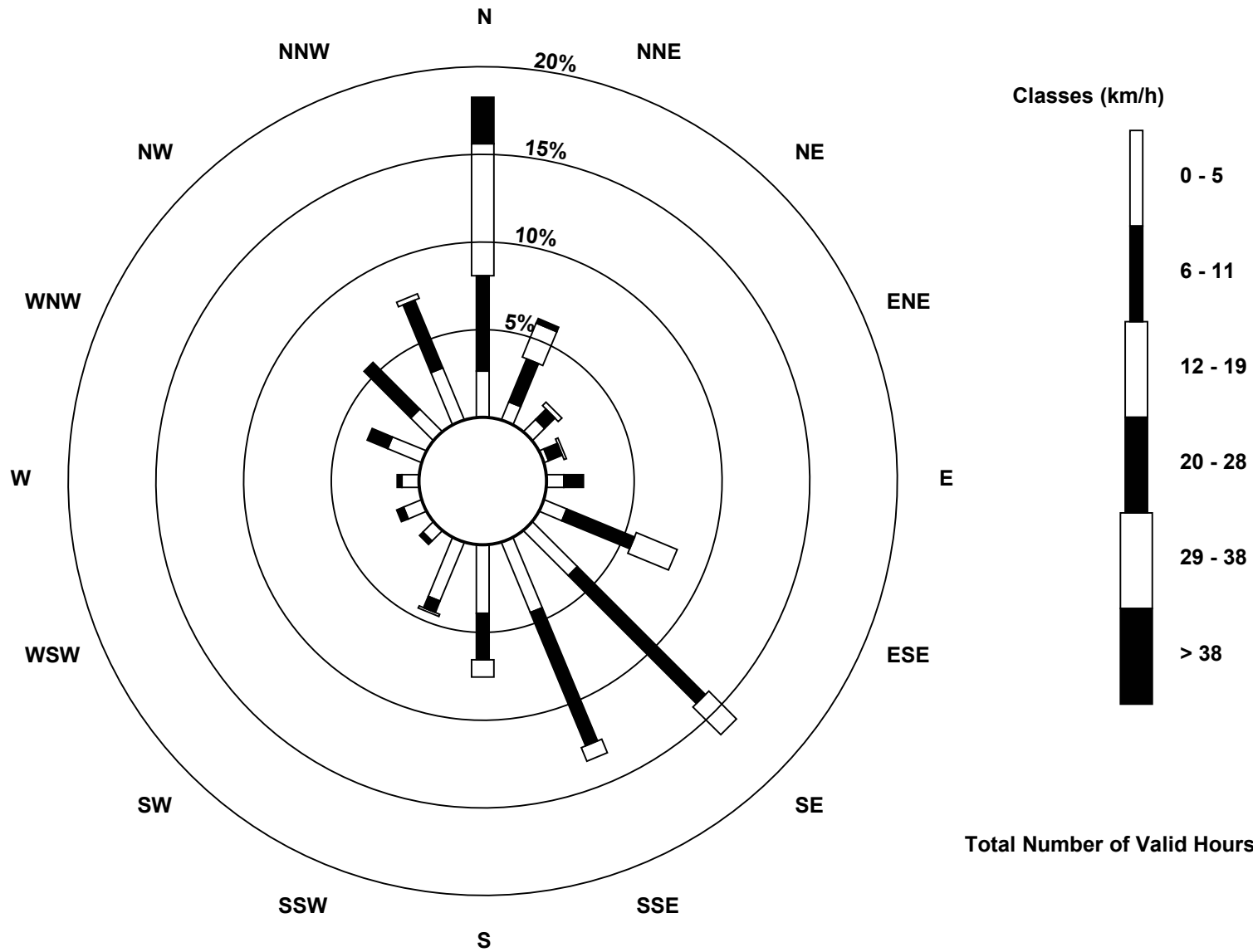
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	19	8	7	2	7	10	26	31	28	26	6	8	7	15	13	23	236
6 - 11	39	19	6	6	8	30	74	59	19	5	2	3	2	9	27	30	338
12 - 19	54	15	2	1	0	18	16	6	7	1	0	0	0	0	0	2	122
20 - 28	19	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21
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	131	44	15	9	15	58	116	96	54	32	8	11	9	24	40	55	717

Total Number of Valid Hours: 717

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Millennium (AMS 12)**





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Millennium - June 2014

Direction of Maximum Speed: 23 deg on Jun 3 20:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 357.8 deg on Jun 5	Hours of Data: 717
Direction of Minimum Speed: 304 deg on Jun 23 10:00	Hours of Missing Data: 3
Direction of Minimum Daily Speed Average: 0.8 deg on Jun 2	Percent Operational Time: 99.6
Monthly Average Direction: 327.0 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-Jun	121	123	137	123	115	108	120	130	131	131	140	157	140	157	146	150	171	181	198	248	129	136	165	200	138.3
2-Jun	158	146	157	157	180	189	185	188	188	168	197	302	287	287	262	253	27	11	23	14	17	AF	AF	319	316.8
3-Jun	334	95	19	22	344	353	332	340	357	83	352	357	356	351	321	9	360	353	338	23	12	6	306	318	357.5
4-Jun	356	351	340	345	357	339	342	346	333	319	347	357	357	4	359	5	5	7	8	9	9	3	12	0	358.9
5-Jun	355	353	0	3	3	358	1	357	2	1	5	2	5	0	357	351	344	351	358	348	355	359	355	334	357.8
6-Jun	352	355	352	7	352	300	336	337	331	326	347	5	2	327	348	12	23	22	34	60	65	100	120	111	11.0
7-Jun	119	115	91	126	115	101	288	332	358	338	348	9	48	44	359	341	358	289	317	181	213	200	189	207	28.5
8-Jun	175	169	189	209	213	186	178	172	166	156	53	152	161	96	129	121	133	126	128	133	131	133	135	129	143.0
9-Jun	129	142	145	153	135	117	105	111	119	125	123	122	121	115	109	109	105	102	102	94	88	76	42	28	111.9
10-Jun	26	18	23	18	15	12	8	343	1	4	2	12	15	352	337	325	355	38	316	248	260	278	267	255	0.1
11-Jun	249	208	193	157	173	141	154	172	175	211	163	165	169	141	129	93	121	53	180	175	162	182	179	85	163.5
12-Jun	101	71	88	150	148	195	170	179	12	312	324	345	359	5	7	18	24	19	14	28	31	27	52	95	22.5
13-Jun	106	112	116	116	121	126	135	130	114	119	131	166	132	134	148	150	148	141	144	161	147	137	136	139	131.3
14-Jun	146	138	122	119	121	128	135	151	149	153	150	153	151	162	171	184	188	178	177	184	181	161	166	149	154.0
15-Jun	141	141	155	130	132	136	150	154	153	154	148	132	138	149	152	143	142	151	139	137	142	138	131	120	141.5
16-Jun	138	134	110	118	42	304	258	205	137	180	210	124	130	117	104	53	54	61	62	116	165	197	211	217	126.8
17-Jun	211	201	161	145	214	212	85	172	145	169	142	147	131	179	160	156	160	192	215	180	186	167	171	184	170.4
18-Jun	163	156	157	130	132	140	134	158	181	170	151	148	152	152	149	166	160	162	166	155	152	152	150	140	153.6
19-Jun	141	134	134	138	142	131	132	127	146	165	140	127	126	130	136	113	116	112	26	286	239	273	276	264	134.8
20-Jun	359	15	351	349	310	AF	214	165	158	189	173	141	107	181	175	140	148	134	155	170	199	340	320	290	150.8
21-Jun	296	352	0	16	24	20	359	2	356	357	354	339	338	316	325	308	304	295	323	313	306	292	332	338	340.2
22-Jun	329	326	289	257	273	272	297	306	295	328	317	350	306	305	325	332	336	350	357	1	4	132	42	354	325.2
23-Jun	19	0	354	304	301	295	355	360	33	304	105	156	154	127	145	192	121	76	108	102	122	136	133	129	118.8
24-Jun	126	132	138	129	122	121	125	129	121	127	133	155	163	162	163	151	158	152	162	150	144	143	139	145	140.9
25-Jun	147	140	130	124	132	132	136	149	134	133	154	156	138	189	147	174	221	22	194	172	187	184	128	202	150.5
26-Jun	220	185	197	192	200	191	185	192	191	247	298	294	292	151	299	4	23	347	329	322	345	36	110	6	279.7
27-Jun	331	13	149	212	196	119	182	143	172	133	12	1	13	72	354	346	351	9	26	39	343	338	351	8	14.6
28-Jun	40	84	120	223	254	228	133	66	357	328	290	319	294	323	1	2	321	323	348	356	5	2	9	6	347.3
29-Jun	344	304	333	359	354	338	313	335	1	4	6	4	4	2	0	360	359	354	356	351	342	345	350	353	355.4
30-Jun	345	322	320	319	324	323	322	351	2	341	353	359	7	2	0	2	6	8	8	3	356	17	27	237	355.7

89.8 95.4 85.1 96.9 91.3 110.2 107.0 109.3 83.7 90.3 53.0 42.2 50.4 50.6 35.7 36.9 35.7 30.9 26.9 42.0 56.2 91.1 92.4 90.1

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 - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 101 deg on Jun 11 17:00	Hours of Data: 717
Minimum Value: 9 deg on Jun 30 23:00	Hours of Missing Data: 3
Percentiles: P ₁ = 12 P ₁₀ = 16 Q ₁ = 19 Median = 25 Q ₃ = 33 P ₉₀ = 52 P ₉₉ = 86	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-Jun	18	18	22	25	19	21	19	17	17	17	21	22	28	31	33	26	21	21	21	81	17	17	32	63	81
2-Jun	17	13	14	13	18	30	52	27	22	32	68	51	36	29	32	38	32	22	15	17	26	AF	AF	85	85
3-Jun	67	81	18	19	20	24	24	22	52	48	26	19	20	92	52	19	27	25	38	19	15	38	38	30	92
4-Jun	25	33	31	31	20	33	28	27	32	35	28	21	22	18	20	16	17	16	17	15	16	18	20	20	35
5-Jun	21	22	18	17	18	19	18	20	19	19	17	20	18	22	23	32	31	24	19	27	20	16	20	29	32
6-Jun	19	19	22	39	27	38	35	34	50	59	43	28	46	52	37	39	34	30	30	19	16	28	15	21	59
7-Jun	18	18	33	27	22	54	62	23	18	31	29	15	23	46	82	45	39	47	39	94	15	26	15	12	94
8-Jun	18	21	16	11	15	27	39	28	42	49	60	71	58	53	68	43	71	39	31	17	15	16	16	17	71
9-Jun	19	18	18	19	16	21	26	27	28	18	19	19	18	25	30	28	31	31	31	32	34	26	34	13	34
10-Jun	12	14	14	14	12	14	13	31	29	18	20	23	22	40	32	34	23	33	36	21	16	16	21	23	40
11-Jun	20	29	29	20	16	18	26	25	26	21	33	25	63	74	39	63	101	77	27	28	12	18	46	51	101
12-Jun	24	46	46	16	26	20	24	33	81	47	44	33	20	24	25	19	18	17	15	14	11	11	30	29	81
13-Jun	26	29	22	19	21	28	61	36	37	36	49	68	57	63	54	42	51	37	24	21	15	15	17	17	68
14-Jun	16	17	15	15	14	15	18	25	28	25	28	34	29	26	30	26	22	21	20	20	20	14	21	20	34
15-Jun	17	21	20	13	15	17	21	24	28	30	29	32	42	50	42	38	33	29	22	19	16	16	15	15	50
16-Jun	14	12	22	52	60	24	27	26	26	35	65	81	34	51	50	33	25	26	27	23	25	20	25	18	81
17-Jun	17	58	32	27	27	16	57	31	39	23	25	28	36	33	29	31	29	26	22	21	20	21	24	25	58
18-Jun	15	14	13	18	14	15	19	24	33	32	25	23	22	25	23	25	25	23	23	22	19	20	18	15	33
19-Jun	15	16	17	17	22	16	19	19	28	37	25	20	20	30	30	38	33	30	45	60	47	13	15	31	60
20-Jun	58	12	25	23	24	AF	25	62	57	26	25	41	33	35	32	25	22	22	23	26	70	42	51	16	70
21-Jun	17	22	18	17	18	19	25	16	20	17	19	29	30	29	32	27	34	28	32	31	27	27	34	34	34
22-Jun	37	33	28	23	26	27	31	27	31	30	32	35	28	30	35	32	34	31	26	19	34	14	40	27	40
23-Jun	17	18	26	77	20	20	18	46	65	97	82	97	33	33	31	32	26	27	28	27	19	21	20	16	97
24-Jun	17	17	18	20	19	17	14	16	20	24	28	27	25	24	23	24	23	24	25	20	17	17	16	20	28
25-Jun	18	16	16	15	18	17	20	23	23	22	25	26	26	29	36	40	74	33	56	25	22	18	65	22	74
26-Jun	75	69	65	26	22	28	28	28	38	85	49	40	57	74	44	24	25	42	35	34	16	39	67	79	85
27-Jun	25	52	32	44	24	60	35	34	46	68	62	26	64	54	26	22	21	23	18	17	46	25	22	17	68
28-Jun	20	45	88	53	60	29	75	58	40	48	79	73	54	51	27	21	34	35	32	18	18	16	15	15	88
29-Jun	29	16	19	18	25	37	31	30	17	16	17	21	22	19	23	21	22	23	21	26	32	32	29	22	37
30-Jun	30	34	32	38	34	35	33	33	16	33	28	19	17	18	19	19	18	18	16	17	18	15	9	90	90
	75	81	88	77	60	60	75	62	81	97	82	97	64	92	82	63	101	77	56	94	70	42	67	90	

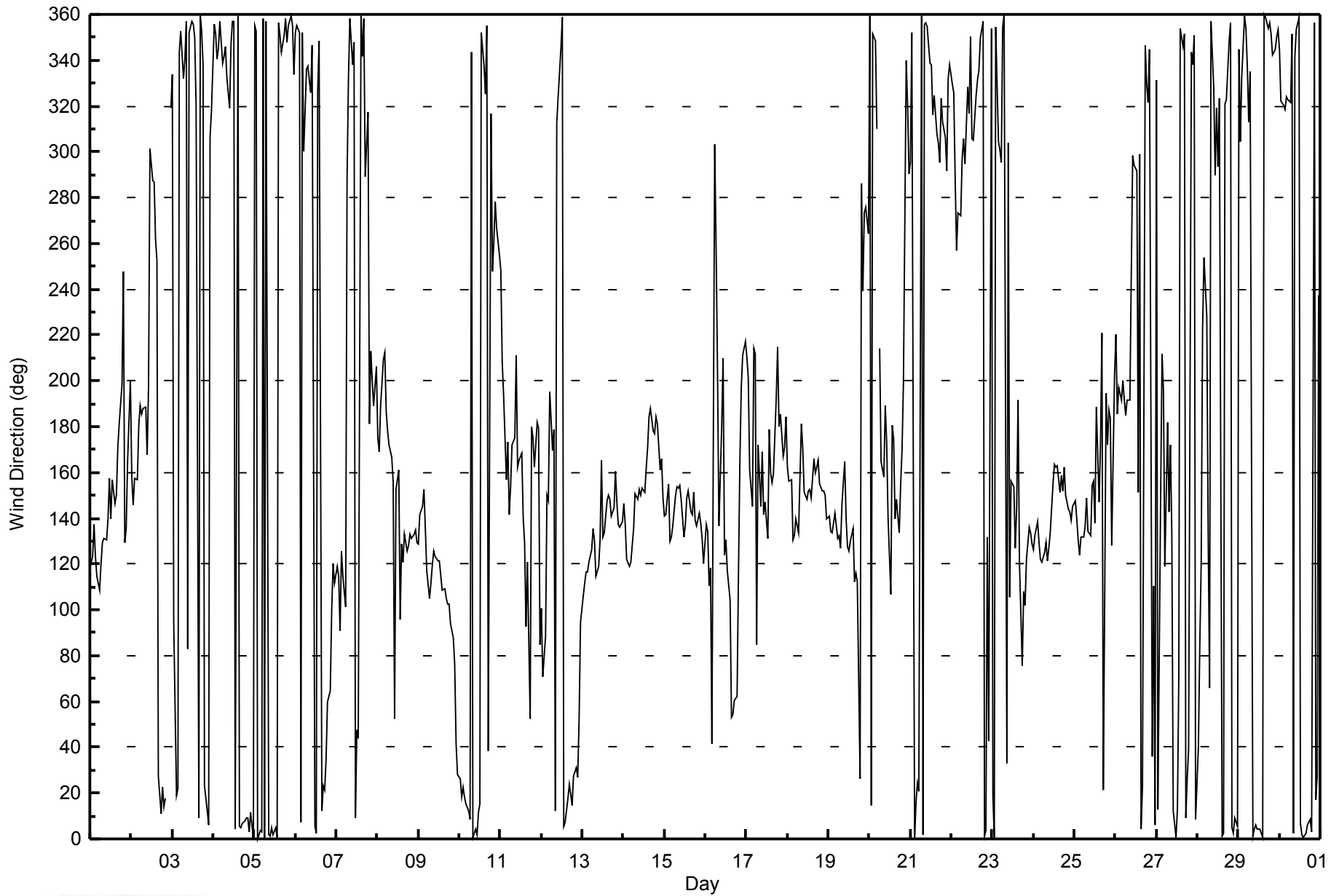
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Millennium - June 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 12, 2014	Previous Calibration	May 27, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	6:30	End Time (MST)	10:35
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	790	790
Calculated slope	1.010616	1.010221	Chamber temp.	44.9	44.9
Calculated intercept	-1.636154	-0.331672	Pressure (mmHg)	707.9	707.9
Analyzer Background	8.6	8.6	Flow (lpm)	0.444	0.444
Analyzer Coefficient	1.190	1.190	Intensity	91	91

Analyzer make	43i Thermo	Analyzer serial #	1118148499
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	-0.4	NA
as found span	6000	94.1	801.4	793.4	1.010
calibrator zero	6000	0.0	0.0	-0.4	NA
high point	6000	94.1	801.4	793.4	1.010
second point	6000	47.1	401.1	397.4	1.009
third point	6000	23.5	200.1	199.4	1.004
calibrator zero	6000	0.0	0.0	0.0	NA
as left zero	6000	0.0	0.0	0.0	NA
as left span	6000	94.1	801.4	796.2	1.007
Average Correction Factor					1.008

Corrected As found	793.8	Previous response	794.6	% change	0.1%
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Notes:

Filter changed No mainanence or adjustments made

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

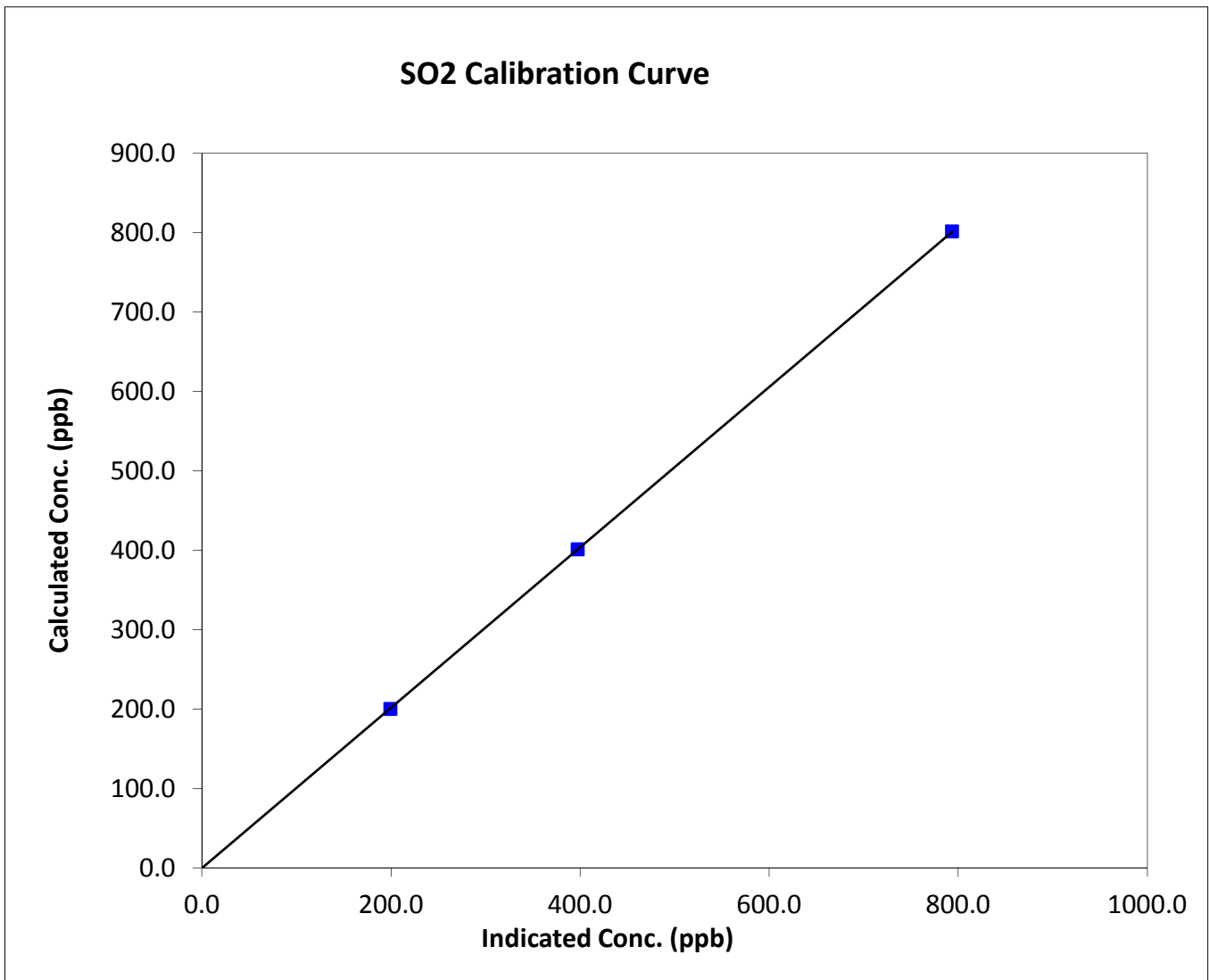
SO₂ Calibration Summary

Station Information

Calibration Date	June 12, 2014	Previous Calibration	May 27, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	6:30	End Time (MST)	10:35
Analyzer make	43i Thermo	Analyzer serial #	1118148499

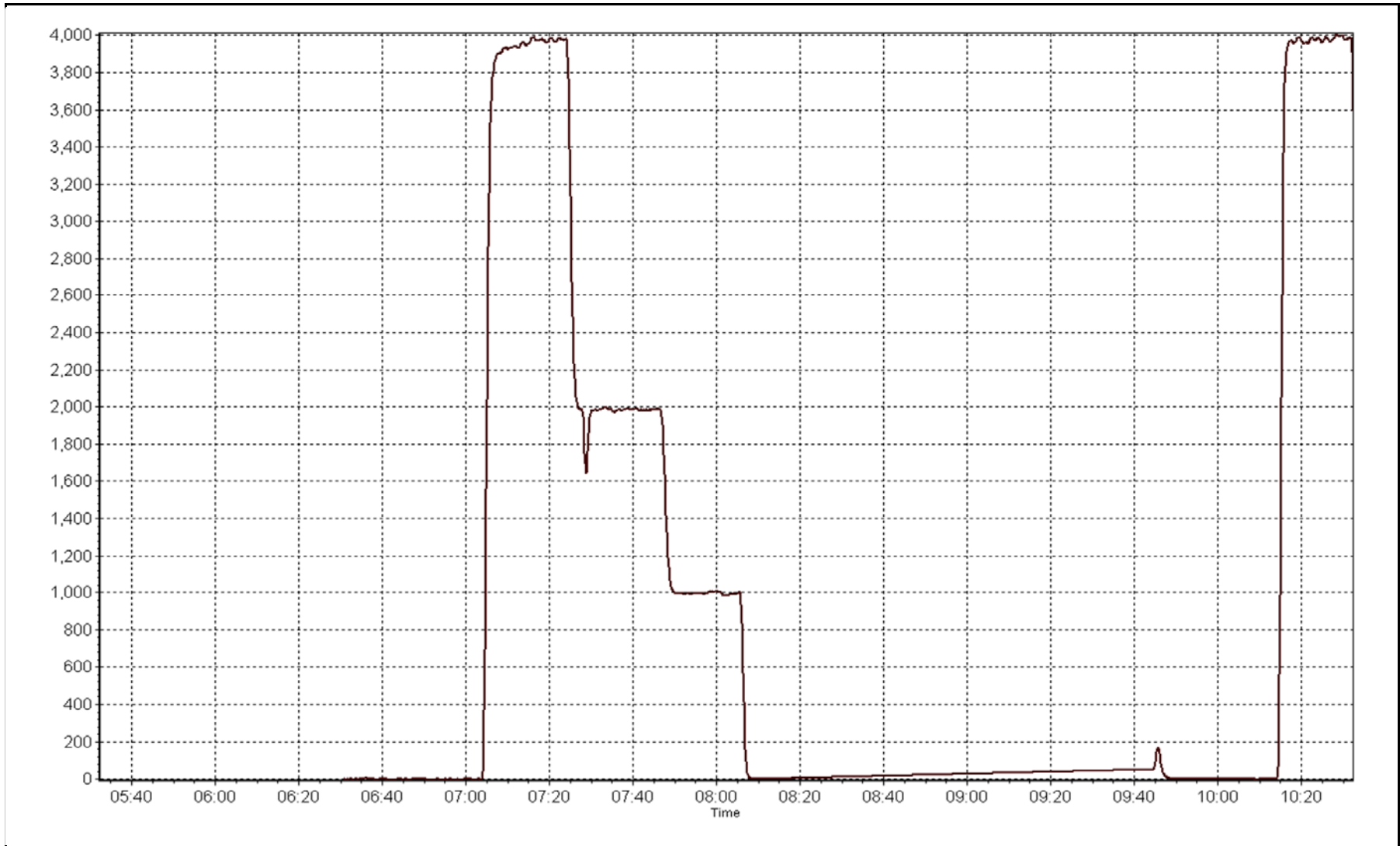
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999996
801.4	793.4	1.0101		
401.1	397.4	1.0094	Slope	1.010221
200.1	199.4	1.0037		
			Intercept	-0.331672



SO2 Calibration Plot

Date: June 12, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	June 13, 2014	Previous Calibration	May 28, 2014
Station Name	Millenium Mine	Station Number	Ams 12
Reason:	Routine		
Start Time (MST)	7:05	End Time (MST)	9:43
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	887	887
Calculated slope	0.993785	0.998147	Chamber temp.	44	44
Calculated intercept	0.531552	0.276454	Pressure	683.7	683.7
Analyzer Background	18	18.5	Flow	0.601	0.601
Analyzer Coefficient	0.641	0.654	Intensity	4600	4600
			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	-0.2	NA
as found span	5000	38.5	80.1	78.5	1.020
SO2 scrubber check	6000	47.1	401.1	1.2	NA
calibrator zero	5000	0.0	0.0	-0.2	NA
high point	5000	38.5	80.1	79.9	1.002
second point	5000	19.2	39.9	39.8	1.003
third point	5000	9.6	20.0	19.6	1.019
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	81.1	0.988
Average Correction Factor					1.008

Corrected As found	78.7	Previous response	80.0	% change	1.7%
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Notes:

Span adjusted, filter changed out, scrubber checked after third point

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

TRS Calibration Summary

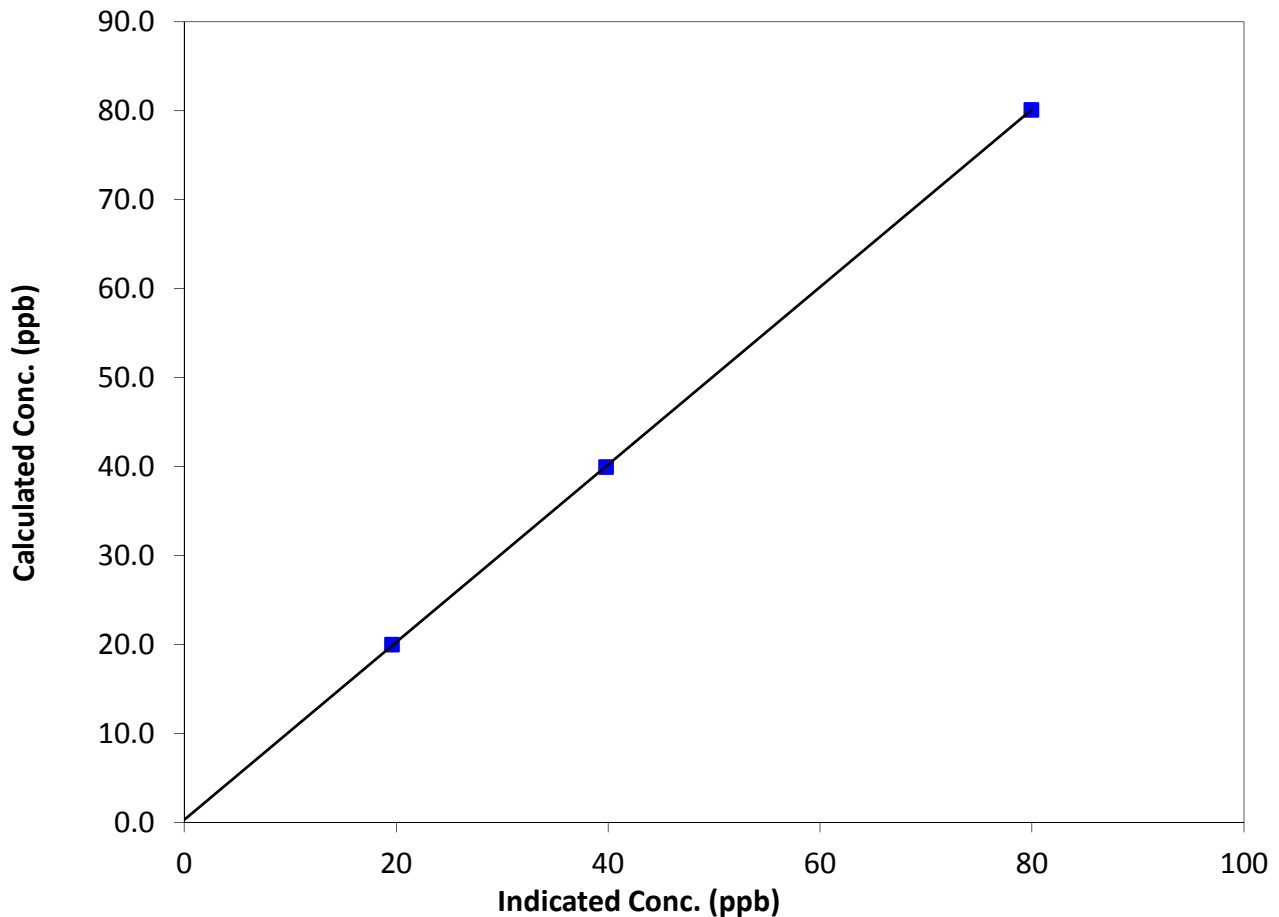
Station Information

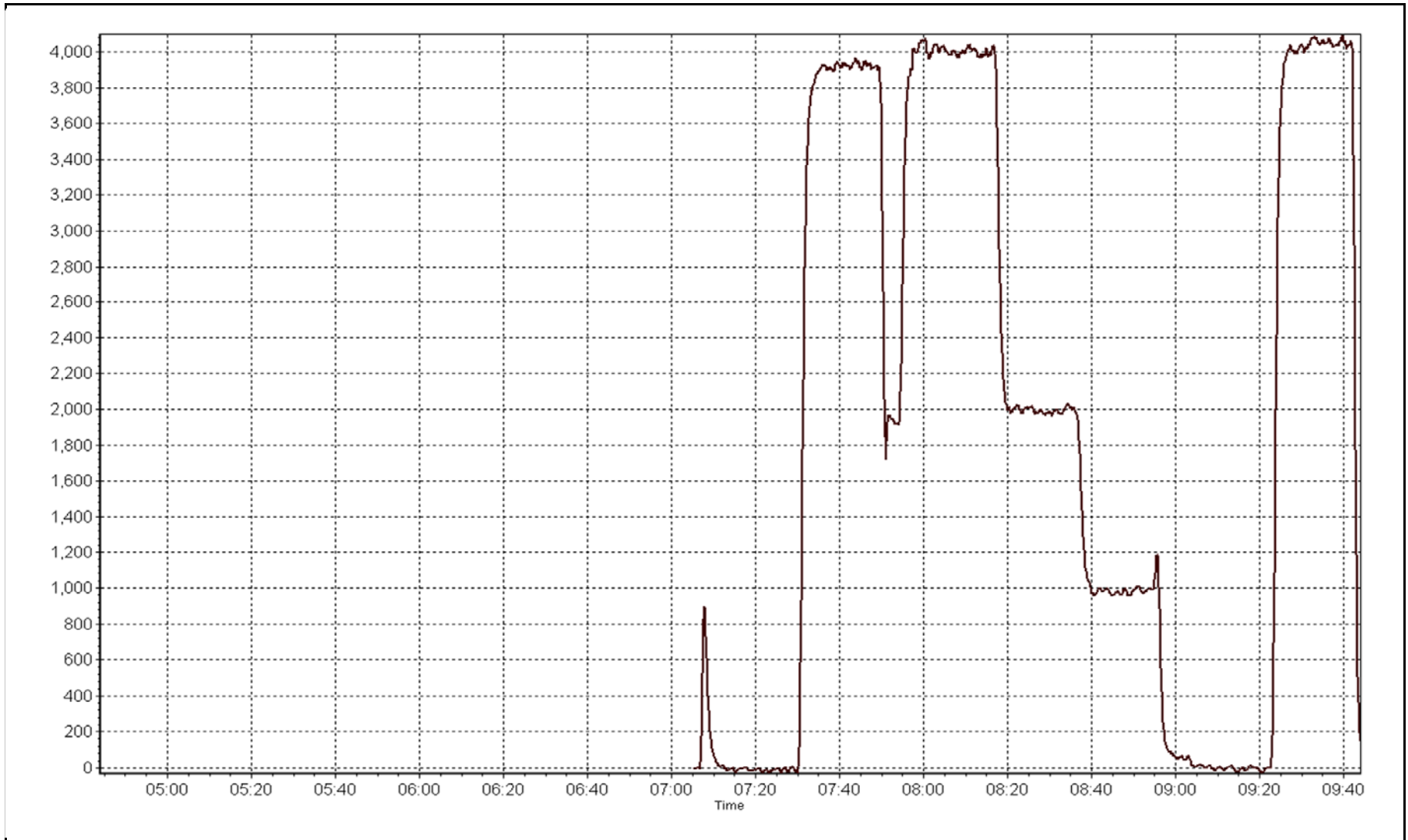
Calibration Date	June 13, 2014	Previous Calibration	May 28, 2014
Station Name	Millenium Mine	Station Number	Ams 12
Start Time (MST)	7:05	End Time (MST)	9:43
Analyzer make	TEI 43C	Analyzer serial #	0509110887

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999992
80.1	79.9	1.0018		
39.9	39.8	1.0029	Slope	0.998147
20.0	19.6	1.0188		
			Intercept	0.276454

TRS Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Thursday, June 12, 2014	Previous Calibration	Wednesday, May 28, 2014
Station Name	Millennium	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	6:30	End Time (MST)	10:35
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	0.984943	1.003123	Fuel Pressure	19.3	19.3
Calculated intercept	0.014774	-0.095754		3.83	3.83
				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	0.03	N/A
as found span	6000	94.1	16.93	16.93	1.000
calibrator zero	6000	0.0	0.00	0.03	N/A
high point	6000	94.1	16.93	16.93	1.000
second point	6000	47.1	8.47	8.59	0.986
third point	6000	23.5	4.23	4.37	0.968
calibrator zero	6000	0.0	0.00	0.10	N/A
as left zero	6000	0.0	0.00	0.10	N/A
as left span	6000	94.1	16.93	17.42	0.972
Average Correction Factor					0.985

Corrected As found	16.90	Previous response	17.17	% change	1.6%
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Notes:

Filter changed out, No adjustments or maintenance done

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

THC Calibration Summary

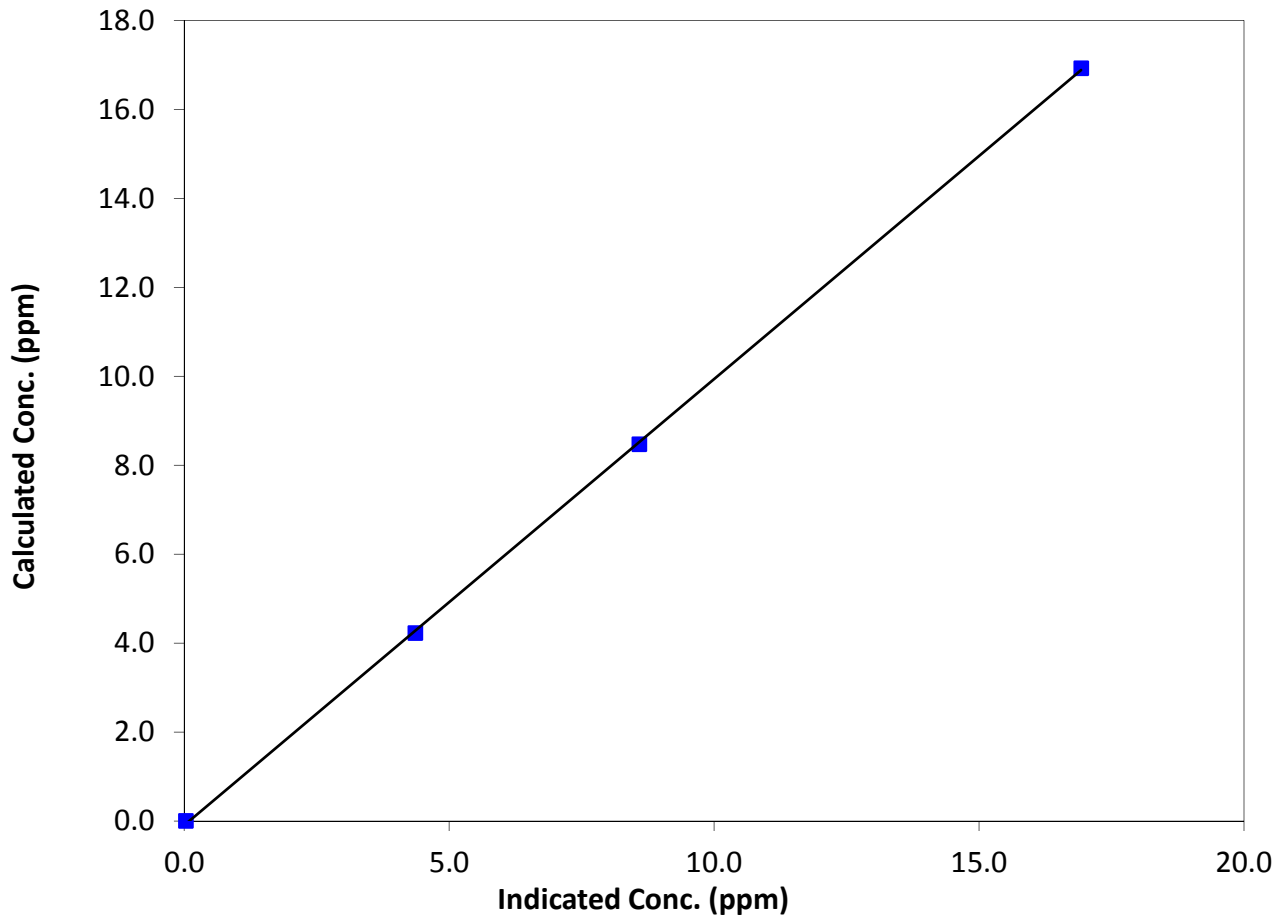
Station Information

Calibration Date	June 12, 2014	Previous Calibration	May 28, 2014
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	6:30	End Time (MST)	10:35
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958296

Calibration Data

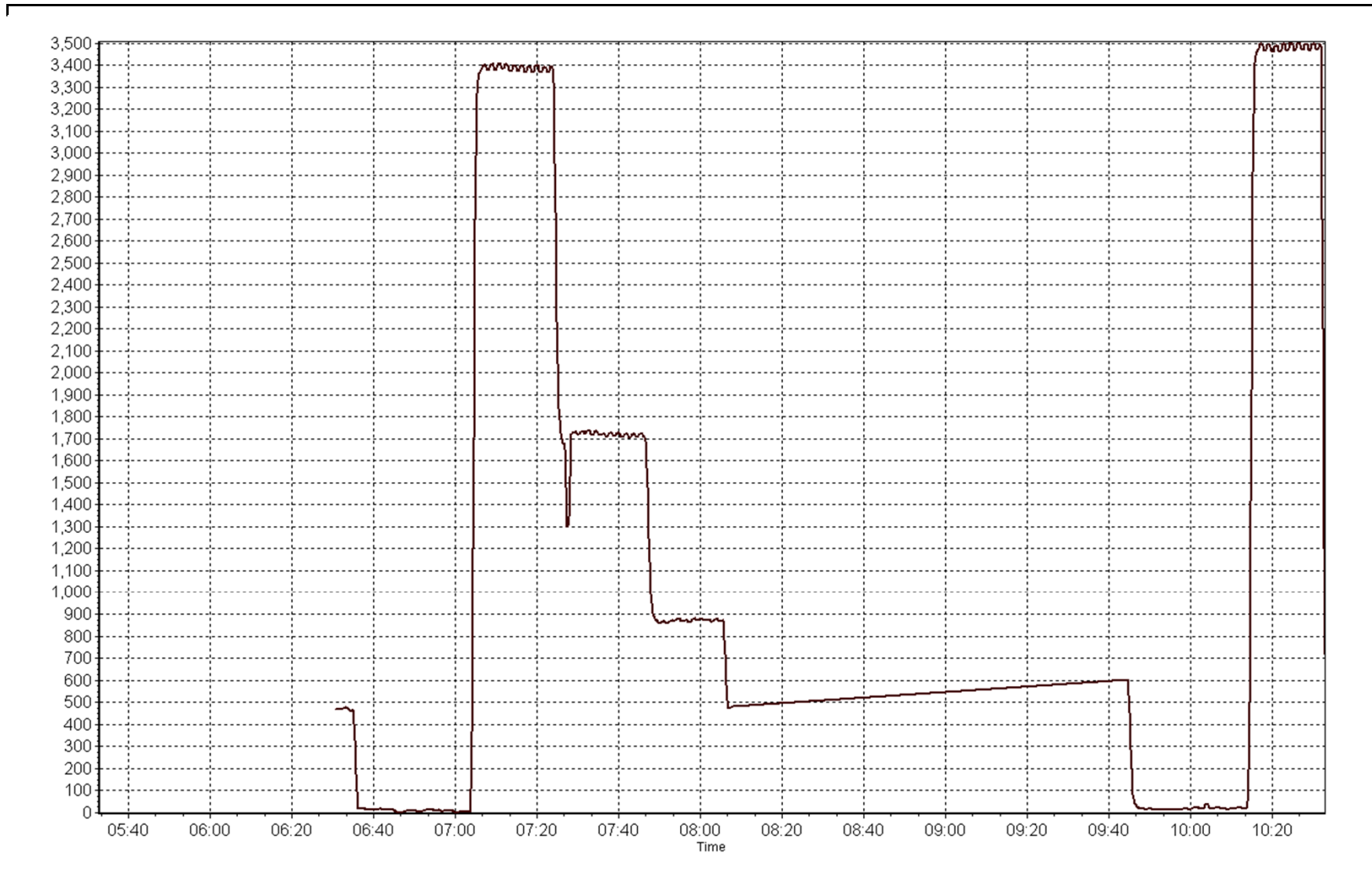
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	N/A	Correlation Coefficient	0.999928
16.93	16.93	0.9998		
8.47	8.59	0.9863	Slope	1.003123
4.23	4.37	0.9684		
			Intercept	-0.095754

THC Calibration Curve



THC Calibration Plot

Date: June 12, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	June 12, 2014	Previous Calibration	May 27, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	6:30	End Time (MST)	10:35
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	1.004308	1.005140	1.018232
	Data Offset	1.718354	0.134822	-0.775123
After	Data Slope	1.015165	1.015715	1.024096
	Data Offset	0.561271	0.067830	-0.278787
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	1.088	ppb	1.088	ppb
NOX coefficient	1.080	ppb	1.080	ppb
NO2 coefficient		ppb		ppb
NO bkgrnd	0.0		0.0	
NOX bkgrnd	2.7		2.7	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.4	Deg C	314.4	Deg C
PMT Temp	6.8	Deg C	6.8	Deg C
O3 flow	87.0	ccm	87.0	ccm
R Cell Press	2.8	mmHg	2.8	mmHg
Sample Flow	496-503	ccm	496-503	ccm

Notes:

Filter changed, No mainenance or adjustments made



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

June 12, 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	0.4	-0.3	0.7	N/A	N/A
as found span	6000	94.1	799.9	799.9	0.0	788.4	787.6	0.5	1.0145	1.0156
calibrator zero	6000	0.0	0.0	0.0	0.0	0.4	-0.3	0.7	N/A	N/A
high point	6000	94.1	799.9	799.9	0.0	788.4	787.6	0.5	1.0145	1.0156
second point	6000	47.1	400.4	400.4	0.0	392.6	393.8	-0.7	1.0197	1.0166
third point	6000	23.5	199.8	199.8	0.0	194.4	196.4	-1.8	1.0275	1.0171
calibrator zero	6000	0.0	0.0	0.0	0.0	0.5	0.5	-0.8	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	0.5	0.5	-0.8	N/A	N/A
as left span	6000	94.1	799.9	506.4	293.5	777.8	508.2	268.6	1.0283	0.9965
Average Correction Factor									1.0206	1.0164

Corrected As found

NO_x= 788.0

NO= 787.9

Percent Change

NO_x= 0.9%

NO= 1.0%

Previous Response

NO_x= 794.7

NO= 795.6

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			0.7			N/A	
1st NO ₂ (300)	N/A	506.4	283.6	784.8	506.4	277.6	1.0034	1.0000	1.0216	97.9%
2nd NO ₂ (200)	N/A	599.4	190.6	785.6	599.4	186.0	1.0024	1.0000	1.0247	97.6%
3rd NO ₂ (100)	N/A	694.4	95.6	788.2	694.4	93.2	0.9991	1.0000	1.0258	97.5%
4th NO ₂ (0)	790.0	N/A	-1.8	788.2	790.0	-2.4	0.9991	1.0000	N/A	N/A
Average Correction Factor							1.0010	1.0000	1.0240	97.7%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

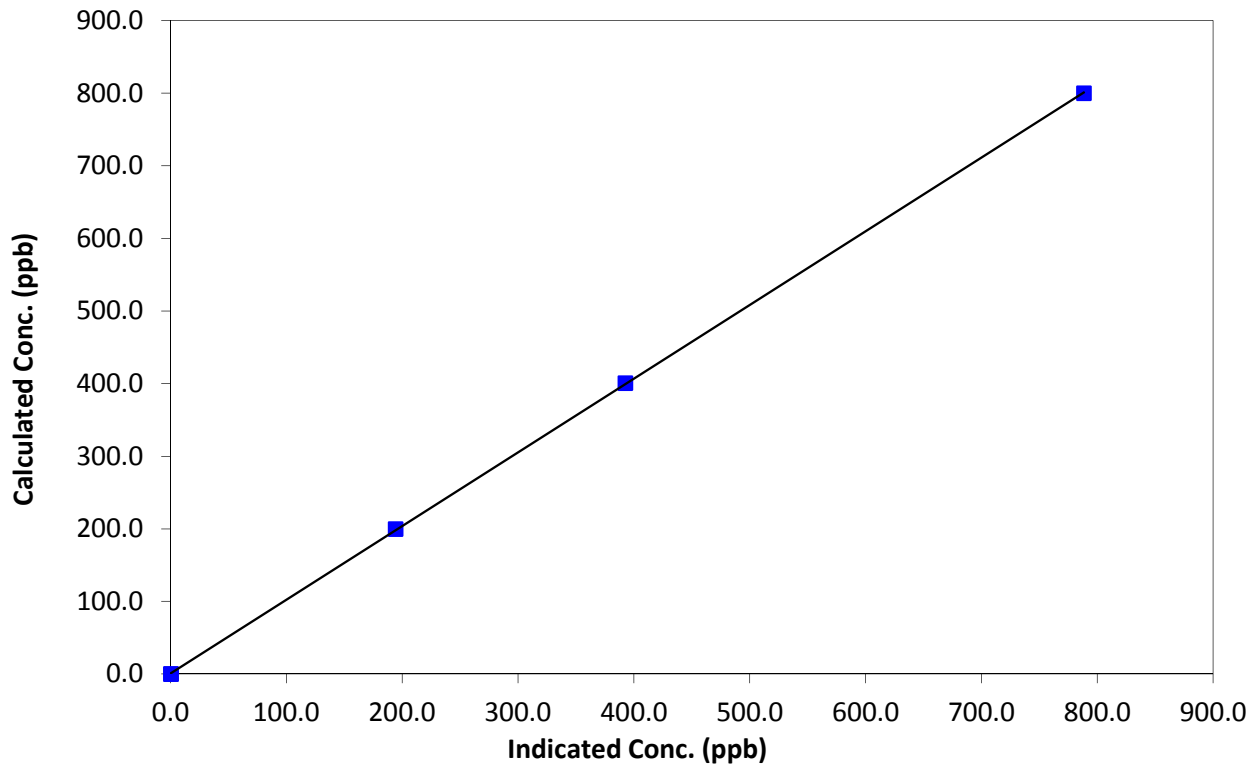
Station Information

Calibration Date	June 12, 2014	Previous Calibration	May 27, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	6:30	End Time (MST)	10:35
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	0.4	N/A	Correlation Coefficient	0.999982
799.9	788.4	1.0145		
400.4	392.6	1.0197	Slope	1.015165
199.8	194.4	1.0275		
0.0	0.5	0.0000	Intercept	0.561271

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

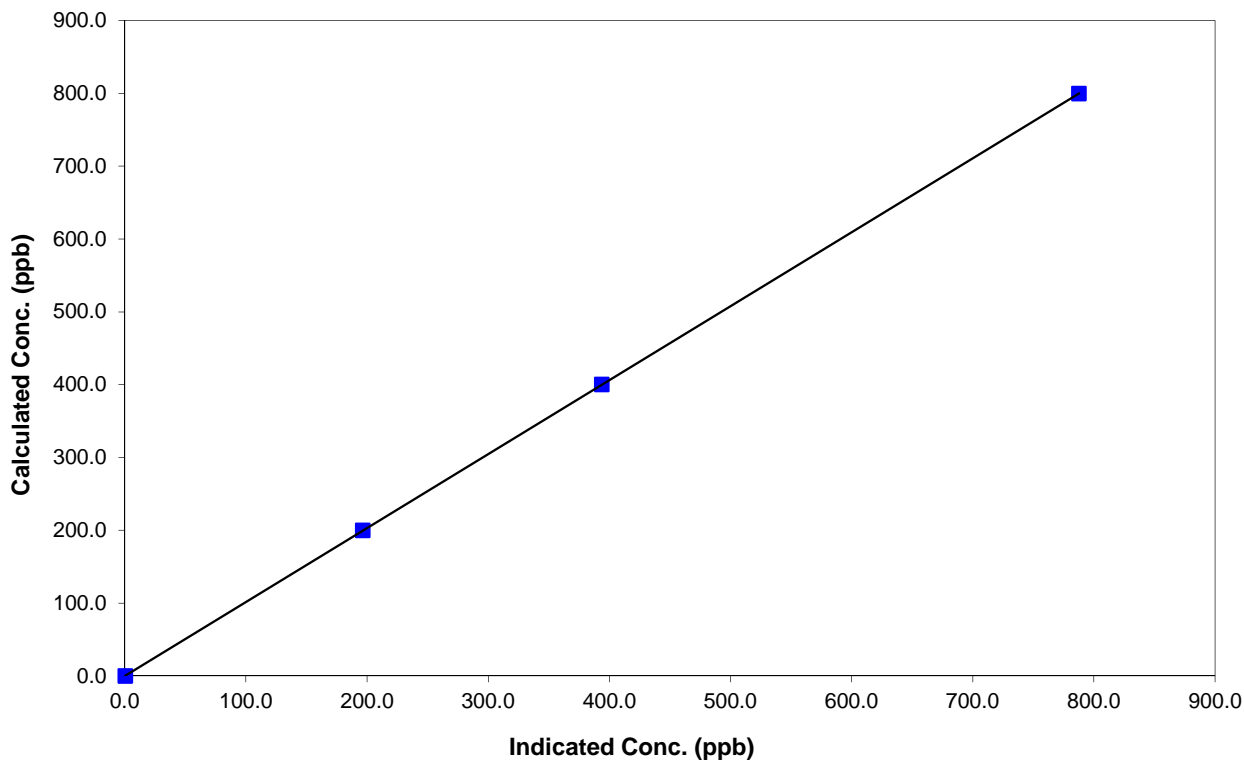
Station Information

Calibration Date	June 12, 2014	Previous Calibration	May 27, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	6:30	End Time (MST)	10:35
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	0.999999
799.9	787.6	1.0156		
400.4	393.8	1.0166	Slope	1.015715
199.8	196.4	1.0171		
0.0	0.5	0.0000	Intercept	0.067830

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

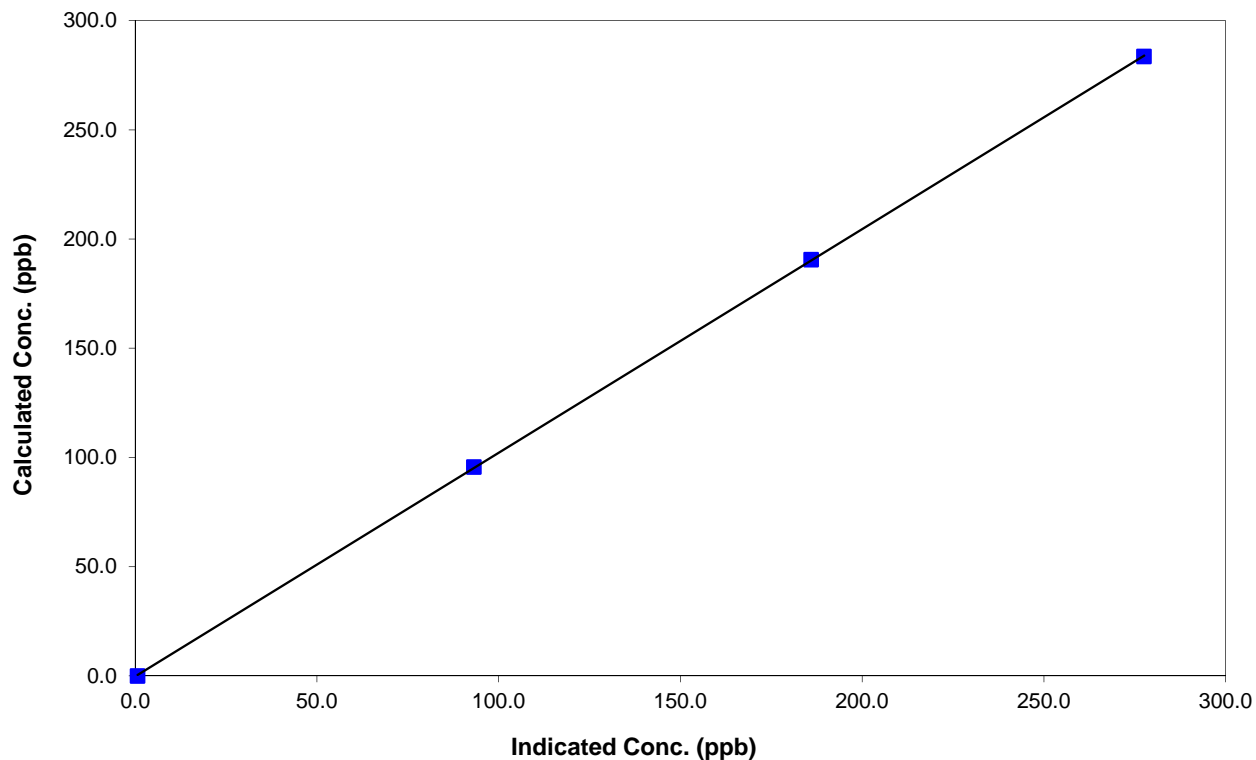
Station Information

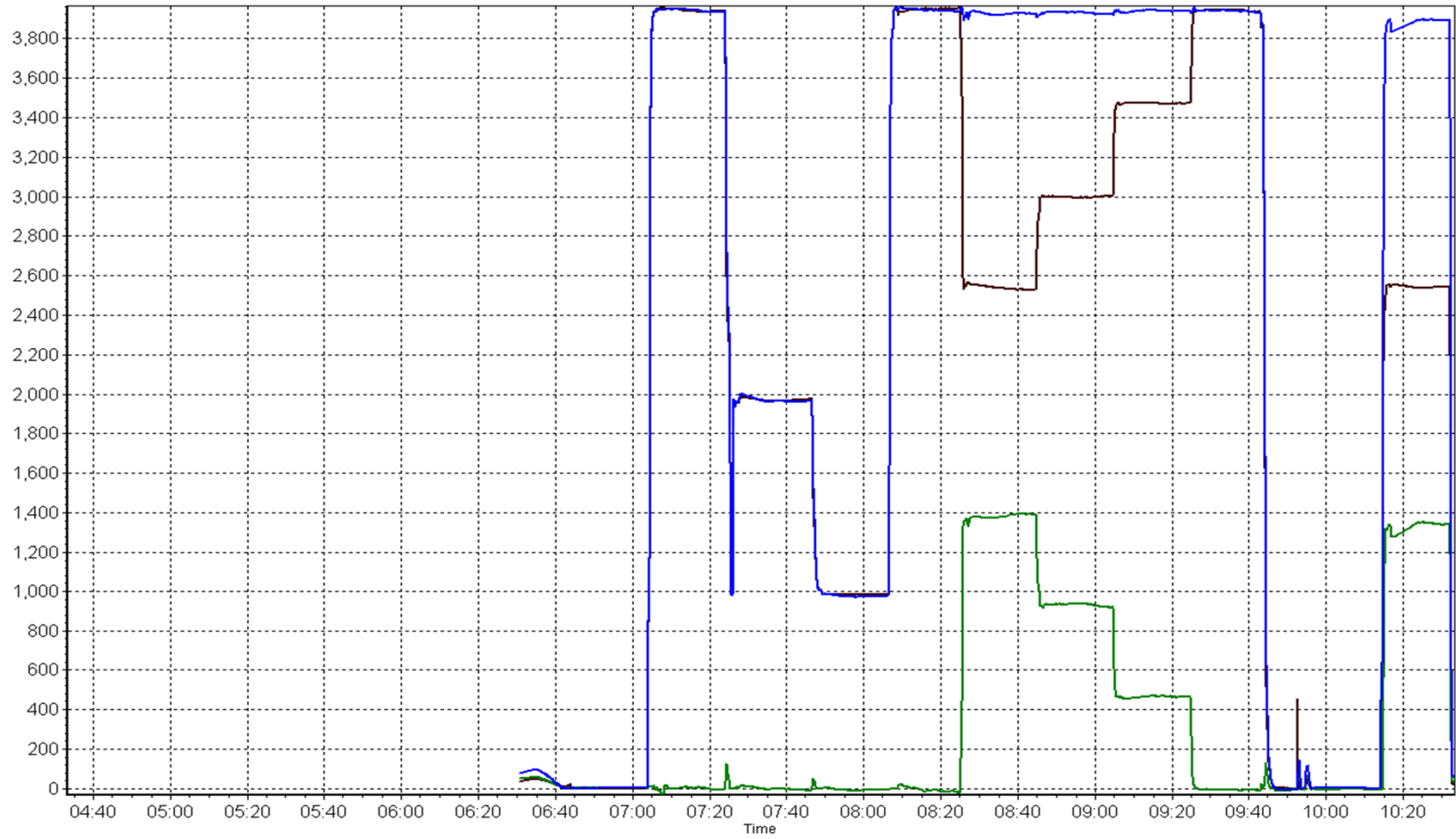
Calibration Date	June 12, 2014	Previous Calibration	May 27, 2014
Station Number	Millenium Mine	Station Number	AMS 12
Start Time (MST)	6:30	End Time (MST)	10:35
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.7	N/A	Correlation Coefficient	0.999985
283.6	277.6	1.0216		
190.6	186.0	1.0247	Slope	1.024096
95.6	93.2	1.0258		
			Intercept	-0.278787

NO₂ Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 13
FORT MCKAY SOUTH
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
 JUNE 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	684	35	36	99.86	23	0	4	0
TRS(ppb) Average	686	33	34	99.86	4	0	1	0
THC(ppm) Average	684	35	36	99.86	3.3	-	2.4	-
O3(ppb) Average	687	33	33	100.00	50	0	30	-
NO2(ppb) Average	683	36	37	99.86	40	0	8	-
NO(ppb) Average	683	36	37	99.86	34	-	5	-
NOX(ppb) Average	683	36	37	99.86	59	-	11	-
PM2.5(ug/m3) Average	719	0	1	99.86	34.1	-	21.8	0
Temperature 2 m (C) Average	720	0	0	100.00	28.6	-	20.9	-
Relative Humidity (%) Average	720	0	0	100.00	100	-	-	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	16	-	-	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
 JUNE 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	684	1.4	3	-	0	0	0	0	1	4	23
TRS(ppb) Average	686	0.3	0	-	0	0	0	0	0	1	4
THC(ppm) Average	684	2.14	0.2	-	1.9	2	2	2.1	2.2	2.4	3.3
O3(ppb) Average	687	20.5	14	-	0	2	8	20	32	39	50
NO2(ppb) Average	683	3.4	4	-	0	0	1	2	4	8	40
NO(ppb) Average	683	1	3	-	0	0	0	0	1	3	34
NOX(ppb) Average	683	4.5	7	-	0	0	1	2	5	10	59
PM2.5(ug/m3) Average	719	6.75	5.1	-	0.6	2.2	3.5	5.5	8.3	12.1	34.1
Temperature 2 m (C) Average	720	15.58	6.3	-	-0.6	7.3	10.5	15.6	20.4	24.2	28.6
Relative Humidity (%) Average	720	69	23	-	16	35	51	72	90	97	100
Wind Speed 10 m (km/h) Average	720	5.1	3	-	0	1	2	4	7	10	16
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)
JUNE 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	26 Jun 2014 15:00	26 Jun 2014 15:00	1	Power spike

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 23 ppb on Jun 15 10:00	Maximum Daily Average: 4.1 ppb on Jun 15		Hours of Data:	684
Minimum Value: 0 ppb on Jun 5 15:00	Minimum Daily Average: 0.2 ppb on Jun 5		Hours of Missing Data:	36
Maximum Diurnal Average: 3.6 ppb at hour 10	Minimum Diurnal Average: 0.3 ppb at hour 5		Hours of Calibration:	35
Monthly Average: 1.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 4 P ₉₉ = 13		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	0	Z	0	1	1	0	0	0	4	1	1	5	15	14	12	11	4	4	0	0	0	0	0	0	3.3	15
2-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Jun	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
5-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
7-Jun	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0	0	0	0.6	1
8-Jun	0	Z	0	0	0	0	1	1	1	1	2	1	2	4	4	3	6	5	3	1	0	0	0	2	1.6	6
9-Jun	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
10-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Jun	0	Z	0	0	0	0	0	1	1	0	1	9	4	1	2	2	1	1	2	2	0	0	0	0	1.2	9
12-Jun	0	Z	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-Jun	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	3	4	4	3	1	0	1	1	1	1.1	4
14-Jun	1	Z	1	0	0	1	2	8	15	13	10	4	2	3	3	3	4	2	2	2	1	0	0	1	3.4	15
15-Jun	0	0	Z	0	0	0	4	11	13	23	6	3	5	4	4	3	3	2	2	3	3	1	1	1	4.1	23
16-Jun	0	Z	0	0	0	0	0	0	4	11	7	4	3	2	1	0	0	0	0	0	1	1	0	0	1.7	11
17-Jun	0	Z	0	0	0	1	0	1	2	3	6	5	8	8	8	8	5	3	10	9	2	1	1	1	3.6	10
18-Jun	1	Z	0	0	0	0	1	11	12	11	4	7	7	2	3	11	1	1	2	2	1	1	1	0	3.4	12
19-Jun	1	Z	1	1	1	0	1	1	4	4	7	14	1	1	1	0	0	1	0	0	0	0	0	0	1.7	14
20-Jun	0	Z	0	0	0	0	0	0	1	2	2	9	12	4	9	5	2	1	1	1	1	0	0	0	2.3	12
21-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.3	1
23-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0.3	2
24-Jun	0	Z	0	0	0	0	4	12	11	13	11	9	5	1	1	1	3	3	2	7	2	1	1	1	3.8	13
25-Jun	1	Z	1	0	0	1	1	7	5	13	11	8	5	2	1	7	1	0	0	0	0	0	0	0	2.9	13
26-Jun	0	Z	0	0	0	0	0	0	0	4	5	1	0	0	PF	1	1	0	0	0	0	0	0	0	0.7	5
27-Jun	0	Z	0	0	0	0	0	0	1	4	8	9	8	2	2	1	1	0	0	0	0	0	0	0	1.7	9
28-Jun	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
29-Jun	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1
30-Jun	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1

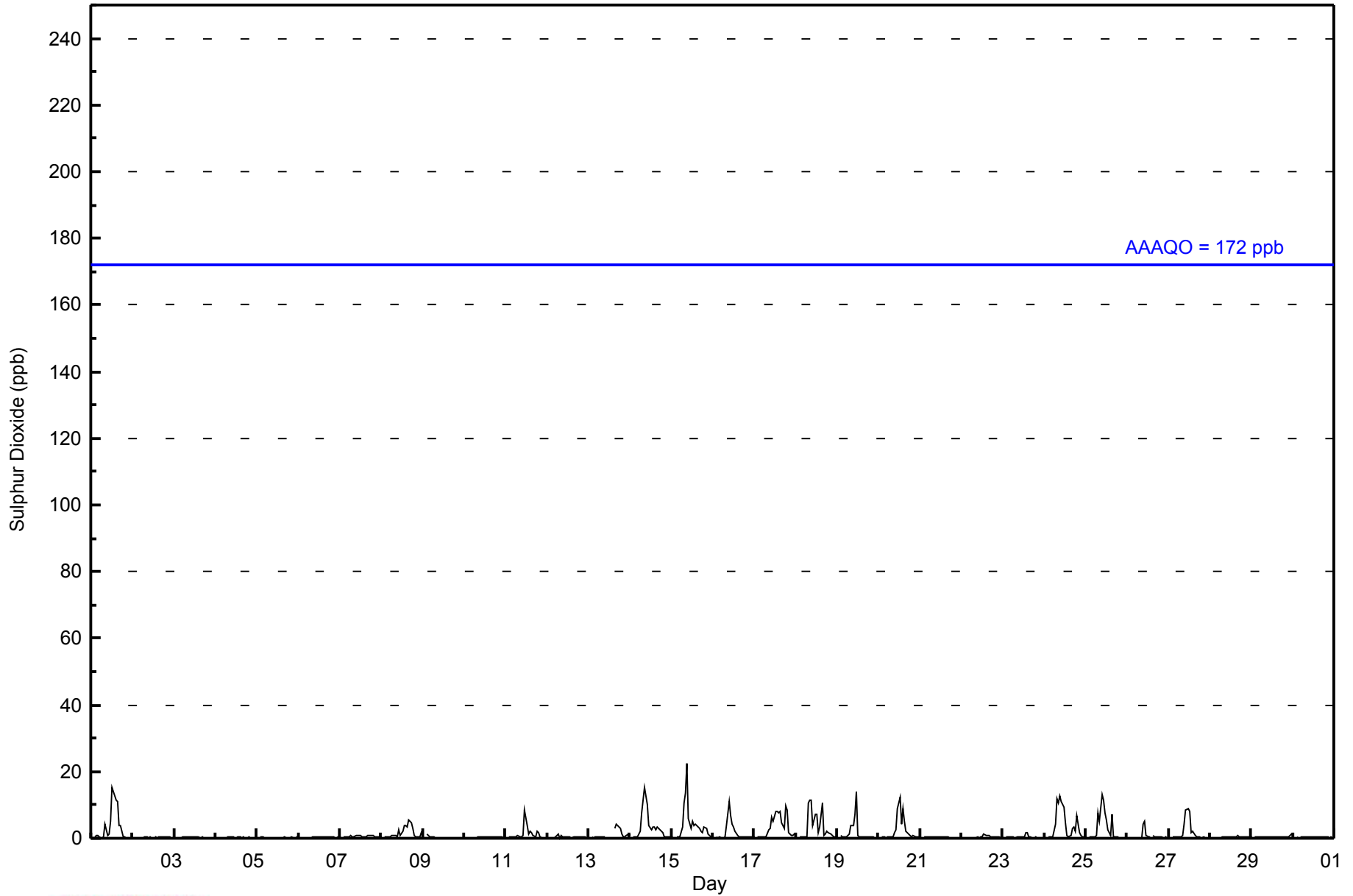
0.3	0.3	0.3	0.3	0.3	0.3	0.7	1.9	2.6	3.6	3.0	3.2	2.9	1.9	2.0	2.1	1.3	1.1	1.1	1.1	1.1	0.5	0.4	0.3	0.4	Diurnal Average	
1	0	1	1	1	1	4	12	15	23	11	14	15	14	12	11	6	5	10	9	3	1	1	2	Diurnal Maximum		

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - June 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	662	96.78	96.78
11 - 20	21	3.07	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: 684

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - June 2014

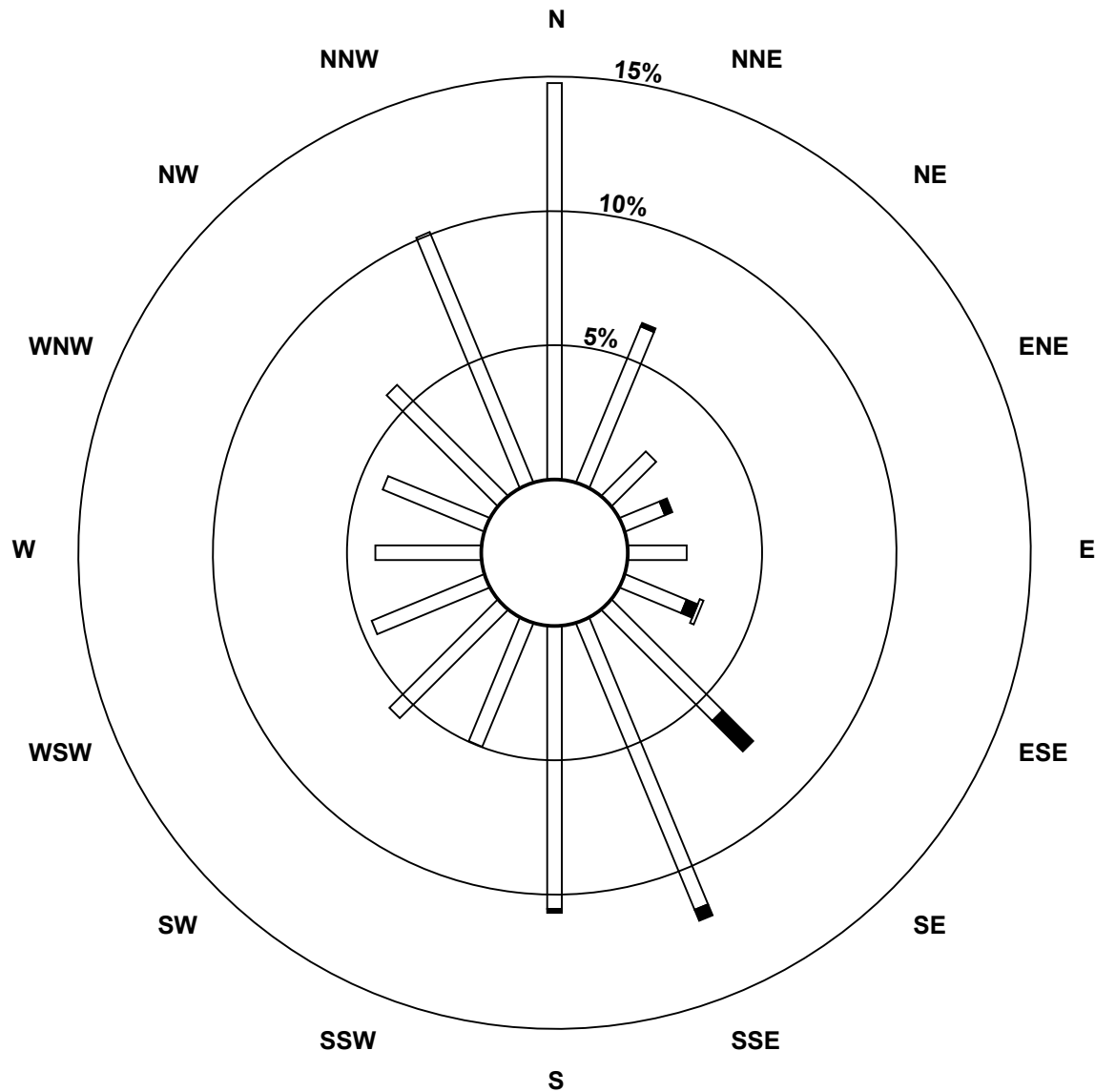
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	101	43	16	11	15	17	40	79	72	34	39	31	27	28	40	69	662
11 - 20	0	1	0	2	0	3	11	3	1	0	0	0	0	0	0	0	21
21 - 60	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	101	44	16	13	15	21	51	82	73	34	39	31	27	28	40	69	684

Total Number of Valid Hours: 684

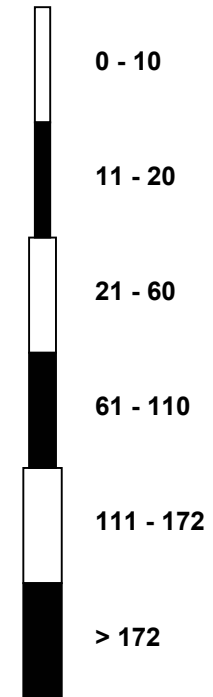
Total Number of Hours: 720

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

**Sulphur Dioxide (SO₂) - ppb
Fort McKay South (AMS 13)**



Classes (ppb)

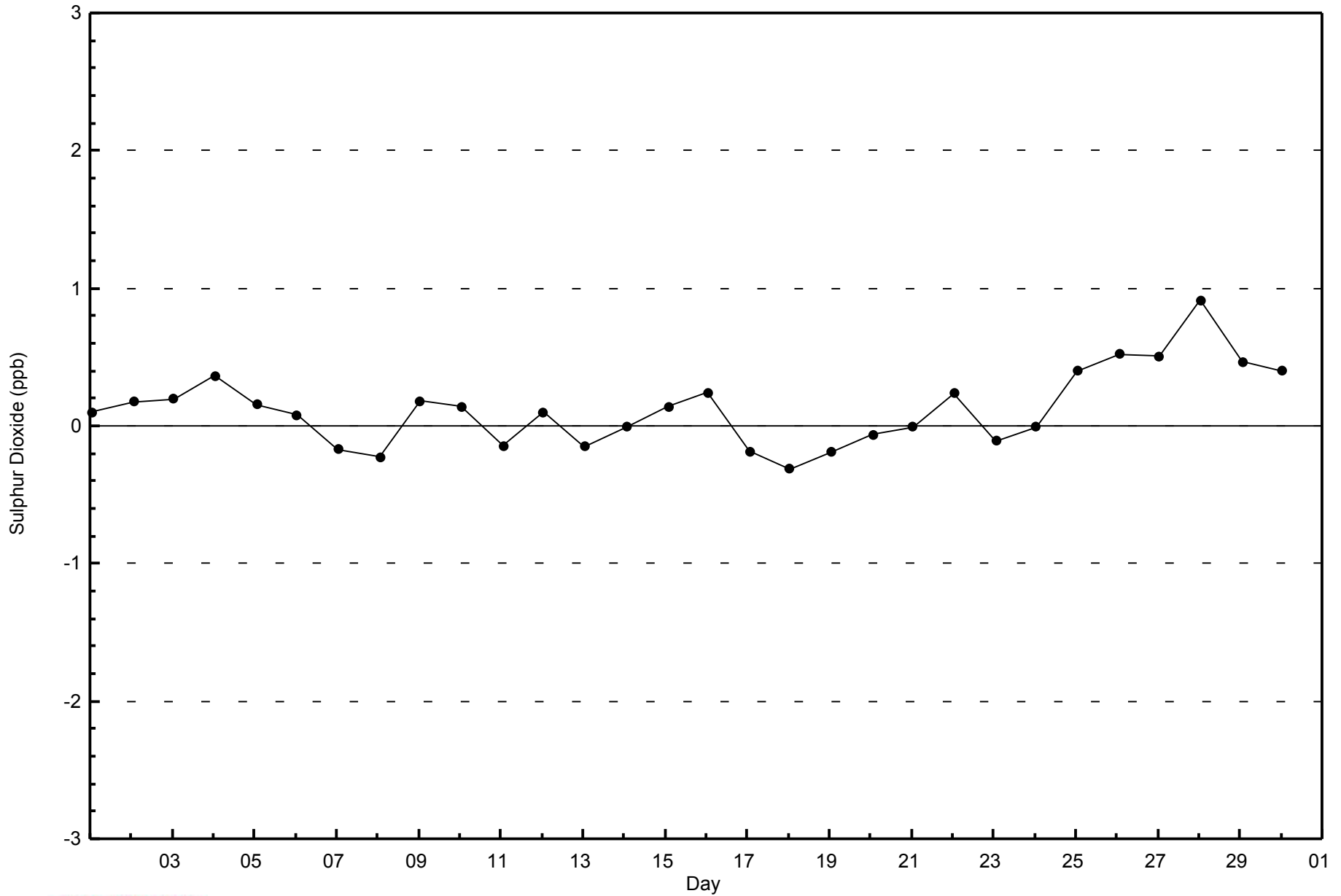


Total Number of Valid Hours: 684



WBEA
Zero Responses

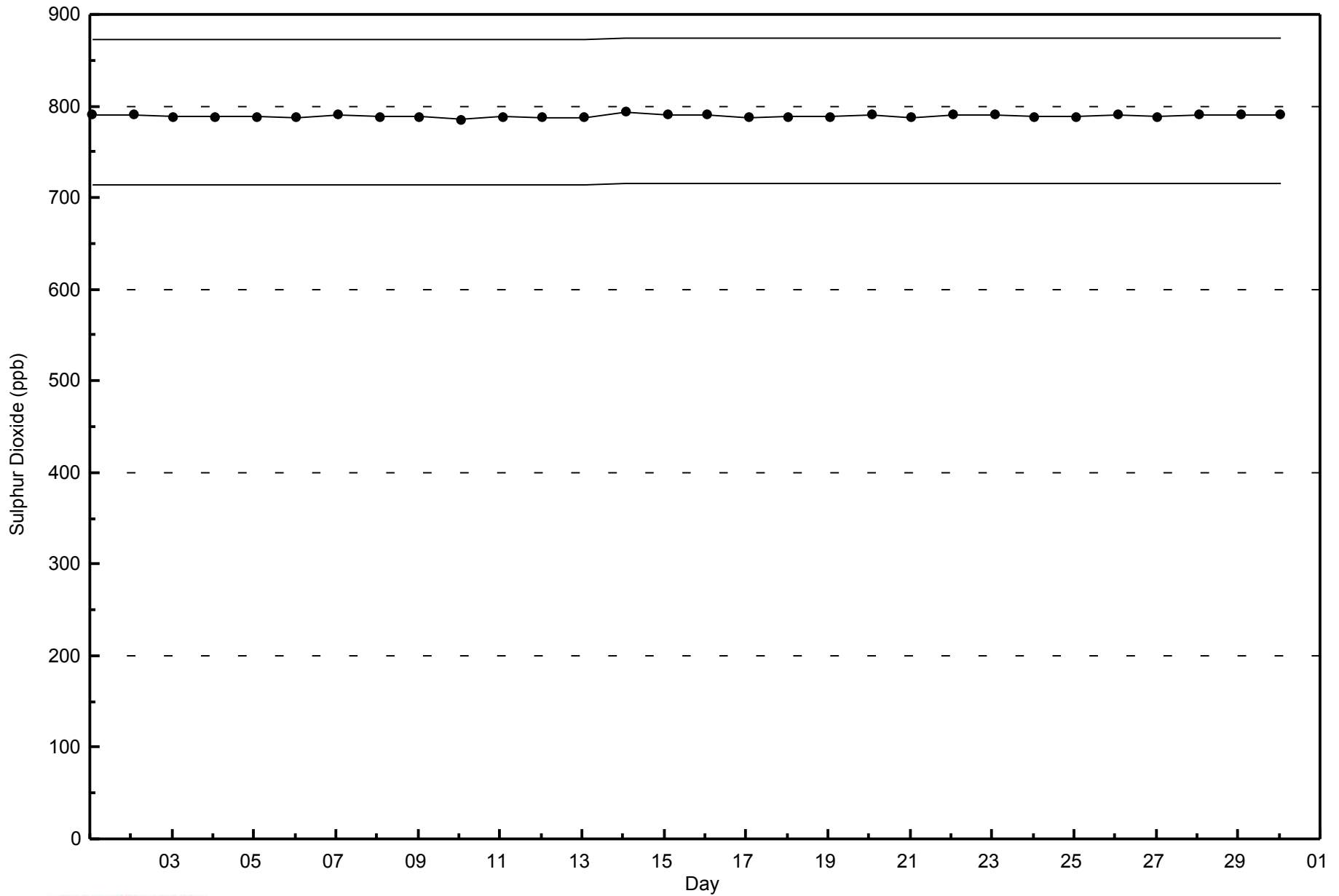
Sulphur Dioxide (SO₂) - ppb
Fort McKay South - June 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - June 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4 ppb on Jun 11 09:00	Maximum Daily Average: 0.6 ppb on Jun 11		Hours of Data:	686
Minimum Value: 0 ppb on Jun 13 13:00	Minimum Daily Average: 0.1 ppb on Jun 5		Hours of Missing Data:	34
Maximum Diurnal Average: 0.9 ppb at hour 3	Minimum Diurnal Average: 0.1 ppb at hour 15		Hours of Calibration:	33
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 = 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-Jun	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
2-Jun	0	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-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
5-Jun	0	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
6-Jun	0	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-Jun	0	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-Jun	0	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-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Jun	0	0	Z	0	0	0	0	0	4	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	0.6	4
12-Jun	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1
14-Jun	1	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0.4	1
15-Jun	0	0	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
16-Jun	1	1	Z	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
17-Jun	0	0	Z	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	2	1	1	1	0	0.5	2
18-Jun	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
19-Jun	1	2	Z	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
20-Jun	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0.3	1
21-Jun	0	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-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-Jun	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	0	1	1	1	0.4	1
25-Jun	0	1	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
26-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	PF	0	0	0	0	0	0	0	0	0	0.1	0
27-Jun	0	0	Z	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
28-Jun	0	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-Jun	0	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-Jun	0	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

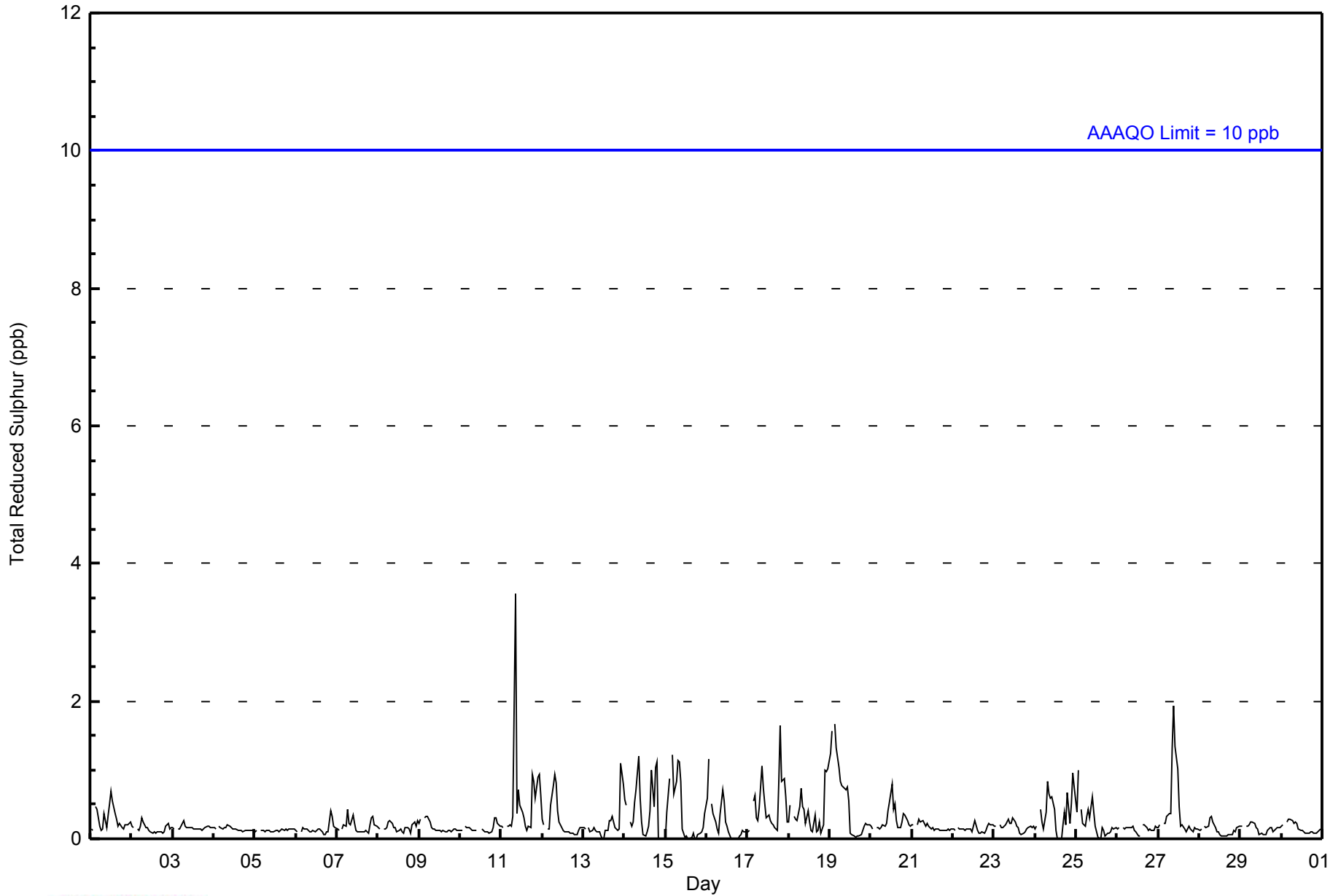
0.2	0.3	0.9	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	Diurnal Average		
1	2	1	2	1	1	1	1	1	4	2	1	1	1	1	1	0	1	0	1	2	1	1	1	1	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - June 2014





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	685	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: 686

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - June 2014

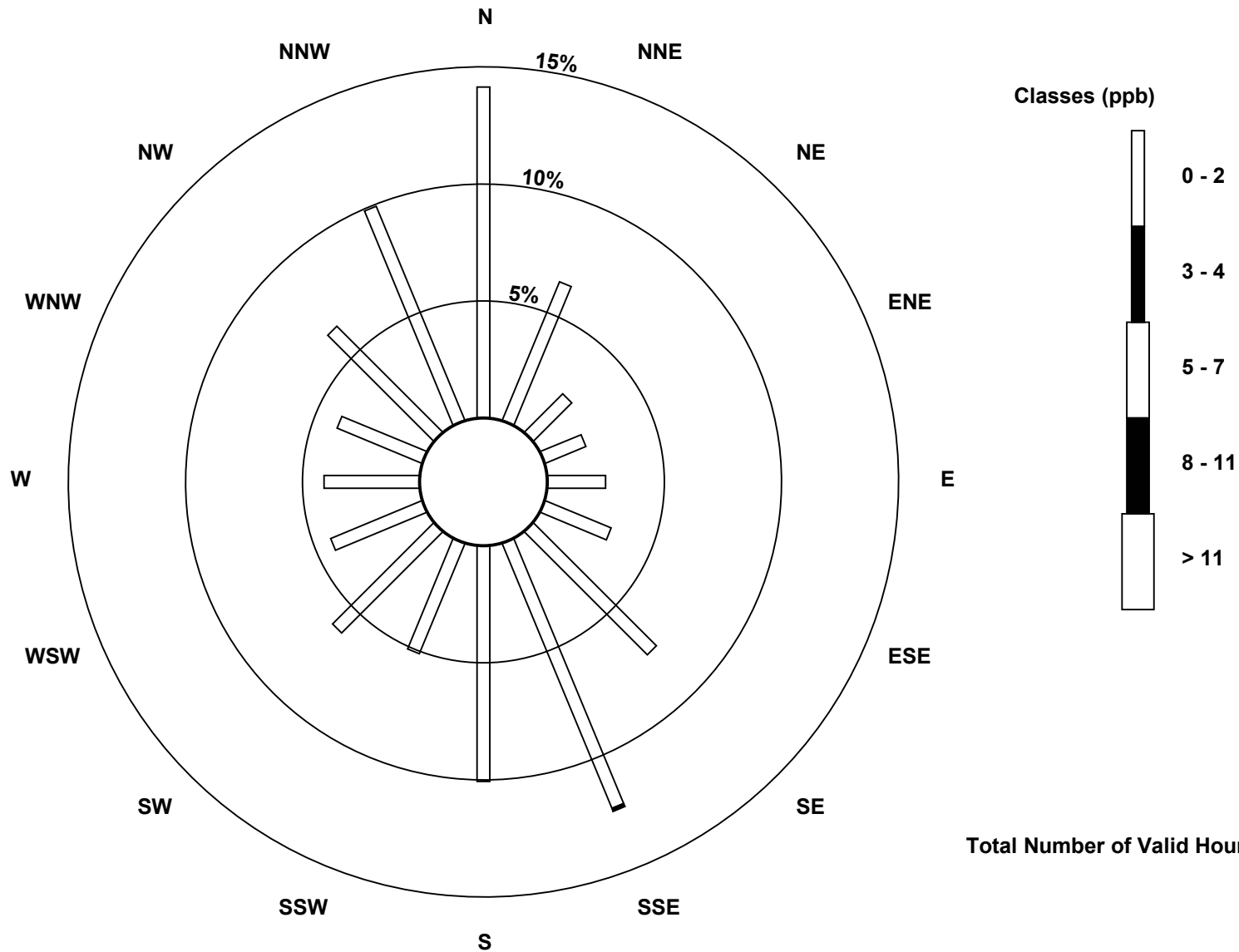
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	97	44	16	13	17	21	51	84	69	35	42	29	28	27	44	68	685
3 - 4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	97	44	16	13	17	21	51	85	69	35	42	29	28	27	44	68	686

Total Number of Valid Hours: 686

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

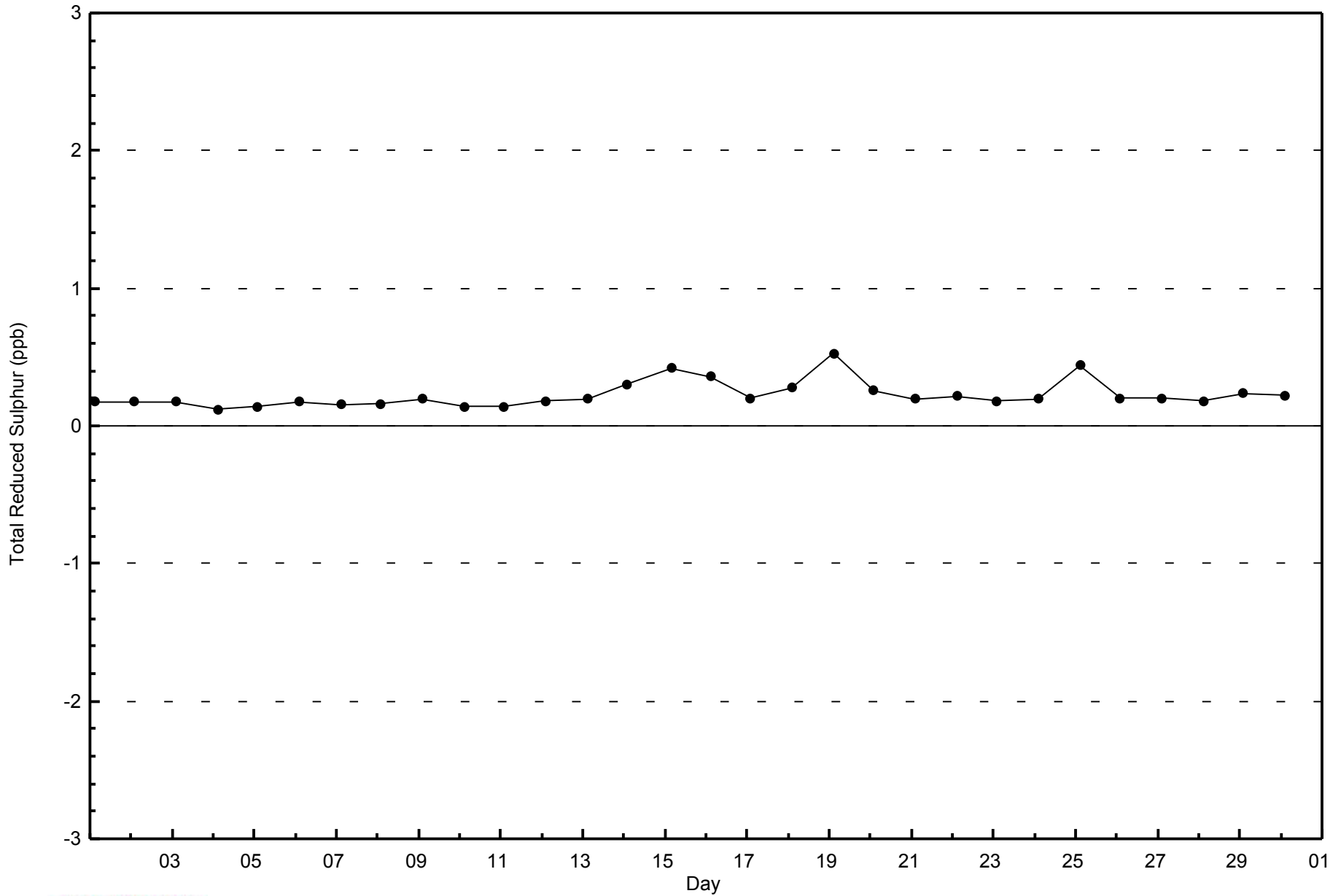
Total Reduced Sulphur (TRS) - ppb
Fort McKay South (AMS 13)





WBEA
Zero Responses

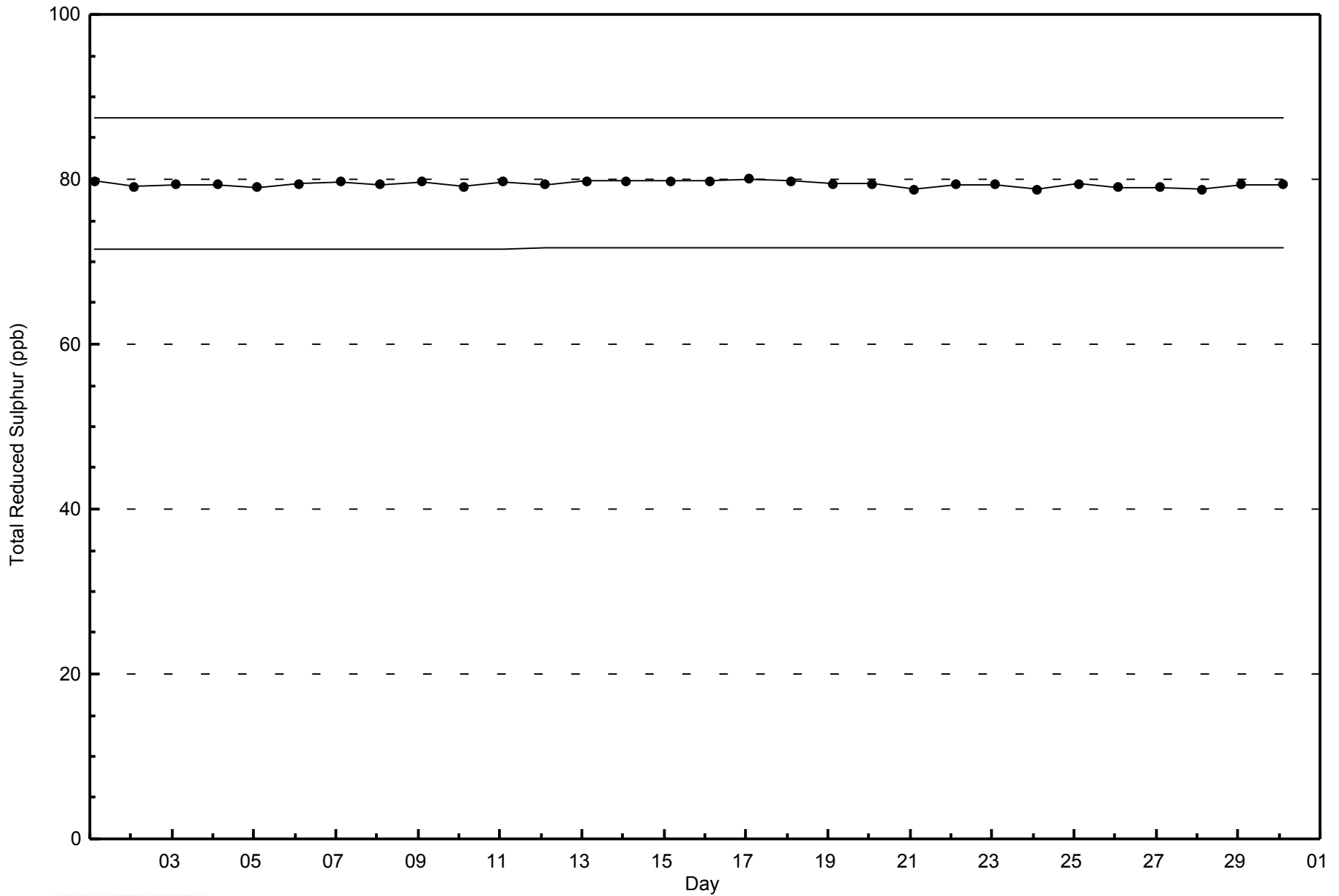
Total Reduced Sulphur (TRS) - ppb
Fort McKay South - June 2014





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - June 2014



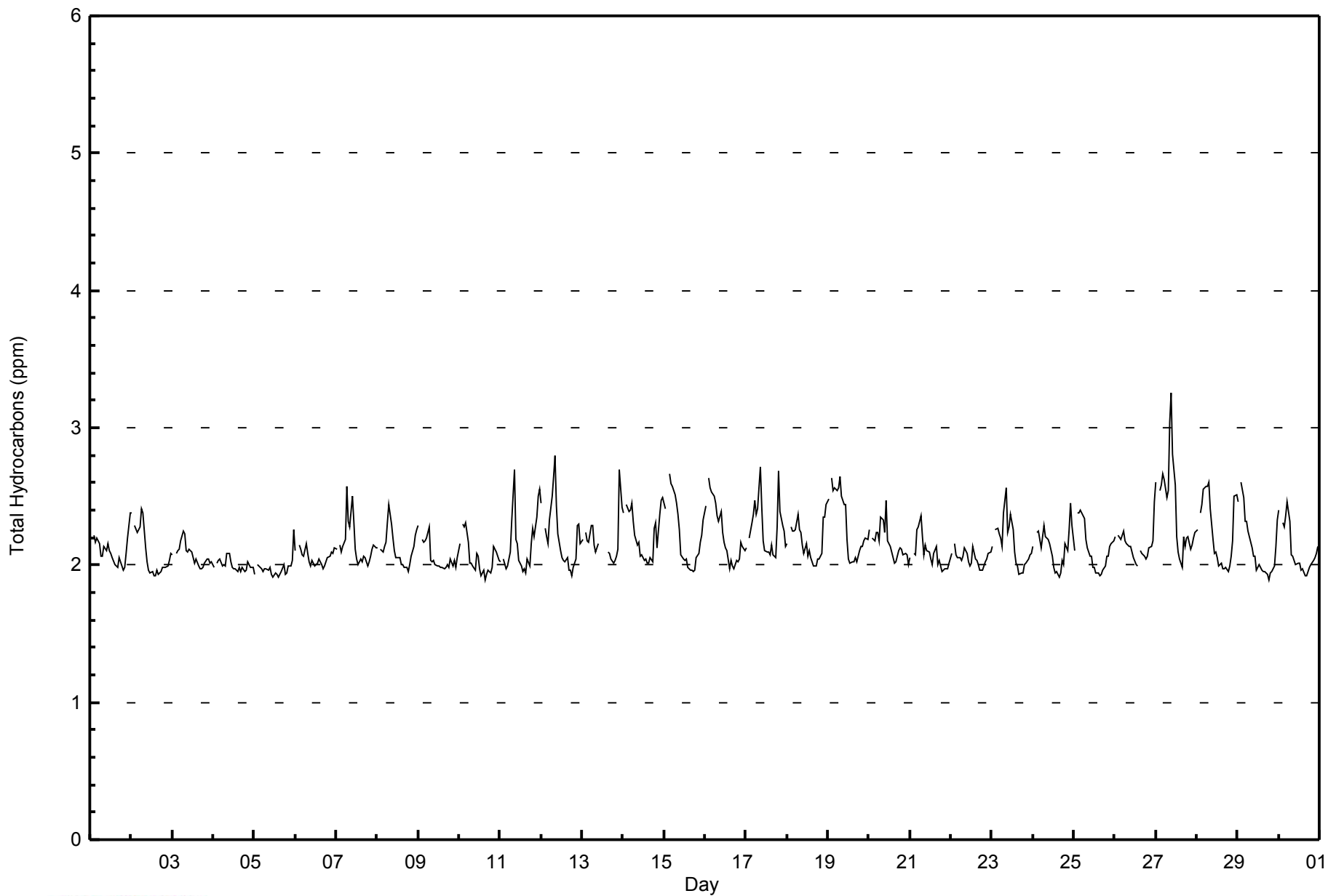


Maximum Value: 3.3 ppm on Jun 27 10:00		Maximum Daily Average: 2.4 ppm on Jun 27		Hours in Service: 720																																													
Minimum Value: 1.9 ppm on Jun 29 19:00		Minimum Daily Average: 2.0 ppm on Jun 5		Hours of Data: 684																																													
Maximum Diurnal Average: 2.4 ppm at hour 2		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 = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.4 P ₉₉ = 2.7		Hours of Calibration: 35																																													
				Percent Operational Time: 99.9																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jun	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.2	2.4	2.1	2.4																							
2-Jun	2.4	Z	2.3	2.2	2.3	2.3	2.4	2.4	2.1	2.0	2.0	1.9	2.0	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.4																							
3-Jun	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2																							
4-Jun	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
5-Jun	1.9	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	1.9	1.9	2.0	2.0	2.3	2.0	2.3																							
6-Jun	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2																							
7-Jun	2.1	Z	2.1	2.1	2.1	2.2	2.6	2.3	2.3	2.5	2.3	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.6																							
8-Jun	2.1	Z	2.1	2.1	2.1	2.2	2.3	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.1	2.1	2.2	2.3	2.1	2.4																							
9-Jun	2.3	Z	2.2	2.2	2.2	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3																							
10-Jun	2.2	Z	2.3	2.3	2.3	2.2	2.0	2.0	2.0	2.0	2.1	2.1	2.0	1.9	2.0	1.9	1.9	2.0	1.9	2.0	2.1	2.1	2.1	2.0	2.1	2.3																							
11-Jun	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.3	2.7	2.2	2.2	2.0	2.0	2.0	1.9	2.0	2.0	2.2	2.3	2.2	2.3	2.5	2.5	2.2	2.7																								
12-Jun	2.4	Z	2.3	2.2	2.2	2.3	2.5	2.6	2.8	2.4	2.2	2.1	2.0	2.0	2.0	2.1	2.0	2.0	1.9	2.0	2.0	2.3	2.3	2.2	2.2	2.8																							
13-Jun	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.1	2.1	2.2	C	C	C	C	C	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.7	2.4	2.2	2.7																							
14-Jun	2.4	Z	2.4	2.4	2.4	2.5	2.3	2.2	2.1	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.3	2.3	2.1	2.4	2.5	2.5	2.2	2.5																							
15-Jun	2.5	2.4	Z	2.7	2.6	2.6	2.5	2.5	2.4	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.2	2.7																							
16-Jun	2.4	Z	2.6	2.6	2.5	2.5	2.4	2.4	2.3	2.4	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.1	2.2	2.6																							
17-Jun	2.1	Z	2.2	2.3	2.4	2.5	2.4	2.4	2.7	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.7	2.4	2.3	2.2	2.1	2.3	2.7																							
18-Jun	2.2	Z	2.3	2.2	2.2	2.3	2.4	2.3	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.3	2.4	2.2	2.4																							
19-Jun	2.5	Z	2.6	2.5	2.6	2.5	2.6	2.6	2.5	2.4	2.4	2.2	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.6																							
20-Jun	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.5	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.2	2.5																							
21-Jun	2.1	Z	2.1	2.1	2.3	2.3	2.4	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4																							
22-Jun	2.1	Z	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.2																							
23-Jun	2.1	Z	2.3	2.3	2.2	2.2	2.1	2.4	2.6	2.2	2.3	2.4	2.3	2.1	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.6																							
24-Jun	2.1	Z	2.2	2.3	2.2	2.1	2.3	2.2	2.2	2.2	2.2	2.1	2.0	1.9	2.0	1.9	1.9	2.0	2.0	2.2	2.1	2.3	2.4	2.3	2.1	2.4																							
25-Jun	2.1	Z	2.4	2.4	2.4	2.4	2.3	2.2	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.1	2.4																							
26-Jun	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	PF	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.5	2.1	2.5																							
27-Jun	2.6	Z	2.5	2.6	2.7	2.6	2.5	2.5	3.0	3.3	2.8	2.6	2.2	2.1	2.0	2.0	2.2	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.4	3.3																							
28-Jun	2.3	Z	2.4	2.4	2.6	2.6	2.6	2.6	2.4	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.5	2.5	2.2	2.6																							
29-Jun	2.5	Z	2.6	2.5	2.3	2.3	2.2	2.2	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	2.1	2.3	2.1	2.6																							
30-Jun	2.4	Z	2.3	2.3	2.4	2.5	2.3	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.5																							
																								2.2	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	Diurnal Average		
																								2.6	2.4	2.6	2.7	2.7	2.6	2.6	2.6	3.0	3.3	2.8	2.6	2.3	2.1	2.1	2.1	2.2	2.1	2.3	2.7	2.4	2.4	2.7	2.5	Diurnal Maximum	
Z - zerospan		C - Calibration					PF - Power Failure																																										



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Fort McKay South - June 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	263	38.45	38.45
2.1 - 3.0	420	61.40	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
Fort McKay South - June 2014

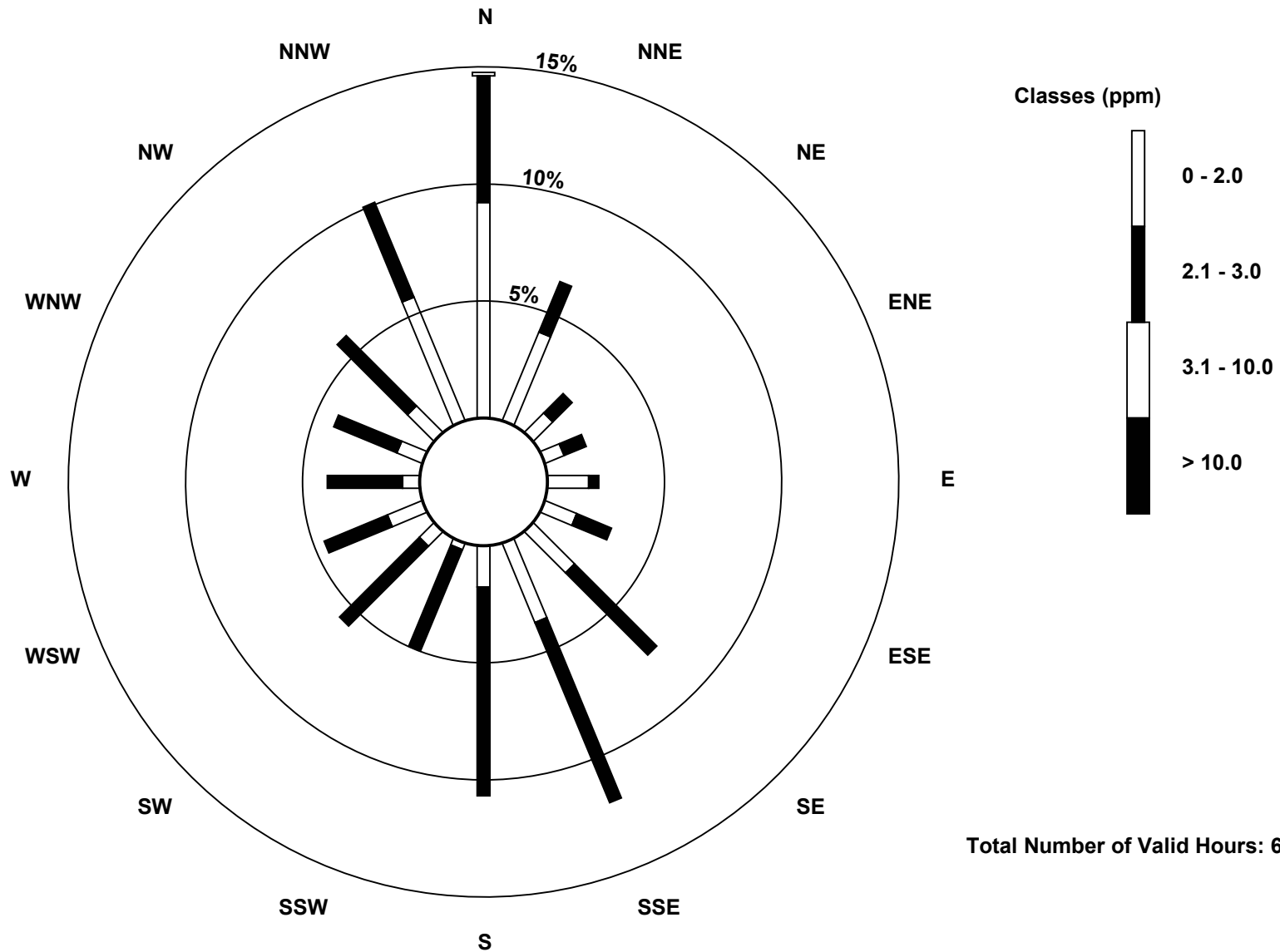
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	63	28	8	6	12	10	17	25	12	2	6	11	5	8	11	39	263
2.1 - 3.0	37	16	8	7	3	11	34	57	61	32	33	20	22	20	29	30	420
3.1 - 10.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	101	44	16	13	15	21	51	82	73	34	39	31	27	28	40	69	684

Total Number of Valid Hours: 684

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

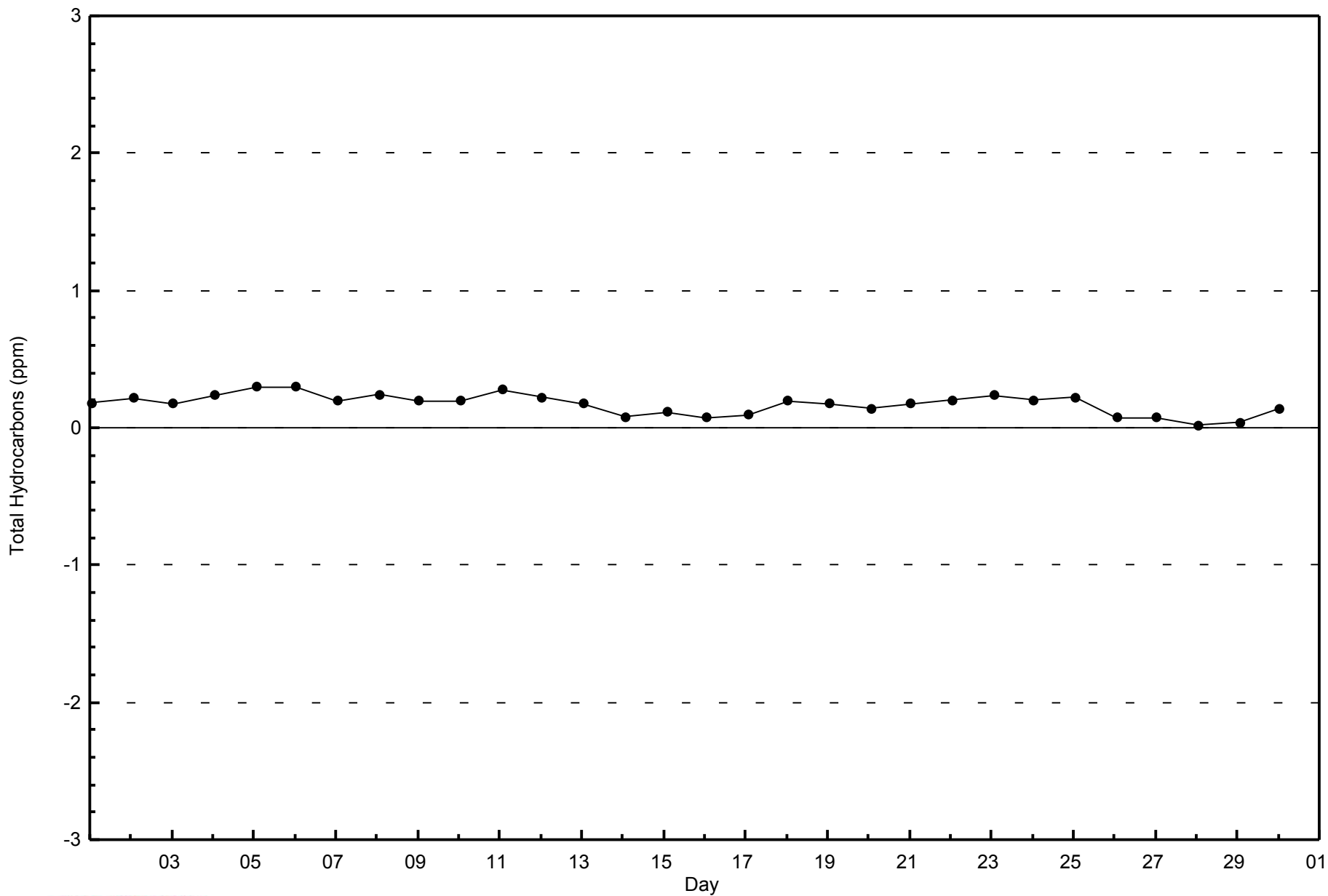
Total Hydrocarbons (THC) - ppm
Fort McKay South (AMS 13)





WBEA
Zero Responses

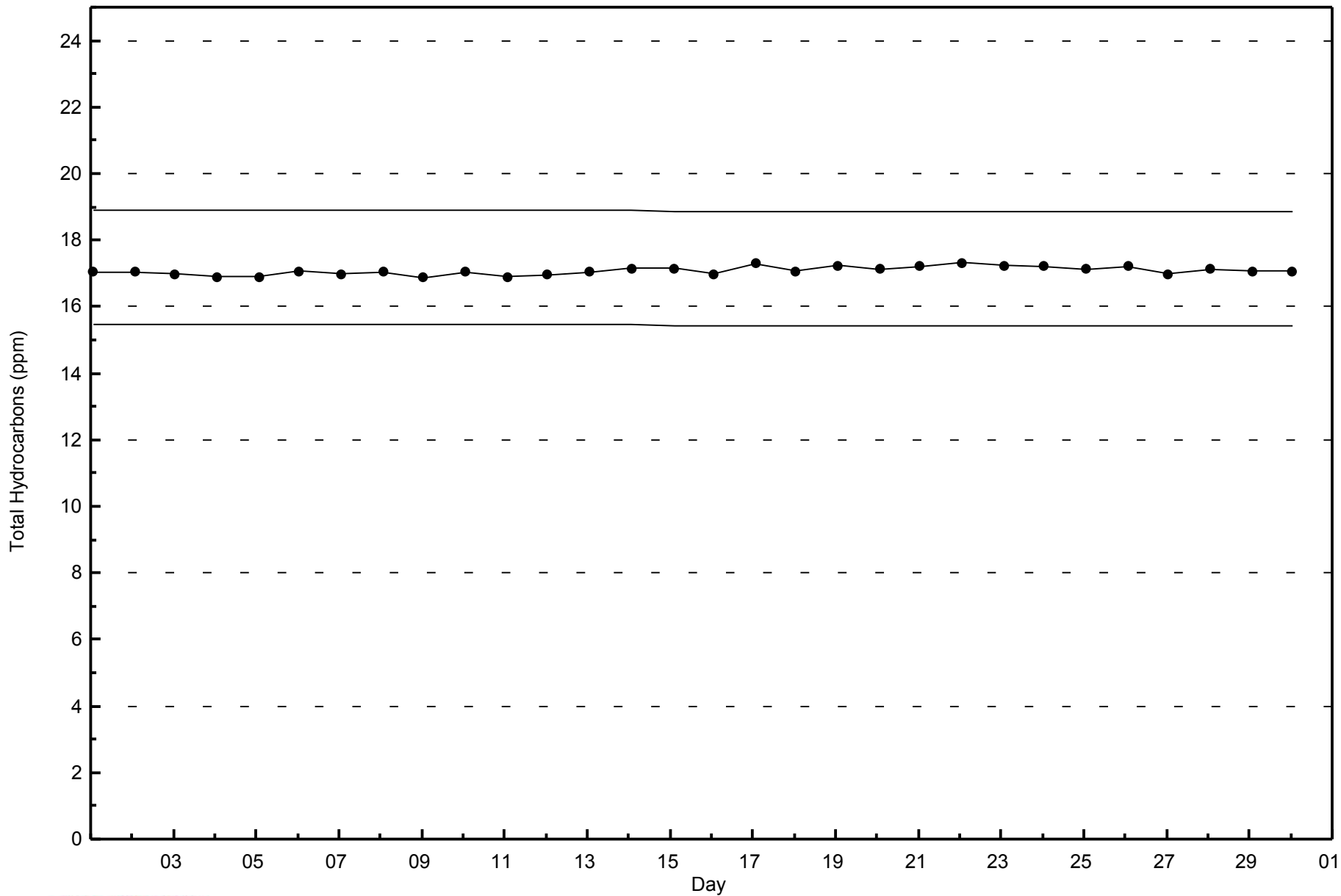
Total Hydrocarbons (THC) - ppm
Fort McKay South - June 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Fort McKay South - June 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 50 ppb on Jun 28 13:00	Maximum Daily Average: 29.5 ppb on Jun 15		Hours of Data:	687
Minimum Value: 0 ppb on Jun 23 23:00	Minimum Daily Average: 10.7 ppb on Jun 20		Hours of Missing Data:	33
Maximum Diurnal Average: 35.0 ppb at hour 15	Minimum Diurnal Average: 5.2 ppb at hour 5		Hours of Calibration:	33
Monthly Average: 20.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 8 Median = 20 Q ₃ = 32 P ₉₀ = 39 P ₉₉ = 45		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	6	8	Z	12	9	16	25	23	20	20	24	25	28	32	37	39	40	36	34	45	28	17	4	3	23.1	45
2-Jun	1	0	Z	0	0	0	3	8	19	23	34	39	41	43	42	37	29	35	41	42	29	11	8	5	21.3	43
3-Jun	7	7	Z	12	14	14	14	17	17	16	15	16	17	15	15	17	17	18	17	15	10	8	12	14	14.2	18
4-Jun	13	13	Z	14	13	12	12	12	10	12	21	22	25	26	27	28	27	27	26	27	26	24	25	24	20.3	28
5-Jun	22	23	Z	22	23	22	23	25	28	31	32	32	32	32	32	31	31	33	31	27	21	12	11	8	25.3	33
6-Jun	12	6	Z	4	3	8	14	22	24	25	26	30	32	32	32	33	35	34	31	28	16	10	7	4	20.5	35
7-Jun	3	3	Z	3	2	3	3	13	12	7	12	26	35	37	37	38	38	38	34	24	15	9	5	7	17.6	38
8-Jun	6	5	Z	6	3	6	10	9	21	39	38	39	40	42	44	44	43	43	41	36	27	22	18	15	25.9	44
9-Jun	17	14	Z	22	16	7	5	14	17	20	23	22	27	34	36	38	39	40	40	38	20	11	11	5	22.4	40
10-Jun	3	16	Z	6	3	18	26	37	40	41	39	40	42	41	42	43	41	40	41	26	14	12	12	24	28.1	43
11-Jun	26	27	Z	18	8	7	7	3	19	14	25	33	26	38	37	34	28	33	31	30	15	6	2	0	20.3	38
12-Jun	1	1	Z	0	0	1	3	10	11	21	27	31	36	36	37	37	41	44	42	42	31	16	12	14	21.5	44
13-Jun	7	4	Z	3	2	5	15	27	29	32	38	43	42	43	45	C	C	C	41	39	32	25	21	13	25.3	45
14-Jun	14	14	Z	6	5	5	22	24	25	31	36	43	44	44	44	44	45	46	43	43	40	20	12	1	28.2	46
15-Jun	3	13	15	Z	6	5	25	30	35	37	41	44	47	48	47	46	45	43	41	36	30	20	12	9	29.5	48
16-Jun	7	7	Z	2	3	3	5	11	16	23	30	35	39	42	39	37	38	37	36	34	25	17	29	25	23.4	42
17-Jun	27	18	Z	8	10	5	12	11	11	15	23	28	29	30	34	34	33	32	27	21	17	18	18	14	20.6	34
18-Jun	6	2	Z	1	1	1	7	15	20	27	32	33	35	38	40	39	40	40	40	38	34	29	27	23	24.7	40
19-Jun	19	17	Z	5	3	2	6	10	9	8	14	21	25	33	37	33	31	27	26	15	9	2	1	1	15.4	37
20-Jun	1	7	Z	2	1	1	7	9	8	9	8	15	19	21	20	19	21	17	12	8	15	5	7	14	10.7	21
21-Jun	2	1	Z	1	2	6	4	11	11	14	17	19	21	20	20	21	16	17	15	14	8	7	4	8	11.1	21
22-Jun	5	9	Z	14	10	6	7	6	6	14	20	23	21	25	28	28	26	27	29	24	13	4	1	2	15.1	29
23-Jun	1	0	Z	1	0	1	2	4	10	17	17	17	29	39	31	27	29	27	16	9	3	0	0	0	12.2	39
24-Jun	0	0	Z	1	3	6	11	14	18	21	26	32	35	34	36	36	34	34	33	31	26	14	8	7	20.0	36
25-Jun	11	10	Z	3	1	1	4	19	27	28	33	37	39	39	39	39	30	19	13	9	2	1	0	1	17.6	39
26-Jun	0	0	Z	0	0	2	7	11	15	18	23	33	36	37	31	25	17	18	18	13	4	3	7	2	14.0	37
27-Jun	0	0	Z	0	0	3	3	5	7	11	20	25	37	35	35	33	35	33	29	28	21	4	3	1	16.0	37
28-Jun	0	0	Z	0	0	1	7	13	24	37	44	48	50	40	39	42	45	40	35	33	17	16	11	7	23.8	50
29-Jun	4	2	Z	2	8	9	12	20	28	31	37	37	32	32	34	35	36	36	34	32	29	31	29	24	25.0	37
30-Jun	20	17	Z	7	7	7	17	23	22	25	26	25	27	30	31	34	35	35	34	30	23	12	7	4	21.5	35

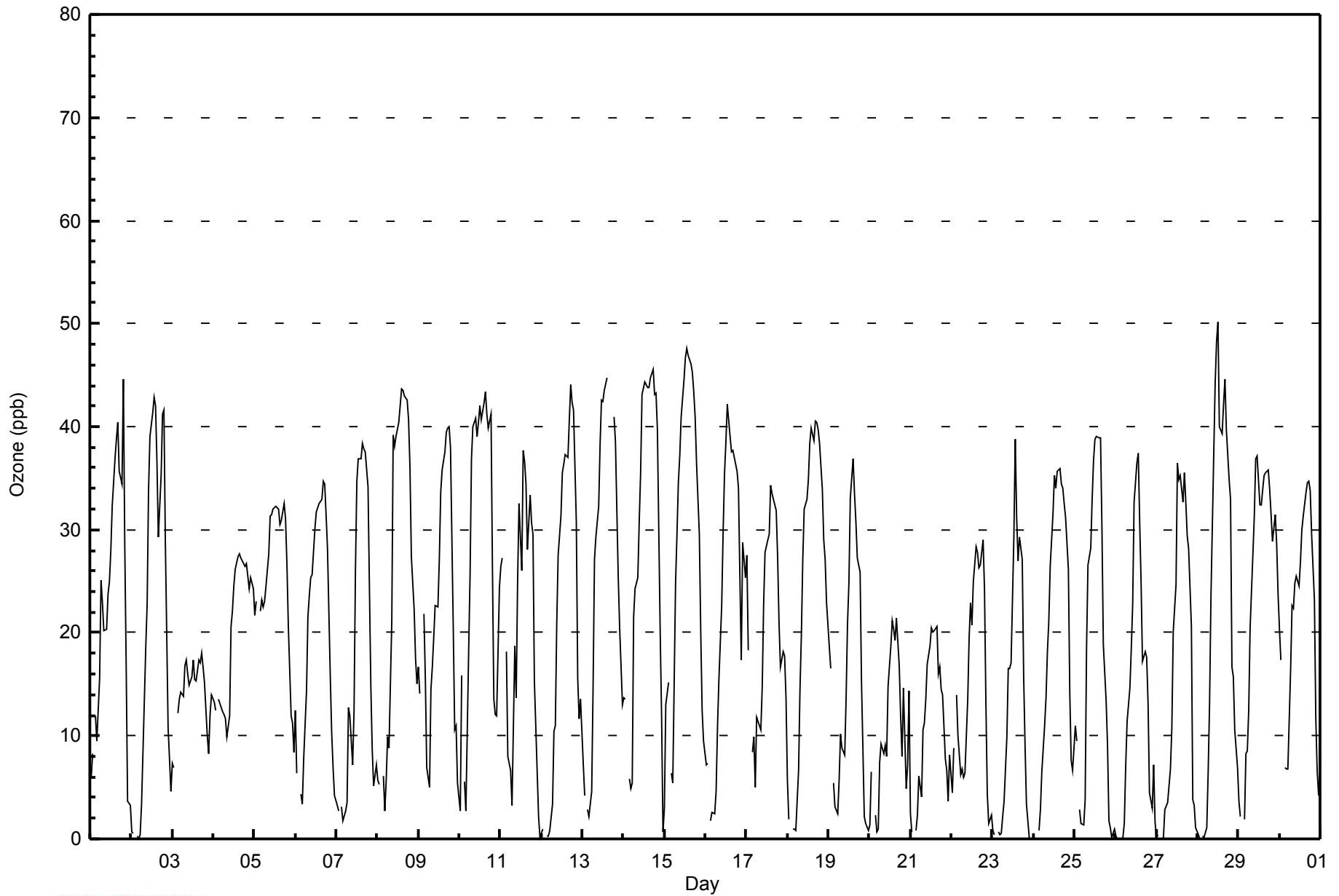
8.1	8.1	15.2	6.0	5.2	6.1	10.6	15.2	18.5	22.2	26.6	30.4	32.9	34.6	35.0	34.1	33.3	32.6	31.0	27.9	19.9	12.9	10.8	9.4	Diurnal Average	
27	27	15	22	23	22	26	37	40	41	44	48	50	48	47	46	45	46	43	45	40	31	29	25	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Fort McKay South - June 2014





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	353	51.38	51.38
21 - 50	334	48.62	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 687

Total Number of Hours: 720



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - June 2014

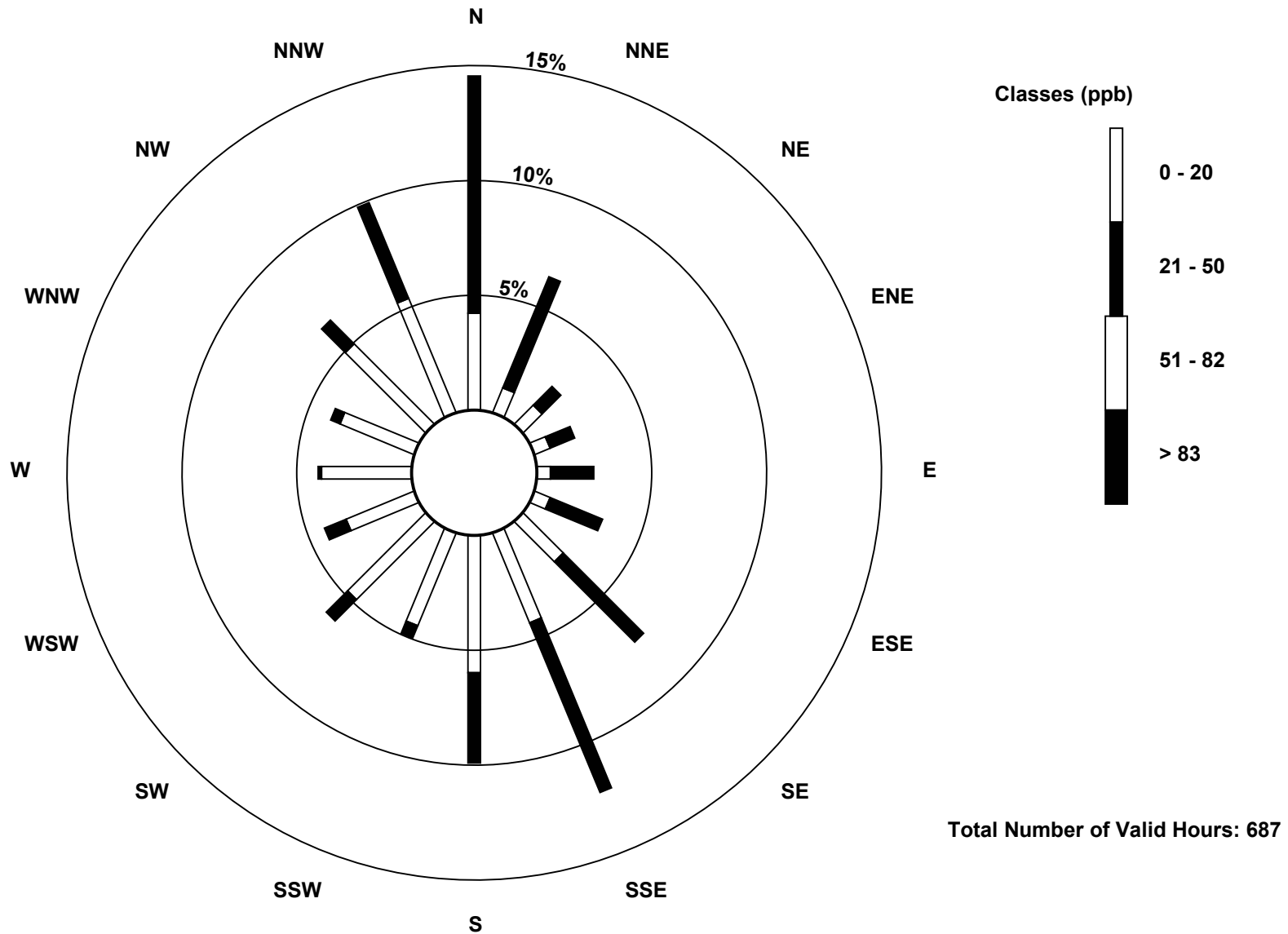
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	29	8	8	5	4	5	17	29	41	30	33	22	27	24	34	37	353
21 - 50	71	36	8	8	13	17	34	55	27	4	9	7	1	3	10	31	334
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	100	44	16	13	17	22	51	84	68	34	42	29	28	27	44	68	687

Total Number of Valid Hours: 687

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

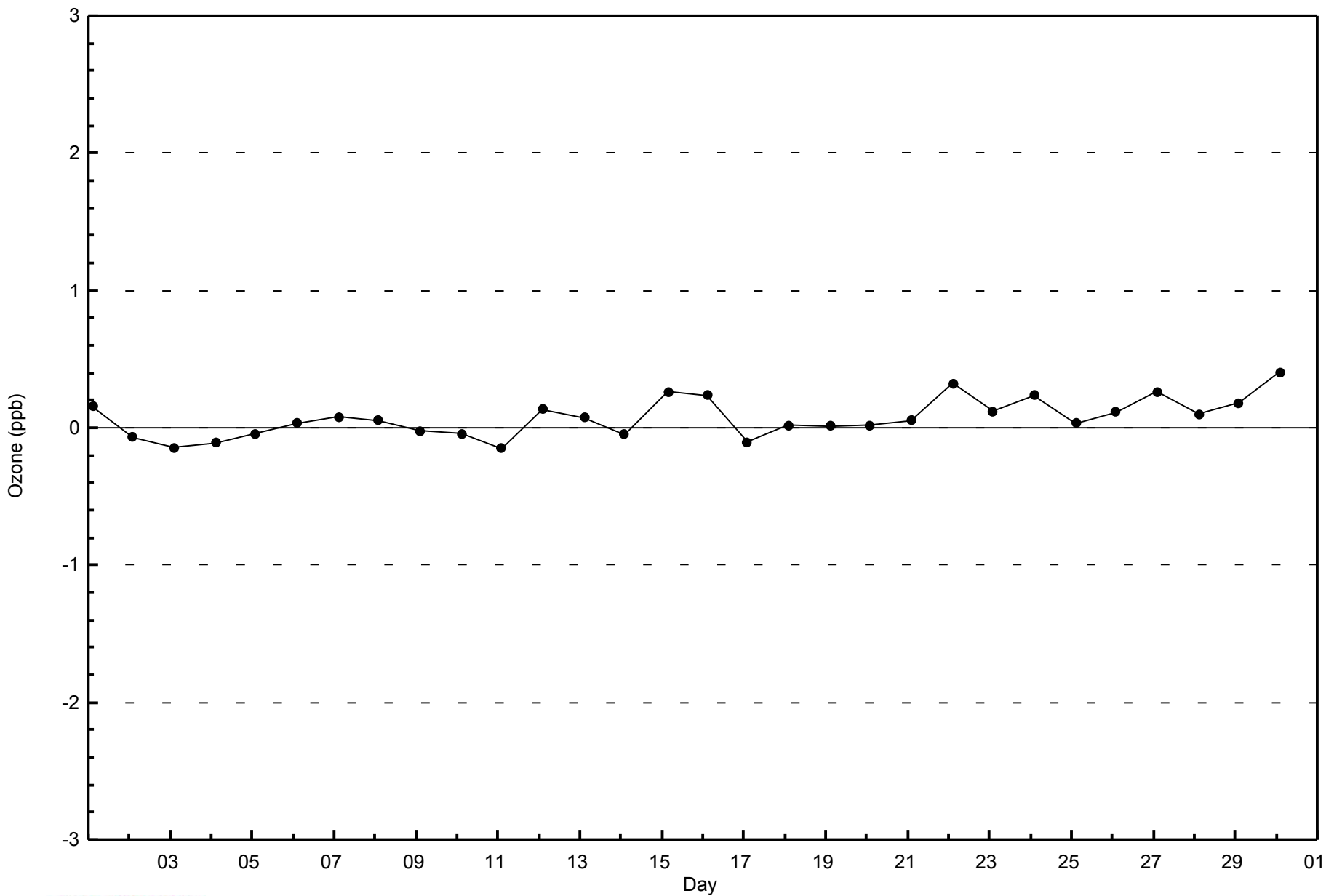
Ozone (O₃) - ppb
Fort McKay South (AMS 13)





WBEA
Zero Responses

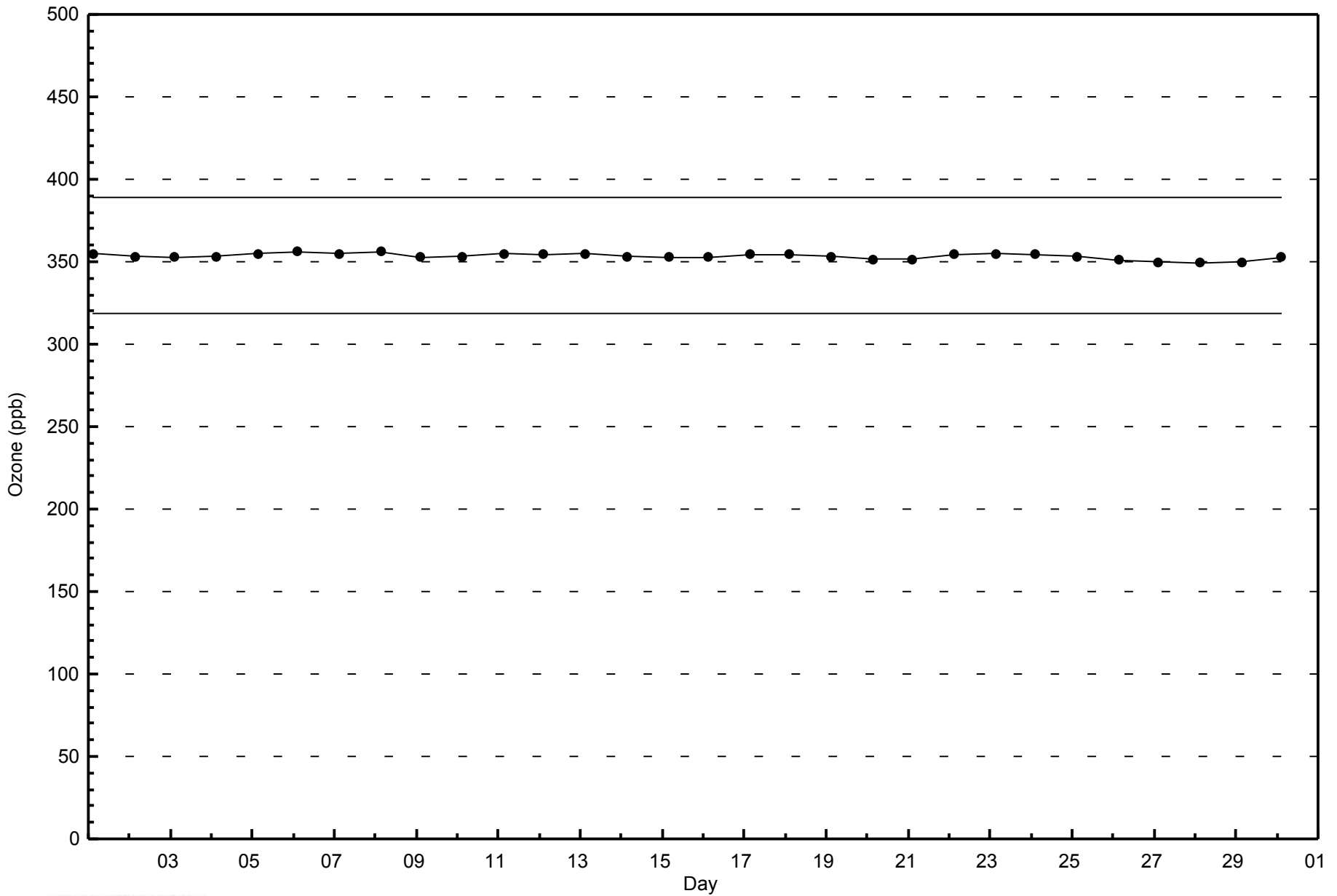
Ozone (O₃) - ppb
Fort McKay South - June 2014





WBEA
Span Responses

Ozone (O₃) - ppb
Fort McKay South - June 2014



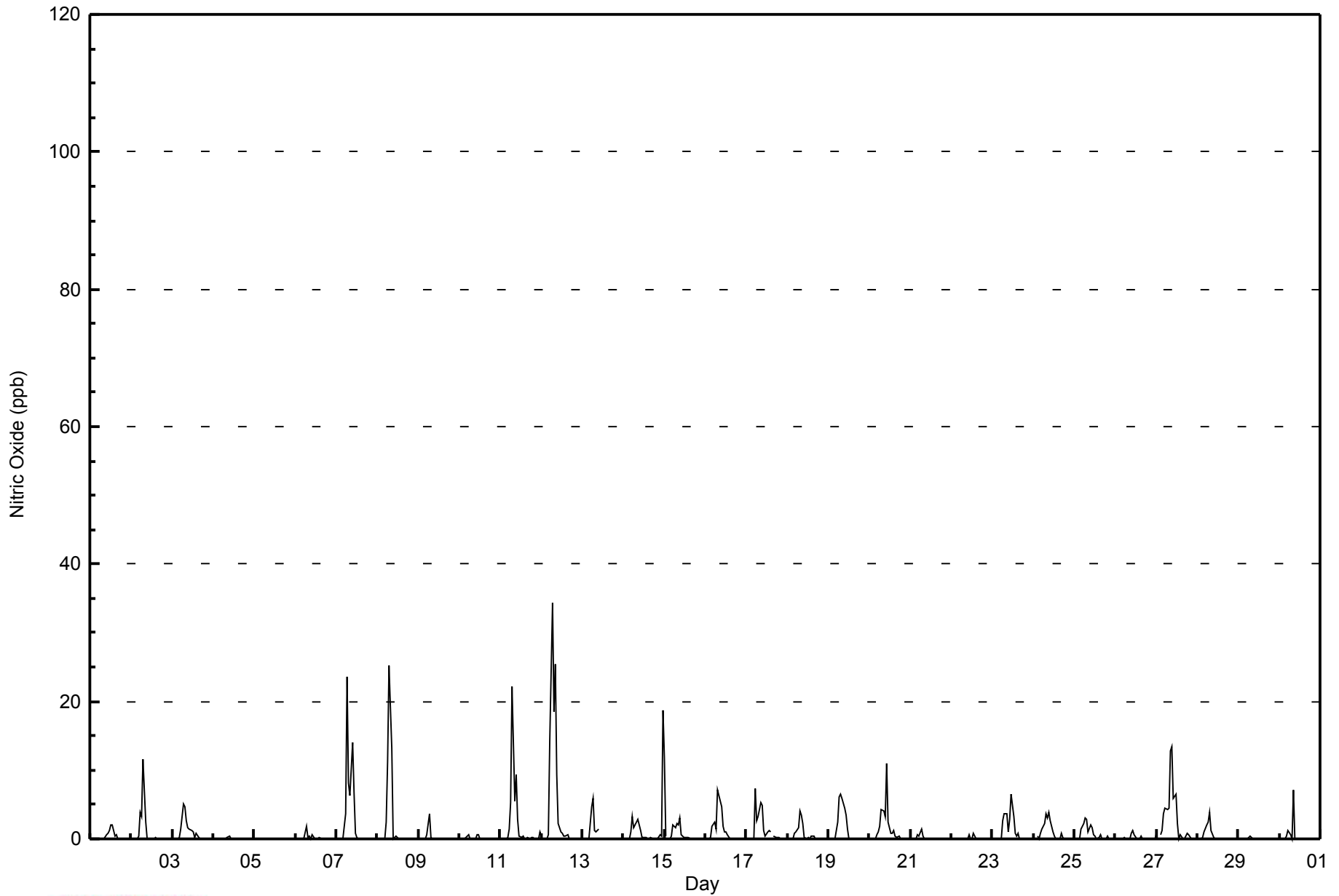


Maximum Value: 34 ppb on Jun 12 07:00																	Maximum Daily Average: 4.7 ppb on Jun 12																	Hours in Service: 720	
Minimum Value: 0 ppb on Jun 1 22:00																	Minimum Daily Average: 0.0 ppb on Jun 5																	Hours of Data: 683	
Maximum Diurnal Average: 4.7 ppb at hour 8																	Minimum Diurnal Average: 0.0 ppb at hour 21																	Hours of Missing Data: 37	
Monthly Average: 1.0 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 18																	Hours of Calibration: 36	
																	Percent Operational Time: 99.9																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Jun	0	Z	0	0	0	0	0	0	0	1	1	1	2	2	0	1	0	0	0	0	0	0	0	0	0.3	2									
2-Jun	0	Z	0	0	0	4	3	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	12									
3-Jun	0	Z	0	0	0	1	5	5	3	2	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0.9	5									
4-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
5-Jun	0	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-Jun	0	Z	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2									
7-Jun	0	Z	0	0	0	4	24	8	6	14	7	1	0	0	0	0	0	0	0	0	0	0	0	0	2.8	24									
8-Jun	0	Z	0	0	0	3	11	25	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3	25									
9-Jun	0	Z	0	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	4									
10-Jun	0	Z	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
11-Jun	0	Z	0	0	0	1	5	22	5	9	3	0	0	0	0	0	0	0	0	0	0	0	0	1	2.2	22									
12-Jun	1	Z	0	0	1	14	34	19	25	9	2	1	1	0	0	1	0	0	0	0	0	0	0	0	4.7	34									
13-Jun	0	Z	0	0	0	5	6	1	1	1	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	6									
14-Jun	0	Z	0	0	1	3	2	2	3	2	1	0	0	0	0	0	0	0	0	0	0	1	0	19	1.5	19									
15-Jun	12	0	Z	0	0	2	2	2	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	12									
16-Jun	0	Z	0	0	2	2	2	7	6	5	2	1	1	1	0	0	0	0	0	0	0	0	0	0	1.3	7									
17-Jun	0	Z	0	0	0	7	3	3	5	5	1	0	1	1	1	PF	0	0	0	0	0	0	0	0	1.3	7									
18-Jun	0	Z	0	0	1	1	2	4	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4									
19-Jun	0	Z	0	0	0	2	6	6	6	5	3	2	0	0	0	0	0	0	0	0	0	0	0	0	1.3	6									
20-Jun	0	Z	0	0	1	1	2	4	4	3	11	2	1	1	1	0	0	0	0	0	0	0	0	0	1.4	11									
21-Jun	0	Z	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
22-Jun	0	Z	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1									
23-Jun	0	Z	0	0	0	0	3	4	4	1	3	7	3	1	1	1	0	0	0	0	0	0	0	0	1.1	7									
24-Jun	0	Z	0	0	1	1	2	4	3	4	3	1	0	0	0	0	1	0	0	0	0	0	0	0	0.9	4									
25-Jun	0	Z	0	0	1	2	3	3	1	2	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0.7	3									
26-Jun	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
27-Jun	1	Z	1	1	4	4	4	4	13	13	6	6	2	0	1	0	0	0	0	1	1	0	0	0	2.7	13									
28-Jun	0	Z	0	0	1	2	2	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4									
29-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
30-Jun	0	Z	0	0	0	1	1	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	7									
																	Diurnal Average		Diurnal Maximum																
																	0.4		0.7																
																	12		19																
Z - zerospan																	C - Calibration		PF - Power Failure																



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Fort McKay South - June 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	678	99.27	99.27
21 - 40	5	0.73	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - June 2014

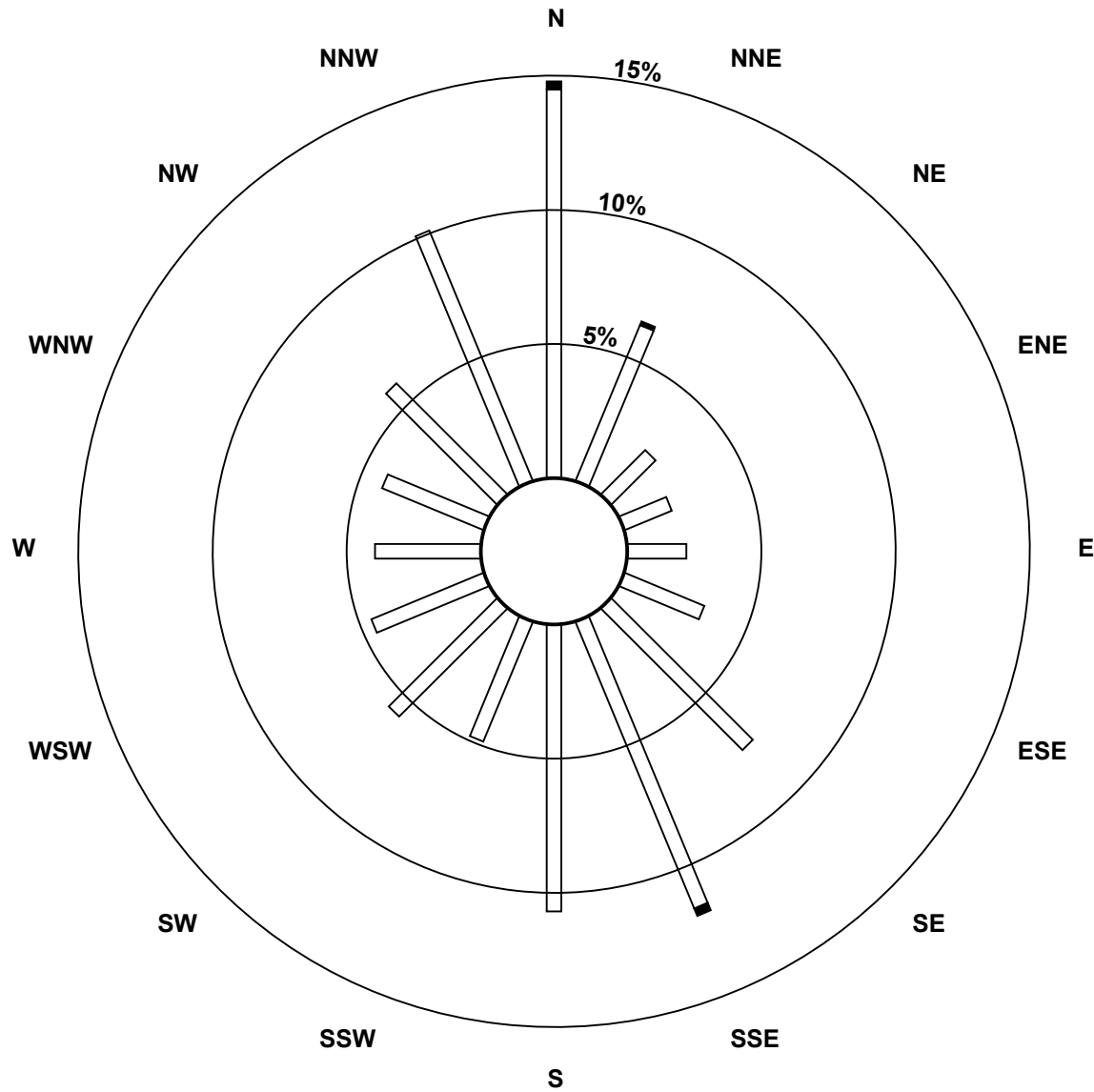
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	99	43	16	13	15	22	51	79	73	33	39	31	27	28	40	69	678
21 - 40	2	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	5
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	101	44	16	13	15	22	51	81	73	33	39	31	27	28	40	69	683

Total Number of Valid Hours: 683

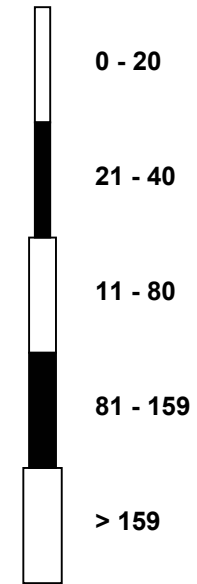
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Nitric Oxide (NO) - ppb
Fort McKay South (AMS 13)



Classes (ppb)

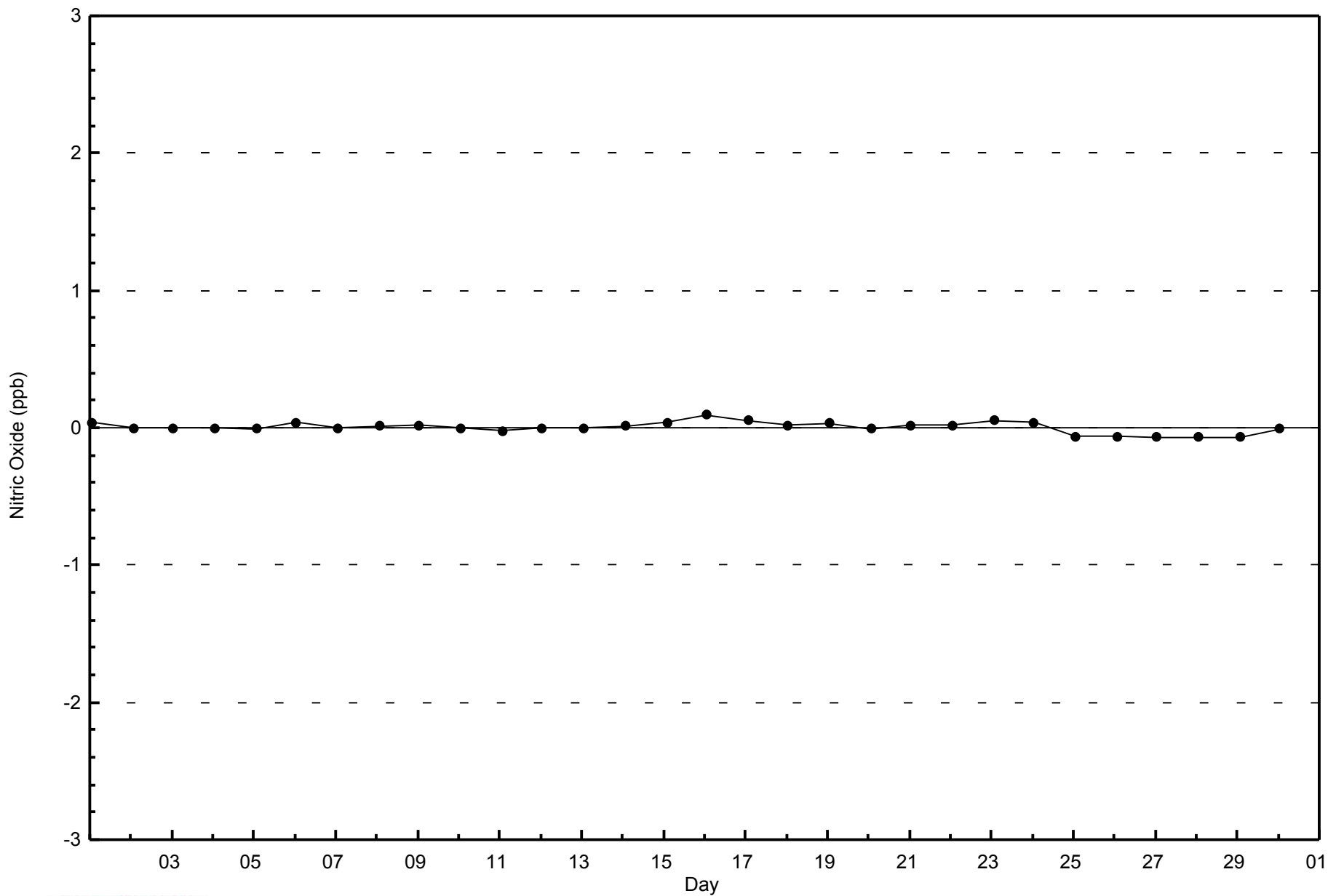


Total Number of Valid Hours: 683



WBEA
Zero Responses

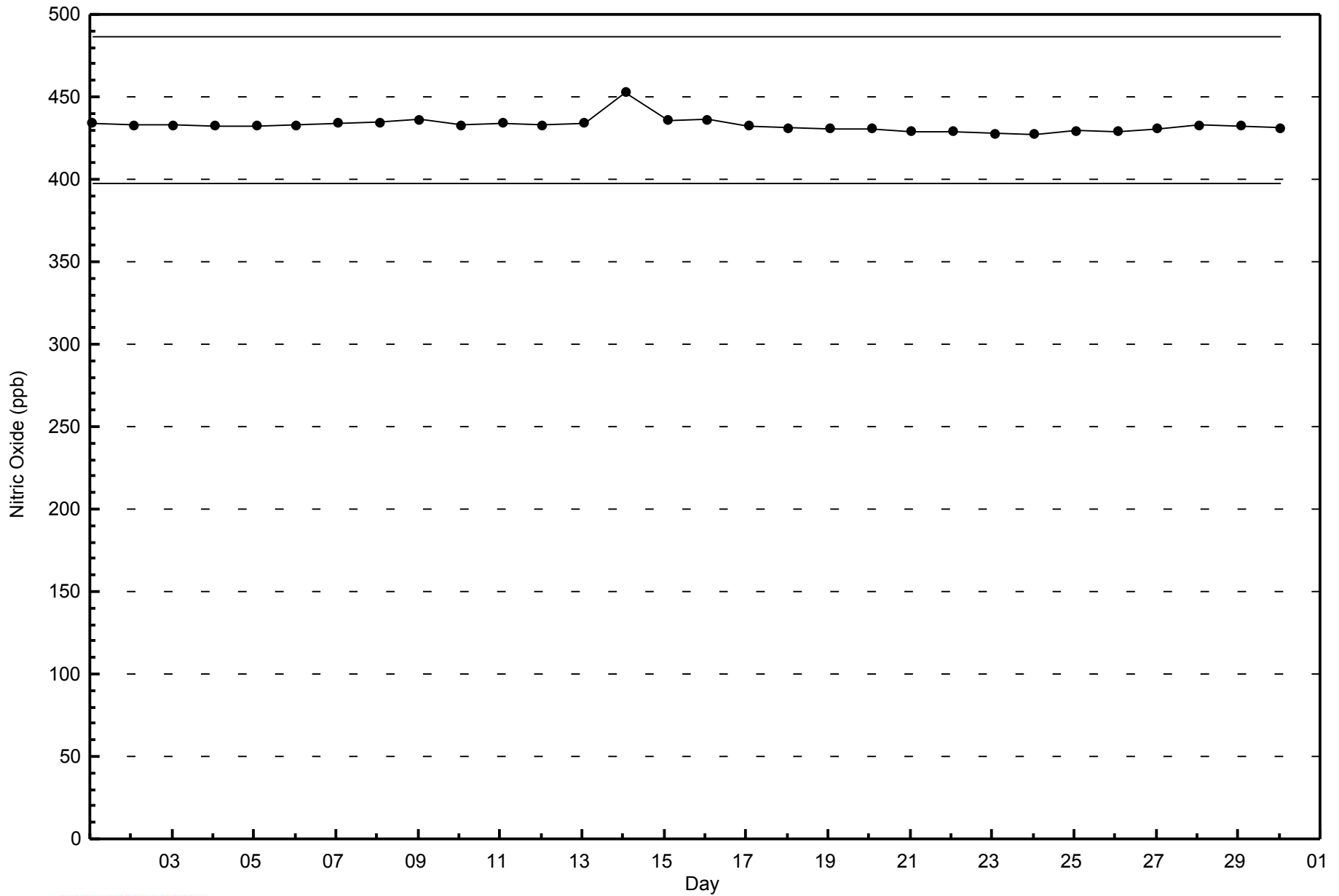
Nitric Oxide (NO) - ppb
Fort McKay South - June 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Fort McKay South - June 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Fort McKay South - June 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 40 ppb on Jun 15 00:00	Maximum Daily Average: 7.6 ppb on Jun 14		Hours of Data:	683
Minimum Value: 0 ppb on Jun 2 11:00	Minimum Daily Average: 0.6 ppb on Jun 5		Hours of Missing Data:	37
Maximum Diurnal Average: 14.6 ppb at hour 2	Minimum Diurnal Average: 1.7 ppb at hour 18		Hours of Calibration:	36
Monthly Average: 3.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 8 P ₉₉ = 20		Percent Operational Time:	99.9

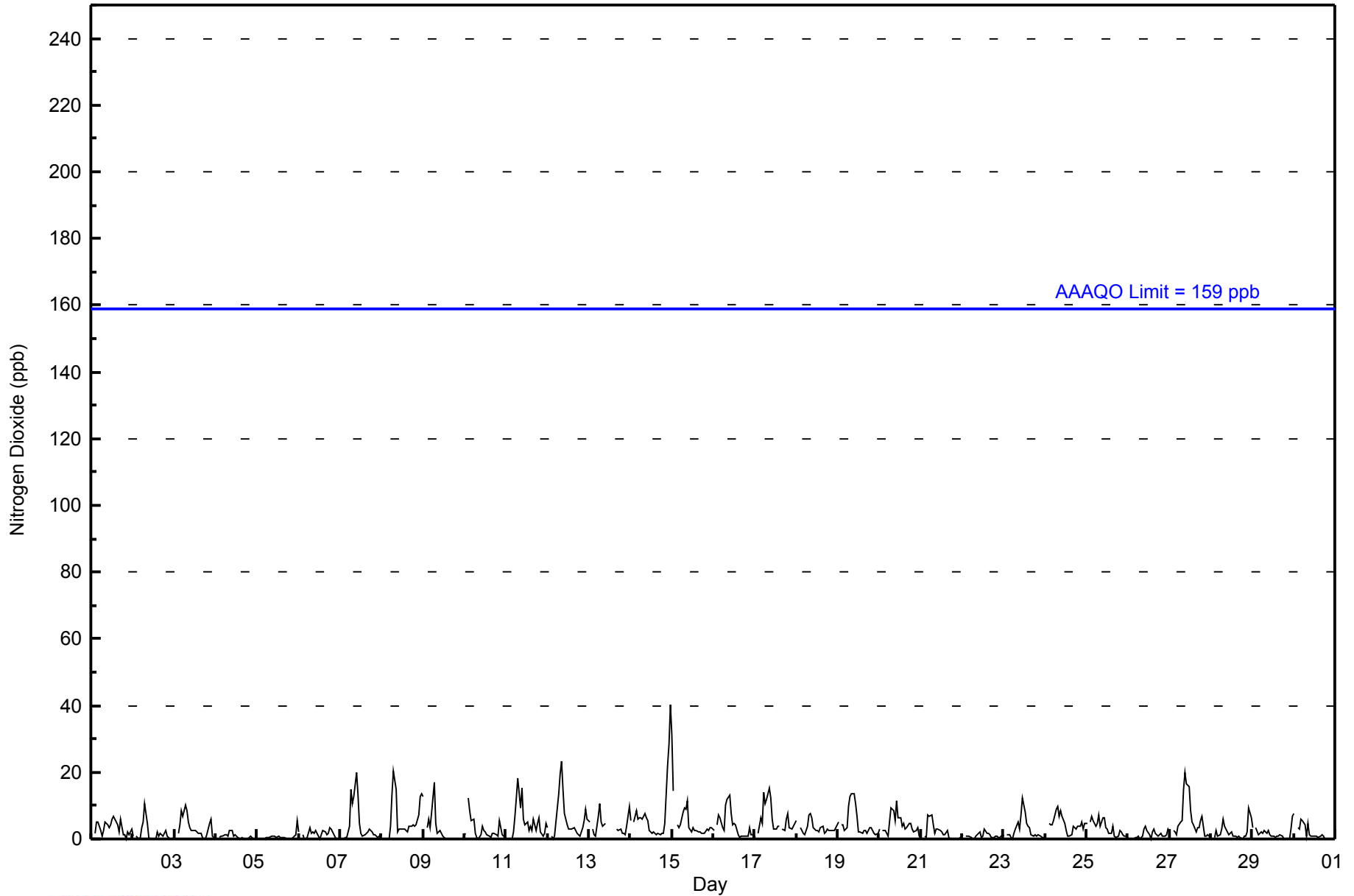
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jun	1	Z	2	5	5	3	1	3	5	4	4	4	6	7	5	4	2	6	1	1	0	2	1	3	3.2	7																							
2-Jun	1	Z	1	0	0	3	5	11	5	0	0	0	0	0	2	1	2	1	2	3	1	0	0	0	1.6	11																							
3-Jun	1	Z	2	4	8	7	10	8	5	4	2	2	2	2	2	2	1	0	0	1	5	6	1	1	3.2	10																							
4-Jun	0	Z	0	1	1	1	1	1	2	2	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0.7	2																							
5-Jun	0	Z	0	0	0	1	1	1	1	1	1	0	1	0	1	0	1	0	0	0	1	1	1	5	0.6	5																							
6-Jun	2	Z	1	0	0	0	3	2	2	2	2	1	0	1	2	2	1	2	3	3	1	1	0	0	1.4	3																							
7-Jun	0	Z	0	1	0	4	15	10	13	20	13	5	2	1	1	2	2	3	2	1	1	1	0	1	4.3	20																							
8-Jun	1	Z	0	0	0	4	13	20	15	2	3	3	3	3	3	2	4	4	4	4	4	7	13	14	5.5	20																							
9-Jun	13	Z	3	6	4	8	17	5	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	2.7	17																							
10-Jun	2	Z	12	8	5	6	2	0	0	1	4	3	2	1	1	1	2	2	1	1	5	4	1	0	2.8	12																							
11-Jun	0	Z	0	0	2	7	12	18	10	15	6	4	5	3	4	3	6	3	5	6	2	1	2	5	5.1	18																							
12-Jun	4	Z	1	0	1	5	14	19	23	15	8	4	3	3	3	4	3	2	1	1	4	5	9	6	5.9	23																							
13-Jun	5	Z	3	1	1	7	10	5	4	5	C	C	C	C	C	C	3	3	3	2	2	1	4	10	--	10																							
14-Jun	6	Z	5	9	6	6	6	6	8	6	5	2	2	2	2	1	2	1	2	2	5	22	29	40	7.6	40																							
15-Jun	31	15	Z	4	3	4	8	9	9	11	3	2	3	3	3	2	2	2	2	2	3	3	4	3	5.7	31																							
16-Jun	3	Z	4	7	7	3	3	10	12	13	8	4	5	4	1	0	1	1	1	1	1	3	1	1	4.1	13																							
17-Jun	1	Z	2	6	5	14	11	12	15	12	6	3	3	4	4	PF	3	3	6	8	4	3	4	5	6.0	15																							
18-Jun	5	Z	4	3	2	1	4	7	8	6	4	3	3	2	3	4	2	2	3	3	3	2	2	4	3.3	8																							
19-Jun	5	Z	4	4	2	4	10	13	14	14	10	7	2	2	2	2	2	2	3	4	3	2	1	2	4.9	14																							
20-Jun	3	Z	2	3	2	1	5	9	8	6	12	6	6	4	5	3	3	5	5	3	2	3	3	1	4.3	12																							
21-Jun	0	Z	1	1	7	7	7	4	2	3	3	3	2	1	1	3	0	0	0	0	0	0	0	0	2.0	7																							
22-Jun	1	Z	1	1	1	0	0	0	1	2	2	1	1	3	2	2	1	1	1	1	1	0	1	1	1.0	3																							
23-Jun	1	Z	1	1	0	0	2	3	5	3	7	12	8	5	4	3	1	1	1	1	1	1	0	0	2.7	12																							
24-Jun	1	Z	5	4	4	6	9	10	7	8	7	5	3	1	1	1	4	3	3	4	4	5	3	5	4.4	10																							
25-Jun	5	Z	5	7	5	4	5	7	4	6	6	3	3	2	2	4	1	1	1	3	2	1	1	1	3.4	7																							
26-Jun	0	Z	0	0	0	0	1	0	1	3	4	2	1	0	2	3	2	1	1	2	1	1	1	3	1.3	4																							
27-Jun	0	Z	2	2	1	4	5	5	15	20	17	16	9	5	4	2	3	3	6	7	1	1	1	1	5.8	20																							
28-Jun	1	Z	1	3	1	1	3	6	4	2	1	2	2	1	1	0	1	1	0	1	1	2	9	7	2.2	9																							
29-Jun	4	Z	3	1	2	2	2	3	2	3	1	1	1	1	1	1	1	1	0	0	0	0	3	7	1.7	7																							
30-Jun	8	Z	3	3	6	6	4	1	5	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	1.9	8																							
																								3.5	14.6	2.4	2.8	2.8	3.9	6.3	6.9	6.8	6.4	4.9	3.5	2.7	2.1	2.0	1.9	1.9	1.7	1.9	2.1	1.9	2.6	3.2	4.2	Diurnal Average	
																								31	15	12	9	8	14	17	20	23	20	17	16	9	7	5	4	6	6	6	8	5	22	29	40	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	678	99.27	99.27
21 - 40	5	0.73	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - June 2014

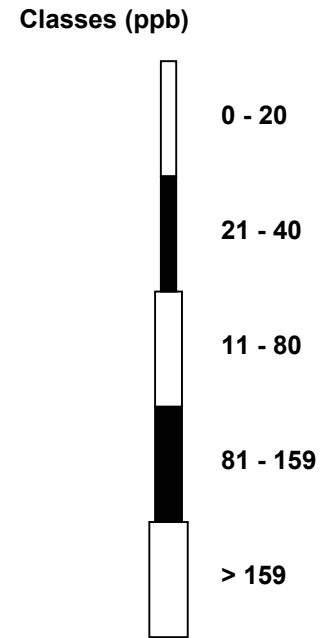
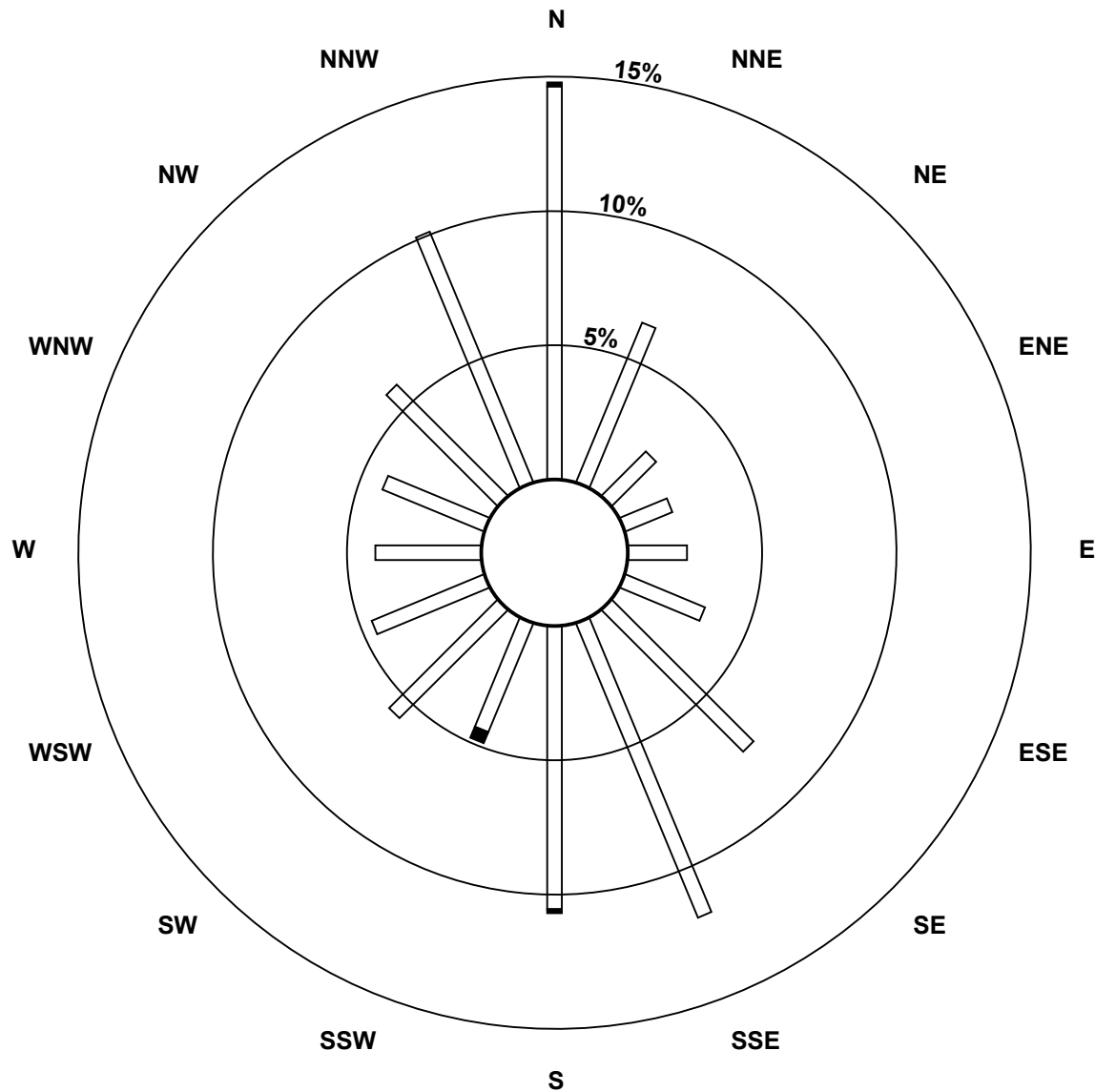
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	100	44	16	13	15	22	51	81	72	30	39	31	27	28	40	69	678
21 - 40	1	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	5
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	101	44	16	13	15	22	51	81	73	33	39	31	27	28	40	69	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South (AMS 13)

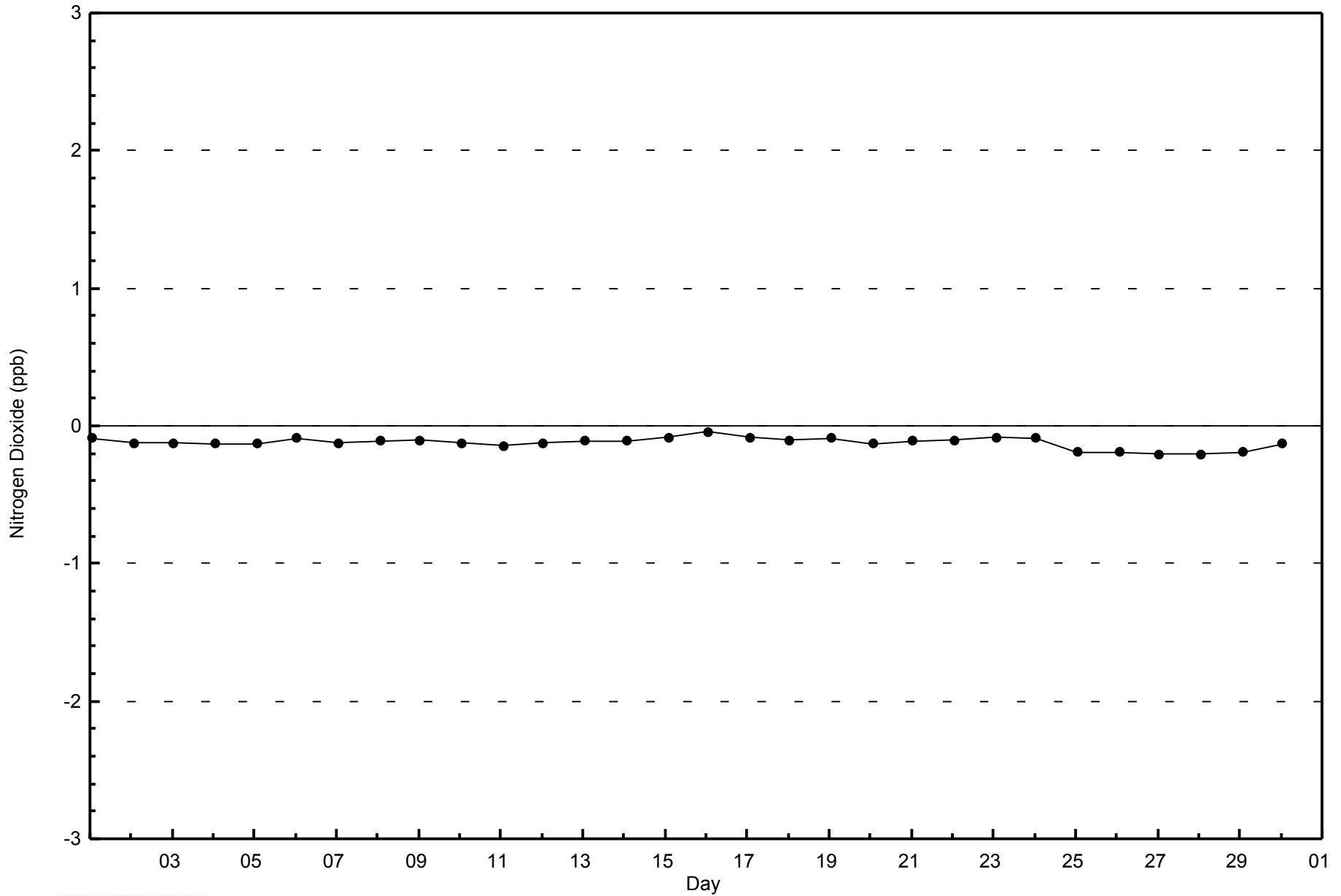


Total Number of Valid Hours: 683



WBEA
Zero Responses

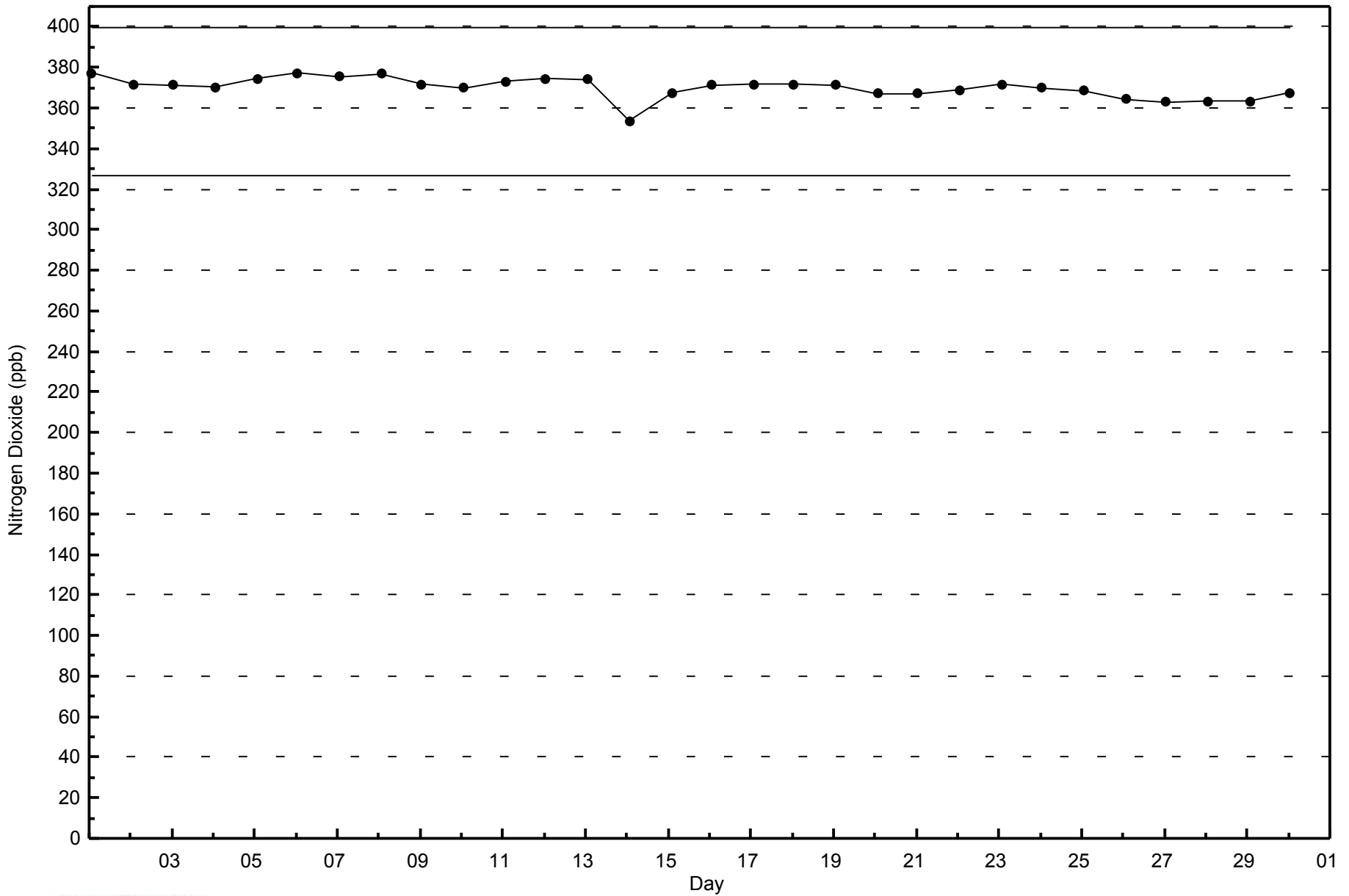
Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - June 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - June 2014





Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - June 2014

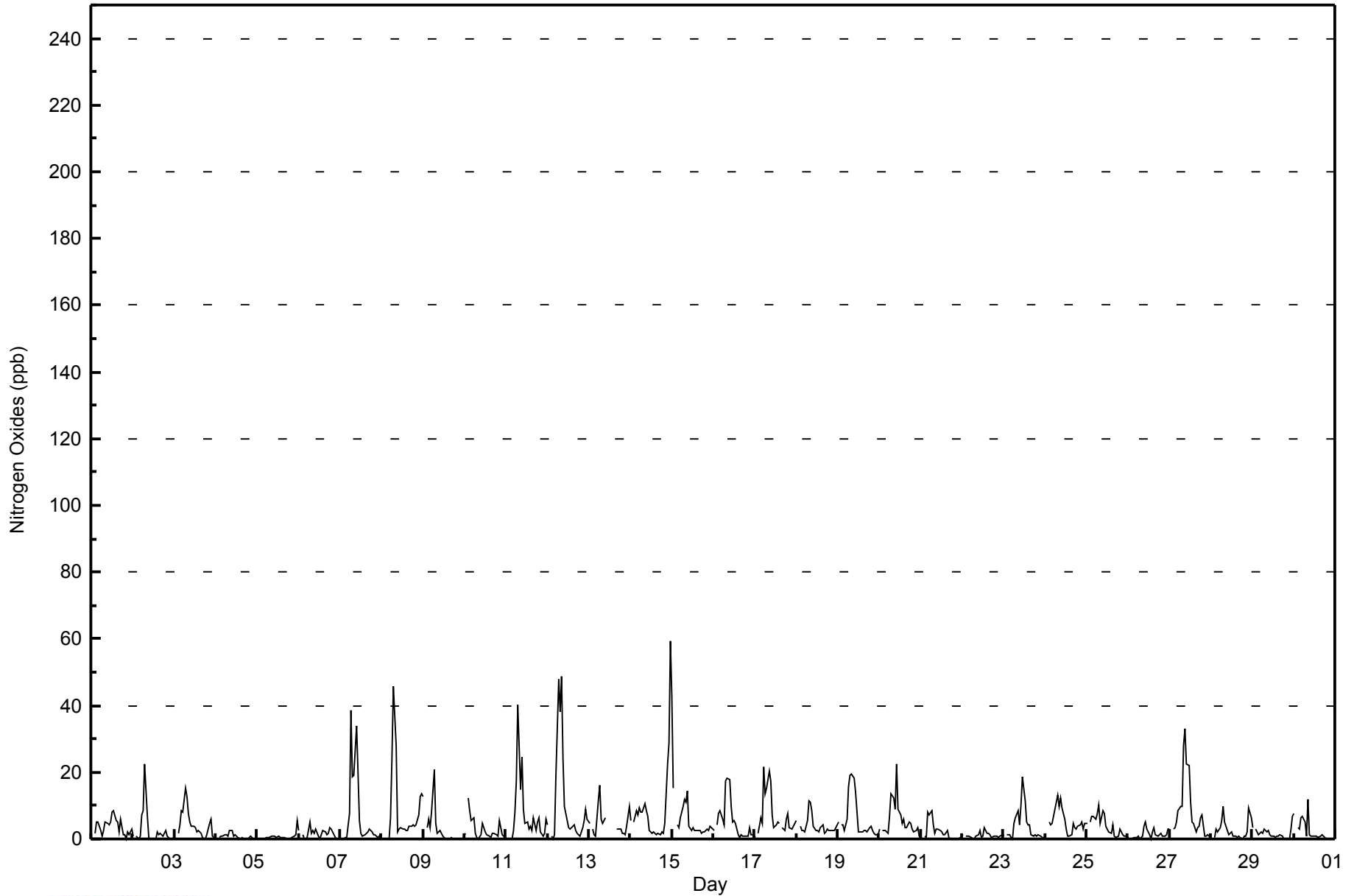
Maximum Value: 59 ppb on Jun 15 00:00																		Maximum Daily Average: 10.6 ppb on Jun 12						Hours in Service: 720		
Minimum Value: 0 ppb on Jun 11 01:00																		Minimum Daily Average: 0.7 ppb on Jun 5						Hours of Data: 683		
Maximum Diurnal Average: 15.1 ppb at hour 2																		Minimum Diurnal Average: 1.8 ppb at hour 18						Hours of Missing Data: 37		
Monthly Average: 4.5 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 10 P ₉₉ = 38						Hours of Calibration: 36		
																		Percent Operational Time: 99.9								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	1	Z	2	5	5	3	1	3	5	5	4	5	8	9	5	5	2	6	1	1	0	2	1	3	3.6	9
2-Jun	1	Z	1	0	1	7	9	22	7	0	0	0	0	0	2	1	2	1	2	3	1	0	0	0	2.6	22
3-Jun	1	Z	2	4	8	8	15	13	7	5	4	4	3	2	2	2	1	0	0	1	5	6	1	1	4.1	15
4-Jun	0	Z	0	1	1	1	1	1	3	3	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0.7	3
5-Jun	0	Z	0	0	0	1	1	1	1	1	1	0	1	0	1	0	0	0	0	0	0	1	1	5	0.7	5
6-Jun	2	Z	1	0	0	0	5	2	3	2	3	1	0	1	3	2	1	2	3	3	1	1	0	0	1.6	5
7-Jun	0	Z	0	0	0	8	39	19	19	34	20	5	2	1	1	2	2	3	2	1	1	1	0	1	7.1	39
8-Jun	1	Z	0	0	0	6	24	46	28	2	3	3	3	3	3	2	4	4	4	4	4	7	13	14	7.7	46
9-Jun	13	Z	3	6	4	8	21	5	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	2.9	21
10-Jun	2	Z	12	8	5	6	2	0	0	1	4	3	2	1	1	1	2	2	1	1	5	4	1	0	2.9	12
11-Jun	0	Z	0	0	3	8	18	40	15	25	9	4	5	3	4	3	6	3	5	6	2	1	2	6	7.2	40
12-Jun	4	Z	1	0	1	19	48	38	49	24	10	5	4	3	3	4	3	2	1	1	4	5	9	6	10.6	49
13-Jun	5	Z	3	1	1	12	16	6	5	6	C	C	C	C	C	C	3	3	3	2	2	1	4	10	--	16
14-Jun	6	Z	5	9	7	9	8	8	10	8	7	3	2	2	2	1	2	1	2	2	5	23	29	59	9.1	59
15-Jun	43	15	Z	4	4	6	10	12	11	14	4	2	3	3	3	2	2	2	2	2	3	3	4	3	6.9	43
16-Jun	3	Z	4	7	8	6	4	18	18	18	10	5	6	5	1	0	1	1	1	1	1	3	1	1	5.4	18
17-Jun	1	Z	2	6	5	21	13	15	20	17	7	3	4	5	5	PF	3	3	6	8	4	3	4	5	7.3	21
18-Jun	5	Z	4	3	3	2	5	11	11	8	4	2	3	2	3	4	2	2	3	3	2	2	2	4	4.0	11
19-Jun	5	Z	4	4	2	6	16	19	20	18	14	8	2	2	2	2	2	2	3	4	3	2	1	1	6.2	20
20-Jun	3	Z	2	3	2	2	7	13	12	9	22	9	7	5	6	3	3	5	5	3	2	2	3	1	5.7	22
21-Jun	0	Z	1	1	8	7	9	4	2	3	3	3	2	1	1	2	0	0	0	0	0	0	0	0	2.1	9
22-Jun	1	Z	1	1	1	0	0	0	1	1	3	1	1	4	2	2	1	1	1	1	1	0	1	1	1.0	4
23-Jun	1	Z	1	1	0	0	5	7	9	4	10	19	11	5	4	4	1	1	1	1	1	0	0	0	3.8	19
24-Jun	1	Z	5	4	5	7	11	13	10	12	10	6	3	1	1	1	5	3	3	4	4	5	3	5	5.2	13
25-Jun	5	Z	5	7	7	6	8	10	5	9	8	4	3	2	2	4	1	1	1	3	2	1	1	1	4.1	10
26-Jun	0	Z	0	0	0	1	1	0	1	4	5	3	1	0	2	3	1	1	1	2	1	1	1	3	1.4	5
27-Jun	3	Z	3	3	5	8	10	10	28	33	23	22	11	5	5	2	3	4	6	7	1	1	1	1	8.5	33
28-Jun	1	Z	1	3	2	3	5	10	5	3	1	2	2	1	1	0	1	0	0	1	1	2	9	7	2.6	10
29-Jun	4	Z	3	1	2	2	2	3	2	3	1	1	1	1	1	1	1	1	0	0	0	0	3	7	1.7	7
30-Jun	8	Z	3	3	6	7	5	1	12	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	2.3	12
																		Diurnal Average						Diurnal Maximum		
																		43						59		
																		3.9						4.8		
																		15.1						15		
																		2.4						3.2		
																		2.9						3.2		
																		3.2						4.8		
																		6.1						11.6		
																		10.5						11.6		
																		10.7						10.7		
																		9.2						9.2		
																		6.7						6.7		
																		4.4						4.4		
																		3.2						3.2		
																		2.3						2.3		
																		2.2						2.2		
																		2.1						2.1		
																		1.9						1.9		
																		1.8						1.8		
																		2.0						2.0		
																		2.1						2.1		
																		1.9						1.9		
																		2.6						2.6		
																		3.2						3.2		
																		4.8						4.8		

Z - zerspan C - Calibration PF - Power Failure



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	660	96.63	96.63
21 - 40	18	2.64	99.27
41 - 80	5	0.73	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - June 2014

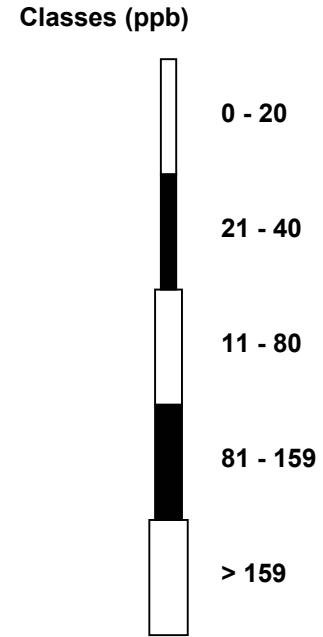
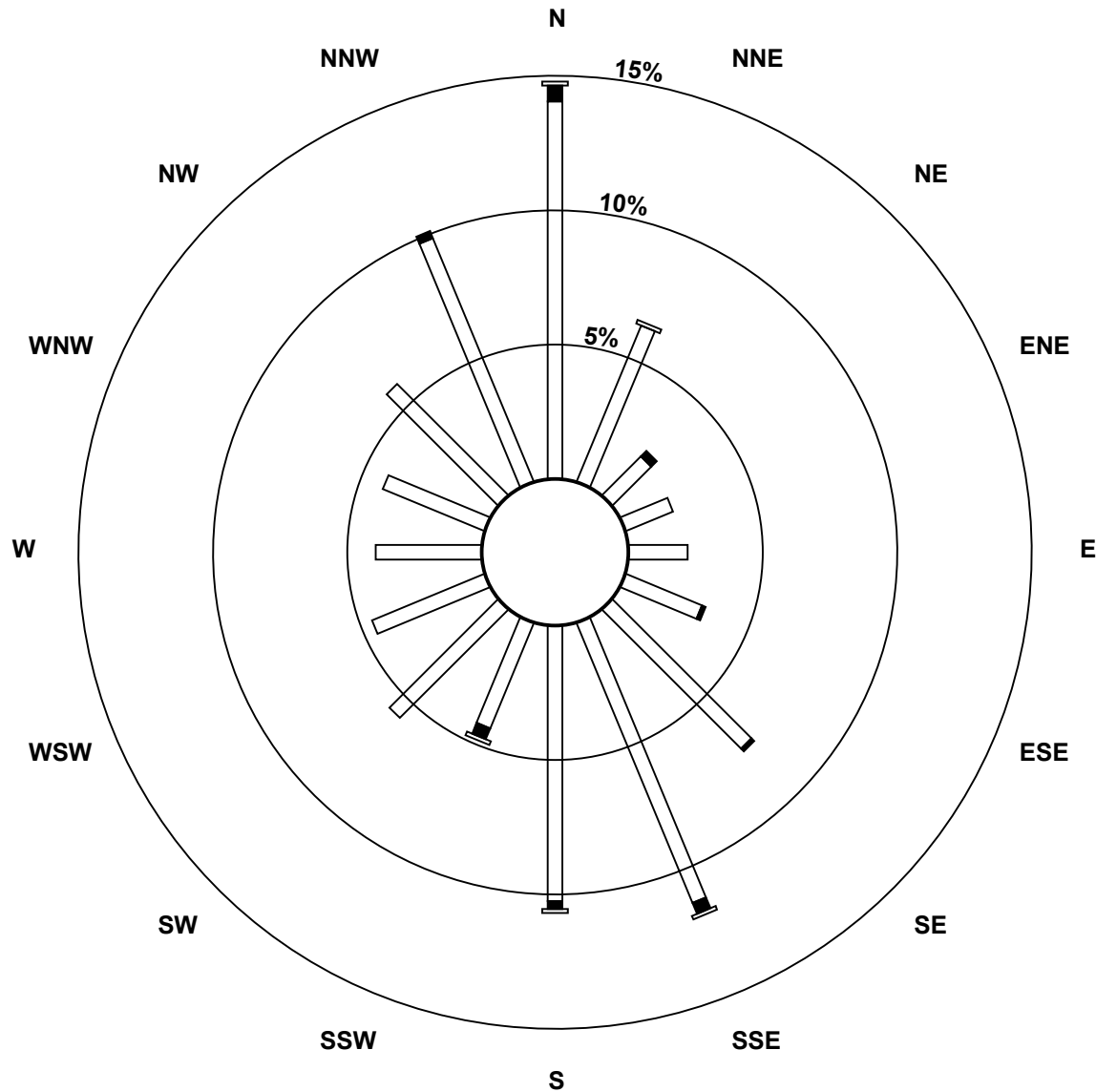
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	96	43	14	13	15	21	50	77	70	29	39	31	27	28	40	67	660
21 - 40	4	0	2	0	0	1	1	3	2	3	0	0	0	0	0	2	18
11 - 80	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	101	44	16	13	15	22	51	81	73	33	39	31	27	28	40	69	683

Total Number of Valid Hours: 683

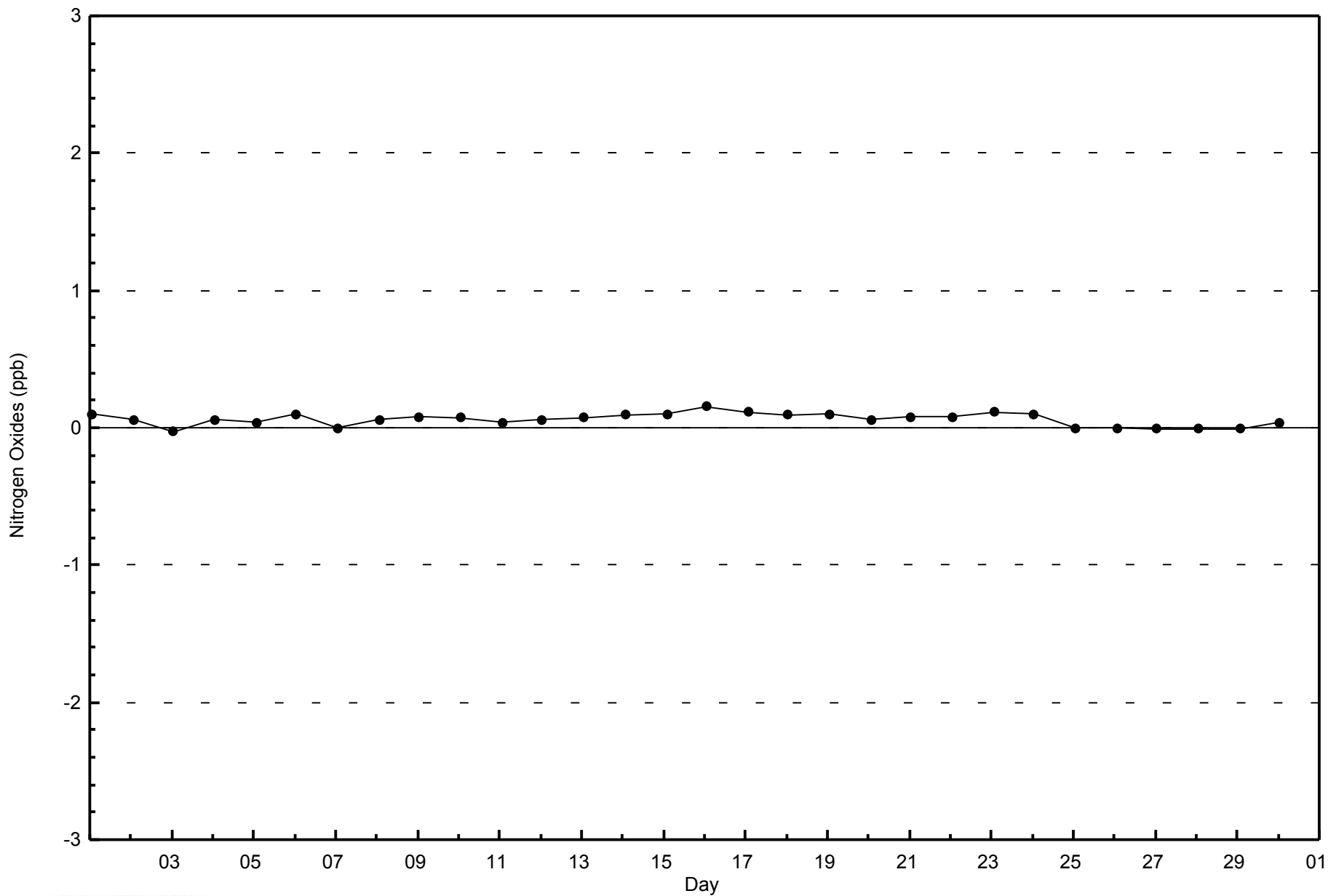
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Nitrogen Oxides (NO_x) - ppb
Fort McKay South (AMS 13)



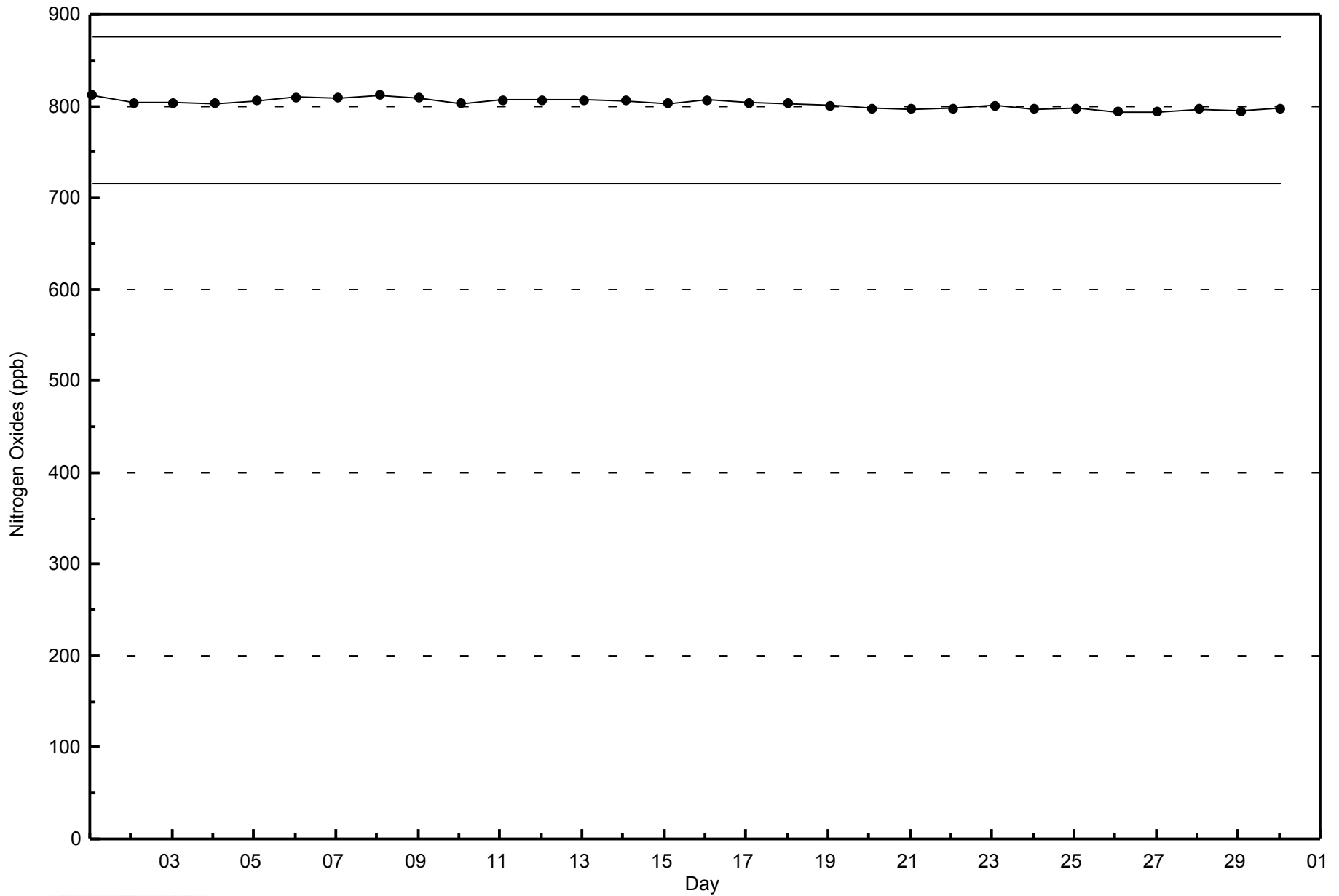
Total Number of Valid Hours: 683





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - June 2014





Summary of Hour Averages

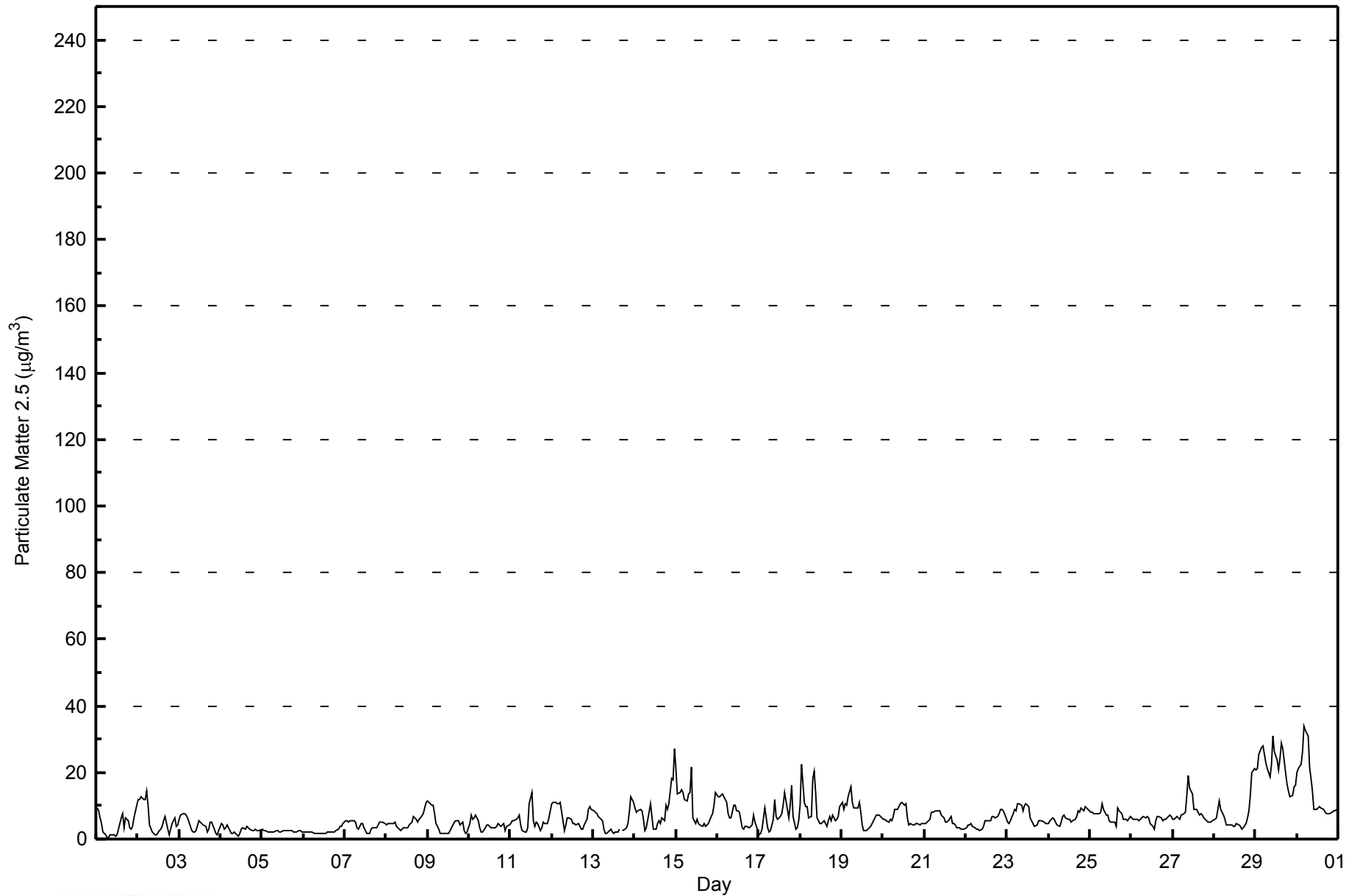
Fort McKay South - June 2014

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 34.1 µg/m ³ on Jun 30 05:00 Minimum Value: 0.6 µg/m ³ on Jun 1 08:00 Maximum Diurnal Average: 8.8 µg/m ³ at hour 5 Monthly Average: 6.75 µg/m ³		Maximum Daily Average: 21.8 µg/m ³ on Jun 29 Minimum Daily Average: 2.3 µg/m ³ on Jun 6 Minimum Diurnal Average: 5.3 µg/m ³ at hour 18 Percentiles: P ₁ = 1.2 P ₁₀ = 2.2 Q ₁ = 3.5 Median = 5.5 Q ₃ = 8.3 P ₉₀ = 12.1 P ₉₉ = 27.5		Hours in Service: 720 Hours of Data: 719 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jun	9.2	8.5	6.5	4.5	2.2	1.1	0.6	0.6	1.4	1.4	1.2	1.0	1.5	2.8	6.5	7.8	3.4	6.2	5.6	3.6	2.9	3.6	6.2	10.3	4.1	10.3																						
2-Jun	11.7	12.1	12.9	11.7	12.0	14.4	10.1	4.2	2.1	1.9	1.2	1.2	2.7	3.0	4.0	5.6	6.6	2.8	1.3	3.1	4.6	6.2	4.0	4.1	6.0	14.4																						
3-Jun	6.1	7.2	7.6	7.8	7.3	6.2	3.7	2.4	2.1	2.1	2.5	5.5	5.2	4.5	4.4	3.7	2.0	2.9	4.9	5.1	3.1	1.5	1.4	2.7	4.2	7.8																						
4-Jun	4.5	4.3	3.1	3.4	4.4	2.7	1.7	1.7	1.9	1.3	0.9	1.7	2.9	3.3	3.0	3.8	3.5	2.9	2.8	2.4	2.8	2.7	2.6	2.6	2.8	4.5																						
5-Jun	2.8	2.7	2.5	2.3	2.1	2.1	2.1	2.2	2.6	2.5	2.1	2.2	2.4	2.4	2.5	2.7	2.4	2.4	2.3	2.2	2.2	2.4	2.6	2.3	2.4	2.8																						
6-Jun	2.2	2.1	2.1	2.0	2.0	2.0	1.9	1.7	1.5	1.6	1.7	1.6	1.6	1.7	2.0	2.2	2.2	2.1	2.1	2.7	3.0	3.6	3.8	4.8	2.3	4.8																						
7-Jun	5.5	5.5	5.0	5.4	5.3	5.5	5.3	3.6	2.9	4.7	4.6	3.3	2.4	1.7	1.9	3.0	3.3	3.2	3.6	4.2	5.1	5.2	5.0	4.8	4.2	5.5																						
8-Jun	4.4	4.6	4.5	4.8	4.5	5.2	3.9	3.3	2.7	2.8	3.5	3.4	3.5	4.3	4.9	5.0	6.7	5.9	4.9	5.8	6.5	7.6	9.2	10.8	5.1	10.8																						
9-Jun	11.5	11.1	10.1	10.4	7.8	4.7	2.8	1.8	1.6	1.5	1.5	1.7	1.8	2.4	3.3	4.9	5.7	5.6	5.4	4.4	5.1	2.7	1.5	2.1	4.6	11.5																						
10-Jun	4.8	7.2	5.7	6.3	7.4	5.6	3.5	2.3	2.1	3.3	4.2	4.3	3.6	3.3	3.3	3.3	3.8	4.5	4.0	4.3	4.6	2.5	3.6	4.3	4.2	7.4																						
11-Jun	4.5	5.6	5.5	5.9	6.5	7.2	4.2	2.5	2.2	2.3	3.5	10.5	13.9	5.6	4.0	5.2	4.5	2.6	3.3	4.9	4.6	4.5	6.2	8.6	5.3	13.9																						
12-Jun	10.4	11.0	10.9	10.7	10.7	11.0	5.5	2.6	4.3	6.3	6.3	6.1	4.8	4.6	4.2	4.7	3.9	3.0	3.2	4.3	5.8	8.9	9.8	8.8	6.7	11.0																						
13-Jun	8.6	8.0	7.5	6.9	6.3	5.6	3.1	1.7	1.6	2.6	2.9	1.9	1.6	2.0	2.0	3.0	M	2.4	3.0	3.2	4.7	8.2	12.5	10.8	4.8	12.5																						
14-Jun	9.4	8.1	8.4	9.0	8.3	6.0	2.4	3.4	8.1	10.4	6.6	3.0	3.1	4.5	5.4	4.8	6.4	5.7	10.1	8.8	10.7	18.1	17.6	27.0	8.6	27.0																						
15-Jun	21.3	13.6	13.9	14.7	14.2	11.8	11.3	13.4	13.8	21.5	6.3	4.7	6.0	4.8	4.1	4.0	4.8	3.9	4.2	4.7	6.6	7.6	10.3	13.9	9.8	21.5																						
16-Jun	12.7	12.7	13.3	13.4	12.7	11.2	7.7	6.3	6.2	10.0	10.1	8.5	8.5	7.9	3.5	2.8	3.9	3.7	3.5	3.6	4.1	7.0	5.1	2.7	7.5	13.4																						
17-Jun	1.3	1.6	3.1	9.2	6.5	3.4	1.9	2.5	5.9	12.1	6.7	5.9	6.6	7.8	10.3	14.0	11.4	6.3	10.2	16.0	6.8	3.2	3.5	5.5	6.7	16.0																						
18-Jun	10.4	22.4	11.0	9.9	9.6	6.6	6.8	18.2	20.3	14.0	6.4	4.5	4.9	4.9	5.3	3.8	5.6	7.0	5.4	7.2	5.5	6.1	6.9	9.9	8.9	22.4																						
19-Jun	11.0	9.0	10.8	10.4	12.8	15.6	11.1	9.5	9.1	9.2	11.1	8.0	4.2	2.7	2.4	2.9	3.5	3.9	5.3	6.2	7.1	7.1	7.2	6.3	7.8	15.6																						
20-Jun	6.1	5.9	5.4	5.2	5.8	5.7	6.6	8.9	9.0	9.5	10.6	10.9	10.1	10.8	6.3	4.3	4.7	4.3	4.4	4.8	4.6	4.3	4.7	4.7	6.6	10.9																						
21-Jun	4.7	4.6	5.5	5.9	7.8	8.1	8.5	8.3	8.4	8.5	7.1	6.2	5.3	5.2	5.5	6.6	4.9	4.5	4.0	3.5	3.3	2.9	2.8	3.0	5.6	8.5																						
22-Jun	3.3	4.2	4.4	4.8	4.0	3.4	3.1	3.0	2.6	3.1	3.8	5.3	5.7	5.5	5.5	6.9	6.8	6.5	6.7	7.7	9.0	8.8	8.5	6.2	5.4	9.0																						
23-Jun	5.1	4.7	5.7	7.6	8.7	8.5	10.5	10.8	10.1	8.6	10.3	10.7	9.6	6.4	5.3	4.7	3.9	4.2	5.3	5.5	5.5	5.1	4.7	4.7	6.9	10.8																						
24-Jun	4.6	5.4	6.2	5.8	5.3	4.2	3.8	5.2	6.9	7.3	6.2	6.1	5.7	5.2	5.4	5.9	6.9	8.5	8.1	9.2	8.3	9.7	9.3	9.0	6.6	9.7																						
25-Jun	8.1	8.0	7.6	7.4	7.8	7.8	8.0	10.8	8.8	7.3	7.1	5.7	5.1	5.1	5.1	3.9	9.2	8.4	7.6	5.9	5.8	6.0	5.7	6.6	7.0	10.8																						
26-Jun	6.3	5.8	5.8	6.0	5.5	5.8	6.5	6.6	6.4	6.7	6.3	4.8	3.6	2.8	5.6	6.9	6.8	6.2	5.5	5.8	6.0	6.6	7.1	6.8	5.9	7.1																						
27-Jun	6.0	6.1	6.8	6.5	6.0	7.1	7.6	8.0	13.3	19.0	15.3	13.5	8.8	8.7	8.8	7.4	7.6	7.2	6.2	5.8	5.2	5.3	5.3	5.7	8.2	19.0																						
28-Jun	5.9	6.5	9.0	11.3	8.8	7.2	6.0	4.4	4.3	4.2	4.3	4.0	3.9	4.7	4.1	3.7	3.0	3.6	4.6	6.5	8.5	13.0	20.0	21.1	7.2	21.1																						
29-Jun	20.7	21.2	25.4	27.7	28.0	25.3	23.0	21.2	18.6	22.4	31.1	26.3	23.8	20.6	24.0	28.7	27.2	19.7	16.5	14.5	12.8	13.2	15.5	16.1	21.8	31.1																						
30-Jun	19.9	21.2	22.5	26.4	34.1	32.7	30.9	21.6	18.2	14.5	8.8	8.9	9.1	9.6	9.2	8.9	8.0	7.6	7.5	7.6	8.0	8.3	8.5	9.1	15.0	34.1																						
																								8.1	8.4	8.3	8.8	8.8	8.1	6.8	6.4	6.6	7.4	6.5	6.0	5.7	5.3	5.4	5.8	6.0	5.3	5.4	5.8	5.8	6.4	7.0	7.8	Diurnal Average
																								21.3	22.4	25.4	27.7	34.1	32.7	30.9	21.6	20.3	22.4	31.1	26.3	23.8	20.6	24.0	28.7	27.2	19.7	16.5	16.0	12.8	18.1	20.0	27.0	Diurnal Maximum
M - Maintenance																																																
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	355	49.37	49.37
6 - 15	317	44.09	93.46
16 - 25	32	4.45	97.91
26 - 80	11	1.53	99.44
> 81.0	0	0.00	99.44

Total Number of Valid Hours: 719

Total Number of Hours: 720



WBEA
Frequency Distribution

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

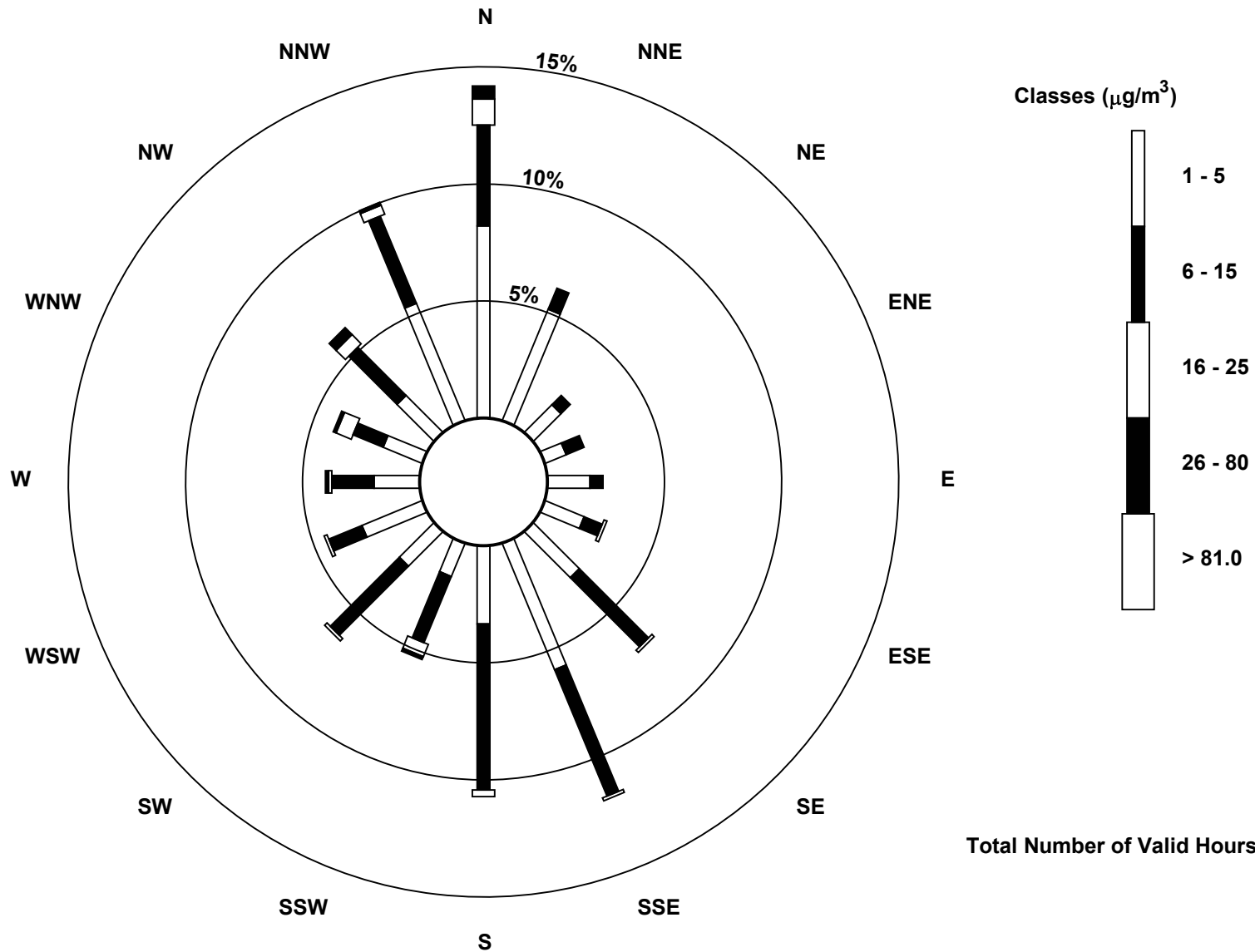
Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	59	37	12	7	13	13	20	42	24	11	15	20	14	13	16	39	355
6 - 15	31	7	4	6	4	6	30	42	51	22	30	11	13	10	21	29	317
16 - 25	8	0	0	0	0	1	1	1	2	4	1	1	1	5	4	3	32
26 - 80	4	0	0	0	0	0	0	0	0	1	0	0	1	1	3	1	11
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	102	44	16	13	17	20	51	85	77	38	46	32	29	29	44	72	715

Total Number of Valid Hours: 719

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South (AMS 13)



Total Number of Valid Hours: 719



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

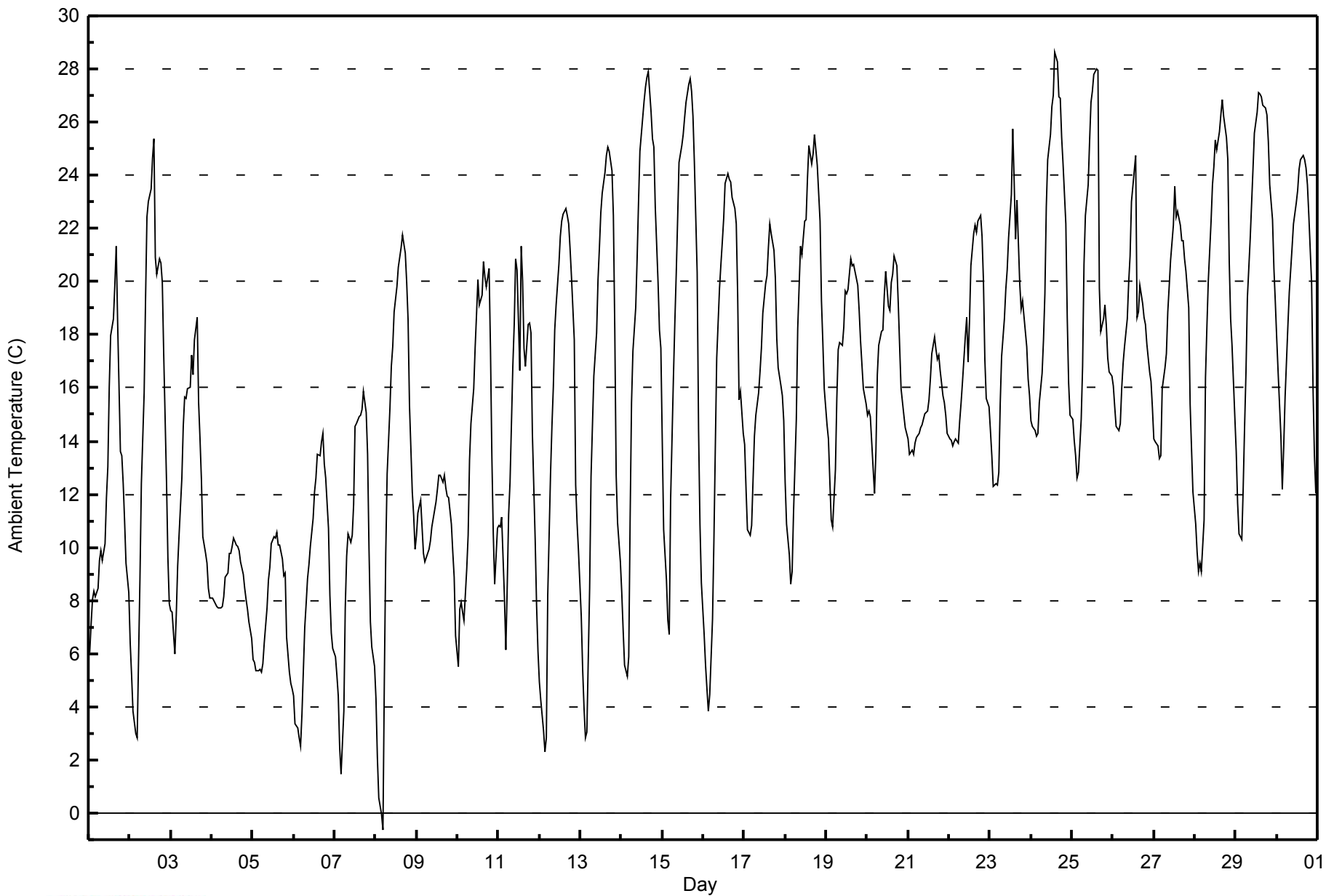
Fort McKay South - June 2014

Maximum Value: 28.6 C on Jun 24 15:00 Maximum Daily Average: 20.9 C on Jun 29																						Hours in Service: 720 Hours of Data: 720				
Minimum Value: -0.6 C on Jun 8 05:00 Minimum Daily Average: 7.6 C on Jun 5 Maximum Diurnal Average: 21.1 C at hour 15 Minimum Diurnal Average: 8.5 C at hour 4 Monthly Average: 15.58 C Percentiles: P ₁ = 2.4 P ₁₀ = 7.3 Q ₁ = 10.5 Median = 15.6 Q ₃ = 20.4 P ₉₀ = 24.2 P ₉₉ = 27.6																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	6.0	7.1	8.0	8.4	8.2	8.4	9.5	9.9	9.5	10.1	11.9	13.0	16.0	18.0	18.6	19.9	21.3	18.5	13.6	13.4	12.4	11.0	9.4	8.3	12.1	21.3
2-Jun	6.4	5.2	3.8	3.0	2.9	5.8	8.8	12.4	15.8	19.3	22.5	23.0	23.5	24.6	25.4	20.9	20.3	20.9	20.7	19.9	17.3	12.5	9.6	7.9	14.7	25.4
3-Jun	7.6	7.6	6.0	7.5	9.3	10.4	12.6	14.5	15.6	15.6	16.0	16.0	17.2	16.5	17.8	18.6	15.4	14.1	12.6	10.4	9.8	9.4	8.4	8.1	12.4	18.6
4-Jun	8.1	8.0	7.9	7.8	7.7	7.7	7.8	8.2	8.9	9.0	9.8	9.8	10.0	10.3	10.1	10.0	9.9	9.5	9.0	8.5	8.0	7.7	7.2	6.6	8.6	10.3
5-Jun	5.8	5.7	5.4	5.4	5.4	5.3	5.6	6.4	7.7	8.8	9.2	10.2	10.4	10.3	10.6	10.1	10.1	9.6	8.9	9.1	6.6	5.3	4.9	4.7	7.6	10.6
6-Jun	4.4	3.4	3.2	2.8	2.5	3.7	7.0	7.9	8.8	9.3	10.0	11.1	12.1	12.6	13.5	13.4	14.0	14.3	13.2	12.6	10.7	8.2	6.8	6.2	8.8	14.3
7-Jun	5.9	5.2	4.4	2.5	1.5	3.8	7.7	9.7	10.5	10.2	10.5	11.6	14.6	14.7	14.9	15.0	15.2	15.8	15.1	13.5	10.0	7.2	6.3	5.5	9.6	15.8
8-Jun	4.3	2.1	0.6	-0.1	-0.6	5.0	9.8	12.8	15.2	16.8	17.5	18.9	19.8	20.6	20.9	21.3	21.7	21.1	20.0	18.5	15.3	12.1	11.2	9.9	13.1	21.7
9-Jun	10.5	11.3	11.8	10.8	9.8	9.5	9.7	9.9	10.2	10.8	11.1	11.7	12.2	12.7	12.7	12.5	12.7	12.2	11.9	11.8	10.8	9.8	8.9	6.7	10.9	12.7
10-Jun	5.5	7.7	7.9	7.6	7.3	9.2	10.5	13.3	14.7	16.0	17.5	18.7	20.1	19.1	19.5	20.8	20.2	19.8	20.5	17.4	13.4	10.5	8.6	10.7	14.0	20.8
11-Jun	10.8	10.8	11.1	8.1	6.1	8.5	11.3	12.5	16.8	18.4	20.8	20.4	16.6	21.3	20.0	17.5	16.8	18.4	18.5	18.1	14.3	10.3	7.8	6.1	14.2	21.3
12-Jun	4.9	4.3	3.1	2.3	2.8	8.2	12.8	14.5	16.0	18.2	19.1	20.6	21.7	22.3	22.5	22.8	22.5	22.2	21.2	20.2	17.8	12.3	10.9	9.9	14.7	22.8
13-Jun	7.4	5.4	3.9	2.9	3.0	8.5	12.7	14.5	16.4	18.1	20.1	21.3	22.6	23.3	24.1	24.8	25.0	24.9	24.2	22.5	18.2	12.7	10.9	9.4	15.7	25.0
14-Jun	8.3	6.9	5.6	5.2	5.9	11.1	15.4	17.4	19.0	20.8	22.9	24.9	26.2	26.8	27.3	27.7	27.9	26.4	25.4	25.1	22.8	20.0	18.2	17.5	18.9	27.9
15-Jun	14.0	10.7	8.8	7.3	6.7	11.8	16.4	18.4	20.3	22.3	24.5	25.1	25.5	26.1	26.7	27.4	27.6	27.2	26.2	24.5	20.4	14.5	10.9	8.7	18.8	27.6
16-Jun	6.7	5.6	4.7	3.9	4.5	7.3	10.3	13.8	17.1	19.7	20.6	21.5	22.4	23.7	24.1	23.8	23.7	23.2	22.8	22.2	19.5	15.6	15.9	14.3	16.1	24.1
17-Jun	13.8	12.2	10.7	10.5	10.8	12.5	14.2	15.0	15.8	16.6	17.5	18.8	19.9	20.2	21.3	22.1	21.8	21.2	20.1	17.9	16.8	16.1	15.7	14.8	16.5	22.1
18-Jun	12.5	10.9	9.7	8.6	9.1	11.3	14.8	18.2	19.8	21.3	21.0	22.3	22.3	23.9	25.1	24.4	24.8	25.5	24.9	24.4	22.3	19.3	17.7	15.9	18.8	25.5
19-Jun	14.6	14.1	12.5	11.0	10.8	12.9	15.6	17.4	17.7	17.6	18.3	19.7	19.5	19.7	20.9	20.6	20.6	20.4	19.8	18.9	17.7	16.8	16.0	15.4	17.0	20.9
20-Jun	15.0	15.2	14.9	13.0	12.0	13.6	16.5	17.6	18.1	18.2	19.5	20.4	19.1	18.9	20.0	20.3	21.0	20.6	19.2	17.6	16.0	15.0	14.5	14.3	17.1	21.0
21-Jun	14.1	13.5	13.6	13.5	13.9	14.1	14.3	14.5	14.6	14.8	15.0	15.2	15.6	16.3	17.3	17.9	17.5	17.1	17.2	16.7	15.7	15.4	15.0	14.3	15.3	17.9
22-Jun	14.1	14.0	13.8	14.0	14.1	13.9	14.8	15.4	16.2	17.9	18.6	17.0	18.5	20.6	21.8	22.1	21.9	22.3	22.5	21.7	20.0	17.1	15.6	15.3	17.6	22.5
23-Jun	14.4	13.5	12.3	12.4	12.4	12.8	15.4	17.2	18.6	19.7	20.4	21.6	23.3	25.7	23.7	21.6	23.0	19.9	19.0	19.3	18.7	17.5	16.3	15.7	18.1	25.7
24-Jun	14.8	14.6	14.4	14.2	14.3	15.4	16.6	17.8	19.6	22.8	24.6	25.5	26.6	27.0	28.6	28.3	26.9	26.9	25.4	24.4	22.2	18.7	16.2	15.0	20.9	28.6
25-Jun	14.8	14.0	13.4	12.6	12.8	14.8	16.8	20.7	22.5	23.6	25.3	26.8	27.1	27.8	28.0	27.9	19.7	18.1	18.6	19.1	18.3	17.1	16.6	16.4	19.7	28.0
26-Jun	16.1	15.3	14.5	14.4	14.6	16.0	16.9	17.5	18.6	20.0	21.0	23.0	24.2	24.8	18.7	18.8	19.9	19.2	18.6	18.4	17.6	16.6	16.2	15.2	18.2	24.8
27-Jun	14.1	14.0	13.8	13.4	13.5	16.0	16.8	17.3	18.8	19.8	20.8	22.1	23.6	22.5	22.7	22.1	21.6	21.6	20.8	20.4	19.0	15.4	13.7	12.1	18.2	23.6
28-Jun	10.9	9.8	9.1	9.4	9.1	11.0	16.4	18.3	20.0	22.3	23.6	24.3	25.3	24.9	25.6	26.3	26.8	26.2	25.4	24.6	20.7	18.6	17.6	14.9	19.2	26.8
29-Jun	13.6	11.7	10.5	10.3	12.3	14.5	16.6	19.4	21.6	22.9	24.2	25.6	26.4	27.1	27.1	26.9	26.6	26.6	26.2	25.3	23.6	22.4	20.5	19.2	20.9	27.1
30-Jun	17.9	16.6	14.2	12.2	13.8	15.7	18.3	19.6	20.4	21.3	22.2	23.0	23.4	24.2	24.6	24.8	24.6	24.3	23.6	22.5	19.9	16.0	13.4	12.0	19.5	24.8
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Fort McKay South - June 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Fort McKay South - June 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	2	0.28	0.28
0 - 10	152	21.11	21.39
10 - 20	373	51.81	73.19
> 20	193	26.81	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

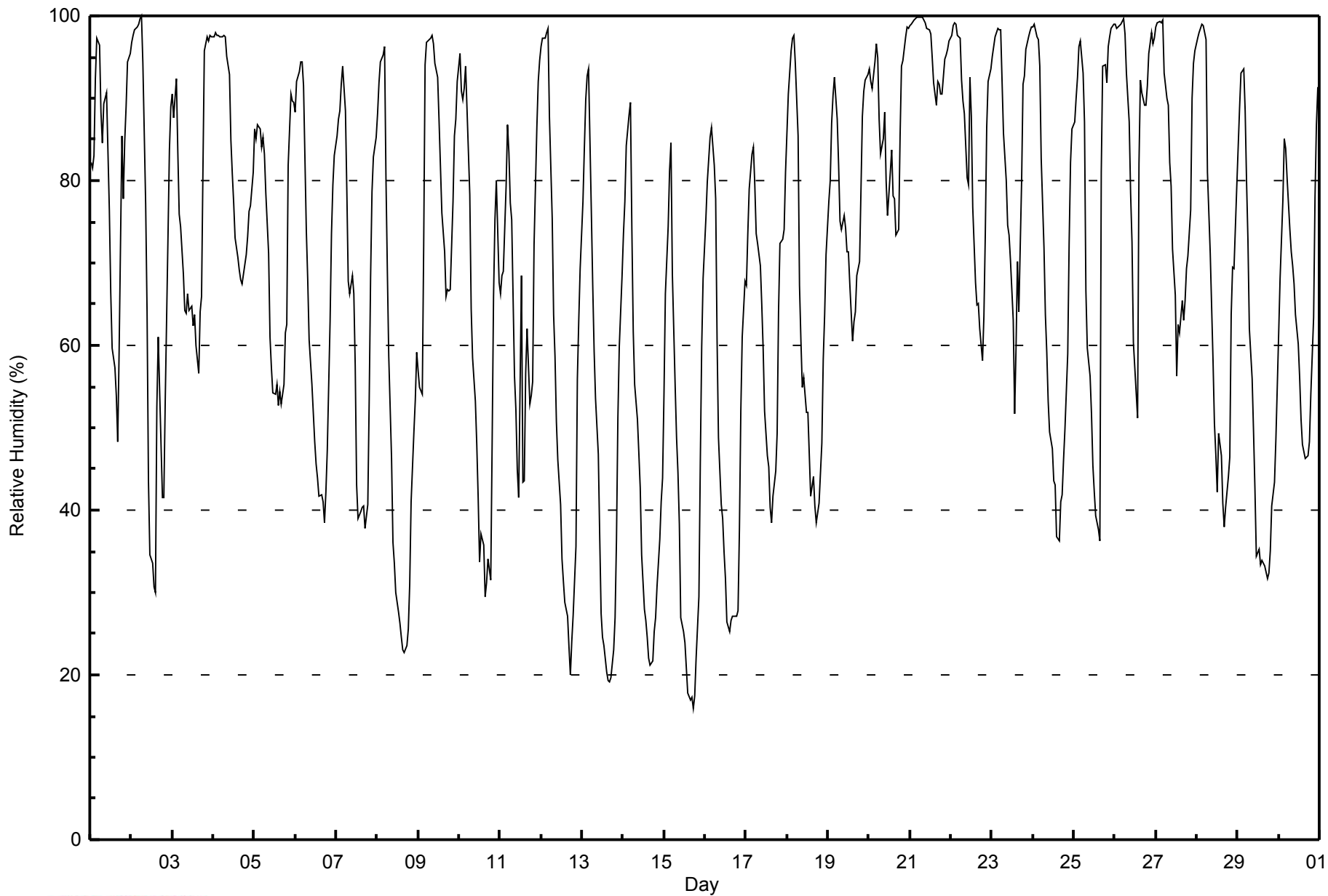


Maximum Value: 100 % on Jun 2 07:00																	Maximum Daily Average: 96.4 % on Jun 21																	Hours in Service: 720	
Minimum Value: 16 % on Jun 15 18:00																	Minimum Daily Average: 42.6 % on Jun 15																	Hours of Data: 720	
Maximum Diurnal Average: 93.1 % at hour 5																	Minimum Diurnal Average: 47.8 % at hour 15																	Hours of Missing Data: 0	
Monthly Average: 69.0 %																	Percentiles: P ₁ = 20 P ₁₀ = 35 Q ₁ = 51 Median = 72 Q ₃ = 90 P ₉₀ = 97 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-Jun	82	81	83	92	97	97	88	85	89	91	84	76	66	60	57	54	48	59	85	78	85	89	94	95	79.9	97									
2-Jun	97	98	98	99	99	100	100	94	77	64	44	35	34	31	30	53	61	48	42	41	53	73	84	89	68.4	100									
3-Jun	91	88	92	84	76	74	69	64	64	66	64	65	62	64	60	57	64	66	81	96	97	97	98	97	76.5	98									
4-Jun	98	98	98	98	97	98	98	97	95	93	85	81	77	73	71	69	68	68	70	71	73	76	77	81	83.7	98									
5-Jun	86	85	87	86	84	85	83	79	71	61	57	54	54	55	53	54	53	55	62	62	82	90	90	90	71.6	90									
6-Jun	88	92	93	94	94	91	74	68	61	58	55	48	46	44	42	42	41	38	42	47	63	74	80	83	65.0	94									
7-Jun	85	88	88	92	94	88	79	68	66	69	66	58	43	39	40	40	41	38	41	53	68	79	83	85	66.3	94									
8-Jun	88	92	94	95	96	80	69	59	46	36	34	30	28	26	25	23	23	24	26	31	41	49	53	59	51.1	96									
9-Jun	57	55	54	72	94	97	97	97	98	97	94	93	87	82	76	71	66	67	67	67	78	85	87	92	80.4	98									
10-Jun	95	91	90	91	94	84	78	64	59	53	48	41	34	37	36	29	31	34	31	48	66	75	80	68	60.8	95									
11-Jun	66	69	69	79	87	83	77	75	56	52	45	41	69	43	44	57	62	53	54	56	72	86	92	95	65.9	95									
12-Jun	96	97	97	98	98	88	75	64	59	51	46	41	34	31	29	27	23	20	24	27	36	56	63	69	56.3	98									
13-Jun	77	84	90	93	94	76	67	59	54	47	37	28	25	24	20	19	19	20	23	27	36	51	60	68	49.9	94									
14-Jun	74	77	84	88	90	74	62	55	51	47	43	35	28	27	25	22	21	22	25	27	31	37	41	44	47.0	90									
15-Jun	54	66	74	81	85	69	55	49	45	38	27	25	24	21	18	17	17	16	17	22	30	46	60	68	42.6	85									
16-Jun	75	80	83	85	86	82	78	61	49	41	39	35	32	26	25	27	27	27	27	28	38	52	61	68	51.3	86									
17-Jun	67	74	79	83	84	79	74	72	70	65	60	52	47	45	40	38	42	45	49	64	72	73	74	81	63.8	84									
18-Jun	86	91	96	97	98	94	86	67	61	55	56	52	52	47	42	44	41	38	40	41	48	58	64	71	63.4	98									
19-Jun	77	80	87	90	92	87	82	75	74	76	74	71	71	68	61	63	64	68	70	79	88	91	92	93	78.1	93									
20-Jun	93	92	91	94	97	95	88	83	85	88	80	76	81	84	78	78	73	74	85	94	95	97	99	99	87.5	99									
21-Jun	99	99	99	100	100	100	100	100	100	99	98	98	98	95	92	89	92	92	91	91	95	95	96	97	96.4	100									
22-Jun	98	99	99	99	98	97	92	90	88	80	80	92	88	77	68	65	65	62	58	63	74	86	92	93	83.5	99									
23-Jun	95	96	97	98	98	98	92	86	80	75	73	70	63	52	60	70	64	80	92	93	96	97	98	99	84.3	99									
24-Jun	99	99	97	97	94	83	72	64	59	53	50	47	43	43	37	36	41	42	46	50	59	72	82	86	64.7	99									
25-Jun	87	90	93	96	97	93	87	67	60	56	52	45	42	39	38	36	81	94	94	92	96	98	99	99	76.3	99									
26-Jun	99	99	99	99	99	100	98	93	87	79	73	60	54	51	82	92	91	89	89	92	95	98	97	97	88.0	100									
27-Jun	99	99	99	99	99	93	90	89	82	79	72	66	56	62	62	65	63	65	69	71	76	90	94	96	80.8	99									
28-Jun	97	98	98	99	99	97	81	76	71	58	51	47	42	49	47	41	38	40	44	47	64	69	69	79	66.8	99									
29-Jun	84	89	93	94	89	80	73	62	56	49	42	34	35	33	34	34	33	32	32	35	41	43	49	55	54.2	94									
30-Jun	62	68	78	85	84	80	74	71	70	68	64	60	56	51	48	46	46	47	48	54	63	78	87	91	65.8	91									
85.1																	87.1																	Diurnal Average	
99																	99																	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Fort McKay South - June 2014





Maximum Speed: 16 km/h on Jun 3 18:00	Maximum Daily Speed Average: 9.8 km/h on Jun 3	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 1 04:00	Minimum Daily Speed Average: 0.6 km/h on Jun 20	Hours of Data: 720
Maximum Diurnal Speed Average: 2.7 km/h at hour 15	Minimum Diurnal Speed Average: 0.3 km/h at hour 7	Hours of Missing Data: 0
Monthly Average Velocity: 0.6 km/h 17.5 deg	Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 7 P ₉₀ = 10 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-Jun	N2	NW2	S3	SE0	E2	SE2	ESE5	SSE6	SSE5	SE4	SSE6	ESE4	SE7	ESE6	ENE5	NNE3	SSE5	S8	S7	SW8	S2	S3	WSW2	SSE2	SSE2.6	S8	
2-Jun	SW2	SW1	S3	SSW3	SSW2	SSW1	S3	S6	S6	SSW6	WSW7	SW8	WSW10	SW11	SSW11	NNW4	ENE2	N9	N8	N7	W2	W2	WSW2	W2	SW2.4	SW11	
3-Jun	NNW4	NNW3	NNW4	NNW5	NNW6	N6	N9	N10	N13	N14	N14	N16	N15	N12	N14	N15	NNW15	NNW16	N10	N10	N6	NNW7	NW7	NNW7	N9.8	NNW16	
4-Jun	NNW4	NW4	NNW5	NNW4	NNW5	NW4	NW3	WNW3	NNW2	NNW5	NNW7	N10	N10	N14	N14	N14	N14	N14	N13	N12	N10	N9	NNW10	NNW10	N8.2	N14	
5-Jun	NNW8	NNW11	NNW11	NNW11	N11	NNW10	N11	N11	N11	NNE12	N12	N13	NNE14	N13	N10	N10	NNW12	NNW11	NNW6	NNW6	WNW5	NW2	WNW3	W4	N9.1	NNE14	
6-Jun	WNW3	NW2	WSW1	W1	SW2	WSW3	NNW3	NNE4	N5	NNE5	NNE8	NNE7	NE6	NNE6	NNE7	NNE7	NNE8	NNE6	NNE5	NE3	ENE1	WSW1	W2	WNW2	NNE3.1	NNE8	
7-Jun	W2	SW3	NNW1	NW3	W2	NNW4	N2	NNE3	NNE6	NNW7	NNW5	NNE3	E3	NNW2	NNE8	NNW5	NW7	NW5	N5	WNW2	WNW3	SSW1	S2	SW3	NNW2.4	NNE8	
8-Jun	SSW2	S1	S2	SSE1	S3	S3	SE3	SSE3	S4	SSE6	S4	S8	S9	SSE9	S8	SSE6	SSE8	SE8	SE7	SE4	SSE3	SSE3	SSE4	SSE4	SSE4.5	SSE9	
9-Jun	SSE4	S5	S6	S6	S4	ESE2	NE2	NE2	ENE1	ESE3	ESE4	E3	ESE4	ESE7	ESE7	E7	E8	E8	E6	E5	NE2	E1	N2	NW2	ESE3.0	E8	
10-Jun	NNW4	NNW4	N5	NNW4	NW3	NNW4	NNW4	N7	NNE9	NNE10	N10	N11	N9	E4	ESE5	NNE6	NNE7	NE1	SSE1	SW3	SW5	WSW5	WSW6	WSW8	N3.1	N11	
11-Jun	WSW7	WSW8	WSW7	S2	S1	S3	SSE3	SSE4	S6	SSE6	SE8	SSE5	SE2	S11	ESE8	SSE7	ENE2	S6	S5	S5	SW2	SSW2	SW2	SSW2	S3.8	S11	
12-Jun	SSW2	S3	SSW2	SSW2	WSW1	S0	NNE2	N5	N8	N9	N10	N10	N11	N12	NNE11	NNE12	NNE13	N11	NNE11	NNE8	N6	NW3	NNW5	NNW4	N5.7	NNE13	
13-Jun	NW2	NW3	W2	WSW2	W2	NNW4	N4	N4	N4	NNE4	N1	E3	SSE4	E1	SSE3	SSW7	S6	SSE7	SSE7	SSE6	S4	S4	S4	SSW3	S1.1	SSE7	
14-Jun	S4	SSW1	S2	SSE1	WSW2	SSE2	SSE8	SSE7	SE7	SE8	SE9	SSE11	SSE10	SSE10	S12	S12	S11	S9	S9	S8	SSW6	SSW7	SSW7	SSW7	SSE6.6	S12	
15-Jun	S4	SSE3	SSW3	SW2	SW2	S2	SSE5	ESE5	ESE6	ESE6	SSE10	SSE9	SE7	ESE7	SE8	SSE8	SSE8	SSE7	SE7	SSE7	SSE3	WSW2	SW3	SSW2	SSE4.6	SSE10	
16-Jun	WSW2	SW1	SSW2	SW2	SW2	SW2	W1	N1	SE2	S6	SW5	N4	SSE3	ESE2	ENE5	ENE7	NE8	NNE9	NE6	NE6	ESE1	SSW5	SSW9	SSW5	ESE0.7	NNE9	
17-Jun	SW4	SSE2	S2	S3	SSW4	SSW3	S2	ESE2	S4	SE4	SE5	SE7	SE8	SE8	SE6	SSE7	SSE6	SSE5	S8	S4	SE2	S5	SSE4	SSE5	SSE4.1	SE8	
18-Jun	SSW2	SSW2	SSW3	S2	S2	NW0	SSE3	SSE8	SE6	SE7	SSE6	SSE11	SE10	SSE11	SSE11	SE11	SSE9	SSE10	SE7	SSE7	SSE5	SSE5	SSE5	S5	SSE5.9	SSE11	
19-Jun	S5	S5	S4	SW1	SW2	SSW2	SE2	ESE4	SE5	SE4	SSE2	SSE7	SE7	SE5	E3	NNE2	NNW3	NNW3	NNE3	W1	SW1	W1	SW1	W2	SSE1.7	SSE7	
20-Jun	WNW2	NNW4	NNW4	W1	SW2	NW2	NW1	NNE3	SSE2	NE4	ESE4	SE4	ENE4	NE3	E4	NE2	E4	SE4	S3	S3	SSW3	NW0	W3	WSW3	E0.6	SE4	
21-Jun	NE0	SW1	N2	NNW1	N2	N2	W2	NW3	NW3	NNW3	NNW3	N4	N4	NW4	WNW4	WNW3	WSW5	WNW5	WNW5	W4	WSW3	W3	WSW2	W3	WNW2.3	WNW5	
22-Jun	NNW2	W1	SW2	WSW6	WSW3	WSW5	NNW1	WSW3	WNW3	NW4	N8	NW3	NW4	NW6	NNW7	NNW8	N7	N5	N8	N7	NNW4	WNW1	NW3	W2	NW3.2	N8	
23-Jun	SSW2	SW2	S1	S1	S1	SSE1	E1	NNE1	NNE4	N3	NNE2	NE3	ENE3	SE6	NNE7	N8	E5	SE6	NNE2	N2	NNW1	WNW1	WNW1	WSW1	NE1.1	N8	
24-Jun	W1	SSE3	SSE4	S3	SSE4	SE4	SSE6	SE6	SE5	SE7	SE8	SE8	SE9	SSE9	SSE11	SSE10	SSE6	S7	SSE7	SSE8	SSE5	S3	SSW3	S3	SSE5.6	SSE11	
25-Jun	S5	S4	S3	S3	S2	S2	S3	SSE9	SSE9	SE9	SE10	SE9	SE9	SE9	SE11	SSE10	ESE6	SW11	NNW1	S2	SSE1	NW1	SW1	NNW1	SW1	SSE4.2	SW11
26-Jun	SSW1	SSW1	SW1	SW1	S1	SSW0	SW1	SW3	W2	SW3	WSW5	SW7	SW6	WSW5	ESE1	N2	WSW3	NW4	NW4	NNW3	NW2	WNW3	WNW4	NW1	WSW1.8	SW7	
27-Jun	WNW2	W1	WSW1	SW1	SW1	N1	NW2	NE0	SSE3	N1	NE3	NNW3	NNW4	ENE5	SE6	NNW1	NNW8	NNE11	N10	NNE6	N2	W2	WNW2	W1	N1.7	NNE11	
28-Jun	SW2	SW2	SW2	NW1	SSW2	SSE1	SE2	ENE3	NNE2	ENE3	NE6	NNE6	NNE7	N10	NNE10	NNE7	NNW8	N7	NNW7	N6	WNW2	WNW4	NW3	WNW3	N3.0	N10	
29-Jun	WNW3	SW2	WNW2	NW3	W3	WSW3	W2	NNW6	N8	N8	N10	N14	N14	NNW15	N14	N16	N16	N14	NNW12	NNW10	NW7	NW8	NW6	NW6	NNW7.7	N16	
30-Jun	NW5	WNW4	WNW2	WNW2	NW2	NW3	NNW7	N10	N8	N8	N10	N13	N12	N10	NNW10	N10	N10	N10	N9	NNW6	NW4	WNW2	SW2	SSW2	N6.0	N13	

WSW1.4WSW1.2WSW1.0 W1.1WSW0.9WNW0.7 NE0.3 NE1.0 ENE1.3 NE1.9 NE1.8 NE2.1 ENE2.0 ENE1.7 ENE2.7 NNE2.7 NNE2.1 NNE2.4 NNE1.9 N1.0WNW0.8WSW1.3WSW1.9WSW1.7
NNW8 NNW11 NNW11 NNW11 N11 NNW10 N11 N11 N13 N14 N14 N16 N15 NNW15 N14 N16 N16 NNW16 N13 N12 N10 NNW9 NNW10 NNW10

Diurnal Average
Diurnal Maximum

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

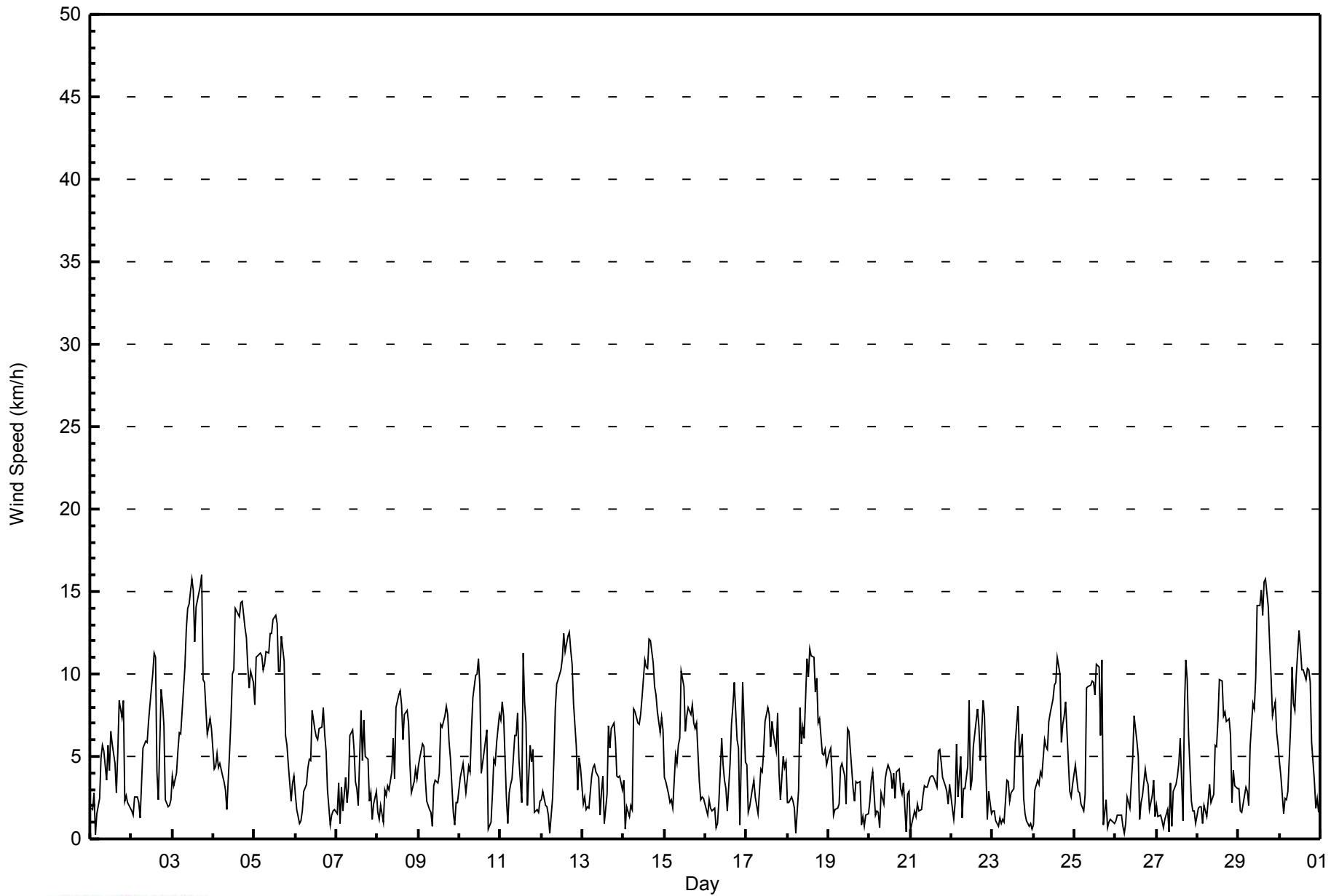


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Jun 25 17:00 Minimum Value: 0 km/h on Jun 15 23:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 5																		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Fort McKay South - June 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - June 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	439	60.97	60.97
6 - 11	243	33.75	94.72
12 - 19	38	5.28	100.00
20 - 28	0	0.00	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - June 2014

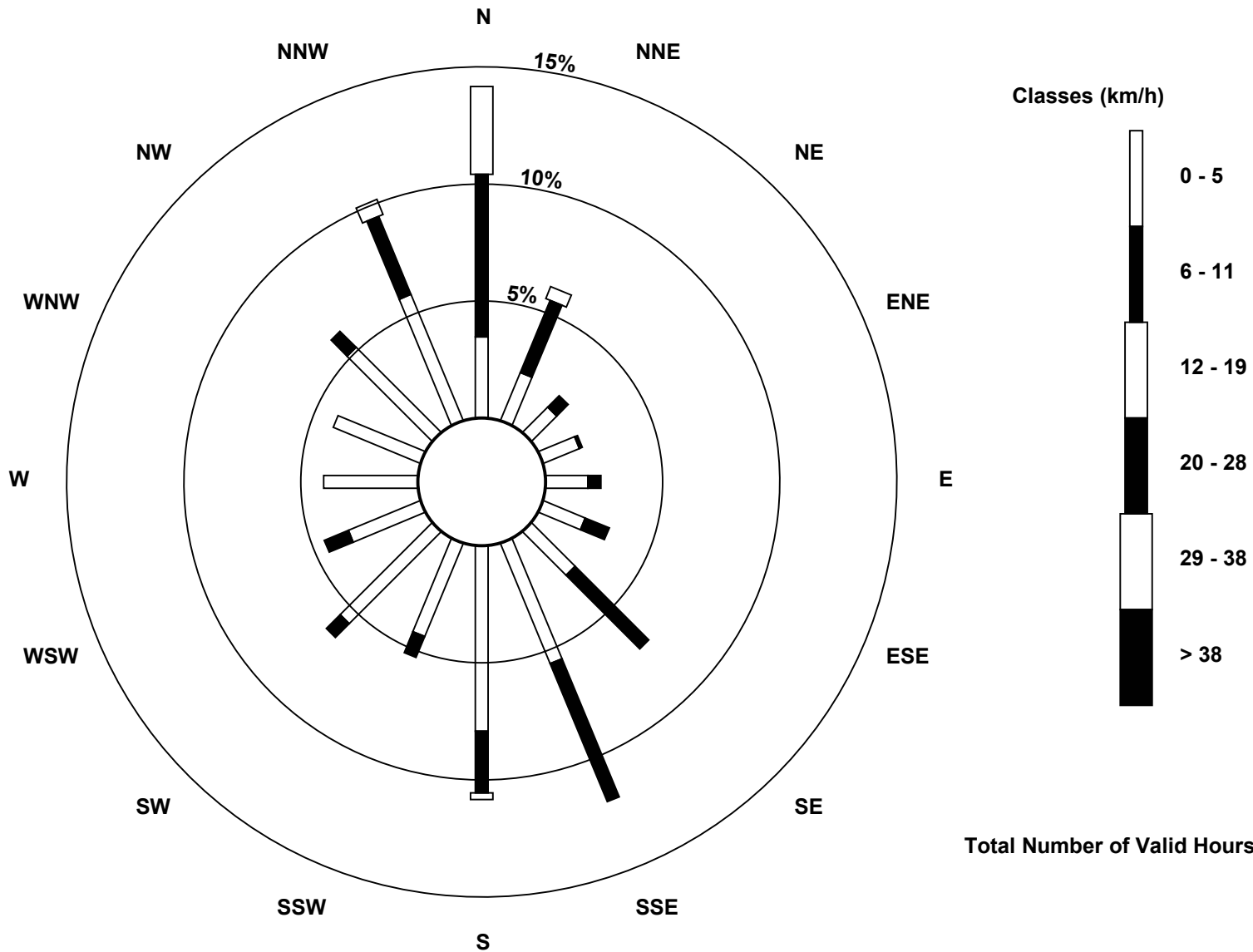
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	25	16	11	12	13	14	19	40	57	31	40	24	29	29	37	42	439
6 - 11	50	24	5	1	4	8	32	46	19	7	6	8	0	0	7	26	243
12 - 19	27	4	0	0	0	0	0	0	2	0	0	0	0	0	0	5	38
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	102	44	16	13	17	22	51	86	78	38	46	32	29	29	44	73	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Wind Speed (WS) - km/h
Fort McKay South (AMS 13)



Total Number of Valid Hours: 720



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort McKay South - June 2014

Direction of Maximum Speed: 344 deg on Jun 3 18:00 Direction of Maximum Daily Speed Average: 351.8 deg on Jun 3	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0
Direction of Minimum Speed: 140 deg on Jun 1 04:00 Direction of Minimum Daily Speed Average: 0.6 deg on Jun 20	Percent Operational Time: 100.0
Monthly Average Direction: 281.9 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-Jun	354	321	180	140	86	127	122	153	149	135	167	123	145	106	57	22	155	181	190	236	188	181	258	163	156.4
2-Jun	226	225	189	198	202	192	171	186	190	194	243	236	237	227	200	343	68	7	4	351	281	259	245	268	234.0
3-Jun	329	336	342	346	348	353	358	358	1	358	0	2	358	355	1	354	342	344	349	1	353	344	304	336	351.8
4-Jun	348	325	337	328	338	325	306	301	327	342	336	5	6	2	1	356	354	354	357	356	349	346	341	350.9	
5-Jun	336	348	346	346	352	346	349	355	6	13	6	3	12	6	358	349	346	348	345	335	298	312	293	280	351.7
6-Jun	300	314	248	269	216	244	329	20	358	16	23	22	45	18	21	31	23	27	25	39	72	255	264	301	12.3
7-Jun	267	214	329	317	264	331	355	13	19	347	334	26	97	345	16	341	323	325	355	289	283	207	180	227	338.1
8-Jun	207	175	183	162	182	171	136	147	171	159	175	179	169	164	178	164	160	130	134	142	155	156	166	159	161.3
9-Jun	158	178	176	180	174	122	49	46	58	112	122	88	106	116	111	96	96	93	89	81	42	91	354	326	112.5
10-Jun	329	346	0	338	322	328	340	4	25	15	9	2	2	96	119	25	27	50	160	221	232	246	245	242	354.1
11-Jun	237	241	245	189	170	171	158	159	169	160	144	151	144	174	115	161	64	176	170	178	221	208	217	201	176.9
12-Jun	202	184	201	209	243	178	31	8	358	359	353	358	359	1	20	14	19	9	16	25	3	324	334	328	3.7
13-Jun	305	320	273	256	279	342	8	353	7	13	4	80	152	85	163	192	180	160	168	168	171	190	187	196	180.2
14-Jun	181	213	174	162	253	167	158	153	148	135	131	129	154	155	153	175	170	170	177	174	183	194	200	204	165.5
15-Jun	171	166	206	231	228	174	157	121	112	121	149	153	127	120	128	154	160	152	141	150	166	238	229	197	150.8
16-Jun	242	227	209	217	228	227	267	10	133	170	215	358	168	115	69	62	39	32	38	45	112	202	209	192	118.0
17-Jun	230	162	190	175	198	213	173	110	170	139	127	138	144	132	138	153	164	155	173	184	144	170	159	161	158.8
18-Jun	206	208	198	188	182	308	159	162	133	128	155	150	146	153	148	134	147	148	146	159	151	168	164	174	153.2
19-Jun	178	182	177	221	221	192	132	121	137	136	152	152	135	139	94	31	334	331	12	276	220	262	230	272	153.6
20-Jun	303	341	338	273	220	325	323	27	166	56	110	146	60	46	88	56	85	125	184	175	199	326	261	246	91.7
21-Jun	40	223	2	344	351	352	263	312	306	341	336	4	357	323	302	301	242	292	285	279	252	272	256	273	302.5
22-Jun	345	265	216	243	254	245	338	238	293	314	3	323	304	314	342	341	352	351	6	359	341	302	323	275	325.2
23-Jun	209	226	179	177	184	157	91	27	18	8	23	36	67	146	32	10	101	132	12	5	337	291	291	247	55.7
24-Jun	270	161	163	177	153	137	154	144	126	143	137	125	139	157	150	155	156	174	161	164	157	170	204	178	153.0
25-Jun	177	172	175	189	191	189	169	160	155	130	134	145	132	143	154	113	222	342	170	149	314	229	335	233	156.6
26-Jun	206	211	217	220	185	198	236	216	264	227	238	221	222	239	104	358	242	312	326	334	305	300	297	314	255.1
27-Jun	287	278	246	232	217	350	323	45	162	5	48	336	348	76	133	336	332	15	10	26	9	273	295	280	3.5
28-Jun	229	214	218	324	203	167	131	61	12	64	38	27	26	4	18	17	337	3	344	356	290	285	322	292	1.5
29-Jun	293	223	282	304	281	250	279	342	355	6	352	359	352	345	353	350	353	359	348	338	326	326	311	314	342.7
30-Jun	307	291	290	299	312	314	330	356	9	4	349	359	7	6	345	1	4	359	359	337	318	285	229	202	348.8

257.4 249.7 242.3 260.4 258.6 288.8 41.1 51.4 56.6 52.9 39.0 48.1 61.8 75.0 65.8 33.3 16.0 24.6 22.1 7.0 283.3 255.8 256.9 251.9

Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Fort McKay South - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Jun 13 11:00	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0
Minimum Value: 8 deg on Jun 15 23:00	
Percentiles: P ₁ = 14 P ₁₀ = 24 Q ₁ = 29 Median = 36 Q ₃ = 51 P ₉₀ = 70 P ₉₉ = 97	

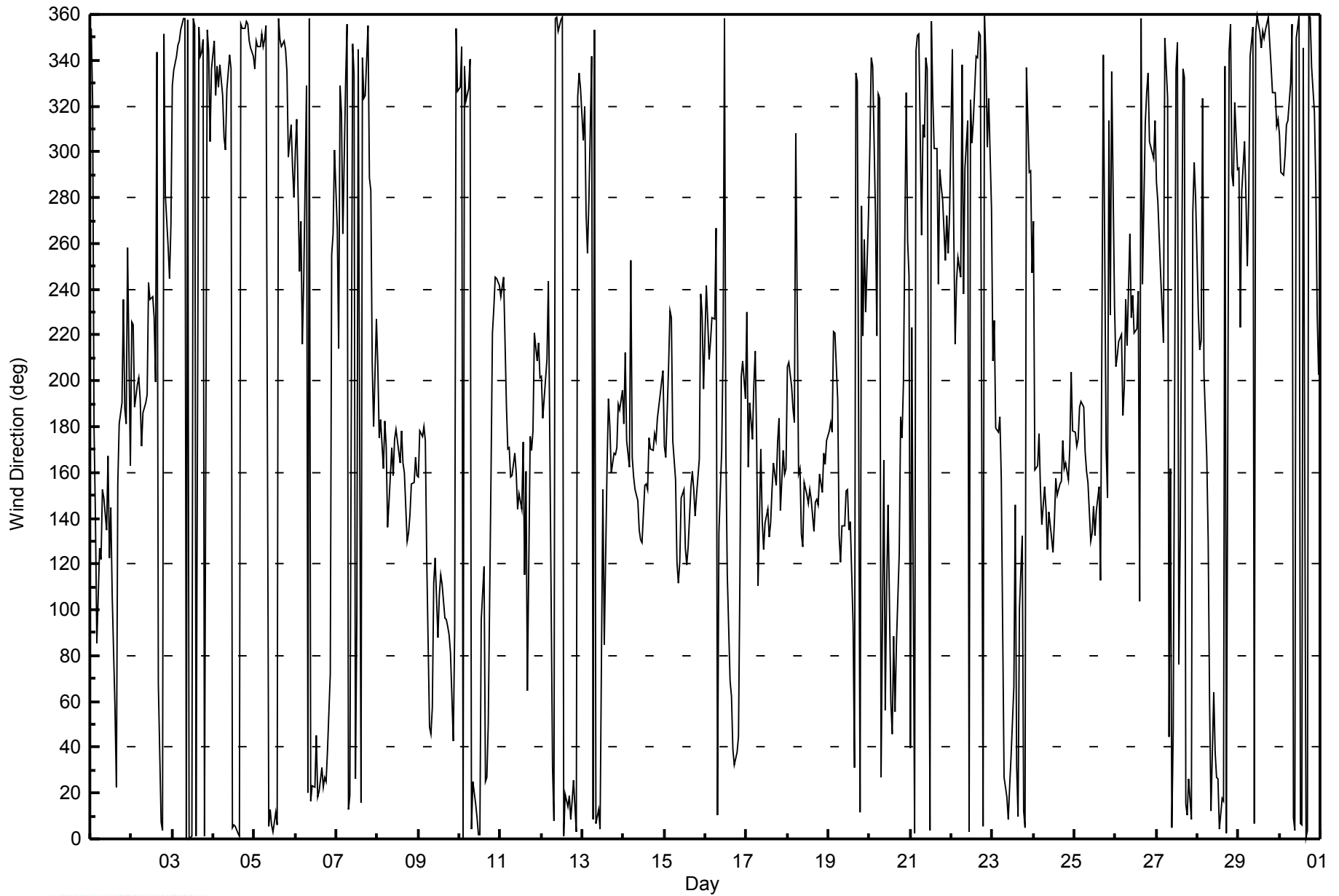
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	51	82	42	97	71	53	36	34	36	51	37	47	52	48	52	81	57	39	33	22	57	65	43	38	97
2-Jun	67	67	33	31	53	73	19	26	37	35	40	41	33	33	30	84	67	28	26	35	47	20	36	26	84
3-Jun	22	15	17	15	19	21	26	28	25	27	28	28	27	28	26	28	31	31	32	27	27	32	34	32	34
4-Jun	32	36	32	29	30	29	38	37	65	34	32	26	28	27	29	27	27	27	29	27	27	26	28	28	65
5-Jun	30	25	26	27	25	27	27	30	29	32	30	29	31	30	32	31	30	31	35	31	34	49	32	32	49
6-Jun	50	50	83	79	37	29	58	49	65	56	34	61	63	58	52	41	39	48	30	32	53	34	32	45	83
7-Jun	56	24	93	31	51	22	57	46	28	27	33	66	95	93	39	53	47	43	39	35	20	61	30	30	95
8-Jun	73	76	66	70	21	28	33	58	65	53	74	42	48	46	47	62	38	32	33	25	19	21	19	21	76
9-Jun	22	26	21	22	20	39	56	81	93	47	38	46	51	42	45	48	49	46	50	43	71	94	66	45	94
10-Jun	18	26	21	17	24	29	41	39	35	35	37	32	42	71	59	53	45	102	90	20	12	13	13	15	102
11-Jun	17	20	27	51	87	27	31	28	38	35	38	51	84	28	49	59	82	28	28	22	48	48	56	27	87
12-Jun	28	34	30	55	78	91	32	32	30	29	27	32	33	29	33	31	32	30	35	34	25	20	14	14	91
13-Jun	66	37	27	42	32	25	34	57	79	89	102	86	82	97	96	54	61	43	33	25	25	16	13	19	102
14-Jun	17	67	36	28	45	58	26	31	38	45	44	45	41	37	35	31	29	25	22	28	19	17	18	17	67
15-Jun	35	31	28	26	28	69	29	43	38	41	37	43	56	50	42	48	38	36	36	32	29	12	8	27	69
16-Jun	30	50	35	35	31	15	62	87	60	44	68	59	80	97	68	50	43	37	43	41	78	31	28	26	97
17-Jun	33	73	68	24	25	68	72	81	26	41	32	34	37	38	56	50	41	37	27	25	27	32	25	24	81
18-Jun	42	27	17	20	51	95	53	32	46	43	33	33	33	31	35	34	32	32	36	27	26	22	23	19	95
19-Jun	17	18	19	51	27	46	47	33	33	32	70	31	36	42	64	59	33	32	30	64	33	71	19	31	71
20-Jun	32	17	17	45	40	31	81	54	70	48	45	46	45	53	61	68	40	36	32	35	25	79	29	74	81
21-Jun	57	69	54	52	62	62	44	39	35	37	32	29	37	40	40	43	29	37	36	29	23	32	43	35	69
22-Jun	37	74	45	21	69	37	80	30	51	40	30	46	52	48	32	36	34	51	26	26	19	66	19	53	80
23-Jun	29	33	85	95	64	69	64	73	42	52	63	82	80	62	49	38	59	39	71	35	64	54	56	72	95
24-Jun	55	28	25	24	20	52	33	39	43	36	39	39	39	34	34	36	39	36	26	31	28	26	23	25	55
25-Jun	15	16	16	14	47	62	29	28	30	35	35	37	41	38	35	40	43	93	45	77	75	49	46	80	93
26-Jun	75	50	52	24	55	87	94	41	63	47	53	49	56	55	101	64	41	38	35	28	31	23	31	61	101
27-Jun	32	51	32	39	63	59	48	80	36	101	45	64	60	40	35	98	45	29	27	32	60	26	66	71	101
28-Jun	50	27	46	84	30	44	35	43	80	86	46	55	44	35	34	36	44	31	30	28	29	33	37	24	86
29-Jun	24	50	61	18	38	37	63	32	28	29	31	31	33	31	33	31	30	30	28	29	26	27	28	28	63
30-Jun	30	35	74	35	43	45	33	29	39	41	37	29	30	33	36	34	28	28	25	28	29	24	37	32	74

75	82	93	97	87	95	94	87	93	101	102	86	95	97	101	98	82	102	90	77	78	94	66	80	
Diurnal Maximum																								



WBEA
Hourly Averages

Wind Direction (WD) - deg
Fort McKay South - June 2014





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 13, 2014	Previous Calibration	May 20, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:05	End Time (MST)	15:00
Barometric Pressure	735 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	25	29
Analyzer Range (mv)	5000	5000	Lamp voltage	2355	2395
Calculated slope	0.994612	0.996148	Chamber temp.	50.0	50.0
Calculated intercept	1.883802	1.672407	Pressure ("Hg)	26.1	26.1
Analyzer Background	26.0	26.0	Flow (lpm)	673	672
Analyzer Coefficient	1.608	1.608	Intensity	80	80

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	-0.2	NA
as found span	5000	78.9	806.4	805.6	1.001
calibrator zero	5000	0.0	0.0	-0.4	0.000
high point	5000	78.9	806.4	808.8	0.997
second point	5000	39.4	402.7	400.9	1.004
third point	5000	19.7	201.3	199.9	1.007
calibrator zero					
as left zero	5000	0.0	0.0	-0.2	NA
as left span	5000	78.9	806.4	803.8	NA
Average Correction Factor					1.003

Corrected As found	805.8	Previous response	808.8	% change	0.4%
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Notes:

No adjustments. Filter changed during As Lefts

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

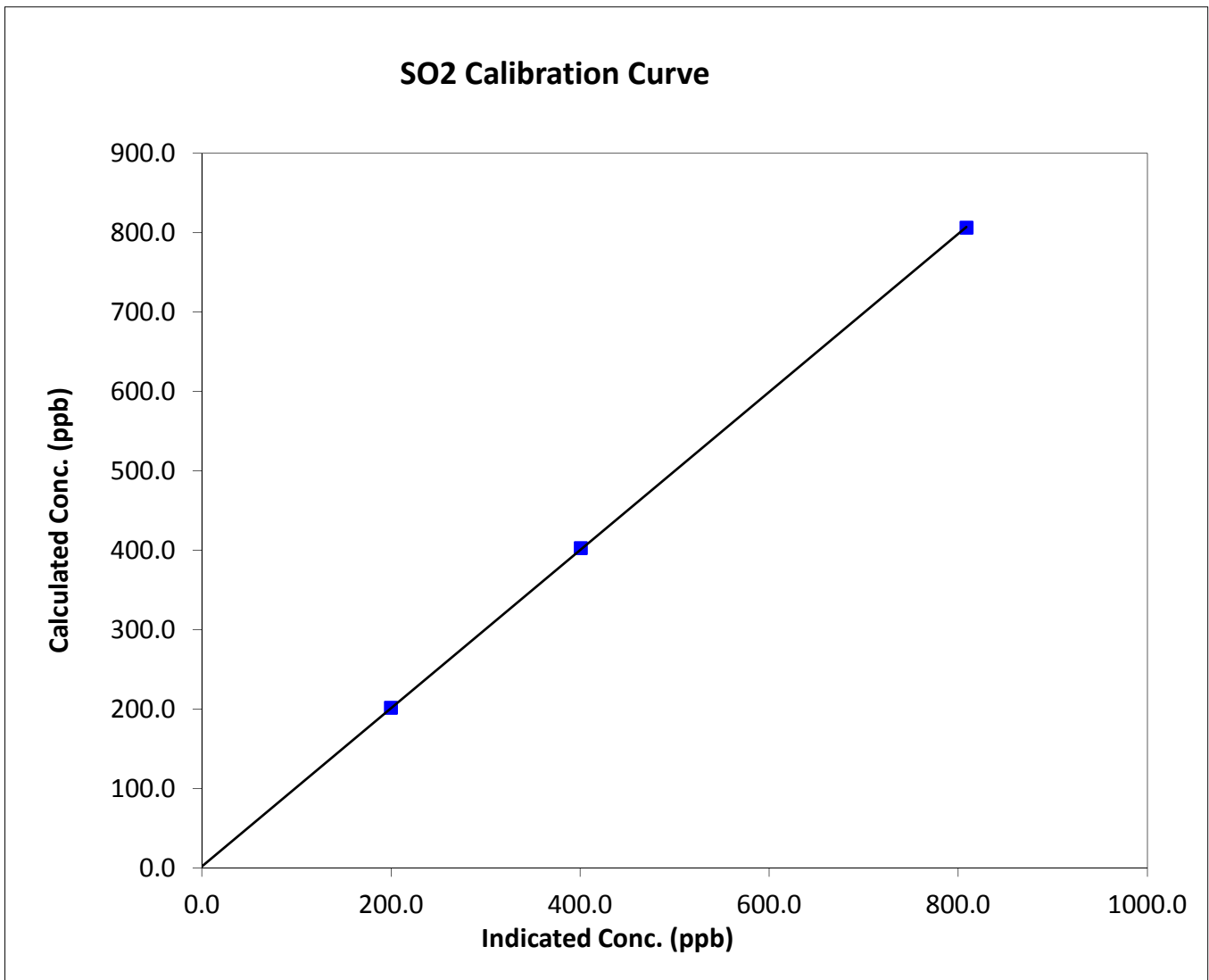
SO₂ Calibration Summary

Station Information

Calibration Date	June 13, 2014	Previous Calibration	May 20, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:05	End Time (MST)	15:00
Analyzer make	API T100	Analyzer serial #	599

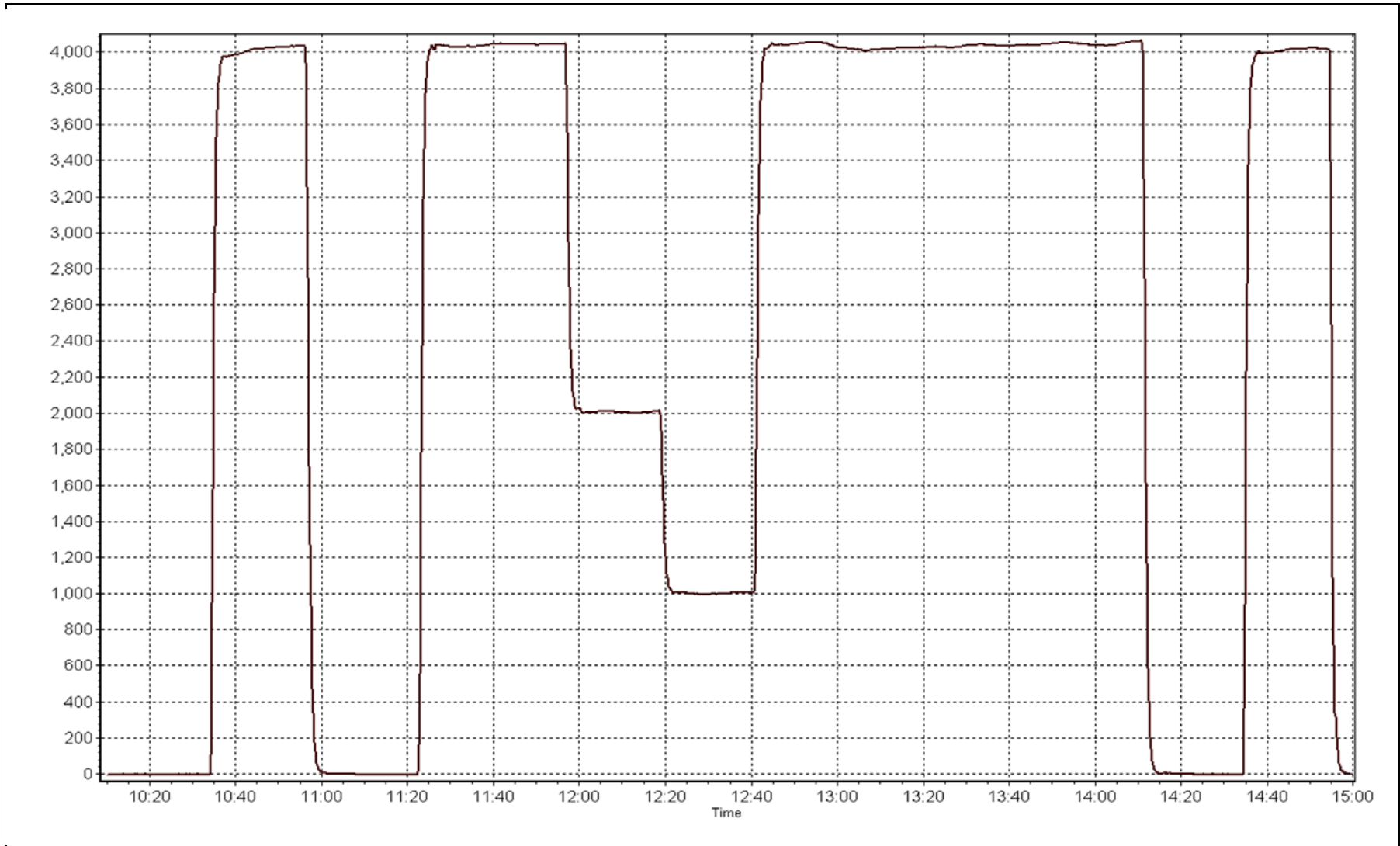
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999985
806.4	808.8	0.9970		
402.7	400.9	1.0045	Slope	0.996148
201.3	199.9	1.0072		
			Intercept	1.672407



SO2 Calibration Plot

Date: June 13, 2014



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Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	June 10, 2014	Previous Calibration	May 16, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	12:39
Barometric Pressure	734 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	1000	1000
Calculated slope	1.002228	1.006821	Chamber temp.	45	45
Calculated intercept	-0.124576	-0.236227	Pressure	685.3	685.3
Analyzer Background	1.81	1.81	Flow	0.432	0.432
Analyzer Coefficient	1.023	1.023	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	79.7	1.005
SO2 scrubber check	5000	39.4	402.7	0.5	NA
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	38.5	80.1	79.7	1.005
second point	5000	19.2	39.9	40.2	0.995
third point	5000	9.6	20.0	20.0	0.998
calibrator zero					
as left zero	5000	0.0	0.0	0.2	NA
as left span	4000	30.8	80.1	80.3	0.997
Average Correction Factor					0.999

Corrected As found	79.5	Previous response	80.0	% change	0.7%
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Notes:

No adjustments. As Found used as Calibrator Zero and High Point.

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

TRS Calibration Summary

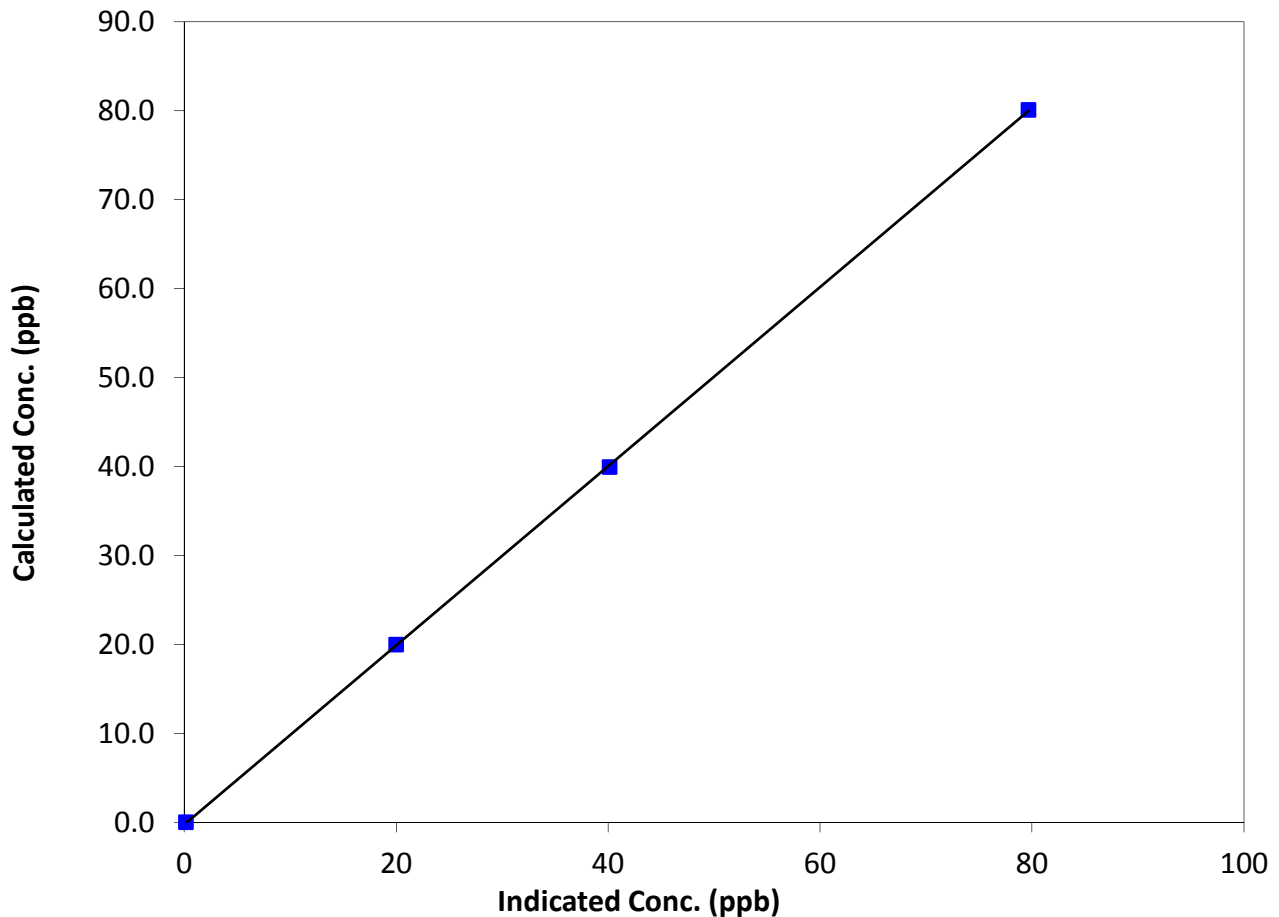
Station Information

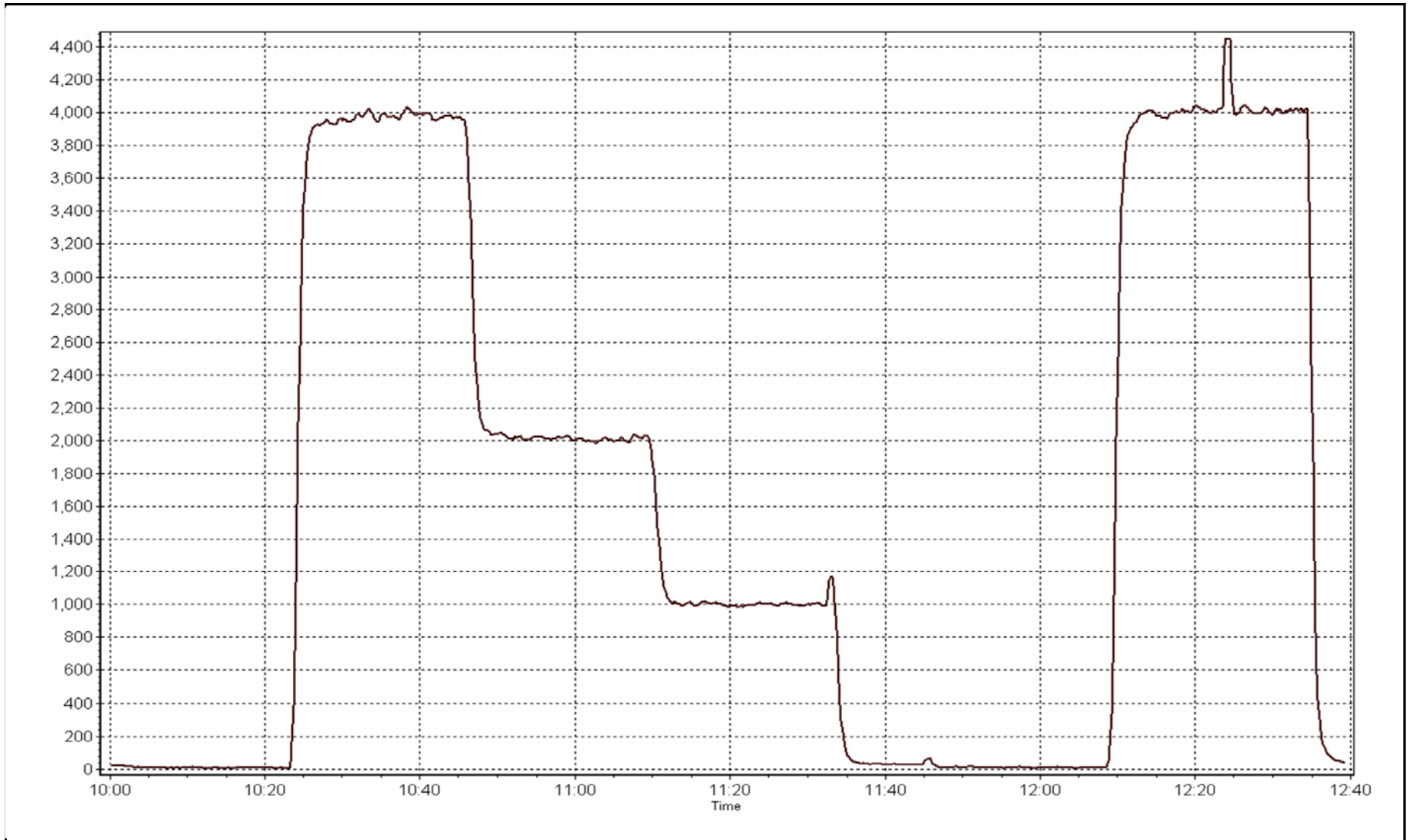
Calibration Date	June 10, 2014	Previous Calibration	May 16, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:00	End Time (MST)	12:39
Analyzer make	TEI 43i-TLE	Analyzer serial #	1218153359

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999975
80.1	79.7	1.0053		
39.9	40.2	0.9946	Slope	1.006821
20.0	20.0	0.9985		
			Intercept	-0.236227

TRS Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Friday, June 13, 2014	Previous Calibration	Tuesday, May 20, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:05	End Time (MST)	15:00
Barometric Pressure	735 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	1.014057	1.002942	Fuel Pressure	22.6	22.6
Calculated intercept	-0.046295	-0.043983			
BKG	2.4	2.5			
COEF	4.706	4.773			

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	0.12	N/A
as found span	5000	78.9	16.98	16.82	1.009
calibrator zero	5000	0.0	0.00	0.06	N/A
high point	5000	78.9	16.98	17.00	0.999
second point	5000	39.4	8.48	8.43	1.006
third point	5000	19.7	4.24	4.30	0.986
calibrator zero					
as left zero	5000	0.0	0.00	0.06	N/A
as left span	5000	78.9	16.98	17.05	0.996
Average Correction Factor					0.997

Corrected As found: 16.70 Previous response: 16.79 % change: 0.5%

Notes:

Hydrogen changed after As Finds. Small adjustments to both zero and span. Filter changed during As Lefts

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

THC Calibration Summary

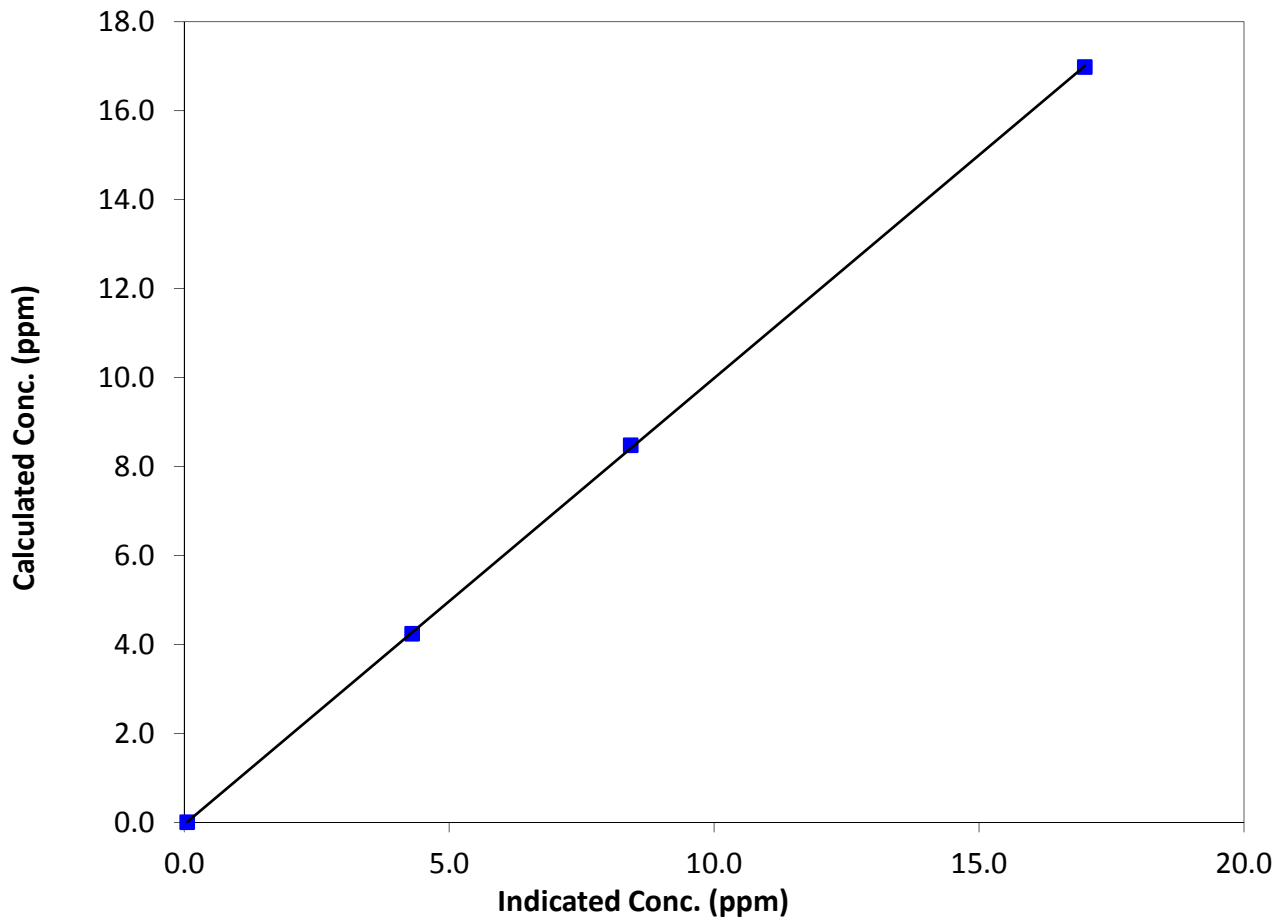
Station Information

Calibration Date	June 13, 2014	Previous Calibration	May 20, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:05	End Time (MST)	15:00
Analyzer make	Thermo Model 51iLT	Analyzer serial #	1236656114

Calibration Data

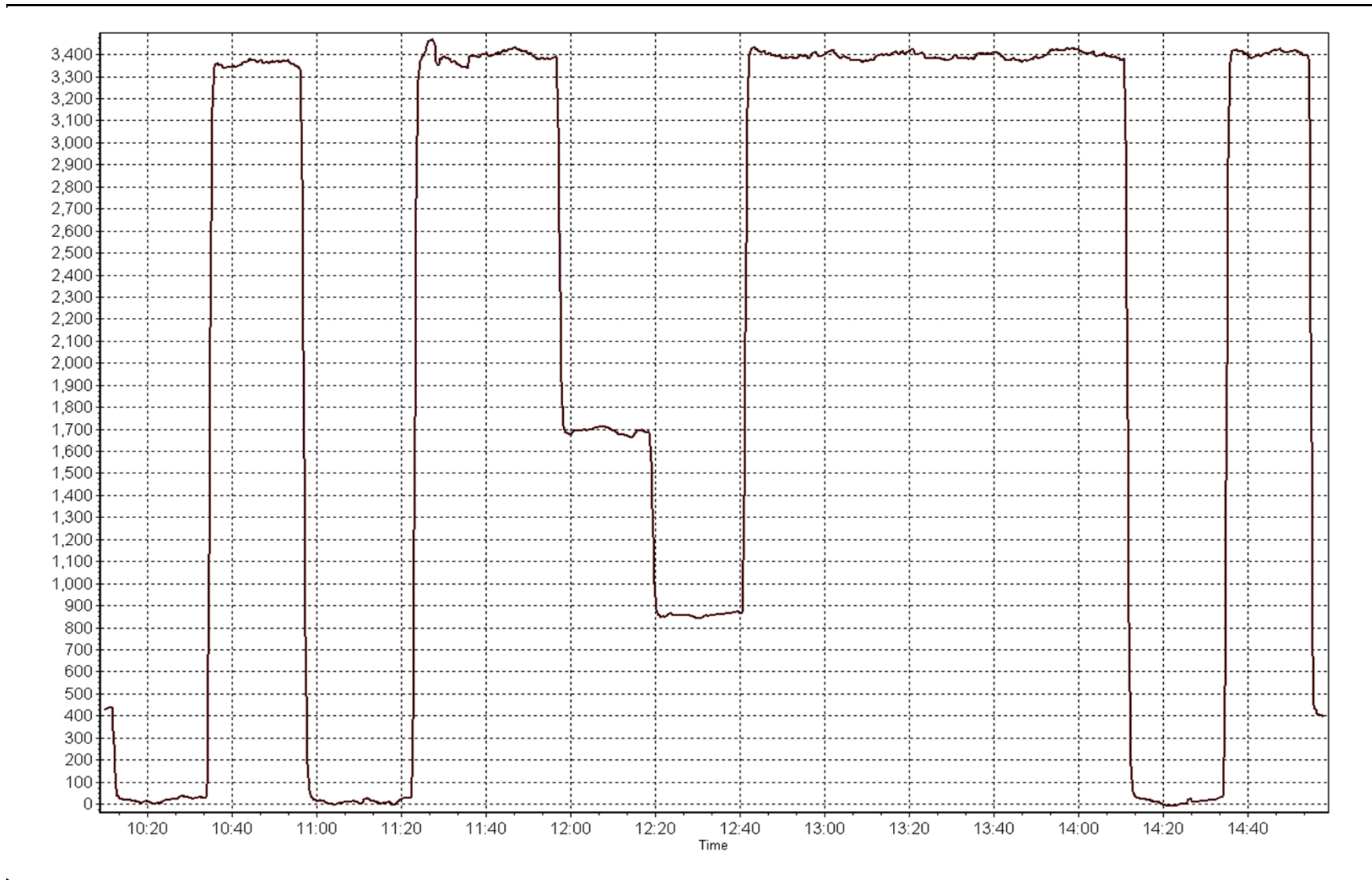
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.06	N/A	Correlation Coefficient	0.999958
16.98	17.00	0.9988		
8.48	8.43	1.0060	Slope	1.002942
4.24	4.30	0.9857		
			Intercept	-0.043983

THC Calibration Curve



THC Calibration Plot

Date: June 13, 2014





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	June 13, 2014	Previous Calibration	May 21, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	14:57	End Time (MST)	17:23
Barometric Pressure	734 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
NO2 calibration used	Friday, June 13, 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.	29.0	27.4
Analyzer Range (input)	5000	500	Lamp temp.	58.0	58.0
Calculated slope	0.999961	0.995642	Pressure ("Hg)	26.4	26.3
Calculated intercept	0.619074	0.022034	Flow cell A	703	703
Analyzer Background	-1.1	-1.1			
Analyzer Coefficient	1.025	1.025			

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	-0.2	N/A
as found span	5000	0.903	357.4	358.7	0.996
calibrator zero	5000	0.00	0.0	-0.2	N/A
high point	5000	0.903	357.4	358.7	0.996
second point	5000	0.585	212.2	213.5	0.994
third point	5000	0.358	111.8	112.3	0.996
calibrator zero					
as left zero	5000	0.00	0.0	0.3	N/A
as left span	5000	0.903	357.4	353.8	1.010
Average Correction Factor					0.995

Corrected As found 358.9 Previous response 356.8 % change -0.6%

Notes:

No adjustments required. Filter changed during As Lefts

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

O₃ Calibration Summary

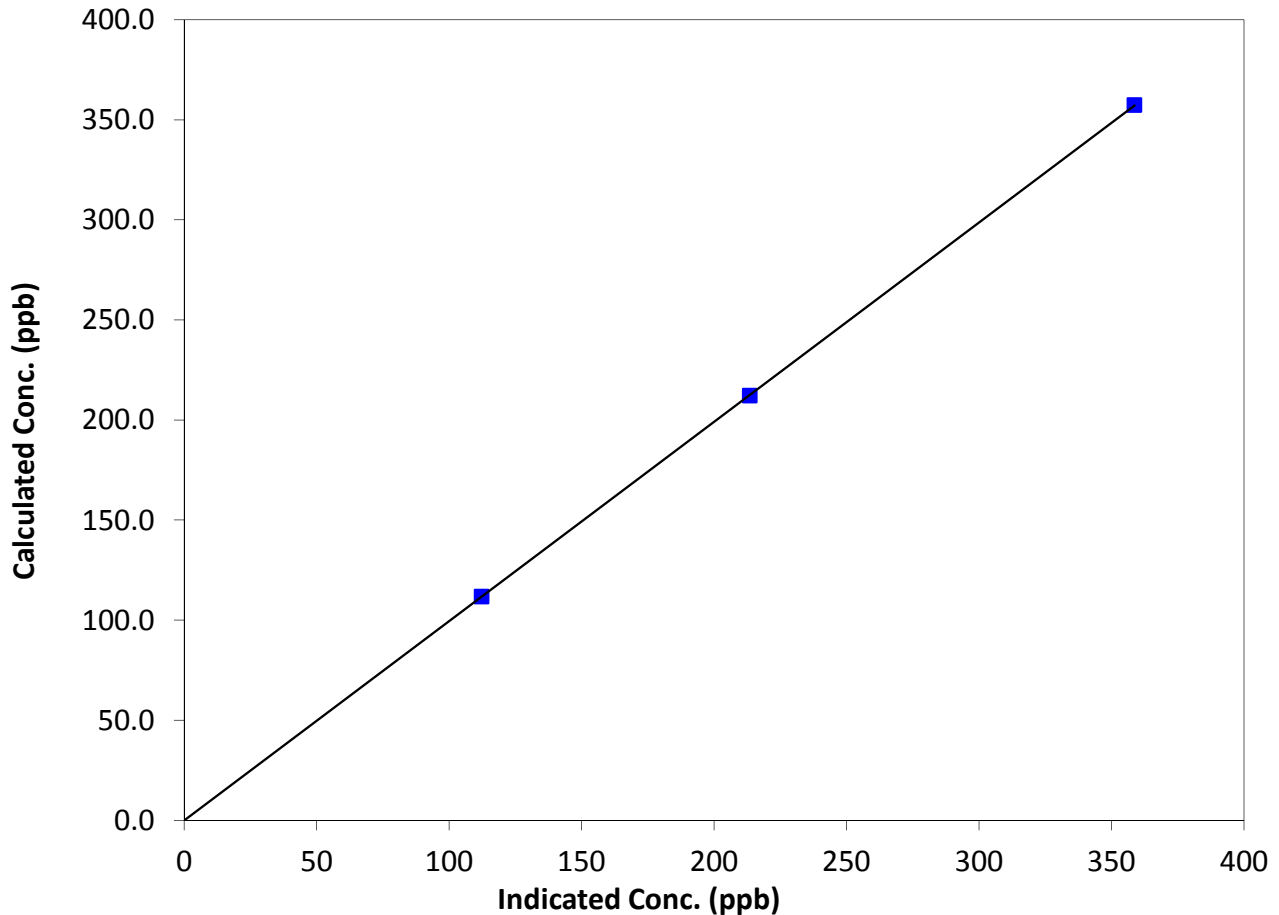
Station Information

Calibration Date	Friday, June 13, 2014	Previous Calibration	May 21, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	14:57	End Time (MST)	17:23
Analyzer make	API T400	Analyzer serial #	825

Calibration Data

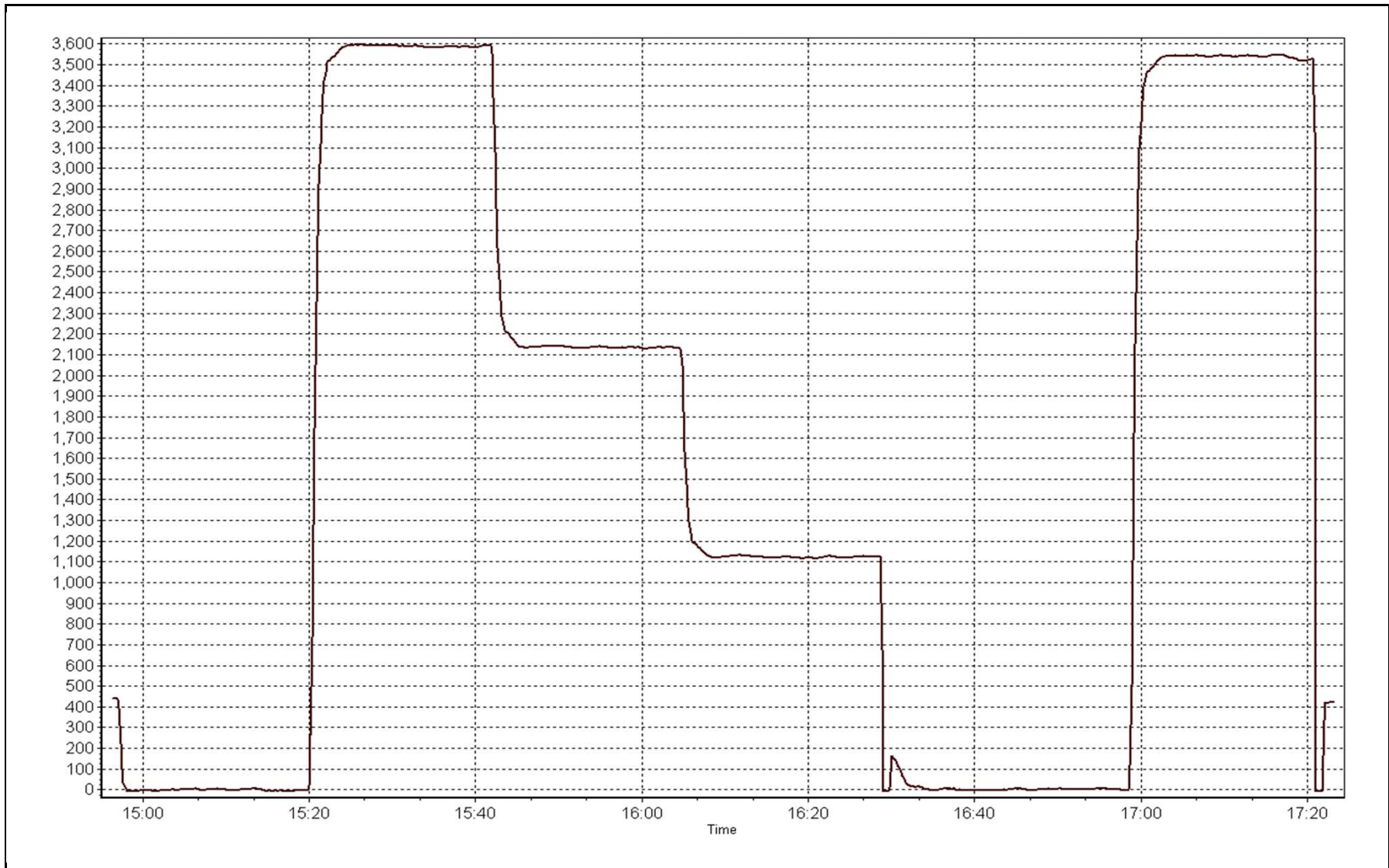
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999996
357.4	358.7	0.9964		
212.2	213.5	0.9938	Slope	0.995642
111.8	112.3	0.9960		
			Intercept	0.022034

O₃ Calibration Curve



O3 Calibration Plot

Date: June 13, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	June 13, 2014	Previous Calibration	May 20, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	10:05	End Time (MST)	15:00
Barometric Pressure	734 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
NO _x Cal Gas Conc	50.8 ppm	Cal Gas Serial #	LL107918

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	3492
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Parameter		NO _x	NO	NO ₂
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.996821	0.996803	0.995418
	Data Offset	2.062689	1.872155	0.246492
After	Data Slope	0.996616	0.995599	0.996418
	Data Offset	1.767564	1.890060	-0.251535
Channel #		3	2	1
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model	Thermo 42C	Analyzer serial #	2185
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.866	ppb	0.866	ppb
NO _x coefficient	1.001	ppb	1.001	ppb
NO ₂ coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	4.4		4.2	
NO _x bkgrnd	4.4		4.3	
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
O ₃ flow	ok	ccm	ok	ccm
R Cell Press	198.9	mmHg	198.4	mmHg
Sample Flow	0.816	ccm	0.813	ccm

Notes:

Zero with small adjustment. Filter changed during As Left



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

June 13, 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	0.1	0.0	-0.1	N/A	N/A
as found span	5000	78.9	801.6	800.0	1.6	803.1	801.1	2.3	0.9981	0.9987
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	-0.1	N/A	N/A
high point	5000	78.9	801.6	800.0	1.6	803.7	802.9	1.3	0.9974	0.9965
second point	5000	39.4	400.3	399.5	0.8	398.2	397.6	0.6	1.0052	1.0047
third point	5000	19.7	200.2	199.8	0.4	197.8	197.4	0.3	1.0121	1.0119
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	-0.1	N/A	N/A
as left span	5000	78.9	801.6	445.7	356.0	809.7	453.9	356.1	0.9901	0.9819
Average Correction Factor									1.0049	1.0044

Corrected As found NO_x= 803.1 NO= 801.1 Percent Change NO_x= -0.1% NO= 0.0%
 Previous Response NO_x= 802.1 NO= 800.7

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	445.7	357.4	804.1	445.7	358.7	0.9815	1.0000	0.9963	100.4%
2nd NO ₂ (200)	N/A	590.8	212.2	803.7	590.8	213.3	0.9820	1.0000	0.9950	100.5%
3rd NO ₂ (100)	N/A	691.2	111.8	803.8	691.2	113.0	0.9819	1.0000	0.9894	101.1%
4th NO ₂ (0)	803.1	N/A	0.8	803.9	803.1	1.2	0.9817	1.0000	N/A	N/A
Average Correction Factor							0.9817	1.0000	0.9936	100.6%

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

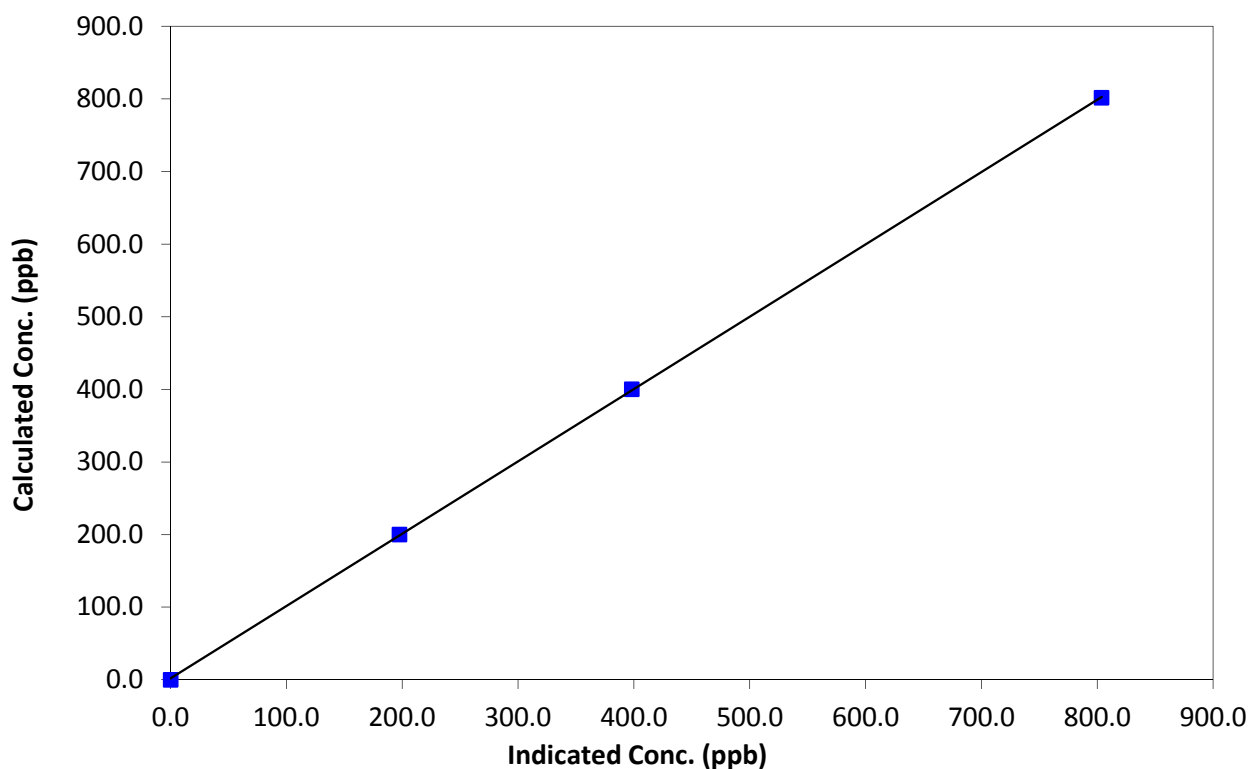
Station Information

Calibration Date	June 13, 2014	Previous Calibration	May 20, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:05	End Time (MST)	15:00
Analyzer make	Thermo 42C	Analyzer serial #	2185

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999974
801.6	803.7	0.9974		
400.3	398.2	1.0052	Slope	0.996616
200.2	197.8	1.0121		
			Intercept	1.767564

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

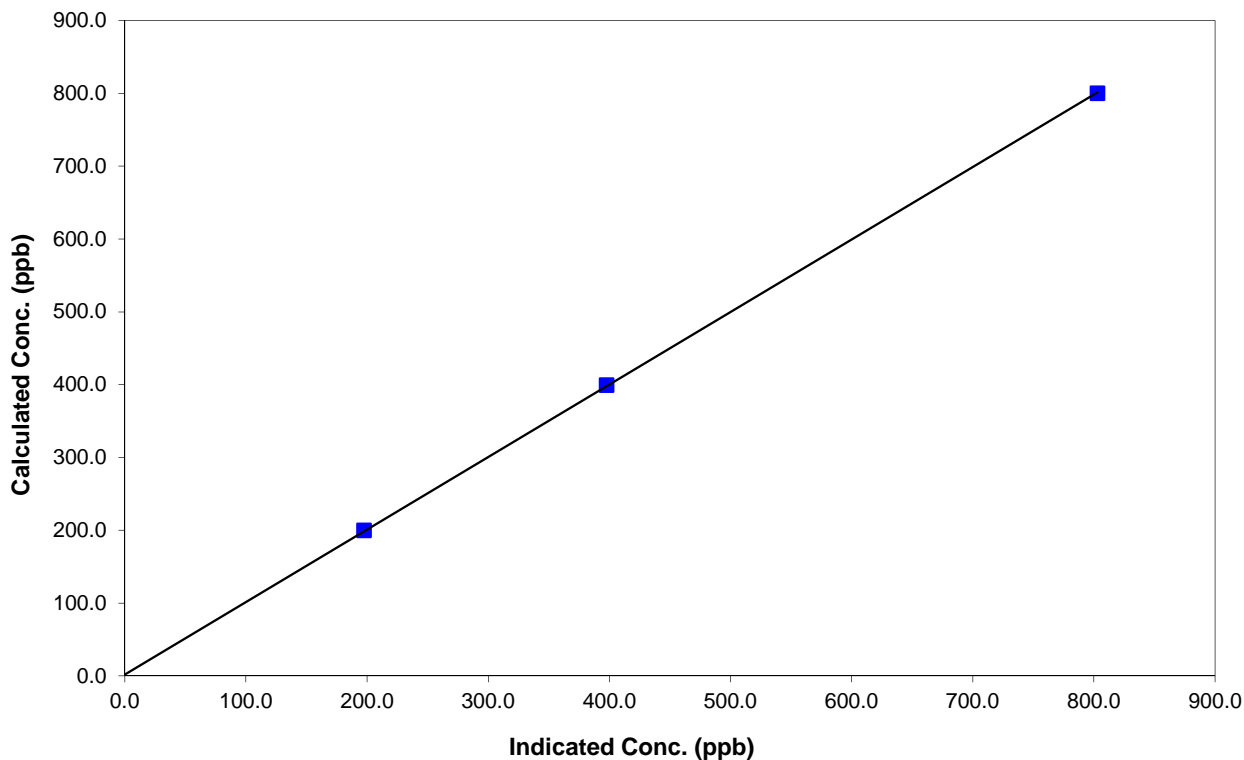
Station Information

Calibration Date	June 13, 2014	Previous Calibration	May 20, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:05	End Time (MST)	15:00
Analyzer make	Thermo 42C	Analyzer serial #	2185

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999972
800.0	802.9	0.9965		
399.5	397.6	1.0047	Slope	0.995599
199.8	197.4	1.0119		
			Intercept	1.890060

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

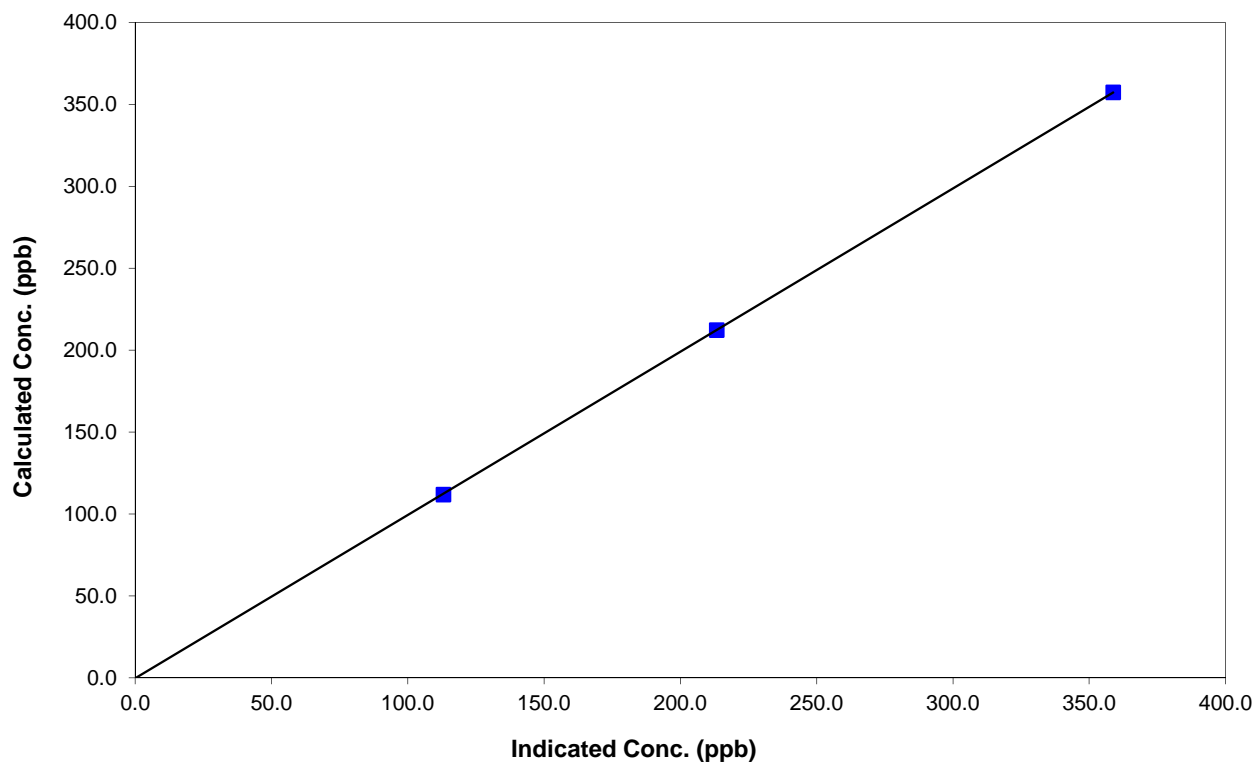
Station Information

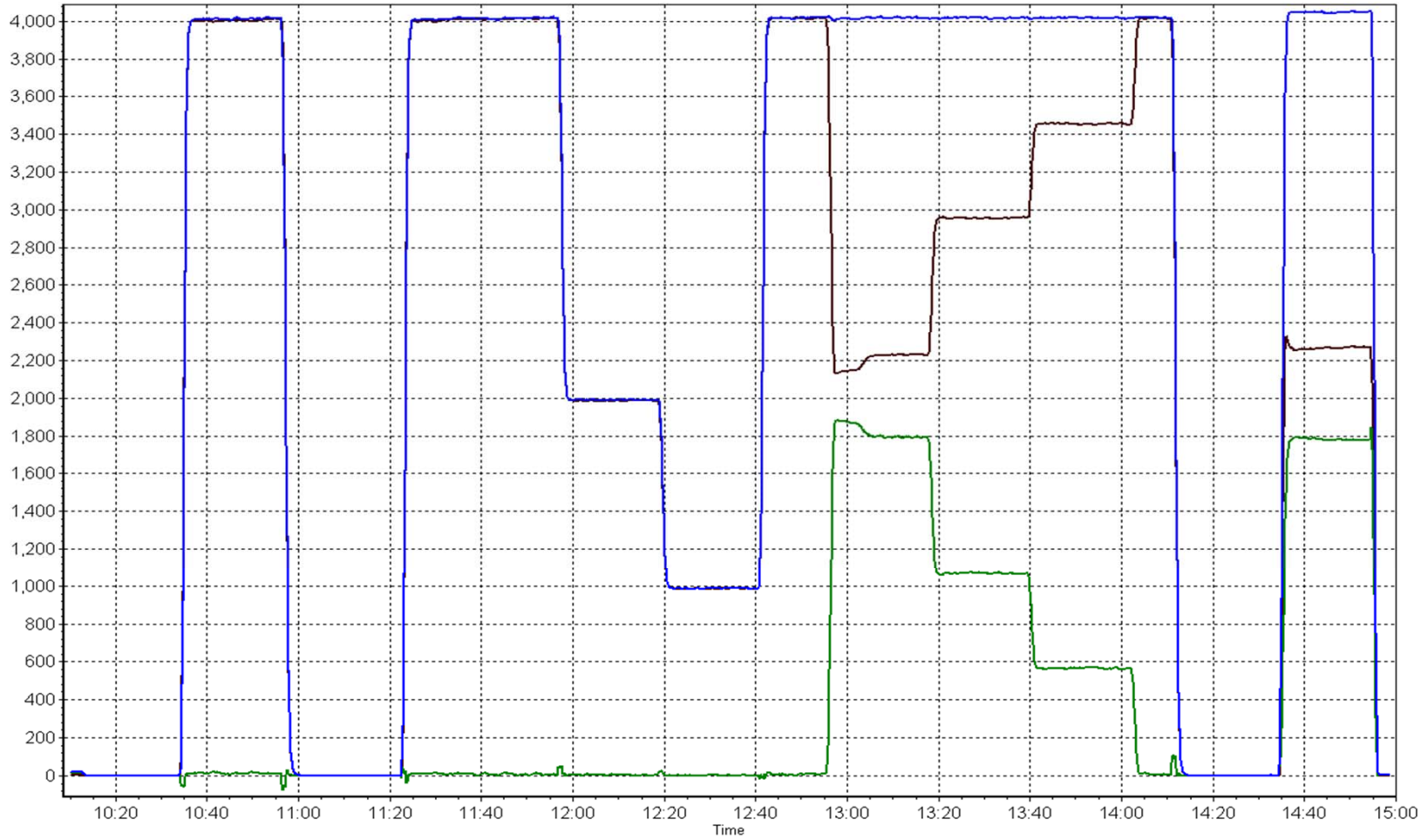
Calibration Date	June 13, 2014	Previous Calibration	May 20, 2014
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:05	End Time (MST)	15:00
Analyzer make	Thermo 42C	Analyzer serial #	2185

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999993
357.4	358.7	0.9963		
212.2	213.3	0.9950	Slope	0.996418
111.8	113.0	0.9894		
			Intercept	-0.251535

NO₂ Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 14
ANZAC
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)

JUNE 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	32	34	99.72	14	0	3	0
TRS(ppb) Average	685	35	35	100.00	2	0	0	0
THC(ppm) Average	684	34	36	99.72	2.3	-	2	-
NMHC(ppm) Average	684	34	36	99.72	0.457	-	0.102	-
CH4(ppm) Average	684	34	36	99.72	2.2	-	1.9	-
NO2(ppb) Average	683	36	37	99.86	13	0	3	-
NO(ppb) Average	683	36	37	99.86	15	-	2	-
NOX(ppb) Average	683	36	37	99.86	27	-	4	-
O3(ppb) Average	678	37	42	99.31	64	0	36	-
PM2.5(ug/m3) Average	706	0	14	98.06	46.6	-	27.6	0
Temperature 2 m (C) Average	720	0	0	100.00	26.2	-	20.1	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	-	-
Surface Wetness (% of range) Average	718	0	2	99.72	47	-	-	-
Wind Speed 10 m (km/h) Average	683	0	37	94.86	17	-	-	-
Wind Direction 10 m (deg) Average	683	0	37	94.86	-	-	-	-
Precipitation (mm) Total	720	0	0	100.00	4.1	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
 JUNE 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	0.3	1	-	0	0	0	0	0	1	14
TRS(ppb) Average	685	0.2	0	-	0	0	0	0	0	0	2
THC(ppm) Average	684	1.87	0.1	-	1.8	1.8	1.8	1.8	1.9	2	2.3
NMHC (ppm) Average	684	0.037	0.041	-	0	0	0	0	0.1	0.1	0.457
CH4(ppm) Average	684	1.83	0	-	1.8	1.8	1.8	1.8	1.8	1.9	2.2
NO2(ppb) Average	683	0.8	1	-	0	0	0	0	1	2	13
NO(ppb) Average	683	0.6	1	-	0	0	0	0	1	1	15
NOX(ppb) Average	683	1.3	2	-	0	0	0	1	1	3	27
O3(ppb) Average	678	26.7	11	-	0	11	19	28	35	41	64
PM2.5(ug/m3) Average	706	7.38	6.9	-	0.2	2.2	3.6	5.3	8.4	14.1	46.6
Temperature 2 m (C) Average	720	14.83	5.5	-	0.9	7.6	10.7	14.9	19	22.2	26.2
Relative Humidity (%) Average	720	68.2	22	-	18	37	52	70	88	96	99
Surface Wetness (% of range) Average	718	4.9	9	-	0	0	0	0	7	19	47
Wind Speed 20 m (km/h) Average	683	7.3	3	-	0	3	5	7	10	12	17
Wind Direction 20 m (deg) Average	683	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	720	-	-	51.05	0	0	0	0	0	0.3	4.1

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
JUNE 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	18 Jun 2014 09:00	18 Jun 2014 10:00	2	Unstable operation - baseline drift
CH4, NMHC, THC	25 Jun 2014 10:00	25 Jun 2014 11:00	2	Maintenance - replaced fuel cylinder
NO2, NO, NOX	17 Jun 2014 09:00	17 Jun 2014 09:00	1	Maintenance - sample manifold cleaned
O3	17 Jun 2014 09:00	17 Jun 2014 09:00	1	Maintenance - sample manifold cleaned
O3	20 Jun 2014 07:00	20 Jun 2014 10:00	4	Maintenance - zero baseline adjust and cal
PM2.5	01 Jun 2014 02:00	01 Jun 2014 02:00	1	Intermittent unstable operation - spike in output signal
PM2.5	01 Jun 2014 04:00	01 Jun 2014 08:00	5	Intermittent unstable operation - spike in output signal
PM2.5	15 Jun 2014 20:00	15 Jun 2014 20:00	1	Intermittent unstable operation - spike in output signal
PM2.5	20 Jun 2014 01:00	20 Jun 2014 06:00	6	Analyzer failure - filter tape broken
PM2.5	20 Jun 2014 07:00	20 Jun 2014 07:00	1	Maintenance - Flow and zero check, sample head cleaning
Surface Leaf Wetness	17 Jun 2014 08:00	17 Jun 2014 09:00	2	Maintenance - sensor response verified
Wind Speed, Wind Direction	16 Jun 2014 05:00	16 Jun 2014 05:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	17 Jun 2014 06:00	17 Jun 2014 06:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	20 Jun 2014 03:00	20 Jun 2014 04:00	2	Flatline in sensor output signal
Wind Speed, Wind Direction	23 Jun 2014 01:00	23 Jun 2014 04:00	4	Flatline in sensor output signal
Wind Speed, Wind Direction	25 Jun 2014 20:00	25 Jun 2014 20:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	26 Jun 2014 04:00	26 Jun 2014 07:00	4	Flatline in sensor output signal
Wind Speed, Wind Direction	26 Jun 2014 21:00	27 Jun 2014 08:00	12	Flatline in sensor output signal
Wind Speed, Wind Direction	27 Jun 2014 22:00	28 Jun 2014 07:00	10	Flatline in sensor output signal
Wind Speed, Wind Direction	29 Jun 2014 00:00	29 Jun 2014 01:00	2	Flatline in sensor output signal

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Summary of Hour Averages

Anzac - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 14 ppb on Jun 28 08:00	Maximum Daily Average: 2.6 ppb on Jun 28
Minimum Value: 0 ppb on Jun 1 09:00	Hours of Data: 686
Maximum Diurnal Average: 0.8 ppb at hour 9	Hours of Missing Data: 34
Monthly Average: 0.3 ppb	Hours of Calibration: 32
Minimum Daily Average: 0.0 ppb on Jun 10	Percent Operational Time: 99.7
Minimum Diurnal Average: 0.1 ppb at hour 1	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 5	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jun	Z	3	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
2-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.1	1
3-Jun	0	0	Z	0	0	1	3	3	5	2	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0.7	5
4-Jun	0	0	1	Z	2	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0.3	2
5-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1	1
6-Jun	0	0	0	0	0	Z	0	0	1	3	2	2	2	3	3	2	3	3	2	1	0	0	0	0	0	1.2	3
7-Jun	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1	1
8-Jun	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
9-Jun	0	Z	0	0	0	0	0	0	0	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	7
10-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
11-Jun	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Jun	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
13-Jun	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0.3	5	
14-Jun	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-Jun	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.1	1
16-Jun	0	Z	0	0	0	0	0	1	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3
17-Jun	0	0	Z	0	0	0	0	1	C	C	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
18-Jun	0	0	0	Z	0	0	0	0	UO	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
19-Jun	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	1
20-Jun	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Jun	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Jun	Z	0	0	0	2	3	1	1	0	0	1	1	1	3	4	0	0	0	0	1	0	0	0	0	0	0.8	4
23-Jun	0	Z	0	0	0	0	0	0	0	0	2	4	1	1	0	1	0	0	0	0	0	0	0	1	0	0.4	4
24-Jun	1	0	Z	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
25-Jun	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
26-Jun	0	0	0	0	Z	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
27-Jun	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Jun	0	0	0	0	0	0	Z	14	12	4	4	3	1	0	2	5	5	2	1	1	2	2	1	0	0	2.6	14
29-Jun	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1
30-Jun	1	Z	2	3	3	3	3	2	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	3

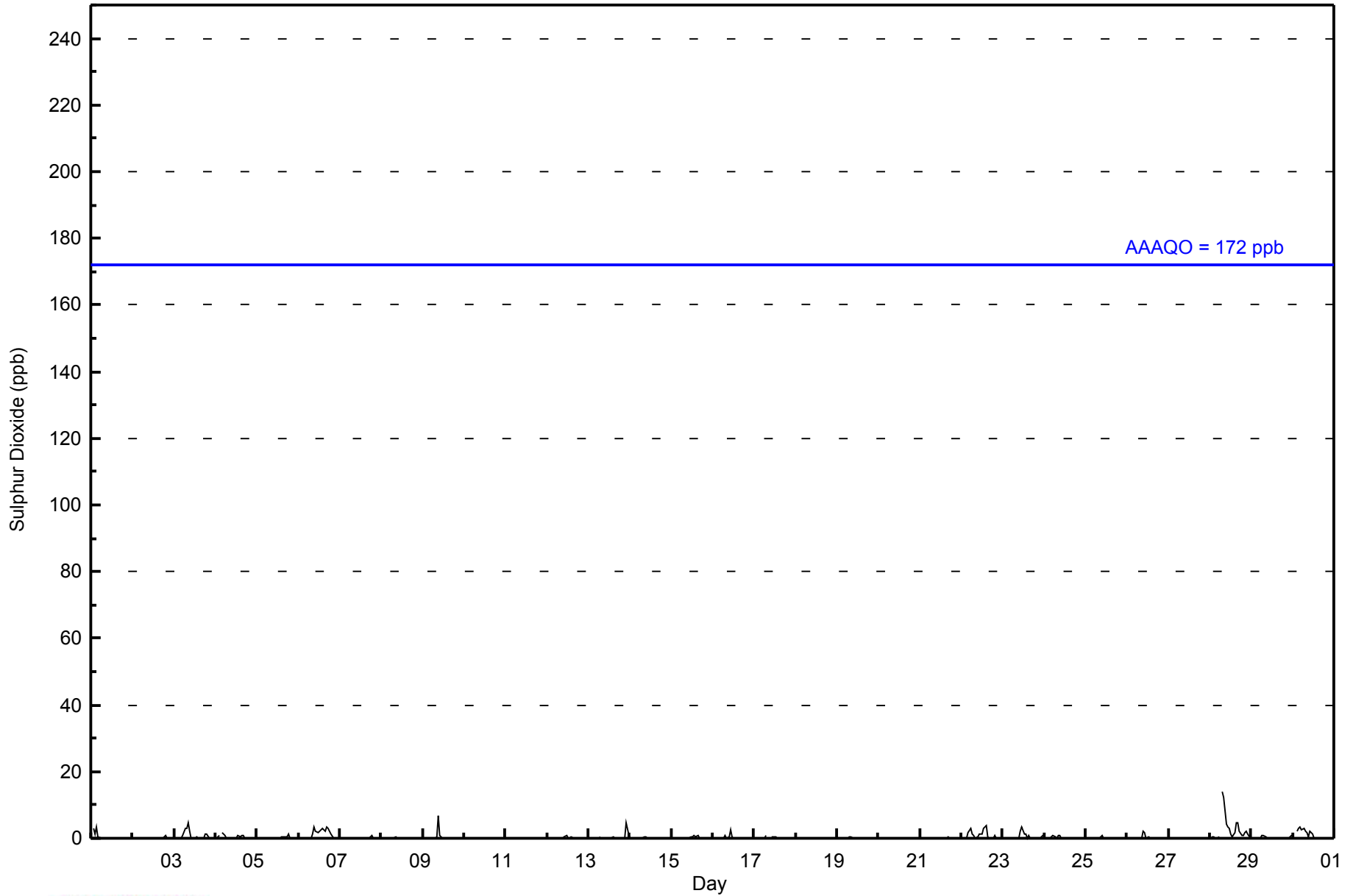
0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.8	0.8	0.8	0.6	0.4	0.3	0.3	0.4	0.3	0.3	0.2	0.3	0.2	0.1	0.1	0.2	0.1			Diurnal Average	
1	3	2	3	3	3	3	14	12	7	4	4	2	3	4	5	5	3	2	1	2	2	5	1			Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Anzac - June 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	684	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: 686

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - June 2014

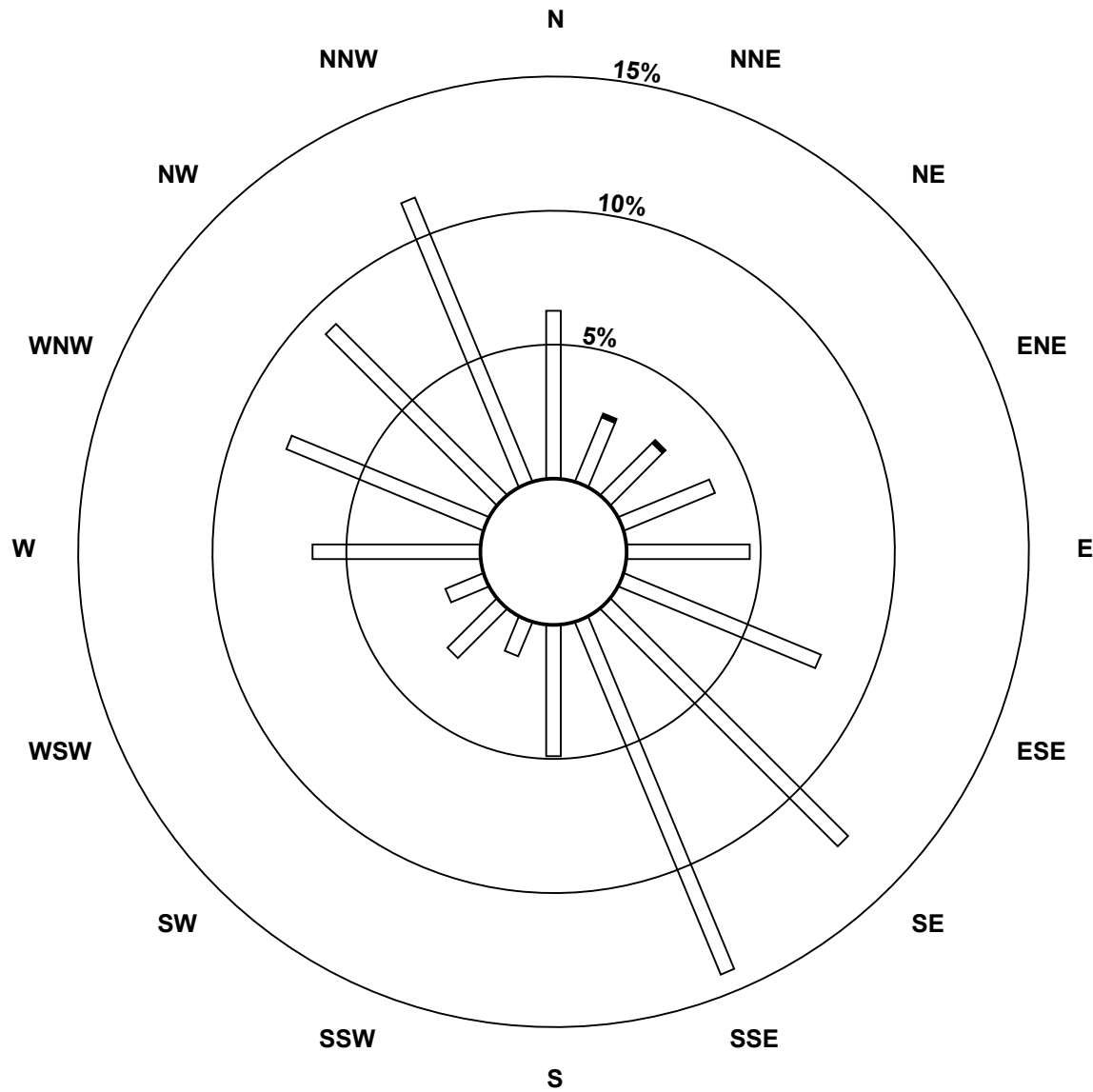
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	41	17	18	24	30	52	82	93	32	9	17	10	41	52	59	75	652
11 - 20	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	41	18	19	24	30	52	82	93	32	9	17	10	41	52	59	75	654

Total Number of Valid Hours: 654

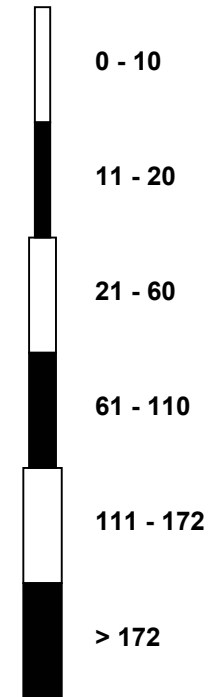
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Sulphur Dioxide (SO₂) - ppb
Anzac (AMS 14)



Classes (ppb)

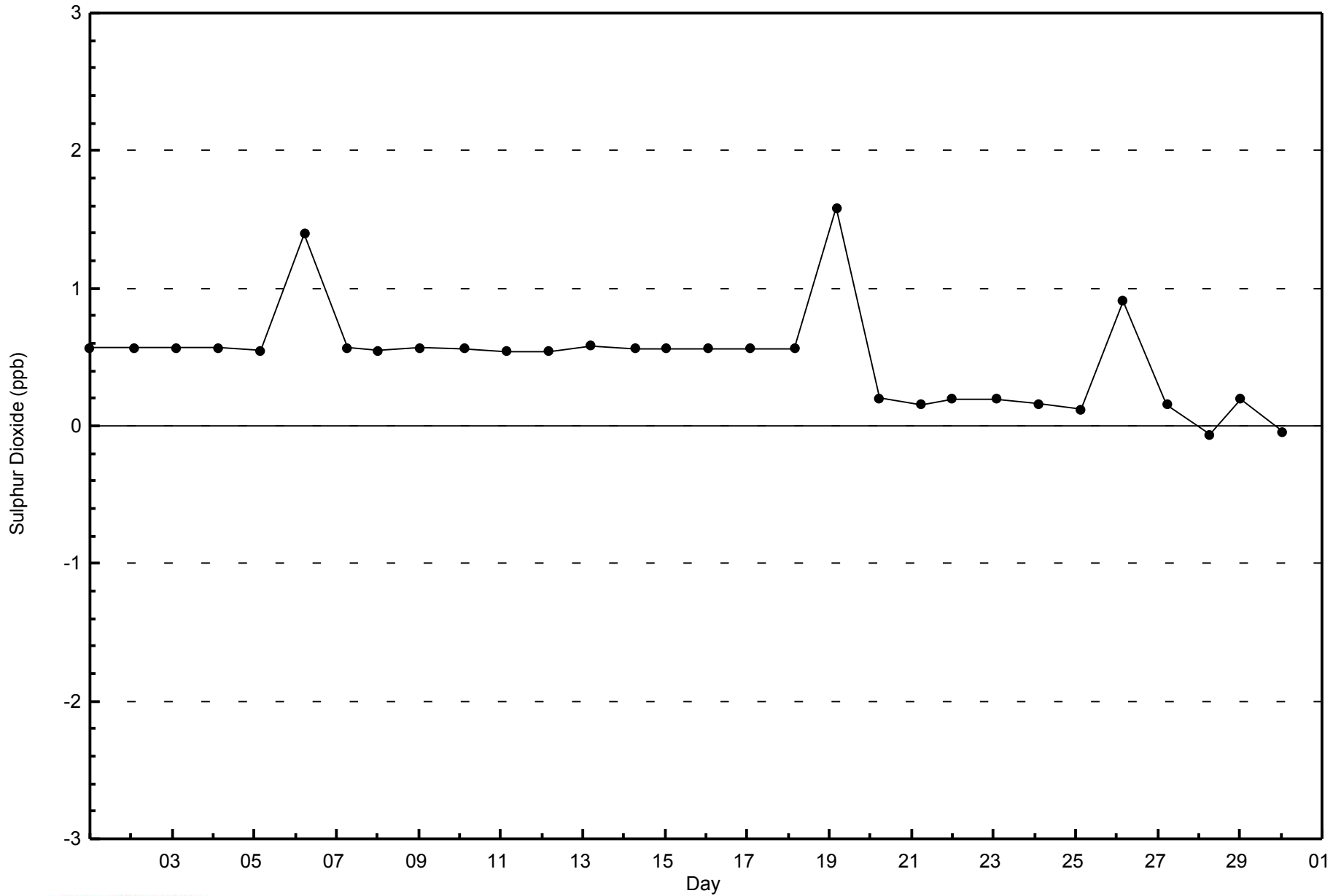


Total Number of Valid Hours: 654



WBEA
Zero Responses

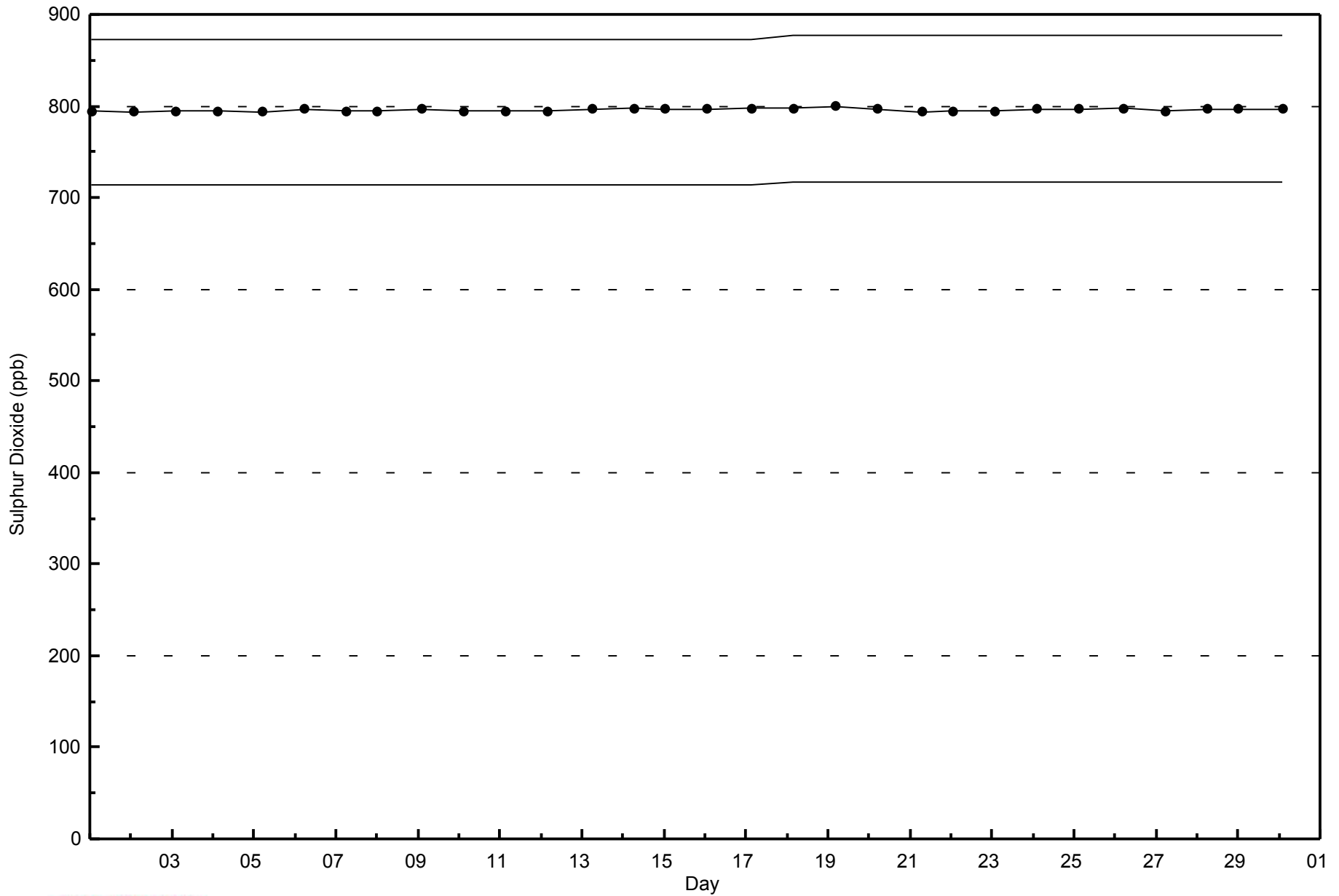
Sulphur Dioxide (SO₂) - ppb
Anzac - June 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Anzac - June 2014





Summary of Hour Averages

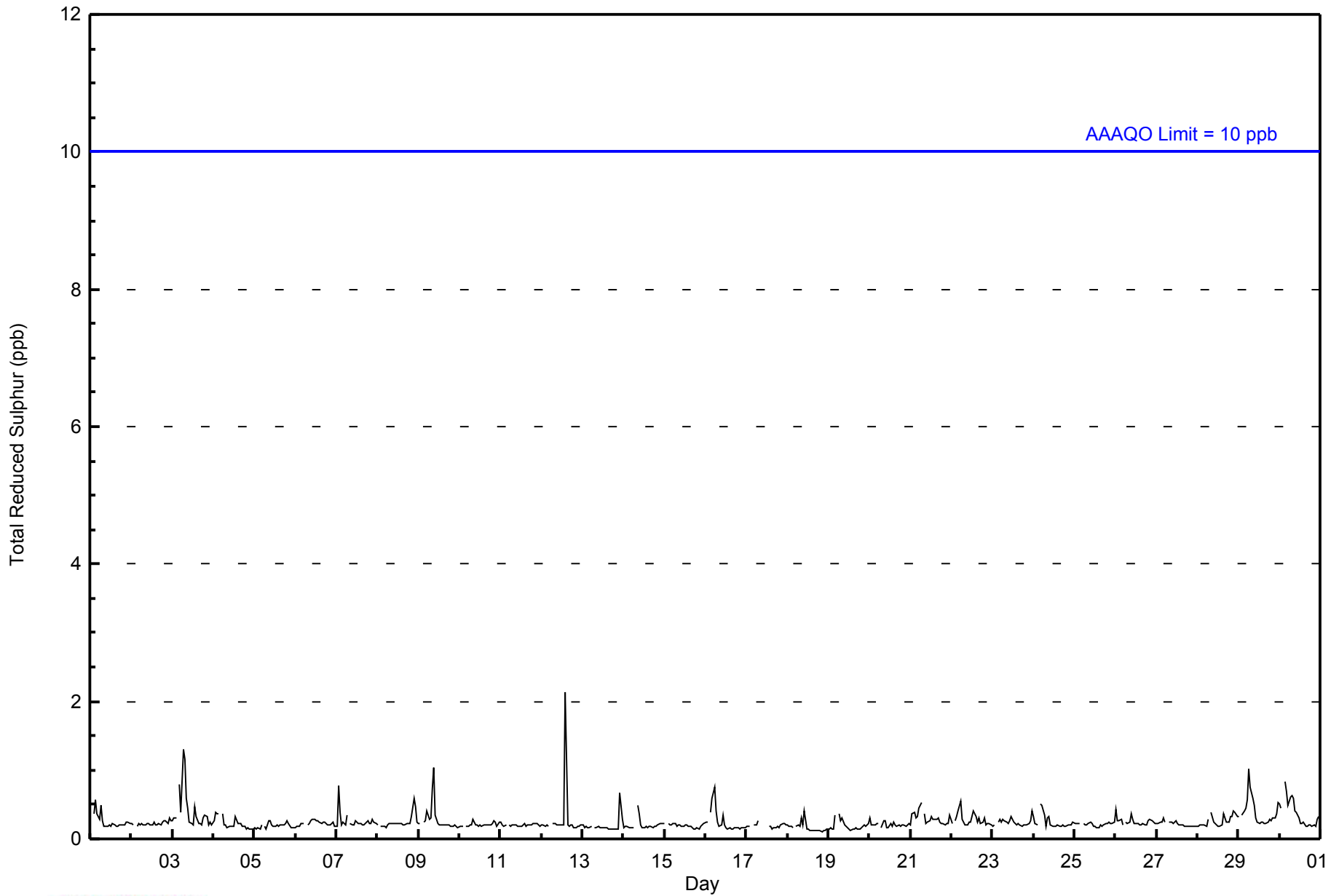
Anzac - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 720												
Maximum Value: 2 ppb on Jun 12 15:00														Maximum Daily Average: 0.4 ppb on Jun 3										Hours of Data: 685		
Minimum Value: 0 ppb on Jun 18 21:00														Minimum Daily Average: 0.2 ppb on Jun 18										Hours of Missing Data: 35		
Maximum Diurnal Average: 0.4 ppb at hour 7														Minimum Diurnal Average: 0.2 ppb at hour 18										Hours of Calibration: 35		
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: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
2-Jun	0	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-Jun	0	0	0	Z	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
4-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-Jun	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Jun	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Jun	0	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1
9-Jun	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
10-Jun	0	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
11-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Jun	0	0	0	0	0	Z	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0.3	2
13-Jun	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1
14-Jun	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
15-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Jun	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
17-Jun	0	0	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0
18-Jun	0	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
19-Jun	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Jun	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
21-Jun	0	0	0	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-Jun	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
23-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-Jun	0	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
25-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Jun	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
27-Jun	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
28-Jun	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
29-Jun	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
30-Jun	1	0	Z	1	1	0	1	1	1	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
Anzac - June 2014





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - June 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
Anzac - June 2014

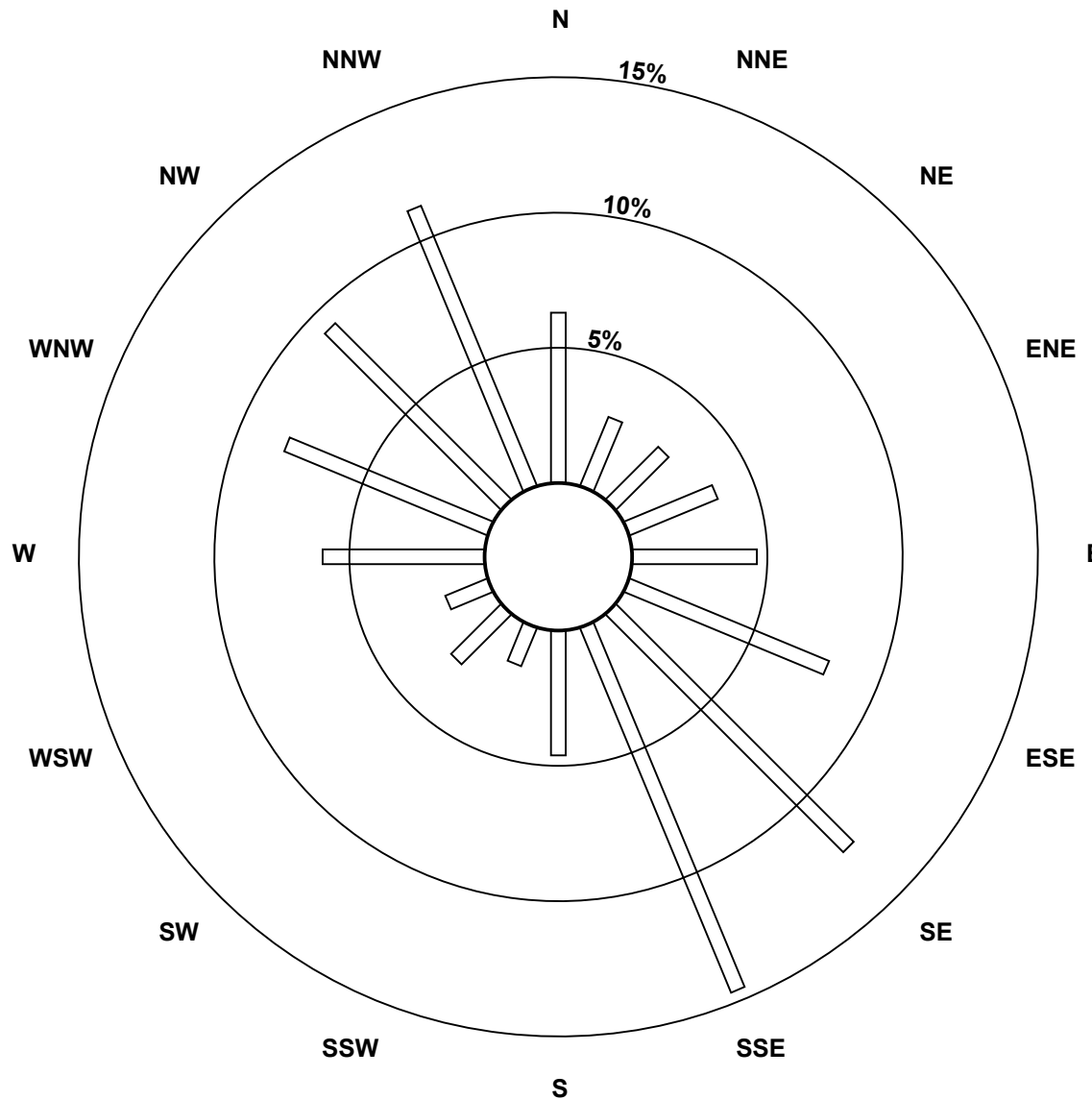
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	41	18	18	23	30	52	81	95	30	10	17	11	39	53	60	73	651
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	41	18	18	23	30	52	81	95	30	10	17	11	39	53	60	73	651

Total Number of Valid Hours: 651

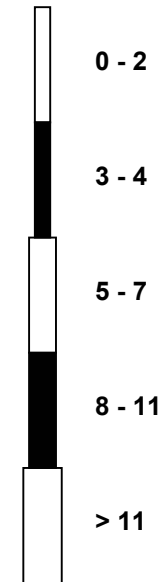
Total Number of Hours: 720

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

**Total Reduced Sulphur (TRS) - ppb
Anzac (AMS 14)**



Classes (ppb)

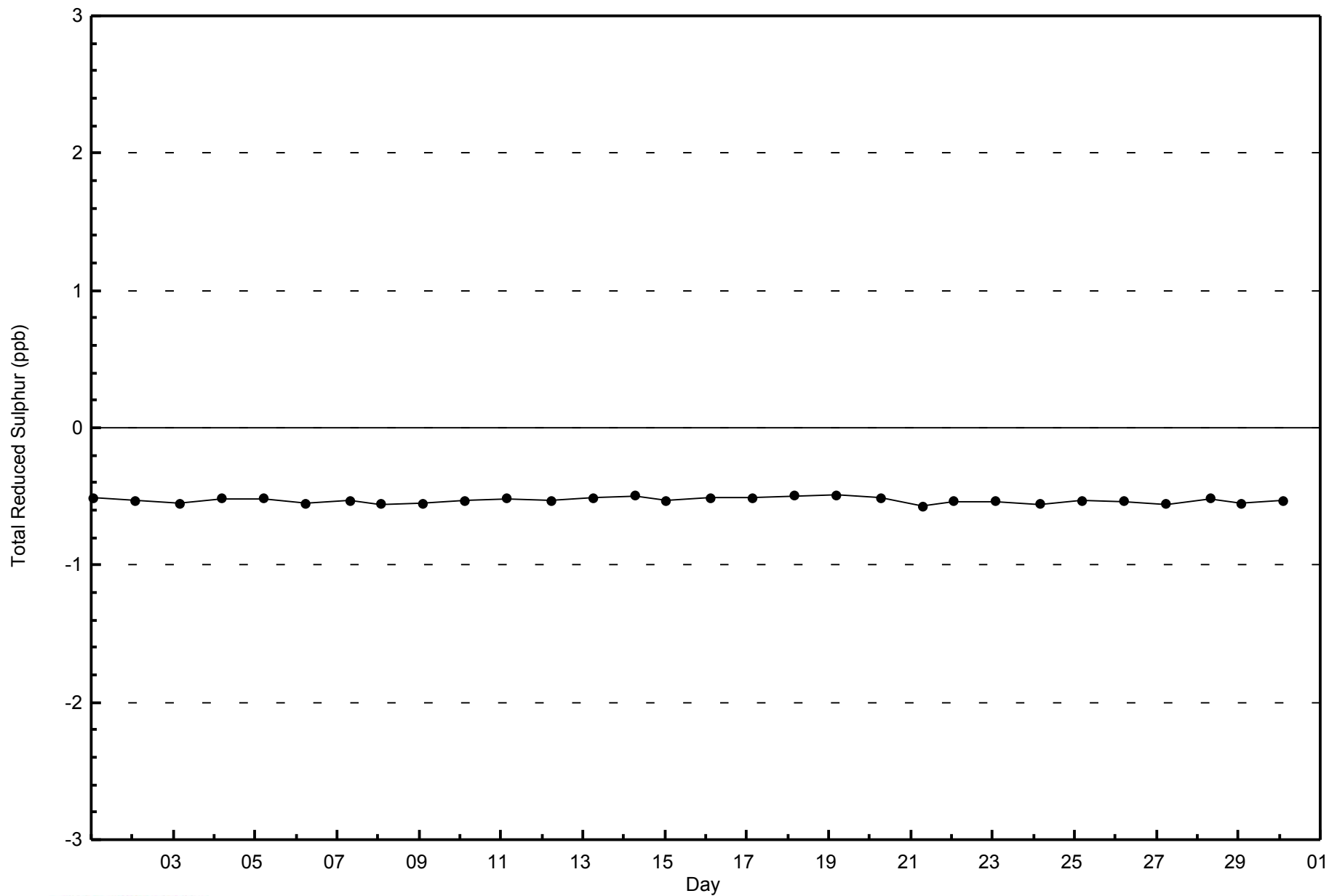


Total Number of Valid Hours: 651



WBEA
Zero Responses

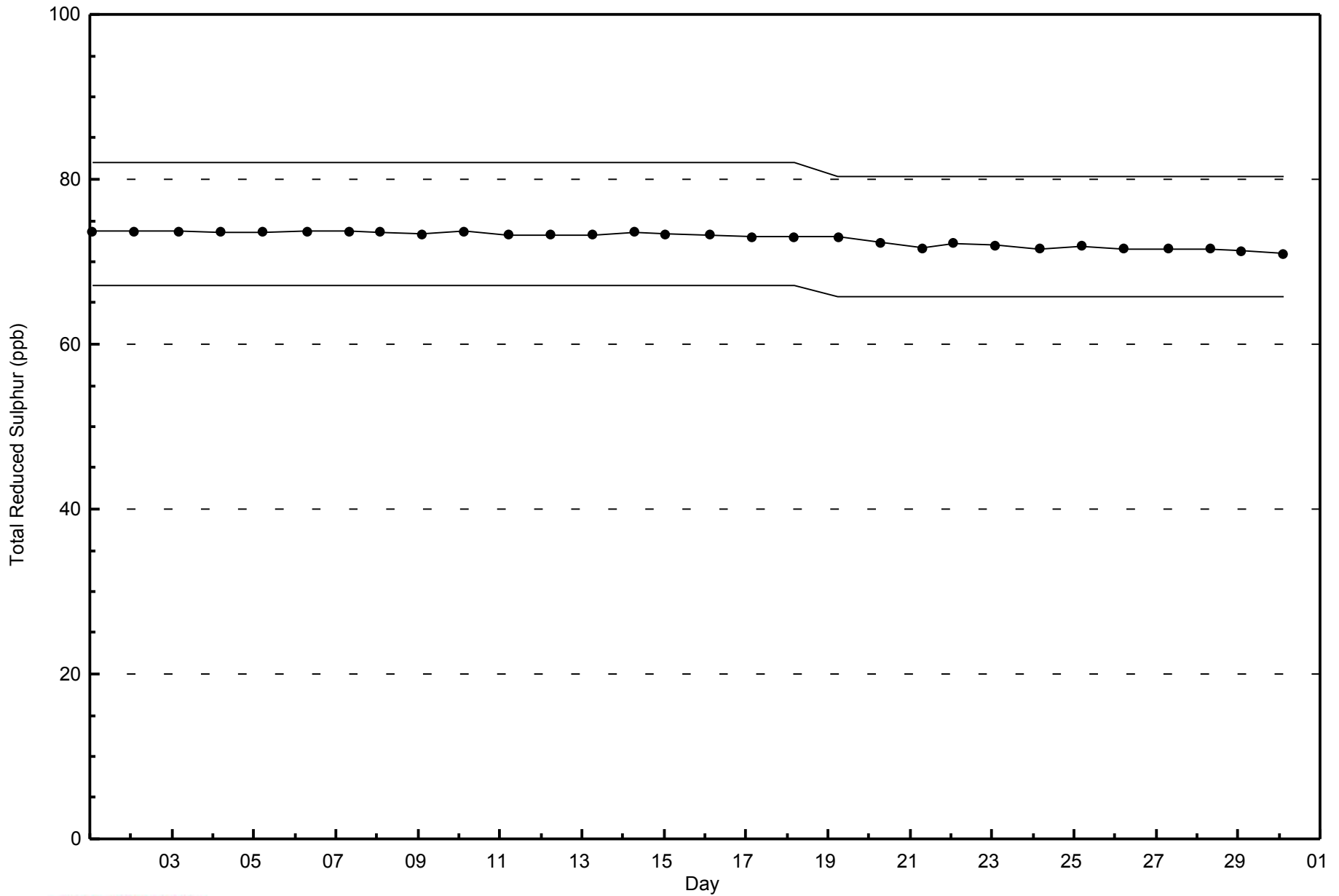
Total Reduced Sulphur (TRS) - ppb
Anzac - June 2014





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Anzac - June 2014



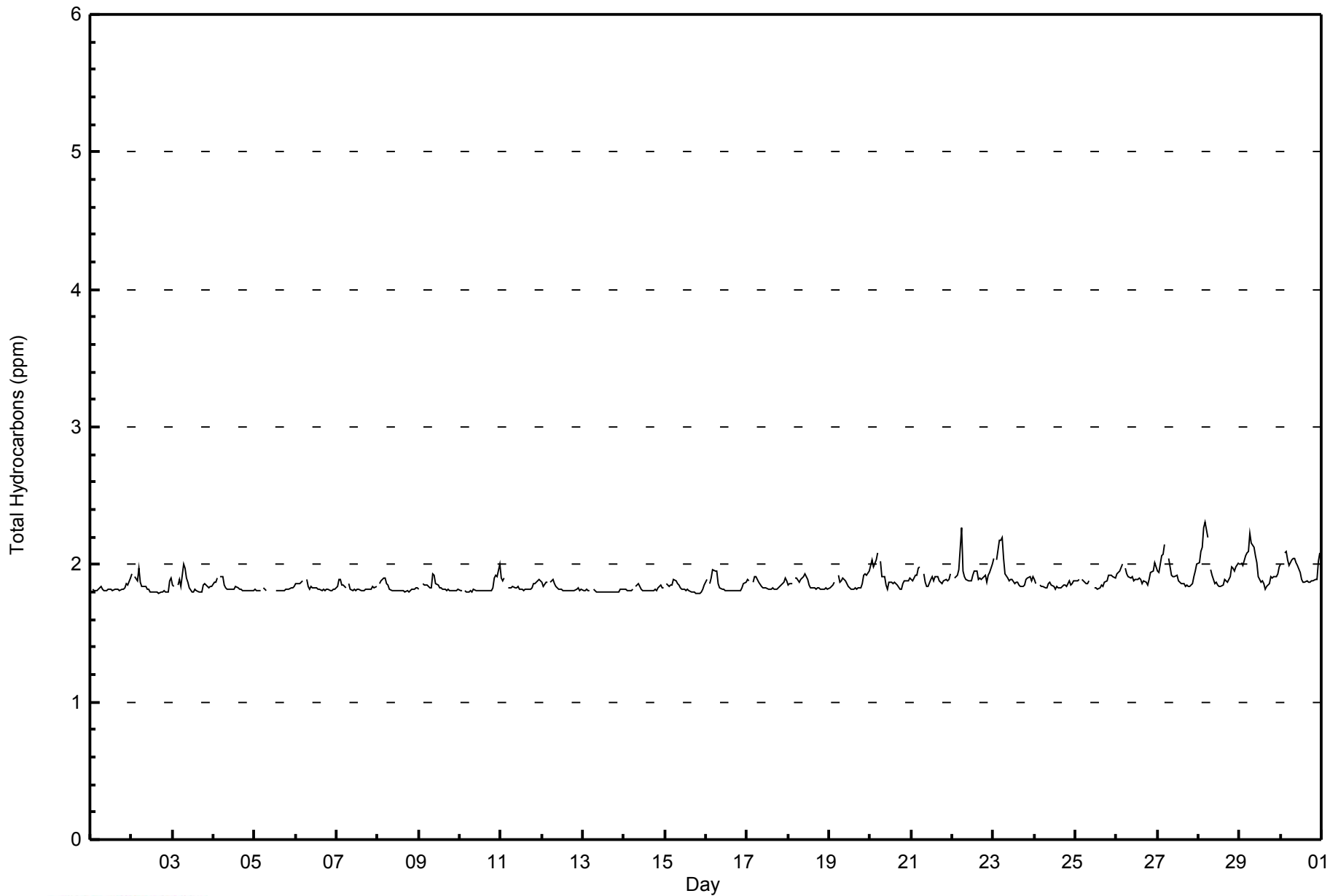


Maximum Value: 2.3 ppm on Jun 28 05:00																	Maximum Daily Average: 2.0 ppm on Jun 28										Hours in Service: 720	
Minimum Value: 1.8 ppm on Jun 15 20:00																	Minimum Daily Average: 1.8 ppm on Jun 13										Hours of Data: 684	
Maximum Diurnal Average: 1.9 ppm at hour 5																	Minimum Diurnal Average: 1.8 ppm at hour 17										Hours of Missing Data: 36	
Monthly Average: 1.87 ppm																	Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.8 Median = 1.8 Q ₃ = 1.9 P ₉₀ = 2.0 P ₉₉ = 2.2										Hours of Calibration: 34	
																											Percent Operational Time: 99.7	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Jun	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	1.9	1.9	1.9	1.8	1.9		
2-Jun	1.9	Z	1.9	1.9	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	2.0		
3-Jun	1.9	1.8	Z	1.9	1.9	1.8	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.9	2.0		
4-Jun	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9		
5-Jun	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	C	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	1.8	1.8		
6-Jun	1.9	1.9	1.9	1.9	1.9	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	1.9		
7-Jun	1.8	1.9	1.9	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	1.9		
8-Jun	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9		
9-Jun	1.8	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9		
10-Jun	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	1.9	1.9	1.9	2.0	1.8	2.0		
11-Jun	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	1.9	1.9	1.9	1.9	1.9	1.8	1.9		
12-Jun	1.9	1.8	1.9	1.9	Z	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9		
13-Jun	1.8	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8		
14-Jun	1.8	1.8	1.8	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	1.8	1.8	1.8	1.8	1.9		
15-Jun	Z	1.9	1.8	1.9	1.8	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9		
16-Jun	1.9	Z	1.9	1.9	2.0	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	2.0		
17-Jun	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	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9		
18-Jun	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9		
19-Jun	1.8	1.8	1.8	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9		
20-Jun	2.0	2.0	2.0	2.0	2.1	Z	2.0	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.1		
21-Jun	1.9	1.9	1.9	1.9	2.0	2.0	Z	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
22-Jun	Z	1.9	1.9	1.9	2.0	2.3	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.3		
23-Jun	2.0	Z	2.0	2.2	2.2	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.2		
24-Jun	1.9	1.9	Z	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9		
25-Jun	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	M	M	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		
26-Jun	1.9	1.9	2.0	2.0	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0		
27-Jun	2.0	1.9	2.1	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	1.8	1.9	1.8	1.8	1.9	1.9	2.0	2.0	1.9	2.1		
28-Jun	2.0	2.1	2.1	2.3	2.3	2.2	Z	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.3		
29-Jun	Z	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2		
30-Jun	2.0	Z	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	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.1		
																								Diurnal Average				
																								Diurnal Maximum				
Z - zerospan C - Calibration M - Maintenance																												



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Anzac - June 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	661	96.64	96.64
2.1 - 3.0	23	3.36	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - June 2014

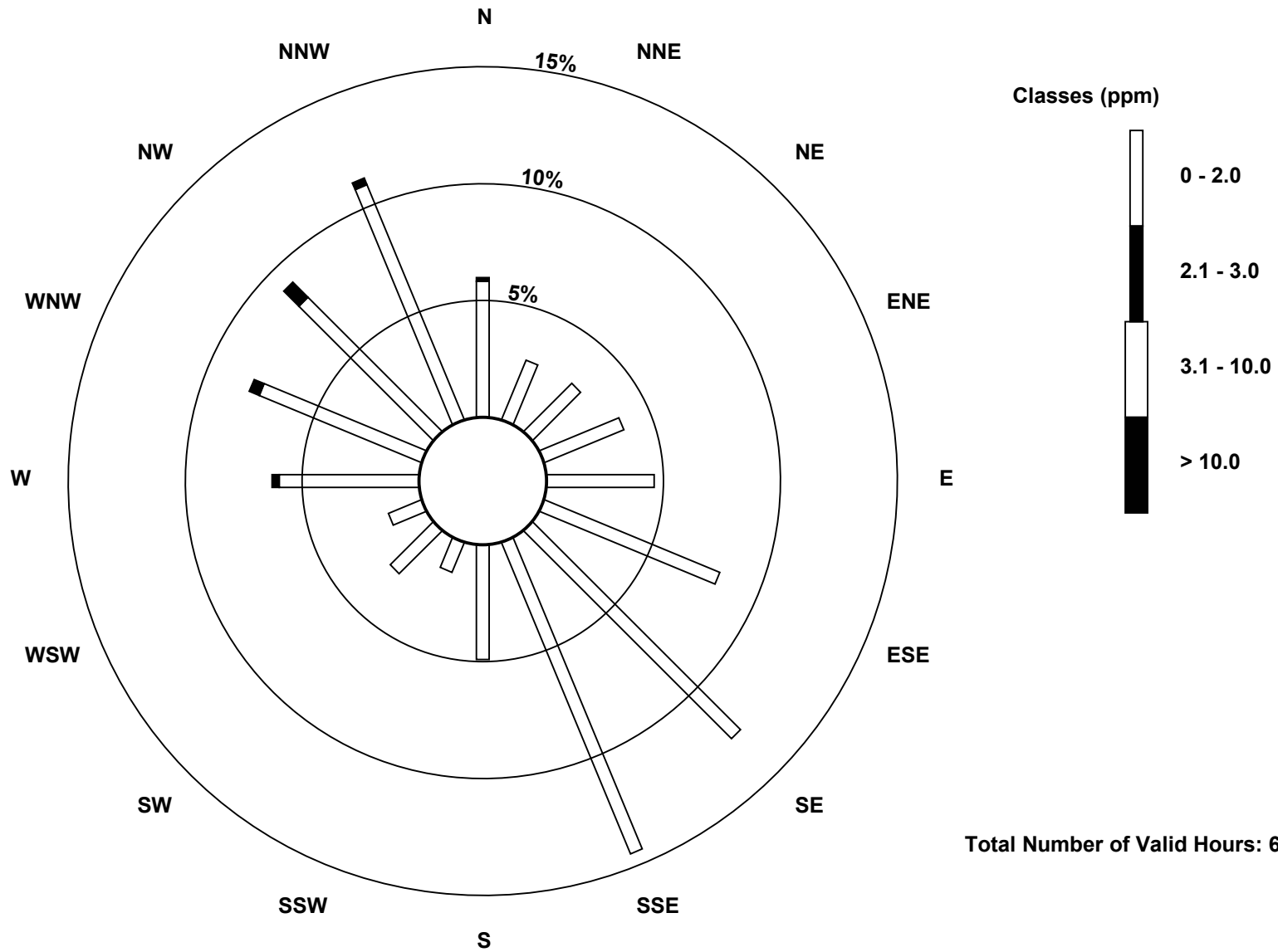
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	38	18	19	24	30	53	82	94	32	9	17	10	39	49	53	71	638
2.1 - 3.0	1	0	0	0	0	0	0	0	0	0	0	0	2	3	6	2	14
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	18	19	24	30	53	82	94	32	9	17	10	41	52	59	73	652

Total Number of Valid Hours: 652

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

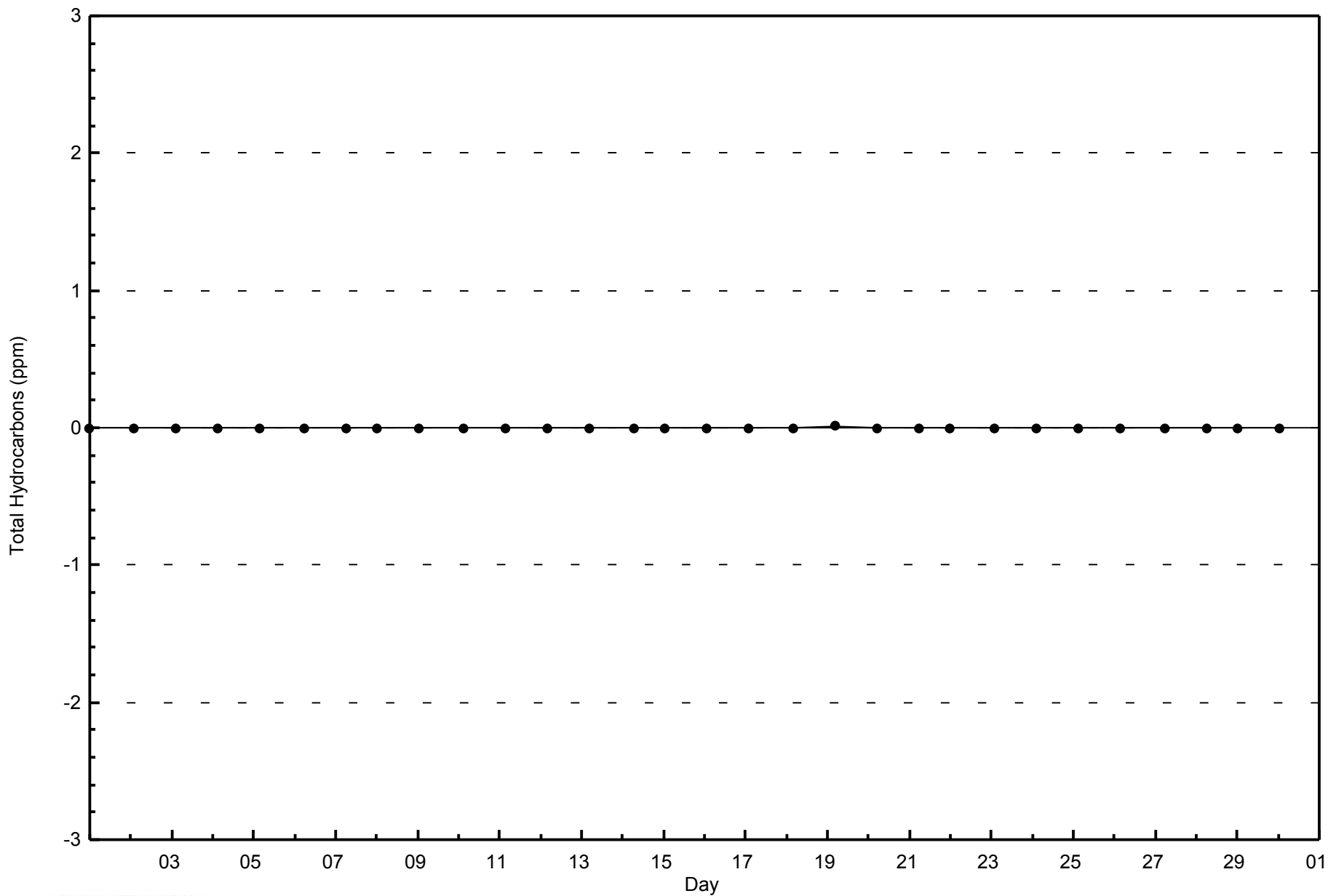
Total Hydrocarbons (THC) - ppm
Anzac (AMS 14)





WBEA
Zero Responses

Total Hydrocarbons (THC) - ppm
Anzac - June 2014

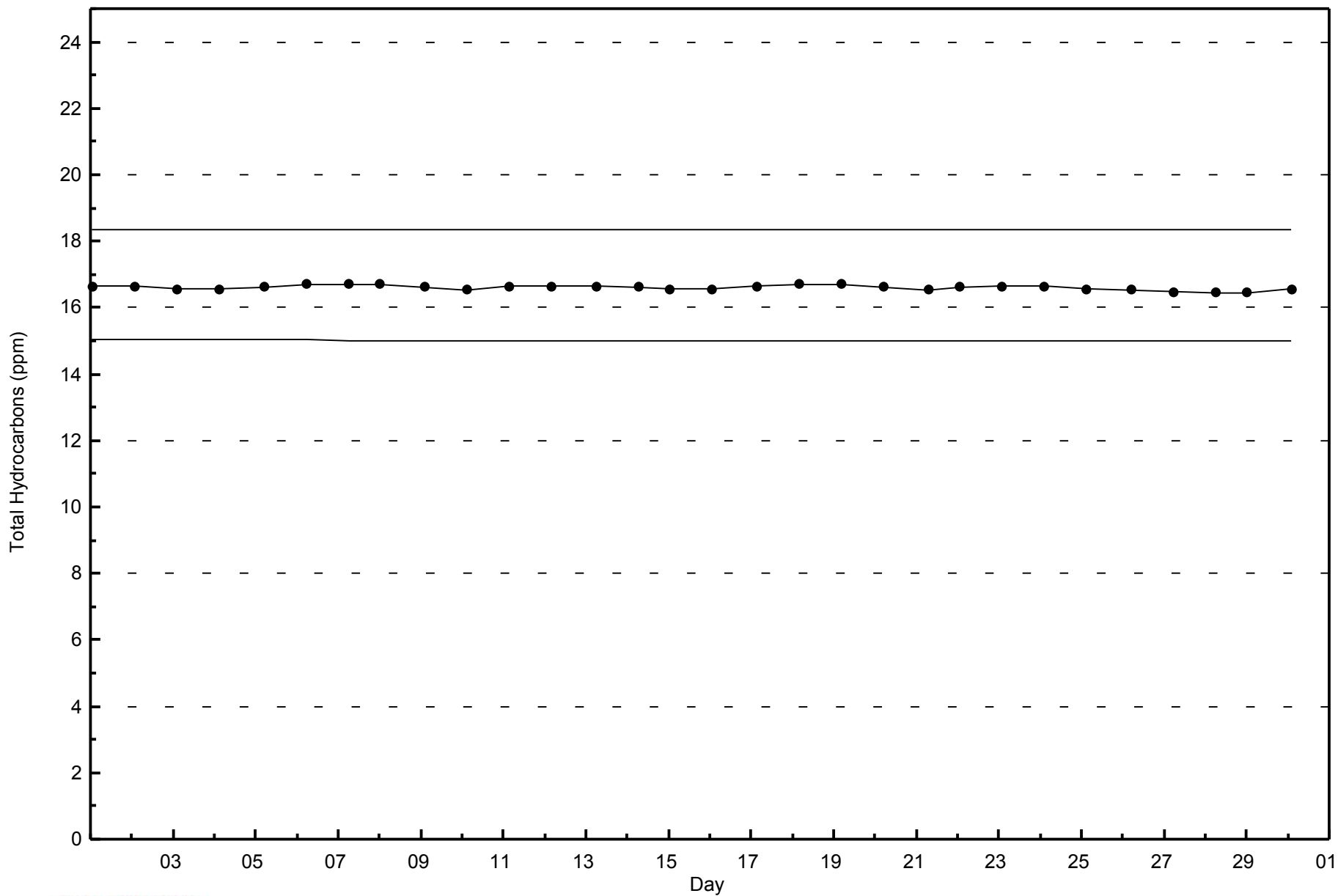




WBEA
Span Responses

Total Hydrocarbons (THC) - ppm

Anzac - June 2014





Summary of Hour Averages

Anzac - June 2014

Maximum Value: 0.457 ppm on Jun 22 06:00	Maximum Daily Average: 0.102 ppm on Jun 22	Hours in Service: 720
Minimum Value: 0.000 ppm on Jun 4 23:00	Minimum Daily Average: 0.001 ppm on Jun 5	Hours of Data: 684
Maximum Diurnal Average: 0.063 ppm at hour 6	Minimum Diurnal Average: 0.021 ppm at hour 17	Hours of Missing Data: 36
Monthly Average: 0.037 ppm	Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.1 P ₉₀ = 0.1 P ₉₉ = 0.1	Hours of Calibration: 34
		Percent Operational Time: 99.7

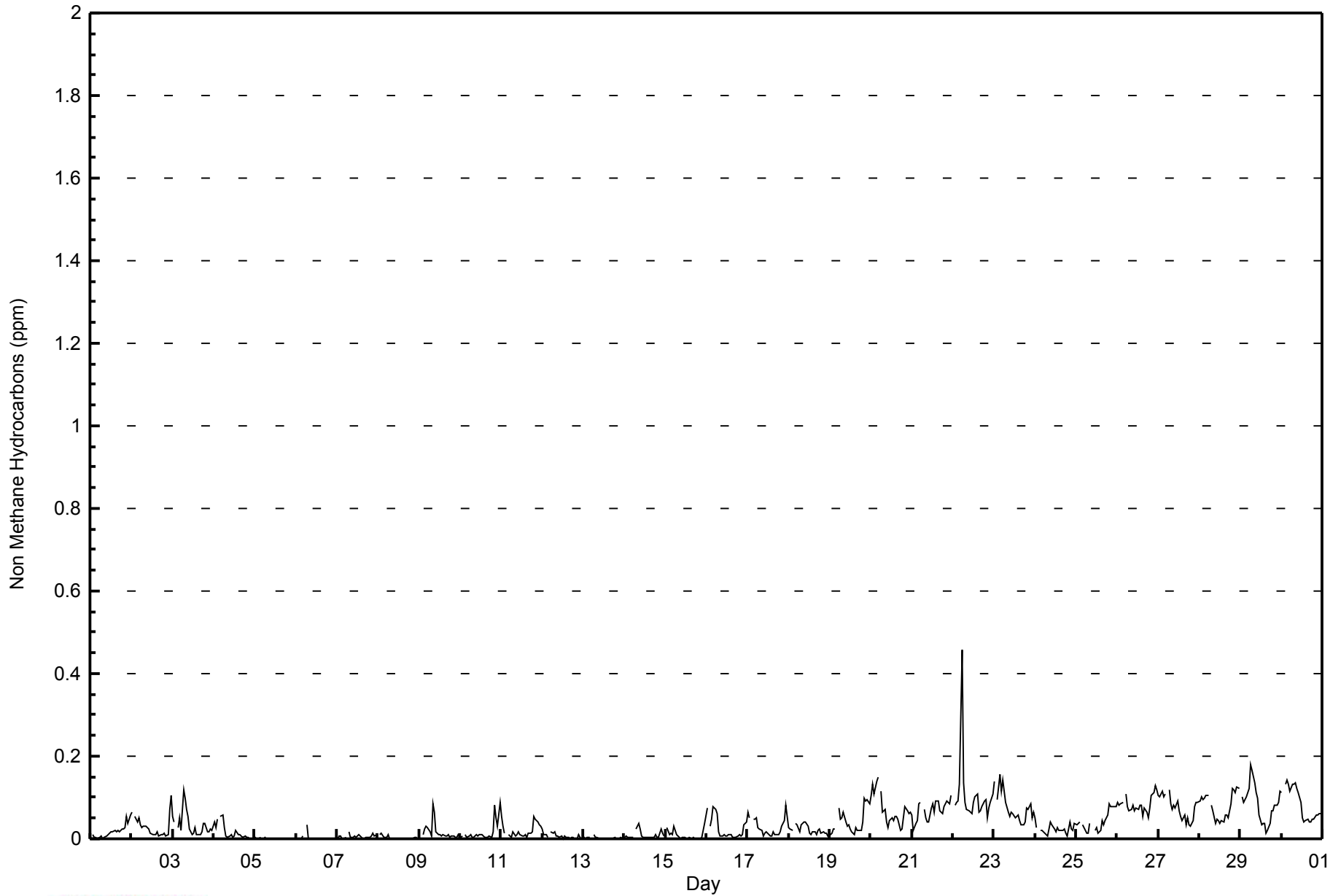
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jun	Z	0.010	0.004	0.003	0.001	0.005	0.005	0.002	0.002	0.007	0.010	0.013	0.015	0.016	0.020	0.015	0.021	0.016	0.023	0.024	0.027	0.053	0.037	0.056	0.017	0.056																							
2-Jun	0.065	Z	0.053	0.040	0.050	0.035	0.026	0.030	0.030	0.027	0.025	0.014	0.009	0.010	0.012	0.017	0.008	0.009	0.009	0.012	0.008	0.010	0.072	0.105	0.029	0.105																							
3-Jun	0.053	0.040	Z	0.026	0.050	0.021	0.120	0.098	0.070	0.054	0.023	0.010	0.013	0.027	0.011	0.009	0.011	0.018	0.038	0.038	0.019	0.016	0.024	0.021	0.035	0.120																							
4-Jun	0.040	0.028	0.049	Z	0.053	0.056	0.026	0.007	0.002	0.007	0.009	0.005	0.007	0.022	0.012	0.010	0.008	0.003	0.006	0.003	0.003	0.001	0.000	0.000	0.015	0.056																							
5-Jun	0.002	0.000	0.000	0.002	Z	0.001	0.002	0.001		C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.001	0.000	0.001	0.002																							
6-Jun	0.000	0.001	0.001	0.001	0.008	Z	0.035	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	0.001	0.002	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.035																							
7-Jun	0.000	0.007	0.006	0.001	0.000	0.002	Z	0.017	0.003	0.002	0.007	0.002	0.005	0.009	0.005	0.001	0.001	0.002	0.005	0.005	0.005	0.015	0.006	0.009	0.005	0.017																							
8-Jun	Z	0.009	0.012	0.002	0.004	0.003	0.009	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.005	0.004	0.000	0.002	0.012																							
9-Jun	0.001	Z	0.009	0.024	0.029	0.028	0.016	0.007	0.083	0.065	0.019	0.011	0.010	0.008	0.010	0.007	0.006	0.010	0.003	0.008	0.007	0.004	0.003	0.009	0.016	0.083																							
10-Jun	0.004	0.006	Z	0.011	0.003	0.006	0.009	0.002	0.004	0.010	0.008	0.010	0.009	0.011	0.003	0.004	0.004	0.006	0.005	0.017	0.082	0.051	0.032	0.087	0.017	0.087																							
11-Jun	0.055	0.029	0.013	Z	0.011	0.006	0.004	0.016	0.005	0.009	0.018	0.012	0.007	0.008	0.011	0.004	0.015	0.014	0.017	0.053	0.048	0.042	0.035	0.029	0.020	0.055																							
12-Jun	0.025	0.010	0.011	0.004	Z	0.017	0.013	0.017	0.006	0.008	0.005	0.008	0.002	0.005	0.002	0.003	0.001	0.004	0.002	0.001	0.001	0.009	0.003	0.001	0.007	0.025																							
13-Jun	0.002	0.001	0.004	0.003	0.002	Z	0.010	0.005	0.002	0.001	0.001	0.000	0.001	0.002	0.001	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.005	0.000	0.002	0.010																							
14-Jun	0.003	0.006	0.003	0.003	0.003	0.005	Z	0.023	0.038	0.024	0.006	0.004	0.002	0.003	0.005	0.004	0.005	0.004	0.010	0.003	0.004	0.024	0.012	0.008	0.009	0.038																							
15-Jun	Z	0.028	0.010	0.013	0.010	0.032	0.010	0.007	0.005	0.001	0.003	0.003	0.000	0.001	0.002	0.000	0.002	0.000	0.000	0.000	0.001	0.003	0.021	0.039	0.008	0.039																							
16-Jun	0.075	Z	0.030	0.048	0.078	0.072	0.062	0.016	0.006	0.007	0.010	0.007	0.007	0.011	0.011	0.004	0.004	0.005	0.006	0.010	0.006	0.012	0.034	0.042	0.024	0.078																							
17-Jun	0.063	0.052	Z	0.047	0.047	0.050	0.027	0.025	0.020	0.007	0.013	0.016	0.012	0.006	0.006	0.016	0.010	0.010	0.012	0.018	0.031	0.046	0.080	0.054	0.029	0.080																							
18-Jun	0.026	0.022	0.021	Z	0.037	0.034	0.017	0.036	0.037	0.039	0.041	0.030	0.014	0.011	0.017	0.016	0.011	0.020	0.023	0.015	0.016	0.013	0.014	0.005	0.022	0.041																							
19-Jun	0.012	0.014	0.025	0.025	Z	0.076	0.048	0.049	0.065	0.040	0.032	0.033	0.024	0.017	0.009	0.026	0.021	0.021	0.019	0.041	0.097	0.093	0.096	0.084	0.042	0.097																							
20-Jun	0.105	0.131	0.108	0.140	0.151	Z	0.115	0.064	0.072	0.040	0.027	0.045	0.050	0.044	0.053	0.053	0.046	0.020	0.024	0.050	0.077	0.067	0.061	0.065	0.070	0.151																							
21-Jun	0.056	0.021	0.037	0.044	0.084	0.089	Z	0.071	0.050	0.040	0.039	0.075	0.086	0.066	0.091	0.091	0.067	0.065	0.062	0.079	0.091	0.088	0.084	0.106	0.069	0.106																							
22-Jun	Z	0.081	0.089	0.092	0.132	0.457	0.136	0.089	0.072	0.069	0.064	0.062	0.088	0.103	0.109	0.066	0.069	0.078	0.090	0.094	0.050	0.074	0.088	0.108	0.102	0.457																							
23-Jun	0.140	Z	0.096	0.154	0.116	0.141	0.114	0.088	0.065	0.053	0.066	0.062	0.051	0.053	0.059	0.045	0.034	0.033	0.042	0.074	0.072	0.084	0.051	0.065	0.076	0.154																							
24-Jun	0.051	0.027	Z	0.019	0.020	0.015	0.009	0.006	0.025	0.041	0.033	0.025	0.017	0.026	0.022	0.019	0.021	0.023	0.015	0.007	0.039	0.024	0.022	0.036	0.024	0.051																							
25-Jun	0.035	0.037	0.041	Z	0.035	0.021	0.012	0.014	0.036		M	M	0.021	0.026	0.014	0.020	0.046	0.035	0.043	0.059	0.085	0.079	0.077	0.078	0.043	0.085																							
26-Jun	0.087	0.082	0.086	0.088	Z	0.110	0.077	0.067	0.072	0.080	0.067	0.073	0.072	0.081	0.080	0.056	0.074	0.065	0.049	0.073	0.103	0.113	0.128	0.118	0.083	0.128																							
27-Jun	0.104	0.102	0.114	0.100	0.109	Z	0.118	0.084	0.072	0.080	0.074	0.093	0.068	0.053	0.045	0.058	0.033	0.050	0.032	0.031	0.046	0.077	0.088	0.088	0.075	0.118																							
28-Jun	0.091	0.101	0.094	0.099	0.105	0.106	Z	0.083	0.066	0.037	0.048	0.044	0.037	0.043	0.042	0.059	0.056	0.053	0.085	0.120	0.118	0.111	0.127	0.122	0.080	0.127																							
29-Jun	Z	0.101	0.087	0.101	0.111	0.124	0.180	0.165	0.137	0.112	0.099	0.057	0.035	0.038	0.036	0.015	0.020	0.037	0.068	0.067	0.081	0.081	0.087	0.114	0.085	0.180																							
30-Jun	0.113	Z	0.133	0.143	0.131	0.115	0.132	0.133	0.135	0.122	0.110	0.088	0.050	0.042	0.044	0.046	0.041	0.040	0.048	0.049	0.058	0.058	0.062	0.061	0.085	0.143																							
																								0.048	0.038	0.044	0.047	0.053	0.063	0.051	0.041	0.041	0.035	0.031	0.028	0.024	0.024	0.025	0.023	0.021	0.022	0.025	0.033	0.039	0.042	0.045	0.050	Diurnal Average	
																								0.140	0.131	0.133	0.154	0.151	0.457	0.180	0.165	0.137	0.122	0.110	0.093	0.088	0.103	0.109	0.091	0.074	0.078	0.090	0.120	0.118	0.113	0.128	0.122	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance



WBEA
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - June 2014





WBEA
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	174	25.44	25.44
0.006 - 0.05	328	47.95	73.39
0.06 - 0.1	177	25.88	99.27
> 0.1	5	0.73	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



WBEA
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - June 2014

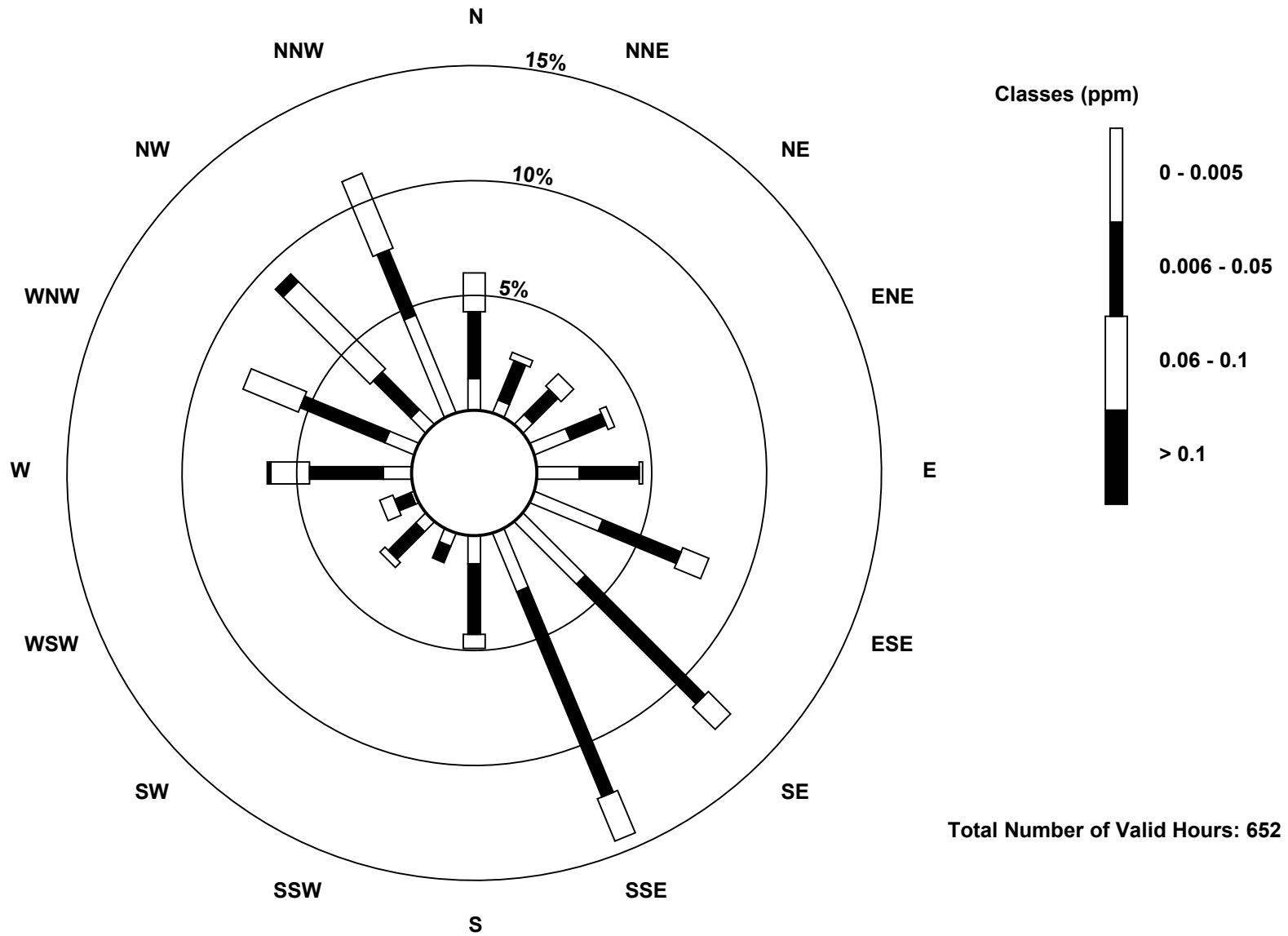
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	9	4	4	11	12	21	25	18	8	4	4	1	8	9	6	30	174
0.006 - 0.05	19	12	10	11	17	24	48	63	20	5	11	5	21	26	15	20	327
0.06 - 0.1	11	2	5	2	1	8	9	13	4	0	2	4	11	17	35	23	147
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	4
Totals	39	18	19	24	30	53	82	94	32	9	17	10	41	52	59	73	652

Total Number of Valid Hours: 652

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Non Methane Hydrocarbons (NMHC) - ppm
Anzac (AMS 14)



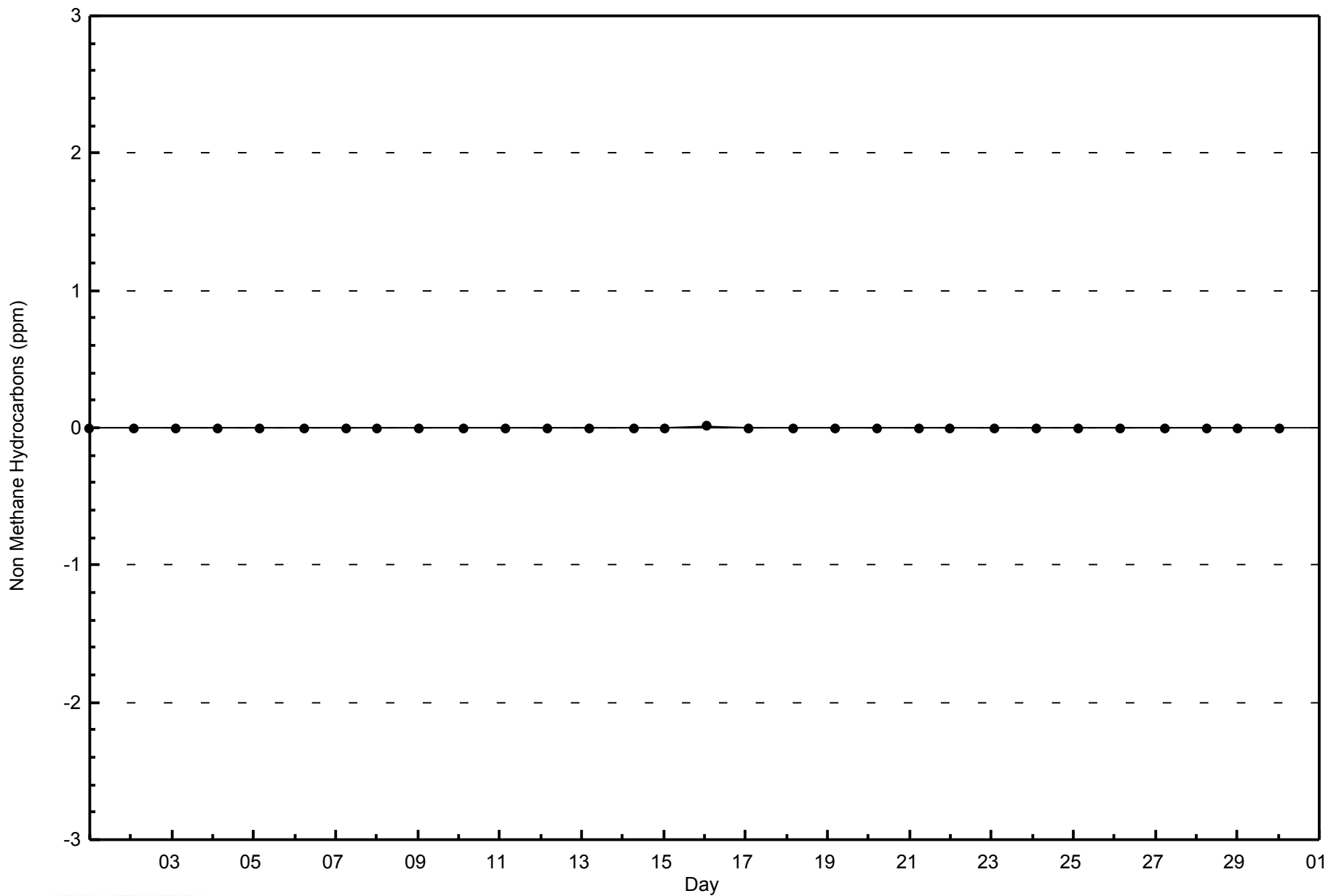


WBEA

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

Anzac - June 2014

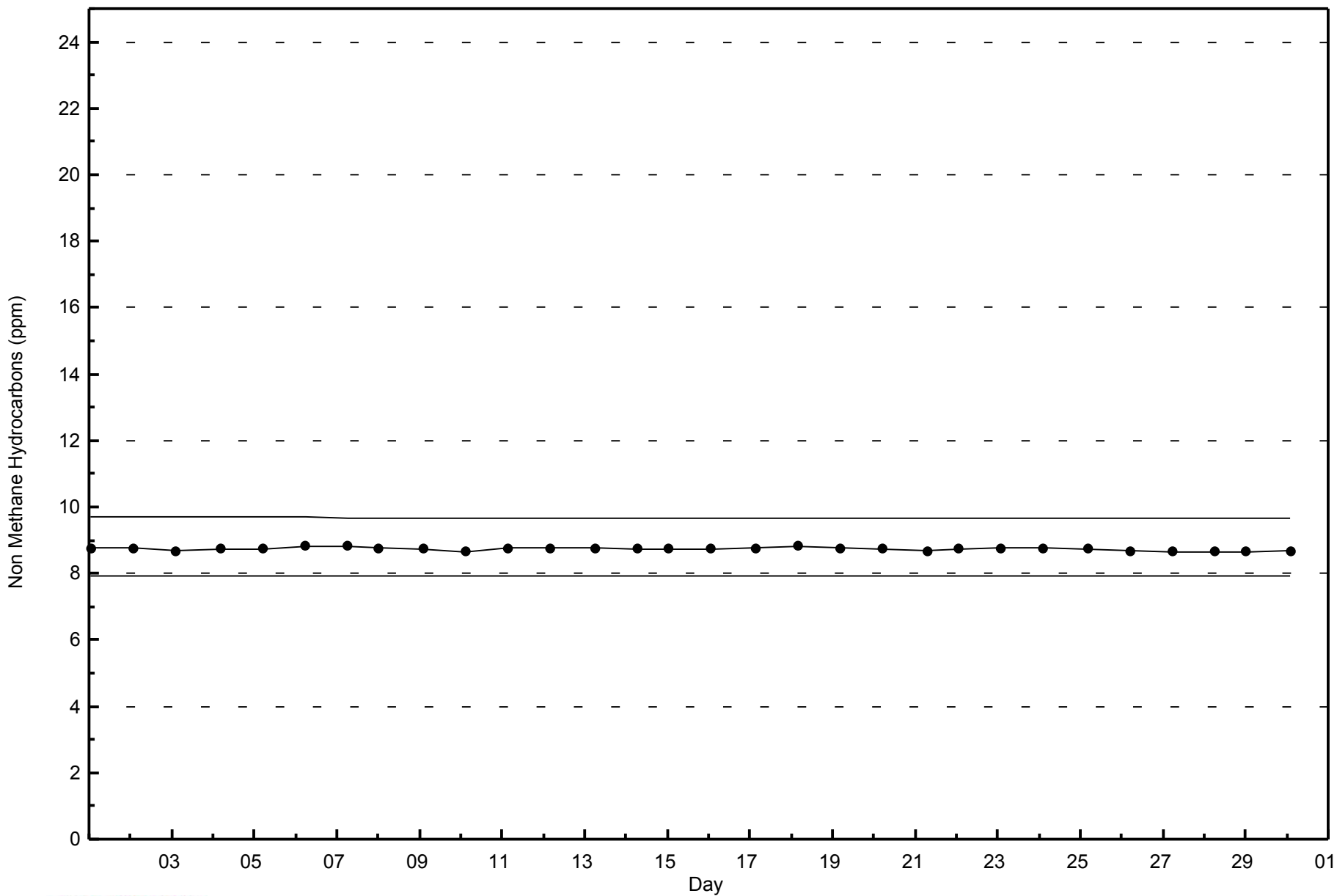




WBEA
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm

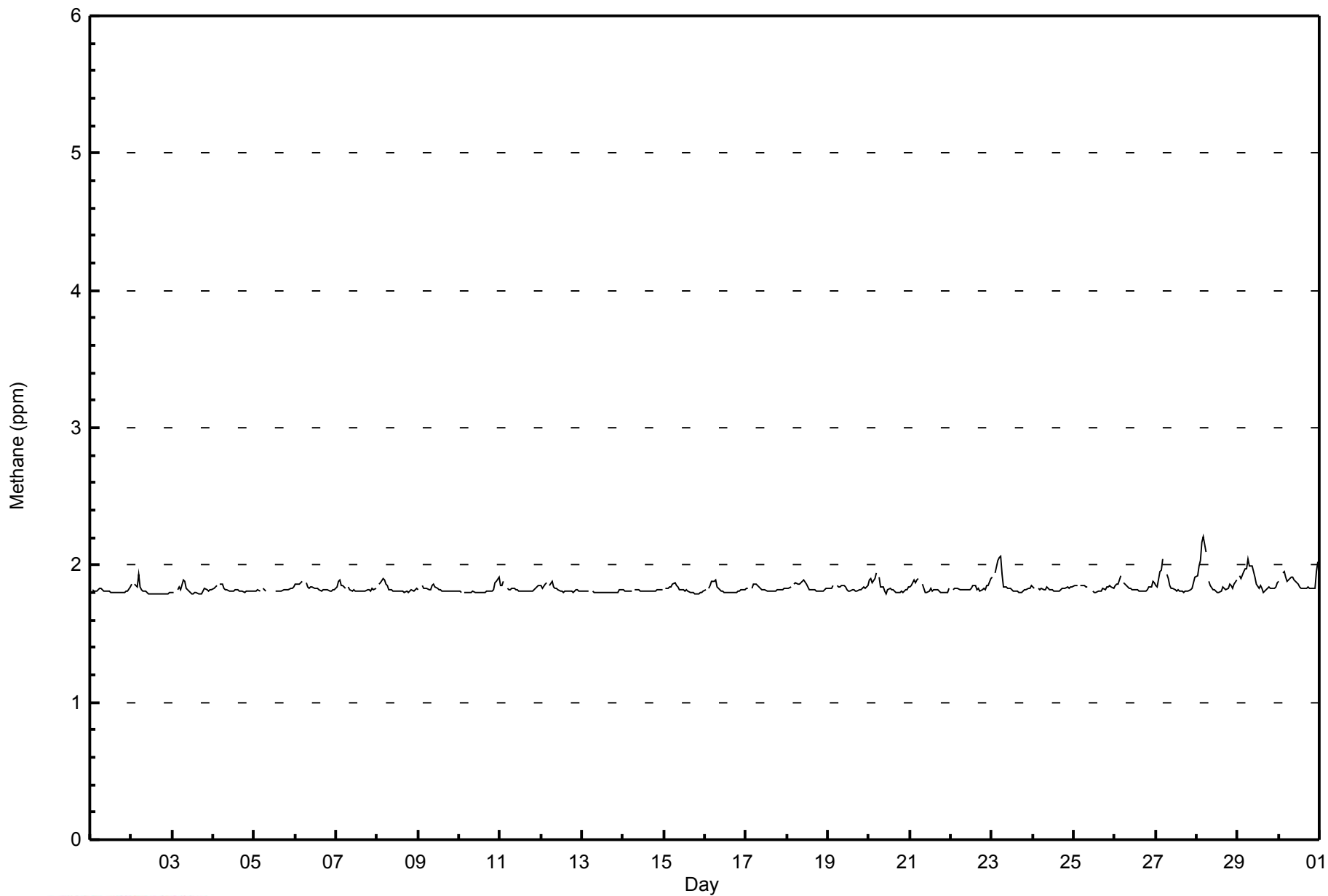
Anzac - June 2014





WBEA
Hourly Averages

Methane (CH₄) - ppm
Anzac - June 2014





WBEA
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Anzac - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	679	99.27	99.27
2.1 - 3.0	5	0.73	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



WBEA
Frequency Distribution

Methane (CH₄) - ppm
Anzac - June 2014

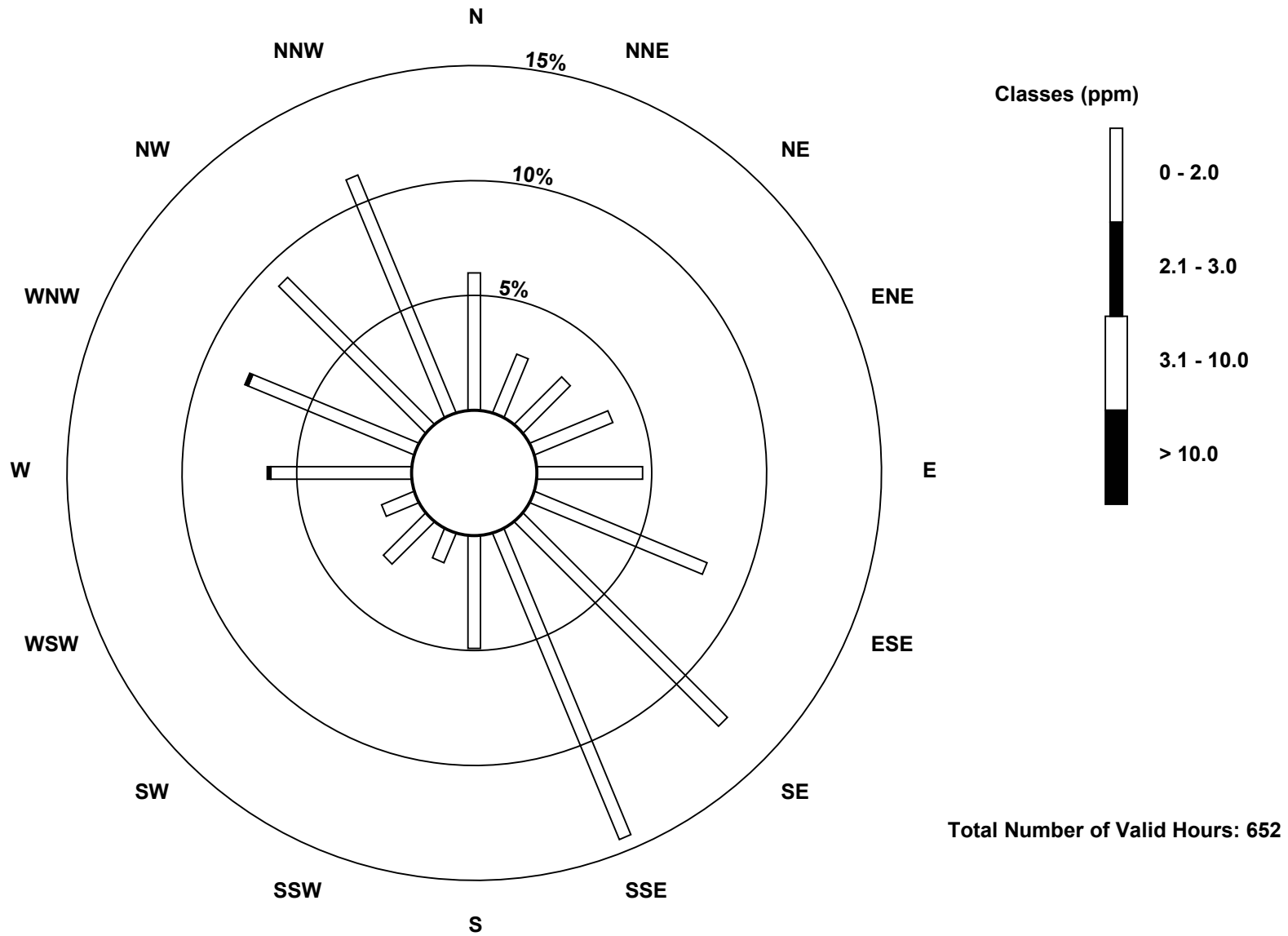
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	39	18	19	24	30	53	82	94	32	9	17	10	40	51	59	73	650
2.1 - 3.0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	18	19	24	30	53	82	94	32	9	17	10	41	52	59	73	652

Total Number of Valid Hours: 652

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

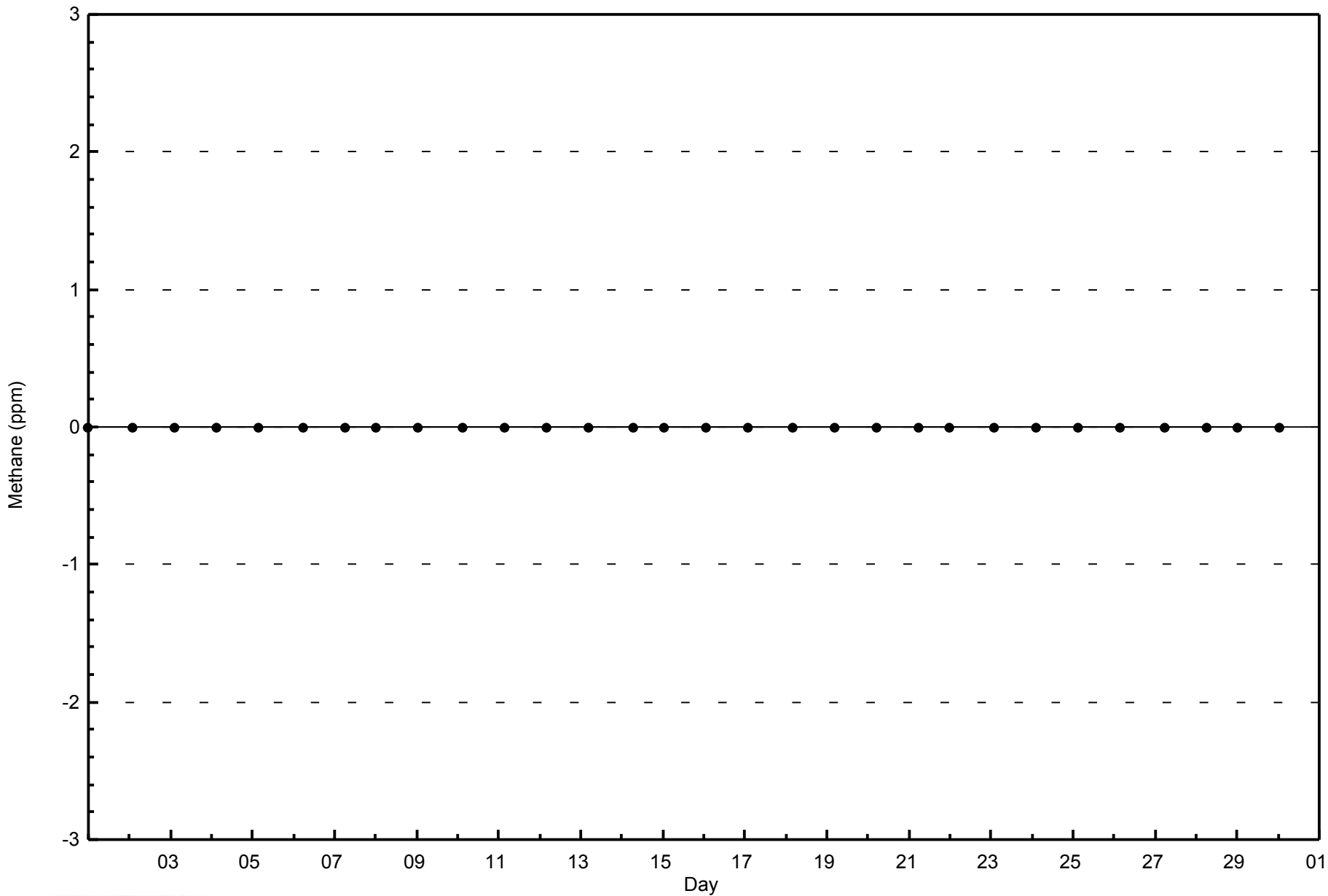
Methane (CH₄) - ppm
Anzac (AMS 14)





WBEA
Zero Responses

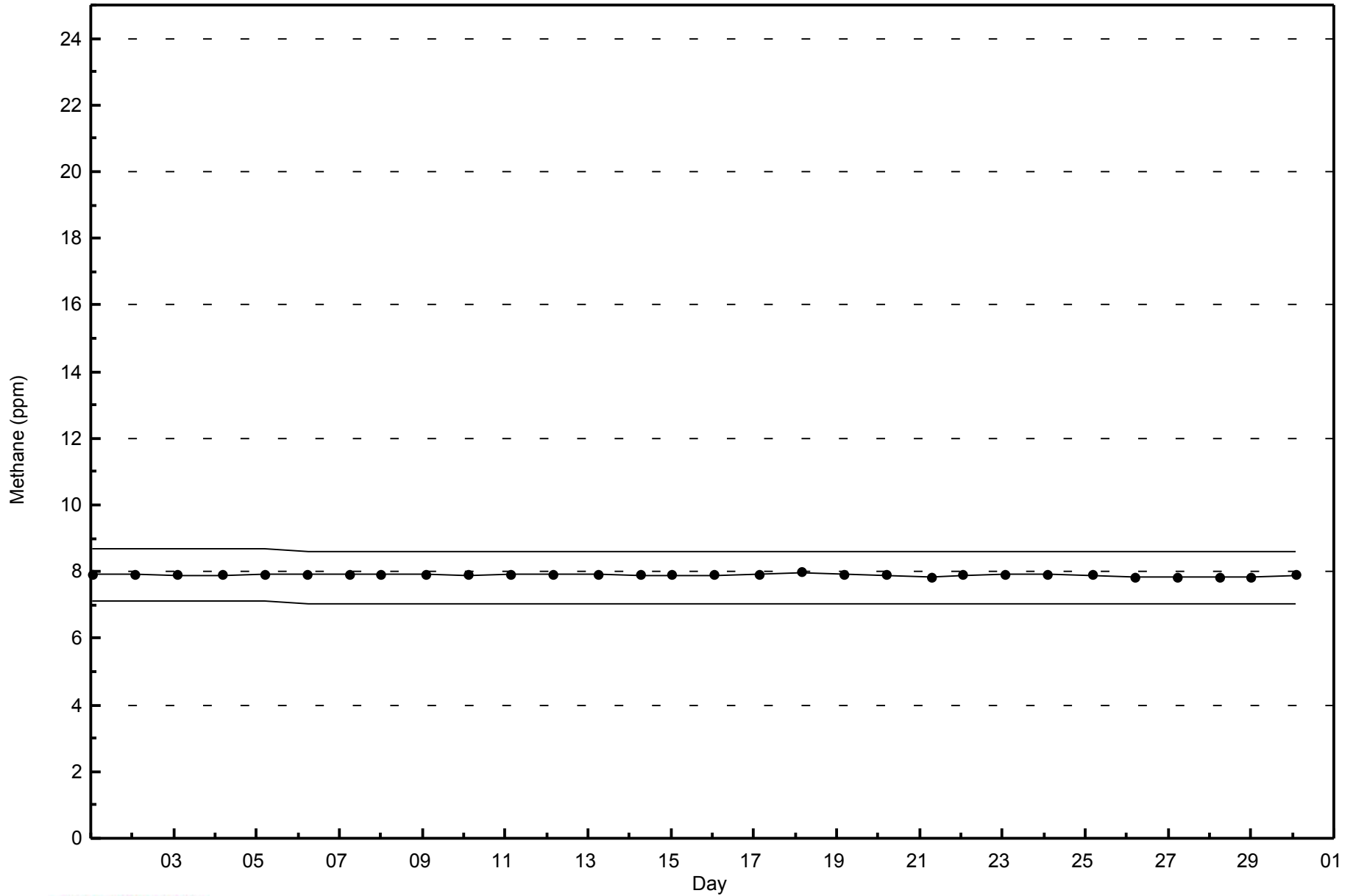
Methane (CH₄) - ppm
Anzac - June 2014





WBEA
Span Responses

Methane (CH₄) - ppm
Anzac - June 2014



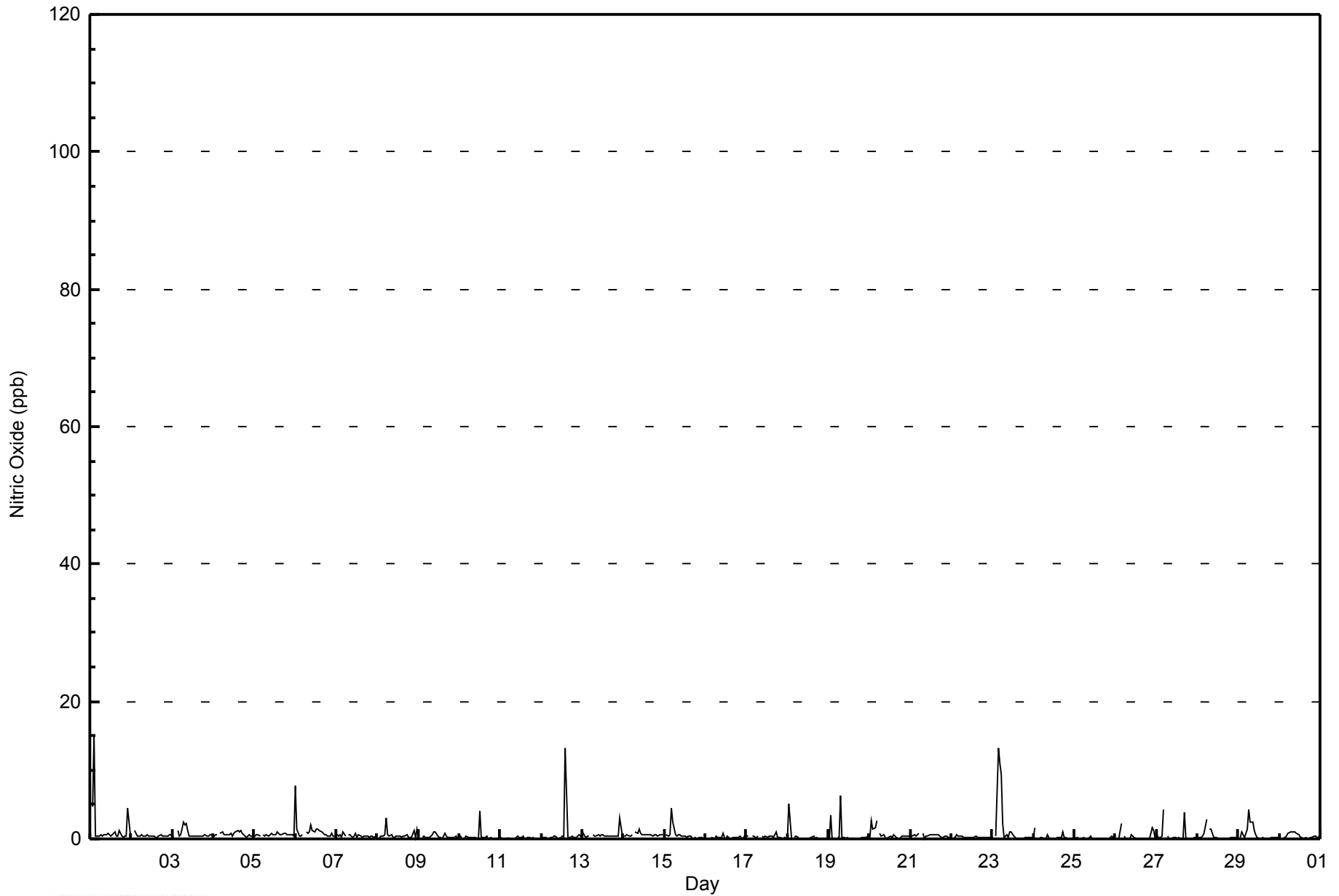


Maximum Value: 15 ppb on Jun 1 03:00																	Maximum Daily Average: 1.8 ppb on Jun 23																	Hours in Service: 720	
Minimum Value: 0 ppb on Jun 10 18:00																	Minimum Daily Average: 0.1 ppb on Jun 25																	Hours of Data: 683	
Maximum Diurnal Average: 1.3 ppb at hour 5																	Minimum Diurnal Average: 0.2 ppb at hour 20																	Hours of Missing Data: 37	
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: 36	
																																		Percent Operational Time: 99.9	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Jun	Z	5	15	0	0	0	1	0	1	1	1	1	0	1	1	0	0	1	0	0	0	0	5	1	1.5	15									
2-Jun	0	Z	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0.5	1									
3-Jun	0	0	Z	1	0	1	2	2	2	1	0	0	1	0	0	0	1	0	1	0	0	1	1	0.8	2										
4-Jun	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0.7	1									
5-Jun	0	1	1	0	Z	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.6	1									
6-Jun	8	1	0	0	1	Z	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	1	0	0	1.2	8									
7-Jun	1	0	1	0	1	0	Z	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1									
8-Jun	Z	0	0	0	1	3	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0.6	3									
9-Jun	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1									
10-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0.4	4									
11-Jun	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
12-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	1	0	0.8	13									
13-Jun	1	0	0	0	0	Z	1	0	0	1	0	1	1	1	1	0	0	0	0	0	0	3	0	0	0.6	3									
14-Jun	0	0	1	0	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0.6	1									
15-Jun	Z	1	0	1	5	2	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	5									
16-Jun	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1									
17-Jun	0	0	Z	0	0	0	0	0	0	M	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1									
18-Jun	0	5	0	Z	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	--	5									
19-Jun	0	3	0	0	Z	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	6									
20-Jun	0	3	1	2	3	Z	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.6	3									
21-Jun	0	0	1	0	1	1	Z	1	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1									
22-Jun	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1									
23-Jun	0	Z	0	13	11	9	2	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.8	13									
24-Jun	0	2	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	2									
25-Jun	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
26-Jun	0	0	0	2	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0.3	2									
27-Jun	1	0	0	0	4	Z	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.5	4									
28-Jun	0	0	0	0	1	3	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3									
29-Jun	Z	0	1	0	1	1	4	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	4									
30-Jun	0	Z	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1									
																	Diurnal Average		Diurnal Maximum																
																	0.6		8																
																	1.0		5																
																	1.0		15																
																	1.0		13																
																	1.3		11																
																	1.0		9																
																	0.7		4																
																	0.8		6																
																	0.6		2																
																	0.5		2																
																	0.5		1																
																	0.4		1																
																	0.5		4																
																	0.4		1																
																	0.8		13																
																	0.3		1																
																	0.4		4																
																	0.4		1																
																	0.3		1																
																	0.2		1																
																	0.2		1																
																	0.4		2																
																	0.5		5																
																	0.3		1																



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Anzac - June 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Anzac - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	683	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Anzac - June 2014

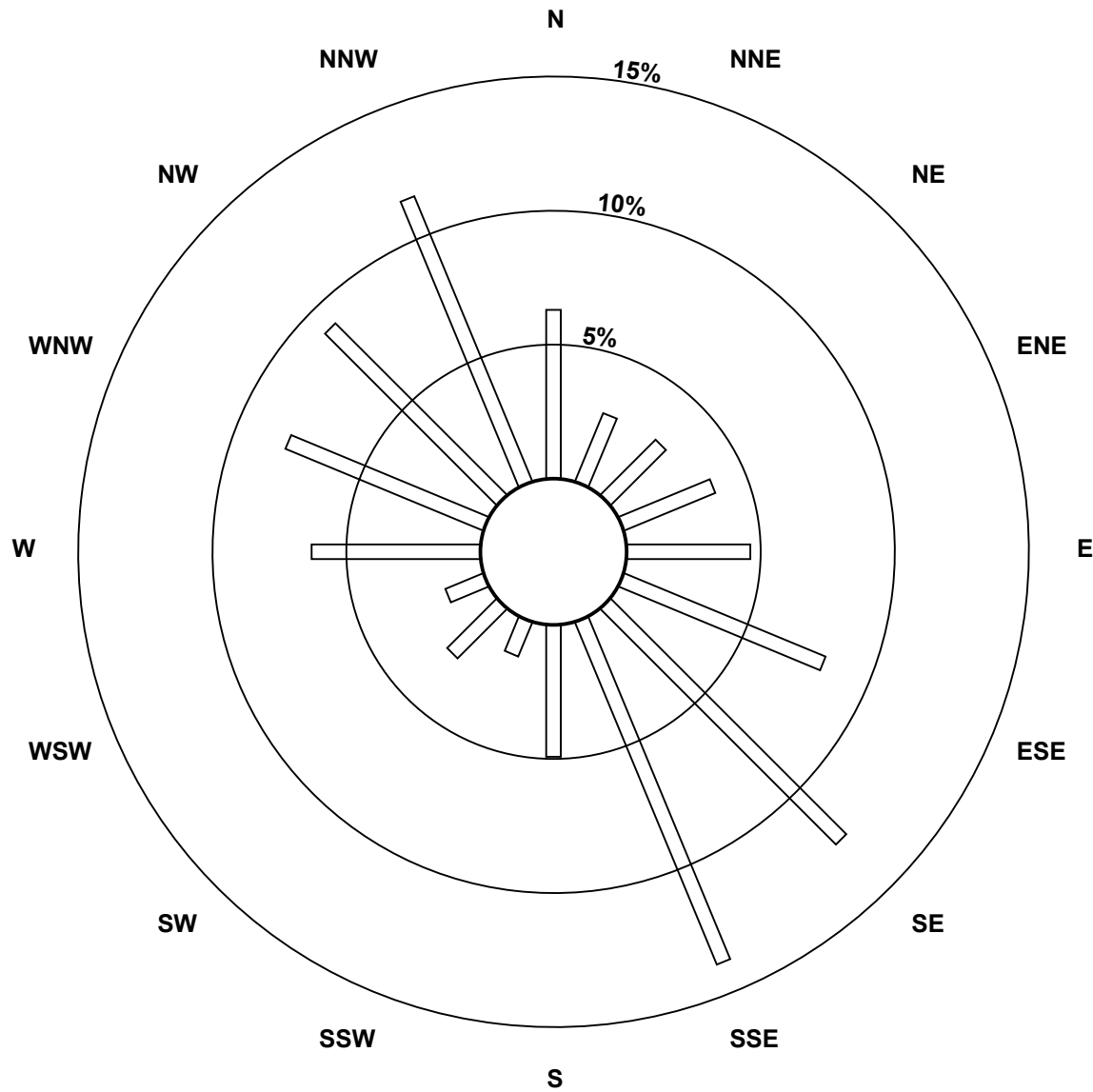
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	41	18	19	24	30	53	81	90	32	9	17	10	41	52	59	75	651
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	41	18	19	24	30	53	81	90	32	9	17	10	41	52	59	75	651

Total Number of Valid Hours: 651

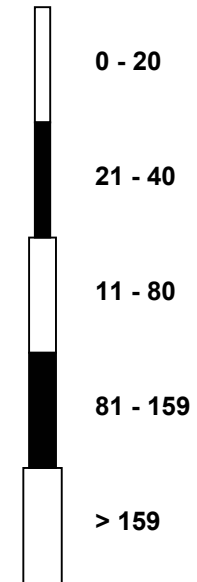
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Nitric Oxide (NO) - ppb
Anzac (AMS 14)



Classes (ppb)

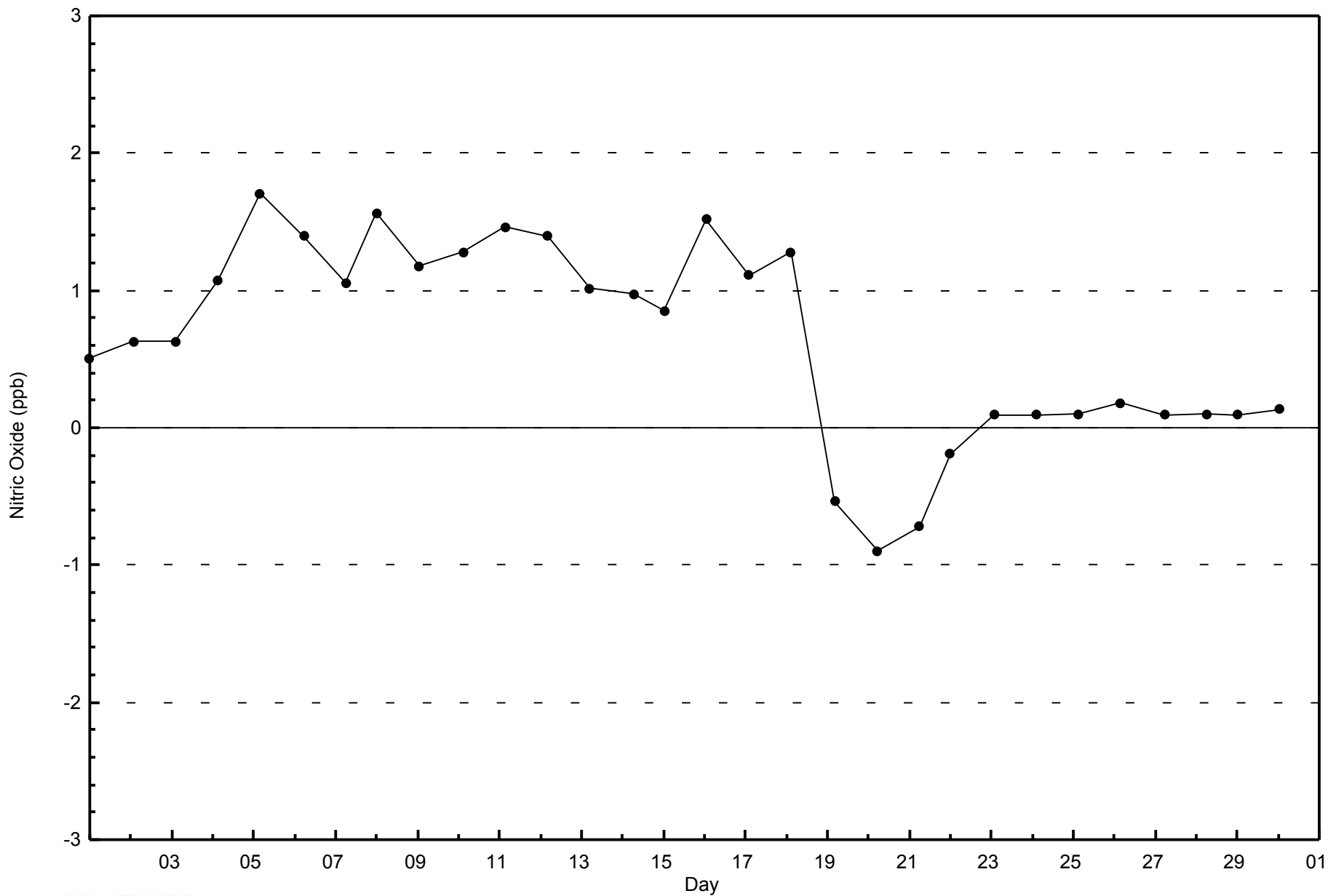


Total Number of Valid Hours: 651



WBEA
Zero Responses

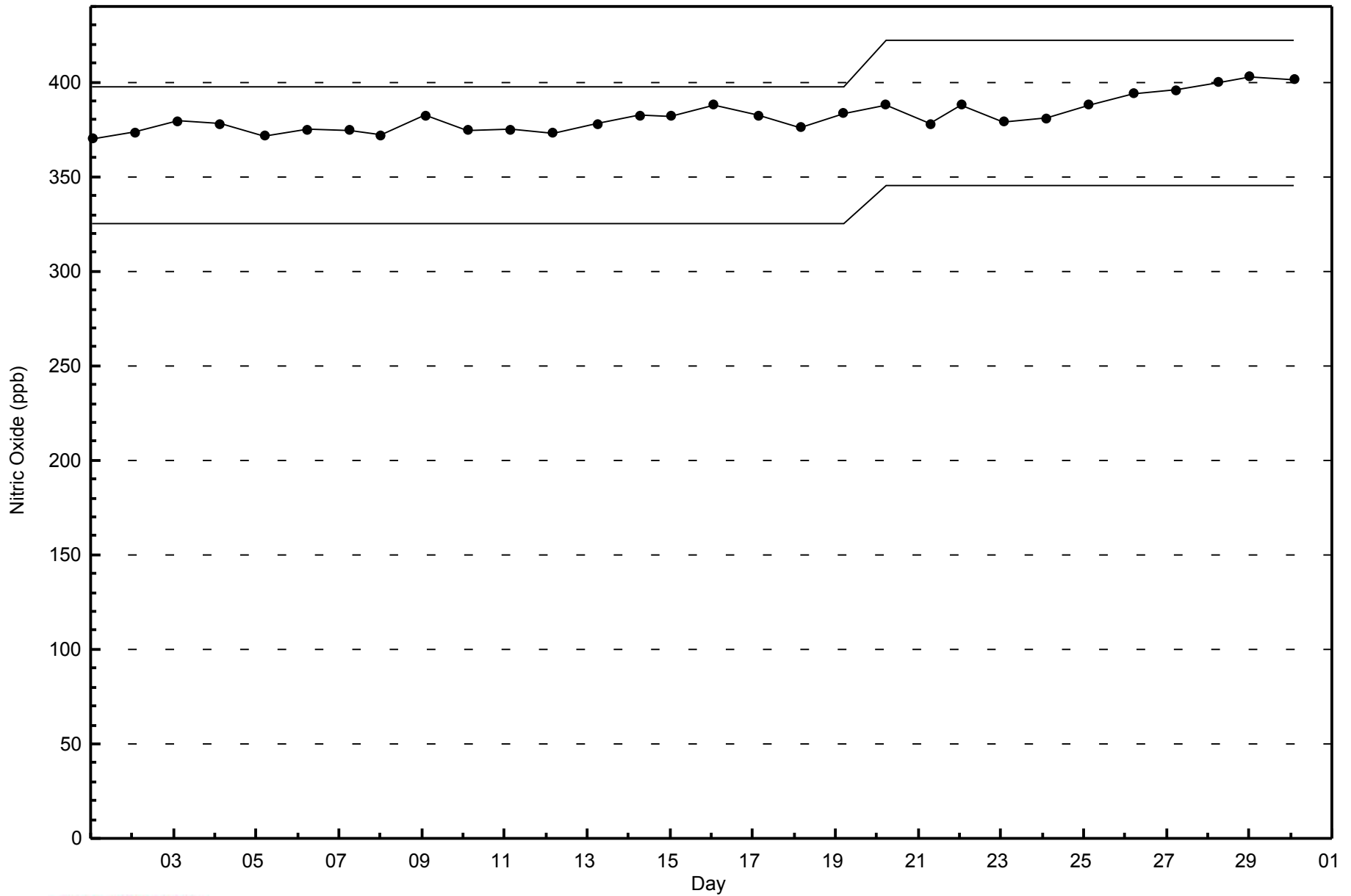
Nitric Oxide (NO) - ppb
Anzac - June 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Anzac - June 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 13 ppb on Jun 29 07:00	Maximum Daily Average: 3.4 ppb on Jun 29		Hours of Data:	683
Minimum Value: 0 ppb on Jun 1 05:00	Minimum Daily Average: 0.0 ppb on Jun 14		Hours of Missing Data:	37
Maximum Diurnal Average: 1.4 ppb at hour 3	Minimum Diurnal Average: 0.3 ppb at hour 21		Hours of Calibration:	36
Monthly Average: 0.8 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:	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-Jun	Z	4	12	2	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	7	3	1.3	12
2-Jun	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.1	1
3-Jun	0	0	Z	1	0	1	5	3	4	1	0	0	0	1	0	0	0	0	1	2	0	0	0	0	0.8	5
4-Jun	1	2	2	Z	4	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.6	4
5-Jun	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0.1	1
6-Jun	5	4	2	2	3	Z	4	1	1	2	2	1	1	1	0	0	0	0	0	0	0	1	0	0	1.4	5
7-Jun	0	0	0	1	1	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
8-Jun	Z	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0.2	2
9-Jun	0	Z	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2
10-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0.1	2
11-Jun	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Jun	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0.1	3
13-Jun	2	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0.4	6
14-Jun	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
15-Jun	Z	0	0	0	5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	6
16-Jun	0	Z	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
17-Jun	0	0	Z	0	0	0	0	0	M	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.0	1
18-Jun	0	5	0	Z	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	--	5
19-Jun	0	2	0	0	Z	1	0	4	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	4
20-Jun	1	2	1	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	2
21-Jun	0	0	2	3	4	3	Z	2	1	1	0	1	3	1	2	2	2	2	2	1	1	1	1	1	1.5	4
22-Jun	Z	1	2	2	4	4	1	1	0	1	1	1	2	4	3	1	2	1	1	2	0	0	0	0	1.5	4
23-Jun	0	Z	1	1	1	2	2	1	1	0	3	3	1	1	0	0	0	0	0	0	0	1	1	1	0.8	3
24-Jun	1	2	Z	0	1	2	1	0	2	1	0	0	0	0	0	1	3	1	1	1	1	1	1	1	0.7	3
25-Jun	1	1	1	Z	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	4	1	0.9	4
26-Jun	1	1	1	4	Z	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	4	6	2	1.4	6
27-Jun	2	1	1	1	1	Z	1	1	0	0	0	1	0	0	0	3	1	0	0	1	1	1	1	1	0.6	3
28-Jun	1	1	1	1	1	2	Z	5	4	2	2	2	1	1	1	3	3	2	2	2	3	3	2	2	1.9	5
29-Jun	Z	1	4	4	3	6	13	9	7	5	3	1	1	1	1	1	1	1	1	1	1	1	5	8	3.4	13
30-Jun	8	Z	9	7	5	4	4	5	5	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	2.7	9

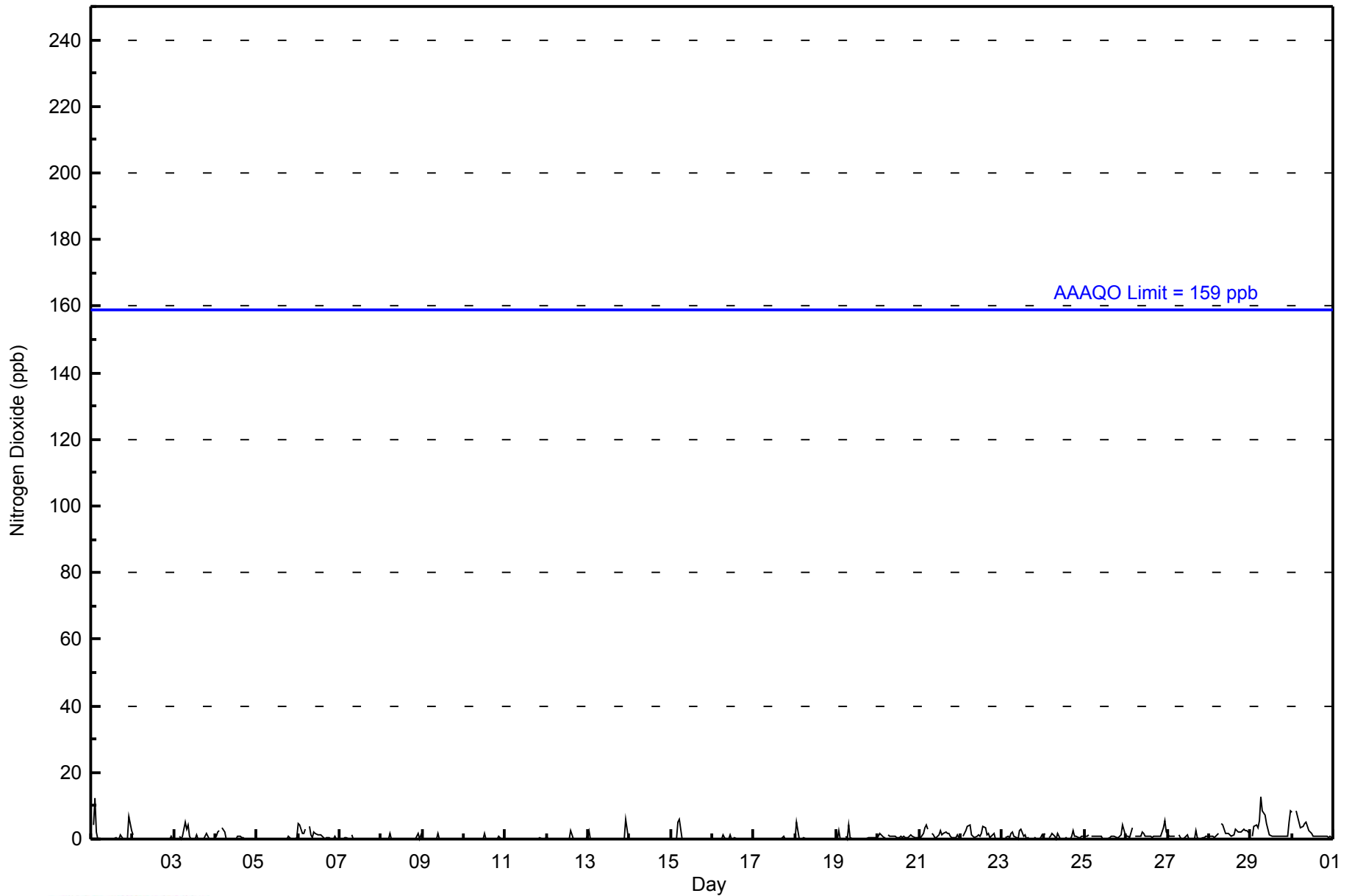
1.0	1.1	1.4	1.1	1.3	1.4	1.4	1.2	1.0	0.7	0.6	0.5	0.4	0.5	0.5	0.4	0.5	0.5	0.4	0.4	0.3	0.5	1.2	0.8	Diurnal Average		
8	5	12	7	5	6	13	9	7	5	3	3	3	4	3	3	3	3	3	2	2	3	4	7	8	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Anzac - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	683	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - June 2014

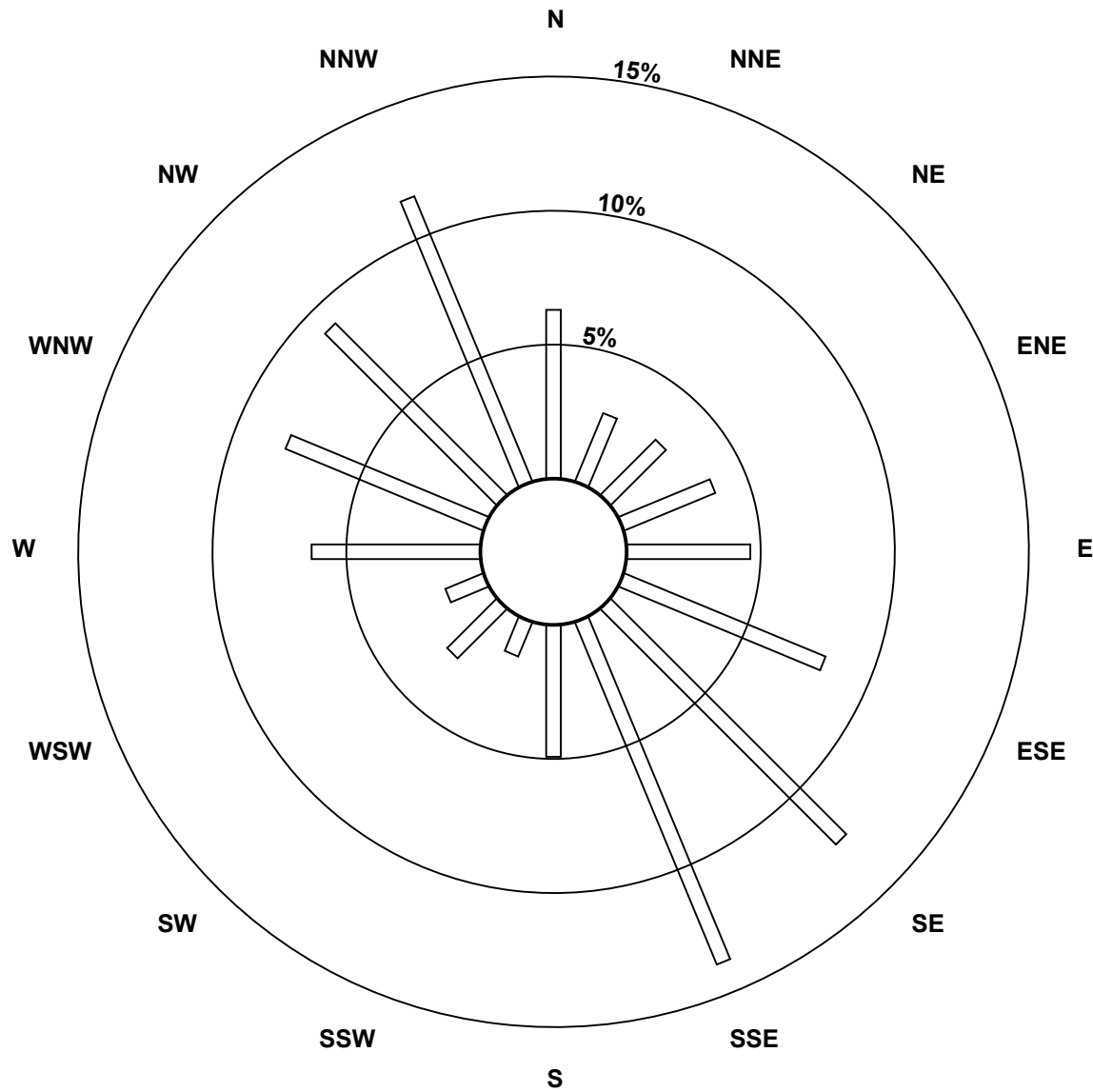
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	41	18	19	24	30	53	81	90	32	9	17	10	41	52	59	75	651
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	41	18	19	24	30	53	81	90	32	9	17	10	41	52	59	75	651

Total Number of Valid Hours: 651

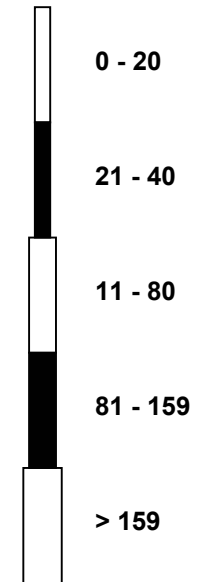
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Nitrogen Dioxide (NO₂) - ppb
Anzac (AMS 14)



Classes (ppb)

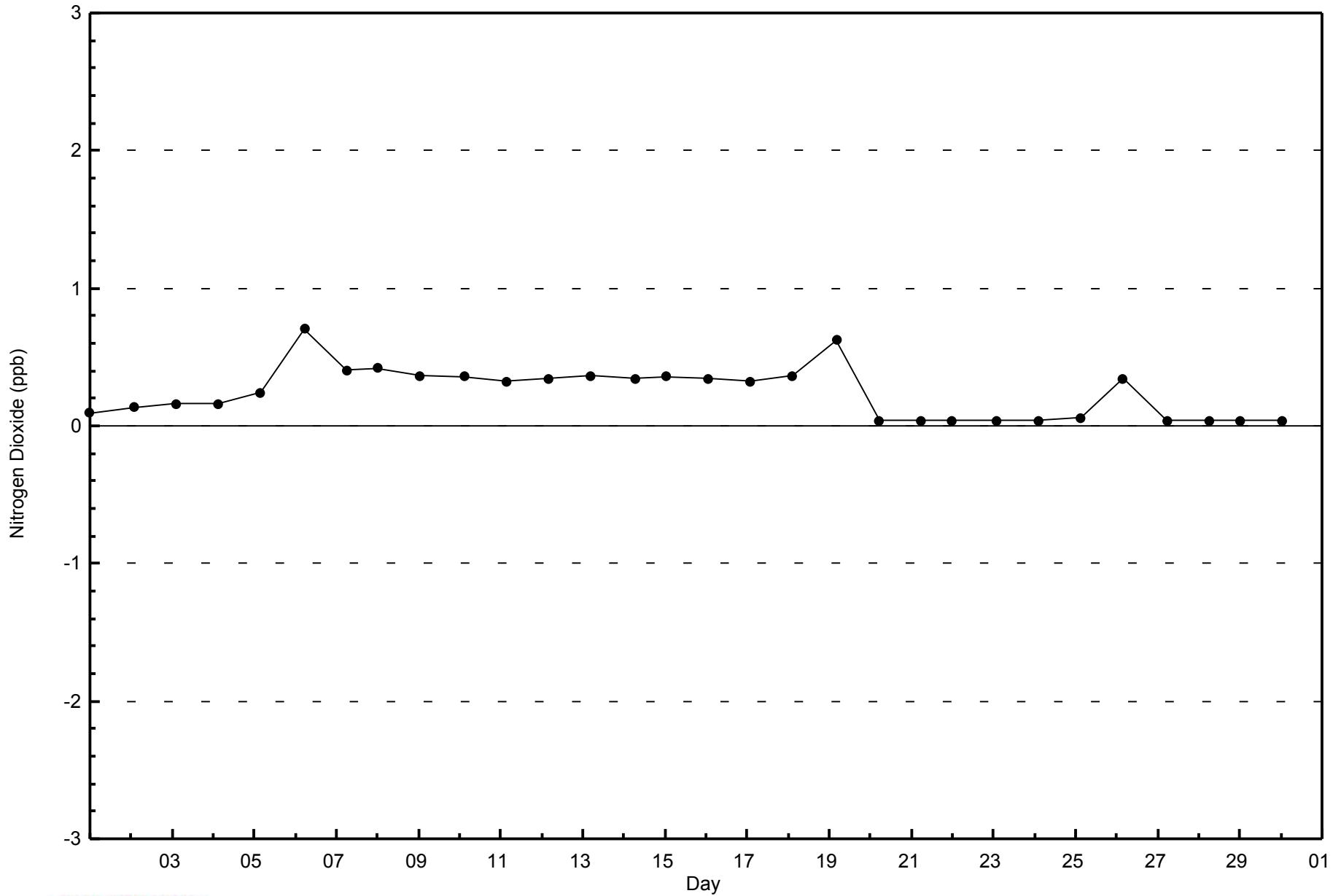


Total Number of Valid Hours: 651



WBEA
Zero Responses

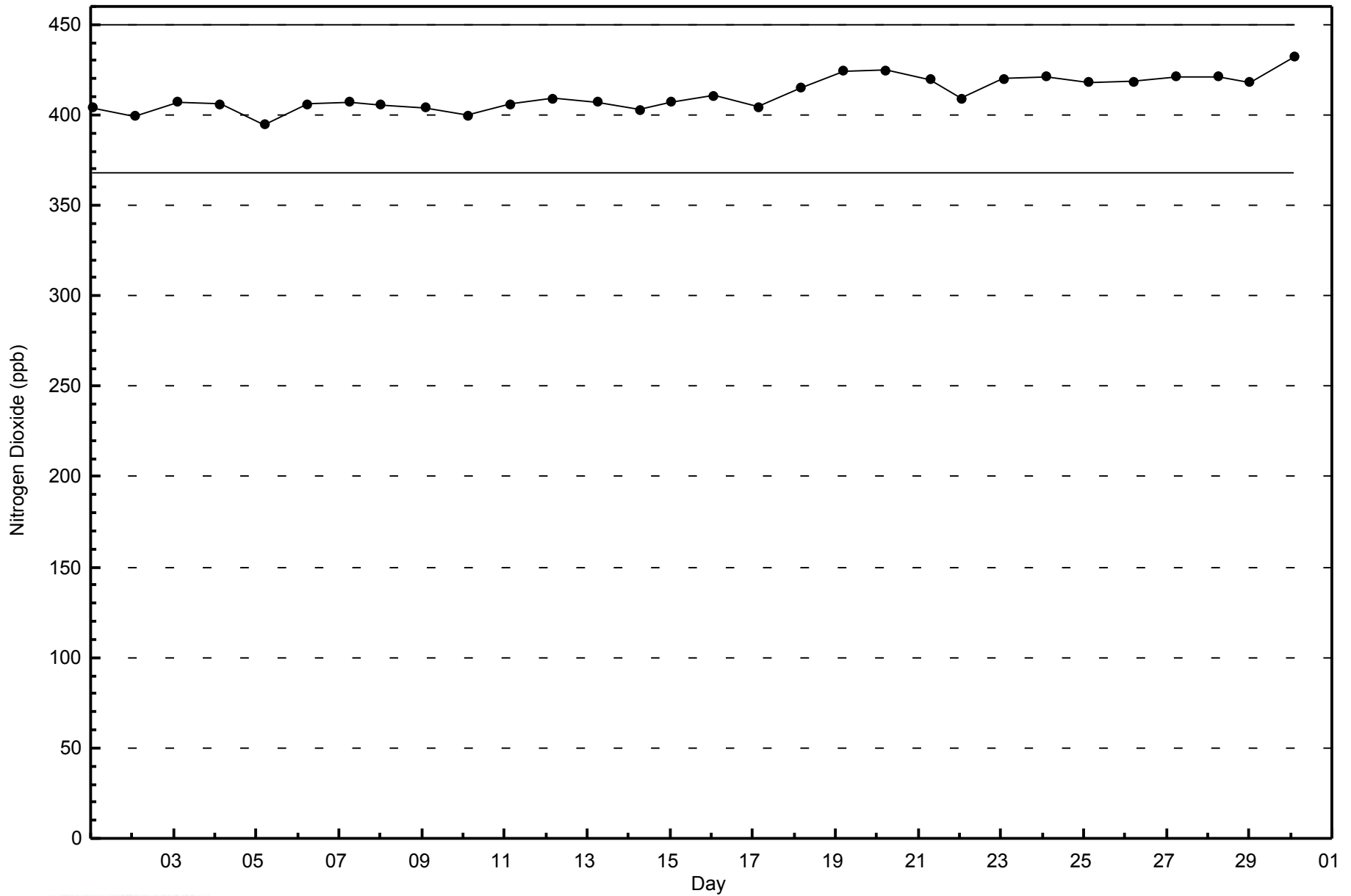
Nitrogen Dioxide (NO₂) - ppb
Anzac - June 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Anzac - June 2014





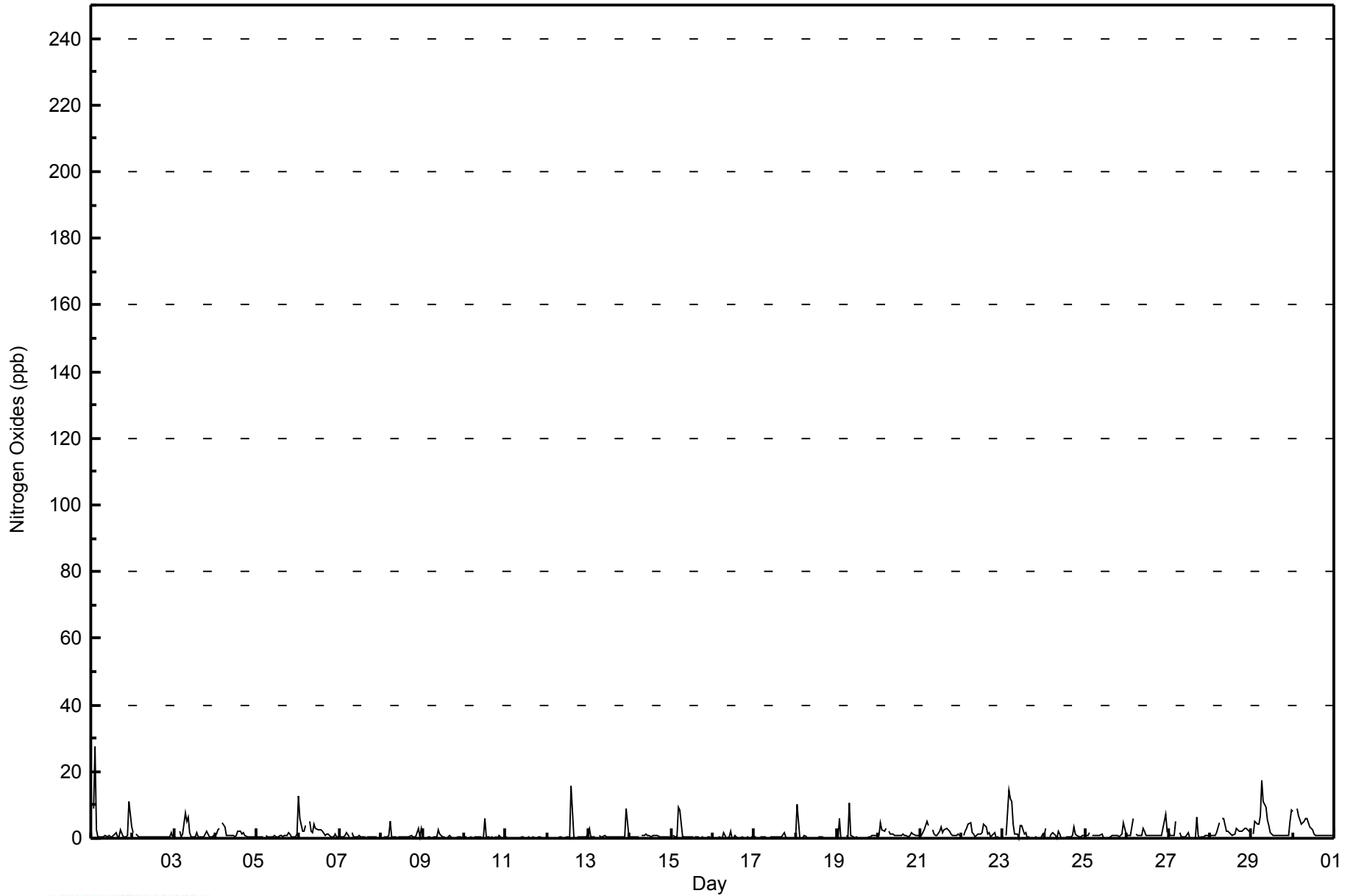
Maximum Value: 27 ppb on Jun 1 03:00																	Maximum Daily Average: 4.1 ppb on Jun 29																	Hours in Service: 720	
Minimum Value: 0 ppb on Jun 10 18:00																	Minimum Daily Average: 0.1 ppb on Jun 11																	Hours of Data: 683	
Maximum Diurnal Average: 2.6 ppb at hour 5																	Minimum Diurnal Average: 0.6 ppb at hour 21																	Hours of Missing Data: 37	
Monthly Average: 1.3 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 11																	Hours of Calibration: 36	
																	Percent Operational Time: 99.9																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Jun	Z	9	27	3	0	0	1	0	1	1	1	1	0	1	2	0	0	3	0	0	0	1	11	3	2.9	27									
2-Jun	2	Z	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2	1	0.6	2									
3-Jun	0	0	Z	2	1	1	8	5	6	2	0	0	2	0	0	0	1	1	2	0	0	1	1	1.6	8										
4-Jun	1	3	3	Z	5	3	1	1	1	1	1	1	2	2	1	2	1	0	0	0	1	0	0	1.3	5										
5-Jun	0	1	1	0	Z	1	0	1	0	1	1	1	1	1	1	1	1	1	2	1	1	1	1	0.7	2										
6-Jun	13	6	2	2	4	Z	5	2	2	4	3	2	3	3	2	1	1	1	1	1	0	1	0	2.6	13										
7-Jun	1	0	1	1	2	0	Z	2	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0.5	2										
8-Jun	Z	0	0	0	1	5	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0.8	5										
9-Jun	1	Z	0	0	0	0	0	0	1	3	1	0	0	0	0	1	0	0	0	0	0	0	0	0.4	3										
10-Jun	0	0	Z	0	1	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	1	0	0	0.5	6										
11-Jun	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0										
12-Jun	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	1	1.0	16										
13-Jun	3	0	0	0	0	Z	1	0	0	1	0	1	1	1	1	0	0	0	0	0	0	9	1	0.9	9										
14-Jun	0	0	1	0	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0.6	1										
15-Jun	Z	1	0	1	9	9	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1.1	9										
16-Jun	0	Z	0	0	0	0	2	1	0	0	2	0	0	1	0	0	0	0	0	0	0	0	1	0.4	2										
17-Jun	0	0	Z	0	0	0	0	0	M	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0.4	2										
18-Jun	0	10	0	Z	0	1	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	--	10										
19-Jun	0	6	0	0	Z	1	0	11	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.1	11										
20-Jun	1	5	2	2	3	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	5										
21-Jun	1	1	2	4	5	4	Z	3	1	1	1	2	3	2	2	3	2	2	1	1	1	1	1	1.9	5										
22-Jun	Z	1	2	3	4	5	2	1	1	1	1	1	2	4	4	1	2	1	1	2	0	0	0	1.7	5										
23-Jun	0	Z	1	14	12	11	4	1	1	0	4	4	1	2	0	1	0	0	0	0	0	1	1	2.5	14										
24-Jun	1	3	Z	0	1	2	1	0	2	1	0	0	0	0	0	0	1	4	1	1	1	1	1	1.0	4										
25-Jun	1	1	2	Z	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	5	1.0	5										
26-Jun	1	1	1	6	Z	1	1	1	1	3	2	1	1	1	1	1	1	1	1	1	1	5	7	1.7	7										
27-Jun	2	1	1	1	5	Z	2	1	0	0	1	2	0	0	0	0	6	1	0	0	1	1	1	1.1	6										
28-Jun	1	1	1	1	2	5	Z	6	6	2	2	2	1	1	1	3	3	2	2	2	3	3	2	2.3	6										
29-Jun	Z	1	5	4	4	7	17	11	9	6	4	2	1	1	1	1	1	1	1	1	1	1	5	4.1	17										
30-Jun	8	Z	9	7	6	4	5	6	6	5	3	2	1	1	1	1	1	1	1	1	1	1	1	3.1	9										
																	Diurnal Average		Diurnal Maximum																
																	1.6		13																
																	2.0		10																
																	2.4		27																
																	2.1		14																
																	2.6		12																
																	2.4		11																
																	2.1		17																
																	2.0		11																
																	1.6		9																
																	1.3		6																
																	1.1		4																
																	0.9		4																
																	0.9		6																
																	0.9		4																
																	1.3		16																
																	0.7		3																
																	0.9		6																
																	0.8		4																
																	0.6		2																
																	0.7		2																
																	0.6		3																
																	0.8		5																
																	1.7		11																
																	1.1		9																

Z - zerspan C - Calibration M - Maintenance



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Anzac - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	682	99.85	99.85
21 - 40	1	0.15	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: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - June 2014

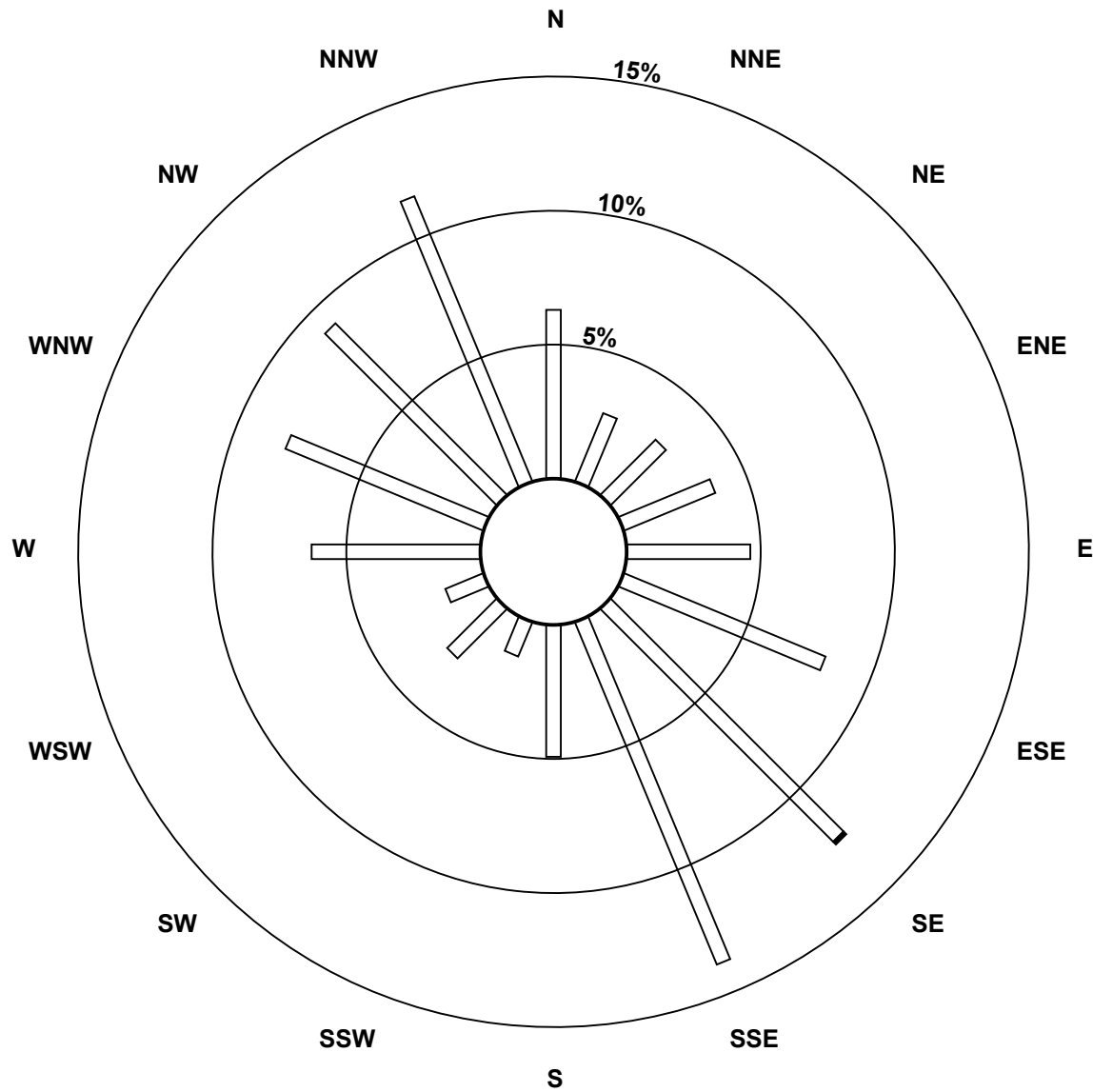
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	41	18	19	24	30	53	80	90	32	9	17	10	41	52	59	75	650
21 - 40	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	41	18	19	24	30	53	81	90	32	9	17	10	41	52	59	75	651

Total Number of Valid Hours: 651

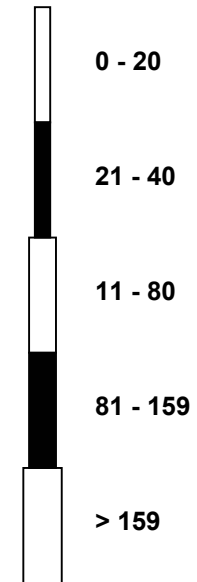
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

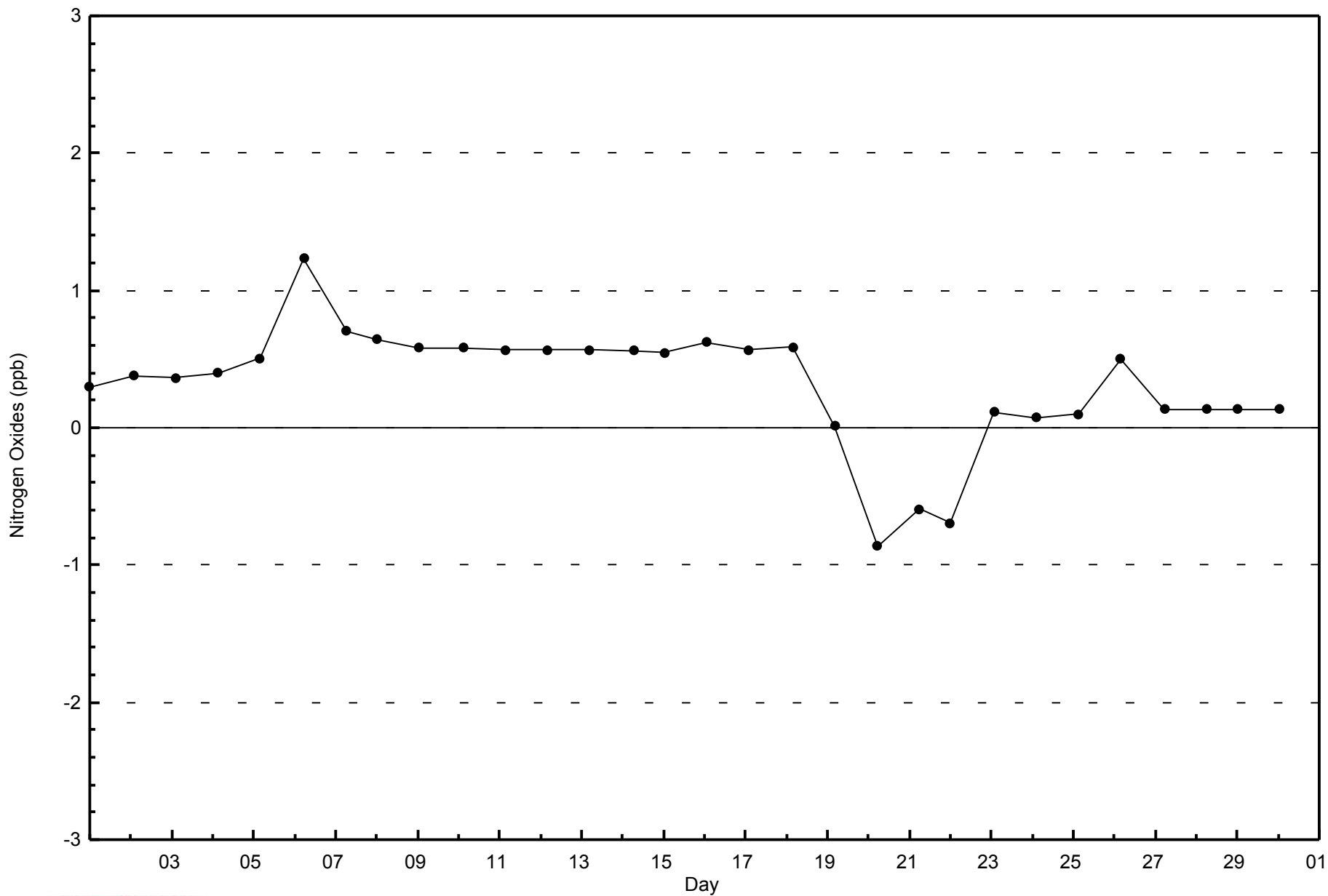
Nitrogen Oxides (NO_x) - ppb
Anzac (AMS 14)



Classes (ppb)



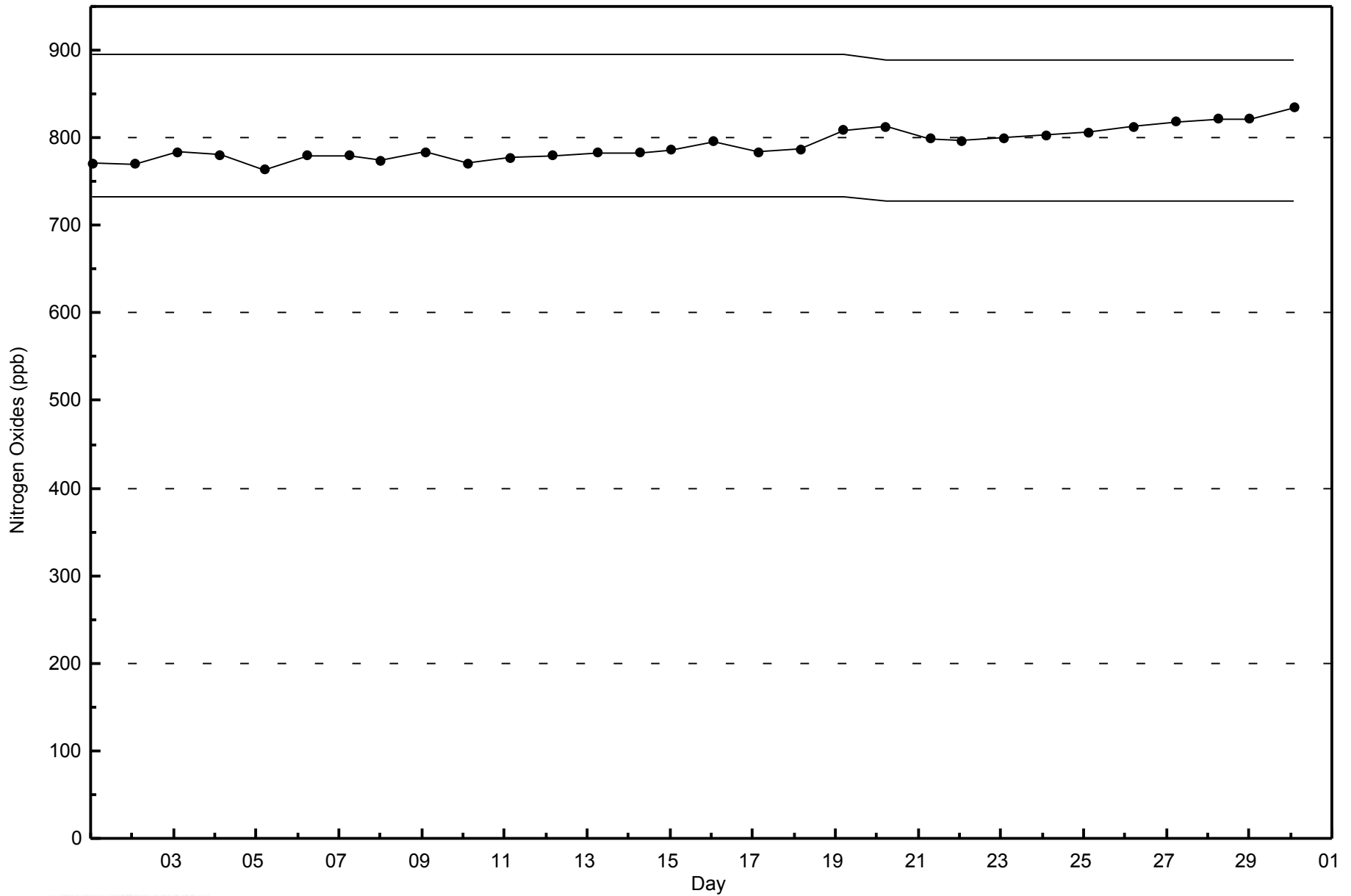
Total Number of Valid Hours: 651





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Anzac - June 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Anzac - June 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 64 ppb on Jun 28 17:00	Maximum Daily Average: 36.2 ppb on Jun 14		Hours of Data:	678
Minimum Value: 0 ppb on Jun 23 05:00	Minimum Daily Average: 14.8 ppb on Jun 20		Hours of Missing Data:	42
Maximum Diurnal Average: 36.3 ppb at hour 16	Minimum Diurnal Average: 14.6 ppb at hour 5		Hours of Calibration:	37
Monthly Average: 26.7 ppb	Percentiles: P ₁ = 1 P ₁₀ = 11 Q ₁ = 19 Median = 28 Q ₃ = 35 P ₉₀ = 41 P ₉₉ = 48		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-Jun	Z	30	27	32	35	34	34	33	32	32	32	34	37	41	41	42	45	46	44	40	32	17	12	6	32.8	46
2-Jun	3	Z	3	4	9	26	32	31	33	37	40	40	42	44	44	43	44	44	42	42	37	31	24	16	31.1	44
3-Jun	13	13	Z	21	26	26	24	29	34	46	50	49	46	41	45	49	47	45	25	13	16	16	13	11	30.3	50
4-Jun	9	8	7	Z	6	9	12	10	12	14	13	14	15	17	19	21	23	23	23	22	21	20	19	18	15.4	23
5-Jun	18	19	21	21	Z	19	18	18	24	24	25	28	30	33	34	34	33	31	29	29	28	20	18	15	24.8	34
6-Jun	9	10	12	11	10	Z	16	21	22	23	25	27	28	30	33	35	35	36	36	35	30	25	24	26	24.2	36
7-Jun	22	17	21	18	12	18	Z	19	30	34	32	34	30	31	35	35	35	35	33	32	33	32	29	22	27.7	35
8-Jun	Z	7	5	4	3	7	25	35	37	38	38	40	40	41	42	44	45	44	44	42	39	36	37	34	31.5	45
9-Jun	34	Z	28	19	12	19	24	24	24	24	28	29	35	34	32	33	34	35	35	36	33	31	25	19	28.1	36
10-Jun	22	22	Z	24	24	25	26	28	28	29	29	31	31	35	37	39	42	41	41	38	32	14	8	14	28.7	42
11-Jun	27	27	22	Z	34	33	31	29	29	32	33	37	37	37	35	34	33	37	36	35	31	25	17	12	30.7	37
12-Jun	19	21	10	10	Z	9	24	34	36	36	40	43	42	43	42	47	45	41	39	40	37	26	36	37	32.9	47
13-Jun	31	33	28	30	30	Z	29	32	34	37	38	40	41	42	42	42	42	39	40	43	39	36	30	32	36.1	43
14-Jun	32	30	30	28	27	26	Z	27	30	33	39	41	42	44	44	45	46	45	45	43	40	34	33	28	36.2	46
15-Jun	Z	24	26	26	21	25	34	39	42	42	43	43	42	42	41	41	37	37	38	38	37	28	29	21	34.6	43
16-Jun	19	Z	19	12	8	16	16	24	28	31	31	32	31	32	33	36	35	34	31	30	32	30	19	14	25.7	36
17-Jun	11	10	Z	16	15	13	22	24	M	27	27	28	28	29	30	30	28	26	28	25	24	17	15	12	22.1	30
18-Jun	16	15	12	Z	12	15	15	15	21	26	27	33	37	37	39	39	40	39	38	37	35	31	29	27	27.7	40
19-Jun	25	21	22	19	Z	17	19	C	C	C	C	C	C	C	30	28	31	29	26	20	16	13	15	8	--	31
20-Jun	8	2	1	1	0	Z	M	M	M	M	25	21	19	18	18	18	20	24	25	20	19	14	13	15	14.8	25
21-Jun	16	17	14	14	13	16	Z	18	22	24	23	26	24	28	24	24	24	22	19	19	19	16	16	13	19.7	28
22-Jun	Z	10	13	16	13	16	14	13	15	15	21	22	30	35	38	31	24	24	26	28	22	10	4	1	19.2	38
23-Jun	1	Z	0	0	0	1	6	13	16	19	23	28	30	31	29	30	31	31	27	21	17	15	18	17	17.6	31
24-Jun	14	14	Z	20	22	22	22	23	23	26	32	31	35	35	35	39	38	35	33	38	33	31	33	30	28.8	39
25-Jun	25	21	20	Z	18	19	20	23	25	26	31	35	36	36	37	35	38	34	31	24	29	27	23	24	27.8	38
26-Jun	24	22	15	5	Z	7	22	32	35	36	36	32	29	26	27	31	28	31	32	29	15	9	1	1	22.9	36
27-Jun	2	1	1	1	1	Z	15	23	23	28	30	30	29	29	31	32	33	33	32	32	27	15	8	3	19.9	33
28-Jun	2	2	1	1	2	3	Z	29	33	43	45	47	47	44	51	63	64	60	44	35	34	29	22	11	31.0	64
29-Jun	Z	6	6	7	6	7	8	17	23	32	35	35	40	41	40	37	37	38	36	33	28	26	22	18	25.1	41
30-Jun	22	Z	19	20	21	21	21	23	27	30	32	32	32	32	32	33	34	33	33	32	26	25	22	19	27.0	34

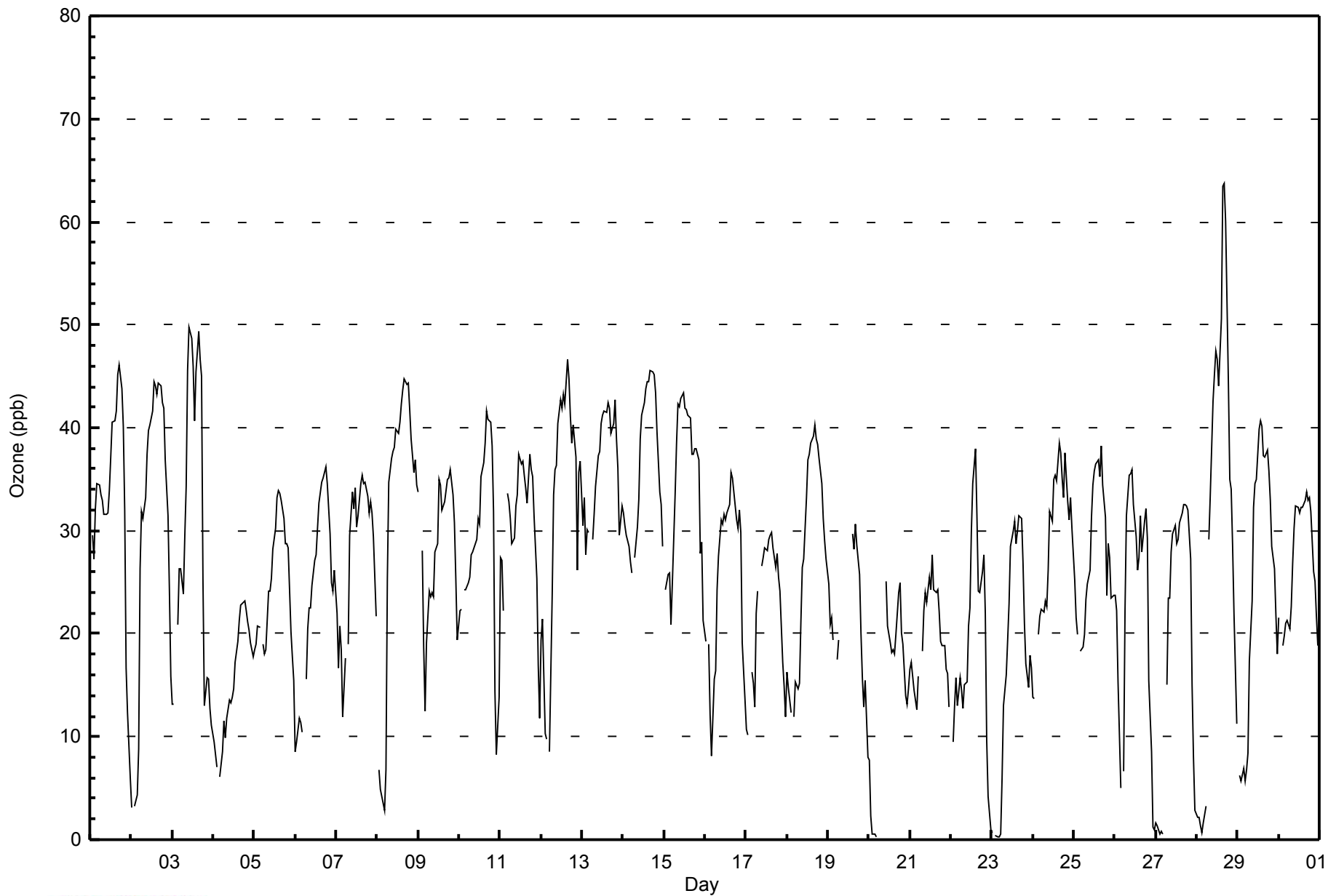
17.0	16.1	14.7	14.6	14.6	17.2	21.1	24.5	27.4	30.1	31.8	33.3	33.9	34.8	35.3	36.3	36.3	35.8	33.8	31.7	28.7	23.3	20.5	17.5	Diurnal Average	
34	33	30	32	35	34	34	39	42	46	50	49	47	44	51	63	64	60	45	43	40	36	37	37	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Anzac - June 2014





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Anzac - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	194	28.61	28.61
21 - 50	480	70.80	99.41
51 - 82	4	0.59	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
Anzac - June 2014

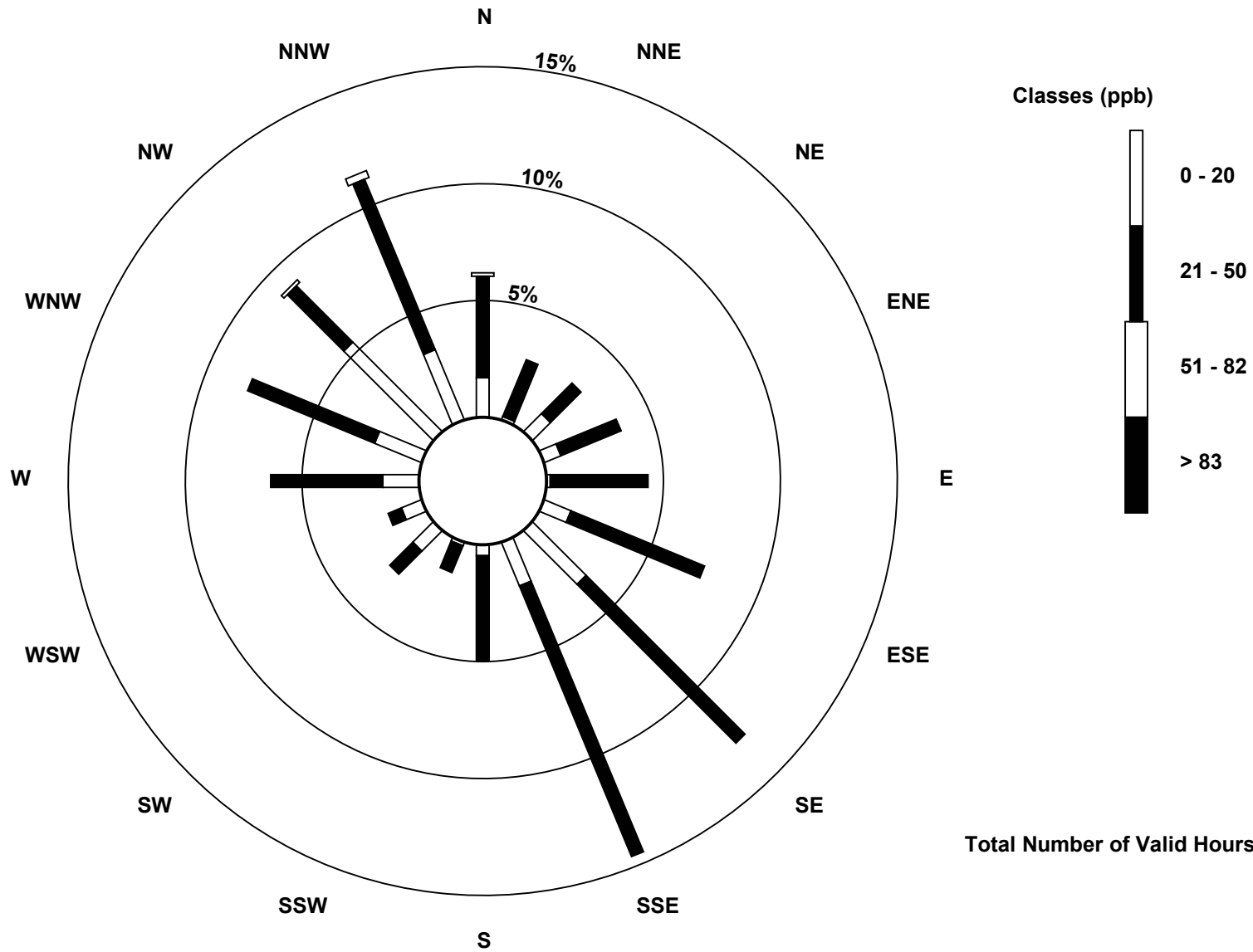
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	11	1	7	5	1	8	21	13	3	1	8	6	10	14	35	21	165
21 - 50	28	17	12	18	27	40	62	81	29	8	9	4	31	38	22	51	477
51 - 82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	40	18	19	23	28	48	83	94	32	9	17	10	41	52	58	74	646

Total Number of Valid Hours: 646

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Jun 2014

Ozone (O₃) - ppb
 Anzac (AMS 14)

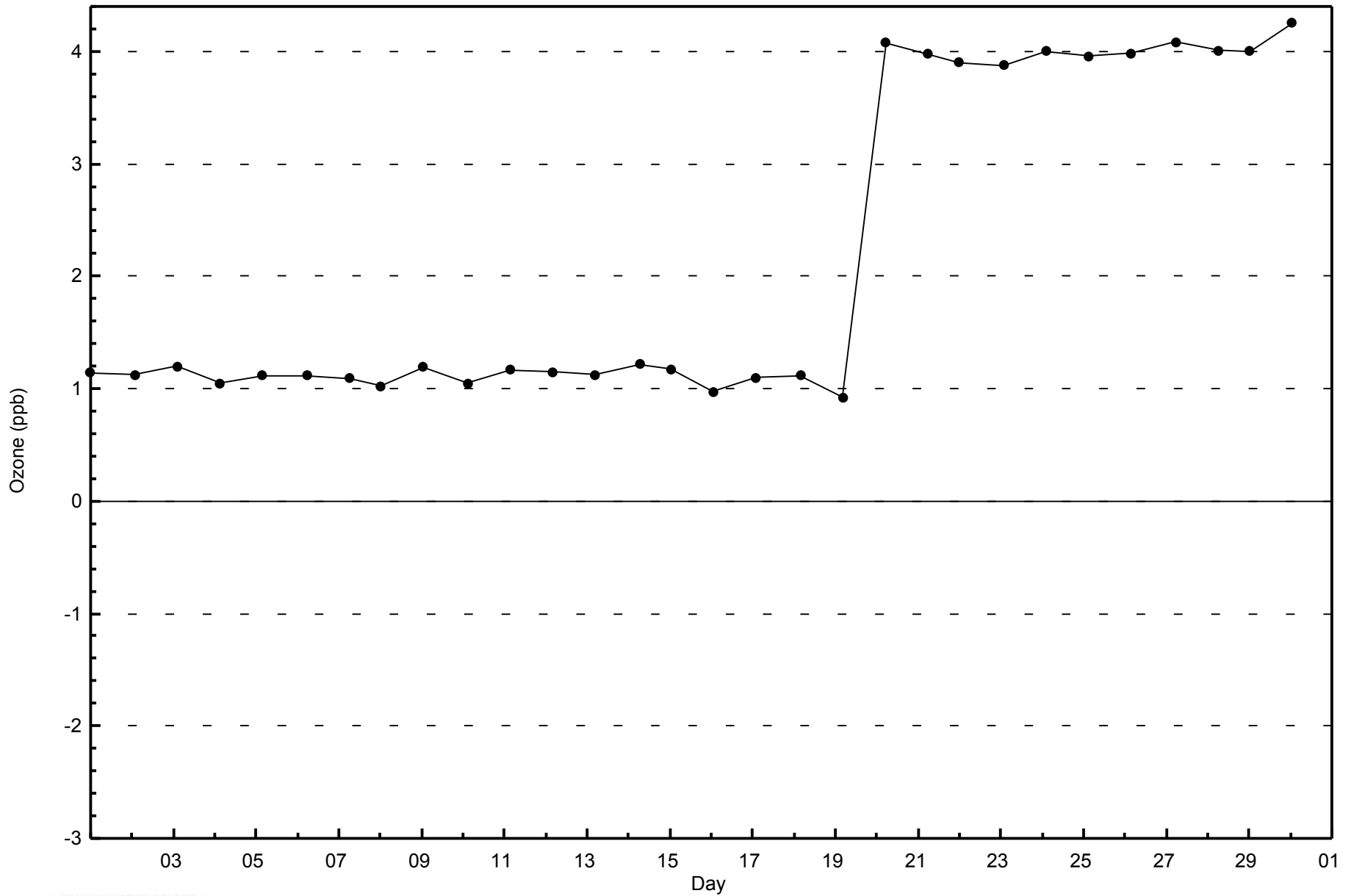


Total Number of Valid Hours: 646



WBEA
Zero Responses

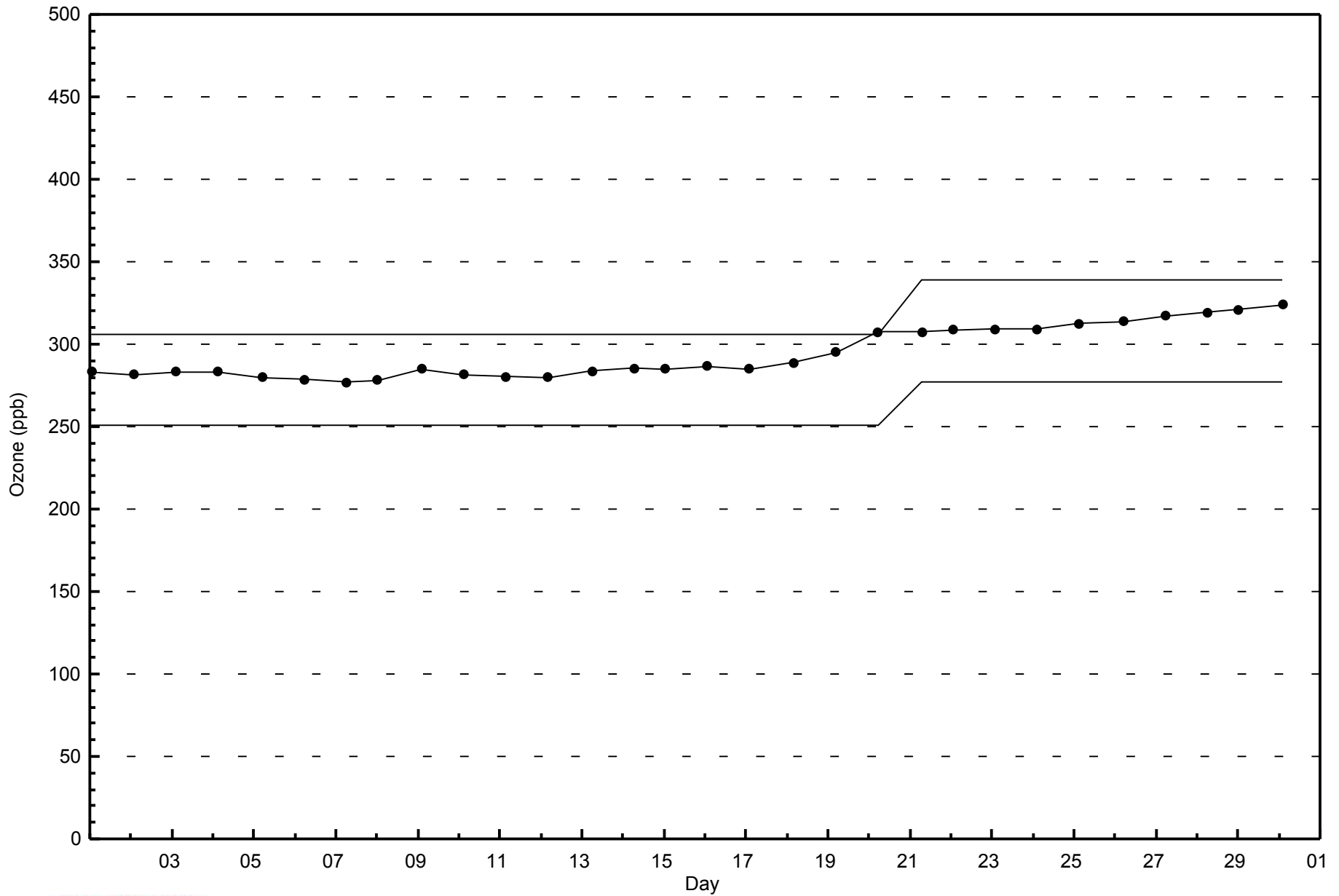
Ozone (O₃) - ppb
Anzac - June 2014





WBEA
Span Responses

Ozone (O₃) - ppb
Anzac - June 2014





Summary of Hour Averages

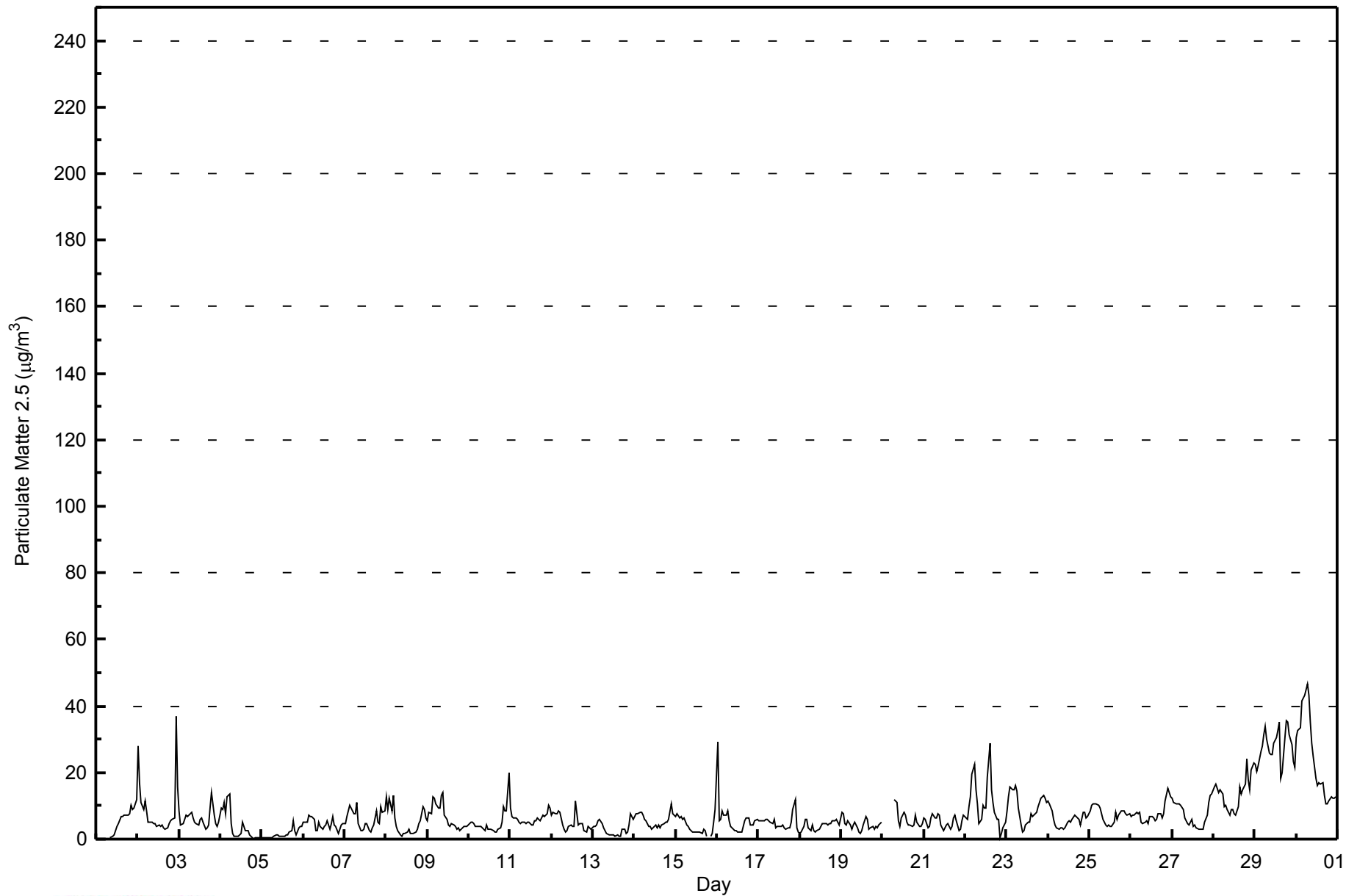
Anzac - June 2014

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 46.6 µg/m ³ on Jun 30 07:00 Minimum Value: 0.2 µg/m ³ on Jun 4 20:00 Maximum Diurnal Average: 10.5 µg/m ³ at hour 5 Monthly Average: 7.38 µg/m ³		Maximum Daily Average: 27.6 µg/m ³ on Jun 29 Minimum Daily Average: 1.5 µg/m ³ on Jun 5 Minimum Diurnal Average: 5.2 µg/m ³ at hour 11 Percentiles: P ₁ = 0.4 P ₁₀ = 2.2 Q ₁ = 3.6 Median = 5.3 Q ₃ = 8.4 P ₉₀ = 14.1 P ₉₉ = 35.1		Hours in Service: 720 Hours of Data: 706 Hours of Missing Data: 14 Hours of Calibration: 0 Percent Operational Time: 98.1																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	0.9	UO	0.5	UO	UO	UO	UO	UO	0.6	0.7	1.2	2.5	3.9	4.6	6.8	6.6	7.1	7.0	7.4	7.5	10.4	9.0	9.2	11.7	5.4	11.7
2-Jun	27.8	16.8	11.0	8.9	11.3	8.4	5.3	5.2	5.0	4.6	4.6	3.9	4.3	3.7	4.0	3.4	3.1	3.6	4.6	5.5	5.8	6.2	36.9	15.5	8.7	36.9
3-Jun	8.5	4.4	4.9	6.1	7.2	7.0	7.8	8.0	6.3	5.1	4.8	4.3	5.7	6.5	5.2	3.1	3.5	4.4	9.4	13.9	7.2	4.8	3.9	5.3	6.1	13.9
4-Jun	9.3	8.8	11.1	7.8	12.8	13.4	4.7	1.8	0.7	0.8	1.0	1.3	1.7	5.0	2.6	2.5	2.6	1.2	0.3	0.2	0.3	0.3	0.4	0.5	3.8	13.4
5-Jun	0.4	0.4	0.3	0.3	0.4	0.3	0.4	0.7	1.2	1.2	1.0	0.7	0.7	0.7	1.3	1.4	2.0	2.6	5.6	2.3	1.3	3.2	4.0	3.9	1.5	5.6
6-Jun	4.9	5.2	5.1	7.1	6.8	6.7	6.1	2.5	2.5	4.9	3.8	2.9	4.0	4.3	5.4	2.8	4.8	6.7	4.2	3.7	1.8	2.9	4.4	4.7	4.5	7.1
7-Jun	4.7	6.9	8.5	10.2	9.5	7.8	7.7	10.9	4.5	2.5	2.6	2.8	4.5	4.7	2.4	2.3	3.3	4.1	8.5	5.3	4.6	9.5	8.2	8.6	6.0	10.9
8-Jun	12.7	8.9	12.1	8.5	13.2	6.2	3.7	2.6	1.4	0.7	1.8	1.6	2.3	2.8	1.7	1.8	1.7	2.2	2.8	4.8	5.6	9.9	9.1	6.3	5.2	13.2
9-Jun	5.3	8.2	7.8	12.7	12.3	10.8	9.5	9.2	13.2	13.9	7.4	6.0	4.3	3.9	4.6	4.4	3.7	3.2	3.4	2.7	3.3	3.8	3.7	3.8	6.7	13.9
10-Jun	4.5	5.0	5.2	4.6	3.9	3.8	3.7	3.9	3.4	2.7	4.3	3.0	2.9	3.1	2.3	2.1	2.3	3.0	3.3	5.2	9.7	8.7	8.4	20.1	5.0	20.1
11-Jun	9.2	6.7	6.5	6.4	5.9	5.2	4.5	5.0	4.9	4.7	5.0	5.1	4.1	4.1	5.7	5.5	6.3	5.6	6.5	7.1	6.9	7.7	10.1	9.2	6.2	10.1
12-Jun	7.0	8.0	7.5	7.8	8.5	8.2	4.4	3.1	2.3	2.5	3.7	4.4	3.7	3.6	11.7	4.2	4.6	4.7	4.7	2.4	2.3	3.8	3.2	3.1	5.0	11.7
13-Jun	3.7	3.9	4.4	5.5	5.8	4.9	3.3	2.7	1.8	1.4	1.3	1.1	1.1	1.0	1.1	0.9	1.0	2.8	2.9	1.6	2.0	4.3	7.4	5.8	3.0	7.4
14-Jun	6.6	7.8	7.8	8.2	7.8	7.3	6.0	5.4	3.8	3.6	3.0	3.5	4.0	3.5	4.1	3.6	4.3	4.7	5.1	5.0	5.8	10.6	7.5	7.2	5.7	10.6
15-Jun	6.7	7.4	6.2	6.6	6.1	6.3	4.1	3.8	3.1	2.4	2.2	2.1	2.0	2.2	1.9	1.9	3.0	2.4	0.8	UO	0.7	1.8	4.9	8.9	3.8	8.9
16-Jun	29.1	5.3	5.8	8.4	7.4	7.2	8.6	5.4	3.7	3.1	2.6	2.4	2.2	2.2	2.3	4.0	5.4	6.5	6.4	4.2	4.3	4.3	5.5	5.8	5.9	29.1
17-Jun	5.6	5.4	5.4	5.4	5.9	6.0	5.6	5.3	4.8	5.8	3.4	3.6	3.8	4.0	4.4	3.3	3.2	3.5	3.4	5.0	8.9	11.9	3.4	2.2	5.0	11.9
18-Jun	1.6	1.9	3.7	6.0	6.1	3.4	2.6	4.0	2.7	2.1	2.5	3.0	3.7	4.6	4.8	4.6	4.2	4.6	4.7	5.4	5.5	5.9	5.1	4.4	4.1	6.1
19-Jun	8.0	7.6	4.7	4.1	5.4	4.2	3.0	4.3	5.3	3.3	2.0	1.9	2.4	4.1	6.9	5.8	2.9	3.5	3.8	2.8	3.6	3.4	4.3	5.2	4.3	8.0
20-Jun	PF	PF	PF	PF	PF	PF	M	11.8	10.8	5.3	4.0	6.5	7.9	7.2	5.2	4.4	4.1	3.8	4.1	7.2	4.9	3.9	4.0	4.5	--	11.8
21-Jun	6.4	5.8	3.2	3.7	6.5	7.7	6.2	6.4	7.7	7.3	4.3	2.6	3.4	4.2	4.8	3.0	3.9	6.4	7.4	5.5	2.4	3.1	5.6	7.2	5.2	7.7
22-Jun	6.4	5.8	9.7	12.8	19.6	22.5	14.9	10.5	4.6	6.1	10.1	9.2	9.5	18.5	28.7	14.8	11.0	8.1	5.8	5.9	0.6	1.6	3.4	4.9	10.2	28.7
23-Jun	8.3	12.5	15.8	15.0	14.7	16.1	14.5	9.5	4.2	2.2	2.6	4.2	5.0	5.0	7.5	6.8	7.1	7.9	9.9	11.2	12.3	12.9	12.1	11.2	9.5	16.1
24-Jun	11.4	10.6	8.4	5.9	4.3	3.4	3.2	3.4	3.2	2.9	3.6	5.1	5.7	5.2	6.1	7.2	6.8	6.2	6.0	4.3	8.1	8.0	6.2	6.7	5.9	11.4
25-Jun	8.5	10.2	10.5	10.5	10.6	10.0	9.1	7.5	5.9	4.3	3.7	4.0	4.0	4.0	5.0	8.0	5.9	7.0	8.3	8.4	8.7	7.6	7.1	7.4	7.4	10.6
26-Jun	6.9	7.1	7.2	8.2	7.7	8.0	4.9	4.7	5.0	5.4	4.8	6.6	6.7	6.4	5.5	5.9	7.7	7.7	6.5	7.5	11.4	15.4	14.2	12.7	7.7	15.4
27-Jun	12.3	10.9	10.7	10.5	10.4	10.0	8.9	6.3	5.6	4.7	4.4	6.0	3.9	4.4	3.3	3.0	3.0	2.9	3.0	4.9	7.4	11.0	13.1	13.7	7.3	13.7
28-Jun	15.6	16.6	15.3	14.1	14.8	13.6	9.8	10.0	8.8	7.4	8.9	8.7	7.6	7.2	9.8	15.6	13.7	14.8	16.5	24.3	17.7	15.0	20.8	23.0	13.7	24.3
29-Jun	22.3	20.4	21.9	26.4	27.8	31.2	34.0	29.9	26.1	25.3	25.3	28.9	30.4	32.8	35.0	18.1	20.0	30.4	35.8	35.0	31.3	28.5	23.2	21.8	27.6	35.8
30-Jun	30.7	32.6	33.6	41.5	42.2	43.4	46.6	43.1	35.1	28.8	25.2	18.2	16.3	16.9	16.5	16.9	13.3	10.8	10.7	11.5	12.5	12.3	12.4	12.7	24.3	46.6
																								Diurnal Average		
																								Diurnal Maximum		
9.8 9.0 8.8 9.8 10.5 10.1 8.7 7.8 6.3 5.5 5.2 5.2 5.4 6.0 6.9 5.6 5.5 6.1 6.7 7.3 6.9 7.7 8.7 8.6 30.7 32.6 33.6 41.5 42.2 43.4 46.6 43.1 35.1 28.8 25.3 28.9 30.4 32.8 35.0 18.1 20.0 30.4 35.8 35.0 31.3 28.5 36.9 23.0																										
M - Maintenance UO - Unstable Operation PF - Power Failure 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 - June 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - June 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	337	47.73	47.73
6 - 15	281	39.80	87.54
16 - 25	30	4.25	91.78
26 - 80	29	4.11	95.89
> 81.0	0	0.00	95.89

Total Number of Valid Hours: 706

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - June 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	14	12	10	22	25	37	43	49	15	5	3	4	16	32	22	27	336
6 - 15	15	7	9	3	4	17	35	44	17	5	14	4	21	16	23	18	252
16 - 25	5	0	0	0	0	0	1	0	0	0	0	1	2	1	5	10	25
26 - 80	6	0	0	0	0	0	0	3	0	0	0	0	0	2	13	5	29
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	40	19	19	25	29	54	79	96	32	10	17	9	39	51	63	60	642

Total Number of Valid Hours: 671

Total Number of Hours: 720



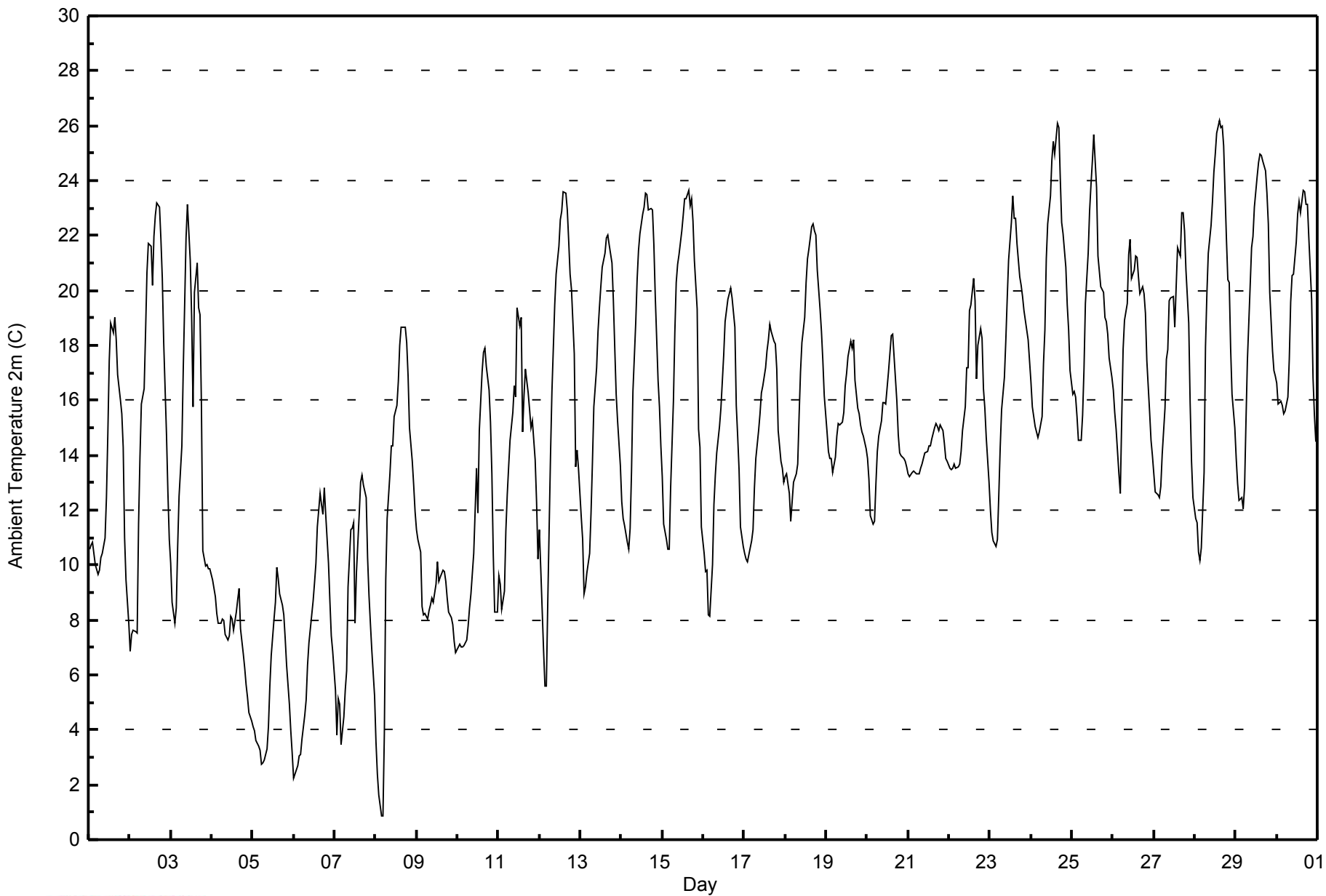
Maximum Value: 26.2 C on Jun 28 15:00		Maximum Daily Average: 20.1 C on Jun 24		Hours in Service: 720																																												
Minimum Value: 0.9 C on Jun 8 04:00		Minimum Daily Average: 5.6 C on Jun 5		Hours of Data: 720																																												
Maximum Diurnal Average: 19.3 C at hour 16		Minimum Diurnal Average: 9.9 C at hour 4		Hours of Missing Data: 0																																												
Monthly Average: 14.83 C		Percentiles: P ₁ = 2.8 P ₁₀ = 7.6 Q ₁ = 10.7 Median = 14.9 Q ₃ = 19.0 P ₉₀ = 22.2 P ₉₉ = 25.6		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-Jun	10.6	10.7	10.8	10.4	10.0	9.7	9.8	10.3	10.4	11.0	12.5	14.8	17.4	18.8	18.5	19.0	18.2	17.0	16.0	15.5	14.3	11.0	9.5	7.9	13.1	19.0																						
2-Jun	6.9	7.5	7.6	7.6	7.5	11.5	13.9	15.8	16.4	18.5	20.6	21.7	21.6	20.2	21.9	22.7	23.2	23.1	21.8	20.4	18.1	14.8	12.7	10.9	16.1	23.2																						
3-Jun	10.1	8.6	7.9	8.4	10.7	12.5	14.4	17.2	19.5	21.9	23.2	21.1	19.1	15.8	20.0	21.0	19.4	19.1	15.9	10.5	10.0	10.0	9.9	9.9	14.8	23.2																						
4-Jun	9.5	9.1	8.9	8.3	7.9	7.9	8.0	8.0	7.5	7.3	7.4	8.1	8.0	7.6	8.3	8.8	9.1	7.7	6.7	6.2	5.7	5.2	4.6	4.3	7.5	9.5																						
5-Jun	4.1	4.0	3.6	3.4	3.2	2.8	2.8	2.9	3.3	4.1	5.6	6.7	8.0	8.7	9.9	9.5	8.9	8.5	8.2	7.3	6.4	4.9	4.0	3.2	5.6	9.9																						
6-Jun	2.2	2.4	2.7	3.0	3.1	3.7	4.5	5.1	6.4	7.2	7.7	8.7	9.4	10.1	11.4	12.6	12.2	11.9	12.8	11.9	10.1	8.7	7.4	6.9	7.6	12.8																						
7-Jun	5.5	3.8	5.2	5.0	3.5	4.5	5.4	6.2	9.2	11.3	11.3	11.5	7.9	9.7	11.9	13.0	13.2	12.9	12.5	10.3	8.9	7.9	6.9	5.3	8.4	13.2																						
8-Jun	3.6	2.4	1.6	0.9	0.9	3.9	9.5	11.7	13.3	14.3	14.3	15.4	15.8	16.7	18.0	18.7	18.7	18.7	18.1	16.9	15.0	13.8	12.9	11.9	11.9	18.7																						
9-Jun	11.3	10.9	10.5	8.5	8.2	8.2	8.1	8.3	8.5	8.8	8.7	9.3	10.1	9.4	9.6	9.8	9.7	9.4	8.8	8.3	8.1	7.8	7.2	6.8	8.9	11.3																						
10-Jun	7.0	7.1	7.0	7.0	7.0	7.3	7.8	8.4	8.9	10.4	12.0	13.6	11.9	14.9	17.0	17.7	17.9	17.2	16.4	15.2	13.3	10.4	8.3	8.3	11.3	17.9																						
11-Jun	9.6	9.3	8.4	9.0	11.2	12.5	13.6	14.5	15.6	16.5	16.1	19.4	18.7	19.0	14.9	16.2	17.1	16.3	15.7	15.0	15.2	13.8	12.3	10.2	14.2	19.4																						
12-Jun	11.3	9.8	6.9	5.6	5.6	8.6	14.0	16.3	17.9	19.5	20.6	21.6	22.6	22.9	23.6	23.5	22.9	21.8	20.6	20.0	17.7	13.6	14.2	13.5	16.4	23.6																						
13-Jun	11.7	10.9	9.0	9.2	9.7	10.4	11.9	13.7	15.8	17.2	18.5	19.3	20.1	20.8	21.4	21.9	22.0	21.7	21.0	19.6	17.9	16.2	15.3	13.6	16.2	22.0																						
14-Jun	12.3	11.7	11.4	10.8	10.6	11.4	13.4	16.3	18.8	20.4	21.5	22.1	22.8	23.0	23.5	23.5	22.9	23.0	22.9	21.6	19.8	16.7	15.8	14.3	17.9	23.5																						
15-Jun	13.2	11.5	10.9	10.6	10.6	12.8	16.0	18.5	20.3	21.0	21.3	22.2	22.7	23.4	23.3	23.7	23.1	23.4	22.5	21.1	19.3	15.0	14.3	11.4	18.0	23.7																						
16-Jun	10.4	9.7	9.8	8.2	8.2	10.0	12.2	13.3	14.1	15.1	15.7	16.7	17.7	18.9	19.7	19.9	20.1	19.8	18.7	15.8	14.7	13.5	11.4	10.7	14.3	20.1																						
17-Jun	10.4	10.2	10.1	10.7	10.9	11.3	12.8	13.9	14.9	15.5	16.3	16.5	17.2	17.8	18.2	18.7	18.5	18.2	18.0	17.2	14.9	13.8	13.5	13.0	14.7	18.7																						
18-Jun	13.2	13.3	12.6	11.6	12.3	13.0	13.3	13.7	15.5	17.0	18.1	19.0	20.3	21.2	21.5	22.3	22.4	22.2	22.0	20.7	19.3	18.5	17.4	16.2	17.4	22.4																						
19-Jun	14.8	14.1	13.9	13.9	13.4	13.9	14.7	15.2	15.1	15.2	15.5	16.5	17.0	17.6	18.2	17.9	18.2	16.7	15.7	15.5	15.1	14.8	14.7	14.3	15.5	18.2																						
20-Jun	13.9	13.1	11.8	11.5	11.6	13.0	14.1	14.7	15.2	15.9	15.9	15.9	17.0	17.7	18.4	18.4	17.6	16.0	14.7	14.1	14.0	13.9	13.8	13.6	14.8	18.4																						
21-Jun	13.3	13.2	13.4	13.4	13.4	13.3	13.3	13.5	13.7	13.9	14.1	14.1	14.4	14.3	14.6	15.0	15.2	15.1	14.9	15.1	14.9	14.5	13.9	13.8	14.1	15.2																						
22-Jun	13.6	13.5	13.5	13.7	13.5	13.6	13.7	14.1	14.9	15.8	17.2	17.2	19.3	19.5	20.5	19.6	16.8	18.0	18.6	18.3	16.4	15.7	14.6	13.0	16.0	20.5																						
23-Jun	12.0	11.2	10.9	10.7	10.9	12.6	14.3	15.7	16.8	18.2	19.7	21.1	22.5	23.4	22.6	22.6	21.7	20.5	20.2	19.8	19.3	18.6	18.2	17.4	17.5	23.4																						
24-Jun	16.7	15.8	15.1	14.8	14.6	14.8	15.4	17.4	18.6	21.2	22.4	23.4	24.8	25.4	25.0	26.1	25.9	24.1	22.5	22.1	20.8	19.5	18.6	17.1	20.1	26.1																						
25-Jun	16.2	16.3	16.1	15.4	14.5	14.5	15.5	17.1	19.5	21.4	22.9	23.8	24.7	25.7	23.8	21.2	20.7	20.2	20.0	19.0	18.9	18.4	17.5	16.8	19.2	25.7																						
26-Jun	16.4	15.5	14.9	13.3	12.6	15.3	17.8	18.9	19.5	21.3	21.8	20.4	20.7	21.2	21.2	20.5	19.9	20.2	19.9	19.2	17.4	15.6	14.5	14.0	18.0	21.8																						
27-Jun	13.3	12.6	12.5	12.5	12.8	14.0	15.7	17.5	17.9	19.6	19.8	19.8	18.7	20.1	21.6	21.2	22.8	22.8	22.2	20.8	18.8	15.9	13.8	12.5	17.5	22.8																						
28-Jun	11.7	11.6	10.5	10.2	10.6	13.4	18.0	19.9	21.3	22.4	23.2	24.3	25.0	25.7	26.2	25.9	26.0	25.3	21.9	20.4	20.3	17.9	16.2	15.0	19.3	26.2																						
29-Jun	13.9	13.0	12.3	12.5	12.1	12.9	15.3	17.4	20.2	21.6	21.9	23.0	24.2	24.7	25.0	24.9	24.7	24.4	23.5	22.4	20.0	17.8	17.1	16.9	19.2	25.0																						
30-Jun	16.6	15.9	15.9	15.8	15.5	15.6	16.1	17.5	19.6	20.5	20.6	21.8	22.8	23.2	22.8	23.7	23.6	23.1	23.1	21.9	19.7	16.8	15.4	14.5	19.3	23.7																						
																								11.2	10.6	10.2	9.9	9.9	11.0	12.5	13.8	15.0	16.1	16.9	17.6	18.1	18.6	19.1	19.3	19.1	18.6	17.9	16.7	15.5	13.8	12.9	11.9	Diurnal Average
																								16.7	16.3	16.1	15.8	15.5	15.6	18.0	19.9	21.3	22.4	23.2	24.3	25.0	25.7	26.2	26.1	26.0	25.3	23.5	22.4	20.8	19.5	18.6	17.4	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature 2m (AT 2m) - C

Anzac - June 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature 2m (AT 2m) - C
Anzac - June 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	149	20.69	20.69
10 - 20	427	59.31	80.00
> 20	144	20.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

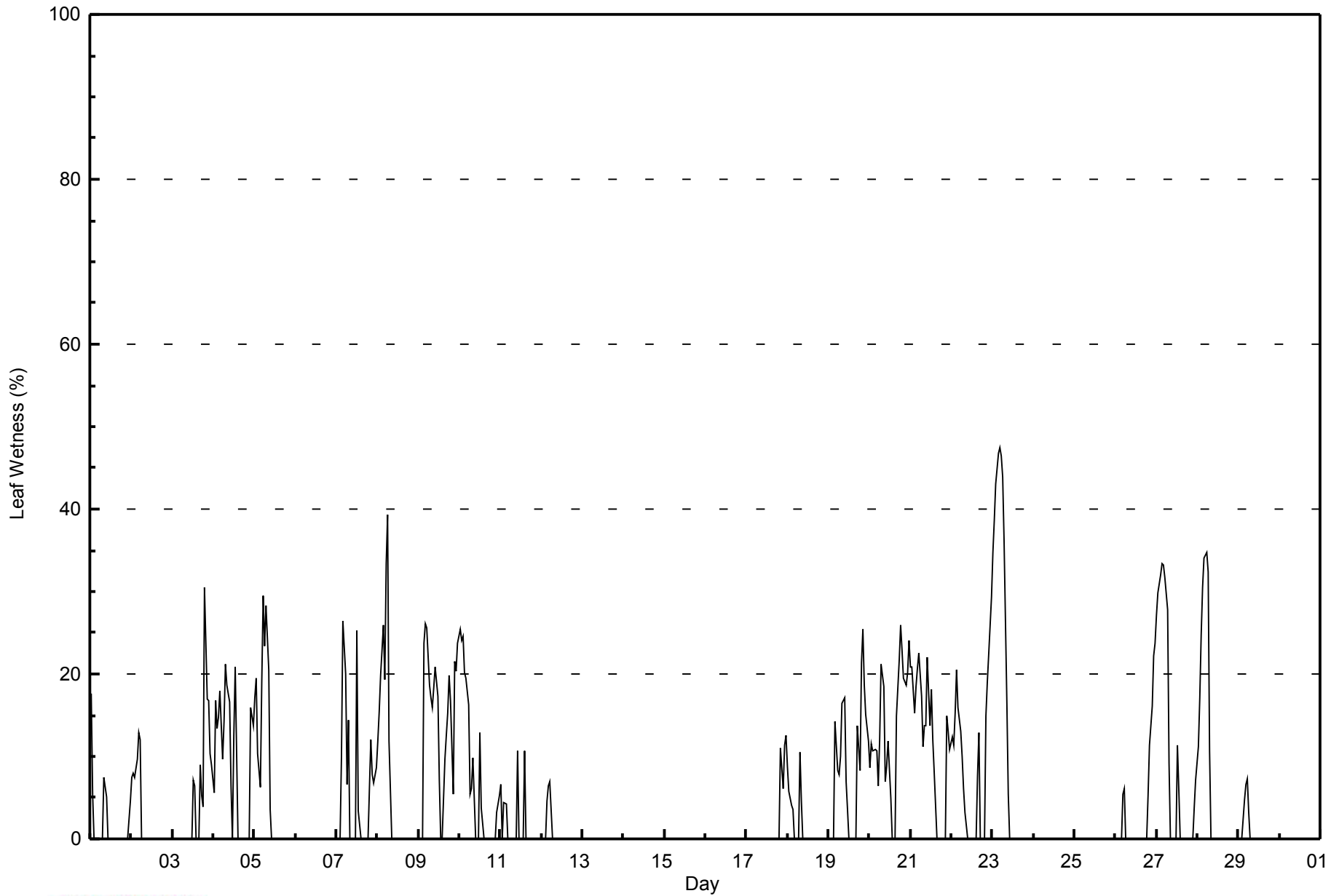


Maximum Value: 47 % on Jun 23 05:00																	Maximum Daily Average: 15.0 % on Jun 23										Hours in Service: 720																																							
Minimum Value: 0 % on Jun 1 03:00																	Minimum Daily Average: 0.0 % on Jun 6										Hours of Data: 718																																							
Maximum Diurnal Average: 11.2 % at hour 5																	Minimum Diurnal Average: 0.6 % at hour 16										Hours of Missing Data: 2																																							
Monthly Average: 4.9 %																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 7 P ₉₀ = 19 P ₉₉ = 38										Hours of Calibration: 0																																							
																											Percent Operational Time: 99.7																																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																										
1-Jun	18	5	0	0	0	0	0	0	7	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1.7	18																																								
2-Jun	7	8	7	10	13	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.4	13																																								
3-Jun	0	0	0	0	0	0	0	0	0	0	0	0	7	6	0	0	9	5	4	30	17	17	10	9	4.8	30																																								
4-Jun	6	17	13	15	18	10	14	21	19	17	6	0	12	21	0	0	0	0	0	0	0	0	16	14	9.1	21																																								
5-Jun	17	20	10	6	19	29	23	28	20	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.4	29																																								
6-Jun	0	0	0	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-Jun	0	0	0	10	26	20	7	14	0	0	0	0	25	3	0	0	0	0	0	6	12	8	7	9	6.1	26																																								
8-Jun	12	15	20	26	19	33	39	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.4	39																																								
9-Jun	0	0	0	24	26	26	19	17	16	18	21	17	7	0	0	10	13	15	20	17	5	21	20	24	14.0	26																																								
10-Jun	25	24	25	20	19	16	5	6	10	0	0	0	13	4	0	0	0	0	0	0	0	0	3	5	7.4	25																																								
11-Jun	7	0	4	4	0	0	0	0	0	0	11	0	0	0	11	0	0	0	0	0	0	0	0	0	1.5	11																																								
12-Jun	0	0	0	5	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	7																																								
13-Jun	0	0	0	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-Jun	0	0	0	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-Jun	0	0	0	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-Jun	0	0	0	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-Jun	0	0	0	0	0	0	0	UO	UO	0	0	0	0	0	0	0	0	0	0	0	11	6	11	12	1.9	12																																								
18-Jun	9	6	4	3	0	0	0	11	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.6	11																																								
19-Jun	0	0	0	0	14	8	8	10	17	17	7	4	0	0	0	0	0	14	8	21	25	19	15	12	8.3	25																																								
20-Jun	9	11	11	11	11	7	12	21	19	7	9	12	5	0	0	0	15	22	26	23	19	19	20	24	13.0	26																																								
21-Jun	21	21	15	18	21	23	17	11	14	14	22	14	18	12	8	0	0	0	0	0	0	15	13	11	12.0	23																																								
22-Jun	12	11	15	20	16	13	10	6	3	0	0	0	0	0	8	13	0	0	0	15	19	22	29	8.9	29																																									
23-Jun	35	39	43	47	47	46	44	36	16	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15.0	47																																								
24-Jun	0	0	0	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-Jun	0	0	0	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-Jun	0	0	0	0	5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	5	11	16	22	24	3.8	24																																								
27-Jun	27	30	32	33	33	32	28	9	0	0	0	0	11	6	0	0	0	0	0	0	0	0	4	7	10.5	33																																								
28-Jun	11	17	25	31	34	35	32	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.2	35																																								
29-Jun	0	0	0	5	7	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	7																																								
30-Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																																								
																	7.2		7.5		7.5		9.6		11.2		11.0		8.7		7.4		5.0		2.9		2.5		1.5		3.3		1.7		0.6		0.6		1.6		1.9		1.9		3.4		3.9		4.6		5.5		6.1		Diurnal Average	
																	35		39		43		47		47		46		44		36		20		18		22		17		25		21		11		10		15		22		26		30		25		21		22		29		Diurnal Maximum	
UO - Unstable Operation																																																																		



WBEA
Hourly Averages

Leaf Wetness (SW) - %
Anzac - June 2014





WBEA
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Anzac - June 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	492	68.52	68.52
0.4 - 0.5	0	0.00	68.52
0.6 - 0.7	0	0.00	68.52
0.8 - 1.4	0	0.00	68.52
1.5 - 10	73	10.17	78.69
> 10	153	21.31	100.00

Total Number of Valid Hours: 718

Total Number of Hours: 720

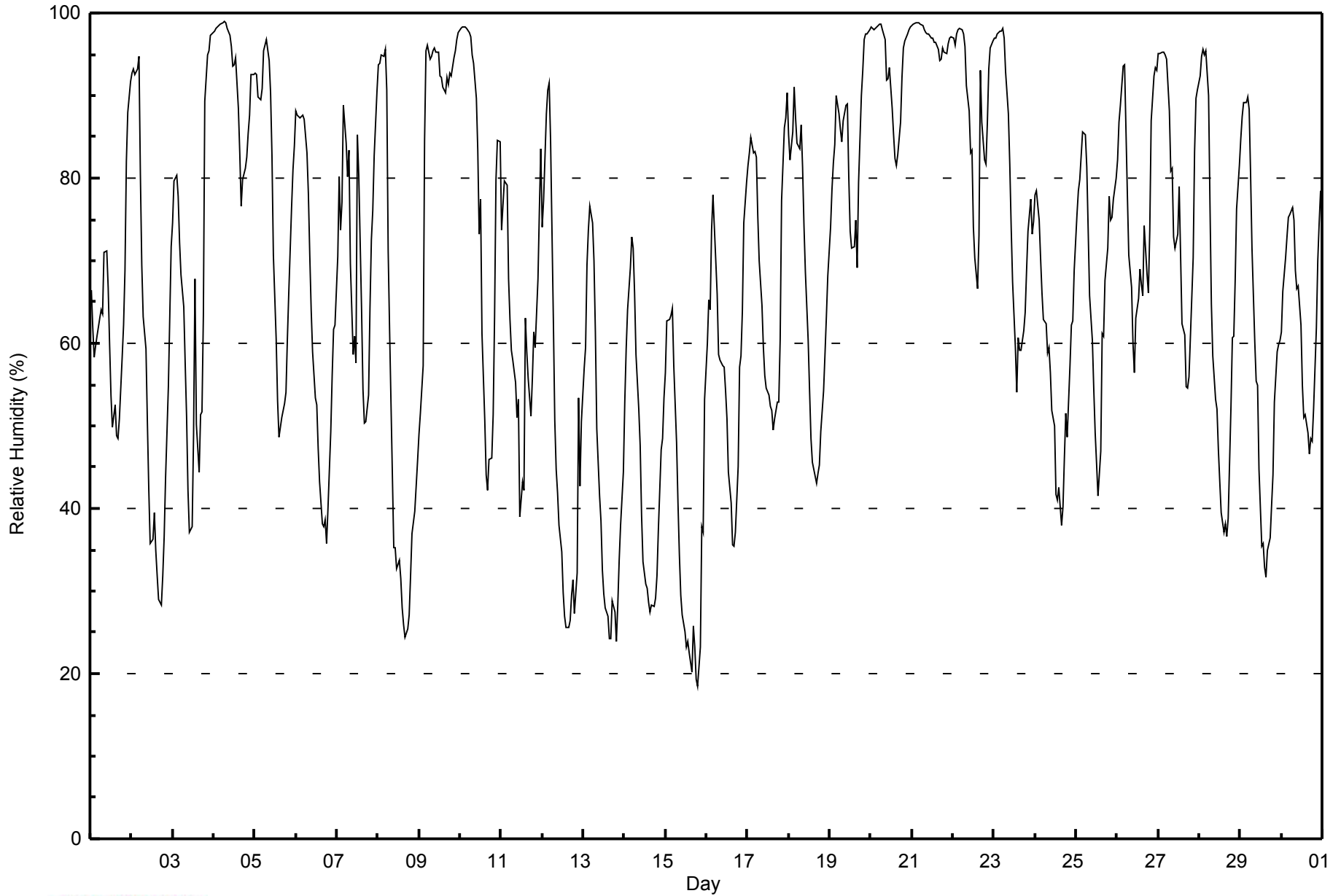


Maximum Value: 99 % on Jun 4 07:00																		Maximum Daily Average: 97.0 % on Jun 21																		Hours in Service: 720	
Minimum Value: 18 % on Jun 15 20:00																		Minimum Daily Average: 37.5 % on Jun 15																		Hours of Data: 720	
Maximum Diurnal Average: 86.3 % at hour 5																		Minimum Diurnal Average: 50.8 % at hour 16																		Hours of Missing Data: 0	
Monthly Average: 68.2 %																		Percentiles: P ₁ = 24 P ₁₀ = 37 Q ₁ = 52 Median = 70 Q ₃ = 88 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-Jun	66	62	58	60	61	63	64	64	71	71	67	60	54	50	53	49	48	51	58	62	69	82	88	92	63.4	92											
2-Jun	93	93	93	93	95	81	69	63	59	51	42	36	36	40	35	32	29	28	32	37	44	55	63	72	57.0	95											
3-Jun	75	80	80	78	72	68	64	58	51	42	37	38	49	68	50	44	51	52	63	89	95	95	97	98	66.5	98											
4-Jun	98	98	98	98	99	99	99	99	98	97	96	94	94	95	89	83	77	80	81	83	85	88	93	93	92.1	99											
5-Jun	93	93	90	89	91	95	96	97	94	90	83	71	60	53	49	50	51	53	54	60	66	76	81	84	75.8	97											
6-Jun	88	88	87	88	88	87	83	78	71	64	59	53	52	47	43	38	38	39	36	40	49	56	62	62	62.3	88											
7-Jun	70	80	74	77	89	84	80	83	70	59	61	58	85	80	64	54	50	51	54	64	73	76	83	90	71.2	90											
8-Jun	94	94	95	95	96	91	71	62	44	35	35	33	34	31	28	26	24	25	27	32	37	40	43	46	51.5	96											
9-Jun	49	52	57	85	95	96	94	95	95	96	95	95	92	92	91	90	92	91	93	92	95	95	97	98	88.5	98											
10-Jun	98	98	98	98	98	98	97	95	94	90	83	73	78	61	51	44	42	46	46	51	63	80	85	84	77.2	98											
11-Jun	74	77	80	79	68	63	59	58	55	51	53	39	43	42	63	59	56	51	56	61	60	68	76	84	61.4	84											
12-Jun	74	77	88	91	92	85	63	51	45	42	38	35	30	27	26	26	26	30	31	27	32	53	43	50	49.2	92											
13-Jun	57	59	70	74	77	75	70	61	50	42	38	32	30	28	27	24	24	29	27	24	28	34	38	44	44.3	77											
14-Jun	53	59	64	69	73	72	66	59	52	48	39	34	31	30	29	27	28	28	29	32	38	47	48	53	46.2	73											
15-Jun	56	63	63	63	64	57	48	41	34	30	27	25	23	24	23	20	26	23	19	18	23	38	37	53	37.5	64											
16-Jun	60	65	64	74	78	70	66	59	58	57	57	54	51	44	41	36	35	37	45	57	58	64	75	80	57.7	80											
17-Jun	81	83	85	83	83	82	75	70	65	59	56	55	54	52	52	50	51	53	53	60	77	86	87	90	68.5	90											
18-Jun	85	82	86	91	87	84	84	87	81	74	69	60	54	48	46	44	43	44	45	49	54	59	63	68	66.2	91											
19-Jun	74	79	82	84	90	88	86	84	87	89	89	80	74	71	72	75	69	79	90	93	97	98	98	98	84.4	98											
20-Jun	98	98	98	98	98	99	99	98	97	92	92	93	89	85	82	82	83	87	92	96	97	97	98	98	93.6	99											
21-Jun	98	99	99	99	99	99	98	98	98	97	97	97	97	97	96	96	94	94	96	95	95	96	97	97	97.0	99											
22-Jun	97	96	98	98	98	98	98	96	91	88	83	83	74	70	67	73	93	87	82	82	87	93	96	97	88.5	98											
23-Jun	97	97	97	98	98	98	97	93	88	82	74	68	60	54	61	59	59	62	64	69	74	78	73	75	78.0	98											
24-Jun	78	78	75	70	66	63	62	59	56	52	50	42	41	43	38	40	46	52	49	57	62	63	69	69	57.1	78											
25-Jun	76	79	80	83	86	85	81	74	66	60	54	49	45	42	47	61	61	68	72	78	75	75	77	80	68.9	86											
26-Jun	82	87	89	94	94	86	78	71	67	60	56	63	65	69	67	66	74	68	66	74	87	92	93	93	76.7	94											
27-Jun	95	95	95	95	95	94	88	81	81	73	71	73	79	71	62	61	55	55	56	61	70	83	90	91	78.0	95											
28-Jun	92	95	96	95	96	90	77	65	58	53	52	47	43	40	37	38	37	39	52	61	61	68	76	82	64.5	96											
29-Jun	85	87	89	89	90	88	80	72	60	55	55	45	35	36	33	32	35	37	40	44	53	59	60	60	59.1	90											
30-Jun	61	66	70	73	75	76	76	75	69	67	67	62	55	51	51	49	47	48	48	52	62	70	75	79	63.5	79											
	79.9	82.0	83.2	85.3	86.3	83.8	79.0	74.7	70.3	65.7	62.7	58.5	56.9	54.7	52.5	50.8	51.3	52.7	55.3	59.7	65.3	72.1	75.1	78.6	Diurnal Average												
	98	99	99	99	99	99	99	99	98	97	97	97	97	97	96	96	94	94	96	96	97	98	98	98	Diurnal Maximum												



WBEA
Hourly Averages

Relative Humidity (RH) - %
Anzac - June 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Anzac - June 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	2	0.28	0.28
20 - 40	93	12.92	13.19
40 - 60	171	23.75	36.94
60 - 80	190	26.39	63.33
80 - 100	264	36.67	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 17 km/h on Jun 24 13:00	Maximum Daily Speed Average: 10.9 km/h on Jun 24	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 23 00:00	Minimum Daily Speed Average: 1.1 km/h on Jun 20	Hours of Data: 683
Maximum Diurnal Speed Average: 2.2 km/h at hour 1	Minimum Diurnal Speed Average: 0.6 km/h at hour 19	Hours of Missing Data: 37
Monthly Average Velocity: 1.2 km/h 123.3 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 12 P ₉₉ = 15	Percent Operational Time: 94.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	SE11	SE11	SE14	SE12	SE14	SE14	SE14	SE13	SSE11	SE14	SSE14	SSE15	SSE14	SSE13	SSE10	SSW11	WNW9	W4	W4	SE4	SSE4	W1	N2	W1	SSE8.0	SSE15
2-Jun	SSE1	SE3	ENE3	SW2	WSW4	WNW6	W7	WNW9	W8	W7WNW12	W9	NW9	WNW6	W10	W9	W8	WNW6	N5	NNE7	NNE7	NNE5	SSE3	SSE3	WNW4.1	WNW12	
3-Jun	ESE4	ESE4	SE6	ESE7	ESE7	ESE8	SE9	ESE10	ESE11	SE13	SSE14	SSE13	ESE5	NE7	NNE12	NE12	ENE8	E7	NNW12	NNW14	NE11	N4	NW4	NW6	E4.7	NNW14
4-Jun	NW7	NW6	NW7	NW7	NNW7	NW8	NW7	NW10	NNW12	NNW13	NW12	NW10	NW10	NNW9	NNW11	NNW11	NNW14	NNW13	NNW11	NNW10	NNW9	NNW9	NNW7	NNW7	NNW9.1	NNW14
5-Jun	NNW8	NNW9	N10	NNW10	N10	N9	NNW9	NNW10	N12	N12	NNW12	NNW15	NNW14	NNW16	NNW16	NNW14	NNW14	NNW12	NNW11	N10	NNW7	NW5	NNW6	NNW5	NNW10.5	NNW16
6-Jun	NNW4	NNW5	NW4	NW5	NW3	NW5	NW5	NW6	NNW5	NNW7	N7	NNW6	NNW5	NNW5	WNW7	NW7	N8	NNW6	N5	NE4	ENE6	SE5	SSE6	SE7	NNW3.4	N8
7-Jun	SE6	SE6	SE9	S3	NE5	ENE6	SSW6	S4	SSE7	W6	WNW6	WSW10	NNE7	ENE9	ENE5	ENE6	E6	SE5	S5	ENE7	E5	S8	S6	SSW5	SE2.5	WSW10
8-Jun	SW5	SW4	SW4	SW2	SW3	W2	WNW5	WNW5	SSW4	W2	SSW4	SSW4	W2	S6	SW4	SW5	SSW5	ESE5	SE7	SE7	SE7	SE8	SE9	SE9	S3.0	SE9
9-Jun	SSE9	SE7	S4	NE0	SE2	ESE6	E7	SE7	SE9	SE8	ESE12	ESE8	E12	E13	E12	E13	E12	E14	ENE12	ENE11	ENE9	NE7	NNE5	NNE4	E7.3	E14
10-Jun	N5	NNE5	NNE6	NNE6	NNE6	NE5	N5	N6	NNW5	NNW5	WNW5	WNW5	S2	WSW7	WNW6	W8	W9	WNW9	WNW9	WNW7	W6	W6	W6	WSW6	NW4.0	W9
11-Jun	W8	W6	W6	WNW8	W8	WNW8	WNW9	WNW9	WNW8	WNW11	WNW9	WNW8	WSW11	SW11	N9	S4	SW3	W5	W6	W7	SW5	SW6	SW5	WSW4	W6.0	WSW11
12-Jun	WSW6	SW3	N2	N2	NNE1	NE1	WNW6	WNW8	W7	W5	W4	WNW4	NNW5	WNW4	W7	NNE5	ENE9	E6	E8	NE10	ENE6	NE5	E9	E7	NNE1.7	NE10
13-Jun	SE6	ESE7	ESE5	ESE8	ESE8	ESE11	ESE11	ESE10	ESE10	E9	E9	ENE7	E6	E7	ESE7	E8	ESE9	ESE10	ESE8	ESE8	SE9	SE8	SSE8	ESE8.0	ESE11	
14-Jun	SE10	SSE10	SSE11	SSE11	SSE12	SSE13	SSE11	SE9	SE8	SE11	SE12	SE13	SSE13	SSE13	S13	S12	SSE13	SSE12	SSE11	SSE10	SSE7	SSE7	SSE7	SSE8	SSE10.5	S13
15-Jun	SSE8	SSE7	S7	S7	SSE6	S5	S5	SSE6	SSE8	SE13	SE12	SE10	SE9	ESE10	ESE9	SE6	ESE11	E12	ESE12	ESE11	ESE7	ESE5	SE7	SSE5	SE7.5	SE13
16-Jun	SSE5	ESE5	SE5	SE4	AF	ESE4	SE4	SE12	S9	SE11	SE7	ESE6	E8	E10	ENE11	ENE9	ENE7	ESE6	SSE10	S13	S7	S5	NNW1	NE2	SE5.5	S13
17-Jun	NE2	E1	NE5	ENE3	SSW3	AF	SSE5	SE7	SE8	SE9	ESE9	SE8	ESE8	SE10	SE10	SSE10	SSE11	SSE9	S10	SSW6	S5	SE5	SSE5	SSE5	SE5.8	SSE11
18-Jun	SSE7	SSE7	SSE5	ESE3	SE6	SE8	SSE9	SSE7	SE6	SSE9	SE8	SSE11	SSE12	SSE14	SSE15	S12	SSE13	SSE13	SSE13	SSE11	SSE10	SSE11	SSE12	SSE9	SSE9.5	SSE15
19-Jun	SSE7	SSE8	SE6	SE5	ESE4	ESE6	SE8	ESE6	ESE4	E6	E10	ESE11	ESE10	E11	E8	E7	E7	ENE7	ENE4	NE3	WNW1	WNW3	WSW3	N3	ESE5.0	E11
20-Jun	WSW1	SW2	AF	AF	W2	WSW3	NNW1	ENE6	NW2	N2	NE4	E2	SE7	SE5	ESE4	ESE7	ESE8	SSE6	S5	SW2	W4	WNW3	NW2	NW3	SE1.1	ESE8
21-Jun	NNW3	N4	NNW4	NNW5	N5	N7	N6	N6	N8	NNW7	NNW7	NNW7	NNW6	NW8	NW7	NW7	NW8	NW6	NW5	NW5	WNW7	NW7	NW6	NW5	NNW5.8	NW8
22-Jun	NW5	NW5	NW6	NW6	NW6	NW6	WNW7	WNW6	WNW8	WNW7	WNW8	WNW6	NW10	NW10	NW9	NNW7	N5	NW5	WNW6	N4	NNE2	NW1	ENE1	W0	NW5.3	NW10
23-Jun	AF	AF	AF	AF	WNW1	W2	W3	N1	SE2	ENE5	E4	ESE6	ESE9	ESE9	ESE16	ESE14	SE13	SE8	SSE6	SSE4	SE6	SSE5	SE7	SE7	SE5.3	ESE16
24-Jun	SE10	SE9	SE10	SE9	SE10	SE9	SE8	SE9	SE10	SE11	SSE15	SSE13	SSE17	SSE14	SE13	S14	S15	S16	SSE13	SSE14	SSE8	SSE10	SSE11	SSE8	SSE10.9	SSE17
25-Jun	SSE8	SSE10	SSE10	SSE11	SE10	SE11	SSE12	SE6	SE13	SE11	SE14	SSE14	SSE15	S12	SW14	SSW14	S8	S5	AF	SSE3	S5	SSE6	SE5	SSE9.2	SSE15	
26-Jun	SSE6	SSE6	S1	AF	AF	AF	AF	S2	SSE2	SE8	SE8	SSE7	SW7	WNW8	W2	WSW3	W7	W8	WNW4	W1	AF	AF	AF	AF	---	W8
27-Jun	AF	AF	AF	AF	AF	AF	AF	AF	NE1	NE4	NNE1	NW2	NE2	ENE2	NNE2	NW2	WNW4	NW2	N6	NNE7	NNE3	AF	AF	AF	---	NNE7
28-Jun	AF	AF	AF	AF	AF	AF	AF	NNE2	NE3	NNE2	W5	WNW5	WNW7	NW7	NW7	NNW9	NNW9	N9	NNW4	NNW3	NNW4	NNW1	NNW1	AF	---	NNW9
29-Jun	AF	W2	NW2	WNW3	WNW2	NW1	NW5	NW5	NNW7	N8	NNW9	N11	N14	N13	N16	N15	N14	N15	N13	NNW8	NNW5	NNW6	NNW7	NNW7	NNW7.7	N16
30-Jun	NNW6	NW6	NW6	NW5	NW7	NW5	NW6	NW7	NW7	NW9	NW8	NNW10	NNW11	N10	N10	NNW10	N10	NNW8	NNW6	NNW6	NNW3	NNW3	N5	NNW2	NNW6.6	NNW11

SSE2.2 SSE2.1 SE1.7 SE1.1 SE1.2 ESE1.5 SSE1.1 SE1.1 SSE1.1 ESE1.6 SE1.4 SSE1.6 ESE1.4 ESE1.9 ENE1.5 E0.7 ENE1.0 E1.1 E0.6 ENE1.5 E1.5 SE1.2 SSE1.6 SSE1.5	Diurnal Average
SE11 SE11 SE14 SE12 SE14 SE14 SE14 SE13 N12 SE14 SSE15NNW15 SSE17NNW16NNW16 N15 S15 S16 SSE13NNW14 NE11 SSE11 SSE12 SSE9	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 Jun 3 19:00	Hours of Data: 683
Minimum Value: 1 km/h on Jun 2 01:00	Hours of Missing Data: 37
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 6	Hours of Calibration: 0
	Percent Operational Time: 94.9

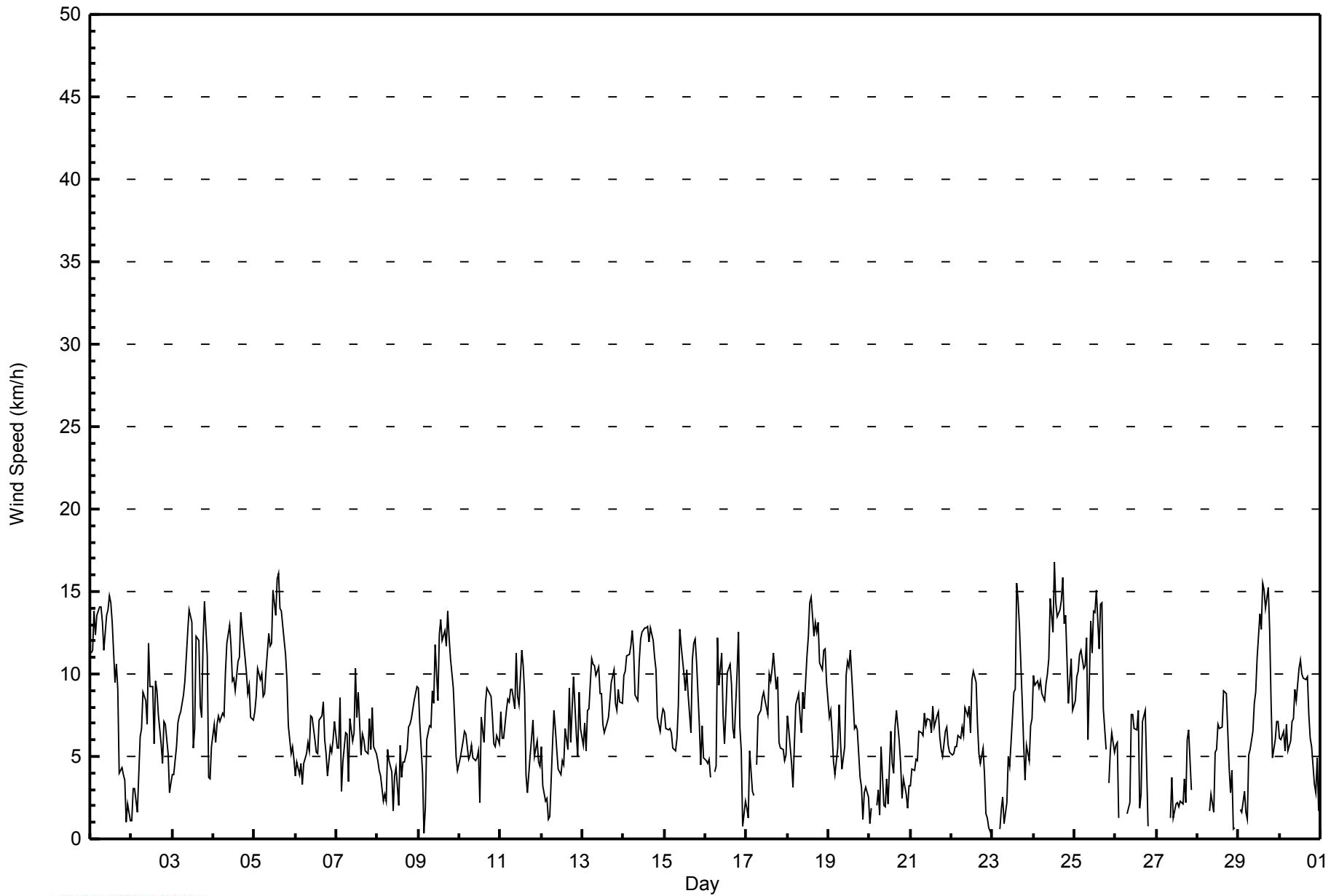
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	3	3	4	3	4	4	4	4	3	4	4	4	4	4	3	3	4	2	3	1	1	1	2	1	4
2-Jun	1	1	1	2	2	2	3	4	4	2	4	4	4	3	3	3	3	3	2	3	2	2	1	1	4
3-Jun	1	1	1	2	2	2	3	3	3	4	4	6	2	3	4	5	3	3	8	5	4	4	2	3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

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Anzac - June 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Anzac - June 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	217	31.77	31.77
6 - 11	372	54.47	86.24
12 - 19	94	13.76	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: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Anzac - June 2014

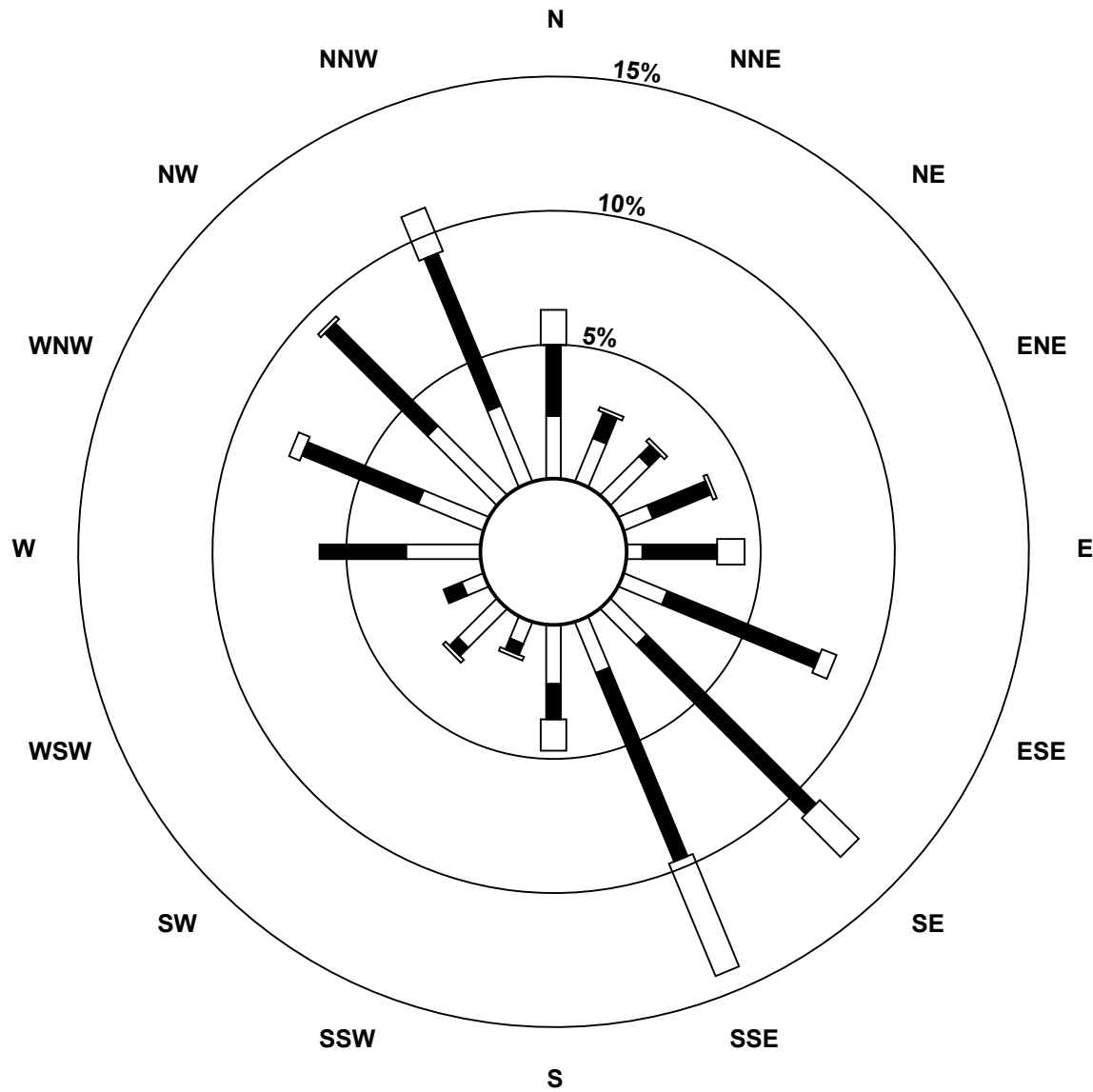
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	16	12	14	8	4	12	13	14	15	6	14	6	19	18	25	21	217
6 - 11	18	7	4	16	19	42	61	52	9	3	3	5	22	32	37	42	372
12 - 19	9	1	1	1	7	4	14	31	8	1	1	0	0	3	1	12	94
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	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	43	20	19	25	30	58	88	97	32	10	18	11	41	53	63	75	683

Total Number of Valid Hours: 683

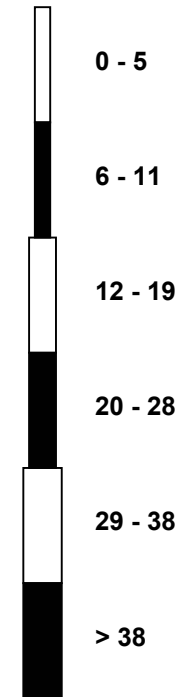
Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Anzac (AMS 14)**



Classes (km/h)



Total Number of Valid Hours: 683



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Anzac - June 2014

Direction of Maximum Speed: 161 deg on Jun 24 13:00															Hours in Service: 720											
Direction of Maximum Daily Speed Average: 152.6 deg on Jun 24															Hours of Data: 683											
Direction of Minimum Speed: 277 deg on Jun 23 00:00															Hours of Missing Data: 37											
Direction of Minimum Daily Speed Average: 1.1 deg on Jun 20															Percent Operational Time: 94.9											
Monthly Average Direction: 303.5 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-Jun	132	130	133	133	138	135	138	137	155	146	156	154	149	151	158	194	283	261	278	137	158	264	354	262	149.5
2-Jun	164	137	66	232	237	283	281	288	263	280	289	278	309	300	265	270	263	289	356	15	13	23	159	152	289.1
3-Jun	115	117	124	120	112	116	128	119	123	137	147	151	105	43	29	55	71	95	336	348	41	8	311	308	89.2
4-Jun	311	305	318	323	330	314	320	312	302	302	306	311	321	337	338	337	335	340	346	347	347	344	341	346	326.6
5-Jun	341	345	349	342	349	351	347	338	356	354	341	344	344	346	337	336	341	340	341	353	346	323	329	338	343.6
6-Jun	341	337	324	314	308	315	319	318	334	347	5	341	329	292	284	313	354	340	10	37	78	129	152	141	338.2
7-Jun	132	133	143	173	55	73	202	172	167	269	287	238	14	77	78	64	82	139	191	65	97	180	182	203	136.4
8-Jun	226	219	216	221	232	261	295	283	209	272	212	200	267	169	232	224	196	120	139	126	125	127	138	138	179.7
9-Jun	149	144	185	49	136	109	92	128	124	133	122	108	90	82	88	85	89	81	77	71	61	46	33	15	94.8
10-Jun	9	15	12	23	29	38	4	4	346	330	294	293	182	240	288	279	266	295	283	284	273	279	281	255	308.2
11-Jun	271	263	271	283	278	285	285	293	289	295	282	287	242	215	11	169	219	276	276	260	231	221	223	243	269.0
12-Jun	240	230	1	5	33	36	300	296	276	268	278	295	346	297	279	31	59	99	80	55	63	55	86	97	11.5
13-Jun	124	123	106	117	123	121	120	112	115	107	99	80	65	85	88	106	96	107	119	111	111	127	135	150	111.2
14-Jun	145	150	152	148	148	151	151	135	136	134	136	144	157	152	172	178	156	153	161	160	168	165	168	154	152.8
15-Jun	154	156	170	172	166	173	174	156	151	134	148	133	141	121	113	129	102	98	106	110	103	109	140	158	134.2
16-Jun	154	114	130	131	AF	106	136	134	173	140	140	123	100	90	57	75	70	104	156	177	185	171	345	40	126.7
17-Jun	44	80	56	57	205	AF	154	143	135	124	107	129	120	142	135	153	157	147	175	198	170	143	149	160	141.3
18-Jun	163	163	148	115	132	145	150	159	143	157	146	159	164	165	163	175	166	160	162	155	156	157	157	160	157.8
19-Jun	155	154	142	124	111	117	125	118	105	101	95	114	108	99	91	97	84	74	65	53	284	287	257	10	108.2
20-Jun	248	232	AF	AF	266	254	347	73	310	356	47	87	131	130	102	117	120	153	185	217	267	286	321	313	133.8
21-Jun	332	353	341	348	352	360	358	356	349	345	343	339	329	326	319	318	324	313	313	310	303	314	316	308	331.6
22-Jun	313	318	320	315	306	308	299	298	296	289	290	300	315	321	315	347	356	313	286	5	32	309	72	277	312.4
23-Jun	AF	AF	AF	AF	299	260	266	354	144	63	80	110	108	116	104	120	146	137	148	163	143	162	138	131	125.4
24-Jun	140	143	135	128	132	130	141	137	125	128	167	154	161	158	146	170	170	189	167	160	149	156	163	147	152.6
25-Jun	148	150	153	154	151	142	145	152	146	138	141	146	148	150	184	224	207	172	190	AF	161	173	167	139	159.6
26-Jun	152	167	170	AF	AF	AF	AF	172	168	124	140	152	232	293	267	252	281	262	284	265	AF	AF	AF	AF	--
27-Jun	AF	AF	AF	AF	AF	AF	AF	AF	41	53	29	304	34	57	31	313	291	310	8	21	14	AF	AF	AF	--
28-Jun	AF	AF	AF	AF	AF	AF	AF	14	46	21	277	283	288	310	321	338	345	354	341	327	335	331	294	AF	--
29-Jun	AF	277	309	291	297	307	310	308	331	352	335	357	357	357	353	360	356	350	355	342	336	333	332	333	344.7
30-Jun	330	323	308	305	305	311	317	326	325	317	323	334	346	356	359	345	353	344	332	339	336	348	356	346	333.6

155.2	149.1	131.7	125.1	134.9	121.9	156.9	133.1	149.9	117.3	144.1	148.3	107.9	107.7	58.7	87.4	77.2	93.2	99.5	65.9	90.8	144.1	153.4	153.0			
Diurnal Average																										

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



Summary of Hour Standard Deviations

Anzac - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 96 deg on Jun 8 10:00	Hours of Data: 683
Minimum Value: 12 deg on Jun 3 03:00	Hours of Missing Data: 37
Percentiles: P ₁ = 14 P ₁₀ = 19 Q ₁ = 21 Median = 27 Q ₃ = 36 P ₉₀ = 54 P ₉₉ = 87	Hours of Calibration: 0
	Percent Operational Time: 94.9

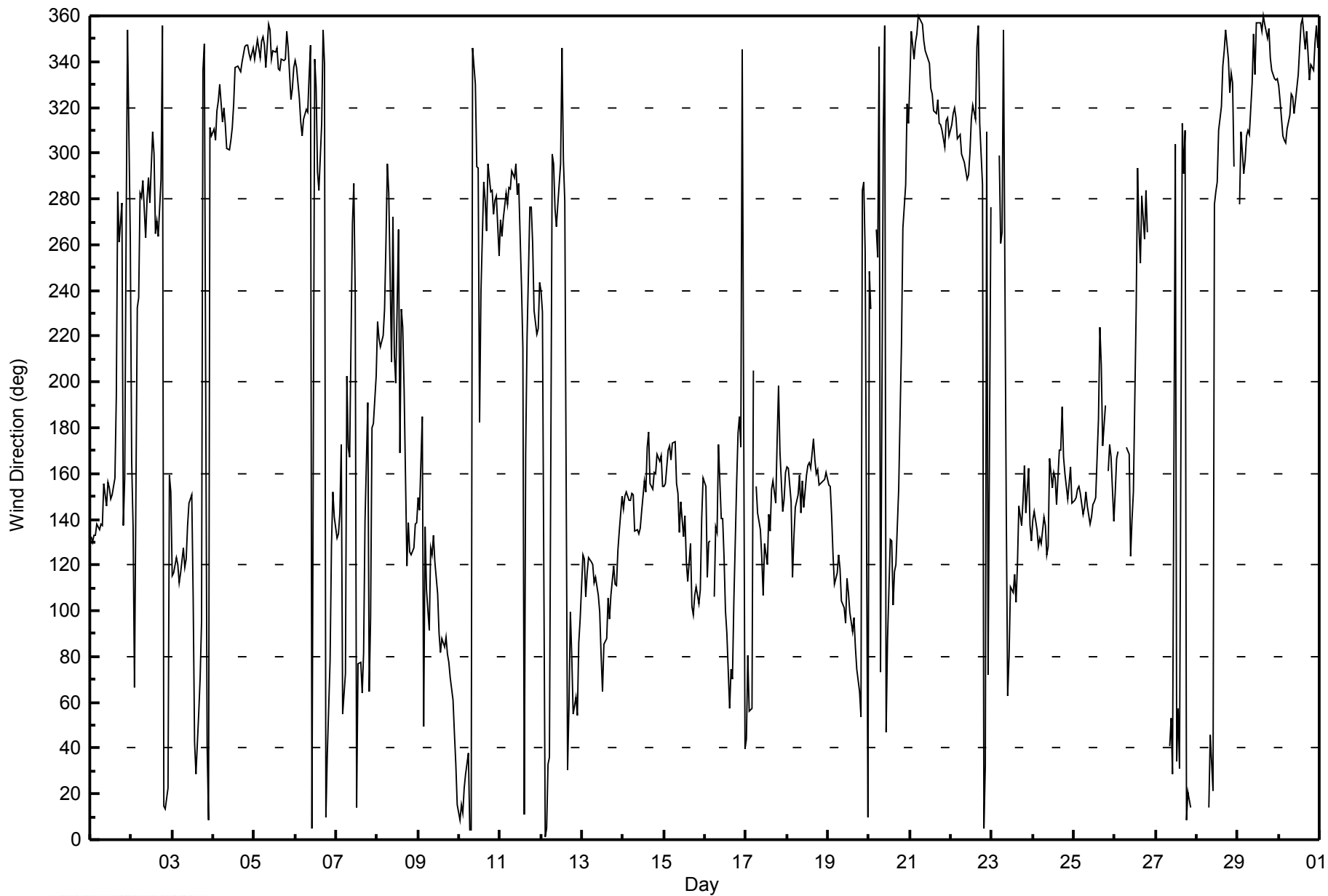
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	20	18	20	19	21	19	21	22	23	24	24	27	30	25	23	35	40	42	67	27	31	81	62	65	81
2-Jun	71	29	32	77	44	28	34	31	35	41	26	39	39	50	34	33	50	43	44	19	17	21	42	32	77
3-Jun	35	21	12	18	17	22	19	29	28	25	28	45	50	54	30	30	34	36	59	23	34	63	41	24	63
4-Jun	22	29	22	22	20	23	21	23	29	25	26	25	24	21	20	22	20	20	20	20	21	20	20	20	29
5-Jun	20	19	20	20	20	21	20	19	21	21	21	22	22	23	21	22	22	21	20	21	20	16	16	15	23
6-Jun	13	15	23	20	24	21	20	24	43	27	29	50	54	56	50	43	30	33	63	48	17	21	16	19	63
7-Jun	22	23	17	59	37	39	30	81	32	57	35	40	50	30	76	48	52	43	29	60	25	24	30	21	81
8-Jun	16	14	14	54	49	59	31	46	63	96	64	68	93	67	76	87	72	61	29	23	15	18	19	19	96
9-Jun	20	21	52	84	49	25	23	26	21	23	21	30	27	25	27	27	30	25	24	24	24	25	25	24	84
10-Jun	21	24	23	24	29	30	24	25	29	36	40	47	89	39	46	38	34	29	29	29	19	19	20	17	89
11-Jun	22	19	25	22	28	29	29	38	36	30	40	37	53	40	50	74	84	41	36	33	18	18	22	21	84
12-Jun	20	58	14	25	65	87	25	24	36	57	68	70	70	70	46	81	36	47	34	28	22	17	28	31	87
13-Jun	21	19	25	22	24	21	26	30	32	33	44	44	60	67	58	54	46	32	26	21	20	19	17	16	67
14-Jun	17	17	18	18	18	18	19	26	30	32	30	34	37	35	35	34	27	27	24	20	18	22	16	15	37
15-Jun	18	19	19	19	19	24	28	30	44	29	30	38	49	39	59	68	33	33	29	28	25	21	17	14	68
16-Jun	22	49	23	24	AF	22	31	30	27	29	36	50	40	37	33	34	41	35	43	29	29	20	80	23	80
17-Jun	23	38	17	49	22	AF	25	23	27	31	32	35	40	32	32	32	26	26	28	48	38	16	18	21	49
18-Jun	16	19	20	38	17	17	17	23	29	27	28	28	33	27	25	33	29	26	24	20	20	20	20	21	38
19-Jun	20	19	19	28	37	20	19	23	27	30	27	28	29	29	37	29	34	27	27	31	62	40	65	40	65
20-Jun	76	39	AF	AF	32	34	48	28	59	40	33	81	32	39	54	24	22	22	25	26	28	32	66	23	81
21-Jun	26	22	24	25	27	23	24	27	23	21	23	24	24	21	23	23	24	28	25	23	25	21	21	21	28
22-Jun	24	20	21	24	25	24	25	24	27	31	33	29	30	27	33	42	30	28	27	54	72	53	81	89	89
23-Jun	AF	AF	AF	AF	72	41	43	87	52	37	52	45	38	46	28	27	25	26	20	36	18	19	18	19	87
24-Jun	21	20	21	20	20	22	25	28	26	27	28	32	24	32	30	32	35	33	27	23	22	20	21	18	35
25-Jun	17	18	20	17	17	21	22	23	63	31	32	28	30	29	46	25	30	27	26	AF	17	21	14	20	63
26-Jun	18	14	30	AF	AF	AF	AF	59	27	39	41	42	36	34	87	65	30	30	24	70	AF	AF	AF	AF	87
27-Jun	AF	AF	AF	AF	AF	AF	AF	AF	30	27	60	46	24	78	57	52	44	47	29	27	16	AF	AF	AF	78
28-Jun	AF	AF	AF	AF	AF	AF	AF	32	49	71	33	43	44	37	38	30	28	26	19	12	15	20	22	AF	71
29-Jun	AF	17	15	19	14	17	22	25	30	27	27	35	31	30	25	26	27	25	26	23	18	16	19	19	35
30-Jun	21	20	22	21	23	23	21	22	28	24	29	28	29	34	28	29	26	28	23	22	15	14	19	19	34
Diurnal Maximum																									
76 58 52 84 72 87 48 87 63 96 68 81 93 78 87 87 84 61 67 70 72 81 81 89																									

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Anzac - June 2014



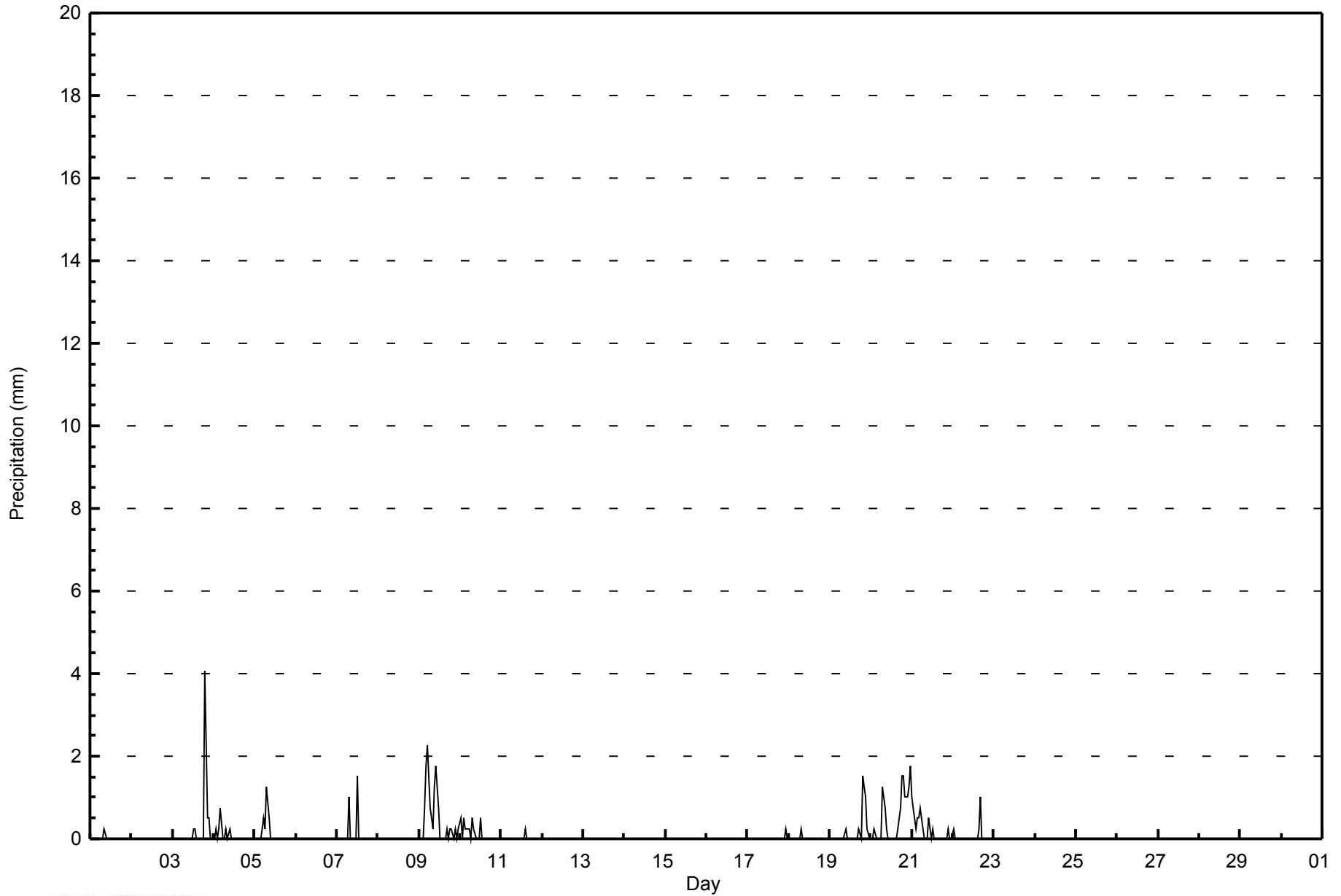


Maximum Value: 4.1 mm on Jun 3 20:00																			Maximum Daily Total: 11.7 mm on Jun 20						Hours in Service: 720																							
Minimum Value: 0.0 mm on Jun 1 01:00																			Minimum Daily Total: 0.0 mm on Jun 2						Hours of Data: 720																							
Maximum Diurnal Total: 7.4 mm at hour 20																			Minimum Diurnal Total: 0.3 mm at hour 14						Hours of Missing Data: 0																							
Monthly Total: 51.05 mm																			Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.3 P ₉₉ = 1.5						Hours of Calibration: 0																							
																									Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3																						
2-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	4.1	0.5	0.5	0.0	0.0	5.6	4.1																						
4-Jun	0.0	0.3	0.0	0.3	0.8	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.8																						
5-Jun	0.0	0.0	0.0	0.0	0.3	0.5	0.3	1.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	1.3																						
6-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1.5																						
8-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.8	1.8	2.3	0.8	0.5	0.3	1.3	1.8	0.8	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.3	0.0	0.3	0.0	0.3	11.4	2.3																						
10-Jun	0.5	0.0	0.5	0.3	0.3	0.3	0.0	0.5	0.3	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	3.0	0.5																						
11-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3																						
12-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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																						
18-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3																						
19-Jun	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	0.0	1.5	1.3	1.0	0.3	0.0	4.6	1.5																							
20-Jun	0.0	0.0	0.3	0.0	0.0	0.0	0.0	1.3	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.8	1.5	1.5	1.0	1.0	1.3	1.8	11.7	1.8																							
21-Jun	1.0	0.8	0.3	0.5	0.5	0.8	0.3	0.0	0.0	0.0	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	5.1	1.0																							
22-Jun	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.0																							
23-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																							
																								1.8	1.0	1.0	1.8	3.6	3.8	1.3	5.1	2.0	2.0	2.3	0.8	2.5	0.3	0.3	0.3	1.5	1.0	1.8	7.4	2.8	3.0	1.8	2.0	Diurnal Average
																								1.0	0.8	0.5	0.8	1.8	2.3	0.8	1.3	0.8	1.3	1.8	0.8	1.5	0.3	0.3	0.3	1.0	0.8	1.5	4.1	1.3	1.0	1.3	1.8	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Anzac - June 2014





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 21, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	7:40	End Time (MST)	9:50
Barometric Pressure	782 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Cal Gas Concentration	51 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL107928		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2372
DACS voltage range	NA	DACS channel #	NA

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-596	-596
Analyzer Range (mv)	5000	5000	Lamp voltage	802	802
Calculated slope	0.991234	0.985611	Chamber temp.	44.1	44.1
Calculated intercept	0.150570	0.555671	Pressure (mmHg)	686.2	686.2
Analyzer Background	12.9	12.9	Flow (lpm)	0.390	0.390
Analyzer Coefficient	0.945	0.945	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	0.5	NA
as found span	5000	78.3	798.7	811.0	0.985
calibrator zero	5000	0.0	0.0	0.5	NA
high point	5000	78.3	798.7	811.0	0.985
second point	5000	39.1	398.8	401.4	0.994
third point	5000	19.6	199.9	202.6	0.987
calibrator zero	5000	0.0	0.0	0.5	NA
as left zero	5000	0.0	0.0	0.5	NA
as left span	5000	78.3	798.7	813.4	0.982
Average Correction Factor					0.988

Corrected As found 810.5 Previous response 805.6 % change -0.6%

Notes:

Filter changed, No Maintenance or adjustments made

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

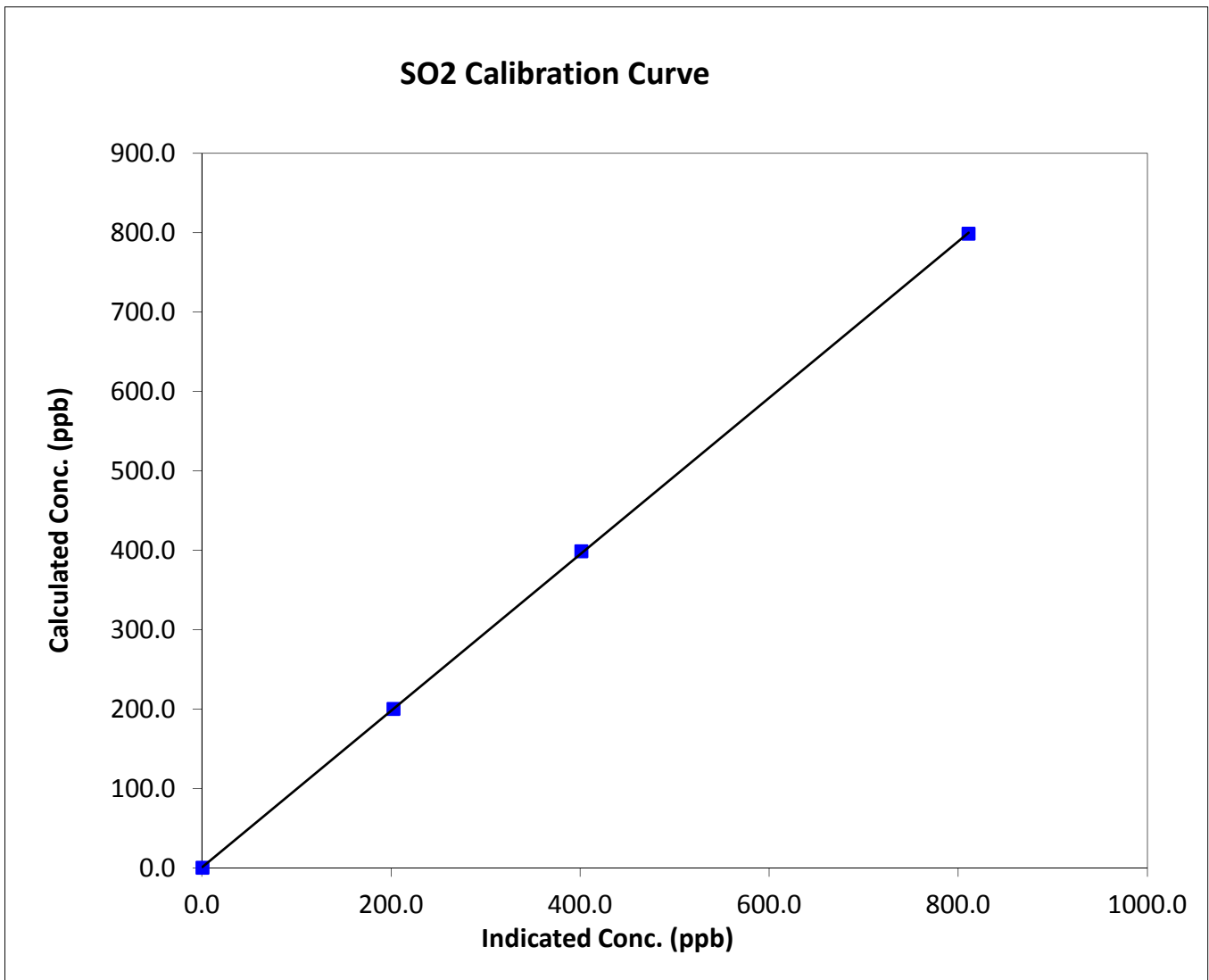
SO₂ Calibration Summary

Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 21, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:40	End Time (MST)	9:50
Analyzer make	TEI 43C	Analyzer serial #	613516095

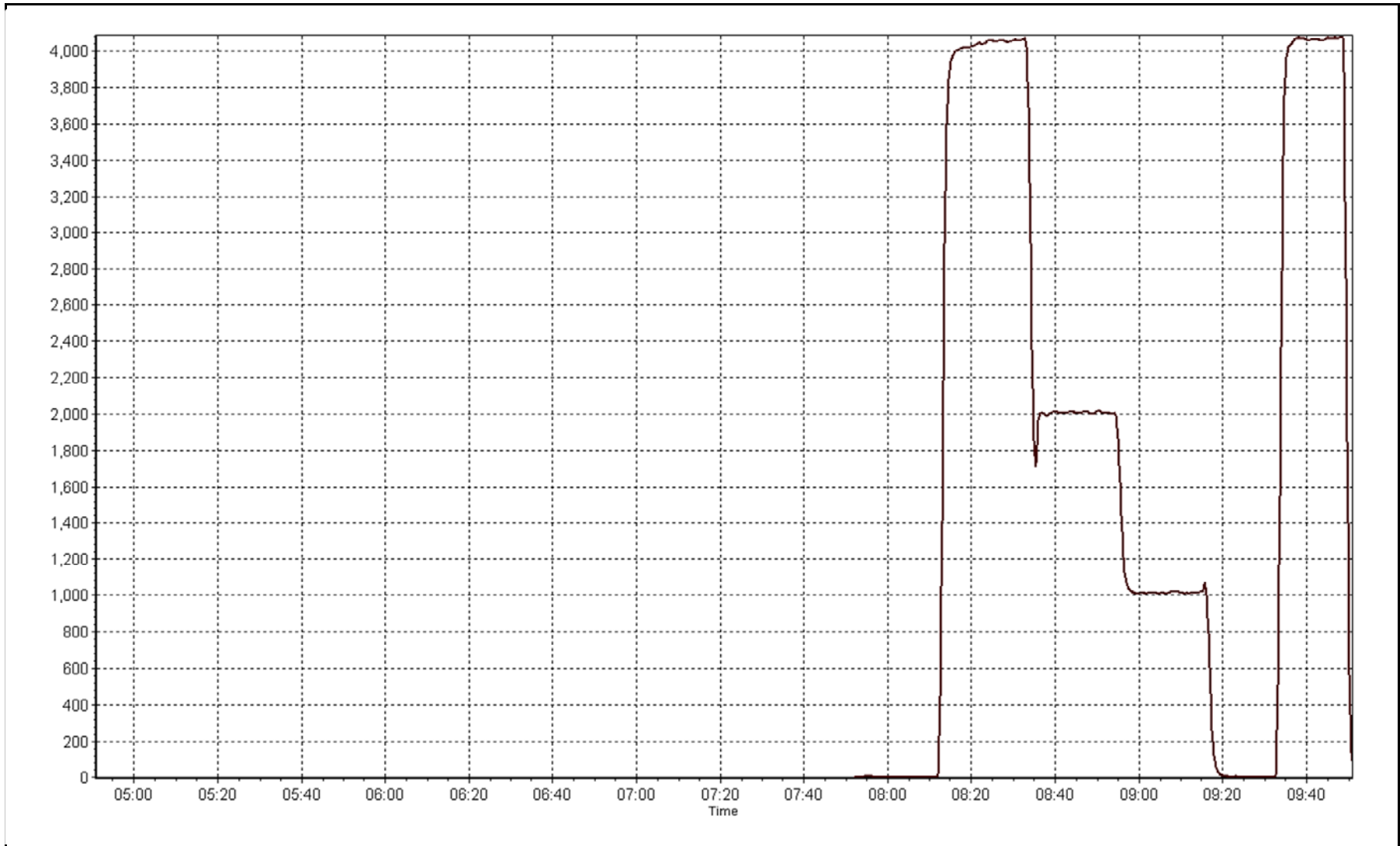
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	N/A	Correlation Coefficient	0.999972
798.7	811.0	0.9848		
398.8	401.4	0.9936	Slope	0.985611
199.9	202.6	0.9868		
			Intercept	0.555671



SO2 Calibration Plot

Date: June 17, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 21, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	12:00
Barometric Pressure	732 mmHg	Station temp.	22 Deg C
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	958	958
Calculated slope	0.992360	1.011508	Chamber temp.	45.2	45.2
Calculated intercept	0.210178	0.238089	Pressure	657.7	657.7
Analyzer Background	2.1	2.1	Flow	0.396	0.396
Analyzer Coefficient	1.157	1.157	Intensity	90	90
			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	-0.5	NA
as found span	5000	39.1	75.1	73.7	1.019
SO2 scrubber check	5000	39.1	398.8	0.1	NA
calibrator zero	5000	0.0	0.0	-0.5	NA
high point	5000	39.1	75.1	73.7	1.019
second point	5000	20.8	39.9	39.7	1.005
third point	5000	10.4	20.0	19.6	1.019
calibrator zero	5000	0.0	0.0	-0.5	NA
as left zero	5000	0.0	0.0	-0.5	NA
as left span	5000	39.1	75.1	73.2	1.025
Average Correction Factor					1.014

Corrected As found	74.2	Previous response	75.4	% change	1.6%
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Notes:

No adjustments made, no maintenance done, scrubber checked after third period

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

TRS Calibration Summary

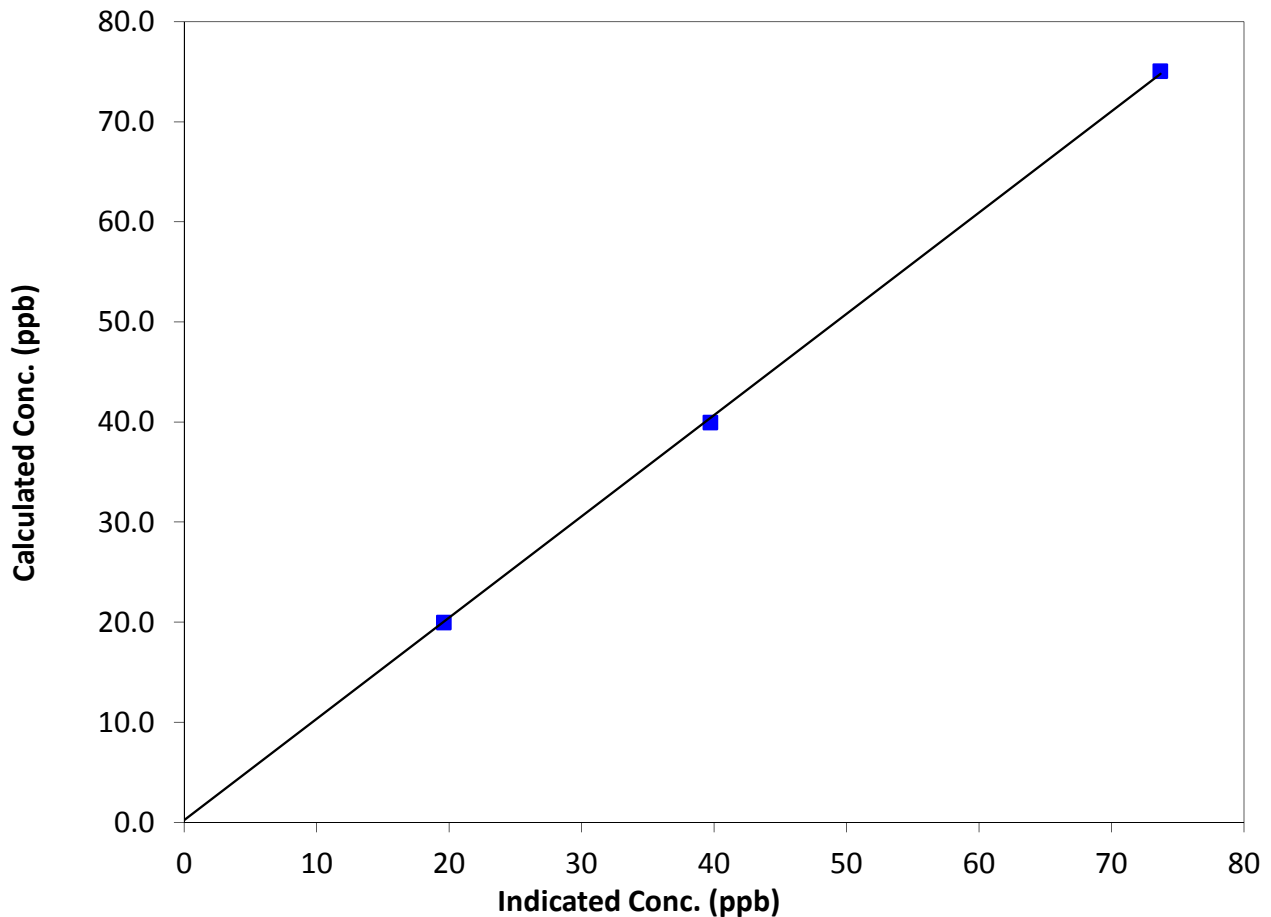
Station Information

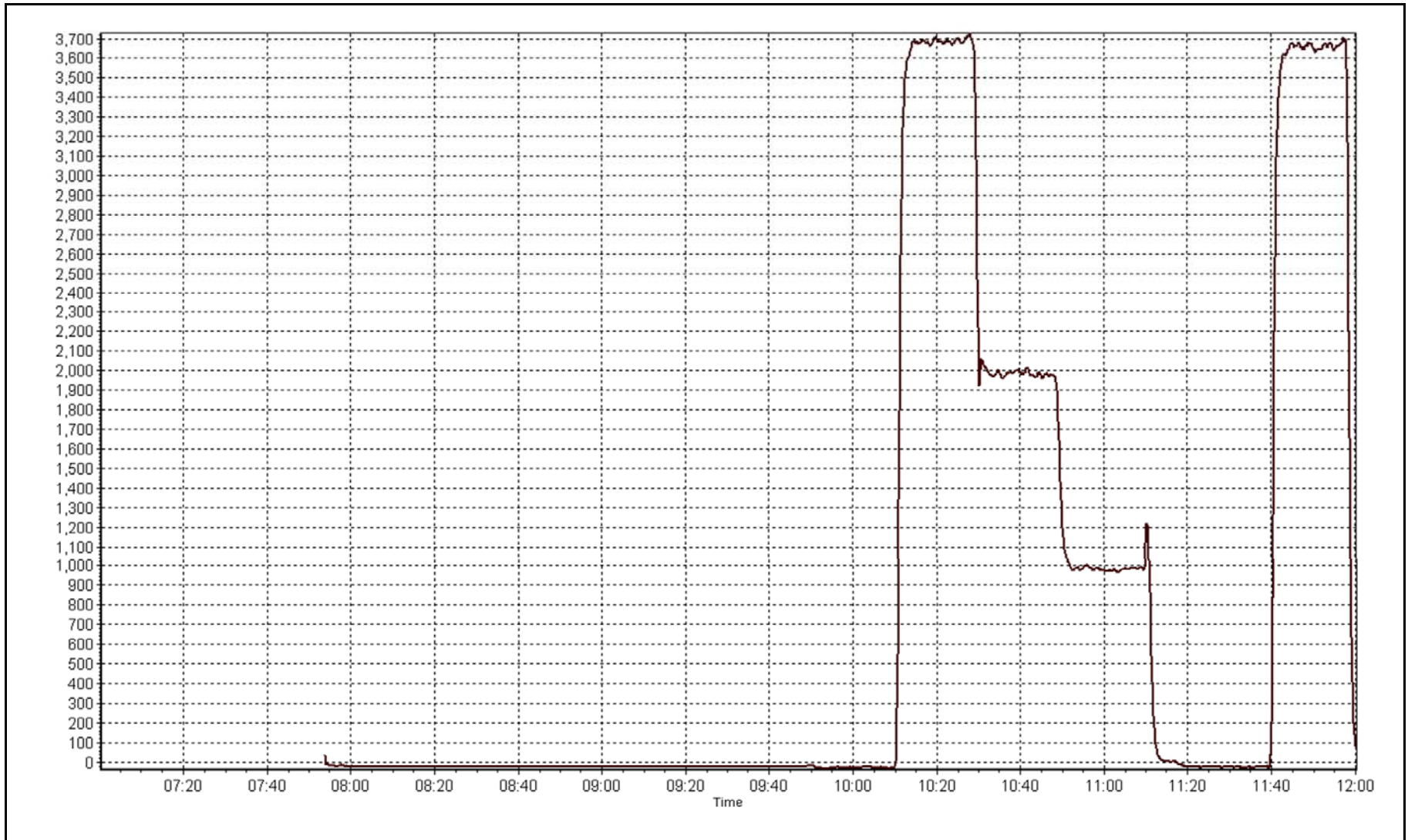
Calibration Date	June 17, 2014	Previous Calibration	May 21, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:50	End Time (MST)	12:00
Analyzer make	43i-TL	Analyzer serial #	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	N/A	Correlation Coefficient	0.999869
75.1	73.7	1.0186		
39.9	39.7	1.0054	Slope	1.011508
20.0	19.6	1.0188		
			Intercept	0.238089

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Thursday, June 05, 2014	Prev Calibration	Wednesday, May 21, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:20	End Time (MST)	11:20
Barometric Pressure	782 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	33.5	31.1
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	1.001214	0.999436	Air Pressure	32.5	32.5
THC Calc intercept	0.018271	0.016215			
NMHC Calc slope	1.001757	1.001757			
NMHC Calc intercept	-0.003896	-0.003896			

Analyzer make TEC 55i Analyzer serial # 1218153355

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	N/A
as found span	5000	78.3	16.69	16.70	1.000
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.3	16.69	16.71	0.999
second point	5000	39.1	8.34	8.27	1.008
third point	5000	19.6	4.18	4.18	1.000
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	78.3	16.69	16.68	1.001
Average Correction Factor					1.002

Corrected As found 16.70 Previous response 16.66 % change -0.3%

Notes:

Filter change out, hydrogen and nitrogen changed out, no adjustments made

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	8.77	1.002
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	4.36	1.006
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	8.75	1.004
Average Correction Factor					0.999

Corrected As found 8.77 Previous response 8.77 % change 0.0%

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	7.93	0.997
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.3	7.91	7.93	0.997
second point	5000	39.1	3.95	3.90	1.013
third point	5000	19.6	1.98	1.96	1.010
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	78.3	7.91	7.92	0.999
Average Correction Factor					

Corrected As found 7.93 Previous response 7.88 % change -0.6%



Wood Buffalo Environmental Association

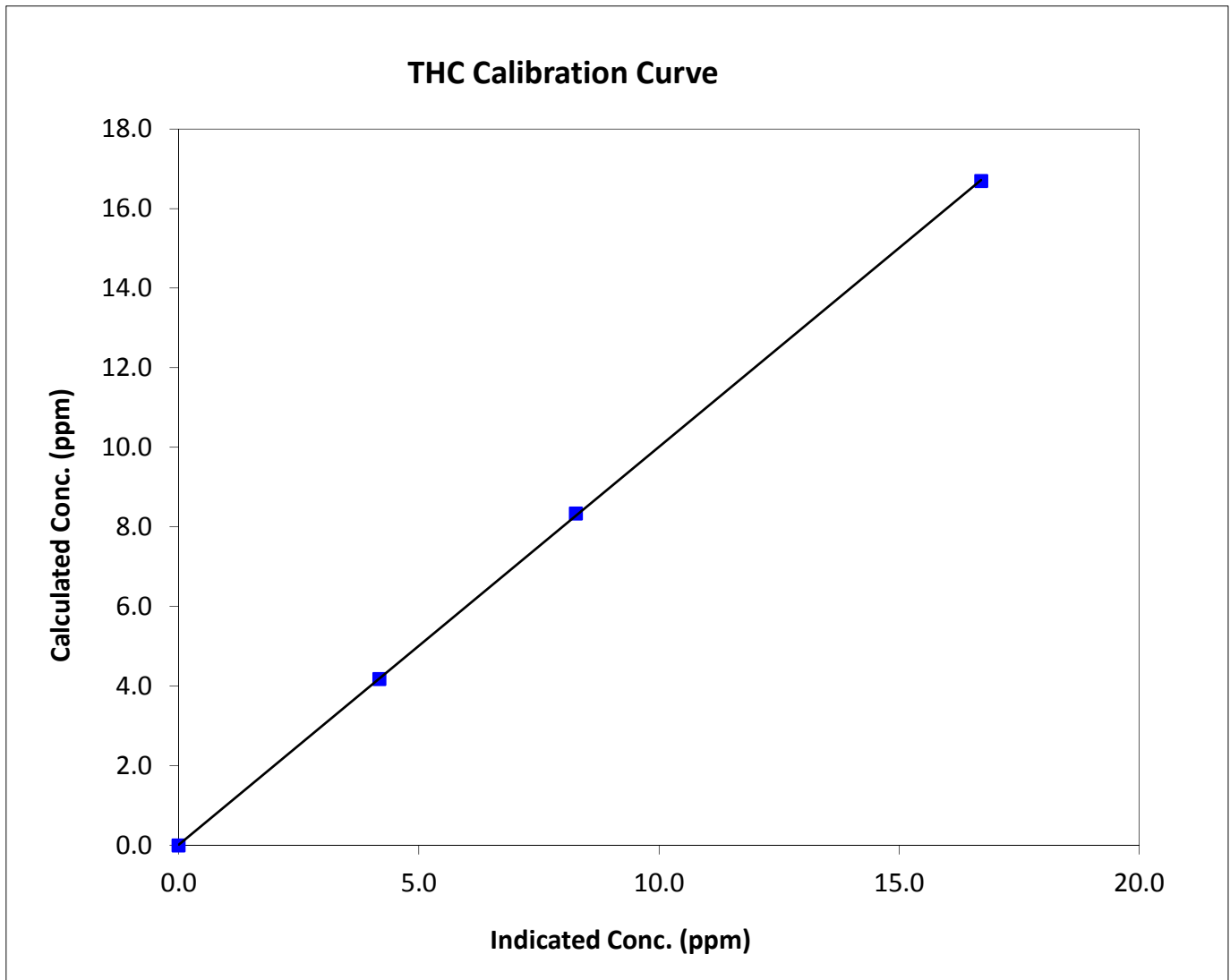
THC Calibration Summary

Station Information

Calibration Date	June 5, 2014	Previous Calibration	May 21, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:20	End Time (MST)	11:20
Analyzer make	TEC 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999974
16.69	16.71	0.9990		
8.34	8.27	1.0080	Slope	0.999436
4.18	4.18	0.9997		
			Intercept	0.016215





Wood Buffalo Environmental Association

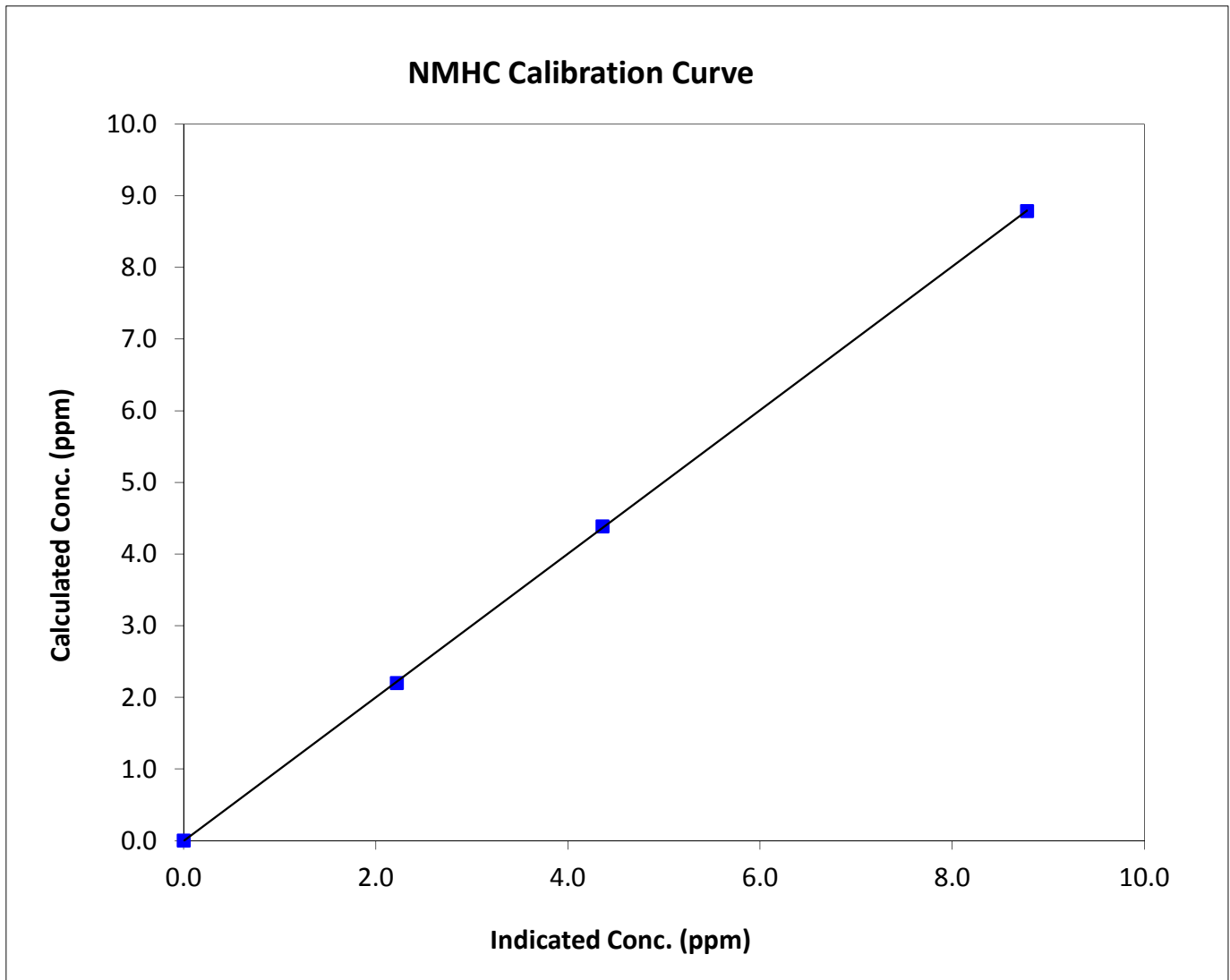
NMHC Calibration Summary

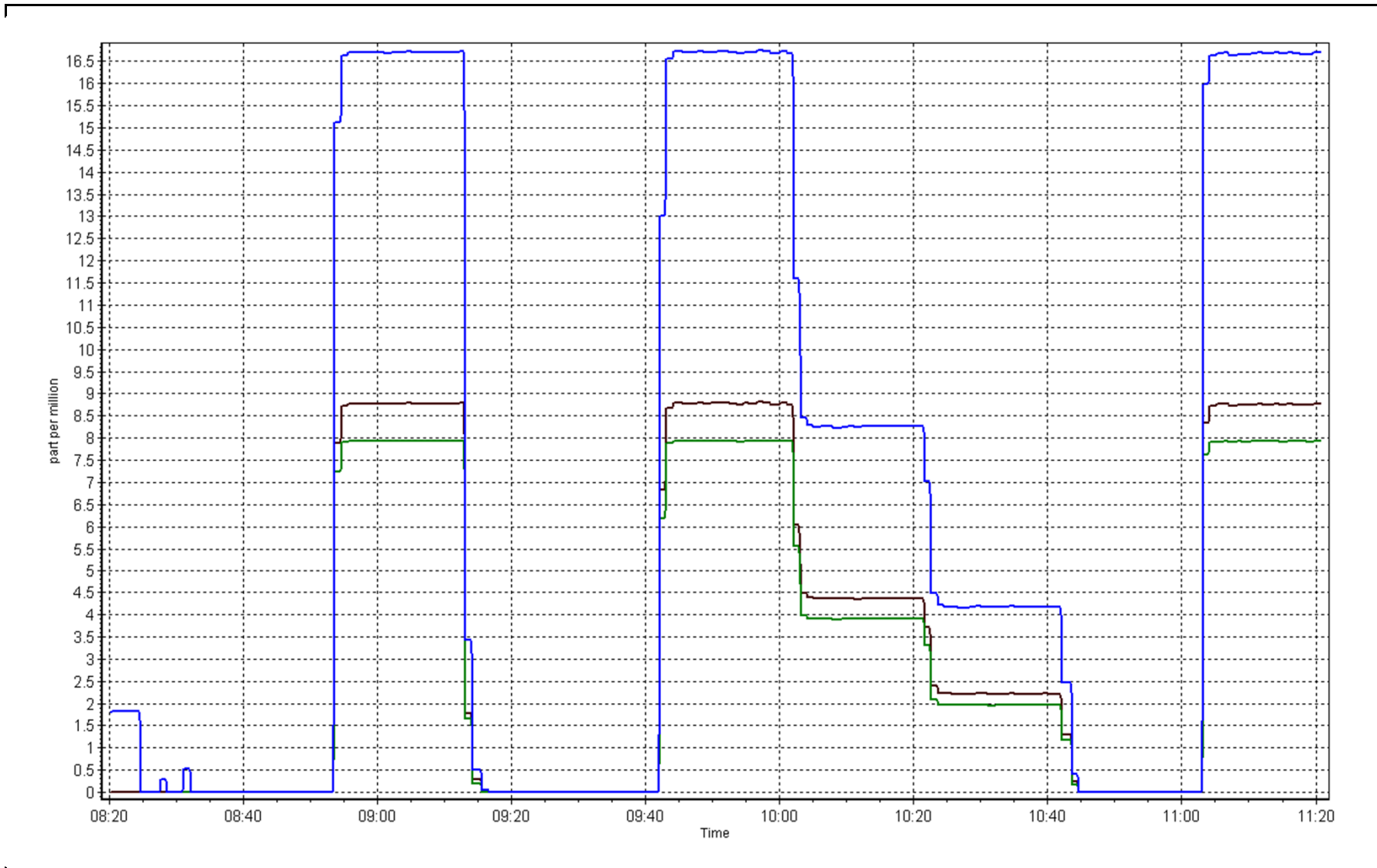
Station Information

Calibration Date	June 5, 2014	Previous Calibration	May 21, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:20	End Time (MST)	11:20
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	0.999976
8.79	8.78	1.0006		
4.39	4.36	1.0062	Slope	1.001757
2.20	2.22	0.9906		
			Intercept	-0.003896







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	June 20, 2014	Previous Calibration	June 19, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	6:20	End Time (MST)	9:05
Barometric Pressure	732 mmHg	Station temp.	A Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
NO2 calibration used	Wednesday, June 18, 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.	29.7	29.2
Analyzer Range (input)	5000	5000	Lamp temp.	55.7	55.8
Calculated slope	0.992616	0.992960	Pressure	707.8	710.4
Calculated intercept	-0.255102	-0.622283	Flow cell A	0.840	0.845
Analyzer Background	-3.5	-3.5	Flow cell B	0.731	0.735
Analyzer Coefficient	1.039	1.039	Cell A Intensity	65291	65693
			Cell B Intensity	59865	60194

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	0.9	N/A
as found span	5000	N/A	395.6	398.6	0.992
calibrator zero	5000	0.00	0.0	0.3	N/A
high point	5000	N/A	395.6	398.8	0.992
second point	5000	N/A	272.6	275.2	0.991
third point	5000	N/A	142.8	145.0	0.985
calibrator zero	5000	0.00	0.0	0.5	N/A
as left zero	N/A	N/A	N/A	4.1	
as left span	N/A	N/A	N/A	304.7	
Average Correction Factor					0.989

Corrected As found 397.7 Previous response 398.8 % change 0.3%

Notes:

Calibration from yesterday's repair, no Adjustments made

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

O₃ Calibration Summary

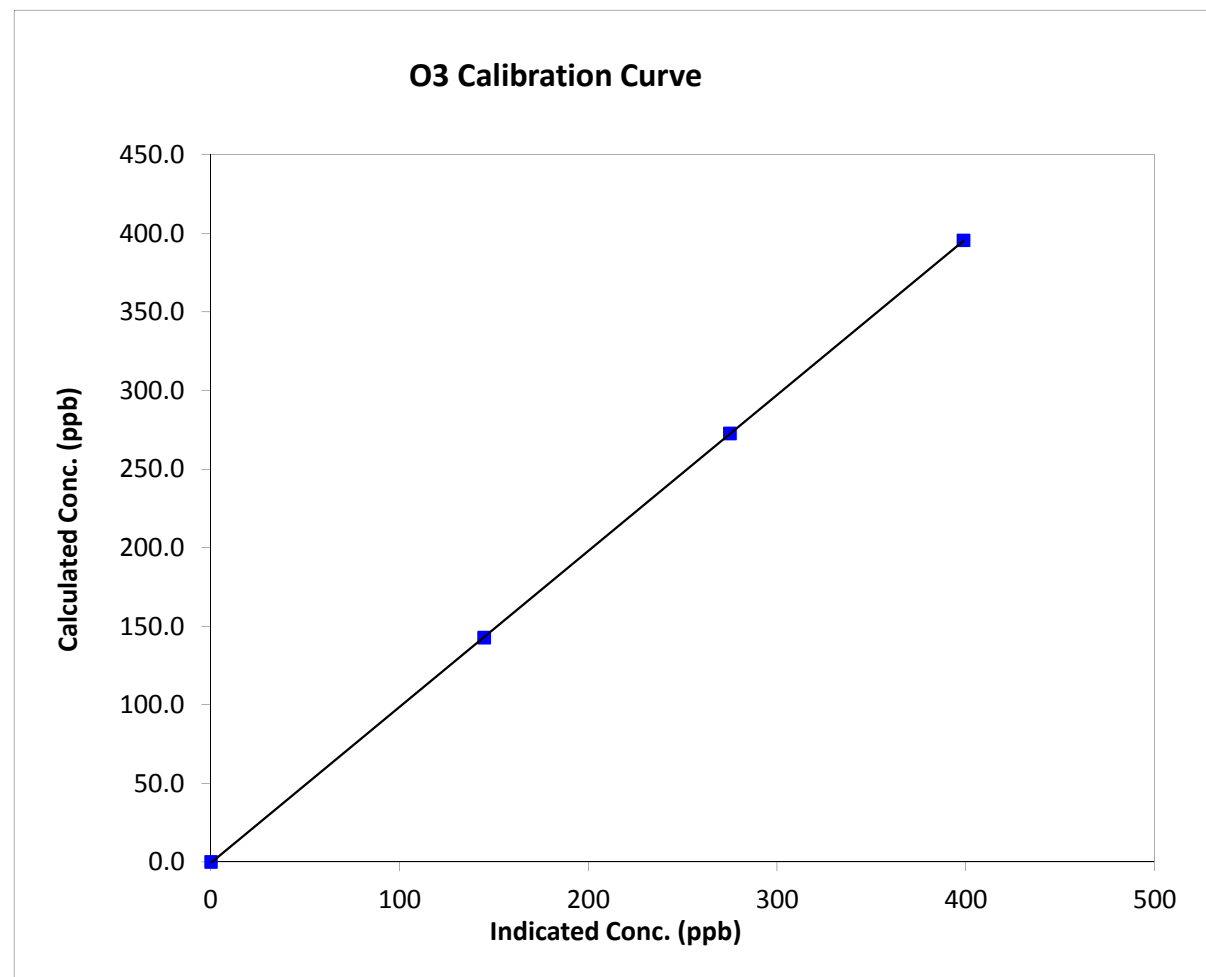
Station Information

Calibration Date	Friday, June 20, 2014	Previous Calibration	June 19, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	6:20	End Time (MST)	9:05
Analyzer make	49C	Analyzer serial #	509110892

Calibration Data

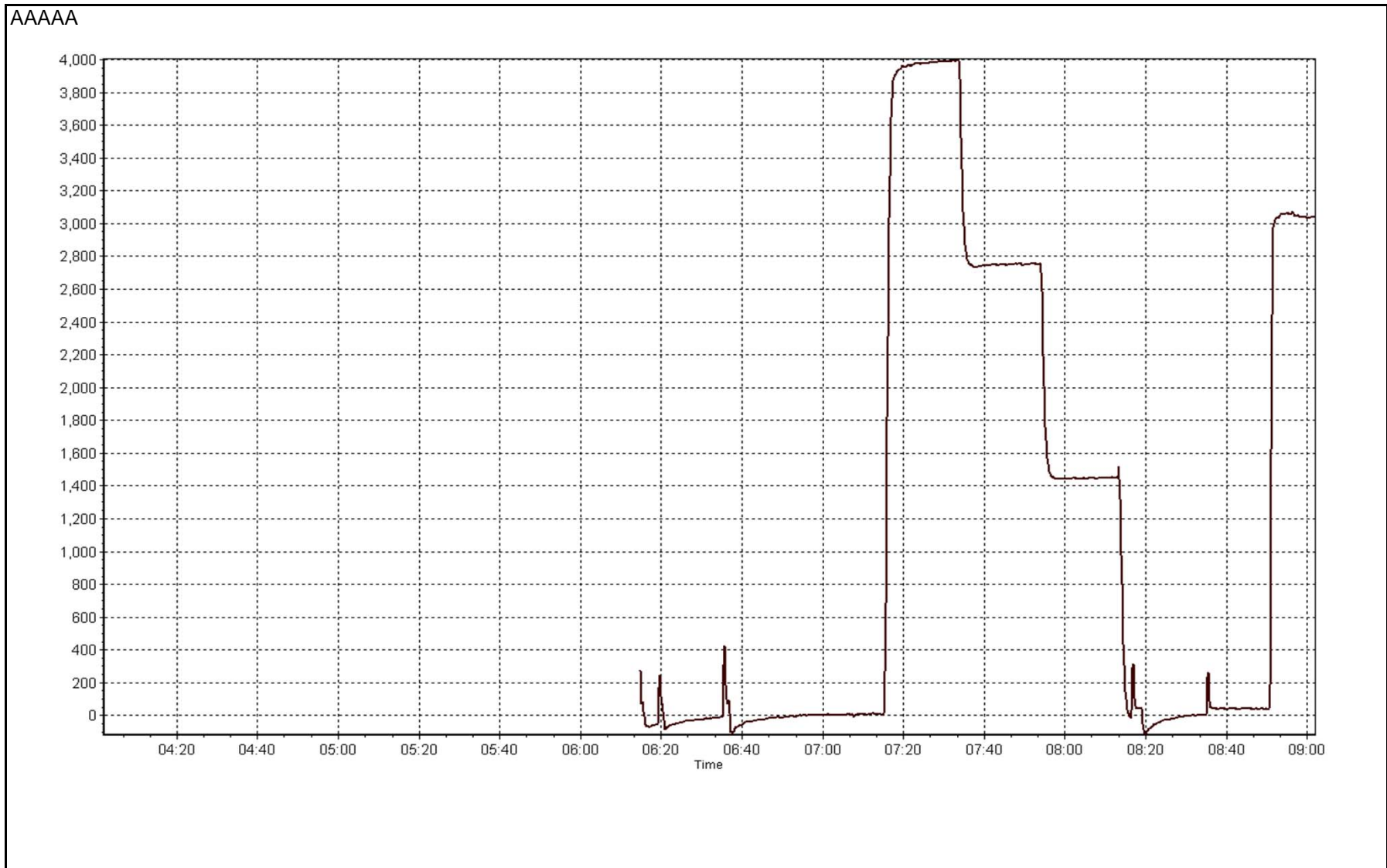
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999994
395.6	398.8	0.9920		
272.6	275.2	0.9906	Slope	0.992960
142.8	145.0	0.9848		
			Intercept	-0.622283

O₃ Calibration Curve



O3 Calibration Plot

Date: June 20, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	June 18, 2014	Previous Calibration	May 23, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Removal		
Start Time (MST)	7:40	End Time (MST)	9:00
Barometric Pressure	782 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
NO _x Cal Gas Conc	51.2 ppm	Cal Gas Serial #	LL107928

DACS Information

DACS make & model Campbell Scientific CR3000 DACS serial No. _____

Parameter		NO _x	NO	NO ₂
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	1.003805	1.001570	1.003327
	Data Offset	1.766776	1.529153	-0.674019
After	Data Slope	1.002039	1.001360	
	Data Offset	2.148244	0.695411	
Channel #		6	5	4
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model T200 Analyzer serial # 837

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.870	ppb	NA	ppb
NO _x coefficient	0.865	ppb	NA	ppb
NO ₂ coefficient	N/A	ppb	NA	ppb
NO bkgrnd	-1.6		NA	
NO _x bkgrnd	2.9		NA	
Nt coefficient	N/A		NA	
Chamber Temp	50.0	Deg C	NA	Deg C
Moly Temp	315.9	Deg C	NA	Deg C
PMT Temp	7.3	Deg C	NA	Deg C
O ₃ flow	81.0	ccm	NA	ccm
R Cell Press	5.0	mmHg	NA	"Hg
Sample Flow	447.000	ccm	NA	ccm

Notes:

Removed; original Nox analyzer returned to service



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

June 18, 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	0.6	1.3	0.3	N/A	N/A
as found span	5000	78.3	801.8	800.2	1.6	795.4	800.2	0.4	1.0080	1.0000
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.3	-0.2	N/A	N/A
high point	5000	78.3	801.8	800.2	1.6	799.4	799.6	0.7	1.0030	1.0008
second point	5000	39.1	400.4	399.6	0.8	395.4	395.8	0.4	1.0126	1.0096
third point	5000	19.6	200.7	200.3	0.4	196.6	199.8	0.4	1.0209	1.0026
calibrator zero										
as left zero										
as left span										
Average Correction Factor									1.0122	1.0043

Corrected As found

NO_x= 794.9

NO= 798.9

Percent Change

NO_x= 0.3%

NO= -0.2%

Previous Response

NO_x= 797.0

NO= 797.4

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

78.30

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO 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)										
2nd NO ₂ (200)										
3rd NO ₂ (100)										
4th NO ₂ (0)										
Average Correction Factor										

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

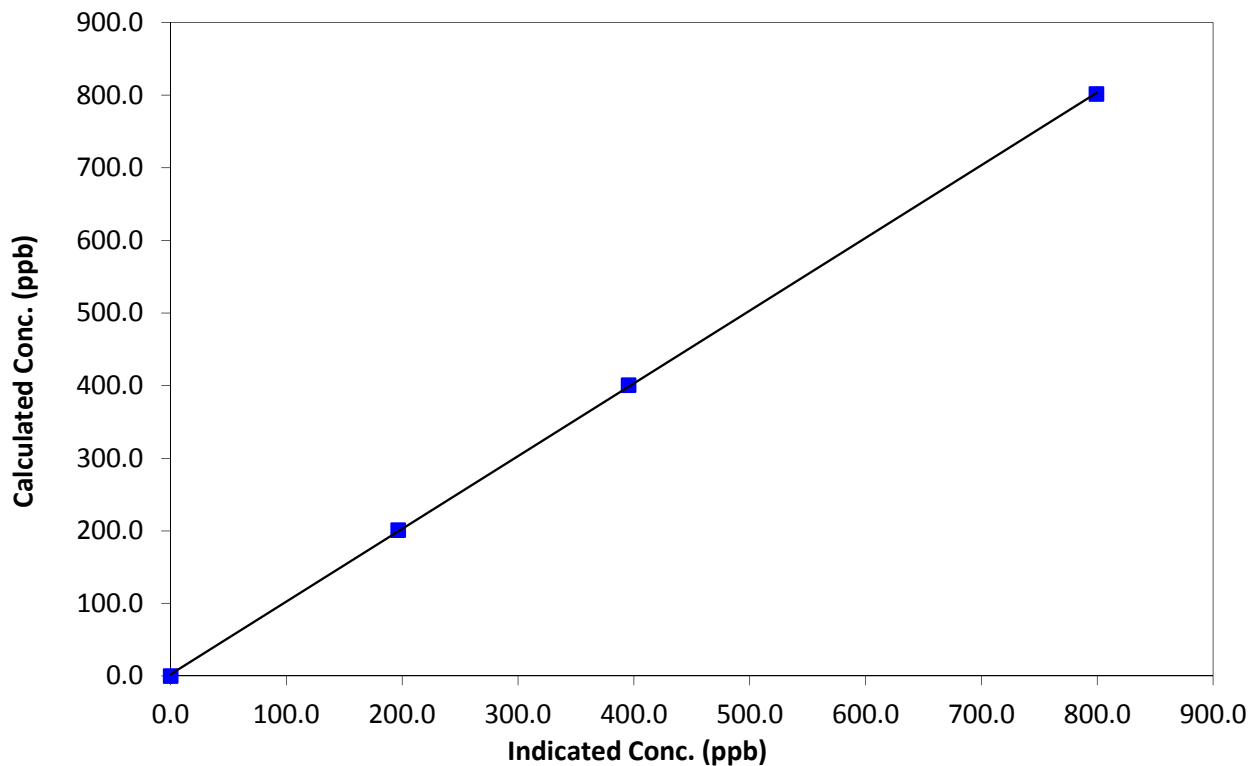
Station Information

Calibration Date	June 18, 2014	Previous Calibration	May 23, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:40	End Time (MST)	9:00
Analyzer make	T200	Analyzer serial #	837

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999962
801.8	799.4	1.0030		
400.4	395.4	1.0126	Slope	1.002039
200.7	196.6	1.0209		
			Intercept	2.148244

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

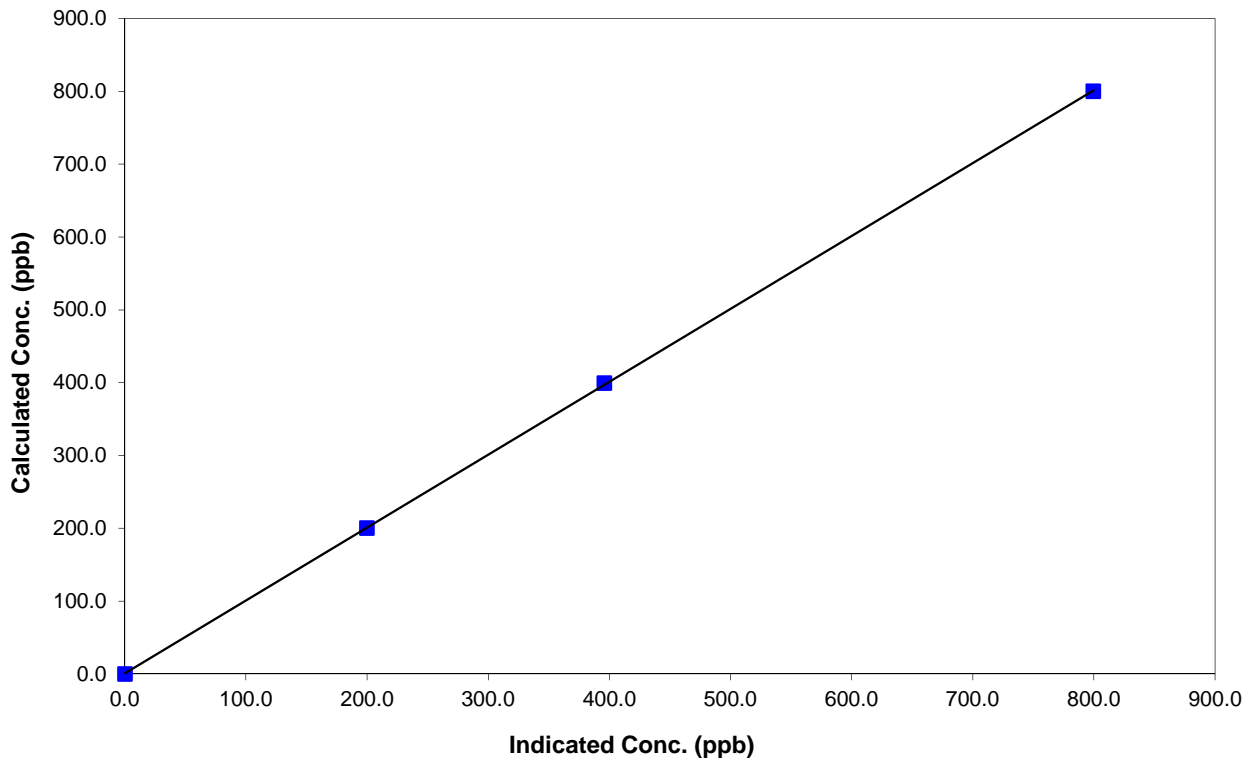
Station Information

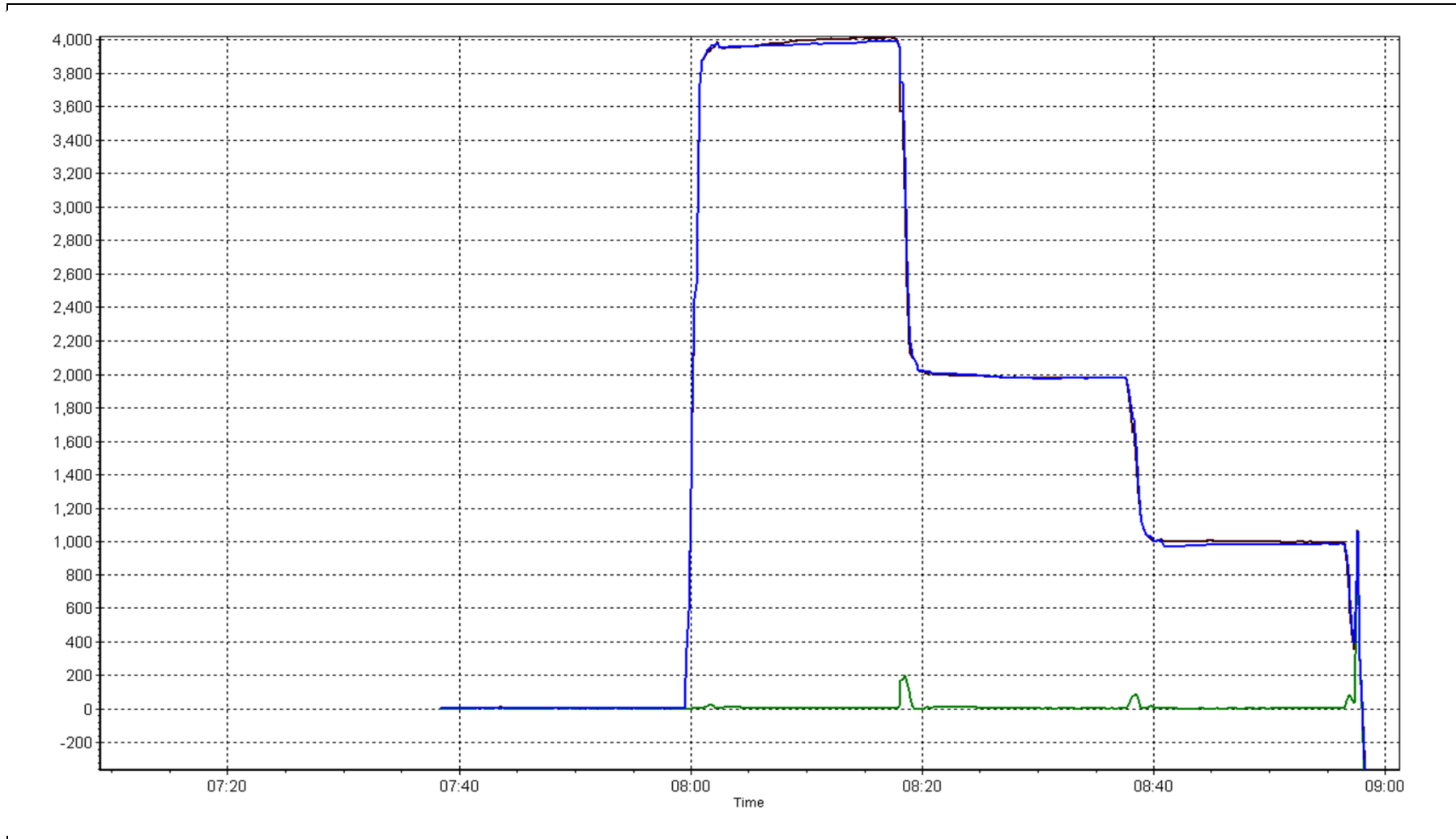
Calibration Date	June 18, 2014	Previous Calibration	May 23, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:40	End Time (MST)	9:00
Analyzer make	T200	Analyzer serial #	837

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999974
800.2	799.6	1.0008		
399.6	395.8	1.0096	Slope	1.001360
200.3	199.8	1.0026		
			Intercept	0.695411

NO Calibration Curve







Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	June 18, 2014	Previous Calibration	NA
Station Name	Anzac	Station Number	AMS 14
Reason:	Install		
Start Time (MST)	9:20	End Time (MST)	13:00
Barometric Pressure	782 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	NA	NA	NA
	Data Offset	NA	NA	NA
After	Data Slope	1.002685	1.001707	1.005988
	Data Offset	1.862837	2.186887	0.487607
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	NA	ppb	1.114	ppb
NOx coefficient	NA	ppb	0.999	ppb
NO2 coefficient	NA	ppb	1.002	ppb
NO bkgrnd	NA		13.8	
NOx bkgrnd	NA		13.9	
Nt coefficient	NA		n/a	
Chamber Temp	NA	Deg C	49.3	Deg C
Moly Temp	NA	Deg C	318.0	Deg C
PMT Temp	NA	Deg C	-2.6	Deg C
O3 flow	NA	ccm	Ok	ccm
R Cell Press	NA	mmHg	212.2	mmHg
Sample Flow	NA	ccm	0.524	ccm

Notes:

Installation of original site analyzer.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

June 18, 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										
as found span										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.0	N/A	N/A
high point	5000	78.3	801.8	800.2	1.6	800.2	799.2	0.1	1.0020	1.0013
second point	5000	39.1	400.4	399.6	0.8	393.6	392.6	0.5	1.0172	1.0178
third point	5000	19.6	200.7	200.3	0.4	196.2	195.8	0.1	1.0230	1.0230
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.8	0.0	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.8	0.0	N/A	N/A
as left span	5000	78.3	801.8	398.2	403.6	819.0	411.4	407.2	0.9790	0.9679
Average Correction Factor									1.0141	1.0141

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

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	398.2	395.6	792.0	398.2	393.2	0.9968	1.0000	1.0061	99.4%
2nd NO ₂ (200)	N/A	521.2	272.6	792.0	521.2	270.2	0.9968	1.0000	1.0089	99.1%
3rd NO ₂ (100)	N/A	651.0	142.8	792.6	651.0	140.8	0.9960	1.0000	1.0142	98.6%
4th NO ₂ (0)	793.8	N/A	0.4	794.2	793.8	-0.7	0.9940	1.0000	N/A	N/A
Average Correction Factor							0.9959	1.0000	1.0097	99.0%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

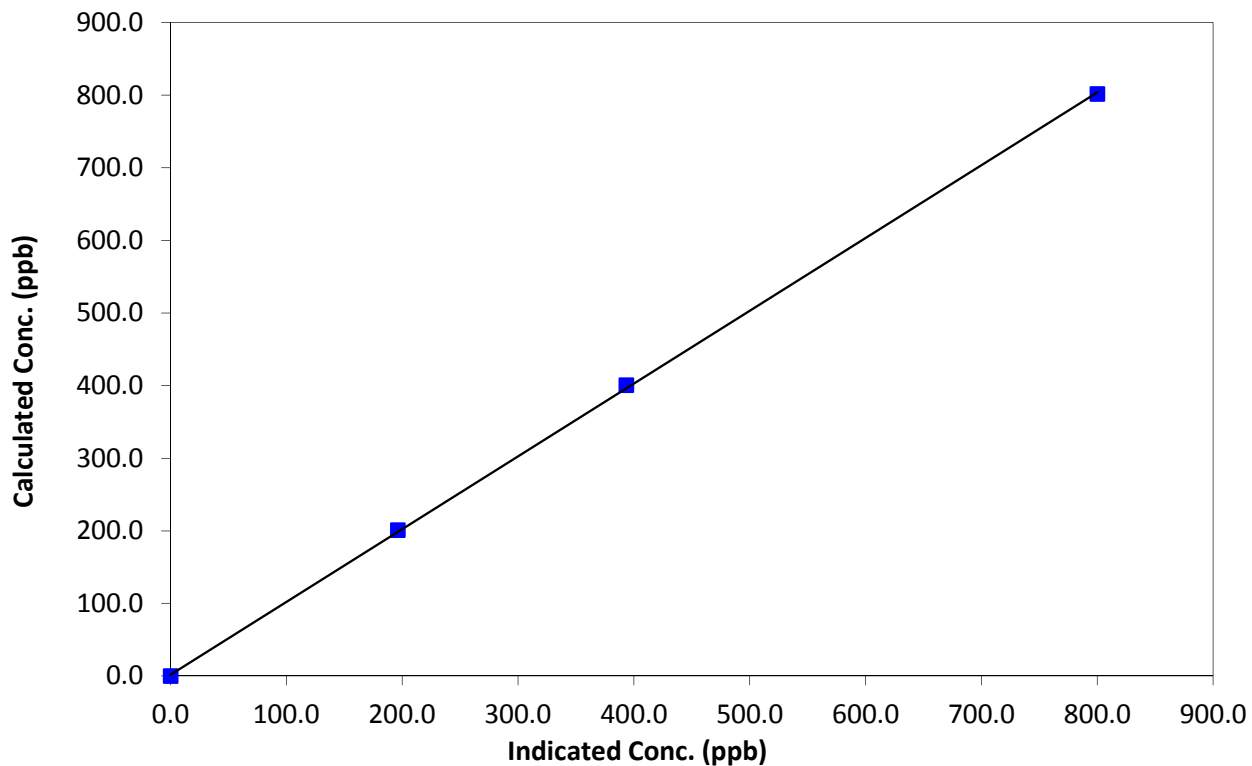
Station Information

Calibration Date	June 18, 2014	Previous Calibration	NA
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:20	End Time (MST)	13:00
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	0.999930
801.8	800.2	1.0020		
400.4	393.6	1.0172	Slope	1.002685
200.7	196.2	1.0230		
0.0	-0.3	0.0000	Intercept	1.862837

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

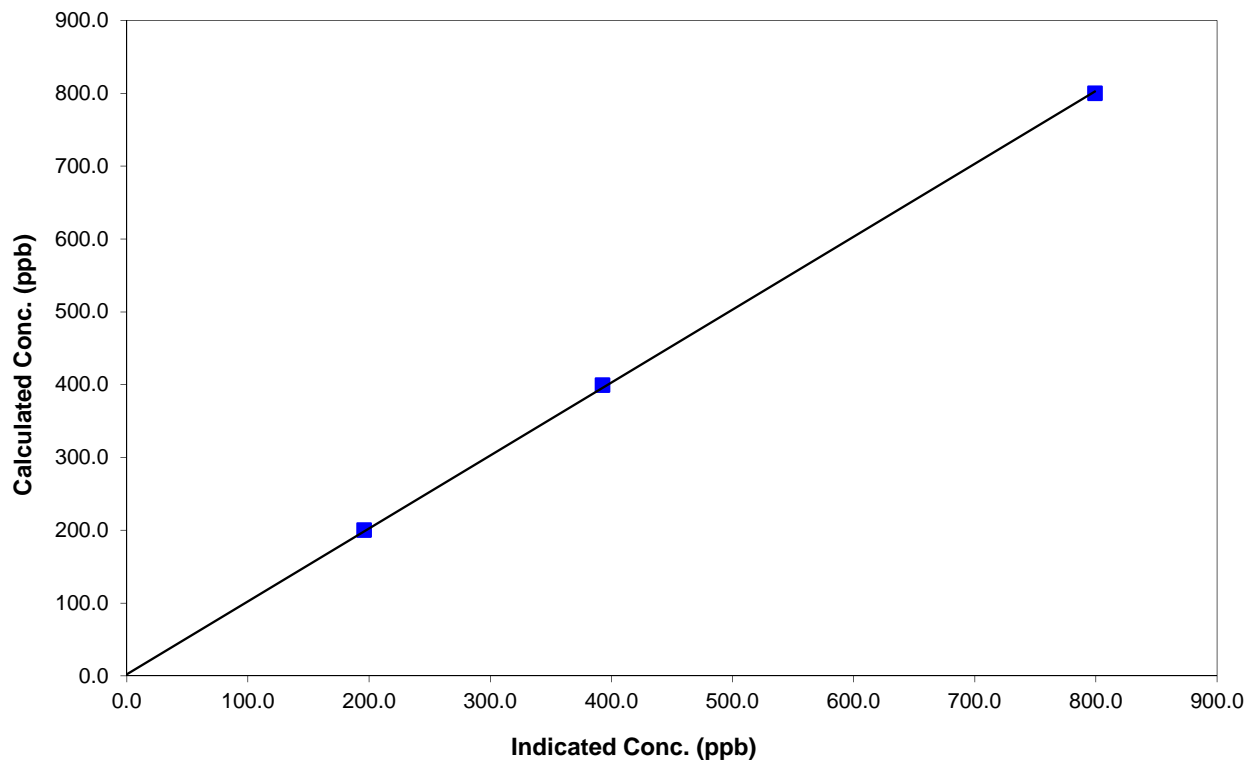
Station Information

Calibration Date	June 18, 2014	Previous Calibration	NA
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:20	End Time (MST)	13:00
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	0.999923
800.2	799.2	1.0013		
399.6	392.6	1.0178	Slope	1.001707
200.3	195.8	1.0230		
0.0	-0.8	0.0000	Intercept	2.186887

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

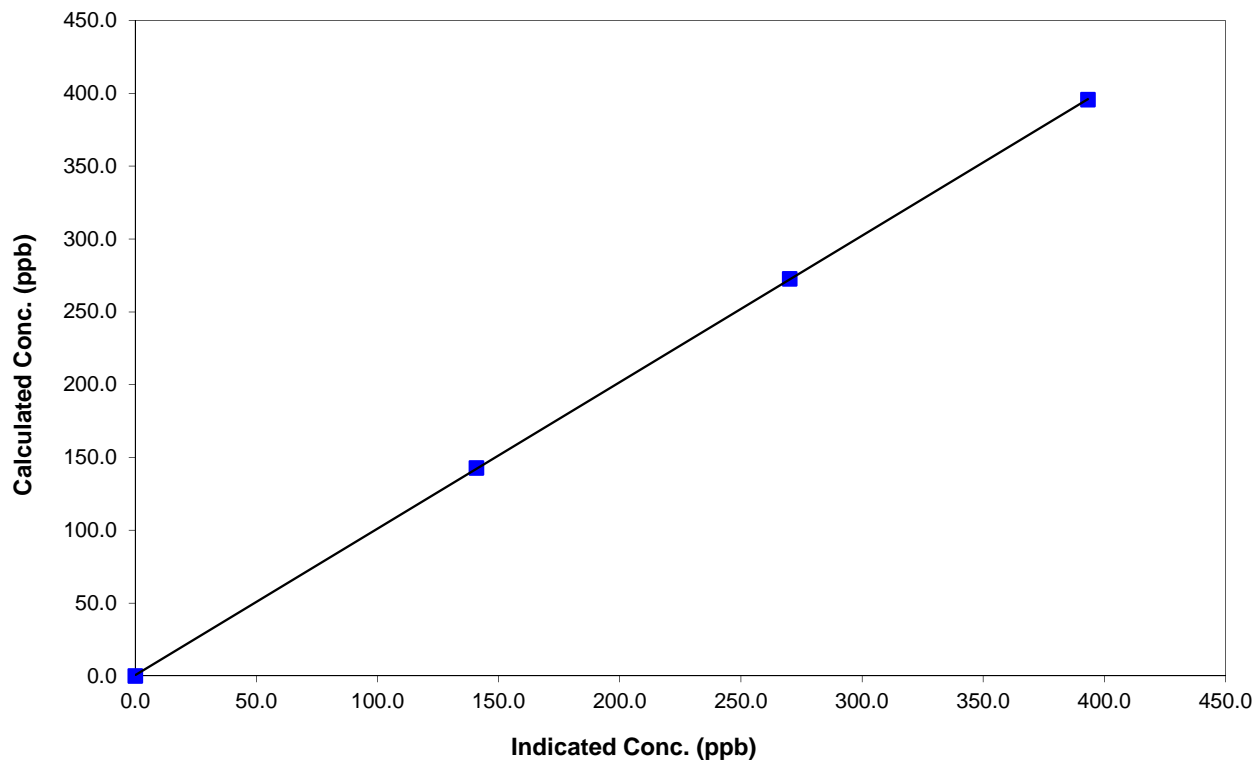
Station Information

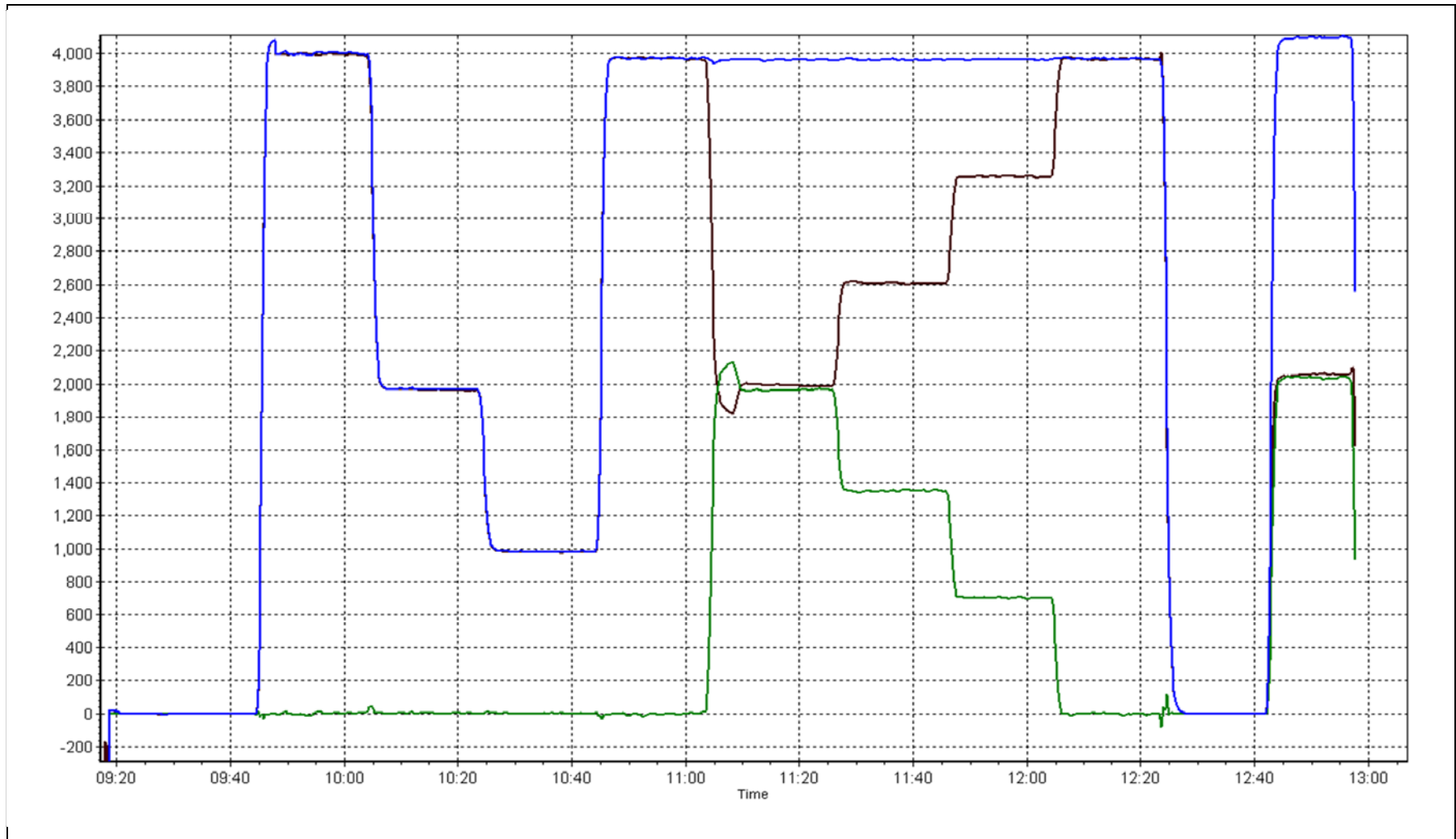
Calibration Date	June 18, 2014	Previous Calibration	NA
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	9:20	End Time (MST)	13:00
Analyzer make	42C	Analyzer serial #	509110890

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999988
395.6	393.2	1.0061		
272.6	270.2	1.0089	Slope	1.005988
142.8	140.8	1.0142		
			Intercept	0.487607

NO₂ Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 15
CNRL HORIZON
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
 JUNE 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	674	35	46	98.47	41	0	5	0
TRS (ppb) Average	684	36	36	100.00	2	0	0	0
THC (ppm) Average	678	35	42	99.03	4.7	-	2.7	-
NO2 (ppb) Average	680	35	40	99.31	31	0	9	-
NO (ppb) Average	680	35	40	99.31	56	-	6	-
NOX (ppb) Average	680	35	40	99.31	85	-	15	-
PM2.5 (ug/m3) Average	716	0	4	99.44	57.2	-	27.9	0
Temperature 2 m (C) Average	718	0	2	99.72	28.2	-	21.6	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	27	-	-	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-
Precipitation (mm) Total	720	0	0	100.00	6.1	-	-	-
Relative Humidity (%) Average	718	0	2	99.72	99	-	-	-
Global Solar Radiation (W/m2) Average	717	0	3	99.58	662	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
 JUNE 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	674	1.3	3	-	0	0	0	0	1	3	41
TRS (ppb) Average	684	0.2	0	-	0	0	0	0	0	0	2
THC (ppm) Average	678	2.38	0.3	-	2.1	2.2	2.2	2.3	2.4	2.7	4.7
NO2 (ppb) Average	680	4.1	5	-	0	0	1	3	6	10	31
NO (ppb) Average	680	1.5	5	-	0	0	0	0	1	3	56
NOX (ppb) Average	680	5.6	8	-	0	0	1	3	7	13	85
PM2.5 (ug/m3) Average	716	9.88	7.1	-	2.3	4.7	5.3	8	11.5	16.3	57.2
Temperature 2 m (C) Average	718	16.26	5.7	-	2.6	8.3	11.9	16.4	20.6	24.1	28.2
Wind Speed 10 m (km/h) Average	720	8.2	5	-	1	3	5	7	11	15	27
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	720	-	-	43.69	0	0	0	0	0	0	6.1
Relative Humidity (%) Average	718	65.3	22	-	18	34	49	68	84	94	99
Global Solar Radiation (W/m2) Average	717	172.8	195	-	0	0	2	85	310	490	662

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
JUNE 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	02 Jun 2014 05:00	02 Jun 2014 07:00	3	Intermittent unstable operation - excessive baseline drift
SO2	09 Jun 2014 11:00	09 Jun 2014 15:00	5	Maintenance - Stn operator on site
SO2	14 Jun 2014 15:00	14 Jun 2014 17:00	3	Intermittent unstable operation - excessive baseline drift
THC	09 Jun 2014 13:00	09 Jun 2014 15:00	3	Maintenance - Stn operator on site
THC	20 Jun 2014 08:00	20 Jun 2014 08:00	1	Maintenance - remotely activated daily zero and span checks
THC	25 Jun 2014 13:00	25 Jun 2014 13:00	1	Maintenance - check on daily zero and span cycle system
THC	30 Jun 2014 10:00	30 Jun 2014 11:00	2	Maintenance - replaced fuel cylinder
NO2, NO, NOX	09 Jun 2014 11:00	09 Jun 2014 15:00	5	Maintenance - Stn operator on site
PM2.5	09 Jun 2014 13:00	09 Jun 2014 16:00	4	Maintenance - Stn operator on site
Temperature 2m	09 Jun 2014 14:00	09 Jun 2014 15:00	2	Maintenance - Stn operator on site
Relative Humidity	09 Jun 2014 14:00	09 Jun 2014 15:00	2	Maintenance - Stn operator on site
Solar Global Radiation	09 Jun 2014 13:00	09 Jun 2014 15:00	3	Maintenance - Stn operator on site

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 41 ppb on Jun 19 10:00	Maximum Daily Average: 5.0 ppb on Jun 19		Hours of Data:	674
Minimum Value: 0 ppb on Jun 2 03:00	Minimum Daily Average: 0.0 ppb on Jun 12		Hours of Missing Data:	46
Maximum Diurnal Average: 3.3 ppb at hour 10	Minimum Diurnal Average: 0.2 ppb at hour 5		Hours of Calibration:	35
Monthly Average: 1.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 13		Percent Operational Time:	98.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	0	Z	0	0	0	0	0	0	1	1	1	6	6	10	10	8	6	6	1	0	0	0	0	0	2.6	10
2-Jun	0	Z	0	0	UO	UO	UO	0	0	0	0	0	0	0	0	1	0	1	2	2	0	2	1	0	0.5	2
3-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	1	1	0	0	0	5	1	0.7	5
4-Jun	0	Z	0	0	0	0	0	0	0	2	2	1	0	1	0	0	0	0	0	0	0	1	0	0	0.5	2
5-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	1	1	0	0	0	0	0.5	2
6-Jun	0	Z	0	0	0	0	0	0	2	1	2	1	2	0	3	2	0	0	0	0	0	0	0	0	0.7	3
7-Jun	0	Z	0	0	0	0	0	0	1	0	1	1	0	0	2	1	0	2	1	0	0	0	0	0	0.5	2
8-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4	3	1	0	0	0	0.6	4
9-Jun	0	Z	7	2	0	0	1	1	0	0	M	M	M	M	M	0	0	0	0	0	0	0	0	0	0.8	7
10-Jun	0	Z	0	0	0	2	4	1	2	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0.6	4
11-Jun	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	3	4	2	1	1	9	3	1	0	0	1.4	9
12-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	1	1	4	0.7	4
14-Jun	2	Z	1	1	0	1	5	5	1	1	2	7	3	2	UO	UO	UO	0	0	0	0	0	0	0	1.5	7
15-Jun	0	Z	0	0	0	0	1	0	0	0	2	3	2	3	2	1	1	1	0	1	1	1	0	0	0.9	3
16-Jun	1	Z	0	0	0	0	1	2	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0.6	2
17-Jun	0	Z	0	0	0	0	0	0	4	9	2	4	5	3	5	7	6	6	1	0	0	0	1	1	2.5	9
18-Jun	0	Z	0	0	0	0	0	2	2	2	4	4	5	5	3	4	5	3	3	1	3	3	1	3	2.3	5
19-Jun	5	Z	2	1	1	0	1	1	1	41	32	13	10	2	1	1	0	1	1	1	0	0	0	1	5.0	41
20-Jun	1	Z	0	0	0	0	0	0	0	0	7	16	30	7	4	2	1	0	0	1	1	0	0	0	3.1	30
21-Jun	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
22-Jun	0	Z	0	0	0	0	0	0	0	2	1	1	2	1	0	0	1	0	0	0	0	0	0	0	0.4	2
23-Jun	0	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-Jun	0	Z	0	0	0	0	0	3	14	12	7	5	3	2	3	2	2	2	1	4	3	2	3	3	3.0	14
25-Jun	3	Z	1	1	1	1	2	5	5	6	8	5	3	3	1	1	1	0	0	0	0	0	0	0	2.0	8
26-Jun	0	Z	0	0	0	0	0	0	0	4	5	1	0	0	0	1	0	0	0	0	0	0	0	0	0.7	5
27-Jun	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	4	4	1	0	0	0	2	0	0	0	0.7	4
28-Jun	0	Z	0	0	0	0	0	1	5	16	5	1	4	9	3	2	2	2	0	0	1	0	1	2	2.4	16
29-Jun	0	Z	0	0	0	0	2	0	0	0	0	0	1	1	2	1	0	1	1	3	8	8	1	5	1.5	8
30-Jun	12	Z	1	0	0	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	12

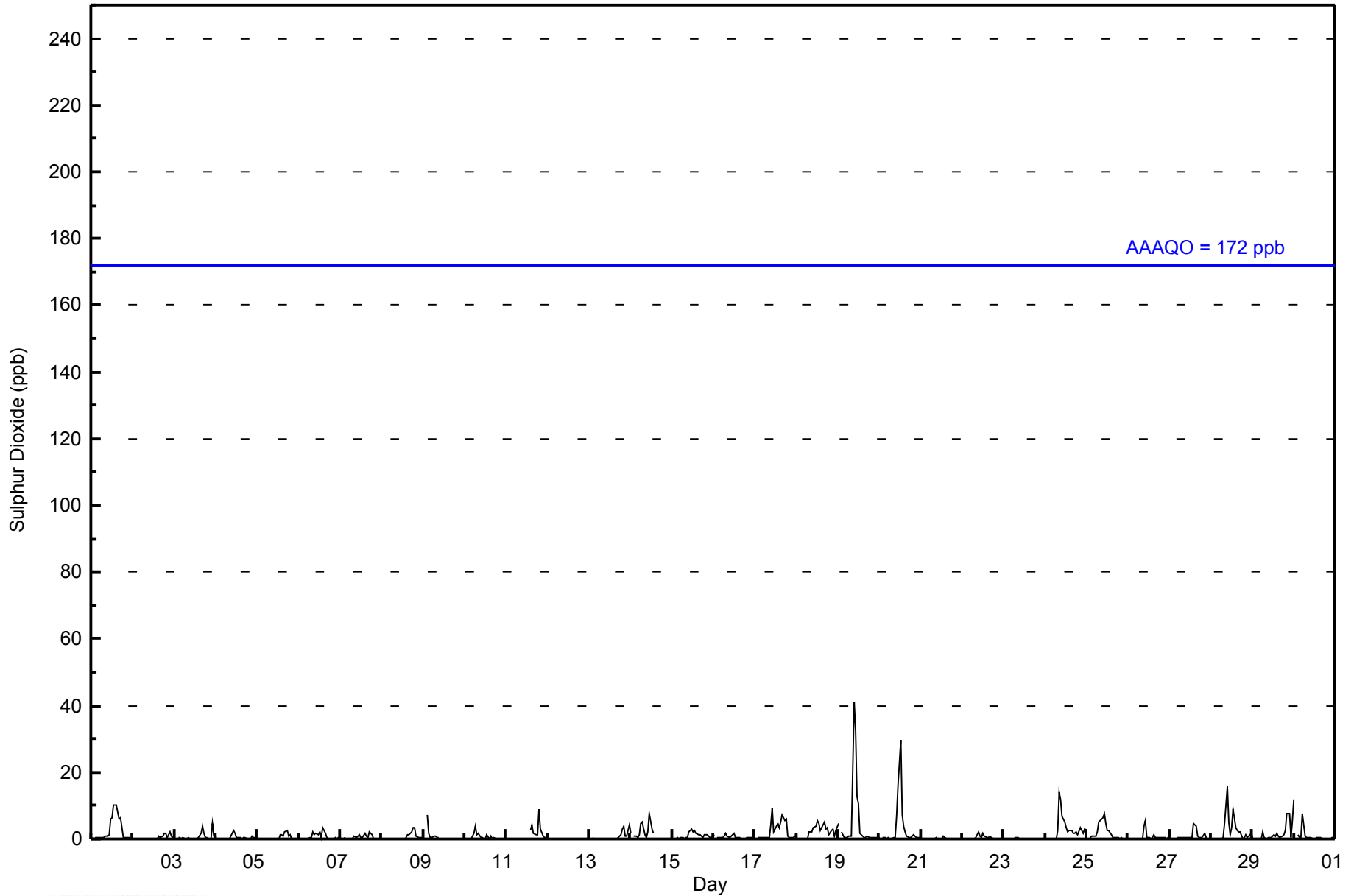
0.9	--	0.5	0.3	0.2	0.5	0.7	0.8	1.3	3.3	3.3	2.5	2.8	1.9	1.7	1.6	1.3	1.1	0.9	1.0	1.0	0.8	0.5	0.8	Diurnal Average	
12	--	7	2	1	7	5	5	14	41	32	16	30	10	10	8	7	6	6	9	8	8	5	5	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - June 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	665	98.66	98.66
11 - 20	6	0.89	99.55
21 - 60	3	0.45	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: 674

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - June 2014

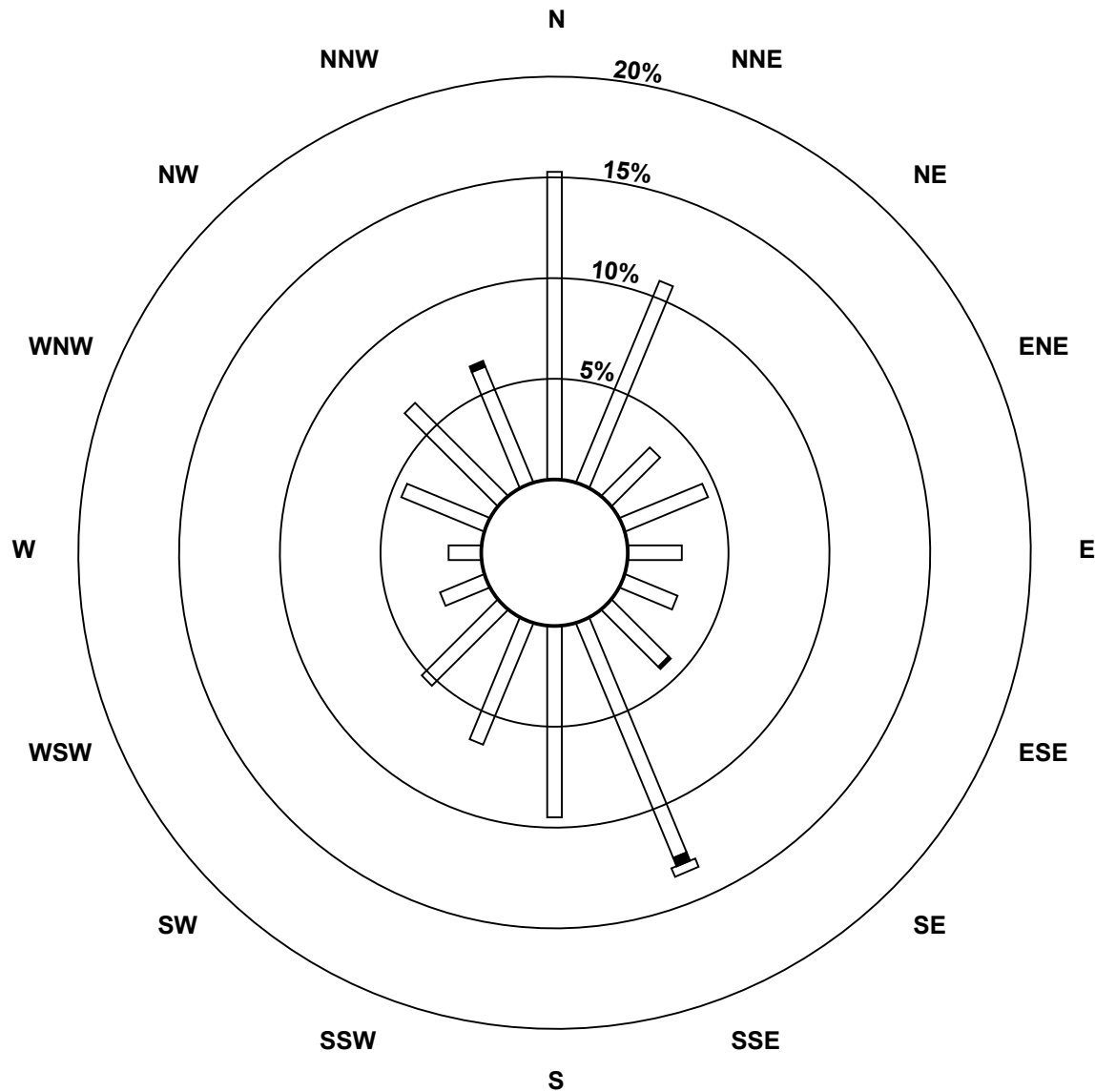
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	103	73	23	30	18	19	27	85	64	44	36	16	11	30	44	42	665
11 - 20	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	2	6
21 - 60	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	103	73	23	30	18	19	28	91	64	44	36	16	11	30	44	44	674

Total Number of Valid Hours: 674

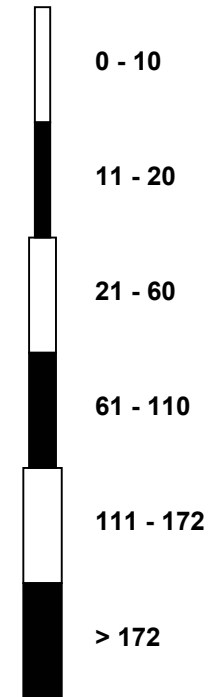
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon (AMS 15)



Classes (ppb)

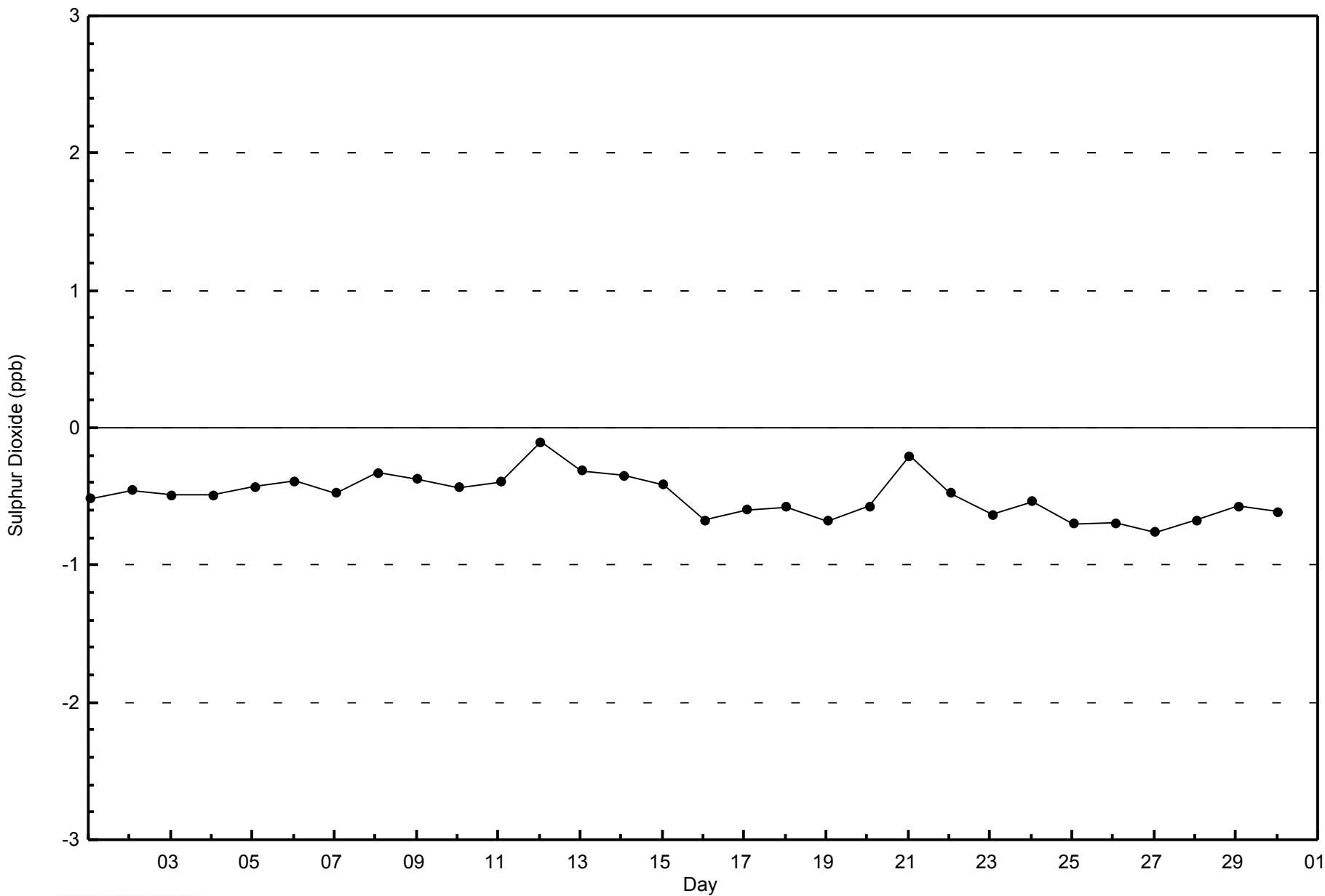


Total Number of Valid Hours: 674



WBEA
Zero Responses

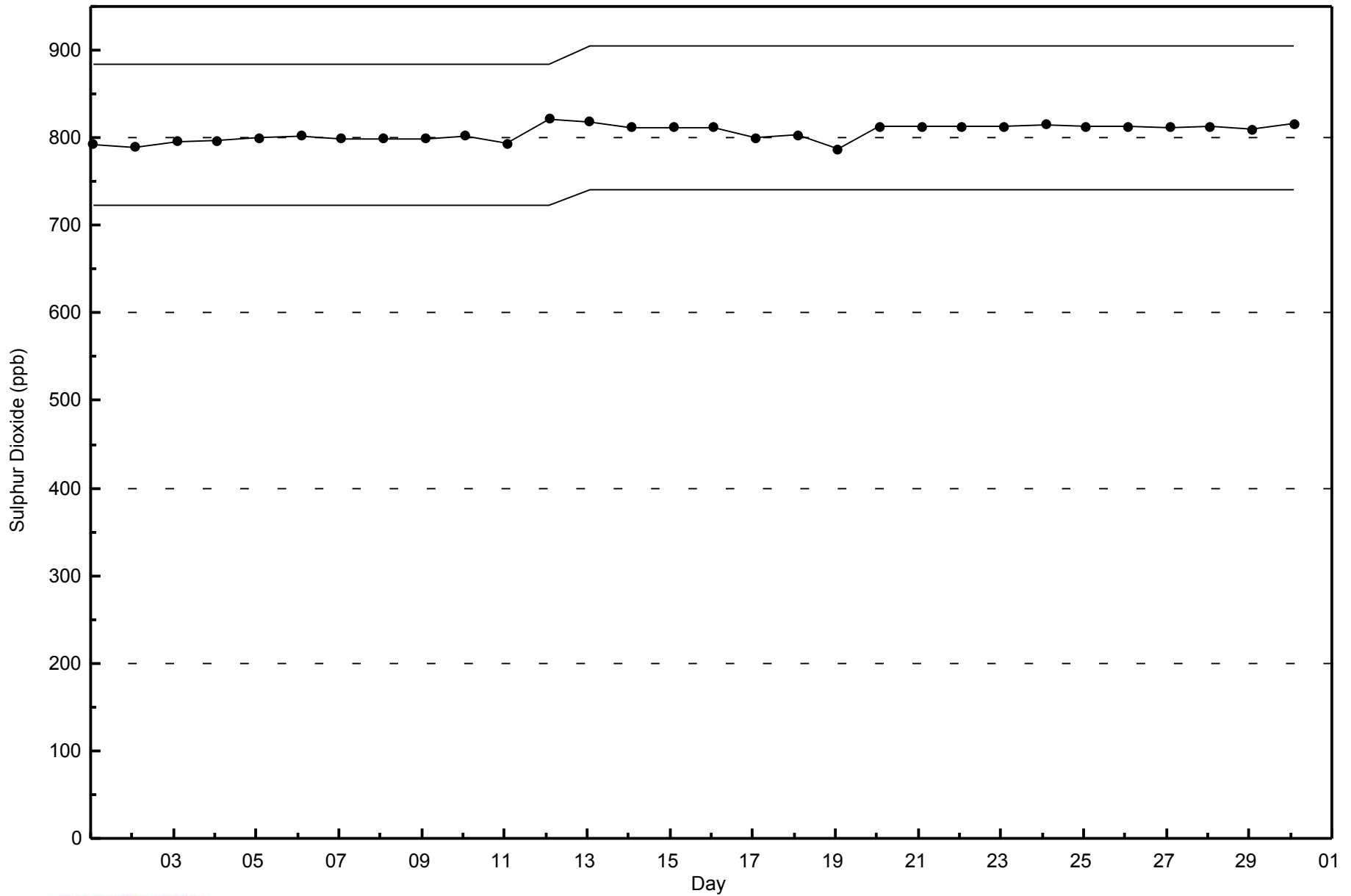
Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - June 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - June 2014





Summary of Hour Averages

CNRL Horizon - June 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Jun 14 02:00	Maximum Daily Average: 0.4 ppb on Jun 14		Hours of Data:	684
Minimum Value: 0 ppb on Jun 4 04:00	Minimum Daily Average: 0.1 ppb on Jun 4		Hours of Missing Data:	36
Maximum Diurnal Average: 0.3 ppb at hour 2	Minimum Diurnal Average: 0.1 ppb at hour 18		Hours of Calibration:	36
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:	100.0

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

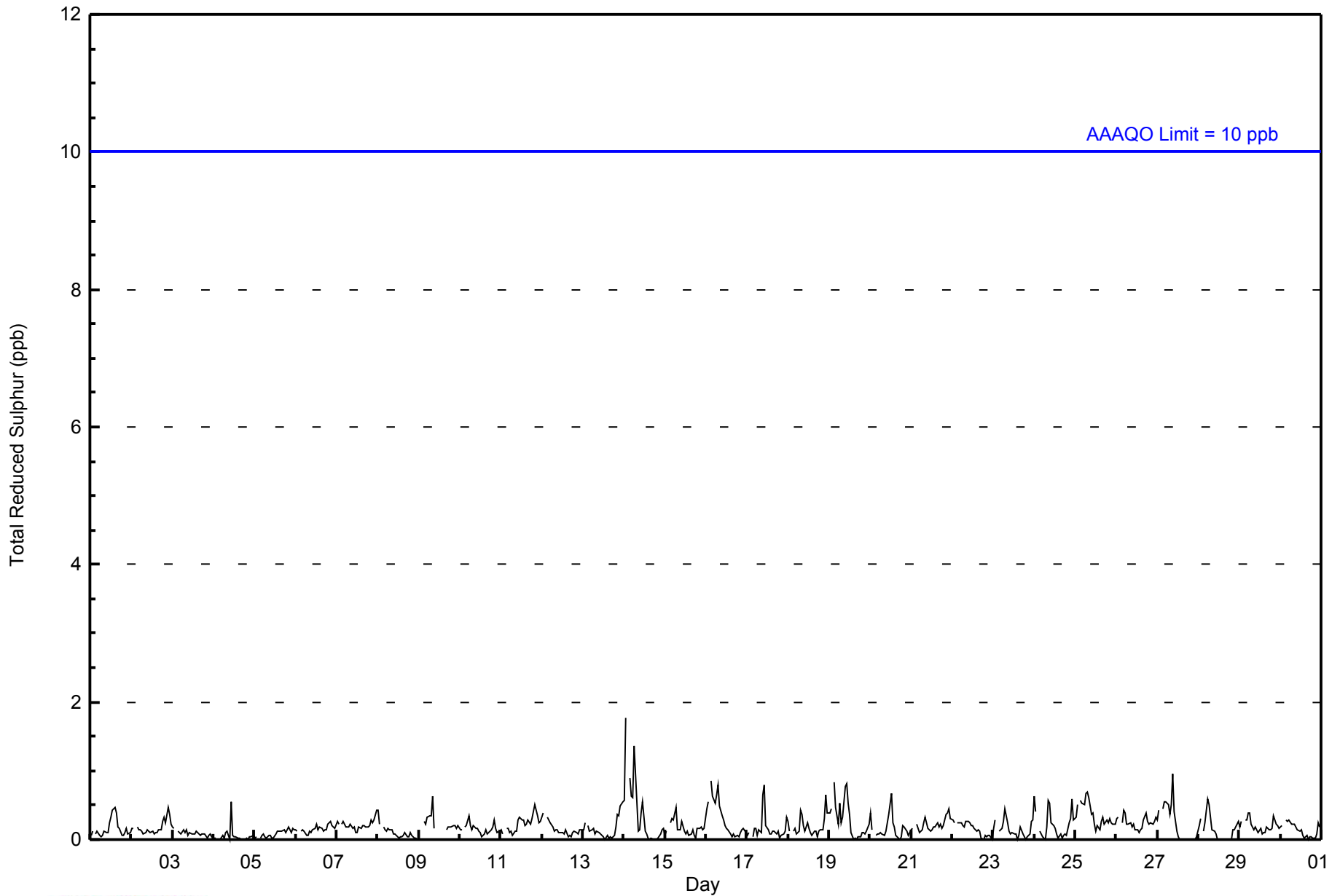
0.2	0.3	--	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	Diurnal Average		
1	2	--	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	1	1	Diurnal Maximum	

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 - June 2014





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - June 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

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - June 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	104	74	23	29	18	22	28	92	71	44	38	14	10	28	45	44	684
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	104	74	23	29	18	22	28	92	71	44	38	14	10	28	45	44	684

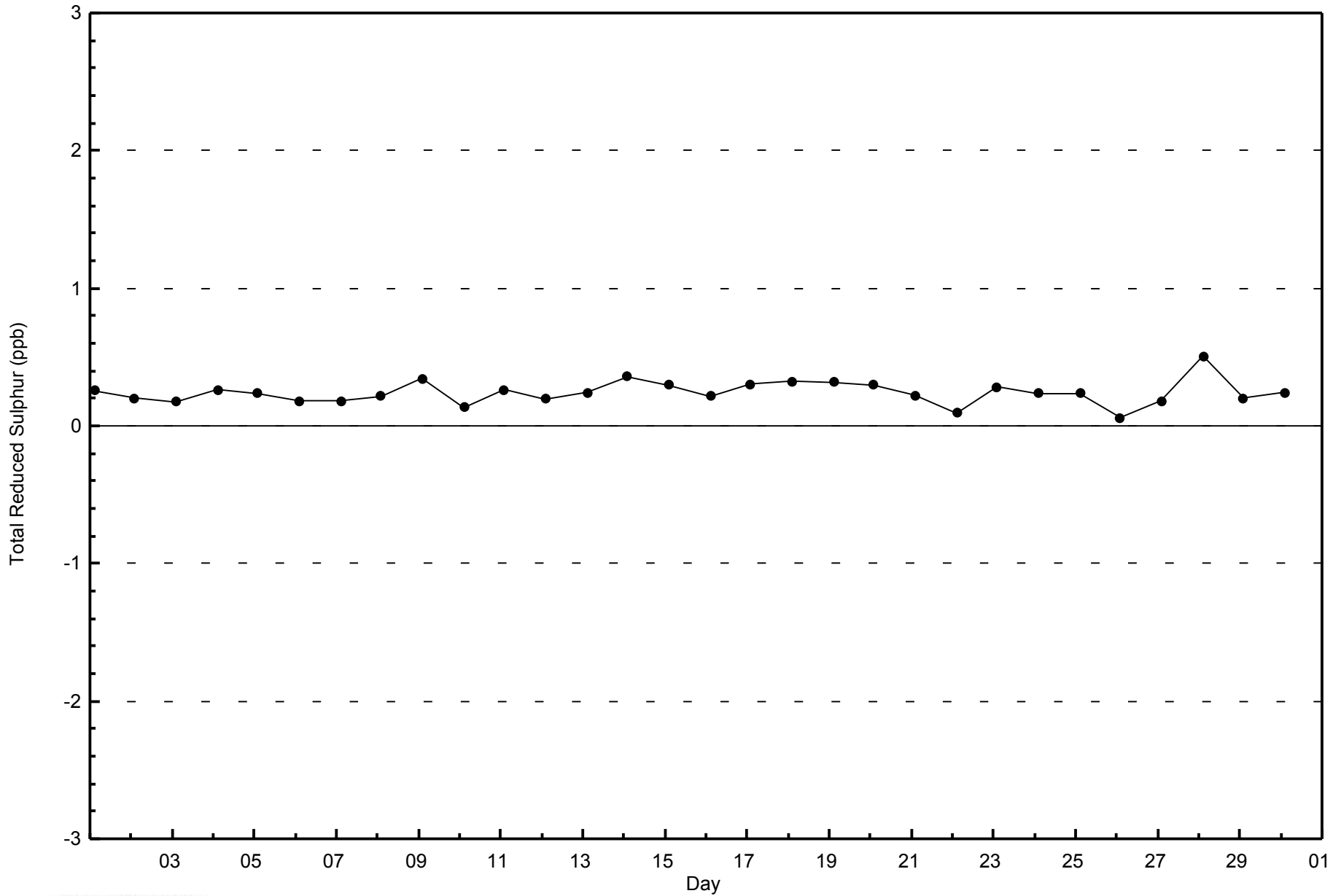
Total Number of Valid Hours: 684

Total Number of Hours: 720



WBEA
Zero Responses

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - June 2014

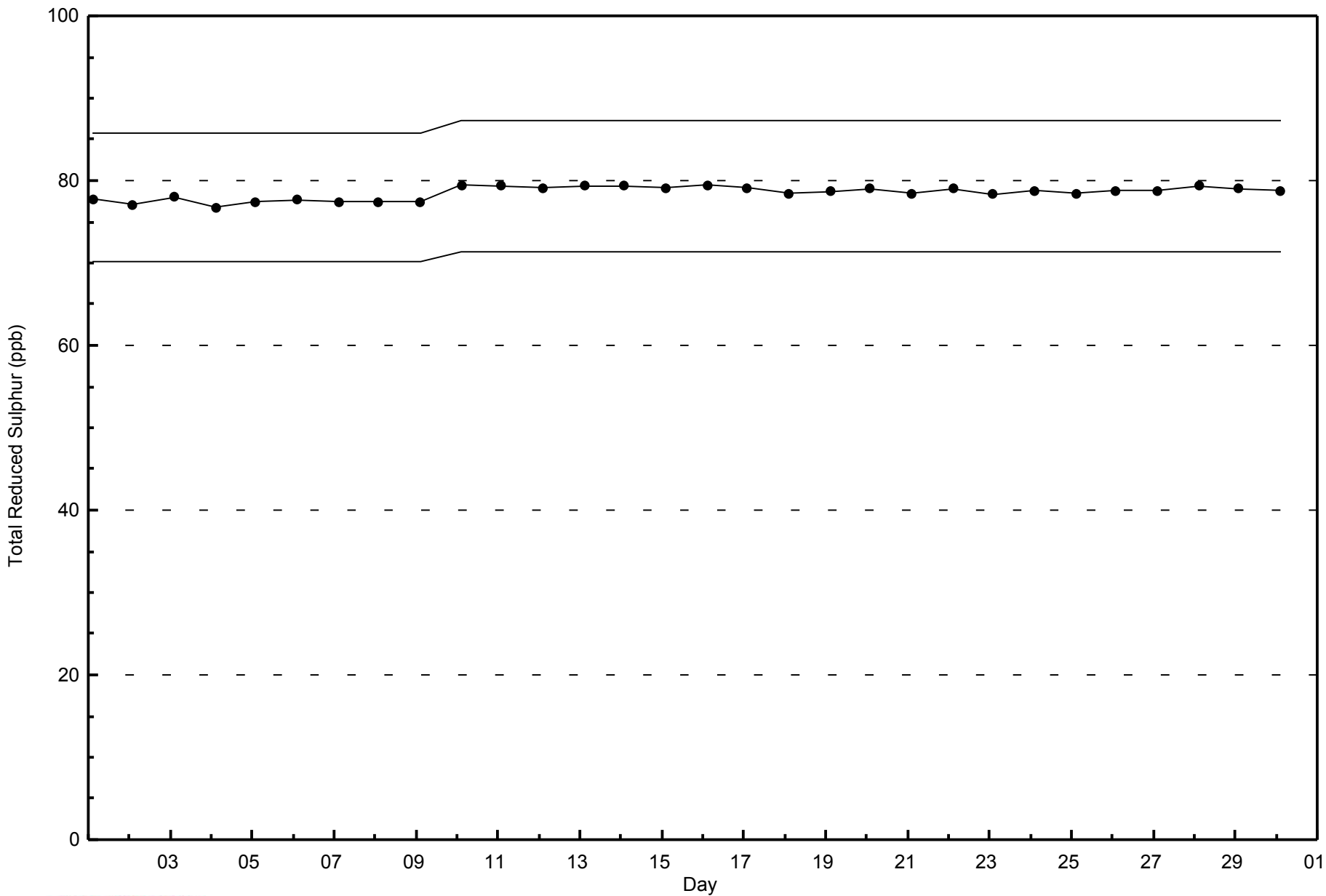




WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb

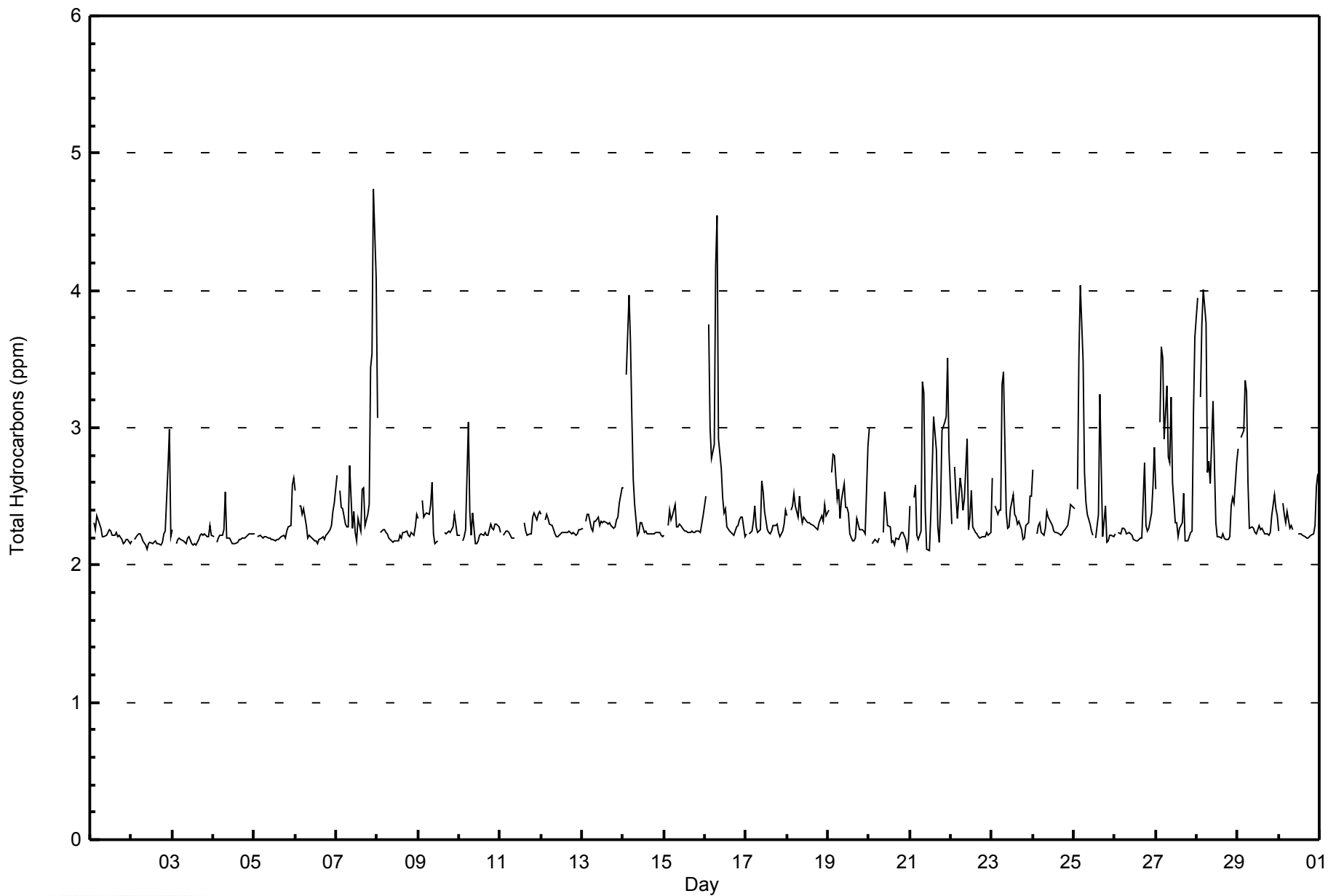
CNRL Horizon - June 2014





WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
CNRL Horizon - June 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	641	94.54	94.54
3.1 - 10.0	37	5.46	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 678

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - June 2014

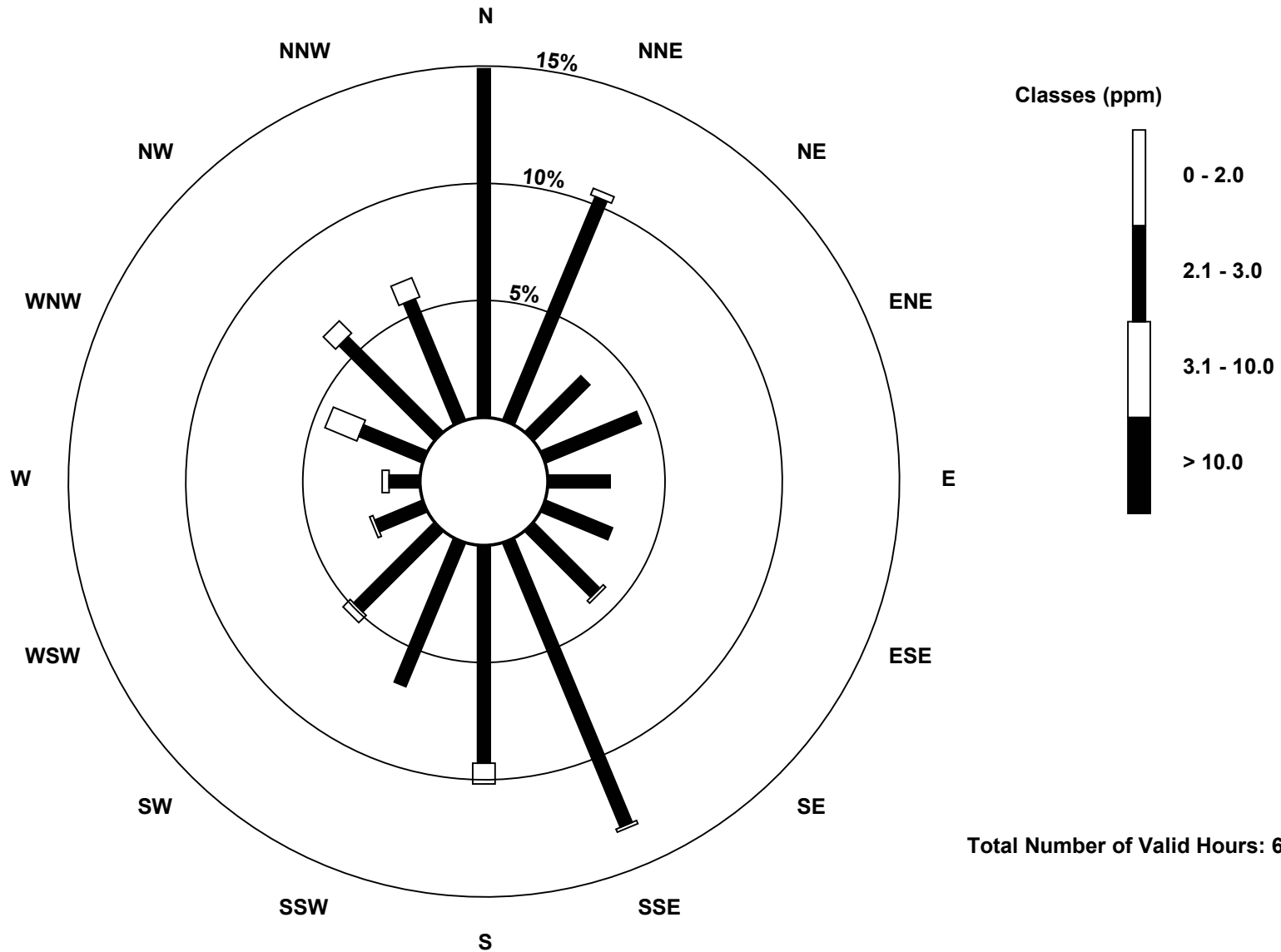
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	101	70	23	30	18	21	27	89	63	45	33	15	9	20	39	38	641
3.1 - 10.0	0	2	0	0	0	0	1	1	6	0	3	1	2	10	5	6	37
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	101	72	23	30	18	21	28	90	69	45	36	16	11	30	44	44	678

Total Number of Valid Hours: 678

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

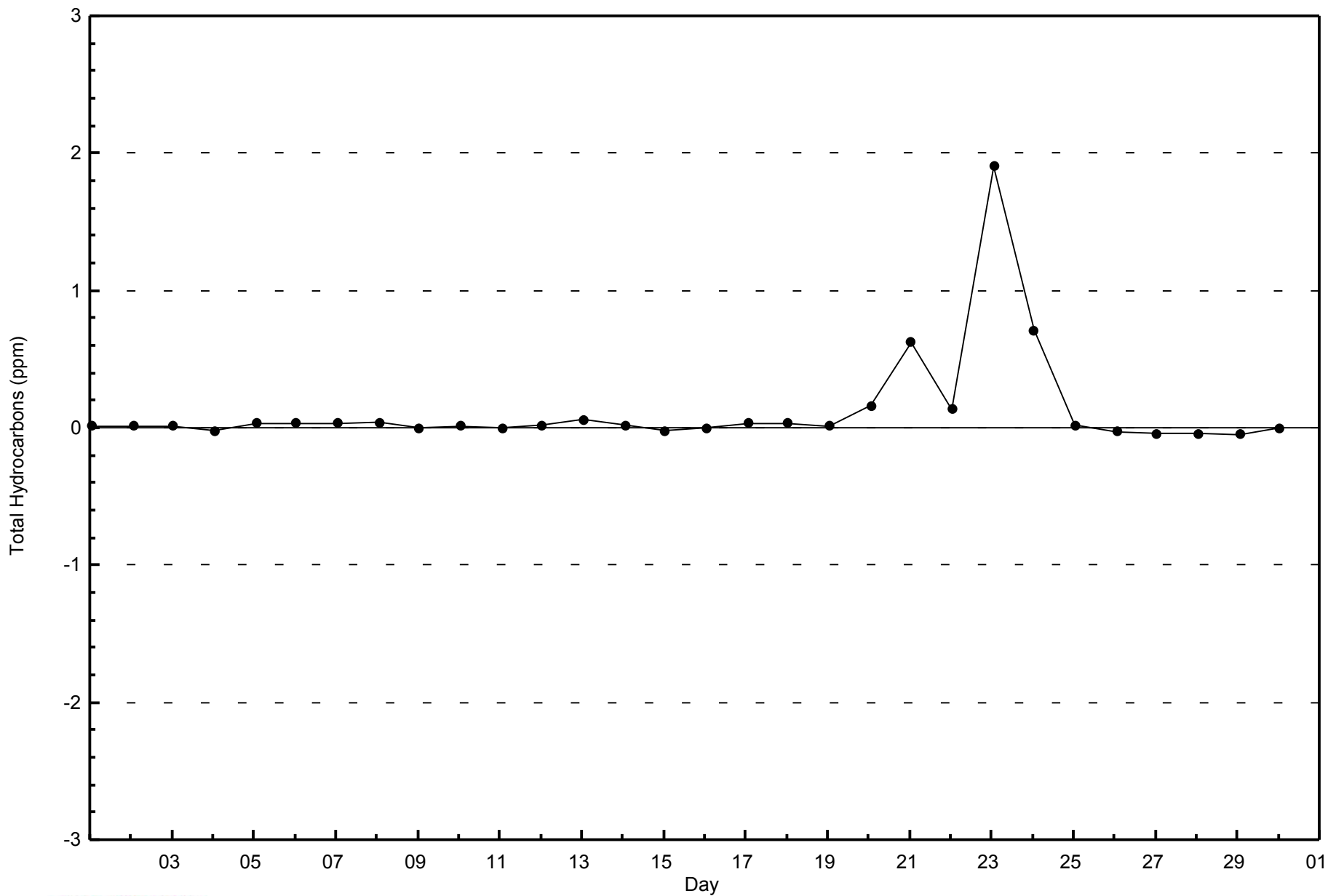
Total Hydrocarbons (THC) - ppm
CNRL Horizon (AMS 15)





WBEA
Zero Responses

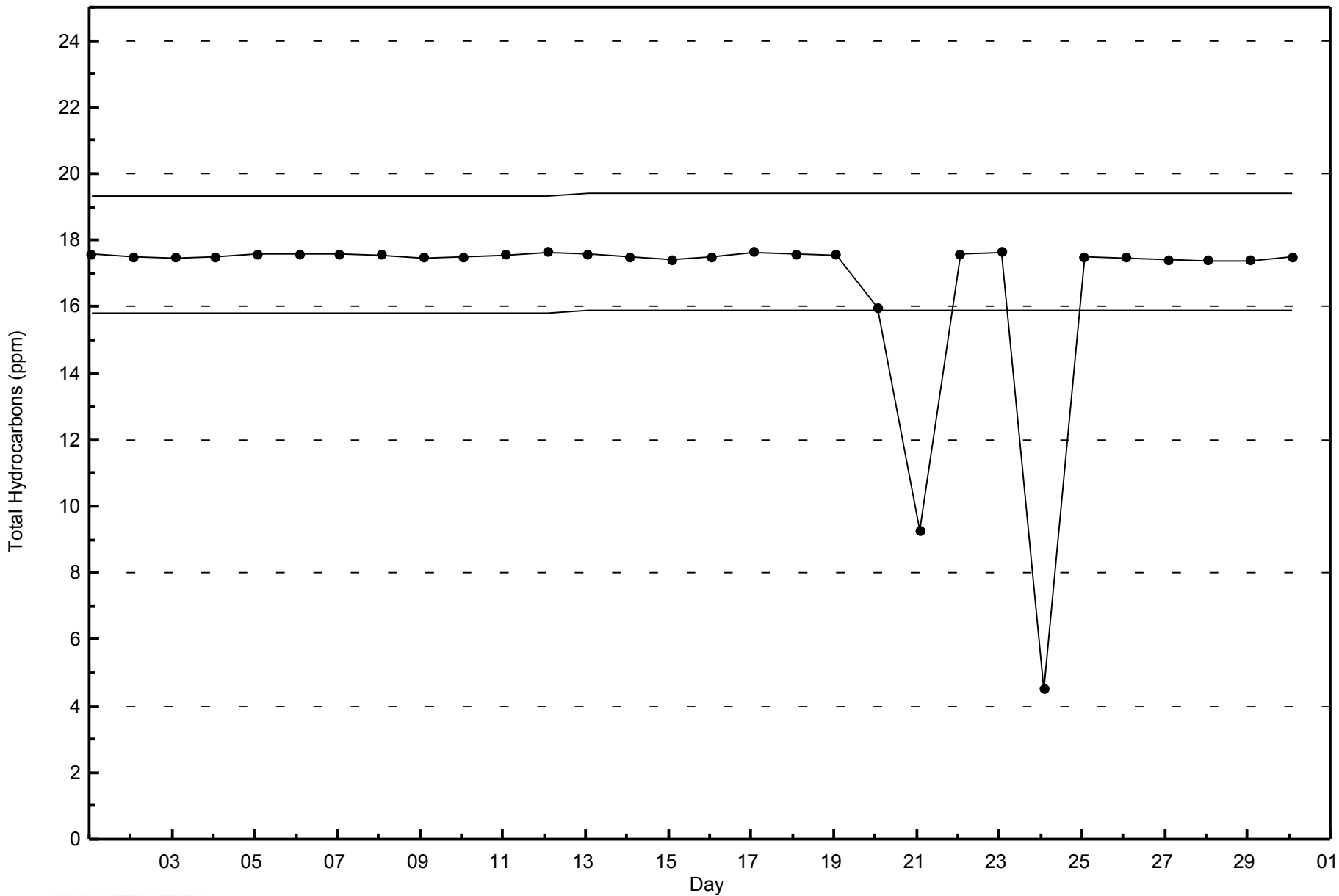
Total Hydrocarbons (THC) - ppm
CNRL Horizon - June 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
CNRL Horizon - June 2014



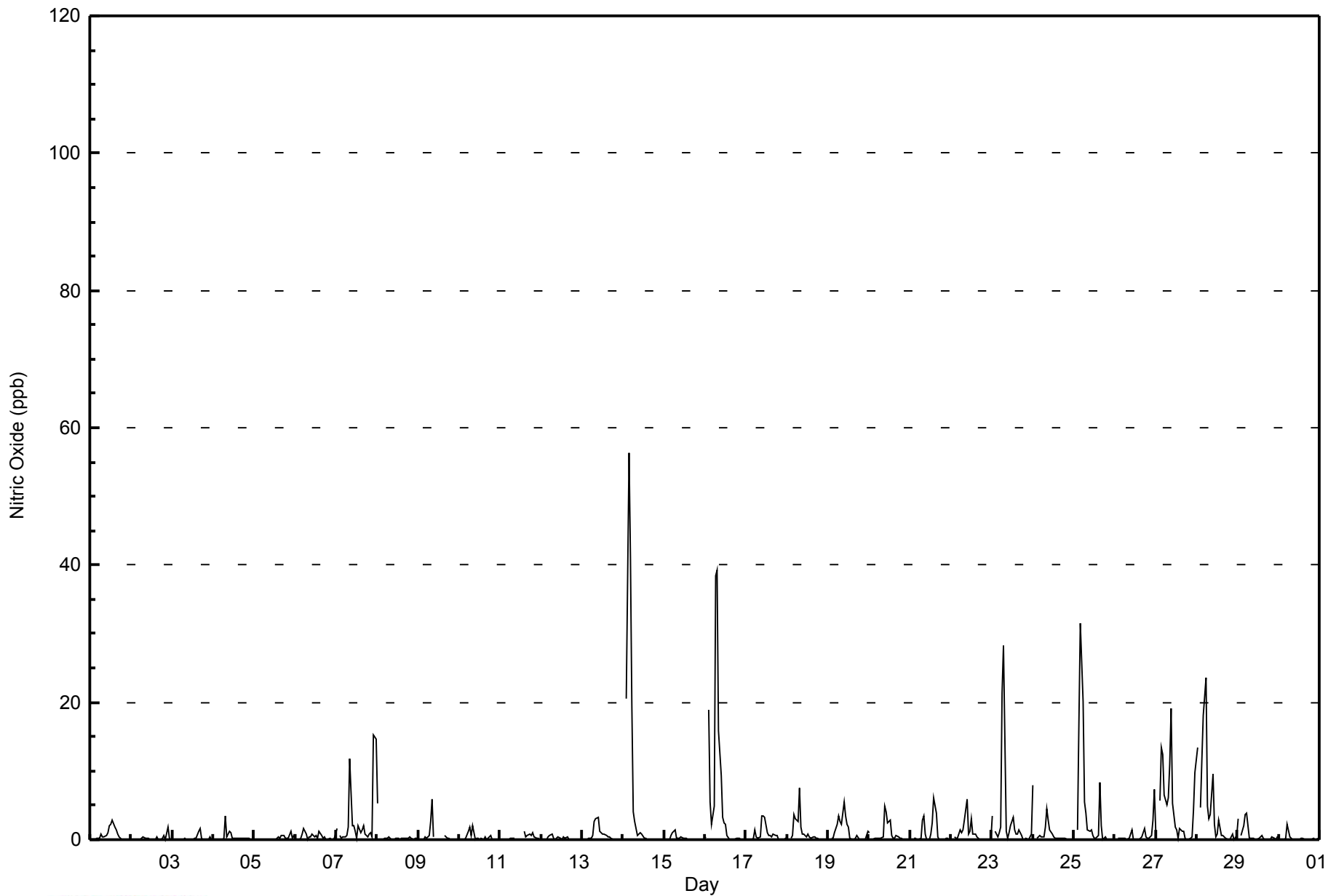


Maximum Value: 56 ppb on Jun 14 04:00														Maximum Daily Average: 6.4 ppb on Jun 14														Hours in Service: 720																					
Minimum Value: 0 ppb on Jun 3 22:00														Minimum Daily Average: 0.2 ppb on Jun 12														Hours of Data: 680																					
Maximum Diurnal Average: 4.0 ppb at hour 5														Minimum Diurnal Average: 0.1 ppb at hour 20														Hours of Missing Data: 40																					
Monthly Average: 1.5 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: 35																					
																												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-Jun	0	Z	0	0	0	0	1	0	0	1	1	2	2	3	2	1	1	0	0	0	0	0	0	0	0.7	3																							
2-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0.2	2																							
3-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0.2	2																							
4-Jun	0	Z	0	0	0	0	0	4	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4																							
5-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	1	0.2	1																							
6-Jun	0	Z	0	0	1	2	1	0	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0.4	2																							
7-Jun	2	Z	1	0	0	0	1	2	12	2	2	1	0	2	1	1	2	1	0	1	1	0	15	15	2.7	15																							
8-Jun	5	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	5																							
9-Jun	0	Z	0	0	0	0	1	3	6	0	M	M	M	M	M	1	0	0	0	0	0	0	0	0	0.7	6																							
10-Jun	0	Z	0	0	0	1	2	1	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	2																							
11-Jun	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	1	0	1	1	1	1	1	0	0	0	0.3	1																							
12-Jun	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
13-Jun	0	Z	0	0	0	0	1	3	3	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.7	3																							
14-Jun	0	Z	21	56	41	20	4	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	6.4	56																							
15-Jun	0	Z	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2																							
16-Jun	0	Z	19	5	2	5	38	39	16	9	3	2	2	1	0	0	0	0	0	0	0	0	0	0	6.3	39																							
17-Jun	0	Z	0	0	0	1	0	0	0	3	3	3	1	1	1	0	1	1	1	0	0	0	0	0	0.8	3																							
18-Jun	0	Z	0	1	4	3	3	8	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1.0	8																							
19-Jun	0	Z	0	0	1	2	3	3	2	5	3	2	2	0	0	0	0	1	0	0	0	0	0	1	1.2	5																							
20-Jun	1	Z	0	0	0	0	0	0	0	5	4	2	3	1	0	0	1	0	0	0	0	0	0	0	0.8	5																							
21-Jun	0	Z	0	0	0	0	0	3	3	1	0	0	1	2	6	4	0	0	0	0	0	0	0	0	0.9	6																							
22-Jun	0	Z	0	0	0	1	1	1	3	6	1	1	3	1	1	0	0	0	0	0	0	0	0	0	0.9	6																							
23-Jun	3	Z	1	0	1	2	21	28	1	0	1	2	3	1	1	1	1	1	0	0	0	0	0	1	3.1	28																							
24-Jun	8	Z	0	0	1	0	0	2	5	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.0	8																							
25-Jun	0	Z	1	17	31	20	6	4	1	1	1	1	0	0	1	8	2	0	0	0	0	0	0	0	4.2	31																							
26-Jun	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2	0	0	0	1	3	7	0.7	7																							
27-Jun	1	Z	6	13	12	6	5	6	11	19	5	2	1	0	2	1	1	0	0	0	0	0	4	10	4.7	19																							
28-Jun	13	Z	5	11	18	24	5	3	4	10	2	0	1	3	1	1	0	0	0	0	0	1	0	1	4.5	24																							
29-Jun	3	Z	1	2	4	4	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.8	4																							
30-Jun	0	Z	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2																							
																								1.3	--	1.9	3.6	4.0	3.2	3.3	3.8	2.5	2.5	1.3	0.9	0.8	0.6	0.7	0.8	0.5	0.3	0.2	0.1	0.2	0.2	0.8	1.2	Diurnal Average	
																								13	--	21	56	41	24	38	39	16	19	5	3	3	3	6	8	2	2	1	1	1	2	15	15	Diurnal Maximum	
Z - zerospan																								C - Calibration				M - Maintenance																					



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
CNRL Horizon - June 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
CNRL Horizon - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	671	98.68	98.68
21 - 40	7	1.03	99.71
41 - 80	2	0.29	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
CNRL Horizon - June 2014

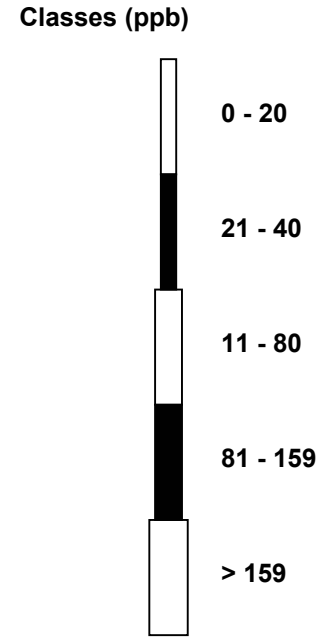
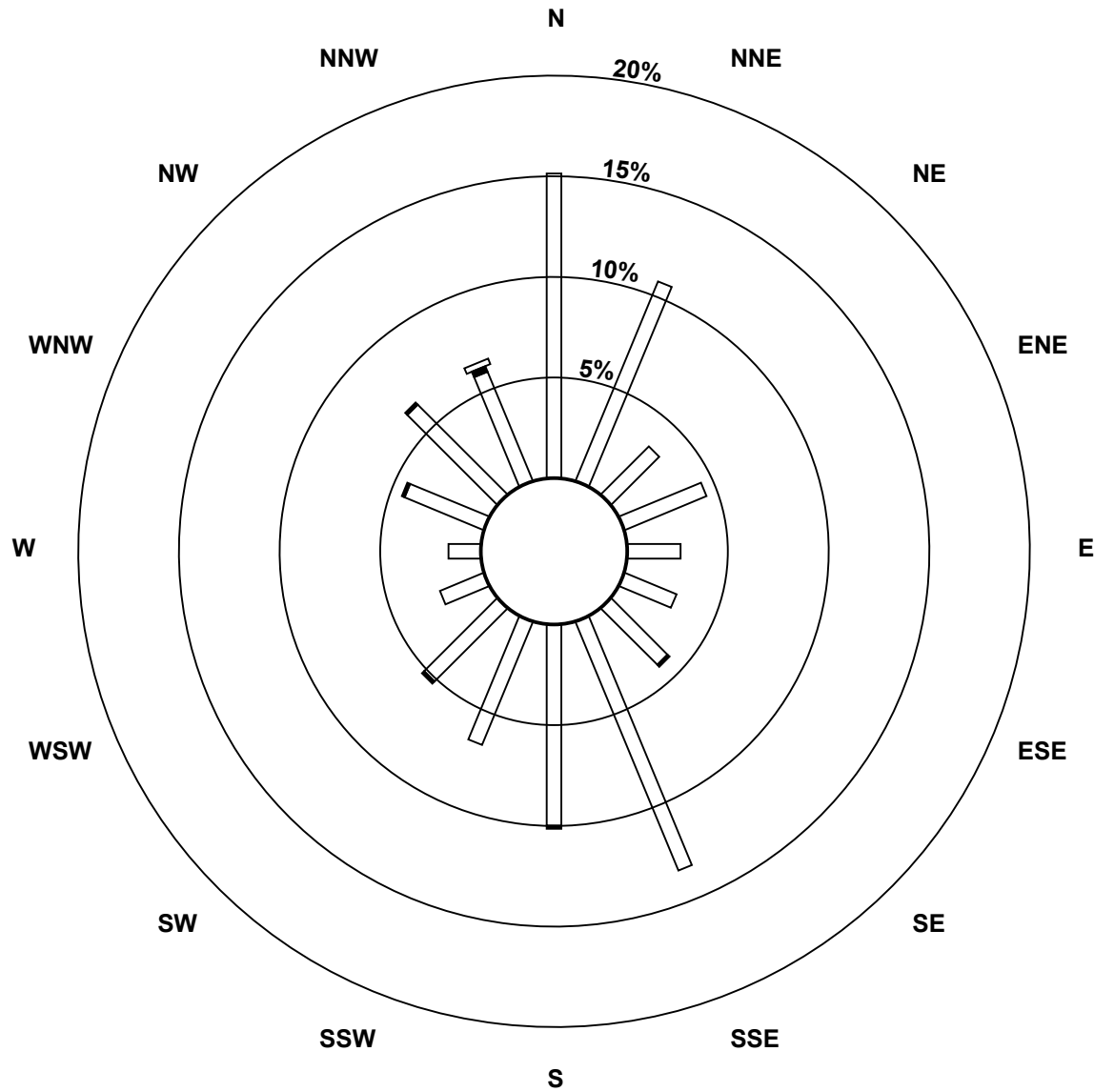
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	103	73	23	30	18	19	27	91	68	45	35	16	11	29	43	40	671
21 - 40	0	0	0	0	0	0	1	0	1	0	1	0	0	1	1	2	7
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	103	73	23	30	18	19	28	91	69	45	36	16	11	30	44	44	680

Total Number of Valid Hours: 680

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Nitric Oxide (NO) - ppb
CNRL Horizon (AMS 15)

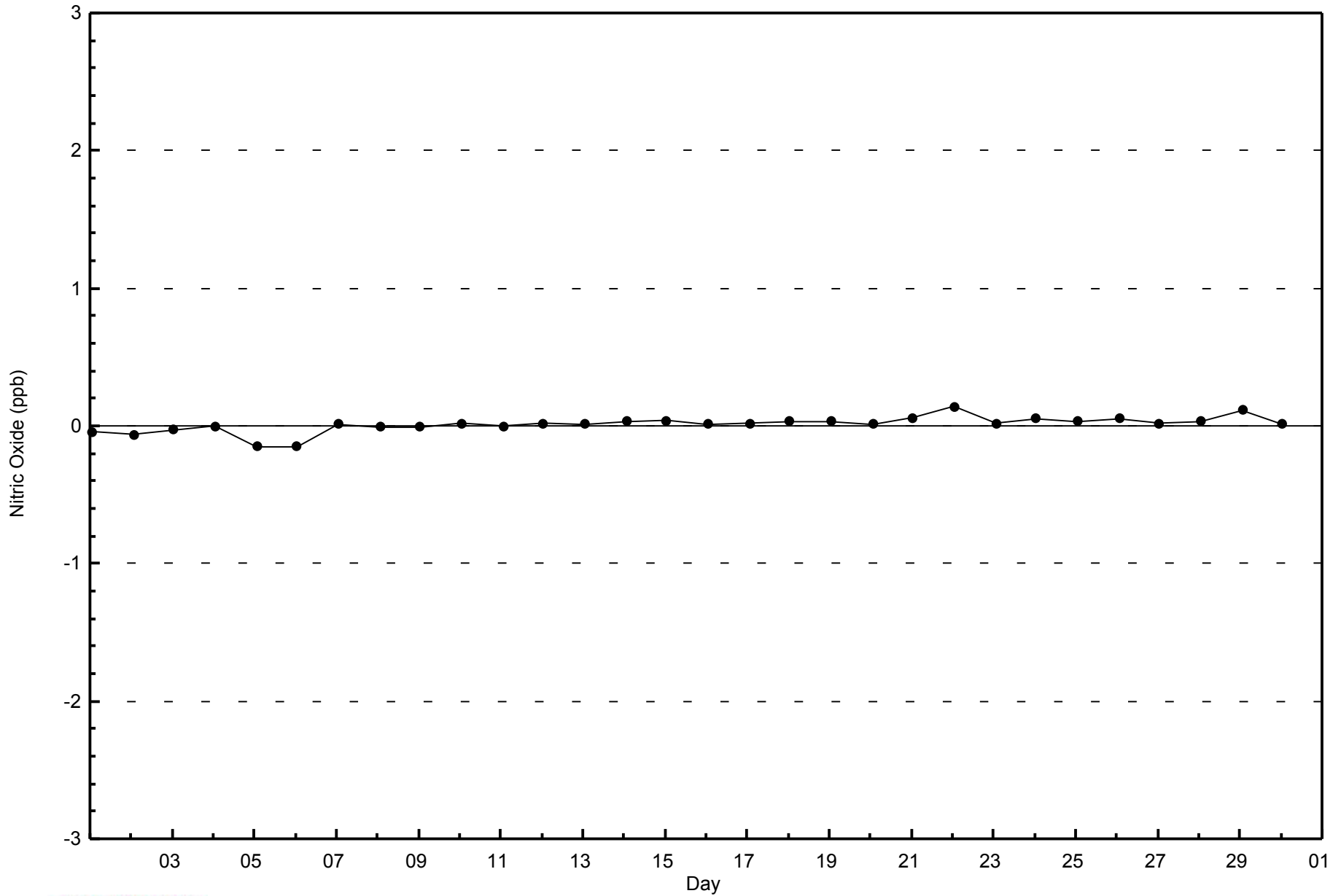


Total Number of Valid Hours: 680



WBEA
Zero Responses

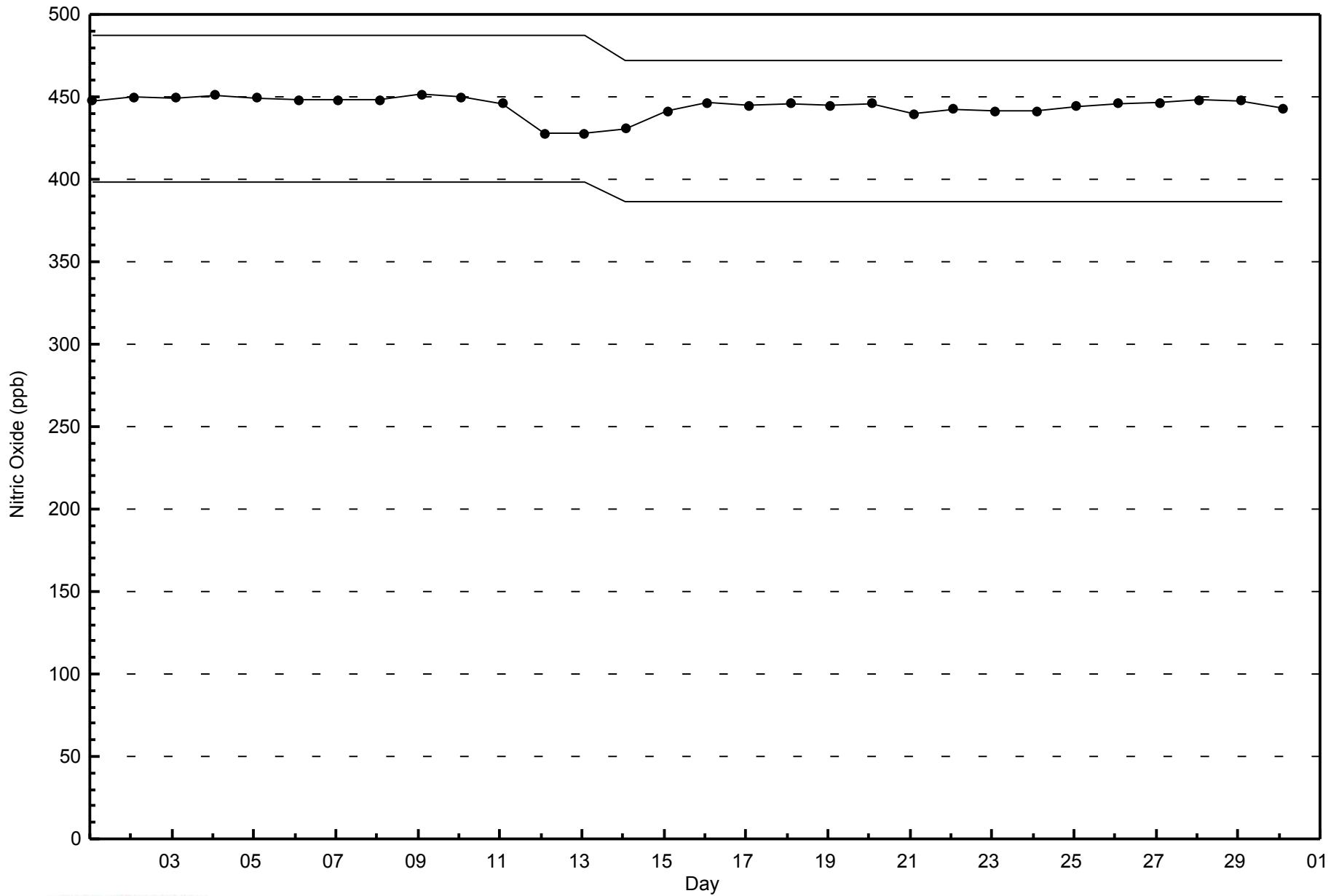
Nitric Oxide (NO) - ppb
CNRL Horizon - June 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
CNRL Horizon - June 2014





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 31 ppb on Jun 7 23:00	Maximum Daily Average: 9.5 ppb on Jun 7
Minimum Value: 0 ppb on Jun 12 12:00	Hours of Data: 680
Maximum Diurnal Average: 6.6 ppb at hour 24	Hours of Missing Data: 40
Monthly Average: 4.1 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.9 ppb on Jun 12	Percent Operational Time: 99.3
Minimum Diurnal Average: 1.7 ppb at hour 19	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 6 P ₉₀ = 10 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-Jun	5	Z	9	3	5	3	3	2	3	3	4	5	5	6	6	5	3	3	1	1	1	1	1	1	3.3	9
2-Jun	1	Z	1	1	0	1	1	1	0	0	0	0	0	0	0	1	0	1	3	4	2	20	13	2	2.3	20
3-Jun	4	Z	1	1	0	0	0	1	0	0	0	0	0	0	0	1	3	1	1	1	0	0	6	1	1.0	6
4-Jun	0	Z	0	0	1	1	2	7	2	3	2	1	0	0	0	0	0	0	0	0	1	1	0	0	1.0	7
5-Jun	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	1	1	2	3	1	1	3	9	6	12	1.9	12
6-Jun	6	Z	6	6	7	5	2	0	2	1	2	1	1	0	2	1	1	1	1	1	2	4	10	12	3.1	12
7-Jun	23	Z	16	8	5	3	3	7	17	8	7	3	1	5	3	6	6	3	2	4	14	18	31	25	9.5	31
8-Jun	13	Z	0	2	2	1	1	1	0	0	0	0	0	0	1	1	1	2	3	4	4	4	9	12	2.7	13
9-Jun	8	Z	10	8	14	7	8	15	22	5	M	M	M	M	M	5	4	3	3	4	6	11	8	3	7.9	22
10-Jun	2	Z	4	1	3	9	7	2	6	1	1	0	0	1	1	2	0	2	3	2	2	3	2	1	2.4	9
11-Jun	0	Z	0	1	1	1	1	1	1	C	C	C	C	C	7	6	4	4	3	7	7	5	5	5	3.2	7
12-Jun	4	Z	2	2	2	2	2	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	1	0.9	4
13-Jun	2	Z	5	3	3	1	2	6	6	7	4	3	3	3	2	2	2	2	1	3	3	3	5	11	3.5	11
14-Jun	8	Z	27	29	20	14	11	7	2	3	4	4	2	1	1	1	1	1	1	0	0	1	1	2	6.0	29
15-Jun	1	Z	3	8	6	5	6	1	1	1	2	2	1	2	1	1	1	1	1	2	2	3	6	6	2.7	8
16-Jun	8	Z	22	12	8	6	19	24	21	17	9	7	7	3	1	1	1	1	3	4	7	10	7	2	8.7	24
17-Jun	2	Z	2	1	4	13	4	1	2	11	11	8	3	2	2	3	4	4	5	2	1	4	5	3	4.1	13
18-Jun	4	Z	10	8	4	3	4	7	4	2	4	3	3	3	2	3	3	2	2	2	3	2	2	3	3.6	10
19-Jun	6	Z	6	7	4	5	8	6	6	12	10	7	8	2	1	1	2	7	4	3	3	4	7	14	5.8	14
20-Jun	13	Z	2	1	1	1	0	1	2	9	8	6	10	3	2	1	3	2	3	4	5	2	1	1	3.4	13
21-Jun	3	Z	5	6	1	1	2	11	13	6	1	1	3	6	11	10	2	1	2	3	5	8	9	6	4.9	13
22-Jun	3	Z	9	5	3	5	5	6	6	10	3	4	6	3	3	1	1	0	0	0	0	1	3	3	3.4	10
23-Jun	9	Z	6	2	3	2	7	15	3	1	3	5	7	5	5	4	6	3	1	1	5	4	11	11	5.1	15
24-Jun	11	Z	2	3	5	2	1	4	9	6	5	3	2	2	2	2	3	3	3	3	3	4	5	10	3.9	11
25-Jun	8	Z	4	16	15	9	11	7	4	5	5	3	2	2	3	17	9	1	4	1	1	1	0	1	5.5	17
26-Jun	1	Z	1	1	1	1	1	1	1	2	3	1	1	0	1	2	3	9	2	2	3	8	11	10	2.7	11
27-Jun	5	Z	12	9	7	9	10	9	12	18	10	5	5	2	5	6	7	1	1	1	4	8	19	14	7.7	19
28-Jun	17	Z	10	9	10	9	5	5	8	20	9	3	3	7	2	3	2	1	0	0	9	12	7	12	7.0	20
29-Jun	11	Z	12	17	8	6	6	1	1	1	1	0	1	1	2	1	1	1	1	1	9	11	2	12	4.7	17
30-Jun	13	Z	4	2	2	9	1	1	0	0	0	0	0	0	1	0	0	0	0	1	5	4	4	4	2.3	13

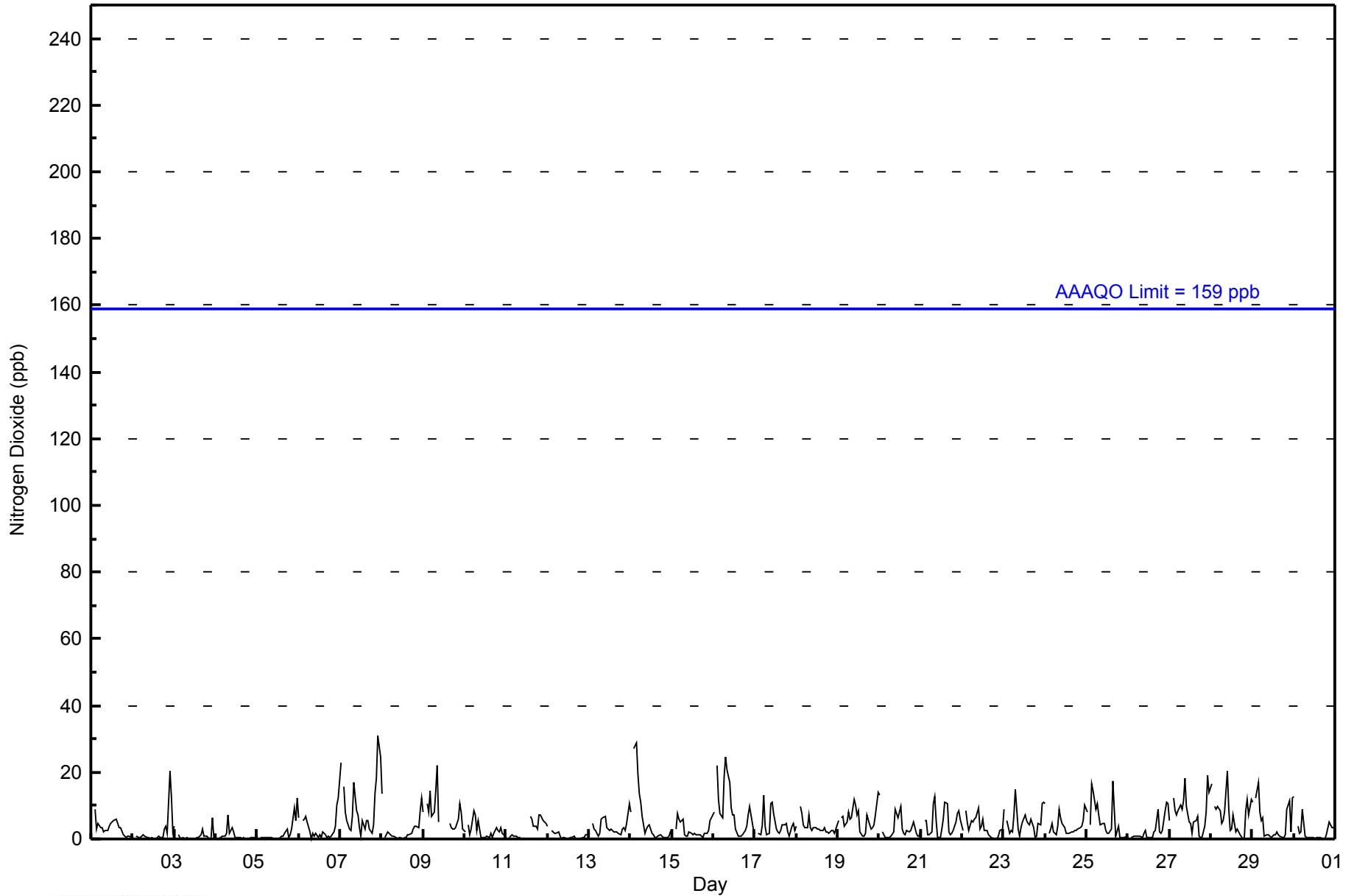
6.3	--	6.4	5.7	4.8	4.4	4.4	5.0	5.1	5.2	3.8	2.7	2.7	2.2	2.3	2.9	2.5	2.1	1.7	2.0	3.6	5.5	6.5	6.6	Diurnal Average	
23	--	27	29	20	14	19	24	22	20	11	8	10	7	11	17	9	9	5	7	14	20	31	25	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	671	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: 680

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - June 2014

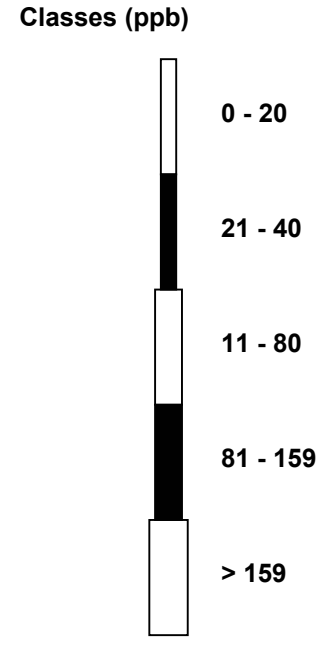
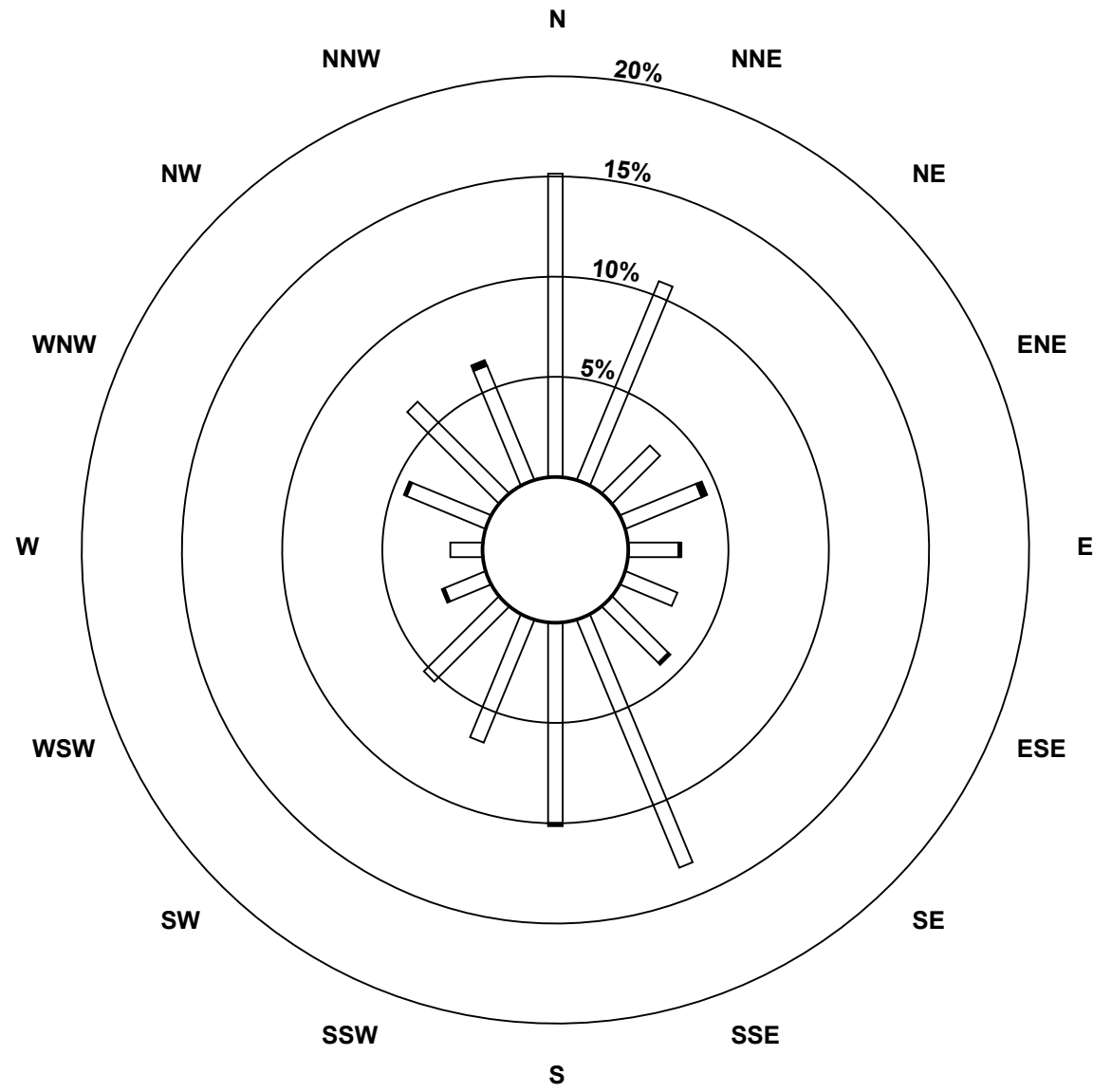
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	103	73	23	28	17	19	27	91	68	45	36	15	11	29	44	42	671
21 - 40	0	0	0	2	1	0	1	0	1	0	0	1	0	1	0	2	9
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	103	73	23	30	18	19	28	91	69	45	36	16	11	30	44	44	680

Total Number of Valid Hours: 680

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Jun 2014

Nitrogen Dioxide (NO₂) - ppb
 CNRL Horizon (AMS 15)

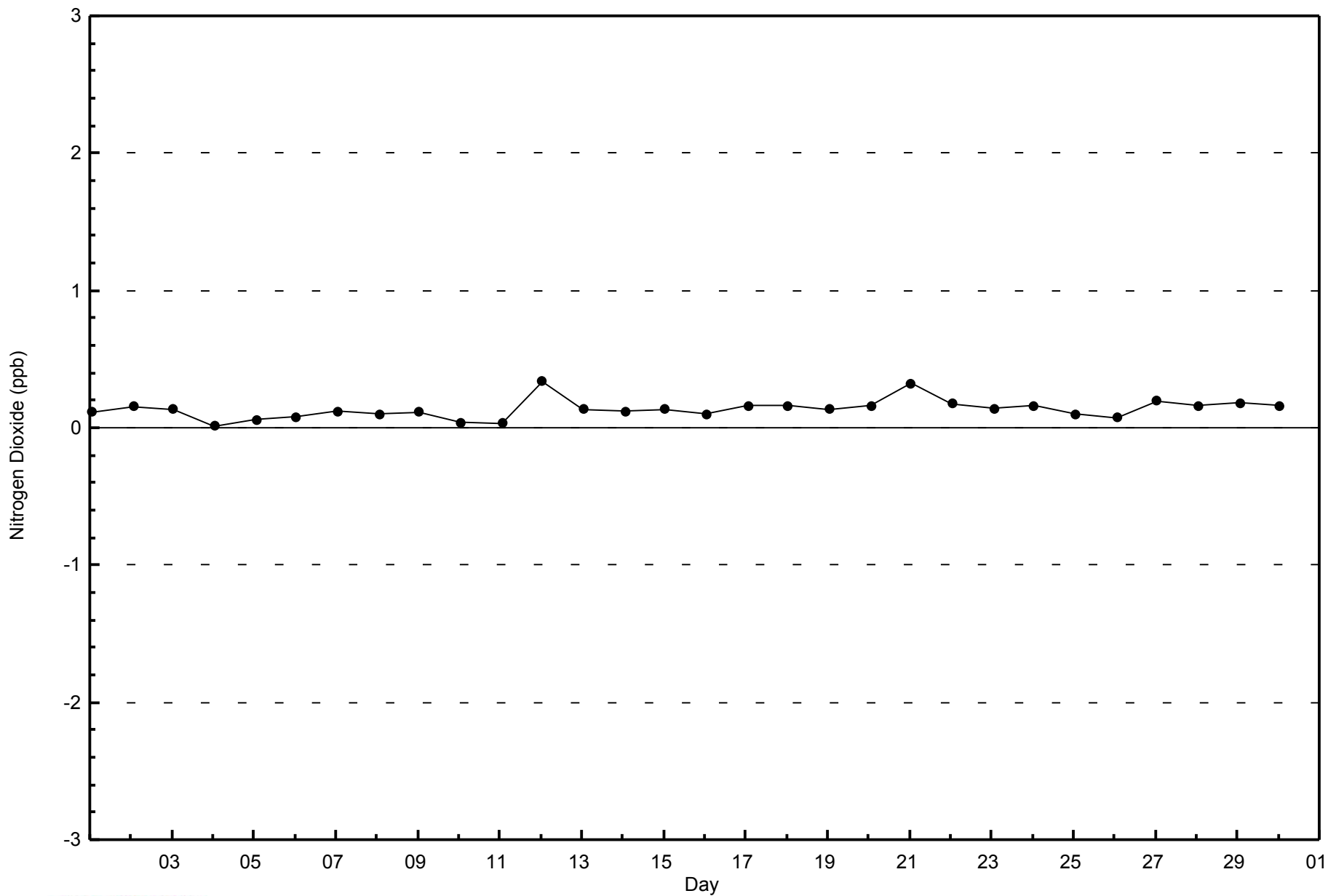


Total Number of Valid Hours: 680



WBEA
Zero Responses

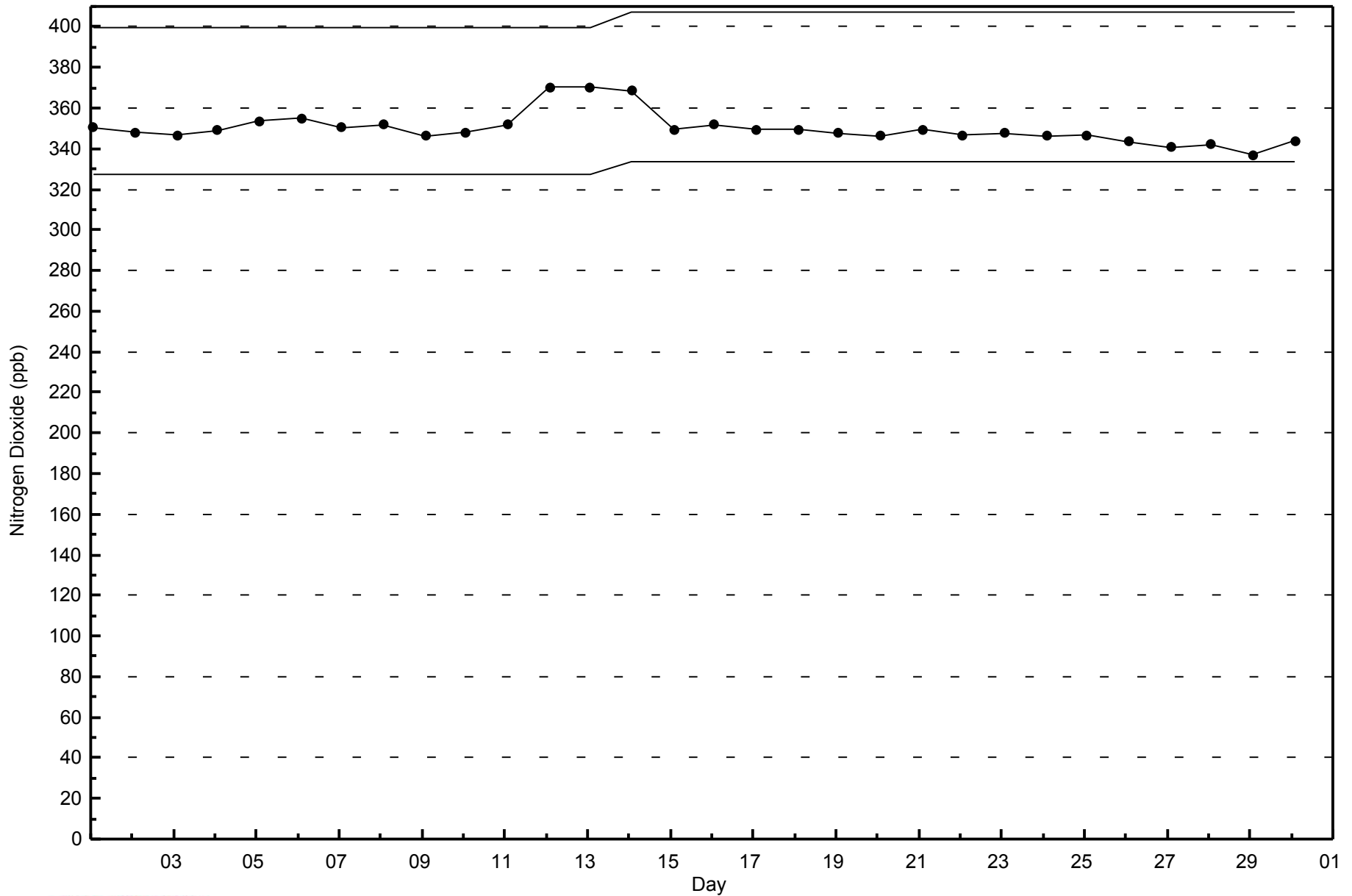
Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - June 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - June 2014



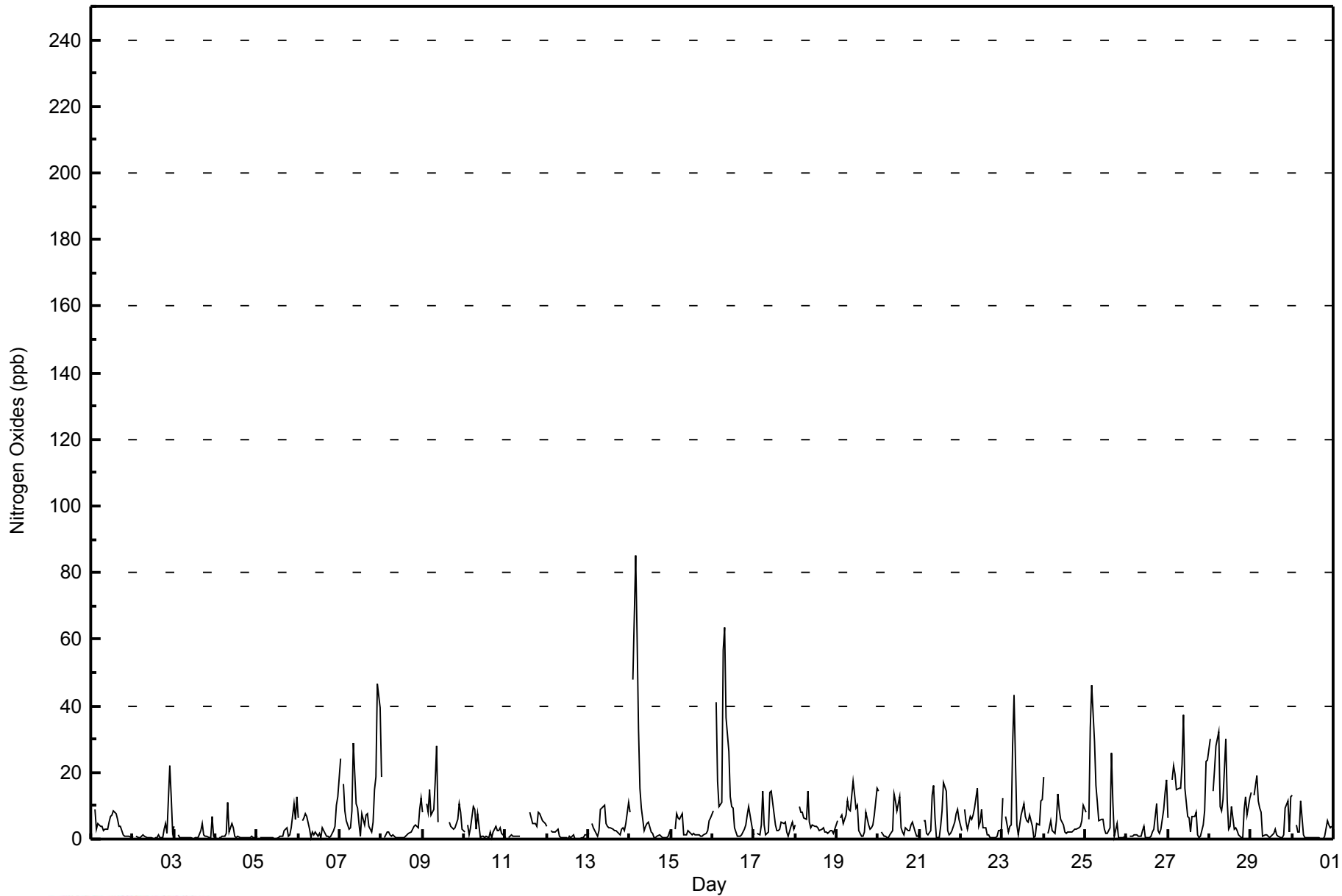


Maximum Value: 85 ppb on Jun 14 04:00																		Maximum Daily Average: 14.9 ppb on Jun 16						Hours in Service: 720					
Minimum Value: 0 ppb on Jun 12 18:00																		Minimum Daily Average: 1.1 ppb on Jun 12						Hours of Data: 680					
Maximum Diurnal Average: 9.3 ppb at hour 4																		Minimum Diurnal Average: 1.9 ppb at hour 19						Hours of Missing Data: 40					
Monthly Average: 5.6 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 7 P ₉₀ = 13 P ₉₉ = 46						Hours of Calibration: 35					
																								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-Jun	5	Z	9	3	5	4	4	2	3	3	5	7	7	8	8	6	4	4	1	1	1	1	1	1	4.0	9			
2-Jun	1	Z	1	1	0	1	1	1	1	0	0	0	0	0	0	1	0	1	3	5	2	22	13	2	2.5	22			
3-Jun	4	Z	1	0	0	0	0	1	0	0	0	0	0	0	1	3	5	1	1	1	0	0	7	1	1.2	7			
4-Jun	0	Z	0	0	1	1	2	11	2	5	3	1	0	1	0	0	0	0	0	1	1	0	1	0	1	1.4	11		
5-Jun	1	Z	1	0	1	0	0	0	0	0	0	0	0	1	1	1	2	3	1	1	3	11	6	13	2.1	13			
6-Jun	6	Z	6	6	7	7	3	0	2	1	2	1	2	1	3	2	1	1	1	1	2	4	10	13	3.5	13			
7-Jun	24	Z	17	8	6	3	3	9	29	10	9	5	1	7	4	7	8	4	2	5	15	19	46	39	12.2	46			
8-Jun	19	Z	0	2	2	1	1	1	0	0	0	0	0	0	1	1	2	2	3	4	4	4	9	12	3.0	19			
9-Jun	8	Z	10	8	15	7	9	17	28	5	M	M	M	M	M	5	4	3	3	4	6	11	8	3	8.6	28			
10-Jun	2	Z	4	1	3	10	9	3	8	1	1	1	0	1	1	2	0	2	4	3	2	3	2	1	2.8	10			
11-Jun	0	Z	0	1	1	1	1	1	1	C	C	C	C	C	8	6	5	5	4	8	8	5	5	5	3.6	8			
12-Jun	4	Z	2	2	2	2	3	1	0	1	1	0	0	1	1	1	0	0	0	0	0	1	1	1	1.1	4			
13-Jun	2	Z	5	3	3	1	3	9	9	10	5	4	4	4	3	2	3	2	1	3	3	2	5	11	4.2	11			
14-Jun	8	Z	48	85	61	33	15	9	2	4	5	5	2	2	1	1	1	1	1	0	0	0	1	2	12.5	85			
15-Jun	1	Z	3	8	6	6	7	1	1	1	3	2	1	2	1	1	1	1	1	1	2	3	6	6	2.9	8			
16-Jun	8	Z	41	17	10	11	57	64	37	26	13	10	9	4	1	1	1	1	3	4	7	10	7	2	14.9	64			
17-Jun	1	Z	2	1	4	14	4	1	2	14	14	11	4	3	3	3	5	5	5	2	1	4	5	3	4.9	14			
18-Jun	4	Z	10	8	8	6	6	15	5	3	4	4	4	3	3	3	4	2	2	2	3	2	2	3	4.6	15			
19-Jun	6	Z	6	7	5	7	11	9	8	17	14	9	10	3	1	1	2	8	4	3	3	4	7	15	7.0	17			
20-Jun	14	Z	2	1	1	1	1	1	2	14	12	8	13	4	2	1	3	2	3	4	5	2	1	1	4.2	14			
21-Jun	3	Z	5	6	2	1	2	13	16	6	0	1	4	8	17	14	3	1	2	2	5	8	9	6	5.9	17			
22-Jun	3	Z	9	5	3	7	6	7	9	15	4	5	9	3	3	1	1	0	0	0	0	1	3	3	4.3	15			
23-Jun	12	Z	7	2	4	4	29	43	4	1	4	7	10	7	6	5	7	4	1	1	5	4	11	12	8.3	43			
24-Jun	18	Z	2	3	5	3	2	6	14	9	6	4	2	2	2	2	2	3	3	3	3	4	5	10	4.9	18			
25-Jun	8	Z	6	33	46	29	16	11	5	6	6	3	2	2	3	26	11	1	5	1	1	0	0	1	9.6	46			
26-Jun	1	Z	1	1	1	1	1	1	1	3	4	1	1	0	1	2	3	10	3	2	3	9	14	18	3.4	18			
27-Jun	6	Z	18	22	20	15	15	15	23	37	15	7	6	2	7	7	8	1	1	1	4	8	23	24	12.4	37			
28-Jun	30	Z	14	21	28	32	10	8	12	30	11	3	4	10	3	3	2	1	0	0	9	13	7	12	11.5	32			
29-Jun	14	Z	13	19	12	10	8	1	1	1	1	0	1	2	3	1	1	1	1	1	9	12	2	13	5.5	19			
30-Jun	13	Z	4	2	2	11	1	1	0	1	0	0	0	1	1	0	0	0	0	1	5	4	4	4	2.4	13			
		7.6	--	8.2	9.3	8.7	7.7	7.7	8.8	7.6	7.8	5.1	3.5	3.5	2.8	3.0	3.7	3.0	2.4	1.9	2.1	3.8	5.7	7.3	7.8	Diurnal Average			
		30	--	48	85	61	33	57	64	37	37	15	11	13	10	17	26	11	10	5	8	15	22	46	39	Diurnal Maximum			
Z - zerspan		C - Calibration					M - Maintenance																						



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	649	95.44	95.44
21 - 40	22	3.24	98.68
41 - 80	8	1.18	99.85
81 - 159	1	0.15	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
CNRL Horizon - June 2014

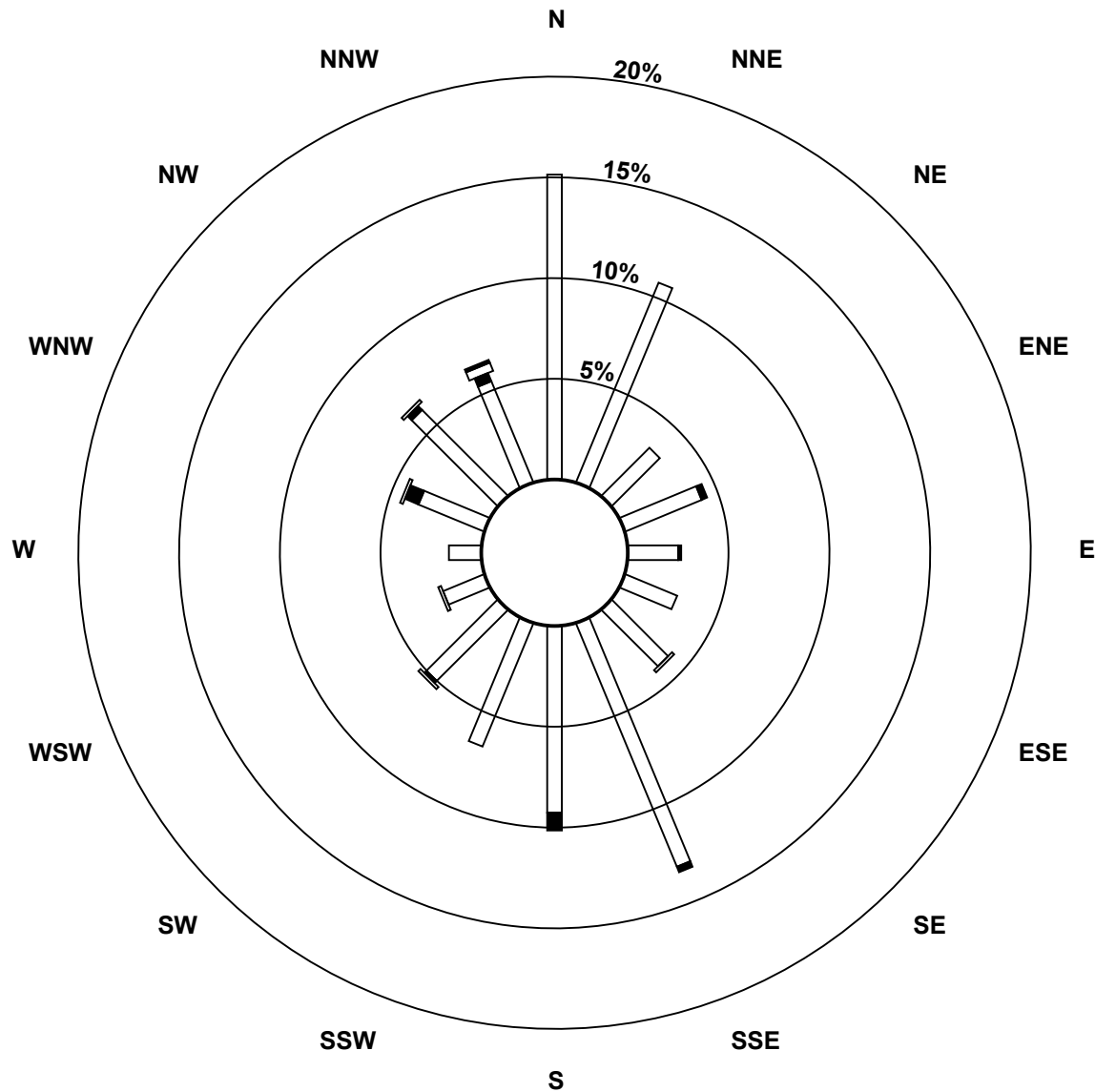
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	103	73	23	28	17	19	27	89	63	45	34	15	11	24	41	37	649
21 - 40	0	0	0	2	1	0	0	2	6	0	1	0	0	5	2	3	22
11 - 80	0	0	0	0	0	0	1	0	0	0	1	1	0	1	1	3	8
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	103	73	23	30	18	19	28	91	69	45	36	16	11	30	44	44	680

Total Number of Valid Hours: 680

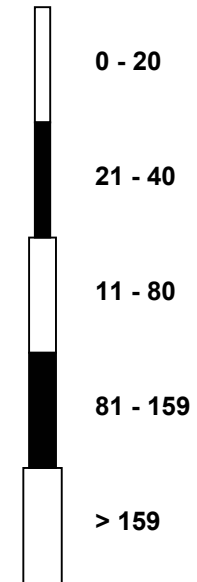
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

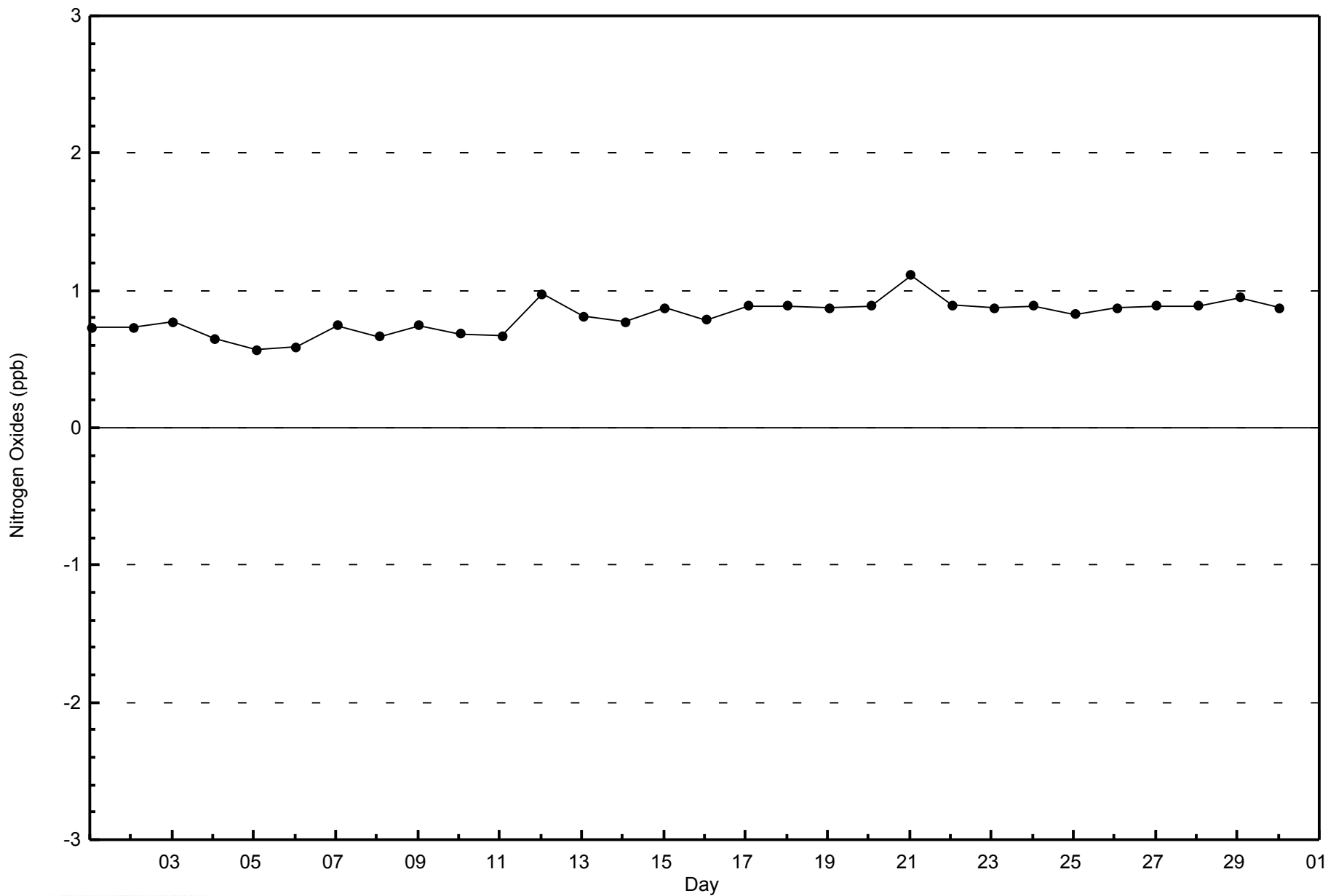
Nitrogen Oxides (NO_x) - ppb
CNRL Horizon (AMS 15)



Classes (ppb)



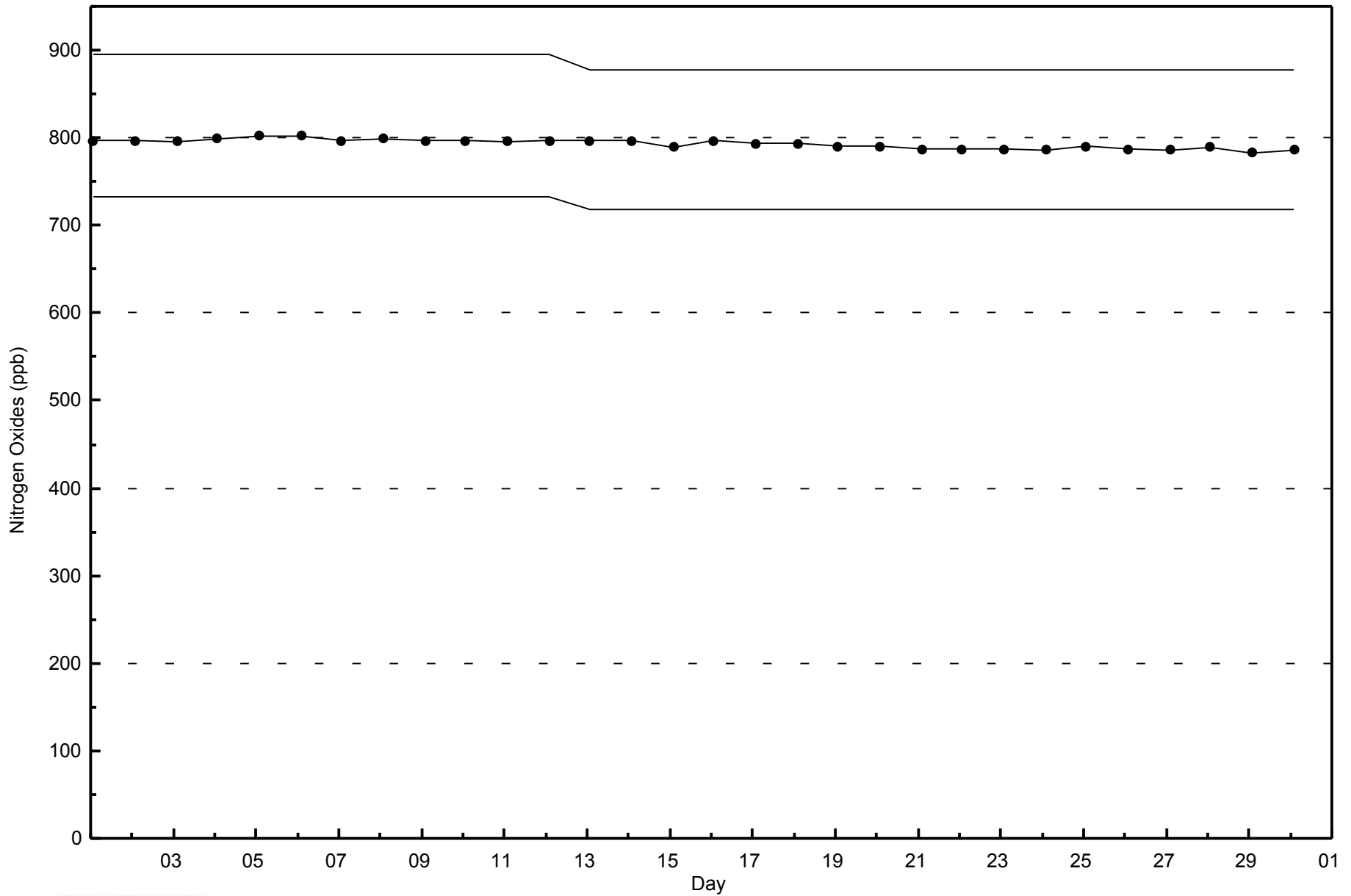
Total Number of Valid Hours: 680





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - June 2014





Number of Exceedences (AAAQO): 24-hr: 0	Hours in Service: 720
Maximum Value: 57.2 µg/m ³ on Jun 30 02:00	Maximum Daily Average: 27.9 µg/m ³ on Jun 29
Minimum Value: 2.3 µg/m ³ on Jun 12 17:00	Hours of Data: 716
Maximum Diurnal Average: 13.0 µg/m ³ at hour 3	Hours of Missing Data: 4
Monthly Average: 9.88 µg/m ³	Hours of Calibration: 0
Minimum Daily Average: 5.0 µg/m ³ on Jun 5	Percent Operational Time: 99.4
Minimum Diurnal Average: 7.7 µg/m ³ at hour 19	
Percentiles: P ₁ = 2.8 P ₁₀ = 4.7 Q ₁ = 5.3 Median = 8.0 Q ₃ = 11.5 P ₉₀ = 16.3 P ₉₉ = 36.8	

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-Jun	7.2	7.8	7.2	6.7	7.2	7.1	6.8	5.4	5.5	5.4	5.0	5.8	5.2	5.3	6.2	8.3	9.4	10.0	9.8	9.8	10.2	10.3	9.5	8.8	7.5	10.3																							
2-Jun	9.2	9.2	9.1	8.9	8.4	7.9	7.5	6.6	5.6	5.5	5.2	5.4	5.3	5.2	5.0	4.9	5.6	6.0	6.1	5.7	5.4	7.4	8.1	7.3	6.7	9.2																							
3-Jun	6.9	6.9	6.8	6.5	6.1	5.6	5.2	5.1	5.1	5.2	5.1	5.1	5.1	5.0	5.2	5.9	9.1	8.9	8.9	8.9	7.8	7.1	6.5	6.0	6.4	9.1																							
4-Jun	6.2	6.5	5.9	5.6	5.1	5.1	5.1	5.1	5.1	5.0	4.9	4.9	4.8	4.8	4.8	4.7	4.8	4.7	4.8	4.8	4.8	4.9	4.9	5.0	5.1	6.5																							
5-Jun	5.0	5.1	5.2	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.0	5.0	4.9	4.9	4.9	4.9	4.9	4.9	4.8	4.8	5.0	5.0	5.1	5.1	5.0	5.2																							
6-Jun	5.1	5.2	5.1	5.1	5.2	5.2	5.1	4.9	4.9	4.8	4.8	4.7	4.7	4.6	4.5	4.5	4.5	4.5	4.7	5.3	5.8	6.3	6.1	6.1	5.1	6.3																							
7-Jun	6.7	7.4	8.1	7.9	7.8	7.0	5.6	5.4	5.6	5.2	5.3	5.0	4.8	5.0	4.8	4.8	5.4	5.1	5.9	7.2	7.8	8.9	9.8	10.5	6.5	10.5																							
8-Jun	11.1	10.6	9.9	9.3	9.2	7.0	5.5	5.1	4.9	4.7	4.5	4.4	4.3	5.0	5.0	6.5	7.0	7.6	9.1	9.5	10.5	11.5	11.7	12.3	7.8	12.3																							
9-Jun	12.7	13.2	15.5	14.1	14.2	15.6	15.9	15.0	13.5	11.7	10.9	10.4	M	M	M	M	4.0	3.7	3.0	2.3	2.4	3.3	3.6	3.7	9.4	15.9																							
10-Jun	4.1	4.3	4.4	4.3	4.3	5.3	4.5	4.3	4.9	4.6	4.7	4.6	4.4	4.6	4.7	5.3	4.9	5.5	5.3	5.5	5.5	7.7	9.4	7.5	5.2	9.4																							
11-Jun	6.4	6.1	6.0	5.9	5.8	5.4	4.7	4.1	3.6	4.6	5.4	8.0	10.5	11.3	9.2	9.2	9.4	9.0	8.7	25.9	15.4	10.5	11.2	14.8	8.8	25.9																							
12-Jun	15.7	14.2	11.6	11.0	10.3	9.2	7.4	5.1	4.6	3.9	3.5	3.1	3.2	3.2	2.8	2.6	2.3	2.3	2.6	2.9	3.2	3.6	3.9	5.2	5.7	15.7																							
13-Jun	4.9	7.6	4.4	4.1	4.1	3.5	3.3	5.7	4.6	4.1	3.5	3.8	4.2	4.4	4.5	5.8	7.1	6.8	6.4	9.7	12.1	11.3	16.6	13.2	6.5	16.6																							
14-Jun	12.1	24.9	24.6	27.9	19.8	15.8	14.3	15.4	8.8	9.2	11.7	16.4	9.1	8.2	5.7	5.1	5.3	6.1	5.5	5.3	5.3	5.6	7.0	6.0	11.5	27.9																							
15-Jun	5.7	6.9	9.5	11.1	8.5	9.0	10.1	5.9	6.1	6.0	8.3	6.4	5.5	5.8	5.2	5.1	15.0	6.7	5.3	7.3	8.8	8.8	12.4	13.5	8.0	15.0																							
16-Jun	17.0	19.6	22.7	13.2	10.9	10.8	34.1	34.0	14.8	11.4	32.3	11.9	27.2	16.6	20.1	5.9	4.3	5.2	4.4	5.6	6.8	7.7	16.7	10.7	15.2	34.1																							
17-Jun	7.3	4.9	5.2	5.4	6.1	8.8	7.5	7.3	13.5	14.0	15.5	9.7	20.9	7.8	6.5	8.8	12.6	14.6	13.6	8.3	13.0	9.2	8.3	7.1	9.8	20.9																							
18-Jun	7.9	9.2	9.1	8.9	12.5	9.5	8.0	18.7	12.6	9.4	13.0	11.7	11.4	9.8	9.1	8.9	10.2	8.4	7.0	7.5	9.3	7.7	8.2	15.5	10.1	18.7																							
19-Jun	22.3	27.2	28.8	21.2	12.0	8.4	11.4	8.0	9.3	25.4	10.2	10.6	11.6	6.4	4.1	4.7	5.6	8.7	10.7	24.5	16.8	9.7	9.0	10.2	13.2	28.8																							
20-Jun	10.3	8.3	7.9	8.4	7.7	7.9	8.2	9.4	10.3	12.7	15.3	14.6	14.6	11.9	11.2	5.1	5.9	5.8	6.0	13.1	10.6	7.8	7.7	8.9	9.6	15.3																							
21-Jun	10.2	11.4	12.5	14.9	12.1	12.5	12.1	12.9	11.5	8.4	7.2	7.8	8.7	9.2	9.5	10.7	9.5	5.5	5.7	6.9	7.3	7.4	7.7	8.0	9.6	14.9																							
22-Jun	6.4	6.7	6.8	6.0	5.2	4.3	4.3	5.1	5.7	6.7	8.3	8.6	8.4	8.5	10.4	9.8	8.0	8.6	11.1	11.8	10.9	13.5	9.7	8.7	8.1	13.5																							
23-Jun	13.3	16.6	16.9	16.3	16.2	15.3	15.8	18.1	12.1	10.8	13.4	14.5	13.2	11.7	9.4	6.6	6.8	6.9	5.8	5.6	6.7	7.7	8.4	8.2	11.5	18.1																							
24-Jun	8.6	10.2	10.6	10.3	9.0	6.4	4.8	5.0	8.1	9.7	7.8	8.0	8.6	9.1	8.8	12.5	11.6	17.0	13.9	14.1	13.4	14.4	13.4	11.8	10.3	17.0																							
25-Jun	11.1	10.0	15.8	17.8	18.3	14.6	13.5	15.0	12.1	13.2	7.7	5.7	5.4	5.9	5.2	8.6	14.2	5.0	4.8	4.7	4.8	5.0	5.8	6.2	9.6	18.3																							
26-Jun	6.4	7.5	7.9	8.2	9.1	8.8	7.9	6.5	5.7	7.2	6.8	4.2	4.2	3.9	4.1	8.1	9.8	9.6	10.8	9.7	12.1	13.4	12.5	13.8	8.3	13.8																							
27-Jun	13.8	13.7	12.3	11.5	11.9	13.8	17.6	15.6	16.5	16.2	11.3	8.4	7.5	5.4	6.1	7.6	8.4	7.6	6.0	5.7	6.1	7.0	9.1	10.0	10.4	17.6																							
28-Jun	11.9	12.5	11.2	11.6	13.1	12.2	9.3	9.0	9.8	11.0	10.9	10.3	10.1	9.0	7.3	7.3	10.0	11.5	14.1	23.0	43.8	43.0	33.2	31.6	15.7	43.8																							
29-Jun	31.2	32.4	34.1	39.3	35.1	34.2	27.0	23.3	28.5	35.5	39.1	18.8	24.8	27.1	34.7	34.9	30.9	23.3	16.3	15.6	15.7	19.3	19.0	30.1	27.9	39.3																							
30-Jun	36.5	57.2	55.3	50.6	43.1	35.0	31.2	24.1	16.4	11.0	8.7	11.4	10.9	11.6	11.5	11.3	10.3	9.0	9.2	10.3	12.3	14.1	16.0	16.7	21.8	57.2																							
																								11.1	12.8	13.0	12.6	11.4	10.5	10.6	10.3	9.2	9.6	9.8	8.3	9.1	8.0	7.9	7.9	8.6	7.9	7.7	9.4	10.0	10.0	10.3	10.8	Diurnal Average	
																								36.5	57.2	55.3	50.6	43.1	35.0	34.1	34.0	28.5	35.5	39.1	18.8	27.2	27.1	34.7	34.9	30.9	23.3	16.3	25.9	43.8	43.0	33.2	31.6	Diurnal Maximum	

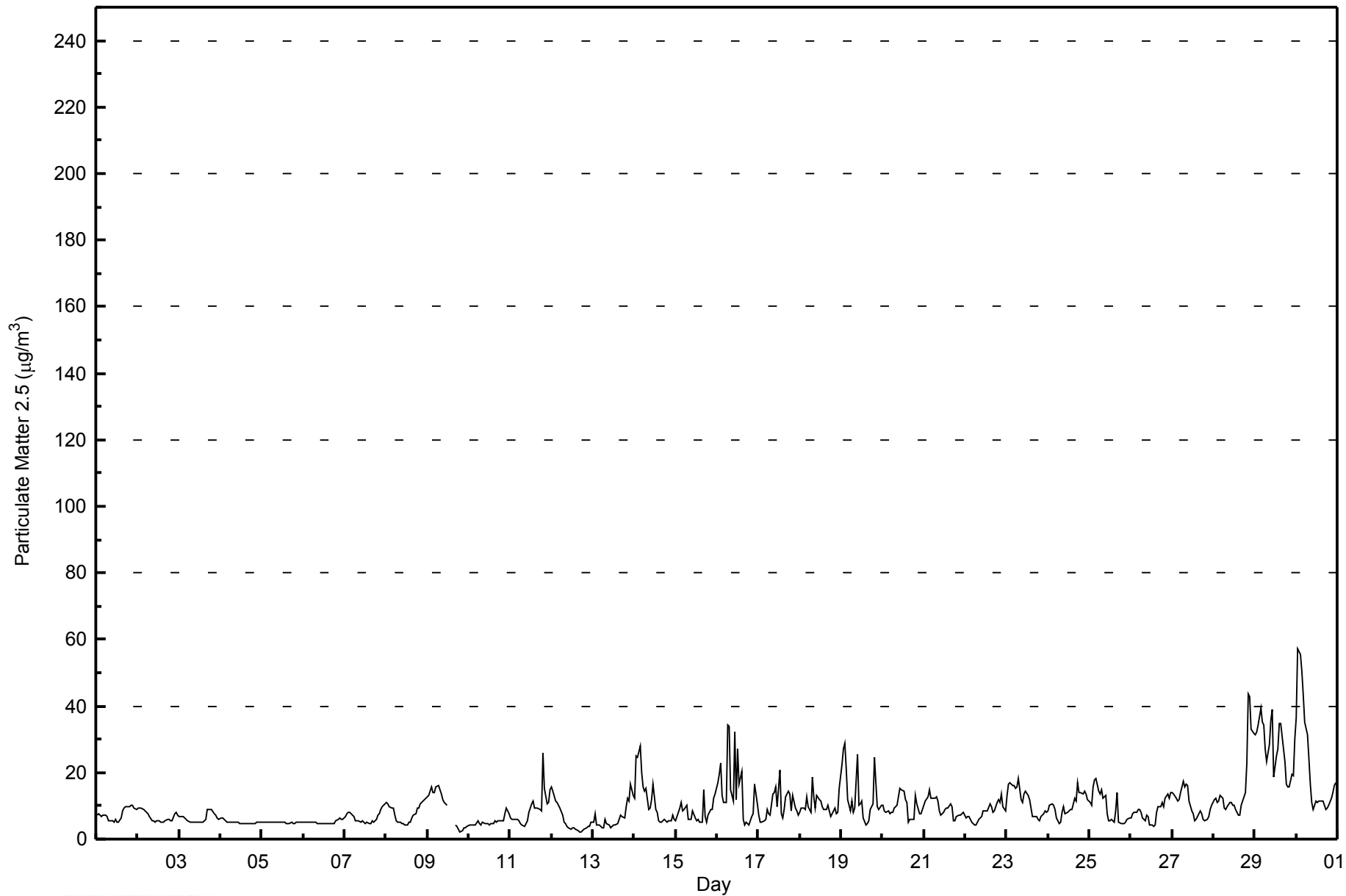
M - Maintenance

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 - June 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - June 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	205	28.63	28.63
6 - 15	427	59.64	88.27
16 - 25	50	6.98	95.25
26 - 80	34	4.75	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 716

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
CNRL Horizon - June 2014

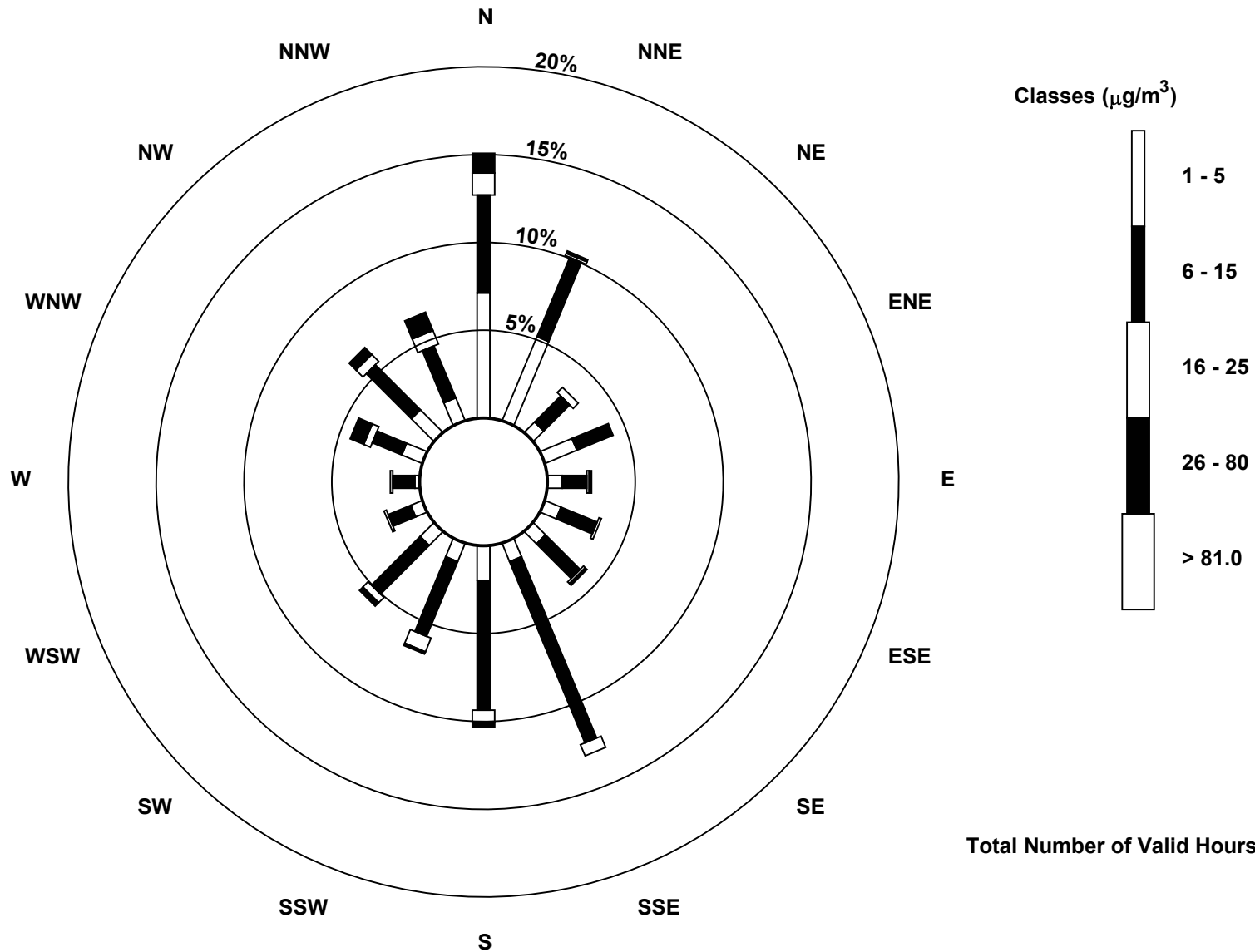
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	51	37	6	14	6	7	7	8	14	8	8	5	2	9	13	10	205
6 - 15	40	35	15	16	10	16	20	80	53	33	28	10	9	13	26	23	427
16 - 25	9	1	3	0	1	1	1	5	5	6	3	1	1	3	4	6	50
26 - 80	8	1	0	0	1	0	1	0	2	1	2	0	0	6	4	8	34
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	108	74	24	30	18	24	29	93	74	48	41	16	12	31	47	47	716

Total Number of Valid Hours: 716

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
CNRL Horizon (AMS 15)



Total Number of Valid Hours: 716

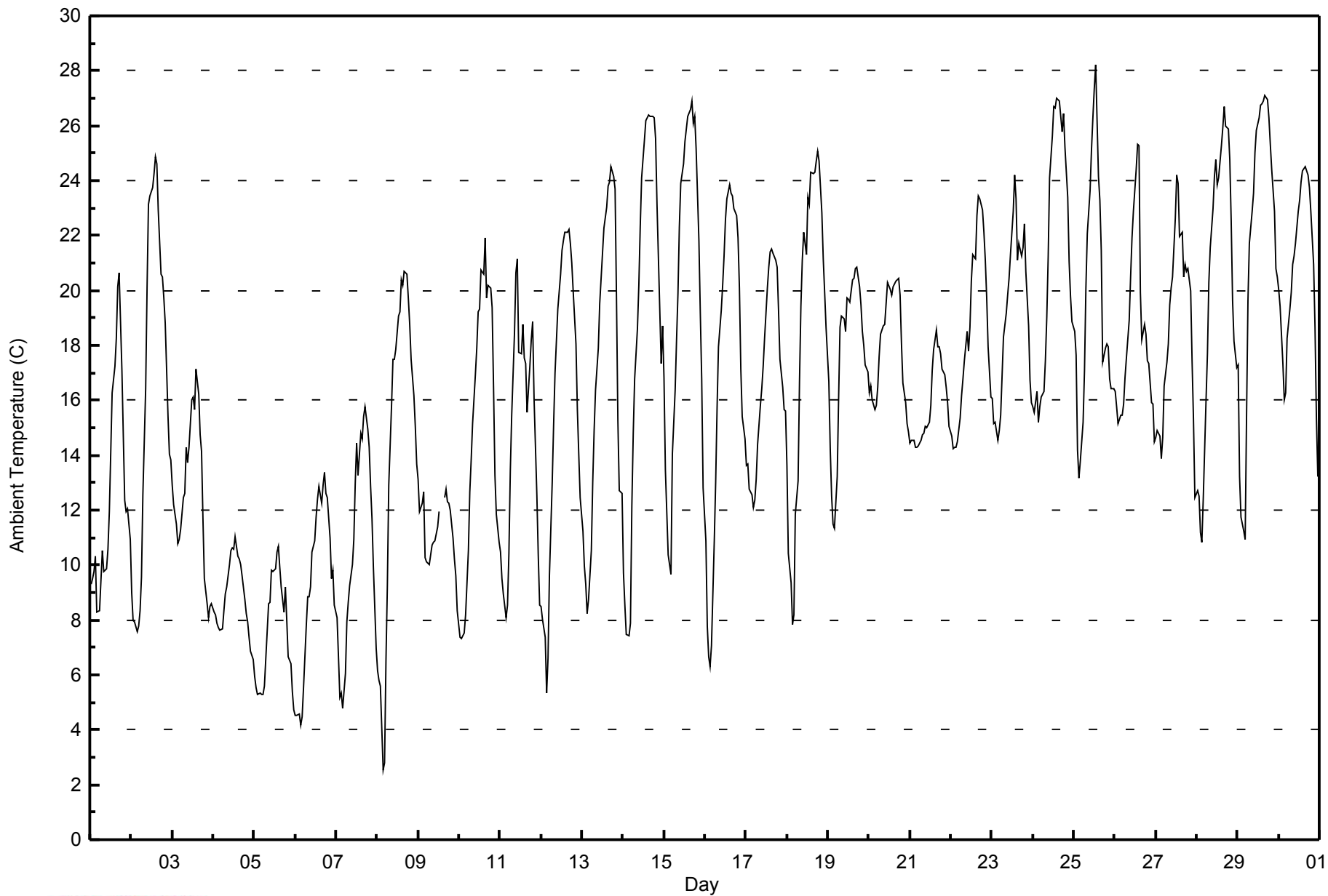


Maximum Value: 28.2 C on Jun 25 14:00 Maximum Daily Average: 21.6 C on Jun 29																						Hours in Service: 720 Hours of Data: 718																											
Minimum Value: 2.6 C on Jun 8 04:00 Minimum Daily Average: 7.5 C on Jun 5 Maximum Diurnal Average: 21.1 C at hour 15 Minimum Diurnal Average: 10.2 C at hour 4 Monthly Average: 16.26 C Percentiles: P ₁ = 4.7 P ₁₀ = 8.3 Q ₁ = 11.9 Median = 16.4 Q ₃ = 20.6 P ₉₀ = 24.1 P ₉₉ = 26.9																						Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jun	9.3	9.5	9.8	10.3	8.3	8.3	9.5	10.5	9.8	9.9	10.6	12.0	14.1	16.3	17.3	18.2	20.1	20.7	17.1	14.7	12.3	11.9	12.0	10.9	12.6	20.7																							
2-Jun	9.0	8.0	7.9	7.6	7.8	8.3	9.5	12.5	16.4	20.1	23.2	23.4	23.7	24.3	24.9	24.6	22.9	20.6	20.5	19.7	18.8	15.4	14.0	13.8	16.5	24.9																							
3-Jun	12.9	12.2	11.5	10.8	10.9	11.3	12.5	12.6	14.3	13.7	14.3	16.0	16.1	15.7	17.1	16.2	14.8	14.1	11.7	9.5	8.6	8.1	8.5	8.6	12.6	17.1																							
4-Jun	8.3	8.2	7.9	7.7	7.6	7.7	8.3	9.0	9.2	10.0	10.5	10.6	10.6	11.1	10.3	10.2	10.0	9.6	8.7	8.3	7.9	7.4	6.9	6.6	8.9	11.1																							
5-Jun	6.0	5.5	5.3	5.4	5.3	5.3	5.6	6.6	8.6	8.6	8.6	9.8	9.8	10.5	10.7	9.9	9.2	8.3	9.2	8.0	6.6	6.4	5.4	4.7	7.5	10.7																							
6-Jun	4.5	4.5	4.6	4.2	4.5	5.6	7.9	8.8	8.8	9.2	10.5	10.9	11.8	12.4	12.9	12.3	12.9	13.4	12.6	12.4	11.0	9.5	9.8	8.5	9.3	13.4																							
7-Jun	8.1	6.7	5.2	5.3	4.8	6.1	7.9	8.6	9.3	10.0	10.9	13.0	14.5	13.3	14.8	14.6	15.4	15.8	14.9	14.3	12.9	11.7	9.9	7.0	10.6	15.8																							
8-Jun	6.2	5.8	5.6	2.6	2.8	6.5	9.2	12.9	15.8	17.5	17.5	17.9	19.1	19.2	20.4	20.2	20.7	20.6	19.7	18.8	17.5	16.2	15.0	13.7	14.2	20.7																							
9-Jun	13.1	11.9	12.3	12.7	10.2	10.1	10.0	10.4	10.7	10.8	10.9	11.4	11.9	MS	MS	12.5	12.8	12.3	12.3	12.0	11.0	10.2	9.6	8.4	11.3	13.1																							
10-Jun	7.4	7.3	7.4	7.5	8.2	10.5	12.6	13.8	15.2	16.9	17.9	19.2	19.3	20.7	20.6	21.9	19.8	20.2	20.1	19.4	16.5	13.3	11.9	10.8	14.9	21.9																							
11-Jun	10.5	9.5	8.9	8.1	8.5	10.4	13.4	15.4	18.5	20.6	21.2	17.8	17.7	18.8	17.5	17.3	15.5	17.3	18.2	18.9	16.1	12.5	10.4	8.5	14.6	21.2																							
12-Jun	8.5	8.0	7.3	5.3	6.6	9.6	13.0	15.1	17.0	18.2	19.3	20.6	21.5	21.8	22.1	22.1	22.2	21.7	21.0	20.0	18.0	15.7	14.0	12.4	15.9	22.2																							
13-Jun	11.2	9.9	9.3	8.2	8.8	10.5	13.0	14.9	16.4	17.9	19.5	20.4	21.4	22.3	23.0	23.8	24.0	24.5	24.2	23.7	19.7	15.3	12.7	12.6	17.0	24.5																							
14-Jun	9.7	8.5	7.5	7.4	7.9	12.2	14.8	16.8	18.6	20.2	22.3	24.1	25.5	26.2	26.3	26.4	26.3	26.3	26.3	25.5	23.2	19.3	17.4	18.7	19.1	26.4																							
15-Jun	16.8	13.5	10.4	10.0	9.6	14.0	16.4	18.2	19.9	22.3	23.9	24.6	25.4	25.9	26.3	26.6	26.9	26.1	26.3	25.2	21.8	19.2	16.8	12.8	20.0	26.9																							
16-Jun	10.9	7.8	6.7	6.3	7.1	10.9	13.0	15.7	18.0	19.3	20.2	21.3	22.6	23.3	23.9	23.5	23.5	23.0	22.7	21.9	20.1	17.1	15.4	14.6	17.0	23.9																							
17-Jun	13.6	13.7	12.8	12.6	12.1	12.4	13.1	14.4	15.8	16.4	17.3	18.3	20.1	20.8	21.4	21.5	21.4	21.1	20.8	19.3	17.5	16.5	15.7	15.6	16.8	21.5																							
18-Jun	13.6	10.4	9.4	7.8	8.2	11.9	13.1	16.7	19.4	21.1	22.1	21.3	23.4	23.1	24.3	24.3	24.3	24.7	25.1	24.7	22.8	21.1	19.9	18.7	18.8	25.1																							
19-Jun	16.7	14.2	12.5	11.5	11.4	13.2	16.1	18.7	19.1	19.0	18.5	19.7	19.7	19.6	20.4	20.4	20.8	20.8	20.1	19.5	18.5	18.0	17.3	17.0	17.6	20.8																							
20-Jun	16.3	16.5	16.0	15.7	15.8	16.5	17.6	18.4	18.7	18.8	19.5	20.3	20.1	19.8	20.1	20.2	20.3	20.4	19.8	18.1	16.6	15.9	15.1	14.9	18.0	20.4																							
21-Jun	14.4	14.6	14.6	14.3	14.3	14.3	14.5	14.7	14.8	15.1	15.0	15.2	15.8	17.1	17.9	18.6	17.9	18.0	17.7	17.1	17.0	16.5	15.9	15.1	15.8	18.6																							
22-Jun	14.7	14.2	14.3	14.3	14.5	15.4	16.2	16.8	17.5	18.5	17.8	18.7	20.4	21.3	21.1	22.7	23.5	23.3	22.9	22.1	21.1	19.7	17.9	16.1	18.5	23.5																							
23-Jun	16.0	15.1	15.2	14.5	14.9	15.4	16.9	18.3	19.2	19.8	20.4	21.3	22.9	24.2	23.3	21.1	21.7	21.3	21.6	22.4	20.7	18.7	16.7	15.9	19.1	24.2																							
24-Jun	15.8	15.5	16.3	15.2	15.8	16.1	16.3	17.5	19.0	21.2	24.1	25.6	26.7	26.6	27.0	26.9	26.4	25.8	26.4	25.2	23.4	21.1	19.8	18.8	21.4	27.0																							
25-Jun	18.5	17.6	14.2	13.2	13.8	15.2	17.1	20.1	22.1	23.6	25.1	26.3	27.4	28.2	24.2	23.3	21.4	17.4	17.9	18.1	17.9	16.8	16.4	16.4	19.7	28.2																							
26-Jun	16.3	15.8	15.2	15.5	15.5	15.9	16.8	17.5	18.9	20.5	21.9	22.9	24.4	25.3	25.3	20.0	18.2	18.8	18.4	17.4	17.4	15.9	15.9	14.5	18.5	25.3																							
27-Jun	14.7	14.9	14.7	13.9	14.7	16.5	17.4	18.1	19.5	20.1	20.5	22.7	24.2	23.9	22.0	22.1	20.5	21.0	20.7	20.8	20.0	17.4	15.3	12.4	18.7	24.2																							
28-Jun	12.7	12.5	11.2	10.8	12.4	16.0	17.7	20.3	21.6	23.0	24.1	24.7	23.8	24.1	25.3	25.9	26.7	26.0	25.9	24.8	22.5	19.6	18.1	17.2	20.3	26.7																							
29-Jun	17.3	13.2	11.8	11.3	10.9	15.5	19.6	21.7	22.9	23.5	25.0	25.9	26.3	26.7	26.8	26.9	27.1	26.9	26.3	25.3	24.4	22.9	20.8	20.5	21.6	27.1																							
30-Jun	20.0	19.4	17.4	16.0	16.3	18.3	19.3	19.9	20.9	21.3	21.7	22.9	23.3	23.9	24.4	24.5	24.4	24.2	23.8	22.9	21.0	18.6	15.4	13.2	20.5	24.5																							
																								12.4	11.5	10.8	10.2	10.3	12.0	13.6	15.2	16.5	17.6	18.5	19.3	20.1	20.9	21.1	20.6	20.4	20.1	19.8	19.0	17.4	15.6	14.3	13.3	Diurnal Average	
																								20.0	19.4	17.4	16.0	16.3	18.3	19.6	21.7	22.9	23.6	25.1	26.3	27.4	28.2	27.0	26.9	27.1	26.9	26.4	25.5	24.4	22.9	20.8	20.5	Diurnal Maximum	
MS - Missing																																																	



WBEA
Hourly Averages

Ambient Temperature (AT) - C
CNRL Horizon - June 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
CNRL Horizon - June 2014

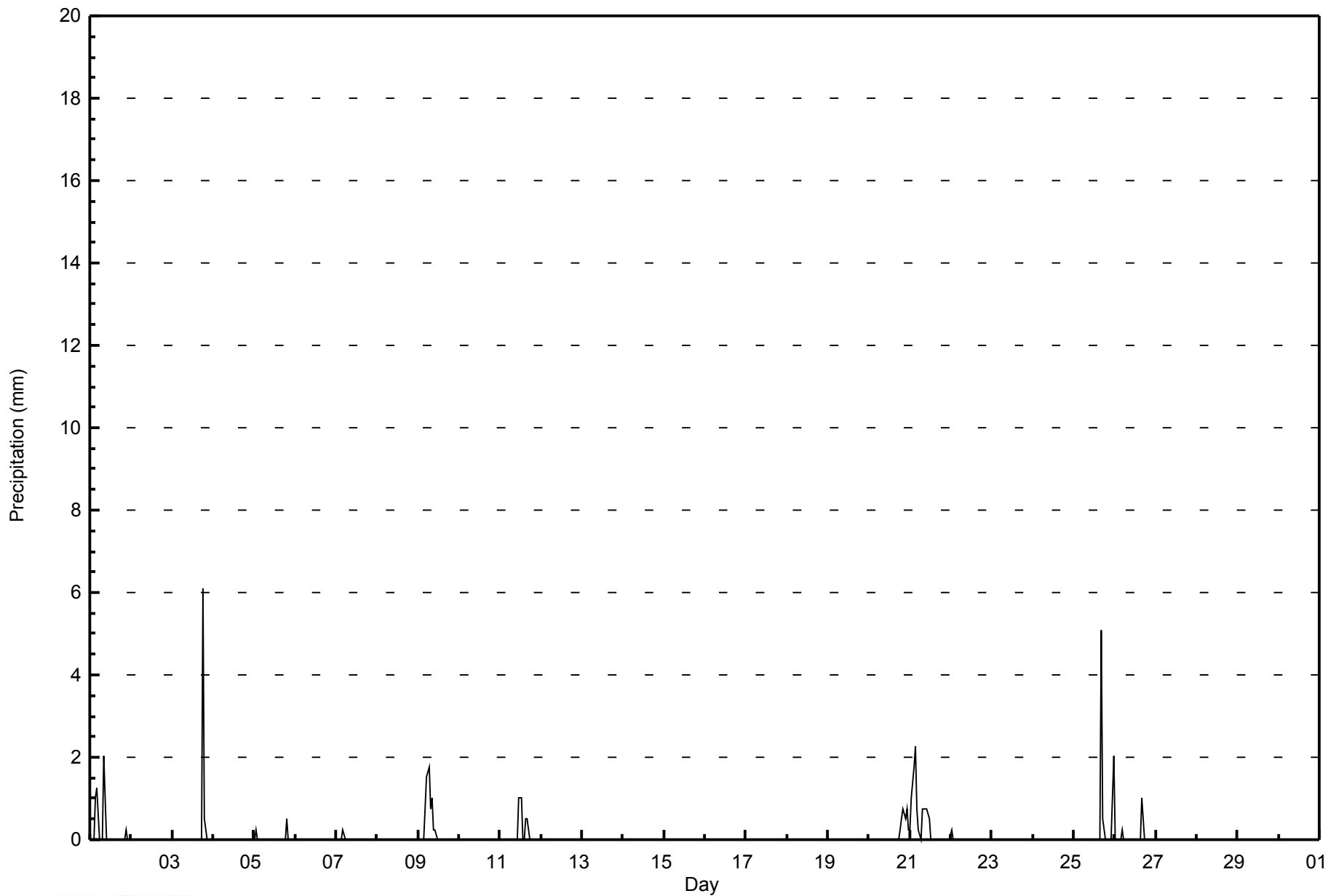
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	125	17.41	17.41
10 - 20	382	53.20	70.61
> 20	211	29.39	100.00

Total Number of Valid Hours: 718

Total Number of Hours: 720



Maximum Value: 6.1 mm on Jun 3 19:00																			Maximum Daily Total: 9.9 mm on Jun 21						Hours in Service: 720																								
Minimum Value: 0.0 mm on Jun 1 01:00																			Minimum Daily Total: 0.0 mm on Jun 2						Hours of Data: 720																								
Maximum Diurnal Total: 6.6 mm at hour 17																			Minimum Diurnal Total: 0.0 mm at hour 14						Hours of Missing Data: 0																								
Monthly Total: 43.69 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 = 1.8						Hours of Calibration: 0																								
																									Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jun	0.0	0.0	0.0	1.0	1.3	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	0.0	0.0	0.3	0.0	0.0	4.6	2.0																							
2-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	0.5	0.0	0.0	0.0	0.0	6.6	6.1																							
4-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	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	0.5	0.0	0.0	0.0	0.8	0.5																							
6-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	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																							
8-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.8	1.5	1.8	0.8	1.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4	1.8																							
10-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.0																							
12-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.8	0.5	0.8	0.3	3.0	0.8																							
21-Jun	0.3	1.0	1.8	2.3	0.8	0.3	0.0	0.8	0.8	0.8	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9	2.3																							
22-Jun	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																							
23-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	0.5	0.0	0.0	0.0	0.0	0.0	2.0	7.6	5.1																							
26-Jun	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	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.0																							
27-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
																								0.5	1.3	1.8	3.3	3.3	1.8	1.8	1.5	3.8	1.0	1.0	1.5	1.0	0.0	0.0	0.5	6.6	0.5	6.4	1.5	0.8	0.8	0.8	2.3	Diurnal Average	
																								0.3	1.0	1.8	2.3	1.3	1.5	1.8	0.8	2.0	0.8	0.8	1.0	1.0	0.0	0.0	0.5	5.1	0.5	6.1	0.5	0.8	0.5	0.8	2.0	Diurnal Maximum	



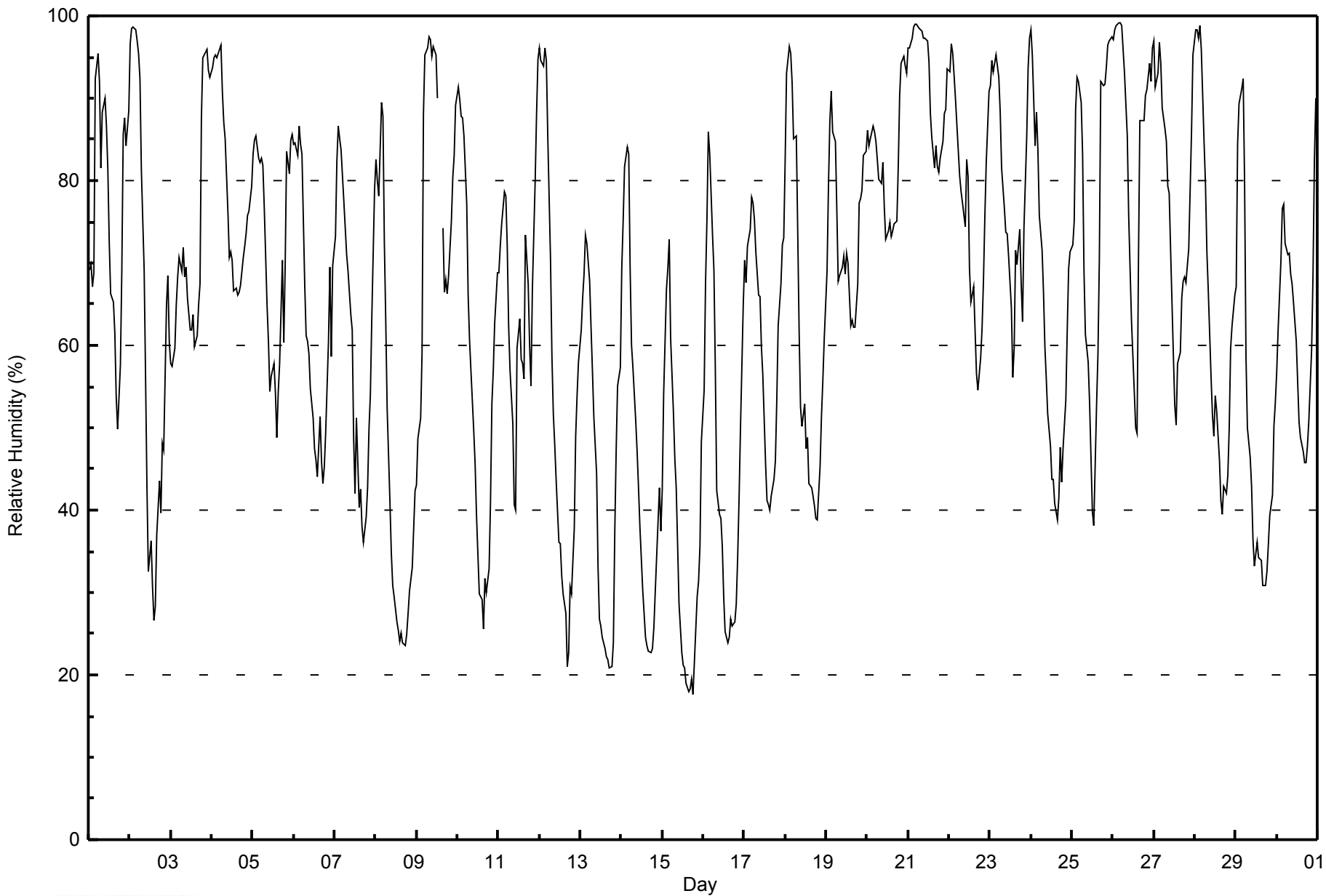


Maximum Value: 99 % on Jun 26 05:00																		Maximum Daily Average: 91.9 % on Jun 21																		Hours in Service: 720												
Minimum Value: 18 % on Jun 15 19:00																		Minimum Daily Average: 37.3 % on Jun 15																		Hours of Data: 718												
Maximum Diurnal Average: 86.9 % at hour 5																		Minimum Diurnal Average: 46.4 % at hour 15																		Hours of Missing Data: 2												
Monthly Average: 65.3 %																		Percentiles: P ₁ = 21 P ₁₀ = 34 Q ₁ = 49 Median = 68 Q ₃ = 84 P ₉₀ = 94 P ₉₉ = 99																		Hours of Calibration: 0												
																																				Percent Operational Time: 99.7												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jun	69	70	67	69	92	96	92	81	88	90	87	81	73	66	65	62	54	50	58	69	86	88	84	89	76.0	96																						
2-Jun	97	98	99	98	97	95	92	81	69	56	43	33	36	31	27	28	37	43	40	48	47	65	68	60	62.1	99																						
3-Jun	58	58	60	65	68	71	69	72	68	69	66	62	64	60	61	65	67	88	95	96	96	93	93	71.8	96																							
4-Jun	94	95	95	95	95	97	91	87	85	76	71	71	70	67	66	66	67	71	72	74	76	76	79	79.3	97																							
5-Jun	83	85	85	83	82	83	82	77	65	61	54	56	58	54	49	54	58	70	60	70	84	81	85	86	71.0	86																						
6-Jun	84	85	83	87	84	83	67	61	61	59	55	51	47	46	44	51	46	43	45	50	60	69	59	70	62.1	87																						
7-Jun	73	82	87	85	84	78	74	71	69	64	62	49	42	51	40	43	38	36	39	43	50	54	63	79	60.6	87																						
8-Jun	82	80	78	89	88	73	63	52	41	35	31	30	26	25	24	25	24	24	25	27	30	33	38	42	45.3	89																						
9-Jun	43	49	51	59	88	95	96	97	97	95	96	95	90	MS	MS	74	66	68	66	68	75	80	83	89	78.4	97																						
10-Jun	91	90	88	88	85	77	66	61	57	50	46	39	35	30	29	26	32	30	33	41	53	57	63	69	55.6	91																						
11-Jun	69	72	75	79	78	72	62	57	51	41	40	60	63	58	58	56	73	68	60	55	67	80	88	95	65.7	95																						
12-Jun	96	95	94	96	95	86	70	59	52	48	44	36	36	32	30	28	21	23	31	30	38	49	54	58	54.1	96																						
13-Jun	62	66	69	73	72	68	62	57	51	44	33	27	26	25	23	22	22	21	21	24	37	47	55	57	44.4	73																						
14-Jun	69	75	82	84	83	69	60	57	51	47	43	38	30	27	25	24	23	23	23	26	30	39	43	38	46.2	84																						
15-Jun	42	54	67	69	73	61	52	46	43	36	29	23	21	21	19	18	18	19	18	22	29	31	36	48	37.3	73																						
16-Jun	55	68	75	86	83	73	69	57	42	40	39	36	30	25	24	25	27	26	26	29	34	41	50	65	46.8	86																						
17-Jun	70	68	72	74	78	77	75	71	66	66	60	56	46	41	41	40	42	44	46	53	62	67	72	73	60.9	78																						
18-Jun	82	93	96	95	92	85	85	74	62	52	50	53	47	49	43	43	42	41	39	39	45	51	56	61	61.5	96																						
19-Jun	69	79	87	91	86	85	76	68	68	69	71	69	71	70	62	63	62	62	67	77	78	79	83	84	74.1	91																						
20-Jun	86	84	85	87	86	85	83	80	80	82	77	73	74	75	73	74	75	75	82	90	94	95	94	93	82.5	95																						
21-Jun	96	96	97	99	99	99	99	98	98	97	97	97	94	88	85	81	84	82	81	83	85	88	89	94	91.9	99																						
22-Jun	93	97	95	93	90	84	81	79	77	74	82	81	69	65	67	62	57	55	59	62	68	76	82	91	76.5	97																						
23-Jun	92	95	93	95	94	93	88	82	77	74	74	71	65	56	60	71	70	74	68	63	74	85	94	97	79.3	97																						
24-Jun	98	95	84	88	84	76	71	66	60	56	52	48	44	44	41	39	42	48	43	47	53	62	69	71	61.7	98																						
25-Jun	72	75	89	92	92	89	83	69	61	58	53	46	40	38	53	59	71	92	92	92	94	97	97	98	75.1	98																						
26-Jun	97	98	99	99	99	99	96	93	85	76	69	63	54	50	49	70	87	87	87	90	91	94	92	96	84.3	99																						
27-Jun	97	91	93	97	94	89	86	85	79	78	72	59	53	50	58	59	66	68	68	68	72	79	86	95	76.7	97																						
28-Jun	98	98	97	99	96	85	79	71	67	56	52	49	54	52	46	41	39	43	42	44	50	60	62	66	64.5	99																						
29-Jun	67	84	89	91	92	80	59	50	46	43	36	33	36	34	34	34	31	31	33	36	39	42	50	53	51.0	92																						
30-Jun	57	62	70	77	77	72	71	71	69	67	65	60	56	51	49	47	46	46	48	51	60	69	83	90	63.0	90																						
																								78.1	81.2	83.4	86.1	86.9	82.4	76.7	71.1	66.2	62.0	58.2	54.8	51.6	47.8	46.4	48.2	49.4	50.8	51.9	55.4	61.8	67.7	71.6	75.9	Diurnal Average
																								98	98	99	99	99	99	99	98	98	97	97	97	94	88	85	81	87	92	92	95	96	97	97	98	Diurnal Maximum
MS - Missing																																																



WBEA
Hourly Averages

Relative Humidity (RH) - %
CNRL Horizon - June 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
CNRL Horizon - June 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	5	0.70	0.70
20 - 40	105	14.62	15.32
40 - 60	170	23.68	39.00
60 - 80	217	30.22	69.22
80 - 100	221	30.78	100.00

Total Number of Valid Hours: 718

Total Number of Hours: 720



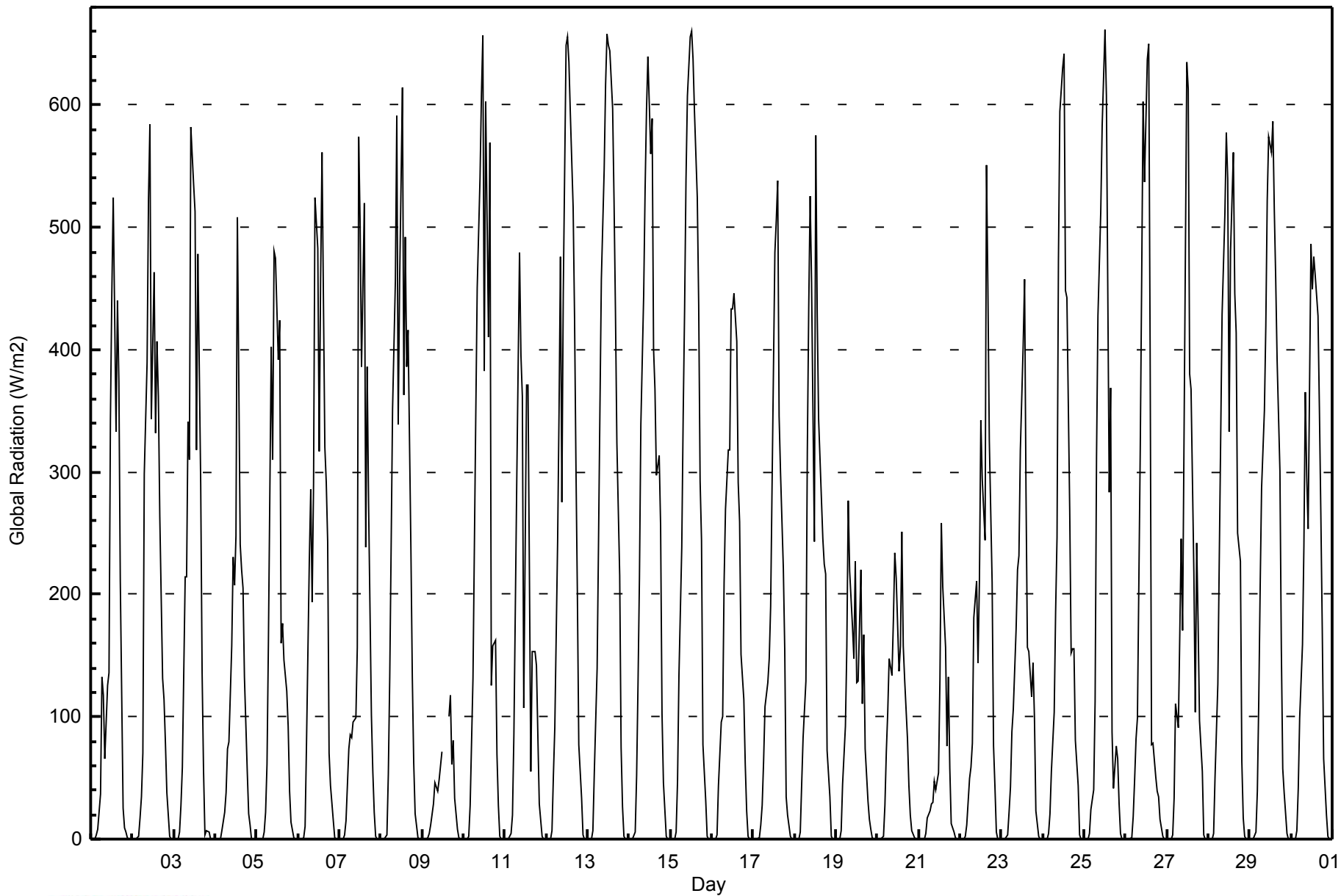
Maximum Value: 662 W/m2 on Jun 25 13:00		Maximum Daily Average: 273.5 W/m2 on Jun 13		Hours in Service: 720																							
Minimum Value: 0 W/m2 on Jun 25 01:00		Minimum Daily Average: 33.1 W/m2 on Jun 9		Hours of Data: 717																							
Maximum Diurnal Average: 458.7 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 24		Hours of Missing Data: 3																							
Monthly Average: 172.8 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 2 Median = 85 Q ₃ = 310 P ₉₀ = 490 P ₉₉ = 647		Hours of Calibration: 0																							
				Percent Operational Time: 99.6																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jun	0	0	0	4	9	36	132	117	65	126	136	343	446	524	333	440	375	211	25	9	5	1	0	0	139.1	524	
2-Jun	0	0	0	2	17	35	71	299	389	523	585	344	463	332	407	362	264	131	114	79	38	2	0	0	185.7	585	
3-Jun	0	0	0	5	27	59	215	214	341	310	582	535	513	318	478	290	136	57	3	7	6	0	0	0	170.7	582	
4-Jun	0	0	0	0	7	22	38	74	80	158	231	207	248	508	241	220	205	132	55	21	12	1	0	0	102.6	508	
5-Jun	0	0	0	1	6	22	62	162	403	310	481	475	392	424	161	176	146	121	92	40	14	1	0	0	145.3	481	
6-Jun	0	0	0	1	10	78	228	286	193	291	525	483	316	457	561	320	291	243	70	44	15	1	0	0	183.9	561	
7-Jun	0	0	0	3	15	73	85	83	96	99	157	574	502	386	520	239	386	275	102	55	22	2	0	0	153.1	574	
8-Jun	0	0	0	4	53	133	240	351	456	591	338	456	615	363	492	387	416	238	133	62	20	2	0	0	222.9	615	
9-Jun	0	0	0	2	5	12	29	46	43	40	48	71	M	M	M	100	117	61	80	33	8	1	0	0	33.1	117	
10-Jun	0	0	0	3	27	132	240	348	451	541	609	657	383	603	410	570	125	158	163	69	28	2	0	0	229.9	657	
11-Jun	0	0	0	4	20	85	187	289	480	396	362	107	372	371	219	55	153	153	142	84	28	3	0	0	146.2	480	
12-Jun	0	0	0	6	51	91	243	348	476	276	446	649	656	635	594	516	427	304	200	77	33	3	0	0	251.4	656	
13-Jun	0	0	0	7	55	140	243	353	457	548	617	658	649	645	597	521	431	324	216	75	27	3	0	0	273.5	658	
14-Jun	0	0	0	6	52	128	213	339	445	531	595	640	560	588	401	367	297	313	255	103	46	2	0	0	245.1	640	
15-Jun	0	0	0	6	47	134	238	346	432	540	607	656	661	638	595	525	437	293	244	77	32	3	0	0	271.3	661	
16-Jun	0	0	0	4	44	95	100	209	270	318	318	433	433	446	407	292	259	151	114	61	23	2	0	0	165.9	446	
17-Jun	0	0	0	1	11	28	63	108	128	148	190	288	480	506	538	346	300	221	155	34	19	2	0	0	148.6	538	
18-Jun	0	0	0	5	45	83	129	317	434	526	456	244	576	429	344	277	245	224	216	73	34	3	0	0	194.2	576	
19-Jun	0	0	0	7	45	92	156	277	218	174	148	227	128	129	220	110	167	74	31	16	8	2	0	0	92.9	277	
20-Jun	0	0	0	2	27	71	104	147	133	179	234	214	138	158	251	157	130	82	43	20	7	1	0	0	87.5	251	
21-Jun	0	0	0	0	4	17	24	29	30	47	40	55	131	258	206	157	76	133	58	13	6	1	0	0	53.5	258	
22-Jun	0	0	0	2	12	50	59	78	181	211	144	212	343	294	244	550	449	326	210	76	43	6	0	0	145.4	550	
23-Jun	0	0	0	3	22	42	87	106	172	220	232	318	403	457	284	157	153	117	144	99	23	2	0	0	126.8	457	
24-Jun	0	0	0	5	21	56	104	185	247	472	595	630	642	449	442	268	153	155	156	80	44	3	0	0	196.1	642	
25-Jun	0	0	0	5	24	40	113	312	427	513	584	623	662	608	283	369	87	41	76	66	28	4	0	0	202.7	662	
26-Jun	0	0	0	2	18	48	82	99	320	456	602	537	638	650	398	78	78	51	39	35	16	2	0	0	172.8	650	
27-Jun	0	0	0	4	33	111	91	166	245	170	324	635	613	380	368	218	103	242	178	97	55	4	0	0	168.2	635	
28-Jun	0	0	0	4	51	127	228	327	429	512	577	540	334	481	561	446	414	250	227	63	17	2	0	0	232.9	577	
29-Jun	0	0	0	6	40	113	207	287	350	420	522	574	561	587	515	458	392	301	155	58	38	4	0	0	232.8	587	
30-Jun	0	0	0	6	41	99	159	239	365	296	254	487	450	476	462	428	350	266	173	65	20	2	0	0	193.2	487	
		0.0	0.0	0.1	3.7	28.0	75.1	139.0	218.1	291.9	331.4	384.7	429.0	458.7	451.8	397.6	313.4	252.1	188.2	129.0	56.3	23.8	2.2	0.1	0.0	Diurnal Average	
		0	0	0	7	55	140	243	353	480	591	617	658	662	650	597	570	449	326	255	103	55	6	0	0	Diurnal Maximum	
M - Maintenance																											



WBEA
Hourly Averages

Global Radiation (GR) - W/m²

CNRL Horizon - June 2014





Maximum Speed: 27 km/h on Jun 3 17:00	Maximum Daily Speed Average: 16.4 km/h on Jun 3	Hours in Service: 720
Minimum Speed Value: 1 km/h on Jun 23 07:00	Minimum Daily Speed Average: 1.1 km/h on Jun 20	Hours of Data: 720
Maximum Diurnal Speed Average: 4.1 km/h at hour 18	Minimum Diurnal Speed Average: 0.7 km/h at hour 6	Hours of Missing Data: 0
Monthly Average Velocity: 1.1 km/h 24.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 11 P ₉₀ = 15 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-Jun	N6	N5	ENE2	SSE5	NE3	ENE3	NE4	SE5	SSE7	SE5	SSE6	SE4	SE7	ESE2	NW4	ENE4	SSE5	SSE10	S16	SW16	WSW9	S5	SSW6	WSW5	S2.8	SW16
2-Jun	SSW5	S6	SSW9	S10	S11	SSW9	S12	SSW14	SSW11	SW9	SW9	WSW12	SW15	WSW9	NW5	NNE12	N17	N14	N13	N7	N9	NW7	NW8	N11	WSW2.9	N17
3-Jun	N10	N10	N9	NNE10	NNE13	NNE13	NNE16	NNE15	NNE19	NNE23	NNE24	NNE22	NNE26	NNE21	N21	N23	NNW27	N24	N17	NNE15	NNE13	NNE12	NNW12	NNE8	N16.4	NNW27
4-Jun	NNE9	NNE5	NE6	NNE5	NNE5	N4	NW2	N3	NNE8	NNW12	N17	N13	N18	N22	N22	N21	N21	N21	N18	N16	N16	N17	N16	N14	N12.7	N14
5-Jun	N16	N14	N15	N16	N14	N13	N16	N15	N18	N18	NNE19	NNE17	NNE16	NNE15	N15	N17	N17	N10	N12	NW8	NW6	NW10	NW6	WNW6	N13.0	NNE19
6-Jun	WNW5	WNW5	WNW5	WNW4	WNW5	NNW1	N3	NE4	NW1	ENE5	N3	N6	N6	E6	N6	NNE11	ENE7	ENE8	ENE4	ESE2	E4	E4	E5	ENE4	NNE2.9	NNE11
7-Jun	ENE4	NW3	NNW4	NNW5	N6	NNE5	NNW3	NW2	NNW5	N4	NNW4	SE5	SSW2	NW14	NNW8	WNW10	NW8	NNW6	NNW7	NW5	WNW6	WNW7	WNW5	S1	NNW4.2	NW14
8-Jun	S5	SW7	WSW8	SW6	SSW4	S5	SSE6	S8	S8	S7	SSW3	WSW3	SW5	SSE7	S9	SSE12	SSE10	SSE11	SE10	SSE8	SSE9	SE9	SSE10	SSE8	S6.4	SSE12
9-Jun	SSE7	SSE6	SSE8	S11	S10	SE4	ESE5	ENE4	E4	E8	ESE7	ESE7	E5	NNW8	NNE6	E11	E13	E13	ESE11	ESE7	ENE4	ENE4	NNE7	N7	ESE4.8	E13
10-Jun	N7	N8	N8	N6	N5	NNW5	NNW7	NW8	NW7	NNE11	NE10	NE10	NNE9	NNE11	NE10	NW11	NE10	N1	SE5	SE4	SSW5	SW7	WSW8	SW10	N3.9	NNE11
11-Jun	SW10	SW11	SW10	SW9	SW9	SSW9	SSW9	SSW8	SSW9	NE4	SE7	ESE8	SSE13	ESE11	ESE15	ESE4	SE5	SSW8	S8	S6	SSE5	SSW7	SW6	SW5	S6.0	ESE15
12-Jun	SSW9	SSW8	SSW8	SSW4	S3	S3	NE4	NNE11	NNE11	NNE10	NE11	NNE14	NNE12	NNE14	NNE14	NNE17	NNE17	NNE19	NNE18	NNE14	N10	N11	N11	NNE8	NNE7.9	NNE19
13-Jun	N7	NNW6	NNW7	NNW6	N6	NNE7	N6	NE6	ENE7	ENE8	ENE10	ENE11	E8	ENE8	E8	ENE6	ENE8	SE4	SE6	S7	S6	S7	S7	SSE7	ENE3.5	ENE11
14-Jun	SW3	NW5	NNW3	NNW5	NNW3	S2	S6	S9	S10	S8	SSE9	SSE11	SSE13	SSE16	S17	S15	S17	SSE17	S18	S14	S11	S9	S11	SSW11	S8.7	S18
15-Jun	SSW9	S6	S6	SSW7	SSW4	S3	SSW3	S5	S7	S6	SSE14	SE15	SSE11	SSE12	SSE12	SSE9	SSE7	ESE7	ESE4	SSE6	SSE7	SE7	SSE5	WSW2	SSE6.7	SE15
16-Jun	NW3	SW2	WSW3	S5	W3	WNW2	NW3	SE1	ENE4	S4	SW2	NW6	NNE7	NE6	E10	ENE12	ENE10	ENE12	ENE9	ENE7	ENE5	ENE4	SSW9	SSW9	ENE2.2	ENE12
17-Jun	SSW9	SW8	S7	S8	SSW4	SW7	SW5	S4	S4	S9	SE8	SE9	SSE13	SSE13	SSE10	S10	S8	S12	SSE10	S11	S7	SSE6	SSE8	SSE8	S7.4	SSE13
18-Jun	S7	S6	SSW6	SW5	SSW3	SW5	S3	S6	SSE7	SSE9	SSE11	SSE12	SSE17	SSE16	SSE15	SSE15	SSE16	SE11	SSE14	SSE10	SSE8	SSE11	SSE12	SSE11	SSE9.4	SSE17
19-Jun	S7	S7	SSW6	SW5	SW4	S5	S6	S7	SSE7	SSE9	SSE9	SSE8	SSE7	SE8	SSE4	NNW2	NNW3	NE2	NE3	NE2	NNE3	NE5	NNW5	NW5	SSE2.8	SSE9
20-Jun	NNW4	N7	N7	NNE9	NNE6	N5	NNE7	NNE7	NE3	ESE3	ESE6	SE6	SSE7	SSE8	SSE5	ESE6	E5	ESE5	SSE4	S7	SW5	WSW6	W8	W6	E1.1	NNE9
21-Jun	WSW5	W5	W3	NE5	NNE5	N3	W3	W3	NNE1	NNE2	NNE2	N2	NW2	NNW3	W5	W6	NNW6	NW12	NW10	WNW7	NW4	WNW4	NW2	WSW3	NW3.3	NW12
22-Jun	N4	SW3	SW6	SW9	SW6	W3	NNE1	WNW2	NW3	NNW5	N6	WNW5	NW8	NW9	NW13	NW13	NNW10	NNE11	NNE12	NNE11	N8	N7	NE2	SW2	NNW4.3	NW13
23-Jun	SW5	SSW5	SW4	SSW4	SSW3	SSW3	WNW1	NNW2	NE5	NE7	ENE5	ESE4	ESE5	ESE6	E11	ESE9	E8	SE11	SSE7	SE6	ESE6	E4	ENE3	E3	ESE3.3	SE11
24-Jun	N3	ESE3	SE6	SE3	SE4	SE5	E4	SE3	SSE8	SSE6	SSE9	SSE13	SSE15	SSE14	SE15	SSE15	SSE11	S6	SSE11	SSE14	SSE10	SSE7	SSE6	SSE8	SSE7.7	SSE15
25-Jun	SSE10	S7	W3	WNW3	SW1	S1	S4	SSE12	S13	SSE10	SSE11	SSE14	SSE14	S15	WSW12	WNW11	SW13	W7	SW5	S8	SSW4	WSW4	WSW4	WSW6	SSW5.8	S15
26-Jun	SW4	SSW3	S5	SSW6	SW6	SSW4	SSW3	SSW5	S6	SSE8	S8	SSW7	S7	SW7	S7	SSE12	SSW3	NW3	N4	NE4	NNW3	WNW6	NW6	NNE2	SSW3.2	SSE12
27-Jun	NW4	NW7	NW3	S4	NNE2	NW4	NW4	NE1	SSE6	SSE3	NNE4	NE6	NE2	NNE7	N9	NW10	NW8	NNE11	N12	NNE8	NW5	WNW6	WNW5	NW1	NNW3.5	N12
28-Jun	NNW4	NNW4	WNW2	SW5	WNW5	S3	SSW4	NNE1	NNE2	NNW5	NNE4	ENE7	N13	NNW14	N8	NNW7	NNW11	N11	N12	N9	NNW8	WNW7	NNW6	WNW7	NNW5.1	NNW14
29-Jun	WNW7	E2	NW4	NW5	SW4	NW3	N7	N15	N13	N15	N17	N22	N20	N23	N22	N21	N24	N24	N19	N15	NNW14	NNW13	NW13	NNW15	N13.2	N24
30-Jun	NNW13	NNW12	WNW9	WNW7	WNW7	NNW9	N14	N14	N13	N13	N14	NNE16	N15	N15	N14	NNE14	NNE15	NNE14	N13	N10	N6	N6	NNW4	WNW4	N10.5	NNE16

WNW1.7	W1.7	W1.7	WSW1.5	WNW1.2	WNW0.7	N1.0	NE0.7	E1.0	ENE2.2	ENE2.8	ENE3.4	ENE2.2	NE2.6	NNE2.8	NNE3.3	NNE3.9	NE4.1	NE2.9	ENE1.1	N0.9	NW1.1	WNW1.4	W1.4	Diurnal Average	
N16	N14	N15	N16	N14	N13	N16	NNE15	NNE19	NNE23	NNE24	NNE22	NNE26	N23	N22	N23	NNW27	N24	N19	N16	N16	N17	N16	NNW15	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

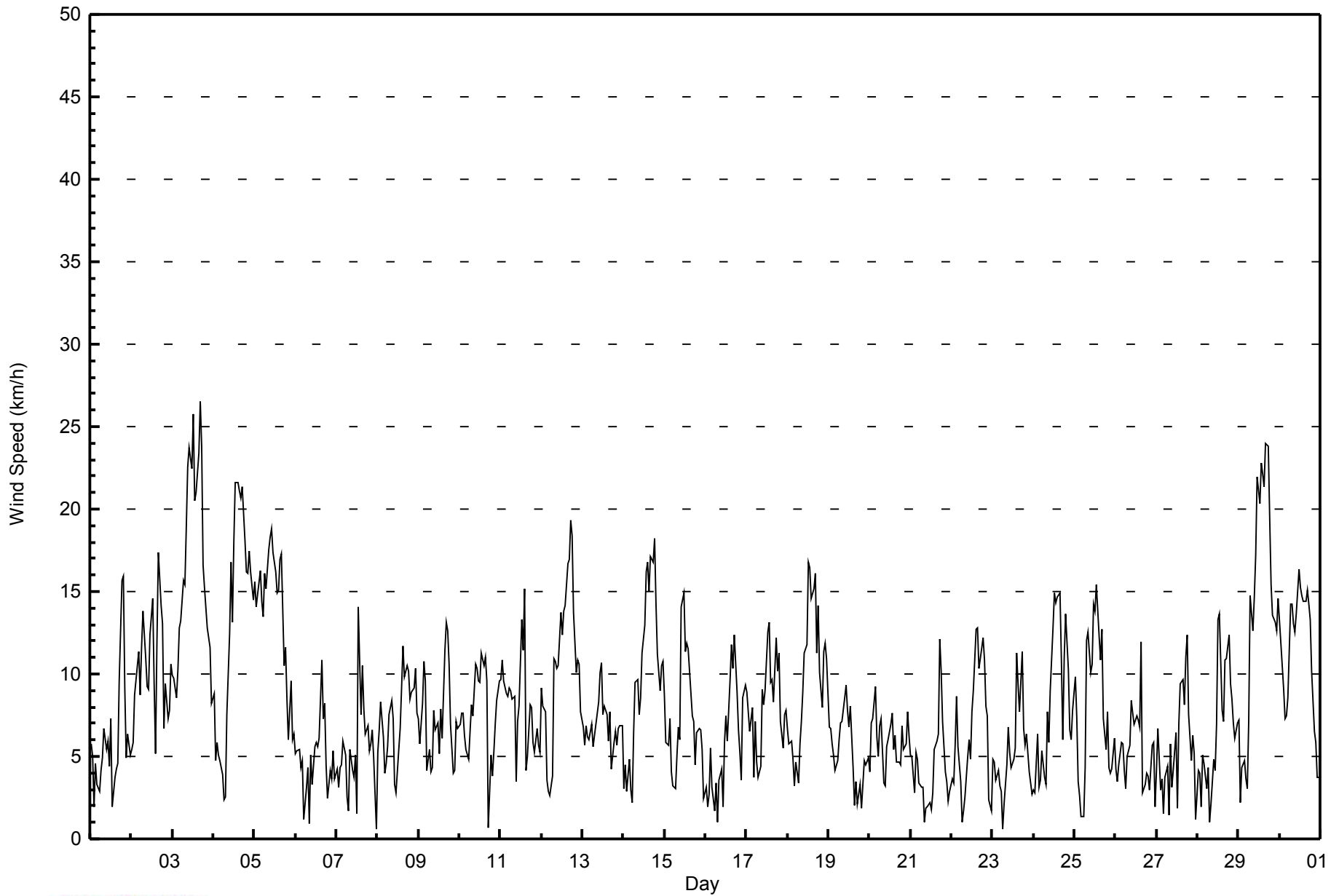
Wind Speed (WS) - km/h
CNRL Horizon - June 2014

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
CNRL Horizon - June 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
CNRL Horizon - June 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	243	33.75	33.75
6 - 11	321	44.58	78.33
12 - 19	135	18.75	97.08
20 - 28	21	2.92	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
CNRL Horizon - June 2014

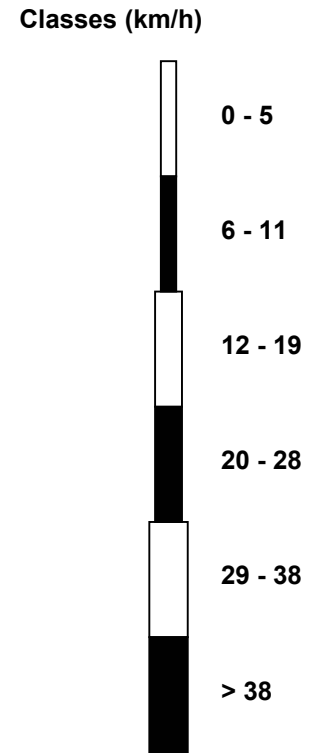
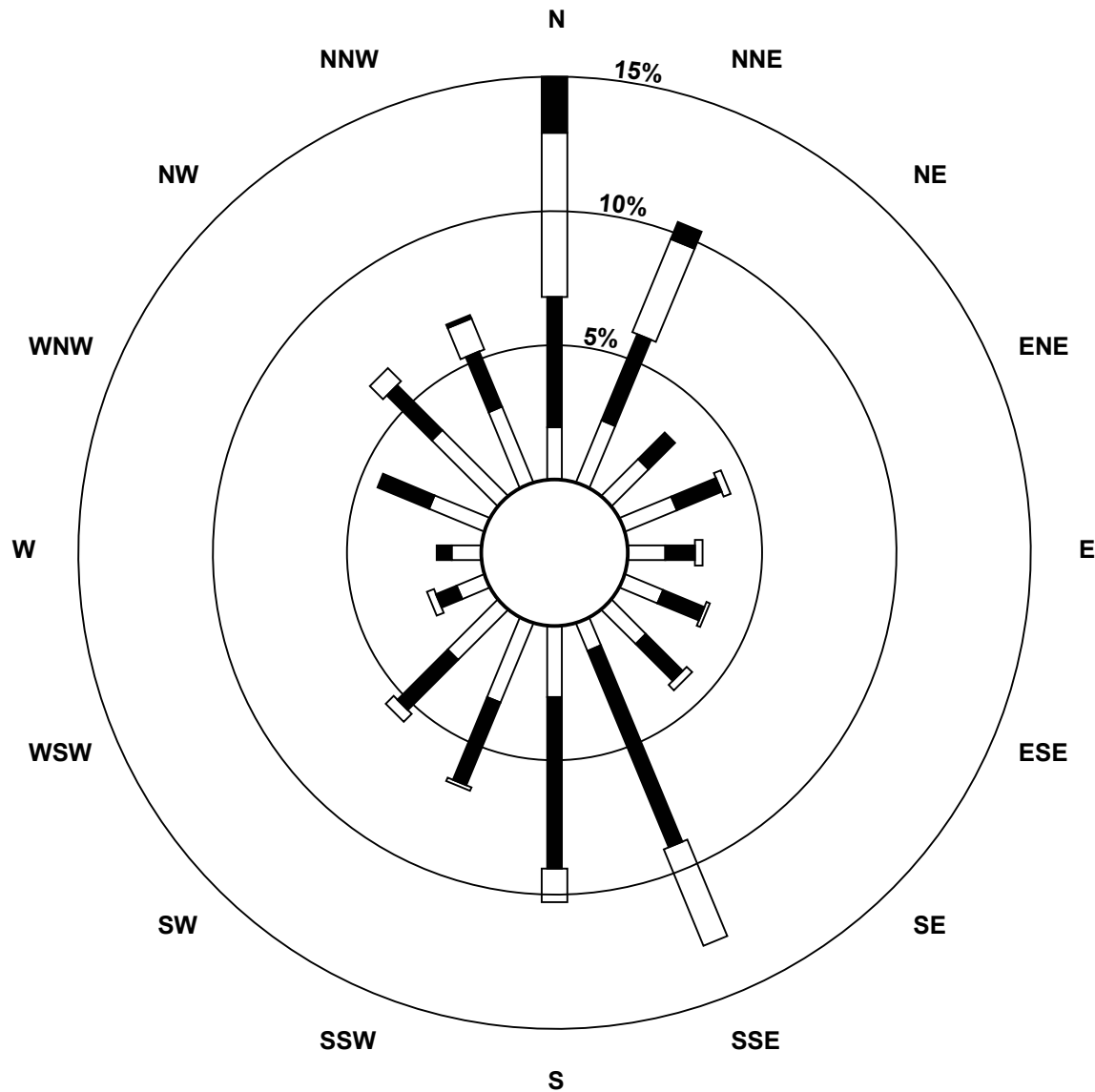
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	14	18	14	15	10	11	13	8	19	23	19	8	8	16	25	22	243
6 - 11	35	25	10	13	8	12	14	57	46	24	19	6	4	15	17	16	321
12 - 19	44	27	0	2	2	1	2	28	9	1	3	2	0	0	5	9	135
20 - 28	15	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21
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	108	75	24	30	20	24	29	93	74	48	41	16	12	31	47	48	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
CNRL Horizon (AMS 15)**



Total Number of Valid Hours: 720



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
CNRL Horizon - June 2014

Direction of Maximum Speed: 344 deg on Jun 3 17:00 Direction of Maximum Daily Speed Average: 8.6 deg on Jun 3	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0
Direction of Minimum Speed: 284 deg on Jun 23 07:00 Direction of Minimum Daily Speed Average: 1.1 deg on Jun 20	Percent Operational Time: 100.0
Monthly Average Direction: 270.4 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-Jun	356	353	68	162	41	62	42	138	163	143	153	136	135	121	323	66	163	154	186	228	245	190	210	242	173.3
2-Jun	213	184	194	184	185	192	187	200	199	219	233	244	234	240	319	21	2	10	0	8	356	317	325	358	255.6
3-Jun	357	359	5	16	18	19	17	16	16	15	20	18	16	15	8	349	344	355	2	16	18	12	346	17	8.6
4-Jun	15	24	36	16	17	4	306	8	13	343	349	10	6	1	359	8	0	2	7	4	359	352	357	354	1.8
5-Jun	355	360	0	354	357	5	0	3	8	11	17	27	25	14	3	2	350	2	3	326	313	321	304	292	0.2
6-Jun	296	303	295	296	289	346	3	34	316	59	3	351	11	83	7	19	62	61	68	122	85	95	81	59	25.0
7-Jun	65	310	337	348	353	18	335	308	328	352	329	124	212	322	348	298	317	341	336	322	295	289	290	176	327.7
8-Jun	188	235	252	221	196	191	168	173	182	175	211	256	215	159	174	152	152	154	145	148	151	146	152	154	172.1
9-Jun	155	165	166	188	181	124	112	73	93	94	112	102	87	340	20	100	90	89	107	103	62	75	15	11	102.6
10-Jun	6	8	11	7	351	327	334	313	319	23	50	45	31	22	35	311	38	356	137	137	199	221	244	235	1.8
11-Jun	225	221	224	215	215	210	204	194	195	36	130	120	162	121	117	110	132	199	187	173	166	200	228	231	182.3
12-Jun	210	212	211	201	175	177	35	20	21	28	34	27	31	31	22	25	14	17	15	14	9	5	2	13	18.8
13-Jun	358	342	345	347	354	12	5	36	76	69	73	69	81	66	86	57	75	125	142	187	169	180	177	166	68.4
14-Jun	214	322	339	335	334	178	175	171	188	169	166	148	153	162	178	183	170	164	178	170	184	185	186	197	175.2
15-Jun	201	180	179	194	208	188	194	187	171	177	157	146	157	153	166	160	150	107	102	157	159	145	152	248	163.1
16-Jun	315	226	253	180	264	282	309	127	70	189	218	319	15	52	83	76	71	67	71	71	57	68	192	199	77.7
17-Jun	206	230	184	175	199	228	231	185	180	172	133	126	164	161	160	191	173	169	164	177	176	153	158	162	174.0
18-Jun	183	181	203	232	206	223	188	187	166	163	164	168	161	155	162	155	154	142	148	158	151	158	159	162	163.9
19-Jun	178	184	192	214	230	188	184	184	154	162	164	164	161	145	164	335	347	41	34	44	26	55	345	324	168.5
20-Jun	334	356	9	26	17	8	29	28	49	114	117	128	153	162	159	123	97	116	160	188	226	238	259	278	87.4
21-Jun	250	273	271	47	17	354	272	263	13	27	16	10	308	347	279	276	331	313	305	293	318	287	313	249	307.8
22-Jun	5	218	228	231	226	260	25	296	310	337	352	300	311	323	317	312	347	26	23	18	11	6	47	235	332.9
23-Jun	231	212	229	204	197	209	284	329	46	46	68	113	114	123	92	105	100	133	149	134	120	92	72	95	118.0
24-Jun	358	108	145	138	124	132	92	134	160	168	160	154	164	154	144	163	164	187	159	168	158	149	147	158	154.6
25-Jun	163	176	278	285	224	173	176	166	172	153	151	156	164	170	253	301	234	264	215	182	204	248	244	247	194.0
26-Jun	216	194	174	199	219	212	203	206	182	163	177	197	188	219	182	152	213	305	1	43	330	299	305	21	199.2
27-Jun	319	309	312	180	32	316	305	37	155	166	25	46	54	31	354	317	311	14	9	12	316	295	291	309	344.7
28-Jun	336	341	297	236	293	187	193	20	12	332	20	66	349	342	2	329	339	351	4	8	328	301	342	300	340.8
29-Jun	291	92	316	325	234	318	349	1	356	353	4	0	359	352	352	0	359	0	357	354	342	331	318	331	350.4
30-Jun	341	330	303	295	293	341	4	8	2	359	4	12	7	3	358	17	17	14	9	4	359	352	338	300	356.5

282.9 278.1 268.0 244.8 281.6 303.6 352.0 39.6 82.4 56.4 67.1 71.8 77.6 51.1 32.4 22.0 24.0 35.0 45.8 61.9 0.6 318.1 284.2 272.4
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

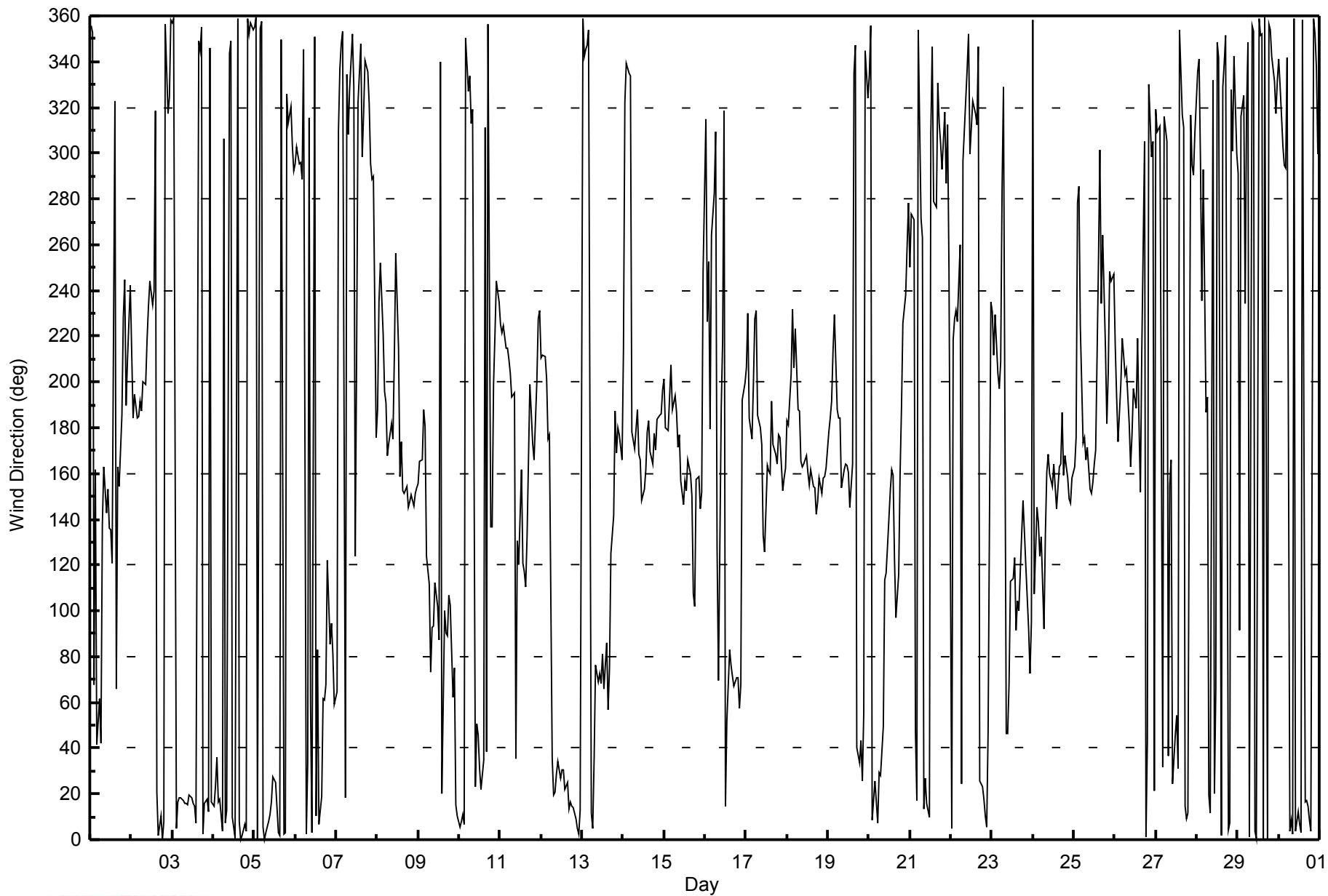
Wind Direction (WD) - deg
CNRL Horizon - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on Jun 10 18:00		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: 7 deg on Jun 10 22:00																										
Percentiles: P ₁ = 9 P ₁₀ = 15 Q ₁ = 19 Median = 23 Q ₃ = 35 P ₉₀ = 55 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-Jun	14	12	81	70	21	36	30	35	22	24	24	44	40	102	58	75	60	41	21	22	23	47	20	21	102	
2-Jun	22	24	11	12	14	18	15	18	22	31	47	32	26	33	75	26	20	23	32	41	20	11	19	15	75	
3-Jun	15	16	16	16	16	18	19	20	18	20	19	20	19	21	21	22	22	20	24	21	19	21	19	21	24	
4-Jun	19	23	23	20	22	22	42	40	25	21	22	23	21	20	22	20	20	22	21	19	20	18	18	18	42	
5-Jun	18	18	19	18	18	19	19	19	22	21	24	23	23	27	24	20	24	23	21	47	23	16	17	14	47	
6-Jun	15	14	11	16	11	70	51	54	95	71	97	50	53	60	51	44	31	33	27	29	21	29	14	33	97	
7-Jun	62	54	34	21	23	32	40	70	23	34	58	61	98	20	34	36	41	55	29	34	15	14	12	92	98	
8-Jun	30	20	15	18	28	21	22	22	33	52	84	80	69	51	41	27	40	25	21	18	18	18	18	17	84	
9-Jun	21	19	17	17	32	28	20	27	24	18	20	19	67	33	58	22	21	23	23	30	70	39	15	12	70	
10-Jun	19	16	14	12	18	19	20	26	33	28	31	38	31	36	35	29	31	105	22	22	13	7	13	16	105	
11-Jun	13	15	14	12	16	17	19	21	26	76	41	37	24	45	30	71	56	17	20	28	21	9	23	27	76	
12-Jun	10	8	13	39	57	53	77	20	23	23	29	21	25	26	24	22	22	20	18	18	17	17	17	17	77	
13-Jun	16	16	12	9	14	18	22	34	40	32	39	35	52	55	57	68	44	73	43	17	11	10	12	13	73	
14-Jun	53	15	38	13	38	45	19	22	28	37	38	32	33	25	22	24	23	19	18	17	15	10	13	16	53	
15-Jun	23	21	25	15	39	29	44	38	33	65	31	25	35	35	33	53	47	35	47	20	11	15	13	56	65	
16-Jun	44	45	54	24	51	56	62	88	42	54	82	43	44	56	33	21	23	19	19	15	9	42	26	18	88	
17-Jun	18	26	18	14	54	15	27	35	30	18	28	25	25	25	41	29	32	20	21	18	13	17	18	16	54	
18-Jun	10	9	11	16	29	16	33	34	36	34	24	23	23	23	22	22	20	25	22	19	18	16	17	16	36	
19-Jun	13	9	16	32	15	17	16	29	26	23	19	24	31	23	57	80	45	65	29	45	32	11	19	15	80	
20-Jun	11	15	15	14	15	21	20	24	59	63	36	31	36	23	49	30	31	27	28	15	18	21	15	20	63	
21-Jun	19	49	65	24	33	36	19	20	75	61	38	25	63	58	28	28	46	16	17	17	31	24	44	63	75	
22-Jun	37	40	20	17	15	39	58	36	39	33	29	30	28	26	17	21	35	29	20	20	18	21	68	80	80	
23-Jun	17	19	34	28	32	27	75	29	37	22	38	48	64	51	31	20	25	23	32	29	18	28	19	40	75	
24-Jun	48	65	19	30	33	22	20	53	27	46	38	28	24	27	27	22	20	26	22	20	18	18	17	15	65	
25-Jun	15	23	34	39	59	48	20	20	22	32	30	29	25	26	51	20	41	27	38	16	19	23	36	26	59	
26-Jun	28	25	21	14	19	19	35	21	31	33	43	44	35	45	46	31	69	42	34	24	33	10	9	64	69	
27-Jun	34	12	59	31	66	19	17	77	24	62	41	36	97	65	23	29	35	31	21	26	32	12	16	71	97	
28-Jun	32	36	56	20	12	50	29	94	81	35	64	49	30	21	37	40	29	22	20	20	22	10	24	14	94	
29-Jun	12	41	14	11	41	19	23	20	21	20	22	22	25	23	25	22	23	22	21	20	20	16	15	16	41	
30-Jun	19	19	14	12	16	20	21	20	23	22	22	24	24	24	25	22	22	20	20	19	15	14	15	27	27	
		62	65	81	70	66	70	77	94	95	76	97	80	98	102	75	80	69	105	47	47	70	47	68	92	
		Diurnal Maximum																								



WBEA
Hourly Averages

Wind Direction (WD) - deg
CNRL Horizon - June 2014





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 11, 2014	Previous Calibration	May 8, 2014
Station Name	CNRL	Station Number	15
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:55
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	780	772
Calculated slope	1.018836	0.997910	Chamber temp.	45.3	45.3
Calculated intercept	-1.007381	-0.039504	Pressure (mmHg)	702.4	703.3
Analyzer Background	12.4	12.4	Flow (lpm)	0.423	0.424
Analyzer Coefficient	0.984	0.984	Intensity	87	87

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	806.7	1.026
calibrator zero	5000	0.0	0.0	-0.4	NA
high point	5000	82.3	827.9	829.1	0.999
second point	5000	41.2	414.5	416.7	0.995
third point	5000	20.6	207.2	207.4	0.999
calibrator zero	5000	0.0	0.0	-0.4	NA
as left zero	5000	0.0	0.0	-0.1	NA
as left span	5000	82.3	827.9	828.7	0.999
Average Correction Factor					0.997

Corrected As found 807.1 Previous response 813.6 % change 0.8%

Notes:

Adjusted span.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

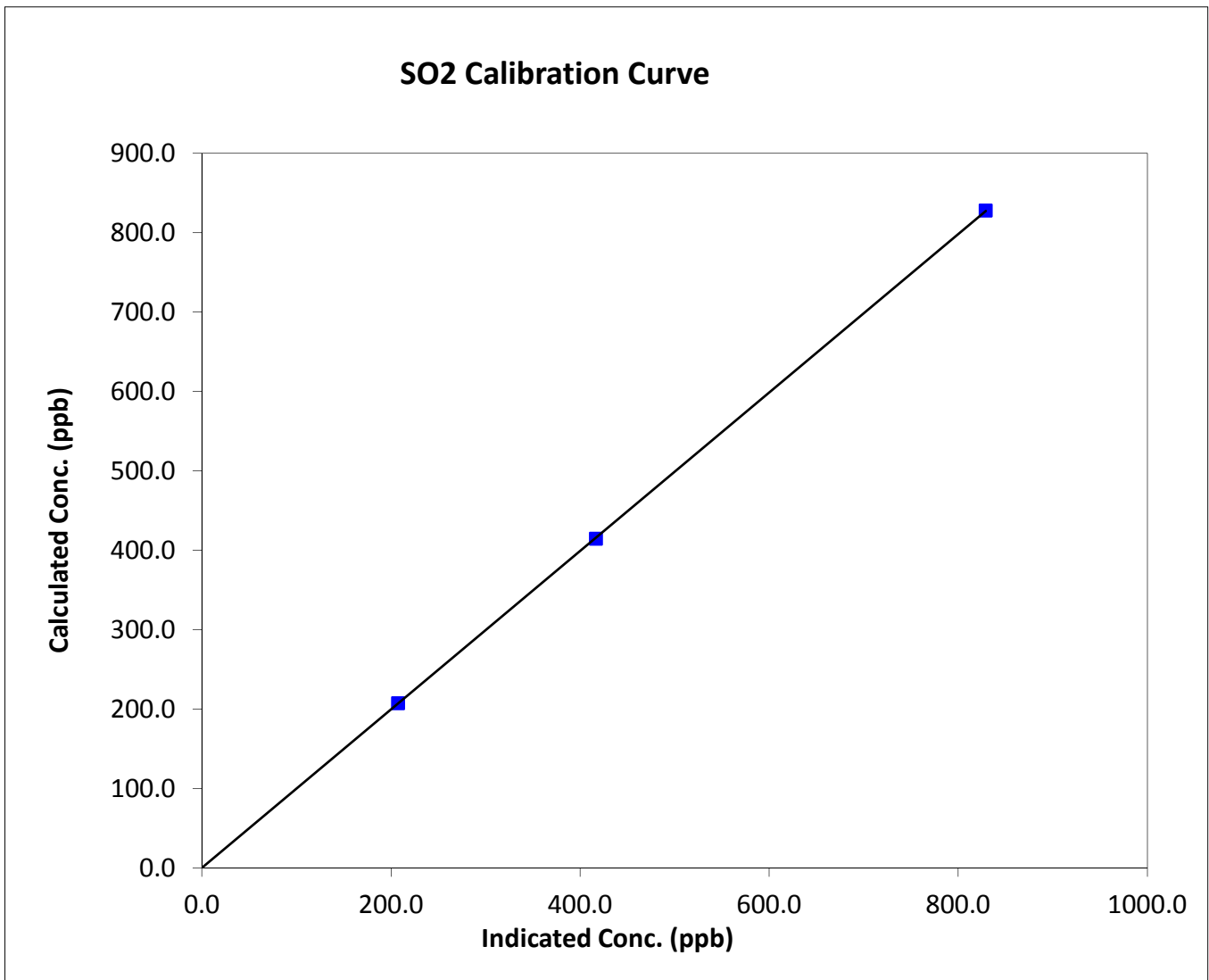
SO₂ Calibration Summary

Station Information

Calibration Date	June 11, 2014	Previous Calibration	May 8, 2014
Station Name	CNRL	Station Number	15
Start Time (MST)	9:00	End Time (MST)	13:55
Analyzer make	43i	Analyzer serial #	10710321322

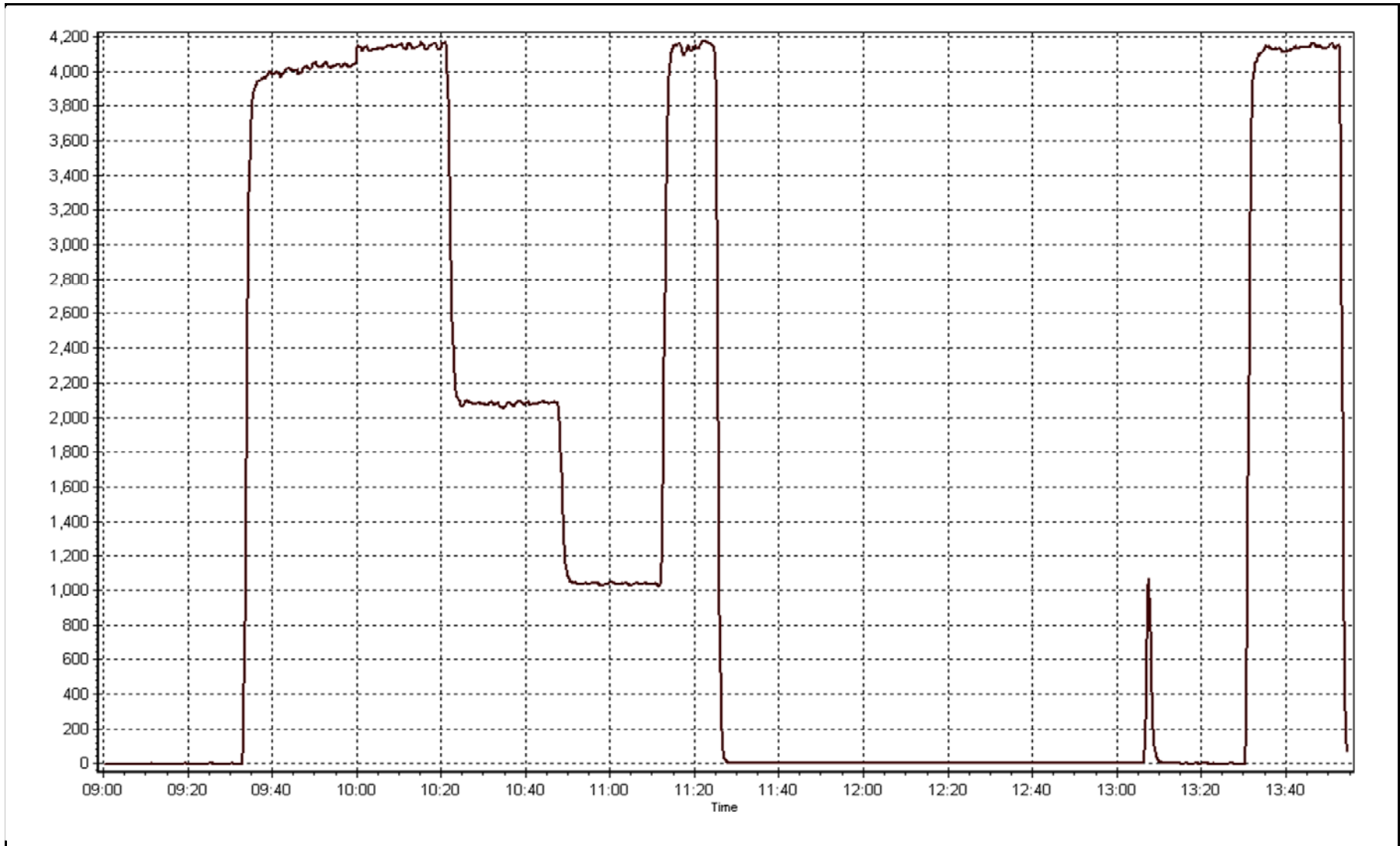
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999994
827.9	829.1	0.9986		
414.5	416.7	0.9947	Slope	0.997910
207.2	207.4	0.9991		
			Intercept	-0.039504



SO2 Calibration Plot

Date: June 11, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	June 9, 2014	Previous Calibration	May 9, 2014
Station Name	CNRL Horizon	Station Number	15
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	15:15
Barometric Pressure	727 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	-672	-672
Analyzer Range (input)	5000	5000	Lamp voltage	767	763
Calculated slope	1.023311	0.994082	Chamber temp.	45	45
Calculated intercept	-0.564042	-0.384958	Pressure	680.7	686.7
Analyzer Background	8.8	8.8	Flow	0.413	0.419
Analyzer Coefficient	0.909	0.909	Intensity	90	90
			Converter temp.	809	809

Analyzer make/model	TEI 43I	Analyzer serial #	0710321323
Converter make/model	NOVA model CDN101	Converter serial #	363

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	NA
as found span	5000	38.5	80.1	77.9	1.029
SO2 scrubber check	5000	20.6	207.2	0.3	NA
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	38.5	80.1	80.7	0.992
second point	5000	19.2	39.9	41.0	0.974
third point	5000	9.6	20.0	20.5	0.975
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	38.5	80.1	80.5	0.995
Average Correction Factor					0.980

Corrected As found	77.7	Previous response	78.8	% change	1.4%
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Notes:

Adjusted span. Analog signal issues between third point and as left points. Resolved.

Calibration Performed By:

Mike Martineau



Wood Buffalo Environmental Association

TRS Calibration Summary

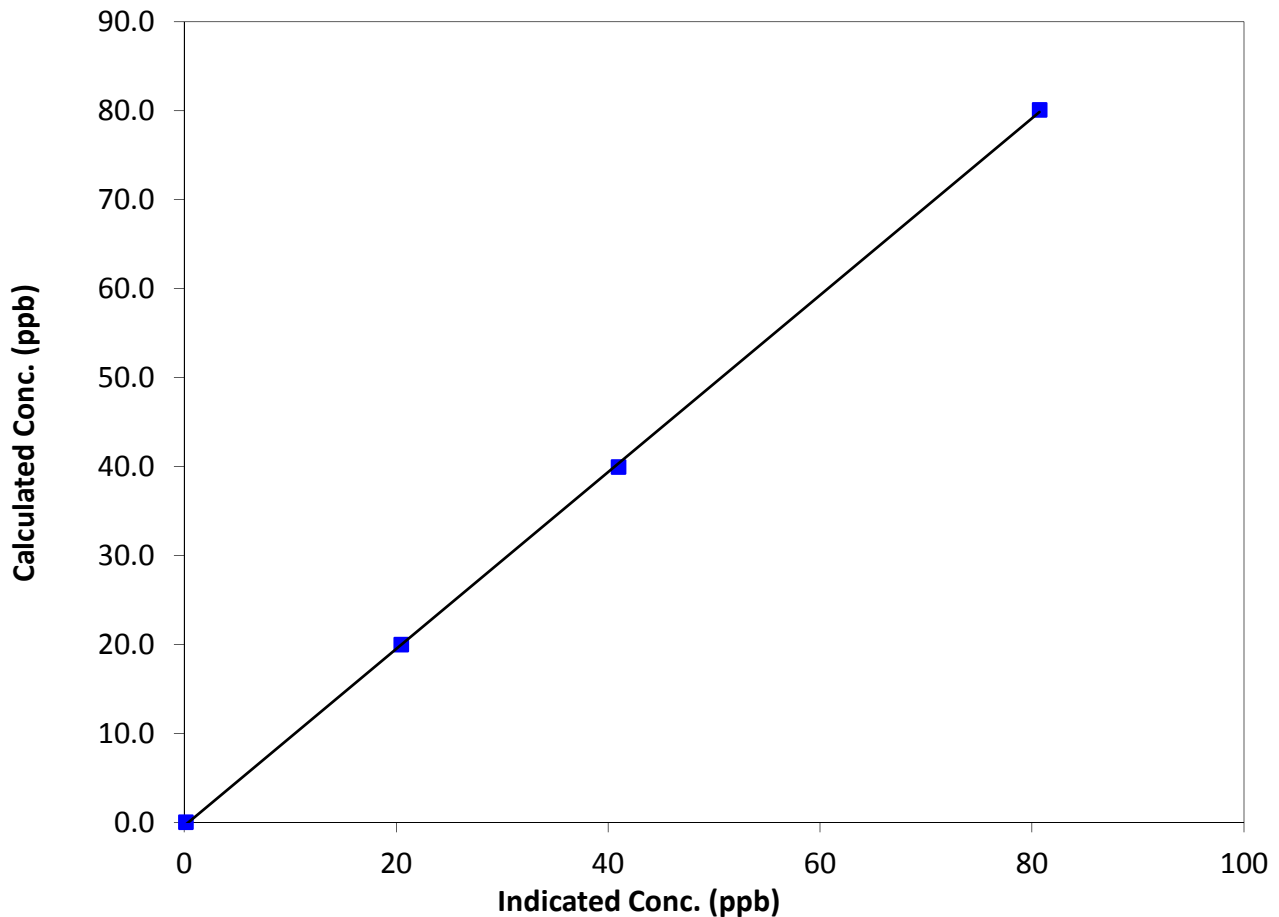
Station Information

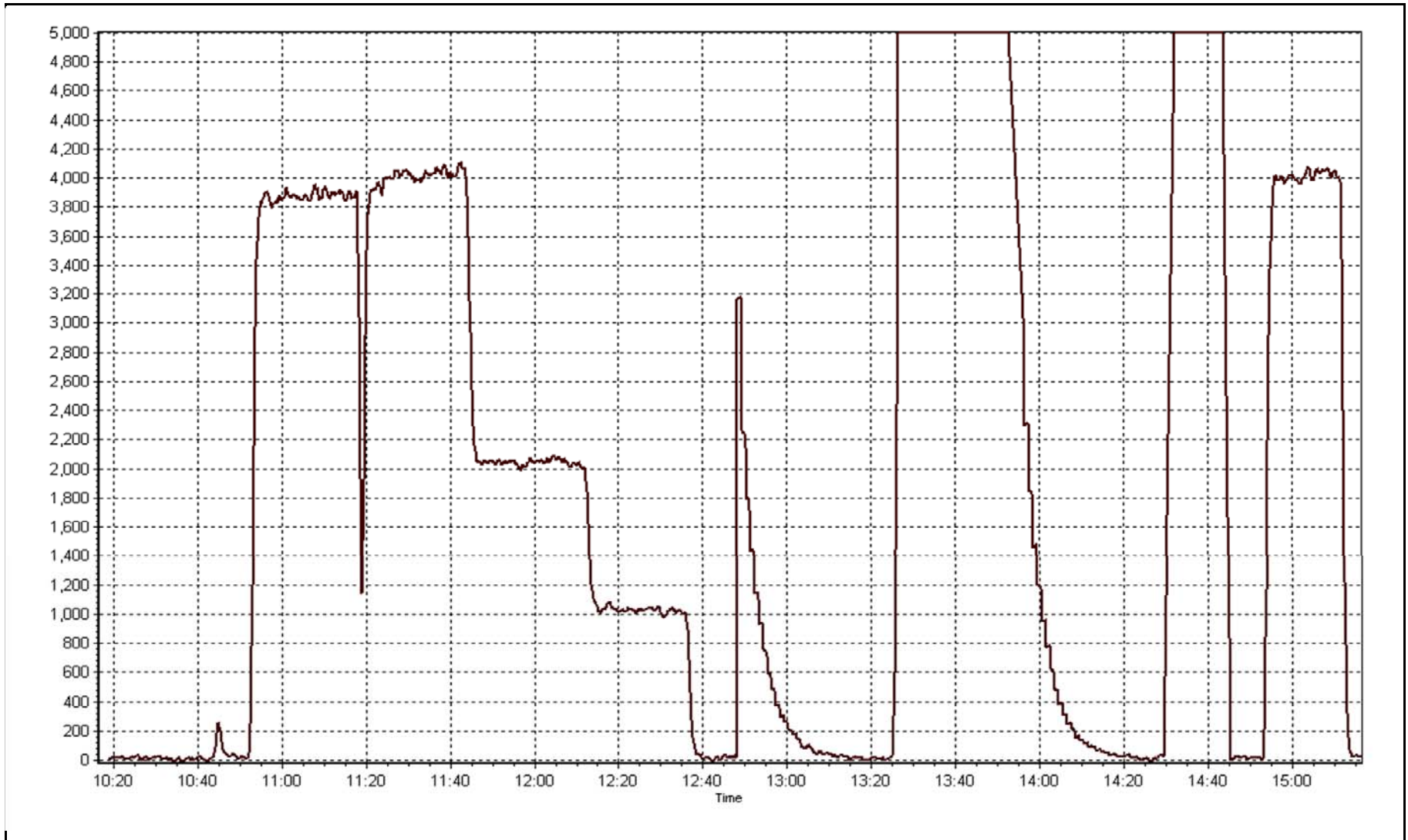
Calibration Date	June 9, 2014	Previous Calibration	May 9, 2014
Station Name	CNRL Horizon	Station Number	15
Start Time (MST)	10:15	End Time (MST)	15:15
Analyzer make	TEI 43I	Analyzer serial #	0710321323

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999918
80.1	80.7	0.9921		
39.9	41.0	0.9740	Slope	0.994082
20.0	20.5	0.9750		
			Intercept	-0.384958

TRS Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	June 11, 2014	Previous Calibration	May 8, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:55
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	10880507
Gas Cert Reference	LL107945	Cal Gas Expiry Date	11/6/2014
CH4 Cal Gas Conc.	490.0 ppm	CH4 Equiv Conc.	1062.0 ppm
C3H8 Cal Gas Conc.	208 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	0-5000mV	DACS channel #	SE 3

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	6.0	6.0
Analyzer Range (mv)	5000	5000	Air or Bypass press	20.0	20.0
Calculated slope	1.002616	0.998371	Fuel Pressure	18.0	18.0
Calculated intercept	0.014280	0.039955			

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	-0.03	N/A
as found span	5000	82.3	17.48	17.48	1.000
calibrator zero	5000	0.0	0.00	-0.03	N/A
high point	5000	82.3	17.48	17.48	1.000
second point	5000	41.2	8.75	8.71	1.005
third point	5000	20.6	4.38	4.34	1.008
calibrator zero	5000	0.0	0.00	-0.03	N/A
as left zero	5000	0.0	0.00	0.03	N/A
as left span	5000	82.3	17.48	17.50	0.999
Average Correction Factor					1.004

Corrected As found 17.51 Previous response 17.42 % change -0.5%

Notes:

No adjustments required

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

THC Calibration Summary

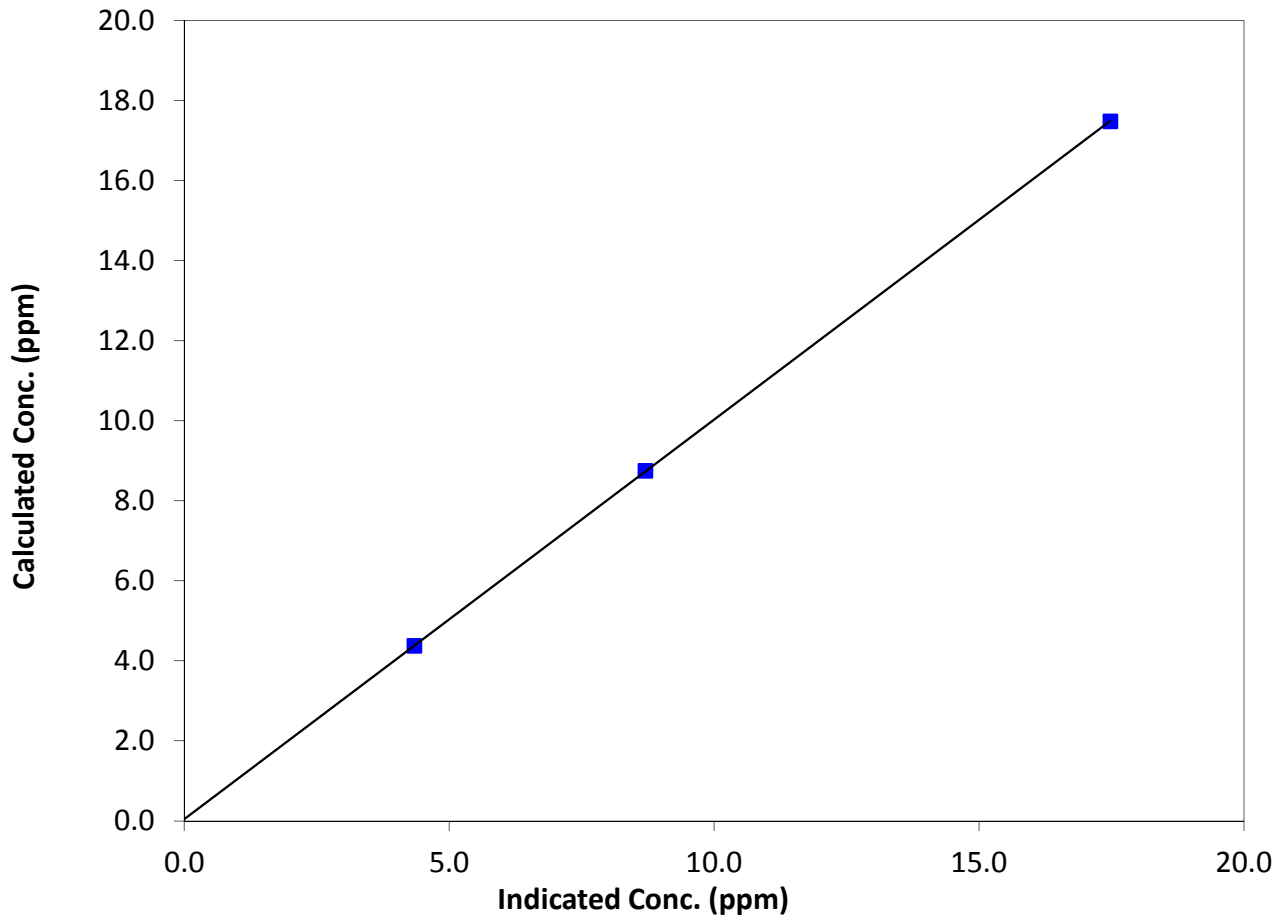
Station Information

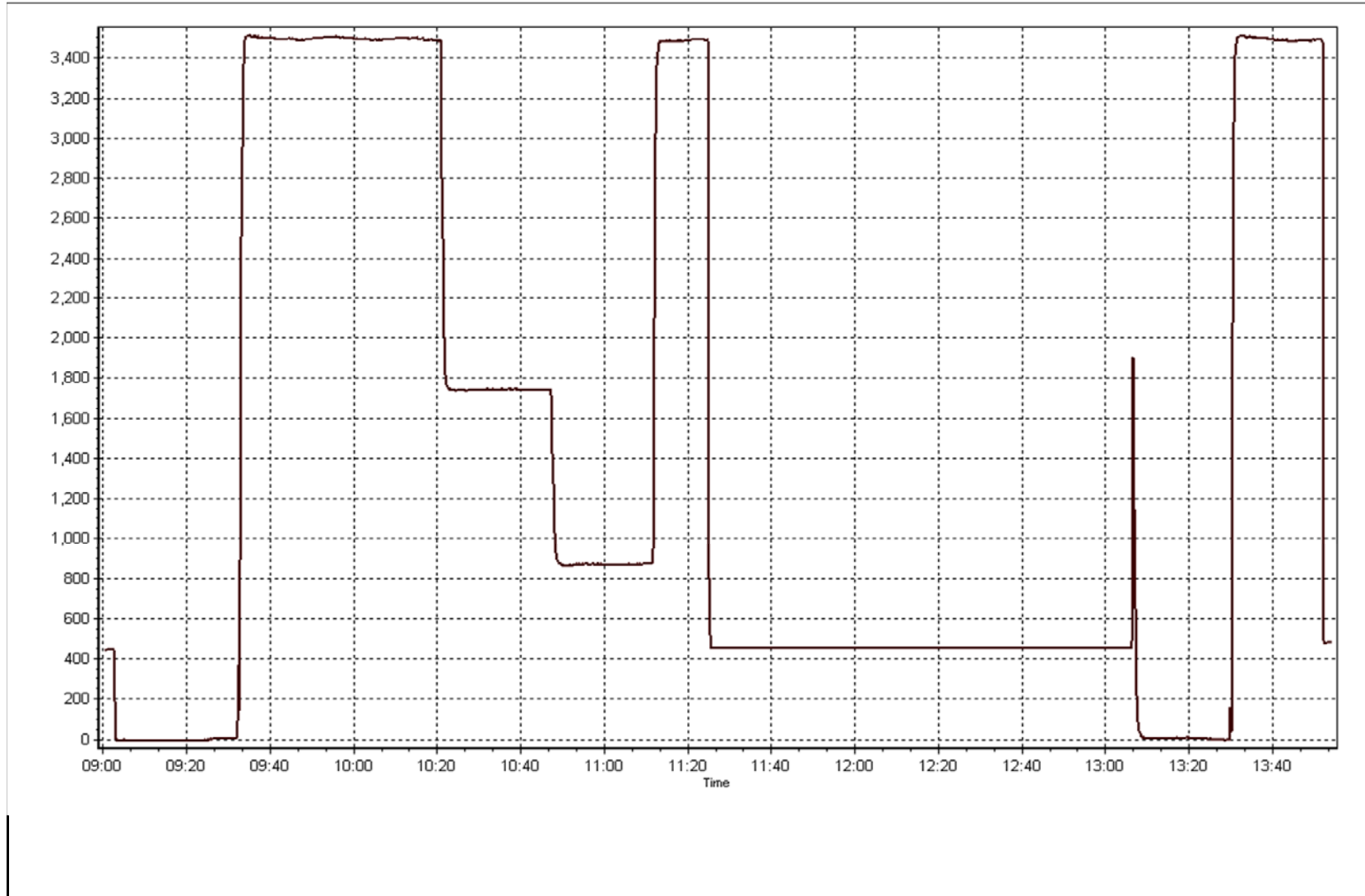
Calibration Date	June 11, 2014	Previous Calibration	May 8, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:00	End Time (MST)	13:55
Analyzer make	TEI 51C-LT	Analyzer serial #	76232382

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	N/A	Correlation Coefficient	0.999997
17.48	17.48	1.0001		
8.75	8.71	1.0051	Slope	0.998371
4.38	4.34	1.0078		
			Intercept	0.039955

THC Calibration Curve







Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	June 11, 2014	Previous Calibration	May 8, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:55
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
NO _x 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		NO _x	NO	NO ₂
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.990212	0.986649	1.003761
	Data Offset	-0.495757	0.060077	0.758586
After	Data Slope	1.008210	1.005482	0.997710
	Data Offset	-1.705808	-0.894861	1.418044
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	0.843	ppb	0.843	ppb
NO _x coefficient	0.998	ppb	0.998	ppb
NO ₂ coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	10.3		10.3	
NO _x bkgrnd	10.6		10.5	
Nt coefficient				
Chamber Temp	50.0	Deg C	49.7	Deg C
Moly Temp	325.0	Deg C	324.5	Deg C
PMT Temp	-3.0	Deg C	-3.0	Deg C
O ₃ flow	ok	ccm	ok	ccm
R Cell Press	171.9	mmHg	173.7	mmHg
Sample Flow	0.690	ccm	0.697	ccm

Notes:

no adjustments required



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

June 11, 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	0.9	0.0	0.2	N/A	N/A
as found span	5000	82.3	800.0	800.0	0.0	793.8	795.1	-0.2	1.0078	1.0060
calibrator zero	5000	0.0	0.0	0.0	0.0	0.9	0.0	0.2	N/A	N/A
high point	5000	82.3	800.0	800.0	0.0	793.8	795.1	-0.2	1.0078	1.0060
second point	5000	41.2	400.5	400.5	0.0	401.3	401.4	0.3	0.9978	0.9977
third point	5000	20.6	200.2	200.2	0.0	200.8	200.9	0.3	0.9970	0.9969
calibrator zero	5000	0.0	0.0	0.0	0.0	0.9	0.0	0.2	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	1.4	0.7	0.2	N/A	N/A
as left span	5000	82.3	800.0	444.6	355.3	793.5	447.8	347.0	1.0082	0.9929
Average Correction Factor									1.0009	1.0002

Corrected As found

NO_x= 792.9

NO= 795.1

Percent Change

NO_x= 2.0%

NO= 2.0%

Previous Response

NO_x= 808.4

NO= 810.7

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			0.2			N/A	
1st NO ₂ (300)	N/A	444.6	354.3	797.4	444.6	354.2	0.9870	1.0000	1.0002	100.0%
2nd NO ₂ (200)	N/A	578.4	220.5	796.7	578.4	219.6	0.9879	1.0000	1.0044	99.6%
3rd NO ₂ (100)	N/A	709.9	89.0	794.7	709.9	85.7	0.9903	1.0000	1.0382	96.3%
4th NO ₂ (0)	798.9	N/A	-2.0	796.9	798.9	-0.7	0.9876	1.0000	N/A	N/A
Average Correction Factor							0.9882	1.0000	1.0143	98.6%

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

NO_x Calibration Summary

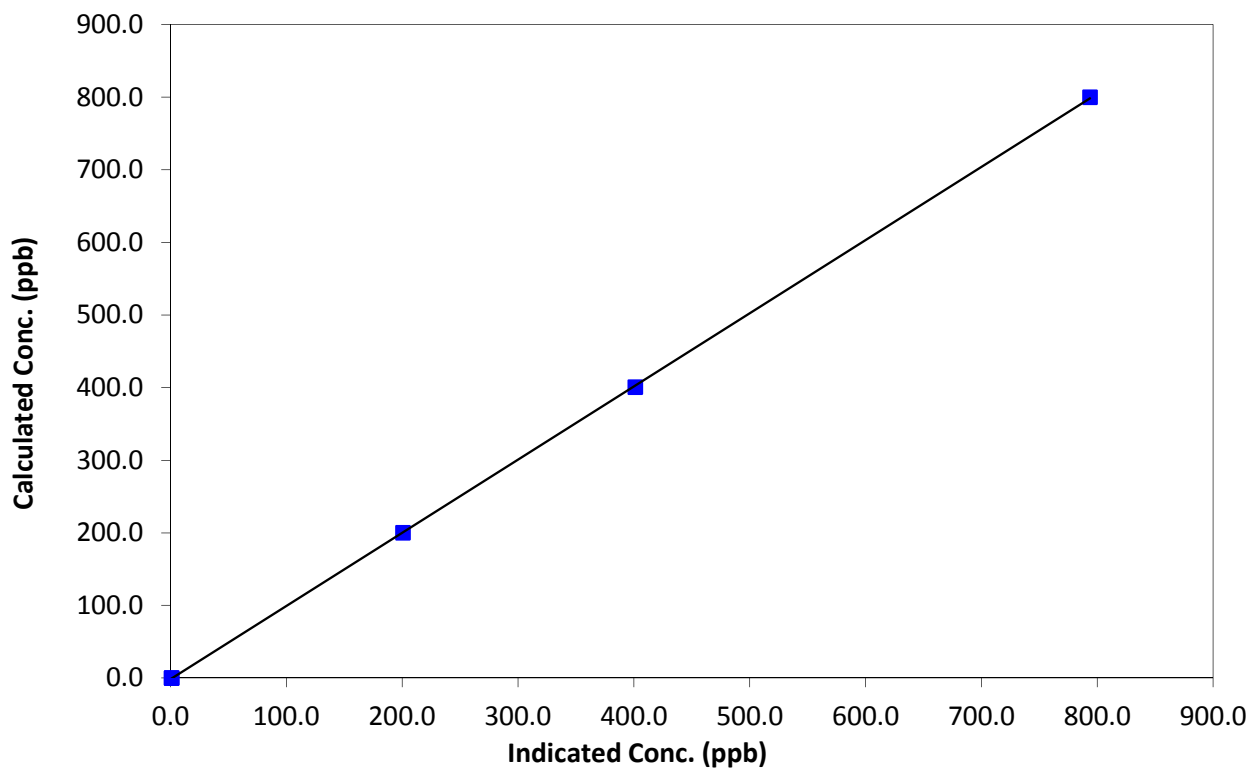
Station Information

Calibration Date	June 11, 2014	Previous Calibration	May 8, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:00	End Time (MST)	13:55
Analyzer make	42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.9	N/A	Correlation Coefficient	0.999978
800.0	793.8	1.0078		
400.5	401.3	0.9978	Slope	1.008210
200.2	200.8	0.9970		
0.0	0.9	0.0000	Intercept	-1.705808

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

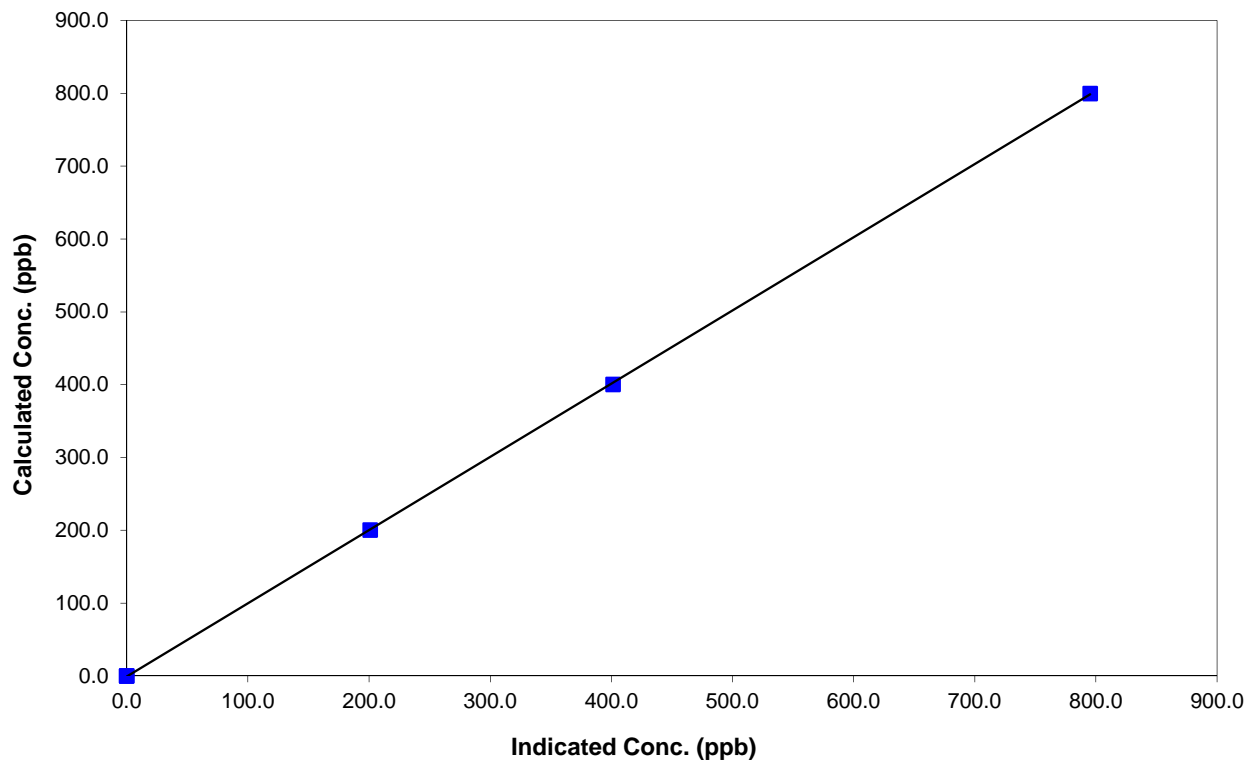
Station Information

Calibration Date	June 11, 2014	Previous Calibration	May 8, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:00	End Time (MST)	13:55
Analyzer make	42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999980
800.0	795.1	1.0060		
400.5	401.4	0.9977	Slope	1.005482
200.2	200.9	0.9969		
0.0	0.0	0.0000	Intercept	-0.894861

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

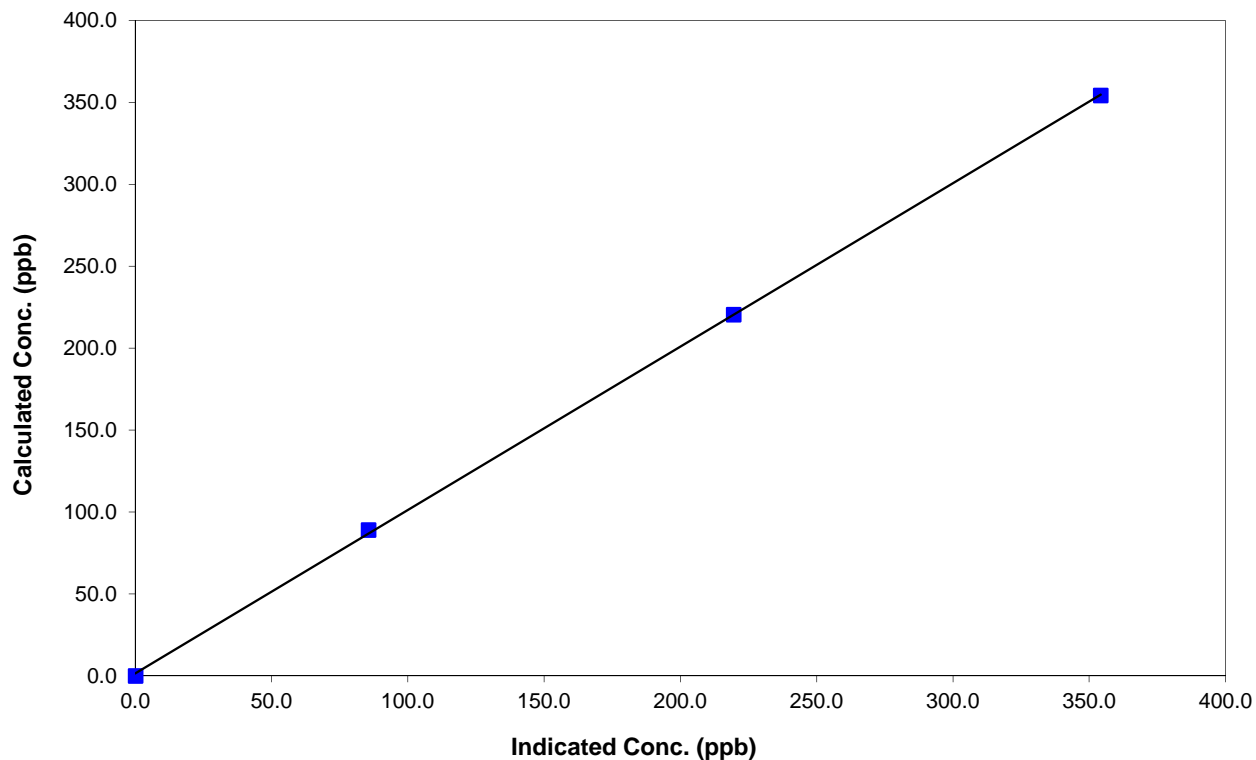
Station Information

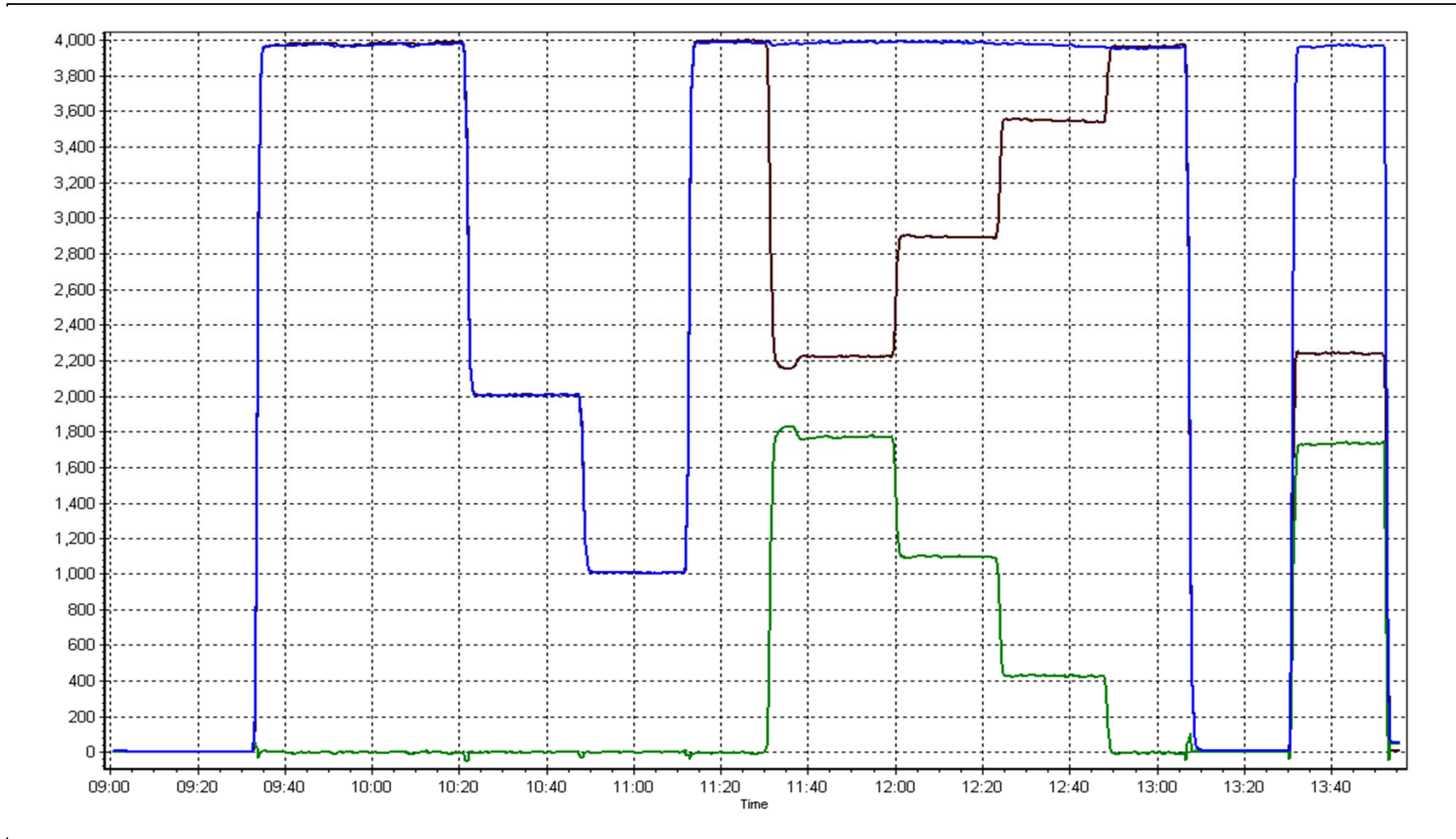
Calibration Date	June 11, 2014	Previous Calibration	May 8, 2014
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:00	End Time (MST)	13:55
Analyzer make	42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999903
354.3	354.2	1.0002		
220.5	219.6	1.0044	Slope	0.997710
89.0	85.7	1.0382		
			Intercept	1.418044

NO₂ Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 16
SHELL MUSKEG RIVER
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
 JUNE 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	677	36	43	99.03	20	0	4	0
THC (ppm) Average	677	36	43	99.03	5.1	-	3.4	-
NO2 (ppb) Average	677	36	43	99.03	43	0	22	-
NO (ppb) Average	677	36	43	99.03	72	-	18	-
NOX (ppb) Average	677	36	43	99.03	102	-	40	-
PM2.5 (ug/m3) Average	712	0	8	98.89	47	-	26.1	0
Temperature 2 m (C) Average	720	0	0	100.00	28.1	-	22.3	-
Relative Humidity (%) Average	720	0	0	100.00	100	-	-	-
Barometric Pressure (inHg) Average	720	0	0	100.00	29	-	-	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	26	-	-	-
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)
 JUNE 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	677	0.6	2	-	0	0	0	0	0	1	20
THC (ppm) Average	677	2.55	0.4	-	1.9	2.2	2.3	2.5	2.6	3	5.1
NO2 (ppb) Average	677	8.9	8	-	0	1	2	7	14	21	43
NO (ppb) Average	677	5.8	9	-	0	0	0	1	9	17	72
NOX (ppb) Average	677	14.8	17	-	0	1	2	8	23	37	102
PM2.5 (ug/m3) Average	712	6.73	6.5	-	0.5	1.9	3.1	4.9	7.6	12	47
Temperature 2 m (C) Average	720	16.38	5.4	-	4.1	9	12.1	16.5	20.3	23.7	28.1
Relative Humidity (%) Average	720	65.9	21	-	17	36	51	68	82	94	100
Barometric Pressure (inHg) Average	720	28.8	0.1	-	28.5	28.6	28.7	28.8	28.9	29	29
Wind Speed 10 m (km/h) Average	720	9.2	5	-	1	4	5	8	12	16	26
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
JUNE 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	05 Jun 2014 05:00	05 Jun 2014 06:00	2	Station power failure
ALL PARAMETERS	10 Jun 2014 05:00	10 Jun 2014 07:00	3	Station power failure
ALL PARAMETERS	26 Jun 2014 15:00	26 Jun 2014 16:00	2	Station power failure

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 20 ppb on Jun 18 13:00	Maximum Daily Average: 4.2 ppb on Jun 18		Hours of Data:	677
Minimum Value: 0 ppb on Jun 1 02:00	Minimum Daily Average: 0.0 ppb on Jun 22		Hours of Missing Data:	43
Maximum Diurnal Average: 1.6 ppb at hour 9	Minimum Diurnal Average: 0.1 ppb at hour 2		Hours of Calibration:	36
Monthly Average: 0.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 11		Percent Operational Time:	99.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	4	5	8	0	0	0	0	1	1.0	8
2-Jun	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Jun	Z	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Jun	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
5-Jun	Z	0	0	0	PF	PF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
6-Jun	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Jun	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	1
8-Jun	Z	0	0	0	0	0	0	0	0	0	1	1	1	2	3	2	2	1	1	0	0	0	0	0	0.7	3
9-Jun	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
10-Jun	Z	0	0	0	PF	PF	PF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
11-Jun	Z	0	0	0	0	0	0	0	0	1	1	0	0	2	1	2	1	0	0	3	1	1	0	0	0.6	3
12-Jun	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
13-Jun	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
14-Jun	Z	0	0	0	0	0	0	5	9	13	13	6	2	1	1	2	0	0	0	4	2	0	0	0	2.6	13
15-Jun	Z	0	0	1	1	1	5	11	11	8	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1.8	11
16-Jun	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
17-Jun	Z	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	2	2	4	1	1	2	1	0	0.8	4
18-Jun	Z	0	0	0	0	0	0	5	9	6	8	11	20	5	6	3	6	5	4	4	1	0	0	0	4.2	20
19-Jun	Z	0	0	0	0	0	0	18	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	18
20-Jun	Z	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	2
21-Jun	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Jun	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
23-Jun	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
24-Jun	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1
25-Jun	Z	0	0	0	0	0	1	3	3	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0.5	3
26-Jun	Z	0	0	0	0	0	0	0	0	7	12	17	4	1	PF	PF	1	1	2	1	1	1	1	1	2.3	17
27-Jun	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
28-Jun	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-Jun	Z	0	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-Jun	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

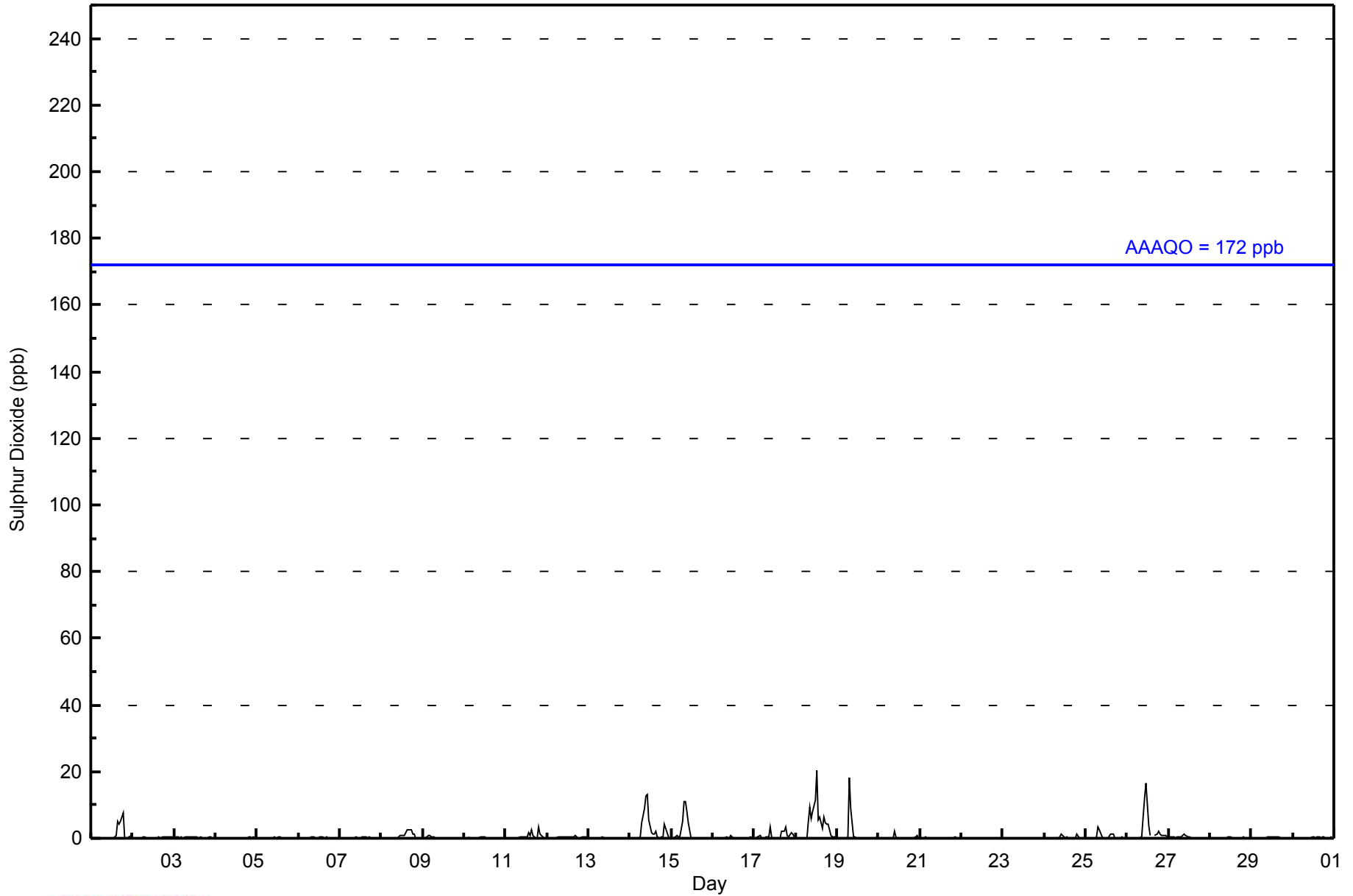
--	0.1	0.1	0.1	0.1	0.1	0.1	0.3	1.5	1.6	1.5	1.5	1.3	1.1	0.5	0.5	0.7	0.7	0.6	0.7	0.5	0.3	0.3	0.2	0.1	Diurnal Average	
--	0	0	1	1	1	1	5	18	11	13	13	17	20	5	6	5	6	5	8	4	4	2	1	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - June 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	668	98.67	98.67
11 - 20	9	1.33	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 677

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - June 2014

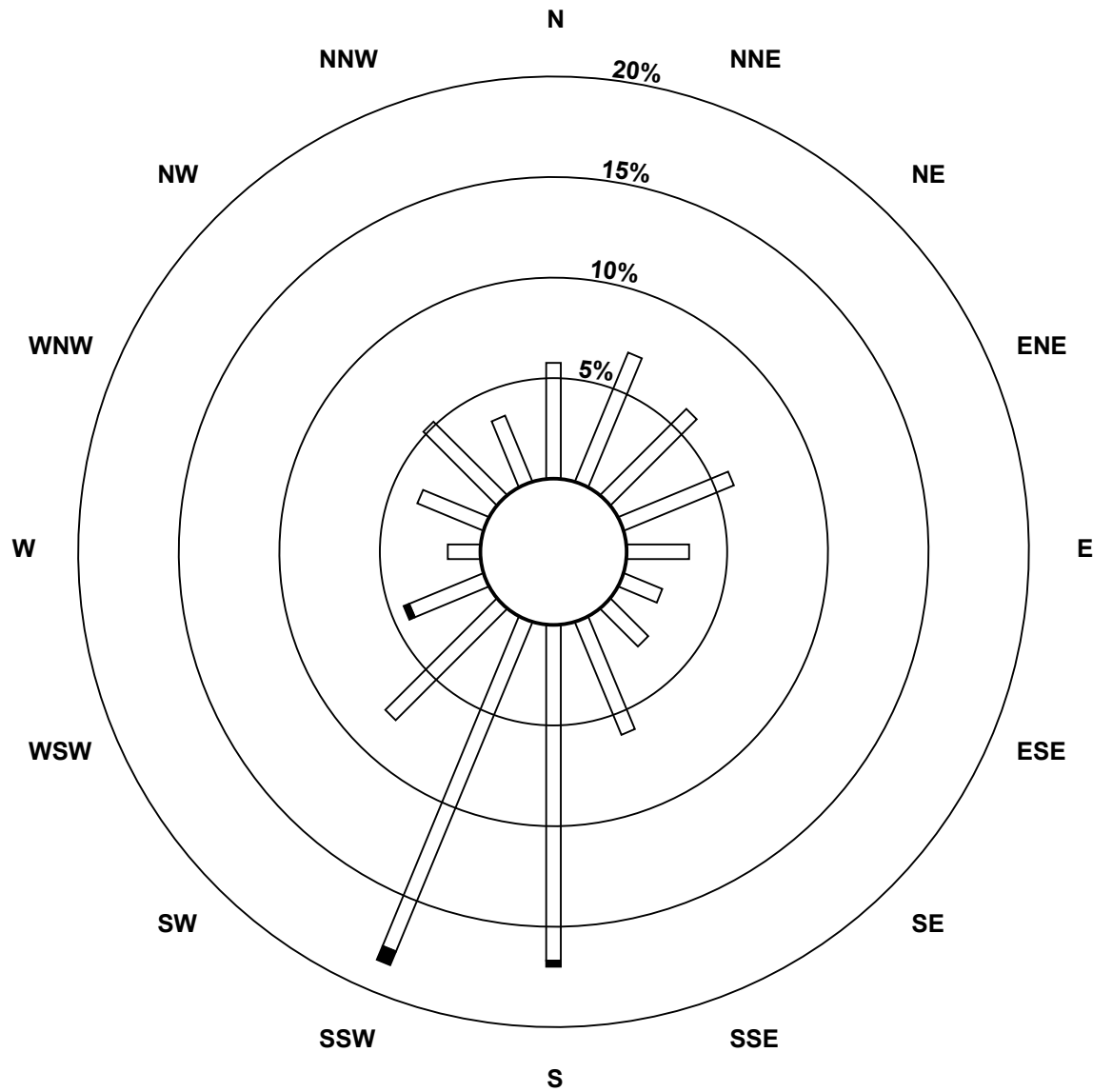
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	39	47	41	40	21	14	18	41	113	120	53	27	11	24	35	24	668
11 - 20	0	0	0	0	0	0	0	0	2	5	0	2	0	0	0	0	9
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	39	47	41	40	21	14	18	41	115	125	53	29	11	24	35	24	677

Total Number of Valid Hours: 677

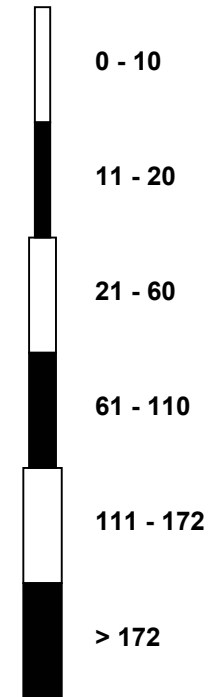
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River (AMS 16)



Classes (ppb)

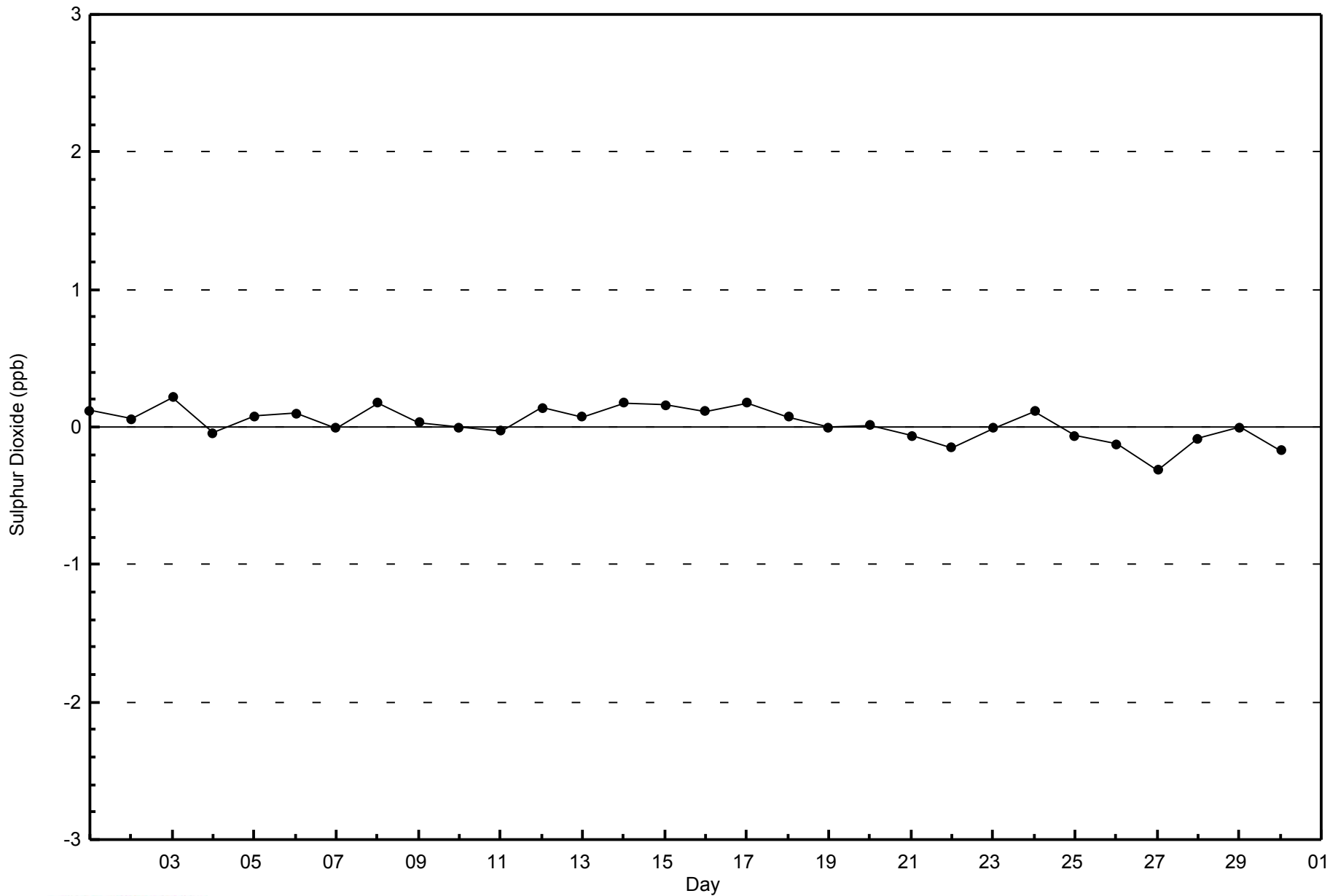


Total Number of Valid Hours: 677



WBEA
Zero Responses

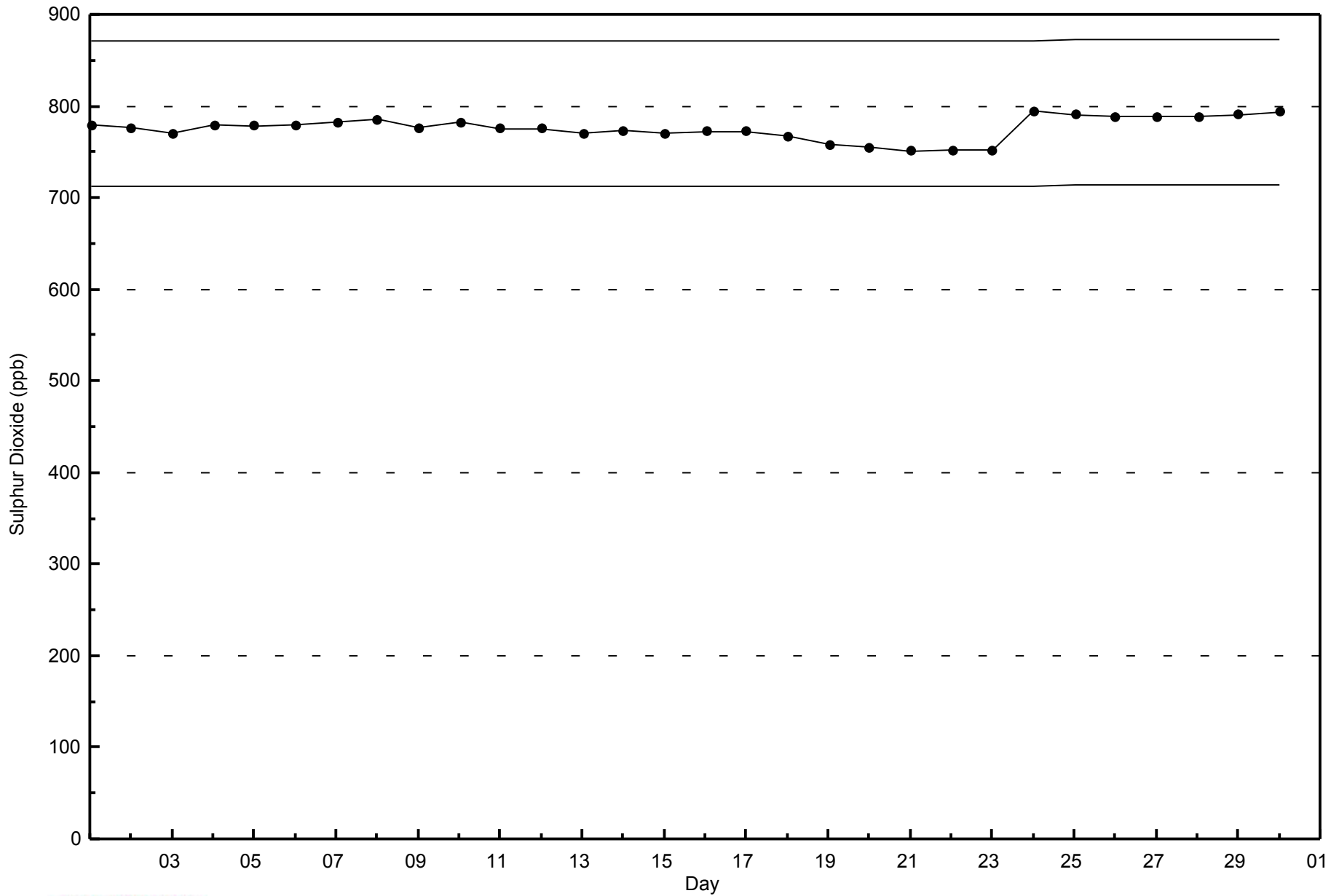
Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - June 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - June 2014



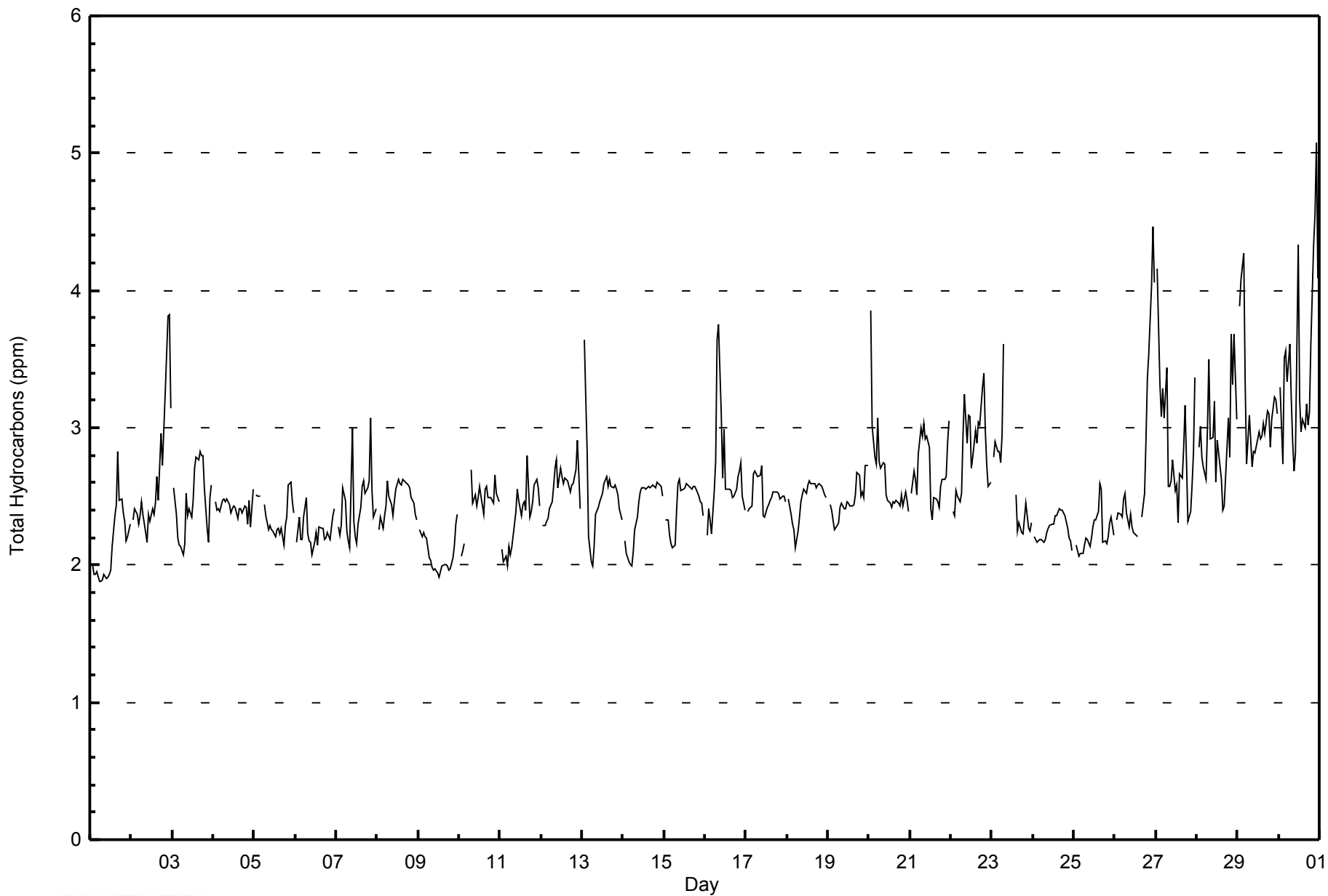


Maximum Value: 5.1 ppm on Jun 30 23:00		Maximum Daily Average: 3.4 ppm on Jun 30		Hours in Service: 720																							
Minimum Value: 1.9 ppm on Jun 1 06:00		Minimum Daily Average: 2.1 ppm on Jun 9		Hours of Data: 677																							
Maximum Diurnal Average: 2.7 ppm at hour 23		Minimum Diurnal Average: 2.4 ppm at hour 6		Hours of Missing Data: 43																							
Monthly Average: 2.55 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 2.2 Q ₁ = 2.3 Median = 2.5 Q ₃ = 2.6 P ₉₀ = 3.0 P ₉₉ = 4.1		Hours of Calibration: 36																							
				Percent Operational Time: 99.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jun	Z	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.4	2.4	2.8	2.5	2.5	2.4	2.3	2.2	2.2	2.3	2.1	2.8	
2-Jun	Z	2.3	2.4	2.4	2.3	2.4	2.5	2.4	2.2	2.2	2.4	2.3	2.4	2.4	2.5	2.6	2.5	3.0	2.7	3.0	3.2	3.8	3.8	3.1	2.6	3.8	
3-Jun	Z	2.6	2.4	2.2	2.1	2.1	2.1	2.2	2.5	2.4	2.4	2.4	2.5	2.7	2.8	2.8	2.8	2.8	2.8	2.6	2.3	2.2	2.5	2.6	2.5	2.8	
4-Jun	Z	2.5	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.5	2.3	2.5	2.4	2.5	
5-Jun	Z	2.5	2.5	2.5	PF	PF	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.3	2.1	2.3	2.4	2.6	2.6	2.5	2.4	2.4	2.6	
6-Jun	Z	2.2	2.4	2.2	2.2	2.3	2.5	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.2	2.5	
7-Jun	Z	2.3	2.2	2.3	2.6	2.5	2.2	2.2	2.1	3.0	2.3	2.2	2.2	2.3	2.4	2.6	2.6	2.5	2.6	2.6	3.1	2.5	2.3	2.4	2.4	3.1	
8-Jun	Z	2.3	2.4	2.3	2.4	2.4	2.6	2.5	2.4	2.4	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.4	2.4	2.3	2.5	2.6	
9-Jun	Z	2.3	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.4	2.1	2.4	
10-Jun	Z	2.1	2.1	2.2	PF	PF	PF	2.7	2.4	2.5	2.4	2.5	2.6	2.5	2.4	2.6	2.6	2.5	2.5	2.5	2.5	2.7	2.5	2.5	2.5	2.7	
11-Jun	Z	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.3	2.4	2.5	2.5	2.4	2.4	2.5	2.4	2.8	2.3	2.4	2.5	2.6	2.6	2.6	2.4	2.4	2.8	
12-Jun	Z	2.3	2.3	2.3	2.3	2.4	2.5	2.6	2.7	2.8	2.6	2.7	2.6	2.6	2.6	2.6	2.6	2.5	2.6	2.6	2.7	2.9	2.7	2.4	2.6	2.9	
13-Jun	Z	3.6	3.2	2.8	2.2	2.0	2.0	2.1	2.4	2.4	2.5	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.4	2.3	2.5	3.6	
14-Jun	Z	2.2	2.1	2.0	2.0	2.0	2.1	2.3	2.3	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.4	2.6	
15-Jun	Z	2.3	2.3	2.2	2.2	2.1	2.1	2.4	2.6	2.6	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.4	2.4	2.6	
16-Jun	Z	2.2	2.4	2.3	2.2	2.5	2.8	3.6	3.7	3.1	2.6	3.0	2.6	2.5	2.6	2.5	2.5	2.5	2.5	2.6	2.7	2.8	2.5	2.4	2.7	3.7	
17-Jun	Z	2.4	2.4	2.4	2.7	2.7	2.7	2.6	2.7	2.7	2.4	2.3	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.7	
18-Jun	Z	2.5	2.4	2.3	2.3	2.1	2.2	2.4	2.5	2.5	2.6	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.6	
19-Jun	Z	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.4	2.4	2.5	2.7	2.7	2.5	2.5	2.5	2.7	2.7	2.5	2.7	
20-Jun	Z	3.9	3.0	2.8	2.7	3.1	2.8	2.7	2.7	2.7	2.5	2.5	2.5	2.4	2.5	2.4	2.5	2.5	2.4	2.5	2.4	2.5	2.5	2.4	2.6	3.9	
21-Jun	Z	2.5	2.7	2.6	2.5	2.8	3.0	2.9	3.0	2.9	2.9	2.9	2.4	2.3	2.5	2.5	2.5	2.4	2.6	2.6	2.6	2.6	2.9	3.1	2.7	3.1	
22-Jun	Z	2.4	2.4	2.5	2.5	2.5	2.5	2.9	3.2	2.9	3.1	3.1	2.7	2.8	3.0	2.9	3.0	3.0	3.3	3.4	3.0	2.7	2.6	2.6	2.8	3.4	
23-Jun	Z	2.8	2.9	2.8	2.8	2.7	2.9	3.6	C	C	C	C	C	C	2.5	2.2	2.3	2.2	2.2	2.3	2.4	2.3	2.3	2.3	--	3.6	
24-Jun	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	2.4	2.4	2.4	2.4	2.3	2.2	2.1	2.3	2.4	
25-Jun	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.3	2.3	2.3	2.3	2.4	2.6	2.6	2.2	2.2	2.2	2.3	2.4	2.2	2.2	2.6	
26-Jun	Z	2.3	2.4	2.4	2.4	2.5	2.5	2.4	2.3	2.4	2.3	2.2	2.2	2.2	PF	PF	2.4	2.5	2.9	3.4	3.5	4.0	4.5	4.1	2.7	4.5	
27-Jun	Z	4.2	3.3	3.1	3.3	3.1	3.4	2.6	2.6	2.6	2.8	2.5	2.6	2.3	2.7	2.6	2.9	3.2	2.8	2.3	2.4	2.6	2.8	3.4	2.9	4.2	
28-Jun	Z	2.9	3.0	2.8	2.7	2.6	3.0	3.5	2.9	2.9	3.2	2.6	2.9	2.8	2.6	2.4	2.4	2.6	3.1	2.8	3.7	3.3	3.7	3.1	2.9	3.7	
29-Jun	Z	3.9	4.1	4.3	3.3	2.7	2.9	3.1	2.7	2.8	2.8	2.9	3.0	2.9	2.9	3.0	3.0	3.1	3.1	2.9	3.1	3.2	3.2	3.1	3.1	4.3	
30-Jun	Z	3.3	2.7	3.5	3.6	3.3	3.6	3.2	2.9	2.7	2.8	4.3	3.2	3.0	3.1	3.0	3.2	3.0	3.1	3.6	4.3	4.6	5.1	4.1	3.4	5.1	
		--	2.6	2.5	2.5	2.4	2.4	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6	2.7	2.7	2.7	2.6	Diurnal Average		
		--	4.2	4.1	4.3	3.6	3.3	3.6	3.6	3.7	3.1	3.2	4.3	3.2	3.0	3.1	3.0	3.2	3.2	3.3	3.6	4.3	4.6	5.1	4.1	Diurnal Maximum	
Z - zerospan		C - Calibration				PF - Power Failure																					



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - June 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	32	4.73	4.73
2.1 - 3.0	579	85.52	90.25
3.1 - 10.0	66	9.75	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 677

Total Number of Hours: 720



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - June 2014

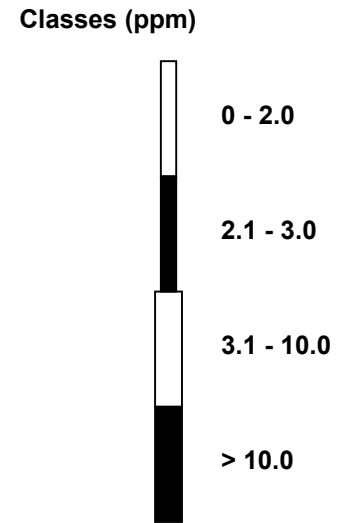
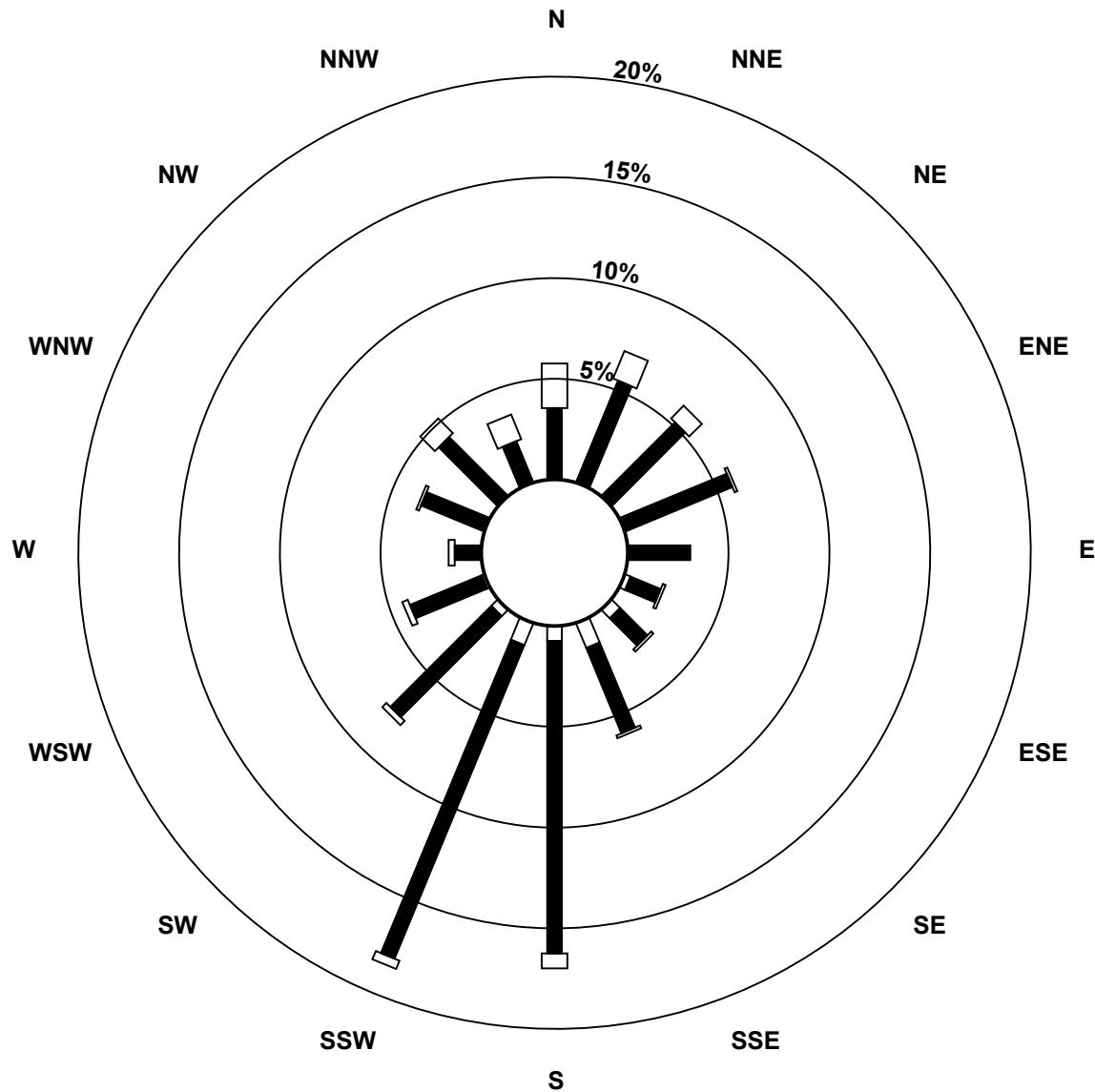
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	2	4	9	5	8	3	1	0	0	0	0	32
2.1 - 3.0	24	37	35	39	21	11	13	31	105	114	48	26	9	23	28	15	579
3.1 - 10.0	15	10	6	1	0	1	1	1	5	3	2	2	2	1	7	9	66
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	47	41	40	21	14	18	41	115	125	53	29	11	24	35	24	677

Total Number of Valid Hours: 677

Total Number of Hours: 720

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

**Total Hydrocarbons (THC) - ppm
Shell Muskeg River (AMS 16)**

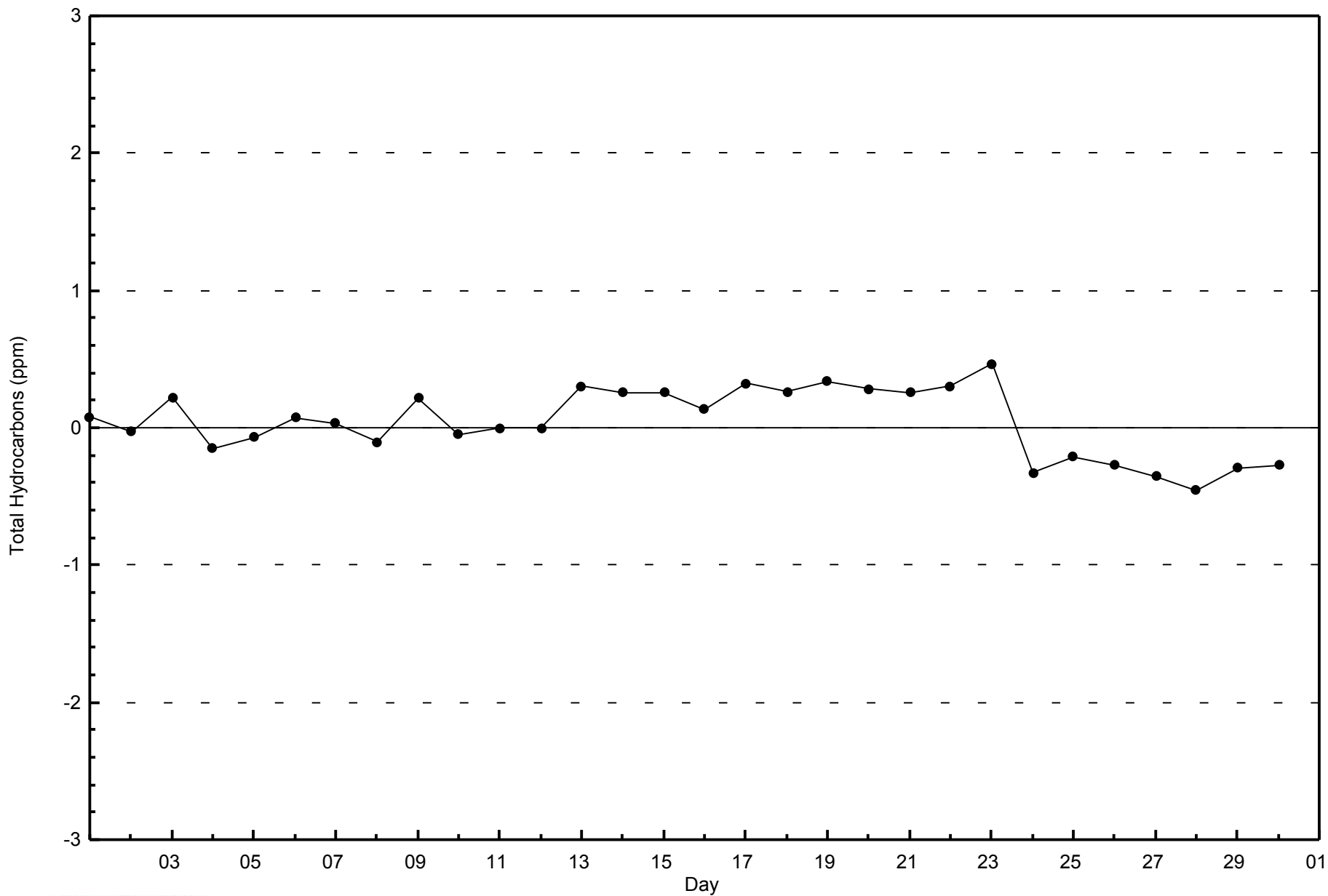


Total Number of Valid Hours: 677



WBEA
Zero Responses

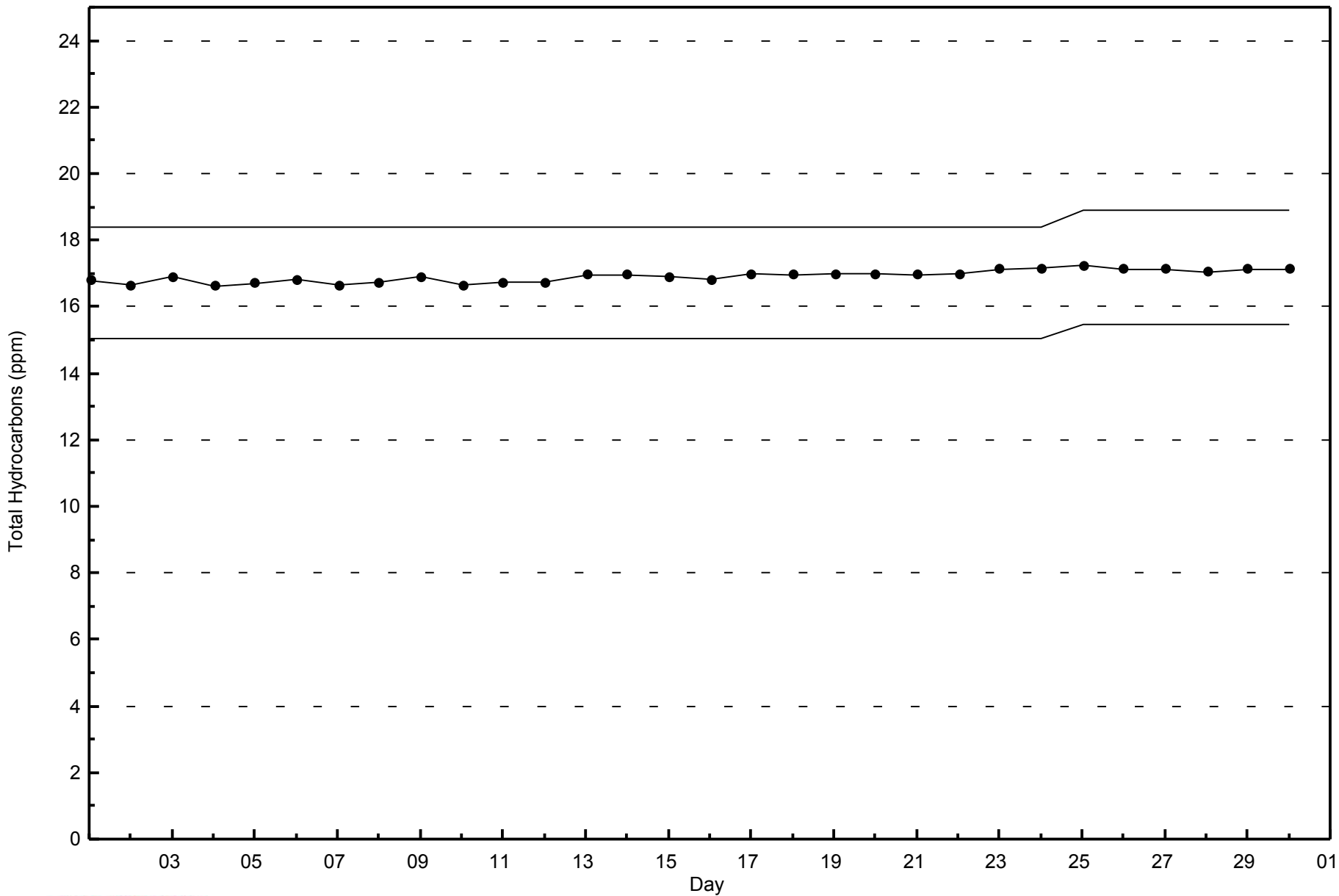
Total Hydrocarbons (THC) - ppm
Shell Muskeg River - June 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - June 2014





Maximum Value: 72 ppb on Jun 30 23:00	Maximum Daily Average: 17.5 ppb on Jun 29	Hours in Service: 720
Minimum Value: 0 ppb on Jun 1 02:00	Minimum Daily Average: 0.1 ppb on Jun 24	Hours of Data: 677
Maximum Diurnal Average: 10.6 ppb at hour 23	Minimum Diurnal Average: 3.0 ppb at hour 19	Hours of Missing Data: 43
Monthly Average: 5.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 9 P ₉₀ = 17 P ₉₉ = 47	Hours of Calibration: 36
		Percent Operational Time: 99.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	8	1	0	0	0	0	0	0	0.5	8
2-Jun	Z	1	1	10	10	4	3	4	4	1	0	0	0	0	0	7	5	16	16	26	25	44	60	51	12.6	60
3-Jun	Z	23	11	4	8	8	16	10	17	26	23	27	25	16	13	24	7	11	9	14	9	17	10	11	14.6	27
4-Jun	Z	8	7	5	12	8	13	10	12	8	7	10	17	9	14	23	12	15	10	29	26	15	27	12	13.4	29
5-Jun	Z	17	16	23	PF	PF	14	14	16	11	13	13	17	17	13	6	3	1	5	15	13	18	15	10	12.9	23
6-Jun	Z	2	7	5	3	17	28	23	17	17	2	3	8	9	9	7	5	2	2	0	0	0	3	10	7.8	28
7-Jun	Z	0	0	0	15	12	8	1	0	47	13	4	1	2	2	10	5	8	4	2	10	2	0	2	6.5	47
8-Jun	Z	0	0	0	1	3	12	9	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.6	12
9-Jun	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0.3	3
10-Jun	Z	2	3	3	PF	PF	PF	10	5	9	5	8	8	3	0	2	3	0	0	0	0	0	0	0	3.1	10
11-Jun	Z	0	0	0	0	1	1	2	4	2	1	0	0	0	0	0	8	0	0	0	0	0	0	1	1.0	8
12-Jun	Z	0	1	6	2	2	15	16	24	20	11	10	14	8	13	13	22	13	4	3	6	13	4	0	9.7	24
13-Jun	Z	9	18	8	2	0	0	6	18	3	1	2	1	2	3	1	0	0	0	0	0	0	0	0	3.3	18
14-Jun	Z	0	0	0	0	0	0	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
15-Jun	Z	0	0	0	0	0	1	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4
16-Jun	Z	0	1	0	0	10	14	49	57	15	4	13	1	0	0	0	0	0	0	0	1	0	0	0	7.2	57
17-Jun	Z	0	0	0	12	13	7	9	5	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2.4	13
18-Jun	Z	0	1	0	4	1	3	4	5	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.9	5
19-Jun	Z	0	0	0	0	0	0	5	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5	0.8	5
20-Jun	Z	31	14	2	2	11	10	4	3	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3.7	31
21-Jun	Z	0	0	1	1	1	9	10	11	12	7	7	2	2	2	1	1	1	1	1	1	1	2	7	4.3	17
22-Jun	Z	0	0	0	0	1	3	11	21	8	15	11	3	2	3	4	4	5	4	6	1	0	1	2	4.6	21
23-Jun	Z	0	0	1	7	7	16	40	C	C	C	C	C	C	2	1	0	0	0	0	1	0	0	0	--	40
24-Jun	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
25-Jun	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.2	1
26-Jun	Z	0	0	1	1	2	5	4	0	2	2	2	0	0	PF	PF	1	2	5	24	26	29	46	38	9.0	46
27-Jun	Z	32	6	5	4	23	39	5	6	4	3	2	2	0	2	3	3	6	4	1	0	0	6	24	7.8	39
28-Jun	Z	0	3	4	4	6	11	9	2	8	13	4	5	2	2	0	1	1	5	10	13	10	48	13	7.7	48
29-Jun	Z	32	33	43	27	17	19	13	14	11	8	24	31	30	17	11	15	6	9	7	12	9	8	10	17.5	43
30-Jun	Z	20	9	21	30	22	16	8	9	6	8	17	17	6	8	8	7	11	9	5	5	31	72	36	16.5	72

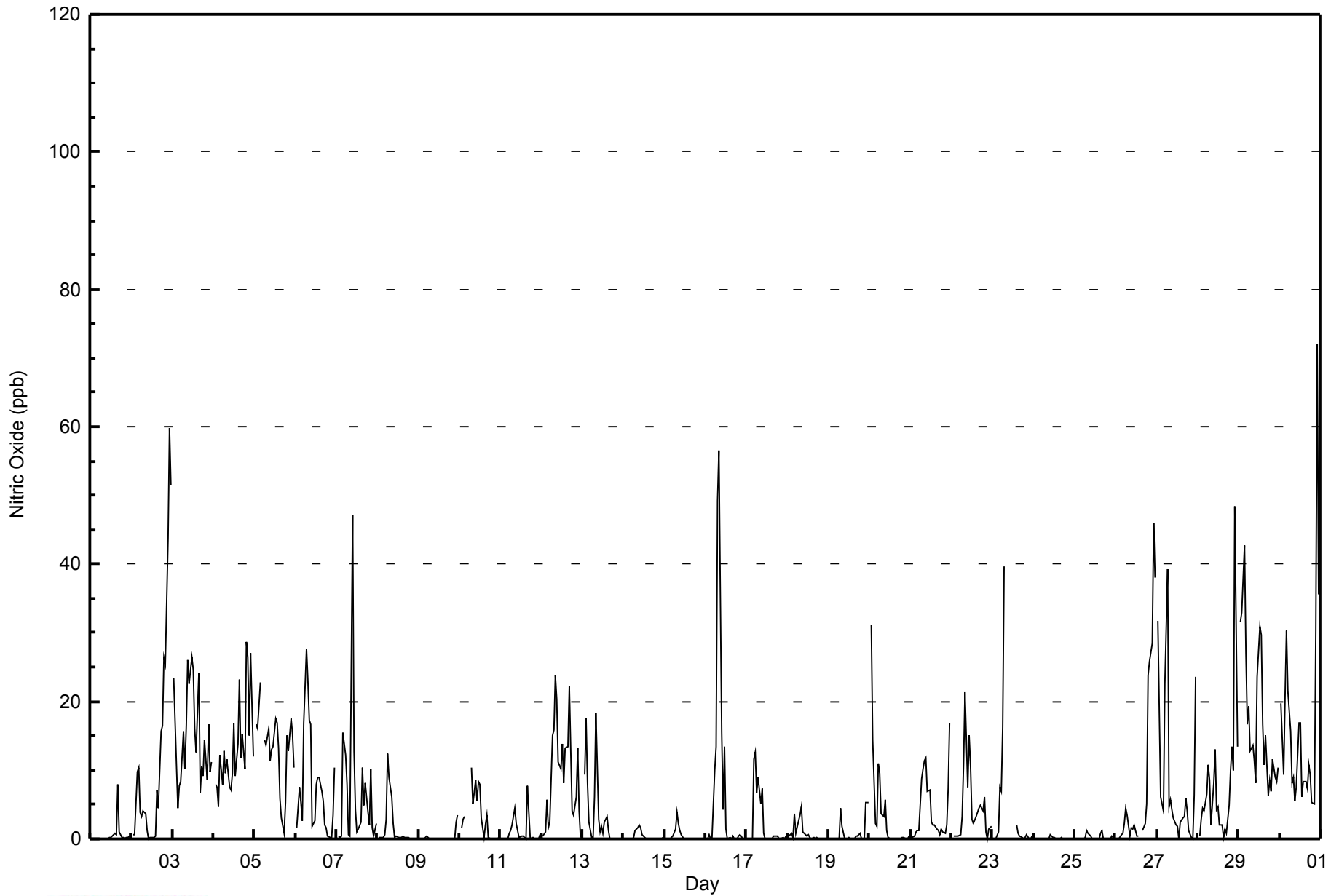
--	5.9	4.4	4.8	5.2	6.0	9.1	9.3	9.1	7.9	4.9	5.5	5.3	3.8	3.7	4.3	3.8	3.3	3.0	4.9	5.0	6.3	10.6	8.3	Diurnal Average	
--	32	33	43	30	23	39	49	57	47	23	27	31	30	17	24	22	16	16	29	26	44	72	51	Diurnal Maximum	

Z - zerspan C - Calibration PF - Power Failure



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Shell Muskeg River - June 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Shell Muskeg River - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	628	92.76	92.76
21 - 40	39	5.76	98.52
41 - 80	10	1.48	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 677

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Shell Muskeg River - June 2014

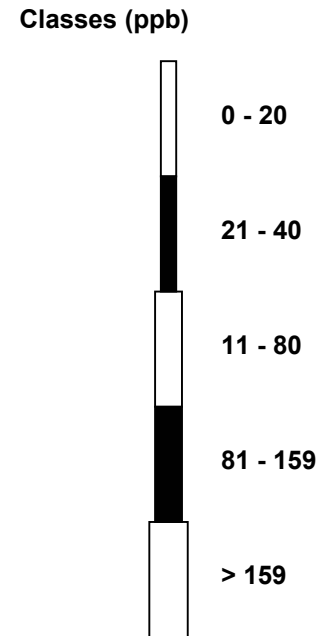
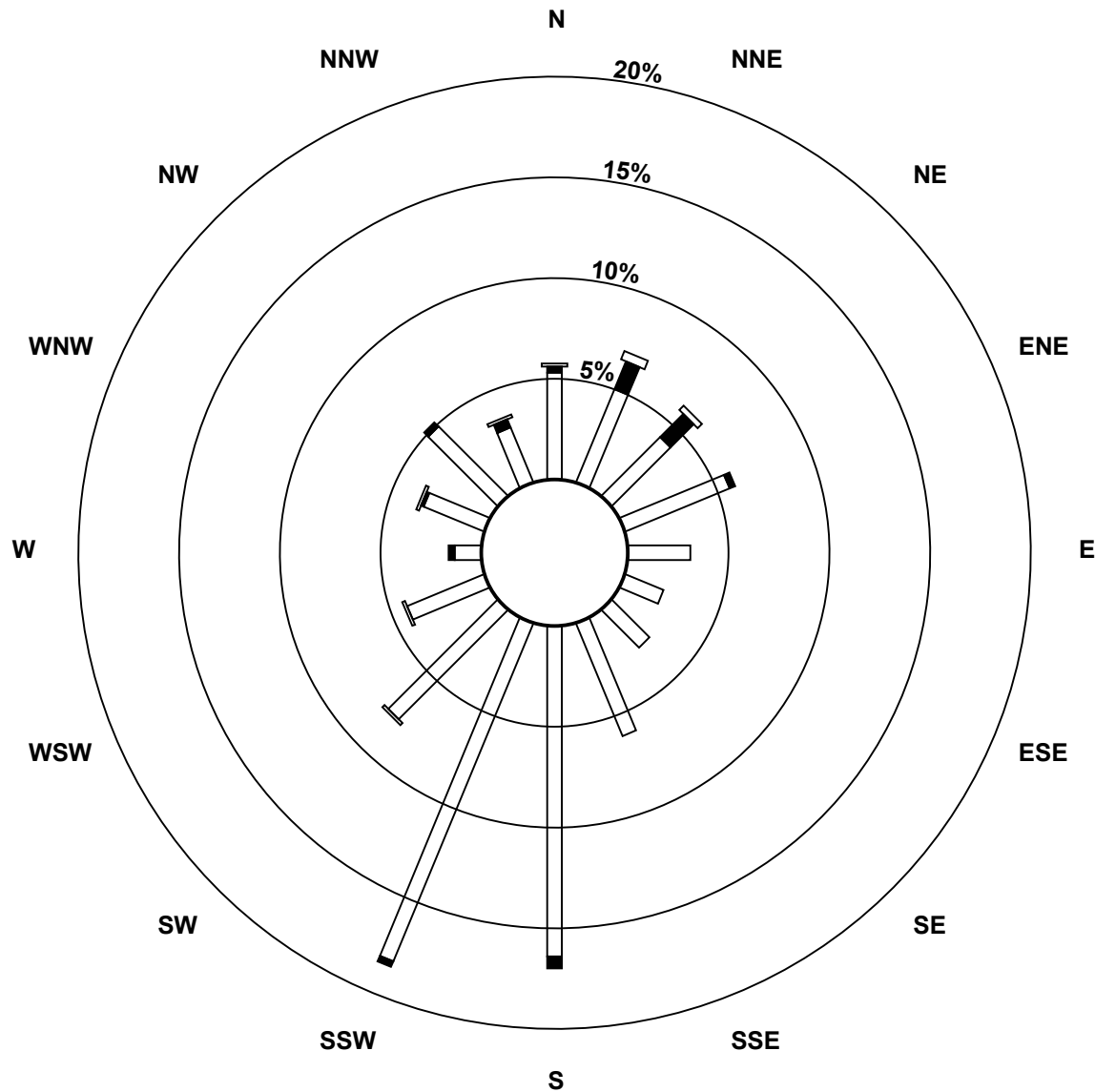
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	34	28	38	21	14	18	41	111	123	52	28	9	22	33	20	628
21 - 40	2	10	11	2	0	0	0	0	4	2	0	0	2	1	2	3	39
11 - 80	1	3	2	0	0	0	0	0	0	0	1	1	0	1	0	1	10
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	47	41	40	21	14	18	41	115	125	53	29	11	24	35	24	677

Total Number of Valid Hours: 677

Total Number of Hours: 720

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

**Nitric Oxide (NO) - ppb
Shell Muskeg River (AMS 16)**

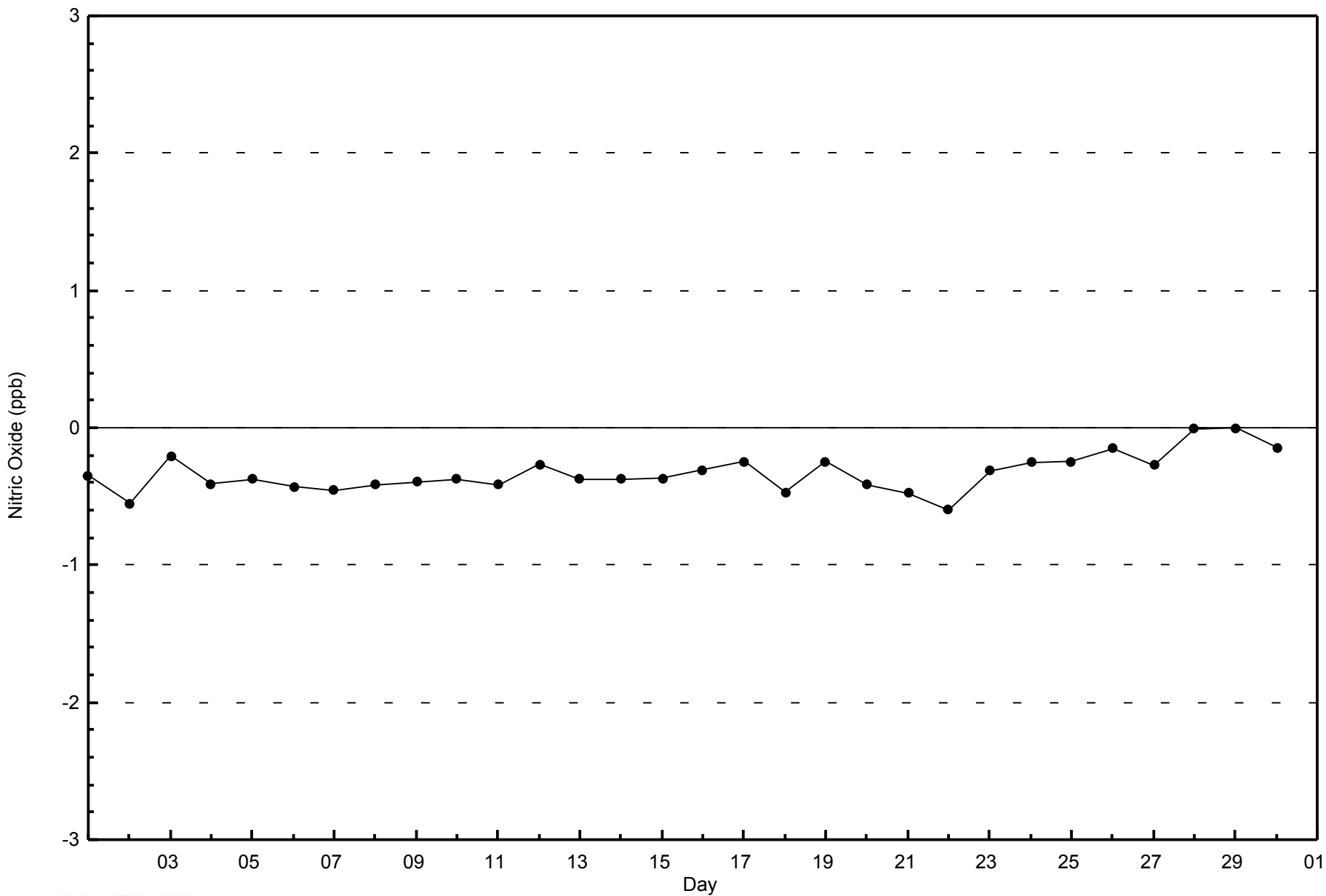


Total Number of Valid Hours: 677



WBEA
Zero Responses

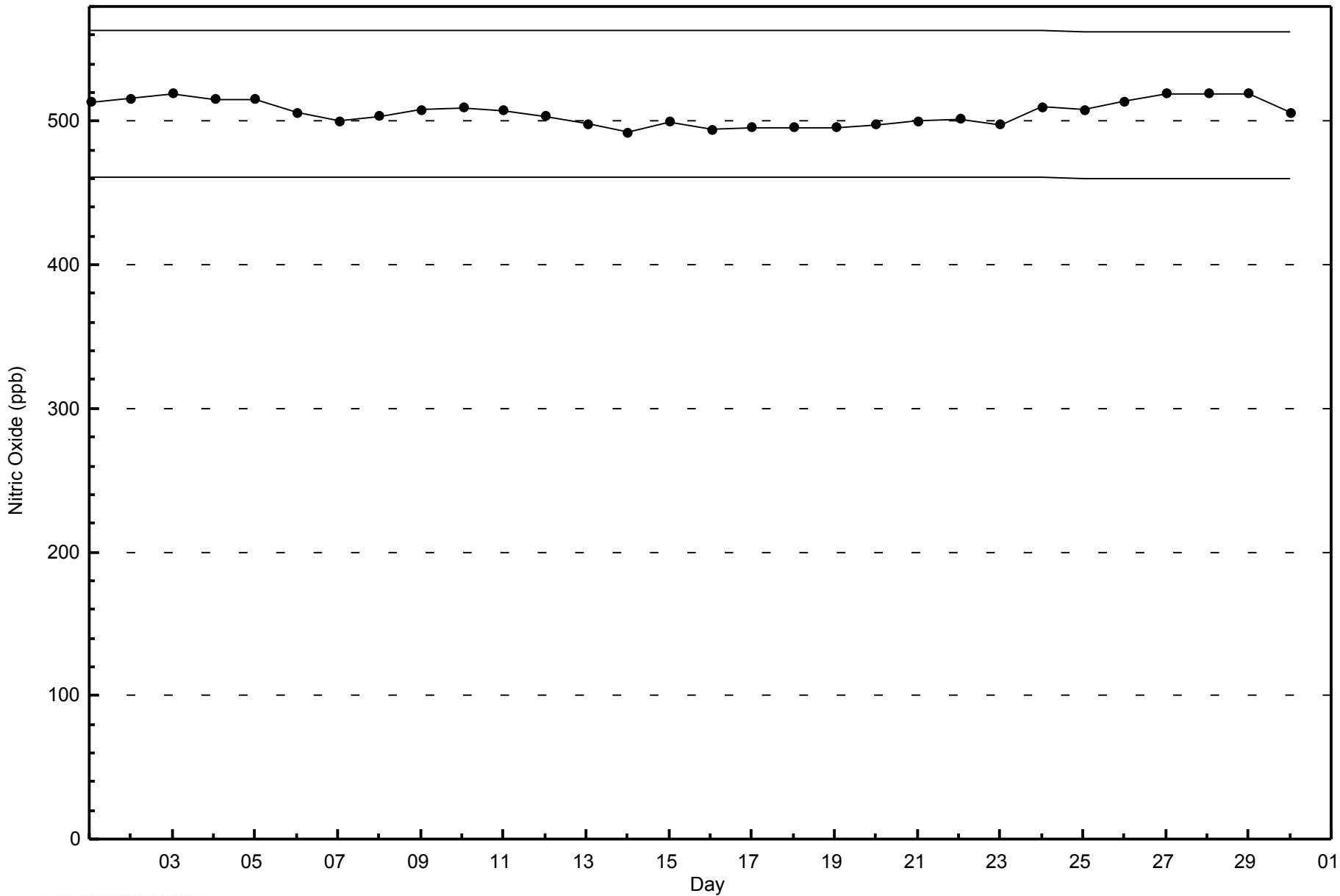
Nitric Oxide (NO) - ppb
Shell Muskeg River - June 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Shell Muskeg River - June 2014





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 43 ppb on Jun 2 22:00	Maximum Daily Average: 22.4 ppb on Jun 29
Minimum Value: 0 ppb on Jun 13 18:00	Hours of Data: 677
Maximum Diurnal Average: 13.0 ppb at hour 23	Hours of Missing Data: 43
Monthly Average: 8.9 ppb	Hours of Calibration: 36
Minimum Daily Average: 0.7 ppb on Jun 24	Percent Operational Time: 99.0
Minimum Diurnal Average: 4.9 ppb at hour 14	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 7 Q ₃ = 14 P ₉₀ = 21 P ₉₉ = 36	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	Z	1	0	2	2	0	1	0	0	0	1	2	1	1	3	4	20	7	7	1	2	2	9	10	3.2	20
2-Jun	Z	16	13	16	18	13	10	8	7	3	1	1	1	1	2	16	6	26	28	35	41	43	40	38	16.6	43
3-Jun	Z	27	22	15	16	13	13	10	14	14	12	12	13	12	10	15	8	12	15	13	7	10	14	16	13.6	27
4-Jun	Z	14	16	11	16	13	16	14	15	14	11	11	13	12	15	20	15	17	14	22	22	19	21	19	15.6	22
5-Jun	Z	23	22	22	PF	PF	18	17	17	16	15	14	13	17	15	9	9	6	14	19	21	25	22	21	16.8	25
6-Jun	Z	13	16	17	11	17	18	17	15	14	3	5	10	9	12	12	9	5	4	5	5	14	23	27	12.1	27
7-Jun	Z	11	6	7	19	17	15	3	3	26	18	10	3	4	6	15	11	11	10	12	32	16	11	14	12.1	32
8-Jun	Z	4	8	7	6	9	16	13	11	5	2	2	1	1	1	2	2	2	2	3	2	1	0	1	4.3	16
9-Jun	Z	0	1	9	10	11	3	2	1	1	1	0	1	0	0	1	0	0	1	2	6	3	10	21	3.7	21
10-Jun	Z	6	12	12	PF	PF	PF	20	13	14	8	11	12	5	1	6	8	2	1	1	1	4	6	5	7.3	20
11-Jun	Z	4	2	1	1	8	7	6	8	6	5	4	4	4	5	3	20	2	1	5	7	11	7	13	5.8	20
12-Jun	Z	11	14	16	9	8	14	17	22	20	11	11	14	9	13	13	22	17	6	7	13	26	11	4	13.3	26
13-Jun	Z	14	18	16	8	2	1	7	19	5	3	3	2	4	6	3	1	0	0	0	1	2	1	1	5.1	19
14-Jun	Z	0	0	0	0	0	2	5	6	6	6	3	2	1	1	1	0	0	0	0	2	1	2	4	1.9	6
15-Jun	Z	2	7	7	8	4	6	12	9	6	3	1	1	1	1	0	0	0	0	0	0	0	1	2	3.0	12
16-Jun	Z	3	4	4	2	10	11	24	32	22	11	20	4	1	1	1	1	1	2	7	16	15	7	3	8.7	32
17-Jun	Z	3	4	7	19	19	14	16	14	16	5	1	0	0	0	1	2	2	3	2	2	5	7	5	6.4	19
18-Jun	Z	7	12	8	10	3	6	6	8	4	4	3	3	2	2	2	2	2	3	3	3	5	4	4	4.6	12
19-Jun	Z	2	2	1	1	1	2	8	5	1	1	2	1	0	0	0	4	10	9	3	2	1	8	11	3.1	11
20-Jun	Z	27	22	6	5	13	12	6	6	9	3	1	1	0	0	0	0	1	1	4	3	5	5	2	5.8	27
21-Jun	Z	6	9	12	6	8	20	22	21	22	21	19	8	6	6	5	5	2	8	9	7	13	15	23	11.8	23
22-Jun	Z	10	5	6	6	3	5	13	18	12	21	15	8	7	8	8	9	9	10	14	6	2	4	8	8.9	21
23-Jun	Z	3	2	5	7	6	8	14	C	C	C	C	C	C	7	3	2	1	0	3	6	1	0	1	--	14
24-Jun	Z	0	0	0	0	0	0	0	0	0	2	1	1	1	1	1	1	0	0	2	2	2	1	1	0.7	2
25-Jun	Z	3	1	1	1	1	2	4	3	2	1	1	1	1	1	4	8	1	2	2	2	3	7	2	2.3	8
26-Jun	Z	3	2	6	7	7	9	7	2	4	4	6	3	3	PF	PF	5	9	18	36	35	35	31	26	12.3	36
27-Jun	Z	14	15	12	10	16	21	11	12	12	12	8	7	2	9	11	14	13	9	3	3	6	23	21	11.4	23
28-Jun	Z	9	9	10	6	6	8	11	7	16	25	12	16	7	6	3	5	6	13	16	24	28	36	24	13.1	36
29-Jun	Z	27	21	30	25	23	22	18	17	17	16	22	23	22	17	15	17	13	19	21	28	32	36	33	22.4	36
30-Jun	Z	31	23	26	27	24	19	11	12	9	11	15	15	9	12	12	12	14	17	15	23	31	30	16	18.0	31

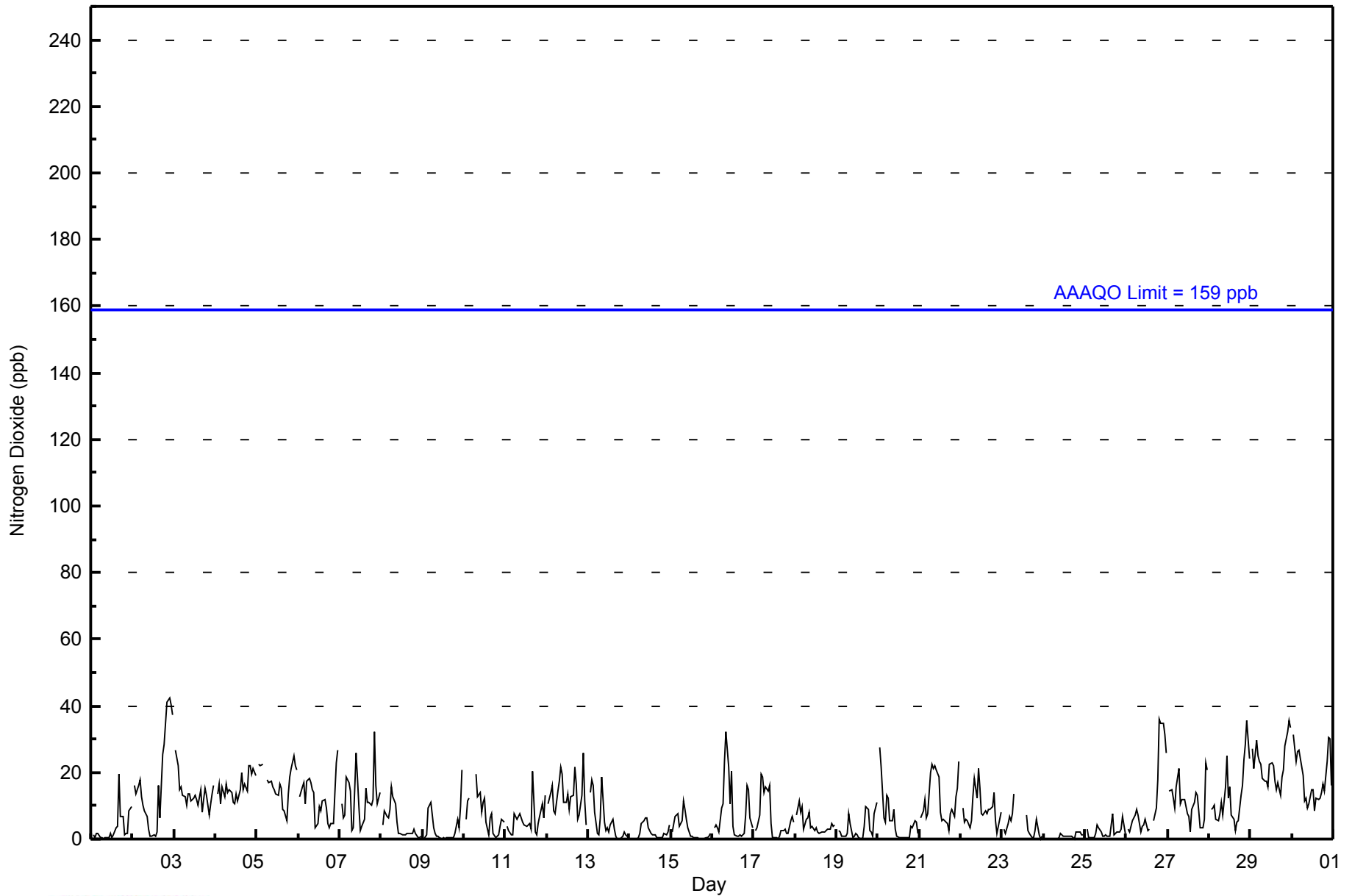
--	9.8	9.6	9.7	9.0	9.0	10.2	10.7	10.9	10.2	8.1	7.4	6.2	4.9	5.6	6.4	7.3	6.3	7.1	8.7	10.8	12.0	13.0	12.5	Diurnal Average	
--	31	23	30	27	24	22	24	32	26	25	22	23	22	17	20	22	26	28	36	41	43	40	38	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	604	89.22	89.22
21 - 40	71	10.49	99.70
41 - 80	2	0.30	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 677

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - June 2014

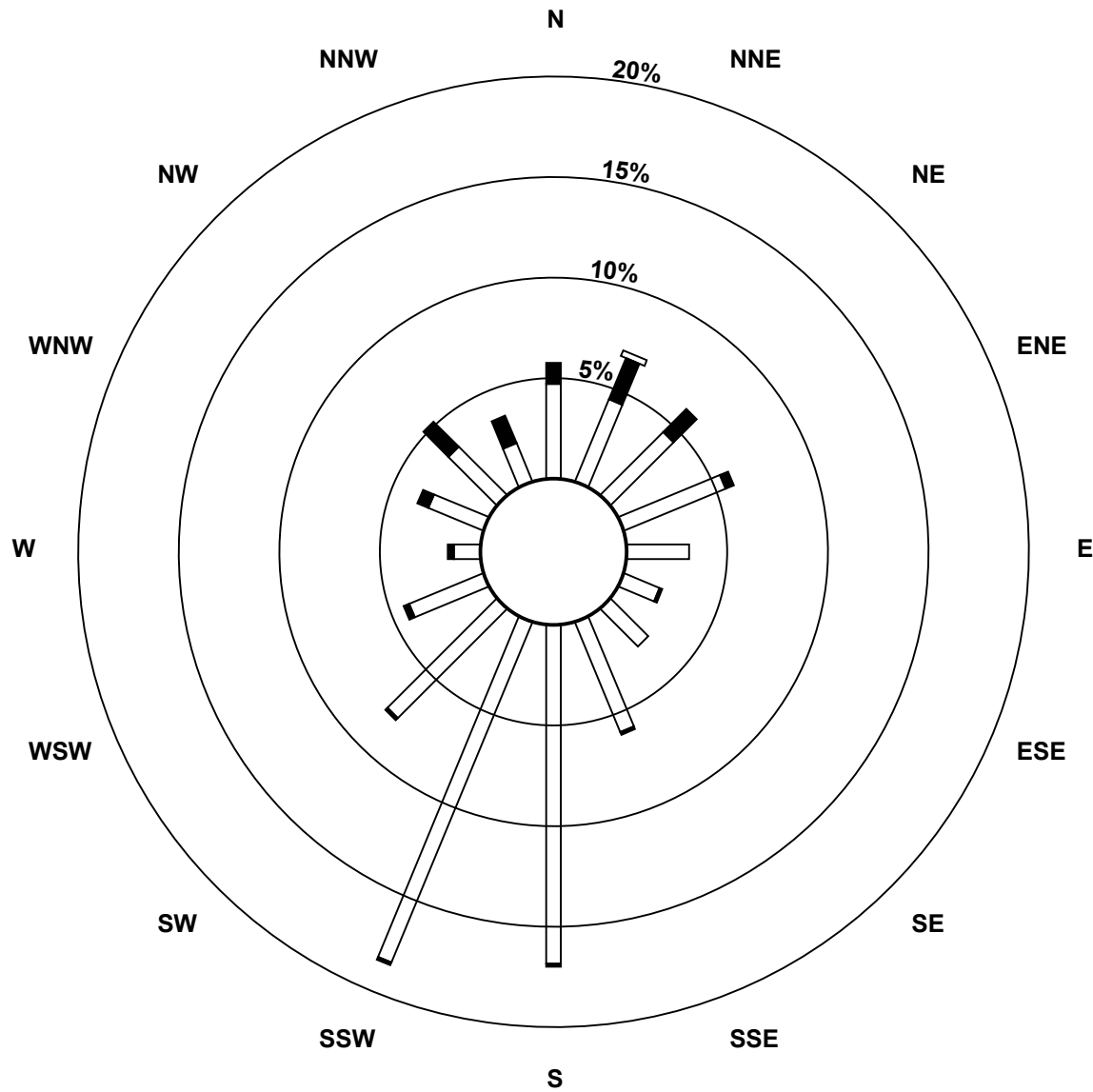
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	32	30	30	37	21	13	18	40	114	124	52	27	9	20	23	14	604
21 - 40	7	15	11	3	0	1	0	1	1	1	1	2	2	4	12	10	71
11 - 80	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	47	41	40	21	14	18	41	115	125	53	29	11	24	35	24	677

Total Number of Valid Hours: 677

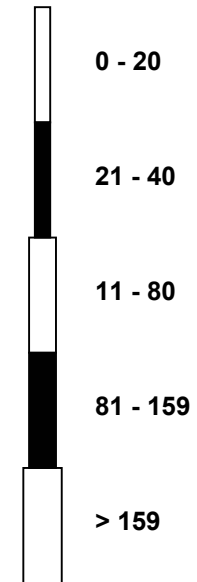
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River (AMS 16)



Classes (ppb)

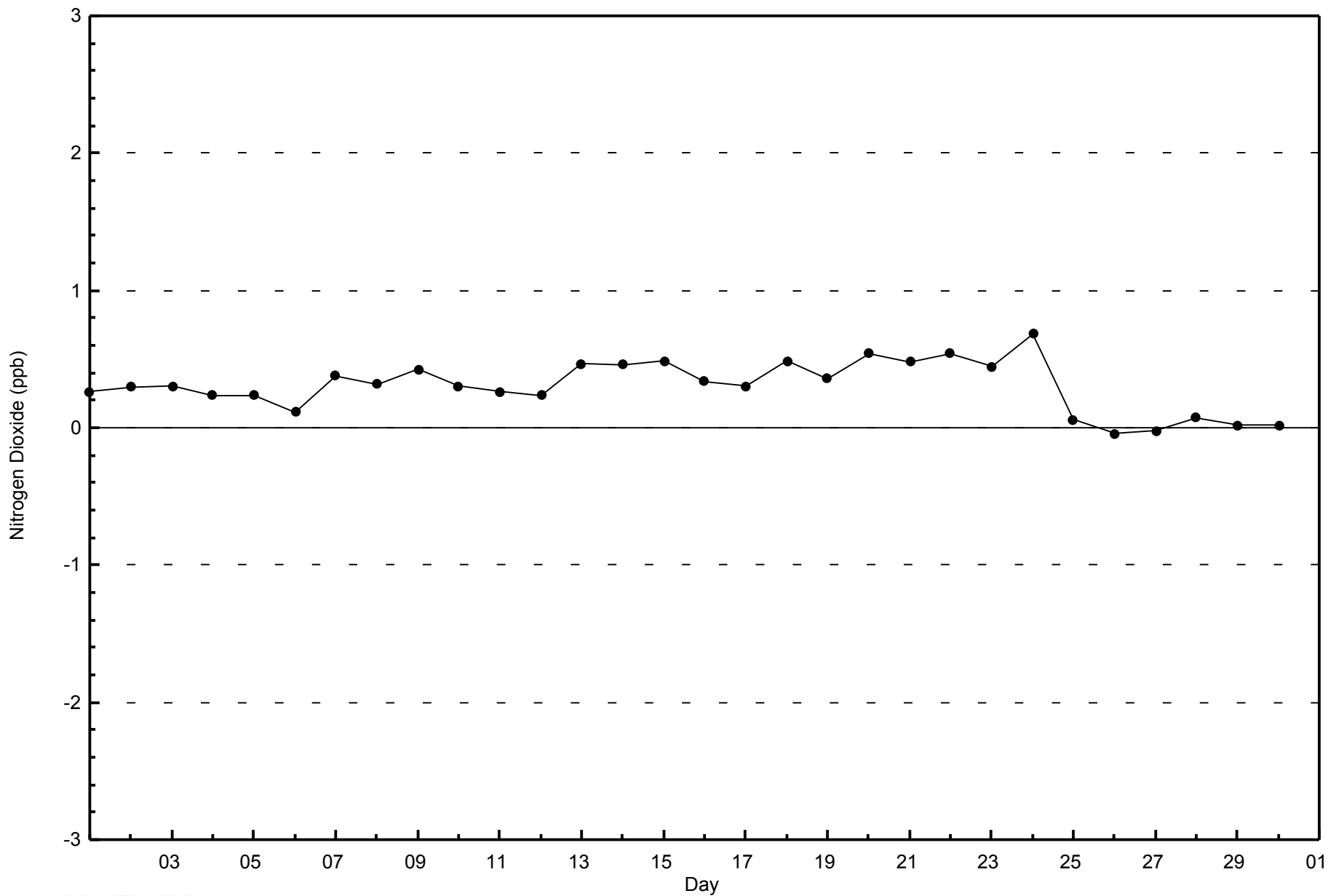


Total Number of Valid Hours: 677



WBEA
Zero Responses

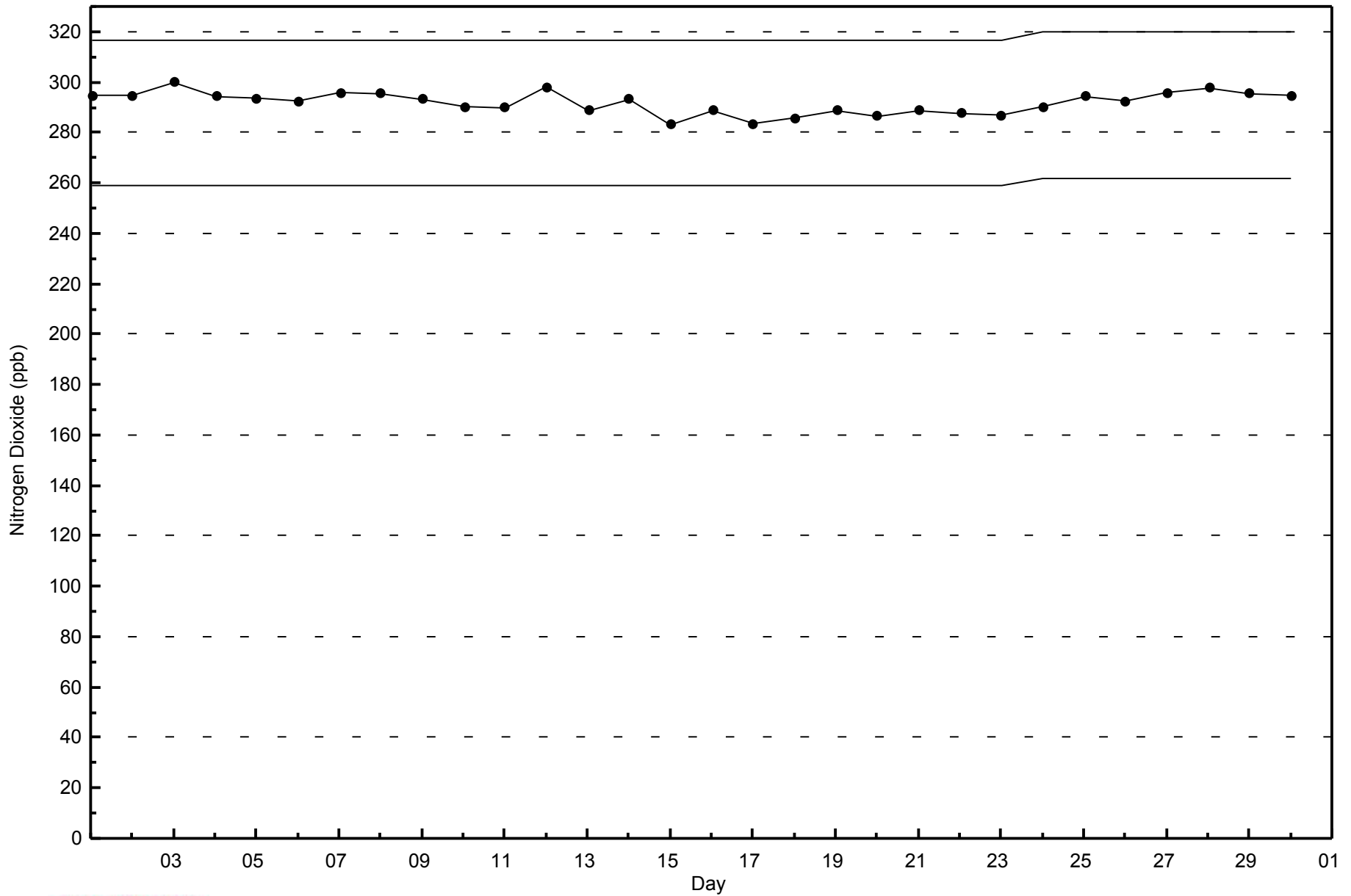
Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - June 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - June 2014



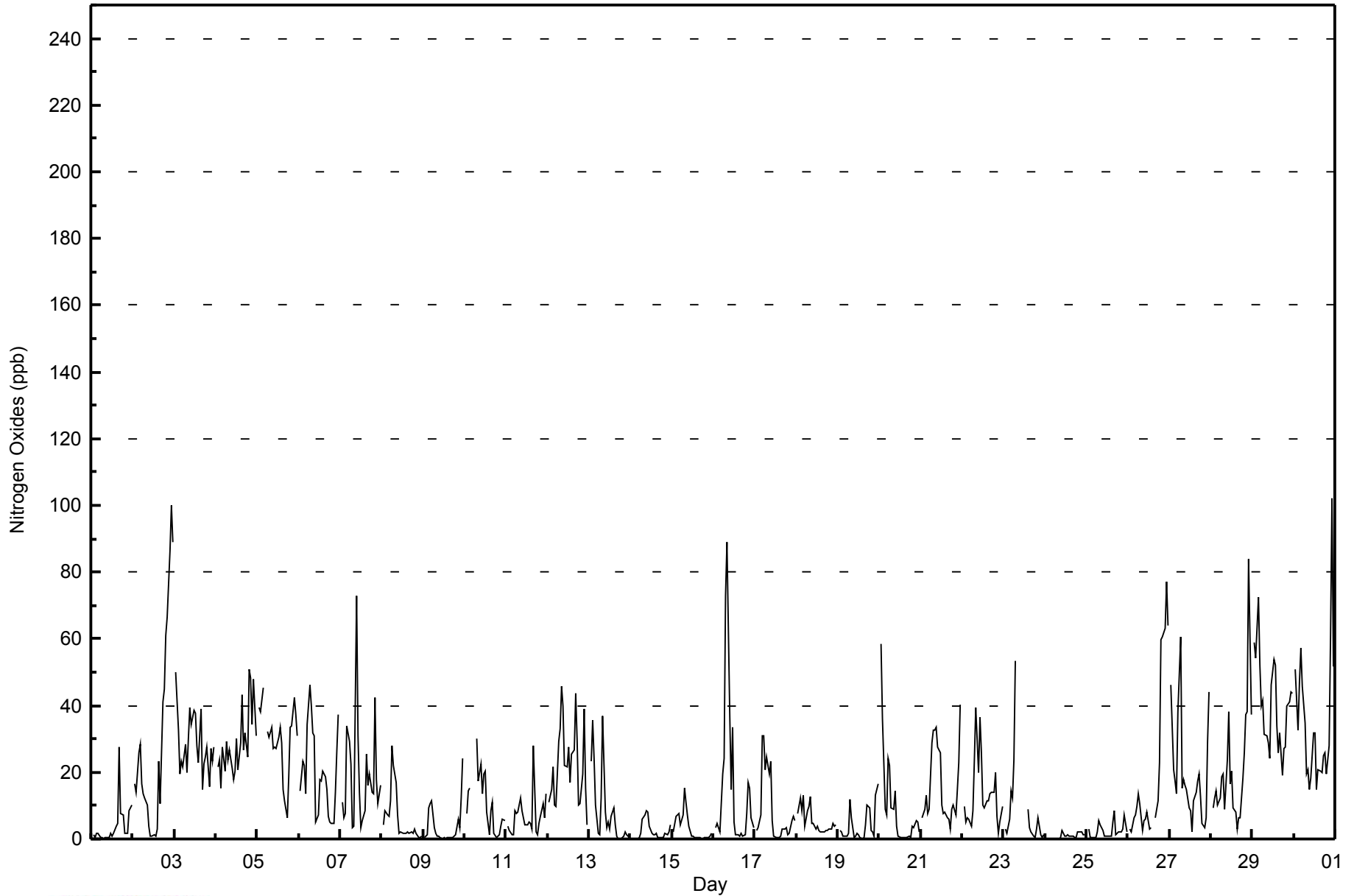


Maximum Value: 102 ppb on Jun 30 23:00														Maximum Daily Average: 40.0 ppb on Jun 29														Hours in Service: 720			
Minimum Value: 0 ppb on Jun 13 19:00														Minimum Daily Average: 0.8 ppb on Jun 24														Hours of Data: 677			
Maximum Diurnal Average: 23.6 ppb at hour 23														Minimum Diurnal Average: 8.7 ppb at hour 14														Hours of Missing Data: 43			
Monthly Average: 14.8 ppb														Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 8 Q ₃ = 23 P ₉₀ = 37 P ₉₉ = 75														Hours of Calibration: 36			
																												Percent Operational Time: 99.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Jun	Z	1	0	2	2	0	1	0	0	0	2	1	2	4	5	28	8	7	2	2	2	9	10	3.7	28						
2-Jun	Z	17	14	26	28	17	13	12	10	4	1	1	1	3	23	11	41	45	61	67	86	100	89	29.2	100						
3-Jun	Z	50	33	19	23	21	28	20	30	40	34	39	38	28	23	39	15	22	24	28	16	27	23	28	28.2	50					
4-Jun	Z	21	24	15	28	20	29	24	27	21	18	20	30	21	29	43	27	32	25	51	48	35	48	31	29.0	51					
5-Jun	Z	39	38	45	PF	PF	32	30	33	27	28	27	31	33	29	15	12	6	19	33	34	43	37	31	29.7	45					
6-Jun	Z	14	23	22	13	34	46	40	32	31	5	7	18	18	20	19	15	7	5	5	5	14	26	37	19.9	46					
7-Jun	Z	11	6	8	34	29	23	3	4	73	31	14	4	5	8	26	16	19	14	14	42	18	11	16	18.6	73					
8-Jun	Z	4	8	7	7	12	28	22	17	7	2	2	2	2	2	2	2	2	2	3	2	0	0	1	5.9	28					
9-Jun	Z	0	1	9	11	12	3	2	1	1	0	0	1	0	0	1	0	0	1	1	6	3	12	24	4.0	24					
10-Jun	Z	8	14	15	PF	PF	PF	30	18	22	14	19	20	8	1	8	11	2	1	1	1	4	6	5	10.4	30					
11-Jun	Z	4	2	1	1	9	8	8	12	8	6	4	4	5	5	3	28	2	1	5	7	10	6	14	6.8	28					
12-Jun	Z	11	15	22	10	10	29	33	46	40	22	21	27	17	26	27	44	30	10	10	19	39	15	4	22.9	46					
13-Jun	Z	23	36	24	10	2	1	12	37	8	4	5	3	7	9	4	1	0	0	0	1	2	1	0	8.4	37					
14-Jun	Z	0	0	0	0	0	2	6	7	8	8	4	2	1	1	2	1	0	0	0	2	1	2	4	2.3	8					
15-Jun	Z	2	7	7	8	4	7	15	11	7	4	1	1	1	1	0	0	0	0	0	0	0	1	2	3.5	15					
16-Jun	Z	3	5	3	2	19	24	73	89	37	15	34	5	1	1	1	2	1	1	8	17	15	6	3	15.9	89					
17-Jun	Z	3	4	7	31	31	21	25	19	23	6	1	0	0	0	1	3	3	3	1	2	5	7	6	8.8	31					
18-Jun	Z	8	12	8	13	4	9	10	13	5	5	3	4	2	2	2	2	2	3	3	3	5	4	4	5.4	13					
19-Jun	Z	2	2	1	1	1	2	12	6	1	1	2	1	0	0	0	4	10	9	3	2	1	13	16	3.9	16					
20-Jun	Z	59	36	9	7	24	22	9	9	14	4	1	0	0	0	0	0	1	0	4	3	5	5	2	9.4	59					
21-Jun	Z	7	9	13	7	9	29	32	33	34	27	26	10	8	8	6	6	3	9	10	7	15	23	40	16.1	40					
22-Jun	Z	10	5	6	6	4	9	23	40	20	36	26	10	9	12	11	13	14	14	20	7	2	5	10	13.6	40					
23-Jun	Z	3	2	6	14	12	24	53	C	C	C	C	C	C	9	4	2	1	0	3	6	1	0	1	--	53					
24-Jun	Z	0	0	0	0	0	0	0	0	1	3	1	1	1	1	1	1	0	0	2	2	2	1	1	0.8	3					
25-Jun	Z	3	0	0	1	1	2	6	4	3	1	1	1	1	1	5	9	1	2	2	2	3	7	2	2.5	9					
26-Jun	Z	3	2	6	7	10	13	11	3	6	6	8	3	3	PF	PF	6	12	23	60	61	63	77	64	21.3	77					
27-Jun	Z	46	21	17	13	38	60	15	18	16	15	9	9	2	11	14	17	19	13	4	3	6	29	44	19.3	60					
28-Jun	Z	9	12	14	10	12	19	20	9	24	38	17	20	9	8	3	6	6	18	26	37	38	84	37	20.8	84					
29-Jun	Z	59	54	72	52	40	42	31	31	29	24	46	54	52	34	26	32	19	27	28	40	41	44	44	40.0	72					
30-Jun	Z	51	33	47	57	46	35	20	21	15	18	32	32	15	21	20	20	25	26	20	28	61	102	52	34.5	102					
--		15.7	14.0	14.5	14.2	15.1	19.3	20.0	19.9	18.1	13.0	12.9	11.5	8.7	9.3	10.7	11.1	9.7	10.1	13.6	15.7	18.3	23.6	20.8	Diurnal Average						
--		59	54	72	57	46	60	73	89	73	38	46	54	52	34	43	44	41	45	61	67	86	102	89	Diurnal Maximum						
Z - zerspan		C - Calibration				PF - Power Failure																									



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	487	71.94	71.94
21 - 40	140	20.68	92.61
41 - 80	44	6.50	99.11
81 - 159	6	0.89	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 677

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - June 2014

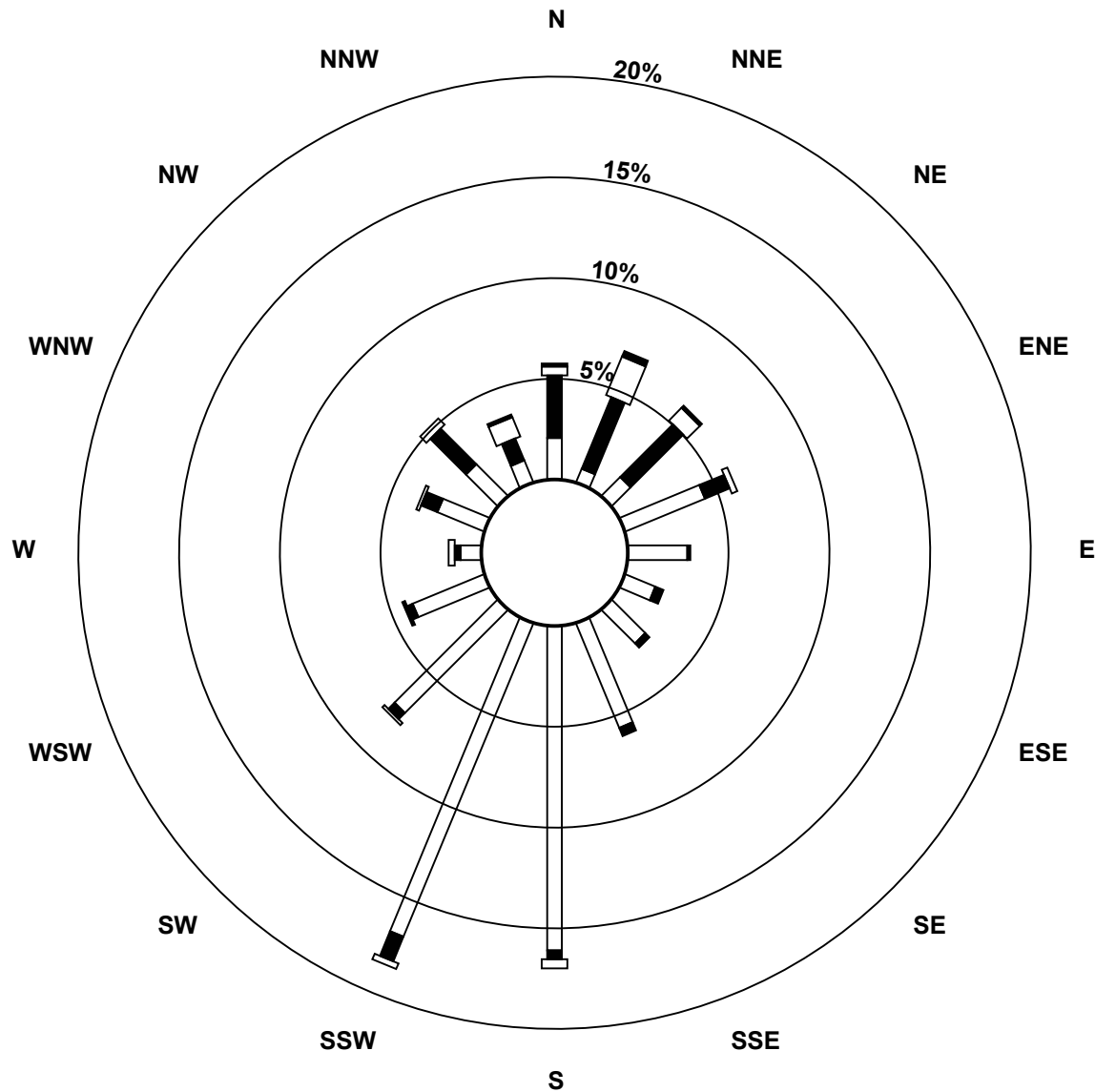
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	14	5	9	29	20	11	16	38	109	114	49	26	7	17	15	8	487
21 - 40	21	26	25	9	1	3	2	3	3	9	3	2	2	6	17	8	140
11 - 80	3	14	6	2	0	0	0	0	3	2	1	0	2	1	3	7	44
81 - 159	1	2	1	0	0	0	0	0	0	0	0	1	0	0	0	1	6
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	47	41	40	21	14	18	41	115	125	53	29	11	24	35	24	677

Total Number of Valid Hours: 677

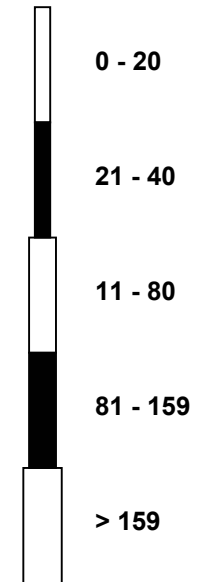
Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Jun 2014

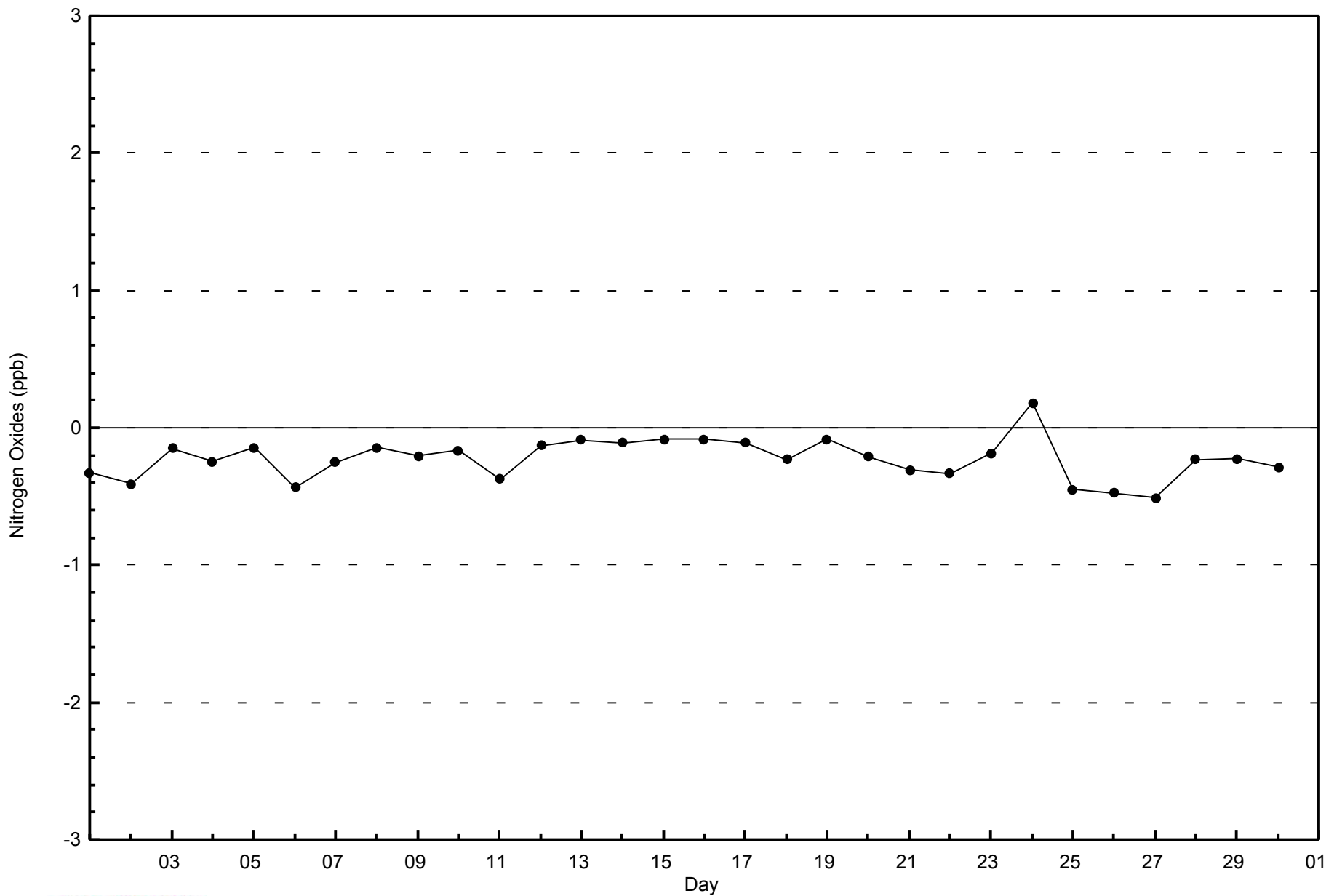
Nitrogen Oxides (NO_x) - ppb
 Shell Muskeg River (AMS 16)



Classes (ppb)



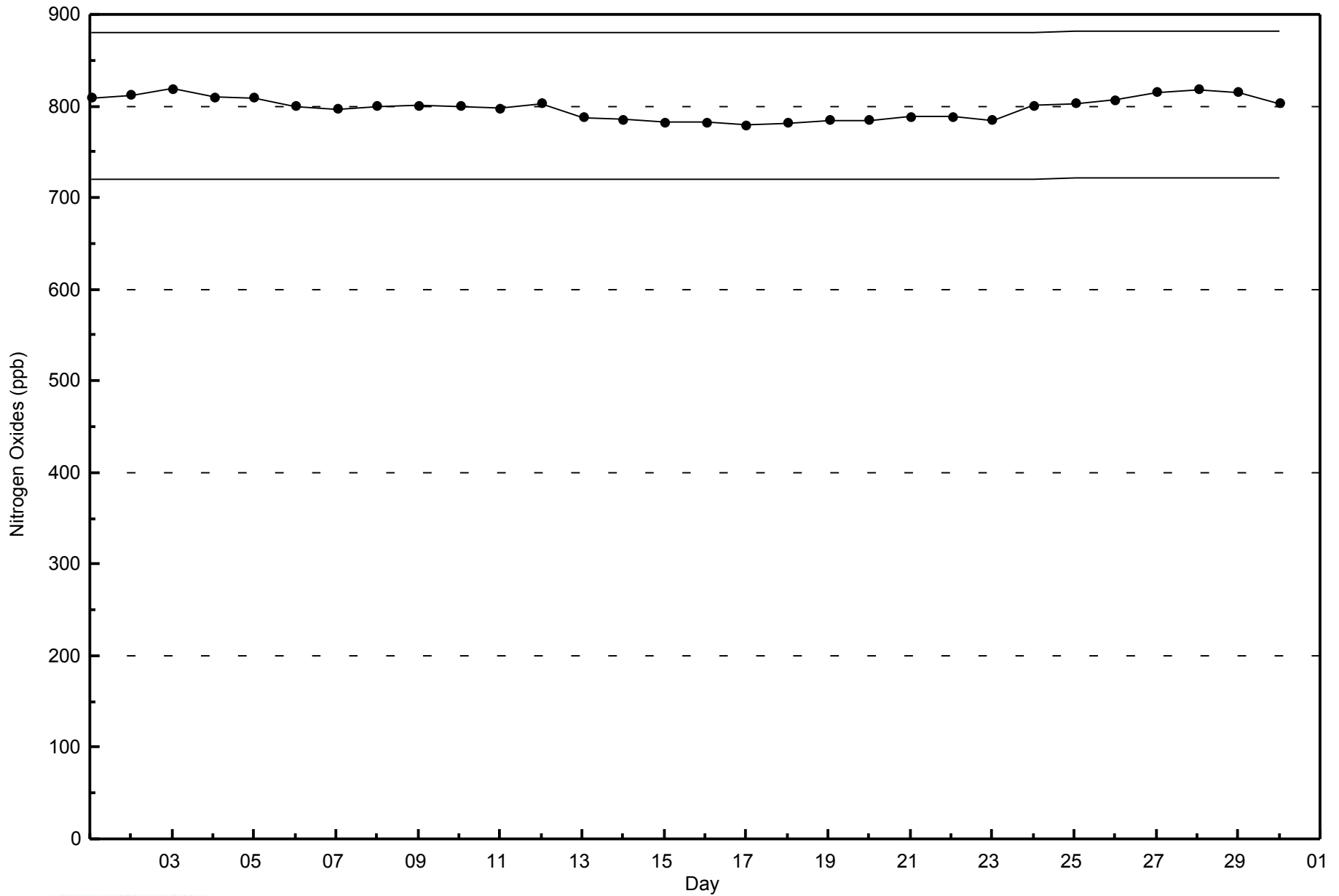
Total Number of Valid Hours: 677





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - June 2014





Summary of Hour Averages

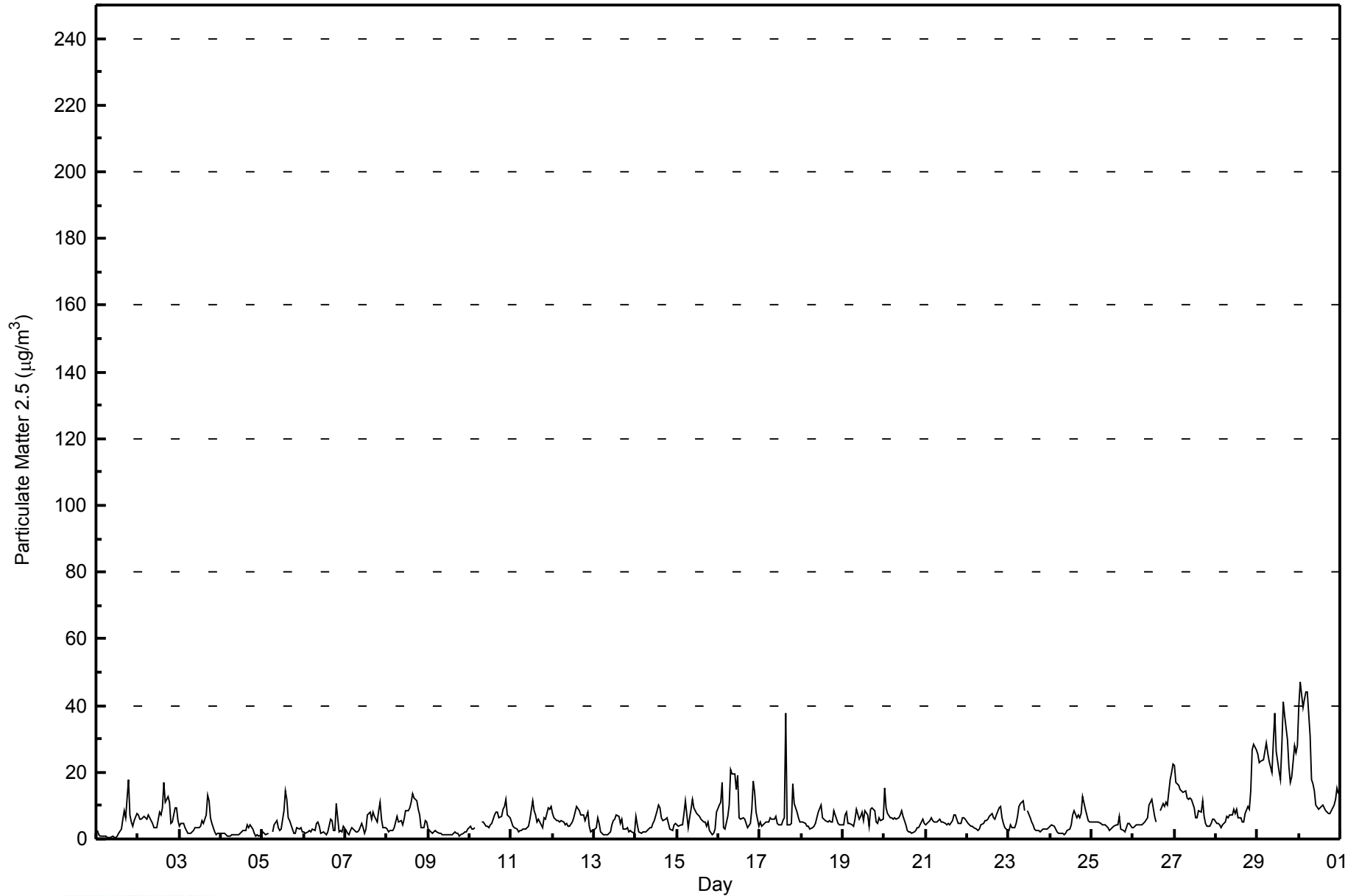
Shell Muskeg River - June 2014

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 47.0 µg/m ³ on Jun 30 02:00 Minimum Value: 0.5 µg/m ³ on Jun 1 08:00 Maximum Diurnal Average: 8.6 µg/m ³ at hour 16 Monthly Average: 6.73 µg/m ³		Maximum Daily Average: 26.1 µg/m ³ on Jun 29 Minimum Daily Average: 1.8 µg/m ³ on Jun 9 Minimum Diurnal Average: 6.0 µg/m ³ at hour 4 Percentiles: P ₁ = 0.8 P ₁₀ = 1.9 Q ₁ = 3.1 Median = 4.9 Q ₃ = 7.6 P ₉₀ = 12.0 P ₉₉ = 38.8		Hours in Service: 720 Hours of Data: 712 Hours of Missing Data: 8 Hours of Calibration: 0 Percent Operational Time: 98.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	2.7	1.1	0.7	0.8	1.1	1.0	0.6	0.5	0.5	0.7	0.6	0.6	1.0	1.8	2.8	6.1	8.3	6.5	18.0	7.0	4.9	3.9	5.4	7.5	3.5	18.0
2-Jun	7.0	6.1	5.7	6.7	6.5	6.1	7.2	6.2	4.5	3.6	3.2	3.4	8.2	7.3	9.5	16.8	11.2	12.8	11.1	4.7	5.0	9.4	9.2	5.4	7.4	16.8
3-Jun	3.9	4.7	4.7	3.4	2.6	1.9	1.8	2.1	2.4	3.5	3.3	3.4	3.8	5.4	4.7	7.1	13.3	11.4	6.2	4.6	2.2	1.5	1.8	1.9	4.2	13.3
4-Jun	1.5	1.8	1.7	1.3	1.0	0.9	1.2	1.2	1.1	1.2	1.5	1.8	2.0	2.5	2.5	4.3	3.5	4.4	3.1	1.8	1.0	1.3	0.8	1.2	1.9	4.4
5-Jun	2.1	1.8	1.2	1.7	PF	PF	2.1	4.1	5.5	3.3	2.6	3.0	8.4	14.4	11.8	6.4	5.5	2.9	1.7	1.7	3.4	3.0	3.2	2.2	4.2	14.4
6-Jun	2.3	1.5	2.2	2.4	1.9	2.9	2.5	4.5	5.1	3.6	1.7	2.2	1.9	1.4	2.1	6.1	5.4	2.4	2.7	10.7	2.3	2.5	2.0	3.6	3.2	10.7
7-Jun	2.7	1.6	1.3	2.6	3.2	2.6	2.1	1.9	2.6	4.8	3.5	1.9	3.1	7.2	8.1	6.0	8.3	6.8	5.1	8.6	10.9	5.8	3.3	3.5	4.5	10.9
8-Jun	2.8	2.3	2.6	2.4	3.6	5.2	7.0	5.0	5.5	4.3	6.0	8.6	8.3	9.3	10.8	13.5	12.5	11.4	9.0	7.3	3.3	3.6	5.3	5.1	6.4	13.5
9-Jun	2.8	2.3	1.9	2.1	2.4	2.3	1.8	1.6	1.2	1.3	1.3	1.3	1.2	1.2	1.2	1.9	1.7	1.6	1.0	1.2	1.8	1.9	2.1	3.1	1.8	3.1
10-Jun	3.7	2.8	3.0	3.2	PF	PF	PF	5.0	5.1	3.9	3.8	3.5	4.3	4.5	7.2	8.2	8.0	6.2	6.9	9.0	9.9	11.8	7.4	6.5	5.9	11.8
11-Jun	4.9	3.8	3.3	3.0	2.2	2.5	2.6	2.9	3.0	3.2	4.0	5.9	11.3	8.6	7.3	5.1	6.1	4.3	3.5	6.4	6.1	9.1	9.0	9.8	5.3	11.3
12-Jun	7.8	6.5	5.6	5.5	5.2	5.5	4.9	4.1	4.6	3.8	4.0	5.1	6.2	8.2	9.7	8.5	7.1	7.0	7.2	5.6	8.3	3.8	2.3	2.7	5.8	9.7
13-Jun	2.8	3.3	6.4	4.8	2.1	1.3	1.1	1.1	1.3	2.0	4.3	5.4	6.0	7.3	6.8	4.9	5.7	2.8	3.0	3.4	2.3	2.4	2.3	1.9	3.5	7.3
14-Jun	6.8	4.4	2.0	1.8	1.9	2.0	2.2	2.7	3.5	3.6	4.8	5.6	8.7	10.4	9.5	6.5	5.6	6.1	6.2	4.8	3.2	2.6	4.2	4.6	4.7	10.4
15-Jun	4.3	3.8	4.2	4.4	7.7	11.5	3.6	6.4	9.0	11.9	9.4	7.8	7.3	6.7	5.9	5.0	5.2	4.0	4.9	2.7	1.4	1.7	3.1	7.9	5.8	11.9
16-Jun	10.1	11.0	16.9	3.3	2.9	6.7	10.3	20.7	19.5	19.4	14.7	19.1	6.6	6.0	6.2	5.7	4.8	3.3	4.9	8.9	17.4	13.9	7.9	3.9	10.2	20.7
17-Jun	4.9	3.8	4.2	5.0	5.0	5.3	6.4	5.9	6.1	6.8	4.5	4.0	4.4	5.7	6.2	37.7	4.4	4.1	4.7	16.3	10.8	8.1	6.4	5.0	7.3	37.7
18-Jun	5.1	5.0	4.6	4.0	3.6	3.1	3.3	3.7	4.7	6.4	7.9	10.0	6.4	6.1	5.7	5.0	5.3	5.0	5.2	8.4	6.0	4.8	4.4	4.1	5.3	10.0
19-Jun	4.1	7.0	8.1	4.9	4.7	4.2	4.0	6.0	8.7	5.9	6.6	7.9	5.3	8.7	7.2	3.9	9.1	9.1	8.3	4.9	4.5	6.4	5.3	5.8	6.3	9.1
20-Jun	15.4	9.3	7.4	6.3	6.5	6.0	6.2	6.0	6.4	7.1	8.5	6.7	4.4	2.4	1.9	2.0	1.9	2.3	2.6	3.3	3.6	4.9	5.8	4.6	5.5	15.4
21-Jun	4.0	4.7	5.5	6.4	5.7	5.0	5.2	5.3	5.8	5.3	5.0	4.4	4.1	4.6	4.3	5.4	7.2	7.4	6.1	4.5	4.7	6.3	6.5	6.0	5.4	7.4
22-Jun	4.7	4.3	3.8	4.0	3.5	2.9	2.4	2.8	4.2	4.5	5.7	5.5	6.0	6.7	7.7	6.4	6.1	7.3	9.4	9.7	6.2	4.6	3.5	2.7	5.2	9.7
23-Jun	2.7	4.1	3.6	3.4	4.5	6.7	10.0	10.5	11.3	8.6	M	8.4	6.2	5.2	4.1	3.0	2.7	2.2	2.4	2.8	2.8	2.8	3.2	5.0	11.3	
24-Jun	3.8	4.0	3.8	3.1	2.3	1.8	1.7	1.6	1.5	1.8	2.5	3.1	4.4	7.1	8.3	6.4	7.1	6.5	7.8	12.8	9.0	7.1	5.6	5.2	4.9	12.8
25-Jun	5.0	4.9	4.9	5.0	5.0	4.6	4.4	4.2	4.4	3.6	2.6	2.9	3.5	3.8	4.1	4.3	6.8	3.1	2.5	2.3	3.2	4.9	4.6	3.4	4.1	6.8
26-Jun	3.4	3.8	4.2	4.4	4.3	4.4	4.7	5.2	6.4	10.2	10.8	12.0	6.8	5.3	PF	PF	8.5	10.5	9.7	11.1	10.3	17.8	19.9	22.4	8.9	22.4
27-Jun	22.0	16.8	16.1	14.7	14.4	14.2	14.4	12.3	11.7	12.1	11.9	9.2	6.5	6.3	8.7	8.1	11.3	6.8	4.6	3.8	3.6	4.5	5.9	5.9	10.2	22.0
28-Jun	4.9	4.6	4.1	3.5	4.1	4.9	6.8	6.5	7.1	7.3	8.8	7.5	8.7	6.2	6.1	4.9	5.2	7.8	9.6	9.0	14.3	26.6	28.6	26.6	9.3	28.6
29-Jun	25.5	22.8	23.1	23.9	26.2	29.0	25.8	23.3	20.1	29.2	37.8	26.2	20.2	17.9	28.1	41.1	37.0	29.8	21.7	16.8	18.7	28.2	26.0	28.1	26.1	41.1
30-Jun	39.9	47.0	39.2	42.0	44.1	44.0	30.9	23.3	20.1	29.2	37.8	26.2	20.2	17.9	28.1	41.1	37.0	29.8	21.7	16.8	18.7	28.2	26.0	28.1	19.8	47.0
																								Diurnal Average		
																								Diurnal Maximum		
7.1 6.7 6.5 6.0 6.4 6.7 6.1 6.0 6.3 6.6 6.6 6.5 6.1 6.6 7.2 8.6 7.8 6.8 6.6 6.7 6.4 7.2 7.0 6.9																								Diurnal Average		
39.9 47.0 39.2 42.0 44.1 44.0 30.9 23.3 20.1 29.2 37.8 26.2 20.2 17.9 28.1 41.1 37.0 29.8 21.7 16.8 18.7 28.2 26.6 28.1																								Diurnal Maximum		
M - Maintenance PF - Power Failure 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 - June 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - June 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	389	54.63	54.63
6 - 15	258	36.24	90.87
16 - 25	28	3.93	94.80
26 - 80	24	3.37	98.17
> 81.0	0	0.00	98.17

Total Number of Valid Hours: 712

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Shell Muskeg River - June 2014

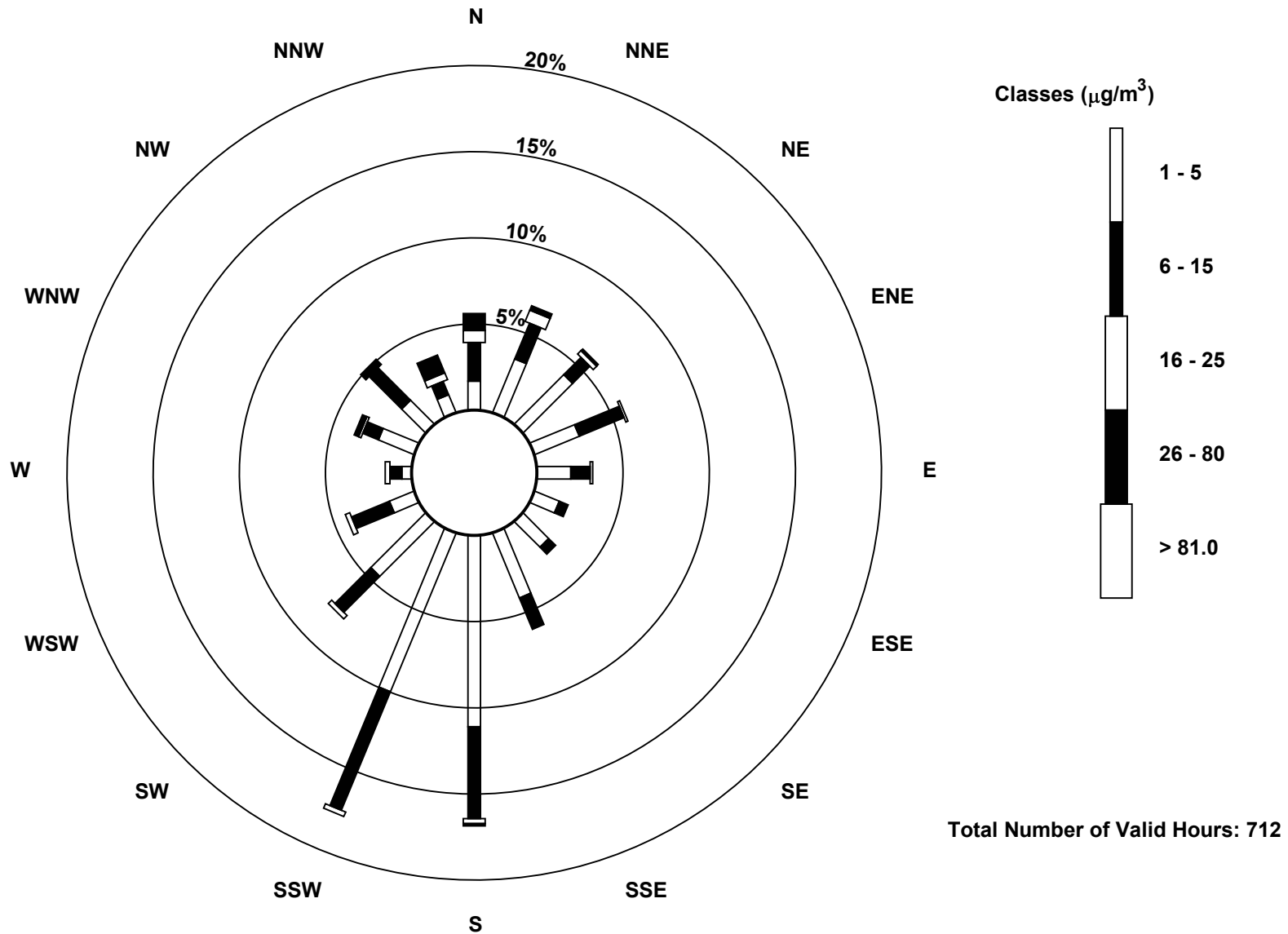
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	12	24	29	20	14	11	15	29	79	71	32	11	4	16	14	8	389
6 - 15	16	16	10	20	8	4	4	14	38	53	21	17	5	7	19	6	258
16 - 25	5	5	2	1	1	0	0	0	2	2	2	2	2	1	0	3	28
26 - 80	7	2	1	0	0	0	0	0	1	0	0	0	0	2	3	8	24
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	40	47	42	41	23	15	19	43	120	126	55	30	11	26	36	25	699

Total Number of Valid Hours: 712

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Jun 2014

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
 Shell Muskeg River (AMS 16)



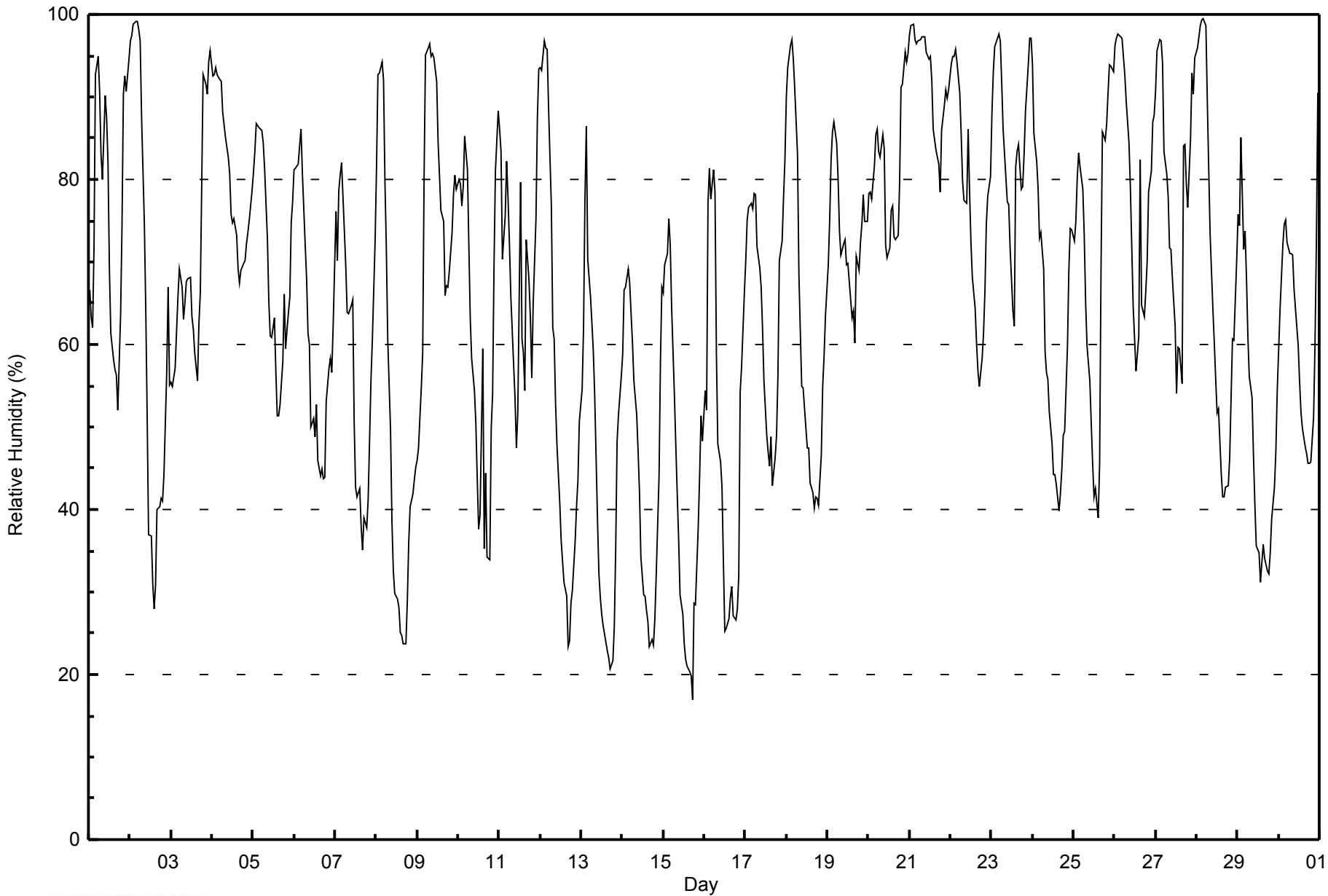


Maximum Value: 100 % on Jun 28 05:00																			Maximum Daily Average: 92.1 % on Jun 21						Hours in Service: 720	
Minimum Value: 17 % on Jun 15 18:00																			Minimum Daily Average: 42.4 % on Jun 15						Hours of Data: 720	
Maximum Diurnal Average: 85.1 % at hour 5																			Minimum Diurnal Average: 48.9 % at hour 16						Hours of Missing Data: 0	
Monthly Average: 65.9 %																			Percentiles: P ₁ = 22 P ₁₀ = 36 Q ₁ = 51 Median = 68 Q ₃ = 82 P ₉₀ = 94 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-Jun	67	63	62	72	93	95	91	83	80	90	87	82	69	61	58	57	56	52	64	74	90	92	91	95	76.0	95
2-Jun	97	98	99	99	99	98	97	88	75	64	51	37	37	31	28	31	40	40	41	41	44	57	67	55	63.1	99
3-Jun	55	55	57	62	66	69	67	63	65	68	68	68	63	62	59	56	63	66	79	93	92	90	94	96	69.8	96
4-Jun	93	93	94	93	92	92	88	87	85	83	81	76	75	73	69	67	69	70	70	72	74	75	79	79	80.1	94
5-Jun	81	83	87	86	86	86	84	81	73	65	61	61	63	57	51	51	53	58	66	60	62	66	75	77	69.7	87
6-Jun	81	81	82	84	86	81	72	68	61	60	50	51	49	53	46	44	45	44	44	53	57	58	57	62	61.2	86
7-Jun	76	70	79	81	82	74	69	64	64	65	65	51	43	42	43	38	35	39	38	41	48	56	61	73	58.1	82
8-Jun	81	93	93	94	92	80	72	61	50	39	33	30	29	28	25	25	24	24	29	36	40	42	44	45	50.3	94
9-Jun	46	47	55	59	80	95	96	96	95	95	95	92	85	81	76	75	66	67	67	69	74	78	81	79	77.0	96
10-Jun	80	79	77	79	85	81	72	63	58	54	50	44	38	39	60	35	44	34	34	50	54	70	81	88	60.4	88
11-Jun	86	83	70	76	82	78	72	66	58	54	47	52	80	61	59	54	73	68	63	56	65	75	87	93	69.1	93
12-Jun	94	93	97	96	96	89	77	62	61	53	48	41	36	34	31	29	23	24	29	30	36	40	44	51	54.7	97
13-Jun	55	62	77	86	70	66	62	59	54	39	32	29	27	26	24	23	22	21	22	26	35	48	52	56	44.7	86
14-Jun	59	67	67	69	67	64	60	56	51	47	42	34	30	30	28	26	23	24	23	27	32	44	58	67	45.7	69
15-Jun	66	70	71	75	72	64	54	48	42	36	30	27	24	22	21	20	20	17	29	29	38	44	51	48	42.4	75
16-Jun	54	52	77	81	78	81	78	59	48	46	43	34	25	26	27	29	31	27	27	28	32	54	57	66	48.4	81
17-Jun	70	75	77	77	76	78	78	72	69	67	62	56	49	47	45	49	43	46	49	56	70	73	78	82	64.4	82
18-Jun	90	94	96	97	95	91	83	68	61	55	55	50	47	47	43	42	40	42	41	40	47	55	59	64	62.6	97
19-Jun	70	75	82	86	87	84	80	74	71	72	73	70	70	68	63	64	60	71	69	72	74	78	75	75	73.5	87
20-Jun	78	78	78	82	85	86	83	83	85	84	72	71	72	76	77	73	73	73	80	91	91	95	94	95	81.5	95
21-Jun	98	99	99	97	96	97	97	97	97	97	95	95	95	92	86	84	83	82	79	86	89	91	90	91	92.1	99
22-Jun	94	95	95	96	94	91	86	80	77	77	86	79	72	68	64	60	57	55	58	61	66	75	78	80	76.9	96
23-Jun	88	93	96	97	98	97	92	86	80	77	77	72	64	62	82	83	84	79	79	83	88	94	97	97	85.2	98
24-Jun	94	86	82	79	73	74	69	59	57	56	52	48	44	44	43	40	42	45	49	49	60	69	74	74	60.9	94
25-Jun	72	75	80	83	82	79	73	65	60	56	50	46	42	43	39	46	69	86	85	87	90	94	94	93	70.3	94
26-Jun	96	97	98	97	97	95	93	89	84	79	72	65	57	59	61	82	65	63	66	70	78	81	87	88	80.0	98
27-Jun	91	96	97	97	94	83	81	78	72	71	68	62	54	60	60	55	84	84	80	77	85	93	90	95	79.4	97
28-Jun	96	97	99	99	100	99	89	81	73	64	60	56	52	52	44	41	42	43	43	46	54	61	60	70	67.6	100
29-Jun	76	74	85	72	74	68	61	56	54	47	41	36	35	31	34	36	34	32	32	35	39	43	47	54	49.7	85
30-Jun	59	64	72	75	75	72	71	71	71	67	64	60	55	52	50	48	47	46	46	46	51	60	73	91	61.9	91
	78.1	79.6	82.6	84.2	85.1	82.9	78.3	72.1	67.7	64.2	60.4	55.7	52.7	50.9	50.0	48.9	50.2	50.7	52.6	56.1	61.8	68.3	72.3	76.0	Diurnal Average	
	98	99	99	99	100	99	97	97	97	97	95	95	95	92	86	84	84	86	85	93	92	95	97	97	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Shell Muskeg River - June 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Shell Muskeg River - June 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	2	0.28	0.28
20 - 40	89	12.36	12.64
40 - 60	180	25.00	37.64
60 - 80	241	33.47	71.11
80 - 100	208	28.89	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

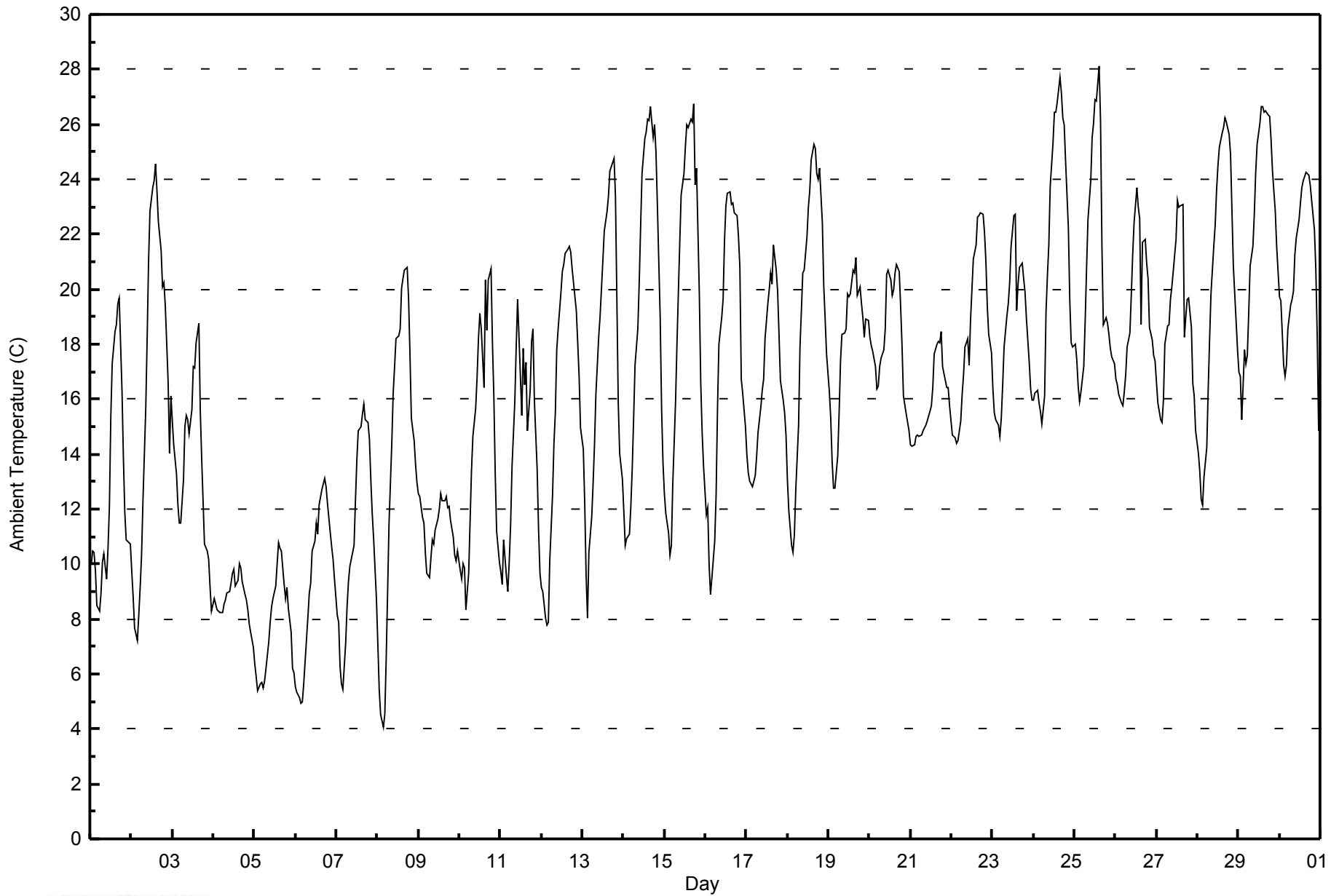


Maximum Value: 28.1 C on Jun 25 15:00																				Maximum Daily Average: 22.3 C on Jun 29					Hours in Service: 720																							
Minimum Value: 4.1 C on Jun 8 04:00																				Minimum Daily Average: 7.7 C on Jun 5					Hours of Data: 720																							
Maximum Diurnal Average: 20.7 C at hour 16																				Minimum Diurnal Average: 11.4 C at hour 4					Hours of Missing Data: 0																							
Monthly Average: 16.38 C																				Percentiles: P ₁ = 5.4 P ₁₀ = 9.0 Q ₁ = 12.1 Median = 16.5 Q ₃ = 20.3 P ₉₀ = 23.7 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-Jun	9.9	10.5	10.4	9.8	8.5	8.3	9.0	10.1	10.4	9.4	10.6	12.1	15.4	17.3	18.4	18.7	19.5	19.7	16.3	13.9	11.9	10.9	10.8	10.7	12.6	19.7																						
2-Jun	9.7	8.8	7.7	7.2	8.2	9.1	10.3	12.3	15.6	18.2	21.0	22.8	23.7	23.9	24.5	23.6	22.5	21.4	20.1	20.2	19.4	16.6	14.0	16.1	16.5	24.5																						
3-Jun	15.2	14.3	13.3	12.2	11.5	11.5	13.1	15.0	15.4	15.3	14.7	15.6	17.2	17.2	18.1	18.7	15.6	13.8	12.3	10.7	10.5	10.2	9.2	8.3	13.7	18.7																						
4-Jun	8.8	8.5	8.3	8.3	8.2	8.3	8.5	8.7	8.9	9.0	9.3	9.7	9.8	9.2	9.4	10.0	9.9	9.4	8.9	8.7	8.3	7.9	7.5	7.0	8.8	10.0																						
5-Jun	6.3	5.9	5.4	5.6	5.7	5.5	5.7	6.2	7.2	7.9	8.5	8.7	9.2	10.0	10.8	10.6	10.5	9.3	8.7	9.1	8.4	7.5	6.2	6.1	7.7	10.8																						
6-Jun	5.5	5.3	5.1	4.9	5.0	5.6	7.3	8.1	8.9	9.3	10.5	10.8	11.5	11.1	12.2	12.7	12.9	13.1	12.8	12.2	11.2	10.6	10.2	9.5	9.4	13.1																						
7-Jun	8.1	7.9	6.3	5.6	5.5	7.1	8.4	9.3	9.9	10.4	10.7	12.3	13.8	14.9	15.0	15.5	15.8	15.3	15.2	14.6	13.1	11.8	10.9	8.7	11.1	15.8																						
8-Jun	7.1	5.5	4.5	4.1	4.5	6.5	9.0	11.4	14.4	16.2	17.2	18.2	18.3	18.6	20.0	20.4	20.7	20.8	19.7	17.6	15.3	14.5	13.6	13.0	13.8	20.8																						
9-Jun	12.5	12.4	11.7	11.5	10.4	9.7	9.5	10.2	10.9	10.7	11.2	11.6	12.0	12.6	12.3	12.3	12.5	12.0	12.1	11.6	11.0	10.3	10.1	10.5	11.3	12.6																						
10-Jun	9.8	9.5	10.0	9.8	8.4	9.7	11.6	13.4	14.6	15.7	16.8	18.2	19.1	18.6	16.4	20.3	18.5	20.4	20.7	18.0	16.1	13.3	11.2	10.0	14.6	20.7																						
11-Jun	9.7	9.3	10.9	9.5	9.0	10.1	11.5	13.5	15.9	17.9	19.6	18.2	15.4	17.8	16.5	17.4	14.9	16.3	18.1	18.6	15.9	13.4	11.3	9.7	14.2	19.6																						
12-Jun	9.2	9.0	8.0	7.8	7.9	10.1	12.5	14.4	15.5	17.8	18.6	19.9	20.7	20.9	21.3	21.4	21.5	21.4	20.8	20.2	19.2	18.1	16.9	14.9	16.2	21.5																						
13-Jun	14.2	12.3	9.6	8.1	10.4	11.7	12.9	14.4	16.2	18.2	19.0	20.1	21.1	22.1	22.8	23.4	24.3	24.5	24.8	23.4	19.7	15.9	14.0	13.1	17.3	24.8																						
14-Jun	11.9	10.7	11.0	11.1	12.1	13.5	15.3	17.2	18.6	20.2	22.3	24.2	25.5	25.7	26.2	26.2	26.6	25.5	26.0	25.0	23.0	19.0	15.7	13.7	19.4	26.6																						
15-Jun	12.6	11.9	11.2	10.3	10.7	12.9	15.9	18.0	19.9	21.7	23.5	24.2	25.2	26.0	25.9	26.2	26.1	26.7	23.8	24.4	19.9	16.6	14.8	13.6	19.2	26.7																						
16-Jun	11.8	12.1	10.0	8.9	9.5	10.9	12.5	15.7	18.0	18.9	19.6	21.7	23.0	23.5	23.5	23.1	23.1	22.8	22.7	21.9	20.8	16.7	16.2	15.0	17.6	23.5																						
17-Jun	14.0	13.3	13.0	12.8	13.0	13.2	13.9	14.8	15.7	16.3	16.7	18.2	19.5	20.0	20.6	20.2	21.6	20.7	19.9	18.4	16.7	16.0	15.5	14.7	16.6	21.6																						
18-Jun	13.1	11.9	10.7	10.4	11.1	12.7	15.0	17.9	19.2	20.6	20.7	21.9	23.0	23.6	24.7	25.3	25.1	24.2	24.0	24.4	22.4	20.1	18.9	17.6	19.1	25.3																						
19-Jun	16.3	15.3	13.7	12.8	12.8	13.9	15.5	17.4	18.3	18.4	18.6	19.8	19.7	19.8	20.7	20.6	21.2	19.8	20.1	19.5	19.0	18.3	18.9	18.9	17.9	21.2																						
20-Jun	18.3	17.9	17.7	17.2	16.4	16.5	17.2	17.5	17.8	18.5	20.5	20.7	20.3	19.8	20.0	20.6	20.9	20.7	19.4	17.9	16.1	15.4	15.1	14.9	18.2	20.9																						
21-Jun	14.4	14.3	14.4	14.7	14.7	14.6	14.7	14.8	14.9	15.1	15.2	15.5	15.8	16.4	17.7	18.0	18.1	18.1	18.4	17.2	16.7	16.4	16.4	15.7	15.9	18.4																						
22-Jun	14.7	14.6	14.6	14.4	14.5	15.2	16.2	16.9	17.9	18.2	17.2	18.9	20.0	21.1	21.6	22.6	22.7	22.8	22.7	22.1	21.0	19.3	18.3	17.7	18.5	22.8																						
23-Jun	16.4	15.5	15.3	15.1	14.6	15.3	16.5	17.9	19.0	19.5	20.2	21.6	22.7	22.8	19.2	20.2	20.8	21.0	20.4	19.9	18.9	17.3	16.4	16.0	18.4	22.8																						
24-Jun	15.9	16.2	16.3	15.8	15.6	15.1	16.1	19.2	20.5	21.6	23.8	25.3	26.4	26.4	26.8	27.7	27.1	26.2	26.0	24.7	22.2	19.6	18.1	17.9	21.3	27.7																						
25-Jun	18.0	17.4	16.5	15.9	16.3	17.2	18.8	20.7	22.5	24.0	25.5	26.0	26.9	26.8	28.1	26.1	21.6	18.7	19.0	18.8	18.4	17.9	17.6	17.3	20.7	28.1																						
26-Jun	16.7	16.5	16.2	15.9	15.8	16.3	16.9	17.9	18.4	19.8	21.2	22.4	23.7	23.0	22.6	18.7	21.7	21.8	20.9	20.4	18.6	18.2	17.6	17.4	19.1	23.7																						
27-Jun	16.6	15.9	15.3	15.1	16.0	18.0	18.7	18.7	19.6	20.1	20.7	21.8	23.3	23.0	23.1	23.1	18.3	19.0	19.6	19.7	18.6	16.6	16.1	14.8	18.8	23.3																						
28-Jun	14.1	13.4	12.4	12.1	13.2	14.3	16.3	18.1	19.8	21.5	22.3	23.6	24.5	25.2	25.7	25.9	26.2	26.1	25.6	24.9	22.9	20.8	19.8	17.8	20.3	26.2																						
29-Jun	17.0	16.8	15.3	17.8	17.3	17.6	19.1	20.9	21.6	22.7	24.3	25.3	26.1	26.7	26.7	26.5	26.5	26.3	26.3	25.4	24.3	22.8	21.6	20.7	22.3	26.7																						
30-Jun	19.7	19.6	17.3	16.8	17.3	18.5	19.4	19.6	19.9	21.2	21.9	22.6	23.1	23.7	24.0	24.3	24.2	24.2	23.8	23.2	22.2	20.7	18.3	14.9	20.8	24.3																						
																								12.9	12.4	11.7	11.4	11.5	12.3	13.6	15.0	16.2	17.1	18.1	19.1	19.9	20.2	20.5	20.7	20.4	20.1	19.6	18.9	17.4	15.8	14.7	13.9	Diurnal Average
																								19.7	19.6	17.7	17.8	17.3	18.5	19.4	20.9	22.5	24.0	25.5	26.0	26.9	26.8	28.1	27.7	27.1	26.7	26.3	25.4	24.3	22.8	21.6	20.7	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Shell Muskeg River - June 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Shell Muskeg River - June 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	108	15.00	15.00
10 - 20	420	58.33	73.33
> 20	192	26.67	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

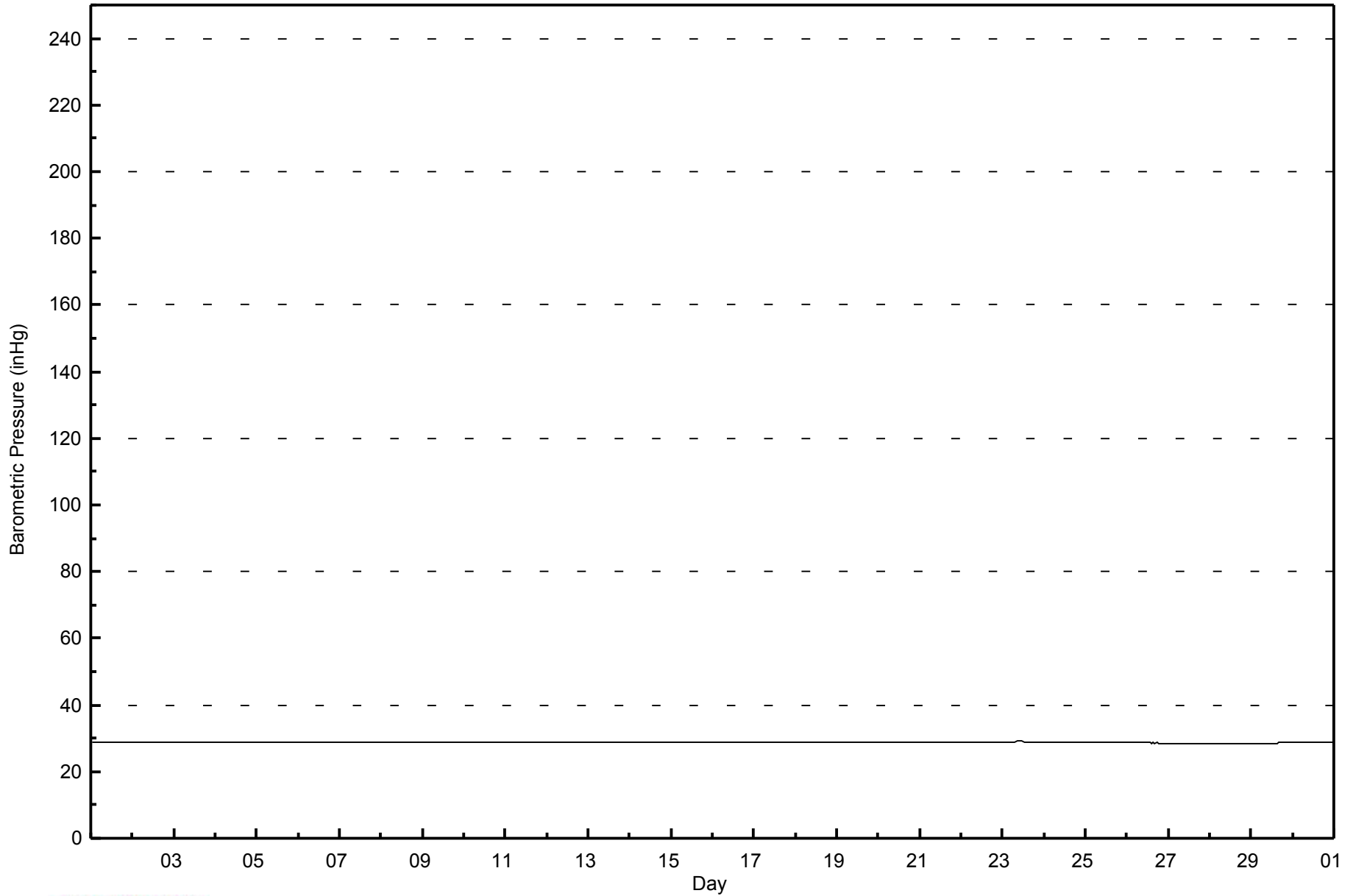


Maximum Value: 29.0 inHg on Jun 23 09:00 Maximum Daily Average: 29.0 inHg on Jun 23																							Hours in Service: 720 Hours of Data: 720			
Minimum Value: 28.5 inHg on Jun 28 18:00 Minimum Daily Average: 28.5 inHg on Jun 28 Maximum Diurnal Average: 28.8 inHg at hour 8 Minimum Diurnal Average: 28.8 inHg at hour 18 Monthly Average: 28.80 inHg Percentiles: P ₁ = 28.5 P ₁₀ = 28.6 Q ₁ = 28.7 Median = 28.8 Q ₃ = 28.9 P ₉₀ = 29.0 P ₉₉ = 29.0																							Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	29.0
2-Jun	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8
3-Jun	28.8	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
4-Jun	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
5-Jun	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
6-Jun	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	29.0	28.9	28.9	28.9	28.9	28.9	29.0	29.0
7-Jun	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0
8-Jun	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.9
9-Jun	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	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7
10-Jun	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	28.9	28.9	28.8	28.9
11-Jun	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
12-Jun	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	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9
13-Jun	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9
14-Jun	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.8
15-Jun	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7
16-Jun	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9
17-Jun	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
18-Jun	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.9
19-Jun	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	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	28.9
20-Jun	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
21-Jun	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.8	28.9
22-Jun	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	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	28.9	29.0
23-Jun	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
24-Jun	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	29.0
25-Jun	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8
26-Jun	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	28.7
27-Jun	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6
28-Jun	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5
29-Jun	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	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.6
30-Jun	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	28.9	29.0
																							Diurnal Average			
																							Diurnal Maximum			



WBEA
Hourly Averages

Barometric Pressure (BP) - inHg
Shell Muskeg River - June 2014





Maximum Speed: 26 km/h on Jun 3 12:00	Maximum Daily Speed Average: 17.0 km/h on Jun 3	Hours in Service: 720
Minimum Speed Value: 1 km/h on Jun 21 06:00	Minimum Daily Speed Average: 0.9 km/h on Jun 27	Hours of Data: 720
Maximum Diurnal Speed Average: 2.1 km/h at hour 21	Minimum Diurnal Speed Average: 0.2 km/h at hour 10	Hours of Missing Data: 0
Monthly Average Velocity: 0.6 km/h 129.6 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 5 Median = 8 Q ₃ = 12 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-Jun	SSE5	S7	SSW6	SW8	SSW4	SSW6	S9	SSW11	SSW10	SSW7	SW5	SW3	S8	SSW5	WSW6	WSW3	NW1	SSW9	SW13	WSW19	SW6	SSW7	SW7	SW3	SSW6.2	WSW19
2-Jun	SW5	SSW6	SSW6	SSW7	SW8	SW6	SW8	SW12	SW13	WSW14	WSW13	WSW10	WSW23	W16	WNW10	ENE7	WSW2	NNE16	NNE26	NNE12	NNE10	NNE6	NNE6	NE13	W3.6	NNE26
3-Jun	NE17	NE20	NE19	NE21	NE22	NE19	ENE16	ENE15	NE17	NE25	NE22	NE26	NE25	NNE17	NNE17	NE20	NNW25	N26	NNW17	NE20	ENE18	ENE20	NNW9	NNW11	NE17.0	NE26
4-Jun	NE14	NNE9	NNE9	NNE10	NNE10	NNE10	NNW8	NNW9	NNW8	N10	NNE13	N19	NNE20	N19	NNE19	NNE20	N21	NNE21	N21	NNE20	NE20	NNE16	NE19	NNE14	NNE14.4	NE21
5-Jun	N16	NNE18	NNE18	NNE17	NNE16	N16	N16	N15	NNE16	NNE15	NNE16	NNE18	NE20	NNE16	NNE16	NNW17	NNW17	NW15	NNW9	NNE16	N12	NNE11	NW9	NW9	N13.9	NE20
6-Jun	NW9	NW7	NW7	W4	SW3	WNW7	NW5	NE7	N4	NE8	WNW9	WNW9	NE2	ENE15	NE4	NW4	E5	E8	SE6	S5	SE7	SE7	ESE8	SSE5	NNE1.2	ENE15
7-Jun	SSW4	SE3	S4	SE6	SSE3	SE5	S5	S3	SSW3	WNW4	WNW4	S5	S5	WNW9	NW9	NNE6	NW6	ENE14	NE6	WNW7	NW8	NW8	NW7	SW5	WNW1.0	ENE14
8-Jun	WSW6	SW5	SW5	SW7	SSW6	SSW7	SW6	SW6	SW6	SW8	SSW8	SW10	SW7	SW6	SW9	SSW9	SSW8	SSW8	S9	S8	S10	S11	S12	S12	SSW7.4	S12
9-Jun	S11	SSW11	SSW10	SSW8	SSW7	SSW6	SSE6	SSE6	SSE9	SE9	SSE8	SSE8	SSE11	SSE13	SSE13	SE15	SE17	SSE15	SSE11	SE9	SE8	SSE6	NE7	ENE12	SSE8.2	SE17
10-Jun	E16	E16	ENE19	ENE12	SE4	WNW2	NW4	N10	NNW10	NE12	NE12	NE13	ENE13	ENE16	SSW8	WSW4	ENE10	S5	SSW5	SW4	SW3	WSW5	WSW6	WSW7	ENE4.1	ENE19
11-Jun	SW6	SSW7	WSW8	SW9	SSW7	SW9	SW10	SW10	SW10	SW10	SW7	S4	SSW10	SSE10	SSE15	SSW7	SSW5	SSW4	S4	SW6	SSW6	SW7	SW6	SSW6	SSW7.0	SSE15
12-Jun	SW9	SW7	SW7	SW7	SSW5	SW4	E3	NE8	NE7	NE10	ENE14	NE15	NE16	ENE17	ENE18	ENE21	ENE22	ENE22	ENE22	ENE20	ENE17	NE15	ENE18	ENE12	ENE10.0	ENE22
13-Jun	ENE9	ESE4	SE2	ESE3	ESE8	ESE11	ESE9	E7	NE7	E9	E13	E11	E10	E10	E7	ESE4	SSW5	S4	S6	SSW7	SSW9	S8	S8	SSW8	ESE5.1	E13
14-Jun	SSW8	SSW9	S10	S11	S11	SSW9	SSW11	SSW12	SSW10	SSW10	SSW11	SSW12	S13	SSW13	SSW13	SSW15	SSW16	SSW15	SSW15	SSW14	SSW10	SSW8	S8	S8	SSW11.1	SSW16
15-Jun	S8	S8	S6	SSW5	SSW3	SSW5	SSW6	SSW7	SSW7	SW8	SSW13	SSW11	SSW9	S9	S9	S7	SSW8	SSW5	SSE8	S7	SSE7	S7	S7	SSW4	S7.0	SSW13
16-Jun	SSW4	SW5	S6	S5	S3	S2	SSW3	SW3	WSW3	WSW8	W8	NNE5	ESE8	ESE8	E13	E13	ENE16	E14	E13	E11	E9	SSE7	SSW13	SSW10	SE4.0	ENE16
17-Jun	SW7	S6	S6	S7	SSW6	SSW5	SSE4	S3	SSW5	SSW7	SSE8	SSE7	S10	SSE11	S8	S9	SSE9	SSW9	SSW10	SSW9	S7	S8	S8	S7	S6.9	SSE11
18-Jun	S5	S6	S7	S5	SSW5	S5	S7	S10	SSW9	SSW9	SSW11	S18	S16	S17	S17	S17	S15	S15	S15	S13	S14	S13	S13	S12	S11.3	S18
19-Jun	S11	S10	S8	SSW6	SSW5	SSW4	SSW5	SSW6	S6	S7	SSW5	S7	SSE10	S7	SSE3	S4	W5	WSW2	S3	ESE5	ESE8	E10	NE13	NE15	SSE4.3	NE15
20-Jun	NE6	NNE10	NE17	ENE15	ENE7	NE7	ENE10	SE3	SSE5	SSE4	SSE7	SSE7	SSE7	SSE8	SSE5	SSE5	S4	S6	SSW6	S6	SSW6	SW6	WSW10	SW3	ESE2.6	NE17
21-Jun	SSW3	SW3	SE3	ENE9	ENE9	E1	NW5	WNW3	NW5	NW6	NW5	NW7	WNW7	WNW8	NW7	WNW7	WNW9	WNW12	NW10	WNW6	WNW7	WNW7	NW6	NW8	NW4.6	WNW12
22-Jun	WNW8	WNW5	W6	WSW7	WSW6	SW4	SW3	WSW4	WNW5	N9	NW4	NW7	NW8	NNW10	N12	NNW10	N12	NNE13	N13	NNE12	ENE10	E12	ENE10	ENE3	NNW4.6	N13
23-Jun	SSW2	SW2	SSW3	SW4	SSW4	SSW2	SSW3	SSW3	SSW2	SE3	SSE4	SSE4	E3	ESE6	E12	SE5	SE10	S13	S8	SSE5	SSE4	S4	S4	S7	SSE3.9	S13
24-Jun	S5	SSW6	SSW10	SSW7	SSW7	S8	S11	S12	S10	S8	SSW11	SSW12	S13	SSW14	S13	SSW13	SSW10	SSE13	SSE15	S15	S9	S8	S8	S10	S10.1	S15
25-Jun	S12	S11	S10	S9	SSW7	SSW7	S9	S14	S12	S10	S14	S14	S13	SSE12	S15	W7	WSW18	WSW11	SSW7	SSW5	SSW4	SW4	WSW4	W4	SSW8.7	WSW18
26-Jun	SW2	SSW4	SSW4	SSW5	SSW5	SSW4	SSW3	SW5	WSW6	W7	WSW12	WSW10	WSW12	ESE3	SSE10	SSE7	ENE4	WNW9	NW7	N5	ENE4	W2	NE3	W4	SW2.8	WSW12
27-Jun	WNW2	S3	SSW2	S3	SSE3	S3	SSW2	S5	SSW6	SSW4	SE3	ESE5	ESE3	S4	W6	ENE4	NW6	NE12	NE14	ENE12	SE2	WNW4	NW7	S2	ESE0.9	NE14
28-Jun	SSE2	SSE3	S4	SW5	SSW2	SSW4	SSW3	SW4	WSW5	W4	NE8	ENE8	NNW1	NW12	NW10	WNW9	NW10	NW11	N14	NE17	N8	NW9	NNW7	NW6	NNW3.3	NE17
29-Jun	NNE6	NNW3	N5	NNE10	NE4	WNW8	N6	N14	NE17	NNE14	N15	NNE21	NNE22	NNE24	N22	N21	N23	N22	N20	NNW17	NNW14	NNW13	NNW12	NNW13	N13.6	NNE24
30-Jun	NNW12	NNW12	WNW9	NW8	NNW9	NNW12	N16	N16	N12	N10	N12	NNE16	NNE16	N13	N13	N14	N14	NNE15	NNE14	N14	N10	NNE9	N3	S3	N11.0	NNE16

S1.0	S1.5	S1.4	SSE1.5	SSE1.7	SSW1.2	S1.3	SSW1.3	SW1.3	W0.2	SSW0.4	E1.2	ESE1.9	E1.5	E0.8	ENE1.3	N1.4	NNE1.7	NE1.6	ENE1.7	E2.1	SE1.0	S0.4	S0.8	Diurnal Average
NE17	NE20	ENE19	NE21	NE22	NE19	ENE16	N16	NE17	NE25	NE22	NE26	NE25	NNE24	N22	N21	NNW25	N26	NNE26	NE20	NE20	ENE20	NE19	NE15	Diurnal Maximum

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

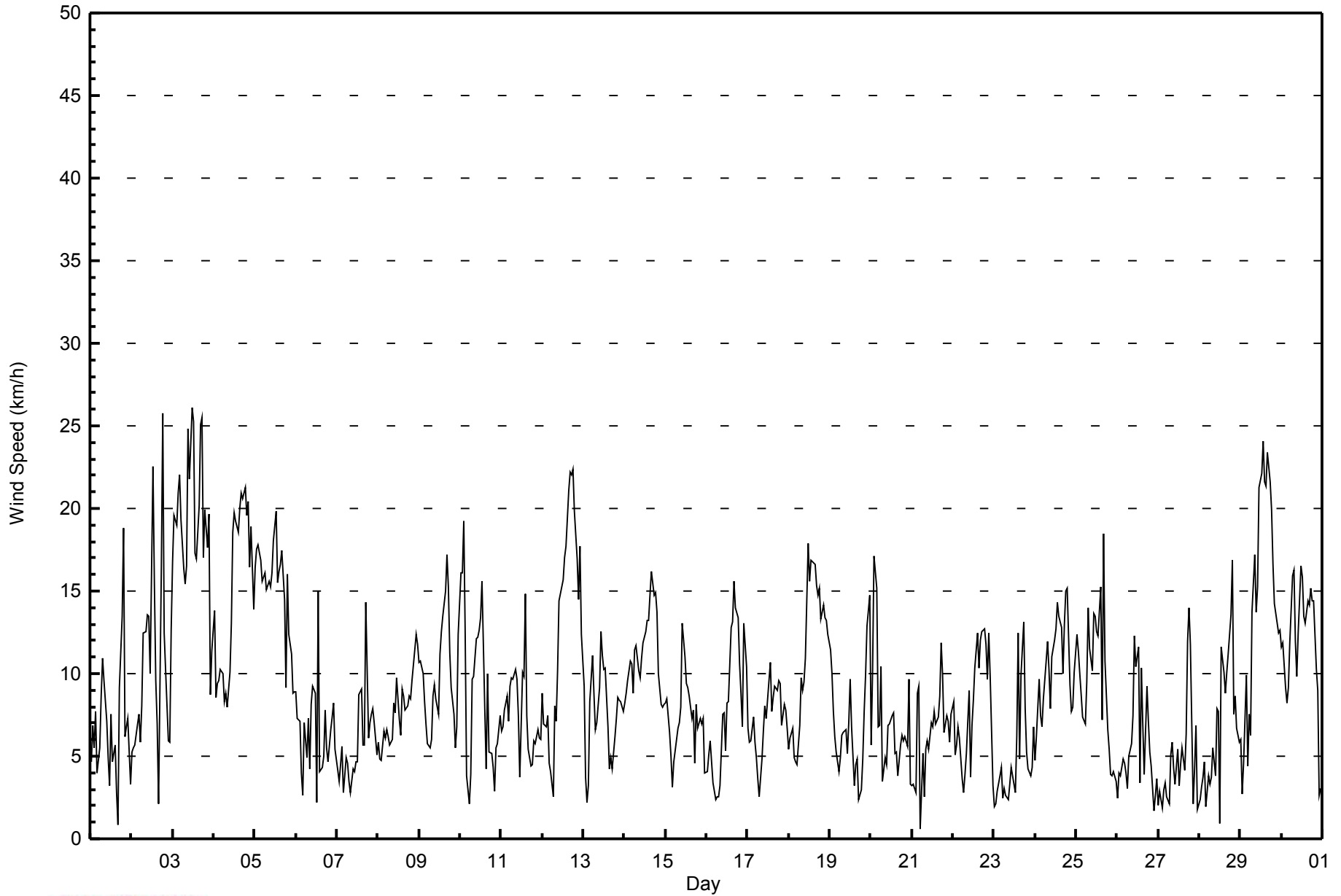


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Jun 2 19:00																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 1 km/h on Jun 23 04:00																									
Percentiles: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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Shell Muskeg River - June 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - June 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	183	25.42	25.42
6 - 11	331	45.97	71.39
12 - 19	171	23.75	95.14
20 - 28	35	4.86	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - June 2014

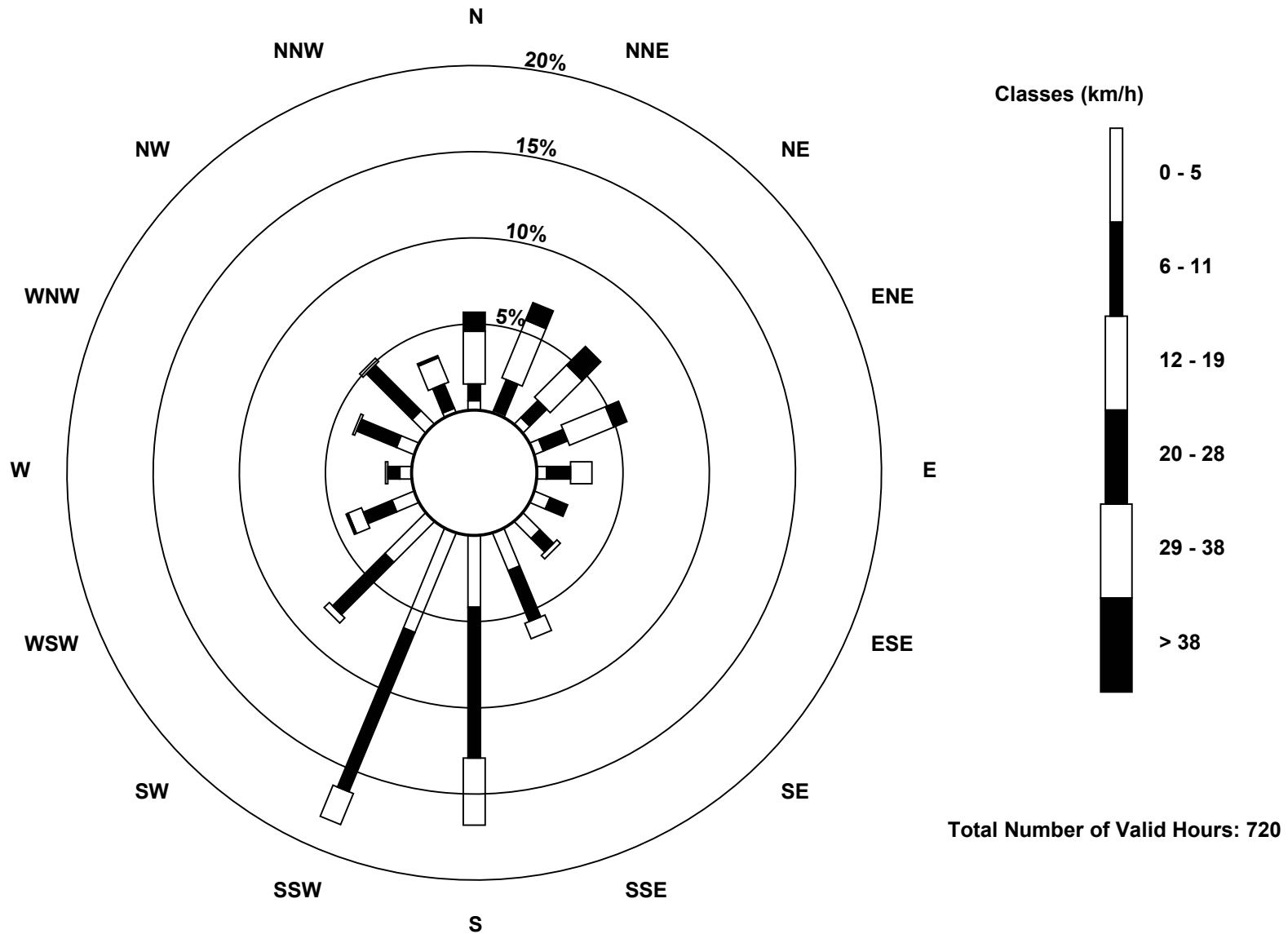
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	1	4	4	4	7	10	17	30	45	24	10	5	8	8	2	183
6 - 11	7	14	10	11	10	8	8	23	63	72	31	13	5	18	27	11	331
12 - 19	22	26	19	20	9	0	2	7	28	14	3	6	1	1	2	11	171
20 - 28	8	8	11	6	0	0	0	0	0	0	0	1	0	0	0	1	35
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	41	49	44	41	23	15	20	47	121	131	58	30	11	27	37	25	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Shell Muskeg River (AMS 16)**





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Shell Muskeg River - June 2014

Direction of Maximum Speed: 47 deg on Jun 3 12:00 Direction of Maximum Daily Speed Average: 36.9 deg on Jun 3	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0
Direction of Minimum Speed: 99 deg on Jun 21 06:00 Direction of Minimum Daily Speed Average: 0.9 deg on Jun 27	Percent Operational Time: 100.0
Monthly Average Direction: 221.3 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-Jun	153	189	209	215	200	196	184	194	208	206	222	216	177	213	255	244	314	212	218	256	215	205	233	220	212.8
2-Jun	220	210	213	213	215	215	220	233	233	241	242	243	252	270	301	58	255	16	15	12	25	28	33	51	278.1
3-Jun	55	54	54	55	54	53	68	67	36	43	39	47	49	19	12	34	336	358	336	47	64	62	336	338	36.9
4-Jun	51	20	14	24	28	15	348	334	339	357	14	5	17	2	20	14	9	22	11	26	41	23	39	13	16.7
5-Jun	9	15	12	18	17	9	9	9	25	21	28	24	41	18	17	337	334	309	336	32	8	13	309	314	8.3
6-Jun	309	306	311	268	236	295	324	46	10	56	292	285	41	63	36	310	80	99	145	180	133	137	123	147	23.9
7-Jun	200	137	183	136	153	127	172	179	193	292	282	170	176	298	326	13	307	68	55	302	315	305	305	230	285.4
8-Jun	245	222	228	218	196	206	214	230	229	225	203	231	214	220	225	204	212	207	190	188	186	184	185	183	207.2
9-Jun	190	205	205	201	202	193	168	158	161	145	161	166	158	162	155	144	138	147	149	126	125	162	56	64	156.2
10-Jun	80	80	71	72	129	297	307	360	341	37	53	56	57	78	206	250	72	175	206	216	222	249	242	242	65.2
11-Jun	230	211	243	231	212	221	224	232	227	233	217	176	204	163	159	195	201	204	189	216	204	228	223	212	210.8
12-Jun	217	214	218	214	205	220	87	44	44	49	63	45	48	65	61	59	57	62	71	69	69	48	65	76	64.3
13-Jun	70	104	137	103	120	102	103	93	52	94	83	93	85	84	87	109	195	191	183	198	197	180	185	197	117.6
14-Jun	212	195	191	185	189	205	194	193	213	211	212	199	189	192	198	196	210	198	196	200	203	193	179	176	197.5
15-Jun	191	186	190	197	212	212	200	210	202	217	203	196	185	169	174	200	202	164	178	168	172	172	202	202	191.0
16-Jun	202	225	185	182	174	169	196	215	241	255	275	27	104	121	101	84	77	93	93	98	98	162	203	211	130.6
17-Jun	218	186	186	191	200	207	168	184	200	194	160	161	170	168	187	170	168	198	203	197	179	186	186	186	184.3
18-Jun	185	177	178	186	204	186	186	185	207	201	199	185	187	186	181	179	179	178	178	178	172	174	172	173	182.5
19-Jun	173	176	173	195	195	203	195	192	190	183	196	178	158	188	161	173	259	257	180	113	104	96	56	54	159.9
20-Jun	43	27	38	60	66	42	57	127	164	158	167	160	149	154	167	153	170	170	196	188	208	224	256	227	123.4
21-Jun	211	218	138	71	64	99	307	294	304	317	323	310	297	302	305	296	298	296	317	283	295	295	325	320	308.7
22-Jun	302	282	264	249	249	226	214	247	302	351	320	310	310	329	352	338	5	15	4	21	61	82	70	77	346.5
23-Jun	203	220	212	230	196	207	198	201	213	135	160	165	81	104	87	126	140	178	173	159	166	176	180	171	161.3
24-Jun	190	202	194	198	197	182	183	186	179	170	201	193	185	200	190	194	193	159	159	191	178	181	177	185	185.6
25-Jun	186	184	180	184	193	192	187	190	187	186	181	190	183	164	190	268	242	257	213	199	196	219	252	264	198.1
26-Jun	214	200	193	204	192	197	199	228	249	262	255	247	251	121	157	149	78	300	323	360	61	267	56	276	234.3
27-Jun	292	169	194	180	163	169	193	186	196	213	143	120	122	181	275	70	326	41	55	65	136	287	313	191	112.4
28-Jun	166	147	169	226	198	212	200	214	249	273	50	75	348	324	307	296	304	325	359	40	358	316	330	306	327.2
29-Jun	19	341	7	21	44	302	5	11	35	25	2	26	20	15	4	2	360	2	358	343	340	336	337	341	4.0
30-Jun	338	339	303	313	328	340	5	6	9	356	351	21	20	4	1	9	11	16	21	7	10	15	354	190	0.6

177.8 176.3 175.8 166.7 164.0 203.5 180.6 197.4 234.6 273.3 205.3 92.4 114.1 87.6 95.0 57.7 351.6 32.8 51.3 68.3 95.6 126.3 179.5 190.1

Diurnal Average

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

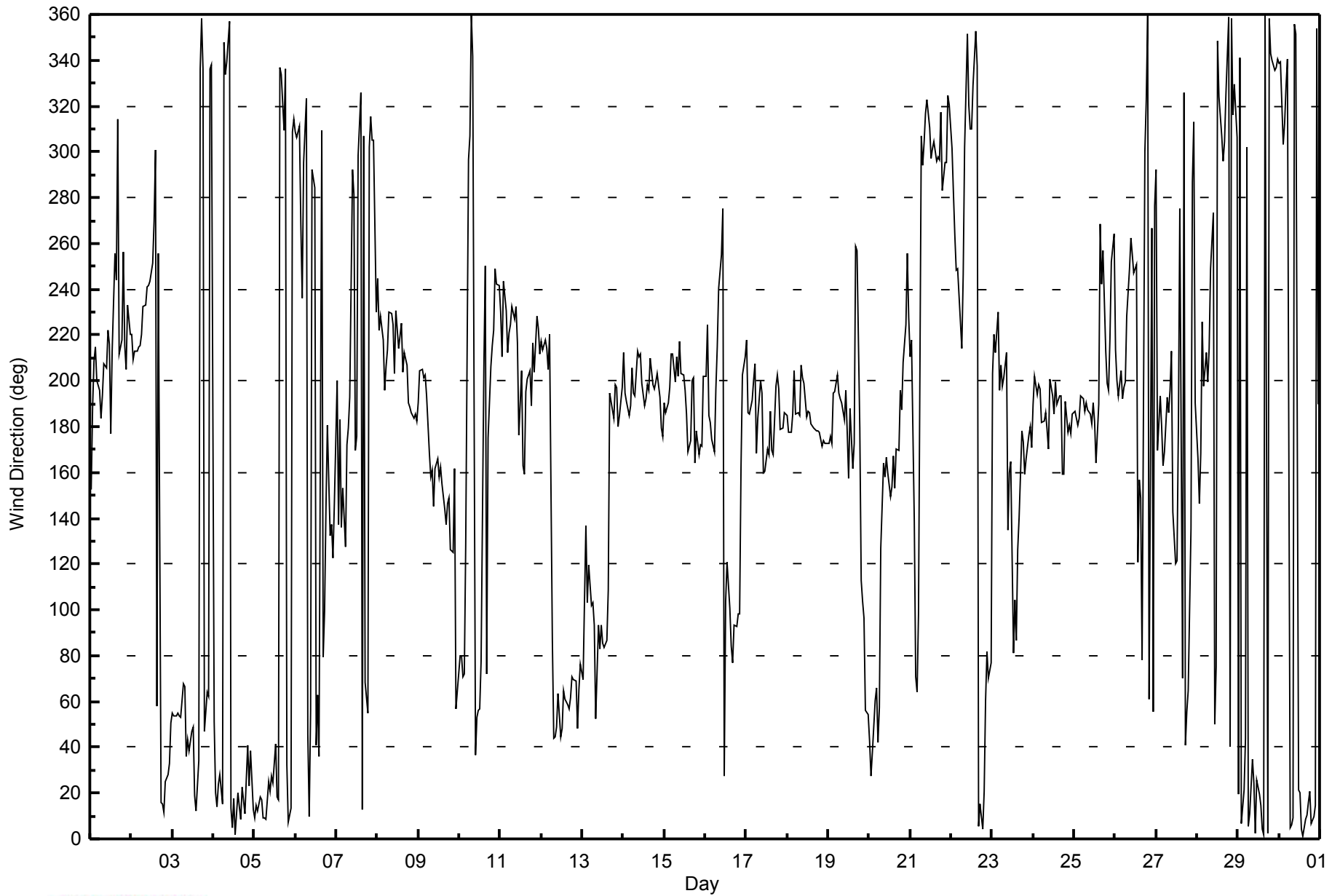


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																			Hours in Service: 720						
Maximum Value: 108 deg on Jun 28 13:00																			Hours of Data: 720						
Minimum Value: 7 deg on Jun 2 13:00																			Hours of Missing Data: 0						
Percentiles: P ₁ = 9 P ₁₀ = 13 Q ₁ = 16 Median = 24 Q ₃ = 38 P ₉₀ = 56 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-Jun	37	15	14	13	15	19	18	15	14	14	17	21	29	38	44	83	85	22	16	14	26	15	12	18	85
2-Jun	17	18	9	9	11	11	13	12	13	11	12	23	7	16	39	73	74	40	38	43	38	49	49	36	74
3-Jun	19	17	12	10	13	12	18	31	33	28	30	25	24	36	36	38	33	33	34	37	24	24	51	39	51
4-Jun	34	50	44	44	47	41	44	41	47	44	43	33	33	35	38	31	34	33	30	32	27	35	29	37	50
5-Jun	33	30	30	30	32	31	33	36	33	37	34	35	37	41	41	40	33	34	49	33	32	40	21	28	49
6-Jun	17	24	24	38	21	23	59	61	78	71	36	56	100	25	82	81	97	48	36	16	25	18	17	24	100
7-Jun	16	56	18	31	73	49	22	25	16	74	65	42	50	56	50	70	76	34	72	44	33	21	32	30	76
8-Jun	21	15	11	9	9	12	16	14	21	25	36	33	30	44	30	26	25	22	15	13	13	14	14	14	44
9-Jun	17	16	14	17	18	13	26	22	18	21	18	21	17	18	19	21	20	21	20	23	36	29	66	21	66
10-Jun	16	19	10	18	60	97	70	41	42	40	44	42	50	23	33	64	45	28	17	10	10	13	12	12	97
11-Jun	17	14	20	20	19	14	14	16	14	13	20	64	19	44	27	52	83	34	15	14	13	9	11	10	83
12-Jun	11	13	11	9	12	17	80	52	64	42	26	33	30	24	25	20	19	19	14	11	11	19	13	15	80
13-Jun	29	77	55	70	21	13	20	41	52	52	33	36	38	58	76	69	52	58	21	15	12	13	13	16	77
14-Jun	15	13	13	14	14	17	17	20	20	21	22	23	25	23	24	20	21	19	17	16	15	12	15	13	25
15-Jun	22	13	16	13	15	17	18	20	22	27	31	29	35	38	37	34	26	48	20	20	13	12	16	12	48
16-Jun	24	13	16	13	19	54	21	29	29	25	29	70	56	40	33	33	23	20	15	18	13	28	18	16	70
17-Jun	16	15	20	23	19	16	26	17	17	16	18	20	23	20	24	20	23	22	17	17	15	15	14	13	26
18-Jun	11	12	12	13	14	15	15	19	24	25	20	18	20	20	21	20	21	18	17	17	16	15	15	14	25
19-Jun	15	15	16	14	12	11	12	15	17	18	26	30	19	28	49	22	37	59	39	42	17	19	10	9	59
20-Jun	89	45	11	10	68	63	28	52	33	24	20	33	22	30	35	20	17	23	16	15	13	20	10	32	89
21-Jun	12	17	52	40	39	91	56	73	66	50	60	30	32	24	42	24	19	16	40	28	31	18	39	34	91
22-Jun	19	49	30	12	21	28	12	32	65	48	64	52	38	40	37	51	46	36	37	34	43	25	24	72	72
23-Jun	10	54	9	15	17	12	23	10	24	45	36	44	81	66	24	46	21	16	19	24	23	16	19	14	81
24-Jun	15	18	18	18	19	14	14	17	23	24	21	23	22	20	20	21	26	20	19	18	14	13	14	15	26
25-Jun	14	15	14	14	14	15	15	17	18	22	21	23	23	23	23	58	47	13	25	15	16	27	19	40	58
26-Jun	14	10	12	9	12	14	12	14	19	22	17	26	21	67	25	21	77	37	54	68	83	96	93	44	96
27-Jun	87	28	17	27	23	24	18	13	18	24	47	38	67	21	65	98	58	59	29	23	65	47	32	68	98
28-Jun	60	33	16	27	13	13	14	21	26	62	56	45	108	44	40	38	49	43	38	18	43	30	56	38	108
29-Jun	69	91	94	26	75	34	87	28	22	33	34	27	26	26	32	29	31	30	33	32	33	35	37	33	94
30-Jun	33	36	22	37	37	32	27	26	36	51	43	34	36	42	42	39	33	32	31	26	29	38	96	17	96
																			89 91 94 70 75 97 87 73 78 74 65 70 108 67 82 98 97 59 72 68 83 96 96 72						
Diurnal Maximum																									



WBEA
Hourly Averages

Wind Direction (WD) - deg
Shell Muskeg River - June 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 23, 2014	Previous Calibration	May 28, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	13:05
Barometric Pressure	732 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	789	789
Calculated slope	0.990866	0.999091	Chamber temp.	44.9	44.9
Calculated intercept	3.464572	2.038684	Pressure (mmHg)	708.1	708.1
Analyzer Background	6.1	6.3	Flow (lpm)	0.453	0.453
Analyzer Coefficient	1.250	1.297	Intensity	90	90

Analyzer make	Thermo 43i	Analyzer serial #	1118148498
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	NA
as found span	5000	78.7	799.6	769.2	1.040
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	78.7	799.6	799.8	1.000
second point	5000	39.4	400.3	396.2	1.010
third point	5000	19.7	200.2	197.0	1.016
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	78.1	793.5	803.8	0.987
Average Correction Factor					1.009

Corrected As found	769.3	Previous response	803.5	% change	4.4%
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Notes:

Good Calibration. Span adjusted, Filter changed. No maintenance done, checked diagnostics similar to last month

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

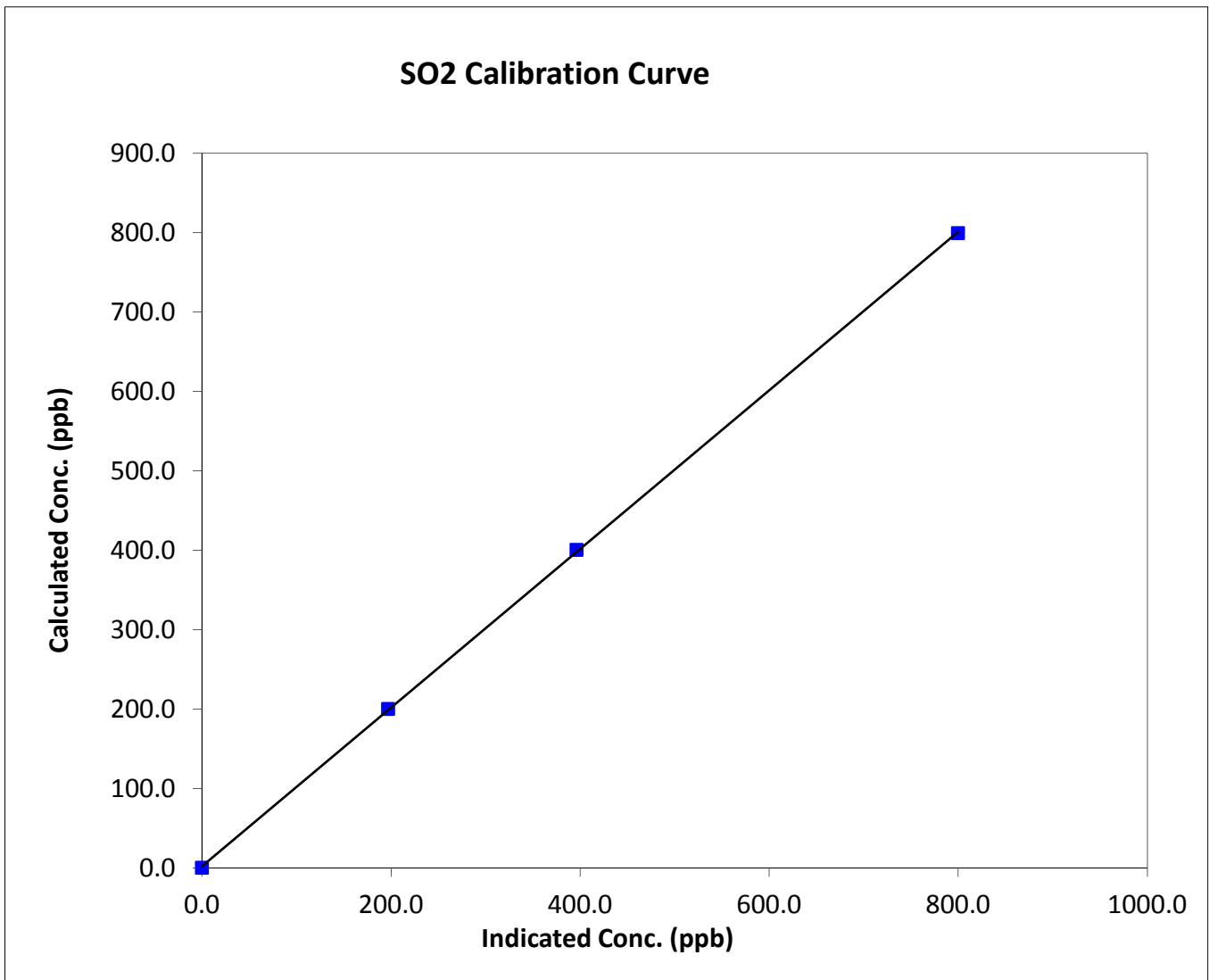
SO₂ Calibration Summary

Station Information

Calibration Date	June 23, 2014	Previous Calibration	May 28, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	8:45	End Time (MST)	13:05
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

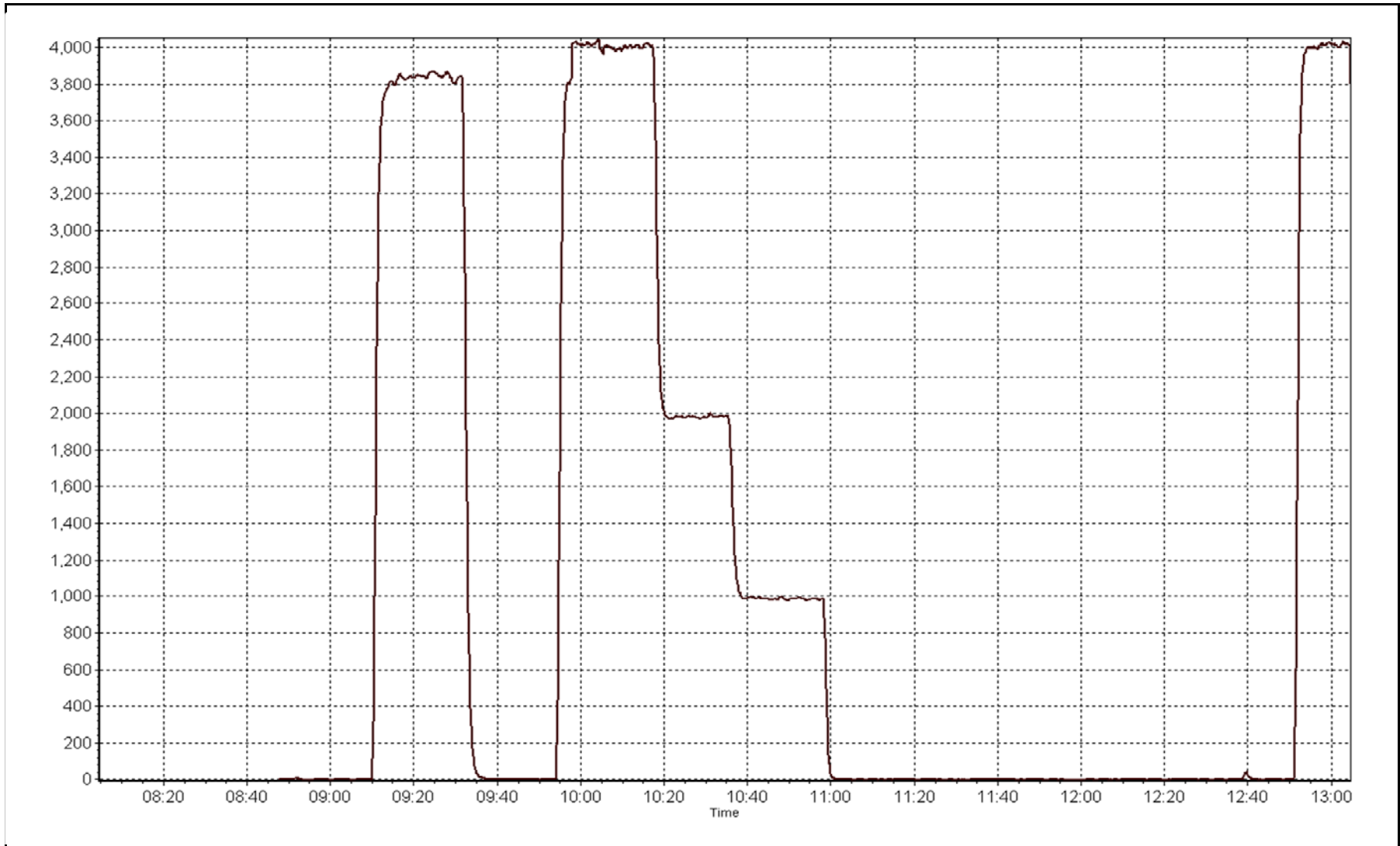
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999958
799.6	799.8	0.9997		
400.3	396.2	1.0104	Slope	0.999091
200.2	197.0	1.0160		
			Intercept	2.038684



SO2 Calibration Plot

Date: June 23, 2014





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Monday, June 23, 2014	Previous Calibration	Wednesday, May 28, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	13:05
Barometric Pressure	732 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	1.003754	1.002942	Fuel Pressure	24.2	24.2
Calculated intercept	-0.007776	0.064652			

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	0.42	N/A
as found span	5000	78.7	16.98	17.35	0.979
calibrator zero	5000	0.0	0.00	0.04	N/A
high point	5000	78.7	16.98	16.93	1.003
second point	5000	39.4	8.50	8.32	1.022
third point	5000	19.7	4.25	4.10	1.037
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	78.7	16.98	17.45	0.973
Average Correction Factor					1.021

Corrected As found 16.93 Previous response 16.92 % change 0.0%

Notes:

adjusted zero and span, Filter changed out, Hydrogen changed out

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

THC Calibration Summary

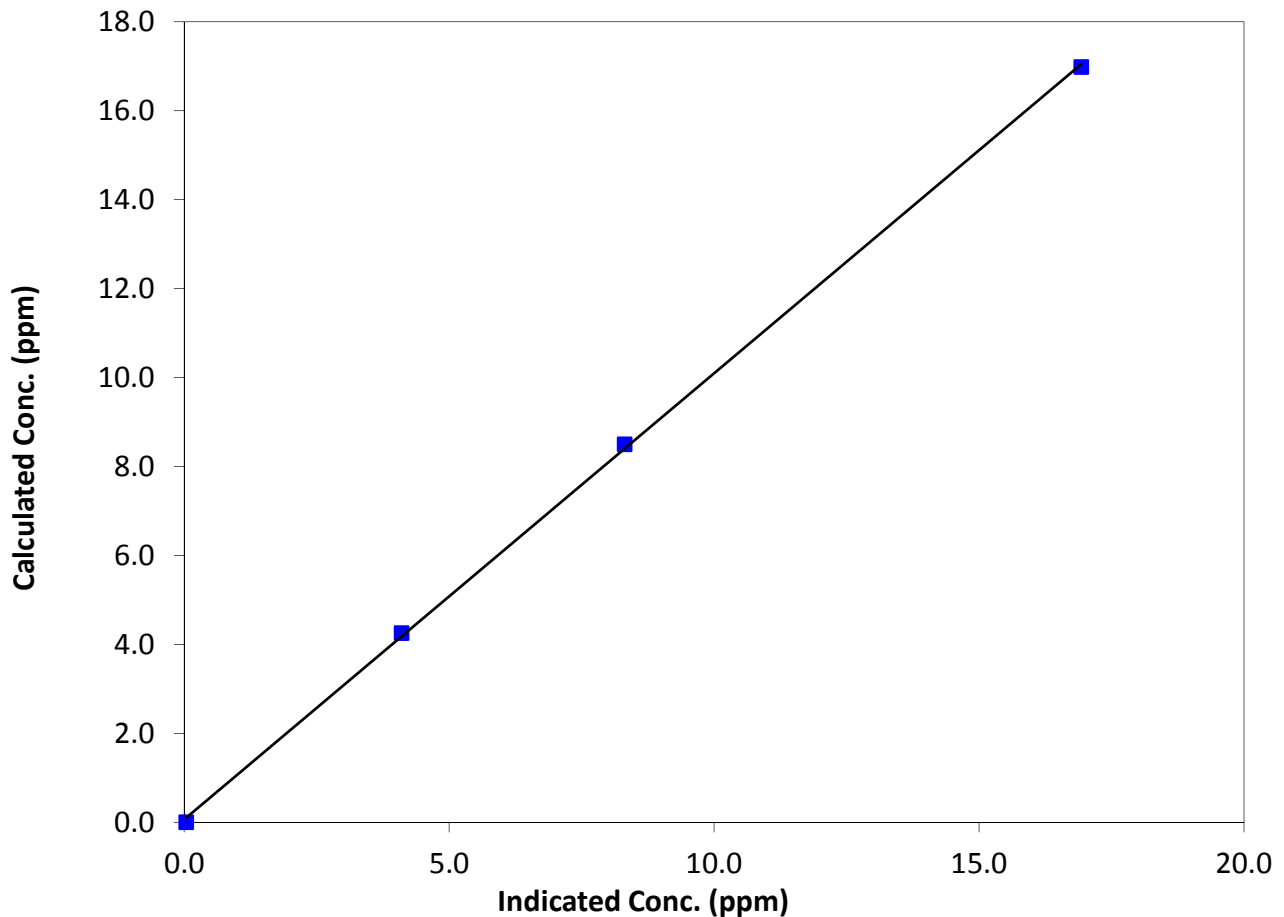
Station Information

Calibration Date	June 23, 2014	Previous Calibration	May 28, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	8:45	End Time (MST)	13:05
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153485

Calibration Data

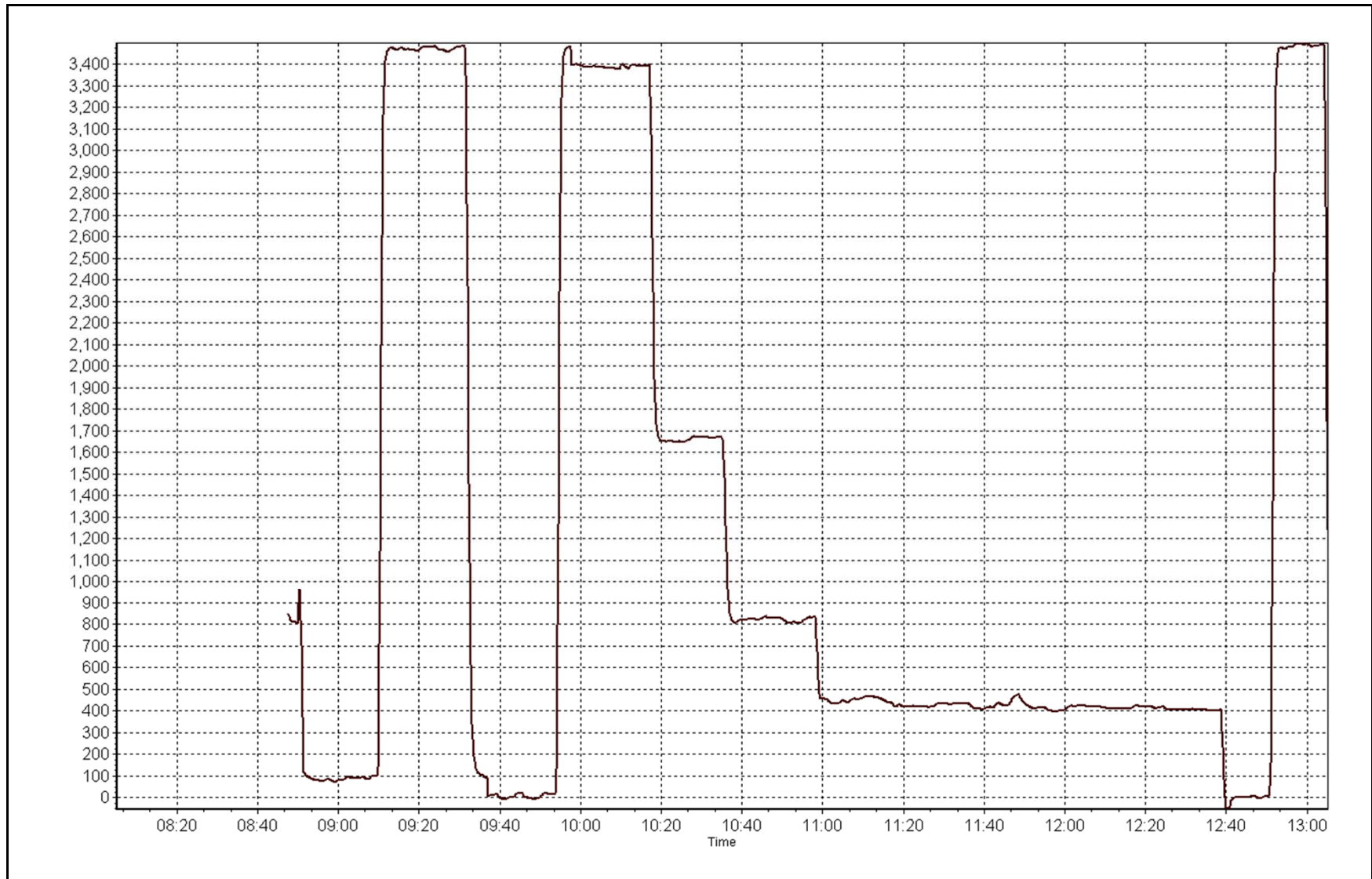
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.04	N/A	Correlation Coefficient	0.999810
16.98	16.93	1.0029		
8.50	8.32	1.0223	Slope	1.002942
4.25	4.10	1.0367		
			Intercept	0.064652

THC Calibration Curve



THC Calibration Plot

Date: June 23, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	June 23, 2014	Previous Calibration	May 28, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	8:45	End Time (MST)	13:05
Barometric Pressure	732 mmHg	Station Temperature	21.0 Deg C
Calibrator	SABIO 4010	Serial Number	11081107
NO Cal Gas Conc	51.2 ppm	Cal Gas Expiry Date	May 29, 2014
NOx Cal Gas Conc	51.3 ppm	Cal Gas Serial #	LL107937

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8346
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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	0.996369	0.995081	1.009622
	Data Offset	1.893079	2.595326	0.882955
After	Data Slope	1.000439	1.000524	1.004235
	Data Offset	1.528209	1.711930	-0.653980
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	1.293	ppb	1.291	ppb
NOx coefficient	1.288	ppb	1.288	ppb
NO2 coefficient	n/a	ppb	n/a	ppb
NO bkgrnd	0.7		0.5	
NOx bkgrnd	0.8		1.2	
Nt coefficient	n/a		n/a	
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.1	Deg C	314.1	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	86.0	ccm	86.0	ccm
R Cell Press	5.9	mmHg	3.2	mmHg
Sample Flow	492.000	ccm	492.000	ccm

Notes:

span adjusted, pump and charcoal changed out, filter changed



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

June 23, 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	0.2	-0.2	0.7	N/A	N/A
as found span	5000	78.7	807.5	805.9	1.6	778.8	776.0	3.2	1.0368	1.0385
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.2	0.2	N/A	N/A
high point	5000	78.7	807.5	805.9	1.6	807.6	806.6	1.5	0.9998	0.9991
second point	5000	39.4	404.2	403.5	0.8	399.6	396.8	1.9	1.0116	1.0168
third point	5000	19.7	202.1	201.7	0.4	198.2	197.8	0.4	1.0198	1.0199
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.4	-0.1	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.4	-0.1	N/A	N/A
as left span	5000	78.1	801.3	506.4	294.9	802.8	513.4	289.2	0.9981	0.9864
Average Correction Factor									1.0104	1.0119

Corrected As found

NO_x= 778.6

NO= 776.2

Percent Change

NO_x= 3.8%

NO= 4.0%

Previous Response

NO_x= 808.5

NO= 807.3

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			0.2			N/A	
1st NO ₂ (300)	N/A	506.4	306.2	811.4	506.4	304.8	0.9797	1.0000	1.0046	99.5%
2nd NO ₂ (200)	N/A	606.2	206.4	813.6	606.2	207.2	0.9771	1.0000	0.9961	100.4%
3rd NO ₂ (100)	N/A	707.0	105.6	813.0	707.0	106.0	0.9778	1.0000	0.9962	100.4%
4th NO ₂ (0)	812.6	N/A	1.0	813.6	812.6	1.4	0.9771	1.0000	N/A	N/A
Average Correction Factor							0.9779	1.0000	0.9990	100.1%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

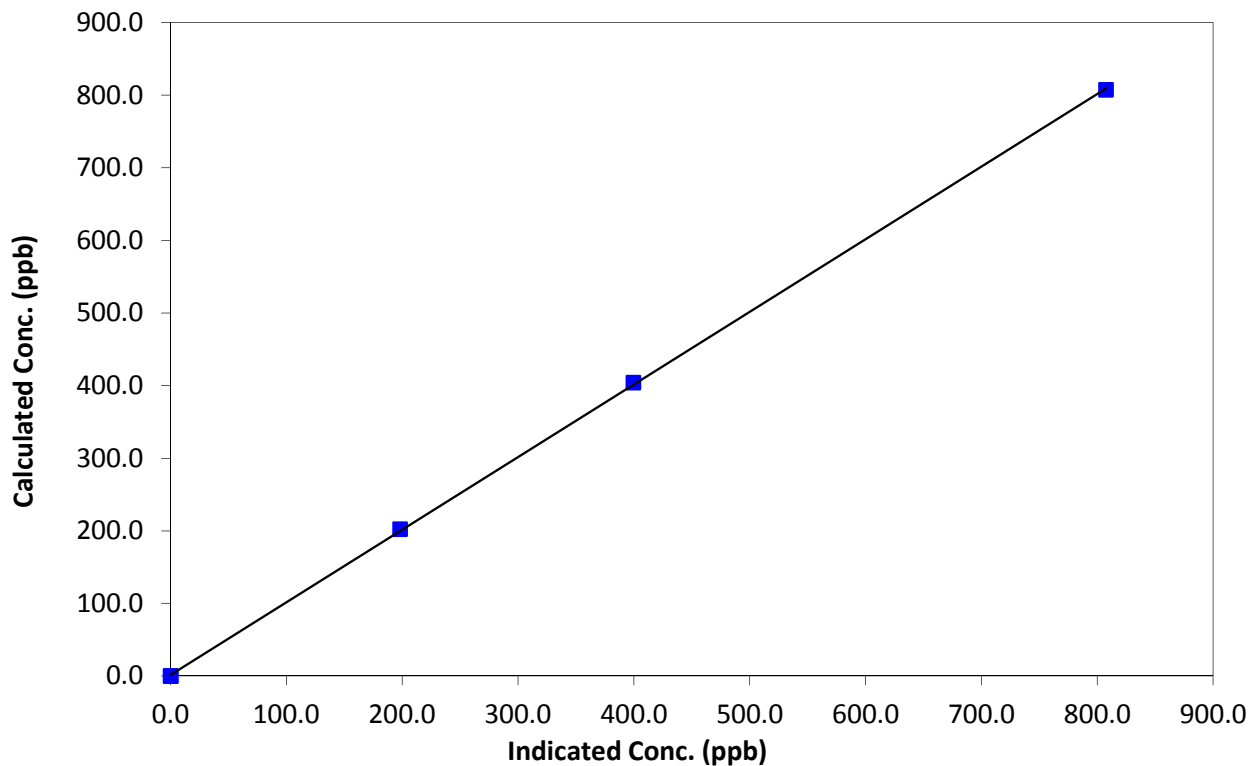
Station Information

Calibration Date	June 23, 2014	Previous Calibration	May 28, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	8:45	End Time (MST)	13:05
Analyzer make	API T200	Analyzer serial #	724

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999949
807.5	807.6	0.9998		
404.2	399.6	1.0116	Slope	1.000439
202.1	198.2	1.0198		
0.0	0.1	0.0000	Intercept	1.528209

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

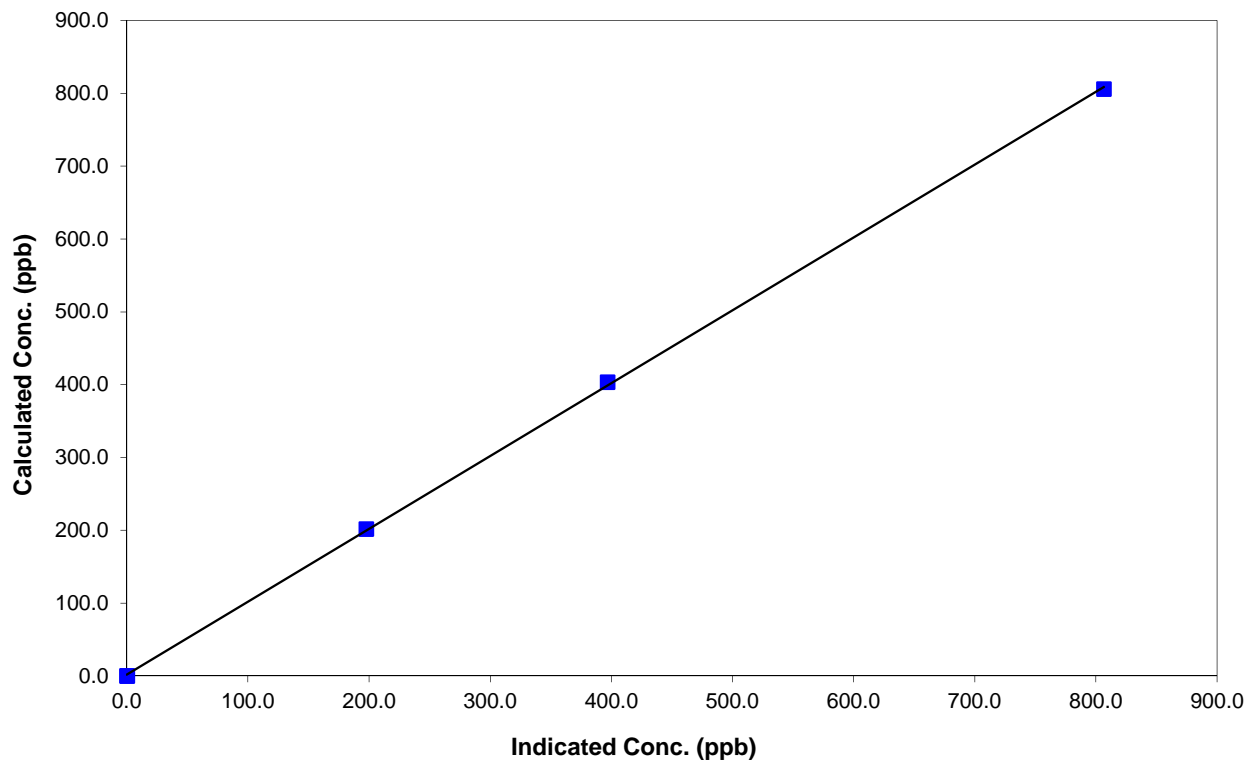
Station Information

Calibration Date	June 23, 2014	Previous Calibration	May 28, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	8:45	End Time (MST)	13:05
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	0.2	N/A	Correlation Coefficient	0.999905
805.9	806.6	0.9991		
403.5	396.8	1.0168	Slope	1.000524
201.7	197.8	1.0199		
0.0	0.4	0.0000	Intercept	1.711930

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

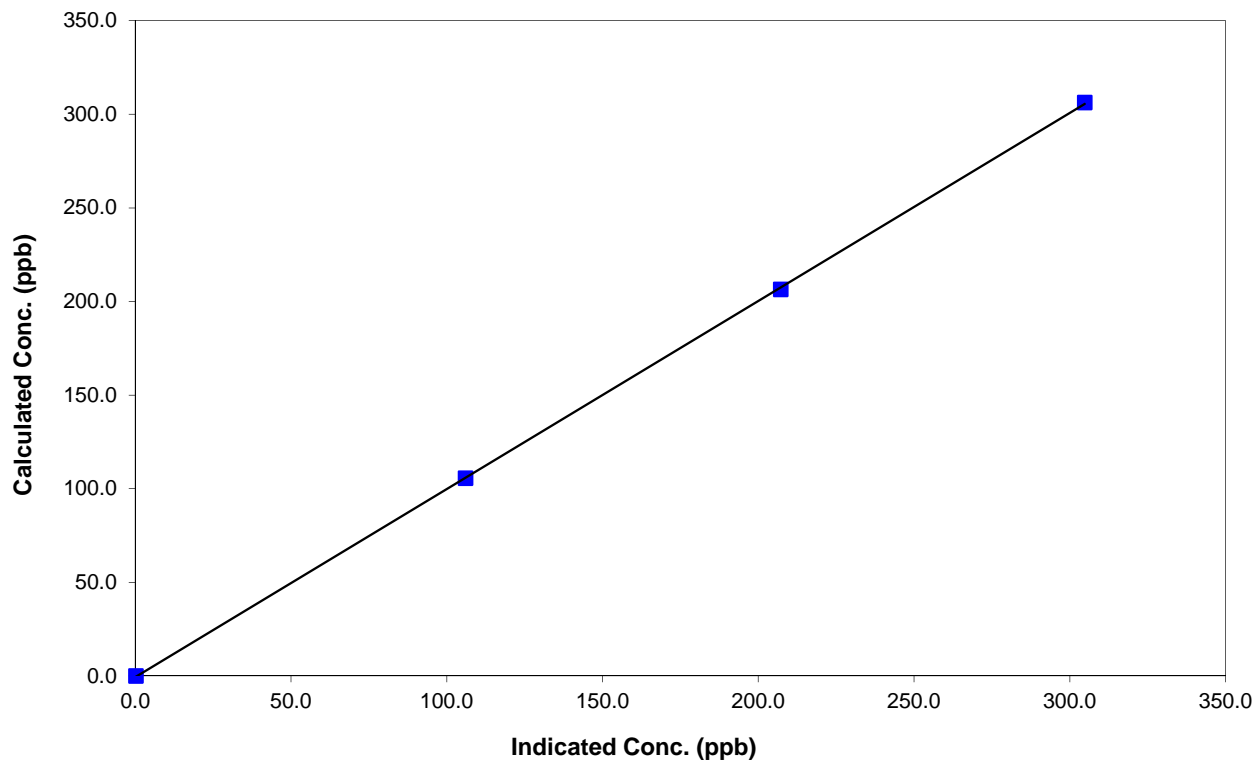
Station Information

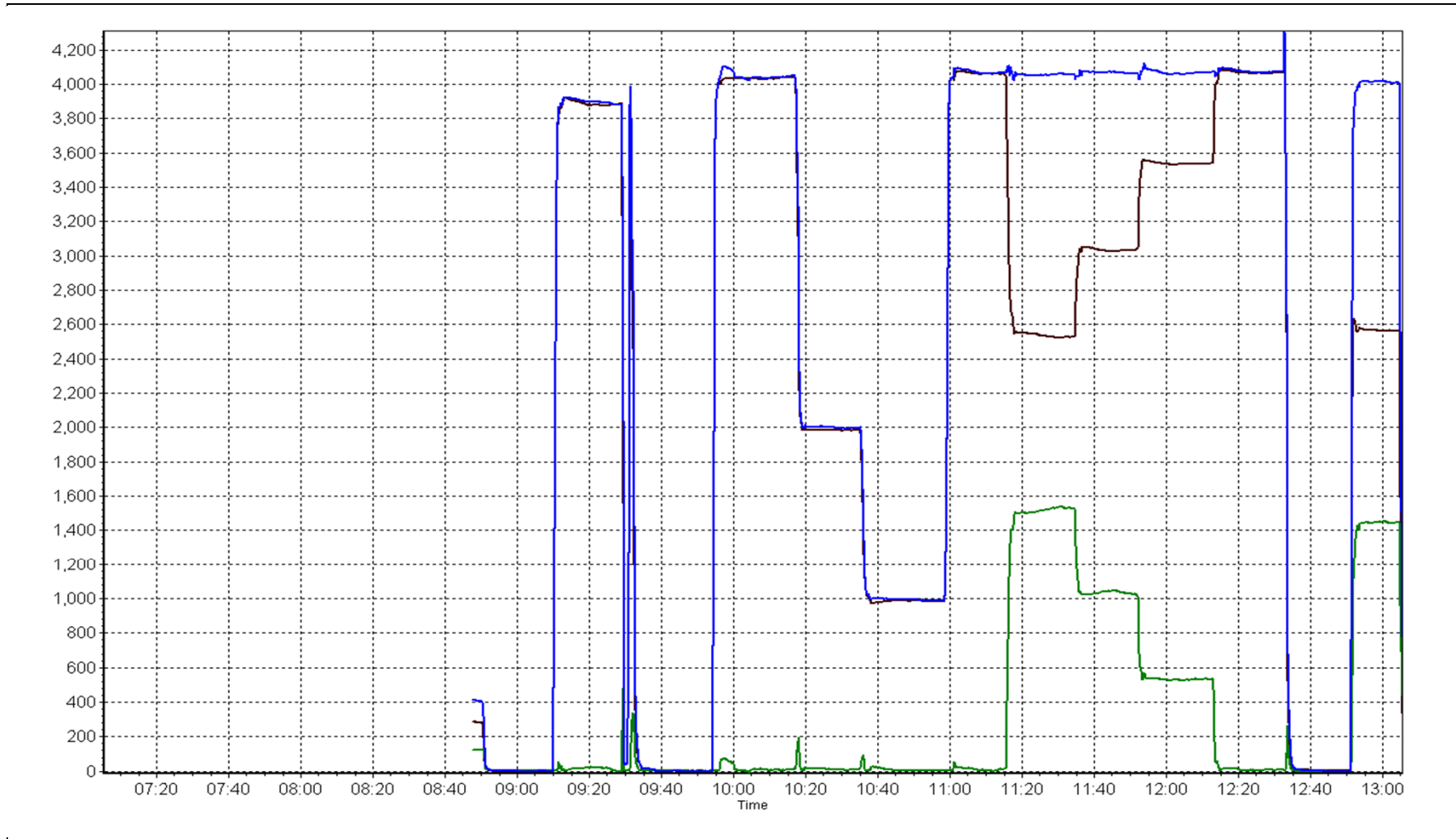
Calibration Date	June 23, 2014	Previous Calibration	May 28, 2014
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	8:45	End Time (MST)	13:05
Analyzer make	API T200	Analyzer serial #	724

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999964
306.2	304.8	1.0046		
206.4	207.2	0.9961	Slope	1.004235
105.6	106.0	0.9962		
			Intercept	-0.653980

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 17
WAPASU
JUNE 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

July 31, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)

JUNE 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	19	0	2	0
H2S (ppb) Average	686	33	34	99.86	1	0	0	0
THC (ppm) Average	682	36	38	99.72	2.4	-	2.2	-
O3 (ppb) Average	684	35	36	99.86	49	0	39	-
NO2 (ppb) Average	683	36	37	99.86	13	0	4	-
NO (ppb) Average	683	36	37	99.86	10	-	1	-
NOX (ppb) Average	683	36	37	99.86	22	-	5	-
PM2.5 (ug/m3) Average	719	0	1	99.86	44.6	-	21.6	0
Temperature 2 m (C) Average	720	0	0	100.00	25.7	-	20.4	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	-	-
Wind Speed 10 m (km/h) Average	716	0	4	99.44	21	-	-	-
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)
 JUNE 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	0.4	1	-	0	0	0	0	0	1	19
H2S (ppb) Average	686	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	682	2.1	0.1	-	1.9	2	2	2.1	2.1	2.2	2.4
O3 (ppb) Average	684	28.6	10	-	1	14	22	30	37	42	49
NO2 (ppb) Average	683	1.1	2	-	0	0	0	0	1	3	13
NO (ppb) Average	683	0.6	1	-	0	0	0	0	1	1	10
NOX (ppb) Average	683	1.7	2	-	0	0	1	1	2	4	22
PM2.5 (ug/m3) Average	719	5.35	5.5	-	0	1.3	2.5	4.2	6.1	9.4	44.6
Temperature 2 m (C) Average	720	14.88	5.6	-	-0.6	6.6	11	15.5	19	22.1	25.7
Relative Humidity (%) Average	720	65.2	23	-	19	34	47	67	86	96	99
Wind Speed 10 m (km/h) Average	716	8.2	4	-	0	3	5	8	11	13	21
Wind Direction 10 m (deg) Average	716	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
JUNE 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	11 Jun 2014 08:00	11 Jun 2014 08:00	1	Maintenance - repair on sample manifold
H2S	10 Jun 2014 08:00	10 Jun 2014 08:00	1	Maintenance - repair on sample manifold
THC	11 Jun 2014 08:00	11 Jun 2014 08:00	1	Maintenance - repair on sample manifold
THC	24 Jun 2014 10:00	24 Jun 2014 10:00	1	Maintenance - replaced fuel cylinder
O3	10 Jun 2014 08:00	10 Jun 2014 08:00	1	Maintenance - repair on sample manifold
NO2, NO, NOX	11 Jun 2014 08:00	11 Jun 2014 08:00	1	Maintenance - repair on sample manifold
PM2.5	11 Jun 2014 08:00	11 Jun 2014 08:00	1	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	06 Jun 2014 03:00	06 Jun 2014 03:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	07 Jun 2014 21:00	07 Jun 2014 22:00	2	Flatline in sensor output signal
Wind Speed, Wind Direction	22 Jun 2014 06:00	22 Jun 2014 06:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	24 Jun 2014 11:00	24 Jun 2014 11:00	1	Maintenance - met sensor calibration

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Summary of Hour Averages

Wapasu - June 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 19 ppb on Jun 2 07:00	Maximum Daily Average: 2.3 ppb on Jun 2		Hours of Data:	683
Minimum Value: 0 ppb on Jun 6 19:00	Minimum Daily Average: 0.1 ppb on Jun 6		Hours of Missing Data:	37
Maximum Diurnal Average: 1.1 ppb at hour 7	Minimum Diurnal Average: 0.3 ppb at hour 21		Hours of Calibration:	36
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 = 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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.3	1
2-Jun	1	Z	0	0	0	7	19	7	5	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3	19
3-Jun	0	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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
5-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Jun	0	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-Jun	0	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-Jun	0	Z	0	0	1	1	1	1	1	0	0	2	4	3	4	2	2	1	1	1	0	0	0	0	1.1	4
9-Jun	0	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-Jun	0	Z	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	--	0	
11-Jun	0	Z	0	0	1	4	5	M	2	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0.9	5	
12-Jun	1	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
13-Jun	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	
14-Jun	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-Jun	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	
16-Jun	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
17-Jun	1	Z	11	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	11	
18-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1	
19-Jun	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	1	
20-Jun	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	2	
21-Jun	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
22-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
23-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
24-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
25-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.4	1	
26-Jun	0	Z	0	0	0	0	0	0	0	0	1	1	1	2	0	0	0	1	1	1	0	0	0	0.5	2	
27-Jun	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-Jun	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-Jun	0	Z	0	1	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0.5	1	
30-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	

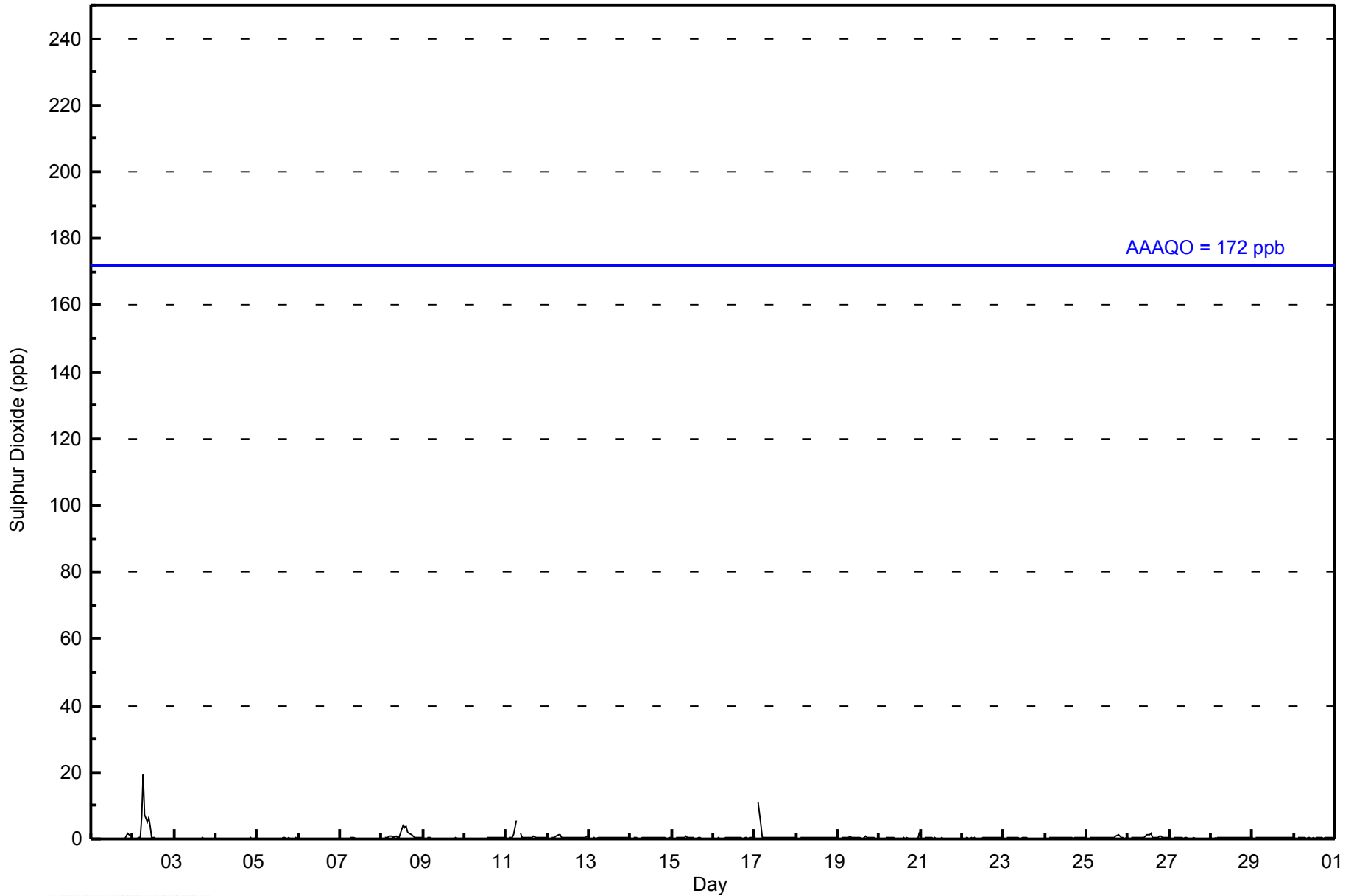
0.3	--	0.6	0.4	0.3	0.6	1.1	0.6	0.5	0.5	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	Diurnal Average
1	--	11	4	1	7	19	7	5	6	4	2	4	3	4	2	2	1	1	1	1	1	1	1	1	1	2	Diurnal Maximum

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
Wapasu - June 2014





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	681	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: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - June 2014

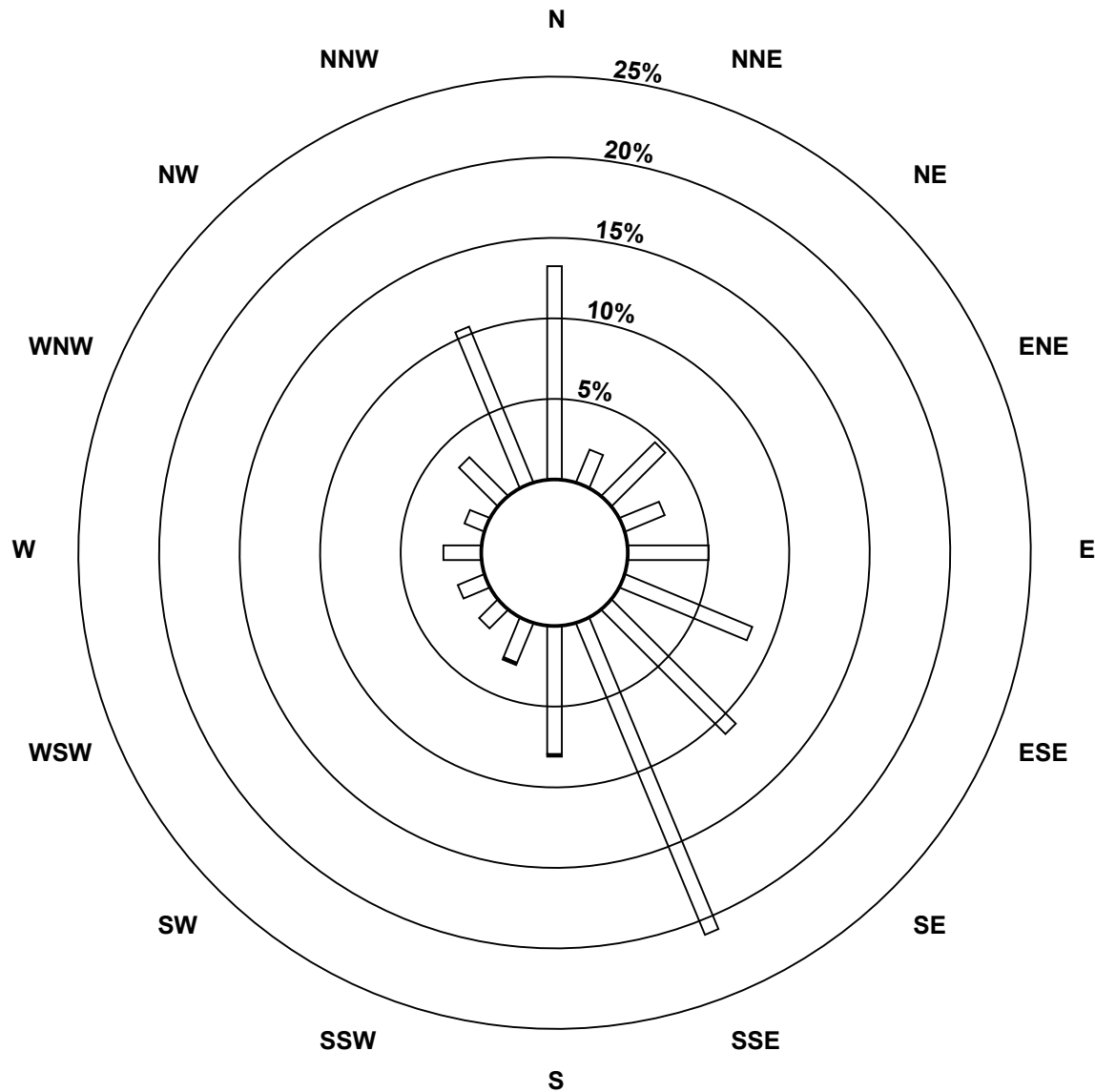
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	90	15	32	18	34	58	74	142	54	18	11	12	16	9	23	71	677
11 - 20	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	90	15	32	18	34	58	74	142	55	19	11	12	16	9	23	71	679

Total Number of Valid Hours: 679

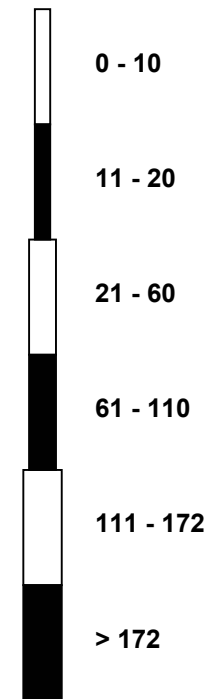
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Sulphur Dioxide (SO₂) - ppb
Wapasu (AMS 17)



Classes (ppb)

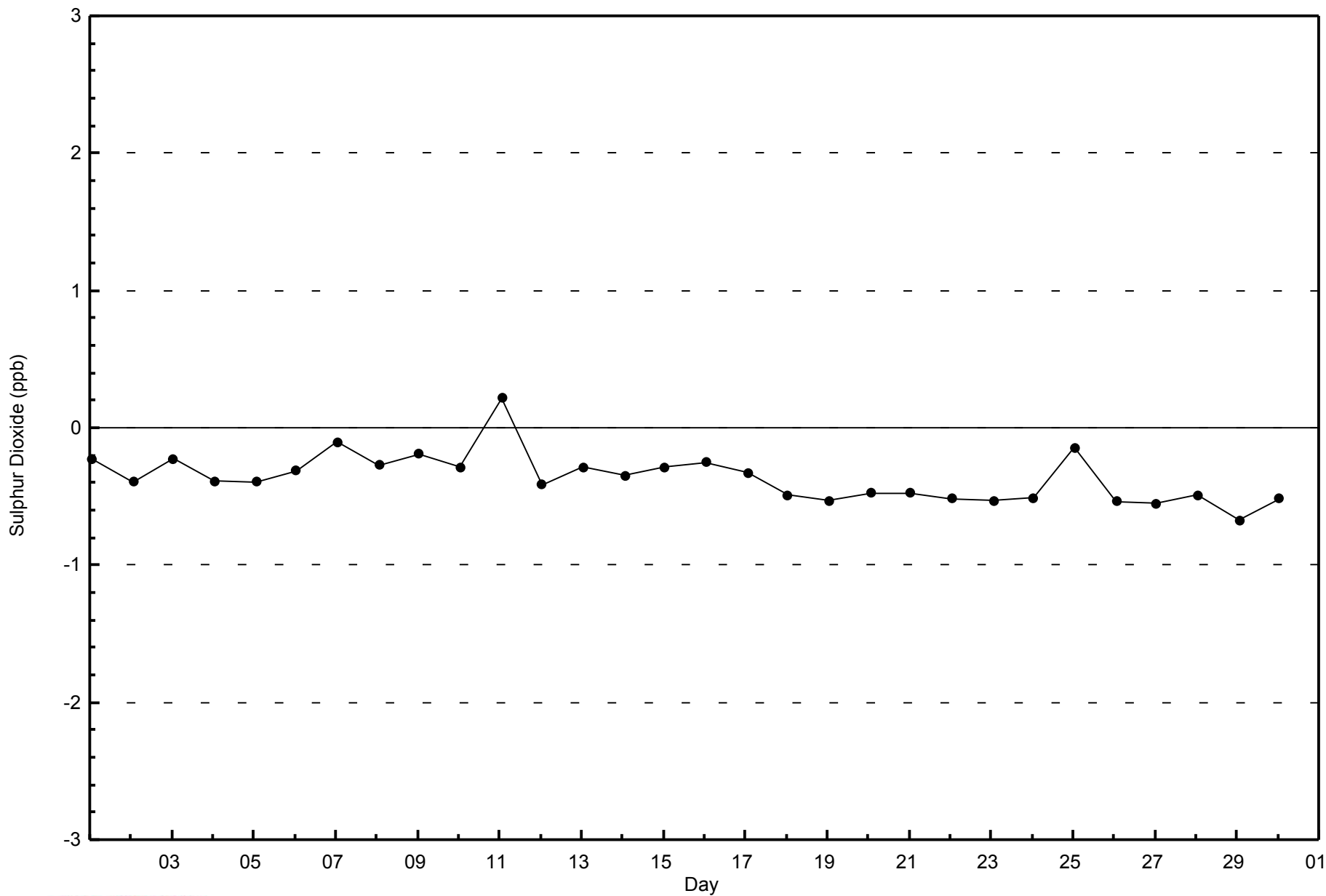


Total Number of Valid Hours: 679



WBEA
Zero Responses

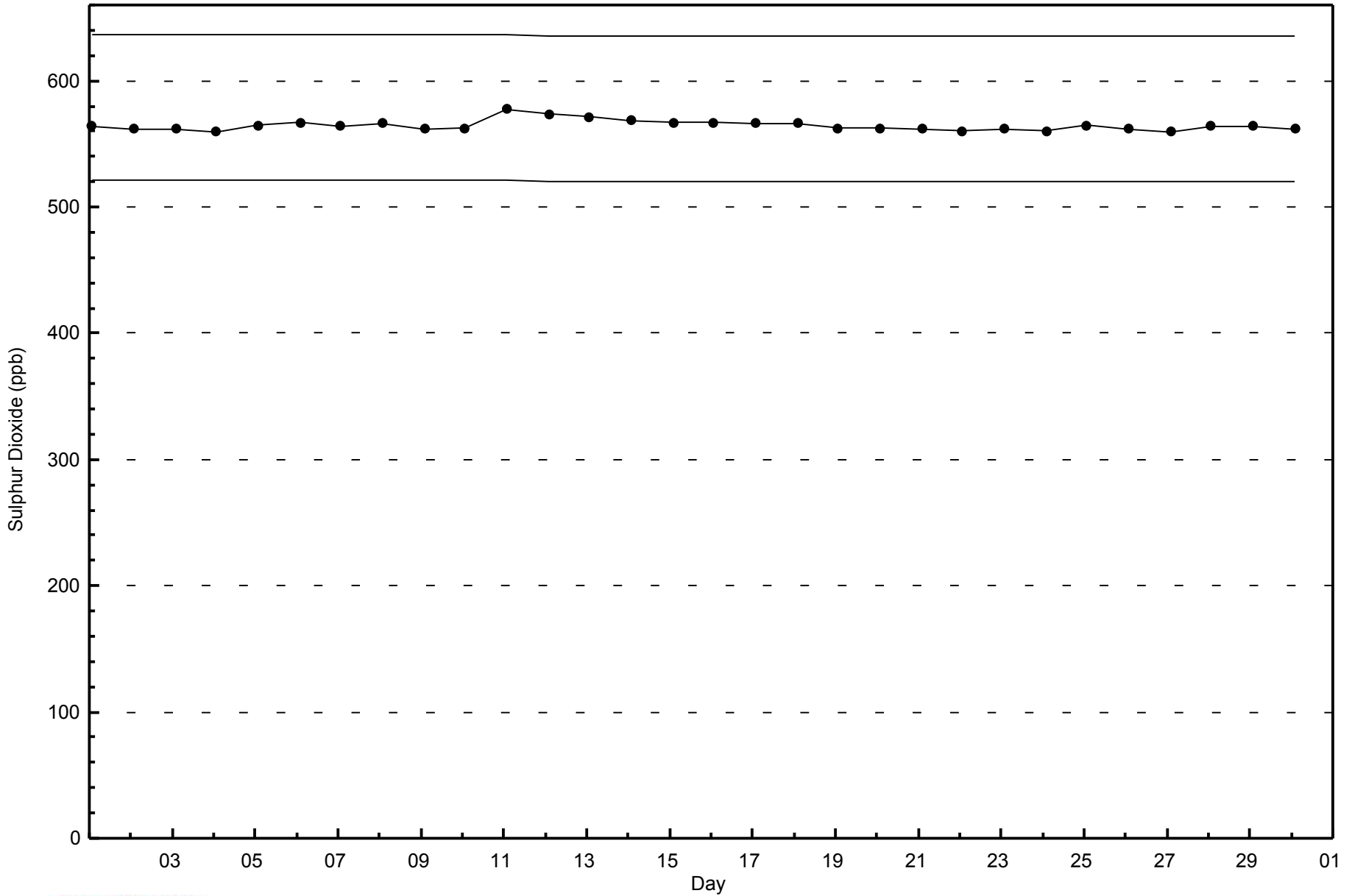
Sulphur Dioxide (SO₂) - ppb
Wapasu - June 2014





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Wapasu - June 2014



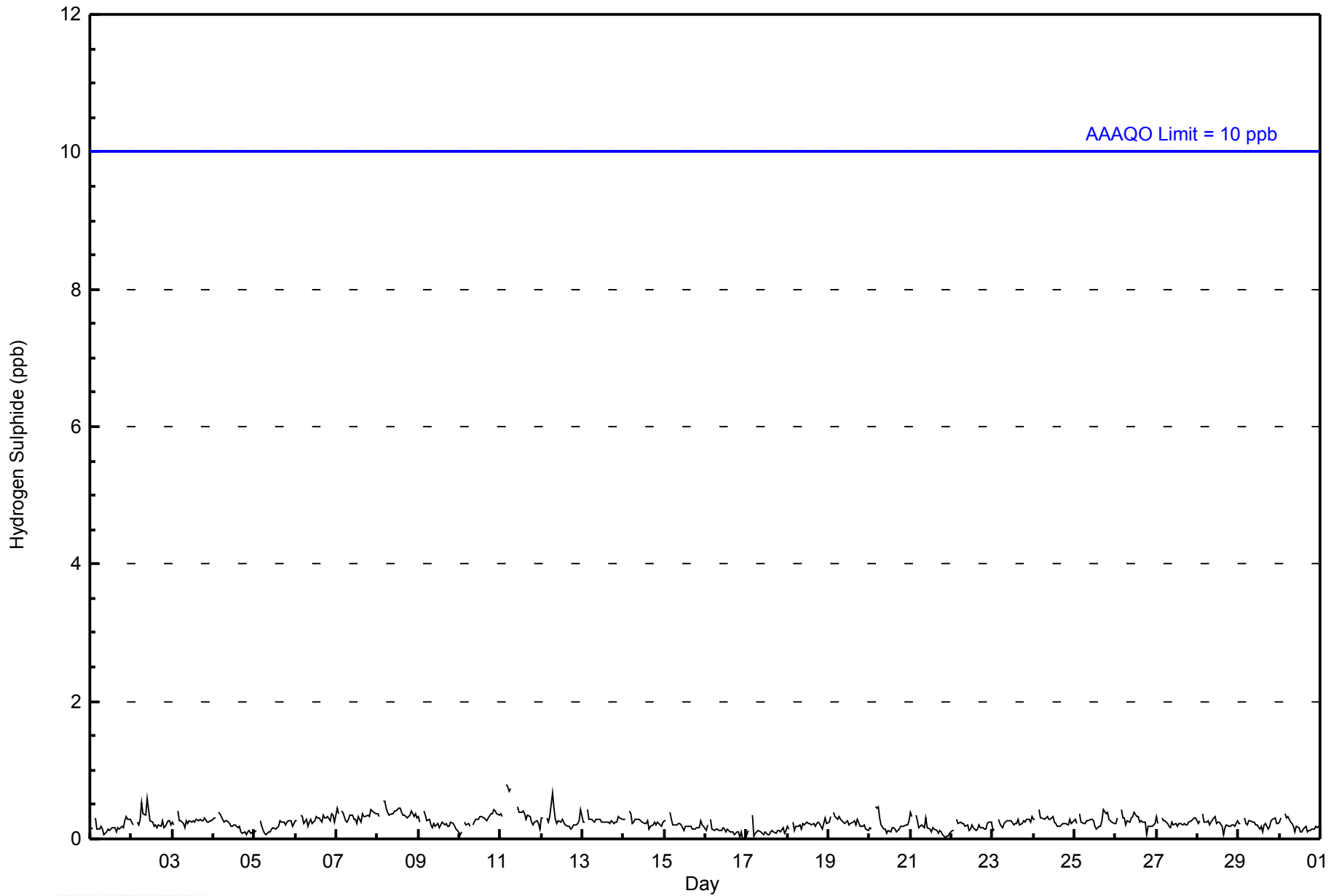


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 720																			
Maximum Value: 1 ppb on Jun 11 04:00										Maximum Daily Average: 0.4 ppb on Jun 11										Hours of Data: 686									
Minimum Value: 0 ppb on Jun 16 23:00										Minimum Daily Average: 0.1 ppb on Jun 17										Hours of Missing Data: 34									
Maximum Diurnal Average: 0.4 ppb at hour 4										Minimum Diurnal Average: 0.2 ppb at hour 16										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: 99.9									
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-Jun	0	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-Jun	0	0	Z	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1			
3-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0			
4-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0			
6-Jun	0	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-Jun	0	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-Jun	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1			
9-Jun	0	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-Jun	0	0	Z	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0			
11-Jun	0	0	Z	1	1	1	1	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1			
12-Jun	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1			
13-Jun	0	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			
14-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0			
15-Jun	0	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-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0			
18-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0			
19-Jun	0	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-Jun	0	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-Jun	0	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-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0			
23-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0			
24-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0			
25-Jun	0	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-Jun	0	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-Jun	0	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-Jun	0	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-Jun	0	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-Jun	0	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 -- 0.4 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 0.2 0.2										Diurnal Average									
										0 0 -- 1 1 1 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0										Diurnal Maximum									
Z - zerospan										C - Calibration										M - Maintenance									
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb										24-hr 3 ppb																			



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Wapasu - June 2014





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - June 2014

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

Total Number of Valid Hours: 686

Total Number of Hours: 720



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - June 2014

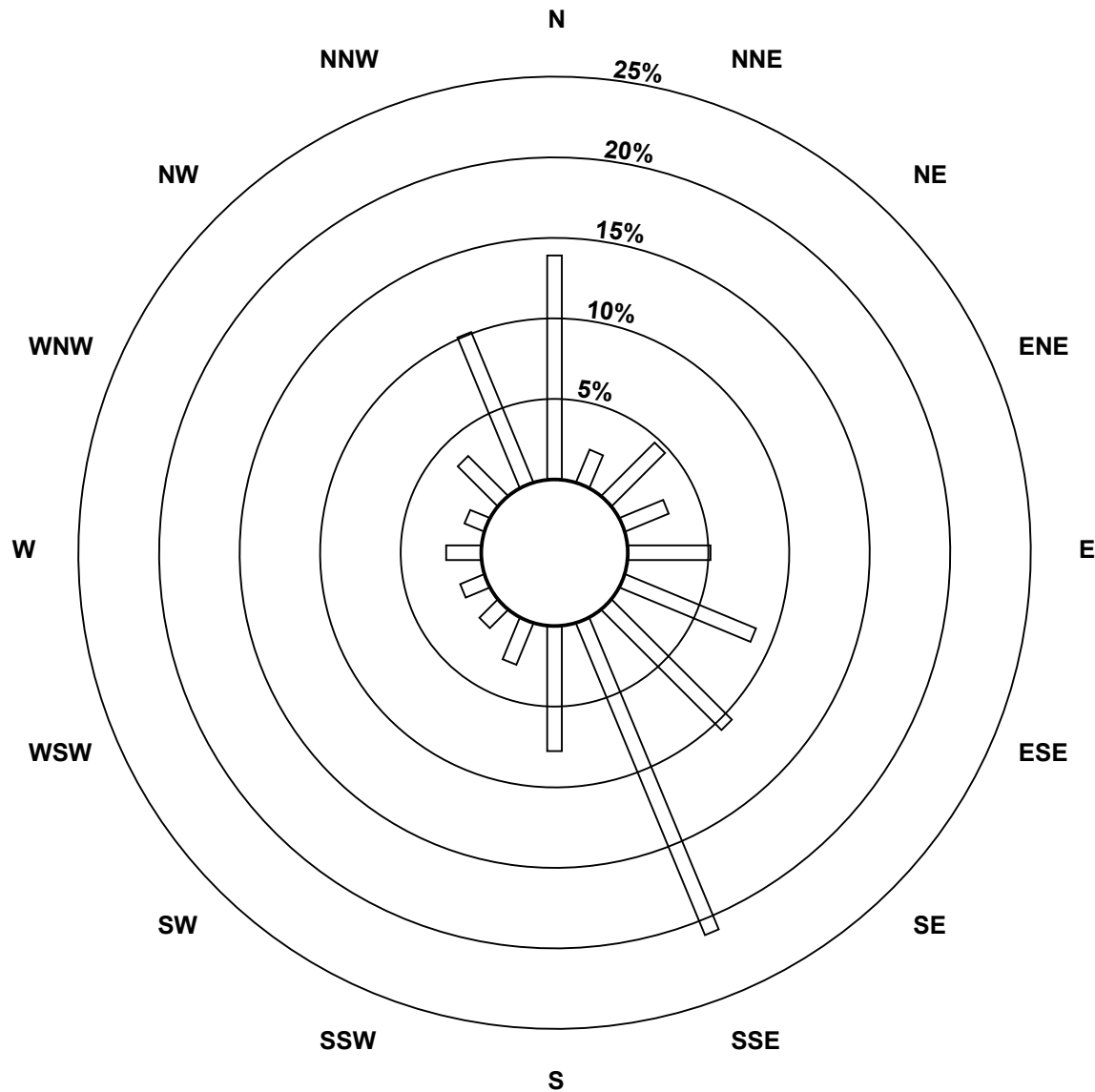
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	95	15	32	20	35	60	72	143	53	19	11	11	15	9	24	69	683
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	95	15	32	20	35	60	72	143	53	19	11	11	15	9	24	69	683

Total Number of Valid Hours: 683

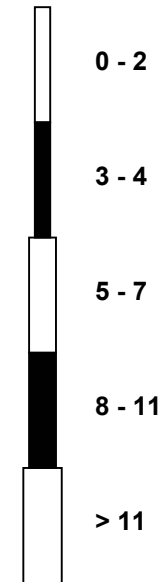
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Hydrogen Sulphide (H₂S) - ppb
Wapasu (AMS 17)



Classes (ppb)

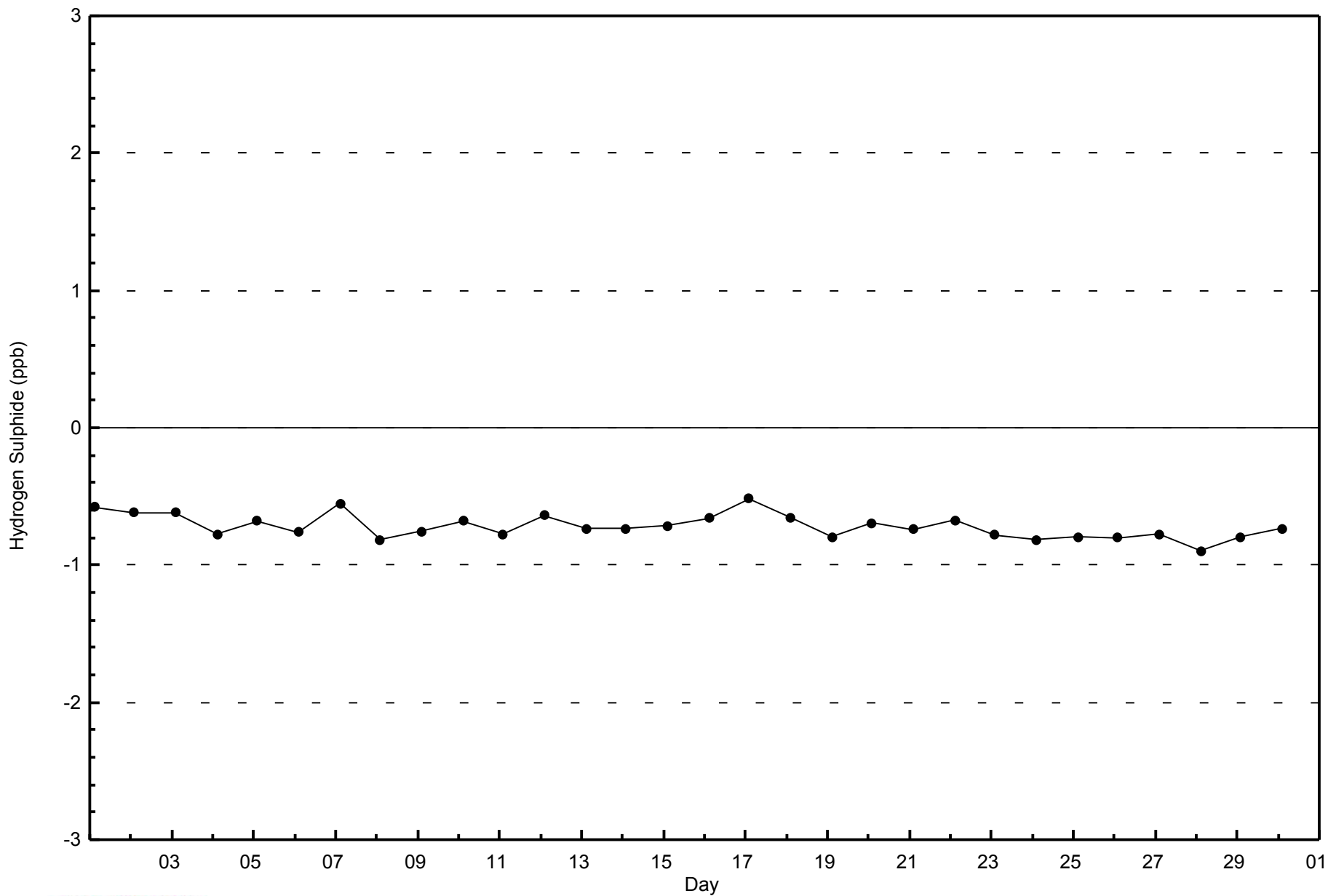


Total Number of Valid Hours: 683



WBEA
Zero Responses

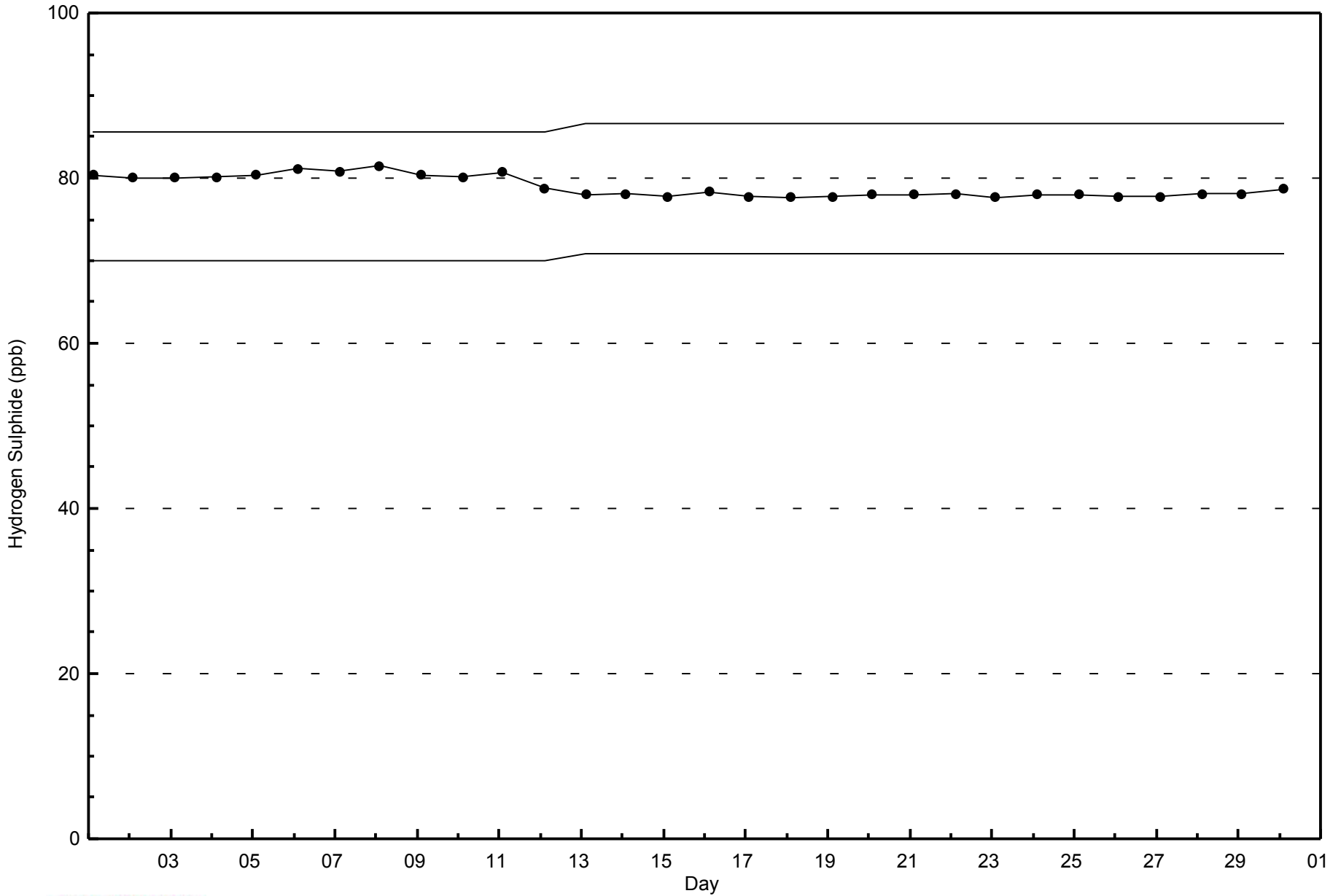
Hydrogen Sulphide (H₂S) - ppb
Wapasu - June 2014





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Wapasu - June 2014



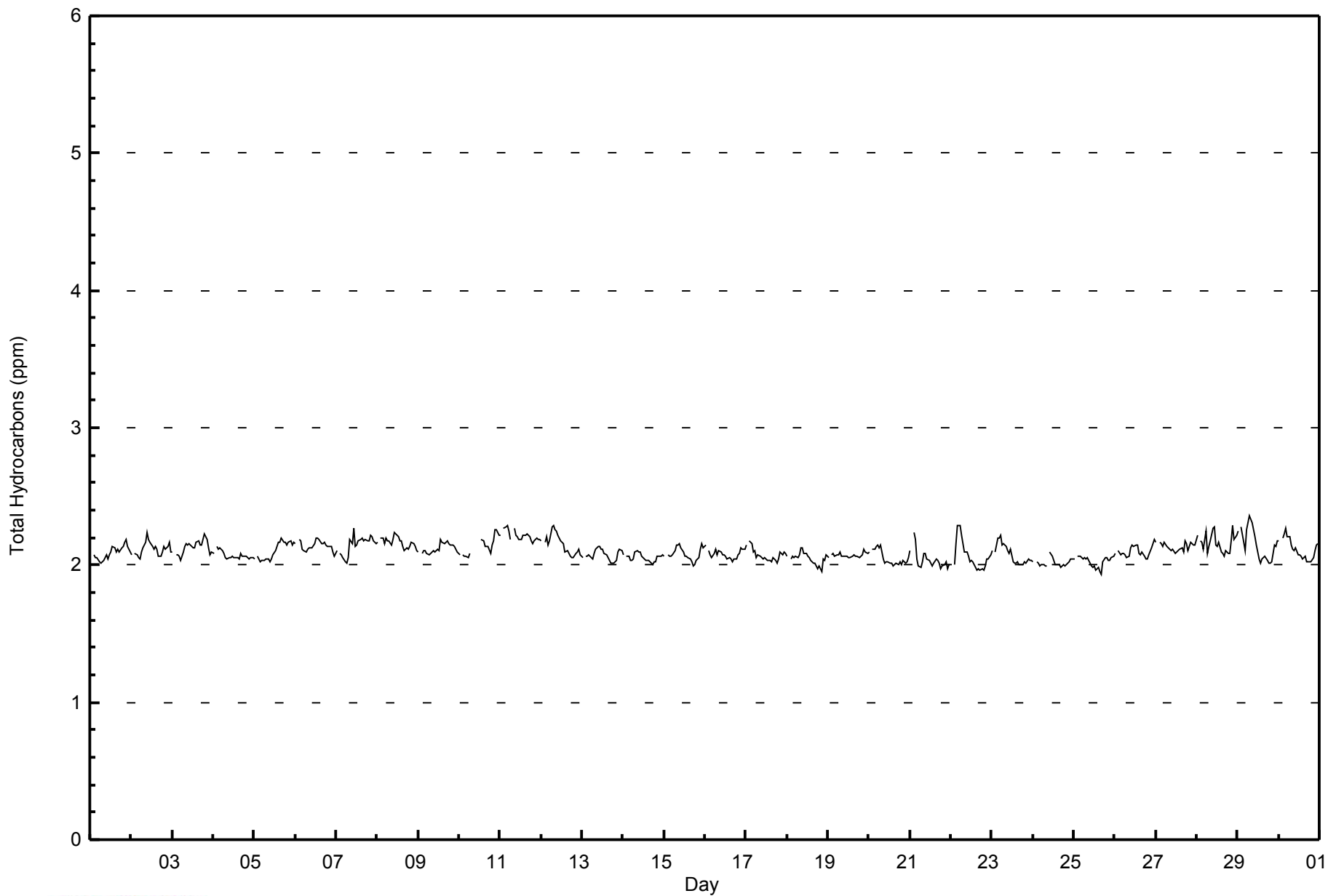


Maximum Value: 2.4 ppm on Jun 29 08:00		Maximum Daily Average: 2.2 ppm on Jun 11		Hours in Service: 720																						
Minimum Value: 1.9 ppm on Jun 25 17:00		Minimum Daily Average: 2.0 ppm on Jun 24		Hours of Data: 682																						
Maximum Diurnal Average: 2.1 ppm at hour 10		Minimum Diurnal Average: 2.1 ppm at hour 19		Hours of Missing Data: 38																						
Monthly Average: 2.10 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.1 P ₉₀ = 2.2 P ₉₉ = 2.3		Hours of Calibration: 36																						
				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-Jun	2.1	Z	2.1	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	2.2	2.2	2.1	2.1	2.1	2.2
2-Jun	2.1	Z	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2
3-Jun	2.1	Z	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2
4-Jun	2.1	Z	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	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1
5-Jun	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.1	2.2
6-Jun	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
7-Jun	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.1	2.2	2.2	2.3	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.3
8-Jun	2.2	Z	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	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.2
9-Jun	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2
10-Jun	2.1	Z	2.1	2.1	2.1	2.1	2.1	C	C	C	C	C	C	C	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.2	2.3
11-Jun	2.2	Z	2.3	2.3	2.3	2.2	2.2	M	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
12-Jun	2.2	Z	2.2	2.2	2.1	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.3
13-Jun	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1
14-Jun	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1
15-Jun	2.1	Z	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.1	2.2
16-Jun	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1
17-Jun	2.1	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.2
18-Jun	2.1	Z	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1
19-Jun	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
20-Jun	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1
21-Jun	2.1	Z	2.2	2.2	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
22-Jun	2.0	Z	2.0	2.2	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3
23-Jun	2.1	Z	2.1	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
24-Jun	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	M	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
25-Jun	2.0	Z	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	1.9	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1
26-Jun	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	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.2
27-Jun	2.2	Z	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.2
28-Jun	2.2	Z	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.3	2.3	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.2	2.3
29-Jun	2.3	Z	2.3	2.2	2.1	2.3	2.3	2.4	2.3	2.3	2.2	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.4
30-Jun	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.3
		2.1	--	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Average
		2.3	--	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	2.3	2.3	2.2	Diurnal Maximum
Z - zerspan		C - Calibration					M - Maintenance																			



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Wapasu - June 2014





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - June 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	175	25.66	25.66
2.1 - 3.0	507	74.34	100.00
3.1 - 10.0	0	0.00	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
Wapasu - June 2014

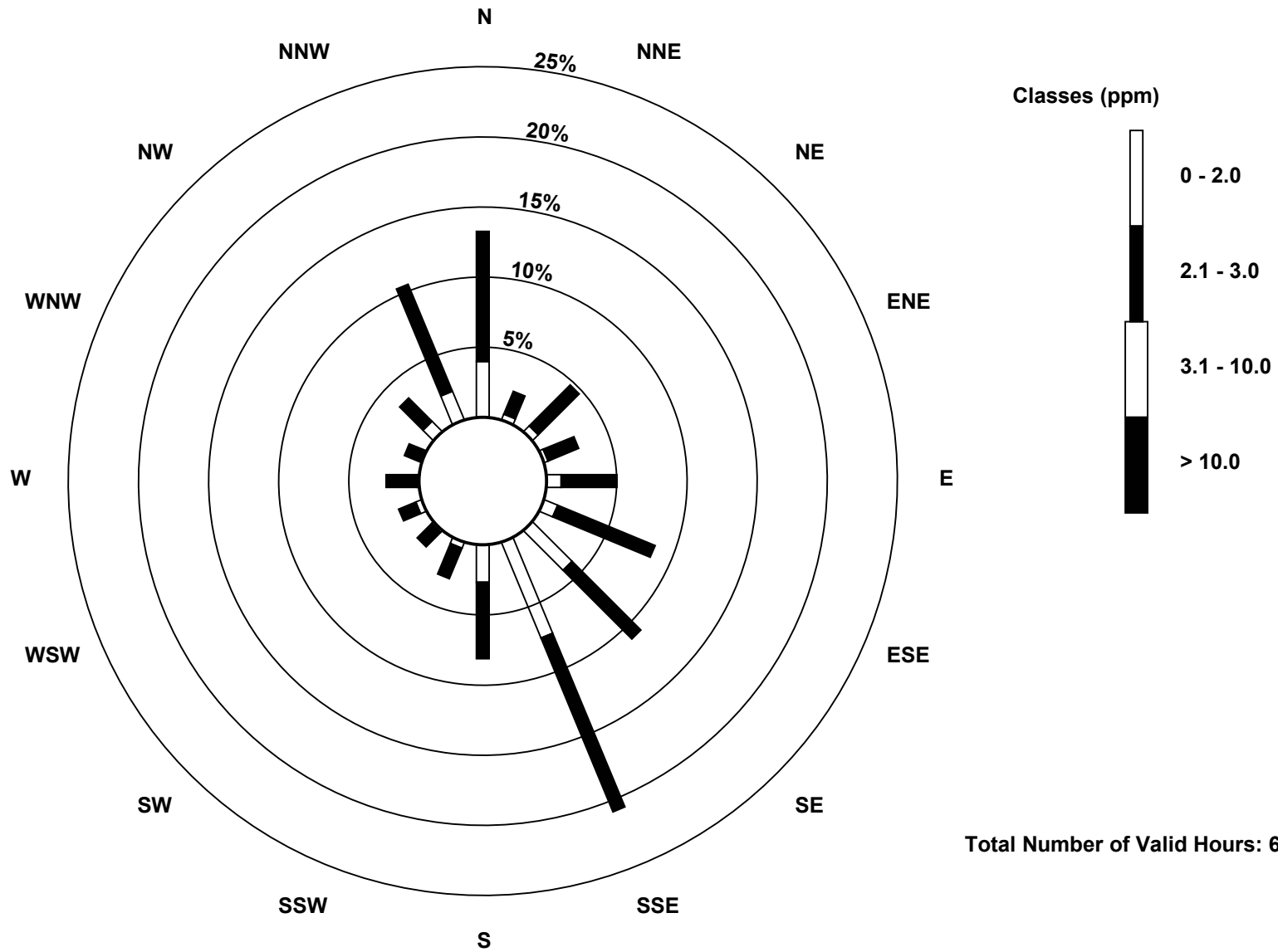
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	27	3	4	2	7	7	27	50	18	3	1	3	1	0	7	15	175
2.1 - 3.0	63	12	28	16	27	51	47	91	37	16	10	9	15	9	16	56	503
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	90	15	32	18	34	58	74	141	55	19	11	12	16	9	23	71	678

Total Number of Valid Hours: 678

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

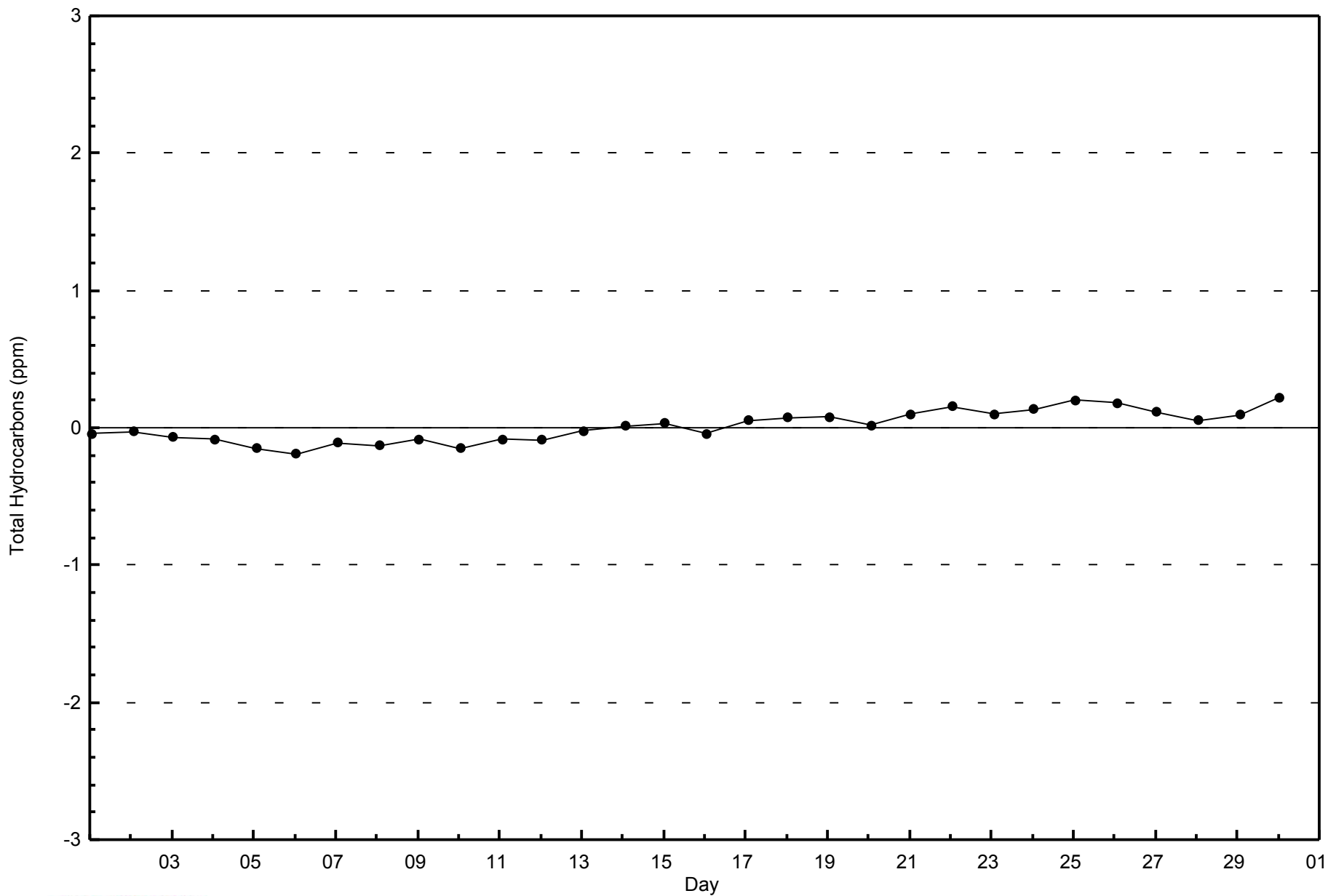
Total Hydrocarbons (THC) - ppm
Wapasu (AMS 17)





WBEA
Zero Responses

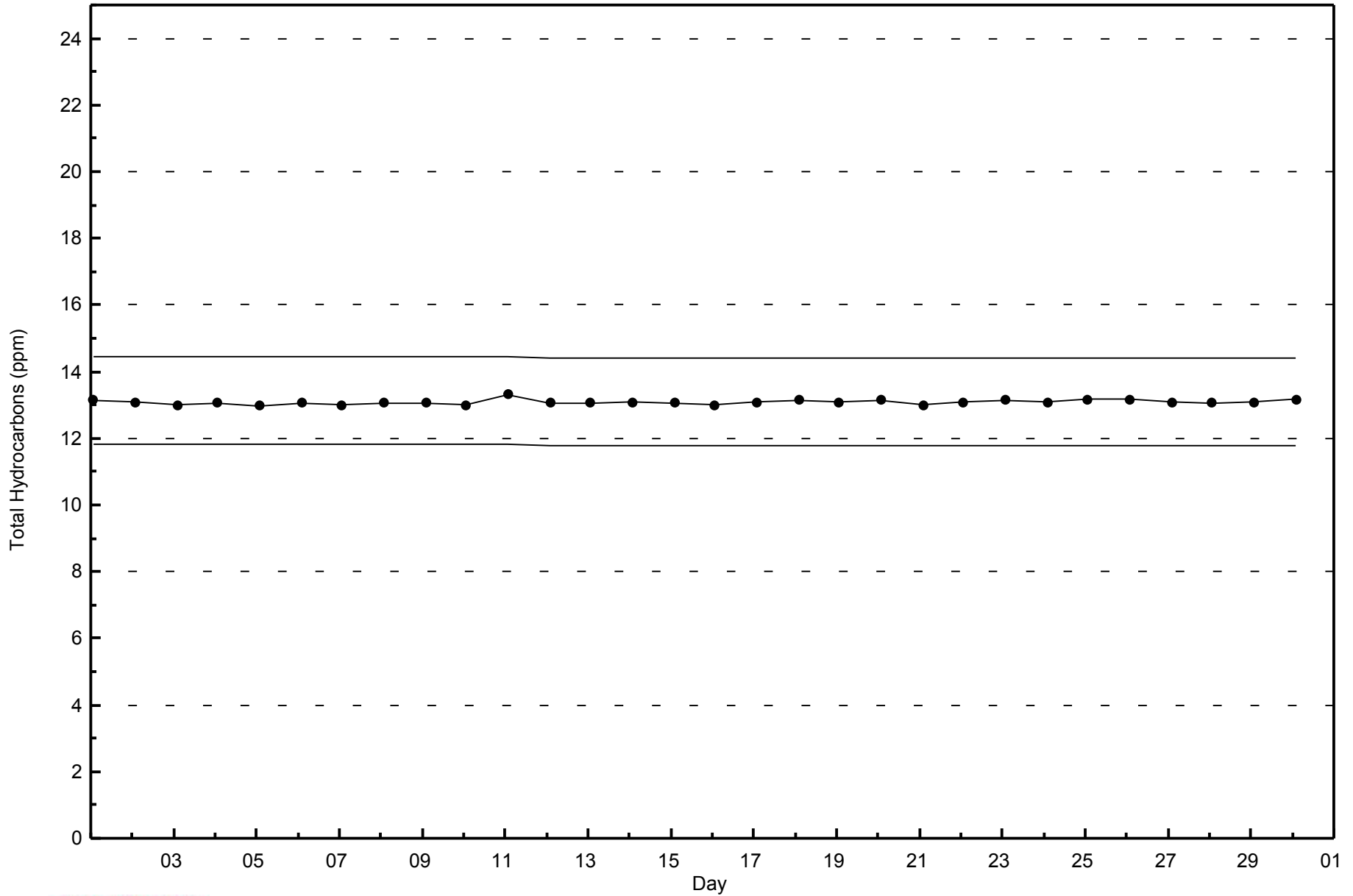
Total Hydrocarbons (THC) - ppm
Wapasu - June 2014





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Wapasu - June 2014





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 49 ppb on Jun 8 17:00	Maximum Daily Average: 38.6 ppb on Jun 14
Minimum Value: 1 ppb on Jun 23 05:00	Hours of Data: 684
Maximum Diurnal Average: 35.6 ppb at hour 17	Hours of Missing Data: 36
Monthly Average: 28.6 ppb	Hours of Calibration: 35
Minimum Daily Average: 14.4 ppb on Jun 23	Percent Operational Time: 99.9
Minimum Diurnal Average: 20.3 ppb at hour 3	
Percentiles: P ₁ = 3 P ₁₀ = 14 Q ₁ = 22 Median = 30 Q ₃ = 37 P ₉₀ = 42 P ₉₉ = 47	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	36	36	37	Z	37	36	34	35	35	33	33	35	36	39	41	42	40	46	47	43	42	38	37	34	37.9	47
2-Jun	31	27	24	Z	21	18	18	25	33	32	41	44	45	43	45	45	42	43	43	44	40	33	30	28	34.6	45
3-Jun	27	34	36	Z	38	39	38	39	38	39	37	23	23	22	24	39	47	34	19	16	14	18	19	16	29.5	47
4-Jun	14	13	14	Z	14	15	16	20	23	25	25	25	26	26	26	25	24	23	22	23	22	21	22	21	21.2	26
5-Jun	22	23	22	Z	21	22	23	25	28	29	29	30	32	31	34	35	33	31	30	28	25	16	16	5	25.7	35
6-Jun	2	2	2	Z	9	18	21	23	27	30	32	32	32	31	33	35	34	35	35	30	21	17	19	24	23.7	35
7-Jun	23	20	23	Z	23	21	30	30	29	28	29	34	35	37	37	37	37	38	38	36	24	13	17	16	28.4	38
8-Jun	9	7	10	Z	12	17	23	32	37	40	41	43	44	46	48	48	49	49	47	42	40	40	40	40	35.0	49
9-Jun	39	38	37	Z	33	32	22	29	34	34	34	38	40	41	38	41	42	40	37	36	38	36	28	26	35.4	42
10-Jun	24	31	29	Z	27	33	37	M	41	42	42	43	43	42	42	42	44	43	42	40	32	17	7	3	33.9	44
11-Jun	7	12	14	Z	12	13	20	C	C	C	C	C	41	37	34	37	35	36	41	38	30	19	17	14	25.4	41
12-Jun	15	18	12	Z	9	13	25	28	33	38	40	38	38	38	39	43	46	47	46	44	41	34	32	34	32.6	47
13-Jun	35	35	34	Z	32	33	34	36	38	38	41	41	44	44	42	42	42	42	41	40	37	36	36	36	38.2	44
14-Jun	37	36	35	Z	32	31	29	31	36	37	40	41	42	42	43	44	45	46	45	45	41	35	37	37	38.6	46
15-Jun	36	35	35	Z	33	34	37	44	48	48	44	43	41	40	40	40	41	40	38	36	31	29	32	32	38.6	48
16-Jun	27	19	23	Z	30	29	29	32	32	33	35	36	37	38	38	37	38	37	36	34	31	26	28	22	31.7	38
17-Jun	15	22	19	Z	26	24	26	24	28	34	33	32	33	32	32	31	32	33	31	28	22	25	24	24	27.4	34
18-Jun	22	19	18	Z	18	18	17	20	29	34	36	37	40	42	42	42	42	43	42	42	37	35	33	30	32.0	43
19-Jun	28	27	26	Z	22	22	23	25	25	25	27	27	32	32	31	32	29	27	29	26	23	16	18	20	25.7	32
20-Jun	23	19	12	Z	13	11	9	10	20	27	30	27	25	25	26	26	25	25	18	14	12	20	22	15	19.7	30
21-Jun	10	5	11	Z	23	25	23	22	20	21	24	25	24	25	25	24	22	21	21	19	19	16	22	18	20.2	25
22-Jun	18	18	12	Z	3	3	7	12	14	18	26	28	28	30	31	32	30	30	28	29	23	18	16	13	20.3	32
23-Jun	8	5	7	Z	1	2	11	13	8	21	24	25	29	17	18	15	18	25	18	15	11	13	15	14	14.4	29
24-Jun	17	20	25	Z	29	29	28	27	26	26	30	31	33	34	35	32	31	28	30	30	31	29	28	28	28.5	35
25-Jun	26	24	23	Z	23	24	25	26	32	33	36	36	37	37	37	37	36	30	24	20	20	17	16	18	27.7	37
26-Jun	18	16	17	Z	19	17	24	31	33	30	35	36	36	40	31	18	17	29	36	28	22	15	13	18	25.1	40
27-Jun	21	23	24	Z	25	18	17	20	22	24	30	32	34	38	30	26	31	24	22	26	14	6	9	9	22.9	38
28-Jun	4	4	4	Z	7	9	28	28	35	36	39	43	43	41	41	38	40	37	36	35	25	15	23	14	27.2	43
29-Jun	7	4	3	Z	8	17	22	23	24	27	35	39	37	37	37	37	38	38	36	34	34	32	30	35	27.6	39
30-Jun	27	24	20	Z	20	20	21	23	24	25	26	28	32	33	35	36	36	37	36	35	33	23	18	18	27.4	37

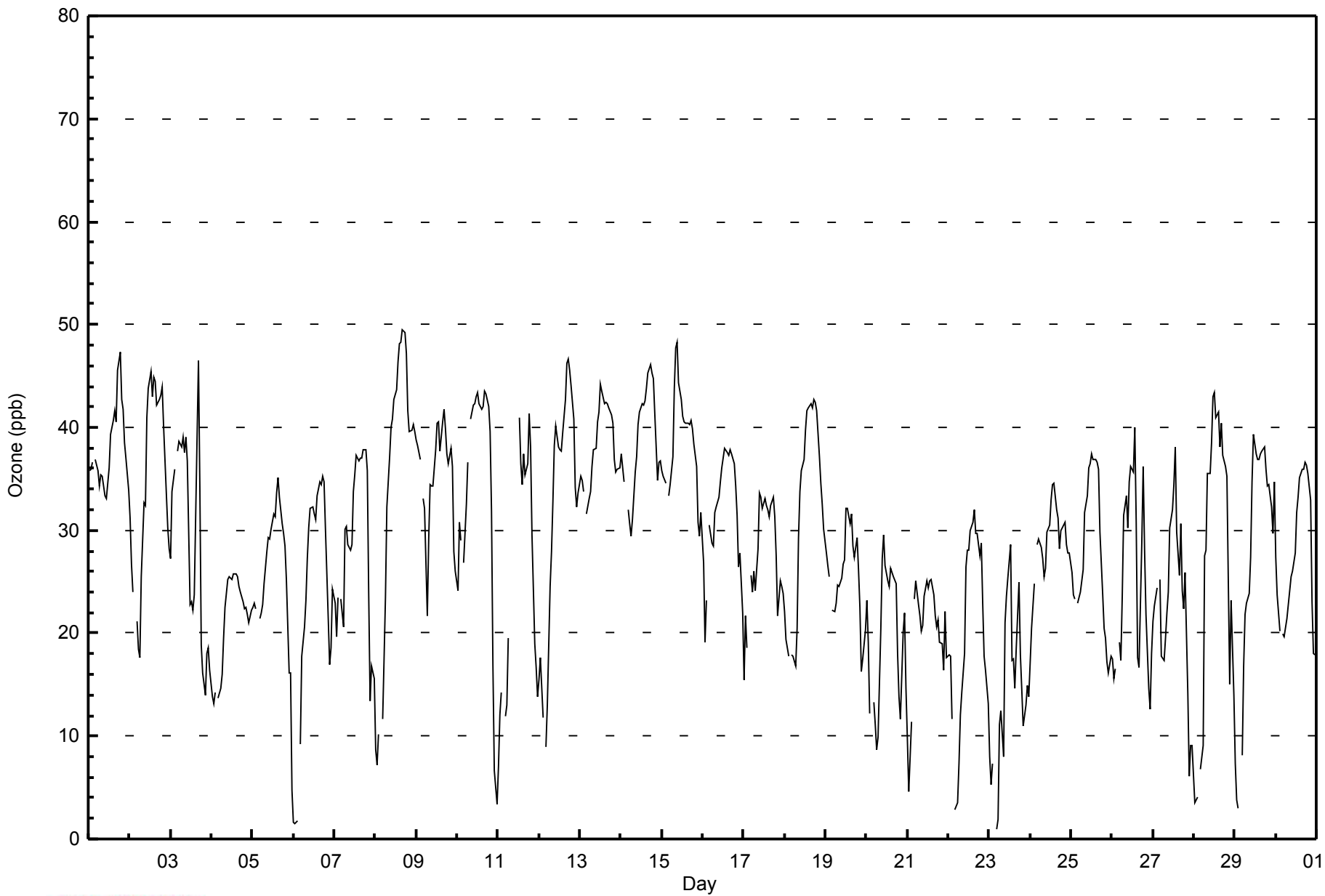
21.0	20.5	20.3	--	20.7	21.4	23.8	26.2	29.4	31.4	33.6	34.2	35.4	35.4	35.1	35.2	35.6	35.3	34.0	32.0	28.0	23.7	23.3	22.0	Diurnal Average	
39	38	37	--	38	39	38	44	48	48	44	44	45	46	48	48	49	49	47	45	42	40	40	40	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Wapasu - June 2014





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Wapasu - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	154	22.51	22.51
21 - 50	530	77.49	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
Wapasu - June 2014

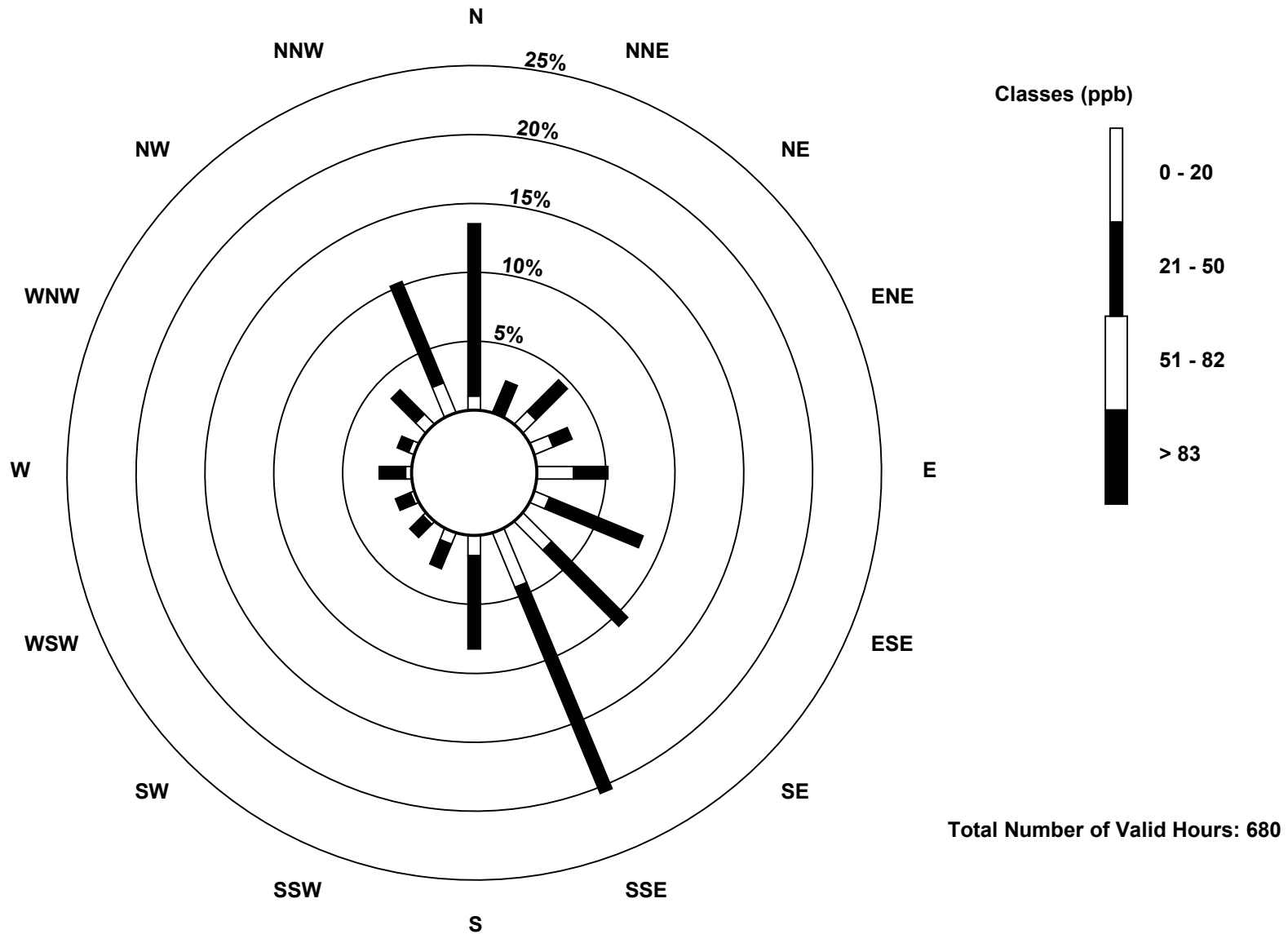
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	7	1	9	10	18	8	20	29	10	6	2	2	3	3	7	16	151
21 - 50	85	16	22	10	17	50	53	110	46	13	9	8	13	6	17	54	529
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	92	17	31	20	35	58	73	139	56	19	11	10	16	9	24	70	680

Total Number of Valid Hours: 680

Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

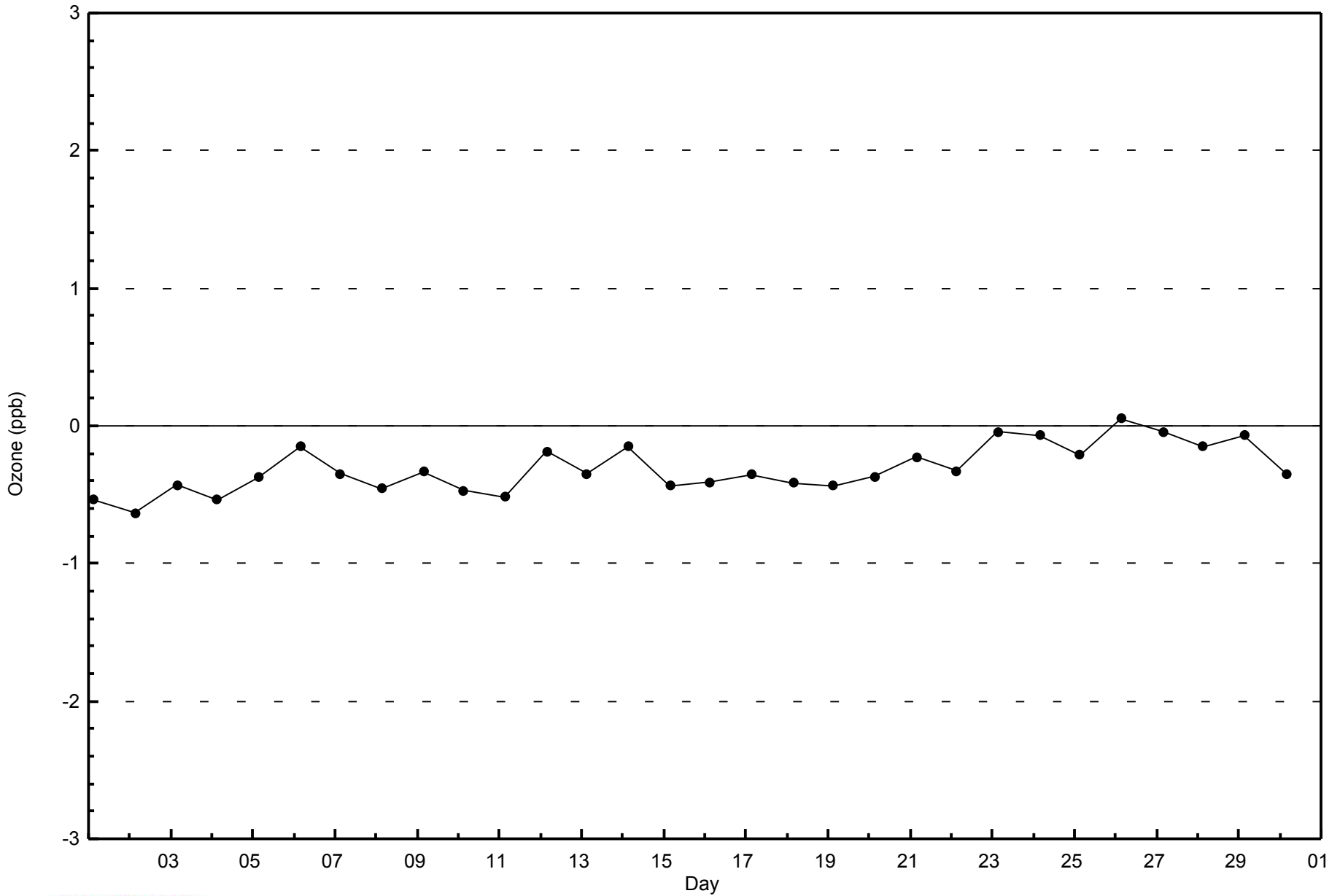
Ozone (O₃) - ppb
Wapasu (AMS 17)





WBEA
Zero Responses

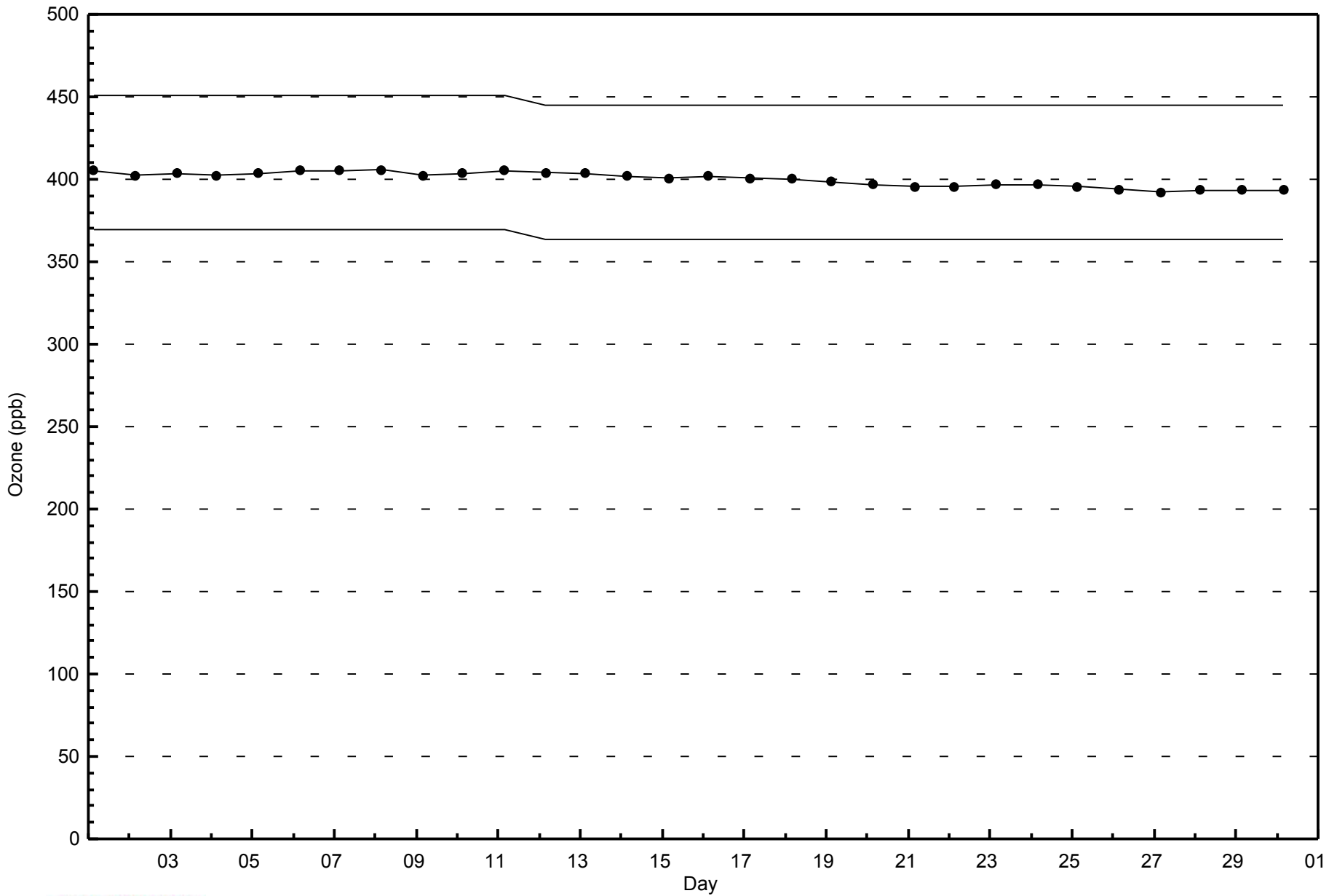
Ozone (O₃) - ppb
Wapasu - June 2014





WBEA
Span Responses

Ozone (O₃) - ppb
Wapasu - June 2014



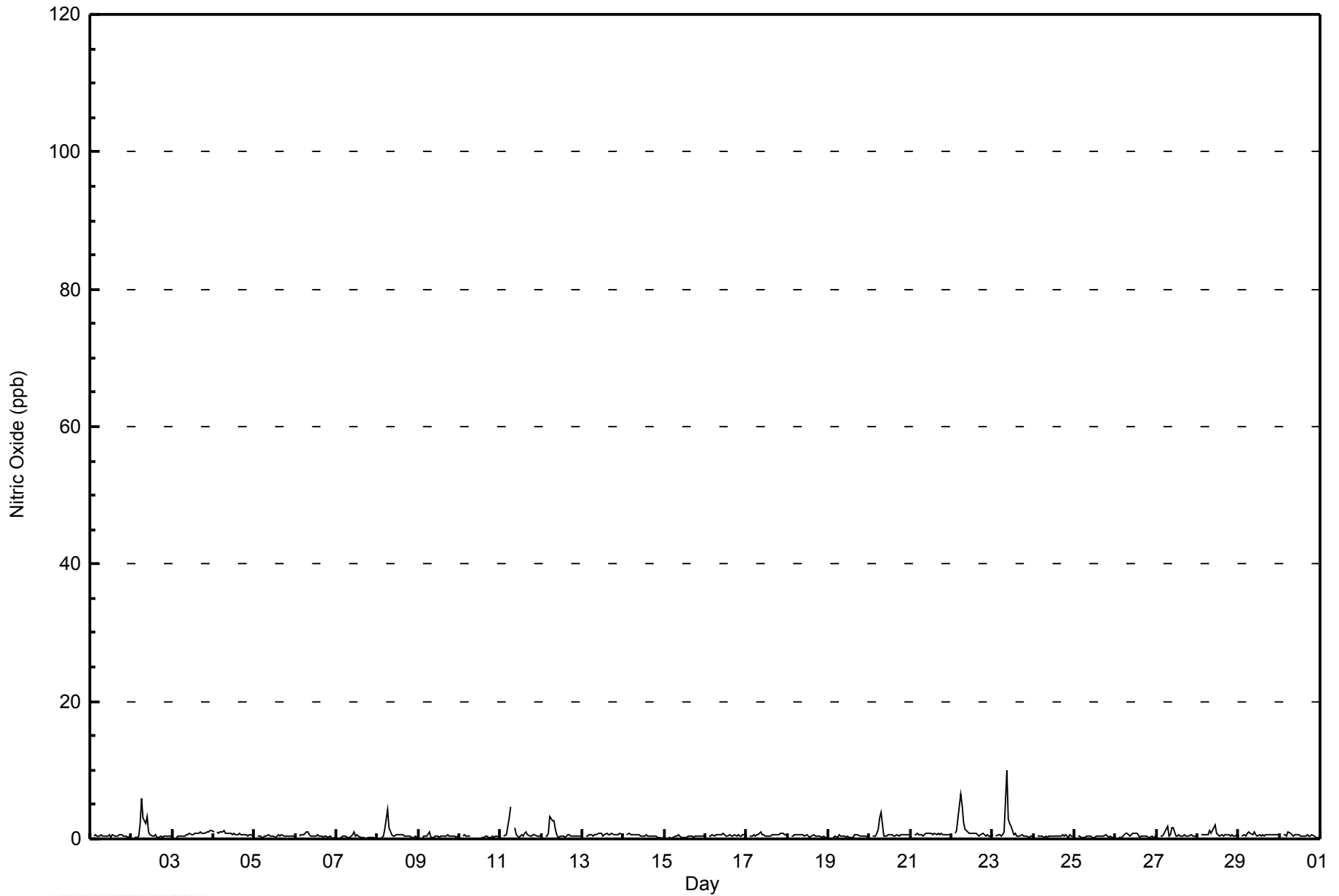


Maximum Value: 10 ppb on Jun 23 09:00																	Maximum Daily Average: 1.3 ppb on Jun 22																	Hours in Service: 720														
Minimum Value: 0 ppb on Jun 19 01:00																	Minimum Daily Average: 0.3 ppb on Jun 7																	Hours of Data: 683														
Maximum Diurnal Average: 1.4 ppb at hour 7																	Minimum Diurnal Average: 0.4 ppb at hour 1																	Hours of Missing Data: 37														
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 = 4																	Hours of Calibration: 36														
																																		Percent Operational Time: 99.9														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jun	0	Z	0	1	0	0	1	0	0	0	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0.4	1																						
2-Jun	0	Z	0	0	1	2	6	3	2	3	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1.0	6																						
3-Jun	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1																							
4-Jun	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0.7	1																						
5-Jun	1	Z	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0.4	1																						
6-Jun	0	Z	0	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1																						
7-Jun	0	Z	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
8-Jun	0	Z	0	0	1	3	4	2	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.8	4																						
9-Jun	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1																						
10-Jun	0	Z	0	1	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	--	1																						
11-Jun	0	Z	0	1	2	3	5	M	2	1	1	0	1	0	1	1	1	0	0	1	1	1	0	0	0.9	5																						
12-Jun	0	Z	0	1	1	3	3	3	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.8	3																						
13-Jun	0	Z	0	0	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0.6	1																						
14-Jun	1	Z	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1																						
15-Jun	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1																						
16-Jun	0	Z	0	0	1	0	1	1	1	1	1	0	0	1	0	0	1	0	1	1	1	0	1	1	0.5	1																						
17-Jun	0	Z	0	0	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	0.6	1																						
18-Jun	1	Z	0	0	1	1	1	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0.5	1																						
19-Jun	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0.3	1																						
20-Jun	0	Z	0	0	1	1	3	4	0	0	0	1	1	1	0	0	1	0	1	1	1	1	1	1	0.8	4																						
21-Jun	1	Z	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1																						
22-Jun	1	Z	1	1	3	6	5	3	1	1	1	1	1	1	1	0	1	1	1	1	0	1	0	0	1.3	6																						
23-Jun	1	Z	0	1	1	1	1	1	10	3	2	2	1	1	0	0	0	1	0	0	0	0	0	0	1.2	10																						
24-Jun	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0.4	1																						
25-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1																						
26-Jun	0	Z	0	0	0	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1																						
27-Jun	0	Z	0	0	1	1	2	0	1	2	2	1	1	1	0	0	1	0	0	0	1	0	0	0	0.7	2																						
28-Jun	1	Z	1	1	1	1	1	1	1	2	2	1	1	0	1	0	1	1	1	0	1	0	0	1	0.7	2																						
29-Jun	0	Z	0	1	0	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1	1	1	1	1	0.6	1																						
30-Jun	1	Z	1	1	0	1	1	1	0	1	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0.5	1																						
																								0.4	--	0.4	0.5	0.7	1.1	1.4	1.0	1.0	0.8	0.7	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	Diurnal Average
																								1	--	1	1	3	6	6	4	10	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance																																																



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Wapasu - June 2014





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Wapasu - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	683	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Wapasu - June 2014

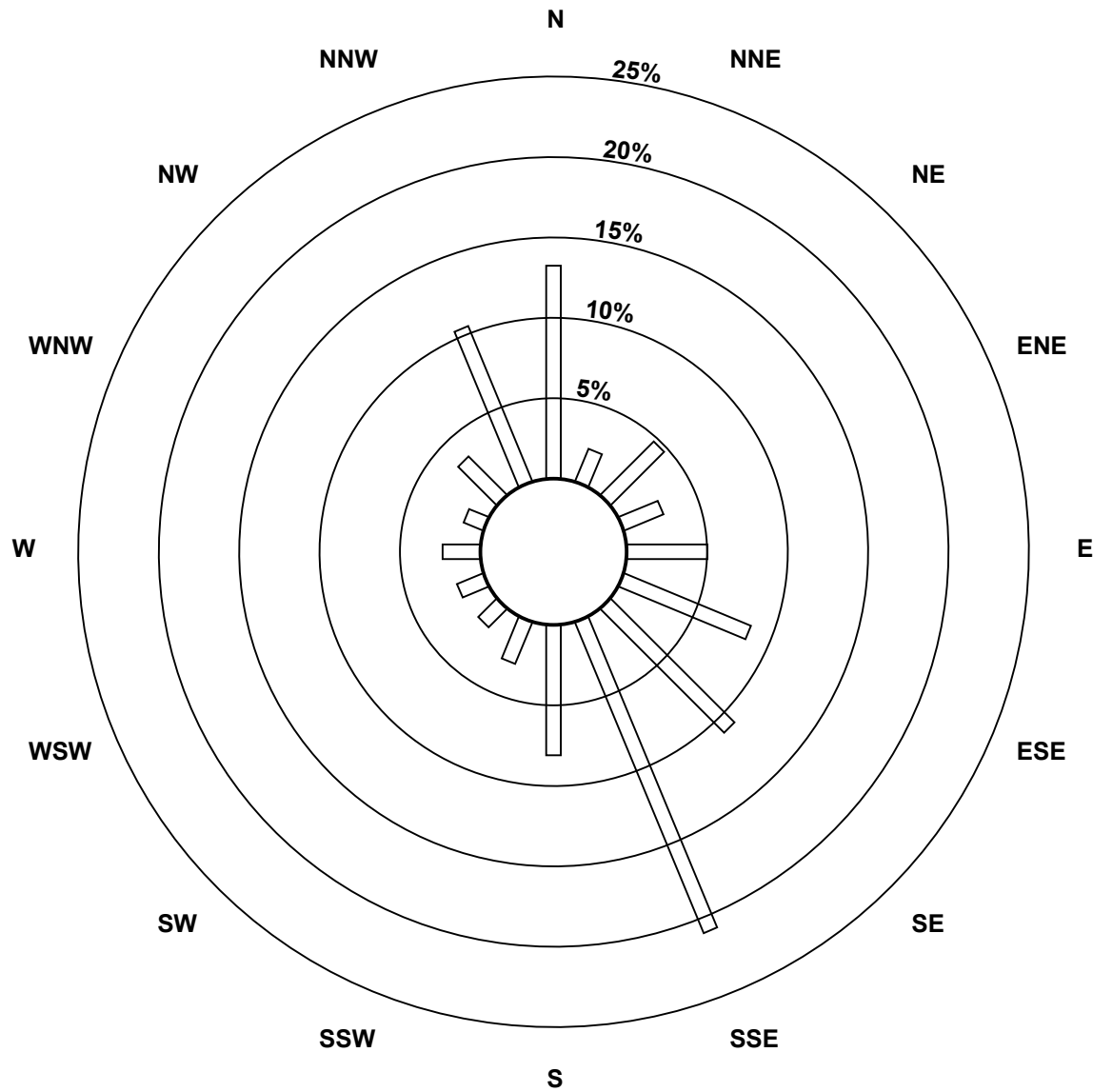
Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Totals
0 - 20	90	15	32	18	34	58	74	142	55	19	11	12	16	9	23	71	679
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	90	15	32	18	34	58	74	142	55	19	11	12	16	9	23	71	679

Total Number of Valid Hours: 679

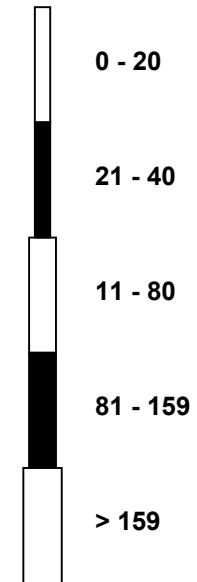
Total Number of Hours: 720

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

**Nitric Oxide (NO) - ppb
Wapasu (AMS 17)**



Classes (ppb)

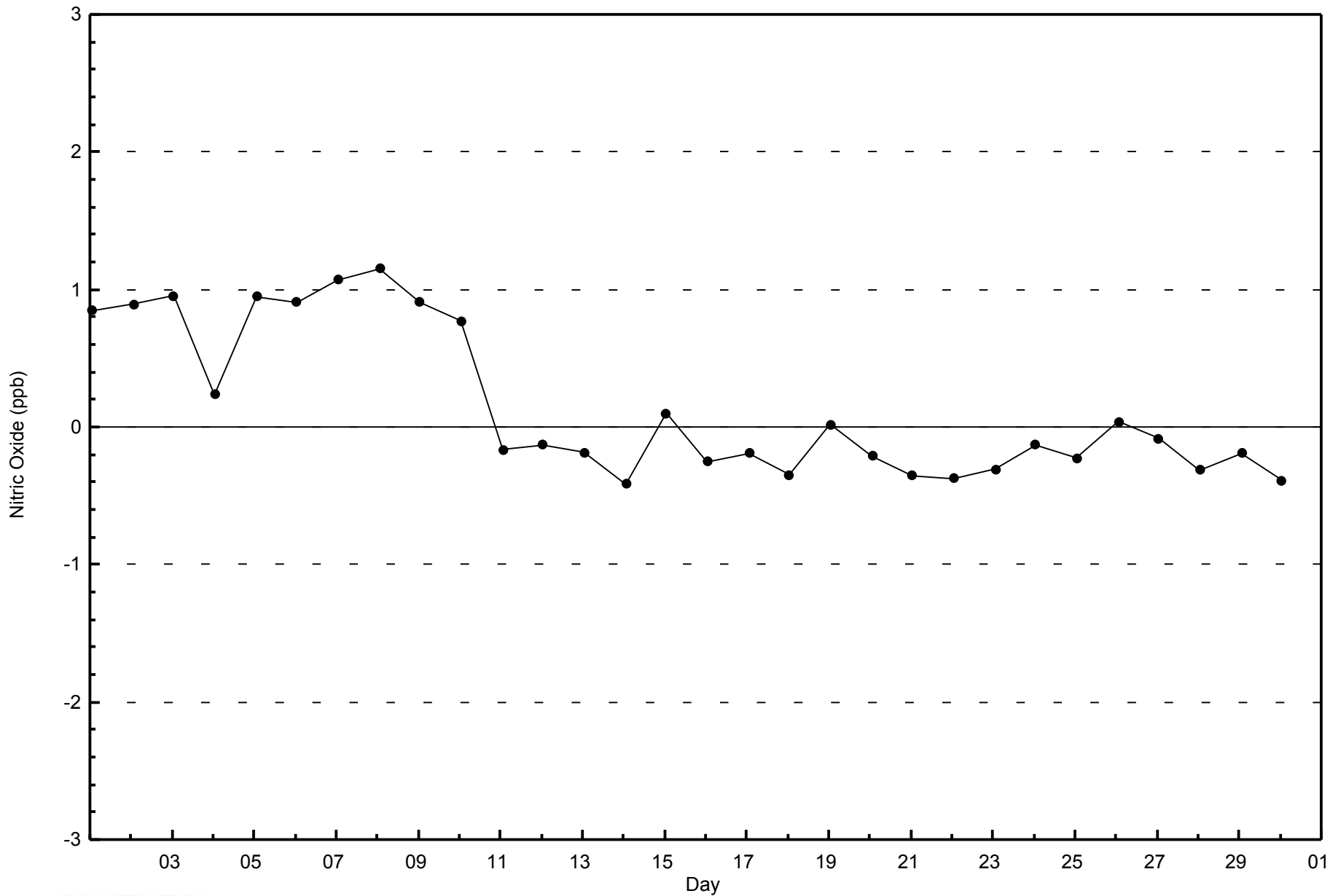


Total Number of Valid Hours: 679



WBEA
Zero Responses

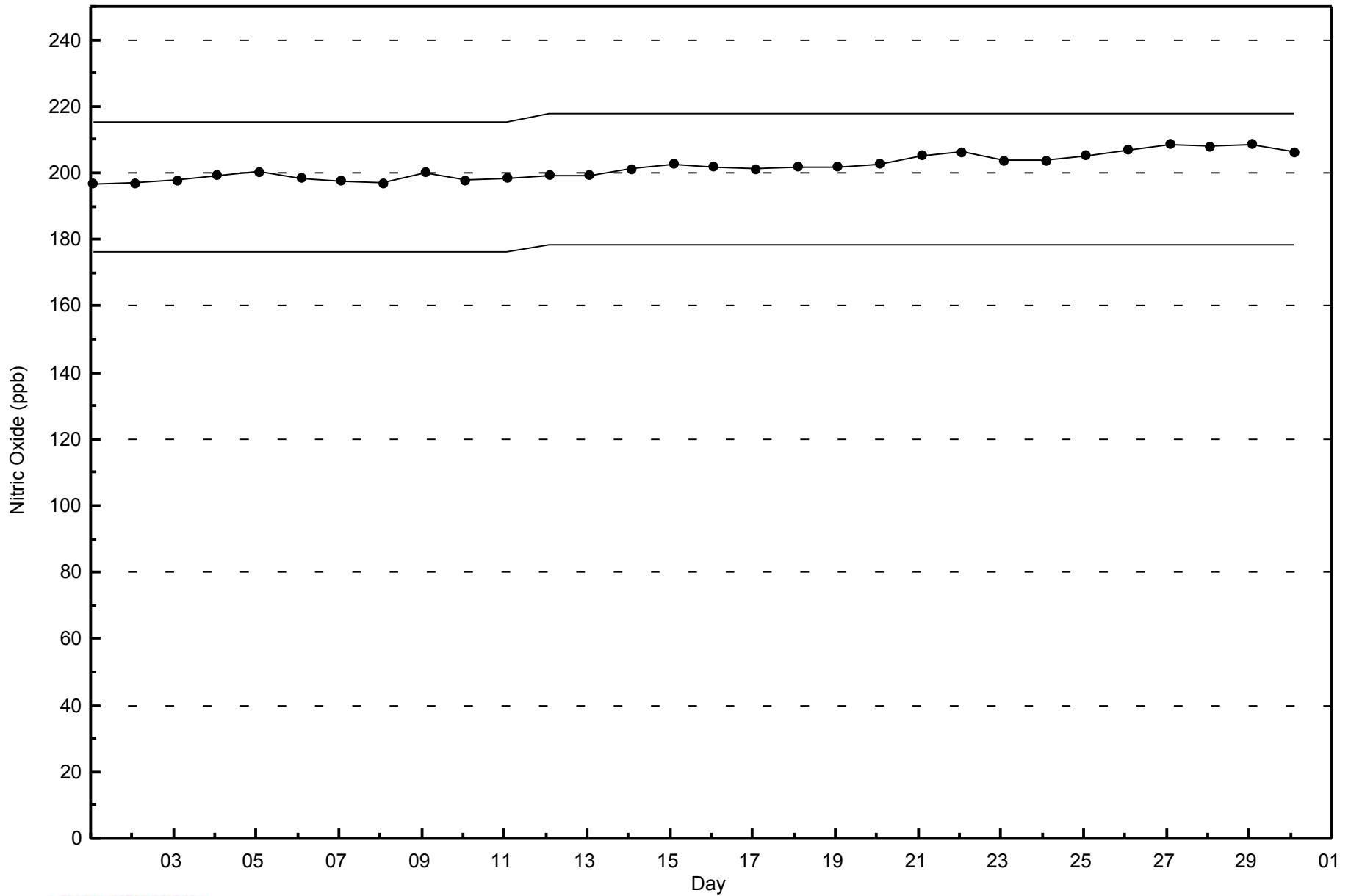
Nitric Oxide (NO) - ppb
Wapasu - June 2014





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Wapasu - June 2014





Summary of Hour Averages

Wapasu - June 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 13 ppb on Jun 11 06:00	Maximum Daily Average: 4.4 ppb on Jun 11		Hours of Data:	683
Minimum Value: 0 ppb on Jun 1 04:00	Minimum Daily Average: 0.0 ppb on Jun 24		Hours of Missing Data:	37
Maximum Diurnal Average: 2.9 ppb at hour 7	Minimum Diurnal Average: 0.4 ppb at hour 19		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 = 10		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-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	3	7	2	4	1.1	7
2-Jun	3	Z	4	3	2	6	12	7	5	6	2	0	1	1	1	0	0	0	0	1	0	1	1	0	2.5	12
3-Jun	1	Z	1	1	2	1	1	0	0	0	1	0	0	0	1	2	2	1	1	1	1	0	0	0	0.7	2
4-Jun	0	Z	2	2	3	2	2	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.6	3
5-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0.3	2
6-Jun	1	Z	0	0	0	2	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	2
7-Jun	2	Z	2	2	1	1	0	0	1	3	4	1	0	0	1	0	0	0	0	0	0	0	0	3	1.1	4
8-Jun	2	Z	5	11	10	9	10	4	2	1	1	2	2	2	2	2	1	1	2	3	1	1	1	0	3.2	11
9-Jun	0	Z	1	1	1	1	8	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1.2	8
10-Jun	0	Z	1	0	1	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	1	--	1
11-Jun	4	Z	10	9	12	13	13	M	4	1	1	1	1	4	3	2	3	1	1	5	7	2	2	4.4	13	
12-Jun	5	Z	9	2	2	8	8	6	3	1	1	0	0	0	0	0	0	0	0	0	0	0	1	2	2.1	9
13-Jun	0	Z	0	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
14-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0.2	1
15-Jun	0	Z	1	1	1	1	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0.6	3
16-Jun	1	Z	5	2	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	6	0.8	6
17-Jun	12	Z	8	6	3	3	1	0	2	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	1.8	12
18-Jun	0	Z	0	0	0	0	0	0	1	0	0	0	0	1	1	0	1	1	1	1	0	0	0	0	0.3	1
19-Jun	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	1	2	2	1	0	0	0	0	1	0	0.5	2
20-Jun	0	Z	0	1	3	4	6	5	0	0	0	0	0	0	0	0	0	0	1	4	4	2	1	2	1.4	6
21-Jun	2	Z	6	5	1	0	0	0	2	2	1	0	1	1	1	1	1	0	0	0	0	1	0	0	1.2	6
22-Jun	0	Z	1	2	6	7	7	5	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.5	7
23-Jun	0	Z	0	0	0	0	1	2	12	4	4	4	2	4	0	0	0	1	0	0	0	0	1	0	1.6	12
24-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
25-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	1	1	1	1	0.5	2
26-Jun	1	Z	1	0	1	4	2	2	1	2	3	4	3	3	2	1	1	1	1	1	1	0	0	0	1.5	4
27-Jun	2	Z	2	0	1	3	6	0	1	4	3	1	1	1	1	0	0	1	1	0	0	0	0	0	1.2	6
28-Jun	0	Z	0	0	0	0	0	2	1	3	5	1	1	1	1	0	1	1	0	0	4	3	1	0	1.0	5
29-Jun	0	Z	0	0	0	3	2	2	1	2	1	1	0	0	0	0	0	0	0	1	0	2	3	3	0.9	3
30-Jun	6	Z	7	4	2	3	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.1	7

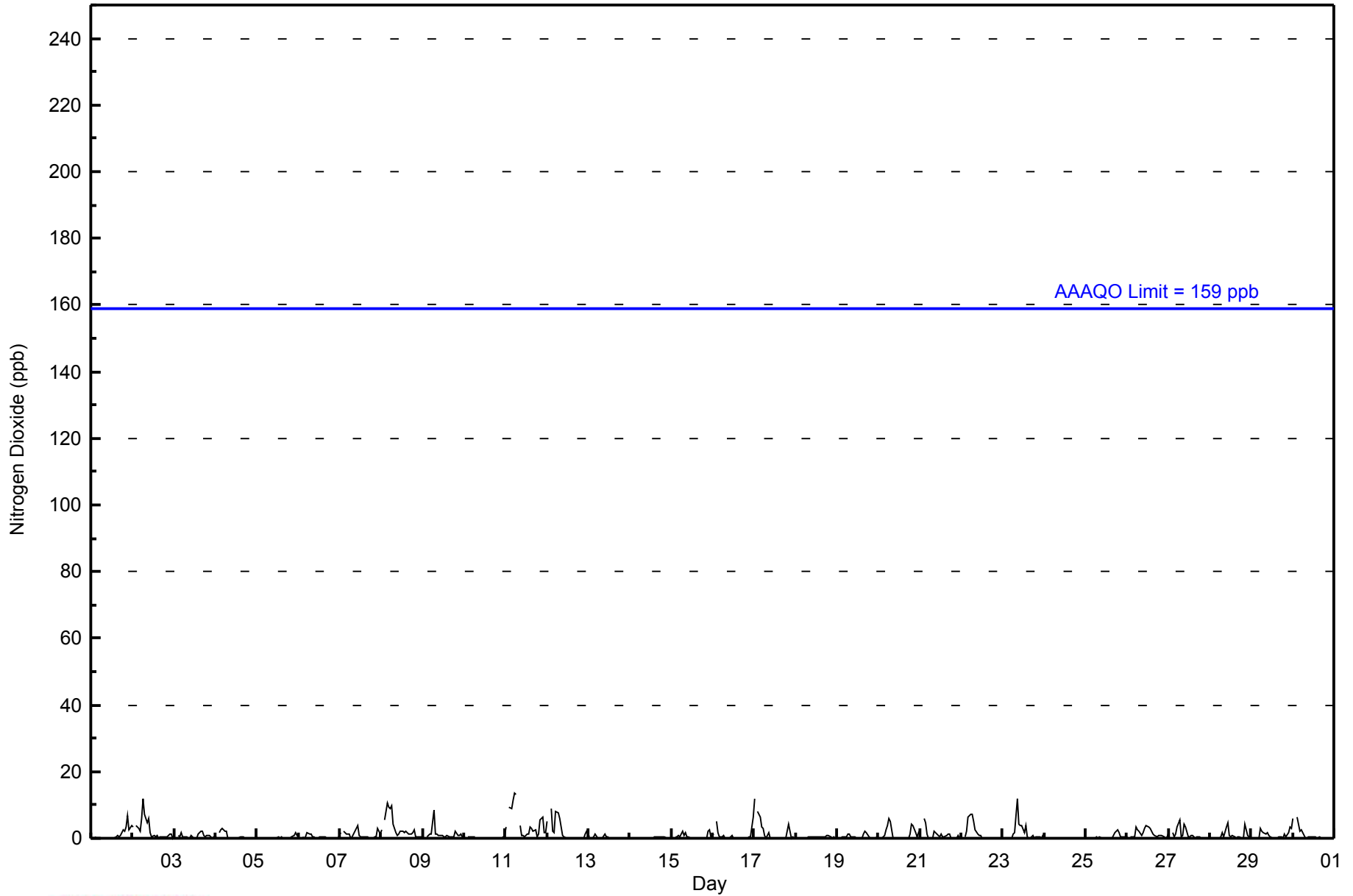
1.5	--	2.1	1.8	1.8	2.4	2.9	1.5	1.4	1.2	1.1	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.4	0.7	0.9	0.9	0.8	0.9	Diurnal Average	
12	--	10	11	12	13	13	7	12	6	5	4	3	4	4	3	2	3	2	4	5	7	3	6	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wapasu - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	683	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - June 2014

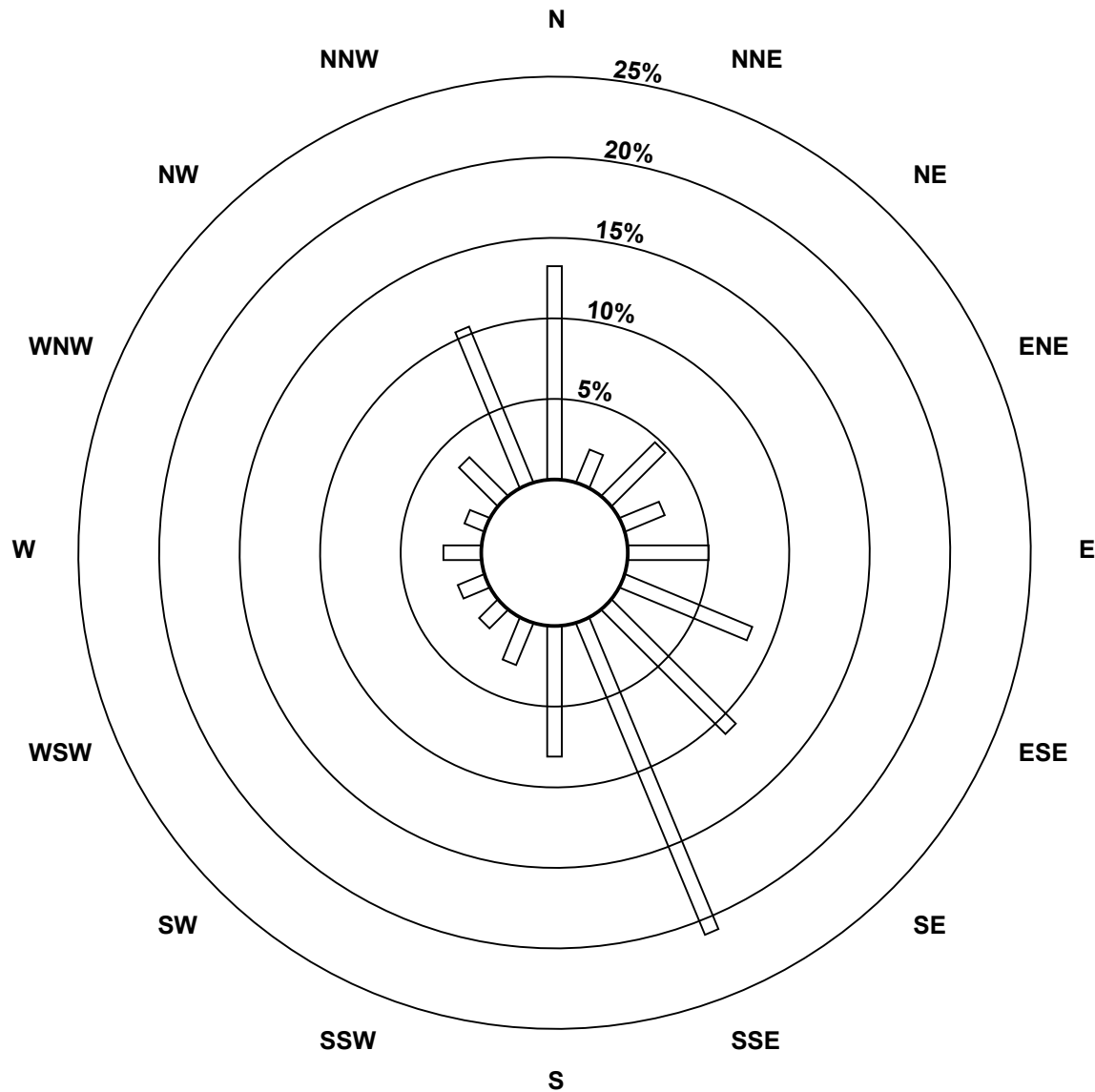
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	90	15	32	18	34	58	74	142	55	19	11	12	16	9	23	71	679
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	90	15	32	18	34	58	74	142	55	19	11	12	16	9	23	71	679

Total Number of Valid Hours: 679

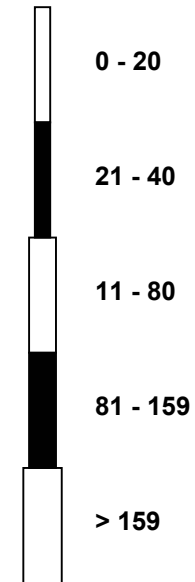
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Nitrogen Dioxide (NO₂) - ppb
Wapasu (AMS 17)



Classes (ppb)

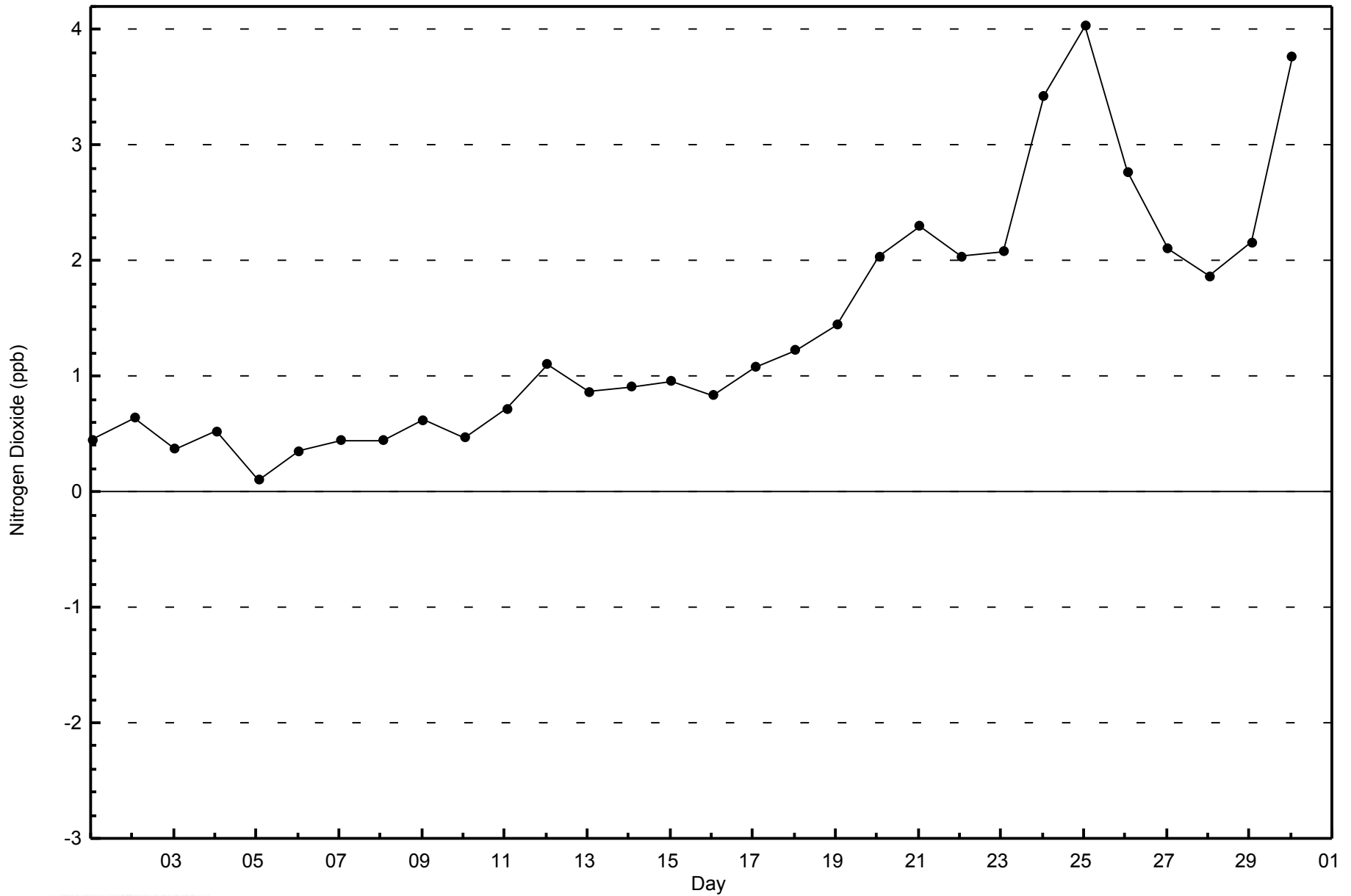


Total Number of Valid Hours: 679



WBEA
Zero Responses

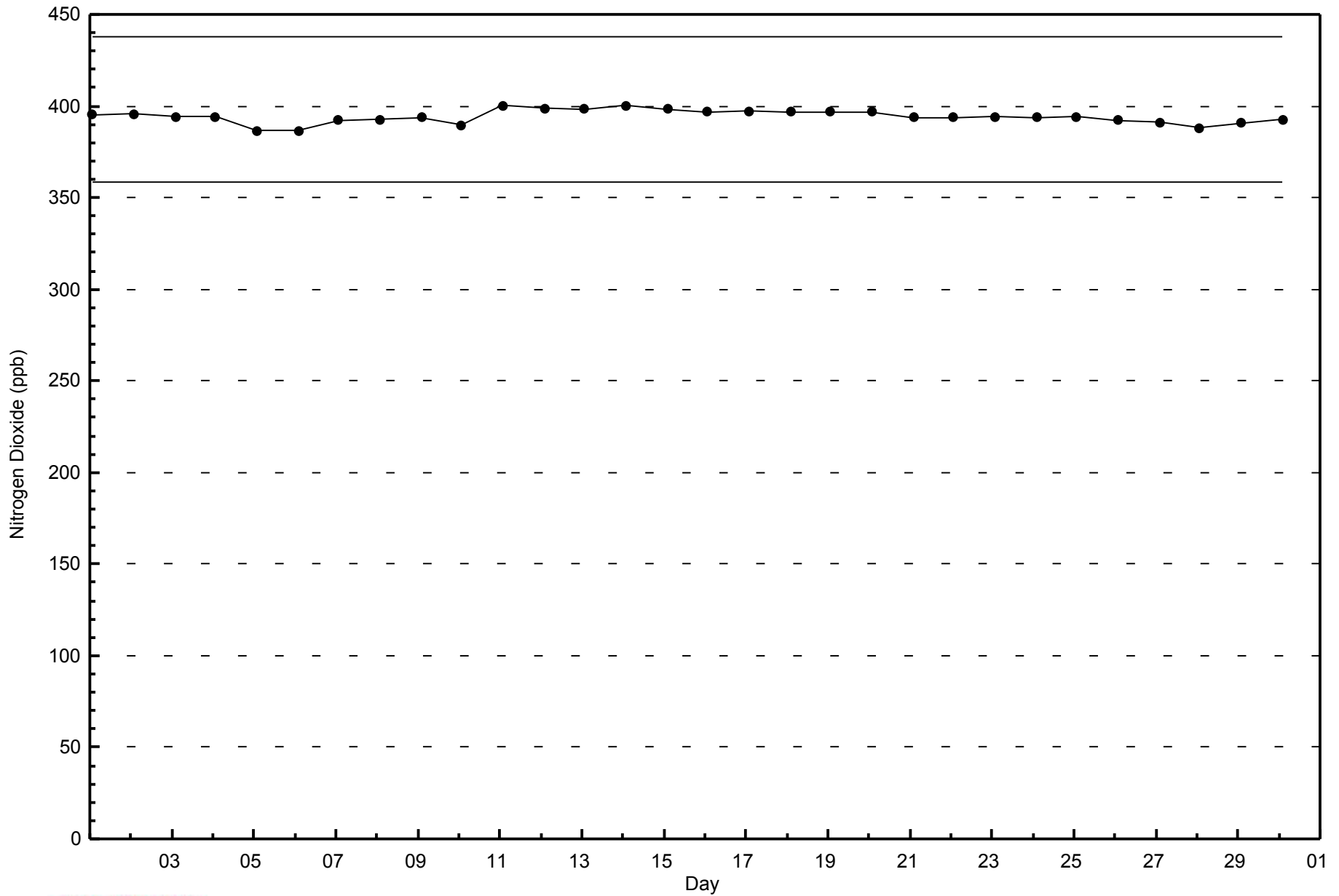
Nitrogen Dioxide (NO₂) - ppb
Wapasu - June 2014





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Wapasu - June 2014



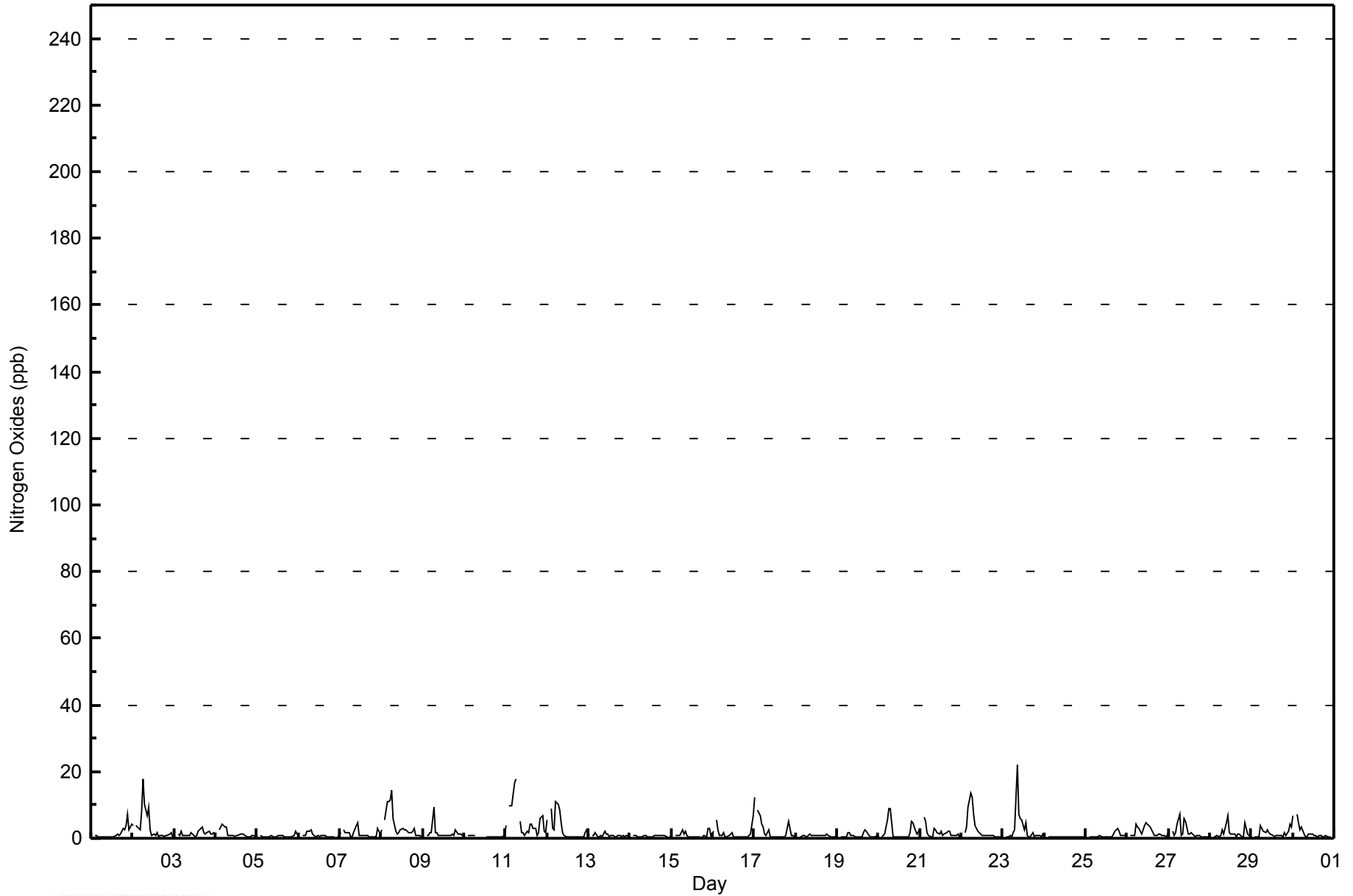


Maximum Value: 22 ppb on Jun 23 09:00														Maximum Daily Average: 5.3 ppb on Jun 11														Hours in Service: 720	
Minimum Value: 0 ppb on Jun 6 23:00														Minimum Daily Average: 0.4 ppb on Jun 24														Hours of Data: 683	
Maximum Diurnal Average: 4.2 ppb at hour 7														Minimum Diurnal Average: 0.9 ppb at hour 19														Hours of Missing Data: 37	
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 = 13														Hours of Calibration: 36	
																												Percent Operational Time: 99.9	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Jun	1	Z	1	1	0	0	1	0	0	0	0	1	0	1	1	1	1	1	3	3	4	7	3	4	1.5	7			
2-Jun	4	Z	4	3	3	8	18	10	7	9	3	1	1	1	2	0	1	1	1	1	1	1	1	1	3.5	18			
3-Jun	1	Z	1	1	2	1	1	1	1	1	2	1	1	1	2	3	3	2	1	2	2	1	1	2	1.4	3			
4-Jun	1	Z	3	3	4	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1.4	4			
5-Jun	1	Z	1	0	0	0	0	1	1	1	0	1	1	1	1	1	1	0	1	0	1	1	2	1	0.7	2			
6-Jun	1	Z	1	1	1	2	2	3	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.8	3			
7-Jun	2	Z	2	2	2	2	0	1	2	4	5	1	1	1	1	1	1	0	0	0	0	0	3	1	1.4	5			
8-Jun	2	Z	5	11	11	12	14	6	2	1	2	3	3	2	3	2	2	2	2	3	1	1	1	1	4.0	14			
9-Jun	1	Z	1	1	2	2	9	2	2	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1.5	9			
10-Jun	1	Z	1	1	1	1	1	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	1	--	1			
11-Jun	4	Z	10	10	13	16	18	M	5	2	1	1	2	2	4	4	3	3	1	2	6	7	2	2	5.3	18			
12-Jun	5	Z	9	3	2	11	10	9	5	2	1	0	0	0	0	1	1	0	0	0	0	0	2	2	2.9	11			
13-Jun	1	Z	1	1	2	1	0	1	1	2	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0.8	2			
14-Jun	1	Z	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0.6	1			
15-Jun	0	Z	1	1	1	1	2	1	2	1	0	0	0	0	0	0	0	0	0	1	0	3	3	1	0.9	3			
16-Jun	2	Z	6	2	1	1	2	1	1	1	1	2	0	0	1	0	0	1	0	1	1	1	1	7	1.3	7			
17-Jun	12	Z	9	7	4	3	1	1	3	1	1	0	0	0	0	1	1	1	1	1	3	5	1	1	1	2.4	12		
18-Jun	1	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.8	1			
19-Jun	0	Z	0	1	1	1	2	2	1	1	0	1	0	0	0	2	3	2	1	0	0	0	0	1	0.8	3			
20-Jun	0	Z	0	1	3	5	9	9	0	0	0	1	1	1	0	0	1	0	2	5	5	2	1	2	2.2	9			
21-Jun	3	Z	6	5	2	1	1	1	3	3	2	1	2	1	2	2	2	2	1	1	1	1	1	1	1.8	6			
22-Jun	1	Z	2	3	9	14	12	7	4	2	2	1	1	1	1	1	1	1	1	1	0	1	0	0	2.9	14			
23-Jun	1	Z	0	1	1	1	2	3	22	7	6	6	2	5	1	0	1	2	0	1	1	1	1	1	2.8	22			
24-Jun	0	Z	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	1	0	1	0	1	0	0	0.4	1			
25-Jun	0	Z	1	0	0	0	1	1	1	1	0	0	0	0	0	1	1	2	3	2	1	1	1	1	0.8	3			
26-Jun	1	Z	1	1	1	4	3	3	1	2	4	4	4	4	2	2	1	1	1	1	1	1	0	1	2.0	4			
27-Jun	2	Z	2	1	2	4	7	1	1	6	5	1	1	2	1	1	1	1	1	1	0	1	1	0	0	1.8	7		
28-Jun	1	Z	1	1	1	1	1	3	1	5	7	2	1	1	1	1	1	1	1	0	5	3	1	1	1.7	7			
29-Jun	0	Z	0	1	1	4	3	2	2	3	2	1	1	1	1	1	1	1	1	2	1	2	4	4	1.5	4			
30-Jun	7	Z	7	5	2	4	1	1	0	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	1.6	7			
		1.9	--	2.5	2.3	2.5	3.5	4.2	2.4	2.4	2.0	1.8	1.2	1.0	1.0	1.0	1.0	1.0	0.9	1.2	1.3	1.3	1.2	1.3	Diurnal Average				
		12	--	10	11	13	16	18	10	22	9	7	6	4	5	4	4	3	3	3	5	6	7	4	7	Diurnal Maximum			
Z - zerospan		C - Calibration					M - Maintenance																						



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Wapasu - June 2014





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	682	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: 683

Total Number of Hours: 720



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - June 2014

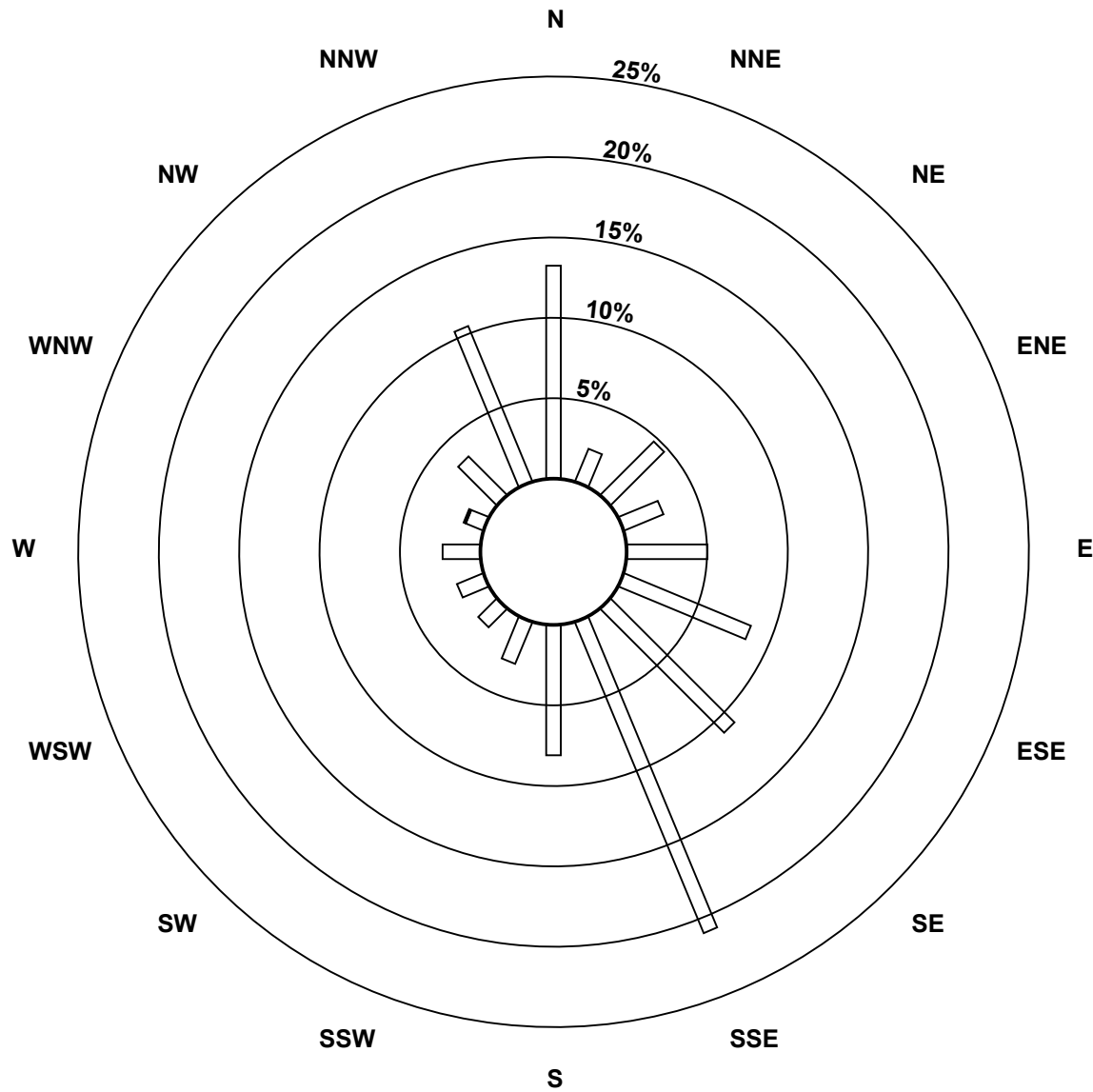
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	90	15	32	18	34	58	74	142	55	19	11	12	16	8	23	71	678
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	90	15	32	18	34	58	74	142	55	19	11	12	16	9	23	71	679

Total Number of Valid Hours: 679

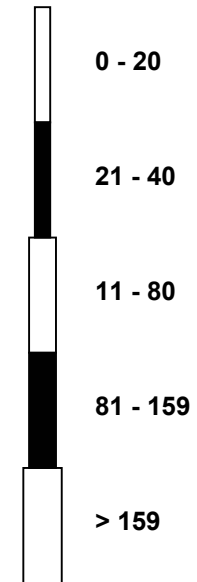
Total Number of Hours: 720

Wood Buffalo Environmental Association
Wind Rose Jun 2014

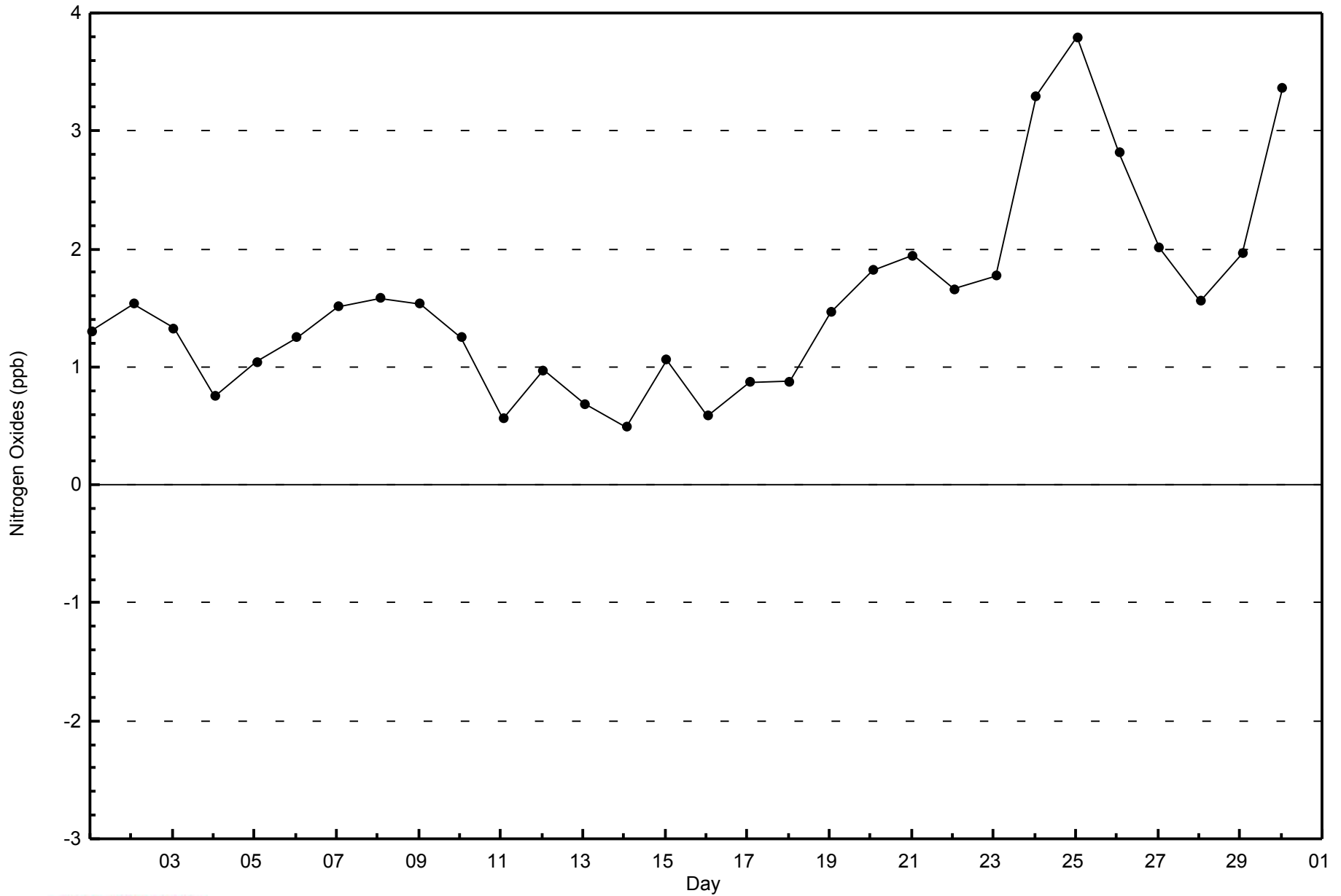
Nitrogen Oxides (NO_x) - ppb
Wapasu (AMS 17)



Classes (ppb)



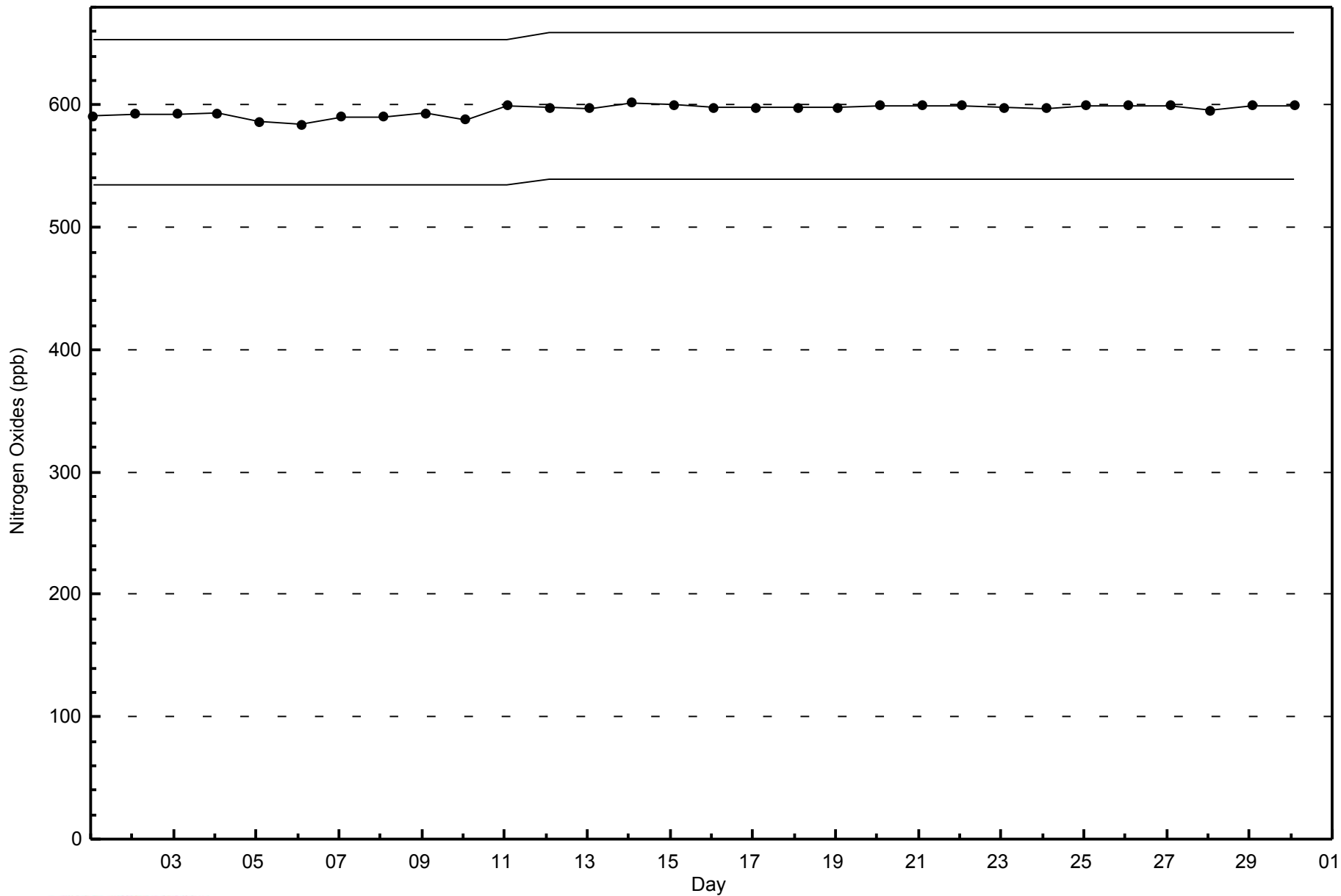
Total Number of Valid Hours: 679





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Wapasu - June 2014





Summary of Hour Averages

Wapasu - June 2014

Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 44.6 µg/m ³ on Jun 29 12:00	Maximum Daily Average: 21.6 µg/m ³ on Jun 29	Hours of Data:	719
Minimum Value: 0.0 µg/m ³ on Jun 4 06:00	Minimum Daily Average: 0.6 µg/m ³ on Jun 4	Hours of Missing Data:	1
Maximum Diurnal Average: 7.7 µg/m ³ at hour 5	Minimum Diurnal Average: 4.0 µg/m ³ at hour 8	Hours of Calibration:	0
Monthly Average: 5.35 µg/m ³	Percentiles: P ₁ = 0.1 P ₁₀ = 1.3 Q ₁ = 2.5 Median = 4.2 Q ₃ = 6.1 P ₉₀ = 9.4 P ₉₉ = 32.4	Percent Operational Time:	99.9

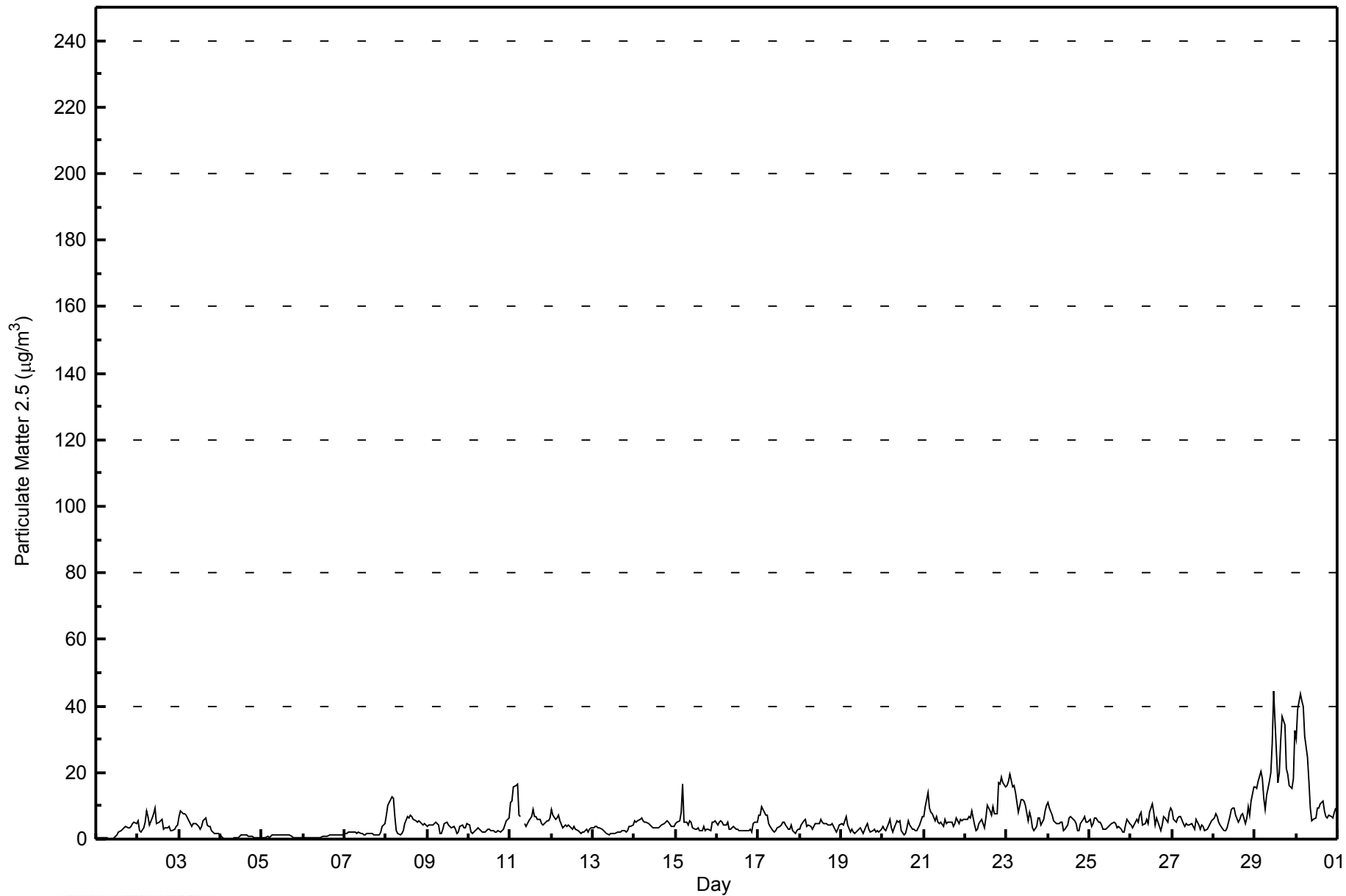
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jun	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.2	0.1	0.1	0.4	0.8	1.2	2.2	2.7	3.0	3.3	3.6	3.2	3.5	3.7	4.8	5.1	4.8	1.9	5.1																						
2-Jun	5.7	2.4	2.0	3.4	5.1	8.6	6.9	4.2	6.2	7.5	9.3	4.7	5.1	5.5	5.8	3.2	3.4	3.6	3.7	2.7	2.5	3.0	3.8	4.2	4.7	9.3																						
3-Jun	6.6	8.3	7.8	7.8	7.2	6.3	4.8	3.7	4.7	4.5	4.5	3.8	2.8	3.7	5.7	6.2	4.1	3.7	3.9	2.7	1.7	1.6	1.8	1.5	4.6	8.3																						
4-Jun	0.8	0.3	0.1	0.1	0.1	0.0	0.0	0.1	0.3	0.4	0.4	0.9	1.1	1.2	1.3	1.2	0.8	0.9	0.8	0.6	0.5	0.5	0.4	0.4	0.6	1.3																						
5-Jun	0.4	0.5	0.5	0.6	0.6	1.0	1.1	1.1	1.3	1.4	1.4	1.4	1.4	1.3	1.3	1.5	1.3	1.0	0.6	0.4	0.3	0.4	0.5	0.6	0.9	1.5																						
6-Jun	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.3	0.3	0.5	0.6	0.7	0.7	0.9	0.9	1.4	1.1	1.3	1.2	1.2	1.3	1.3	1.4	1.5	0.8	1.5																						
7-Jun	1.7	1.8	1.9	2.0	2.2	2.2	2.3	1.9	2.0	1.7	1.8	1.5	1.4	1.5	1.7	1.7	1.8	1.4	1.2	1.3	1.4	2.0	3.7	4.5	1.9	4.5																						
8-Jun	7.0	10.1	11.1	12.7	12.3	6.6	2.5	1.5	1.5	1.9	2.6	4.6	7.0	6.2	7.2	6.8	6.1	5.7	5.2	5.4	5.2	4.3	4.6	4.2	5.9	12.7																						
9-Jun	3.8	4.1	4.2	4.4	4.8	5.1	4.0	1.7	1.8	3.0	4.5	4.9	4.1	4.0	3.3	3.7	3.0	1.8	2.2	3.6	4.1	3.2	3.3	4.6	3.6	5.1																						
10-Jun	4.4	2.3	1.8	2.0	2.5	3.3	2.9	2.4	2.2	2.0	2.3	2.8	3.1	2.4	2.4	2.3	2.1	2.4	2.2	2.7	3.0	4.4	5.6	6.4	2.9	6.4																						
11-Jun	11.1	11.4	15.9	15.9	16.5	7.4	6.6	M	4.7	3.9	4.6	5.3	6.8	8.7	6.9	6.8	6.1	5.8	4.7	4.4	4.6	5.3	5.7	6.4	7.6	16.5																						
12-Jun	9.0	7.3	6.0	6.2	7.2	5.5	3.2	3.9	4.4	3.9	4.4	3.3	3.1	4.0	3.0	2.4	2.0	1.9	2.0	2.1	2.9	2.2	3.0	3.4	4.0	9.0																						
13-Jun	3.2	3.8	3.6	3.6	3.6	3.0	2.5	2.0	1.5	1.5	1.7	1.7	1.6	1.7	2.0	2.2	2.3	2.6	2.7	2.2	2.7	3.7	3.8	4.4	2.7	4.4																						
14-Jun	5.5	5.3	5.7	6.1	6.4	5.7	5.2	5.0	4.6	4.3	3.6	3.6	3.5	3.5	3.4	3.7	4.4	4.6	5.3	5.3	5.0	3.9	3.8	3.8	4.6	6.4																						
15-Jun	4.6	5.2	5.6	8.0	16.4	5.2	5.3	4.3	5.3	5.3	3.5	3.2	3.1	3.4	2.5	2.5	3.7	2.7	2.9	2.8	2.7	4.9	5.0	5.7	4.7	16.4																						
16-Jun	4.3	5.0	5.4	5.1	4.3	4.1	4.9	3.1	2.9	4.0	3.3	3.1	2.8	2.5	2.6	2.4	2.4	2.4	2.6	2.8	2.3	4.6	4.9	5.3	3.6	5.4																						
17-Jun	7.4	7.4	9.9	8.2	7.2	7.0	4.6	3.8	2.4	2.0	2.6	3.6	4.0	4.1	4.9	5.1	4.1	3.1	3.0	4.1	2.7	1.8	2.4	3.1	4.5	9.9																						
18-Jun	3.0	4.2	5.5	5.9	3.8	4.2	3.7	3.0	3.9	4.7	4.8	4.8	6.0	5.0	4.8	4.5	4.3	4.2	4.2	4.5	2.8	2.3	3.1	4.2	4.2	6.0																						
19-Jun	4.8	4.3	5.4	6.6	4.4	2.0	2.9	2.3	1.9	2.4	3.1	3.5	2.6	1.9	3.6	4.7	2.9	2.1	2.7	2.9	1.9	2.7	2.2	3.0	3.2	6.6																						
20-Jun	3.8	2.8	2.5	4.6	6.1	3.5	2.3	3.3	5.6	5.1	5.7	2.5	1.1	1.7	3.3	5.4	4.2	3.1	3.1	2.5	2.5	4.0	5.5	6.7	3.8	6.7																						
21-Jun	6.6	9.9	14.1	9.5	7.8	7.8	5.6	6.6	5.3	4.5	5.3	3.8	6.0	4.5	5.0	5.2	5.2	3.8	4.8	6.3	4.6	6.1	5.4	6.0	6.2	14.1																						
22-Jun	6.0	5.9	6.6	6.5	8.5	4.3	2.6	3.0	4.7	5.8	4.5	3.6	6.5	10.0	8.4	7.3	9.8	7.8	7.7	17.1	16.3	18.6	17.2	15.5	8.5	18.6																						
23-Jun	16.0	17.2	19.3	15.7	16.2	14.1	10.8	8.2	12.0	12.1	11.5	10.1	5.6	8.2	6.4	3.5	2.5	3.7	6.3	6.6	4.1	6.0	8.4	10.3	9.8	19.3																						
24-Jun	10.9	9.4	7.1	5.7	4.9	4.6	4.8	5.2	5.2	2.8	2.8	4.2	6.4	6.7	6.3	5.7	4.6	2.6	2.6	4.5	6.0	6.6	4.9	5.0	5.4	10.9																						
25-Jun	5.9	3.9	4.8	6.6	6.5	5.1	5.2	4.1	3.2	3.1	3.5	3.9	4.3	4.8	5.1	4.5	3.5	3.8	2.9	2.2	2.0	4.3	5.8	4.5	4.3	6.6																						
26-Jun	4.4	3.3	4.0	5.7	5.0	7.0	8.1	4.2	4.7	5.8	4.7	8.2	10.6	8.0	4.4	6.2	5.0	2.6	4.1	7.0	6.5	5.2	7.9	9.2	5.9	10.6																						
27-Jun	8.5	6.1	4.9	6.1	6.7	7.0	4.9	3.8	4.5	4.2	4.4	4.5	4.0	2.8	5.9	4.0	2.9	4.3	3.6	2.6	3.1	3.8	4.6	5.4	4.7	8.5																						
28-Jun	6.4	7.5	6.6	5.0	4.1	2.8	2.7	2.6	3.4	6.9	8.8	9.1	9.3	7.2	5.1	5.7	7.1	7.8	4.7	6.3	9.6	7.2	11.5	15.5	6.8	15.5																						
29-Jun	15.8	15.3	17.5	20.5	18.4	12.5	8.8	13.0	17.4	20.0	28.7	44.6	25.9	17.0	19.9	29.5	37.0	34.3	21.2	19.6	16.1	15.3	18.3	32.8	21.6	44.6																						
30-Jun	30.0	38.8	43.6	41.3	40.0	30.9	24.4	17.2	9.4	5.6	6.1	6.3	9.2	9.4	10.4	11.3	8.6	6.7	6.3	7.2	6.9	6.5	8.1	9.4	16.4	43.6																						
																								6.6	6.8	7.5	7.6	7.7	5.9	4.8	4.0	4.2	4.4	4.8	5.3	5.0	4.8	4.9	5.1	5.0	4.5	4.1	4.6	4.3	4.7	5.4	6.4	Diurnal Average
																								30.0	38.8	43.6	41.3	40.0	30.9	24.4	17.2	17.4	20.0	28.7	44.6	25.9	17.0	19.9	29.5	37.0	34.3	21.2	19.6	16.3	18.6	18.3	32.8	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}) - $\mu\text{g}/\text{m}^3$
Wapasu - June 2014





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - June 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	444	61.75	61.75
6 - 15	176	24.48	86.23
16 - 25	28	3.89	90.13
26 - 80	13	1.81	91.93
> 81.0	0	0.00	91.93

Total Number of Valid Hours: 719

Total Number of Hours: 720



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - June 2014

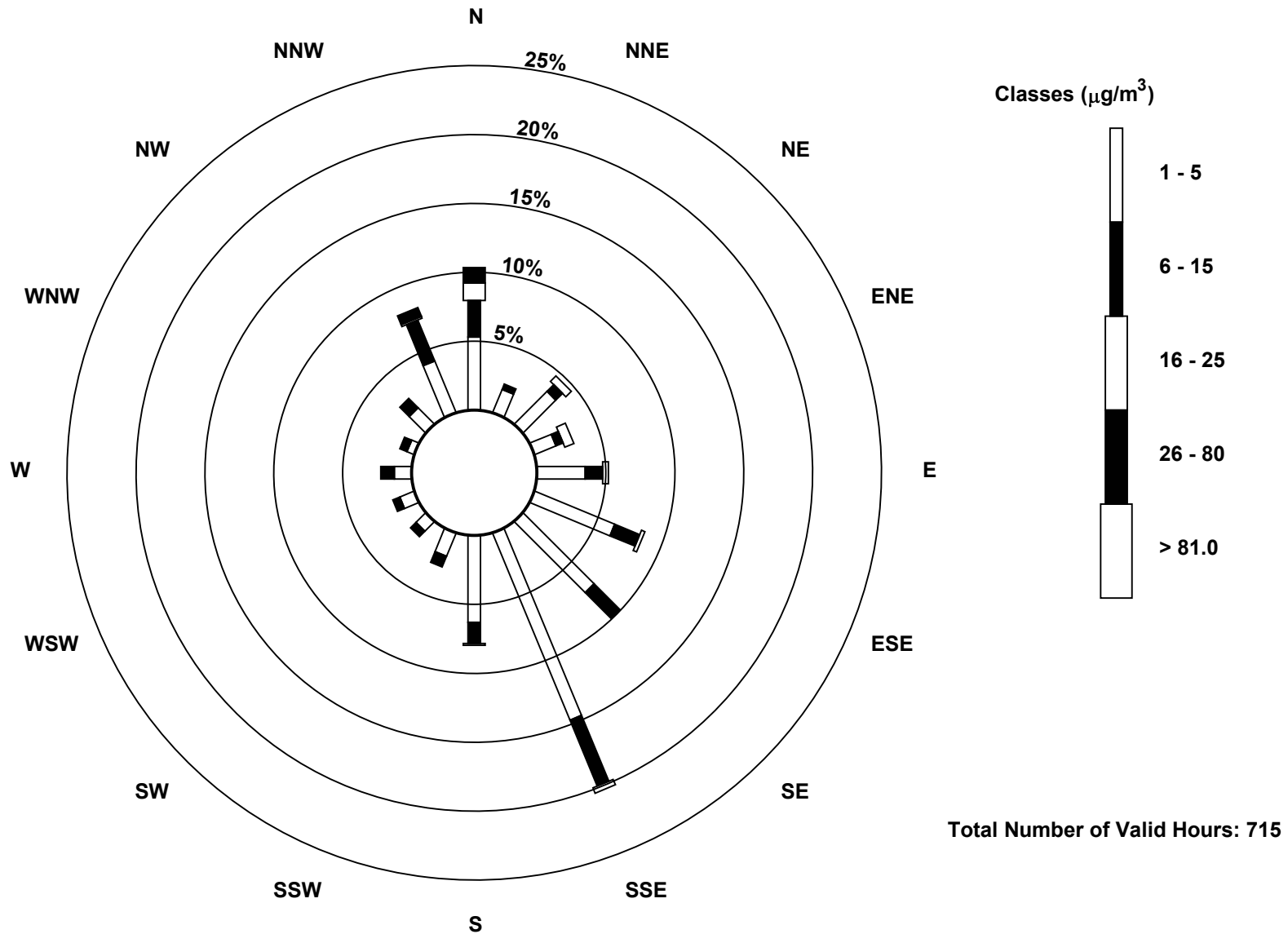
Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	38	13	24	12	25	45	52	105	45	13	7	8	9	4	12	29	441
6 - 15	19	3	5	4	9	14	19	37	11	6	4	4	7	4	7	23	176
16 - 25	9	0	4	5	3	2	0	3	1	0	0	0	0	0	0	1	28
26 - 80	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	13
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	74	16	33	21	37	61	71	145	57	19	11	12	16	8	19	58	658

Total Number of Valid Hours: 715

Total Number of Hours: 720

Wood Buffalo Environmental Association
 Wind Rose Jun 2014

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
 Wapasu (AMS 17)



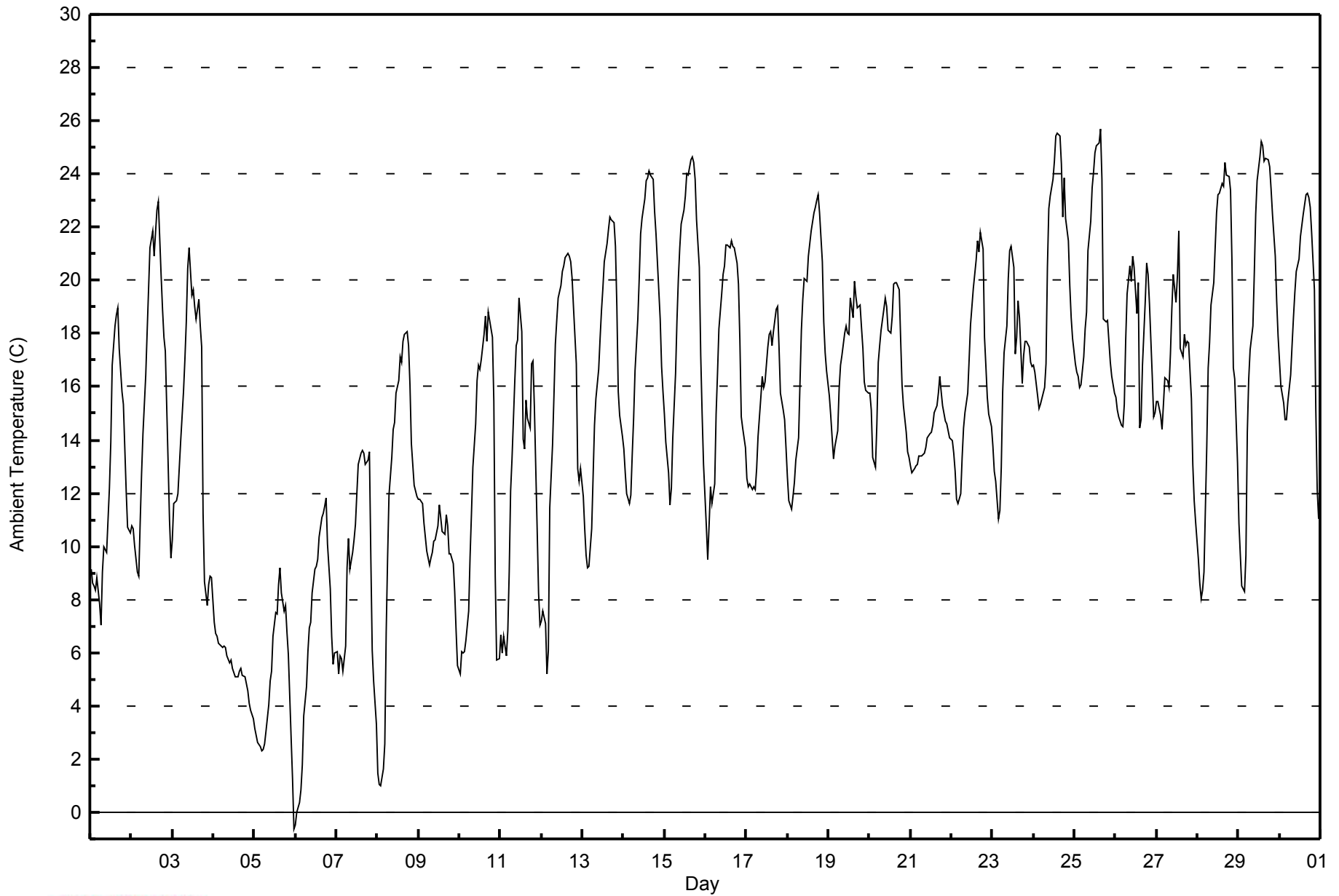


Maximum Value: 25.7 C on Jun 25 16:00		Maximum Daily Average: 20.4 C on Jun 24		Hours in Service: 720																						
Minimum Value: -0.6 C on Jun 6 00:00		Minimum Daily Average: 4.8 C on Jun 5		Hours of Data: 720																						
Maximum Diurnal Average: 18.9 C at hour 16		Minimum Diurnal Average: 9.9 C at hour 4		Hours of Missing Data: 0																						
Monthly Average: 14.88 C		Percentiles: P ₁ = 1.2 P ₁₀ = 6.6 Q ₁ = 11.0 Median = 15.5 Q ₃ = 19.0 P ₉₀ = 22.1 P ₉₉ = 25.0		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-Jun	9.2	8.6	8.5	8.3	8.8	7.8	7.1	9.0	10.0	9.8	11.0	12.2	13.9	16.8	18.3	18.7	19.0	17.4	15.8	15.4	13.7	12.1	10.7	10.5	12.2	19.0
2-Jun	10.8	10.6	10.0	9.0	8.9	10.9	12.7	14.2	16.4	18.1	19.7	21.2	21.9	20.9	21.8	22.7	23.0	20.2	18.9	17.8	17.3	13.1	11.0	9.6	15.9	23.0
3-Jun	10.2	11.6	11.7	12.0	13.0	14.0	15.8	17.0	18.4	20.5	21.2	19.4	19.6	19.0	18.5	19.3	18.3	17.5	11.2	8.7	7.8	8.6	8.9	8.8	14.6	21.2
4-Jun	7.1	6.7	6.6	6.4	6.3	6.2	6.2	6.2	5.9	5.6	5.7	5.4	5.2	5.1	5.1	5.3	5.4	5.2	5.1	4.9	4.6	4.1	3.8	3.5	5.5	7.1
5-Jun	3.2	2.9	2.6	2.5	2.3	2.4	2.6	3.1	4.0	4.9	5.3	6.6	7.5	7.4	8.6	9.2	8.2	7.5	7.8	6.8	5.9	2.8	1.3	-0.6	4.8	9.2
6-Jun	-0.5	0.0	0.4	0.9	1.8	3.6	4.7	6.1	6.9	7.1	8.2	9.1	9.3	9.5	10.4	11.1	11.3	11.5	11.8	10.1	8.4	6.6	5.6	6.0	6.7	11.8
7-Jun	6.1	5.2	5.9	5.8	5.3	6.2	9.2	10.3	9.2	9.8	10.2	10.8	12.0	13.1	13.5	13.6	13.5	13.1	13.2	13.5	9.6	6.1	5.0	3.3	9.3	13.6
8-Jun	1.5	1.1	1.0	1.6	2.6	6.8	9.6	11.9	13.3	14.4	14.6	15.7	16.2	17.1	16.9	17.7	18.0	18.1	17.5	16.1	13.9	12.3	12.1	11.8	11.7	18.1
9-Jun	11.8	11.8	11.6	10.9	10.3	9.8	9.3	9.5	9.7	10.2	10.2	10.8	11.6	11.1	10.5	10.4	11.2	10.8	9.7	9.7	9.3	8.3	6.9	5.5	10.0	11.8
10-Jun	5.2	6.0	6.0	6.0	6.5	7.6	9.6	11.3	13.0	14.6	16.2	16.8	16.6	17.0	18.0	18.6	17.7	18.8	18.2	17.9	15.4	8.9	5.7	5.8	12.4	18.8
11-Jun	6.7	6.0	6.6	5.9	6.8	9.1	12.1	13.3	16.2	17.6	17.8	19.3	18.1	14.0	13.7	15.5	14.8	14.5	16.9	16.9	15.2	10.6	8.2	7.0	12.6	19.3
12-Jun	7.2	7.6	7.1	5.2	6.1	11.4	13.8	15.7	17.6	18.5	19.3	19.8	20.3	20.5	20.8	21.0	20.9	20.7	20.1	19.0	16.9	12.9	12.5	12.9	15.3	21.0
13-Jun	11.9	10.7	9.7	9.2	9.2	10.7	12.6	14.6	15.5	16.7	17.8	18.9	19.7	20.7	21.4	21.9	22.4	22.3	22.1	21.3	19.0	15.8	14.9	14.1	16.4	22.4
14-Jun	13.7	12.8	12.0	11.6	11.9	13.4	14.8	16.6	18.5	20.1	21.8	22.3	23.1	23.7	23.9	24.1	23.9	23.8	22.6	21.7	20.7	18.6	16.8	15.8	18.7	24.1
15-Jun	15.0	13.9	12.7	11.5	12.2	14.1	16.5	18.5	20.1	21.2	22.1	22.7	23.2	24.0	24.0	24.6	24.7	24.4	23.8	22.3	20.5	17.2	14.9	13.1	19.0	24.7
16-Jun	10.8	9.5	10.8	12.2	11.6	12.4	15.0	16.5	18.2	19.5	20.2	20.6	21.3	21.3	21.2	21.5	21.3	21.2	20.6	19.8	17.8	14.9	14.4	13.7	16.9	21.5
17-Jun	12.6	12.3	12.3	12.1	12.2	12.1	12.9	14.1	15.6	16.4	16.0	16.2	17.5	18.0	18.1	17.5	18.1	18.9	19.0	17.5	15.8	15.1	14.7	13.7	15.4	19.0
18-Jun	12.6	11.7	11.4	11.9	12.4	13.3	14.1	16.1	18.2	19.3	20.0	20.0	20.9	21.4	21.9	22.5	22.8	23.0	23.2	22.6	20.7	18.5	17.3	16.6	18.0	23.2
19-Jun	15.7	14.9	14.1	13.3	13.8	14.3	15.9	16.8	17.2	18.0	18.3	18.0	18.0	19.3	18.6	20.0	19.4	19.0	19.1	18.2	17.4	16.2	15.9	15.7	17.0	20.0
20-Jun	15.8	15.1	13.3	13.0	14.6	16.9	17.5	18.1	18.9	19.3	19.0	18.1	18.0	18.7	19.8	19.9	19.9	19.6	17.8	16.1	15.3	14.3	13.6	13.3	16.9	19.9
21-Jun	13.0	12.8	12.9	13.0	13.1	13.4	13.4	13.4	13.5	13.7	14.1	14.2	14.3	14.6	15.0	15.3	15.8	16.4	15.8	15.3	14.7	14.6	14.3	14.1	14.2	16.4
22-Jun	14.0	13.5	12.8	11.8	11.6	12.0	13.4	14.5	15.0	15.7	17.0	18.3	19.0	19.7	20.7	21.5	21.1	21.8	21.2	17.9	16.7	15.6	15.0	14.5	16.4	21.8
23-Jun	13.8	12.8	12.5	11.1	11.4	13.0	15.8	17.3	18.3	20.1	21.1	21.3	20.5	17.2	17.8	19.2	18.6	16.1	17.2	17.7	17.7	17.5	16.9	16.8	16.7	21.3
24-Jun	16.8	16.5	15.7	15.2	15.4	15.5	16.0	16.8	20.5	22.7	23.2	23.8	24.5	25.4	25.5	25.4	24.4	22.4	23.9	22.3	21.5	19.8	18.6	17.8	20.4	25.5
25-Jun	16.9	16.6	16.4	16.0	16.1	17.1	18.2	18.8	21.1	22.2	23.5	24.1	24.8	25.1	25.2	25.7	23.8	18.6	18.4	18.5	17.7	16.9	16.4	15.8	19.7	25.7
26-Jun	15.6	15.1	14.9	14.5	14.5	15.3	17.8	19.5	20.5	19.9	20.9	20.5	18.8	19.9	14.4	14.7	16.8	19.2	20.7	20.2	19.1	16.4	14.9	15.0	17.5	20.9
27-Jun	15.4	15.5	14.9	14.4	15.3	16.3	16.2	16.0	17.2	18.9	20.3	19.2	20.2	21.9	17.4	17.1	18.0	17.6	17.7	17.6	15.5	13.1	11.7	10.9	16.6	21.9
28-Jun	9.5	8.6	8.1	8.3	9.0	13.8	16.7	17.6	19.1	19.9	21.2	22.6	23.2	23.3	23.7	23.6	24.4	24.0	23.9	23.4	20.7	16.7	16.3	13.1	17.9	24.4
29-Jun	10.9	9.6	8.5	8.3	9.7	14.3	16.3	17.4	18.3	20.3	22.5	23.7	24.6	25.2	25.0	24.5	24.6	24.5	24.3	23.4	22.5	20.9	19.2	17.9	19.0	25.2
30-Jun	17.0	16.0	15.4	14.8	14.8	15.4	16.4	17.5	18.6	19.5	20.3	20.8	21.7	22.1	22.5	23.2	23.3	23.1	22.7	21.8	19.6	15.1	12.1	11.0	18.5	23.3
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Wapasu - June 2014





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Wapasu - June 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	3	0.42	0.42
0 - 10	147	20.42	20.83
10 - 20	430	59.72	80.56
> 20	140	19.44	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

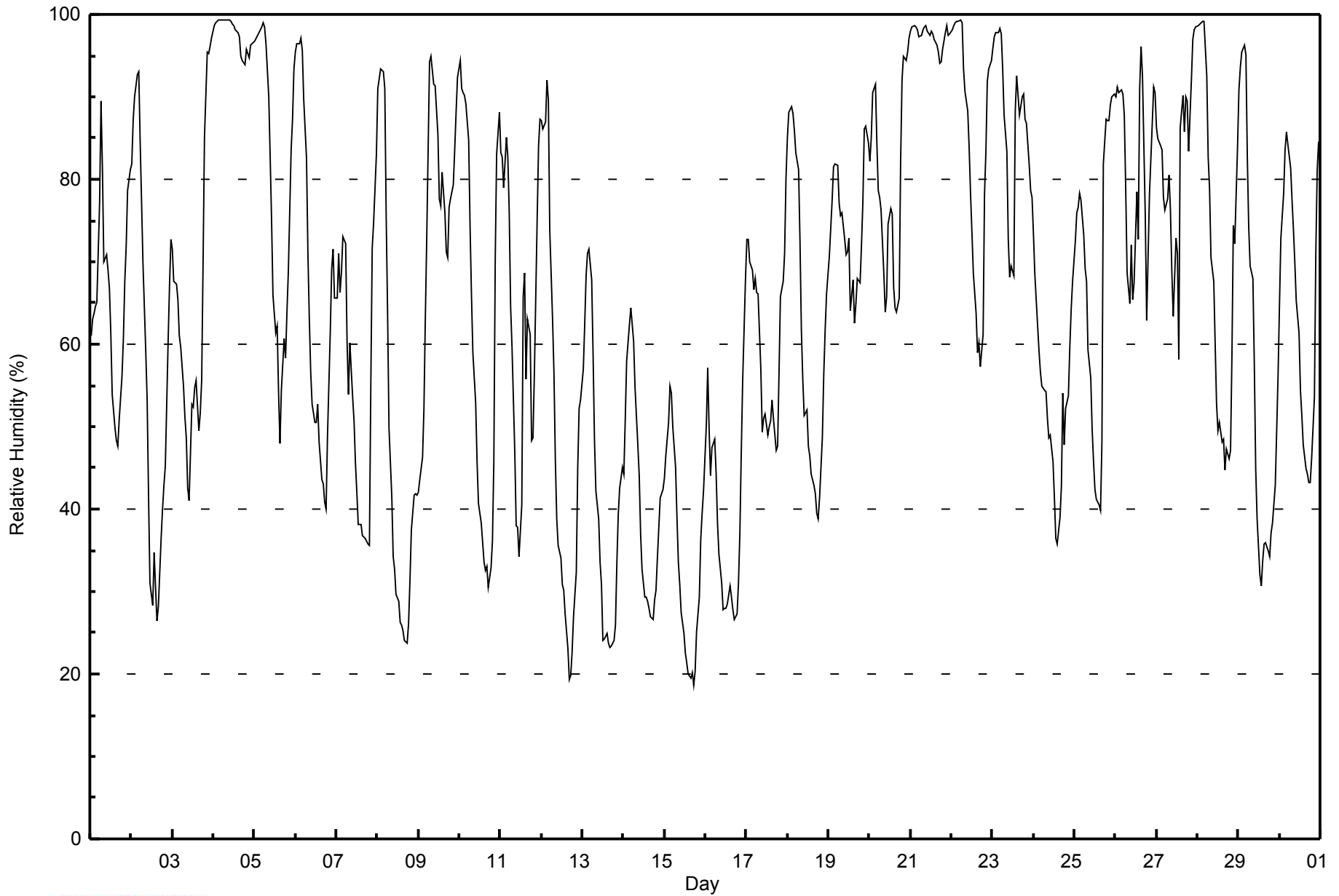


Maximum Value: 99 % on Jun 4 06:00																		Maximum Daily Average: 97.7 % on Jun 4																		Hours in Service: 720	
Minimum Value: 19 % on Jun 15 18:00																		Minimum Daily Average: 34.0 % on Jun 15																		Hours of Data: 720	
Maximum Diurnal Average: 81.6 % at hour 4																		Minimum Diurnal Average: 50.8 % at hour 17																		Hours of Missing Data: 0	
Monthly Average: 65.2 %																		Percentiles: P ₁ = 21 P ₁₀ = 34 Q ₁ = 47 Median = 67 Q ₃ = 86 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-Jun	61	63	64	65	65	77	90	81	70	71	69	67	61	54	50	48	48	51	56	61	68	72	79	81	65.4	90											
2-Jun	82	87	90	93	93	85	77	70	59	53	41	31	28	35	31	26	28	36	40	43	45	60	67	73	57.3	93											
3-Jun	72	68	67	65	61	60	55	51	49	43	41	53	52	55	56	50	52	56	70	85	95	95	96	97	64.2	97											
4-Jun	99	99	99	99	99	99	99	99	99	99	99	99	99	98	98	97	95	94	94	96	95	95	96	97	97.7	99											
5-Jun	97	97	97	98	99	99	98	96	90	83	75	66	61	62	54	48	54	61	58	64	69	84	87	93	78.8	99											
6-Jun	95	96	97	97	96	90	83	71	63	57	53	51	51	53	48	43	43	41	40	49	62	69	72	66	65.9	97											
7-Jun	66	71	66	69	73	72	60	54	60	54	51	46	42	38	38	37	37	36	36	36	55	72	75	83	55.2	83											
8-Jun	91	92	93	93	91	75	64	50	41	34	33	30	29	26	26	25	24	24	26	31	37	42	42	42	48.4	93											
9-Jun	42	44	46	52	63	73	94	95	93	92	91	85	78	77	81	76	71	71	77	78	79	84	88	92	75.9	95											
10-Jun	94	91	90	90	89	85	74	66	59	53	46	41	39	38	34	33	33	30	33	36	46	70	83	88	60.1	94											
11-Jun	83	83	79	85	83	76	65	60	47	38	38	34	41	66	69	56	63	61	48	49	56	75	84	87	63.5	87											
12-Jun	87	86	87	92	90	74	63	57	46	39	36	34	31	30	27	23	19	20	23	27	32	45	52	53	48.9	92											
13-Jun	57	62	68	71	72	68	59	48	42	39	34	31	24	24	25	24	23	23	24	26	33	39	43	45	41.9	72											
14-Jun	44	51	58	62	64	62	60	55	48	44	37	33	29	29	29	28	27	27	29	30	34	41	42	42	41.9	64											
15-Jun	44	46	50	55	54	50	45	39	34	31	27	25	23	21	20	19	20	19	20	25	29	36	40	42	34.0	55											
16-Jun	50	57	50	44	47	48	44	38	35	31	28	28	28	28	31	29	28	27	27	31	37	47	56	68	39.1	68											
17-Jun	73	73	70	69	67	68	66	66	57	49	51	52	49	50	51	53	51	47	48	56	66	68	71	80	60.4	80											
18-Jun	85	88	89	88	86	83	81	72	62	56	51	52	48	46	44	43	42	39	39	41	49	56	62	66	61.2	89											
19-Jun	71	74	77	81	82	82	77	76	76	73	71	71	73	64	68	63	65	68	67	72	77	86	87	84	74.3	87											
20-Jun	82	85	90	91	84	79	78	76	68	64	66	75	77	76	67	64	64	66	82	92	95	94	95	97	79.5	97											
21-Jun	98	98	99	98	98	97	98	98	99	99	98	97	98	98	97	96	95	94	94	96	98	99	98	98	97.4	99											
22-Jun	98	99	99	99	99	99	99	93	91	88	84	78	74	69	64	59	60	57	61	78	83	92	93	94	83.8	99											
23-Jun	96	97	98	98	98	98	93	88	83	73	68	70	68	88	93	90	88	90	90	87	87	82	79	78	86.6	98											
24-Jun	73	68	62	59	57	55	54	54	51	49	49	46	41	36	36	39	43	54	48	52	54	60	64	68	53.0	73											
25-Jun	73	76	77	78	78	73	69	68	59	56	50	46	42	41	40	40	48	82	87	87	87	89	90	90	67.8	90											
26-Jun	90	91	91	91	90	88	79	69	65	72	65	67	78	73	91	96	92	76	63	71	78	87	91	90	81.0	96											
27-Jun	86	85	84	84	78	76	78	81	76	69	63	73	71	58	86	90	86	90	90	83	92	97	98	98	82.2	98											
28-Jun	99	99	99	99	99	93	83	79	71	68	60	53	49	51	48	49	45	47	46	47	59	74	72	84	69.6	99											
29-Jun	91	93	95	96	95	83	74	69	68	58	45	39	32	31	34	36	36	35	34	37	38	43	50	56	57.0	96											
30-Jun	65	73	78	84	86	84	81	77	74	70	65	61	54	51	48	45	44	43	43	46	54	71	81	85	65.2	86											
	78.1	79.8	80.4	81.6	81.2	78.4	74.7	69.9	64.5	60.0	56.2	54.4	52.4	52.2	52.7	50.9	50.8	52.1	53.1	57.1	63.0	70.8	74.4	77.3	Diurnal Average												
	99	99	99	99	99	99	99	99	99	99	99	99	99	98	98	97	95	94	94	96	98	99	98	98	Diurnal Maximum												



WBEA
Hourly Averages

Relative Humidity (RH) - %
Wapasu - June 2014





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Wapasu - June 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	4	0.56	0.56
20 - 40	116	16.11	16.67
40 - 60	178	24.72	41.39
60 - 80	193	26.81	68.19
80 - 100	229	31.81	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 21 km/h on Jun 9 14:00	Maximum Daily Speed Average: 13.5 km/h on Jun 24	Hours in Service: 720
Minimum Speed Value: 0 km/h on Jun 21 01:00	Minimum Daily Speed Average: 1.3 km/h on Jun 7	Hours of Data: 716
Maximum Diurnal Speed Average: 5.2 km/h at hour 4	Minimum Diurnal Speed Average: 0.5 km/h at hour 11	Hours of Missing Data: 4
Monthly Average Velocity: 2.4 km/h 123.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 11 P ₉₀ = 13 P ₉₉ = 17	Percent Operational Time: 99.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jun	SE14	SE14	SE13	SE14	SSE15	SSE15	SE16	SE18	SSE17	SSE15	SSE13	SSE12	SSE11	SSE10	SSW8	SSW7	S9	S11	SSE6	S9	SSW8	S5	SSE7	SSE6	SSE10.8	SE18
2-Jun	SSE7	S6	S6	SSE6	SSE7	S8	SSW8	SSW8	SW9	WSW11	W9	W11	W11	WSW11	WNW10	N11	N11	NNW12	NNW5	NW8	NE5	ENE5	ENE4	E5	WSW2.7	NNW12
3-Jun	ESE7	ESE8	SE9	ESE9	ESE12	ESE13	ESE14	ESE13	E8	E11	ENE9	N12	N12	NNW8	NW7	SSE5	E4	NNW11	NNW17	NNW10	NE11	ENE11	ENE9	NNW6	ENE5.0	NNW17
4-Jun	NNW6	N5	NNW7	NNW7	NNW6	NNW7	NW8	NW10	NW11	NW12	NNW13	NNW14	NNW15	NNW14	NNW13	N10	N11	N11	N10	N9	N10	N8	N8	N9	NNW9.3	NNW15
5-Jun	N9	N10	NNE10	N10	N9	N10	N9	N10	N11	N11	N13	N14	N14	N13	N13	N14	N12	N11	N11	N9	N7	NW3	N4	NE2	N9.8	N14
6-Jun	SE1	NW1	AF	N1	NNW3	N4	N6	N8	N7	NNW7	NNW10	NW8	NNW4	NW5	WNW6	NNW7	N5	N7	NE6	ENE3	E4	E4	E5	ESE6	N3.4	NNW10
7-Jun	SE5	E5	SE6	SE5	ESE5	ESE3	SE4	N5	NNW6	NNW6	NW7	NW4	S2	NE1	NNW10	NNW6	N5	N5	NNW5	NW3	AF	AF	SE6	SSE5	NNE1.3	NNW10
8-Jun	SSE5	SE5	SSE6	SSE6	SSE5	S4	SW5	W6	W6	SW7	W7	WSW6	WSW6	SW7	S5	SSW7	SW6	SSW4	S5	SSE5	SE8	SE10	SE12	SE14	S4.5	SSE14
9-Jun	SSE15	SSE15	SSE12	SSE10	S8	SSE9	S6	SE8	ESE10	ESE11	SE13	SE16	SE19	SE21	ESE16	ESE18	ESE20	ESE16	ESE12	ESE11	SE9	SE5	NE4	NE4	SE11.2	ESE21
10-Jun	NE4	NE7	NNE6	NE6	NE4	NE5	N8	N12	N13	N12	NNE10	NNE9	NE11	NNE9	NNE7	NE8	NE8	NE7	NNE9	NNW4	NW3	SE2	SE5	SE6	NNE6.0	N13
11-Jun	SSE4	SSE5	S5	SSE6	SSE6	S6	SSW7	SSW6	WSW7	NW8	ENE2	WSW4	W12	W2	SSW9	WSW7	W9	E2	W5	SW7	SW4	SE4	SSE5	SSE5	SW3.8	W12
12-Jun	SSE5	SSE5	S4	SSE5	SE5	SSW3	W3	NNW5	NNE8	NE10	NNE10	N11	NNE10	N10	N11	N10	NNE10	N10	NE10	NE9	NE6	ENE5	E11	ESE12	NE4.6	ESE12
13-Jun	ESE14	ESE15	ESE13	ESE14	ESE14	SE14	ESE12	ESE11	SE12	ESE10	ESE9	ESE9	ESE8	E9	ESE9	ESE6	ESE8	SE8	SE7	SSE8	SSE7	SE10	SSE11	SSE12	SE10.0	ESE15
14-Jun	SSE13	SSE13	SSE14	SSE14	SSE15	SSE16	SSE15	SSE14	S11	S10	S11	S11	S11	S12	S12	S13	S13	S13	SSE11	SSE8	SSE10	SSE13	SSE14	SSE14	SSE12.3	SSE16
15-Jun	SSE13	SSE11	SSE9	SSE8	SSE9	SSE10	S9	S9	SSW7	SSW8	S10	S11	SSE9	S11	SSE9	SE7	SSE9	SE9	SE10	SE11	SE8	SE7	SE7	SE7	SSE8.6	SSE13
16-Jun	SE6	SE5	SE8	SE7	ESE6	ESE5	ESE7	SE11	SE11	ESE10	ESE12	ESE10	E11	E10	E10	E12	E11	E11	E11	E7	ESE5	SE6	S8	SSW6	ESE7.8	E12
17-Jun	SSW4	S5	S6	SSE6	SSE5	SSE4	SSE4	SE3	SSE7	SSE11	SSE11	SSE9	SSE10	SSE12	SSE11	SSE9	SSE10	S9	S10	SSW6	S4	SSE8	SSE8	SSE9	SSE7.4	SSE12
18-Jun	SSE10	SSE7	SSE8	SSE8	SSE7	SSE9	SSE9	SSE9	S9	S11	SSE14	S15	S14	S16	S14	S15	S14	S14	S12	S11	SSE11	SSE11	SSE13	SSE13	SSE11.2	S16
19-Jun	SSE12	SSE11	SSE9	SSE10	SSE8	SSE7	SSE6	SSE8	SSE7	SSE8	SE10	SE11	SE9	SE9	ESE9	ESE6	ESE11	ESE7	E6	NNE3	NE4	NE2	NE6	ENE6	SE6.4	SSE12
20-Jun	ENE7	ENE3	NE4	E5	ESE5	ESE2	WNW2	S2	SSE10	SE10	SE7	ESE12	SE13	SE9	SSE10	S7	SE7	SSE6	SSW5	SSW4	SW2	WSW5	WSW4	SW2	SE4.3	SE13
21-Jun	N0	ENE2	NE4	NE5	NNE6	N5	NNE4	NNW6	NNW7	NNW8	N6	N7	NNW8	NNW7	N7	NNW7	NW5	NNW6	NW8	NW6	NW6	NW4	NNW6	NNW3	NNW5.0	NNW8
22-Jun	NW4	NW4	W2	S2	W1	AF	W2	NNW5	NNW7	NNW6	NNW9	NNW11	NNW12	NNW12	NNW13	NNW13	NNW12	NNW12	N10	ENE9	NE4	NE4	NE4	ENE3	NNW5.9	NNW13
23-Jun	E3	ENE3	E2	ESE1	ESE2	ESE3	SE1	WSW2	WNW3	ESE1	WNW6	N4	E5	ESE4	E7	NNE3	S7	SSE8	SE8	SE7	SE6	SE9	SE11	SE12	SE3.4	SE12
24-Jun	SE15	SE16	SE15	SE16	SE16	SSE15	SE14	SE15	SSE13	SSE13	S11	S15	SSE15	SSE13	SSE13	SSE12	SE13	SE13	SSE16	SSE12	SSE11	SSE11	SSE12	SSE13	SSE13.5	SE16
25-Jun	SSE12	SSE12	SSE13	SSE13	SSE13	SSE13	SSE13	SSE13	SSE13	SSE13	SSE13	SSE14	SSE13	SSE14	SSE13	SSE15	S14	WSW10	S5	SE6	SSE6	SSE6	SSE5	SSE5	SSE10.7	SSE15
26-Jun	SSE4	SSE5	SSE5	SSE6	SSE6	S4	S6	SSW6	SW6	W8	W8	NW5	NNW8	NNW7	SSW3	E2	SSE4	ESE2	ESE3	NE5	ENE3	E4	E5	ESE6	SSE1.4	NNW8
27-Jun	ESE7	ESE6	SE7	SE6	SE4	WNW1	SE3	SE4	SSE3	SW2	WNW5	N5	NW5	WNW0	NNW2	ESE3	N6	N4	NNE5	NE5	S0	E2	E5	E4	E1.5	ESE7
28-Jun	ESE3	E4	E4	E4	E4	SSE1	WNW4	W5	NW6	NW6	NNW7	NNW8	NNW9	N11	NW10	NNW8	NNW10	NNW9	N7	N7	N3	NE2	NE3	ENE3	N4.0	N11
29-Jun	E3	E3	ENE3	NE4	NE4	N5	N8	N8	N8	N9	NNW13	N14	N17	N16	N15	N13	NNW16	N14	N11	N9	N9	NNW8	NNW8	NNW8	N8.8	N17
30-Jun	NNW7	N6	NNW6	N5	N6	N7	N8	N7	N8	N10	N11	NNW12	N11	N12	N11	NNW13	N12	NNW11	N9	N8	NNE5	ENE3	E3	E3	N7.6	NNW13

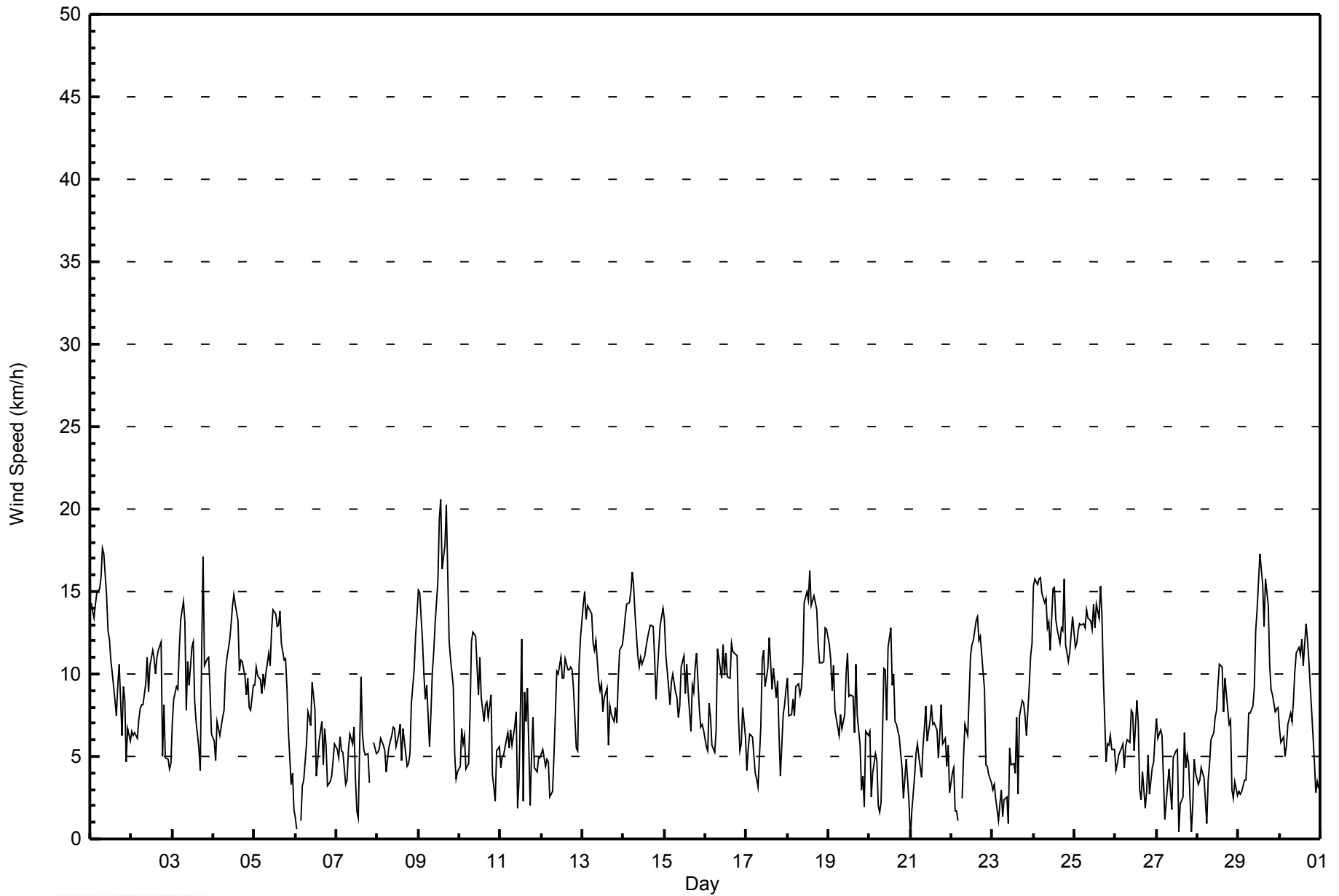
SE5.1 SE5.0 SE5.0 SE5.2 SE4.8 SE4.2 SSE3.1 SE2.3 SSE1.4 SE0.9 ESE0.5 ENE0.8 ENE1.0 E1.2 E0.6 ENE1.4 E1.5 ENE1.5 ENE2.2 E1.6 ESE2.3 ESE3.4 ESE4.4 SE4.4	Diurnal Average
SE15 SE16 SE15 SE16 SE16 SSE16 SE16 SE18 SSE17 SSE15 SSE14 SE16 SE19 ESE21 ESE16 ESE18 ESE20 ESE16 NNW17 SSE12 NE11 SSE13 SSE14 SSE14	Diurnal Maximum

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Wapasu - June 2014





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Wapasu - June 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	198	27.65	27.65
6 - 11	366	51.12	78.77
12 - 19	150	20.95	99.72
20 - 28	2	0.28	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 - June 2014

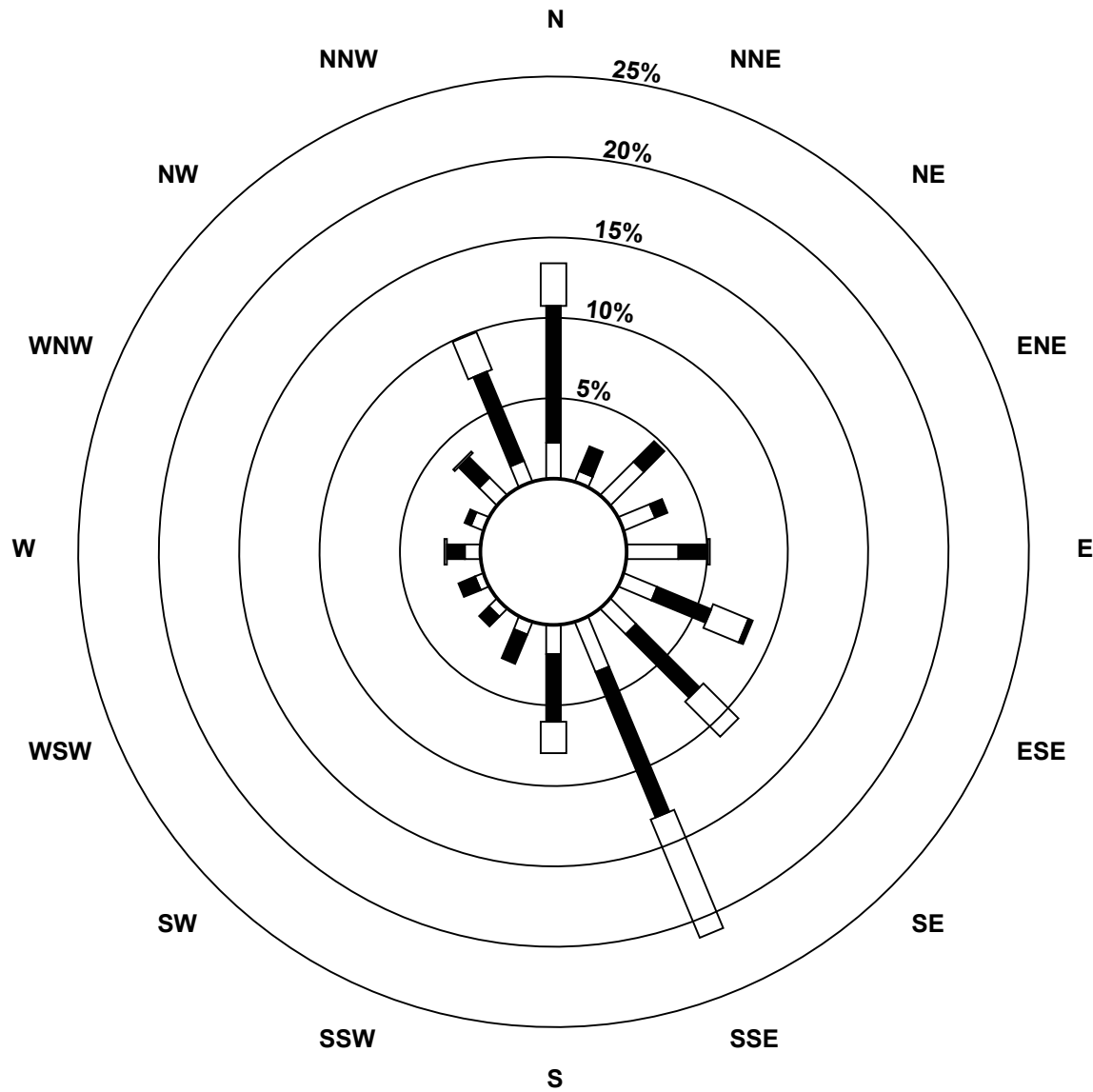
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	16	5	21	15	23	16	16	24	13	6	5	4	7	6	11	10	198
6 - 11	61	12	13	6	13	26	40	70	30	14	6	8	8	3	13	43	366
12 - 19	19	0	0	0	1	17	22	57	14	0	0	0	1	0	1	18	150
20 - 28	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
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	96	17	34	21	37	61	78	151	57	20	11	12	16	9	25	71	716

Total Number of Valid Hours: 716

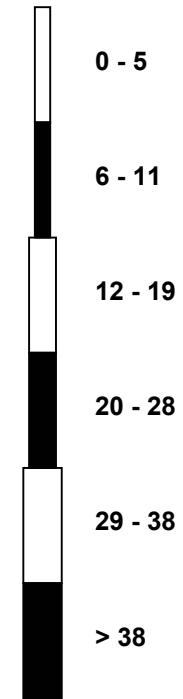
Total Number of Hours: 720

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

**Wind Speed (WS) - km/h
Wapasu (AMS 17)**



Classes (km/h)



Total Number of Valid Hours: 716



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Wapasu - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Jun 24 11:00	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 Jun 11 00:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 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-Jun	3	3	3	3	4	5	4	5	6	4	4	4	4	4	3	3	4	4	3	3	4	2	1	1	6
2-Jun	2	2	2	2	2	2	3	3	3	3	3	3	5	5	4	5	4	5	2	3	1	1	0	1	5
3-Jun	1	2	2	2	3	3	4	4	3	3	4	5	4	3	3	3	5	6	4	4	4	3	3	6	
4-Jun	2	2	2	2	2	2	2	3	3	3	4	4	4	4	5	4	4	4	3	3	4	3	3	5	
5-Jun	3	4	3	4	3	4	3	4	4	4	5	5	5	5	5	5	4	4	5	4	3	1	1	5	
6-Jun	1	1	AF	1	1	2	2	3	3	3	3	4	3	3	3	3	3	2	3	1	1	1	1	4	
7-Jun	1	1	1	2	1	1	2	2	2	2	2	2	2	3	3	3	3	2	2	2	AF	AF	1	1	3
8-Jun	0	0	1	1	1	1	1	2	2	3	3	4	4	3	3	4	3	3	2	1	2	2	3	3	4
9-Jun	4	4	4	3	3	3	2	3	3	3	4	5	6	6	5	6	6	6	4	3	3	3	1	1	6
10-Jun	1	2	2	2	1	2	3	4	4	5	4	4	6	5	3	5	4	3	3	1	1	2	1	0	6
11-Jun	1	1	1	1	1	2	2	2	2	4	3	4	5	2	4	4	4	3	3	2	1	1	0	1	5
12-Jun	1	1	1	1	1	1	1	2	3	4	4	4	4	4	4	4	4	4	4	3	2	1	3	3	4
13-Jun	4	4	3	4	3	4	4	4	4	4	4	4	3	4	4	3	4	4	3	2	2	2	3	3	4
14-Jun	3	4	4	4	4	5	5	4	4	4	4	4	4	4	5	5	5	5	4	2	3	3	3	3	5
15-Jun	3	3	2	2	2	3	3	3	3	4	4	4	4	5	4	4	4	3	3	3	2	1	1	1	5
16-Jun	1	1	2	2	1	1	3	3	3	3	4	4	4	4	3	4	4	3	4	3	1	2	2	3	4
17-Jun	1	1	2	2	1	1	1	1	4	3	3	3	4	4	3	3	3	3	3	3	1	2	2	2	4
18-Jun	2	2	2	2	2	3	3	3	4	4	5	5	5	6	5	5	5	5	5	4	4	3	3	3	6
19-Jun	3	3	3	3	2	2	3	2	2	3	3	3	3	3	3	3	3	3	2	1	1	2	1	2	3
20-Jun	2	2	2	1	1	1	1	4	3	4	3	4	4	3	3	3	2	2	2	2	1	1	1	1	4
21-Jun	1	2	1	1	2	2	1	2	2	3	2	2	2	2	2	2	1	2	2	1	2	2	2	1	3
22-Jun	2	2	1	1	1	AF	1	2	2	2	3	3	4	4	4	4	5	4	4	4	2	2	1	1	5
23-Jun	1	1	1	1	1	1	1	1	2	2	2	3	4	2	2	2	7	4	2	2	1	2	3	3	7
24-Jun	4	4	4	4	4	4	4	4	4	5	9	5	5	5	5	4	4	4	5	4	3	3	3	4	9
25-Jun	3	3	3	3	4	4	4	4	4	5	4	5	5	4	4	5	6	6	2	2	1	2	1	2	6
26-Jun	1	1	1	1	1	1	2	2	3	3	3	3	3	4	4	1	1	1	2	2	1	1	1	1	4
27-Jun	2	2	2	1	2	1	2	1	1	1	2	2	3	3	2	2	3	1	2	2	1	1	1	1	3
28-Jun	1	1	1	1	1	2	2	2	3	2	3	4	4	4	3	3	3	3	2	3	2	2	1	1	4
29-Jun	1	1	1	1	1	2	2	3	2	3	4	5	6	6	6	5	5	5	4	3	3	3	2	3	6
30-Jun	2	2	2	2	2	2	3	3	3	4	4	4	4	4	4	5	4	4	4	3	2	1	0	1	5
	4	4	4	4	4	5	5	5	6	5	9	5	6	6	6	6	7	6	6	4	4	4	3	4	
Diurnal Maximum																									

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Wapasu - June 2014

Direction of Maximum Speed: 124 deg on Jun 9 14:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 151.4 deg on Jun 24	Hours of Data: 716
Direction of Minimum Speed: 1 deg on Jun 21 01:00	Hours of Missing Data: 4
Direction of Minimum Daily Speed Average: 1.3 deg on Jun 7	Percent Operational Time: 99.4
Monthly Average Direction: 169.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jun	128	132	133	140	147	147	139	143	149	154	152	152	155	165	198	202	180	178	168	180	193	174	156	166	154.6
2-Jun	166	171	173	160	166	177	200	211	227	240	264	271	269	242	282	350	352	347	335	323	44	58	73	85	254.4
3-Jun	108	123	130	122	115	116	120	123	95	85	69	4	3	332	314	153	93	345	341	330	56	60	77	330	67.1
4-Jun	341	3	333	341	337	340	326	313	316	319	330	328	330	334	336	351	354	358	1	357	10	0	6	355	340.8
5-Jun	352	1	12	11	8	3	4	9	2	360	358	352	349	351	352	357	3	3	3	9	357	326	354	40	359.9
6-Jun	132	318	AF	358	333	359	0	355	355	337	331	319	334	309	293	342	9	1	34	73	79	98	100	109	357.6
7-Jun	124	101	128	141	121	117	141	353	338	333	313	311	188	42	327	346	1	4	340	323	AF	AF	146	147	21.1
8-Jun	151	146	149	154	151	170	225	261	276	228	271	238	253	236	189	210	235	200	169	159	142	143	142	146	185.6
9-Jun	148	148	159	162	178	164	187	131	123	123	125	135	130	124	118	120	118	121	111	112	128	144	47	56	131.1
10-Jun	43	51	32	48	53	41	5	356	355	360	16	33	40	27	16	35	34	43	30	339	315	130	144	144	26.7
11-Jun	166	167	174	165	166	176	211	207	253	305	61	241	264	281	209	244	264	80	265	234	220	139	150	154	215.9
12-Jun	167	165	169	156	144	204	281	345	24	36	27	350	24	1	351	6	30	11	40	39	38	71	101	116	37.5
13-Jun	116	119	115	116	121	126	122	116	133	118	117	117	106	100	111	119	115	133	141	159	161	144	150	150	125.2
14-Jun	147	150	150	151	151	156	160	168	179	183	188	173	171	170	177	174	173	174	166	159	151	149	147	149	162.3
15-Jun	151	154	154	154	152	157	171	183	196	206	176	171	165	175	152	129	159	146	128	129	140	131	135	136	156.4
16-Jun	130	133	138	129	115	111	119	124	124	112	106	104	95	88	99	93	88	79	87	82	102	146	174	196	110.6
17-Jun	192	178	171	160	162	148	149	124	147	164	150	160	154	150	148	163	167	178	179	198	169	156	161	155	161.4
18-Jun	151	158	156	152	158	157	153	165	182	181	164	169	177	181	182	180	177	175	181	179	161	150	151	154	167.9
19-Jun	157	160	161	154	158	155	158	149	154	150	145	139	130	129	123	107	113	103	84	24	40	49	54	62	132.3
20-Jun	68	58	48	83	109	117	298	179	148	138	144	115	124	144	160	177	145	166	198	205	217	244	240	216	144.1
21-Jun	1	60	41	34	25	10	26	345	328	337	9	351	329	331	354	335	321	331	324	312	315	325	333	344	344.0
22-Jun	309	312	267	190	261	AF	265	333	338	335	337	343	337	347	346	342	331	334	5	62	44	52	56	73	347.1
23-Jun	97	76	88	112	118	114	128	256	303	112	291	3	92	119	99	15	184	160	140	130	131	129	131	135	126.8
24-Jun	140	143	141	138	142	147	145	144	151	152	172	171	167	168	153	162	146	143	148	167	154	151	149	152	151.4
25-Jun	147	152	154	152	154	161	164	157	164	157	164	155	163	156	158	151	191	237	175	146	153	159	162	157	160.9
26-Jun	163	160	147	149	159	176	183	195	221	275	259	322	339	329	192	99	147	117	121	45	60	89	89	108	164.4
27-Jun	119	120	137	138	124	302	139	144	161	218	292	354	316	295	330	111	351	9	32	55	180	79	83	91	85.6
28-Jun	111	93	91	97	96	157	284	273	324	306	328	333	327	5	324	345	338	336	5	4	6	39	52	65	349.8
29-Jun	86	93	64	45	39	7	354	357	1	358	341	350	359	11	1	10	347	352	6	7	1	346	333	341	0.0
30-Jun	344	349	347	1	6	3	5	10	358	351	350	345	6	355	0	343	351	348	3	11	24	63	97	101	358.9
	133.5	133.6	135.1	132.7	134.4	138.6	147.7	142.4	150.7	144.6	103.6	68.8	67.6	96.1	96.1	75.5	90.5	56.9	67.8	86.6	107.6	120.7	123.4	130.3	

Diurnal Average

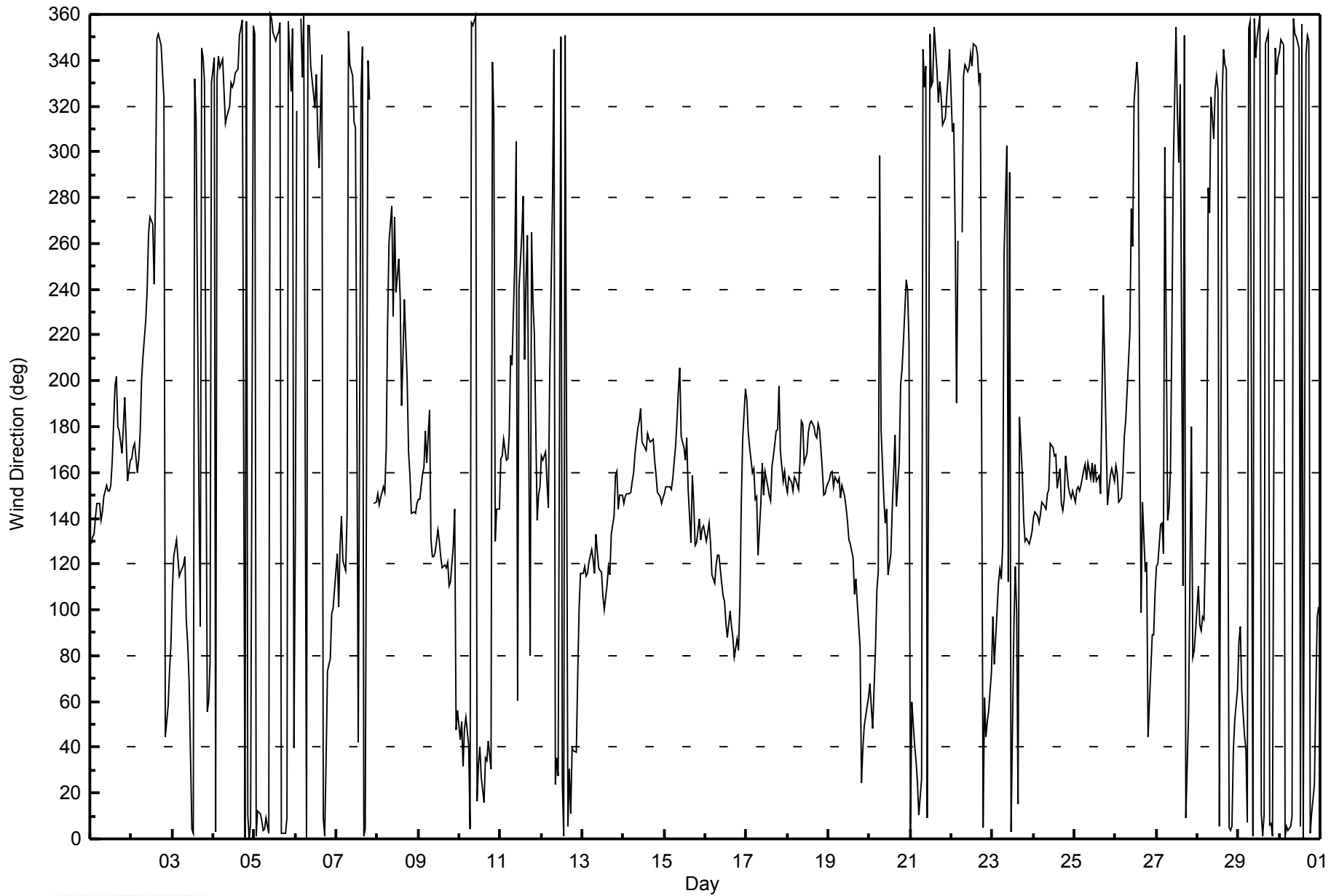
AF - Analyzer Failure

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



WBEA
Hourly Averages

Wind Direction (WD) - deg
Wapasu - June 2014





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 104 deg on Jun 27 14:00	Hours of Data: 716
Minimum Value: 4 deg on Jun 10 23:00	Hours of Missing Data: 4
Percentiles: P ₁ = 8 P ₁₀ = 17 Q ₁ = 21 Median = 30 Q ₃ = 38 P ₉₀ = 50 P ₉₉ = 92	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-Jun	17	17	17	17	19	21	19	19	24	23	22	24	26	41	44	41	35	34	28	28	32	36	19	18	44
2-Jun	20	22	24	21	22	29	38	35	33	30	38	36	32	29	33	39	39	33	43	27	23	9	6	9	43
3-Jun	12	14	15	16	17	19	20	22	37	31	48	39	35	41	33	52	56	36	29	32	32	29	24	47	56
4-Jun	36	36	25	30	26	29	23	24	24	22	24	22	24	24	26	34	32	34	35	33	32	35	35	32	36
5-Jun	32	35	35	36	36	34	39	37	34	35	35	33	34	36	38	37	39	37	37	38	35	21	27	41	41
6-Jun	61	47	AF	59	21	30	34	42	48	49	39	55	70	77	78	53	73	42	50	24	17	11	13	13	78
7-Jun	15	25	18	30	23	27	58	52	26	30	25	74	96	95	32	50	56	42	32	54	AF	AF	10	6	96
8-Jun	10	9	6	9	8	20	31	38	44	47	68	69	63	55	67	58	59	60	54	26	14	15	17	18	69
9-Jun	19	20	24	25	29	32	33	21	18	20	21	20	22	20	21	22	22	23	24	25	22	40	26	21	40
10-Jun	33	22	31	25	24	33	38	35	34	37	45	43	41	48	47	57	38	41	35	31	15	49	4	4	57
11-Jun	16	11	25	13	15	28	33	37	36	37	91	101	43	82	34	47	53	88	66	22	28	10	10	9	101
12-Jun	10	11	19	9	12	39	56	50	46	35	42	42	48	46	42	42	44	42	34	30	23	21	15	18	56
13-Jun	19	19	19	19	18	19	21	27	26	34	49	48	45	46	47	75	45	49	40	24	22	14	18	18	75
14-Jun	18	20	19	20	21	22	25	28	35	37	40	39	37	43	40	35	32	34	25	22	19	19	19	20	43
15-Jun	18	20	19	19	19	23	30	33	41	50	43	42	54	43	44	65	39	42	29	21	16	10	10	8	65
16-Jun	8	8	12	13	12	11	17	20	21	35	31	39	40	34	32	33	28	25	23	21	15	32	25	28	40
17-Jun	23	25	26	22	19	14	14	25	23	25	22	30	35	27	30	28	28	32	31	34	23	20	24	20	35
18-Jun	18	21	20	18	22	22	20	31	38	36	30	33	36	35	35	34	35	31	37	33	24	17	18	21	38
19-Jun	22	24	23	19	22	22	23	23	25	24	25	23	28	30	22	42	22	26	31	27	28	34	18	22	42
20-Jun	20	51	25	23	13	62	72	73	24	26	34	24	23	30	30	36	26	29	27	34	40	24	39	39	73
21-Jun	93	37	47	31	30	31	41	33	24	30	38	31	22	30	31	24	25	28	20	22	26	29	21	31	93
22-Jun	22	27	27	41	65	AF	41	30	27	31	32	32	29	32	34	32	27	31	43	25	31	35	21	17	65
23-Jun	21	8	20	59	30	20	77	52	47	101	48	69	72	55	20	64	84	33	17	17	15	15	17	17	101
24-Jun	18	19	18	18	17	18	19	18	24	29	54	33	31	35	29	33	24	20	23	29	21	19	19	18	54
25-Jun	18	20	21	20	21	23	26	24	29	28	35	32	36	29	29	26	45	31	36	19	19	20	18	19	45
26-Jun	27	19	16	17	23	27	36	47	56	30	48	61	32	52	99	68	18	61	74	27	44	14	16	18	99
27-Jun	15	18	12	15	66	85	37	19	40	67	59	34	30	104	85	62	36	32	37	34	87	81	11	12	104
28-Jun	20	24	8	10	28	69	28	43	45	40	44	49	36	40	29	37	42	33	39	41	34	52	34	34	69
29-Jun	14	15	38	28	27	24	30	34	32	37	37	37	38	39	38	40	36	37	39	36	39	32	22	26	40
30-Jun	28	30	29	29	32	36	37	41	38	39	40	33	43	37	38	32	39	36	38	37	27	35	8	18	43
	93	51	47	59	66	85	77	73	56	101	91	101	96	104	99	75	84	88	74	54	87	81	39	47	

Diurnal Maximum

AF - Analyzer Failure

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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 10, 2014	Previous Calibration	May 14, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:45	End Time (MST)	12:03
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	878	878
Calculated slope	1.009640	0.996863	Chamber temp.	44.9	44.9
Calculated intercept	-0.791677	0.429148	Pressure (mmHg)	688.0	688.0
Analyzer Background	8.3	8.3	Flow (lpm)	0.450	0.450
Analyzer Coefficient	0.794	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	-0.3	NA
as found span	5000	60.4	577.4	569.0	1.015
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	60.4	577.4	579.0	0.997
second point	5000	30.2	288.7	289.0	0.999
third point	5000	15.1	144.4	144.0	1.002
calibrator zero	6000	0.0	0.0	-0.2	NA
as left zero	6000	0.0	0.0	-0.2	NA
as left span	5000	60.4	577.4	575.9	1.003
Average Correction Factor					1.000

Corrected As found	569.3	Previous response	572.7	% change	0.6%
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Notes:

No Maintenance Done, Filter changed out, span was adjusted

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

SO₂ Calibration Summary

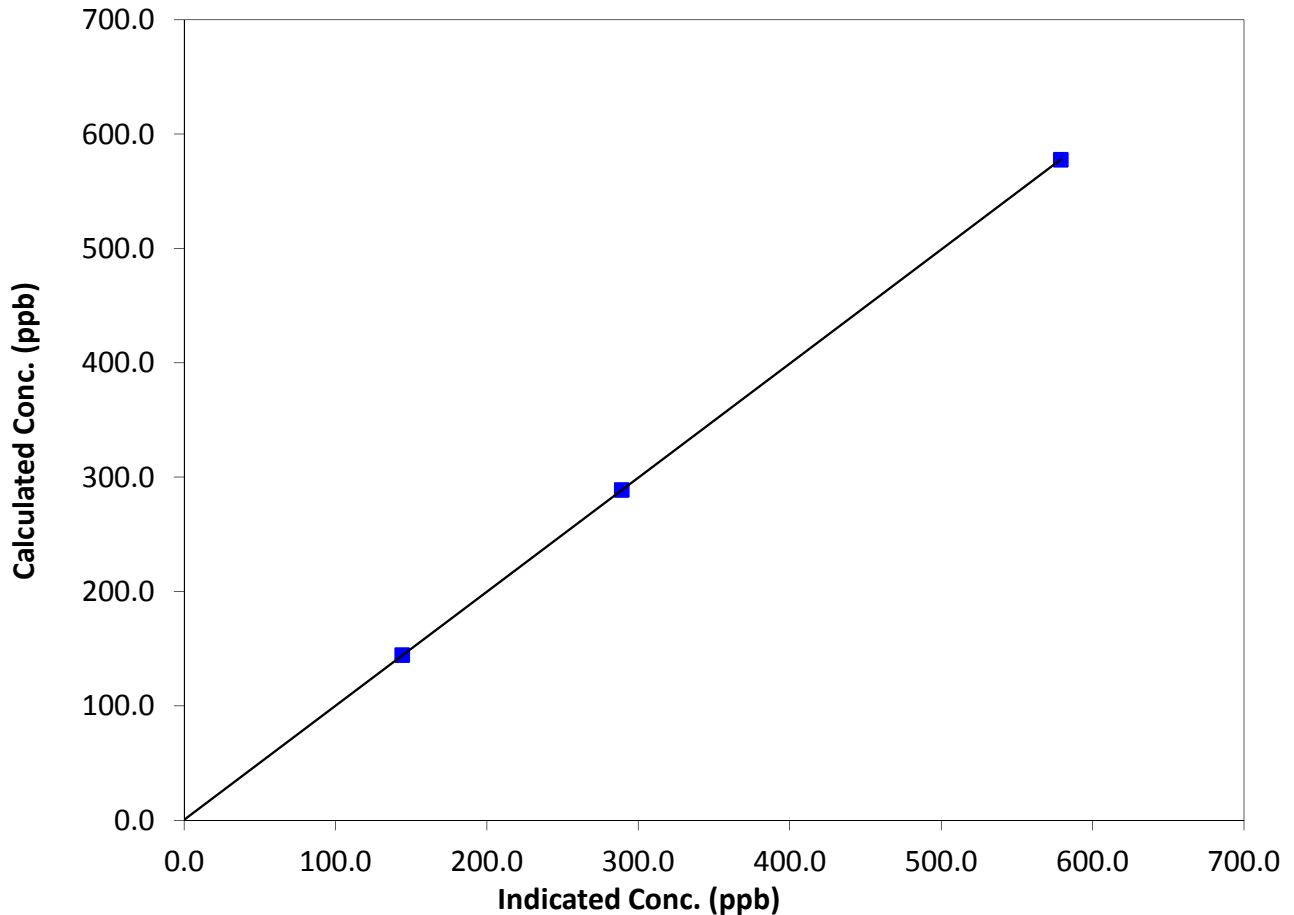
Station Information

Calibration Date	June 10, 2014	Previous Calibration	May 14, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:45	End Time (MST)	12:03
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

Calibration Data

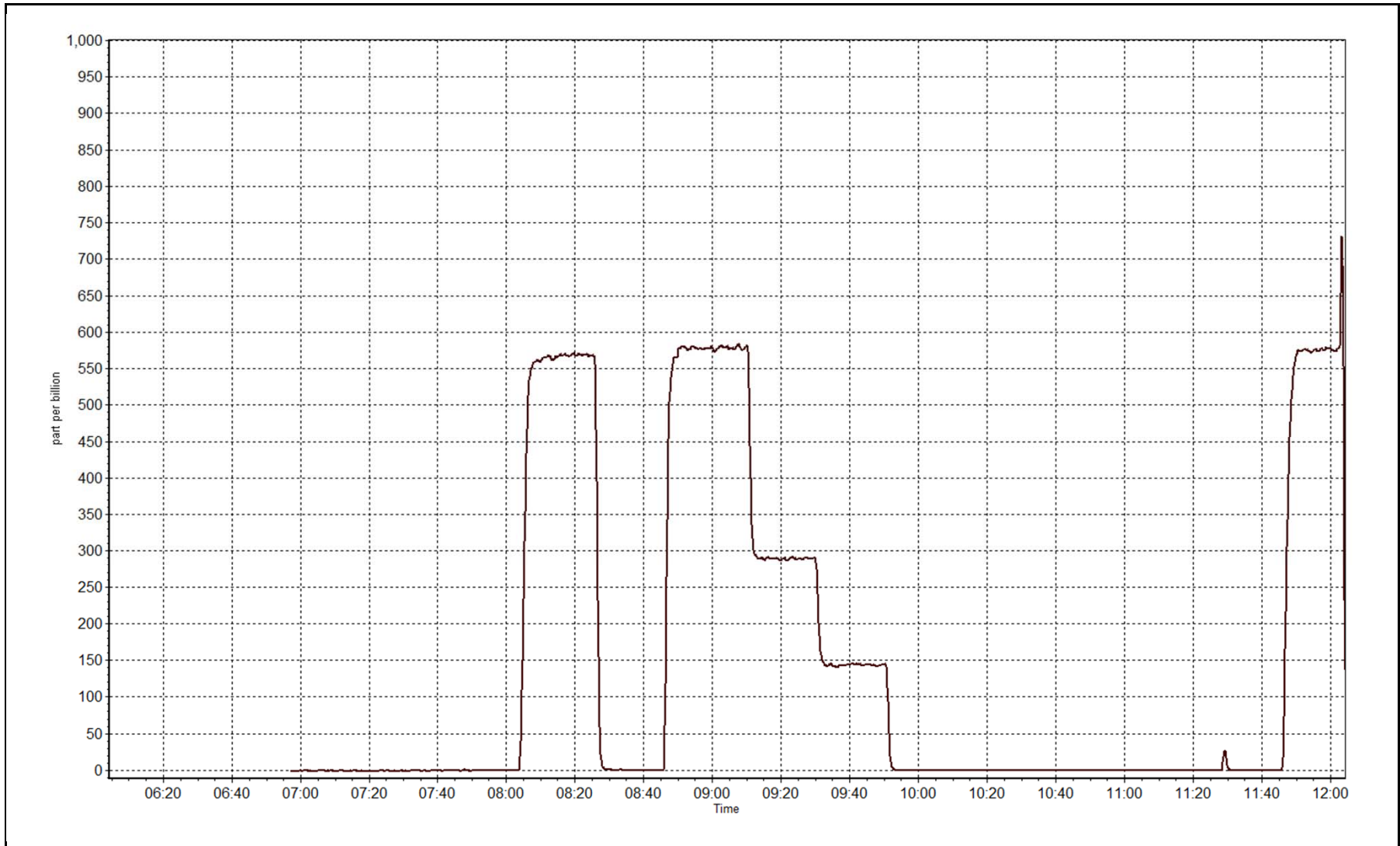
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999998
577.4	579.0	0.9973		
288.7	289.0	0.9990	Slope	0.996863
144.4	144.0	1.0025		
			Intercept	0.429148

SO₂ Calibration Curve



SO2 Calibration Plot

Date: June 10, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	June 11, 2014	Previous Calibration	May 14, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	6:45	End Time (MST)	9:15
Barometric Pressure	mmHg	Station temp.	27 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	813	813
Calculated slope	1.001139	0.997379	Chamber temp.	45	45
Calculated intercept	0.133319	0.388962	Pressure	575.6	575.6
Analyzer Background	12.6	12.2	Flow	0.869	0.869
Analyzer Coefficient	0.856	0.837	Intensity	91	91
			Converter temp.	340	340

Analyzer make/model	450i	Analyzer serial #	1218153583
Converter make/model	internal	Converter serial #	internal

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.6	NA
as found span	5000	39.3	80.2	81.9	0.979
SO2 scrubber check	5000	60.4	577.4	2.2	NA
calibrator zero	5000	0.0	0.0	-0.6	NA
high point	5000	39.3	80.2	79.7	1.006
second point	5000	19.5	39.8	40.0	0.994
third point	6000	11.8	20.1	19.7	1.020
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	39.2	80.0	79.4	1.007
Average Correction Factor					1.006

Corrected As found	82.5	Previous response	79.9	% change	-3.1%
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Notes:

Scrubber checked third point, Span adjusted, No Maintenance Done, filter changed

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

H2S Calibration Summary

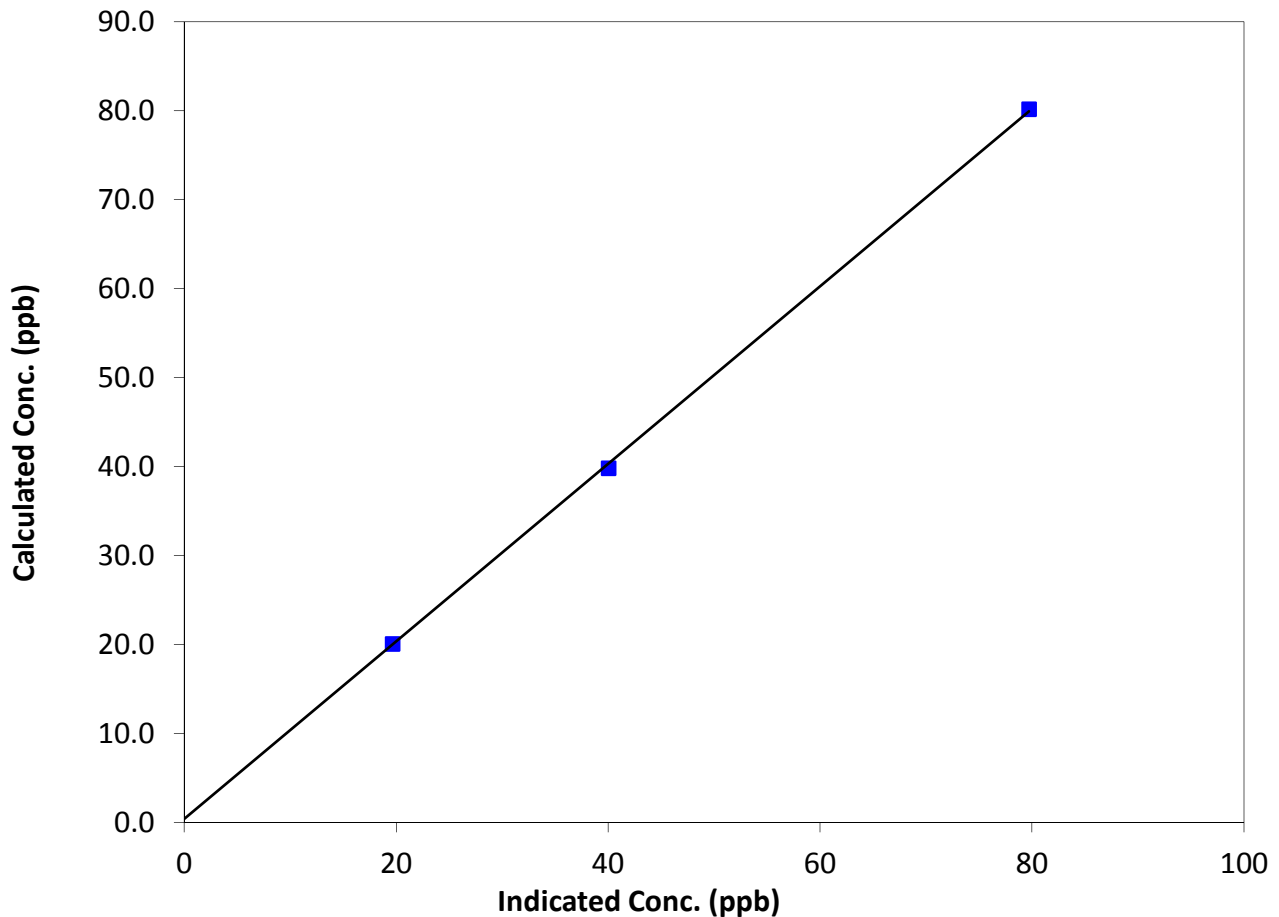
Station Information

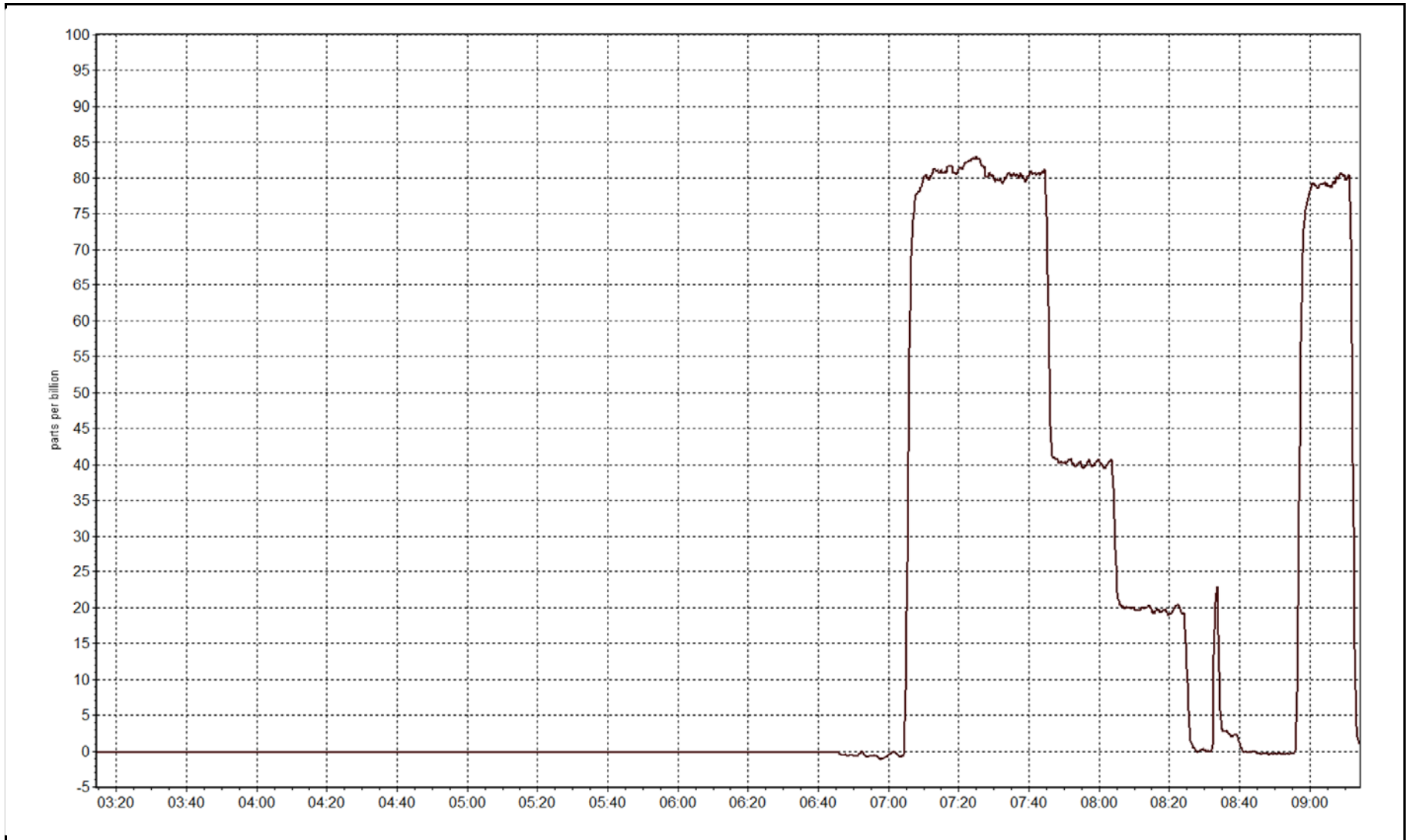
Calibration Date	June 11, 2014	Previous Calibration	May 14, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	6:45	End Time (MST)	9:15
Analyzer make	450i	Analyzer serial #	1218153583

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.6	N/A	Correlation Coefficient	0.999880
80.2	79.7	1.0055		
39.8	40.0	0.9935	Slope	0.997379
20.1	19.7	1.0198		
			Intercept	0.388962

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Tuesday, June 10, 2014	Previous Calibration	Wednesday, May 14, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:45	End Time (MST)	12:03
Barometric Pressure	716 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	API T700	Serial Number	493
Gas Cert Reference	SA130010A	Cal Gas Expiry Date	12-Dec-16
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894
DACS voltage range	NA	DACS channel #	NA

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	100	100	Sample Pressure	8.5	8.5
Analyzer Range (mv)	100	100	Air or Bypass press	39.1	40.0
Calculated slope	0.999883	0.997814	Fuel Pressure	24.8	24.8
Calculated intercept	-0.069273	-0.019768		2.4	2.4
				4.976	4.976

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352
---------------	---------------	-------------------	------------

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.09	N/A
as found span	5000	60.4	13.19	13.10	1.007
calibrator zero	5000	0.0	0.00	-0.01	N/A
high point	5000	60.4	13.19	13.22	0.998
second point	5000	30.2	6.60	6.67	0.989
third point	5000	15.1	3.30	3.34	0.988
calibrator zero	6000	0.0	0.00	0.03	N/A
as left zero	6000	0.0	0.00	0.03	N/A
as left span	5000	60.4	13.19	13.36	0.988
Average Correction Factor					0.992

Corrected As found	13.19	Previous response	13.27	% change	0.6%
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Notes:

Filter changed, no adjustments made, no maintenance done

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

THC Calibration Summary

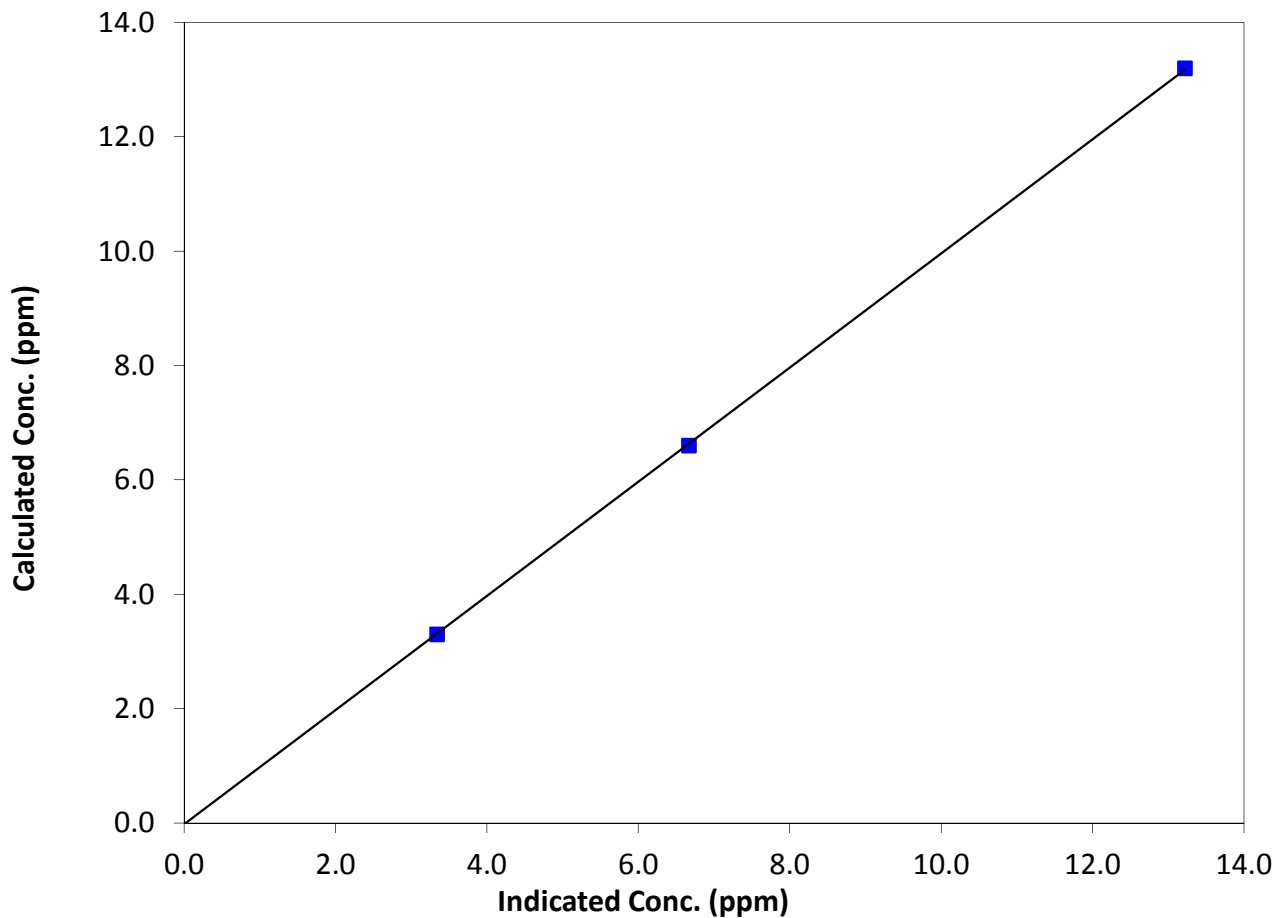
Station Information

Calibration Date	June 10, 2014	Previous Calibration	May 14, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:45	End Time (MST)	12:03
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

Calibration Data

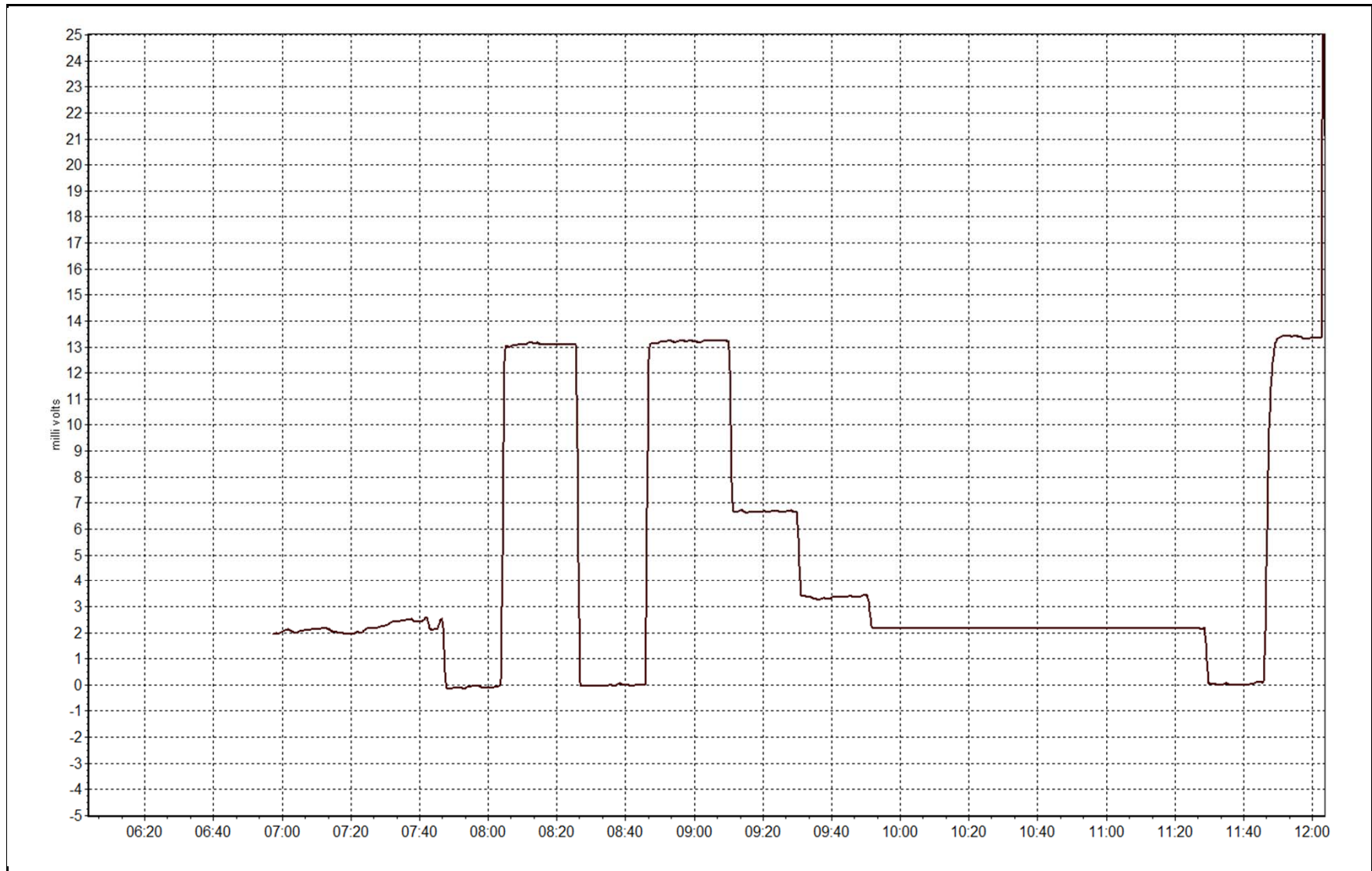
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	N/A	Correlation Coefficient	0.999967
13.19	13.22	0.9981		
6.60	6.67	0.9891	Slope	0.997814
3.30	3.34	0.9876		
			Intercept	-0.019768

THC Calibration Curve



THC Calibration Plot

Date: June 10, 2014





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	June 11, 2014	Previous Calibration	May 16, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	11:06
Barometric Pressure	23 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	T700	Serial Number	997
NO2 calibration used	June-10-14	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.	28.0	28.0
Analyzer Range (input)	500	500	Photo Lamp Temp.	58.0	58.0
Calculated slope	0.987908	0.992534	Pressure	26.0	26.0
Calculated intercept	1.046850	1.052178	Flow	670	670
Analyzer Background	1.436	1.436			
Analyzer Coefficient	1.016	1.016			

Analyzer make T400 Analyzer serial # 824

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.1	N/A
as found span	5000	933.10	397.5	400.0	0.994
calibrator zero	5000	0.00	0.0	-0.1	N/A
high point	5000	713.5	397.50	400.0	0.994
second point	5000	495.5	270.30	271.2	0.997
third point	5000	260.7	140.50	139.0	1.011
calibrator zero	5000	0.00	0.0	0.0	N/A
as left zero	5000	0.00	0.0	0.0	N/A
as left span	5000	714.70	397.5	405.3	0.981
Average Correction Factor					1.000

Corrected As found 400.1 Previous response 401.3 % change 0.3%

Notes:

No Maintenance Done, No adjustments made, Filter changed out

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

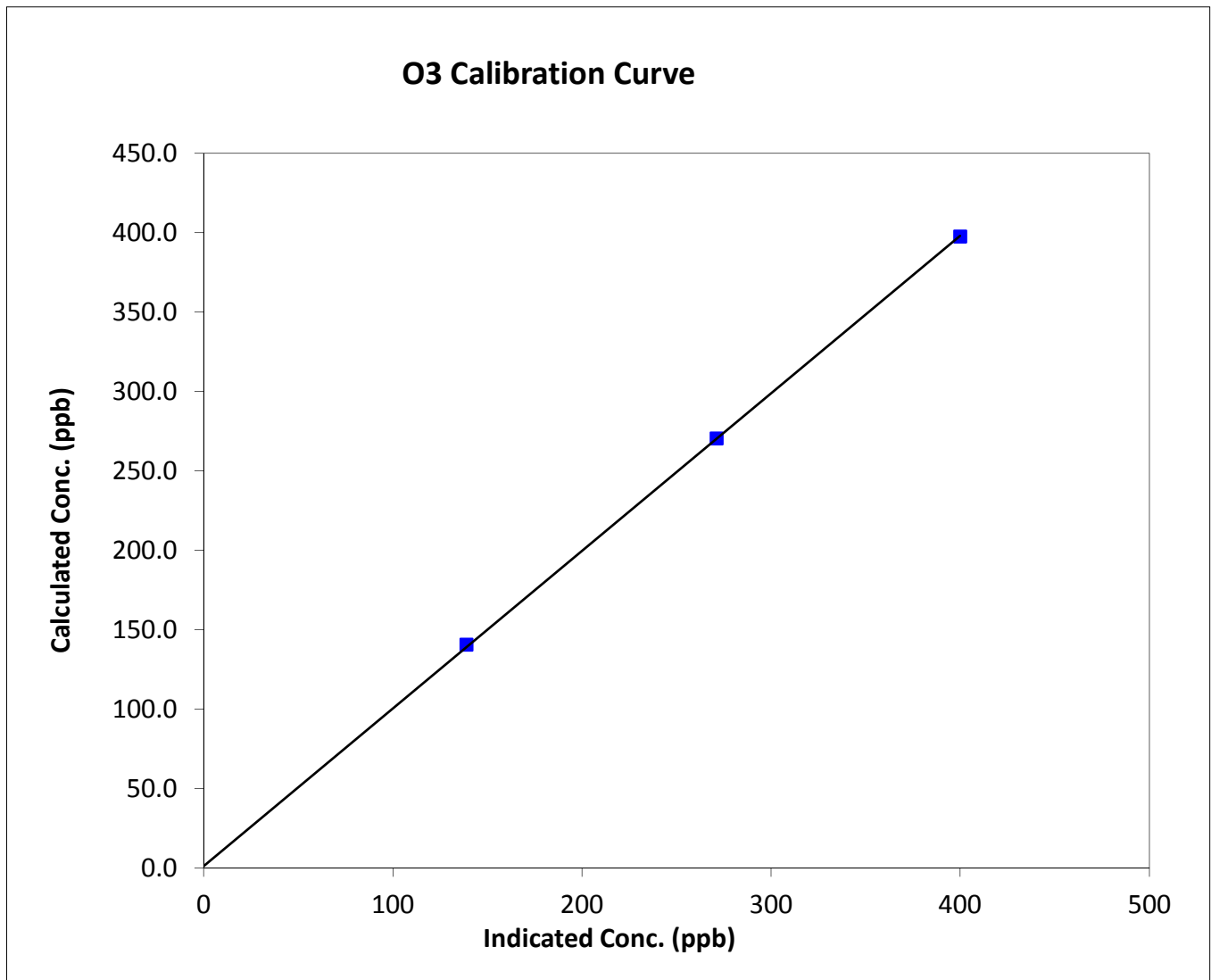
O₃ Calibration Summary

Station Information

Calibration Date	June-11-14	Previous Calibration	May 16, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:10	End Time (MST)	11:06
Analyzer make	T400	Analyzer serial #	824

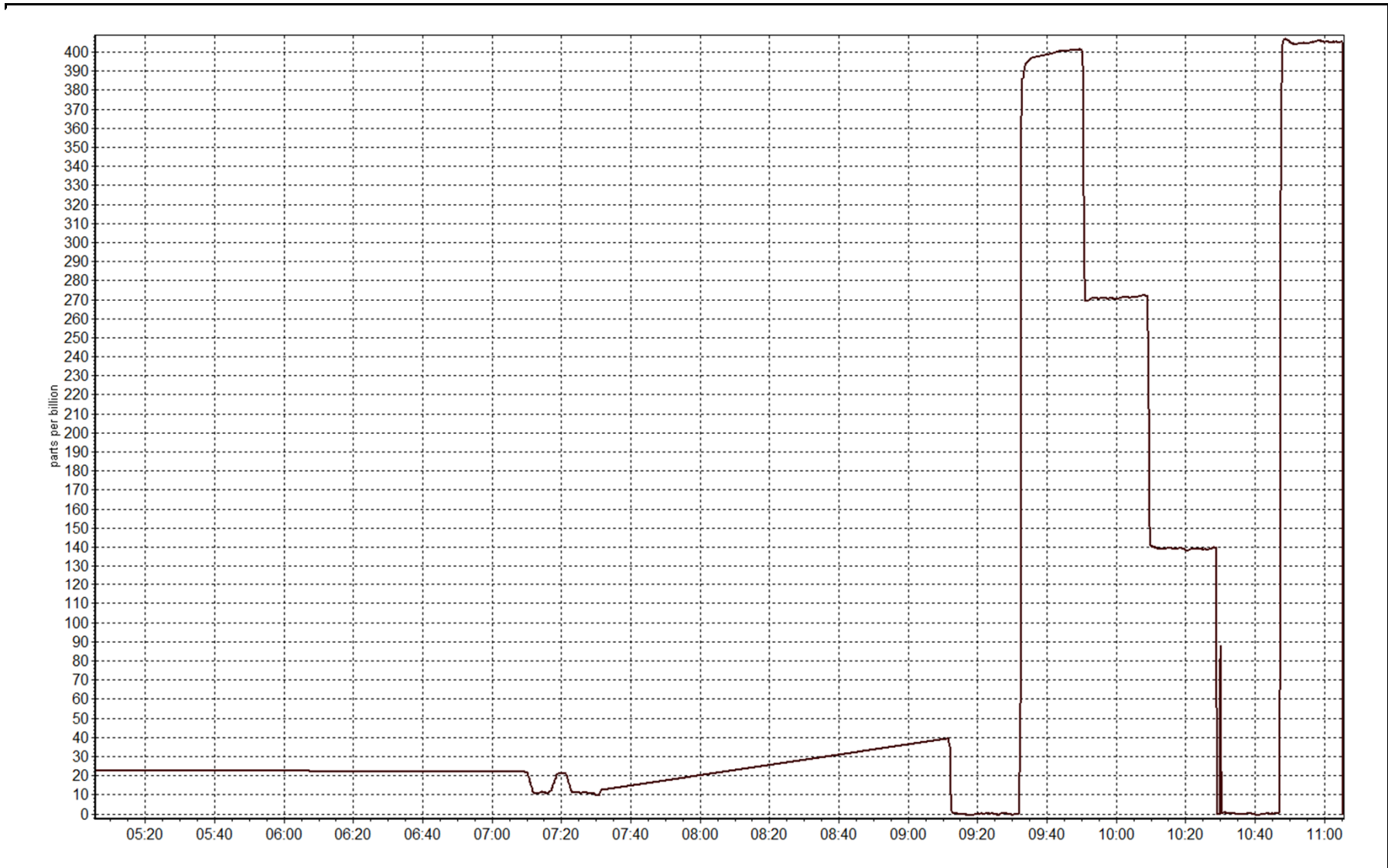
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999960
397.5	400.0	0.9938		
270.3	271.2	0.9967	Slope	0.992534
140.5	139.0	1.0108		
			Intercept	1.052178



O3 Calibration Plot

Date: June 11, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	June 10, 2014	Previous Calibration	May 15, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	reinstall		
Start Time (MST)	7:45	End Time (MST)	12:03
Barometric Pressure	mmHg	Station Temperature	21.0 Deg C
Calibrator	API T700	Serial Number	997
NO Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	49.7 ppm	Cal Gas Serial #	SA130010A

DACS Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 6894

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.999657	0.997799	1.001676
	Data Offset	-1.281904	-0.439817	0.645145
After	Data Slope	0.995768	0.997432	0.998456
	Data Offset	-0.258283	0.377693	0.129707
Channel #				
Voltage Range				

Analyzer Information

Analyzer make/model API T200 Analyzer serial # 833

Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.947	ppb	0.960	ppb
NOX coefficient	0.948	ppb	0.960	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	-2.2		0.2	
NOX bkgrnd	-1.7		0.9	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	317.0	Deg C	317.0	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	71.0	ccm	71.0	ccm
R Cell Press	4.9	mmHg	4.9	mmHg
Sample Flow	443	ccm	443	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:

June 10, 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	1.2	0.9	0.4	N/A	N/A
as found span	5000	60.4	600.4	600.4	0.0	592.0	591.0	1.0	1.0141	1.0159
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	-0.1	N/A	N/A
high point	5000	60.4	600.4	600.4	0.0	602.6	601.7	0.9	0.9963	0.9978
second point	5000	30.2	300.2	300.2	0.0	303.0	301.0	2.3	0.9907	0.9973
third point	5000	15.1	150.1	150.1	0.0	150.8	148.6	2.2	0.9955	1.0099
calibrator zero	6000	0.0	0.0	0.0	0.0	0.3	0.3	0.0	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	0.3	0.3	0.0	N/A	N/A
as left span	5000	60.4	600.4	204.0	396.4	601.0	202.0	399.0	0.9990	1.0099
Average Correction Factor									0.9942	1.0017

Corrected As found

NO_x= 590.8

NO= 590.1

Percent Change

NO_x= 1.9%

NO= 2.0%

Previous Response

NO_x= 601.9

NO= 602.1

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			-0.1			N/A	
1st NO ₂ (300)	N/A	204.0	397.5	602.0	204.0	397.5	0.9854	1.0000	1.0000	100.0%
2nd NO ₂ (200)	N/A	331.2	270.3	602.8	331.2	271.6	0.9841	1.0000	0.9952	100.5%
3rd NO ₂ (100)	N/A	461.0	140.5	601.4	461.0	140.0	0.9864	1.0000	1.0036	99.6%
4th NO ₂ (0)	601.5	N/A	1.8	603.3	601.5	1.8	0.9833	1.0000	N/A	N/A
Average Correction Factor							0.9848	1.0000	0.9996	100.0%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

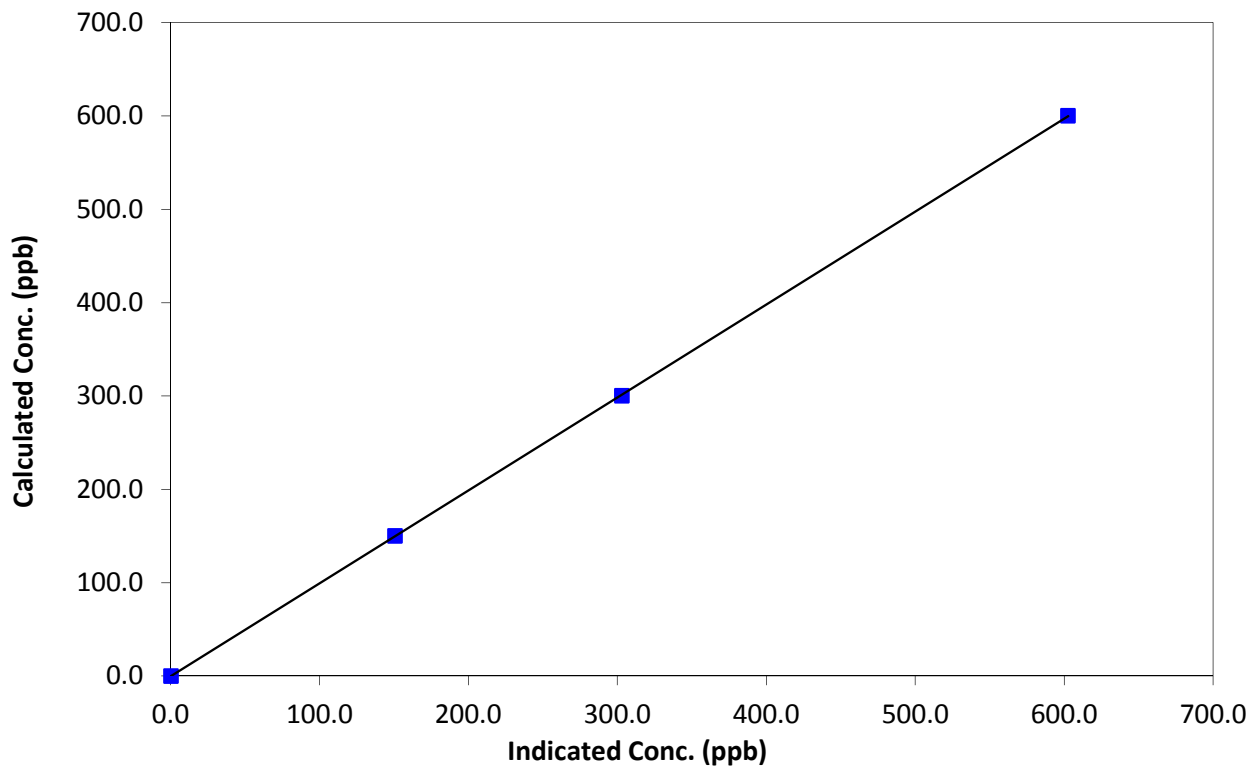
Station Information

Calibration Date	June 10, 2014	Previous Calibration	May 15, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:45	End Time (MST)	12:03
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999991
600.4	602.6	0.9963		
300.2	303.0	0.9907	Slope	0.995768
150.1	150.8	0.9955		
0.0	0.3	0.0000	Intercept	-0.258283

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

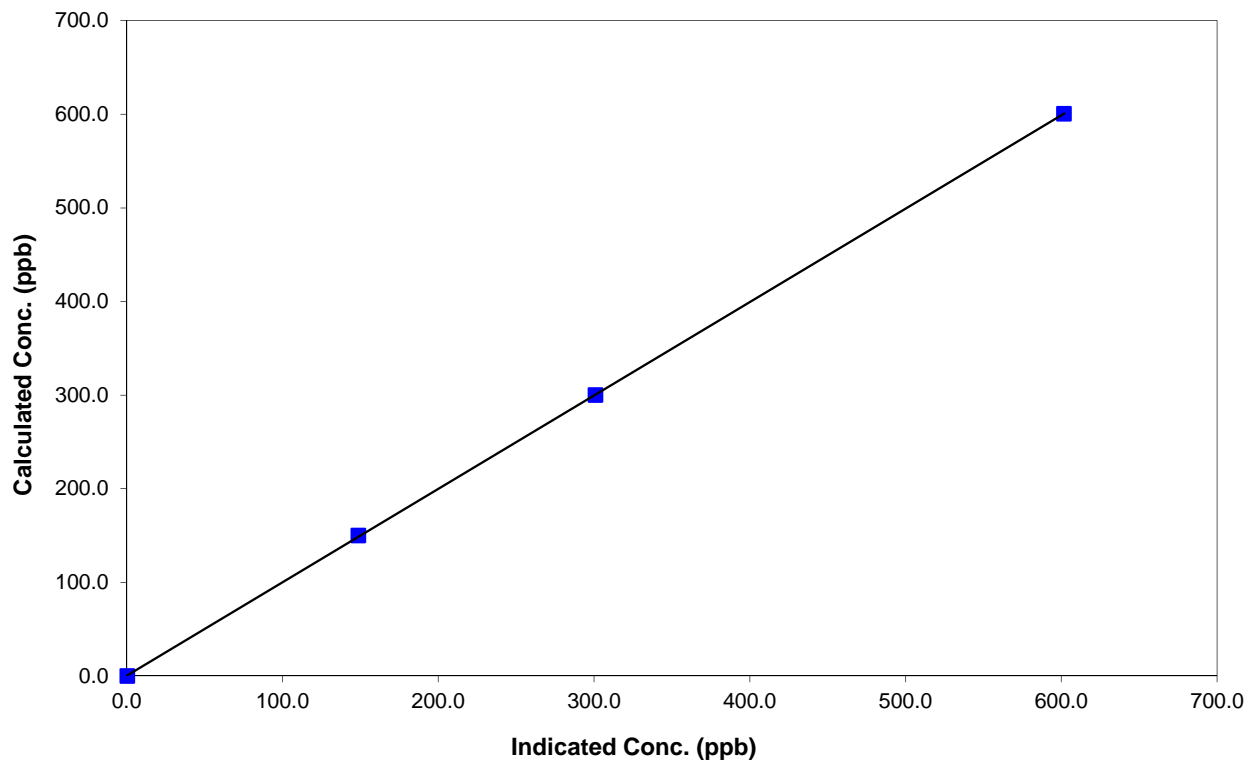
Station Information

Calibration Date	June 10, 2014	Previous Calibration	May 15, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:45	End Time (MST)	12:03
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999989
600.4	601.7	0.9978		
300.2	301.0	0.9973	Slope	0.997432
150.1	148.6	1.0099		
0.0	0.3	0.0000	Intercept	0.377693

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

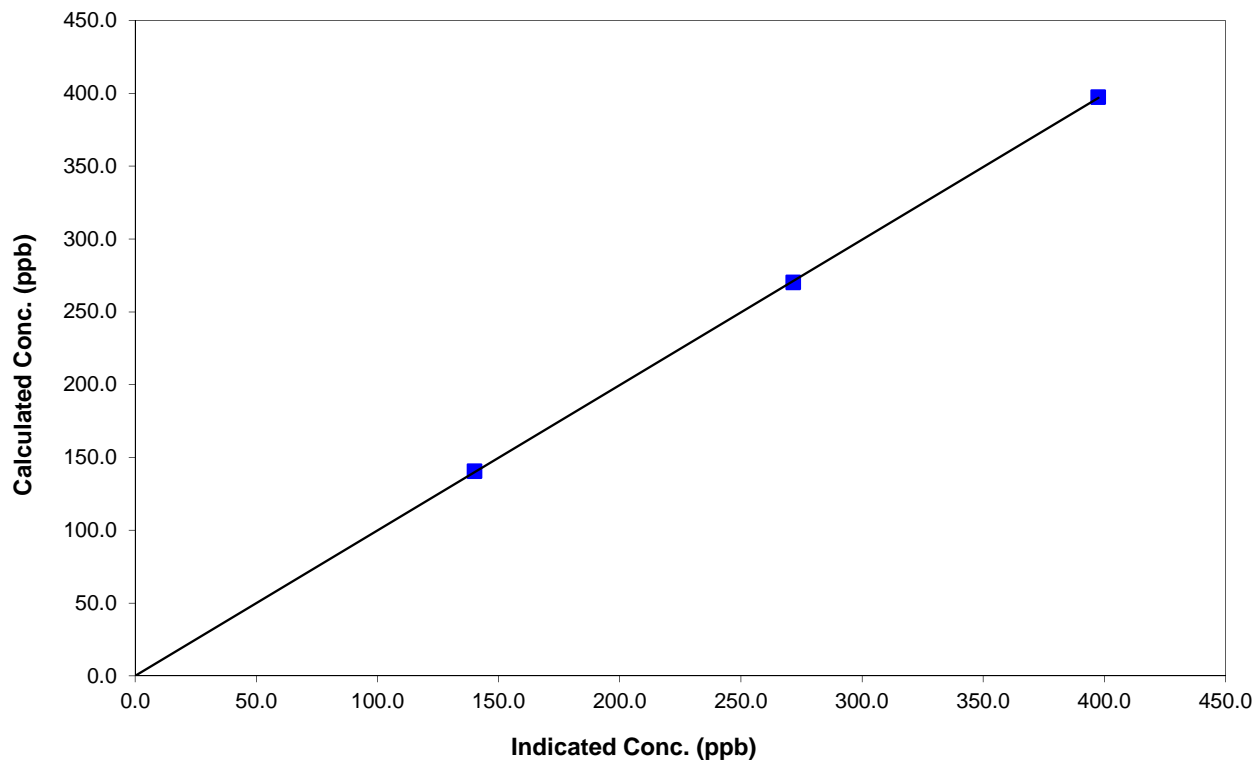
Station Information

Calibration Date	June 10, 2014	Previous Calibration	May 15, 2014
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	7:45	End Time (MST)	12:03
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	0.999982
397.5	397.5	1.0000		
270.3	271.6	0.9952	Slope	0.998456
140.5	140.0	1.0036		
			Intercept	0.129707

NO₂ Calibration Curve



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 500
CENOVUS
CHRISTINA LAKE
JUNE 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

July 24, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - GENOVUS CHRISTINA LAKE (AMS 500)
 JUNE 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	372	22	25	99.24	8	0	1	0
H2S (ppb) Average	377	19	20	99.75	2	0	0	0
NO2 (ppb) Average	375	22	22	100.00	14	0	3	0
NO (ppb) Average	375	22	22	100.00	11	0	3	0
NOX (ppb) Average	375	22	22	100.00	25	0	5	0
Temperature 2 m (C) Average	394	0	0	100.00	24.5	0	17.7	0
Relative Humidity (%) Average	394	0	0	100.00	97	0	88.0	10
Wind Speed 10 m (km/h) Average	394	0	0	100.00	23	0	17.0	0
Wind Direction 10 m (deg) Average	394	0	0	100.00	0	150	0.0	14

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - GENOVUS CHRISTINA LAKE (AMS 500)
 JUNE 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	372	0.5	1	-	0	0	0	0	0	1	8
H2S (ppb) Average	377	0.3	0	-	0	0	0	0	0	0	2
NO2 (ppb) Average	375	1.7	2	-	0	0	0	1	2	4	14
NO (ppb) Average	375	1.1	1	-	0	0	1	1	1	2	11
NOX (ppb) Average	375	2.8	3	-	0	1	1	2	4	6	25
Temperature 2 m (C) Average	394	12.33	5.3	-	1.5	5.7	8.6	11.3	16.4	20.7	24.5
Relative Humidity (%) Average	394	67	22	-	22	32	47	73	88	94	97
Wind Speed 10 m (km/h) Average	394	8.9	5	-	0	3	5	8	12	15	23
Wind Direction 10 m (deg) Average	394	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
JUNE 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	02 Jun 2014 03:00	02 Jun 2014 03:00	1	Stabilization after daily span
SO2	03 Jun 2014 20:00	03 Jun 2014 20:00	1	Unstable operation - excessive baseline drift
SO2	08 Jun 2014 03:00	08 Jun 2014 03:00	1	Stabilization after daily span
H2S	03 Jun 2014 15:00	03 Jun 2014 15:00	1	Unstable operation - excessive baseline drift
ALL PARAMETERS	17 Jun 2014 11:00	30 Jun 2014 24:00	-	Not in Service

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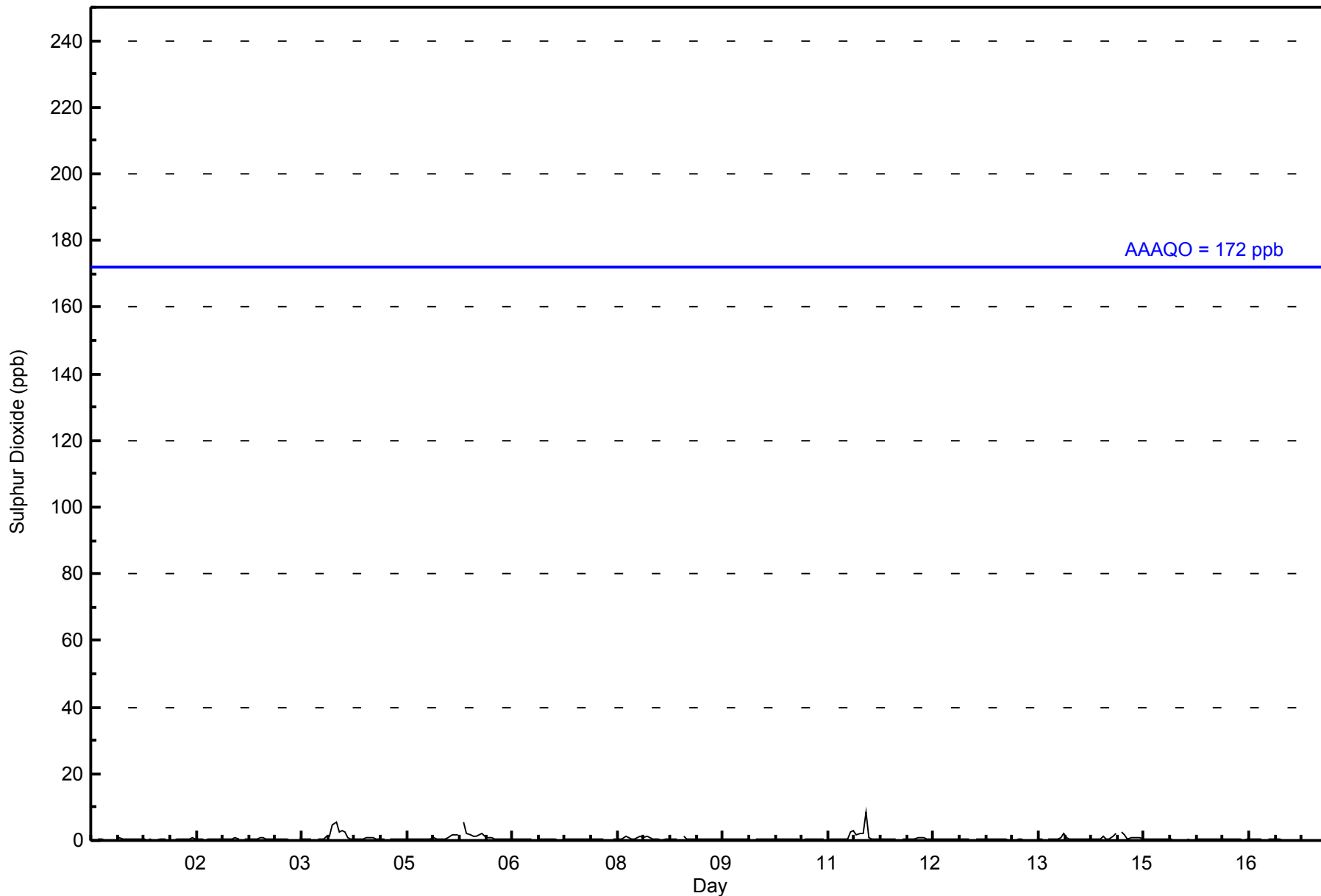


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 397																	
Maximum Value: 8 ppb on Jun 11 15:00										Maximum Daily Average: 1.2 ppb on Jun 4										Hours of Data: 372							
Minimum Value: 0 ppb on Jun 13 22:00										Minimum Daily Average: 0.2 ppb on Jun 13										Hours of Missing Data: 25							
Maximum Diurnal Average: 0.9 ppb at hour 3										Minimum Diurnal Average: 0.3 ppb at hour 22										Hours of Calibration: 22							
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 = 5										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-Jun	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
2-Jun	0	Z	UO	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1	
3-Jun	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	UO	1	0	0	0	0.4	1	
4-Jun	0	Z	0	0	0	1	1	5	5	3	3	1	1	0	0	0	0	0	1	1	1	0	0	0	1.2	5	
5-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	1	2	1	0.5	2
6-Jun	2	Z	5	2	2	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.0	5	
7-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.3	1	
8-Jun	0	Z	UO	0	0	0	0	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1	
9-Jun	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
10-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
11-Jun	0	Z	0	0	0	0	0	0	0	3	3	2	2	2	8	1	0	0	0	0	0	0	0	0	1.1	8	
12-Jun	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1	
13-Jun	0	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-Jun	0	Z	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0.6	2	
15-Jun	2	Z	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2	
16-Jun	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
17-Jun	0	Z	0	0	0	0	0	0	C	C	C	C	C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	0	
										0.5 -- 0.9 0.5 0.4 0.5 0.5 0.9 0.9 0.8 0.7 0.6 0.5 0.5 0.9 0.4 0.3 0.3 0.3 0.3 0.4 0.3 0.4 0.5										Diurnal Average							
										2 -- 5 2 2 1 1 5 5 3 3 3 2 2 8 1 1 1 1 1 1 1 1 2 1										Diurnal Maximum							
Z - zerospan C - Calibration UO - Unstable Operation NS - Not in Service																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																											



WBEA NETWORK
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - June 2014





WBEA NETWORK
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	372	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: 372

Total Number of Hours: 408



WBEA NETWORK
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - June 2014

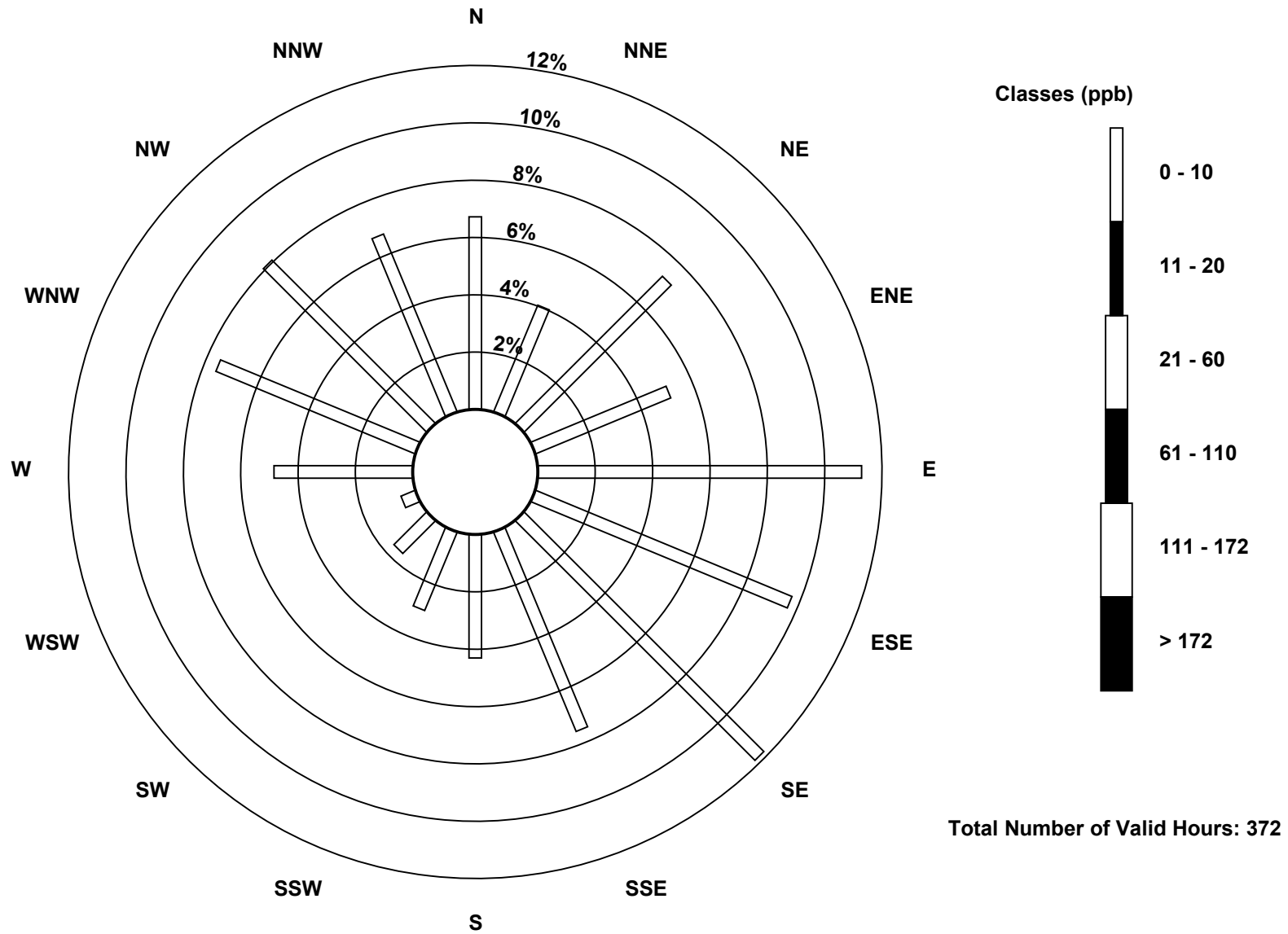
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	25	15	27	19	42	36	44	28	16	11	6	2	18	28	30	25	372
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	25	15	27	19	42	36	44	28	16	11	6	2	18	28	30	25	372

Total Number of Valid Hours: 372

Total Number of Hours: 408

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

**Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake (AMS500)**

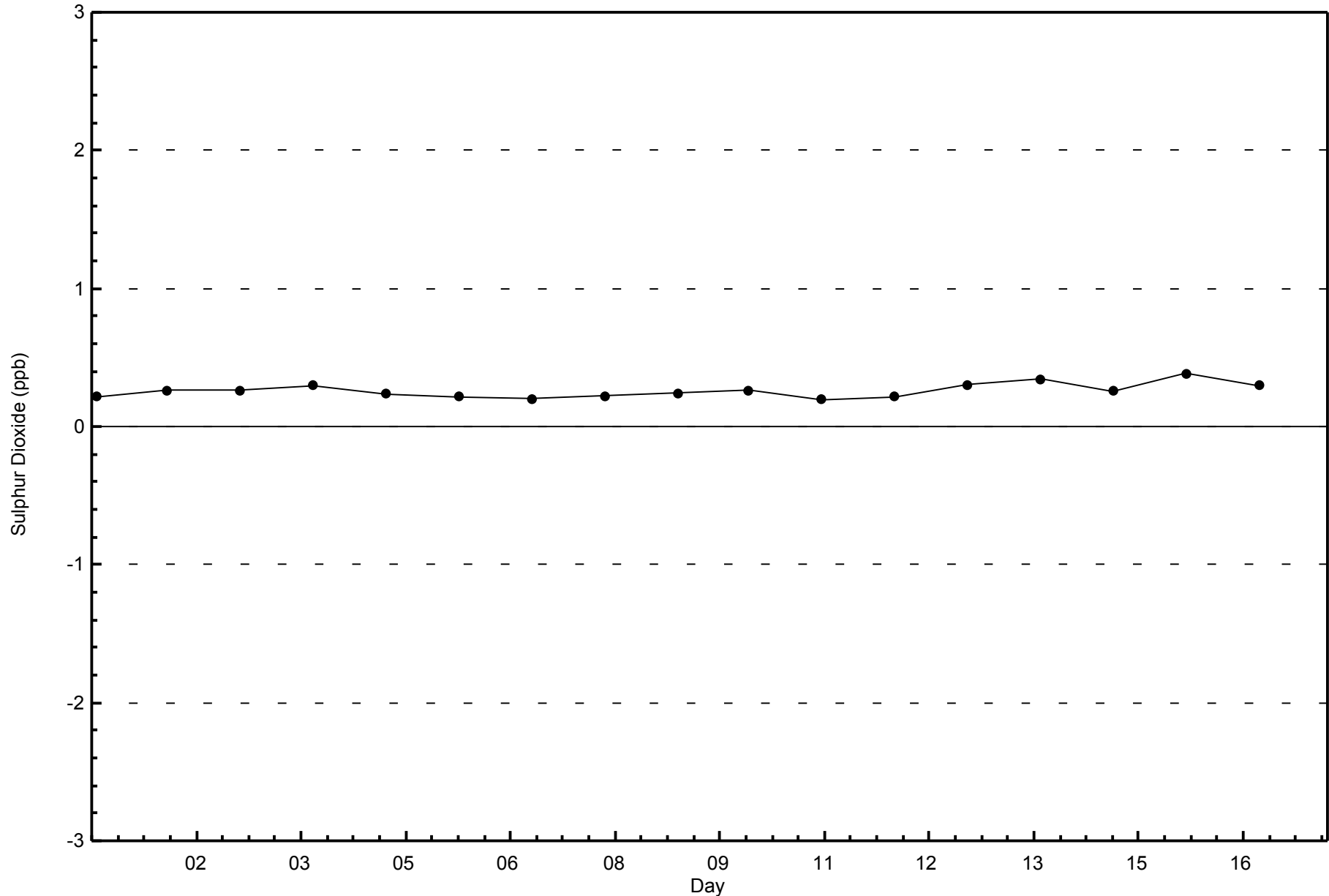




WBEA NETWORK

Zero Responses

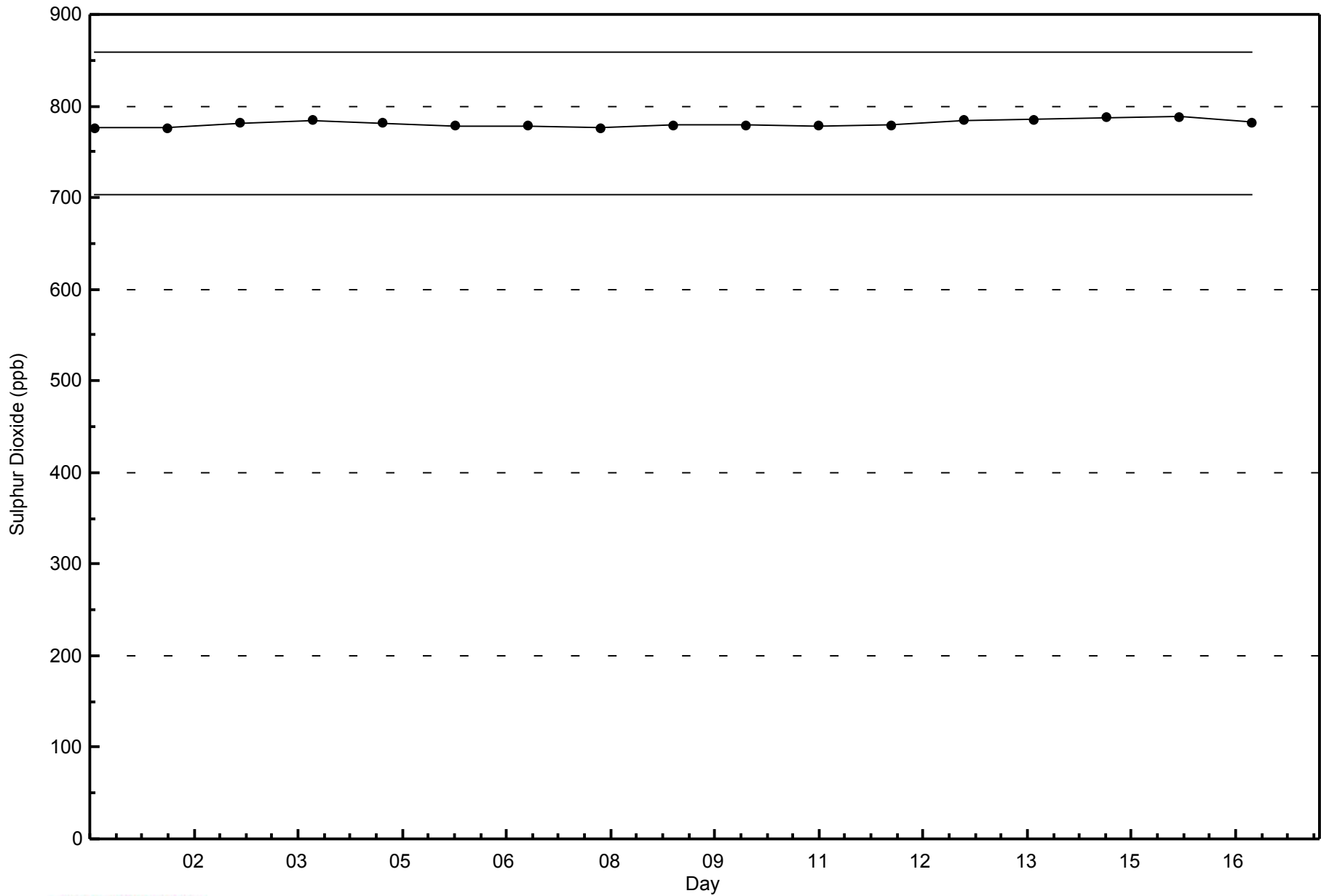
Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - June 2014





WBEA NETWORK
Span Responses

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - June 2014



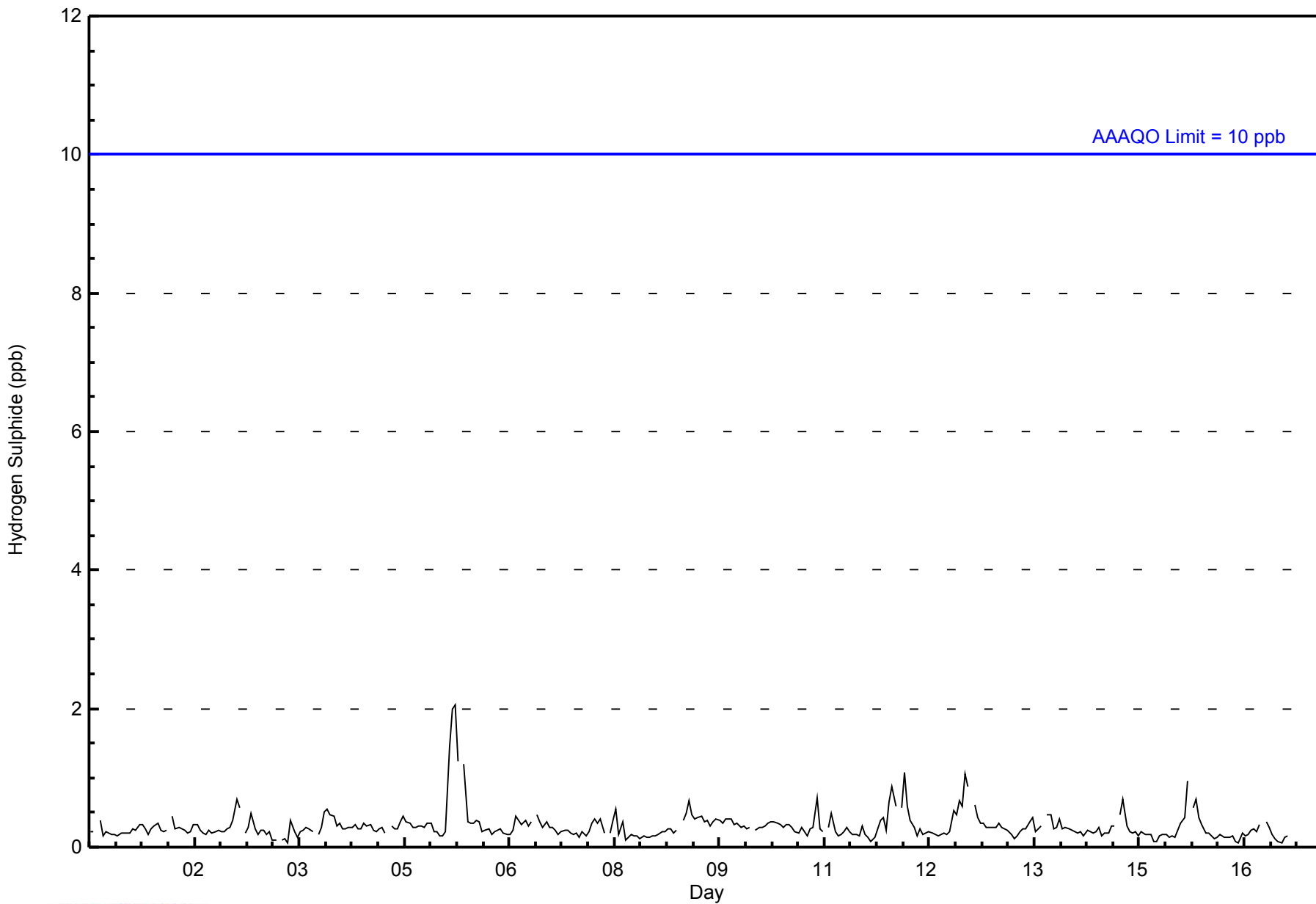


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 397																
Maximum Value: 2 ppb on Jun 6 01:00										Maximum Daily Average: 0.4 ppb on Jun 6										Hours of Data: 377						
Minimum Value: 0 ppb on Jun 17 09:00										Minimum Daily Average: 0.2 ppb on Jun 8										Hours of Missing Data: 20						
Maximum Diurnal Average: 0.5 ppb at hour 1										Minimum Diurnal Average: 0.2 ppb at hour 18										Hours of Calibration: 19						
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: 99.8						
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-Jun	0	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-Jun	0	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-Jun	1	1	Z	0	0	0	0	0	0	0	0	0	0	UO	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Jun	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
5-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.4	2
6-Jun	2	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
7-Jun	0	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-Jun	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
9-Jun	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
10-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
11-Jun	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
12-Jun	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0.4	1
13-Jun	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
14-Jun	0	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-Jun	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
16-Jun	0	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
17-Jun	0	0	Z	0	0	0	0	0	0	0	C	C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	0
										0.5 0.4 -- 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.4 0.5										Diurnal Average						
										2 1 -- 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 2										Diurnal Maximum						
Z - zerospan			C - Calibration			UO - Unstable Operation			NS - Not in Service																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



WBEA NETWORK
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - June 2014





WBEA NETWORK
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	377	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: 377

Total Number of Hours: 408



WBEA NETWORK
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - June 2014

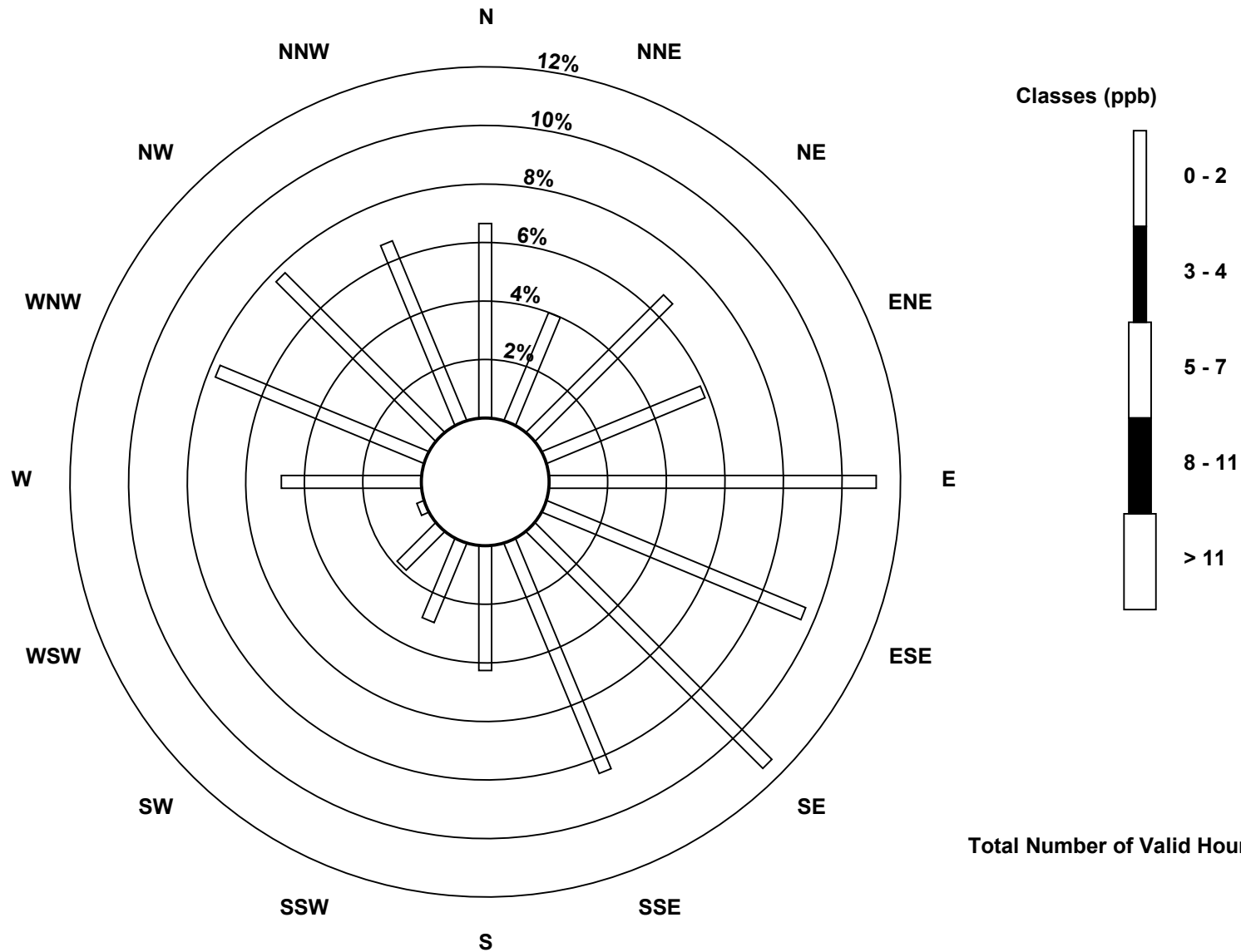
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	25	15	25	22	42	36	43	32	16	11	7	1	18	29	29	25	376
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	15	25	22	42	36	43	32	16	11	7	1	18	29	29	25	376

Total Number of Valid Hours: 376

Total Number of Hours: 408

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

**Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake (AMS500)**



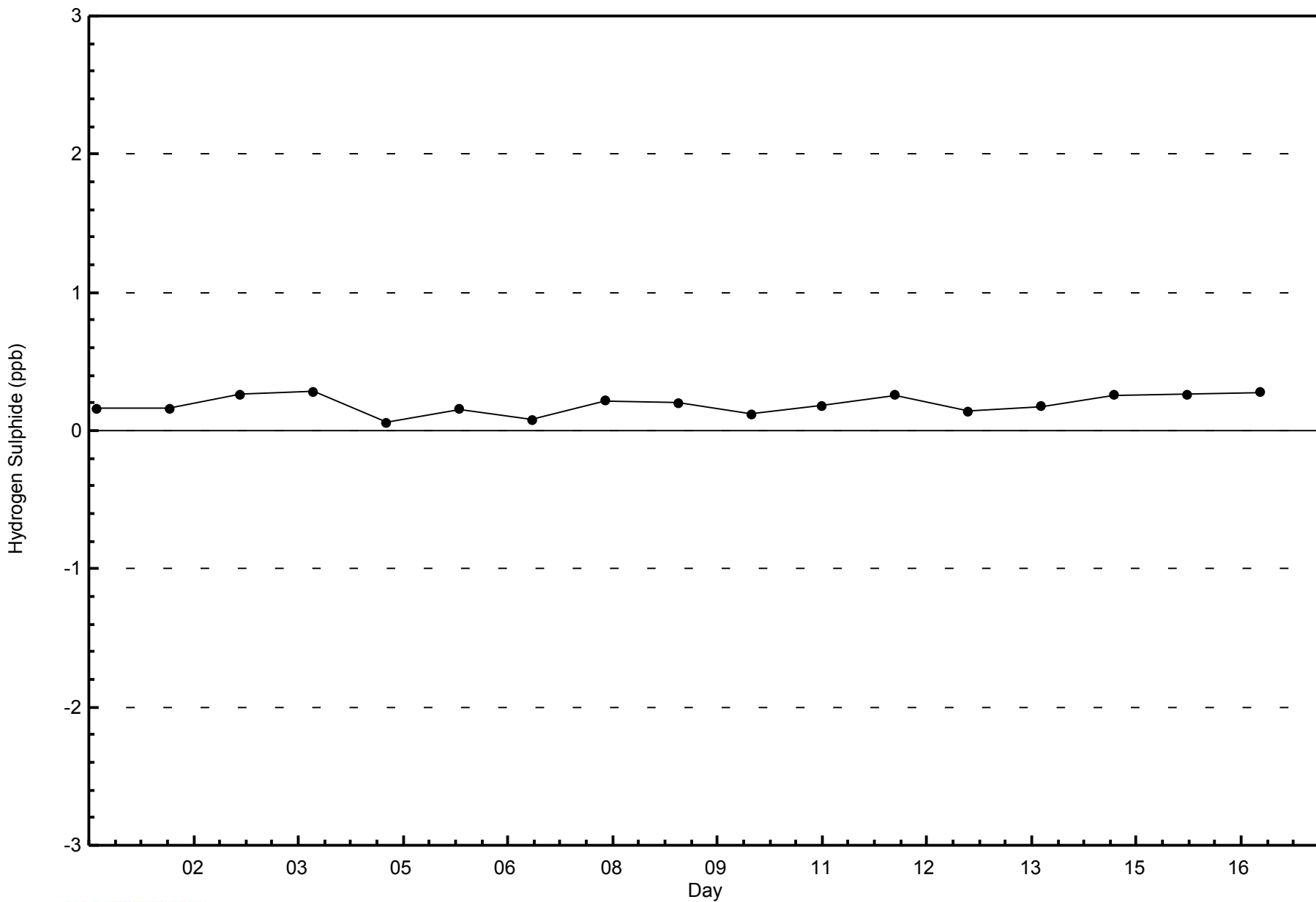
Total Number of Valid Hours: 376



WBEA NETWORK

Zero Responses

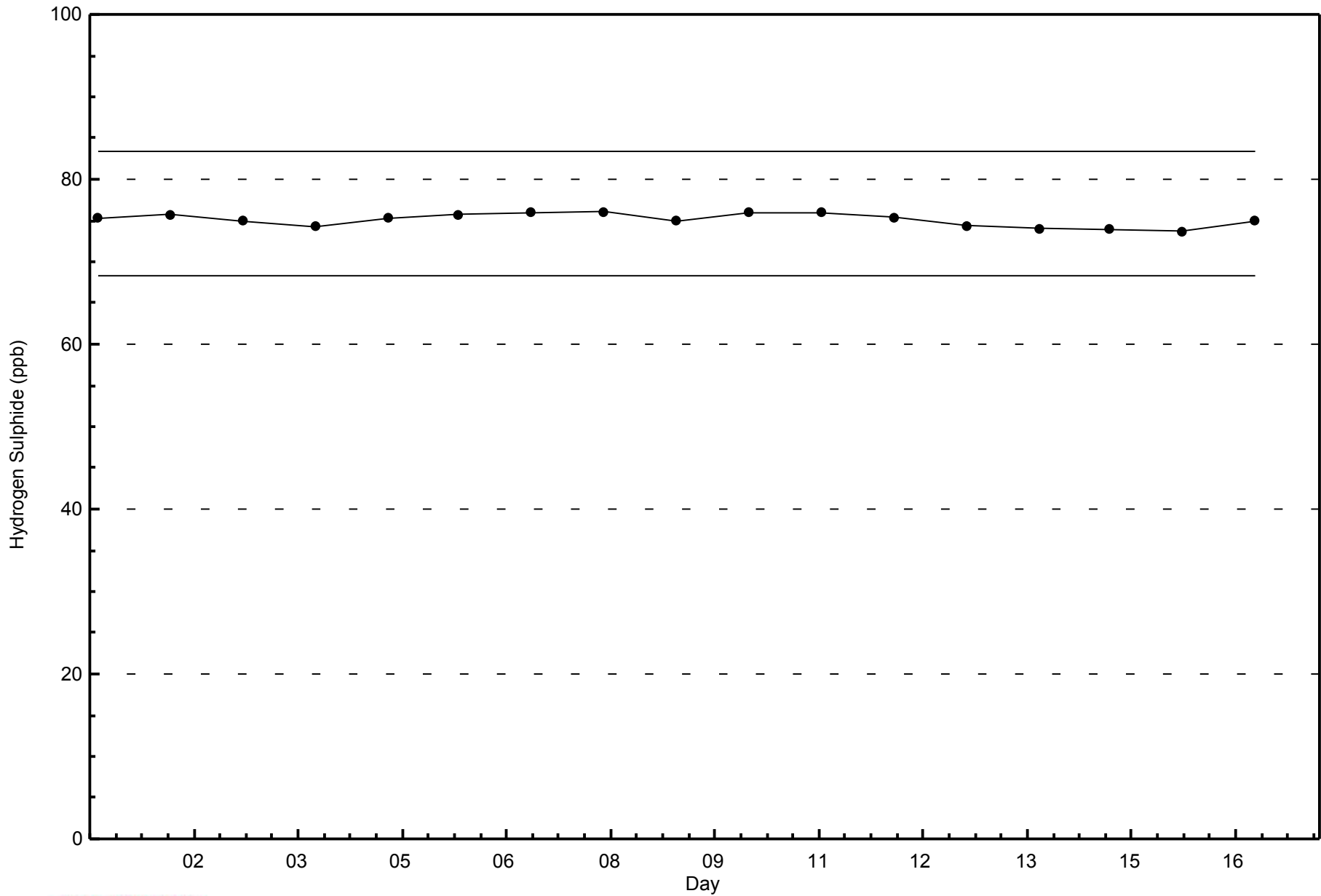
Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - June 2014





WBEA NETWORK
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - June 2014



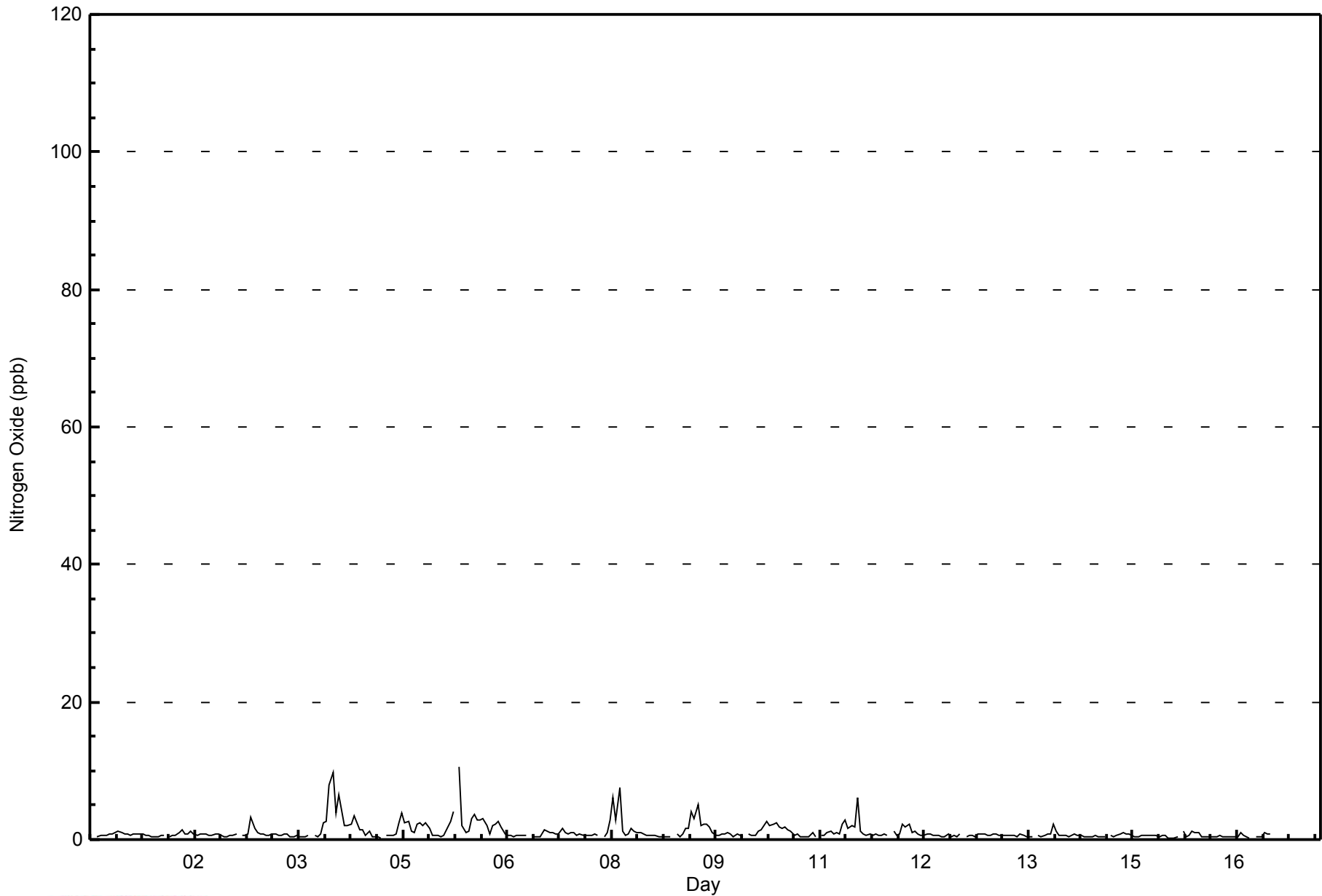


Maximum Value: 11 ppb on Jun 6 03:00														Maximum Daily Average: 2.5 ppb on Jun 4														Hours in Service: 397			
Minimum Value: 0 ppb on Jun 15 22:00														Minimum Daily Average: 0.5 ppb on Jun 15														Hours of Data: 375			
Maximum Diurnal Average: 2.4 ppb at hour 8														Minimum Diurnal Average: 0.5 ppb at hour 22														Hours of Missing Data: 22			
Monthly Average: 1.1 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 7														Hours of Calibration: 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-Jun	1	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0.7	1					
2-Jun	1	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0.7	1					
3-Jun	1	Z	1	1	1	3	2	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0.8	3					
4-Jun	1	Z	1	0	1	2	3	8	10	4	7	4	2	2	3	2	1	1	1	1	1	1	0	0	2.5	10					
5-Jun	0	Z	1	1	1	1	2	4	3	3	1	1	2	3	2	3	2	1	1	1	0	1	2	3	1.5	4					
6-Jun	4	Z	11	2	1	1	3	4	3	3	3	2	1	2	3	2	1	1	1	1	1	1	1	1	2.2	11					
7-Jun	1	Z	1	0	0	1	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0.8	2					
8-Jun	1	Z	0	1	3	6	3	7	1	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0	1.5	7					
9-Jun	0	Z	1	0	1	2	2	4	3	5	2	2	2	2	1	1	1	1	1	1	1	0	1	1	1.5	5					
10-Jun	1	Z	1	1	1	1	1	2	3	2	2	3	2	2	2	2	1	1	1	1	0	0	0	1	1.3	3					
11-Jun	0	Z	1	1	1	1	1	1	1	2	3	2	2	2	6	1	1	1	1	1	1	1	1	1	1.3	6					
12-Jun	1	Z	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	0	0.9	2					
13-Jun	1	Z	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0.6	1					
14-Jun	0	Z	1	0	1	1	1	2	1	1	1	0	1	1	1	1	1	1	0	0	0	1	0	0	0.7	2					
15-Jun	0	Z	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	1	1	0	0	0	0.5	1					
16-Jun	0	Z	1	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0.6	1					
17-Jun	0	Z	0	0	0	1	1	1	C	C	C	C	C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	1					
																												Diurnal Average			
0.7														--														11			
																												Diurnal Maximum			
4														--														2			
Z - zerospan			C - Calibration				NS - Not in Service																								



WBEA NETWORK
Hourly Averages

Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - June 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	375	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: 375

Total Number of Hours: 408



WBEA NETWORK
Frequency Distribution

Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - June 2014

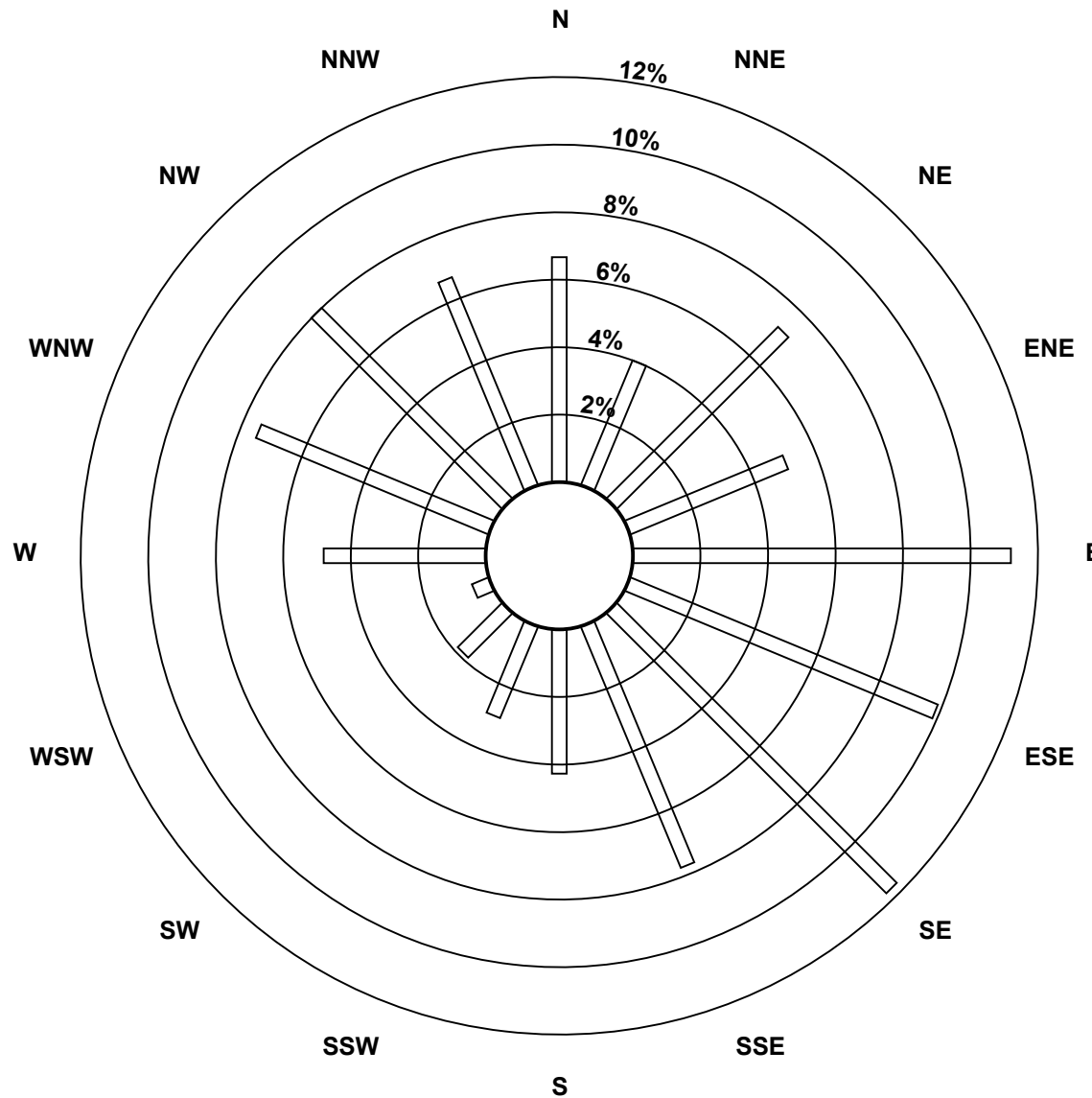
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	25	15	27	19	42	37	44	29	16	11	7	2	18	28	30	25	375
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	15	27	19	42	37	44	29	16	11	7	2	18	28	30	25	375

Total Number of Valid Hours: 375

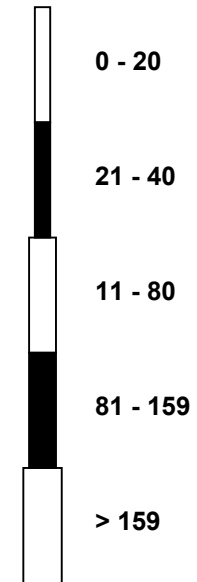
Total Number of Hours: 408

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

**Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake (AMS500)**



Classes (ppb)



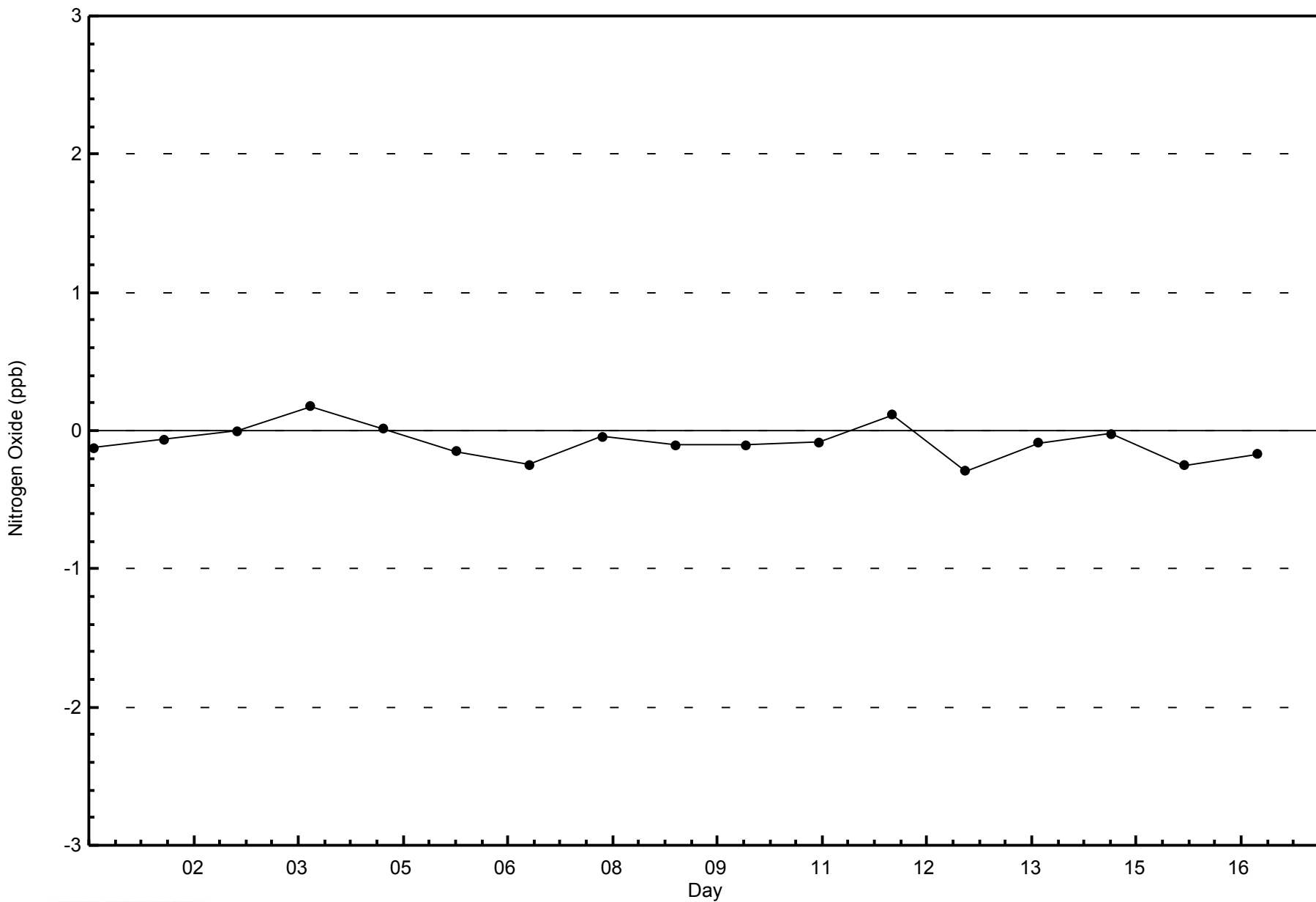
Total Number of Valid Hours: 375



WBEA NETWORK

Zero Responses

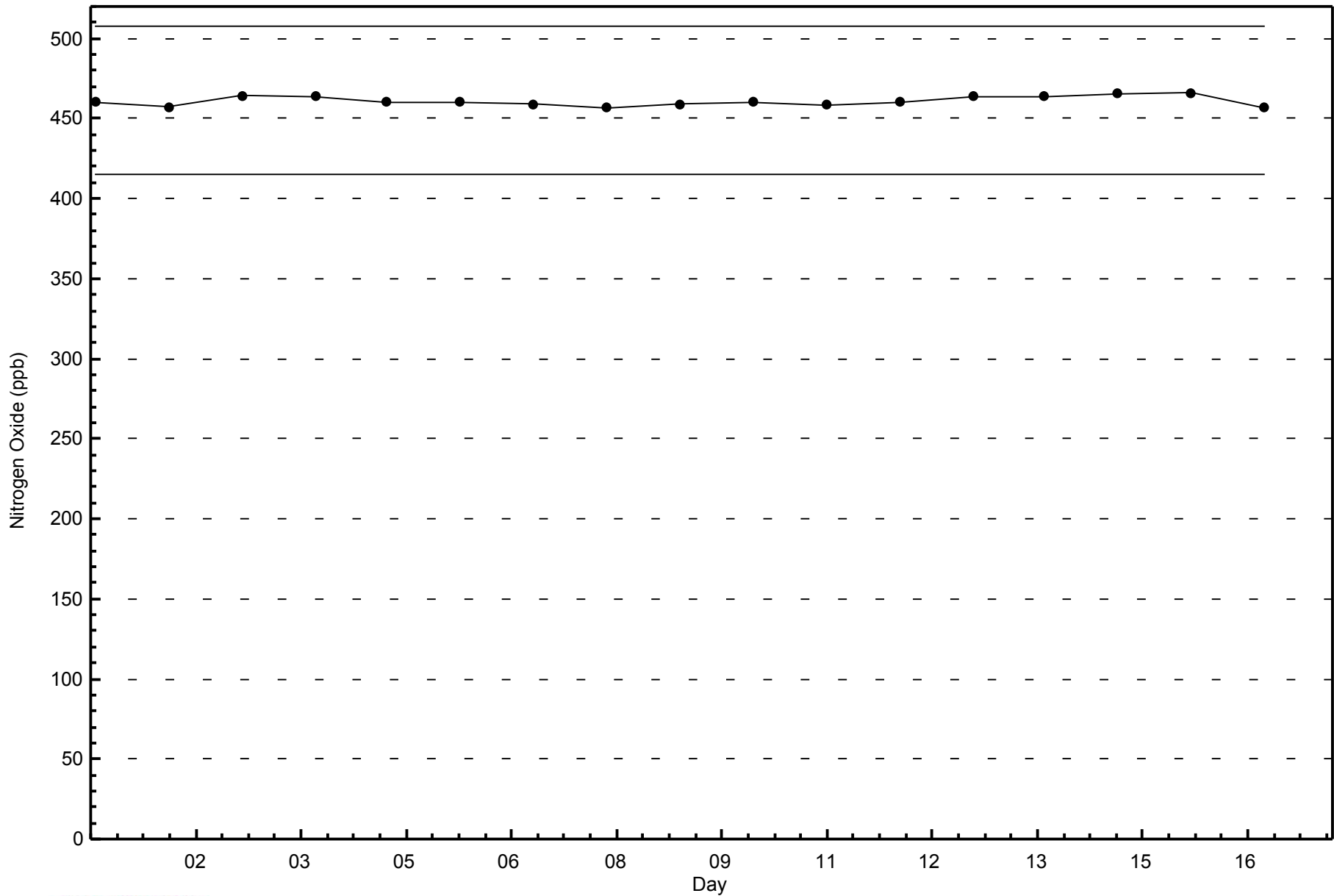
Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - June 2014





WBEA NETWORK
Span Responses

Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - June 2014



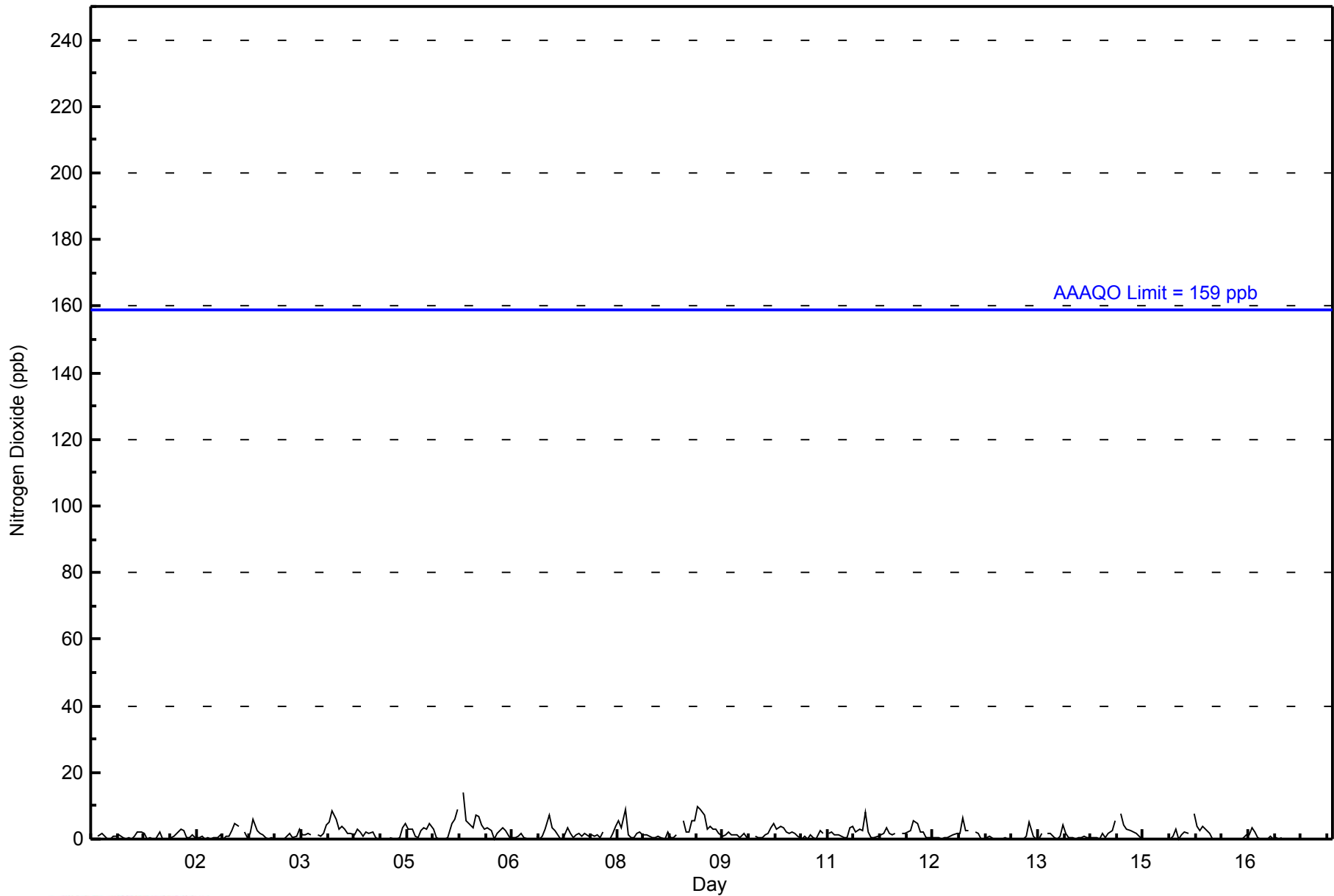


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 397																
Maximum Value: 14 ppb on Jun 6 03:00										Maximum Daily Average: 3.3 ppb on Jun 6										Hours of Data: 375						
Minimum Value: 0 ppb on Jun 1 14:00										Minimum Daily Average: 0.7 ppb on Jun 13										Hours of Missing Data: 22						
Maximum Diurnal Average: 3.6 ppb at hour 8										Minimum Diurnal Average: 0.7 ppb at hour 18										Hours of Calibration: 22						
Monthly Average: 1.7 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 4 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-Jun	6	Z	1	2	1	0	0	1	1	1	1	0	0	0	1	2	2	2	0	1	0	0	2	0	1.0	6
2-Jun	0	Z	0	1	2	3	2	1	0	1	1	0	1	0	0	0	1	1	1	0	1	1	3	5	1.0	5
3-Jun	4	Z	2	1	2	6	2	2	1	0	0	0	0	0	0	1	2	0	1	3	1	1	2	1.4	6	
4-Jun	1	Z	1	1	2	4	5	8	6	3	4	3	2	2	1	3	2	1	2	2	2	1	0	0	2.4	8
5-Jun	0	Z	1	0	0	0	3	5	3	3	1	1	3	3	3	5	3	1	0	0	0	1	5	6	1.9	6
6-Jun	9	Z	14	5	4	4	7	7	4	3	4	3	0	2	3	3	2	0	0	0	1	2	0	0	3.3	14
7-Jun	0	Z	1	0	1	3	7	3	3	1	0	0	3	2	1	1	2	1	2	1	1	1	1	1	1.6	7
8-Jun	2	Z	0	2	4	6	4	9	1	1	1	2	2	1	1	1	0	1	1	1	0	2	0	1	1.8	9
9-Jun	1	Z	5	2	2	5	6	10	9	7	3	4	3	3	2	1	1	2	1	1	1	0	2	1	3.1	10
10-Jun	0	Z	1	0	0	1	2	3	5	3	4	3	2	2	2	2	1	0	1	0	1	0	0	3	1.6	5
11-Jun	2	Z	2	2	1	1	1	1	1	3	4	2	3	3	8	2	1	0	1	1	2	3	2	1	2.0	8
12-Jun	2	Z	2	2	2	3	5	5	2	2	1	0	0	1	1	0	1	0	1	1	2	2	7	2	1.8	7
13-Jun	3	Z	2	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	5	1	0	0	0.7	5
14-Jun	2	Z	2	2	1	0	1	4	2	0	0	0	0	1	1	0	0	1	0	0	2	0	2	3	1.0	4
15-Jun	5	Z	8	4	3	2	2	2	1	0	0	0	0	0	0	0	0	0	0	1	3	0	1	2	1.5	8
16-Jun	2	Z	8	4	2	4	3	2	0	0	0	0	0	0	0	0	0	0	0	1	1	3	2	1	1.4	8
17-Jun	0	Z	0	1	0	1	0	0	C	C	C	C	C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	1
										2.3 -- 2.9 1.8 1.6 2.6 3.0 3.6 2.4 1.9 1.3 1.2 1.2 1.1 1.5 1.3 1.1 0.7 0.7 0.8 1.6 1.1 1.7 1.6										Diurnal Average						
										9 -- 14 5 4 6 7 10 9 7 4 4 3 3 8 5 3 2 2 2 5 3 7 6										Diurnal Maximum						
Z - zerospan C - Calibration NS - Not in Service																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



WBEA NETWORK
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - June 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	375	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: 375

Total Number of Hours: 408



WBEA NETWORK
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - June 2014

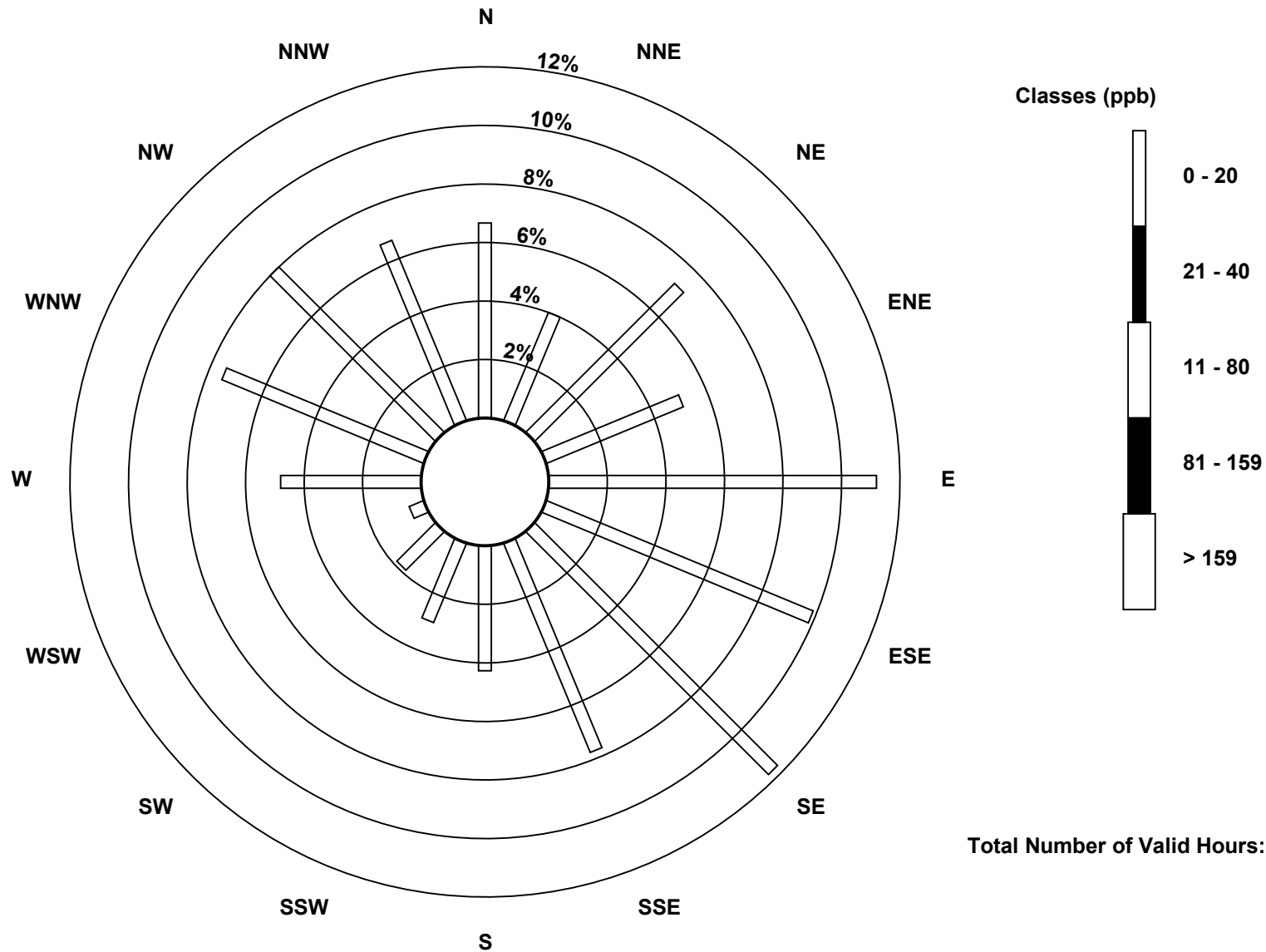
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	25	15	27	19	42	37	44	29	16	11	7	2	18	28	30	25	375
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	15	27	19	42	37	44	29	16	11	7	2	18	28	30	25	375

Total Number of Valid Hours: 375

Total Number of Hours: 408

Wood Buffalo Environmental Association
Wind Rose Jun 2014

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake (AMS500)

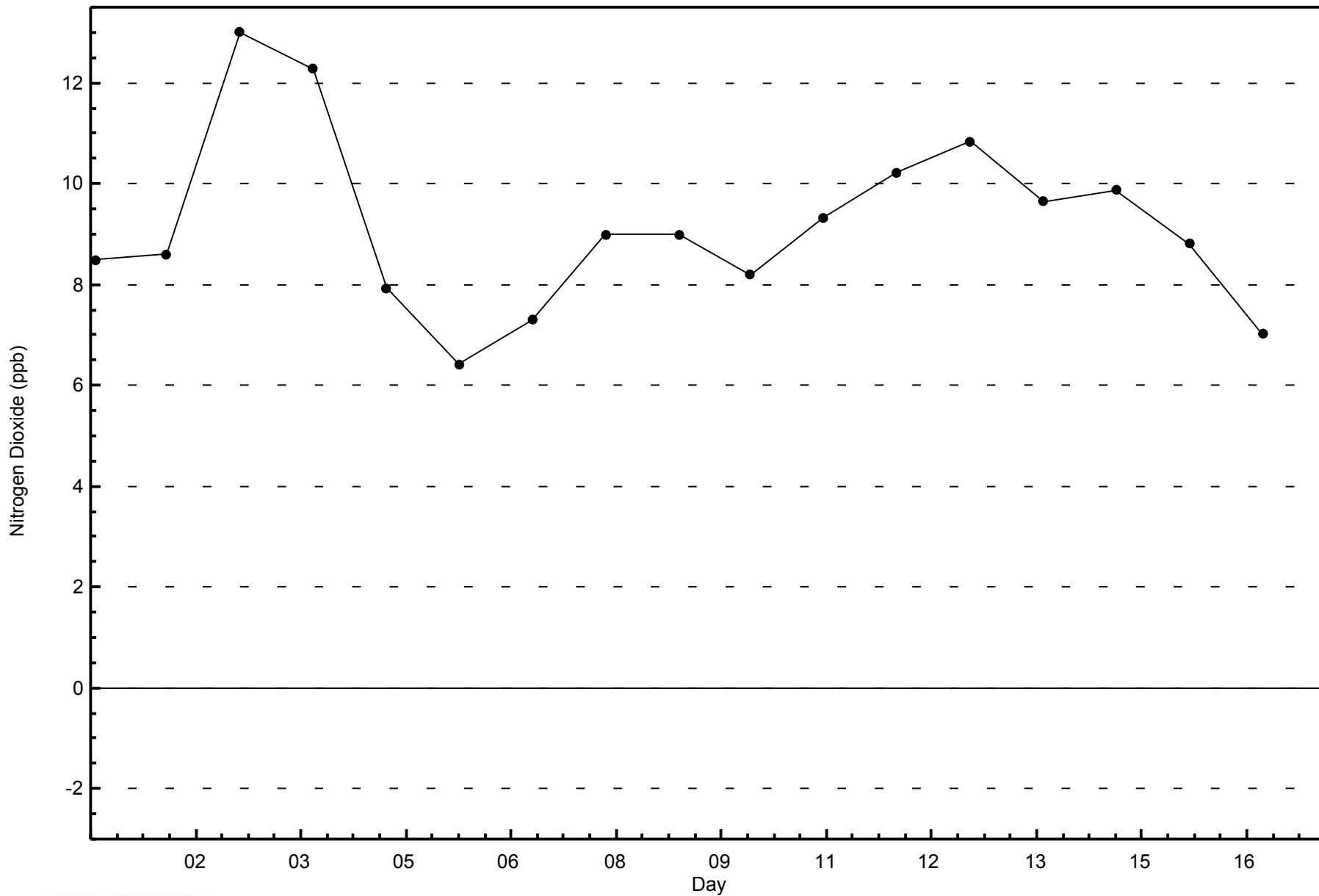




WBEA NETWORK

Zero Responses

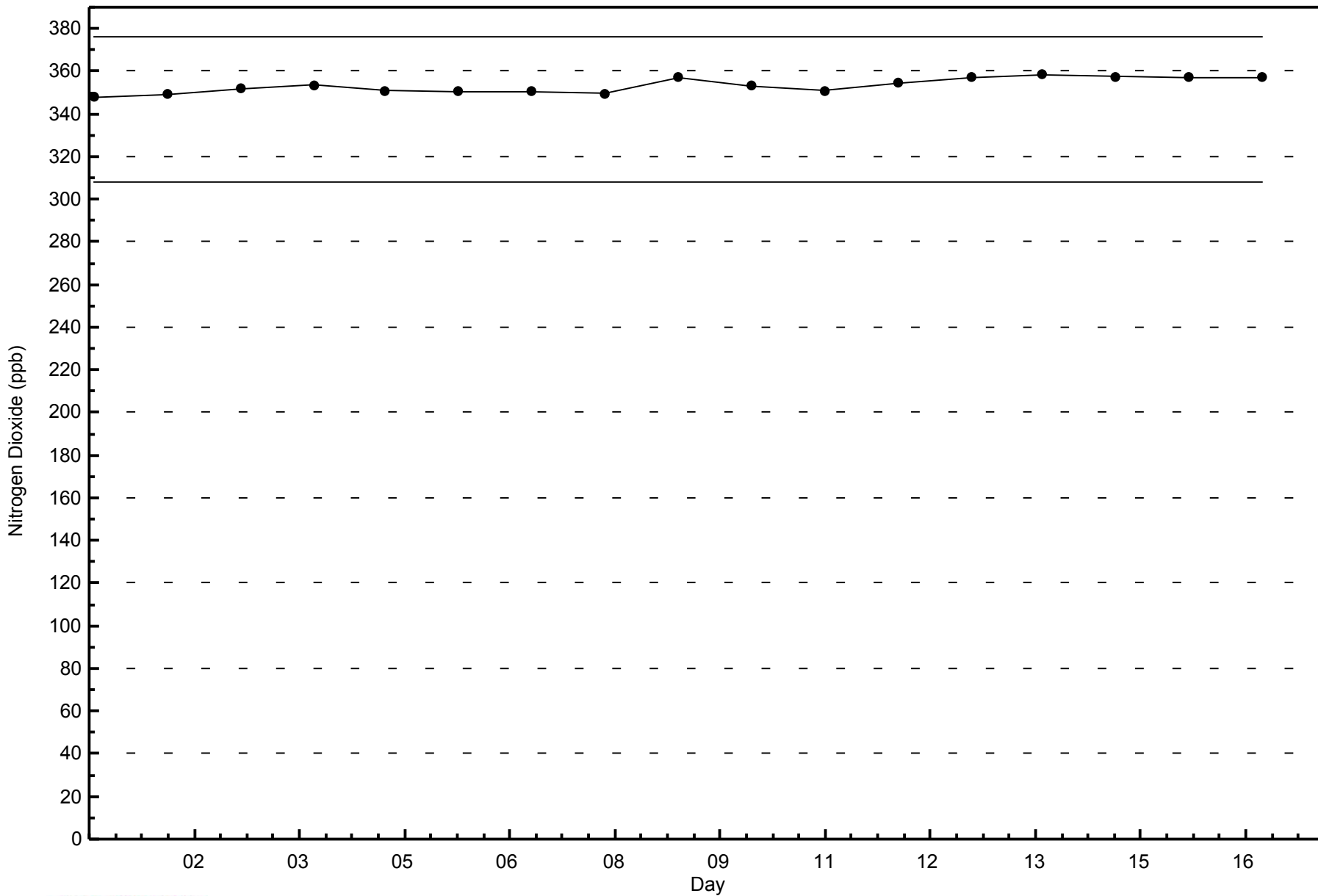
Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - June 2014





WBEA NETWORK
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - June 2014



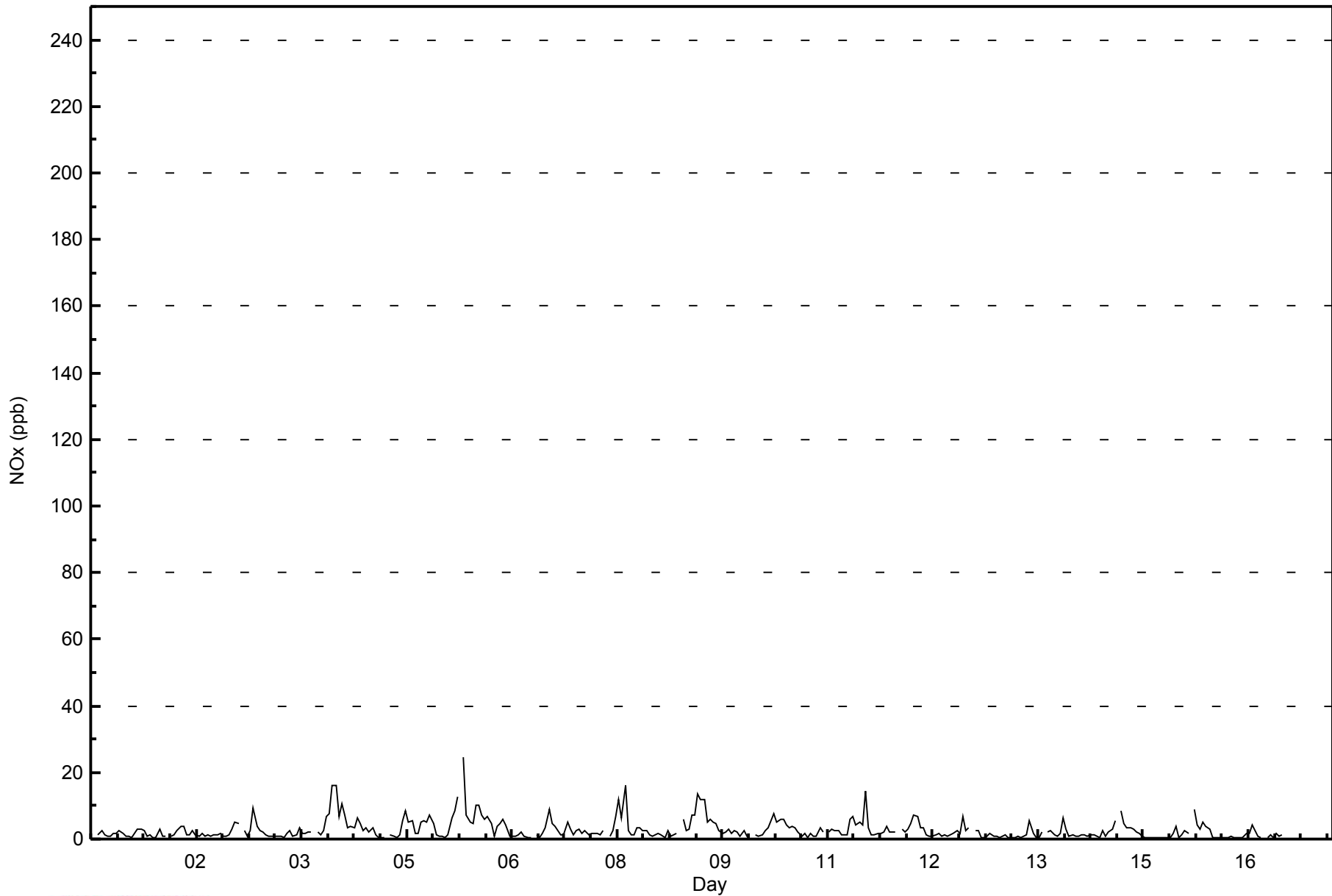


Maximum Value: 25 ppb on Jun 6 03:00														Maximum Daily Average: 5.5 ppb on Jun 6														Hours in Service: 397			
Minimum Value: 0 ppb on Jun 15 22:00														Minimum Daily Average: 1.3 ppb on Jun 13														Hours of Data: 375			
Maximum Diurnal Average: 6.0 ppb at hour 8														Minimum Diurnal Average: 1.3 ppb at hour 19														Hours of Missing Data: 22			
Monthly Average: 2.8 ppb														Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 16														Hours of Calibration: 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-Jun	6	Z	1	2	1	1	1	2	2	3	2	1	1	1	2	3	3	2	1	1	0	0	3	1	1.7	6					
2-Jun	1	Z	1	1	2	4	4	1	1	3	1	1	2	1	1	1	1	1	2	1	1	1	3	5	1.8	5					
3-Jun	5	Z	3	1	3	9	4	3	2	1	1	1	1	1	1	2	2	1	1	4	2	2	2	2.2	9						
4-Jun	2	Z	2	1	2	7	8	16	16	7	10	7	4	4	4	6	4	2	4	2	3	1	1	1	5.0	16					
5-Jun	0	Z	1	1	1	1	6	9	5	5	2	2	5	6	5	7	5	1	1	1	0	1	7	9	3.5	9					
6-Jun	13	Z	25	7	5	5	10	10	7	6	7	5	1	4	5	6	4	1	1	1	1	2	1	1	5.5	25					
7-Jun	1	Z	1	1	2	3	9	5	4	2	1	1	5	3	1	2	3	2	2	1	2	2	2	1	2.4	9					
8-Jun	3	Z	1	2	7	12	7	16	3	1	1	3	3	2	2	1	1	1	2	1	0	3	1	1	3.3	16					
9-Jun	2	Z	6	3	3	7	7	14	12	12	5	6	5	5	3	2	2	3	2	2	2	1	2	1	4.6	14					
10-Jun	1	Z	1	1	1	3	3	5	8	5	6	6	4	4	4	3	2	1	2	1	2	1	1	4	2.9	8					
11-Jun	2	Z	2	3	3	2	1	1	1	6	7	4	5	4	14	3	1	1	1	2	2	4	2	2	3.3	14					
12-Jun	2	Z	3	2	3	5	7	7	3	3	1	1	1	1	2	1	1	1	1	2	2	2	7	3	2.7	7					
13-Jun	3	Z	3	2	1	0	1	2	1	1	1	1	1	1	1	1	1	1	1	1	6	2	0	0	1.3	6					
14-Jun	2	Z	2	2	1	1	2	6	3	1	1	1	1	1	1	1	1	1	1	1	2	1	2	3	1.7	6					
15-Jun	6	Z	8	5	4	3	3	2	2	1	1	0	1	1	1	1	1	1	0	2	4	0	1	3	2.1	8					
16-Jun	2	Z	9	4	3	5	4	3	0	0	0	0	0	1	0	0	0	0	0	2	2	4	3	1	2.0	9					
17-Jun	0	Z	0	1	0	2	1	1	C	C	C	C	C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	2					
																												Diurnal Average			
3.0														--														Diurnal Maximum			
13														--																	
Z - zerospan			C - Calibration			NS - Not in Service																									



WBEA NETWORK
Hourly Averages

NOx (NO_x) - ppb
Cenovus - Christina Lake - June 2014





WBEA NETWORK
Cumulative Frequency Distribution

NO_x (NO_x) - ppb
Cenovus - Christina Lake - June 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	374	99.73	99.73
21 - 40	1	0.27	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: 375

Total Number of Hours: 408



WBEA NETWORK
Frequency Distribution

NOx (NO_x) - ppb
Cenovus - Christina Lake - June 2014

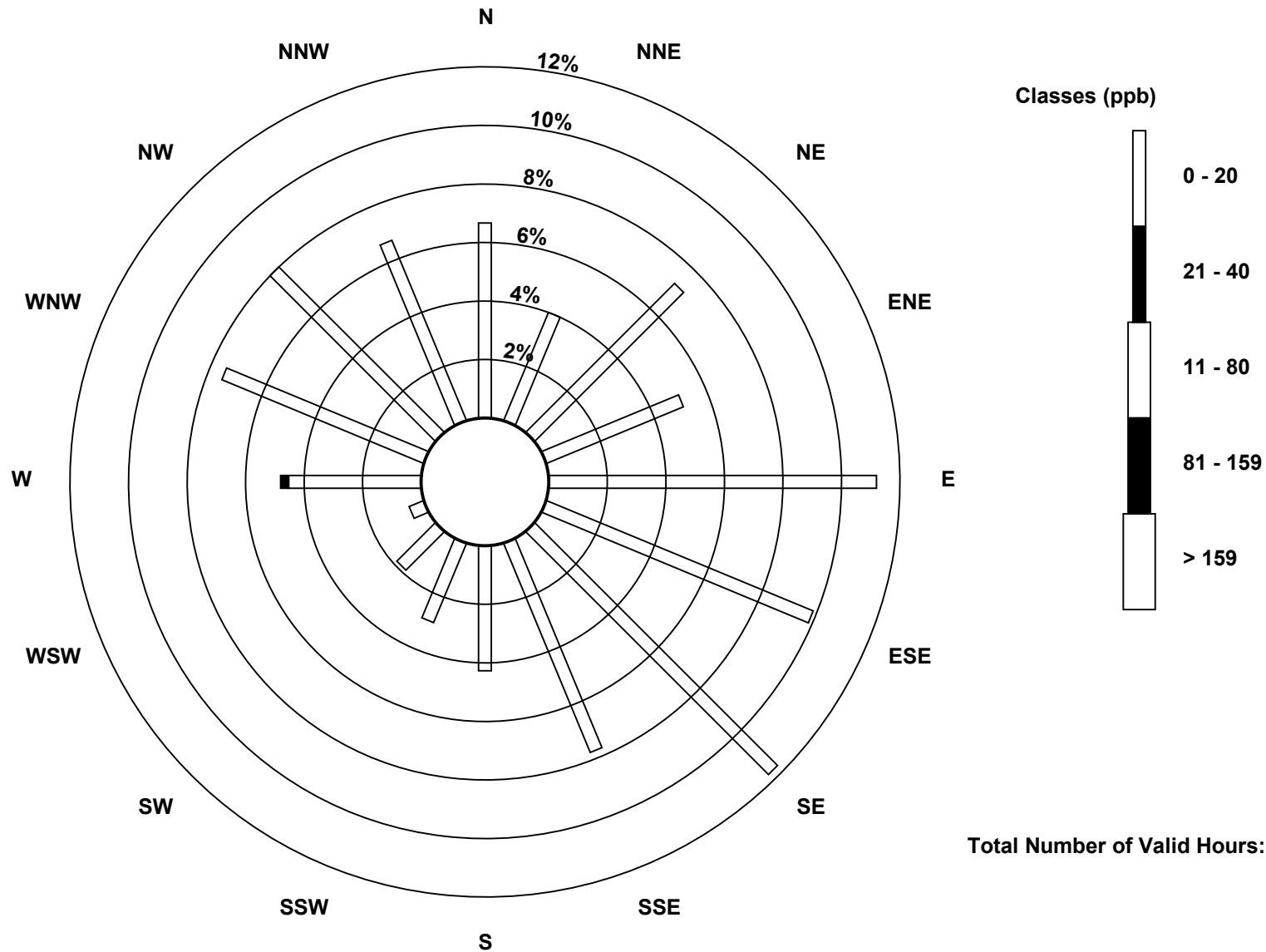
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	25	15	27	19	42	37	44	29	16	11	7	2	17	28	30	25	374
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	15	27	19	42	37	44	29	16	11	7	2	18	28	30	25	375

Total Number of Valid Hours: 375

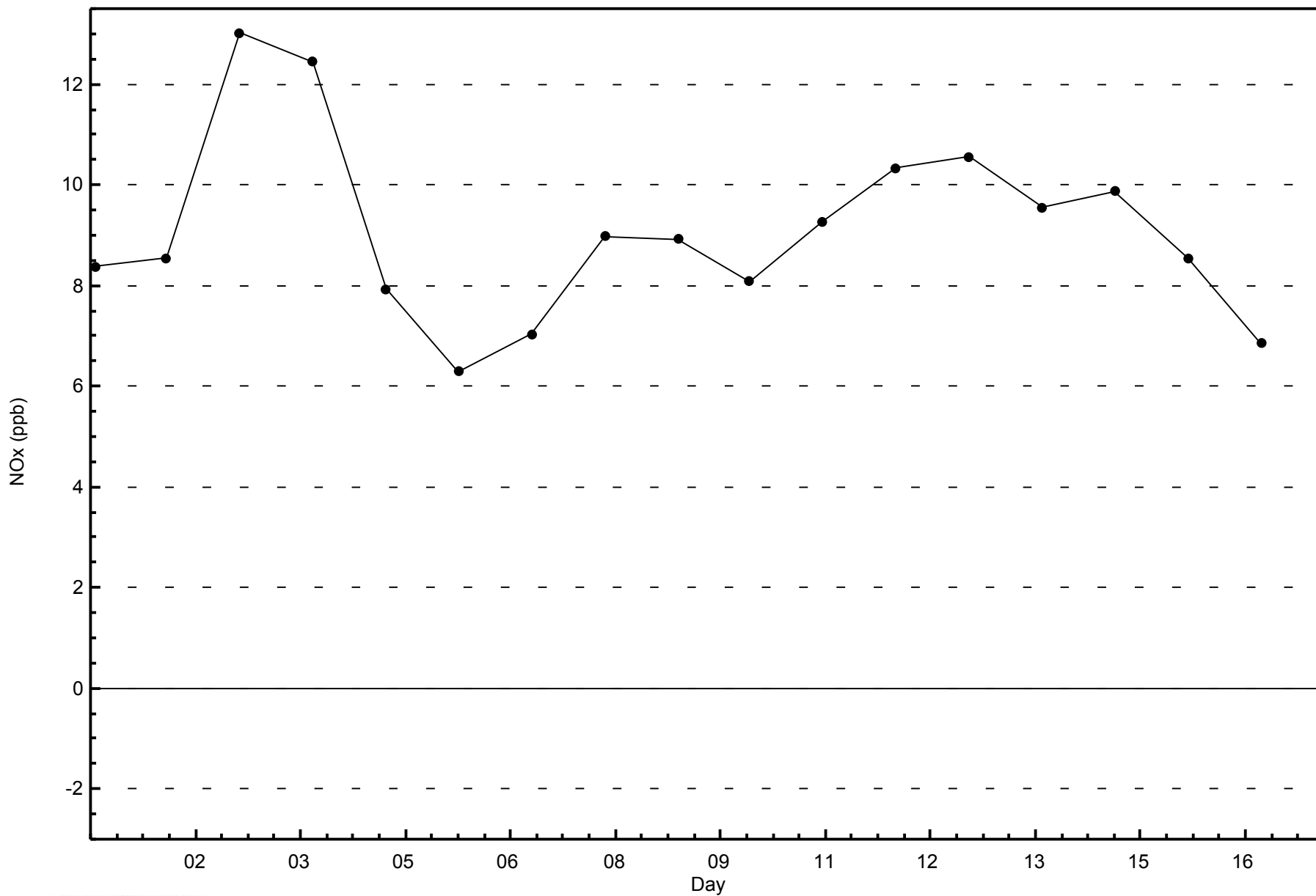
Total Number of Hours: 408

Wood Buffalo Environmental Association
 Wind Rose Jun 2014

NOx (NO_x) - ppb
 Cenovus - Christina Lake (AMS500)



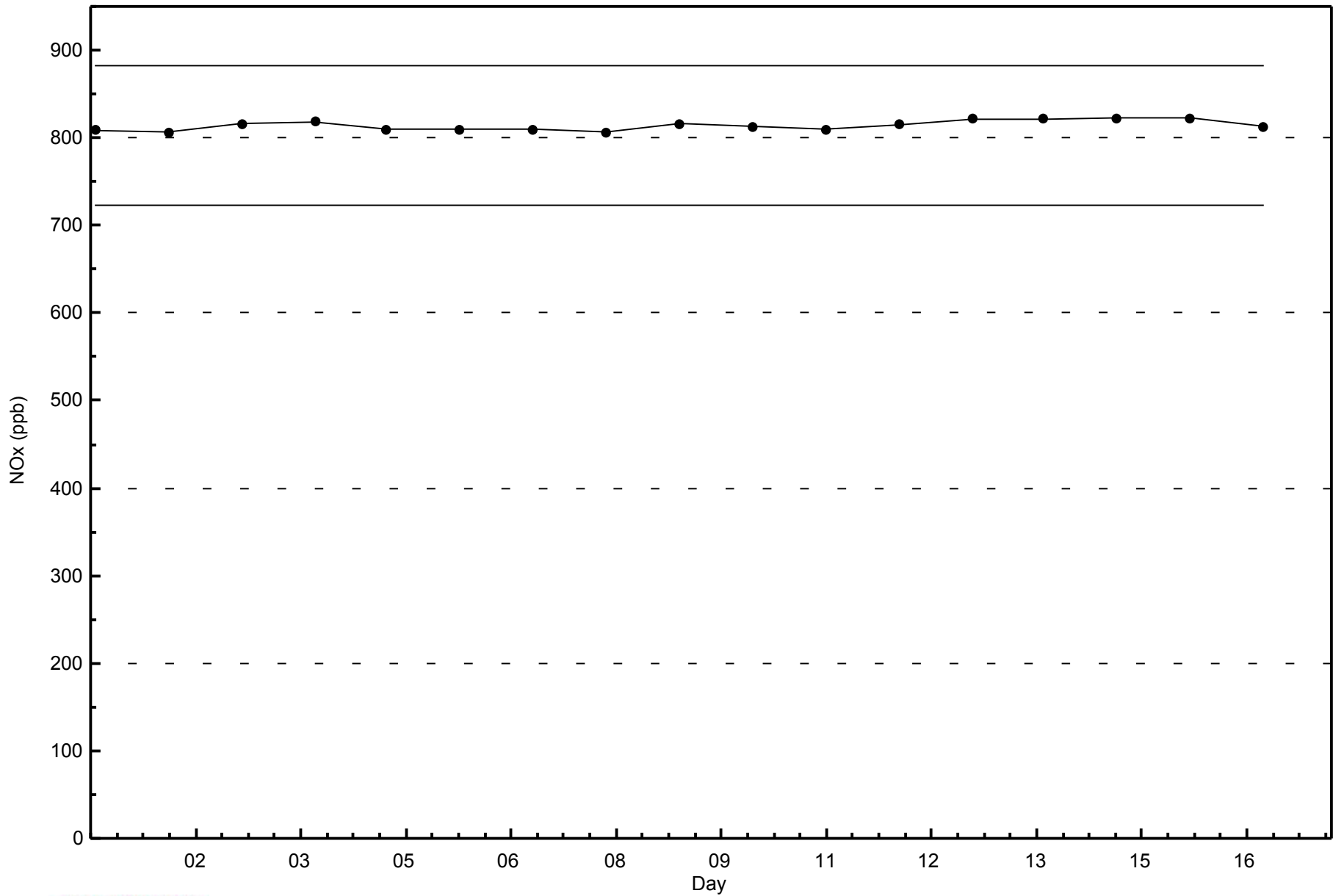
Total Number of Valid Hours: 375





WBEA NETWORK
Span Responses

NOx (NO_x) - ppb
Cenovus - Christina Lake - June 2014



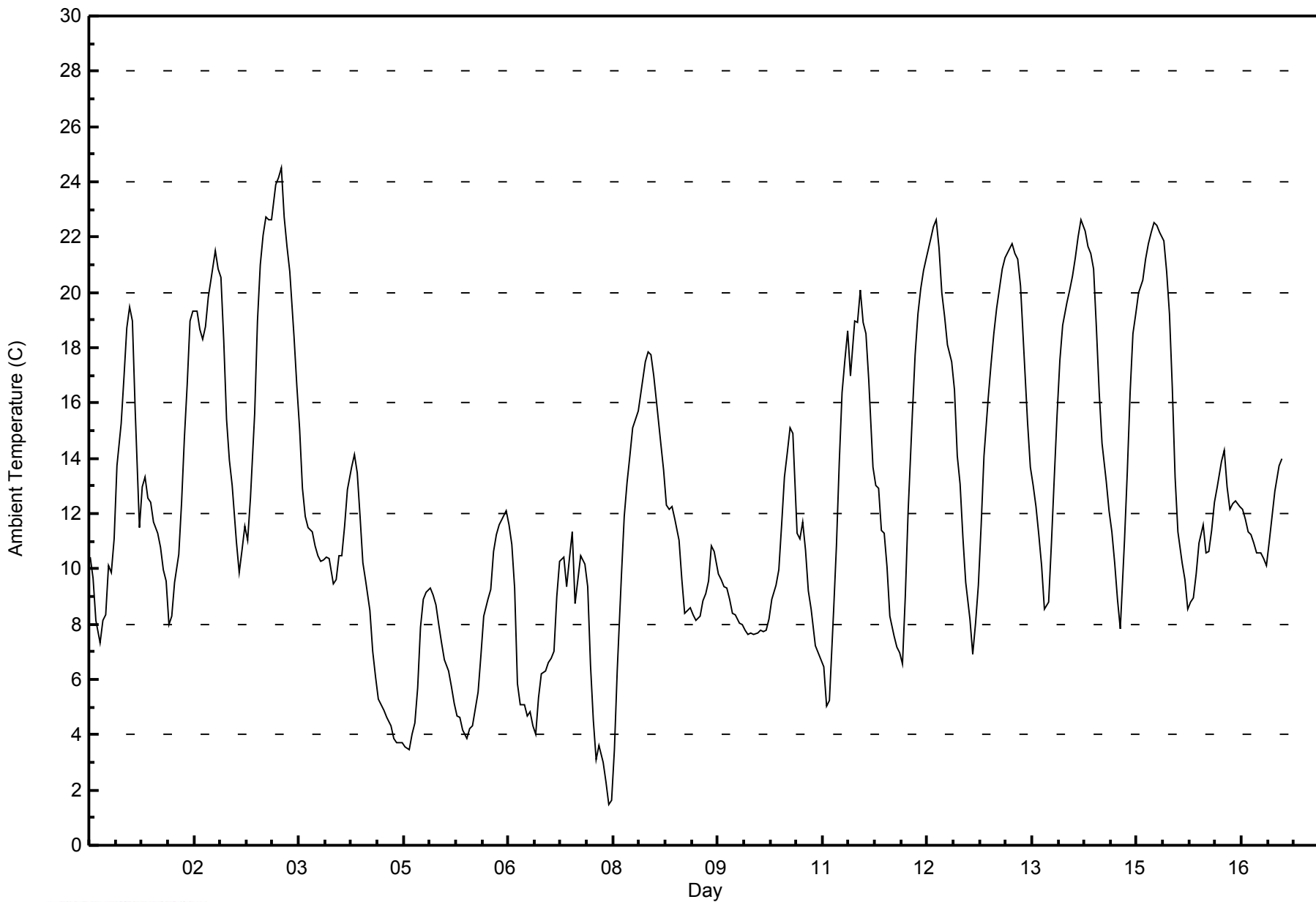


Maximum Value: 24.5 C on Jun 3 16:00		Maximum Daily Average: 17.7 C on Jun 3		Hours in Service: 394																							
Minimum Value: 1.5 C on Jun 8 04:00		Minimum Daily Average: 5.9 C on Jun 5		Hours of Data: 394																							
Maximum Diurnal Average: 16.9 C at hour 16		Minimum Diurnal Average: 7.3 C at hour 4		Hours of Missing Data: 0																							
Monthly Average: 12.33 C		Percentiles: P ₁ = 2.9 P ₁₀ = 5.7 Q ₁ = 8.6 Median = 11.3 Q ₃ = 16.4 P ₉₀ = 20.7 P ₉₉ = 22.2		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jun	10.4	9.6	8.1	7.3	8.1	8.3	10.1	9.9	11.1	13.7	15.2	16.9	18.7	19.5	19.0	15.7	11.5	13.0	13.3	12.6	12.4	11.7	11.3	10.8	12.4	19.5	
2-Jun	10.0	9.6	8.0	8.3	9.5	10.5	12.4	14.7	16.7	19.0	19.3	19.3	18.6	18.3	18.8	19.9	20.5	21.5	20.9	20.5	18.3	15.4	13.9	13.0	15.7	21.5	
3-Jun	11.0	9.9	10.7	11.6	11.1	12.6	15.6	19.0	21.0	22.1	22.7	22.6	22.6	23.9	24.1	24.5	22.7	21.7	20.7	18.4	16.6	15.1	12.9	11.9	17.7	24.5	
4-Jun	11.5	11.3	10.8	10.5	10.3	10.3	10.4	10.4	9.4	9.6	10.5	10.5	11.5	12.9	13.7	14.1	13.5	11.9	10.2	9.6	8.5	7.0	6.1	5.3	10.4	14.1	
5-Jun	5.1	4.9	4.6	4.3	3.9	3.7	3.7	3.7	3.6	3.4	4.0	4.4	5.7	7.9	8.9	9.1	9.3	9.0	8.7	8.0	7.3	6.7	6.3	5.7	5.9	9.3	
6-Jun	5.1	4.7	4.6	4.2	3.9	4.2	4.3	4.9	5.5	6.8	8.3	8.9	9.3	10.6	11.2	11.6	11.8	12.1	11.6	10.9	9.3	5.8	5.1	5.1	7.5	12.1	
7-Jun	4.7	4.9	4.3	4.0	5.3	6.2	6.3	6.6	6.8	7.0	9.0	10.3	10.4	9.4	10.4	11.4	8.7	9.6	10.5	10.2	9.4	6.5	4.5	3.1	7.5	11.4	
8-Jun	3.6	3.0	2.3	1.5	1.6	3.4	6.3	9.8	11.9	13.1	14.1	15.1	15.4	15.7	16.8	17.5	17.8	17.8	17.0	16.0	14.5	13.6	12.3	12.1	11.3	17.8	
9-Jun	12.2	11.8	11.0	9.6	8.4	8.5	8.6	8.3	8.2	8.3	8.9	9.1	9.6	10.9	10.6	9.8	9.6	9.4	9.3	8.9	8.4	8.3	8.0	8.0	9.3	12.2	
10-Jun	7.8	7.6	7.7	7.6	7.7	7.8	7.7	7.8	8.2	8.9	9.4	10.0	11.6	13.3	14.2	15.1	14.9	11.3	11.1	11.7	10.7	9.2	8.5	7.2	9.9	15.1	
11-Jun	6.9	6.7	6.5	5.0	5.2	8.5	10.8	13.8	16.4	17.5	18.6	17.0	19.0	18.9	20.1	18.9	18.5	16.8	13.7	13.0	12.9	11.4	11.3	10.1	13.2	20.1	
12-Jun	8.3	7.6	7.2	7.0	6.6	9.0	12.0	15.5	17.7	19.2	20.1	20.8	21.3	21.9	22.4	22.7	21.6	20.0	19.1	18.1	17.5	16.5	14.1	13.1	15.8	22.7	
13-Jun	11.1	9.5	8.2	6.9	8.0	9.4	11.6	14.1	16.2	17.4	18.5	19.4	20.1	20.9	21.3	21.5	21.7	21.4	21.2	20.2	18.3	15.3	13.7	13.0	15.8	21.7	
14-Jun	12.2	11.2	10.1	8.6	8.8	10.9	13.3	15.5	17.6	18.8	19.6	20.1	20.6	21.3	22.0	22.6	22.2	21.6	21.4	20.8	18.7	16.4	14.5	13.2	16.8	22.6	
15-Jun	12.1	11.4	10.2	8.9	7.8	11.0	13.5	16.4	18.5	19.2	20.0	20.4	21.2	21.7	22.2	22.5	22.4	22.2	21.9	20.7	19.2	16.6	13.3	11.4	16.9	22.5	
16-Jun	10.2	9.6	8.6	8.8	9.0	9.8	10.9	11.6	10.6	10.6	11.4	12.4	13.0	13.9	14.3	13.0	12.2	12.3	12.4	12.2	12.1	11.8	11.3	11.2	11.4	14.3	
17-Jun	11.0	10.6	10.6	10.4	10.1	11.0	11.9	12.8	13.7	14.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	14.0	
		9.0	8.5	7.9	7.3	7.4	8.5	10.0	11.5	12.5	13.5	14.4	14.8	15.5	16.3	16.9	16.9	16.2	15.7	15.2	14.5	13.4	11.7	10.5	9.6	Diurnal Average	
		12.2	11.8	11.0	11.6	11.1	12.6	15.6	19.0	21.0	22.1	22.7	22.6	23.9	24.1	24.5	22.7	22.2	21.9	20.8	19.2	16.6	14.5	13.2	Diurnal Maximum		
NS - Not in Service																											



WBEA NETWORK
Hourly Averages

Ambient Temperature (AT) - C
Cenovus - Christina Lake - June 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Cenovus - Christina Lake - June 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	146	37.06	37.06
10 - 20	199	50.51	87.56
> 20	49	12.44	100.00

Total Number of Valid Hours: 394

Total Number of Hours: 408

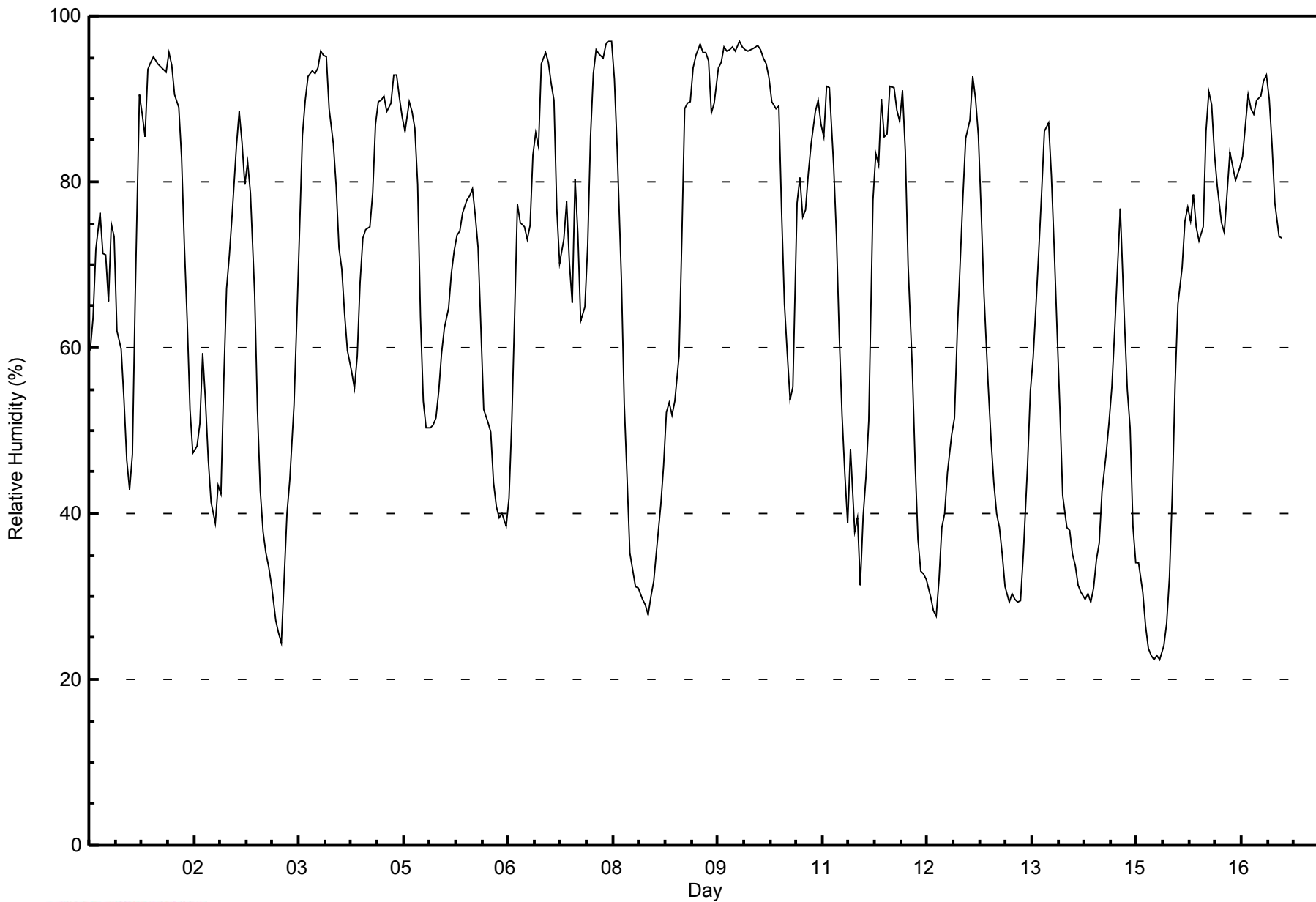


Maximum Value: 97 % on Jun 8 04:00										Maximum Daily Average: 88.2 % on Jun 9										Hours in Service: 394						
Minimum Value: 22 % on Jun 15 16:00										Minimum Daily Average: 41.9 % on Jun 15										Hours of Data: 394						
Maximum Diurnal Average: 87.3 % at hour 5										Minimum Diurnal Average: 46.6 % at hour 15										Hours of Missing Data: 0						
Monthly Average: 67.0 %										Percentiles: P ₁ = 24 P ₁₀ = 32 Q ₁ = 47 Median = 73 Q ₃ = 88 P ₉₀ = 94 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-Jun	60	64	72	76	71	71	66	75	73	62	60	54	46	43	47	66	90	88	85	94	94	95	94	94	72.5	95
2-Jun	94	93	96	94	91	89	83	72	63	52	47	48	51	59	54	46	41	39	43	42	56	67	71	76	65.4	96
3-Jun	84	89	85	80	82	79	66	52	43	38	35	34	31	27	26	24	32	40	44	53	63	74	86	90	56.6	90
4-Jun	93	93	93	94	96	95	95	89	85	79	72	70	64	60	57	55	59	68	73	74	75	79	87	90	78.9	96
5-Jun	90	90	88	89	93	93	90	88	86	90	88	86	80	64	54	50	50	51	52	55	59	62	65	69	74.3	93
6-Jun	72	74	74	76	78	78	79	76	72	62	53	51	50	44	41	40	40	39	42	51	64	77	75	75	61.7	79
7-Jun	73	75	83	86	84	94	96	94	92	90	77	70	73	78	70	65	80	74	63	65	72	85	93	96	80.4	96
8-Jun	96	95	97	97	97	92	84	68	53	44	35	33	31	31	30	29	28	30	32	36	41	46	52	53	55.4	97
9-Jun	52	54	59	73	89	89	90	94	95	97	96	96	95	88	89	94	94	96	96	96	96	96	97	96	88.2	97
10-Jun	96	96	96	96	96	96	95	94	93	90	89	89	76	65	59	54	55	77	80	76	77	81	85	89	83.3	96
11-Jun	90	87	85	92	91	82	73	62	52	45	39	48	38	39	31	40	44	51	78	83	82	90	85	86	66.4	92
12-Jun	91	91	89	87	91	84	70	57	46	37	33	33	32	30	28	28	32	38	40	45	50	52	62	70	54.8	91
13-Jun	78	85	87	93	90	86	76	67	55	49	44	40	38	35	31	29	30	30	29	29	35	46	55	59	54.1	93
14-Jun	65	72	79	86	87	81	72	62	53	42	38	38	35	34	31	30	30	29	31	34	36	43	47	49.4	87	
15-Jun	51	55	62	69	77	63	55	50	38	34	34	30	26	24	23	22	23	22	24	27	32	42	56	65	41.9	77
16-Jun	70	75	77	75	78	75	73	75	86	91	89	83	80	75	74	79	84	82	80	82	83	87	91	89	80.4	91
17-Jun	88	90	90	92	93	90	84	77	73	73	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	93
																								Diurnal Average		
																								Diurnal Maximum		
NS - Not in Service																										



WBEA NETWORK
Hourly Averages

Relative Humidity (RH) - %
Cenovus - Christina Lake - June 2014





WBEA NETWORK
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Cenovus - Christina Lake - June 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	72	18.27	18.27
40 - 60	78	19.80	38.07
60 - 80	101	25.63	63.71
80 - 100	143	36.29	100.00

Total Number of Valid Hours: 394

Total Number of Hours: 408



Maximum Speed: 23 km/h on Jun 5 15:00		Maximum Daily Speed Average: 16.2 km/h on Jun 5		Hours in Service: 394																							
Minimum Speed Value: 0 km/h on Jun 16 06:00		Minimum Daily Speed Average: 0.2 km/h on Jun 7		Hours of Data: 394																							
Maximum Diurnal Speed Average: 4.6 km/h at hour 13		Minimum Diurnal Speed Average: 0.3 km/h at hour 4		Hours of Missing Data: 0																							
Monthly Average Velocity: 1.3 km/h 31.2 deg		Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 15 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-Jun	ENE8	ENE5	NE3	E5	E6	E8	ESE11	ESE6	E7	ESE6	E10	ESE9	SE9	SSE9	ESE11	N3	E9	ENE5	ESE8	SSE3	SE8	SE7	SE8	SSE8	ESE6.1	ESE11	
2-Jun	SSE6	SSE3	ESE4	SE4	S5	SSE5	SSW7	SSW9	S7	NNW1	SE5	SE4	N7	NE7	SSE16	ESE5	SSE6	ESE6	ESE9	E8	SE9	ESE6	SSE8	ESE2	SE4.5	SSE16	
3-Jun	E4	ESE2	SE3	SSE7	SE2	NE2	SE5	SE7	SE9	SE10	ESE11	SE13	ESE11	SE15	ESE14	E11	E14	S7	SW6	SW16	NW7	NNW6	WNW9	WNW9	SE4.3	SW16	
4-Jun	WNW8	WNW11	WNW11	WNW9	W11	W12	W12	W16	W21	WNW23	W21	WNW19	WNW19	WNW17	WNW16	NW16	NW18	NNW18	NNW16	NW14	NNW17	NW17	NW13	WNW12	WNW14.0	WNW23	
5-Jun	WNW12	WNW14	NW14	NW15	NW15	WNW14	NW16	NW17	NW20	NW17	NW22	NW21	NW17	NW20	NW23	NW21	NW19	WNW21	NW19	WNW14	WNW10	WNW10	W12	W13	NW16.2	NW23	
6-Jun	W13	W12	W11	W7	W6	W6	WNW7	WNW7	WNW7	WNW10	WNW11	NW8	N8	NW9	WNW13	WNW11	NNW10	NNW8	NNE7	ESE4	E4	SE4	SSE6	SE5	WNW5.4	WNW13	
7-Jun	SE5	SSE4	E3	SE4	S7	S7	NE4	ENE7	N8	NE7	N5	NNW8	NNW10	SW8	S10	W9	N7	WNW6	NNW8	SSW3	SSE5	SSE3	SE3	E1	W0.2	NNW10	
8-Jun	SW5	SSE8	SSE5	S4	ESE2	SE3	SE3	NNW4	N3	N5	S1	NW4	NNE6	ENE4	NNE4	NE7	SSE6	E10	ENE12	E8	ESE9	ESE12	SE11	SE13	ESE3.6	SE13	
9-Jun	SE14	S4	WSW2	SE5	E3	ENE5	NE4	NNW6	N8	NNE10	N10	N10	N10	NNW6	NNE9	E6	NNE4	NNW7	N9	NNW13	NNW13	NW13	NW12	NW13	N5.2	SE14	
10-Jun	NNW14	NNW14	NNW12	NNW12	NW11	NNW13	N16	N16	N16	N16	N14	NNW14	NNW12	NW10	NW11	NW10	NE3	ESE17	SSE11	S9	SSW7	SW6	SSW5	ESE3	NNW6.7	ESE17	
11-Jun	SE7	SSE9	S6	S5	SSE3	SSW7	SW9	SSW8	SW8	W10	WSW15	W5	W13	WNW12	W16	WNW5	S10	NW5	ESE6	SE6	NNE6	SE5	SSE9	SE3	SW3.9	W16	
12-Jun	E4	SE5	SSE5	SE4	ENE3	SSE4	S5	SSW4	SSW6	SSW8	S6	SE6	SSE9	S7	S7	SSW8	NE4	NE13	NE6	NNW8	NNE4	ENE6	E6	NE2	SE2.4	NE13	
13-Jun	NE3	NNE3	NNE1	N3	N6	N7	NNE8	NNE10	NE16	NE16	NE15	ENE11	NE12	NE12	NE10	NE11	NNE12	NE14	NE11	ENE12	E8	E8	E8	ESE12	NE8.6	NE16	
14-Jun	ESE13	ESE9	E5	E5	ESE4	ESE7	ESE10	SSE8	SSE8	ESE7	E11	ESE10	ESE10	SSE7	SE9	SE13	SE15	SE12	SSE12	SSE13	SE11	SE12	SSE10	SE10	SE9.3	SE15	
15-Jun	SE9	SSE9	SE6	E4	E5	E1	SE7	SE5	SE8	ESE10	ENE11	ENE12	ENE14	E14	E13	E12	ENE13	E13	E15	E15	E12	E9	E4	ESE2	E8.4	E15	
16-Jun	SSE3	ENE3	SE2	ESE3	E3	N0	NE7	ENE13	NNE11	N11	NNE13	NNE15	NE13	ENE12	E9	SE18	ESE12	ESE8	E8	E3	N4	N2	NNW3	NE7	ENE5.7	SE18	
17-Jun	NE5	ENE4	NE4	NE5	E2	ENE6	ENE9	E8	E9	E8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	ENE9
SE1.4SSW0.7WNW0.8NNE0.3 NW0.6 NW0.4 NE0.9 N1.2 N2.1 N3.5 N3.2 N4.0 N4.6 N1.7 N0.4NNE1.4 ENE3.2 NE3.6 ENE3.8 E1.5 ENE2.3 E1.3 SSE1.5 SE1.0																								Diurnal Average			
SE14WNW14 NW14 NW15 NW15WNW14 N16 NW17 W21WNW23 NW22 NW21WNW19 NW20 NW23 NW21 NW19WNW21WNW19 SW16NNW17 NW17 NW13 W13																								Diurnal Maximum			
NS - Not in Service																											
All monthly, daily, and diurnal averages have been calculated using vector methods																											

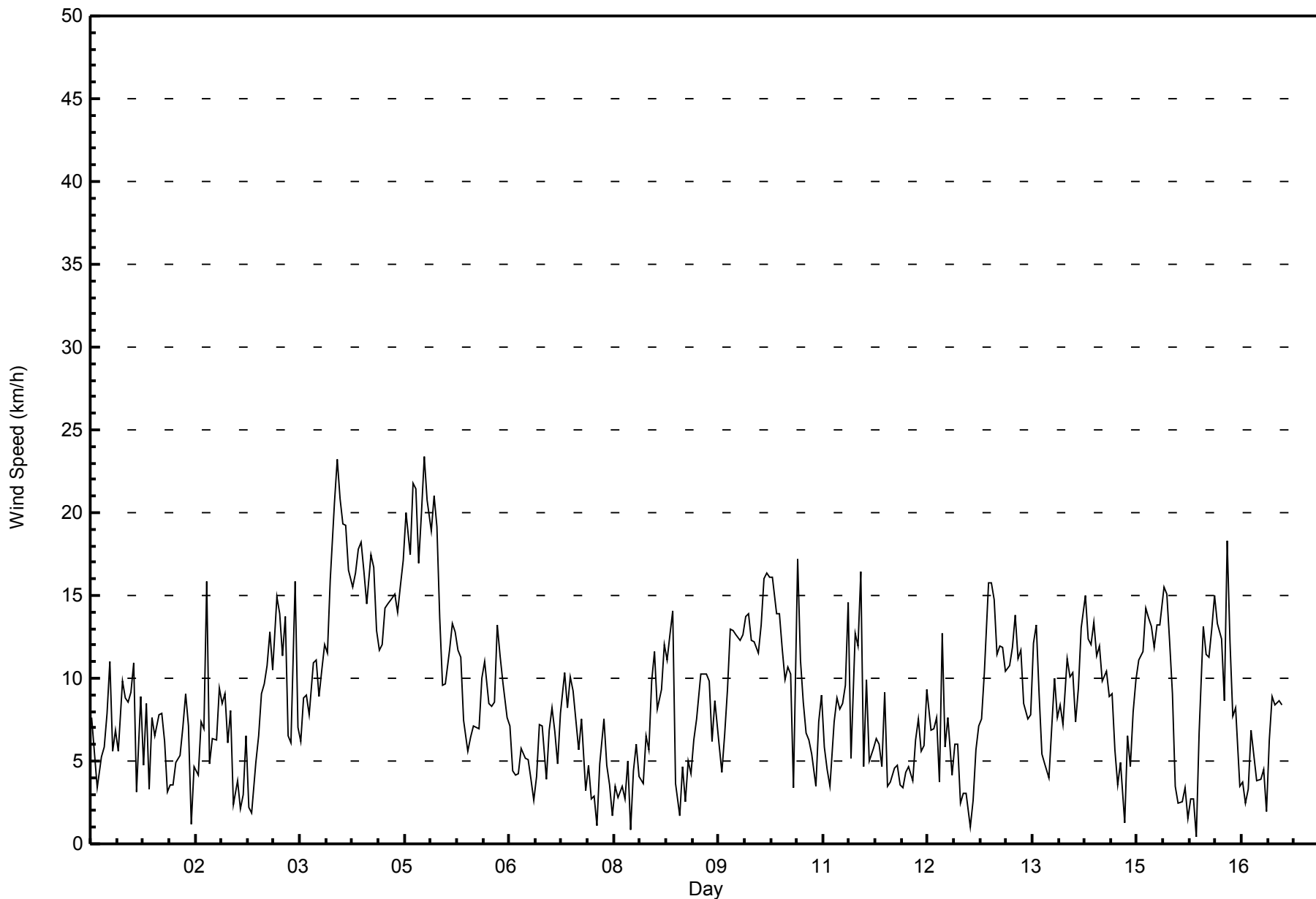


WBEA NETWORK

Hourly Averages

Wind Speed (WS) - km/h

Cenovus - Christina Lake - June 2014





WBEA NETWORK
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Cenovus - Christina Lake - June 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	106	26.90	26.90
6 - 11	178	45.18	72.08
12 - 19	100	25.38	97.46
20 - 28	10	2.54	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 394

Total Number of Hours: 408



WBEA NETWORK
Frequency Distribution

Wind Speed (WS) - km/h
Cenovus - Christina Lake - June 2014

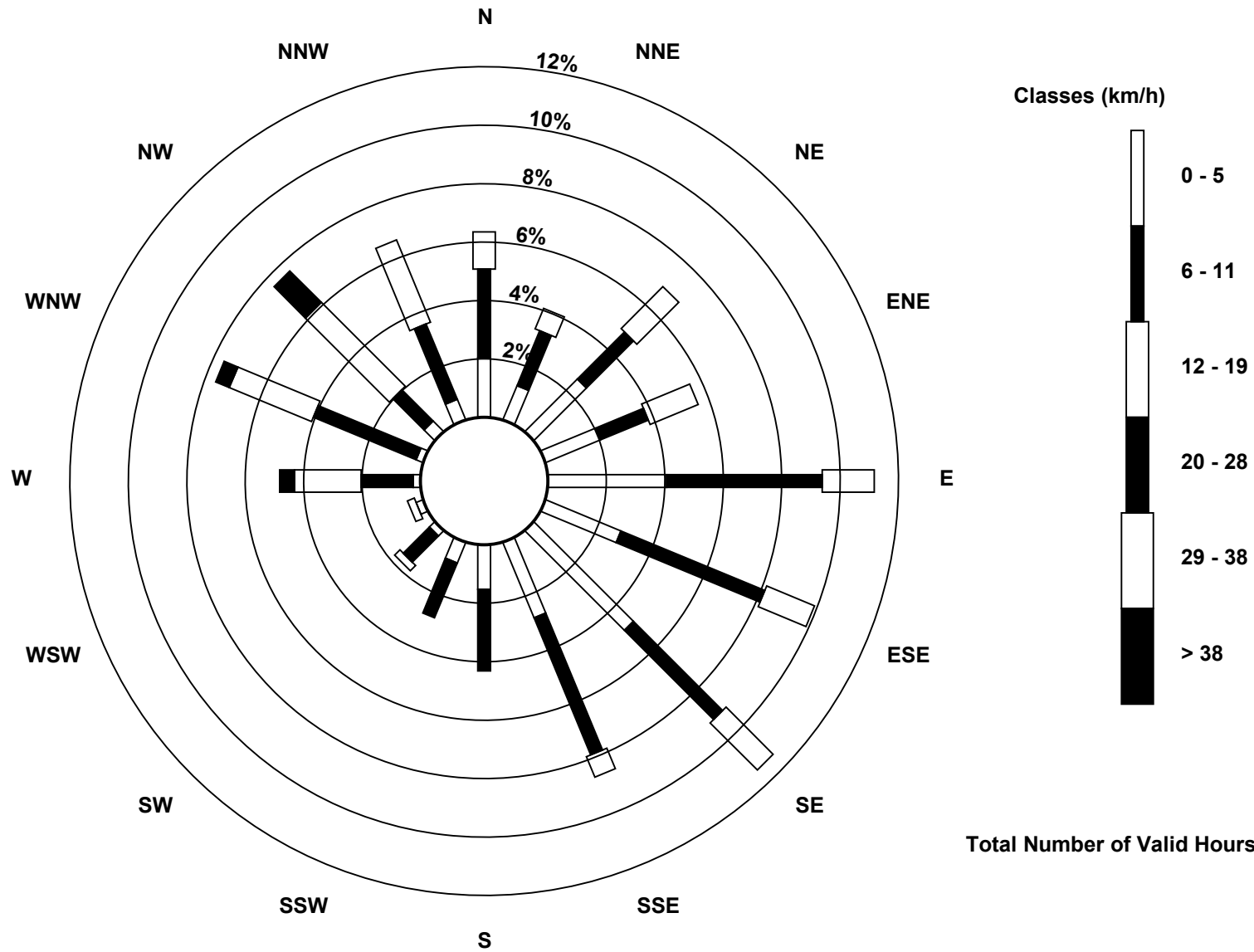
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	5	10	8	16	11	19	11	6	3	1	1	1	1	2	3	106
6 - 11	12	8	9	7	21	21	17	20	11	8	5	0	7	15	6	11	178
12 - 19	5	3	8	7	7	7	9	3	0	0	1	1	9	12	16	12	100
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	2	2	6	0	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	25	16	27	22	44	39	45	34	17	11	7	2	19	30	30	26	394

Total Number of Valid Hours: 394

Total Number of Hours: 408

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

**Wind Speed (WS) - km/h
Cenovus - Christina Lake (AMS500)**



Total Number of Valid Hours: 394



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Cenovus - Christina Lake - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Jun 10 17:00 Minimum Value: 1 km/h on Jun 16 21:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7																	Hours in Service: 394 Hours of Data: 394 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-Jun	2	2	1	2	2	2	3	4	4	3	3	4	4	4	4	5	2	2	2	2	2	1	1	2	5
2-Jun	2	1	2	2	2	1	2	3	2	2	3	1	7	2	5	2	3	3	2	2	2	1	1	2	7
3-Jun	1	1	2	2	1	2	2	2	2	3	3	4	4	5	5	4	7	3	3	6	3	4	4	3	7
4-Jun	2	3	3	3	3	4	5	4	5	4	5	5	4	4	4	5	4	4	3	3	5	4	3	2	5
5-Jun	2	3	3	3	3	3	4	4	4	4	5	5	4	5	6	5	5	5	5	4	2	2	3	2	6
6-Jun	2	3	3	5	3	2	1	2	2	2	4	3	4	4	4	4	4	3	2	1	1	1	1	1	5
7-Jun	2	2	1	1	4	3	2	2	3	1	2	3	6	3	3	5	3	4	2	2	1	2	2	2	6
8-Jun	3	2	2	1	1	1	1	2	2	2	2	5	3	3	3	3	3	3	2	2	2	2	1	2	5
9-Jun	2	3	2	1	2	1	1	1	1	2	2	2	2	2	2	3	2	1	2	3	3	2	2	3	3
10-Jun	3	3	2	2	3	3	3	3	3	4	3	3	3	4	4	4	8	5	2	2	2	2	1	2	8
11-Jun	2	1	1	1	1	2	2	2	2	4	5	7	7	7	6	5	4	6	3	2	3	1	3	1	7
12-Jun	1	2	1	1	1	1	1	2	2	3	3	3	4	3	3	3	5	3	2	3	1	2	1	1	5
13-Jun	1	2	1	2	2	1	1	3	4	3	4	4	4	4	5	5	4	4	3	3	2	1	1	2	5
14-Jun	2	2	1	1	1	2	2	2	3	3	4	4	4	3	4	4	3	3	3	2	2	2	2	2	4
15-Jun	2	2	2	2	2	1	2	2	3	4	4	5	5	5	5	6	5	5	4	4	5	4	1	1	6
16-Jun	2	1	2	2	2	1	3	4	3	2	2	4	3	3	3	4	4	2	3	1	1	2	2	1	4
17-Jun	1	1	1	2	1	1	2	2	3	2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	3
											Diurnal Maximum														
NS - Not in Service																									



Wood Buffalo Environmental Association
Summary of Hour Averages

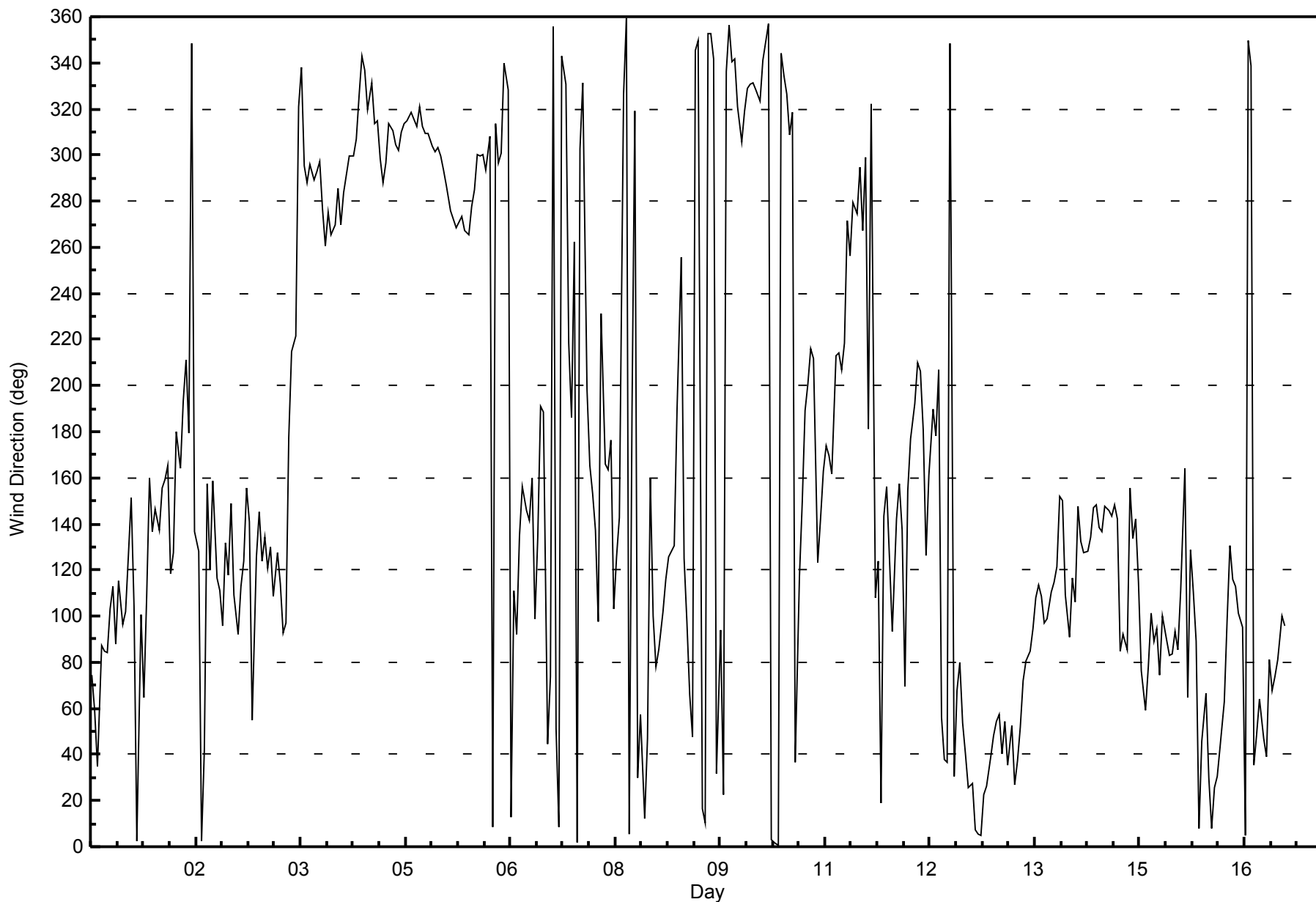
Wind Direction (WD) - deg
Cenovus - Christina Lake - June 2014

Direction of Maximum Speed: 309 deg on Jun 5 15:00																				Hours in Service: 394							
Direction of Maximum Daily Speed Average: 305.7 deg on Jun 5																				Hours of Data: 394							
Direction of Minimum Speed: 8 deg on Jun 16 06:00										Direction of Minimum Daily Speed Average: 0.2 deg on Jun 7										Hours of Missing Data: 0							
Monthly Average Direction: 303.7 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-Jun	75	59	35	87	85	84	103	113	88	115	97	102	126	151	104	3	100	65	109	160	137	146	137	156	106.9		
2-Jun	159	166	119	127	180	164	193	211	179	348	136	128	3	42	157	120	158	116	111	96	132	118	149	109	140.2		
3-Jun	92	113	124	155	141	55	126	145	124	134	121	130	108	128	114	93	97	177	215	222	321	338	295	288	131.6		
4-Jun	296	289	293	297	277	260	275	265	270	286	270	283	291	299	300	307	326	343	337	320	331	314	315	298	297.9		
5-Jun	288	297	313	311	304	302	310	314	315	318	315	312	321	313	309	310	304	302	304	299	294	287	276	272	305.7		
6-Jun	268	271	273	267	266	278	285	300	300	300	294	308	9	314	296	301	340	328	13	111	92	135	156	146	296.7		
7-Jun	142	160	99	134	191	189	45	74	356	51	8	343	331	219	186	262	2	303	331	198	165	153	138	98	278.1		
8-Jun	231	166	163	176	103	125	143	327	359	6	190	319	30	58	12	47	160	100	78	85	102	116	126	128	103.4		
9-Jun	131	190	256	125	97	66	48	346	349	17	10	353	353	342	32	94	23	336	356	341	342	321	306	319	357.4		
10-Jun	329	331	331	328	324	341	349	357	3	2	0	344	334	326	309	319	37	117	149	189	201	216	212	123	340.3		
11-Jun	142	163	174	169	162	213	214	207	218	272	256	280	275	295	267	299	181	322	108	124	19	143	156	125	221.6		
12-Jun	93	142	157	137	70	154	177	192	210	206	180	126	161	190	178	207	56	38	37	348	30	68	80	54	134.4		
13-Jun	40	25	27	7	5	5	23	27	39	48	54	58	40	54	36	53	27	37	52	72	80	85	94	108	49.0		
14-Jun	113	109	97	99	110	114	121	152	150	109	91	116	106	148	132	128	128	134	147	148	139	137	148	146	127.9		
15-Jun	144	148	142	85	92	85	155	134	142	115	76	59	78	101	89	94	75	100	90	83	84	93	86	111	97.8		
16-Jun	164	65	129	110	89	8	46	66	30	8	25	30	43	63	98	131	116	113	101	95	5	350	338	35	63.8		
17-Jun	49	64	47	39	81	68	74	81	100	96	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--		
133.3	205.3	299.7	26.1	313.3	315.8	43.1	358.7	355.5	2.8	4.2	5.2	9.8	5.0	3.2	22.8	60.3	48.0	61.8	91.5	57.7	94.8	164.9	138.7				
Diurnal Average																											
NS - Not in Service																											
All monthly, daily, and diurnal averages have been calculated using vector methods																											



WBEA NETWORK
Hourly Averages

Wind Direction (WD) - deg
Cenovus - Christina Lake - June 2014





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Cenovus - Christina Lake - June 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Jun 2 10:00 Minimum Value: 8 deg on Jun 2 23:00 Percentiles: P ₁ = 9 P ₁₀ = 13 Q ₁ = 15 Median = 24 Q ₃ = 39 P ₉₀ = 56 P ₉₉ = 96		Hours in Service: 394 Hours of Data: 394 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-Jun	13	21	29	57	21	12	21	40	31	48	21	30	37	45	29	80	33	63	16	43	15	11	10	14	80
2-Jun	41	21	47	34	26	25	18	22	34	103	54	43	83	34	16	55	51	38	14	14	13	19	8	54	103
3-Jun	17	52	55	15	56	29	33	20	21	25	36	28	42	24	25	36	59	62	49	26	51	51	29	17	62
4-Jun	37	13	14	17	18	25	24	18	18	14	23	19	17	20	22	20	24	16	15	15	15	16	13	16	37
5-Jun	12	13	17	17	13	12	13	15	14	14	14	14	16	20	15	15	18	18	14	17	11	14	12	9	20
6-Jun	9	12	12	54	53	20	15	21	23	25	32	45	37	44	27	25	33	43	33	15	10	25	20	15	54
7-Jun	49	27	21	25	24	21	54	25	31	27	49	33	33	33	25	55	31	76	19	71	13	43	42	86	86
8-Jun	39	15	41	19	70	23	61	46	79	52	102	97	63	76	71	41	63	24	14	10	9	11	8	9	102
9-Jun	9	74	87	24	82	20	19	18	16	19	18	12	17	33	27	40	34	14	18	14	13	13	14	13	87
10-Jun	13	12	13	12	13	14	13	14	16	17	16	17	23	29	29	29	75	25	15	22	18	21	20	55	75
11-Jun	15	9	12	15	16	20	18	23	27	35	28	91	55	60	33	96	47	88	55	38	42	42	26	57	96
12-Jun	32	15	8	41	36	30	14	65	35	34	61	67	39	48	48	48	89	16	38	37	54	32	20	62	89
13-Jun	31	27	58	52	16	15	16	18	14	18	22	27	38	32	51	36	28	20	29	14	11	10	10	10	58
14-Jun	11	15	14	17	30	15	15	30	26	51	28	41	30	48	39	34	17	20	17	15	11	9	11	11	51
15-Jun	13	10	12	21	23	76	19	41	40	40	37	46	30	27	36	43	27	28	18	13	12	24	37	56	76
16-Jun	68	34	72	67	56	94	28	19	19	15	16	15	15	20	32	14	28	26	18	31	28	38	30	15	94
17-Jun	16	32	21	14	65	16	19	19	21	24	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	65
Diurnal Maximum																									
NS - Not in Service																									



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 6, 2014
Station Name	Cenovus	Station Number	AMS 103
Reason:	Removal		
Start Time (MST)	8:30	End Time (MST)	11:15
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	06/10/2016
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	17
Analyzer Range (mv)	1000	1000	Lamp voltage	3084	3074
Calculated slope	0.994050	1.000499	Chamber temp.	50.0	50.0
Calculated intercept	-1.044229	-2.373316	Pressure (mmHg)	25.2	25.2
Analyzer Background	12.9	12.9	Flow (lpm)	636.000	634.000
Analyzer Coefficient	1.082	1.074	Intensity	76	76

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	6000	0.0	0.0	0.3	N/A
as found span	6000	95.4	785.5	785.6	1.000
calibrator zero	6000	0.0	0.0	0.3	N/A
high point	6000	95.4	785.5	785.6	1.000
second point	6000	47.7	392.7	398.1	0.986
third point	6000	23.9	196.8	199.8	0.985
calibrator zero					
as left zero					
as left span					
Average Correction Factor					0.990

Corrected As found	785.4	Previous response	781.8	% change	-0.5%
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Notes: Removal Cal

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

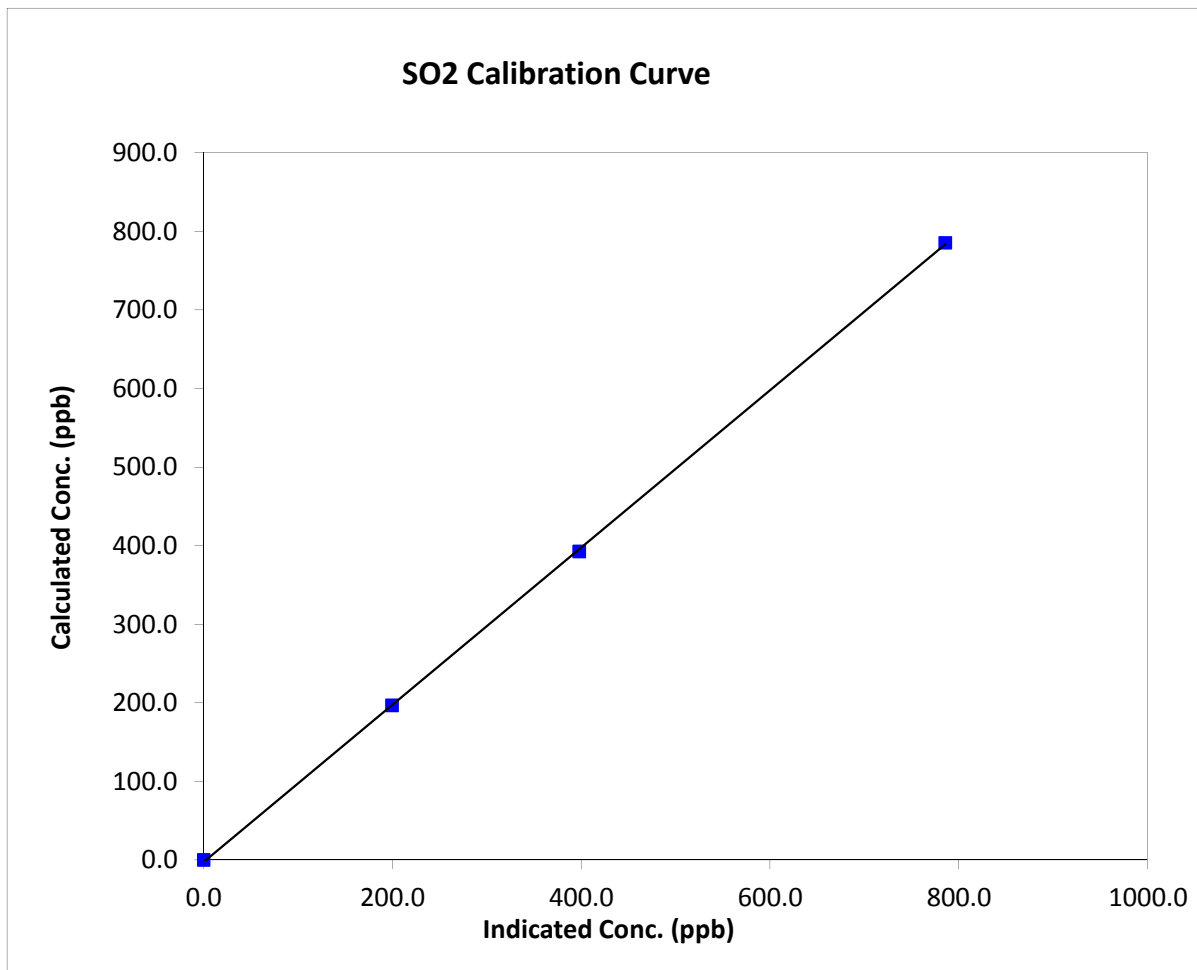
SO₂ Calibration Summary

Station Information

Calibration Date	June-17-14	Previous Calibration	May 6, 2014
Station Name	Cenovus	Station Number	AMS 103
Start Time (MST)	8:30	End Time (MST)	11:15
Analyzer make	API T100	Analyzer serial #	720

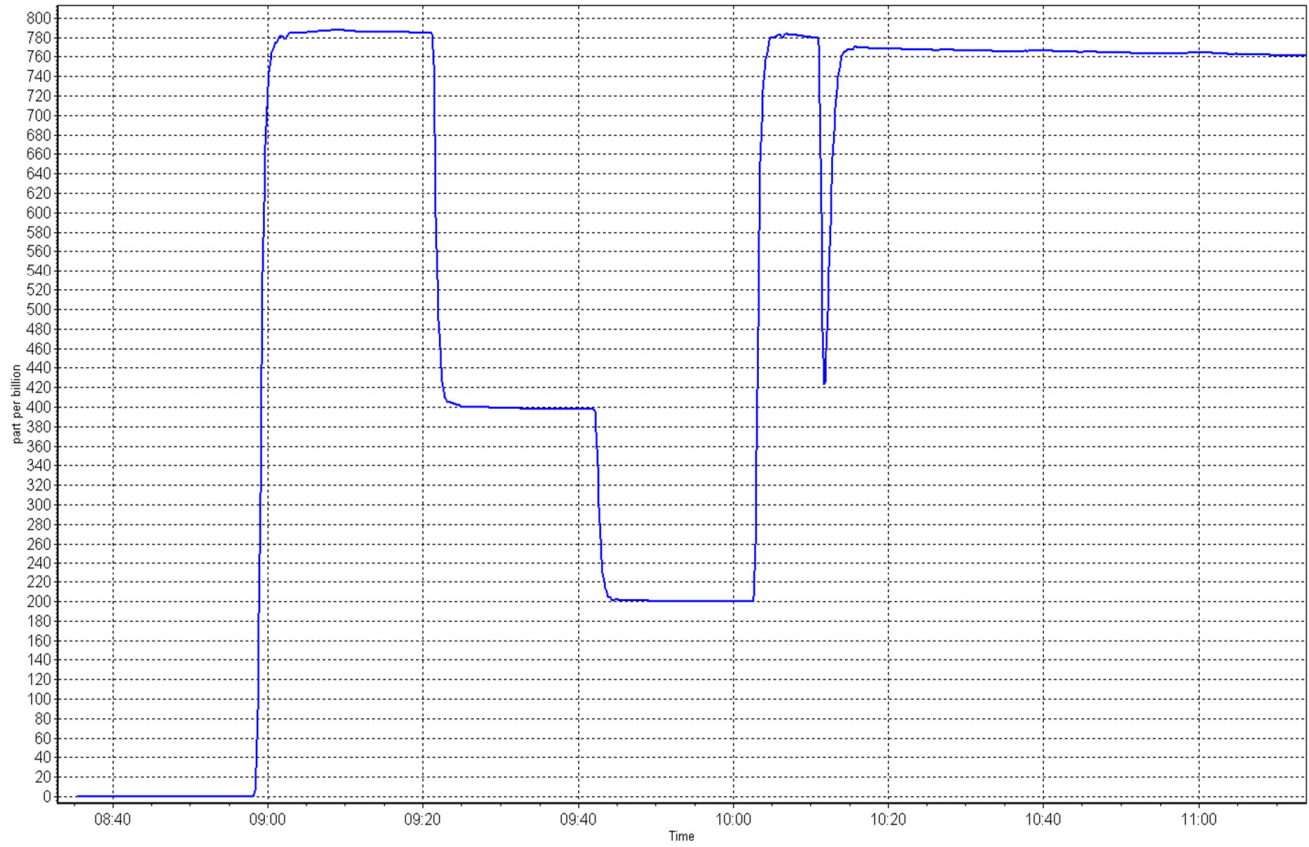
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999945
785.5	785.6	0.9998		
392.7	398.1	0.9865	Slope	1.000499
196.8	199.8	0.9850		
			Intercept	-2.373316



SO₂ Calibration Plot

Date: June 17, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 6, 2014
Station Name	Cenovus - Christina Lake	Station Number	AMS 103
Reason:	Routine		
Start Time (MST)	11:15	End Time (MST)	12:55
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	18.0	28.0
Analyzer Range (mv)	100	100	Lamp voltage	2318	2318
Calculated slope	0.984965	0.987175	Chamber temp.	50	50
Calculated intercept	-0.335270	-0.497624	Pressure	23.7	23.7
Analyzer Background	17.6	17.6	Flow	568	566
Analyzer Coefficient	1.003	1.003	Intensity	57	59
			Converter temp.	315	315

Analyzer make/model	API T101	Analyzer serial #	157
Converter make/model	Internal	Converter serial #	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	NA
as found span	5000	36.8	75.1	76.3	0.984
SO2 scrubber check	6000	24.3	200.1	5.2	NA
calibrator zero	6000	0.0	0.0	0.3	NA
high point	6000	44.1	75.0	76.3	0.983
second point	6000	23.5	40.0	41.2	0.969
third point	6000	11.8	20.1	21.0	0.956
calibrator zero					
as left zero					
as left span					
Average Correction Factor					0.969

Corrected As found 76.0 Previous response 76.6 % change 0.7%

Notes: Removal cal, scrubber check after third point

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

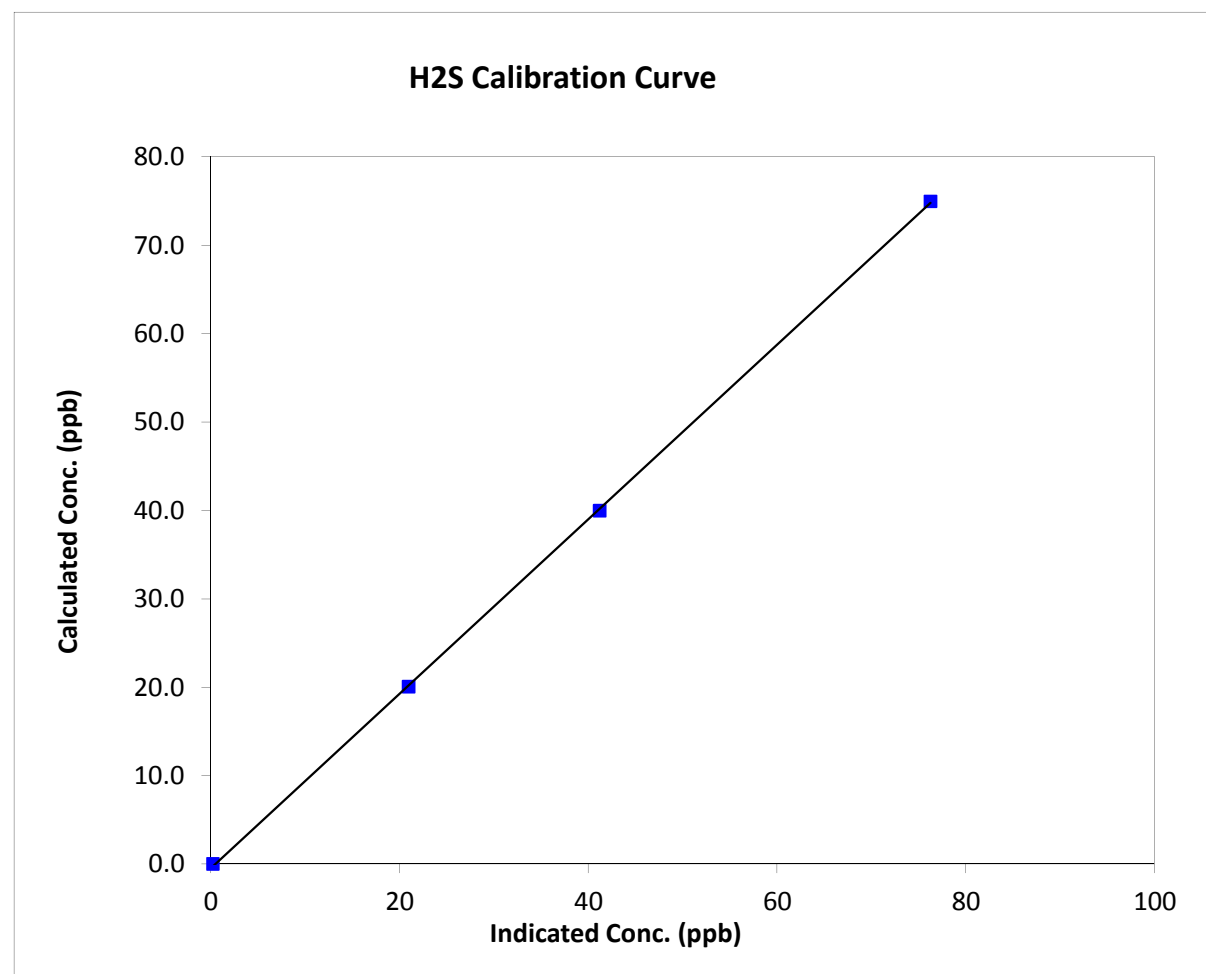
H2S Calibration Summary

Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 6, 2014
Station Name	Cenovus - Christina Lake	Station Number	AMS 103
Start Time (MST)	11:15	End Time (MST)	12:55
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	0.3	N/A	Correlation Coefficient	0.999944
75.0	76.3	0.9830		
40.0	41.2	0.9692	Slope	0.987175
20.1	21.0	0.9557		
			Intercept	-0.497624







Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 6, 2014
Station Name	Cenovus	Station Number	AMS 103
Reason:	Removal		
Start Time (MST)	8:30	End Time (MST)	11:40
Barometric Pressure	NA mmHg	Station Temperature	23.0 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

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.996757	1.002912	1.000080
	Data Offset	-0.355925	-0.863274	-0.505974
After	Data Slope	1.003723	0.996657	0.991013
	Data Offset	-2.648925	-4.133422	0.438489
Channel #				
Voltage Range		0-5V	0-5V	0-5V

Analyzer Information

Analyzer make/model Teledyne T200 Analyzer serial # 722

Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.986	ppb	0.986	ppb
NOx coefficient	0.981	ppb	0.981	ppb
NO2 coefficient		ppb		ppb
NO bkgrnd	-0.5		-0.5	
NOx bkgrnd	1.3		1.3	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.4	Deg C	316.4	Deg C
PMT Temp	6.8	Deg C	6.8	Deg C
O3 flow	84.0	ccm	84.0	ccm
R Cell Press	4.9	mmHg	4.8	mmHg
Sample Flow	458	ccm	428	ccm

Notes: Removal Cal



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

June 17, 2014

Station Number:

AMS 103

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	1.1	0.3	0.9	N/A	N/A
as found span	6000	95.4	804.5	799.8	4.8	808.8	797.5	11.3	0.9947	1.0028
calibrator zero	6000	0.0	0.0	0.0	0.0	1.1	0.3	0.9	N/A	N/A
high point	6000	95.4	804.5	799.8	4.8	808.8	797.5	11.3	0.9947	1.0028
second point	6000	47.7	402.3	399.9	2.4	412.3	404.4	7.9	0.9757	0.9890
third point	6000	23.9	201.6	200.4	1.2	207.5	203.3	4.2	0.9715	0.9857
calibrator zero										
as left zero										
as left span										
Average Correction Factor									0.9806	0.9925

Corrected As found

NO_x= 807.7

NO= 797.3

Percent Change

NO_x= -0.7%

NO= 0.7%

Previous Response

NO_x= 802.3

NO= 803.0

GPT Calibration Data

Total Flow

6000

ccm

Source Gas Flow

95.40

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			0.9			N/A	
1st NO ₂ (300)	N/A	467.6	329.7	801.8	467.6	334.2	0.9877	1.0000	0.9865	101.4%
2nd NO ₂ (200)	N/A	552.3	245.0	797.0	552.3	244.6	0.9937	1.0000	1.0014	99.9%
3rd NO ₂ (100)	N/A	674.0	123.3	797.0	674.0	122.9	0.9937	1.0000	1.0039	99.6%
4th NO ₂ (0)	797.3	N/A	13.7	811.0	797.3	13.6	0.9765	1.0000	N/A	N/A
Average Correction Factor							0.9879	1.0000	0.9973	100.3%

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

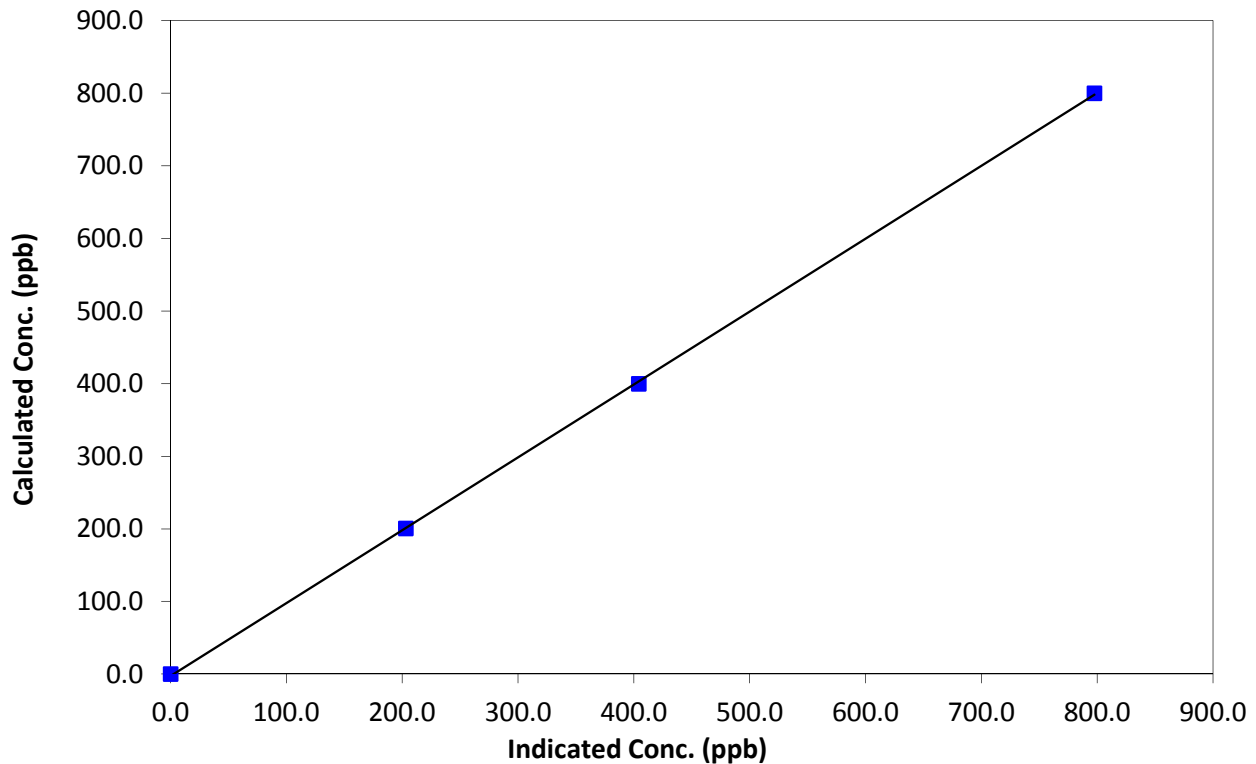
Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 6, 2014
Station Number	Cenovus	Station Number	AMS 103
Start Time (MST)	8:30	End Time (MST)	11:40
Analyzer make	Teledyne T200	Analyzer serial #	722

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999938
799.8	797.5	1.0028		
399.9	404.4	0.9890	Slope	1.003723
200.4	203.3	0.9857		
			Intercept	-2.648925

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

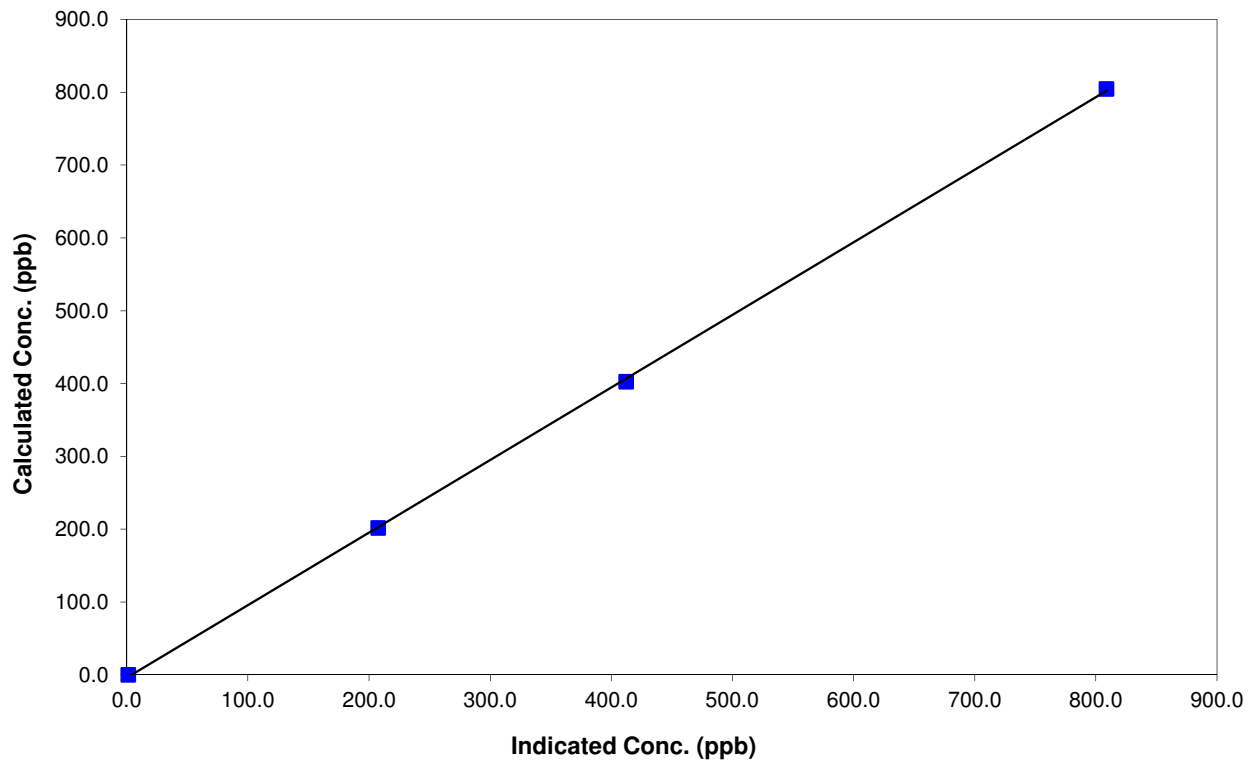
Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 6, 2014
Station Number	Cenovus	Station Number	AMS 103
Start Time (MST)	8:30	End Time (MST)	11:40
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	1.1	N/A	Correlation Coefficient	0.999895
804.5	808.8	0.9947		
402.3	412.3	0.9757	Slope	0.996657
201.6	207.5	0.9715		
			Intercept	-4.133422

NO Calibration Curve





Wood Buffalo Environmental Association

NO2 Calibration Summary

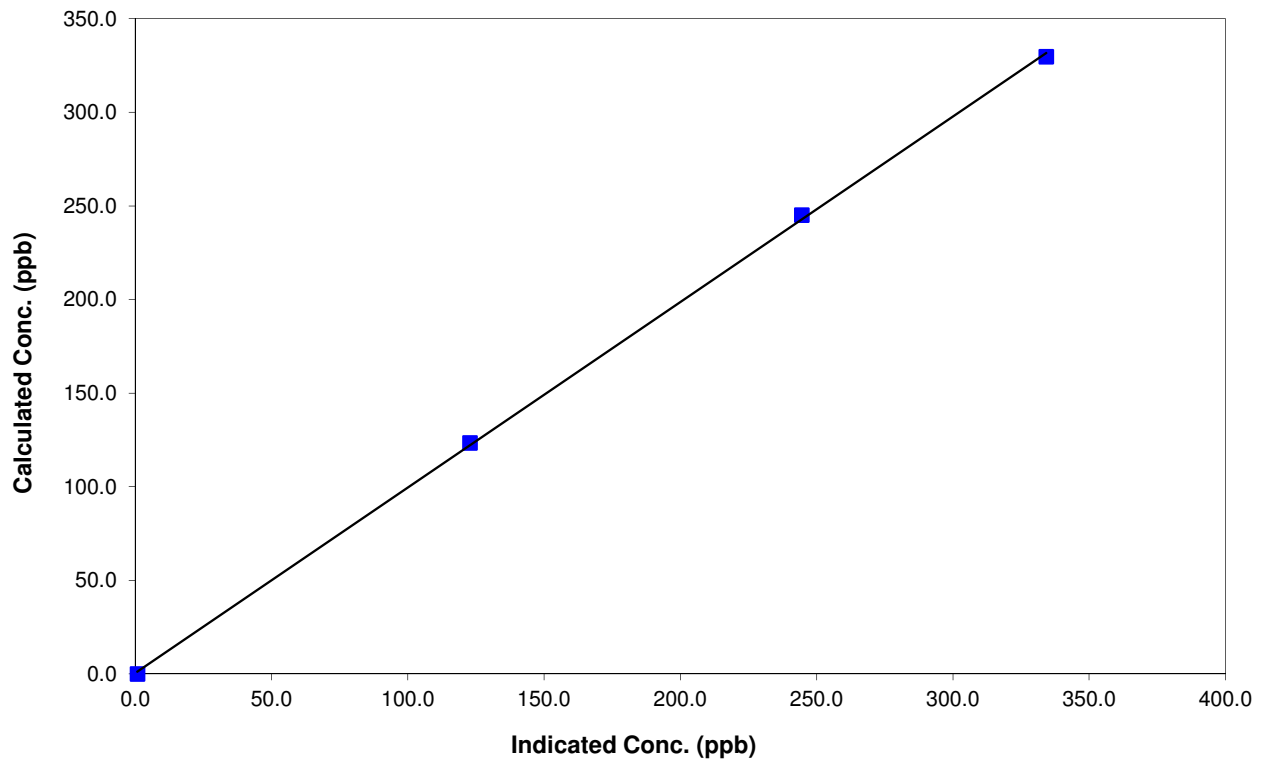
Station Information

Calibration Date	June 17, 2014	Previous Calibration	May 6, 2014
Station Number	Cenovus	Station Number	AMS 103
Start Time (MST)	8:30	End Time (MST)	11:40
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	0.9	N/A	Correlation Coefficient	0.999820
329.7	334.2	0.9865		
245.0	244.6	1.0014	Slope	0.991013
123.3	122.9	1.0039		
			Intercept	0.438489

NO2 Calibration Curve



NOx, NO & NO₂ Calibration Plot

Date: June 17, 2014

