



*WOOD BUFFALO
ENVIRONMENTAL
ASSOCIATION*

JULY 2014

MONTHLY REPORT



CONTINUOUS MONITORING
INTEGRATED MONITORING
August 29, 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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August 29, 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 July 2014
Wood Buffalo Environmental Association**

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

The continuous ambient air quality monitoring network stations are:

AMS 1 - Fort McKay – Bertha Ganter
AMS 2 - Mildred Lake
AMS 3 - Lower Camp B (meteorology)
AMS 4 - Buffalo Viewpoint
AMS 5 - Mannix
AMS 6 - Patricia McInnes
AMS 7 - Athabasca Valley
AMS 8 - Fort Chipewyan
AMS 9 - Barge Landing
AMS 11 - Lower Camp (air quality)
AMS 12 - Millennium Mine
AMS 13 - Fort McKay South
AMS 14 - Anzac
AMS 15 - CNRL Horizon
AMS 16 - Shell Muskeg River
AMS 17 - Wapasu
AMS 19 - Firebag
AMS 501 - Statoil Leismer
AMS502 - ConocoPhillips Surmont

WBEA commissioned a permanent air monitoring station at the Suncor Firebag facility on July 9, 2014. This continuous air monitoring station is to fulfill Alberta Environment's Environmental Protection and Enhancement Act (EPEA) facility approval number 80105-01-00. This station is equipped with ambient air quality analyzers for SO₂, H₂S, THC, NO, NO₂, NO_x and meteorological sensors for ambient temperature, relative humidity, and wind speed and direction.

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

241311-00-02. The survey at the ConocoPhillips Surmont facility will be conducted from July 1, 2014 to June 30, 2015 to fulfill EPEA approval number 48263-00-00.

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

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

1.0 Concentrations in Excess of Alberta Ambient Air Quality Objectives

There were no ambient concentrations in excess of the air quality objectives as indicated in the Air Monitoring Directive Section III.A.3 (a & b) for SO₂, CO, H₂S, NO₂, NH₃ and O₃.

There was 1 ambient ground level concentration of H₂S in excess of the 1-hour H₂S air quality objectives reported to Alberta Environment in real time. After data processing to account for valid analyzer response, the reported incident was found not to be in exceedance of the objective.

There were 50 ambient ground level concentrations of PM_{2.5} in excess of the 24-hour PM_{2.5} air quality objective reported to Alberta Environment in real time. After data processing to account for valid analyzer response, there were 48 concentrations in excess of the 24-hour PM_{2.5} air quality objective. There were 2 24-hour objective exceedances reported in real-time that were found not to be in exceedance after data processing.

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

<u>Site</u>	<u>parameter</u>	<u>date/time</u>	<u>reference</u>	<u>period</u>	<u>concentration (ppb or ug/m³ for PM_{2.5})</u>		
					<u>reported</u>	<u>final</u>	<u>status*</u>
AMS 5 Mannix	H ₂ S	30Jul14:22:00	287530	1-hour	14	8.0	nae
AMS 1 Fort McKay	PM _{2.5}	12Jul14:24:00	286635	24-hour	40	42.8	exc
AMS 1 Fort McKay	PM _{2.5}	20Jul14:24:00	521045	24-hour	35	34.6	late
AMS 1 Fort McKay	PM _{2.5}	21Jul14:24:00	755103	24-hour	31	32.3	exc
AMS 1 Fort McKay	PM _{2.5}	22Jul14:24:00	287165	24-hour	36	35.6	exc
AMS 1 Fort McKay	PM _{2.5}	31Jul14:24:00	287591	24-hour	43	43.2	exc
AMS 6 Patricia McInnes	PM _{2.5}	07Jul14:24:00	286331	24-hour	36	36.4	exc
AMS 6 Patricia McInnes	PM _{2.5}	12Jul14:24:00	286636	24-hour	61	60.5	exc
AMS 6 Patricia McInnes	PM _{2.5}	20Jul14:24:00	521045	24-hour	37	36.5	late
AMS 6 Patricia McInnes	PM _{2.5}	21Jul14:24:00	755104	24-hour	30	26.8	rec
AMS 6 Patricia McInnes	PM _{2.5}	22Jul14:24:00	287166	24-hour	31	30.5	exc
AMS 6 Patricia McInnes	PM _{2.5}	31Jul14:24:00	287592	24-hour	50	50.0	exc

Site	parameter	date/time	reference	period	concentration (ppb or ug/m3 for PM _{2.5})		status
					reported	final	
AMS 7 Athabasca Valley	PM _{2.5}	07Jul14:24:00	286332	24-hour	35	36.2	exc
AMS 7 Athabasca Valley	PM _{2.5}	12Jul14:24:00	286637	24-hour	58	58.6	exc
AMS 7 Athabasca Valley	PM _{2.5}	20Jul14:24:00	521047	24-hour	35	36.5	late
AMS 7 Athabasca Valley	PM _{2.5}	21Jul14:24:00	755105	24-hour	34	32.8	exc
AMS 7 Athabasca Valley	PM _{2.5}	22Jul14:24:00	287174	24-hour	32	33.0	exc
AMS 7 Athabasca Valley	PM _{2.5}	31Jul14:24:00	287593	24-hour	40	41.5	exc
AMS 8 Fort Chipewyan	PM _{2.5}	11Jul14:24:00	286623	24-hour	39	39.1	late
AMS 8 Fort Chipewyan	PM _{2.5}	22Jul14:24:00	287167	24-hour	31	31.0	exc
AMS 8 Fort Chipewyan	PM _{2.5}	31Jul14:24:00	287594	24-hour	52	51.9	exc
AMS 12 Millennium Mine	PM _{2.5}	07Jul14:24:00	286333	24-hour	34	34.1	exc
AMS 12 Millennium Mine	PM _{2.5}	12Jul14:24:00	286638	24-hour	42	42.3	exc
AMS 12 Millennium Mine	PM _{2.5}	16Jul14:24:00	286875	24-hour	33	32.8	exc
AMS 12 Millennium Mine	PM _{2.5}	20Jul14:24:00	521048	24-hour	36	36.1	late
AMS 12 Millennium Mine	PM _{2.5}	21Jul14:24:00	755106	24-hour	40	33.2	exc
AMS 12 Millennium Mine	PM _{2.5}	22Jul14:24:00	287168	24-hour	37	37.6	exc
AMS 12 Millennium Mine	PM _{2.5}	31Jul14:24:00	287595	24-hour	38	37.9	exc
AMS 13 Syncrude UE-1	PM _{2.5}	12Jul14:24:00	286639	24-hour	45	45.1	exc
AMS 13 Syncrude UE-1	PM _{2.5}	20Jul14:24:00	521049	24-hour	35	35.2	late
AMS 13 Syncrude UE-1	PM _{2.5}	21Jul14:24:00	755107	24-hour	33	34.6	exc
AMS 13 Syncrude UE-1	PM _{2.5}	22Jul14:24:00	287169	24-hour	32	31.8	exc
AMS 13 Syncrude UE-1	PM _{2.5}	31Jul14:24:00	287596	24-hour	41	41.4	exc
AMS 14 Anzac	PM _{2.5}	07Jul14:24:00	286334	24-hour	41	40.7	exc
AMS 14 Anzac	PM _{2.5}	12Jul14:24:00	286640	24-hour	55	54.7	exc
AMS 14 Anzac	PM _{2.5}	20Jul14:24:00	521043	24-hour	40	40.5	exc
AMS 14 Anzac	PM _{2.5}	21Jul14:24:00	755108	24-hour	44	34.1	exc
AMS 14 Anzac	PM _{2.5}	22Jul14:24:00	287170	24-hour	32	31.9	exc
AMS 15 CNRL Horizon	PM _{2.5}	07Jul14:24:00	286335	24-hour	41	42.1	exc
AMS 15 CNRL Horizon	PM _{2.5}	12Jul14:24:00	286641	24-hour	40	41.0	exc
AMS 15 CNRL Horizon	PM _{2.5}	20Jul14:24:00	521044	24-hour	36	37.8	exc
AMS 15 CNRL Horizon	PM _{2.5}	21Jul14:24:00	755109	24-hour	41	33.8	exc
AMS 15 CNRL Horizon	PM _{2.5}	22Jul14:24:00	287171	24-hour	33	34.2	exc
AMS 15 CNRL Horizon	PM _{2.5}	31Jul14:24:00	287597	24-hour	54	55.1	exc

Site	parameter	date/time	reference	period	concentration (ppb or ug/m3 for PM _{2.5})		
					reported	final	status
AMS 16 Shell Muskeg River	PM _{2.5}	12Jul14:24:00	286642	24-hour	37	36.7	exc
AMS 16 Shell Muskeg River	PM _{2.5}	21Jul14:24:00	755110	24-hour	36	26.8	rec
AMS 16 Shell Muskeg River	PM _{2.5}	22Jul14:24:00	287172	24-hour	34	34.0	exc
AMS 16 Shell Muskeg River	PM _{2.5}	31Jul14:24:00	287598	24-hour	89	42.4	exc
AMS 17 Wapasu	PM _{2.5}	21Jul14:24:00	755111	24-hour	40	30.6	exc
AMS 17 Wapasu	PM _{2.5}	22Jul14:24:00	287173	24-hour	33	33.2	exc
AMS 17 Wapasu	PM _{2.5}	31Jul14:24:00	287599	24-hour	31	30.9	exc

*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 July 2014, there were no incidents resulting in a compliance monitoring instrument operating less than 90 % of the time.

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

Station 1, Fort McKay

The NH₃ analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily span period. Additional time for stabilization after spanning is an inherent behavior in the NH₃ analyzer operations resulting from the properties of the NH₃ gas. Data for one hour following the daily spans have been reported as invalid for a total of 31 hours this month.

Maintenance and cleaning of the sample manifold on July 16th interrupted the normal operations of all air quality analyzers for 3 hours. The NH₃ analyzer required additional time to stabilize following the maintenance on the sample manifold resulting 8 hours invalid data.

There were three issues associated with operation of the THC analyzer resulting in 11 hours of invalid data. Station operator activities on July 15 affected the normal operation of the THC analyzer for 5 hours. A power spike at the station on July 30 affected the normal operations of the THC analyzer for 1 hour. The normal baseline readings for the THC analyzer on July 31st drifted below the background value of 1.8 ppm resulting in an additional 5 hours of invalid data.

There were two issues associated with operation of the PM_{2.5} analyzer resulting in 3 hours of invalid data. The PM_{2.5} analyzer experienced a single episode of intermittent unstable operation on July 6, resulting in 2 hours of invalid data. Maintenance to the sample inlet and flow and zero reference checks on July 17 interrupted the normal operations of the PM_{2.5} analyzer for 1 hour.

There were six issues associated with operation of the O₃ analyzer resulting in 67 hours of invalid data. Excessive particulate deposits from the forest fire in the region interrupted the normal operations of the analyzer 46 hours. Three instances of power spikes resulted in 4 hours of invalid data. Replacement of the analyzer and maintenance on the daily auto zero and span systems interrupted the normal operation of the analyzer for 17 hours.

Maintenance and response check of the leaf wetness sensor on July 10 interrupted the normal operation of the sensor for 1 hour.

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

Station 2, Mildred Lake

Maintenance and cleaning of the sample manifold on July 17th interrupted the normal operations of the H₂S analyzer for 1 hour.

Power spikes at the station on July 25th and 30th affected the normal operations of all air quality analyzers for 2 hours.

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

Station 3, Lower Camp B - Meteorology

Spikes in the output signals of the 167 m elevation wind sensor on July 6th, resulted 1 hour of invalid data.

Flat-lines in the output signals of the 167 m elevation meteorological sensors on July 30 resulted in 29 hours of invalid data.

Station 4, Buffalo Viewpoint

A power spike at the station on July 31st affected the normal operation of all air quality analyzers for 4 hours.

Station 5, Mannix

Maintenance and cleaning of the sample manifold on July 11th interrupted the normal operations of the SO₂ and THC analyzers for 1 hour.

Flat-line in the output signals of the 90 m elevation wind sensor resulted in 1 hour of invalid data this reporting period.

Station 6, Patricia McInnes

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

Maintenance and cleaning of the sample manifold on July 9th interrupted the normal operations of SO₂, THC and NO_x analyzers for 1 to 2 hours.

The PM_{2.5} analyzer experienced three episodes of unstable operation this month resulting in 13 hours of invalid data. Maintenance to the sample inlet and flow and zero reference checks on July 14th interrupted the normal operations of the PM_{2.5} analyzer for an additional 2 hours.

Upgrades to the station setup and transition to a digital data collection program interrupted the normal operations of the analyzers and meteorological sensors from 2 to 25 hours this month.

Station 7, Athabasca Valley

Spikes in the output signals of the temperature and Relative Humidity sensors on July 19th resulted 2 hours of invalid data.

Maintenance on the auto daily zero and span systems and verification of analyzer response on July 22nd interrupted the normal operations of the THC analyzer for 1 hour.

Maintenance to the sample inlet and flow and zero reference checks on July 23rd interrupted the normal operations of the PM_{2.5} analyzer for 1 hour.

The normal operation of the TRS analyzer was interrupted on July 25th for 2 hours due to a maintenance calibration to re-adjust the zero base line.

Station 8, Fort Chipewyan

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

A power failure at the station on July 10th interrupted the normal operations of all air quality analyzers for 4 hours.

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

Station 9, Barge Landing

A power failure at the station on July 3rd interrupted the normal operations of the TRS analyzer for 2 hours.

Maintenance and cleaning of the sample manifold on July 8th interrupted the normal operations of TRS analyzer for 1 hour.

The THC analyzer experienced two episodes of intermittent unstable operation on July 30th and 31st, resulting in 4 hours of invalid data.

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

Station 11, Lower Camp

Station operator activities on July 16 affected the normal operations of the all air quality analyzers for 1 hour.

Station 12, Millennium Mine

Power interruptions at the station on July 16th and 23rd affected the normal operations of all parameters for 3 to 7 hours.

Maintenance to the sample inlet, flow audits and zero reference checks on July 29th 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 1 hours of invalid data this reporting period.

Station 13, Syncrude UE 1

The SO₂ analyzer experienced four episodes of intermittent unstable operation this reporting period, resulting in 4 hours of invalid data.

Maintenance to the sample inlet, flow audits and zero reference checks on July 22nd interrupted the normal operations of the PM_{2.5} analyzer for 1 hour.

Station 14, Anzac

A power failure at the station on July 6th interrupted the normal operations of all air quality analyzers for 2 hours. The THC analyzer required additional time to stabilize to ambient levels following the power spike resulting in 1 hour of invalid data.

Maintenance on the daily zero and span systems and verification of analyzer responses on July 9th interrupted the normal operations of the THC analyzer for 1 hour.

A new data collection program and revision uploads to the data logger on July 19th and 27th interrupted the normal data collection for all parameters for 5 hours.

Maintenance and replacement of the fuel gas cylinder at the station on July 19th interrupted the normal operations of the THC analyzer for 6 hours.

There were two issues associated with operation of the PM_{2.5} analyzer resulting in 11 hours of invalid data. The filter tape in the analyzer failed to advance on July 4th resulting in 9 hours of

invalid data. A power interrupted at the station on July 18th affected the normal operations of the analyzer for 2 hours.

Replacement of the wind speed and direction sensors at the station on July 7th affected the normal operations of these parameters for 1 hour.

Flat-lines in the output signals of the wind sensor resulted in 18 hours of invalid data this reporting period.

Station 15, CNRL Horizon

Maintenance and cleaning of the glass manifold on July 15th interrupted the normal operations of the TRS analyzer for 1 hour.

Maintenance and cleaning of the precipitation collector on July 17th resulted in 1 hour of invalid data.

Maintenance to the sample inlet, flow audits and zero reference checks on July 17th interrupted the normal operations of the PM_{2.5} analyzer for 1 hour.

Station 16, Albian Muskeg River

Power spikes at the station during this reporting period, affected the normal operations of all parameters for 4 hours.

Maintenance to the sample inlet, flow audits and zero reference checks on July 29th interrupted the normal operations of the PM_{2.5} analyzer for 1 hour.

A new data collection program and revision uploads to the data logger on July 31st interrupted the normal data collection for all parameters for 1 hour.

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

A new data collection program and revision uploads to the data logger on July 31st interrupted the normal data collection of the relative humidity and barometric pressure sensors for 10 hours.

Station 17, Wapasu

Maintenance on the auto daily zero and span systems and verification of analyzer responses on July 4, 6 and 8 interrupted the normal operations of all air quality analyzers for 2 to 3 hours.

Maintenance and cleaning of the sample manifold on July 15th interrupted the normal operations of the SO₂, THC and NO_x analyzers for 1 hour.

Maintenance to the sample inlet, flow audits and zero reference checks on July 15th interrupted the normal operations of the PM_{2.5} analyzer for 1 hour.

There 3 instances of power spikes during this reporting period, resulting in 1 hour of invalid data for the H₂S, THC and NO_x analyzers.

Station 19, Firebag

WBEA commissioned a permanent air monitoring station at the Suncor Firebag facility on July 9, 2014. This continuous air monitoring station is to fulfill Alberta Environment's Environmental Protection and Enhancement Act (EPEA) facility approval number 80105-01-00. This station is equipped with ambient air quality analyzers for SO₂, H₂S, THC, NO, NO₂, NO_x and meteorological sensors for ambient temperature, relative humidity, and wind speed and direction.

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

Station 501, Statoil Leismer

In July 2014, WBEA commissioned a portable air monitoring station at the Statoil Leismer facility. The survey at this location will be conducted from July 1 to September 30, 2014 to fulfill Alberta Environment's Environmental Protection and Enhancement Act facility approval number 241311-00-02. This station is equipped with ambient air quality analyzers for SO₂, H₂S, NO, NO₂, NO_x and meteorological sensors for ambient temperature, relative humidity, and wind speed and direction.

Power interruptions at the station on July 11th affected the normal operations of all air quality analyzers for 8 hours.

The SO₂ analyzer experienced extended stabilization periods after daily span checks this reporting month resulting in 31 hours of invalid data.

The H₂S analyzer experienced two episodes of unstable operations for excessive baseline drift this month, resulting in 2 hours of invalid data.

Flat-lines in the output signals of the wind sensor resulted in 3 hours of invalid data this reporting period.

Station 502, ConocoPhillips Surmont

In July 2014, WBEA commissioned a portable air monitoring station at the ConocoPhillips facility. The survey at this location will be conducted from July 1, 2014 to June 30, 2015 to fulfill Alberta Environment's Environmental Protection and Enhancement Act facility approval number 48263-00-00. This station is equipped with ambient air quality analyzers for SO₂, H₂S, NO, NO₂, NO_x and meteorological sensors for ambient temperature, relative humidity, and wind speed and direction.

The nitrogen oxides analyzer utilizes chemiluminescence detection principle for measurement of nitric oxide (NO), nitrogen dioxide (NO₂) and the total nitrogen oxides (NO_x). A molybdenum converter operating at 325°C oxidizes any NO₂ molecules to produce NO and ozone (O₃). The produced NO is measured by the analyzer as well as the NO_x component of the ambient air. The subtraction of NO from NO_x calculates the NO₂ value. On a daily basis, zero air is directed through the sample flow of the analyzer to determine the “offset” or analyzer drift. This offset or analyzer drift is then used to subtract from ambient readings recorded by the analyzer for representative ambient values of NO_x, NO and NO₂. During this reporting period, a flow restriction was observed in the molybdenum converter while the analyzer was in daily auto zero mode. Specifically, during the periods of daily auto zero mode when flow restrictions existed, the calculated daily “offset” was not representative of the analyzer condition. Therefore, during data validation and processing for final data, manual analyzer zero data from the monthly multipoint calibrations were used to calculate the analyzer “offset” and final data.

Maintenance and replacement of the molybdenum converter at the station on July 10 interrupted the normal operations of the NO_x analyzer for 7 hours.

The NO_x analyzer experienced multiple episodes of intermittent unstable operations due to flow restrictions in the molybdenum converter and excessive baseline drift resulting in 44 hours of invalid data.

Station 101, Portable

Not in operation during this reporting period.

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

Yours sincerely,

Aurora Atmospheric Inc.

Sanjay Prasad
Air Quality Scientist

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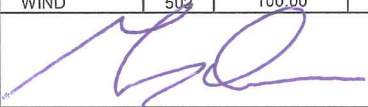
WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
MONTHLY AIR MONITORING SUMMARY
for AMD SECTION III.B.1(c)

JULY 2014
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prepared 29Aug14:08:09

APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	7	2014					
254465-00-00							
149968-00-01							
48522-01-00	CONTINUOUS AMBIENT MONITORING						
240008-00-03			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
48263-00-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
224816-00-03	SO2(ppm)	1	99.60	0.034	0	0.006	0
189942-00-02	SO2(ppm)	2	99.73	0.047	0	0.012	0
206355-00-00	SO2(ppm)	4	99.46	0.020	0	0.004	0
46586-00-00	SO2(ppm)	5	99.87	0.063	0	0.009	0
216466-00-04	SO2(ppm)	6	97.04	0.012	0	0.004	0
137467-00-00	SO2(ppm)	7	100.00	0.013	0	0.004	0
20809-01-00	SO2(ppm)	8	99.46	0.003	0	0.001	0
241311-00-00	SO2(ppm)	11	99.87	0.045	0	0.011	0
094-02-00	SO2(ppm)	12	99.60	0.034	0	0.007	0
305529-00-00	SO2(ppm)	13	99.46	0.046	0	0.007	0
026-02-00	SO2(ppm)	14	99.06	0.064	0	0.005	0
228044-00-00	SO2(ppm)	15	100.00	0.040	0	0.006	0
73203-01-00	SO2(ppm)	16	99.33	0.049	0	0.010	0
	SO2(ppm)	17	99.60	0.027	0	0.004	0
	SO2(ppm)	19	100.00	0.013	0	0.002	0
	SO2(ppm)	501	94.76	0.007	0	0.002	0
	SO2(ppm)	502	100.00	0.017	0	0.004	0
	H2S(ppm)	2	99.60	0.008	0	0.002	0
	H2S(ppm)	4	99.46	0.003	0	0.001	0
	H2S(ppm)	5	100.00	0.010	0	0.002	0
	H2S(ppm)	11	99.87	0.007	0	0.002	0
	H2S(ppm)	17	99.60	0.005	0	0.001	0
	H2S(ppm)	19	100.00	0.001	0	0.001	0
	H2S(ppm)	501	98.52	0.001	0	0.000	0
	H2S(ppm)	502	100.00	0.006	0	0.001	0
	TRS(ppm)	1	99.60	0.003	0	0.001	0
	TRS(ppm)	6	97.85	0.003	0	0.001	0
	TRS(ppm)	7	99.73	0.002	0	0.001	0
	TRS(ppm)	9	99.60	0.003	0	0.001	0
	TRS(ppm)	12	99.60	0.005	0	0.001	0
	TRS(ppm)	13	100.00	0.003	0	0.001	0
	TRS(ppm)	14	99.06	0.007	0	0.001	0
	TRS(ppm)	15	99.87	0.002	0	0.001	0
	THC(ppm)	1	98.12	2.3	-	2.0	-
	THC(ppm)	2	99.73	6.9	-	3.1	-
	THC(ppm)	4	99.46	3.6	-	2.7	-
	THC(ppm)	5	99.87	3.9	-	2.6	-
	THC(ppm)	6	96.91	2.7	-	2.1	-
	THC(ppm)	7	99.87	2.5	-	2.1	-
	THC(ppm)	9	99.46	3.1	-	2.3	-
	THC(ppm)	11	99.87	4.3	-	3.1	-
	THC(ppm)	12	99.46	5.1	-	3.1	-
	THC(ppm)	13	100.00	3.3	-	2.4	-
	THC(ppm)	14	97.98	3.8	-	2.3	-
	THC(ppm)	15	100.00	4.0	-	2.6	-
	THC(ppm)	16	99.33	4.1	-	2.9	-
	THC(ppm)	17	99.46	2.7	-	2.3	-
	THC(ppm)	19	100.00	3.2	-	2.4	-
	O3(ppm)	1	90.59	0.077	0	0.036	-
	O3(ppm)	6	98.12	0.056	0	0.037	-

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

JULY 2014
page 2 of 2
prepared 29Aug14:08:09

APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	7	2014					
254465-00-00							
149968-00-01							
48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00							
224816-00-03							
189942-00-02							
206355-00-00							
46586-00-00							
216466-00-04							
137467-00-00							
20809-01-00							
241311-00-02							
094-02-00							
305529-00-00							
026-02-00							
228044-00-00							
73203-01-00							
			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	
O3(ppm)	7	100.00	0.062	0	0.031	-	
O3(ppm)	8	99.46	0.052	0	0.039	-	
O3(ppm)	13	100.00	0.069	0	0.030	-	
O3(ppm)	14	99.06	0.066	0	0.037	-	
O3(ppm)	17	100.00	0.076	0	0.043	-	
NO2(ppm)	1	99.60	0.020	0	0.006	-	
NO2(ppm)	6	97.72	0.014	0	0.008	-	
NO2(ppm)	7	100.00	0.020	0	0.010	-	
NO2(ppm)	8	99.46	0.006	0	0.002	-	
NO2(ppm)	12	99.06	0.043	0	0.013	-	
NO2(ppm)	13	100.00	0.022	0	0.006	-	
NO2(ppm)	14	99.06	0.014	0	0.003	-	
NO2(ppm)	15	100.00	0.024	0	0.007	-	
NO2(ppm)	16	99.33	0.036	0	0.017	-	
NO2(ppm)	17	99.33	0.013	0	0.004	-	
NO2(ppm)	19	100.00	0.038	0	0.009	-	
NO2(ppm)	501	98.92	0.014	0	0.004	-	
NO2(ppm)	502	93.15	0.021	0	0.007	-	
CO(ppm)	7	100.00	1.1	0	0.4	-	
NH3(ppm)	1	94.35	0	0	0	-	
NH3(ppm)	6	92.74	0	0	0	-	
PM2.5(ug/m ³)	1	99.19	213.8	-	43.2	5	
PM2.5(ug/m ³)	6	97.04	218.1	-	60.5	5	
PM2.5(ug/m ³)	7	99.87	227.3	-	58.6	6	
PM2.5(ug/m ³)	8	99.73	241	-	51.9	3	
PM2.5(ug/m ³)	12	99.46	269.2	-	42.3	7	
PM2.5(ug/m ³)	13	99.87	173.3	-	45.1	5	
PM2.5(ug/m ³)	14	98.12	86.2	-	54.7	5	
PM2.5(ug/m ³)	15	99.87	210.9	-	55.1	6	
PM2.5(ug/m ³)	16	99.19	212.3	-	42.4	3	
PM2.5(ug/m ³)	17	99.87	180.4	-	33.2	3	
WIND	1	100.00	-	-	-	-	
WIND	2	99.33	-	-	-	-	
WIND	4	100.00	-	-	-	-	
WIND	5	100.00	-	-	-	-	
WIND	6	99.46	-	-	-	-	
WIND	7	100.00	-	-	-	-	
WIND	8	99.87	-	-	-	-	
WIND	9	99.87	-	-	-	-	
WIND	11	100.00	-	-	-	-	
WIND	12	99.87	-	-	-	-	
WIND	13	100.00	-	-	-	-	
WIND	14	97.04	-	-	-	-	
WIND	15	100.00	-	-	-	-	
WIND	16	99.73	-	-	-	-	
WIND	17	100.00	-	-	-	-	
WIND	19	99.81	-	-	-	-	
WIND	501	99.60	-	-	-	-	
WIND	502	100.00	-	-	-	-	
							
SIGNATURE OF ASSOCIATION REPRESENTATIVE			FOR ALBERTA ENVIRONMENT USE ONLY				

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 1
BERTHA GANTER FORT MCKAY
JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY - BERTHA GANTER (AMS 1)
 JULY 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	706	35	38	99.60	34	0	6	0
TRS(ppb) Average	706	35	38	99.60	3	0	1	0
THC(ppm) Average	696	34	48	98.12	2.3	-	2	-
NMHC(ppm) Average	696	34	48	98.12	0.262	-	0.026	-
CH4(ppm) Average	696	34	48	98.12	2.3	-	2	-
O3 (ppb) Average	630	44	114	90.59	77	0	36	-
NO2 (ppb) Average	705	36	39	99.60	20	0	6	-
NO (ppb) Average	705	36	39	99.60	18	-	3	-
NOX (ppb) Average	705	36	39	99.60	35	-	8	-
NH3 (ppb) Average	653	49	91	94.35	0	0	0	-
PM2.5 (ug/m3) Average	738	0	6	99.19	213.8	-	43.2	5
Wind Speed 10 m (km/h) Average	744	0	0	100.00	18	-	-	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	37.6	-	28.7	-
Temperature 10 m (C) Average	744	0	0	100.00	35	-	28.1	-
Relative Humidity (%) Average	744	0	0	100.00	100	-	-	-
Precipitation (mm) Total	744	0	0	100.00	9.9	-	-	-
Surface Wetness (% of range) Average	743	0	1	99.87	62	-	-	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	551	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT McKAY (AMS 1)
 JULY 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	706	1.8	4	-	0	0	1	1	1	4	34
TRS (ppb) Average	706	0.4	0	-	0	0	0	0	0	1	3
THC (ppm) Average	696	1.89	0.1	-	1.8	1.8	1.8	1.9	1.9	2	2.3
NMHC(ppm) Average	696	0.002	0.017	-	0	0	0	0	0	0	0.262
CH4(ppm) Average	696	1.88	0.1	-	1.8	1.8	1.8	1.9	1.9	2	2.3
O3 (ppb) Average	630	24.1	14	-	0	8	13	22	33	44	77
NO2 (ppb) Average	705	3.2	3	-	0	0	1	2	5	8	20
NO (ppb) Average	705	0.9	2	-	0	0	0	0	1	2	18
NOX (ppb) Average	705	4.2	5	-	0	0	1	2	5	11	35
NH3 (ppb) Average	653	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	738	16.83	17.4	-	0.3	2.6	5.8	11.3	23.6	34.7	213.8
Wind Speed 10 m (km/h) Average	744	5.7	3	-	0	2	3	5	8	10	18
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	22.57	6	-	9	15	17.6	22.4	27.1	31	37.6
Temperature 10 m (C) Average	744	22.51	4.9	-	10.4	16.4	18.5	22.4	26.3	29.1	35
Relative Humidity (%) Average	744	67.2	20	-	26	39	51	68	84	93	100
Precipitation (mm) Total	744	-	-	83.82	0	0	0	0	0	0	9.9
Surface Wetness (% of range) Average	743	4.6	11	-	0	0	0	0	0	17	62
Global Solar Radiation (W/m2) Average	744	155.6	169	-	0	0	1	89	289	435	551

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER Fort McKay (AMS 1)
JULY 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	16 Jul 2014 12:00	16 Jul 2014 14:00	3	Maintenance - replaced glass manifold stack
NMHC, CH4, THC	15 Jul 2014 09:00	15 Jul 2014 13:00	5	Maintenance - Station operator on site
NMHC, CH4, THC	30 Jul 2014 20:00	30 Jul 2014 20:00	1	Power spike
NMHC, CH4, THC	31 Jul 2014 09:00	31 Jul 2014 13:00	5	Unstable operation - excessive baseline drift
O3	02 Jul 2014 16:00	03 Jul 2014 10:00	19	Analyzer failure - excessive deposits on cells due to forest fire
O3	06 Jul 2014 19:00	06 Jul 2014 20:00	2	Unstable operation - spike in output signal
O3	08 Jul 2014 19:00	08 Jul 2014 19:00	1	Unstable operation - spike in output signal
O3	09 Jul 2014 13:00	09 Jul 2014 13:00	1	Power spike
O3	10 Jul 2014 08:00	11 Jul 2014 10:00	27	Analyzer failure - excessive noise in output signal
O3	11 Jul 2014 11:00	11 Jul 2014 18:00	8	Maintenance - replaced analyzer and re-calibration
O3	12 Jul 2014 14:00	12 Jul 2014 17:00	4	Maintenance on daily auto zero and span system
O3	14 Jul 2014 10:00	14 Jul 2014 14:00	5	Maintenance on daily auto zero and span system
NH3	01 Jul 2014 03:00	31 Jul 2014 03:00	31	Stabilization after daily span
NH3	16 Jul 2014 14:00	16 Jul 2014 22:00	8	Additional stabilization following glass manifold replacement
PM2.5	06 Jul 2014 16:00	06 Jul 2014 17:00	2	Unstable operation - excessive baseline drift
PM2.5	17 Jul 2014 11:00	17 Jul 2014 11:00	1	Maintenance - Flow and zero check, sample head cleaning
Surface Leaf Wetness	10 Jul 2014 11:00	10 Jul 2014 11:00	1	Maintenance - sensor response tested.

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 34 ppb on Jul 26 10:00	Maximum Daily Average: 6.4 ppb on Jul 22		Hours of Data:	706
Minimum Value: 0 ppb on Jul 4 23:00	Minimum Daily Average: 0.3 ppb on Jul 5		Hours of Missing Data:	38
Maximum Diurnal Average: 4.5 ppb at hour 11	Minimum Diurnal Average: 0.6 ppb at hour 4		Hours of Calibration:	35
Monthly Average: 1.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 1 P ₉₀ = 4 P ₉₉ = 21		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-Jul	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	0	1	0	0	0	0	0.5	1
2-Jul	0	Z	0	0	0	1	1	1	7	28	21	7	3	2	1	1	5	4	3	2	1	1	1	1	3.9	28
3-Jul	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	0.9	2
4-Jul	1	Z	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
5-Jul	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1
6-Jul	0	Z	0	0	0	1	1	1	1	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0.4	1
7-Jul	0	Z	1	0	1	1	1	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1
8-Jul	0	Z	1	1	1	1	1	1	1	3	3	5	6	2	1	1	1	1	2	3	2	1	1	1	1.7	6
9-Jul	1	Z	1	1	1	1	1	2	6	6	2	1	C	C	C	C	1	1	1	1	1	1	1	0	1.3	6
10-Jul	0	Z	1	1	0	1	1	1	0	1	1	0	0	0	1	0	0	1	0	1	1	0	0	0	0.5	1
11-Jul	1	Z	1	1	1	1	1	0	0	0	0	1	1	0	0	0	0	1	1	0	1	1	1	1	0.5	1
12-Jul	1	Z	1	1	0	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	0	0	1	0	0.8	2
13-Jul	1	Z	1	1	0	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	2	1	1	1	1.1	3
14-Jul	1	Z	1	1	1	1	1	3	7	12	13	12	9	2	1	1	1	1	1	1	1	1	1	1	3.2	13
15-Jul	1	Z	1	1	1	2	2	2	5	13	14	13	7	2	2	2	2	2	2	1	1	1	1	2	3.4	14
16-Jul	1	Z	1	1	1	1	1	1	1	1	1	M	M	M	1	1	1	1	1	1	1	1	1	1	0.8	1
17-Jul	1	Z	1	1	1	1	1	1	1	1	1	1	1	8	23	16	10	5	4	3	2	2	1	1	3.8	23
18-Jul	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	11	9	9	5	1	1	1	1	0	2.2	11
19-Jul	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
20-Jul	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.6	1
21-Jul	0	Z	0	0	0	0	0	0	0	1	1	1	1	7	8	5	2	3	9	7	2	1	1	1	2.2	9
22-Jul	1	Z	1	1	1	1	1	1	2	5	19	23	29	4	7	5	4	4	28	7	2	1	1	1	6.4	29
23-Jul	1	Z	1	1	1	1	1	1	1	2	1	3	2	1	1	1	1	1	1	1	1	1	1	1	1.0	3
24-Jul	1	Z	1	1	1	1	1	1	1	1	1	2	3	1	2	1	1	1	1	1	1	1	1	1	1.1	3
25-Jul	1	Z	1	1	1	0	1	1	1	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0.5	1
26-Jul	0	Z	0	0	0	0	1	0	21	34	15	7	7	5	8	15	9	3	2	2	1	1	1	1	5.9	34
27-Jul	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
28-Jul	1	Z	1	1	1	1	1	2	2	4	17	10	3	1	1	1	1	1	1	1	1	1	1	1	2.3	17
29-Jul	1	Z	1	1	1	1	1	1	2	3	7	21	20	9	3	2	1	1	1	1	1	1	1	1	3.7	21
30-Jul	1	Z	1	1	1	1	1	2	4	10	10	2	6	14	10	11	9	5	2	2	1	1	1	1	4.2	14
31-Jul	1	Z	1	1	1	1	1	1	2	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.2	3

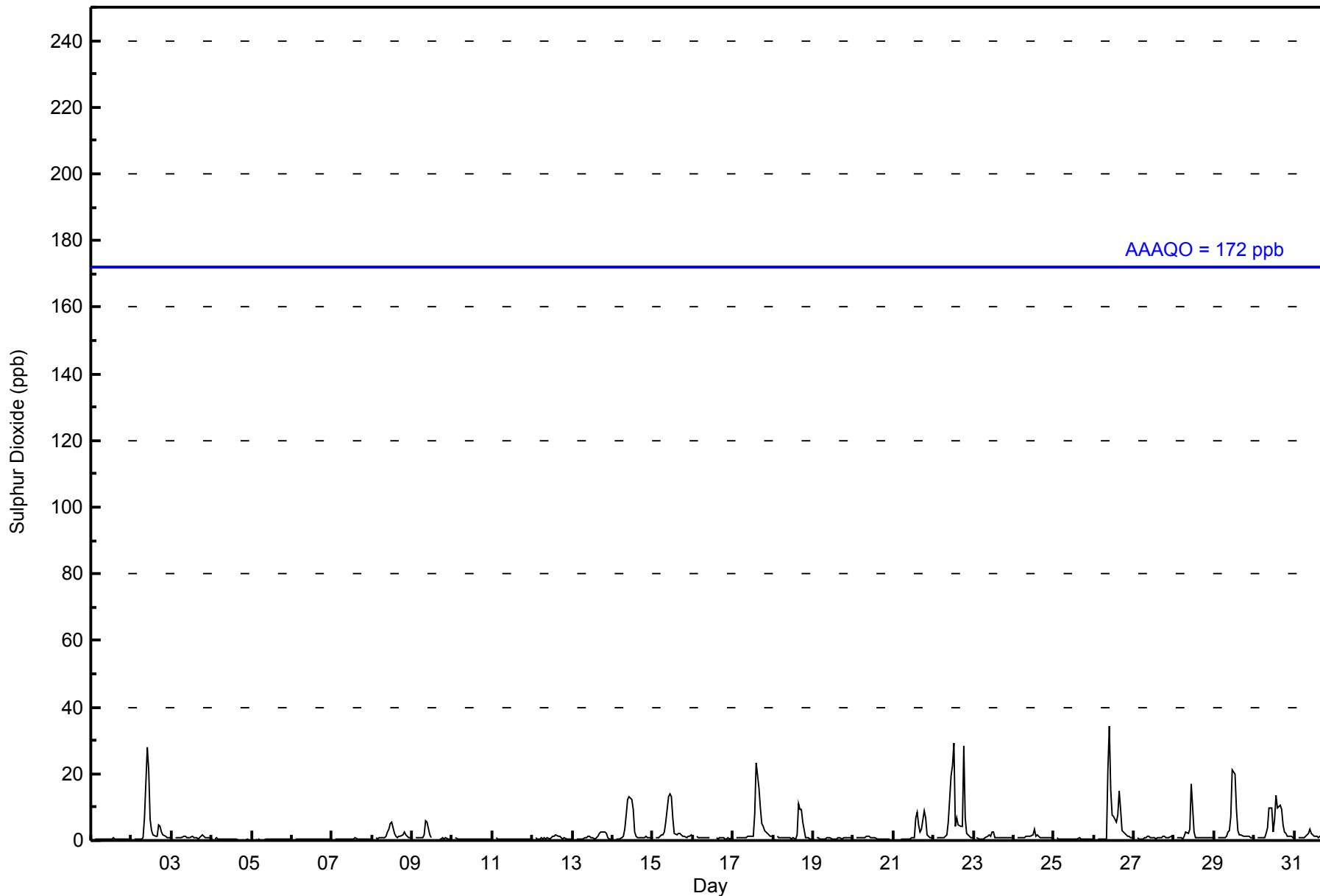
0.6	--	0.7	0.6	0.7	0.7	0.7	0.7	1.0	2.4	4.4	4.5	3.9	3.7	2.4	2.6	2.7	2.2	1.7	2.4	1.4	0.9	0.8	0.7	0.7	Diurnal Average
1	--	1	1	1	2	2	3	21	34	21	23	29	14	23	16	10	9	28	7	2	2	1	2	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	682	96.60	96.60
11 - 20	15	2.12	98.73
21 - 60	9	1.27	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: 706

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

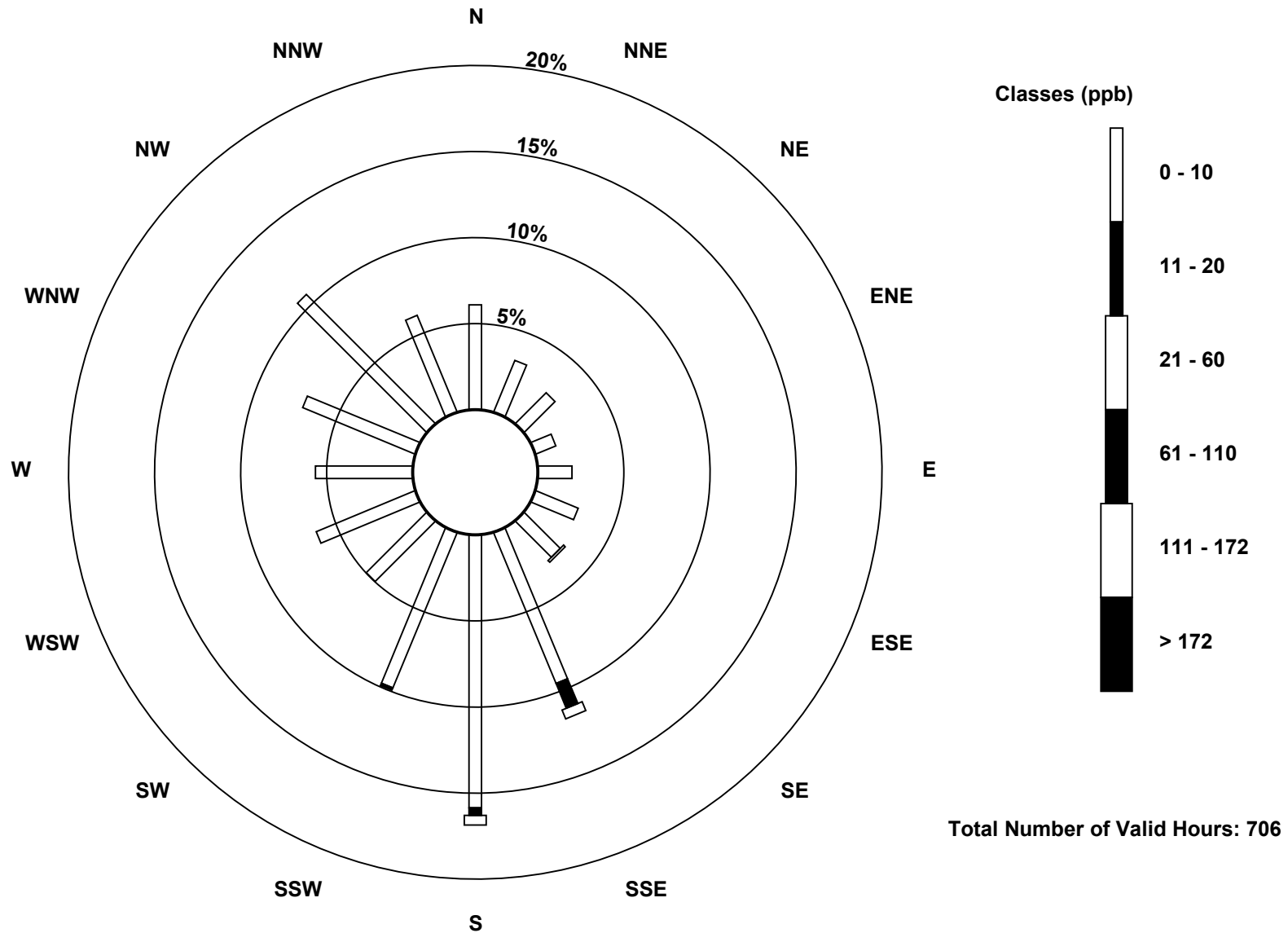
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	43	23	18	9	14	19	21	67	112	69	35	44	40	50	75	43	682
11 - 20	0	0	0	0	0	0	0	11	3	1	0	0	0	0	0	0	15
21 - 60	0	0	0	0	0	0	1	4	4	0	0	0	0	0	0	0	9
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	43	23	18	9	14	19	22	82	119	70	35	44	40	50	75	43	706

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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



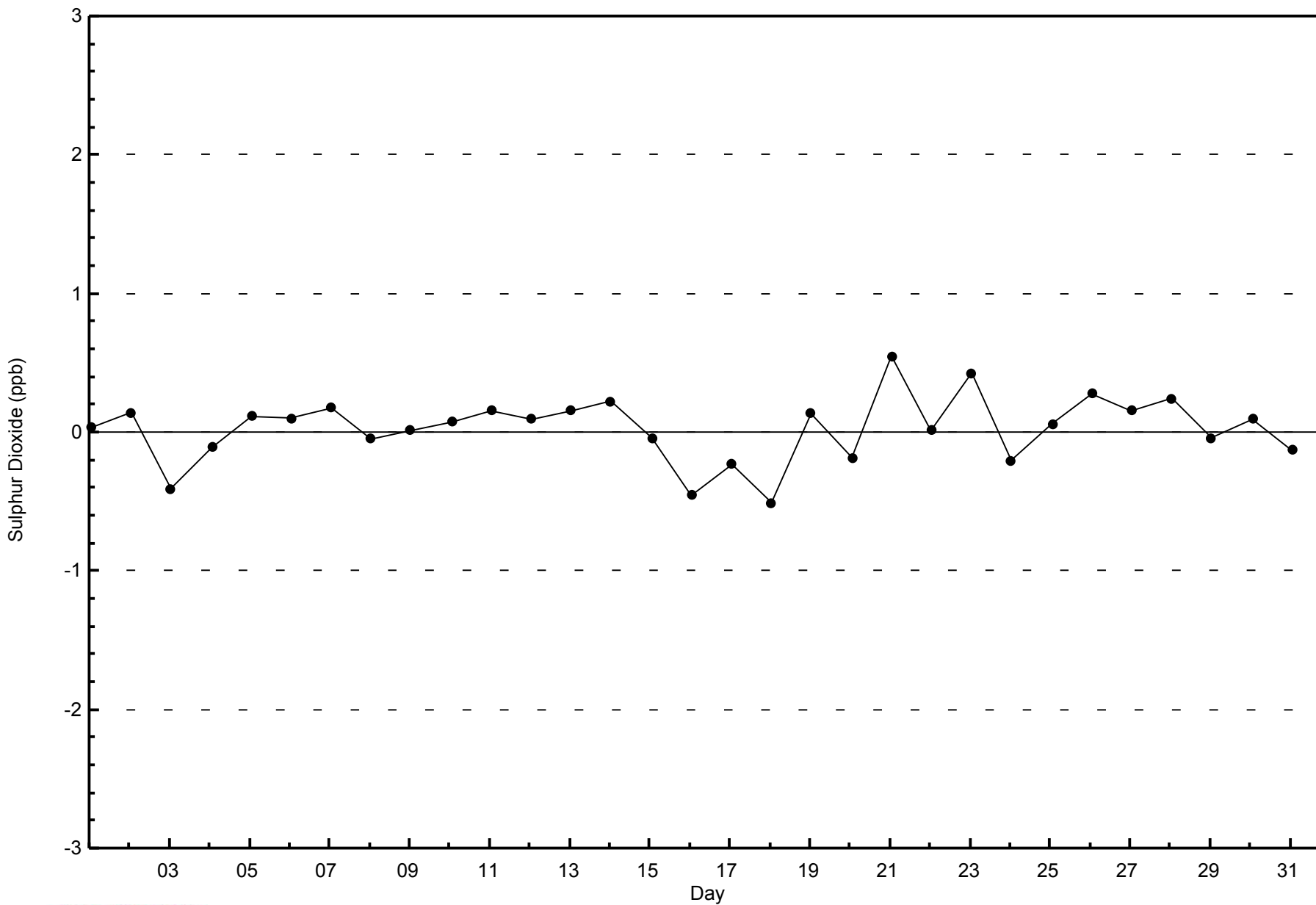


WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

Fort McKay - Bertha Ganter - July 2014



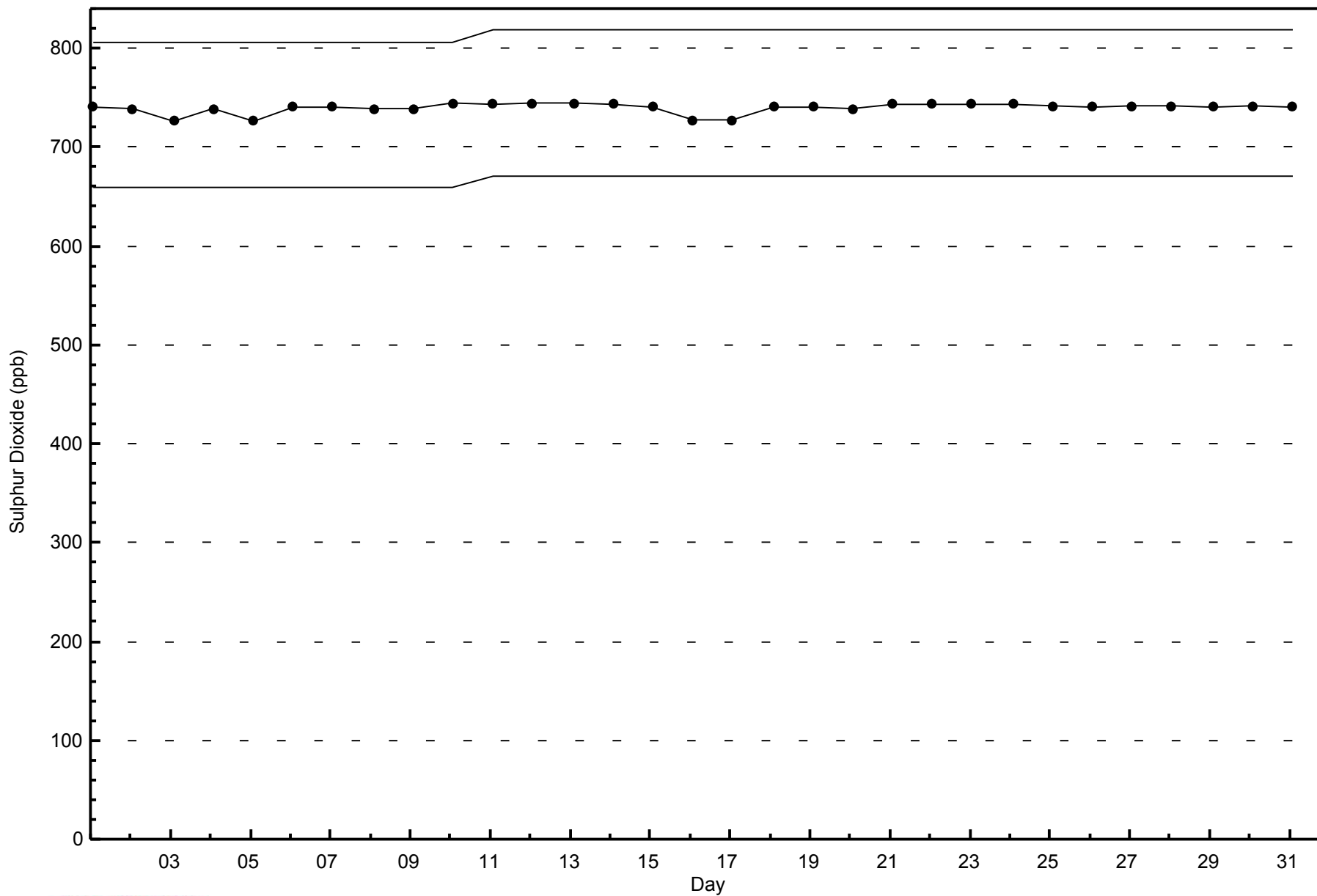


WBEA NETWORK

Span Responses

Sulphur Dioxide (SO₂) - ppb

Fort McKay - Bertha Ganter - July 2014



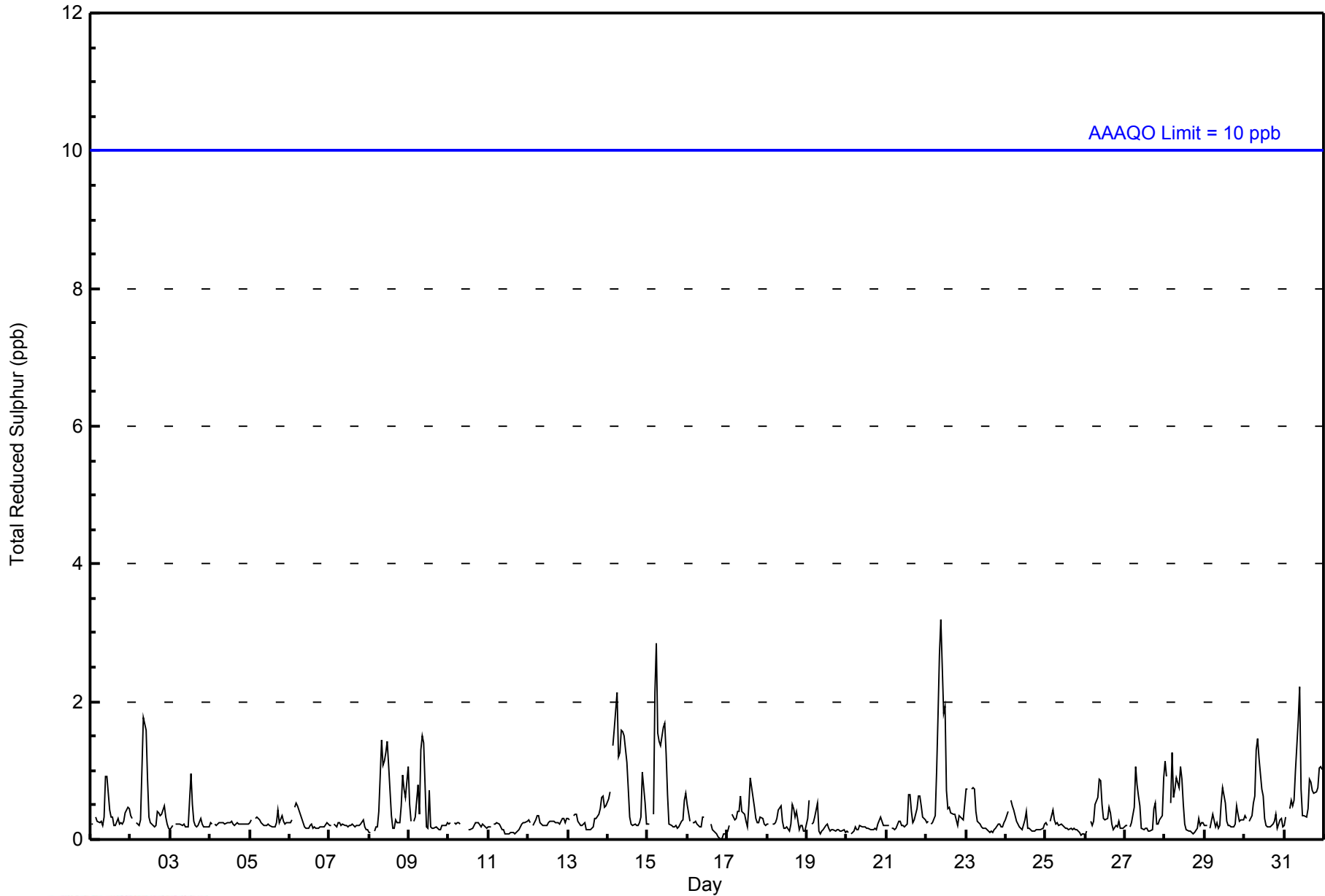


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744																																				
Maximum Value: 3 ppb on Jul 22 10:00														Maximum Daily Average: 0.8 ppb on Jul 14																																				
Minimum Value: 0 ppb on Jul 16 21:00														Minimum Daily Average: 0.2 ppb on Jul 11																																				
Maximum Diurnal Average: 0.7 ppb at hour 10														Minimum Diurnal Average: 0.2 ppb at hour 18																																				
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																																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Jul	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
2-Jul	0	0	Z	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2																							
3-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
4-Jul	0	0	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-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
6-Jul	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	0.2	1																							
7-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
8-Jul	0	0	Z	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0.6	1																							
9-Jul	1	0	Z	0	0	1	0	1	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																							
10-Jul	0	0	Z	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
11-Jul	0	0	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-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
13-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1																							
14-Jul	1	1	Z	1	2	2	1	1	2	2	2	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0.8	2																							
15-Jul	0	0	Z	0	2	3	2	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0.8	3																							
16-Jul	1	0	Z	0	0	0	0	0	0	0	0	M	M	M	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
17-Jul	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.4	1																							
18-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1																							
19-Jul	0	1	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
20-Jul	0	0	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-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0.3	1																							
22-Jul	0	0	Z	0	0	0	1	2	3	3	2	2	1	0	0	0	0	0	0	0	0	0	0	1	1	0.8	3																							
23-Jul	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
24-Jul	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	0.2	1																							
25-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
26-Jul	0	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
27-Jul	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0.4	1																							
28-Jul	1	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																							
29-Jul	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
30-Jul	0	0	Z	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																							
31-Jul	0	0	Z	0	1	0	1	1	2	2	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.8	2																							
																								0.3	0.3	--	0.3	0.4	0.5	0.4	0.6	0.7	0.7	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	Diurnal Average	
																								1	1	--	1	2	3	2	2	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance																																																		
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																		



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	703	99.58	99.58
3 - 4	3	0.42	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - July 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	44	23	19	9	14	19	22	82	118	72	33	44	39	47	74	44	703
3 - 4	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	3
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	44	23	19	9	14	19	22	84	118	73	33	44	39	47	74	44	706

Total Number of Valid Hours: 706

Total Number of Hours: 744

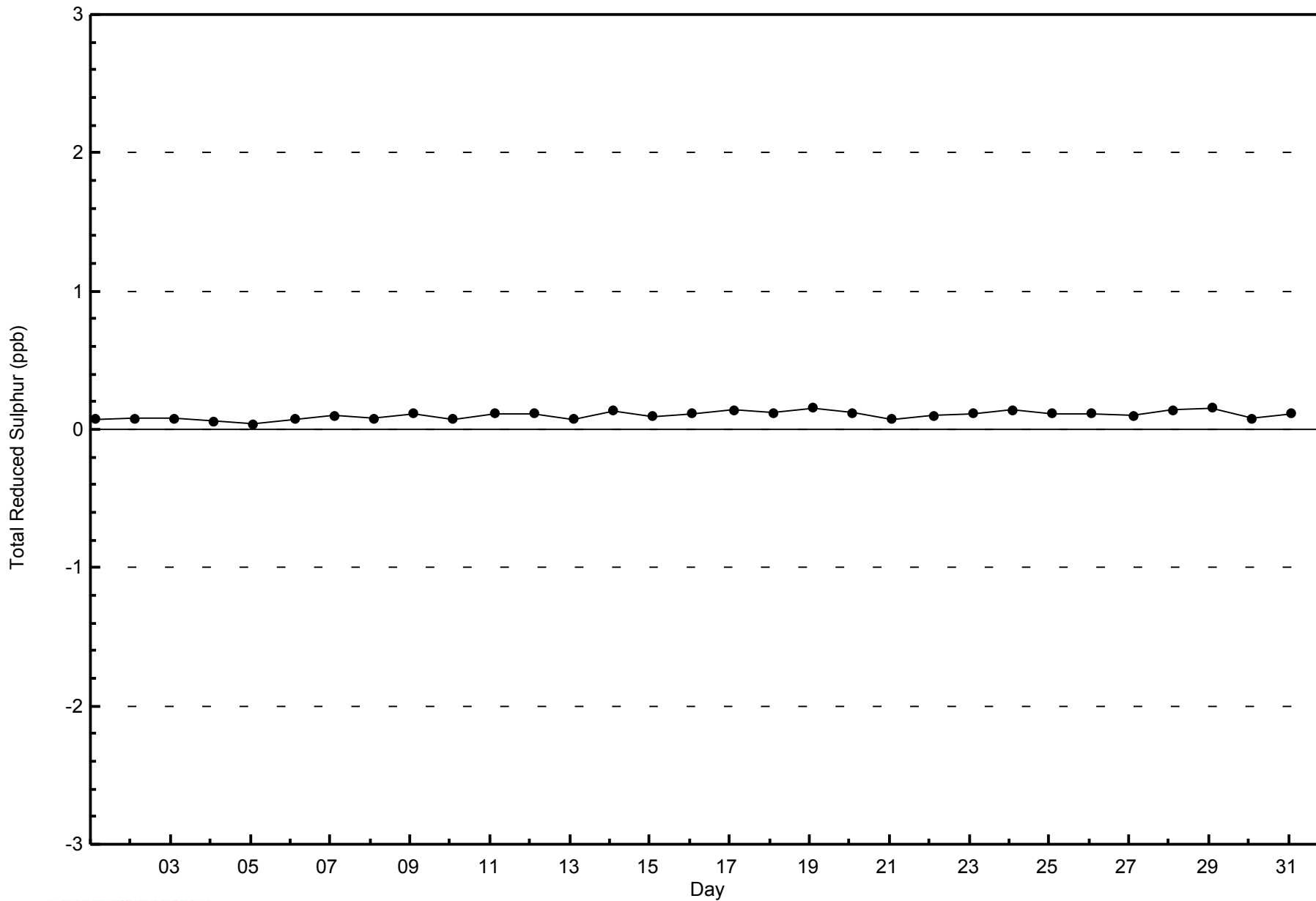


WBEA NETWORK

Zero Responses

Total Reduced Sulphur (TRS) - ppb

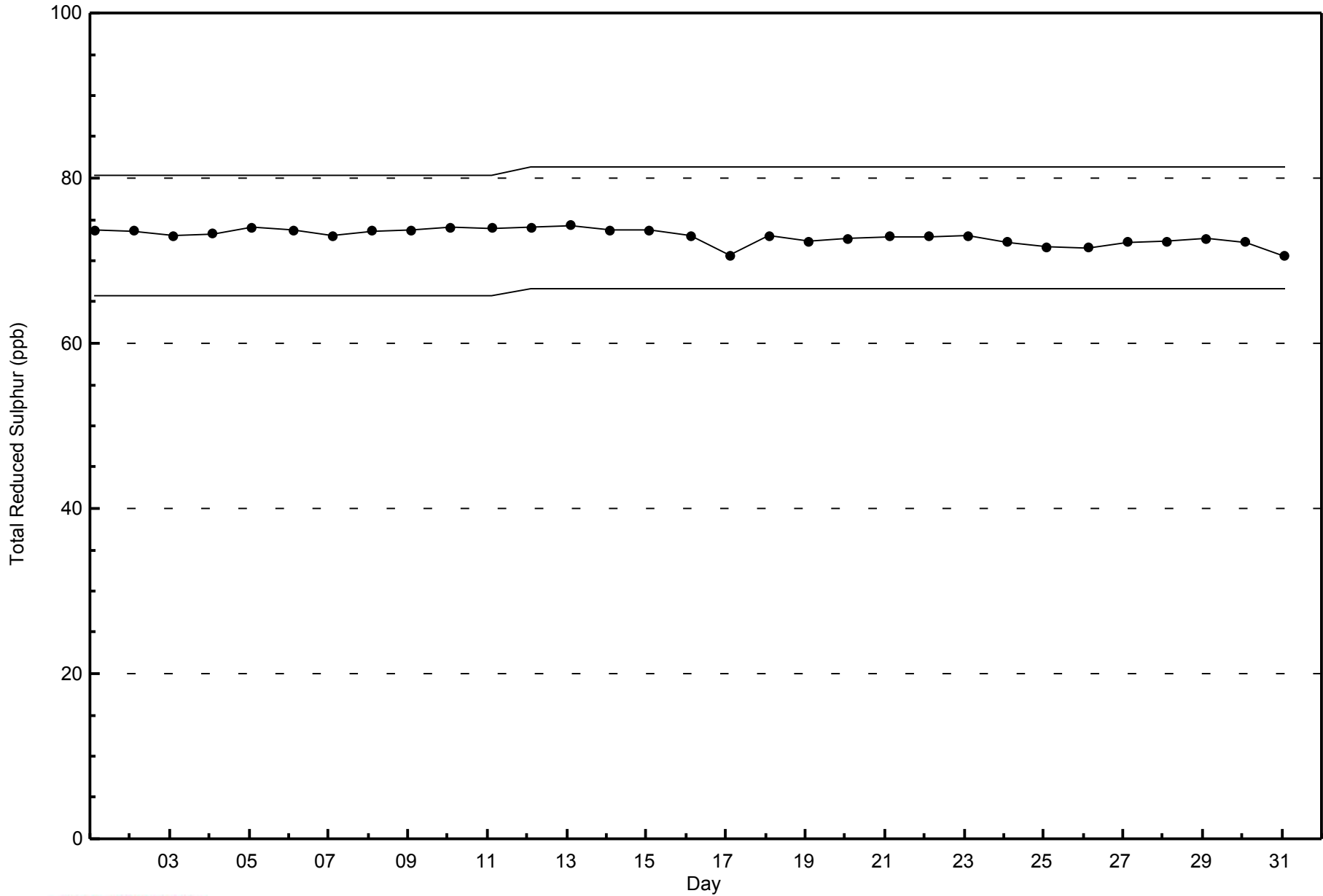
Fort McKay - Bertha Ganter - July 2014





WBEA NETWORK
Span Responses

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



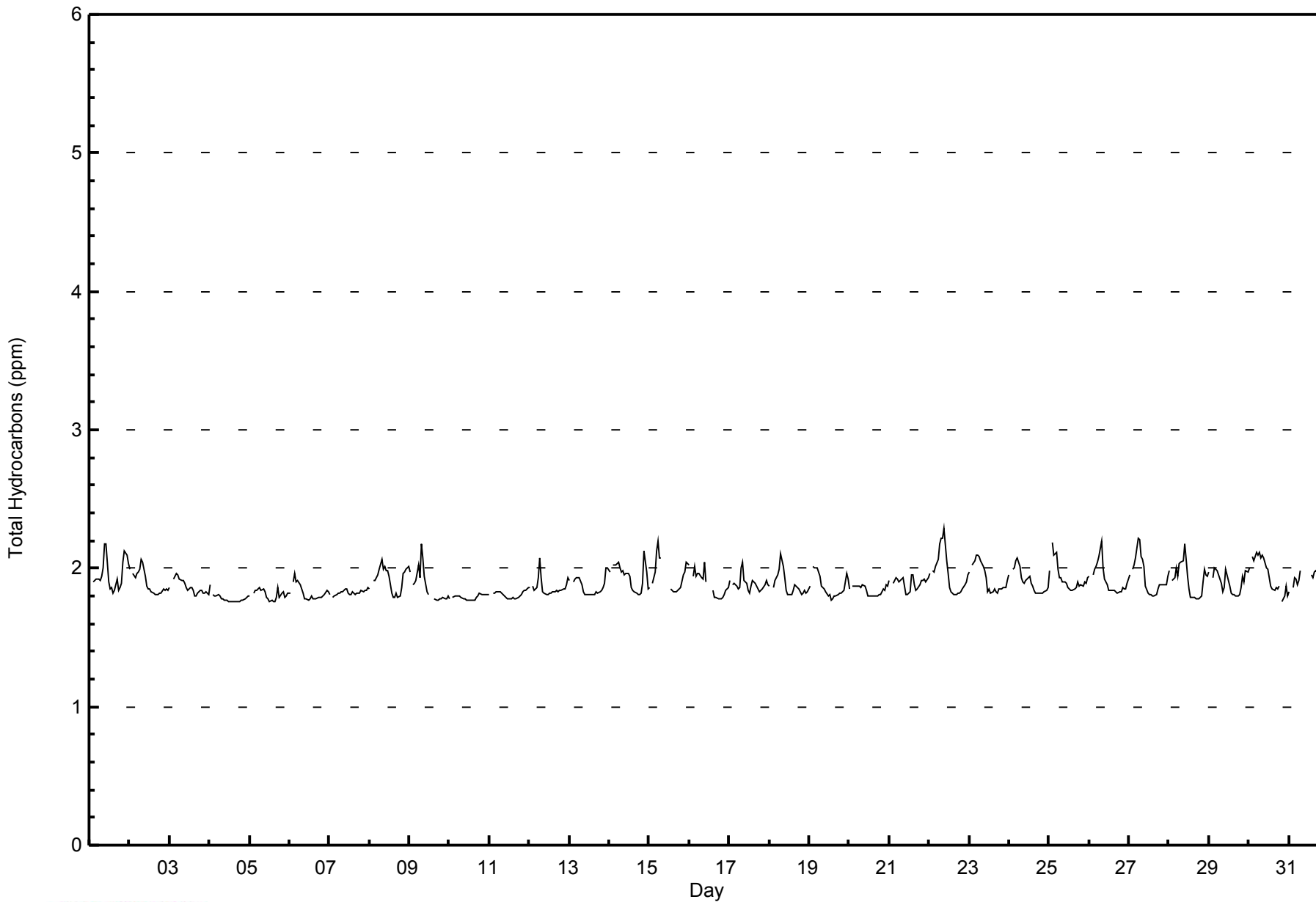


Maximum Value: 2.3 ppm on Jul 22 10:00																	Maximum Daily Average: 2.0 ppm on Jul 22										Hours in Service: 744																						
Minimum Value: 1.8 ppm on Jul 4 16:00																	Minimum Daily Average: 1.8 ppm on Jul 4										Hours of Data: 696																						
Maximum Diurnal Average: 2.0 ppm at hour 8																	Minimum Diurnal Average: 1.8 ppm at hour 16										Hours of Missing Data: 48																						
Monthly Average: 1.89 ppm																	Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.8 Median = 1.9 Q ₃ = 1.9 P ₉₀ = 2.0 P ₉₉ = 2.2										Hours of Calibration: 34																						
																											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-Jul	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.2	1.9	1.9	1.9	1.8	1.8	1.9	1.8	1.9	1.9	2.0	2.1	2.1	2.0	1.9	2.2																							
2-Jul	2.0	Z	2.0	1.9	2.0	2.0	2.0	2.1	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.9	2.1																							
3-Jul	1.9	Z	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0																							
4-Jul	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9																							
5-Jul	1.8	Z	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9																							
6-Jul	1.8	Z	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	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0																							
7-Jul	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9																							
8-Jul	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.0	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.0	2.0	2.0	1.9	2.1																							
9-Jul	2.0	Z	1.9	1.9	1.9	2.0	1.9	2.2	2.1	1.9	1.8	1.8	C	C	C	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.2																							
10-Jul	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																							
11-Jul	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																							
12-Jul	1.9	Z	1.9	1.8	1.9	1.9	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.1																							
13-Jul	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	1.8	1.8	1.9	1.9	2.0	2.0	1.9	2.0																							
14-Jul	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.9	2.1	2.0	1.9	1.9	2.1																							
15-Jul	1.9	Z	1.9	2.0	2.1	2.2	2.1	2.1	M	M	M	M	M	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.0	1.9	2.2																							
16-Jul	2.0	Z	1.9	2.0	1.9	2.0	2.0	1.9	1.9	2.0	1.9	M	M	M	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0																							
17-Jul	1.9	Z	1.9	1.9	1.9	1.8	1.9	2.0	2.0	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0																							
18-Jul	1.9	Z	1.9	1.9	1.9	2.0	2.0	2.1	2.0	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	1.9	2.1																							
19-Jul	1.9	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	1.9	1.9	2.0																							
20-Jul	1.8	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.9																							
21-Jul	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	2.0	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0																							
22-Jul	2.0	Z	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.3	2.1	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	1.9	2.3																							
23-Jul	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.1																							
24-Jul	1.9	Z	2.0	2.0	2.0	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.1																							
25-Jul	2.0	Z	2.2	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2																							
26-Jul	1.9	Z	2.0	2.0	2.0	2.0	2.1	2.2	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.2																							
27-Jul	2.0	Z	2.0	2.0	2.1	2.2	2.2	2.1	2.1	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2																							
28-Jul	2.0	Z	1.9	1.9	2.0	1.9	2.0	2.0	2.1	2.2	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.0	1.9	1.9	2.2																							
29-Jul	2.0	Z	1.9	2.0	2.0	2.0	1.9	1.9	1.8	1.9	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	1.9	2.0																							
30-Jul	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.9	1.9	1.9	PF	1.8	1.8	1.9	1.8	2.1	2.1																							
31-Jul	1.8	Z	1.9	1.9	1.9	1.9	1.9	2.0	UO	UO	UO	UO	UO	2.0	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0																							
																								1.9	--	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	Diurnal Average	
																								2.0	--	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.1	2.1	2.0	Diurnal Maximum
Z - zerospan																								C - Calibration				M - Maintenance				UO - Unstable Operation				PF - Power Failure													



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	648	93.10	93.10
2.1 - 3.0	48	6.90	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

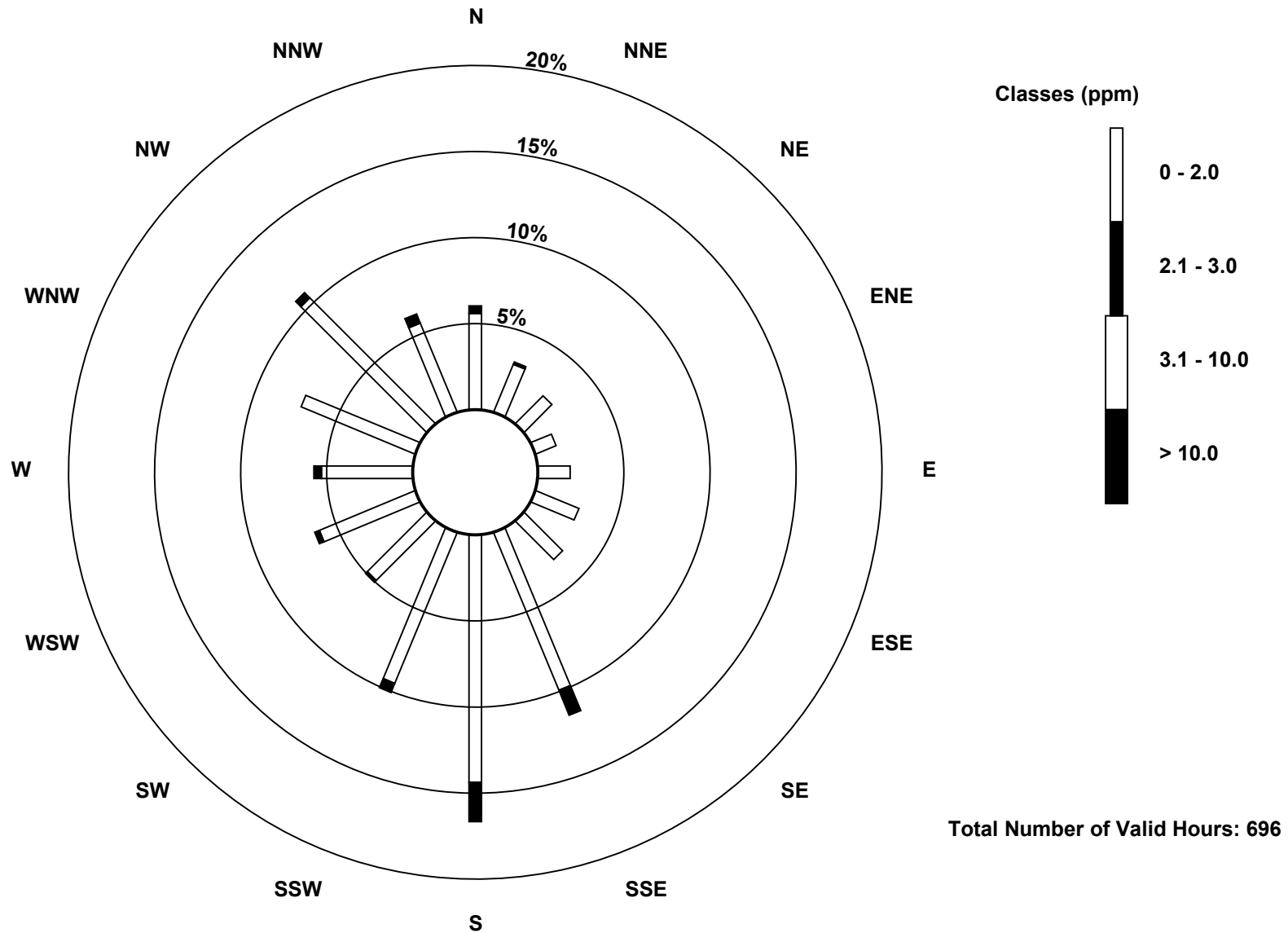
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	39	21	16	9	13	19	22	69	100	66	34	42	37	50	72	39	648
2.1 - 3.0	3	1	0	0	0	0	0	11	16	4	1	2	3	0	3	4	48
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	42	22	16	9	13	19	22	80	116	70	35	44	40	50	75	43	696

Total Number of Valid Hours: 696

Total Number of Hours: 744

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

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

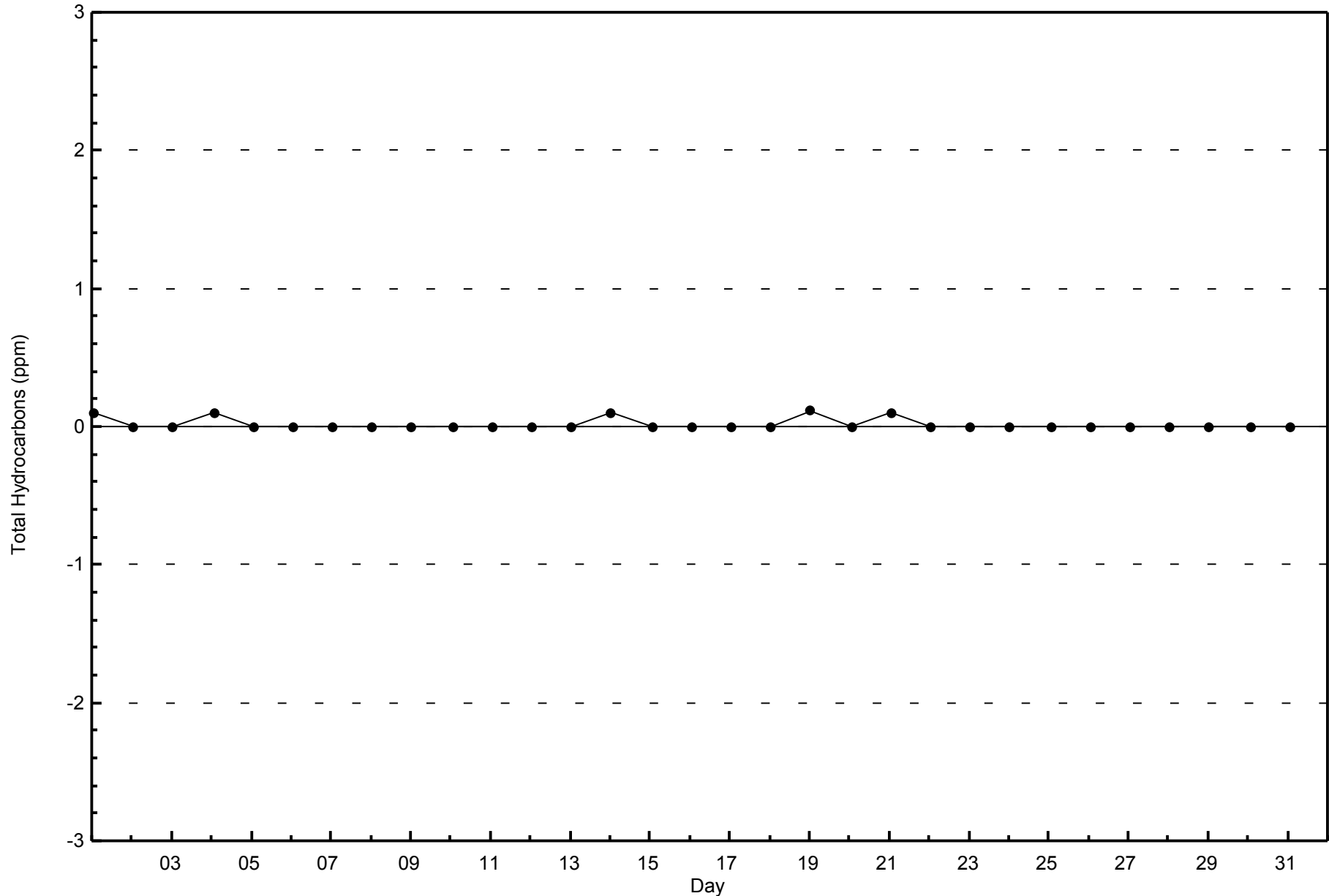




WBEA NETWORK

Zero Responses

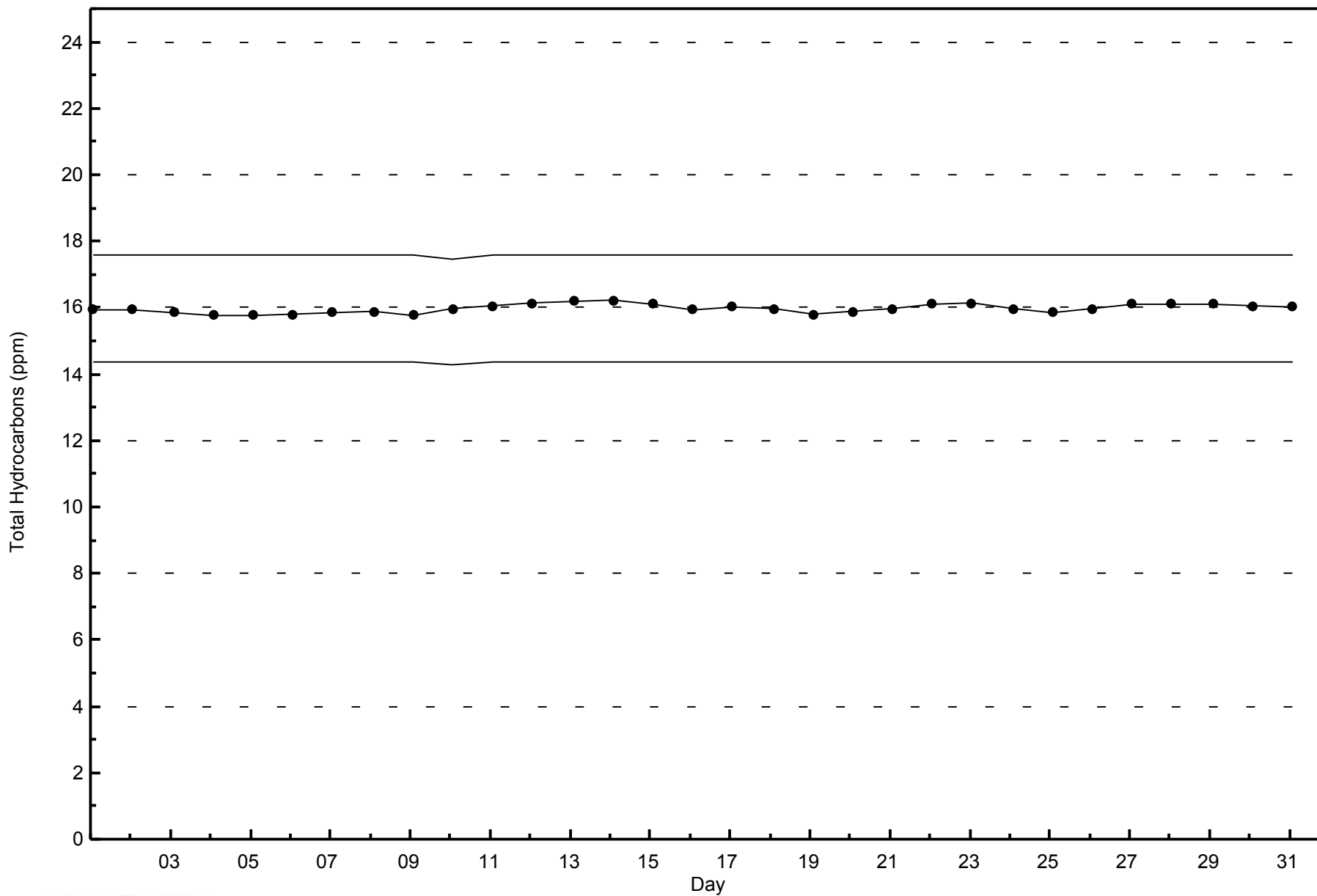
Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - July 2014





WBEA NETWORK
Span Responses

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



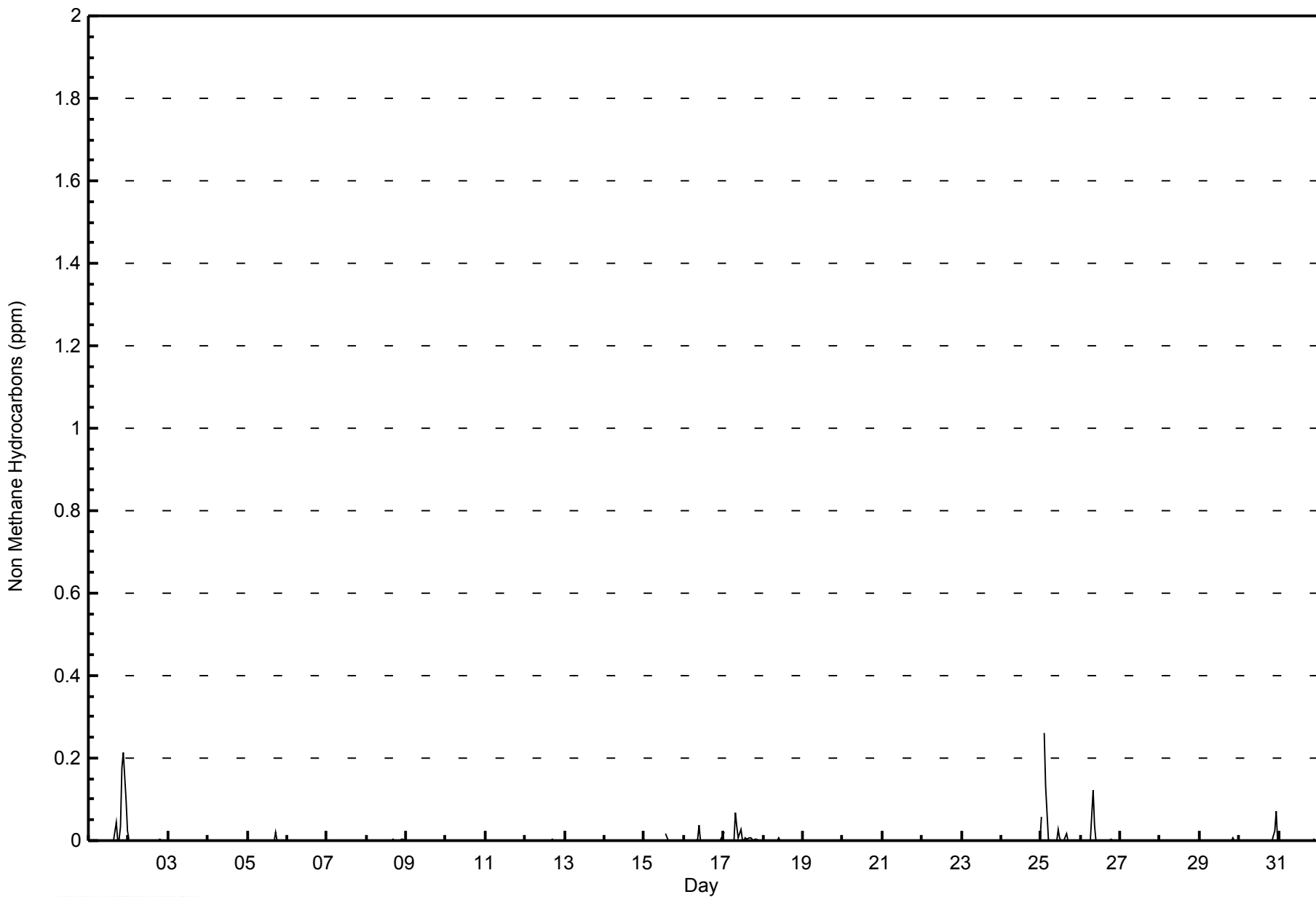


Maximum Value: 0.262 ppm on Jul 25 03:00		Maximum Daily Average: 0.026 ppm on Jul 1		Hours in Service: 744																						
Minimum Value: 0.000 ppm on Jul 1 01:00		Minimum Daily Average: 0.000 ppm on Jul 3		Hours of Data: 696																						
Maximum Diurnal Average: 0.008 ppm at hour 3		Minimum Diurnal Average: 0.000 ppm at hour 7		Hours of Missing Data: 48																						
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 = 0.1		Hours of Calibration: 34																						
				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-Jul	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	0.043	0.000	0.003	0.034	0.176	0.214	0.099	0.024	0.026	0.214
2-Jul	0.004	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	0.002	0.001	0.000	0.000	0.000	0.000	0.004
3-Jul	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
4-Jul	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
5-Jul	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	0.021	0.000	0.000	0.001	0.000	0.000	0.001	0.021
6-Jul	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-Jul	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-Jul	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	0.004	0.000	0.000	0.000	0.000	0.003	0.002	0.000	0.000	0.004
9-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10-Jul	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-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
12-Jul	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	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
13-Jul	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-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.001
15-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	M	M	M	M	M	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.016
16-Jul	0.002	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.038	0.000	M	M	M	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.038
17-Jul	0.019	Z	0.000	0.000	0.000	0.000	0.000	0.069	0.034	0.008	0.026	0.003	0.000	0.008	0.008	0.003	0.006	0.006	0.005	0.000	0.003	0.002	0.000	0.000	0.008	0.069
18-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
19-Jul	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
20-Jul	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
21-Jul	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
22-Jul	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
23-Jul	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
24-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
25-Jul	0.059	Z	0.262	0.131	0.004	0.001	0.000	0.000	0.000	0.000	0.026	0.005	0.001	0.000	0.002	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.262
26-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.122	0.038	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	0.007	0.122	
27-Jul	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
28-Jul	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	0.001	0.000	0.000	0.000	0.001	0.001
29-Jul	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	0.001	0.005	0.000	0.000	0.000	0.005
30-Jul	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	PF	0.000	0.025	0.072	0.004	0.072
31-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	UO	UO	UO	UO	UO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.001	0.001	0.000	0.005
		0.003	--	0.008	0.004	0.000	0.000	0.000	0.006	0.003	0.002	0.002	0.000	0.000	0.001	0.000	0.001	0.002	0.001	0.000	0.001	0.006	0.008	0.006	0.001	Diurnal Average
		0.059	--	0.262	0.131	0.004	0.001	0.000	0.122	0.038	0.038	0.026	0.005	0.001	0.016	0.003	0.016	0.043	0.021	0.003	0.034	0.176	0.214	0.099	0.024	Diurnal Maximum
Z - zerospan		C - Calibration					M - Maintenance					UO - Unstable Operation					PF - Power Failure									



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	670	96.26	96.26
0.006 - 0.05	17	2.44	98.71
0.06 - 0.1	6	0.86	99.57
> 0.1	3	0.43	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

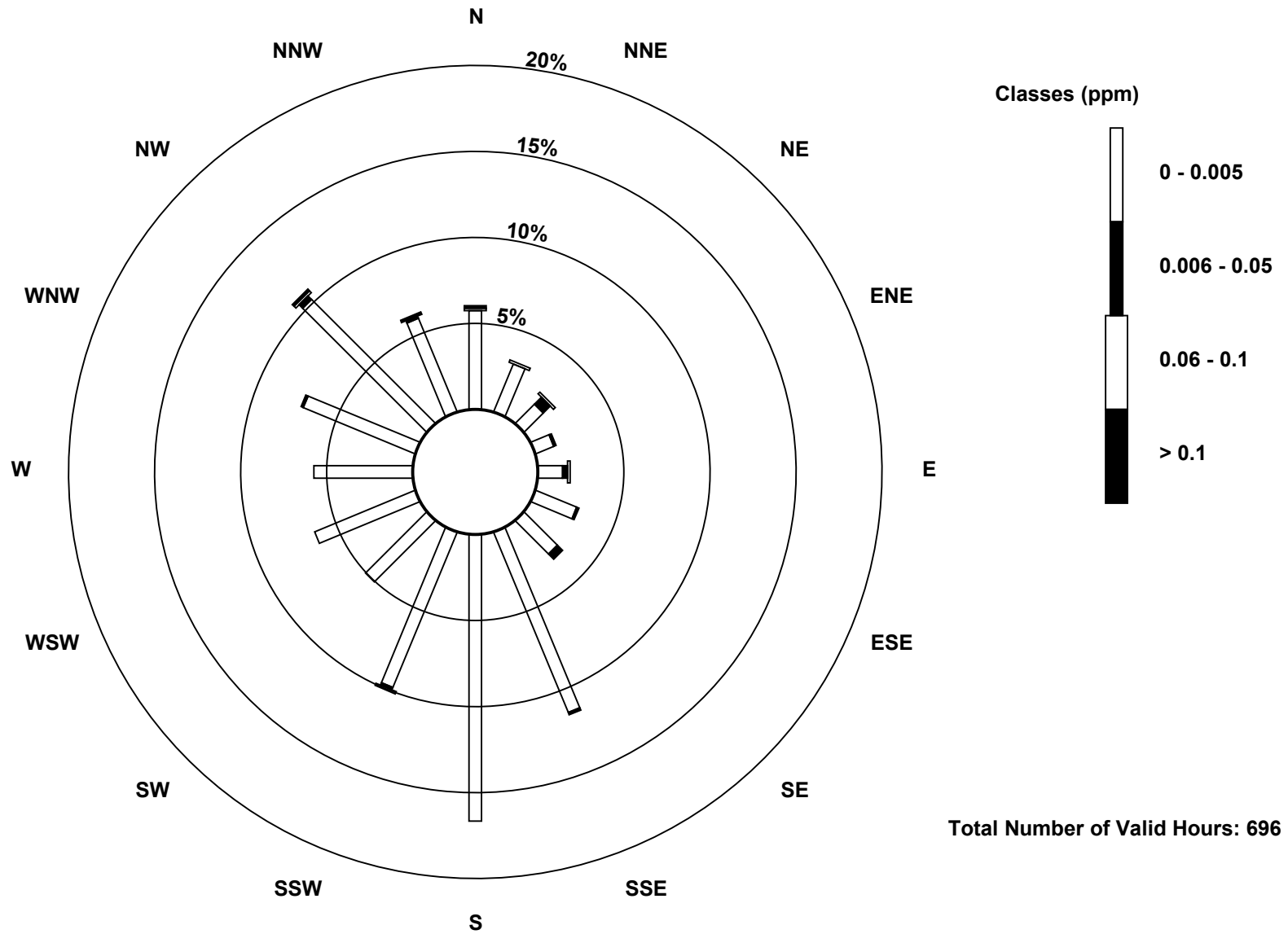
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	40	21	11	8	10	18	19	79	116	68	35	44	40	49	71	41	670
0.006 - 0.05	0	0	4	1	2	1	3	1	0	1	0	0	0	1	2	1	17
0.06 - 0.1	1	1	1	0	1	0	0	0	0	1	0	0	0	0	1	0	6
> 0.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3
Totals	42	22	16	9	13	19	22	80	116	70	35	44	40	50	75	43	696

Total Number of Valid Hours: 696

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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



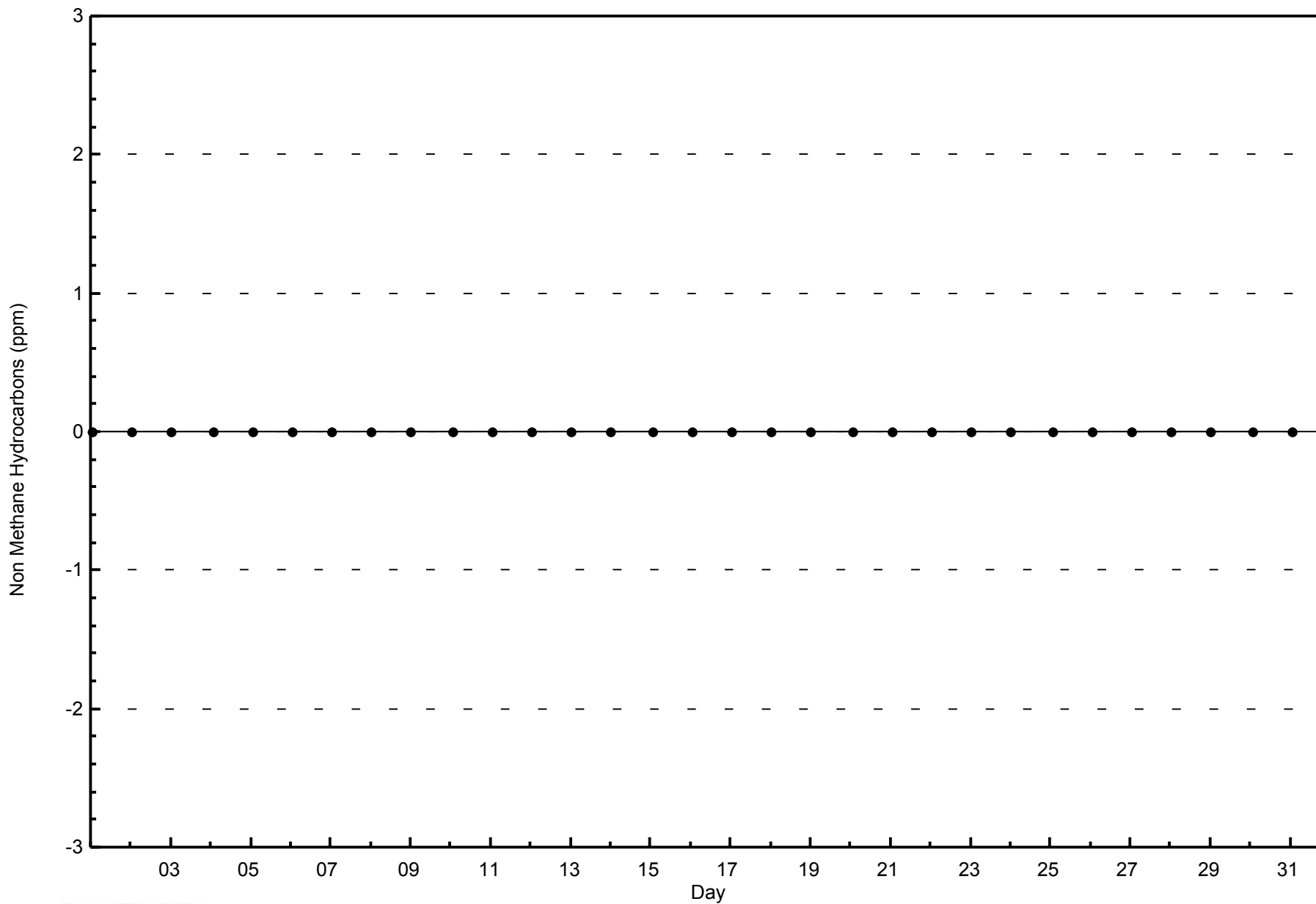


WBEA NETWORK

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

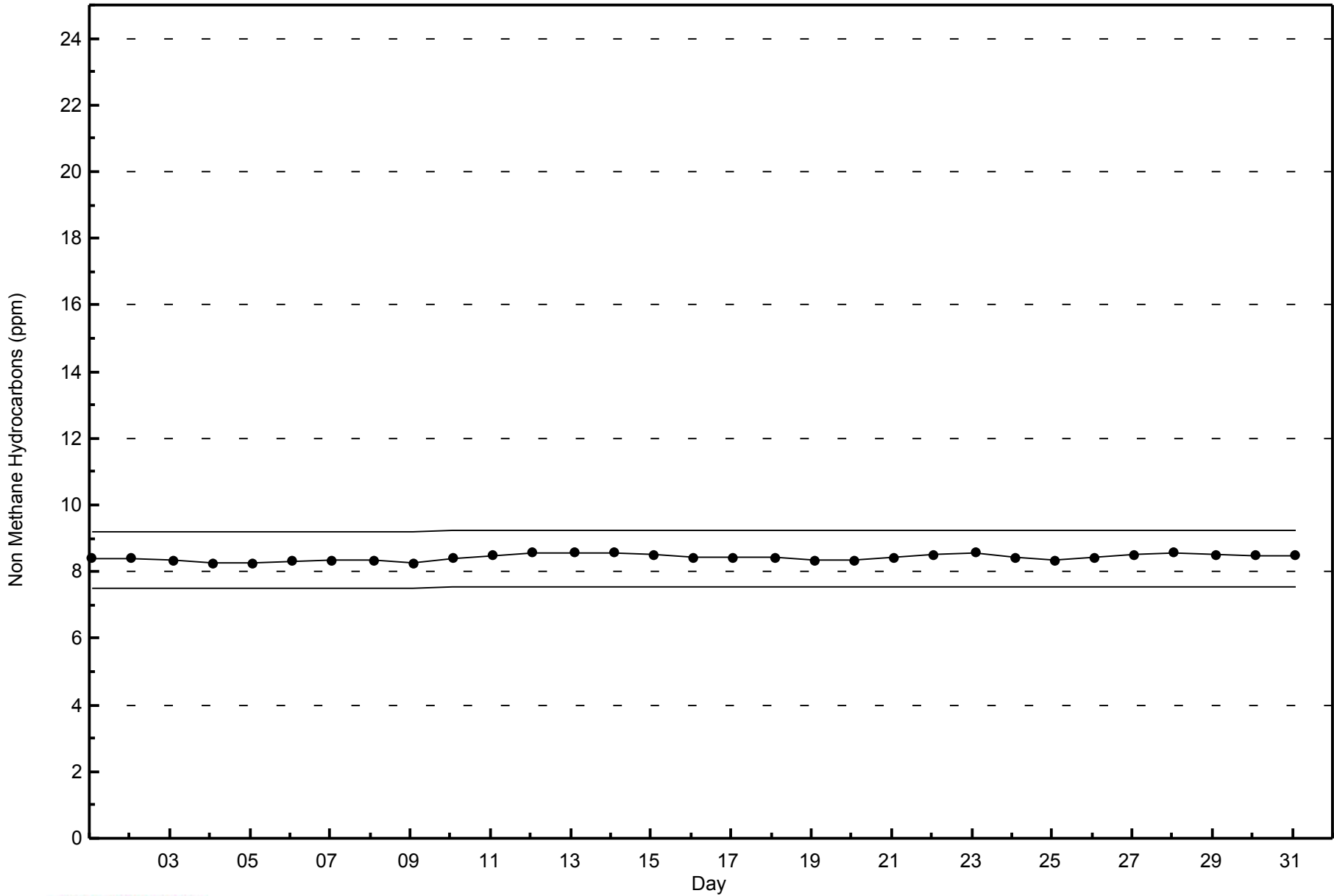
Fort McKay - Bertha Ganter - July 2014





WBEA NETWORK
Span Responses

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





Summary of Hour Averages

Fort McKay - Bertha Ganter - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																								
Maximum Value: 2.3 ppm on Jul 22 10:00										Maximum Daily Average: 2.0 ppm on Jul 22										Hours of Data: 696																														
Minimum Value: 1.8 ppm on Jul 4 16:00										Minimum Daily Average: 1.8 ppm on Jul 4										Hours of Missing Data: 48																														
Maximum Diurnal Average: 2.0 ppm at hour 6										Minimum Diurnal Average: 1.8 ppm at hour 16										Hours of Calibration: 34																														
Monthly Average: 1.88 ppm										Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.8 Median = 1.9 Q ₃ = 1.9 P ₉₀ = 2.0 P ₉₉ = 2.2										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-Jul	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.2	1.9	1.9	1.9	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.2																								
2-Jul	2.0	Z	2.0	1.9	2.0	2.0	2.0	2.1	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	1.9	1.8	1.8	1.8	1.9	2.1																							
3-Jul	1.9	Z	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0																							
4-Jul	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9																							
5-Jul	1.8	Z	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9																							
6-Jul	1.8	Z	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	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0																							
7-Jul	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.1																							
8-Jul	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.0	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.0	2.0	2.0	1.9	2.1																							
9-Jul	2.0	Z	1.9	1.9	1.9	2.0	1.9	2.2	2.1	1.9	1.8	1.8	C	C	C	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.2																							
10-Jul	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																							
11-Jul	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	1.8	1.9																							
12-Jul	1.9	Z	1.9	1.8	1.9	1.9	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.1																							
13-Jul	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	1.8	1.8	1.8	1.9	1.9	2.0	2.0	1.9	2.0																							
14-Jul	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.1	2.0	1.9	1.9	2.1																							
15-Jul	1.9	Z	1.9	2.0	2.1	2.2	2.1	2.1	M	M	M	M	M	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.0	2.0	1.9	2.2																							
16-Jul	2.0	Z	1.9	2.0	1.9	2.0	2.0	1.9	1.9	2.0	1.9	M	M	M	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0																							
17-Jul	1.9	Z	1.9	1.9	1.9	1.8	1.9	1.9	2.0	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0																							
18-Jul	1.9	Z	1.9	1.9	1.9	2.0	2.0	2.1	2.0	1.9	1.8	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	1.9	2.1																							
19-Jul	1.9	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	1.9	1.9	2.0																							
20-Jul	1.8	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.9																							
21-Jul	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	2.0	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0																							
22-Jul	2.0	Z	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.3	2.1	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	1.9	2.3																							
23-Jul	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.1																							
24-Jul	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	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.1																							
25-Jul	1.9	Z	1.9	2.0	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1																							
26-Jul	1.9	Z	2.0	2.0	2.0	2.0	2.1	2.1	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	1.9	1.9	1.9	1.9	1.9	2.1																							
27-Jul	2.0	Z	2.0	2.0	2.1	2.2	2.2	2.1	2.1	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2																							
28-Jul	2.0	Z	1.9	1.9	2.0	1.9	2.0	2.0	2.1	2.2	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.0	1.9	1.9	2.2																							
29-Jul	2.0	Z	1.9	2.0	2.0	2.0	1.9	1.9	1.8	1.9	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	1.9	2.0																							
30-Jul	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	PF	1.8	1.8	1.8	1.8	2.0	2.1																							
31-Jul	1.8	Z	1.9	1.9	1.9	1.9	1.9	2.0	UO	UO	UO	UO	UO	2.0	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0																							
1.9																								--	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	Diurnal Average	
2.0																								--	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.1	2.0	2.0	2.0	2.0	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation PF - Power Failure																																																		

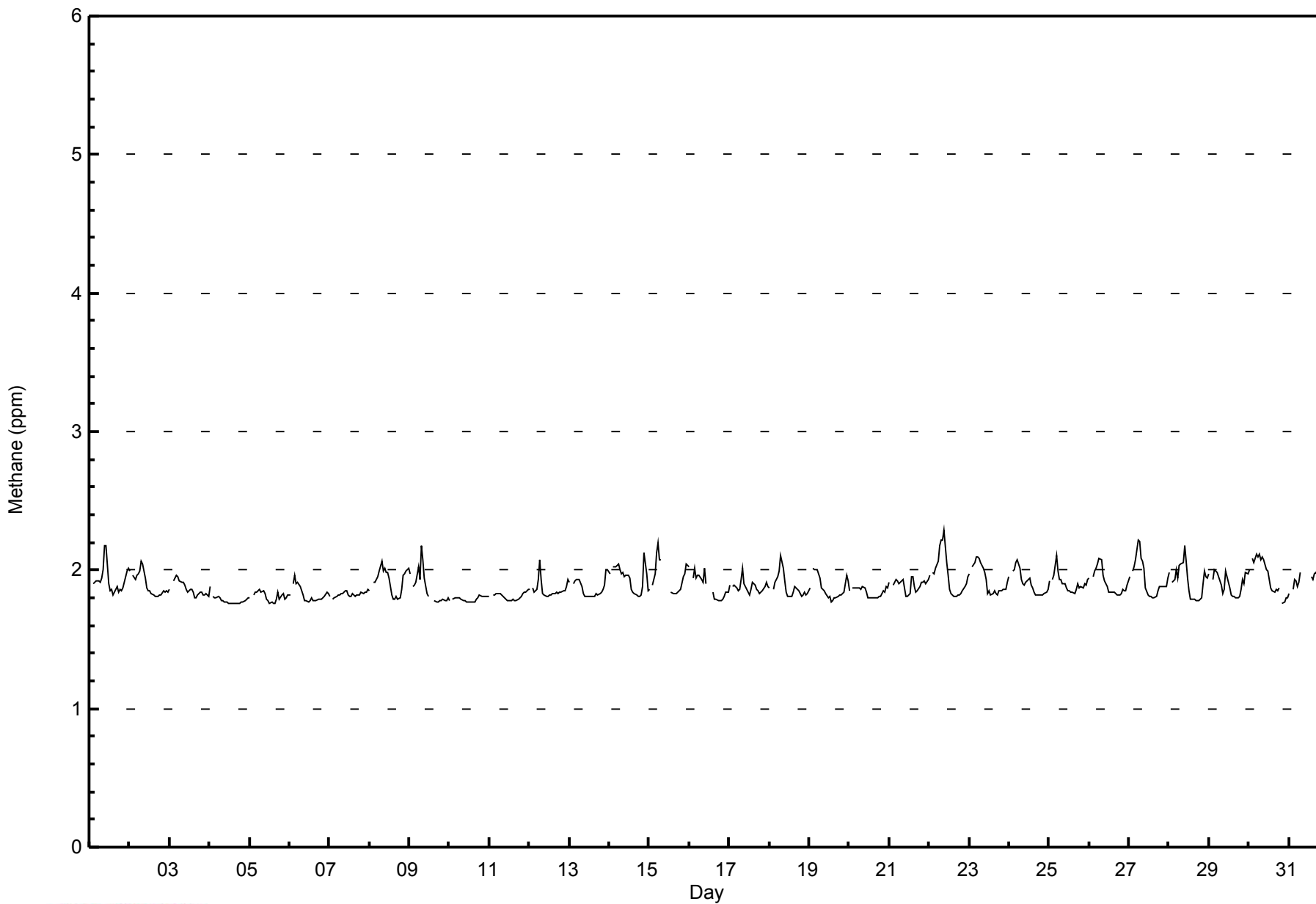


WBEA NETWORK

Hourly Averages

Methane (CH₄) - ppm

Fort McKay - Bertha Ganter - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	652	93.68	93.68
2.1 - 3.0	44	6.32	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

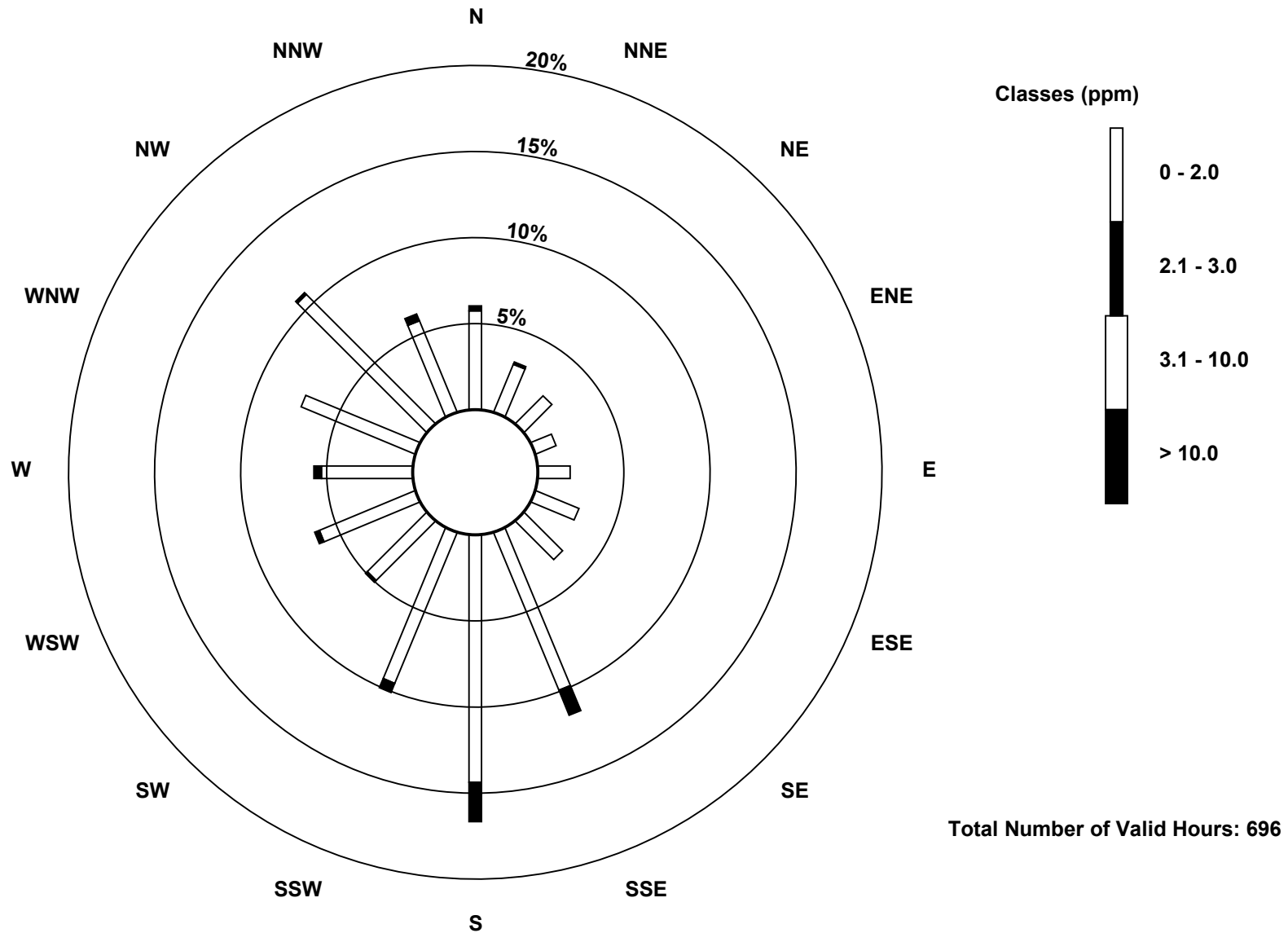
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	40	21	16	9	13	19	22	69	100	66	34	42	37	50	74	40	652
2.1 - 3.0	2	1	0	0	0	0	0	11	16	4	1	2	3	0	1	3	44
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	42	22	16	9	13	19	22	80	116	70	35	44	40	50	75	43	696

Total Number of Valid Hours: 696

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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



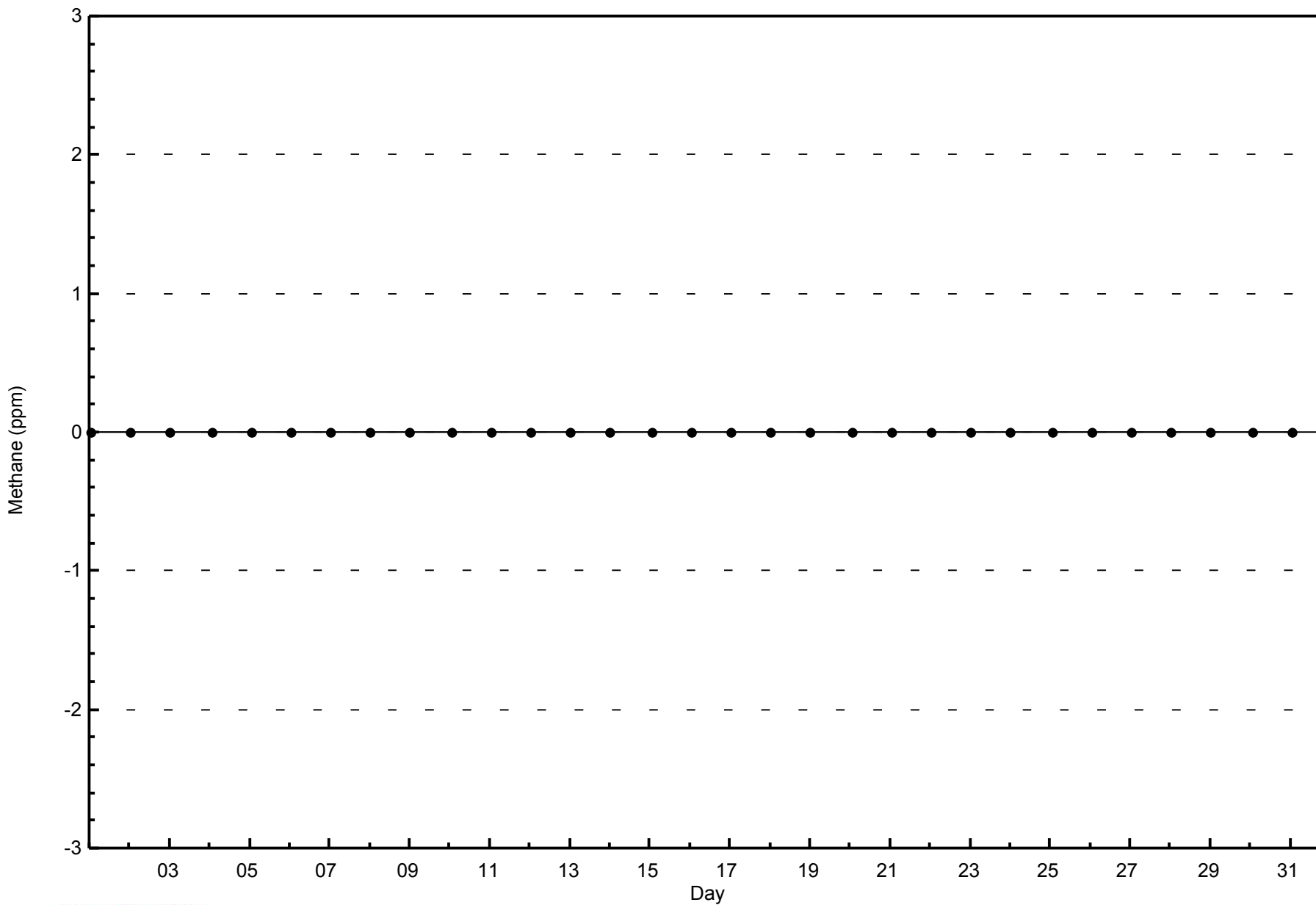


WBEA NETWORK

Zero Responses

Methane (CH₄) - ppm

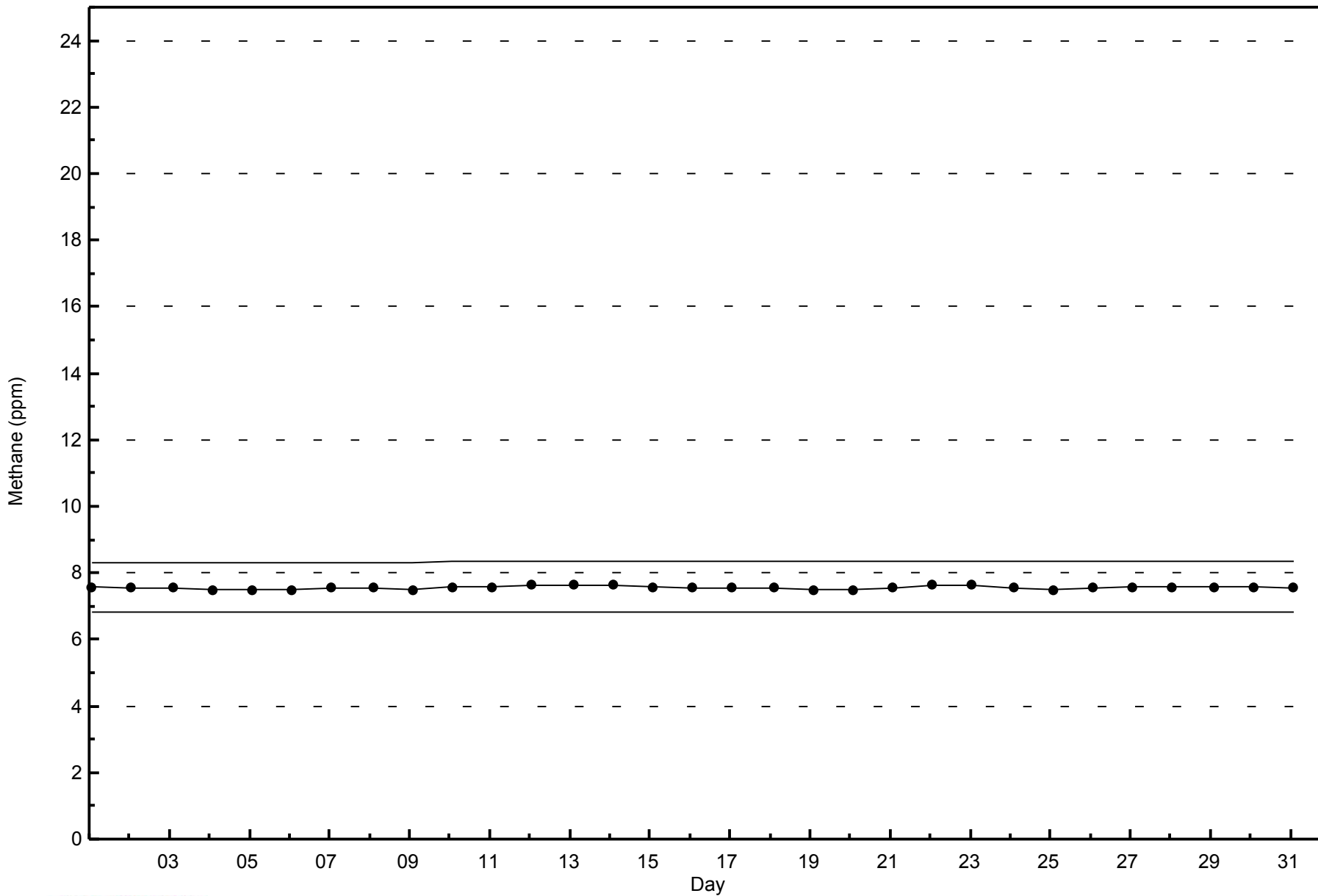
Fort McKay - Bertha Ganter - July 2014





WBEA NETWORK
Span Responses

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



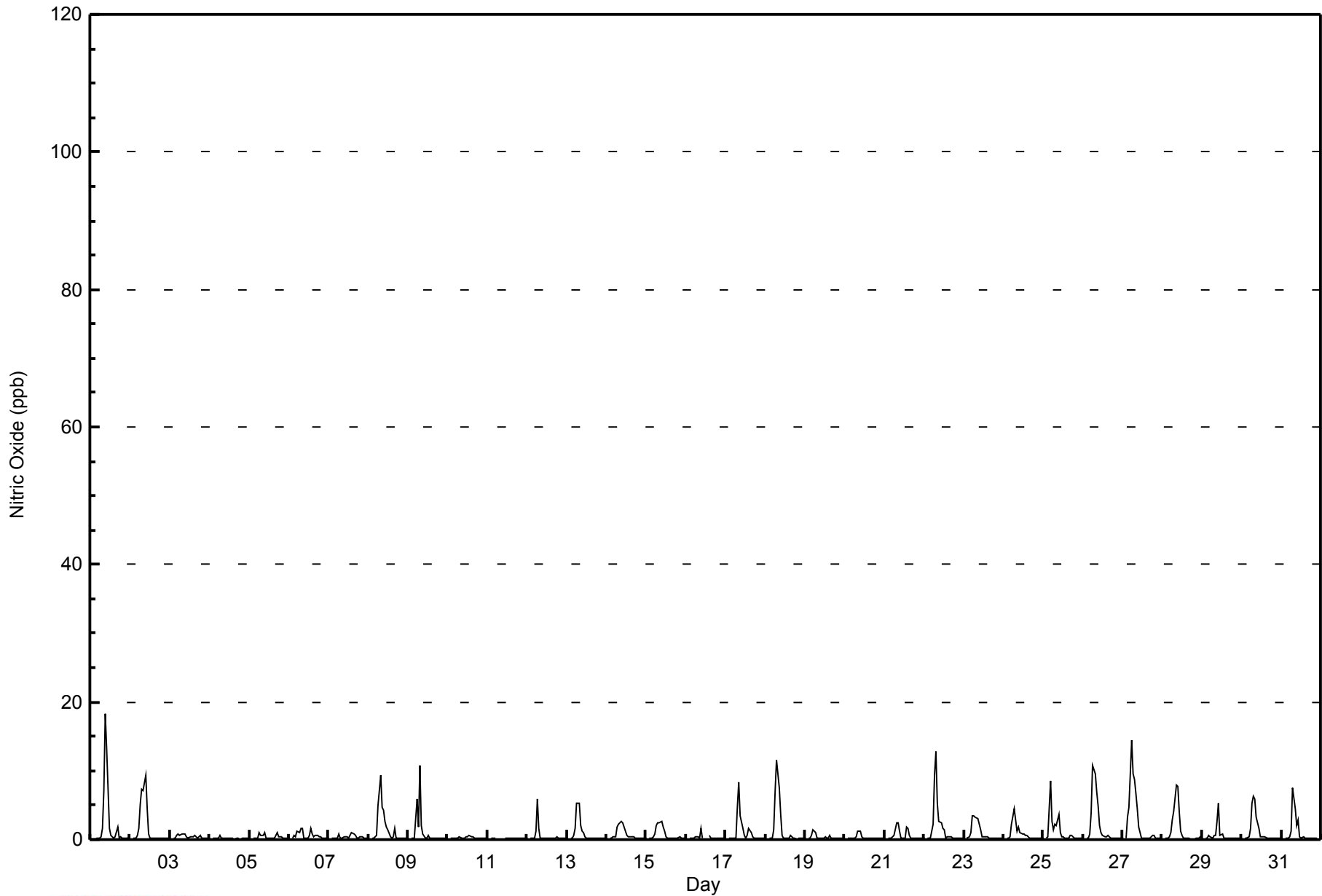


Maximum Value: 18 ppb on Jul 1 10:00														Maximum Daily Average: 2.5 ppb on Jul 27														Hours in Service: 744																					
Minimum Value: 0 ppb on Jul 1 01:00														Minimum Daily Average: 0.2 ppb on Jul 11														Hours of Data: 705																					
Maximum Diurnal Average: 4.1 ppb at hour 8														Minimum Diurnal Average: 0.1 ppb at hour 22														Hours of Missing Data: 39																					
Monthly Average: 0.9 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 11														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-Jul	0	Z	0	0	0	0	0	2	7	18	13	2	1	0	0	0	2	0	0	0	0	0	0	0	2.1	18																							
2-Jul	0	Z	0	0	1	2	5	7	7	9	4	1	0	0	0	0	0	0	0	0	0	0	0	0	1.7	9																							
3-Jul	0	Z	0	0	1	1	1	1	1	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0.4	1																							
4-Jul	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																							
5-Jul	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.4	1																							
6-Jul	0	Z	0	1	0	1	1	2	2	0	0	0	1	2	1	0	1	1	0	0	0	0	0	0	0.6	2																							
7-Jul	0	Z	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	0	0.4	1																							
8-Jul	0	Z	0	0	0	1	5	9	5	4	3	2	1	0	0	0	2	0	0	0	0	0	0	0	1.5	9																							
9-Jul	0	Z	0	0	0	6	2	11	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1.1	11																							
10-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1																							
11-Jul	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
12-Jul	0	Z	0	0	0	1	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	6																							
13-Jul	0	Z	0	0	1	2	5	5	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	5																							
14-Jul	0	Z	0	0	0	0	2	2	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.8	3																							
15-Jul	0	Z	0	0	0	1	2	2	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	3																							
16-Jul	0	Z	0	0	0	0	0	0	0	2	0	M	M	M	1	0	0	0	0	0	0	0	0	0	0.3	2																							
17-Jul	0	Z	0	0	0	0	0	5	8	3	2	1	0	1	2	1	0	0	0	0	0	0	0	0	1.1	8																							
18-Jul	0	Z	0	0	0	1	7	12	8	4	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1.5	12																							
19-Jul	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1																							
20-Jul	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
21-Jul	0	Z	0	0	0	0	1	2	2	1	0	0	0	2	2	1	0	0	0	0	0	0	0	0	0.6	2																							
22-Jul	0	Z	0	0	0	2	9	13	5	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	1.8	13																							
23-Jul	0	Z	0	0	1	3	4	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	4																							
24-Jul	0	Z	0	0	0	2	5	3	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.8	5																							
25-Jul	0	Z	0	0	9	3	1	2	2	4	1	0	0	0	0	0	1	1	0	0	0	0	0	0	1.2	9																							
26-Jul	0	Z	0	0	1	4	11	10	7	5	2	1	1	0	0	1	0	0	0	0	0	0	0	0	1.9	11																							
27-Jul	0	Z	0	3	5	14	10	9	7	4	2	0	0	0	0	0	0	0	0	1	1	0	0	0	2.5	14																							
28-Jul	0	Z	0	0	0	1	3	4	8	8	4	1	1	0	0	0	0	0	0	0	0	0	0	0	1.4	8																							
29-Jul	1	Z	0	0	1	0	0	1	1	3	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0.6	5																							
30-Jul	0	Z	0	0	0	2	5	6	6	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	6																							
31-Jul	0	Z	0	0	0	0	1	8	4	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	8																							
																								0.2	--	0.2	0.3	0.8	1.7	3.0	4.1	3.2	2.9	1.8	0.6	0.5	0.4	0.4	0.3	0.4	0.3	0.2	0.2	0.2	0.1	0.2	0.2	Diurnal Average	
																								1	--	0	3	9	14	11	13	8	18	13	2	1	2	2	1	2	1	1	1	1	0	0	0	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance																																																	



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	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: 705

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

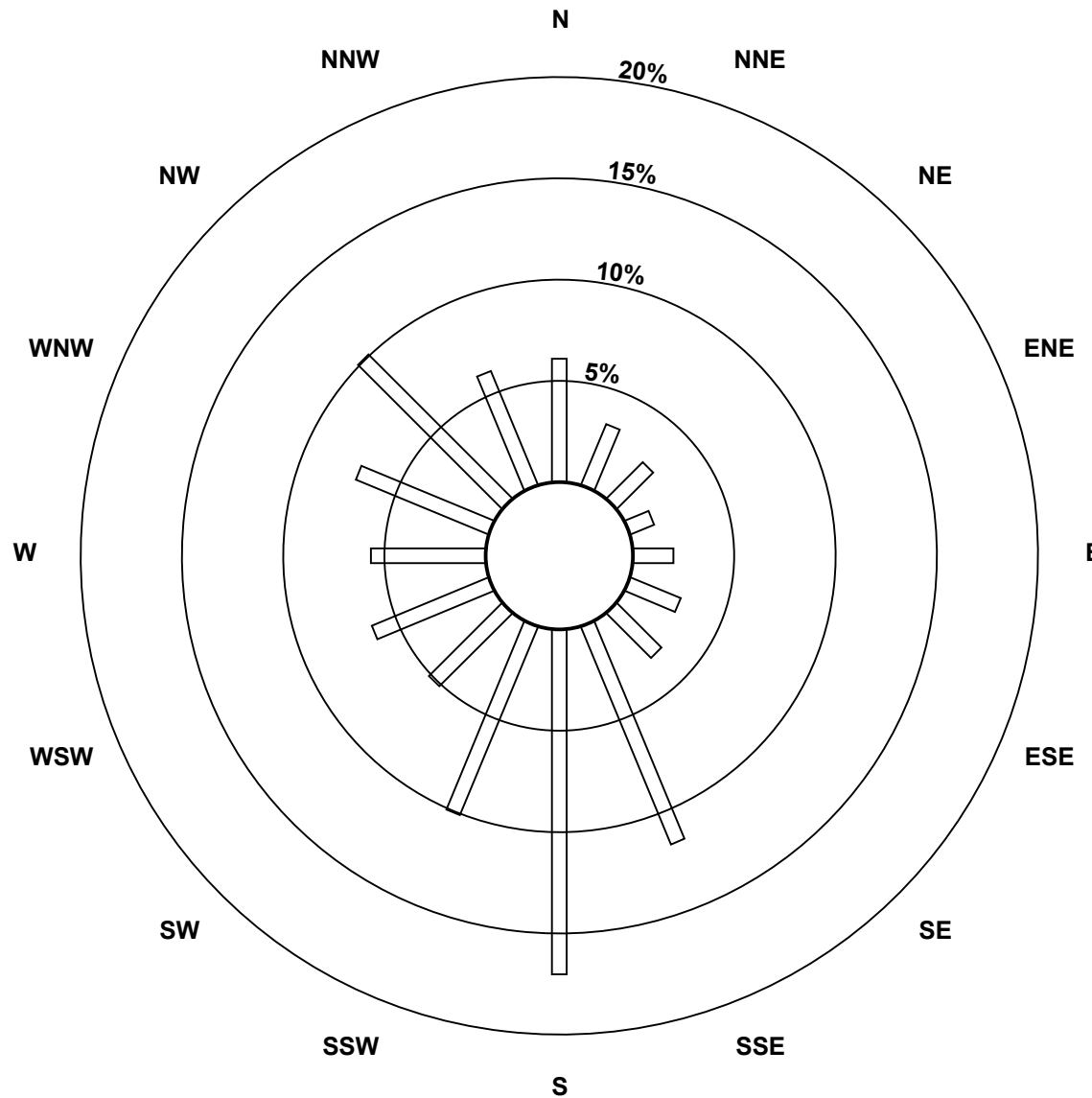
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	43	23	18	9	14	19	22	82	120	71	36	44	40	50	71	43	705
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	43	23	18	9	14	19	22	82	120	71	36	44	40	50	71	43	705

Total Number of Valid Hours: 705

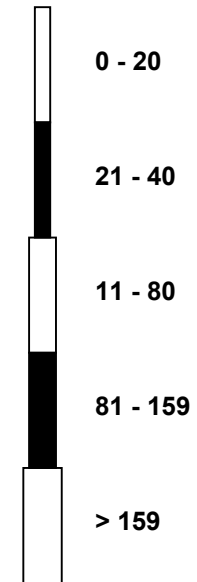
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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



Classes (ppb)



Total Number of Valid Hours: 705

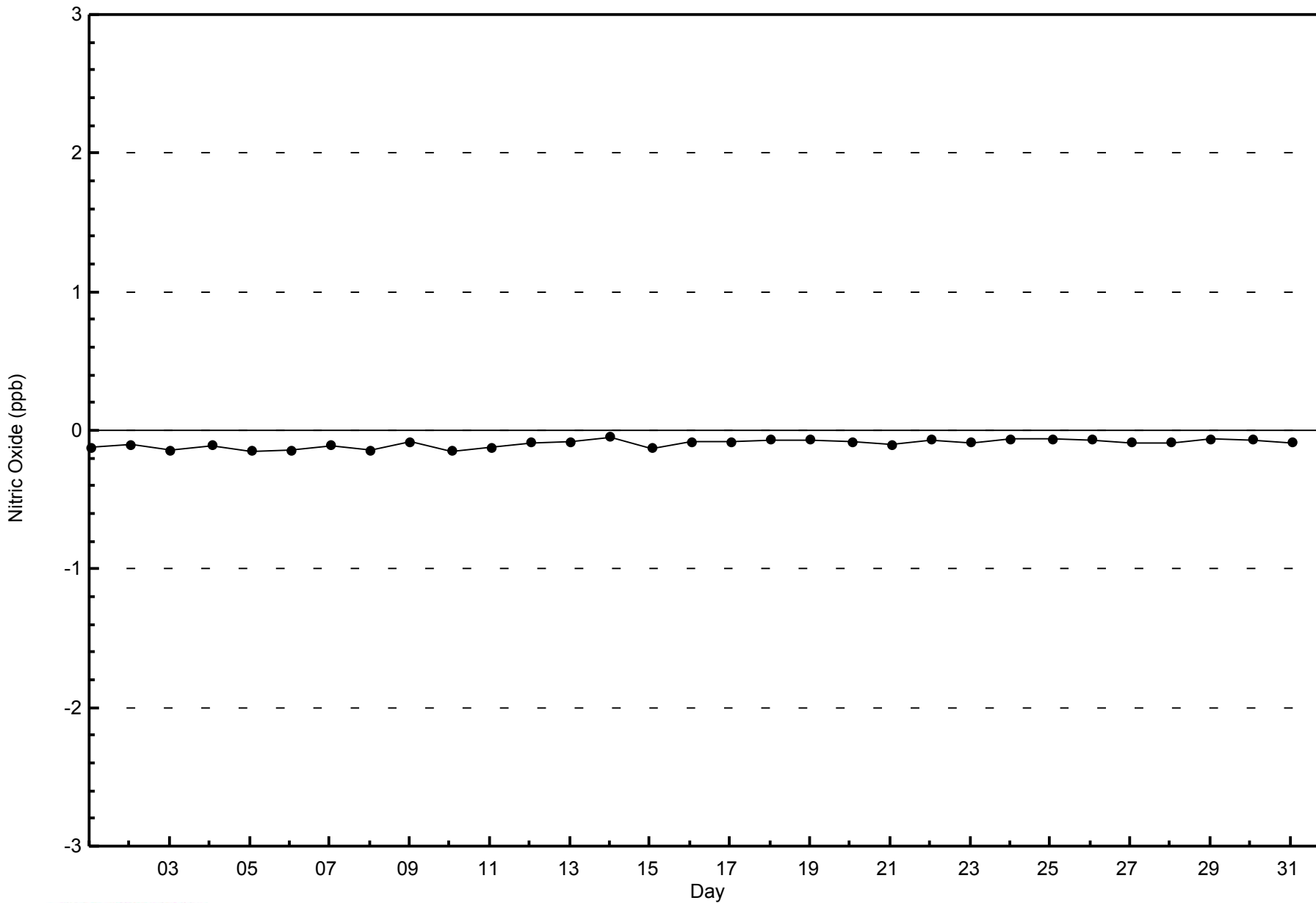


WBEA NETWORK

Zero Responses

Nitric Oxide (NO) - ppb

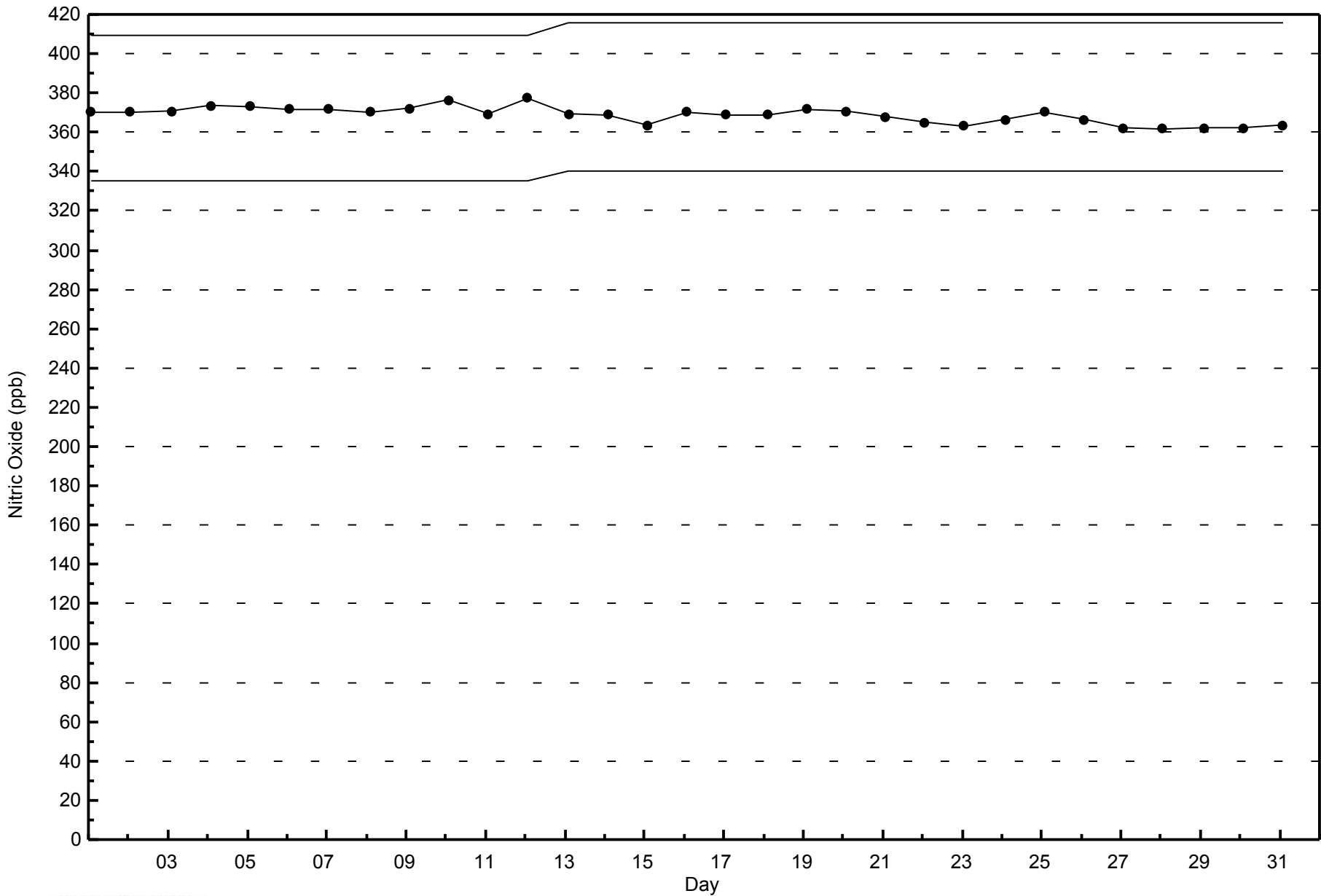
Fort McKay - Bertha Ganter - July 2014





WBEA NETWORK
Span Responses

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





Summary of Hour Averages

Fort McKay - Bertha Ganter - July 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 20 ppb on Jul 1 11:00	Maximum Daily Average: 5.9 ppb on Jul 15		Hours of Data:	705
Minimum Value: 0 ppb on Jul 10 01:00	Minimum Daily Average: 0.2 ppb on Jul 10		Hours of Missing Data:	39
Maximum Diurnal Average: 6.3 ppb at hour 10	Minimum Diurnal Average: 1.7 ppb at hour 20		Hours of Calibration:	36
Monthly Average: 3.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 8 P ₉₉ = 15		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-Jul	1	Z	2	2	1	1	1	2	8	16	20	6	3	3	1	3	9	3	5	4	4	6	15	14	5.6	20
2-Jul	9	Z	3	2	1	2	6	10	15	17	11	5	3	3	2	2	3	3	3	2	2	3	2	1	4.7	17
3-Jul	2	Z	5	7	9	6	3	4	3	3	2	2	3	4	3	2	1	1	4	2	2	2	1	1	3.1	9
4-Jul	5	Z	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.6	5
5-Jul	0	Z	0	1	0	1	2	1	1	2	0	0	0	0	0	0	2	5	2	2	3	2	3	3	1.4	5
6-Jul	2	Z	5	9	5	4	3	4	4	0	0	0	2	4	2	1	2	2	2	2	2	1	2	2	2.6	9
7-Jul	1	Z	0	0	0	1	1	1	1	1	1	1	1	1	3	2	2	1	1	2	2	1	1	0	1.1	3
8-Jul	0	Z	0	1	1	2	5	9	8	8	7	8	7	2	1	2	5	2	2	4	4	7	6	6	4.2	9
9-Jul	5	Z	1	4	4	15	7	19	10	7	1	1	3	1	1	1	1	1	1	0	0	0	0	0	3.5	19
10-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0.2	1
11-Jul	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	1	1	2	1	1	1	0.4	2
12-Jul	1	Z	0	0	0	4	11	5	2	2	1	1	2	2	2	3	3	4	5	3	2	4	10	13	3.4	13
13-Jul	9	Z	6	5	4	4	8	7	3	2	2	1	1	1	1	2	2	2	2	3	3	2	2	3	3.2	9
14-Jul	5	Z	5	4	4	2	5	7	7	8	10	8	5	2	2	2	1	1	0	1	3	10	6	0	4.3	10
15-Jul	1	Z	3	10	7	7	9	8	9	10	10	8	4	1	1	2	2	1	1	1	14	11	12	6	5.9	14
16-Jul	8	Z	1	1	1	1	1	1	1	10	6	M	M	M	2	0	0	0	0	0	0	2	4	3	2.1	10
17-Jul	8	Z	3	3	2	1	0	6	11	7	6	4	2	5	13	11	7	4	3	3	3	3	5	4	4.8	13
18-Jul	3	Z	3	2	2	3	8	12	9	7	2	1	1	1	2	5	5	5	4	1	3	3	0	1	3.5	12
19-Jul	2	Z	12	7	6	4	4	1	0	0	0	0	0	0	0	1	0	1	1	1	1	1	6	4	2.2	12
20-Jul	0	Z	0	0	0	0	0	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	1	0.9	2
21-Jul	2	Z	0	0	0	0	0	2	2	2	1	1	2	10	11	6	3	4	6	6	3	4	2	2	3.0	11
22-Jul	2	Z	1	1	2	4	11	14	12	11	13	12	9	2	3	3	3	3	3	2	3	4	8	10	5.9	14
23-Jul	7	Z	7	10	10	9	10	9	8	7	6	2	2	2	1	1	1	0	0	1	1	3	3	2	4.4	10
24-Jul	3	Z	4	4	2	5	9	7	3	4	4	3	3	2	2	1	1	0	1	0	0	0	0	1	2.6	9
25-Jul	2	Z	2	7	13	8	4	5	5	6	4	2	2	1	2	1	2	4	2	1	1	0	0	0	3.1	13
26-Jul	1	Z	2	4	3	6	11	12	13	10	6	4	3	2	2	4	3	1	2	1	1	0	1	1	3.9	13
27-Jul	1	Z	4	10	9	8	7	7	7	7	3	0	1	0	0	1	1	3	4	6	4	4	5	6	4.2	10
28-Jul	5	Z	4	5	4	4	5	6	8	10	10	5	2	1	0	0	1	0	0	1	2	1	4	8	3.7	10
29-Jul	6	Z	2	1	6	4	1	2	3	7	15	6	6	2	2	1	1	1	1	1	3	5	5	6	3.8	15
30-Jul	4	Z	3	3	3	4	8	10	13	11	8	4	4	3	2	3	3	2	2	2	1	2	5	2	4.4	13
31-Jul	2	Z	1	1	2	1	2	8	8	10	8	2	1	1	2	1	2	1	0	1	0	1	1	1	2.5	10

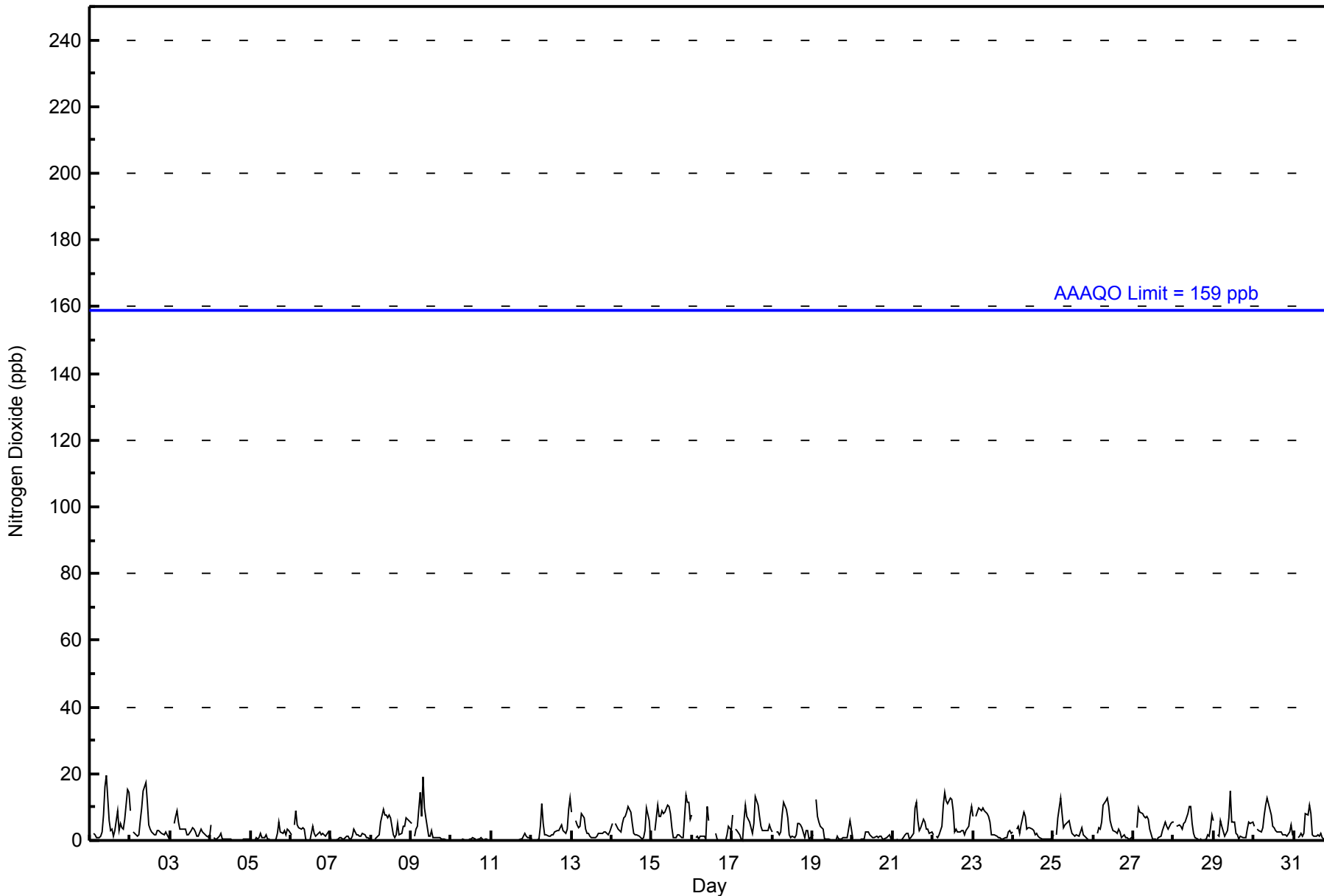
3.0	--	2.6	3.3	3.2	3.6	4.8	6.0	5.8	6.3	5.3	3.0	2.4	1.9	2.1	1.9	2.2	1.8	1.9	1.7	2.2	2.7	3.6	3.2	Diurnal Average	
9	--	12	10	13	15	11	19	15	17	20	12	9	10	13	11	9	5	6	6	14	11	15	14	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	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: 705

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

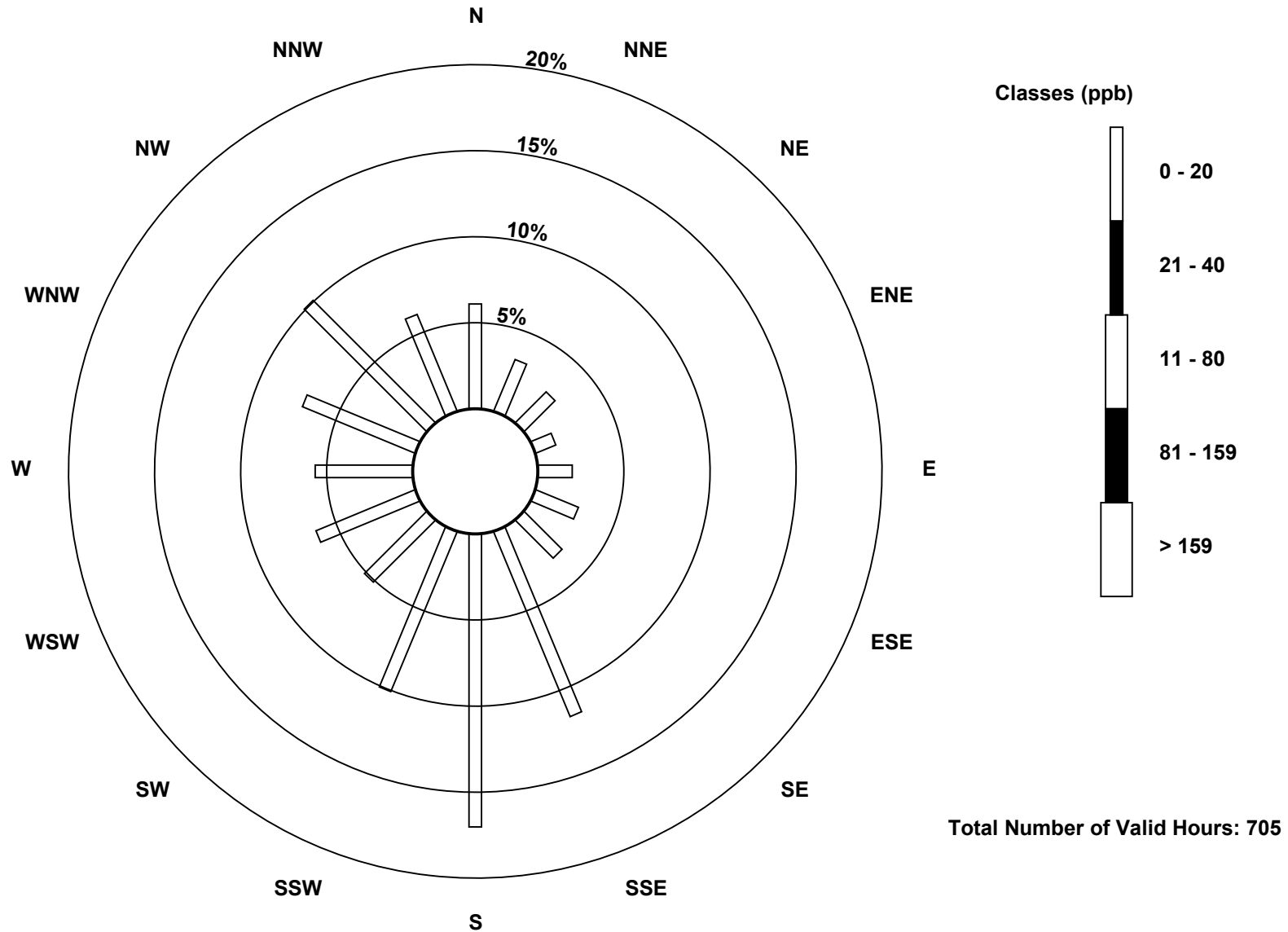
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	43	23	18	9	14	19	22	82	120	71	36	44	40	50	71	43	705
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	43	23	18	9	14	19	22	82	120	71	36	44	40	50	71	43	705

Total Number of Valid Hours: 705

Total Number of Hours: 744

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

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



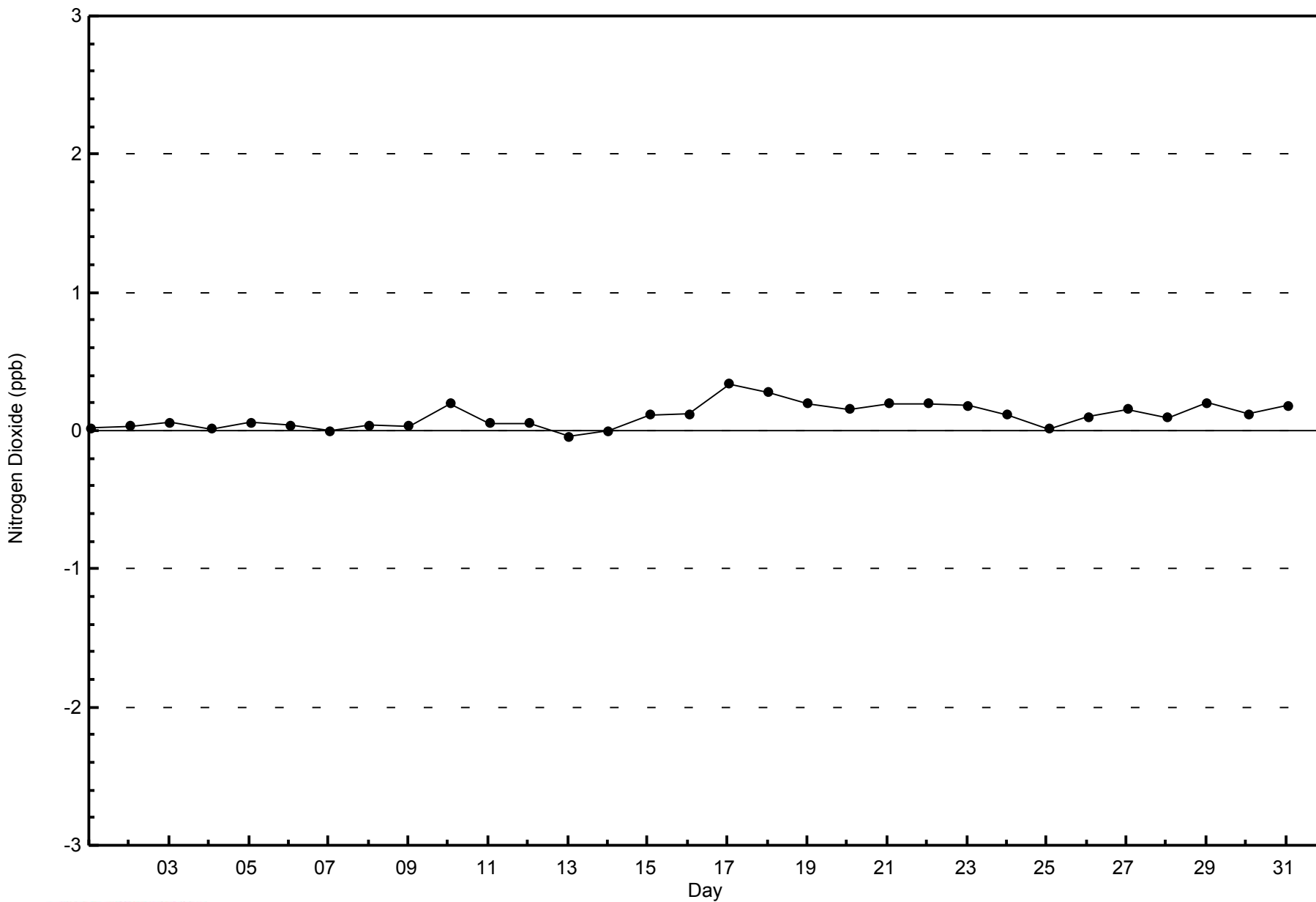


WBEA NETWORK

Zero Responses

Nitrogen Dioxide (NO₂) - ppb

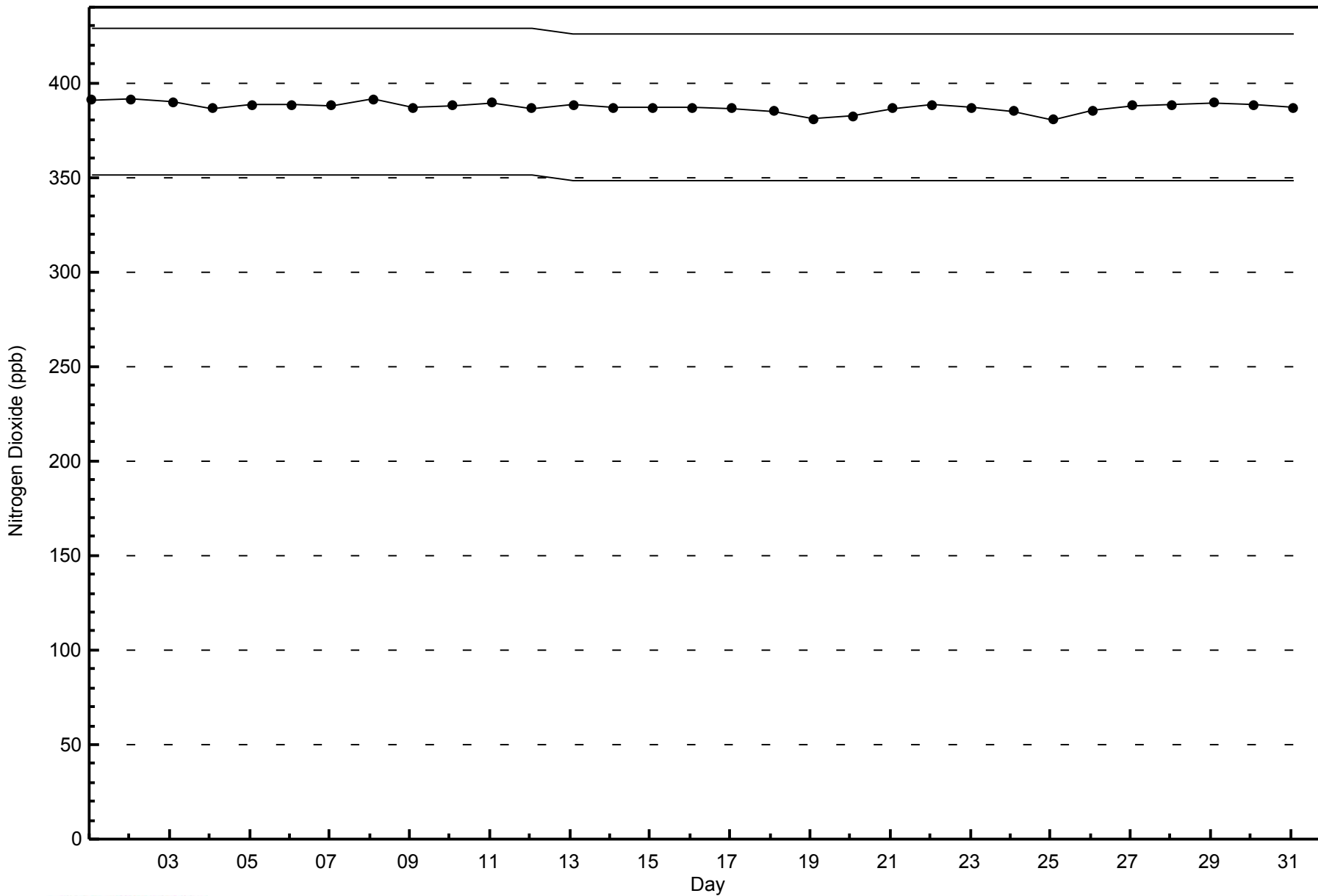
Fort McKay - Bertha Ganter - July 2014





WBEA NETWORK
Span Responses

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





Maximum Value: 35 ppb on Jul 1 10:00	Maximum Daily Average: 7.7 ppb on Jul 1	Hours in Service: 744
Minimum Value: 0 ppb on Jul 11 17:00	Minimum Daily Average: 0.5 ppb on Jul 10	Hours of Data: 705
Maximum Diurnal Average: 10.0 ppb at hour 8	Minimum Diurnal Average: 1.9 ppb at hour 20	Hours of Missing Data: 39
Monthly Average: 4.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 11 P ₉₉ = 22	Hours of Calibration: 36
		Percent Operational Time: 99.6

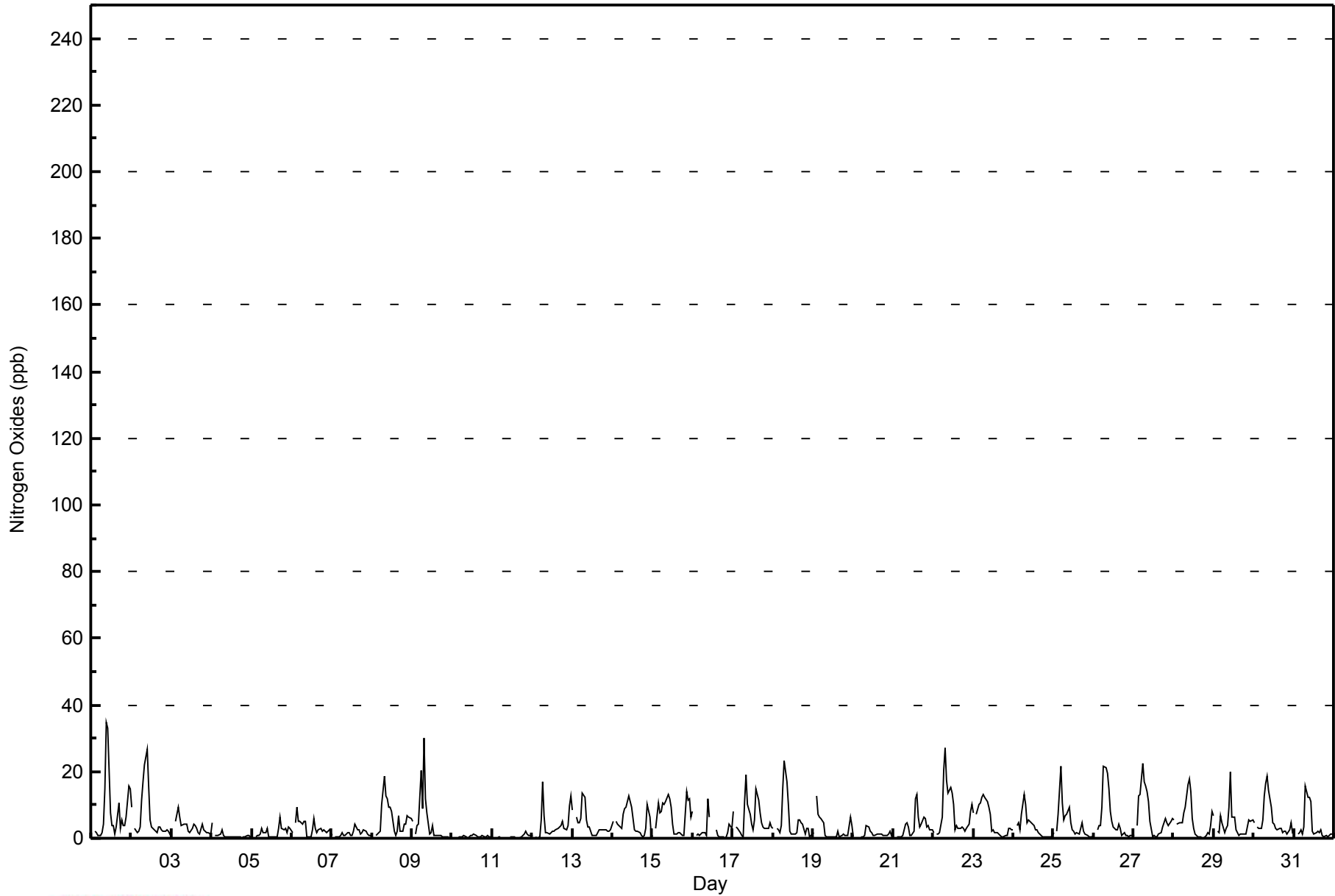
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	1	Z	2	2	1	1	2	4	15	35	33	7	4	4	1	3	11	3	6	4	4	6	16	15	7.7	35
2-Jul	9	Z	3	2	2	4	11	17	22	27	16	5	3	3	2	2	3	3	3	2	2	3	2	1	6.4	27
3-Jul	2	Z	5	7	9	6	4	4	4	4	2	2	3	4	4	3	2	1	4	3	2	2	2	1	3.6	9
4-Jul	5	Z	1	1	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0.8	5
5-Jul	0	Z	0	1	1	1	3	2	2	3	1	0	0	0	0	1	3	6	3	3	3	2	3	3	1.8	6
6-Jul	2	Z	5	10	5	5	4	5	5	1	0	0	3	6	3	2	3	3	2	2	2	2	3	2	3.2	10
7-Jul	1	Z	0	0	0	1	2	1	1	2	2	1	1	2	4	3	2	1	2	3	2	1	1	1	1.4	4
8-Jul	1	Z	1	1	2	2	10	19	13	12	9	9	8	2	1	2	7	2	2	4	4	7	6	6	5.7	19
9-Jul	5	Z	1	4	4	20	9	30	12	8	1	2	4	1	1	1	1	1	1	0	0	0	0	0	4.6	30
10-Jul	0	Z	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	0	1	0	1	1	0	0	0.5	1
11-Jul	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	1	1	1	2	1	1	1	0.6	2
12-Jul	1	Z	0	0	1	5	17	7	2	2	1	2	2	2	3	3	3	4	5	3	2	4	10	13	3.9	17
13-Jul	9	Z	6	5	4	6	13	12	5	3	3	2	1	1	1	2	2	2	2	3	3	2	2	3	4.1	13
14-Jul	5	Z	5	4	4	3	7	9	10	11	13	10	6	3	2	2	2	1	1	1	3	10	6	0	5.1	13
15-Jul	1	Z	3	11	8	8	11	10	11	13	12	9	4	1	1	2	2	1	1	1	14	12	12	7	6.7	14
16-Jul	8	Z	1	1	1	1	2	2	1	12	6	M	M	M	3	1	0	0	0	0	0	2	4	3	2.4	12
17-Jul	8	Z	3	3	2	1	1	11	19	10	7	4	2	5	15	11	7	5	3	3	3	3	5	4	5.9	19
18-Jul	3	Z	3	3	2	4	15	23	17	10	2	1	1	1	2	5	5	5	4	1	3	3	1	1	5.0	23
19-Jul	2	Z	13	7	6	6	5	1	0	1	1	0	1	0	0	2	1	1	1	1	1	1	6	4	2.6	13
20-Jul	0	Z	0	0	0	1	1	1	4	3	2	2	1	1	1	1	1	1	1	1	1	1	2	1	1.2	4
21-Jul	2	Z	1	0	0	0	1	4	5	3	1	1	2	12	13	7	3	4	6	6	4	4	2	3	3.7	13
22-Jul	2	Z	1	1	2	6	20	27	17	14	15	14	10	3	4	3	3	3	3	2	3	4	8	10	7.7	27
23-Jul	7	Z	7	10	11	12	13	12	11	9	7	2	2	2	2	1	1	0	1	1	1	3	3	2	5.3	13
24-Jul	3	Z	4	5	3	7	13	10	5	6	5	4	4	2	3	2	1	0	1	0	0	0	0	1	3.4	13
25-Jul	2	Z	2	7	21	11	5	7	7	9	5	3	2	1	2	1	3	5	2	1	1	0	0	0	4.3	21
26-Jul	1	Z	2	4	4	9	21	21	20	15	8	5	4	3	3	4	3	1	2	1	1	0	1	1	5.8	21
27-Jul	1	Z	4	13	13	23	17	16	14	11	5	0	1	0	0	1	2	4	5	6	5	4	5	6	6.7	23
28-Jul	6	Z	4	5	5	5	8	10	16	18	14	6	3	1	1	0	1	0	0	1	2	1	4	8	5.1	18
29-Jul	7	Z	2	2	7	5	2	3	4	9	20	6	6	2	2	1	1	1	1	1	3	6	5	6	4.4	20
30-Jul	5	Z	4	3	3	5	13	17	19	14	9	4	4	3	3	3	3	2	2	2	1	2	5	2	5.6	19
31-Jul	2	Z	1	2	2	1	3	16	12	12	11	2	1	2	2	2	2	1	0	1	0	1	1	1	3.5	16
	3.2	--	2.8	3.7	4.0	5.2	7.8	10.0	9.0	9.2	7.1	3.6	2.9	2.3	2.5	2.3	2.6	2.1	2.1	1.9	2.4	2.9	3.8	3.4	Diurnal Average	
	9	--	13	13	21	23	21	30	22	35	33	14	10	12	15	11	11	6	6	6	14	12	16	15	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	694	98.44	98.44
21 - 40	11	1.56	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

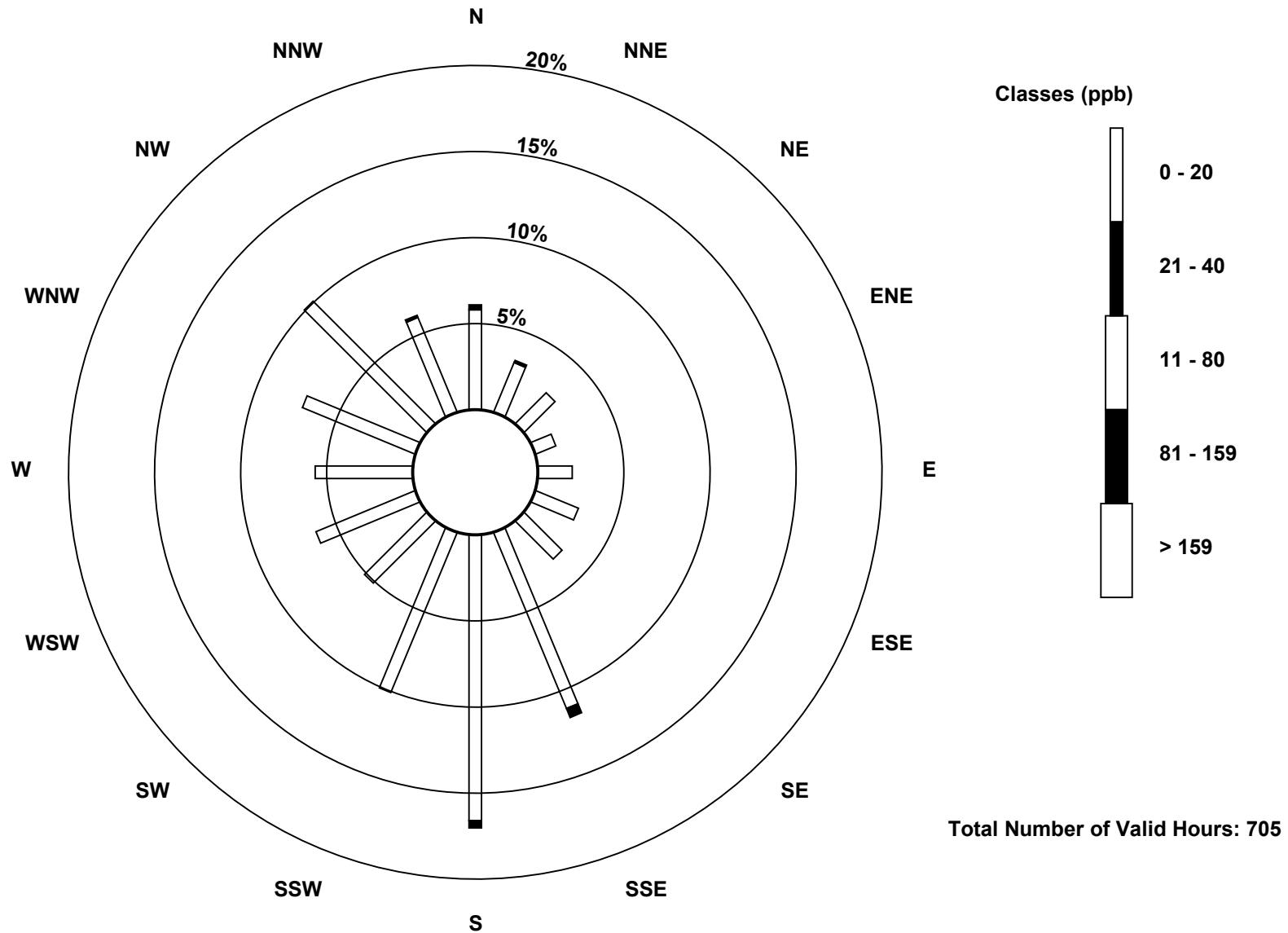
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	41	22	18	9	14	19	22	78	117	71	36	44	40	50	71	42	694
21 - 40	2	1	0	0	0	0	0	4	3	0	0	0	0	0	0	1	11
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	43	23	18	9	14	19	22	82	120	71	36	44	40	50	71	43	705

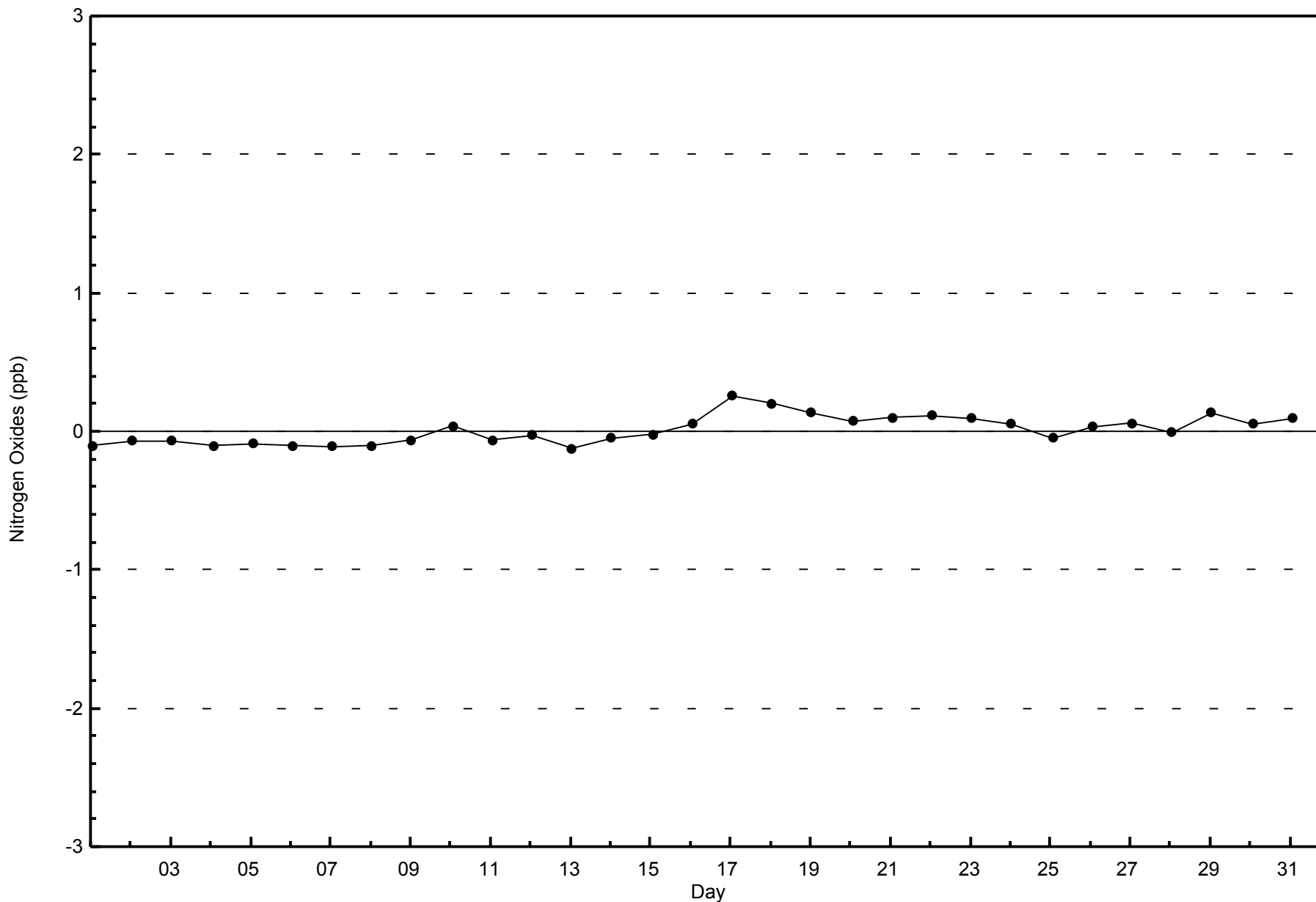
Total Number of Valid Hours: 705

Total Number of Hours: 744

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

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

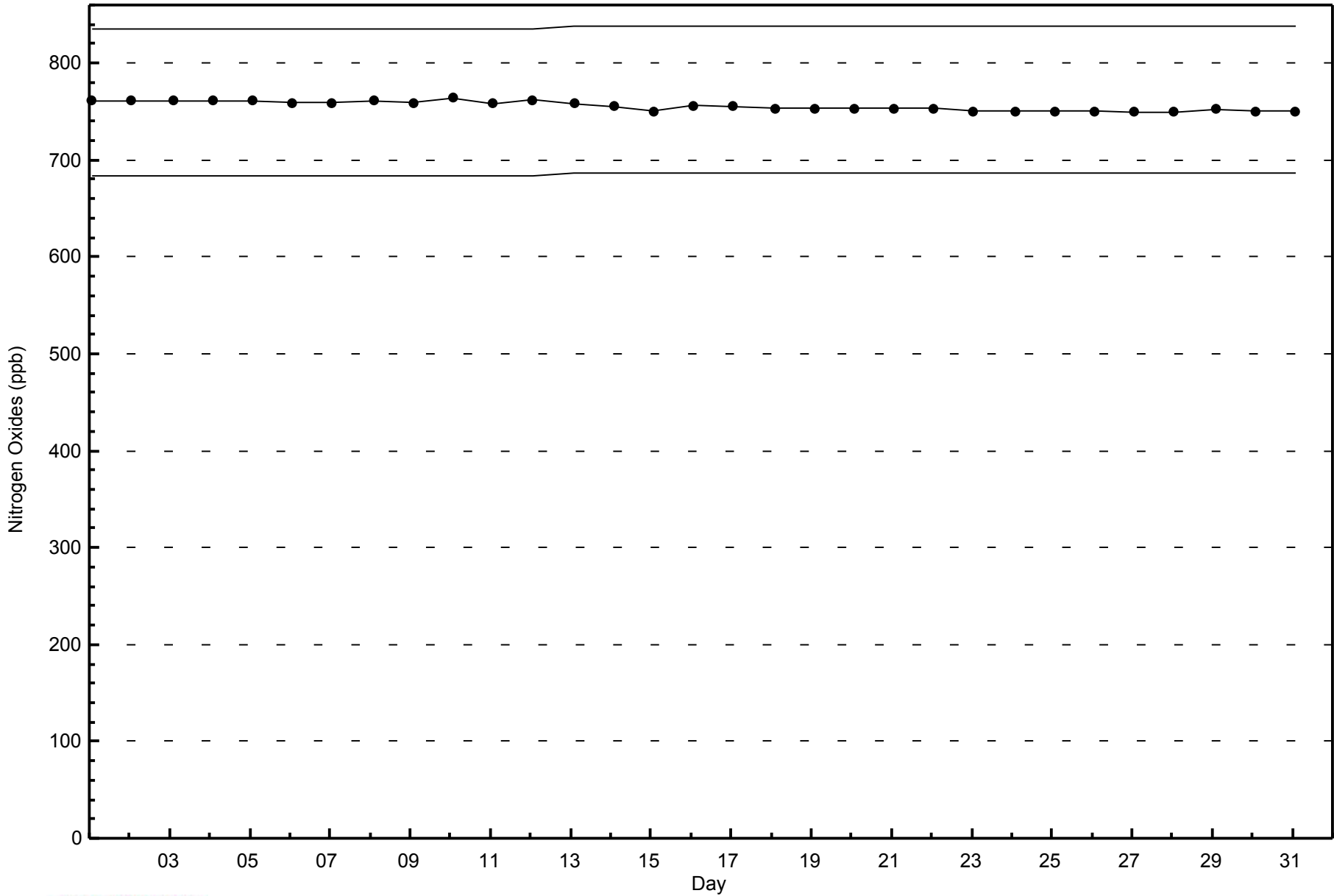






WBEA NETWORK
Span Responses

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





Summary of Hour Averages

Fort McKay - Bertha Ganter - July 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 77 ppb on Jul 21 19:00	Maximum Daily Average: 36.4 ppb on Jul 30		Hours of Data:	630
Minimum Value: 0 ppb on Jul 2 04:00	Minimum Daily Average: 14.8 ppb on Jul 7		Hours of Missing Data:	114
Maximum Diurnal Average: 39.2 ppb at hour 14	Minimum Diurnal Average: 8.6 ppb at hour 5		Hours of Calibration:	44
Monthly Average: 24.1 ppb	Percentiles: P ₁ = 1 P ₁₀ = 8 Q ₁ = 13 Median = 22 Q ₃ = 33 P ₉₀ = 44 P ₉₉ = 64		Percent Operational Time:	90.6

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-Jul	7	Z	8	6	5	5	8	8	8	9	15	32	35	36	32	33	30	38	36	36	24	14	4	1	18.5	38
2-Jul	1	Z	1	0	0	0	4	8	17	19	28	43	52	54	49	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	54
3-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	C	31	33	33	32	28	25	23	20	18	--	33
4-Jul	15	Z	25	25	19	24	26	28	28	30	31	31	32	32	33	31	31	30	28	28	26	24	23	22	27.1	33
5-Jul	22	Z	15	16	16	17	14	17	20	24	25	25	26	26	26	26	25	20	23	17	18	23	21	17	21.0	26
6-Jul	16	Z	9	4	8	9	13	18	23	24	22	23	21	21	24	18	23	21	UO	UO	15	10	20	10	16.8	24
7-Jul	11	Z	12	12	10	13	14	11	11	13	18	19	22	24	25	20	25	24	20	14	11	5	3	3	14.8	25
8-Jul	3	Z	1	2	2	4	4	6	14	18	26	36	40	32	28	27	28	32	UO	32	21	14	10	8	17.7	40
9-Jul	9	Z	16	19	18	10	21	15	38	41	35	37	PF	45	45	42	46	45	42	41	34	30	28	24	30.9	46
10-Jul	26	Z	22	20	18	18	18	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	26
11-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	M	M	C	C	23	17	16	15	--	23
12-Jul	13	Z	12	12	10	8	5	14	24	29	30	33	31	M	M	M	M	48	40	36	26	20	17	11	22.0	48
13-Jul	11	8	Z	6	6	10	13	17	24	28	30	34	35	38	41	47	54	55	53	48	34	22	17	14	28.1	55
14-Jul	12	10	Z	7	7	10	15	22	28	M	M	M	M	M	C	C	20	19	19	18	13	9	10	17	--	28
15-Jul	18	18	Z	13	11	11	12	14	17	20	26	30	25	22	30	31	27	25	22	15	13	9	13	13	19.1	31
16-Jul	12	12	Z	8	6	5	6	6	8	8	10	M	M	M	24	31	29	29	28	28	25	26	29	21	17.6	31
17-Jul	13	11	Z	11	11	11	14	16	18	29	39	48	48	53	54	55	56	50	53	45	35	27	19	18	31.9	56
18-Jul	14	10	Z	7	6	6	10	12	18	27	32	36	41	44	47	58	57	49	40	36	31	22	18	14	27.7	58
19-Jul	16	17	Z	6	6	7	12	17	15	15	17	16	15	20	23	23	25	26	28	29	27	19	10	14	17.5	29
20-Jul	17	16	Z	8	8	9	12	16	22	26	32	39	40	40	40	39	36	36	35	27	22	15	13	13	24.5	40
21-Jul	8	9	Z	8	6	6	10	12	15	31	41	45	54	60	65	69	67	70	77	60	33	27	26	21	35.6	77
22-Jul	16	14	Z	10	7	6	8	12	25	C	C	C	C	C	C	54	53	50	44	39	33	27	22	16	--	54
23-Jul	17	13	Z	6	5	6	12	20	27	34	40	41	39	37	38	37	40	37	33	29	26	27	22	16	26.1	41
24-Jul	10	10	Z	10	5	8	13	15	18	19	21	22	21	31	40	41	39	35	33	31	28	25	26	26	23.3	41
25-Jul	22	23	Z	10	6	11	16	17	22	24	32	32	35	36	31	24	24	23	18	18	11	7	6	6	19.8	36
26-Jul	5	8	Z	6	5	8	10	16	26	31	40	48	52	55	53	52	53	45	47	38	32	25	23	17	30.2	55
27-Jul	12	17	Z	7	6	6	9	13	17	22	28	32	37	39	40	45	39	34	28	29	21	18	15	13	23.0	45
28-Jul	15	15	Z	14	13	14	15	17	17	23	35	41	40	38	37	38	41	45	44	39	22	16	12	10	26.1	45
29-Jul	8	9	Z	10	9	16	19	26	29	37	43	65	61	59	54	42	37	44	41	28	25	28	21	19	31.8	65
30-Jul	13	10	Z	8	6	8	12	19	27	40	51	59	57	56	58	59	59	54	48	39	51	44	32	27	36.4	59
31-Jul	22	20	Z	12	12	10	10	12	22	45	35	38	39	40	39	23	16	16	14	15	17	16	15	14	21.8	45

13.2	13.2	12.1	9.7	8.6	9.6	12.2	15.1	20.6	25.4	29.9	36.1	37.6	39.2	38.7	38.3	37.6	37.0	35.8	31.5	25.1	20.6	17.4	15.1	Diurnal Average
26	23	25	25	19	24	26	28	38	45	51	65	61	60	65	69	67	70	77	60	51	44	32	27	Diurnal Maximum

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

Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

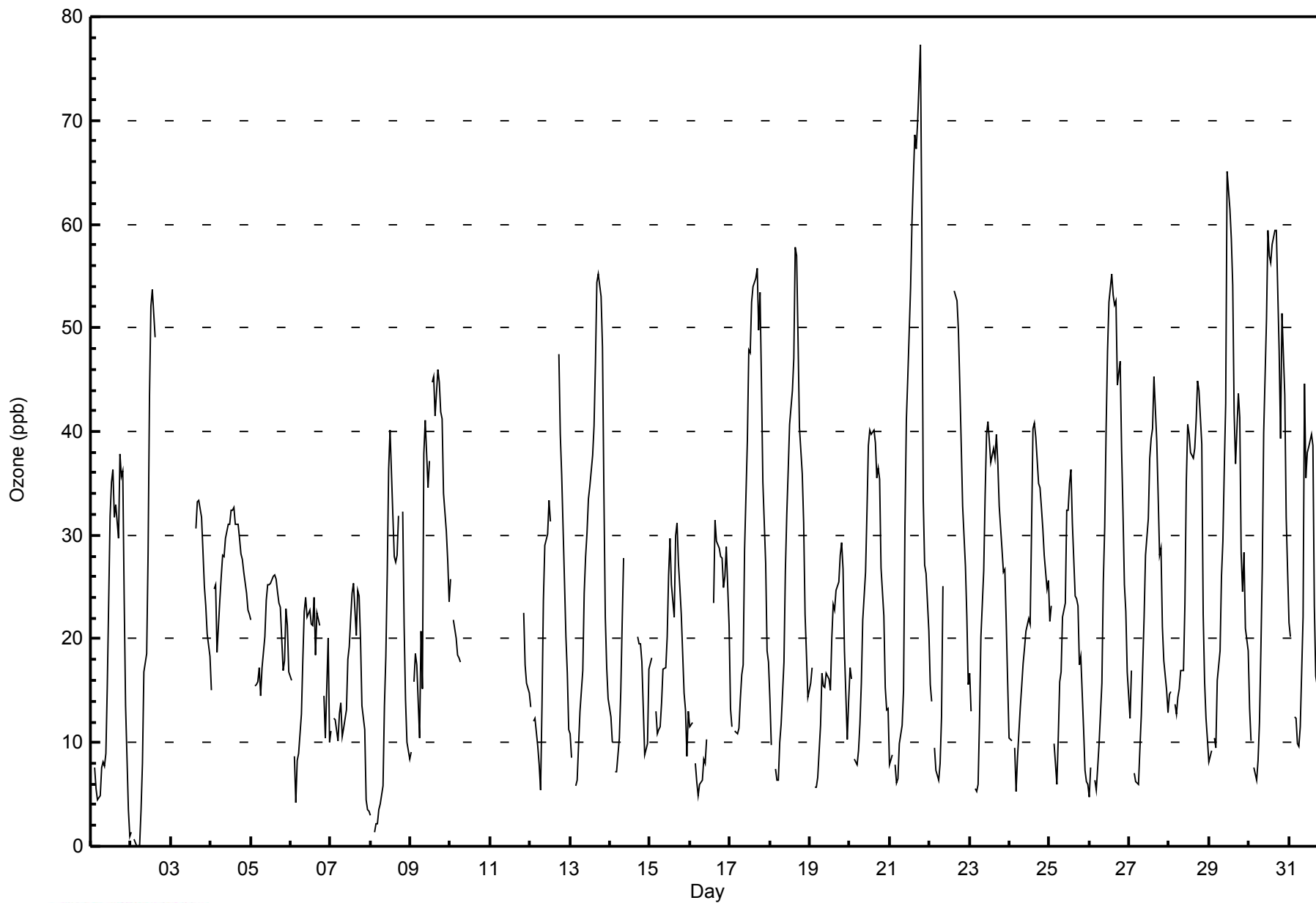


WBEA NETWORK

Hourly Averages

Ozone (O₃) - ppb

Fort McKay - Bertha Ganter - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	296	46.98	46.98
21 - 50	294	46.67	93.65
51 - 82	40	6.35	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 630

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

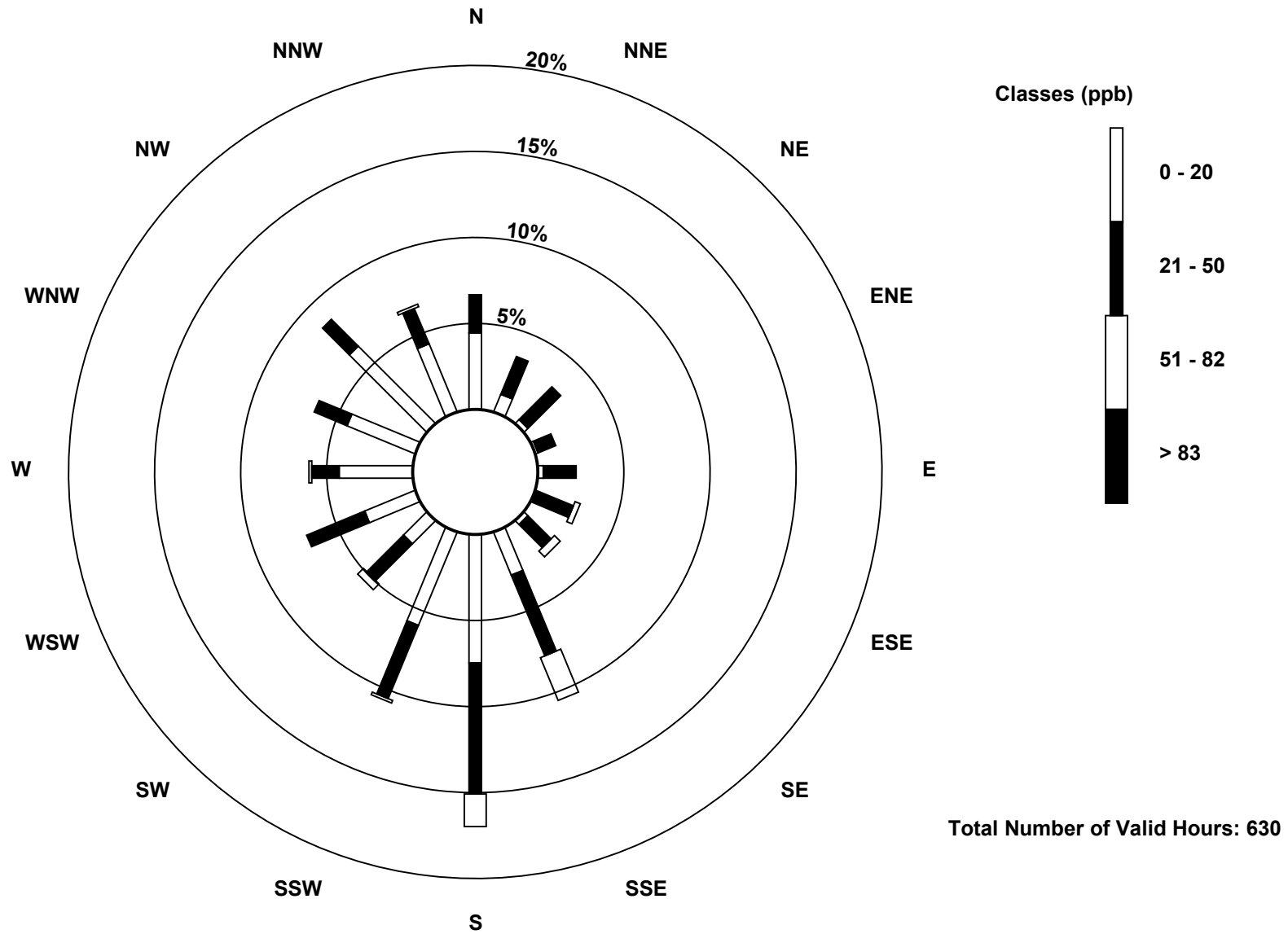
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	7	2	1	2	0	2	17	47	37	12	20	27	27	40	27	296
21 - 50	14	15	17	7	12	15	12	32	48	29	19	23	10	13	14	14	294
51 - 82	0	0	0	0	0	2	3	17	12	1	3	0	1	0	0	1	40
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	42	22	19	8	14	17	17	66	107	67	34	43	38	40	54	42	630

Total Number of Valid Hours: 630

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

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



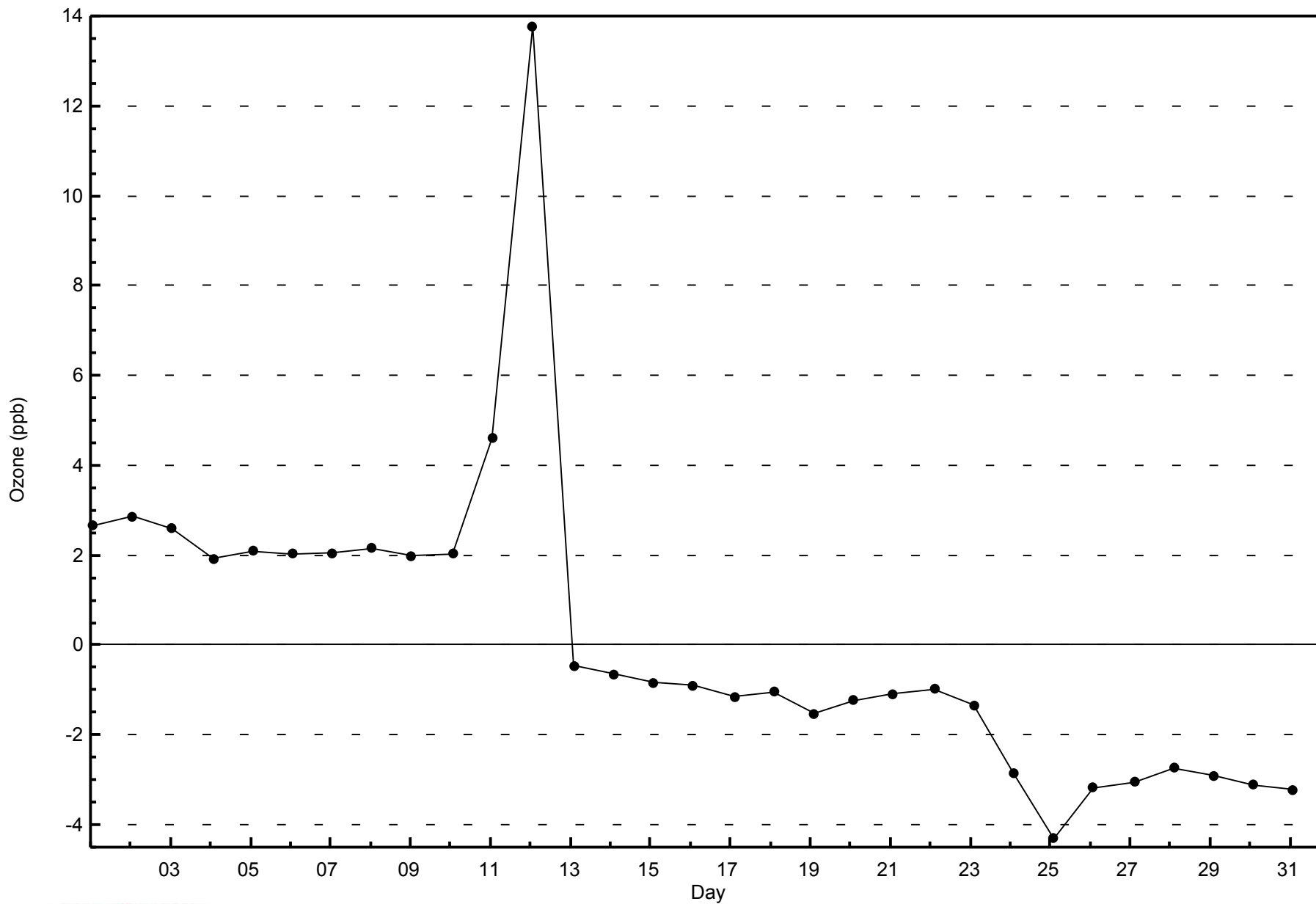


WBEA NETWORK

Zero Responses

Ozone (O₃) - ppb

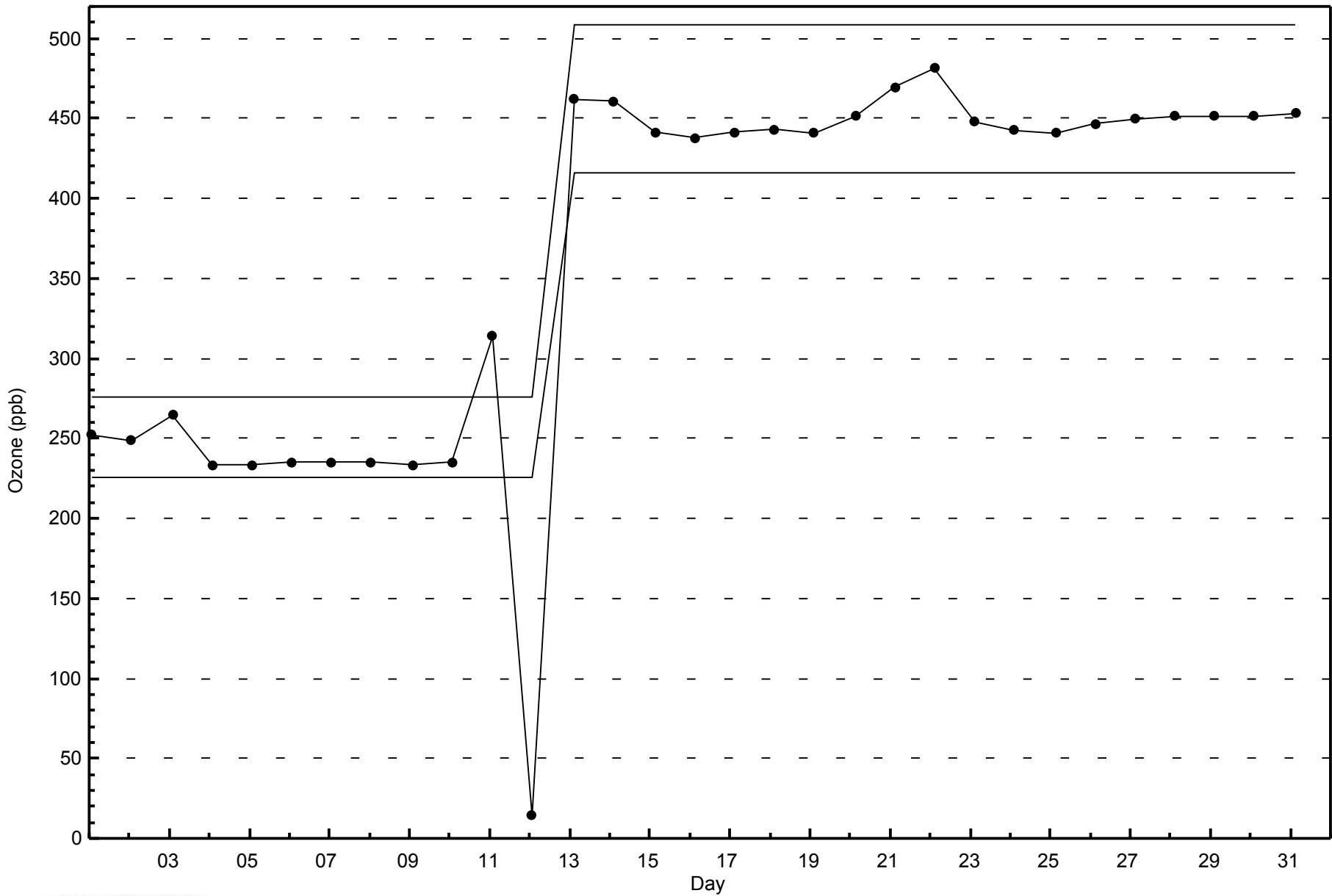
Fort McKay - Bertha Ganter - July 2014





WBEA NETWORK
Span Responses

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





Wood Buffalo Environmental Association

Summary of Hour Averages

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

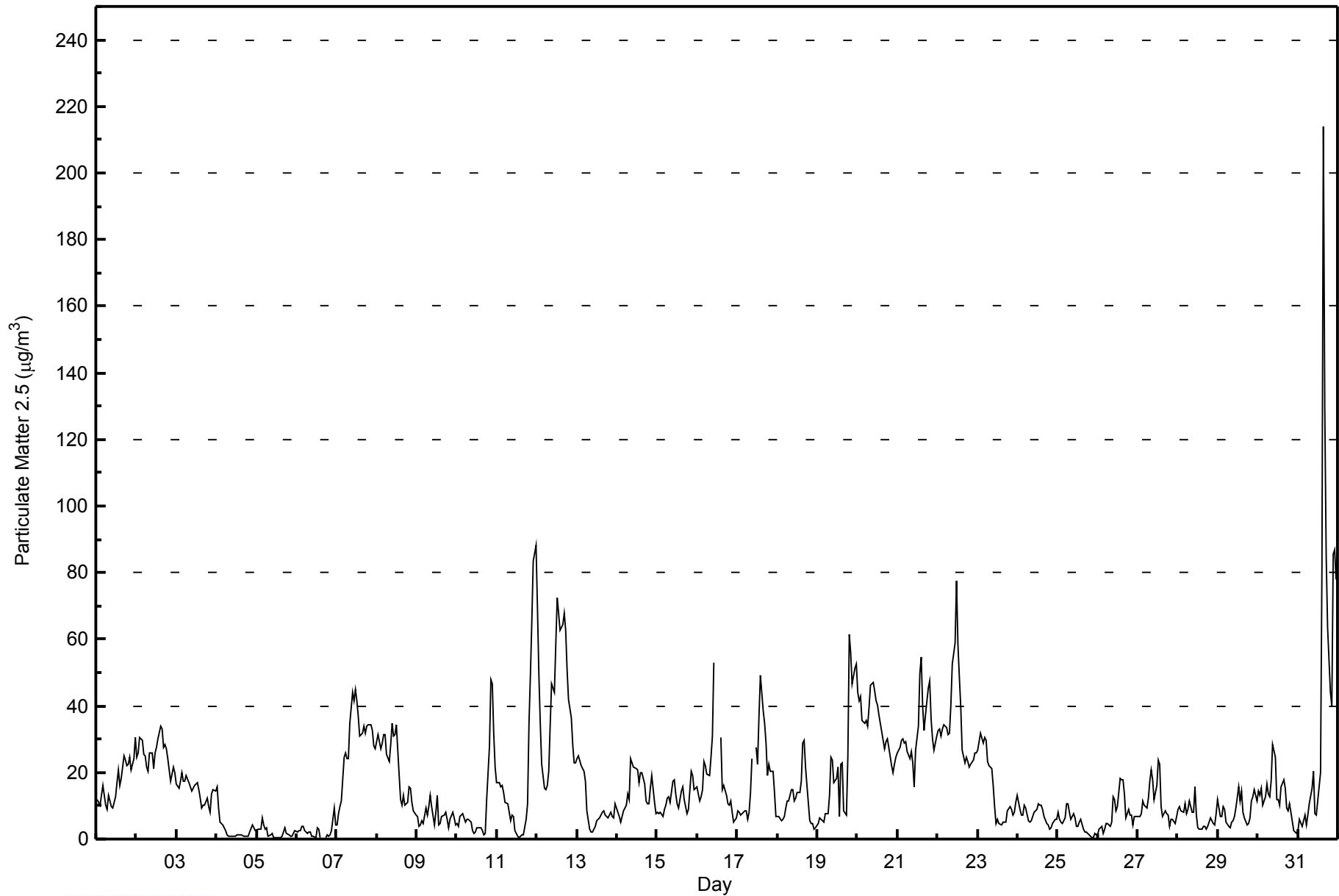
Fort McKay - Bertha Ganter - July 2014

Number of Exceedences (AAAQO): 24-hr: 5		Hours in Service: 744																								
Maximum Value: 213.8 μg/m ³ on Jul 31 16:00		Maximum Daily Average: 43.2 μg/m ³ on Jul 31																								
Minimum Value: 0.3 μg/m ³ on Jul 6 12:00		Hours of Data: 738																								
Maximum Diurnal Average: 23.6 μg/m ³ at hour 16		Hours of Missing Data: 6																								
Monthly Average: 16.83 μg/m ³		Hours of Calibration: 0																								
Minimum Daily Average: 1.9 μg/m ³ on Jul 5		Percent Operational Time: 99.2																								
Minimum Diurnal Average: 13.1 μg/m ³ at hour 7																										
Percentiles: P ₁ = 0.5 P ₁₀ = 2.6 Q ₁ = 5.8 Median = 11.3 Q ₃ = 23.6 P ₉₀ = 34.7 P ₉₉ = 82.4																										
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-Jul	11.7	10.9	10.0	13.2	16.1	10.2	8.9	13.1	11.4	9.6	9.2	12.8	16.9	20.6	16.1	18.2	25.1	23.6	22.2	22.6	24.4	20.6	24.3	30.3	16.8	30.3
2-Jul	24.6	26.1	30.4	29.8	25.6	25.0	21.7	20.5	25.9	25.7	21.3	25.7	27.6	29.9	34.0	33.0	27.6	28.3	27.3	24.2	17.3	19.6	21.6	20.1	25.5	34.0
3-Jul	16.6	15.4	17.3	19.8	17.2	17.5	18.9	16.9	15.7	14.5	15.4	15.9	16.8	14.8	12.1	9.3	10.0	10.1	12.3	9.6	7.8	13.6	14.7	14.3	14.4	19.8
4-Jul	15.5	9.2	5.2	4.7	4.1	2.7	1.4	0.9	0.8	0.8	1.0	1.1	1.2	1.5	1.4	1.2	1.0	0.9	0.9	0.9	2.2	4.1	3.2	2.4	2.8	15.5
5-Jul	2.4	3.0	3.1	6.2	4.1	2.8	3.5	1.1	1.3	1.9	0.6	0.5	0.4	0.4	0.5	0.7	2.1	3.5	1.5	1.2	0.9	1.0	1.7	2.4	1.9	6.2
6-Jul	2.1	2.4	2.6	3.7	3.8	2.5	1.8	2.0	2.1	0.8	0.6	0.3	3.5	2.9	0.5	UO	UO	0.6	1.3	1.1	1.2	2.5	9.4	4.1	2.4	9.4
7-Jul	4.4	7.4	9.9	11.5	24.4	26.0	24.2	24.2	34.5	44.1	41.6	45.0	41.4	36.8	31.1	31.9	33.9	31.7	34.0	34.4	34.4	32.6	27.9	27.2	28.9	45.0
8-Jul	29.3	31.3	27.3	28.6	31.3	31.2	25.6	23.5	28.5	34.9	30.9	31.5	34.3	18.9	12.0	10.1	13.0	10.2	11.2	15.6	15.4	11.1	8.5	7.4	21.7	34.9
9-Jul	6.7	3.9	4.2	5.3	4.8	9.2	7.3	9.8	13.3	9.6	4.2	8.1	13.1	4.1	4.6	6.7	7.0	7.9	6.0	3.5	5.8	8.1	6.3	4.3	6.8	13.3
10-Jul	4.7	3.8	6.6	7.7	6.4	5.2	5.8	5.9	5.0	2.7	1.9	2.0	3.2	3.5	3.4	2.5	1.3	1.6	12.0	28.0	48.0	46.8	31.9	21.7	10.9	48.0
11-Jul	17.1	17.0	15.6	16.2	13.9	11.2	10.7	8.2	5.5	7.1	7.0	2.7	0.8	0.4	0.8	1.2	1.4	5.7	10.6	34.6	49.1	65.2	83.7	88.1	19.7	88.1
12-Jul	69.6	49.7	34.7	22.5	15.4	14.7	16.2	20.2	33.9	46.5	44.2	58.4	72.5	67.8	62.8	64.6	67.9	62.7	50.7	42.0	36.3	28.5	23.1	22.7	42.8	72.5
13-Jul	24.1	25.1	21.9	21.0	20.1	17.5	8.4	2.9	1.9	2.0	2.9	3.9	5.4	6.4	7.2	8.2	8.5	7.1	6.4	7.1	7.9	6.7	6.2	10.4	10.0	25.1
14-Jul	7.9	6.9	5.1	6.6	8.5	10.1	13.4	11.9	24.1	22.7	21.8	21.0	20.6	17.0	19.7	19.7	16.4	11.6	10.6	10.6	15.4	19.0	11.0	7.7	14.1	24.1
15-Jul	7.9	7.6	8.0	6.6	8.9	10.0	12.3	12.9	10.8	17.3	17.7	13.6	10.4	9.4	14.5	15.6	11.8	9.7	7.7	8.8	20.2	19.1	14.7	15.4	12.1	20.2
16-Jul	15.8	11.6	12.8	14.7	23.2	21.9	19.7	19.2	24.5	31.0	53.0	M	M	M	30.6	14.7	15.9	13.2	10.6	10.4	11.4	8.3	5.1	6.4	17.8	53.0
17-Jul	8.3	7.9	7.0	7.7	8.4	8.4	6.1	8.0	13.8	24.3	M	27.5	22.5	37.0	49.0	38.4	34.7	28.7	19.3	22.3	20.4	20.2	13.9	6.6	19.2	49.0
18-Jul	6.9	6.7	5.5	5.9	6.8	9.2	11.5	11.5	14.7	14.6	11.5	12.4	13.8	13.9	17.4	28.8	29.4	21.5	16.0	5.5	4.8	4.5	2.8	3.2	11.6	29.4
19-Jul	4.6	6.2	6.1	5.4	4.9	7.5	7.8	12.9	24.5	23.9	16.8	18.3	21.7	6.9	22.3	22.8	8.4	7.2	24.8	61.3	56.0	46.6	51.4	52.3	21.7	61.3
20-Jul	44.1	41.5	42.6	35.6	34.7	35.7	34.1	39.5	46.4	47.0	44.4	41.4	40.3	37.4	32.3	29.7	27.3	29.4	30.0	27.7	22.2	20.1	22.6	24.7	34.6	47.0
21-Jul	25.8	27.5	29.5	30.0	28.8	29.3	26.1	24.0	26.3	22.9	15.9	26.8	33.9	49.5	54.6	39.8	32.4	37.3	45.1	47.3	36.2	30.0	26.7	30.8	32.3	54.6
22-Jul	32.5	33.0	30.7	33.1	34.5	33.6	31.4	31.8	40.2	52.5	59.0	77.4	58.5	48.8	40.0	26.6	23.0	24.6	23.4	21.8	22.4	23.6	26.1	25.7	35.6	77.4
23-Jul	26.6	29.1	31.9	28.9	30.5	29.5	23.4	22.1	21.4	16.2	9.8	4.7	5.8	4.6	4.3	4.9	4.9	4.9	8.5	9.6	9.0	7.4	7.9	11.0	14.9	31.9
24-Jul	13.2	9.0	7.1	7.0	10.1	9.4	5.5	5.2	5.7	7.0	8.2	9.1	10.5	10.1	10.1	9.1	6.9	4.5	4.1	2.9	3.4	4.8	5.8	5.9	7.3	13.2
25-Jul	8.3	6.0	5.1	4.8	6.4	10.5	10.6	8.2	5.8	7.5	6.2	3.9	3.7	5.1	5.8	2.8	2.2	2.2	1.9	1.2	0.3	0.6	1.7	1.3	4.7	10.6
26-Jul	1.2	2.9	3.6	1.5	2.9	4.5	4.6	3.6	5.2	12.7	11.7	8.3	9.9	18.2	17.7	18.0	13.6	6.4	8.9	7.1	7.4	4.0	6.9	6.8	7.8	18.2
27-Jul	6.8	6.9	7.8	11.5	10.4	9.4	12.3	17.5	20.8	17.8	11.8	16.0	23.8	22.6	10.0	6.6	8.5	7.8	7.3	3.7	5.7	6.1	4.8	6.6	10.9	23.8
28-Jul	8.9	9.8	8.6	8.1	10.7	7.5	9.0	11.5	8.2	8.0	15.8	7.2	3.6	2.9	3.1	4.0	4.0	3.2	3.7	6.2	5.4	4.5	4.4	7.8	6.9	15.8
29-Jul	11.9	7.0	7.0	9.7	8.9	5.2	3.7	3.2	4.9	5.7	6.6	9.4	15.5	11.5	14.6	8.2	6.3	4.2	4.7	6.2	11.6	12.8	15.0	11.4	8.6	15.5
30-Jul	14.6	13.0	15.4	10.1	12.7	16.5	13.5	12.7	17.5	28.3	24.8	12.0	11.7	10.3	15.7	18.0	15.5	9.2	8.4	10.6	8.1	2.4	2.2	1.6	12.7	28.3
31-Jul	2.7	6.0	4.0	5.7	7.3	4.4	7.1	10.6	15.2	20.2	7.5	7.3	11.3	20.1	81.6	213.8	129.7	85.1	63.6	44.2	39.8	85.6	87.0	77.9	43.2	213.8
15.4 14.3 13.8 13.7 14.4 14.1 13.1 13.4 16.4 18.7 17.4 17.5 18.5 17.8 20.3 23.6 19.7 16.3 16.0 17.2 17.8 18.7 18.5 18.0																								Diurnal Average		
69.6 49.7 42.6 35.6 34.7 35.7 34.1 39.5 46.4 52.5 59.0 77.4 72.5 67.8 81.6 213.8 129.7 85.1 63.6 61.3 56.0 85.6 87.0 88.1																								Diurnal Maximum		
M - Maintenance				UO - Unstable Operation																						
Alberta Ambient Air Quality Objectives (AAAQO):				24-hr 30 μg/m ³																						



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	146	19.78	19.78
6 - 15	276	37.40	57.18
16 - 25	128	17.34	74.53
26 - 80	154	20.87	95.39
> 81.0	8	1.08	96.48

Total Number of Valid Hours: 738

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

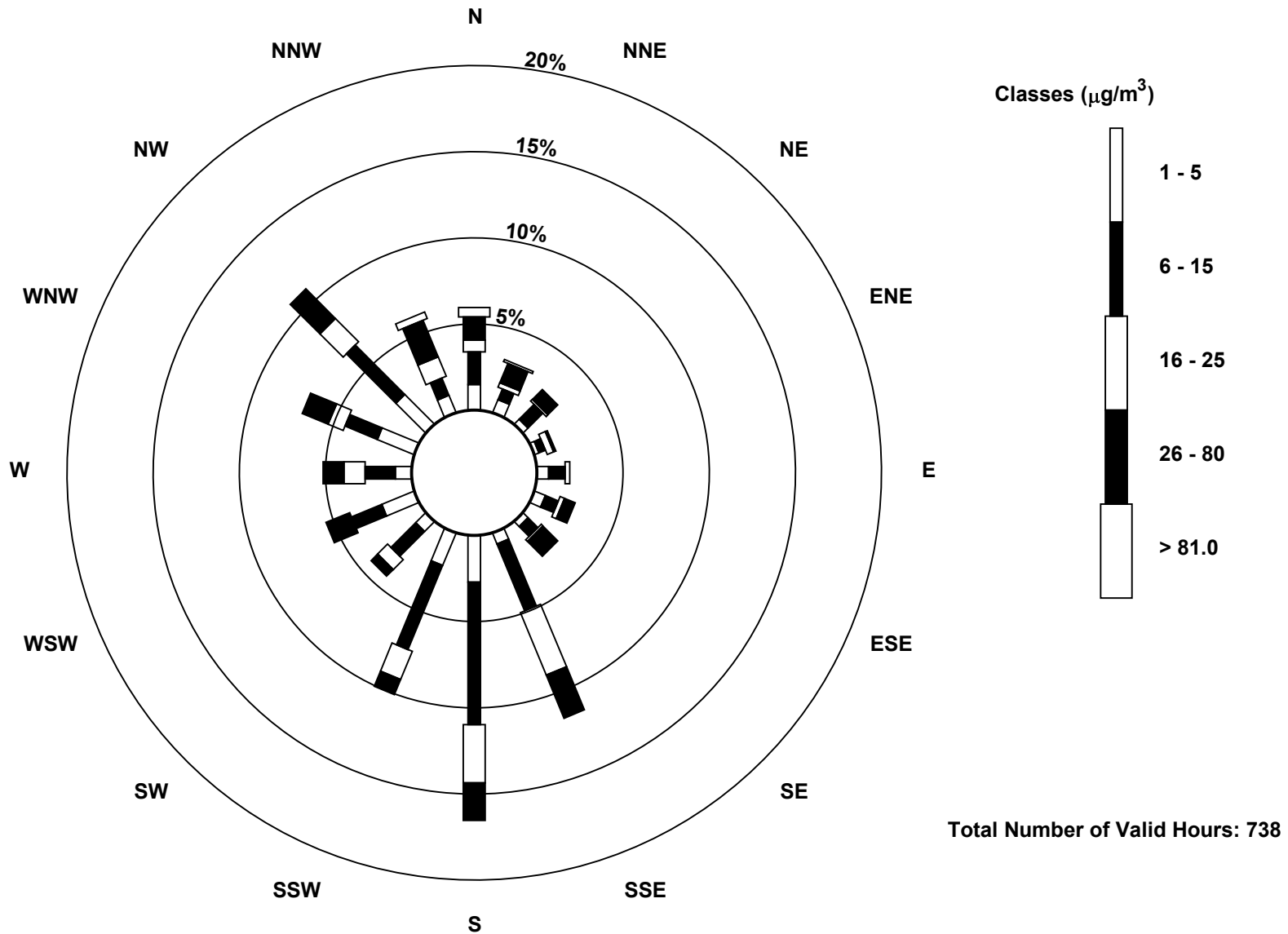
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	11	6	3	2	5	5	3	5	20	15	6	15	7	17	18	8	146
6 - 15	14	5	9	3	7	6	6	31	61	39	15	14	13	15	30	8	276
16 - 25	5	2	1	3	2	2	1	29	25	13	6	0	9	7	14	9	128
26 - 80	10	9	6	1	0	5	9	20	16	7	4	11	9	12	18	17	154
> 81.0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	8
Totals	44	23	19	9	14	18	19	85	122	74	31	40	38	51	80	45	712

Total Number of Valid Hours: 738

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

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





Summary of Hour Averages

Fort McKay - Bertha Ganter - July 2014

Number of Exceedences (AAAQO): 1-hr: 0	Maximum Value: 0 ppb on Jul 1 01:00	Maximum Daily Average: 0.0 ppb on Jul 1	Hours in Service: 744
Minimum Value: 0 ppb on Jul 1 01:00	Maximum Diurnal Average: 0.0 ppb at hour 1	Minimum Daily Average: 0.0 ppb on Jul 1	Hours of Data: 653
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		Hours of Missing Data: 91
			Hours of Calibration: 49
			Percent Operational Time: 94.4

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

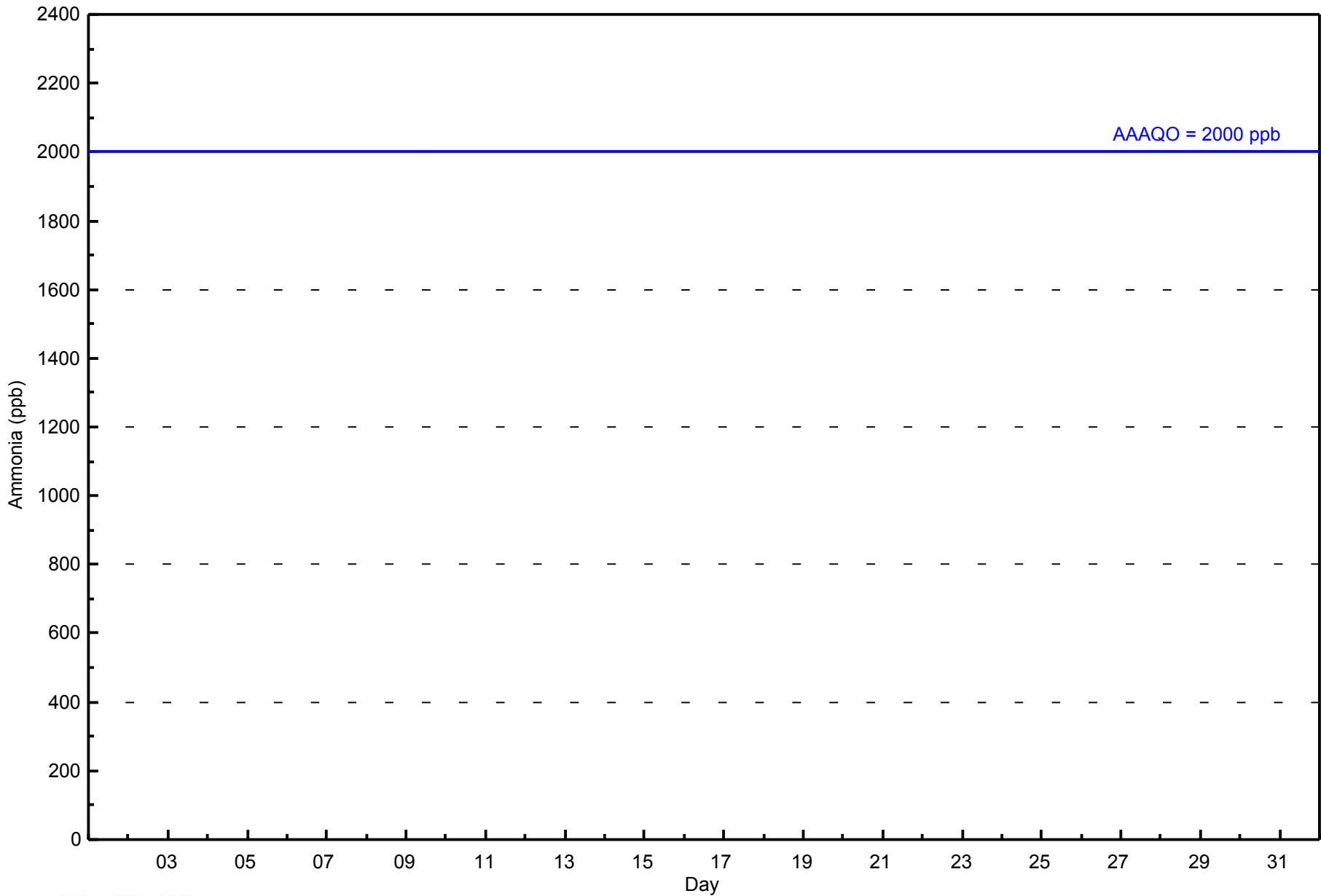
0.0	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
0	--	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

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



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	653	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: 653

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

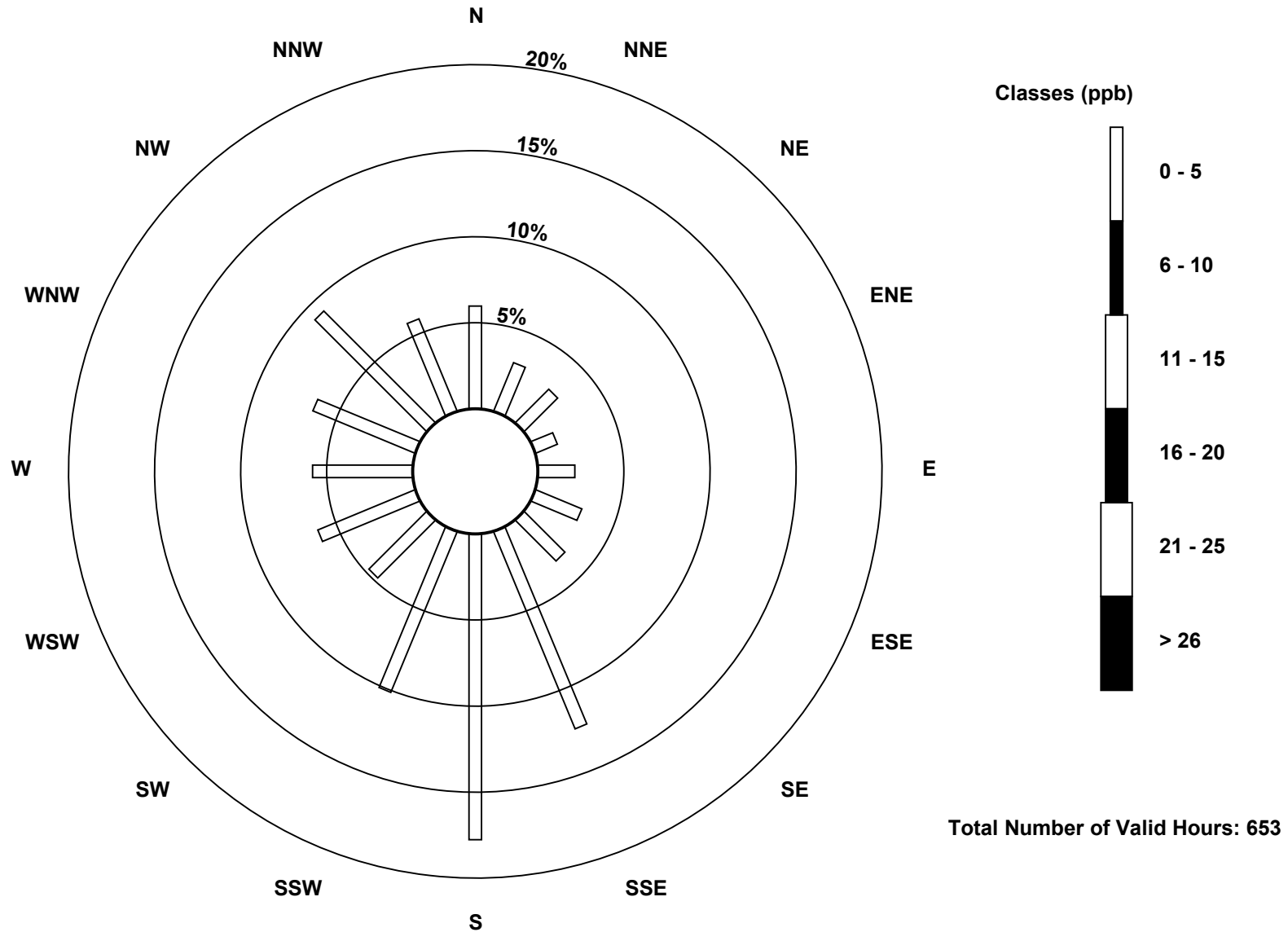
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	39	20	18	9	14	19	22	81	116	66	31	40	38	42	60	38	653
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	39	20	18	9	14	19	22	81	116	66	31	40	38	42	60	38	653

Total Number of Valid Hours: 653

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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



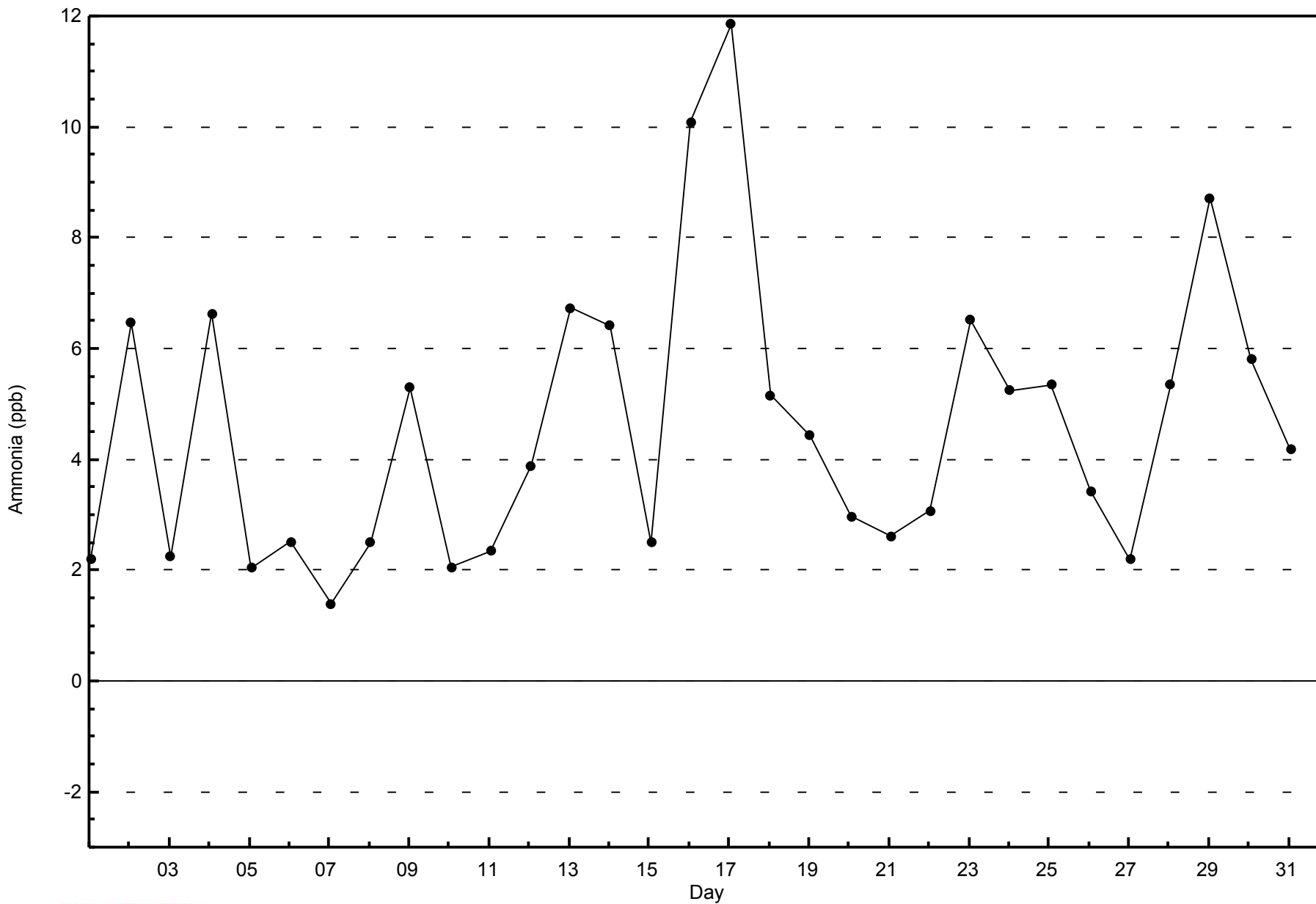


WBEA NETWORK

Zero Responses

Ammonia (NH₃) - ppb

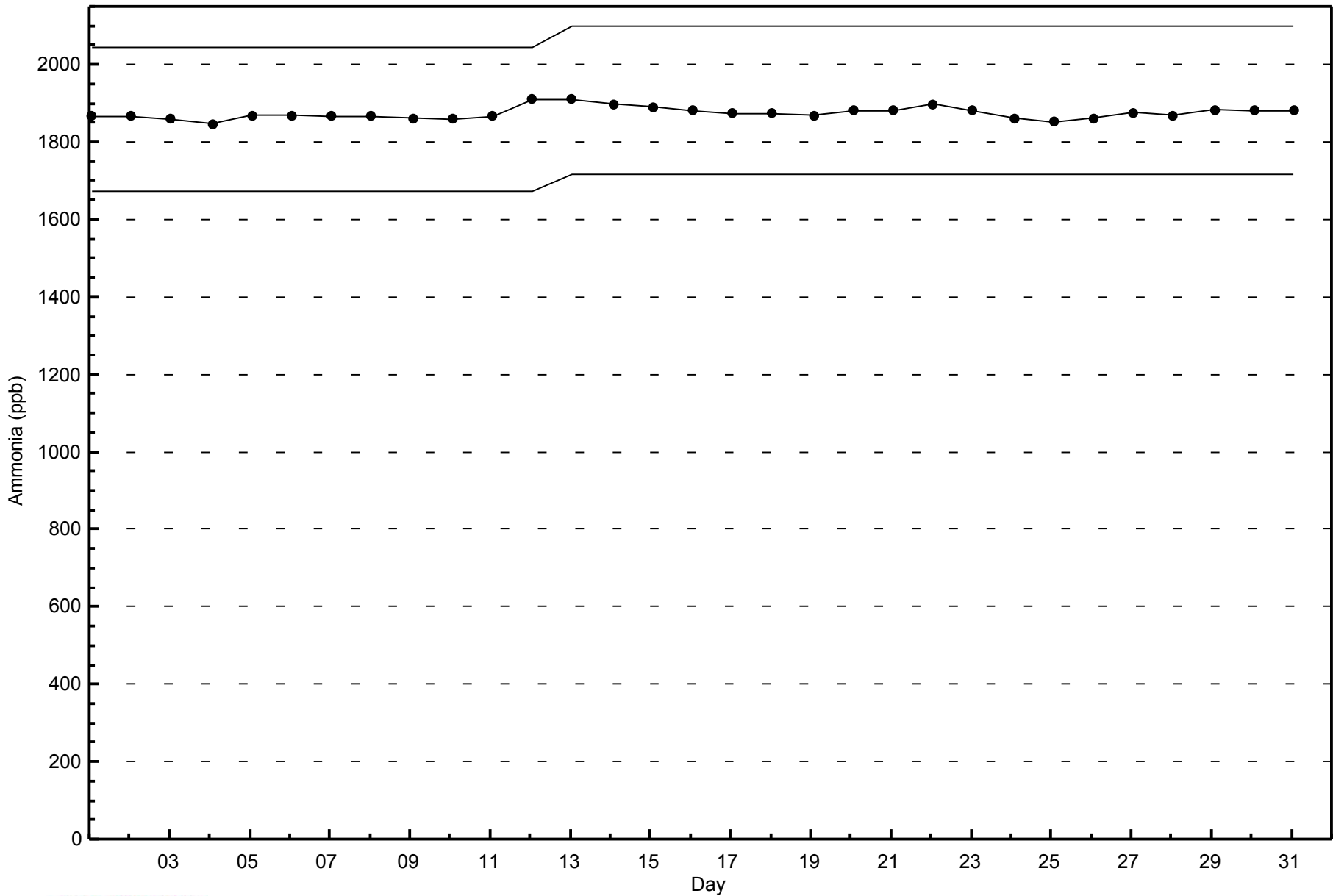
Fort McKay - Bertha Ganter - July 2014





WBEA NETWORK
Span Responses

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



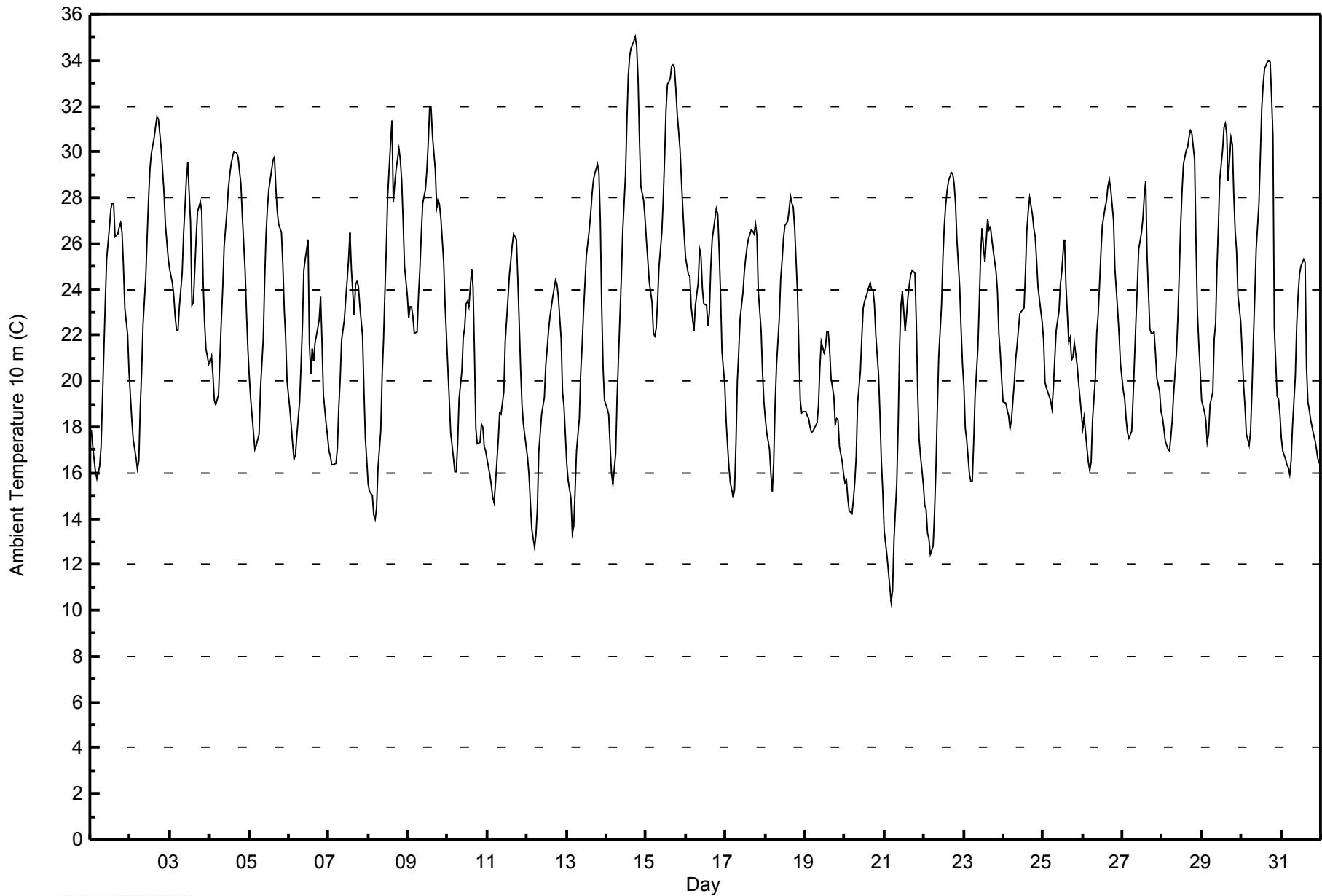


Maximum Value: 35.0 C on Jul 14 18:00																				Maximum Daily Average: 28.1 C on Jul 15					Hours in Service: 744																				
Minimum Value: 10.4 C on Jul 21 05:00																				Minimum Daily Average: 18.5 C on Jul 21					Hours of Data: 744																				
Maximum Diurnal Average: 27.4 C at hour 15																				Minimum Diurnal Average: 16.7 C at hour 5					Hours of Missing Data: 0																				
Monthly Average: 22.51 C																				Percentiles: P ₁ = 12.8 P ₁₀ = 16.4 Q ₁ = 18.5 Median = 22.4 Q ₃ = 26.3 P ₉₀ = 29.1 P ₉₉ = 33.9					Hours of Calibration: 0																				
																									Percent Operational Time: 100.0																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																					
1-Jul	17.9	17.2	16.6	16.0	15.7	16.3	17.2	19.2	21.3	23.4	25.3	26.7	27.5	27.8	27.7	26.3	26.4	26.7	26.9	26.5	25.0	23.2	22.0	20.4	22.5	27.8																			
2-Jul	19.4	18.3	17.5	16.6	16.2	16.5	18.8	20.4	22.5	24.6	26.4	28.0	29.3	30.0	30.6	31.1	31.6	31.4	30.8	30.1	28.3	26.8	26.1	25.4	24.9	31.6																			
3-Jul	24.9	24.3	23.7	22.8	22.2	22.2	23.2	24.7	26.5	27.5	28.8	29.5	26.9	23.3	23.5	24.8	26.2	27.4	27.8	27.4	24.3	22.6	21.4	20.7	24.9	29.5																			
4-Jul	20.9	21.1	20.2	19.2	19.0	19.4	21.1	22.6	24.0	25.9	27.4	28.3	29.0	29.5	29.8	30.0	29.9	29.8	29.2	28.6	27.2	24.8	23.0	21.4	25.1	30.0																			
5-Jul	20.2	19.2	17.7	17.0	17.2	17.5	17.7	19.7	21.9	24.4	26.4	27.6	28.4	29.2	29.6	29.8	28.4	27.4	26.8	26.5	25.1	23.1	21.9	20.0	23.4	29.8																			
6-Jul	18.8	18.1	17.3	16.6	16.8	17.6	19.1	20.7	22.4	24.9	25.4	26.2	21.6	20.3	21.4	20.8	21.7	22.3	22.7	23.7	21.7	19.4	18.1	17.6	20.6	26.2																			
7-Jul	17.0	16.7	16.4	16.4	16.4	17.1	18.8	20.1	21.8	22.7	23.6	24.4	25.3	26.5	24.9	22.9	24.2	24.3	24.1	23.3	22.0	19.6	17.5	16.5	20.9	26.5																			
8-Jul	15.5	15.2	15.0	14.2	14.0	14.5	16.2	17.8	20.3	21.8	23.9	25.9	28.1	30.4	31.4	27.8	28.6	29.2	30.1	29.6	28.8	27.0	25.0	23.7	23.1	31.4																			
9-Jul	22.7	23.2	23.2	22.8	22.1	22.2	23.7	24.9	26.4	27.7	28.4	29.2	30.5	31.9	31.9	30.7	29.2	27.6	27.9	27.7	27.1	25.2	23.3	21.9	26.3	31.9																			
10-Jul	20.5	19.2	17.7	16.7	16.0	16.0	17.3	19.2	20.4	21.9	22.3	23.3	23.5	23.2	24.9	24.1	21.3	17.9	17.2	17.3	18.1	18.0	17.1	16.9	19.6	24.9																			
11-Jul	16.6	15.9	15.5	14.9	14.7	15.5	17.4	18.6	18.6	19.0	19.5	21.7	23.6	24.7	25.3	26.0	26.4	26.1	24.5	22.6	20.6	19.0	18.1	17.1	20.1	26.4																			
12-Jul	16.7	15.9	14.7	13.5	12.8	13.3	14.5	16.9	17.7	18.5	19.3	20.7	21.4	22.2	22.8	23.7	24.0	24.4	24.2	23.7	21.8	19.6	18.9	17.7	19.1	24.4																			
13-Jul	16.4	15.7	14.9	13.4	13.7	15.3	16.9	18.4	20.4	21.6	23.0	24.2	25.4	26.5	27.2	28.0	28.8	29.1	29.4	29.1	27.0	23.2	20.6	19.2	22.0	29.4																			
14-Jul	18.8	18.5	17.2	16.0	15.5	16.8	19.3	21.0	22.8	24.4	26.5	29.0	31.3	33.3	34.2	34.5	34.8	35.0	34.6	33.2	30.5	28.5	27.9	27.1	26.3	35.0																			
15-Jul	26.1	25.2	24.3	23.4	22.1	22.0	22.3	23.5	25.0	26.5	28.0	29.8	31.8	32.9	33.2	33.7	33.8	33.7	32.8	31.7	30.2	28.8	27.5	26.4	28.1	33.8																			
16-Jul	25.4	24.7	24.6	23.2	22.7	22.2	23.3	24.3	25.8	25.5	24.0	23.4	23.3	22.4	23.0	25.0	26.2	27.1	27.5	27.2	25.7	23.8	21.3	19.8	24.2	27.5																			
17-Jul	18.2	17.2	16.2	15.6	14.9	15.3	17.3	20.0	21.3	22.8	23.9	24.8	25.4	25.9	26.3	26.6	26.5	26.4	26.8	26.4	23.9	22.2	20.4	19.1	21.8	26.8																			
18-Jul	18.4	17.8	17.0	15.9	15.2	16.5	19.0	20.7	22.7	24.5	25.3	26.2	26.8	27.0	27.5	28.1	27.8	27.6	26.7	23.9	21.4	19.2	18.6	18.7	22.2	28.1																			
19-Jul	18.7	18.5	18.4	18.0	17.8	17.8	18.0	18.2	18.9	20.6	21.8	21.2	21.5	22.1	22.2	21.4	20.1	19.3	18.1	18.3	18.3	17.2	16.5	15.9	19.1	22.2																			
20-Jul	15.6	15.7	14.9	14.3	14.2	14.8	15.6	16.7	19.1	20.4	21.9	23.2	23.5	23.7	24.1	24.3	24.0	24.0	23.4	22.0	20.2	18.5	16.5	15.2	19.4	24.3																			
21-Jul	13.5	12.4	11.7	11.1	10.4	10.8	13.1	15.6	18.0	21.5	23.3	23.9	22.2	22.9	23.7	24.2	24.6	24.9	24.7	22.5	19.4	17.5	16.7	15.5	18.5	24.9																			
22-Jul	14.6	14.4	13.4	13.1	12.4	12.8	14.3	16.2	18.7	21.1	23.3	25.4	26.8	27.7	28.3	28.7	29.1	29.1	28.6	27.8	26.2	24.1	22.3	20.8	21.6	29.1																			
23-Jul	19.8	18.0	17.4	16.0	15.6	15.6	17.4	19.3	21.4	23.4	25.6	26.7	25.9	25.2	27.1	26.6	26.8	26.2	25.7	24.7	23.9	22.1	21.2	20.1	22.1	27.1																			
24-Jul	19.1	19.0	18.7	18.5	17.9	18.3	19.9	20.9	21.5	22.3	22.9	23.1	23.2	24.7	26.6	27.4	28.0	27.3	26.7	26.3	25.3	24.1	23.0	22.6	22.8	28.0																			
25-Jul	21.8	19.9	19.7	19.5	19.1	18.8	19.7	21.0	22.2	23.1	24.2	24.8	25.7	26.2	24.1	21.7	21.9	20.9	21.1	21.7	20.7	20.0	19.3	18.6	21.5	26.2																			
26-Jul	17.9	18.4	17.1	16.5	16.1	16.5	18.3	20.2	22.1	22.9	24.2	25.6	26.8	27.6	27.9	28.5	28.8	28.4	27.0	24.9	24.0	23.1	22.0	20.7	22.7	28.8																			
27-Jul	19.6	19.2	18.4	17.8	17.5	17.8	19.3	20.9	22.6	24.1	25.8	26.5	27.1	28.0	28.7	25.4	22.2	22.1	22.1	22.1	21.2	20.2	19.5	18.7	22.0	28.7																			
28-Jul	18.4	17.9	17.4	17.0	17.0	17.6	18.3	19.5	21.3	22.8	24.6	26.8	28.2	29.5	30.1	30.2	30.6	30.9	30.8	29.7	26.0	23.0	21.6	20.4	23.7	30.9																			
29-Jul	19.2	18.7	18.3	17.3	17.7	19.0	19.5	21.8	22.5	25.0	26.8	28.8	30.1	31.1	31.2	30.8	28.8	30.6	30.3	28.1	26.6	25.7	23.7	22.6	24.8	31.2																			
30-Jul	21.2	19.9	18.9	17.7	17.2	17.8	19.6	21.8	23.7	25.8	27.8	29.9	31.9	32.9	33.6	33.9	34.0	33.9	32.5	30.7	22.3	19.4	19.2	18.6	25.2	34.0																			
31-Jul	17.5	17.0	16.6	16.4	16.2	15.9	16.5	18.0	20.2	22.4	23.7	24.7	25.0	25.3	25.2	20.6	19.1	18.8	18.3	17.7	17.4	17.1	16.7	16.4	19.3	25.3																			
																				19.1	18.5	17.8	17.0	16.7	17.1	18.5	20.1	21.7	23.3	24.6	25.8	26.4	26.9	27.4	27.0	26.9	26.8	26.4	25.6	23.9	22.1	20.9	19.9	Diurnal Average	
																				26.1	25.2	24.6	23.4	22.7	22.2	23.7	24.9	26.5	27.7	28.8	29.9	31.9	33.3	34.2	34.5	34.8	35.0	34.6	33.2	30.5	28.8	27.9	27.1	Diurnal Maximum	



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	0	0.00	0.00
10 - 20	261	35.08	35.08
> 20	483	64.92	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

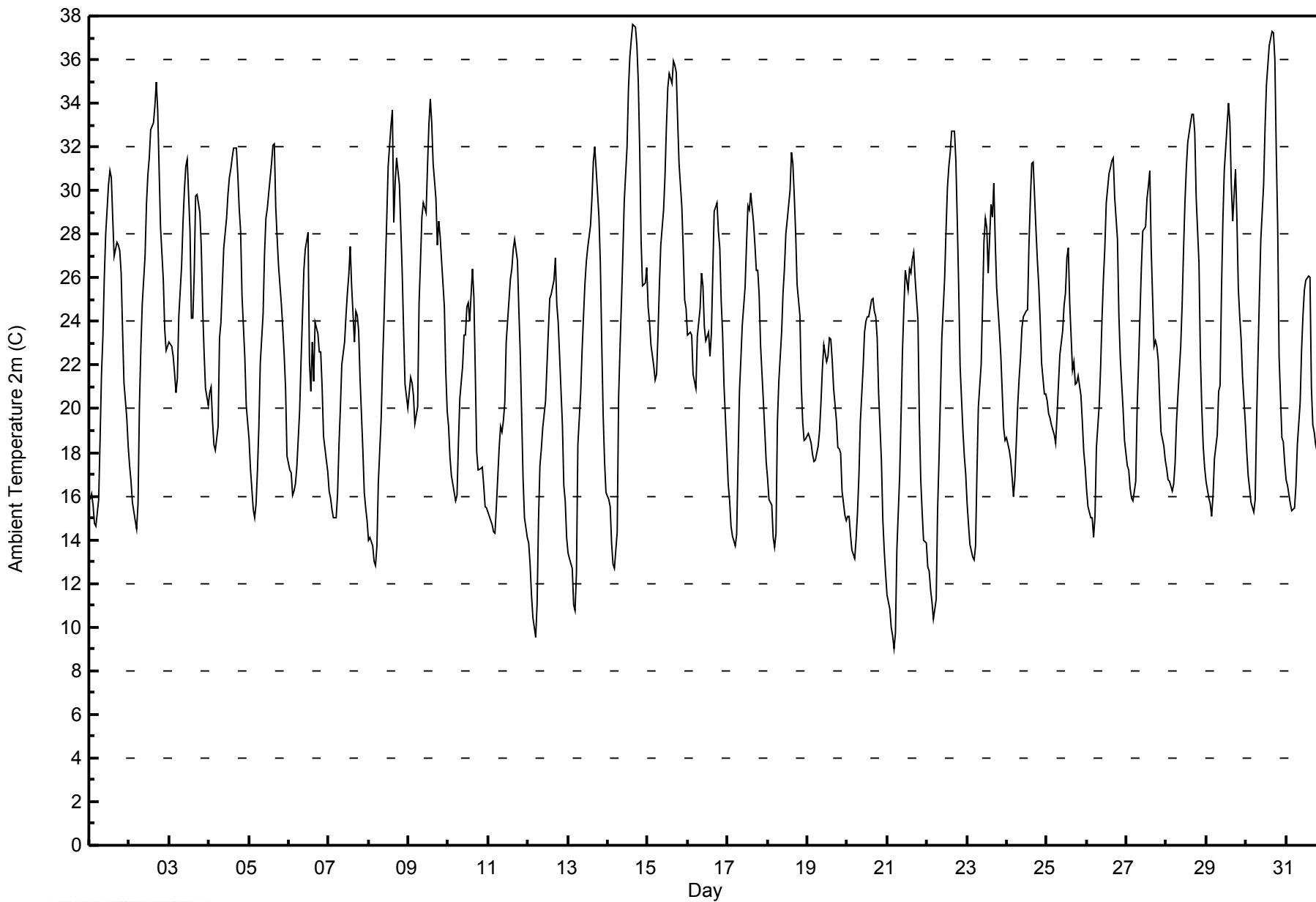


Maximum Value: 37.6 C on Jul 14 16:00																						Maximum Daily Average: 28.7 C on Jul 15																						Hours in Service: 744					
Minimum Value: 9.0 C on Jul 21 05:00																						Minimum Daily Average: 18.5 C on Jul 12																						Hours of Data: 744					
Maximum Diurnal Average: 29.4 C at hour 15																						Minimum Diurnal Average: 15.2 C at hour 5																						Hours of Missing Data: 0					
Monthly Average: 22.57 C																						Percentiles: P ₁ = 10.7 P ₁₀ = 15.0 Q ₁ = 17.6 Median = 22.4 Q ₃ = 27.1 P ₉₀ = 31.0 P ₉₉ = 36.6																						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-Jul	15.9	16.1	15.6	14.8	14.6	15.8	18.6	21.5	23.3	26.1	28.0	30.3	30.9	30.6	28.7	27.0	27.6	27.5	27.2	26.2	23.6	21.2	19.5	18.3	22.9	30.9																							
2-Jul	17.4	16.7	15.7	14.9	14.5	15.6	20.2	22.8	24.8	27.0	29.4	30.7	31.5	32.8	33.1	33.9	35.0	33.7	31.0	28.4	25.9	23.6	22.6	22.9	25.2	35.0																							
3-Jul	23.1	22.9	22.4	21.6	20.7	21.4	24.2	26.5	28.6	30.0	31.1	31.4	28.1	24.2	24.1	26.3	29.7	29.8	29.0	27.4	24.6	22.6	20.9	20.2	25.5	31.4																							
4-Jul	20.7	21.0	19.5	18.4	18.1	19.2	23.3	24.0	25.7	27.4	28.8	29.8	30.6	31.0	31.5	32.0	31.9	30.7	29.2	28.1	25.2	22.3	20.2	19.4	25.3	32.0																							
5-Jul	18.6	17.3	15.4	15.0	15.7	17.2	19.2	22.1	24.4	27.0	28.7	29.2	29.9	31.2	32.1	32.1	29.2	27.8	26.5	24.8	23.7	22.5	20.9	17.9	23.7	32.1																							
6-Jul	17.2	17.0	16.1	16.2	16.6	17.3	19.9	22.2	24.2	26.3	27.3	28.1	22.2	20.8	23.1	21.3	24.0	23.4	22.6	22.6	21.0	18.8	17.6	17.1	21.0	28.1																							
7-Jul	16.3	15.9	15.4	15.0	15.0	16.1	18.3	20.0	22.0	23.1	24.3	25.3	26.1	27.5	25.6	23.0	24.5	24.3	23.6	21.4	18.1	16.2	15.5	14.9	20.3	27.5																							
8-Jul	13.9	14.1	13.7	13.0	12.8	13.7	16.6	19.5	21.9	24.0	26.4	28.7	31.1	32.9	33.7	28.5	30.4	31.5	30.3	28.3	26.2	23.6	21.1	20.0	23.2	33.7																							
9-Jul	20.7	21.4	21.2	20.6	19.3	20.1	24.9	26.7	28.8	29.4	29.0	31.1	33.0	34.2	33.1	31.2	29.6	27.5	28.6	27.9	26.8	24.7	21.7	19.9	26.3	34.2																							
10-Jul	19.2	17.8	16.9	16.2	15.8	16.0	18.4	20.5	21.9	23.4	23.4	24.7	24.8	24.1	26.4	25.1	21.7	18.0	17.2	17.3	17.3	16.5	15.5	15.5	19.7	26.4																							
11-Jul	15.2	14.9	14.7	14.4	14.3	15.5	18.2	19.2	18.9	19.4	20.3	23.1	25.0	26.0	26.4	27.3	27.7	26.8	24.5	22.6	19.7	16.8	15.0	14.1	20.0	27.7																							
12-Jul	13.9	12.9	11.5	10.4	9.5	11.1	15.0	17.4	18.2	19.2	20.4	22.0	23.6	25.0	25.2	25.9	26.9	24.8	24.0	22.4	19.2	16.5	15.8	14.1	18.5	26.9																							
13-Jul	13.4	13.2	12.7	11.0	10.7	12.5	18.3	20.7	22.7	24.2	25.7	26.8	27.4	28.4	29.6	31.3	32.0	31.0	28.8	26.7	23.0	19.7	17.6	16.2	21.8	32.0																							
14-Jul	15.8	15.5	13.8	12.9	12.7	14.4	20.6	22.8	24.9	27.0	29.5	32.0	34.7	36.1	36.9	37.6	37.5	36.7	34.9	31.9	27.7	25.6	25.8	26.5	26.4	37.6																							
15-Jul	24.7	24.0	22.9	22.0	21.3	21.6	23.4	25.6	27.5	29.1	30.6	32.9	34.7	35.3	34.9	35.9	35.7	35.4	33.2	31.3	29.3	27.2	25.0	24.6	28.7	35.9																							
16-Jul	23.4	23.5	23.4	21.6	21.3	20.9	23.3	24.6	26.2	25.6	23.7	23.1	23.5	22.4	23.5	26.2	29.1	29.4	28.1	27.4	24.9	23.5	21.1	18.1	24.1	29.4																							
17-Jul	16.6	15.8	14.7	14.2	13.7	14.2	17.7	20.8	22.3	23.8	25.6	27.5	29.3	29.1	29.9	28.5	27.5	26.3	26.4	25.3	22.9	20.4	19.0	17.6	22.0	29.9																							
18-Jul	16.8	15.8	15.6	14.1	13.7	14.3	19.4	21.3	23.5	25.3	26.4	28.0	28.7	30.0	31.7	31.3	29.7	28.0	25.7	24.3	21.1	19.4	18.6	18.6	22.6	31.7																							
19-Jul	18.9	18.6	18.4	17.9	17.6	17.7	18.3	19.0	20.3	21.8	23.0	22.1	22.4	23.2	23.2	22.2	20.9	19.4	18.2	18.2	18.0	16.3	15.2	14.9	19.4	23.2																							
20-Jul	15.0	15.1	14.3	13.5	13.2	14.0	15.3	17.0	19.4	21.9	23.5	24.0	24.2	24.2	25.0	25.0	24.5	24.2	23.2	20.7	17.6	14.9	13.5	12.4	19.0	25.0																							
21-Jul	11.4	10.8	10.0	9.6	9.0	9.8	13.5	16.9	19.7	22.6	24.6	26.3	25.4	26.4	26.2	26.9	27.2	26.0	24.1	19.5	16.7	15.3	14.0	13.9	18.6	27.2																							
22-Jul	12.8	12.6	11.7	11.1	10.4	11.3	15.4	17.7	20.5	23.3	26.0	28.2	30.1	31.1	31.7	32.7	32.7	31.4	28.6	25.6	22.0	19.0	17.8	17.0	21.7	32.7																							
23-Jul	15.6	14.7	13.8	13.2	13.1	13.7	17.1	20.1	22.0	24.8	27.7	28.7	28.3	26.2	29.4	28.8	30.3	27.7	25.6	23.6	22.4	20.8	19.2	18.6	21.9	30.3																							
24-Jul	18.6	18.1	17.7	16.8	16.0	16.8	20.2	21.4	22.4	23.7	24.2	24.5	24.6	27.5	29.6	31.2	31.3	28.2	26.8	25.6	24.0	22.1	20.7	20.7	23.0	31.3																							
25-Jul	20.4	19.8	19.6	19.3	18.8	18.4	19.7	21.1	22.5	23.6	24.8	25.3	26.9	27.4	24.9	21.8	22.2	21.1	21.2	21.5	20.6	19.4	18.0	17.3	21.5	27.4																							
26-Jul	16.3	15.5	15.0	15.0	14.1	15.1	18.2	20.2	21.9	24.1	26.0	27.4	29.4	30.8	31.1	31.4	31.5	29.7	27.7	24.3	22.3	21.1	19.9	18.5	22.8	31.5																							
27-Jul	17.4	17.2	16.4	15.9	15.8	16.7	20.0	22.0	24.3	26.4	28.1	28.3	29.6	30.2	30.9	27.3	22.9	23.1	22.9	22.2	20.5	18.9	18.3	17.6	22.2	30.9																							
28-Jul	17.3	16.7	16.7	16.2	16.6	17.5	19.4	20.6	22.8	24.8	27.3	29.5	31.1	32.2	33.1	33.5	33.5	32.6	29.7	26.6	22.4	20.0	18.3	17.3	24.0	33.5																							
29-Jul	16.7	15.9	15.7	15.1	16.0	17.7	18.8	20.8	21.0	25.4	28.6	30.9	33.0	34.0	33.1	30.3	28.6	31.0	28.7	25.5	24.2	23.2	21.4	19.3	24.0	34.0																							
30-Jul	18.1	16.9	16.4	15.7	15.3	15.8	19.5	22.4	25.2	27.8	30.3	32.8	34.9	35.7	36.6	37.3	37.2	36.0	31.7	28.4	22.4	18.7	18.5	17.5	25.5	37.3																							
31-Jul	16.7	16.5	15.7	15.3	15.4	15.5	16.5	18.4	20.3	22.7	24.3	25.4	25.9	26.1	26.0	21.0	19.3	18.9	18.4	17.7	17.3	16.8	16.6	16.3	19.3	26.1																							
																								17.4	16.9	16.2	15.5	15.2	16.0	19.1	21.2	23.0	24.8	26.3	27.7	28.4	28.9	29.4	28.8	28.8	27.8	26.4	24.6	22.3	20.2	18.9	18.0	Diurnal Average	
																								24.7	24.0	23.4	22.0	21.3	21.6	24.9	26.7	28.8	30.0	31.1	32.9	34.9	36.1	36.9	37.6	37.5	36.7	34.9	31.9	29.3	27.2	25.8	26.5	Diurnal Maximum	



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	4	0.54	0.54
10 - 20	272	36.56	37.10
> 20	468	62.90	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

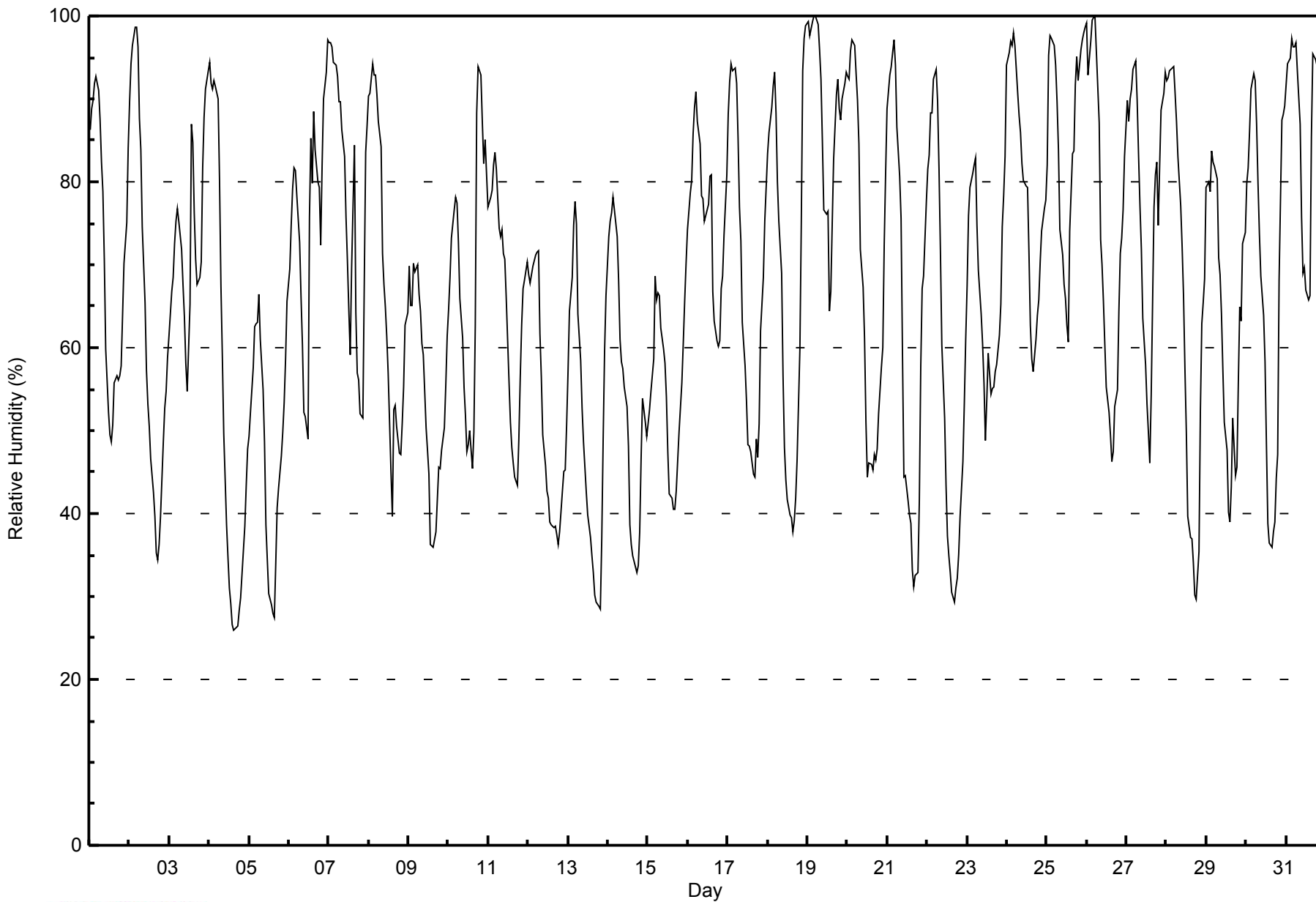
Fort McKay - Bertha Ganter - July 2014

Maximum Value: 100 % on Jul 19 05:00																			Maximum Daily Average: 88.3 % on Jul 19						Hours in Service: 744			Hours of Data: 744																
Minimum Value: 26 % on Jul 4 16:00																			Minimum Daily Average: 48.3 % on Jul 5						Hours of Missing Data: 0			Hours of Calibration: 0																
Maximum Diurnal Average: 87.5 % at hour 5																			Minimum Diurnal Average: 49.1 % at hour 15						Percent Operational Time: 100.0																			
Monthly Average: 67.2 %																			Percentiles: P ₁ = 28 P ₁₀ = 39 Q ₁ = 51 Median = 68 Q ₃ = 84 P ₉₀ = 93 P ₉₉ = 99																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Jul	86	89	90	92	93	91	87	82	79	71	60	52	49	49	51	56	57	56	57	58	64	70	75	84	70.7	93																		
2-Jul	90	94	97	99	99	96	88	84	75	65	57	53	50	47	43	40	35	34	36	40	49	53	55	59	64.0	99																		
3-Jul	61	67	68	72	75	77	75	72	68	64	58	55	65	87	85	76	71	68	68	70	82	88	91	93	73.2	93																		
4-Jul	94	92	91	92	90	80	67	59	50	39	35	31	29	27	26	26	26	26	28	30	33	39	43	48	52.8	94																		
5-Jul	49	52	58	62	63	63	66	61	55	49	39	34	30	29	28	27	34	41	43	47	50	53	59	66	48.3	66																		
6-Jul	69	75	79	82	81	78	73	66	60	52	52	49	76	85	80	88	84	80	79	72	82	90	93	97	76.0	97																		
7-Jul	97	97	96	94	94	93	90	90	86	83	76	70	65	59	70	84	64	57	56	52	51	68	84	87	77.6	97																		
8-Jul	90	91	94	93	93	90	87	84	71	68	65	61	57	45	40	52	53	50	47	47	51	55	63	64	67.2	94																		
9-Jul	70	65	65	70	69	70	66	64	61	59	50	48	45	36	36	36	38	42	46	45	48	50	56	61	54.0	70																		
10-Jul	65	68	73	77	78	77	73	66	61	55	52	48	48	50	45	50	63	88	94	93	87	82	85	81	69.2	94																		
11-Jul	77	78	79	82	84	82	74	73	74	71	71	66	56	51	48	46	44	43	49	56	63	67	68	70	65.6	84																		
12-Jul	69	68	69	70	71	72	72	62	56	49	46	43	42	39	39	38	38	37	36	38	43	45	45	51	51.5	72																		
13-Jul	57	64	69	75	78	75	64	58	53	49	46	43	40	37	35	33	30	29	29	28	37	49	59	66	50.1	78																		
14-Jul	73	75	76	78	77	73	68	61	58	57	55	53	48	39	36	35	33	33	34	38	47	54	51	49	54.3	78																		
15-Jul	51	53	55	59	69	66	67	66	62	60	58	54	48	42	42	40	41	43	46	50	56	61	66	70	55.1	70																		
16-Jul	74	79	80	86	89	91	87	85	78	78	75	76	77	81	81	67	63	61	60	61	67	69	74	81	75.8	91																		
17-Jul	88	92	94	93	94	92	85	77	73	63	58	54	48	48	47	45	44	49	47	51	62	68	75	79	67.8	94																		
18-Jul	83	86	89	92	93	88	80	75	69	57	48	44	42	40	39	38	39	42	46	60	75	93	97	99	67.3	99																		
19-Jul	99	98	99	99	100	100	99	96	92	85	77	76	76	64	67	75	83	91	92	89	87	90	92	93	88.3	100																		
20-Jul	93	92	96	97	96	93	90	85	72	67	61	51	44	46	46	45	47	46	48	52	58	60	72	81	68.3	97																		
21-Jul	89	93	94	96	97	94	87	81	76	59	44	45	42	40	39	33	31	33	33	41	58	67	69	78	63.2	97																		
22-Jul	81	83	88	88	92	94	90	82	72	60	52	43	37	35	33	30	29	31	32	35	40	46	53	61	57.9	94																		
23-Jul	68	76	79	81	82	83	75	69	64	61	56	49	54	59	54	55	55	57	58	62	65	75	78	83	66.6	83																		
24-Jul	94	96	97	96	98	97	91	88	86	82	80	79	79	72	63	59	57	61	64	66	70	74	77	78	79.3	98																		
25-Jul	82	95	98	97	96	94	90	84	74	71	68	66	63	61	74	83	84	92	95	92	96	97	98	99	85.4	99																		
26-Jul	99	93	97	99	100	100	96	87	73	70	66	60	55	52	49	46	47	53	55	64	71	73	77	83	73.6	100																		
27-Jul	90	87	90	91	94	95	90	83	77	72	64	58	53	50	46	54	77	81	82	75	82	89	91	93	77.6	95																		
28-Jul	92	93	93	94	94	91	87	83	77	72	66	57	50	40	37	37	34	30	30	35	52	63	65	68	64.2	94																		
29-Jul	79	80	79	84	82	82	80	71	69	64	57	51	48	40	39	43	52	45	46	56	65	63	73	74	63.4	84																		
30-Jul	80	82	86	91	93	92	87	80	74	69	64	58	48	39	36	36	38	39	44	47	68	87	88	89	67.3	93																		
31-Jul	92	94	95	97	96	96	97	93	87	76	69	70	67	66	66	85	95	95	95	93	90	89	89	88	86.7	97																		
																			80.1	82.1	84.3	86.4	87.5	86.3	81.9	76.6	70.7	64.8	58.9	54.9	52.7	50.2	49.1	50.4	51.2	52.7	54.1	56.3	62.8	68.6	72.9	76.6	Diurnal Average	
																			99	98	99	99	100	100	99	96	92	85	80	79	79	87	85	88	95	95	95	93	96	97	98	99	Diurnal Maximum	



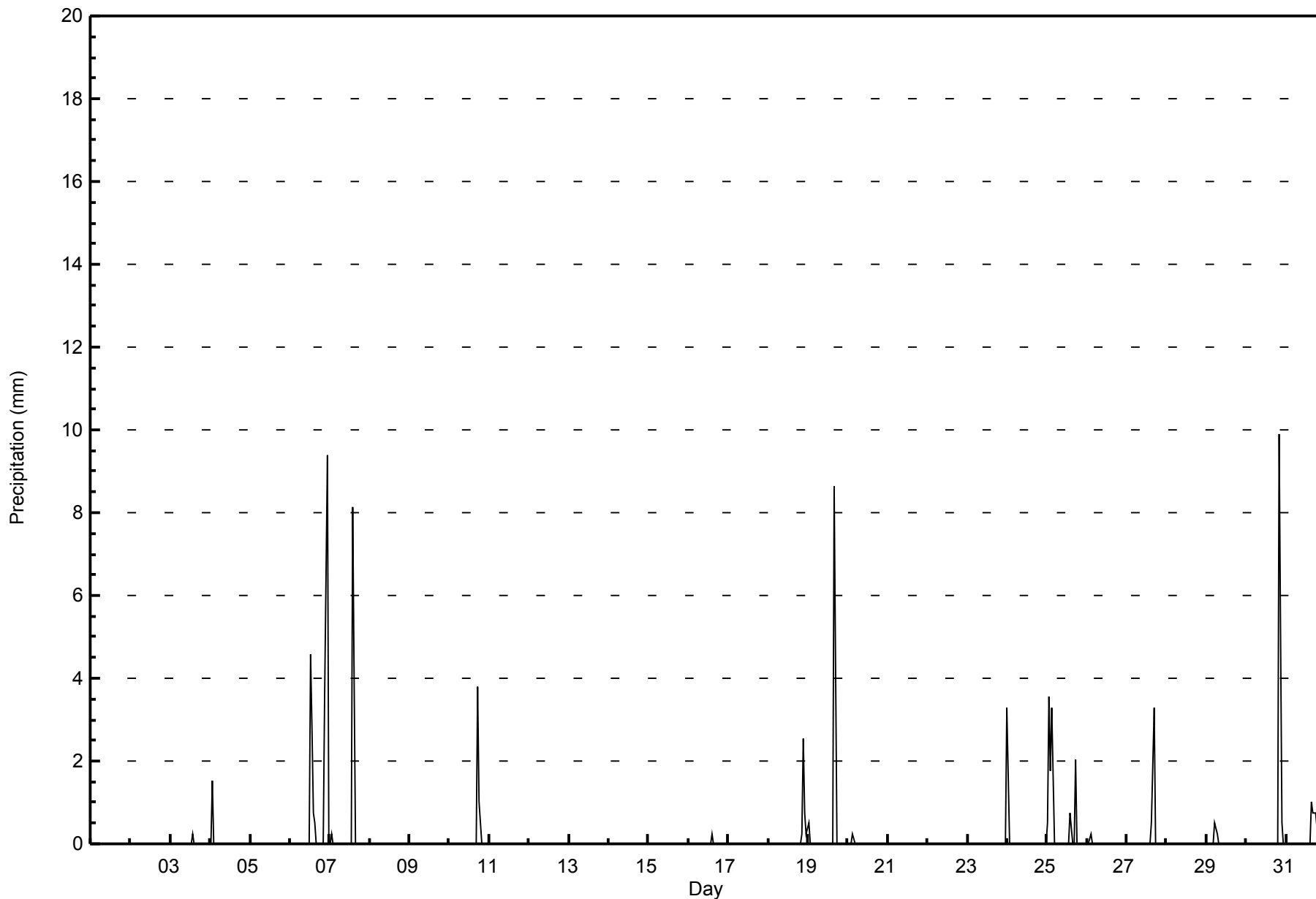
WBEA NETWORK
Hourly Averages

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





Maximum Value: 9.9 mm on Jul 30 21:00		Maximum Daily Total: 21.6 mm on Jul 6		Hours in Service: 744																																
Minimum Value: 0.0 mm on Jul 1 01:00		Minimum Daily Total: 0.0 mm on Jul 1		Hours of Data: 744																																
Maximum Diurnal Total: 12.7 mm at hour 17		Minimum Diurnal Total: 0.0 mm at hour 5		Hours of Missing Data: 0																																
Monthly Total: 83.82 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 3.3		Hours of Calibration: 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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
4-Jul	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	2.8	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	3.6	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.6	9.4
7-Jul	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4	8.1
8-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	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	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	3.8
11-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
17-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.5	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	2.5
19-Jul	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	8.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1	8.6
20-Jul	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
21-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	3.3
25-Jul	0.5	3.6	1.8	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	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	0.0	0.0	0.0	11.9	3.6	
26-Jul	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
27-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	3.3	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	3.8	3.3
28-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.5
30-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.4	9.9
31-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	1.0
		4.3	5.3	2.0	3.6	0.0	0.5	0.3	0.0	0.0	0.0	0.0	4.6	3.0	9.9	2.0	12.7	6.6	1.8	0.0	10.2	6.6	10.2	0.3											Diurnal Average	
		3.3	3.6	1.8	3.3	0.0	0.5	0.3	0.0	0.0	0.0	0.0	4.6	2.8	8.1	1.0	8.6	3.8	1.0	0.0	9.9	3.6	9.4	0.3											Diurnal Maximum	





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	714	95.97	95.97
0.4 - 0.5	6	0.81	96.77
0.6 - 0.7	0	0.00	96.77
0.8 - 1.4	8	1.08	97.85
1.5 - 10	16	2.15	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

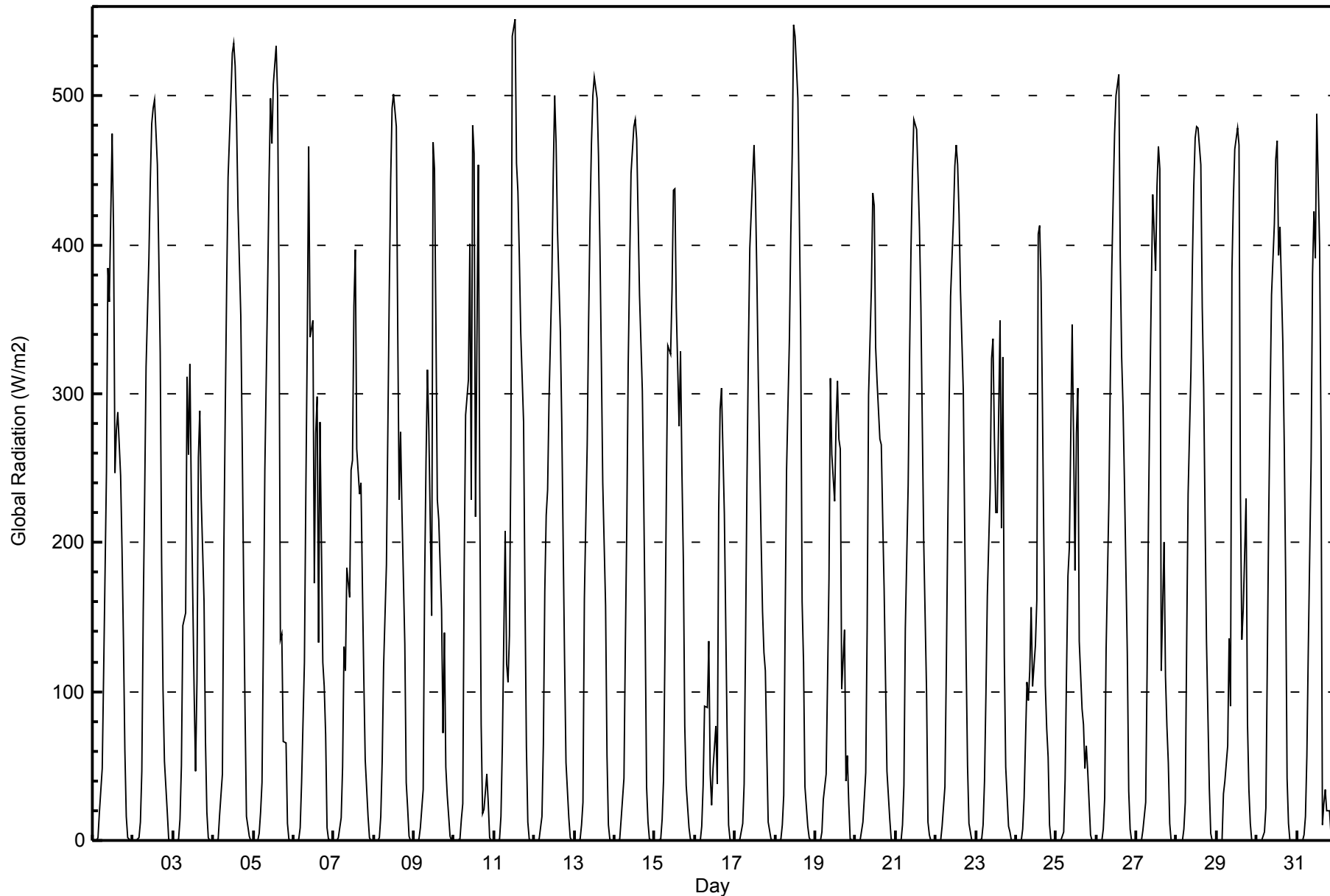


Maximum Value: 551 W/m2 on Jul 11 13:00																			Maximum Daily Average: 218.9 W/m2 on Jul 4						Hours in Service: 744	
Minimum Value: 0 W/m2 on Jul 25 02:00																			Minimum Daily Average: 77.0 W/m2 on Jul 16						Hours of Data: 744	
Maximum Diurnal Average: 406.2 W/m2 at hour 13																			Minimum Diurnal Average: 0.0 W/m2 at hour 24						Hours of Missing Data: 0	
Monthly Average: 155.6 W/m2																			Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 89 Q ₃ = 289 P ₉₀ = 435 P ₉₉ = 524						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-Jul	0	0	0	2	19	49	113	180	248	384	362	474	410	247	275	288	245	196	134	60	16	2	0	0	154.4	474
2-Jul	0	0	0	2	13	46	154	231	318	391	444	481	492	498	454	393	328	187	100	53	19	1	0	0	191.9	498
3-Jul	0	0	0	1	15	50	144	153	311	259	320	232	100	46	107	257	288	230	160	67	19	1	0	0	115.1	320
4-Jul	0	0	0	1	17	44	195	288	372	445	500	529	535	520	483	426	352	267	174	87	16	3	0	0	218.9	535
5-Jul	0	0	0	5	19	39	138	249	373	444	498	468	508	534	501	375	135	139	66	66	11	1	0	0	190.3	534
6-Jul	0	0	0	1	9	39	119	234	334	466	338	349	172	274	298	133	281	119	104	72	8	1	0	0	139.6	466
7-Jul	0	0	0	2	16	49	130	114	183	163	248	255	358	397	263	233	240	171	109	54	16	2	0	0	125.2	397
8-Jul	0	0	0	2	16	54	117	185	275	367	443	491	502	479	343	229	274	220	132	38	21	3	0	0	174.7	502
9-Jul	0	0	0	1	9	34	171	255	316	275	151	469	451	346	229	216	155	73	140	49	31	3	0	0	140.5	469
10-Jul	0	0	0	1	14	25	182	286	309	401	228	481	461	217	454	236	78	18	21	45	26	2	0	0	145.2	481
11-Jul	0	0	0	1	16	65	208	119	106	138	258	540	551	455	436	392	340	280	164	63	12	1	0	0	172.7	551
12-Jul	0	0	0	1	16	64	167	219	236	296	377	448	500	468	409	342	281	199	120	52	15	2	0	0	175.6	500
13-Jul	0	0	0	1	11	26	162	266	349	418	468	501	512	499	459	399	323	240	157	57	10	1	0	0	202.4	512
14-Jul	0	0	0	1	14	42	133	211	320	385	448	479	484	471	418	366	302	228	144	36	12	1	0	0	187.4	484
15-Jul	0	0	0	1	15	41	129	235	332	327	369	437	437	357	278	328	248	188	77	37	8	1	0	0	160.2	437
16-Jul	0	0	0	0	9	37	90	89	133	45	24	48	76	38	221	289	304	219	144	68	10	1	0	0	77.0	304
17-Jul	0	0	0	1	11	38	134	241	329	398	445	467	434	379	310	202	154	126	114	60	13	1	0	0	160.7	467
18-Jul	0	0	0	1	11	31	147	249	336	407	462	548	540	499	422	343	160	119	36	10	2	0	0	0	180.1	548
19-Jul	0	0	0	0	6	28	45	108	176	310	259	228	279	308	269	263	102	141	40	57	25	1	0	0	110.2	310
20-Jul	0	0	0	0	12	28	46	143	299	371	434	426	332	308	269	266	215	169	107	46	14	1	0	0	145.3	434
21-Jul	0	0	0	0	11	37	143	239	325	397	447	484	477	446	411	359	279	201	101	12	4	0	0	0	182.2	484
22-Jul	0	0	0	0	9	36	117	209	293	365	417	453	467	454	420	369	302	208	121	50	11	0	0	0	179.3	467
23-Jul	0	0	0	1	11	40	98	164	237	324	337	269	221	220	349	210	325	123	49	10	6	0	0	0	124.7	349
24-Jul	0	0	0	0	8	28	106	94	114	157	103	131	162	407	413	375	289	105	75	56	11	0	0	0	109.8	413
25-Jul	0	0	0	0	6	40	112	178	196	346	269	181	274	303	134	88	78	48	64	46	4	0	0	0	98.6	346
26-Jul	0	0	0	0	7	28	128	229	312	383	431	475	500	514	392	325	291	239	125	33	8	0	0	0	184.2	514
27-Jul	0	0	0	0	7	25	114	221	302	371	433	383	440	466	451	114	200	110	77	52	11	0	0	0	157.4	466
28-Jul	0	0	0	0	7	25	134	233	315	386	440	472	479	478	454	358	304	218	133	35	5	0	0	0	186.5	479
29-Jul	0	0	0	0	31	39	63	136	90	382	430	464	479	467	233	134	155	230	79	34	11	0	0	0	144.1	479
30-Jul	0	0	0	0	5	21	118	216	295	366	414	458	469	393	412	334	266	175	42	11	0	0	0	0	166.5	469
31-Jul	0	0	0	0	3	17	57	128	255	381	422	391	488	399	270	11	25	35	20	20	4	0	0	0	122.0	488
																			0.0 0.0 0.0 0.9 12.0 37.7 126.3 196.8 270.6 340.3 361.9 403.6 406.2 383.4 349.6 279.1 236.1 168.5 101.0 46.4 12.3 0.9 0.0 0.0						Diurnal Average	
																			0 0 0 5 31 65 208 288 373 466 500 548 551 534 501 426 352 280 174 87 31 3 0 0						Diurnal Maximum	



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	283	38.04	38.04
21 - 100	96	12.90	50.94
101 - 300	186	25.00	75.94
301 - 600	179	24.06	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Fort McKay - Bertha Ganter - July 2014

Maximum Speed: 18 km/h on Jul 10 16:00	Maximum Daily Speed Average: 8.8 km/h on Jul 11	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 13 06:00	Minimum Daily Speed Average: 0.6 km/h on Jul 17	Hours of Data: 744
Maximum Diurnal Speed Average: 4.1 km/h at hour 12	Minimum Diurnal Speed Average: 1.1 km/h at hour 18	Hours of Missing Data: 0
Monthly Average Velocity: 1.7 km/h 221.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 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-Jul	W3	WNW4	NW2	WSW2	SSW3	WSW2	SSW3	SSE5	SE6	SSE7	SSE8	SSE10	SSE9	SSE6	N6	NNE9	E4	ENE4	ENE4	NE3	N3	NNW3	NW2	NW2	SE1.3	SSE10	
2-Jul	W3	NNW2	WNW2	WNW2	NW2	W1	SSE2	SSE5	SSE5	S6	S9	S5	ESE5	SE5	ESE4	SE4	S7	S7	SSW5	SSW1	ENE1	SE2	SSE4	SSE6	S2.8	S9	
3-Jul	SSE6	SSE5	S7	SSE5	SSE5	S4	SSE5	SSE8	S9	S10	SSE15	SSE16	S15	S8	ESE4	ESE3	SSE8	S5	SSE4	N6	N8	N6	NW3	NNW4	SSE4.6	SSE16	
4-Jul	NW6	WNW8	SW3	SW5	SSW3	S6	SSW8	SW7	SW9	SW10	WSW11	W11	W12	WSW12	WSW13	WSW12	WSW11	W9	W9	WNW7	WSW4	SW4	WSW5	WSW4	WSW7.2	WSW13	
5-Jul	WNW5	W3	NW2	S3	SSW4	SSW5	S6	S9	SSW10	S11	SW12	WSW10	W9	WSW10	SW9	WSW8	N4	ENE5	E3	NNW3	N5	NNE4	NE1	WNW4	SW3.2	SW12	
6-Jul	NW3	N3	WNW4	WNW4	WNW2	WSW3	WNW4	W2	SSW4	W3	SW6	WSW6	NNE3	E6	SE6	SW1	SE5	ESE2	SSW3	NW4	N4	NW5	NW5	NW3	WNW1.5	SE6	
7-Jul	NW5	NW6	NW4	NW4	NW5	NW6	NW6	NW3	NW5	NNW4	NW7	NW7	NW9	NNW10	NE8	NNE4	NNE6	NNE6	NNE5	NNW3	NNW3	WNW3	W2	W3	NNW4.3	NNW10	
8-Jul	WSW2	WSW2	W3	W3	SSW1	WSW3	S2	S6	S10	S11	S10	S13	S13	S13	SSW11	N9	ESE8	SSE8	S6	SSW6	S2	SSW4	SSW4	WSW1	S4.8	S13	
9-Jul	S5	NNW2	NNE2	S6	WSW3	SSW3	SE3	SSE5	S7	SSW10	SW9	SSW13	S13	SSW12	SW9	WNW13	WNW10	W5	SSW7	SSW8	WNW8	NW11	NW5	WNW4	SW4.4	SSW13	
10-Jul	NW6	NW7	NW6	WNW7	WNW7	WNW8	W4	W6	WSW6	W6	WNW7	WNW11	WNW11	WNW11	WNW10	NW18	NW18	NW14	NW9	NW7	NW8	NW9	NW9	NW11	NW8.7	NW18	
11-Jul	NW10	NW12	NW13	NW13	NW8	NW8	NW8	NW7	NW8	NW8	WNW10	WNW11	WNW10	NW12	WNW13	NW12	NW13	N11	NNE11	NNE10	N6	NNW4	NNW6	NNW6	NW8.8	NW13	
12-Jul	NNW7	NNW6	NNW7	NNW5	NNW6	NW4	NW6	N7	N6	NNW6	NNW5	NW4	SE4	SE6	SE5	SE4	ESE5	NE4	NNE4	NE2	NNW4	N4	N2	WNW1	N2.7	NNW7	
13-Jul	NW2	NW3	WNW3	NNW3	NNW3	WNW0	SE4	S6	S9	S9	S7	S4	S2	SW3	SSW3	S4	S4	S3	SW1	S2	SSW1	W2	WSW3	SSW2	SSW2.4	S9	
14-Jul	S4	S4	SW2	W2	WNW1	W0	S5	S8	SSE10	SSE9	SSE9	S9	SSE13	SSW12	SSW10	SSW12	SSW10	SW8	SSW8	SSW6	S4	S4	SW6	SSW9	SSW6.4	SSE13	
15-Jul	S7	S8	S8	S7	SSW7	SSW6	S6	S10	S12	S10	SSE9	SSE10	S9	SSW10	SW9	SW10	SW9	SSW9	SSW9	SSW7	SSW7	SSW6	SSW5	SSW5	SSW7.8	S12	
16-Jul	SW4	W4	NW4	WSW2	W1	W2	WNW2	WNW5	N4	NE5	N4	NW4	NNW6	NNW3	WSW6	WSW8	SSW7	SSW8	SSW5	SSW6	WSW5	N7	ENE5	NW3	W2.2	WSW8	
17-Jul	WNW4	NW4	NW3	WNW4	W1	NNW2	NW3	E1	E3	ESE4	SE4	S5	S7	SE7	SSE8	SSE4	SSE3	SE3	S2	S2	NNW4	NW2	NNW5	NW4	S0.6	SSE8	
18-Jul	WNW2	NW4	NNW3	NW5	NW4	NNW4	N3	N5	ENE3	E5	ENE5	ESE5	E5	SSE5	SSE8	SSE5	SSE5	SSE5	SSE4	WSW9	SSW6	WSW6	S1	SSE2	SSE0.9	WSW9	
19-Jul	S5	SSE6	SSE5	NNE1	S2	SW2	WSW3	SW5	SW6	W6	W8	W9	W9	WNW12	NW14	NNW8	NW7	NNW9	NNW11	NNW9	NNW8	NNW7	NW7	NW7	WNW4.6	NW14	
20-Jul	NW8	WSW3	WNW3	NW5	WNW3	NW3	W3	WNW4	NW4	SSE4	ESE5	NNE5	N8	NE6	ENE5	NE6	NNE6	NNE7	N7	NNW4	WNW2	NNW4	W3	WNW4	NNW2.7	NW8	
21-Jul	WNW4	WNW3	WNW3	WSW2	SSW3	WNW2	WSW2	SSE4	SSE5	SSE3	ESE4	SSE6	SSE9	SSE8	ESE6	SE4	SSE4	SSE2	SW4	W4	W3	WNW3	WNW3	WSW2	S1.8	SSE9	
22-Jul	WSW3	SW3	WSW2	W2	SW3	SSW3	S4	S7	SSE7	SSE8	SSE9	SSE9	SSE9	SSE10	S9	S9	S8	S8	S7	S4	S3	S3	SSW4	S4	S5.4	SSE10	
23-Jul	SSW3	SSW3	SW2	W1	WSW2	N2	NNW1	SSE2	S2	S3	SSE7	SSE14	SSE16	E6	SSE10	SSE15	SSE15	ESE9	ESE4	E3	ESE4	SE5	E1	W1	SSE4.5	SSE16	
24-Jul	NE1	SSE4	S4	S3	SSW1	S3	S5	S5	SSE7	SSE6	S3	S8	S10	SSE10	S9	SSE10	SE10	SE10	SE10	SE11	ESE6	ESE6	ESE5	E4	NE3	SSE5.2	SE11
25-Jul	NE4	NE2	NW3	N3	N5	N6	N8	NNE5	NE5	NNE7	NE5	E3	E5	ESE6	E5	NNW5	NW5	NNW2	NNW3	NW3	NNW2	NW2	NW3	WNW3	N2.8	N8	
26-Jul	NNW3	NNE3	N4	N4	N2	N3	NNW1	NNE2	SE2	S4	SSE4	S4	S6	SSE7	S9	SSW7	SW7	WSW7	NE2	N3	S1	W3	SW2	SSW2	SSW1.2	S9	
27-Jul	SSW3	SSW5	SW4	SSW4	SW4	S5	S6	S8	S9	SSE10	S5	SW6	SW5	SW5	WSW5	SE11	S6	S7	S9	SSW6	SSE4	SSW5	S5	S5	S5.2	SE11	
28-Jul	SSW5	SSW5	SSW6	S6	S6	SSW8	S9	S8	S8	SSE10	S11	S10	S10	S10	SSW9	S9	SSW8	SW7	SW5	S4	WSW2	WSW2	W2	W3	S6.3	S11	
29-Jul	SSW2	SW3	SW3	WSW2	S3	N4	N1	WNW1	NW4	S3	SSE6	SSE6	SSE9	SSE9	S6	NW5	NNW7	NNE3	NE2	WNW2	SSW4	S5	SSE4	S2	S1.6	SSE9	
30-Jul	N2	N3	W3	W2	WSW2	SSW1	S4	S6	SSE8	S7	S9	S9	S10	SSE10	SSE10	SSE8	SSE10	S9	S6	WNW5	NNW18	NE5	SSW2	WSW4	S3.5	NNW18	
31-Jul	WNW5	NW5	S1	SW4	WSW3	N1	SW2	SSW4	NE3	E5	NE7	NNE9	N11	NNE10	NNE11	N12	N7	NNW8	N4	N8	N10	N9	N10	N10	N5.0	N12	

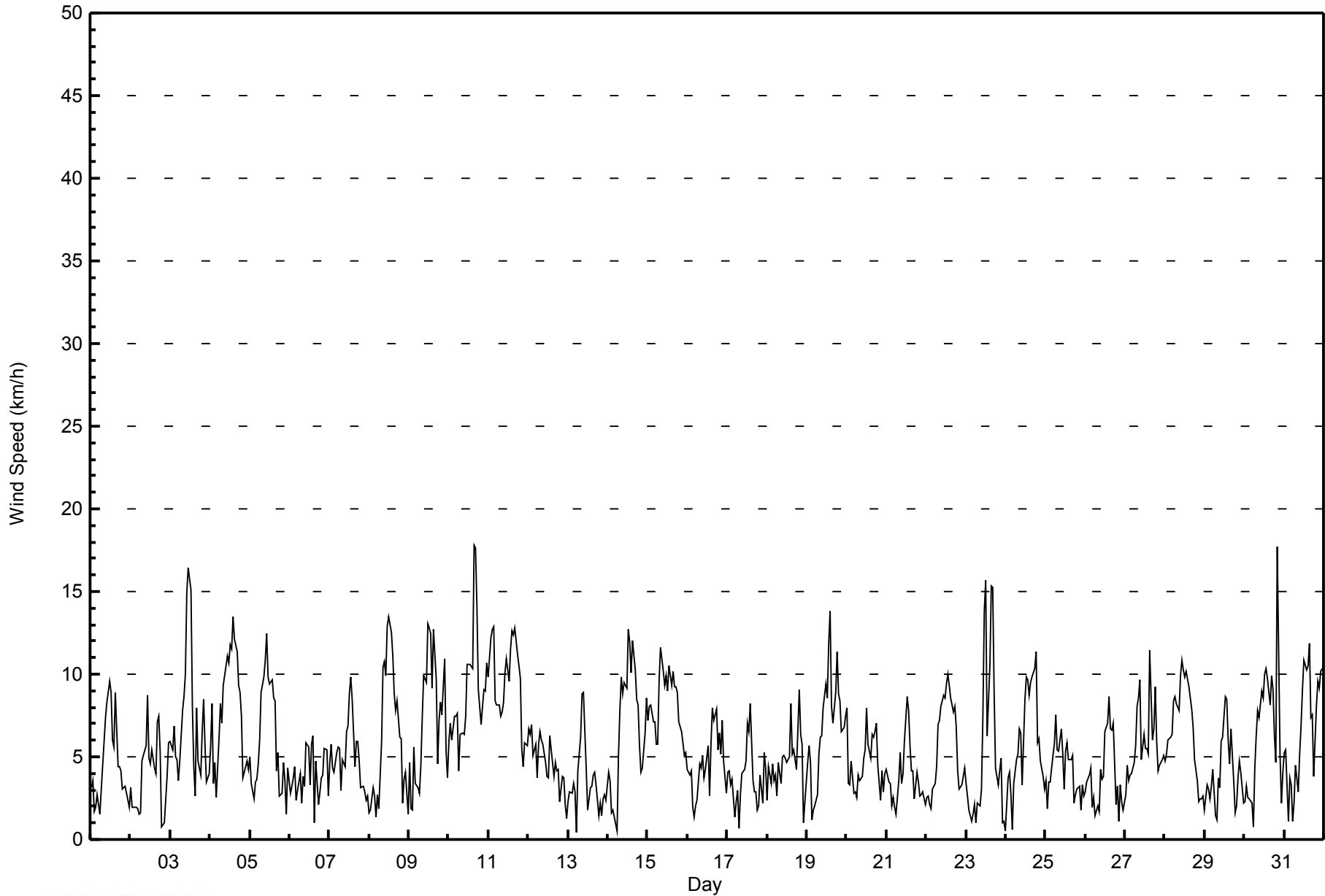
W2.1	W2.1	W2.1	W2.0	W1.8	W1.6	SW1.6	SSW2.8	S3.4	S3.9	S3.8	SSW4.1	S3.8	S3.3	SSW3.2	SW1.5	SSW2.1	SSW1.1	SSW1.2	W1.4	NW2.0	NW1.7	WNW1.5	W2.0	Diurnal Average	
NW10	NW12	NW13	NW13	NW8	SSW8	S9	S10	S12	S11	SSE15	SSE16	SSE16	S13	NW14	NW18	NW18	NW14	SE11	NNE10	NNW18	NW11	N10	NW11	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	412	55.38	55.38
6 - 11	295	39.65	95.03
12 - 19	37	4.97	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: 744

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

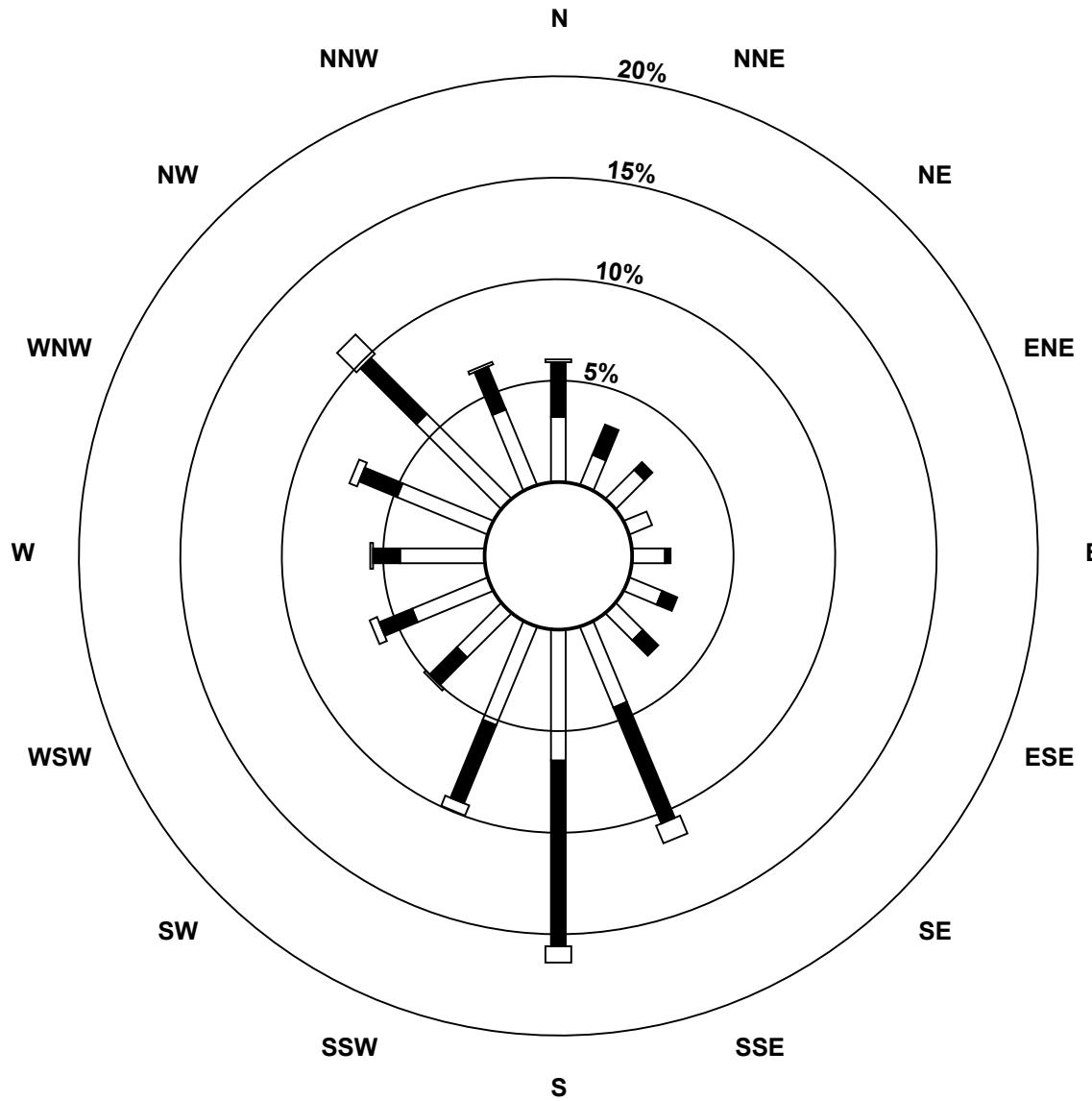
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	24	12	15	9	12	13	14	32	48	39	23	30	31	36	44	30	412
6 - 11	20	12	4	0	2	6	8	46	68	31	14	13	10	15	29	17	295
12 - 19	1	0	0	0	0	0	0	7	6	4	1	3	1	3	10	1	37
20 - 28	0	0	0	0	0	0	0	0	0	0	0	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	45	24	19	9	14	19	22	85	122	74	38	46	42	54	83	48	744

Total Number of Valid Hours: 744

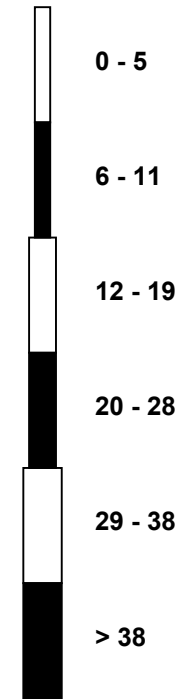
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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



Classes (km/h)



Total Number of Valid Hours: 744



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Jul 30 21:00 Minimum Value: 0 km/h on Jul 14 00:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	1	1	1	1	1	1	1	1	1	1	2	2	3	3	6	5	2	1	1	1	1	1	1	1	6
2-Jul	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	2	3	2	2	1	1	1	1	2	3
3-Jul	1	1	1	1	1	1	2	2	2	3	4	5	5	3	2	2	3	2	2	3	3	2	1	2	5
4-Jul	4	3	1	2	2	2	2	3	3	4	5	5	6	6	5	4	3	2	4	4	2	1	2	1	6
5-Jul	2	1	1	1	2	2	2	2	3	3	4	4	4	4	4	4	3	2	1	1	1	3	2	1	4
6-Jul	2	2	1	1	3	1	2	2	2	2	3	3	4	2	3	1	1	2	1	1	3	3	5	1	5
7-Jul	2	1	1	1	1	3	2	1	3	2	3	3	3	4	4	2	2	2	2	1	1	1	1	1	4
8-Jul	1	2	1	1	2	1	1	2	2	2	2	2	3	4	4	4	3	3	2	1	2	1	1	2	4
9-Jul	2	3	2	2	1	1	1	1	2	4	4	5	4	4	4	5	4	4	2	2	6	4	2	2	6
10-Jul	2	2	2	2	2	3	2	3	3	3	4	4	4	4	4	7	6	4	3	2	2	3	2	3	7
11-Jul	2	3	3	3	3	2	2	2	3	3	4	4	4	5	5	4	5	4	4	4	1	1	1	1	5
12-Jul	1	1	1	1	1	1	2	2	2	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1	3
13-Jul	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	0	2
14-Jul	1	1	1	1	1	1	2	2	2	2	2	2	3	4	3	3	4	3	3	1	1	1	2	2	4
15-Jul	2	2	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	1	3
16-Jul	1	2	2	1	2	1	1	2	2	2	2	1	3	1	3	3	2	2	2	2	2	5	3	1	5
17-Jul	1	1	1	1	1	1	1	1	2	2	2	2	2	3	2	3	2	1	2	1	3	2	1	1	3
18-Jul	1	1	1	1	1	1	1	2	2	3	2	2	2	3	3	3	2	1	5	4	4	5	1	1	5
19-Jul	2	2	1	1	1	1	2	2	2	3	3	4	4	5	5	5	4	5	4	3	2	2	2	2	5
20-Jul	2	1	1	2	2	1	1	1	2	2	2	3	3	2	2	3	3	3	2	1	1	1	1	1	3
21-Jul	1	1	1	1	1	1	1	1	1	1	2	3	3	2	2	2	2	2	1	1	1	2	1	1	3
22-Jul	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	0	1	1	1	2
23-Jul	1	1	1	1	1	1	1	2	1	2	3	4	5	2	5	4	4	3	2	1	2	2	1	1	5
24-Jul	2	1	1	1	1	2	1	2	1	2	2	3	2	3	3	3	3	4	4	2	1	2	1	1	4
25-Jul	2	3	1	1	2	2	3	2	2	2	2	3	3	2	3	1	2	2	1	1	1	1	1	1	3
26-Jul	1	1	2	2	1	1	1	1	2	2	2	2	3	3	4	2	3	3	3	2	2	1	1	2	4
27-Jul	2	1	1	1	1	1	1	2	2	2	3	3	3	3	3	5	3	2	3	2	2	1	1	1	5
28-Jul	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	1	2	1	1	2	2	3
29-Jul	1	1	1	1	3	3	3	3	2	2	1	2	2	3	3	2	3	3	1	1	3	1	1	1	3
30-Jul	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	2	2	2	7	11	5	2	2	11
31-Jul	1	2	1	1	1	1	2	2	1	3	3	4	4	4	5	5	3	4	3	3	3	3	3	4	5
																		Diurnal Maximum							



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Fort McKay - Bertha Ganter - July 2014

Direction of Maximum Speed: 320 deg on Jul 10 16:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 316.4 deg on Jul 11	Hours of Data: 744
Direction of Minimum Speed: 292 deg on Jul 13 06:00	Direction of Minimum Daily Speed Average: 0.6 deg on Jul 17
Direction of Minimum Speed: 292 deg on Jul 13 06:00	Hours of Missing Data: 0
Monthly Average Direction: 258.6 deg	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	271	286	312	237	208	239	193	164	146	149	155	152	165	166	358	28	88	59	71	51	349	344	305	322	137.5
2-Jul	279	330	284	285	308	275	162	163	150	169	187	178	105	129	116	127	183	188	192	203	74	146	159	157	168.9
3-Jul	161	162	185	152	154	170	162	166	171	178	161	163	178	174	120	117	153	178	160	1	4	352	325	327	163.6
4-Jul	305	298	235	234	200	183	203	235	220	234	254	259	272	257	248	245	246	266	273	284	253	236	240	246	249.9
5-Jul	291	277	323	187	196	200	184	190	192	182	221	247	273	252	230	252	4	57	100	329	356	22	51	301	233.8
6-Jul	315	356	292	302	299	255	296	260	209	264	233	253	14	81	139	231	142	123	208	310	352	317	319	312	285.2
7-Jul	315	309	314	323	313	308	306	304	318	336	316	316	320	339	43	13	21	18	14	347	328	289	259	281	331.3
8-Jul	256	255	261	278	210	239	182	191	176	175	172	176	173	187	201	11	113	150	180	193	188	196	207	258	183.0
9-Jul	175	339	26	181	242	197	127	161	177	205	236	205	188	203	231	299	298	280	199	201	288	320	315	290	230.2
10-Jul	314	313	304	302	299	294	277	276	248	263	290	300	302	303	299	320	322	321	316	309	322	316	305	308	305.0
11-Jul	307	308	307	308	306	306	312	309	309	308	299	293	293	306	302	313	312	354	15	13	349	336	338	335	316.4
12-Jul	347	336	339	331	335	321	324	3	0	346	328	318	131	133	125	125	119	42	20	43	348	349	0	299	359.2
13-Jul	306	318	283	343	332	292	142	181	178	190	190	172	172	218	192	170	189	177	234	180	213	267	247	212	199.2
14-Jul	184	182	217	274	302	270	179	181	165	167	168	173	165	199	209	193	206	216	209	202	187	177	220	213	191.4
15-Jul	182	190	184	186	192	194	191	171	173	177	168	163	189	210	217	217	216	204	210	207	204	197	205	206	193.1
16-Jul	217	263	304	243	260	264	294	297	358	38	1	326	343	332	246	248	208	206	209	206	258	353	59	325	275.6
17-Jul	291	322	325	298	272	337	318	88	90	111	130	189	169	139	160	167	158	146	173	191	341	316	330	314	190.6
18-Jul	283	307	334	313	305	333	5	1	78	85	71	110	79	148	160	167	155	156	157	246	193	257	180	168	166.6
19-Jul	177	155	153	29	180	236	255	234	226	264	264	281	277	302	323	331	316	334	345	346	333	327	318	307	301.4
20-Jul	309	258	293	307	299	316	281	291	313	162	119	30	351	35	73	42	25	15	4	342	300	334	280	289	344.7
21-Jul	282	296	291	258	213	303	255	153	154	160	111	164	151	149	122	141	162	148	227	272	259	295	301	258	185.5
22-Jul	255	225	240	265	232	198	172	173	163	161	168	160	160	164	175	176	181	179	177	177	187	180	192	188	177.4
23-Jul	207	193	217	281	252	349	342	158	189	190	162	168	160	98	164	159	157	118	109	94	102	137	95	266	153.9
24-Jul	55	164	184	188	209	178	170	181	157	168	187	169	175	148	179	152	141	124	131	106	116	115	95	44	150.3
25-Jul	36	42	316	357	1	358	8	20	36	24	41	84	99	111	93	335	304	337	333	306	322	327	310	286	10.9
26-Jul	331	14	10	1	354	358	345	29	139	186	160	175	172	166	175	196	225	251	49	351	184	278	224	192	203.7
27-Jul	213	206	233	208	215	187	188	182	178	164	187	217	216	230	247	133	171	181	172	210	168	198	187	169	188.4
28-Jul	208	199	195	189	190	195	190	183	171	153	169	169	174	190	192	186	206	214	214	191	251	256	263	277	189.8
29-Jul	203	227	219	249	174	355	352	282	310	177	152	153	166	153	177	317	334	23	54	290	196	174	164	180	186.7
30-Jul	10	2	270	270	250	204	172	177	155	169	179	177	176	163	163	161	164	176	188	295	327	54	199	253	181.9
31-Jul	298	313	186	216	251	351	217	197	48	88	51	20	10	19	18	359	355	348	1	358	2	4	6	6	3.7

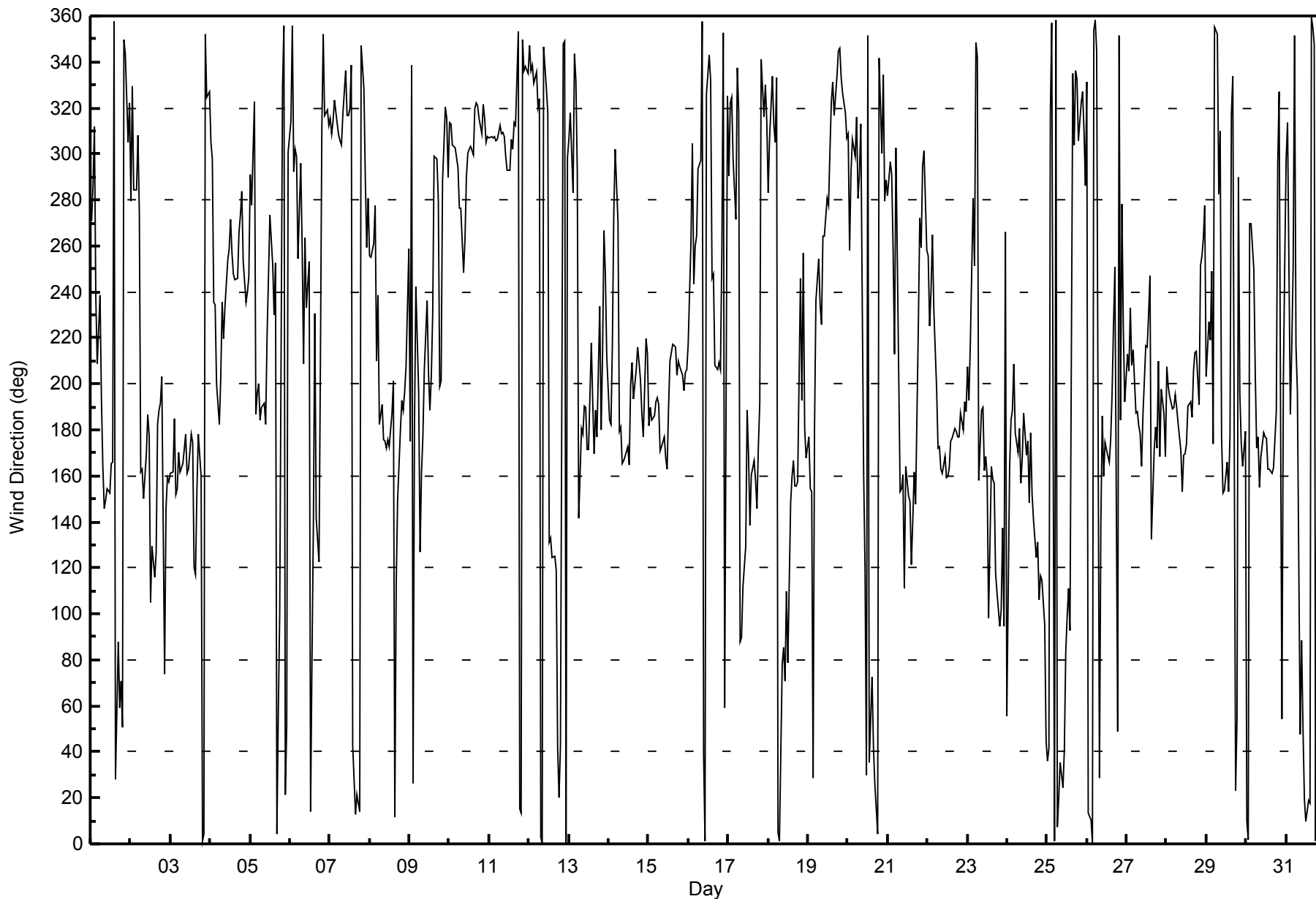
274.6 280.7 273.3 270.7 259.0 260.7 220.9 197.2 179.2 178.7 188.1 193.8 187.4 188.1 196.5 224.0 204.1 196.0 196.2 280.3 313.8 310.5 286.5 278.4
Diurnal Average

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



WBEA NETWORK
Hourly Averages

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																		Hours in Service: 744							
Maximum Value: 103 deg on Jul 17 08:00																		Hours of Data: 744							
Minimum Value: 10 deg on Jul 12 04:00																		Hours of Missing Data: 0							
Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 22 Median = 32 Q ₃ = 48 P ₉₀ = 66 P ₉₉ = 87																		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-Jul	32	29	38	42	23	34	18	20	17	15	16	18	38	46	77	43	54	46	42	48	19	33	55	68	77
2-Jul	22	57	64	34	38	34	69	22	29	36	25	58	56	56	77	75	41	19	16	28	77	37	26	18	77
3-Jul	16	16	15	20	20	22	24	17	21	22	19	20	23	22	38	67	29	49	61	32	29	26	27	26	67
4-Jul	48	32	48	38	48	18	28	45	32	39	50	53	50	50	44	42	46	54	43	42	39	25	29	44	54
5-Jul	31	41	67	48	56	30	13	17	21	27	30	50	50	53	60	50	69	52	54	56	29	62	85	31	85
6-Jul	54	55	26	33	76	48	45	81	53	74	51	59	87	46	52	96	38	75	42	25	52	21	38	43	96
7-Jul	25	16	20	18	17	29	24	47	33	33	26	36	25	39	45	43	37	33	33	33	20	29	30	32	47
8-Jul	37	60	14	38	35	55	56	26	18	16	20	15	15	26	36	48	34	18	13	12	77	15	12	75	77
9-Jul	43	94	84	46	26	46	54	22	22	28	38	26	25	23	39	34	36	58	29	20	53	21	19	30	94
10-Jul	23	17	23	28	31	37	50	46	48	51	50	42	38	34	44	28	22	21	21	22	20	19	17	17	51
11-Jul	20	18	18	17	26	28	25	28	20	27	36	38	42	40	34	32	29	42	38	35	21	12	13	11	42
12-Jul	17	13	10	10	14	30	23	31	37	44	70	76	81	46	45	59	40	53	64	38	24	17	33	45	81
13-Jul	35	41	26	32	30	81	27	25	23	26	40	64	99	79	85	64	52	46	88	30	41	23	18	36	99
14-Jul	15	20	43	22	28	66	24	19	18	22	20	21	18	34	32	26	32	31	24	12	19	13	27	25	66
15-Jul	16	14	13	12	13	17	17	14	15	17	16	17	36	26	28	27	28	21	23	16	16	17	14	13	36
16-Jul	17	48	58	55	63	49	64	33	49	52	53	26	31	51	43	44	32	25	46	29	42	59	52	46	64
17-Jul	20	28	31	36	43	49	39	103	73	60	68	70	40	34	22	68	69	30	47	31	52	61	28	19	103
18-Jul	42	21	38	21	19	17	51	46	71	64	68	60	68	75	27	57	21	25	30	43	43	72	90	57	90
19-Jul	26	21	21	70	72	53	48	41	37	48	48	44	51	37	26	35	43	31	24	25	20	18	16	16	72
20-Jul	17	40	22	21	39	27	41	48	58	66	50	64	41	54	53	47	47	38	30	16	40	12	14	19	66
21-Jul	13	14	16	34	35	32	61	28	18	42	58	54	29	22	42	59	71	72	24	12	39	41	49	73	73
22-Jul	55	20	49	70	25	25	28	19	22	19	18	19	20	20	21	22	24	18	13	16	17	11	15	23	70
23-Jul	22	19	47	20	41	19	68	71	51	64	26	19	18	37	38	20	19	26	32	37	28	25	75	61	75
24-Jul	80	16	19	48	90	22	21	29	19	23	53	20	19	22	29	26	26	22	22	27	18	26	29	28	90
25-Jul	44	88	37	29	38	27	29	37	43	38	58	66	52	40	56	35	42	99	63	29	26	42	54	46	99
26-Jul	25	25	39	23	34	29	63	61	78	52	69	75	47	44	36	38	49	47	83	37	76	34	37	75	83
27-Jul	41	20	26	18	19	14	22	19	21	21	70	46	57	66	64	32	51	25	23	25	46	25	22	32	70
28-Jul	17	18	14	13	14	17	17	20	26	17	18	23	33	33	39	31	39	37	36	15	18	14	35	56	56
29-Jul	56	49	45	50	65	73	96	89	56	78	26	30	25	25	25	34	31	64	64	32	44	15	13	20	96
30-Jul	77	23	24	14	29	75	28	25	20	24	23	22	27	21	22	26	17	18	17	56	28	80	84	38	84
31-Jul	24	29	79	26	37	83	63	68	65	56	49	43	42	43	47	31	45	40	71	26	25	27	29	30	83
80 94 84 70 90 83 96 103 78 78 70 76 99 79 85 96 71 99 88 56 77 80 90 75																									
Diurnal Maximum																									



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 9, 2014	Previous Calibration	June 17, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	12:00	End Time (MST)	14:48
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	0.995967	1.002912	Chamber temp.	43.0	42.9
Calculated intercept	1.827848	0.820160	Pressure (mmHg)	701.5	714.2
Analyzer Background	37.8	37.8	Flow (lpm)	0.493	0.500
Analyzer Coefficient	0.754	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	-0.3	NA
as found span	5500	81.5	755.7	753.0	1.004
calibrator zero	5500	0.0	0.0	-0.4	NA
high point	5500	81.5	755.7	753.0	1.004
second point	5500	45.7	423.8	421.4	1.006
third point	5500	22.8	211.4	209.6	1.009
calibrator zero	5500	0.0	0.0	-0.4	NA
as left zero	5500	0.0	0.0	0.3	NA
as left span	5500	81.5	755.7	755.6	1.000
Average Correction Factor					1.006

Corrected As found	753.3	Previous response	757.0	% change	0.5%
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Notes:

No adjustments.

Calibration Performed By: Zack Eastman



Wood Buffalo Environmental Association

SO₂ Calibration Summary

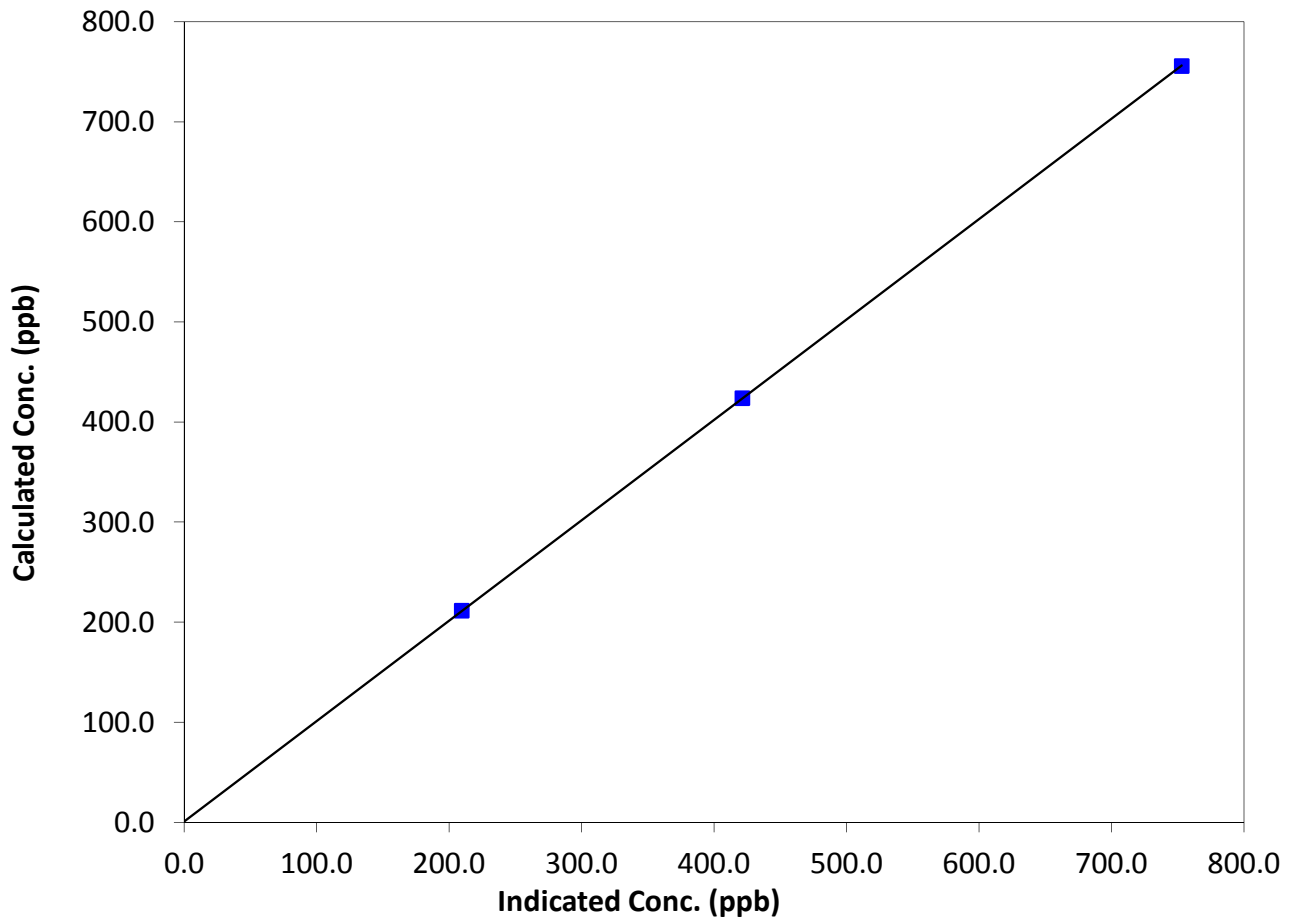
Station Information

Calibration Date	July 9, 2014	Previous Calibration	June 17, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:00	End Time (MST)	14:48
Analyzer make	Thermo 43C	Analyzer serial #	50911

Calibration Data

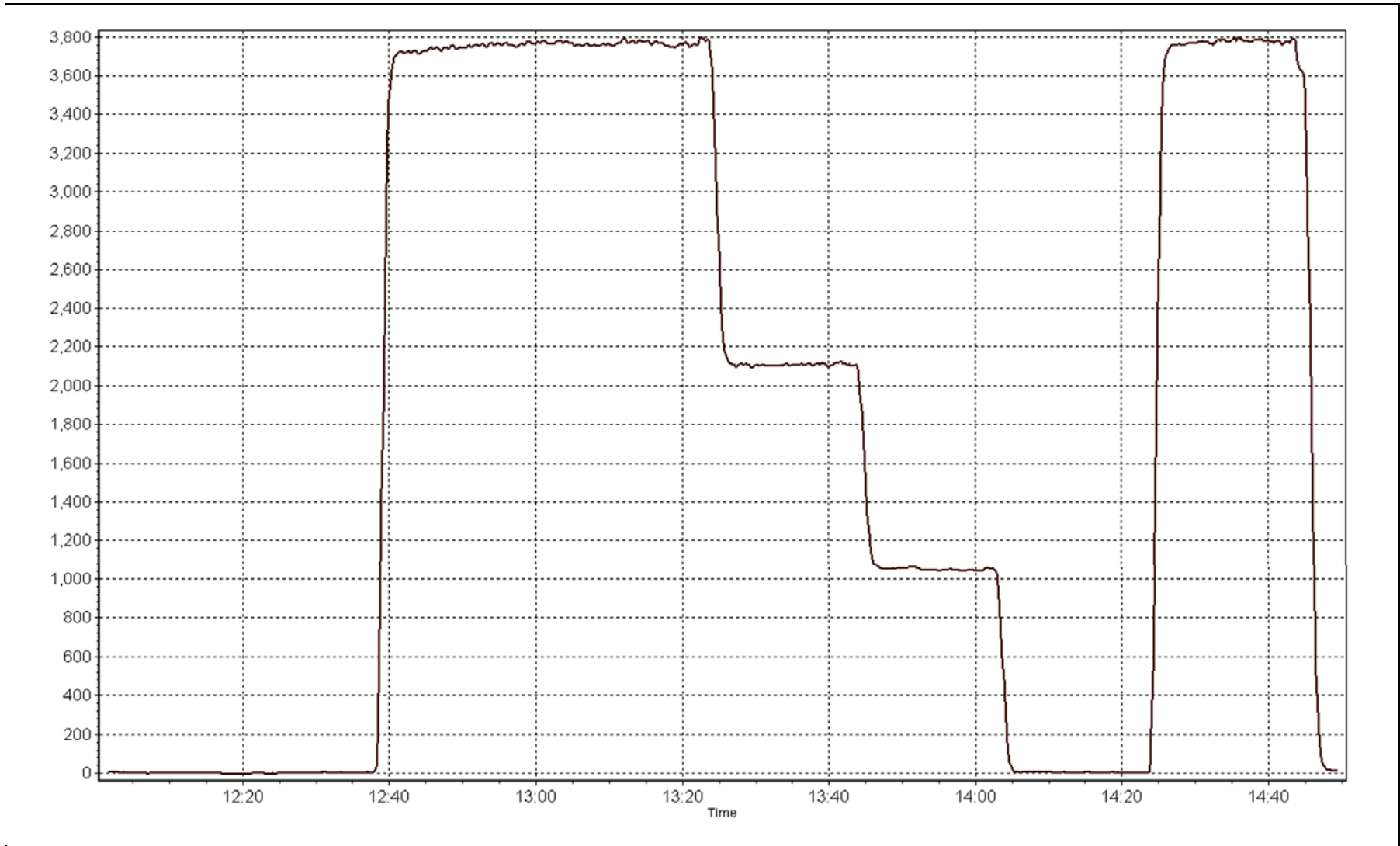
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999998
755.7	753.0	1.0036		
423.8	421.4	1.0056	Slope	1.002912
211.4	209.6	1.0087		
			Intercept	0.820160

SO₂ Calibration Curve



SO2 Calibration Plot

Date: July 9, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	July 10, 2014	Previous Calibration	June 19, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	11:15
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	1.007667	0.991273	Chamber temp.	45	45
Calculated intercept	-0.087633	-0.178044	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	0.08	NA
as found span	6500	46.0	75.0	75.8	0.990
SO2 scrubber check	5500	22.8	211.4	0.4	NA
calibrator zero	6500	0.0	0.0	0.1	NA
high point	6500	46.0	75.0	75.8	0.990
second point	6500	24.6	40.1	40.7	0.986
third point	6500	12.3	20.1	20.5	0.978
calibrator zero	6500	0.0	0.0	0.1	NA
as left zero	6500	0.0	0.0	0.2	NA
as left span	6500	46.0	75.0	76.5	0.981
Average Correction Factor					0.984

Corrected As found	75.7	Previous response	74.5	% change	-1.6%
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Notes:

No adjustments.

Calibration Performed By:

Zack Eastman



Wood Buffalo Environmental Association

TRS Calibration Summary

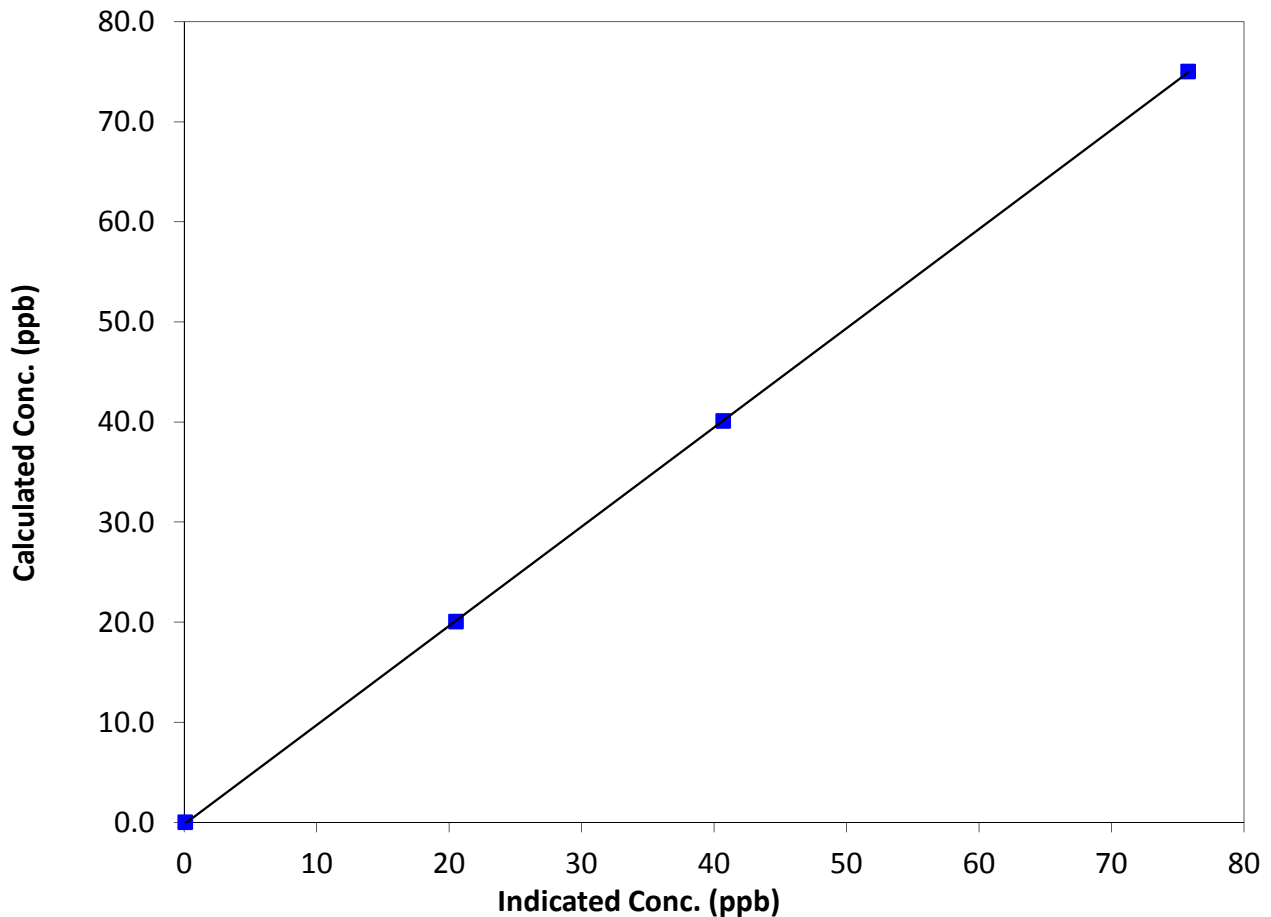
Station Information

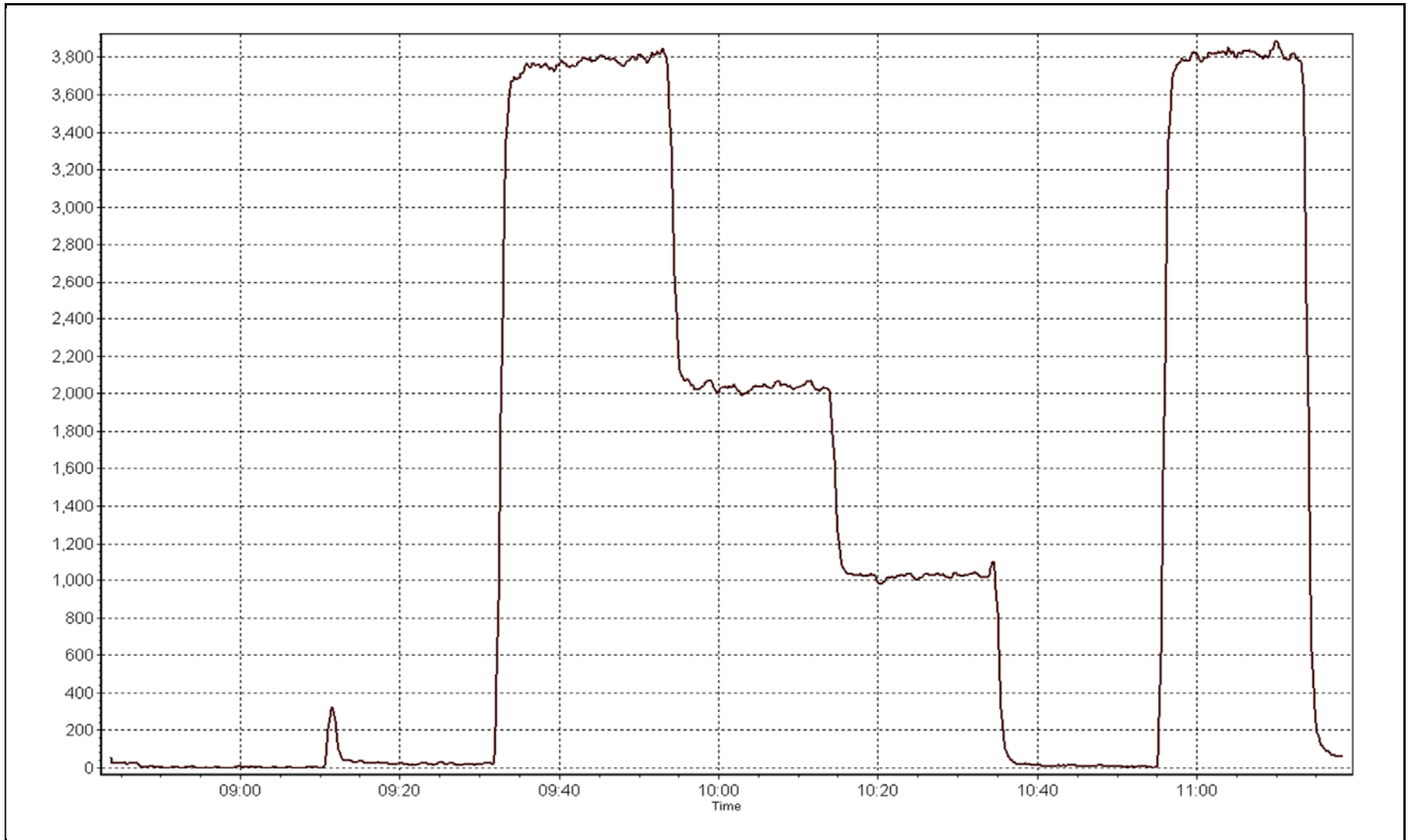
Calibration Date	July 10, 2014	Previous Calibration	June 19, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:45	End Time (MST)	11:15
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999991
75.0	75.8	0.9896		
40.1	40.7	0.9857	Slope	0.991273
20.1	20.5	0.9775		
			Intercept	-0.178044

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Wednesday, July 09, 2014	Prev Calibration	Tuesday, June 17, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	12:00	End Time (MST)	14:48
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	1.000368	0.999221	Air Pressure	32.2	32.2
THC Calc intercept	0.029584	0.027976			
NMHC Calc slope	1.001787	0.999390			
NMHC Calc intercept	0.010629	0.007353			

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	15.72	1.015
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	81.5	15.95	15.96	0.999
second point	5500	45.7	8.94	8.89	1.006
third point	5500	22.8	4.46	4.42	1.010
calibrator zero	5500	0.0	0.00	0.00	N/A
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	81.5	15.95	15.93	1.001
Average Correction Factor					1.005

Corrected As found 15.72 Previous response 15.92 % change 1.2%

Notes:

Span adjusted slightly.

Calibration Performed By: Zack Eastman



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	N/A
as found span	5500	81.5	8.39	8.24	1.019
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	81.5	8.39	8.40	0.999
second point	5500	45.7	4.71	4.69	1.004
third point	5500	22.8	2.35	2.34	1.004
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	8.38	1.002
Average Correction Factor					1.002

Corrected As found 8.24 Previous response 8.37 % change 1.6%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	N/A
as found span	5500	81.5	7.56	7.48	1.010
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	2.08	1.016
calibrator zero	5500	0.0	0.00	0.00	N/A
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	81.5	7.56	7.55	1.001
Average Correction Factor					

Corrected As found 7.48 Previous response 7.55 % change 0.9%



Wood Buffalo Environmental Association

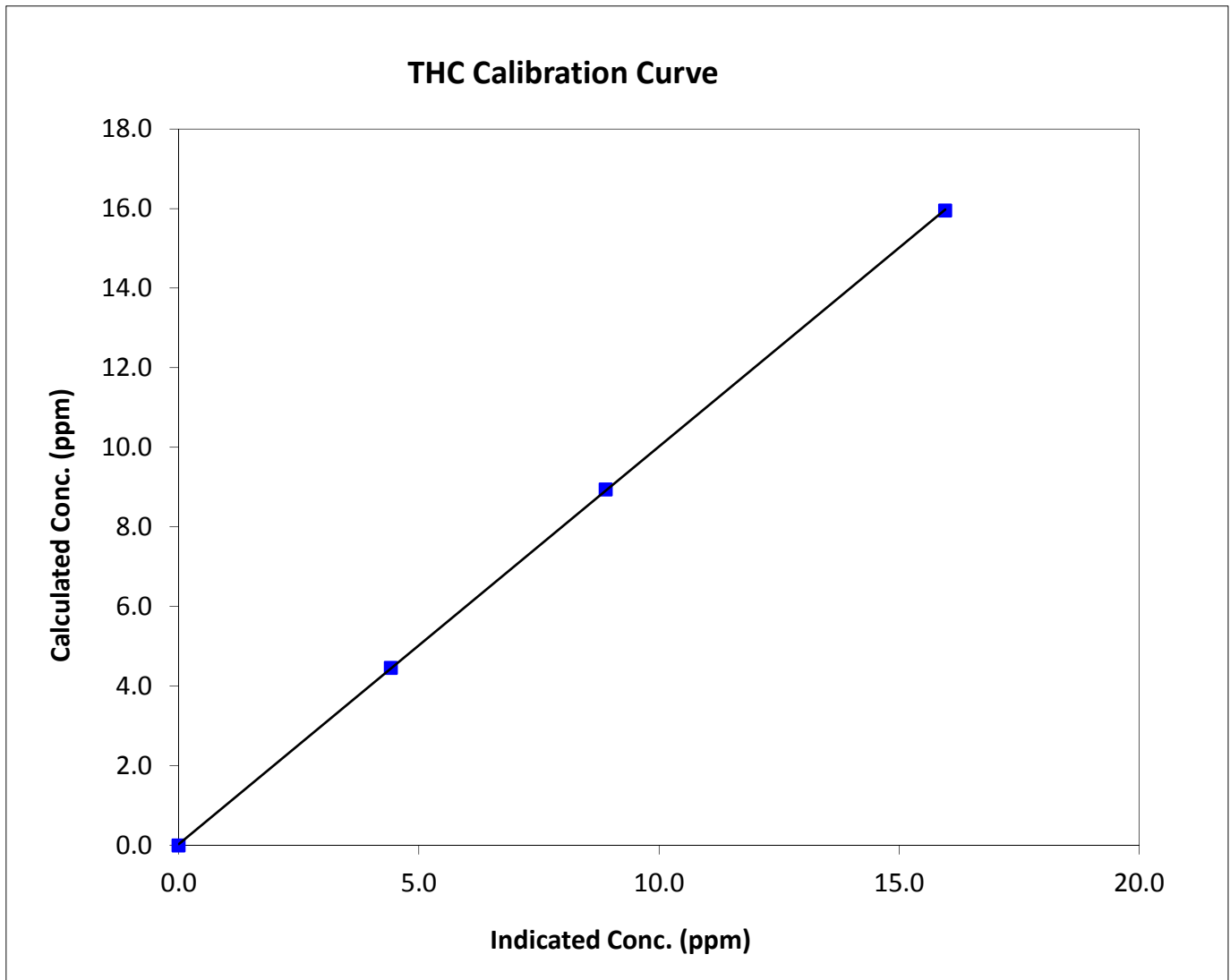
THC Calibration Summary

Station Information

Calibration Date	July 9, 2014	Previous Calibration	June 17, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:00	End Time (MST)	14:48
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	0.999980
15.95	15.96	0.9995		
8.94	8.89	1.0062	Slope	0.999221
4.46	4.42	1.0096		
			Intercept	0.027976





Wood Buffalo Environmental Association

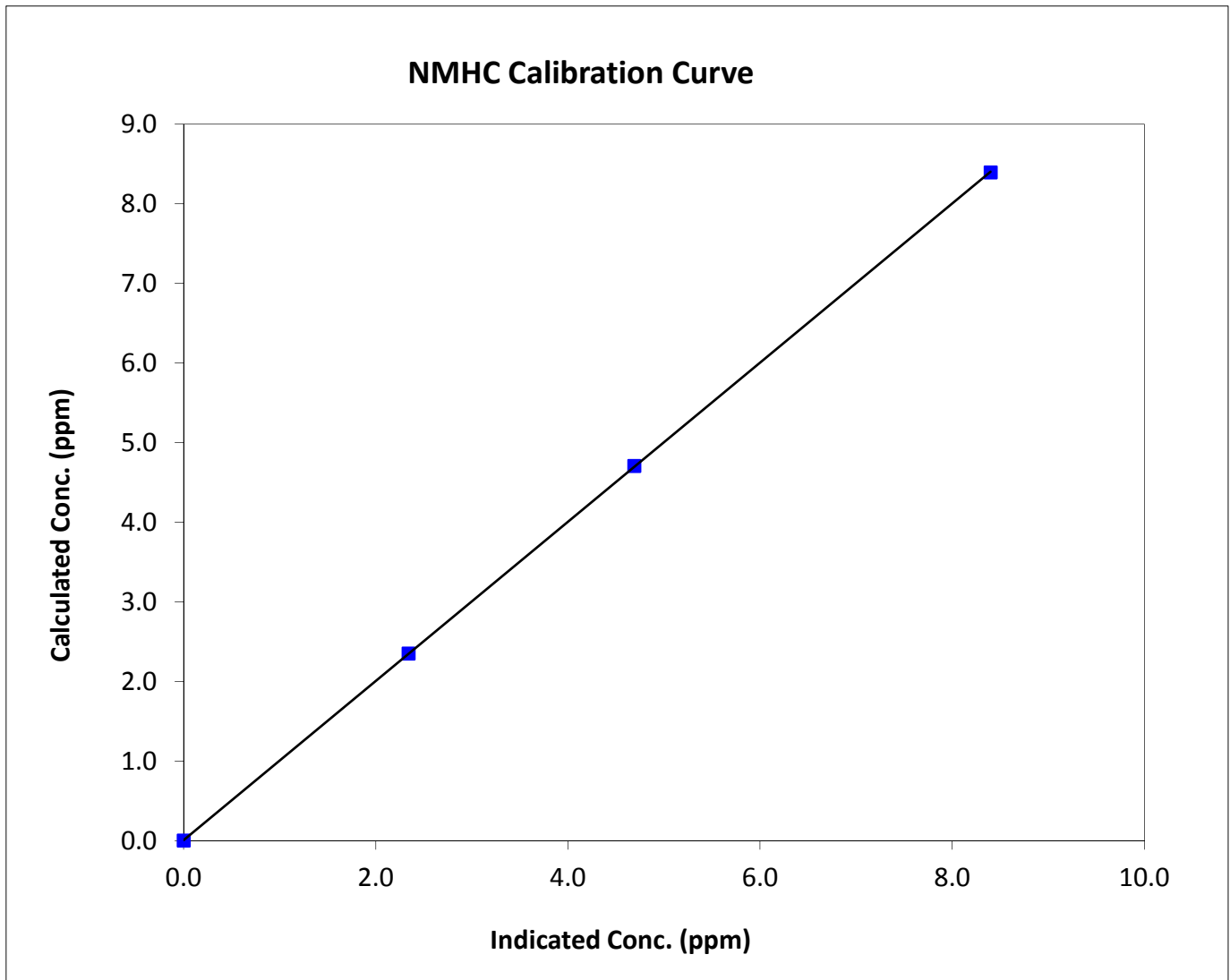
NMHC Calibration Summary

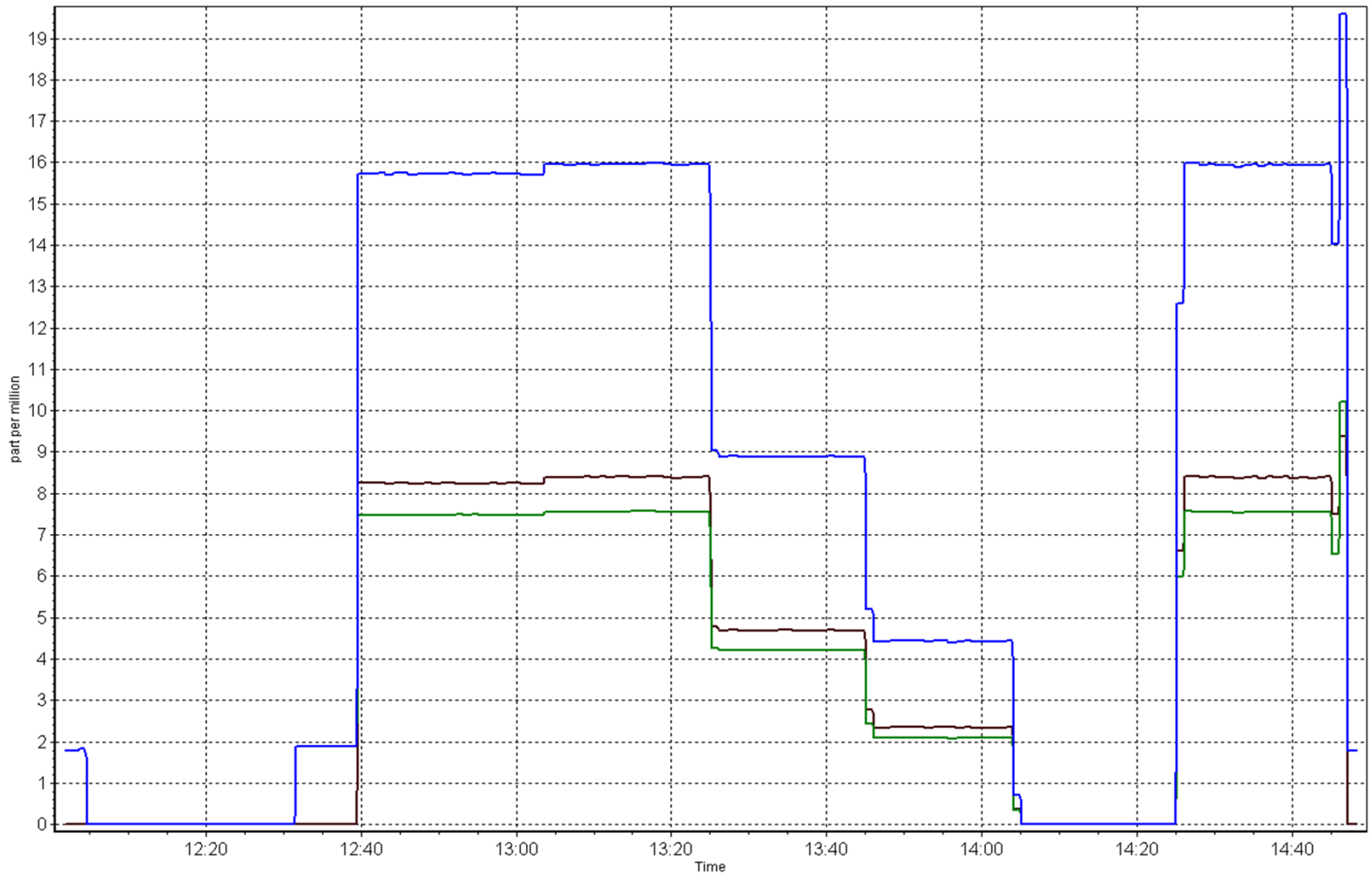
Station Information

Calibration Date	July 9, 2014	Previous Calibration	June 17, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:00	End Time (MST)	14:48
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	0.999993
8.39	8.40	0.9993		
4.71	4.69	1.0036	Slope	0.999390
2.35	2.34	1.0036		
			Intercept	0.007353





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Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	July 3, 2014	Previous Calibration	June 23, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Other: repair		
Start Time (MST)	9:50	End Time (MST)	14:25
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	28.4
Analyzer Range (input)	5000	5000	Lamp temp.	56.7	56.8
Calculated slope	0.997711	0.998824	Pressure	714.0	685.9
Calculated intercept	-0.647508	-1.364138	Flow cell A	0.200	0.968
Analyzer Background	-1.6	-1.9	Flow cell B	0.758	0.736
Analyzer Coefficient	1.152	1.181	Cell A Intensity	44xxx	64xxx
			Cell B Intensity	51xxx	55xxx

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	0.3	N/A
as found span	5000	1.10	391.0	386.7	1.011
calibrator zero	5500	0.00	0.0	0.3	N/A
high point	5000	1.10	391.0	391.8	0.998
second point	5000	0.60	202.0	205.4	0.983
third point	5000	0.35	106.0	107.8	0.983
calibrator zero	5500	0.00	0.0	0.3	N/A
as left zero	N/A	0.00	0.0	2.1	N/A
as left span	N/A	Level 1	N/A	240.3	
Average Correction Factor					0.988

Corrected As found 386.4 Previous response 392.5 % change 1.6%

Notes:

found cell A low flow and low intensity alarms on; optics were clogged. Cleaned optics and capillaries. Adjusted zero and span.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

O₃ Calibration Summary

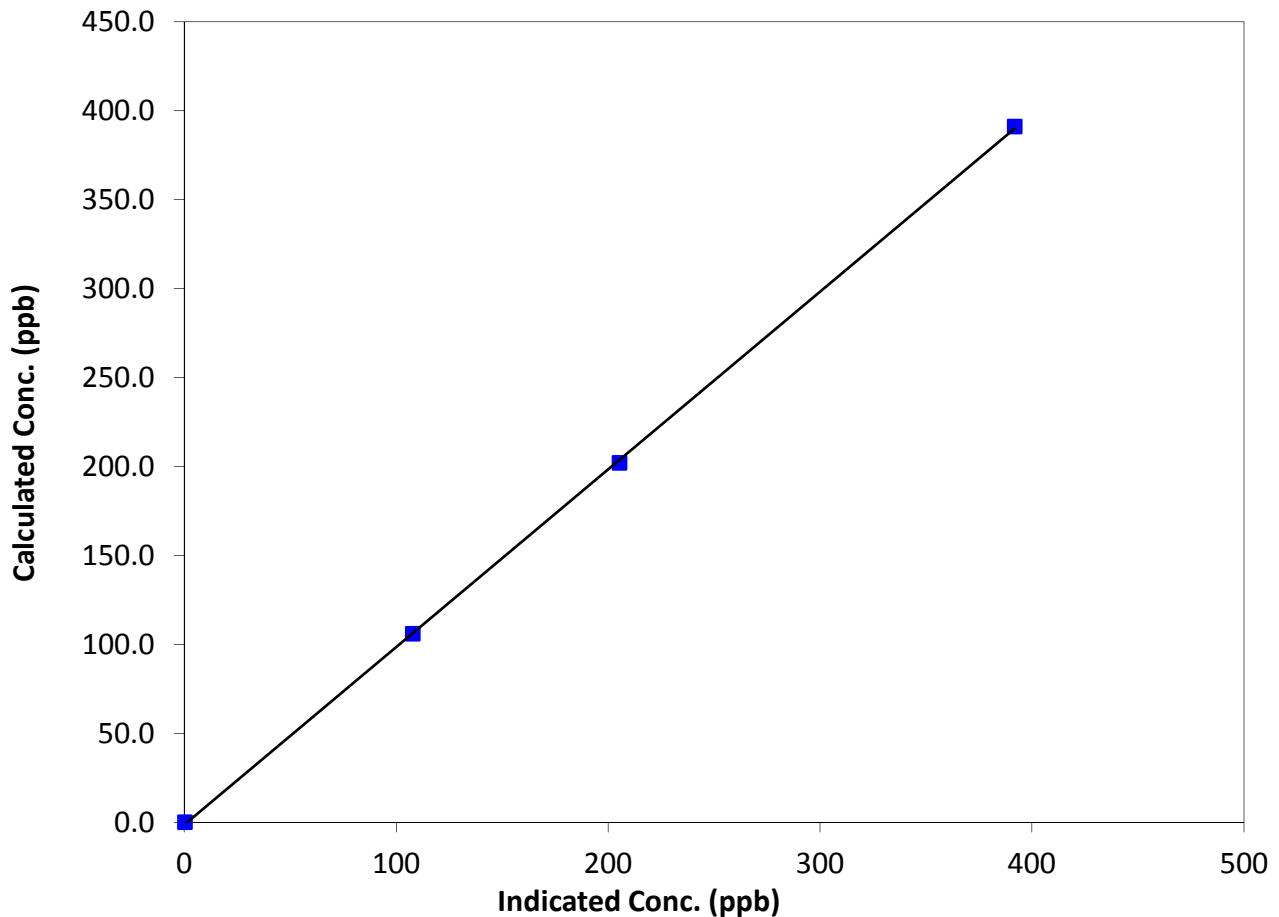
Station Information

Calibration Date	Thursday, July 03, 2014	Previous Calibration	June 23, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:50	End Time (MST)	14:25
Analyzer make	Thermo 49C	Analyzer serial #	49C-60861-328

Calibration Data

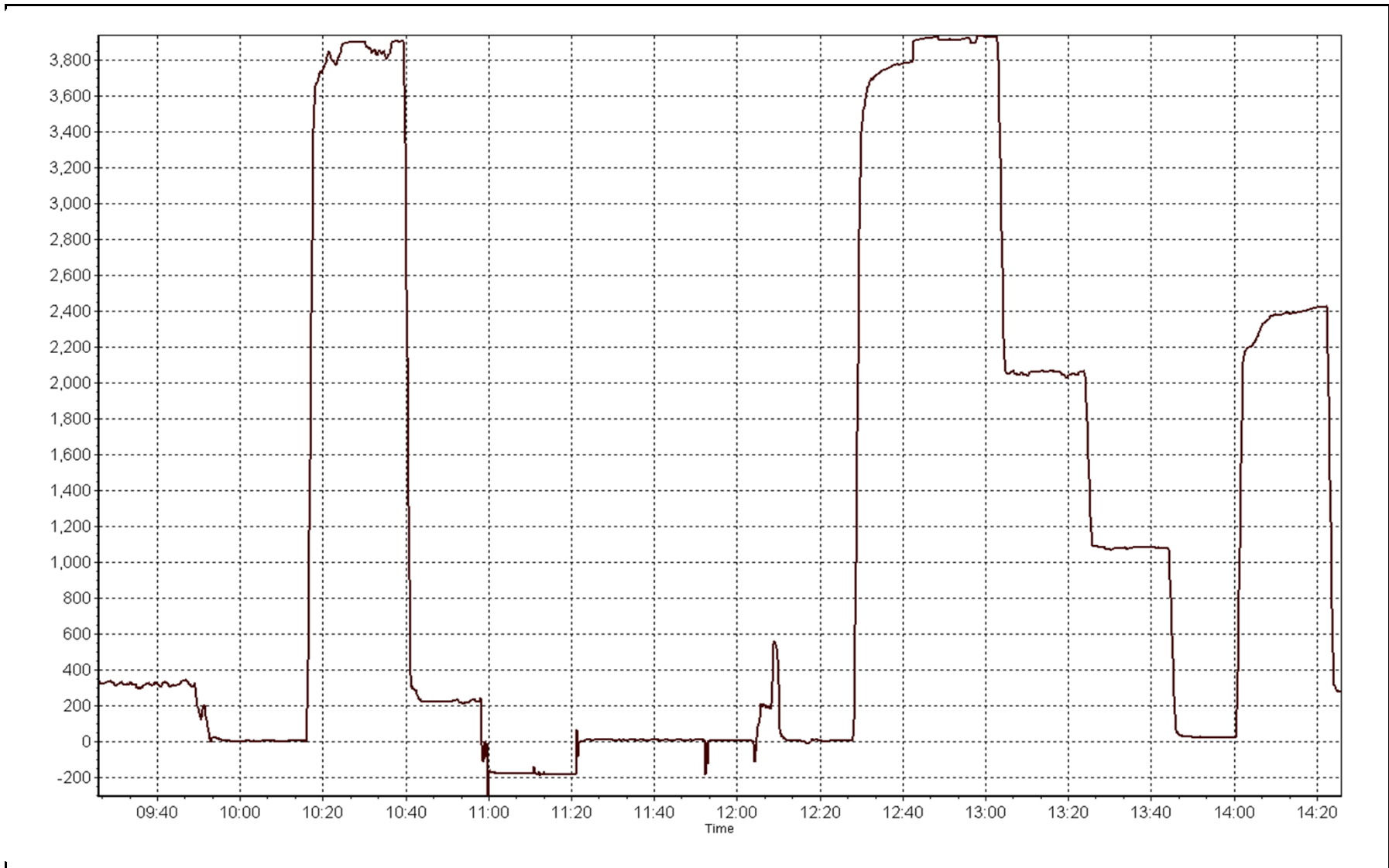
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999933
391.0	391.8	0.9980		
202.0	205.4	0.9834	Slope	0.998824
106.0	107.8	0.9833		
			Intercept	-1.364138

O₃ Calibration Curve



O3 Calibration Plot

Date: July 3, 2014





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	July 11, 2014	Previous Calibration	NA
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Other:		
Start Time (MST)	17:35	End Time (MST)	19:34
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.	29.0	29.0
Analyzer Range (input)	5000	5000	Lamp temp.	54.0	54.0
Calculated slope	NA	0.991560	Pressure	694.0	694.0
Calculated intercept	NA	1.091380	Flow cell A	689.000	689.000
Analyzer Background	NA	-1.3	Flow cell B	689.000	689.000
Analyzer Coefficient	NA	1.536	Cell A Intensity	90xxx	90xxx
			Cell B Intensity	85xxx	85xxx

Analyzer make Thermo 49i Analyzer serial # 1300156233

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5500	0.00	0.0	0.5	N/A
high point	5000	1.10	389.0	391.8	0.993
second point	5000	0.60	202.0	202.6	0.997
third point	5000	0.35	106.0	103.6	1.023
calibrator zero	5500	0.00	0.0	0.5	N/A
as left zero					
as left span					
Average Correction Factor					1.004

Corrected As found NA Previous response NA % change NA

Notes:

span adjusted after some stabilization issues related to filter change.

Calibration Performed By: Zack Eastman



Wood Buffalo Environmental Association

O₃ Calibration Summary

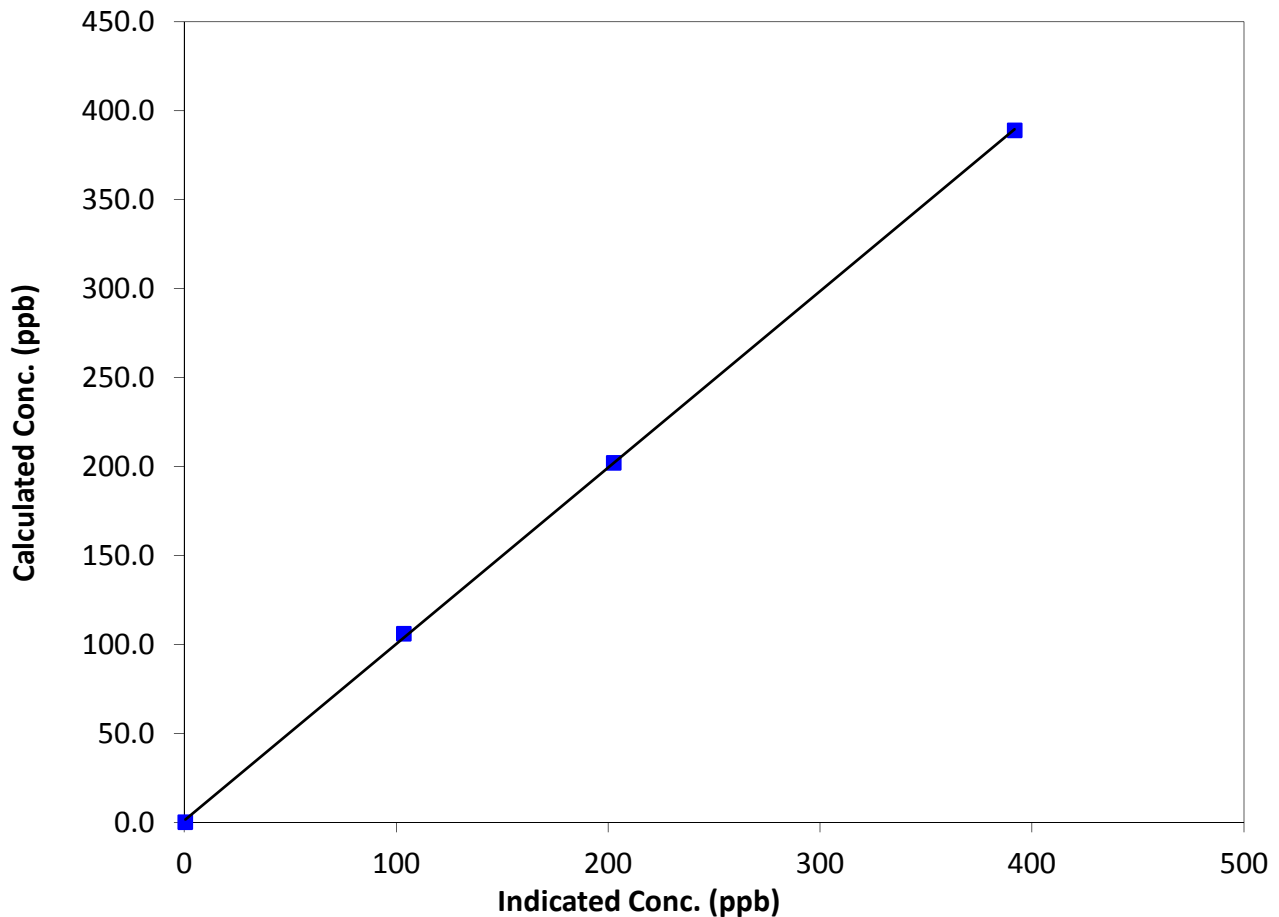
Station Information

Calibration Date	Friday, July 11, 2014	Previous Calibration	NA
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	17:35	End Time (MST)	19:34
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

Calibration Data

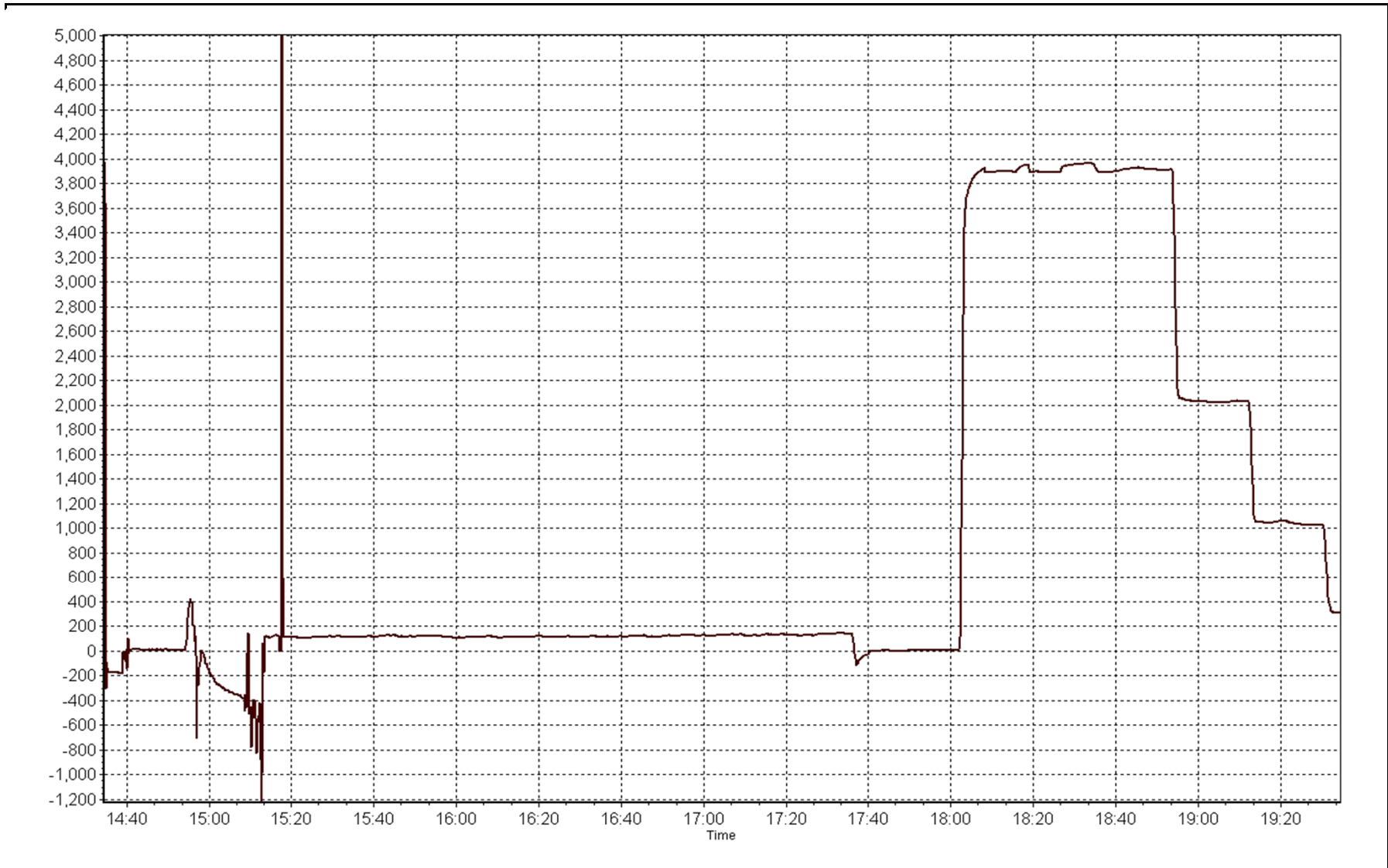
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	N/A	Correlation Coefficient	0.999906
389.0	391.8	0.9929		
202.0	202.6	0.9970	Slope	0.991560
106.0	103.6	1.0232		
			Intercept	1.091380

O₃ Calibration Curve



O3 Calibration Plot

Date: July 11, 2014





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	July 14, 2014	Previous Calibration	July 11, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Other:	Repair	
Start Time (MST)	9:30	End Time (MST)	15:55
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.	29.0	29.0
Analyzer Range (input)	5000	5000	Lamp temp.	54.0	54.0
Calculated slope	0.991560	0.991060	Pressure	694.0	695.0
Calculated intercept	1.091380	1.037439	Flow cell A	689.000	696.000
Analyzer Background	-1.3	-1.3	Flow cell B	689.000	696.000
Analyzer Coefficient	1.536	1.536	Cell A Intensity	90xxx	90xxx
			Cell B Intensity	85xxx	85xxx

Analyzer make Thermo 49i Analyzer serial # 1300156233

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.00	0.0	0.2	N/A
as found span	5000	1.10	389.0	409.9	0.949
calibrator zero	5500	0.00	0.0	0.2	N/A
high point	5000	1.10	389.0	391.8	0.993
second point	5000	0.60	202.0	203.1	0.995
third point	5000	0.35	106.0	104.0	1.019
calibrator zero	5500	0.00	0.0	0.2	N/A
as left zero	N/A	0.00	0.0	-0.6	N/A
as left span	N/A	1.10	389.0	442.0	N/A
Average Correction Factor					1.002

Corrected As found 409.7 Previous response 391.2 % change -4.5%

Notes:

Zero and span adjusted after solenoid valve repair.

Calibration Performed By:

Zack Eastman



Wood Buffalo Environmental Association

O₃ Calibration Summary

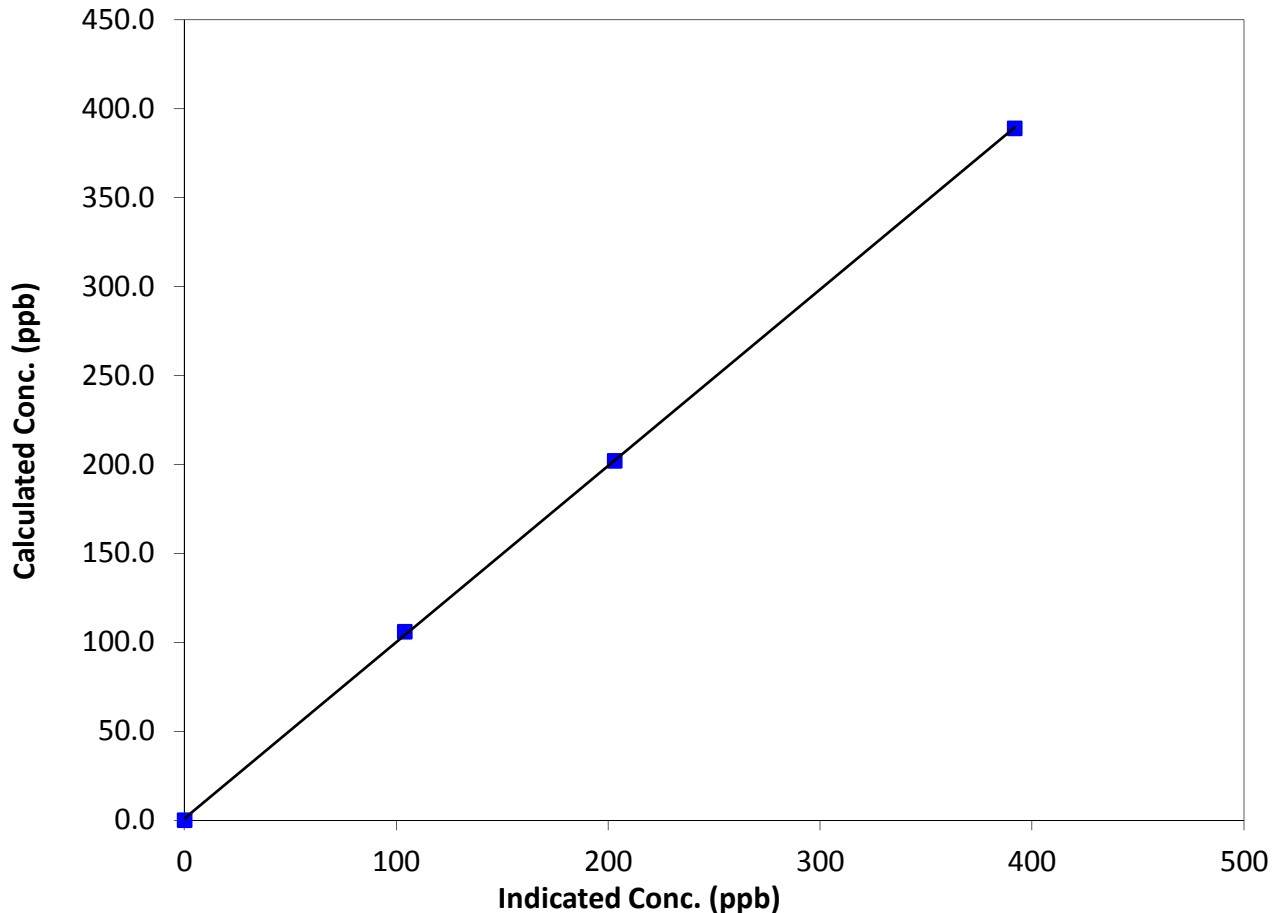
Station Information

Calibration Date	Monday, July 14, 2014	Previous Calibration	July 11, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:30	End Time (MST)	15:55
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

Calibration Data

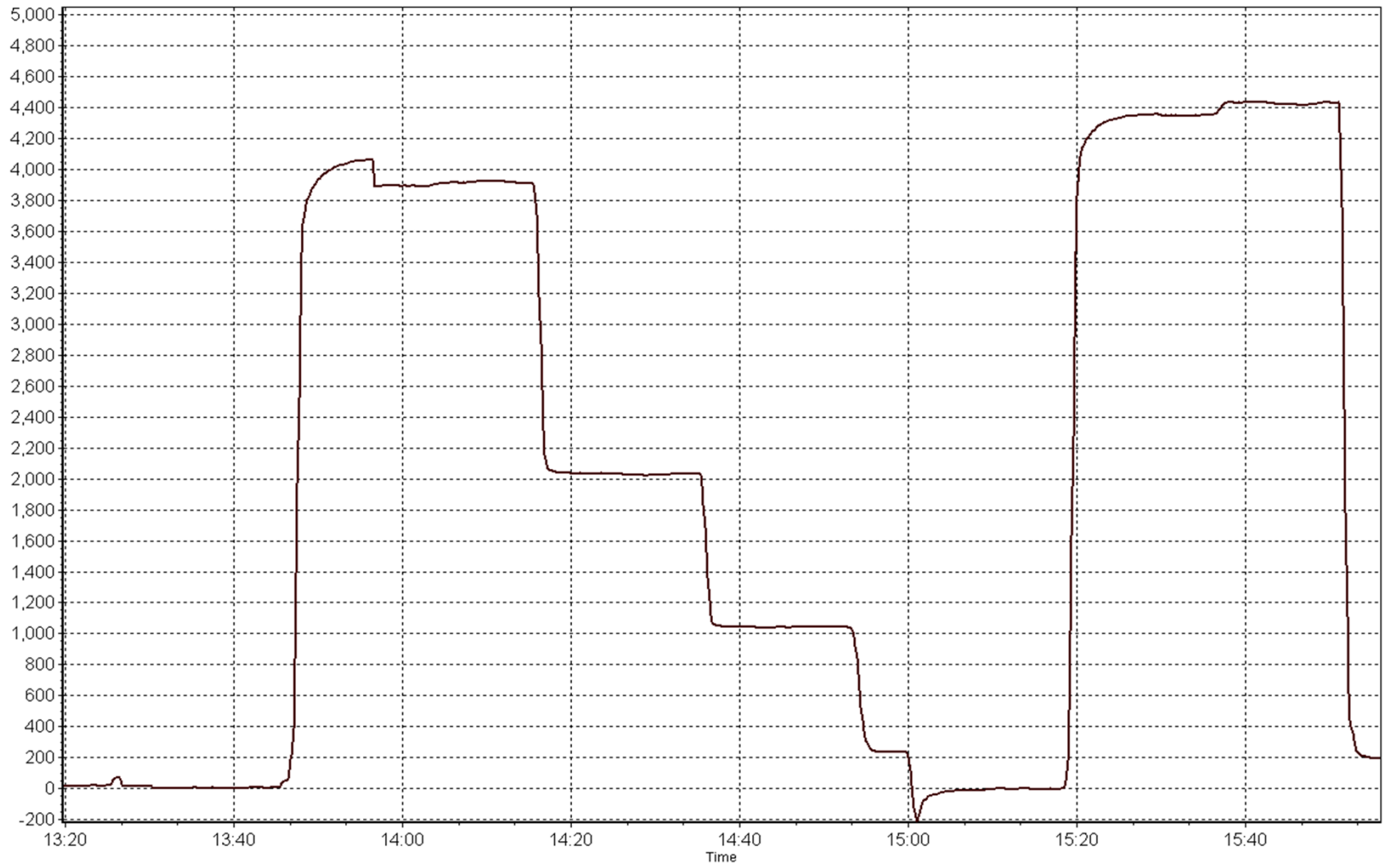
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999935
389.0	391.8	0.9929		
202.0	203.1	0.9946	Slope	0.991060
106.0	104.0	1.0192		
			Intercept	1.037439

O₃ Calibration Curve



O3 Calibration Plot

Date: July 14, 2014





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	July 22, 2014	Previous Calibration	July 14, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Other:	Repair	
Start Time (MST)	9:10	End Time (MST)	14:20
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.	29.0	29.0
Analyzer Range (input)	5000	5000	Lamp temp.	54.0	54.0
Calculated slope	0.991060	0.995414	Pressure	694.0	689.0
Calculated intercept	1.037439	-0.656690	Flow cell A	689	736
Analyzer Background	-1.3	-1.3	Flow cell B	689	740
Analyzer Coefficient	1.536	1.536	Cell A Intensity	85xxx	85xxx
			Cell B Intensity	83xxx	83xxx

Analyzer make Thermo 49i Analyzer serial # 1300156233

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.00	0.0	0.3	N/A
as found span	5000	1.10	389.0	453.5	0.858
calibrator zero	5500	0.00	0.0	0.1	N/A
high point	5000	1.10	389.0	390.7	0.996
second point	5000	0.60	202.0	205.1	0.985
third point	5000	0.35	106.0	107.0	0.991
calibrator zero	5500	0.00	0.0	0.1	N/A
as left zero	N/A	0.00	0.0	-0.3	N/A
as left span	N/A	1.10	NA	439.0	NA
Average Correction Factor					0.990

Corrected As found 453.2 Previous response 391.5 % change -13.6%
Average Correction

Notes:

Instrument was experiencing some flow restriction at the capillary connections causing periodic leaking from orings and seal breakage due increased vacuum on the capillary holders. Plumbing replaced and issue resolved.

Calibration Performed By: Zack Eastman



Wood Buffalo Environmental Association

O₃ Calibration Summary

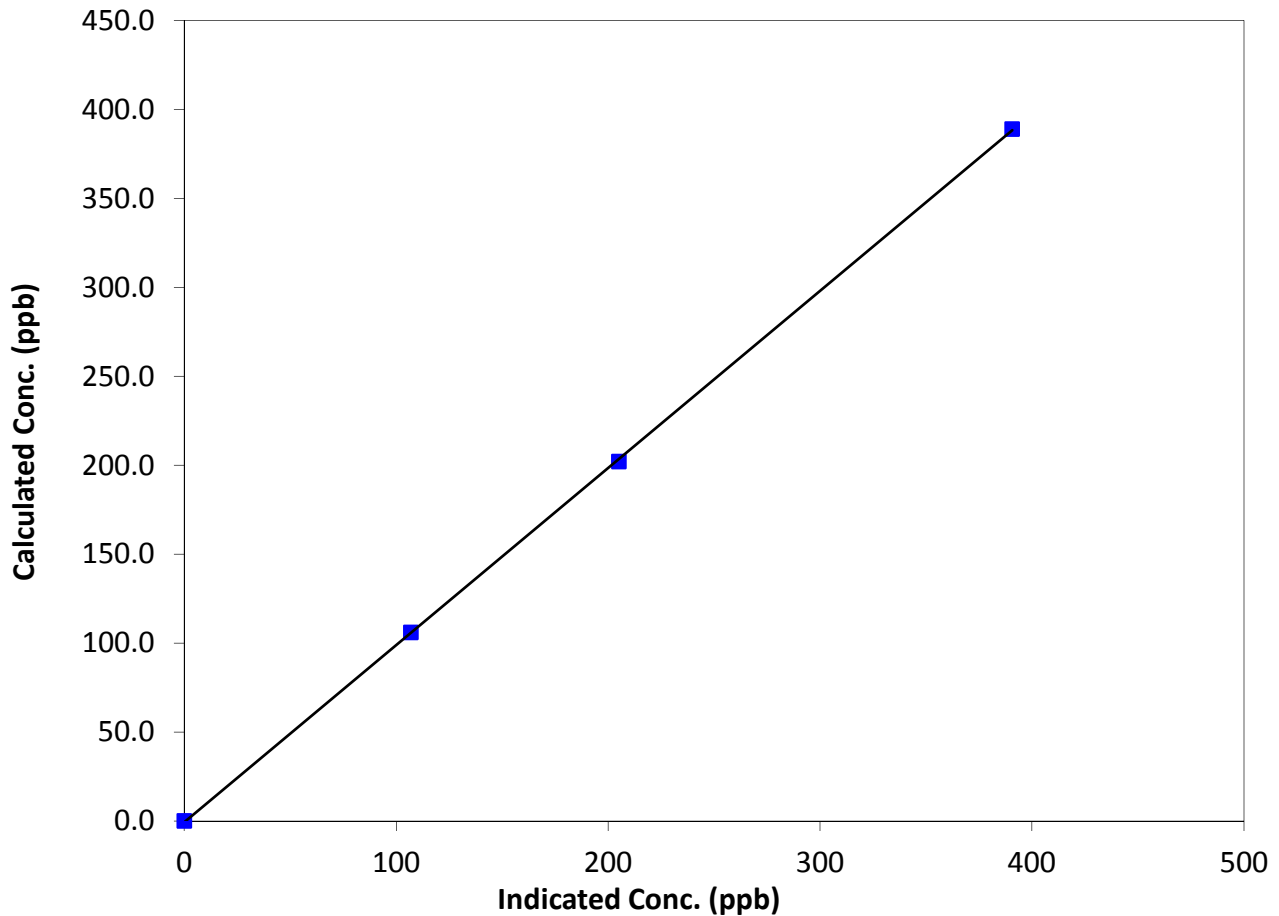
Station Information

Calibration Date	Tuesday, July 22, 2014	Previous Calibration	July 14, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:10	End Time (MST)	14:20
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

Calibration Data

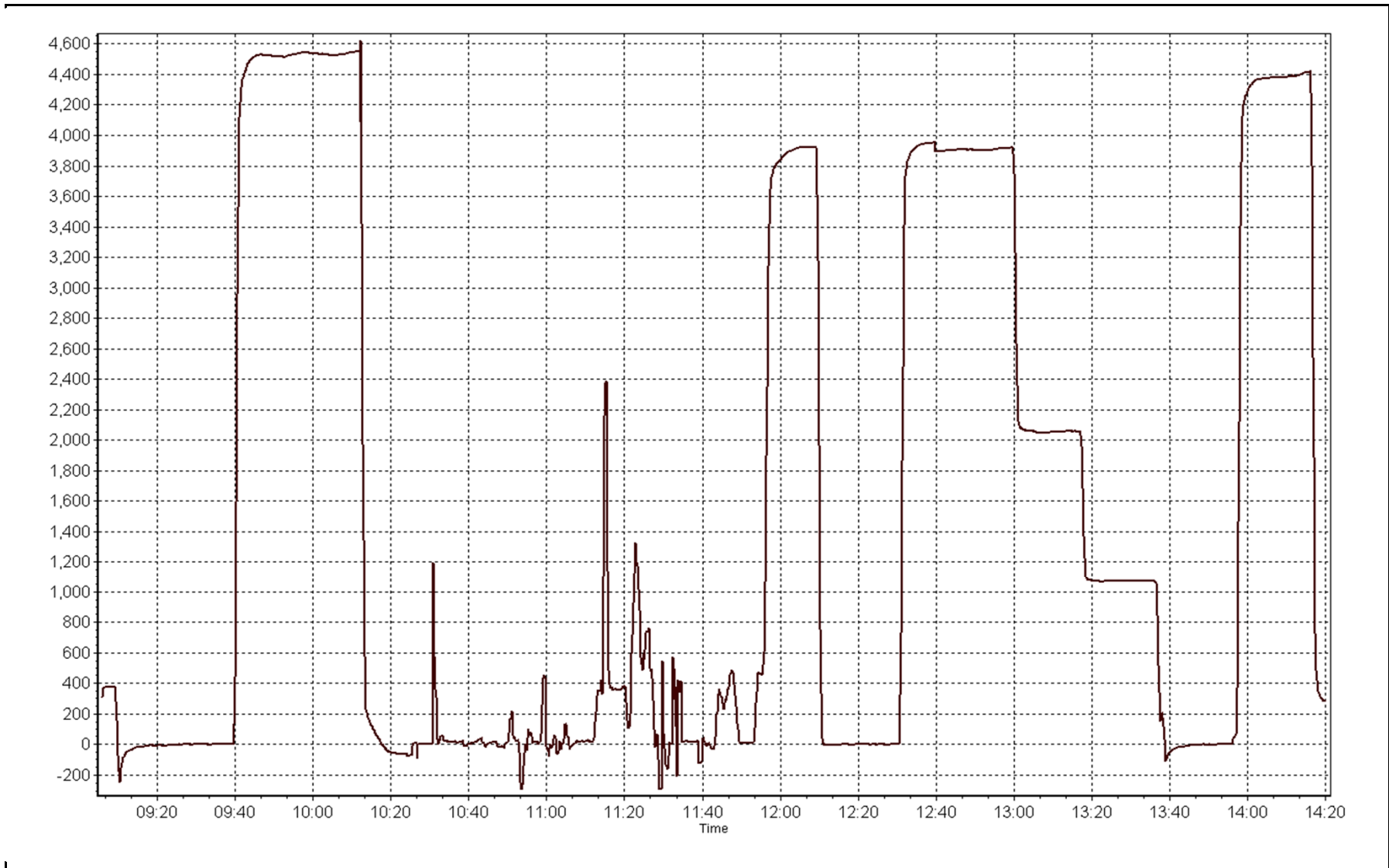
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999961
389.0	390.7	0.9956		
202.0	205.1	0.9849	Slope	0.995414
106.0	107.0	0.9907		
			Intercept	-0.656690

O₃ Calibration Curve



O3 Calibration Plot

Date: July 22, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 11, 2014	Previous Calibration	June 19, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	6:30	End Time (MST)	10:35
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

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	5000	5000	5000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.992987	0.994069	1.002745
	Data Offset	0.211763	0.133987	-0.244021
After	Data Slope	0.997960	0.999577	0.999894
	Data Offset	0.451253	0.380743	0.031033
Channel #				
Voltage Range		0-5000mv	0-5000mv	0-5000mv

Analyzer Information

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

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.866	ppb	0.859	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:

Span adjusted slightly. No issues.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date: July 11, 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	757.0	756.0	1.0	0.990	0.992
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	751.0	750.0	1.0	0.998	1.000
second point	5500	45.7	420.4	420.4	0.0	421.0	420.0	0.3	0.999	1.001
third point	5500	22.8	209.8	209.8	0.0	209.0	209.0	0.3	1.004	1.004
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	363.0	386.8	755.0	365.0	390.0	0.993	0.995
Average Correction Factor									1.000	1.001

Corrected As found NO_x= 757.2 NO= 756.2 Percent Change NO_x= -0.3% NO= -0.3%
 Previous Response NO_x= 754.9 NO= 754.1

GPT Calibration Data

Dilution Flow 5500 ccm Source Gas Flow 81.50 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO 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	363.0	389.0	753.0	363.0	389.0	0.981	1.000	1.000	100.0%
2nd NO ₂ (200)	N/A	550.0	202.0	752.0	550.0	202.0	0.983	1.000	1.000	100.0%
3rd NO ₂ (100)	N/A	646.0	106.0	752.0	646.0	106.0	0.983	1.000	1.000	100.0%
4th NO ₂ (0)	752.0	N/A	0.0	752.0	752.0	0.0	0.983	1.000	N/A	N/A
Average Correction Factor							0.982	1.000	1.000	100.0%

Calibration Performed By: Zack Eastman



Wood Buffalo Environmental Association

NO_x Calibration Summary

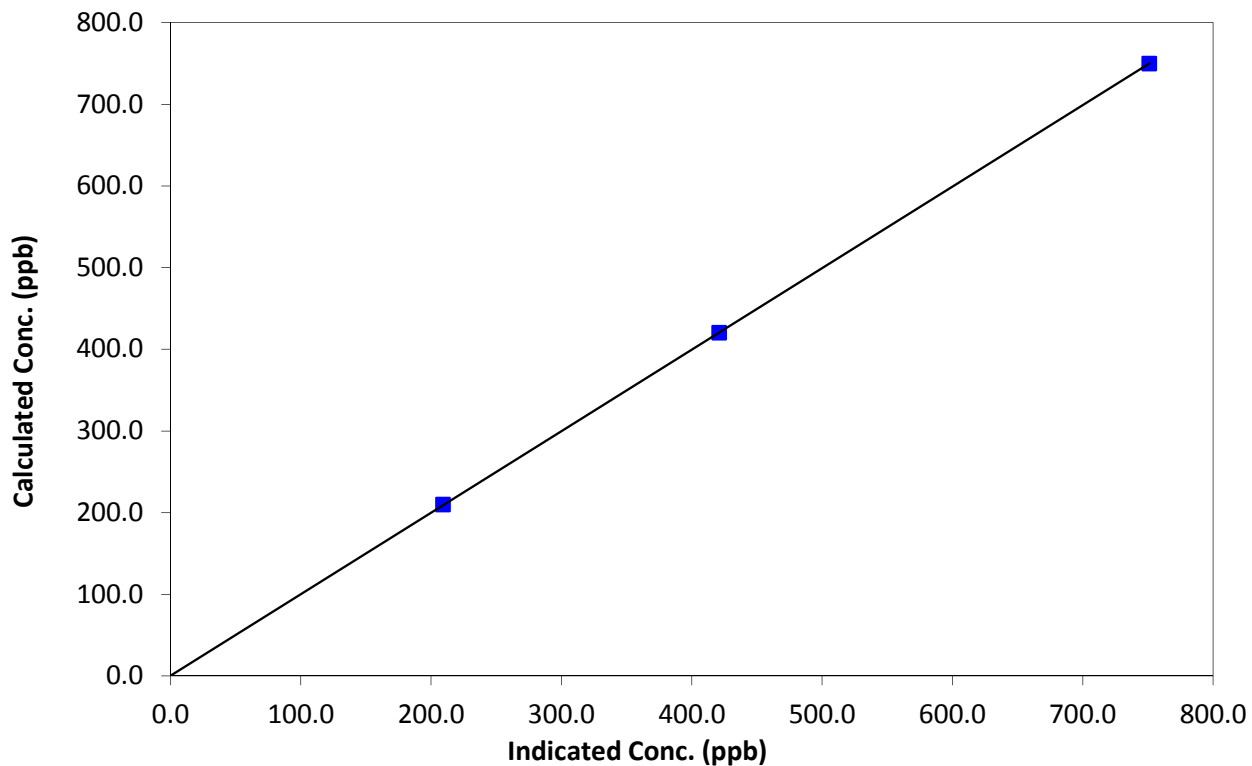
Station Information

Calibration Date	July 11, 2014	Previous Calibration	June 19, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	6:30	End Time (MST)	10:35
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	-0.2	N/A	Correlation Coefficient	0.999998
749.8	751.0	0.9984		
420.4	421.0	0.9987	Slope	0.997960
209.8	209.0	1.0036		
0.0	-0.2	0.0000	Intercept	0.451253

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

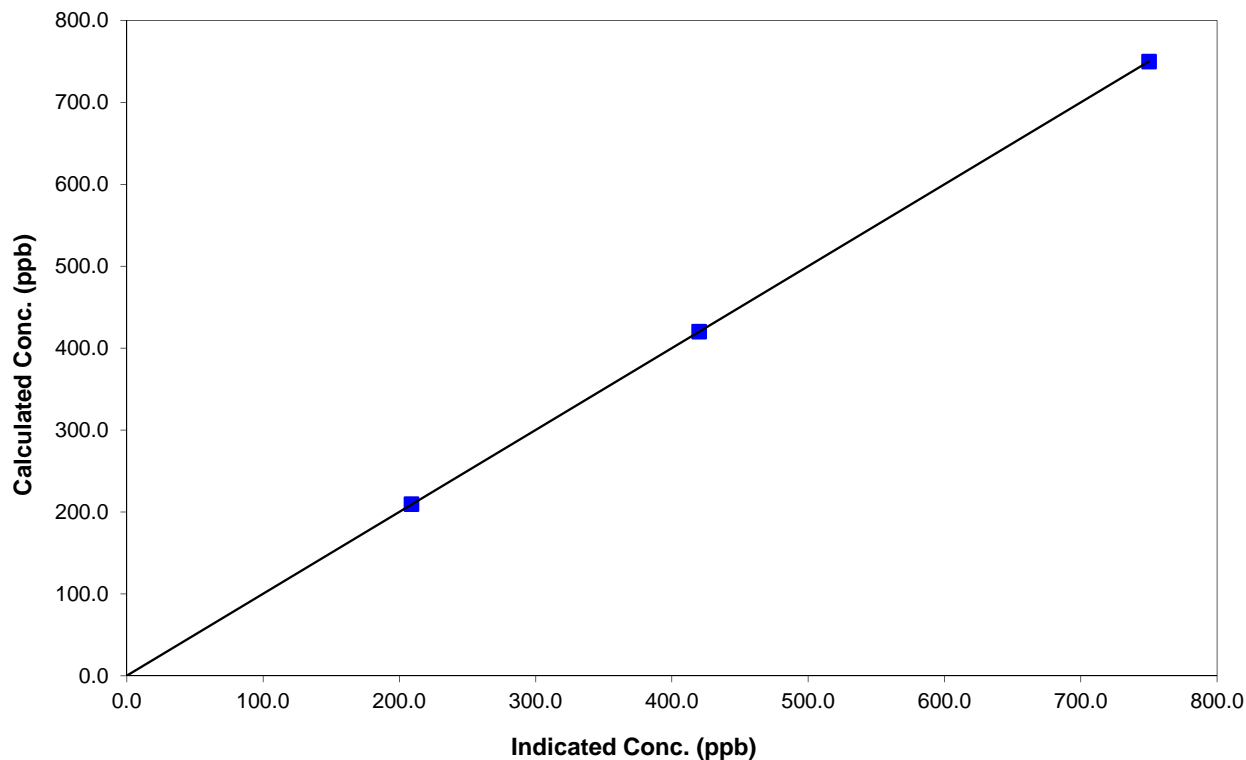
Station Information

Calibration Date	July 11, 2014	Previous Calibration	June 19, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	6:30	End Time (MST)	10:35
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	0.999999
749.8	750.0	0.9997		
420.4	420.0	1.0010	Slope	0.999577
209.8	209.0	1.0036		
0.0	-0.2	0.0000	Intercept	0.380743

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

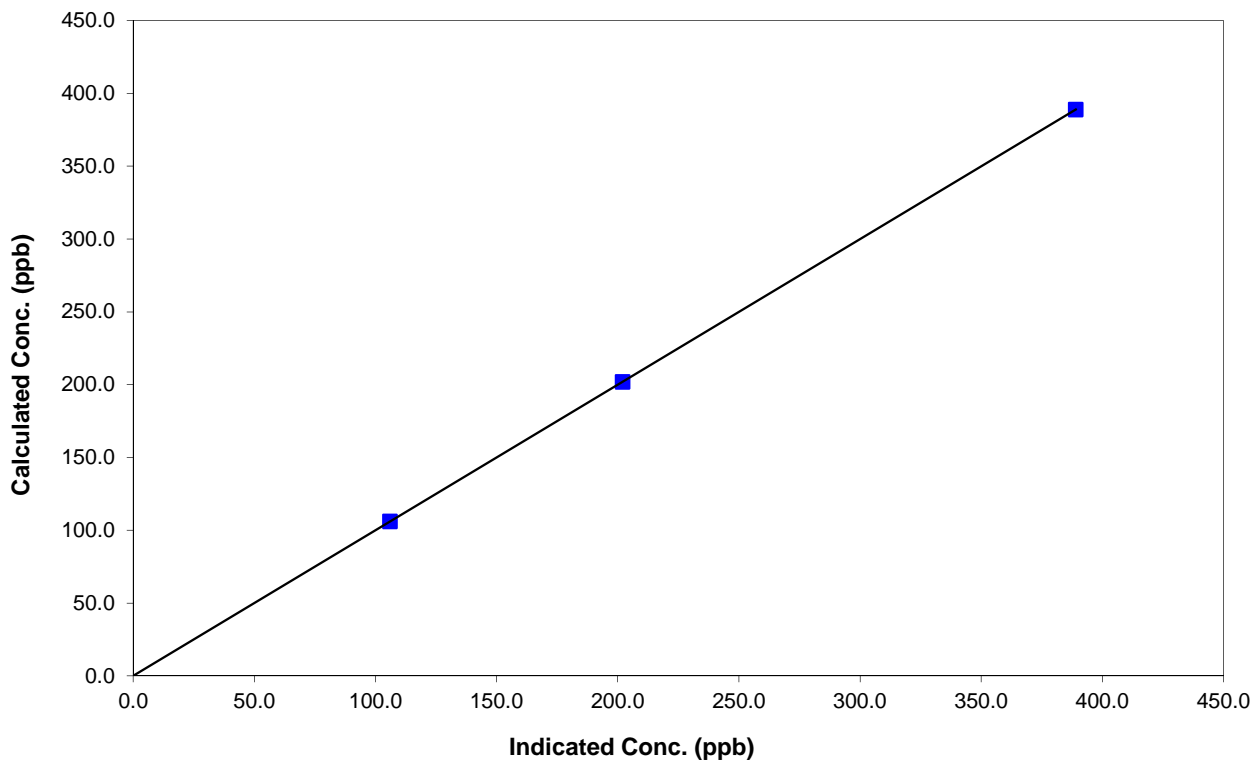
Station Information

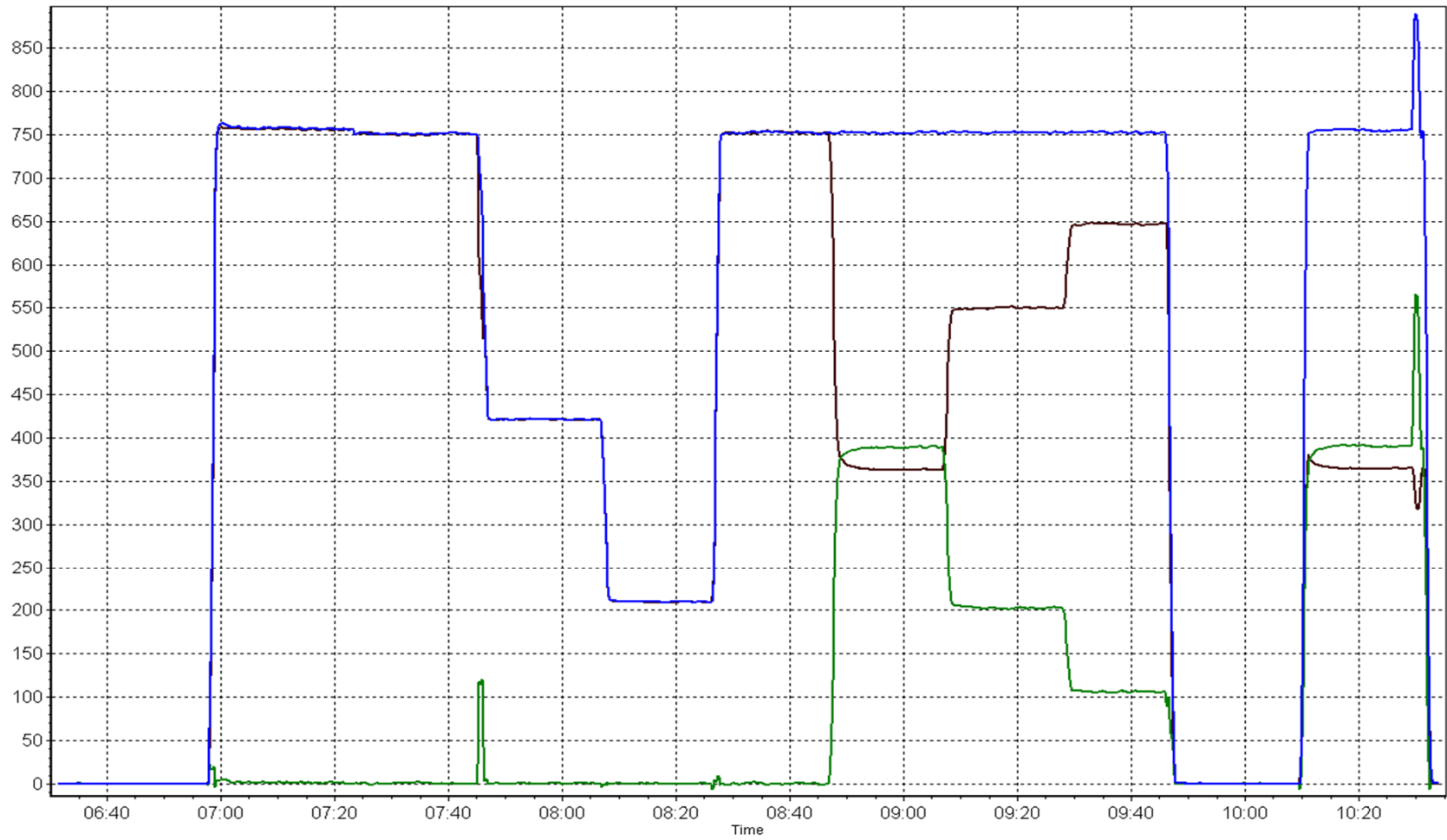
Calibration Date	July 11, 2014	Previous Calibration	June 19, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	6:30	End Time (MST)	10:35
Analyzer make	Thermo 42i NO/NO ₂ /NO _x Analyzer	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	1.000000
389.0	389.0	1.0000		
202.0	202.0	1.0000	Slope	0.999894
106.0	106.0	1.0000		
			Intercept	0.031033

NO₂ Calibration Curve







Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date	July 11, 2014	Previous Calibration	June 19, 2014
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	14:00	End Time (MST)	17:30
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	0.993695	0.000000	0.998204
	Data Offset	-8.441287	749.800000	-0.889461
After	Data Slope	0.989129	1.006233	0.998923
	Data Offset	-7.797115	0.238222	-9.444577
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	1.196		1.208	
NOX Slope	1.192		1.183	
NH3_coeff			0.958	
NO slope	1.175		1.150	
No bkgnd	0.0	mV	0.0	mV
Nt bkgnd	0.1	mV	0.1	mV
NOX bkgnd	0.0	mV	0.0	
NhH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.5	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	4.1	mmHg	4.1	mmHg
PMT Voltage		v		v
Sample Flow 1 NO	546.0	ccm	546.0	ccm
Sample Flow 2 Nox	516.0	ccm	516.0	ccm
Sample Flow 3 Nt	n/a	ccm	n/a	ccm

Notes:

Nt response to NO adjusted. No Zero adjustment required. NH3 span adjusted.



Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date:

July 11, 2014

Station Number:

AMS 1

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NO _x conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.0	-0.2	0.4	NA	NA
as found NO	5500	81.5	749.8	749.8	NA	754.2	757.8	-9.0	0.994	NA
calibrator zero	5500	0.0	0.0	0.0	0.0	0.0	-0.2	0.4	NA	NA
high NO point	5500	81.5	749.8	749.8	NA	746.8	748.6	-4.5	1.004	NA
NO/O ₃ point	5500	81.5	749.8	749.8	NA	744.0	741.2	7.0	1.008	NA
as found NH ₃	6500	67.7	1999.8	NA	1999.8	2006.8	6.9	1989.5	0.997	1.005
first NH ₃	6500	67.7	1999.8	NA	1999.8	2025.5	7.2	2007.5	0.987	0.996
second NH ₃	6500	33.9	1001.4	NA	1001.4	1024.4	4.1	1014.0	0.978	0.988
third NH ₃	6500	16.9	499.2	NA	499.2	520.5	0.2	520.0	0.959	0.960
as left zero						0.0				
as left span						0.0				
Average Correction Factor									1.0059	0.9812

Corrected As found

Nt = 754.2 ppb
NH₃ = 1989.1 ppb

Previous response

Nt = 763.0 ppb
NH₃ = 2004.2 ppb

Nt percent change 1.2%
NH₃ percent change 0.8%

Converter efficiency 95.8%

Calibration Performed By:

Zach Eastman



Wood Buffalo Environmental Association

NH3 Calibration Summary

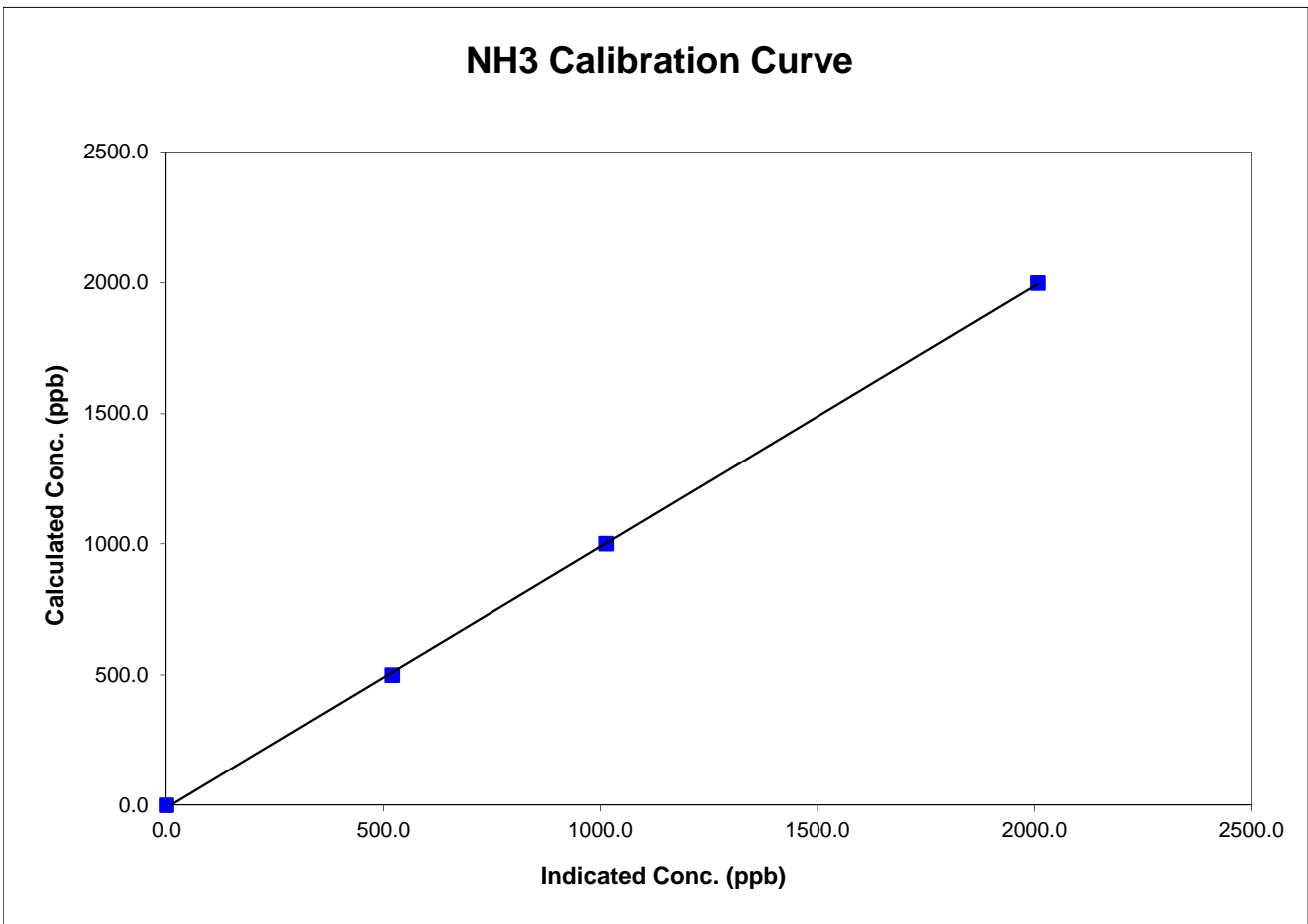
Station Information

Calibration Date	July 11, 2014	Previous Calibration	June 19, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	14:00	End Time (MST)	17:30
Analyzer make	API T201	Analyzer serial #	152

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999900
1999.8	2007.5	0.9961		
1001.4	1014.0	0.9875	Slope	0.998923
499.2	520.0	0.9600		
			Intercept	-9.444577

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

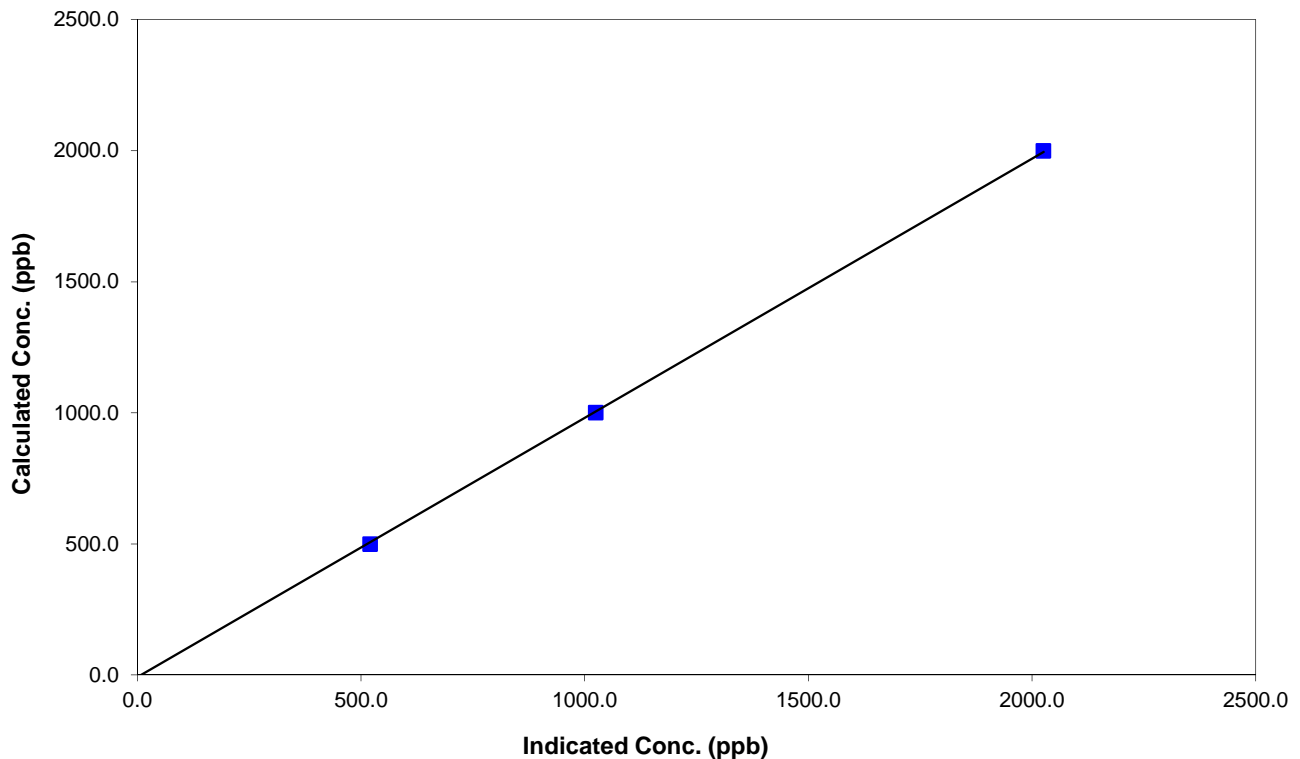
Station Information

Calibration Date	July 11, 2014	Previous Calibration	June 19, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	14:00	End Time (MST)	17:30
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	0.0	N/A	Correlation Coefficient	0.999929
1999.8	2025.5	0.9873		
1001.4	1024.4	0.9776	Slope	0.989129
499.2	520.5	0.9591		
	0.0		Intercept	-7.797115

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

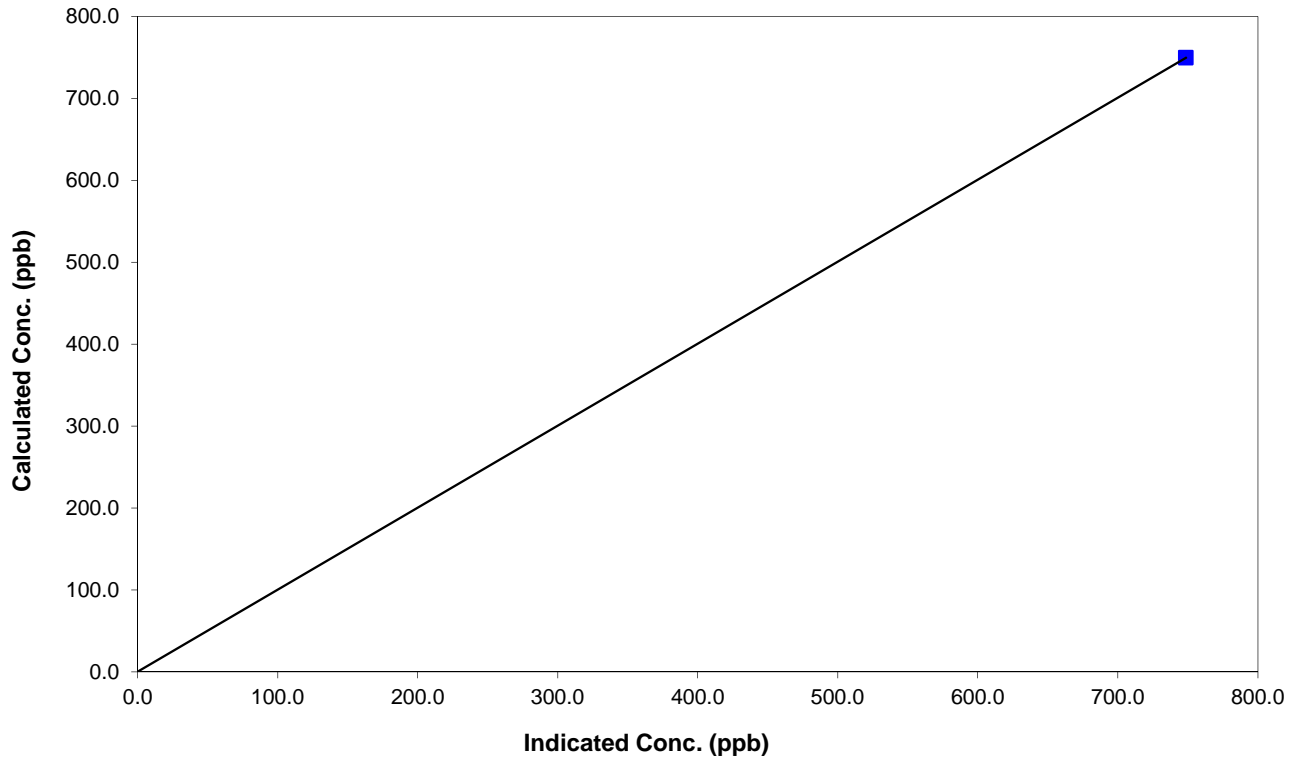
Station Information

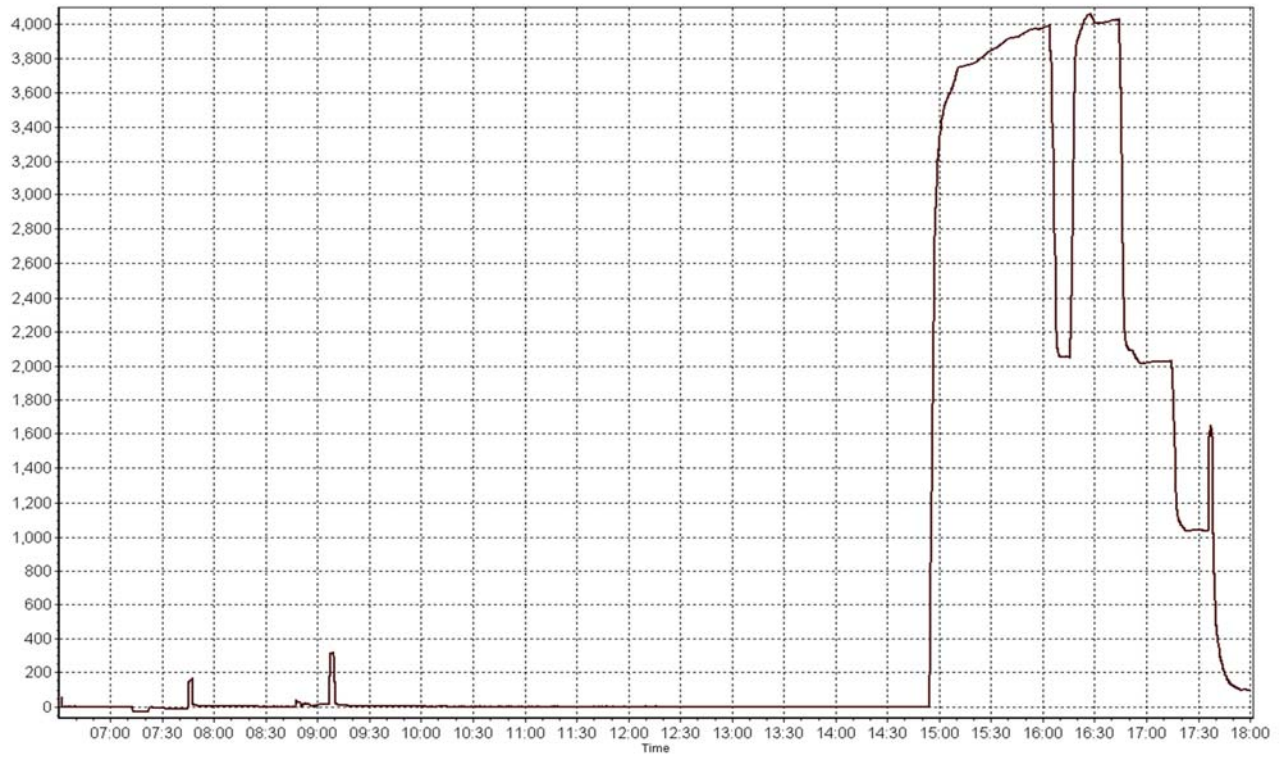
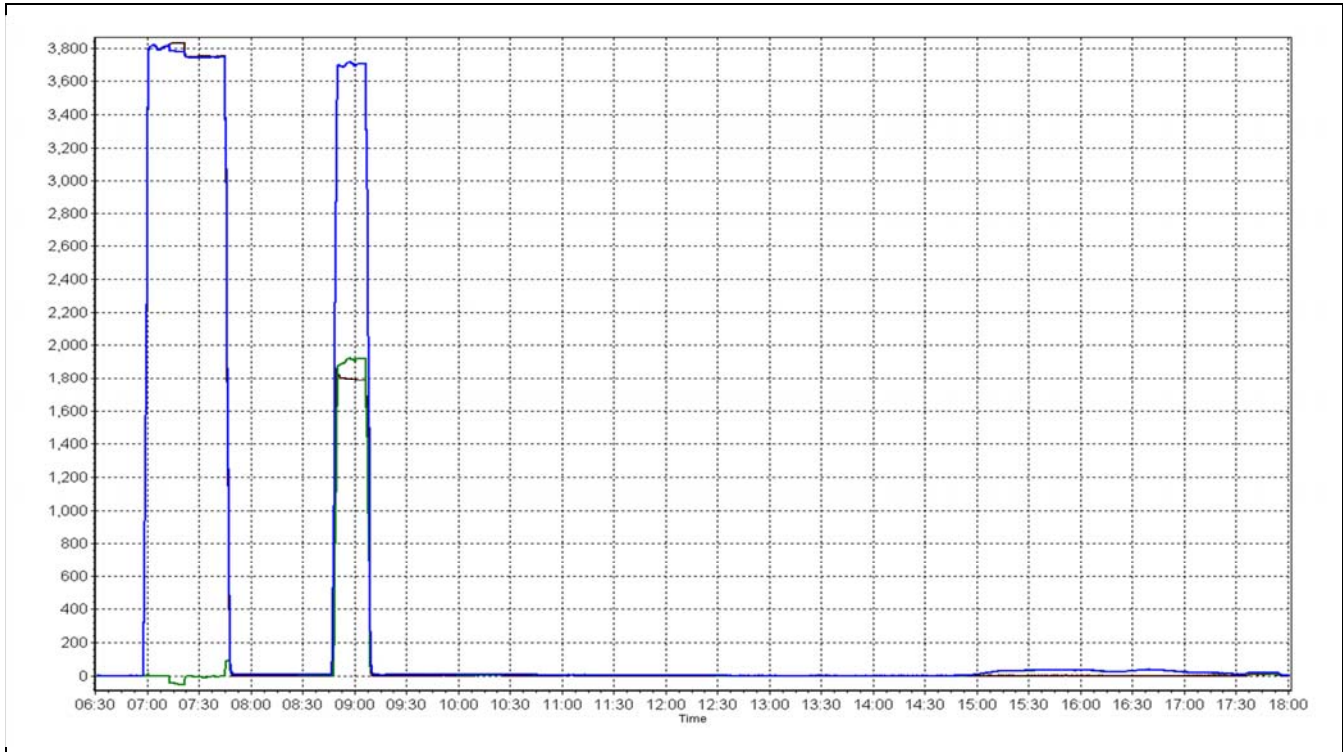
Calibration Date	July 11, 2014	Previous Calibration	June 19, 2014
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	14:00	End Time (MST)	17:30
Analyzer make	API T201	Analyzer serial #	152

NO_x Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999926
749.8	748.6	1.0016		
749.8	741.2	1.0116	Slope	1.006233
			Intercept	0.238222

NOx Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 2
MILDRED LAKE
JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)

JULY 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	706	36	38	99.73	47	0	12	0
H2S (ppb) Average	706	35	38	99.60	8	0	2	0
THC (ppm) Average	706	36	38	99.73	6.9	-	3.1	-
Temperature (C) Average	744	0	0	100.00	33.7	-	25.2	-
Wind Speed 10 m (km/h) Average	739	0	5	99.33	31	-	-	-
Wind Direction 10 m (deg) Average	739	0	5	99.33	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
 JULY 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	706	2.9	5	-	0	0	1	1	3	7	47
H2S (ppb) Average	706	1.1	1	-	0	0	0	1	1	3	8
THC (ppm) Average	706	2.42	0.5	-	1.9	2.1	2.2	2.3	2.5	2.9	6.9
Temperature 2 m (C) Average	744	20.65	5	-	7.6	14.3	16.8	20.4	24.1	27.2	33.7
Wind Speed 10 m (km/h) Average	739	8.4	4	-	0	3	5	8	11	14	31
Wind Direction 10 m (deg) Average	739	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

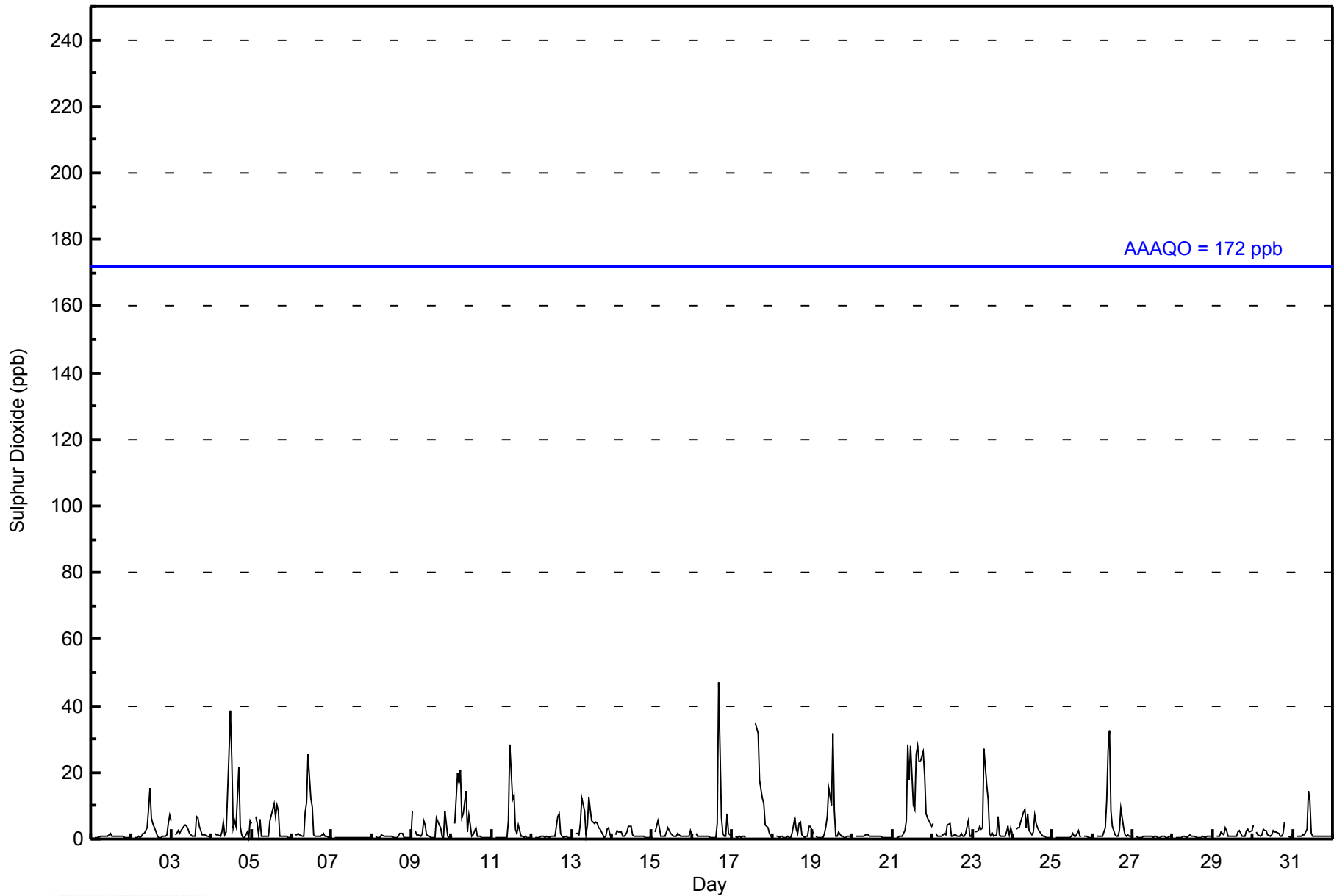
Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY PARAMETERS	25 Jul 2014 19:00	25 Jul 2014 19:00	1	Power spike
AIR QUALITY PARAMETERS	30 Jul 2014 21:00	30 Jul 2014 21:00	1	Power spike
H2S	17 Jul 2014 11:00	17 Jul 2014 11:00	1	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction	07 Jul 2014 22:00	08 Jul 2014 02:00	5	Flatline in sensor output signal

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WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	663	93.91	93.91
11 - 20	22	3.12	97.03
21 - 60	21	2.97	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: 706

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

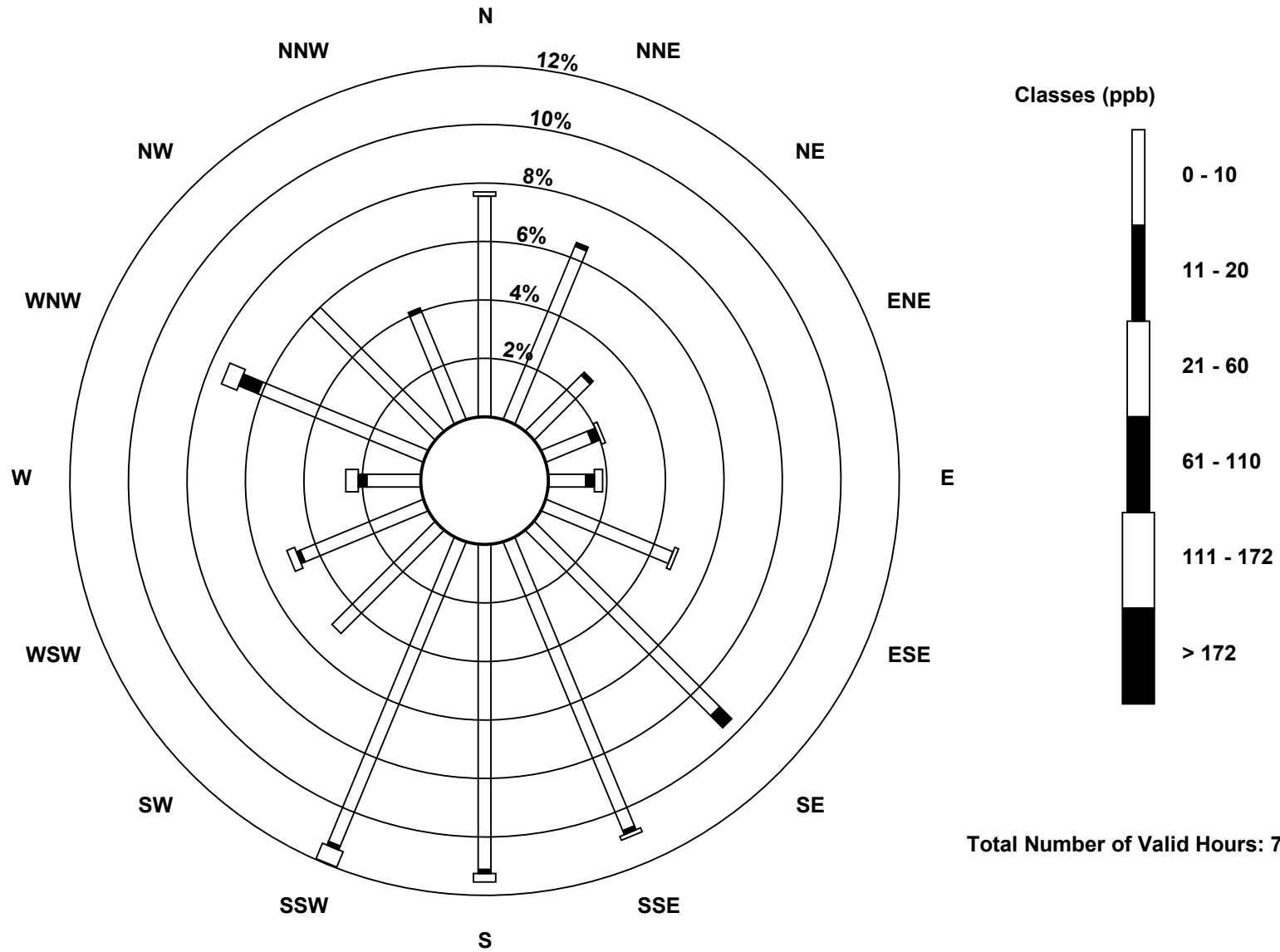
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	53	45	19	12	9	33	63	75	78	79	35	32	13	43	42	28	659
11 - 20	0	1	1	2	2	0	4	1	1	1	0	1	2	5	0	1	22
21 - 60	1	0	0	1	2	1	0	1	2	4	0	2	3	4	0	0	21
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	54	46	20	15	13	34	67	77	81	84	35	35	18	52	42	29	702

Total Number of Valid Hours: 702

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

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



Total Number of Valid Hours: 702

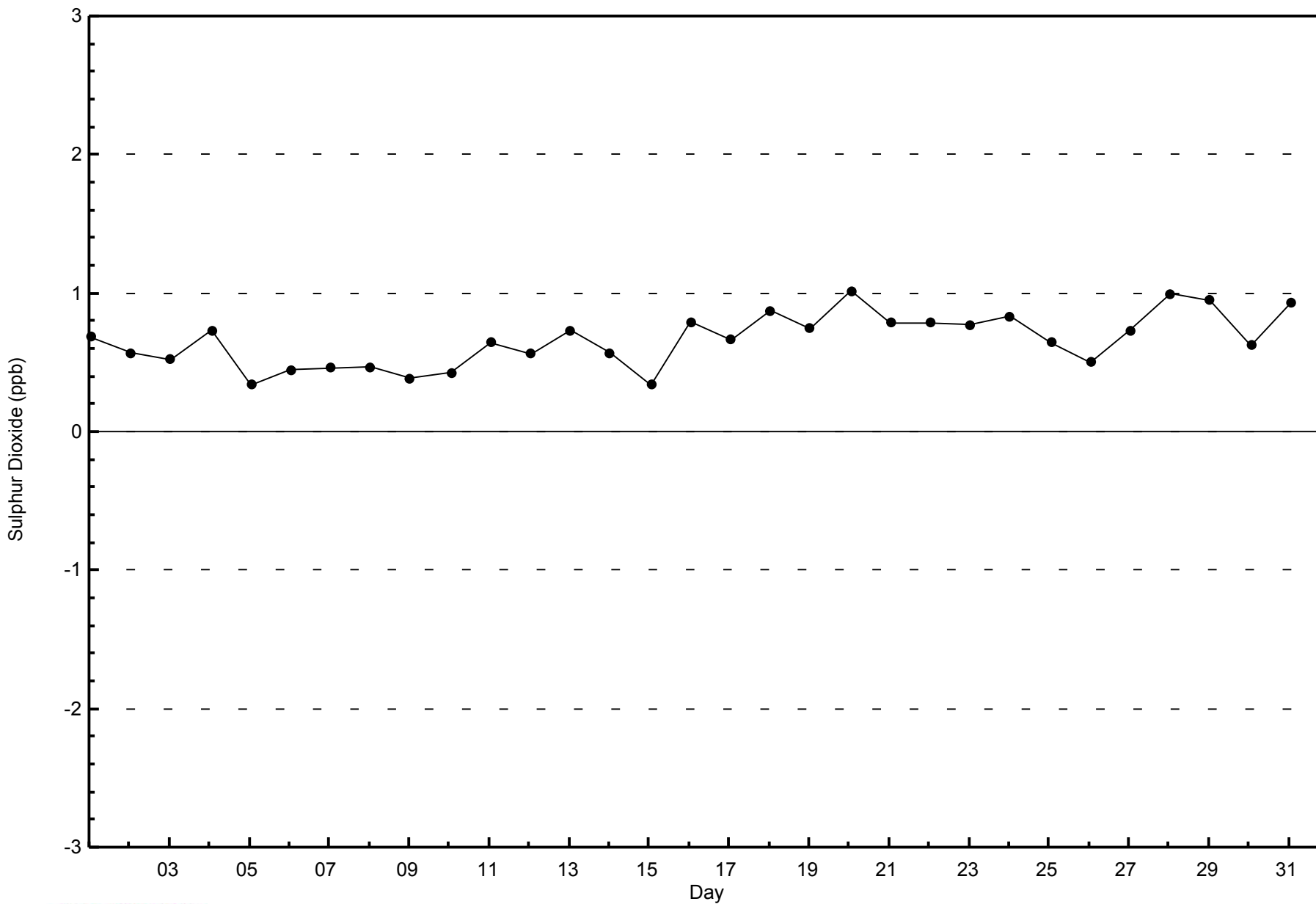


WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

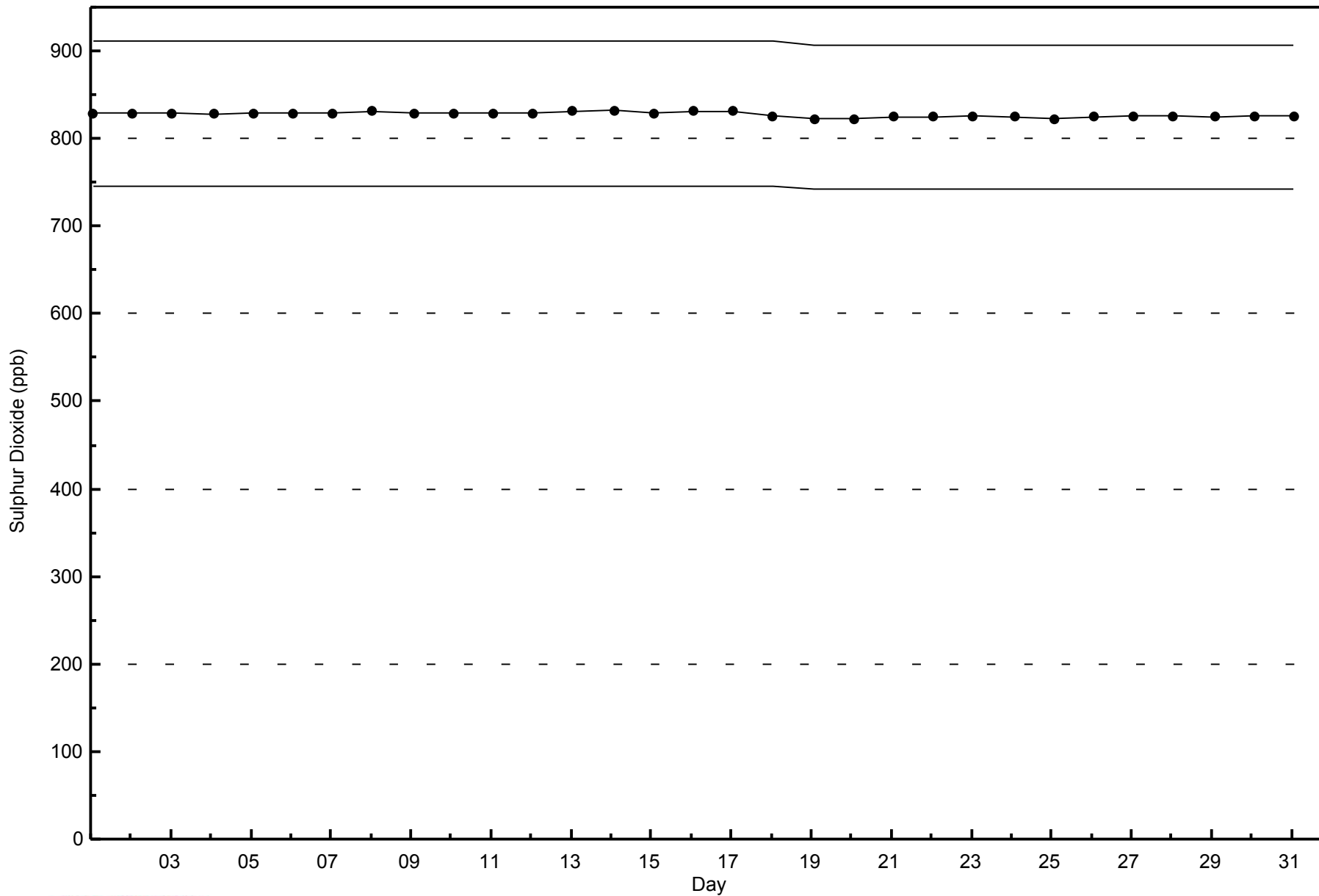
Mildred Lake - July 2014





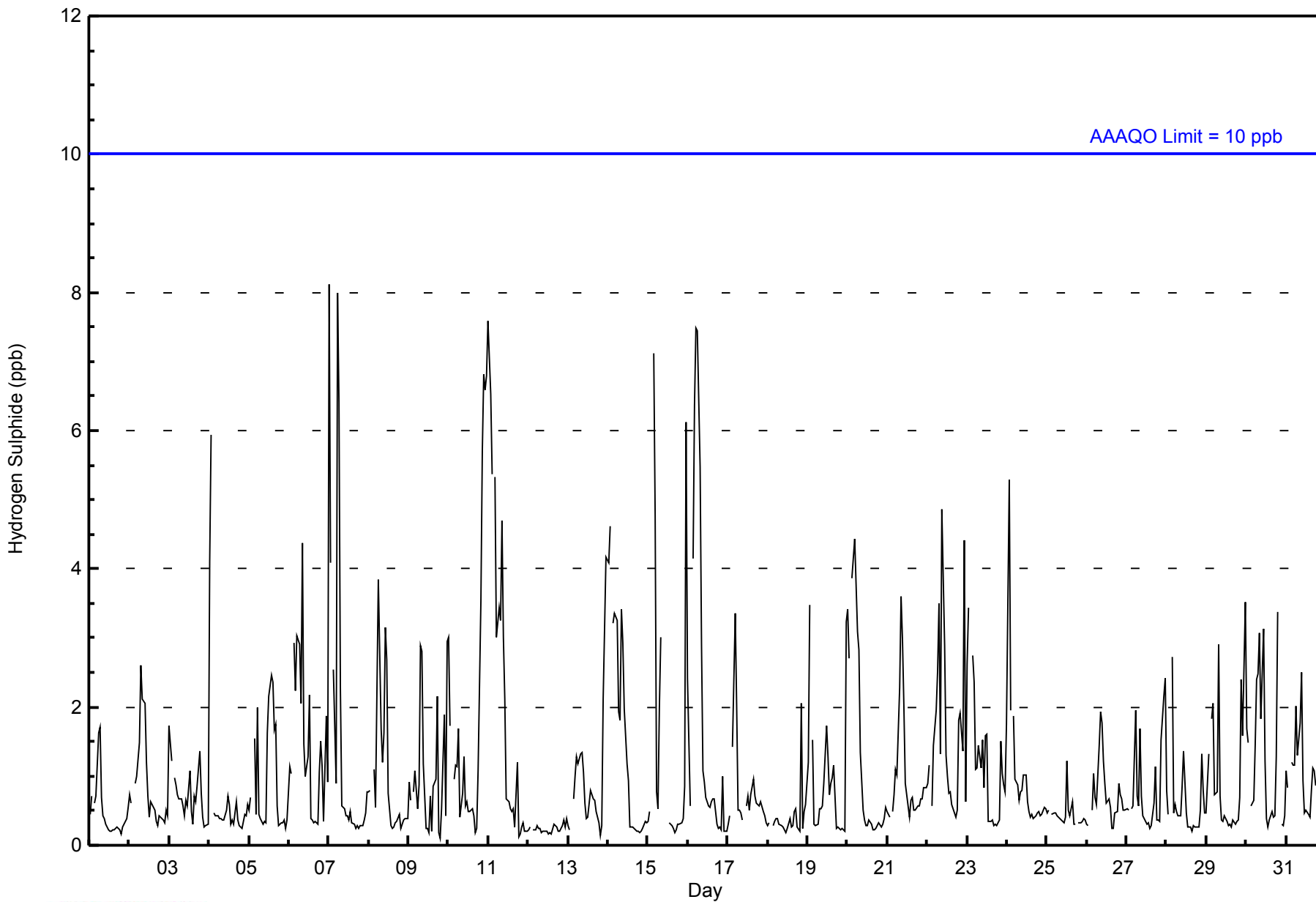
WBEA NETWORK
Span Responses

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 8 ppb on Jul 7 01:00										Maximum Daily Average: 2.2 ppb on Jul 11										Hours of Data: 706																													
Minimum Value: 0 ppb on Jul 9 20:00										Minimum Daily Average: 0.2 ppb on Jul 12										Hours of Missing Data: 38																													
Maximum Diurnal Average: 3.7 ppb at hour 3										Minimum Diurnal Average: 0.5 ppb at hour 19										Hours of Calibration: 35																													
Monthly Average: 1.1 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 3 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-Jul	0	1	Z	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	2																							
2-Jul	1	1	Z	1	1	1	1	3	2	2	1	1	0	1	1	1	0	0	0	0	0	0	1	0	0.9	3																							
3-Jul	2	1	Z	1	1	1	1	1	1	0	1	1	1	0	0	1	1	1	1	1	0	0	0	0	0.7	2																							
4-Jul	4	6	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	1	0.8	6																							
5-Jul	1	1	Z	2	0	2	0	0	0	0	0	2	2	2	2	2	2	1	0	0	0	0	0	0	0.9	2																							
6-Jul	1	1	Z	3	2	3	3	2	4	1	1	1	2	0	0	0	0	0	1	2	1	0	2	1	1.5	4																							
7-Jul	8	4	Z	3	1	8	6	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1.7	8																							
8-Jul	1	1	Z	1	1	2	4	2	1	2	3	3	1	0	0	0	0	0	0	0	0	0	0	0	1.0	4																							
9-Jul	1	1	Z	1	1	1	1	3	3	1	0	0	1	0	1	1	1	2	0	0	1	2	0	3	1.0	3																							
10-Jul	3	2	Z	1	1	1	2	0	1	1	1	1	0	0	1	0	0	0	1	4	6	7	7	7	2.0	7																							
11-Jul	8	7	5	Z	5	3	3	3	5	3	2	1	1	1	0	1	0	1	0	0	0	0	0	0	2.2	8																							
12-Jul	0	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-Jul	0	0	Z	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0	0	0	0	2	3	4	1.0	4																							
14-Jul	4	5	Z	3	3	3	2	2	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	1.5	5																							
15-Jul	0	0	Z	7	5	1	1	2	3	C	C	C	C	0	0	0	0	0	0	0	0	0	1	6	1.5	7																							
16-Jul	2	1	Z	4	6	7	7	5	3	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	2.0	7																							
17-Jul	0	0	Z	1	3	2	1	1	0	0	M	1	1	1	0	1	1	1	1	1	1	0	0	0	0.8	3																							
18-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0.4	2																							
19-Jul	1	3	Z	2	0	0	0	1	1	1	1	2	1	1	1	1	1	0	0	0	0	0	0	3	0.9	3																							
20-Jul	3	3	Z	4	4	4	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1.3	4																							
21-Jul	0	0	Z	0	1	1	1	2	4	3	2	1	1	0	1	1	1	1	1	1	1	1	1	1	1.0	4																							
22-Jul	1	1	Z	1	1	2	3	3	1	5	3	1	1	1	1	1	0	0	1	2	2	1	4	1	1.6	5																							
23-Jul	3	3	Z	3	2	1	1	1	1	2	1	2	2	0	0	0	0	0	0	0	2	1	1	1	1.2	3																							
24-Jul	2	5	2	Z	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1.0	5																							
25-Jul	0	1	Z	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	PF	0	0	0	0	0	0.4	1																							
26-Jul	0	0	Z	1	1	1	1	1	2	2	1	1	1	1	0	0	0	0	0	1	1	1	1	1	0.8	2																							
27-Jul	1	1	Z	1	1	2	1	1	2	1	0	0	0	0	0	0	1	1	0	0	0	2	2	2	0.8	2																							
28-Jul	1	0	Z	3	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0.6	3																							
29-Jul	0	1	Z	2	2	1	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	2	2	4	1.0	4																							
30-Jul	2	1	Z	1	1	1	2	2	3	2	3	1	0	0	0	0	0	0	1	3	PF	0	0	0	1.3	3																							
31-Jul	1	1	Z	1	1	1	2	1	2	2	1	0	1	0	0	1	1	1	1	1	1	1	1	1	1.1	2																							
																								1.7	1.7	3.7	1.6	1.7	1.8	1.7	1.6	1.6	1.3	1.0	0.8	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.9	1.0	1.3	Diurnal Average	
																								8	7	5	7	6	8	7	5	5	5	3	3	2	2	2	2	2	2	2	1	4	6	7	7	7	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																	





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	627	88.81	88.81
3 - 4	56	7.93	96.74
5 - 7	20	2.83	99.58
8 - 11	3	0.42	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

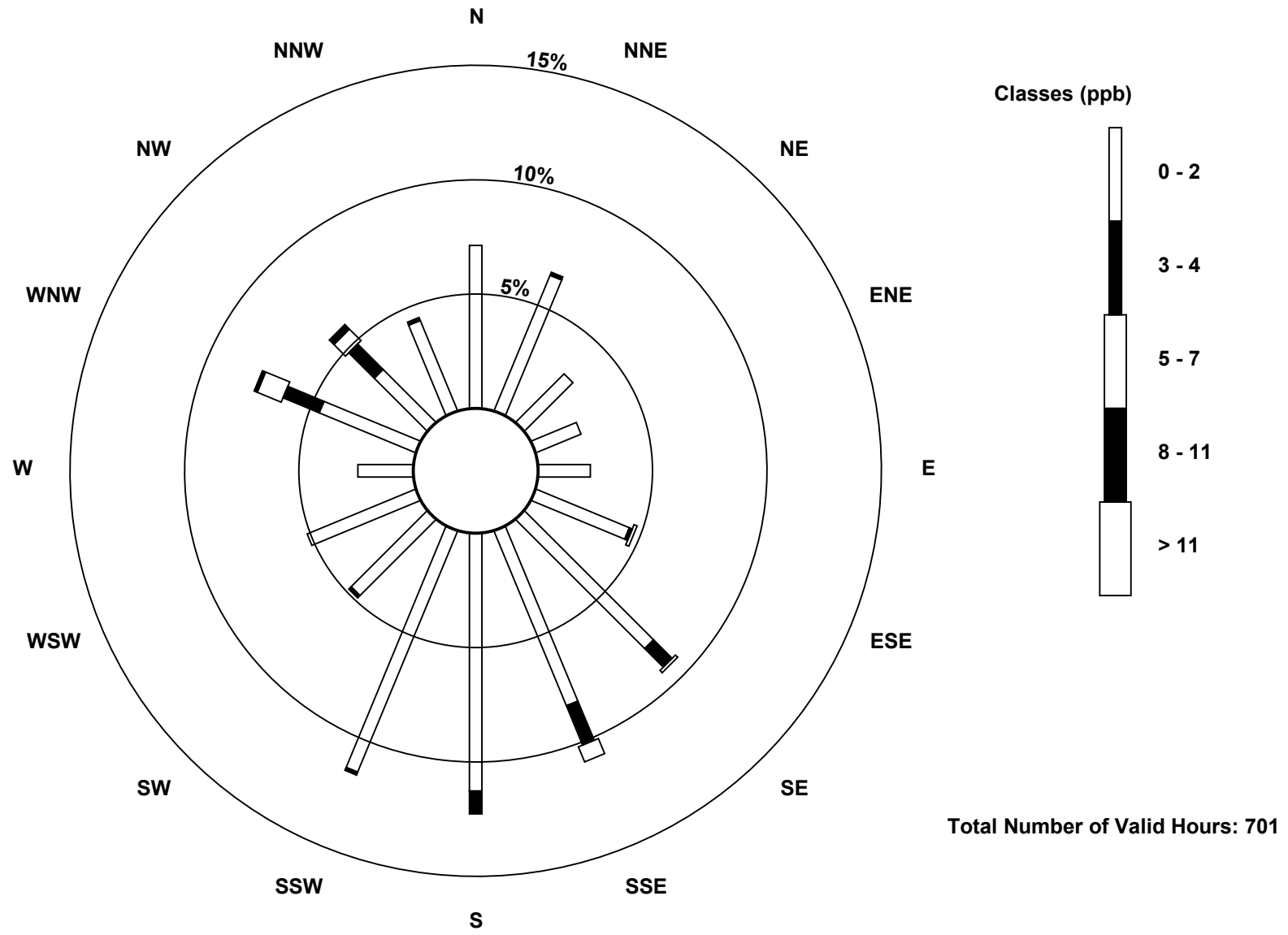
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	50	45	21	15	16	31	56	58	79	80	33	36	17	32	23	30	622
3 - 4	0	1	0	0	0	1	8	13	7	1	1	0	0	12	11	1	56
5 - 7	0	0	0	0	0	1	1	5	0	0	0	0	0	8	5	0	20
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	3
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	50	46	21	15	16	33	65	76	86	81	34	36	17	53	41	31	701

Total Number of Valid Hours: 701

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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



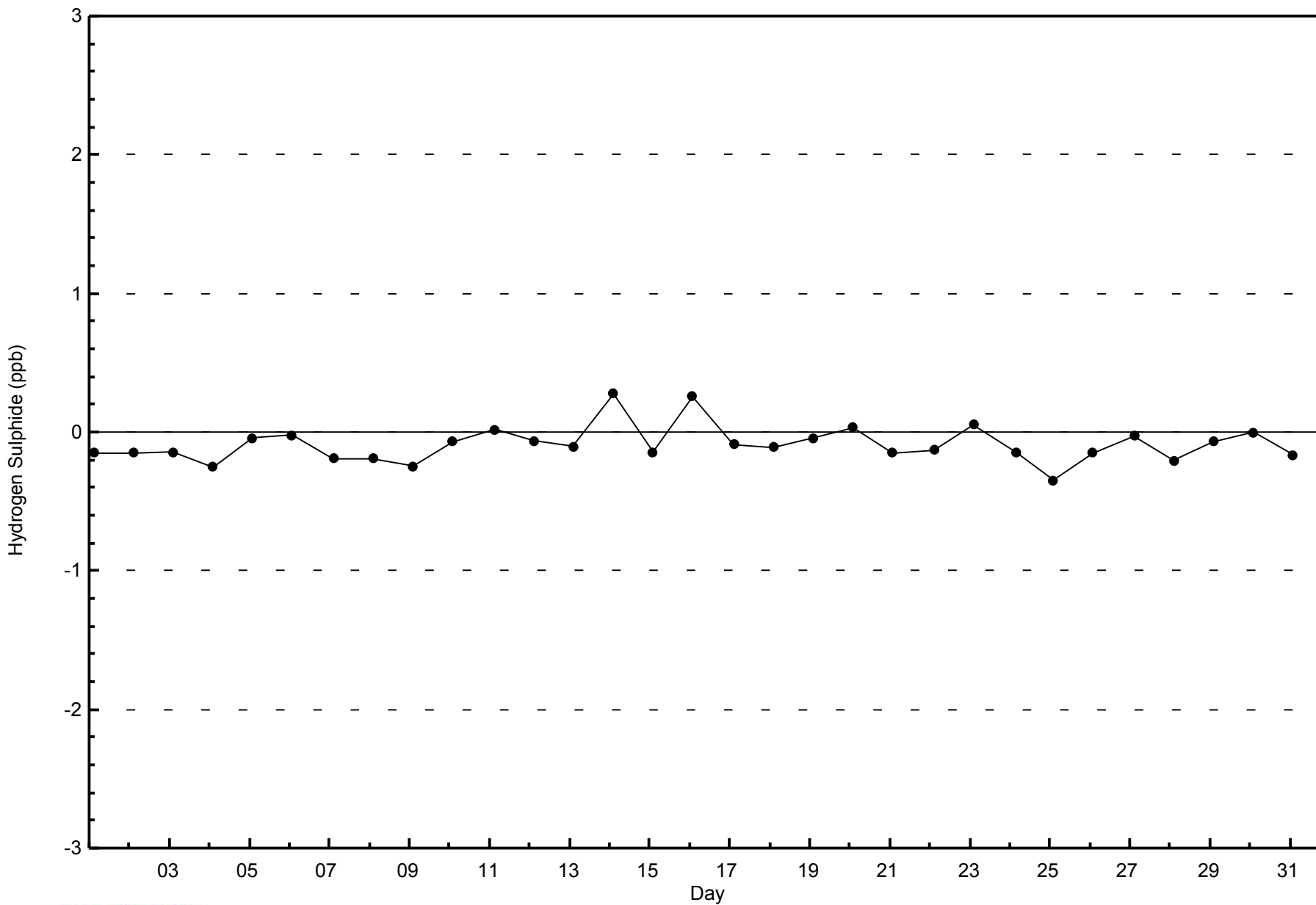


WBEA NETWORK

Zero Responses

Hydrogen Sulphide (H₂S) - ppb

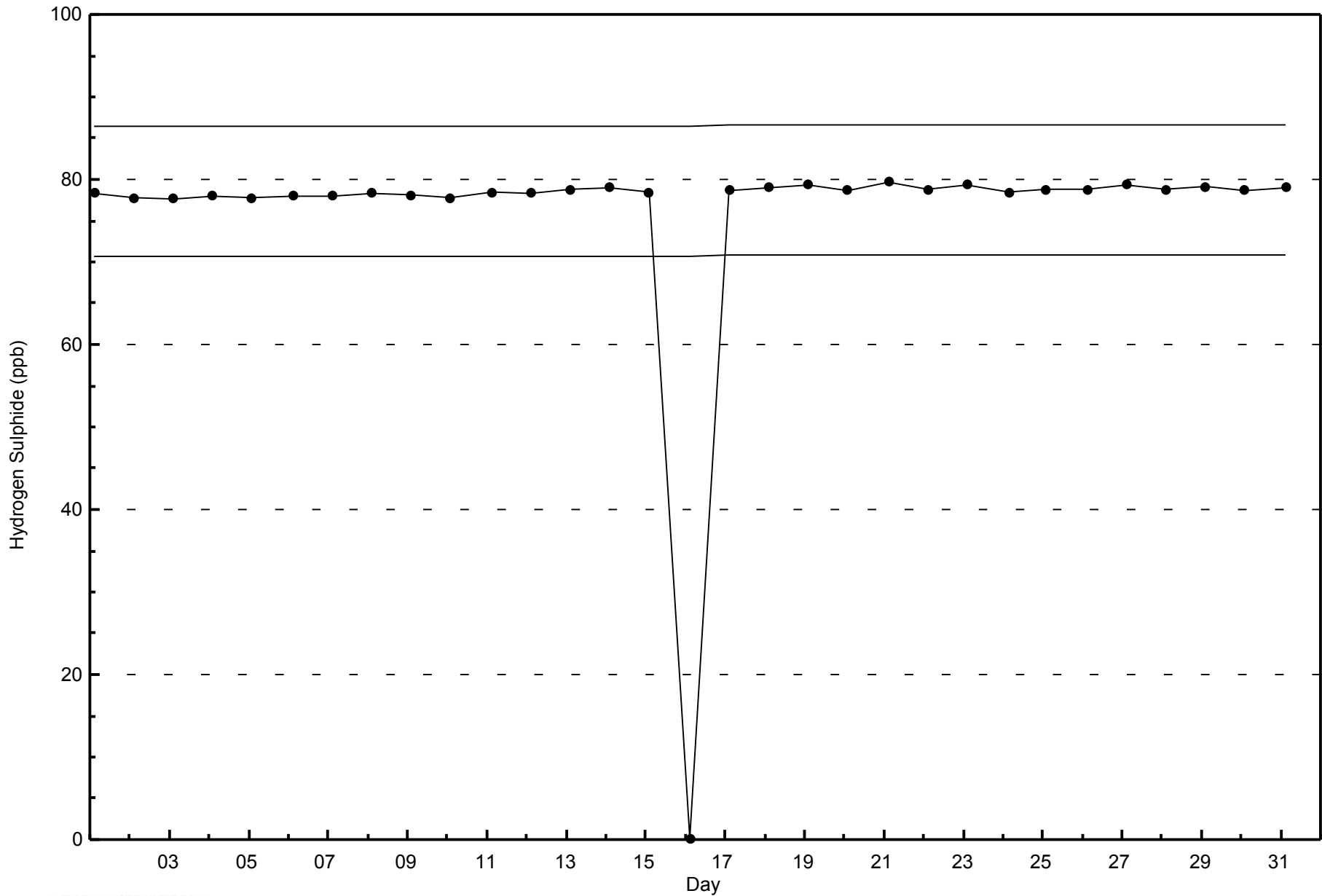
Mildred Lake - July 2014





WBEA NETWORK
Span Responses

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



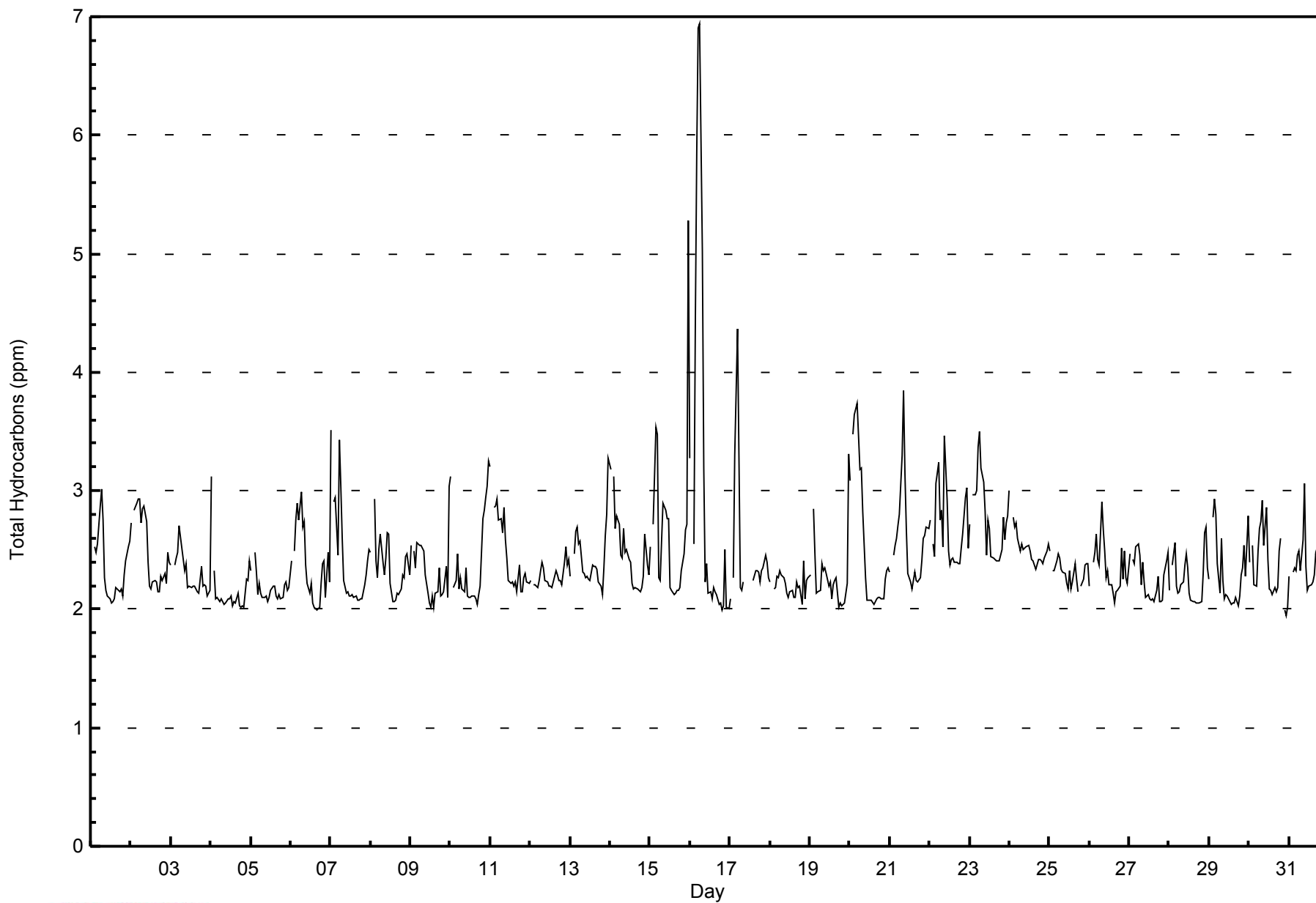


WBEA NETWORK

Hourly Averages

Total Hydrocarbons (THC) - ppm

Mildred Lake - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	34	4.82	4.82
2.1 - 3.0	631	89.38	94.19
3.1 - 10.0	41	5.81	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

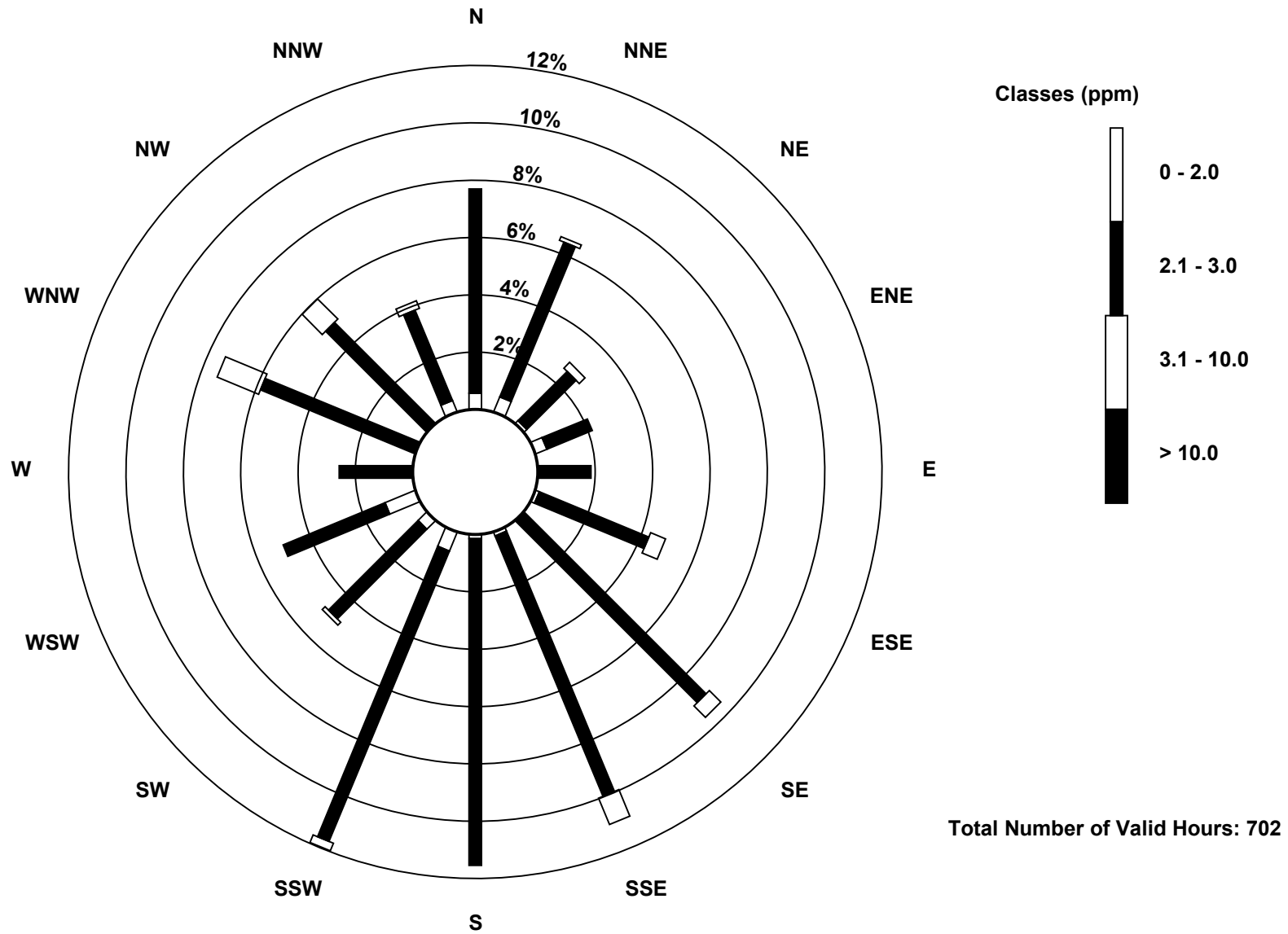
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	4	4	1	3	0	1	0	1	1	5	3	8	0	0	0	3	34
2.1 - 3.0	50	41	17	12	13	29	63	69	80	77	31	27	18	41	35	24	627
3.1 - 10.0	0	1	2	0	0	4	4	7	0	2	1	0	0	11	7	2	41
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	54	46	20	15	13	34	67	77	81	84	35	35	18	52	42	29	702

Total Number of Valid Hours: 702

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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



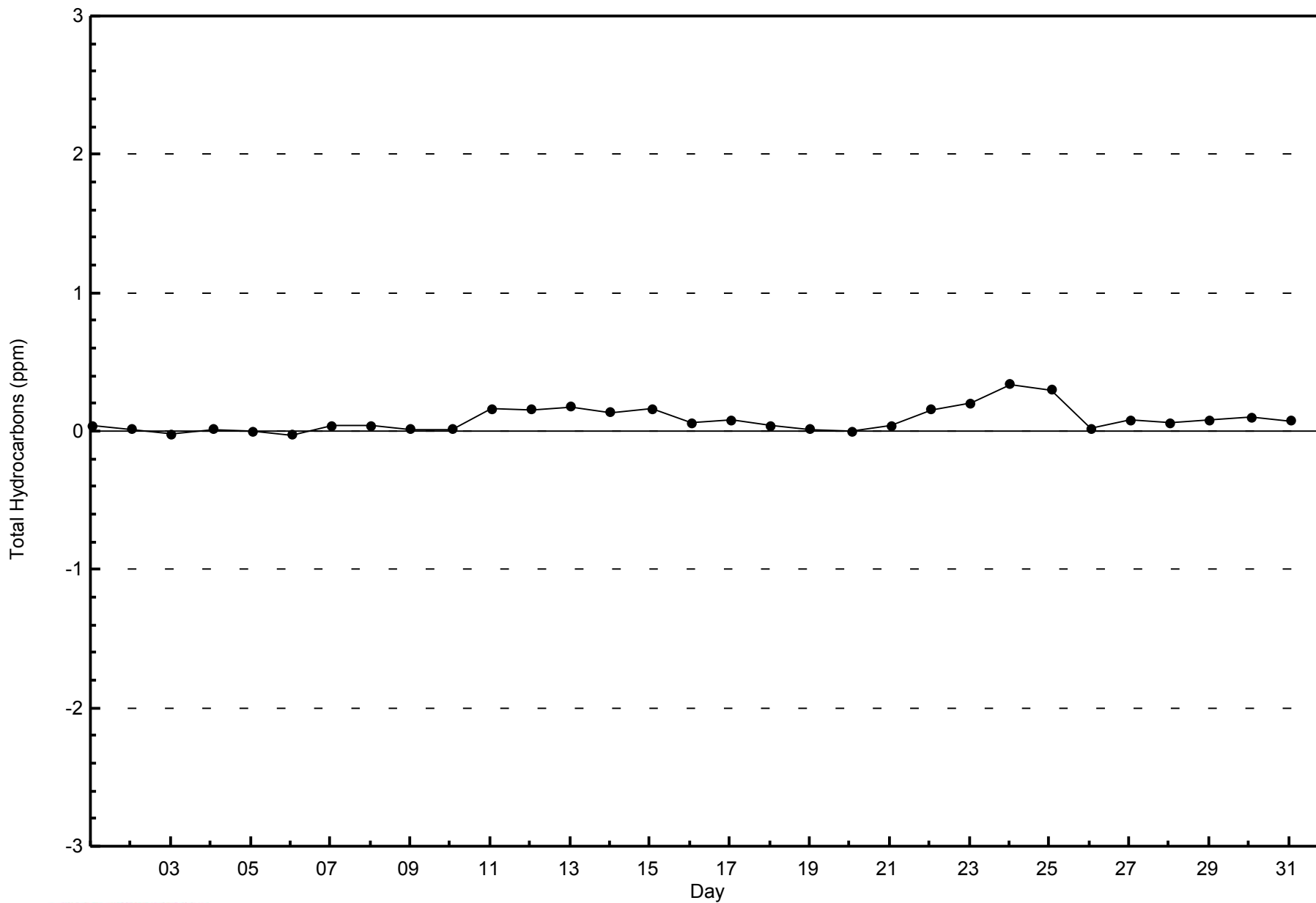


WBEA NETWORK

Zero Responses

Total Hydrocarbons (THC) - ppm

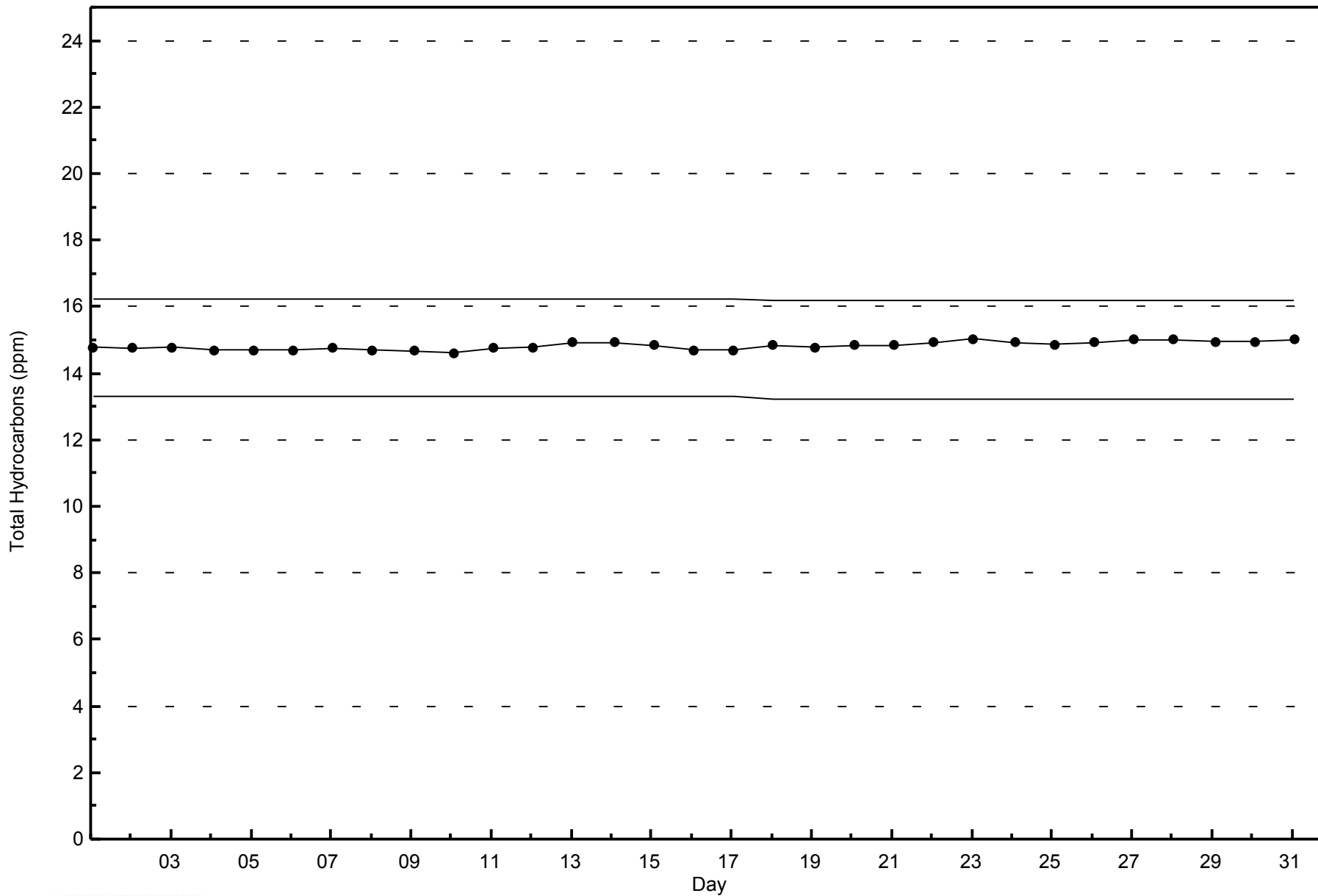
Mildred Lake - July 2014





WBEA NETWORK
Span Responses

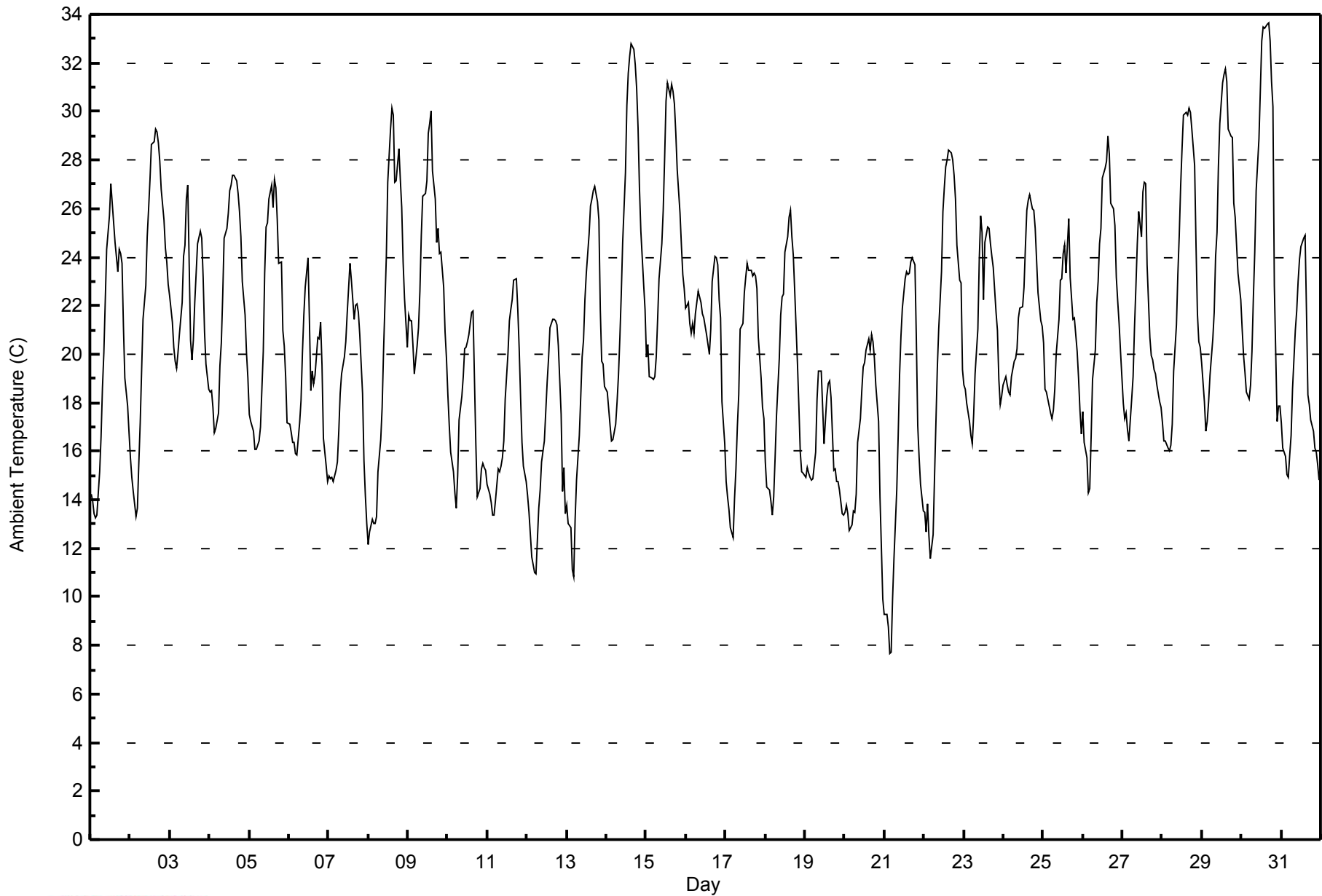
Total Hydrocarbons (THC) - ppm
Mildred Lake - July 2014





WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	7	0.94	0.94
10 - 20	340	45.70	46.64
> 20	397	53.36	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
 Summary of Hour Standard Deviations

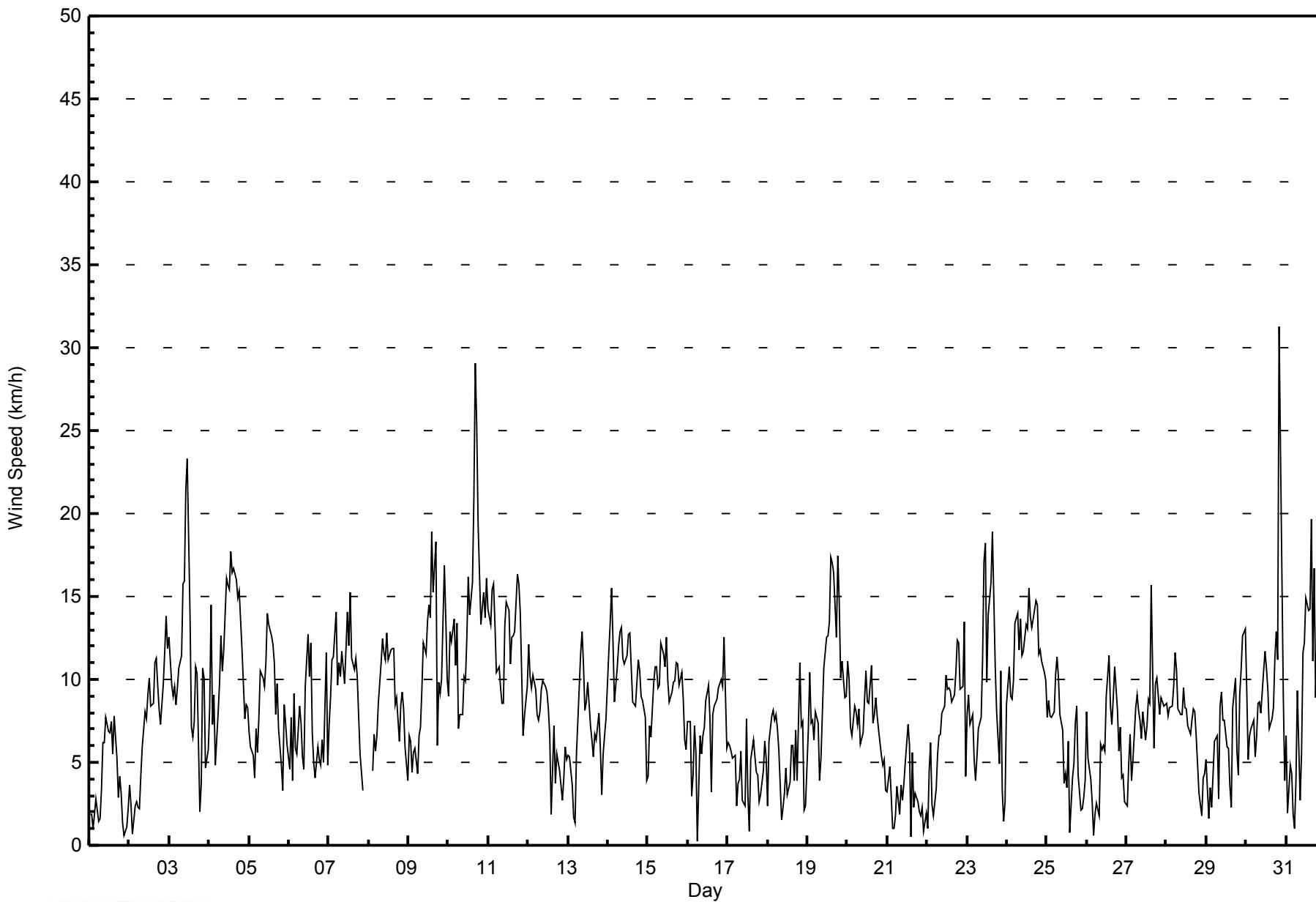
Wind Speed (WS) - km/h
 Mildred Lake - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 13 km/h on Jul 30 21:00																			Hours in Service: 744 Hours of Data: 739 Hours of Missing Data: 5 Hours of Calibration: 0 Percent Operational Time: 99.3						
Minimum Value: 1 km/h on Jul 20 23:00																									
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-Jul	2	1	1	1	1	1	1	1	2	1	2	2	3	3	2	5	1	1	1	1	2	1	2	2	5
2-Jul	1	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	2	2	2	2	3	3	3	3
3-Jul	3	2	1	2	2	2	2	3	4	4	5	5	6	2	2	3	4	3	2	2	3	2	2	2	6
4-Jul	4	6	3	4	2	2	4	5	4	5	5	6	6	6	6	6	6	6	5	5	4	3	3	3	6
5-Jul	2	3	3	3	2	2	2	2	3	3	4	5	5	5	5	4	3	5	3	1	1	6	4	3	6
6-Jul	3	2	2	3	3	4	2	3	2	3	3	4	5	4	3	3	1	2	2	2	5	1	7	2	7
7-Jul	2	3	2	3	3	2	3	2	2	3	3	3	3	4	3	4	3	3	2	2	1	AF	AF	AF	4
8-Jul	AF	AF	1	2	2	2	2	2	2	2	2	3	4	4	3	3	2	2	2	2	2	2	3	2	4
9-Jul	3	3	2	2	2	1	3	2	2	5	4	4	4	6	5	6	6	4	3	3	5	4	3	2	6
10-Jul	3	5	4	4	4	4	3	3	3	3	4	4	5	4	5	9	6	6	5	4	4	4	4	4	9
11-Jul	4	4	4	4	3	3	3	3	2	3	5	5	5	4	4	4	4	5	4	3	3	1	1	1	5
12-Jul	2	2	2	1	2	1	1	2	2	2	3	3	3	3	3	3	2	2	1	1	2	1	1	1	3
13-Jul	1	2	2	1	1	1	2	3	3	3	3	3	3	3	2	3	3	2	2	2	1	1	2	3	4
14-Jul	2	3	3	2	2	2	3	3	2	2	3	4	4	4	4	3	3	3	2	2	2	3	2	2	4
15-Jul	1	2	3	1	2	2	2	2	2	2	2	3	4	3	3	3	3	3	3	2	2	3	1	1	4
16-Jul	1	3	1	2	2	1	2	3	2	3	2	3	4	3	3	4	3	3	3	3	3	6	4	2	6
17-Jul	1	1	1	1	1	1	1	2	2	2	2	3	2	2	2	1	1	1	1	1	2	2	2	3	3
18-Jul	2	2	2	1	1	1	2	2	2	2	2	2	2	2	3	3	2	2	6	5	5	4	2	2	6
19-Jul	1	2	4	2	2	2	2	1	2	3	4	6	5	5	5	6	5	4	4	4	2	2	1	2	6
20-Jul	3	3	2	2	2	2	2	2	2	3	3	3	3	4	4	3	2	2	2	2	1	1	1	1	4
21-Jul	2	1	2	1	1	1	1	1	1	1	2	2	3	3	2	2	2	2	1	1	1	1	2	1	3
22-Jul	2	1	1	1	1	2	1	2	2	2	2	2	3	3	3	3	3	3	3	2	3	3	3	1	3
23-Jul	2	2	1	2	2	1	2	1	2	4	4	4	3	5	4	5	4	3	3	2	2	2	2	2	5
24-Jul	3	3	2	2	2	4	5	4	3	3	3	3	4	4	3	3	3	4	4	2	3	3	2	3	5
25-Jul	2	4	2	2	2	2	3	2	2	2	3	2	2	3	3	3	2	2	2	2	1	1	2	2	4
26-Jul	2	2	2	2	1	1	1	1	2	2	2	3	3	3	3	3	3	4	3	3	3	2	1	2	4
27-Jul	1	2	2	1	3	2	2	2	2	2	3	2	2	3	3	7	4	4	3	2	2	2	2	2	7
28-Jul	3	2	2	2	2	2	2	2	2	2	2	2	3	2	3	3	3	3	2	3	1	1	1	1	3
29-Jul	2	2	2	2	3	6	4	4	3	3	2	2	3	3	2	2	2	3	1	2	3	2	3	2	6
30-Jul	3	2	2	2	2	1	1	2	2	2	3	3	3	3	4	3	3	3	2	2	13	5	4	3	13
31-Jul	3	2	2	1	1	1	3	2	2	2	3	4	4	4	4	6	5	4	4	4	3	3	3	2	6
Diurnal Maximum																									
AF - Analyzer Failure																									



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	189	25.58	25.58
6 - 11	399	53.99	79.57
12 - 19	144	19.49	99.05
20 - 28	5	0.68	99.73
29 - 38	2	0.27	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 739

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

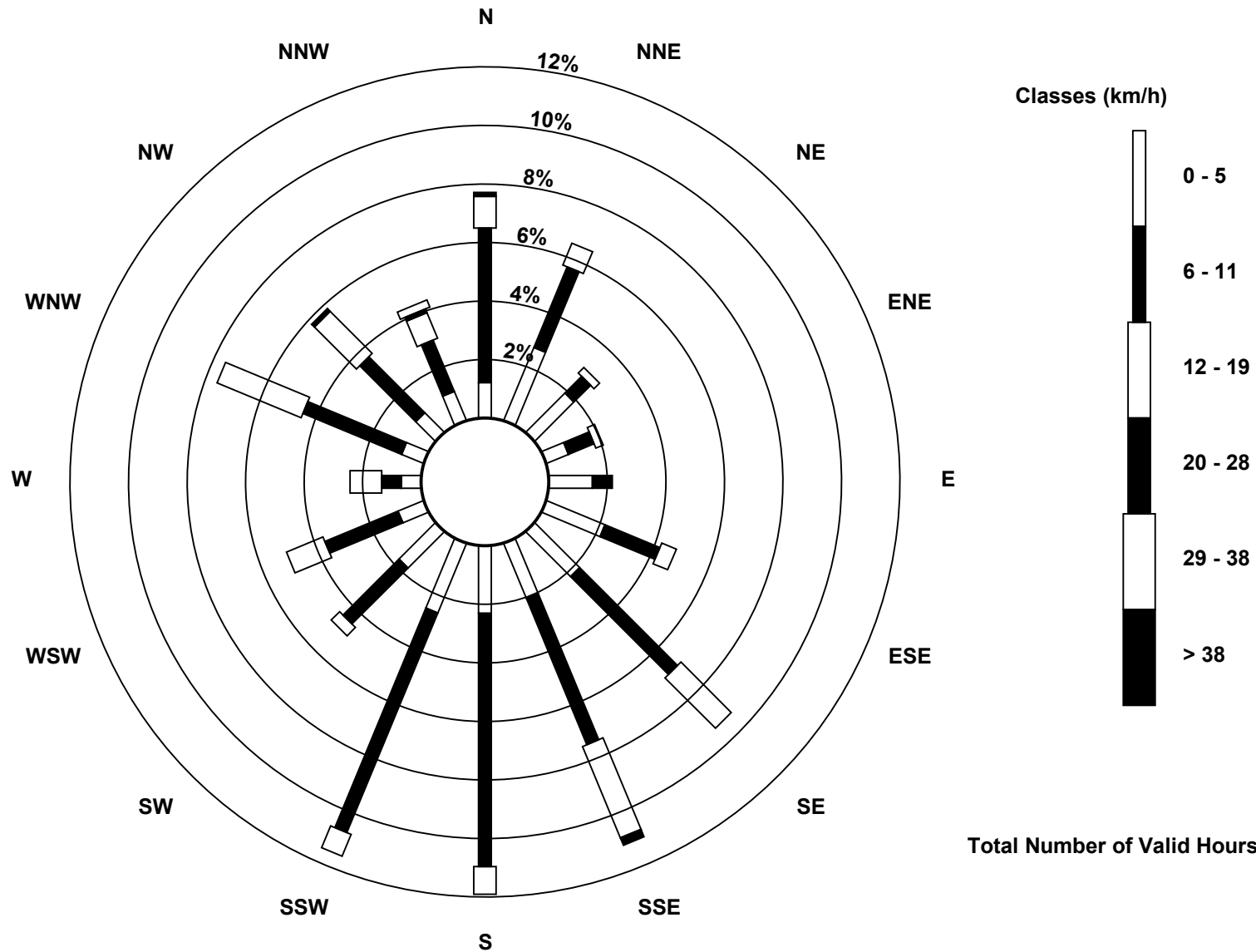
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	9	20	14	6	11	16	16	15	17	19	13	7	5	6	7	8	189
6 - 11	39	22	6	7	5	15	35	40	64	60	20	20	5	27	20	14	399
12 - 19	8	6	2	2	0	4	18	25	7	6	3	10	8	23	15	7	144
20 - 28	1	0	0	0	0	0	0	2	0	0	0	0	0	0	1	1	5
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	57	48	22	15	16	35	69	82	88	85	36	37	18	56	43	32	739

Total Number of Valid Hours: 739

Total Number of Hours: 744

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

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





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Mildred Lake - July 2014

Number of Exceedences (AAQO): 1-hr: 0 24-hr: 0 Maximum Value: 107 deg on Jul 21 15:00 Minimum Value: 6 deg on Jul 20 23:00	Hours in Service: 744 Hours of Data: 739 Hours of Missing Data: 5 Hours of Calibration: 0 Percent Operational Time: 99.3
Percentiles: P ₁ = 9 P ₁₀ = 14 Q ₁ = 18 Median = 25 Q ₃ = 35 P ₉₀ = 58 P ₉₉ = 92	

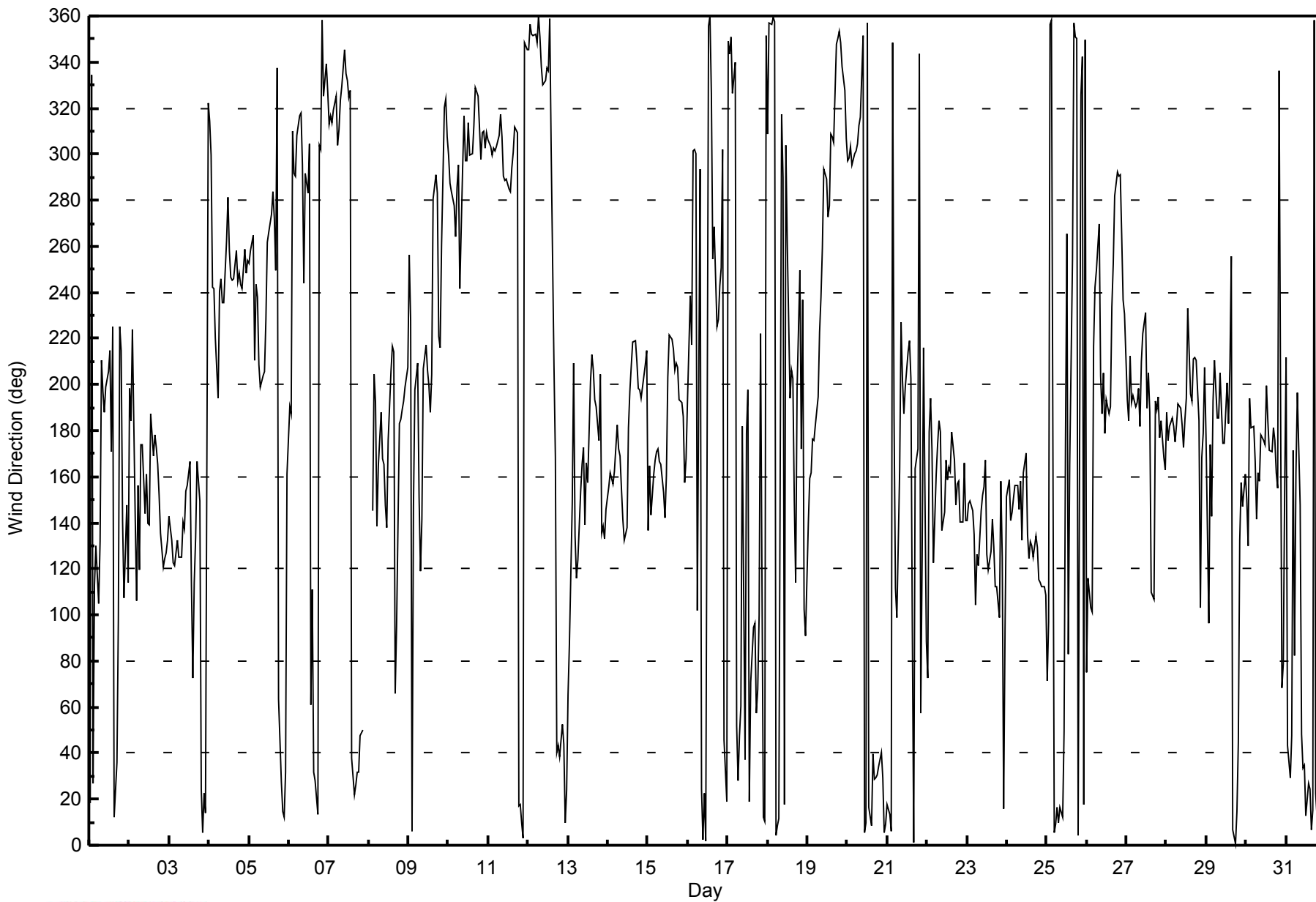
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	71	42	81	63	34	66	66	27	28	26	22	37	37	42	33	47	21	56	29	20	78	78	92	59	92
2-Jul	20	45	80	52	37	37	54	37	33	33	34	32	34	28	33	22	20	19	20	16	12	14	15	18	80
3-Jul	17	15	11	13	13	17	17	17	20	19	17	21	31	12	24	24	25	25	67	34	11	16	25	25	67
4-Jul	26	24	35	27	38	25	31	27	29	32	27	25	31	27	31	30	29	29	26	25	23	32	26	26	38
5-Jul	25	30	30	62	24	30	25	15	20	27	31	30	31	36	33	34	38	44	31	27	23	26	42	39	62
6-Jul	51	17	60	19	57	52	19	23	38	64	30	31	59	25	32	57	41	35	30	32	35	23	22	33	64
7-Jul	21	18	15	13	12	17	17	18	16	20	17	17	20	21	28	20	18	20	19	24	13	AF	AF	AF	28
8-Jul	AF	AF	23	16	20	19	20	18	15	17	21	21	29	27	29	22	59	19	46	17	14	14	42	25	59
9-Jul	50	47	61	48	34	23	34	25	20	40	26	19	18	27	17	35	21	52	25	23	38	14	14	19	61
10-Jul	18	19	20	22	25	21	38	33	42	32	30	26	21	25	23	23	12	13	15	19	17	16	16	17	42
11-Jul	18	18	18	19	19	23	19	20	20	26	23	21	23	27	22	24	27	22	19	16	13	11	8	8	27
12-Jul	9	10	11	9	9	10	14	19	15	17	22	27	37	50	84	38	58	44	22	18	13	15	11	24	84
13-Jul	16	19	33	41	77	13	18	23	19	27	40	36	27	41	40	48	37	37	22	22	32	11	12	14	77
14-Jul	12	11	10	10	15	18	17	15	16	22	21	22	24	26	24	29	27	23	14	13	12	17	16	42	42
15-Jul	26	13	20	8	10	13	16	16	15	18	21	19	26	28	25	24	21	20	18	13	13	26	13	21	28
16-Jul	21	27	53	55	16	15	84	22	41	22	20	18	19	19	68	33	28	30	30	28	25	45	19	32	84
17-Jul	12	17	12	14	10	45	26	52	42	96	79	33	77	101	57	21	19	29	25	38	69	37	33	33	101
18-Jul	55	19	14	8	10	10	20	25	105	94	84	41	74	78	52	54	71	22	67	30	48	59	67	55	105
19-Jul	22	15	28	25	22	14	21	54	48	35	34	23	26	32	22	23	25	19	13	15	14	11	9	17	54
20-Jul	17	15	17	23	15	18	18	21	29	39	32	30	35	49	25	40	28	21	18	15	11	16	6	10	49
21-Jul	67	19	56	56	92	42	17	55	39	84	62	67	32	49	107	58	89	67	54	30	62	36	76	55	107
22-Jul	87	14	25	68	66	44	27	26	32	24	26	24	24	29	29	31	25	19	15	12	19	17	19	36	87
23-Jul	21	12	16	16	33	20	21	16	22	22	17	14	28	22	18	21	19	17	14	49	15	68	75	36	75
24-Jul	27	12	16	16	15	16	17	20	15	22	23	20	22	21	23	23	20	19	19	18	13	16	12	15	27
25-Jul	20	32	11	14	26	13	19	14	17	33	73	43	52	50	93	52	42	48	16	27	56	60	45	24	93
26-Jul	23	32	36	68	79	32	59	84	27	39	33	60	29	26	36	32	28	23	24	26	21	32	27	52	84
27-Jul	52	23	16	45	23	15	17	21	29	31	28	28	32	30	29	26	46	18	25	15	25	18	14	20	52
28-Jul	14	15	16	19	17	15	19	20	23	29	23	28	34	38	44	34	28	23	30	88	45	62	21	24	88
29-Jul	20	91	46	80	64	58	50	94	32	25	28	28	48	56	66	80	15	16	18	36	17	10	16	11	94
30-Jul	21	34	17	16	16	26	18	22	24	26	21	21	24	30	55	38	31	19	11	13	47	28	34	67	67
31-Jul	31	70	30	25	75	89	44	16	68	43	22	30	20	25	22	18	27	19	50	14	11	12	12	11	89
	87	91	81	80	92	89	84	94	105	96	84	67	77	101	107	80	89	67	67	88	78	78	92	67	
Diurnal Maximum																									

AF - Analyzer Failure



WBEA NETWORK
Hourly Averages

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



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 17, 2014	Previous Calibration	June 12 2014
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	1:00
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11541008
Cal Gas Concentration	59.4 ppm	Cal Gas Expiry Date	3/26/2012
Gas Cert Reference	cc307191		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2589
DACS voltage range	0-5v	DACS channel #	SE1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-616	-616
Analyzer Range (mv)	5000	5000	Lamp voltage	901	900
Calculated slope	0.999544	1.001406	Chamber temp.	44.5	44.4
Calculated intercept	-0.083236	0.012033	Pressure (mmHg)	702.5	702.3
Analyzer Background	26.6	26.4	Flow (lpm)	0.540	0.532
Analyzer Coefficient	0.909	0.902	Intensity	29000	29000

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.9	NA
as found span	5000	69.9	830.4	836.3	0.993
calibrator zero	5000	0.0	0.0	0.9	0.000
high point	5000	69.9	830.4	829.9	1.001
second point	5000	35.4	420.6	418.9	1.004
third point	5000	17.7	210.3	209.4	1.004
calibrator zero				0.9	
as left zero	5000	0.0	0.0	0.9	0.000
as left span	5000	69.9	830.4	831.7	0.998
Average Correction Factor					1.003

Corrected As found 835.4 Previous response 830.9 % change -0.5%

Notes:

Span Adjusted

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

SO₂ Calibration Summary

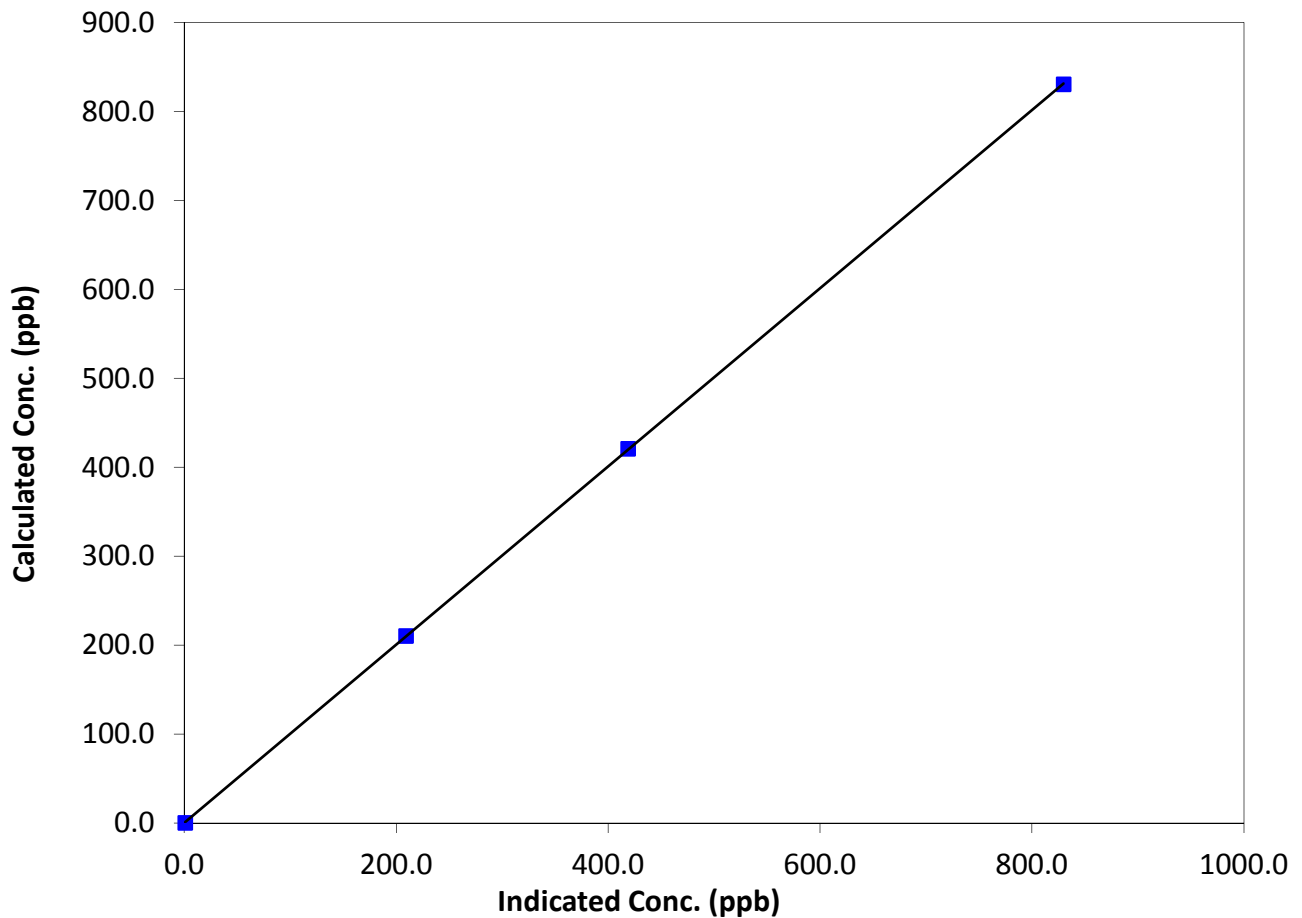
Station Information

Calibration Date	July 17, 2014	Previous Calibration	June 12 2014
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	9:45	End Time (MST)	1:00
Analyzer make	TEI 43c	Analyzer serial #	43c-77879-387

Calibration Data

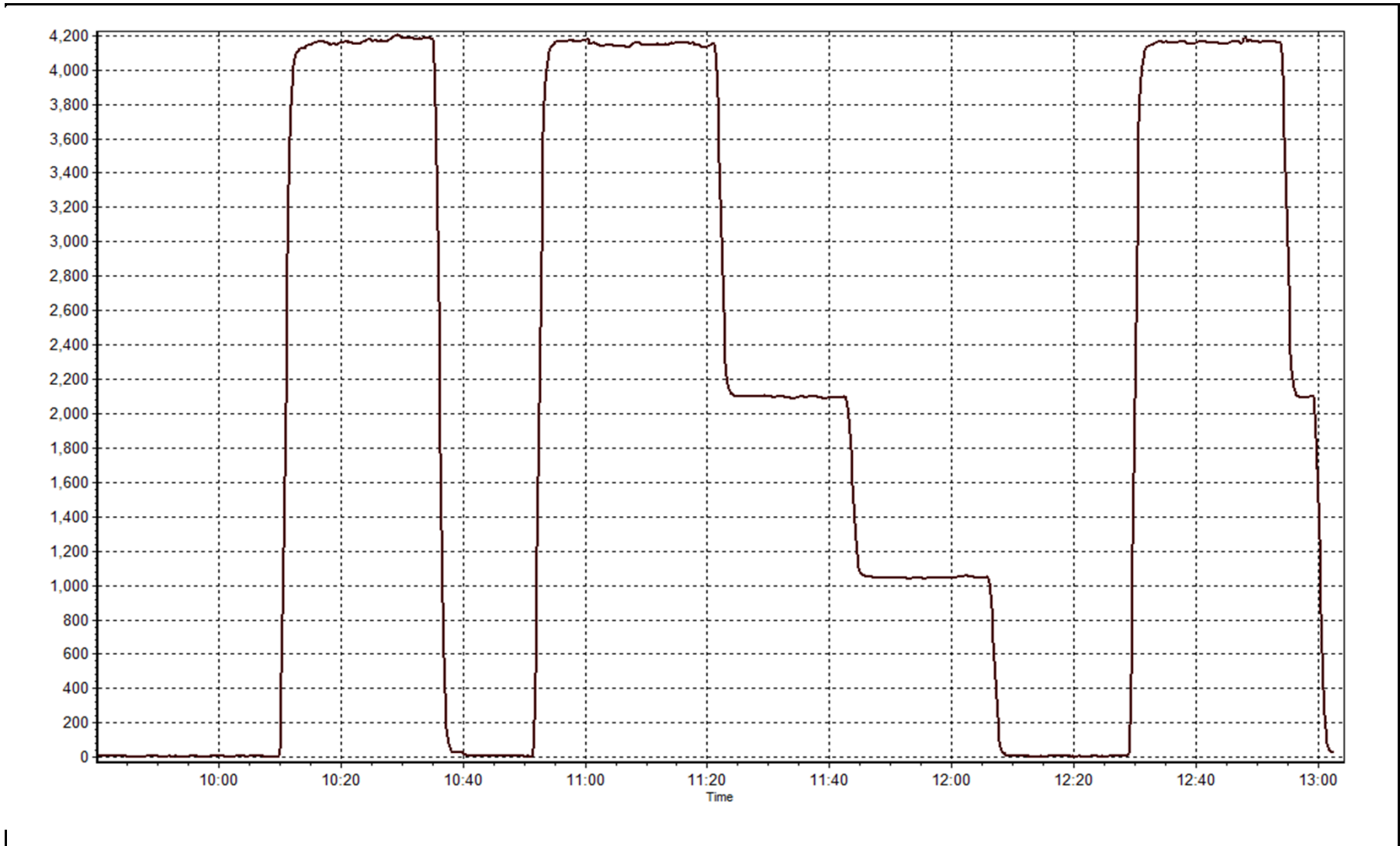
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.9	N/A	Correlation Coefficient	0.999993
830.4	829.9	1.0006		
420.6	418.9	1.0039	Slope	1.001406
210.3	209.4	1.0043		
			Intercept	0.012033

SO₂ Calibration Curve



SO2 Calibration Plot

Date: July 17, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	July 15, 2014	Previous Calibration	June 10, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	12:55
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	772
Calculated slope	1.005166	0.994880	Chamber temp.	45	45
Calculated intercept	0.096105	0.085461	Pressure	553.6	545.1
Analyzer Background	12.5	12.8	Flow	1.024	1.007
Analyzer Coefficient	0.875	0.886	Intensity	88	88
			Converter temp.	324	325

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	4000	0.0	0.0	0.0	NA
as found span	4000	57.2	79.9	79.0	1.012
SO2 scrubber check	5000	17.7	210.3	-0.1	NA
calibrator zero	4000	0.0	0.0	0.0	NA
high point	4000	57.2	79.9	80.3	0.995
second point	4000	28.6	40.0	40.0	0.999
third point	4000	14.3	20.0	19.9	1.004
calibrator zero				0.0	
as left zero	5000	0.0	0.0	-0.1	NA
as left span	4000	57.2	79.9	79.9	1.000
Average Correction Factor					0.999

Corrected As found	78.9	Previous response	79.4	% change	0.6%
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Notes:

Adjusted span. Filter changed after as founds.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

H2S Calibration Summary

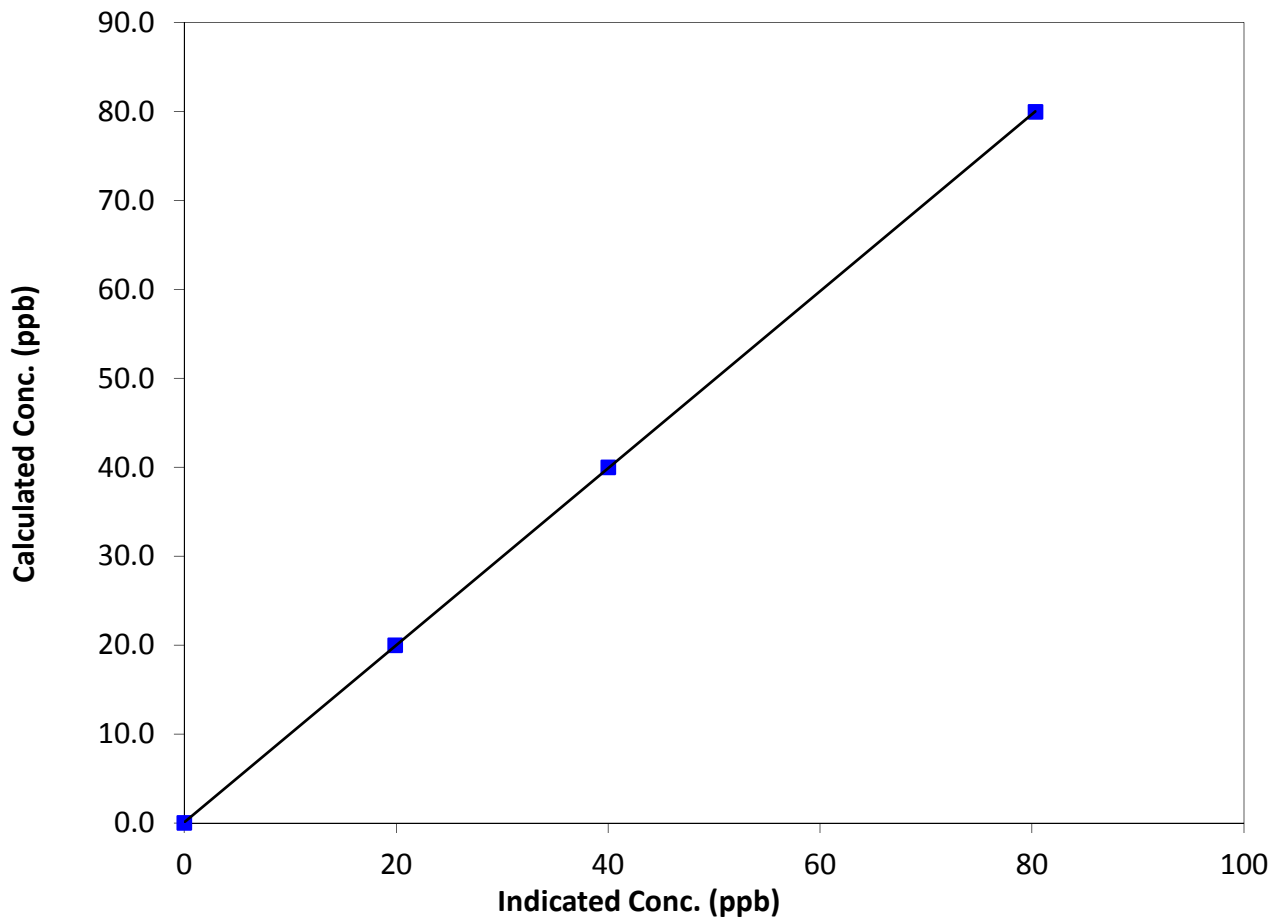
Station Information

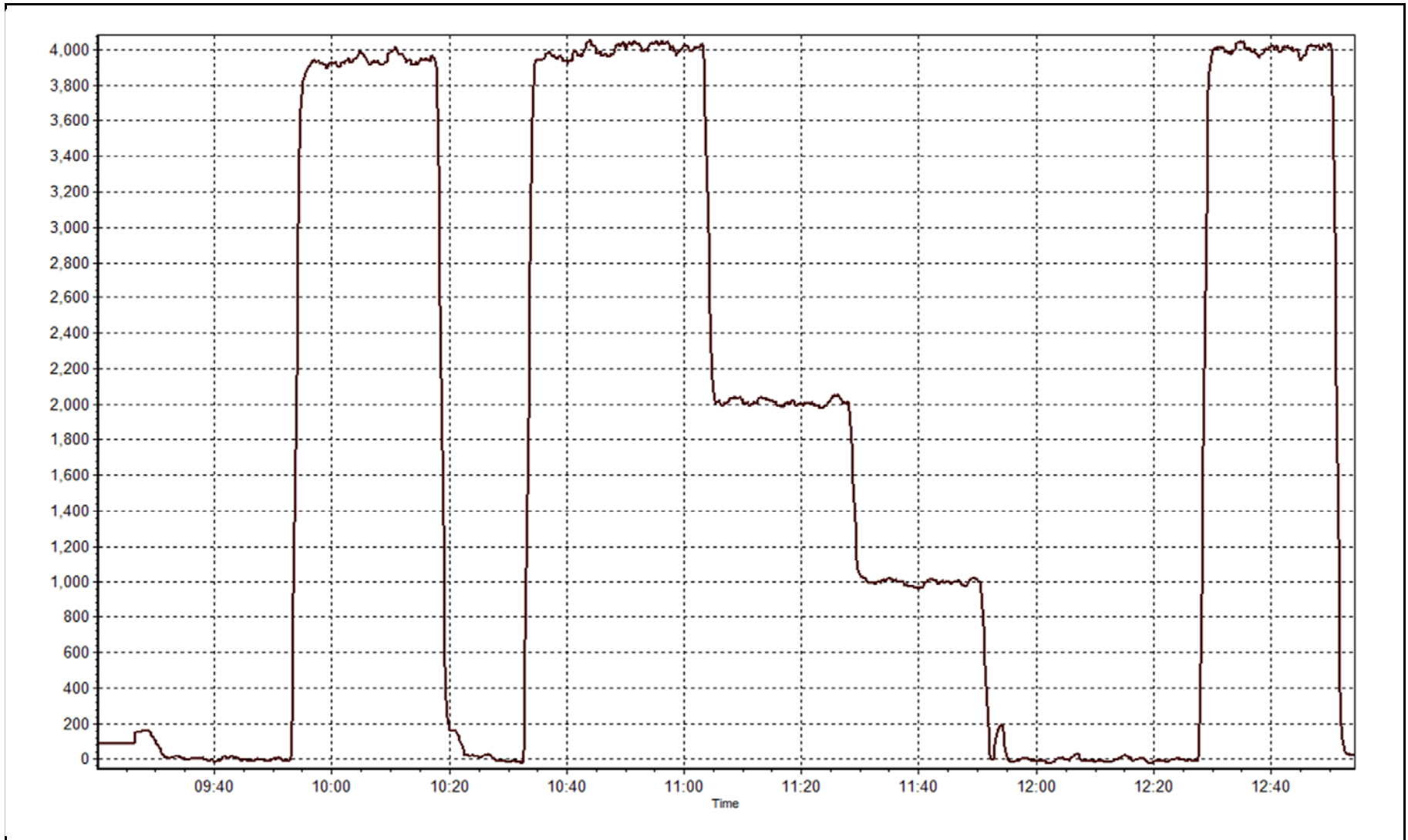
Calibration Date	July 15, 2014	Previous Calibration	June 10, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	9:25	End Time (MST)	12:55
Analyzer make	TEI 450i	Analyzer serial #	815129107

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999991
79.9	80.3	0.9952		
40.0	40.0	0.9991	Slope	0.994880
20.0	19.9	1.0036		
			Intercept	0.085461

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Thursday, July 17, 2014	Previous Calibration	Thursday, June 12, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	1:00
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	0.998328	1.000394	Fuel Pressure	25.7	25.7
Calculated intercept	0.031797	-0.016436			
BKG	2.59	2.62			
COEF	4.987	5.046			

Analyzer make 51i-LT Analyzer serial # 1300156231

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	N/A
as found span	5000	69.9	14.83	14.75	1.005
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	69.9	14.83	14.82	1.000
second point	5000	35.4	7.51	7.55	0.995
third point	5000	17.7	3.75	3.77	0.996
calibrator zero				0.00	
as left zero	5000	0.0	0.00	-0.01	N/A
as left span	5000	69.9	14.83	14.88	0.996
Average Correction Factor					0.997

Corrected As found 14.75 Previous response 14.82 % change 0.5%

Notes:

Span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

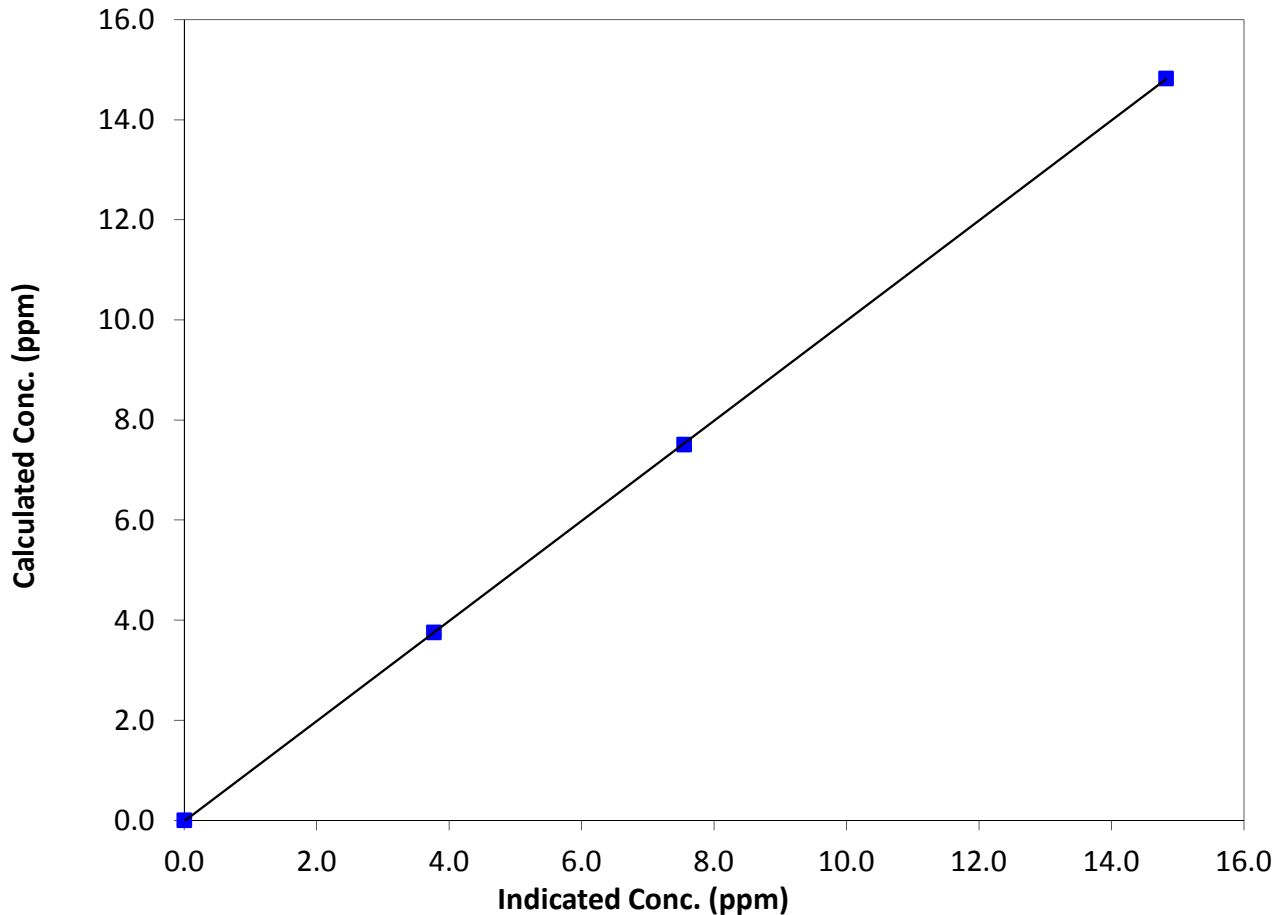
Station Information

Calibration Date	July 17, 2014	Previous Calibration	June 12, 2014
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	9:45	End Time (MST)	1:00
Analyzer make	51i-LT	Analyzer serial #	1300156231

Calibration Data

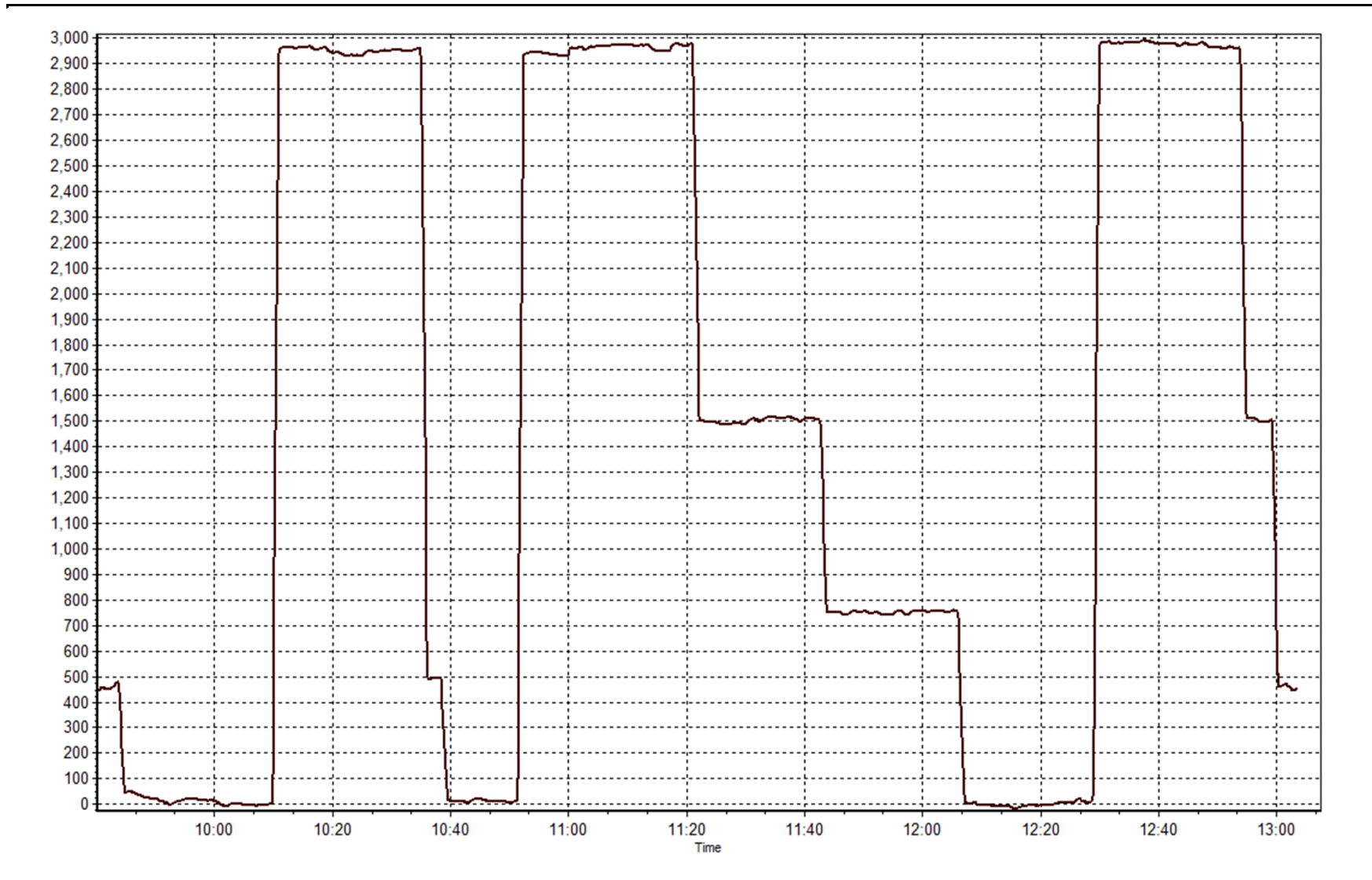
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999992
14.83	14.82	1.0002		
7.51	7.55	0.9949	Slope	1.000394
3.75	3.77	0.9956		
			Intercept	-0.016436

THC Calibration Curve



THC Calibration Plot

Date: July 17, 2014



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 3
LOWER CAMP METEOROLOGY
JULY 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

August 29, 2014

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

JULY 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
Temperature 20 m (C) Average	744	0	0	100.00	32.9	-	24.8	-
Temperature 45 m (C) Average	744	0	0	100.00	32.6	-	24.8	-
Temperature 100 m (C) Average	744	0	0	100.00	32	-	24.7	-
Temperature 167 m (C) Average	715	0	29	96.10	31.3	-	24.8	-
Relative Humidity 20 m (%) Average	744	0	0	100.00	97	-	-	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	97	-	-	-
Relative Humidity 100 m (%) Average	744	0	0	100.00	94	-	-	-
Relative Humidity 167 m (%) Average	715	0	29	96.10	93	-	-	-
Wind Speed 20 m (km/h) Average	744	0	0	100.00	22	-	-	-
Wind Speed 45 m (km/h) Average	744	0	0	100.00	30	-	-	-
Wind Speed 100 m (km/h) Average	744	0	0	100.00	40	-	-	-
Wind Speed 167 m (km/h) Average	714	0	30	95.97	44	-	-	-
Wind Direction 20 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 45 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 100 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 167 m (deg) Average	714	0	30	95.97	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	0	0	100.00	0.8	-	-	-
Vertical Wind Speed 45 m (km/h) Average	744	0	0	100.00	1.5	-	-	-
Vertical Wind Speed 100 m (km/h) Average	744	0	0	100.00	2.6	-	-	-
Vertical Wind Speed 167 m (km/h) Average	714	0	30	95.97	4.1	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
Temperature 20 m (C) Average	744	20.49	4.7	-	8.5	14.4	17	20.4	23.8	26.6	32.9
Temperature 45 m (C) Average	744	20.45	4.6	-	8.8	14.6	17	20.2	23.7	26.4	32.6
Temperature 100 m (C) Average	744	20.3	4.3	-	10.1	14.8	17	20.1	23.3	26.1	32
Temperature 167 m (C) Average	715	20.18	4.1	-	11.3	14.7	17	20	22.9	25.8	31.3
Relative Humidity 20 m (%) Average	744	63.9	19	-	25	37	49	64	80	89	97
Relative Humidity 45 m (%) Average	744	63.2	19	-	25	36	48	64	79	88	97
Relative Humidity 100 m (%) Average	744	60.2	18	-	24	35	45	61	76	84	94
Relative Humidity 167 m (%) Average	715	57.2	17	-	24	34	43	58	71	80	93
Wind Speed 20 m (km/h) Average	744	7	4	-	0	2	3	6	10	13	22
Wind Speed 45 m (km/h) Average	744	9.3	6	-	0	2	4	9	13	18	30
Wind Speed 100 m (km/h) Average	744	13.4	8	-	0	4	7	12	18	25	40
Wind Speed 167 m (km/h) Average	714	15.6	9	-	0	5	9	14	21	29	44
Wind Direction 20 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	714	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	-0.19	0.4	-	-1.6	-0.7	-0.4	-0.2	0.1	0.3	0.8
Vertical Wind Speed 45 m (km/h) Average	744	0.03	0.5	-	-1.9	-0.6	-0.3	0	0.4	0.7	1.5
Vertical Wind Speed 100 m (km/h) Average	744	0.21	0.5	-	-1.2	-0.3	-0.1	0.1	0.5	0.8	2.6
Vertical Wind Speed 167 m (km/h) Average	714	0.36	0.8	-	-1.7	-0.4	-0.1	0.2	0.7	1.4	4.1

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Temperature, Relative Humidity 167 m	30 Jul 2014 20:00	01 Aug 2014 00:00	29	Flatline in sensor output signal
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	06 Jul 2014 23:00	06 Jul 2014 23:00	1	Intermittent unstable operation - spikes in output signal
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	30 Jul 2014 20:00	01 Aug 2014 00:00	29	Flatline in sensor output signal

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Summary of Hour Averages

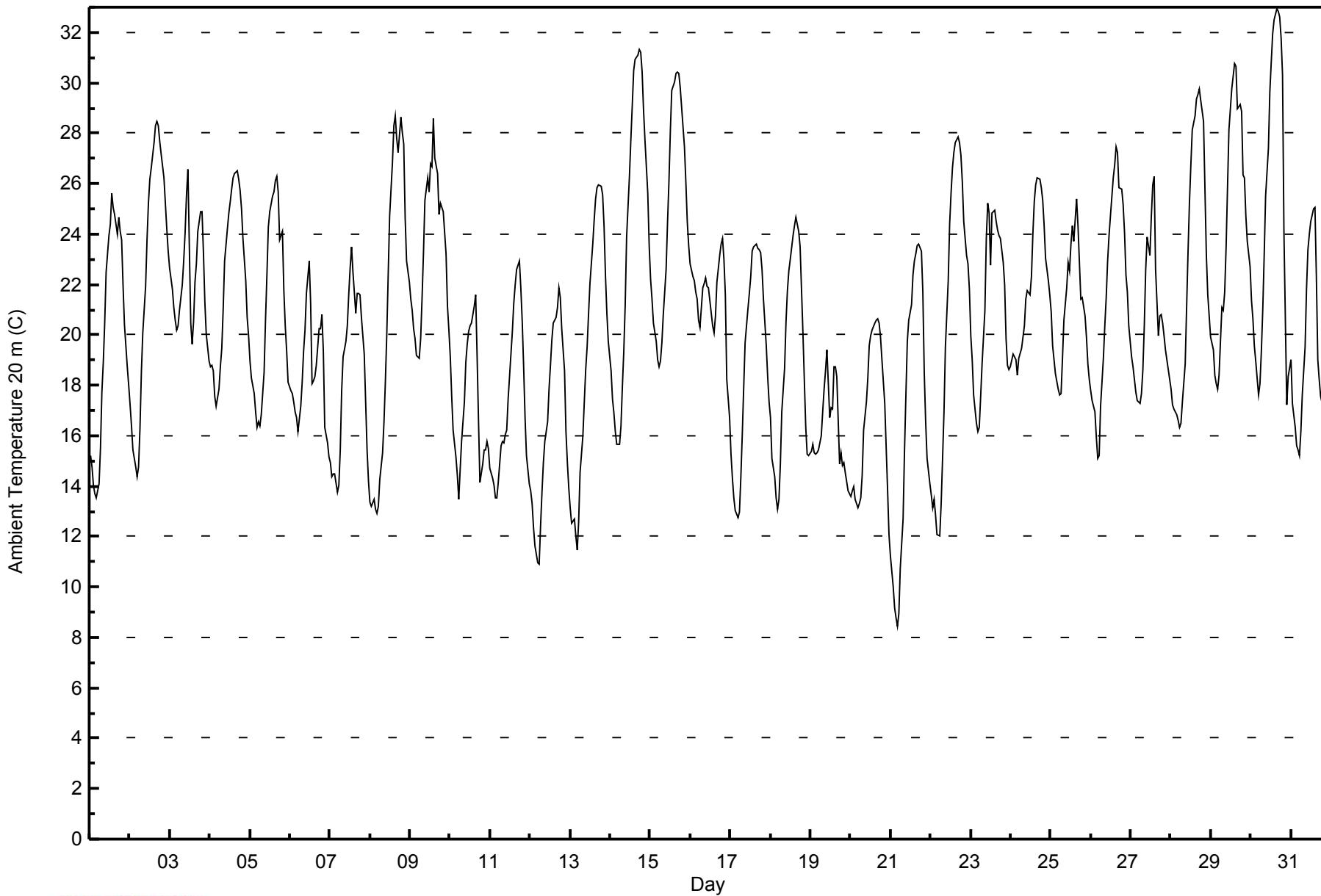
Lower Camp Met Tower - July 2014

Table with columns for Day, Hourly Period Ending At (MST) (1-24), Daily Average, and Daily Maximum. Includes summary statistics like Maximum Value: 32.9 C on Jul 30 16:00, Minimum Value: 8.5 C on Jul 21 05:00, and Percentiles: P1=10.9, P10=14.4, Q1=17.0, Median=20.4, Q3=23.8, P90=26.6, P99=30.9.



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	5	0.67	0.67
10 - 20	347	46.64	47.31
> 20	392	52.69	100.00

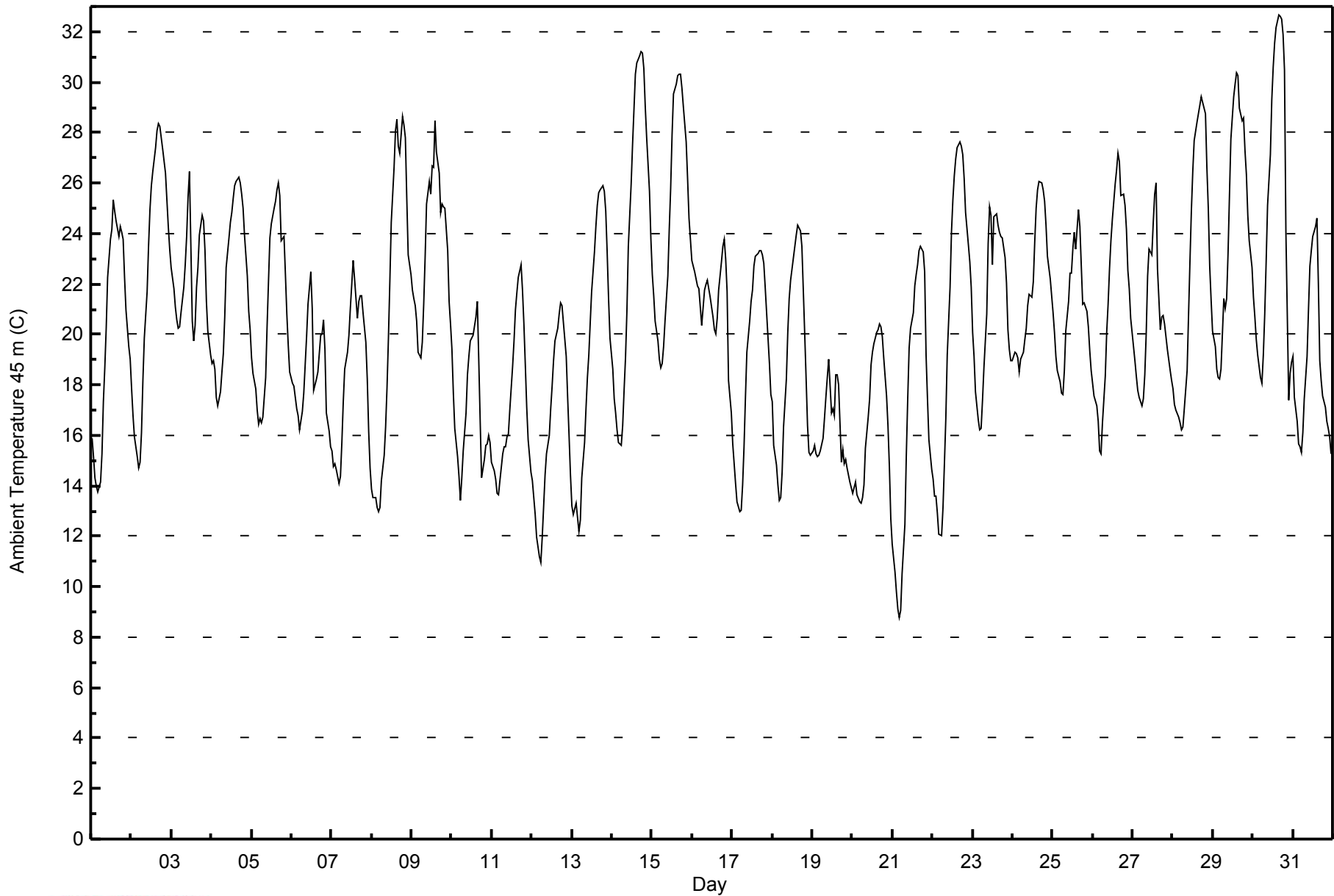
Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	4	0.54	0.54
10 - 20	351	47.18	47.72
> 20	389	52.28	100.00

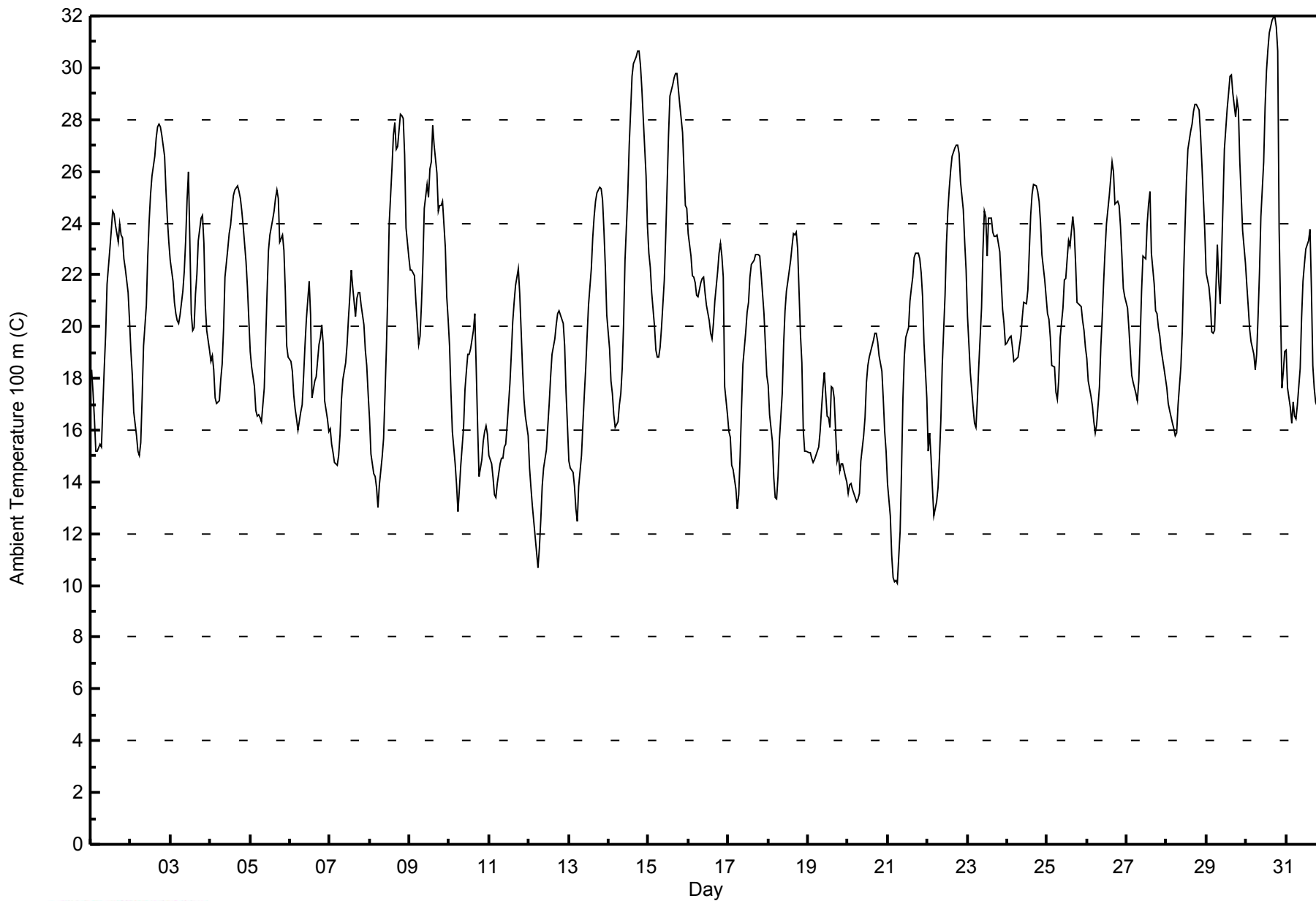
Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	0	0.00	0.00
10 - 20	369	49.60	49.60
> 20	375	50.40	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

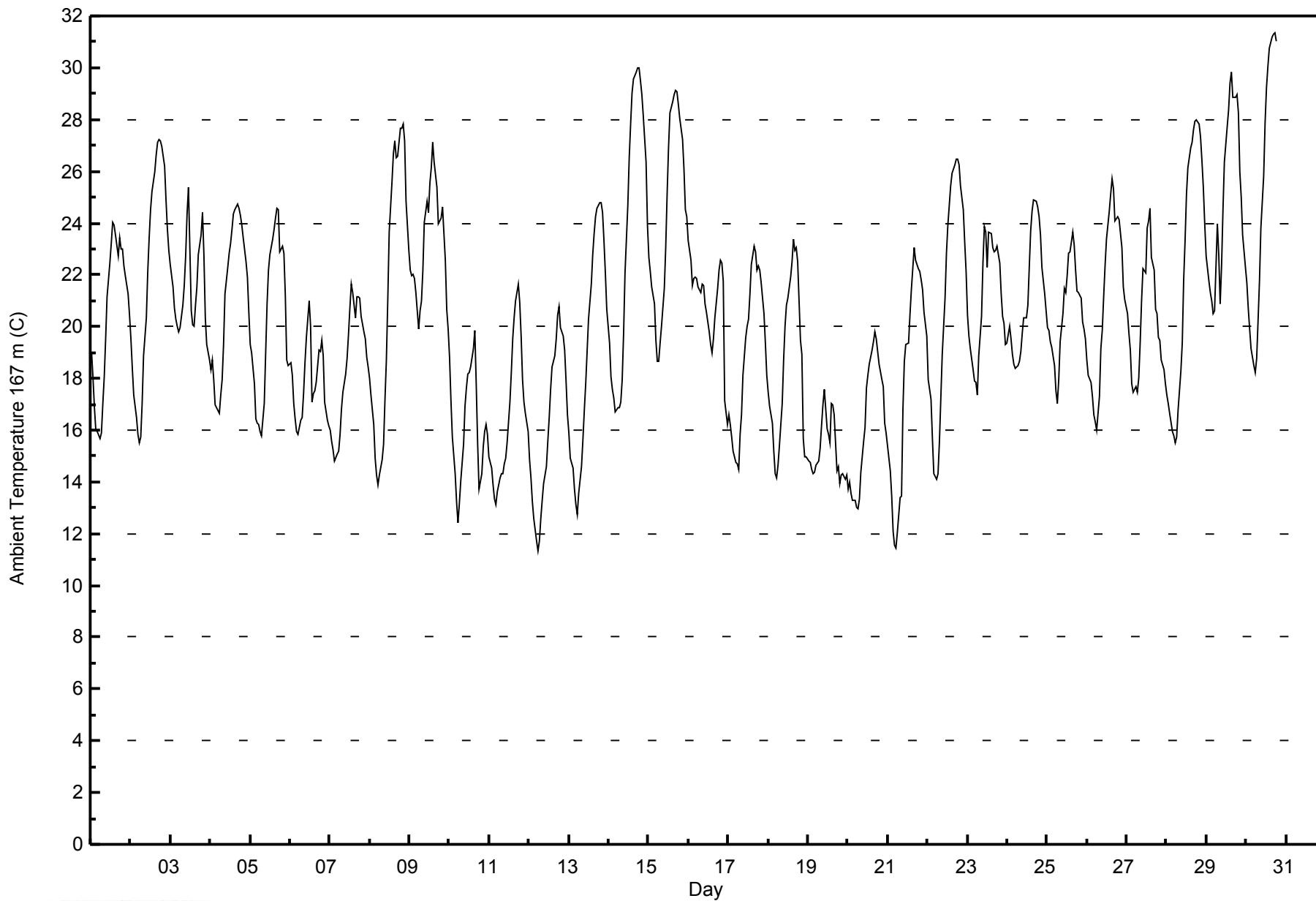


WBEA NETWORK

Hourly Averages

Ambient Temperature 167 m (AT167m) - C

Lower Camp Met Tower - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	0	0.00	0.00
10 - 20	360	50.35	50.35
> 20	355	49.65	100.00

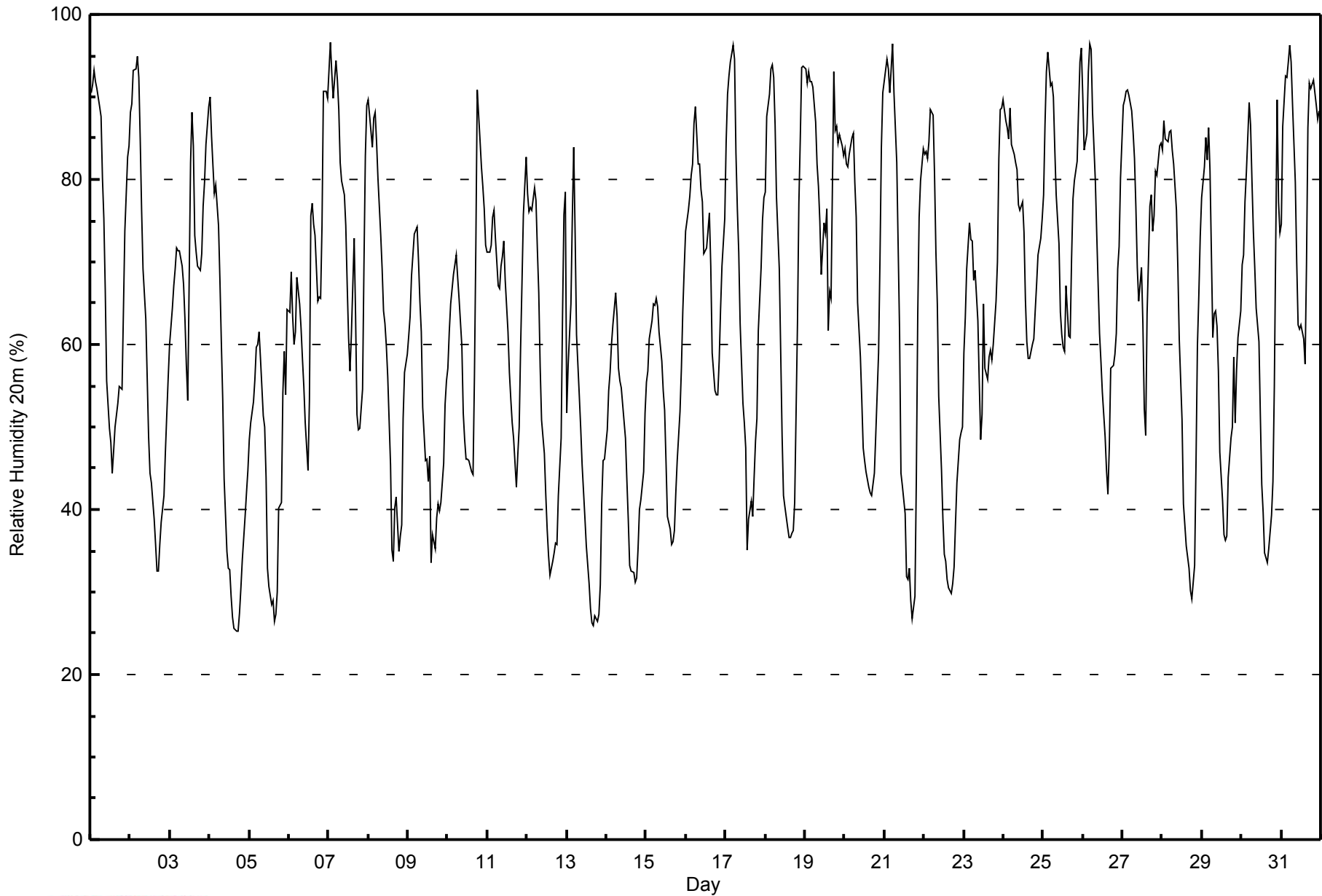
Total Number of Valid Hours: 715

Total Number of Hours: 744



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	103	13.84	13.84
40 - 60	207	27.82	41.67
60 - 80	248	33.33	75.00
80 - 100	186	25.00	100.00

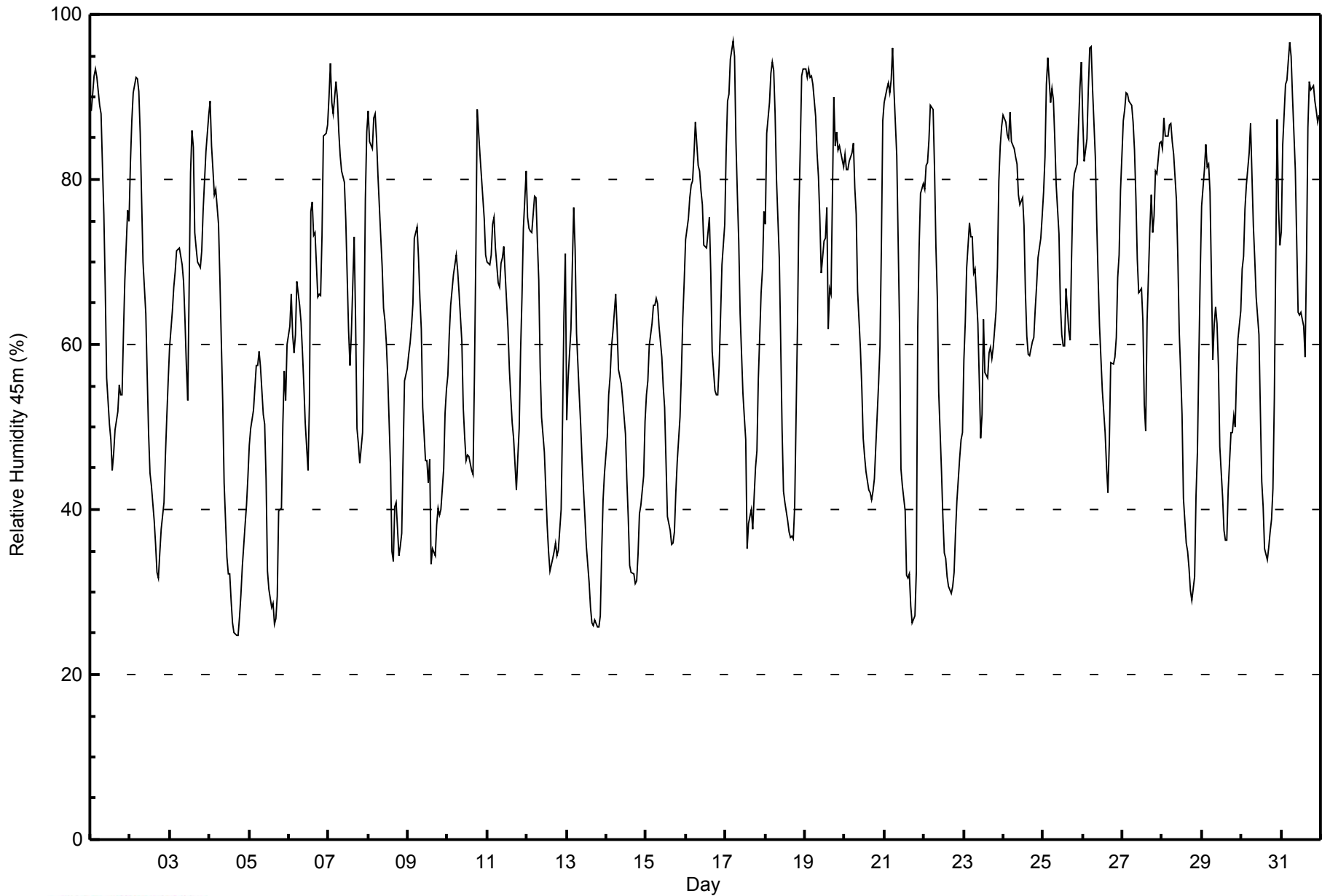
Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	109	14.65	14.65
40 - 60	208	27.96	42.61
60 - 80	247	33.20	75.81
80 - 100	180	24.19	100.00

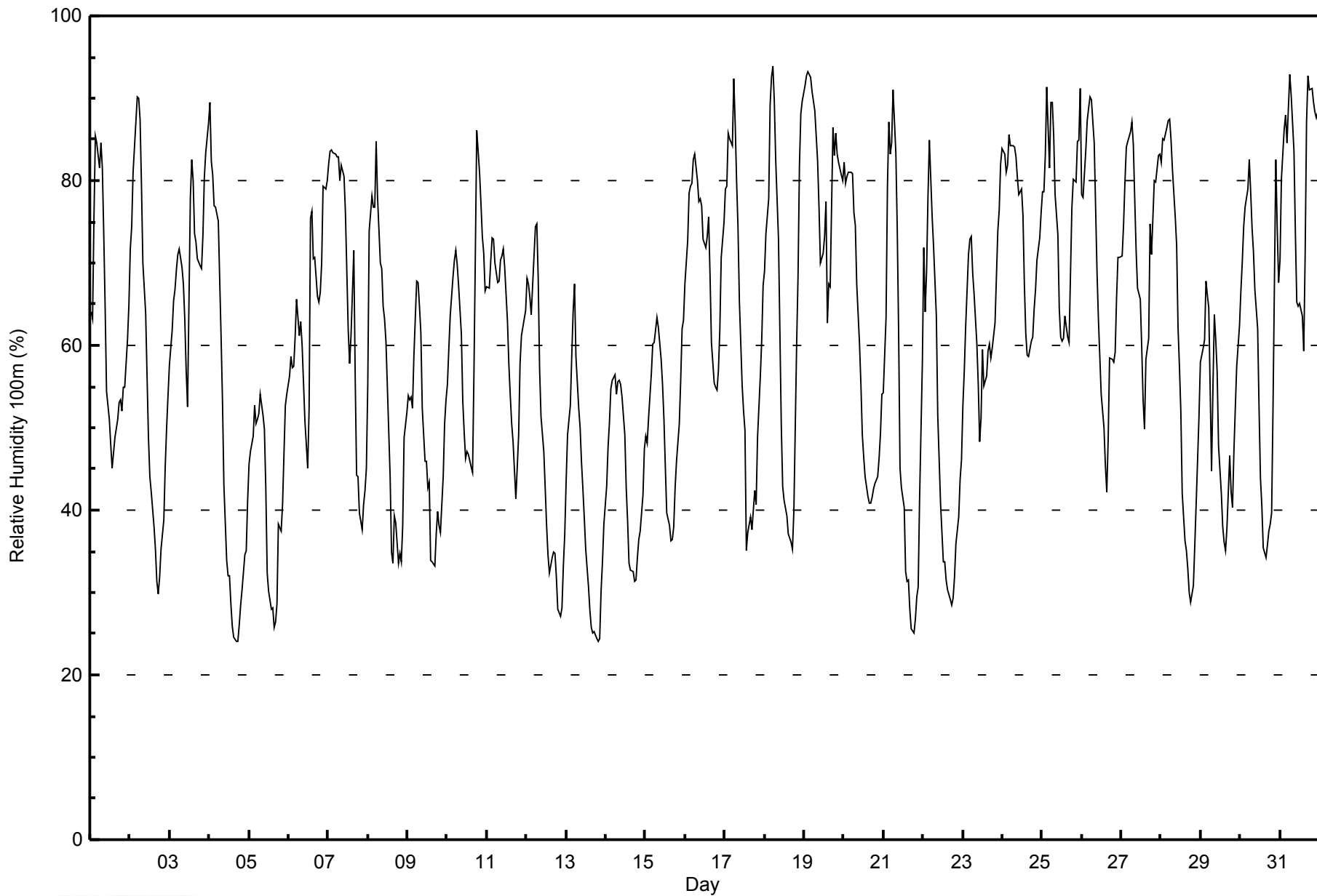
Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	132	17.74	17.74
40 - 60	222	29.84	47.58
60 - 80	256	34.41	81.99
80 - 100	134	18.01	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

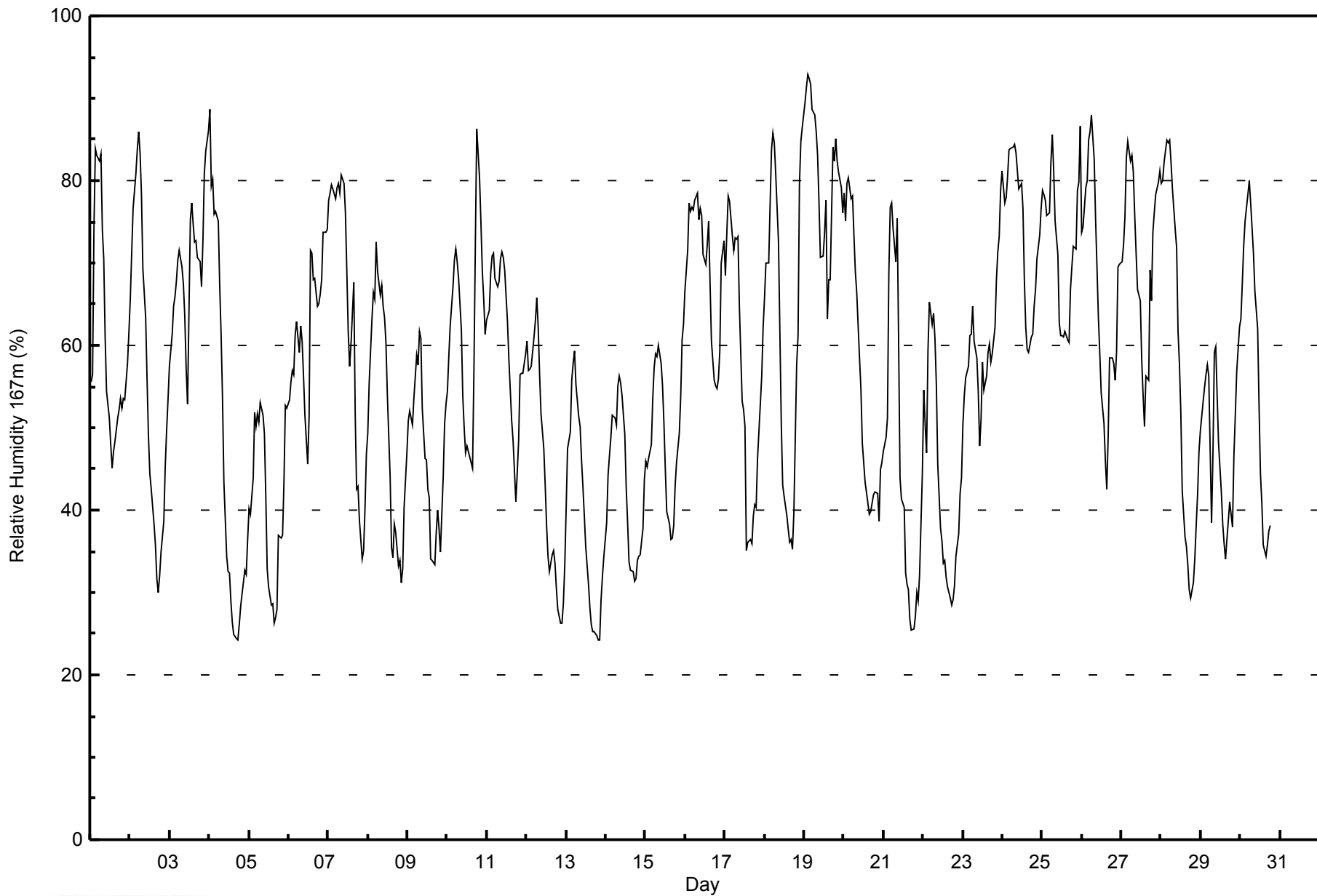
Relative Humidity 167m (RH167m) - %
Lower Camp Met Tower - July 2014

Maximum Value: 93 % on Jul 19 03:00																			Maximum Daily Average: 80.9 % on Jul 19						Hours in Service: 744																								
Minimum Value: 24 % on Jul 13 20:00																			Minimum Daily Average: 39.0 % on Jul 13						Hours of Data: 715																								
Maximum Diurnal Average: 72.2 % at hour 6																			Minimum Diurnal Average: 44.0 % at hour 17						Hours of Missing Data: 29																								
Monthly Average: 57.2 %																			Percentiles: P ₁ = 25 P ₁₀ = 34 Q ₁ = 43 Median = 58 Q ₃ = 71 P ₉₀ = 80 P ₉₉ = 89						Hours of Calibration: 0																								
																									Percent Operational Time: 96.1																								
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-Jul	56	56	74	84	83	82	83	74	70	61	54	51	48	45	47	48	51	52	54	52	54	53	58	62	60.6	84																							
2-Jul	66	71	77	81	84	86	83	78	69	63	56	49	44	43	38	36	32	30	32	35	39	45	50	53	55.8	86																							
3-Jul	57	61	65	66	68	70	72	69	68	64	57	53	75	77	75	73	73	71	70	67	73	81	84	86	69.7	86																							
4-Jul	89	79	80	76	76	75	67	61	54	43	34	32	32	29	26	25	24	24	26	28	30	33	32	36	46.5	89																							
5-Jul	40	39	44	52	50	52	51	53	52	49	42	33	31	28	29	26	27	28	37	37	37	43	53	52	41.0	53																							
6-Jul	53	56	57	56	61	63	59	62	60	56	52	46	51	72	71	68	68	65	65	66	68	74	74	74	62.4	74																							
7-Jul	78	78	79	79	78	79	80	79	81	80	76	69	62	58	60	68	52	43	43	39	34	35	40	47	63.1	81																							
8-Jul	49	55	63	66	66	73	69	66	67	65	63	60	54	44	35	34	38	37	33	34	31	33	40	47	51.1	73																							
9-Jul	51	52	51	50	54	59	58	62	61	52	46	46	43	42	34	34	33	37	40	38	35	44	51	53	46.8	62																							
10-Jul	54	59	62	67	70	72	70	68	62	54	50	47	48	47	46	45	57	72	86	80	75	69	66	61	62.0	86																							
11-Jul	63	64	69	71	71	68	67	68	71	71	71	69	63	58	55	51	49	41	45	48	56	57	57	59	60.9	71																							
12-Jul	60	57	57	57	61	63	66	62	57	52	47	43	38	34	33	35	35	34	31	28	26	26	29	33	44.3	66																							
13-Jul	40	48	49	56	58	59	55	51	50	46	43	39	36	31	28	26	25	25	25	24	24	29	32	34	39.0	59																							
14-Jul	38	44	47	49	52	51	50	55	56	55	54	49	43	38	34	33	33	31	32	34	34	35	38	44	42.9	56																							
15-Jul	46	45	46	48	54	57	59	59	60	58	55	50	45	40	38	36	37	38	43	46	49	54	61	63	49.4	63																							
16-Jul	67	72	77	76	77	76	78	78	75	77	76	71	70	72	75	68	61	56	55	55	56	59	70	73	69.5	78																							
17-Jul	68	74	78	78	73	72	73	73	73	65	53	52	50	35	36	36	36	39	41	40	46	53	56	62	56.8	78																							
18-Jul	66	70	70	77	84	86	85	81	72	62	50	43	42	39	38	36	37	35	40	58	61	80	85	86	61.7	86																							
19-Jul	89	91	93	92	92	89	88	86	83	77	71	71	74	78	63	68	68	84	82	85	82	81	79	76	80.9	93																							
20-Jul	78	75	80	80	78	78	73	69	66	59	55	48	46	43	41	40	40	41	42	42	42	39	45	46	56.1	80																							
21-Jul	47	49	51	69	77	77	74	70	75	60	44	41	40	32	31	30	27	25	26	27	30	29	32	45	46.3	77																							
22-Jul	55	50	47	59	65	63	64	61	55	46	38	36	34	34	32	31	29	28	29	31	34	37	42	44	43.5	65																							
23-Jul	50	54	56	58	61	61	65	60	58	54	48	51	58	55	56	59	60	58	59	62	68	71	73	79	59.8	79																							
24-Jul	81	77	78	81	84	84	84	83	81	79	80	77	68	62	59	59	61	61	61	65	67	71	73	77	74.0	84																							
25-Jul	79	78	78	76	76	82	86	81	75	71	63	61	61	61	62	61	60	67	70	72	72	79	80	87	72.3	87																							
26-Jul	74	74	79	80	85	86	88	82	75	69	63	59	54	50	46	43	49	59	59	58	56	59	70	70	66.1	88																							
27-Jul	70	72	76	83	85	82	83	81	76	71	67	65	58	54	50	56	56	69	65	74	76	78	80	81	71.2	85																							
28-Jul	80	80	82	85	85	85	82	79	74	72	62	58	52	42	37	36	33	30	29	31	34	38	42	47	57.3	85																							
29-Jul	50	53	55	56	58	56	38	47	59	60	54	48	42	38	36	34	36	41	39	38	47	52	57	62	48.2	62																							
30-Jul	63	68	72	75	78	80	77	74	71	67	62	53	44	41	36	34	36	38	38	AF	AF	AF	AF	AF	58.3	80																							
31-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--																							
																								61.9	63.4	66.4	69.4	71.4	72.2	70.9	69.2	67.0	62.0	56.2	52.5	50.5	47.7	45.0	44.3	44.0	45.3	46.5	48.1	49.5	53.0	56.7	60.0	Diurnal Average	
																								89	91	93	92	92	89	88	86	83	81	79	80	77	78	75	73	73	84	86	85	82	81	85	87	Diurnal Maximum	
AF - Analyzer Failure																																																	



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	146	20.42	20.42
40 - 60	246	34.41	54.83
60 - 80	257	35.94	90.77
80 - 100	66	9.23	100.00

Total Number of Valid Hours: 715

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 20 m (WS20m) - km/h

Lower Camp Met Tower - July 2014

Maximum Speed: 22 km/h on Jul 4 15:00	Maximum Daily Speed Average: 12.5 km/h on Jul 4	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 21 08:00	Minimum Daily Speed Average: 0.5 km/h on Jul 1	Hours of Data: 744
Maximum Diurnal Speed Average: 3.9 km/h at hour 10	Minimum Diurnal Speed Average: 0.4 km/h at hour 23	Hours of Missing Data: 0
Monthly Average Velocity: 1.9 km/h 180.9 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 6 Q ₃ = 10 P ₉₀ = 13 P ₉₉ = 19	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Jul	NE0	NNW1	NNW1	ESE1	E1	NE1	WNW2	NE1	SE3	SE5	SE5	SSE4	E3	ESE2	E1	N6	N2	W2	WSW6	W1	SE4	NNW1	NNW0	NE1	ESE0.5	N6		
2-Jul	ESE2	NE1	NNW2	NNE1	NNE1	NE1	ESE2	ESE2	SE6	SSE6	SE7	SE8	SSE7	ESE6	ESE7	SE7	SSE9	SSE7	SE6	ESE8	ESE9	SE11	SE12	SE12	SE5.3	SE12		
3-Jul	SE14	SE12	SE9	SE12	SE11	ESE10	ESE14	SE16	SE16	SE18	SE18	SE20	SSE16	ESE1	ENE4	SE7	SE9	SE11	SSE2	NNW3	NNW8	N8	NW3	NW3	SE8.0	SE20		
4-Jul	NW6	NNW13	SW10	SW8	SSE5	SSW7	SW9	SW11	WSW8	WSW14	WSW17	WSW18	WSW18	WSW18	WSW22	WSW21	WSW19	WSW19	WSW17	WSW14	WSW13	WSW9	WSW11	W9	WSW12.5	WSW22		
5-Jul	WSW8	WSW8	W3	SSE4	SE5	SE7	SE7	SSE8	S7	SE7	S5	WSW16	WSW16	WSW15	W12	WSW14	WSW11	WNNW6	NE3	NW2	NNW3	N6	NNW3	SSE4	SW4.3	WSW16		
6-Jul	N2	NNE1	W2	W7	W7	WNW4	NNW5	NNW4	WSW4	WSW7	WSW9	WSW13	WNW10	NE6	SSE4	N2	ENE2	W2	NW3	WNW4	NNW2	NW2	NW7	WNW3	WNW3.2	WSW13		
7-Jul	NE2	NNW1	E1	NW1	N2	ENE1	E3	NNE2	NNW4	N5	NNW5	NNW8	NNW7	NNW9	NNE7	N5	N7	NNE5	NNE5	NE3	NNW1	E0	NNW0	W1	N3.1	NNW9		
8-Jul	NE1	ESE1	SE5	ESE4	ESE4	SE6	SE5	SSE11	SE9	SE13	SSE12	SE13	SE14	SSE10	SSW13	SSW12	N0	ESE7	SSE12	SSE11	S11	SE9	E6	E7	SSE7.0	SE14		
9-Jul	ESE4	ESE7	SE1	SE8	SE4	SE3	SE8	SE9	SE10	SSW15	SSW15	S13	S13	SSE16	SSW19	W17	W17	WNNW4	SW12	SW12	WSW12	NW12	NW9	NW7	SSW5.7	SSW19		
10-Jul	WNNW8	W13	W14	W16	W18	W17	WNNW5	WSW11	WSW9	W7	WSW11	W12	WNNW13	WNNW15	WNNW15	WNNW15	NW19	NW17	NW14	WNNW16	WNNW12	NW11	WNNW13	WNNW13	WNNW12.1	NW19		
11-Jul	NW8	NNW7	NNW6	N5	N4	NNW4	NW6	WNNW7	WNNW5	W7	W10	W16	W13	W12	W12	WNNW11	WNNW11	WNNW14	N13	N13	NNW7	NNW4	NNW3	NW3	NW6.9	W16		
12-Jul	NNW6	NNW6	NNW5	NNW6	N3	NNW1	NW2	NW5	NW7	NW8	NW8	NW7	NW7	NNW7	NW6	W5	WSW4	NNW3	N3	NNE3	N1	NNW1	NNW2	N3	NW4.0	NW8		
13-Jul	NE3	N3	NNW4	N3	N2	NNE1	ESE8	SE13	SE10	SE9	SSE8	SSE9	SSE10	SSE7	SSE6	SSE6	SSE6	SSE7	SSE8	SSE8	SE7	SE10	SE11	SE10	SE5.7	SE13		
14-Jul	SE11	SSE10	SSE6	SSE4	SSE6	SE9	SE11	SSE15	SSE13	SE12	SE9	SE12	SSE16	SSE13	S12	S11	S12	SSW11	SSW9	S9	S9	S11	SSW9	ESE5	SSE9.5	SSE16		
15-Jul	SE10	SE13	SE11	SE12	SE12	SSE15	SSE17	SE13	SE12	SE13	SE11	SE12	SSE11	SSW9	SSW12	SSW12	SSW13	SSW12	SSW12	SSW12	SSW12	SSW12	S9	SSE10	SE6	SE11	SSE10.3	SSE17
16-Jul	SE11	SSE6	ESE2	SSW2	NW3	NNW1	NW2	NW3	NNE3	NW4	N5	NNW6	NNW6	NNW5	NW3	W7	WSW11	SW10	SW9	SSW7	SW14	W11	N7	N3	W2.6	SW14		
17-Jul	NW3	NNW3	NW4	NW2	NNW1	N1	ENE2	W1	SW2	S1	NNW2	S3	WNNW6	WNNW5	NNE3	N4	NNE2	NE2	NNW2	NW1	WSW2	NNW3	N3	NNW5	NNW1.8	WNNW6		
18-Jul	NW2	NNW4	NNW4	NW2	NW3	NW3	WNNW4	WNNW4	W3	WSW4	SW4	SW4	SW4	WSW3	WNNW1	ENE2	ESE4	SE5	SSW6	WSW16	S8	SW10	E2	ENE1	WSW2.3	WSW16		
19-Jul	SE6	SSE7	SE4	SE8	SSE8	SSE10	SSE8	SW3	WSW4	W7	W10	W14	W16	WSW17	WNNW17	WNNW15	WNNW13	NNW8	NNW14	NNW10	NW8	NW8	NW7	NNW6	W4.7	WNNW17		
20-Jul	N5	N4	NW4	NW5	NNW3	NNW2	NW4	NW4	NW3	N5	NNW7	N7	N8	N8	N5	N6	NNE6	NNE5	NE6	NNE4	N2	N1	N1	NNE1	N4.1	N8		
21-Jul	NNW2	NNW2	NNW1	E1	NNE1	NNE1	NNW1	SSW0	E2	E3	SSW2	E3	WSW2	WNNW2	NNE4	NNE4	NE3	SE3	SE1	NNW3	SSW1	S1	N1	ESE1	NE0.9	NNE4		
22-Jul	NNE2	SE5	SE7	ESE5	ESE3	ESE6	ESE7	SE8	SE8	SE8	SE8	SE10	ESE8	SE8	SSE8	SSE6	SSE7	SSE7	SSE9	SSE7	SE4	SSE5	SSE11	SSE10	SE6.6	SSE11		
23-Jul	SE3	SSE3	ESE3	ENE3	ENE3	ESE3	NNE1	W0	SE6	SE9	SE15	SSE16	SE6	SE13	SE15	SE20	SE13	ESE9	ESE5	ESE2	SE11	E2	NNW3	NW3	SE6.0	SE20		
24-Jul	ESE2	SSE9	SE7	SSE6	E3	SE14	SE14	SE13	SE13	SE12	SE11	SSE13	SE14	SE14	SE13	SE15	SE13	SE15	SE13	SE15	ESE11	ESE10	ESE6	SE9	ESE7	SE10.5	SE15	
25-Jul	NNE5	ENE5	NNW4	NNW5	NNW4	NNW6	NNW5	NNW5	NNW4	NNW2	N1	SSE4	SW2	SSW2	NNW2	WNNW3	SE2	N5	NNW6	NW3	NW3	NNW2	N3	NNW3	NNW2.4	NNW6		
26-Jul	ENE2	E2	NNE1	NNW4	NNW3	NW3	NNW2	N3	ESE3	SSE6	SE6	SE7	SE8	SSE8	SSE9	SSW6	WSW11	W13	W9	W6	W9	WNNW3	SE2	SE5	SSW1.9	W13		
27-Jul	SE4	SE8	SE5	SE8	SE10	SE9	SE9	SE10	SE10	SE6	NNE2	WSW3	SE2	WSW7	WSW7	E9	SE6	SSE8	S9	SSE7	SSE9	SSE10	SSE10	SE7	SSE6.0	SSE10		
28-Jul	SSE8	SSE11	SSE10	SSE9	SSE8	SSE5	SSE11	SE11	SE9	SE8	SE8	SE7	SE5	SW5	SSW5	WNNW7	WSW7	WSW6	SW7	S5	ENE2	SE2	SE2	SE3	SSE5.0	SSE11		
29-Jul	SE7	SE6	SE5	ESE5	ESE2	SSE5	SSE11	SSE5	SW7	SE7	ESE5	SE6	SSE3	S5	ENE3	N5	NNW6	NNW6	NNW4	NE2	SE9	SSE9	SE12	SSE10	SE3.6	SSE12		
30-Jul	ESE4	SE6	NNE1	ESE3	ENE2	SE4	SE6	SE7	SE9	SE8	SSE7	SSE9	S11	SSE6	SSE7	SSE7	SSE9	SSE11	SSE14	SSE10	NNW20	ENE6	N1	S3	SE4.9	NNW20		
31-Jul	S4	ESE3	N3	ENE2	E1	NNW1	SE2	SE6	E4	NNW3	NNE7	N10	N11	N10	NNE11	N15	N8	NNW11	N3	NNW10	NNW7	NNW6	NNW8	NNW8	N5.0	N15		

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

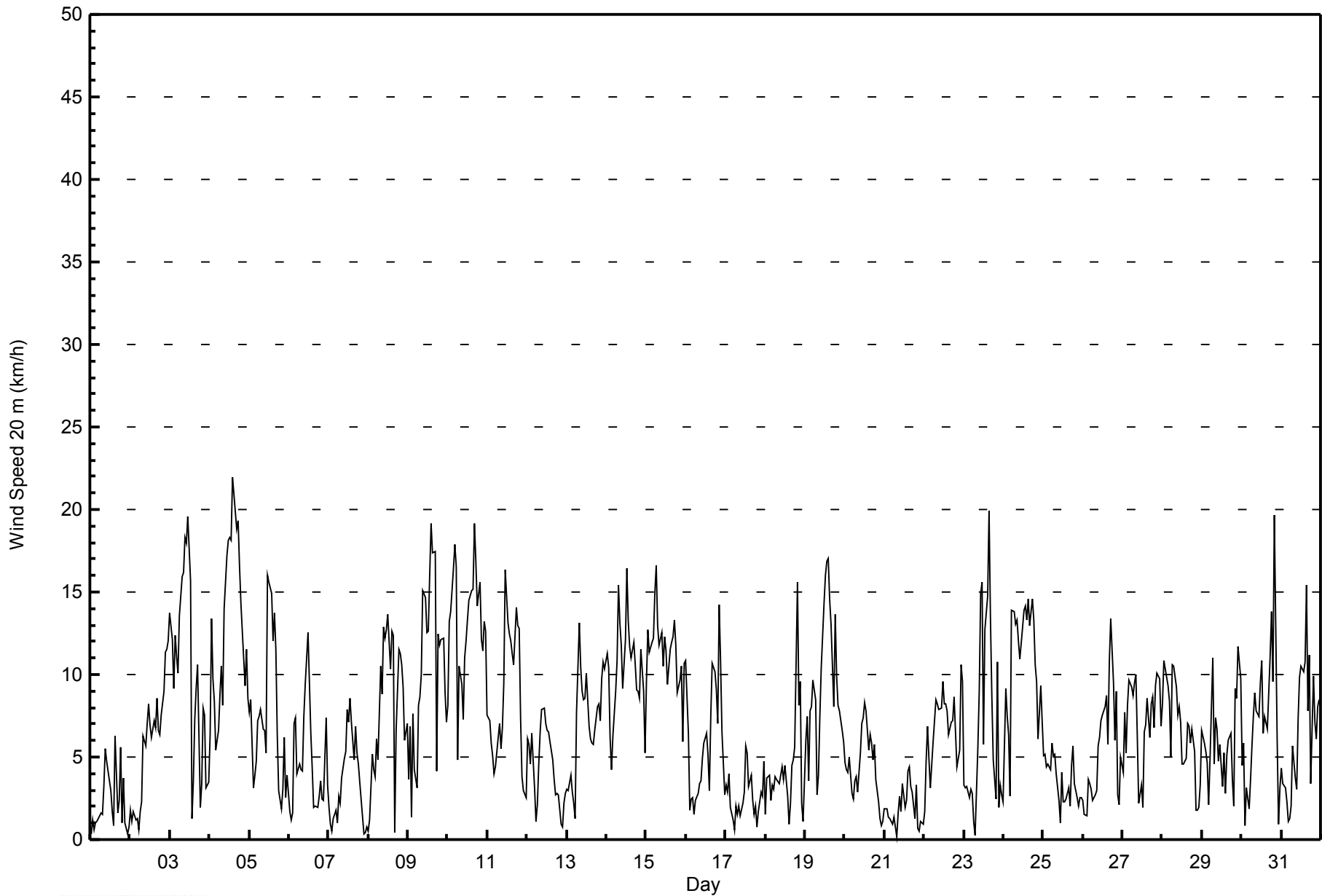


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744											
Maximum Value: 12 km/h on Jul 30 21:00														Hours of Data: 744											
Minimum Value: 1 km/h on Jul 8 00:00														Hours of Missing Data: 0											
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8														Hours of Calibration: 0											
														Percent Operational Time: 100.0											
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	4	2	1	3	1	2	1	2	1	4
2-Jul	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	3	3	3	2	2	3	4	4	5	5
3-Jul	4	4	4	5	4	3	5	5	6	6	6	7	9	3	2	4	4	6	2	1	4	4	1	2	9
4-Jul	3	7	3	4	2	2	4	4	4	6	7	7	7	7	8	7	8	6	6	5	3	3	3	4	8
5-Jul	3	3	3	3	2	2	3	3	3	3	4	6	6	6	6	6	5	4	3	2	1	6	2	3	6
6-Jul	3	1	2	3	4	4	2	3	3	5	4	5	7	5	2	2	2	2	2	2	4	1	5	1	7
7-Jul	1	1	1	1	1	1	1	1	3	2	2	3	4	4	4	4	3	3	2	2	1	1	1	1	4
8-Jul	1	1	2	2	1	3	3	3	4	4	4	4	4	5	5	5	5	3	4	3	2	3	2	3	5
9-Jul	3	3	2	2	4	2	3	3	3	7	5	4	5	5	6	7	7	5	4	4	4	6	4	3	7
10-Jul	3	5	5	6	7	7	3	5	4	4	5	6	5	6	6	8	8	7	5	6	5	4	5	5	8
11-Jul	4	3	2	2	2	4	3	4	3	3	6	6	6	5	5	5	5	6	5	5	3	1	1	1	6
12-Jul	2	2	1	2	2	1	2	2	3	3	3	4	4	3	3	3	3	2	1	1	1	1	1	2	4
13-Jul	1	1	1	1	1	1	4	4	4	4	3	3	3	3	3	3	2	2	2	2	2	2	3	4	4
14-Jul	3	3	3	2	4	4	3	4	4	4	4	4	5	5	4	4	4	3	3	3	2	3	4	3	5
15-Jul	2	3	3	3	4	4	4	4	3	4	4	4	4	4	4	4	3	4	4	2	2	3	2	2	4
16-Jul	3	3	1	1	2	1	1	3	2	2	2	3	3	3	2	5	5	4	4	4	4	5	6	2	6
17-Jul	1	1	1	2	1	1	1	1	2	2	2	2	3	3	2	2	1	1	1	1	2	3	2	2	3
18-Jul	2	2	2	1	1	1	1	2	2	3	3	3	3	2	2	2	2	2	9	7	7	6	2	1	9
19-Jul	3	3	2	2	2	2	3	2	2	4	5	6	6	6	7	7	6	5	6	4	4	3	2	2	7
20-Jul	2	2	2	2	2	1	2	2	2	3	3	3	3	4	3	3	3	3	3	2	1	1	1	1	4
21-Jul	1	1	1	1	1	1	1	1	1	1	1	2	2	3	2	2	2	2	1	1	1	1	1	2	3
22-Jul	2	2	3	2	1	2	2	3	2	3	3	3	3	3	3	3	3	3	3	3	2	2	3	3	3
23-Jul	2	3	2	1	1	1	1	1	3	4	5	5	6	7	6	7	5	4	2	2	5	2	2	1	7
24-Jul	4	3	2	2	4	4	5	4	5	4	4	4	5	5	6	5	5	6	5	4	5	3	3	4	6
25-Jul	3	5	2	2	2	3	3	3	2	2	2	2	3	2	2	3	2	4	3	2	1	1	1	1	5
26-Jul	2	2	1	1	1	1	1	1	2	2	3	3	3	3	3	4	5	6	4	4	3	2	1	3	6
27-Jul	2	2	2	2	3	3	3	3	3	2	2	3	2	4	3	8	4	4	4	3	3	4	5	3	8
28-Jul	3	2	3	3	4	3	3	3	2	2	3	3	3	4	3	4	4	3	3	2	2	1	1	1	4
29-Jul	4	3	3	2	1	4	5	4	4	2	2	2	3	2	2	2	2	3	1	3	4	3	4	3	5
30-Jul	3	2	1	1	1	2	3	2	3	3	2	4	4	3	3	3	4	4	4	3	12	6	3	3	12
31-Jul	3	4	2	1	2	1	3	3	2	2	4	4	4	5	5	7	5	5	5	5	3	3	4	4	7
														Diurnal Maximum											



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

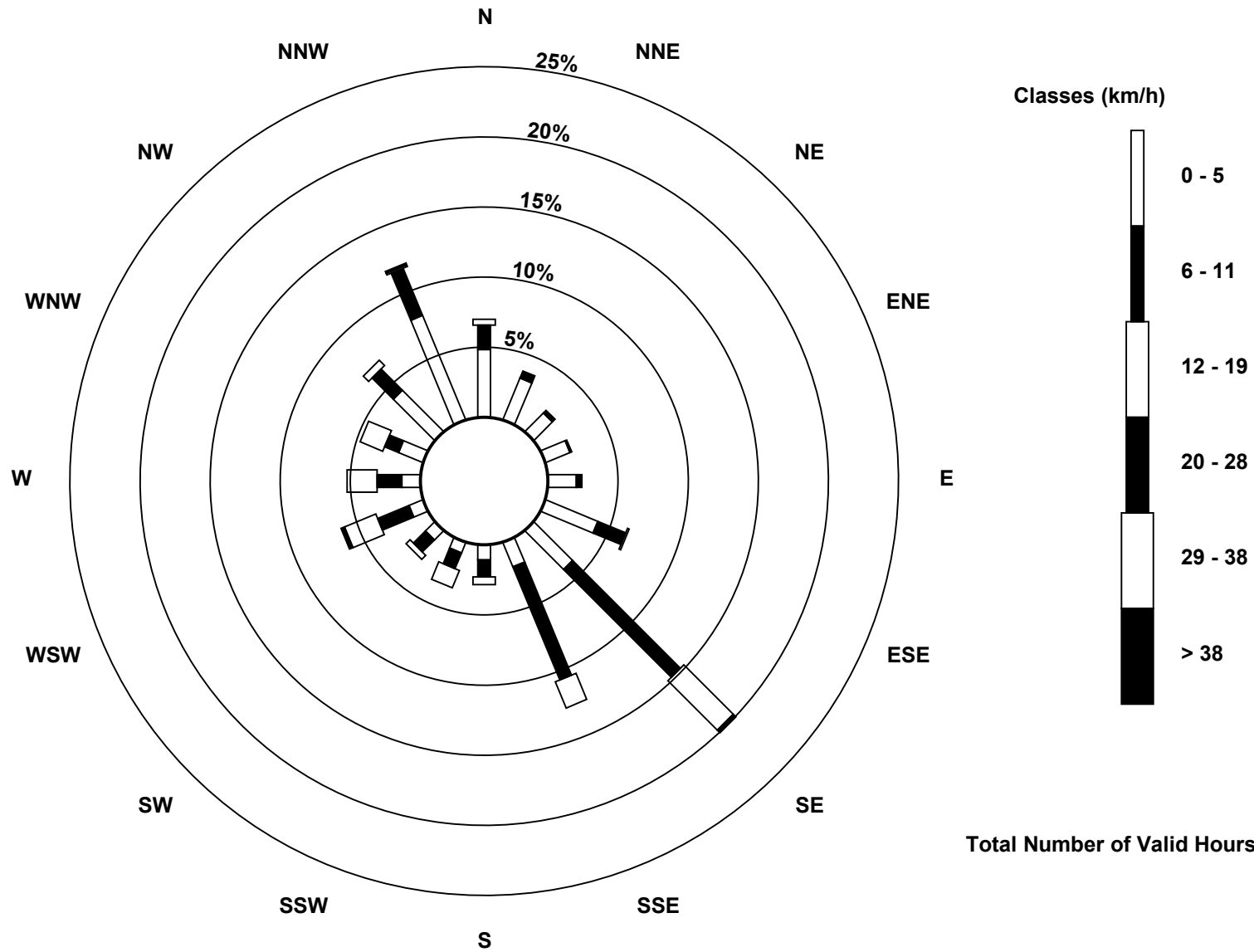
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	320	43.01	43.01
6 - 11	294	39.52	82.53
12 - 19	125	16.80	99.33
20 - 28	5	0.67	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

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

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



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 45 m (WS45m) - km/h

Lower Camp Met Tower - July 2014

Maximum Speed: 30 km/h on Jul 4 16:00	Maximum Daily Speed Average: 17.4 km/h on Jul 4	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 1 22:00	Minimum Daily Speed Average: 0.6 km/h on Jul 1	Hours of Data: 744
Maximum Diurnal Speed Average: 4.6 km/h at hour 9	Minimum Diurnal Speed Average: 0.1 km/h at hour 23	Hours of Missing Data: 0
Monthly Average Velocity: 2.1 km/h 185.5 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 9 Q ₃ = 13 P ₉₀ = 18 P ₉₉ = 26	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NE1	NNW1	NNW2	ESE1	E1	NE2	WNW1	NE1	SE3	SE6	SE5	SSE3	E4	ESE2	E1	N9	N3	W3	WSW8	W2	SE6	NNW0	NNW0	NE3	E0.6	N9
2-Jul	ESE3	NE2	NNW1	NNE1	NNE1	NE1	ESE2	ESE3	SE7	SSE6	SE8	SE10	SSE9	ESE8	ESE9	SE8	SSE10	SSE9	SE9	ESE12	ESE13	SE16	SE16	SE17	SE7.1	SE17
3-Jul	SE19	SE17	SE14	SE18	SE17	ESE15	ESE18	SE21	SE22	SE24	SE24	SE25	SSE20	ESE3	ENE5	SE9	SE12	SE14	SSE3	NNW5	NNW12	N11	NW5	NW6	SE10.7	SE25
4-Jul	NW9	NNW19	SW13	SW11	SSE6	SSW8	SW11	SW14	WSW11	WSW19	WSW25	WSW26	WSW26	WSW25	WSW30	WSW30	WSW26	WSW27	WSW24	WSW21	WSW17	WSW14	WSW17	W13	WSW17.4	WSW30
5-Jul	WSW11	WSW13	W6	SSE4	SE6	SE8	SE8	SSE9	S7	SE7	S6	WSW22	WSW22	WSW20	W17	WSW19	WSW16	WNNW8	NE6	NW3	NNW5	N10	NNW4	SSE5	WSW5.9	WSW22
6-Jul	N1	NNE0	W2	W10	W11	WNNW6	NNW6	NNW6	WSW5	WSW10	WSW13	WSW16	WNNW13	NE10	SSE5	N3	ENE3	W3	NW4	WNNW5	NNW4	NW4	NW12	WNNW5	WNNW4.4	WSW16
7-Jul	NE2	NNW1	E2	NW3	N4	ENE2	E1	NNE3	NNW5	N6	NNW7	NNW10	NNW9	NNW11	NNE11	N7	N10	NNE9	NNE8	NE7	NNW3	E0	NNW1	W1	N4.5	NNW11
8-Jul	NE0	ESE2	SE7	ESE6	ESE5	SE8	SE6	SSE12	SE11	SE16	SSE14	SE16	SE17	SSE12	SSW16	SSW15	N2	ESE10	SSE13	SSE12	S12	SE13	E7	E9	SSE8.7	SE17
9-Jul	ESE5	ESE8	SE1	SE9	SE6	SE4	SE11	SE11	SE12	SSW19	SSW17	S14	S14	SSE19	SSW22	W23	W24	WNNW6	SW16	SW15	WSW17	NW17	NW13	NW10	SSW6.9	W24
10-Jul	WNNW12	W19	W20	W24	W25	W24	WNNW7	WSW15	WSW12	W9	WSW14	W17	WNNW17	WNNW19	WNNW21	WNNW20	NW26	NW23	NW20	WNNW23	WNNW18	NW16	WNNW19	WNNW19	WNNW17.0	NW26
11-Jul	NW12	NNW11	NNW9	N8	N6	NNW7	NW9	WNNW9	WNNW7	W10	W13	W22	W18	W17	W16	WNNW16	WNNW14	WNNW19	N18	N19	WNNW11	NNW7	NNW6	NW4	WNNW9.8	W22
12-Jul	NNW10	NNW9	NNW9	NNW10	N6	NNW2	NW3	NW5	NW9	NW10	NW10	NW9	NW8	NNW8	NW7	W6	WSW4	NNW4	N4	NNE6	N2	NNW2	NNW3	N4	NNW5.7	NNW10
13-Jul	NE4	N2	NNW2	N3	N2	NNE2	ESE10	SE17	SE13	SE11	SSE10	SSE10	SSE12	SSE7	SSE7	SSE7	SSE7	SSE8	SSE9	SSE10	SE10	SE14	SE15	SE14	SE7.3	SE17
14-Jul	SE15	SSE14	SSE10	SSE7	SSE9	SE11	SE13	SSE18	SSE16	SE14	SE12	SE15	SSE20	SSE16	S14	S12	S13	SSW12	SSW11	S10	S11	S13	SSW12	ESE7	SSE11.7	SSE20
15-Jul	SE12	SE16	SE15	SE15	SE15	SSE18	SSE19	SE16	SE15	SSE15	SE14	SE16	SSE13	SSW11	SSW14	SSW15	SSW14	SSW16	SSW14	S10	SSE11	SSE12	SE8	SE14	SSE12.6	SSE19
16-Jul	SE15	SSE7	ESE2	SSW3	NW4	NNW2	NW3	NW4	NNE5	NW5	N8	NNW8	NNW10	NNW8	NW4	W11	WSW15	SW14	SW12	SSW9	SW18	W16	N10	N4	W3.7	SW18
17-Jul	NW6	NNW5	NW7	NW2	NNW1	N1	ENE3	W1	SW2	S2	NNW3	S3	WNNW7	WNNW6	NNE4	N5	NNE4	NE2	NNW2	NNW1	WSW3	NNW5	N4	NNW8	NNW2.6	NNW8
18-Jul	NW3	NNW7	NNW6	NW4	NW4	NW3	WNNW4	WNNW4	W4	WSW4	SW5	SW4	SW5	WSW3	WNNW2	ENE3	ESE6	SE6	SSW8	WSW23	S10	SW13	E3	ENE2	WSW2.9	WSW23
19-Jul	SE8	SSE9	SE5	SE10	SSE9	SSE11	SSE9	SW3	WSW5	W10	W15	W21	W22	WSW23	WNNW23	WNNW20	WNNW18	NNW12	NNW21	NNW15	NW12	NW12	NW10	NNW9	WNNW6.9	WSW23
20-Jul	N7	N6	NW6	NW7	NNW5	NNW4	NW5	NW5	NW4	N7	NNW9	N9	N11	N10	N7	N9	NNE9	NNE8	NE9	NNE7	N4	N3	N2	NNE2	N5.9	N11
21-Jul	NNW2	NNW4	NNW1	E0	NNE1	NNE1	NNW2	SSW0	E2	E3	SSW2	E4	WSW2	WNNW3	NNE5	NNE6	NE4	SE3	SE3	NNW4	SSW1	S1	N1	ESE1	NE1.0	NNE6
22-Jul	NNE2	SE8	SE9	ESE7	ESE5	ESE8	ESE9	SE10	SE10	SE10	SE10	SE12	ESE10	SE10	SSE9	SSE7	SSE9	SSE10	SSE11	SSE9	SE8	SSE9	SSE13	SSE12	SE8.5	SSE13
23-Jul	SE6	SSE5	ESE5	ENE4	ENE3	ESE4	NNE2	W1	SE8	SE12	SE19	SSE18	SE9	SE17	SE19	SE24	SE18	ESE12	ESE8	ESE5	SE14	E5	NNW4	NW1	SE8.2	SE24
24-Jul	ESE3	SSE12	SE10	SSE9	E5	SE19	SE19	SE17	SE17	SE15	SE13	SSE16	SE18	SE18	SE17	SE18	SE17	SE19	SE18	ESE15	ESE13	ESE9	SE13	ESE10	SE13.9	SE19
25-Jul	NNE8	ENE8	NNW6	NNW8	NNW8	NNW9	NNW8	NNW7	NNW5	NNW3	N2	SSE5	SW3	SSW2	NNW3	WNNW5	SE3	N6	NNW8	NW5	NW4	NNW4	N5	NNW4	NNW3.8	NNW9
26-Jul	ENE4	E4	NNE2	NNW2	NNW5	NW4	NNW3	N3	ESE3	SSE6	SE7	SE9	SE9	SSE9	SSE10	SSW7	WSW15	W19	W13	W9	W13	WNNW5	SE2	SE6	SW2.5	W19
27-Jul	SE7	SE10	SE7	SE10	SE12	SE12	SE11	SE12	SE12	SE7	NNE2	WSW5	SE2	WSW8	WSW8	E13	SE9	SSE11	S10	SSE8	SSE12	SSE13	SSE12	SE10	SSE7.6	SSE13
28-Jul	SSE10	SSE13	SSE12	SSE10	SSE10	SSE7	SSE12	SE13	SE10	SE9	SE10	SE8	SE5	SW6	SSW6	WNNW8	WSW9	WSW8	SW8	S7	ENE3	SE4	SE6	SE7	SSE6.2	SSE13
29-Jul	SE9	SE8	SE8	ESE8	ESE3	SSE7	SSE14	SSE6	SW9	SE8	ESE5	SE7	SSE4	S6	ENE3	N7	NNW9	NNW9	NNW5	NE4	SE13	SSE11	SE15	SSE12	SE4.7	SSE15
30-Jul	ESE8	SE9	NNE1	ESE5	ENE4	SE5	SE7	SE9	SE11	SE10	SSE9	SSE11	S12	SSE8	SSE9	SSE8	SSE10	SSE13	SSE15	SSE11	NNW27	ENE11	N2	S4	SE5.8	NNW27
31-Jul	S6	ESE4	N4	ENE3	E1	NNW1	SE3	SE7	E5	NNW3	NNE10	N13	N14	N14	NNE16	N22	N11	NNW16	N5	NNW15	NNW11	NNW10	NNW12	NNW13	N7.2	N22

SE1.9 SE2.2 SSE1.2 SSE1.9 SE1.4 SE2.6 SE4.0 SSE4.3 SSE4.6 SSE4.6 S3.8SSW4.6SSW3.5 SW3.4 SW3.2WSW3.4WSW2.8 SW2.4 SW2.2 SW1.9 SW1.9 SW0.9 SW0.1 SE1.1	Diurnal Average
SE19 W19 W20 W24 W25 W24 SSE19 SE21 SE22 SE24WSW25WSW26WSW26WSW25WSW30WSW30 NW26WSW27WSW24WNNW23NNW27 NW17WNNW19WNNW19	Diurnal Maximum

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

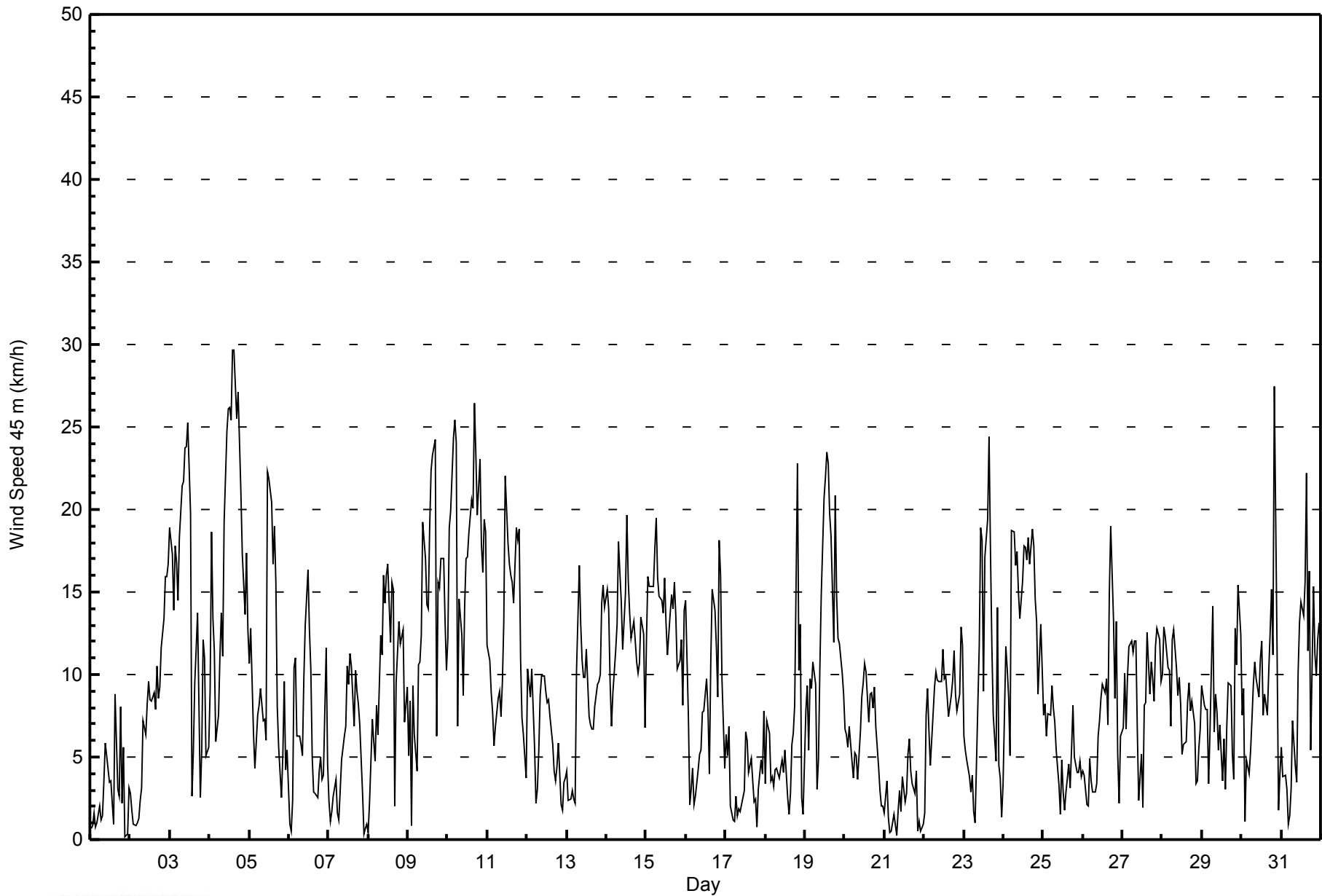


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 15 km/h on Jul 30 21:00																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 1 km/h on Jul 21 06:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 8																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Jul	1	1	1	1	1	1	1	1	2	2	2	2	1	2	2	5	4	2	4	2	2	1	1	2	5
2-Jul	2	2	1	1	1	1	1	2	2	2	2	3	3	3	3	4	4	3	3	2	4	4	4	5	5
3-Jul	5	5	4	4	4	3	5	5	6	6	7	8	10	4	2	5	4	7	2	2	4	4	2	3	10
4-Jul	4	8	3	4	2	2	5	4	4	6	7	6	7	7	7	7	7	6	6	4	3	3	3	5	8
5-Jul	3	3	5	3	3	2	3	3	2	3	5	6	6	6	6	6	5	5	4	3	2	8	3	4	8
6-Jul	3	1	2	4	5	5	2	3	4	6	4	5	9	7	2	3	2	2	2	3	6	1	7	1	9
7-Jul	2	1	1	1	2	2	1	1	3	2	3	3	4	4	5	5	3	3	3	2	2	1	1	1	5
8-Jul	1	2	2	2	2	3	3	2	4	4	4	5	4	5	5	5	6	3	4	3	3	3	2	3	6
9-Jul	4	4	2	4	6	2	3	3	3	7	5	4	5	5	6	9	7	6	4	4	3	6	4	3	9
10-Jul	4	5	5	5	6	8	3	4	3	4	4	6	5	6	6	7	8	7	5	6	5	4	5	5	8
11-Jul	5	4	3	3	3	5	3	4	3	4	7	6	5	5	5	5	5	7	5	6	4	1	1	1	7
12-Jul	3	2	2	2	3	2	2	2	3	2	3	4	4	4	3	3	3	2	2	1	2	1	1	3	4
13-Jul	2	1	1	1	1	2	4	4	4	4	3	3	3	3	3	3	3	3	3	2	2	2	2	2	4
14-Jul	3	4	3	3	5	4	3	4	5	4	4	4	4	5	4	4	4	3	3	3	2	3	4	3	5
15-Jul	2	2	3	4	4	3	3	4	4	4	4	4	5	4	4	4	3	4	3	2	3	3	3	2	5
16-Jul	3	3	2	1	2	1	1	4	2	3	3	3	4	4	3	6	4	3	4	4	4	4	8	3	8
17-Jul	2	1	2	2	1	1	1	1	2	2	2	2	3	3	2	2	1	1	1	1	2	4	2	3	4
18-Jul	3	2	2	1	1	1	1	2	2	3	3	3	3	2	2	2	3	3	12	8	9	7	2	1	12
19-Jul	3	4	3	3	3	2	3	2	3	4	5	6	7	5	7	7	6	6	6	5	5	3	2	2	7
20-Jul	2	2	2	2	2	2	2	2	2	3	4	4	4	5	4	5	4	3	3	2	1	1	1	1	5
21-Jul	1	1	1	1	1	1	1	1	1	2	1	2	3	3	2	2	2	2	1	1	1	1	1	2	3
22-Jul	2	4	3	2	2	2	2	3	2	3	3	3	4	3	3	3	3	4	4	3	3	3	3	3	4
23-Jul	3	3	2	2	1	2	1	2	3	5	5	5	7	8	6	7	6	5	3	3	6	2	2	2	8
24-Jul	5	3	2	2	5	4	4	5	5	4	4	6	6	6	5	6	7	6	5	5	3	4	4	4	7
25-Jul	4	6	2	2	3	3	4	3	2	2	2	3	2	3	3	3	4	3	2	2	2	2	1	6	
26-Jul	3	3	2	2	2	1	1	1	2	2	3	3	3	4	3	4	6	6	4	5	3	2	1	4	6
27-Jul	2	2	2	3	3	3	3	3	3	2	2	3	2	4	3	9	5	5	3	4	5	5	3	3	9
28-Jul	3	2	3	3	4	3	4	3	2	3	3	3	3	4	4	4	4	3	3	2	2	1	1	2	4
29-Jul	4	3	3	3	2	5	6	4	4	2	2	3	3	3	2	3	2	3	2	4	5	3	5	4	6
30-Jul	3	2	2	1	1	2	3	3	3	3	2	4	4	3	3	4	4	4	3	3	15	8	3	3	15
31-Jul	3	5	2	2	2	1	3	3	2	2	5	5	5	5	6	7	5	5	6	6	3	3	4	4	7
																	Diurnal Maximum								



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

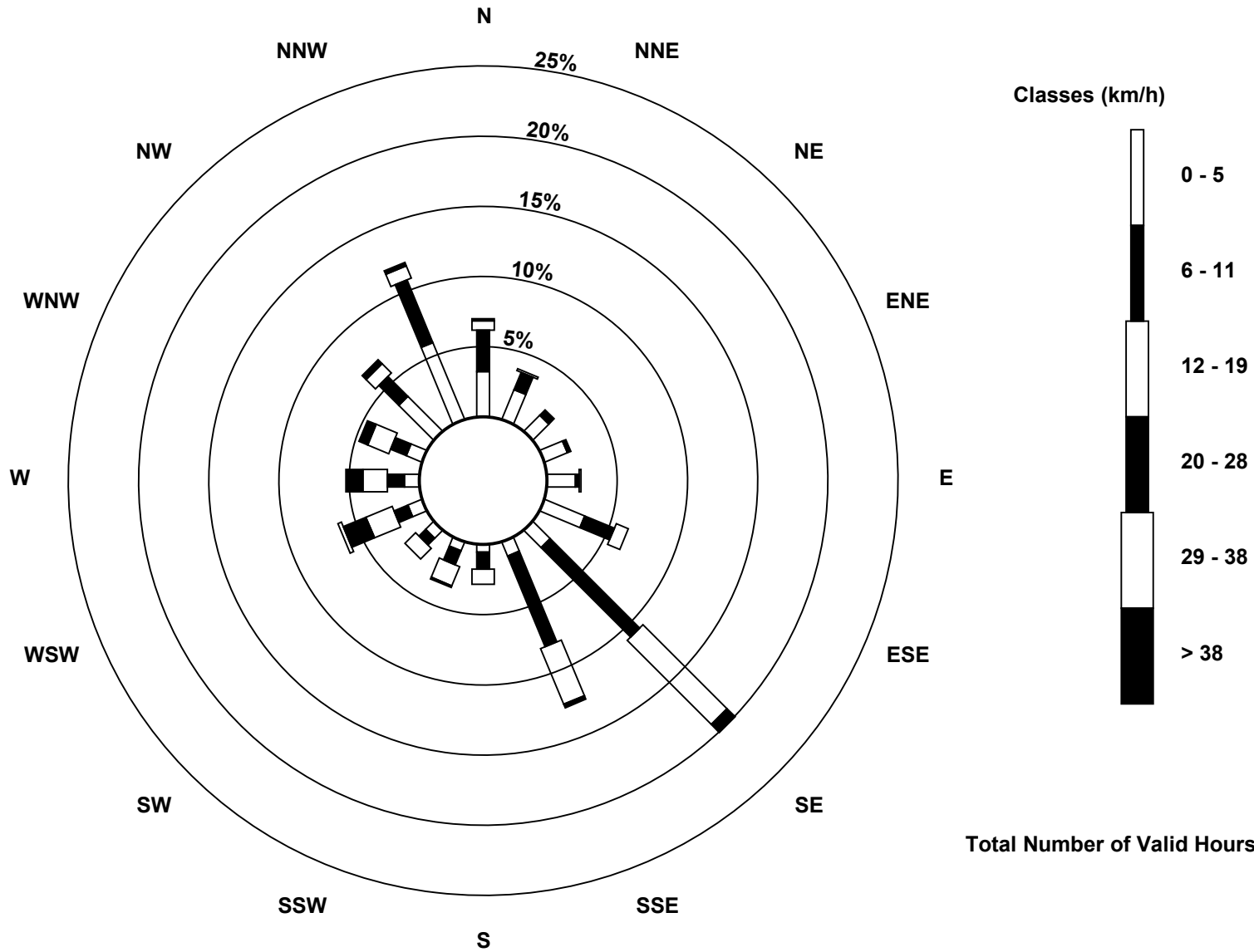
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	235	31.59	31.59
6 - 11	275	36.96	68.55
12 - 19	190	25.54	94.09
20 - 28	42	5.65	99.73
29 - 38	2	0.27	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

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

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





Maximum Speed: 40 km/h on Jul 30 21:00	Maximum Daily Speed Average: 24.2 km/h on Jul 10	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 19 00:00	Minimum Daily Speed Average: 1.3 km/h on Jul 21	Hours of Data: 744
Maximum Diurnal Speed Average: 6.1 km/h at hour 9	Minimum Diurnal Speed Average: 0.9 km/h at hour 23	Hours of Missing Data: 0
Monthly Average Velocity: 3.2 km/h 189.6 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 7 Median = 12 Q ₃ = 18 P ₉₀ = 25 P ₉₉ = 34	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	NE4	E1	N1	SE2	SSE6	SSE5	SSW1	WSW3	SE3	SE6	SSE4	S3	ESE3	ESE2	NNE1	NNE11	ENE7	WNW1	WSW8	WSW4	SSE4	SSW4	SSE4	SSE9	SE1.8	NNE11																							
2-Jul	SSE8	SE8	SE6	SE5	SE6	SE6	SE4	SE6	SSE8	SE9	SE11	SE13	SE12	SE13	SE11	SSE13	SE14	SE17	SE21	SE25	SE27	SE26	SE30	SE12.9	SE30																								
3-Jul	SE32	SE30	SE26	SE29	SE26	SE25	SE27	SE31	SE33	SE34	SE35	SE37	SSE28	SE10	ESE10	SE16	SE18	SE20	SSE3	N6	N19	N16	N7	NNW9	SE17.5	SE37																							
4-Jul	WNW14	WNW29	WSW18	WSW18	SW8	SW10	WSW14	SW16	WSW13	WSW22	WSW28	WSW29	WSW29	WSW30	WSW33	WSW33	WSW29	WSW31	WSW28	WSW25	WSW24	WSW21	WSW26	W21	WSW22.1	WSW33																							
5-Jul	W18	W22	W13	SSW6	SSW6	SSW6	SSW7	SSW8	SSW7	SSE8	SSW7	WSW26	WSW24	WSW22	W21	WSW21	WSW17	NW10	NE10	NNE4	N8	N17	NNE7	SE10	WSW7.7	WSW26																							
6-Jul	SSE7	S5	WSW6	W16	W16	WNW10	NW10	NNW8	W6	WSW10	WSW15	WSW18	WNW15	NE17	SE5	NNE6	NE3	NW5	WNW7	W8	N7	NNW7	NNW20	NNW8	WNW5.9	NNW20																							
7-Jul	WNW9	NW10	NW10	NW11	NNW13	NW11	NW11	NW10	NNW8	NNW9	NNW9	NNW14	NNW13	NNW15	NE15	NNE13	NNE19	NE17	NNE14	NE13	NE11	NNE5	NE5	ENE3	N9.0	NNE19																							
8-Jul	SE3	SE11	SSE12	SSE6	S8	SSE13	SSE14	SSE12	SSE15	SSE19	SSE18	SE22	SSE20	S14	SW19	SSW17	ENE5	ESE14	S14	S15	S20	S17	S8	SSE5	SSE12.0	SE22																							
9-Jul	SSW3	SSW5	WNW8	SE8	SSE11	S5	SE14	SE14	SE18	SSW23	SSW19	S15	S15	SSE22	SSW23	W31	W33	WNW11	SW19	SW23	WSW25	NW27	NW23	NW17	SW9.6	W33																							
10-Jul	WNW18	W26	W27	W33	W34	W33	WNW10	WSW16	WSW14	W10	WSW15	W21	NW22	WNW24	WNW26	NW28	NW38	NW34	NW31	WNW34	WNW30	NW32	WNW35	WNW34	WNW24.2	NW38																							
11-Jul	WNW27	NW25	NW19	NW13	NNW11	NW15	NW13	WNW12	WNW10	W13	W17	W28	W24	W20	W20	WNW21	WNW21	WNW27	NNE27	NNE26	N18	N13	NNW15	NNW15	NW15.5	W28																							
12-Jul	NNW20	NNW18	NNW17	NNW20	N13	NNW7	N4	NNW6	NW11	NW11	NW12	NW11	NNW10	NNW10	NNW9	W6	W5	N5	NNE7	NE11	NE10	ENE9	NE7	E6	NNW8.4	NNW20																							
13-Jul	ESE5	SE9	SE12	SSE5	SSE8	SE10	SE17	SE23	SE18	SE15	SSE11	SSE11	SSE13	SSE9	SSE8	SSE8	SSE8	SSE9	SSE11	S10	SSE12	SSE19	SSE21	SSE21	SSE11.9	SE23																							
14-Jul	SSE23	SSE24	SSE20	SSE18	SSE19	SSE20	SSE19	SSE18	SSE21	SSE23	SE20	SE16	SE20	SSE22	SSE18	SSW15	S13	S14	SSW13	SSW11	SSW11	SSW12	SW25	SW29	SSW9	S16.4	SW29																						
15-Jul	SSE10	S11	SSE15	SSE20	SSE19	SSE19	SSE19	SSE19	SSE19	SSE19	SSE17	SE18	SSE21	S15	SSW12	SW15	SSW17	SSW15	SSW15	SSW15	SSW13	S16	S17	SSE9	S14	S14.6	SSE21																						
16-Jul	S10	SW8	WSW5	W7	WNW11	WNW8	W6	W11	NNE7	N8	NNE12	N10	N15	NNW12	NW5	W15	WSW16	WSW16	SW13	SW11	WSW24	W23	NE17	NNE6	WNW6.3	WSW24																							
17-Jul	NNW11	NNW11	NNW13	NW8	NW5	N2	NNE3	NNW2	WNW2	SW1	N3	SSW2	WNW7	WNW7	N4	N5	NNE4	ENE4	NE3	ENE3	SW7	N7	NE4	N12	NNW3.8	NNW13																							
18-Jul	WNW5	NNW12	NNW13	N9	N7	N5	NW4	NW5	WNW4	W4	WSW4	WSW4	SW6	WSW2	WNW2	ENE3	ESE7	SE9	SSW10	SW27	S18	WSW18	ENE1	S0	WSW2.9	SW27																							
19-Jul	SSE12	SE16	SE11	SSE12	SSE11	SSE11	S8	SW4	WSW6	W12	W18	W28	W28	WSW26	WNW29	WNW26	WNW25	NNW19	N31	NNW24	NNW21	NNW19	NNW17	NW17	WNW9.5	N31																							
20-Jul	WNW11	WNW14	WNW11	W14	WNW12	WNW10	WNW12	NW8	NW5	N9	NNW12	N12	N14	N13	N10	NNE12	NNE11	NE11	NE13	NE13	NE13	NE10	NNE6	N6	N8.0	W14																							
21-Jul	NE3	N7	NNW8	NNW3	ENE2	SE3	ESE3	E1	SE0	ENE2	S1	E3	W3	NW4	NNE5	NNE6	NNE4	SE4	SE5	NW4	WNW2	ESE2	SE2	SE6	NE1.3	NNW8																							
22-Jul	SSE5	S7	SSE9	SSE9	SSE6	S10	SSE10	SE11	SE10	SE13	SE13	SE15	SE13	SE12	SSE10	SSE10	SSE12	SE17	SE22	SE22	SE20	SE25	SSE24	SSE19	SSE13.3	SE25																							
23-Jul	SE18	SE18	SSE16	SSE13	SSE7	SE8	SE6	SE13	SE17	SE20	SE27	SSE26	SE18	SE27	SE29	SE34	SE25	ESE21	ESE14	SE11	SSE20	SE11	SE4	SSE5	SE16.8	SE34																							
24-Jul	SSE12	SSE18	SE20	SE21	SE18	SE30	SE29	SE23	SE26	SE20	SSE18	SSE21	SE25	SE24	SE23	SE24	SE25	SE29	SE26	ESE22	SE22	SE16	SE20	SE18	SE21.8	SE30																							
25-Jul	ENE10	E14	NNE7	N11	NNE15	N15	N13	N10	NNE8	NNE4	NNE3	SSE4	WSW3	SSW1	NNW1	WNW6	SE5	NNW4	NNW12	NNW8	NNW6	NNW7	NNW7	NNW5	N5.3	N15																							
26-Jul	ESE10	SE14	SE10	SE7	N2	NNW6	WNW5	NNW3	ESE4	SSE7	SE9	SE11	SE13	SSE11	SSE12	SSW8	WSW17	W24	W17	WNW12	W18	WSW13	SW4	SSW4	SSW4.5	W24																							
27-Jul	SSW4	S6	SSW7	S7	S7	SSE13	SSE16	SSE15	SSE14	SE8	NW3	WSW7	SSW1	WSW10	WSW9	ESE19	SE17	SSE16	S13	S11	SSE15	SSE19	SSE16	SSE16	SSE9.2	ESE19																							
28-Jul	SSE14	SSE15	SSE14	SSE14	SSE15	SSE14	SSE15	SSE10	SSE8	SE11	SE12	SE10	SE6	SW6	SSW7	WNW11	WSW11	WSW10	SW10	SSW8	S9	SSW4	SSE7	S6	S8.0	SSE15																							
29-Jul	S7	S7	S8	SSE11	SSW7	SW12	S19	SSE12	SW9	SSE8	SE6	SE8	SSE4	S7	ENE2	N7	N14	N12	NNE8	ESE12	SE24	SE22	SE30	SE23	SSE7.3	SE30																							
30-Jul	SE18	SSE16	SSE7	SSE6	SE6	SSE11	SSE13	SE14	SE15	SSE13	SSE11	SSE14	S13	SSE9	SSE10	SSE10	SSE12	S14	S18	SSE18	NNW40	ENE24	ENE9	SE9	SE9.0	NNW40																							
31-Jul	S10	SSE4	NNE5	E4	SSE4	ESE0	SSE10	SSE11	ESE5	NE5	NNE14	NNE18	N20	NNE19	NNE22	N31	NNE18	N25	N11	N23	N19	N17	N19	N22	NNE10.4	N31																							
																								S3.4	S3.8	SSW3.1	S3.7	S3.4	S4.3	SSE5.5	SSE5.8	SSE6.1	SSE5.7	S4.9	SSW6.0	SSW4.4	SSW3.7	SW3.5	WSW3.5	WSW2.4	SW1.8	SW1.7	SSW2.0	SSW2.1	SW1.0	SSE0.9	S2.0		Diurnal Average
																								SE32	SE30	W27	W33	W34	W33	SE29	SE31	SE33	SE34	SE35	SE37	WSW29	WSW30	WSW33	SE34	NW38	NW34	N31	WNW34	NNW40	NW32	WNW35	WNW34		Diurnal Maximum

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

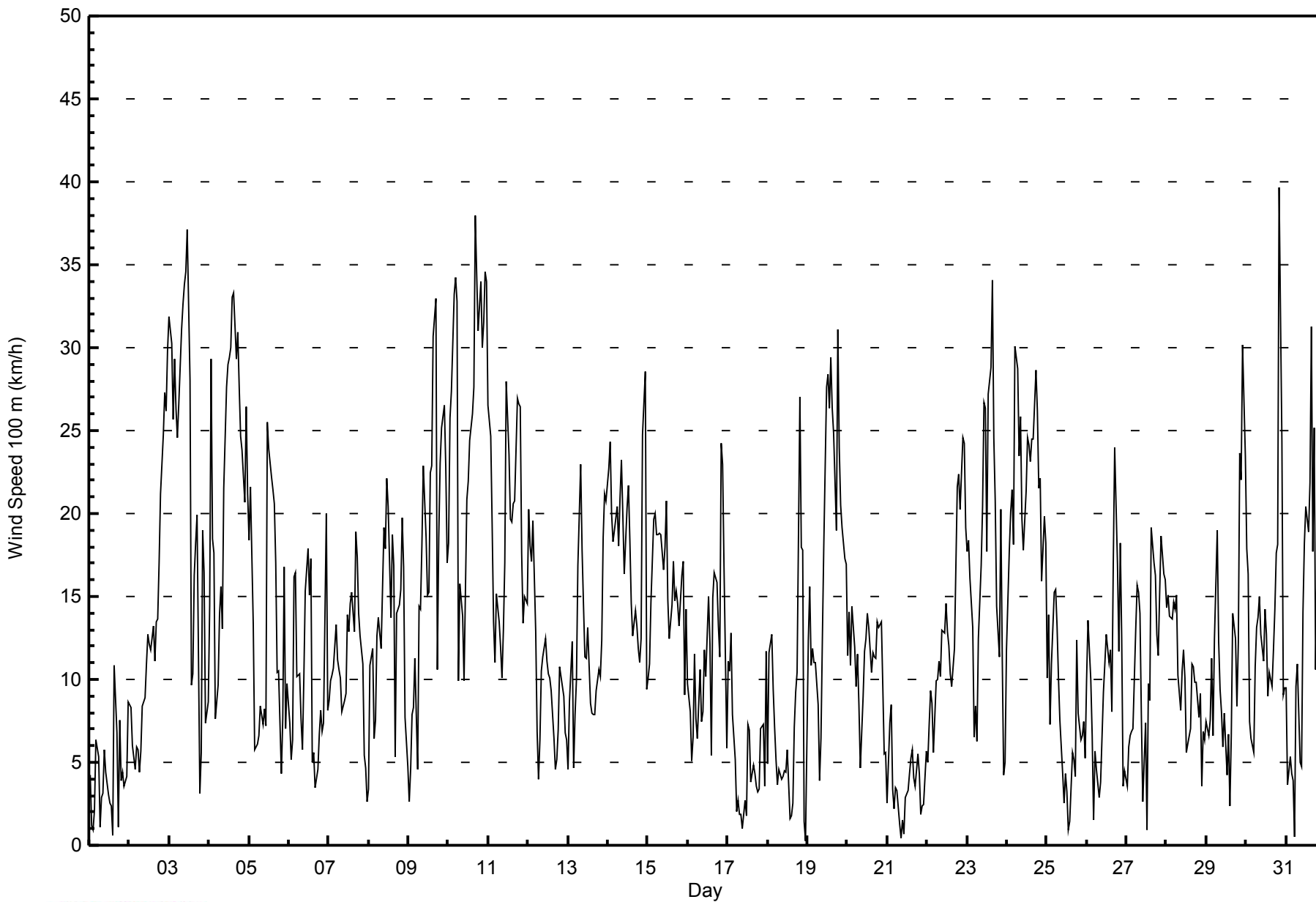


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 18 km/h on Jul 30 21:00														Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0											
Minimum Value: 1 km/h on Jul 21 00:00																									
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 10																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Jul	1	1	1	2	1	3	2	2	2	1	2	2	2	2	7	5	1	3	2	2	1	3	2	7	
2-Jul	2	1	1	2	1	1	1	2	2	3	3	2	2	3	3	4	4	3	3	2	3	3	3	3	4
3-Jul	2	3	4	3	3	3	3	4	4	4	5	6	11	7	3	5	4	7	3	2	3	4	1	2	11
4-Jul	5	9	3	5	3	3	4	3	4	5	4	5	5	5	6	6	6	4	5	3	2	3	3	8	9
5-Jul	4	3	6	4	3	2	2	2	3	3	5	6	5	4	5	5	4	4	6	3	2	11	3	5	11
6-Jul	6	4	3	4	5	6	2	4	4	6	3	4	8	8	2	4	2	3	2	4	9	2	10	3	10
7-Jul	2	3	3	2	2	2	2	2	3	3	3	3	3	5	4	7	4	3	3	2	2	2	1	1	7
8-Jul	3	2	2	2	3	4	3	3	4	2	2	2	3	6	6	6	6	3	4	3	4	4	3	2	6
9-Jul	4	3	5	5	8	2	4	3	3	7	7	5	5	6	7	11	7	8	4	5	4	7	4	4	11
10-Jul	5	5	5	4	4	6	4	3	3	3	3	5	5	5	6	8	7	6	5	4	4	5	4	4	8
11-Jul	6	5	5	4	4	5	4	5	3	4	7	4	5	5	4	4	4	6	4	4	3	2	1	2	7
12-Jul	3	1	1	1	5	3	3	2	3	2	2	4	4	4	3	3	2	2	2	1	2	1	2	2	5
13-Jul	2	4	4	2	2	2	3	3	3	3	3	3	2	3	3	3	2	2	2	3	2	3	3	3	4
14-Jul	2	3	2	3	4	5	4	3	3	2	2	3	4	6	4	4	4	3	3	2	6	6	6	6	6
15-Jul	3	3	5	2	2	3	3	2	2	3	3	3	6	4	4	4	4	4	4	4	4	5	4	3	6
16-Jul	3	3	3	2	3	2	2	5	4	4	2	4	5	4	3	6	3	2	4	5	4	4	10	4	10
17-Jul	2	1	2	2	2	1	1	2	1	2	1	2	3	2	1	1	1	2	1	1	5	5	3	5	5
18-Jul	3	4	3	2	2	1	1	2	2	3	3	3	3	3	2	2	3	3	13	6	10	10	3	2	13
19-Jul	3	3	3	2	2	2	3	2	3	5	5	6	7	4	7	7	6	6	7	5	6	3	2	3	7
20-Jul	3	3	3	2	3	2	2	2	3	4	3	4	4	6	5	5	5	2	3	2	2	2	1	1	6
21-Jul	1	4	1	2	1	2	1	1	1	1	1	2	3	3	2	2	2	3	1	1	1	1	1	4	4
22-Jul	4	3	2	2	2	2	2	2	2	2	2	2	2	3	4	4	4	4	3	2	1	5	4	3	5
23-Jul	3	4	3	4	3	2	4	4	2	4	4	6	7	7	5	5	5	6	5	4	6	3	4	4	7
24-Jul	7	3	3	2	5	3	3	3	3	3	4	6	4	4	4	3	4	6	4	4	5	4	4	4	7
25-Jul	4	7	2	1	2	3	5	3	2	3	2	2	4	2	3	4	4	5	3	2	2	3	2	2	7
26-Jul	4	5	4	3	1	2	2	1	2	2	3	4	3	4	3	4	6	4	3	5	3	2	3	2	6
27-Jul	2	2	2	2	2	2	2	3	2	2	3	3	4	3	13	7	4	4	5	4	4	3	3	3	13
28-Jul	3	2	3	3	3	3	4	3	1	1	2	2	4	4	4	3	4	3	2	2	3	2	3	2	4
29-Jul	3	3	2	3	2	8	5	4	4	2	1	2	2	3	2	3	2	2	1	8	4	6	3	2	8
30-Jul	5	2	4	2	2	2	2	2	2	2	2	4	5	4	4	4	4	4	4	3	18	9	6	6	18
31-Jul	5	5	3	2	2	1	4	3	1	2	5	4	4	4	5	7	7	5	8	7	3	3	4	4	8
Diurnal Maximum																									
7 9 6 5 8 8 5 5 4 7 7 6 11 8 7 13 7 8 13 8 18 11 10 8																									



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

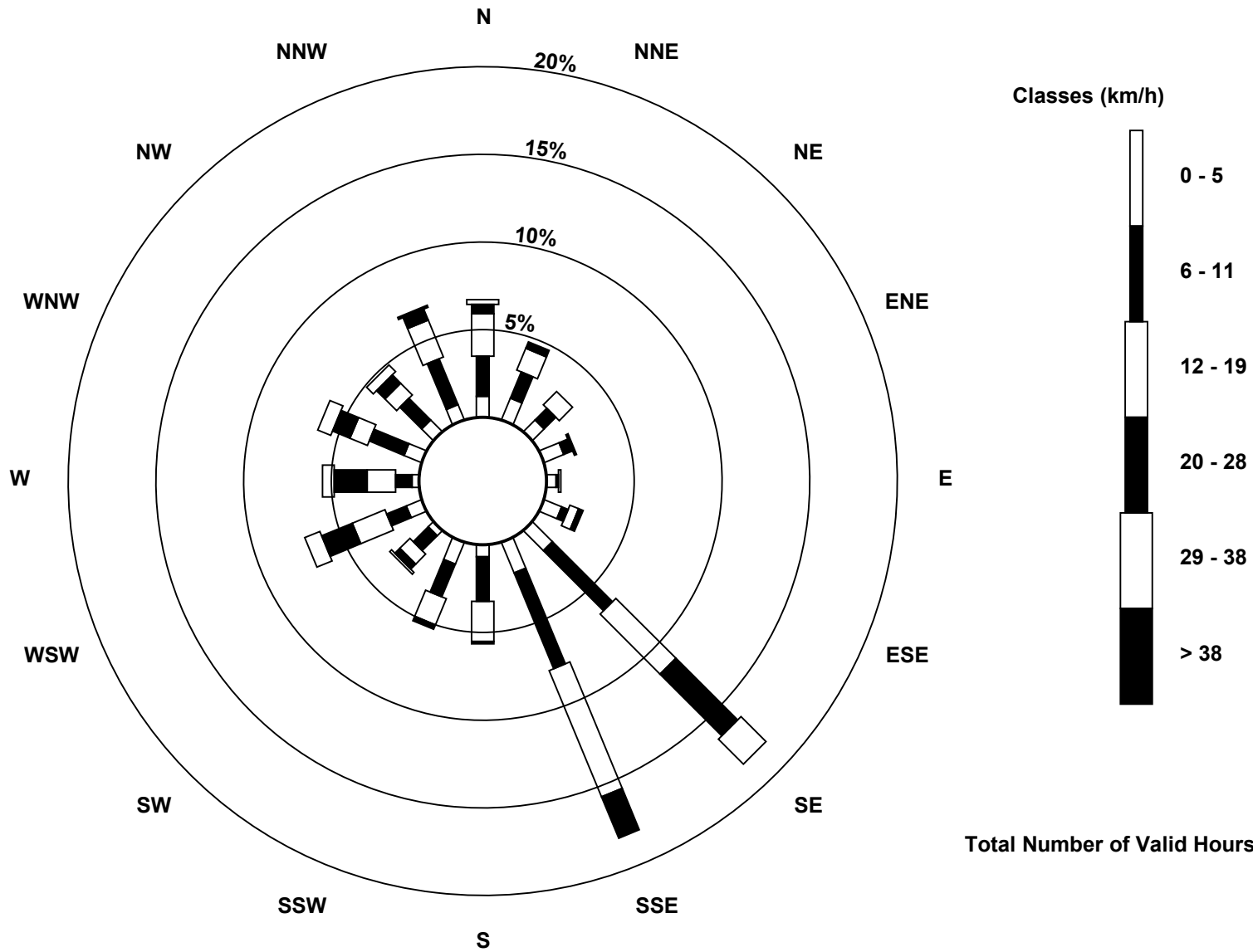
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	123	16.53	16.53
6 - 11	233	31.32	47.85
12 - 19	229	30.78	78.63
20 - 28	118	15.86	94.49
29 - 38	40	5.38	99.87
> 38	1	0.13	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

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



Total Number of Valid Hours: 744



Maximum Speed: 44 km/h on Jul 11 00:00	Maximum Daily Speed Average: 27.8 km/h on Jul 10	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 25 14:00	Minimum Daily Speed Average: 0.4 km/h on Jul 21	Hours of Data: 714
Maximum Diurnal Speed Average: 7.3 km/h at hour 12	Minimum Diurnal Speed Average: 2.7 km/h at hour 23	Hours of Missing Data: 30
Monthly Average Velocity: 4.4 km/h 203.5 deg	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 9 Median = 14 Q ₃ = 21 P ₉₀ = 29 P ₉₉ = 39	Percent Operational Time: 96.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	ENE6	NE3	WNW3	WSW4	SW2	SSW1	WSW2	SW7	SSW4	S4	S4	SSW3	SE2	SE2	NNW1	NNE11	ENE10	NNE1	WSW6	SW3	SSE3	SSW4	S5	SSE8	S1.2	NNE11
2-Jul	S8	SSE10	S7	S4	SSE5	SSE4	SE8	SSE7	SSE8	SE11	SE12	SE14	SE13	SE12	SE14	SE11	SSE13	SE15	SE19	SE24	SE29	SE33	SE32	SE35	SE14.3	SE35
3-Jul	SSE34	SSE33	SE29	SE33	SE31	SE29	SE31	SE35	SE35	SE37	SE37	SE38	SSE29	SE16	ESE12	SE20	SE21	SE22	SSE4	N4	N20	NNE16	NNE8	NNW8	SE20.3	SE38
4-Jul	WNW17	WNW36	WSW21	WSW22	WSW10	SW15	WSW19	SW17	SW15	WSW24	WSW32	WSW34	WSW34	WSW35	WSW37	WSW39	WSW34	WSW35	WSW32	WSW30	WSW30	WSW30	WSW38	W32	WSW27.1	WSW39
5-Jul	W31	W30	W19	SW8	WSW12	WSW10	SSW9	SSW12	SSW9	SSE7	SW10	WSW29	WSW27	WSW25	W24	WSW24	WSW20	NW13	NE13	NE6	NNE9	NNE19	NE12	SE13	WSW10.0	W31
6-Jul	SSE11	SSW11	WSW10	W17	W18	NNW13	NNW12	NW8	W7	WSW11	W17	WSW20	NNW16	NE19	E7	NNE8	NNW5	NNW6	WNW8	W10	NNW9	NNW11	UO	NW13	WNW7.1	WSW20
7-Jul	WNW15	NW20	NNW19	NW21	NW25	NW20	NW19	NW14	NW11	NNW11	NW10	NNW16	NNW14	NNW16	NNE17	NNE18	NNE22	NNE20	NNE16	NE14	NE16	NNE13	ENE7	ESE10	NNW12.1	NW25
8-Jul	SE12	SSE13	SSE14	S10	S16	SSE16	SSE15	SSE13	S14	SSE15	SSE17	SSE20	SSE19	S14	SW21	SSW20	E4	SE15	S17	SSW16	SSW19	SSW21	SSW17	SSW14	S13.9	SSW21
9-Jul	WSW10	SW11	NNW14	E10	SSE14	SSW10	S10	SSE14	SSE18	SSW26	SSW21	S17	SSW18	S22	SSW27	W34	W36	NNW13	SW21	SW28	WSW32	NW32	NW27	NNW22	SW12.8	W36
10-Jul	WNW22	W28	W30	W37	W39	W35	NNW12	WSW17	W15	W11	WSW16	W23	WNW23	WNW26	NNW28	NNW30	NW41	NW38	NW38	NNW38	NW38	NW42	NW42	NW44	WNW27.8	NW44
11-Jul	NW36	NNW33	NNW29	NW22	NW19	NNW22	NW17	NNW14	NNW12	W15	W21	W30	W26	W22	W21	NNW21	NNW23	NNW31	NNE28	NNE28	N20	N19	N20	N21	NW19.1	NW36
12-Jul	N26	N23	N22	N26	N19	N14	N10	N9	NW11	NW12	NW13	NW12	NNW11	NNW11	NW10	W7	WNW5	N6	NNE8	NE11	NE11	NE12	ENE14	ESE12	N10.4	N26
13-Jul	ESE14	SE17	SE20	SSE11	SE14	SE18	SE23	SE26	SE19	SE15	SSE11	SSE11	SSE13	SSE9	SSE8	SSE8	SSE8	SSE9	SSE11	S11	SSE13	SSE19	SSE21	SSE25	SSE14.3	SE26
14-Jul	SSE25	SSE25	SSE24	SSE23	SSE20	S20	S21	S19	SSE21	SSE18	SE16	SE19	SSE20	S18	SSW17	S14	S16	SSW15	SSW14	SSW15	SSW23	SW35	SW41	SW19	S18.6	SW21
15-Jul	SSW11	SSW14	S12	S16	S17	S17	S15	S14	SSE15	SSE14	SE17	SSE18	S15	SSW14	SSW16	SSW19	SSW17	SSW19	SSW20	SSW20	SSW23	SSW28	S10	SSW13	S15.6	SSW28
16-Jul	SSW13	WSW17	WSW13	NNW12	NNW19	NW12	WNW8	W12	N7	NNE10	NNE13	N10	N17	NNW14	NW6	WSW18	WSW18	WSW17	SW15	SW13	WSW30	W32	NE24	NE9	WNW8.4	W32
17-Jul	NNE11	NNW12	NNW16	NW12	NNW12	N10	N8	NNE4	NW2	WSW1	NNW2	WSW3	W7	W7	NNW3	NNE5	NNE4	ENE4	NE4	ENE4	SW9	NNW8	ENE7	N12	NNW4.9	NNW16
18-Jul	WNW4	NW7	N10	N16	N16	NNE12	NNE5	NW4	NW4	W5	SW4	SW4	SW7	WSW2	W2	ENE2	ESE7	SE10	SSW12	SW31	SSE24	WSW20	NW2	W2	WSW2.6	SW31
19-Jul	SSE14	SSE18	SSE10	SSE12	S9	S9	SSW9	SW5	WSW8	W14	W20	W32	W31	WSW30	NNW31	NNW28	NNW27	NNW24	NNW36	NNW29	NNW25	NNW23	NNW22	NW24	WNW11.6	NNW36
20-Jul	WNW21	WNW21	WNW14	WNW16	NNW18	NNW15	NNW15	NW10	NW5	NNW9	NNW12	N13	N15	N14	N11	NNE11	NNE11	NNE12	NE15	NE16	NE17	NE17	NE11	NNE9	NNW9.8	WNW21
21-Jul	NE7	NE5	ENE0	WNW5	WSW2	S2	SE2	SW1	SW4	NNW1	SSE1	E3	W4	NW5	N5	NNE5	N4	SE4	SE6	NW4	WNW3	ESE3	SE5	SSE6	NE0.4	NE7
22-Jul	S7	S10	S17	S9	S10	S13	S6	SSW6	S5	SE11	SSE12	SSE13	SE12	SE13	SSE11	SSE11	SSE12	SE18	SE22	SE26	SE26	SE33	SSE27	S24	SSE14.2	SSE33
23-Jul	SE20	SE19	SSE19	SSE22	SSE20	SSE20	SE15	SE21	SE22	SE24	SE28	SSE27	SE21	SE30	SE30	SE35	SE26	ESE27	ESE21	SE17	SE23	SE16	SE12	SSE13	SE21.6	SE35
24-Jul	S19	SSE22	SE26	SE27	SE26	SE35	SE32	SE27	SE28	SE20	SE18	SSE22	SE25	SE25	SE24	SE25	SE25	SE30	SE28	ESE24	ESE26	ESE20	SE23	SE22	SE24.4	SE35
25-Jul	E12	E17	ENE8	NE11	NNE16	NNE18	NNE16	NNE12	NE9	NE4	NE4	SSE4	W4	WNW0	S2	W5	SSE7	W1	NNW11	NNW8	NNW6	NW7	N6	NE8	NNE5.1	NNE18
26-Jul	ESE16	SE19	SE18	SE16	SSE3	SW0	W8	W3	SE4	SE7	SE10	SE12	SE15	SSE12	SSE12	SSW9	WSW19	W26	W18	NNW12	W21	W20	WSW13	WSW8	SSW6.2	W26
27-Jul	WSW6	SSW6	SW12	SW9	SW8	S8	S9	S11	SSE10	SSE6	WNW3	WSW9	W2	WSW10	WSW9	E18	SE18	S19	SSW20	SSW15	S14	SSE18	S18	SSE19	S9.1	SSW20
28-Jul	S16	S14	SSE13	SSE13	SSE16	SSE15	S14	S7	S6	SE10	SSE10	SE10	SSE5	SW8	SSW8	W12	WSW12	WSW12	SW11	SSW8	S12	SW10	SSW9	SSW10	S9.1	SSE16
29-Jul	SSW11	SW6	SW8	S7	SW10	WSW16	S21	SSE14	SW10	S9	SSE6	SSE6	S5	SSW8	NNE1	N6	N14	N12	NE8	ESE17	SE26	SE25	SSE31	SSE23	SSE7.3	SSE31
30-Jul	SE24	SE22	SSE12	SSE8	SSE6	SSE10	SE16	SSE13	SSE14	SSE11	SSE12	SSE14	S14	S10	SSE10	SSE10	SSE12	S15	S20	AF	AF	AF	AF	AF	SSE13.0	SE24
31-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---

SSW4.7	SSW5.2	SSW4.9	SSW4.2	SW4.3	SSW4.6	S5.1	S5.7	S6.0	S5.8	S5.8	SSW7.3	SSW6.0	SSW5.2	SW5.2	SW4.7	WSW3.6	SW2.8	SSW2.8	SSW3.4	SSW4.5	WSW3.6	S2.7	SSW3.4	Diurnal Average		
NNW36	WNW36	W30	W37	W39	W35	SE32	SE35	SE35	SE37	SE37	SE37	SE38	WSW34	WSW35	WSW37	WSW39	NW41	NW38	NW38	NNW38	NW38	NW42	NW42	NW44	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

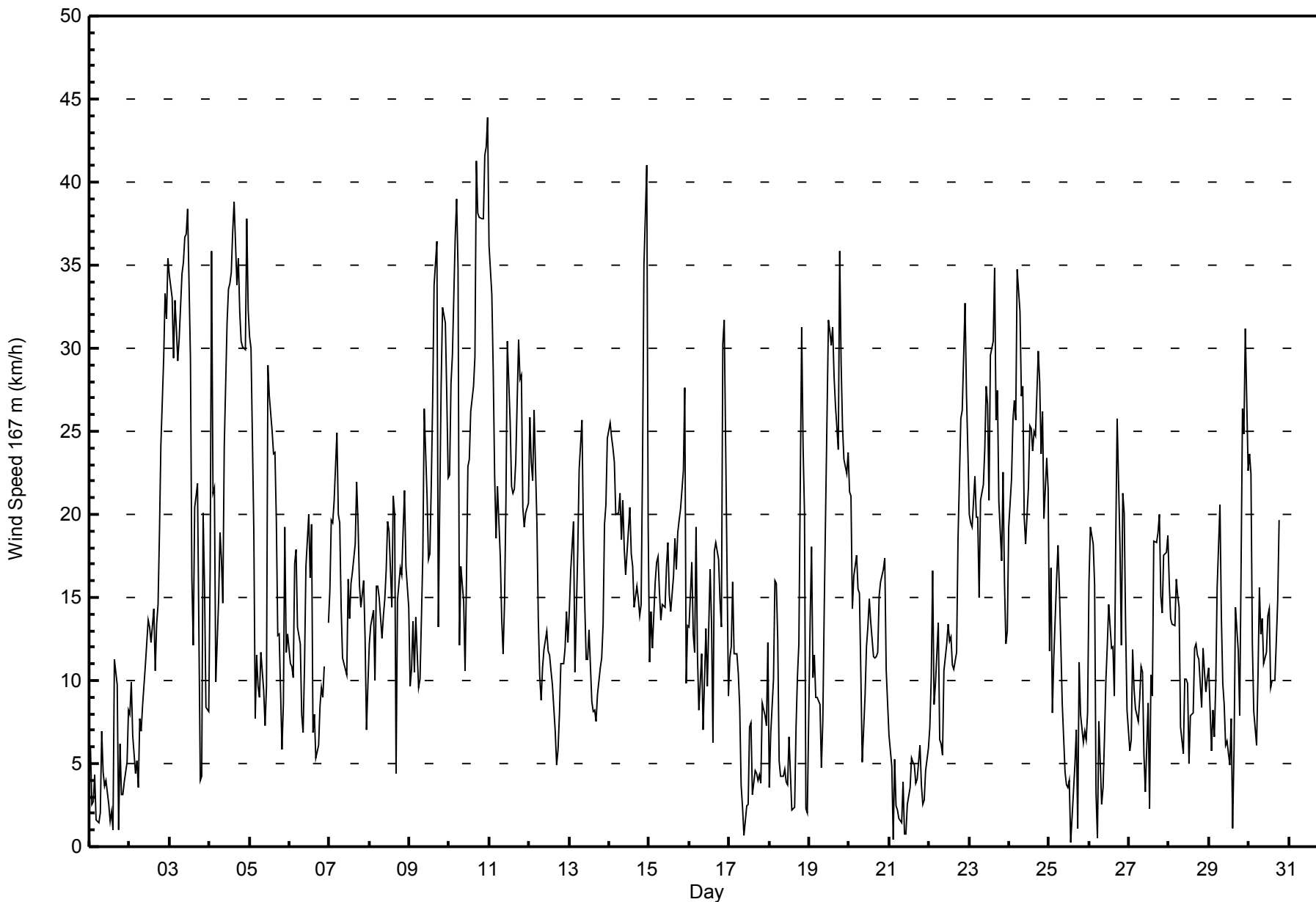
Lower Camp Met Tower - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744											
Maximum Value: 14 km/h on Jul 27 16:00														Hours of Data: 714											
Minimum Value: 1 km/h on Jul 1 05:00														Hours of Missing Data: 30											
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 9														Hours of Calibration: 0											
														Percent Operational Time: 96.0											
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-Jul	1	1	1	1	1	1	2	2	1	1	2	2	2	2	2	7	4	2	3	3	2	2	2	2	7
2-Jul	2	1	2	1	2	1	2	2	2	3	2	2	2	3	2	4	4	3	3	2	4	2	3	3	4
3-Jul	3	2	3	2	3	2	3	2	3	4	3	6	11	5	4	5	4	7	3	3	3	2	2	2	11
4-Jul	6	9	3	4	3	3	4	3	4	6	5	4	4	5	6	5	5	5	3	2	2	4	8	9	
5-Jul	3	2	6	5	3	2	2	3	3	2	7	6	5	5	5	4	5	3	5	2	1	11	6	5	11
6-Jul	7	5	3	3	5	6	2	4	4	6	3	4	8	7	2	4	2	3	2	3	4	2	UO	3	8
7-Jul	2	5	4	3	3	3	3	3	3	3	3	3	3	5	4	6	3	2	2	2	2	2	2	1	6
8-Jul	2	2	4	2	3	3	2	2	3	2	3	3	3	5	6	6	6	3	4	2	2	4	4	4	6
9-Jul	5	5	5	4	6	3	3	2	3	8	6	4	5	5	5	12	5	7	3	5	3	7	4	6	12
10-Jul	5	5	4	4	3	5	4	3	3	4	3	5	5	4	5	8	6	6	5	4	4	5	4	3	8
11-Jul	6	5	5	6	5	5	4	5	4	4	7	3	5	4	4	4	4	6	4	4	3	2	1	1	7
12-Jul	3	2	2	1	5	3	4	2	2	2	3	4	3	4	3	3	2	2	2	1	1	2	2	3	5
13-Jul	3	4	3	4	3	2	3	2	3	3	3	3	2	3	3	3	2	2	2	2	3	3	3	3	4
14-Jul	3	3	3	3	2	3	3	3	3	3	2	3	4	5	4	4	4	3	3	3	2	6	4	9	9
15-Jul	3	3	3	2	2	2	2	2	2	2	3	3	5	4	4	4	2	4	4	4	3	7	3	2	7
16-Jul	2	5	4	3	4	1	1	5	5	3	3	3	5	4	3	6	4	3	3	5	7	4	10	4	10
17-Jul	1	3	1	1	1	1	1	3	2	2	1	2	3	2	1	1	1	1	1	6	4	3	6	6	
18-Jul	2	2	2	3	2	3	2	2	2	3	3	3	3	2	2	2	2	3	14	7	8	11	4	2	14
19-Jul	4	4	4	3	2	2	2	2	3	5	4	6	6	4	6	6	5	6	6	4	7	4	2	2	7
20-Jul	4	2	3	1	2	2	2	3	3	4	3	3	4	6	5	5	5	2	3	2	1	1	2	1	6
21-Jul	1	1	1	1	1	1	1	1	1	1	1	2	3	3	2	2	2	3	1	2	1	1	1	2	3
22-Jul	2	3	2	4	3	2	1	1	1	2	2	2	2	3	4	4	4	3	2	3	2	4	5	4	5
23-Jul	2	2	2	2	3	2	2	2	2	3	5	6	5	7	5	5	5	6	6	3	6	2	6	6	7
24-Jul	6	3	3	2	3	2	3	3	2	3	4	5	4	4	4	3	4	6	4	3	5	5	4	4	6
25-Jul	4	7	3	3	2	3	5	3	3	3	3	2	3	2	3	4	4	5	2	2	1	2	2	1	7
26-Jul	6	2	3	2	3	2	2	1	2	1	4	3	3	4	3	4	6	4	3	4	2	2	3	4	6
27-Jul	2	2	2	3	1	1	2	2	2	3	3	4	3	4	3	14	6	4	5	3	4	3	3	4	14
28-Jul	3	2	2	3	3	3	4	2	1	2	2	2	4	4	5	4	4	3	3	2	2	3	2	2	5
29-Jul	3	2	3	3	4	10	7	4	3	2	1	2	2	3	2	3	3	2	1	8	3	4	3	3	10
30-Jul	3	2	4	2	2	3	2	2	2	2	2	4	4	4	5	4	4	4	3	AF	AF	AF	AF	AF	5
31-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
Diurnal Maximum																									
AF - Analyzer Failure UO - Unstable Operation																									



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

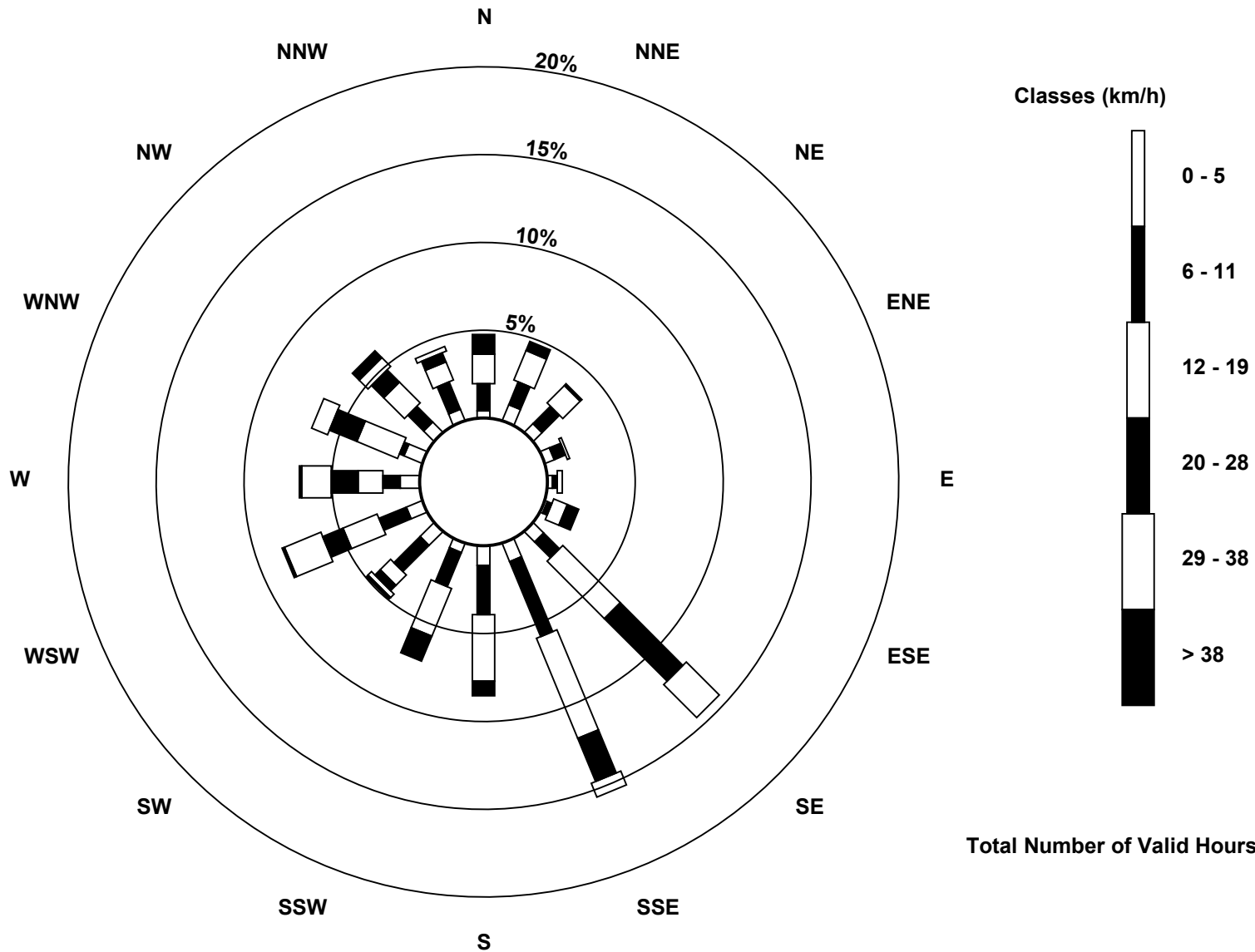
Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	90	12.61	12.61
6 - 11	174	24.37	36.97
12 - 19	238	33.33	70.31
20 - 28	136	19.05	89.36
29 - 38	69	9.66	99.02
> 38	7	0.98	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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





Direction of Maximum Speed: 243 deg on Jul 4 15:00																						Hours in Service: 744			
Direction of Maximum Daily Speed Average: 246.1 deg on Jul 4																						Hours of Data: 744			
Direction of Minimum Speed: 198 deg on Jul 21 08:00											Direction of Minimum Daily Speed Average: 0.5 deg on Jul 1											Hours of Missing Data: 0			
Monthly Average Direction: 293.1 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-Jul	43	345	333	108	100	45	303	36	139	143	135	157	87	110	92	0	359	276	249	264	127	334	339	53	107.2
2-Jul	115	53	343	33	24	51	123	107	131	152	127	135	147	115	119	133	151	152	143	116	122	134	134	139	131.3
3-Jul	136	139	138	129	127	119	123	134	136	134	136	143	159	105	66	136	131	138	156	342	345	354	326	306	131.6
4-Jul	304	296	234	220	160	199	228	230	239	238	252	251	251	251	243	253	248	249	250	242	237	246	242	262	246.1
5-Jul	256	251	261	166	142	145	145	164	181	146	172	253	253	253	274	247	248	295	46	314	341	352	344	158	235.7
6-Jul	350	22	272	274	281	301	338	329	254	238	254	249	290	40	166	9	64	269	325	282	348	316	325	298	288.4
7-Jul	54	334	79	325	357	68	93	20	337	356	328	341	340	338	27	352	2	27	21	39	328	96	342	278	0.2
8-Jul	52	114	127	117	117	126	133	154	144	142	148	134	138	168	212	206	349	120	166	163	170	141	92	98	149.4
9-Jul	119	120	125	138	132	124	126	142	146	204	194	181	178	154	196	262	280	286	224	217	237	312	324	308	203.1
10-Jul	284	268	267	266	267	270	287	245	249	266	247	269	303	301	289	302	321	318	313	293	303	312	300	299	287.0
11-Jul	322	335	341	352	3	331	320	303	288	280	269	264	272	260	278	302	303	297	359	9	347	336	333	315	306.8
12-Jul	341	345	341	346	350	340	307	312	313	310	310	319	324	327	323	270	246	344	352	22	2	339	343	358	325.4
13-Jul	36	357	338	354	356	32	121	133	126	133	157	165	155	154	161	156	153	152	150	148	137	135	143	140	140.3
14-Jul	144	148	147	156	152	138	145	152	147	144	136	137	149	158	187	185	174	193	196	184	179	190	213	119	161.4
15-Jul	125	141	139	142	146	149	151	145	144	147	130	135	161	195	209	210	193	196	195	191	167	164	124	133	159.4
16-Jul	145	151	118	200	312	328	319	317	15	323	360	339	338	333	316	262	248	235	228	213	226	267	7	351	264.8
17-Jul	326	330	321	321	334	355	60	280	235	187	346	175	293	295	17	3	20	38	332	311	258	343	357	337	327.7
18-Jul	312	336	338	323	308	308	290	294	262	240	224	232	217	241	283	66	115	137	212	237	184	233	101	75	240.0
19-Jul	141	149	135	141	149	153	160	215	240	263	271	277	269	244	300	298	299	336	342	332	325	316	314	328	279.8
20-Jul	2	352	310	320	329	337	323	325	323	3	343	350	350	354	0	359	27	28	36	27	3	351	358	15	354.0
21-Jul	336	343	338	82	21	24	345	198	87	84	194	83	251	302	27	24	55	140	130	340	195	180	350	118	34.5
22-Jul	33	132	131	111	106	121	123	128	126	128	134	129	121	138	156	156	150	151	152	163	146	154	161	157	138.8
23-Jul	144	153	110	78	65	103	29	279	127	130	141	157	125	135	132	145	131	111	108	107	146	83	340	326	131.3
24-Jul	113	147	134	155	100	137	136	133	135	134	145	155	133	136	142	139	137	137	135	113	118	119	126	119	134.8
25-Jul	30	65	342	336	343	334	348	343	348	347	353	154	221	201	340	290	143	3	346	312	311	330	349	337	345.1
26-Jul	65	82	27	337	332	318	327	1	118	154	145	132	135	160	162	198	252	261	264	281	260	287	124	141	212.3
27-Jul	139	132	137	139	139	136	133	132	142	135	17	241	137	246	254	92	145	164	172	158	148	147	153	138	147.0
28-Jul	150	154	156	160	159	150	160	145	146	132	133	143	132	222	201	296	256	253	220	176	58	128	139	137	163.1
29-Jul	130	134	127	119	119	155	163	152	226	138	112	132	157	189	59	359	347	338	347	48	140	151	146	152	140.4
30-Jul	123	135	25	107	57	125	142	141	144	137	149	155	173	158	148	153	149	166	161	150	330	72	356	184	146.1
31-Jul	171	104	353	57	95	329	132	134	85	342	12	0	359	360	21	350	355	337	349	340	336	333	344	339	358.4
125.8 144.8 155.5 152.3 142.3 145.5 143.5 152.4 155.0 161.1 172.4 186.5 199.5 210.0 218.6 244.9 231.8 225.0 213.2 219.6 213.7 212.2 159.1 142.0																									
Diurnal Average																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

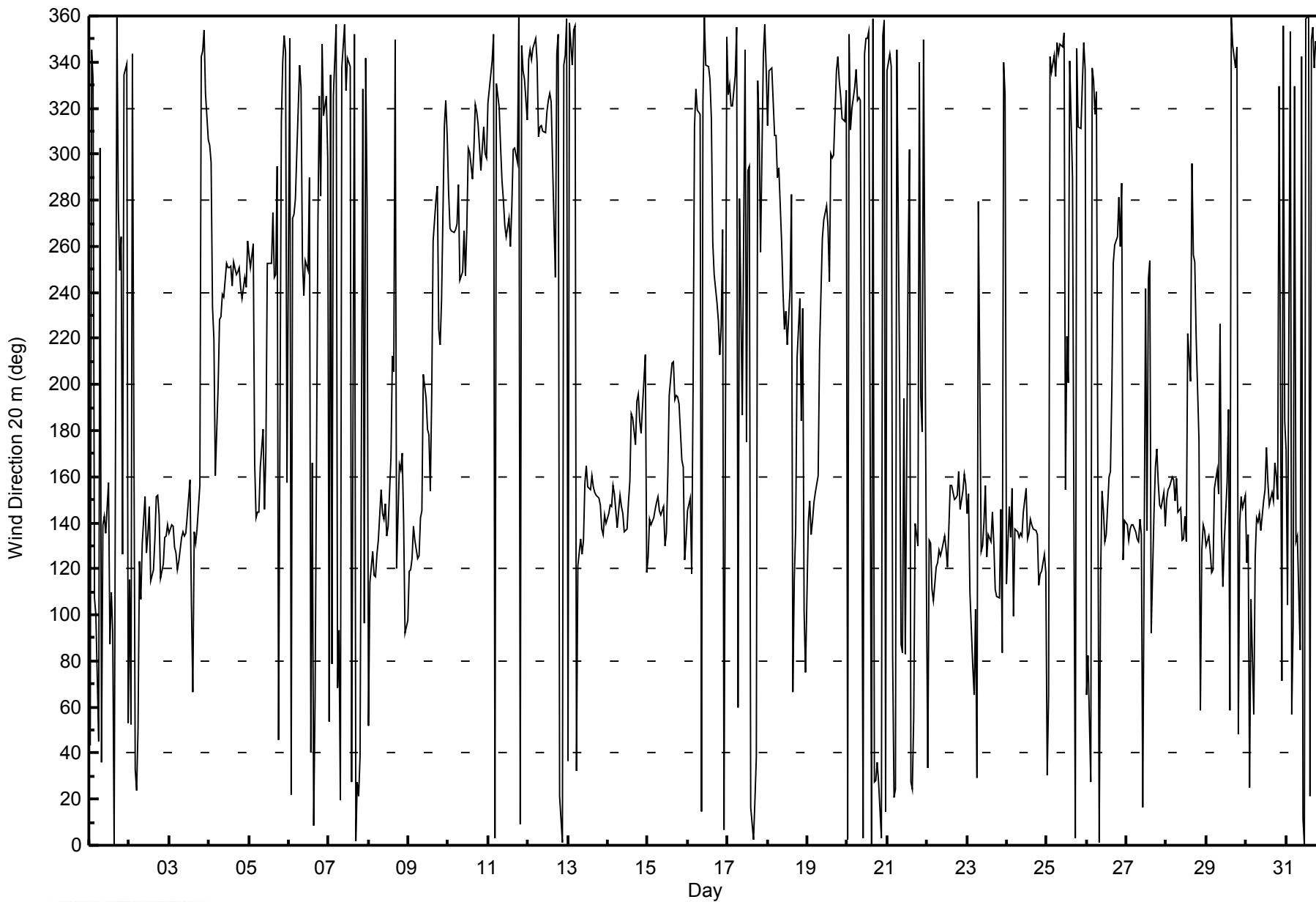
Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 115 deg on Jul 23 08:00		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 7 deg on Jul 14 21:00																									
Percentiles: P ₁ = 10 P ₁₀ = 16 Q ₁ = 19 Median = 27 Q ₃ = 50 P ₉₀ = 72 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-Jul	93	81	84	83	61	55	59	52	26	19	36	44	59	93	97	32	80	38	21	80	29	87	93	82	97
2-Jul	59	71	50	83	45	73	71	48	19	22	22	22	22	27	25	31	23	24	22	14	16	16	16	17	83
3-Jul	17	18	23	19	16	17	17	16	17	17	17	20	35	91	47	32	23	22	75	18	18	25	33	43	91
4-Jul	28	25	28	14	27	19	27	18	25	21	23	20	19	21	18	19	19	18	14	11	16	13	20	20	28
5-Jul	15	16	75	72	33	12	16	21	20	24	57	22	22	23	29	22	23	55	67	78	38	35	72	61	78
6-Jul	91	76	83	25	43	64	29	45	60	39	23	27	54	71	36	82	69	63	51	59	70	56	23	36	91
7-Jul	55	77	99	65	38	73	28	43	39	30	29	24	34	27	41	40	26	33	28	31	63	80	89	70	99
8-Jul	88	79	20	19	24	24	39	13	18	15	15	19	16	41	26	20	91	25	26	10	10	25	18	17	91
9-Jul	84	60	90	15	55	59	20	17	16	39	20	17	22	21	13	33	21	74	13	13	19	21	16	20	90
10-Jul	18	19	19	19	18	22	41	22	26	37	25	26	26	26	24	25	19	19	19	19	19	17	19	19	41
11-Jul	33	26	25	32	34	68	28	31	32	27	30	21	26	25	30	23	32	21	23	24	22	17	15	27	68
12-Jul	15	16	15	16	55	82	75	33	25	23	27	35	39	33	40	50	54	50	33	26	73	70	33	49	82
13-Jul	20	33	26	51	31	84	25	17	21	24	20	18	14	21	28	26	24	18	14	15	11	9	9	13	84
14-Jul	12	15	23	31	40	19	16	11	16	17	19	17	14	22	19	21	18	17	16	12	7	11	16	50	50
15-Jul	11	10	12	12	13	9	10	14	14	14	21	18	24	24	21	14	13	10	10	11	12	23	37	12	37
16-Jul	12	20	71	38	33	82	30	65	49	33	28	21	22	31	52	47	22	19	20	22	11	41	57	74	82
17-Jul	21	17	16	61	68	80	52	64	66	83	73	58	44	34	39	23	18	72	28	84	69	88	52	40	88
18-Jul	89	28	30	26	18	15	18	40	57	55	49	60	46	67	100	71	33	24	61	24	32	61	69	69	100
19-Jul	29	22	42	15	15	12	19	45	47	29	28	21	21	20	21	22	28	24	20	22	22	15	13	22	47
20-Jul	25	27	36	19	50	38	21	28	72	39	32	30	25	32	50	37	37	41	30	30	25	65	86	64	86
21-Jul	38	57	84	61	54	58	51	94	69	48	76	56	83	80	46	36	40	46	73	45	71	83	75	89	94
22-Jul	69	20	17	21	29	17	16	16	16	21	21	16	22	25	30	35	26	25	18	17	24	13	14	21	69
23-Jul	43	69	47	40	31	38	64	115	32	21	21	18	65	34	20	17	21	29	33	79	23	62	70	55	115
24-Jul	79	13	16	18	69	16	16	16	17	20	23	19	20	20	22	19	22	19	19	20	23	24	18	29	79
25-Jul	37	52	27	20	46	22	35	34	36	71	101	30	68	70	70	78	82	75	22	38	23	66	53	45	101
26-Jul	83	87	76	22	18	29	35	44	55	22	28	21	22	31	29	47	29	19	21	33	15	32	54	52	87
27-Jul	39	13	25	13	12	16	19	17	16	24	67	72	71	43	34	74	48	34	22	29	36	24	14	27	74
28-Jul	16	9	12	14	26	39	16	14	13	19	21	27	60	60	59	40	44	37	18	40	60	54	62	49	62
29-Jul	35	40	44	51	73	68	33	62	44	24	25	30	63	34	70	34	13	20	17	59	22	12	17	17	73
30-Jul	46	20	75	32	37	20	24	22	17	21	19	23	21	41	29	36	20	18	12	17	51	74	95	68	95
31-Jul	65	66	44	57	87	67	64	31	42	52	35	30	26	30	34	23	35	26	75	26	24	25	25	22	87
	93	87	99	83	87	84	75	115	72	83	101	72	83	93	100	82	91	75	75	84	73	88	95	89	
	Diurnal Maximum																								



WBEA NETWORK
Hourly Averages

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg

Lower Camp Met Tower - July 2014

Direction of Maximum Speed: 254 deg on Jul 4 16:00												Hours in Service: 744	
Direction of Maximum Daily Speed Average: 248.2 deg on Jul 4												Hours of Data: 744	
Direction of Minimum Speed: 335 deg on Jul 1 22:00						Direction of Minimum Daily Speed Average: 0.8 deg on Jul 1						Hours of Missing Data: 0	
Monthly Average Direction: 281.4 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-Jul	299	339	349	162	169	90	323	35	138	142	140	160	96	105	72	7	30	281	249	243	130	335	66	133	120.8
2-Jul	140	141	345	52	113	106	118	115	137	149	130	137	146	117	123	134	150	150	140	120	125	136	136	140	134.0
3-Jul	137	137	137	134	132	124	127	137	139	136	137	144	160	116	79	135	135	140	156	345	349	358	342	320	132.1
4-Jul	305	296	237	223	173	200	232	233	243	241	253	253	252	253	244	254	249	250	252	244	239	247	243	260	248.2
5-Jul	260	254	261	172	150	155	156	167	182	144	182	255	255	254	274	249	249	302	53	333	345	357	354	159	244.0
6-Jul	336	104	244	272	277	304	336	335	257	242	257	251	292	47	164	24	62	292	328	281	357	318	331	319	291.9
7-Jul	25	306	321	327	357	15	75	359	341	3	331	344	345	341	35	4	8	32	27	41	16	288	337	273	2.9
8-Jul	263	135	133	129	127	132	137	154	144	144	147	139	142	173	214	206	57	119	168	171	176	155	108	102	152.4
9-Jul	117	127	240	142	141	129	130	142	144	209	195	180	178	155	196	265	281	290	226	218	239	316	329	312	209.0
10-Jul	284	268	266	265	267	268	286	248	253	271	249	268	304	304	290	303	324	321	315	293	302	310	298	298	287.6
11-Jul	315	326	337	350	358	330	323	305	292	279	269	265	273	263	279	301	303	299	8	16	357	348	350	346	310.4
12-Jul	345	347	344	349	356	354	324	317	317	315	310	322	330	332	328	275	256	353	1	46	57	4	356	11	334.8
13-Jul	48	30	13	14	38	85	125	136	130	135	156	162	156	154	157	152	152	151	154	155	146	143	145	142	141.2
14-Jul	144	144	143	149	151	142	148	151	145	143	139	140	151	159	188	185	177	193	196	185	180	192	214	131	161.3
15-Jul	129	144	142	142	147	149	151	146	144	146	133	139	162	197	210	210	192	194	194	191	174	169	130	137	160.0
16-Jul	147	160	145	229	314	326	348	304	24	331	14	343	343	337	322	265	250	238	231	215	228	265	23	2	271.6
17-Jul	344	353	339	352	11	54	55	294	246	205	0	177	290	295	19	6	24	55	351	333	235	353	13	340	342.8
18-Jul	306	347	354	358	336	332	296	297	265	250	233	234	224	248	302	67	115	140	218	239	183	238	96	75	248.0
19-Jul	140	145	135	142	149	154	163	219	243	266	274	278	269	247	302	299	301	340	345	338	332	323	320	326	287.5
20-Jul	355	345	305	308	316	334	325	330	320	8	347	358	355	359	2	8	29	34	38	32	25	352	349	352	357.1
21-Jul	341	3	303	50	308	53	11	62	93	76	198	84	252	311	28	23	46	140	130	331	203	180	294	60	33.2
22-Jul	67	140	137	123	120	132	129	134	131	133	138	136	127	138	157	156	150	146	146	148	132	145	157	157	140.2
23-Jul	145	144	131	111	81	115	74	94	129	134	140	154	126	136	134	144	132	112	112	120	145	111	345	318	132.7
24-Jul	129	145	136	146	122	139	138	136	138	135	145	153	135	136	143	141	137	137	136	117	121	121	130	120	136.0
25-Jul	45	77	351	344	355	341	355	353	358	355	12	155	231	206	353	294	146	359	348	322	322	333	354	343	353.7
26-Jul	80	113	89	2	350	344	344	4	114	155	145	133	137	161	164	201	255	262	265	283	260	266	143	147	215.0
27-Jul	150	140	143	146	146	141	136	136	144	134	18	242	131	246	254	95	143	162	174	159	149	149	151	142	149.5
28-Jul	152	154	155	159	157	149	158	146	145	132	136	143	132	223	208	295	258	259	223	189	136	113	141	140	163.9
29-Jul	138	141	140	131	143	168	167	148	227	142	114	134	158	189	61	3	355	341	348	63	138	149	143	147	141.1
30-Jul	126	133	104	125	114	133	142	141	143	138	149	155	174	158	149	156	153	168	165	154	332	64	68	173	144.6
31-Jul	174	123	13	59	108	13	138	136	88	360	23	9	5	8	28	355	4	344	353	346	342	342	350	344	4.6

133.1 148.5 162.2 158.9 151.4 147.5 144.2 153.7 155.0 163.8 175.5 193.3 207.1 214.7 223.2 253.8 243.2 234.7 221.1 229.1 216.7 227.9 116.7 137.2																							
Diurnal Average																							

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



Summary of Hour Standard Deviations

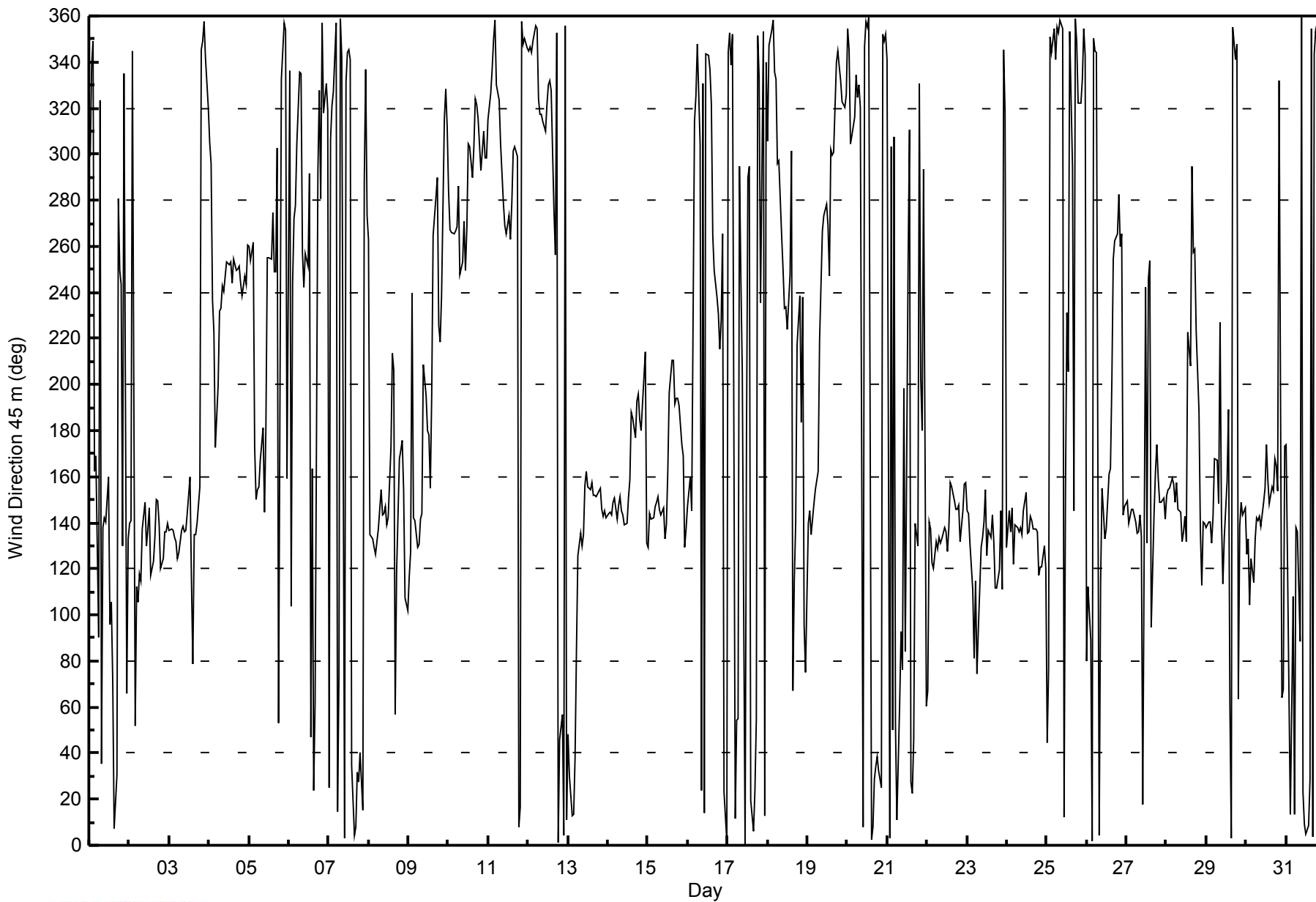
Lower Camp Met Tower - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																	Hours in Service: 744								
Maximum Value: 108 deg on Jul 1 22:00																	Hours of Data: 744								
Minimum Value: 4 deg on Jul 14 21:00																	Hours of Missing Data: 0								
Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 14 Median = 21 Q ₃ = 42 P ₉₀ = 69 P ₉₉ = 94																	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-Jul	79	94	71	71	86	57	66	58	22	15	24	42	50	82	91	29	77	38	17	73	18	108	96	46	108
2-Jul	39	52	81	86	56	66	57	40	15	16	17	16	17	20	22	26	20	19	15	8	10	10	11	11	86
3-Jul	11	13	15	11	9	11	11	11	11	11	13	16	33	97	36	26	16	17	72	14	15	18	24	38	97
4-Jul	23	16	25	11	25	19	25	14	18	14	14	16	12	14	13	12	8	7	10	7	10	7	16	16	25
5-Jul	11	9	57	70	27	13	19	16	16	22	55	15	14	16	22	15	16	57	47	71	17	27	63	62	71
6-Jul	99	87	71	17	40	58	27	38	61	39	18	20	59	46	42	72	50	61	42	49	66	41	15	31	99
7-Jul	68	75	58	47	26	83	73	40	32	26	25	22	29	24	30	36	20	19	14	14	66	94	86	46	94
8-Jul	78	41	12	12	22	17	30	9	14	10	11	14	12	37	24	20	86	18	24	7	6	16	18	10	86
9-Jul	69	56	90	20	38	39	15	13	12	38	20	14	22	21	14	32	15	69	10	11	16	18	12	19	90
10-Jul	14	12	12	11	11	14	32	14	19	36	16	17	22	20	17	21	13	13	14	11	12	12	12	13	36
11-Jul	25	21	20	22	28	50	19	25	24	20	27	13	20	21	24	15	30	15	19	16	18	11	6	20	50
12-Jul	11	10	8	11	45	61	64	27	19	19	23	32	32	29	29	46	67	46	26	13	88	39	29	39	88
13-Jul	18	64	44	37	31	57	17	13	18	19	16	14	10	18	23	22	24	14	12	13	8	5	6	8	64
14-Jul	9	12	15	20	19	14	15	9	13	13	14	13	12	21	17	19	15	17	16	9	4	12	12	42	42
15-Jul	8	6	8	9	10	7	7	10	11	12	14	13	23	23	20	14	13	10	11	11	9	20	32	7	32
16-Jul	7	21	57	34	19	65	30	62	37	25	21	16	16	17	60	46	15	13	16	22	9	40	53	72	72
17-Jul	9	12	10	78	71	61	38	64	71	79	61	61	39	31	32	17	16	38	26	74	76	61	39	36	79
18-Jul	78	24	21	19	17	17	14	32	55	53	45	53	42	69	86	52	26	17	58	20	31	56	70	62	86
19-Jul	24	20	31	12	13	10	17	43	43	21	21	15	15	16	14	17	22	16	13	15	14	10	8	14	43
20-Jul	18	21	35	17	28	27	16	25	69	32	27	25	20	30	42	31	26	27	18	15	16	20	34	24	69
21-Jul	37	27	67	73	84	54	52	91	68	40	73	56	83	78	36	27	35	45	70	23	82	52	74	75	91
22-Jul	72	13	13	14	16	12	12	12	13	16	15	14	17	19	23	30	22	20	15	17	16	11	13	19	72
23-Jul	22	49	42	34	38	26	64	97	22	17	16	16	43	22	15	14	17	21	25	74	20	50	63	88	97
24-Jul	92	9	10	14	55	10	10	12	12	15	20	17	15	16	17	15	18	14	14	15	18	19	13	19	92
25-Jul	32	45	30	13	33	15	24	24	30	68	95	23	67	83	83	63	75	81	15	24	22	43	42	32	95
26-Jul	70	82	81	74	12	27	29	39	48	15	22	16	17	27	25	45	26	12	13	29	10	20	62	48	82
27-Jul	20	9	12	12	9	12	13	13	12	20	66	68	74	40	30	73	32	32	17	25	23	19	12	16	74
28-Jul	13	7	10	13	18	26	13	10	10	16	15	21	55	55	53	34	38	30	18	31	56	28	18	16	56
29-Jul	17	27	20	22	53	68	31	53	40	21	17	22	57	33	81	29	11	14	13	55	16	11	14	14	81
30-Jul	30	12	87	15	18	14	19	17	14	14	14	19	19	36	23	34	17	15	9	12	52	69	98	69	98
31-Jul	48	90	44	51	80	60	58	24	32	43	27	24	20	24	23	20	28	20	73	19	14	17	18	15	90
99 94 90 86 86 83 73 97 71 79 95 68 83 97 91 73 86 81 73 74 88 108 98 88																									
Diurnal Maximum																									



WBEA NETWORK
Hourly Averages

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





Summary of Hour Averages

Lower Camp Met Tower - July 2014

Direction of Maximum Speed: 331 deg on Jul 30 21:00 Direction of Maximum Daily Speed Average: 290.2 deg on Jul 10																				Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0						
Direction of Minimum Speed: 182 deg on Jul 19 00:00										Direction of Minimum Daily Speed Average: 1.3 deg on Jul 21										Percent Operational Time: 100.0						
Monthly Average Direction: 242.8 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-Jul	35	98	351	133	150	148	212	245	146	136	157	172	119	115	27	13	62	303	243	238	156	192	161	150	144.6	
2-Jul	153	145	136	137	143	135	126	138	147	144	138	138	145	127	129	138	150	144	139	133	134	137	140	143	139.1	
3-Jul	145	145	143	141	139	136	136	140	142	139	141	146	163	124	104	139	141	143	157	353	358	8	3	330	137.1	
4-Jul	299	293	246	238	223	215	238	235	242	239	253	254	251	252	243	253	248	248	248	250	245	244	252	249	260	250.3
5-Jul	262	261	260	207	209	211	195	196	194	150	195	254	253	253	273	248	249	310	54	24	4	5	21	144	253.5	
6-Jul	158	186	247	266	268	297	310	328	265	247	258	254	294	52	131	32	34	322	302	275	354	327	333	333	293.4	
7-Jul	301	314	307	317	331	310	311	306	332	348	327	334	339	336	37	24	14	34	31	44	42	21	35	64	352.1	
8-Jul	140	144	153	167	179	150	150	162	153	151	147	143	151	181	219	211	72	122	178	184	185	181	169	167	164.4	
9-Jul	200	207	288	127	166	169	146	146	144	209	202	187	188	163	201	268	281	291	228	223	248	315	323	304	227.2	
10-Jul	284	272	271	263	263	269	286	250	256	273	250	267	306	303	291	305	323	321	316	294	302	308	299	302	290.2	
11-Jul	303	304	313	326	328	309	316	302	294	279	271	268	274	264	280	302	301	302	13	19	6	357	343	340	310.6	
12-Jul	341	345	344	348	350	347	2	335	323	321	312	320	331	337	328	279	272	5	18	54	55	59	49	80	347.7	
13-Jul	110	142	144	158	147	138	139	140	135	136	154	161	154	154	154	150	152	161	170	161	154	154	155	155	149.1	
14-Jul	155	150	151	151	149	154	165	157	147	145	140	142	157	163	194	190	186	200	202	195	196	214	221	192	168.9	
15-Jul	159	174	155	154	157	164	163	152	149	150	140	153	173	204	214	213	195	199	203	203	189	187	158	169	172.4	
16-Jul	179	229	245	276	297	287	260	272	20	7	22	351	349	346	316	262	252	239	232	223	238	271	38	27	281.7	
17-Jul	346	335	343	316	320	8	19	340	282	228	7	209	283	287	10	10	28	71	40	70	224	359	43	352	342.1	
18-Jul	289	344	338	353	355	2	326	304	291	266	237	238	233	256	298	69	117	140	213	235	174	240	63	182	257.6	
19-Jul	148	146	141	154	160	165	178	229	248	267	275	276	267	250	303	301	303	341	349	344	341	338	327	312	294.4	
20-Jul	302	300	283	281	291	298	302	314	316	4	347	359	358	359	6	15	30	36	40	36	51	44	26	10	349.6	
21-Jul	38	351	344	345	61	139	116	84	134	61	189	93	273	316	15	22	29	140	127	321	300	111	139	143	36.0	
22-Jul	162	172	167	154	164	169	157	146	139	135	145	142	137	139	160	153	149	142	145	144	136	145	153	165	148.9	
23-Jul	143	145	149	148	151	140	136	133	137	137	143	152	131	138	134	144	132	113	116	132	148	141	136	148	138.6	
24-Jul	166	157	144	144	142	145	142	139	141	137	147	153	138	139	142	142	135	139	139	122	124	126	133	126	139.7	
25-Jul	76	92	30	5	13	358	8	10	24	19	29	162	251	203	344	285	158	347	346	340	342	336	347	348	9.5	
26-Jul	114	133	136	142	354	338	284	329	120	150	138	138	139	159	162	201	253	263	263	284	260	253	221	193	205.6	
27-Jul	204	184	212	190	186	156	147	147	149	141	326	238	198	245	252	106	140	167	191	172	158	157	158	148	163.8	
28-Jul	162	161	161	159	155	151	160	159	148	135	142	142	136	223	211	285	253	256	228	199	173	193	166	177	172.8	
29-Jul	169	172	178	157	198	215	178	152	226	162	126	142	161	186	60	359	5	349	13	108	141	143	145	146	151.8	
30-Jul	143	147	159	151	139	150	148	142	146	147	150	158	179	163	155	161	159	173	170	152	331	60	72	143	146.1	
31-Jul	181	162	33	81	168	120	151	153	103	37	27	16	11	13	30	360	16	350	3	355	356	358	1	356	12.2	
179.0 190.1 197.3 187.4 189.4 179.0 164.9 164.2 156.9 161.9 174.3 192.8 209.9 209.6 222.6 251.5 244.7 235.0 217.7 208.6 212.3 224.3 158.7 171.0																										
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 100 m (WD100m) - deg

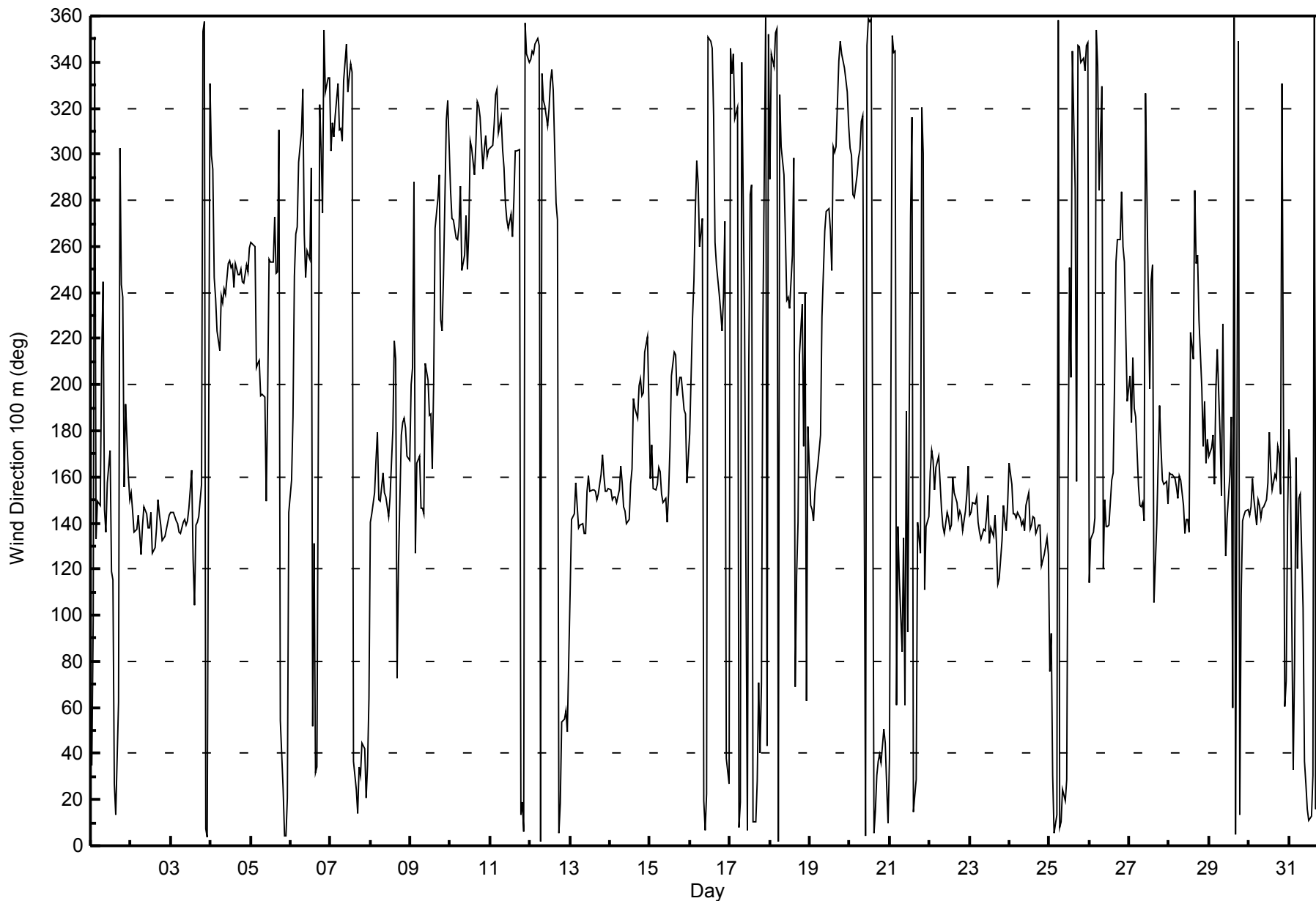
Lower Camp Met Tower - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 113 deg on Jul 21 09:00 Minimum Value: 3 deg on Jul 3 04:00 Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 9 Median = 14 Q ₃ = 25 P ₉₀ = 51 P ₉₉ = 88																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	24	72	72	54	6	58	79	53	46	14	23	54	56	75	93	36	26	73	22	50	33	26	56	7	93
2-Jul	10	13	11	26	7	7	19	16	10	8	11	9	10	14	11	19	18	14	8	4	4	5	4	3	26
3-Jul	3	3	5	3	3	4	4	4	4	5	6	11	27	40	12	14	9	8	65	19	9	10	19	16	65
4-Jul	21	13	17	6	24	14	18	10	13	10	10	11	9	10	10	8	10	9	9	5	4	7	5	8	24
5-Jul	7	5	15	51	31	20	14	16	17	23	51	10	10	14	17	10	11	56	26	36	14	20	61	46	61
6-Jul	50	41	28	12	29	45	19	25	55	35	13	15	61	22	49	60	50	48	35	33	56	27	18	25	61
7-Jul	19	11	13	10	9	16	12	16	18	17	18	15	20	21	20	17	10	10	7	9	7	12	14	49	49
8-Jul	24	5	10	12	23	8	9	9	8	7	6	5	9	34	18	17	80	14	19	5	4	9	24	37	80
9-Jul	88	60	46	46	21	26	11	6	5	33	18	13	22	19	12	30	12	34	8	7	14	13	6	15	88
10-Jul	11	9	10	4	5	7	22	11	15	32	13	12	18	15	15	18	8	8	10	6	7	5	4	5	32
11-Jul	8	9	12	15	18	16	13	18	20	15	22	8	16	18	20	11	26	10	10	7	7	8	3	4	26
12-Jul	4	4	4	3	12	26	30	24	12	14	15	21	23	25	22	37	51	35	23	8	3	5	18	25	51
13-Jul	17	16	11	29	8	9	7	5	8	10	12	10	8	14	18	17	14	12	13	11	8	5	4	6	29
14-Jul	5	4	5	4	5	8	8	7	5	5	5	6	10	21	15	16	16	16	14	12	8	6	4	30	30
15-Jul	17	11	11	7	8	7	7	6	5	9	7	9	24	19	16	12	12	10	10	11	8	14	26	7	26
16-Jul	13	32	51	16	10	12	10	17	40	26	14	16	13	11	49	18	9	10	11	16	8	38	33	58	58
17-Jul	7	10	7	15	29	47	34	71	62	96	50	84	28	24	26	12	14	15	20	12	52	52	53	33	96
18-Jul	59	18	10	10	8	19	26	27	40	52	43	49	38	87	79	46	20	11	52	22	32	48	80	92	92
19-Jul	13	11	14	12	9	12	18	33	25	15	17	11	11	13	10	12	18	14	9	9	10	8	4	9	33
20-Jul	17	12	13	7	11	11	7	18	53	21	18	17	14	23	32	18	20	17	10	9	8	9	11	5	53
21-Jul	20	19	6	33	23	11	31	69	113	60	95	56	78	55	33	25	32	67	28	13	53	20	44	22	113
22-Jul	36	17	12	9	14	8	9	9	8	8	8	7	9	12	24	27	16	10	5	5	3	4	11	12	36
23-Jul	5	4	6	10	25	13	24	9	5	6	11	12	15	9	9	6	12	12	15	20	15	8	71	58	71
24-Jul	23	10	4	3	8	3	4	6	4	8	20	15	7	8	9	8	12	7	7	8	11	10	8	8	23
25-Jul	37	28	30	8	13	12	20	22	26	76	82	23	66	90	90	45	63	87	10	9	10	9	17	18	90
26-Jul	49	14	11	25	81	22	27	39	44	13	13	10	12	25	23	38	20	7	8	26	5	5	71	33	81
27-Jul	21	14	15	22	23	7	7	6	8	14	74	45	90	31	29	77	20	25	17	21	16	10	11	9	90
28-Jul	9	5	6	9	9	9	10	10	9	7	11	13	56	53	54	23	32	20	11	26	18	31	16	16	56
29-Jul	18	17	15	13	27	40	30	36	36	18	14	14	49	34	76	33	7	10	10	35	4	4	3	3	76
30-Jul	8	5	16	8	16	6	4	8	6	9	10	15	19	31	21	27	16	13	6	8	60	39	65	68	68
31-Jul	24	67	57	34	46	94	9	11	27	33	18	15	13	16	14	17	21	16	61	16	8	11	10	9	94
Diurnal Maximum																									



WBEA NETWORK
Hourly Averages

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





Maximum Value: 0.8 km/h on Jul 8 20:00		Maximum Daily Average: 0.2 km/h on Jul 14		Hours in Service: 744																						
Minimum Value: -1.6 km/h on Jul 30 21:00		Minimum Daily Average: -0.8 km/h on Jul 10		Hours of Data: 744																						
Maximum Diurnal Average: 0.0 km/h at hour 9		Minimum Diurnal Average: -0.3 km/h at hour 16		Hours of Missing Data: 0																						
Monthly Average: -0.19 km/h		Percentiles: P ₁ = -1.1 P ₁₀ = -0.7 Q ₁ = -0.4 Median = -0.2 Q ₃ = 0.1 P ₉₀ = 0.3 P ₉₉ = 0.5		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.3	-0.2	0.2	0.2	-0.1	0.1	-0.5	0.0	-0.2	-0.7	-0.4	-0.2	-0.3	-0.3	0.0	-0.1	-0.1	-0.1	-0.2	0.2
2-Jul	0.0	-0.1	-0.1	-0.2	-0.1	-0.1	-0.3	-0.3	0.1	0.1	-0.3	-0.1	0.2	-0.2	-0.2	0.0	0.2	0.3	0.1	-0.3	-0.1	0.0	-0.1	0.3	-0.1	0.3
3-Jul	0.1	0.1	0.1	-0.2	-0.2	-0.4	-0.4	0.5	0.5	0.1	0.2	0.5	0.2	-0.3	-0.4	0.1	-0.2	0.0	0.0	-0.3	-0.6	-0.5	-0.4	-0.4	-0.1	0.5
4-Jul	-0.5	-0.9	-0.3	-0.1	0.2	0.0	-0.2	-0.2	-0.2	-0.2	-0.5	-0.5	-0.8	-0.6	-0.6	-1.0	-0.6	-0.7	-0.7	-0.3	-0.4	-0.5	-0.4	-0.5	-0.4	0.2
5-Jul	-0.5	-0.4	-0.2	0.0	0.1	0.3	0.3	0.5	0.2	0.1	0.0	-0.8	-0.6	-0.5	-0.5	-0.4	-0.5	-0.8	-0.4	-0.3	-0.3	-0.4	-0.4	0.0	-0.2	0.5
6-Jul	-0.4	-0.2	-0.2	-0.5	-0.6	-0.4	-0.6	-0.4	-0.2	-0.4	-0.2	-0.6	-0.9	-0.5	0.1	-0.4	-0.3	-0.2	-0.3	-0.5	-0.5	-0.4	-0.6	-0.5	-0.4	0.1
7-Jul	-0.2	-0.2	-0.1	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.6	-0.5	-0.7	-0.6	-0.7	-0.6	-0.7	-0.5	-0.5	-0.5	-0.4	-0.1	0.0	-0.1	-0.1	-0.4	0.0
8-Jul	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	0.1	0.4	0.3	0.3	0.2	0.5	0.3	0.3	-0.2	-0.1	-0.4	-0.3	0.5	0.8	0.7	0.5	-0.4	-0.3	0.1	0.8
9-Jul	-0.1	0.1	-0.1	0.1	0.0	-0.1	-0.3	0.1	0.3	0.0	0.3	0.3	0.3	0.5	0.1	-1.0	-1.0	-0.4	-0.3	-0.2	-0.4	-0.9	-0.9	-0.8	-0.2	0.5
10-Jul	-0.6	-0.7	-0.7	-1.0	-1.0	-1.1	-0.4	-0.3	-0.2	-0.5	-0.6	-0.8	-1.0	-1.1	-1.0	-1.0	-1.3	-1.4	-1.1	-0.5	-0.8	-0.9	-0.9	-0.8	-0.8	-0.2
11-Jul	-0.5	-0.5	-0.5	-0.5	-0.4	-0.5	-0.6	-0.6	-0.4	-0.5	-0.7	-1.1	-0.8	-0.7	-0.7	-0.7	-0.9	-1.0	-1.0	-1.0	-0.7	-0.4	-0.2	-0.3	-0.6	-0.2
12-Jul	-0.5	-0.4	-0.5	-0.6	-0.3	-0.2	-0.2	-0.5	-0.5	-0.9	-0.7	-0.5	-0.5	-0.6	-0.7	-0.3	-0.3	-0.4	-0.3	-0.3	-0.1	-0.1	-0.2	-0.2	-0.4	-0.1
13-Jul	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	-0.2	0.1	0.0	0.0	0.1	0.2	0.2	0.1	0.0	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.0	0.0	0.0	0.2
14-Jul	0.2	0.2	0.0	-0.1	0.1	-0.1	0.0	0.2	0.4	0.3	0.7	0.3	0.5	0.5	0.3	0.3	0.6	0.0	0.1	0.2	0.3	0.1	0.0	-0.1	0.2	0.7
15-Jul	0.0	0.4	0.2	0.4	0.4	0.2	0.2	0.2	0.2	0.3	0.0	0.5	0.4	0.0	0.0	-0.2	0.0	-0.2	-0.2	-0.1	0.5	0.5	-0.1	0.1	0.2	0.5
16-Jul	0.4	0.2	-0.2	-0.1	-0.3	-0.2	-0.3	-0.3	-0.5	-0.4	-0.4	-0.6	-0.5	-0.5	-0.3	-0.4	-0.3	-0.1	-0.3	-0.1	-0.3	-0.6	-0.7	-0.3	-0.3	0.4
17-Jul	-0.4	-0.4	-0.5	-0.3	-0.1	-0.2	-0.3	-0.2	0.2	0.3	-0.2	0.1	-0.3	-0.4	-0.3	-0.2	-0.3	-0.2	-0.3	-0.1	-0.2	-0.3	-0.3	-0.5	-0.2	0.3
18-Jul	-0.3	-0.4	-0.4	-0.3	-0.4	-0.5	-0.4	-0.4	-0.1	-0.1	-0.2	-0.2	0.0	0.0	0.1	0.0	0.0	0.0	-0.3	-0.6	-0.1	-0.5	-0.3	-0.2	-0.2	0.1
19-Jul	0.0	0.0	-0.1	-0.1	0.3	0.5	0.2	0.0	-0.2	-0.3	-0.4	-0.8	-1.0	-0.4	-1.3	-1.0	-0.8	-0.7	-0.8	-0.5	-0.5	-0.6	-0.6	-0.7	-0.4	0.5
20-Jul	-0.6	-0.5	-0.7	-0.7	-0.3	-0.4	-0.5	-0.4	-0.2	-0.4	-0.6	-0.8	-0.9	-0.8	-0.5	-0.6	-0.7	-0.5	-0.7	-0.4	-0.3	-0.1	-0.1	-0.1	-0.5	-0.1
21-Jul	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	0.2	0.3	-0.2	-0.2	-0.2	-0.5	-0.2	-0.2	0.1	-0.2	-0.4	0.0	0.0	-0.1	-0.1	-0.1	0.3
22-Jul	-0.2	0.0	0.1	0.0	-0.1	0.0	-0.1	0.2	-0.1	0.2	0.3	0.2	0.0	0.1	0.4	0.2	0.1	0.2	0.3	0.2	0.0	0.1	0.3	0.3	0.1	0.4
23-Jul	0.0	0.0	-0.2	-0.2	-0.2	-0.2	-0.3	-0.2	0.0	0.1	0.1	0.6	-0.2	0.4	0.2	0.4	0.0	-0.1	-0.2	-0.2	0.1	-0.2	-0.5	-0.4	0.0	0.6
24-Jul	-0.1	0.2	-0.1	0.2	-0.2	0.1	0.1	-0.1	0.1	0.2	0.3	0.5	0.2	0.1	0.3	0.1	0.2	0.4	0.2	-0.5	-0.4	-0.2	0.0	-0.2	0.1	0.5
25-Jul	-0.6	-0.7	-0.6	-0.5	-0.4	-0.5	-0.5	-0.5	-0.4	-0.2	0.0	0.2	0.0	-0.1	-0.2	0.0	-0.2	-0.6	-0.5	-0.4	-0.3	-0.3	-0.3	-0.4	-0.3	0.2
26-Jul	-0.4	-0.2	-0.3	-0.3	-0.4	-0.4	-0.4	-0.5	0.0	0.2	0.0	0.0	-0.1	0.3	0.1	0.2	-0.4	-0.7	-0.5	-0.6	-0.5	-0.2	-0.1	0.1	-0.2	0.3
27-Jul	0.0	0.1	0.1	0.3	0.3	0.1	-0.2	0.2	0.4	0.4	-0.2	-0.2	0.1	-0.3	-0.6	-0.7	0.0	0.1	0.4	0.2	0.3	0.0	0.2	-0.1	0.0	0.4
28-Jul	0.0	0.3	0.3	0.3	0.4	-0.1	0.5	0.2	0.2	0.0	0.4	0.5	-0.1	0.2	-0.2	-0.6	-0.1	-0.2	-0.2	0.1	-0.1	-0.1	-0.1	-0.1	0.1	0.5
29-Jul	0.1	0.1	0.0	0.0	-0.2	-0.1	0.3	-0.2	-0.2	0.1	-0.3	0.2	0.2	-0.1	-0.3	-0.5	-0.5	-0.7	-0.4	-0.3	0.0	0.2	0.5	0.1	-0.1	0.5
30-Jul	-0.2	-0.1	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	0.1	0.5	-0.1	0.2	0.2	0.3	0.3	0.1	0.5	0.5	0.6	0.3	-1.6	-0.4	-0.4	-0.2	0.0	0.6
31-Jul	0.1	-0.3	-0.4	-0.3	-0.2	-0.2	-0.1	-0.2	-0.2	-0.2	-0.6	-1.0	-1.0	-0.8	-1.0	-1.3	-0.6	-0.6	-0.5	-0.6	-0.4	-0.4	-0.6	-0.7	-0.5	0.1
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.8 km/h on Jul 30 21:00 Minimum Value: 0.1 km/h on Jul 21 22:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.8 Median = 1.4 Q ₃ = 1.9 P ₉₀ = 2.6 P ₉₉ = 3.5																								Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	0.1	0.2	0.2	0.1	0.1	0.4	0.4	0.7	1.0	1.3	1.3	1.4	1.2	1.4	0.7	1.7	0.9	0.7	1.1	0.5	0.4	0.2	0.2	0.3	1.7
2-Jul	0.3	0.2	0.2	0.3	0.2	0.2	0.6	0.9	1.4	1.4	1.6	1.9	1.5	1.5	1.6	1.7	1.6	1.3	1.1	1.3	1.6	2.1	2.2	2.4	2.4
3-Jul	2.6	2.6	2.2	2.5	2.1	2.0	2.5	3.0	3.4	3.5	3.6	3.9	2.7	0.9	1.2	1.8	1.9	2.2	0.6	0.5	1.5	1.7	0.5	0.6	3.9
4-Jul	1.2	2.8	1.3	1.2	0.6	1.0	1.6	1.8	1.8	2.3	3.2	3.4	3.2	3.2	3.3	3.5	3.1	3.3	2.7	2.2	1.6	1.3	1.6	1.5	3.5
5-Jul	1.1	1.3	1.2	0.8	0.6	0.7	1.1	1.2	1.3	1.5	1.8	3.0	3.0	2.7	2.8	2.5	2.0	1.9	1.4	0.4	0.3	1.7	0.9	0.6	3.0
6-Jul	0.8	0.4	0.6	1.6	1.8	1.4	0.9	1.2	1.4	1.7	2.1	2.4	2.7	2.6	1.0	1.0	0.8	1.0	0.8	0.9	1.5	0.4	1.8	0.4	2.7
7-Jul	0.4	0.3	0.4	0.4	0.5	0.4	0.5	0.6	1.2	1.3	1.3	1.8	2.0	2.0	2.2	1.6	1.8	1.6	1.3	0.9	0.4	0.3	0.2	0.1	2.2
8-Jul	0.2	0.2	0.9	0.7	0.6	1.3	1.4	1.4	2.0	2.5	2.1	2.6	2.4	2.1	1.8	1.7	2.1	1.4	1.4	0.9	0.9	1.3	1.0	1.2	2.6
9-Jul	0.9	1.2	0.6	0.8	1.2	0.6	1.5	1.7	2.1	2.4	1.8	1.5	1.9	2.6	2.0	3.2	3.4	1.4	1.5	1.4	1.7	2.5	1.8	1.2	3.4
10-Jul	1.4	2.4	2.6	3.1	3.5	3.2	1.4	2.0	2.1	1.9	2.2	2.6	3.0	3.0	3.3	3.4	4.1	3.5	2.8	3.2	2.5	2.2	2.8	2.8	4.1
11-Jul	2.0	1.8	1.4	1.3	1.0	1.6	1.7	1.7	1.2	1.5	2.2	3.2	2.9	2.5	2.5	2.6	2.4	2.9	2.9	3.2	1.6	0.6	0.4	0.3	3.2
12-Jul	1.1	1.0	0.7	1.2	0.9	0.4	0.7	1.2	1.5	1.7	1.7	2.0	1.8	1.7	1.6	1.5	1.2	0.9	0.6	0.5	0.3	0.2	0.3	0.4	2.0
13-Jul	0.5	0.5	0.5	0.3	0.3	0.5	1.6	2.6	2.2	2.1	1.6	1.5	1.7	1.8	1.6	1.5	1.4	1.1	1.0	0.8	0.6	0.9	1.2	1.4	2.6
14-Jul	1.8	1.9	1.5	1.2	1.1	1.6	1.3	2.2	2.6	2.4	2.2	2.6	2.5	2.3	1.8	1.5	1.6	1.4	1.2	1.0	0.6	1.2	1.6	1.0	2.6
15-Jul	1.0	1.4	1.7	1.8	1.9	1.8	2.1	2.3	2.3	2.1	2.2	2.6	2.1	1.6	1.4	1.4	1.4	1.5	1.3	0.9	0.9	1.2	0.8	1.2	2.6
16-Jul	1.3	0.9	0.7	0.4	0.5	0.3	0.3	0.9	0.8	0.8	1.3	1.3	1.5	1.2	0.7	1.7	2.2	1.8	1.3	1.1	1.5	2.5	2.4	0.8	2.5
17-Jul	0.5	0.3	0.5	0.3	0.2	0.4	0.8	1.1	1.3	1.3	1.4	1.5	1.7	1.5	1.2	1.1	0.4	0.3	0.3	0.2	0.5	0.9	0.4	0.8	1.7
18-Jul	0.5	0.6	0.5	0.3	0.4	0.4	0.8	1.2	1.3	1.5	1.8	1.5	1.5	1.7	1.5	1.2	1.2	0.8	2.0	2.7	1.4	1.7	0.6	0.4	2.7
19-Jul	1.2	1.4	1.1	1.3	1.1	1.1	1.2	1.1	1.4	1.7	2.4	2.8	3.0	2.8	3.5	3.0	2.8	1.8	3.1	2.2	1.9	1.4	1.0	1.0	3.5
20-Jul	1.0	0.9	0.8	0.9	0.6	0.5	0.7	1.0	1.3	1.7	1.8	2.0	2.0	2.0	1.6	1.7	1.8	1.5	1.5	0.9	0.5	0.3	0.2	0.1	2.0
21-Jul	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.8	1.0	1.3	1.3	1.5	1.6	1.5	1.5	1.4	1.2	0.7	0.4	0.3	0.1	0.1	0.2	0.3	1.6
22-Jul	0.5	0.6	0.9	0.7	0.6	0.8	1.2	1.7	1.6	1.7	2.0	2.1	1.9	1.9	1.7	1.6	1.5	1.5	1.7	1.0	0.7	0.8	1.2	1.3	2.1
23-Jul	1.0	1.1	0.8	0.7	0.5	0.7	0.5	0.7	1.3	2.2	2.8	2.5	1.6	2.9	3.0	3.7	3.0	2.4	1.3	1.0	1.9	0.7	0.6	0.6	3.7
24-Jul	0.9	1.2	1.0	1.1	1.1	2.6	2.8	2.5	2.6	2.4	2.2	2.3	3.0	2.8	2.6	2.7	2.8	2.9	3.0	2.3	2.1	1.3	1.9	1.7	3.0
25-Jul	1.4	1.5	0.8	0.9	1.0	1.3	1.2	1.4	1.1	1.1	1.2	0.8	1.3	1.3	1.0	1.5	1.0	1.6	1.1	0.6	0.3	0.4	0.4	0.4	1.6
26-Jul	0.7	0.9	0.6	0.4	0.4	0.4	0.7	1.0	1.2	1.4	1.6	1.6	1.5	1.8	1.6	1.6	2.3	2.6	1.9	1.2	1.4	0.7	0.6	0.7	2.6
27-Jul	0.5	0.9	0.7	1.1	1.4	1.8	1.9	2.0	2.0	1.7	1.2	1.1	1.4	1.7	1.6	3.1	1.1	1.7	1.2	1.3	1.5	1.6	1.4	1.6	3.1
28-Jul	1.1	1.1	1.3	1.3	1.4	1.4	1.6	1.8	1.7	1.7	2.1	1.9	1.7	1.9	1.4	1.8	1.7	1.4	0.9	0.6	0.5	0.4	0.3	0.4	2.1
29-Jul	0.9	1.1	0.7	1.0	0.5	1.3	1.8	1.1	1.6	1.4	1.5	1.6	1.5	1.5	1.4	1.2	0.9	1.4	0.5	1.0	1.9	1.2	2.4	1.9	2.4
30-Jul	1.2	1.1	0.3	0.4	0.3	0.7	1.1	1.4	1.9	2.0	1.6	1.9	1.7	1.8	1.8	1.7	1.6	1.4	1.3	0.8	4.8	2.9	1.4	1.0	4.8
31-Jul	0.9	0.9	0.6	0.5	0.4	0.3	0.6	1.4	1.2	1.3	2.3	2.5	2.5	2.6	3.0	3.5	2.1	2.7	2.0	2.4	1.6	1.4	1.8	2.0	3.5
	2.6	2.8	2.6	3.1	3.5	3.2	2.8	3.0	3.4	3.5	3.6	3.9	3.2	3.2	3.5	3.7	4.1	3.5	3.1	3.2	4.8	2.9	2.8	2.8	
	Diurnal Maximum																								



Maximum Value: 1.5 km/h on Jul 8 22:00 Maximum Daily Average: 0.6 km/h on Jul 24																								Hours in Service: 744 Hours of Data: 744		
Minimum Value: -1.9 km/h on Jul 10 17:00 Minimum Daily Average: -0.9 km/h on Jul 10 Maximum Diurnal Average: 0.3 km/h at hour 10 Minimum Diurnal Average: -0.1 km/h at hour 16 Monthly Average: 0.03 km/h Percentiles: $P_1 = -1.4$ $P_{10} = -0.6$ $Q_1 = -0.3$ Median = 0.0 $Q_3 = 0.4$ $P_{90} = 0.7$ $P_{99} = 1.0$																								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-Jul	0.0	0.0	0.0	0.0	0.1	0.0	-0.2	0.0	0.3	0.5	0.2	0.3	-0.3	0.1	-0.1	-0.4	0.0	-0.2	-0.2	-0.1	0.3	0.0	0.0	0.2	0.0	0.5
2-Jul	0.2	0.2	0.0	0.1	0.1	0.1	-0.1	-0.1	0.5	0.3	0.0	0.2	0.5	0.2	0.3	0.3	0.5	0.6	0.5	0.3	0.5	0.5	0.5	0.8	0.3	0.8
3-Jul	0.8	0.6	0.5	0.4	0.4	0.3	0.5	0.8	1.2	0.8	1.0	1.2	0.6	0.0	0.0	0.5	0.1	0.6	0.2	-0.3	-0.6	-0.5	-0.3	-0.4	0.4	1.2
4-Jul	-0.7	-1.2	0.0	0.0	0.4	0.0	-0.1	0.0	-0.1	0.0	-0.4	-0.6	-0.3	-0.5	-0.2	-0.8	-0.4	-0.5	-0.4	-0.2	0.0	-0.4	-0.2	-0.4	-0.3	0.4
5-Jul	-0.5	-0.3	-0.1	0.1	0.4	0.5	0.8	0.7	0.4	0.5	0.3	-0.8	-0.7	-0.4	-0.6	0.0	-0.2	-0.6	-0.1	-0.2	-0.3	-0.4	-0.6	0.3	-0.1	0.8
6-Jul	-0.3	0.1	-0.1	-0.5	-0.6	-0.4	-0.6	-0.2	0.0	-0.3	0.0	-0.4	-0.7	0.0	0.4	-0.2	-0.3	-0.1	-0.3	-0.3	-0.5	-0.4	-0.8	-0.4	-0.3	0.4
7-Jul	0.0	-0.1	-0.1	-0.3	-0.1	-0.1	0.1	-0.3	-0.2	-0.4	-0.4	-0.5	-0.6	-0.6	-0.3	-0.3	-0.4	-0.1	-0.2	-0.3	-0.1	0.0	0.0	0.0	-0.2	0.1
8-Jul	0.0	0.2	0.3	0.4	0.1	0.3	0.6	0.7	0.6	0.7	0.6	0.8	0.7	0.7	0.1	0.2	-0.1	0.2	0.6	0.6	0.4	1.5	0.0	-0.1	0.4	1.5
9-Jul	0.1	0.5	-0.1	0.3	0.4	0.1	0.3	0.5	0.5	0.5	0.4	0.3	0.5	0.9	0.0	-1.4	-1.4	-0.4	0.0	0.0	-0.2	-1.2	-0.9	-0.9	0.0	0.9
10-Jul	-0.7	-0.9	-0.8	-0.9	-1.1	-1.2	-0.2	-0.1	0.0	-0.3	-0.3	-0.8	-1.3	-1.3	-1.3	-0.9	-1.9	-1.6	-1.4	-1.2	-1.1	-1.1	-1.0	-0.9	-0.9	0.0
11-Jul	-0.4	-0.5	-0.5	-0.6	-0.5	-0.5	-0.5	-0.6	-0.3	-0.4	-0.6	-1.0	-0.7	-0.7	-0.8	-1.1	-0.8	-1.3	-0.7	-0.8	-0.6	-0.4	-0.2	-0.2	-0.6	-0.2
12-Jul	-0.5	-0.5	-0.5	-0.4	-0.3	0.0	-0.2	-0.2	-0.6	-0.8	-0.6	-0.4	-0.3	-0.7	-0.7	-0.1	-0.1	-0.2	-0.1	-0.2	0.0	0.1	-0.1	-0.1	-0.3	0.1
13-Jul	0.0	-0.1	-0.1	0.0	0.0	0.0	0.3	0.6	0.5	0.5	0.3	0.4	0.4	0.3	0.1	0.4	0.2	0.3	0.5	0.5	0.7	0.9	0.5	0.4	0.3	0.9
14-Jul	0.6	0.4	0.3	0.0	0.4	0.3	0.5	0.7	0.8	0.8	1.0	0.8	0.9	0.9	0.6	0.7	0.6	0.3	0.3	0.3	0.1	0.3	0.3	0.2	0.5	1.0
15-Jul	0.4	1.2	0.7	1.0	0.8	0.7	0.8	0.7	0.7	0.8	0.4	0.8	0.6	0.2	0.1	0.0	0.2	0.1	0.1	0.1	0.4	0.6	0.4	0.8	0.5	1.2
16-Jul	1.2	0.6	0.0	-0.2	-0.3	-0.2	-0.1	-0.2	-0.4	-0.3	-0.2	-0.3	-0.5	-0.4	-0.3	-0.1	0.0	0.2	0.1	0.1	0.1	-0.4	-0.2	-0.2	-0.1	1.2
17-Jul	-0.4	-0.3	-0.4	-0.1	0.0	-0.1	-0.1	-0.1	0.2	0.7	0.0	0.4	0.0	-0.1	0.0	-0.2	-0.2	-0.1	-0.1	0.0	0.0	-0.3	-0.1	-0.5	-0.1	0.7
18-Jul	-0.3	-0.4	-0.3	-0.1	-0.3	-0.4	-0.5	-0.1	0.1	0.1	-0.1	-0.2	0.1	0.3	0.4	0.2	0.1	0.3	0.0	-0.1	0.3	-0.2	-0.3	-0.1	-0.1	0.4
19-Jul	0.3	0.5	0.2	0.4	0.6	0.7	0.4	0.1	-0.2	-0.1	-0.3	-1.2	-1.0	-0.3	-1.5	-1.1	-0.7	-0.7	-1.0	-0.7	-0.7	-0.7	-0.6	-0.9	-0.4	0.7
20-Jul	-0.6	-0.4	-0.7	-0.7	-0.4	-0.3	-0.5	-0.4	0.0	0.0	-0.2	-0.7	-0.7	-0.9	-0.3	-0.4	-0.5	-0.4	-0.4	-0.2	-0.1	-0.1	0.0	-0.1	-0.4	0.0
21-Jul	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.6	0.2	-0.1	0.1	-0.3	0.0	-0.2	0.3	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.6
22-Jul	0.0	0.6	0.7	0.4	0.2	0.5	0.4	0.6	0.3	0.5	0.6	0.6	0.6	0.6	0.7	0.6	0.5	0.6	0.7	0.6	0.5	0.6	0.6	0.4	0.5	0.7
23-Jul	0.2	0.4	0.1	0.2	0.1	0.0	-0.2	0.0	0.4	0.5	0.5	0.9	0.3	1.0	0.9	1.3	0.7	0.4	0.2	0.1	0.5	0.1	-0.3	-0.2	0.3	1.3
24-Jul	0.2	0.7	0.5	0.6	0.2	0.8	0.7	0.7	0.8	0.8	0.7	0.9	0.8	0.8	0.9	0.5	1.1	0.9	0.8	0.1	0.3	0.3	0.6	0.2	0.6	1.1
25-Jul	-0.3	-0.4	-0.6	-0.4	-0.4	-0.4	-0.4	-0.5	-0.3	-0.1	0.1	0.5	0.2	0.1	-0.1	0.4	0.0	-0.3	-0.3	-0.4	-0.2	-0.3	-0.3	-0.3	-0.2	0.5
26-Jul	-0.2	0.0	-0.1	-0.1	-0.3	-0.3	-0.2	-0.3	0.3	0.4	0.3	0.4	0.3	0.6	0.2	0.4	-0.2	-0.6	-0.4	-0.6	-0.5	-0.1	0.1	0.5	0.0	0.6
27-Jul	0.4	0.8	0.4	0.8	0.9	0.5	0.2	0.5	0.8	0.8	0.1	0.0	0.4	-0.2	-0.5	-0.3	0.4	0.3	0.6	0.4	0.5	0.3	0.6	0.2	0.4	0.9
28-Jul	0.3	0.6	0.6	0.5	0.4	0.1	0.7	0.5	0.6	0.6	0.8	0.8	0.3	0.3	-0.1	-0.3	0.0	0.0	0.0	0.3	0.2	0.2	0.3	0.3	0.3	0.8
29-Jul	0.5	0.7	0.5	0.5	0.1	0.3	0.8	0.2	0.0	0.4	0.0	0.6	0.5	0.1	0.0	-0.2	-0.4	-0.4	-0.3	0.0	0.6	0.5	1.0	0.5	0.3	1.0
30-Jul	0.2	0.3	0.2	0.3	0.4	0.2	0.2	0.2	0.5	0.7	0.1	0.6	0.4	0.5	0.7	0.2	0.7	0.9	0.8	0.6	-1.7	-0.2	-0.1	-0.1	0.3	0.9
31-Jul	0.3	0.0	-0.2	-0.1	-0.1	0.0	0.0	0.2	0.0	0.0	-0.5	-0.5	-0.6	-0.5	-0.6	-1.4	-0.6	-0.7	-0.4	-0.5	-0.4	-0.2	-0.5	-0.5	-0.3	0.3
																								Diurnal Average		
																								Diurnal Maximum		
																								0.0		
																								1.2		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.2 km/h on Jul 30 21:00 Minimum Value: 0.1 km/h on Jul 21 05:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 0.9 Median = 1.5 Q ₃ = 2.0 P ₉₀ = 2.6 P ₉₉ = 3.6																								Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	0.2	0.2	0.3	0.1	0.1	0.4	0.4	0.8	1.0	1.3	1.4	1.6	1.5	1.7	0.9	1.8	1.0	0.7	0.8	0.6	0.5	0.3	0.3	0.4	1.8
2-Jul	0.4	0.3	0.2	0.3	0.2	0.2	0.8	1.0	1.5	1.4	1.7	1.9	1.6	1.6	1.8	1.9	1.8	1.5	1.3	1.2	1.7	2.1	2.1	2.5	2.5
3-Jul	2.6	2.6	2.3	2.2	1.8	2.0	2.3	3.0	3.2	3.2	3.4	4.0	2.8	0.9	1.2	2.0	2.1	2.2	0.7	0.5	1.6	1.8	0.6	0.5	4.0
4-Jul	1.3	2.9	1.5	1.4	0.8	1.3	1.8	1.8	1.8	2.3	3.0	3.1	3.0	3.3	3.2	3.2	3.1	3.1	2.6	2.1	1.5	1.1	1.4	1.5	3.3
5-Jul	1.2	1.3	1.4	1.0	0.7	0.9	1.2	1.4	1.5	1.7	1.9	2.9	2.8	2.7	3.0	2.5	2.1	2.0	1.6	0.5	0.4	1.8	1.1	0.8	3.0
6-Jul	1.1	0.6	0.8	1.8	1.9	1.4	1.0	1.4	1.7	1.4	2.2	2.4	3.0	2.6	1.1	1.1	0.8	1.2	0.8	1.0	1.7	0.4	1.9	0.4	3.0
7-Jul	0.5	0.4	0.6	0.5	0.6	0.6	0.6	0.7	1.3	1.4	1.5	1.9	2.1	2.1	2.3	1.9	1.9	1.7	1.3	0.9	0.4	0.4	0.2	0.1	2.3
8-Jul	0.2	0.4	1.0	0.8	0.7	1.5	1.7	1.5	2.2	2.5	2.2	2.7	2.5	2.2	2.2	2.2	2.4	1.5	1.5	1.0	1.1	1.3	1.1	1.2	2.7
9-Jul	1.1	1.3	0.8	0.8	1.3	0.7	1.5	1.6	2.1	2.7	2.3	2.0	2.2	2.5	2.6	3.3	3.4	1.5	1.6	1.7	1.8	2.6	2.0	1.5	3.4
10-Jul	1.4	2.3	2.7	3.0	3.4	3.3	1.6	1.9	2.2	2.1	2.3	2.6	3.1	3.2	3.2	3.7	4.5	3.7	3.1	3.1	2.7	2.5	2.9	2.8	4.5
11-Jul	2.6	2.3	1.9	1.5	1.3	1.9	1.9	2.0	1.4	1.8	2.1	3.4	3.1	2.6	2.6	2.5	2.7	3.2	3.1	3.2	1.8	0.7	0.4	0.3	3.4
12-Jul	1.3	1.1	0.8	1.3	1.1	0.6	0.7	1.2	1.5	1.7	2.0	2.2	2.1	2.0	1.8	1.7	1.4	1.0	0.8	0.5	0.4	0.2	0.4	0.6	2.2
13-Jul	0.6	0.5	0.8	0.4	0.4	0.7	1.7	2.5	2.1	2.1	1.6	1.6	1.5	1.9	1.8	1.7	1.4	1.1	1.1	0.9	0.8	0.9	1.1	1.3	2.5
14-Jul	1.8	2.1	1.8	1.4	1.3	1.7	1.3	2.1	2.7	2.5	2.2	2.6	2.5	2.4	2.2	1.9	1.9	1.7	1.3	1.1	0.8	1.6	2.0	1.1	2.7
15-Jul	1.0	1.4	1.7	1.9	1.9	1.7	1.9	2.2	2.3	2.1	2.1	2.5	2.3	1.8	1.6	1.6	1.7	1.7	1.5	1.2	1.2	1.7	0.9	1.0	2.5
16-Jul	1.3	1.3	0.8	0.5	0.8	0.4	0.3	1.0	0.8	0.9	1.3	1.3	1.6	1.4	0.7	1.8	2.2	1.8	1.5	1.1	1.6	2.4	2.7	1.0	2.7
17-Jul	0.6	0.4	0.6	0.3	0.2	0.4	1.0	1.2	1.5	1.6	1.7	1.7	1.9	1.7	1.2	1.0	0.4	0.2	0.3	0.3	0.6	0.9	0.5	0.8	1.9
18-Jul	0.6	0.6	0.6	0.4	0.4	0.4	0.7	1.3	1.6	1.8	2.0	1.8	1.7	1.9	1.7	1.2	1.2	0.8	1.9	2.6	1.8	1.7	0.7	0.5	2.6
19-Jul	1.3	1.7	1.3	1.4	1.2	1.2	1.3	1.2	1.4	1.8	2.6	2.8	2.9	2.6	3.3	3.1	3.1	2.0	3.2	2.5	2.0	1.3	0.9	1.2	3.3
20-Jul	1.2	1.2	0.9	1.0	0.9	0.7	0.8	1.1	1.5	1.8	2.0	2.0	2.1	2.0	1.7	1.9	1.8	1.6	1.5	1.0	0.5	0.4	0.2	0.1	2.1
21-Jul	0.1	0.2	0.2	0.2	0.1	0.2	0.6	0.8	1.1	1.4	1.3	1.6	1.9	1.8	1.6	1.5	1.3	0.7	0.4	0.3	0.2	0.1	0.2	0.3	1.9
22-Jul	0.5	0.7	1.0	0.8	0.7	0.8	1.3	1.7	1.5	1.9	1.8	2.0	1.9	1.9	1.9	1.7	1.7	1.7	2.0	1.5	0.9	1.1	1.6	1.3	2.0
23-Jul	1.2	1.3	1.0	0.9	0.6	0.8	0.6	0.9	1.2	2.2	2.8	2.8	1.7	3.0	3.2	3.7	3.1	2.6	1.5	1.1	1.8	0.7	0.7	0.9	3.7
24-Jul	1.1	1.3	1.0	1.4	1.3	2.5	2.5	2.4	2.7	2.7	2.2	2.6	2.8	2.7	2.6	2.7	2.8	3.0	2.8	2.4	2.1	1.5	1.9	1.9	3.0
25-Jul	1.6	1.5	0.9	1.0	1.1	1.4	1.4	1.4	1.2	1.3	1.2	0.9	1.4	1.5	1.1	1.6	1.2	1.6	1.1	0.6	0.3	0.4	0.4	0.4	1.6
26-Jul	0.7	1.0	0.7	0.4	0.4	0.5	0.7	1.1	1.4	1.6	1.7	1.6	1.5	2.0	1.9	1.8	2.3	2.6	1.9	1.1	1.4	0.9	0.7	0.9	2.6
27-Jul	0.7	0.9	0.8	1.3	1.3	1.9	1.9	2.0	1.8	1.8	1.4	1.2	1.5	1.8	1.7	3.1	1.2	2.0	1.5	1.5	1.6	1.9	1.6	1.6	3.1
28-Jul	1.3	1.2	1.3	1.6	1.7	1.6	1.8	1.8	1.5	1.8	2.0	1.9	1.8	2.1	1.7	1.9	1.8	1.6	1.1	0.8	0.8	0.6	0.5	0.5	2.1
29-Jul	1.0	1.3	0.8	1.0	0.5	1.6	1.9	1.3	1.6	1.5	1.5	1.9	1.7	1.7	1.4	1.3	0.9	1.4	0.5	1.0	1.9	1.4	2.6	2.2	2.6
30-Jul	1.3	1.1	0.6	0.5	0.4	0.8	1.2	1.3	1.9	2.1	1.6	2.2	1.9	2.0	2.1	1.9	1.8	1.8	1.5	1.0	5.2	3.4	1.8	1.3	5.2
31-Jul	1.2	0.8	0.7	0.5	0.4	0.3	0.7	1.6	1.3	1.5	2.3	2.6	2.6	2.6	3.2	3.6	2.3	2.9	2.2	2.6	1.8	1.7	2.1	2.2	3.6
Diurnal Maximum																									



Maximum Value: 2.6 km/h on Jul 23 12:00		Maximum Daily Average: 0.7 km/h on Jul 24		Hours in Service: 744																																													
Minimum Value: -1.2 km/h on Jul 20 00:00		Minimum Daily Average: -0.2 km/h on Jul 20		Hours of Data: 744																																													
Maximum Diurnal Average: 0.3 km/h at hour 12		Minimum Diurnal Average: 0.1 km/h at hour 24		Hours of Missing Data: 0																																													
Monthly Average: 0.21 km/h		Percentiles: P ₁ = -0.8 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.1 Q ₃ = 0.5 P ₉₀ = 0.8 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-Jul	0.0	0.0	0.1	0.0	0.2	0.3	-0.1	0.0	-0.1	0.1	0.0	0.3	-0.9	-0.3	0.4	-0.1	0.0	0.0	0.3	0.0	0.3	0.0	0.1	0.5	0.0	0.5																							
2-Jul	0.5	0.4	0.2	0.3	0.0	0.4	-0.3	0.1	-0.2	0.0	0.2	0.1	-0.1	-0.2	0.4	0.5	1.2	1.0	0.9	0.3	0.6	0.7	1.1	1.0	0.4	1.2																							
3-Jul	1.4	1.8	1.7	1.3	1.1	0.7	0.7	1.1	1.0	0.6	1.2	1.2	0.4	0.1	0.2	0.2	-0.4	0.3	0.0	0.0	0.2	0.0	0.0	0.0	0.6	1.8																							
4-Jul	-0.3	-0.7	0.7	0.7	0.3	-0.1	0.4	0.4	0.0	0.7	0.5	0.2	0.4	0.5	1.2	0.6	0.8	0.8	0.4	0.5	0.4	0.2	0.4	0.4	0.4	1.2																							
5-Jul	-0.3	0.0	1.1	0.0	0.2	0.0	0.4	0.1	0.2	0.4	0.2	0.4	0.4	0.2	-0.1	0.5	0.1	0.4	0.3	0.0	-0.1	0.1	0.0	0.4	0.2	1.1																							
6-Jul	0.1	0.2	0.0	0.5	0.5	-0.1	-0.4	0.0	0.3	-0.1	0.4	-0.2	0.4	0.2	0.1	0.1	-0.3	-0.1	0.3	0.1	-0.3	-0.1	-0.3	-0.2	0.0	0.5																							
7-Jul	-0.1	-0.4	-0.2	-0.3	-0.1	-0.4	-0.3	-0.5	0.2	0.1	-0.1	0.0	-0.6	-0.1	0.3	0.3	0.1	0.2	-0.1	-0.1	-0.1	-0.2	0.2	0.1	-0.1	0.3																							
8-Jul	0.1	0.4	0.4	0.1	0.0	0.4	1.2	0.2	0.3	0.1	0.2	0.3	0.5	1.2	0.6	-0.1	1.0	0.6	0.1	-0.2	-0.3	1.1	0.0	-0.2	0.3	1.2																							
9-Jul	-0.2	-0.2	-0.1	0.0	0.4	0.1	0.3	0.5	0.3	0.4	0.2	-0.3	0.5	0.8	-0.2	-0.6	-0.5	-0.1	0.5	0.7	0.5	-0.5	-0.6	-0.3	0.1	0.8																							
10-Jul	-0.2	0.3	0.4	0.6	0.4	0.0	0.2	0.5	0.5	0.6	0.0	-0.2	-0.3	-0.9	-0.6	-0.4	-0.8	-0.7	-0.4	-0.5	-0.4	0.0	0.0	0.2	-0.1	0.6																							
11-Jul	0.9	0.8	-0.1	-0.1	-0.4	-0.1	0.1	-0.2	-0.2	0.4	-0.1	-0.3	0.0	-0.1	-0.2	-0.7	-0.2	-0.4	0.1	-0.2	0.6	0.0	0.0	-0.2	0.0	0.9																							
12-Jul	-0.1	0.1	0.0	0.2	0.1	0.1	-0.2	0.1	-0.2	-0.5	-0.5	0.0	0.0	-0.3	-0.8	0.0	0.1	0.1	0.0	-0.1	0.0	0.1	0.0	0.0	-0.1	0.2																							
13-Jul	0.3	0.3	0.2	-0.2	0.0	0.6	0.4	0.6	0.5	0.4	-0.1	-0.1	0.1	0.0	-0.4	-0.3	0.1	0.4	0.0	0.0	0.2	0.7	0.6	0.1	0.2	0.7																							
14-Jul	0.3	0.8	0.7	0.7	0.1	0.8	-0.4	0.6	0.9	0.3	0.2	0.5	0.9	1.1	0.2	0.5	0.1	0.0	0.0	0.1	0.6	0.2	1.6	0.4	0.5	1.6																							
15-Jul	-0.2	-0.4	0.1	0.2	0.6	0.2	0.4	0.6	0.6	0.8	0.5	1.0	0.6	0.0	0.6	0.0	-0.2	-0.5	-0.3	-0.2	-0.1	0.3	0.1	-0.2	0.2	1.0																							
16-Jul	0.0	0.6	0.1	-0.4	-0.5	-0.2	0.0	0.1	-0.1	0.1	0.2	0.1	0.0	0.0	-0.2	0.5	1.1	1.1	0.5	0.3	0.9	0.7	0.6	0.0	0.2	1.1																							
17-Jul	-0.1	-0.2	0.0	-0.3	-0.1	-0.1	0.1	-0.2	-0.2	1.1	-0.1	1.2	1.0	-0.3	-0.5	-0.5	-0.4	0.0	0.1	0.0	0.5	0.0	0.0	-0.3	0.0	1.2																							
18-Jul	-0.2	0.1	-0.2	-0.1	-0.1	-0.2	-0.2	0.1	0.3	0.3	-0.1	-0.6	0.3	1.7	0.6	0.5	0.0	-0.1	0.0	0.6	1.0	0.7	-0.2	-0.1	0.2	1.7																							
19-Jul	0.4	1.5	0.7	0.1	0.5	0.0	0.1	0.1	-0.5	0.3	0.3	-0.4	-0.4	0.7	-0.4	-0.1	0.0	-0.1	-0.6	-0.4	-0.2	0.0	-0.1	-1.2	0.0	1.5																							
20-Jul	-0.8	-0.9	-0.3	-0.7	-0.3	-0.5	-0.5	-0.1	0.1	0.4	0.3	-0.3	-0.2	-0.4	-0.1	-0.1	-0.6	-0.3	-0.1	-0.2	0.0	-0.1	0.0	0.3	-0.2	0.4																							
21-Jul	-0.1	0.1	0.1	0.1	-0.1	0.1	-0.1	0.0	-0.3	0.3	1.1	0.6	0.1	1.4	0.7	-0.3	-1.1	0.1	0.3	-0.2	0.0	0.0	0.0	0.3	0.1	1.4																							
22-Jul	0.1	0.1	0.0	0.5	0.2	0.0	0.0	0.1	0.0	0.2	0.2	0.1	0.2	0.8	0.4	0.8	0.8	1.4	1.5	2.0	1.3	1.3	0.8	0.2	0.5	2.0																							
23-Jul	1.1	1.3	0.2	0.6	-0.2	-0.2	-0.3	1.7	0.5	0.9	1.6	2.6	0.1	0.9	1.0	1.3	0.5	0.6	0.2	0.0	0.5	0.2	0.2	0.3	0.6	2.6																							
24-Jul	0.6	0.4	0.5	1.3	1.4	0.2	0.4	0.5	0.7	0.8	0.7	1.6	0.5	0.5	0.7	0.5	1.2	1.4	1.0	0.0	0.2	0.3	0.4	0.5	0.7	1.6																							
25-Jul	-0.1	0.0	-0.4	-0.5	0.1	0.1	0.1	0.0	0.1	0.3	0.3	0.0	0.4	0.4	0.2	1.1	0.4	0.4	0.1	0.1	-0.1	-0.1	-0.2	-0.2	0.1	1.1																							
26-Jul	-0.1	0.7	0.2	0.3	0.0	-0.4	-0.2	0.1	0.4	-0.1	-0.1	-0.1	-0.1	0.6	0.2	0.8	0.7	0.1	0.1	-0.1	0.5	1.2	0.2	-0.2	0.2	1.2																							
27-Jul	-0.1	-0.2	0.0	0.0	-0.1	0.6	0.4	0.2	0.1	0.3	0.6	0.6	0.5	-0.1	-0.3	-0.3	0.4	0.8	0.4	0.5	0.3	-0.3	0.5	0.1	0.2	0.8																							
28-Jul	-0.3	0.5	0.7	0.5	0.8	1.2	0.8	0.2	0.1	0.7	0.4	0.5	0.6	0.0	-0.3	-0.1	0.4	0.9	0.2	0.2	0.3	0.1	0.4	-0.1	0.4	1.2																							
29-Jul	-0.2	0.3	-0.1	0.7	-0.2	0.6	0.9	0.1	-0.1	-0.3	0.0	0.5	0.5	0.0	0.2	-0.2	-0.1	0.0	-0.1	0.2	1.5	1.1	1.6	1.2	0.3	1.6																							
30-Jul	0.8	0.4	0.9	0.0	0.2	0.2	0.2	-0.3	0.3	0.4	0.0	0.8	0.3	0.5	0.8	0.0	0.0	0.3	0.1	0.7	-0.9	0.7	-0.4	0.1	0.3	0.9																							
31-Jul	0.2	-0.2	-0.1	0.0	0.0	0.0	0.5	0.6	0.0	0.0	0.1	0.5	0.6	0.3	-0.1	-0.3	0.3	0.0	-0.5	0.1	0.3	0.4	-0.1	0.1	0.1	0.6																							
																								0.1	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.3	0.3	0.2	0.3	0.1	0.1	0.2	0.3	0.2	0.1	0.3	0.3	0.2	0.1	Diurnal Average		
																								1.4	1.8	1.7	1.3	1.4	1.2	1.2	1.7	1.0	1.1	1.6	2.6	1.0	1.7	1.2	1.3	1.2	1.4	1.5	2.0	1.5	1.3	1.6	1.2	Diurnal Maximum	



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.3 km/h on Jul 30 21:00 Minimum Value: 0.1 km/h on Jul 21 22:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 1.0 Median = 1.5 Q ₃ = 2.1 P ₉₀ = 2.6 P ₉₉ = 3.4																								Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	0.3	0.2	0.3	0.2	0.3	0.5	0.3	0.6	0.5	0.6	1.3	2.0	1.6	2.0	1.3	1.7	0.9	0.7	1.1	0.8	0.7	0.4	0.6	0.6	2.0
2-Jul	0.7	0.5	0.4	0.6	0.4	0.4	0.9	1.0	1.1	1.1	1.6	1.7	1.6	1.8	2.1	2.1	1.9	1.7	1.3	1.0	1.2	1.7	1.5	1.6	2.1
3-Jul	1.7	1.5	1.6	1.1	0.7	1.2	1.6	1.9	1.9	2.4	2.6	3.2	2.6	1.2	1.1	2.3	2.5	2.1	0.9	0.3	1.0	1.2	0.7	0.3	3.2
4-Jul	1.3	2.5	1.3	1.2	1.0	1.4	2.2	2.5	2.2	3.3	3.2	3.1	3.4	3.5	4.0	3.5	3.4	2.7	2.7	2.0	1.3	1.1	0.8	1.7	4.0
5-Jul	1.6	1.5	1.4	1.0	1.1	0.9	1.1	1.3	1.6	1.6	2.3	3.3	3.3	3.1	3.2	2.9	2.7	2.4	1.6	0.7	0.4	1.6	1.7	1.3	3.3
6-Jul	1.4	1.1	1.0	1.6	1.6	1.2	1.1	1.5	2.1	1.9	2.8	3.0	3.3	3.0	1.0	1.4	0.9	1.4	1.2	1.3	1.8	0.5	1.7	0.7	3.3
7-Jul	0.9	0.9	1.4	1.0	1.2	1.0	1.1	1.0	1.6	1.5	1.8	2.5	2.2	2.2	2.3	2.0	1.4	1.4	1.2	0.9	0.7	0.7	0.5	0.4	2.5
8-Jul	0.2	0.8	0.8	0.6	1.0	1.3	1.6	1.3	1.7	1.8	1.7	1.9	2.1	2.6	3.3	2.8	3.1	1.6	1.7	1.0	0.9	1.1	1.4	1.4	3.3
9-Jul	1.8	1.5	1.4	0.8	1.2	0.8	1.1	1.2	1.7	3.0	2.6	2.2	2.9	2.5	2.7	3.2	3.4	1.7	2.0	1.7	1.7	2.7	1.8	1.5	3.4
10-Jul	1.5	2.2	2.1	2.1	2.6	2.3	1.8	2.2	2.6	2.7	3.3	2.6	3.5	3.4	3.5	3.9	3.8	3.8	3.1	2.3	2.2	2.1	1.9	2.1	3.9
11-Jul	2.3	2.5	2.6	2.4	2.2	2.3	2.3	2.2	1.7	1.8	2.3	2.8	3.3	2.8	2.8	2.4	3.0	3.2	2.6	2.5	1.5	0.7	0.2	0.7	3.3
12-Jul	0.7	0.6	0.6	0.5	0.7	0.9	1.0	1.4	1.6	1.9	2.3	3.0	3.0	2.5	2.5	2.4	1.9	1.3	1.1	0.4	0.3	0.4	0.8	1.2	3.0
13-Jul	1.0	1.1	1.3	0.9	0.8	1.0	1.6	1.8	1.9	2.3	1.8	1.7	1.4	1.6	1.9	1.7	1.5	1.5	1.3	1.0	1.2	1.3	1.4	1.6	2.3
14-Jul	1.6	1.5	1.6	1.4	1.3	1.7	1.6	1.7	1.8	1.7	1.6	1.9	2.7	2.5	2.8	2.5	2.1	2.2	1.8	1.3	0.9	1.7	1.6	1.9	2.8
15-Jul	1.6	1.3	1.1	1.3	1.4	1.5	1.5	1.3	1.2	1.5	1.7	1.9	2.5	2.5	2.6	2.6	2.1	1.9	1.6	1.3	1.3	1.6	1.2	1.1	2.6
16-Jul	1.0	1.7	1.6	0.9	1.2	0.6	0.4	1.3	0.5	0.8	1.3	1.1	1.3	1.1	0.7	2.2	2.4	2.4	2.1	1.8	1.4	2.0	3.1	1.5	3.1
17-Jul	0.3	0.2	0.5	0.4	0.4	0.5	0.9	1.1	1.8	1.9	2.1	2.2	2.5	2.2	1.0	0.8	0.5	0.3	0.3	0.5	1.0	1.3	0.7	0.6	2.5
18-Jul	0.6	0.5	0.4	0.7	0.6	0.7	0.8	1.7	1.8	2.4	2.6	2.2	2.4	2.3	2.3	1.7	1.5	1.1	2.0	2.2	1.8	1.6	0.7	0.4	2.6
19-Jul	1.2	1.7	1.1	1.5	1.4	1.2	1.4	1.6	1.9	2.3	2.9	2.9	2.8	2.7	3.3	3.1	3.1	1.6	2.6	2.4	2.4	1.3	0.7	1.7	3.3
20-Jul	1.8	1.7	1.3	1.1	1.2	1.0	0.8	1.2	1.7	1.8	2.4	2.3	2.6	2.0	1.9	1.8	2.0	1.8	1.5	1.0	0.3	0.6	0.4	0.3	2.6
21-Jul	0.2	0.3	0.3	0.3	0.2	0.3	0.7	0.8	0.8	1.4	1.3	1.5	2.2	2.5	1.9	1.5	1.2	1.0	0.5	0.3	0.2	0.1	0.2	0.5	2.5
22-Jul	0.7	0.7	0.8	0.8	0.6	0.7	0.8	0.9	0.7	1.0	1.2	1.5	1.7	1.9	2.2	2.1	2.1	1.6	1.7	1.2	0.8	1.4	1.8	1.4	2.2
23-Jul	1.0	1.0	1.2	1.4	1.4	1.1	0.9	1.2	1.4	2.0	2.6	2.7	1.2	2.5	3.1	2.8	2.9	3.1	1.8	1.7	1.7	0.9	1.3	1.3	3.1
24-Jul	1.5	1.3	1.1	1.1	1.5	1.4	1.5	1.9	1.6	2.3	1.8	2.4	2.5	2.7	2.6	2.2	2.6	2.6	2.2	1.9	2.2	1.9	2.1	1.9	2.7
25-Jul	1.7	2.1	1.2	0.8	0.9	1.1	1.2	1.2	1.3	1.5	1.6	0.9	1.6	1.5	1.0	1.8	1.5	1.9	0.9	0.5	0.3	0.4	0.5	0.4	2.1
26-Jul	1.2	1.2	1.3	1.0	0.6	1.0	0.7	1.3	1.4	1.0	1.5	1.8	1.7	2.4	2.5	2.5	2.6	2.1	1.9	0.9	1.0	0.8	1.1	1.0	2.6
27-Jul	0.4	0.6	1.1	1.3	0.8	0.9	1.2	1.3	1.2	1.4	1.6	1.7	1.8	2.6	2.1	2.5	1.3	1.7	1.5	1.6	1.5	1.8	1.5	1.8	2.6
28-Jul	1.8	1.1	1.1	1.7	1.6	1.8	1.7	1.0	0.7	1.3	1.1	1.7	2.2	2.8	2.2	2.6	2.6	2.4	1.9	1.2	1.0	0.9	0.8	0.9	2.8
29-Jul	0.9	1.1	0.9	0.9	0.8	2.2	2.3	1.3	1.8	1.5	1.1	1.5	1.9	2.2	1.8	1.3	0.7	1.0	0.5	1.2	1.2	1.3	1.7	1.4	2.3
30-Jul	1.4	1.2	1.2	0.5	0.7	0.8	1.0	1.1	1.3	1.5	1.6	2.3	2.7	2.5	2.4	2.5	2.1	2.1	1.5	1.5	5.3	3.7	2.6	2.0	5.3
31-Jul	1.5	0.7	1.0	0.6	0.5	0.2	1.1	1.3	1.2	1.7	2.3	2.6	2.7	2.7	3.3	2.9	2.5	2.5	1.9	1.7	1.8	2.0	2.2	2.2	3.3
	2.3	2.5	2.6	2.4	2.6	2.3	2.3	2.5	2.6	3.3	3.3	3.3	3.5	3.5	4.0	3.9	3.8	3.8	3.1	2.5	5.3	3.7	3.1	2.2	
	Diurnal Maximum																								



Maximum Value: 4.1 km/h on Jul 14 23:00		Maximum Daily Average: 1.3 km/h on Jul 23		Hours in Service: 744																							
Minimum Value: -1.7 km/h on Jul 1 13:00		Minimum Daily Average: -0.2 km/h on Jul 20		Hours of Data: 714																							
Maximum Diurnal Average: 0.6 km/h at hour 22		Minimum Diurnal Average: 0.2 km/h at hour 13		Hours of Missing Data: 30																							
Monthly Average: 0.36 km/h		Percentiles: P ₁ = -1.1 P ₁₀ = -0.4 Q ₁ = -0.1 Median = 0.2 Q ₃ = 0.7 P ₉₀ = 1.4 P ₉₉ = 2.6		Hours of Calibration: 0																							
				Percent Operational Time: 96.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.1	-0.3	-1.7	-1.1	0.9	0.1	0.1	0.0	0.3	0.1	0.2	0.1	0.3	0.3	0.0	0.9	
2-Jul	0.0	0.6	0.2	0.2	0.2	0.2	-0.3	0.2	-0.3	-0.2	0.3	-0.2	-0.5	-0.1	0.3	0.9	1.7	1.6	1.6	1.0	1.5	1.7	1.8	2.0	0.6	2.0	
3-Jul	2.3	2.9	3.0	2.3	1.8	1.5	1.6	1.7	1.3	1.4	1.9	1.6	0.6	0.7	0.5	0.6	-0.5	0.5	-0.1	0.0	-0.1	0.1	-0.1	-0.1	1.1	3.0	
4-Jul	-0.3	-0.5	0.6	0.9	0.5	0.4	0.7	0.6	0.1	0.8	1.0	0.5	0.5	0.8	2.1	0.5	1.2	1.1	1.0	0.9	0.8	0.4	0.6	0.3	0.6	2.1	
5-Jul	-0.3	-0.2	1.6	0.6	0.7	0.3	0.8	0.8	0.4	0.4	0.2	0.5	0.2	-0.1	-0.4	0.7	0.2	0.3	0.6	0.1	-0.1	0.0	-0.1	0.5	0.3	1.6	
6-Jul	0.4	0.6	0.4	1.1	0.8	0.0	-0.5	-0.3	0.1	-0.1	0.1	-0.4	0.9	1.1	0.3	0.2	-0.2	-0.2	0.5	0.3	-0.3	-0.3	UO	-0.5	0.2	1.1	
7-Jul	-0.3	-0.7	-0.3	-0.5	-0.7	-0.6	-0.4	-0.7	0.1	0.0	-0.1	-0.5	-1.1	-0.1	0.7	0.8	-0.1	0.5	0.1	0.0	0.2	0.2	0.2	0.5	-0.1	0.8	
8-Jul	0.7	0.9	0.8	0.1	0.0	0.4	0.7	0.2	-0.2	-0.4	-0.2	0.0	0.1	1.5	1.2	0.7	1.5	1.1	0.2	0.6	1.4	2.6	1.3	0.5	0.7	2.6	
9-Jul	-0.1	0.0	-0.1	0.2	0.7	0.4	0.2	0.1	0.2	1.0	0.9	0.3	1.3	0.5	1.0	-0.3	-0.4	-0.1	1.1	1.7	0.4	-1.1	-1.1	-0.4	0.3	1.7	
10-Jul	-0.2	0.1	0.2	1.1	1.2	0.4	0.6	0.5	0.5	1.0	-0.2	0.2	-0.5	-1.3	-0.8	-0.1	-1.4	-1.2	-1.1	-0.5	-0.7	-0.2	-0.3	-0.1	-0.1	1.2	
11-Jul	1.3	1.6	0.6	-0.2	-0.5	0.1	0.0	-0.1	-0.5	1.2	0.1	-0.1	0.4	0.1	-0.3	-1.1	-0.2	-0.8	-0.2	-0.2	0.6	-0.1	0.0	-0.2	0.1	1.6	
12-Jul	-0.3	-0.1	-0.1	-0.1	0.2	-0.2	-0.6	-0.1	-0.3	-0.8	-0.7	-0.1	-0.5	-0.3	-1.0	-0.3	0.0	-0.1	-0.1	0.1	0.1	0.2	0.4	0.4	-0.2	0.4	
13-Jul	0.7	0.9	0.9	0.4	0.6	1.6	0.9	0.9	0.6	0.7	-0.6	-0.4	-0.5	-0.5	-1.0	-0.7	0.1	0.4	-0.2	0.0	0.1	0.9	0.7	0.7	0.3	1.6	
14-Jul	0.4	1.0	0.6	1.3	0.4	0.7	-0.5	0.3	1.1	0.3	-0.1	0.6	0.4	1.2	0.8	1.2	0.8	0.7	0.7	0.9	1.8	2.5	4.1	2.5	1.0	4.1	
15-Jul	0.0	0.4	0.0	0.1	0.1	-0.3	0.0	0.2	0.4	0.3	0.7	0.4	1.1	0.9	1.4	0.4	0.6	0.6	0.6	1.0	1.9	2.5	0.0	0.2	0.6	2.5	
16-Jul	0.5	1.5	1.0	-0.6	-0.5	-0.1	-0.3	0.0	0.0	-0.1	0.2	0.0	-0.2	-0.3	-0.2	0.8	1.7	1.4	0.6	0.7	1.1	0.7	1.1	-0.1	0.4	1.7	
17-Jul	-0.1	-0.3	-0.1	-0.4	-0.2	-0.2	-0.1	-0.2	-0.2	1.5	-0.7	2.0	0.7	-0.7	-1.0	-1.0	-0.6	-0.1	0.2	0.1	0.8	0.2	0.3	-0.4	0.0	2.0	
18-Jul	-0.2	-0.1	-0.2	-0.2	-0.3	-0.3	-0.1	0.1	0.4	0.1	-0.9	-0.8	0.0	1.5	0.0	0.3	0.1	0.1	-0.1	1.4	1.8	1.2	-0.1	-0.2	0.1	1.8	
19-Jul	0.8	2.5	1.1	-0.2	0.1	0.2	0.5	-0.1	-0.6	0.4	0.5	-0.2	0.1	1.1	-1.1	-0.6	0.1	-0.5	-1.0	-0.7	-0.3	-0.3	-0.4	-1.5	0.0	2.5	
20-Jul	-1.1	-1.5	-0.2	-0.4	-0.2	-0.5	-0.3	-0.3	0.3	0.2	0.6	-0.8	-0.6	-0.4	-0.3	-0.2	-0.7	-0.2	0.0	0.1	0.4	0.4	0.2	0.1	-0.2	0.6	
21-Jul	-0.1	0.1	0.0	-0.1	0.0	0.1	0.1	0.0	-0.2	-0.2	1.2	0.6	0.5	1.7	0.8	-0.7	-1.6	0.0	0.6	-0.3	-0.1	0.1	0.2	0.3	0.1	1.7	
22-Jul	0.4	0.2	0.0	0.0	0.0	-0.1	0.1	0.3	0.1	0.0	0.1	-0.2	0.2	0.8	0.5	1.0	0.9	2.0	1.9	2.7	2.0	2.0	1.4	0.4	0.7	2.7	
23-Jul	1.8	1.7	0.7	1.1	0.4	0.9	0.2	3.2	0.6	1.4	2.1	3.4	0.6	1.6	2.3	1.6	1.0	1.8	0.9	0.5	0.4	0.4	1.0	1.1	1.3	3.4	
24-Jul	0.9	0.7	0.9	1.7	2.7	0.3	0.7	0.8	0.9	0.8	0.7	2.1	0.7	0.2	0.8	0.4	1.6	2.3	1.7	0.9	1.3	1.0	1.0	1.2	1.1	2.7	
25-Jul	0.3	0.7	-0.1	-0.3	0.2	0.3	0.1	0.0	0.2	0.2	0.4	0.0	0.3	0.6	0.1	1.2	1.3	0.8	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.2	1.3	
26-Jul	0.4	1.8	1.2	1.5	0.1	0.2	0.0	-0.1	0.1	-0.3	-0.4	-0.5	-0.4	0.9	0.9	1.2	0.7	0.3	0.3	-0.1	0.6	1.9	0.9	0.0	0.5	1.9	
27-Jul	-0.1	0.3	0.4	0.4	0.1	0.3	0.1	0.1	0.1	0.2	0.7	0.9	0.4	0.3	-0.3	0.2	0.9	1.1	1.6	1.3	0.3	-0.6	0.0	0.1	0.4	1.6	
28-Jul	-0.7	0.0	0.3	0.1	0.6	1.0	0.6	-0.1	0.0	0.3	0.1	0.2	0.3	0.3	-0.5	-0.5	0.2	1.2	0.0	0.2	0.2	0.6	0.5	0.3	0.2	1.2	
29-Jul	0.0	0.2	0.3	0.1	0.4	1.5	1.7	0.5	0.1	-0.1	0.5	0.4	0.6	0.2	0.6	-0.4	-0.1	-0.2	-0.1	1.0	2.0	1.3	1.7	1.1	0.6	2.0	
30-Jul	1.3	1.0	1.4	0.1	-0.1	0.2	-0.1	-0.4	0.1	0.3	-0.5	0.6	0.5	0.9	0.5	0.4	-0.1	0.5	0.0	AF	AF	AF	AF	AF	0.3	1.4	
31-Jul	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	--	--
																								Diurnal Average			
																								Diurnal Maximum			
AF - Analyzer Failure																								UO - Unstable Operation			



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 4.5 km/h on Jul 10 16:00			Hours of Data:	714
Minimum Value: 0.1 km/h on Jul 21 21:00			Hours of Missing Data:	30
			Hours of Calibration:	0
Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 1.0 Median = 1.5 Q ₃ = 2.2 P ₉₀ = 2.8 P ₉₉ = 3.8			Percent Operational Time:	96.0

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-Jul	0.4	0.3	0.3	0.2	0.1	0.3	0.2	0.6	0.6	0.6	1.2	1.9	1.7	1.8	1.4	1.6	0.8	0.6	0.9	0.9	0.8	0.3	0.5	0.6	1.9
2-Jul	0.4	0.7	0.4	0.4	0.4	0.3	1.3	0.8	1.0	1.2	1.6	2.0	1.8	2.1	2.5	2.5	2.3	1.9	1.5	0.9	1.0	1.2	1.9	1.8	2.5
3-Jul	2.2	1.8	1.7	1.4	1.1	1.1	1.4	1.7	1.6	1.9	2.5	3.5	1.7	1.5	1.3	2.6	2.7	2.4	1.0	0.4	1.0	1.2	0.7	0.3	3.5
4-Jul	1.4	2.2	1.4	1.4	1.1	1.4	2.2	2.5	2.4	3.3	3.1	3.1	3.4	3.6	4.2	3.0	3.1	2.7	2.1	1.7	1.2	0.7	0.5	1.2	4.2
5-Jul	1.1	1.1	1.3	1.2	1.1	1.3	1.1	1.4	1.7	1.6	2.7	3.4	3.2	3.2	3.2	3.0	2.8	2.4	1.6	0.9	0.4	1.5	1.8	1.7	3.4
6-Jul	1.7	1.2	1.4	1.4	1.6	1.3	1.0	1.3	1.9	1.8	2.5	3.0	3.5	2.9	1.1	1.8	1.0	1.8	1.2	1.6	1.6	0.7	UO	1.1	3.5
7-Jul	0.9	0.9	1.2	1.1	1.2	1.2	1.2	1.3	1.7	1.9	2.0	2.5	2.4	2.7	2.6	2.0	1.3	1.4	1.4	1.0	0.7	0.6	0.3	0.3	2.7
8-Jul	0.4	0.7	0.9	0.6	0.9	1.2	1.1	1.0	1.1	1.2	1.9	2.0	2.1	2.7	3.6	2.6	3.4	2.0	1.4	0.9	0.7	1.6	1.4	1.9	3.6
9-Jul	2.1	2.0	1.9	1.0	1.1	0.8	0.7	1.3	1.9	2.9	2.7	1.8	2.6	2.0	2.6	3.1	3.2	1.9	2.0	1.6	1.5	2.9	1.8	1.9	3.2
10-Jul	1.9	2.3	2.2	1.6	2.0	1.7	1.9	2.2	2.9	3.1	3.4	2.9	4.3	3.8	3.8	4.5	3.8	3.8	2.7	2.4	2.3	1.9	1.8	1.9	4.5
11-Jul	2.3	2.5	2.9	3.3	2.7	2.6	2.4	2.3	2.0	2.1	2.5	2.5	3.3	2.9	3.1	2.7	3.1	3.5	2.6	2.4	1.5	0.5	0.4	0.9	3.5
12-Jul	0.9	0.9	1.0	0.6	0.8	1.0	1.4	1.2	1.5	2.0	2.5	3.4	3.2	3.2	2.9	2.5	2.2	1.5	1.2	0.5	0.2	0.3	0.9	1.4	3.4
13-Jul	1.5	1.4	1.3	1.0	1.0	1.1	1.3	1.8	2.0	2.6	1.8	1.9	1.5	1.6	2.1	1.9	1.7	1.6	1.3	0.9	1.1	1.2	1.6	1.4	2.6
14-Jul	1.8	1.9	2.1	1.8	1.6	1.4	1.2	1.3	1.8	1.8	1.8	2.1	2.7	2.4	2.4	2.3	1.9	1.9	1.6	1.0	0.7	0.8	1.0	2.4	2.7
15-Jul	1.3	1.0	0.7	0.9	0.9	0.9	0.9	0.8	1.1	1.5	1.8	1.8	2.3	2.5	2.7	2.9	1.6	1.6	1.5	1.2	0.9	1.0	0.9	1.0	2.9
16-Jul	1.0	2.2	2.1	1.0	1.0	0.7	0.6	1.2	0.6	1.0	1.0	1.0	0.8	0.7	1.0	2.1	2.4	2.2	2.1	1.9	1.1	1.9	3.0	1.8	3.0
17-Jul	0.4	0.2	0.3	0.6	0.3	0.5	0.6	0.9	2.1	2.0	1.8	2.1	2.6	2.3	0.9	0.7	0.7	0.5	0.3	0.6	1.1	1.5	0.9	0.8	2.6
18-Jul	0.9	0.5	0.4	0.4	0.6	0.5	0.9	1.6	2.1	2.5	2.9	2.5	2.9	2.5	2.4	1.5	1.6	1.3	2.0	1.7	1.7	1.6	0.7	0.6	2.9
19-Jul	1.0	1.9	1.4	1.4	0.9	0.8	1.0	1.5	2.4	2.5	3.0	2.7	2.7	2.5	3.8	3.3	3.4	1.3	2.3	2.2	2.3	1.5	0.5	1.4	3.8
20-Jul	2.5	1.4	1.3	1.0	1.0	0.8	0.6	0.9	1.6	2.2	2.8	2.5	2.8	2.0	2.3	1.9	2.3	2.1	1.4	0.9	0.4	0.5	0.4	0.3	2.8
21-Jul	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.4	1.0	1.2	1.6	1.6	2.4	2.8	2.0	1.4	1.4	1.1	0.6	0.4	0.1	0.2	0.3	0.3	2.8
22-Jul	0.6	0.5	0.5	0.6	0.5	0.5	0.3	0.4	0.3	0.8	1.2	1.7	2.1	2.0	2.1	2.5	2.4	1.9	2.1	1.2	0.8	1.6	2.2	1.0	2.5
23-Jul	1.3	1.2	1.2	1.2	1.4	1.0	1.1	1.0	1.7	2.2	3.1	3.0	1.3	2.6	3.4	2.8	3.0	2.8	1.9	2.0	2.0	1.1	1.8	1.7	3.4
24-Jul	1.4	1.1	1.7	1.6	1.6	1.5	1.9	1.6	1.4	2.7	2.2	2.9	3.0	2.7	3.0	2.6	2.8	3.0	2.2	1.8	2.0	2.1	2.3	2.4	3.0
25-Jul	2.0	2.7	1.6	1.0	0.8	1.4	1.2	1.2	1.3	1.7	1.8	0.9	1.8	1.8	1.1	1.9	1.7	2.2	1.0	0.6	0.3	0.5	0.7	0.8	2.7
26-Jul	1.6	1.3	1.4	1.2	1.0	1.3	0.9	0.8	1.1	1.0	1.5	1.9	2.2	2.7	2.5	2.5	2.5	1.6	1.6	1.0	0.8	0.5	1.5	1.0	2.7
27-Jul	0.5	0.6	1.1	1.3	0.8	0.5	0.6	0.9	0.9	1.2	1.9	1.6	2.1	2.9	2.2	2.7	1.4	1.5	1.4	1.3	1.5	1.4	1.1	2.1	2.9
28-Jul	1.2	0.7	0.7	1.2	1.6	1.5	1.3	0.6	0.7	1.2	1.3	2.0	2.3	3.0	2.7	2.7	3.2	2.7	2.4	1.4	1.0	1.5	0.9	1.0	3.2
29-Jul	1.1	1.0	0.9	0.7	1.2	3.0	2.8	1.4	1.8	1.1	1.0	1.6	1.9	2.3	1.9	1.8	0.7	0.8	0.7	1.1	1.5	1.7	2.6	1.8	3.0
30-Jul	1.4	1.2	1.4	0.7	0.7	1.0	1.2	1.2	1.1	1.5	1.8	2.3	2.2	2.7	2.5	2.8	2.1	1.9	1.4	AF	AF	AF	AF	AF	2.8
31-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
Diurnal Maximum																									
2.5 2.7 2.9 3.3 2.7 3.0 2.8 2.5 2.9 3.3 3.4 3.5 4.3 3.8 4.2 4.5 3.8 3.8 2.7 2.4 2.3 2.9 3.0 2.4																									

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
JULY 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

August 29, 2014

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	705	35	39	99.46	20	0	4	0
H2S (ppb) Average	701	39	43	99.46	3	0	1	0
THC (ppm) Average	704	36	40	99.46	3.6	-	2.7	-
Temperature (C) Average	744	0	0	100.00	33.2	-	23.9	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	36	-	17	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2 (ppb) Average	705	0.4	1	-	0	0	0	0	0	0	0	20
H2S (ppb) Average	701	0.4	0	-	0	0	0	0	0	0	1	3
THC (ppm) Average	704	2.35	0.2	-	2.1	2.2	2.2	2.3	2.4	2.6	2.6	3.6
Temperature 2 m (C) Average	744	19.85	4.9	-	6.9	13.9	15.9	19.8	23.2	26.1	26.1	33.2
Wind Speed 10 m (km/h) Average	744	9	5	-	1	4	6	8	11	15	15	36
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	30 Jul 2014 21:00	31 Jul 2014 00:00	4	Station power failure

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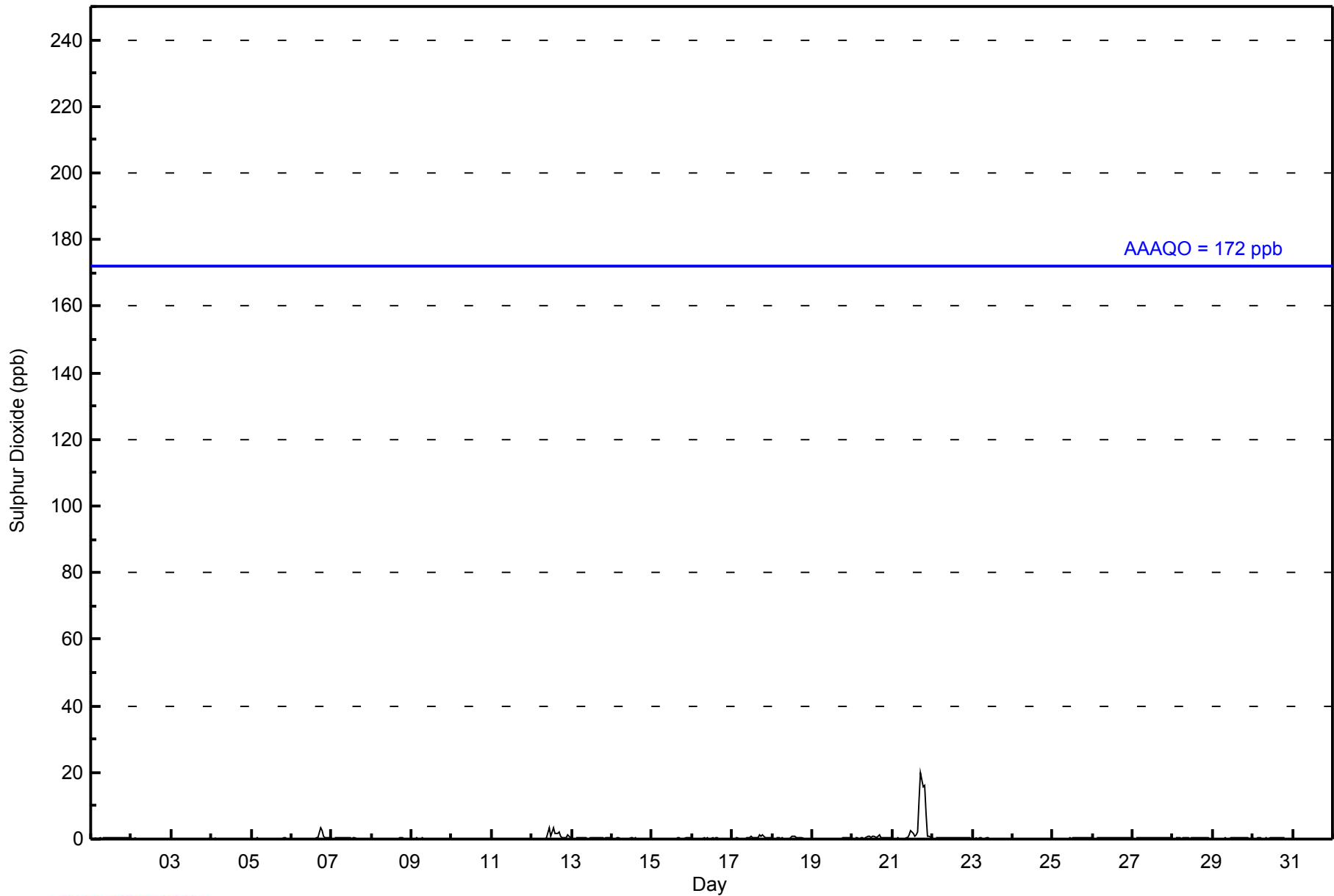


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																	
Maximum Value: 20 ppb on Jul 21 18:00										Maximum Daily Average: 3.7 ppb on Jul 21										Hours of Data: 705							
Minimum Value: 0 ppb on Jul 3 00:00										Minimum Daily Average: 0.1 ppb on Jul 3										Hours of Missing Data: 39							
Maximum Diurnal Average: 1.0 ppb at hour 18										Minimum Diurnal Average: 0.2 ppb at hour 8										Hours of Calibration: 35							
Monthly Average: 0.4 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 3										Percent Operational Time: 99.5							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0	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-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0.1	0	
4-Jul	0	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-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	1	1	0	0	0	0.4	3	
7-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
8-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1	
9-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
10-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
12-Jul	0	Z	0	0	0	0	0	0	0	3	1	2	3	2	2	2	1	0	0	0	1	1	1	1	0.9	3	
13-Jul	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	
14-Jul	0	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-Jul	0	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-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0.4	1	
18-Jul	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
19-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0.4	1	
21-Jul	0	Z	0	0	0	0	0	0	0	1	2	2	1	1	2	11	20	16	16	8	1	1	1	1	3.7	20	
22-Jul	0	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-Jul	0	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-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
26-Jul	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
27-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
28-Jul	0	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	
29-Jul	0	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	
30-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
31-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
		0.2	--	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.3	0.3	0.7	1.0	0.8	0.8	0.5	0.3	0.2	0.2	Diurnal Average		
		1	--	0	0	0	0	0	0	1	3	2	2	3	2	2	11	20	16	16	8	1	1	1	Diurnal Maximum		
Z - zerospan		C - Calibration		PF - Power Failure																							
Alberta Ambient Air Quality Objectives (AAAQO):		1-hr 172 ppb		24-hr 48 ppb																							



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	701	99.43	99.43
11 - 20	4	0.57	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

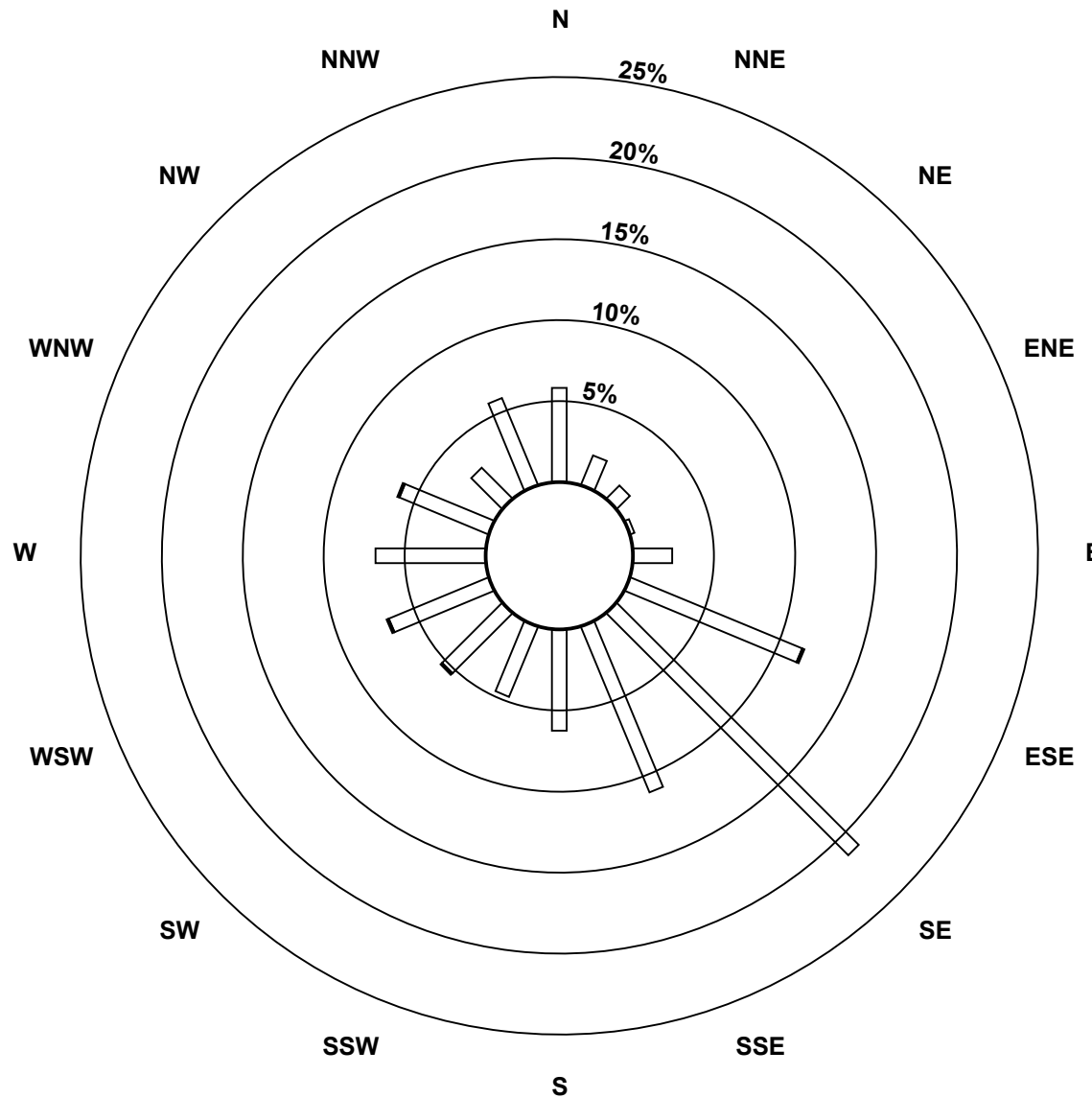
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	41	14	8	2	17	81	149	78	44	33	37	47	48	42	19	41	701
11 - 20	0	0	0	0	0	1	0	0	0	0	1	1	0	1	0	0	4
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	14	8	2	17	82	149	78	44	33	38	48	48	43	19	41	705

Total Number of Valid Hours: 705

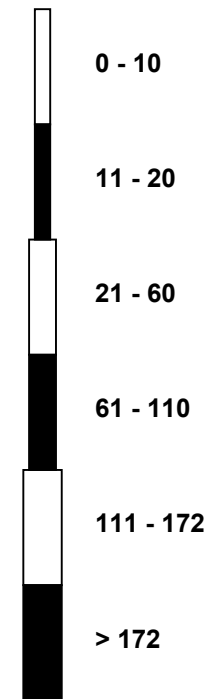
Total Number of Hours: 744

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

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



Classes (ppb)



Total Number of Valid Hours: 705

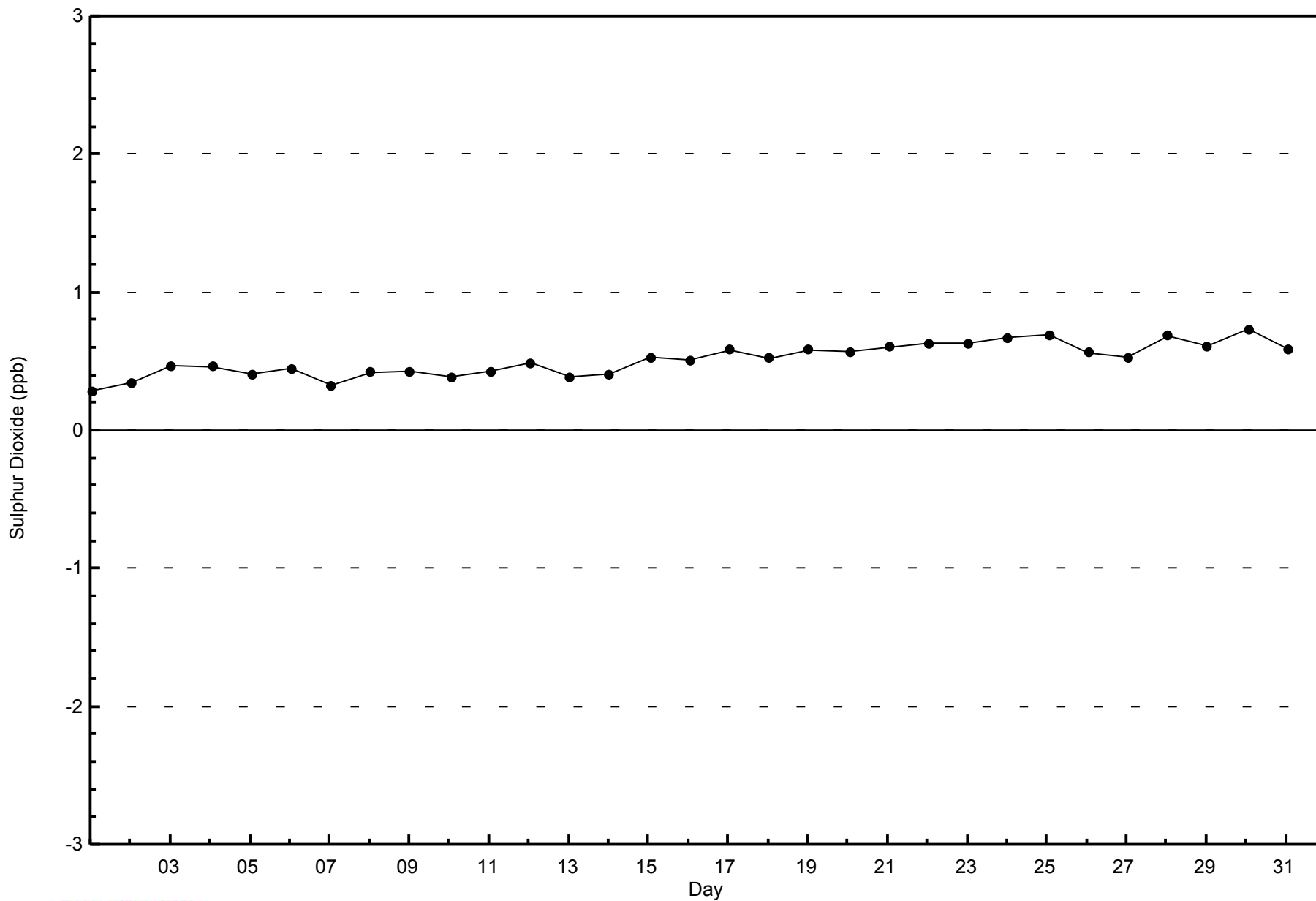


WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

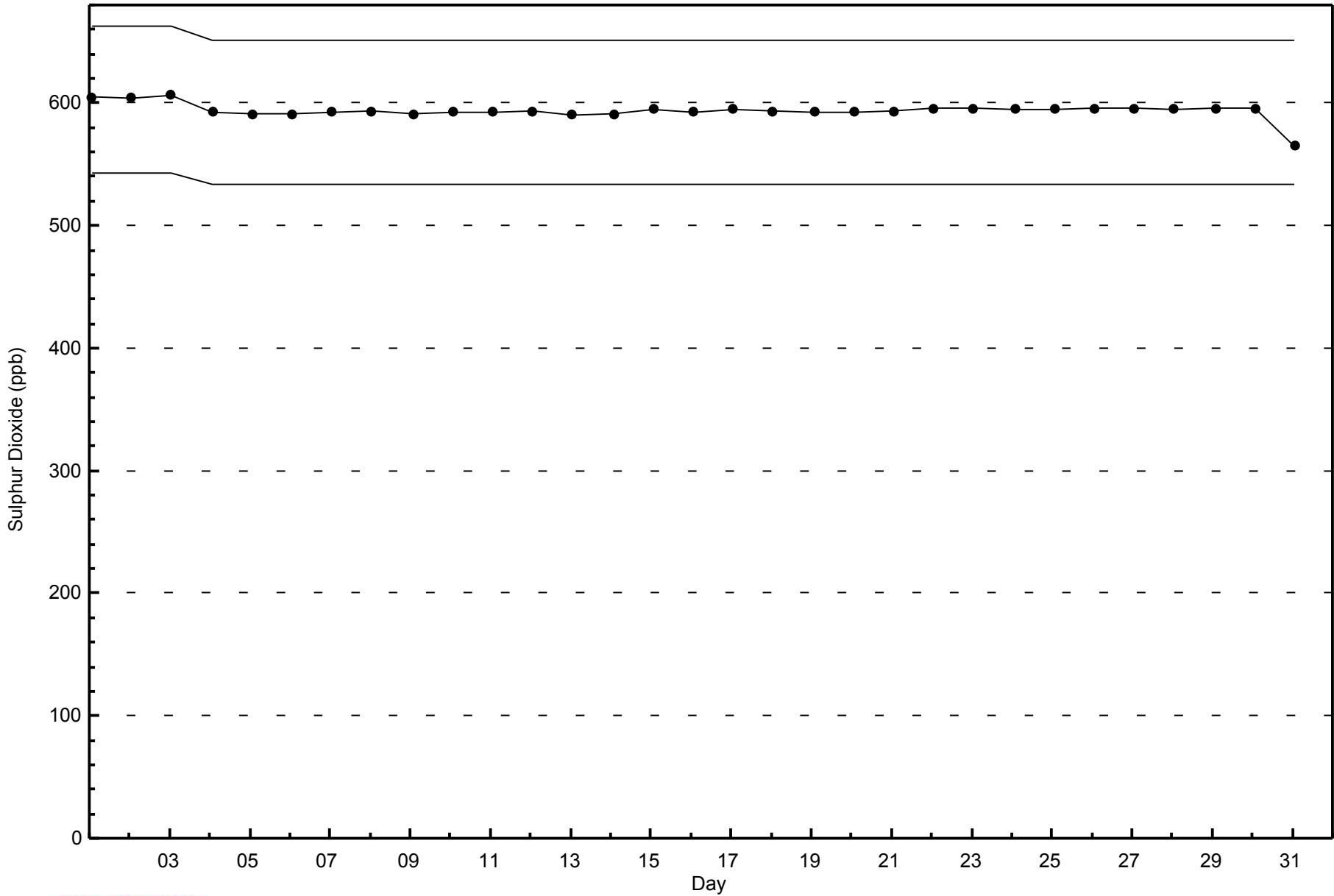
Buffalo Viewpoint - July 2014





WBEA NETWORK
Span Responses

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



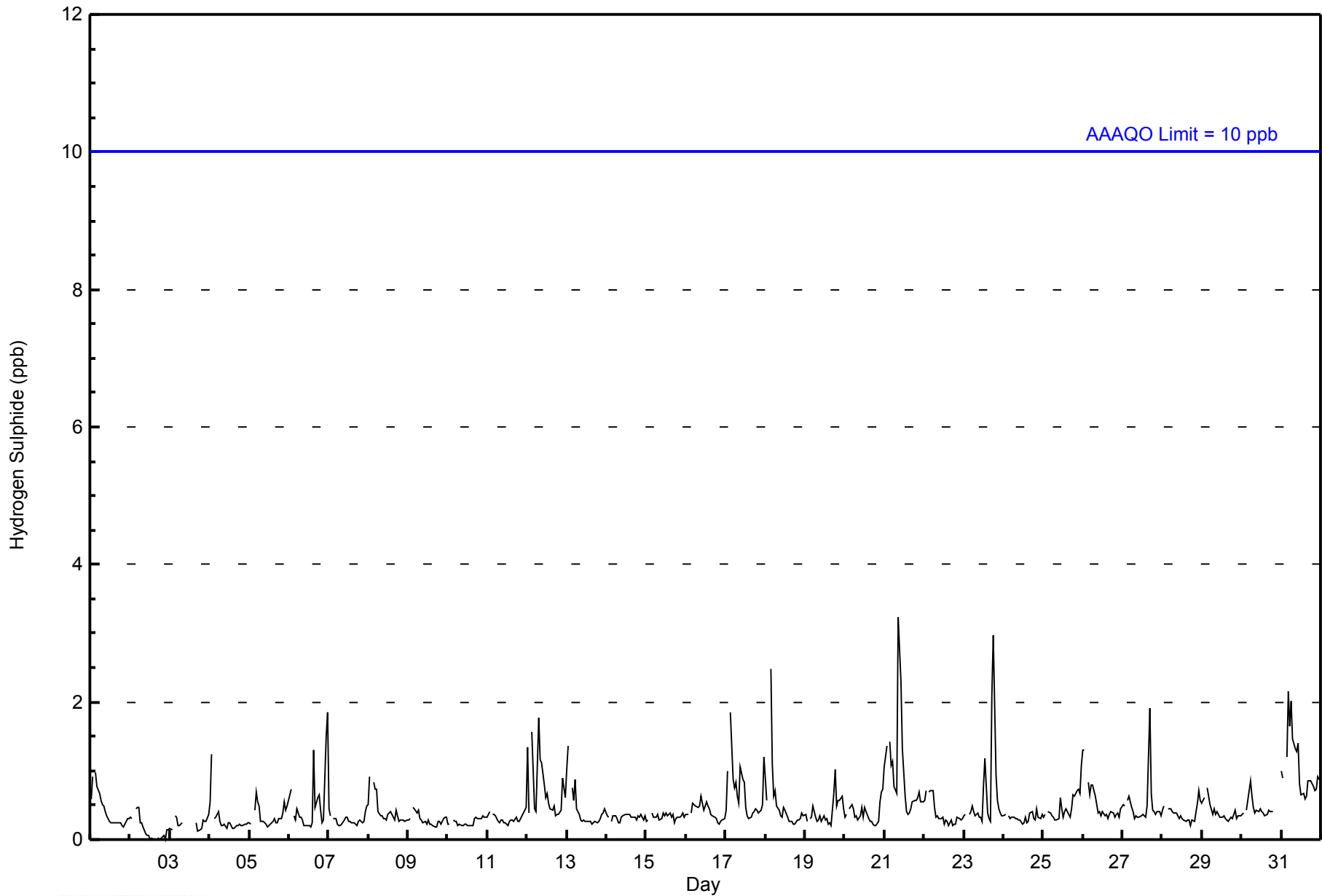


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3 ppb on Jul 21 09:00 Maximum Daily Average: 1.1 ppb on Jul 31																	Hours in Service: 744 Hours of Data: 701 Hours of Missing Data: 43 Hours of Calibration: 39 Percent Operational Time: 99.5																																
Minimum Value: 0 ppb on Jul 2 15:00 Minimum Daily Average: 0.1 ppb on Jul 2 Maximum Diurnal Average: 0.7 ppb at hour 4 Minimum Diurnal Average: 0.3 ppb at hour 15 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																																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	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	0.4	1																						
2-Jul	0	0	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-Jul	0	0	Z	0	0	0	0	0	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0																						
4-Jul	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	0.3	1																						
5-Jul	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1																						
6-Jul	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	2	2	0.5	2																							
7-Jul	0	0	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																						
8-Jul	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
9-Jul	0	0	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																						
10-Jul	0	0	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-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
12-Jul	1	0	Z	2	0	0	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0.7	2																						
13-Jul	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
14-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
15-Jul	0	0	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-Jul	0	0	Z	0	1	1	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
17-Jul	0	1	Z	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.7	2																						
18-Jul	1	1	Z	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2																						
19-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0.4	1																							
20-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1																						
21-Jul	1	1	Z	1	1	1	1	1	3	3	2	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1.0	3																						
22-Jul	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
23-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	3	1	1	0	0	0	0	0.6	3																						
24-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
25-Jul	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.5	1																						
26-Jul	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																						
27-Jul	1	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0.5	2																						
28-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1																						
29-Jul	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
30-Jul	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	PF	PF	PF	PF	0.5	1																						
31-Jul	1	1	Z	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2																						
																								0.5	0.6	--	0.7	0.6	0.6	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.5	0.5	Diurnal Average	
																								1	1	--	2	2	2	2	2	3	3	2	1	1	1	1	1	2	2	3	1	1	1	2	2	Diurnal Maximum	
Z - zerospan C - Calibration PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																	



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	698	99.57	99.57
3 - 4	3	0.43	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

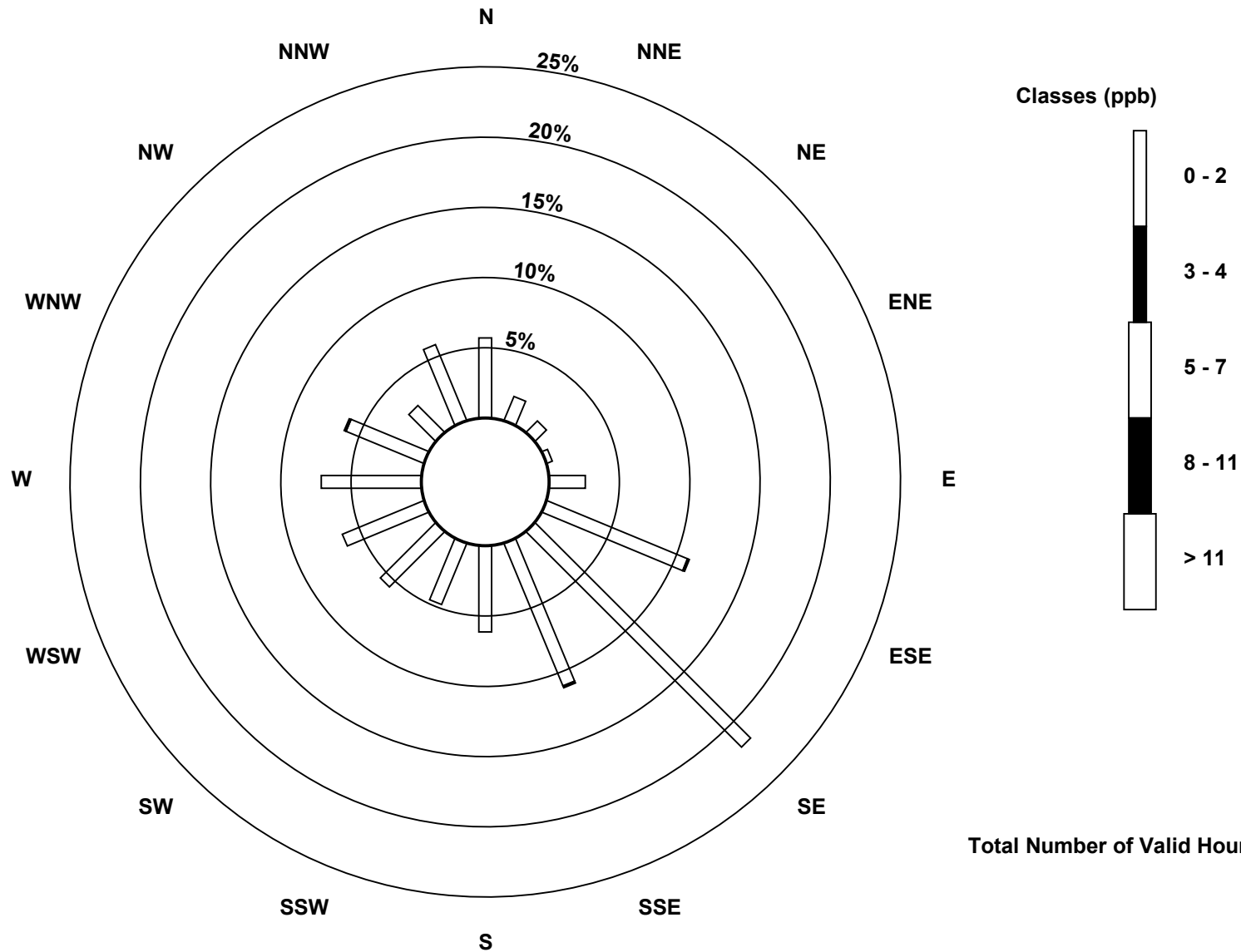
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	40	13	8	3	18	76	152	77	43	33	39	44	50	42	19	41	698
3 - 4	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	3
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	40	13	8	3	18	77	152	78	43	33	39	44	50	43	19	41	701

Total Number of Valid Hours: 701

Total Number of Hours: 744

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

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



Total Number of Valid Hours: 701

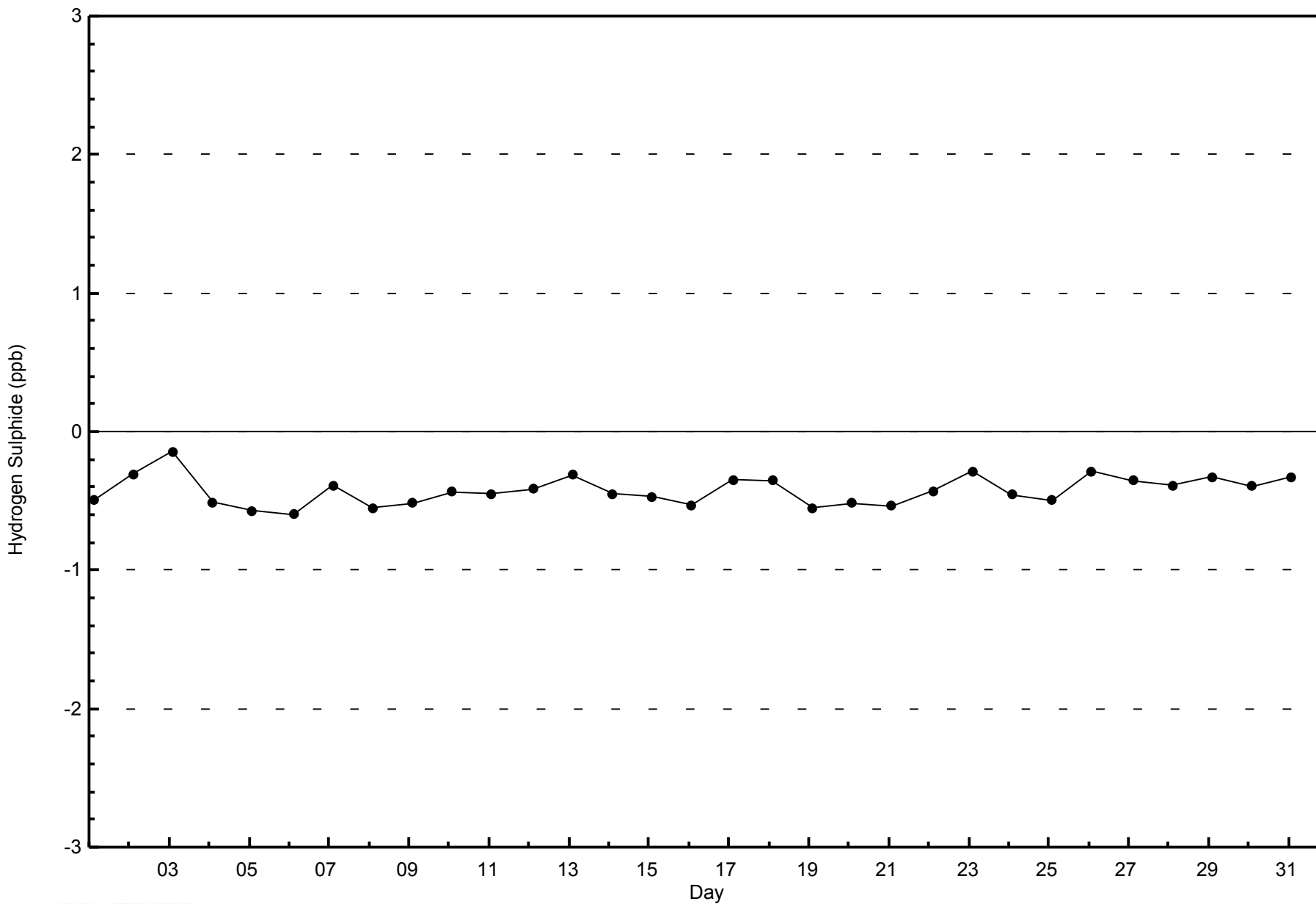


WBEA NETWORK

Zero Responses

Hydrogen Sulphide (H₂S) - ppb

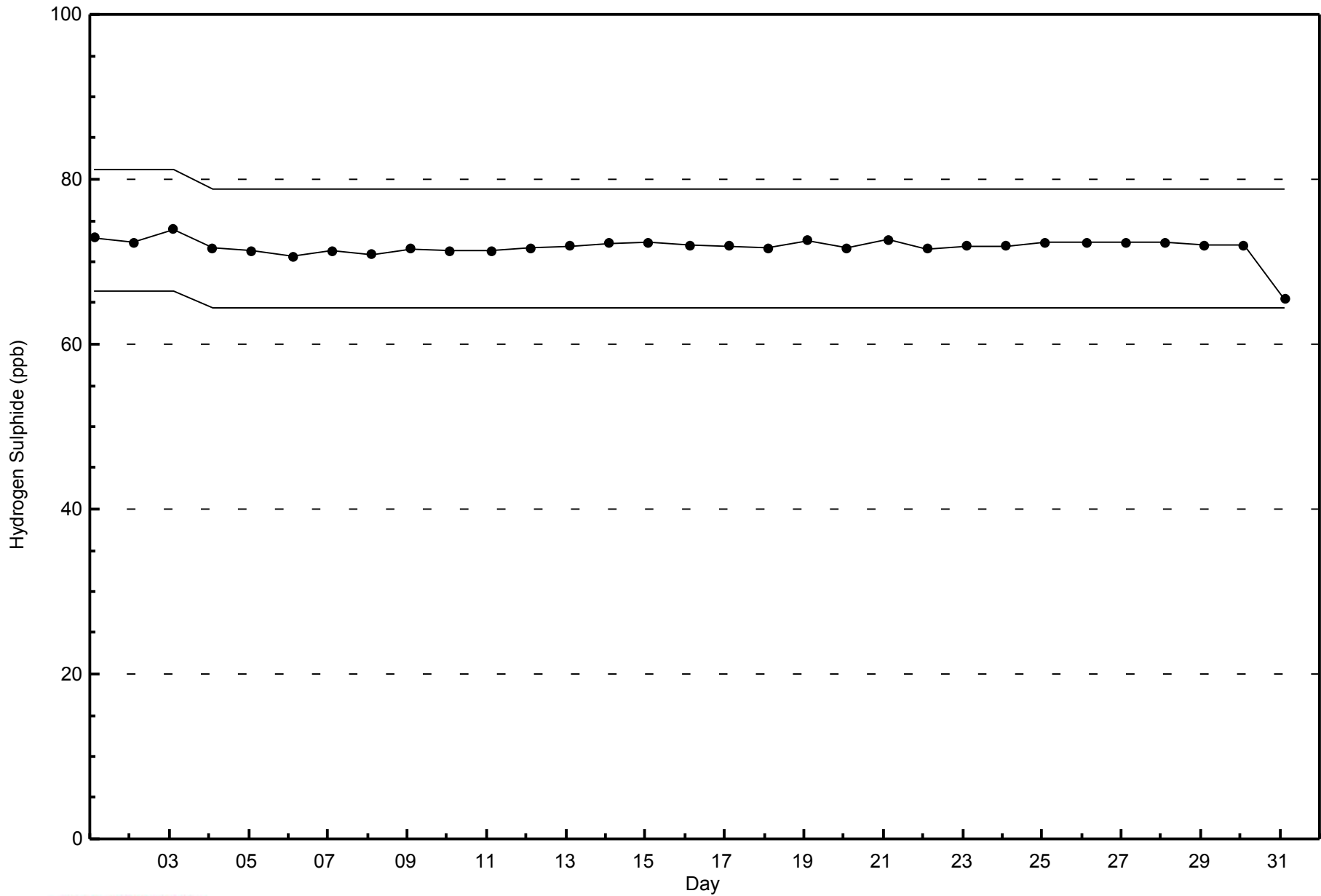
Buffalo Viewpoint - July 2014





WBEA NETWORK
Span Responses

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



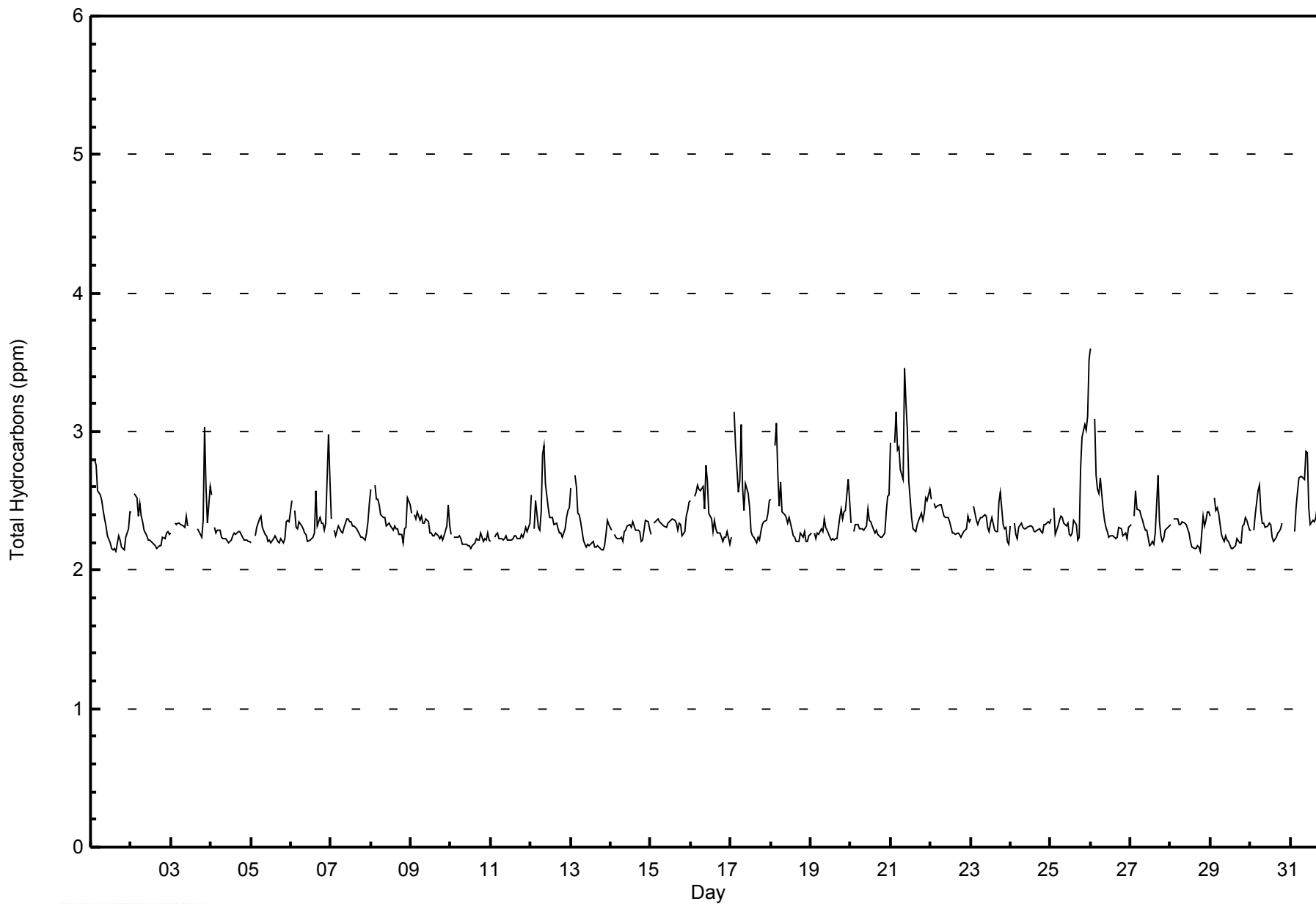


Maximum Value: 3.6 ppm on Jul 26 01:00																		Maximum Daily Average: 2.7 ppm on Jul 21																		Hours in Service: 744												
Minimum Value: 2.1 ppm on Jul 1 16:00																		Minimum Daily Average: 2.2 ppm on Jul 10																		Hours of Data: 704												
Maximum Diurnal Average: 2.5 ppm at hour 3																		Minimum Diurnal Average: 2.3 ppm at hour 15																		Hours of Missing Data: 40												
Monthly Average: 2.35 ppm																		Percentiles: P ₁ = 2.2 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.4 P ₉₀ = 2.6 P ₉₉ = 3.1																		Hours of Calibration: 36												
																																				Percent Operational Time: 99.5												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	2.4	Z	2.8	2.8	2.6	2.5	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.3	2.4	2.3	2.8																						
2-Jul	2.4	Z	2.6	2.5	2.4	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.6																						
3-Jul	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	C	C	C	C	C	2.3	2.3	2.2	2.4	3.0	2.6	2.3	2.6	3.0																							
4-Jul	2.5	Z	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.5																							
5-Jul	2.2	Z	2.2	2.3	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.4																							
6-Jul	2.5	Z	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.6	2.3	2.4	2.3	2.3	2.3	3.0	2.7	2.4	3.0																							
7-Jul	2.4	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.4	2.5	2.5																							
8-Jul	2.6	Z	2.6	2.5	2.5	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.5	2.5	2.4	2.6																							
9-Jul	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.3	2.2	2.3	2.3	2.5	2.3	2.5																							
10-Jul	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.3																							
11-Jul	2.2	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	2.3	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3																							
12-Jul	2.5	Z	2.3	2.5	2.3	2.3	2.4	2.8	2.9	2.6	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.3	2.4	2.4	2.4	2.4	2.9																							
13-Jul	2.6	Z	2.7	2.6	2.4	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.3	2.4	2.3	2.7																							
14-Jul	2.3	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.4	2.4	2.3	2.4																							
15-Jul	2.3	Z	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.3	2.4	2.4	2.5	2.5																							
16-Jul	2.5	Z	2.5	2.6	2.6	2.6	2.6	2.6	2.4	2.8	2.6	2.4	2.4	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.8																							
17-Jul	2.2	Z	3.1	2.9	2.6	2.6	3.0	2.6	2.4	2.6	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.5	3.1																							
18-Jul	2.5	Z	2.9	3.1	2.7	2.5	2.6	2.4	2.4	2.4	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.2	3.1																							
19-Jul	2.3	Z	2.3	2.2	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.4	2.4	2.4	2.7	2.5	2.7																							
20-Jul	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.4	2.5	2.5	2.5																							
21-Jul	2.9	Z	2.9	3.1	2.9	2.9	2.7	2.7	3.5	3.2	3.0	2.6	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.6	3.5																							
22-Jul	2.5	Z	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.4	2.3	2.5																							
23-Jul	2.4	Z	2.5	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.5	2.6	2.3	2.3	2.3	2.2	2.2	2.6																							
24-Jul	2.3	Z	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3																							
25-Jul	2.4	Z	2.4	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.3	2.4	2.3	2.2	2.2	2.7	3.0	3.1	3.0	3.1	3.5	3.5																							
26-Jul	3.6	Z	3.1	2.7	2.6	2.6	2.7	2.4	2.4	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.3	3.6																							
27-Jul	2.3	Z	2.4	2.6	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.7	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.7																							
28-Jul	2.3	Z	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.4	2.3	2.4	2.4	2.4	2.4																							
29-Jul	2.4	Z	2.5	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.5																							
30-Jul	2.3	Z	2.3	2.4	2.6	2.6	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	PF	PF	PF	PF	2.6																							
31-Jul	2.3	Z	2.3	2.5	2.6	2.7	2.7	2.7	2.7	2.9	2.9	2.4	2.3	2.4	2.3	2.4	2.5	2.5	2.5	2.4	2.3	2.3	2.5	2.5	2.9																							
																								2.4	--	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	Diurnal Average	
																								3.6	--	3.1	3.1	2.9	2.9	3.0	2.8	3.5	3.2	3.0	2.6	2.4	2.4	2.4	2.6	2.7	2.5	2.7	3.0	3.1	3.0	3.1	3.5	Diurnal Maximum
Z - zerospan																								C - Calibration				PF - Power Failure																				



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	694	98.58	98.58
3.1 - 10.0	10	1.42	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

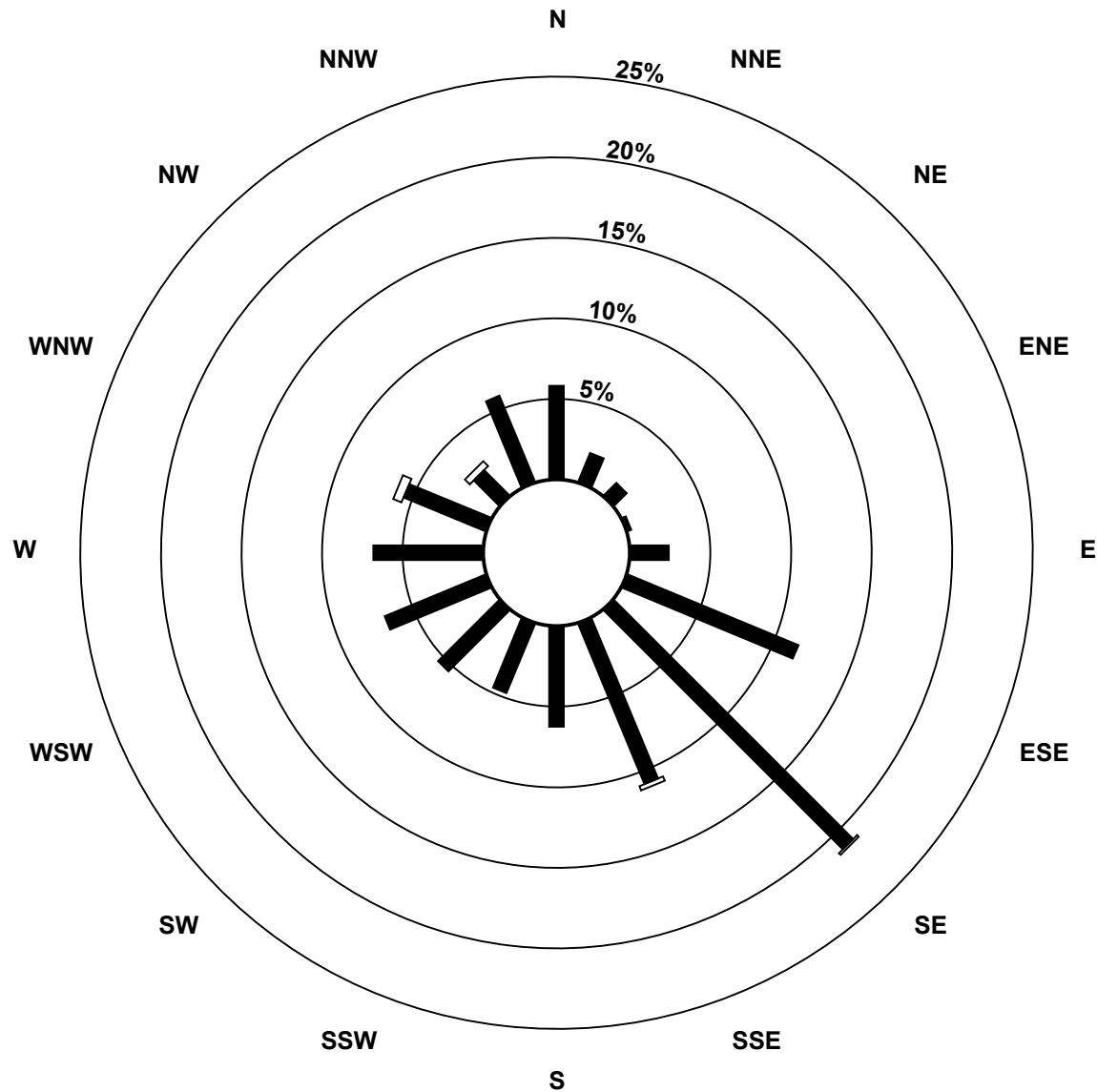
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	41	14	8	2	17	81	148	76	44	33	38	48	48	39	16	41	694
3.1 - 10.0	0	0	0	0	0	0	1	2	0	0	0	0	0	4	3	0	10
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	41	14	8	2	17	81	149	78	44	33	38	48	48	43	19	41	704

Total Number of Valid Hours: 704

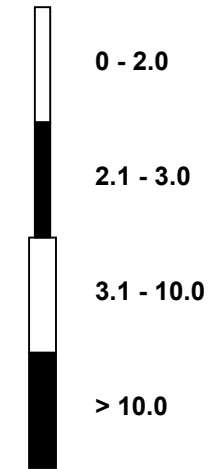
Total Number of Hours: 744

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

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



Classes (ppm)



Total Number of Valid Hours: 704

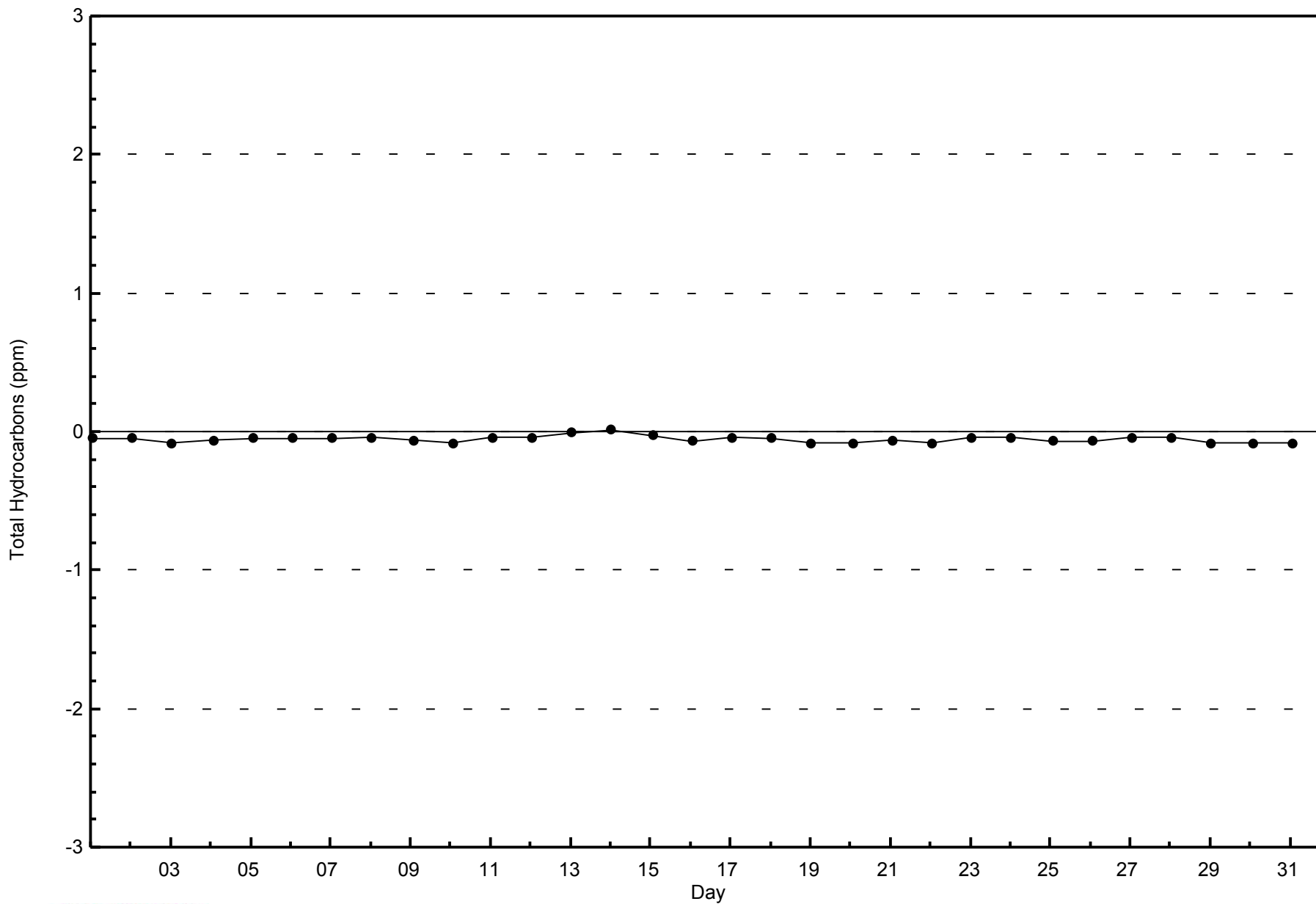


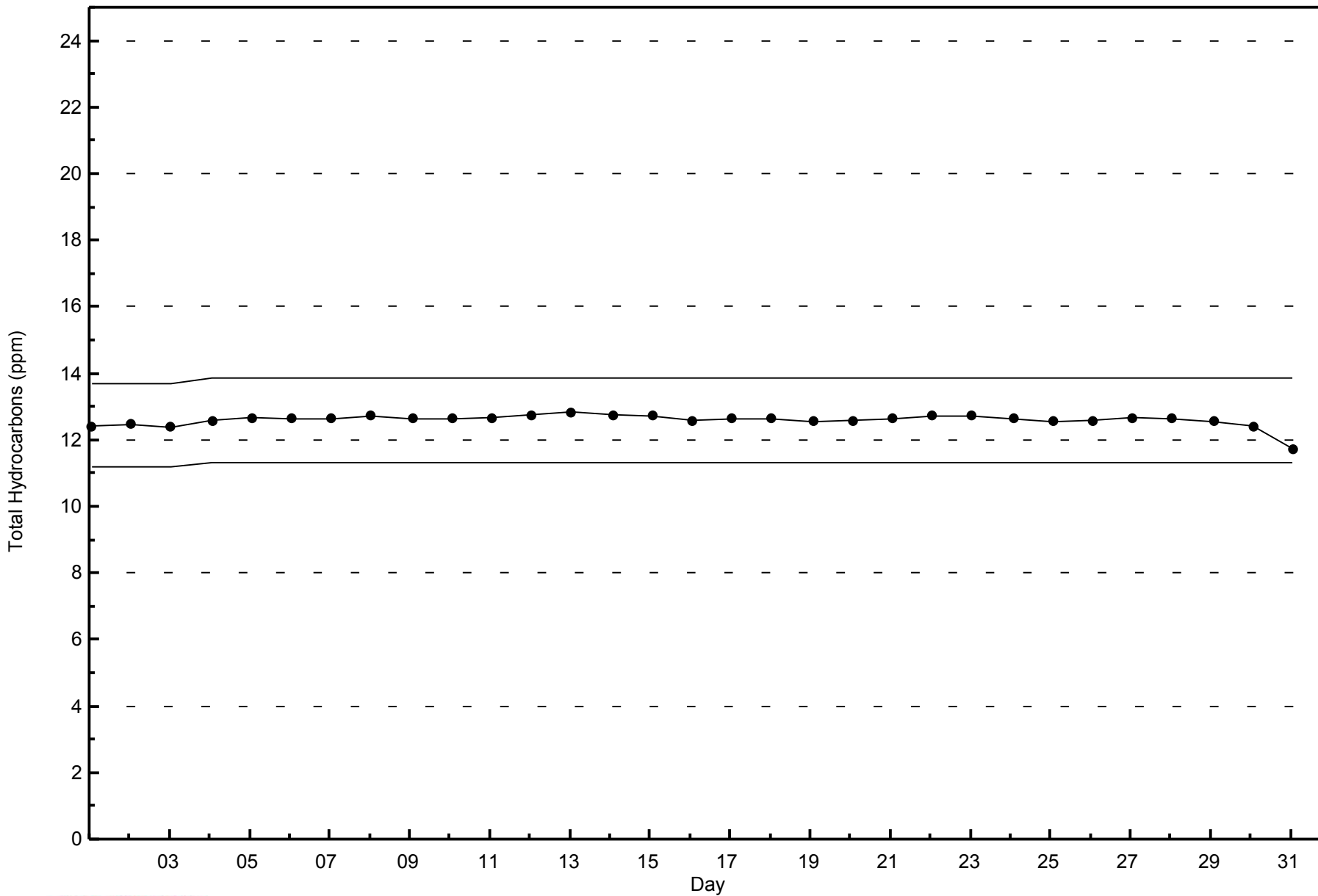
WBEA NETWORK

Zero Responses

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint - July 2014







Wood Buffalo Environmental Association
Summary of Hour Averages

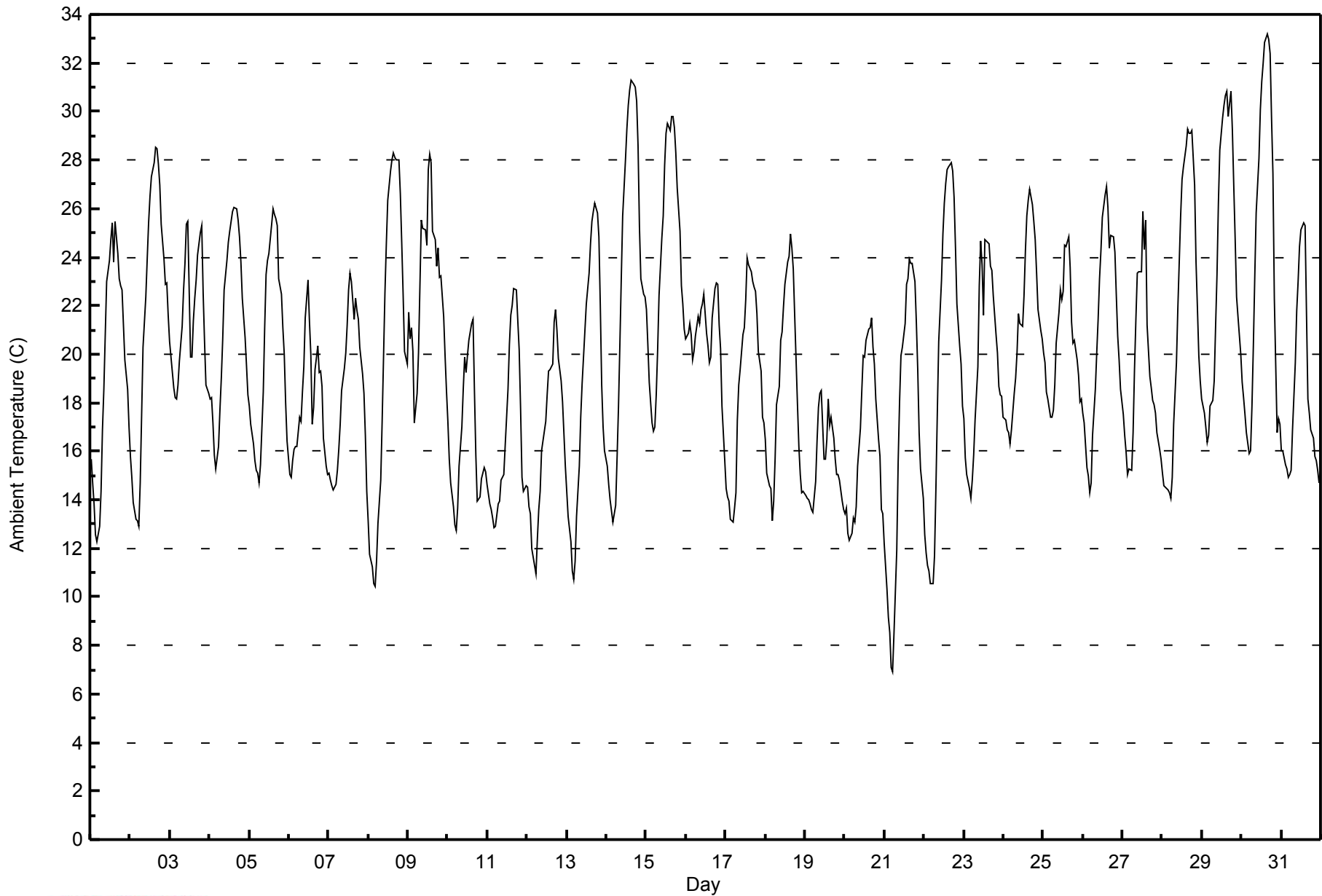
Ambient Temperature (AT) - C
Buffalo Viewpoint - July 2014

Maximum Value: 33.2 C on Jul 30 16:00 Maximum Daily Average: 23.9 C on Jul 15																						Hours in Service:	744			
Minimum Value: 6.9 C on Jul 21 06:00 Minimum Daily Average: 15.6 C on Jul 19																						Hours of Data:	744			
Maximum Diurnal Average: 24.8 C at hour 15 Minimum Diurnal Average: 14.2 C at hour 5																						Hours of Missing Data:	0			
Monthly Average: 19.85 C Percentiles: P ₁ = 10.5 P ₁₀ = 13.9 Q ₁ = 15.9 Median = 19.8 Q ₃ = 23.2 P ₉₀ = 26.1 P ₉₉ = 31.1																						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-Jul	15.7	14.7	13.9	12.6	12.3	12.9	14.3	16.9	18.5	20.8	23.0	23.9	24.7	25.4	23.8	25.5	24.1	23.1	22.8	22.6	21.2	19.8	18.6	17.0	19.5	25.5
2-Jul	15.8	14.9	13.9	13.2	13.1	12.9	14.7	17.4	20.3	22.3	23.9	25.4	26.5	27.3	27.9	28.5	28.5	27.8	27.0	25.4	23.9	22.9	22.9	21.6	21.6	28.5
3-Jul	20.5	19.2	18.6	18.2	18.2	18.7	19.7	21.2	22.6	23.7	25.4	25.5	19.9	19.9	21.4	22.3	23.1	24.1	25.0	25.3	22.5	20.5	18.7	18.4	21.4	25.5
4-Jul	18.1	18.2	17.2	15.8	15.3	16.2	17.7	19.0	20.6	22.6	23.8	24.6	25.0	25.5	25.9	26.1	26.0	25.5	24.8	23.8	22.3	20.7	19.5	18.3	21.4	26.1
5-Jul	17.8	17.1	16.3	15.6	15.2	15.1	14.7	15.4	18.4	21.1	23.3	23.9	24.2	25.4	26.0	25.8	25.6	25.3	23.1	22.5	21.1	20.0	18.0	16.4	20.3	26.0
6-Jul	15.0	14.9	15.6	16.1	16.2	16.2	17.4	17.2	18.4	19.5	21.5	23.0	21.4	20.0	17.1	17.8	19.4	20.4	19.3	19.3	18.7	16.5	15.4	15.0	18.0	23.0
7-Jul	15.1	14.8	14.6	14.4	14.6	15.2	16.1	17.1	18.5	19.4	20.0	21.2	22.6	23.3	23.0	21.4	22.3	21.8	21.4	20.3	19.2	18.4	16.6	14.3	18.6	23.3
8-Jul	13.1	11.7	11.2	10.6	10.5	11.5	13.0	14.8	17.2	19.9	22.6	24.5	26.3	27.5	28.0	28.3	28.2	28.0	28.0	26.6	24.6	22.5	20.1	19.6	20.3	28.3
9-Jul	21.7	20.7	21.1	20.1	17.2	18.4	20.0	22.8	25.5	25.2	25.1	24.5	27.6	28.3	27.9	25.1	24.7	23.6	24.4	23.2	23.2	21.6	19.9	18.5	22.9	28.3
10-Jul	17.2	15.7	14.7	13.7	12.9	12.7	13.7	15.4	17.0	18.5	19.9	19.2	19.9	20.6	21.3	21.5	18.5	15.9	14.0	14.1	14.9	15.1	15.3	15.2	16.5	21.5
11-Jul	14.6	13.9	13.6	13.3	12.9	12.9	13.8	14.0	14.8	14.9	15.0	16.3	18.6	20.4	21.6	22.0	22.7	22.6	21.4	20.2	17.7	14.9	14.3	14.6	16.7	22.7
12-Jul	14.5	13.7	13.4	12.0	11.3	11.0	12.4	13.6	14.4	16.0	16.8	17.2	18.3	19.3	19.4	19.6	21.3	21.9	21.0	19.8	18.9	18.0	16.7	15.4	16.5	21.9
13-Jul	14.3	13.3	12.3	11.1	10.7	11.4	13.3	15.4	17.4	18.8	19.9	21.0	22.1	23.4	24.6	25.5	25.9	26.2	25.8	24.8	22.0	18.7	17.0	16.0	18.8	26.2
14-Jul	15.4	14.6	14.0	13.5	13.1	13.8	15.7	17.8	20.4	23.1	25.7	28.0	29.2	30.2	30.9	31.3	31.1	31.0	30.4	28.6	25.3	23.1	22.5	22.3	23.0	31.3
15-Jul	21.9	20.4	18.9	17.2	16.8	17.0	18.3	20.2	22.4	24.8	25.7	27.8	29.1	29.5	29.2	29.8	29.8	29.3	28.3	26.8	25.0	22.8	22.0	21.0	23.9	29.8
16-Jul	20.6	20.9	21.3	20.8	19.8	20.1	20.8	21.6	21.3	21.8	22.1	22.5	20.9	20.3	19.6	19.9	21.5	22.7	22.9	22.9	21.2	20.2	17.9	15.6	20.8	22.9
17-Jul	14.5	14.1	14.0	13.2	13.1	13.7	14.3	17.3	18.7	19.4	20.8	21.1	22.2	23.9	23.7	23.4	23.0	22.8	22.6	21.7	20.1	19.3	17.4	17.2	18.8	23.9
18-Jul	16.5	15.1	14.6	14.4	13.1	14.0	15.7	17.9	18.7	20.6	20.9	21.9	22.9	23.8	24.0	25.0	24.4	23.5	21.6	17.9	16.2	15.0	14.3	14.4	18.6	25.0
19-Jul	14.2	14.0	14.0	13.8	13.6	13.5	14.8	16.4	17.8	18.4	18.5	15.7	15.7	16.5	18.2	17.0	17.4	16.5	15.7	15.0	15.0	14.8	13.9	13.6	15.6	18.5
20-Jul	13.4	13.7	12.6	12.3	12.6	13.3	13.1	13.7	15.4	17.0	18.5	20.0	19.9	20.6	21.0	21.1	21.5	20.3	19.6	18.1	16.5	15.8	13.6	13.4	16.5	21.5
21-Jul	12.2	10.3	9.1	8.6	7.1	6.9	8.5	12.0	15.5	18.0	19.9	20.3	21.3	22.9	23.1	23.9	23.8	23.7	23.0	21.3	19.3	16.7	15.3	14.1	16.5	23.9
22-Jul	12.5	11.8	11.3	11.1	10.6	10.5	11.7	14.4	17.6	20.5	23.1	24.9	26.2	27.0	27.6	27.7	27.9	27.6	26.4	24.4	22.1	20.3	19.6	17.8	19.8	27.9
23-Jul	17.4	15.7	15.0	14.5	14.0	14.8	15.9	17.3	19.5	22.8	24.7	23.7	21.6	24.7	24.6	24.6	23.7	23.4	22.4	20.8	20.1	18.6	18.3	18.3	19.9	24.7
24-Jul	17.4	17.3	16.9	16.8	16.3	16.9	18.4	19.0	20.0	21.7	21.3	21.1	22.4	24.3	25.7	26.3	26.8	26.2	25.5	24.7	23.4	21.9	21.0	20.6	21.3	26.8
25-Jul	20.0	19.6	18.4	18.1	17.4	17.4	17.7	18.7	20.4	21.7	22.7	22.2	22.6	24.5	24.4	24.8	23.5	21.3	20.5	20.6	19.8	19.1	18.0	18.2	20.5	24.8
26-Jul	17.6	17.2	15.3	15.0	14.3	14.7	16.6	18.6	20.1	21.4	23.1	24.3	25.7	26.6	26.9	26.1	24.4	24.9	24.8	24.2	22.4	20.8	19.8	18.6	21.0	26.9
27-Jul	17.5	16.7	15.9	15.0	15.3	15.2	16.8	19.4	21.4	23.3	23.4	23.4	25.9	24.3	25.5	21.2	19.0	18.6	18.1	17.9	17.6	16.8	16.1	15.7	19.2	25.9
28-Jul	15.1	14.6	14.5	14.4	14.3	14.1	14.9	17.1	19.7	21.9	23.8	25.7	27.2	27.7	28.6	29.3	29.1	29.1	29.2	27.0	23.8	21.9	19.9	18.9	21.7	29.3
29-Jul	18.2	17.6	17.0	16.4	16.7	17.9	18.1	18.9	21.1	23.3	26.2	28.4	29.7	30.2	30.7	30.8	29.8	30.8	29.2	26.9	24.7	22.4	21.5	20.0	23.6	30.8
30-Jul	18.8	18.2	17.5	16.7	15.9	16.0	17.8	20.3	23.1	25.8	28.1	30.1	31.2	32.0	32.8	33.2	33.0	32.4	29.7	27.4	22.3	16.8	17.3	17.1	23.9	33.2
31-Jul	16.0	16.0	15.5	15.3	14.9	15.0	15.2	16.9	19.6	21.8	23.0	24.4	25.2	25.4	25.3	21.7	18.2	17.6	16.9	16.5	15.8	15.6	15.2	14.7	18.4	25.4
																						Diurnal Average				
																						Diurnal Maximum				



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	5	0.67	0.67
10 - 20	384	51.61	52.28
> 20	355	47.72	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 36 km/h on Jul 30 21:00	Maximum Daily Speed Average: 16.1 km/h on Jul 10	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jul 20 23:00	Minimum Daily Speed Average: 1.7 km/h on Jul 21	Hours of Data: 744
Maximum Diurnal Speed Average: 3.7 km/h at hour 7	Minimum Diurnal Speed Average: 0.5 km/h at hour 20	Hours of Missing Data: 0
Monthly Average Velocity: 1.9 km/h 189.5 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 8 Q ₃ = 11 P ₉₀ = 15 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-Jul	SE1	SSW4	S4	SE6	SE6	SE6	SE5	SSE4	SSE5	SSE4	SSE3	SSW4	S4	E1	WSW6	N7	NNE8	SW6	SSW4	SSE3	SE3	SSE6	S2	SSE6	SSE2.8	NNE8
2-Jul	SE7	SSE7	SSE4	SE5	SSE5	SE6	SSE5	SE6	SE6	ESE9	E9	ESE10	ESE10	ESE10	ESE10	E9	E9	ESE9	ESE7	ESE6	ESE7	ESE9	ESE12	SE11	ESE7.4	ESE12
3-Jul	SE10	SE10	SE10	SE10	SE10	SE11	SE13	SE13	ESE16	ESE17	ESE17	SE17	SE12	E4	E5	ESE11	ESE12	ESE7	NNW2	NW5	NNW13	N14	NNW6	WNW7	ESE6.9	SE17
4-Jul	W7	W15	SSW9	S7	SSE7	S9	SW11	SW10	SSW9	SW15	WSW21	WSW20	SW19	SW20	SW21	SW20	SW19	SW18	SW16	SW13	SSW12	SW11	SSW13	SW11	SW13.1	SW21
5-Jul	SW13	SW11	WSW8	SSW5	SSE4	SE6	SSE7	SSE8	S7	SSW7	SW11	WSW16	WSW16	SW16	WSW15	SW13	WSW11	WNW10	NNE11	S2	WNW4	NNW9	N5	SSE4	SW5.8	WSW16
6-Jul	SSE8	SSE8	SSW3	WSW12	WSW9	WNW12	W9	W9	WSW6	WSW7	W10	W11	WSW15	N9	E7	ENE3	NW9	N4	SW4	S4	NW2	WNW5	NW13	W7	W4.8	WSW15
7-Jul	W9	W9	WSW7	WNW9	WNW12	W11	W10	W7	W9	WNW12	WNW14	WNW15	WNW14	WNW15	NNW12	N15	N14	N14	N9	NNE7	NE7	NNE7	ENE3	SSE4	NW7.0	WNW15
8-Jul	SE5	SE8	SE8	SE7	SE6	SE6	SE9	SE9	SE10	SE10	SE10	ESE11	S10	S11	SSW12	S12	SSW4	E5	S8	SSE7	SE6	SE9	SE10	SE10	SSE7.8	SSW12
9-Jul	WSW5	SSW3	W8	E3	SE6	SE4	SE6	ESE6	SE11	S16	S13	SSE11	S12	SSE14	S15	WSW15	W18	SW8	SSW11	S8	SW9	W13	WNW11	W11	SSW6.3	W18
10-Jul	WSW8	WSW15	WSW14	WSW16	WSW18	WSW19	WSW12	SW10	W10	W7	W8	WSW13	WNW15	W19	W19	W22	WNW33	WNW31	WNW24	W21	WNW21	WNW22	WNW21	WNW20	W16.1	WNW33
11-Jul	WNW20	W17	W17	WNW18	W15	WSW12	WSW13	SW8	SW5	WSW10	WSW13	WSW16	WSW17	WSW15	W14	W16	W15	WNW20	NNW21	N21	N15	NNW9	NNW13	NNW13	WNW11.7	NNW21
12-Jul	NNW18	NNW21	NNW22	NW15	NNW17	N7	NNW3	W6	NW7	NNW8	WNW8	W9	WNW7	W6	WSW8	SSW7	NE2	N6	NNE5	NNE7	NE8	NE8	NNE6	NE7	NNW6.6	NNW22
13-Jul	NE4	S4	SSE5	SE5	ESE6	SSE5	SE7	SE11	ESE11	ESE9	ESE9	SE8	ESE9	ESE8	ESE8	ESE7	ESE8	ESE7	SSE7	SSE6	ESE6	SE8	SE8	SE10	SE6.8	SE11
14-Jul	SE12	SE12	SE13	SE13	SSE11	SSE10	SE11	SE11	SE11	ESE9	ESE7	SSE10	SSE11	S12	S11	S10	S10	SSE8	SSE8	SE7	SE8	SSE8	SSE9	SSE9	SSE9.5	SE13
15-Jul	SSE8	SE8	ESE9	SE12	SE12	SE11	SE8	SE7	ESE8	SE9	ESE10	SSE11	S10	SSW11	SSW9	S9	SSE8	S10	S9	SSE8	SSE9	SE9	SE7	SE8	SSE8.3	SE12
16-Jul	SE8	SSW3	WSW9	WSW7	W10	W10	WSW5	WSW9	NNW3	NNW5	N9	N11	NNW11	NNW9	W6	SW10	SW12	SW10	SSW8	S7	SSW10	WSW11	NNE17	N6	W4.2	NNE17
17-Jul	NW9	WNW10	WNW9	WNW8	W3	W3	NNW1	NNE6	N4	WSW2	WNW1	S5	SSW1	NNW5	WNW5	SSW3	ESE4	SSE3	S3	S4	S6	SSW5	NW2	NW7	WNW2.3	WNW10
18-Jul	SW4	WNW4	WNW7	NW3	NNW7	N5	NNW5	N4	NNW4	NNW6	SSE4	SSW7	SSW6	SSW5	SW6	SSE5	ESE6	ESE7	SSW8	SW10	SSE9	SW6	SSE3	SSE4	SW1.9	SW10
19-Jul	SE7	SE9	SE7	SE6	SE7	SE7	SSE6	SSW3	WSW5	WSW10	W14	W16	WSW17	WSW16	W20	W17	W18	NW19	NNW31	NNW26	NW20	NW19	WNW15	WNW14	WNW7.9	NNW31
20-Jul	W12	W11	WSW9	W10	W11	W12	W11	WNW11	W9	W6	WNW6	N9	NW6	N11	N7	N11	N7	NNE9	NNE10	N10	NNE9	NNE5	NW1	NW4	NW5.9	W12
21-Jul	NW3	SSE2	SSW4	SSE5	SE6	SE6	SE6	SE3	SSE1	WNW2	N4	SSW4	SW5	NNW5	WNW5	WNW4	WNW2	ESE1	SW2	WSW5	S4	SE7	SSE5	SE7	S1.7	SE7
22-Jul	SSE7	SE9	SE9	SE10	SSE8	SE10	SE9	SSE7	SE6	ESE7	ESE7	SE9	SE9	ESE10	E9	ESE10	ESE9	ESE10	ESE8	ESE7	ESE7	SE8	SE9	SE8	SE8.1	ESE10
23-Jul	SE8	SE7	SE8	SE7	SE6	SE6	SSE6	SE5	SE6	SE8	SE12	SE13	E9	ESE15	ESE17	ESE19	ESE14	E10	ESE6	SE5	ESE6	ESE9	ESE6	SSE6	ESE8.4	ESE19
24-Jul	SE10	SE8	SE6	SE7	SE6	SE9	SE10	SE10	SE10	ESE12	ESE10	SE14	ESE13	ESE13	ESE14	ESE14	ESE13	ESE17	ESE13	ESE10	E10	ESE9	ESE10	ESE8	ESE10.4	ESE17
25-Jul	E5	ENE5	N7	NNW9	N13	N16	N13	N10	N9	N9	E6	SE6	SSW5	E1	S7	SSW7	SSE6	N1	WNW7	WNW3	WNW4	W4	NW6	WNW6	N3.1	N16
26-Jul	NW5	E5	SE5	SE6	SE4	S2	SW3	SE4	ESE6	ESE6	ESE7	E8	ESE9	SSE7	SSW8	SSW6	WSW11	WSW12	WSW10	WSW7	SW8	S6	S6	SSE6	S3.5	WSW12
27-Jul	SE6	SE8	S8	SE7	SSE7	SE7	SSE5	SE6	SE5	SW3	WSW7	E2	NNW3	ESE4	ESE4	E14	SE9	SSE11	SE8	SE8	SE7	SE10	SE10	SE10	SE6.0	E14
28-Jul	SE10	SE10	SE10	SE11	SE11	SE10	SE10	SE7	SSE5	SE6	ESE7	ESE7	S4	S5	SE6	SW6	SW8	SSW7	SSE4	ESE5	SE6	SE7	SE9	SE9	SE6.6	SE11
29-Jul	SE8	SE4	SSE6	SE4	SSE7	S12	SE11	SSE8	SSE4	SSE8	SSE6	SSE6	SE5	SSW5	S5	NNW6	NNW11	NNW11	N8	NE7	SE10	SE10	SE12	SE10	SE4.1	S12
30-Jul	SE7	SE7	S5	SSE6	SSE6	SSE7	SE8	SE9	SE9	ESE6	ESE7	SE10	SSE10	S6	SE6	SE8	SSE10	SE10	SE9	SE6	NW36	NNE17	NE8	SSE6	SE4.7	NW36
31-Jul	SSE8	S2	NNE2	NE5	SSE3	S3	SE7	SE6	SSE3	N7	N11	N14	N19	NNW19	N18	NNW28	NNW17	NNW19	NNW7	NNW22	NNW21	NNW17	N22	NNW22	N9.8	NNW28

S2.6	S2.8	SSW2.9	S2.9	S2.9	S3.4	SSE3.7	SSE3.4	SSE3.2	SSE2.5	S2.1	S3.3	SSW3.6	SW2.7	SSW2.9	SW2.1	WSW1.8	W1.0	W1.0	WNW0.5	WNW0.9	NE0.5	NE0.9	S1.5	Diurnal Average
WNW20	NNW21	NNW22	WNW18	WSW18	WSW19	N13	SE13	ESE16	ESE17	WSW21	WSW20	SW19	SW20	SW21	NNW28	WNW33	WNW31	NNW31	NNW26	NW36	WNW22	N22	NNW22	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

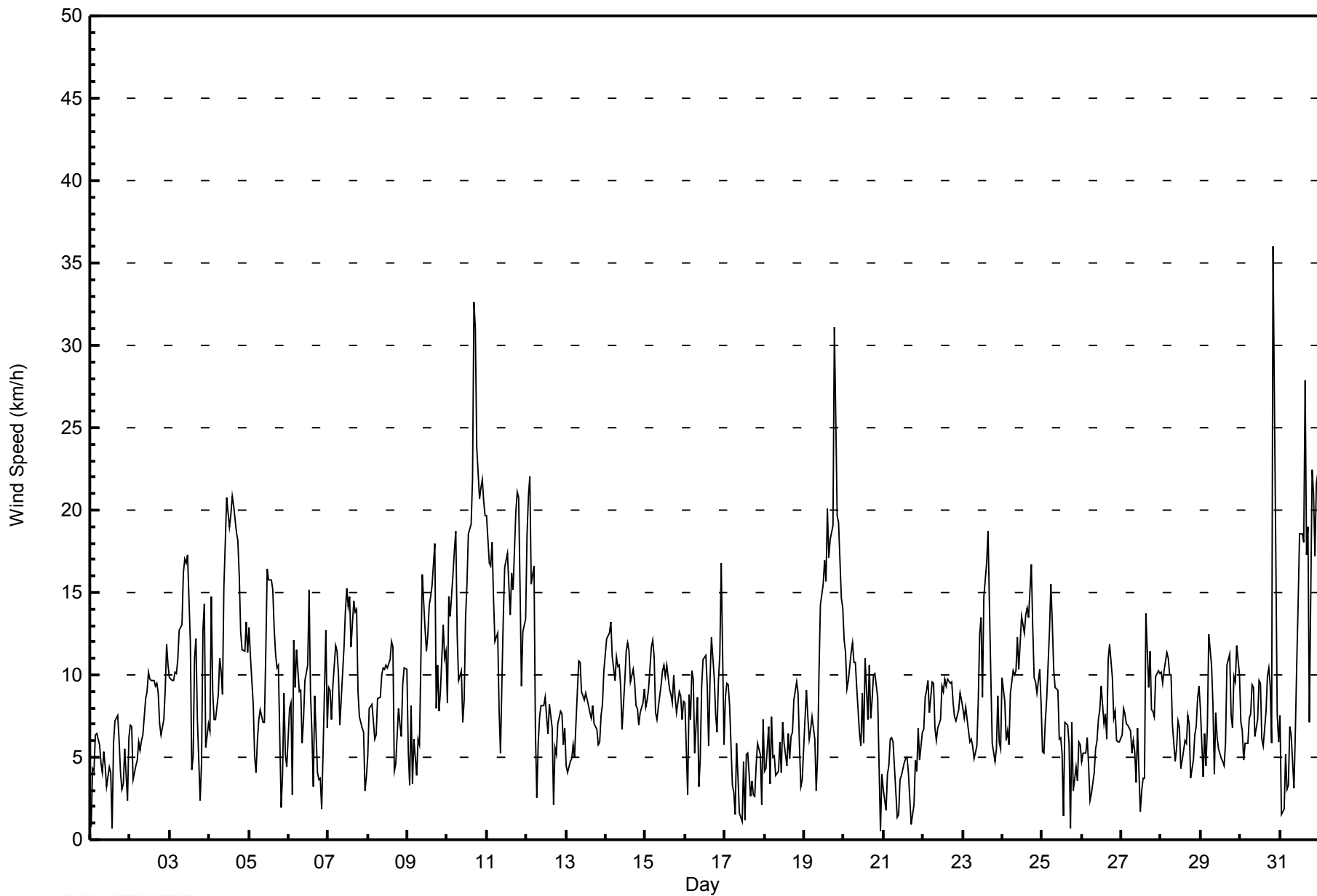
Wind Speed (WS) - km/h
Buffalo Viewpoint - July 2014

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



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	153	20.56	20.56
6 - 11	431	57.93	78.49
12 - 19	130	17.47	95.97
20 - 28	26	3.49	99.46
29 - 38	4	0.54	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

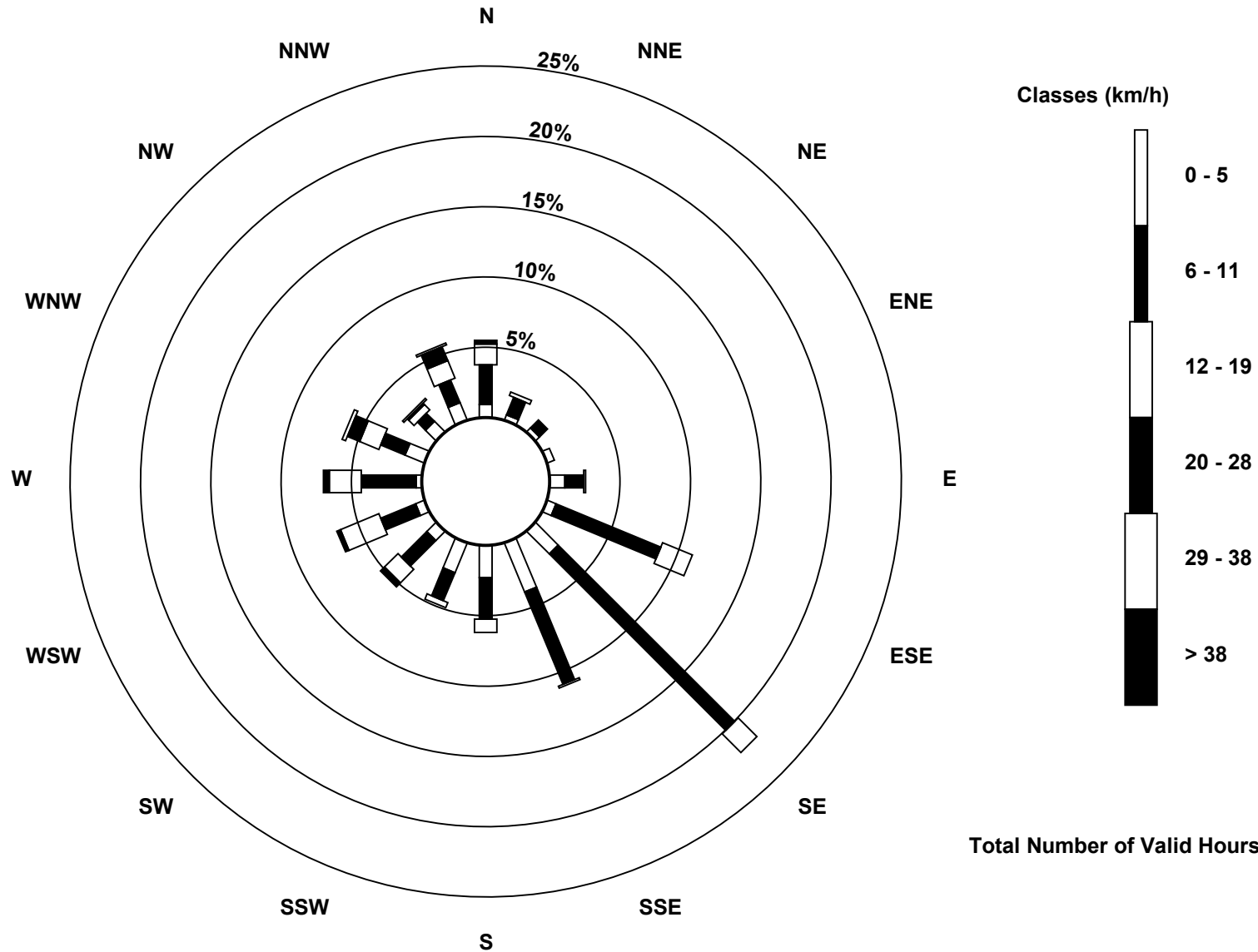
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	7	3	3	4	8	5	17	28	17	17	7	5	3	11	8	10	153
6 - 11	21	10	6	0	10	60	132	53	22	16	19	20	29	14	6	13	431
12 - 19	11	2	0	0	1	17	14	1	7	3	10	22	17	11	4	10	130
20 - 28	2	0	0	0	0	0	0	0	0	0	3	2	3	7	1	8	26
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	4
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	41	15	9	4	19	82	163	82	46	36	39	49	52	45	20	42	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

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

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 309 deg on Jul 30 21:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 273.0 deg on Jul 10	Hours of Data: 744
Direction of Minimum Speed: 316 deg on Jul 20 23:00	Direction of Minimum Daily Speed Average: 1.7 deg on Jul 21
Direction of Minimum Speed: 316 deg on Jul 20 23:00	Hours of Missing Data: 0
Monthly Average Direction: 224.6 deg	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	143	205	189	144	135	145	139	156	164	153	159	209	182	90	248	351	23	217	201	161	143	151	180	154	165.3
2-Jul	143	166	158	126	151	137	149	130	125	109	100	102	106	107	102	100	100	117	116	115	116	118	117	124	118.4
3-Jul	134	137	142	133	131	132	128	128	123	121	120	136	133	79	79	119	117	105	340	326	347	352	331	282	117.6
4-Jul	259	268	209	189	157	180	218	220	205	219	245	237	231	225	221	231	228	225	225	224	213	214	213	228	224.0
5-Jul	219	222	249	197	157	136	149	165	174	200	230	246	247	230	253	235	245	286	19	175	286	345	10	154	231.8
6-Jul	161	161	194	251	239	282	271	274	245	242	270	265	254	349	85	72	308	0	236	189	305	291	319	259	265.4
7-Jul	270	275	258	285	285	279	271	261	262	291	303	294	295	282	329	9	2	9	8	19	46	33	77	157	309.2
8-Jul	144	141	142	143	142	135	146	137	140	139	131	122	171	189	192	187	196	79	180	158	144	140	126	136	149.8
9-Jul	247	199	267	85	144	128	131	119	146	191	181	161	171	162	173	244	266	226	201	181	214	280	300	265	203.3
10-Jul	248	238	243	238	238	240	242	233	262	277	273	255	287	276	275	279	297	298	297	275	286	293	286	288	273.0
11-Jul	287	277	278	282	265	249	245	231	222	247	245	247	251	256	265	272	273	298	341	353	352	344	338	330	283.7
12-Jul	332	337	334	326	340	360	335	273	310	334	299	273	285	267	248	192	36	5	26	21	45	40	23	40	332.9
13-Jul	44	175	152	141	123	149	139	127	117	116	109	127	122	117	106	110	107	118	160	160	108	125	131	142	125.3
14-Jul	142	140	141	140	148	150	136	138	127	117	121	149	167	177	183	182	186	176	164	162	145	145	159	168	152.8
15-Jul	157	124	121	130	135	136	132	127	119	135	109	148	184	192	195	182	167	178	175	160	148	131	134	136	147.9
16-Jul	134	201	246	253	265	274	240	257	346	340	351	350	339	344	278	235	233	215	196	190	206	246	12	350	271.9
17-Jul	309	303	300	283	278	268	348	19	3	243	298	189	208	333	294	195	103	168	191	184	183	324	311	283.0	
18-Jul	227	285	290	324	345	354	340	351	329	340	162	207	204	210	227	165	108	104	207	234	165	226	150	166	227.2
19-Jul	141	139	136	144	135	140	150	208	246	249	262	267	239	240	278	262	274	324	327	332	321	325	302	291	283.2
20-Jul	276	272	245	264	273	273	278	282	273	278	300	352	305	353	2	4	5	28	16	8	15	30	316	309	313.1
21-Jul	323	148	204	163	138	145	129	145	158	302	353	212	220	339	293	288	284	106	222	252	180	137	159	138	180.5
22-Jul	149	137	139	140	160	144	139	148	133	114	121	133	125	109	101	104	107	112	117	116	118	128	146	130	127.3
23-Jul	142	128	130	144	141	142	149	142	144	127	125	136	88	112	113	112	109	86	112	129	109	117	107	148	121.5
24-Jul	129	126	134	135	140	140	130	124	128	110	123	124	108	109	111	110	104	114	118	110	100	105	107	109	117.1
25-Jul	94	67	359	347	359	352	359	357	8	1	82	134	211	87	176	213	156	9	300	283	296	274	316	294	351.6
26-Jul	320	85	131	145	135	186	234	133	123	110	114	97	118	166	199	200	243	249	252	256	227	189	169	155	178.0
27-Jul	137	131	172	142	151	139	149	133	126	229	244	101	346	110	117	90	124	158	143	141	145	134	132	134	138.1
28-Jul	136	137	138	139	138	140	138	143	154	140	116	105	183	187	145	228	217	194	161	114	132	145	136	130	145.3
29-Jul	129	139	147	142	148	188	134	150	166	156	153	155	139	208	174	330	348	344	7	44	131	129	134	140	137.5
30-Jul	129	143	173	158	160	149	146	146	132	114	110	137	159	171	127	127	147	131	126	124	309	33	51	151	131.4
31-Jul	167	173	21	37	160	176	146	139	158	358	11	2	351	348	2	344	346	333	344	345	343	347	354	347	351.8

182.0	186.6	200.2	183.3	177.8	179.4	166.0	163.2	154.9	164.6	172.4	185.8	210.3	215.5	211.0	217.5	247.0	269.3	270.2	284.5	302.3	46.7	56.0	183.2
Diurnal Average																							

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

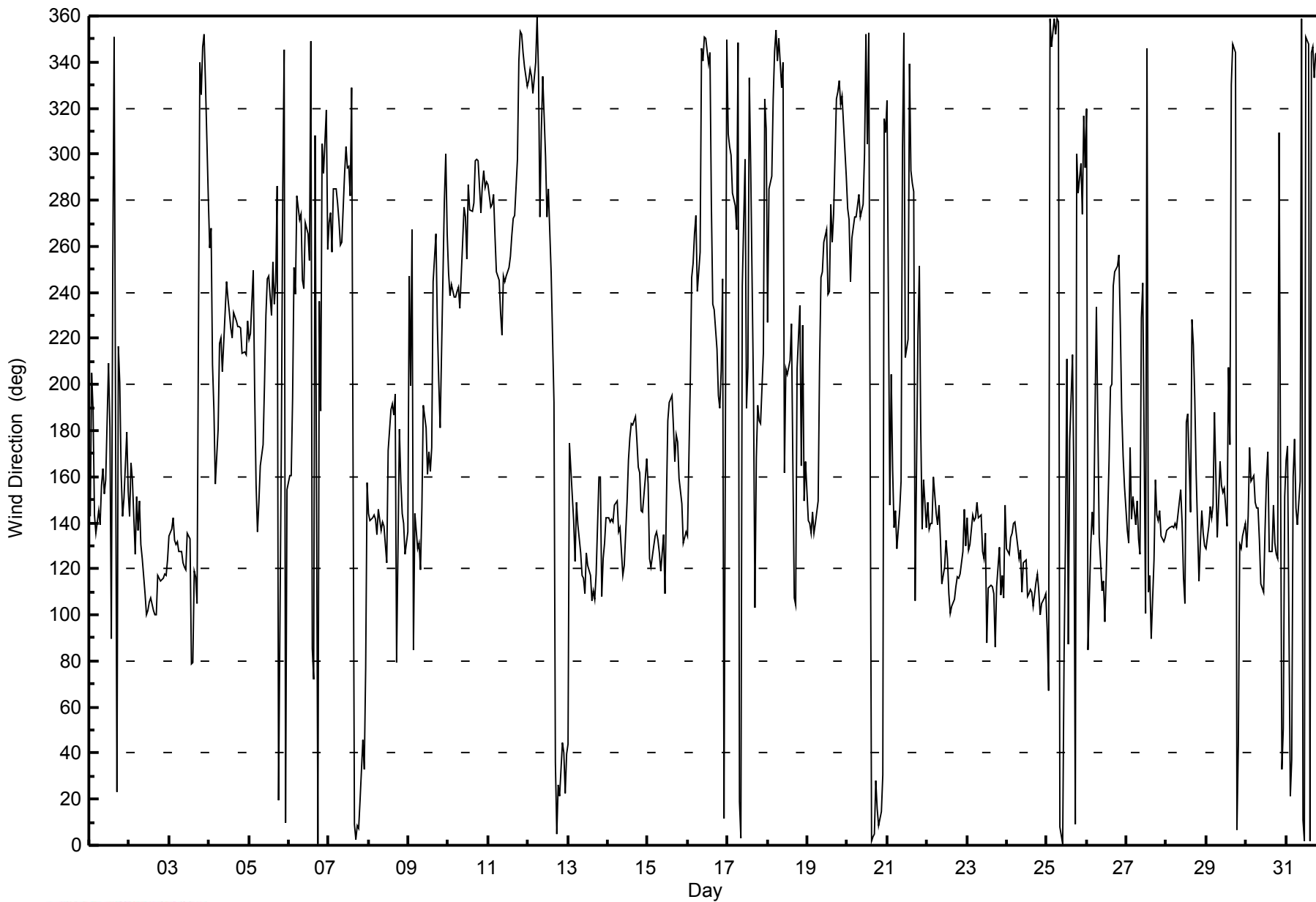
Wind Direction (WD) - deg
Buffalo Viewpoint - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on Jul 25 14:00		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 6 deg on Jul 12 22:00																									
Percentiles: P ₁ = 9 P ₁₀ = 13 Q ₁ = 16 Median = 22 Q ₃ = 33 P ₉₀ = 59 P ₉₉ = 90																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	82	19	36	15	14	20	27	21	21	40	77	69	61	97	30	67	58	25	25	60	27	21	71	20	97
2-Jul	12	12	68	26	22	12	22	24	30	26	24	24	28	26	26	27	23	20	18	14	14	15	18	18	68
3-Jul	16	14	16	16	17	19	19	20	20	21	21	28	21	26	40	24	23	28	89	19	16	12	36	27	89
4-Jul	38	26	20	32	24	18	18	21	24	19	17	20	21	20	19	20	21	19	18	17	12	10	13	15	38
5-Jul	15	17	37	46	47	33	16	19	26	24	32	22	21	23	33	23	25	33	22	63	15	36	74	64	74
6-Jul	24	18	82	16	37	31	21	27	33	42	23	27	22	65	42	60	26	43	49	24	65	49	26	33	82
7-Jul	17	13	17	16	15	14	17	20	22	17	15	15	16	17	46	17	19	15	21	21	14	10	43	36	46
8-Jul	14	14	13	12	13	17	19	20	19	21	25	29	33	25	21	22	89	63	23	15	14	8	7	10	89
9-Jul	60	77	42	61	41	40	39	29	22	26	22	23	24	28	21	31	20	35	18	17	22	16	21	15	77
10-Jul	19	12	13	14	13	13	16	21	25	40	38	20	18	18	19	20	13	13	14	15	14	12	13	13	40
11-Jul	13	15	15	14	16	17	16	22	34	24	17	16	20	22	23	19	18	19	28	12	12	12	8	12	34
12-Jul	14	9	12	13	10	30	70	50	22	25	30	28	31	45	35	23	90	34	36	16	7	6	13	31	90
13-Jul	31	37	23	16	13	15	21	21	24	29	28	32	33	32	31	35	27	29	22	21	9	11	14	15	37
14-Jul	16	16	17	17	18	18	17	21	20	24	44	30	25	25	25	20	21	20	16	22	9	14	18	18	44
15-Jul	22	12	10	9	12	14	20	22	23	26	20	27	26	21	18	21	22	19	20	16	17	13	14	14	27
16-Jul	23	73	14	14	12	12	21	25	71	41	33	18	20	22	45	18	18	17	18	30	13	28	26	40	73
17-Jul	12	11	10	18	64	48	94	30	64	88	94	46	100	63	43	59	35	25	31	25	22	41	80	37	100
18-Jul	47	52	26	25	13	48	27	64	48	37	71	33	51	63	36	56	27	18	60	55	35	57	64	47	71
19-Jul	21	20	20	19	13	12	22	56	44	23	23	23	19	23	17	21	17	22	13	13	15	14	12	11	56
20-Jul	15	18	12	13	13	15	14	14	22	32	49	42	55	32	60	24	41	25	16	13	16	13	89	24	89
21-Jul	30	86	35	41	14	10	9	41	90	97	68	72	59	65	60	62	72	92	56	12	42	11	23	13	97
22-Jul	34	11	10	10	20	13	10	22	27	24	25	27	32	28	31	26	23	21	19	13	12	11	22	14	34
23-Jul	14	15	14	16	11	15	20	26	30	26	24	20	21	22	20	21	23	20	33	25	26	17	20	22	33
24-Jul	16	15	16	16	18	17	19	21	22	21	25	21	21	23	23	21	23	20	20	19	19	19	20	25	25
25-Jul	32	47	26	19	15	11	28	18	18	27	44	36	44	104	40	28	28	85	24	63	31	64	14	10	104
26-Jul	28	20	19	18	15	46	46	33	39	33	35	36	31	46	31	38	13	21	18	17	19	21	19	30	46
27-Jul	23	17	15	22	23	20	30	23	39	73	31	63	88	85	45	22	26	20	25	15	20	15	13	15	88
28-Jul	12	13	11	12	14	16	17	27	41	40	34	36	70	55	47	48	30	22	26	9	16	7	9	6	70
29-Jul	9	58	26	46	40	64	35	33	82	25	38	45	60	63	63	43	18	15	15	33	17	15	17	17	82
30-Jul	15	20	14	9	10	13	21	20	24	32	29	34	31	49	65	31	28	23	16	20	69	43	54	54	69
31-Jul	17	76	75	19	65	45	16	24	75	28	20	21	16	18	18	14	19	23	64	18	12	12	13	10	76
	82	86	82	61	65	64	94	64	90	97	94	72	100	104	65	67	90	92	89	63	69	64	89	64	
	Diurnal Maximum																								



WBEA NETWORK
Hourly Averages

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



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 3, 2014	Previous Calibration	June 5, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	11:30	End Time (MST)	14:10
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	824	823
Calculated slope	0.999072	0.999299	Chamber temp.	45.3	45.0
Calculated intercept	-0.684088	-0.967258	Pressure (mmHg)	696.4	688.0
Analyzer Background	9.1	9.1	Flow (lpm)	0.495	0.492
Analyzer Coefficient	0.929	0.910	Intensity	85	85

Analyzer make TEI 43i Analyzer serial # JC1327300932

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	NA
as found span	5000	58.8	599.8	611.4	0.981
calibrator zero	5000	0.0	0.0	0.3	NA
high point	5000	58.8	599.8	600.5	0.999
second point	5000	29.4	299.9	302.4	0.992
third point	5000	14.7	149.9	151.0	0.993
calibrator zero	5000	0.0	0.0	0.3	NA
as left zero	5000	0.0	0.0	0.6	NA
as left span	5000	58.8	599.8	600.5	0.999
Average Correction Factor					0.995

Corrected As found 611.0 Previous response 601.0 % change -1.6%

Notes:

Adjusted span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

SO₂ Calibration Summary

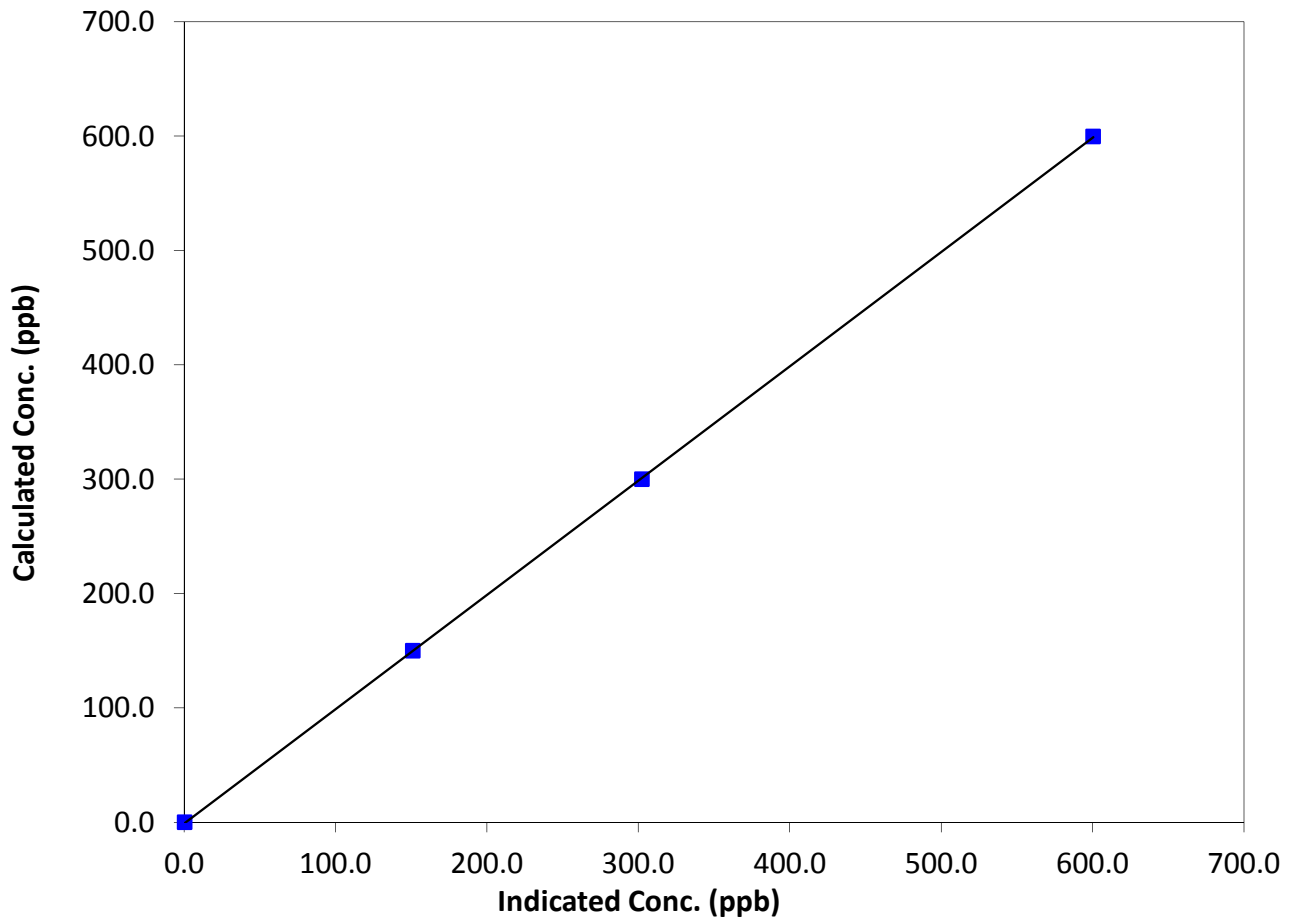
Station Information

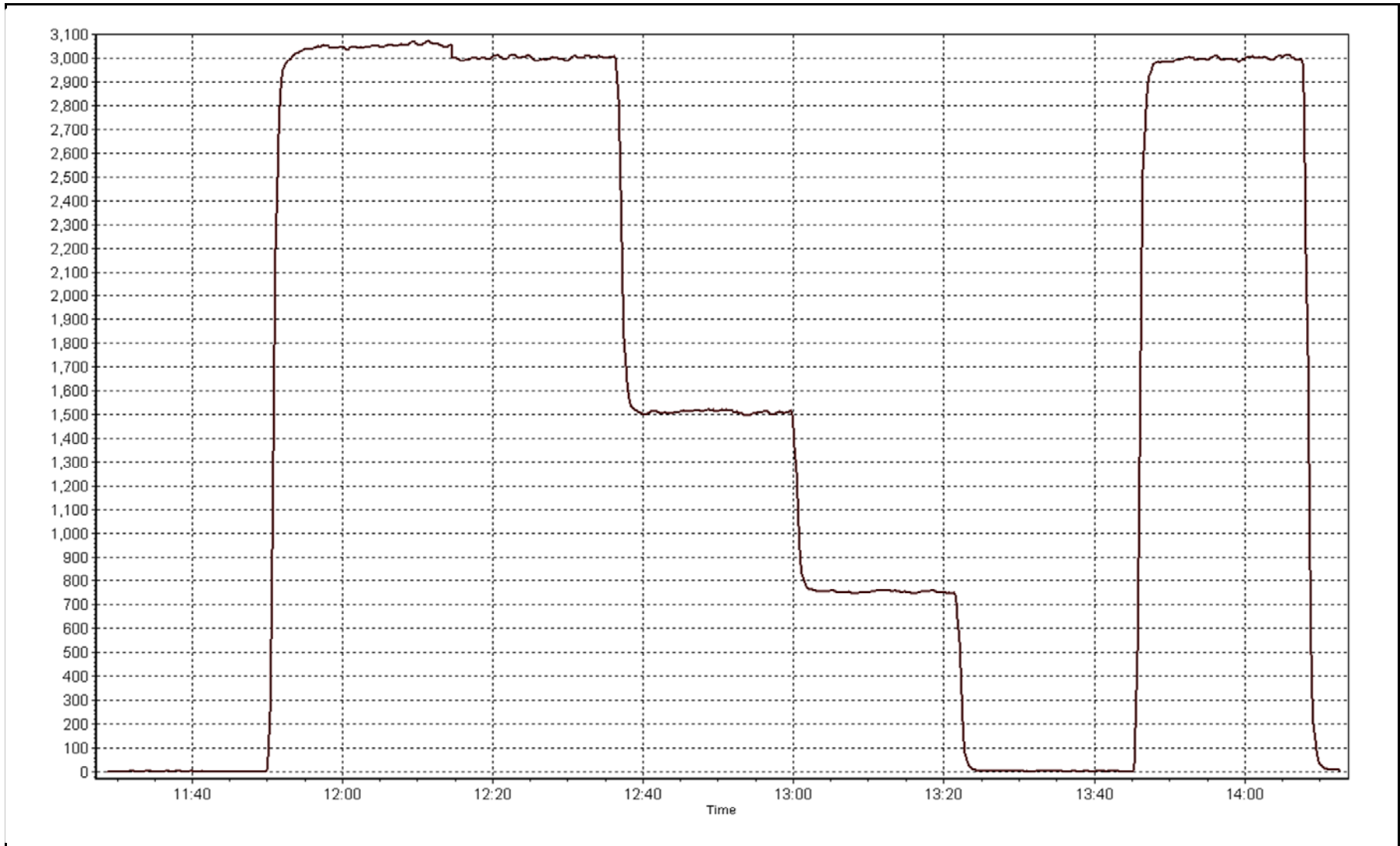
Calibration Date	July 3, 2014	Previous Calibration	June 5, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	11:30	End Time (MST)	14:10
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999986
599.8	600.5	0.9988		
299.9	302.4	0.9916	Slope	0.999299
149.9	151.0	0.9932		
			Intercept	-0.967258

SO₂ Calibration Curve







Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	July 3, 2014	Previous Calibration	June 6, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	11:30
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	-615	-616
Analyzer Range (mv)	5000	5000	Lamp voltage	872	874
Calculated slope	0.974091	0.979951	Chamber temp.	45	45
Calculated intercept	0.109770	0.045022	Pressure	546.3	550.8
Analyzer Background	16.7	16.3	Flow	1.046	1.056
Analyzer Coefficient	1.023	1	Intensity	94	95
			Converter temp.	329	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	76.0	0.988
SO2 scrubber check	5000	29.4	299.9	3.0	NA
calibrator zero	6000	0.0	0.0	-0.4	NA
high point	6000	46.2	75.1	76.2	0.985
second point	6000	25.9	42.1	43.3	0.971
third point	6000	15.4	25.0	25.8	0.970
calibrator zero	6000	0.0	0.0	-0.4	NA
as left zero	5000	0.0	0.0	-0.4	NA
as left span	6000	46.2	75.1	78.8	0.953
Average Correction Factor					0.975

Corrected As found	76.5	Previous response	77.0	% change	0.7%
--------------------	------	-------------------	------	----------	------

Notes:

Changed filter after as founds. Adjusted span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

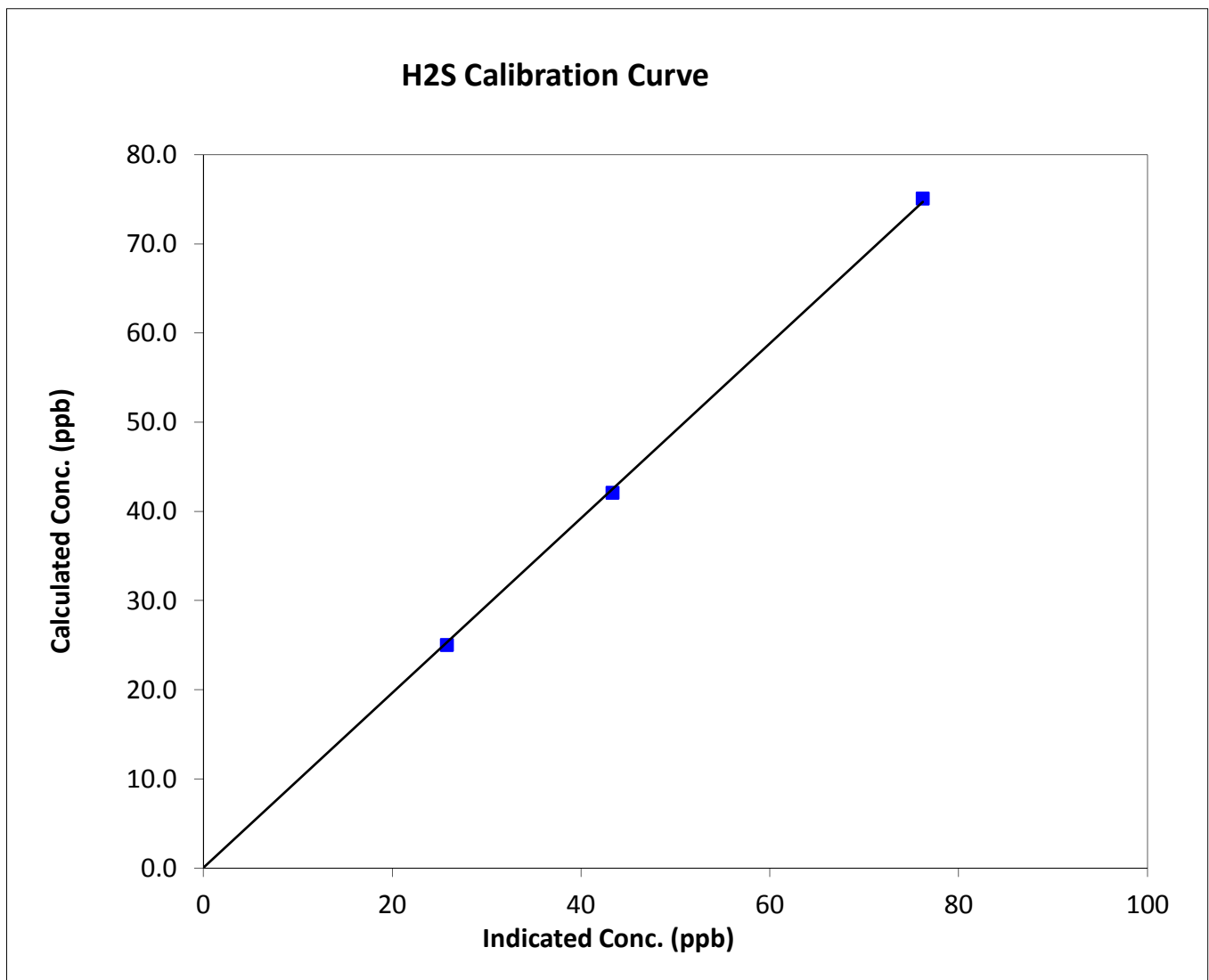
H2S Calibration Summary

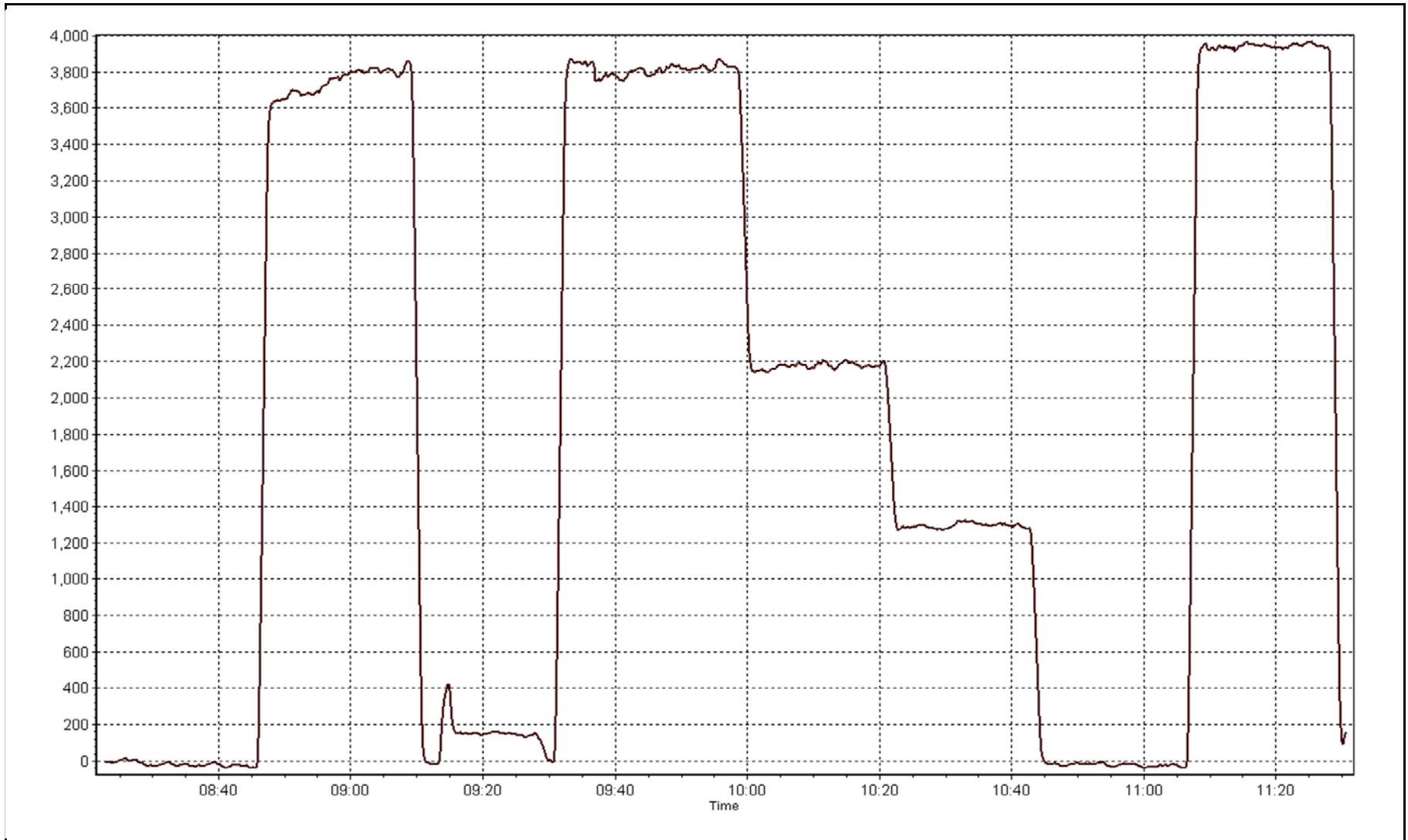
Station Information

Calibration Date	July 3, 2014	Previous Calibration	June 6, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	8:25	End Time (MST)	11:30
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	0.999814
75.1	76.2	0.9852		
42.1	43.3	0.9710	Slope	0.979951
25.0	25.8	0.9698		
			Intercept	0.045022







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Thursday, July 03, 2014	Previous Calibration	Thursday, June 05, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	11:30	End Time (MST)	14:10
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	0.998540	0.995514	Fuel Pressure	19.9	19.9
Calculated intercept	-0.022158	0.031813			
BKG	1.7	1.7			
COEF	4.182	4.269			

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	-0.06	N/A
as found span	5000	58.8	12.56	12.32	1.019
calibrator zero	5000	0.0	0.00	-0.06	N/A
high point	5000	58.8	12.56	12.56	1.000
second point	5000	29.4	6.28	6.31	0.995
third point	5005	14.7	3.14	3.13	1.003
calibrator zero				-0.06	
as left zero	5000	0.0	0.00	-0.04	N/A
as left span	5000	58.8	12.56	12.59	0.997
Average Correction Factor					0.999

Corrected As found 12.38 Previous response 12.60 % change 1.8%

Notes:

Span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

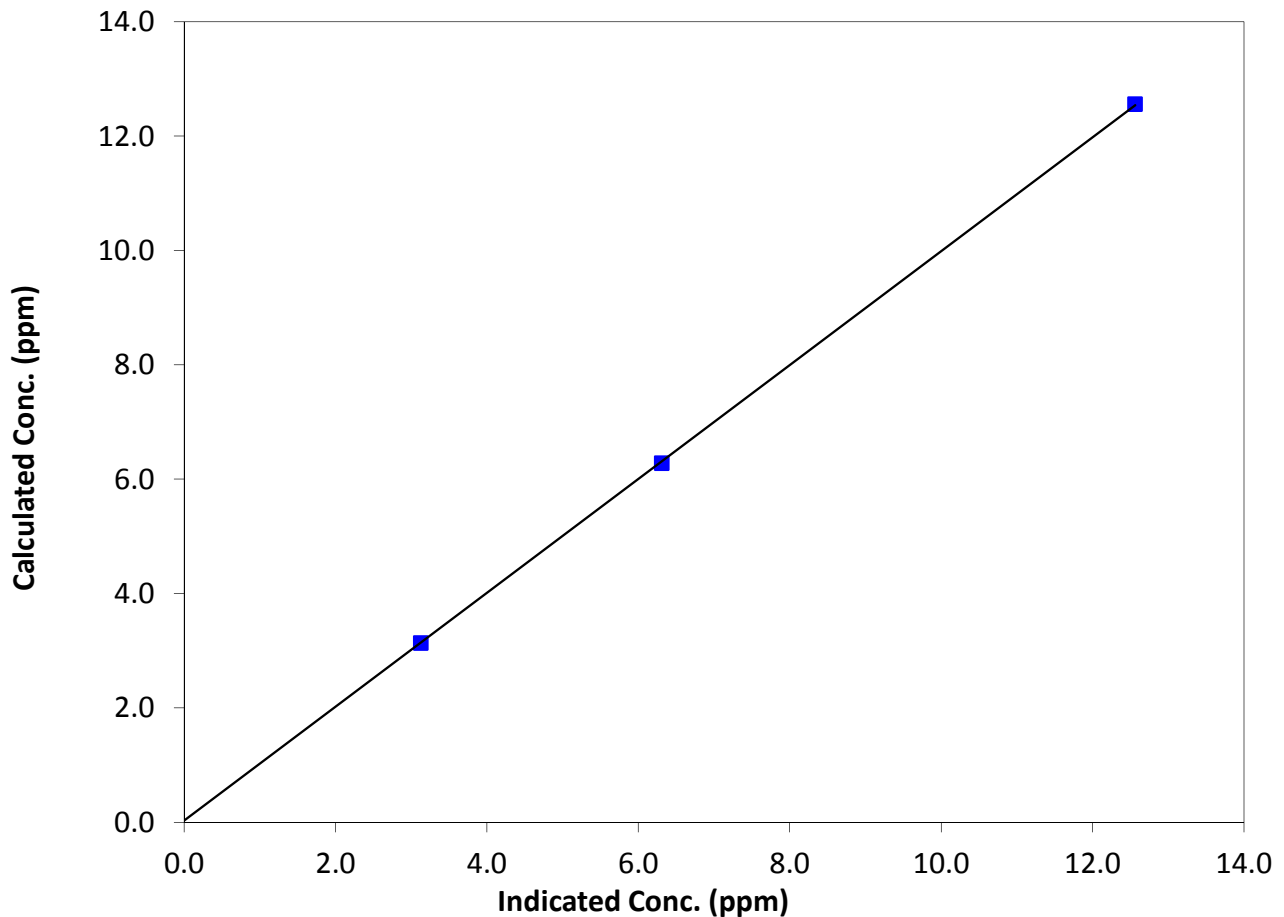
Station Information

Calibration Date	July 3, 2014	Previous Calibration	June 5, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	11:30	End Time (MST)	14:10
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

Calibration Data

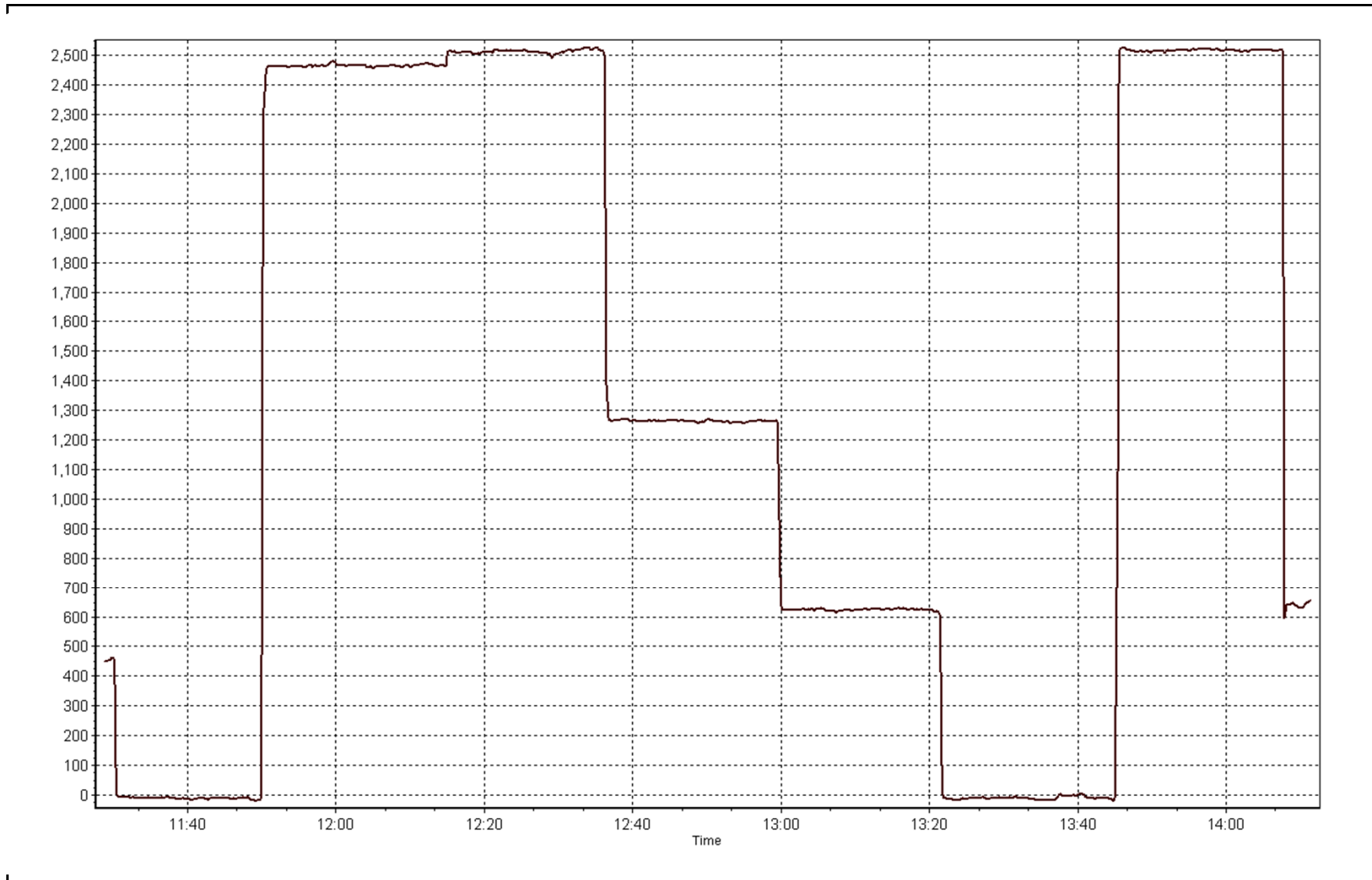
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.06	N/A	Correlation Coefficient	0.999975
12.56	12.56	0.9996		
6.28	6.31	0.9951	Slope	0.995514
3.14	3.13	1.0031		
			Intercept	0.031813

THC Calibration Curve



THC Calibration Plot

Date: July 3, 2014



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 5
MANNIX
JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)

JULY 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	36	37	99.87	63	0	9	0
H2S (ppb) Average	710	34	34	100.00	10	0	2	0
THC (ppm) Average	707	36	37	99.87	3.9	-	2.6	-
Temperature 2 m (C) Average	744	0	0	100.00	32.2	-	24.3	-
Temperature 20 m (C) Average	744	0	0	100.00	32.3	-	24.5	-
Temperature 45 m (C) Average	744	0	0	100.00	32	-	24.3	-
Temperature 75 m (C) Average	744	0	0	100.00	31.7	-	24.4	-
Temperature 90 m (C) Average	744	0	0	100.00	31.6	-	24.4	-
Relative Humidity 2 m (%) Average	744	0	0	100.00	97	-	-	-
Relative Humidity 20 m (%) Average	744	0	0	100.00	97	-	-	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	97	-	-	-
Relative Humidity 75 m (%) Average	744	0	0	100.00	97	-	-	-
Relative Humidity 90 m (%) Average	744	0	0	100.00	96	-	-	-
Wind Speed 20 m (km/h) Average	744	0	0	100.00	31	-	-	-
Wind Speed 45 m (km/h) Average	744	0	0	100.00	43	-	-	-
Wind Speed 75 m (km/h) Average	744	0	0	100.00	45	-	-	-
Wind Speed 90 m (km/h) Average	743	0	1	99.87	45	-	-	-
Wind Direction 20 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 45 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 75 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 90 m (deg) Average	743	0	1	99.87	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	0	0	100.00	0.8	-	-	-
Vertical Wind Speed 45 m (km/h) Average	744	0	0	100.00	1.4	-	-	-
Vertical Wind Speed 75 m (km/h) Average	744	0	0	100.00	1.5	-	-	-
Vertical Wind Speed 90 m (km/h) Average	743	0	1	99.87	4.8	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	1.7	5	-	0	0	0	1	1	3	63
H2S (ppb) Average	710	0.9	1	-	0	0	0	0	1	2	10
THC (ppm) Average	707	2.32	0.2	-	2	2.1	2.2	2.3	2.4	2.6	3.9
Temperature 2 m (C) Average	744	19.82	4.7	-	7.6	14.1	16	19.6	23.1	26.1	32.2
Temperature 20 m (C) Average	744	20.12	4.4	-	8.6	14.6	16.6	19.8	23.2	26	32.3
Temperature 45 m (C) Average	744	20.05	4.3	-	9.8	14.5	16.8	19.8	23	25.7	32
Temperature 75 m (C) Average	744	20	4.2	-	11.1	14.5	16.8	19.7	22.8	25.5	31.7
Temperature 90 m (C) Average	744	19.96	4.1	-	11.7	14.6	16.8	19.6	22.8	25.4	31.6
Relative Humidity 2 m (%) Average	744	65.5	18	-	26	41	51	66	81	90	97
Relative Humidity 20 m (%) Average	744	60.8	19	-	22	35	45	61	77	85	97
Relative Humidity 45 m (%) Average	744	59.4	18	-	22	34	44	60	75	84	97
Relative Humidity 75 m (%) Average	744	58.8	18	-	22	34	44	60	74	83	97
Relative Humidity 90 m (%) Average	744	58.8	18	-	23	34	44	60	74	82	96
Wind Speed 20 m (km/h) Average	744	9.0	5	-	1	4	6	8	11	16	31
Wind Speed 45 m (km/h) Average	744	13.2	7	-	1	5	9	12	17	22	43
Wind Speed 75 m (km/h) Average	744	14.7	8	-	0	5	9	13	20	25	45
Wind Speed 90 m (km/h) Average	743	15.8	8	-	1	6	10	15	21	27	45
Wind Direction 20 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	0.07	0.3	-	-1.3	-0.2	-0.1	0.1	0.2	0.4	0.8
Vertical Wind Speed 45 m (km/h) Average	744	0.27	0.4	-	-0.9	-0.2	0	0.3	0.6	0.8	1.4
Vertical Wind Speed 75 m (km/h) Average	744	0.12	0.3	-	-0.8	-0.3	-0.1	0.1	0.3	0.6	1.5
Vertical Wind Speed 90 m (km/h) Average	743	0.68	1	-	-1.4	-0.4	0	0.5	1.2	2.1	4.8

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	11 Jul 2014 11:00	11 Jul 2014 11:00	1	Maintenance - glass manifold cleaned
THC	11 Jul 2014 11:00	11 Jul 2014 11:00	1	Maintenance - glass manifold cleaned
Wind Speed. Wind Direction, Vertical Wind Speed 90 m	18 Jul 2014 22:00	18 Jul 2014 22:00	1	Flatline in sensor output signal

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Summary of Hour Averages

Mannix - July 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 63 ppb on Jul 31 23:00	Maximum Daily Average: 8.7 ppb on Jul 21		Hours of Data:	707
Minimum Value: 0 ppb on Jul 13 20:00	Minimum Daily Average: 0.3 ppb on Jul 22		Hours of Missing Data:	37
Maximum Diurnal Average: 3.4 ppb at hour 18	Minimum Diurnal Average: 0.6 ppb at hour 4		Hours of Calibration:	36
Monthly Average: 1.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 28		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	2	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	2
2-Jul	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1
3-Jul	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
4-Jul	1	Z	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0.5	1
5-Jul	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	2	0	1	0.7	3
6-Jul	1	Z	0	0	0	1	1	3	3	1	0	0	0	1	0	1	9	3	6	5	1	2	1	0	1.8	9
7-Jul	0	Z	0	0	1	0	1	1	2	2	1	1	6	3	1	1	0	0	0	0	0	0	0	0	1.0	6
8-Jul	1	Z	1	1	1	1	1	1	0	1	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0.5	1
9-Jul	0	Z	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	6	1	0.7	6
10-Jul	0	Z	0	0	1	0	0	0	0	C	C	C	C	C	0	1	15	10	4	1	0	0	0	0	2.0	15
11-Jul	1	Z	1	1	1	0	0	1	1	1	M	1	1	1	1	1	1	2	4	1	1	4	2	2	1.2	4
12-Jul	1	Z	3	2	3	3	12	13	1	0	1	1	4	1	2	4	4	1	1	0	0	0	0	0	2.5	13
13-Jul	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
15-Jul	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
16-Jul	1	Z	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1	1	1	1	0	0	1	1	0.9	2
17-Jul	2	Z	1	1	1	1	1	0	0	1	5	4	1	1	3	15	30	31	26	17	4	1	1	1	6.4	31
18-Jul	1	Z	0	1	1	6	9	2	14	2	2	3	4	4	3	2	1	1	1	1	1	1	1	1	2.6	14
19-Jul	1	Z	1	0	1	1	0	1	1	1	1	0	0	0	0	0	0	1	1	1	2	2	1	2	0.7	2
20-Jul	1	Z	1	1	1	1	1	1	9	9	3	1	4	5	2	4	4	1	0	0	0	0	0	1	2.1	9
21-Jul	1	Z	1	1	1	1	1	1	1	1	1	12	5	4	11	24	26	29	18	15	19	18	8	3	8.7	29
22-Jul	2	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
23-Jul	0	Z	0	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
24-Jul	0	Z	1	1	1	0	0	0	0	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0.5	1
25-Jul	0	Z	0	0	2	32	32	5	4	1	1	1	1	0	1	1	0	0	2	2	2	1	1	1	3.8	32
26-Jul	1	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.4	1
28-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0.5	1
29-Jul	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	7	7	4	1	1	1	1	1.2	7
30-Jul	1	Z	1	1	1	1	0	0	0	0	0	0	1	2	2	0	0	1	2	2	4	10	0	0	1.3	10
31-Jul	0	Z	0	0	0	0	0	0	2	13	15	3	3	2	1	2	5	14	5	2	13	8	63	30	7.9	63

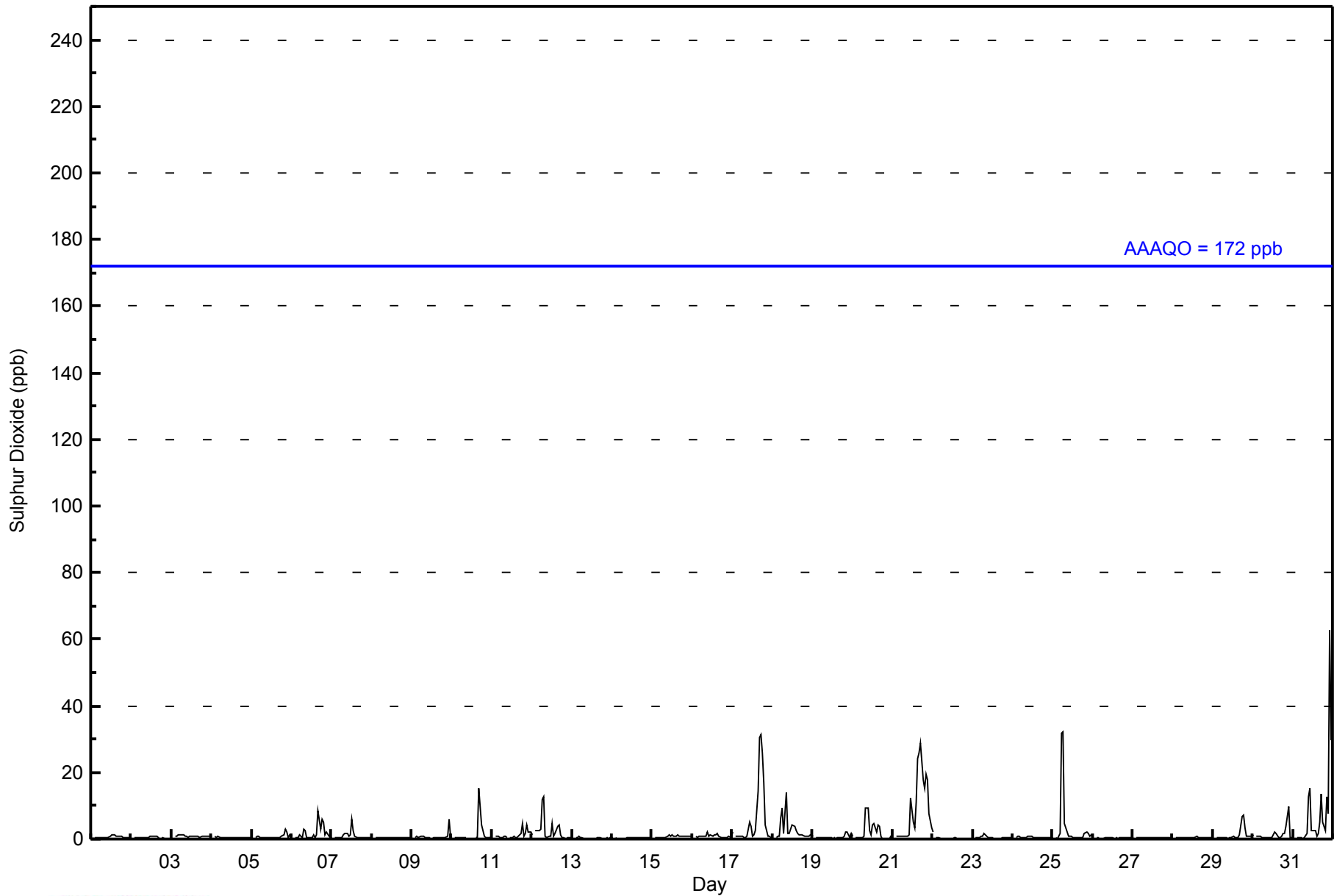
0.7	--	0.6	0.6	0.7	1.8	2.2	1.2	1.5	1.3	1.3	1.2	1.3	1.1	1.1	2.1	3.4	3.4	2.7	1.9	1.9	1.9	3.0	1.7	Diurnal Average	
2	--	3	2	3	32	32	13	14	13	15	12	6	5	11	24	30	31	26	17	19	18	63	30	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Mannix - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	681	96.32	96.32
11 - 20	16	2.26	98.59
21 - 60	9	1.27	99.86
61 - 110	1	0.14	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - July 2014

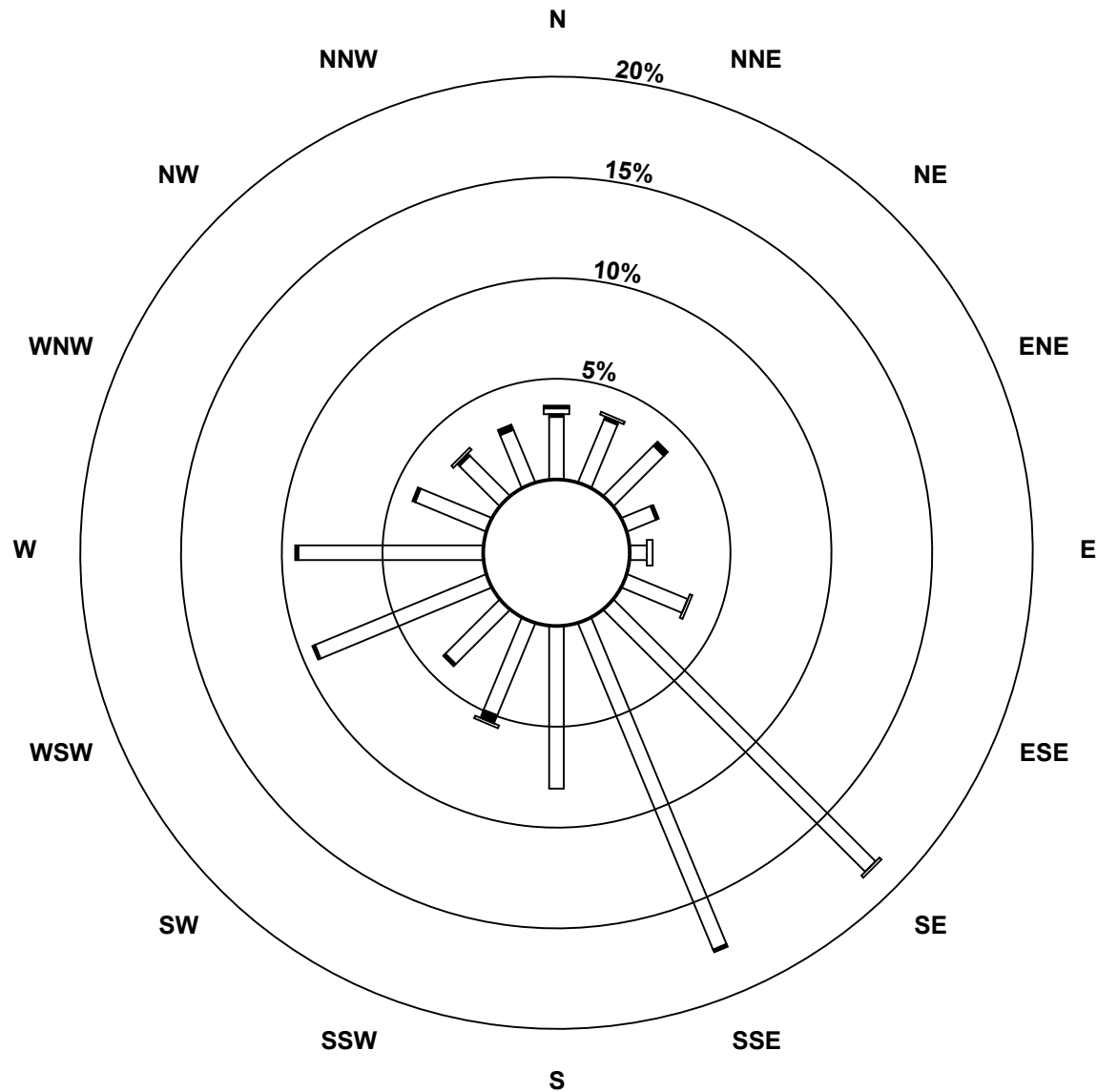
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	22	24	25	11	6	23	130	124	57	35	27	65	65	27	20	20	681
11 - 20	1	1	2	1	0	0	0	1	0	3	1	1	1	1	1	2	16
21 - 60	2	1	0	0	2	1	1	0	0	1	0	0	0	0	1	0	9
61 - 110	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	26	26	27	12	8	24	131	125	57	39	28	66	66	28	22	22	707

Total Number of Valid Hours: 707

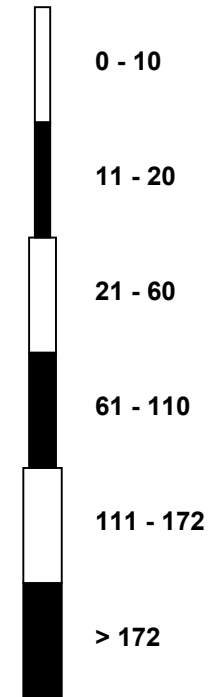
Total Number of Hours: 744

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

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



Classes (ppb)



Total Number of Valid Hours: 707

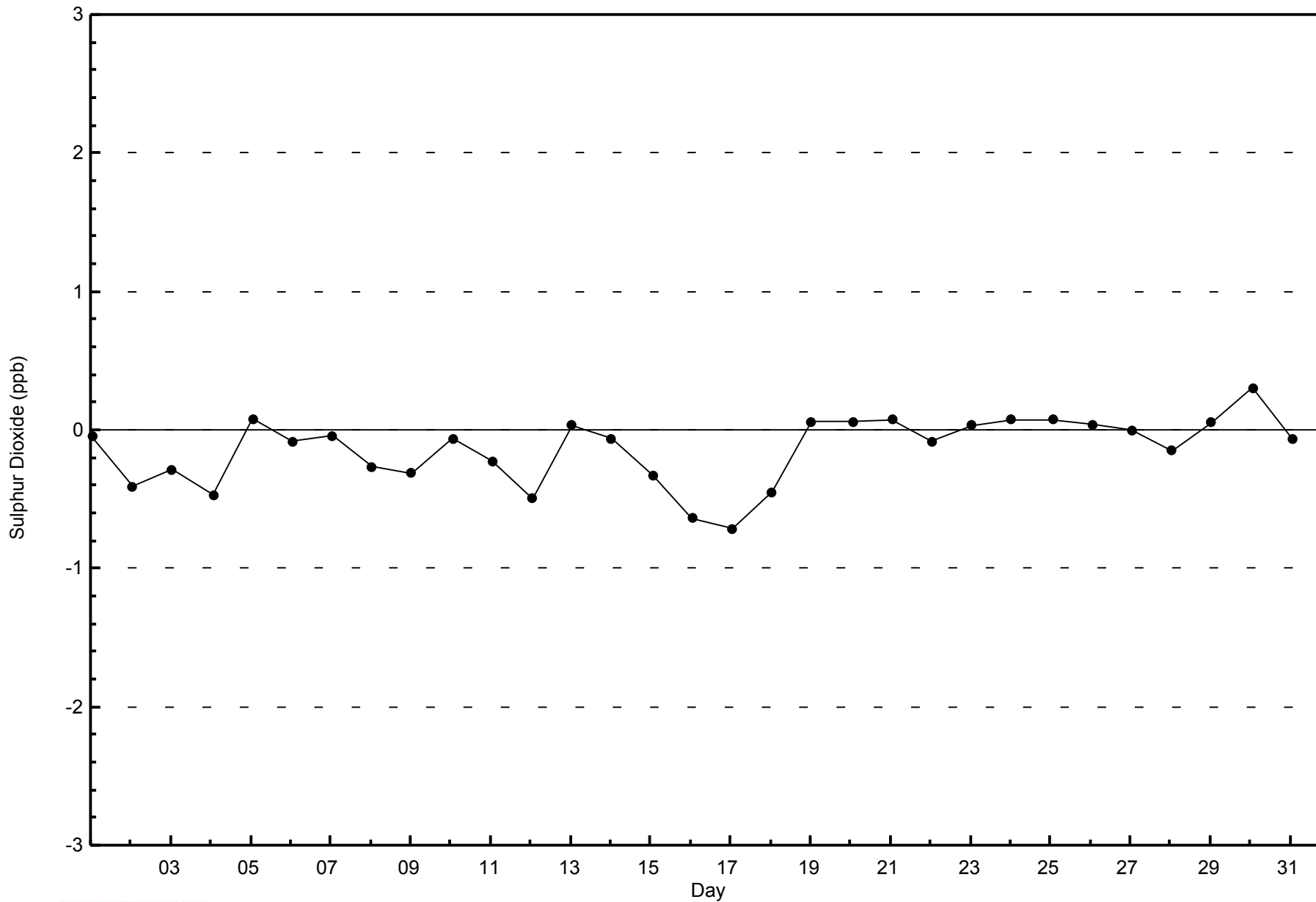


WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

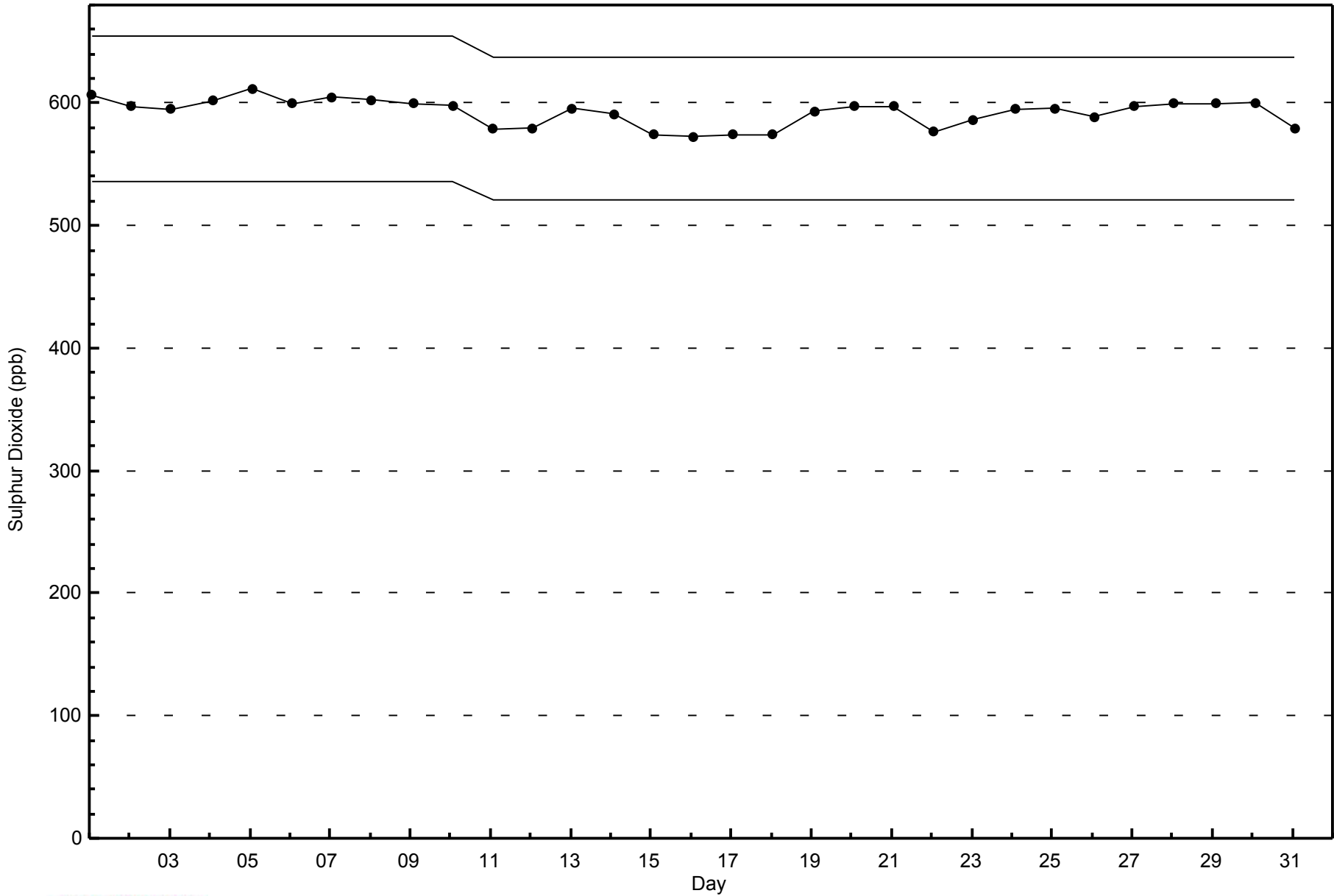
Mannix - July 2014





WBEA NETWORK
Span Responses

Sulphur Dioxide (SO₂) - ppb
Mannix - July 2014

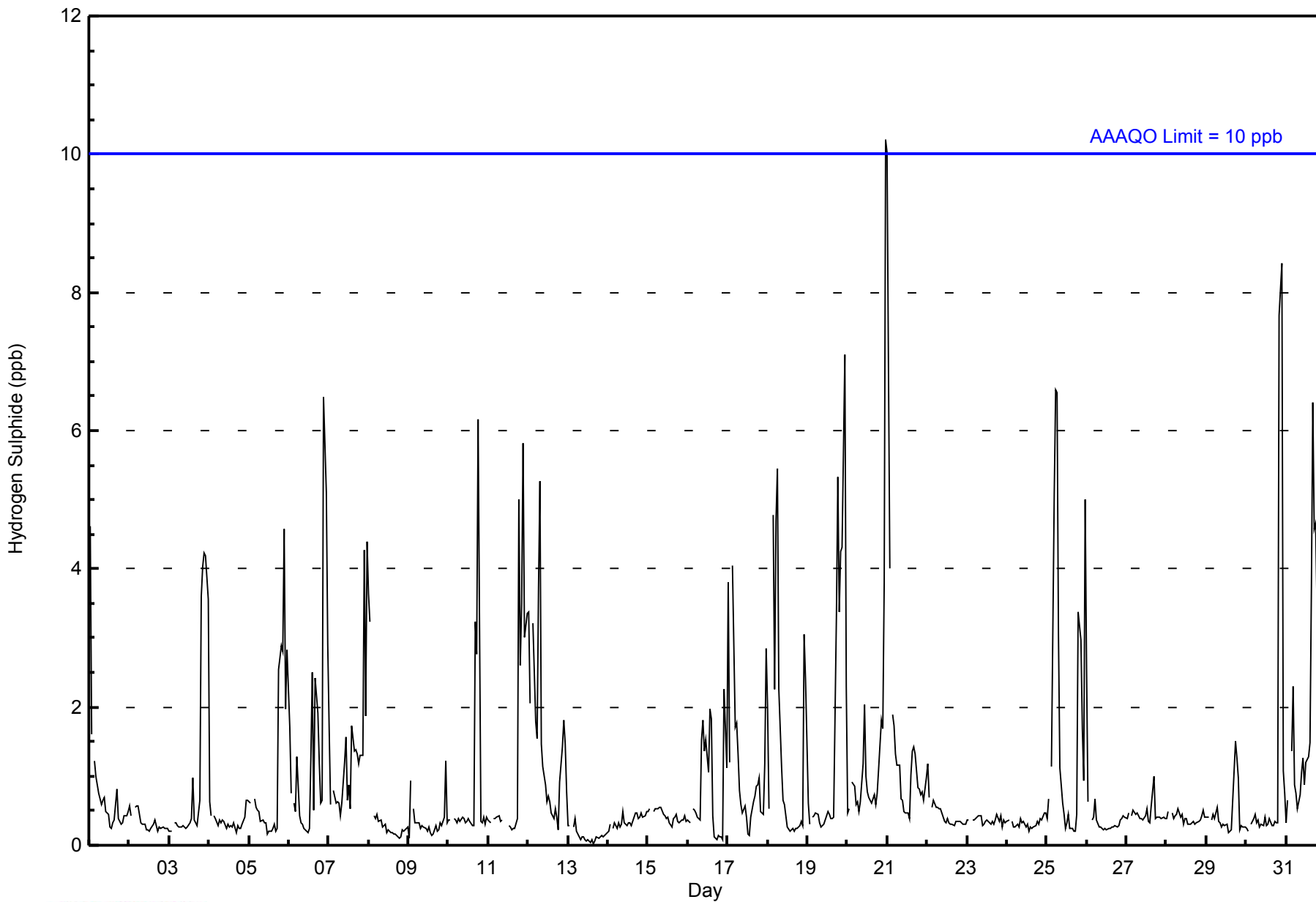




Summary of Hour Averages

Mannix - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 10 ppb on Jul 21 00:00										Maximum Daily Average: 2.4 ppb on Jul 31										Hours of Data: 710																												
Minimum Value: 0 ppb on Jul 13 16:00										Minimum Daily Average: 0.1 ppb on Jul 13										Hours of Missing Data: 34																												
Maximum Diurnal Average: 1.7 ppb at hour 23										Minimum Diurnal Average: 0.4 ppb at hour 13										Hours of Calibration: 34																												
Monthly Average: 0.9 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 6										Percent Operational Time: 100.0																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	5	2	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.8	5																						
2-Jul	1	0	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																						
3-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	4	4	4	4	4	1.1	4																						
4-Jul	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1																						
5-Jul	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	5	2	3	1.0	5																						
6-Jul	2	1	Z	1	0	1	0	0	0	0	0	0	1	2	1	2	2	1	1	1	6	5	3	1.4	6																							
7-Jul	2	1	Z	1	1	1	1	0	1	1	2	1	1	1	2	1	1	1	1	1	4	2	4	1.3	4																							
8-Jul	4	3	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4																							
9-Jul	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1																							
10-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	6	0	0	0	0	0.8	6																							
11-Jul	0	0	Z	0	0	0	0	0	0	C	C	C	0	0	0	0	0	5	3	3	6	3	3	1.4	6																							
12-Jul	3	2	Z	3	2	2	4	5	1	1	1	1	1	0	0	1	0	0	1	1	2	1	1	1.5	5																							
13-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
14-Jul	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																							
15-Jul	0	1	Z	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
16-Jul	0	0	Z	1	1	0	0	0	2	2	1	2	1	2	0	0	0	0	0	0	0	2	1	0.8	2																							
17-Jul	4	1	Z	4	2	2	1	1	1	0	1	0	0	0	1	1	1	1	1	1	0	1	3	1.1	4																							
18-Jul	2	1	Z	5	2	5	5	2	1	1	1	0	0	0	0	0	0	0	0	0	0	3	2	1.4	5																							
19-Jul	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	3	4	4	7	1.6	7																							
20-Jul	0	1	Z	1	1	1	1	0	1	1	2	1	1	1	1	1	1	1	1	1	2	2	4	1.4	10																							
21-Jul	10	4	Z	2	2	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1.5	10																							
22-Jul	1	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																							
23-Jul	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-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
25-Jul	0	1	Z	1	5	7	7	3	1	1	0	0	0	0	0	0	0	0	0	3	3	2	1	1.8	7																							
26-Jul	3	1	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3																							
27-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0.4	1																							
28-Jul	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1																							
29-Jul	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0.5	2																							
30-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	1	1.0	8																							
31-Jul	0	1	Z	1	2	1	1	1	1	1	1	1	1	1	4	6	5	5	2	3	2	9	4	2.4	9																							
																								1.4	0.8	--	0.9	0.9	0.9	1.0	0.7	0.5	0.5	0.5	0.4	0.4	0.4	0.5	0.5	0.8	0.8	1.2	1.0	1.3	1.7	1.7	1.7	Diurnal Average
																								10	4	--	5	5	7	7	5	2	2	2	2	1	2	2	4	6	5	6	4	8	8	9	10	Diurnal Maximum
Z - zerospan C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																





WBEA NETWORK
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mannix - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	645	90.85	90.85
3 - 4	40	5.63	96.48
5 - 7	20	2.82	99.30
8 - 11	5	0.70	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mannix - July 2014

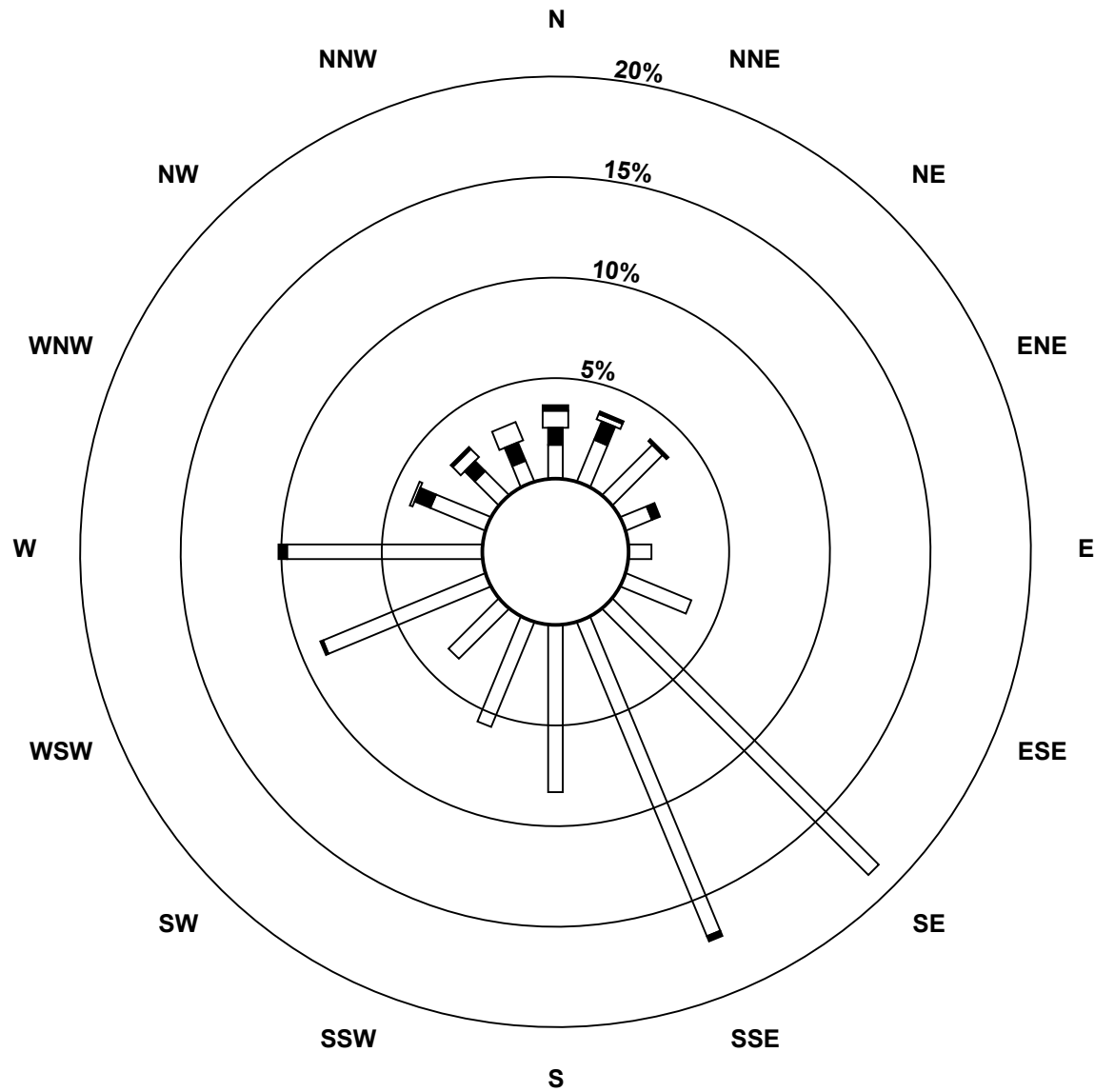
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	12	16	25	10	8	25	133	120	59	40	25	62	69	21	12	8	645
3 - 4	6	7	0	3	0	0	0	2	0	0	0	1	3	6	5	7	40
5 - 7	6	2	0	0	0	0	0	0	0	0	0	0	0	1	4	7	20
8 - 11	2	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	5
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	26	26	26	13	8	25	133	122	59	40	25	63	72	28	22	22	710

Total Number of Valid Hours: 710

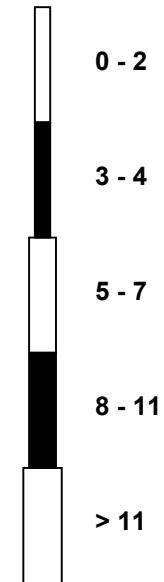
Total Number of Hours: 744

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

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



Classes (ppb)



Total Number of Valid Hours: 710

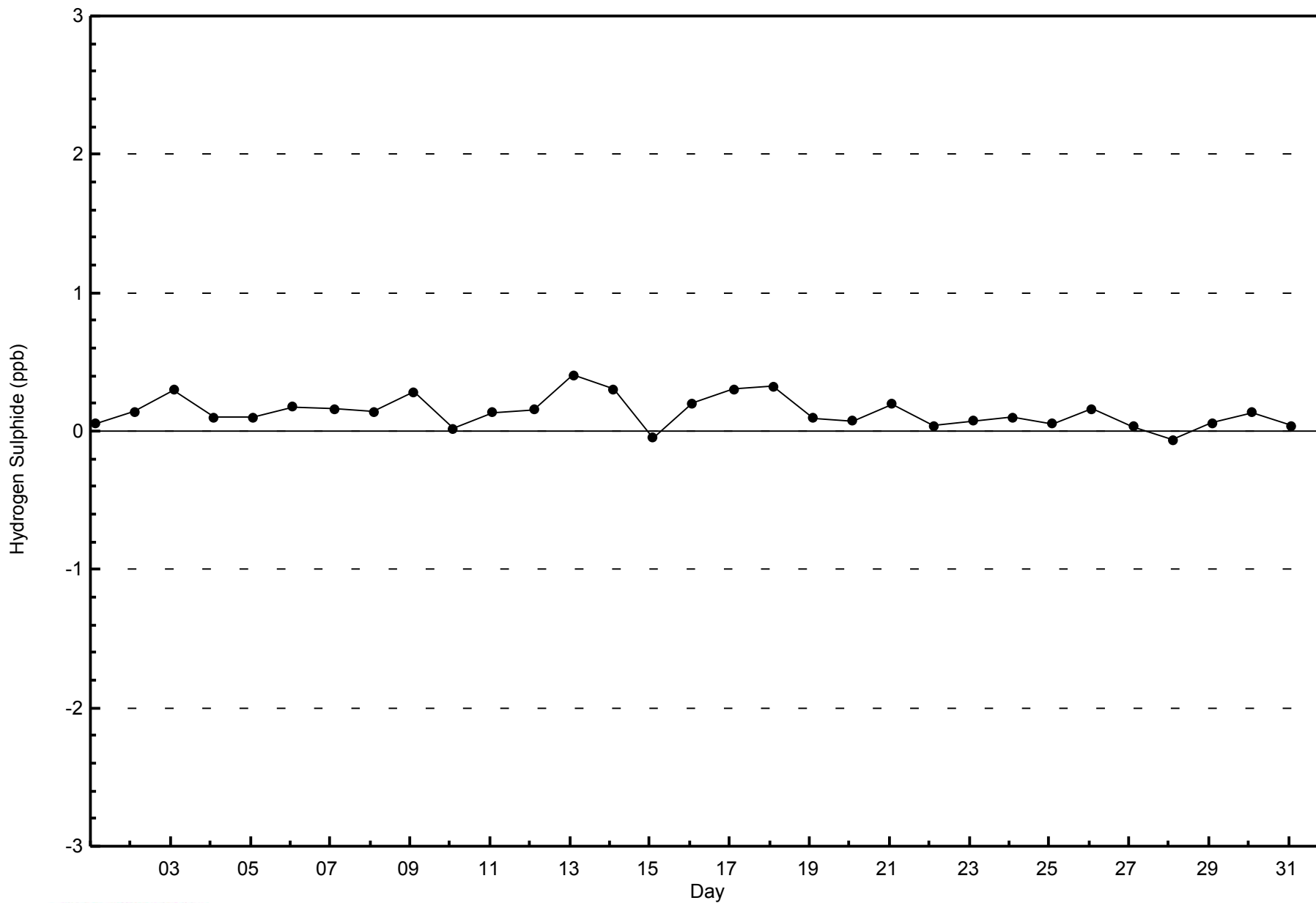


WBEA NETWORK

Zero Responses

Hydrogen Sulphide (H₂S) - ppb

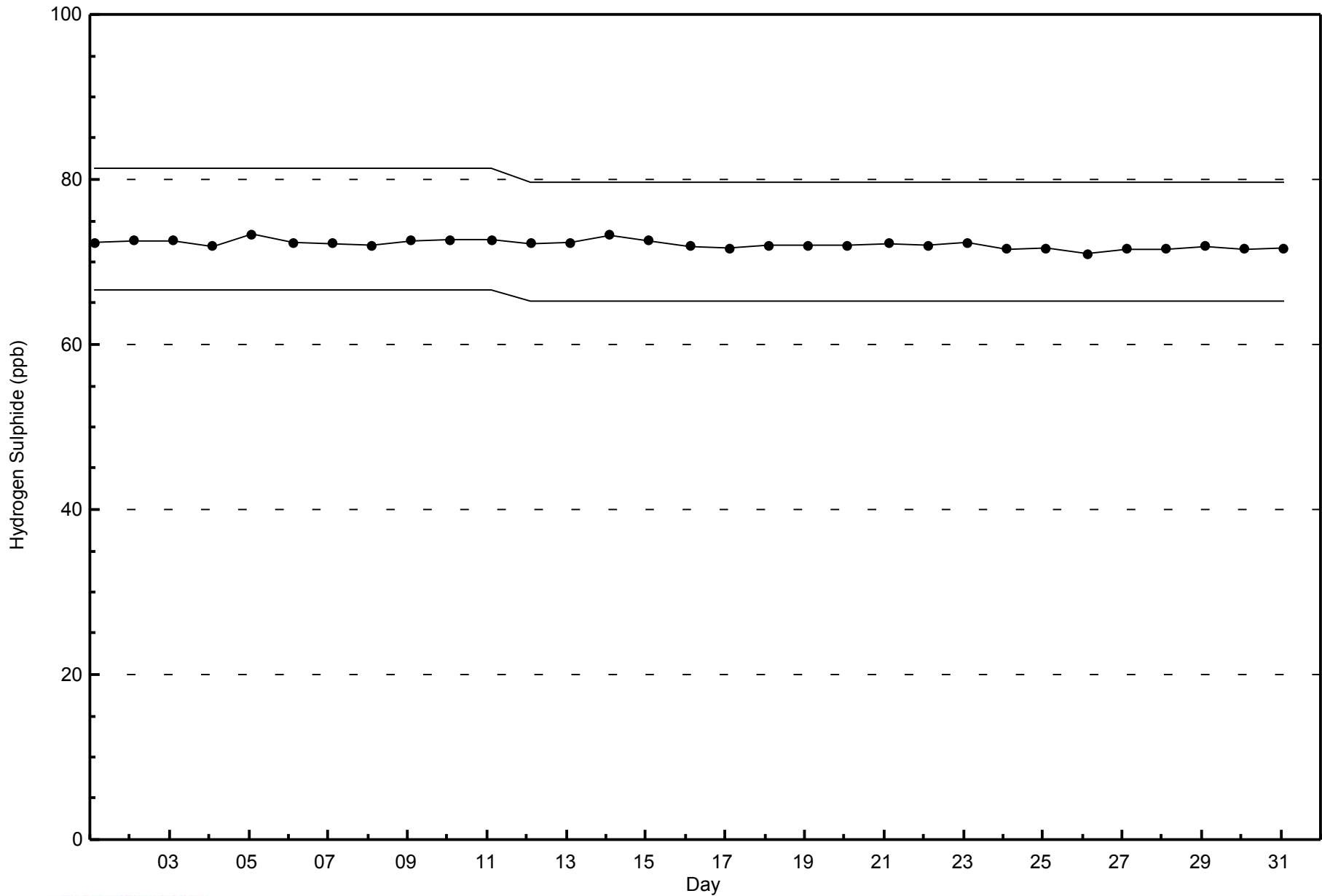
Mannix - July 2014





WBEA NETWORK
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Mannix - July 2014





Maximum Value: 3.9 ppm on Jul 26 00:00														Maximum Daily Average: 2.6 ppm on Jul 17														Hours in Service: 744																					
Minimum Value: 2.0 ppm on Jul 10 15:00														Minimum Daily Average: 2.1 ppm on Jul 4														Hours of Data: 707																					
Maximum Diurnal Average: 2.5 ppm at hour 24														Minimum Diurnal Average: 2.2 ppm at hour 16														Hours of Missing Data: 37																					
Monthly Average: 2.32 ppm														Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.4 P ₉₀ = 2.6 P ₉₉ = 3.2														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-Jul	2.9	Z	2.7	2.5	2.5	2.5	2.4	2.5	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.4	2.2	2.2	2.2	2.3	2.3	2.3	2.5	2.4	2.9																							
2-Jul	2.5	Z	2.5	2.4	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.5	2.3	2.2	2.5																							
3-Jul	2.3	Z	2.3	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.4	2.3	2.2	2.1	2.2	2.2	2.2	3.1	3.1	2.5	2.4	3.0	2.4	3.1																							
4-Jul	2.6	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.6																							
5-Jul	2.1	Z	2.2	2.3	2.3	2.4	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	2.4	2.5	2.6	2.4	2.5	2.2	2.6																							
6-Jul	2.6	Z	2.4	2.2	2.3	2.5	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.3	2.4	2.4	2.7	2.3	2.3	2.3	2.6	3.0	2.4	2.4	3.0																							
7-Jul	2.4	Z	2.3	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.3	2.3	2.2	2.5	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4	3.2	2.4	3.2																							
8-Jul	2.9	Z	2.6	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.4	2.3	2.9																							
9-Jul	2.3	Z	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.2	2.2	2.4																							
10-Jul	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	C	C	C	C	C	2.0	2.1	2.3	2.3	2.5	2.1	2.1	2.2	2.2	2.2	2.2	2.5																							
11-Jul	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	M	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.3	2.5	2.6	2.2	2.6																							
12-Jul	3.1	Z	2.5	2.7	2.4	2.4	2.5	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.6	3.2	3.1	3.1	2.5	3.2																							
13-Jul	2.9	Z	2.4	2.3	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.9																							
14-Jul	2.2	Z	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3																							
15-Jul	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.2	2.4																							
16-Jul	2.3	Z	2.5	2.6	2.5	2.4	2.5	2.4	2.7	2.8	2.6	2.3	2.3	2.4	2.4	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.5	2.4	2.8																							
17-Jul	2.9	Z	3.3	3.6	2.8	2.8	2.6	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.3	2.5	2.7	2.6	2.5	2.5	2.4	2.3	2.5	3.3	2.6	3.6																							
18-Jul	2.9	Z	2.9	3.3	2.5	2.8	2.7	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.1	2.5	2.6	2.4	3.3																							
19-Jul	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.7	2.9	2.3	2.8	2.6	3.5	2.9	2.4	3.5																							
20-Jul	2.3	Z	2.3	2.2	2.2	2.3	2.2	2.2	2.3	2.5	2.7	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.6	2.8	3.1	2.7	2.4	3.1																							
21-Jul	2.9	Z	2.6	2.6	2.6	2.5	2.6	2.6	2.4	2.4	2.4	2.2	2.2	2.2	2.4	2.6	2.5	2.5	2.4	2.4	2.4	2.5	2.4	2.5	2.5	2.9																							
22-Jul	2.5	Z	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5																							
23-Jul	2.3	Z	2.3	2.3	2.4	2.5	2.5	2.4	2.5	2.3	2.2	2.2	2.3	2.3	2.2	2.3	2.5	2.5	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.5																							
24-Jul	2.2	Z	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.2	2.4																							
25-Jul	2.4	Z	2.5	2.6	2.6	2.4	2.5	2.6	2.4	2.3	2.3	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.2	2.7	3.5	3.1	3.0	3.9	2.5	3.9																							
26-Jul	2.7	Z	2.7	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.7																						
27-Jul	2.3	Z	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.4	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4																						
28-Jul	2.3	Z	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3																							
29-Jul	2.4	Z	2.4	2.4	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.2	2.3	2.5	2.3	2.2	2.3	2.2	2.3	2.5																							
30-Jul	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.9	2.4	2.3	2.2	2.3	2.9																							
31-Jul	2.1	Z	2.2	2.4	2.4	2.3	2.3	2.2	2.3	2.4	2.4	2.2	2.3	2.3	2.3	2.4	2.6	2.6	3.0	2.5	2.4	2.5	2.7	2.6	2.4	3.0																							
																								2.5	--	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.5	Diurnal Average		
																								3.1	--	3.3	3.6	2.8	2.8	2.7	2.6	2.7	2.8	2.7	2.3	2.3	2.4	2.5	2.6	2.7	2.7	3.0	3.1	3.5	3.2	3.5	3.9	Diurnal Maximum	
Z - zerospan																								C - Calibration								M - Maintenance																	

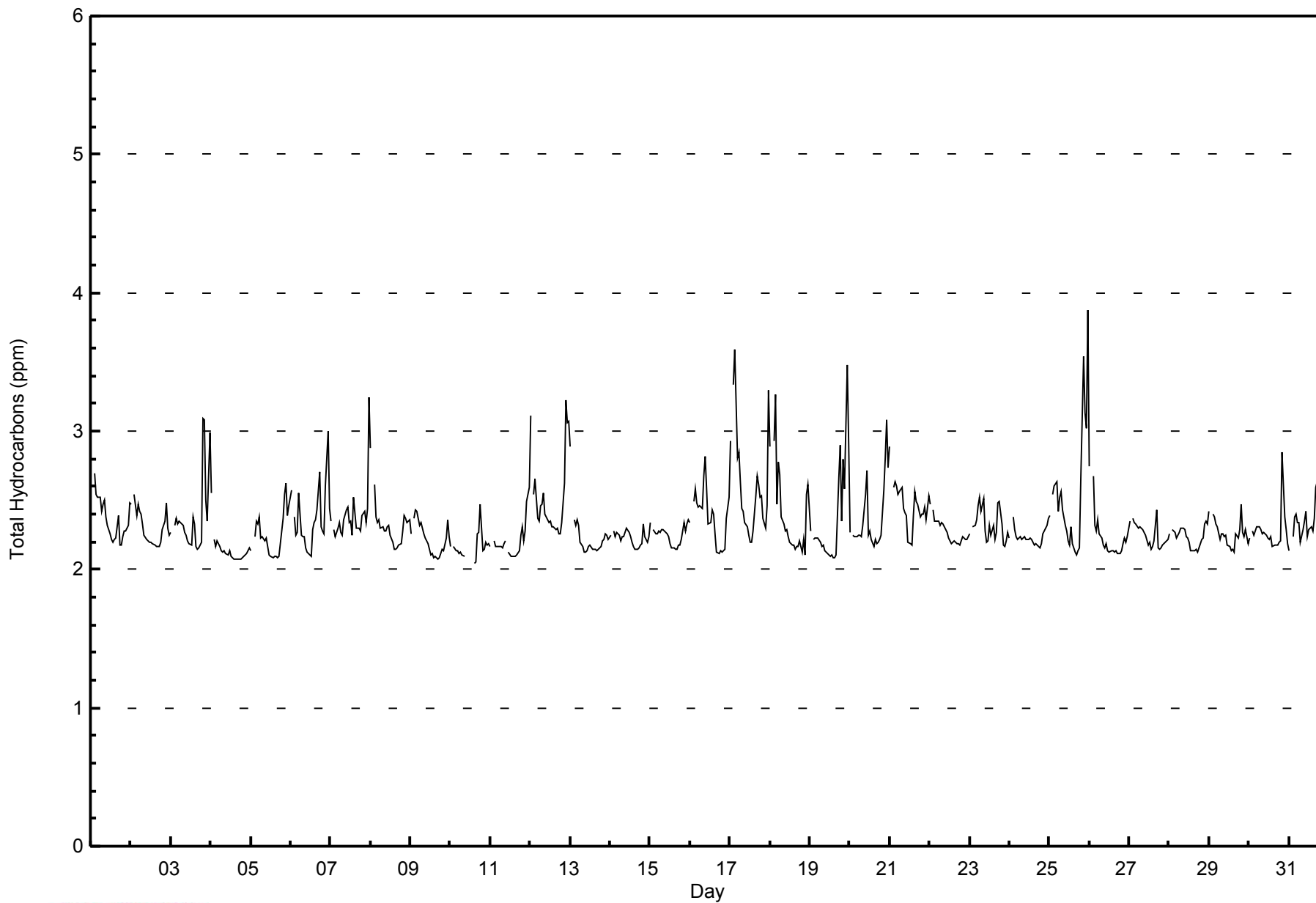


WBEA NETWORK

Hourly Averages

Total Hydrocarbons (THC) - ppm

Mannix - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	1	0.14	0.14
2.1 - 3.0	690	97.60	97.74
3.1 - 10.0	16	2.26	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - July 2014

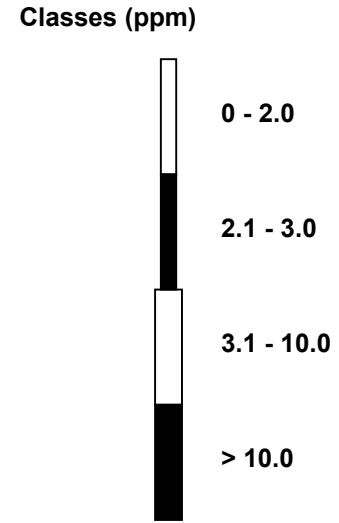
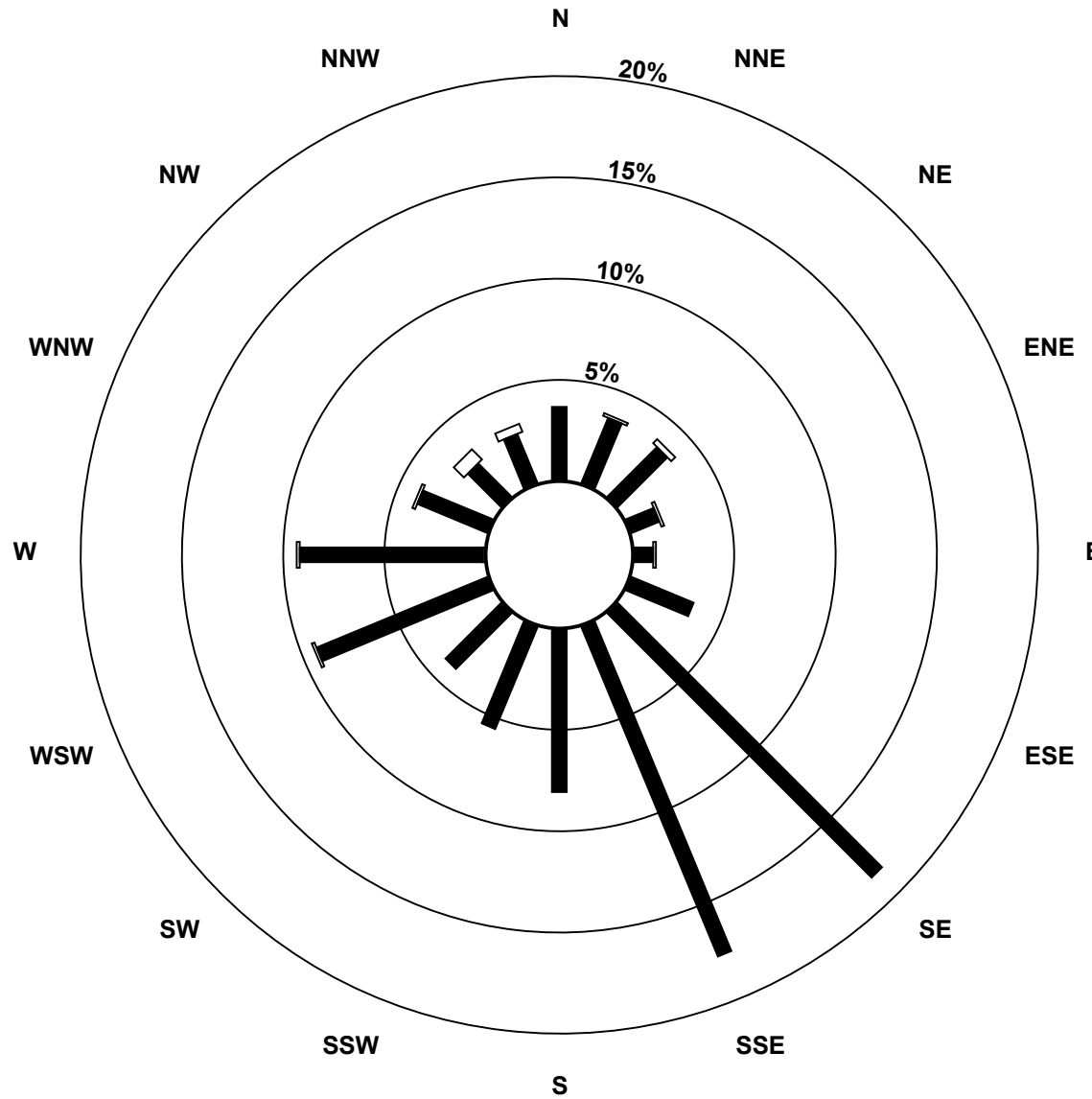
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
2.1 - 3.0	26	25	25	11	7	24	131	125	57	39	28	65	64	27	17	19	690
3.1 - 10.0	0	1	2	1	1	0	0	0	0	0	0	1	1	1	5	3	16
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	26	26	27	12	8	24	131	125	57	39	28	66	66	28	22	22	707

Total Number of Valid Hours: 707

Total Number of Hours: 744

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

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



Total Number of Valid Hours: 707

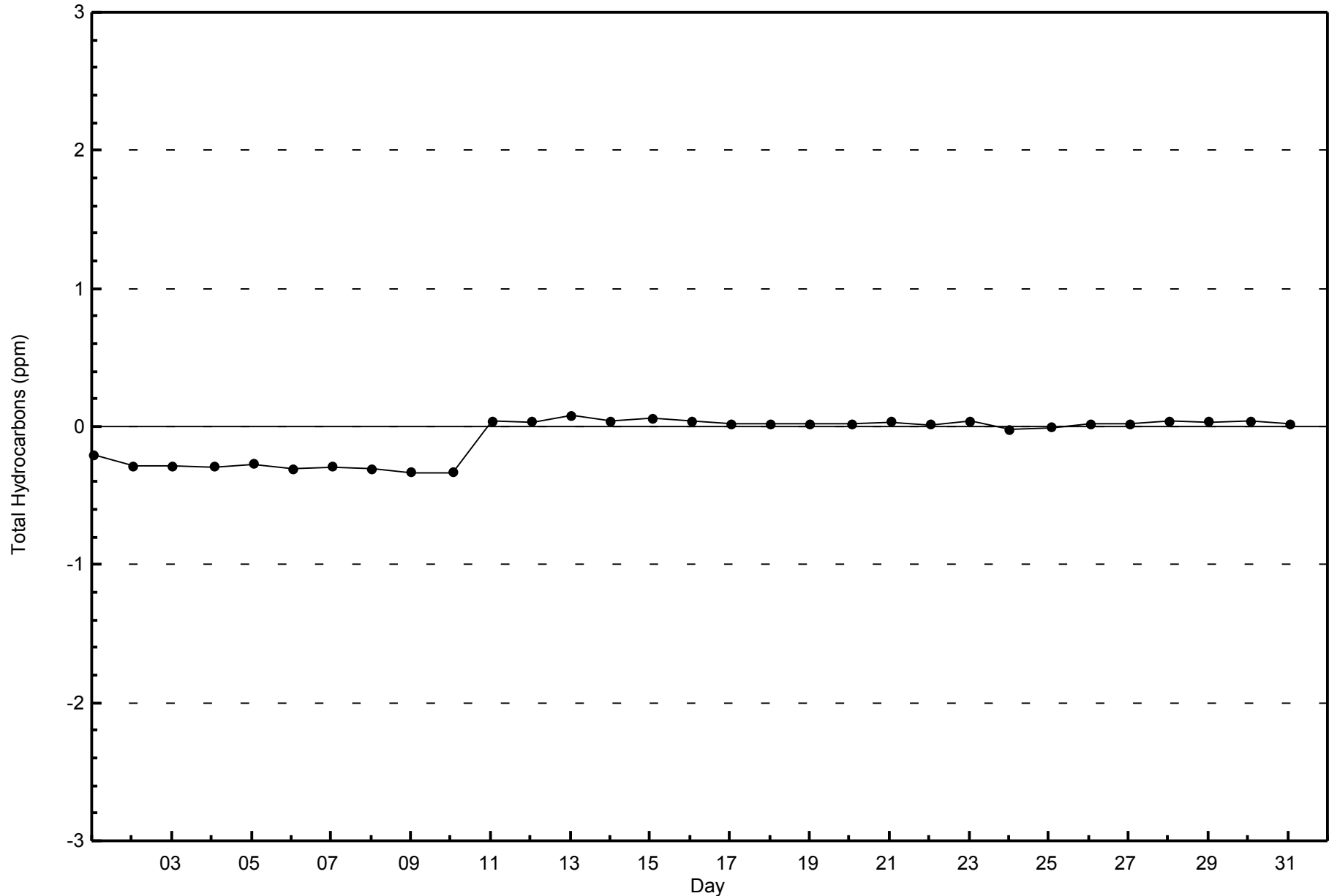


WBEA NETWORK

Zero Responses

Total Hydrocarbons (THC) - ppm

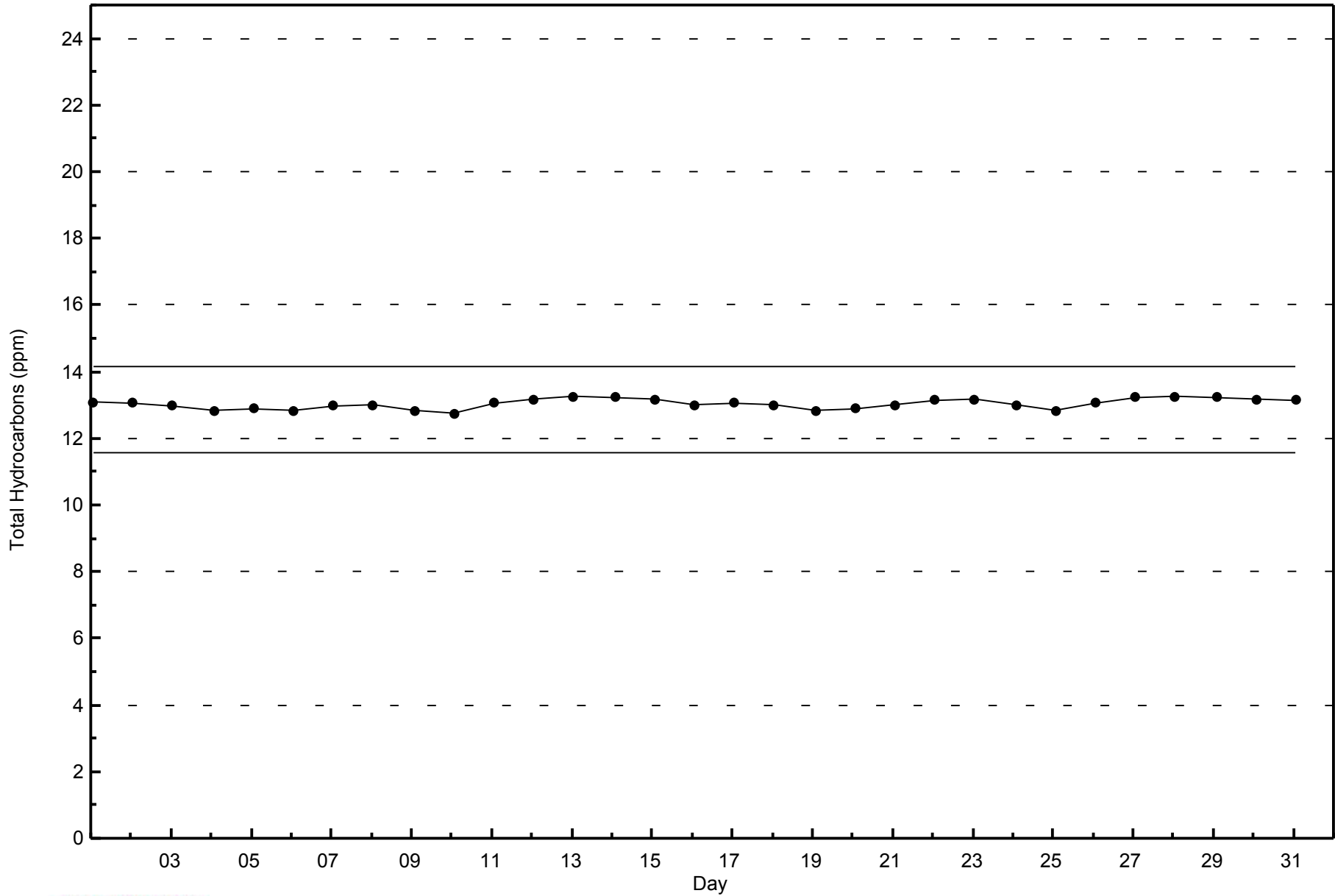
Mannix - July 2014





WBEA NETWORK
Span Responses

Total Hydrocarbons (THC) - ppm
Mannix - July 2014



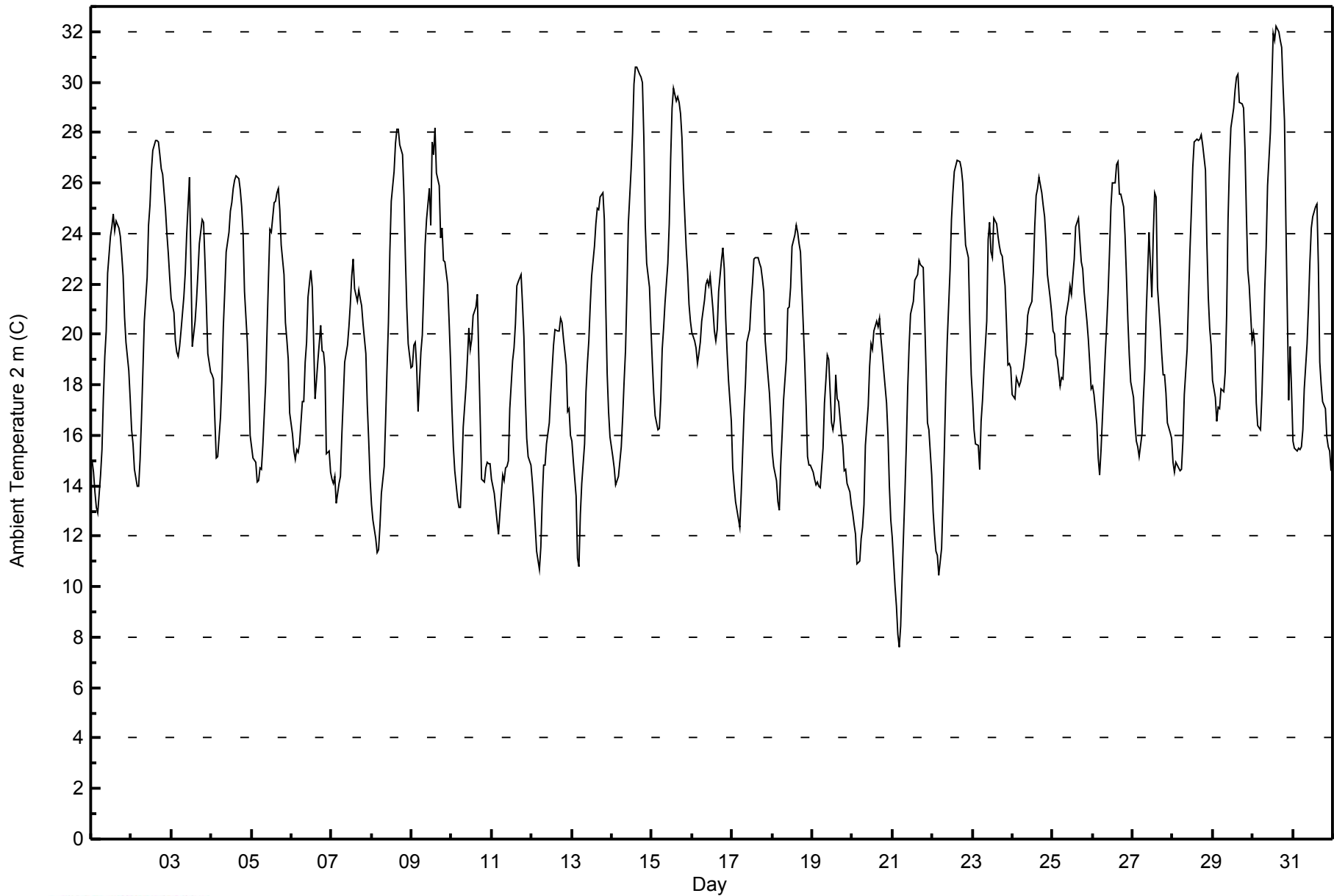


Maximum Value: 32.2 C on Jul 30 15:00																				Maximum Daily Average: 24.3 C on Jul 30					Hours in Service: 744																							
Minimum Value: 7.6 C on Jul 21 05:00																				Minimum Daily Average: 15.8 C on Jul 19					Hours of Data: 744																							
Maximum Diurnal Average: 24.6 C at hour 15																				Minimum Diurnal Average: 14.2 C at hour 5					Hours of Missing Data: 0																							
Monthly Average: 19.82 C																				Percentiles: P ₁ = 10.7 P ₁₀ = 14.1 Q ₁ = 16.0 Median = 19.6 Q ₃ = 23.1 P ₉₀ = 26.1 P ₉₉ = 29.9					Hours of Calibration: 0																							
																									Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	15.0	14.6	13.8	13.2	12.9	14.4	15.4	17.5	19.2	20.1	22.4	23.9	24.3	24.8	24.1	24.5	24.2	23.9	23.2	22.3	20.7	19.7	18.6	17.5	19.6	24.8																						
2-Jul	16.2	15.7	14.7	14.0	14.0	15.0	16.7	18.6	20.5	22.2	24.3	25.1	26.4	27.3	27.7	27.7	27.6	27.1	26.5	26.3	25.0	24.0	23.2	22.3	22.0	27.7																						
3-Jul	21.4	20.8	19.7	19.3	19.1	19.5	20.1	21.5	22.4	23.9	25.1	26.2	19.5	20.0	20.6	21.4	22.4	23.6	24.5	24.4	22.9	21.2	19.2	18.5	21.6	26.2																						
4-Jul	18.4	18.2	16.6	15.1	15.2	16.7	18.2	20.3	21.7	23.3	24.1	24.9	25.2	25.8	26.1	26.3	26.2	25.7	25.0	24.0	21.7	19.7	18.0	16.0	21.3	26.3																						
5-Jul	15.6	15.1	14.9	14.1	14.2	14.7	14.7	15.6	18.0	20.2	22.2	24.2	24.1	25.2	25.3	25.6	25.8	25.0	23.5	22.4	20.5	19.8	19.0	16.9	19.9	25.8																						
6-Jul	16.1	15.4	15.0	15.4	15.3	15.7	17.3	17.3	18.9	19.7	21.5	22.5	21.9	19.8	17.5	18.2	19.0	20.3	19.4	19.3	18.7	15.3	15.4	14.5	17.9	22.5																						
7-Jul	14.3	14.1	14.4	13.3	14.1	14.3	16.0	17.5	18.9	19.6	20.3	21.2	22.3	23.0	21.8	21.3	21.8	21.4	21.1	20.4	19.3	17.2	15.8	14.3	18.2	23.0																						
8-Jul	13.3	12.6	11.9	11.3	11.4	12.4	13.7	14.8	16.6	18.6	20.5	23.3	25.3	26.4	27.6	28.2	28.1	27.5	27.1	25.5	23.1	21.1	19.6	18.7	19.9	28.2																						
9-Jul	18.8	19.6	19.7	18.7	16.9	19.3	20.0	21.7	23.6	24.6	25.8	24.3	27.6	27.2	28.2	26.4	25.9	23.8	24.2	22.9	22.9	22.0	20.5	19.0	22.6	28.2																						
10-Jul	17.1	15.5	14.6	13.5	13.1	13.1	14.6	16.3	18.0	19.1	20.2	19.4	19.8	20.7	21.1	21.6	19.1	16.7	14.2	14.1	14.7	14.9	14.9	14.9	16.7	21.6																						
11-Jul	14.3	13.7	13.1	12.6	12.1	12.9	14.5	14.2	14.7	14.8	15.0	17.1	19.0	19.5	20.4	21.9	22.1	22.4	21.2	19.9	17.5	15.9	15.2	14.8	16.6	22.4																						
12-Jul	14.1	13.4	12.4	11.4	10.7	11.6	13.5	14.8	14.8	15.7	16.5	17.6	18.6	19.6	20.2	20.1	20.1	20.7	20.5	19.8	18.8	16.9	17.1	16.0	16.5	20.7																						
13-Jul	15.8	15.0	13.6	11.1	10.8	12.9	14.1	15.7	17.7	18.9	19.8	21.1	22.3	23.5	24.4	25.0	25.0	25.5	25.6	24.6	21.2	18.5	17.0	15.9	18.9	25.6																						
14-Jul	15.1	14.7	14.1	14.2	14.4	15.5	16.7	18.1	19.4	21.6	24.4	26.6	27.9	29.9	30.6	30.6	30.3	30.2	30.0	27.8	24.3	22.8	21.9	20.3	22.6	30.6																						
15-Jul	18.9	17.7	16.8	16.2	16.3	17.4	19.4	20.3	21.3	22.8	24.4	26.9	29.0	29.8	29.2	29.4	29.2	28.8	27.8	26.0	23.4	22.5	21.2	20.5	23.1	29.8																						
16-Jul	20.1	19.8	19.5	18.8	19.2	19.7	20.5	21.4	22.0	22.1	21.9	22.3	21.0	20.2	19.7	20.2	21.7	22.9	23.4	22.6	20.6	19.3	18.2	16.6	20.6	23.4																						
17-Jul	14.7	14.0	13.4	13.0	12.4	13.7	15.3	16.9	18.1	19.7	20.2	21.2	22.1	23.0	23.0	23.0	22.8	22.6	22.2	21.7	19.7	18.4	17.6	16.6	18.6	23.0																						
18-Jul	15.3	14.8	14.2	13.3	13.0	14.8	16.0	17.4	19.0	21.0	21.1	21.9	23.5	24.0	24.3	24.1	23.6	23.3	21.7	18.9	17.2	15.2	14.8	14.8	18.6	24.3																						
19-Jul	14.6	14.3	14.1	14.2	14.0	13.9	15.5	17.3	18.2	19.2	19.0	16.5	16.2	16.6	18.4	17.4	17.3	16.0	15.6	14.6	14.7	14.1	13.8	13.3	15.8	19.2																						
20-Jul	12.9	12.5	12.1	10.9	11.0	11.9	12.4	13.3	15.6	17.2	18.7	19.6	19.4	20.1	20.5	20.3	20.6	19.9	19.2	18.6	17.3	16.0	14.0	12.7	16.1	20.6																						
21-Jul	12.0	10.0	9.2	8.1	7.6	8.5	10.4	13.7	15.6	17.9	19.6	20.8	21.3	22.1	22.3	22.4	22.9	22.8	22.6	20.7	18.6	16.5	16.2	14.4	16.5	22.9																						
22-Jul	13.0	12.1	11.4	11.3	10.4	11.5	13.4	15.5	17.9	19.7	22.5	24.5	25.6	26.5	26.7	26.9	26.9	26.6	26.0	24.7	23.5	23.0	20.5	18.4	19.9	26.9																						
23-Jul	17.4	16.2	15.7	15.6	14.7	16.6	17.4	18.6	20.5	23.8	24.5	23.3	23.0	24.6	24.4	23.9	23.5	23.2	23.1	21.9	20.4	18.8	18.9	18.7	20.4	24.6																						
24-Jul	17.6	17.4	18.3	18.1	17.9	18.1	18.7	19.2	19.7	20.8	21.0	21.3	22.5	24.2	25.5	25.8	26.2	25.6	25.1	24.6	23.7	22.4	21.4	20.9	21.5	26.2																						
25-Jul	20.1	20.0	19.2	19.0	18.0	18.3	18.2	19.4	20.7	21.4	22.0	21.6	22.3	23.0	24.3	24.6	23.7	22.9	22.6	21.7	20.5	19.8	18.9	17.8	20.8	24.6																						
26-Jul	18.0	17.6	16.4	15.1	14.4	15.4	16.7	19.2	20.3	21.6	23.3	25.0	26.0	26.0	26.8	26.9	25.5	25.6	25.1	24.0	22.3	20.6	19.2	18.1	21.2	26.9																						
27-Jul	17.5	16.5	15.8	15.6	15.2	16.1	17.4	18.6	20.8	22.4	24.0	21.5	24.0	25.6	25.4	21.9	20.2	19.2	18.4	18.4	17.7	16.5	16.1	15.9	19.2	25.6																						
28-Jul	14.9	14.6	14.9	14.7	14.6	14.7	15.8	17.6	19.4	21.4	23.3	24.9	26.6	27.7	27.7	27.7	27.8	27.9	27.5	26.5	23.6	21.5	20.3	19.6	21.5	27.9																						
29-Jul	18.2	17.5	16.6	17.1	17.0	17.9	17.8	18.5	20.8	24.6	26.7	28.2	28.9	29.7	30.2	30.3	29.2	29.1	29.0	27.3	24.8	22.5	21.9	19.7	23.5	30.3																						
30-Jul	20.1	19.6	17.3	16.4	16.2	17.6	19.5	21.8	23.5	25.9	28.0	30.0	31.9	31.6	32.2	32.0	31.7	31.4	29.8	28.5	24.4	17.4	19.5	17.8	24.3	32.2																						
31-Jul	15.8	15.5	15.4	15.5	15.4	15.5	16.2	17.8	19.6	21.1	22.9	24.2	24.7	25.0	25.2	22.8	18.9	18.0	17.3	17.1	15.9	15.6	15.4	14.6	18.6	25.2																						
																								16.3	15.8	15.1	14.5	14.2	15.2	16.3	17.8	19.3	20.8	22.1	22.9	23.6	24.3	24.6	24.5	24.2	23.9	23.3	22.3	20.6	19.0	18.2	17.1	Diurnal Average
																								21.4	20.8	19.7	19.3	19.2	19.7	20.5	21.8	23.6	25.9	28.0	30.0	31.9	31.6	32.2	32.0	31.7	31.4	30.0	28.5	25.0	24.0	23.2	22.3	Diurnal Maximum



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	5	0.67	0.67
10 - 20	392	52.69	53.36
> 20	347	46.64	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

Mannix - July 2014

Maximum Value: 32.3 C on Jul 30 16:00 Maximum Daily Average: 24.5 C on Jul 30																						Hours in Service:	744			
Minimum Value: 8.6 C on Jul 21 06:00 Minimum Daily Average: 15.6 C on Jul 19																						Hours of Data:	744			
Maximum Diurnal Average: 24.2 C at hour 16 Minimum Diurnal Average: 15.2 C at hour 5																						Hours of Missing Data:	0			
Monthly Average: 20.12 C Percentiles: P ₁ = 11.8 P ₁₀ = 14.6 Q ₁ = 16.6 Median = 19.8 Q ₃ = 23.2 P ₉₀ = 26.0 P ₉₉ = 29.9																						Hours of Calibration:	0			
																						Percent Operational Time:	100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	18.3	16.3	14.8	14.1	13.9	14.5	15.1	17.0	18.5	19.6	21.6	23.0	23.7	24.6	24.1	24.4	23.9	23.7	23.5	22.9	21.9	21.5	20.2	19.6	20.0	24.6
2-Jul	18.2	17.6	16.3	15.5	14.6	15.1	16.2	17.7	19.4	21.3	23.1	24.5	25.6	26.3	27.1	27.7	27.9	27.8	27.5	27.1	26.0	24.8	23.6	22.6	22.2	27.9
3-Jul	21.8	21.4	20.6	19.7	19.4	19.6	19.9	21.3	22.2	23.7	24.9	26.1	19.7	20.0	20.3	21.1	22.3	23.5	24.3	24.6	23.5	21.4	19.9	19.5	21.7	26.1
4-Jul	18.6	18.5	17.5	16.4	16.3	16.2	17.7	19.1	20.3	22.5	23.5	24.2	24.4	25.1	25.5	25.8	25.9	25.6	25.1	24.5	23.2	21.4	19.8	18.2	21.5	25.9
5-Jul	17.6	16.6	16.3	15.4	15.3	15.2	14.5	15.2	17.1	19.3	21.4	23.3	23.7	24.4	24.8	25.1	25.5	25.4	23.9	23.8	22.6	21.6	19.8	18.7	20.3	25.5
6-Jul	18.0	17.0	16.8	16.5	16.0	16.3	17.0	17.2	17.8	19.2	20.4	21.8	21.6	18.9	17.3	18.0	18.9	19.8	19.4	19.3	19.0	16.9	16.2	15.8	18.1	21.8
7-Jul	15.2	15.2	15.1	14.3	14.8	14.4	16.0	17.0	18.2	19.0	19.8	20.5	21.6	22.4	21.6	21.1	21.4	21.4	21.3	20.7	20.0	19.2	18.4	17.6	18.6	22.4
8-Jul	16.3	15.4	14.0	12.8	12.6	12.4	13.4	14.2	15.8	17.7	19.6	22.2	24.5	26.0	27.4	28.0	28.3	28.1	27.8	27.2	26.2	24.4	23.0	22.0	20.8	28.3
9-Jul	22.0	21.4	21.2	21.0	19.0	19.4	19.7	21.1	22.9	24.2	24.8	24.3	25.9	26.6	27.6	26.6	25.9	24.4	24.6	24.3	24.2	22.8	21.2	19.8	23.1	27.6
10-Jul	18.4	16.3	15.0	13.9	13.3	13.1	13.7	15.1	16.6	17.5	18.7	18.5	19.0	19.7	20.0	20.6	18.9	16.7	14.4	14.2	15.0	15.4	15.4	15.5	16.5	20.6
11-Jul	14.9	14.2	13.6	13.0	12.4	13.0	14.0	14.0	14.4	14.7	14.6	16.1	17.6	18.7	19.9	21.1	21.7	22.3	21.7	20.1	18.5	17.4	16.7	16.3	16.7	22.3
12-Jul	15.4	14.6	13.7	12.7	11.9	11.8	12.8	13.7	14.3	14.9	15.5	16.3	17.2	18.4	19.1	19.6	20.1	20.6	20.7	20.3	19.8	19.2	18.3	17.2	16.6	20.7
13-Jul	16.1	15.4	14.3	13.0	12.3	12.8	13.5	14.7	16.4	17.7	18.7	20.1	21.4	22.7	23.9	24.6	25.2	25.5	25.4	25.1	24.4	22.5	20.9	19.3	19.4	25.5
14-Jul	17.9	16.8	16.4	16.1	15.6	15.6	16.2	17.4	18.6	20.7	23.4	25.8	27.3	28.9	29.8	30.2	30.4	30.5	30.1	29.1	27.4	25.6	24.3	23.0	23.2	30.5
15-Jul	21.6	20.4	19.6	18.9	18.0	18.1	18.5	19.4	20.5	21.9	23.7	25.9	27.9	29.1	29.2	29.5	29.6	29.4	28.7	27.7	25.9	24.7	23.6	22.9	23.9	29.6
16-Jul	22.0	21.5	21.4	21.0	20.2	20.1	20.4	21.2	21.9	22.0	21.7	21.6	21.0	20.2	19.9	20.0	21.1	22.4	23.0	23.2	22.1	20.4	18.5	17.1	21.0	23.2
17-Jul	16.3	15.5	15.3	14.3	13.3	14.0	14.7	15.8	17.2	18.7	19.4	20.4	21.1	22.2	22.7	22.9	23.0	23.0	23.0	22.5	21.4	20.0	19.4	17.7	18.9	23.0
18-Jul	17.4	16.2	15.8	15.3	14.3	14.9	15.3	16.4	17.8	19.7	20.2	20.9	22.1	23.1	23.5	23.9	23.8	23.7	22.7	19.5	18.1	15.4	15.1	15.1	18.8	23.9
19-Jul	14.7	14.3	14.2	14.2	14.2	14.2	14.7	16.0	17.3	18.3	18.4	16.5	16.0	15.9	17.7	17.0	16.7	15.6	15.6	14.5	14.8	14.7	14.6	14.0	15.6	18.4
20-Jul	13.5	13.0	12.6	11.8	11.5	11.9	12.3	13.0	14.6	16.0	17.1	18.1	18.6	19.2	19.6	19.8	20.1	19.8	19.4	18.9	18.0	17.2	16.5	15.6	16.2	20.1
21-Jul	15.0	11.9	10.4	9.8	9.6	8.6	9.7	12.4	14.4	17.3	18.7	19.5	20.4	21.0	22.0	22.3	22.7	22.9	23.1	22.2	21.5	20.6	18.2	16.8	17.1	23.1
22-Jul	15.4	14.1	13.3	12.6	11.8	11.7	12.7	14.6	16.9	19.0	21.6	23.7	24.8	26.0	26.4	26.9	27.2	27.3	26.8	26.1	24.9	24.0	22.4	20.8	20.5	27.3
23-Jul	19.8	18.5	17.5	16.8	16.4	16.8	17.4	18.5	20.2	23.0	24.3	23.4	23.2	24.5	24.3	23.7	23.4	23.1	23.3	22.2	20.9	19.8	19.8	19.3	20.8	24.5
24-Jul	18.4	18.6	18.9	18.5	18.3	18.1	18.4	18.9	19.5	20.3	20.6	20.8	21.8	23.6	24.9	25.5	26.0	25.7	25.4	24.9	23.9	22.5	21.5	20.9	21.5	26.0
25-Jul	20.3	20.1	19.4	19.3	18.7	18.4	18.1	19.0	20.3	20.8	21.5	21.5	21.9	22.9	23.4	23.9	23.5	23.4	23.1	21.9	21.2	20.4	19.7	19.5	20.9	23.9
26-Jul	18.8	17.8	17.0	16.4	15.6	15.6	16.1	18.3	19.2	20.4	22.1	23.3	24.5	25.3	26.2	26.5	25.7	25.1	24.9	24.4	23.4	22.2	20.7	19.7	21.2	26.5
27-Jul	19.4	18.0	17.0	16.6	16.1	16.1	16.6	17.9	19.7	21.7	23.1	21.6	23.8	25.0	25.2	22.3	20.8	19.5	19.4	19.2	18.6	17.8	17.3	17.2	19.6	25.2
28-Jul	16.3	15.7	15.3	14.9	14.8	14.6	15.0	16.6	18.4	20.5	22.3	24.0	25.8	27.1	27.3	27.8	28.1	28.7	28.2	27.8	26.4	25.5	23.7	22.0	22.0	28.7
29-Jul	20.3	19.2	18.3	18.2	18.1	18.7	21.1	20.1	19.8	22.8	25.4	27.2	28.5	29.4	29.9	30.2	29.6	29.3	29.3	28.2	25.9	24.3	22.8	21.6	24.1	30.2
30-Jul	20.8	20.2	19.1	18.3	17.7	17.8	18.8	20.6	22.2	24.8	26.7	28.8	30.2	31.2	32.0	32.3	32.1	31.9	31.0	30.0	25.0	17.5	19.9	18.9	24.5	32.3
31-Jul	17.2	16.5	16.6	16.5	16.2	16.0	16.0	17.0	19.0	20.4	21.8	22.9	23.6	24.1	24.4	22.7	18.9	18.0	17.4	17.1	16.4	16.1	15.7	15.1	18.6	24.4
																						Diurnal Average				
																						Diurnal Maximum				

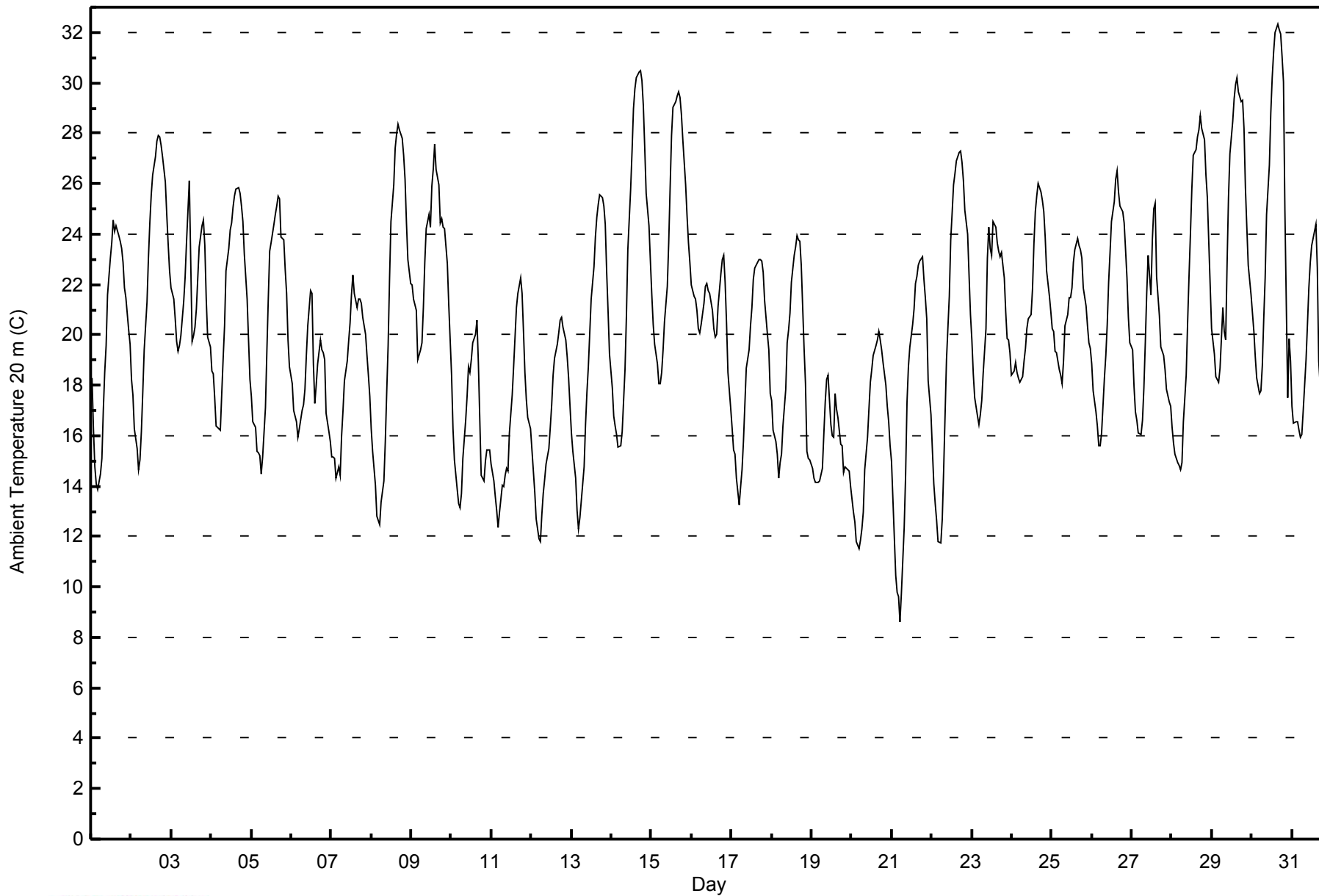


WBEA NETWORK

Hourly Averages

Ambient Temperature 20 m (AT20m) - C

Mannix - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	4	0.54	0.54
10 - 20	380	51.08	51.61
> 20	360	48.39	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

Mannix - July 2014

Maximum Value: 32.0 C on Jul 30 16:00																				Maximum Daily Average: 24.3 C on Jul 30					Hours in Service: 744																							
Minimum Value: 9.8 C on Jul 21 07:00																				Minimum Daily Average: 15.3 C on Jul 19					Hours of Data: 744																							
Maximum Diurnal Average: 23.9 C at hour 16																				Minimum Diurnal Average: 15.4 C at hour 6					Hours of Missing Data: 0																							
Monthly Average: 20.05 C																				Percentiles: P ₁ = 11.9 P ₁₀ = 14.5 Q ₁ = 16.8 Median = 19.8 Q ₃ = 23.0 P ₉₀ = 25.7 P ₉₉ = 29.6					Hours of Calibration: 0																							
																									Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	18.8	18.0	17.1	16.7	15.9	15.2	15.5	16.8	18.1	19.2	21.3	22.7	23.4	24.2	23.9	24.1	23.6	23.4	23.2	22.7	21.9	21.7	20.7	20.1	20.3	24.2																						
2-Jul	18.7	17.9	17.0	15.9	15.4	15.0	15.9	17.3	19.0	20.9	22.7	24.2	25.2	25.9	26.6	27.3	27.6	27.6	27.4	27.0	26.0	24.7	23.5	22.4	22.1	27.6																						
3-Jul	21.8	21.4	20.5	19.7	19.3	19.4	19.7	21.1	22.0	23.4	24.6	25.8	19.8	19.9	20.1	20.7	21.9	23.2	24.0	24.3	23.4	21.2	19.9	19.5	21.5	25.8																						
4-Jul	18.4	18.3	17.5	16.5	16.4	16.0	17.3	18.6	19.9	22.1	23.0	23.7	23.9	24.5	25.0	25.3	25.4	25.2	24.8	24.2	23.1	21.6	20.1	18.8	21.2	25.4																						
5-Jul	18.1	16.9	16.9	16.0	15.8	15.5	14.4	15.0	16.7	19.0	21.1	22.9	23.2	23.9	24.3	24.7	25.1	25.1	23.7	23.8	22.9	22.0	19.7	18.7	20.2	25.1																						
6-Jul	18.6	17.8	16.9	16.6	15.9	16.2	16.7	16.9	17.5	18.9	20.0	21.4	21.3	18.4	17.1	17.8	18.6	19.4	19.2	19.0	19.0	17.1	16.2	16.1	18.0	21.4																						
7-Jul	15.4	15.4	15.2	14.5	14.8	14.4	15.9	16.7	17.8	18.6	19.4	20.1	21.2	21.9	21.3	20.8	21.1	21.1	21.0	20.5	20.0	19.4	18.8	18.0	18.5	21.9																						
8-Jul	17.3	16.4	15.1	13.5	13.0	12.4	13.1	13.8	15.4	17.3	19.2	21.9	24.2	25.6	27.0	27.5	28.0	27.9	27.7	27.4	26.9	25.2	24.1	23.2	21.0	28.0																						
9-Jul	22.8	22.5	21.5	21.7	21.1	19.6	19.4	20.8	22.6	23.9	24.4	24.0	25.3	26.1	27.1	26.3	25.5	24.2	24.4	24.3	24.1	22.8	21.1	19.7	23.1	27.1																						
10-Jul	18.4	16.2	14.9	13.8	13.1	12.8	13.3	14.7	16.3	17.1	18.2	18.1	18.6	19.1	19.4	20.0	18.5	16.3	14.2	14.0	14.8	15.4	15.5	15.5	16.2	20.0																						
11-Jul	14.9	14.2	13.6	13.0	12.5	12.8	13.7	13.7	14.1	14.4	14.3	15.6	17.1	18.3	19.5	20.6	21.2	21.9	21.4	19.9	18.4	17.4	16.8	16.3	16.5	21.9																						
12-Jul	15.4	14.7	13.8	12.8	12.1	11.7	12.5	13.4	14.0	14.5	15.1	15.9	16.8	17.9	18.7	19.2	19.8	20.3	20.5	20.1	19.8	19.3	18.3	17.2	16.4	20.5																						
13-Jul	16.1	15.4	14.3	13.2	12.4	12.6	13.2	14.4	16.1	17.2	18.3	19.7	21.1	22.2	23.3	24.2	24.8	25.0	25.1	25.0	24.4	22.7	21.2	19.6	19.2	25.1																						
14-Jul	18.2	16.9	16.6	16.3	16.0	15.7	15.9	17.0	18.2	20.3	23.0	25.4	26.9	28.4	29.3	29.8	30.0	30.1	29.9	29.2	28.0	26.4	24.9	23.6	23.2	30.1																						
15-Jul	22.4	21.3	19.8	19.0	18.1	18.0	18.2	19.0	20.2	21.5	23.3	25.5	27.5	28.6	29.0	29.2	29.3	29.2	28.6	27.9	26.4	25.0	23.9	23.2	23.9	29.3																						
16-Jul	22.3	22.1	21.8	21.4	20.5	20.5	20.3	20.9	21.7	21.8	21.5	21.3	20.7	20.0	19.7	19.7	20.7	22.0	22.6	22.9	22.1	20.5	18.4	16.9	20.9	22.9																						
17-Jul	16.4	16.0	15.7	14.6	13.8	13.9	14.4	15.4	16.9	18.3	19.1	20.0	20.8	21.8	22.3	22.6	22.8	22.7	22.7	22.4	21.5	20.3	19.5	18.0	18.8	22.8																						
18-Jul	17.6	16.4	16.2	15.4	14.3	14.7	14.9	16.0	17.5	19.1	19.8	20.5	21.6	22.6	23.1	23.5	23.5	23.5	22.6	19.5	18.2	15.3	15.0	15.0	18.6	23.5																						
19-Jul	14.5	14.1	14.1	14.0	14.0	14.1	14.3	15.5	17.0	17.9	18.1	16.2	15.7	15.5	17.2	16.7	16.3	15.4	15.3	14.3	14.6	14.6	14.5	14.1	15.3	18.1																						
20-Jul	13.5	13.1	12.6	12.1	11.9	12.0	12.3	12.7	14.3	15.6	16.6	17.6	18.2	18.8	19.2	19.5	19.8	19.5	19.1	18.7	17.9	17.3	16.7	16.1	16.0	19.8																						
21-Jul	15.8	14.0	13.2	11.0	11.5	10.6	9.8	11.9	14.1	16.8	18.5	19.2	20.1	20.5	21.7	22.0	22.5	22.6	22.8	22.2	21.9	21.2	20.0	19.2	17.6	22.8																						
22-Jul	17.2	15.2	14.9	12.9	13.1	11.8	12.4	14.2	16.5	18.6	21.2	23.4	24.5	25.5	26.0	26.6	26.9	27.0	26.6	26.0	25.0	24.0	22.5	21.2	20.6	27.0																						
23-Jul	20.1	18.8	17.9	17.1	16.8	17.0	17.4	18.3	20.0	22.7	24.0	23.2	22.9	24.1	24.0	23.3	23.0	22.8	23.1	22.1	20.8	19.8	19.8	19.3	20.8	24.1																						
24-Jul	18.6	18.8	19.1	18.5	18.2	17.9	18.1	18.7	19.2	19.9	20.3	20.5	21.4	23.2	24.5	25.1	25.5	25.3	25.1	24.6	23.7	22.4	21.3	20.7	21.3	25.5																						
25-Jul	20.1	20.0	19.2	19.1	18.6	18.2	17.9	18.7	20.0	20.4	21.1	21.2	21.5	22.6	22.8	23.3	23.2	23.2	22.9	21.7	21.2	20.5	19.9	19.8	20.7	23.3																						
26-Jul	18.8	17.8	17.2	16.5	16.0	15.5	15.8	17.8	18.8	19.8	21.6	22.9	24.0	24.8	25.7	26.0	25.4	24.7	24.5	24.2	23.2	22.4	21.2	19.9	21.0	26.0																						
27-Jul	19.8	19.0	18.5	17.6	17.1	15.9	16.2	17.6	19.4	21.3	22.7	21.8	23.6	24.5	25.0	22.4	20.9	19.6	19.5	19.2	18.7	18.1	17.5	17.4	19.7	25.0																						
28-Jul	16.6	15.8	15.1	14.8	14.7	14.4	14.5	16.1	17.9	20.0	21.9	23.7	25.5	26.6	26.9	27.4	27.8	28.2	27.9	27.6	26.9	26.7	24.9	23.0	21.9	28.2																						
29-Jul	21.5	20.4	19.8	18.9	19.4	19.4	22.7	20.6	19.3	22.1	24.9	26.9	28.1	28.9	29.6	29.9	29.4	29.0	29.1	28.1	25.7	24.3	22.7	21.6	24.3	29.9																						
30-Jul	20.9	20.2	19.2	18.8	18.2	17.7	18.5	20.2	21.9	24.2	26.2	28.4	29.6	30.7	31.4	32.0	31.7	31.5	30.9	30.1	24.7	17.4	19.8	19.2	24.3	32.0																						
31-Jul	17.7	16.8	16.8	16.7	16.6	16.4	15.9	16.6	18.6	20.0	21.4	22.4	23.1	23.6	23.9	22.3	18.8	17.8	17.2	16.9	16.3	16.0	15.6	15.0	18.4	23.9																						
																								18.3	17.5	16.8	16.1	15.7	15.4	15.8	16.8	18.1	19.6	20.9	21.8	22.5	23.2	23.7	23.9	23.8	23.7	23.4	22.9	22.0	20.7	19.8	19.0	Diurnal Average
																								22.8	22.5	21.8	21.7	21.1	20.5	22.7	21.1	22.6	24.2	26.2	28.4	29.6	30.7	31.4	32.0	31.7	31.5	30.9	30.1	28.0	26.7	24.9	23.6	Diurnal Maximum

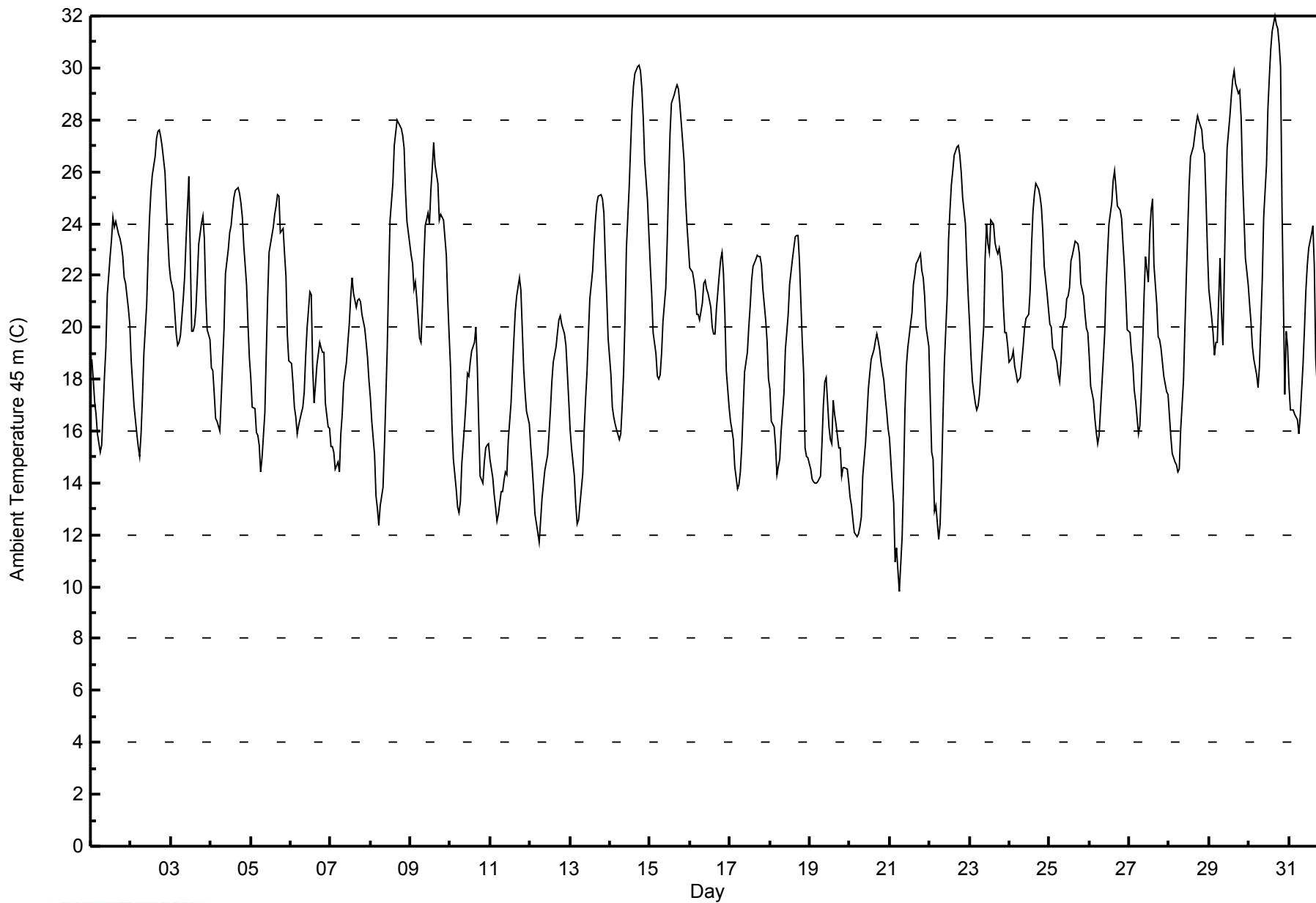


WBEA NETWORK

Hourly Averages

Ambient Temperature 45 m (AT45m) - C

Mannix - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	1	0.13	0.13
10 - 20	393	52.82	52.96
> 20	350	47.04	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

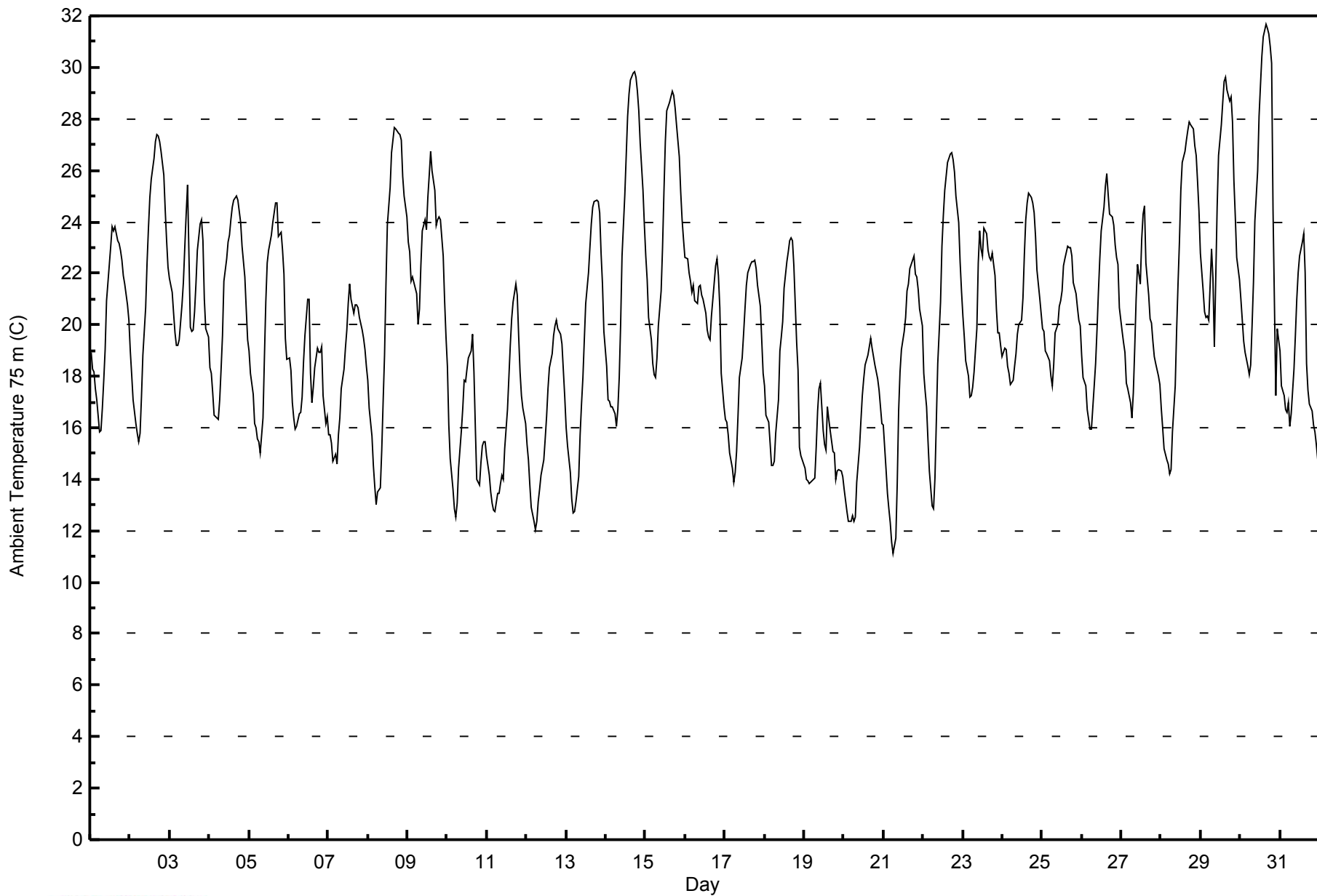
Mannix - July 2014

Maximum Value: 31.7 C on Jul 30 16:00		Maximum Daily Average: 24.4 C on Jul 29		Hours in Service: 744																																												
Minimum Value: 11.1 C on Jul 21 07:00		Minimum Daily Average: 15.1 C on Jul 19		Hours of Data: 744																																												
Maximum Diurnal Average: 23.6 C at hour 16		Minimum Diurnal Average: 15.8 C at hour 6		Hours of Missing Data: 0																																												
Monthly Average: 20.00 C		Percentiles: P ₁ = 12.4 P ₁₀ = 14.5 Q ₁ = 16.8 Median = 19.7 Q ₃ = 22.8 P ₉₀ = 25.5 P ₉₉ = 29.9		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	18.9	18.3	18.2	17.5	17.1	15.9	15.9	16.7	17.9	19.1	20.9	22.4	23.0	23.8	23.7	23.8	23.2	23.1	22.9	22.5	21.9	21.6	20.8	20.2	20.4	23.8																						
2-Jul	19.0	18.0	17.1	16.2	15.8	15.5	15.8	17.2	18.8	20.7	22.4	23.8	24.9	25.7	26.5	27.1	27.4	27.3	27.1	26.7	25.8	24.5	23.3	22.2	22.0	27.4																						
3-Jul	21.8	21.3	20.5	19.7	19.2	19.2	19.4	20.8	21.6	23.0	24.3	25.5	19.9	19.8	19.8	20.5	21.6	22.9	23.9	24.1	23.3	21.0	19.8	19.6	21.3	25.5																						
4-Jul	18.3	18.1	17.4	16.5	16.4	16.3	17.1	18.3	19.6	21.7	22.6	23.2	23.5	24.1	24.6	24.9	25.0	24.8	24.4	24.0	23.1	21.8	20.6	19.4	21.1	25.0																						
5-Jul	19.0	18.1	17.3	16.1	16.0	15.6	15.5	15.0	16.4	18.7	20.9	22.4	22.9	23.5	24.0	24.3	24.7	24.8	23.4	23.6	22.9	22.0	19.5	18.6	20.2	24.8																						
6-Jul	18.7	18.2	17.0	16.4	15.9	16.1	16.6	16.6	17.2	18.6	19.6	21.0	21.0	18.1	17.0	17.6	18.3	19.1	18.9	18.9	19.2	17.2	16.2	16.4	17.9	21.0																						
7-Jul	15.7	15.7	15.4	14.7	15.0	14.6	15.7	16.4	17.5	18.3	19.1	19.8	20.8	21.6	21.0	20.4	20.8	20.8	20.7	20.3	19.8	19.5	19.0	18.4	18.4	21.6																						
8-Jul	17.8	16.8	15.7	14.6	13.7	13.0	13.5	13.7	15.1	17.0	18.8	21.5	23.8	25.3	26.7	27.2	27.6	27.6	27.5	27.4	27.1	25.8	25.0	24.2	21.1	27.6																						
9-Jul	23.2	22.8	21.7	21.9	21.7	21.2	20.0	20.6	22.3	23.7	24.1	23.7	25.0	25.8	26.8	26.0	25.2	23.9	24.1	24.2	24.1	22.7	20.9	19.5	23.1	26.8																						
10-Jul	18.4	16.1	14.8	13.6	12.8	12.5	13.1	14.4	15.9	16.8	17.9	17.8	18.3	18.7	19.0	19.6	18.2	16.0	14.0	13.8	14.7	15.3	15.4	15.5	15.9	19.6																						
11-Jul	14.9	14.2	13.5	13.1	12.8	12.8	13.4	13.5	13.9	14.2	14.0	15.2	16.7	17.9	19.2	20.2	20.9	21.6	21.1	19.6	18.2	17.3	16.7	16.2	16.3	21.6																						
12-Jul	15.4	14.7	13.8	12.9	12.4	12.0	12.3	13.1	13.6	14.2	14.7	15.6	16.5	17.5	18.3	18.9	19.6	20.0	20.2	19.9	19.7	19.3	18.2	17.2	16.2	20.2																						
13-Jul	16.0	15.3	14.2	13.2	12.7	12.7	13.1	14.1	15.7	16.9	17.9	19.4	20.8	22.0	23.0	23.9	24.6	24.8	24.8	24.8	24.3	22.8	21.6	19.7	19.1	24.8																						
14-Jul	18.4	17.1	17.0	16.8	16.8	16.5	16.1	16.7	17.9	20.0	22.7	25.1	26.6	28.1	29.0	29.5	29.8	29.8	29.6	29.1	28.3	27.1	25.2	23.9	23.2	29.8																						
15-Jul	22.7	21.8	20.3	19.4	18.5	18.1	18.0	18.7	19.9	21.3	23.0	25.2	27.1	28.3	28.6	28.8	29.1	28.9	28.4	27.8	26.5	25.1	24.1	23.3	23.9	29.1																						
16-Jul	22.6	22.6	22.0	21.7	21.2	21.5	20.9	20.8	21.5	21.5	21.2	21.0	20.5	19.8	19.5	19.4	20.4	21.7	22.3	22.6	21.9	20.6	18.1	16.8	20.9	22.6																						
17-Jul	16.3	16.2	15.8	15.0	14.4	13.9	14.2	15.1	16.4	17.9	18.7	19.6	20.6	21.5	22.0	22.3	22.4	22.4	22.5	22.2	21.5	20.7	19.4	18.1	18.7	22.5																						
18-Jul	17.7	16.5	16.2	15.4	14.5	14.5	14.7	15.8	17.1	19.0	19.5	20.1	21.4	22.4	22.8	23.2	23.4	23.3	22.3	19.3	18.2	15.2	14.9	14.7	18.4	23.4																						
19-Jul	14.4	14.0	13.9	13.8	13.9	14.0	14.0	15.2	16.7	17.5	17.7	15.9	15.4	15.1	16.8	16.3	15.9	15.1	15.0	14.0	14.3	14.4	14.3	14.1	15.1	17.7																						
20-Jul	13.6	13.2	12.8	12.4	12.4	12.6	12.4	12.6	13.9	15.2	16.2	17.3	17.9	18.5	18.8	19.1	19.5	19.1	18.8	18.4	17.9	17.5	16.8	16.2	16.0	19.5																						
21-Jul	16.1	14.4	13.5	12.9	12.3	11.6	11.1	11.7	13.8	16.7	18.2	19.0	19.8	20.3	21.3	21.6	22.2	22.3	22.7	22.0	21.8	21.3	20.6	19.9	17.8	22.7																						
22-Jul	18.1	17.4	16.8	15.5	14.3	12.9	12.9	14.0	16.3	18.5	20.9	23.0	24.2	25.2	25.8	26.3	26.6	26.7	26.4	25.9	25.0	24.0	22.5	21.3	20.9	26.7																						
23-Jul	20.4	19.5	18.6	18.0	17.2	17.3	17.5	18.2	19.8	22.4	23.7	23.0	22.6	23.8	23.5	22.9	22.6	22.5	22.8	21.9	20.6	19.7	19.7	19.2	20.7	23.8																						
24-Jul	18.7	19.1	19.1	18.4	18.1	17.7	17.8	18.4	18.9	19.6	20.0	20.2	21.0	22.7	24.1	24.7	25.1	24.9	24.7	24.3	23.4	22.1	21.1	20.4	21.0	25.1																						
25-Jul	19.9	19.8	19.0	18.9	18.6	18.0	17.6	18.5	19.7	20.0	20.7	20.9	21.3	22.3	22.6	23.1	23.0	23.0	22.6	21.6	21.2	20.6	20.2	20.0	20.5	23.1																						
26-Jul	18.8	18.0	17.6	16.7	16.3	16.0	16.0	17.6	18.5	19.8	21.3	22.5	23.7	24.5	25.4	25.9	25.0	24.3	24.2	23.9	23.1	22.6	22.4	20.6	21.0	25.9																						
27-Jul	19.7	19.3	18.9	17.7	17.5	17.0	16.4	17.3	19.1	21.0	22.3	21.6	23.3	24.3	24.6	22.4	21.2	20.3	20.0	19.4	18.8	18.5	18.0	17.7	19.8	24.6																						
28-Jul	16.8	16.0	15.2	14.8	14.6	14.2	14.4	15.9	17.6	19.8	21.6	23.2	25.2	26.3	26.8	27.2	27.5	27.9	27.8	27.6	26.9	26.6	25.6	24.4	21.8	27.9																						
29-Jul	22.8	21.3	20.5	20.3	20.3	20.2	23.0	21.8	19.2	21.8	24.6	26.6	27.8	28.6	29.5	29.6	29.1	28.7	28.8	27.9	25.6	24.2	22.6	21.7	24.4	29.6																						
30-Jul	21.0	20.2	19.4	18.9	18.4	18.0	18.4	20.0	21.6	24.0	26.0	28.1	29.3	30.4	31.2	31.7	31.5	31.3	30.8	30.2	24.5	17.2	19.8	19.4	24.2	31.7																						
31-Jul	19.0	17.6	17.3	16.7	16.6	17.0	16.1	16.6	18.3	19.6	21.0	22.0	22.7	23.2	23.6	22.0	18.5	17.5	16.9	16.6	16.1	15.8	15.3	14.8	18.4	23.6																						
																								18.5	17.8	17.1	16.4	16.0	15.8	15.9	16.6	17.8	19.3	20.5	21.5	22.2	22.9	23.4	23.6	23.5	23.4	23.2	22.7	21.9	20.8	19.9	19.2	Diurnal Average
																								23.2	22.8	22.0	21.9	21.7	21.5	23.0	21.8	22.3	24.0	26.0	28.1	29.3	30.4	31.2	31.7	31.5	31.3	30.8	30.2	28.3	27.1	25.6	24.4	Diurnal Maximum



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	0	0.00	0.00
10 - 20	395	53.09	53.09
> 20	349	46.91	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

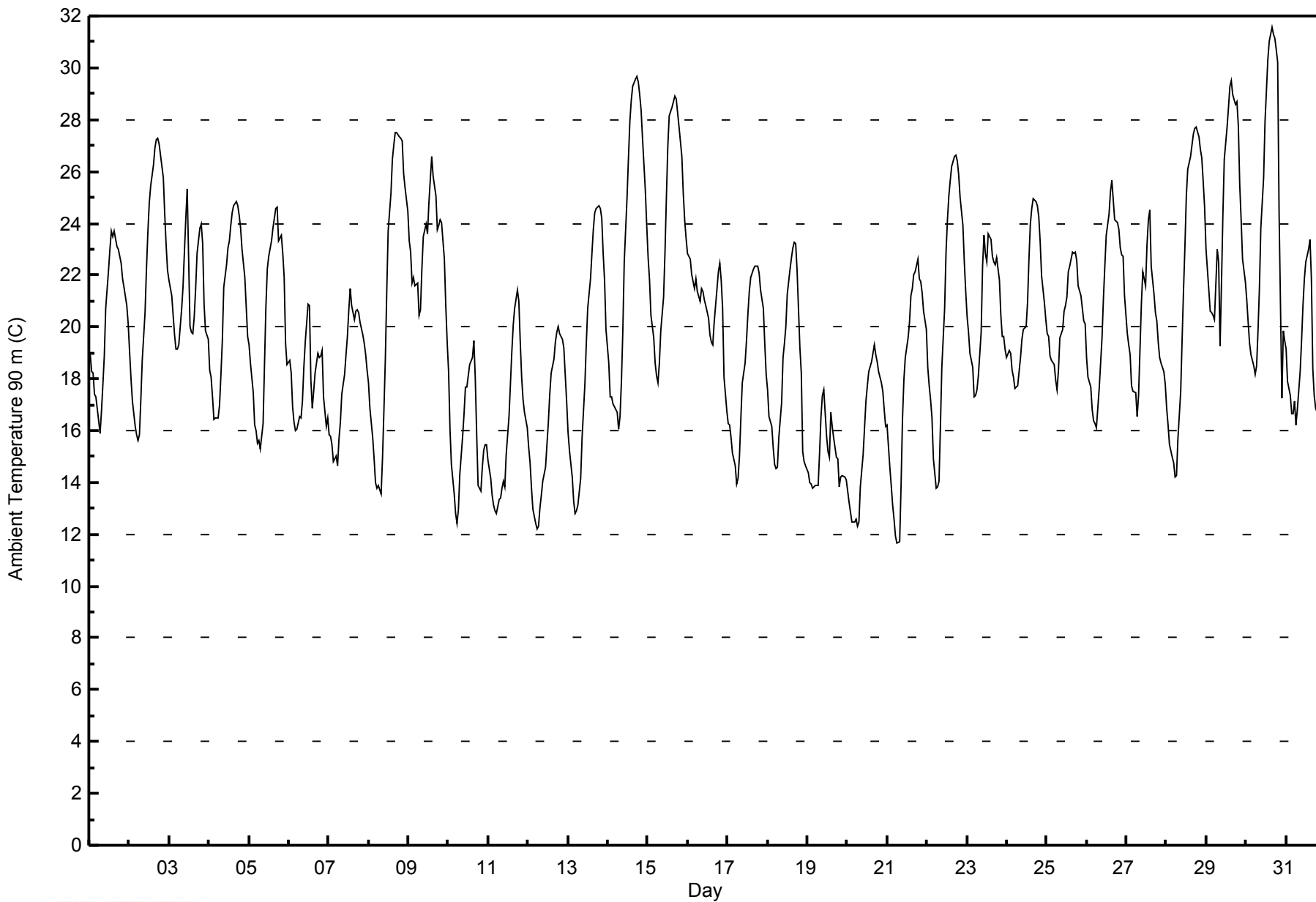
Mannix - July 2014

Maximum Value: 31.6 C on Jul 30 16:00																						Maximum Daily Average: 24.4 C on Jul 29																						Hours in Service: 744		
Minimum Value: 11.7 C on Jul 21 07:00																						Minimum Daily Average: 15.0 C on Jul 19																						Hours of Data: 744		
Maximum Diurnal Average: 23.4 C at hour 16																						Minimum Diurnal Average: 15.9 C at hour 6																						Hours of Missing Data: 0		
Monthly Average: 19.96 C																						Percentiles: P ₁ = 12.4 P ₁₀ = 14.6 Q ₁ = 16.8 Median = 19.6 Q ₃ = 22.8 P ₉₀ = 25.4 P ₉₉ = 30.1																						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-Jul	18.9	18.3	18.2	17.4	17.3	16.4	15.9	16.8	17.8	18.9	20.7	22.2	23.0	23.7	23.5	23.7	23.1	23.0	22.7	22.4	21.9	21.5	20.8	20.1	20.3	23.7																				
2-Jul	19.0	18.0	17.2	16.2	15.9	15.6	15.9	17.2	18.7	20.5	22.3	23.7	24.8	25.5	26.2	26.9	27.2	27.3	27.0	26.6	25.8	24.4	23.2	22.2	22.0	27.3																				
3-Jul	21.8	21.2	20.4	19.7	19.1	19.2	19.3	20.7	21.5	22.9	24.2	25.3	20.0	19.8	19.7	20.4	21.5	22.8	23.8	24.0	23.2	20.9	19.8	19.5	21.3	25.3																				
4-Jul	18.3	18.0	17.3	16.4	16.5	16.5	17.0	18.2	19.5	21.5	22.4	23.1	23.3	23.9	24.4	24.7	24.8	24.7	24.3	23.8	23.0	21.9	20.8	19.6	21.0	24.8																				
5-Jul	19.3	18.6	17.4	16.2	16.0	15.5	15.6	15.3	16.3	18.6	20.8	22.2	22.7	23.3	23.8	24.2	24.6	24.6	23.3	23.5	22.8	21.9	19.4	18.6	20.2	24.6																				
6-Jul	18.7	18.2	16.9	16.3	16.0	16.0	16.5	16.5	17.1	18.4	19.4	20.9	20.9	18.0	16.9	17.5	18.2	19.0	18.8	18.9	19.1	17.3	16.2	16.5	17.8	20.9																				
7-Jul	15.8	15.8	15.5	14.8	15.0	14.6	15.7	16.3	17.4	18.2	18.9	19.7	20.7	21.5	20.8	20.3	20.6	20.6	20.5	20.2	19.7	19.4	19.0	18.4	18.3	21.5																				
8-Jul	17.8	16.9	15.8	14.9	14.0	13.8	13.9	13.6	15.0	16.8	18.8	21.4	23.7	25.2	26.5	27.0	27.5	27.5	27.4	27.3	27.2	25.9	25.4	24.4	21.1	27.5																				
9-Jul	23.3	22.9	21.7	21.9	21.6	21.7	20.4	20.7	22.2	23.5	24.0	23.6	24.8	25.7	26.6	25.8	25.1	23.8	23.9	24.1	24.0	22.6	20.8	19.4	23.1	26.6																				
10-Jul	18.3	16.1	14.7	13.6	12.8	12.4	13.0	14.3	15.8	16.6	17.7	17.7	18.1	18.5	18.8	19.5	18.0	15.9	13.9	13.6	14.6	15.2	15.4	15.4	15.8	19.5																				
11-Jul	14.9	14.1	13.5	13.1	12.9	12.8	13.4	13.4	13.8	14.1	13.9	15.1	16.6	17.8	19.0	20.1	20.7	21.4	21.0	19.4	18.1	17.2	16.7	16.1	16.2	21.4																				
12-Jul	15.4	14.8	13.8	12.9	12.4	12.2	12.3	13.0	13.5	14.0	14.6	15.4	16.3	17.4	18.2	18.7	19.4	19.8	20.0	19.7	19.5	19.2	18.2	17.1	16.2	20.0																				
13-Jul	15.9	15.2	14.2	13.3	12.8	12.9	13.1	14.1	15.7	16.8	17.8	19.3	20.7	21.8	22.8	23.7	24.4	24.6	24.7	24.6	24.2	22.8	21.8	19.9	19.1	24.7																				
14-Jul	18.6	17.3	17.3	17.0	16.9	16.7	16.0	16.6	17.9	19.9	22.5	25.0	26.5	27.9	28.8	29.3	29.6	29.7	29.5	29.0	28.4	27.3	25.3	23.9	23.2	29.7																				
15-Jul	22.7	21.8	20.5	19.6	18.6	18.1	17.8	18.6	19.8	21.2	22.9	25.0	27.0	28.1	28.5	28.7	28.9	28.8	28.3	27.7	26.6	25.2	24.2	23.4	23.8	28.9																				
16-Jul	22.9	22.6	22.0	21.8	21.5	21.8	21.3	21.0	21.5	21.4	21.0	20.8	20.3	19.7	19.4	19.3	20.2	21.5	22.2	22.4	21.8	20.7	18.1	16.8	20.9	22.9																				
17-Jul	16.3	16.2	15.7	15.2	14.6	14.0	14.1	15.0	16.5	17.8	18.6	19.5	20.5	21.4	21.9	22.3	22.3	22.3	22.3	22.1	21.4	20.7	19.4	18.2	18.7	22.3																				
18-Jul	17.6	16.5	16.2	15.4	14.7	14.5	14.6	15.7	17.1	18.8	19.3	20.0	21.3	22.2	22.7	23.0	23.2	23.2	22.2	19.2	18.2	15.2	14.8	14.6	18.3	23.2																				
19-Jul	14.4	14.0	13.9	13.8	13.8	13.9	13.9	15.1	16.5	17.4	17.6	15.8	15.2	15.0	16.7	16.2	15.7	15.0	14.9	13.8	14.2	14.3	14.2	14.1	15.0	17.6																				
20-Jul	13.7	13.2	12.8	12.5	12.5	12.6	12.3	12.5	13.8	15.1	16.1	17.1	17.8	18.3	18.7	19.0	19.3	18.9	18.6	18.3	17.8	17.5	16.8	16.2	15.9	19.3																				
21-Jul	16.2	14.6	13.9	13.1	12.6	11.9	11.7	11.7	13.9	16.5	18.0	18.8	19.6	20.2	21.2	21.5	22.0	22.2	22.6	21.9	21.7	21.3	20.6	19.9	17.8	22.6																				
22-Jul	18.5	17.7	17.2	16.5	14.9	13.8	13.8	14.0	16.2	18.5	20.7	22.9	24.2	25.0	25.7	26.2	26.6	26.6	26.4	25.9	25.0	23.9	22.5	21.3	21.0	26.6																				
23-Jul	20.4	19.8	19.0	18.4	17.3	17.4	17.6	18.1	19.8	22.3	23.6	22.8	22.5	23.6	23.4	22.7	22.5	22.4	22.7	21.8	20.5	19.6	19.6	19.2	20.7	23.6																				
24-Jul	18.8	19.1	19.0	18.3	18.0	17.7	17.7	18.3	18.8	19.5	19.9	20.0	20.9	22.6	24.0	24.6	25.0	24.8	24.7	24.2	23.3	22.0	20.9	20.3	20.9	25.0																				
25-Jul	19.8	19.6	18.9	18.7	18.5	18.0	17.6	18.4	19.6	19.9	20.6	20.8	21.2	22.2	22.3	22.9	22.9	22.9	22.6	21.6	21.2	20.7	20.2	20.1	20.5	22.9																				
26-Jul	18.8	18.1	17.7	16.8	16.4	16.2	16.1	17.6	18.6	19.6	21.1	22.4	23.6	24.4	25.2	25.6	24.9	24.2	24.0	23.7	23.1	22.8	22.7	21.2	21.0	25.6																				
27-Jul	19.8	19.3	18.9	17.7	17.5	17.5	16.5	17.3	19.1	20.9	22.1	21.6	23.2	24.1	24.5	22.3	21.2	20.6	20.2	19.4	18.8	18.6	18.3	17.8	19.9	24.5																				
28-Jul	16.9	16.2	15.5	15.0	14.7	14.2	14.3	15.7	17.5	19.5	21.4	23.1	25.1	26.1	26.6	27.0	27.5	27.7	27.7	27.3	26.9	26.5	25.6	24.6	21.8	27.7																				
29-Jul	23.0	21.4	20.6	20.6	20.5	20.3	23.0	22.5	19.2	21.6	24.3	26.5	27.7	28.5	29.3	29.5	29.0	28.6	28.7	27.8	25.5	24.2	22.6	21.8	24.4	29.5																				
30-Jul	21.0	20.2	19.4	18.9	18.5	18.2	18.5	19.8	21.5	23.8	25.8	27.9	29.1	30.3	31.0	31.6	31.3	31.1	30.7	30.2	24.4	17.2	19.8	19.5	24.2	31.6																				
31-Jul	19.2	17.9	17.4	16.7	16.7	17.1	16.2	16.8	18.3	19.5	20.8	21.9	22.5	23.0	23.4	21.9	18.4	17.4	16.8	16.5	16.0	15.7	15.2	14.7	18.3	23.4																				
																						18.6	17.9	17.2	16.5	16.1	15.9	16.0	16.6	17.7	19.2	20.4	21.3	22.1	22.7	23.2	23.4	23.4	23.3	23.1	22.6	21.9	20.8	19.9	19.2	Diurnal Average
																						23.3	22.9	22.0	21.9	21.6	21.8	23.0	22.5	22.2	23.8	25.8	27.9	29.1	30.3	31.0	31.6	31.3	31.1	30.7	30.2	28.4	27.3	25.6	24.6	Diurnal Maximum



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	0	0.00	0.00
10 - 20	396	53.23	53.23
> 20	348	46.77	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

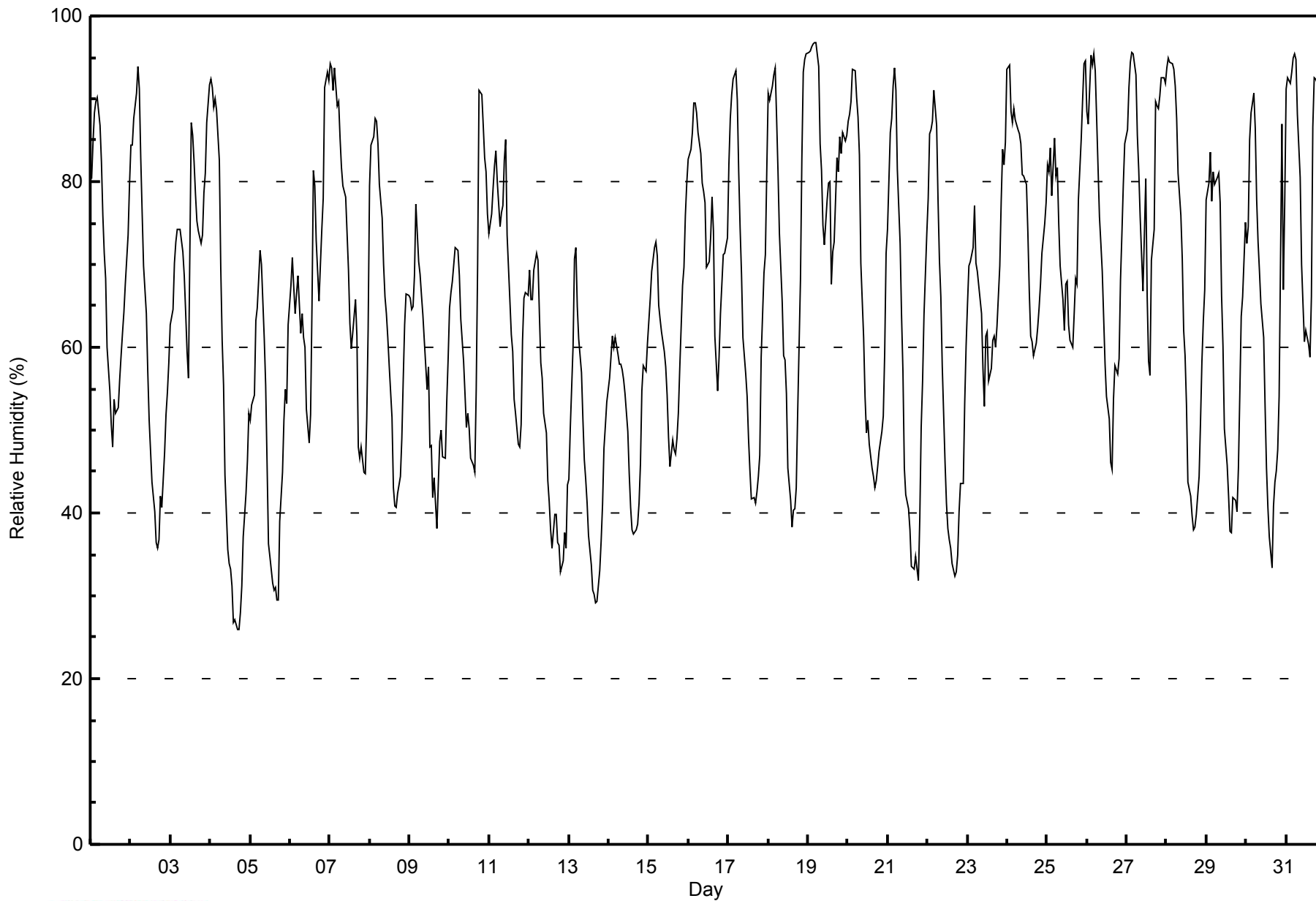


Maximum Value: 97 % on Jul 19 06:00														Maximum Daily Average: 84.3 % on Jul 19														Hours in Service: 744	
Minimum Value: 26 % on Jul 4 18:00														Minimum Daily Average: 46.5 % on Jul 13														Hours of Data: 744	
Maximum Diurnal Average: 84.5 % at hour 5														Minimum Diurnal Average: 49.0 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 65.5 %														Percentiles: P ₁ = 29 P ₁₀ = 41 Q ₁ = 51 Median = 66 Q ₃ = 81 P ₉₀ = 90 P ₉₉ = 95														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Jul	80	85	88	90	90	87	82	76	71	68	60	55	51	48	54	52	53	56	59	62	64	68	74	80	68.8	90			
2-Jul	84	84	88	91	94	91	83	76	70	64	57	51	48	44	40	36	36	37	42	41	47	52	55	58	61.2	94			
3-Jul	63	65	70	73	74	74	74	72	69	64	59	56	87	86	82	78	75	74	73	73	79	81	87	92	74.2	92			
4-Jul	92	91	89	90	89	83	70	61	55	45	36	34	33	31	27	26	26	26	28	31	37	42	46	52	51.7	92			
5-Jul	51	53	54	63	65	68	72	70	61	55	46	36	35	32	31	27	29	30	39	45	51	55	53	63	49.5	72			
6-Jul	68	71	67	64	67	69	62	64	61	60	53	49	52	65	81	79	73	66	70	74	78	91	93	92	69.5	93			
7-Jul	94	94	91	94	89	90	85	82	80	78	74	69	63	60	62	66	61	48	47	48	45	45	51	62	69.9	94			
8-Jul	80	84	85	88	87	85	80	76	70	66	64	61	58	51	43	41	41	42	44	49	56	63	66	66	64.5	88			
9-Jul	66	65	65	69	77	70	69	66	64	61	55	58	48	48	42	44	38	44	49	50	47	47	53	59	56.3	77			
10-Jul	65	67	68	72	72	72	69	63	58	54	50	52	50	47	46	45	55	70	91	90	87	83	81	76	65.9	91			
11-Jul	74	76	79	82	84	80	75	76	77	83	85	74	66	61	59	54	52	48	48	51	61	66	67	66	68.4	85			
12-Jul	69	66	66	69	71	70	64	58	56	52	50	44	41	38	36	40	40	36	36	33	34	38	36	43	49.5	71			
13-Jul	44	50	60	71	72	65	61	57	51	46	44	41	37	34	31	30	29	29	33	37	41	48	51	53	46.5	72			
14-Jul	56	59	61	60	61	59	58	58	57	56	54	50	45	41	38	37	38	39	41	46	55	58	57	61	51.9	61			
15-Jul	63	66	69	72	73	71	65	63	62	60	58	54	49	46	49	48	47	49	52	57	67	70	76	80	61.0	80			
16-Jul	83	84	86	90	90	88	86	83	80	79	78	70	70	73	78	74	61	55	59	64	68	71	71	73	75.5	90			
17-Jul	82	88	90	92	93	90	81	74	69	61	57	54	49	45	42	42	41	43	44	47	59	69	71	81	65.2	93			
18-Jul	91	90	92	93	94	88	81	74	65	59	58	54	45	42	38	40	40	43	52	68	83	93	95	95	69.7	95			
19-Jul	96	96	96	97	97	97	94	85	81	75	72	78	80	80	68	72	73	83	81	85	83	86	85	86	84.3	97			
20-Jul	87	88	90	94	93	90	88	83	70	61	54	50	51	48	45	44	43	44	46	47	50	52	59	71	64.6	94			
21-Jul	74	86	88	92	94	91	81	73	64	57	45	42	41	38	33	33	33	35	32	39	50	56	64	74	59.0	94			
22-Jul	78	86	86	87	91	87	78	70	66	58	46	41	38	37	36	34	32	33	35	40	44	44	53	60	56.7	91			
23-Jul	65	70	70	72	77	70	69	68	64	57	53	61	62	56	57	61	61	60	62	70	78	84	82	85	67.3	85			
24-Jul	93	94	88	87	89	88	86	86	85	81	81	80	74	67	61	61	59	61	62	65	68	71	75	77	76.6	94			
25-Jul	82	81	84	78	85	81	82	75	70	66	62	68	68	63	61	60	64	68	68	78	85	90	94	95	75.3	95			
26-Jul	88	87	95	94	95	93	88	76	72	69	64	58	54	51	46	45	54	58	57	59	68	74	80	85	71.3	95			
27-Jul	86	91	94	96	95	93	86	81	76	71	67	80	66	58	57	70	74	90	89	89	90	93	93	92	82.4	96			
28-Jul	94	95	94	94	94	91	88	81	76	71	62	59	53	44	42	40	38	38	40	44	51	58	63	67	65.7	95			
29-Jul	78	80	84	78	81	80	81	81	77	66	60	50	46	42	38	38	42	41	40	45	54	64	66	75	61.9	84			
30-Jul	73	75	85	88	91	86	78	73	69	65	61	53	45	41	37	33	41	44	45	48	54	87	67	78	63.2	91			
31-Jul	91	93	92	93	95	95	95	88	80	70	65	61	62	60	59	66	87	92	92	92	90	89	88	89	82.7	95			
	77.1	79.3	81.2	82.9	84.5	82.0	77.7	73.2	68.6	63.9	59.0	56.2	53.8	50.8	49.0	49.1	49.6	51.0	53.4	57.0	62.1	67.3	69.4	73.7	Diurnal Average				
	96	96	96	97	97	97	95	88	85	83	85	80	87	86	82	79	87	92	92	92	90	93	95	95	Diurnal Maximum				



WBEA NETWORK
Hourly Averages

Relative Humidity (RH) - %
Mannix - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Mannix - July 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	68	9.14	9.14
40 - 60	216	29.03	38.17
60 - 80	263	35.35	73.52
80 - 100	197	26.48	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

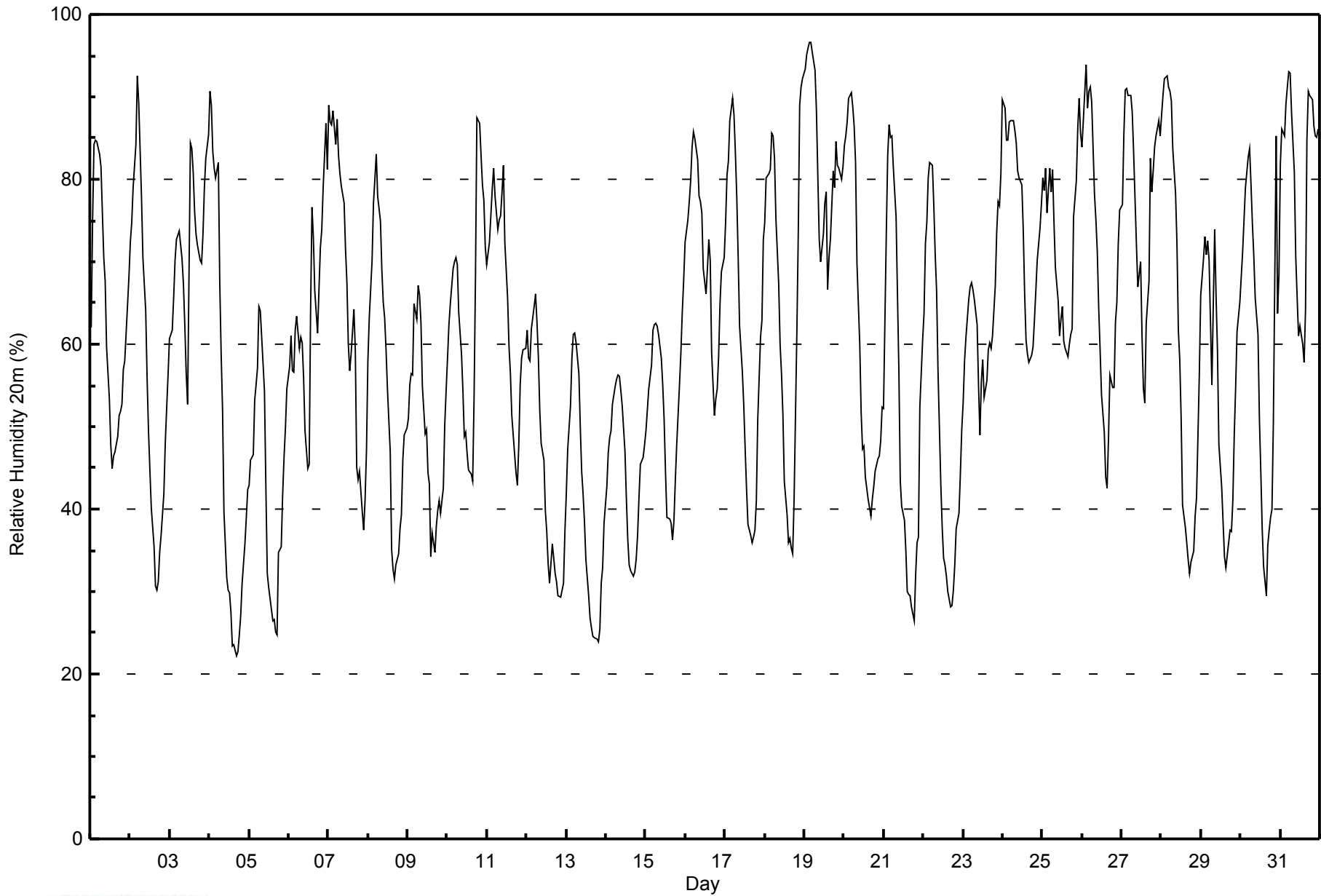
Mannix - July 2014

Maximum Value: 97 % on Jul 19 04:00																			Maximum Daily Average: 82.7 % on Jul 19																			Hours in Service: 744												
Minimum Value: 22 % on Jul 4 17:00																			Minimum Daily Average: 39.8 % on Jul 13																			Hours of Data: 744												
Maximum Diurnal Average: 78.6 % at hour 6																			Minimum Diurnal Average: 45.0 % at hour 16																			Hours of Missing Data: 0												
Monthly Average: 60.8 %																			Percentiles: P ₁ = 25 P ₁₀ = 35 Q ₁ = 45 Median = 61 Q ₃ = 77 P ₉₀ = 85 P ₉₉ = 93																			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-Jul	62	75	84	85	85	83	82	76	71	68	60	53	48	45	46	47	49	51	52	53	57	58	65	68	63.4	85																								
2-Jul	72	75	79	84	93	89	84	78	70	64	56	49	45	40	35	31	30	31	35	37	42	48	52	56	57.3	93																								
3-Jul	61	62	66	70	73	73	74	70	67	62	57	53	84	84	81	76	73	72	70	70	73	79	83	85	71.6	85																								
4-Jul	91	89	83	81	80	82	67	59	52	40	32	30	30	28	23	24	22	23	25	27	31	36	39	42	47.3	91																								
5-Jul	43	46	47	53	55	57	65	64	58	54	43	32	30	28	26	27	25	25	35	35	42	46	50	55	43.3	65																								
6-Jul	57	61	57	57	62	63	59	61	60	56	50	45	45	64	77	73	66	61	67	72	74	79	87	81	63.9	87																								
7-Jul	89	87	87	88	84	87	83	81	79	77	72	67	60	57	59	64	59	45	43	45	40	37	41	47	65.8	89																								
8-Jul	58	63	70	77	80	83	78	75	69	65	63	59	55	47	35	33	31	33	35	38	39	46	49	50	55.4	83																								
9-Jul	51	55	56	56	65	63	67	66	63	55	49	50	44	43	34	37	35	38	40	41	39	43	50	54	49.8	67																								
10-Jul	58	62	65	69	70	71	70	64	59	54	49	49	47	45	44	43	54	68	87	87	83	79	77	72	63.6	87																								
11-Jul	70	72	76	79	81	78	74	75	76	78	82	72	66	60	56	51	49	44	43	48	55	58	59	59	65.1	82																								
12-Jul	62	58	58	62	65	66	63	59	52	48	46	40	37	33	31	36	34	32	31	30	29	30	31	37	44.6	66																								
13-Jul	42	47	53	58	61	61	60	56	50	45	42	39	34	30	27	26	25	24	24	24	25	31	33	38	39.8	61																								
14-Jul	43	47	49	49	53	55	56	56	56	54	53	47	41	36	33	33	32	32	34	37	41	45	46	48	44.8	56																								
15-Jul	49	52	55	58	62	62	63	62	61	58	55	51	44	39	39	38	36	38	43	48	55	59	64	68	52.5	68																								
16-Jul	72	75	77	80	84	86	85	82	78	77	76	69	66	69	73	70	59	51	53	55	58	65	69	71	70.9	86																								
17-Jul	75	80	82	87	90	88	83	78	71	62	57	53	47	42	38	37	36	37	37	41	51	61	63	73	61.2	90																								
18-Jul	75	80	81	81	86	85	83	75	67	60	56	52	43	39	36	36	35	35	41	61	73	89	91	92	64.8	92																								
19-Jul	93	95	96	97	97	95	93	88	80	73	70	73	77	79	67	71	73	81	79	85	82	81	80	82	82.7	97																								
20-Jul	84	85	87	90	91	89	86	82	70	60	52	47	48	44	41	40	39	41	43	45	46	46	48	52	60.7	91																								
21-Jul	52	73	83	87	85	85	82	75	66	57	43	40	39	35	30	30	29	28	27	32	36	37	52	61	52.7	87																								
22-Jul	64	72	75	80	82	82	77	71	66	57	43	38	34	33	32	30	28	28	30	33	38	39	44	50	51.1	82																								
23-Jul	53	58	61	65	67	67	67	66	62	55	49	56	58	54	56	59	60	60	61	67	73	77	77	81	62.9	81																								
24-Jul	90	89	85	85	87	87	87	86	84	81	80	79	74	66	60	59	58	59	60	63	66	70	74	77	75.2	90																								
25-Jul	80	79	81	76	81	78	81	75	69	65	61	63	65	60	59	58	60	61	62	75	80	86	90	86	72.2	90																								
26-Jul	84	87	94	89	91	91	89	78	75	71	64	59	54	49	44	43	49	56	55	55	63	65	72	76	68.9	94																								
27-Jul	77	85	91	91	90	90	88	83	78	72	67	70	61	55	53	63	68	83	78	81	84	85	87	85	77.7	91																								
28-Jul	88	90	92	93	91	91	89	84	78	72	62	58	51	41	38	36	34	32	34	35	39	41	49	56	61.4	93																								
29-Jul	66	70	73	71	73	70	55	65	74	66	59	48	43	38	34	33	34	38	37	41	49	55	62	65	54.9	74																								
30-Jul	68	71	75	79	83	84	79	75	71	66	61	51	45	38	33	30	36	38	39	40	51	85	64	68	59.5	85																								
31-Jul	82	86	85	89	91	93	93	88	81	71	66	61	62	60	58	64	85	91	90	90	87	85	85	86	80.4	93																								
	68.1		71.9		74.2		76.3		78.5		78.6		76.2		72.7		68.2		62.7		57.2		53.4		50.9		47.7		45.1		45.0		45.3		46.3		48.0		51.2		54.9		59.5		62.4		65.2		Diurnal Average	
	93		95		96		97		97		95		93		88		84		81		82		79		84		84		81		76		85		91		90		90		87		89		91		92		Diurnal Maximum	



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	134	18.01	18.01
40 - 60	222	29.84	47.85
60 - 80	236	31.72	79.57
80 - 100	152	20.43	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

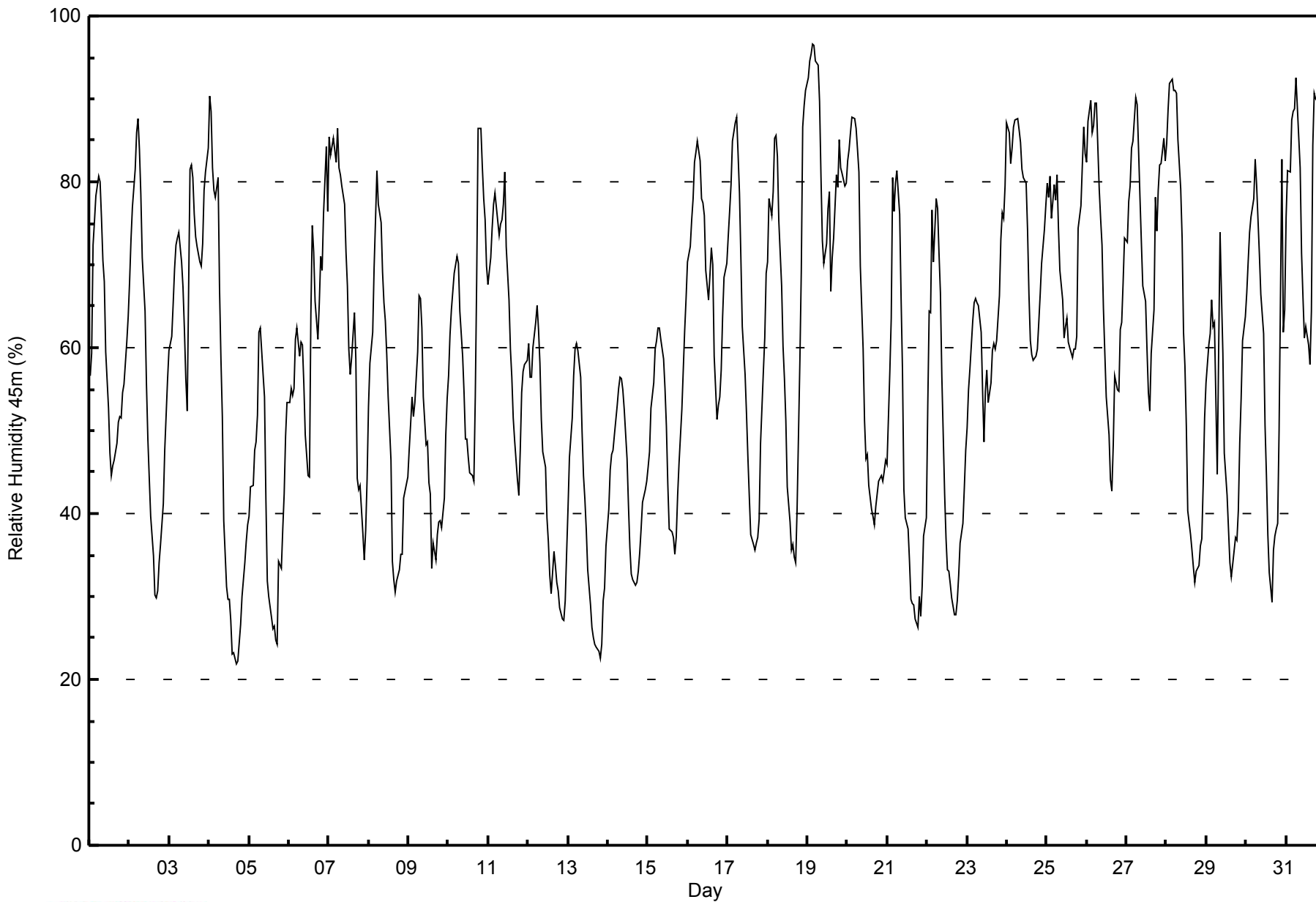
Mannix - July 2014

Maximum Value: 97 % on Jul 19 04:00														Maximum Daily Average: 82.7 % on Jul 19														Hours in Service: 744	
Minimum Value: 22 % on Jul 4 17:00														Minimum Daily Average: 38.9 % on Jul 13														Hours of Data: 744	
Maximum Diurnal Average: 76.9 % at hour 6														Minimum Diurnal Average: 44.7 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 59.4 %														Percentiles: P ₁ = 24 P ₁₀ = 34 Q ₁ = 44 Median = 60 Q ₃ = 75 P ₉₀ = 84 P ₉₉ = 91														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-Jul	57	59	72	75	78	81	80	76	71	68	59	53	47	45	46	46	49	51	52	52	55	56	61	64	60.4	81			
2-Jul	68	73	77	82	86	88	84	78	71	64	56	49	44	40	35	30	30	31	34	36	41	48	52	56	56.3	88			
3-Jul	60	61	65	69	72	73	74	70	67	62	56	52	81	82	81	76	73	72	70	70	73	79	81	84	71.1	84			
4-Jul	90	88	82	79	78	81	67	59	52	39	31	30	30	27	23	23	22	22	24	27	30	34	37	39	46.4	90			
5-Jul	40	43	43	48	49	52	62	62	57	54	42	32	30	27	26	26	25	24	34	33	38	42	49	53	41.4	62			
6-Jul	53	55	54	55	61	62	59	61	60	56	49	45	44	64	75	72	66	61	65	71	69	76	84	77	62.3	84			
7-Jul	85	83	84	85	82	86	82	81	79	77	72	67	60	57	59	64	59	44	43	43	38	34	38	44	64.5	86			
8-Jul	53	58	62	70	75	81	77	75	69	65	63	59	54	46	34	32	31	32	33	35	35	42	43	44	52.9	81			
9-Jul	48	51	54	52	53	60	66	66	62	54	48	49	44	42	33	36	34	37	39	39	38	42	49	54	48.0	66			
10-Jul	57	62	65	69	70	71	70	64	59	55	49	49	47	45	45	44	54	68	86	86	82	78	75	70	63.3	86			
11-Jul	68	71	74	77	79	77	74	75	75	77	81	72	66	60	56	52	49	44	42	48	55	57	58	59	64.4	81			
12-Jul	61	56	56	60	63	65	62	58	51	48	46	39	37	33	30	35	34	32	31	29	27	27	29	35	43.5	65			
13-Jul	41	47	52	57	60	61	60	56	50	45	42	38	33	29	26	25	24	24	23	23	24	29	31	36	38.9	61			
14-Jul	41	45	47	48	50	53	55	56	56	55	53	47	41	36	33	32	31	32	33	35	38	41	43	44	43.5	56			
15-Jul	46	48	53	56	60	61	62	62	61	59	55	50	44	38	38	37	35	37	42	46	52	57	62	66	51.1	66			
16-Jul	70	72	75	78	82	84	85	83	78	77	76	69	66	69	72	70	59	51	53	54	57	64	69	70	70.2	85			
17-Jul	73	76	80	85	87	88	83	79	71	63	57	52	47	42	37	36	36	36	37	39	48	57	61	69	60.0	88			
18-Jul	70	78	76	79	85	86	83	75	67	60	56	51	43	39	36	36	35	34	40	58	69	87	89	91	63.5	91			
19-Jul	92	95	96	97	96	95	94	90	81	73	70	73	77	79	67	71	73	81	79	85	82	81	79	80	82.7	97			
20-Jul	82	84	86	88	88	86	84	81	70	60	51	47	47	43	41	40	39	41	42	44	45	44	45	46	59.3	88			
21-Jul	46	57	64	81	76	80	81	76	66	57	43	39	38	34	30	29	29	27	26	30	28	31	37	39	47.7	81			
22-Jul	53	64	64	77	70	78	77	71	67	57	42	37	33	33	32	30	28	28	30	33	36	39	43	48	48.7	78			
23-Jul	50	55	57	63	65	66	65	65	62	55	49	55	57	53	56	60	60	60	61	66	73	76	76	80	61.9	80			
24-Jul	87	86	82	84	87	87	88	86	85	82	80	80	74	66	61	59	58	59	60	63	66	70	74	77	75.1	88			
25-Jul	80	78	81	76	80	78	81	74	69	66	61	62	63	61	60	59	60	60	61	74	77	82	87	83	71.4	87			
26-Jul	82	87	90	86	87	89	89	79	76	72	65	59	54	49	44	43	48	57	55	55	62	63	68	73	68.1	90			
27-Jul	73	78	80	84	85	90	89	84	78	73	67	66	60	55	52	59	65	78	74	79	82	82	85	83	75.0	90			
28-Jul	85	89	92	92	91	91	91	85	79	73	62	58	50	40	37	36	34	32	33	34	36	37	44	51	60.5	92			
29-Jul	56	60	62	66	63	63	45	60	74	66	59	47	42	38	34	32	34	37	37	40	49	54	61	64	51.8	74			
30-Jul	67	70	74	76	78	83	80	75	71	66	62	51	45	38	33	29	36	37	38	39	50	83	62	65	58.6	83			
31-Jul	76	81	81	87	88	89	93	89	82	71	66	61	62	60	58	64	84	91	90	90	86	85	85	86	79.4	93			
														64.8 68.1 70.3 73.5 75.0 76.9 75.5 72.7 68.3 62.9 57.1 52.9 50.4 47.5 44.8 44.7 44.9 45.8 47.4 50.2 53.0 57.3 59.9 62.2														Diurnal Average	
														92 95 96 97 96 95 94 90 85 82 81 80 81 82 81 76 84 91 90 90 86 87 89 91														Diurnal Maximum	



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	147	19.76	19.76
40 - 60	229	30.78	50.54
60 - 80	244	32.80	83.33
80 - 100	124	16.67	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

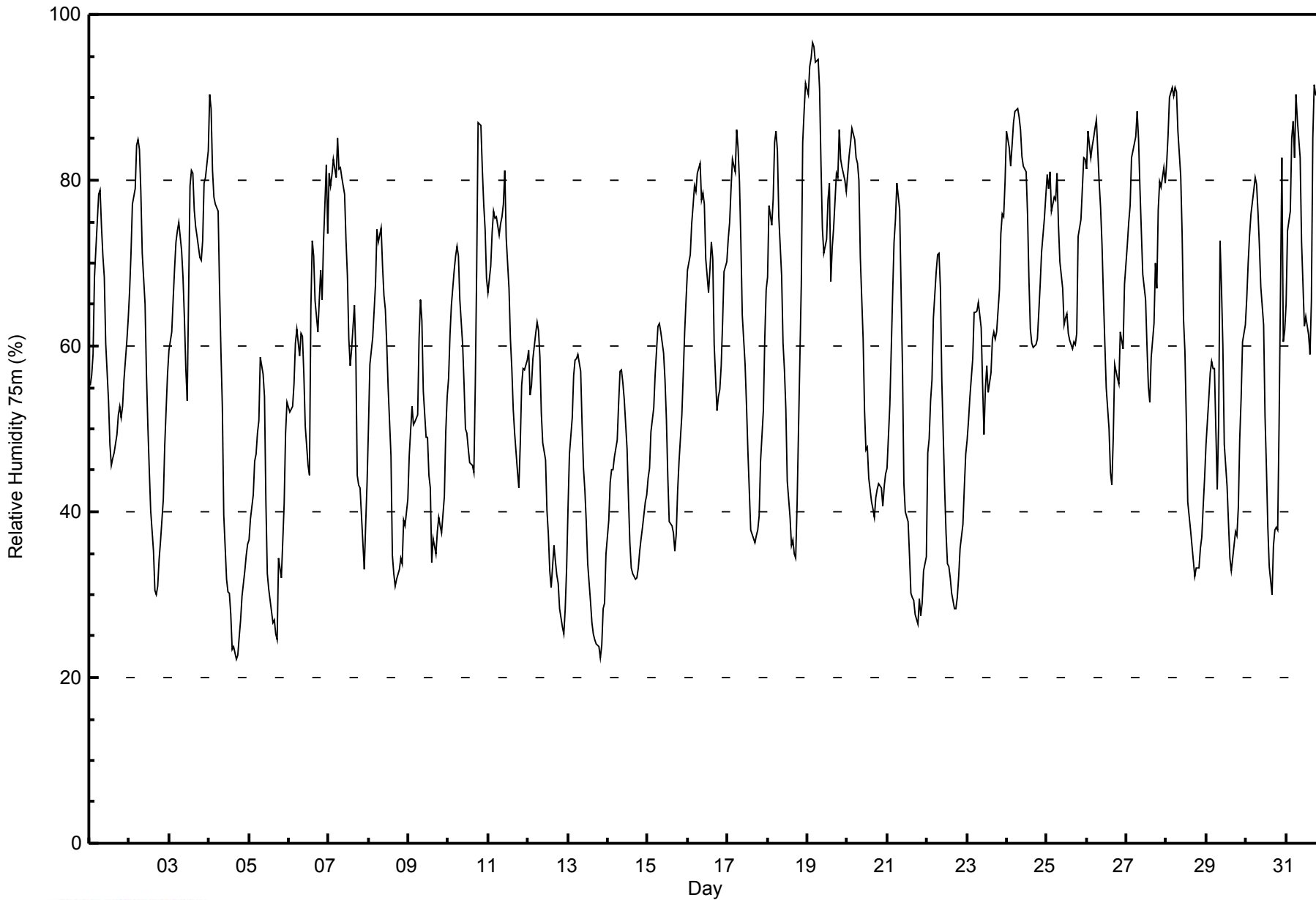


Maximum Value: 97 % on Jul 19 04:00																			Maximum Daily Average: 83.0 % on Jul 19						Hours in Service: 744																			
Minimum Value: 22 % on Jul 4 17:00																			Minimum Daily Average: 38.8 % on Jul 13						Hours of Data: 744																			
Maximum Diurnal Average: 74.1 % at hour 7																			Minimum Diurnal Average: 45.2 % at hour 16						Hours of Missing Data: 0																			
Monthly Average: 58.8 %																			Percentiles: P ₁ = 24 P ₁₀ = 34 Q ₁ = 44 Median = 60 Q ₃ = 74 P ₉₀ = 83 P ₉₉ = 90						Hours of Calibration: 0																			
																			Percent Operational Time: 100.0																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Jul	55	56	59	68	72	78	79	74	71	68	60	53	48	46	46	47	49	52	53	51	53	56	60	63	59.2	79																		
2-Jul	67	71	77	79	84	85	84	79	71	65	57	50	45	40	35	30	30	31	34	37	41	48	52	57	56.2	85																		
3-Jul	60	62	66	69	73	74	75	71	68	63	57	53	79	81	81	76	74	73	71	70	73	80	80	83	71.4	83																		
4-Jul	90	89	81	78	77	76	67	59	53	40	32	30	30	28	23	24	22	23	25	27	30	33	35	36	46.2	90																		
5-Jul	37	39	42	46	47	50	51	59	57	54	41	33	31	28	27	27	25	25	34	32	36	41	50	53	40.1	59																		
6-Jul	52	52	53	56	60	62	59	62	61	57	50	46	44	65	73	71	65	62	66	69	66	73	82	74	61.6	82																		
7-Jul	81	79	81	82	80	85	81	81	80	78	73	69	61	58	60	65	59	44	43	43	36	33	39	44	64.0	85																		
8-Jul	50	58	61	64	68	74	73	74	70	66	64	60	55	47	35	32	31	32	33	34	34	39	38	41	51.4	74																		
9-Jul	47	50	53	50	51	52	61	66	63	55	49	49	44	43	34	37	35	38	39	38	37	42	50	54	47.3	66																		
10-Jul	56	61	65	69	71	72	71	66	60	55	50	50	48	46	46	45	55	69	87	87	81	77	74	68	63.7	87																		
11-Jul	66	70	74	76	75	76	73	75	76	77	81	73	67	61	57	52	50	45	43	48	55	57	57	58	64.3	81																		
12-Jul	59	54	55	59	62	63	62	59	52	48	46	40	37	33	31	36	34	32	31	28	26	25	28	33	43.1	63																		
13-Jul	41	47	51	56	58	58	59	57	51	45	42	39	34	29	27	25	25	24	24	22	24	28	29	35	38.8	59																		
14-Jul	39	44	45	45	47	49	53	57	57	56	54	48	42	36	33	33	32	32	33	35	37	38	41	42	42.8	57																		
15-Jul	44	45	50	53	57	60	62	63	62	59	56	51	44	39	38	37	35	37	43	46	52	57	62	66	50.7	66																		
16-Jul	69	71	75	77	79	79	81	82	78	78	77	70	67	69	72	70	60	52	54	55	58	63	69	70	69.8	82																		
17-Jul	73	75	79	83	81	86	84	80	73	64	58	53	47	43	38	37	36	37	38	40	46	52	61	67	59.5	86																		
18-Jul	68	77	75	78	85	86	84	76	68	60	57	52	44	39	36	37	35	34	41	59	68	85	88	92	63.4	92																		
19-Jul	90	94	95	97	96	94	95	91	82	74	71	73	78	80	68	72	74	81	80	86	83	82	80	79	83.0	97																		
20-Jul	81	83	84	86	85	83	82	80	71	61	52	48	48	44	41	40	39	42	43	43	43	41	43	45	58.6	86																		
21-Jul	45	53	60	66	72	75	80	77	67	57	43	40	39	35	30	30	29	28	26	30	27	29	33	35	46.1	80																		
22-Jul	47	49	53	56	63	69	71	71	67	56	43	37	34	33	32	30	28	28	30	32	36	38	43	47	45.6	71																		
23-Jul	49	51	54	59	64	64	64	65	62	55	49	55	58	54	57	61	62	61	62	67	74	76	76	80	61.6	80																		
24-Jul	86	84	82	84	87	88	89	88	86	83	82	81	76	68	62	60	60	60	61	64	67	71	75	78	75.9	89																		
25-Jul	81	79	81	76	78	78	81	75	70	67	63	63	64	62	61	60	61	60	62	73	75	79	83	83	71.3	83																		
26-Jul	81	86	83	84	85	86	87	80	77	72	66	60	55	50	45	43	49	58	56	55	62	61	60	67	67.0	87																		
27-Jul	72	75	77	83	83	85	88	85	79	74	69	66	60	55	53	59	63	70	67	76	80	79	82	80	73.3	88																		
28-Jul	82	85	90	91	90	91	91	86	80	74	63	59	51	41	38	36	34	32	33	33	36	37	41	44	60.0	91																		
29-Jul	48	54	57	58	57	57	43	51	73	67	60	48	43	39	34	33	34	38	37	40	49	54	61	63	49.9	73																		
30-Jul	66	70	73	76	79	80	79	76	72	67	63	52	45	38	33	30	36	38	38	38	51	83	61	62	58.5	83																		
31-Jul	65	74	76	85	87	83	90	87	83	73	67	62	64	61	59	65	85	92	90	90	87	85	86	87	78.5	92																		
																			62.8	65.7	67.9	70.6	72.7	74.1	74.1	72.6	69.0	63.5	57.9	53.7	51.0	48.1	45.3	45.2	45.4	46.1	47.6	50.0	52.3	56.2	58.6	60.8	Diurnal Average	
																			90	94	95	97	96	94	95	91	86	83	82	81	79	81	81	76	85	92	90	90	87	85	88	92	Diurnal Maximum	



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	149	20.03	20.03
40 - 60	228	30.65	50.67
60 - 80	255	34.27	84.95
80 - 100	112	15.05	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

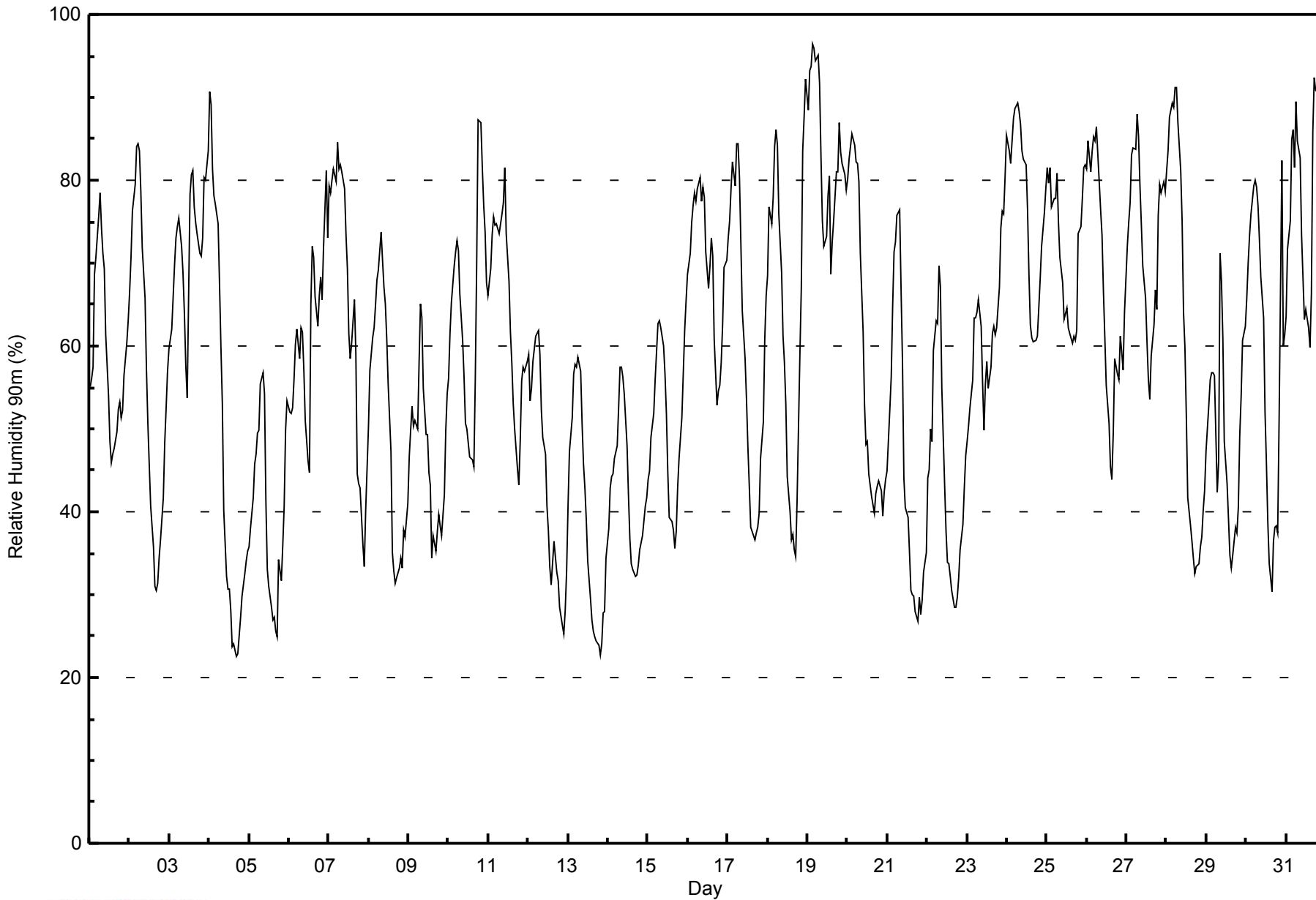


Maximum Value: 96 % on Jul 19 04:00																			Maximum Daily Average: 83.4 % on Jul 19						Hours in Service: 744																							
Minimum Value: 23 % on Jul 4 17:00																			Minimum Daily Average: 38.8 % on Jul 13						Hours of Data: 744																							
Maximum Diurnal Average: 73.4 % at hour 7																			Minimum Diurnal Average: 45.6 % at hour 16						Hours of Missing Data: 0																							
Monthly Average: 58.8 %																			Percentiles: P ₁ = 24 P ₁₀ = 34 Q ₁ = 44 Median = 60 Q ₃ = 74 P ₉₀ = 82 P ₉₉ = 91						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-Jul	55	56	57	69	71	76	79	74	71	69	61	54	48	46	47	48	50	52	53	51	52	56	60	63	59.2	79																						
2-Jul	66	71	76	79	84	84	84	79	72	66	57	51	46	41	36	31	30	31	34	37	42	48	53	57	56.4	84																						
3-Jul	60	62	66	70	73	74	75	72	69	64	58	54	78	81	81	77	75	74	71	71	73	80	80	84	71.7	84																						
4-Jul	91	89	81	78	77	75	67	60	53	40	32	31	31	28	24	24	23	23	25	27	30	33	34	35	46.3	91																						
5-Jul	36	38	42	46	47	50	50	55	57	54	41	33	31	28	27	27	26	25	34	32	36	41	50	53	39.9	57																						
6-Jul	52	52	53	56	60	62	58	62	62	57	51	46	45	65	72	71	66	62	66	68	66	72	81	73	61.6	81																						
7-Jul	79	78	80	81	80	85	81	82	81	79	73	69	62	58	60	66	59	45	43	43	36	33	40	45	64.2	85																						
8-Jul	50	57	61	62	65	68	69	74	70	67	65	61	55	47	35	33	31	32	33	34	33	38	37	41	50.8	74																						
9-Jul	47	50	53	50	51	50	58	65	63	55	49	49	45	43	34	37	35	38	40	38	37	42	50	54	47.2	65																						
10-Jul	56	61	65	70	71	73	72	66	61	56	51	50	48	47	46	45	56	70	87	87	81	77	74	68	64.1	87																						
11-Jul	66	69	73	76	75	75	74	75	76	77	81	74	68	62	58	53	50	45	43	49	56	58	57	58	64.4	81																						
12-Jul	59	53	55	58	61	61	62	59	52	49	47	41	38	33	31	36	35	33	32	28	26	25	28	33	43.2	62																						
13-Jul	41	47	51	57	58	57	59	57	51	46	43	39	34	30	27	26	25	24	24	23	24	28	28	34	38.8	59																						
14-Jul	38	43	44	45	46	48	53	58	57	56	54	48	42	37	34	33	32	32	34	35	36	37	41	42	42.7	58																						
15-Jul	44	45	49	52	56	59	63	63	62	60	57	52	45	39	39	38	36	38	43	46	51	57	62	65	50.8	65																						
16-Jul	69	71	75	77	79	77	79	80	77	79	78	71	67	70	73	71	61	53	55	55	58	62	69	70	69.9	80																						
17-Jul	73	75	79	82	79	84	84	80	72	64	58	54	48	43	38	37	37	37	38	40	46	51	61	66	59.5	84																						
18-Jul	68	77	75	78	84	86	84	76	69	61	58	53	44	40	37	37	35	35	41	59	67	84	88	92	63.7	92																						
19-Jul	89	93	94	96	96	94	95	92	83	75	72	73	78	81	69	73	75	81	81	87	83	82	81	79	83.4	96																						
20-Jul	80	83	84	86	84	82	82	80	71	62	53	48	48	45	42	41	40	42	43	44	43	40	42	44	58.6	86																						
21-Jul	45	52	56	65	71	73	76	76	67	58	44	41	39	35	31	30	30	28	27	30	28	29	33	35	45.7	76																						
22-Jul	44	45	50	48	59	63	63	70	67	55	43	38	34	34	32	30	28	28	30	32	35	38	43	47	44.1	70																						
23-Jul	48	50	52	56	63	63	64	66	62	56	50	55	58	55	57	61	62	61	62	67	74	76	76	80	61.6	80																						
24-Jul	85	83	82	85	87	89	89	88	87	84	83	82	77	69	63	61	60	61	61	65	68	72	76	79	76.5	89																						
25-Jul	81	80	81	77	78	78	81	75	71	68	63	64	64	62	62	60	61	61	62	74	74	78	82	82	71.6	82																						
26-Jul	81	85	81	84	85	85	86	80	76	73	67	61	55	51	45	44	49	58	57	56	61	59	57	64	66.7	86																						
27-Jul	72	75	77	83	84	84	88	85	79	75	70	66	61	56	54	59	62	67	64	76	79	79	80	79	73.0	88																						
28-Jul	81	84	88	89	89	91	91	87	81	75	64	60	51	42	38	36	34	33	33	34	36	37	40	43	59.9	91																						
29-Jul	47	53	56	57	57	57	42	46	71	68	61	49	43	39	35	33	35	38	37	41	49	54	61	62	49.6	71																						
30-Jul	66	70	73	76	79	80	79	77	73	68	63	52	46	39	34	30	36	38	38	37	51	82	60	61	58.8	82																						
31-Jul	64	72	75	85	86	82	90	85	83	73	68	63	64	62	60	66	86	92	91	91	88	86	87	87	78.5	92																						
																								62.4	65.2	67.3	70.0	72.2	73.0	73.4	72.4	69.3	64.2	58.6	54.2	51.4	48.6	45.8	45.6	45.8	46.4	47.9	50.2	52.3	55.9	58.3	60.5	Diurnal Average
																								91	93	94	96	96	94	95	92	87	84	83	82	78	81	81	77	86	92	91	91	88	86	88	92	Diurnal Maximum



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	147	19.76	19.76
40 - 60	230	30.91	50.67
60 - 80	259	34.81	85.48
80 - 100	108	14.52	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 31 km/h on Jul 10 17:00	Maximum Daily Speed Average: 17.3 km/h on Jul 10	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jul 5 20:00	Minimum Daily Speed Average: 0.8 km/h on Jul 17	Hours of Data: 744
Maximum Diurnal Speed Average: 4.2 km/h at hour 16	Minimum Diurnal Speed Average: 0.2 km/h at hour 23	Hours of Missing Data: 0
Monthly Average Velocity: 2.6 km/h 202.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 8 Q ₃ = 11 P ₉₀ = 16 P ₉₉ = 24	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NNE4	W5	WSW7	WSW5	SW3	SW4	WSW5	SW3	S3	ESE4	SE4	SSE5	SE6	ESE7	S4	S2	NE5	WSW5	WSW6	S5	SSE4	SSW5	S3	SSE4	SSW2.4	WSW7
2-Jul	SSE5	SE4	SSE5	SSE4	S4	SSE4	SE4	SSE4	SSE7	SE6	SE7	ESE6	SE7	SSE9	SSE9	SSE10	SSE9	SE10	SE9	SE10	SE9	SE10	SE12	SE12	SE7.1	SE12
3-Jul	SE10	SE11	SE9	SE7	SE9	SE10	SE10	SE11	SE15	SE16	SE18	SE18	SSE11	E8	ENE4	SE9	SE13	SE8	WNW1	NW2	NNW8	NNE12	NNE5	W4	SE7.0	SE18
4-Jul	W8	W15	SW9	SW7	S4	SSW6	SW12	SW8	SW10	SW17	WSW23	WSW23	WSW26	WSW24	WSW27	WSW25	WSW24	WSW25	WSW22	WSW17	WSW13	WSW12	SW12	SW8	WSW15.3	WSW27
5-Jul	WSW9	WSW10	WSW9	SSE5	S4	S5	S7	S5	S5	SE7	SW7	WSW18	WSW19	W19	W18	WSW18	WSW17	WSW17	N7	WNW1	NW4	NNW7	NE7	ENE3	WSW6.2	WSW19
6-Jul	S6	S7	SW5	WSW8	WSW9	W6	WSW8	W10	WSW6	WSW8	W12	W13	W20	NNE15	ENE5	ENE2	NW5	NW7	W9	WSW9	WNW7	NW5	NW10	WNW7	W5.7	W20
7-Jul	W7	W9	W9	W7	WNW9	WSW6	WNW10	W11	W10	WNW9	NW10	WNW15	WNW13	WNW14	NNE9	NNE12	NNE13	NE13	NE9	NE8	NE6	NNE6	NE5	ENE2	NW5.4	WNW15
8-Jul	SSE1	SSE5	SSE7	SSE7	SSE7	SE7	SSE6	SSE7	SSE8	SE9	SE10	SE11	SE11	SSE12	SSW11	SSW13	SSW11	S9	SSE10	SSE8	SSE9	SSE9	SSE8	S8	SSE8.0	SSW13
9-Jul	SSW6	SSE2	W9	SSW3	S8	S5	SE7	SE7	SE9	SSW13	S12	S11	S11	SSE14	SSW16	WSW16	W23	W9	SW8	SSW7	SW12	W14	WNW13	W13	SW7.0	W23
10-Jul	W10	W15	W17	WSW17	WSW18	W19	WSW10	WSW10	W9	W9	W12	W12	WNW15	W22	W25	W26	WNW31	WNW29	WNW22	W24	W20	WNW20	W20	WNW20	W17.3	WNW31
11-Jul	WNW20	W20	W21	W19	W18	W16	W17	W16	WSW14	WSW12	WSW14	WSW20	W21	WSW18	WSW16	W21	W18	WNW17	NNW13	NNE18	N11	N11	N8	N9	W13.4	W21
12-Jul	NNW12	NNW14	NNW12	NNW10	N11	N5	NW3	N5	WNW8	NW8	WNW8	WNW11	NW9	NW9	NW9	W7	WSW3	NE6	NNE4	NE9	NE7	NE6	NE6	E7	NNW5.9	NNW14
13-Jul	E8	ESE8	SSE10	SSE7	SSE6	SE8	SE11	SE10	SE10	SE9	SE7	SE7	SE7	SSE7	S6	S5	SSE5	S5	S8	SSE8	SE8	SSE9	SSE11	SSE11	SSE7.5	SSE11
14-Jul	SSE11	SSE11	SSE12	SSE12	SSE13	SSE10	SSE9	SE8	SE10	SE10	SE9	SE13	SE15	S13	S13	S12	S12	S11	S11	S9	S8	S9	SSW9	SSW8	SSE10.3	SE15
15-Jul	S7	SSE8	SE8	SE10	SE10	SE10	SSE9	SSE8	SE7	SE10	SE12	SSE11	S9	SSW10	SSW10	S9	SSW10	SSW9	SSW9	SSW8	S9	S8	SSE7	SSE8	S8.4	SE12
16-Jul	SSE7	S5	SW4	WSW5	W9	W9	W7	W12	N2	N3	NNE7	NNE9	NNW9	NNW7	NW4	W10	WSW15	WSW11	SW6	SW5	SW7	WSW12	N15	NE8	W4.1	WSW15
17-Jul	WNW4	NW5	NW5	W4	W5	ENE1	NE3	NE6	ENE4	NE3	ENE4	SSE4	NW2	WNW2	N2	SSW1	ESE4	E3	SE1	SSW2	SW7	WSW4	SW3	WNW8	WNW0.8	WNW8
18-Jul	W7	W8	WNW4	NW3	NNW7	NNW4	N8	NNE7	NNE5	S2	S2	SW4	SSW5	SSW2	W5	SSE5	SSE5	SE6	SW9	SW11	S6	WSW6	NNE1	SW2	WSW1.9	SW11
19-Jul	SSE7	SSE9	SSE8	SSE8	SSE6	SSE6	SSE7	SSW4	SW8	WSW11	W14	W20	W21	WSW19	W23	W23	W24	NW13	NNW18	NNW16	NNW14	NNW13	NW11	WNW11	W8.1	W24
20-Jul	W14	W10	WSW9	WSW10	WSW10	WSW12	W12	W11	W11	WNW8	NW8	NNW10	NW7	NNW7	N9	N6	N7	NE10	NE10	NE9	NE9	NE7	NNE5	N3	NW5.2	W14
21-Jul	NNE5	WSW5	W5	WSW3	WSW2	SSW4	SW3	SSW3	SW2	ESE2	ESE3	SW3	SE1	NNW4	ENE3	E5	NW3	SSW4	SSE3	WSW4	W4	SSW1	W6	SSW2	SW1.3	W6
22-Jul	SSW4	S5	SSE7	SE5	S7	SSE7	SSE5	SSE5	SSE4	SE6	SSE7	SE8	SE9	SE6	SE8	SE7	SE10	SE10	SE10	SE11	SE10	SE16	SSE12	SE7	SSE7.5	SE16
23-Jul	SE9	SE10	SE8	SE9	SE6	SE5	SE8	SE7	SE8	SE11	SE14	SSE12	ESE11	SE17	SE16	SE19	ESE13	E14	ESE8	SE9	SE10	SSE9	SE6	SSE6	SE9.9	SE19
24-Jul	SSE6	SE6	SE9	SE10	SE11	SE11	SE10	ESE10	SE10	SE11	SSE11	SE13	SE15	SE12	SE13	SE13	ESE14	SE17	SE13	ESE11	ESE11	ESE10	ESE10	ESE12	SE10.8	SE17
25-Jul	ESE11	E10	NE8	NE7	N7	N11	NNE8	NNE8	ENE11	E10	ENE8	S3	W4	ESE3	S8	S6	SE10	SE8	SSE6	W5	NW3	WSW4	W4	NNW3	ENE2.7	N11
26-Jul	ENE7	ESE6	SE7	SSE5	S4	SW4	WSW6	SE2	SE5	SSE5	SE6	SSE7	SSE7	SSE8	SSE6	SSE5	SW9	W19	W14	W11	W8	WSW8	WSW8	S3	SSW3.7	W19
27-Jul	SSE4	SSE6	SSW6	SSE6	SSE7	SSE7	SSE6	SE6	SE6	SE6	SE7	S3	SSW2	WSW4	SE5	SE2	ESE8	S11	S9	S5	SSE8	SSE9	SSE8	SSE9	SSE5.7	S11
28-Jul	SSE7	SSE8	SSE9	SSE8	SSE9	SSE9	SSE8	SSE6	SE5	SE5	SE7	ESE8	SE6	S5	SSE6	SSE5	SE7	S4	SE8	SSE7	S6	SSW6	S6	S6	SSE6.4	SSE9
29-Jul	SE4	SE5	SSE7	SE6	SSW4	SSW9	SSW5	S7	SSW5	S6	SSE4	SE7	ESE7	SE5	SE2	W2	NNE5	N10	NNE7	E9	SE10	SE10	SE10	SSE10	SE4.1	SSE10
30-Jul	SE9	SE11	SSE9	SSE7	SSE7	SSE7	SSE7	SSE7	SSE9	SE8	SSE9	SSE11	S8	SE8	SSE7	SE8	SSE10	SSE10	SE11	SE11	NW24	NE20	NE17	SE6	SE6.0	NW24
31-Jul	S7	SSW3	ESE2	NNE1	SW2	SSW2	SSE7	S6	ESE3	NE4	NE10	NNE14	NNE15	NNE15	NNE15	N19	N15	NNW13	NNW11	N12	NNW15	N15	N20	N20	N7.4	N20

S2.5	SSW3.1	SSW3.6	SSW3.5	SSW3.6	SSW3.5	SSW3.3	S2.9	SSE3.3	SSE3.6	S3.1	SSW3.9	SW3.8	SSW2.9	SW3.4	SW4.2	SW3.0	SW2.6	SW1.9	SSW1.0	WSW1.4	SW0.9	NNW0.2	SSW1.3		Diurnal Average
WNW20	W20	W21	W19	W18	W19	W17	W16	SE15	WSW17	WSW23	WSW23	WSW26	WSW24	WSW27	W26	WNW31	WNW29	WSW22	W24	NW24	WNW20	N20	N20		Diurnal Maximum

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



Summary of Hour Standard Deviations

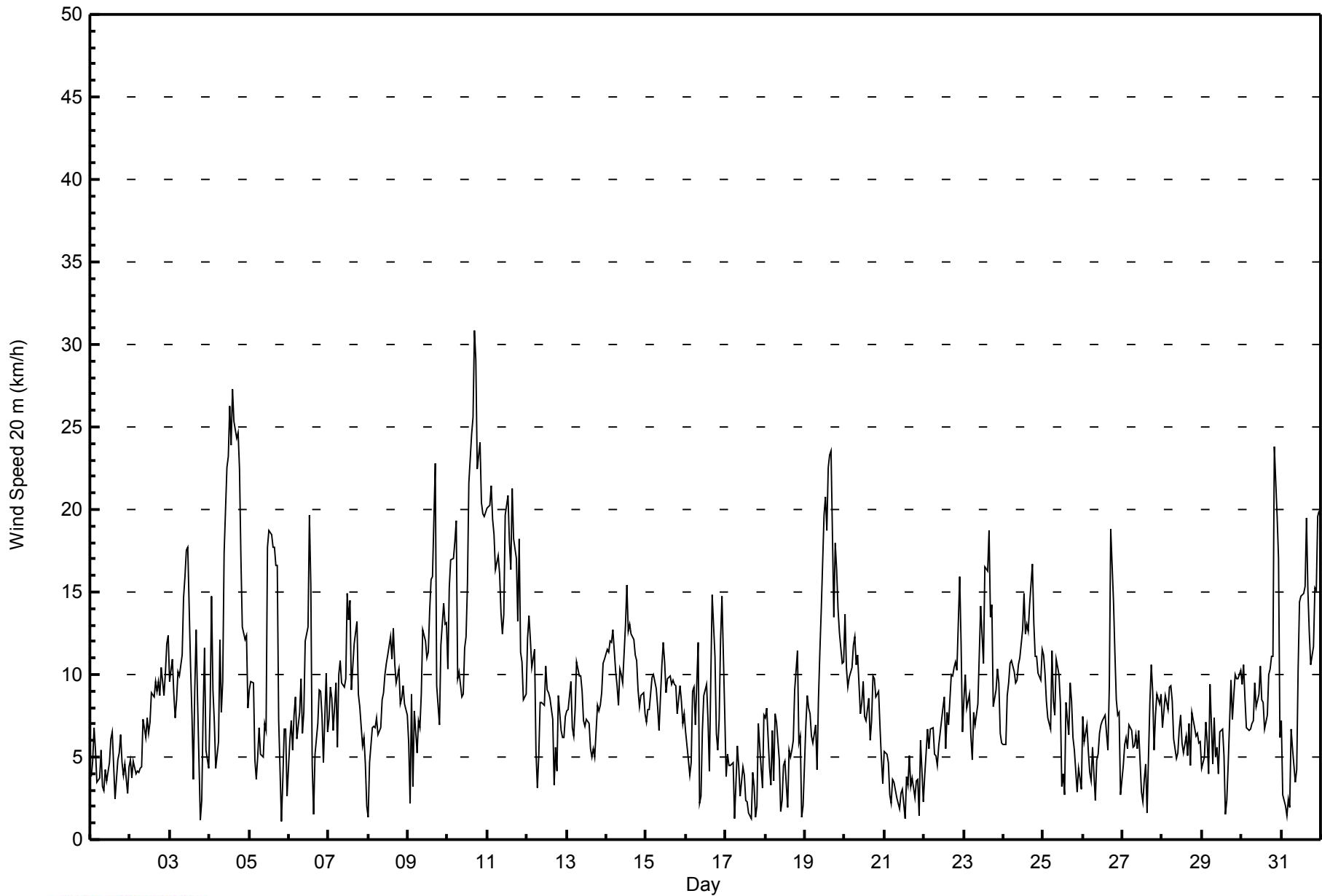
Mannix - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 19 km/h on Jul 30 21:00 Minimum Value: 1 km/h on Jul 21 05:00 Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 8																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	2	2	1	1	1	2	2	2	2	2	2	3	3	3	2	2	4	3	2	2	1	1	2	1	4
2-Jul	2	1	2	2	1	2	2	2	3	3	3	3	4	4	4	4	4	3	3	4	3	4	4	4	5
3-Jul	4	3	3	3	3	4	4	5	5	6	6	6	11	4	3	4	5	5	1	1	4	4	2	2	11
4-Jul	6	6	3	3	2	3	4	4	4	7	6	7	6	8	8	8	7	7	6	5	4	3	3	2	8
5-Jul	1	2	2	2	1	2	3	3	3	3	7	7	6	7	6	7	5	4	3	2	2	6	3	2	7
6-Jul	3	2	2	2	4	4	4	4	3	5	4	5	8	6	3	3	3	3	3	2	6	4	7	3	8
7-Jul	3	3	3	2	3	3	4	3	3	4	4	4	5	5	6	6	5	4	2	2	2	2	1	1	6
8-Jul	1	1	2	2	3	3	3	3	3	3	4	4	4	5	5	6	5	5	4	3	2	2	2	2	6
9-Jul	3	3	3	3	2	2	3	2	3	6	6	5	5	6	7	8	6	5	4	3	4	5	4	3	8
10-Jul	2	3	4	3	4	4	3	3	3	4	5	6	6	6	6	6	9	9	7	4	4	5	5	5	9
11-Jul	5	5	3	3	5	4	4	3	3	3	4	4	5	4	5	5	5	5	6	5	4	3	3	3	6
12-Jul	5	5	5	4	3	3	2	2	3	3	3	4	4	4	3	3	4	3	2	2	2	2	1	3	5
13-Jul	3	4	3	2	2	3	4	4	4	4	3	4	3	4	4	4	3	3	3	3	2	2	3	3	4
14-Jul	4	3	4	3	3	3	3	3	4	4	3	5	5	6	6	6	5	5	4	3	3	3	3	3	6
15-Jul	2	2	2	3	3	3	4	3	3	3	4	4	5	5	4	4	4	5	4	3	3	3	2	2	5
16-Jul	2	2	1	1	2	2	2	5	3	2	4	3	4	3	2	3	4	3	3	3	3	3	6	3	6
17-Jul	2	2	2	2	2	1	2	2	2	2	2	3	3	2	2	2	2	2	1	2	2	2	3	3	3
18-Jul	2	2	2	2	2	2	3	2	3	2	2	3	3	3	3	3	3	3	8	7	6	4	3	2	8
19-Jul	3	3	3	3	3	2	3	2	3	4	4	7	6	6	6	6	6	7	7	6	5	5	4	3	7
20-Jul	2	2	2	2	2	2	2	2	4	3	3	5	4	4	4	4	4	3	3	2	2	2	1	1	5
21-Jul	2	2	2	1	1	1	1	1	1	2	2	2	3	3	3	3	2	2	2	1	1	2	1	1	3
22-Jul	2	2	2	2	3	2	2	2	2	2	3	3	3	3	3	3	4	4	3	3	3	5	4	2	5
23-Jul	3	3	3	2	2	2	3	3	3	6	6	5	4	6	7	7	5	5	4	4	4	3	3	2	7
24-Jul	2	2	3	3	4	4	5	4	4	4	4	5	6	6	5	5	6	6	5	4	4	4	4	4	6
25-Jul	4	4	3	3	2	4	3	2	4	4	4	2	3	2	4	3	4	4	4	3	2	2	2	2	4
26-Jul	3	2	2	2	1	1	2	2	2	2	3	3	4	4	4	3	5	4	4	2	2	1	2	2	5
27-Jul	2	2	2	2	2	2	2	2	2	2	4	4	2	3	4	4	4	4	3	2	3	3	3	3	4
28-Jul	2	2	3	3	3	3	3	3	2	2	2	3	3	3	3	3	3	3	3	2	1	1	2	2	3
29-Jul	2	2	3	3	3	7	8	3	3	3	3	3	3	3	2	2	3	3	2	5	4	3	3	3	8
30-Jul	3	4	3	1	2	2	2	3	3	3	3	5	4	4	4	3	4	4	4	3	19	7	6	4	19
31-Jul	2	2	1	1	2	1	4	3	2	2	4	5	5	5	5	7	6	6	7	5	6	5	7	7	7
Diurnal Maximum																									



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	182	24.46	24.46
6 - 11	403	54.17	78.63
12 - 19	122	16.40	95.03
20 - 28	35	4.70	99.73
29 - 38	2	0.27	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

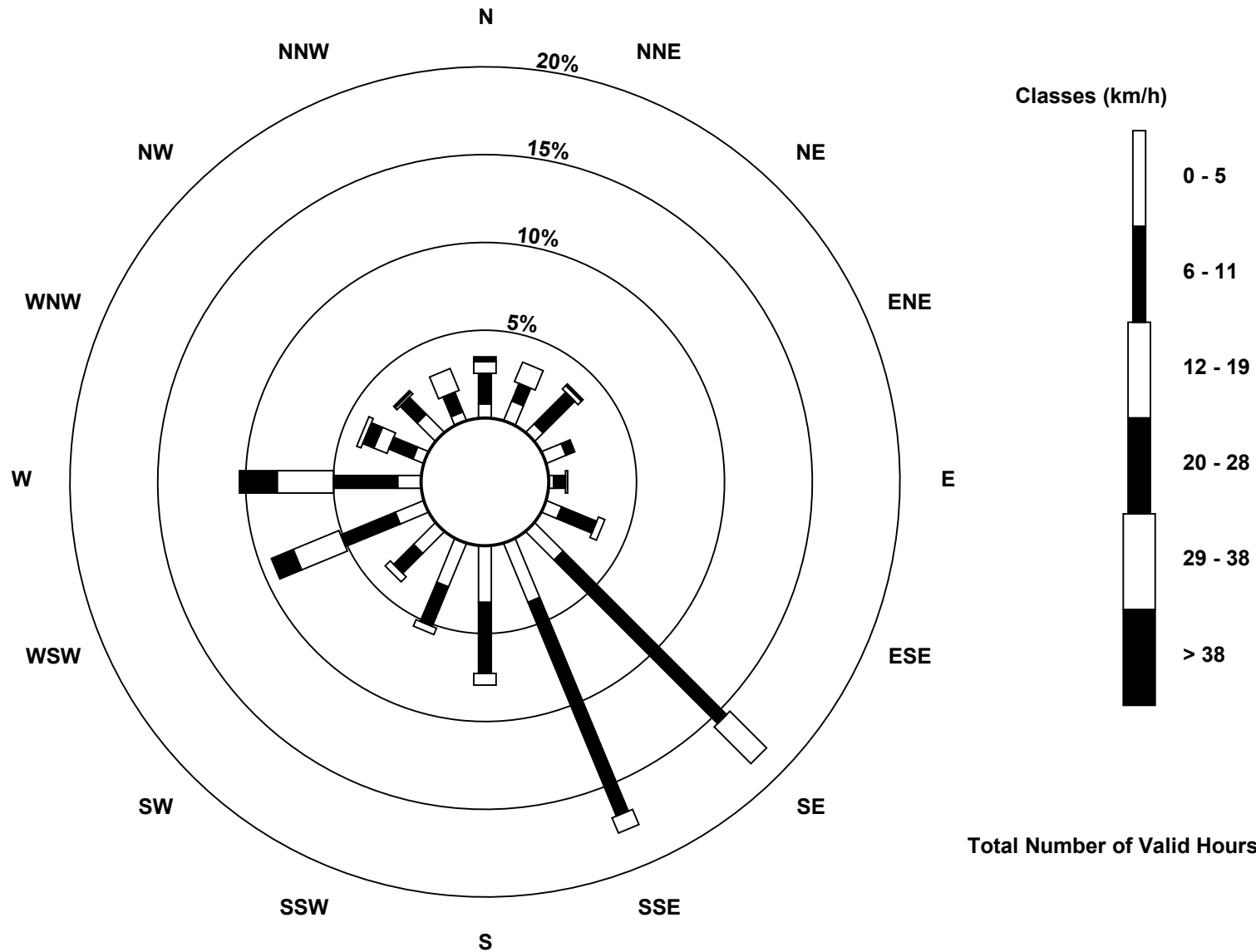
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	9	5	9	2	7	17	27	24	20	13	13	10	5	11	4	182
6 - 11	13	8	19	4	5	16	98	98	30	18	12	25	27	11	10	9	403
12 - 19	5	9	2	0	1	3	22	7	5	3	3	21	24	6	1	10	122
20 - 28	2	0	1	0	0	0	0	0	0	0	0	10	16	5	1	0	35
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	26	26	27	13	8	26	137	132	59	41	28	69	77	29	23	23	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

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



Total Number of Valid Hours: 744



Maximum Speed: 43 km/h on Jul 10 17:00	Maximum Daily Speed Average: 22.2 km/h on Jul 10	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jul 9 04:00	Minimum Daily Speed Average: 0.7 km/h on Jul 21	Hours of Data: 744
Maximum Diurnal Speed Average: 5.5 km/h at hour 16	Minimum Diurnal Speed Average: 0.4 km/h at hour 23	Hours of Missing Data: 0
Monthly Average Velocity: 3.9 km/h 194.3 deg	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 9 Median = 12 Q ₃ = 17 P ₉₀ = 22 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-Jul	NNE7	NW3	W9	WNW6	W2	WSW4	W6	SW3	S4	SE5	SE5	SSE6	SE8	ESE7	S6	S3	NE6	WSW7	SW8	S8	SSE7	S6	SSE6	SE8	S2.7	W9
2-Jul	SSE10	SE7	SE9	SSE9	SSE9	SSE8	SE6	SSE6	SSE10	SE8	SE10	ESE8	SE10	SSE13	SSE12	SSE13	SSE12	SE13	SE12	SE15	SE13	SE14	SE18	SE18	SE10.7	SE18
3-Jul	SE18	SE18	SE15	SE13	SE12	SE14	SE14	SE16	SE20	SE21	SE24	SE24	SSE18	E10	E5	SE13	SE16	SE11	NW2	NW4	N13	NNE17	NNE9	WNW7	SE10.2	SE24
4-Jul	W12	W19	SW14	SW13	SSW8	SSW12	SW17	SW13	SW14	SW23	WSW27	WSW28	WSW31	WSW30	WSW34	WSW31	WSW31	WSW29	WSW28	WSW22	WSW20	WSW21	SW22	WSW16	WSW20.9	WSW34
5-Jul	WSW16	WSW16	WSW16	S9	SSW7	S10	S13	S10	S8	SE9	SW9	WSW21	WSW22	W22	W21	WSW20	WSW19	WSW19	N9	W2	NW6	N12	NE10	ENE5	WSW8.3	W22
6-Jul	SSE11	S17	SW11	WSW12	W13	W8	W10	W12	WSW8	WSW9	W14	W15	W23	NNE19	ENE6	E3	NW8	NW11	W11	WSW11	NW10	NW9	NW17	NW11	W7.4	W23
7-Jul	W11	WNW16	WNW15	WNW12	WNW17	W10	WNW16	W12	WNW12	NW13	NW15	WNW19	WNW18	WNW18	NNE12	NNE15	NNE16	NE17	NE12	NE10	NE8	NNE12	NE8	ENE5	NW8.6	WNW19
8-Jul	ESE5	SE10	SSE15	SSE15	S16	SE13	SSE11	SSE10	SSE12	SE12	SE14	SE15	SE16	SSE18	SSW18	SSW22	S20	S17	S17	S17	SSE18	SSE20	S19	SSW20	SSE14.4	SSW22
9-Jul	SSW15	SW5	W14	NNE1	S18	S12	SSE12	SE10	SE12	SSW22	S22	S19	S20	SSE22	S30	SW22	W27	W12	SSW13	SSW14	SW18	WNW21	WNW21	W16	SSW11.7	S30
10-Jul	W14	W19	W21	WSW23	WSW23	W23	W12	WSW12	W10	W11	WNW14	W15	WNW19	WNW26	W29	W29	NW43	NW41	NW33	W28	WNW26	WNW28	WNW28	WNW29	W22.2	NW43
11-Jul	WNW31	WNW27	W27	W24	W24	W21	W21	W19	W17	WSW15	WSW17	WSW23	W23	WSW20	W20	W24	W21	WNW23	NNW20	NNE25	N18	N16	N14	N13	WNW16.9	WNW31
12-Jul	NNW20	N23	NNW22	NNW20	N19	N10	NNW5	N6	NW12	NW13	NW12	WNW13	NW13	NW13	NW12	W8	WSW4	NE7	NNE5	NE11	NE10	NE11	NE9	E10	NNW9.5	N23
13-Jul	E11	ESE11	SE14	SSE12	SE12	SE13	SE15	SE13	SE14	SE12	SE9	SE9	SE10	SSE10	SSE8	S7	SSE7	S8	S13	SSE12	SSE13	SSE16	SSE20	SSE20	SSE11.6	SSE20
14-Jul	SSE21	SSE20	SSE21	SSE21	SSE23	SSE17	SSE14	SSE11	SE15	SE13	SE12	SE18	SE20	S20	S21	S19	S19	S19	S18	S17	S21	SSW22	SSW21	SSW18	SSE17.3	SSE23
15-Jul	S16	S17	SSE14	SSE18	SSE19	SSE18	SSE15	SSE12	SE9	SE13	SE16	SSE16	S15	SSW17	SSW18	S17	SSW18	SSW20	SSW19	SSW17	S21	S20	SSE15	SSE17	S15.7	S21
16-Jul	S15	SW10	WSW10	W9	W13	WNW14	W10	W13	N4	N4	NNE9	NNE11	NNW15	NNW12	NW7	W11	WSW17	WSW14	SW11	SW10	SW15	WSW18	N22	NE12	W6.3	N22
17-Jul	NW5	NW10	NNW10	WNW7	WNW9	NE3	NE5	NE7	ENE5	NE3	ENE5	SSE5	NW2	WNW3	NNW2	SSE1	ESE5	E4	SSE1	SSW3	SW12	WSW8	WSW4	WNW12	NW1.8	WNW12
18-Jul	W11	W13	NW8	NNW6	N12	N6	N10	NNE9	NNE6	SSE2	S3	SW6	S6	S3	W6	SSE7	SE7	SE8	SSW11	SW16	S10	SW11	NNE3	SW3	WSW2.4	SW16
19-Jul	SSE11	SSE13	SSE14	SSE13	SSE12	S12	S12	SSW6	SW11	SW15	W16	W23	W25	WSW23	W27	W28	W27	NNW21	NNW28	NNW25	NNW22	NNW20	NW18	WNW18	W9.9	NNW28
20-Jul	W18	W15	W13	W13	W16	W16	W15	W12	WNW13	WNW9	NNW12	NNW14	NW11	NNW11	N12	N8	N10	NE13	NE13	NE13	NE14	NE12	NE9	NNE8	NW7.9	W18
21-Jul	NE10	NE1	WNW1	ENE2	E2	SE3	SSW4	SSW3	SSW3	ESE2	ESE3	SSW3	SSE1	NNW5	ENE4	E6	NW3	SSW5	SSE3	WSW5	W5	SSE1	WSW4	SW3	S0.7	NE10
22-Jul	SSE10	S14	SSE16	SSE12	SSE15	SSE13	SSE7	SSE7	SSE6	SE7	SSE10	SSE11	SE12	SE8	SE10	SE9	SE12	SE13	SE15	SE15	SE17	SE23	SSE21	SSE13	SSE12.1	SE23
23-Jul	SE16	SE17	SE15	SE15	SE11	SE9	SE13	ESE10	SE11	SE16	SE19	SSE18	ESE14	SE22	SE21	SE24	ESE18	E18	ESE11	SE13	SE14	SE14	SE11	SSE12	SE14.7	SE24
24-Jul	SSE13	SE12	SE15	SE16	SE17	SE17	SE14	ESE13	SE13	SE13	SE16	SE18	SE19	SE16	SE16	SE16	ESE17	SE22	SE18	ESE16	ESE15	ESE14	ESE13	ESE15	SE15.2	SE22
25-Jul	ESE16	E13	NE11	NE10	N12	N17	NNE12	NE10	ENE14	E12	ENE10	S5	W5	ESE3	S12	S9	SE13	SE12	SSE10	WNW6	NW7	SW5	NW6	NNW6	ENE3.8	N17
26-Jul	ENE10	ESE9	SE12	SSE11	SSE10	SSW5	WSW5	SE3	SE6	SSE7	SE8	SSE10	SSE11	SSE10	SSE9	SSE8	SW12	W21	W16	W13	W10	WSW12	WSW13	SW6	SSW5.2	W21
27-Jul	SSE5	S10	SSW12	S7	SSE10	SSE10	SSE8	SE7	SE8	SE6	SE8	SSW6	SSW3	WSW5	SE6	S5	ESE14	S21	S19	S12	SSE15	SSE18	SSE17	SSE17	SSE9.6	S21
28-Jul	SSE15	SSE14	SSE15	SSE14	SSE15	SSE14	SSE13	SSE8	SE6	SE6	SE8	ESE8	SE7	S8	SSE8	SSE7	SE8	S7	SE10	SSE10	S12	SSW12	S14	S15	SSE10.2	SSE15
29-Jul	S11	SSE10	SSE13	SE12	SSW7	SSW16	SW7	S13	SSW9	S10	SSE6	SE8	ESE8	SE6	SSE3	WNW3	NNE6	N12	NE9	E12	SE15	SE16	SE15	SSE17	SSE6.9	SSE17
30-Jul	SE16	SE17	SSE16	SSE12	SSE13	SSE11	SE10	SSE10	SSE12	SE11	SSE12	SSE15	S14	SE11	SSE10	ESE9	SSE14	SSE16	SE16	SE17	NW33	NE27	NE24	SE10	SE9.3	NW33
31-Jul	S18	SSW7	SSE4	NE2	SW2	ESE1	SSE11	S10	SE3	NE5	NE12	NNE18	NNE19	NNE19	NNE20	N28	N22	NNW20	NNW17	N19	N24	N23	N28	N30	N10.2	N30
S5.0SSW5.1SSW5.3 S5.0SSW5.3 S5.1 S4.5 S4.2 SSE4.4 S4.8 S4.3SSW5.2SSW4.8SSW3.9SSW4.8SSW5.5 SW3.7 SW3.4SSW2.9 S3.0 SW2.3SSW1.5 SSE0.4 S2.7																								Diurnal Average		
WNW31WNW27 W27 W24 W24 W23 W21 W19 SE20 SW23WSW27WSW28WSW31WSW30WSW34WSW31 NW43 NW41 NW33 W28 NW33WNW28WNW28 N30																								Diurnal Maximum		

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

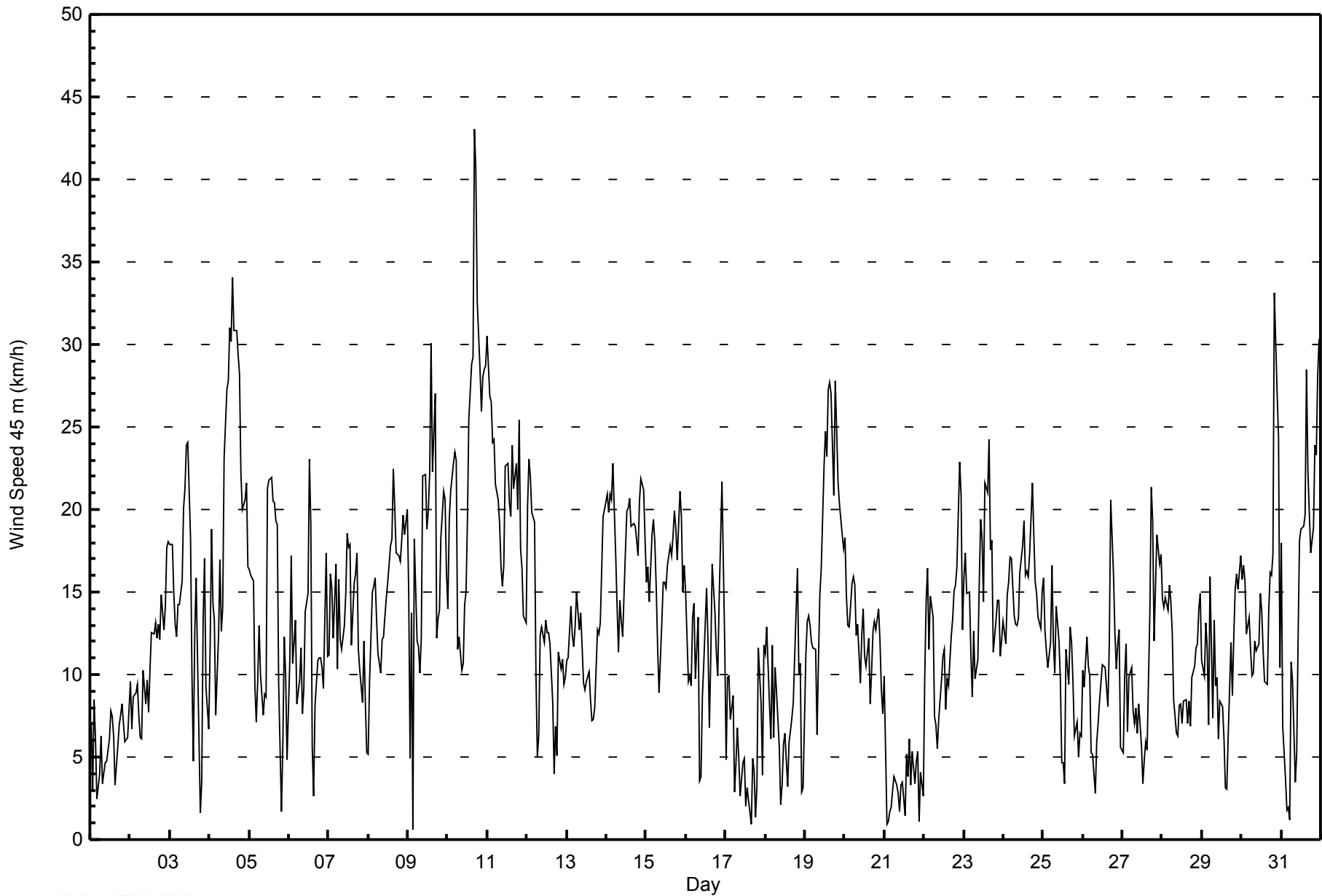


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 23 km/h on Jul 30 21:00																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 1 km/h on Jul 21 00:00																									
Percentiles: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



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	85	11.42	11.42
6 - 11	221	29.70	41.13
12 - 19	319	42.88	84.01
20 - 28	103	13.84	97.85
29 - 38	14	1.88	99.73
> 38	2	0.27	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

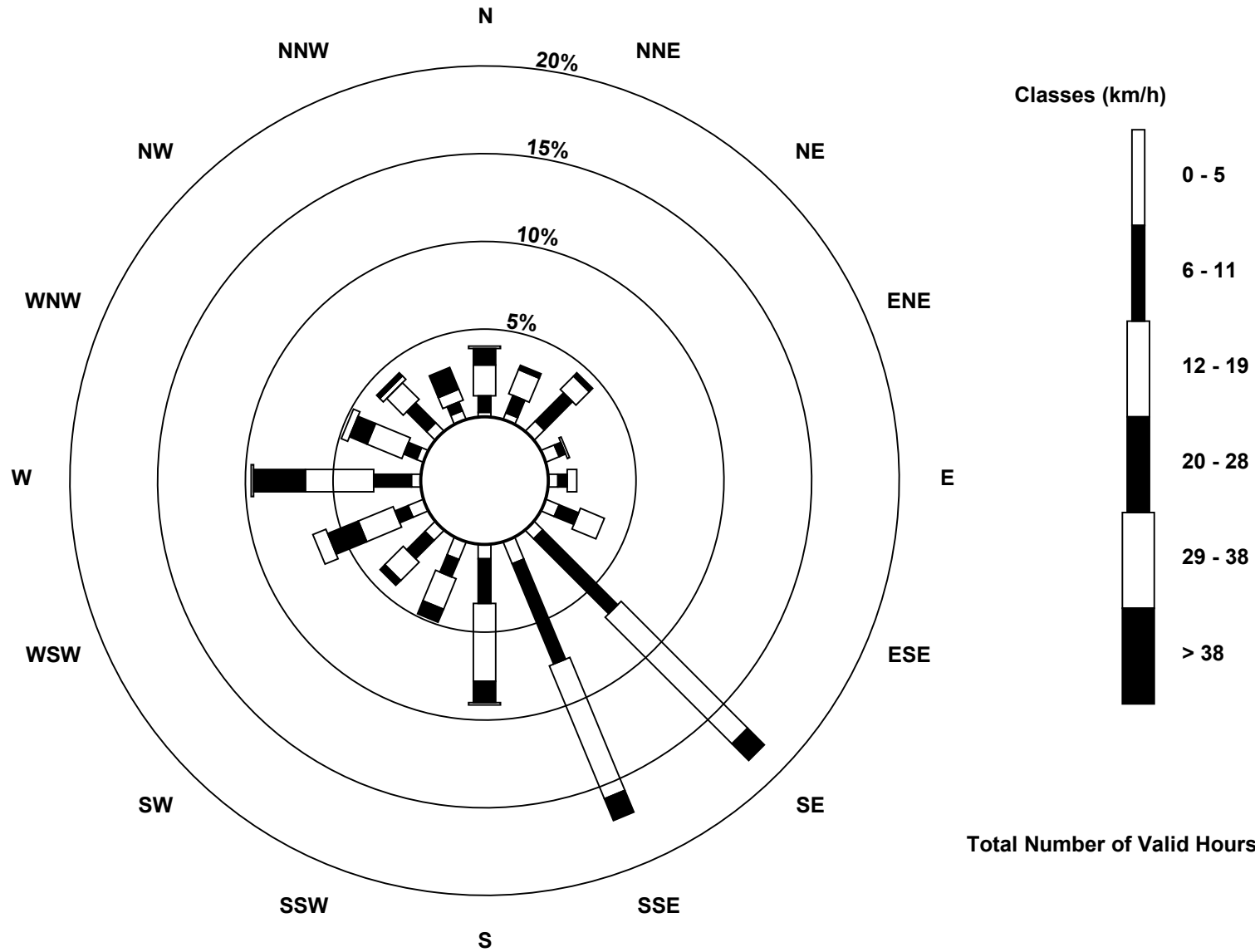
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	3	6	6	4	6	5	10	6	8	6	7	4	3	5	4	85
6 - 11	7	8	17	3	4	9	45	46	19	8	11	6	16	6	12	4	221
12 - 19	13	11	8	1	4	11	76	61	33	14	11	16	29	16	10	5	319
20 - 28	7	2	2	0	0	0	10	10	9	6	3	14	22	8	0	10	103
29 - 38	1	0	0	0	0	0	0	0	1	0	0	6	1	3	2	0	14
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Totals	30	24	33	10	12	26	136	127	68	36	31	49	72	36	31	23	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

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

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





Maximum Speed: 45 km/h on Jul 10 17:00	Maximum Daily Speed Average: 24.4 km/h on Jul 10	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 1 05:00	Minimum Daily Speed Average: 0.7 km/h on Jul 21	Hours of Data: 744
Maximum Diurnal Speed Average: 6.2 km/h at hour 1	Minimum Diurnal Speed Average: 0.5 km/h at hour 23	Hours of Missing Data: 0
Monthly Average Velocity: 4.2 km/h 198.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 9 Median = 13 Q ₃ = 20 P ₉₀ = 25 P ₉₉ = 34	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NE6	NNE1	WNW3	W4	SSE0	S4	WSW5	SW4	S4	SE4	SSE5	SSE6	SE7	ESE7	S6	S3	NE6	WSW7	SW7	S9	SSE9	S7	SSE7	SE7	SSE3.3	S9
2-Jul	SSE10	SE9	SE9	SSE8	SE7	SE9	SE6	SE6	SSE10	SE8	SE9	ESE7	SE11	SSE13	SSE14	SSE13	SE12	SE13	SE13	SE12	SE12	SE13	SE15	SE16	SE10.5	SE16
3-Jul	SE23	SE23	SE20	SE14	SE10	SE12	SE12	SE15	SE17	SE19	SE25	SE25	SSE24	ESE9	E5	SE13	SE13	SE9	NW1	NW3	N16	NNE20	NNE13	NW6	SE10.3	SE25
4-Jul	W14	W22WSW17	SW17	SW10	SSW17	SW19	SW14	SW14	SW25WSW30WSW29WSW33WSW33WSW36WSW33WSW33WSW32WSW31WSW25WSW24WSW28WSW29WSW24	WSW23.9	WSW36															
5-Jul	WSW25WSW25	W20	SW11	SW9	SSW10	SSW15	S14	S9	SE9	SW10WSW23WSW22	W23	W21WSW21WSW20WSW20	N10	NNW2	NW7	N14	NE13	ENE6	WSW10.3	WSW25						
6-Jul	SSE13	S21	SW15WSW15	W18WNW10	W11WNW12	WSW7	WSW9	W14	W16	W24	NNE20	ENE7	E3	NW9NNW11	W11WSW13	NW12	NW12	NW21	NW14	W8.2	W24					
7-Jul	WNW16WNW22WNW22WNW18WNW15WNW19	W13WNW12	NW14	NW15WNW19WNW18WNW18	NNE14	NNE18	NNE18	NNE20	NE14	NE12	NNE11	NNE16	ENE9	E7	NNW10.7	WNW22										
8-Jul	SE5	SE10	SE13	SSE18	S22	SSE21	SSE17	SSE12	SSE14	SSE13	SE13	SSE15	SSE16	SSE18	SSW20	SSW24	S22	S20	S20	S20	S23	S25	SSW23	SSW27	S16.8	SSW27
9-Jul	SW21	SW10	W18	NNE5	SSE19	S19	SSE17	SSE12	SSE13	SSW24	S24	S20	S21	S24	S33	SW24	W28	W14	SSW14	SSW17	SW23WNW25WNW24	W19	SW13.5	S33		
10-Jul	W17	W24	W25WSW28WSW27	W25	W13WSW13	W10	W11	W14	W16WNW20WNW26WNW29	W30	NW45	NW43	NW35WNW30WNW30WNW33WNW34WNW34	WNW24.4	NW45											
11-Jul	WNW36WNW31	W30	W27	W28	W25	W22	W20	W18WSW17WSW19WSW24	W23WSW21	W21	W24	W22WNW24NNW22	NNE29	N20	N18	N17	N17	WNW18.6	WNW36							
12-Jul	N25	N29	N27	N25	N22	N13	N6	N7	NW12	NW13	NW12	NW13	NW13	NW13	NW12	W8	W4	NE7	NNE5	NE14	NE12	NE14	NE13	E11	N11.0	N29
13-Jul	E10	ESE9	SE13	SE14	SE15	SE12	SE14	SE12	SE13	SE11	SE9	SE8	SE9	SSE10	SSE9	SSE7	SSE8	S9	SSE13	SSE14	SSE15	SSE22	SSE27	SSE27	SE12.5	SSE27
14-Jul	SSE28	SSE27	SSE30	SSE29	SE30	SE25	SSE19	SSE13	SE15	SE13	SE12	SE17	SE21	S22	S22	S20	SSE20	S20	S20	S19	S26	SSW28	SSW28	SSW24	SSE20.6	SE30
15-Jul	SSW20	S19	S19	S24	S25	S23	SSE18	SSE13	SE10	SE13	SSE16	SSE16	S16	SSW17	SSW19	S19	SSW20	S22	SSW22	SSW20	S26	S26	S19	S19	S18.6	S26
16-Jul	S17WSW15	W16	W13WNW20WNW18WNW13	W16	N5	N5	NNE10	NNE11	NNW17	NNW13	NW8	W12WSW17WSW15	SW12	SW11	SW18WSW24	NNE25	NE15	WNW8.0	NNE25							
17-Jul	N7	NNW12	NNW13	NW9	NW11	NNE4	NE6	NE7	ENE5	NE3	ENE5	SSE5	WNW2	WNW3	NNW3	SE1	E5	E4	SE1	SSW3	SW13	SW12	WSW3	NW13	NNW2.3	NW13
18-Jul	W11	W16	NNW10	NNW7	N12	N9	N12	NNE10	NNE6	SE2	SSW3	SSW6	S6	S4	W5	SSE6	SE7	SE8	SW12	SW18	S12	SW13	N3	SW3	WSW2.3	SW18
19-Jul	SSE12	SSE16	SSE17	SSE16	S15	S14	S13	SSW6	SW11	SW15	W17	W24	W27WSW25	W28	W30	W28	NNW23	NNW30	NNW27	NNW24	NNW24	NNW22	NW21	W10.4	NNW30	
20-Jul	WNW22WNW19	W16	W17WNW20WNW19WNW16WNW14WNW13	WNW9	NNW13	NNW15	NW12	NNW11	N12	N9	N11	NE14	NE16	NE16	NE18	NE17	NE12	NE9	NNW9.6	WNW22						
21-Jul	NNE13	ENE2	N0	WSW1	NNE1	SE3	S5	SSW3	S3	ESE2	ESE3	S4	SSE2	NNW5	E3	E6	NW3	SSW5	SSE3	WSW5	WSW5	S1	SE1	SSE1	SE0.7	NNE13
22-Jul	SSE10	SSE16	SSE18	SSE16	SSE16	SSE19	SSE11	SSE7	SSE6	SE7	SSE10	SSE11	SE11	SE8	SE9	SE9	SE11	SE13	SE17	SE18	SE16	SE25	SSE27	SSE17	SSE13.5	SSE27
23-Jul	SSE20	SSE23	SE20	SE17	SE10	SE9	SE11	SE7	SE9	SE16	SE20	ESE12	SE17	SE17	SE20	ESE14	E17	ESE10	SE13	SE14	SE16	SE13	SSE17	SE14.7	SSE23	
24-Jul	SSE19	SSE15	SE13	SE16	SE17	SE16	SE12	SE11	SE11	SE12	SSE17	SE19	SE16	SE13	SE14	SE13	ESE14	SE18	SE18	ESE13	ESE12	ESE12	ESE10	ESE12	SE13.9	SSE19
25-Jul	ESE12	E13	NE13	NE13	N14	NNE18	NNE14	NE12	ENE16	E12	ENE10	S4	WNW3	ESE4	S12	S9	SE14	SE12	SSE9	WNW6	NNW9	SW4	NNW7	N7	ENE4.8	NNE18
26-Jul	ENE10	SE10	SE17	SE9	SE11	SSE6	SW3	SE3	SE5	SSE7	SE7	SSE9	SSE11	SE11	SSE10	SSE9	SW12	W20	W16	W13	W14WSW17WSW18WSW11	SSW5.5	W20			
27-Jul	S5	S7	SW10	SW7	S7	SSE12	SSE9	SE7	SE8	SE6	SSE8	SSW6	SSW4	WSW5	SSE6	S6	SE17	S27	S26	S17	SSE20	S24	SSE24	SSE24	S11.1	S27
28-Jul	S20	SSE20	SSE20	SSE19	SSE20	SSE18	SSE15	SSE9	SSE7	SSE6	SE7	ESE7	SSE6	S9	SSE9	SSE7	SE8	S8	SE10	SSE12	S13	SSW12	S16	S20	SSE11.9	SSE20
29-Jul	SSW16	S7	S10	SSE7	SW7	SW19	SW7	S14	SSW12	S10	SSE6	SE8	ESE7	SE6	SSE4	WNW3	NNE7	NNE12	NE10	E13	SE18	SE19	SE19	SE22	SSE7.2	SE22
30-Jul	SE15	SE16	SE20	SE15	SE12	SE15	SE12	SSE11	SSE13	SSE11	SSE12	SSE16	S15	SE10	SSE10	ESE8	SSE15	SSE17	SE19	SE21	NW37	NNE33	NE31	ESE12	SE10.1	NW37
31-Jul	S24	SSW12	S5	ENE2	S2	ENE2	SSE11	SSE12	SE3	NE5	NE13	NNE19	NNE21	NNE20	NNE21	N32	N26	NNW23	N20	N23	N28	N27	N32	N35	NNE11.3	N35

SSW6.2SSW6.2SSW5.6	S5.1SSW5.0	S5.6	S4.9	S4.4	S4.4	S4.4	S4.8	S4.4SSW5.6	SW5.1SSW4.0SSW4.9	SW5.5	SW3.8	SW3.5SSW3.0	S3.2	SW2.9	SW1.9	S0.5SSW3.2	Diurnal Average
WNW36WNW31	W30	SSE29	SE30	W25	W22	W20	W18	SW25WSW30WSW29WSW33WSW33WSW36WSW33	NW45	NW43	NW35WNW30	NW37WNW33WNW34	N35	Diurnal Maximum			

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



Summary of Hour Standard Deviations

Mannix - July 2014

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

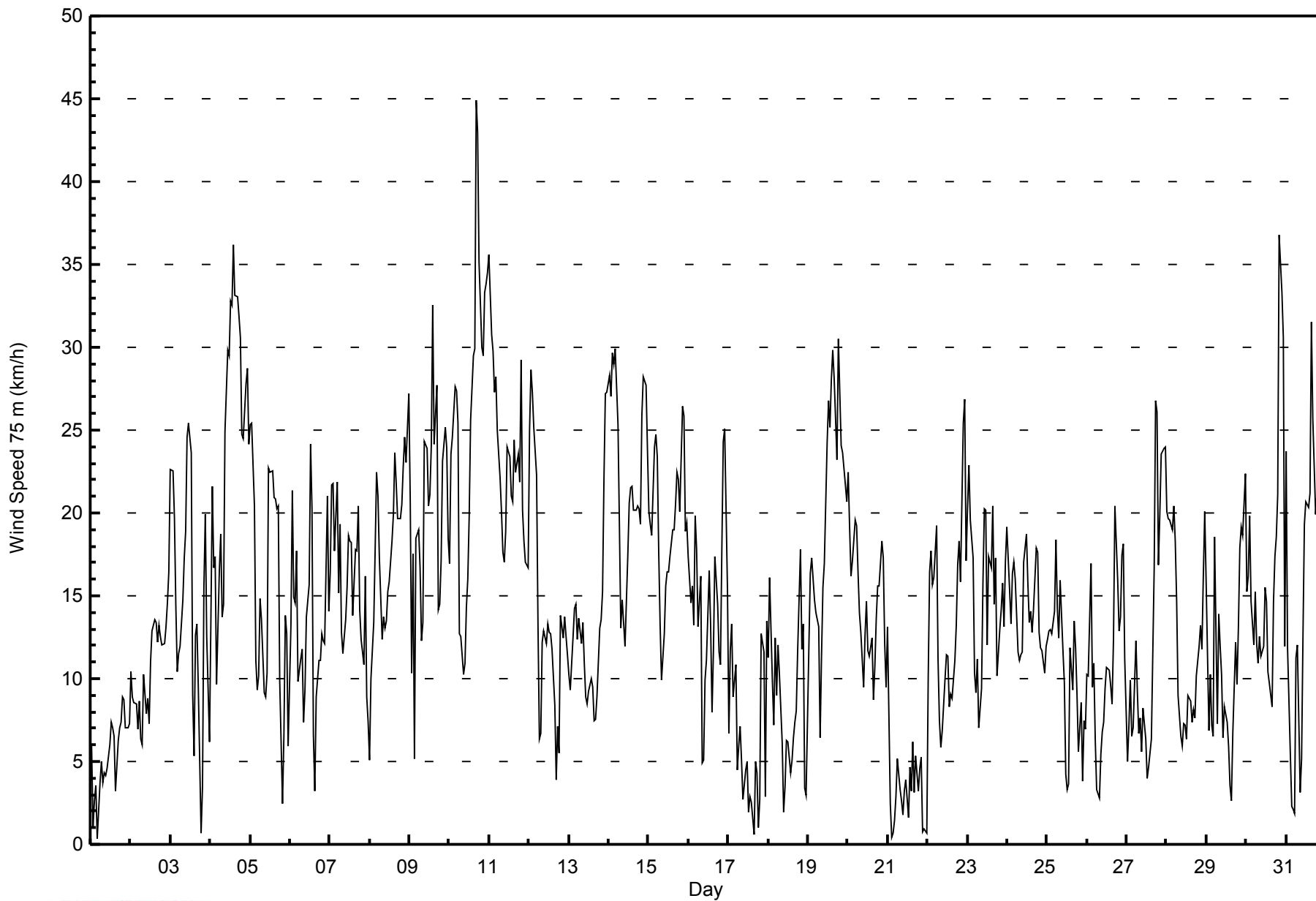


WBEA NETWORK

Hourly Averages

Wind Speed 75 m (WS75m) - km/h

Mannix - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	82	11.02	11.02
6 - 11	183	24.60	35.62
12 - 19	287	38.58	74.19
20 - 28	155	20.83	95.03
29 - 38	35	4.70	99.73
> 38	2	0.27	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

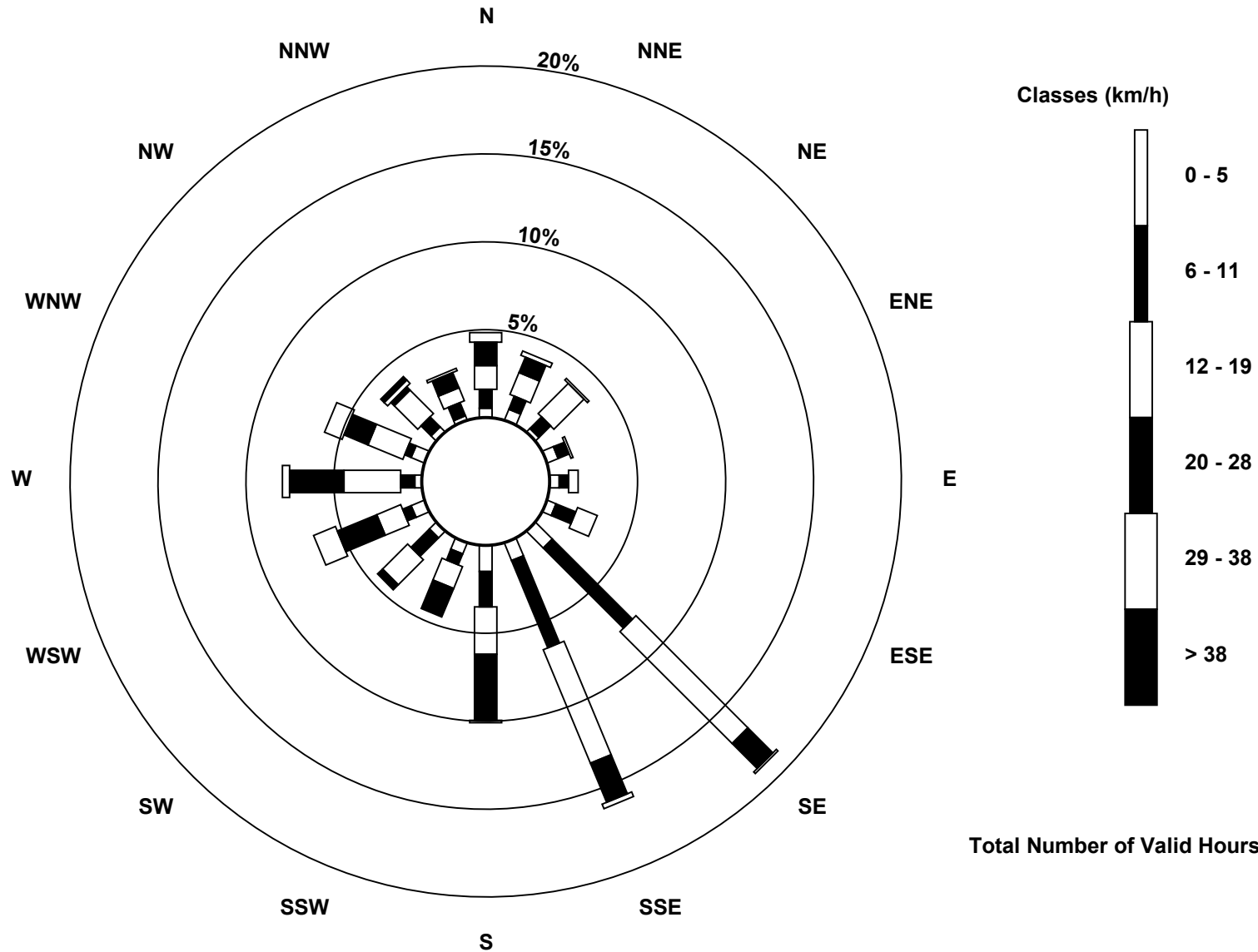
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	5	2	5	4	4	10	8	11	5	4	6	3	6	3	2	82
6 - 11	8	6	7	5	4	9	48	40	15	5	11	4	6	3	6	6	183
12 - 19	10	10	18	1	4	9	67	52	20	10	15	11	24	16	14	6	287
20 - 28	10	7	0	0	0	0	15	18	28	13	3	18	23	11	2	7	155
29 - 38	4	2	1	0	0	0	1	2	1	0	0	10	3	8	2	1	35
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Totals	36	30	28	11	12	22	141	120	75	33	33	49	59	44	29	22	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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



Total Number of Valid Hours: 744



Summary of Hour Averages

Mannix - July 2014

Maximum Speed: 45 km/h on Jul 10 17:00	Maximum Daily Speed Average: 25.0 km/h on Jul 4	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jul 3 19:00	Minimum Daily Speed Average: 0.8 km/h on Jul 21	Hours of Data: 743
Maximum Diurnal Speed Average: 6.7 km/h at hour 1	Minimum Diurnal Speed Average: 0.8 km/h at hour 23	Hours of Missing Data: 1
Monthly Average Velocity: 4.4 km/h 187.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 6 Q ₁ = 10 Median = 15 Q ₃ = 21 P ₉₀ = 27 P ₉₉ = 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-Jul	ENE6	E2	WNW2	WSW3	S1	SE4	SW4	WSW4	S4	SSE4	SE5	SE6	SE8	E8	SSE7	S3	NE6	SW7	SW7	S9	SSE9	SSE7	SSE8	SE9	SSE3.6	SSE9
2-Jul	SE12	SE12	SE9	SE8	ESE7	SE10	SE8	SE7	SE11	SE9	SE9	ESE9	SE12	SSE13	SSE14	SSE14	SE13	SE14	SE14	ESE17	ESE15	ESE17	ESE20	ESE22	SE12.1	ESE22
3-Jul	SE26	SE26	SE23	SE17	ESE15	ESE18	ESE17	ESE19	ESE21	SE24	SE27	SE28	SSE27	E13	E6	SE14	ESE18	ESE11	WNW1	NW4	NNW16	N21	NNE14	NW6	ESE13.0	SE28
4-Jul	W14	W22WSW18	SW19	SW11	SSW18	SW20	SSW14	SW15	SW25WSW30WSW30WSW33	SW33WSW36WSW33WSW34WSW32WSW31WSW25	SW27WSW31WSW32WSW27	WSW25.0	WSW36													
5-Jul	WSW29WSW29WSW22	SW12WSW11	SW11	SSW15	SSW15	S10	SE10	SW11WSW23WSW23WSW23	W21WSW21WSW20WSW20	N10	W3	NW7	N14	NNE14	ENE7	WSW11.1	WSW29									
6-Jul	SE15	S23	SW17WSW16	W19	W11	W12	W12	WSW8	WSW9	W14	W16	W22	NNE21	ENE7	ENE3	NW9	NW11	W11WSW13	NW13	NW13	NW19	NW15	W8.4	S23		
7-Jul	WNW18WNW23WNW23WNW20WNW23WNW17WNW21	W13WNW12	NW14	NW16WNW18WNW18	W18	NNE15	NNE19	NNE22	NNE15	NE13	NNE12	NNE17	NE9	E8	NW11.4	WNW23										
8-Jul	ESE8	SE12	SE14	SE20	SSE25	SSE25	SSE20	SSE14	SSE15	SE14	SE14	SE16	SE17	SSE19	SSW20	S24	S23	S21	SSE21	S22	SSE24	SSE26	SSW26	SSW31	SSE18.2	SSW31
9-Jul	SW23	SW13	W18	NNE7	SSE18	S22	SSE20	SSE15	SE15	SSW25	S25	S21	S22	SSE25	S34	SW24	W28	W15	SSW15	SSW18	SW25WNW26WNW25	W19	SSW14.4	S34		
10-Jul	W18WSW25	W25WSW29WSW28WSW26	W13WSW13	W10	W11	W14	W16WNW20	W25	W29	W30WNW45WNW43WNW36	W30WNW31WNW35WNW35WNW36	W24.9	WNW45													
11-Jul	WNW37	W32	W31	W28	W29	W26	W23	W20	W18WSW17WSW19WSW24	W23WSW21WSW21	W24	W22WNW23NNW23	NNE31	N21	N19	N19	NNW19	WNW19.2	WNW37							
12-Jul	NNW27	N31	NNW29	N27	N23	N15	N7	NNW7	NW12	NW13	NW12WNW13	NW13	NW13	NW12	W8	W4	NNE7	NNE6	NNE14	NE13	NE14	NE14	E15	N11.5	N31	
13-Jul	E15	ESE14	ESE15	SE14	SE14	ESE16	ESE17	SE14	SE15	SE12	SE10	SE9	SE10	SSE10	SSE10	SSE8	SSE8	SSE9	SSE13	SSE14	SE16	SE25	SE31	SSE32	SE14.0	SSE32
14-Jul	SSE33	SE31	SE34	SE32	SE33	SE28	SSE22	SSE14	SE15	SE14	SE13	SE19	SE22	SSE22	SSE22	SSE21	SSE21	SSE21	SSE21	S20	S28	SSW31	SSW31	SSW27	SSE22.3	SE34
15-Jul	SSW22	S21	S19	S25	S27	S26	SSE19	SSE14	SSE11	SE14	SE16	SSE17	S17	SSE18	SSW20	S20	S21	S24	SSW23	S21	S29	S29	S21	S20	S19.9	S29
16-Jul	SSW19WSW17WSW17	W15WNW21	NW17WNW13	W17	NNW6	N6	NNE10	N11	NNW17	NNW14	NW8WSW12WSW17WSW15	SSW12	SW11	SW19WSW27	N27	NE17	W8.8	WSW27								
17-Jul	N8	NNW13	NNW15	NW10	NW11	N6	NNE6	NNE7	ENE5	NE3	ENE5	SSE5	W2	WNW3	NNW3	E1	E5	E4	SE1	SSW3	SW12	SW12	WSW3	NW14	NNW2.6	NNW15
18-Jul	W11	W17	NW10	NNW8	N13	N11	N13	N11	NNE6	ESE2	S3	SSW6	S6	S5	W5	SE7	SE7	SE9	SSW11	SW18	S13	UO	N3	SW3	W1.8	SW18
19-Jul	SE13	SE18	SSE19	SSE18	S16	S15	S14	SSW6	SW12	SW16WSW17	W25WSW27WSW25	W28	W30	W28	NW24	NNW32	NNW29	NNW25	NNW25	NW23WNW21	W10.7	NNW32				
20-Jul	WNW23WNW20	W17	W19	W21	W20	W17WNW14WNW13WNW10	NW13	NNW15	NW12	NNW12	NNW13	N9	N11	NNE14	NNE17	NNE17	NNE20	NNE19	NNE14	NNE11	NW10.4	WNW23				
21-Jul	NNE14	ENE4	NNE1	WNW1	NNE2	SE3	SSE6	S3	S2	SE1	ESE3	S4	SE2	NW5	ENE3	E7	NW3	S5	SE3	WSW4	WSW5	S1	ESE2	SE2	ESE0.8	NNE14
22-Jul	SSE10	SSE15	SSE18	SSE14	SE15	SSE18	SSE13	SSE9	SSE6	SE7	SE11	SE12	SE12	SE9	SE10	SE10	SE13	SE15	SE18	SE21	ESE19	SE29	SE30	SSE20	SE14.3	SE30
23-Jul	SE22	SE25	SE24	SE21	SE14	ESE13	ESE15	ESE11	ESE13	SE18	SE22	SE22	ESE18	ESE24	ESE24	ESE25	ESE21	E22	ESE15	ESE18	SE17	SE17	SE15	SSE20	SE18.3	ESE25
24-Jul	SSE22	SE18	ESE16	SE18	SE19	SE18	ESE15	ESE15	ESE14	SE13	SE18	SE21	ESE20	ESE17	ESE17	ESE19	ESE23	SE21	ESE18	ESE20	ESE18	ESE16	ESE19	ESE17.6	ESE23	
25-Jul	ESE21	E15	NE14	NE14	N14	N19	NNE15	NE14	ENE14	ENE10	SSE4	WNW3	E4	SSE12	S9	SE14	SE14	SE10	W5	NW9	SSW3	NNW8	N8	ENE5.8	ESE21	
26-Jul	ENE12	SE14	SE19	ESE10	SE10	SE7	S3	ESE3	SE6	SE7	SE8	SSE10	SE11	SE11	SE10	SSE9	SW12	W20	W16	W13WSW15WSW19WSW19WSW14	S5.4	W20				
27-Jul	SSW6	S7	SW10	SW8	SSW7	SE11	SSE10	SE8	SE8	SE7	SE9	SSW7	SSW4	SW5	SE6	SSE4	ESE18	SSE28	S28	S19	SSE21	SSE25	SSE27	SSE27	SSE11.6	S28
28-Jul	SSE22	SSE22	SSE22	SSE22	SSE23	SSE21	SSE16	SSE10	SSE7	SSE6	SE8	ESE8	SE7	SSE9	SSE9	SSE8	SE9	S8	SE10	SSE12	S13	SSW12	S16	S21	SSE12.9	SSE23
29-Jul	SSW18	SSW7	S8	SE8	SW7	SW19	SW7	SSE15	S14	S11	SSE7	SE9	ESE8	SE6	SE3	WNW2	N7	N12	NE10	E17	SE20	SE21	SE22	SE25	SSE7.5	SE25
30-Jul	SE17	ESE19	SE22	SE16	SE14	SE17	SE14	SSE12	SE14	SE12	SE12	SSE16	SSE15	SE11	SE10	ESE9	SSE15	SSE18	SE20	SE24	NW37	NNE36	NE34	ESE13	ESE11.5	NW37
31-Jul	SSE24	S14	S5	ENE3	S2	NNE2	SE12	SSE14	SE4	NNE5	NNE13	NNE20	NNE21	NNE21	NNE22	N33	N28	NNW24	NNW21	N24	N29	N29	N34	N36	N12.0	N36

S6.7	SSW6.7	SSW5.7	S5.1	S4.9	S5.8	S5.4	S4.9	SSE4.9	SSE5.2	S4.7	S5.9	SSW5.2	SSW4.1	SSW5.0	SSW5.3	SW3.6	SSW3.3	SSW3.1	S3.4	SW3.0	SSW1.6	SSE0.8	S3.6	Diurnal Average
WNW37	W32	SE34	SE32	SE33	SE28	W23	W20	ESE21	SSW25	WSW30	WSW30	WSW33	SW33	WSW36	WSW33	WNW45	WNW43	WNW36	NNE31	NW37	NNE36	WNW35	N36	Diurnal Maximum

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



Summary of Hour Standard Deviations

Mannix - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744													
Maximum Value: 24 km/h on Jul 30 21:00														Hours of Data: 743													
Minimum Value: 0 km/h on Jul 21 04:00														Hours of Missing Data: 1													
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 10														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-Jul	2	2	1	1	1	2	3	2	2	2	2	3	3	3	3	2	5	3	2	4	2	2	2	2	5		
2-Jul	2	2	2	1	1	3	2	2	3	3	3	3	5	4	4	4	3	3	3	3	4	5	4	4	5		
3-Jul	3	2	2	4	3	4	4	6	5	6	7	7	11	5	3	4	4	5	2	2	5	3	3	3	11		
4-Jul	9	7	3	3	4	4	4	4	3	6	5	5	6	8	6	6	6	7	5	4	3	2	2	3	9		
5-Jul	1	2	2	4	2	1	1	3	3	3	9	6	6	5	5	6	6	6	4	3	2	2	12	3	3	12	
6-Jul	3	4	2	3	5	5	3	3	2	5	3	5	5	7	3	3	4	3	2	2	9	4	9	5	9		
7-Jul	1	3	3	2	2	3	4	3	3	3	3	3	3	4	6	7	5	3	3	2	2	1	2	1	7		
8-Jul	1	3	2	4	2	2	4	3	2	2	3	3	4	4	5	5	4	4	4	3	2	2	3	2	5		
9-Jul	9	5	4	3	3	2	3	3	3	7	4	4	4	8	5	5	5	5	4	5	3	4	4	3	9		
10-Jul	2	2	3	3	3	4	4	3	3	3	4	6	5	5	4	5	6	5	7	4	4	3	4	4	7		
11-Jul	3	4	2	3	5	4	3	2	2	3	3	4	4	3	5	3	3	3	7	4	3	2	3	4	7		
12-Jul	5	3	4	3	2	4	3	3	2	3	3	3	4	4	3	3	4	3	3	3	2	2	2	3	5		
13-Jul	3	5	3	3	3	2	4	4	4	4	3	4	3	4	4	4	3	3	2	1	3	2	2	2	5		
14-Jul	3	2	1	1	1	2	4	3	3	3	3	4	4	5	5	4	4	4	3	3	1	2	2	2	5		
15-Jul	3	2	2	1	2	2	4	3	3	2	3	3	4	4	3	3	4	4	4	2	4	4	2	1	4		
16-Jul	1	2	2	2	2	1	1	5	4	4	6	3	5	3	3	3	3	3	2	3	3	3	5	6	6		
17-Jul	4	4	2	4	3	1	2	2	2	2	2	3	2	3	2	3	3	2	1	2	2	5	2	5	5		
18-Jul	4	2	2	4	2	3	3	3	2	3	3	3	3	3	3	3	3	3	10	7	11	UO	4	2	11		
19-Jul	5	2	3	2	2	2	2	3	3	4	4	7	5	4	5	5	5	6	6	5	6	4	4	3	7		
20-Jul	1	2	2	1	1	1	2	2	2	3	2	4	3	4	5	3	5	3	4	1	3	1	1	1	5		
21-Jul	2	2	1	0	1	1	1	1	1	1	2	3	3	3	3	3	2	2	2	1	1	1	1	2	3		
22-Jul	3	4	3	1	1	2	2	2	2	2	2	3	3	3	3	4	4	4	3	3	4	7	3	2	7		
23-Jul	2	2	1	3	3	2	3	3	3	6	5	4	5	6	6	6	6	5	5	6	4	3	5	4	6		
24-Jul	3	3	3	4	4	4	5	4	4	4	4	5	4	6	5	5	6	5	5	4	5	5	5	5	6		
25-Jul	5	5	3	3	2	2	4	3	4	4	4	2	3	2	3	3	4	4	4	2	2	4	2	2	5		
26-Jul	2	3	2	3	2	3	2	2	2	2	4	4	3	4	4	3	4	3	3	2	2	1	2	4	4		
27-Jul	3	2	2	3	1	1	3	2	2	2	4	7	2	3	4	5	6	3	2	4	2	2	2	2	7		
28-Jul	3	1	2	2	3	3	3	3	2	2	2	3	4	3	4	3	3	2	2	3	1	1	3	2	4		
29-Jul	6	3	4	2	4	13	11	7	6	4	3	3	3	3	3	3	4	2	2	5	3	4	4	1	13		
30-Jul	5	4	3	3	2	3	3	3	3	3	2	5	4	4	3	3	4	4	4	4	24	8	7	7	24		
31-Jul	2	6	5	2	2	2	7	5	2	2	4	4	4	4	5	7	6	7	7	6	5	5	6	4	7		
														Diurnal Maximum													
UO - Unstable Operation																											

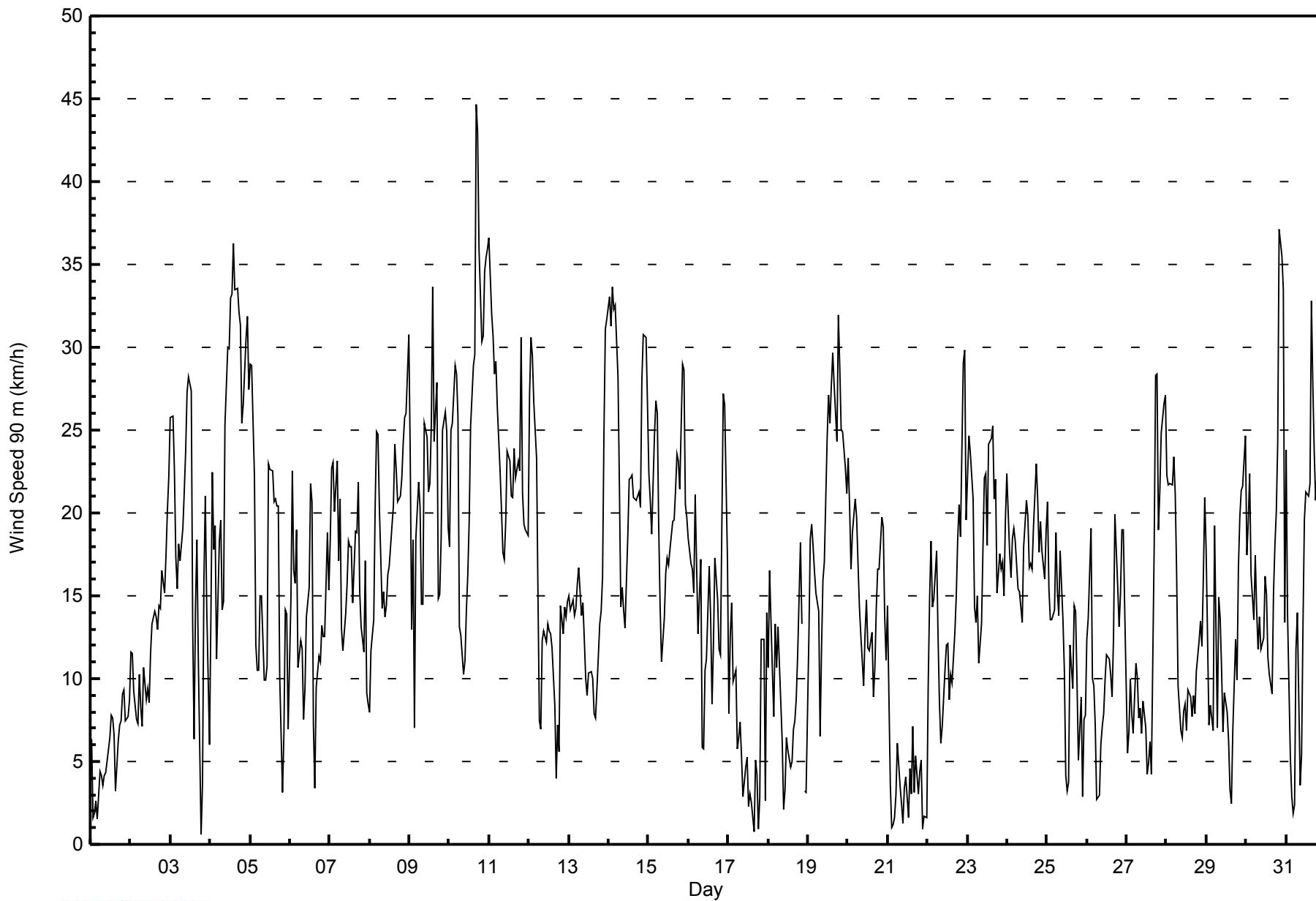


WBEA NETWORK

Hourly Averages

Wind Speed 90 m (WS90m) - km/h

Mannix - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	74	9.96	9.96
6 - 11	159	21.40	31.36
12 - 19	276	37.15	68.51
20 - 28	177	23.82	92.33
29 - 38	55	7.40	99.73
> 38	2	0.27	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

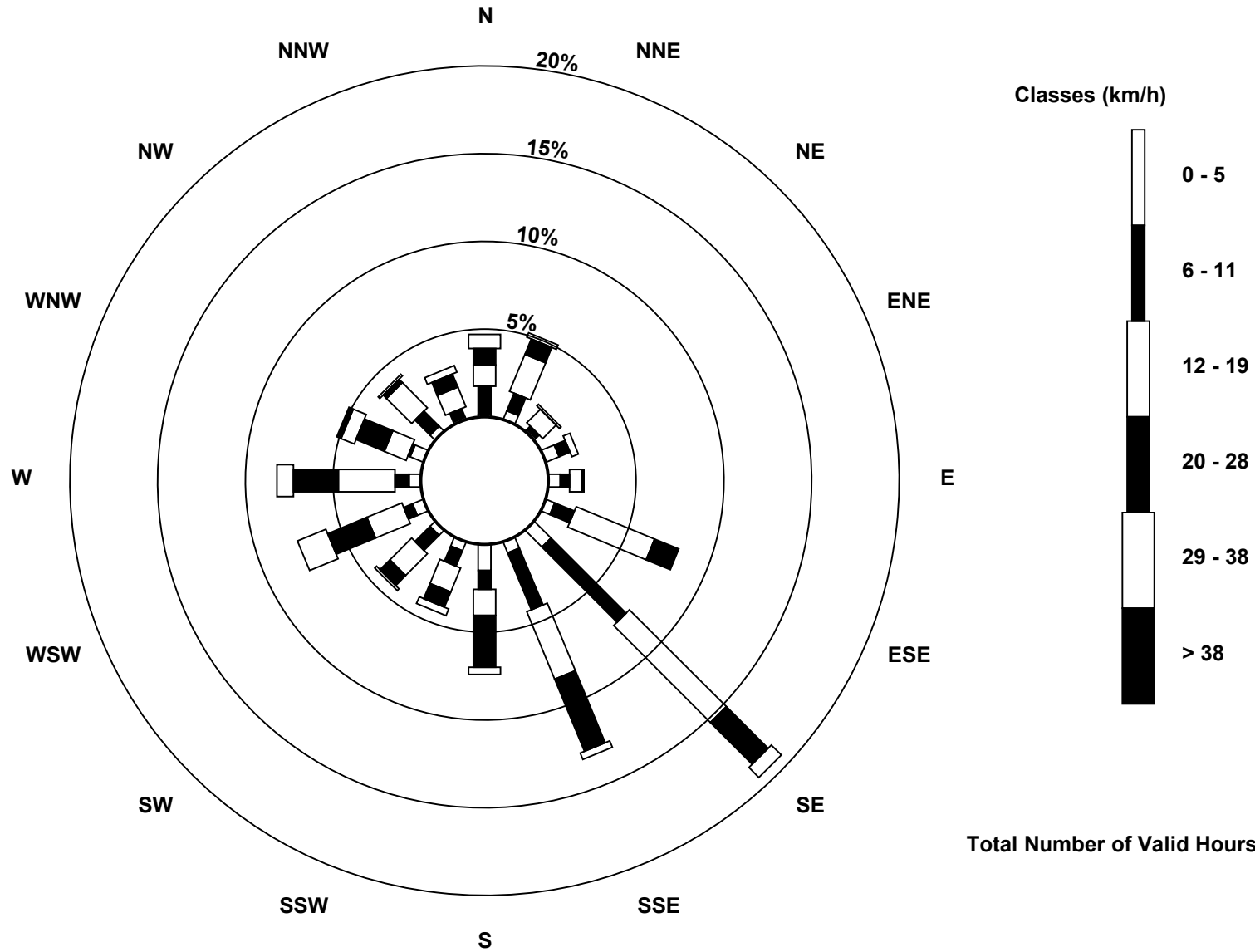
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	4	1	6	5	4	10	5	11	4	3	5	5	6	3	1	74
6 - 11	12	8	2	5	4	9	45	26	8	7	9	4	6	1	9	4	159
12 - 19	9	17	8	3	5	36	58	31	11	11	13	16	24	10	15	9	276
20 - 28	7	7	0	0	1	11	25	33	22	7	6	18	19	13	2	6	177
29 - 38	6	2	1	0	0	0	6	3	3	3	1	13	7	6	1	3	55
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Totals	35	38	12	14	15	60	144	98	55	32	32	56	61	38	30	23	743

Total Number of Valid Hours: 743

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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





Direction of Maximum Speed: 303 deg on Jul 10 17:00 Direction of Maximum Daily Speed Average: 276.9 deg on Jul 10																							Hours in Service:	744	
Direction of Minimum Speed: 286 deg on Jul 5 20:00 Direction of Minimum Daily Speed Average: 0.8 deg on Jul 17																							Hours of Data:	744	
Monthly Average Direction: 220.9 deg																							Hours of Missing Data:	0	
																							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-Jul	33	268	253	244	230	224	251	230	174	119	139	147	133	103	184	183	54	241	243	179	152	210	176	155	192.3
2-Jul	155	131	168	167	173	158	143	157	151	137	145	111	136	163	160	156	149	143	143	134	136	137	129	128	144.1
3-Jul	132	139	141	128	127	129	128	131	132	132	139	144	161	90	70	139	132	139	301	324	348	18	12	275	127.6
4-Jul	270	267	229	219	191	192	231	218	222	236	252	250	253	240	244	248	243	255	244	250	237	239	231	234	242.9
5-Jul	249	252	248	160	171	171	170	178	169	129	218	252	253	265	273	258	257	256	359	286	309	344	38	66	250.6
6-Jul	173	191	217	240	252	267	258	277	255	249	274	265	268	26	74	78	326	313	271	255	297	321	309	296	273.5
7-Jul	263	280	278	268	286	255	286	269	280	301	304	285	291	282	26	30	27	36	44	47	43	18	36	57	317.7
8-Jul	160	149	154	168	164	135	151	150	150	141	135	141	143	151	213	199	192	179	164	168	161	162	167	181	162.6
9-Jul	206	147	261	196	180	169	140	131	138	199	190	176	181	162	192	242	276	266	214	207	236	280	290	271	217.2
10-Jul	266	262	261	253	254	260	255	245	272	281	279	262	287	279	280	271	303	302	301	275	278	282	281	283	276.9
11-Jul	285	278	274	269	267	272	274	263	257	252	253	258	265	258	258	266	276	286	337	20	357	359	356	357	280.4
12-Jul	340	344	338	337	356	352	320	1	303	309	302	295	305	312	307	269	244	36	27	34	45	43	49	81	339.2
13-Jul	94	104	148	156	148	144	140	140	146	139	133	137	139	158	169	177	162	174	169	165	146	151	153	157	147.1
14-Jul	157	155	152	150	150	149	150	145	137	140	136	137	141	171	170	172	169	173	169	173	179	188	205	192	159.6
15-Jul	170	157	146	155	157	160	160	153	132	138	140	157	182	201	200	191	194	194	199	193	176	175	157	158	168.8
16-Jul	167	185	221	242	259	266	262	268	8	354	14	19	337	332	319	263	252	244	218	220	217	253	9	41	275.2
17-Jul	287	304	316	268	259	74	49	41	68	42	64	156	315	298	352	213	106	101	143	203	227	252	235	284	292.9
18-Jul	267	262	297	316	340	335	4	22	28	169	176	216	194	202	273	148	147	136	218	236	179	240	29	227	245.1
19-Jul	153	150	156	157	163	161	168	200	234	237	264	271	260	249	274	265	271	322	334	332	335	328	319	286	270.8
20-Jul	274	262	257	255	257	257	261	270	278	290	324	337	311	334	349	6	359	37	37	39	34	42	27	353	311.3
21-Jul	29	239	268	252	256	212	230	205	214	115	103	218	137	344	78	97	307	195	156	243	263	201	260	212	230.2
22-Jul	194	177	162	144	170	161	159	158	148	137	148	145	141	141	137	134	136	134	141	142	137	141	155	142	146.8
23-Jul	143	144	139	141	140	124	138	125	127	142	144	149	106	129	126	133	112	95	109	126	137	147	136	153	130.9
24-Jul	164	135	130	132	135	134	130	123	132	133	147	144	130	126	128	125	104	131	136	120	111	105	113	112	127.4
25-Jul	111	79	42	39	1	7	23	33	70	83	67	170	274	114	169	186	153	144	150	280	308	239	278	341	76.8
26-Jul	68	120	143	154	173	234	257	143	140	149	138	157	153	148	150	167	236	269	269	271	262	237	239	186	204.9
27-Jul	152	160	196	163	163	160	154	137	143	126	143	187	199	244	143	145	120	178	183	177	161	161	156	153	160.1
28-Jul	158	150	149	154	156	154	158	148	143	138	135	122	142	174	162	161	132	189	146	153	177	198	176	175	155.2
29-Jul	140	138	165	137	208	207	207	171	204	186	167	142	112	145	135	279	18	9	32	100	141	143	138	149	146.2
30-Jul	137	140	153	166	168	157	147	152	149	145	150	152	176	139	150	124	158	162	144	141	323	39	46	141	136.9
31-Jul	185	193	119	15	227	197	167	177	107	53	44	24	24	26	22	358	6	338	345	359	348	351	360	353	7.6
191.2 198.8 204.6 194.2 203.0 194.1 192.1 183.1 167.1 168.3 176.3 201.1 219.2 211.3 218.2 221.2 230.7 233.8 216.1 204.1 239.1 228.5 340.9 193.7																									
Diurnal Average																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Summary of Hour Standard Deviations

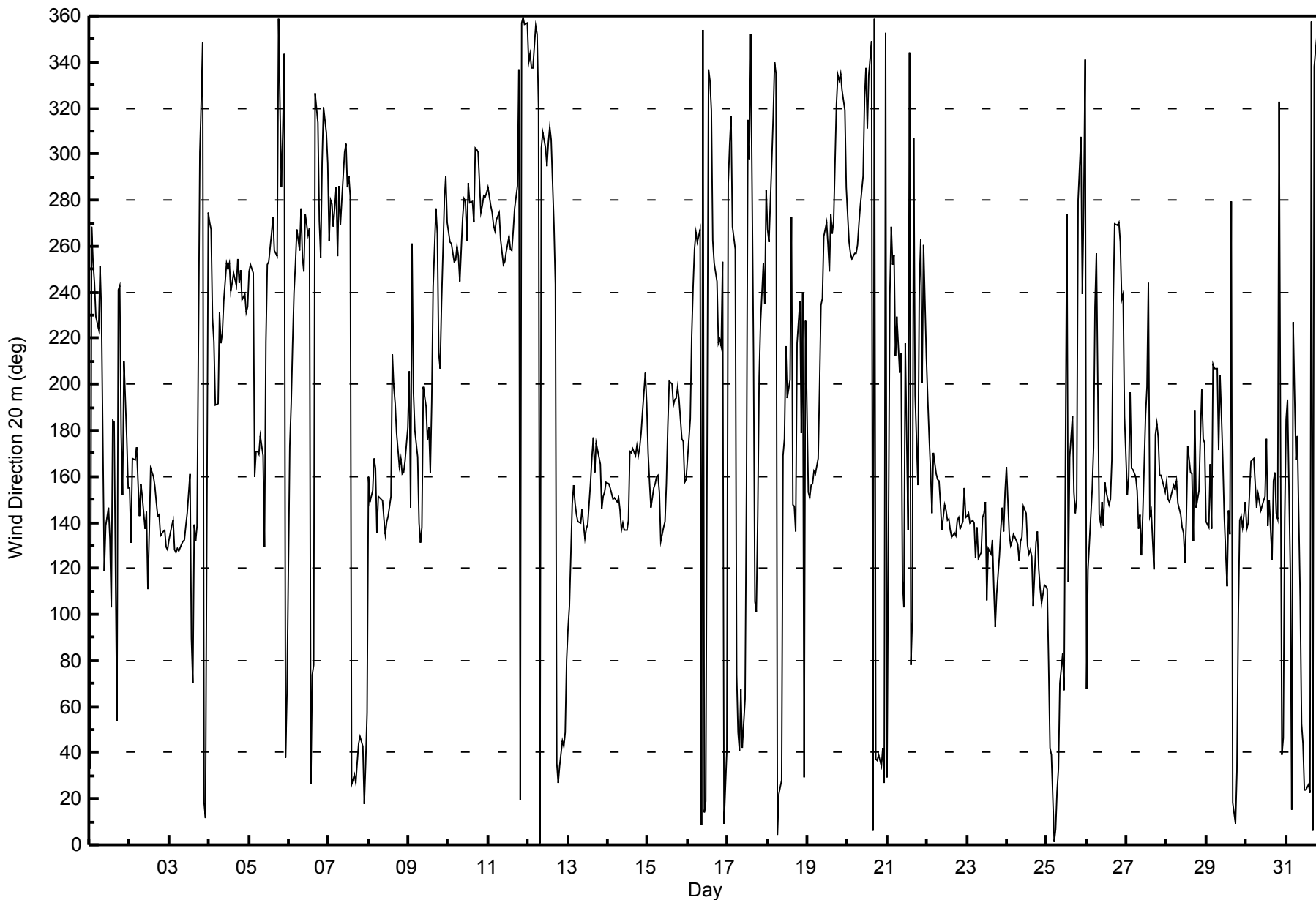
Mannix - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 98 deg on Jul 12 17:00 Minimum Value: 6 deg on Jul 11 03:00 Percentiles: P ₁ = 8 P ₁₀ = 12 Q ₁ = 15 Median = 19 Q ₃ = 31 P ₉₀ = 54 P ₉₉ = 85																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	19	28	12	14	36	35	20	53	33	35	60	52	38	30	44	65	73	40	16	30	15	20	63	29	73
2-Jul	22	13	14	32	20	17	20	23	20	26	24	33	39	30	21	21	20	17	16	14	15	15	13	13	39
3-Jul	12	11	13	13	13	16	15	16	14	15	14	17	39	28	61	18	16	21	75	40	17	18	25	30	75
4-Jul	74	17	14	15	39	26	15	27	24	16	14	16	14	18	17	19	15	13	14	13	11	10	10	12	74
5-Jul	7	10	14	48	26	19	17	23	28	17	66	22	19	21	15	19	16	16	37	92	40	43	29	66	92
6-Jul	35	15	21	15	33	55	18	20	25	40	16	20	23	17	68	84	56	25	28	17	38	49	37	38	84
7-Jul	24	11	18	17	18	39	23	11	16	30	20	16	21	18	43	18	15	12	14	13	23	16	14	58	58
8-Jul	79	21	13	14	22	13	19	18	16	17	14	15	18	22	25	22	22	25	17	16	12	12	15	15	79
9-Jul	59	76	17	66	13	18	15	14	15	28	23	22	25	26	21	40	11	24	27	26	14	19	15	8	76
10-Jul	9	7	8	10	9	9	15	17	25	22	23	28	17	13	13	14	12	12	15	9	10	10	10	10	28
11-Jul	10	10	6	8	10	10	9	11	10	11	12	11	12	14	16	13	12	16	32	13	15	12	15	14	32
12-Jul	18	16	17	16	12	30	41	29	23	22	27	26	28	30	24	32	98	32	39	13	12	8	20	11	98
13-Jul	12	21	15	13	16	17	14	16	22	21	34	31	28	33	48	58	39	47	18	14	11	12	12	14	58
14-Jul	14	14	12	13	11	12	14	16	14	15	15	13	14	25	22	23	19	21	17	16	16	16	14	16	25
15-Jul	16	12	11	13	14	15	16	18	17	13	14	18	31	26	20	24	20	21	19	18	16	18	13	13	31
16-Jul	20	29	28	18	9	12	16	11	70	71	45	20	21	24	37	15	14	18	24	22	16	18	36	32	71
17-Jul	29	31	32	62	30	75	57	28	38	69	47	52	72	81	90	84	33	42	68	76	10	59	67	28	90
18-Jul	15	22	33	24	13	31	23	18	35	96	63	46	48	86	42	43	44	23	52	26	46	62	67	62	96
19-Jul	20	15	15	15	18	16	25	31	19	17	21	13	14	14	16	15	11	26	18	18	23	15	17	13	31
20-Jul	7	11	15	9	12	8	8	11	14	29	24	30	35	36	25	41	42	18	17	13	11	11	15	25	42
21-Jul	21	18	18	45	33	22	17	35	54	68	68	61	87	63	74	45	57	41	42	35	9	76	11	60	87
22-Jul	44	37	14	14	17	18	18	19	31	16	23	23	19	39	27	32	22	18	13	11	11	12	16	18	44
23-Jul	13	11	12	10	13	15	15	18	18	23	15	15	20	17	17	15	21	14	22	26	17	14	20	19	26
24-Jul	18	16	13	12	13	13	17	18	15	19	19	17	16	22	22	21	21	16	14	20	17	18	19	18	22
25-Jul	17	28	16	26	24	15	32	20	28	26	29	47	65	61	29	29	19	23	70	42	58	58	27	29	70
26-Jul	36	20	12	18	18	35	19	59	28	35	29	39	35	32	39	63	37	9	12	9	11	12	9	47	63
27-Jul	30	16	14	20	12	16	22	17	22	21	34	80	70	58	66	84	43	22	21	28	16	18	16	17	84
28-Jul	14	13	14	15	15	14	18	22	20	19	18	23	37	54	55	40	31	40	14	12	19	14	21	15	55
29-Jul	33	14	25	32	41	38	90	38	56	32	48	23	30	55	93	79	55	16	17	32	12	13	14	12	93
30-Jul	12	14	12	11	12	14	15	20	16	20	19	25	28	36	45	25	24	19	11	11	78	38	24	47	78
31-Jul	18	55	60	73	70	49	16	27	52	33	24	19	19	17	20	19	17	27	48	37	15	16	16	15	73
79 76 60 73 70 75 90 59 70 96 68 80 87 86 93 84 98 47 75 92 78 76 67 66																									
Diurnal Maximum																									



WBEA NETWORK
Hourly Averages

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





Summary of Hour Averages

Mannix - July 2014

Direction of Maximum Speed: 305 deg on Jul 10 17:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 280.6 deg on Jul 10	Hours of Data: 744
Direction of Minimum Speed: 28 deg on Jul 9 04:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.7 deg on Jul 21	Percent Operational Time: 100.0
Monthly Average Direction: 222.4 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-Jul	32	325	281	284	277	241	264	232	175	129	142	149	135	107	177	187	54	240	236	181	161	187	165	146	184.2
2-Jul	148	128	145	163	154	151	135	150	151	140	141	116	144	162	157	156	147	140	140	129	131	131	128	127	141.5
3-Jul	136	140	142	130	125	124	126	129	130	131	137	143	159	97	82	138	128	134	316	323	351	18	16	293	126.0
4-Jul	270	272	233	226	205	199	234	215	223	236	252	249	253	239	243	245	242	254	243	248	238	240	235	241	242.0
5-Jul	248	249	255	190	212	190	174	182	177	132	220	250	253	265	275	257	257	257	2	280	319	358	38	64	248.1
6-Jul	158	187	222	245	260	279	263	281	258	251	276	265	269	27	74	87	321	320	275	254	306	321	315	311	276.2
7-Jul	280	289	287	286	292	275	294	274	288	308	311	290	297	286	22	28	25	34	42	43	36	24	44	71	323.0
8-Jul	117	140	152	168	170	143	155	153	151	143	136	142	144	152	209	196	191	181	169	174	167	166	177	195	166.5
9-Jul	213	222	267	28	181	178	148	136	141	197	190	177	183	167	191	230	278	268	211	207	235	286	297	275	213.4
10-Jul	269	263	264	255	255	261	259	245	273	281	282	266	290	283	281	272	305	305	304	279	283	288	287	288	280.6
11-Jul	290	283	278	275	273	277	278	265	261	253	253	258	266	258	259	269	279	290	340	20	359	1	355	351	286.4
12-Jul	344	349	344	345	358	359	336	359	309	315	307	303	312	318	312	273	250	37	29	36	44	42	51	86	345.5
13-Jul	97	107	140	151	144	136	135	138	143	140	133	142	140	156	168	170	161	174	170	166	147	151	153	155	146.5
14-Jul	155	153	152	149	147	147	151	149	138	140	137	138	140	172	172	172	169	175	170	176	183	192	207	199	163.0
15-Jul	186	173	154	159	162	166	162	157	137	138	142	158	183	199	200	190	193	193	198	193	180	180	166	165	174.3
16-Jul	175	216	252	262	274	283	276	273	6	3	14	18	341	337	322	262	252	244	215	217	219	252	9	40	277.4
17-Jul	326	325	330	293	291	48	40	38	65	49	75	158	306	292	342	161	104	98	151	208	224	241	240	303	311.5
18-Jul	272	265	320	327	351	356	5	18	25	162	177	215	188	188	275	150	142	135	213	228	180	233	12	231	249.7
19-Jul	151	150	157	162	166	169	171	197	233	235	264	272	261	249	278	267	273	327	337	337	338	333	324	296	273.7
20-Jul	280	277	264	272	272	268	270	277	284	299	328	342	319	339	350	4	3	37	36	38	36	39	39	22	323.1
21-Jul	41	50	289	77	93	138	213	202	199	114	116	196	159	331	72	94	309	193	155	247	260	165	247	225	174.9
22-Jul	165	171	160	148	156	162	155	157	150	138	148	148	142	145	136	134	133	133	139	138	133	138	155	149	147.1
23-Jul	142	141	135	134	130	125	131	121	124	143	143	148	107	125	124	130	112	95	110	128	136	141	136	155	130.0
24-Jul	167	143	129	131	133	132	127	122	130	132	148	142	127	125	126	124	106	128	134	121	112	107	114	114	128.0
25-Jul	111	81	48	43	5	8	23	37	69	83	69	180	271	113	171	186	151	142	155	284	325	232	313	347	72.5
26-Jul	72	122	141	149	163	209	252	140	143	147	135	157	152	148	151	168	229	270	269	271	262	245	245	214	194.8
27-Jul	165	170	210	189	166	158	157	136	142	127	146	196	200	238	145	185	122	178	185	181	163	165	158	157	166.5
28-Jul	165	156	152	156	156	155	158	151	145	141	136	119	146	172	160	160	131	190	145	154	186	204	175	177	159.6
29-Jul	170	153	165	141	205	213	221	170	200	186	166	144	116	141	147	294	16	11	35	101	140	141	137	148	152.9
30-Jul	134	135	147	151	164	150	143	154	147	146	149	155	174	137	150	121	160	162	144	139	325	34	45	136	135.8
31-Jul	183	197	148	49	232	117	160	173	127	45	41	23	22	24	23	359	8	341	346	1	353	355	2	357	8.2

182.9 191.3 196.4 186.5 193.6 186.3 185.2 177.1 165.9 169.5 174.3 194.5 212.0 203.6 210.5 212.5 223.6 224.3 206.7 190.3 221.4 210.7 163.1 188.0
Diurnal Average

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



Summary of Hour Standard Deviations

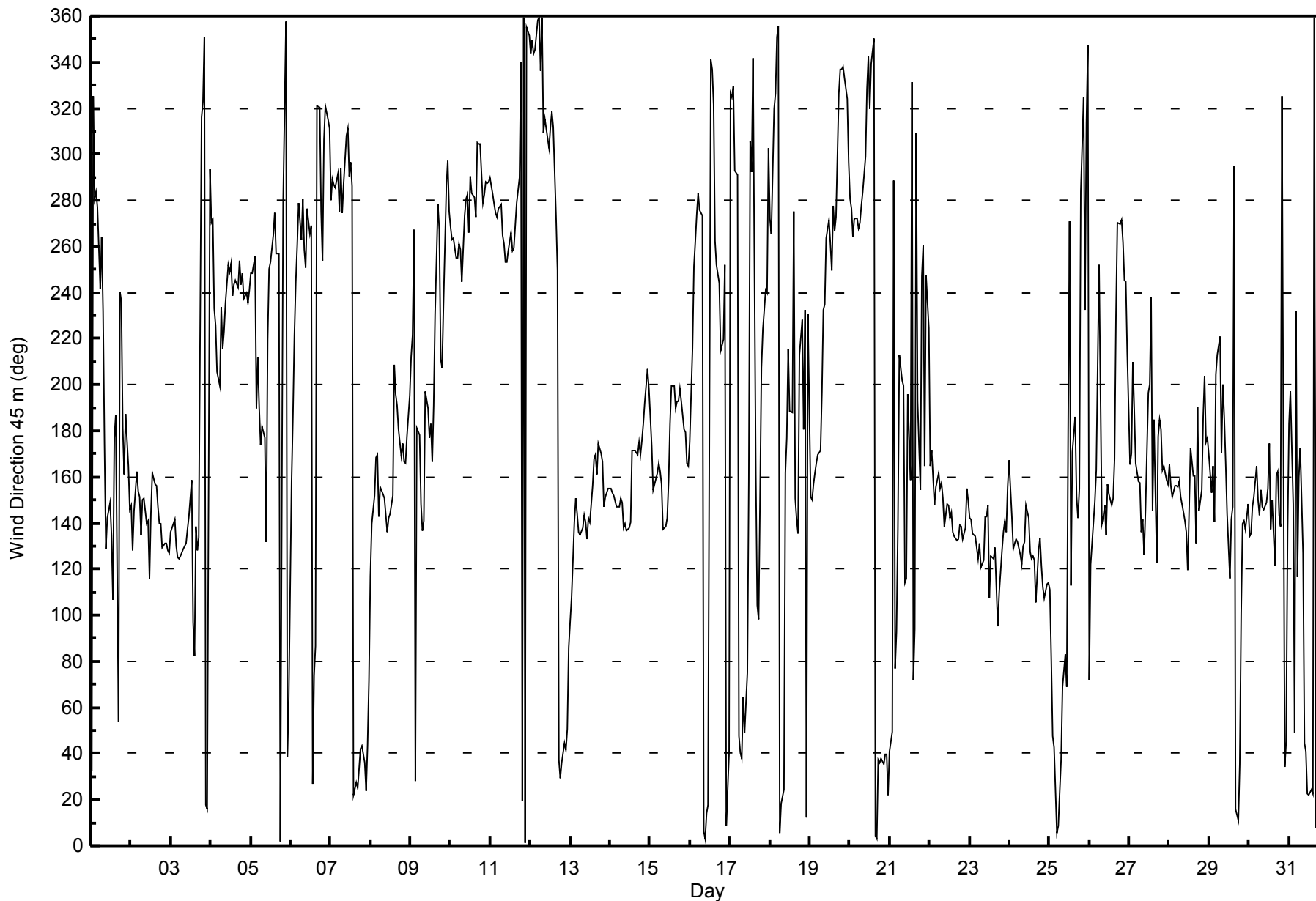
Mannix - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744																								
Maximum Value: 94 deg on Jul 12 17:00														Hours of Data: 744																								
Minimum Value: 3 deg on Jul 30 05:00														Hours of Missing Data: 0																								
Percentiles: P ₁ = 4 P ₁₀ = 7 Q ₁ = 9 Median = 14 Q ₃ = 24 P ₉₀ = 45 P ₉₉ = 81														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-Jul	7	36	9	14	72	29	23	58	28	31	36	39	28	28	40	60	71	35	12	19	15	15	39	18	72													
2-Jul	12	8	7	19	11	10	13	16	13	19	18	26	32	20	16	15	15	11	11	9	9	11	8	8	32													
3-Jul	6	6	8	8	7	10	10	11	8	11	10	14	31	21	56	14	12	14	80	30	13	12	16	29	80													
4-Jul	64	15	9	12	33	19	10	17	16	13	11	14	12	15	15	17	12	11	10	10	6	5	4	4	64													
5-Jul	4	6	8	25	24	17	7	10	17	14	60	20	19	20	15	18	15	16	36	83	40	21	24	53	83													
6-Jul	22	12	11	9	20	56	18	19	26	38	14	19	24	14	63	71	47	18	30	16	35	42	30	33	71													
7-Jul	13	6	9	10	10	24	11	9	14	24	13	11	16	14	38	14	10	9	10	10	22	8	11	22	38													
8-Jul	15	13	9	5	12	9	11	11	10	12	9	10	12	16	17	14	12	15	11	7	6	6	9	5	17													
9-Jul	45	71	12	79	7	7	10	10	10	21	13	14	13	21	11	38	9	24	21	19	11	18	10	7	79													
10-Jul	7	5	6	6	6	7	12	14	20	20	19	27	14	12	11	13	7	7	12	7	8	7	6	6	27													
11-Jul	5	7	5	6	8	7	7	9	7	10	9	9	11	12	15	12	10	11	29	8	9	7	9	10	29													
12-Jul	12	8	9	9	6	12	30	22	19	14	19	21	23	24	18	30	94	23	43	9	7	5	20	9	94													
13-Jul	7	17	11	8	10	9	10	12	13	18	24	23	24	22	34	51	29	23	10	7	7	6	6	7	51													
14-Jul	7	7	6	6	5	7	9	12	8	10	10	9	11	15	13	14	10	12	9	6	4	7	4	6	15													
15-Jul	8	8	6	5	5	6	8	12	14	9	10	11	23	16	12	12	9	10	9	8	5	6	7	4	23													
16-Jul	13	28	11	9	8	5	14	9	69	75	45	15	13	16	35	14	11	13	15	14	10	15	33	24	75													
17-Jul	60	21	17	20	18	26	46	23	30	69	45	48	82	71	81	93	31	26	69	83	5	50	65	30	93													
18-Jul	17	20	19	17	6	21	16	13	26	88	63	39	40	83	40	36	31	17	54	22	43	54	61	53	88													
19-Jul	15	10	8	7	8	7	14	21	14	13	21	12	13	11	15	14	9	22	13	10	17	9	10	9	22													
20-Jul	6	8	11	6	8	6	7	10	11	27	16	23	25	28	18	30	31	13	12	8	6	6	10	6	31													
21-Jul	9	84	58	31	22	41	17	23	34	67	54	73	88	57	77	40	58	36	33	39	11	69	48	66	88													
22-Jul	31	12	4	9	10	10	12	15	23	12	14	17	15	31	23	24	17	12	8	7	5	8	11	15	31													
23-Jul	8	4	6	5	5	8	8	12	12	17	11	10	14	12	11	11	17	11	16	22	12	9	10	13	22													
24-Jul	8	14	7	5	6	8	12	13	11	15	14	12	10	15	17	15	16	13	10	15	12	12	13	12	17													
25-Jul	11	26	14	20	17	9	25	17	26	25	27	44	64	58	21	19	14	21	54	44	29	62	22	29	64													
26-Jul	32	14	7	11	7	21	20	54	21	21	23	30	21	23	28	34	36	8	11	8	12	7	8	28	54													
27-Jul	31	11	10	28	17	10	16	12	14	16	28	69	57	45	61	82	41	15	11	19	6	11	9	10	82													
28-Jul	8	8	8	8	8	8	11	15	21	20	14	18	31	36	54	35	28	27	12	6	20	10	9	6	54													
29-Jul	15	14	16	14	37	41	90	39	55	16	32	19	26	48	78	76	49	9	16	29	7	9	10	6	90													
30-Jul	7	8	5	9	3	9	10	14	10	13	11	18	18	27	31	21	16	11	7	5	77	34	20	46	77													
31-Jul	8	38	47	73	90	84	12	15	52	25	21	13	14	12	14	14	11	21	43	32	9	10	10	7	90													
														64	84	58	79	90	84	90	58	69	88	63	73	88	83	81	93	94	36	80	83	77	69	65	66	
														Diurnal Maximum																								



WBEA NETWORK
Hourly Averages

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





Summary of Hour Averages

Mannix - July 2014

Direction of Maximum Speed: 306 deg on Jul 10 17:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 281.5 deg on Jul 10	Hours of Data: 744
Direction of Minimum Speed: 155 deg on Jul 1 05:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.7 deg on Jul 21	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-Jul	56	26	297	268	155	169	253	236	183	146	147	151	136	105	172	178	52	240	229	182	166	171	161	140	168.2
2-Jul	148	137	139	149	135	137	133	142	151	140	135	117	146	159	154	154	146	140	139	128	131	129	130	131	139.9
3-Jul	140	141	143	134	128	126	127	131	132	134	138	144	159	102	97	137	129	132	322	319	352	18	22	312	127.2
4-Jul	265	272	239	232	221	211	235	216	222	235	252	248	252	237	242	243	241	252	243	247	239	241	239	247	242.3
5-Jul	251	253	260	214	235	210	193	190	186	142	225	249	252	264	274	255	256	257	3	282	326	4	40	62	250.4
6-Jul	149	182	229	251	265	283	271	283	257	248	275	265	269	28	69	84	319	327	278	258	318	323	318	319	279.1
7-Jul	290	295	294	295	298	287	297	280	294	313	312	292	298	287	21	28	24	33	41	43	33	24	57	85	326.5
8-Jul	127	137	138	153	169	153	161	156	155	148	140	148	147	152	207	195	190	181	172	176	170	171	194	207	169.3
9-Jul	219	232	273	22	167	187	166	148	147	198	189	178	183	169	190	231	279	270	212	211	236	288	299	279	215.6
10-Jul	271	263	265	257	255	261	262	244	273	277	280	266	290	284	282	273	306	306	306	282	286	291	290	290	281.5
11-Jul	291	285	281	280	279	280	281	269	267	256	255	258	266	257	259	270	280	290	342	20	2	4	357	350	289.8
12-Jul	349	356	351	354	3	7	357	355	313	317	309	306	314	322	314	272	262	38	31	37	45	42	54	91	353.1
13-Jul	97	109	134	141	138	132	133	138	142	139	132	142	141	152	165	167	160	171	168	165	147	150	153	155	145.6
14-Jul	155	152	151	147	145	145	152	154	142	142	140	141	142	170	172	171	168	174	169	177	187	199	209	204	164.2
15-Jul	198	189	169	169	170	173	167	163	149	144	147	159	182	199	198	188	192	191	197	194	183	183	178	175	179.2
16-Jul	190	240	259	276	287	300	292	277	358	9	18	16	343	340	321	261	252	243	214	220	224	251	14	44	282.9
17-Jul	353	339	334	315	313	28	39	39	71	54	78	160	286	293	346	140	101	89	144	206	219	233	237	316	330.5
18-Jul	274	270	328	335	359	7	7	17	25	144	192	213	182	178	270	149	138	133	217	222	183	224	7	229	253.4
19-Jul	147	147	156	164	172	177	175	201	231	233	262	271	260	250	278	266	274	329	339	339	340	335	328	305	274.0
20-Jul	287	285	275	281	284	283	283	286	287	301	328	345	321	342	353	5	5	38	35	38	38	38	43	37	329.0
21-Jul	33	57	349	255	15	139	186	196	188	119	118	183	148	329	81	92	314	194	150	245	254	171	146	163	141.8
22-Jul	158	166	154	160	149	161	160	161	156	143	151	148	143	146	135	132	132	134	139	137	133	139	152	155	147.8
23-Jul	147	147	142	141	132	129	131	124	127	142	142	146	109	127	125	131	111	95	110	132	136	136	137	156	133.2
24-Jul	164	147	132	135	134	133	129	126	131	132	148	142	130	126	127	124	108	128	134	121	113	109	117	115	130.9
25-Jul	113	82	56	46	10	13	26	45	69	81	71	181	293	106	169	181	150	143	156	285	333	224	330	8	68.2
26-Jul	75	134	140	135	141	155	225	130	140	147	133	154	149	145	149	168	230	269	268	271	260	253	255	238	196.2
27-Jul	189	184	228	225	188	151	161	141	143	130	149	199	205	239	151	179	126	173	187	183	168	170	164	160	170.8
28-Jul	171	163	157	160	157	156	161	156	154	150	139	122	147	170	157	157	134	191	145	153	189	209	176	178	162.7
29-Jul	196	182	174	150	219	226	219	169	192	181	162	145	116	137	149	296	17	16	42	99	140	141	141	146	156.9
30-Jul	134	134	139	139	143	138	139	155	148	148	148	157	171	138	150	121	159	160	144	137	325	31	46	120	129.5
31-Jul	173	196	170	72	187	72	152	163	132	38	39	25	23	24	24	0	10	345	350	5	358	359	5	360	12.2

191.5 200.1 199.8 191.0 197.6 186.8 187.5 181.6 169.7 175.0 179.0 195.7 213.8 206.2 211.0 214.7 228.4 226.4 204.5 190.0 226.5 222.5 178.7 192.2
Diurnal Average

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



Summary of Hour Standard Deviations

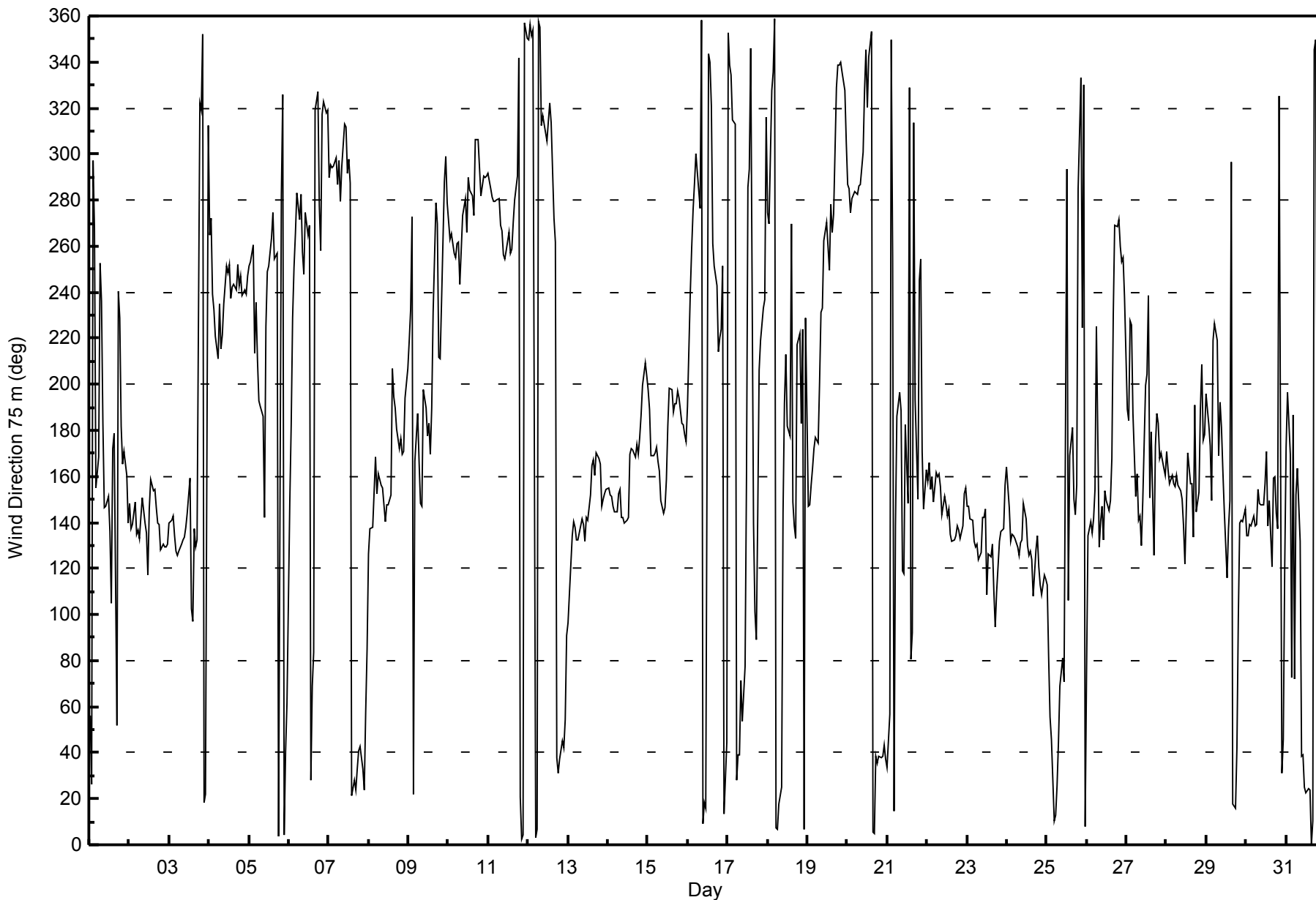
Mannix - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744																								
Maximum Value: 98 deg on Jul 1 05:00														Hours of Data: 744																								
Minimum Value: 2 deg on Jul 14 05:00														Hours of Missing Data: 0																								
Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 8 Median = 13 Q ₃ = 22 P ₉₀ = 43 P ₉₉ = 87														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-Jul	12	77	23	29	98	43	34	63	32	31	34	37	27	27	35	58	69	33	12	14	16	13	31	14	98													
2-Jul	15	8	8	15	8	7	11	14	11	17	17	23	26	18	13	13	13	11	11	10	11	12	9	8	26													
3-Jul	4	5	6	7	9	10	11	10	8	9	8	12	25	20	48	14	12	14	93	33	13	9	11	30	93													
4-Jul	55	14	9	12	30	17	9	15	14	12	10	13	11	14	14	17	11	10	9	8	5	3	4	3	55													
5-Jul	2	4	5	20	17	17	7	8	15	14	55	19	18	20	15	18	14	15	38	63	38	15	21	47	63													
6-Jul	15	19	8	9	13	50	18	17	27	32	13	18	25	13	57	66	36	18	31	15	32	33	27	29	66													
7-Jul	9	5	5	7	9	9	9	10	14	21	12	11	15	14	35	10	9	7	8	8	16	4	17	16	35													
8-Jul	12	8	5	12	4	8	8	10	9	11	8	10	11	15	15	12	11	14	11	5	6	9	9	3	15													
9-Jul	36	28	17	56	10	9	10	10	9	21	11	12	11	20	9	38	8	22	19	17	11	18	10	7	56													
10-Jul	6	4	5	5	5	6	13	12	20	19	17	25	13	11	10	13	7	6	11	7	7	6	5	5	25													
11-Jul	4	6	4	6	7	6	7	8	7	9	7	9	11	11	13	11	9	11	29	6	9	6	8	8	29													
12-Jul	11	6	7	6	4	9	22	22	17	14	17	21	21	23	17	39	87	21	48	6	6	3	20	8	87													
13-Jul	10	16	9	7	5	7	9	11	11	15	20	20	19	20	24	43	25	17	8	6	6	3	3	5	43													
14-Jul	4	4	3	3	2	4	6	11	7	8	10	8	14	12	14	10	11	7	5	6	5	3	5	5	14													
15-Jul	6	8	4	2	3	5	8	10	13	9	9	10	21	17	11	10	8	9	9	8	4	3	6	5	21													
16-Jul	15	17	5	9	9	8	16	7	57	68	40	13	12	12	34	14	10	11	14	13	9	13	33	21	68													
17-Jul	19	11	11	17	17	19	19	23	26	61	49	43	95	82	78	98	29	25	68	78	3	50	70	29	98													
18-Jul	23	18	14	12	8	14	14	11	20	89	61	32	32	77	59	31	19	15	54	27	40	43	55	52	89													
19-Jul	13	7	6	7	9	7	12	19	12	13	19	11	11	10	14	13	9	21	13	10	15	7	8	9	21													
20-Jul	5	5	9	4	4	4	6	7	12	26	15	20	23	27	16	28	27	11	9	5	4	3	6	4	28													
21-Jul	9	75	95	63	20	44	17	25	38	65	52	66	89	59	83	30	59	36	48	40	10	65	45	81	95													
22-Jul	20	9	7	8	7	5	7	13	19	13	12	14	11	27	22	24	15	11	6	5	7	7	9	12	27													
23-Jul	5	4	6	7	7	9	8	12	12	14	10	9	15	12	11	10	17	11	17	22	12	7	7	10	22													
24-Jul	6	12	8	5	6	7	11	13	10	12	12	10	10	14	15	15	16	13	10	16	14	15	14	13	16													
25-Jul	13	24	15	17	13	9	21	14	22	22	24	43	71	44	18	17	12	20	60	46	18	69	16	18	71													
26-Jul	29	13	4	8	8	22	52	49	19	19	19	27	19	21	27	25	37	7	10	7	11	6	8	15	52													
27-Jul	32	17	10	23	31	7	12	15	12	17	25	48	41	42	59	79	39	13	9	15	5	9	6	7	79													
28-Jul	6	5	4	5	5	6	9	14	19	23	14	17	30	27	41	33	25	24	11	4	21	9	6	6	41													
29-Jul	12	20	21	24	38	39	92	37	56	13	28	18	23	44	74	80	46	8	16	26	5	7	7	4	92													
30-Jul	7	8	3	4	4	5	8	11	9	11	10	16	16	25	27	19	14	10	6	3	78	32	17	41	78													
31-Jul	7	24	53	66	82	75	17	12	47	26	18	12	12	11	12	14	10	20	41	29	7	9	8	6	82													
														55	77	95	66	98	75	92	63	57	89	61	66	95	82	83	98	87	36	93	78	78	69	70	81	
Diurnal Maximum																																						



WBEA NETWORK
Hourly Averages

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





Summary of Hour Standard Deviations

Mannix - July 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 101 deg on Jul 17 16:00			Hours of Data:	743
Minimum Value: 1 deg on Jul 14 05:00			Hours of Missing Data:	1
Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 8 Median = 12 Q ₃ = 22 P ₉₀ = 41 P ₉₉ = 88			Hours of Calibration:	0
			Percent Operational Time:	99.9

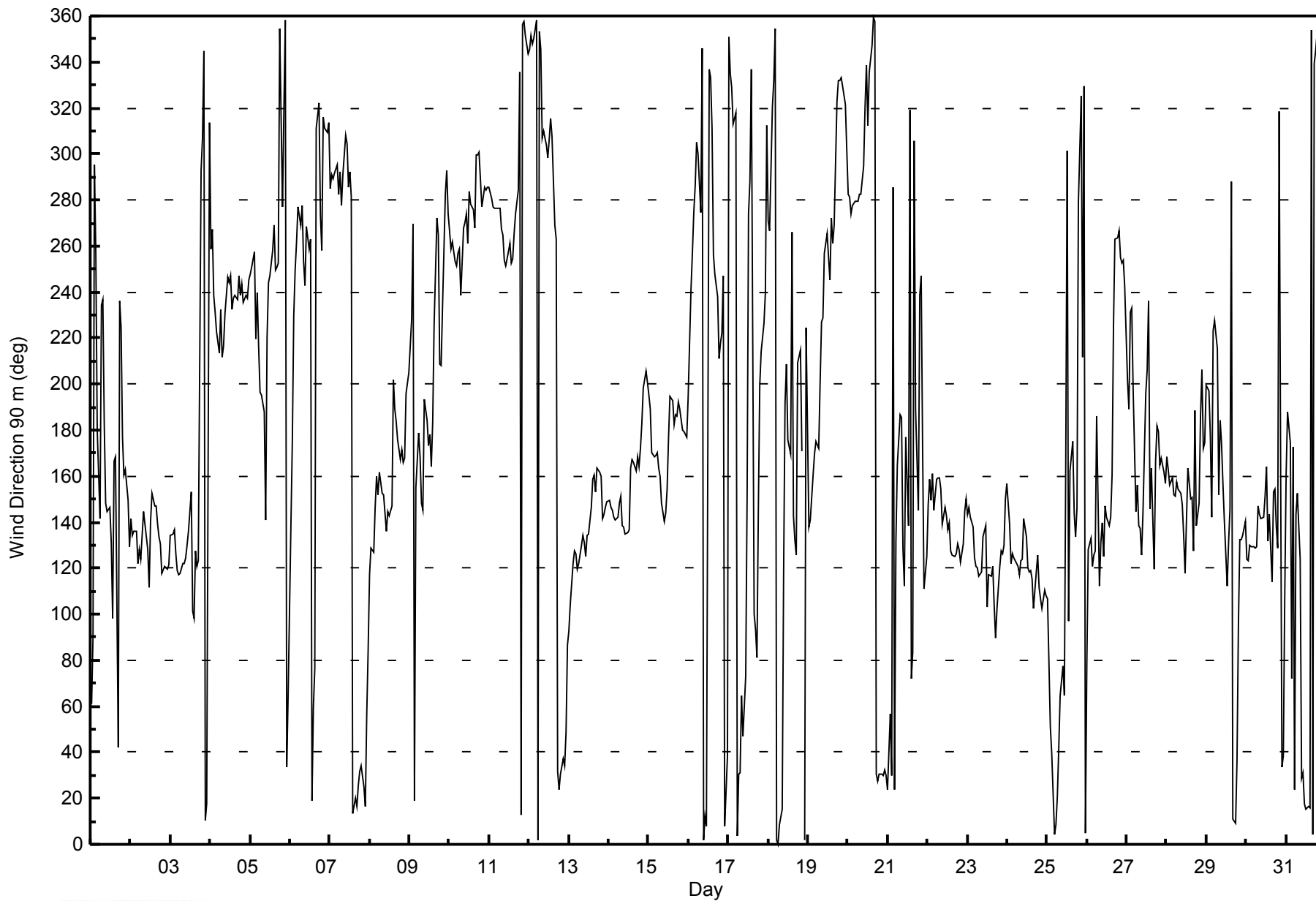
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	13	79	50	42	42	35	39	61	35	34	32	36	30	30	37	59	73	31	12	16	16	13	32	12	79
2-Jul	16	7	10	17	7	5	8	15	11	17	19	23	27	19	13	14	13	11	11	7	10	11	6	6	27
3-Jul	5	4	5	5	6	6	8	8	6	8	8	13	24	19	44	14	10	14	96	30	14	8	9	29	96
4-Jul	51	12	9	11	27	15	9	16	14	12	9	12	10	14	14	16	11	9	8	8	5	2	4	2	51
5-Jul	2	3	4	19	15	17	6	8	16	15	52	19	17	18	14	17	12	14	37	52	37	15	21	46	52
6-Jul	14	22	7	9	11	41	17	16	25	26	13	17	26	15	56	64	33	17	30	14	31	25	28	27	64
7-Jul	8	4	3	6	9	7	8	10	12	18	10	10	14	13	34	9	8	6	8	8	13	3	17	13	34
8-Jul	5	7	3	11	3	5	7	8	8	10	8	10	12	15	15	12	11	14	12	5	6	10	8	3	15
9-Jul	31	24	18	49	12	10	8	10	9	21	10	12	11	20	8	38	8	20	19	15	11	17	9	6	49
10-Jul	5	3	5	4	4	6	12	11	21	17	16	23	12	10	9	12	6	6	13	7	6	5	4	4	23
11-Jul	4	6	3	5	7	5	7	7	7	9	7	8	11	10	13	11	9	11	29	6	8	6	7	7	29
12-Jul	10	6	6	5	4	8	19	22	16	14	17	20	20	22	16	35	85	21	42	5	6	2	21	8	85
13-Jul	8	13	8	7	5	4	6	11	12	16	21	21	20	19	24	38	28	15	8	5	5	3	3	4	38
14-Jul	3	3	2	2	1	3	6	10	8	9	10	9	14	11	14	10	11	7	5	7	4	3	4	4	14
15-Jul	5	7	7	2	3	4	7	10	13	9	9	9	20	17	11	10	8	8	9	8	3	3	6	6	20
16-Jul	14	14	4	8	8	8	19	6	49	68	38	12	12	12	32	13	10	11	13	12	9	11	32	19	68
17-Jul	14	9	11	13	15	18	16	22	29	62	46	46	88	82	78	101	35	35	72	76	3	52	75	25	101
18-Jul	25	17	14	12	7	13	12	10	20	89	63	33	35	73	62	33	24	16	56	30	40	UO	55	47	89
19-Jul	12	6	5	6	9	6	11	20	13	12	18	10	10	9	13	12	8	21	12	9	14	7	8	8	21
20-Jul	5	4	7	3	3	3	5	6	12	24	16	19	23	26	15	27	28	11	8	5	3	2	5	3	28
21-Jul	7	37	65	52	20	45	14	27	39	81	55	70	97	60	89	31	61	36	49	39	9	65	29	75	97
22-Jul	19	8	6	8	7	5	6	11	20	14	12	14	13	28	22	24	13	12	6	4	5	7	9	11	28
23-Jul	4	5	8	10	3	5	5	9	9	14	9	8	13	9	9	8	13	10	13	21	12	6	6	8	21
24-Jul	4	14	5	4	5	6	9	11	10	13	13	11	8	16	15	15	10	9	12	11	12	12	10	16	16
25-Jul	10	23	16	17	13	10	21	14	20	24	25	45	71	46	18	18	12	19	50	42	13	75	15	11	75
26-Jul	29	10	4	7	7	15	55	51	20	21	25	27	19	23	27	22	36	7	9	7	8	4	6	12	55
27-Jul	33	19	10	17	34	7	10	15	14	20	28	37	34	41	58	82	37	11	10	12	5	10	6	7	82
28-Jul	5	5	4	4	4	5	8	14	19	24	15	22	33	27	39	30	28	23	12	4	23	9	7	6	39
29-Jul	12	22	32	32	37	40	95	36	58	12	25	18	27	47	90	80	46	8	17	24	6	8	7	3	95
30-Jul	6	6	2	4	3	4	6	10	8	12	10	15	15	28	28	25	13	9	6	2	78	29	15	39	78
31-Jul	8	23	51	51	88	63	24	10	47	26	15	11	12	10	11	14	10	19	40	28	7	8	7	5	88
Diurnal Maximum																									
51 79 65 52 88 63 95 61 58 89 63 70 97 82 90 101 85 36 96 76 78 75 75 75																									

UO - Unstable Operation



WBEA NETWORK
Hourly Averages

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





Summary of Hour Averages

Mannix - July 2014

Maximum Value: 0.8 km/h on Jul 30 23:00		Maximum Daily Average: 0.3 km/h on Jul 24		Hours in Service: 744																						
Minimum Value: -1.3 km/h on Jul 10 17:00		Minimum Daily Average: -0.2 km/h on Jul 31		Hours of Data: 744																						
Maximum Diurnal Average: 0.1 km/h at hour 9		Minimum Diurnal Average: 0.0 km/h at hour 22		Hours of Missing Data: 0																						
Monthly Average: 0.07 km/h		Percentiles: P ₁ = -0.7 P ₁₀ = -0.2 Q ₁ = -0.1 Median = 0.1 Q ₃ = 0.2 P ₉₀ = 0.4 P ₉₉ = 0.6		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.0	-0.3	-0.3	-0.3	-0.2	-0.2	-0.1	0.0	0.1	0.2	0.2	0.5	0.2	0.5	-0.1	0.1	0.2	0.1	0.1	0.0	0.0	-0.4	0.1	0.0	0.0	0.5
2-Jul	0.1	0.1	0.0	0.0	0.1	0.1	0.3	0.2	0.2	0.1	0.2	0.1	0.3	0.2	0.1	0.1	0.0	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.3
3-Jul	0.3	0.2	0.3	0.2	0.1	0.4	0.3	0.4	0.2	0.4	0.4	0.4	0.1	0.4	0.3	0.1	0.1	0.0	-0.1	0.0	-0.2	-0.1	-0.1	0.0	0.2	0.4
4-Jul	-0.1	0.1	-0.3	-0.2	0.0	0.0	-0.4	0.1	-0.1	-0.1	0.0	0.1	0.0	-0.2	-0.4	-0.1	-0.4	0.0	-0.1	-0.1	-0.2	-0.3	-0.5	-0.3	-0.2	0.1
5-Jul	-0.2	-0.2	-0.2	0.1	-0.2	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.0	0.0	-0.2	0.1	-0.1	-0.3	0.2	-0.1	0.0	0.2
6-Jul	0.0	-0.2	-0.1	-0.1	-0.1	-0.1	0.1	0.1	0.1	0.0	0.1	0.2	0.1	-0.1	0.3	0.1	-0.2	-0.1	0.0	0.2	0.2	-0.1	-0.5	-0.1	0.0	0.3
7-Jul	0.0	0.0	0.0	0.1	-0.3	-0.2	-0.3	0.1	0.2	0.0	-0.4	-0.3	-0.2	0.0	0.4	0.1	0.0	0.3	0.5	0.3	0.1	-0.2	0.0	0.0	0.0	0.5
8-Jul	0.0	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.3	0.4	0.0	-0.2	0.0	0.2	0.4	0.2	0.3	0.4	0.2	-0.2	0.2	0.4
9-Jul	-0.1	-0.1	0.0	-0.3	-0.2	0.2	0.3	0.1	0.3	0.1	0.0	0.1	0.2	0.4	0.1	0.2	0.1	0.0	-0.1	0.0	-0.3	-0.3	-0.4	0.5	0.0	0.5
10-Jul	0.3	0.4	0.2	-0.1	-0.3	0.2	0.1	-0.1	-0.1	-0.2	-0.1	0.0	-0.2	0.0	-0.2	0.1	-1.3	-1.3	-0.9	0.4	0.3	0.0	0.0	-0.3	-0.1	0.4
11-Jul	-0.6	0.2	0.4	0.4	0.1	0.3	0.3	0.3	0.1	0.0	0.0	0.2	0.0	0.1	0.2	0.4	0.0	-0.2	-0.4	0.0	-0.3	-0.6	-0.4	-0.5	0.0	0.4
12-Jul	-0.4	-0.4	-0.2	-0.2	-0.5	-0.2	0.0	-0.2	-0.1	-0.2	-0.3	-0.3	-0.3	-0.2	-0.4	0.2	0.0	0.2	0.1	0.1	0.2	0.0	0.2	0.5	-0.1	0.5
13-Jul	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.3	0.3	0.2	0.1	0.2	0.2	0.1	0.2	-0.2	-0.1	0.0	0.2	0.3	0.4	0.4	0.4	0.2	0.4
14-Jul	0.4	0.3	0.4	0.3	0.2	0.0	0.1	0.4	0.3	0.3	0.1	0.2	0.4	0.1	0.3	0.1	0.2	0.2	0.2	0.1	0.0	-0.1	-0.1	-0.1	0.2	0.4
15-Jul	0.0	0.4	0.4	0.6	0.6	0.5	0.3	0.2	0.3	0.1	0.3	0.3	0.2	0.0	-0.1	0.0	0.0	0.1	0.0	-0.1	0.0	0.1	0.4	0.4	0.2	0.6
16-Jul	0.3	-0.2	-0.2	-0.1	-0.2	-0.1	-0.1	0.2	0.1	-0.1	0.0	0.0	-0.3	-0.3	-0.1	0.2	0.0	0.0	0.1	0.1	-0.1	-0.1	-0.1	0.3	0.0	0.3
17-Jul	-0.1	-0.1	-0.1	-0.2	-0.1	0.0	0.1	0.0	0.3	0.0	0.3	0.2	0.0	0.1	0.3	0.1	0.3	0.3	0.0	-0.2	-0.2	-0.1	0.0	-0.1	0.0	0.3
18-Jul	0.2	-0.1	0.0	-0.1	-0.2	0.0	-0.2	-0.1	-0.1	0.4	0.1	-0.2	-0.1	0.3	-0.1	0.1	0.0	0.3	0.1	-0.2	-0.2	-0.2	0.0	0.0	0.0	0.4
19-Jul	0.3	0.3	0.4	0.4	0.3	0.4	0.3	0.0	-0.2	0.0	-0.1	0.2	0.2	-0.1	0.0	0.2	0.6	-0.5	-0.7	-0.8	-0.6	-0.6	-0.5	-0.3	0.0	0.6
20-Jul	0.3	0.1	0.0	-0.2	-0.1	-0.1	0.1	0.2	0.2	0.0	-0.3	-0.4	-0.1	-0.2	-0.3	0.3	-0.3	0.3	0.3	0.3	0.0	0.1	0.0	-0.2	0.0	0.3
21-Jul	0.0	-0.3	-0.3	-0.2	-0.1	-0.2	-0.2	0.0	-0.1	0.3	0.3	-0.1	0.0	0.2	0.4	0.4	-0.1	-0.1	0.0	-0.2	0.1	-0.1	-0.2	0.0	0.0	0.4
22-Jul	-0.1	0.0	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	-0.1	0.3	0.0	0.0	0.1	0.3	0.2	0.1	0.1	0.3	0.4	0.2	0.1	0.4
23-Jul	0.3	0.3	0.3	0.2	0.2	0.3	0.1	0.2	0.1	0.0	0.3	0.5	0.5	0.3	0.4	0.4	0.5	0.5	0.4	0.4	0.3	0.2	0.2	0.2	0.3	0.5
24-Jul	0.3	0.3	0.2	0.1	0.2	0.3	0.2	0.3	0.1	0.2	0.2	0.3	0.3	0.6	0.4	0.5	0.8	0.2	0.4	0.4	0.4	0.4	0.6	0.4	0.3	0.8
25-Jul	0.4	0.7	0.4	0.3	-0.1	-0.4	-0.1	0.1	0.8	0.6	0.6	0.0	0.3	0.0	0.2	-0.1	0.2	0.2	0.1	0.1	0.0	0.1	0.0	-0.1	0.2	0.8
26-Jul	0.2	0.1	0.2	0.3	0.1	-0.2	-0.2	0.2	0.1	0.1	0.4	0.2	0.0	0.1	0.1	-0.1	0.0	0.5	0.4	0.3	0.1	-0.3	-0.2	-0.1	0.1	0.5
27-Jul	0.0	0.0	-0.2	0.0	0.1	0.2	0.2	0.1	0.2	0.0	0.2	0.1	-0.2	0.0	0.1	0.2	0.5	0.2	0.0	0.1	0.4	0.4	0.5	0.4	0.1	0.5
28-Jul	0.3	0.4	0.3	0.4	0.4	0.3	0.2	0.1	0.2	0.1	0.0	0.3	0.3	0.0	0.0	0.0	0.1	0.0	0.2	0.1	-0.1	-0.3	-0.1	-0.1	0.1	0.4
29-Jul	0.2	0.2	0.0	0.2	-0.1	-0.1	-0.1	0.1	0.1	0.2	0.2	0.0	0.4	0.2	0.1	-0.1	-0.1	-0.2	0.1	0.6	0.2	0.3	0.3	0.2	0.1	0.6
30-Jul	0.1	0.1	0.4	0.1	0.1	0.1	0.0	0.2	0.0	0.2	0.0	0.2	0.2	0.5	0.2	0.3	0.2	0.4	0.2	0.2	-0.8	0.3	0.8	0.2	0.2	0.8
31-Jul	-0.1	0.0	0.1	-0.1	-0.2	-0.1	0.2	0.1	0.3	-0.1	0.4	0.0	0.1	0.1	-0.1	-0.5	-0.4	-0.5	-0.1	-0.1	-0.4	-0.6	-0.9	-0.7	-0.2	0.4
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.4 km/h on Jul 30 21:00 Minimum Value: 0.2 km/h on Jul 21 04:00 Percentiles: P ₁ = 0.3 P ₁₀ = 0.7 Q ₁ = 1.1 Median = 1.5 Q ₃ = 2.0 P ₉₀ = 2.5 P ₉₉ = 3.4																								Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	0.3	0.3	0.4	0.5	0.5	0.5	0.7	0.8	1.0	1.3	1.4	1.6	1.6	1.7	1.2	1.1	1.6	1.2	1.0	1.0	0.5	0.3	0.5	0.6	1.7
2-Jul	0.7	0.4	0.5	0.6	0.8	0.8	1.1	1.1	1.5	1.5	1.7	1.7	2.0	2.1	1.8	1.9	1.6	1.7	1.5	2.0	1.5	1.9	2.2	2.3	2.3
3-Jul	1.7	1.7	1.5	1.4	1.7	2.2	2.1	2.3	2.7	2.9	2.9	3.0	2.6	1.2	1.2	1.8	2.5	1.6	0.7	0.6	1.5	1.9	0.9	0.6	3.0
4-Jul	1.5	1.8	1.4	1.2	1.0	1.3	1.9	1.8	2.0	2.7	2.8	2.8	3.2	3.3	3.3	3.0	3.2	3.1	2.7	2.2	1.8	1.4	1.5	1.0	3.3
5-Jul	0.7	0.8	0.8	1.0	0.5	0.9	1.3	1.2	1.3	1.6	2.0	2.6	2.4	2.4	2.2	2.4	2.0	1.9	1.4	0.4	0.5	1.6	1.2	0.7	2.6
6-Jul	1.0	1.2	1.0	1.0	1.3	1.3	1.1	1.3	1.3	1.3	1.8	2.0	2.5	2.4	1.6	1.0	1.4	1.7	1.4	1.2	1.4	1.2	2.1	1.1	2.5
7-Jul	0.6	1.1	1.4	1.0	1.6	1.2	1.9	1.3	1.6	1.9	1.9	2.1	2.3	2.1	2.1	1.9	2.0	2.0	1.5	1.1	0.9	0.8	0.4	0.3	2.3
8-Jul	0.3	0.5	1.0	1.1	1.3	1.3	1.4	1.4	1.6	1.7	1.9	2.0	2.2	2.3	2.4	2.6	2.4	2.1	1.9	1.5	1.2	1.4	1.2	1.2	2.6
9-Jul	1.3	0.9	1.1	0.7	1.2	1.1	1.3	1.4	1.6	2.8	2.7	2.3	2.6	2.9	3.4	2.8	2.5	1.5	1.7	1.4	1.6	2.0	2.1	1.2	3.4
10-Jul	0.9	1.4	1.6	2.0	2.2	2.1	1.5	1.6	1.7	1.8	2.1	2.0	2.4	2.7	2.8	2.7	3.6	3.3	3.2	2.2	2.4	2.7	2.5	2.7	3.6
11-Jul	2.7	2.1	1.7	1.7	1.9	1.8	1.8	1.7	1.6	1.6	1.9	2.5	2.2	2.2	2.2	2.3	2.1	2.4	2.5	2.8	2.0	1.6	1.3	1.3	2.8
12-Jul	2.5	2.6	2.5	2.1	1.8	1.1	1.0	1.3	1.7	1.9	1.8	2.1	2.1	2.1	1.9	1.6	1.4	1.2	0.9	1.2	0.9	0.6	0.7	0.9	2.6
13-Jul	0.8	1.2	1.5	0.9	1.0	1.4	1.9	1.8	2.0	2.0	1.8	1.8	1.8	1.8	1.8	1.7	1.4	1.3	1.6	1.3	1.0	1.3	1.8	2.0	2.0
14-Jul	2.0	2.0	1.9	1.8	1.8	1.6	1.6	1.5	1.8	1.8	1.7	2.3	2.5	2.7	2.7	2.5	2.5	2.4	2.1	1.6	1.4	1.5	1.6	1.3	2.7
15-Jul	1.1	1.2	1.2	1.7	1.9	1.8	1.8	1.6	1.5	1.7	2.0	2.1	2.1	2.2	2.1	2.0	2.2	2.1	2.0	1.5	1.7	1.7	1.1	1.3	2.2
16-Jul	1.2	0.7	0.6	0.4	0.7	0.8	0.9	1.2	0.8	1.0	1.4	1.6	1.9	1.6	1.0	1.3	1.8	1.7	1.5	1.3	1.4	1.4	2.6	1.3	2.6
17-Jul	0.7	0.8	0.8	0.7	0.7	0.4	1.0	1.3	1.4	1.3	1.5	1.5	1.5	1.4	1.2	1.3	1.1	0.9	0.5	0.6	0.8	0.6	0.6	1.2	1.5
18-Jul	0.9	0.9	0.6	0.6	1.2	1.0	1.6	1.5	1.4	1.4	1.3	1.6	1.6	1.7	1.7	1.5	1.3	1.1	1.8	1.7	1.5	1.6	0.8	0.5	1.8
19-Jul	1.3	1.5	1.4	1.4	1.3	1.2	1.6	1.3	1.5	1.9	1.9	2.2	2.5	2.4	2.7	2.7	2.4	2.6	3.5	3.1	2.6	2.4	2.1	1.5	3.5
20-Jul	1.1	1.0	1.0	0.6	1.0	1.1	1.1	1.2	1.6	1.6	2.0	2.2	1.9	1.9	2.0	1.6	1.7	1.7	1.6	1.4	1.2	0.9	0.4	0.4	2.2
21-Jul	0.3	0.3	0.3	0.2	0.3	0.6	0.7	1.0	1.0	1.2	1.4	1.7	1.6	1.7	1.6	1.6	1.2	1.0	0.6	0.6	0.3	0.3	0.3	0.4	1.7
22-Jul	0.5	0.9	1.0	0.9	1.0	1.3	1.1	1.1	1.3	1.2	1.5	1.8	1.8	1.7	1.7	1.8	1.9	1.8	1.7	1.5	1.5	2.4	2.1	0.9	2.4
23-Jul	1.2	1.4	1.2	1.2	0.8	1.0	1.4	1.4	1.5	2.2	2.3	2.3	2.1	3.2	3.1	3.2	2.6	2.2	1.7	2.0	1.9	1.6	1.2	1.0	3.2
24-Jul	1.0	0.9	1.6	1.6	1.9	1.9	2.0	2.0	1.8	1.9	2.0	2.3	2.7	2.6	2.4	2.5	2.6	2.9	2.4	2.2	2.3	1.8	2.1	2.3	2.9
25-Jul	2.2	1.7	1.4	1.3	1.2	1.7	1.6	1.4	1.9	1.8	1.6	1.0	1.3	0.9	1.9	1.7	1.7	1.7	1.4	0.7	0.6	0.9	0.5	0.5	2.2
26-Jul	1.1	1.1	1.0	1.0	0.7	0.6	0.8	1.2	1.4	1.5	1.7	1.9	2.0	1.8	1.8	1.6	1.6	1.8	1.6	1.1	0.7	0.7	0.6	0.4	2.0
27-Jul	0.5	0.7	0.8	0.7	1.0	1.2	1.2	1.2	1.5	1.5	1.7	1.2	0.9	1.3	1.4	1.9	1.7	2.2	1.8	1.1	1.4	1.6	1.6	1.5	2.2
28-Jul	1.1	1.3	1.5	1.5	1.7	1.7	1.6	1.4	1.4	1.3	1.5	1.7	1.8	1.8	1.6	1.4	1.5	1.2	1.1	0.9	0.8	0.7	0.8	0.7	1.8
29-Jul	0.7	0.7	1.1	1.1	0.7	2.2	1.8	1.5	1.7	1.6	1.4	1.5	1.6	1.6	1.5	1.1	1.0	1.5	1.1	1.8	1.6	1.6	1.6	1.6	2.2
30-Jul	1.5	1.7	1.4	0.8	1.0	1.1	1.3	1.5	1.6	1.7	1.7	2.2	2.1	2.0	1.9	1.7	1.9	2.0	1.6	1.6	4.4	3.6	2.8	1.5	4.4
31-Jul	1.3	0.6	0.4	0.4	0.5	0.4	1.3	1.4	1.1	1.3	2.1	2.4	2.5	2.5	2.5	3.4	2.7	2.4	2.6	2.7	2.9	2.7	3.2	3.6	3.6
Diurnal Maximum																									



Summary of Hour Averages

Mannix - July 2014

Maximum Value: 1.4 km/h on Jul 24 17:00		Maximum Daily Average: 0.7 km/h on Jul 24		Hours in Service: 744																																												
Minimum Value: -0.9 km/h on Aug 1 00:00		Minimum Daily Average: -0.3 km/h on Jul 4		Hours of Data: 744																																												
Maximum Diurnal Average: 0.4 km/h at hour 14		Minimum Diurnal Average: 0.1 km/h at hour 22		Hours of Missing Data: 0																																												
Monthly Average: 0.27 km/h		Percentiles: P ₁ = -0.6 P ₁₀ = -0.2 Q ₁ = 0.0 Median = 0.3 Q ₃ = 0.6 P ₉₀ = 0.8 P ₉₉ = 1.1		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	0.1	-0.1	-0.2	-0.2	0.0	0.0	0.0	0.2	0.4	0.7	0.4	1.3	0.6	0.9	0.0	0.2	0.4	0.3	0.3	0.3	0.2	0.0	0.2	0.3	0.3	1.3																						
2-Jul	0.4	0.4	0.4	0.2	0.5	0.4	0.5	0.4	0.5	0.3	0.6	0.2	0.8	0.6	0.5	0.3	0.3	0.5	0.5	0.5	0.6	0.7	0.6	0.5	0.5	0.8																						
3-Jul	0.8	0.8	0.6	0.6	0.3	0.8	0.7	1.0	0.7	0.7	1.0	1.2	0.7	0.7	0.8	0.5	0.6	0.3	-0.1	0.2	-0.1	0.2	0.0	0.1	0.5	1.2																						
4-Jul	0.0	0.1	-0.3	-0.3	0.1	0.0	0.0	-0.4	0.4	0.0	-0.3	-0.3	-0.1	-0.5	0.0	-0.7	-0.3	-0.5	-0.1	-0.5	-0.3	-0.2	-0.5	-0.6	-0.4	-0.3	0.4																					
5-Jul	-0.4	-0.4	-0.3	0.1	0.0	0.3	0.4	0.4	0.5	0.4	0.4	0.5	0.0	0.2	-0.1	0.3	-0.4	-0.4	-0.2	0.1	0.0	-0.2	0.3	0.2	0.1	0.5																						
6-Jul	0.4	0.2	-0.1	-0.2	-0.1	0.0	-0.3	0.1	0.3	0.2	0.0	0.3	0.0	0.2	0.5	0.6	0.3	0.1	-0.1	0.2	0.0	-0.1	-0.4	-0.2	0.1	0.6																						
7-Jul	-0.4	-0.3	0.0	0.0	-0.2	0.1	0.0	0.1	0.3	0.2	0.2	-0.2	0.1	0.1	0.5	0.3	0.1	0.3	0.5	0.3	0.2	0.1	0.1	0.2	0.1	0.5																						
8-Jul	0.3	0.4	0.7	0.3	0.5	0.8	0.8	0.6	0.7	0.6	0.5	0.8	0.9	0.9	0.4	-0.2	0.3	0.5	0.7	0.5	0.5	0.5	0.2	-0.1	0.5	0.9																						
9-Jul	-0.2	0.2	-0.1	-0.1	0.0	0.3	0.6	0.4	0.7	0.5	0.3	0.6	0.2	0.9	0.6	0.2	-0.2	0.2	0.1	0.1	-0.2	-0.2	-0.2	0.1	0.2	0.9																						
10-Jul	0.0	0.0	-0.1	-0.3	-0.4	-0.1	0.1	-0.1	-0.1	-0.2	0.1	-0.2	0.2	-0.2	-0.1	-0.4	-0.9	-0.7	-0.4	0.0	0.0	-0.4	-0.4	-0.3	-0.2	0.2																						
11-Jul	-0.6	0.0	0.0	-0.1	-0.2	-0.1	0.0	-0.1	0.1	-0.1	-0.1	0.0	-0.4	-0.4	0.1	0.0	0.0	0.1	-0.1	0.3	-0.1	-0.5	-0.5	-0.6	-0.1	0.3																						
12-Jul	-0.3	-0.6	-0.4	-0.5	-0.5	0.0	0.4	0.0	0.5	0.1	-0.1	-0.3	-0.2	-0.2	-0.6	0.3	0.0	0.4	0.1	0.2	0.3	0.1	0.2	0.5	0.0	0.5																						
13-Jul	0.4	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.9	0.7	0.4	0.6	0.8	0.8	0.5	0.4	-0.1	0.1	0.2	0.3	0.5	0.6	0.8	0.8	0.5	0.9																						
14-Jul	0.8	0.7	0.9	0.6	0.7	0.5	0.4	1.4	0.7	0.7	0.3	0.6	0.9	0.7	0.9	0.7	0.9	0.8	0.7	0.4	0.3	-0.1	-0.3	-0.1	0.6	1.4																						
15-Jul	0.1	0.6	0.8	0.8	0.9	0.7	0.6	0.6	0.6	0.1	0.7	0.9	0.9	0.0	-0.1	0.3	0.2	0.3	0.0	0.1	0.4	0.4	0.6	0.6	0.5	0.9																						
16-Jul	0.4	-0.1	-0.2	-0.1	-0.5	-0.3	-0.1	0.2	0.2	0.3	0.4	0.3	-0.4	-0.2	0.0	0.3	0.1	0.0	0.0	0.2	-0.1	-0.2	0.0	0.2	0.0	0.4																						
17-Jul	-0.1	0.0	0.0	0.0	-0.1	0.2	0.4	0.2	0.2	0.5	1.0	0.6	0.2	0.5	0.7	0.4	0.7	0.7	0.4	-0.1	-0.2	-0.1	0.1	0.1	0.3	1.0																						
18-Jul	0.1	-0.2	0.0	0.1	-0.2	0.1	-0.2	-0.1	0.0	0.8	0.5	-0.2	0.2	1.1	-0.1	0.8	0.3	0.6	0.1	-0.2	0.1	-0.2	0.1	0.2	0.2	1.1																						
19-Jul	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.1	0.0	0.5	-0.2	0.2	-0.1	-0.2	-0.2	0.0	0.5	-0.5	-0.5	-0.8	-0.3	-0.9	-0.6	-0.2	0.0	0.6																						
20-Jul	-0.1	-0.1	-0.3	-0.5	-0.2	-0.2	-0.2	0.2	0.3	0.2	-0.1	-0.2	0.2	-0.1	-0.1	0.5	0.2	0.5	0.3	0.2	0.1	0.1	0.0	0.1	0.0	0.5																						
21-Jul	0.2	0.2	0.0	0.1	0.2	0.2	0.0	0.1	-0.2	0.5	0.9	0.2	0.2	0.3	1.0	1.0	0.4	0.2	0.2	0.1	0.0	0.1	-0.1	0.1	0.3	1.0																						
22-Jul	0.2	0.2	0.7	0.6	0.5	0.4	0.4	0.3	0.4	0.2	0.4	0.7	-0.1	0.9	0.3	0.2	0.6	0.9	0.3	0.6	0.6	1.0	0.7	0.5	0.5	1.0																						
23-Jul	0.7	1.0	0.8	0.6	0.6	0.7	0.1	0.9	0.5	0.2	0.8	1.2	0.8	0.8	1.1	0.9	0.9	0.4	0.7	0.9	0.6	0.5	0.5	0.4	0.7	1.2																						
24-Jul	0.4	0.6	0.5	0.6	0.7	0.6	0.8	1.0	0.7	0.7	0.5	0.8	0.5	1.3	0.8	0.8	1.4	0.6	0.7	0.7	0.6	1.1	0.8	0.7	1.4																							
25-Jul	0.9	0.8	0.7	0.6	0.0	-0.1	0.1	0.3	1.0	0.8	0.7	0.3	0.2	0.4	0.4	0.0	0.3	0.8	0.6	0.3	0.1	0.3	0.0	0.2	0.4	1.0																						
26-Jul	0.6	0.5	0.5	0.8	0.6	0.0	0.1	0.4	0.2	0.2	1.1	0.5	0.4	0.4	0.4	0.2	0.2	0.4	0.2	0.1	0.0	-0.4	-0.3	0.0	0.3	1.1																						
27-Jul	0.2	0.2	-0.1	0.0	0.2	0.5	0.5	0.4	0.6	0.2	0.8	0.2	-0.1	0.6	0.4	0.4	0.8	0.5	0.2	0.2	0.7	0.8	0.9	0.9	0.4	0.9																						
28-Jul	0.6	0.8	0.8	0.9	0.7	0.6	0.5	0.4	0.4	0.3	0.2	1.0	0.6	0.3	0.3	0.1	0.7	0.3	0.6	0.2	0.1	0.0	0.2	0.2	0.5	1.0																						
29-Jul	0.3	0.5	0.2	0.6	0.0	-0.1	-0.1	0.3	0.3	0.4	0.5	0.4	1.3	1.1	0.4	0.5	0.3	0.1	0.1	0.7	0.7	0.5	0.5	0.5	0.4	1.3																						
30-Jul	0.7	0.6	0.6	0.4	0.3	0.5	0.4	0.6	0.4	0.9	0.1	0.8	0.6	1.1	0.7	1.0	0.4	0.9	0.6	0.7	-0.6	0.2	0.9	0.4	0.5	1.1																						
31-Jul	0.2	0.1	0.2	0.2	0.0	0.1	0.4	0.4	0.6	-0.2	0.7	-0.2	0.3	0.3	0.3	-0.7	0.1	-0.2	-0.3	0.0	-0.5	-0.6	-0.4	-0.9	0.0	0.7																						
																								0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.2	Diurnal Average
																								0.9	1.0	0.9	0.9	0.9	0.8	0.8	1.4	1.0	0.9	1.1	1.3	1.3	1.3	1.1	1.0	1.4	0.9	0.7	0.9	0.7	1.0	1.1	0.9	Diurnal Maximum



Summary of Hour Standard Deviations

Mannix - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.9 km/h on Jul 30 21:00		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 0.1 km/h on Jul 28 22:00																									
Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 1.0 Median = 1.6 Q ₃ = 2.1 P ₉₀ = 2.6 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-Jul	0.4	0.2	0.3	0.3	0.3	0.4	0.6	0.9	1.2	1.4	1.8	2.0	2.3	2.1	1.7	1.6	2.0	1.6	1.1	0.8	0.5	0.1	0.4	0.4	2.3
2-Jul	0.6	0.5	0.3	0.4	0.5	0.8	1.1	1.3	1.8	2.0	2.1	2.2	2.6	2.6	2.1	2.2	1.9	1.8	1.6	1.9	1.5	2.2	2.0	2.1	2.6
3-Jul	1.7	1.6	1.5	1.2	1.6	2.2	2.2	2.4	2.3	2.9	3.1	3.4	2.8	1.2	1.5	2.2	2.6	1.7	0.9	0.7	1.4	1.7	0.9	0.4	3.4
4-Jul	1.2	1.9	1.1	1.1	1.0	1.2	1.8	2.0	2.2	2.9	3.1	3.1	3.3	3.9	3.5	3.5	3.3	2.8	2.2	1.6	1.3	1.0	0.7	3.9	
5-Jul	0.6	0.6	0.4	0.8	0.5	0.6	0.8	1.0	1.7	1.7	2.2	3.3	3.0	2.8	2.6	3.0	2.3	2.0	1.4	0.5	0.5	1.3	1.4	0.7	3.3
6-Jul	1.0	0.9	1.0	1.1	1.2	1.1	1.1	1.4	1.7	1.8	2.3	2.5	2.9	2.7	1.6	1.3	1.6	2.0	1.2	1.2	1.2	1.4	2.0	0.8	2.9
7-Jul	0.6	0.9	1.3	1.1	1.1	1.1	1.6	1.3	1.6	1.9	2.0	1.9	2.3	2.1	2.2	2.2	2.0	2.1	1.6	1.1	0.9	0.8	0.5	0.3	2.3
8-Jul	0.4	0.4	0.7	0.4	0.9	1.3	1.4	1.6	1.9	1.9	1.7	2.2	2.3	2.6	2.7	2.6	2.4	1.9	1.7	1.2	0.6	0.8	0.5	0.8	2.7
9-Jul	0.8	1.1	1.1	0.8	0.5	0.6	1.2	1.3	1.6	2.7	2.3	2.1	2.5	2.7	3.0	2.6	2.5	1.4	1.9	1.4	1.5	1.7	1.7	1.3	3.0
10-Jul	0.8	1.3	1.4	1.8	2.0	2.1	1.8	2.0	2.3	2.2	2.7	2.2	2.7	2.9	2.8	2.8	3.2	3.3	3.1	2.3	2.3	2.5	2.2	2.2	3.3
11-Jul	2.0	1.8	1.4	1.5	1.8	1.5	1.7	1.4	1.4	1.5	1.9	2.6	2.8	2.4	2.5	2.5	2.0	2.3	2.4	2.7	1.9	1.3	1.4	1.4	2.8
12-Jul	2.4	2.4	2.6	2.0	1.2	1.1	1.2	1.6	1.8	2.1	2.1	2.3	2.7	2.4	2.2	2.1	1.7	1.5	1.3	1.3	0.9	0.5	0.9	1.0	2.7
13-Jul	0.9	1.3	1.2	0.7	0.7	1.3	1.9	1.9	2.3	2.5	2.3	2.4	2.4	2.5	2.3	2.1	1.9	1.8	1.3	0.8	0.9	1.2	1.7	1.9	2.5
14-Jul	1.8	1.8	1.7	1.6	1.4	1.5	1.7	1.9	1.8	2.0	1.9	2.2	2.7	2.8	2.7	2.5	2.4	2.1	1.7	1.0	0.8	0.8	1.0	1.0	2.8
15-Jul	0.9	0.7	1.0	1.3	1.2	1.3	1.7	1.7	1.6	1.7	1.9	2.3	2.4	2.2	1.8	1.8	1.8	1.8	1.5	1.1	1.0	1.2	0.7	0.7	2.4
16-Jul	0.6	0.6	0.7	0.3	0.6	0.4	0.7	1.2	0.9	1.3	1.7	1.7	1.7	1.4	1.1	1.6	2.2	2.0	1.6	1.4	1.2	1.3	2.5	1.4	2.5
17-Jul	0.6	0.6	0.6	0.5	0.5	0.5	1.2	1.8	1.7	1.6	2.1	2.0	2.0	1.9	1.8	1.7	1.6	1.2	0.7	0.4	0.5	0.7	0.7	1.0	2.1
18-Jul	0.8	0.6	0.5	0.4	0.7	1.2	1.7	1.6	1.7	1.9	1.7	2.0	2.5	2.2	2.3	2.2	1.5	1.4	1.9	1.6	1.4	1.2	0.6	0.4	2.5
19-Jul	1.0	1.3	1.2	1.3	1.0	0.9	1.4	1.5	1.9	2.6	2.1	2.1	2.6	2.7	2.6	2.9	2.6	2.6	3.5	3.1	2.8	2.3	2.0	1.2	3.5
20-Jul	0.8	1.1	0.9	0.6	0.4	0.6	0.6	1.0	1.8	2.1	2.3	2.7	2.4	2.3	2.4	2.1	2.3	2.0	1.7	1.2	1.1	0.8	0.4	0.2	2.7
21-Jul	0.2	0.3	0.2	0.2	0.2	0.2	0.5	1.1	1.3	1.4	1.8	2.2	2.1	2.4	1.9	1.9	1.7	1.5	0.9	0.5	0.1	0.3	0.3	0.4	2.4
22-Jul	0.4	0.5	0.5	0.8	0.6	0.9	1.0	1.1	1.5	1.5	1.9	2.2	1.9	2.2	2.1	2.2	2.2	2.0	1.6	1.5	1.3	2.4	2.1	0.8	2.4
23-Jul	0.9	1.0	0.9	0.9	0.7	1.1	1.4	1.5	1.6	2.4	2.7	2.6	2.3	3.2	3.1	3.1	2.7	2.5	2.0	2.0	1.9	1.5	1.1	1.0	3.2
24-Jul	0.9	0.8	1.1	1.1	1.5	1.6	2.0	2.1	2.0	2.2	1.8	2.4	2.6	2.9	2.7	2.7	2.7	2.9	2.3	2.1	2.3	2.0	2.4	2.3	2.9
25-Jul	2.3	2.1	1.6	1.4	1.0	1.5	1.7	1.5	2.3	1.9	1.9	1.1	1.5	1.3	2.0	2.1	1.9	1.9	1.4	0.7	0.5	0.7	0.4	0.4	2.3
26-Jul	1.1	1.0	1.0	0.7	0.4	0.6	0.8	1.4	1.7	1.9	2.0	2.4	2.5	2.3	2.4	2.1	1.4	2.1	1.6	1.2	0.9	0.7	0.5	0.5	2.5
27-Jul	0.6	0.6	0.2	0.5	0.5	0.8	1.0	1.4	1.7	1.8	2.4	1.1	1.1	1.9	1.8	1.5	1.4	1.3	1.2	0.8	1.1	0.9	1.4	1.4	2.4
28-Jul	0.8	1.1	1.5	1.3	1.5	1.7	1.5	1.5	1.5	1.5	1.7	2.1	2.1	2.3	2.1	1.9	1.9	1.7	1.1	0.7	0.4	0.1	0.2	0.4	2.3
29-Jul	0.6	0.7	0.5	0.9	0.7	2.3	1.6	1.1	1.7	1.8	1.8	2.0	2.0	2.1	2.1	1.6	1.2	1.7	1.2	1.9	1.6	1.5	1.3	1.3	2.3
30-Jul	1.2	1.3	1.0	0.4	0.3	0.9	1.4	1.5	1.8	2.2	2.0	2.3	2.3	2.5	2.5	2.3	1.9	1.9	1.5	1.3	4.9	3.4	2.8	1.3	4.9
31-Jul	0.7	0.6	0.4	0.4	0.3	0.2	0.8	1.2	1.5	1.7	2.4	2.3	2.8	2.8	2.9	3.1	2.6	2.5	2.5	2.7	2.8	2.4	3.0	3.2	3.2
	2.4	2.4	2.6	2.0	2.0	2.3	2.2	2.4	2.3	2.9	3.1	3.4	3.3	3.9	3.5	3.5	3.5	3.3	3.5	3.1	4.9	3.4	3.0	3.2	
	Diurnal Maximum																								



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.8 km/h on Jul 30 21:00 Minimum Value: 0.1 km/h on Jul 21 04:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 0.9 Median = 1.6 Q ₃ = 2.4 P ₉₀ = 2.8 P ₉₉ = 3.4																								Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	0.5	0.3	0.2	0.3	0.2	0.5	0.4	0.7	1.3	1.4	1.9	2.4	2.7	2.7	2.0	1.9	2.0	1.8	1.2	0.8	0.4	0.2	0.6	0.6	2.7
2-Jul	0.6	0.6	0.5	0.4	0.6	0.6	1.1	1.3	2.0	2.4	2.5	2.7	2.8	3.0	2.5	2.5	2.1	1.8	1.7	2.1	1.8	2.4	2.0	2.0	3.0
3-Jul	1.5	1.4	1.3	1.2	1.6	2.1	2.2	2.4	2.1	2.6	3.0	3.1	3.0	1.8	1.7	2.3	2.6	1.9	1.0	0.7	1.2	1.5	0.7	0.3	3.1
4-Jul	0.9	2.1	1.1	1.1	1.2	1.0	2.0	2.4	2.5	2.9	3.1	3.3	3.5	4.0	3.6	3.3	3.3	3.2	2.9	2.2	1.6	1.1	0.8	0.5	4.0
5-Jul	0.4	0.3	0.5	0.8	0.6	0.6	0.6	0.8	1.7	1.6	2.3	3.3	3.1	3.2	3.1	3.5	2.4	2.1	1.3	0.7	0.6	1.2	1.4	0.7	3.5
6-Jul	1.1	0.9	0.8	1.1	1.0	1.1	1.0	1.5	1.9	1.8	2.8	3.0	3.4	2.9	1.7	1.4	2.0	2.2	1.2	1.1	1.3	1.6	1.7	0.9	3.4
7-Jul	0.6	0.7	1.0	1.2	0.9	1.2	1.6	1.3	1.7	2.1	2.2	2.2	2.5	2.6	2.1	2.1	2.1	1.8	1.3	0.8	1.0	0.6	0.3	0.5	2.6
8-Jul	0.9	0.6	0.7	0.5	0.6	1.1	1.2	1.3	1.6	1.8	1.7	2.2	2.4	2.6	3.1	3.0	2.6	1.8	1.7	1.1	0.4	0.8	0.6	0.7	3.1
9-Jul	1.0	1.6	1.3	1.0	0.6	0.5	1.0	1.3	1.4	2.8	2.5	2.3	2.7	2.6	3.1	2.9	2.9	1.5	2.1	1.4	1.3	1.8	1.5	1.3	3.1
10-Jul	1.0	1.1	1.3	1.4	1.7	2.0	1.8	2.2	2.4	2.5	3.0	2.2	2.9	3.0	3.1	3.1	3.1	3.3	3.2	2.3	2.3	2.2	2.0	2.3	3.3
11-Jul	1.8	1.9	1.3	1.6	1.9	1.5	1.6	1.2	1.3	1.3	1.8	2.4	3.1	2.6	2.6	2.7	2.3	2.5	2.7	2.3	1.8	1.4	1.6	1.6	3.1
12-Jul	2.1	2.4	2.4	1.9	1.1	1.1	1.4	1.7	2.0	2.4	2.4	2.7	3.0	2.8	2.6	2.5	1.7	1.9	1.4	0.8	0.4	0.3	0.7	1.4	3.0
13-Jul	1.6	2.1	1.4	0.8	0.7	1.2	1.8	2.0	2.5	2.9	2.7	2.8	2.8	2.8	2.7	2.2	2.4	2.2	1.3	0.6	0.6	0.8	1.1	1.6	2.9
14-Jul	1.5	1.3	1.0	0.8	0.5	0.9	1.3	1.9	1.6	1.8	1.8	2.3	2.8	3.1	3.0	2.6	2.8	2.4	1.6	0.9	0.6	0.6	0.9	1.0	3.1
15-Jul	1.1	1.0	0.6	0.7	0.7	1.2	1.5	1.7	1.6	1.5	2.0	2.3	2.8	2.5	2.0	2.0	1.8	1.8	1.6	1.0	0.8	1.1	0.7	0.5	2.8
16-Jul	0.7	0.7	0.4	0.4	0.4	0.6	0.6	1.0	0.9	1.4	1.7	1.7	1.4	1.3	1.2	1.7	2.2	2.0	1.8	1.4	1.1	1.2	2.3	1.3	2.3
17-Jul	0.7	0.6	0.7	0.5	0.5	0.6	1.2	2.1	2.0	2.0	2.4	2.3	2.2	2.2	2.0	2.0	2.0	1.6	0.8	0.6	0.2	0.8	0.8	1.0	2.4
18-Jul	0.7	0.5	0.5	0.6	0.7	1.4	1.7	1.5	1.9	2.1	2.0	2.3	2.6	2.4	2.6	2.7	1.9	1.8	2.0	1.5	1.5	1.1	0.7	0.5	2.7
19-Jul	0.8	1.0	1.0	1.2	0.9	0.8	1.4	1.4	2.1	3.0	2.4	2.1	2.5	2.7	2.7	2.9	2.7	2.6	3.4	3.0	2.8	1.9	1.9	1.2	3.4
20-Jul	0.6	1.0	0.7	0.6	0.4	0.4	0.6	0.8	1.9	2.5	2.4	2.9	2.7	2.6	2.7	2.4	2.6	2.0	1.6	0.8	0.7	0.4	0.3	0.2	2.9
21-Jul	0.2	0.3	0.2	0.1	0.1	0.2	0.3	0.9	1.3	1.6	2.0	2.6	2.4	2.7	2.4	2.3	2.0	1.7	1.2	0.6	0.1	0.3	0.3	0.4	2.7
22-Jul	0.5	0.4	0.3	0.6	0.5	0.6	0.7	1.0	1.4	1.5	1.9	2.3	2.1	2.6	2.5	2.5	2.4	2.1	1.4	1.4	1.5	2.4	1.8	0.7	2.6
23-Jul	0.5	0.5	0.9	0.7	1.0	1.3	1.2	1.7	1.8	2.4	2.7	2.5	3.0	3.4	3.3	3.1	3.3	3.3	2.6	2.7	2.1	1.5	1.2	0.9	3.4
24-Jul	0.8	0.8	1.3	1.2	1.5	1.6	2.1	2.4	2.0	2.4	1.8	2.4	2.7	3.5	3.4	3.1	3.4	2.9	2.3	2.5	3.1	3.0	2.9	3.1	3.5
25-Jul	3.2	2.7	1.8	1.5	0.8	1.4	1.6	1.6	2.5	2.4	2.4	1.3	1.5	1.6	2.3	2.3	1.9	2.1	1.5	0.8	0.5	0.6	0.5	0.5	3.2
26-Jul	1.4	1.3	0.7	0.9	0.6	1.0	0.9	1.5	1.8	2.2	2.4	2.7	2.7	2.6	2.9	2.3	1.6	2.3	1.9	1.3	0.8	0.7	0.4	0.5	2.9
27-Jul	0.9	0.6	0.3	0.5	0.5	0.7	0.9	1.2	1.8	1.8	2.7	1.3	1.2	2.1	2.0	1.5	1.2	0.9	0.7	0.6	0.7	0.7	0.9	1.1	2.7
28-Jul	0.7	0.7	0.9	0.9	1.2	1.3	1.3	1.4	1.5	1.6	1.8	2.4	2.3	2.7	2.3	2.2	2.2	1.9	1.1	0.5	0.5	0.1	0.3	0.4	2.7
29-Jul	0.8	0.9	0.6	1.0	0.8	2.5	2.1	1.3	1.9	1.9	2.1	2.1	2.4	2.9	2.4	1.9	1.4	1.8	1.3	2.2	1.4	1.1	1.2	0.7	2.9
30-Jul	1.1	1.4	0.7	0.6	0.3	0.8	1.3	1.4	1.8	2.3	1.9	2.5	2.7	3.0	2.8	3.0	2.2	2.1	1.3	1.2	4.8	3.2	2.8	1.5	4.8
31-Jul	0.7	0.7	0.5	0.4	0.2	0.3	0.7	1.0	1.4	1.7	2.7	2.6	3.0	3.1	2.9	3.0	2.3	2.3	2.3	2.3	2.8	2.5	2.8	2.9	3.1
	3.2	2.7	2.4	1.9	1.9	2.5	2.2	2.4	2.5	3.0	3.1	3.3	3.5	4.0	3.6	3.5	3.4	3.3	3.4	3.0	4.8	3.2	2.9	3.1	
	Diurnal Maximum																								



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.6 km/h on Jul 30 21:00 Minimum Value: 0.1 km/h on Jul 21 05:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 0.9 Median = 1.6 Q ₃ = 2.3 P ₉₀ = 2.9 P ₉₉ = 3.7																								Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	0.5	0.4	0.2	0.4	0.2	0.5	0.6	0.7	1.2	1.3	1.8	2.4	2.4	2.3	2.0	1.8	2.0	1.9	1.3	0.7	0.4	0.2	0.7	0.6	2.4
2-Jul	0.6	0.5	0.4	0.4	0.5	0.6	0.9	1.2	2.0	2.4	2.3	2.4	2.6	3.1	2.4	2.6	2.1	1.7	1.5	1.9	1.6	2.4	2.1	2.1	3.1
3-Jul	1.4	1.3	1.1	1.2	1.5	1.9	2.1	2.2	2.1	2.6	3.0	3.2	3.6	1.3	1.7	2.1	2.5	1.7	1.0	0.8	1.1	1.5	0.6	0.6	3.6
4-Jul	1.8	2.3	1.2	1.2	1.4	1.1	2.1	2.5	2.5	3.0	3.2	3.6	3.8	4.2	4.1	3.8	3.7	3.5	3.0	2.3	1.6	1.0	0.8	0.7	4.2
5-Jul	0.5	0.4	0.6	1.0	0.9	0.8	0.6	0.8	1.6	1.3	2.7	3.6	3.1	3.5	3.4	3.5	2.6	2.3	1.6	0.9	0.8	1.2	1.4	0.7	3.6
6-Jul	1.3	0.9	0.9	1.2	1.1	1.4	1.1	1.4	1.9	1.8	2.8	3.1	3.2	3.1	1.5	1.5	2.1	2.3	1.2	1.1	1.6	1.1	1.8	0.9	3.2
7-Jul	0.7	0.7	0.9	1.0	0.8	1.2	1.4	1.3	1.7	2.2	2.1	2.3	2.5	2.6	2.2	2.1	2.2	1.7	1.3	0.9	1.1	0.6	0.2	0.4	2.6
8-Jul	0.7	0.5	0.5	0.8	0.4	1.0	1.1	1.3	1.5	1.7	1.6	2.1	2.5	2.7	3.3	3.2	2.7	1.8	1.7	1.1	0.5	0.9	0.6	0.9	3.3
9-Jul	1.1	1.8	1.5	1.1	0.8	0.5	1.0	1.4	1.4	2.7	2.5	2.3	2.8	2.7	3.1	3.2	2.9	1.6	2.1	1.5	1.4	1.8	1.4	1.3	3.2
10-Jul	1.1	1.2	1.4	1.5	1.8	2.2	1.7	2.2	2.5	2.6	3.2	2.4	2.9	3.1	3.0	3.1	3.0	3.1	4.6	2.3	2.1	2.0	1.9	2.0	4.6
11-Jul	1.7	1.9	1.3	1.7	2.1	1.5	1.6	1.3	1.4	1.5	1.8	2.6	3.3	2.8	2.6	2.9	2.3	2.5	2.9	2.2	2.0	1.6	1.8	1.8	3.3
12-Jul	2.3	2.4	2.5	1.9	1.3	1.4	1.4	1.8	2.0	2.4	2.6	2.9	3.1	2.9	2.8	2.6	1.8	2.0	1.5	0.7	0.4	0.3	0.6	1.0	3.1
13-Jul	1.1	1.7	1.4	0.9	0.7	1.0	1.7	2.0	2.6	3.0	2.6	2.9	2.8	3.0	2.9	2.2	2.4	2.3	1.3	0.6	0.6	0.7	0.9	1.4	3.0
14-Jul	1.3	1.0	0.8	0.6	0.5	0.7	1.2	1.8	1.6	1.7	1.7	2.2	2.9	3.2	3.0	2.8	2.9	2.5	1.7	1.0	0.5	0.6	0.9	1.2	3.2
15-Jul	1.3	1.2	0.6	0.5	0.7	1.2	1.5	1.6	1.6	1.6	1.9	2.2	3.0	2.7	2.2	2.0	1.7	1.7	1.6	1.1	0.8	1.0	0.7	0.5	3.0
16-Jul	0.6	1.1	0.6	0.6	0.5	0.8	0.7	1.0	1.0	1.5	1.7	1.8	1.4	1.3	1.3	1.8	2.2	2.1	1.9	1.5	1.3	1.4	2.8	1.3	2.8
17-Jul	0.8	0.8	0.8	0.9	0.8	0.5	1.2	2.1	1.9	2.1	2.3	2.3	2.2	2.1	2.2	2.1	1.7	1.3	0.7	0.7	0.2	1.0	1.0	1.1	2.3
18-Jul	1.1	0.7	0.8	0.8	0.9	1.5	1.8	1.6	1.9	2.1	2.0	2.6	2.6	2.6	2.7	2.9	1.7	1.6	2.3	1.8	1.4	UO	0.7	0.6	2.9
19-Jul	0.9	0.9	0.9	1.2	1.0	0.9	1.3	1.5	2.1	3.0	2.5	2.2	2.7	2.9	2.8	3.0	2.7	2.6	3.4	3.0	2.9	1.9	2.0	1.2	3.4
20-Jul	0.6	0.9	0.9	0.7	0.4	0.5	0.7	0.8	1.9	2.6	2.5	3.1	2.8	2.7	2.8	2.5	2.7	2.1	1.6	0.7	0.6	0.4	0.3	0.2	3.1
21-Jul	0.1	0.3	0.2	0.2	0.1	0.2	0.3	0.8	1.2	1.6	1.8	2.5	2.3	2.7	2.3	2.3	2.1	1.9	1.0	0.8	0.3	0.3	0.3	0.3	2.7
22-Jul	0.5	0.4	0.3	0.5	0.4	0.5	0.5	0.9	1.1	1.5	1.8	2.4	2.0	2.5	2.3	2.3	2.2	1.9	1.3	1.1	1.5	2.4	1.7	0.8	2.5
23-Jul	0.6	0.6	0.9	0.8	0.7	1.1	1.1	1.4	1.6	2.5	2.7	2.4	2.3	2.9	3.0	2.9	2.7	2.6	2.1	2.3	2.2	1.5	1.2	1.0	3.0
24-Jul	0.8	0.9	1.3	1.0	1.5	1.6	2.0	2.1	1.9	2.1	1.9	2.4	2.6	3.0	3.0	2.8	2.5	2.6	2.3	2.0	2.4	2.3	2.4	2.4	3.0
25-Jul	2.3	2.4	1.8	1.6	0.9	1.6	1.7	1.7	2.3	1.9	2.3	1.3	1.5	1.5	2.3	2.3	2.0	2.0	1.6	1.0	0.6	0.8	0.7	0.5	2.4
26-Jul	1.0	1.0	0.5	1.0	0.8	1.1	1.0	1.4	1.8	2.1	2.1	2.5	2.7	2.4	3.0	2.4	1.8	2.4	1.9	1.3	0.8	0.8	0.4	0.8	3.0
27-Jul	1.0	0.6	0.4	0.6	0.7	0.5	0.7	1.0	1.6	1.7	2.6	1.3	1.1	2.1	1.9	1.7	1.2	0.8	0.6	0.5	0.7	0.6	0.8	1.0	2.6
28-Jul	0.7	0.5	0.7	0.8	1.1	1.2	1.3	1.4	1.4	1.6	1.8	1.9	2.0	2.8	2.2	2.2	1.9	1.9	1.2	0.6	0.5	0.2	0.4	0.4	2.8
29-Jul	0.9	1.0	0.8	0.9	1.0	3.0	2.7	1.5	2.0	1.8	2.1	2.2	1.9	2.6	2.5	1.9	1.4	2.0	1.3	1.8	1.3	1.1	1.2	0.7	3.0
30-Jul	1.0	1.2	0.4	0.6	0.4	0.7	1.2	1.3	1.7	2.3	2.0	2.6	2.9	2.9	2.7	2.5	2.3	2.1	1.3	0.8	5.6	3.1	2.7	1.6	5.6
31-Jul	0.7	0.9	0.4	0.4	0.3	0.4	0.8	1.0	1.2	1.6	2.9	2.7	3.0	3.3	3.1	3.0	2.5	2.3	2.6	2.3	3.0	2.7	3.0	3.1	3.3
2.3 2.4 2.5 1.9 2.1 3.0 2.7 2.5 2.6 3.0 3.2 3.6 3.8 4.2 4.1 3.8 3.7 3.5 4.6 3.0 5.6 3.1 3.0 3.1																									
Diurnal Maximum																									
UO - Unstable Operation																									



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 10, 2014	Previous Calibration	June 9, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	13:20
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	800	802
Calculated slope	0.999850	0.999130	Chamber temp.	44.5	44.5
Calculated intercept	0.250721	1.091578	Pressure (mmHg)	689.6	689.8
Analyzer Background	16.5	16.0	Flow (lpm)	0.497	0.497
Analyzer Coefficient	0.776	0.763	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	-0.3	NA
as found span	5000	58.8	599.8	604.3	0.993
calibrator zero	5000	0.0	0.0	0.0	0.000
high point	5000	58.8	599.8	599.2	1.001
second point	5000	29.4	299.9	300.1	0.999
third point	5000	14.7	149.9	146.9	1.021
calibrator zero					
as left zero	5000	0.0	0.0	0.0	0.000
as left span	5000	58.8	599.8	604.5	0.992
Average Correction Factor					1.007

Corrected As found 604.6 Previous response 599.6 % change -0.8%

Notes:

Zero and Span adjusted. Filter changed after As Finds.

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

SO₂ Calibration Summary

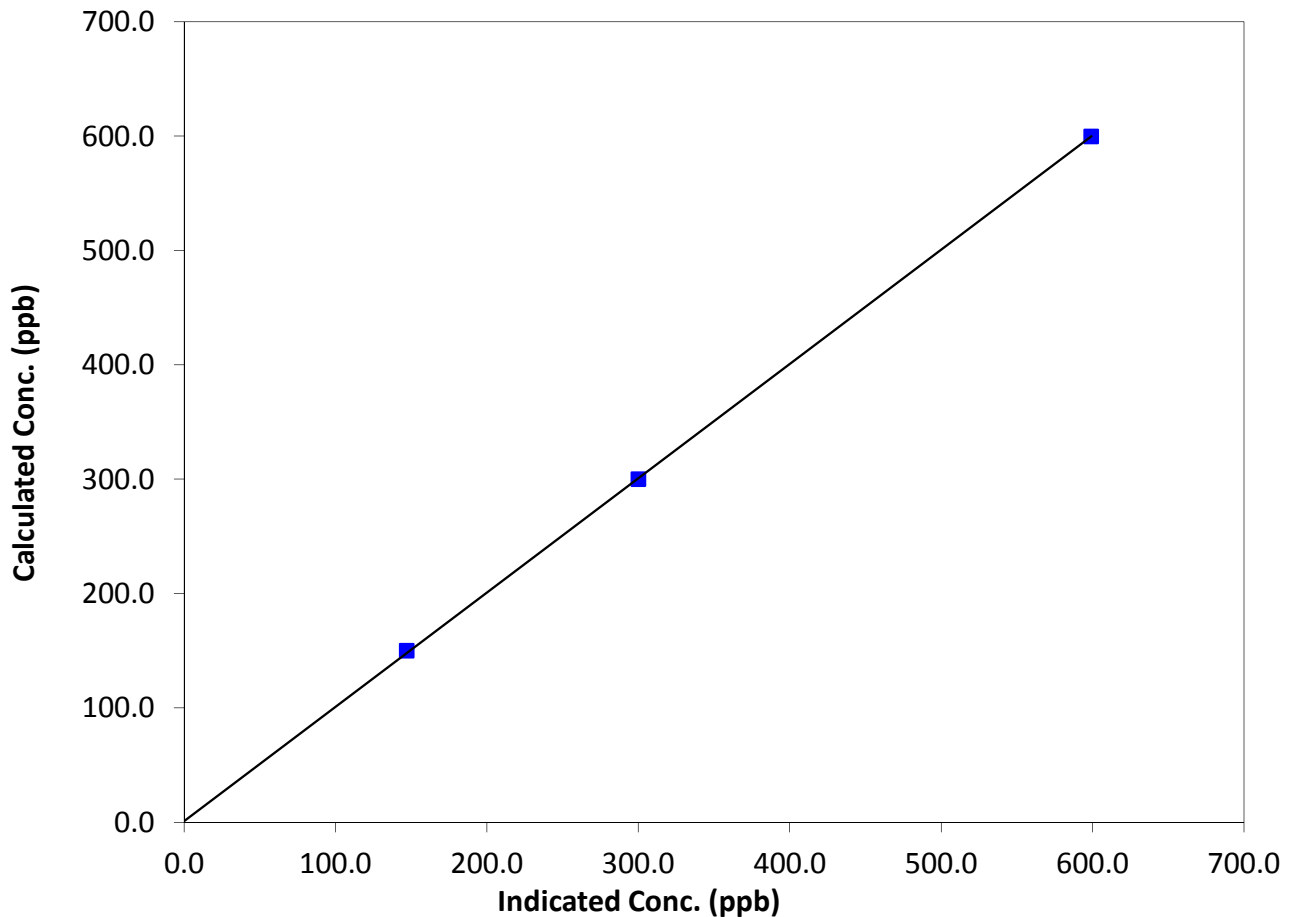
Station Information

Calibration Date	July 10, 2014	Previous Calibration	June 9, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:35	End Time (MST)	13:20
Analyzer make	TEI 43C	Analyzer serial #	613516797

Calibration Data

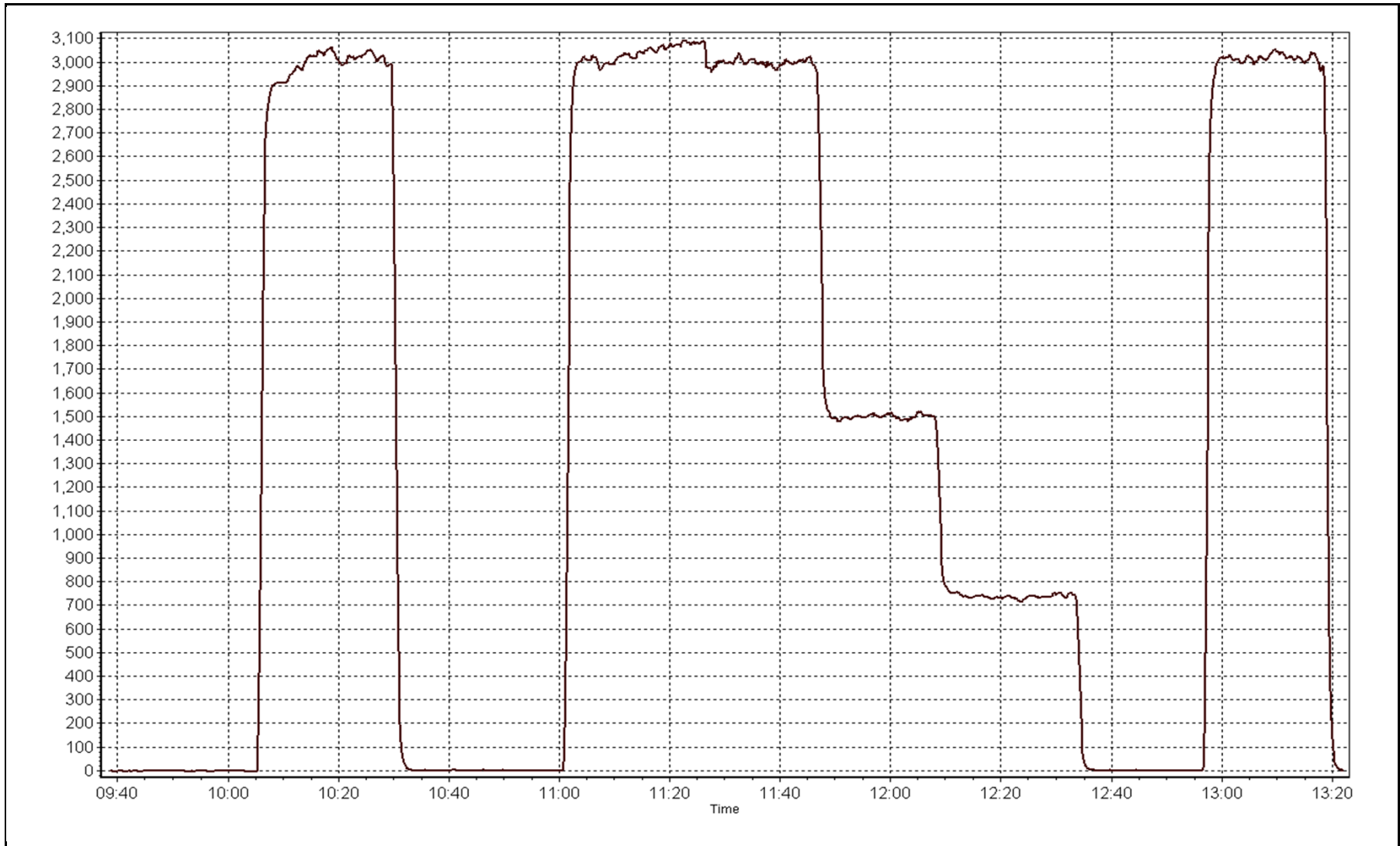
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999968
599.8	599.2	1.0009		
299.9	300.1	0.9994	Slope	0.999130
149.9	146.9	1.0206		
			Intercept	1.091578

SO₂ Calibration Curve



SO2 Calibration Plot

Date: July 10, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	July 11, 2014	Previous Calibration	June 12, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	11:25
Barometric Pressure	731 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	881	881
Calculated slope	1.006188	1.005846	Chamber temp.	45	45
Calculated intercept	-0.285667	0.184921	Pressure	483.8	502.0
Analyzer Background	14.8	14.4	Flow	1.012	1.040
Analyzer Coefficient	1.110	1.11	Intensity (%)	115	115
			Converter temp.	326	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	-0.09	NA
as found span	5000	36.8	75.1	74.4	1.009
SO2 scrubber check	5000	29.4	299.9	1.6	NA
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	36.8	75.1	74.4	1.009
second point	5000	20.6	42.0	41.8	1.006
third point	5000	12.3	25.1	24.5	1.024
calibrator zero					
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	36.8	75.1	74.3	1.011
Average Correction Factor					1.013

Corrected As found	74.5	Previous response	74.9	% change	0.5%
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Notes:

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

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

H2S Calibration Summary

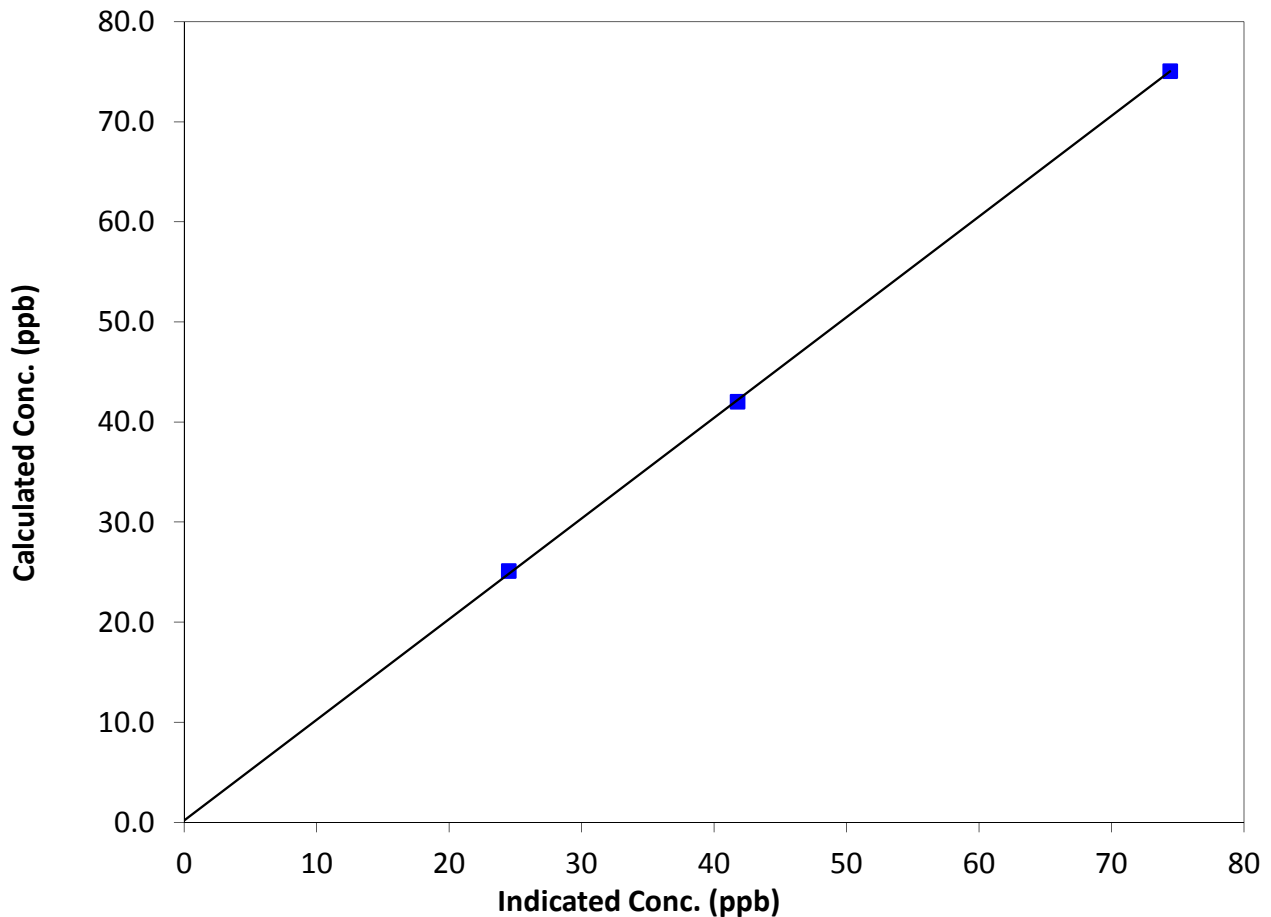
Station Information

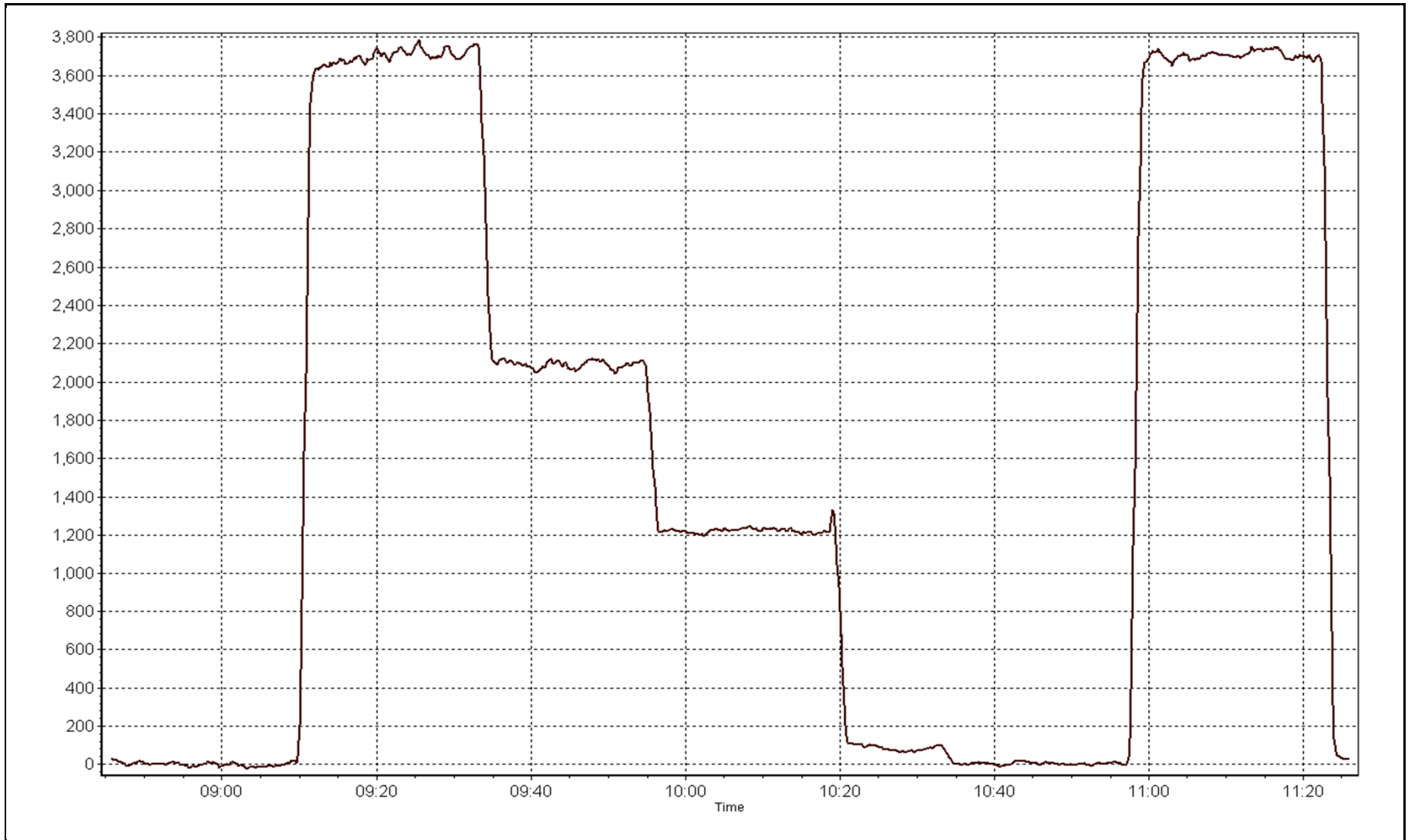
Calibration Date	July 11, 2014	Previous Calibration	June 12, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:45	End Time (MST)	11:25
Analyzer make	TEI 450i	Analyzer serial #	815129108

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999963
75.1	74.4	1.0086		
42.0	41.8	1.0058	Slope	1.005846
25.1	24.5	1.0240		
			Intercept	0.184921

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Thursday, July 10, 2014	Previous Calibration	Friday, June 06, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	13:20
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	11.6	11.6
Analyzer Range (mv)	5000	5000	Air	41.9	41.4
Calculated slope	0.992457	0.998136	Fuel Pressure	20.2	20.2
Calculated intercept	0.036129	0.006800	Detector Temp	125.1	124.9
Bkg	2.45	2.08	Flame Temp	162.4	162.1
Slope	1.778	1.749			

Analyzer make	TEI 51i-LT	Analyzer serial #	1317958295
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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	-0.36	N/A
as found span	5000	58.8	12.72	12.46	1.020
calibrator zero	5000	0.0	0.00	0.01	N/A
high point	5000	58.8	12.72	12.73	0.999
second point	5000	29.0	6.27	6.33	0.992
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	-0.02	N/A
as left span	5000	58.8	12.72	12.82	0.992
Average Correction Factor					1.003

Corrected As found	12.82	Previous response	12.78	% change	-0.3%
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Notes:

Zero and Span adjusted, long span due to SO2 stabilization. Filter changed after As Finds

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

THC Calibration Summary

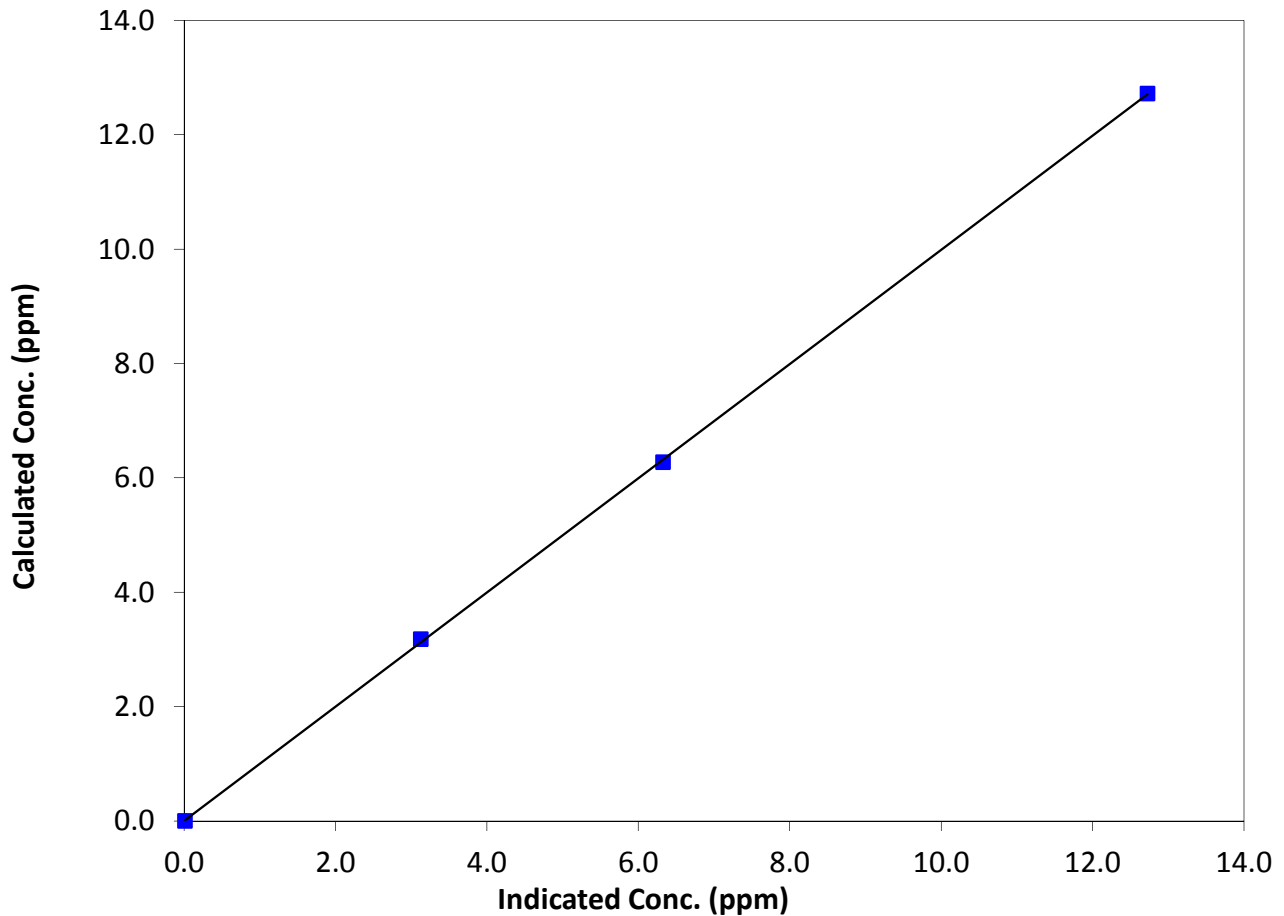
Station Information

Calibration Date	July 10, 2014	Previous Calibration	June 6, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:35	End Time (MST)	13:20
Analyzer make	TEI 51i-LT	Analyzer serial #	1317958295

Calibration Data

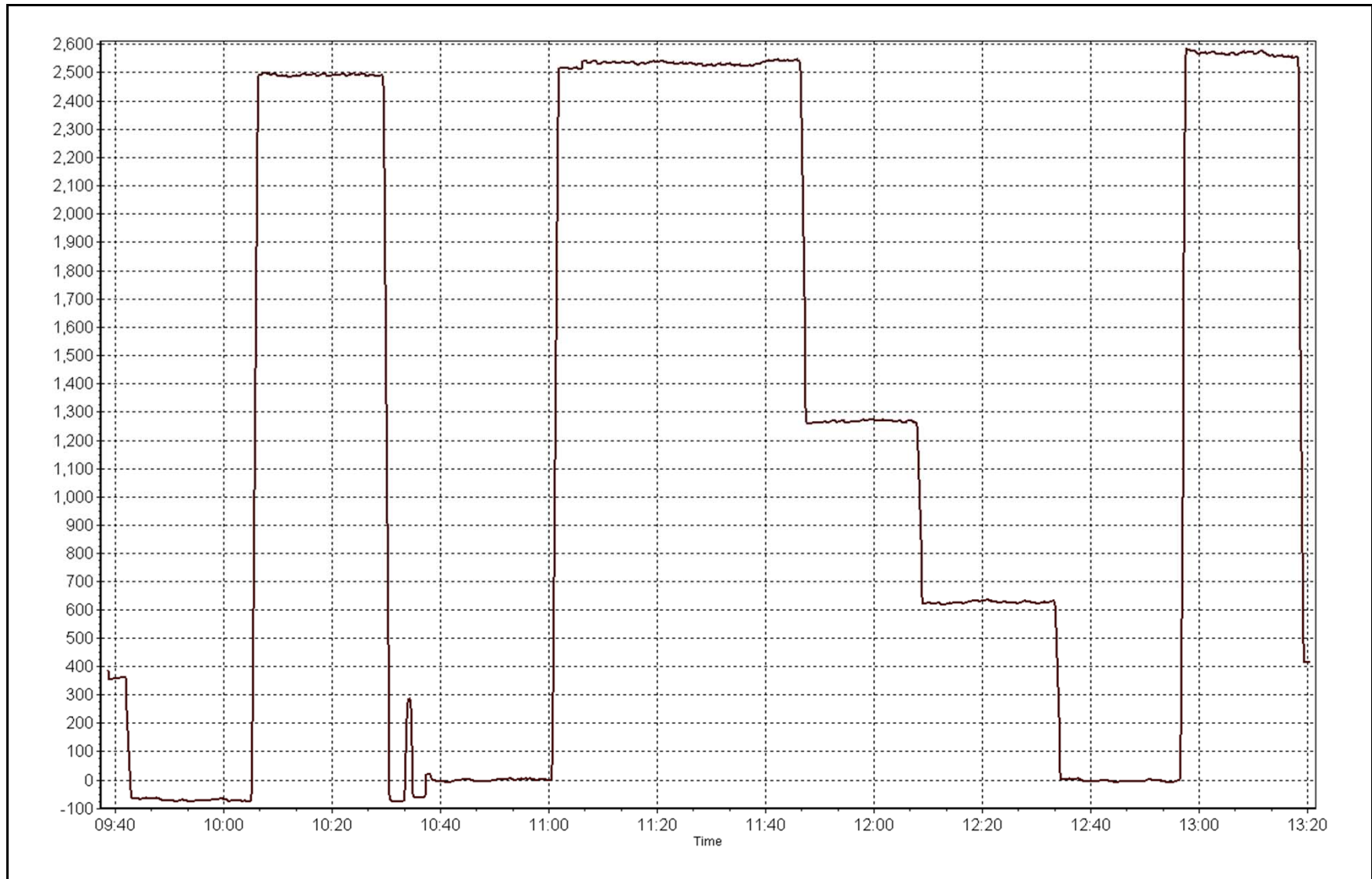
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	N/A	Correlation Coefficient	0.999938
12.72	12.73	0.9995		
6.27	6.33	0.9917	Slope	0.998136
3.18	3.13	1.0175		
			Intercept	0.006800

THC Calibration Curve



THC Calibration Plot

Date: July 10, 2014



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 6
PATRICIA MCINNES
JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)

JULY 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	35	57	97.04	12	0	4	0
TRS (ppb) Average	693	35	51	97.85	3	0	1	0
THC (ppm) Average	685	36	59	96.91	2.7	-	2.1	-
NMHC(ppm) Average	685	36	59	96.91	0.099	-	0.005	-
CH4(ppm) Average	685	36	59	96.91	2.7	-	2.1	-
O3 (ppb) Average	697	33	47	98.12	56	0	37	-
NO2 (ppb) Average	692	35	52	97.72	14	0	8	-
NO (ppb) Average	692	35	52	97.72	12	-	1	-
NOX (ppb) Average	692	35	52	97.72	20	-	10	-
NH3 (ppb) Average	651	39	93	92.74	0	0	0	-
PM2.5 (ug/m3) Average	722	0	22	97.04	218.1	-	60.5	5
Temperature 2 m (C) Average	742	0	2	99.73	32.5	-	-	-
Relative Humidity (%) Average	742	0	2	99.73	99	-	-	-
Wind Speed 10 m (km/h) Average	740	0	4	99.46	28	-	-	-
Wind Direction 10 m (deg) Average	740	0	4	99.46	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
 JULY 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	0.7	1	-	0	0	0	0	1	1	12
TRS (ppb) Average	693	0.3	0	-	0	0	0	0	0	1	3
THC (ppm) Average	685	2	0.1	-	1.9	1.9	1.9	2	2	2.1	2.7
NMHC(ppm) Average	685	0.001	0.006	-	0	0	0	0	0	0	0.099
CH4(ppm) Average	685	1.99	0.1	-	1.9	1.9	1.9	2	2	2.1	2.7
O3 (ppb) Average	697	24.4	11	-	3	11	17	25	31	39	56
NO2 (ppb) Average	692	2.5	2	-	0	0	1	2	4	6	14
NO (ppb) Average	692	0.7	1	-	0	0	0	0	1	1	12
NOX (ppb) Average	692	3.2	3	-	0	0	1	2	4	7	20
NH3 (ppb) Average	651	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	722	16.97	20	-	0.2	2.6	6	11.3	21.9	34.1	218.1
Temperature 2 m (C) Average	742	19.38	5.2	-	5.5	12.6	15.3	19.3	23.1	26.2	32.5
Relative Humidity (%) Average	742	65.3	20	-	20	36	49	67	83	91	99
Wind Speed 10 m (km/h) Average	740	8.8	5	-	0	3	5	8	12	15	28
Wind Direction 10 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	09 Jul 2014 12:00	09 Jul 2014 12:00	1	Maintenance - sample manifold cleaned
SO2	25 Jul 2014 16:00	25 Jul 2014 22:00	7	Maintenance - transition analyzer signals to digital collection
SO2	26 Jul 2014 10:00	26 Jul 2014 15:00	6	Maintenance - transition analyzer signals to digital collection
SO2	27 Jul 2014 06:00	27 Jul 2014 12:00	7	Maintenance - transition analyzer signals to digital collection
SO2	29 Jul 2014 10:00	29 Jul 2014 10:00	1	Maintenance - transition analyzer signals to digital collection
TRS	25 Jul 2014 16:00	25 Jul 2014 22:00	7	Maintenance - transition analyzer signals to digital collection
TRS	26 Jul 2014 10:00	26 Jul 2014 15:00	6	Maintenance - transition analyzer signals to digital collection
TRS	27 Jul 2014 16:00	27 Jul 2014 17:00	2	Maintenance - transition analyzer signals to digital collection
TRS	29 Jul 2014 11:00	29 Jul 2014 11:00	1	Maintenance - transition analyzer signals to digital collection
NMHC, CH4, THC	09 Jul 2014 11:00	09 Jul 2014 12:00	2	Maintenance - sample manifold cleaned
NMHC, CH4, THC	25 Jul 2014 16:00	25 Jul 2014 22:00	7	Maintenance - transition analyzer signals to digital collection
NMHC, CH4, THC	26 Jul 2014 10:00	26 Jul 2014 15:00	6	Maintenance - transition analyzer signals to digital collection
NMHC, CH4, THC	27 Jul 2014 06:00	27 Jul 2014 12:00	7	Maintenance - transition analyzer signals to digital collection
NMHC, CH4, THC	29 Jul 2014 10:00	29 Jul 2014 10:00	1	Maintenance - transition analyzer signals to digital collection
O3	25 Jul 2014 16:00	25 Jul 2014 22:00	7	Maintenance - transition analyzer signals to digital collection
O3	26 Jul 2014 10:00	26 Jul 2014 15:00	6	Maintenance - transition analyzer signals to digital collection
O3	29 Jul 2014 12:00	29 Jul 2014 12:00	1	Maintenance - transition analyzer signals to digital collection
NO2, NO, NOX	09 Jul 2014 12:00	09 Jul 2014 12:00	1	Maintenance - sample manifold cleaned
NO2, NO, NOX	25 Jul 2014 16:00	25 Jul 2014 22:00	7	Maintenance - transition analyzer signals to digital collection
NO2, NO, NOX	26 Jul 2014 10:00	26 Jul 2014 10:00	1	Maintenance - transition analyzer signals to digital collection
NO2, NO, NOX	27 Jul 2014 06:00	27 Jul 2014 12:00	7	Maintenance - transition analyzer signals to digital collection
NO2, NO, NOX	29 Jul 2014 10:00	29 Jul 2014 10:00	1	Maintenance - transition analyzer signals to digital collection
NH3	01 Jul 2014 05:00	31 Jul 2014 08:00	29	Stabilization after daily span
NH3	25 Jul 2014 16:00	25 Jul 2014 22:00	7	Maintenance - transition analyzer signals to digital collection
NH3	26 Jul 2014 10:00	26 Jul 2014 15:00	6	Maintenance - transition analyzer signals to digital collection
NH3	27 Jul 2014 06:00	27 Jul 2014 12:00	7	Maintenance - transition analyzer signals to digital collection
NH3	28 Jul 2014 04:00	28 Jul 2014 04:00	1	Maintenance - output signal unstable
NH3	29 Jul 2014 04:00	29 Jul 2014 04:00	1	Maintenance - output signal unstable
NH3	29 Jul 2014 10:00	29 Jul 2014 10:00	1	Maintenance - transition analyzer signals to digital collection
NH3	30 Jul 2014 06:00	30 Jul 2014 06:00	1	Maintenance - output signal unstable
NH3	31 Jul 2014 07:00	31 Jul 2014 07:00	1	Maintenance - output signal unstable
PM2.5	04 Jul 2014 11:00	04 Jul 2014 12:00	2	Intermittent unstable operation - excessive baseline drift
PM2.5	04 Jul 2014 15:00	04 Jul 2014 21:00	7	Intermittent unstable operation - excessive baseline drift

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	05 Jul 2014 01:00	05 Jul 2014 04:00	4	Intermittent unstable operation - excessive baseline drift
PM2.5	14 Jul 2014 13:00	14 Jul 2014 14:00	2	Maintenance - Flow and zero check, sample head cleaning
PM2.5	25 Jul 2014 16:00	25 Jul 2014 22:00	7	Maintenance - transition analyzer signals to digital collection
Temperature	25 Jul 2014 16:00	25 Jul 2014 16:00	1	Maintenance - transition analyzer signals to digital collection
Temperature	26 Jul 2014 10:00	26 Jul 2014 10:00	1	Maintenance - transition analyzer signals to digital collection
Relative Humidity	25 Jul 2014 16:00	25 Jul 2014 16:00	1	Maintenance - transition analyzer signals to digital collection
Relative Humidity	26 Jul 2014 10:00	26 Jul 2014 10:00	1	Maintenance - transition analyzer signals to digital collection
Wind Speed, Wind Direction	25 Jul 2014 16:00	25 Jul 2014 17:00	2	Maintenance - transition analyzer signals to digital collection
Wind Speed, Wind Direction	25 Jul 2014 19:00	25 Jul 2014 19:00	1	Maintenance - transition analyzer signals to digital collection
Wind Speed, Wind Direction	26 Jul 2014 10:00	26 Jul 2014 10:00	1	Maintenance - transition analyzer signals to digital collection



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 12 ppb on Aug 1 00:00	Maximum Daily Average: 4.2 ppb on Jul 12		Hours of Data:	687
Minimum Value: 0 ppb on Jul 25 23:00	Minimum Daily Average: 0.1 ppb on Jul 5		Hours of Missing Data:	57
Maximum Diurnal Average: 1.4 ppb at hour 12	Minimum Diurnal Average: 0.2 ppb at hour 2		Hours of Calibration:	35
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 = 7		Percent Operational Time:	97.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	1	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0.7	1
2-Jul	0	Z	0	0	1	1	1	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.4	1
3-Jul	0	Z	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
4-Jul	0	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-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	5	5	3	2	2	1	3	1.1	5
7-Jul	1	Z	0	0	0	0	0	0	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
8-Jul	0	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-Jul	0	Z	1	0	0	0	1	1	0	0	0	M	0	0	0	1	0	0	1	1	1	1	1	1	0.5	1
10-Jul	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1
11-Jul	0	Z	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
12-Jul	2	Z	2	2	3	2	2	3	7	4	3	7	9	8	5	7	10	7	5	3	2	1	1	1	4.2	10
13-Jul	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
14-Jul	0	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
15-Jul	0	Z	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
16-Jul	1	Z	1	1	0	0	0	0	0	0	1	2	3	7	1	0	0	0	0	0	0	0	0	1	1.0	7
17-Jul	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	2	2	1	0	0	0	0	0.7	2
18-Jul	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
19-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	1	1	0	0.6	3
20-Jul	0	Z	0	0	0	0	0	0	1	6	4	6	10	3	1	2	3	2	2	1	1	0	0	0	1.9	10
21-Jul	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0.4	1
22-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	1	0	0	0	0.4	1
23-Jul	0	Z	0	0	0	0	0	2	4	4	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0.7	4
24-Jul	1	Z	0	0	0	0	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	2
25-Jul	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	M	M	M	M	M	M	M	M	0	--	1
26-Jul	0	0	0	0	Z	0	0	0	0	M	M	M	M	M	M	2	1	1	0	0	0	0	0	0	--	2
27-Jul	0	0	0	0	0	M	M	M	M	M	M	M	M	M	0	0	0	0	0	0	0	0	0	0	--	0
28-Jul	Z	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
29-Jul	0	Z	0	0	0	0	0	0	0	M	0	0	0	0	1	1	1	1	1	1	0	0	1	1	0.6	1
30-Jul	1	0	Z	0	0	0	0	0	0	0	1	3	2	0	0	1	0	2	3	1	0	5	1	0	1.0	5
31-Jul	0	0	0	Z	0	1	0	1	1	1	11	7	3	0	0	0	3	3	3	4	4	1	3	12	2.6	12

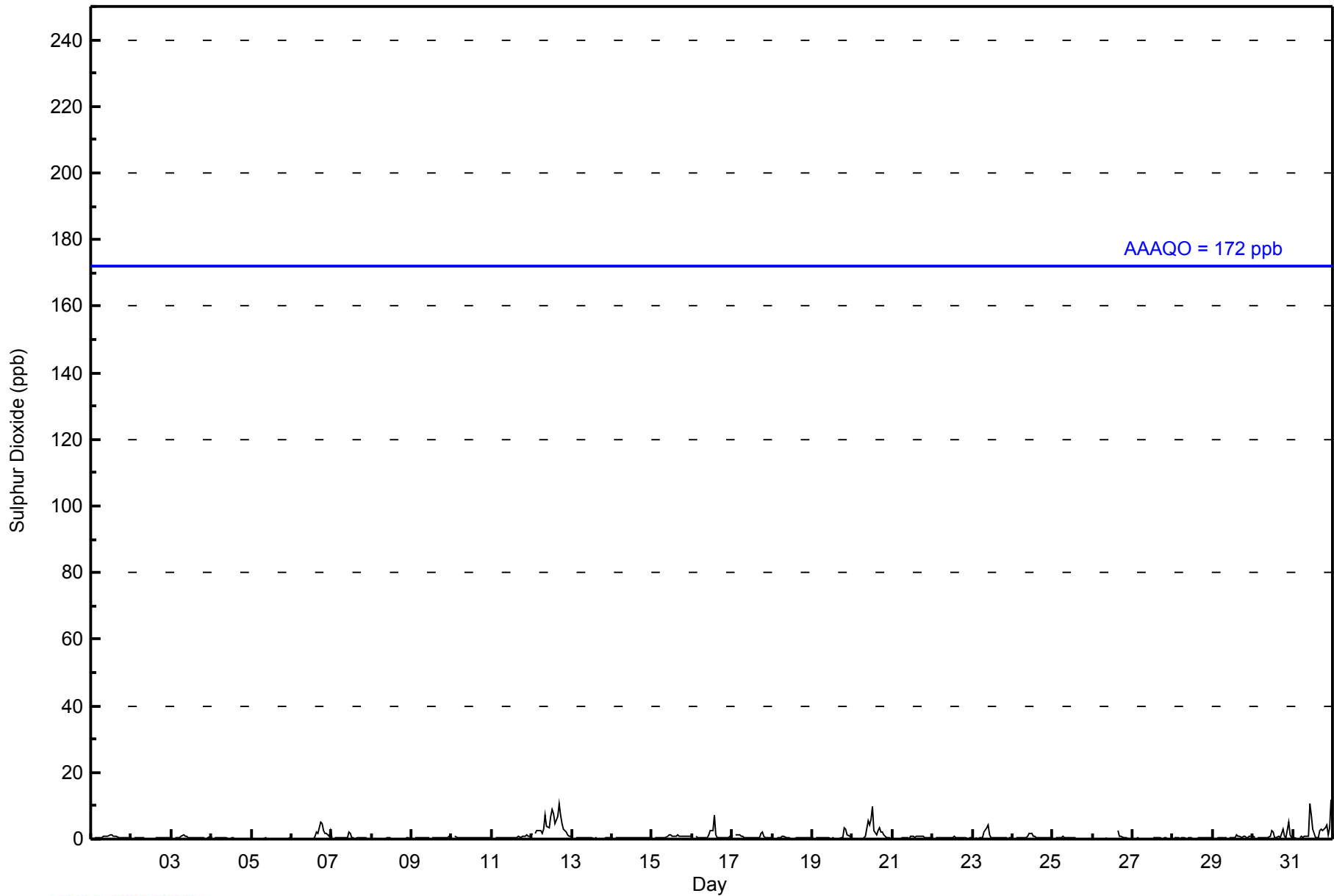
0.4	0.2	0.4	0.4	0.4	0.4	0.4	0.5	0.8	0.9	1.2	1.4	1.3	1.0	0.6	0.8	0.9	1.0	0.9	0.8	0.7	0.6	0.5	0.9	Diurnal Average
2	0	2	2	3	2	2	3	7	6	11	7	10	8	5	7	10	7	5	4	4	5	3	12	Diurnal Maximum

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



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	685	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: 687

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

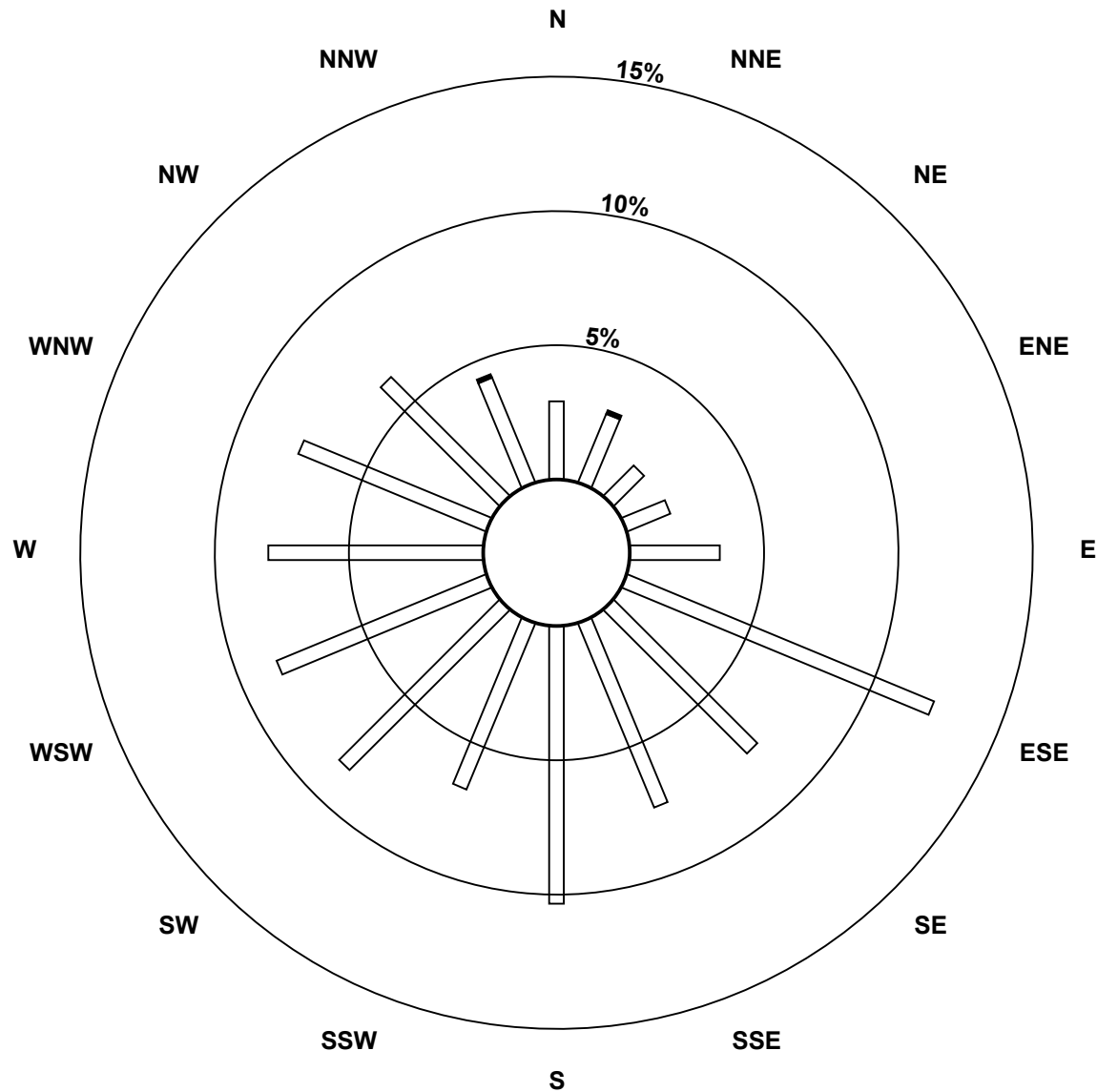
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	20	19	11	12	23	85	52	51	71	46	58	58	55	52	43	29	685
11 - 20	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	20	11	12	23	85	52	51	71	46	58	58	55	52	43	30	687

Total Number of Valid Hours: 687

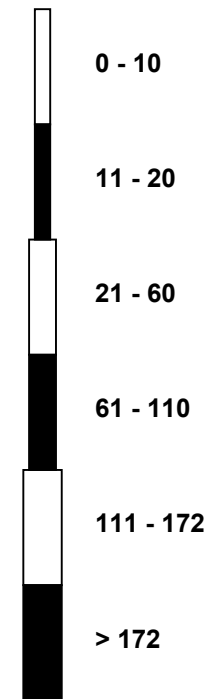
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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



Classes (ppb)



Total Number of Valid Hours: 687

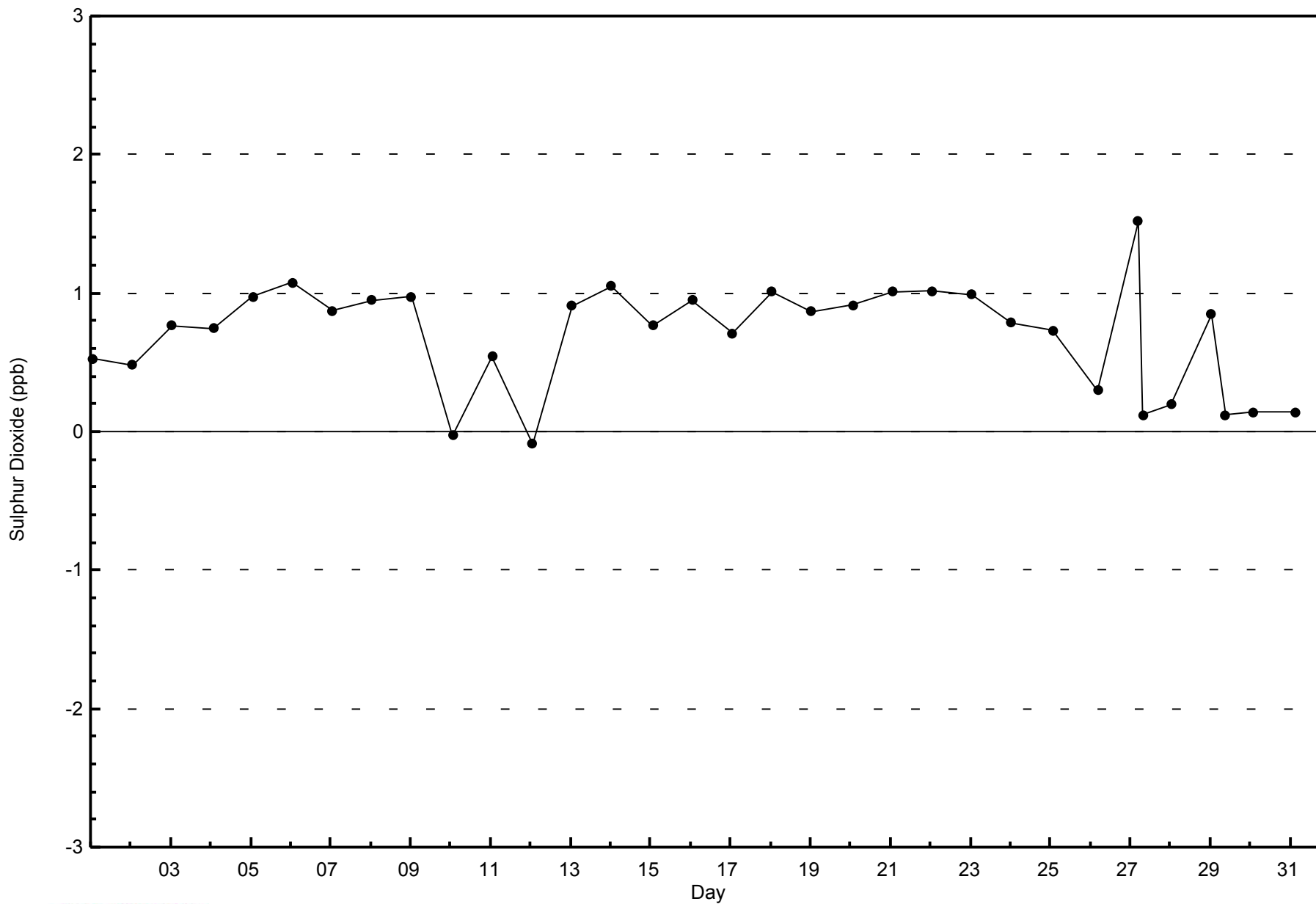


WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

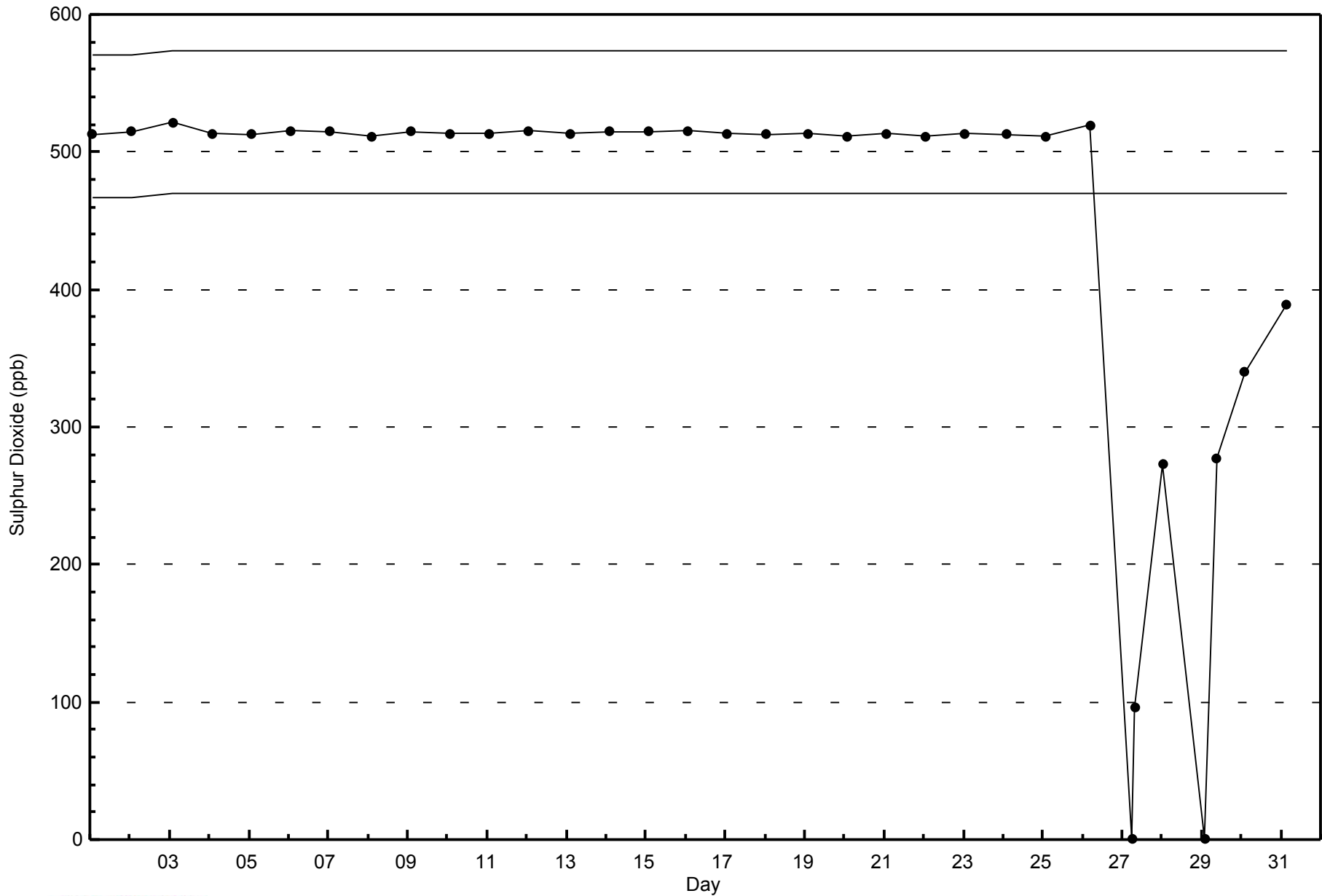
Patricia McInnes - July 2014





WBEA NETWORK
Span Responses

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



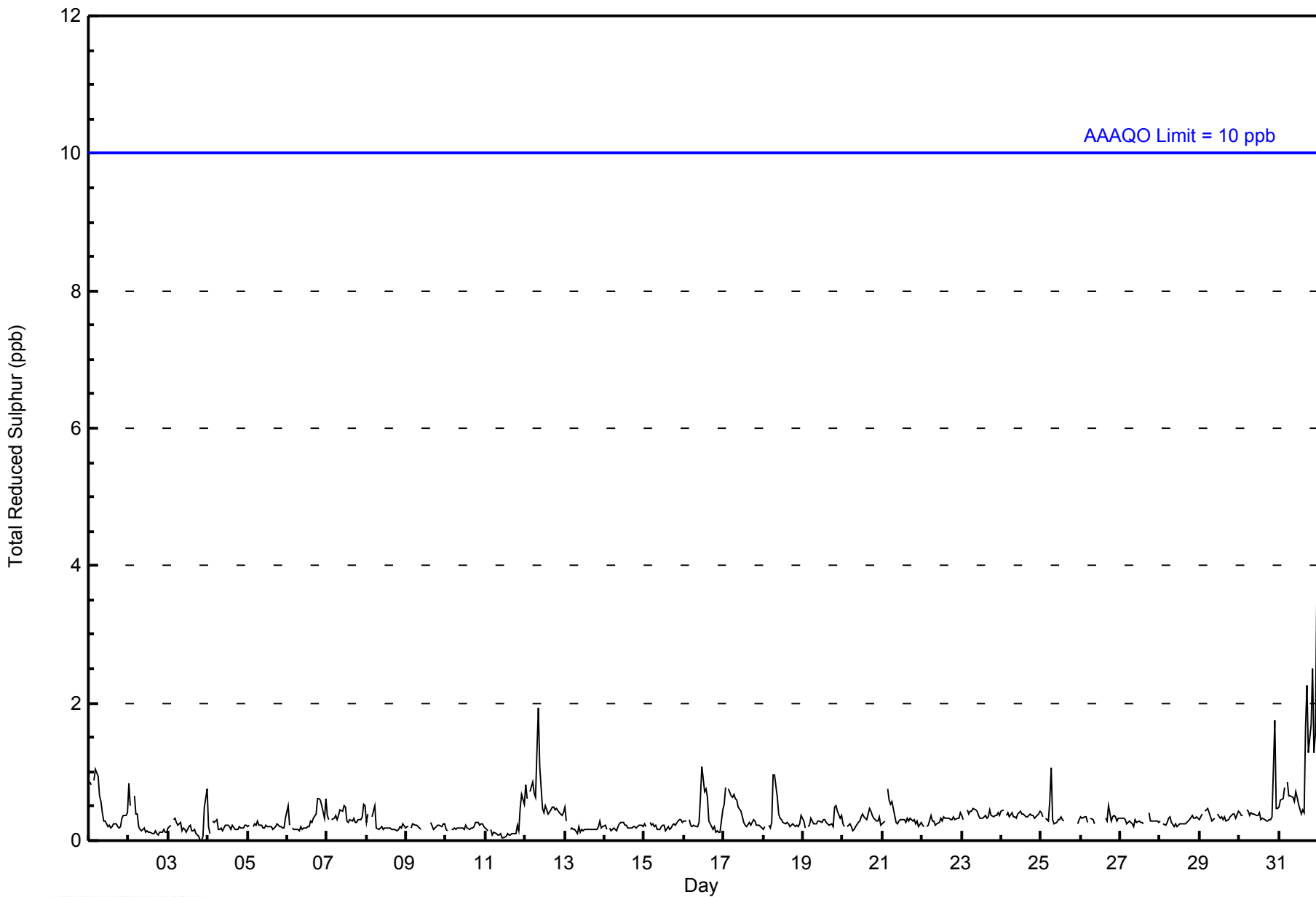


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 3 ppb on Aug 1 00:00										Maximum Daily Average: 1.1 ppb on Jul 31										Hours of Data: 693																													
Minimum Value: 0 ppb on Jul 3 20:00										Minimum Daily Average: 0.2 ppb on Jul 11										Hours of Missing Data: 51																													
Maximum Diurnal Average: 0.4 ppb at hour 24										Minimum Diurnal Average: 0.3 ppb at hour 16										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 = 1 P ₉₉ = 2										Percent Operational Time: 97.9																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	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																							
2-Jul	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
3-Jul	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																							
4-Jul	0	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-Jul	0	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-Jul	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0.3	1																						
7-Jul	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1																						
8-Jul	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																						
9-Jul	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0																						
10-Jul	0	0	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-Jul	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																							
12-Jul	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	0.6	2																						
13-Jul	0	0	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-Jul	0	0	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-Jul	0	0	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-Jul	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1																						
17-Jul	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
18-Jul	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	0.3	1																						
19-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1																						
20-Jul	0	0	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																						
21-Jul	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	0.3	1																						
22-Jul	0	0	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-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0																						
24-Jul	0	0	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																						
25-Jul	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	M	M	M	M	M	M	M	M	0	0	--	1																						
26-Jul	0	0	0	0	0	Z	0	0	0	M	M	M	M	M	M	0	0	1	0	0	0	0	0	0	0	--	1																						
27-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0.3	0																						
28-Jul	0	Z	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																						
29-Jul	0	0	Z	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0																						
30-Jul	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.4	2																						
31-Jul	0	1	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	2	2	1	2	2	1	2	3	1.1	3																							
																								0.4	0.3	0.4	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	0.3	0.4	0.3	0.4	Diurnal Average	
																								1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0	2	2	1	2	2	2	2	3	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																	



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	692	99.86	99.86
3 - 4	1	0.14	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 693

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

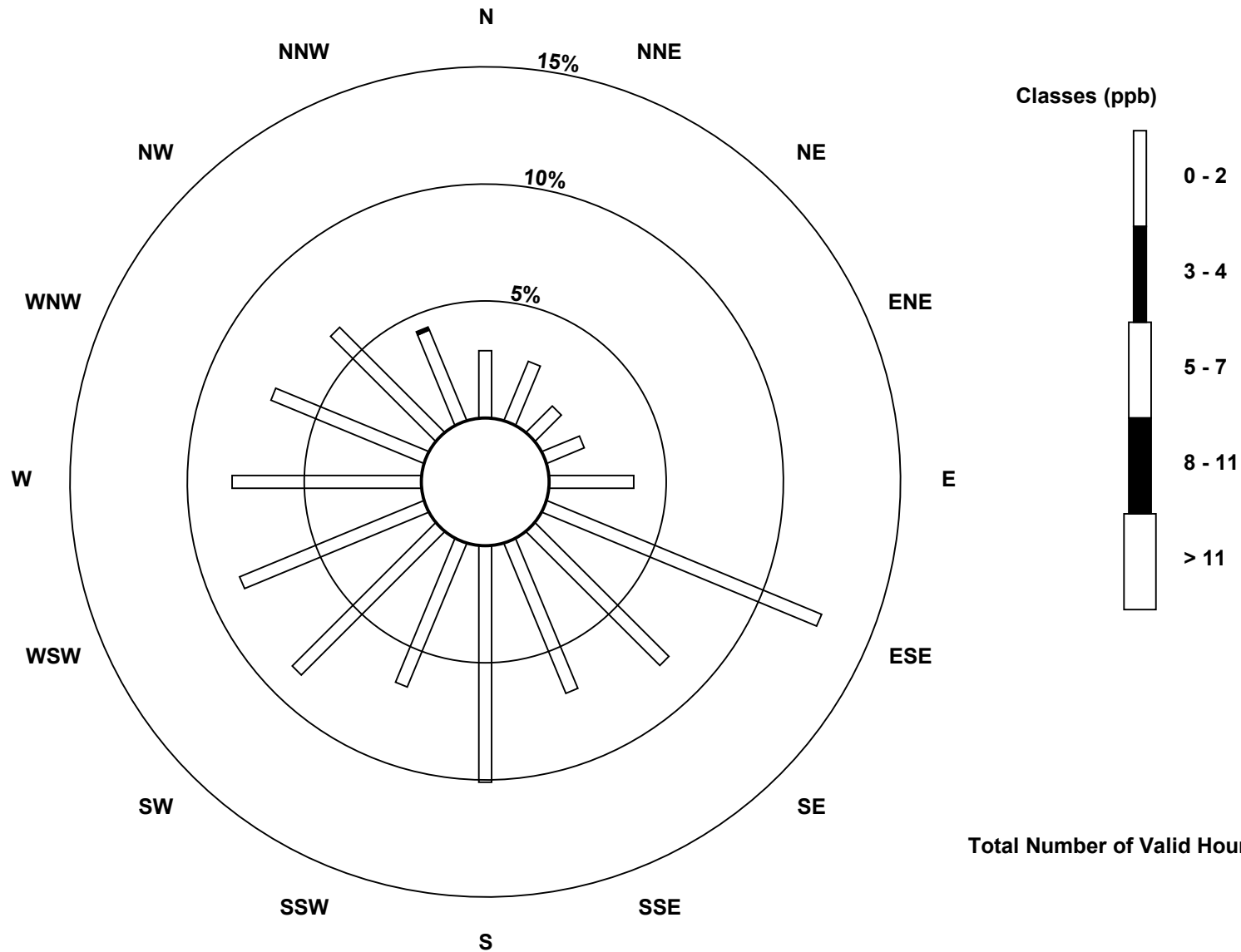
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	20	19	11	12	25	88	56	48	70	46	60	59	56	49	44	29	692
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	19	11	12	25	88	56	48	70	46	60	59	56	49	44	30	693

Total Number of Valid Hours: 693

Total Number of Hours: 744

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

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



Total Number of Valid Hours: 693

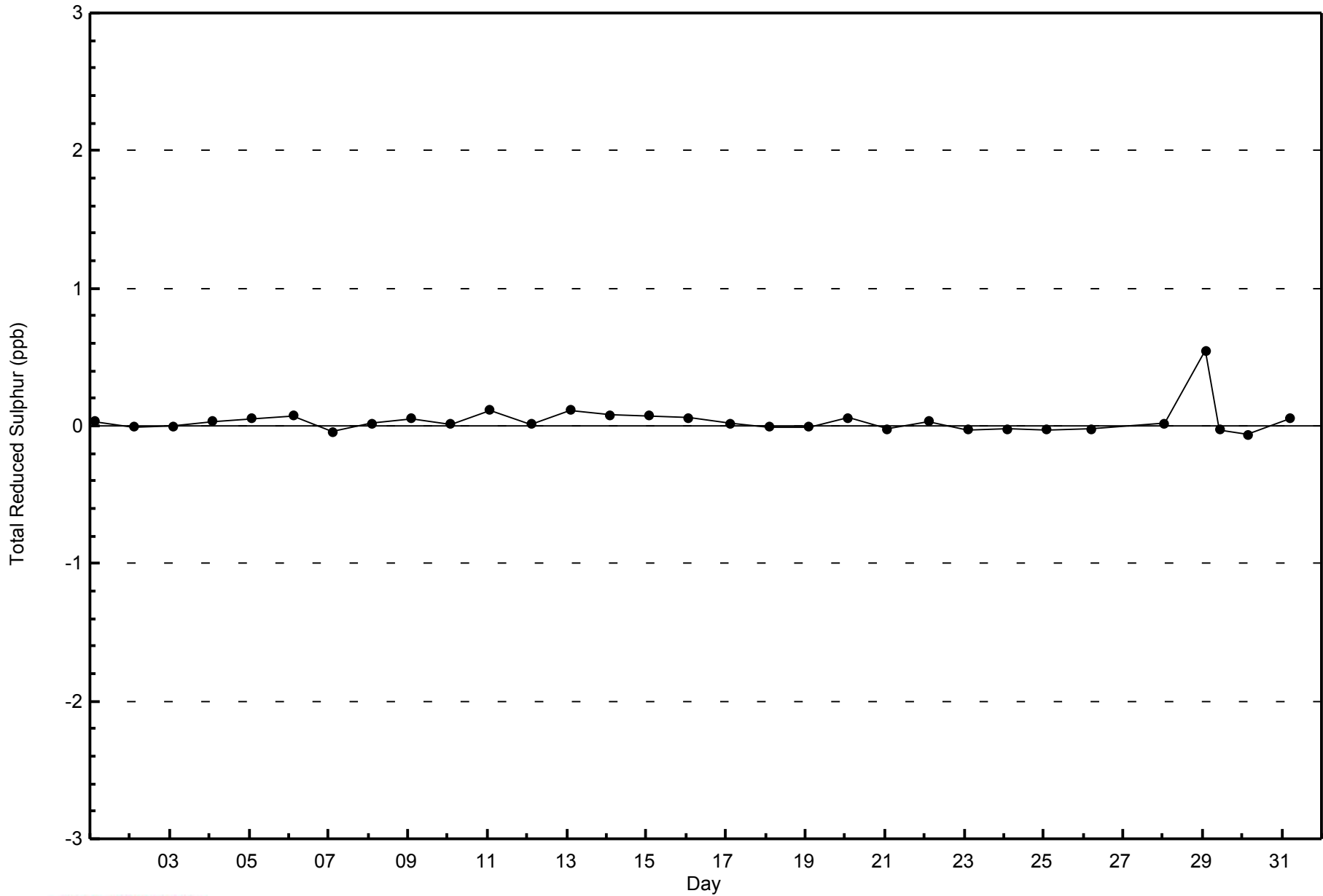


WBEA NETWORK

Zero Responses

Total Reduced Sulphur (TRS) - ppb

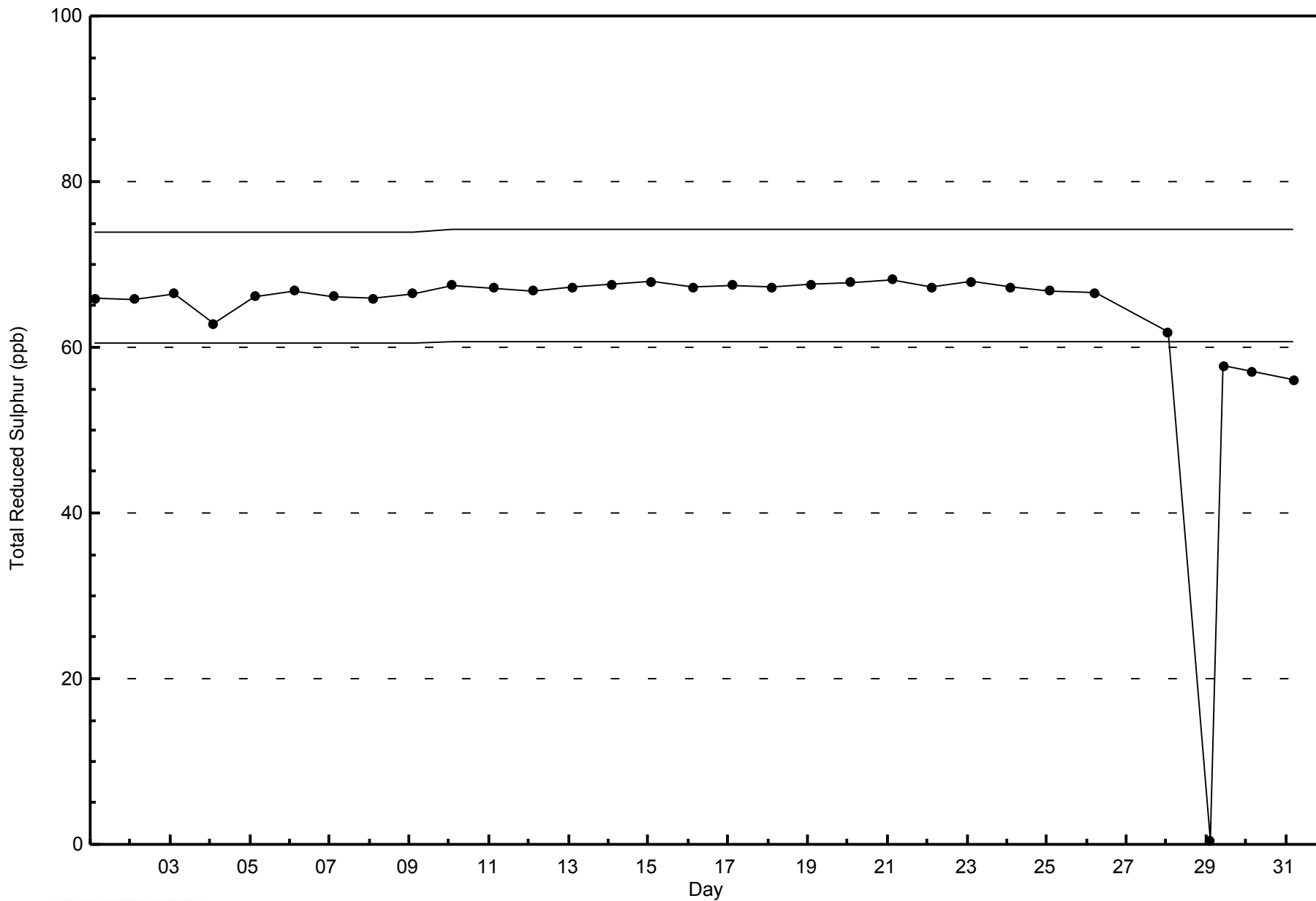
Patricia McInnes - July 2014





WBEA NETWORK
Span Responses

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



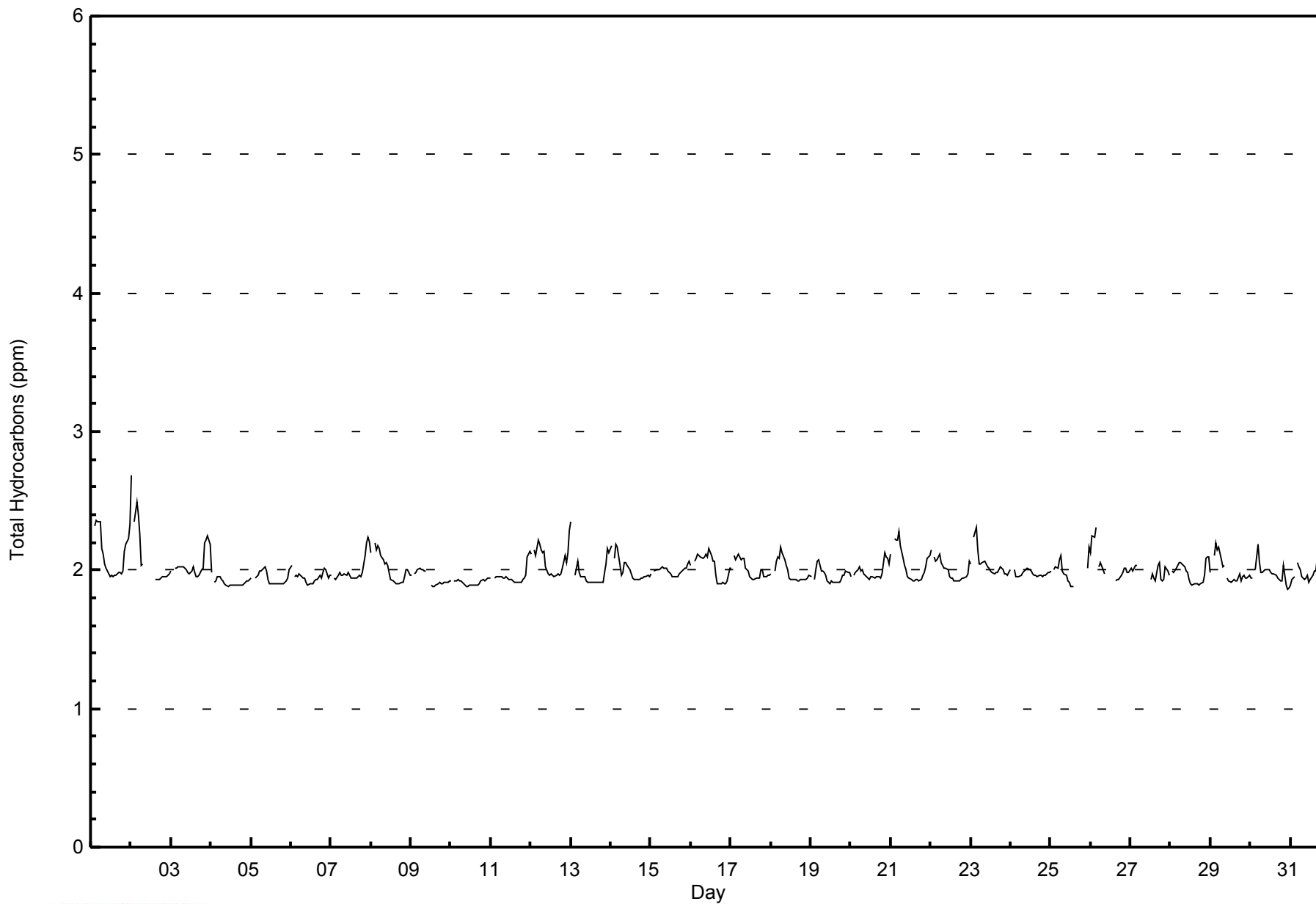


Maximum Value: 2.7 ppm on Jul 2 01:00																		Maximum Daily Average: 2.1 ppm on Jul 1						Hours in Service: 744			
Minimum Value: 1.9 ppm on Jul 30 23:00																		Minimum Daily Average: 1.9 ppm on Jul 4						Hours of Data: 685			
Maximum Diurnal Average: 2.1 ppm at hour 5																		Minimum Diurnal Average: 1.9 ppm at hour 16						Hours of Missing Data: 59			
Monthly Average: 2.00 ppm																		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.3						Hours of Calibration: 36			
																								Percent Operational Time: 96.9			
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-Jul	2.2	Z	2.3	2.4	2.4	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.3	2.1	2.4	
2-Jul	2.7	Z	2.4	2.5	2.4	2.3	2.0	2.0	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	--	2.7	
3-Jul	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	2.2	2.2	2.2	2.2	2.0	2.2	
4-Jul	2.0	Z	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
5-Jul	1.9	Z	1.9	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	1.9	2.0	
6-Jul	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	1.9	2.0	1.9	2.0	
7-Jul	2.0	Z	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.0	2.2	
8-Jul	2.1	Z	2.2	2.1	2.2	2.2	2.1	2.1	2.0	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.2	
9-Jul	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	1.9	2.0	
10-Jul	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	
11-Jul	1.9	Z	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.0	2.1	
12-Jul	2.1	Z	2.1	2.1	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	2.1	2.1	2.1	2.3	2.1	2.3	
13-Jul	2.3	Z	2.0	2.0	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.2	2.1	2.0	2.3	
14-Jul	2.2	Z	2.1	2.2	2.2	2.0	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	2.0	2.0	2.0	2.0	2.0	2.2	
15-Jul	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	2.1	2.0	2.1	
16-Jul	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.2	
17-Jul	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.1	
18-Jul	2.0	Z	2.0	2.1	2.1	2.1	2.2	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	2.0	2.0	2.2	
19-Jul	2.0	Z	1.9	2.0	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
20-Jul	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	1.9	2.0	2.0	1.9	1.9	2.0	2.1	2.1	2.1	2.0	2.0	2.1	
21-Jul	2.1	Z	2.2	2.2	2.2	2.3	2.2	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	2.0	2.0	2.1	2.1	2.0	2.3	
22-Jul	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.1	
23-Jul	2.0	Z	2.2	2.3	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	
24-Jul	2.0	Z	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
25-Jul	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	M	M	M	M	M	M	M	M	2.0	2.2	--	2.2
26-Jul	2.1	2.2	2.2	2.3	Z	2.0	2.1	2.0	2.0	M	M	M	M	M	M	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	--	2.3	
27-Jul	2.0	2.0	2.0	2.0	2.0	M	M	M	M	M	M	M	1.9	2.0	1.9	1.9	1.9	2.0	2.1	1.9	1.9	1.9	2.0	2.0	--	2.1	
28-Jul	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.0	2.1	
29-Jul	2.0	Z	2.1	2.2	2.1	2.2	2.1	2.0	2.0	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	1.9	1.9	2.0	2.2	
30-Jul	1.9	1.9	Z	2.0	2.2	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	2.0	1.9	1.9	1.9	2.0	2.2	
31-Jul	1.9	1.9	1.9	Z	2.1	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.0	2.2	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	546	79.71	79.71
2.1 - 3.0	139	20.29	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

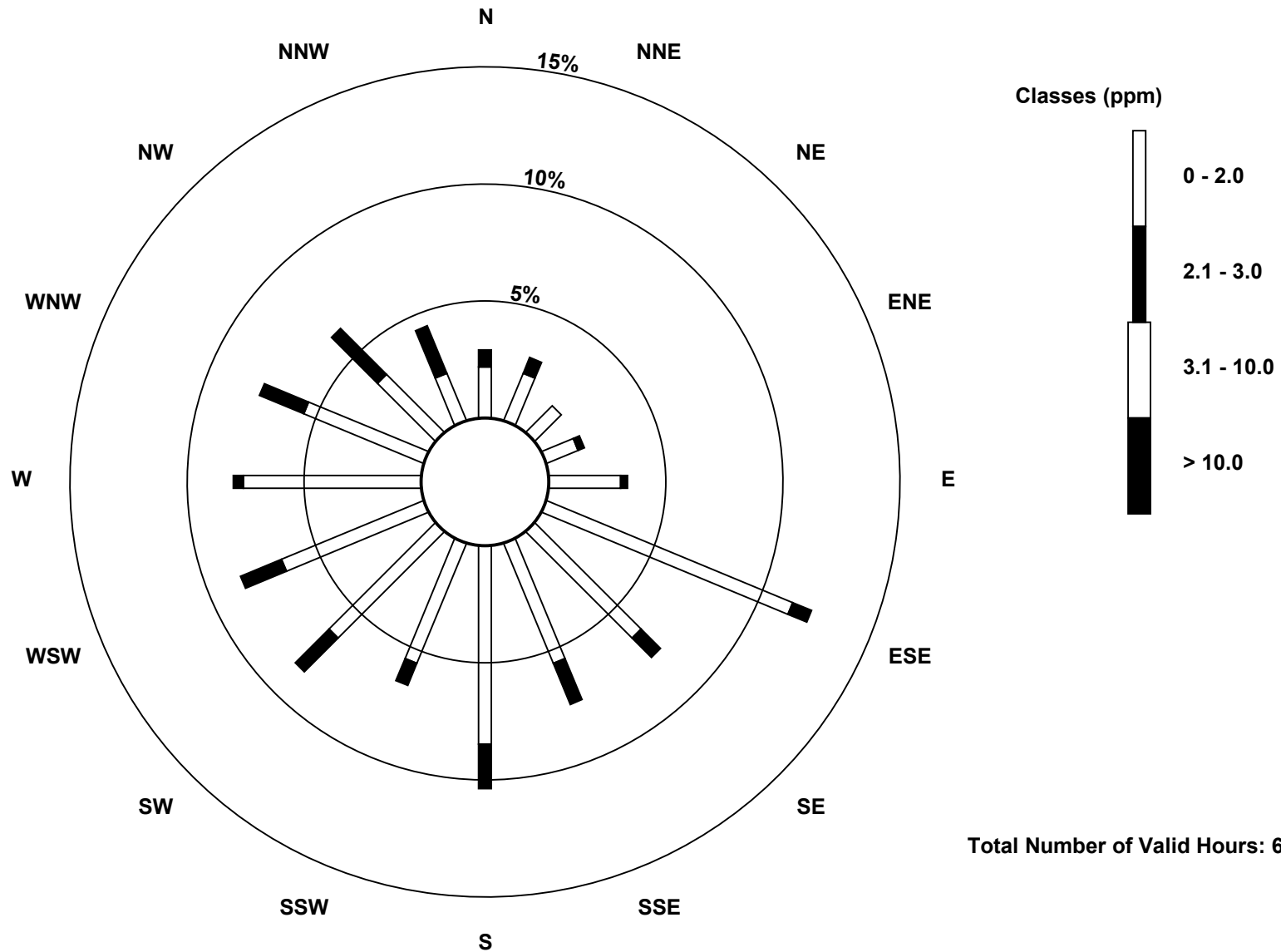
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	15	15	11	10	21	78	44	38	58	38	44	45	52	38	24	15	546
2.1 - 3.0	5	5	0	2	2	6	8	13	13	7	14	13	3	14	19	15	139
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	20	11	12	23	84	52	51	71	45	58	58	55	52	43	30	685

Total Number of Valid Hours: 685

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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



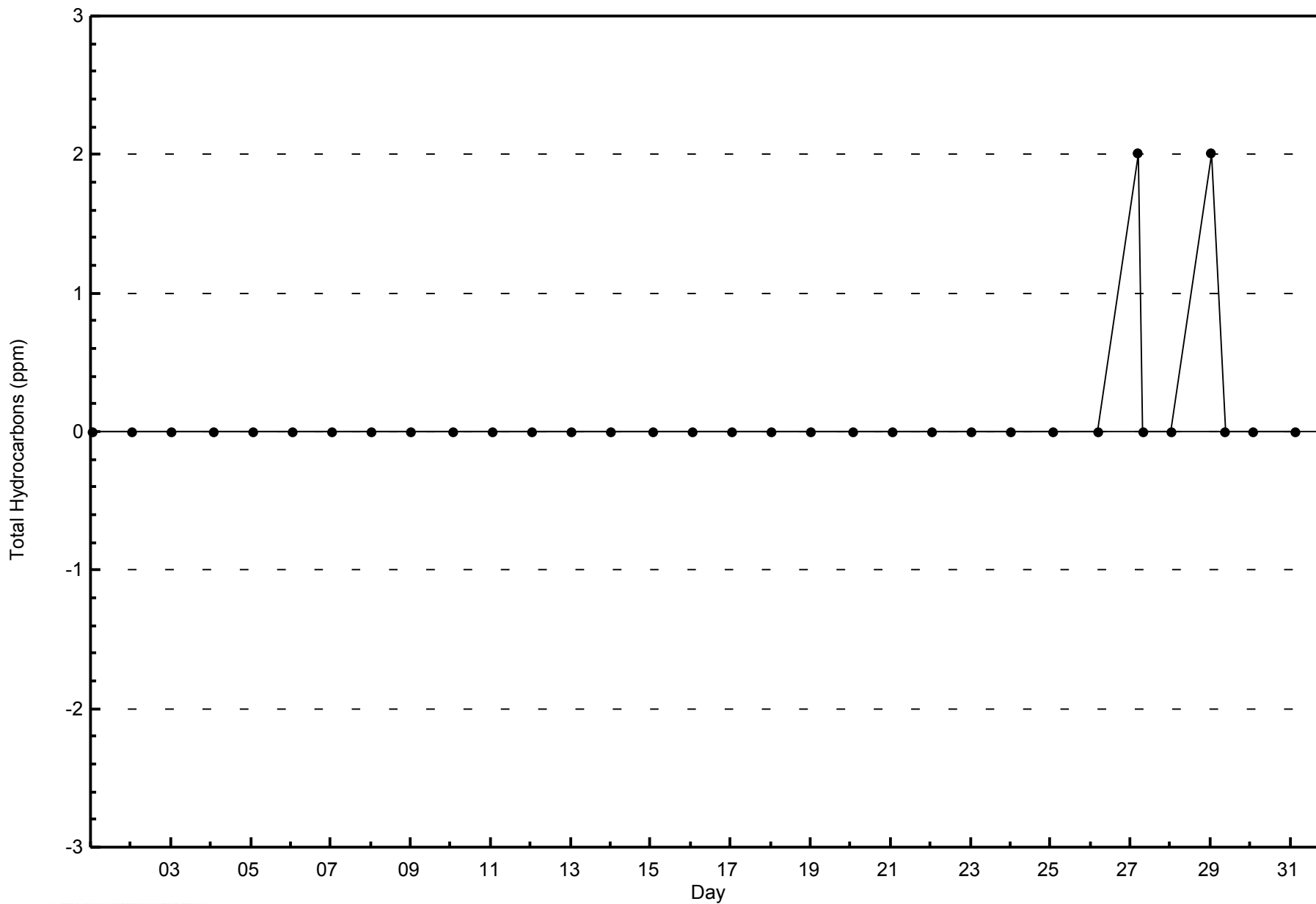


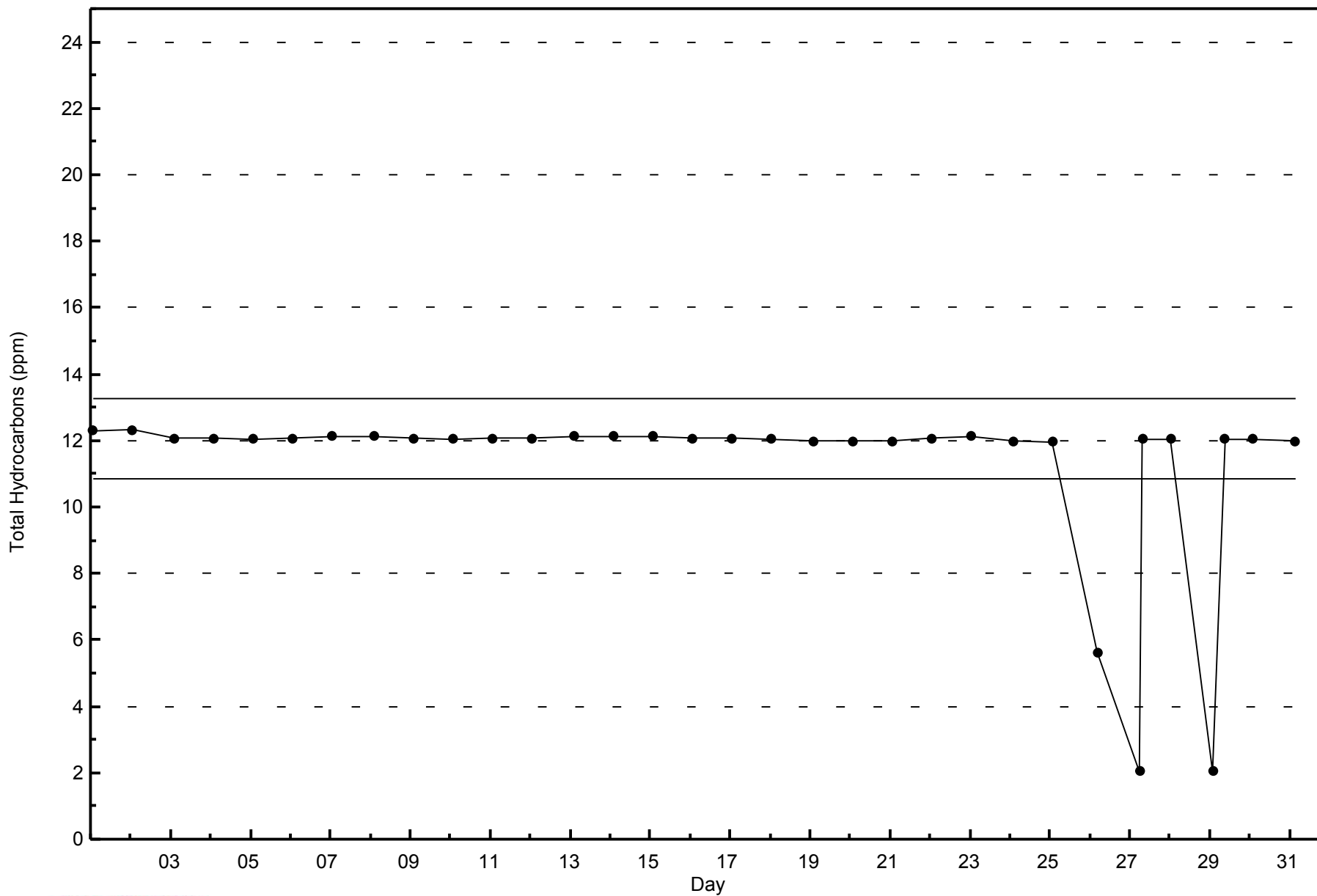
WBEA NETWORK

Zero Responses

Total Hydrocarbons (THC) - ppm

Patricia McInnes - July 2014





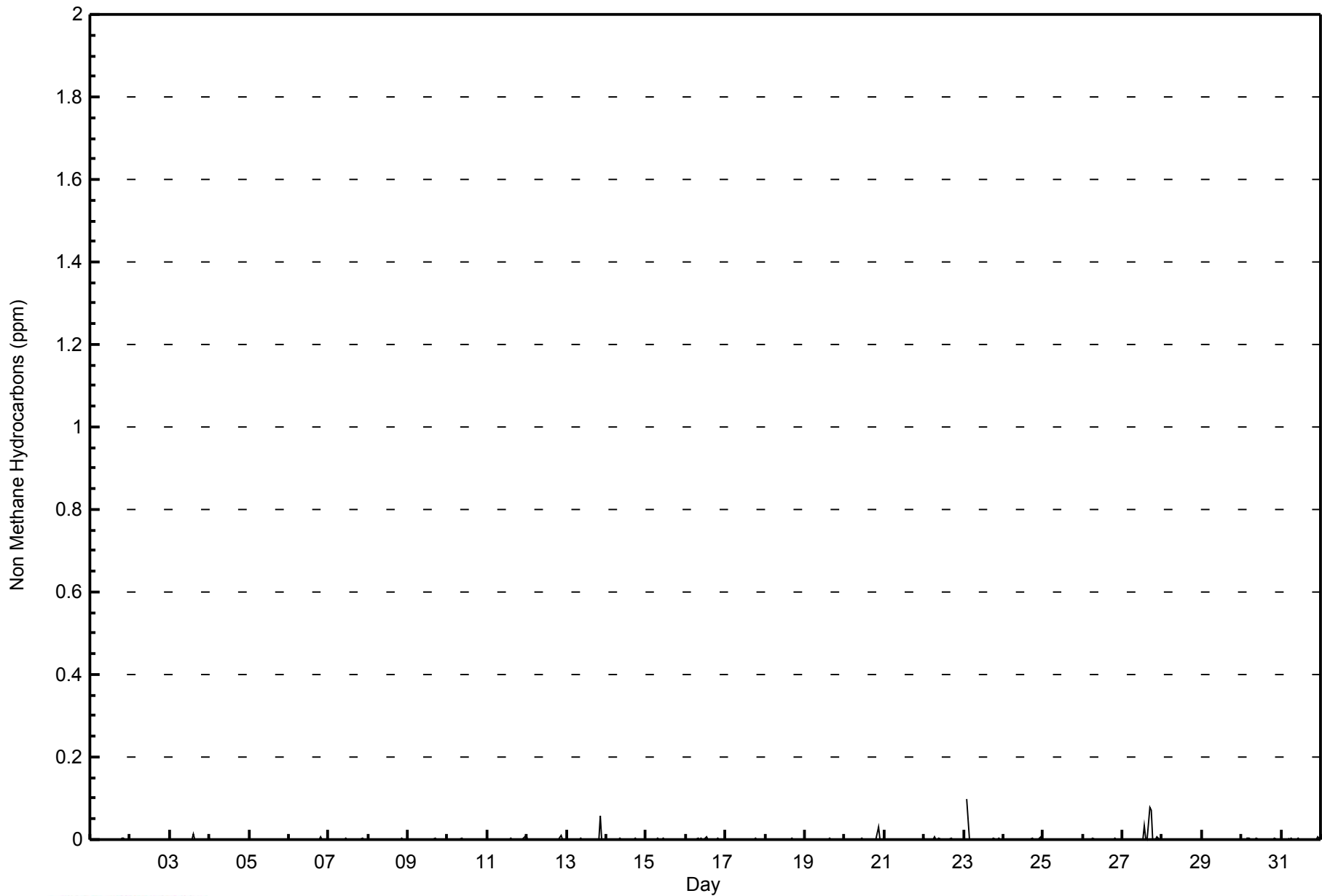


Maximum Value: 0.099 ppm on Jul 23 03:00		Maximum Daily Average: 0.005 ppm on Jul 23		Hours in Service: 744																							
Minimum Value: 0.000 ppm on Jul 1 01:00		Minimum Daily Average: 0.000 ppm on Jul 28		Hours of Data: 685																							
Maximum Diurnal Average: 0.004 ppm at hour 21		Minimum Diurnal Average: 0.000 ppm at hour 2		Hours of Missing Data: 59																							
Monthly Average: 0.001 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.0		Hours of Calibration: 36																							
				Percent Operational Time: 96.9																							
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-Jul	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	0.002	0.000	0.000	0.000	0.002	0.003	0.000	0.000	0.003	0.000	0.003	
2-Jul	0.000	Z	0.000	0.000	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	0.001	0.000	--	0.001	
3-Jul	0.001	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.014	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.014	
4-Jul	0.002	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
5-Jul	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	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	
6-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.006	
7-Jul	0.000	Z	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	0.004	0.000	0.000	0.000	0.000	0.004	
8-Jul	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	0.004	0.000	0.000	0.000	0.000	0.004	
9-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	M	M	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	
10-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
11-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.009	0.001	0.009	
12-Jul	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	0.011	0.000	0.000	0.001	0.001	0.011	
13-Jul	0.000	Z	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	0.057	0.000	0.000	0.000	0.003	0.057	
14-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	
15-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	
16-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.003	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.001	0.008	
17-Jul	0.000	Z	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	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.003	
18-Jul	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	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
19-Jul	0.000	Z	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	0.003	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.003	
20-Jul	0.000	Z	0.001	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	0.031	0.000	0.000	0.000	0.002	0.031	
21-Jul	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	
22-Jul	0.004	Z	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.002	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	0.001	0.007	
23-Jul	0.000	Z	0.099	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.002	0.000	0.000	0.005	0.099	
24-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.004	0.001	0.000	0.000	0.000	0.008	0.000	0.001	0.008	
25-Jul	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	M	M	M	M	M	M	M	M	0.002	0.001	--	
26-Jul	0.000	0.000	0.000	0.000	Z	0.000	0.003	0.000	0.000	M	M	M	M	M	M	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	--	0.003	
27-Jul	0.000	0.000	0.000	0.000	0.000	M	M	M	M	M	M	M	0.000	0.033	0.003	0.000	0.079	0.070	0.000	0.000	0.000	0.005	0.000	0.000	--	0.079	
28-Jul	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
29-Jul	0.000	Z	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	
30-Jul	0.000	0.000	Z	0.003	0.003	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.001	0.004	
31-Jul	0.000	0.000	0.000	Z	0.003	0.000	0.003	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.004	0.001	0.005	
		0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.001	0.000	0.003	0.003	0.000	0.000	0.004	0.000	0.001	0.001	Diurnal Average		
		0.004	0.000	0.099	0.003	0.003	0.000	0.007	0.005	0.004	0.004	0.005	0.000	0.008	0.033	0.014	0.003	0.079	0.070	0.003	0.006	0.057	0.005	0.008	0.009	Diurnal Maximum	
Z - zerospan		C - Calibration					M - Maintenance																				



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	672	98.10	98.10
0.006 - 0.05	9	1.31	99.42
0.06 - 0.1	4	0.58	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

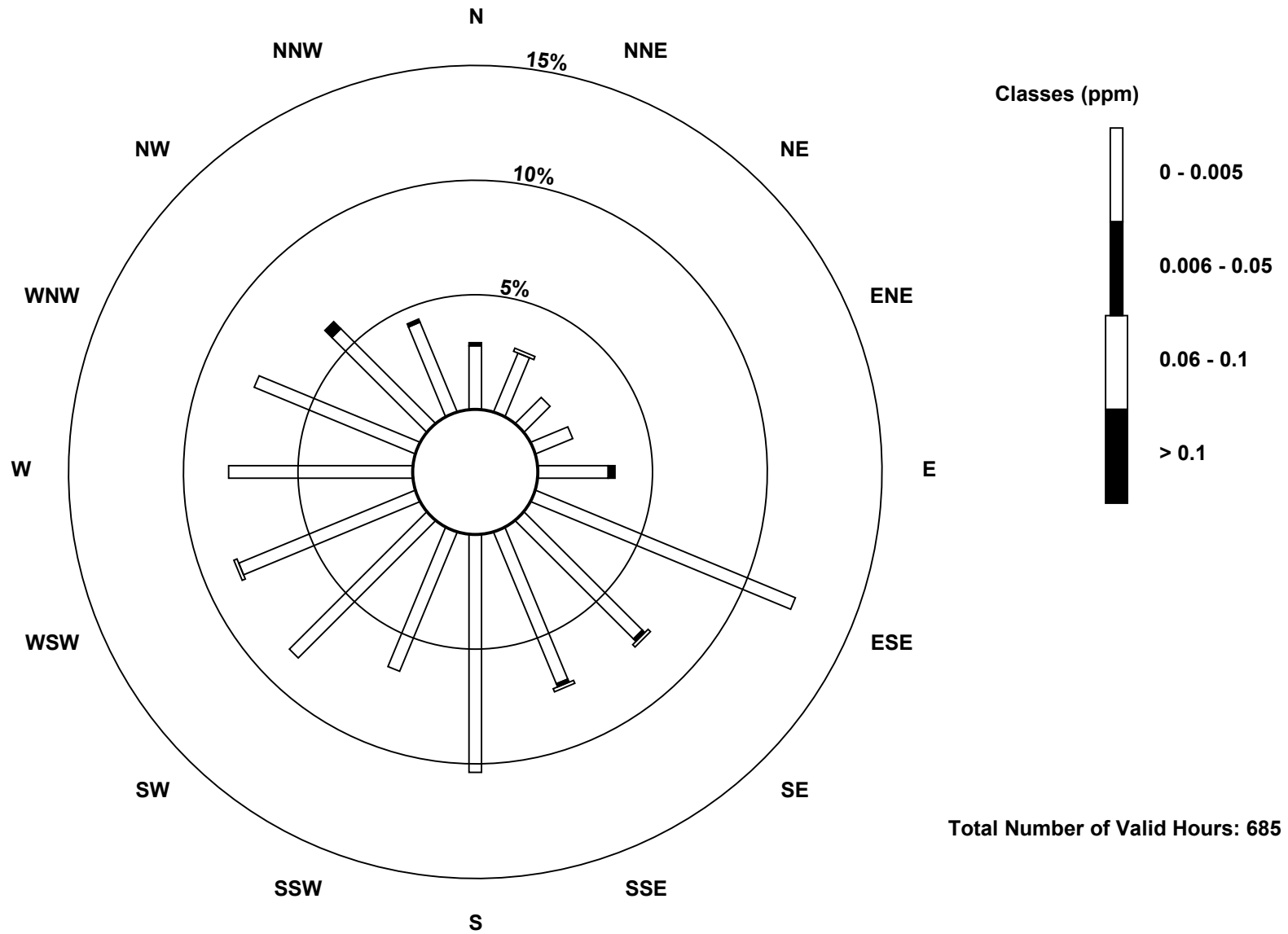
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	19	19	11	12	21	84	50	49	71	45	58	57	55	52	40	29	672
0.006 - 0.05	1	0	0	0	2	0	1	1	0	0	0	0	0	0	3	1	9
0.06 - 0.1	0	1	0	0	0	0	1	1	0	0	0	1	0	0	0	0	4
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	20	11	12	23	84	52	51	71	45	58	58	55	52	43	30	685

Total Number of Valid Hours: 685

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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



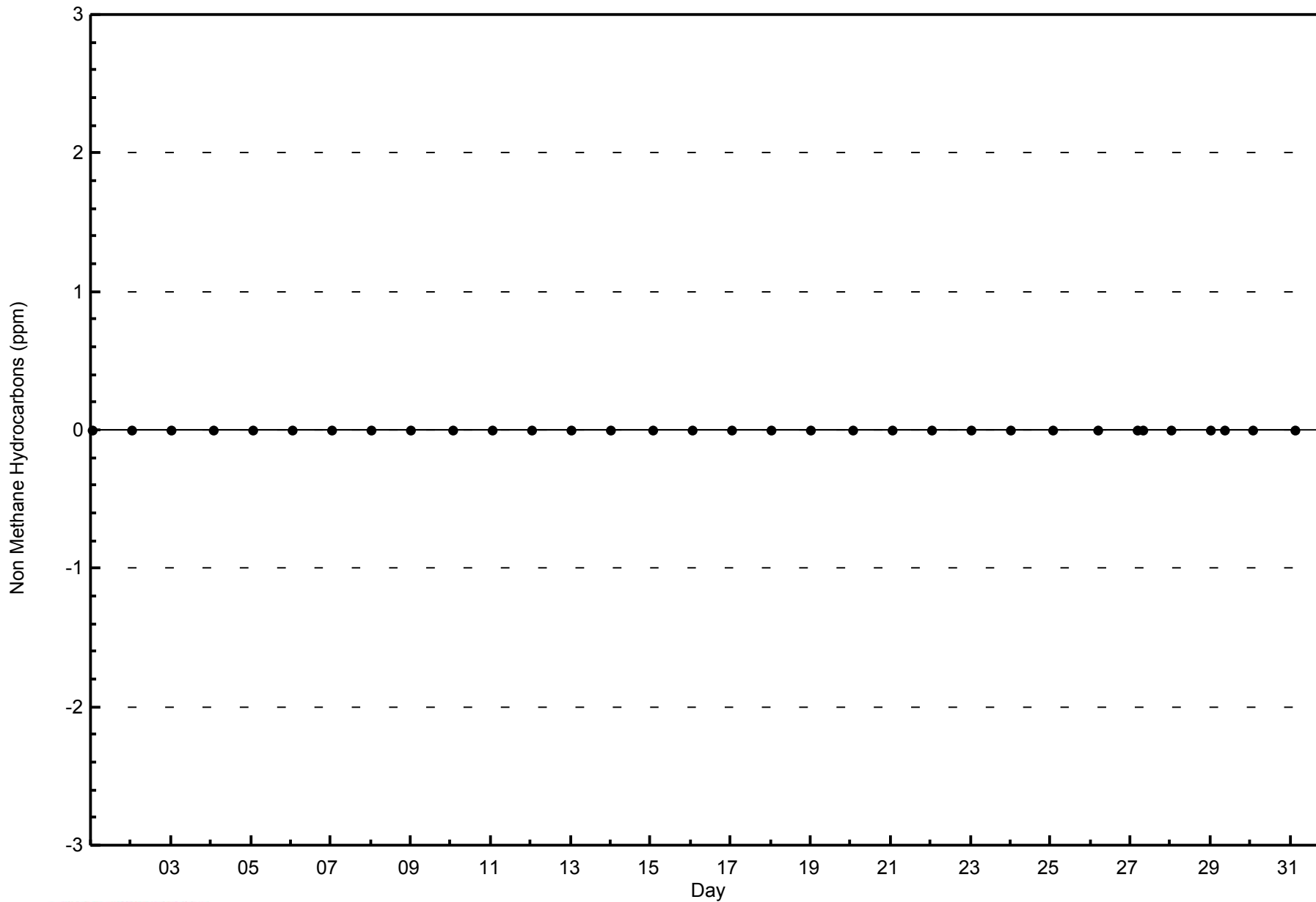


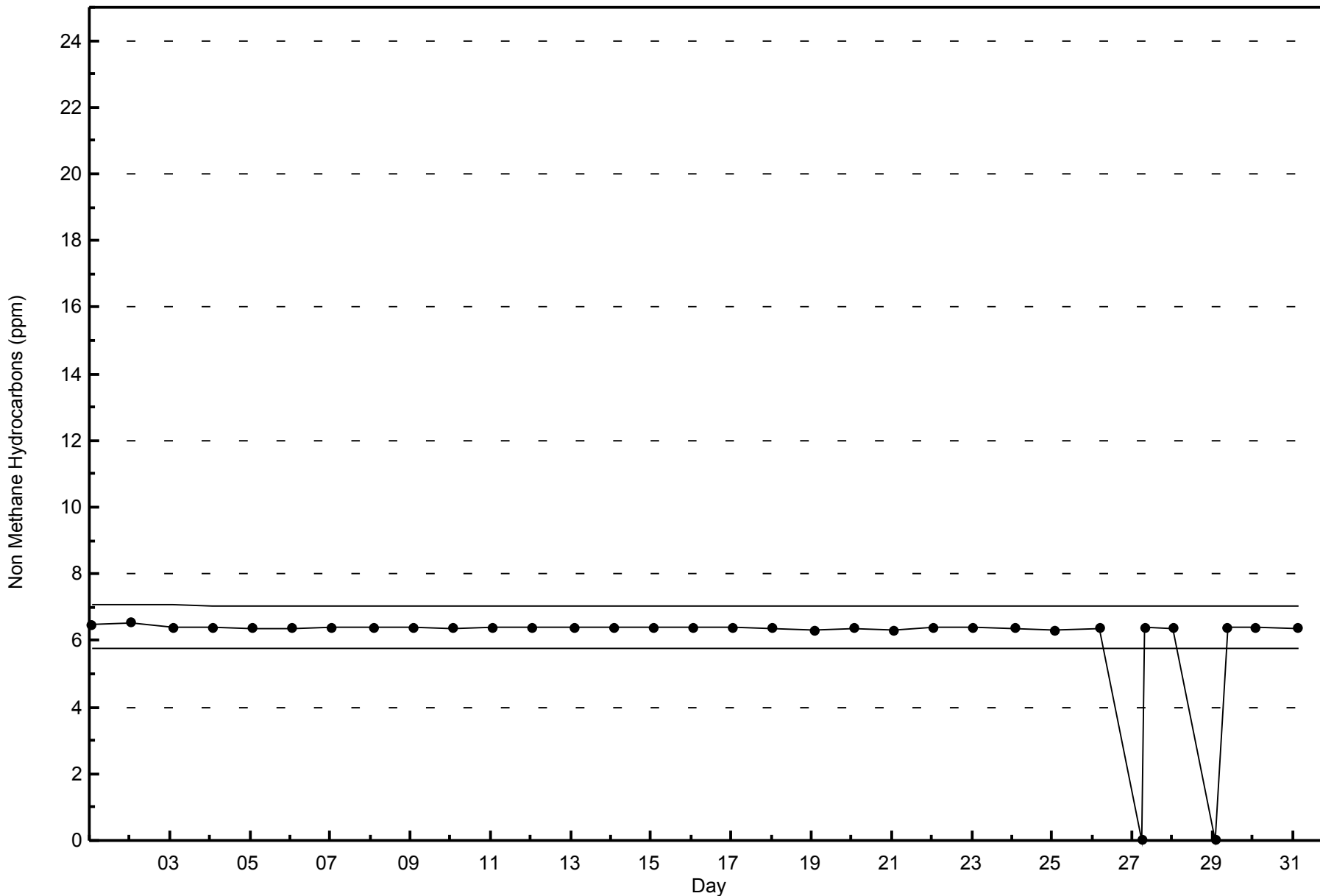
WBEA NETWORK

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - July 2014







Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Patricia McInnes - July 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2.7 ppm on Jul 2 01:00	Maximum Daily Average: 2.1 ppm on Jul 1		Hours of Data:	685
Minimum Value: 1.9 ppm on Jul 30 23:00	Minimum Daily Average: 1.9 ppm on Jul 4		Hours of Missing Data:	59
Maximum Diurnal Average: 2.1 ppm at hour 5	Minimum Diurnal Average: 1.9 ppm at hour 16		Hours of Calibration:	36
Monthly Average: 1.99 ppm	Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.3		Percent Operational Time:	96.9

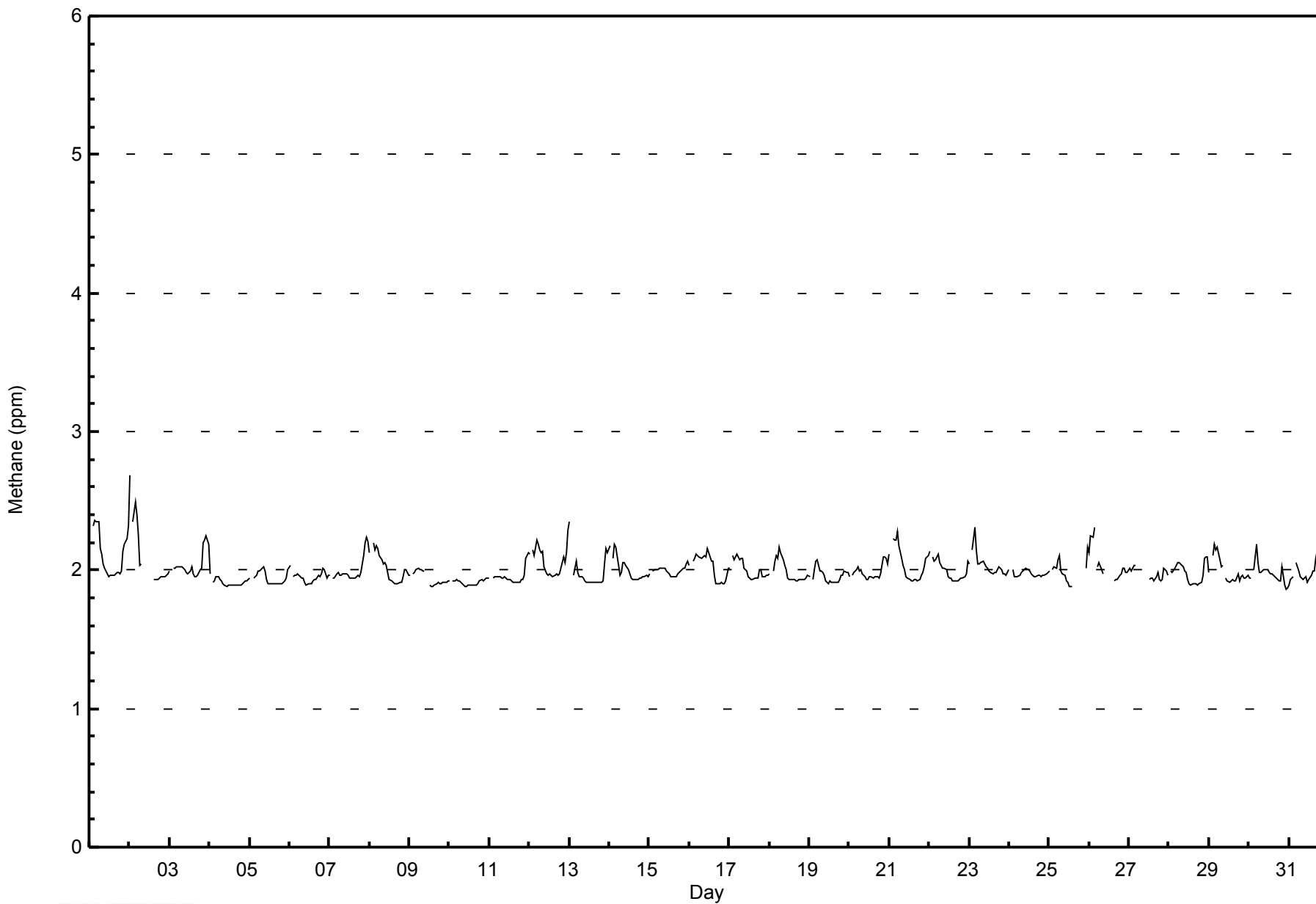
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	2.2	Z	2.3	2.4	2.4	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.3	2.1	2.4																							
2-Jul	2.7	Z	2.4	2.5	2.4	2.3	2.0	2.0	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	--	2.7																							
3-Jul	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2	2.0	2.2																							
4-Jul	2.0	Z	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0																							
5-Jul	1.9	Z	1.9	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	1.9	2.0																							
6-Jul	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	1.9	2.0	1.9	2.0																							
7-Jul	2.0	Z	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.0	2.2																							
8-Jul	2.1	Z	2.2	2.1	2.2	2.2	2.1	2.1	2.0	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.2																							
9-Jul	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	1.9	2.0																							
10-Jul	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																							
11-Jul	1.9	Z	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.0	2.1																							
12-Jul	2.1	Z	2.1	2.1	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	2.1	2.1	2.1	2.3	2.1	2.3																							
13-Jul	2.3	Z	2.0	2.0	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.1	2.0	2.3																							
14-Jul	2.2	Z	2.1	2.2	2.2	2.0	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	2.0	2.0	2.0	2.0	2.0	2.2																							
15-Jul	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	2.1	2.0	2.1																							
16-Jul	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.2																							
17-Jul	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.1																							
18-Jul	2.0	Z	2.0	2.1	2.1	2.1	2.2	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	2.0	2.0	2.2																							
19-Jul	2.0	Z	1.9	2.0	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
20-Jul	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	1.9	2.0	2.0	1.9	1.9	2.0	2.1	2.1	2.1	2.0	2.0	2.1																							
21-Jul	2.1	Z	2.2	2.2	2.2	2.3	2.2	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	2.0	2.0	2.1	2.1	2.0	2.3																							
22-Jul	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.1																							
23-Jul	2.0	Z	2.1	2.3	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3																							
24-Jul	2.0	Z	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																							
25-Jul	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	M	M	M	M	M	M	M	M	2.0	2.2	--																							
26-Jul	2.1	2.2	2.2	2.3	Z	2.0	2.1	2.0	2.0	M	M	M	M	M	M	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	--	2.3																							
27-Jul	2.0	2.0	2.0	2.0	2.0	M	M	M	M	M	M	M	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	--	2.0																							
28-Jul	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.0	2.1																							
29-Jul	2.0	Z	2.1	2.2	2.1	2.2	2.1	2.0	2.0	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	1.9	1.9	2.0	2.2																							
30-Jul	1.9	1.9	Z	2.0	2.2	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	2.0	1.9	1.9	1.9	2.0	2.2																							
31-Jul	1.9	1.9	1.9	Z	2.1	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1																							
																								2.1	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	Diurnal Average		
																								2.7	2.2	2.4	2.5	2.4	2.3	2.2	2.1	2.1	2.1	2.1	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	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance



WBEA NETWORK
Hourly Averages

Methane (CH₄) - ppm
Patricia McInnes - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	547	79.85	79.85
2.1 - 3.0	138	20.15	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: 744



WBEA NETWORK
Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - July 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	15	15	11	10	21	78	44	38	58	38	44	46	52	38	24	15	547
2.1 - 3.0	5	5	0	2	2	6	8	13	13	7	14	12	3	14	19	15	138
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	20	20	11	12	23	84	52	51	71	45	58	58	55	52	43	30	685

Total Number of Valid Hours: 685

Total Number of Hours: 744

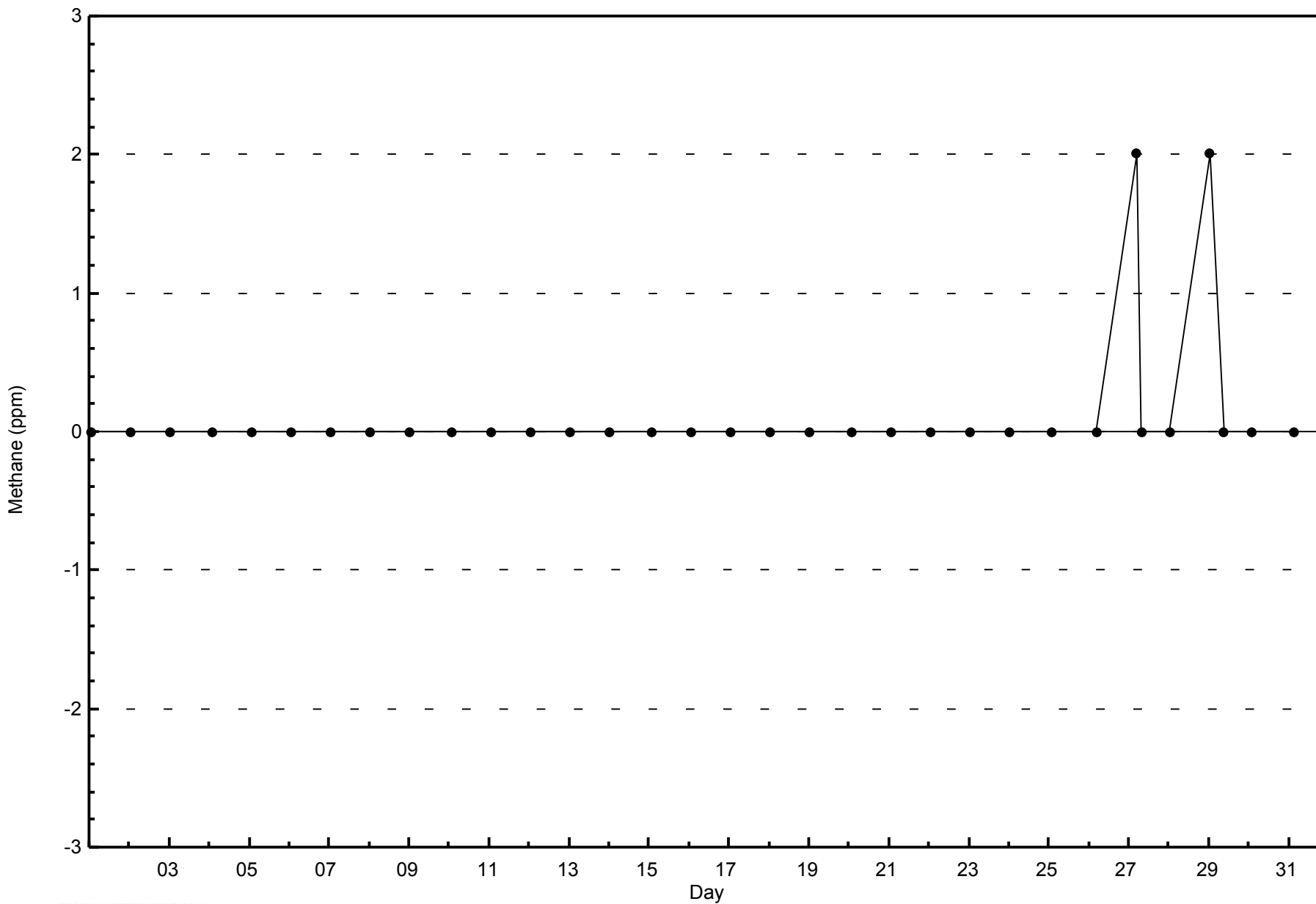


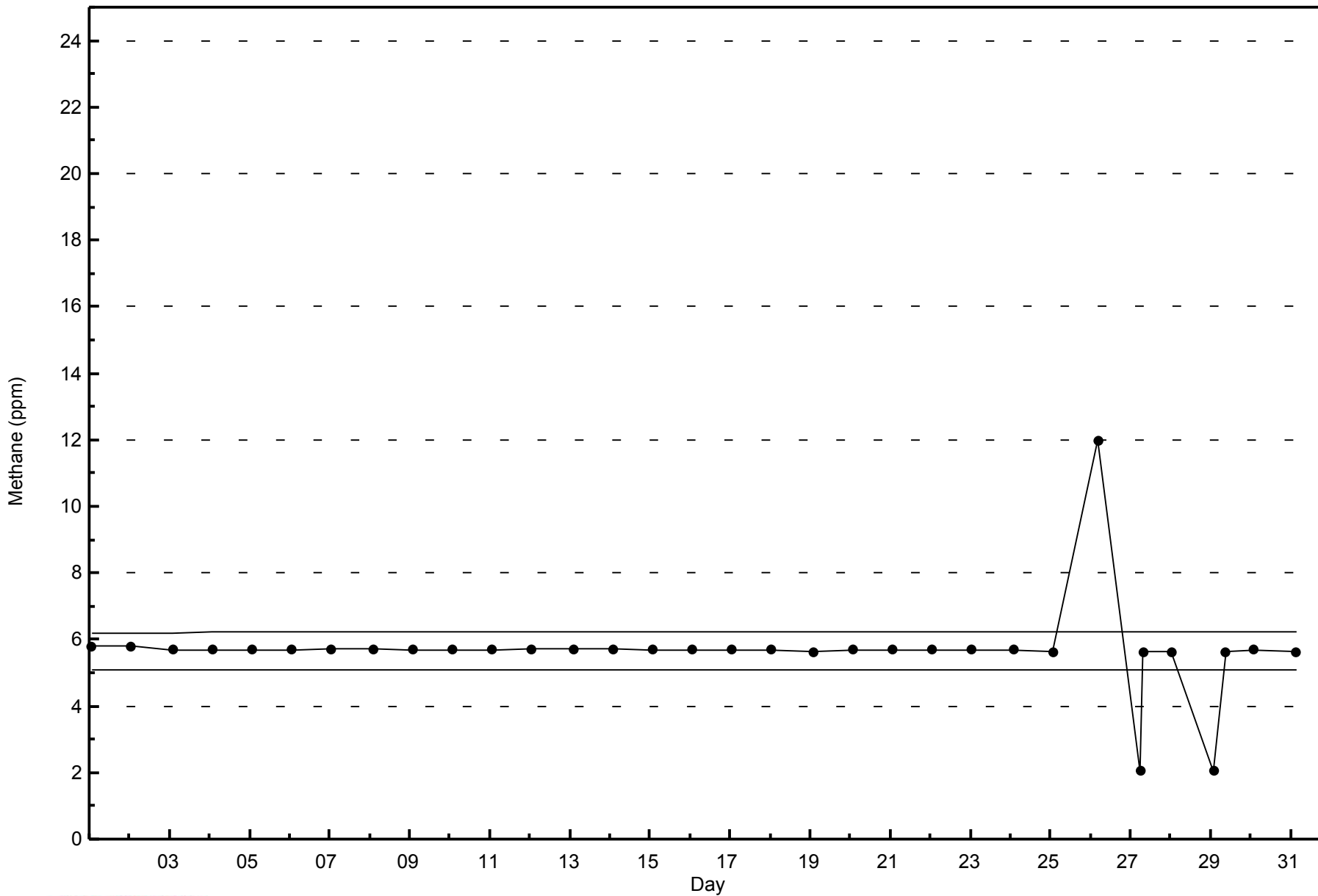
WBEA NETWORK

Zero Responses

Methane (CH₄) - ppm

Patricia McInnes - July 2014







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Patricia McInnes - July 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 56 ppb on Jul 12 19:00	Maximum Daily Average: 37.2 ppb on Jul 9		Hours of Data:	697
Minimum Value: 3 ppb on Jul 26 04:00	Minimum Daily Average: 18.1 ppb on Jul 19		Hours of Missing Data:	47
Maximum Diurnal Average: 34.6 ppb at hour 16	Minimum Diurnal Average: 13.2 ppb at hour 6		Hours of Calibration:	33
Monthly Average: 24.4 ppb	Percentiles: P ₁ = 3 P ₁₀ = 11 Q ₁ = 17 Median = 25 Q ₃ = 31 P ₉₀ = 39 P ₉₉ = 49		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-Jul	15	10	Z	5	4	3	9	14	21	24	29	36	39	37	36	36	26	27	29	23	12	8	8	7	20.0	39	
2-Jul	6	6	Z	4	4	5	15	18	20	25	30	36	37	39	38	37	35	34	33	31	29	29	30	29	24.8	39	
3-Jul	26	26	Z	25	24	23	23	23	24	28	32	36	31	25	29	33	31	26	22	18	10	9	12	12	23.8	36	
4-Jul	41	38	Z	32	26	27	31	30	32	34	34	34	33	34	34	34	33	32	31	29	26	24	24	24	31.6	41	
5-Jul	25	26	Z	22	21	19	17	17	19	21	25	27	28	27	28	27	27	26	28	27	26	26	26	25	24.4	28	
6-Jul	18	22	Z	21	22	20	22	23	23	26	27	27	26	27	26	29	25	24	29	27	22	20	26	26	24.2	29	
7-Jul	21	18	Z	25	19	22	22	21	23	22	25	27	27	28	27	29	29	30	31	27	20	15	15	15	23.4	31	
8-Jul	13	12	Z	8	5	3	6	10	14	18	26	34	32	33	32	31	32	30	29	26	17	19	21	25	20.7	34	
9-Jul	31	34	Z	34	30	30	31	31	32	C	C	C	39	46	48	43	46	45	44	41	39	35	33	31	37.2	48	
10-Jul	28	28	Z	27	26	25	24	24	25	28	30	29	27	25	25	25	25	32	25	22	20	18	18	18	24.9	32	
11-Jul	18	18	Z	16	16	16	16	15	14	13	15	16	17	21	22	23	22	21	22	23	23	21	17	15	18.3	23	
12-Jul	15	12	Z	15	9	10	11	15	16	24	27	28	36	42	47	52	50	54	56	48	30	27	24	9	28.5	56	
13-Jul	8	16	Z	16	12	16	19	20	20	22	24	25	28	30	31	34	35	34	33	31	27	17	15	17	23.0	35	
14-Jul	17	15	Z	12	10	13	17	18	22	26	29	30	30	29	29	29	28	29	28	27	26	26	27	27	23.7	30	
15-Jul	29	29	Z	24	21	21	24	24	23	24	29	35	39	38	40	43	40	36	35	34	33	36	33	31	31.3	43	
16-Jul	30	30	Z	25	17	10	8	7	7	6	15	24	31	26	23	22	31	31	30	28	26	24	23	20	21.3	31	
17-Jul	21	20	Z	13	12	8	15	14	15	25	29	35	39	41	42	45	48	47	35	31	23	20	19	20	26.9	48	
18-Jul	19	17	Z	11	8	7	10	15	19	24	30	29	32	35	36	34	33	34	29	27	28	26	22	17	23.5	36	
19-Jul	16	17	Z	14	12	10	13	14	14	15	16	18	17	18	18	19	20	22	24	25	26	23	22	22	18.1	26	
20-Jul	23	22	Z	12	9	9	12	13	18	23	27	31	36	35	38	42	42	39	34	28	18	12	13	10	23.6	42	
21-Jul	5	3	Z	4	3	3	5	7	11	19	29	35	36	39	42	46	47	49	49	33	27	23	18	16	23.8	49	
22-Jul	14	15	Z	13	12	4	11	18	22	29	38	44	45	49	44	42	42	41	39	36	29	31	30	23	29.2	49	
23-Jul	19	15	Z	11	17	16	24	27	27	29	28	26	28	27	29	29	25	21	17	20	22	24	21	16	22.6	29	
24-Jul	12	8	Z	17	15	19	17	16	14	15	18	19	23	28	29	28	27	27	26	24	25	23	22	22	20.9	29	
25-Jul	20	18	Z	15	13	12	12	16	19	26	39	44	56	55	49	M	M	M	M	M	M	M	M	13	9	--	56
26-Jul	7	4	3	3	6	9	Z	16	24	M	M	M	M	M	M	40	39	34	26	18	16	15	18	16	--	40	
27-Jul	15	14	14	10	9	9	8	8	9	14	19	24	28	29	30	35	33	25	26	26	22	14	17	19	19.0	35	
28-Jul	17	15	Z	12	9	7	11	13	13	17	19	24	28	30	31	30	31	33	32	27	18	11	11	10	19.6	33	
29-Jul	17	11	7	Z	11	10	9	16	32	39	42	M	41	41	44	44	45	38	45	37	31	31	31	27	29.5	45	
30-Jul	27	26	24	18	Z	12	18	20	24	30	35	39	42	40	42	41	39	41	40	32	29	40	41	33	31.8	42	
31-Jul	27	23	19	14	12	Z	12	17	25	26	40	46	47	43	41	38	25	17	15	13	10	9	10	8	23.3	47	

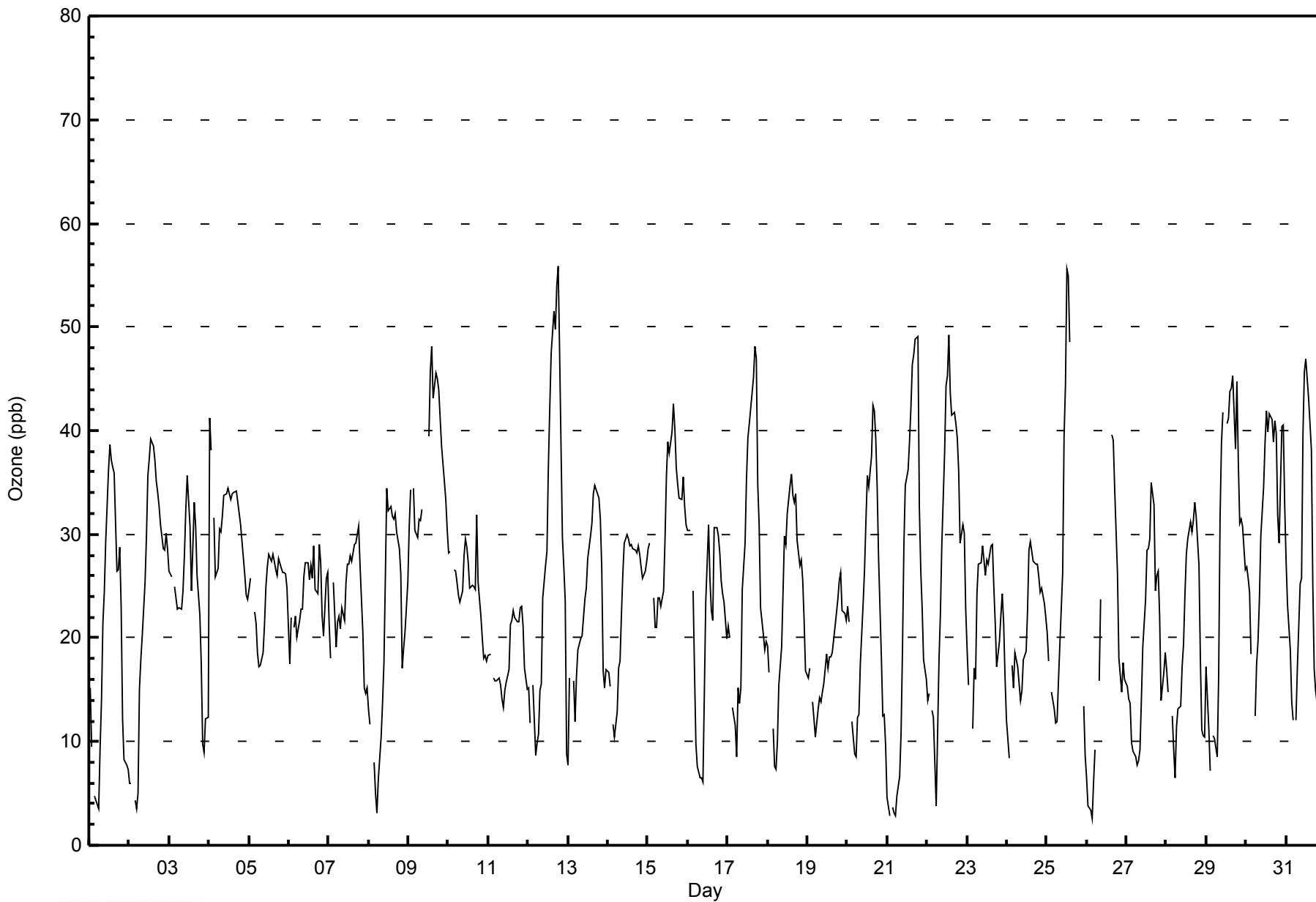
19.4	18.3	13.5	16.0	13.8	13.2	15.7	17.4	20.0	23.2	27.7	30.7	33.3	33.8	34.3	34.6	33.7	32.7	31.4	28.1	23.8	22.0	21.3	19.3	Diurnal Average	
41	38	24	34	30	30	31	31	32	39	42	46	56	55	49	52	50	54	56	48	39	40	41	33	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

Ozone (O₃) - ppb
Patricia McInnes - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	256	36.73	36.73
21 - 50	436	62.55	99.28
51 - 82	5	0.72	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 697

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - July 2014

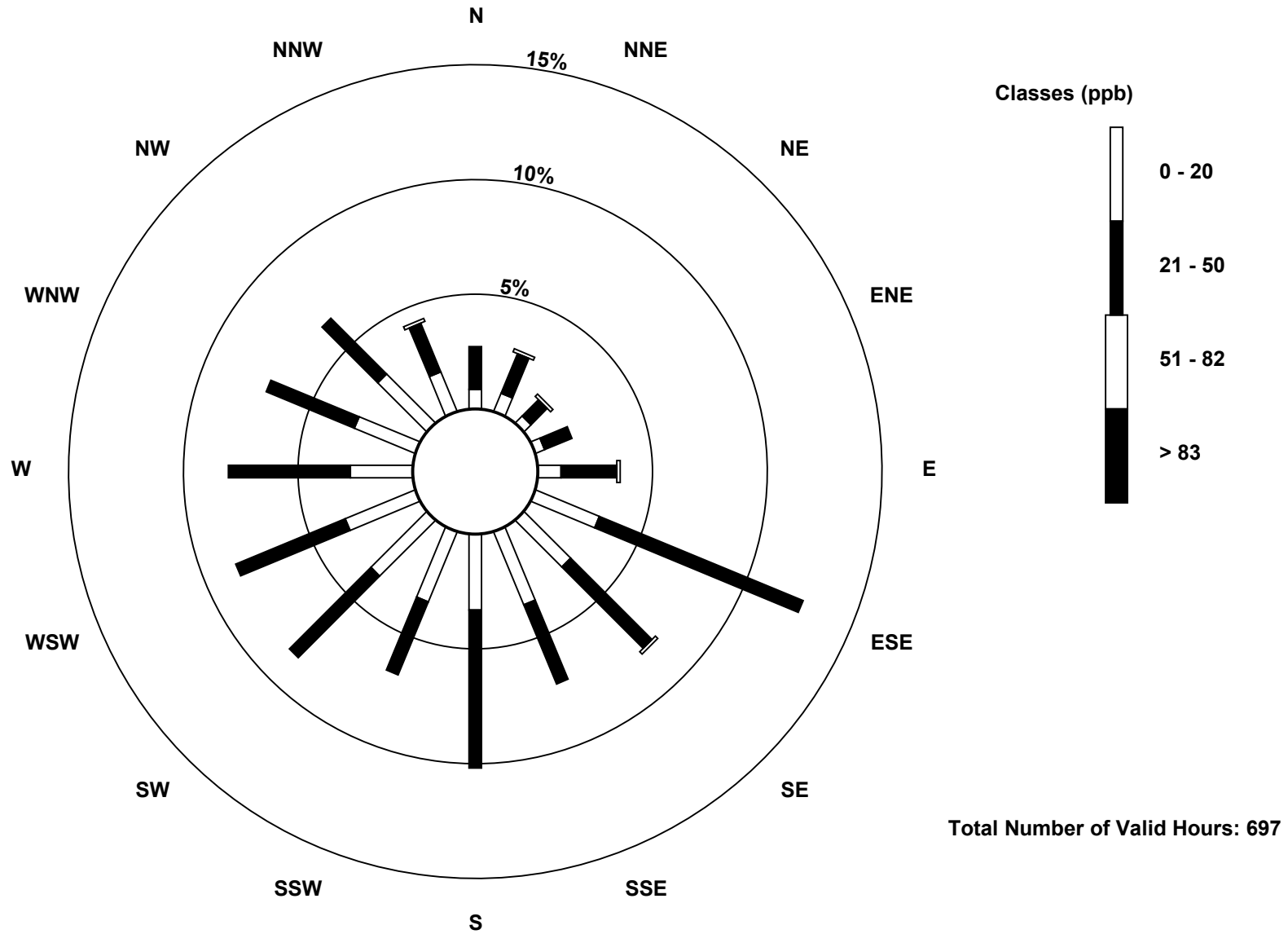
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	6	6	3	3	7	21	20	24	23	23	24	23	19	20	21	13	256
21 - 50	13	13	7	9	17	67	35	26	48	24	35	36	37	29	24	16	436
51 - 82	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	1	5
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	20	11	12	25	88	56	50	71	47	59	59	56	49	45	30	697

Total Number of Valid Hours: 697

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

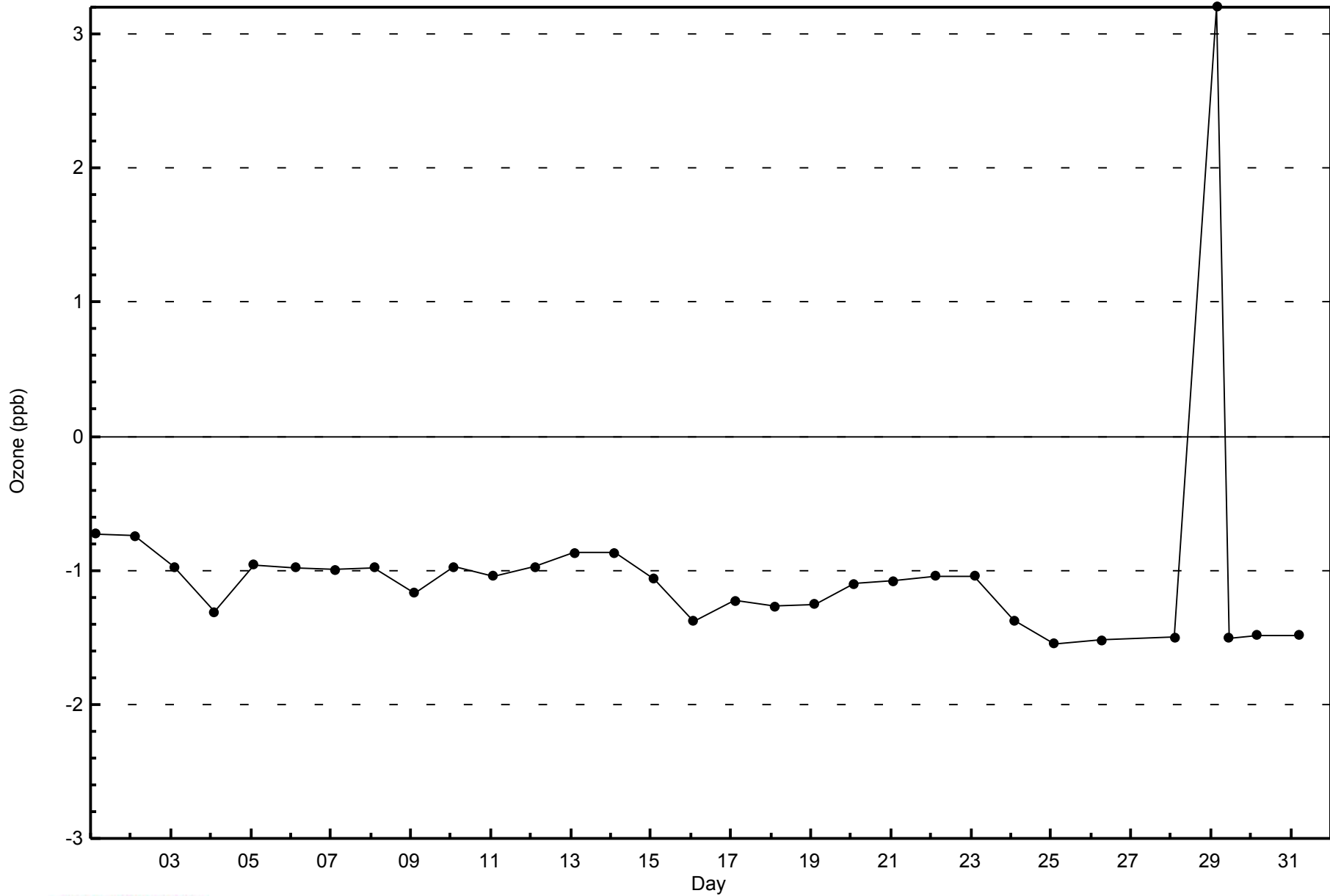
Ozone (O₃) - ppb
 Patricia McInnes (AMS 6)





WBEA NETWORK
Zero Responses

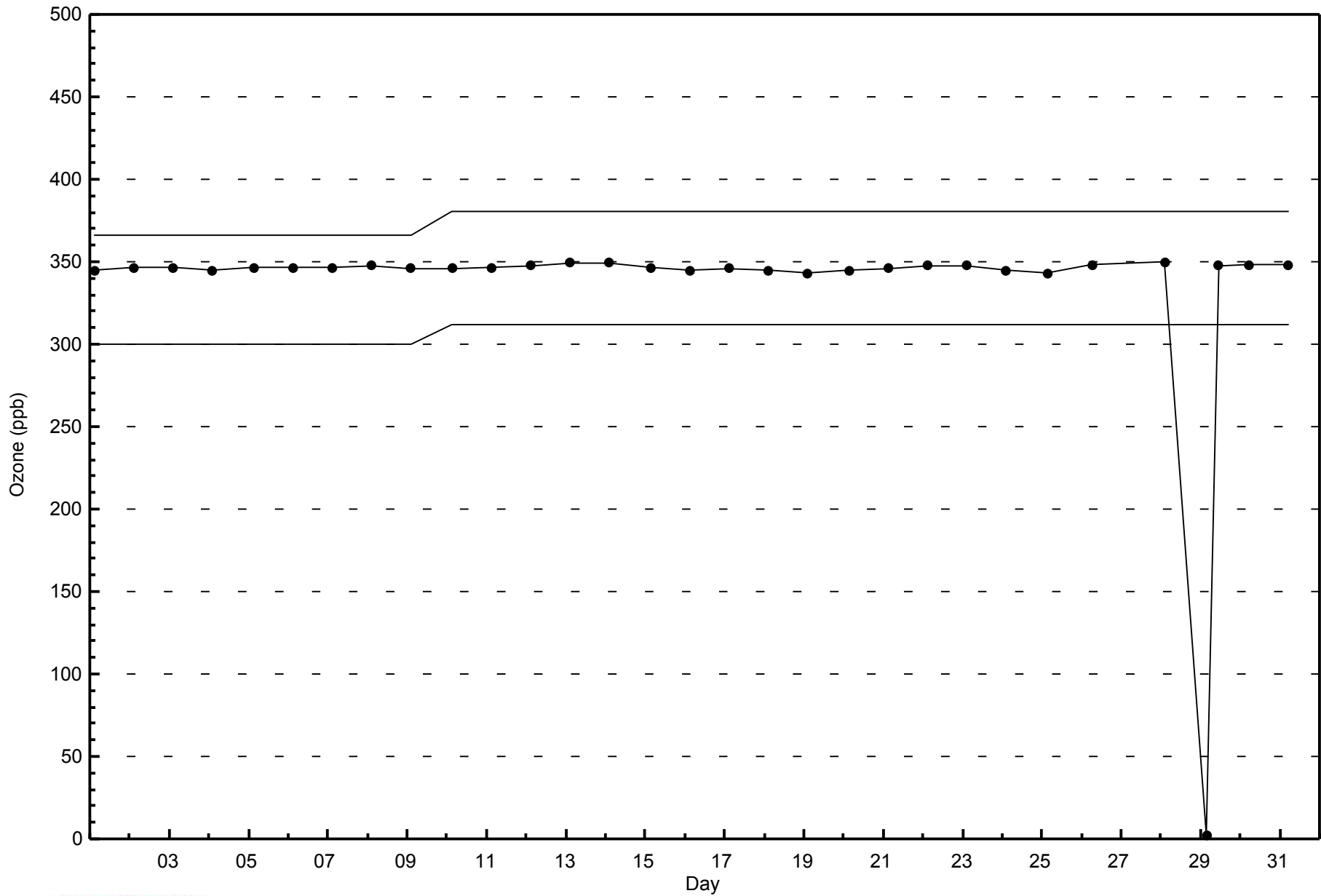
Ozone (O₃) - ppb
Patricia McInnes - July 2014





WBEA NETWORK
Span Responses

Ozone (O₃) - ppb
Patricia McInnes - July 2014



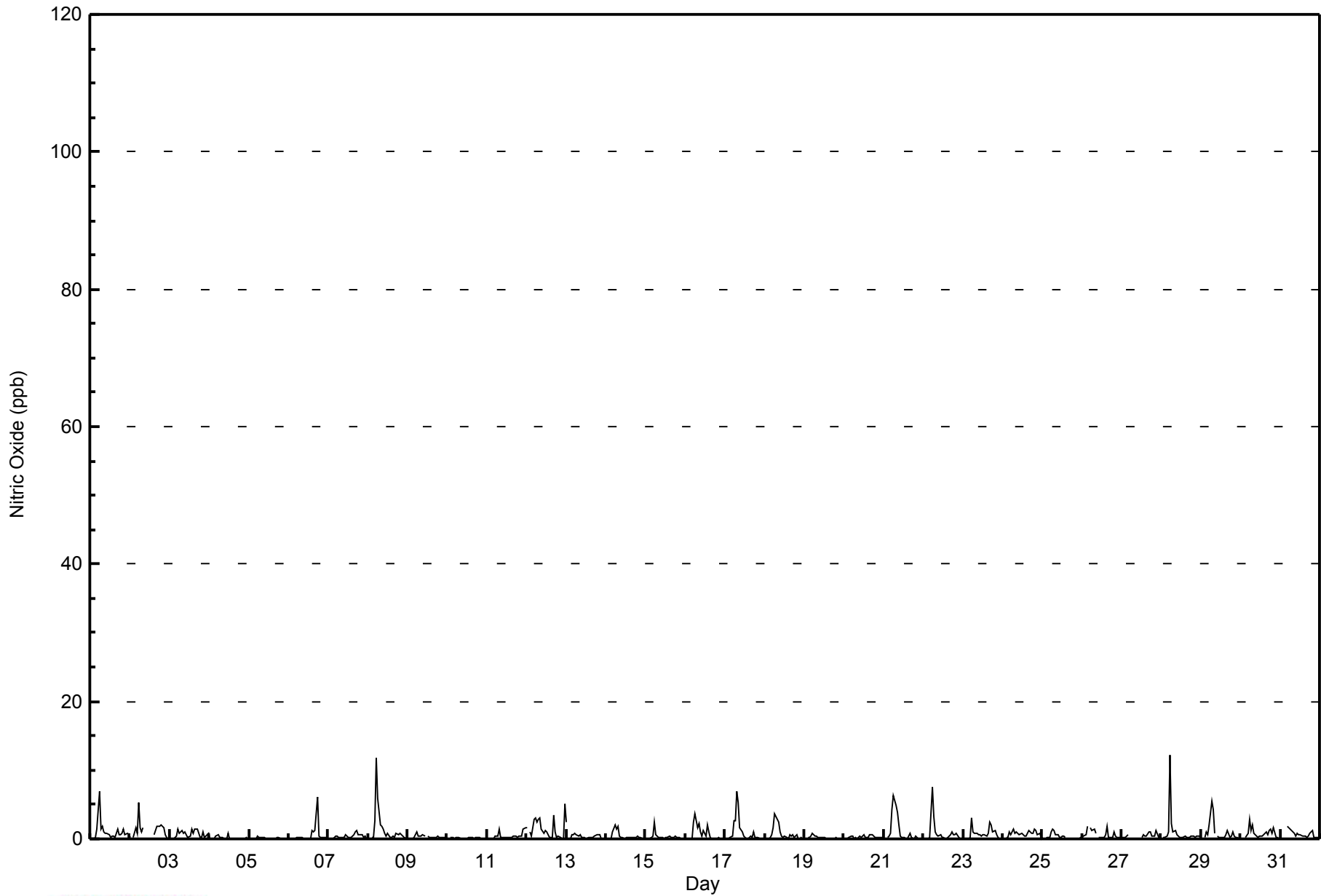


Maximum Value: 12 ppb on Jul 28 06:00														Maximum Daily Average: 1.4 ppb on Jul 12														Hours in Service: 744																					
Minimum Value: 0 ppb on Jul 4 13:00														Minimum Daily Average: 0.1 ppb on Jul 5														Hours of Data: 692																					
Maximum Diurnal Average: 2.7 ppb at hour 6														Minimum Diurnal Average: 0.1 ppb at hour 3														Hours of Missing Data: 52																					
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 = 6														Hours of Calibration: 35																					
																												Percent Operational Time: 97.7																					
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-Jul	0	Z	0	0	1	7	2	2	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1.0	7																							
2-Jul	0	Z	0	2	1	5	2	1	2	C	C	C	C	C	1	1	2	2	2	2	2	1	0	0	1.3	5																							
3-Jul	0	Z	0	0	0	1	1	1	1	1	1	0	0	1	1	2	2	1	0	0	1	0	0	1	0.7	2																							
4-Jul	0	Z	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
5-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	6	0	0	0	0	0	0	0.5	6																							
7-Jul	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	0	0	0	0.4	1																							
8-Jul	0	Z	0	0	3	12	6	2	2	1	1	0	1	0	0	0	0	1	1	1	1	0	0	0	1.4	12																							
9-Jul	0	Z	0	0	0	1	1	0	0	1	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
10-Jul	0	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-Jul	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.4	2																							
12-Jul	2	Z	1	0	3	3	2	3	3	1	1	1	1	0	0	3	1	0	0	0	0	0	0	5	1.4	5																							
13-Jul	2	Z	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0.5	2																							
14-Jul	0	Z	0	0	1	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																							
15-Jul	0	Z	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																							
16-Jul	0	Z	0	0	0	2	4	2	2	1	0	1	0	2	1	0	0	0	0	0	0	0	0	0	0.7	4																							
17-Jul	0	Z	0	0	0	3	3	7	5	2	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1.0	7																							
18-Jul	0	Z	0	0	1	2	4	3	3	1	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0.7	4																							
19-Jul	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
20-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0.3	1																							
21-Jul	0	Z	0	0	1	4	6	5	4	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1.1	6																							
22-Jul	0	Z	0	0	0	7	3	1	1	0	1	0	0	0	0	0	1	1	1	1	1	0	0	0	0.8	7																							
23-Jul	0	Z	0	0	0	3	1	1	1	1	1	1	1	0	1	3	2	1	1	1	1	0	0	0	0.8	3																							
24-Jul	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0.7	1																							
25-Jul	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	M	M	M	M	M	M	M	M	M	0	--	1																							
26-Jul	0	0	1	2	Z	2	1	1	1	MS	0	0	0	0	1	2	0	0	0	1	0	0	0	0	0.6	2																							
27-Jul	0	0	0	0	1	M	M	M	M	M	M	M	0	1	0	0	1	1	0	0	0	1	0	0	--	1																							
28-Jul	Z	0	0	0	1	12	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	12																							
29-Jul	0	Z	0	1	1	2	5	4	1	M	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0.9	5																							
30-Jul	0	0	Z	0	1	3	1	2	1	1	0	0	0	0	1	1	1	1	1	1	1	2	0	0	0.8	3																							
31-Jul	0	0	0	Z	2	2	1	1	1	0	1	1	1	0	0	0	0	1	1	1	0	0	0	0	0.6	2																							
																								0.2	0.2	0.1	0.3	0.7	2.7	1.7	1.5	1.1	0.6	0.4	0.4	0.3	0.3	0.3	0.5	0.7	0.8	0.4	0.6	0.5	0.2	0.2	0.3	Diurnal Average	
																								2	0	1	2	3	12	6	7	5	2	1	1	1	2	1	2	3	6	2	2	2	1	1	5	Diurnal Maximum	
Z - zerospan																								C - Calibration				M - Maintenance				MS - Missing																	



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	692	100.00	100.00
21 - 40	0	0.00	100.00
11 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 692

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

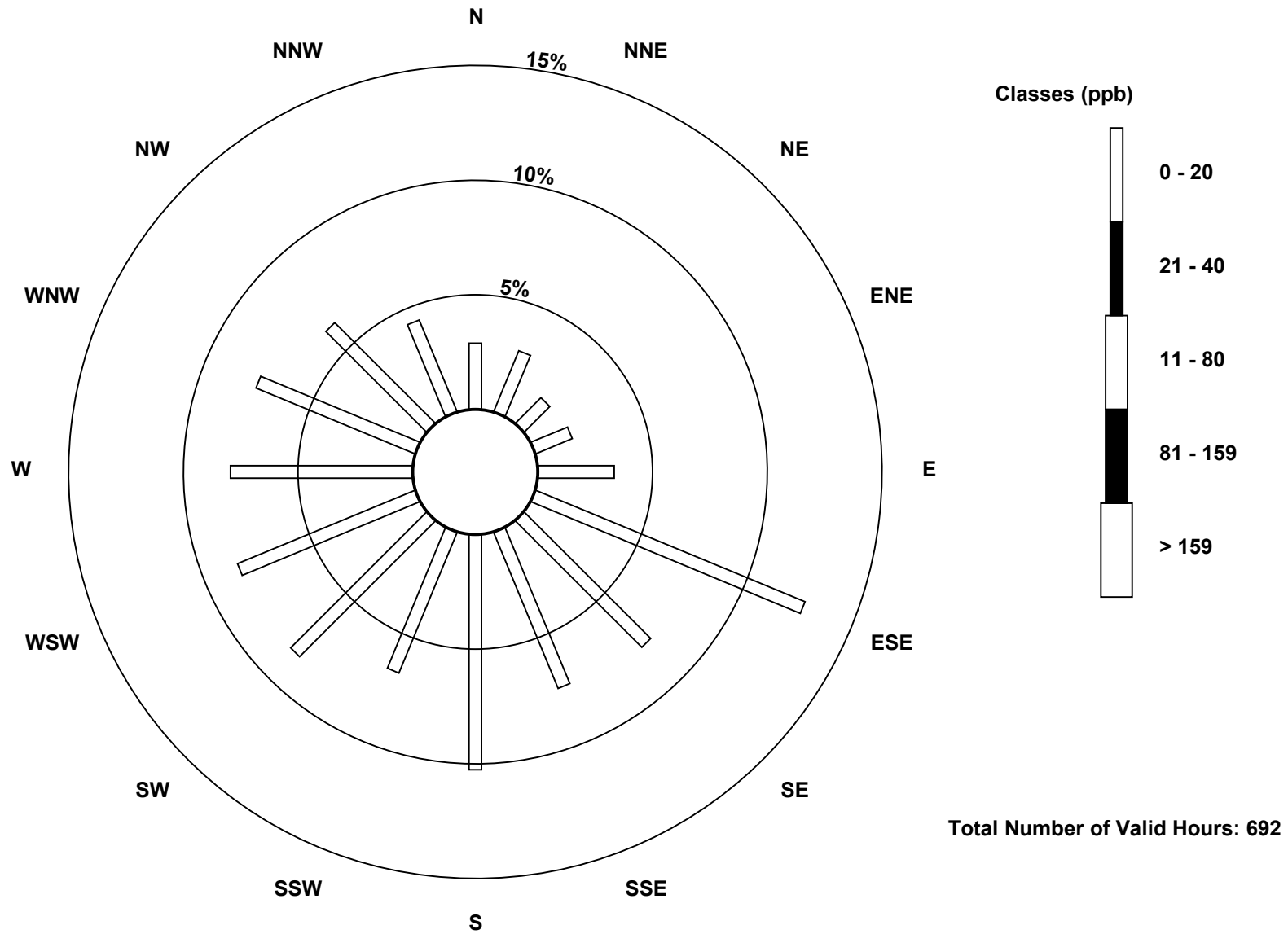
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	20	20	11	12	23	88	54	51	71	46	58	58	55	52	43	30	692
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	20	11	12	23	88	54	51	71	46	58	58	55	52	43	30	692

Total Number of Valid Hours: 692

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

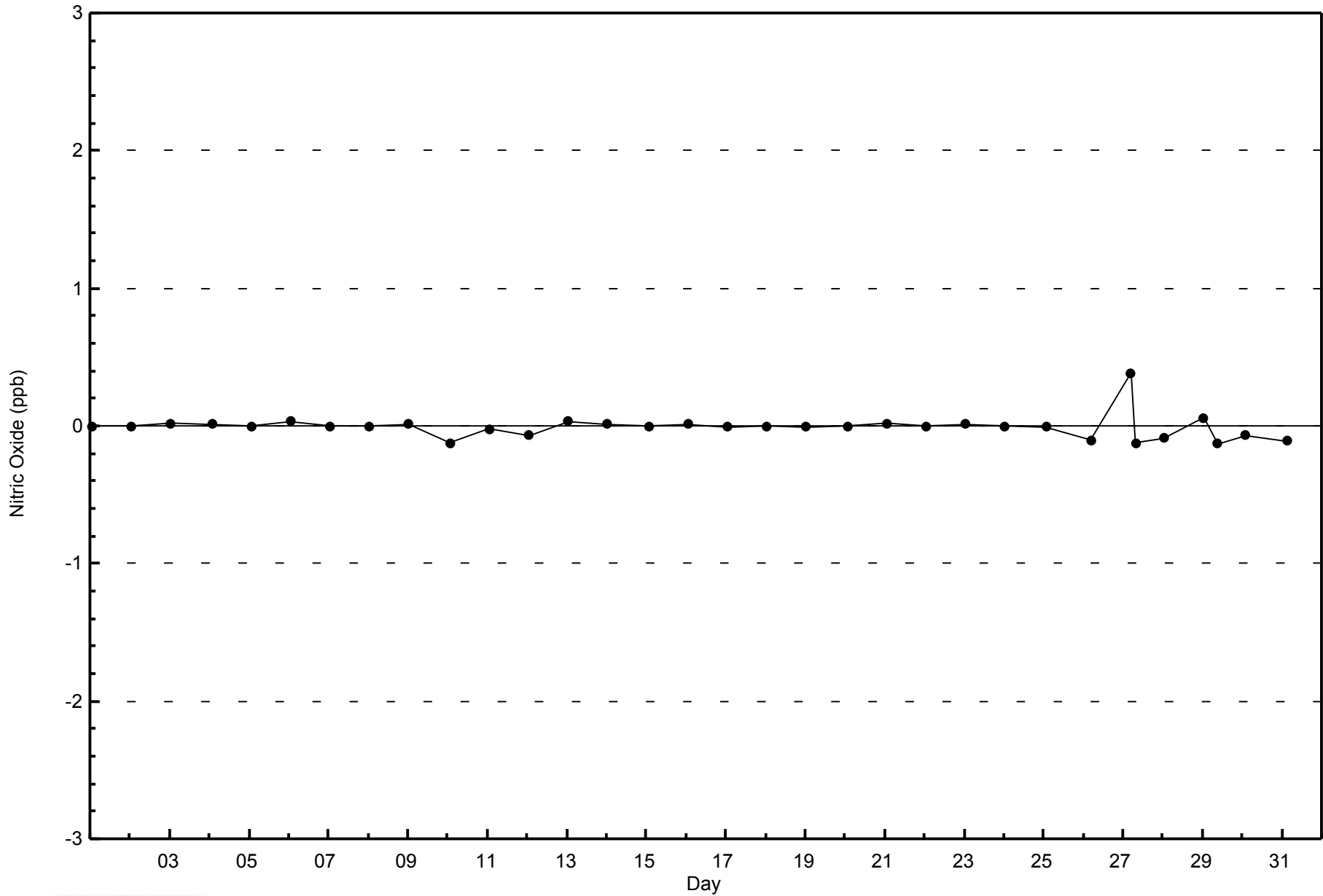
Nitric Oxide (NO) - ppb
Patricia McInnes (AMS 6)





WBEA NETWORK
Zero Responses

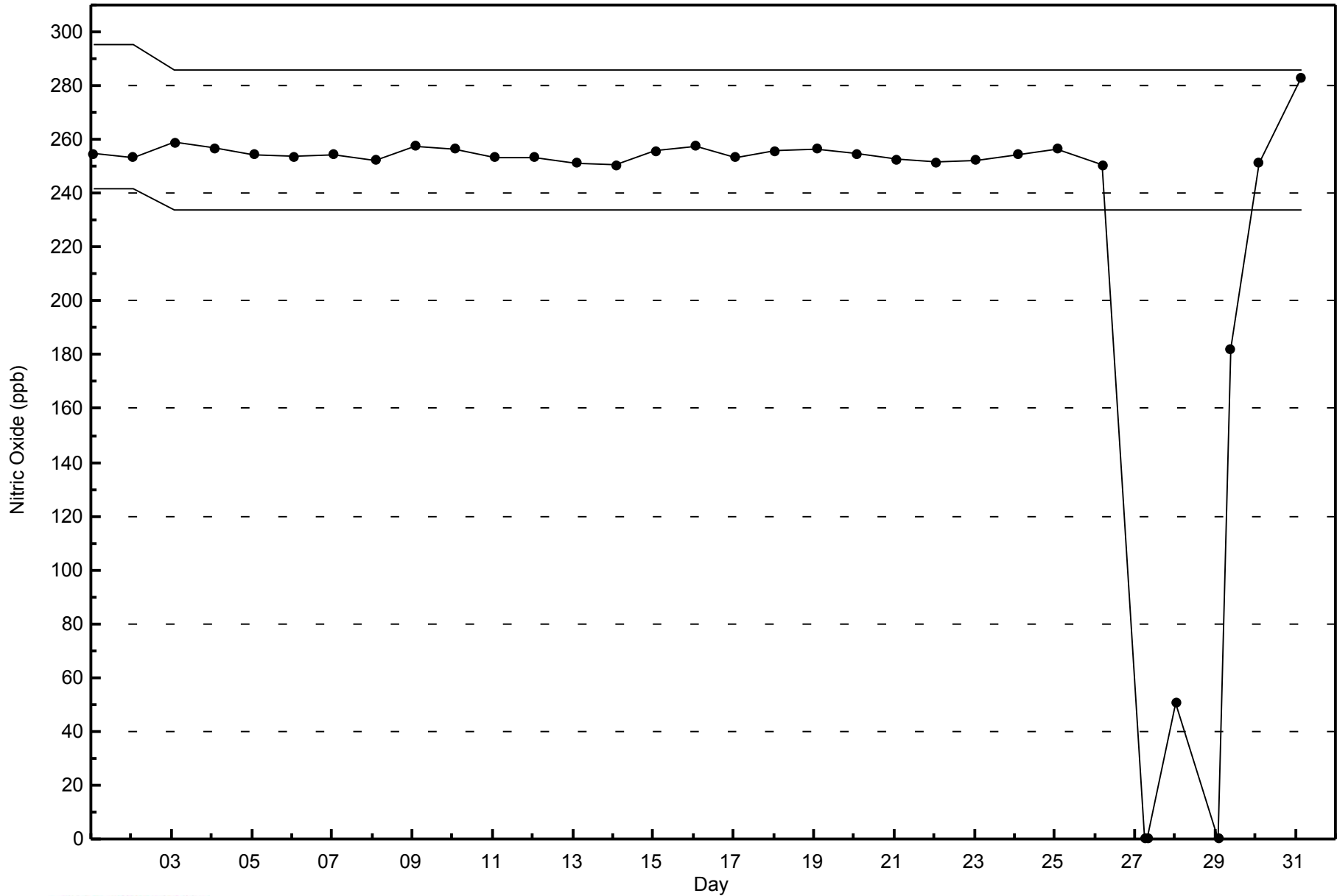
Nitric Oxide (NO) - ppb
Patricia McInnes - July 2014





WBEA NETWORK
Span Responses

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





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 14 ppb on Jul 17 08:00	Maximum Daily Average: 8.1 ppb on Jul 12		Hours of Data:	692
Minimum Value: 0 ppb on Jul 4 11:00	Minimum Daily Average: 0.2 ppb on Jul 10		Hours of Missing Data:	52
Maximum Diurnal Average: 4.5 ppb at hour 6	Minimum Diurnal Average: 1.3 ppb at hour 2		Hours of Calibration:	35
Monthly Average: 2.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 11		Percent Operational Time:	97.7

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-Jul	4	Z	4	5	4	6	4	5	4	2	2	1	1	1	1	1	3	2	3	6	7	6	4	5	3.5	7	
2-Jul	3	Z	3	2	2	5	3	2	2	C	C	C	C	C	1	2	3	4	3	4	3	2	1	1	2.5	5	
3-Jul	2	Z	1	2	2	3	2	3	2	2	2	1	3	7	4	2	3	3	1	1	5	3	7	8	2.9	8	
4-Jul	1	Z	1	2	2	2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0.6	2	
5-Jul	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1	
6-Jul	3	Z	1	0	1	1	1	1	1	0	0	0	0	0	3	4	4	8	3	2	2	3	2	2	1.8	8	
7-Jul	1	Z	0	0	3	1	1	1	1	1	2	2	1	0	0	2	5	6	5	6	7	3	2	1	2.2	7	
8-Jul	2	Z	2	2	5	8	7	3	3	2	2	2	1	1	1	1	1	2	2	4	7	4	3	0	2.7	8	
9-Jul	1	Z	1	1	2	3	2	2	2	1	1	M	1	1	1	1	0	1	2	1	1	1	1	1	1.2	3	
10-Jul	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	
11-Jul	0	Z	0	0	0	1	0	1	0	1	0	0	0	0	0	0	1	1	0	2	3	4	8	11	1.5	11	
12-Jul	10	Z	11	9	9	10	9	9	11	8	5	6	7	7	5	6	12	10	8	9	8	4	3	13	8.1	13	
13-Jul	13	Z	2	5	5	4	1	1	1	1	1	1	1	1	1	1	1	2	2	3	5	4	3	3	2.7	13	
14-Jul	2	Z	2	1	2	7	5	5	3	2	1	1	1	1	1	1	1	2	2	3	3	2	1	1	2.0	7	
15-Jul	1	Z	1	4	5	11	3	2	2	1	2	1	2	1	2	2	2	2	3	4	6	4	3	2	2.9	11	
16-Jul	2	Z	1	1	1	4	4	2	4	3	2	7	6	7	8	2	1	0	0	1	2	1	0	4	2.7	8	
17-Jul	4	Z	2	4	3	5	7	14	13	8	6	4	3	2	2	4	5	7	4	4	1	1	0	0	4.4	14	
18-Jul	0	Z	1	2	2	3	6	8	8	6	3	1	2	2	1	2	2	3	2	3	2	1	2	1	2.7	8	
19-Jul	1	Z	1	2	3	4	1	1	1	0	0	0	0	0	0	0	0	0	0	3	3	4	2	1	1.2	4	
20-Jul	1	Z	0	1	1	1	0	0	1	2	2	3	4	2	2	4	5	5	5	6	5	3	3	5	2.6	6	
21-Jul	7	Z	4	4	4	3	4	4	6	6	2	2	2	1	1	3	4	3	2	3	3	2	2	2	3.1	7	
22-Jul	1	Z	1	1	1	7	6	3	3	3	4	3	3	2	2	2	3	4	4	5	9	4	3	2	3.1	9	
23-Jul	1	Z	1	2	4	10	5	3	3	3	2	2	2	2	1	2	6	5	4	5	4	2	2	2	3.1	10	
24-Jul	4	Z	2	3	5	2	2	2	2	1	1	1	2	2	1	2	2	2	2	3	2	1	1	1	2.0	5	
25-Jul	1	Z	1	1	2	5	6	4	2	1	1	1	2	2	1	M	M	M	M	M	M	M	M	1	1	--	6
26-Jul	2	1	2	3	Z	4	2	3	2	MS	2	2	2	1	2	3	1	1	1	4	3	1	1	1	1.9	4	
27-Jul	1	1	1	2	2	M	M	M	M	M	M	M	1	1	1	2	7	8	3	2	4	6	3	2	--	8	
28-Jul	Z	2	2	3	4	8	4	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	1.9	8	
29-Jul	1	Z	2	4	3	5	10	8	3	M	2	1	1	1	2	2	3	3	4	6	4	3	2	3	3.4	10	
30-Jul	2	1	Z	3	6	7	3	3	3	2	2	2	2	1	2	3	2	3	5	7	7	3	3	2	3.2	7	
31-Jul	1	2	2	Z	5	6	4	3	2	1	4	4	4	2	2	3	4	5	4	5	5	4	3	4	3.4	6	

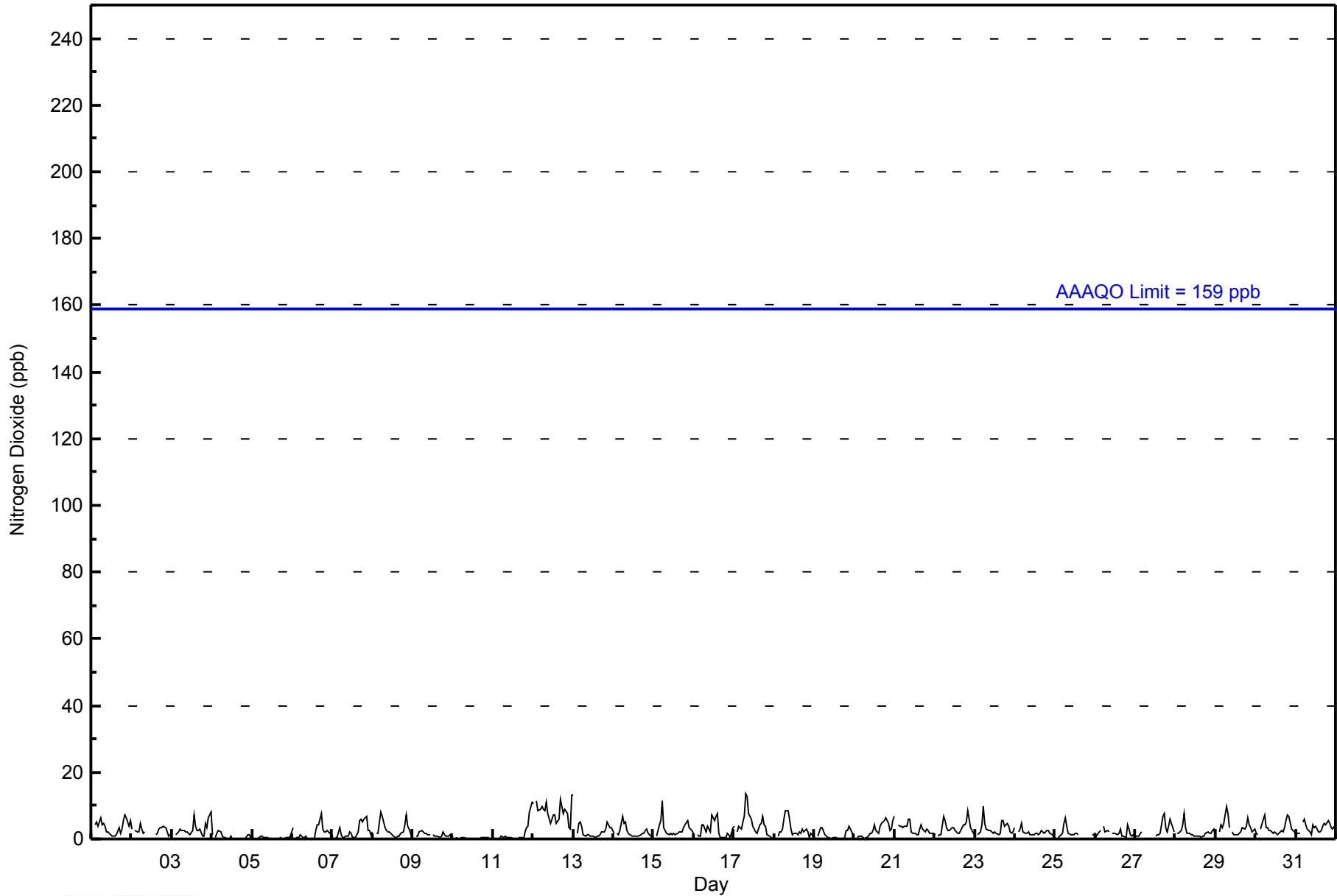
2.3	1.3	1.7	2.3	3.0	4.5	3.4	3.1	2.8	2.2	1.8	1.8	1.7	1.6	1.5	1.8	2.7	3.1	2.6	3.4	3.7	2.6	2.2	2.7	Diurnal Average	
13	2	11	9	9	11	10	14	13	8	6	7	7	7	8	6	12	10	8	9	9	6	8	13	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	692	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: 692

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

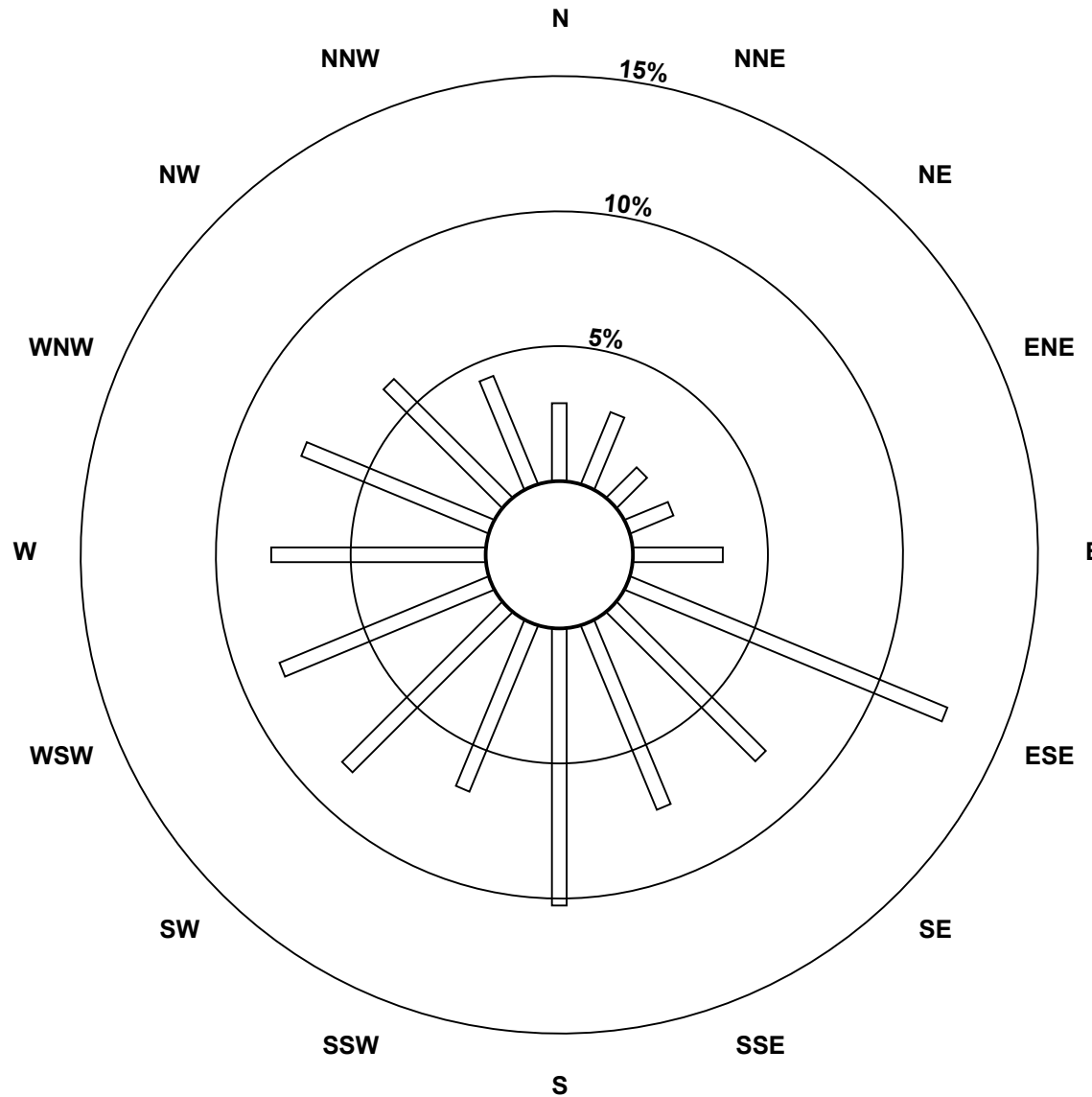
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	20	20	11	12	23	88	54	51	71	46	58	58	55	52	43	30	692
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	20	11	12	23	88	54	51	71	46	58	58	55	52	43	30	692

Total Number of Valid Hours: 692

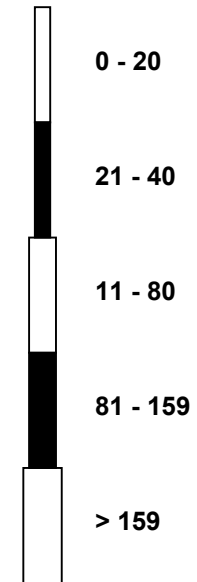
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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



Classes (ppb)



Total Number of Valid Hours: 692

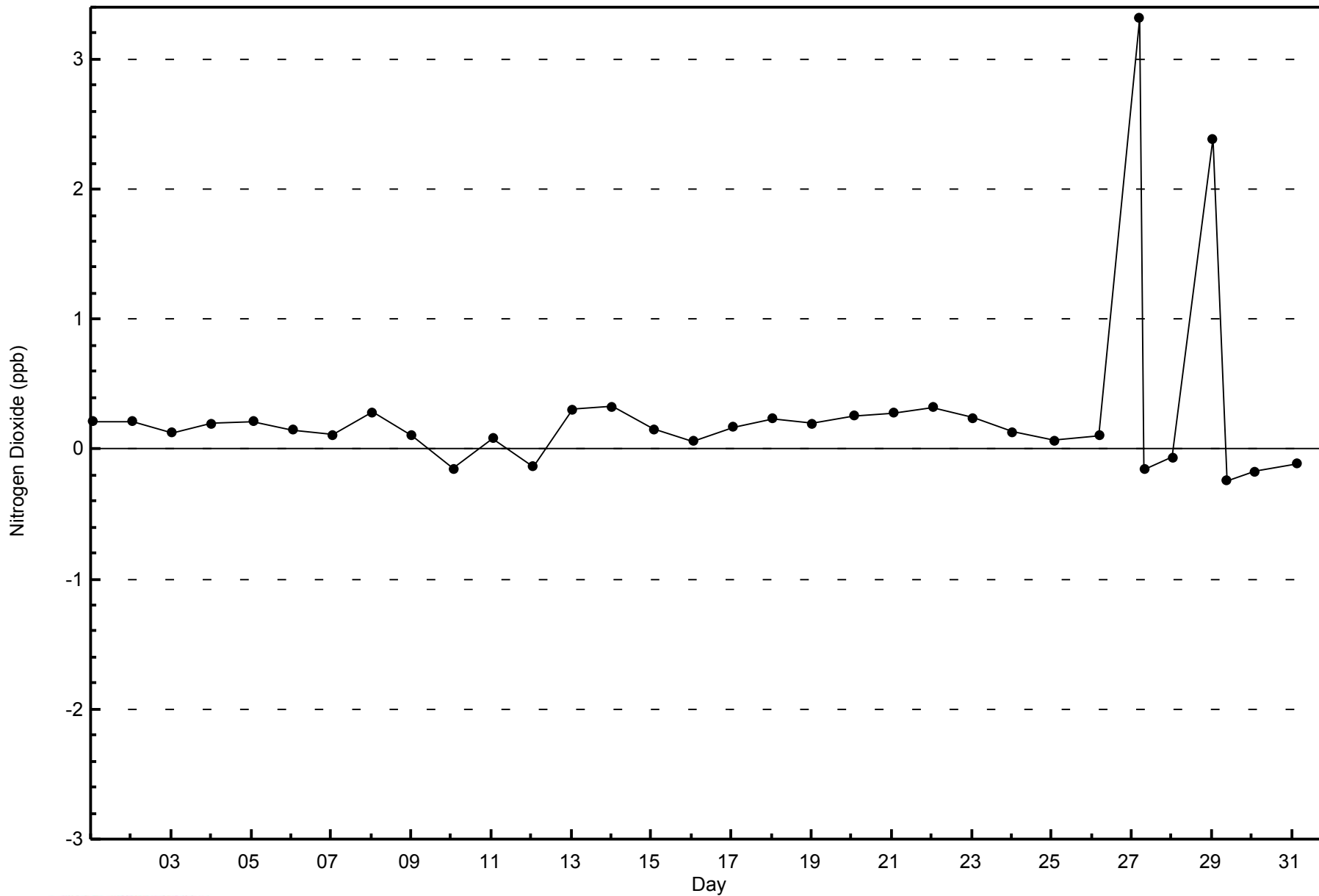


WBEA NETWORK

Zero Responses

Nitrogen Dioxide (NO₂) - ppb

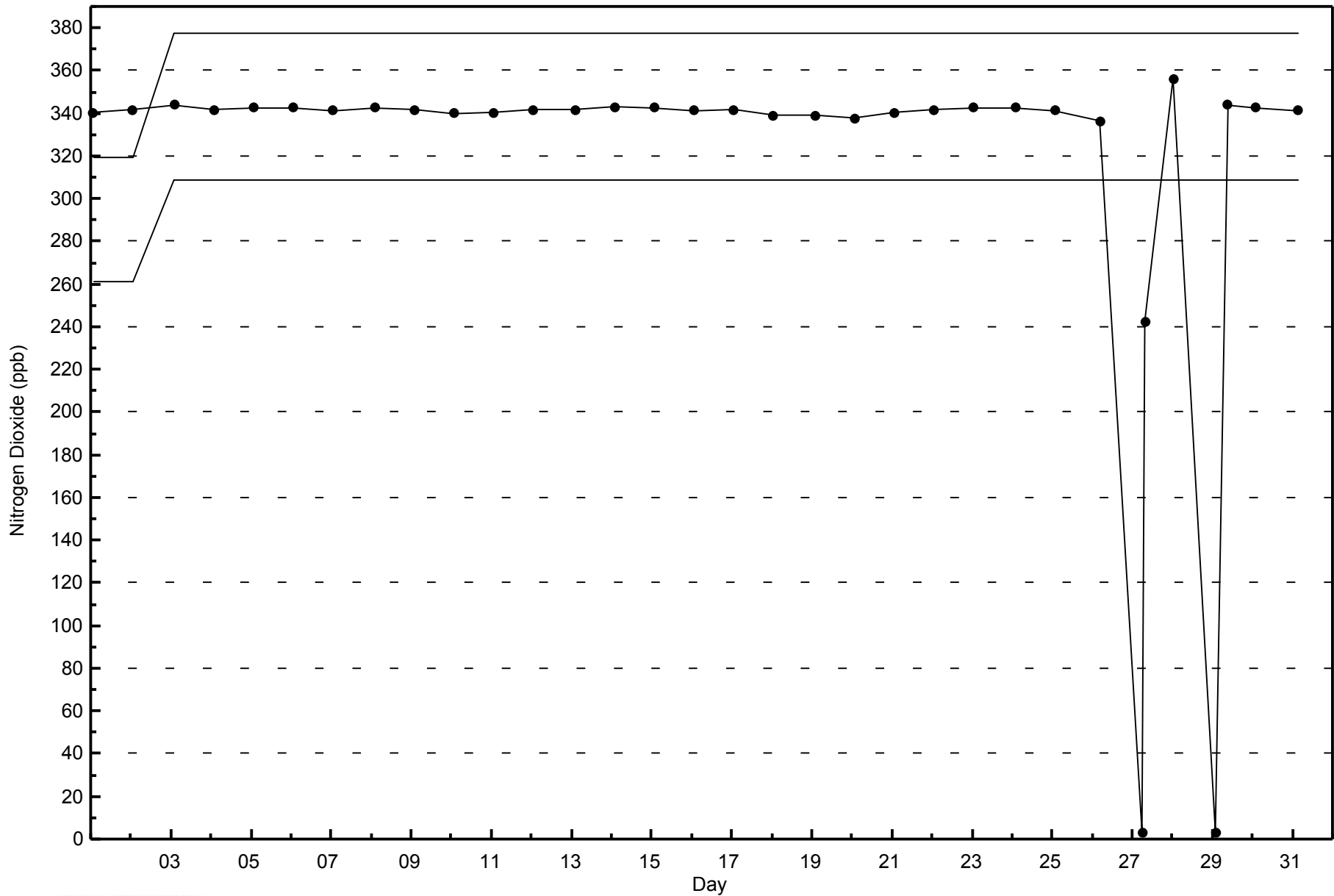
Patricia McInnes - July 2014





WBEA NETWORK
Span Responses

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



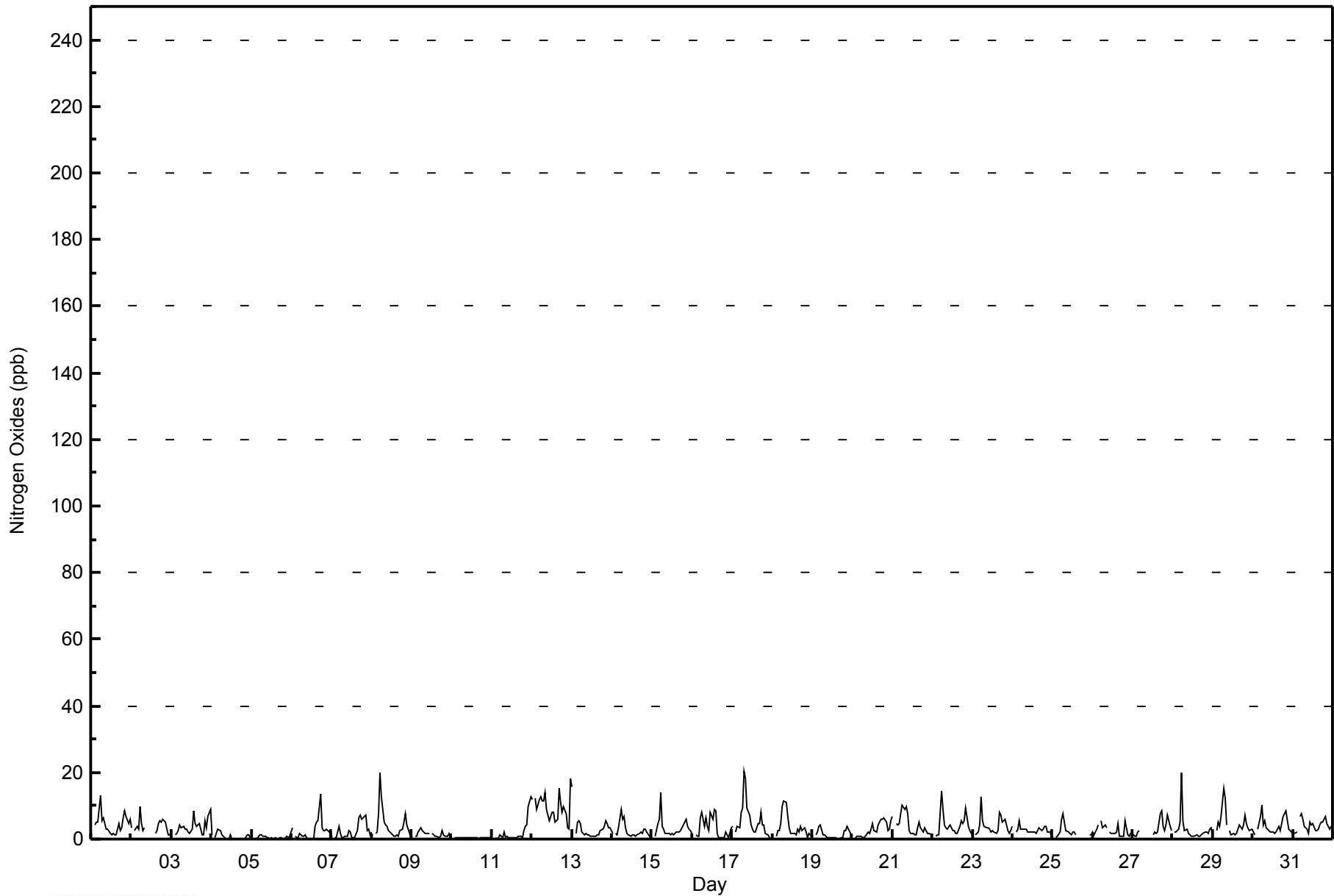


Maximum Value: 20 ppb on Jul 17 08:00																	Maximum Daily Average: 9.5 ppb on Jul 12							Hours in Service: 744			
Minimum Value: 0 ppb on Jul 4 13:00																	Minimum Daily Average: 0.4 ppb on Jul 10							Hours of Data: 692			
Maximum Diurnal Average: 7.2 ppb at hour 6																	Minimum Diurnal Average: 1.5 ppb at hour 2							Hours of Missing Data: 52			
Monthly Average: 3.2 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 7 P ₉₉ = 15							Hours of Calibration: 35			
																								Percent Operational Time: 97.7			
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-Jul	4	Z	4	5	5	13	6	7	5	3	3	2	1	2	1	1	5	2	3	6	9	7	5	6	4.5	13	
2-Jul	3	Z	3	4	3	10	5	2	4	C	C	C	C	C	2	3	5	5	5	6	5	3	1	1	3.8	10	
3-Jul	2	Z	1	2	3	4	3	4	3	3	2	2	3	9	5	4	4	4	1	1	5	3	7	9	3.6	9	
4-Jul	1	Z	1	2	3	3	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0.7	3	
5-Jul	0	Z	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1	
6-Jul	3	Z	1	0	1	2	1	1	1	0	0	0	0	0	4	5	6	14	3	2	2	3	2	2	2.3	14	
7-Jul	1	Z	0	0	4	2	1	1	1	1	3	2	1	1	1	3	6	7	6	6	7	3	3	1	2.6	7	
8-Jul	2	Z	2	2	7	20	13	5	4	4	3	2	2	1	1	1	1	2	3	5	8	4	3	1	4.2	20	
9-Jul	1	Z	1	1	2	4	2	2	2	2	2	M	2	1	1	1	1	1	2	1	1	1	2	1	1.5	4	
10-Jul	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
11-Jul	0	Z	0	0	0	1	1	2	0	1	1	1	0	0	0	0	1	1	0	3	4	4	10	13	1.9	13	
12-Jul	12	Z	12	9	12	13	11	11	14	9	5	7	8	8	5	6	15	11	8	10	8	3	3	18	9.5	18	
13-Jul	16	Z	2	5	6	5	2	1	2	1	1	1	1	1	1	1	1	3	3	4	6	4	3	3	3.1	16	
14-Jul	2	Z	2	1	3	9	6	7	3	2	1	1	1	1	1	1	2	2	2	3	3	2	1	1	2.4	9	
15-Jul	1	Z	1	4	6	14	4	3	2	2	2	1	2	1	2	2	2	2	4	4	6	4	3	2	3.2	14	
16-Jul	2	Z	1	1	1	7	8	4	6	4	3	8	6	9	9	2	1	0	0	0	2	1	0	4	3.4	9	
17-Jul	4	Z	2	4	3	8	9	20	18	9	7	4	3	2	2	4	5	8	4	4	1	1	0	0	5.4	20	
18-Jul	0	Z	1	3	3	5	10	12	11	7	3	2	2	2	1	3	2	4	2	4	2	1	2	1	3.5	12	
19-Jul	1	Z	1	2	4	4	1	1	1	1	0	1	1	0	0	0	0	0	0	3	3	4	2	1	1.4	4	
20-Jul	1	Z	0	1	1	1	0	1	1	2	2	3	5	3	2	4	5	6	6	7	5	3	3	6	2.8	7	
21-Jul	7	Z	5	4	5	7	10	9	10	8	3	2	2	1	1	3	5	3	2	3	3	2	2	1	4.2	10	
22-Jul	1	Z	1	1	1	14	9	4	3	3	4	3	3	2	2	2	4	5	5	6	9	4	3	2	3.9	14	
23-Jul	1	Z	1	2	4	13	6	4	3	3	3	2	3	2	2	2	8	7	5	6	4	2	2	2	3.9	13	
24-Jul	4	Z	2	3	6	3	3	3	3	2	2	2	2	2	2	3	4	3	3	4	4	2	2	1	2.7	6	
25-Jul	1	Z	0	1	2	6	8	5	2	2	2	1	2	2	1	M	M	M	M	M	M	M	M	1	1	--	8
26-Jul	2	1	3	4	Z	6	4	4	3	MS	2	2	2	1	2	5	1	1	1	5	4	1	1	2	2.6	6	
27-Jul	1	1	1	2	3	M	M	M	M	M	M	M	1	2	2	2	8	9	4	3	4	7	4	2	--	9	
28-Jul	Z	2	2	3	5	20	6	2	3	2	1	1	1	1	1	1	1	1	2	2	2	2	3	3	2.9	20	
29-Jul	1	Z	3	5	4	7	15	12	4	M	3	1	2	1	2	3	4	3	4	7	5	4	3	3	4.3	15	
30-Jul	2	1	Z	3	7	10	4	5	3	3	2	2	2	2	2	4	3	5	7	8	8	3	3	2	4.0	10	
31-Jul	1	2	2	Z	7	8	6	4	3	2	5	4	4	2	2	3	4	5	5	7	5	4	3	4	4.0	8	
																	Diurnal Average		Diurnal Maximum								
2.6 1.5 1.9 2.6 3.7 7.2 5.2 4.6 3.9 2.8 2.2 2.1 2.0 2.0 1.8 2.3 3.4 3.9 3.0 4.0 4.2 2.8 2.5 3.1																											
16 2 12 9 12 20 15 20 18 9 7 8 8 9 9 6 15 14 8 10 9 7 10 18																											
Z - zerospan C - Calibration M - Maintenance MS - Missing																											



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	692	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: 692

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

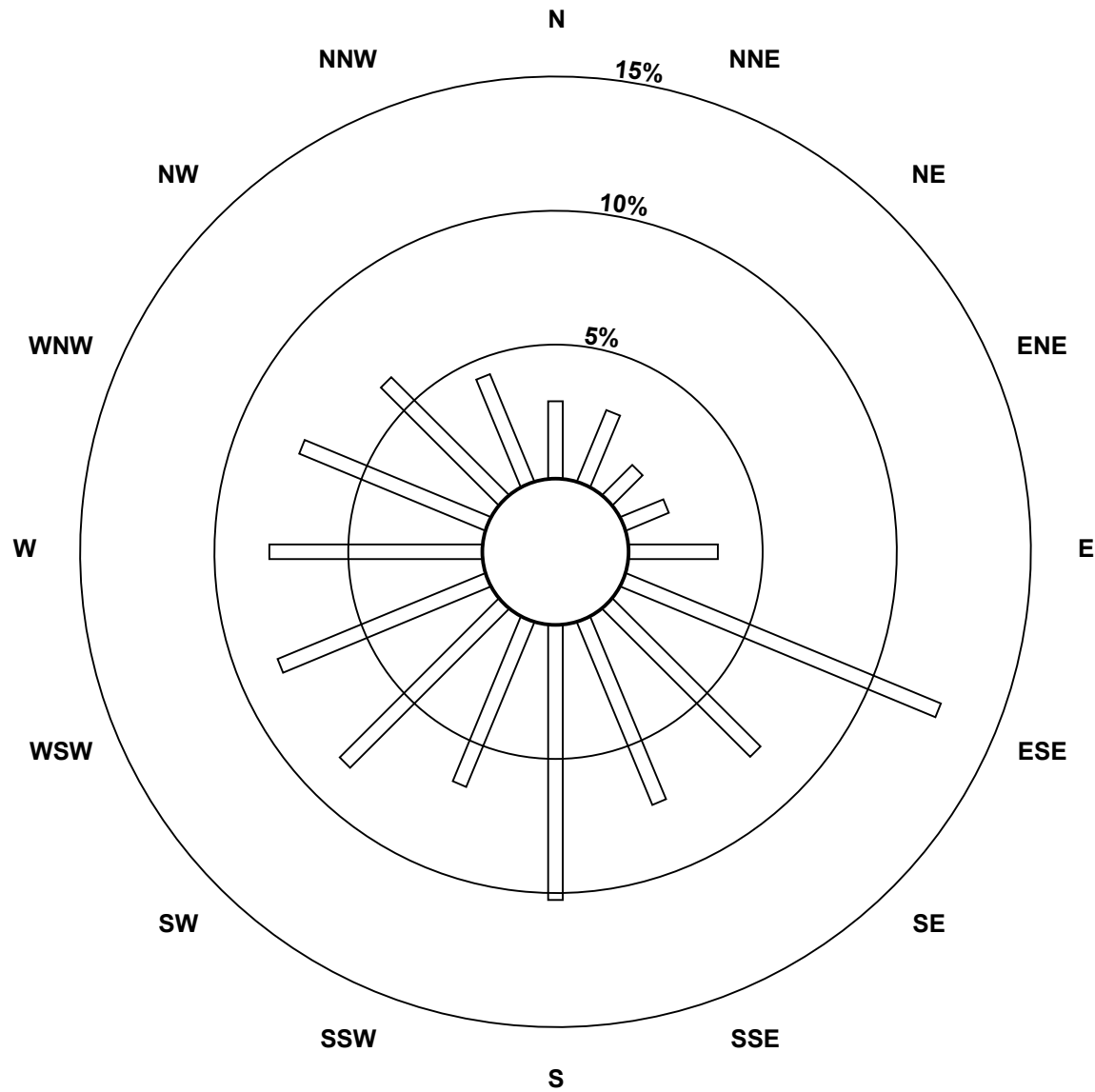
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	20	20	11	12	23	88	54	51	71	46	58	58	55	52	43	30	692
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	20	11	12	23	88	54	51	71	46	58	58	55	52	43	30	692

Total Number of Valid Hours: 692

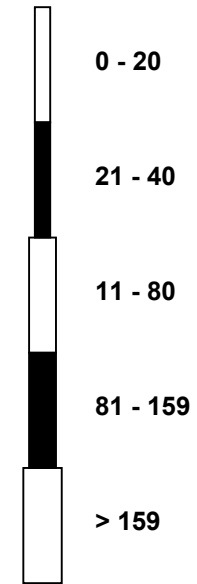
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

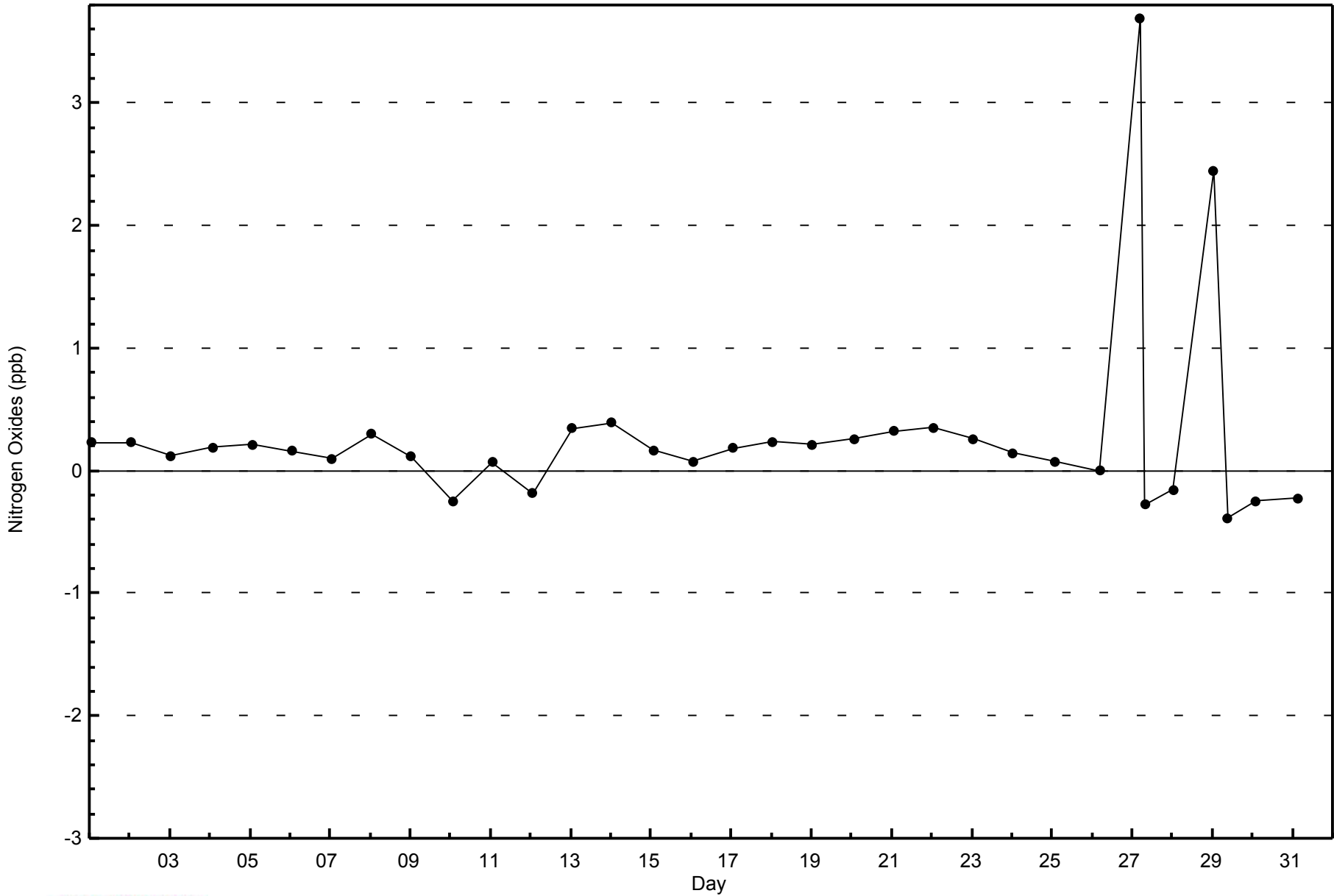
Nitrogen Oxides (NO_x) - ppb
Patricia McInnes (AMS 6)

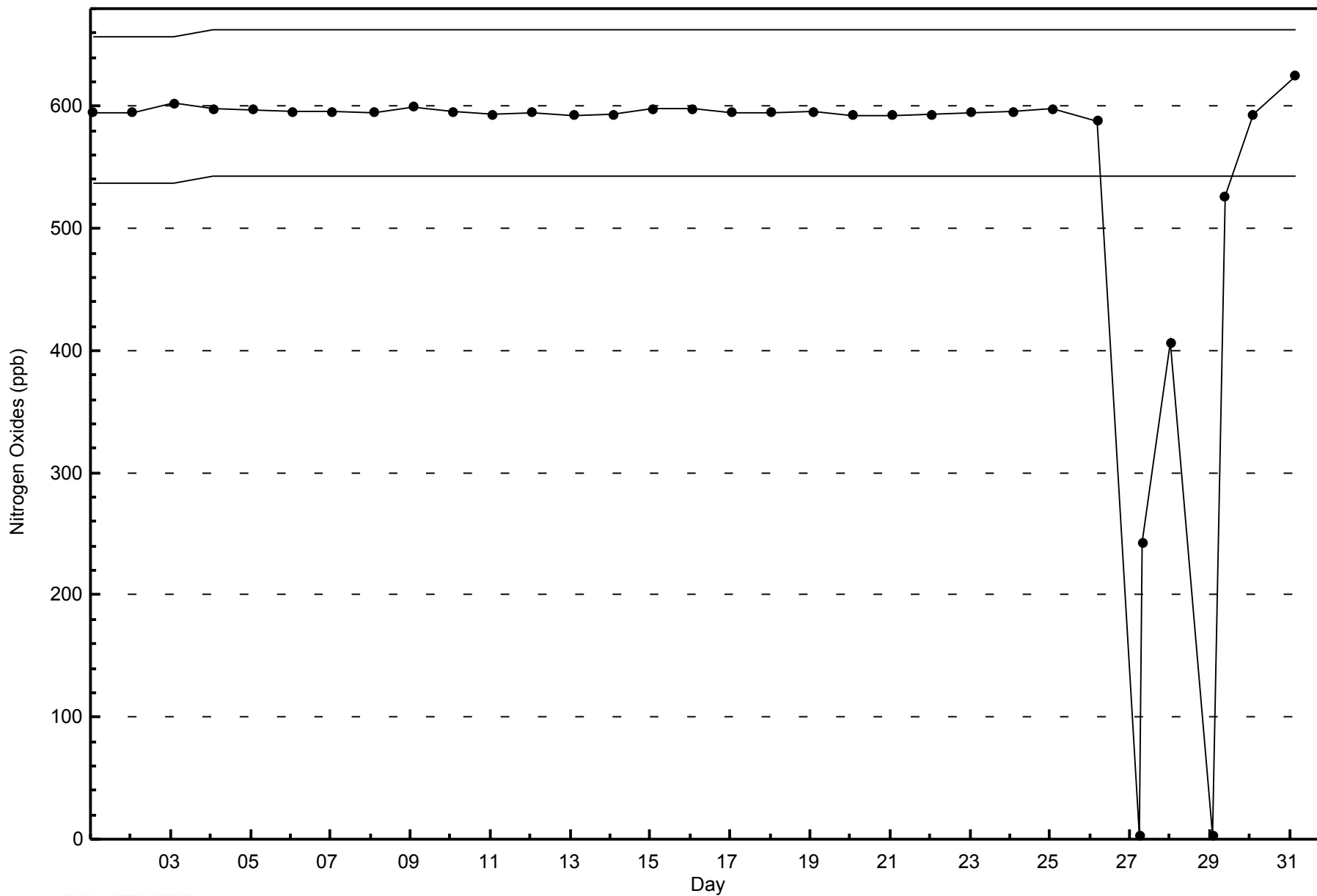


Classes (ppb)



Total Number of Valid Hours: 692







Number of Exceedences (AAQO): 1-hr: 0	Maximum Value: 0 ppb on Jul 1 01:00	Maximum Daily Average: 0.0 ppb on Jul 1	Hours in Service: 744
Minimum Value: 0 ppb on Jul 1 01:00	Maximum Diurnal Average: 0.0 ppb at hour 1	Minimum Daily Average: 0.0 ppb on Jul 1	Hours of Data: 651
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		Hours of Missing Data: 93
			Hours of Calibration: 39
			Percent Operational Time: 92.7

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-Jul	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-Jul	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-Jul	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-Jul	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-Jul	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-Jul	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-Jul	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-Jul	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-Jul	0	0	0	Z	RE	0	0	0	0	0	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-Jul	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
11-Jul	0	0	0	Z	RE	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	--	0
12-Jul	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-Jul	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-Jul	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-Jul	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-Jul	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-Jul	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-Jul	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-Jul	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-Jul	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-Jul	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-Jul	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-Jul	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-Jul	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-Jul	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	M	M	M	M	M	M	M	M	0	--	0
26-Jul	0	0	0	0	0	0	0	Z	0	M	M	M	M	M	M	0	0	0	0	0	0	0	0	0	--	0
27-Jul	0	0	0	0	0	M	M	M	M	M	M	M	M	0	0	0	C	C	C	C	0	0	0	0	--	0
28-Jul	0	0	0	M	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-Jul	0	0	0	M	Z	0	0	0	0	M	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0.0	0
30-Jul	0	0	0	0	0	M	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
31-Jul	0	0	0	0	0	0	M	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0

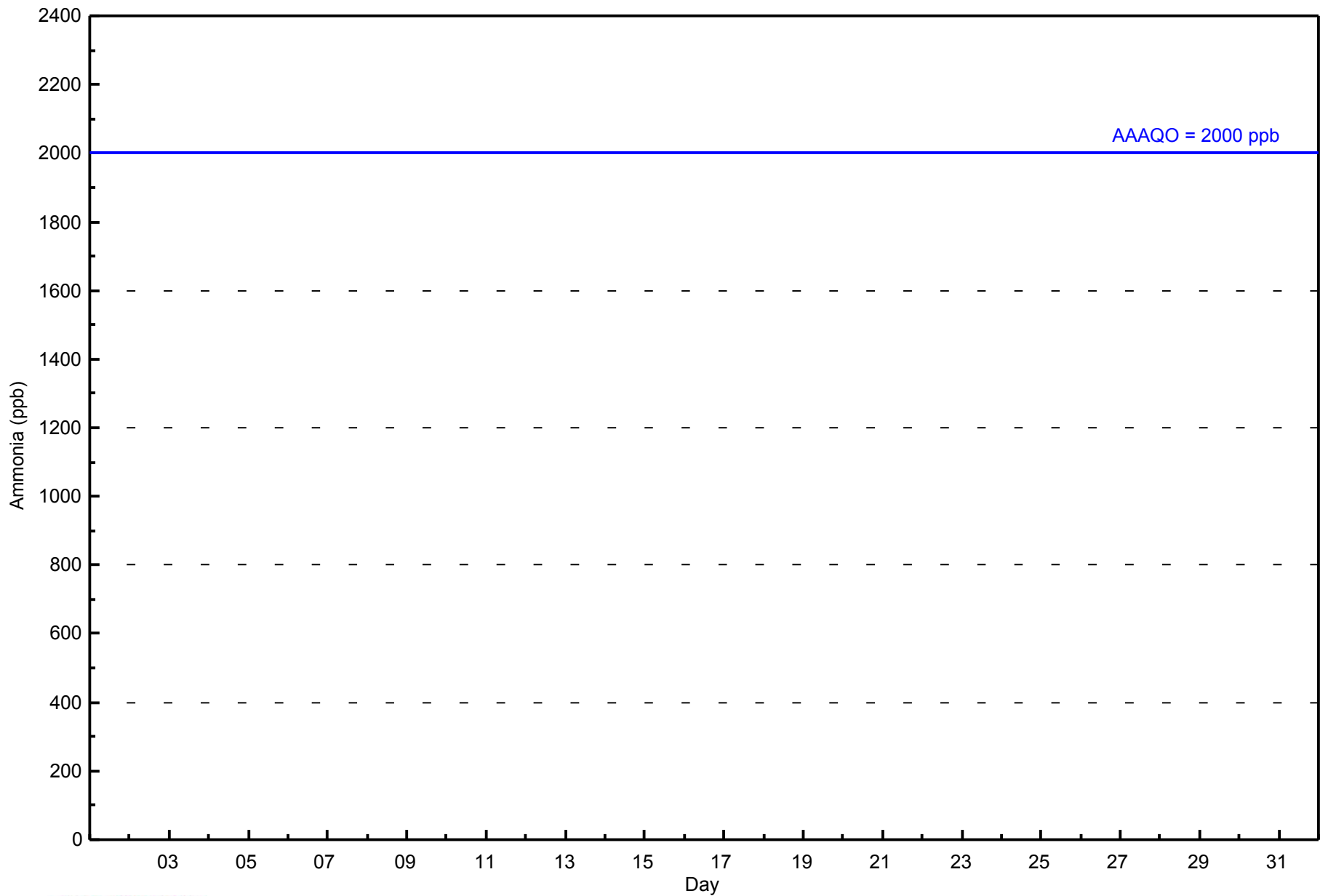
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

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



WBEA NETWORK
Hourly Averages

Ammonia (NH₃) - ppb
Patricia McInnes - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	651	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: 651

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - July 2014

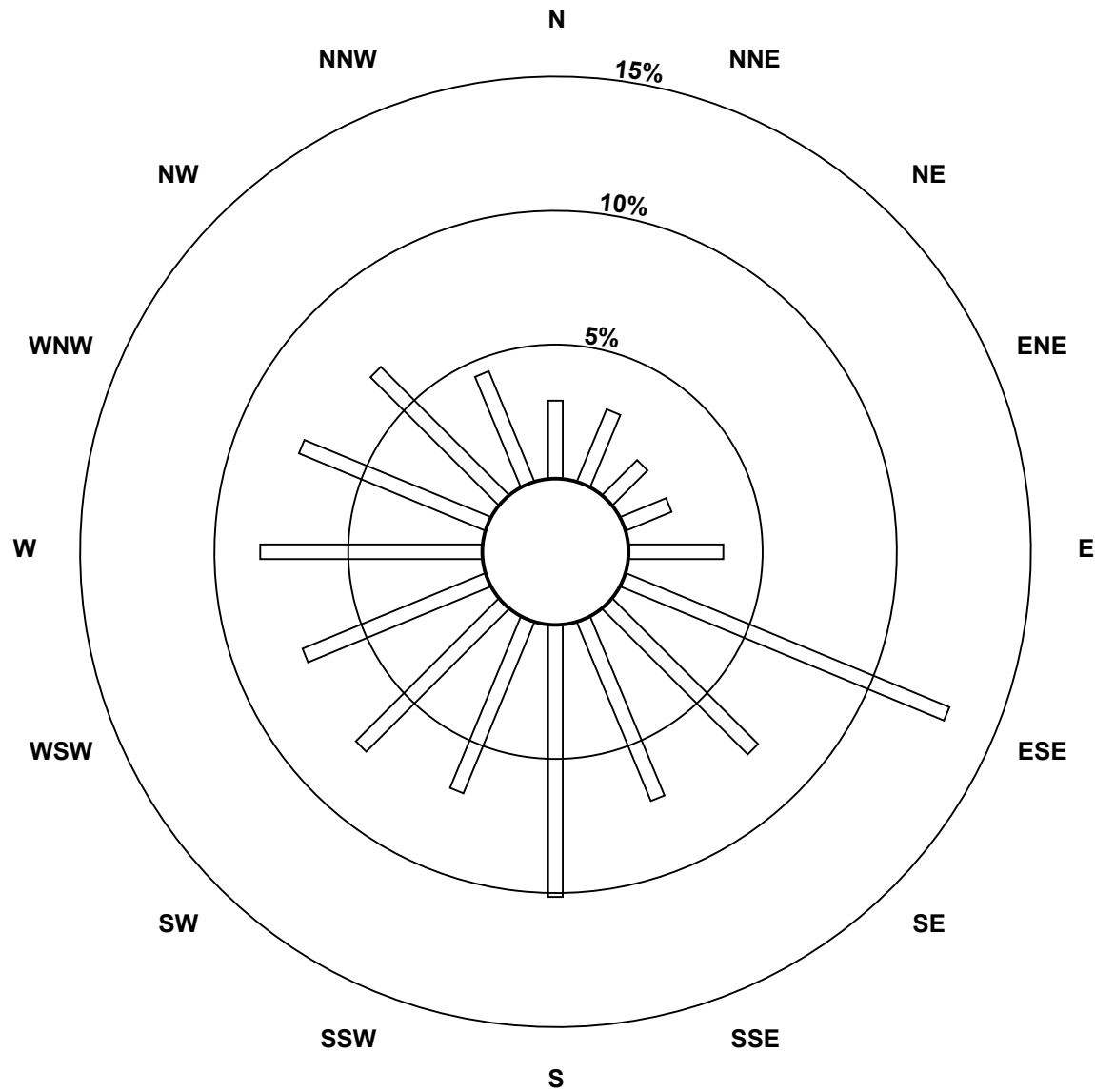
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	19	19	12	12	23	85	50	47	66	45	49	48	54	49	44	29	651
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	19	19	12	12	23	85	50	47	66	45	49	48	54	49	44	29	651

Total Number of Valid Hours: 651

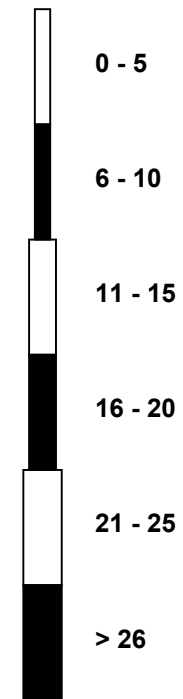
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

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



Classes (ppb)



Total Number of Valid Hours: 651

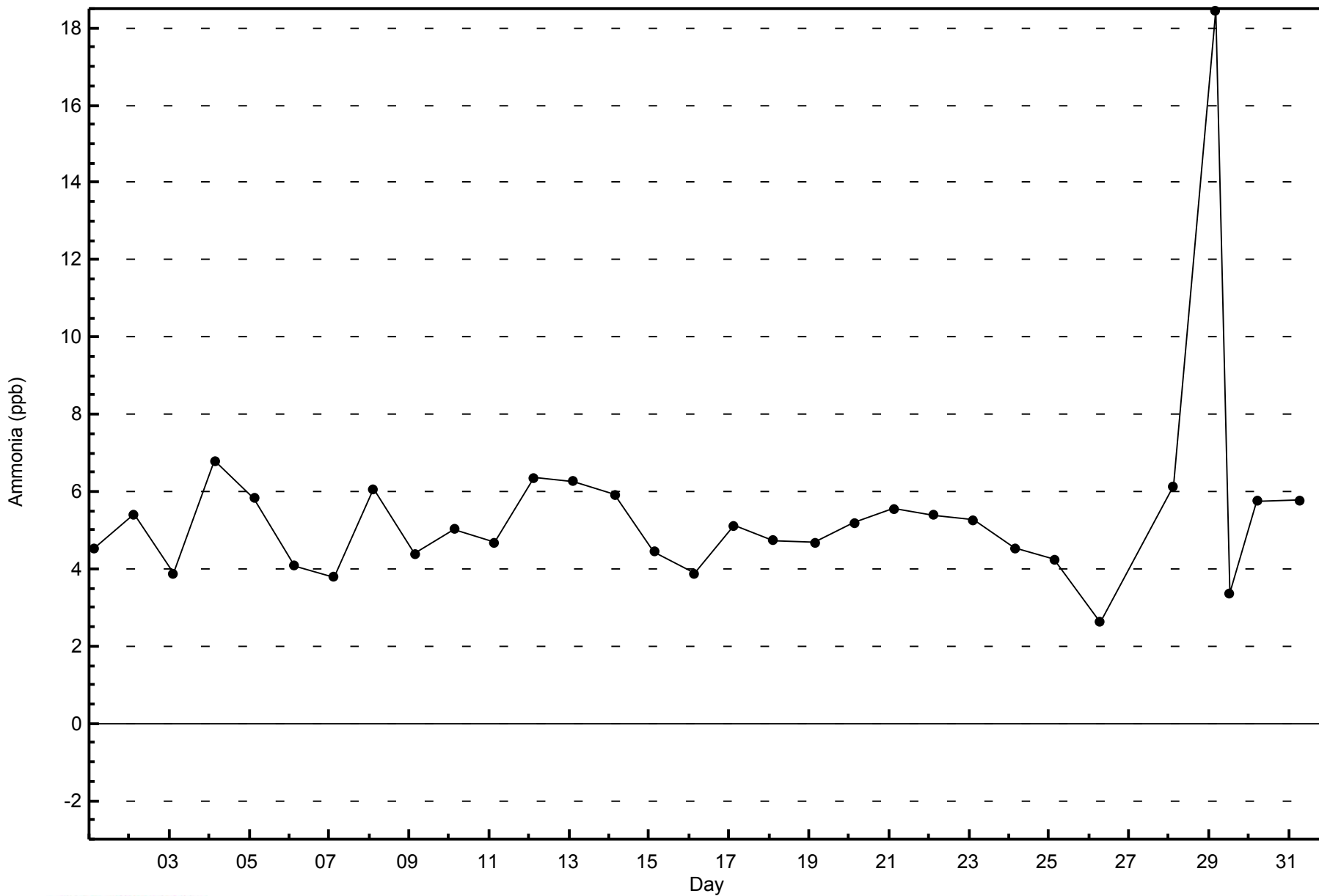


WBEA NETWORK

Zero Responses

Ammonia (NH₃) - ppb

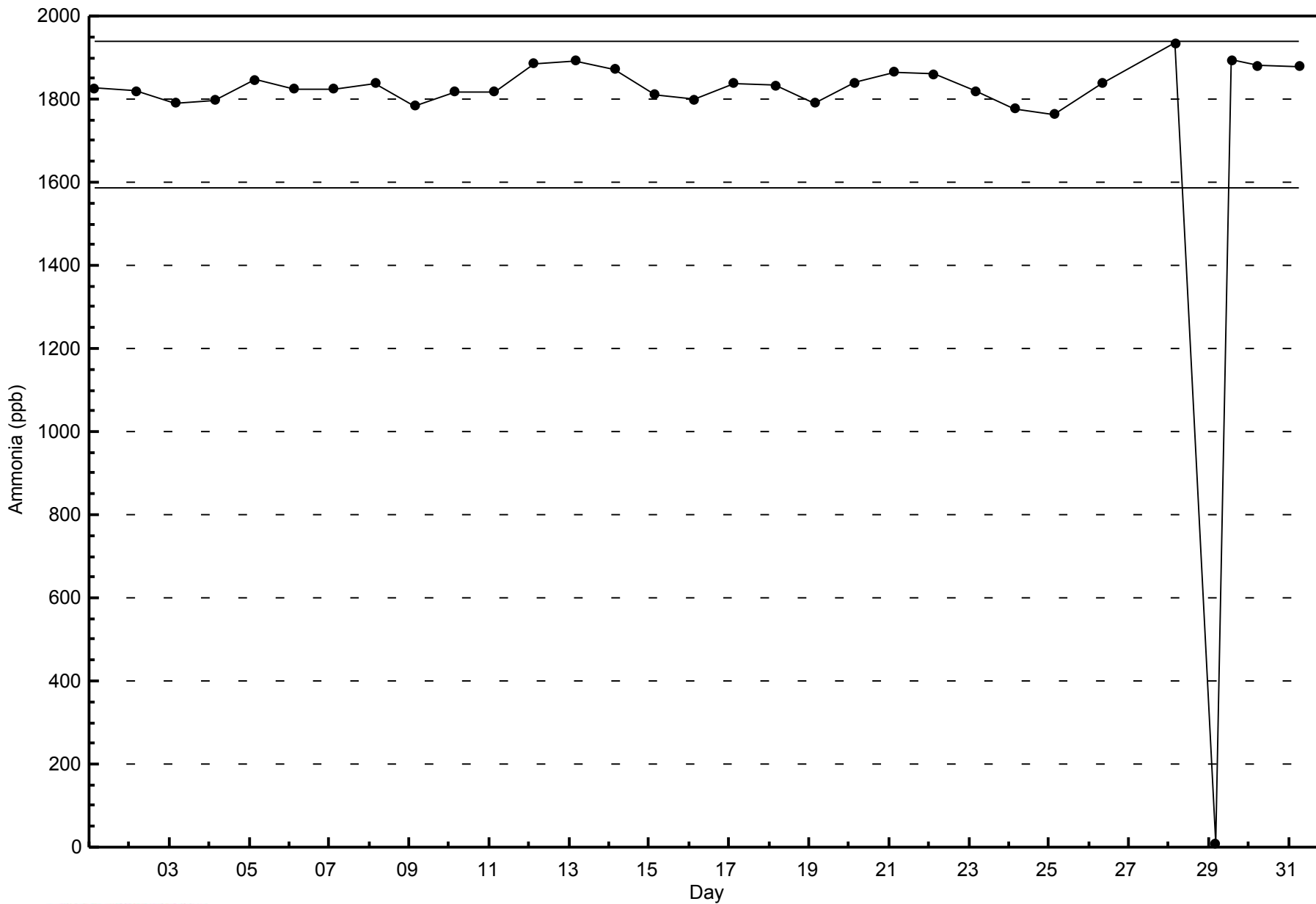
Patricia McInnes - July 2014





WBEA NETWORK
Span Responses

Ammonia (NH₃) - ppb
Patricia McInnes - July 2014





Summary of Hour Averages

Patricia McInnes - July 2014

Number of Exceedences (AAAQO):	24-hr: 5	Hours in Service:	744
Maximum Value: 218.1 µg/m ³ on Jul 31 18:00	Maximum Daily Average: 60.5 µg/m ³ on Jul 12	Hours of Data:	722
Minimum Value: 0.2 µg/m ³ on Jul 5 05:00	Minimum Daily Average: 1.3 µg/m ³ on Jul 5	Hours of Missing Data:	22
Maximum Diurnal Average: 22.2 µg/m ³ at hour 18	Minimum Diurnal Average: 13.6 µg/m ³ at hour 7	Hours of Calibration:	0
Monthly Average: 16.97 µg/m ³	Percentiles: P ₁ = 0.7 P ₁₀ = 2.6 Q ₁ = 6.0 Median = 11.3 Q ₃ = 21.9 P ₉₀ = 34.1 P ₉₉ = 93.7	Percent Operational Time:	97.0

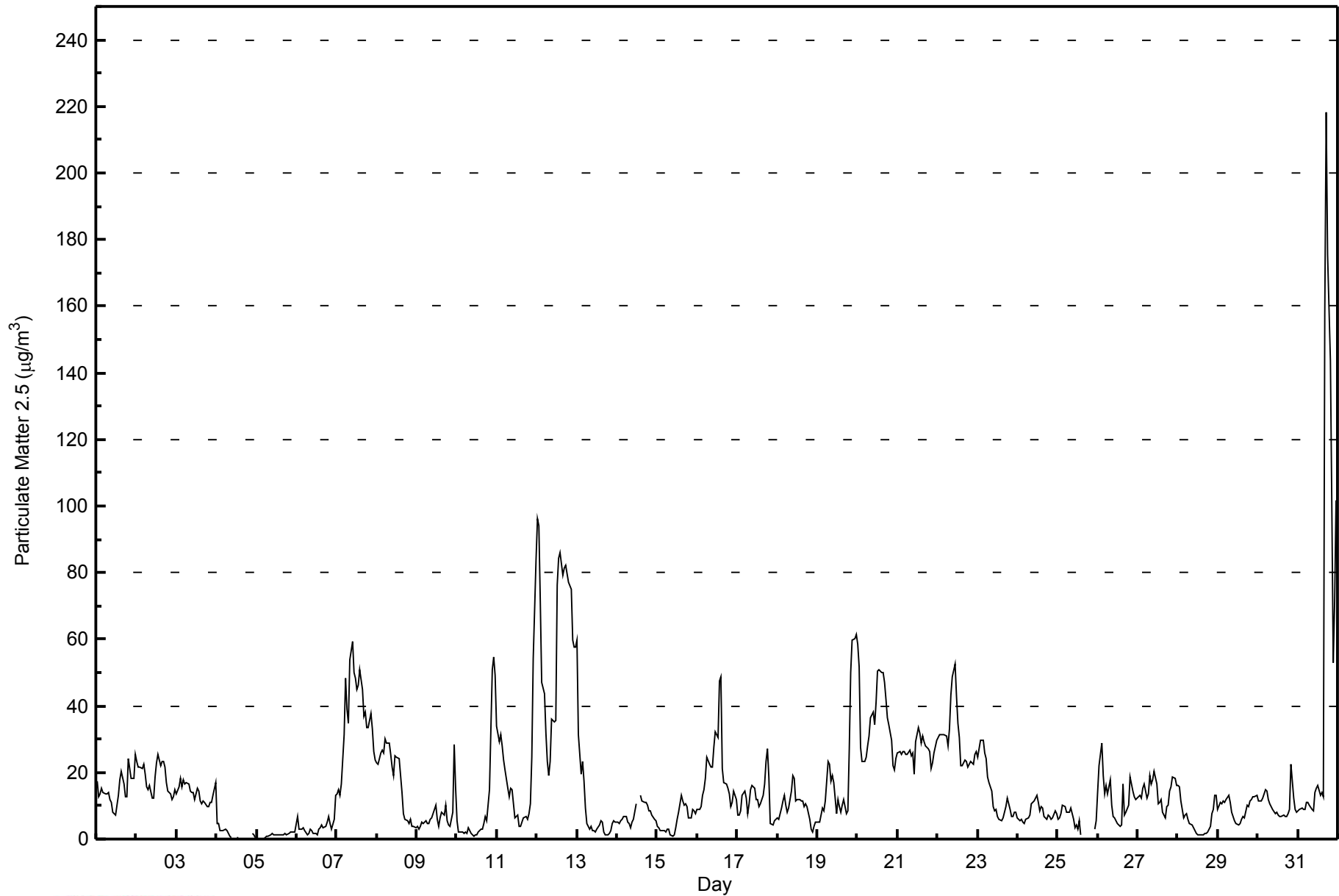
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	17.3	12.7	13.5	15.3	14.0	13.5	13.4	14.2	11.7	11.0	8.0	7.1	10.1	13.0	17.7	20.4	16.6	12.5	12.5	24.3	21.3	18.1	18.3	25.5	15.1	25.5																							
2-Jul	23.3	21.6	21.7	21.3	22.6	19.4	15.7	14.9	15.9	12.4	12.2	18.7	23.1	25.6	22.1	23.5	23.2	21.6	17.1	14.3	13.8	11.7	12.8	15.0	18.5	25.6																							
3-Jul	13.5	15.9	18.0	15.8	17.9	16.7	16.8	16.5	14.6	14.1	14.0	11.8	15.1	14.3	11.5	10.4	11.4	10.8	9.8	9.8	11.1	11.1	13.0	16.9	13.8	18.0																							
4-Jul	4.7	4.7	2.4	2.6	2.5	3.2	2.4	1.5	0.9	0.4	UO	UO	0.3	0.4	UO	UO	UO	UO	UO	UO	UO	1.6	1.1	0.2	--	4.7																							
5-Jul	UO	UO	UO	UO	0.2	0.4	0.7	1.0	1.3	1.8	1.4	1.2	1.1	1.3	1.3	1.2	1.2	1.5	1.2	1.5	2.1	2.3	2.0	2.1	1.3	2.3																							
6-Jul	6.9	2.8	2.9	3.1	3.4	2.5	1.4	1.5	3.0	2.3	1.6	1.7	1.4	2.9	3.5	4.2	3.5	4.0	4.9	6.6	4.5	3.1	6.1	13.3	3.8	13.3																							
7-Jul	13.6	14.9	13.1	16.6	31.3	48.5	39.1	34.8	53.8	59.5	50.0	48.5	45.0	46.2	50.7	45.1	36.9	38.1	33.3	33.3	37.8	32.9	26.2	23.9	36.4	59.5																							
8-Jul	23.0	22.6	25.9	26.5	25.9	30.2	29.0	28.8	25.4	21.5	19.0	25.1	24.5	24.3	19.0	14.0	7.8	6.1	5.4	4.5	5.8	3.7	3.7	3.2	17.7	30.2																							
9-Jul	3.7	3.1	3.8	5.0	4.9	5.6	4.8	4.5	5.8	6.3	8.8	10.1	5.9	3.9	6.3	8.0	7.2	10.2	5.6	4.1	3.9	7.9	28.5	15.2	7.2	28.5																							
10-Jul	5.4	2.3	2.0	2.1	1.9	2.0	1.6	3.2	1.6	1.2	0.8	1.2	1.5	2.1	2.8	3.0	4.5	6.6	5.4	14.7	32.9	50.9	54.5	49.3	10.6	54.5																							
11-Jul	33.8	29.1	31.4	28.2	23.7	20.7	15.1	12.6	15.4	14.9	10.6	6.5	7.1	4.0	4.0	4.9	6.4	6.7	5.9	7.7	10.6	24.6	54.1	84.0	19.3	84.0																							
12-Jul	96.3	94.0	71.5	47.2	43.5	31.7	23.1	19.2	23.2	36.2	35.1	35.4	76.4	84.4	86.2	79.2	81.4	82.0	79.7	77.2	74.9	59.9	57.7	57.7	60.5	96.3																							
13-Jul	59.9	31.6	19.3	23.3	17.3	9.5	4.5	3.0	3.7	2.3	2.6	2.3	3.1	4.4	5.5	5.2	2.0	1.2	1.2	1.5	2.5	4.7	5.7	5.1	9.2	59.9																							
14-Jul	4.9	4.7	5.3	5.8	6.8	6.7	5.0	4.6	3.2	5.2	6.0	10.6	M	M	12.9	11.2	10.9	11.0	10.0	8.6	8.6	7.2	5.9	5.7	7.3	12.9																							
15-Jul	3.8	3.3	2.6	2.7	2.4	2.1	2.8	3.0	1.5	1.1	1.3	3.3	6.1	8.1	13.2	11.4	10.0	10.7	9.7	6.6	6.3	9.0	8.4	7.5	5.7	13.2																							
16-Jul	8.8	8.9	9.6	13.2	15.0	18.0	24.6	22.3	21.7	21.7	27.4	32.1	30.5	47.5	48.6	21.2	16.8	16.4	15.4	13.6	9.6	11.1	14.6	11.8	20.0	48.6																							
17-Jul	7.1	7.0	8.7	13.1	14.3	12.2	7.7	10.6	14.9	15.9	15.4	12.1	11.9	9.8	10.8	13.2	16.4	23.1	27.0	18.6	4.6	4.3	5.4	6.1	12.1	27.0																							
18-Jul	6.3	6.0	9.2	11.4	13.2	10.2	7.9	9.1	14.3	19.2	18.3	11.6	11.8	11.9	11.2	11.4	9.8	10.6	9.9	6.1	3.1	2.2	3.8	5.2	9.7	19.2																							
19-Jul	5.3	4.9	7.1	9.3	8.6	11.4	23.5	22.6	17.3	18.9	17.0	7.7	11.7	9.7	8.0	10.3	12.0	7.8	8.3	27.2	50.1	59.8	60.2	61.5	20.0	61.5																							
20-Jul	58.5	51.8	27.5	23.2	23.5	24.6	28.2	31.0	36.3	38.3	34.2	41.2	50.4	51.0	49.9	49.8	47.0	42.1	36.4	34.4	29.5	22.2	20.9	24.2	36.5	58.5																							
21-Jul	26.0	26.1	25.4	26.4	26.4	25.6	25.4	26.7	24.9	25.7	19.5	29.1	33.3	31.9	28.9	30.9	29.3	28.0	27.0	26.3	21.3	22.8	25.8	29.5	26.8	33.3																							
22-Jul	30.5	31.2	31.2	31.4	31.4	30.8	27.9	33.2	43.3	48.9	52.5	42.6	34.8	30.4	21.9	22.0	23.5	23.1	21.8	22.3	23.4	22.4	25.6	26.4	30.5	52.5																							
23-Jul	24.4	27.0	29.8	29.8	25.8	23.9	18.6	16.9	14.4	9.6	8.6	9.0	6.7	6.0	5.5	6.3	8.0	9.9	12.1	9.0	6.7	7.0	8.2	7.9	13.8	29.8																							
24-Jul	6.5	5.6	6.0	4.9	4.6	5.8	6.3	7.2	10.4	10.9	11.6	13.1	11.2	8.4	9.7	9.3	6.9	6.0	7.1	6.6	6.1	6.3	8.6	7.8	7.8	13.1																							
25-Jul	6.1	6.2	7.6	10.1	9.8	8.1	7.9	8.3	9.2	6.1	3.5	4.3	3.0	5.5	1.4	M	M	M	M	M	M	M	M	3.0	5.5	--	10.1																						
26-Jul	13.8	22.2	29.0	19.0	13.4	15.9	13.5	17.8	10.2	7.0	6.5	5.5	4.5	3.7	4.2	16.4	7.1	8.2	10.3	18.7	16.5	14.5	12.7	11.9	12.6	29.0																							
27-Jul	12.8	13.2	12.1	15.4	16.7	12.3	13.5	19.2	16.6	17.7	20.5	16.6	10.7	11.1	11.8	8.1	6.2	9.6	10.2	14.3	15.5	18.5	18.1	15.9	14.0	20.5																							
28-Jul	15.9	15.8	11.6	6.4	7.2	7.6	6.0	4.7	4.2	3.3	2.7	1.8	1.4	1.2	1.2	1.4	1.7	1.8	2.3	3.6	7.5	8.7	13.3	13.1	6.0	15.9																							
29-Jul	9.0	11.0	10.7	11.3	11.2	11.8	13.2	11.2	7.9	6.9	5.5	4.5	4.3	4.6	6.0	6.7	6.3	10.1	9.7	11.5	12.0	12.9	12.9	12.9	9.3	13.2																							
30-Jul	11.6	11.4	11.5	12.2	15.0	14.3	11.8	10.8	9.6	8.9	7.8	8.1	7.2	6.7	6.9	7.1	6.6	6.9	7.7	9.1	22.3	12.3	9.0	8.2	10.1	22.3																							
31-Jul	8.5	9.0	9.5	9.1	8.8	11.1	11.0	10.3	8.8	8.5	14.0	15.1	16.2	13.0	14.0	12.8	157.7	218.1	175.4	143.8	99.9	52.8	71.3	101.5	50.0	218.1																							
																								18.7	17.3	16.0	15.4	14.9	14.7	13.6	13.7	14.3	14.8	14.5	14.6	15.7	16.2	16.6	16.2	19.9	22.2	20.1	20.0	19.5	17.6	19.7	21.7	Diurnal Average	
																								96.3	94.0	71.5	47.2	43.5	48.5	39.1	34.8	53.8	59.5	52.5	48.5	76.4	84.4	86.2	79.2	157.7	218.1	175.4	143.8	99.9	59.9	71.3	101.5	Diurnal Maximum	

M - Maintenance UO - Unstable Operation
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	155	21.47	21.47
6 - 15	306	42.38	63.85
16 - 25	115	15.93	79.78
26 - 80	124	17.17	96.95
> 81.0	13	1.80	98.75

Total Number of Valid Hours: 722

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

Patricia McInnes - July 2014

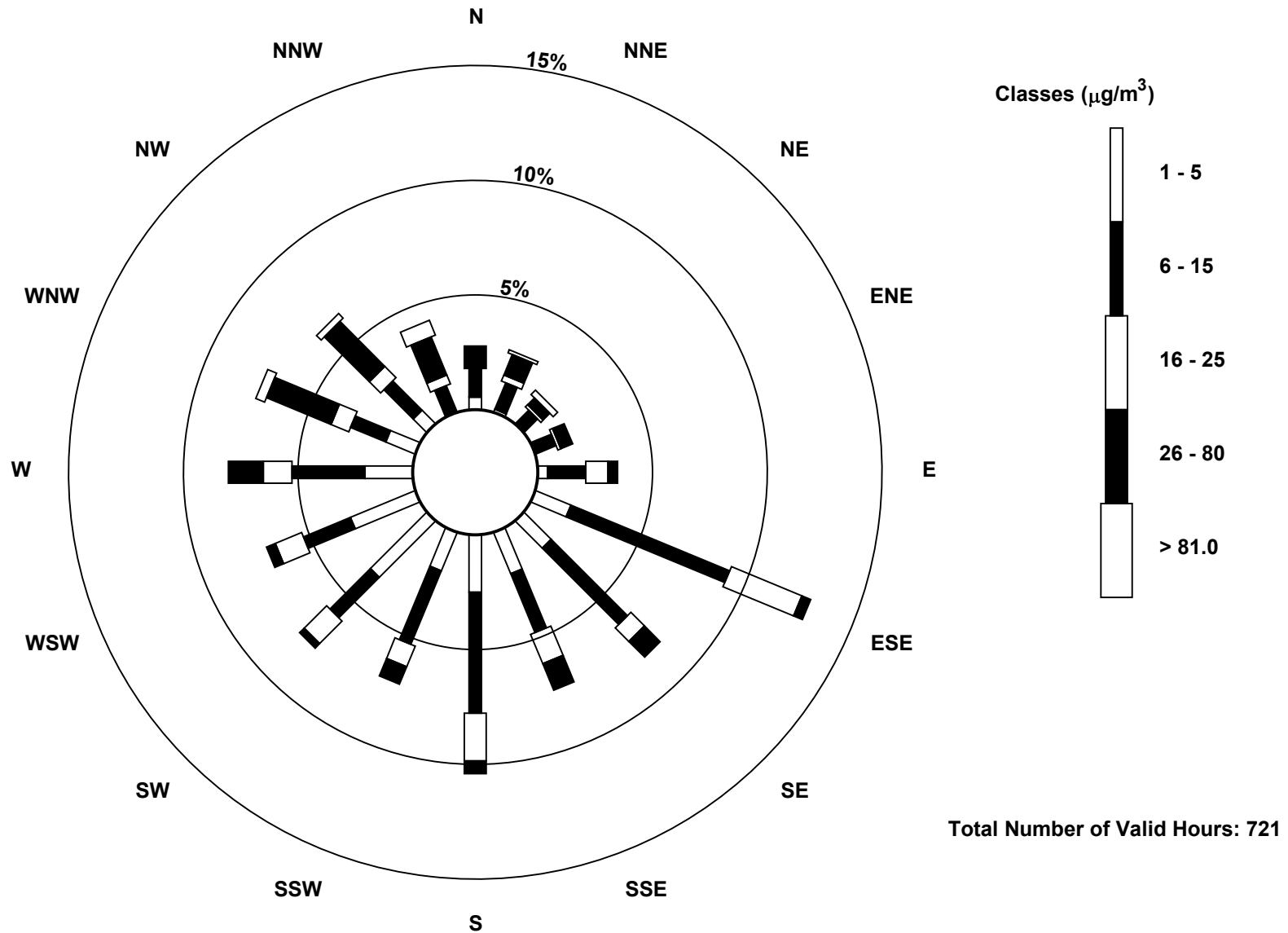
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	4	1	0	0	3	12	12	14	18	13	25	22	15	10	6	0	155
6 - 15	9	9	6	7	12	54	34	20	38	25	18	16	23	12	13	9	305
16 - 25	0	2	1	1	7	24	6	10	15	7	10	9	9	6	5	3	115
26 - 80	7	7	3	4	3	3	7	9	4	6	2	3	11	22	20	13	124
> 81.0	0	1	2	0	0	0	0	0	0	0	0	0	0	3	2	5	13
Totals	20	20	12	12	25	93	59	53	75	51	55	50	58	53	46	30	712

Total Number of Valid Hours: 721

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

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



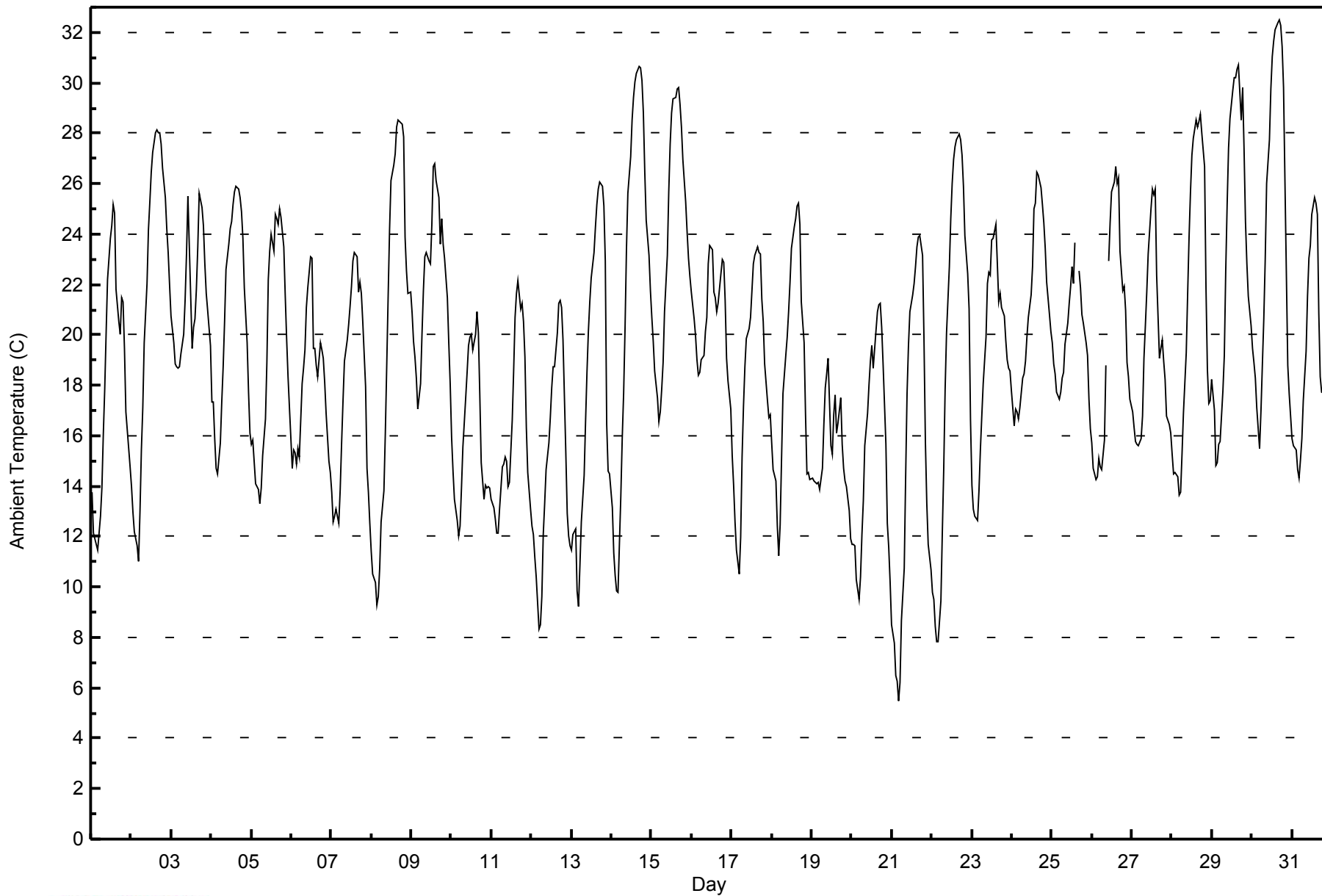


Maximum Value: 32.5 C on Jul 30 17:00		Maximum Daily Average: 24.4 C on Jul 30		Hours in Service: 744																						
Minimum Value: 5.5 C on Jul 21 05:00		Minimum Daily Average: 14.8 C on Jul 12		Hours of Data: 742																						
Maximum Diurnal Average: 24.6 C at hour 15		Minimum Diurnal Average: 13.1 C at hour 5		Hours of Missing Data: 2																						
Monthly Average: 19.38 C		Percentiles: P ₁ = 8.3 P ₁₀ = 12.6 Q ₁ = 15.3 Median = 19.3 Q ₃ = 23.1 P ₉₀ = 26.2 P ₉₉ = 30.7		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-Jul	13.8	12.2	11.9	11.7	11.5	12.8	13.9	16.0	17.8	20.1	22.2	23.8	24.4	25.2	24.8	21.8	20.5	20.0	21.5	21.3	19.5	16.9	15.5	14.8	18.1	25.2
2-Jul	14.0	13.0	12.2	11.6	11.0	13.0	15.4	17.1	19.7	22.0	24.2	25.3	26.5	27.3	28.0	28.1	28.0	28.0	27.6	26.6	25.5	24.2	23.3	22.0	21.4	28.1
3-Jul	20.8	19.7	18.9	18.7	18.7	18.7	19.3	20.0	21.4	23.2	25.5	23.5	19.5	20.3	20.7	21.8	23.5	25.6	25.1	24.3	22.8	21.6	21.0	19.6	21.4	25.6
4-Jul	17.3	17.3	15.9	14.7	14.5	15.7	17.3	18.7	20.5	22.6	23.6	24.2	24.5	25.1	25.6	25.9	25.8	25.5	24.9	23.8	21.9	19.7	17.7	16.1	20.8	25.9
5-Jul	15.7	15.8	14.1	14.0	13.9	13.3	13.9	15.2	16.6	18.9	22.2	23.3	24.0	23.3	24.8	24.6	24.4	25.0	24.7	23.5	21.6	19.8	18.4	17.1	19.5	25.0
6-Jul	14.7	15.5	15.3	14.9	15.5	15.1	18.0	18.7	19.4	21.1	21.9	23.1	23.0	19.5	19.5	18.8	18.4	19.7	19.4	19.1	18.1	16.9	15.0	14.5	18.1	23.1
7-Jul	13.8	12.6	12.8	13.1	12.5	13.9	15.7	17.4	19.0	19.8	20.4	21.2	21.9	22.9	23.3	23.1	21.7	22.1	21.6	20.5	18.0	14.7	13.8	12.5	17.8	23.3
8-Jul	11.4	10.5	10.2	9.3	9.6	10.7	12.6	13.8	16.1	18.8	21.5	24.2	26.1	26.7	27.2	28.3	28.5	28.4	28.4	27.8	23.9	22.5	21.6	21.7	20.0	28.5
9-Jul	20.9	19.7	19.1	18.3	17.0	18.1	20.0	21.8	23.1	23.3	22.9	22.8	24.4	26.7	26.8	26.1	25.5	23.6	24.6	23.6	23.1	21.5	19.7	18.1	22.1	26.8
10-Jul	16.0	14.6	13.5	12.6	12.0	12.4	13.9	15.6	17.5	18.5	19.6	19.9	20.0	19.4	20.0	20.9	20.1	17.6	14.9	13.5	14.0	13.9	14.0	13.9	16.2	20.9
11-Jul	13.5	13.1	12.7	12.1	12.1	13.1	14.7	14.9	15.1	15.0	14.0	14.2	16.6	18.6	20.7	21.6	22.1	21.0	21.3	20.5	19.1	16.3	14.5	13.1	16.3	22.1
12-Jul	12.4	12.1	11.2	10.4	8.3	8.5	9.6	12.1	13.3	14.6	15.7	16.7	17.9	18.7	18.7	20.1	21.2	21.4	21.1	19.8	15.3	12.9	12.0	11.7	14.8	21.4
13-Jul	11.5	12.1	12.3	9.9	9.2	10.8	12.6	14.5	16.6	18.5	20.1	21.3	22.3	23.3	24.3	25.2	25.8	26.0	25.9	25.1	23.0	16.4	14.6	14.5	18.1	26.0
14-Jul	13.1	11.4	10.5	9.8	9.8	13.6	15.9	17.7	20.2	23.4	25.6	27.1	28.5	29.4	30.0	30.4	30.6	30.6	30.1	28.8	26.4	24.5	23.1	21.8	22.2	30.6
15-Jul	20.7	19.8	18.6	17.5	16.5	16.9	17.9	18.9	20.9	23.2	25.7	27.6	28.8	29.4	29.4	29.7	29.8	29.1	28.3	27.0	25.3	24.1	23.0	22.3	23.8	29.8
16-Jul	21.7	20.7	20.0	19.0	18.4	18.5	19.0	19.2	20.1	20.7	22.8	23.6	23.4	21.7	21.5	20.9	21.3	22.4	23.0	22.9	21.4	19.1	18.2	17.0	20.7	23.6
17-Jul	15.2	14.0	12.6	11.5	10.5	12.0	15.2	17.2	18.7	19.8	20.3	20.7	21.8	22.8	23.2	23.5	23.3	23.2	21.4	20.5	18.8	17.4	16.7	16.8	18.2	23.5
18-Jul	15.7	14.7	14.2	12.4	11.2	12.5	15.1	17.7	19.2	19.9	20.9	22.1	23.4	24.3	24.6	25.1	25.2	24.4	21.3	19.7	16.9	14.5	14.5	14.3	18.5	25.2
19-Jul	14.3	14.2	14.1	14.1	14.2	13.9	14.7	16.4	17.9	18.4	19.1	15.6	15.3	16.8	17.6	16.1	16.5	17.5	15.6	14.7	14.2	14.0	13.0	11.9	15.4	19.1
20-Jul	11.7	11.7	11.6	10.3	9.5	10.4	12.1	13.4	15.6	16.9	18.0	19.0	19.6	18.7	20.2	20.9	21.2	21.3	20.3	18.8	15.7	12.5	11.6	10.2	15.5	21.3
21-Jul	8.5	7.8	6.5	6.3	5.5	6.2	8.7	10.7	14.4	17.7	19.6	20.9	21.6	22.1	22.7	23.5	23.9	24.0	23.2	19.8	15.8	13.3	11.7	10.7	15.2	24.0
22-Jul	9.8	9.5	8.5	7.8	7.8	9.4	12.1	14.7	17.8	20.1	22.7	24.6	26.0	26.9	27.5	27.8	28.0	27.7	27.1	25.9	23.9	22.4	21.0	16.6	19.4	28.0
23-Jul	14.0	13.1	12.8	12.7	13.8	15.5	16.8	18.1	19.9	22.0	22.5	22.4	23.8	23.8	24.4	22.9	21.3	21.7	21.1	20.8	19.8	19.0	18.7	18.6	19.1	24.4
24-Jul	17.8	16.4	17.1	16.9	16.7	17.1	18.3	18.5	18.9	19.9	20.7	21.6	22.7	25.0	25.2	26.4	26.3	25.8	25.2	24.5	23.4	22.1	20.8	20.1	21.1	26.4
25-Jul	19.7	18.9	18.4	17.7	17.5	17.7	18.3	18.5	19.6	20.5	21.2	21.9	22.7	22.0	23.7	M	22.6	21.9	20.8	20.5	19.7	19.2	17.5	16.3	19.9	23.7
26-Jul	15.7	14.7	14.3	14.4	15.1	14.8	14.7	15.8	18.8	MS	22.9	24.5	25.7	26.1	26.7	26.0	26.2	23.3	21.8	21.9	21.0	18.9	18.4	17.5	20.0	26.7
27-Jul	16.9	16.3	15.8	15.7	15.6	15.9	16.8	19.1	20.4	21.7	23.2	25.0	25.8	25.6	25.8	22.3	19.1	19.4	19.8	19.0	18.3	16.8	16.4	16.1	19.4	25.8
28-Jul	15.3	14.5	14.6	14.3	13.7	13.8	15.3	16.9	19.3	21.7	23.9	25.7	27.1	27.8	28.5	28.2	28.5	28.8	28.0	26.7	21.9	18.6	17.3	17.4	21.2	28.8
29-Jul	18.2	17.0	14.8	15.0	15.7	15.8	17.8	19.2	22.5	25.2	27.4	28.6	29.7	30.2	30.2	30.5	30.7	28.5	29.8	27.4	24.5	22.8	21.5	20.3	23.5	30.7
30-Jul	19.5	18.9	18.3	17.1	15.5	17.0	18.8	20.7	23.0	26.0	27.7	29.8	31.0	31.7	32.1	32.4	32.5	32.3	31.4	29.8	26.0	18.8	17.7	16.8	24.4	32.5
31-Jul	15.9	15.6	15.4	14.7	14.3	15.1	15.9	17.4	19.3	21.5	23.0	23.6	24.8	25.4	25.2	24.8	20.9	18.3	17.7	17.7	16.8	15.8	15.2	14.8	18.7	25.4
																								Diurnal Average		
																								Diurnal Maximum		
M - Maintenance MS - Missing																										



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	23	3.10	3.10
10 - 20	385	51.89	54.99
> 20	334	45.01	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

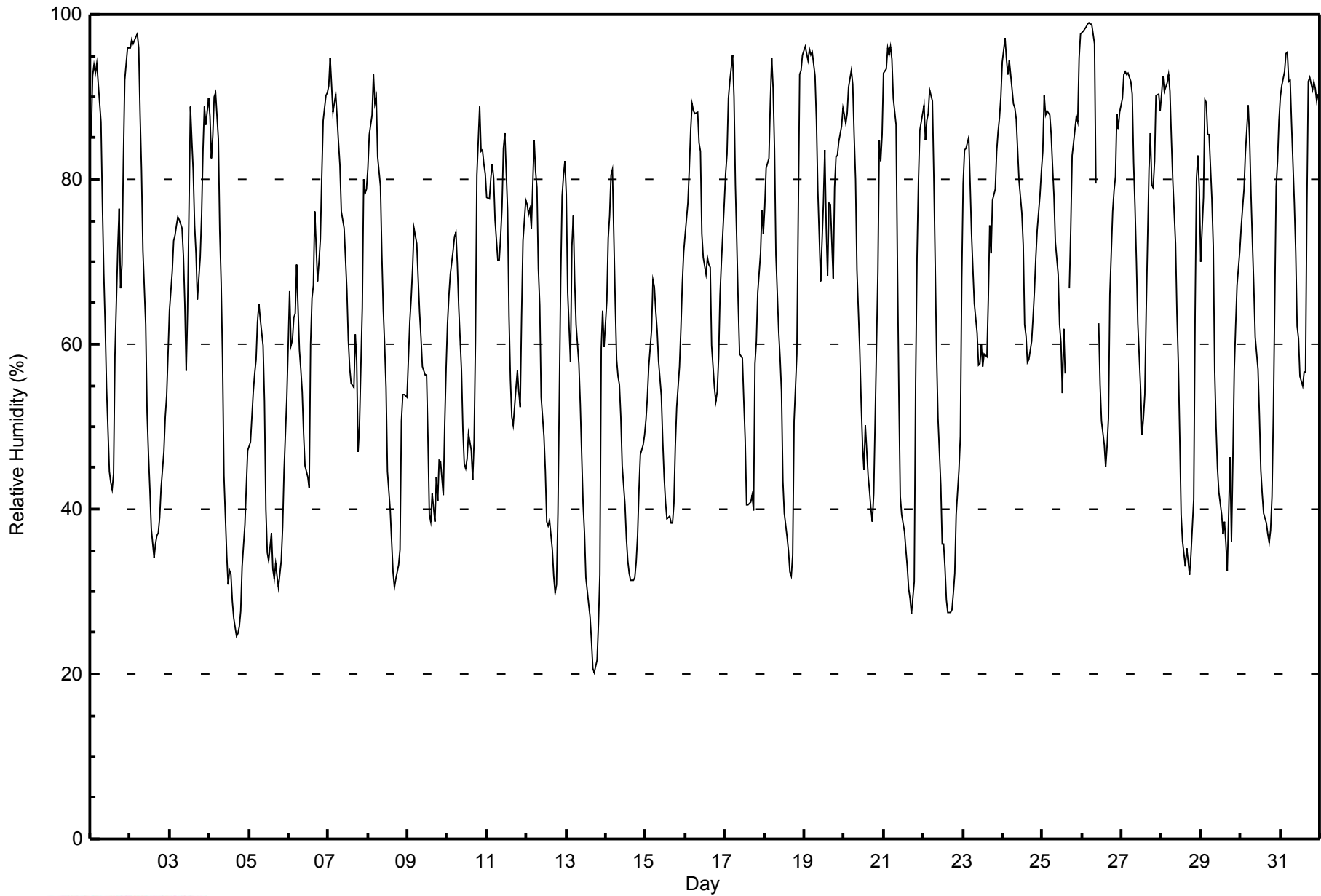
Patricia McInnes - July 2014

Maximum Value: 99 % on Jul 26 05:00																		Maximum Daily Average: 83.4 % on Jul 19																		Hours in Service: 744							
Minimum Value: 20 % on Jul 13 18:00																		Minimum Daily Average: 45.5 % on Jul 5																		Hours of Data: 742							
Maximum Diurnal Average: 86.0 % at hour 5																		Minimum Diurnal Average: 45.6 % at hour 16																		Hours of Missing Data: 2							
Monthly Average: 65.3 %																		Percentiles: P ₁ = 26 P ₁₀ = 36 Q ₁ = 49 Median = 67 Q ₃ = 83 P ₉₀ = 91 P ₉₉ = 98																		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-Jul	85	93	94	93	94	89	87	77	69	62	55	45	43	42	44	59	72	76	67	70	82	92	96	96	74.2	96																	
2-Jul	96	97	96	97	98	96	88	81	71	62	52	47	42	38	34	36	37	37	39	43	47	51	54	59	62.4	98																	
3-Jul	64	69	72	73	74	75	75	74	71	65	57	64	89	85	81	74	71	65	71	76	84	89	87	90	74.8	90																	
4-Jul	88	83	85	90	91	85	74	67	58	44	34	31	33	32	29	27	25	25	26	28	33	38	43	47	50.6	91																	
5-Jul	48	48	54	56	58	63	65	63	60	53	40	35	34	37	33	32	33	32	31	34	38	45	49	54	45.5	65																	
6-Jul	66	60	61	63	64	70	59	57	54	49	45	44	43	60	66	67	76	68	70	73	80	87	90	90	65.1	90																	
7-Jul	91	95	91	88	90	87	84	82	76	74	70	66	60	57	55	55	61	58	47	50	64	80	78	79	72.6	95																	
8-Jul	81	85	88	93	89	90	83	79	71	64	60	55	45	40	36	32	30	31	33	35	51	54	54	54	59.7	93																	
9-Jul	58	63	66	69	74	72	68	64	61	57	56	56	49	39	38	42	39	44	41	46	46	42	50	57	54.0	74																	
10-Jul	63	66	69	71	73	74	70	65	57	50	45	45	46	49	47	44	48	60	81	89	83	83	82	81	64.1	89																	
11-Jul	78	78	80	82	80	75	70	70	73	77	84	86	76	63	56	51	50	55	57	54	52	63	73	78	69.2	86																	
12-Jul	77	76	76	74	85	81	79	69	65	54	49	45	38	38	39	35	32	30	31	39	68	78	80	82	59.2	85																	
13-Jul	78	66	58	72	76	68	62	58	53	47	41	37	32	29	27	24	21	20	22	26	32	60	64	60	47.1	78																	
14-Jul	65	73	76	81	81	65	58	56	55	51	45	40	36	34	32	31	31	32	34	37	42	47	48	49	50.0	81																	
15-Jul	51	54	57	62	68	67	64	62	58	54	48	44	41	39	39	38	38	41	48	52	57	62	67	71	53.4	71																	
16-Jul	73	77	81	86	89	88	88	88	84	83	73	71	69	71	70	69	60	55	53	54	58	66	70	77	73.1	89																	
17-Jul	81	83	90	92	95	90	79	72	65	59	58	53	48	41	41	41	42	40	58	60	66	71	76	73	65.6	95																	
18-Jul	77	81	83	89	95	91	84	71	62	58	54	43	39	37	35	32	32	34	51	59	76	93	93	95	65.2	95																	
19-Jul	96	95	94	96	95	95	93	87	79	73	68	77	84	74	68	77	77	68	79	83	83	85	87	89	83.4	96																	
20-Jul	88	87	88	91	93	92	85	80	69	59	53	48	45	50	44	42	40	38	42	51	69	85	82	86	66.9	93																	
21-Jul	93	93	96	95	96	95	90	87	69	54	42	39	37	35	33	30	29	27	31	55	70	80	86	88	64.6	96																	
22-Jul	89	85	87	88	91	89	81	70	59	51	43	36	36	33	29	27	27	28	30	32	39	45	49	68	54.6	91																	
23-Jul	80	83	84	85	80	73	69	65	61	57	58	60	57	59	58	65	74	71	78	79	83	86	88	90	72.6	90																	
24-Jul	94	97	95	93	94	93	89	89	87	84	80	76	72	62	61	58	58	60	63	66	70	74	78	81	78.1	97																	
25-Jul	83	90	88	88	88	85	82	78	72	68	62	60	54	62	56	M	67	74	83	84	88	87	95	98	78.0	98																	
26-Jul	98	98	98	99	99	99	99	96	79	MS	63	55	51	48	45	48	51	66	76	79	80	88	86	88	77.8	99																	
27-Jul	90	93	93	93	93	92	90	82	77	70	63	55	49	51	54	64	81	86	79	79	82	90	90	88	78.5	93																	
28-Jul	90	93	91	92	93	91	85	80	72	64	58	49	39	36	33	35	34	32	34	41	64	80	83	79	64.5	93																	
29-Jul	70	78	90	89	85	85	78	72	57	50	45	42	39	37	38	36	32	46	36	46	57	62	67	71	58.7	90																	
30-Jul	74	77	79	83	89	85	78	72	67	61	57	51	45	42	39	38	37	36	37	42	51	79	82	87	62.1	89																	
31-Jul	90	91	93	95	96	92	92	87	77	71	62	61	56	55	57	57	77	92	92	91	92	91	90	90	81.1	96																	
																		79.2	80.8	82.3	84.5	86.0	83.6	78.9	74.2	67.4	60.9	55.5	52.1	49.3	47.5	45.7	45.6	47.8	49.3	52.2	56.5	64.2	72.0	74.7	77.2	Diurnal Average	
																		98	98	98	99	99	99	99	96	87	84	84	86	89	85	81	77	81	92	92	91	92	93	96	98	Diurnal Maximum	
M - Maintenance MS - Missing																																											



WBEA NETWORK
Hourly Averages

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





Maximum Speed: 28 km/h on Jul 10 18:00	Maximum Daily Speed Average: 14.9 km/h on Jul 10	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 2 05:00	Minimum Daily Speed Average: 0.6 km/h on Jul 21	Hours of Data: 740
Maximum Diurnal Speed Average: 3.7 km/h at hour 1	Minimum Diurnal Speed Average: 1.1 km/h at hour 17	Hours of Missing Data: 4
Monthly Average Velocity: 2.2 km/h 212.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 15 P ₉₉ = 24	Percent Operational Time: 99.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	W3	W4	WNW3	SW2	NW3	S3	SW4	S2	SSE4	SE4	SE7	E7	ESE6	ESE3	S2	SW12	W5	W5	S5	SSE2	ESE2	NW1	WNW1	ESE2	S1.7	SW12
2-Jul	E1	SSW1	S2	SW1	SW0	SE3	ESE7	ESE7	ESE7	ESE9	ESE12	ESE11	ESE10	E11	ESE9	ESE12	ESE11	E12	E12	ESE14	ESE12	ESE13	ESE15	SE13	ESE8.2	ESE15
3-Jul	SE10	SE8	SE8	ESE11	ESE11	ESE12	ESE15	ESE15	ESE18	ESE17	ESE17	SSE15	SE7	NE8	E7	ESE11	ESE12	E6	NW9	NW3	N3	NW5	NNW7	WSW6	ESE7.1	ESE18
4-Jul	WSW12	WSW17	WSW11	SW7	SSW7	SSW7	S7	SW8	SW12	WSW18	WSW24	WSW24	WSW23	WSW21	WSW23	SW25	WSW24	WSW22	WSW20	WSW15	WSW10	SW9	SW8	SW11	WSW14.7	SW25
5-Jul	WSW11	W11	SW13	SW13	SW9	SSW5	SSW7	SW11	SW13	SW13	SW18	SW17	SW18	WSW14	WSW15	W15	W11	SW16	WSW19	WSW13	WSW11	WSW12	W9	WNW8	WSW12.0	WSW19
6-Jul	SW4	SW10	SSW7	SW9	SW12	NW4	N4	W2	N4	W10	NNW11	W13	W17	NNW15	N10	SSW1	N9	NW4	NW6	NW3	WSW6	WNW6	WNW9	WNW9	W5.6	W17
7-Jul	W7	W5	W9	W6	WSW4	WNW5	W6	WNW8	NW9	NW14	NNW14	NW12	NW16	NNW13	NNW16	N12	NNE14	NNE14	NNE11	N6	NNW4	NW5	NW6	WNW4	NW7.7	NW16
8-Jul	WSW1	WSW1	SSW2	SW2	S4	SSE3	SE5	S5	SSE7	SSE8	SSE9	SSE9	S12	S13	S11	S14	SSW14	S15	S12	S8	S5	SSW5	SSW7	SSW11	S7.1	S15
9-Jul	SW11	SW10	W8	WSW7	SW8	SSW9	SSW9	S12	S15	SSW17	SSW12	S11	S10	S16	S16	SW10	W14	W7	S7	SW10	WSW11	W12	W12	W11	SW9.2	SSW17
10-Jul	SW8	WSW14	WSW11	WSW16	WSW17	W15	WSW13	WSW13	W9	W10	WSW13	W10	NNW11	NW18	NNW19	NNW23	NNW25	NW28	NW26	NNW19	NNW21	W18	NNW16	W17	W14.9	NW28
11-Jul	W17	W18	W16	W16	W16	W14	NNW14	NNW10	WSW6	W5	W12	WSW10	WSW12	W14	W15	W18	NW14	W14	W12	NNW11	N14	NNW9	NW8	NW7	NNW11.2	W18
12-Jul	WNW9	NW10	NW9	NW6	WNW6	NW7	NW6	NNW7	NW7	NW8	WNW8	NW10	NNW10	WNW8	NNW11	NNW6	NE7	NE8	NNE6	N5	NW4	WNW4	WNW4	NNW3	NW6.0	WNW11
13-Jul	ENE2	SE4	ESE4	E3	E3	SE4	ESE10	ESE12	ESE12	ESE10	E9	ESE9	SE9	SE8	SE7	ESE7	ESE8	ESE9	ESE9	SE7	SSW1	SE3	SE4	ESE6.5	ESE12	
14-Jul	SSE3	SE2	S2	S2	SSE3	SE7	SE9	SSE9	SSE10	S12	SSE12	S13	S14	SSE16	S15	S14	S13	S13	S12	S10	SSW7	SSW8	SSW11	SW12	S9.1	SSE16
15-Jul	SW12	SSW12	SSW7	S6	SSE7	SSE8	SSE8	S11	S12	S12	S12	S11	SSW13	SSW14	SSW12	SSW11	SSW12	SSW10	S11	S9	S7	S9	S7	S8	S9.5	SSW14
16-Jul	SSW9	WSW12	WSW12	WSW11	WSW9	SW6	SW3	WSW5	WSW2	WNW2	NNW10	NNW11	NNW12	NNW12	NW8	W9	W13	W11	W9	WSW7	SW8	SW11	W12	NNW12	W6.8	W13
17-Jul	NNW10	NW7	WNW5	SW4	WSW2	SW3	N5	NNE8	ENE5	ENE3	SSE4	S3	SSE3	NNW3	NW5	NNW2	NNE8	NE7	W3	SW8	SW10	SW11	WSW15	WSW17	W2.4	WSW17
18-Jul	W9	SW4	WSW5	WSW2	WSW3	SW3	NNW6	NNE6	NNE4	SE5	SSE5	S2	ENE7	ENE6	S3	ESE5	SE6	SE7	SW13	SE6	WSW10	WNW5	SW1	SSW4	S1.5	SW13
19-Jul	SSE6	SSE5	SSE5	SE4	SSE6	S6	SSW7	SSW9	SW14	SW15	SW15	W10	W15	W20	W20	NNW21	W15	NNW17	NW14	NNW19	NW15	NW7	NNW10	WNW10	W8.2	WNW21
20-Jul	WNW11	WNW11	WNW9	WSW6	SW8	WSW7	WNW8	WNW4	WNW7	NW6	NW9	N10	N8	NNW11	NNW8	NE8	NE9	NE7	NNE10	N7	N4	NW6	NW5	WSW3	NW5.0	WNW11
21-Jul	WNW4	WSW3	WNW4	WNW3	WNW2	SSW1	S3	S4	E3	ENE3	ESE5	ENE4	E3	NW4	W3	E5	ENE6	NNE4	WNW4	WNW5	WNW4	W3	W3	SW1	NNW0.6	ENE6
22-Jul	WSW3	SSW2	SSW2	SSW2	SSW2	SSE2	SSE4	SSE5	SE7	SE6	SE6	SE8	SSE8	ESE7	SE8	SE9	ESE11	ESE12	ESE11	ESE8	ESE7	SE10	S7	SSE2	SE5.6	ESE12
23-Jul	S3	S2	SSE3	SE2	ESE5	E4	ESE10	ESE11	ESE14	ESE15	ESE14	ESE8	ESE17	ESE14	ESE17	E15	ENE12	ENE11	NE1	SSE7	ESE8	ESE7	ESE7	SSE3	ESE8.2	ESE17
24-Jul	SE2	NE1	ESE7	ESE7	ESE7	SE12	ESE11	ESE11	ESE12	ESE14	ESE16	ESE17	E13	ESE16	ESE16	ESE15	E17	ESE18	ESE16	ESE12	E12	E11	E10	E9	ESE11.6	ESE18
25-Jul	E10	E12	NE7	NNW9	N9	N11	NNE11	NNE11	NE13	ENE9	E7	NNE4	E9	SE10	SE6	M	M	SSE8	AF	WNW6	NW6	NNW5	WNW2	NW4	NE4.3	NE13
26-Jul	WSW2	WNW3	S2	ESE2	ESE3	SSE3	SW3	S3	SSE4	MS	SE5	ESE7	ESE6	SE8	SE10	S7	W13	W11	NNW5	SSW3	SW4	SW6	WSW8	SW5	SSW2.5	W13
27-Jul	SSW7	S5	SSW6	S5	S5	SSE5	SSW6	SSW7	S8	SSW9	SSW8	S6	S10	SE12	ESE16	SSW3	NNE5	WSW2	SSW10	S7	SSE7	S4	SSE6	S6	S5.7	ESE16
28-Jul	S5	SSE6	SSE6	SE6	SE6	SE6	S8	S7	SE7	SSE8	SSE7	S9	S8	S10	S10	WSW5	SW9	SW6	SSW9	SW7	SSW4	W2	SW3	SSW4	S5.7	S10
29-Jul	SSW7	SE5	SSW2	SSE3	SW3	NW1	SE5	SSE7	SSE10	SSE9	SSE9	S7	SSE5	SSE5	SE13	SE10	ESE6	NNW4	NE8	E12	ESE7	ESE7	ESE9	SE4	SE5.1	SE13
30-Jul	ESE8	SE9	SE7	SSE5	S3	SE6	SE7	SE7	SE9	SE7	SE10	ESE9	SSE8	SE7	SE10	ESE12	SE12	ESE13	ESE10	SE8	NNW14	N21	ENE7	SSW6	ESE6.2	N21
31-Jul	SW6	SSW4	SSE3	NW5	NW5	N1	S6	S5	S5	W3	NNE8	N13	NNE15	NNE17	NNE16	N20	NNW24	NNW19	NNW22	NNE8	NNW13	NNW12	N16	NNW15	N8.0	NNW24

SW3.7	SW3.7	SW3.3	SW2.9	SW2.9	SSW2.2	S2.5	S3.0	SSE3.6	S3.6	S3.5	S2.8	S2.5	SSW2.2	SSW2.8	SW2.2	NNW1.1	WSW1.1	WSW2.0	SW1.3	W2.1	W2.2	WSW2.8	WSW3.4	Diurnal Average
W17	W18	W16	WSW16	WSW17	W15	ESE15	ESE15	ESE18	WSW18	WSW24	WSW24	WSW23	WSW21	WSW23	SW25	NNW25	NW28	NW26	NNW19	NNW21	N21	NNW16	WSW17	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

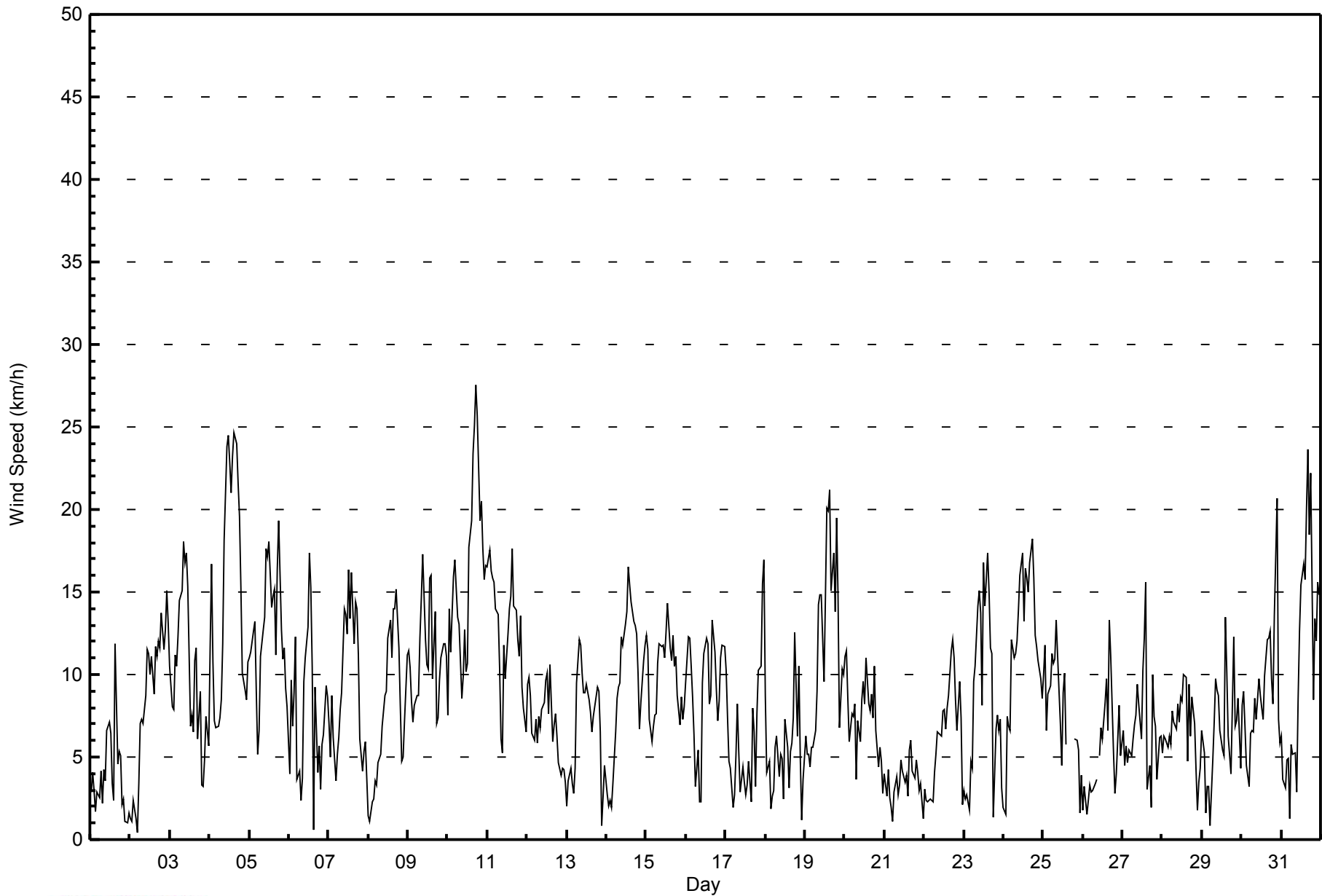
Wind Speed (WS) - km/h
Patricia McInnes - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 17 km/h on Jul 30 21:00														Hours in Service: 744 Hours of Data: 740 Hours of Missing Data: 4 Hours of Calibration: 0 Percent Operational Time: 99.5											
Minimum Value: 1 km/h on Jul 1 05:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 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-Jul	1	1	1	1	1	1	1	1	1	1	2	2	2	3	2	6	2	3	2	1	1	1	1	1	6
2-Jul	1	1	1	1	1	1	2	2	2	2	3	3	3	4	4	3	3	3	3	3	3	3	3	3	4
3-Jul	3	2	2	2	3	3	4	4	4	4	4	11	3	3	4	4	3	3	2	2	1	3	2	12	
4-Jul	6	5	3	1	2	2	2	2	3	5	5	6	5	5	6	7	6	5	5	4	2	1	1	7	
5-Jul	1	2	3	2	2	2	2	2	2	3	4	5	5	4	4	4	3	5	5	3	2	2	3	5	
6-Jul	2	2	2	2	3	3	2	2	3	4	3	4	4	10	6	4	4	2	2	2	2	3	5	10	
7-Jul	2	2	1	2	2	2	2	2	2	4	3	4	4	3	4	3	3	3	3	2	1	1	1	4	
8-Jul	1	1	2	1	1	1	1	1	2	2	2	3	3	4	2	4	4	4	3	2	1	1	2	4	
9-Jul	2	2	3	1	2	2	3	3	4	4	3	3	4	4	5	4	4	2	2	2	2	3	2	5	
10-Jul	2	2	2	3	3	3	3	3	3	3	4	4	3	6	5	5	7	7	6	4	4	3	3	7	
11-Jul	3	3	3	3	3	3	3	4	2	2	2	2	3	3	4	4	4	4	2	5	3	1	1	5	
12-Jul	1	2	2	2	1	1	1	1	2	2	3	4	3	3	3	2	3	2	2	2	1	1	1	4	
13-Jul	1	1	2	1	1	2	2	3	2	3	3	4	3	3	4	3	3	3	2	2	3	1	1	4	
14-Jul	1	1	1	1	1	1	2	2	2	3	3	4	4	4	4	3	3	3	3	3	1	2	2	4	
15-Jul	2	3	2	1	1	1	2	2	2	3	3	3	4	4	4	3	3	3	3	2	1	2	2	4	
16-Jul	2	2	2	2	2	2	1	2	3	1	3	3	4	3	2	3	3	2	2	2	1	1	2	4	
17-Jul	1	2	2	1	1	1	3	2	2	2	2	3	2	2	2	2	2	2	1	3	2	1	4	4	
18-Jul	3	2	3	1	1	1	2	2	2	3	3	3	3	2	3	3	3	2	5	2	8	3	2	8	
19-Jul	2	2	1	1	1	1	2	2	3	4	4	8	5	6	5	6	3	5	4	5	4	2	2	8	
20-Jul	2	2	2	2	1	2	3	3	2	2	3	3	4	3	4	4	3	3	3	2	1	1	2	4	
21-Jul	2	1	1	1	2	1	1	1	1	1	2	2	2	2	2	3	3	2	1	1	1	1	1	3	
22-Jul	2	1	1	1	2	1	2	2	1	2	2	2	3	4	4	3	3	3	3	2	1	2	2	4	
23-Jul	1	1	1	1	1	1	2	3	3	4	3	2	5	4	4	4	3	4	2	3	4	4	2	5	
24-Jul	1	2	2	2	2	3	3	4	4	4	4	4	3	4	4	4	4	5	4	3	3	2	3	5	
25-Jul	4	4	2	1	2	2	2	2	3	2	2	2	4	3	3	M	M	3	AF	1	1	1	1	4	
26-Jul	1	2	1	2	1	1	1	2	2	MS	3	3	3	3	3	3	3	5	2	2	1	2	2	5	
27-Jul	1	1	2	2	1	1	1	2	2	3	3	3	3	3	4	10	2	3	2	2	1	2	1	10	
28-Jul	1	1	1	1	1	1	2	2	2	2	2	3	4	4	3	3	4	3	2	2	1	1	1	4	
29-Jul	2	2	2	2	2	1	2	2	2	2	2	3	4	3	3	3	3	1	2	4	3	2	2	4	
30-Jul	2	2	1	1	1	2	2	2	2	2	3	3	4	4	4	3	4	3	2	2	17	9	4	17	
31-Jul	2	1	2	2	2	1	3	1	1	2	3	3	4	4	4	5	5	4	6	5	3	2	3	6	
Diurnal Maximum																									
6 5 3 3 3 3 4 4 4 5 5 11 5 10 6 10 7 7 6 5 17 9 5 12																									
M - Maintenance AF - Analyzer Failure MS - Missing																									



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	207	27.97	27.97
6 - 11	334	45.14	73.11
12 - 19	178	24.05	97.16
20 - 28	21	2.84	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 740

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

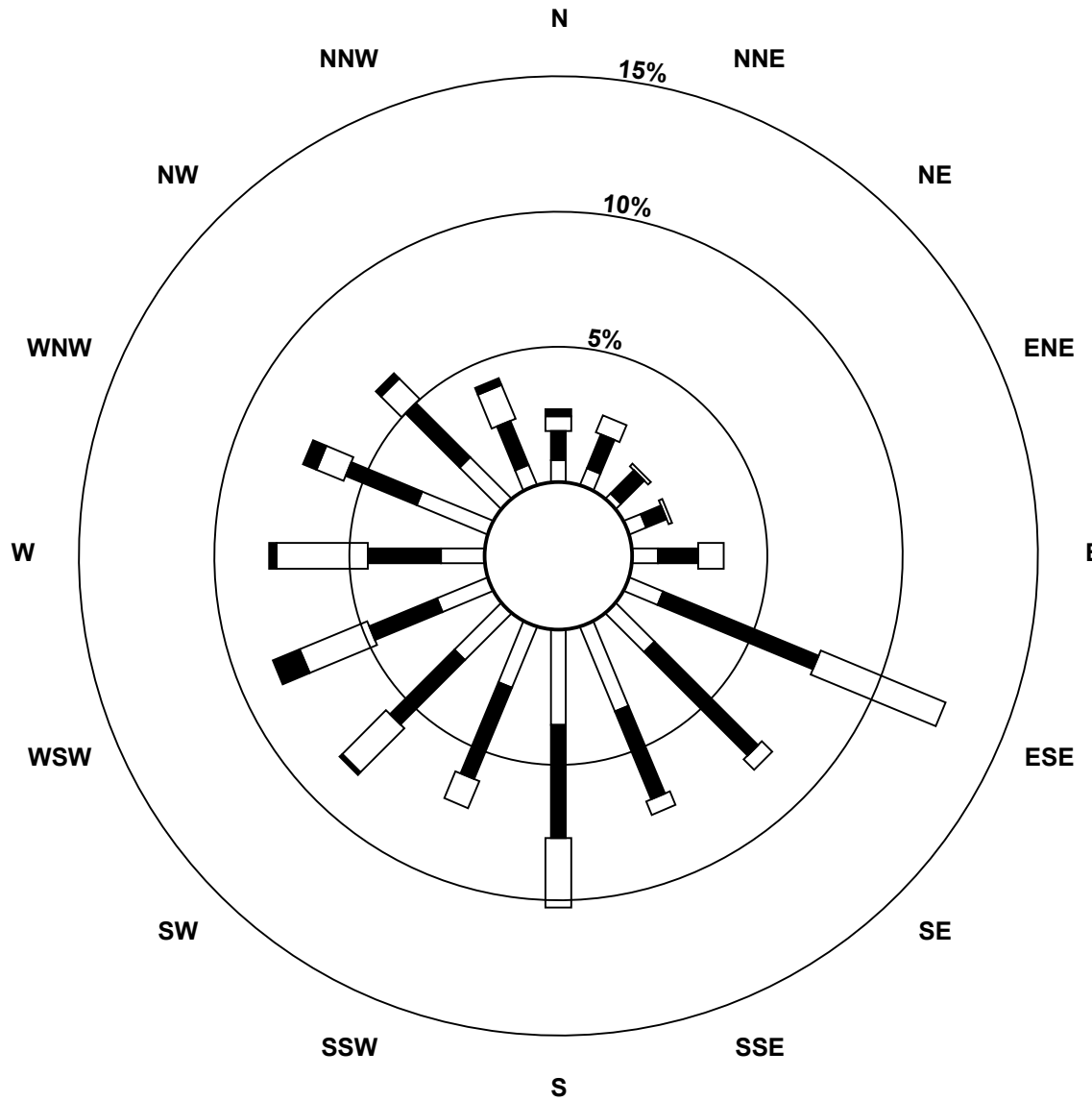
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	5	2	5	7	10	15	25	26	18	18	15	12	21	16	6	207
6 - 11	8	10	9	6	11	46	40	26	31	27	25	20	20	21	21	13	334
12 - 19	4	5	1	1	7	37	4	4	19	8	17	20	25	8	8	10	178
20 - 28	2	0	0	0	0	0	0	0	0	0	1	8	2	4	2	2	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	20	20	12	12	25	93	59	55	76	53	61	63	59	54	47	31	740

Total Number of Valid Hours: 740

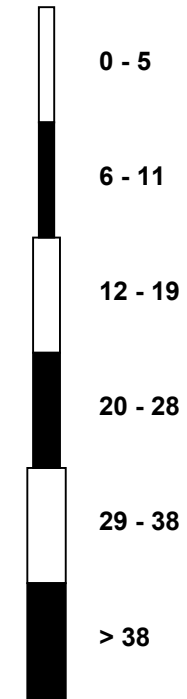
Total Number of Hours: 744

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

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



Classes (km/h)



Total Number of Valid Hours: 740



Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 309 deg on Jul 10 18:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 280.7 deg on Jul 10	Hours of Data: 740
Direction of Minimum Speed: 218 deg on Jul 2 05:00	Hours of Missing Data: 4
Direction of Minimum Daily Speed Average: 0.6 deg on Jul 21	Percent Operational Time: 99.5
Monthly Average Direction: 242.1 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-Jul	278	277	296	233	311	184	217	187	164	146	124	99	110	107	172	221	272	262	183	148	113	305	301	117	188.0
2-Jul	83	199	185	225	218	124	123	115	103	112	112	113	114	97	122	114	106	93	96	103	109	109	120	126	111.6
3-Jul	130	132	131	117	116	116	114	114	111	110	113	150	131	54	90	105	104	82	319	306	9	308	338	254	111.0
4-Jul	240	245	245	223	203	201	179	220	223	237	249	244	246	239	243	235	237	252	248	257	254	236	223	230	238.8
5-Jul	245	262	222	235	226	206	200	226	227	216	226	233	223	246	239	269	263	226	237	242	239	238	275	292	237.5
6-Jul	229	222	201	226	225	307	1	263	1	264	286	262	275	291	7	196	357	305	321	317	246	285	282	301	278.6
7-Jul	275	264	272	276	258	303	281	293	311	323	332	308	318	308	299	353	17	20	13	359	327	306	310	295	319.5
8-Jul	252	258	202	227	177	148	129	177	152	151	154	161	174	187	187	185	198	173	172	174	186	203	207	212	180.0
9-Jul	215	219	268	241	215	211	207	179	187	212	198	176	180	175	188	229	281	260	190	235	239	268	267	259	217.9
10-Jul	236	255	253	252	253	264	249	252	272	276	241	261	295	306	303	297	299	309	310	290	283	281	288	281	280.7
11-Jul	278	279	275	273	276	281	288	286	253	275	272	253	245	264	271	280	305	276	265	341	4	340	322	310	283.5
12-Jul	301	324	321	315	293	304	312	343	324	322	293	311	333	297	290	341	39	39	24	11	310	293	290	339	322.5
13-Jul	63	129	114	96	100	130	117	112	105	108	89	107	128	142	144	145	120	116	113	118	126	193	137	130	118.0
14-Jul	150	143	185	187	158	146	145	147	166	169	168	171	176	167	174	181	174	175	182	184	198	196	213	216	175.6
15-Jul	215	210	198	174	147	157	159	172	170	178	174	176	194	208	212	198	192	197	181	177	177	187	180	182	186.3
16-Jul	210	237	240	247	252	234	235	242	240	298	344	336	339	337	324	273	268	261	259	248	228	235	279	327	272.1
17-Jul	327	305	295	214	248	224	8	32	69	59	149	175	165	328	310	347	26	53	275	216	230	222	249	254	272.9
18-Jul	261	220	254	238	248	230	337	18	33	135	155	190	69	75	169	103	124	130	214	145	237	303	236	207	188.6
19-Jul	151	159	157	144	165	180	196	211	234	233	229	276	274	272	275	286	281	287	316	331	324	312	299	296	270.1
20-Jul	287	284	283	248	236	244	284	286	300	321	326	349	1	335	347	39	39	51	25	5	349	313	305	246	322.7
21-Jul	290	237	299	287	288	203	187	169	94	78	107	74	84	322	269	81	63	13	300	299	291	261	278	227	326.3
22-Jul	237	208	199	204	211	165	152	152	144	126	133	134	148	112	142	137	121	107	118	123	111	124	169	155	136.2
23-Jul	180	174	157	127	116	88	114	111	118	109	107	108	106	106	114	100	73	76	49	148	109	103	119	148	108.9
24-Jul	136	48	111	115	112	124	113	110	106	121	123	114	98	109	105	102	100	116	113	102	97	93	89	93	108.1
25-Jul	89	83	49	346	349	352	29	19	40	67	86	19	97	144	132	M	M	166	AF	293	308	345	297	307	42.2
26-Jul	244	296	189	106	109	148	219	179	150	MS	124	108	102	130	136	183	266	270	295	202	216	233	237	222	195.8
27-Jul	200	188	213	170	182	168	197	197	186	201	208	178	171	144	120	206	27	246	202	190	154	172	148	173	176.7
28-Jul	182	153	151	138	132	140	169	171	144	152	162	178	175	169	169	244	229	224	197	216	212	274	227	203	178.1
29-Jul	209	141	209	147	218	308	129	167	161	152	148	172	160	148	141	131	105	332	37	101	111	116	118	138	138.0
30-Jul	116	124	131	149	170	138	127	124	132	125	128	120	152	129	127	120	139	116	122	131	331	10	73	203	119.3
31-Jul	218	195	148	322	310	6	189	187	175	281	25	9	17	17	17	3	346	343	346	20	334	345	349	342	353.1

232.1 232.7 230.7 227.3 219.5 195.9 170.9 169.7 158.1 174.0 175.1 185.8 185.6 203.1 196.9 215.3 284.7 241.5 250.4 217.9 261.2 270.2 258.3 250.0
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

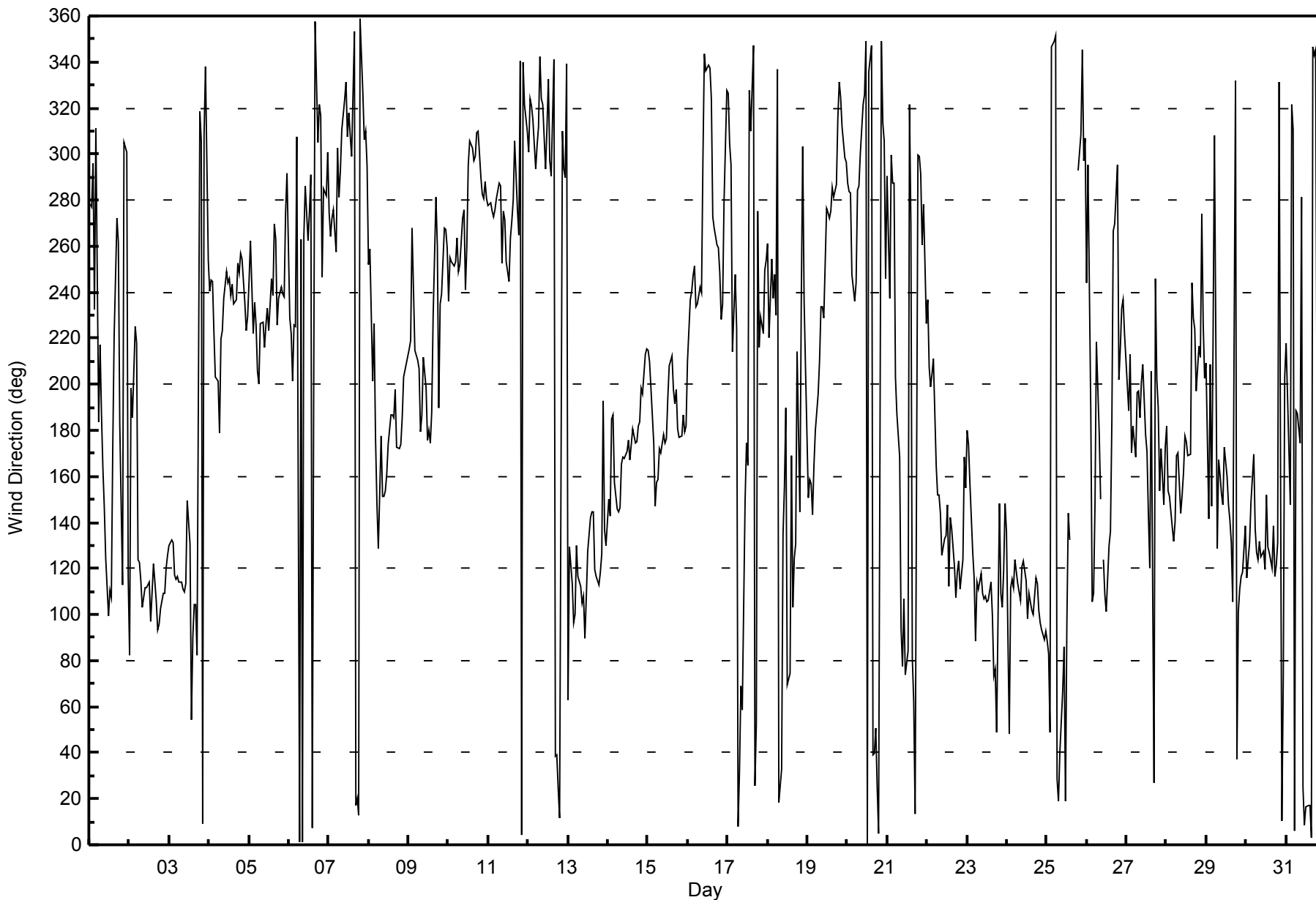
Wind Direction (WD) - deg
Patricia McInnes - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on Jul 18 12:00 Minimum Value: 6 deg on Jul 5 01:00 Percentiles: P ₁ = 8 P ₁₀ = 12 Q ₁ = 15 Median = 21 Q ₃ = 37 P ₉₀ = 57 P ₉₉ = 85																		Hours in Service: 744 Hours of Data: 740 Hours of Missing Data: 4 Hours of Calibration: 0 Percent Operational Time: 99.5							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	37	25	37	67	26	46	23	50	23	46	42	39	42	80	86	31	57	52	20	61	44	81	69	73	86
2-Jul	77	70	42	63	90	28	20	24	23	24	22	23	27	27	37	26	21	17	14	14	13	13	12	13	90
3-Jul	13	13	13	12	14	15	13	15	13	14	17	52	46	25	46	20	19	36	13	29	27	37	29	75	75
4-Jul	52	13	13	10	20	26	20	22	15	16	15	16	17	23	17	18	17	18	16	13	12	9	7	11	52
5-Jul	6	12	12	11	18	44	22	12	11	15	17	23	21	22	26	23	17	21	13	12	8	8	39	24	44
6-Jul	41	11	18	14	14	76	48	67	78	29	14	24	20	26	52	96	26	55	37	50	14	55	26	22	96
7-Jul	30	15	9	19	46	22	24	17	16	16	20	24	16	22	16	47	14	15	15	34	42	13	18	28	47
8-Jul	54	66	35	48	20	27	20	24	18	20	24	22	26	26	20	22	25	15	13	13	11	12	12	11	66
9-Jul	10	9	44	11	13	14	24	14	17	14	19	16	23	18	17	47	18	28	24	12	12	17	10	14	47
10-Jul	23	9	10	9	10	11	13	16	29	29	20	36	27	25	20	18	15	12	12	15	12	12	11	12	36
11-Jul	12	11	11	10	10	11	14	19	29	24	14	20	18	18	17	16	20	27	11	46	14	9	9	10	46
12-Jul	6	9	9	16	7	7	12	18	20	25	30	27	26	51	17	40	38	30	28	42	11	27	21	34	51
13-Jul	55	27	21	20	20	21	15	17	18	26	29	34	38	34	48	49	37	28	18	12	18	53	22	17	55
14-Jul	24	47	24	20	13	11	13	16	17	16	19	21	23	19	22	22	22	16	16	13	15	14	12	11	47
15-Jul	11	12	14	24	10	11	13	12	14	18	18	23	29	22	25	22	22	19	14	14	15	15	13	12	29
16-Jul	16	8	9	11	9	22	34	31	82	67	17	19	20	15	22	29	14	12	12	16	10	7	28	9	82
17-Jul	9	11	28	20	49	45	46	22	38	83	64	72	81	68	48	79	20	29	63	15	12	11	11	9	83
18-Jul	49	53	53	70	37	27	28	26	64	60	66	97	41	42	88	61	59	27	36	47	63	57	74	46	97
19-Jul	19	21	15	18	9	14	18	18	15	17	24	40	21	15	16	22	15	16	16	12	13	25	10	8	40
20-Jul	9	10	10	28	13	23	22	56	26	42	36	30	44	19	52	61	22	33	21	22	24	6	30	34	61
21-Jul	25	32	15	38	61	55	27	24	57	50	45	62	72	65	75	64	56	55	34	12	18	42	17	69	75
22-Jul	43	42	43	51	26	45	61	20	19	27	36	30	36	71	52	44	28	16	14	13	12	12	28	37	71
23-Jul	14	13	33	48	19	18	17	17	15	14	17	23	17	17	16	18	18	86	38	59	48	16	47	86	
24-Jul	76	49	12	13	16	13	16	15	17	18	16	16	20	19	16	19	17	17	14	13	14	16	15	15	76
25-Jul	16	16	39	17	15	15	20	19	17	28	38	78	49	25	48	M	M	37	AF	13	11	18	42	19	78
26-Jul	61	47	67	46	18	51	46	45	51	MS	71	49	58	37	35	55	22	23	40	53	25	13	8	19	71
27-Jul	17	14	21	31	19	26	19	22	32	26	32	49	41	28	17	89	73	82	14	28	20	56	23	24	89
28-Jul	14	12	17	15	12	12	15	24	24	24	31	34	58	37	39	69	28	48	17	14	9	49	16	24	69
29-Jul	12	19	54	67	61	78	33	15	16	19	21	68	73	70	24	24	63	56	20	24	20	18	11	21	78
30-Jul	14	12	12	17	15	14	21	24	18	26	23	33	46	49	40	25	23	17	14	12	76	29	72	29	76
31-Jul	23	32	65	46	57	75	32	24	28	67	28	19	19	19	20	17	17	14	17	48	12	14	14	12	75
Diurnal Maximum																									
77 70 67 70 90 78 61 67 82 83 71 97 81 80 88 96 73 82 86 61 76 81 74 75																									
M - Maintenance AF - Analyzer Failure MS - Missing																									



WBEA NETWORK
Hourly Averages

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



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 2, 2014	Previous Calibration	June 4, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	13:45
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1220
Cal Gas Concentration	47.0 ppm	Cal Gas Expiry Date	12/12/2016
Gas Cert Reference	SA130110A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	0-5000mV	DACS channel #	SE 1

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-670	-670
Analyzer Range (mv)	5000	5000	Lamp voltage	755	753
Calculated slope	0.991458	0.993129	Chamber temp.	45.0	45.1
Calculated intercept	0.357213	-0.257209	Pressure (mmHg)	691.0	697.0
Analyzer Background	4.7	4.7	Flow (lpm)	0.436	0.438
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	-0.1	NA
as found span	5000	55.3	519.8	523.4	0.993
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	55.3	519.8	523.4	0.993
second point	5000	27.7	260.4	262.9	0.990
third point	5000	13.9	130.7	132.0	0.990
calibrator zero	5000	0.0	0.0	-0.1	NA
as left zero	5000	0.0	0.0	0.0	NA
as left span	5000	55.3	519.8	524.5	0.991
Average Correction Factor					0.991

Corrected As found 523.5 Previous response 523.9 % change 0.1%

Notes:

No adjustments or maintenance performed.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

SO₂ Calibration Summary

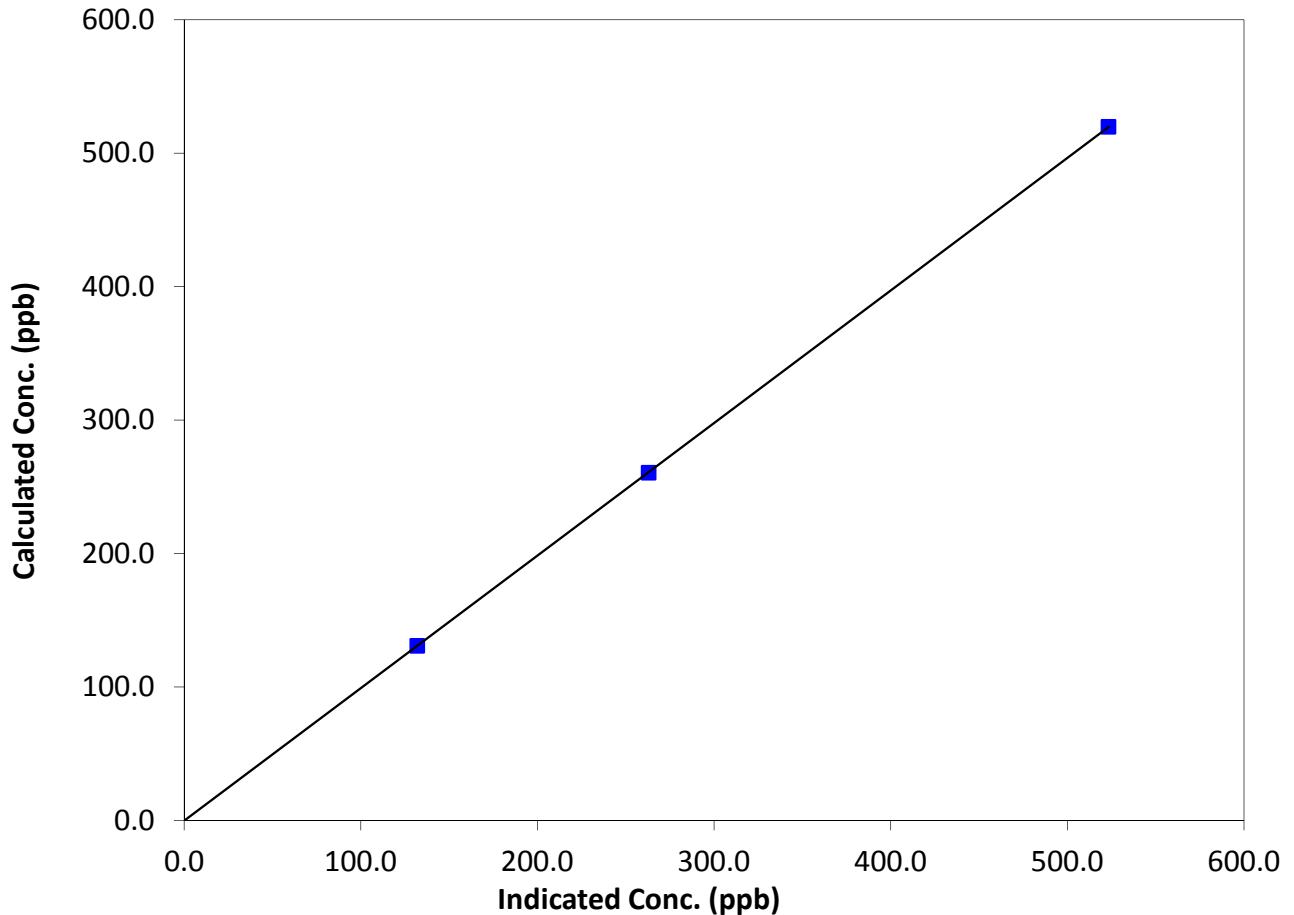
Station Information

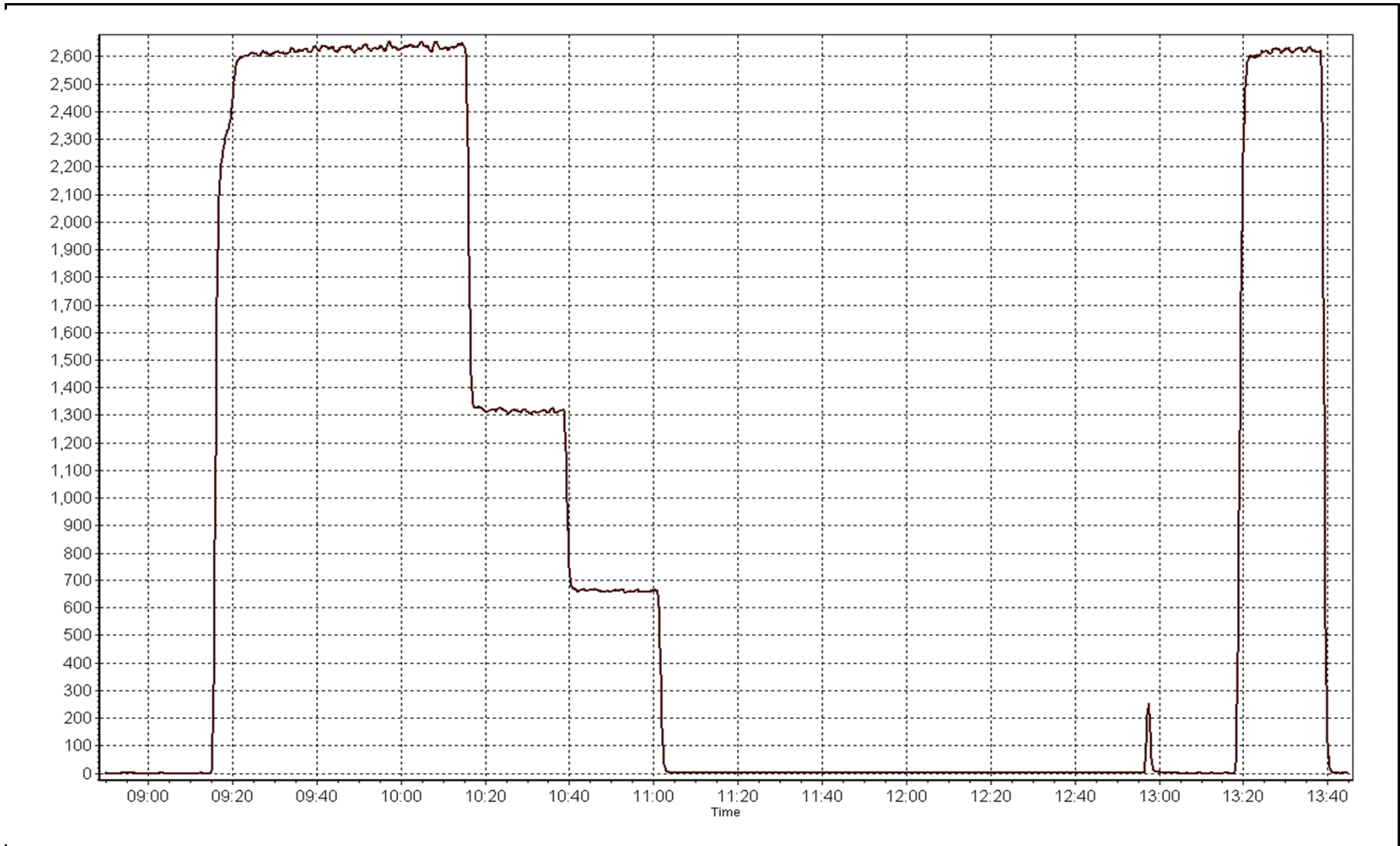
Calibration Date	July 2, 2014	Previous Calibration	June 4, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	13:45
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999997
519.8	523.4	0.9932		
260.4	262.9	0.9904	Slope	0.993129
130.7	132.0	0.9898		
			Intercept	-0.257209

SO₂ Calibration Curve







Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	July 9, 2014	Previous Calibration	June 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	11:35	End Time (MST)	14:30
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	849	846
Calculated slope	0.996696	0.989662	Chamber temp.	45	45
Calculated intercept	0.031721	0.145132	Pressure	713.2	689.7
Analyzer Background	13.5	14	Flow	0.497	0.470
Analyzer Coefficient	1.187	1.208	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	0.0	NA
as found span	5000	72.3	70.0	68.3	1.025
SO2 scrubber check	5000	21.3	200.2	0.0	NA
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	72.3	70.0	70.6	0.991
second point	5000	36.3	35.1	35.4	0.992
third point	5000	18.7	18.1	17.9	1.009
calibrator zero	5000	0.0	0.0	0.0	NA
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	72.3	70.0	70.8	0.989
Average Correction Factor					0.997

Corrected As found	68.3	Previous response	70.2	% change	2.7%
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Notes:

scrubber check done after as found zero; adjusted span

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

TRS Calibration Summary

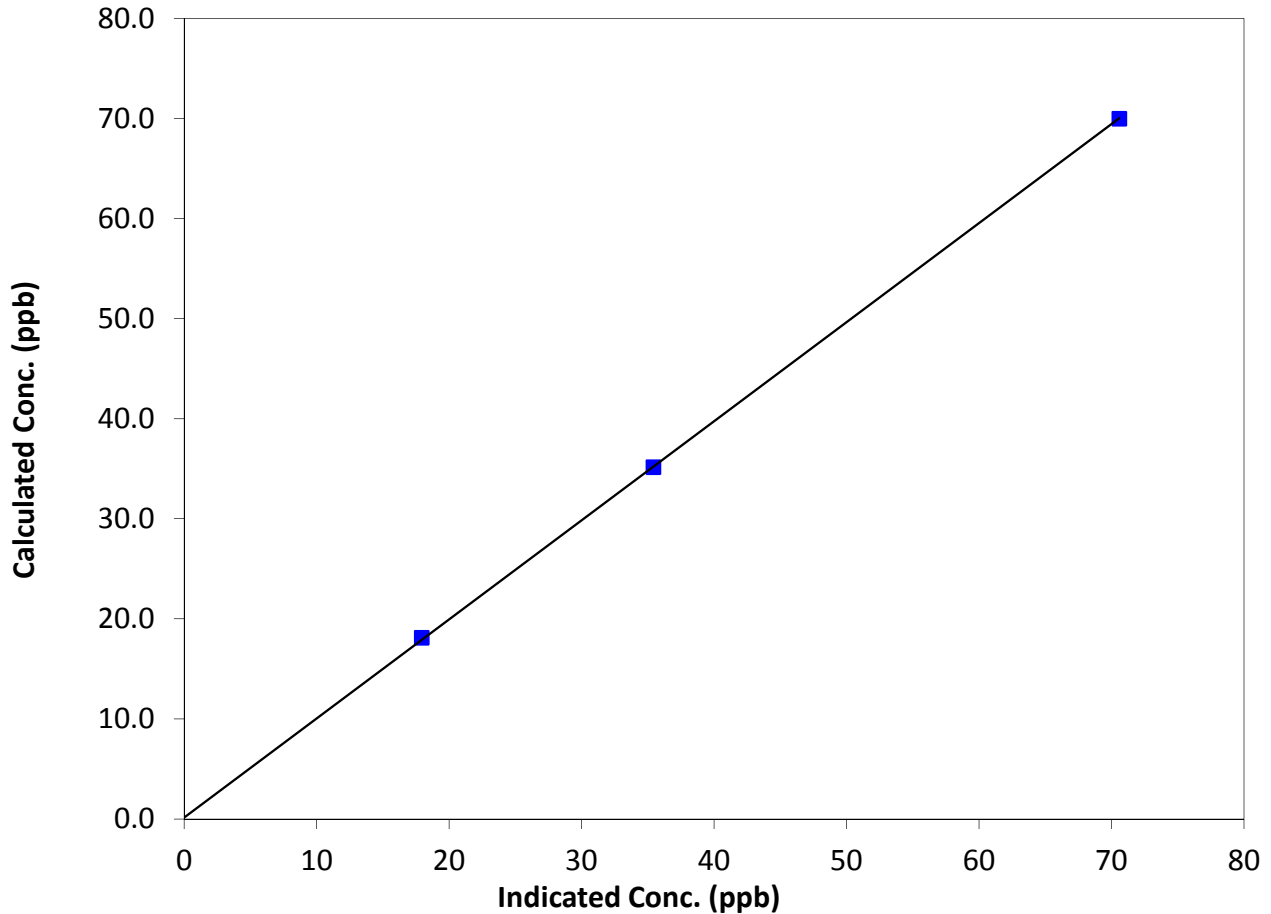
Station Information

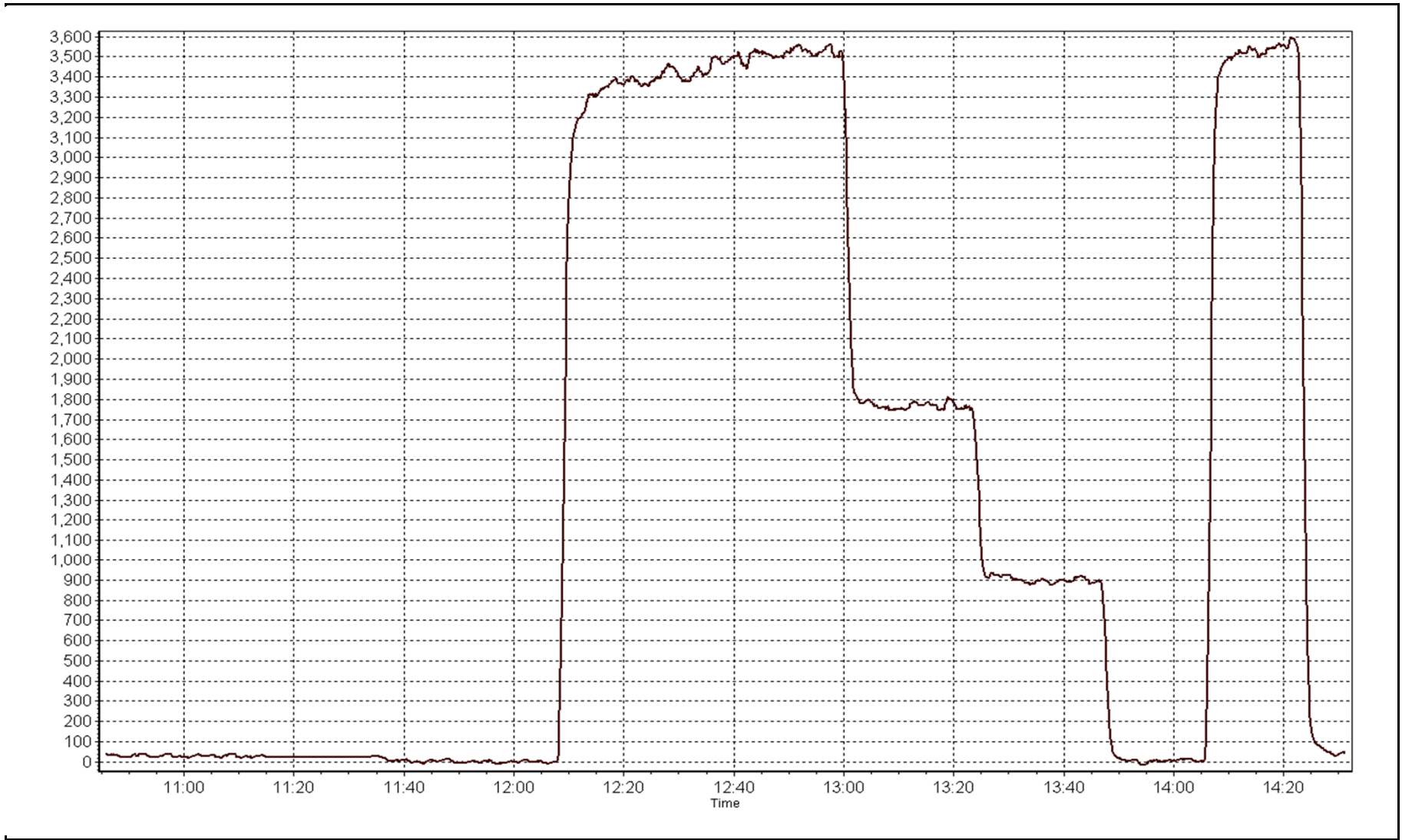
Calibration Date	July 9, 2014	Previous Calibration	June 6, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	11:35	End Time (MST)	14:30
Analyzer make	TEI 43i	Analyzer serial #	1008841398

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999978
70.0	70.6	0.9914		
35.1	35.4	0.9920	Slope	0.989662
18.1	17.9	1.0090		
			Intercept	0.145132

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Wednesday, July 02, 2014	Prev Calibration	Tuesday, June 24, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	13:45
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	API T700	Serial Number	1220
Gas Cert Reference	SA130110A	Cal Gas Expiry Date	Monday, December 12, 2016
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	34.8	36.5
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	0.991608	0.998954	Air Pressure	32.4	32.4
THC Calc intercept	0.035924	0.012011			
NMHC Calc slope	0.993313	0.998708			
NMHC Calc intercept	0.038804	0.012029			

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	12.31	0.981
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	6.03	1.003
third point	5000	13.8	3.01	3.00	1.005
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	55.3	12.08	12.08	1.000
Average Correction Factor					1.003

Corrected As found 12.31 Previous response 12.15 % change -1.3%

Notes:

Changed hydrogen cylinder and adjusted span 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	6.56	0.978
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	3.20	1.005
third point	5000	13.8	1.60	1.58	1.014
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	6.36	1.009
Average Correction Factor					1.006

Corrected As found 6.56 Previous response 6.42 % change -2.1%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	55.3	5.66	5.74	0.987
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	0.995
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	5.71	0.992
Average Correction Factor					

Corrected As found 5.74 Previous response 5.72 % change -0.3%



Wood Buffalo Environmental Association

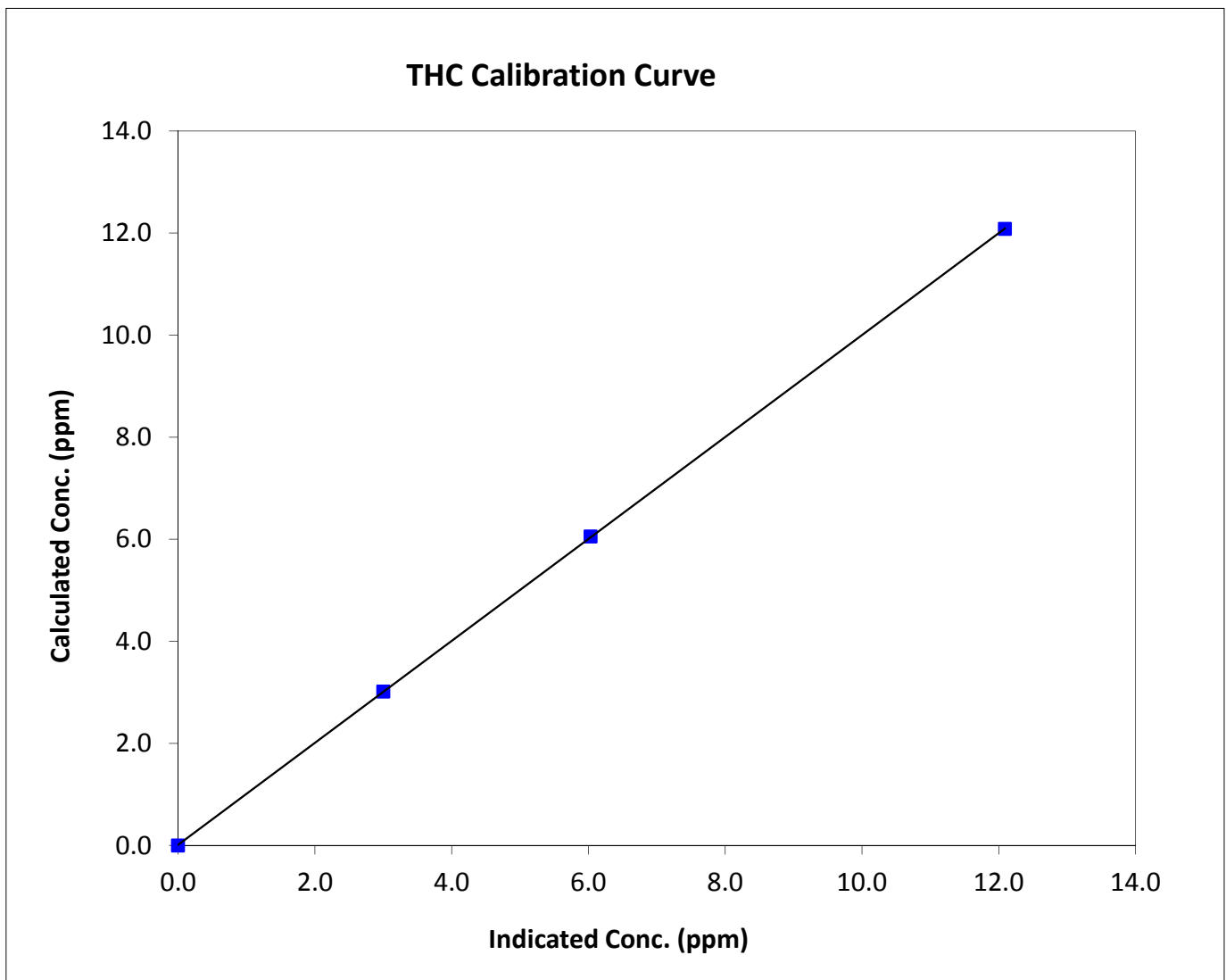
THC Calibration Summary

Station Information

Calibration Date	July 2, 2014	Previous Calibration	June 24, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	13:45
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999994
12.08	12.09	0.9992		
6.05	6.03	1.0035	Slope	0.998954
3.01	3.00	1.0049		
			Intercept	0.012011





Wood Buffalo Environmental Association

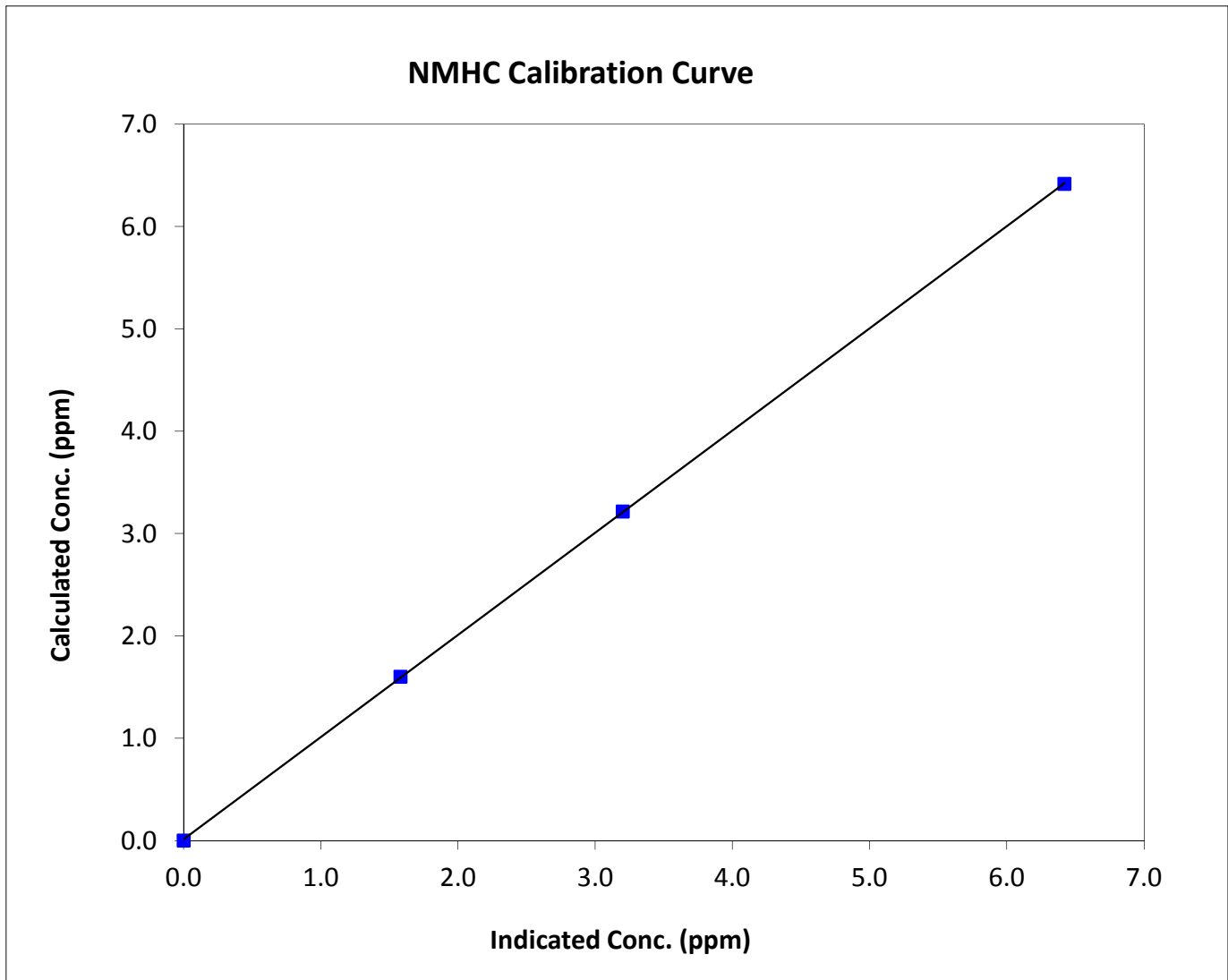
NMHC Calibration Summary

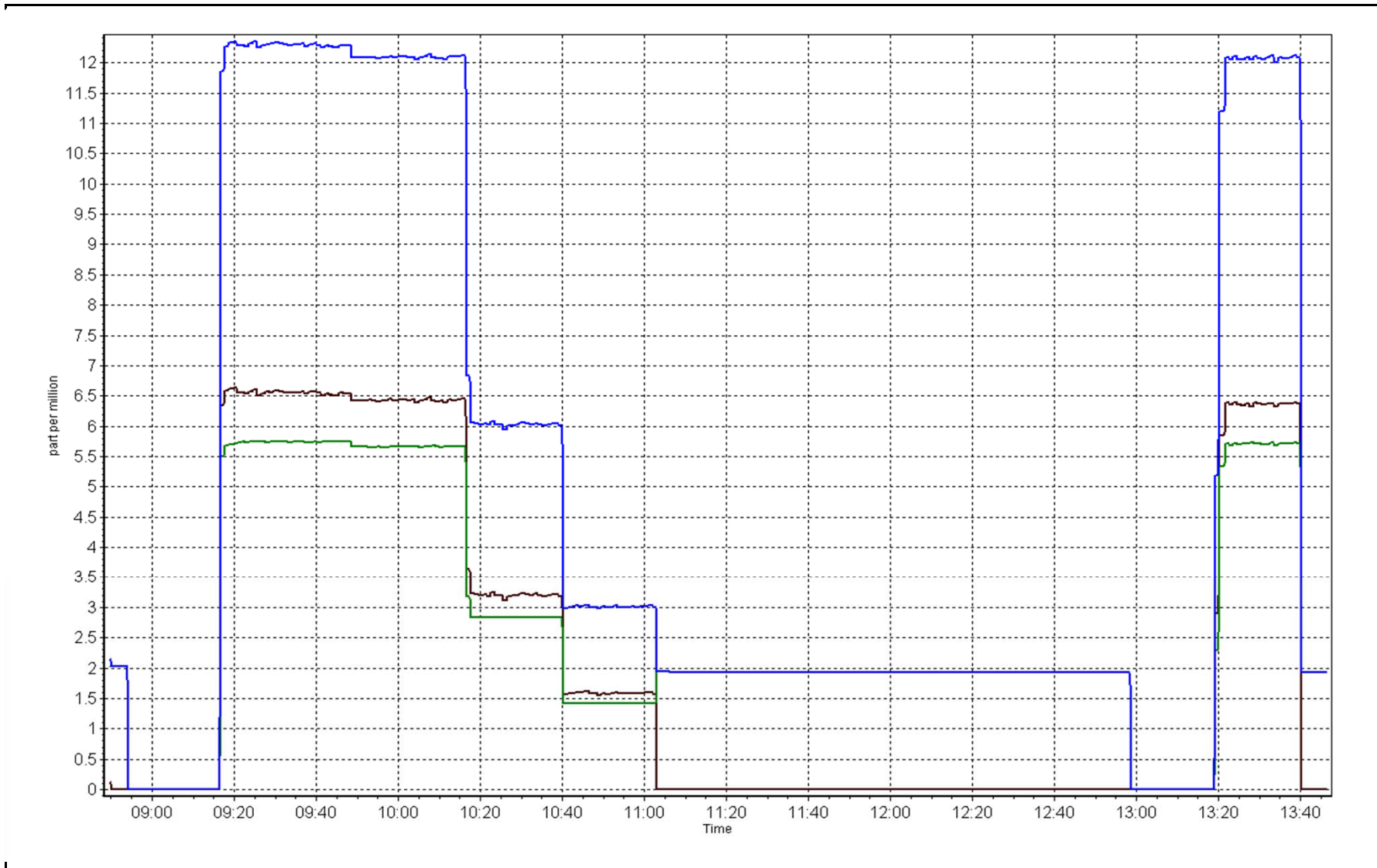
Station Information

Calibration Date	July 2, 2014	Previous Calibration	June 24, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	13:45
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999984
6.42	6.42	0.9996		
3.21	3.20	1.0046	Slope	0.998708
1.60	1.58	1.0136		
			Intercept	0.012029







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	July 9, 2014	Previous Calibration	June 5, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	11:30
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Make/Model	API T700	Serial Number	1220
NO2 calibration used	Wednesday, July 02, 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.	31.1	29.9
Analyzer Range (input)	5000	5000	Lamp temp.	53.6	53.5
Calculated slope	0.992648	0.984700	Pressure	675.7	668.2
Calculated intercept	0.951856	1.649080	Flow cell A	0.613	0.610
Analyzer Background	0.0	0.0	Flow cell B	0.633	0.630
Analyzer Coefficient	0.984	0.984	Cell A Intensity	94000	92300
			Cell B Intensity	87350	86000

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	-0.8	N/A
as found span	5000	0.950	340.2	344.3	0.988
calibrator zero	5000	0.000	0.0	-0.8	N/A
high point	5000	0.953	340.2	344.3	0.988
second point	5000	0.542	233.1	235.0	0.992
third point	5000	0.324	121.0	119.9	1.009
calibrator zero	5000	0.000	0.0	-0.8	N/A
as left zero	5000	0.000	0.0	-0.1	N/A
as left span	5000	0.950	340.2	347.5	0.979
Average Correction Factor					0.996

Corrected As found 345.1 Previous response 341.8 % change -1.0%

Notes:

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

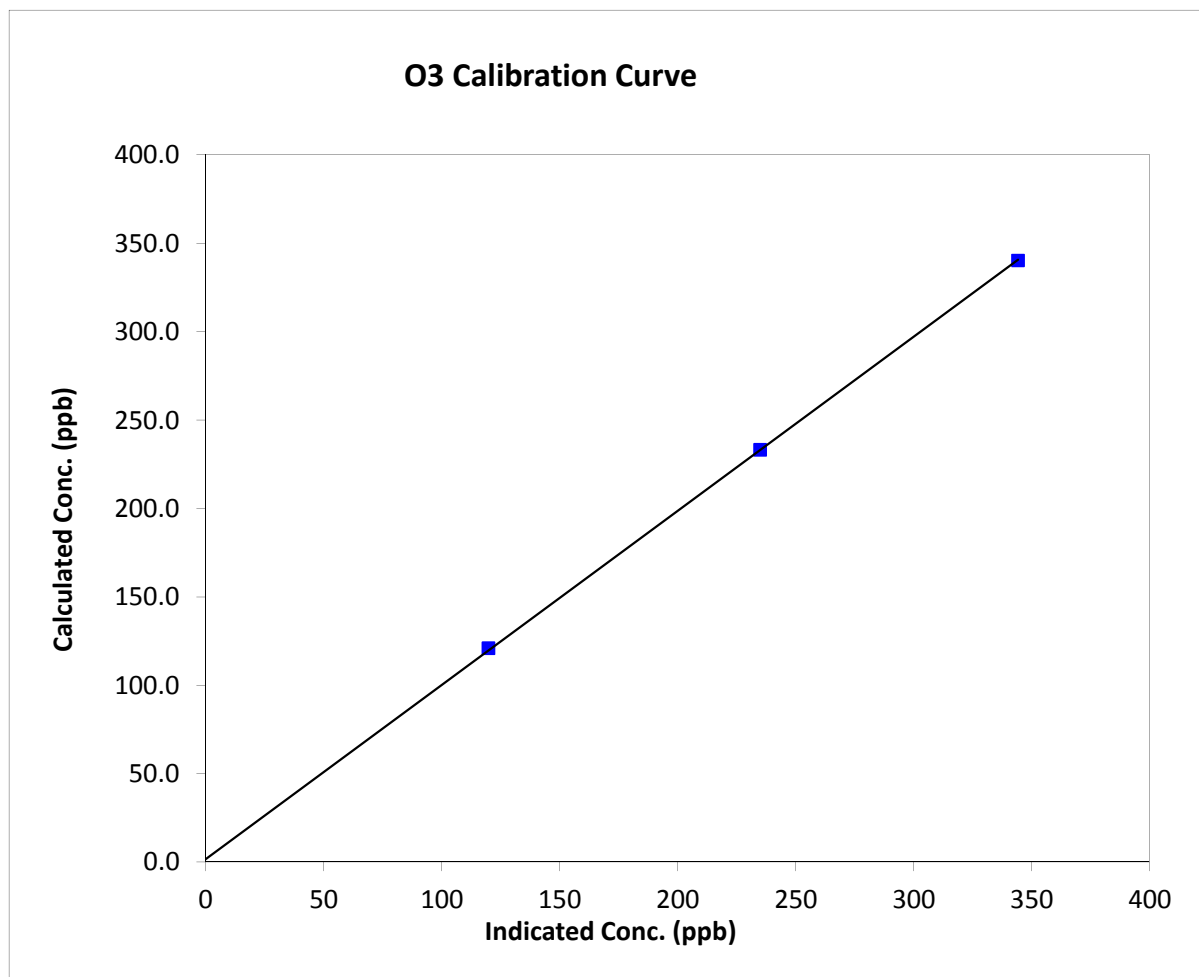
O₃ Calibration Summary

Station Information

Calibration Date	Wednesday, July 09, 2014	Previous Calibration	June 5, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:20	End Time (MST)	11:30
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

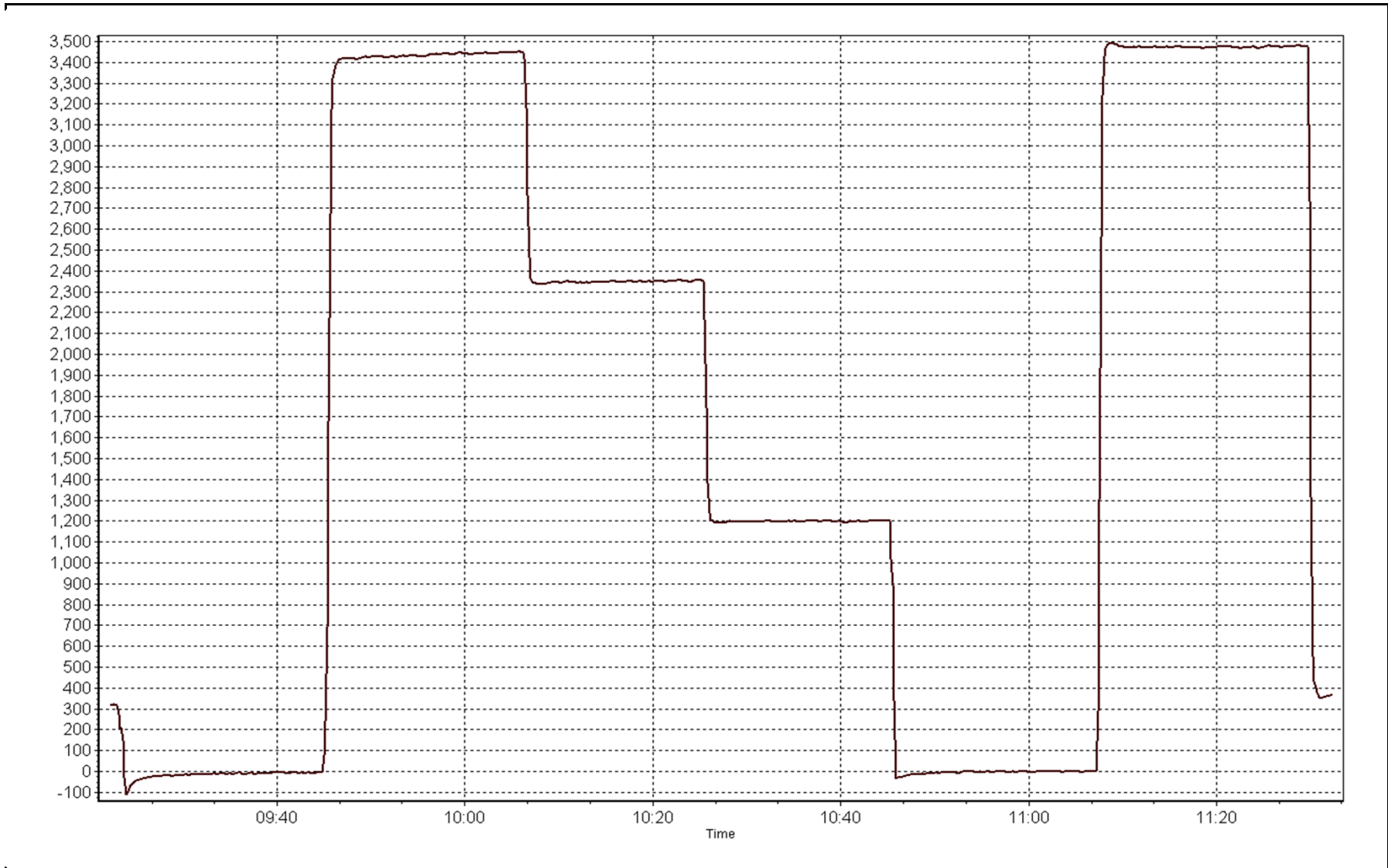
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.8	N/A	Correlation Coefficient	0.999959
340.2	344.3	0.9881		
233.1	235.0	0.9919	Slope	0.984700
121.0	119.9	1.0092		
			Intercept	1.649080



O3 Calibration Plot

Date: July 9, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 2, 2014	Previous Calibration	June 4, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	13:45
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	API T700	Serial Number	1220
NO Cal Gas Conc	54.4 ppm	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	54.4 ppm	Cal Gas Serial #	SA130110A

DACs Information

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

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.998429	0.997574	1.003184
	Data Offset	-0.255526	0.304495	1.691898
After	Data Slope	0.991787	0.994157	1.003812
	Data Offset	-0.013348	0.377500	1.745075
IP address:		192.168.1.42		
Voltage Range		N/A		

Analyzer Information

Analyzer make/model Thermo Scientific 42i Analyzer serial # 1218153460

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.988		0.988	
NOX coefficient	0.993		0.993	
NO2 coefficient	1		1.000	
NO bkgnd	2.7		2.7	
NOX bkgnd	3.2		3.2	
Chamber Temp	50.6	Deg C	50.6	Deg C
Moly Temp	325	Deg C	325.0	Deg C
PMT Temp	-2.7	Deg C	-3.0	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	177	mmHg	178.3	mmHg
Sample Flow	802	ccm	800	ccm

Notes:



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

July 2, 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	-0.2	-0.1	-0.1	N/A	N/A
as found span	5000	55.3	601.7	601.7	0.0	606.3	604.8	1.5	0.9924	0.9948
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	N/A	N/A
high point	5000	55.3	601.7	601.7	0.0	606.3	604.8	1.5	0.9924	0.9948
second point	5000	27.7	301.4	301.4	0.0	304.6	303.4	1.2	0.9894	0.9933
third point	5000	13.9	151.2	151.2	0.0	152.6	150.6	2.0	0.9912	1.0045
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	0.4	0.0	0.4	N/A	N/A
as left span	5000	55.3	601.7	263.9	337.8	600.5	261.9	338.6	1.0019	1.0076
Average Correction Factor									0.9910	0.9976

Corrected As found

NO_x= 606.5

NO= 604.9

Percent Change

NO_x= -0.6%

NO= -0.3%

Previous Response

NO_x= 602.9

NO= 602.8

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	263.9	340.2	602.1	263.9	338.3	0.9883	1.0000	1.0058	99.4%
2nd NO ₂ (200)	N/A	371.0	233.1	601.0	371.0	230.0	0.9902	1.0000	1.0133	98.7%
3rd NO ₂ (100)	N/A	483.1	121.0	599.6	483.1	116.5	0.9925	1.0000	1.0384	96.3%
4th NO ₂ (0)	604.1	N/A	-1.6	602.5	604.1	-1.6	0.9878	1.0000	N/A	N/A
Average Correction Factor							0.9897	1.0000	1.0191	98.1%

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

NO_x Calibration Summary

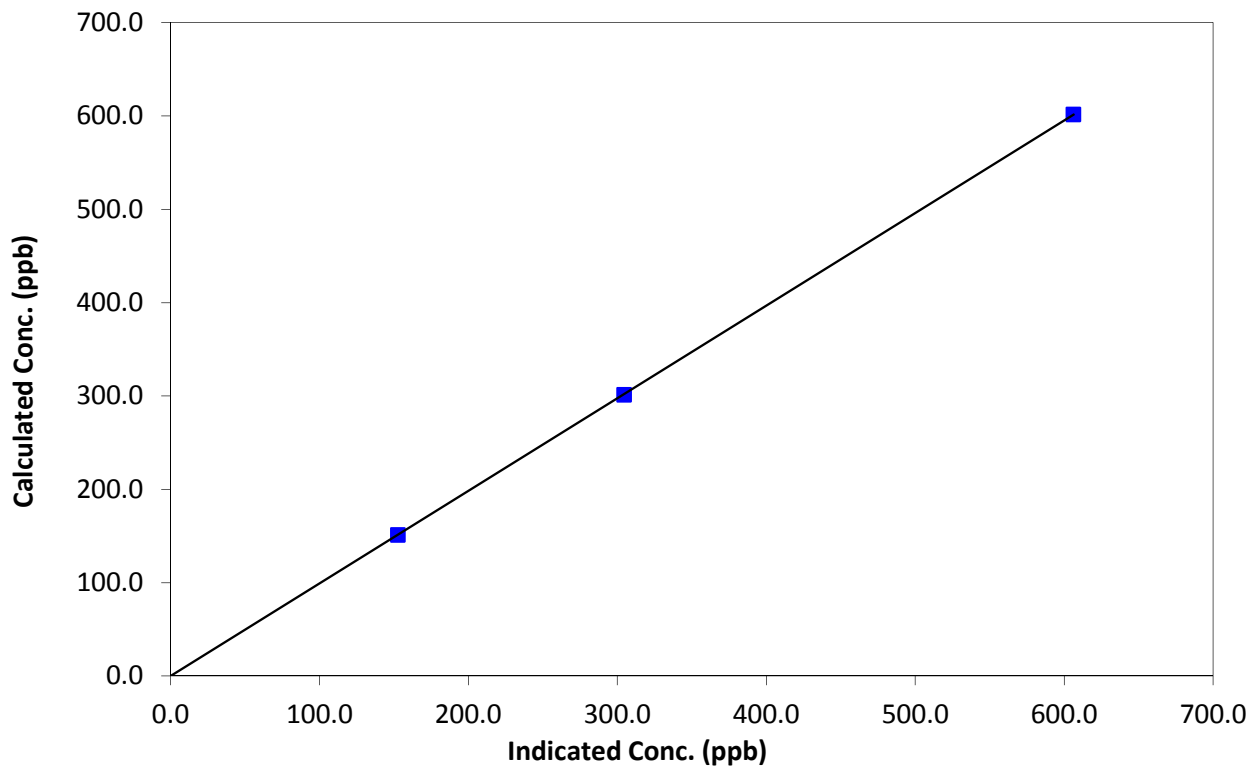
Station Information

Calibration Date	July 2, 2014	Previous Calibration	June 4, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	13:45
Analyzer make	Thermo Scientific 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999997
601.7	606.3	0.9924		
301.4	304.6	0.9894	Slope	0.991787
151.2	152.6	0.9912		
0.0	-0.2	0.0000	Intercept	-0.013348

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

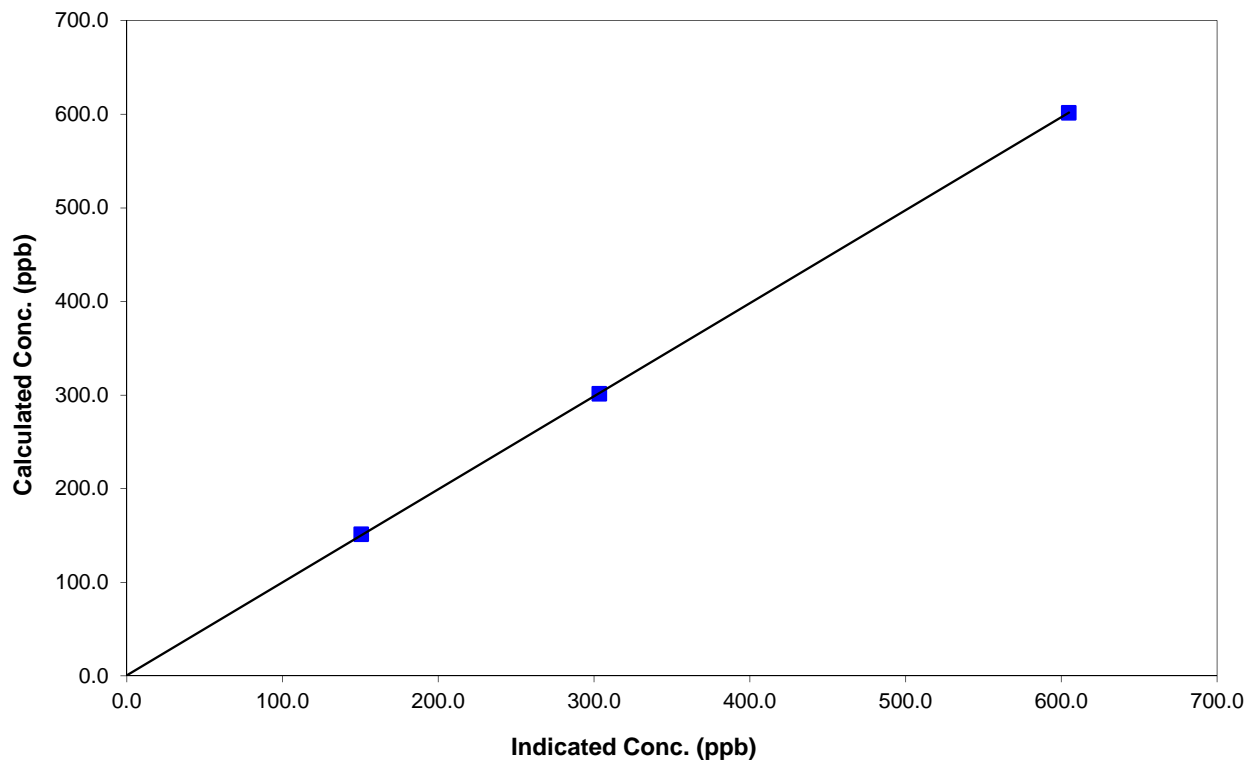
Station Information

Calibration Date	July 2, 2014	Previous Calibration	June 4, 2014
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	13:45
Analyzer make	Thermo Scientific 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999992
601.7	604.8	0.9948		
301.4	303.4	0.9933	Slope	0.994157
151.2	150.6	1.0045		
0.0	-0.1	0.0000	Intercept	0.377500

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

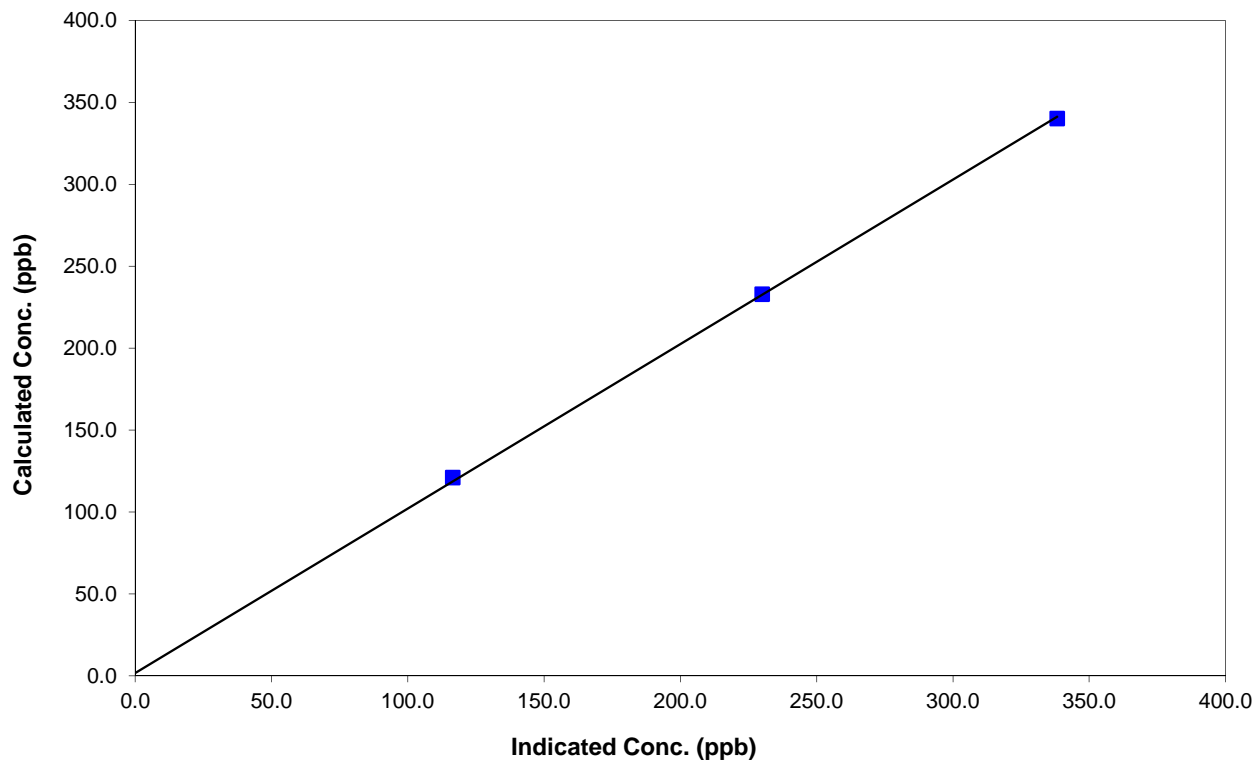
Station Information

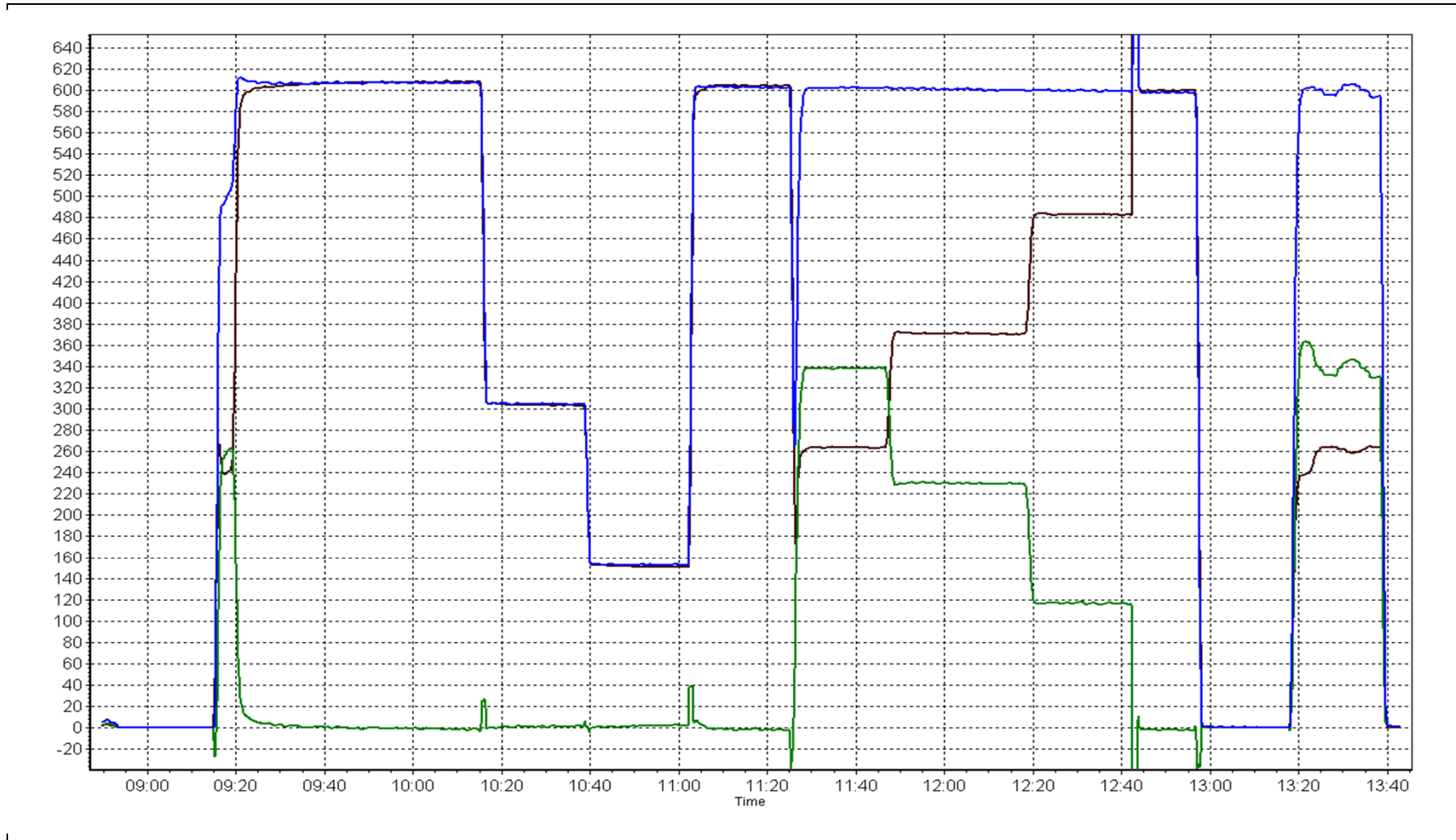
Calibration Date	July 2, 2014	Previous Calibration	June 4, 2014
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	13:45
Analyzer make	Thermo Scientific 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999856
340.2	338.3	1.0058		
233.1	230.0	1.0133	Slope	1.003812
121.0	116.5	1.0384		
			Intercept	1.745075

NO₂ Calibration Curve







Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date	July 11, 2014	Previous Calibration	June 10, 2014
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	7:30	End Time (MST)	11:00
Barometric Pressure	n/a mmHg	Station Temperature	21.0 Deg C
Calibrator	API T700	Serial Number	1220
NH3 Cal Gas Conc	190 ppm	Cal Gas Expiry Date	April 3, 2012
NOx Cal Gas Conc	54.4 ppm	Cal Gas Serial #	LL86349

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2582
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Parameter		Nt	NOx	NH3
MV conversion	Analyzer Range (ppb)	2500	1000	2500
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.997441	1.000236	0.997996
	Data Offset	10.650759	0.060020	10.541662
After	Data Slope	1.007204	1.003725	1.008733
	Data Offset	4.802732	0.047010	3.102652
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	0.887	ppb	0.887	ppb
NOX coefficient	0.905	ppb	0.905	ppb
NH3 coefficient	0.910		0.910	
NO coefficient	0.899		0.899	
NO2 coefficient	1.000	ppb	1.000	ppb
No bkgnd	5.8		5.9	
Nt bkgnd	8.6		8.7	
NOX bkgnd	5.0		5.1	
NH3 conv temp	780	DegC	776	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	322.0	Deg C	322.0	Deg C
PMT Temp	-8.6	Deg C	-8.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	119.3	mmHg	119.8	mmHg
PMT Voltage	-839.0	v	-839.0	v
Sample Flow 1 NO	444.0	ccm	445.0	ccm
Sample Flow 2 Nox	490.0	ccm	491.0	ccm
Sample Flow 3 Nt	495.0	ccm	495.0	ccm

Notes:



Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date:

July 11, 2014

Station Number:

AMS 6

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NO _x conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-2.5	0.0	-2.5	NA	NA
as found NO	5000	55.2	600.6	600.6	NA	586.8	598.8	-12.0	1.023	NA
calibrator zero	5000	0.0	0.0	0.0	0.0	-2.5	0.0	-2.5	NA	NA
high NO point	5000	55.2	600.6	600.6	NA	586.8	598.8	-12.0	1.023	NA
NO/O ₃ point	5000	55.2	600.6	600.6	NA	590.8	597.8	-7.0	1.017	NA
as found NH ₃	5000	52.8	2006.4	NA	2006.4	1985.9	0.9	1985.0	1.010	1.011
first NH ₃	5000	52.8	2006.4	NA	2006.4	1985.9	0.9	1985.0	1.010	1.011
second NH ₃	5000	26.3	999.4	NA	999.4	993.7	0.2	993.5	1.006	1.006
third NH ₃	5000	13.3	505.4	NA	505.4	489.9	-0.1	490.0	1.032	1.031
as left zero						0.0				
as left span						0.0				
Average Correction Factor									1.0200	1.0160

Corrected As found

Nt = 589.3 ppb

NH₃ = 1987.5 ppb

Previous response

Nt = 591.5 ppb

NH₃ = 1999.9 ppb

Nt percent change 0.4%

NH₃ percent change 0.6%

Converter efficiency 91.0%

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association NH3 Calibration Summary

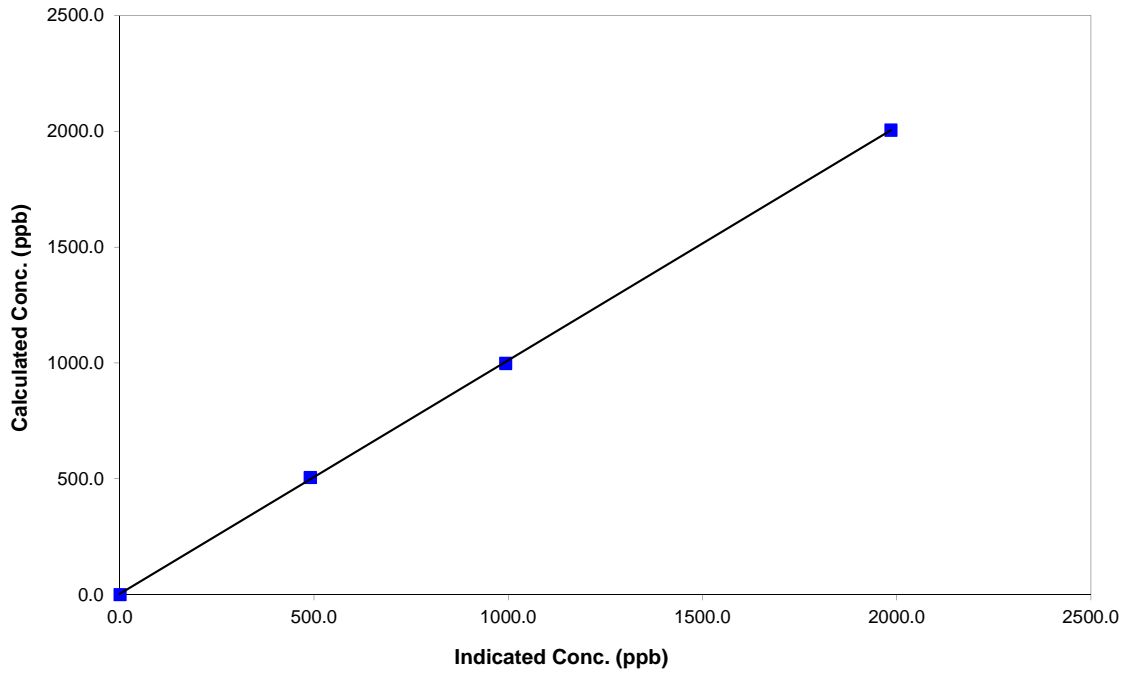
Station Information

Calibration Date	July 11, 2014	Previous Calibration	June 10, 2014
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	7:30	End Time (MST)	11:00
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	0.999950
2006.4	1985.0	1.0108		
999.4	993.5	1.0059	Slope	1.008733
505.4	490.0	1.0314		
			Intercept	3.102652

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

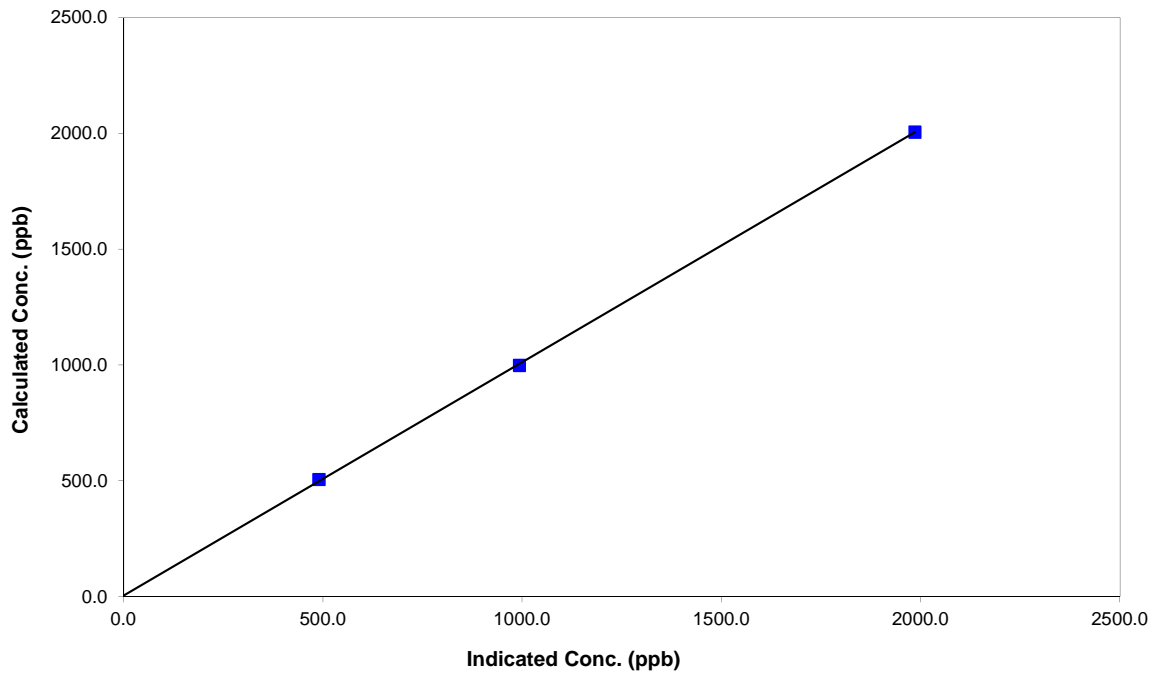
Station Information

Calibration Date	July 11, 2014	Previous Calibration	June 10, 2014
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	7:30	End Time (MST)	11:00
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	-2.5	N/A	Correlation Coefficient	0.999956
2006.4	1985.9	1.0103		
999.4	993.7	1.0057	Slope	1.007204
505.4	489.9	1.0316		
	0.0		Intercept	4.802732

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

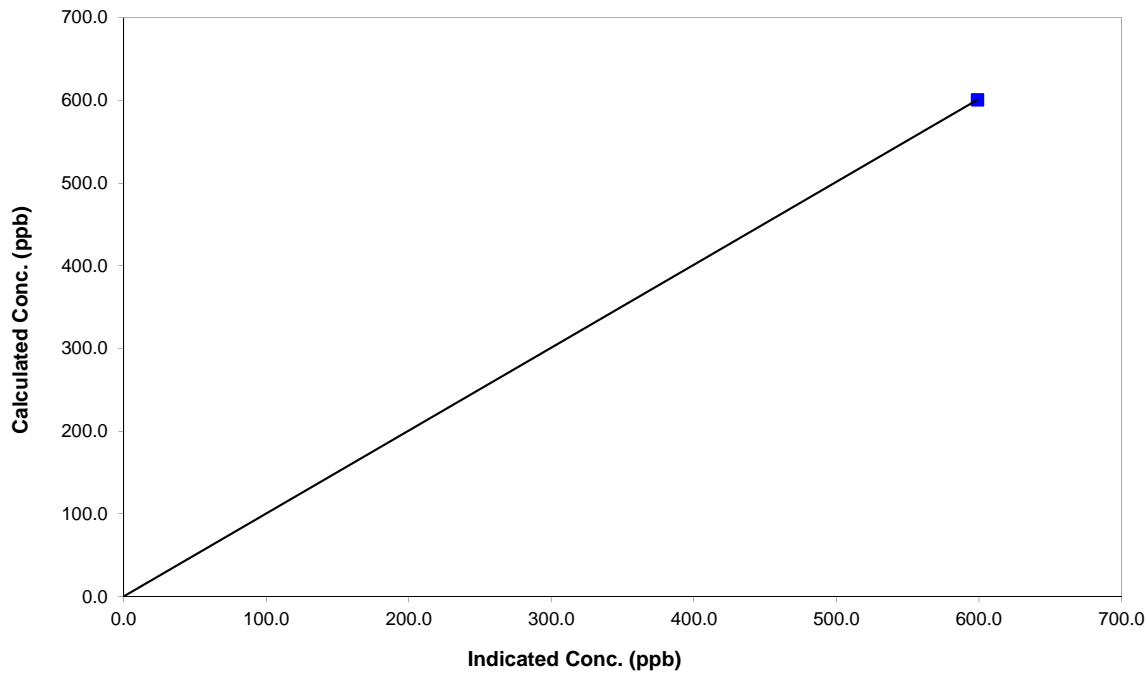
Station Information

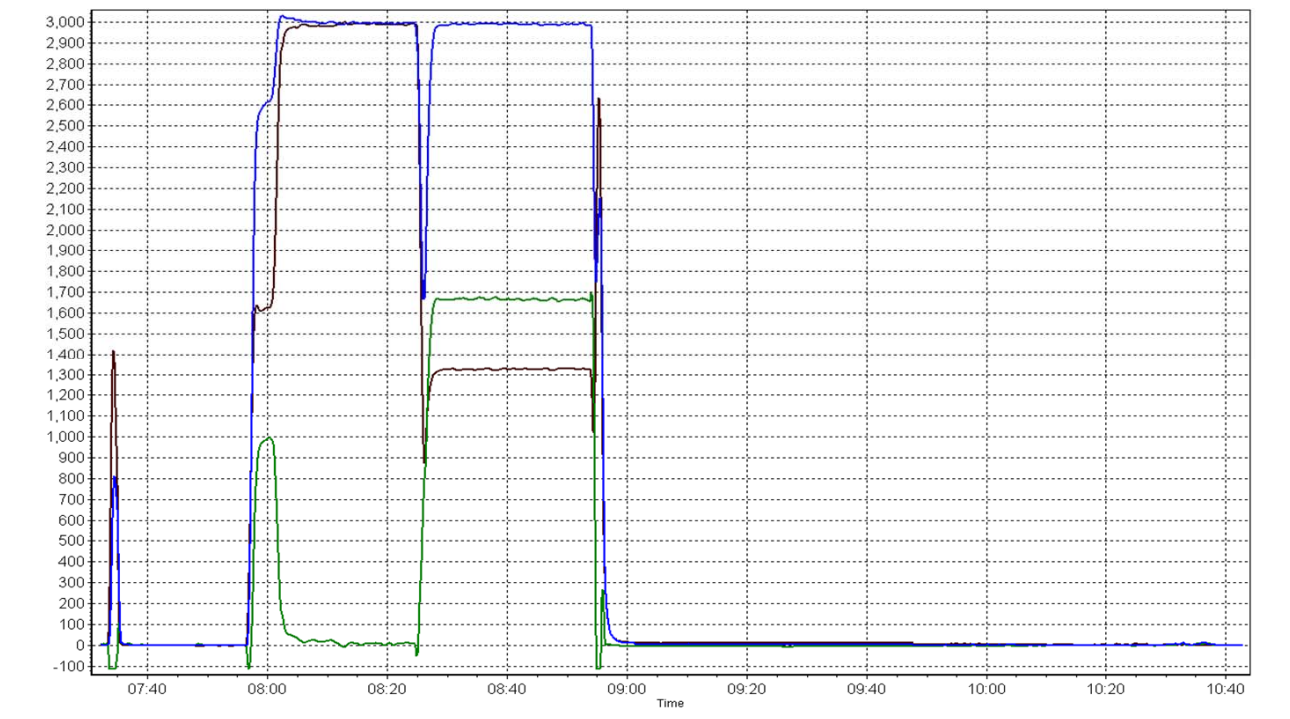
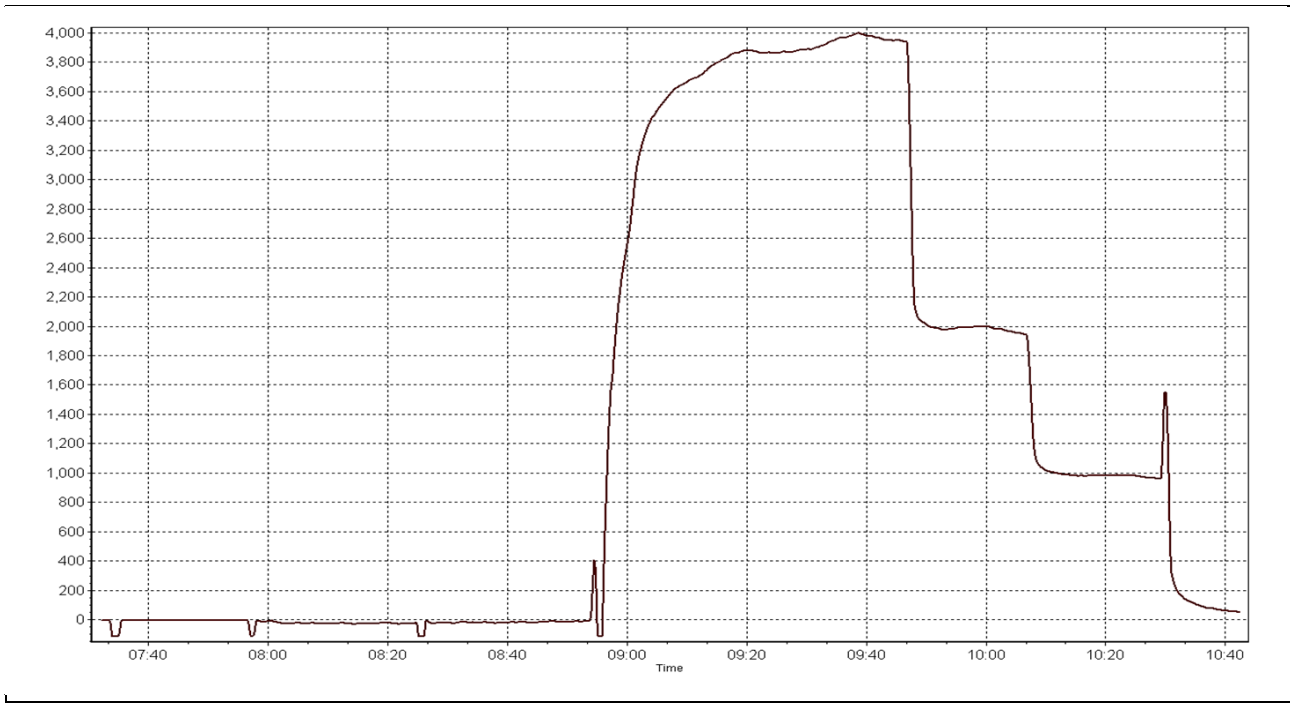
Calibration Date	July 11, 2014	Previous Calibration	June 10, 2014
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	7:30	End Time (MST)	11:00
Analyzer make	Thermo 17c	Analyzer serial #	622817829

NO_x Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999998
600.6	598.8	1.0030		
600.6	597.8	1.0046	Slope	1.003725
			Intercept	0.047010

NOx Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 7
ATHABASCA VALLEY
JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)

JULY 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	37	37	100.00	13	0	4	0
TRS (ppb) Average	706	36	38	99.73	2	0	1	0
THC (ppm) Average	706	37	38	99.87	2.5	-	2.1	-
NMHC (ppm) Average	706	37	38	99.87	0.441	-	0.086	-
CH4(ppm) Average	706	37	38	99.87	2.2	-	2	-
O3 (ppb) Average	709	35	35	100.00	62	0	31	-
NO2 (ppb) Average	707	37	37	100.00	20	0	10	-
NO (ppb) Average	707	37	37	100.00	193	-	28	-
NOX (ppb) Average	707	37	37	100.00	200	-	35	-
PM2.5 (ug/m3) Average	743	0	1	99.87	227.3	0	58.6	6
CO(ppm) Average	709	35	35	100.00	1.1	0	0.4	-
Temperature 2 m (C) Average	742	0	2	99.73	33.6	-	25.2	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.3	-	-	-
Relative Humidity (%) Average	742	0	2	99.73	100	-	-	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	31	-	-	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
 JULY 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	0.8	1	-	0	0	0	0	1	1	13
TRS (ppb) Average	706	0.5	0	-	0	0	0	0	1	1	2
THC (ppm) Average	706	1.95	0.1	-	1.8	1.9	1.9	1.9	2	2	2.5
NMHC (ppm) Average	706	0.037	0.038	-	0	0	0	0	0	0.1	0.441
CH4(ppm) Average	706	1.91	0.1	-	1.8	1.8	1.9	1.9	1.9	2	2.2
O3 (ppb) Average	709	22.7	12	-	1	8	13	22	31	40	62
NO2 (ppb) Average	707	4.4	3	-	0	1	2	4	6	8	20
NO (ppb) Average	707	2.3	11	-	0	0	0	0	1	4	193
NOX (ppb) Average	707	6.7	12	-	0	2	3	4	7	11	200
PM2.5 (ug/m3) Average	743	17.53	19.2	-	1.2	3.7	6.2	11.5	21.9	36.3	227.3
CO(ppm) Average	709	0.13	0.1	-	0	0	0.1	0.1	0.2	0.2	1.1
Temperature 2 m (C) Average	742	20.49	5	-	7.9	14.2	16.7	20.3	23.9	27.2	33.6
Barometric Pressure (inHg) Average	744	28.93	0.2	-	28.4	28.7	28.8	28.9	29.1	29.2	29.3
Relative Humidity (%) Average	742	65.3	19	-	18	37	50	68	82	89	100
Wind Speed 10 m (km/h) Average	744	7.2	5	-	1	3	4	6	9	13	31
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
JULY 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	25 Jul 2014 14:00	25 Jul 2014 15:00	2	Maintenance - address baseline drift
NMHC, CH4, THC	22 Jul 2014 14:00	22 Jul 2014 14:00	1	Maintenance on daily auto zero and span system
PM2.5	23 Jul 2014 12:00	23 Jul 2014 12:00	1	Maintenance - Flow and zero check, sample head cleaning
Temperature	19 Jul 2014 12:00	19 Jul 2014 13:00	2	Intermittent unstable operation - spikes in output signal
Relative Humidity	19 Jul 2014 12:00	19 Jul 2014 13:00	2	Intermittent unstable operation - spikes in output signal

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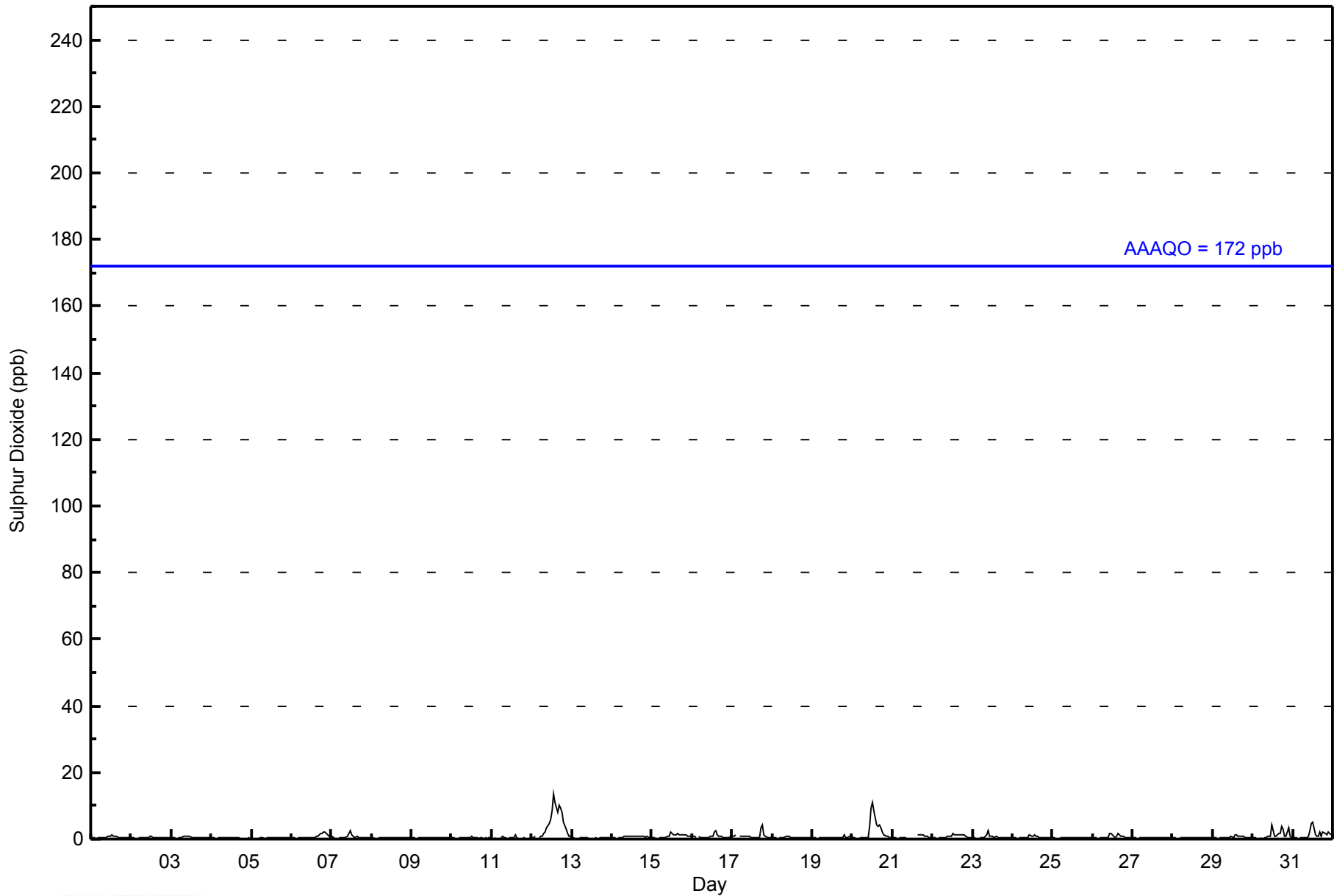


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 13 ppb on Jul 12 14:00										Maximum Daily Average: 4.4 ppb on Jul 12										Hours of Data: 707																												
Minimum Value: 0 ppb on Jul 11 22:00										Minimum Daily Average: 0.3 ppb on Jul 5										Hours of Missing Data: 37																												
Maximum Diurnal Average: 1.5 ppb at hour 13										Minimum Diurnal Average: 0.4 ppb at hour 6										Hours of Calibration: 37																												
Monthly Average: 0.8 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 8										Percent Operational Time: 100.0																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	1	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	1																						
2-Jul	0	0	0	Z	0	0	0	0	0	1	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0.5	1																						
3-Jul	0	0	0	Z	0	0	1	1	1	1	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0.5	1																						
4-Jul	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																						
5-Jul	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
6-Jul	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	1	1	0.8	2																						
7-Jul	1	1	0	Z	0	0	0	0	0	1	2	3	1	1	1	1	1	1	0	0	0	0	0	0	0.7	3																						
8-Jul	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0.4	1																						
9-Jul	0	1	0	Z	1	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
10-Jul	0	0	0	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
11-Jul	0	0	0	Z	0	0	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0.3	1																						
12-Jul	0	0	1	Z	1	1	1	2	2	3	5	6	9	13	11	8	10	9	8	5	3	2	1	1	4.4	13																						
13-Jul	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
14-Jul	0	0	0	Z	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.6	1																						
15-Jul	0	1	0	Z	0	0	0	1	1	1	1	2	2	1	1	2	1	1	1	1	1	1	1	1	1.0	2																						
16-Jul	1	1	1	Z	1	1	1	1	1	1	1	1	2	3	1	1	1	1	1	1	0	1	1	0.8	3																							
17-Jul	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	1	4	4	1	1	0	0	1.0	4																							
18-Jul	0	0	0	Z	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1																						
19-Jul	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0.5	1																						
20-Jul	1	0	0	Z	0	0	0	0	0	1	4	9	11	8	4	4	4	3	2	1	1	1	1	1	2.5	11																						
21-Jul	0	1	0	Z	1	0	0	1	1	C	C	C	C	C	C	1	1	1	1	1	1	1	0	1	--	1																						
22-Jul	1	0	0	Z	1	1	0	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	0	0.8	2																						
23-Jul	1	0	1	Z	0	0	0	1	1	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	3																						
24-Jul	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1																						
25-Jul	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																						
26-Jul	0	0	0	Z	0	0	0	0	0	0	2	2	1	1	1	2	1	1	1	1	1	0	0	0	0.7	2																						
27-Jul	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1																						
28-Jul	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	1	0	1	1	0	0.4	1																						
29-Jul	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	1																						
30-Jul	0	0	0	Z	0	0	0	0	1	1	1	4	3	1	1	2	2	4	3	1	1	3	1	0	1.3	4																						
31-Jul	0	0	0	Z	0	0	0	0	0	1	3	4	5	1	1	1	2	1	2	2	1	2	2	1	1.4	5																						
																								0.4	0.4	0.4	--	0.4	0.4	0.4	0.5	0.5	0.7	1.0	1.4	1.5	1.3	1.2	1.0	1.1	1.1	1.1	0.8	0.7	0.6	0.5	0.5	Diurnal Average
																								1	1	1	--	1	1	1	2	2	3	5	9	11	13	11	8	10	9	8	5	3	3	2	1	Diurnal Maximum
Z - zerospan C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																



WBEA NETWORK
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	704	99.58	99.58
11 - 20	3	0.42	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - July 2014

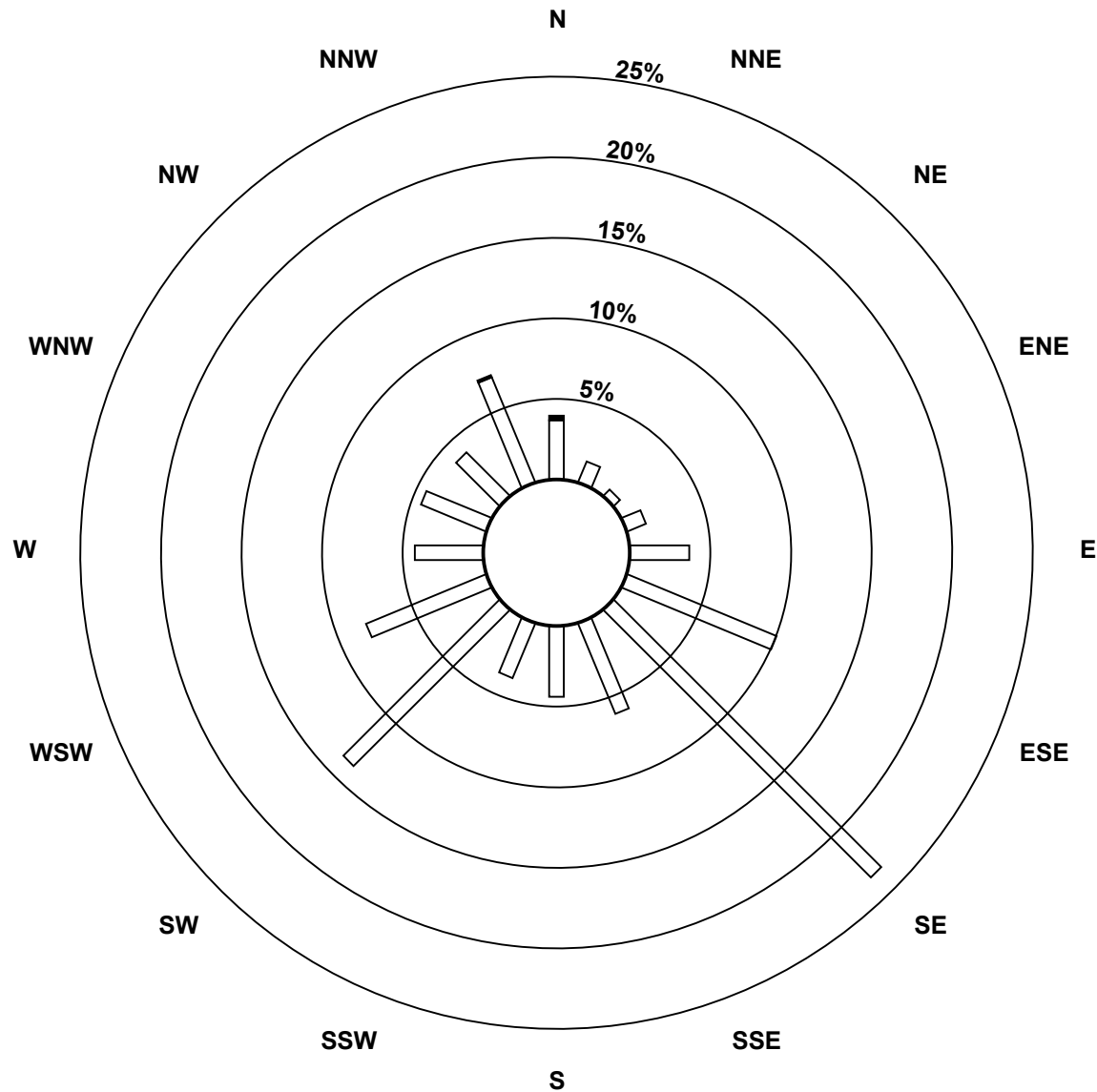
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	26	10	4	9	26	71	166	43	31	26	97	57	30	31	27	50	704
11 - 20	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	28	10	4	9	26	71	166	43	31	26	97	57	30	31	27	51	707

Total Number of Valid Hours: 707

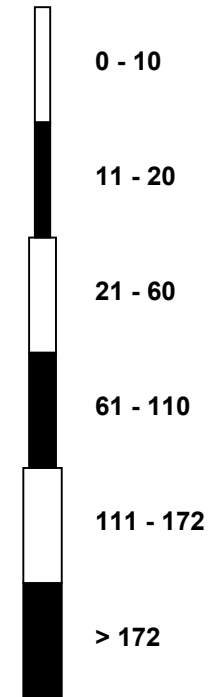
Total Number of Hours: 744

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

**Sulphur Dioxide (SO₂) - ppb
Athabasca Valley (AMS 7)**



Classes (ppb)

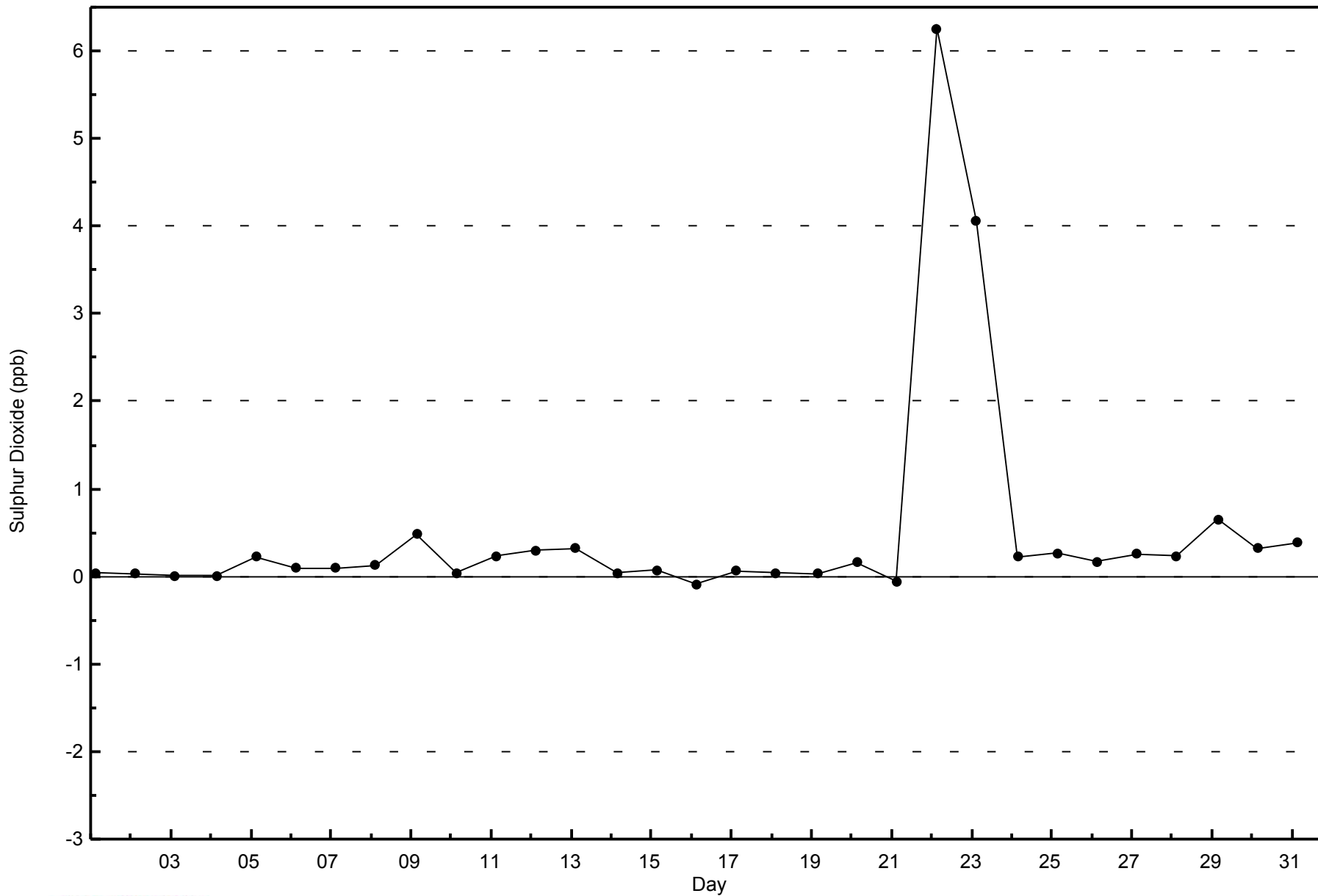


Total Number of Valid Hours: 707



WBEA NETWORK
Zero Responses

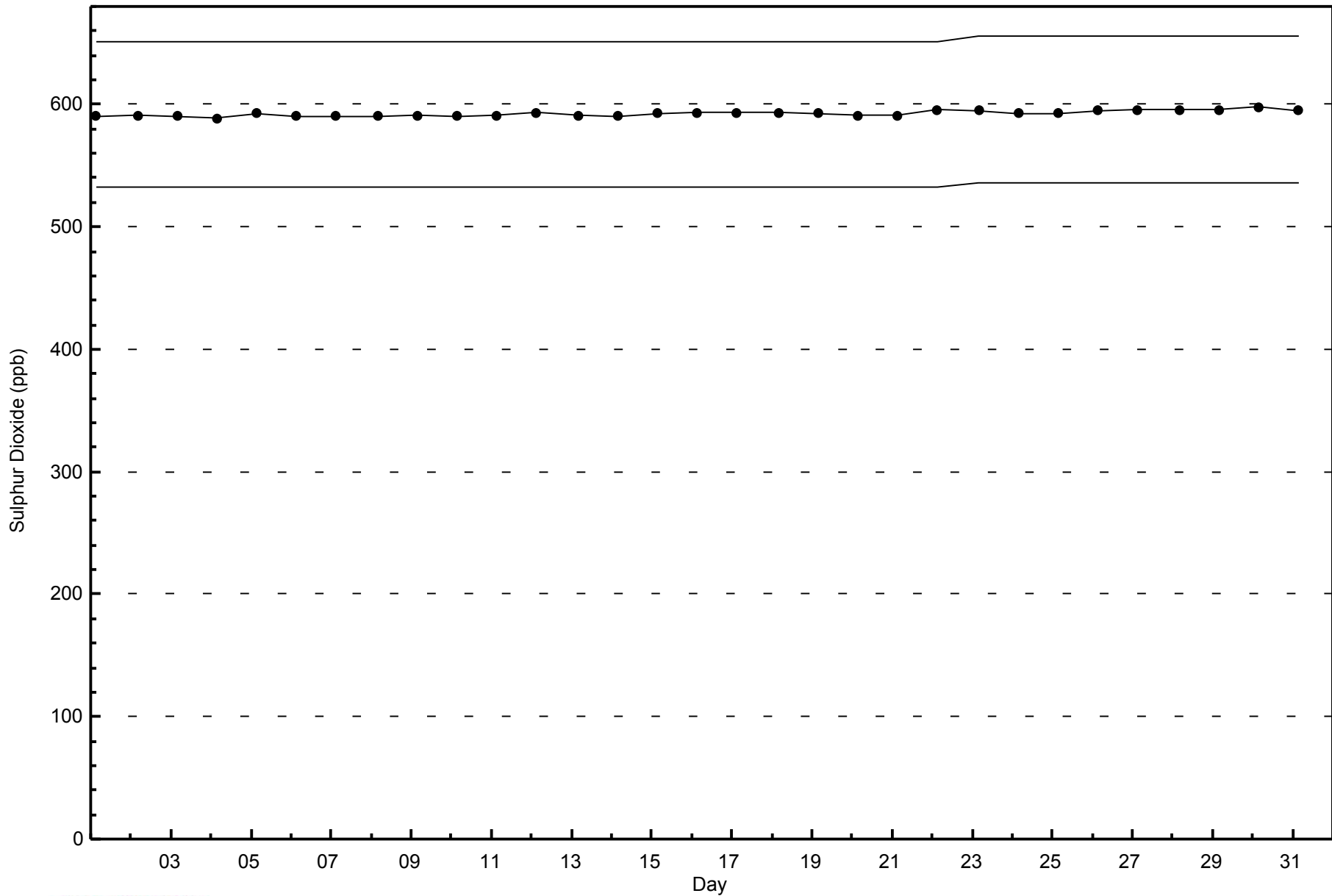
Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - July 2014





WBEA NETWORK
Span Responses

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - July 2014



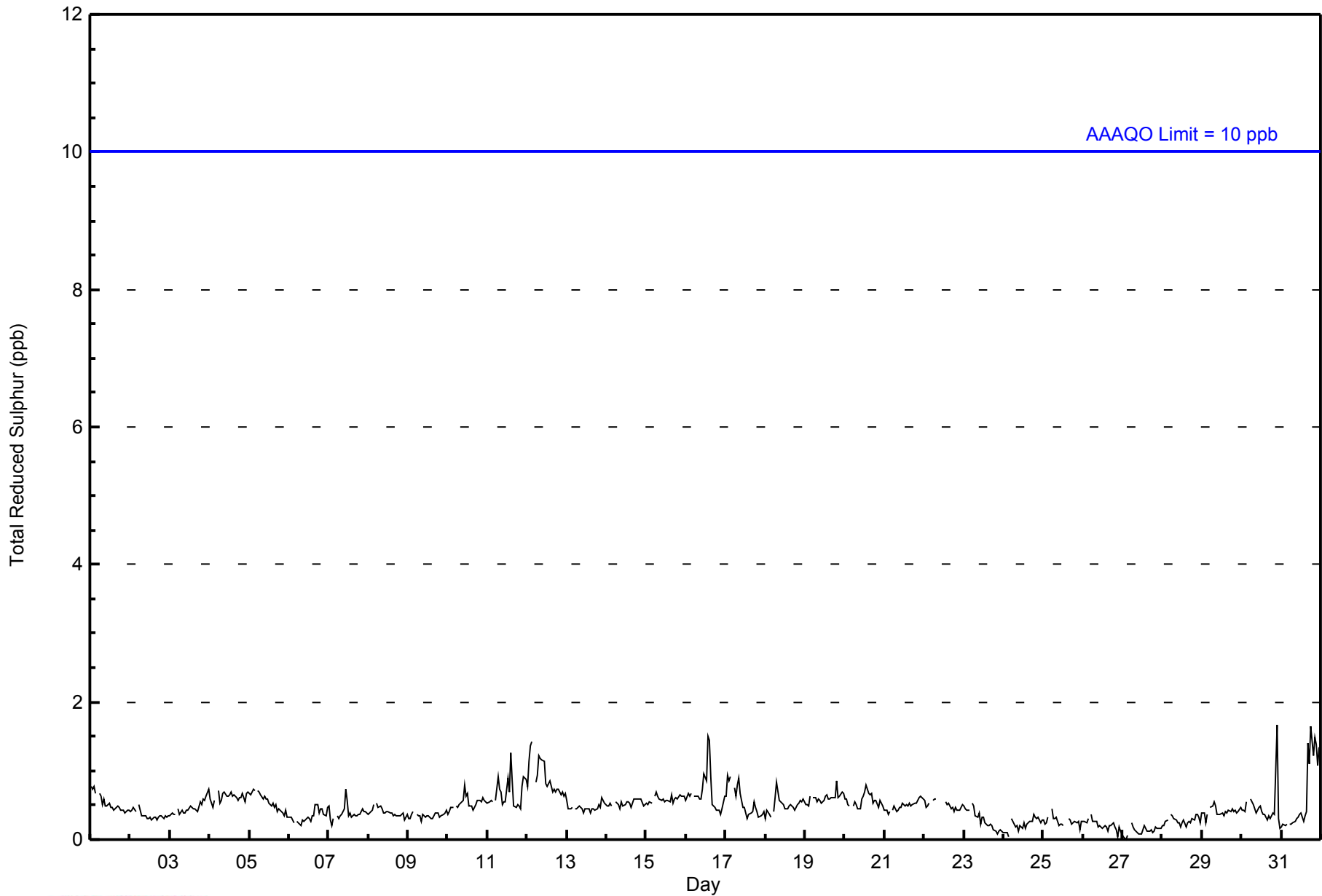


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																								
Maximum Value: 2 ppb on Jul 30 22:00										Maximum Daily Average: 0.9 ppb on Jul 12										Hours of Data: 706																														
Minimum Value: 0 ppb on Jul 27 03:00										Minimum Daily Average: 0.1 ppb on Jul 27										Hours of Missing Data: 38																														
Maximum Diurnal Average: 0.5 ppb at hour 22										Minimum Diurnal Average: 0.4 ppb at hour 1										Hours of Calibration: 36																														
Monthly Average: 0.5 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 1										Percent Operational Time: 99.7																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Jul	1	1	1	1	Z	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																								
2-Jul	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																								
3-Jul	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.5	1																								
4-Jul	1	1	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1																								
5-Jul	1	1	1	1	Z	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0.5	1																								
6-Jul	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.3	1																								
7-Jul	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																								
8-Jul	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																								
9-Jul	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																								
10-Jul	0	0	0	0	Z	0	0	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	0.5	1																								
11-Jul	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	1	1	1	0.7	1																								
12-Jul	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1																								
13-Jul	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0.5	1																								
14-Jul	0	0	1	0	Z	1	1	1	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	0.5	1																								
15-Jul	1	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1																								
16-Jul	1	1	1	1	Z	1	1	1	1	1	1	1	2	1	1	1	1	0	0	0	0	0	0	1	0.7	2																								
17-Jul	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.6	1																								
18-Jul	0	0	0	0	Z	0	1	1	1	1	1	1	0	0	0	1	0	0	0	1	1	1	1	1	0.5	1																								
19-Jul	1	1	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1																								
20-Jul	1	1	1	0	Z	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0.6	1																								
21-Jul	0	0	0	0	Z	0	0	0	0	0	0	1	0	1	0	1	0	0	1	1	1	1	1	1	0.5	1																								
22-Jul	1	0	0	1	Z	1	1	1	C	C	C	C	C	1	1	1	0	0	0	0	0	0	0	1	0.5	1																								
23-Jul	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
24-Jul	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
25-Jul	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0.3	0																								
26-Jul	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
27-Jul	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-Jul	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																								
29-Jul	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																								
30-Jul	0	0	0	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0.5	2																								
31-Jul	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	1	1	1	0.6	2																								
																								0.4	0.4	0.4	0.5	--	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Diurnal Average	
																								1	1	1	1	--	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1	1	2	1	1	1	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance																																																		
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																		



WBEA NETWORK
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	706	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - July 2014

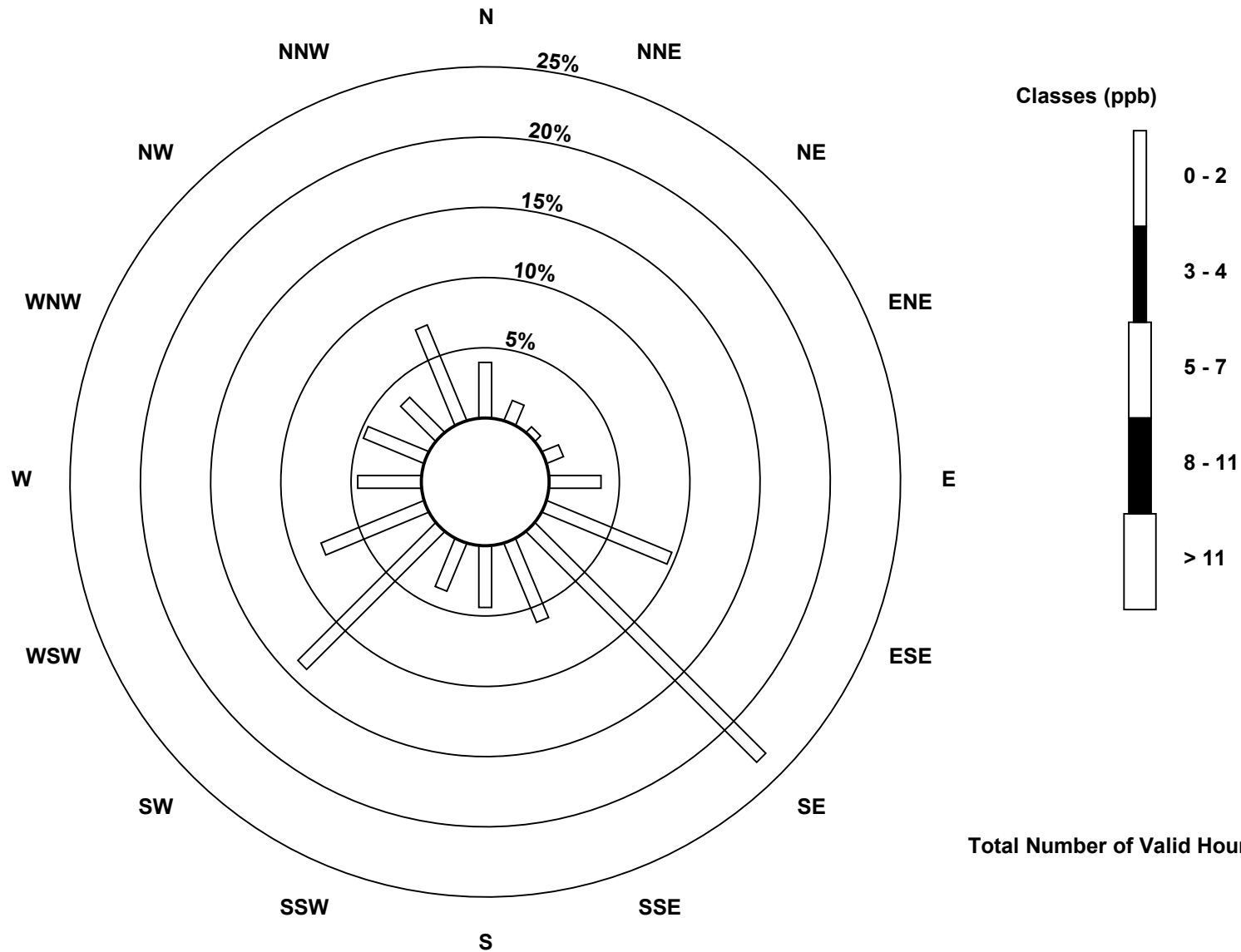
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	28	11	4	9	26	68	164	43	31	26	98	56	32	33	25	52	706
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	28	11	4	9	26	68	164	43	31	26	98	56	32	33	25	52	706

Total Number of Valid Hours: 706

Total Number of Hours: 744

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

**Total Reduced Sulphur (TRS) - ppb
Athabasca Valley (AMS 7)**



Total Number of Valid Hours: 706

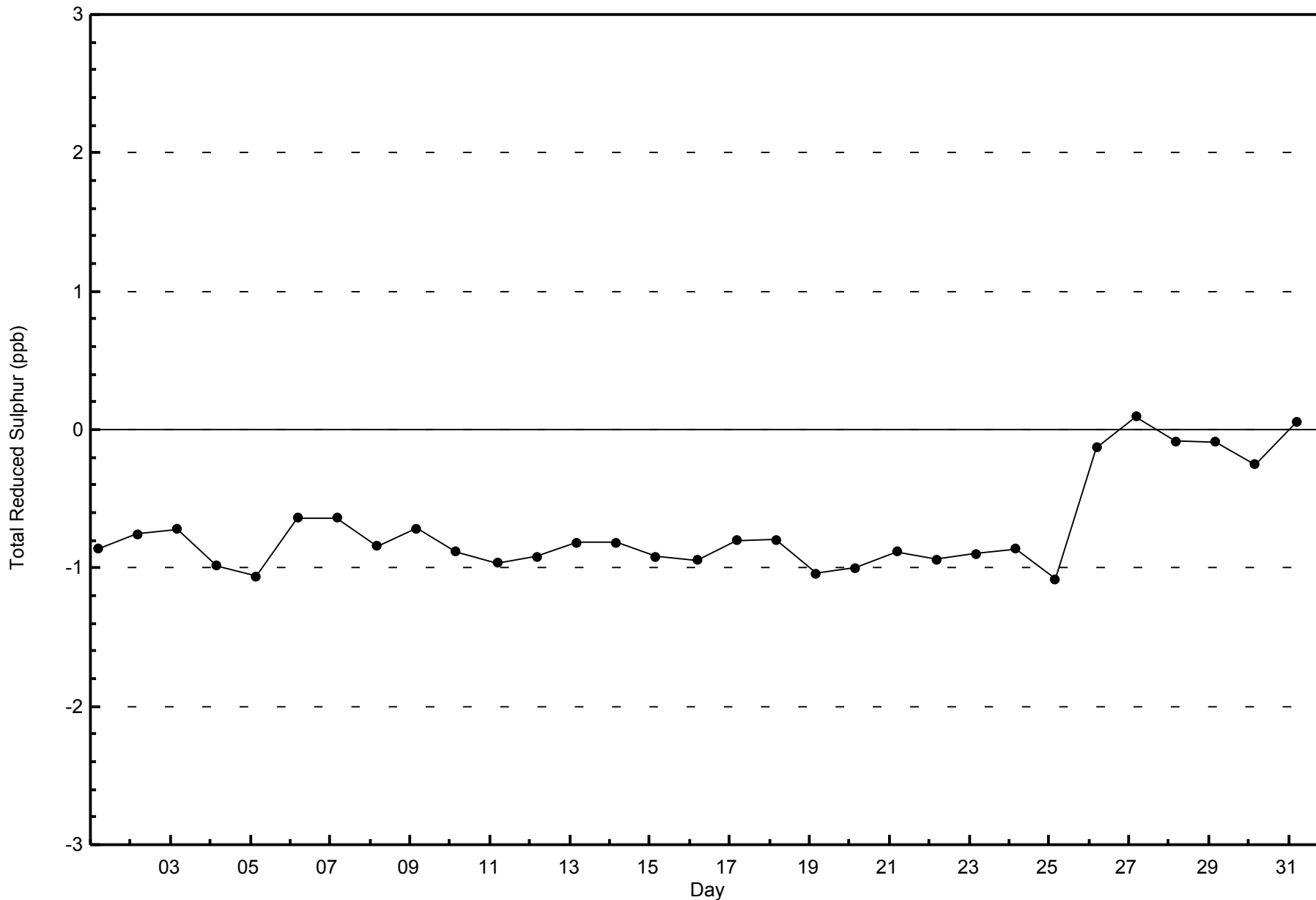


WBEA NETWORK

Zero Responses

Total Reduced Sulphur (TRS) - ppb

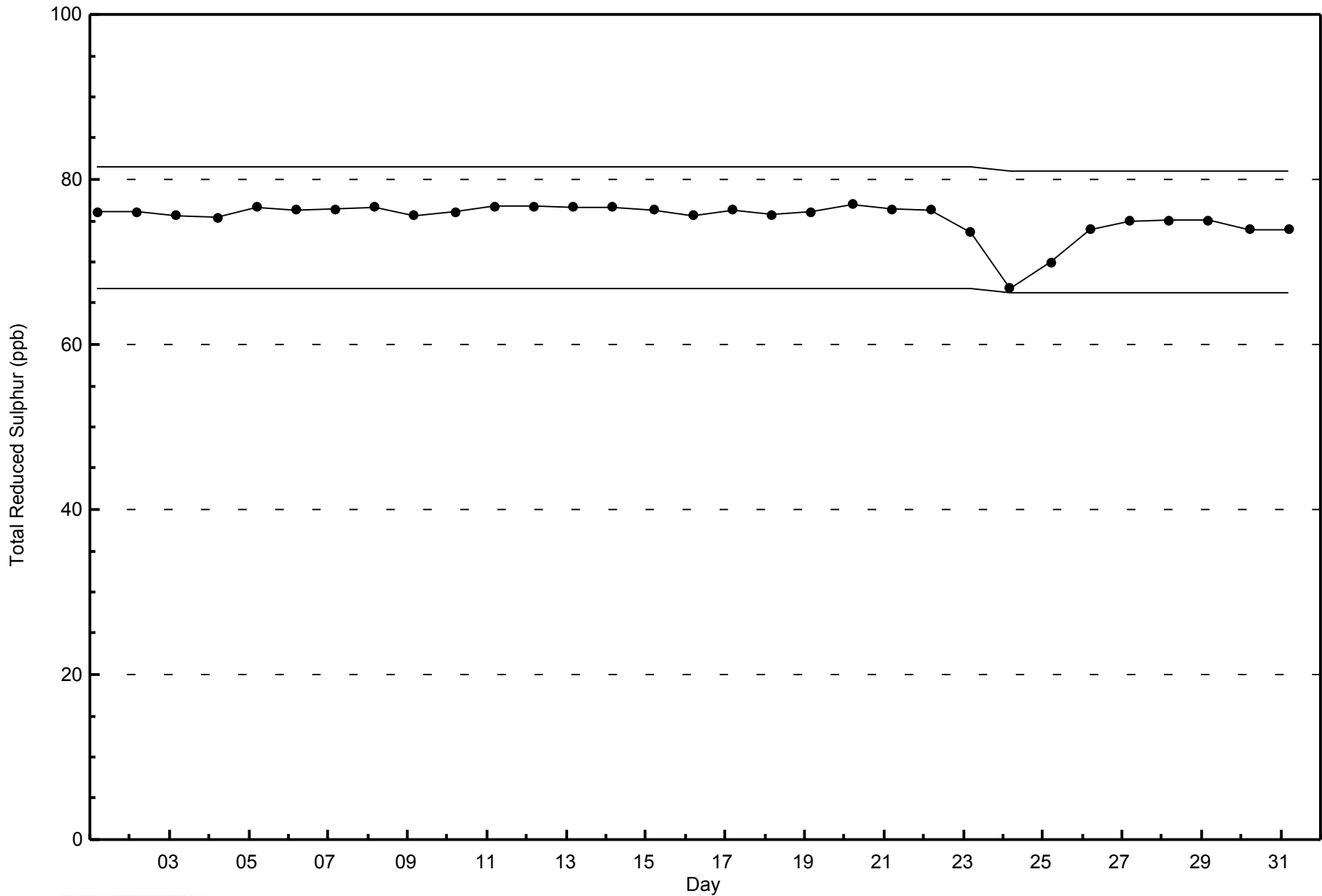
Athabasca Valley - July 2014





WBEA NETWORK
Span Responses

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - July 2014



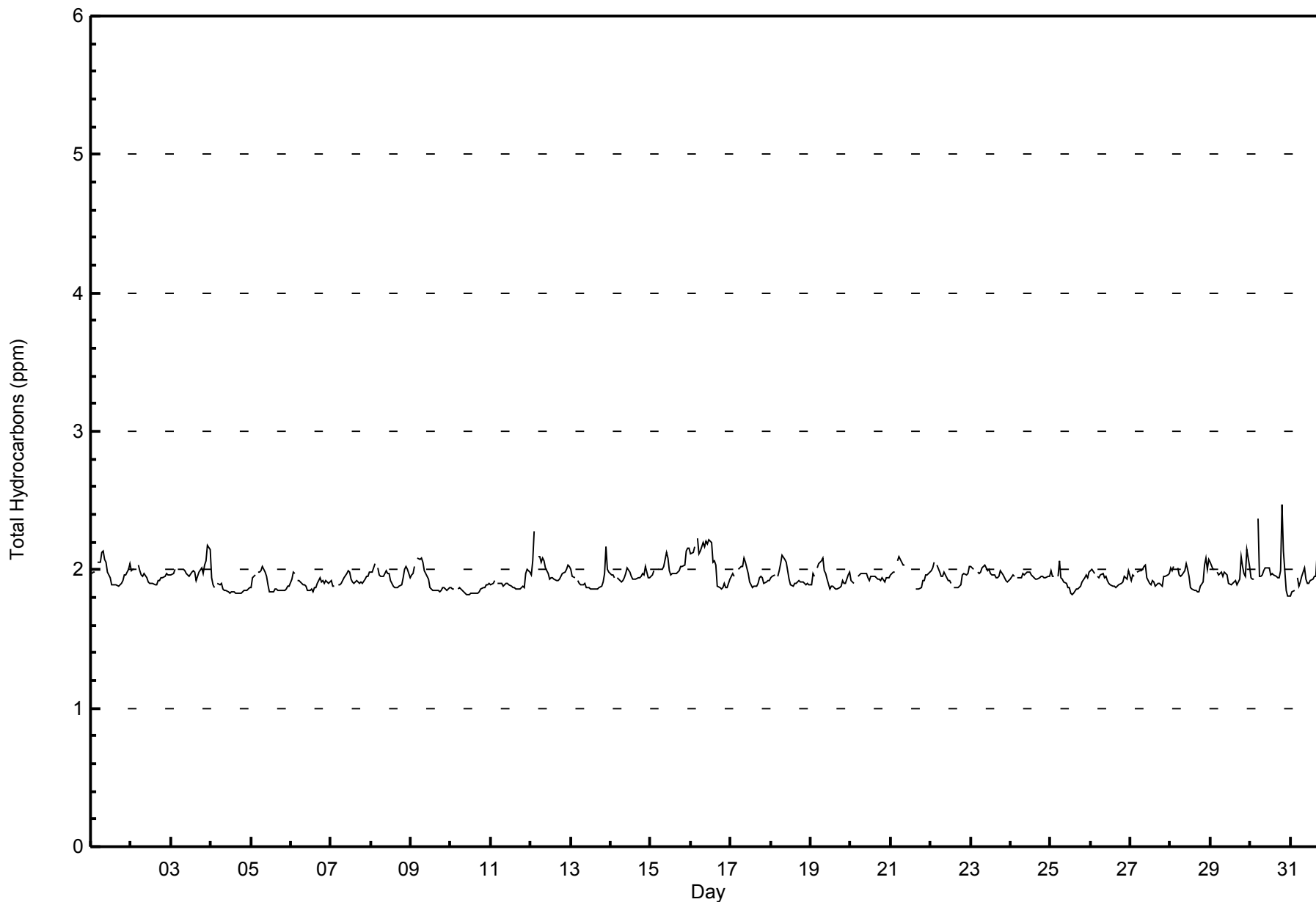


Maximum Value: 2.5 ppm on Jul 30 20:00		Maximum Daily Average: 2.1 ppm on Jul 16		Hours in Service: 744																							
Minimum Value: 1.8 ppm on Jul 31 00:00		Minimum Daily Average: 1.9 ppm on Jul 10		Hours of Data: 706																							
Maximum Diurnal Average: 2.0 ppm at hour 5		Minimum Diurnal Average: 1.9 ppm at hour 16		Hours of Missing Data: 38																							
Monthly Average: 1.95 ppm		Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.2		Hours of Calibration: 37																							
				Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.1
2-Jul	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0
3-Jul	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.0	2.2	
4-Jul	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9
5-Jul	1.9	1.9	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.0
6-Jul	1.9	2.0	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
7-Jul	1.9	1.9	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	2.0	2.0	2.0	2.0	1.9	2.0
8-Jul	2.0	2.0	2.0	Z	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0	2.0
9-Jul	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
10-Jul	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
11-Jul	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	
12-Jul	2.0	2.1	2.3	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.3
13-Jul	2.0	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.0	2.0	1.9	2.2	
14-Jul	2.0	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.0	
15-Jul	2.0	2.0	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	2.1	2.2	2.2	2.0	2.2	
16-Jul	2.1	2.1	2.2	Z	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.2
17-Jul	2.0	2.0	2.0	Z	2.0	2.0	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	2.0	1.9	1.9	1.9	1.9	2.1	
18-Jul	1.9	1.9	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	
19-Jul	1.9	2.0	2.0	Z	2.0	2.0	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	2.0	2.0	1.9	2.1	
20-Jul	1.9	1.9	1.9	Z	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
21-Jul	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.0	2.0	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	--	2.1	
22-Jul	2.0	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	M	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1	
23-Jul	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	
24-Jul	1.9	2.0	2.0	Z	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	
25-Jul	2.0	2.0	2.0	Z	2.0	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	2.1	
26-Jul	2.0	2.0	2.0	Z	2.0	1.9	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	1.9	2.0	
27-Jul	1.9	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	2.0	
28-Jul	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	2.0	2.1	2.0	2.1	2.0	2.1	
29-Jul	2.1	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.0	2.0	2.0	2.2	2.0	2.0	2.2	
30-Jul	1.9	1.9	1.9	Z	2.4	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.5	2.1	1.9	1.8	1.8	2.0	2.5	
31-Jul	1.8	1.8	1.9	Z	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.2	2.3	2.2	2.1	2.1	2.1	2.2	2.0	2.3	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											



WBEA NETWORK
Hourly Averages

Total Hydrocarbons (THC) - ppm
Athabasca Valley - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Athabasca Valley - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	638	90.37	90.37
2.1 - 3.0	68	9.63	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Athabasca Valley - July 2014

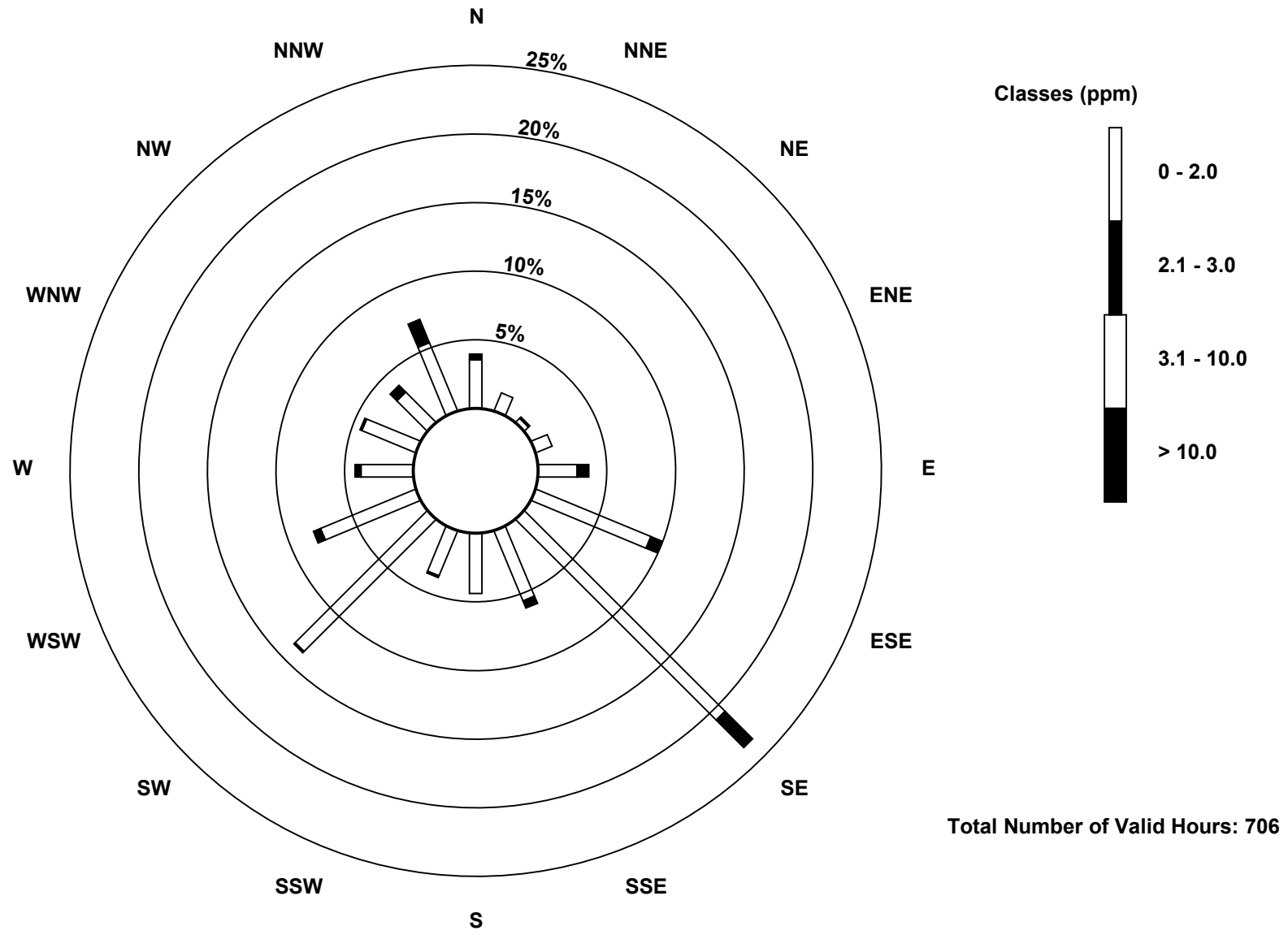
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	25	10	3	9	20	64	146	39	31	25	96	53	27	30	22	38	638
2.1 - 3.0	3	0	1	0	6	6	20	4	0	1	1	4	3	1	5	13	68
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	28	10	4	9	26	70	166	43	31	26	97	57	30	31	27	51	706

Total Number of Valid Hours: 706

Total Number of Hours: 744

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

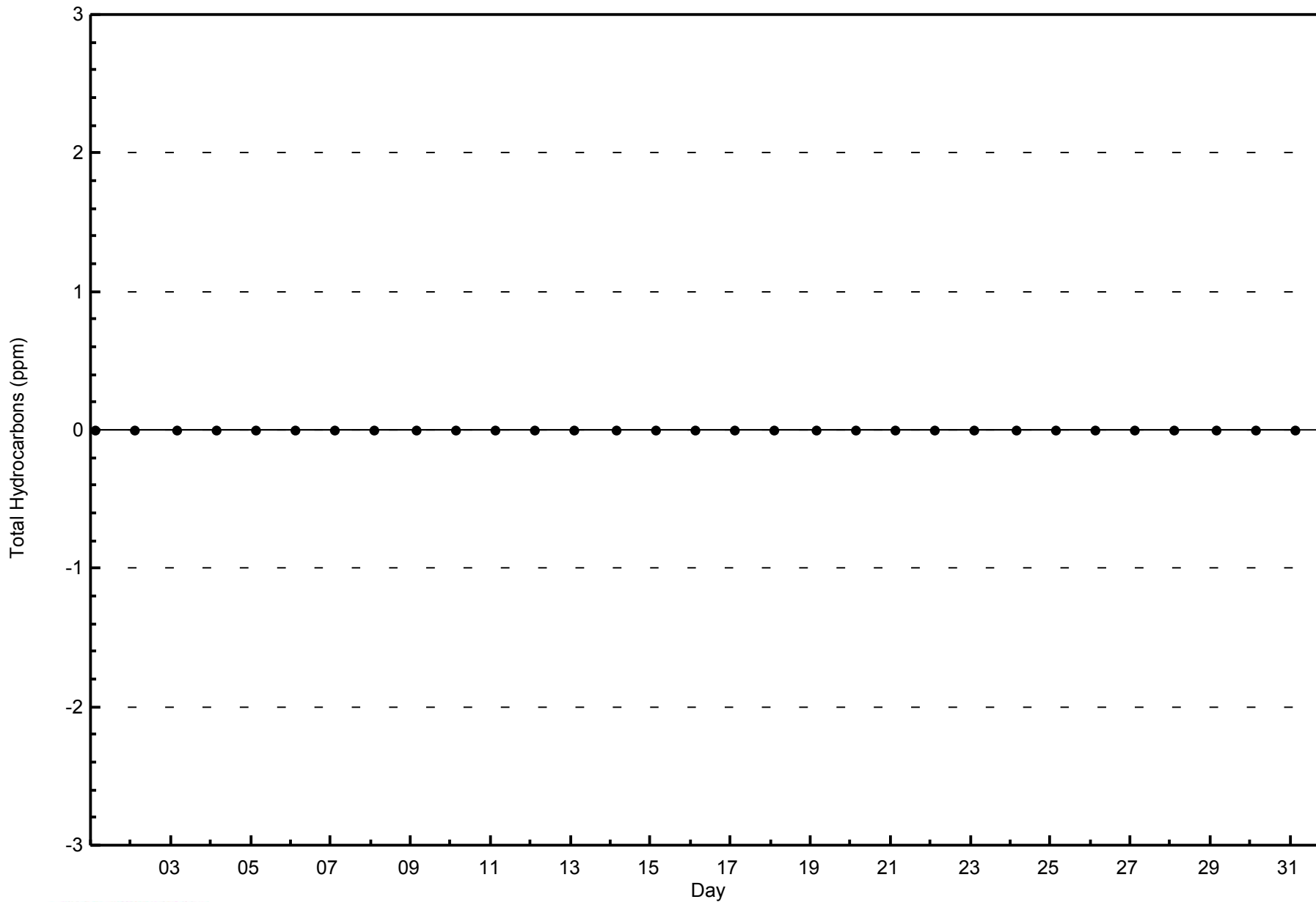
**Total Hydrocarbons (THC) - ppm
Athabasca Valley (AMS 7)**





WBEA NETWORK
Zero Responses

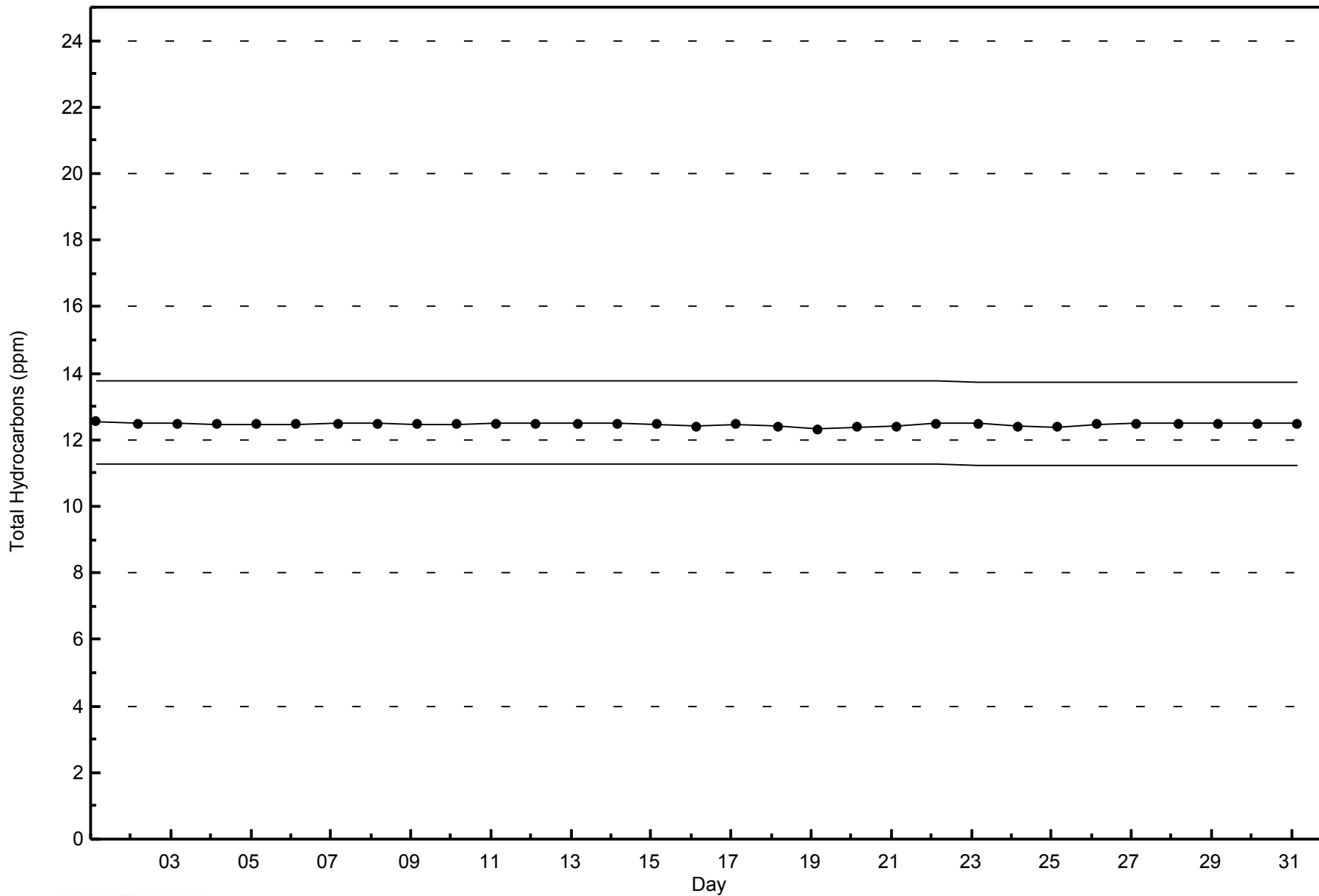
Total Hydrocarbons (THC) - ppm
Athabasca Valley - July 2014





WBEA NETWORK
Span Responses

Total Hydrocarbons (THC) - ppm
Athabasca Valley - July 2014



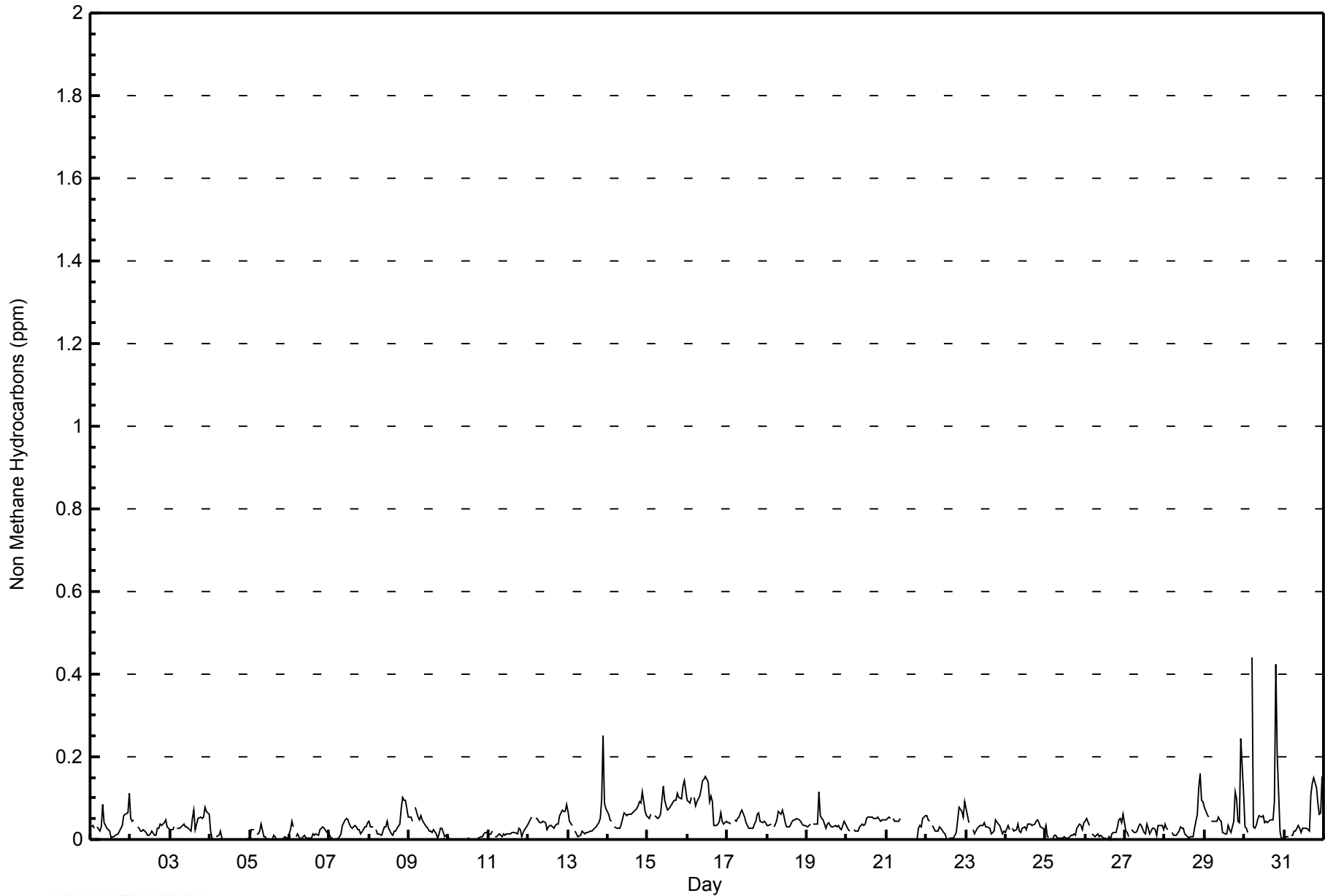


Maximum Value: 0.441 ppm on Jul 30 05:00		Maximum Daily Average: 0.086 ppm on Jul 16		Hours in Service: 744																											
Minimum Value: 0.000 ppm on Jul 4 11:00		Minimum Daily Average: 0.003 ppm on Jul 4		Hours of Data: 706																											
Maximum Diurnal Average: 0.057 ppm at hour 20		Minimum Diurnal Average: 0.025 ppm at hour 16		Hours of Missing Data: 38																											
Monthly Average: 0.037 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.1 P ₉₉ = 0.1		Hours of Calibration: 37																											
				Percent Operational Time: 99.9																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Jul	0.032	0.035	0.026	Z	0.031	0.022	0.030	0.083	0.041	0.035	0.026	0.019	0.004	0.007	0.008	0.011	0.013	0.021	0.027	0.035	0.056	0.059	0.065	0.112	0.035	0.112					
2-Jul	0.052	0.044	0.046	Z	0.032	0.026	0.019	0.019	0.024	0.018	0.012	0.011	0.013	0.019	0.011	0.012	0.026	0.029	0.038	0.033	0.042	0.048	0.032	0.028	0.027	0.052					
3-Jul	0.023	0.024	0.029	Z	0.028	0.028	0.029	0.034	0.036	0.029	0.031	0.028	0.020	0.052	0.072	0.022	0.039	0.052	0.055	0.051	0.055	0.077	0.068	0.061	0.041	0.077					
4-Jul	0.019	0.003	0.001	Z	0.006	0.009	0.019	0.005	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	0.001	0.003	0.003	0.019					
5-Jul	0.003	0.023	0.022	Z	0.015	0.015	0.020	0.036	0.008	0.006	0.001	0.000	0.000	0.000	0.009	0.007	0.000	0.001	0.001	0.001	0.005	0.007	0.005	0.005	0.008	0.036					
6-Jul	0.023	0.045	0.032	Z	0.008	0.013	0.002	0.002	0.006	0.011	0.002	0.004	0.005	0.003	0.012	0.009	0.013	0.011	0.024	0.028	0.032	0.027	0.016	0.018	0.015	0.045					
7-Jul	0.010	0.002	0.003	Z	0.001	0.003	0.008	0.015	0.035	0.047	0.052	0.047	0.036	0.030	0.026	0.035	0.030	0.023	0.024	0.014	0.023	0.030	0.029	0.040	0.025	0.052					
8-Jul	0.045	0.031	0.030	Z	0.022	0.014	0.013	0.011	0.021	0.031	0.032	0.044	0.027	0.012	0.010	0.019	0.021	0.028	0.036	0.073	0.100	0.096	0.094	0.053	0.037	0.100					
9-Jul	0.054	0.055	0.043	Z	0.078	0.054	0.047	0.057	0.048	0.041	0.031	0.028	0.019	0.022	0.018	0.024	0.013	0.003	0.014	0.028	0.027	0.006	0.010	0.010	0.032	0.078					
10-Jul	0.005	0.001	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.000	0.000	0.001	0.000	0.003	0.005	0.007	0.015	0.016	0.003	0.017					
11-Jul	0.009	0.014	0.019	Z	0.006	0.008	0.012	0.010	0.007	0.012	0.012	0.014	0.015	0.015	0.018	0.016	0.016	0.014	0.027	0.025	0.008	0.015	0.024	0.035	0.015	0.035					
12-Jul	0.041	0.047	0.053	Z	0.051	0.052	0.043	0.041	0.039	0.045	0.042	0.024	0.030	0.035	0.032	0.029	0.032	0.038	0.037	0.057	0.072	0.068	0.067	0.085	0.046	0.085					
13-Jul	0.068	0.045	0.033	Z	0.021	0.013	0.008	0.010	0.020	0.017	0.013	0.017	0.015	0.020	0.020	0.023	0.027	0.032	0.039	0.050	0.095	0.251	0.090	0.075	0.044	0.251					
14-Jul	0.060	0.048	0.043	Z	0.032	0.028	0.027	0.027	0.037	0.051	0.063	0.058	0.060	0.062	0.062	0.064	0.071	0.074	0.081	0.090	0.088	0.114	0.067	0.058	0.059	0.114					
15-Jul	0.054	0.049	0.060	Z	0.059	0.056	0.051	0.055	0.060	0.130	0.094	0.080	0.070	0.075	0.086	0.091	0.095	0.094	0.111	0.100	0.099	0.130	0.144	0.120	0.085	0.144					
16-Jul	0.094	0.088	0.102	Z	0.101	0.082	0.092	0.106	0.120	0.143	0.147	0.152	0.139	0.091	0.104	0.090	0.035	0.034	0.036	0.044	0.063	0.045	0.037	0.043	0.086	0.152					
17-Jul	0.042	0.041	0.038	Z	0.048	0.044	0.051	0.053	0.065	0.070	0.056	0.039	0.035	0.027	0.028	0.027	0.039	0.044	0.060	0.065	0.046	0.042	0.043	0.039	0.045	0.070					
18-Jul	0.034	0.033	0.038	Z	0.030	0.036	0.047	0.067	0.060	0.071	0.058	0.040	0.032	0.031	0.038	0.044	0.048	0.048	0.050	0.048	0.046	0.037	0.034	0.034	0.044	0.071					
19-Jul	0.031	0.035	0.036	Z	0.038	0.036	0.038	0.114	0.059	0.053	0.047	0.029	0.037	0.042	0.034	0.030	0.030	0.035	0.030	0.035	0.030	0.027	0.024	0.043	0.040	0.114					
20-Jul	0.032	0.025	0.020	Z	0.023	0.020	0.020	0.021	0.032	0.039	0.035	0.038	0.051	0.054	0.053	0.055	0.052	0.052	0.052	0.054	0.045	0.049	0.049	0.046	0.040	0.055					
21-Jul	0.047	0.055	0.050	Z	0.050	0.045	0.043	0.044	0.050	C	C	C	C	C	C	0.000	0.000	0.001	0.001	0.027	0.034	0.031	0.052	0.057	--	0.057					
22-Jul	0.057	0.048	0.043	Z	0.033	0.022	0.022	0.020	0.031	0.026	0.017	0.015	0.005	M	0.003	0.003	0.003	0.009	0.016	0.048	0.079	0.068	0.053	0.092	0.032	0.092					
23-Jul	0.074	0.056	0.040	Z	0.023	0.013	0.019	0.028	0.034	0.035	0.035	0.041	0.030	0.030	0.028	0.014	0.015	0.020	0.046	0.036	0.035	0.022	0.015	0.019	0.031	0.074					
24-Jul	0.017	0.035	0.025	Z	0.029	0.021	0.025	0.038	0.019	0.018	0.028	0.031	0.025	0.038	0.036	0.036	0.035	0.039	0.044	0.047	0.041	0.030	0.028	0.020	0.031	0.047					
25-Jul	0.032	0.008	0.008	Z	0.002	0.012	0.011	0.005	0.003	0.003	0.004	0.007	0.002	0.003	0.002	0.010	0.011	0.014	0.009	0.026	0.037	0.036	0.023	0.042	0.013	0.042					
26-Jul	0.045	0.052	0.033	Z	0.013	0.011	0.007	0.015	0.006	0.011	0.007	0.004	0.003	0.002	0.008	0.001	0.012	0.016	0.018	0.030	0.049	0.051	0.041	0.060	0.021	0.060					
27-Jul	0.020	0.018	0.006	Z	0.024	0.018	0.018	0.022	0.032	0.037	0.033	0.017	0.014	0.036	0.029	0.013	0.028	0.027	0.023	0.010	0.034	0.034	0.033	0.024	0.024	0.037					
28-Jul	0.036	0.027	0.025	Z	0.018	0.010	0.012	0.009	0.019	0.030	0.027	0.027	0.013	0.010	0.005	0.008	0.007	0.006	0.028	0.060	0.124	0.160	0.096	0.091	0.037	0.160					
29-Jul	0.077	0.060	0.054	Z	0.044	0.043	0.044	0.043	0.056	0.048	0.043	0.018	0.014	0.013	0.033	0.022	0.015	0.043	0.116	0.099	0.045	0.041	0.244	0.111	0.058	0.244					
30-Jul	0.032	0.026	0.017	Z	0.441	0.029	0.027	0.034	0.049	0.056	0.055	0.056	0.041	0.045	0.040	0.048	0.048	0.049	0.093	0.425	0.203	0.020	0.001	0.003	0.080	0.441					
31-Jul	0.002	0.006	0.007	Z	0.009	0.010	0.022	0.022	0.032	0.026	0.018	0.026	0.027	0.026	0.025	0.020	0.108	0.135	0.151	0.125	0.089	0.061	0.065	0.153	0.051	0.153					
		0.038	0.035	0.032	--	0.042	0.026	0.027	0.034	0.034	0.038	0.034	0.030	0.026	0.028	0.028	0.025	0.028	0.032	0.042	0.057	0.055	0.051	0.051	Diurnal Average						
		0.094	0.088	0.102	--	0.441	0.082	0.092	0.114	0.120	0.143	0.147	0.152	0.139	0.091	0.104	0.091	0.108	0.135	0.151	0.425	0.203	0.251	0.244	0.153	Diurnal Maximum					
Z - zerospan		C - Calibration		M - Maintenance																											



WBEA NETWORK
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	86	12.18	12.18
0.006 - 0.05	496	70.25	82.44
0.06 - 0.1	115	16.29	98.73
> 0.1	9	1.27	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - July 2014

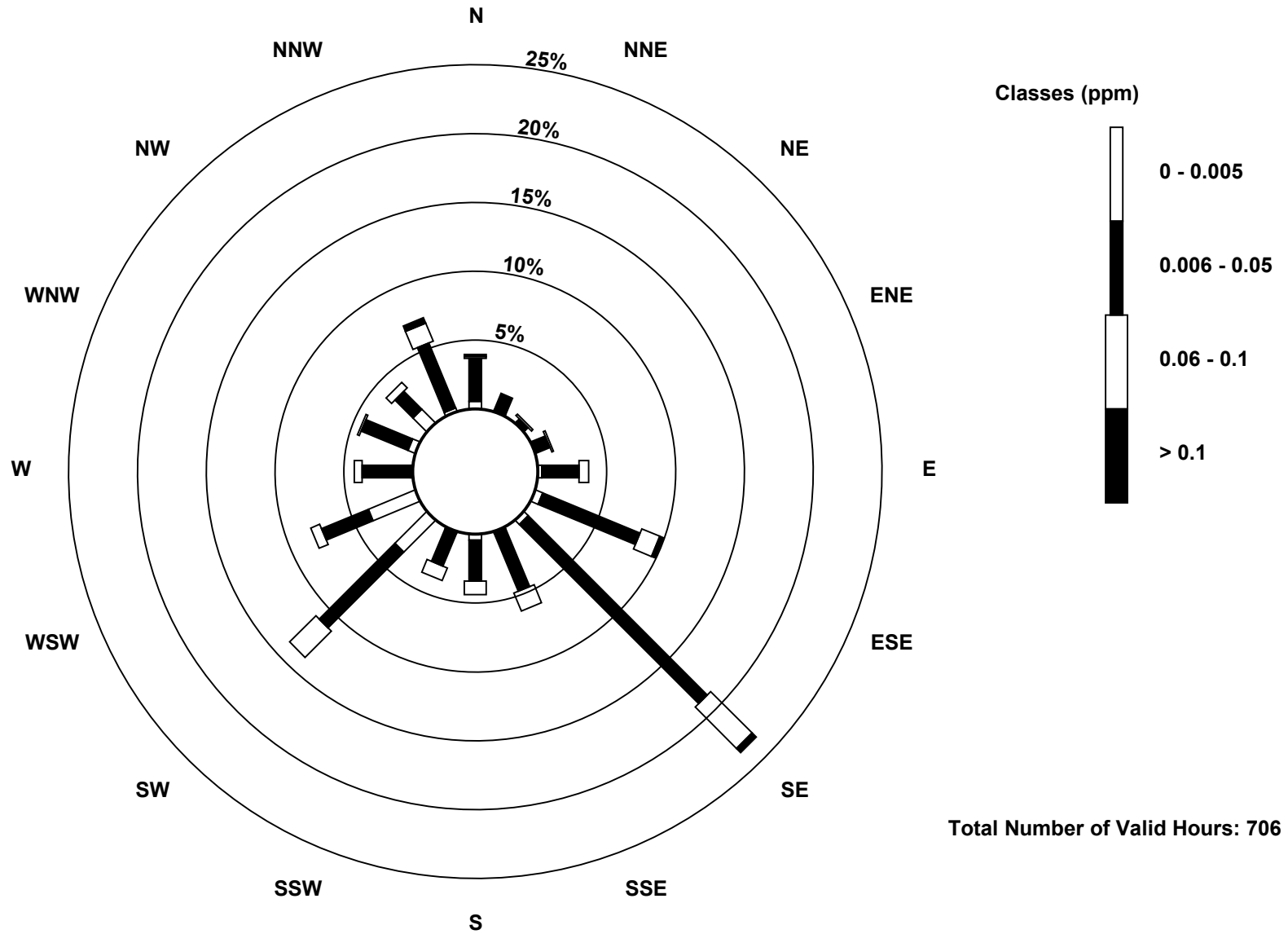
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	4	1	1	0	2	4	3	1	3	1	23	26	1	4	10	2	86
0.006 - 0.05	22	9	2	8	19	54	130	32	21	18	55	26	25	26	13	36	496
0.06 - 0.1	1	0	1	1	5	10	30	10	7	7	19	5	4	1	4	10	115
> 0.1	1	0	0	0	0	2	3	0	0	0	0	0	0	0	0	3	9
Totals	28	10	4	9	26	70	166	43	31	26	97	57	30	31	27	51	706

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley (AMS 7)



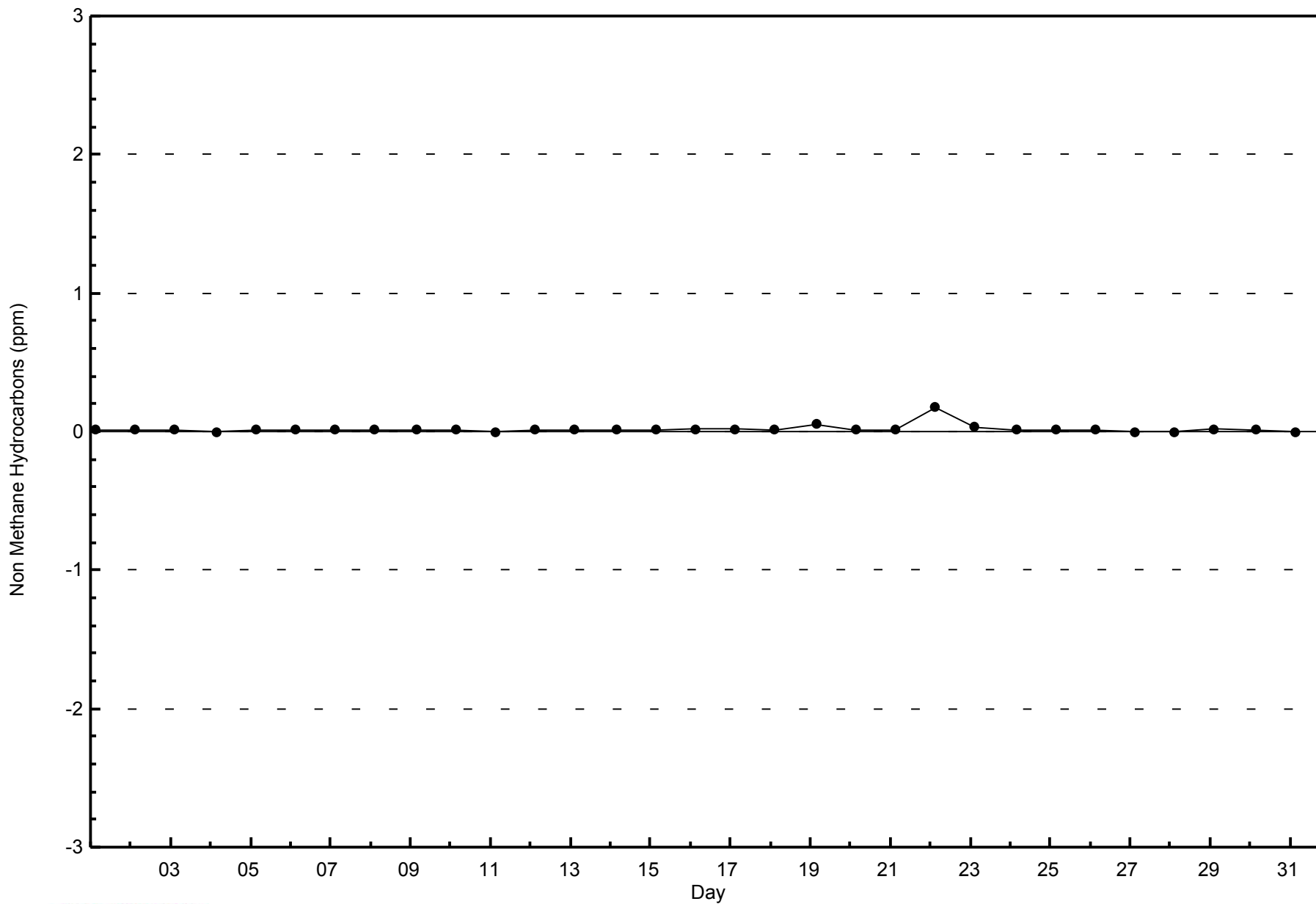


WBEA NETWORK

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

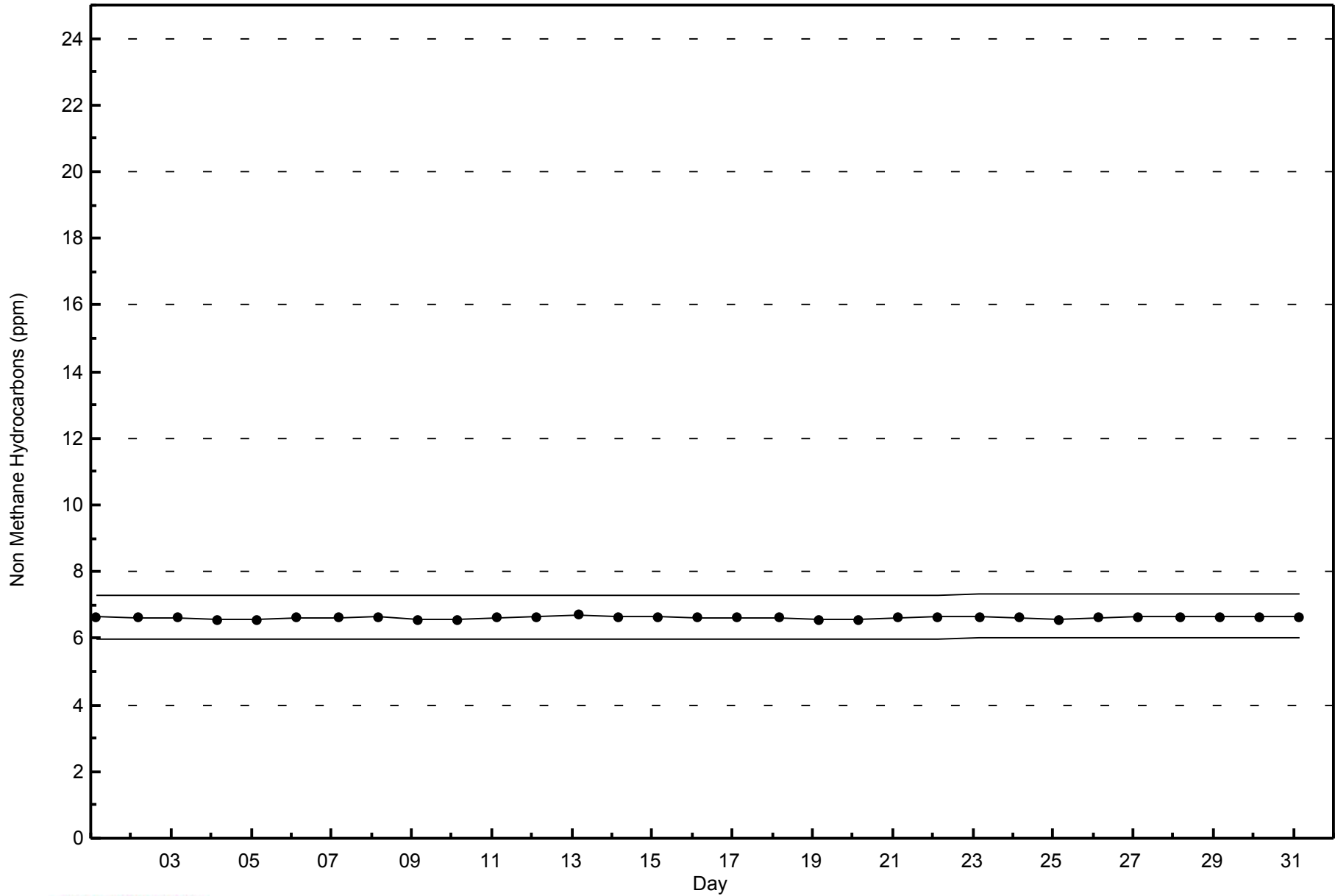
Athabasca Valley - July 2014





WBEA NETWORK
Span Responses

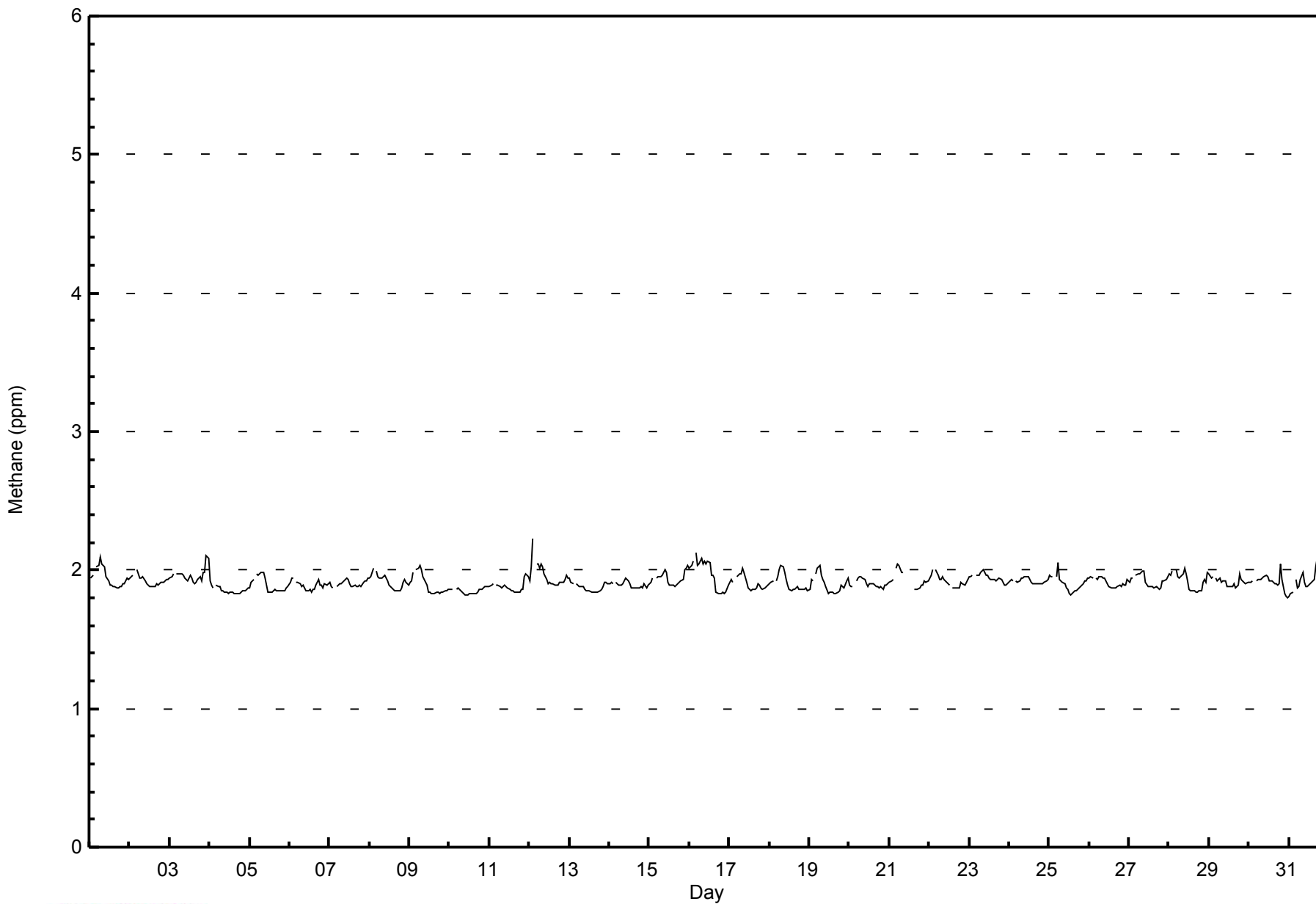
Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - July 2014





WBEA NETWORK
Hourly Averages

Methane (CH₄) - ppm
Athabasca Valley - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Athabasca Valley - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	692	98.02	98.02
2.1 - 3.0	14	1.98	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Methane (CH₄) - ppm
Athabasca Valley - July 2014

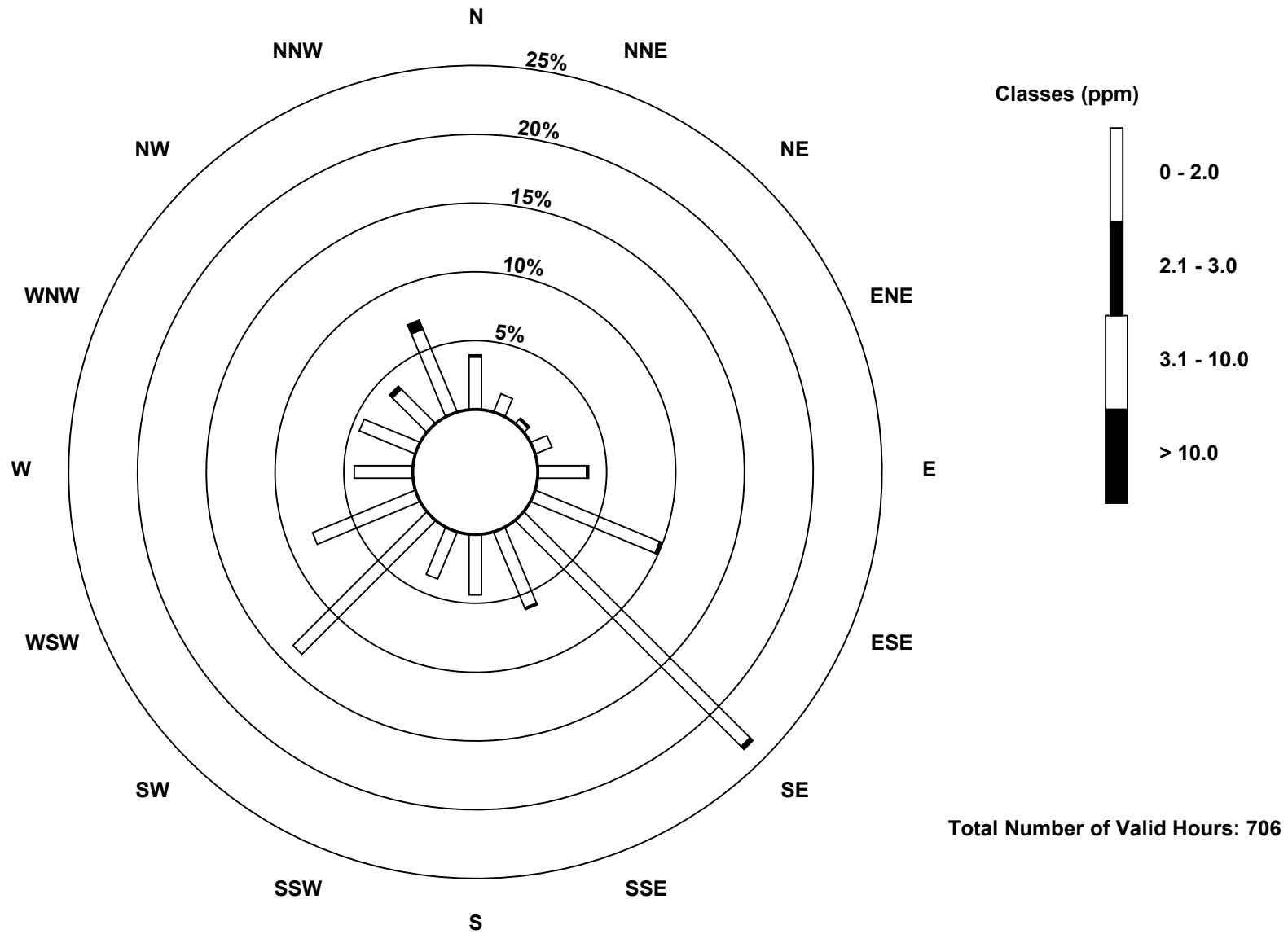
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	27	10	3	9	25	69	164	42	31	26	97	57	30	31	25	46	692
2.1 - 3.0	1	0	1	0	1	1	2	1	0	0	0	0	0	0	2	5	14
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	28	10	4	9	26	70	166	43	31	26	97	57	30	31	27	51	706

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Methane (CH₄) - ppm
Athabasca Valley (AMS 7)

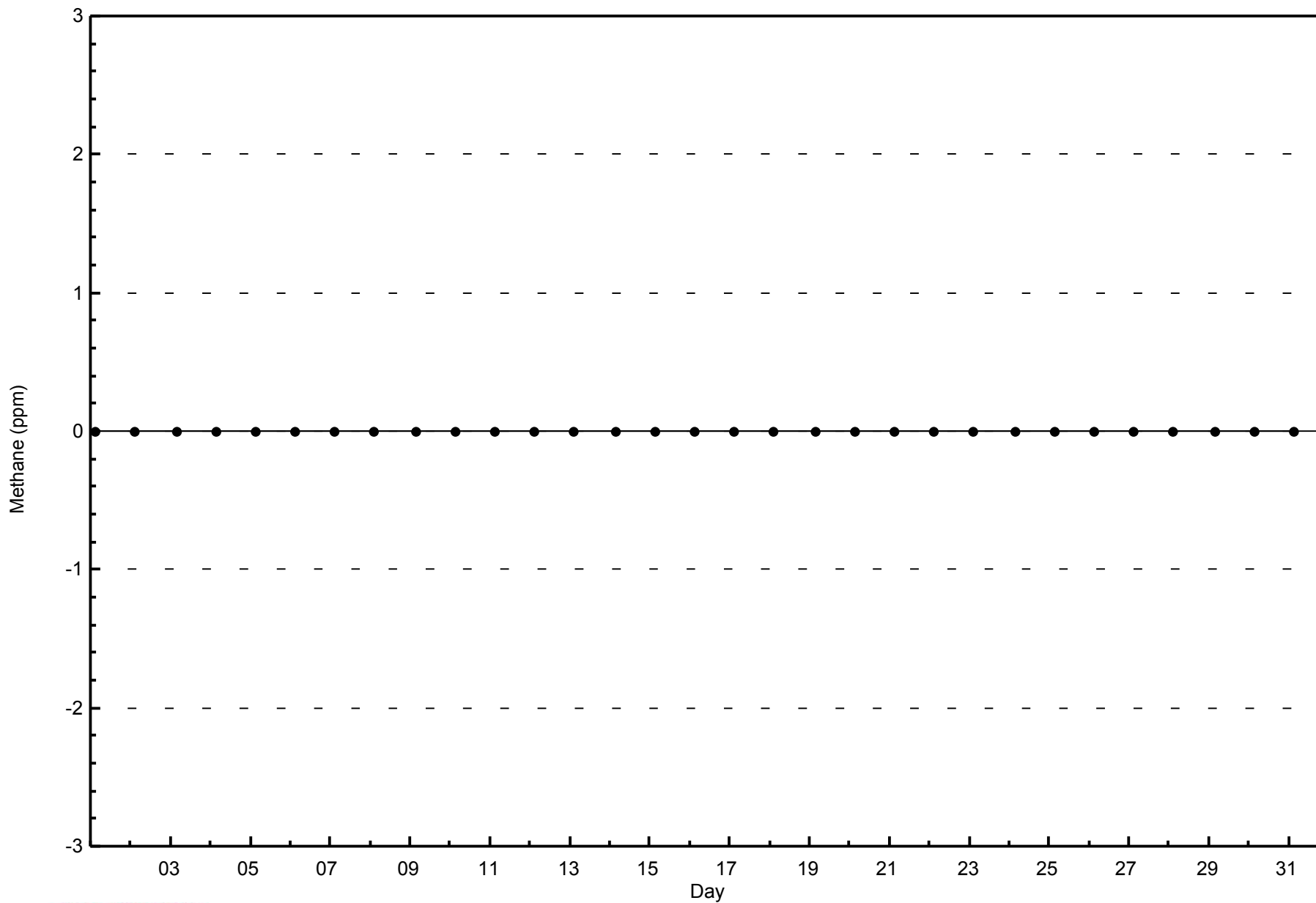




WBEA NETWORK

Zero Responses

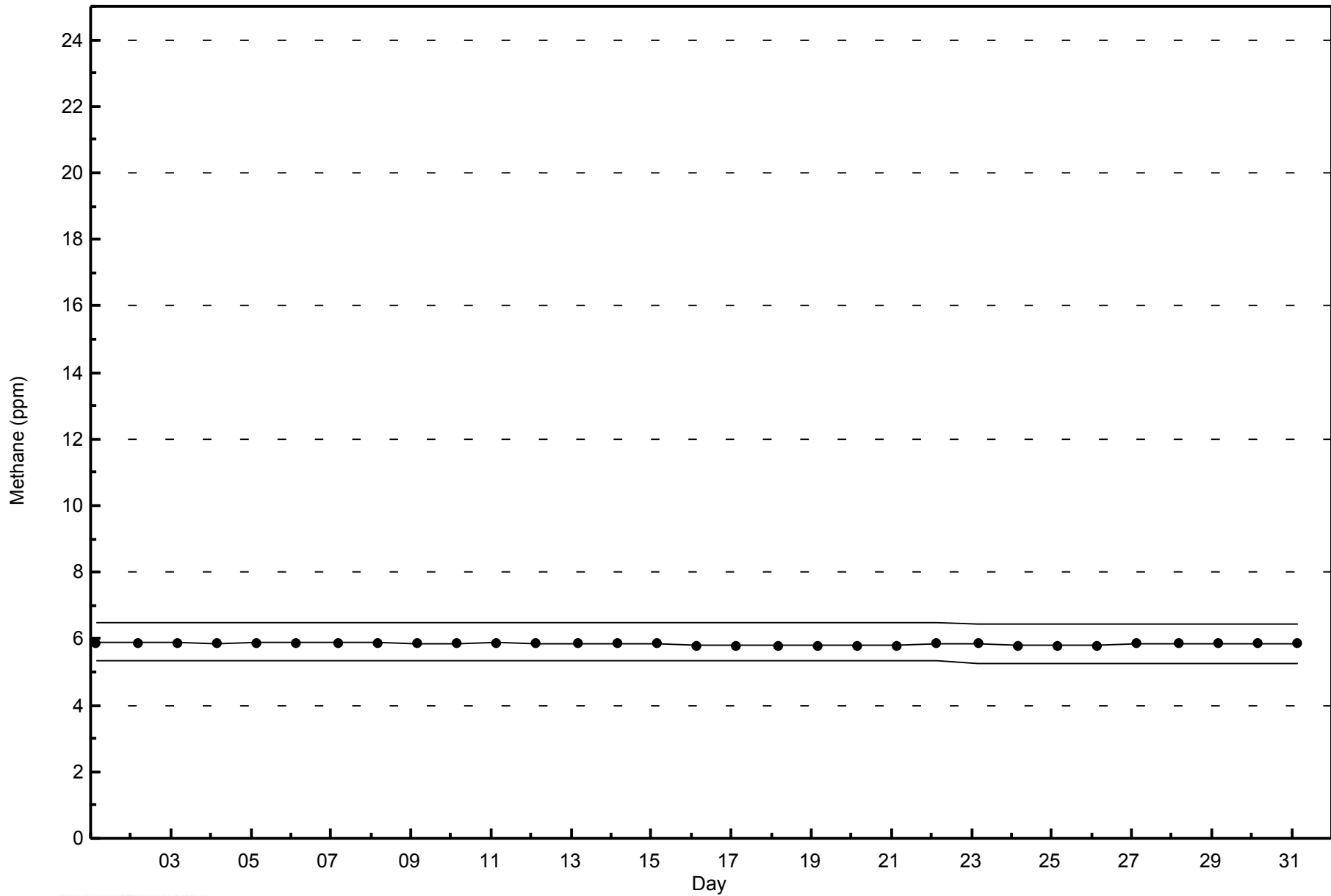
Methane (CH₄) - ppm
Athabasca Valley - July 2014





WBEA NETWORK
Span Responses

Methane (CH₄) - ppm
Athabasca Valley - July 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 62 ppb on Jul 12 18:00	Maximum Daily Average: 30.9 ppb on Jul 4		Hours of Data:	709
Minimum Value: 1 ppb on Jul 21 05:00	Minimum Daily Average: 14.9 ppb on Jul 11		Hours of Missing Data:	35
Maximum Diurnal Average: 35.1 ppb at hour 16	Minimum Diurnal Average: 9.8 ppb at hour 5		Hours of Calibration:	35
Monthly Average: 22.7 ppb	Percentiles: P ₁ = 3 P ₁₀ = 8 Q ₁ = 13 Median = 22 Q ₃ = 31 P ₉₀ = 40 P ₉₉ = 55		Percent Operational Time:	100.0

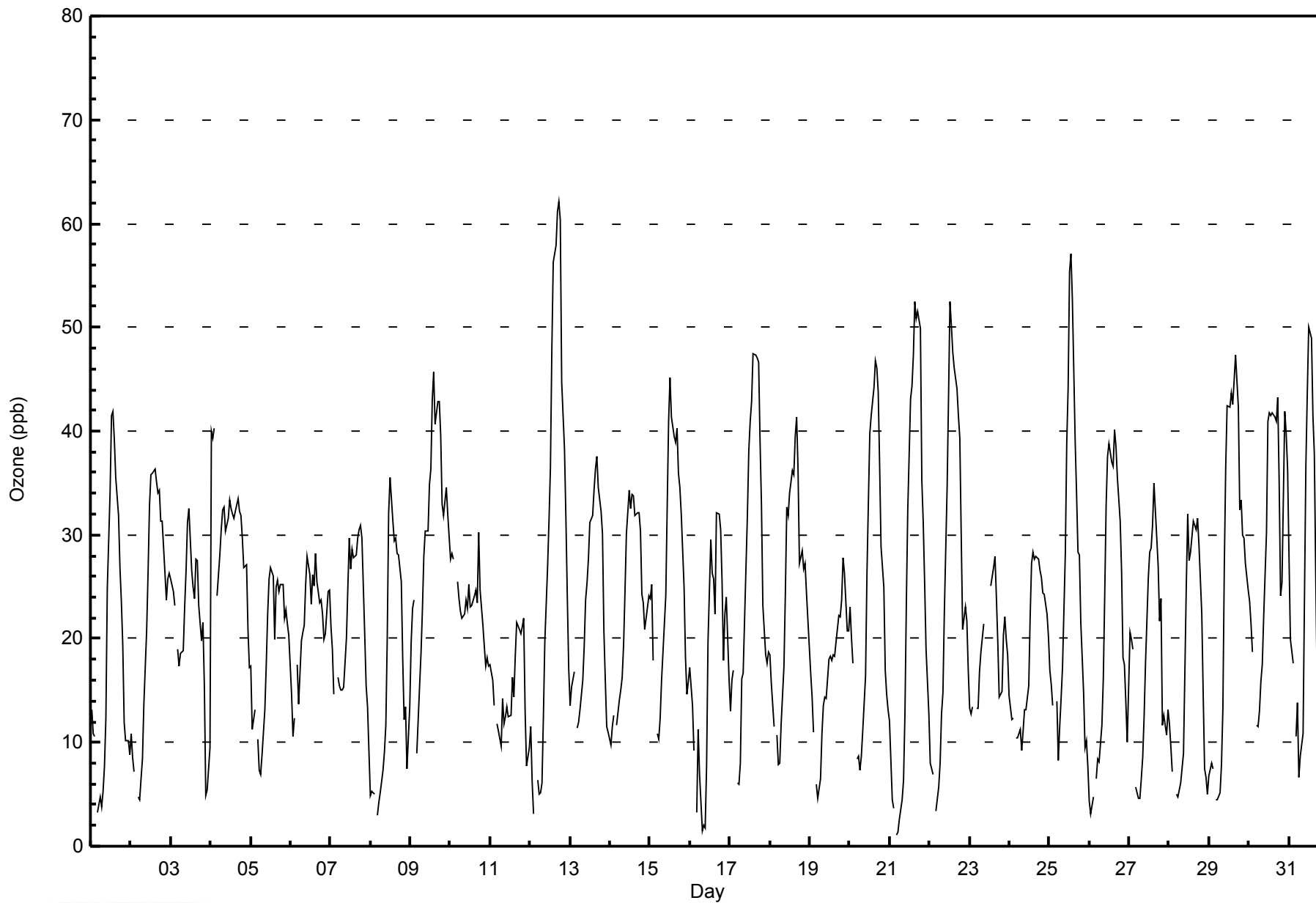
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	13	11	11	Z	3	5	4	5	8	12	25	34	41	42	39	35	32	27	24	19	12	10	10	9	18.8	42
2-Jul	11	8	7	Z	5	4	6	8	14	21	27	33	36	36	36	35	34	34	31	31	26	24	26	26	22.6	36
3-Jul	26	25	23	Z	19	17	19	19	23	27	31	33	27	25	24	28	27	23	20	22	15	5	5	10	21.4	33
4-Jul	40	39	40	Z	24	28	30	32	33	30	32	33	33	32	32	32	34	32	32	30	27	27	21	17	30.9	40
5-Jul	17	11	13	Z	10	7	7	9	13	17	22	26	27	26	20	25	26	24	25	25	22	23	21	20	19.1	27
6-Jul	15	11	12	Z	17	14	20	21	21	25	28	26	23	26	25	28	25	23	24	22	20	21	25	25	21.6	28
7-Jul	21	19	15	Z	16	16	15	15	15	20	25	30	27	29	28	28	30	31	31	30	20	16	13	9	21.6	31
8-Jul	5	5	5	Z	3	4	5	7	9	12	20	32	36	31	29	30	28	28	26	18	12	13	8	13	16.5	36
9-Jul	20	23	24	Z	9	15	19	23	28	30	30	35	36	43	46	41	43	43	40	33	32	35	32	30	30.8	46
10-Jul	28	28	28	Z	26	24	23	22	22	24	23	25	23	23	24	25	23	30	25	21	19	17	18	17	23.4	30
11-Jul	17	16	14	Z	12	11	10	14	12	13	13	12	13	16	14	18	22	21	20	21	22	13	8	10	14.9	22
12-Jul	12	6	3	Z	6	5	5	6	12	20	27	31	36	48	56	58	61	62	60	45	38	32	24	17	29.2	62
13-Jul	14	15	17	Z	11	12	13	16	19	24	25	28	31	32	34	36	38	35	32	30	21	16	11	11	22.7	38
14-Jul	10	12	13	Z	12	14	15	16	19	25	30	34	33	34	34	32	32	32	30	24	23	21	23	24	23.5	34
15-Jul	24	25	18	Z	11	10	12	16	19	24	33	41	45	41	39	39	40	36	35	32	25	18	15	16	26.7	45
16-Jul	17	14	9	Z	3	11	7	2	2	2	8	20	30	26	26	22	32	32	31	25	18	22	24	16	17.3	32
17-Jul	13	16	17	Z	6	6	8	16	17	22	32	38	41	43	47	47	47	47	39	33	23	18	18	19	26.6	47
18-Jul	18	16	12	Z	11	8	8	12	17	24	33	32	34	36	36	39	41	36	27	28	27	27	24	22	24.8	41
19-Jul	17	14	11	Z	6	5	7	11	14	14	14	18	18	18	18	18	20	22	22	24	28	26	21	21	16.8	28
20-Jul	23	20	18	Z	8	9	7	9	11	16	26	33	40	42	44	47	46	44	37	29	25	17	15	13	25.2	47
21-Jul	12	4	4	Z	1	1	3	4	6	13	23	32	43	44	47	52	51	52	50	35	31	25	19	13	24.7	52
22-Jul	8	7	7	Z	3	6	8	13	15	22	35	43	53	50	48	46	44	41	39	30	21	23	22	17	26.2	53
23-Jul	13	13	13	Z	13	13	17	19	21	C	C	C	C	25	27	28	24	20	14	15	20	22	20	18	18.8	28
24-Jul	15	12	12	Z	11	10	11	9	11	13	13	16	22	27	28	28	28	28	27	26	24	24	22	20	19.0	28
25-Jul	17	16	14	Z	14	8	12	14	17	28	39	44	55	57	53	39	34	28	28	22	15	9	10	8	25.2	57
26-Jul	4	3	5	Z	7	8	8	12	16	24	33	38	39	37	37	40	39	36	31	26	18	18	14	10	21.8	40
27-Jul	21	20	19	Z	6	5	5	6	9	12	18	26	28	29	31	35	30	27	22	24	12	13	11	13	18.2	35
28-Jul	12	10	7	Z	5	5	5	6	9	17	25	32	28	28	31	31	31	32	29	22	15	7	7	5	17.3	32
29-Jul	7	8	7	Z	4	4	5	8	13	27	36	42	42	44	43	45	47	42	32	33	30	30	27	25	26.3	47
30-Jul	24	21	19	Z	12	12	13	16	18	22	30	41	42	41	42	41	41	43	35	24	25	42	40	36	29.6	43
31-Jul	28	20	18	Z	11	14	7	9	11	24	37	44	50	49	41	38	26	16	13	12	10	9	9	9	21.9	50
																								Diurnal Average		
																								Diurnal Maximum		

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



WBEA NETWORK
Hourly Averages

Ozone (O₃) - ppb
Athabasca Valley - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	324	45.70	45.70
21 - 50	373	52.61	98.31
51 - 82	12	1.69	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - July 2014

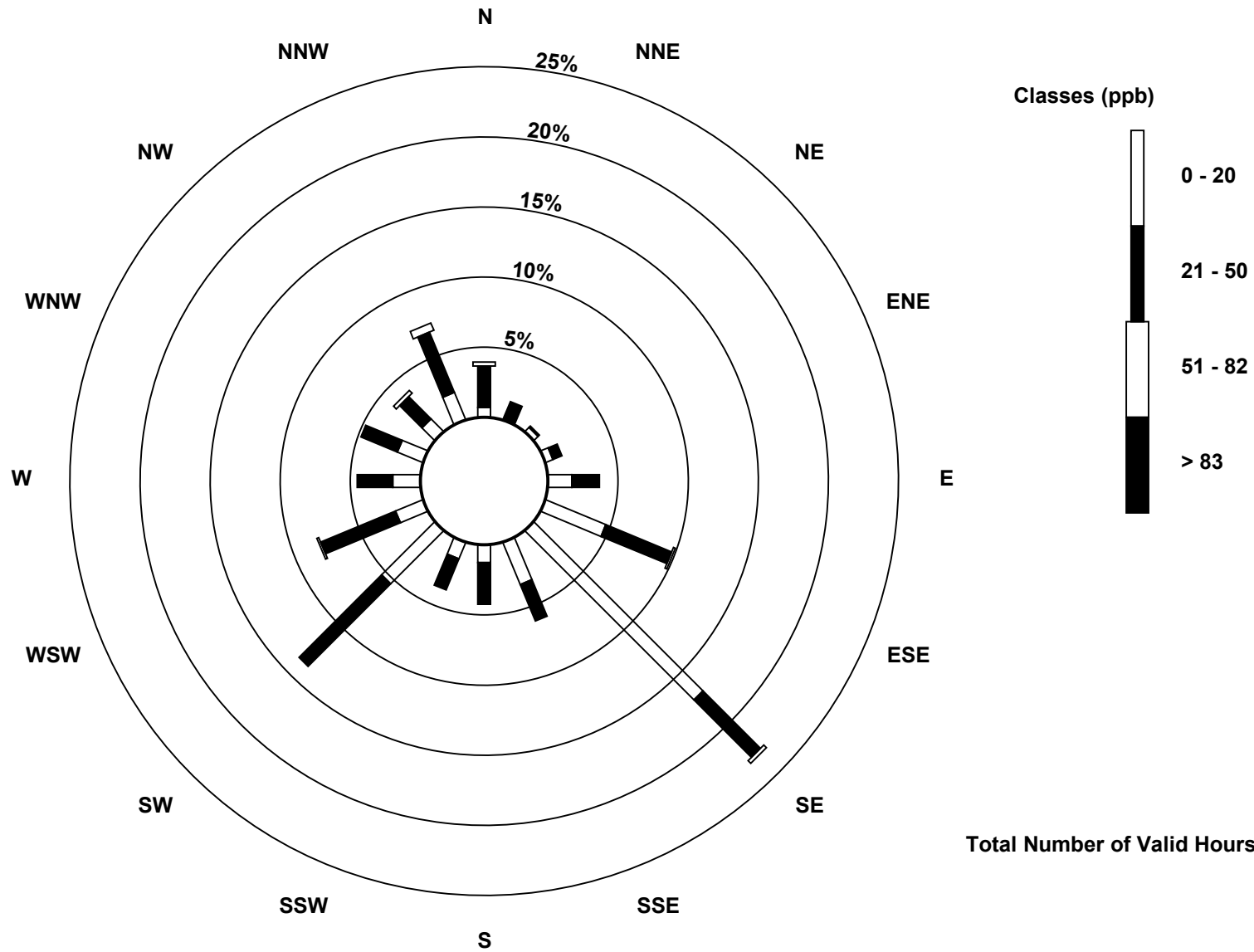
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	5	0	3	4	12	33	121	23	9	9	38	15	14	14	9	15	324
21 - 50	21	10	1	5	14	36	41	20	21	17	59	41	18	20	16	33	373
51 - 82	2	0	0	0	0	1	2	0	0	0	0	1	0	0	2	4	12
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	28	10	4	9	26	70	164	43	30	26	97	57	32	34	27	52	709

Total Number of Valid Hours: 709

Total Number of Hours: 744

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

**Ozone (O₃) - ppb
Athabasca Valley (AMS 7)**

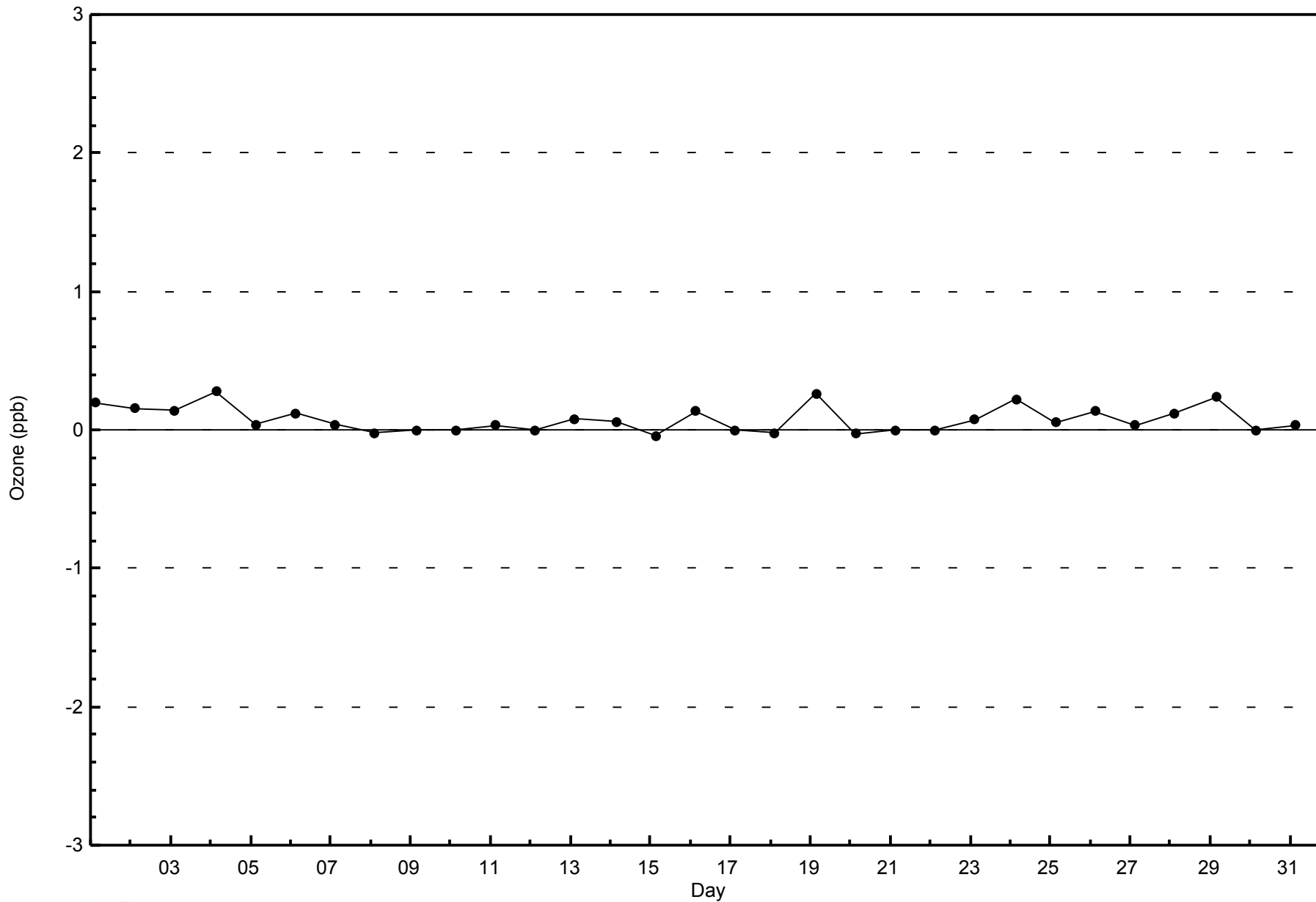


Total Number of Valid Hours: 709



WBEA NETWORK
Zero Responses

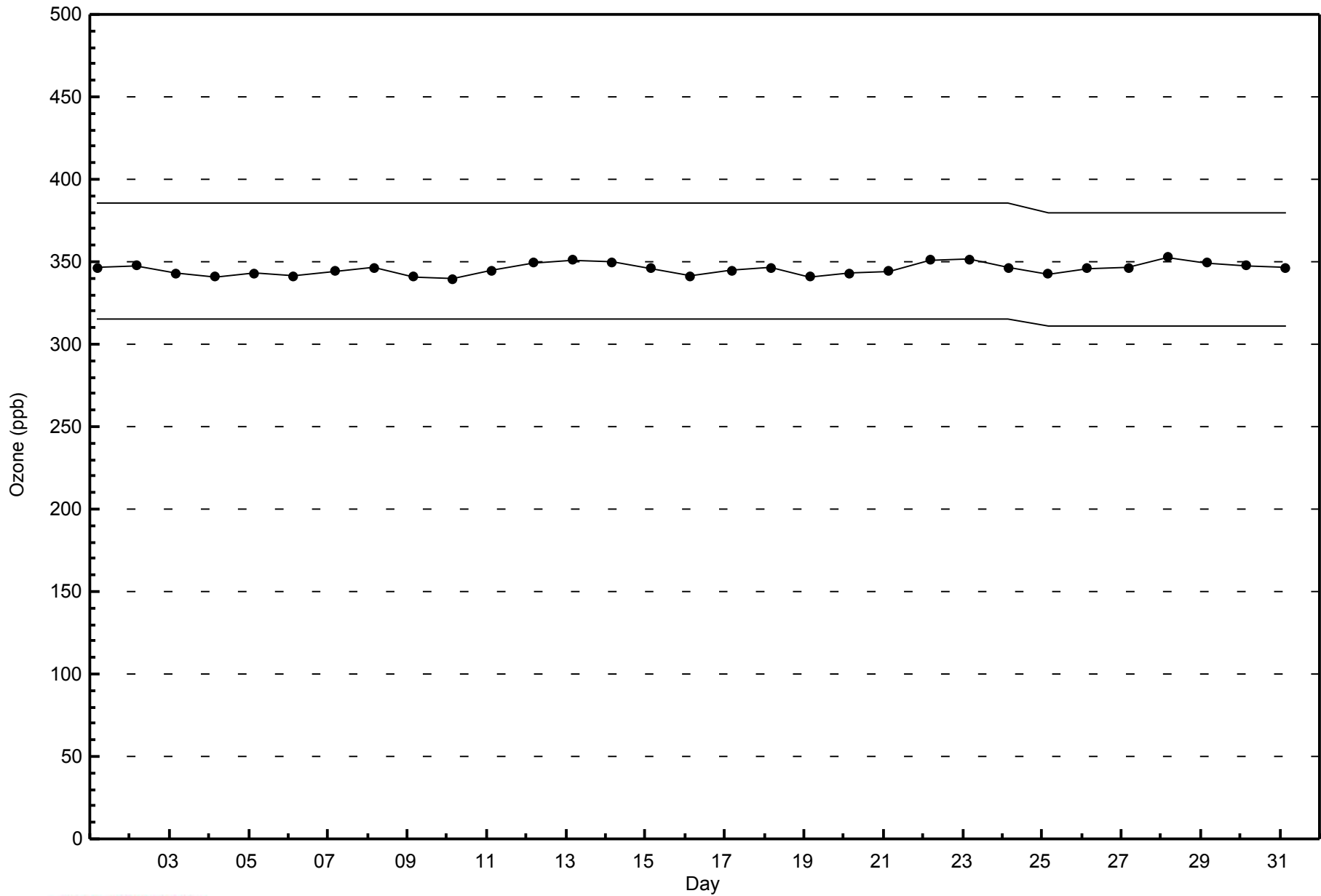
Ozone (O₃) - ppb
Athabasca Valley - July 2014





WBEA NETWORK
Span Responses

Ozone (O₃) - ppb
Athabasca Valley - July 2014



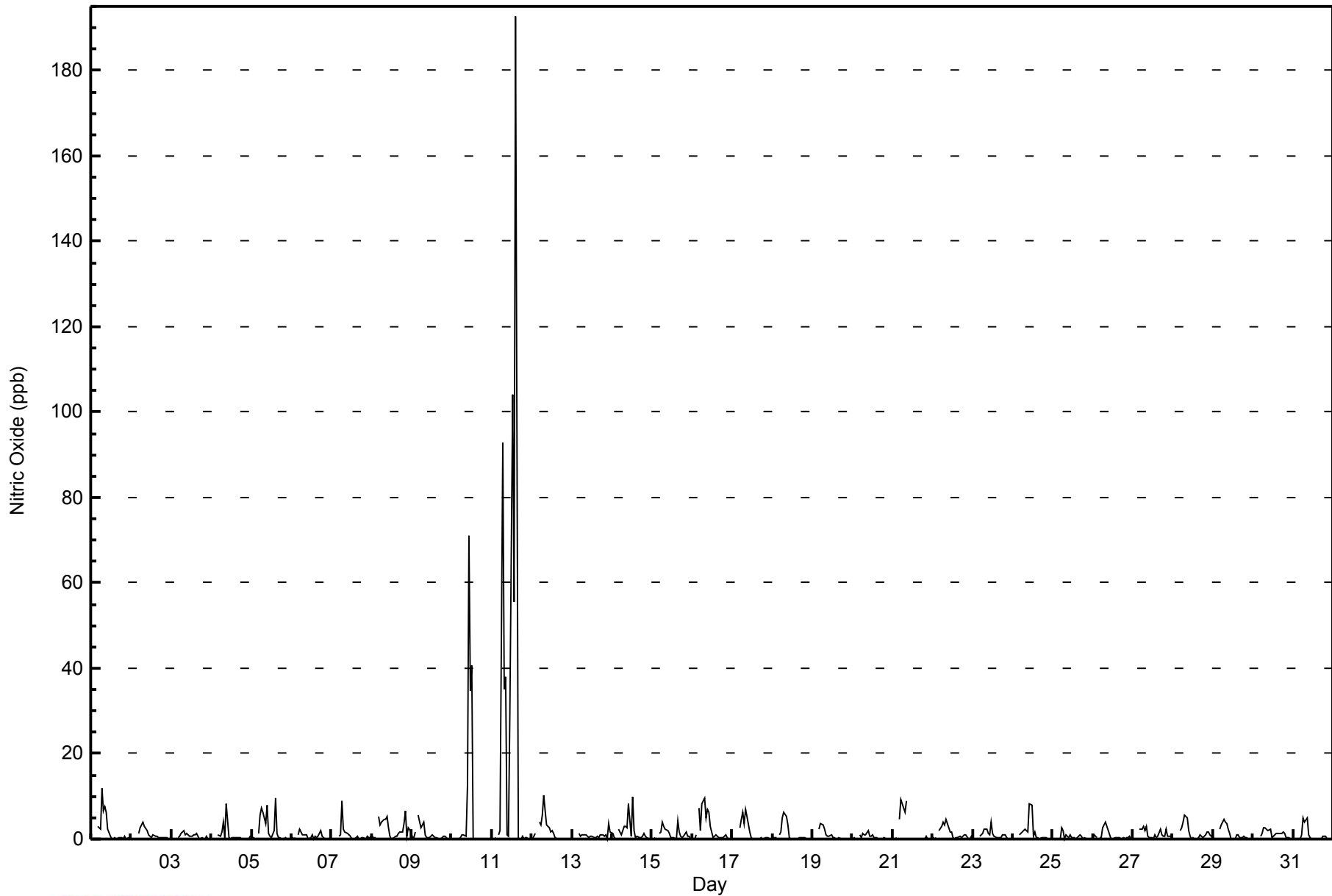


Maximum Value: 193 ppb on Jul 11 15:00														Maximum Daily Average: 28.3 ppb on Jul 11														Hours in Service: 744											
Minimum Value: 0 ppb on Jul 1 20:00														Minimum Daily Average: 0.4 ppb on Jul 20														Hours of Data: 707											
Maximum Diurnal Average: 7.1 ppb at hour 15														Minimum Diurnal Average: 0.1 ppb at hour 2														Hours of Missing Data: 37											
Monthly Average: 2.3 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 4 P ₉₉ = 32														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-Jul	0	0	0	Z	3	2	12	7	8	6	2	1	0	0	0	0	0	0	0	0	1	0	0	0	1.9	12													
2-Jul	0	0	0	Z	1	3	3	4	3	2	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0.9	4													
3-Jul	0	0	0	Z	0	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0.6	2													
4-Jul	0	0	0	Z	1	1	2	4	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.8	8													
5-Jul	1	0	0	Z	1	6	7	6	4	8	1	1	0	2	10	1	0	0	0	0	0	0	0	0	2.2	10													
6-Jul	0	0	0	Z	1	2	1	1	1	1	0	0	1	0	1	0	1	2	1	0	0	0	0	0	0.6	2													
7-Jul	0	0	0	Z	1	1	9	2	2	1	1	1	0	0	0	1	0	0	0	0	0	1	0	0	0.9	9													
8-Jul	1	0	0	Z	5	3	4	5	5	5	2	1	0	0	1	1	1	2	2	4	6	1	3	2	2.3	6													
9-Jul	0	0	2	Z	5	3	3	4	1	0	0	1	1	1	0	0	0	0	0	1	1	0	0	0	1.1	5													
10-Jul	0	0	0	Z	0	0	1	1	1	13	71	35	41	0	0	0	0	0	0	0	0	0	0	0	7.1	71													
11-Jul	0	0	0	Z	1	2	93	35	38	1	1	30	104	56	193	97	0	0	1	0	0	0	0	0	28.3	193													
12-Jul	0	1	1	Z	4	3	6	10	7	3	3	2	2	1	0	0	0	0	0	0	0	0	0	0	1.9	10													
13-Jul	0	0	0	Z	1	1	1	1	1	1	0	1	1	0	0	1	0	1	1	1	1	0	4	2	0.8	4													
14-Jul	1	0	0	Z	2	1	2	3	3	3	8	1	10	2	0	1	0	0	1	1	1	0	0	0	1.8	10													
15-Jul	0	0	0	Z	1	2	4	3	2	2	1	0	0	0	0	4	2	1	0	1	2	1	1	0	1.2	4													
16-Jul	0	0	1	Z	7	2	8	9	5	7	6	3	0	1	1	1	0	0	0	1	1	0	0	0	2.4	9													
17-Jul	0	0	0	Z	3	5	6	4	7	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	7													
18-Jul	0	0	0	Z	1	2	5	6	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	6													
19-Jul	0	0	0	Z	2	4	3	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	4													
20-Jul	0	0	0	Z	1	0	1	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2													
21-Jul	0	0	0	Z	5	9	8	6	9	C	C	C	C	C	C	0	0	0	0	0	0	1	0	0	0	--	9												
22-Jul	0	0	0	Z	2	3	4	3	5	4	2	2	0	0	0	0	1	0	1	1	1	0	0	1	1.3	5													
23-Jul	0	0	0	Z	1	1	1	2	2	1	1	4	1	1	0	0	0	0	1	1	0	0	0	0	0.8	4													
24-Jul	0	0	0	Z	1	1	2	2	2	2	8	8	1	1	0	0	0	0	0	0	0	0	0	0	1.4	8													
25-Jul	0	0	0	Z	0	3	2	0	1	0	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0.5	3													
26-Jul	0	1	0	Z	0	0	3	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0.8	4													
27-Jul	0	0	0	Z	2	2	3	2	3	1	0	0	0	1	0	0	2	1	1	1	2	1	1	0	1.1	3													
28-Jul	0	0	0	Z	2	3	4	6	5	2	1	0	0	0	0	0	1	1	0	1	2	2	1	1	1.3	6													
29-Jul	0	0	0	Z	2	3	5	4	4	2	1	0	0	0	1	1	0	0	1	0	0	0	0	0	1.1	5													
30-Jul	0	0	0	Z	1	1	3	3	2	2	2	0	1	1	1	1	1	1	2	1	0	0	0	0	1.1	3													
31-Jul	0	0	0	Z	0	1	5	4	5	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.8	5													
														0.1	0.1	0.2	--	1.9	2.3	6.8	4.7	4.3	3.0	4.1	3.1	5.6	2.4	7.1	3.7	0.5	0.4	0.5	0.5	0.7	0.3	0.3	0.2	Diurnal Average	
														1	1	2	--	7	9	93	35	38	13	71	35	104	56	193	97	2	2	2	4	6	2	4	2	Diurnal Maximum	
Z - zerospan														C - Calibration																									



WBEA NETWORK
Hourly Averages

Nitric Oxide (NO) - ppb
Athabasca Valley - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	696	98.44	98.44
21 - 40	4	0.57	99.01
11 - 80	3	0.42	99.43
81 - 159	3	0.42	99.86
> 159	1	0.14	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - July 2014

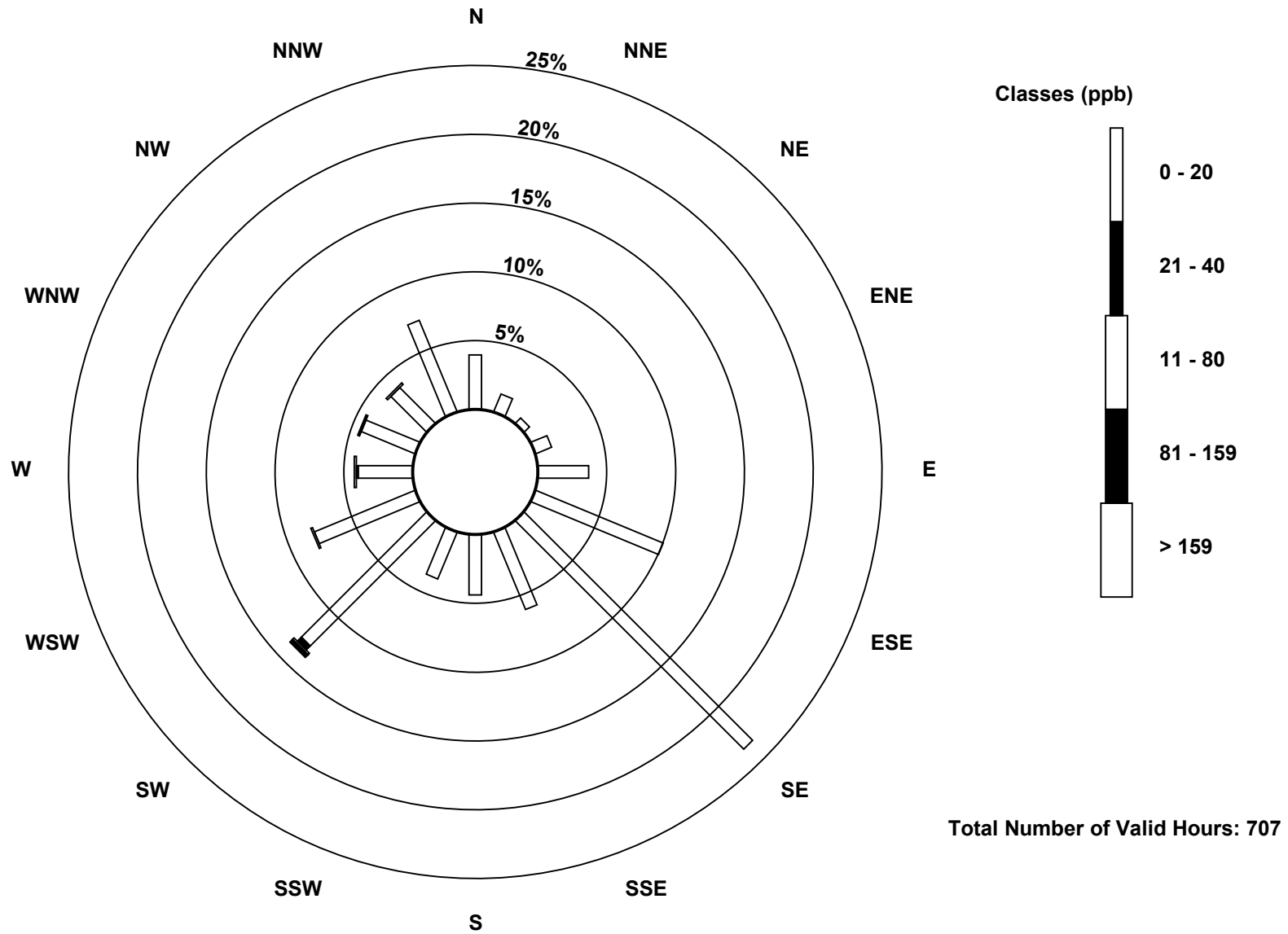
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	10	4	9	26	71	166	43	31	26	91	56	28	30	26	51	696
21 - 40	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	4
41 - 80	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Totals	28	10	4	9	26	71	166	43	31	26	97	57	30	31	27	51	707

Total Number of Valid Hours: 707

Total Number of Hours: 744

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

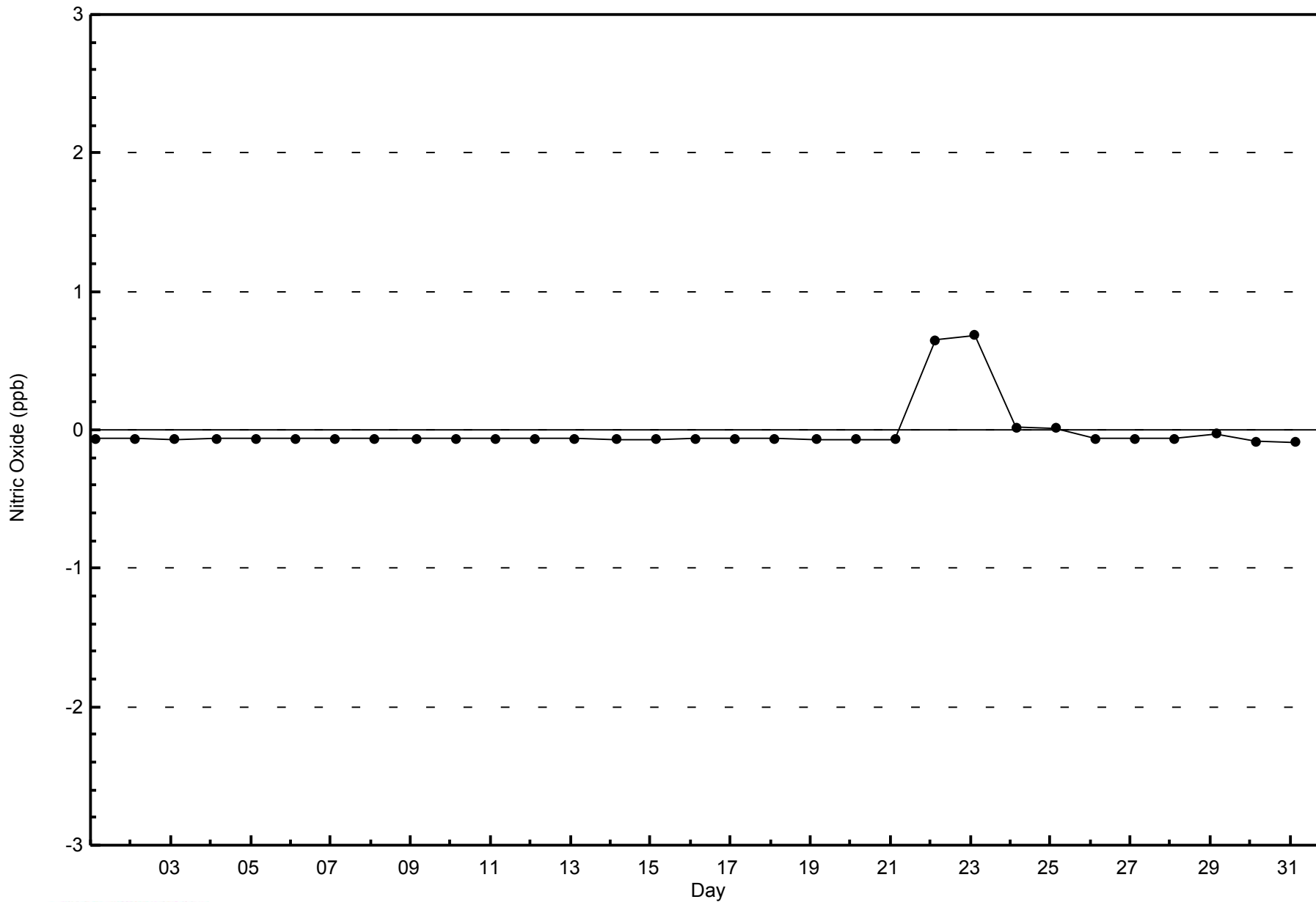
**Nitric Oxide (NO) - ppb
Athabasca Valley (AMS 7)**





WBEA NETWORK
Zero Responses

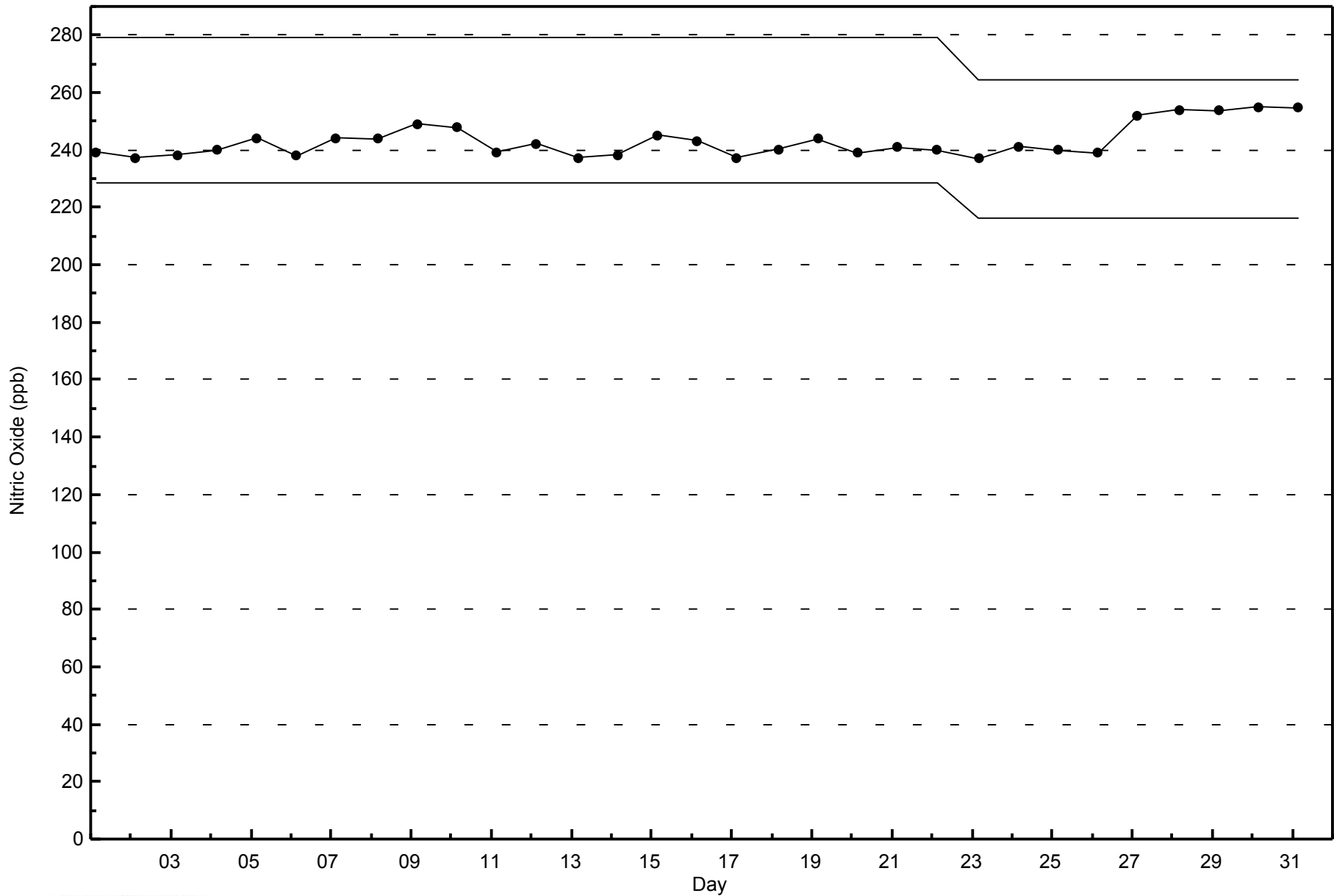
Nitric Oxide (NO) - ppb
Athabasca Valley - July 2014





WBEA NETWORK
Span Responses

Nitric Oxide (NO) - ppb
Athabasca Valley - July 2014



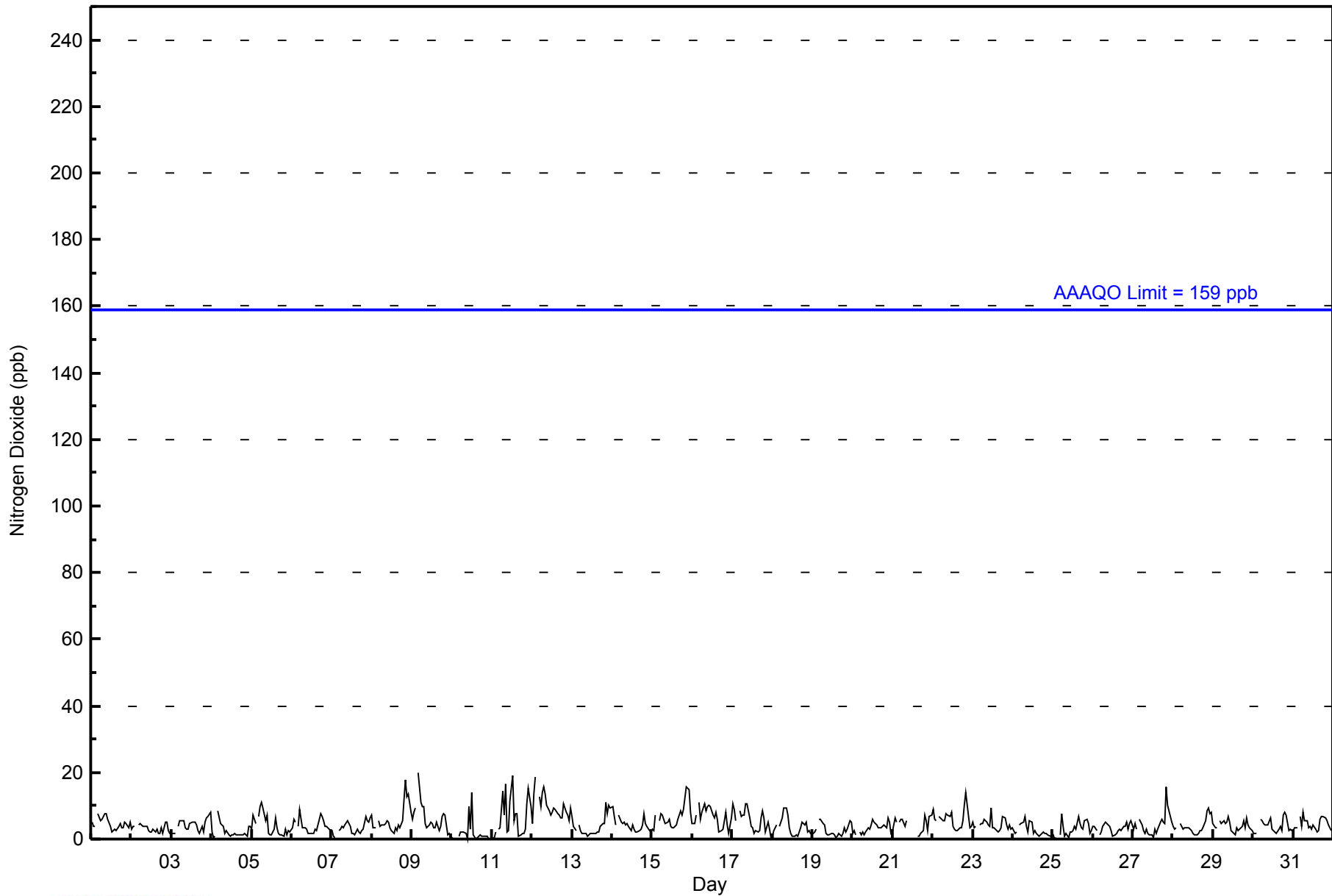


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 20 ppb on Jul 9 05:00										Maximum Daily Average: 9.7 ppb on Jul 12										Hours of Data: 707																													
Minimum Value: 0 ppb on Jul 10 10:00										Minimum Daily Average: 1.9 ppb on Jul 10										Hours of Missing Data: 37																													
Maximum Diurnal Average: 6.4 ppb at hour 21										Minimum Diurnal Average: 2.9 ppb at hour 14										Hours of Calibration: 37																													
Monthly Average: 4.4 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 6 P ₉₀ = 8 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-Jul	5	4	4	Z	8	6	6	7	8	8	6	4	2	2	3	3	4	5	4	3	5	5	4	5	4.7	8																							
2-Jul	3	4	4	Z	4	5	4	4	4	4	2	2	2	3	2	3	2	2	3	2	5	5	3	2	3.2	5																							
3-Jul	2	2	2	Z	4	5	6	6	3	3	3	5	5	5	5	4	3	2	4	2	5	6	7	8	4.1	8																							
4-Jul	2	1	1	Z	8	5	4	4	2	3	1	1	1	1	2	1	1	1	1	1	2	1	4	4	2.3	8																							
5-Jul	3	7	5	Z	7	10	11	9	6	7	2	1	1	1	3	6	3	2	1	1	1	3	1	2	2	4.2	11																						
6-Jul	4	6	5	Z	4	9	3	3	3	3	2	2	2	2	3	2	4	8	7	6	4	4	3	3	3.9	9																							
7-Jul	3	1	1	Z	3	3	4	4	4	6	5	4	2	2	1	3	2	2	3	3	7	6	5	6	3.3	7																							
8-Jul	7	4	4	Z	6	4	4	4	5	5	5	4	3	2	3	3	4	4	5	12	18	13	14	8	6.0	18																							
9-Jul	6	8	9	Z	20	11	10	10	5	3	4	5	5	4	3	5	3	4	7	8	7	1	2	1	6.0	20																							
10-Jul	1	0	0	Z	1	2	2	2	2	0	10	3	14	1	0	1	1	1	1	1	1	1	0	0	1.9	14																							
11-Jul	0	0	2	Z	3	4	15	7	16	2	2	12	19	6	8	8	1	1	2	2	3	11	15	10	6.4	19																							
12-Jul	5	14	19	Z	13	10	14	16	14	10	9	7	8	9	9	8	7	6	6	11	8	7	6	9	9.7	19																							
13-Jul	7	4	3	Z	4	3	2	2	2	1	1	2	2	2	2	2	2	4	5	5	11	8	10	9	3.9	11																							
14-Jul	10	7	4	Z	7	5	5	5	4	5	4	3	4	3	2	2	3	3	4	8	5	4	3	2	4.4	10																							
15-Jul	3	3	7	Z	6	8	7	6	5	5	6	4	4	4	4	6	7	8	7	9	16	15	15	8	7.1	16																							
16-Jul	5	5	7	Z	11	6	8	11	8	10	10	10	7	6	8	6	2	3	3	5	8	4	2	6	6.6	11																							
17-Jul	11	9	6	Z	9	7	7	7	11	10	6	4	3	2	3	2	3	6	9	6	2	5	3	1	5.7	11																							
18-Jul	1	3	4	Z	4	5	7	9	10	7	3	2	1	1	1	1	2	3	5	4	5	2	2	2	3.7	10																							
19-Jul	2	2	3	Z	6	6	5	4	2	1	1	2	2	1	1	1	2	1	2	3	2	3	6	5	2.7	6																							
20-Jul	2	3	1	Z	2	1	2	1	2	4	3	4	6	5	4	4	3	4	4	4	4	6	5	2	3.3	6																							
21-Jul	2	6	5	Z	5	6	6	4	5	C	C	C	C	C	C	1	1	2	3	7	6	3	7	7	--	7																							
22-Jul	9	6	6	Z	7	6	6	5	8	7	7	8	4	3	3	3	3	3	6	10	14	7	3	4	5.9	14																							
23-Jul	5	4	4	Z	4	5	5	6	5	4	4	9	3	3	2	2	3	3	7	6	4	3	4	3	4.3	9																							
24-Jul	3	2	2	Z	4	5	5	7	4	2	5	5	2	3	2	1	1	2	2	2	2	1	1	1	2.7	7																							
25-Jul	1	0	0	Z	1	8	4	1	2	1	2	2	3	4	3	7	5	3	3	5	6	5	2	3	3.0	8																							
26-Jul	4	4	2	Z	1	2	4	5	5	4	4	2	1	1	2	3	3	3	4	4	5	3	5	6	3.3	6																							
27-Jul	3	5	3	Z	6	4	3	2	3	2	1	1	1	3	2	3	5	6	5	5	16	10	7	5	4.3	16																							
28-Jul	4	3	3	Z	5	4	3	3	4	4	3	3	2	1	1	2	3	3	4	6	9	10	8	8	4.0	10																							
29-Jul	5	4	3	Z	5	5	6	5	5	7	5	2	2	1	3	3	3	4	6	4	6	4	4	3	4.1	7																							
30-Jul	2	2	2	Z	6	5	5	4	4	4	4	6	3	3	2	2	3	4	3	7	8	7	3	3	2	3.9	8																						
31-Jul	3	4	3	Z	7	4	8	5	6	3	4	3	4	3	2	2	6	7	7	6	5	4	3	3	4.4	8																							
																								3.8	3.9	4.0	--	5.8	5.3	5.7	5.4	5.3	4.5	4.2	3.9	3.9	2.9	3.1	3.1	3.0	3.4	4.3	5.1	6.4	5.1	5.0	4.4	Diurnal Average	
																								11	14	19	--	20	11	15	16	16	10	10	12	19	9	9	8	7	8	9	12	18	15	15	10	Diurnal Maximum	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																	



WBEA NETWORK
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	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: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - July 2014

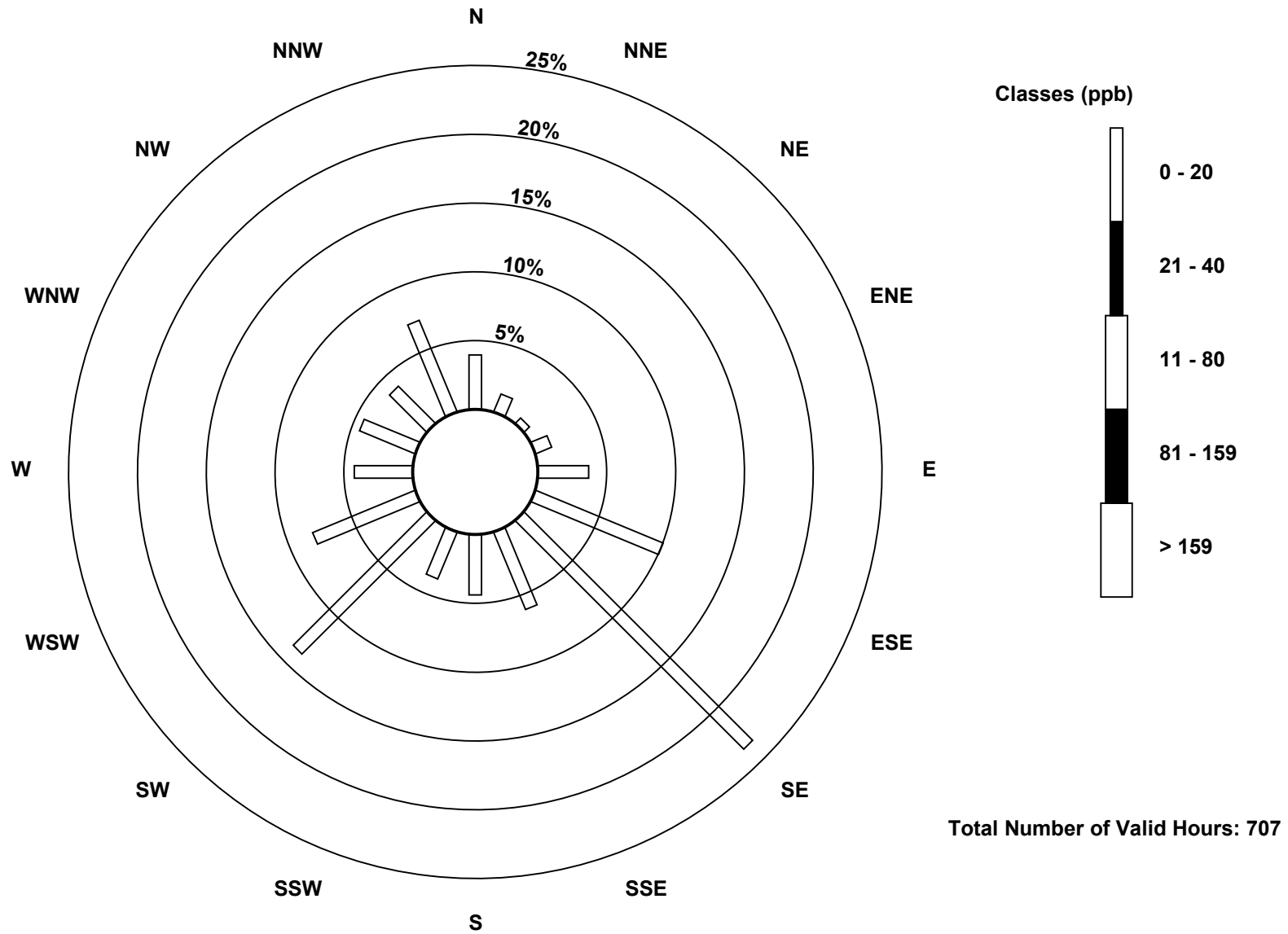
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	10	4	9	26	71	166	43	31	26	97	57	30	31	27	51	707
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	28	10	4	9	26	71	166	43	31	26	97	57	30	31	27	51	707

Total Number of Valid Hours: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley (AMS 7)



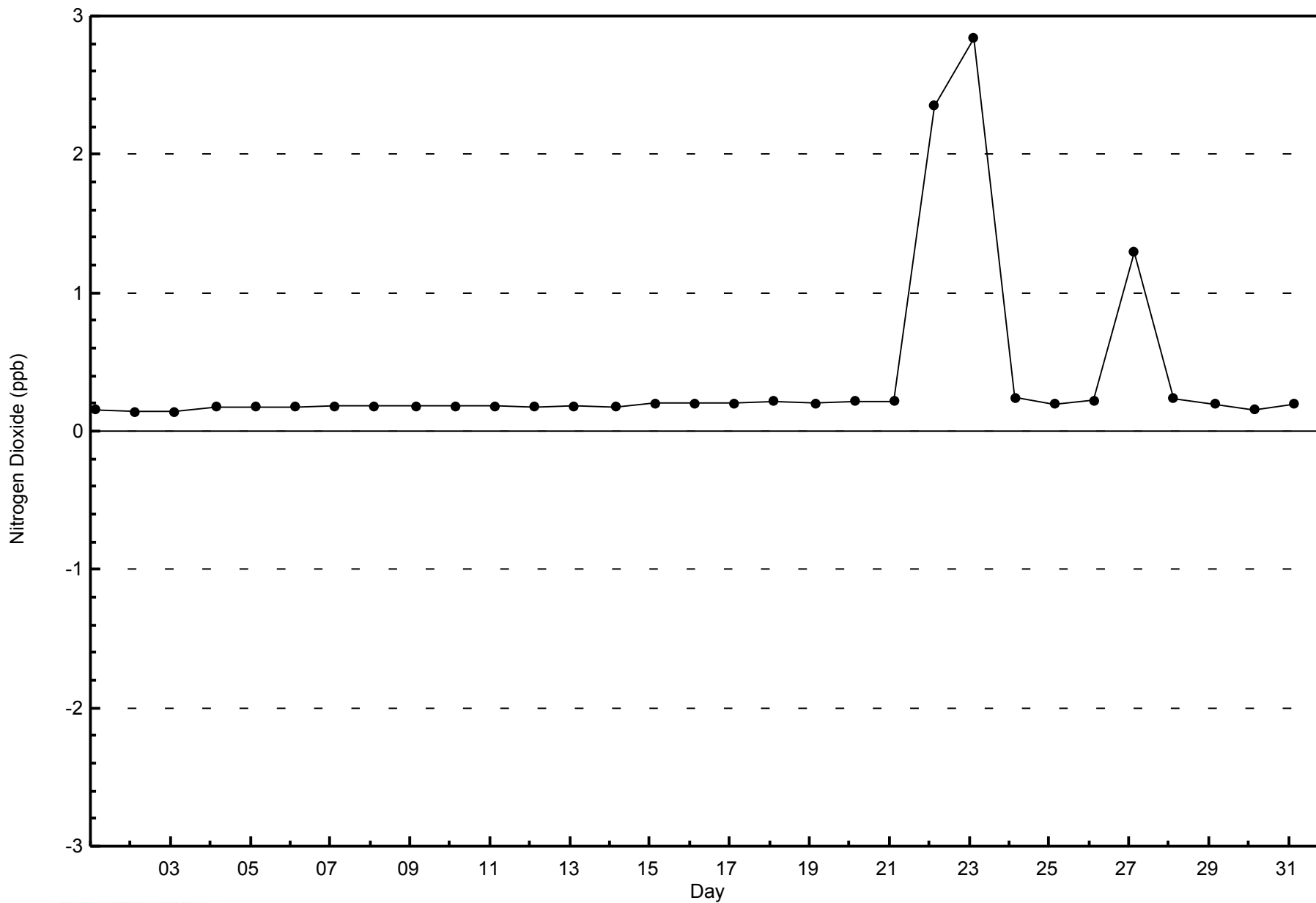


WBEA NETWORK

Zero Responses

Nitrogen Dioxide (NO₂) - ppb

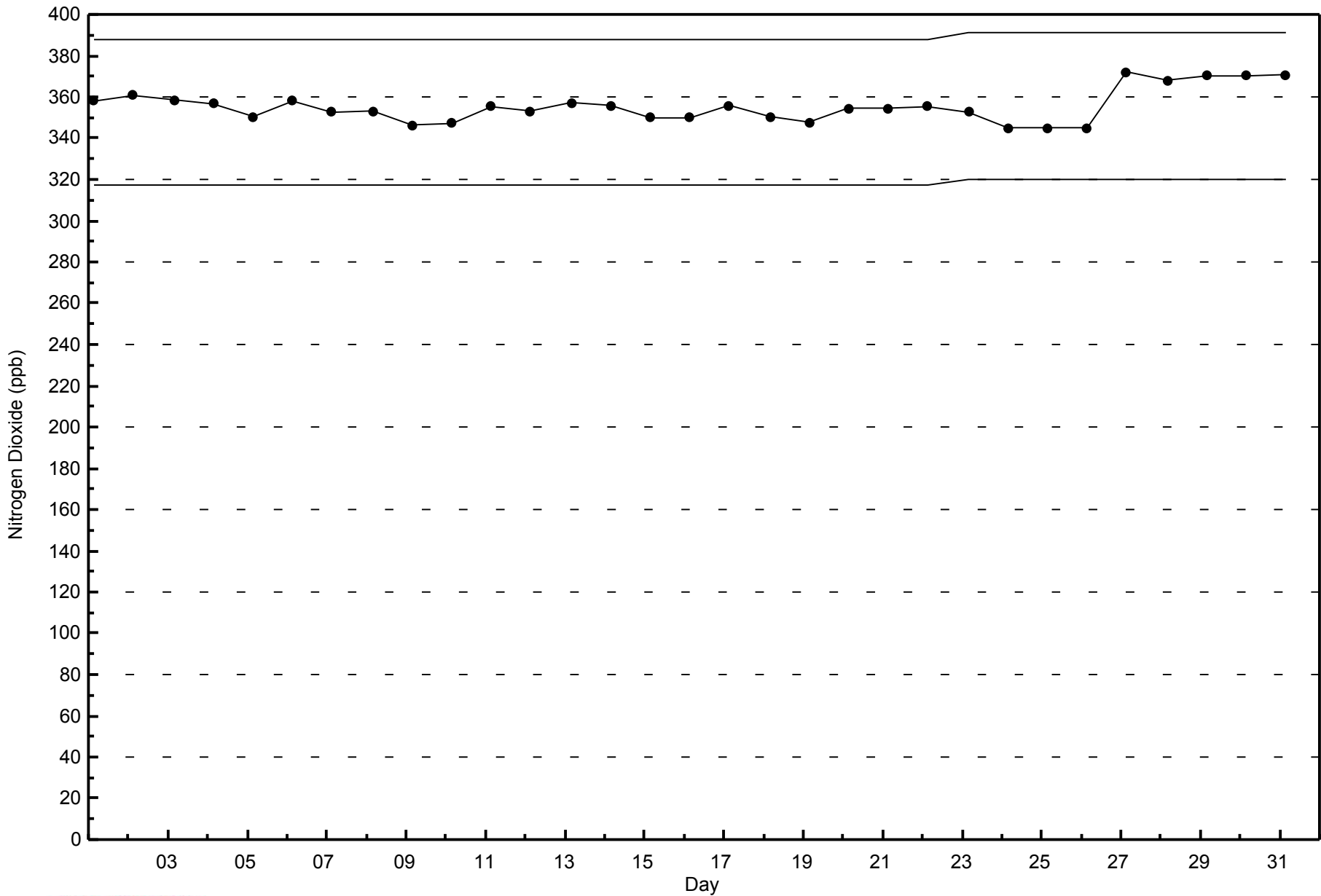
Athabasca Valley - July 2014





WBEA NETWORK
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - July 2014





Wood Buffalo Environmental Association
Summary of Hour Averages

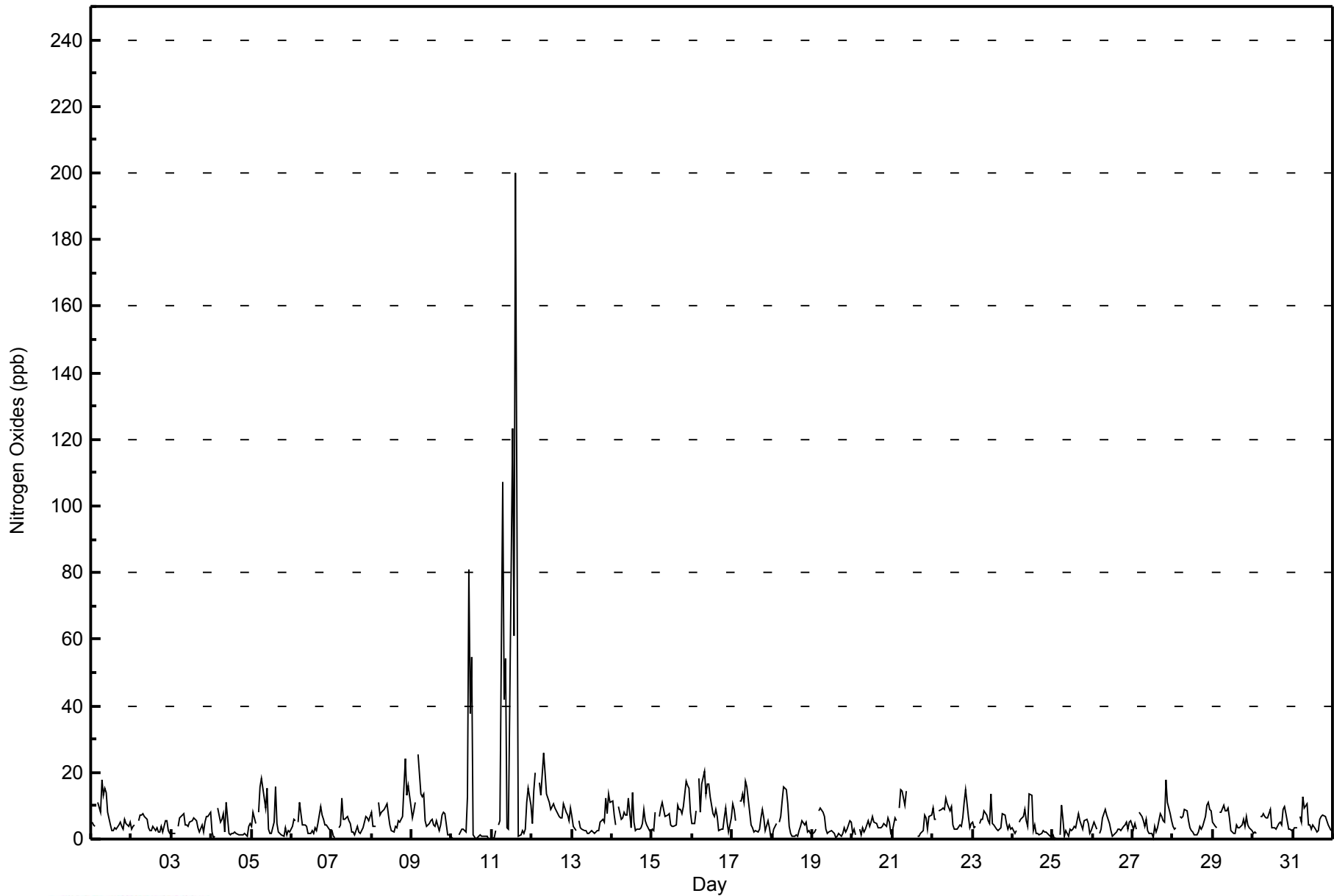
Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - July 2014

Maximum Value: 200 ppb on Jul 11 15:00																		Maximum Daily Average: 34.7 ppb on Jul 11						Hours in Service: 744		
Minimum Value: 0 ppb on Jul 25 02:00																		Minimum Daily Average: 3.1 ppb on Jul 4						Hours of Data: 707		
Maximum Diurnal Average: 12.5 ppb at hour 7																		Minimum Diurnal Average: 3.5 ppb at hour 17						Hours of Missing Data: 37		
Monthly Average: 6.7 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 4 Q ₃ = 7 P ₉₀ = 11 P ₉₉ = 51						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-Jul	5	4	4	Z	11	8	18	13	15	14	8	4	2	2	3	3	4	5	4	3	6	5	4	5	6.6	18
2-Jul	3	4	4	Z	5	7	7	8	7	6	3	3	2	4	3	4	2	2	4	2	5	5	2	2	4.1	8
3-Jul	2	2	2	Z	4	6	7	7	4	4	4	5	6	6	6	5	3	2	4	2	5	7	7	8	4.7	8
4-Jul	2	0	1	Z	9	5	6	8	2	11	2	1	2	2	2	2	1	1	1	1	2	1	4	5	3.1	11
5-Jul	4	8	5	Z	8	16	18	15	9	15	3	2	2	5	16	5	2	2	1	1	4	1	2	2	6.4	18
6-Jul	4	6	5	Z	5	11	4	4	4	4	2	2	3	2	4	3	5	10	7	6	4	4	3	3	4.5	11
7-Jul	3	1	1	Z	3	4	12	6	6	7	5	5	2	2	1	4	2	2	3	3	7	6	5	7	4.2	12
8-Jul	8	4	4	Z	11	7	8	9	10	11	7	4	3	2	4	4	6	5	7	16	24	13	16	10	8.3	24
9-Jul	6	9	11	Z	25	14	13	14	5	4	5	6	6	4	4	5	3	4	7	8	8	1	1	1	7.1	25
10-Jul	1	0	0	Z	1	2	3	3	2	13	81	38	55	1	0	0	1	1	1	1	1	1	0	0	9.0	81
11-Jul	0	0	3	Z	4	5	107	42	54	3	3	41	123	61	200	105	1	1	2	2	3	11	15	10	34.7	200
12-Jul	5	14	20	Z	17	13	19	26	20	14	11	9	10	10	9	8	7	6	6	11	8	7	6	9	11.6	26
13-Jul	7	4	3	Z	6	3	3	3	3	2	2	2	2	2	3	3	3	5	6	5	12	8	14	11	4.7	14
14-Jul	11	7	4	Z	10	6	7	8	7	7	12	3	14	5	2	3	3	3	5	9	5	4	3	2	6.1	14
15-Jul	3	3	8	Z	7	9	11	9	7	7	8	4	4	4	4	10	9	9	8	10	17	16	15	8	8.3	17
16-Jul	5	5	8	Z	18	8	16	20	13	17	17	13	8	7	9	7	3	3	3	6	9	5	2	6	9.0	20
17-Jul	11	9	6	Z	11	11	13	11	17	16	8	4	3	2	3	2	3	6	9	6	2	6	3	1	7.1	17
18-Jul	1	3	5	Z	5	7	11	16	15	11	4	2	1	1	1	1	2	4	5	4	5	2	2	2	4.8	16
19-Jul	2	2	3	Z	8	9	8	7	3	2	2	3	2	2	1	1	2	1	2	3	2	3	6	5	3.3	9
20-Jul	2	3	1	Z	3	1	3	2	3	6	4	5	7	5	5	3	3	4	4	5	4	6	5	2	3.7	7
21-Jul	2	6	5	Z	9	15	14	10	14	C	C	C	C	C	C	1	1	1	3	7	6	3	7	7	--	15
22-Jul	9	6	6	Z	9	9	10	9	12	11	8	10	4	3	3	3	4	4	6	11	15	7	3	5	7.2	15
23-Jul	5	4	4	Z	5	6	6	8	7	5	5	13	5	4	3	3	3	4	8	7	4	3	4	3	5.1	13
24-Jul	3	2	2	Z	5	6	7	9	6	4	14	13	3	4	2	2	1	2	3	2	2	1	1	1	4.1	14
25-Jul	1	0	0	Z	1	10	6	1	3	1	3	3	3	4	3	8	6	4	3	6	6	5	2	3	3.5	10
26-Jul	4	5	3	Z	2	3	7	9	7	6	5	2	1	2	2	3	3	3	4	4	5	3	5	6	4.0	9
27-Jul	3	5	3	Z	8	7	6	4	6	3	2	1	0	4	2	4	8	7	6	5	18	11	7	5	5.4	18
28-Jul	4	3	3	Z	7	6	7	9	9	6	3	2	2	1	1	2	4	3	4	7	10	11	9	9	5.3	11
29-Jul	5	4	3	Z	8	8	10	9	9	9	6	3	2	1	4	4	3	4	6	4	7	4	4	3	5.2	10
30-Jul	2	2	2	Z	7	7	7	7	6	6	9	4	3	3	3	5	5	4	9	10	7	3	3	2	5.1	10
31-Jul	3	4	3	Z	7	5	13	9	11	4	4	3	4	3	2	2	6	7	7	7	5	4	3	3	5.2	13
4.0 4.1 4.2 -- 7.7 7.6 12.5 10.1 9.6 7.5 8.3 7.0 9.5 5.3 10.2 6.8 3.5 3.9 4.7 5.6 7.1 5.4 5.3 4.6																								Diurnal Average		
11 14 20 -- 25 16 107 42 54 17 81 41 123 61 200 105 9 10 9 16 24 16 16 11																								Diurnal Maximum		
Z - zerspan C - Calibration																										



WBEA NETWORK
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	693	98.02	98.02
21 - 40	4	0.57	98.59
41 - 80	5	0.71	99.29
81 - 159	3	0.42	99.72
> 159	1	0.14	99.86

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - July 2014

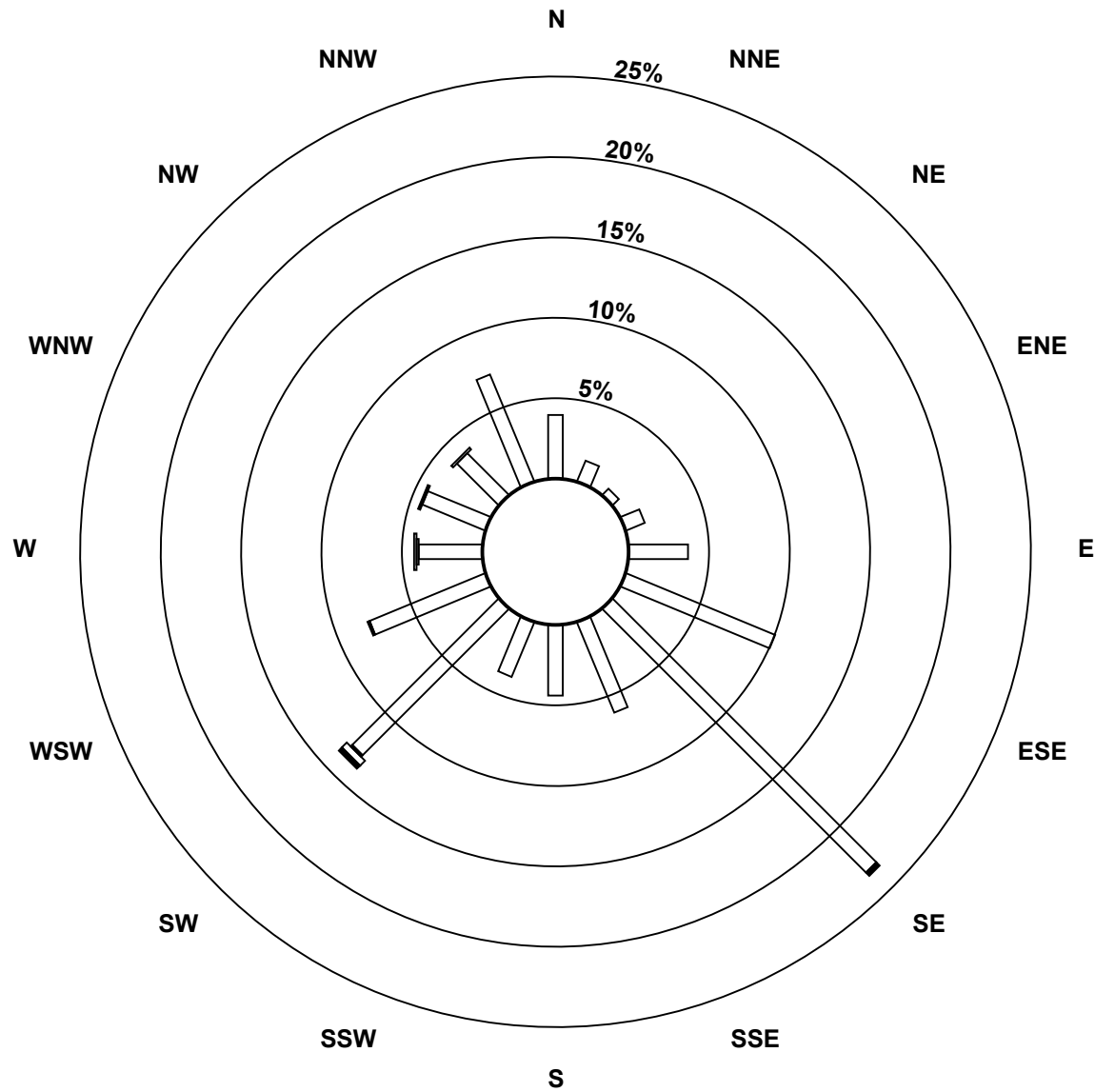
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	10	4	9	26	71	164	43	31	26	91	55	28	30	26	51	693
21 - 40	0	0	0	0	0	0	2	0	0	0	1	1	0	0	0	0	4
41 - 80	0	0	0	0	0	0	0	0	0	0	3	0	1	0	1	0	5
81 - 159	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Totals	28	10	4	9	26	71	166	43	31	26	97	56	30	31	27	51	706

Total Number of Valid Hours: 707

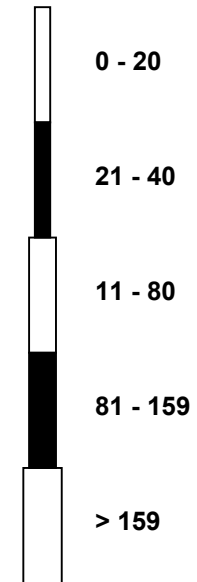
Total Number of Hours: 744

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

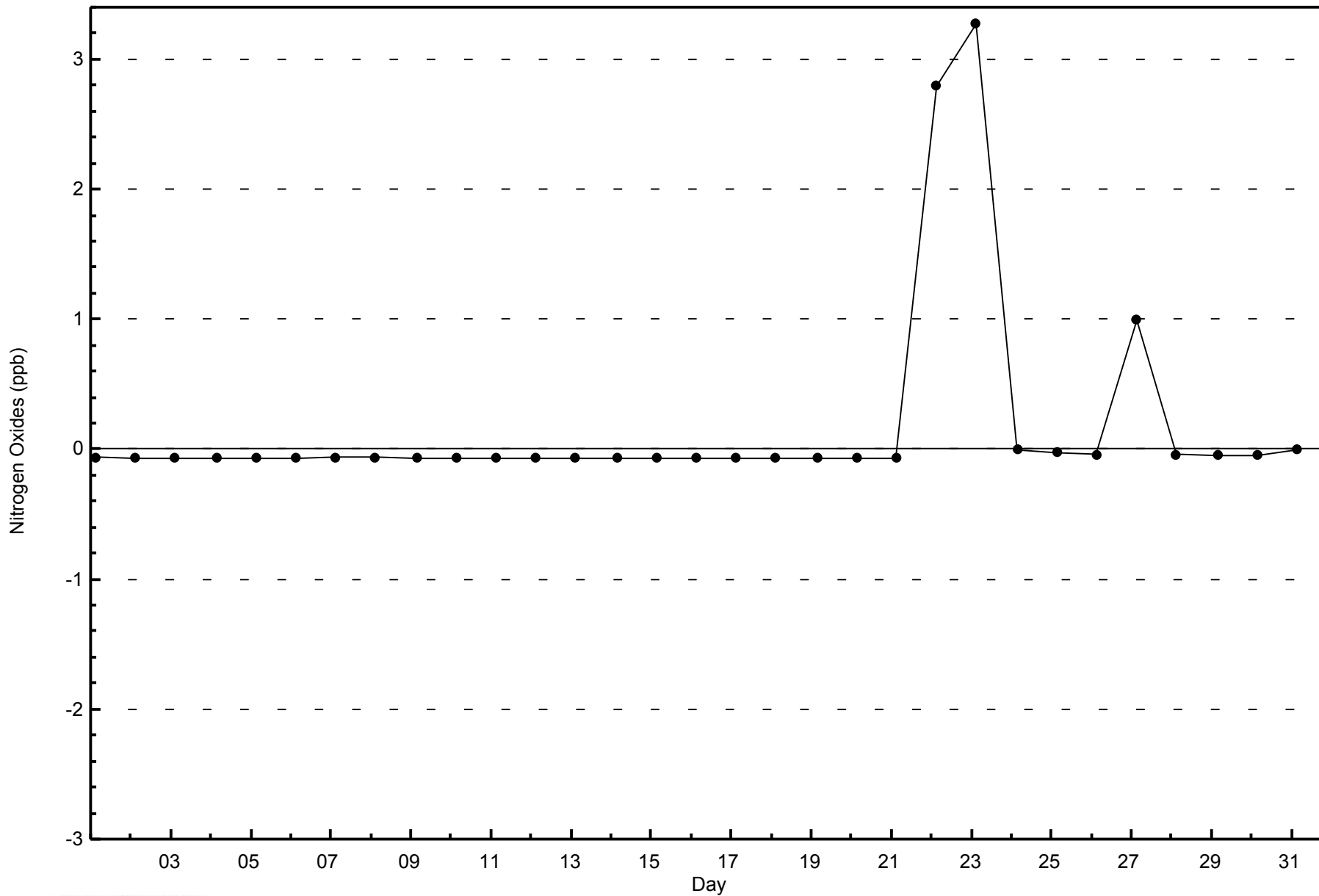
**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley (AMS 7)**



Classes (ppb)



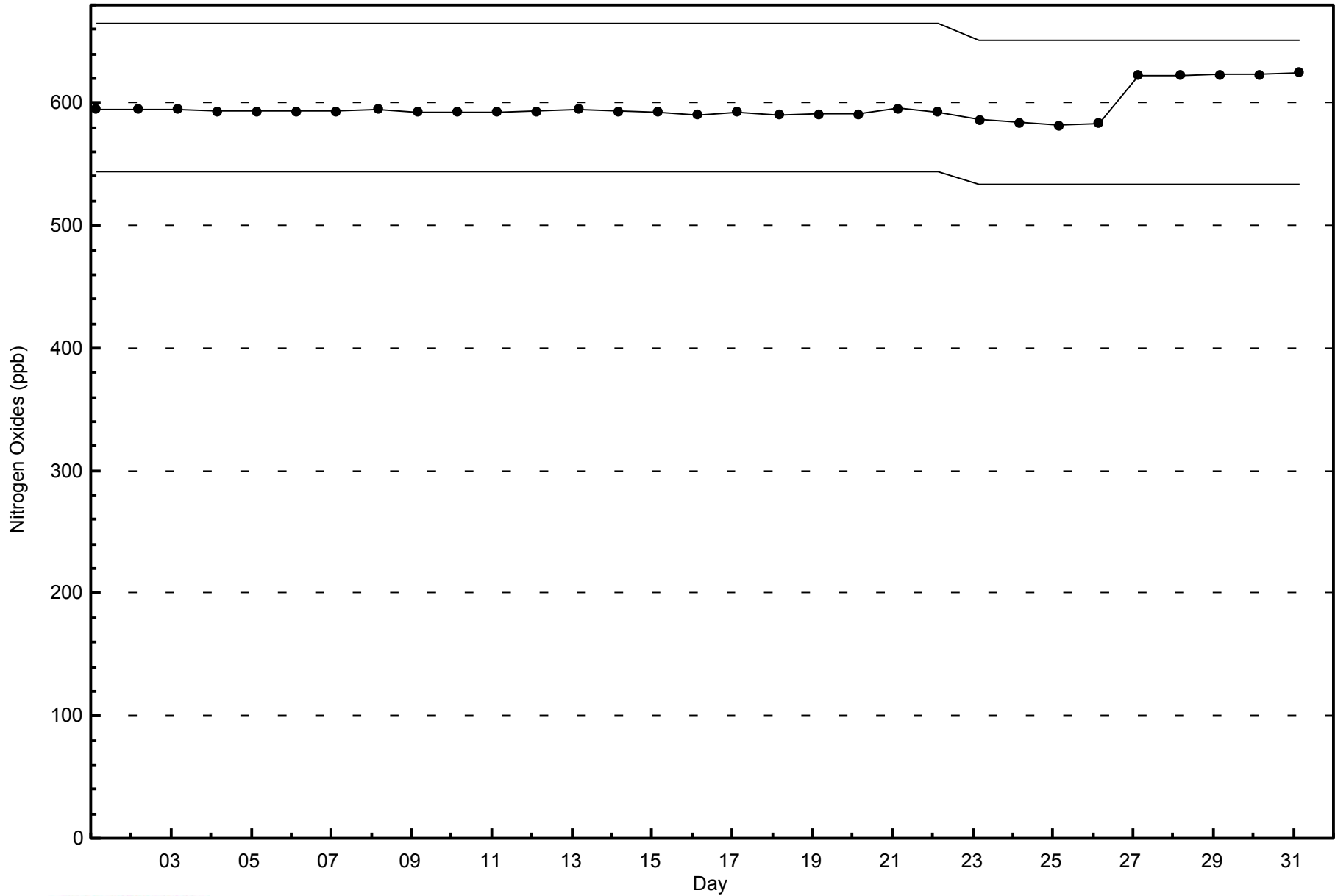
Total Number of Valid Hours: 707





WBEA NETWORK
Span Responses

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - July 2014





Summary of Hour Averages

Athabasca Valley - July 2014

Number of Exceedences (AAAQO):	24-hr: 6	Hours in Service:	744
Maximum Value: 227.3 µg/m ³ on Jul 31 17:00	Maximum Daily Average: 58.6 µg/m ³ on Jul 12	Hours of Data:	743
Minimum Value: 1.2 µg/m ³ on Jul 25 23:00	Minimum Daily Average: 2.7 µg/m ³ on Jul 4	Hours of Missing Data:	1
Maximum Diurnal Average: 22.6 µg/m ³ at hour 17	Minimum Diurnal Average: 13.4 µg/m ³ at hour 8	Hours of Calibration:	0
Monthly Average: 17.53 µg/m ³	Percentiles: P ₁ = 1.7 P ₁₀ = 3.7 Q ₁ = 6.2 Median = 11.5 Q ₃ = 21.9 P ₉₀ = 36.3 P ₉₉ = 81.6	Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	16.0	11.4	13.4	15.6	15.9	13.6	13.7	11.4	16.3	15.8	12.1	13.1	13.8	16.8	19.8	23.2	20.2	15.5	15.2	16.0	19.2	22.4	27.3	29.1	16.9	29.1																						
2-Jul	25.5	21.9	21.6	23.5	19.0	20.3	18.3	16.7	14.8	12.5	15.1	22.6	27.5	27.3	22.6	22.0	16.2	14.4	17.7	18.0	16.0	14.9	17.0	16.9	19.3	27.5																						
3-Jul	16.7	17.6	19.1	18.1	20.1	21.3	19.2	21.0	19.8	18.6	20.2	21.5	22.3	17.2	14.6	13.4	13.1	12.2	13.5	15.1	17.4	17.7	17.6	18.0	17.7	22.3																						
4-Jul	3.3	4.9	3.8	3.7	2.5	3.4	5.5	3.0	1.8	1.8	1.9	2.1	2.2	2.5	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.4	2.7	2.7	5.5																							
5-Jul	2.3	4.5	5.6	7.0	6.8	7.7	7.2	4.2	4.5	5.1	4.4	4.6	4.6	4.9	4.5	3.2	3.7	4.5	4.7	4.6	4.8	3.5	2.8	4.1	4.7	7.7																						
6-Jul	6.7	6.9	7.8	8.6	8.3	6.9	3.6	5.2	5.1	3.1	3.9	5.5	5.5	6.1	3.5	2.7	3.8	5.0	8.3	6.2	3.7	4.4	10.2	16.0	6.1	16.0																						
7-Jul	11.8	10.1	14.0	13.0	16.9	19.3	23.0	28.7	35.7	60.7	81.1	74.1	59.3	51.9	56.7	43.8	35.2	36.1	37.2	34.7	36.0	33.0	27.4	28.6	36.2	81.1																						
8-Jul	32.9	31.4	30.1	28.1	26.1	22.1	19.1	17.8	16.8	15.3	16.9	28.4	36.4	31.2	26.9	20.7	12.4	9.5	8.4	6.7	11.3	15.7	9.6	5.0	19.9	36.4																						
9-Jul	6.2	5.8	6.2	6.6	10.1	13.1	12.0	10.1	6.7	7.4	12.7	13.7	8.8	5.6	7.2	9.1	6.5	6.9	8.2	7.5	3.8	5.0	17.7	16.5	8.9	17.7																						
10-Jul	7.1	4.3	4.0	3.9	3.5	2.9	2.5	2.6	2.3	2.3	2.7	2.6	2.9	2.5	2.1	3.4	4.9	5.1	4.7	19.8	52.6	69.3	64.9	51.2	13.5	69.3																						
11-Jul	37.7	33.5	31.0	30.3	25.3	23.0	19.1	15.2	18.6	16.8	14.0	11.1	11.4	9.4	8.8	7.3	7.5	7.6	7.9	10.0	12.0	19.2	33.9	38.1	18.7	38.1																						
12-Jul	37.0	70.4	78.6	64.7	48.6	41.4	29.7	27.9	26.1	32.1	36.0	35.6	45.6	69.9	88.8	83.8	81.6	82.7	80.9	79.7	70.5	62.8	58.7	73.3	58.6	88.8																						
13-Jul	58.2	47.5	34.3	24.4	20.1	14.3	9.1	6.2	5.5	4.6	5.0	5.2	6.1	7.5	6.6	4.6	4.0	4.5	5.0	6.9	8.2	7.1	7.2	12.8	58.2	58.2																						
14-Jul	7.3	6.9	8.3	9.3	9.0	7.8	6.9	5.1	5.3	7.5	15.5	21.3	29.5	22.8	19.8	17.5	15.1	14.0	14.3	16.3	13.4	9.8	8.6	9.5	12.5	29.5																						
15-Jul	9.2	8.6	7.0	5.0	6.9	9.9	12.7	8.4	7.3	6.4	6.5	8.0	14.9	14.8	15.5	15.6	20.3	18.4	13.1	16.7	17.9	18.9	18.5	18.2	12.4	20.3																						
16-Jul	14.6	13.0	11.9	13.6	13.9	17.5	20.5	24.1	27.0	26.4	34.3	44.5	55.4	76.5	81.7	43.0	17.3	17.0	16.2	11.7	9.8	8.9	11.9	13.8	26.0	81.7																						
17-Jul	11.0	8.7	10.0	10.3	10.7	10.8	11.6	8.8	10.4	14.1	15.0	14.5	13.0	9.7	10.2	10.2	10.6	11.3	16.9	15.2	5.4	7.7	7.9	6.1	10.8	16.9																						
18-Jul	6.4	7.8	8.0	7.7	11.0	8.7	9.0	10.6	13.1	20.3	21.3	17.1	12.4	9.2	9.8	9.1	8.8	8.6	7.9	5.2	3.9	3.2	3.4	6.1	9.5	21.3																						
19-Jul	6.8	7.2	7.6	8.6	10.1	11.6	16.4	29.9	28.5	26.4	23.5	9.7	9.3	12.4	11.3	11.4	8.1	7.8	8.8	19.5	50.0	50.3	52.4	54.7	20.1	54.7																						
20-Jul	58.1	56.5	42.2	27.2	25.0	21.7	19.8	19.5	26.6	32.1	35.5	43.2	52.9	55.4	53.5	48.5	46.6	42.7	36.3	31.6	26.3	26.1	24.3	25.7	36.5	58.1																						
21-Jul	27.7	29.8	28.8	29.1	28.7	30.2	30.9	29.7	33.8	40.3	38.4	32.9	36.1	42.0	40.0	35.3	35.1	35.9	32.3	29.1	27.4	27.9	29.4	35.3	32.8	42.0																						
22-Jul	38.5	38.9	35.7	35.4	36.1	35.8	34.6	37.1	37.9	36.3	41.9	49.8	39.4	33.8	28.8	28.4	28.1	27.2	25.5	25.8	23.3	21.9	25.0	27.5	33.0	49.8																						
23-Jul	28.6	29.1	30.2	28.8	24.5	24.6	24.5	20.4	18.0	13.5	12.6	M	10.1	10.2	10.2	10.2	11.5	13.3	14.3	11.9	9.4	6.9	7.5	8.2	16.5	30.2																						
24-Jul	5.5	4.2	4.3	4.2	4.8	5.4	5.9	7.7	10.7	15.6	20.7	16.9	14.6	12.0	13.5	11.1	8.6	8.5	9.2	8.1	8.4	8.4	7.0	6.1	9.2	20.7																						
25-Jul	6.1	7.4	7.6	9.7	8.9	7.9	5.7	8.2	5.6	3.1	4.4	5.5	2.1	1.7	1.6	2.2	2.6	1.5	1.4	1.6	1.5	1.5	1.2	2.8	4.2	9.7																						
26-Jul	2.7	2.6	2.7	2.0	2.7	3.5	3.5	4.5	4.7	4.0	3.5	7.1	7.2	7.4	8.0	4.7	4.0	3.2	3.8	5.0	7.8	6.7	9.2	15.0	5.2	15.0																						
27-Jul	9.0	10.8	6.3	3.9	5.6	6.9	4.6	5.8	8.2	12.3	26.7	29.0	23.9	21.9	12.8	7.8	8.0	6.2	5.3	5.9	17.2	17.0	14.0	11.1	11.7	29.0																						
28-Jul	11.6	13.6	14.1	13.2	7.1	6.2	5.7	5.2	3.1	3.3	4.3	3.6	2.6	3.3	4.3	5.0	5.6	4.7	3.9	3.1	4.0	4.4	5.3	6.1	6.0	14.1																						
29-Jul	7.2	7.4	6.2	4.8	6.6	8.3	6.0	5.9	5.9	6.7	9.1	9.8	10.1	11.2	13.3	13.5	12.4	14.4	13.2	7.1	9.1	9.5	7.3	6.9	8.8	14.4																						
30-Jul	6.8	6.0	6.8	6.4	9.3	8.6	10.0	8.6	7.3	9.1	8.5	7.5	5.8	10.0	14.6	17.4	17.2	15.0	16.6	16.7	18.7	11.8	6.0	4.9	10.4	18.7																						
31-Jul	2.9	2.2	2.7	4.1	3.6	4.5	10.2	5.5	5.4	4.9	12.6	18.1	21.2	16.6	14.9	12.4	227.3	192.4	127.5	94.5	60.9	35.9	37.8	78.2	41.5	227.3																						
																								16.8	17.1	16.4	15.2	14.4	14.2	13.6	13.4	14.0	15.4	18.1	19.3	19.6	20.1	20.3	17.6	22.6	20.9	18.7	17.7	18.4	17.9	18.5	20.7	Diurnal Average
																								58.2	70.4	78.6	64.7	48.6	41.4	34.6	37.1	37.9	60.7	81.1	74.1	59.3	76.5	88.8	83.8	227.3	192.4	127.5	94.5	70.5	69.3	64.9	78.2	Diurnal Maximum

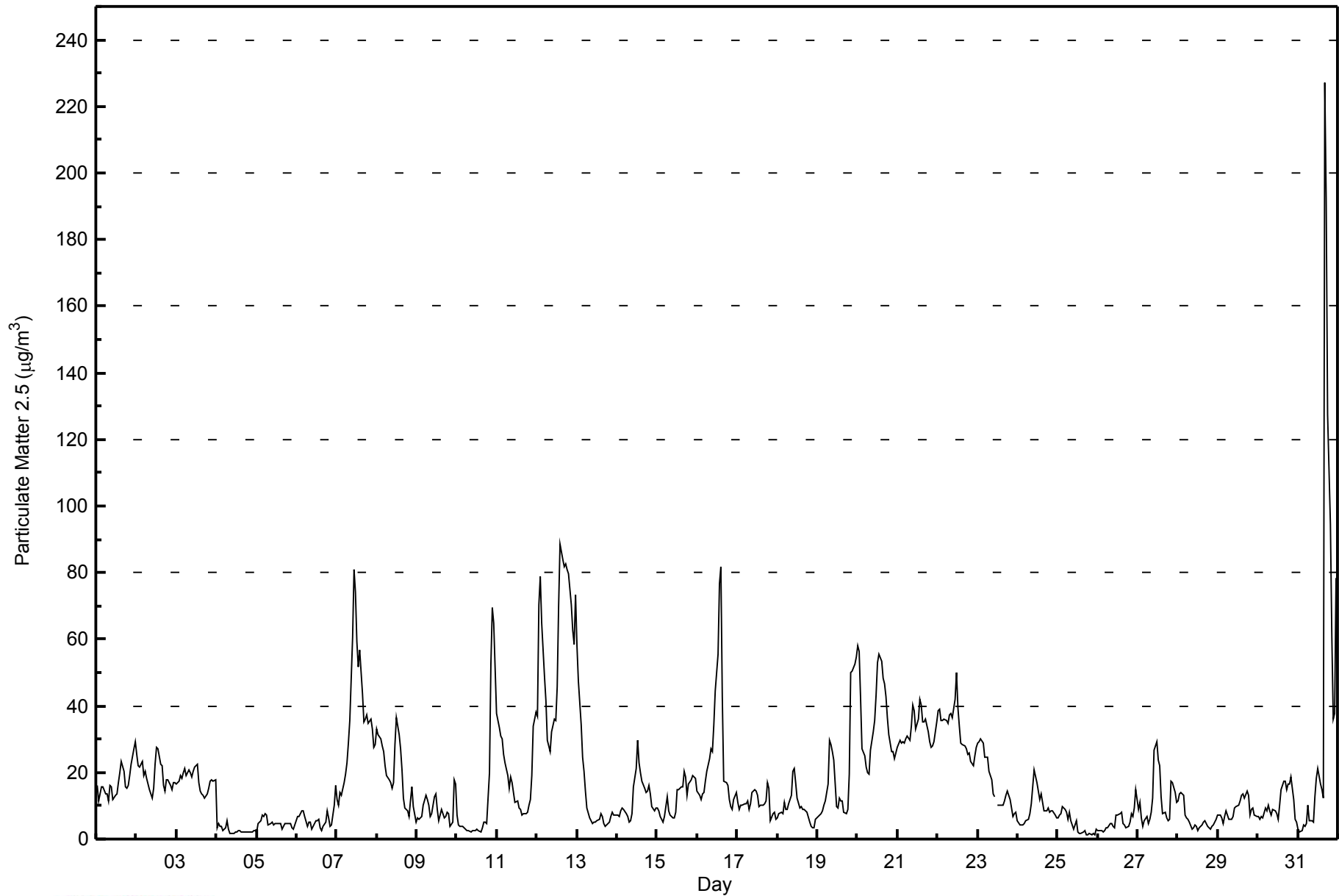
M - Maintenance

Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA NETWORK
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - July 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	155	20.86	20.86
6 - 15	301	40.51	61.37
16 - 25	126	16.96	78.33
26 - 80	150	20.19	98.52
> 81.0	11	1.48	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Athabasca Valley - July 2014

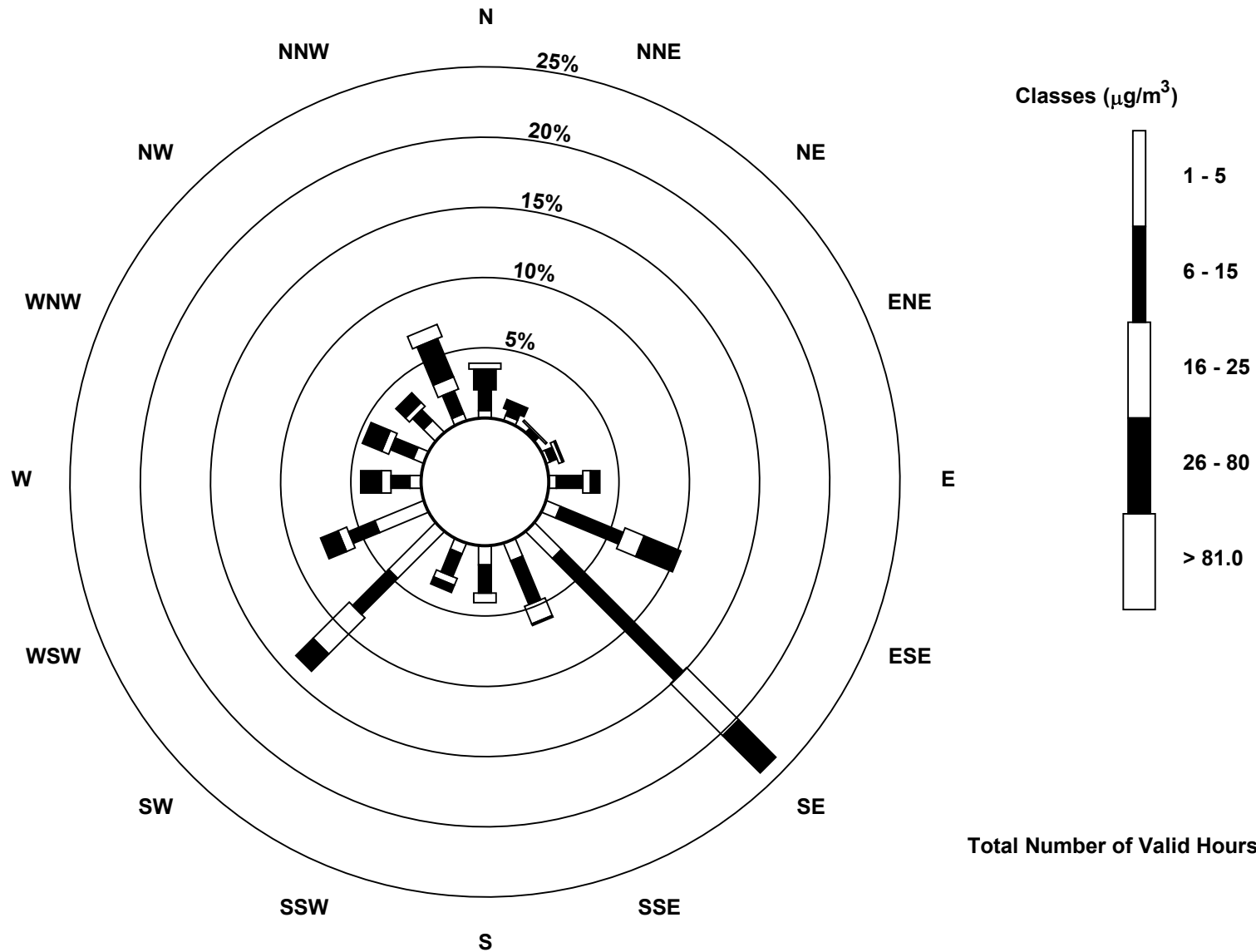
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	4	3	0	2	4	8	20	10	10	6	35	28	6	6	9	4	155
6 - 15	11	3	3	4	14	36	91	25	15	13	27	15	10	13	8	13	301
16 - 25	0	0	0	2	4	11	39	10	5	4	27	5	5	4	3	7	126
26 - 80	11	5	0	1	5	21	28	1	0	4	13	10	11	11	7	22	150
> 81.0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	7	11
Totals	29	11	4	9	27	76	178	46	30	27	102	58	32	34	27	53	743

Total Number of Valid Hours: 743

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 743

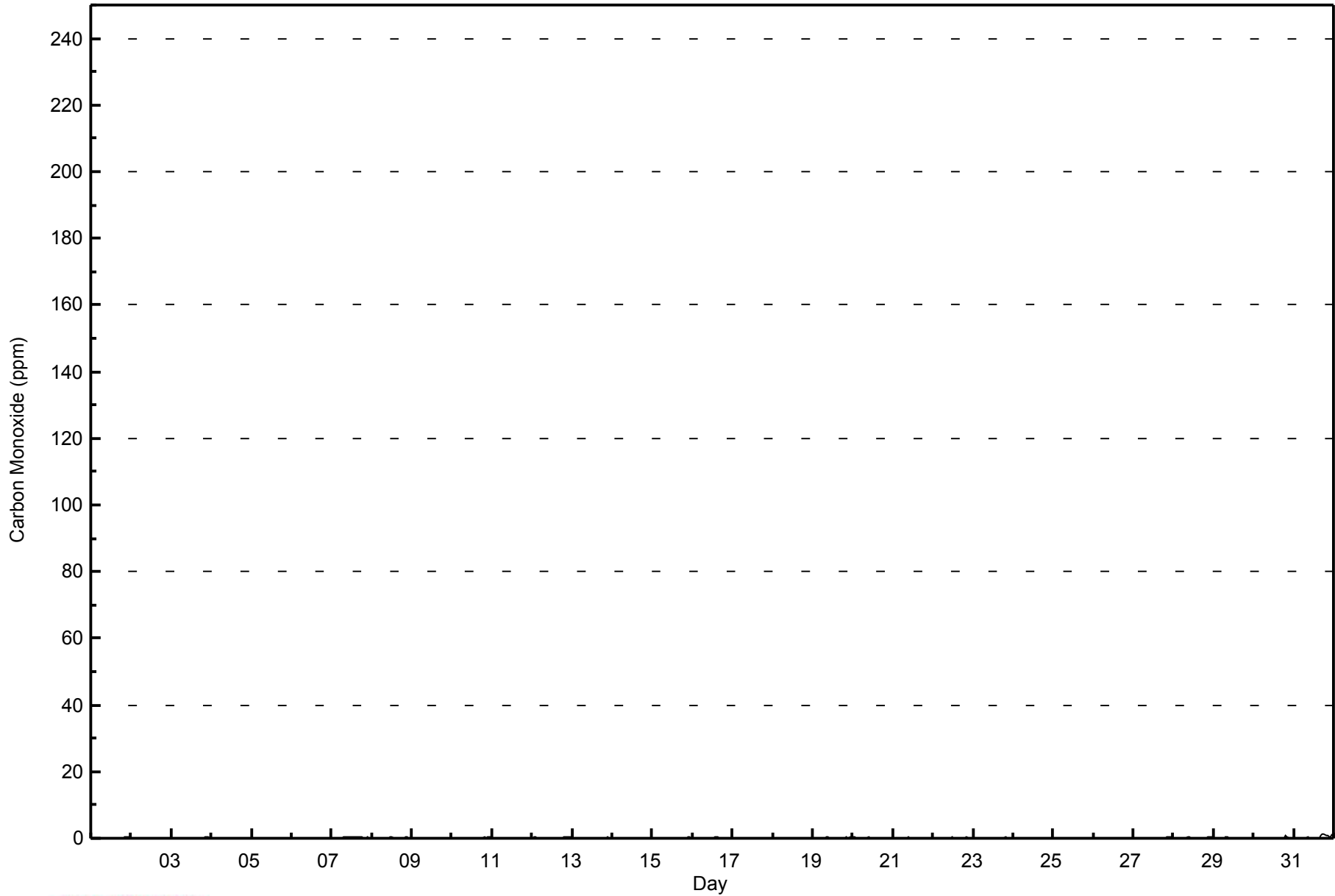


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0															Hours in Service: 744																																	
Maximum Value: 1.1 ppm on Aug 1 00:00															Maximum Daily Average: 0.4 ppm on Jul 31										Hours of Data: 709																							
Minimum Value: 0.0 ppm on Jul 4 19:00															Minimum Daily Average: 0.0 ppm on Jul 4										Hours of Missing Data: 35																							
Maximum Diurnal Average: 0.2 ppm at hour 21															Minimum Diurnal Average: 0.1 ppm at hour 16										Hours of Calibration: 35																							
Monthly Average: 0.13 ppm															Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.1 Q ₃ = 0.2 P ₉₀ = 0.2 P ₉₉ = 0.6										Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2																						
2-Jul	0.2	0.2	0.1	0.2	0.1	Z	0.1	0.1	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	0.2	0.1	0.1	0.1	0.1	0.2																					
3-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.0	0.3																						
4-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
5-Jul	0.0	0.1	0.0	0.0	0.0	Z	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1																						
6-Jul	0.1	0.1	0.1	0.1	0.0	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1																						
7-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.2	0.3	0.3	0.5	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2																						
8-Jul	0.2	0.2	0.2	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.2	0.2	0.3	0.2	0.1	0.1	0.3																						
9-Jul	0.1	0.1	0.1	0.1	0.2	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2																						
10-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.1	0.3																						
11-Jul	0.2	0.2	0.2	0.2	0.1	Z	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	0.0	0.1	0.1	0.1	0.1	0.2																						
12-Jul	0.2	0.2	0.2	0.2	0.2	Z	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.3																						
13-Jul	0.3	0.2	0.1	0.1	0.1	Z	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.2	0.1	0.1	0.3																						
14-Jul	0.1	0.1	0.0	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1																						
15-Jul	0.1	0.0	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.2																						
16-Jul	0.1	0.1	0.1	0.1	0.2	Z	0.2	0.2	C	C	C	C	0.2	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.3																						
17-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2																						
18-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2																						
19-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.3																						
20-Jul	0.2	0.2	0.2	0.2	0.1	Z	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2																						
21-Jul	0.1	0.1	0.1	0.1	0.2	Z	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	0.2	0.1	0.2																						
22-Jul	0.2	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.3																						
23-Jul	0.2	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2																						
24-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	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	0.2																						
25-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2																						
26-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.2																						
27-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3																						
28-Jul	0.2	0.2	0.2	0.2	0.2	Z	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	0.3	0.4	0.3	0.2	0.2	0.4																						
29-Jul	0.2	0.2	0.2	0.2	0.2	Z	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	0.1	0.2	0.2	0.2	0.2	0.1	0.2																						
30-Jul	0.2	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.8	0.4	0.1	0.1	0.1	0.2	0.8																						
31-Jul	0.1	0.2	0.2	0.1	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.7	1.1	1.1	1.0	0.8	0.5	0.6	1.1	0.4	1.1																						
																								0.1	0.1	0.1	0.1	0.1	--	0.1	0.1	0.1	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	0.2	0.2	Diurnal Average
																								0.3	0.2	0.2	0.2	0.2	--	0.2	0.3	0.3	0.5	0.5	0.5	0.4	0.3	0.3	0.3	0.7	1.1	1.1	1.0	0.8	0.5	0.6	1.1	Diurnal Maximum
Z - zerospan C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 13 ppm																																																



WBEA NETWORK
Hourly Averages

Carbon Monoxide (CO) - ppm
Athabasca Valley - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Carbon Monoxide (CO) - ppm
Athabasca Valley - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	694	97.88	97.88
0.4 - 0.5	7	0.99	98.87
0.6 - 0.7	2	0.28	99.15
0.8 - 1.4	6	0.85	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Carbon Monoxide (CO) - ppm
Athabasca Valley - July 2014

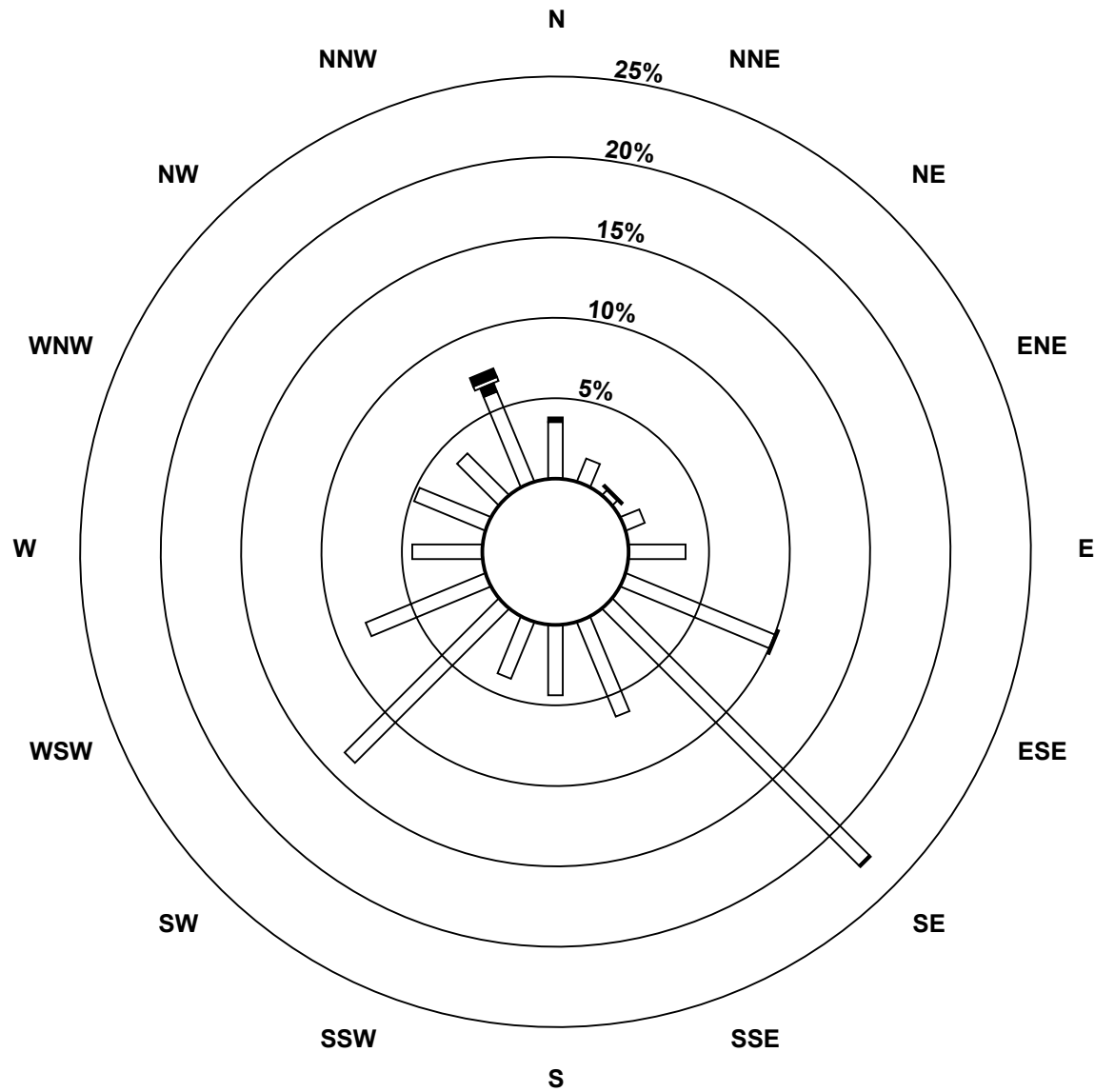
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	25	11	3	9	25	71	160	45	31	27	96	57	31	34	26	43	694
0.4 - 0.5	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4	7
0.6 - 0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
0.8 - 1.4	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	4	6
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	27	11	4	9	25	72	161	45	31	27	96	57	31	34	26	53	709

Total Number of Valid Hours: 709

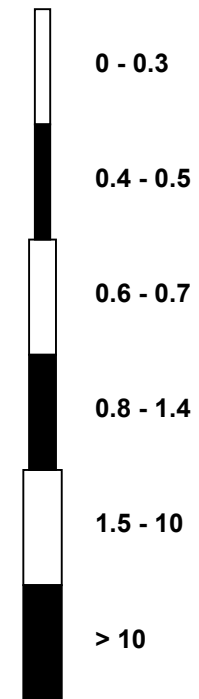
Total Number of Hours: 744

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

**Carbon Monoxide (CO) - ppm
Athabasca Valley (AMS 7)**



Classes (ppm)



Total Number of Valid Hours: 709

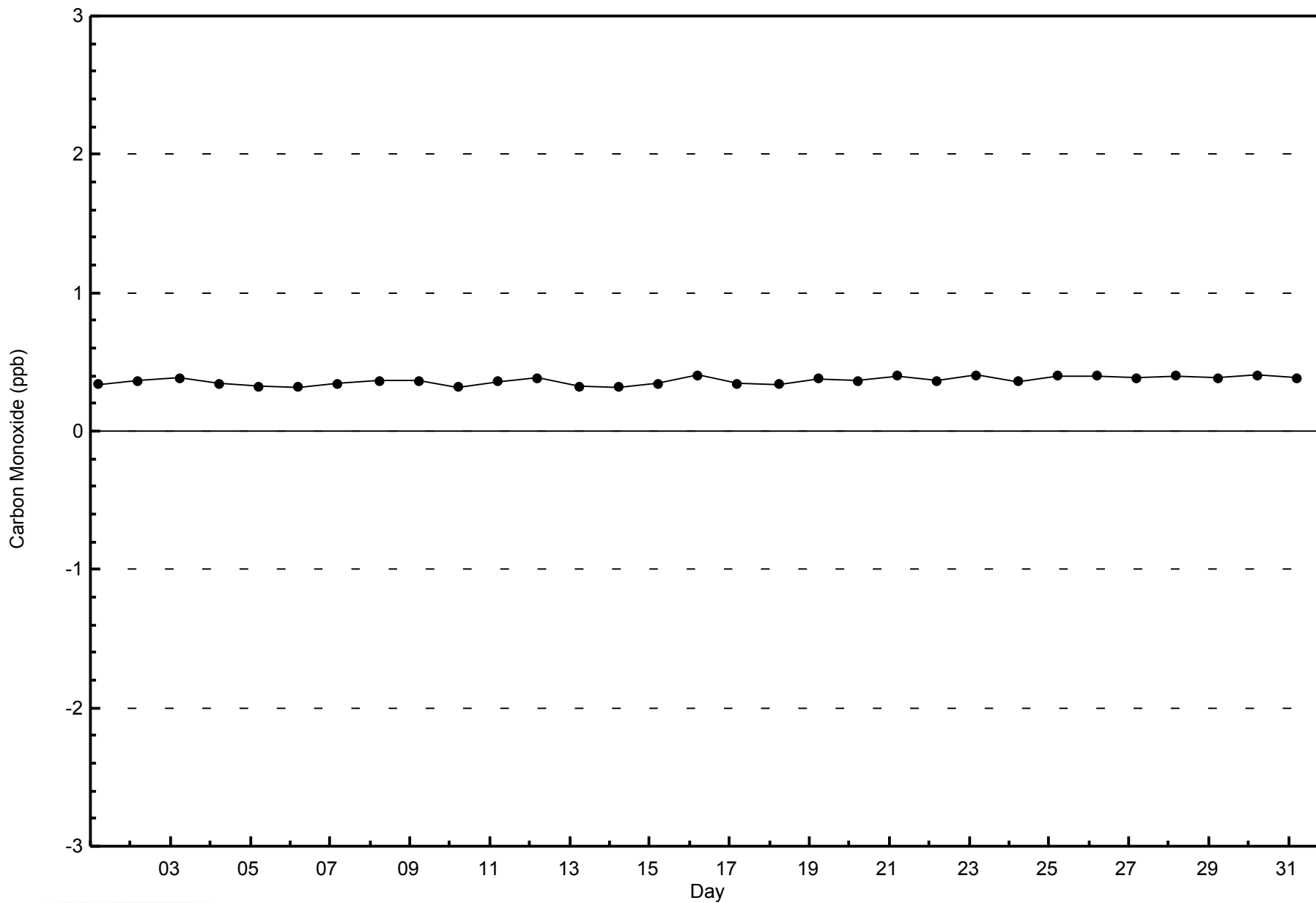


WBEA NETWORK

Zero Responses

Carbon Monoxide (CO) - ppb

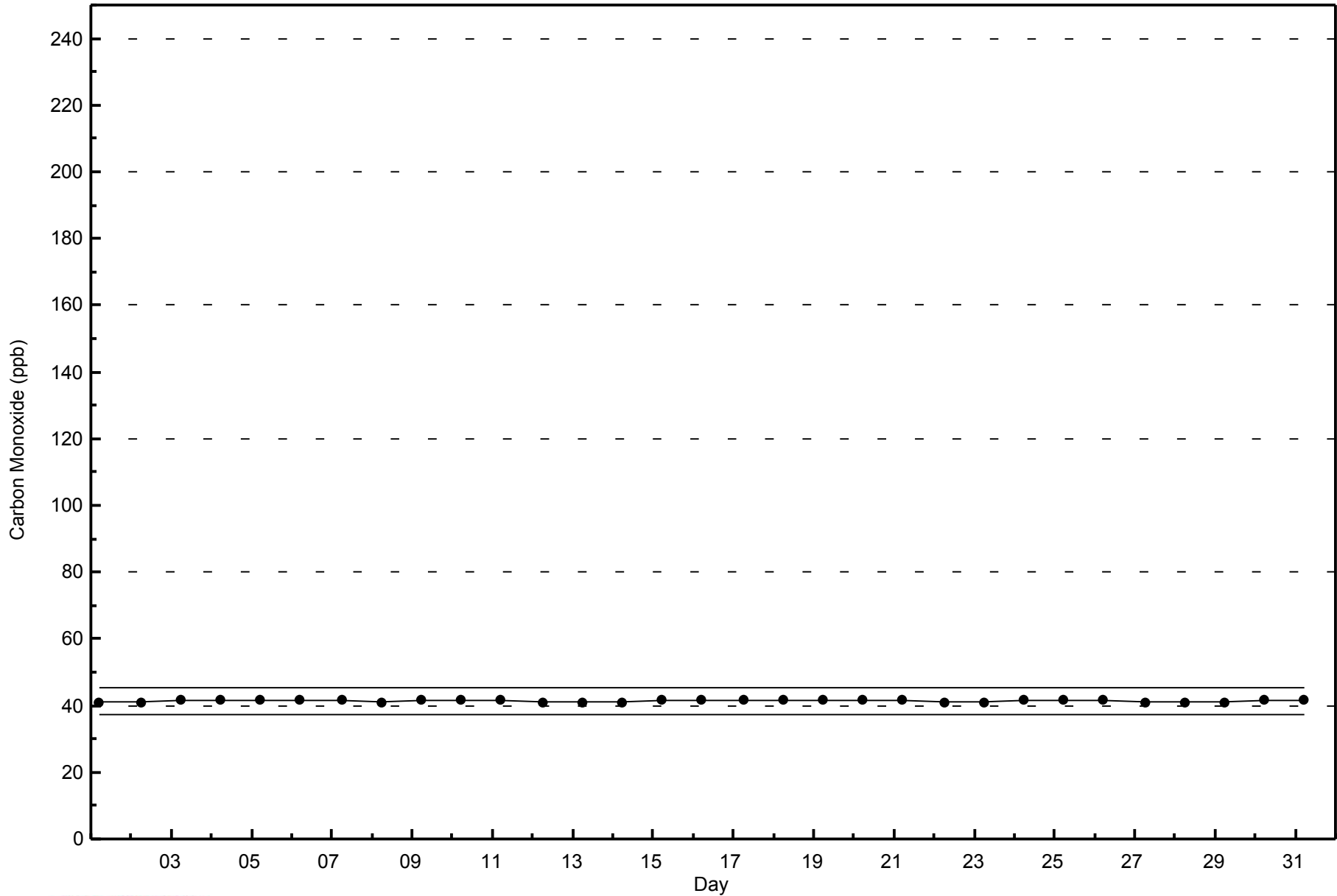
Athabasca Valley - July 2014





WBEA NETWORK
Span Responses

Carbon Monoxide (CO) - ppb
Athabasca Valley - July 2014





Wood Buffalo Environmental Association
Summary of Hour Averages

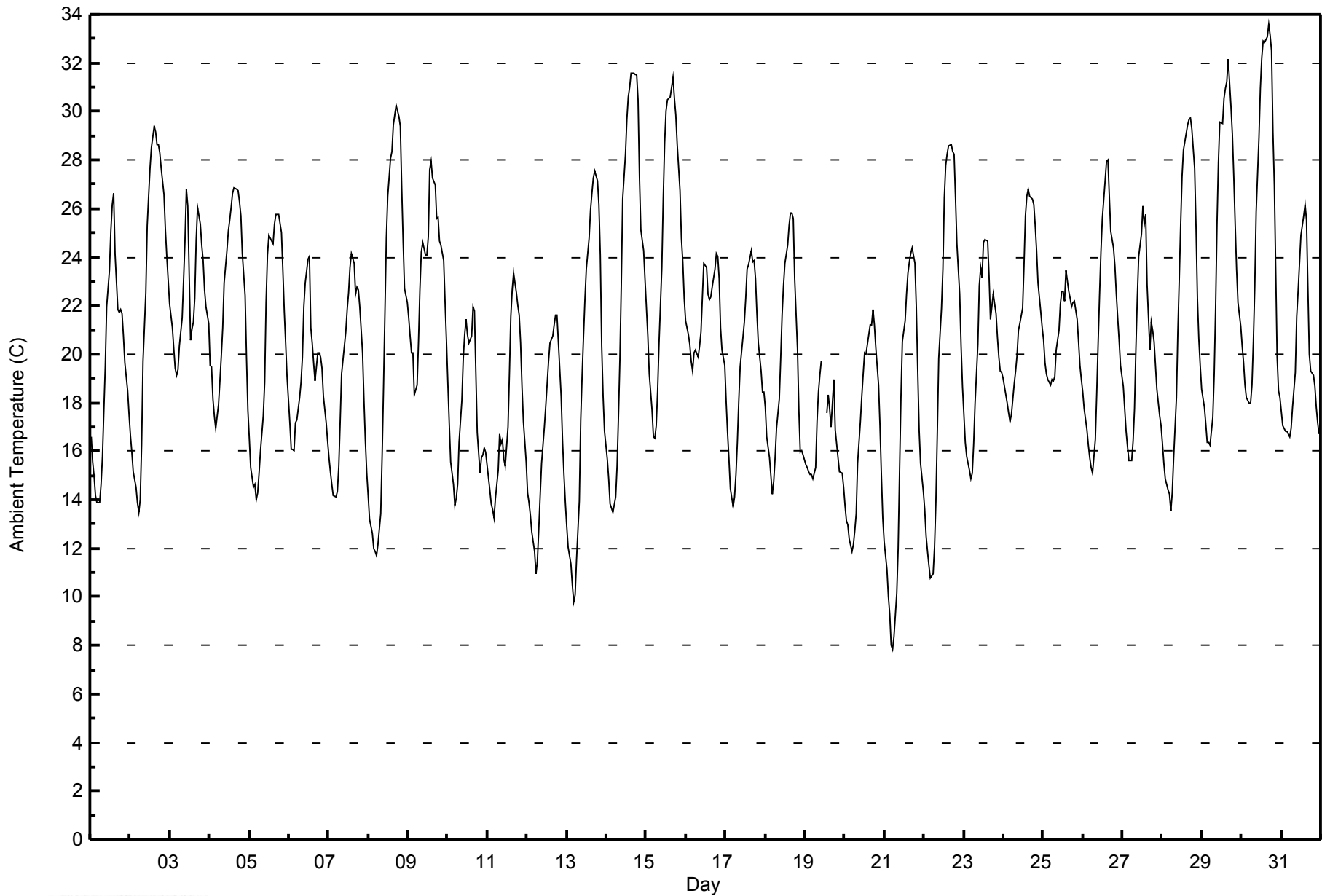
Ambient Temperature (AT) - C
Athabasca Valley - July 2014

Maximum Value: 33.6 C on Jul 30 17:00 Maximum Daily Average: 25.2 C on Jul 30																						Hours in Service: 744 Hours of Data: 742																									
Minimum Value: 7.9 C on Jul 21 06:00 Minimum Daily Average: 16.4 C on Jul 12 Maximum Diurnal Average: 25.5 C at hour 15 Minimum Diurnal Average: 14.8 C at hour 5 Monthly Average: 20.49 C Percentiles: P ₁ = 10.1 P ₁₀ = 14.2 Q ₁ = 16.7 Median = 20.3 Q ₃ = 23.9 P ₉₀ = 27.2 P ₉₉ = 31.9																						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-Jul	16.6	15.5	15.0	14.2	13.9	13.9	14.6	15.8	17.7	19.5	21.9	23.5	25.1	26.2	26.6	24.2	21.8	21.8	21.9	21.7	20.8	19.6	18.5	17.5	19.5	26.6																					
2-Jul	16.6	16.0	15.2	14.5	13.9	13.5	14.0	16.2	19.7	22.6	25.3	26.5	27.7	28.5	29.4	29.1	28.6	28.7	28.3	27.6	26.5	25.1	24.0	23.0	22.5	29.4																					
3-Jul	22.1	21.1	20.2	19.4	19.1	19.4	20.4	21.5	23.0	24.7	26.8	26.1	20.6	21.1	21.3	22.3	24.6	26.0	25.3	24.5	23.9	22.6	21.9	21.3	22.5	26.8																					
4-Jul	19.5	19.5	18.2	17.4	16.9	17.9	18.9	20.0	21.1	22.9	24.3	25.1	25.5	26.0	26.6	26.8	26.8	26.8	26.3	25.7	24.2	22.4	19.9	17.7	22.4	26.8																					
5-Jul	16.5	15.3	14.5	14.6	14.0	14.3	15.1	16.0	17.5	18.9	22.1	24.1	24.9	24.7	24.6	25.4	25.8	25.8	25.8	25.0	23.5	21.8	20.5	19.1	20.4	25.8																					
6-Jul	17.2	16.1	16.1	16.0	17.2	17.3	18.2	18.9	19.9	21.9	22.9	23.9	24.0	21.1	20.4	19.7	18.9	20.0	20.1	19.9	19.4	18.3	17.2	16.4	19.2	24.0																					
7-Jul	15.7	15.2	14.6	14.2	14.1	14.3	15.4	17.3	19.2	20.3	20.9	21.9	22.6	23.6	24.1	23.7	22.5	22.7	22.7	21.9	20.1	18.1	16.4	15.1	19.0	24.1																					
8-Jul	14.2	13.2	12.6	12.0	11.9	11.7	12.1	13.4	15.8	18.7	21.7	24.8	26.5	28.1	28.4	29.4	29.8	30.2	29.8	29.4	26.8	24.7	22.7	22.1	21.3	30.2																					
9-Jul	21.5	20.7	20.1	20.1	18.3	18.7	20.5	22.6	24.2	24.6	24.1	24.1	24.8	27.6	28.0	27.2	27.0	25.6	25.6	24.7	24.5	23.9	22.1	20.5	23.4	28.0																					
10-Jul	18.8	17.1	15.6	14.6	13.8	14.0	14.6	16.4	18.1	19.8	20.8	21.4	20.8	20.4	20.7	21.9	21.8	19.3	16.8	15.1	15.7	15.9	16.1	15.9	17.7	21.9																					
11-Jul	15.4	14.4	13.8	13.6	13.3	14.0	15.2	16.7	16.3	16.5	15.7	15.4	17.0	19.2	21.6	22.6	23.4	22.6	22.0	21.6	20.5	18.6	17.3	15.6	17.6	23.4																					
12-Jul	14.3	13.9	13.4	12.7	11.9	11.0	11.5	12.8	14.2	15.5	17.0	17.9	18.8	19.7	20.5	20.7	21.2	21.6	21.6	20.5	18.3	16.4	15.0	13.9	16.4	21.6																					
13-Jul	12.9	12.0	11.4	10.5	9.8	10.1	11.5	13.9	17.3	19.2	20.8	22.2	23.5	24.8	25.9	26.6	27.2	27.5	27.2	26.1	24.1	20.3	18.3	16.8	19.2	27.5																					
14-Jul	15.7	14.8	13.8	13.6	13.5	14.1	15.4	17.5	19.8	22.8	26.4	28.3	29.7	30.6	31.0	31.6	31.6	31.5	31.5	30.5	27.3	25.1	24.2	23.0	23.5	31.6																					
15-Jul	21.9	20.7	19.2	17.7	16.6	16.5	17.1	18.5	20.4	23.6	26.4	28.7	30.1	30.5	30.6	31.0	31.4	30.6	29.8	28.6	26.8	24.8	23.8	22.3	24.5	31.4																					
16-Jul	21.4	20.8	20.4	19.7	19.3	20.1	20.2	19.9	20.4	20.9	22.4	23.7	23.6	22.5	22.3	22.4	22.7	23.5	24.2	24.0	23.1	21.1	20.2	19.5	21.6	24.2																					
17-Jul	18.0	16.7	15.7	14.5	13.7	14.1	15.1	16.4	18.0	19.5	20.7	21.3	22.3	23.5	23.7	24.3	23.8	23.9	23.1	21.7	20.4	19.3	18.4	18.4	19.4	24.3																					
18-Jul	17.8	16.6	15.7	15.0	14.2	14.7	15.7	16.9	18.2	19.8	21.6	22.8	23.7	24.5	25.3	25.8	25.8	25.6	23.1	20.2	17.7	16.0	16.0	15.8	19.5	25.8																					
19-Jul	15.4	15.3	15.2	15.0	15.0	14.9	15.3	17.2	18.4	19.1	19.7	UO	UO	17.6	18.4	17.7	17.0	19.0	16.9	16.3	15.7	15.2	15.1	14.5	16.5	19.7																					
20-Jul	13.8	13.1	12.9	12.4	11.9	12.2	12.7	13.4	15.5	17.3	18.2	19.2	20.1	20.0	20.8	21.2	21.2	21.9	21.2	20.3	18.7	17.1	15.0	13.3	16.8	21.9																					
21-Jul	12.3	11.1	10.0	9.3	8.0	7.9	8.3	10.1	12.0	15.2	18.2	20.5	21.4	22.5	23.3	23.8	24.1	24.4	23.7	21.9	19.3	16.9	15.5	14.4	16.4	24.4																					
22-Jul	13.6	12.5	11.9	11.3	10.8	10.9	12.0	14.0	16.8	19.8	21.9	23.5	26.4	27.7	28.2	28.6	28.6	28.3	28.2	26.5	24.5	22.5	20.4	18.7	20.3	28.6																					
23-Jul	17.5	16.4	15.8	15.2	14.9	15.1	16.3	18.0	20.4	22.8	23.6	23.2	24.6	24.7	24.7	23.2	21.5	22.0	22.5	21.7	20.7	19.9	19.3	19.3	20.1	24.7																					
24-Jul	19.0	18.3	18.0	17.6	17.3	17.5	18.8	19.3	20.0	21.0	21.3	21.9	23.7	25.7	26.5	26.8	26.5	26.4	26.2	25.3	24.2	22.9	21.8	21.1	22.0	26.8																					
25-Jul	20.6	19.6	19.2	19.0	18.7	19.0	18.9	19.1	20.2	21.0	22.1	22.6	22.6	22.2	23.4	22.6	22.3	21.9	22.1	22.2	21.5	20.5	19.5	18.9	20.8	23.4																					
26-Jul	18.5	17.8	16.9	16.3	15.7	15.3	15.1	16.5	18.4	20.5	22.4	24.2	25.6	27.2	28.0	28.0	26.5	25.0	24.4	23.6	22.5	21.5	20.6	19.5	21.2	28.0																					
27-Jul	18.7	17.7	16.8	16.2	15.6	15.6	16.4	17.7	20.2	22.3	24.0	24.9	26.1	25.4	25.8	22.9	20.2	21.3	21.0	20.5	19.5	18.6	17.5	17.0	20.1	26.1																					
28-Jul	16.3	15.5	14.8	14.4	14.2	13.5	14.3	15.7	18.2	20.9	23.0	25.3	27.3	28.4	29.1	29.5	29.7	29.7	29.3	27.7	25.2	22.3	20.6	19.5	21.9	29.7																					
29-Jul	18.5	17.8	17.1	16.4	16.4	16.2	17.4	19.2	21.9	25.3	27.9	29.6	29.5	30.5	31.0	31.3	32.1	30.2	29.1	27.3	25.4	23.5	22.2	21.2	24.0	32.1																					
30-Jul	20.3	19.6	18.7	18.2	18.0	18.0	18.8	20.5	22.8	25.9	28.9	30.9	32.2	32.9	32.9	33.1	33.6	33.1	32.5	29.1	27.0	19.9	18.5	18.2	25.2	33.6																					
31-Jul	17.6	17.1	16.8	16.8	16.7	16.6	16.9	17.8	19.3	21.6	22.6	23.7	24.9	25.7	26.1	25.5	22.7	20.0	19.3	19.1	18.7	17.8	17.2	16.7	19.9	26.1																					
																						17.4	16.5	15.8	15.2	14.8	14.9	15.7	17.1	18.9	20.8	22.4	23.7	24.5	24.9	25.5	25.4	25.2	25.1	24.6	23.6	22.1	20.4	19.2	18.3	Diurnal Average	
																						22.1	21.1	20.4	20.1	19.3	20.1	20.5	22.6	24.2	25.9	28.9	30.9	32.2	32.9	32.9	33.1	33.6	33.1	32.5	30.5	27.3	25.1	24.2	23.0	Diurnal Maximum	
UO - Unstable Operation																																															



WBEA NETWORK
Hourly Averages

Ambient Temperature (AT) - C
Athabasca Valley - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Athabasca Valley - July 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	5	0.67	0.67
10 - 20	349	47.04	47.71
> 20	388	52.29	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744

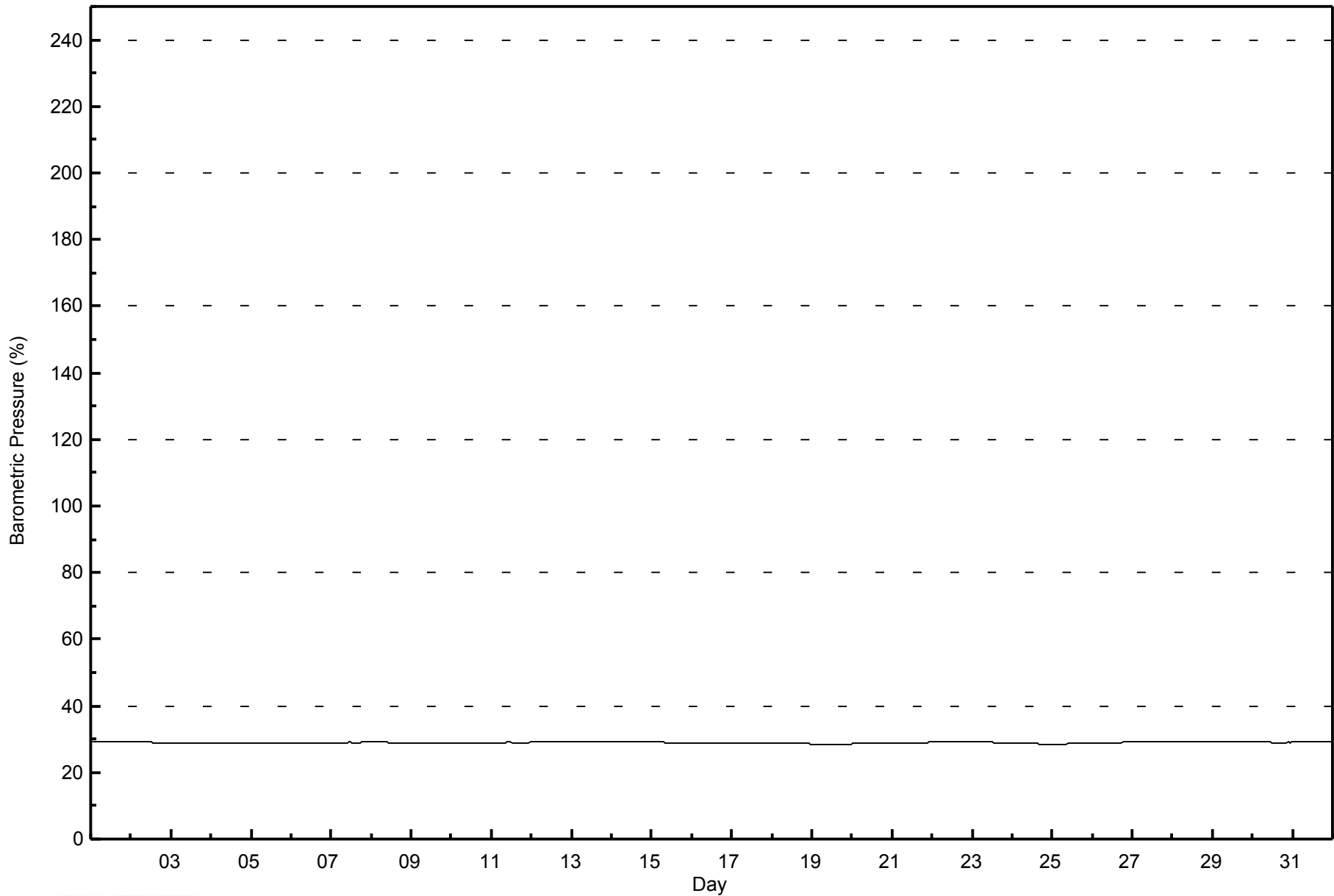


Maximum Value: 29.3 % on Jul 13 07:00 Maximum Daily Average: 29.3 % on Jul 13 Minimum Value: 28.4 % on Jul 19 11:00 Minimum Daily Average: 28.5 % on Jul 19 Maximum Diurnal Average: 29.0 % at hour 7 Minimum Diurnal Average: 28.9 % at hour 19 Monthly Average: 28.93 % Percentiles: P ₁ = 28.5 P ₁₀ = 28.7 Q ₁ = 28.8 Median = 28.9 Q ₃ = 29.1 P ₉₀ = 29.2 P ₉₉ = 29.3																					Hours in Service:	744						
																					Hours of Data:	744						
																					Hours of Missing Data:	0						
																					Hours of Calibration:	0						
																					Percent Operational Time:	100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Jul	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
2-Jul	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
3-Jul	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7
4-Jul	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
5-Jul	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	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
6-Jul	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
7-Jul	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1
8-Jul	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
9-Jul	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	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6
10-Jul	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	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9
11-Jul	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
12-Jul	29.0	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2
13-Jul	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3
14-Jul	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
15-Jul	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
16-Jul	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
17-Jul	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	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7
18-Jul	28.8	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	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6
19-Jul	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6
20-Jul	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	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8
21-Jul	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	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
22-Jul	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2
23-Jul	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8
24-Jul	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	28.6	28.6	28.6	28.6	28.6
25-Jul	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8
26-Jul	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
27-Jul	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2
28-Jul	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2
29-Jul	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.2
30-Jul	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	28.9	28.9	28.9	29.0	29.1	29.0	29.0	29.0	29.0	29.1
31-Jul	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2
																								Diurnal Average	28.9			
																								Diurnal Maximum	29.3			



WBEA NETWORK
Hourly Averages

Barometric Pressure (BP) - %
Athabasca Valley - July 2014



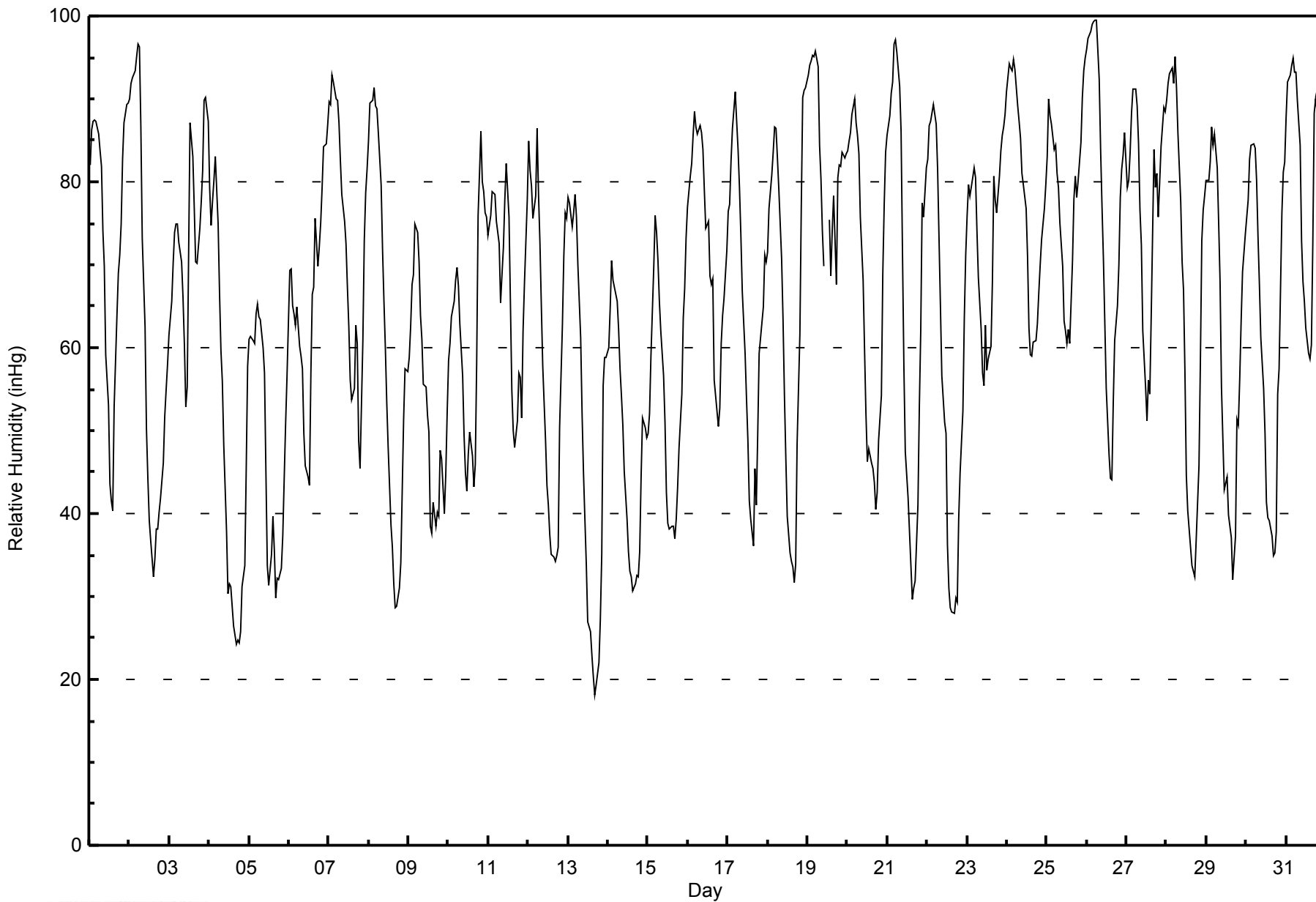


Maximum Value: 100 inHg on Jul 26 06:00 Maximum Daily Average: 83.1 inHg on Jul 19																			Hours in Service: 744 Hours of Data: 742																																																	
Minimum Value: 18 inHg on Jul 13 17:00 Minimum Daily Average: 48.0 inHg on Jul 13 Maximum Diurnal Average: 84.2 inHg at hour 5 Minimum Diurnal Average: 45.7 inHg at hour 15 Monthly Average: 65.3 inHg Percentiles: P ₁ = 25 P ₁₀ = 37 Q ₁ = 50 Median = 68 Q ₃ = 82 P ₉₀ = 89 P ₉₉ = 97																			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-Jul	82	86	87	87	87	86	84	82	74	70	59	53	43	41	40	53	64	69	71	75	83	87	89	90	72.6	90																																										
2-Jul	90	92	93	93	95	97	96	87	73	63	50	44	39	37	32	35	38	38	40	42	46	52	55	58	61.8	97																																										
3-Jul	62	66	70	74	75	75	73	70	66	60	53	55	87	85	83	77	70	74	78	81	90	90	87	73.8	90																																											
4-Jul	79	75	78	80	83	75	67	60	56	48	38	30	31	31	29	27	24	25	24	26	31	34	45	58	48.1	83																																										
5-Jul	61	61	61	61	64	65	64	63	60	57	45	34	31	35	40	36	30	32	32	33	37	44	51	56	48.1	65																																										
6-Jul	69	70	65	64	63	65	60	59	57	50	46	44	43	57	66	67	76	70	72	75	79	84	85	87	65.6	87																																										
7-Jul	90	89	93	92	90	90	87	83	79	75	73	67	62	56	54	55	63	60	49	45	61	73	79	81	72.7	93																																										
8-Jul	85	89	90	91	89	89	86	80	72	66	60	53	48	39	36	32	29	29	31	34	43	51	57	57	59.8	91																																										
9-Jul	59	62	68	69	75	74	70	64	61	56	55	52	50	39	38	41	39	40	40	48	47	40	45	52	53.4	75																																										
10-Jul	58	61	64	66	68	70	67	63	57	49	45	43	47	50	47	43	46	58	76	86	80	79	76	76	61.4	86																																										
11-Jul	74	76	79	79	78	75	72	65	69	72	78	82	76	65	55	50	48	51	57	56	52	62	68	78	67.4	82																																										
12-Jul	85	81	80	76	78	86	78	73	65	58	49	43	41	37	35	35	34	35	36	50	63	71	76	76	60.1	86																																										
13-Jul	78	78	75	76	78	76	70	61	52	45	39	34	27	26	23	20	18	19	22	27	35	55	59	59	48.0	78																																										
14-Jul	60	65	70	68	67	66	62	57	54	51	45	39	35	33	32	31	32	32	32	35	44	52	50	49	48.5	70																																										
15-Jul	50	52	59	70	76	74	71	66	62	57	51	43	39	38	38	38	37	39	43	48	54	64	67	73	54.5	76																																										
16-Jul	77	81	82	86	88	87	86	87	86	84	79	74	75	69	68	68	56	52	51	53	60	64	66	72	72.9	88																																										
17-Jul	76	77	83	87	91	87	84	79	74	67	59	54	49	42	39	36	45	41	50	59	61	65	71	70	64.5	91																																										
18-Jul	72	77	81	84	87	86	83	79	71	63	54	47	40	35	34	34	32	34	48	62	77	90	91	91	64.6	91																																										
19-Jul	93	94	95	95	95	96	94	84	80	74	70	UO	UO	75	69	74	78	68	81	82	82	84	83	83	83.1	96																																										
20-Jul	84	85	86	88	90	87	86	83	76	68	60	52	46	48	46	45	44	40	42	49	54	69	77	84	66.2	90																																										
21-Jul	86	88	91	92	97	97	96	92	86	71	58	47	42	38	34	30	31	32	41	53	62	77	76	82	66.5	97																																										
22-Jul	83	87	87	88	89	87	82	73	65	57	51	50	36	31	29	28	28	30	29	39	45	52	64	71	57.5	89																																										
23-Jul	76	80	78	80	82	80	74	68	62	57	56	63	57	59	60	68	81	78	76	81	84	86	87	88	73.3	88																																										
24-Jul	91	94	94	93	95	94	89	87	85	81	80	77	71	62	59	59	61	61	63	67	70	73	77	80	77.6	95																																										
25-Jul	83	90	88	87	84	84	81	79	75	70	63	62	61	62	61	71	78	81	78	80	85	90	93	95	78.4	95																																										
26-Jul	96	97	98	99	99	100	99	92	84	77	71	63	55	47	44	44	53	61	65	70	78	82	83	86	76.8	100																																										
27-Jul	79	80	84	88	91	91	89	85	77	72	62	55	51	56	54	64	84	79	81	76	80	84	89	89	76.7	91																																										
28-Jul	90	92	93	94	92	95	91	86	78	70	67	57	45	40	36	34	33	32	37	46	58	73	77	78	66.4	95																																										
29-Jul	80	80	82	87	84	86	82	75	68	55	49	43	44	40	38	37	32	37	51	51	56	63	69	74	61.0	87																																										
30-Jul	76	78	83	84	85	84	80	73	68	61	55	50	41	39	39	37	35	35	38	54	57	76	81	82	62.2	85																																										
31-Jul	88	92	93	94	95	93	93	90	84	73	68	66	62	59	59	60	72	88	90	87	87	85	86	87	81.4	95																																										
																			77.7		79.8		81.5		83.0		84.2		83.8		80.5		75.7		70.2		63.8		57.6		52.6		49.2		47.5		45.7		46.1		48.1		49.0		52.3		57.0		62.4		69.4		73.0		75.8		Diurnal Average	
																			96		97		98		99		99		100		99		92		86		84		80		82		87		85		83		77		84		88		90		87		87		90		93		95		Diurnal Maximum	
UO - Unstable Operation																																																																				



WBEA NETWORK
Hourly Averages

Relative Humidity (RH) - inHg
Athabasca Valley - July 2014





Maximum Speed: 31 km/h on Jul 10 18:00	Maximum Daily Speed Average: 14.5 km/h on Jul 10	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jul 6 06:00	Minimum Daily Speed Average: 0.4 km/h on Jul 21	Hours of Data: 744
Maximum Diurnal Speed Average: 4.8 km/h at hour 7	Minimum Diurnal Speed Average: 1.8 km/h at hour 22	Hours of Missing Data: 0
Monthly Average Velocity: 2.0 km/h 198.9 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 6 Q ₃ = 9 P ₉₀ = 13 P ₉₉ = 26	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	SSW3	WSW3	SE2	E3	SSE3	SE5	SE3	E5	ESE2	E6	NE3	NW3	N2	WNW2	ENE3	SW9	SW6	SW6	SW3	W2	SW2	SW2	E1	SE2	S1.2	SW9
2-Jul	ESE2	SE2	SE3	SSE2	ESE4	SE5	SE6	SE5	SE5	SE4	SE7	SE9	SE8	SE7	SSE8	SE8	E9	E11	E10	ESE10	SE8	SE9	SE11	SE14	SE6.6	SE14
3-Jul	SE13	SE12	ESE7	ESE7	SE8	SE9	SE10	SE8	SE13	SE18	SE18	S15	NNW1	ENE4	ENE3	SE5	ESE8	N2	NNW9	N6	NW2	WSW3	NW4	NW5	SE5.3	SE18
4-Jul	W9WSW19	WSW8	WS5	SSE3	SSE4	SE7	SW8	SW9	SW13	WSW17	WSW25	WSW20	WSW18	SW19	SW22	WSW24	WSW19	WSW21	WSW14	WSW9	WSW9	SW4	SW6	WSW12.0	WSW25	
5-Jul	WS5	SSE5	SE7	SE5	SE9	SE6	SE5	SE3	S3	SW10	SW15	SW18	SW18	SW14	SSW7	S2WSW15	SW15	SW17	WSW12	SW9	SW9	WNW7	WSW7	SW7.4	SW18	
6-Jul	S2	SE3	SE7	SE5	SSW4	SW1	WNW3	SW6	SE1	N1	NW5	WSW6	WSW16	NW19	N6	N4	NNW8	WNW2	WSW5	SW5	SW7	W7	WNW7	WNW8	W3.1	NW19
7-Jul	WSW6	WSW7	SW9	SW6	SW8	SW8	SSW5	ESE1	N5	N8	NNW8	NNW13	NNW13	NW18	NNE8	N7	N7	NNE6	NNE4	WSW5	SW1	SW2	SE2	NW3.2	NW18	
8-Jul	SE4	SE6	SE6	SE7	SE10	SE8	SE8	SSE7	ESE5	ESE2	ESE5	WSW3	SW6	SW7	SSW7	S8	S9	SSE8	SSE6	SE7	SE5	S4	SSE5	SSE5.3	SE10	
9-Jul	S5	S6	N2	SSE2	SE6	SE5	E4	SE5	SW4	SW12	SW4	SSE8	SSE4	S10	SW9	SW9	WNW13	W7	SSW4	SSW4	SW8	W14	W10	W10	SW4.4	W14
10-Jul	WSW10	WSW15	WSW16	WSW18	WSW18	WSW17	SW8	SW8	SW7	SSW6	WSW10	SW12	NW6	NNW15	NW22	NW24	NW29	NW31	NW28	WNW16	WNW20	W26	W27	W26	W14.5	NW31
11-Jul	W21	WSW5	SSW4	SW7	SW6	SW6	SW9	W10	SW7	WNW9	W10	SW9	SW9	SW10	W16	WNW19	NW17	WNW15	WSW12	NW7	N8	NNW5	NNW3	WSW5	W7.8	W21
12-Jul	WSW6	NW5	NNW7	NNW5	NW2	W1	WSW4	WSW2	WNW5	WNW4	W4	NNW5	NNW7	NNW8	N7	NNW6	NNW7	NNW6	NNW3	W2	SW4	SSW2	E2	SE3	NW3.1	NNW8
13-Jul	SE4	SE6	SE7	SE6	SE6	SE6	SE6	SE9	SE8	ESE9	SSE8	SSE8	S9	SSE8	S9	S8	S6	S8	SSE6	ESE5	SE6	ESE1	SE2	SE4	SSE6.1	S9
14-Jul	SSE4	SSE2	SE2	SSE5	SE6	SE8	SE13	SE12	SE10	SE9	SW6	SW9	SSW8	SW11	SW12	SW11	SW12	SW10	SSW8	S5	SW5	SW4	SSW8	SSE6	S6.0	SE13
15-Jul	SSE7	SSE8	SSE8	SE9	SE8	SE8	SE10	SE9	SE9	ESE6	E5	WSW7	SW10	SW9	WSW7	SSW5	S8	S7	S7	S5	S4	SE4	SE6	SE8	SSE5.7	SW10
16-Jul	SE7	SE5	SE4	SE3	ESE3	SW6	SSW5	SSE1	SE4	E3	NW2	N7	NNW11	NNW13	N7	WNW6	W15	WSW9	SW8	SW5	SSW2	SW9	WSW7	NW9	W2.1	W15
17-Jul	NNW9	WNW6	WSW5	SSW5	ESE1	E3	E4	NW2	W4	W4	WSW7	WSW7	W5	NNW4	NNW6	NNW5	N5	E3	SW4	SW10	SSW8	SSE4	S5	SW13	W2.5	SW13
18-Jul	W6	SW6	SE4	SW3	SW5	SW1	WSW2	NNW4	NNW3	WSW4	W3	WSW5	WNW3	NW4	W4	NW4	ENE4	ESE3	SSW11	SSE7	WSW11	N4	NW4	SSW4	WSW2.2	SSW11
19-Jul	SSE6	SE5	SE7	SE6	SSE6	SE8	SE7	SSE3	SW11	SW14	SW14	WNW12	WNW14	W14	WNW21	WNW26	WNW16	WNW19	NNW13	NNW18	NNW15	NNW8	WNW9	WNW8	W6.6	WNW26
20-Jul	W8	WSW4	SW4	SW8	SW5	SW7	SW5	SW6	ESE3	ENE1	NNW4	N7	N7	N8	N7	NNW9	N7	N3	NNE6	NNE2	NNW4	WNW2	SW4	E3	NW2.2	NNW9
21-Jul	E3	ESE3	ESE3	SE4	SE7	SE5	ESE4	SW2	W3	WNW2	WNW3	WNW4	NNW5	W3	W3	NW5	NW6	N6	NNW5	WSW4	SW4	E2	ESE1	ESE2	NW0.4	SE7
22-Jul	SE3	SE4	SE3	SE5	SE5	SE8	SE7	SE7	ESE5	ESE4	WNW2	NW3	ESE4	ESE8	ESE9	ESE9	ESE9	ESE10	SE9	SE5	SE6	SE7	SSE3	ESE2	ESE5.1	ESE10
23-Jul	ESE2	ESE1	SE3	ESE3	ESE5	ESE5	SE7	SE8	SE10	SE12	SE12	S3	ESE11	ESE9	ESE14	ESE10	NW4	NNW2	ESE2	S3	SE9	SE7	SE8	SE9	SE5.9	ESE14
24-Jul	SE6	E3	SE7	ESE5	SE8	SE8	SE8	SE6	SE8	SE11	SSE13	SE10	ESE10	ESE12	ESE12	ESE11	E15	ESE14	ESE10	ESE8	ESE6	ESE6	ESE6	ESE6	ESE8.4	E15
25-Jul	ESE4	E7	E3	N7	N7	N9	NE5	N7	NE6	E8	E4	NNE3	SE10	SE9	WSW6	SSW6	SW6	SW8	WSW4	W3	W4	WSW4	S1	ESE1	ENE0.7	SE10
26-Jul	SW1	SE3	SE5	ESE4	E5	ESE4	S4	ESE3	NW3	WNW2	WSW5	WNW5	NNE3	SE7	SSE7	S8	SSW9	W7	WNW4	SW4	SSW3	SSW4	S3	SE2	S2.1	SSW9
27-Jul	SSE6	SSE6	SSE5	SE7	SE9	SE9	SE8	SE9	ESE7	ENE4	SW7	WSW7	SW2	SE9	ESE8	SSW8	E4	WSW2	SSW7	S4	SSE6	SSE4	SE7	SE5	SSE4.9	SE9
28-Jul	SE6	SE7	SE8	SE7	ESE7	SE10	SE10	SE9	SE6	E5	N4	NNW3	SW5	WSW3	WSW5	SW4	SW9	SW7	SW4	SW6	SSE3	SE2	SSE3	SSE4	SSE3.4	SE10
29-Jul	SE8	SE8	SE6	SE8	SE8	ESE5	SE6	SE8	SE7	SE8	ESE7	ESE4	NNE2	ENE3	SE11	E8	E3	N6	E2	ESE11	SE7	SE7	SE6	SE5	ESE5.8	ESE11
30-Jul	SE8	SE6	ESE5	SE5	SE7	SE7	SE10	SE9	SE9	SE7	SSE6	ESE6	S6	SE5	ESE8	ESE11	SE10	ESE9	SE7	ESE4	NNW12	NNE17	SSE4	S4	SE5.3	NNE17
31-Jul	S4	SE6	SE5	NNE2	NNW4	ESE3	SSE4	SW1	ENE5	WNW2	NNW6	NNW10	NNW13	NNW15	NNW12	N13	NNW23	NNW17	NNW23	NE3	NNW16	NNW15	NNW13	NNW16	NNW7.5	NNW23

S2.7	S3.3	SSE3.4	SSE3.2	SSE3.6	SSE4.1	SSE4.8	SSE3.6	SSE3.5	SSE3.0	SSW2.0	WSW3.2	WSW2.3	W1.8	W2.3	WSW2.5	W3.4	W2.9	WSW2.5	SW1.8	WSW2.2	WSW1.8	SW2.0	SW2.1	Diurnal Average	
W21	WSW19	WSW16	WSW18	WSW18	WSW17	SE13	SE12	SE13	SE18	SE18	WSW25	WSW20	NW19	NW22	WNW26	NW29	NW31	NW28	NNW18	WNW20	W26	W27	W26	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

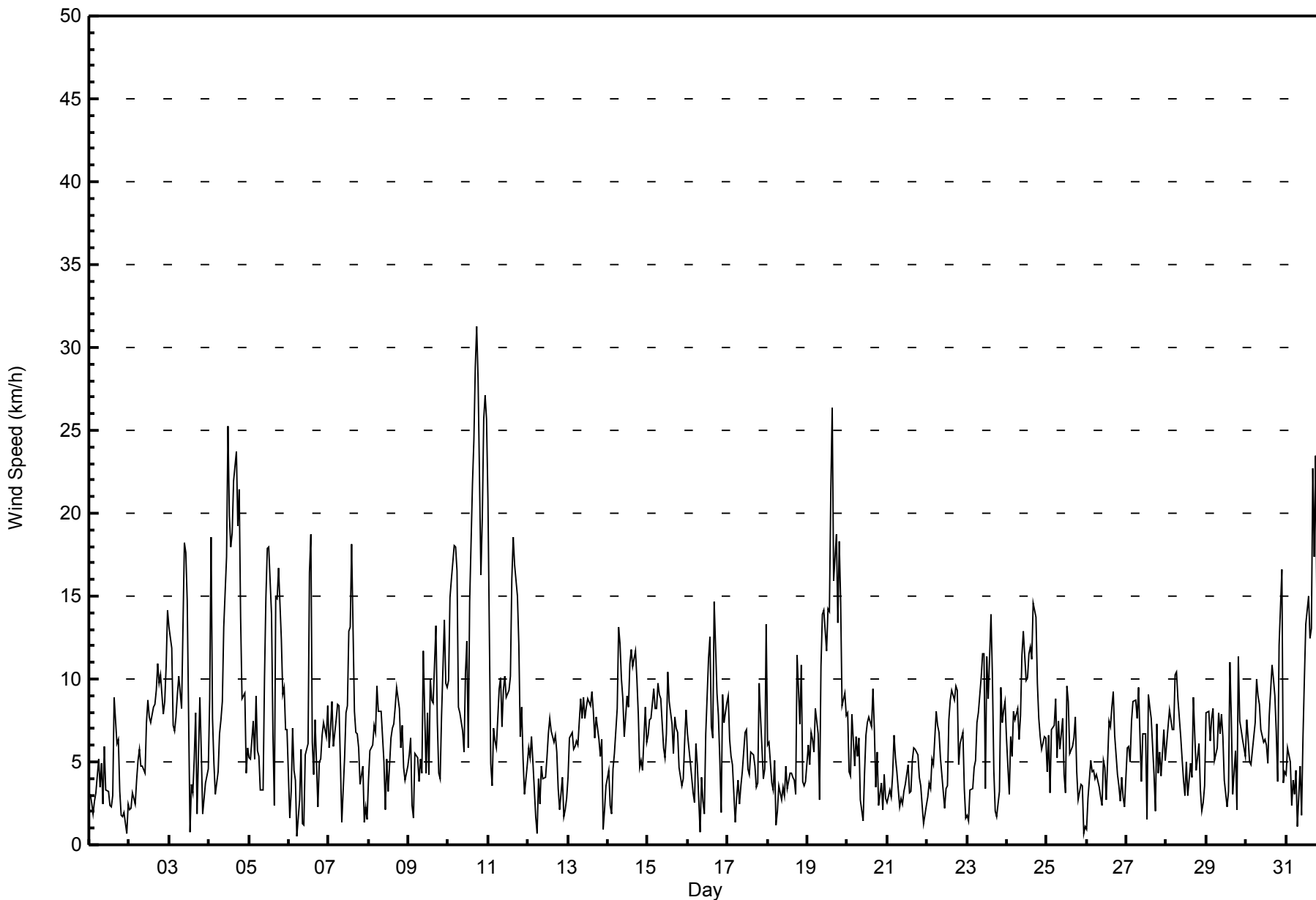
Wind Speed (WS) - km/h
Athabasca Valley - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 17 km/h on Jul 30 21:00														Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0											
Minimum Value: 1 km/h on Jul 21 11:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 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-Jul	3	2	2	1	1	1	2	2	1	2	1	1	1	2	3	8	5	4	2	2	2	1	1	2	8
2-Jul	2	1	1	1	2	2	2	1	2	4	3	3	3	3	4	4	3	3	2	3	2	2	2	3	4
3-Jul	3	3	2	2	2	2	2	3	4	5	5	7	3	2	1	3	3	3	2	2	1	2	2	5	7
4-Jul	10	5	2	3	2	2	3	2	2	4	5	6	6	5	6	6	5	5	5	4	2	2	2	3	10
5-Jul	3	3	2	1	2	1	2	2	3	3	3	4	5	5	2	4	4	4	4	3	2	2	3	2	5
6-Jul	2	1	1	2	3	3	3	2	2	2	4	6	5	9	5	4	3	2	1	2	2	3	3	2	9
7-Jul	3	2	2	2	2	2	2	2	1	3	2	5	4	3	5	4	3	3	2	2	3	2	2	2	5
8-Jul	1	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	3	3	2	2	2	2	1	2	3
9-Jul	1	2	6	2	2	2	1	3	4	5	2	2	2	4	3	3	6	3	2	2	3	5	2	1	6
10-Jul	4	2	3	3	3	5	3	3	2	3	4	4	3	7	5	7	8	7	7	4	5	3	3	3	8
11-Jul	6	3	2	2	2	2	2	4	3	3	3	2	3	3	5	4	5	3	2	4	3	2	1	2	6
12-Jul	1	2	2	1	2	1	1	2	2	2	2	3	3	3	2	2	2	1	1	1	2	3	1	1	3
13-Jul	2	2	2	2	2	2	2	2	2	3	3	4	3	3	3	3	3	2	2	2	2	1	1	1	4
14-Jul	1	1	1	2	2	3	3	3	2	3	4	4	3	4	4	4	3	2	3	2	2	3	2	2	4
15-Jul	1	2	1	2	2	3	2	2	3	2	2	2	3	3	2	3	3	2	3	2	1	1	2	2	3
16-Jul	3	1	1	1	2	3	3	2	3	1	1	2	5	4	2	4	4	3	2	1	1	4	4	2	5
17-Jul	2	2	2	2	1	1	1	1	1	1	1	1	1	3	2	1	1	2	2	3	5	1	2	4	5
18-Jul	4	3	1	2	1	2	1	2	1	1	2	2	2	1	2	1	2	2	6	4	9	2	2	3	9
19-Jul	1	2	2	1	1	2	2	2	4	3	3	12	9	8	6	5	4	5	7	3	3	3	2	2	12
20-Jul	2	2	1	2	2	2	1	1	2	1	2	2	3	3	3	4	2	1	2	1	2	1	2	1	4
21-Jul	1	1	1	1	1	1	1	2	1	1	1	1	2	2	2	2	1	2	2	2	3	1	2	1	3
22-Jul	1	1	2	1	1	2	2	2	2	1	1	1	3	4	3	3	3	3	3	2	2	2	4	2	4
23-Jul	1	1	2	1	1	2	3	3	3	3	4	2	5	3	5	4	2	1	2	4	3	3	3	2	5
24-Jul	3	2	2	2	2	2	2	2	3	3	3	3	4	4	4	4	4	4	3	2	2	3	2	2	4
25-Jul	2	2	1	2	3	3	2	2	2	3	2	2	5	2	2	3	3	3	1	1	1	2	2	1	5
26-Jul	2	2	1	2	2	2	2	1	1	1	1	2	2	3	3	4	3	4	4	2	3	4	2	1	4
27-Jul	2	2	1	2	2	2	1	2	2	2	2	2	2	4	3	10	2	2	2	2	2	3	2	2	10
28-Jul	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	3	2	2	1	2	2	1	2	1	3
29-Jul	2	3	2	3	3	2	2	2	2	2	3	2	2	3	4	3	3	2	1	4	3	3	2	2	4
30-Jul	3	2	1	1	2	2	3	2	2	2	2	3	4	3	3	3	3	3	2	2	17	10	4	3	17
31-Jul	2	2	2	2	2	2	2	1	2	1	1	3	3	4	3	4	8	4	7	4	3	4	3	3	8
														Diurnal Maximum											



WBEA NETWORK
Hourly Averages

Wind Speed (WS) - km/h
Athabasca Valley - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Athabasca Valley - July 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	308	41.40	41.40
6 - 11	338	45.43	86.83
12 - 19	79	10.62	97.45
20 - 28	17	2.28	99.73
29 - 38	2	0.27	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Wind Speed (WS) - km/h
Athabasca Valley - July 2014

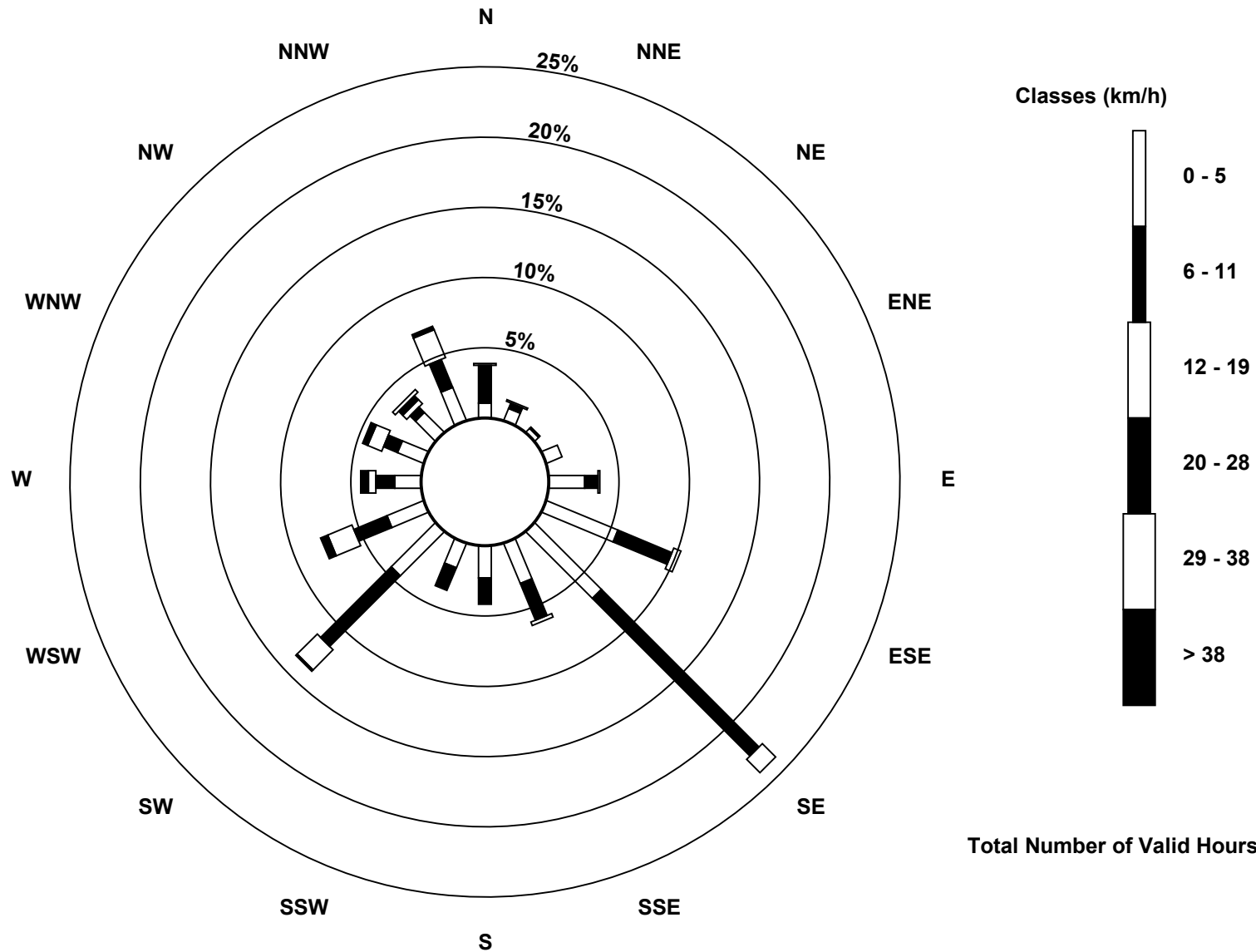
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	7	3	9	19	41	50	23	17	14	33	21	14	15	15	19	308
6 - 11	20	3	1	0	7	31	118	21	14	13	53	19	10	8	4	16	338
12 - 19	1	1	0	0	1	4	10	2	0	0	15	14	4	8	3	16	79
20 - 28	0	0	0	0	0	0	0	0	0	0	1	4	4	3	3	2	17
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	29	11	4	9	27	76	178	46	31	27	102	58	32	34	27	53	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

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

**Wind Speed (WS) - km/h
Athabasca Valley (AMS 7)**





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Athabasca Valley - July 2014

Direction of Maximum Speed: 318 deg on Jul 10 18:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 279.1 deg on Jul 10	Hours of Data: 744
Direction of Minimum Speed: 225 deg on Jul 6 06:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.4 deg on Jul 21	Percent Operational Time: 100.0
Monthly Average Direction: 230.3 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-Jul	202	239	136	97	149	135	135	84	114	81	49	326	2	282	78	226	219	232	221	266	216	226	101	133	172.2
2-Jul	102	136	124	160	123	146	143	129	146	146	133	140	128	133	164	132	94	94	97	113	126	132	135	139	128.0
3-Jul	143	138	122	117	129	132	128	129	129	130	127	169	335	78	67	128	122	355	339	358	323	250	321	316	127.1
4-Jul	280	244	247	233	156	156	131	220	215	225	237	254	253	245	233	232	243	239	239	255	247	244	229	217	238.5
5-Jul	217	147	134	136	135	136	142	133	188	215	221	220	224	224	206	176	253	234	236	246	235	235	283	247	217.3
6-Jul	169	129	139	134	212	225	297	225	124	2	317	243	243	308	354	11	348	285	242	232	226	274	285	296	270.8
7-Jul	257	237	231	223	230	228	221	206	120	6	350	334	344	340	312	31	2	4	32	14	237	217	217	130	304.2
8-Jul	137	128	134	143	132	141	140	137	147	120	116	107	255	227	227	199	180	173	166	165	146	144	180	168	157.2
9-Jul	172	176	349	164	141	136	94	132	226	224	220	162	151	185	214	220	299	266	197	206	227	264	265	260	217.7
10-Jul	245	246	243	241	249	258	215	230	219	212	240	231	317	330	312	305	306	318	320	302	284	274	277	271	279.1
11-Jul	269	247	196	229	231	226	224	269	235	282	269	227	216	228	271	282	304	286	249	310	9	345	331	250	265.1
12-Jul	242	305	331	343	325	273	245	258	303	291	265	332	346	342	350	336	337	331	335	278	232	204	80	134	315.4
13-Jul	132	135	132	131	135	136	128	140	130	121	156	150	174	168	188	188	169	173	148	122	140	120	125	138	148.4
14-Jul	164	163	126	149	144	134	141	142	141	135	224	230	194	217	234	228	236	235	208	188	228	218	205	160	189.7
15-Jul	156	155	152	137	131	137	139	136	128	115	87	239	217	230	238	204	184	174	179	184	169	137	139	137	161.2
16-Jul	130	139	134	124	122	221	205	167	135	85	316	351	342	345	360	295	278	238	225	226	210	219	249	309	265.5
17-Jul	338	301	255	213	102	86	81	316	279	260	247	250	264	337	342	348	7	82	233	219	206	165	188	230	259.2
18-Jul	263	216	137	216	236	226	255	338	336	252	271	256	282	325	275	311	57	110	193	149	237	10	322	200	243.2
19-Jul	155	144	141	145	152	140	143	165	222	220	223	300	292	273	292	290	285	289	332	328	335	331	297	303	280.1
20-Jul	268	242	228	229	221	235	226	229	104	66	339	351	1	358	4	346	355	2	24	31	341	283	234	84	312.0
21-Jul	94	115	122	129	135	132	107	225	277	294	286	297	327	261	273	325	323	353	341	251	219	82	115	104	308.7
22-Jul	128	126	141	128	126	135	139	129	123	113	303	307	119	102	108	110	108	102	124	129	137	133	163	112	122.0
23-Jul	111	110	134	117	114	115	126	131	142	138	135	185	119	117	117	109	319	341	121	187	130	130	141	140	128.3
24-Jul	136	86	132	121	138	134	132	138	126	133	147	142	106	112	123	105	100	113	113	104	111	114	104	114	120.6
25-Jul	112	94	89	356	358	350	43	5	54	95	86	16	128	144	247	201	228	219	254	280	264	257	170	115	75.6
26-Jul	236	133	143	108	99	106	178	112	309	283	254	296	14	131	160	185	212	265	284	232	211	211	186	146	187.0
27-Jul	153	153	156	140	137	137	132	135	118	76	221	247	230	134	118	207	84	243	203	173	148	166	143	142	151.4
28-Jul	137	131	137	137	123	138	134	132	125	79	358	327	225	249	257	220	228	226	236	224	168	139	158	149	160.8
29-Jul	140	139	136	131	141	119	125	129	128	134	115	113	25	65	126	88	98	9	93	119	135	131	131	135	122.1
30-Jul	127	128	113	124	137	131	139	135	136	141	151	114	179	131	112	120	141	110	130	116	338	12	164	183	124.1
31-Jul	179	144	138	29	339	106	166	220	71	298	345	338	336	342	347	350	346	337	339	55	330	337	340	332	343.1

187.1 171.6 156.8 157.0 152.4 150.2 148.4 152.2 149.5 158.4 207.2 239.4 250.6 259.2 258.8 253.0 279.9 269.3 252.8 224.2 237.0 249.4 229.4 215.6
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

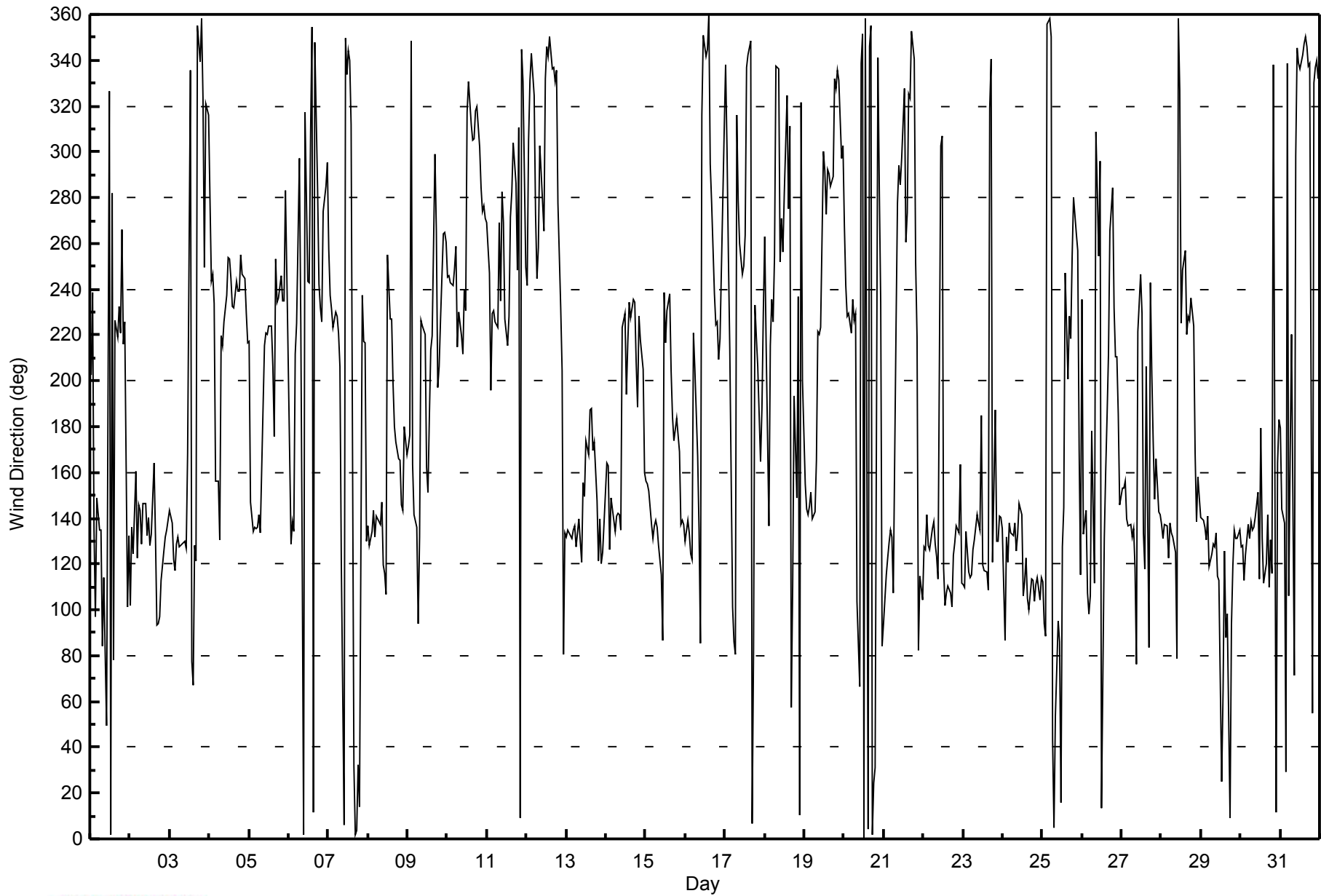
Wind Direction (WD) - deg
Athabasca Valley - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Jul 9 03:00		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 8 deg on Jul 10 23:00																									
Percentiles: P ₁ = 10 P ₁₀ = 14 Q ₁ = 18 Median = 25 Q ₃ = 43 P ₉₀ = 64 P ₉₉ = 91																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	69	89	62	24	38	20	35	26	65	27	44	26	56	64	85	49	64	42	68	60	73	72	86	64	89
2-Jul	53	44	30	41	31	22	22	20	45	86	32	29	36	50	35	39	24	17	17	20	18	16	15	13	86
3-Jul	12	13	23	20	17	16	16	20	17	15	18	38	95	47	50	55	28	80	14	17	47	62	48	48	95
4-Jul	67	15	21	58	59	43	43	18	16	23	18	19	21	25	20	15	16	16	16	13	12	13	50	56	67
5-Jul	63	44	13	16	9	16	19	52	81	17	13	13	15	20	27	76	17	13	12	12	13	10	43	34	81
6-Jul	69	47	19	35	79	92	84	13	95	98	58	85	21	24	58	46	24	57	16	43	11	51	24	18	98
7-Jul	42	14	10	16	11	9	11	53	72	47	22	30	21	16	21	42	29	34	24	46	51	81	64	68	81
8-Jul	41	28	26	17	21	14	15	15	23	39	97	49	51	30	22	31	29	24	15	17	13	21	25	21	97
9-Jul	15	22	101	73	14	17	28	42	81	30	41	23	61	32	34	25	26	29	36	31	20	19	16	15	101
10-Jul	17	12	11	11	12	16	26	24	19	47	25	19	53	32	12	20	19	13	12	21	15	9	8	9	53
11-Jul	13	70	58	23	24	29	11	32	23	27	18	19	16	21	17	16	19	33	14	56	20	20	40	24	70
12-Jul	9	34	22	16	80	92	22	54	38	52	69	50	41	30	24	21	15	18	19	50	65	91	50	53	92
13-Jul	29	20	17	18	13	20	22	16	24	25	35	43	32	33	21	37	38	26	32	29	23	84	37	29	84
14-Jul	21	41	39	25	21	17	11	14	15	18	74	32	40	32	17	19	21	17	29	33	26	22	22	22	74
15-Jul	15	16	11	12	15	13	14	13	17	27	49	26	27	23	22	33	28	22	29	38	34	32	17	11	49
16-Jul	31	24	19	34	50	33	51	94	43	57	49	20	16	18	19	55	18	19	13	22	82	26	61	26	94
17-Jul	15	26	33	35	73	56	36	29	26	26	17	15	29	45	21	25	37	41	60	11	51	35	51	12	73
18-Jul	60	33	35	47	14	85	50	34	39	57	76	41	63	22	29	26	57	77	34	42	67	60	52	68	85
19-Jul	21	27	21	16	20	12	20	50	23	13	14	56	56	33	22	15	19	22	17	11	24	35	24	20	56
20-Jul	23	27	21	13	18	17	14	11	51	68	35	20	34	25	25	20	30	46	30	34	33	45	65	22	68
21-Jul	54	20	18	19	11	14	32	68	25	24	21	34	19	60	48	20	20	33	19	22	70	59	80	60	80
22-Jul	38	34	46	22	15	15	16	14	25	43	43	23	90	40	29	31	24	23	21	29	17	16	70	64	90
23-Jul	33	63	32	29	21	24	20	19	16	18	18	46	32	24	22	25	46	62	82	81	22	35	22	16	82
24-Jul	23	36	21	23	16	19	18	21	23	18	19	23	23	25	26	24	21	22	22	19	22	26	24	24	36
25-Jul	31	24	54	25	21	22	32	19	38	21	42	60	76	24	35	40	31	17	14	39	33	34	85	67	85
26-Jul	91	36	17	26	25	29	37	30	33	44	19	33	69	44	53	38	35	46	67	20	58	92	46	41	92
27-Jul	21	15	13	15	13	12	12	11	22	62	18	19	81	30	25	79	41	72	21	46	22	49	34	34	81
28-Jul	20	16	13	18	15	13	12	12	26	25	40	35	26	48	27	52	14	13	14	11	50	53	62	38	62
29-Jul	16	23	20	35	19	33	36	13	19	19	36	70	74	88	29	29	69	21	68	20	24	20	20	25	88
30-Jul	21	19	19	23	18	17	14	15	20	23	41	41	56	63	35	27	32	22	26	35	74	54	83	37	83
31-Jul	42	24	41	57	40	49	48	84	50	72	17	14	13	14	18	18	18	16	14	86	11	12	18	10	86
	91	89	101	73	80	92	84	94	95	98	97	85	95	88	85	79	69	80	82	86	82	92	86	68	
	Diurnal Maximum																								



WBEA NETWORK
Hourly Averages

Wind Direction (WD) - deg
Athabasca Valley - July 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 21, 2014	Previous Calibration	June 16, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	14:20
Barometric Pressure	735 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	799	796
Calculated slope	0.988668	0.983085	Chamber temp.	43.6	43.5
Calculated intercept	1.640008	1.420694	Pressure (mmHg)	710.6	706.4
Analyzer Background	10.4	10.4	Flow (lpm)	0.520	0.510
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	0.1	NA
as found span	5000	58.8	597.4	604.1	0.989
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	58.8	597.4	607.2	0.984
second point	5000	29.4	298.7	301.0	0.992
third point	5000	14.7	149.4	149.4	1.000
calibrator zero	6000	0.0	0.0	0.1	NA
as left zero	6000	0.0	0.0	0.7	NA
as left span	5000	58.8	597.4	608.6	0.982
Average Correction Factor					0.992

Corrected As found 604.0 Previous response 602.6 % change -0.2%

Notes:

no adjustments required.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

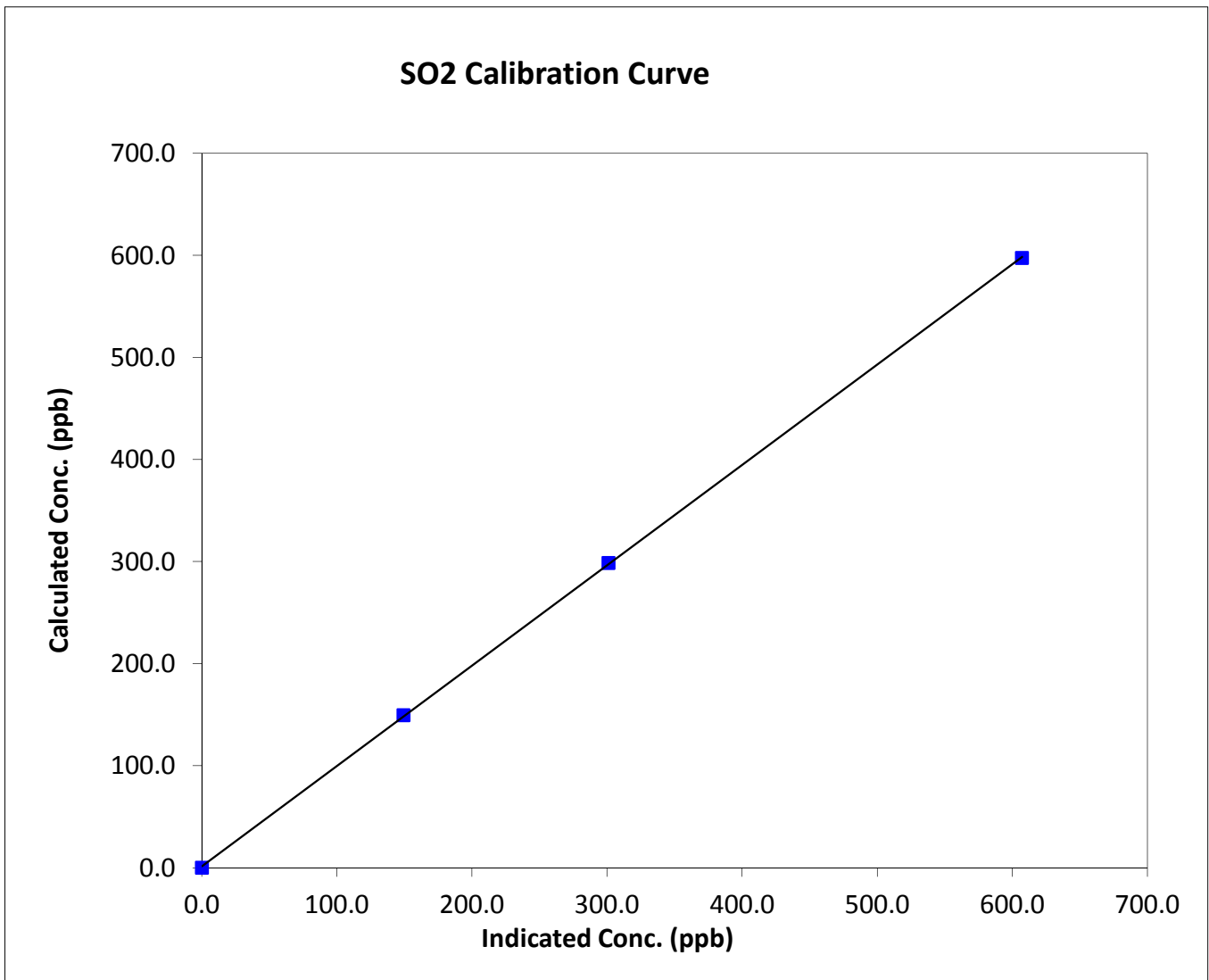
SO₂ Calibration Summary

Station Information

Calibration Date	July 21, 2014	Previous Calibration	June 16, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:15	End Time (MST)	14:20
Analyzer make	Thermo 43c	Analyzer serial #	607415781

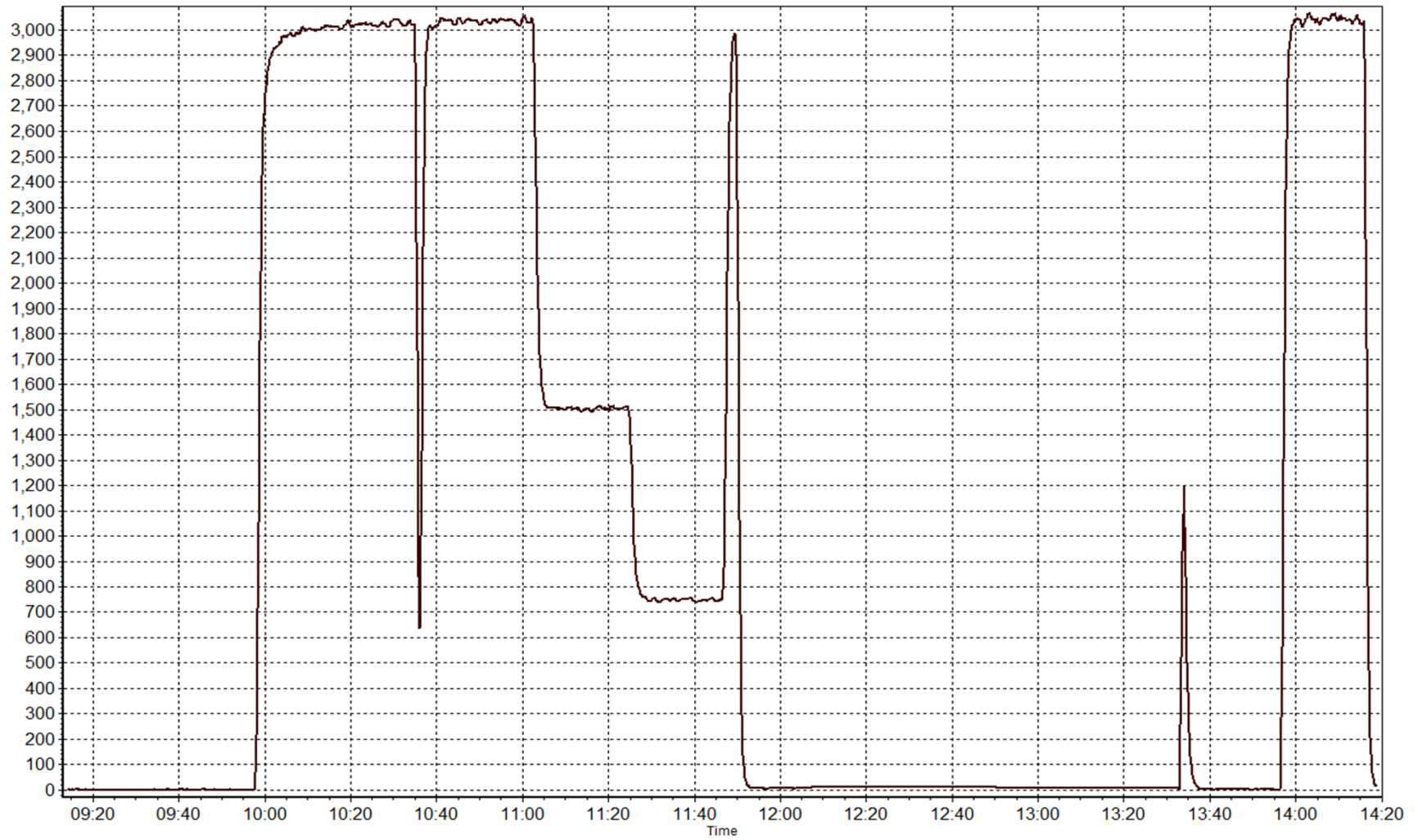
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999969
597.4	607.2	0.9839		
298.7	301.0	0.9924	Slope	0.983085
149.4	149.4	0.9997		
			Intercept	1.420694



SO2 Calibration Plot

Date: July 21, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	July 22, 2014	Previous Calibration	June 23, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	REMOVAL		
Start Time (MST)	8:20	End Time (MST)	10:00
Barometric Pressure	740 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	8400311
Cal Gas Concentration	5.64 ppm H2S	Cal Gas Expiry Date	11/3/2009
Gas Cert Reference	CC 188098	SO2 gas conc.	50.8 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2575
DACS voltage range	0-5V	DACS channel #	2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-619	-619
Analyzer Range (input)	5000	5000	Lamp voltage	809	811
Calculated slope	0.987786	0.960972	Chamber temp.	44	44
Calculated intercept	0.440287	0.960123	Pressure	692.6	692.6
Analyzer Background	17.7	17.7	Flow	0.478	0.478
Analyzer Coefficient	1.026	1.026	Intensity	43500	43500
			Converter temp.	815	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	-1.0	NA
as found span	6000	79.8	75.0	77.0	0.974
SO2 scrubber check	5000	8.9	90.4	-0.7	NA
calibrator zero	6000	0.0	0.0	-1.0	NA
high point	6000	79.8	75.0	77.0	0.974
second point	6000	44.7	42.0	43.0	0.978
third point	6000	26.6	25.0	24.8	1.008
calibrator zero					
as left zero					
as left span					
Average Correction Factor					0.987

Corrected As found	78.0	Previous response	75.5	% change	-3.1%
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Notes:

Removal cal to change out converter and replace with original, repaired unit.

Calibration Performed By:

Mike Martineau



Wood Buffalo Environmental Association

TRS Calibration Summary

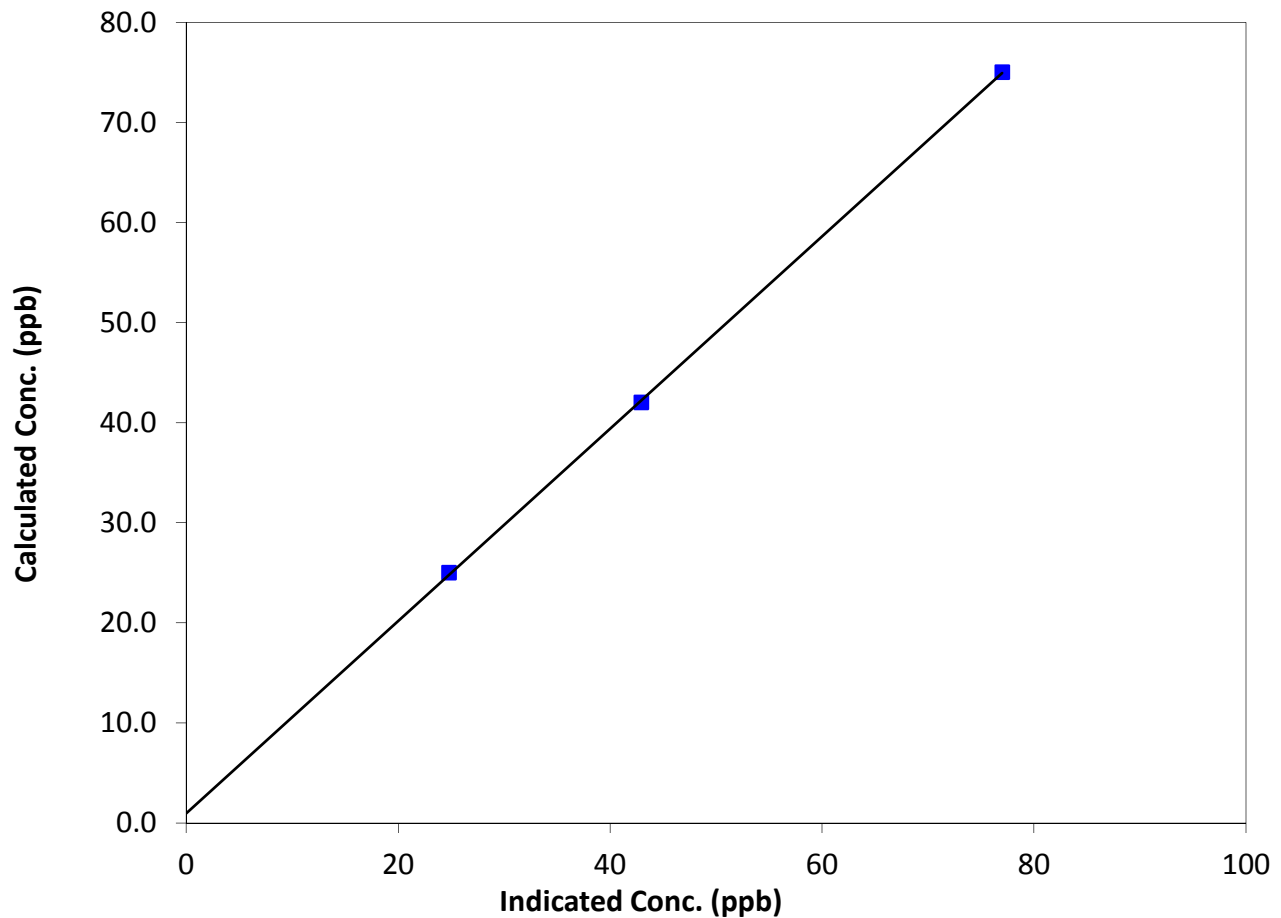
Station Information

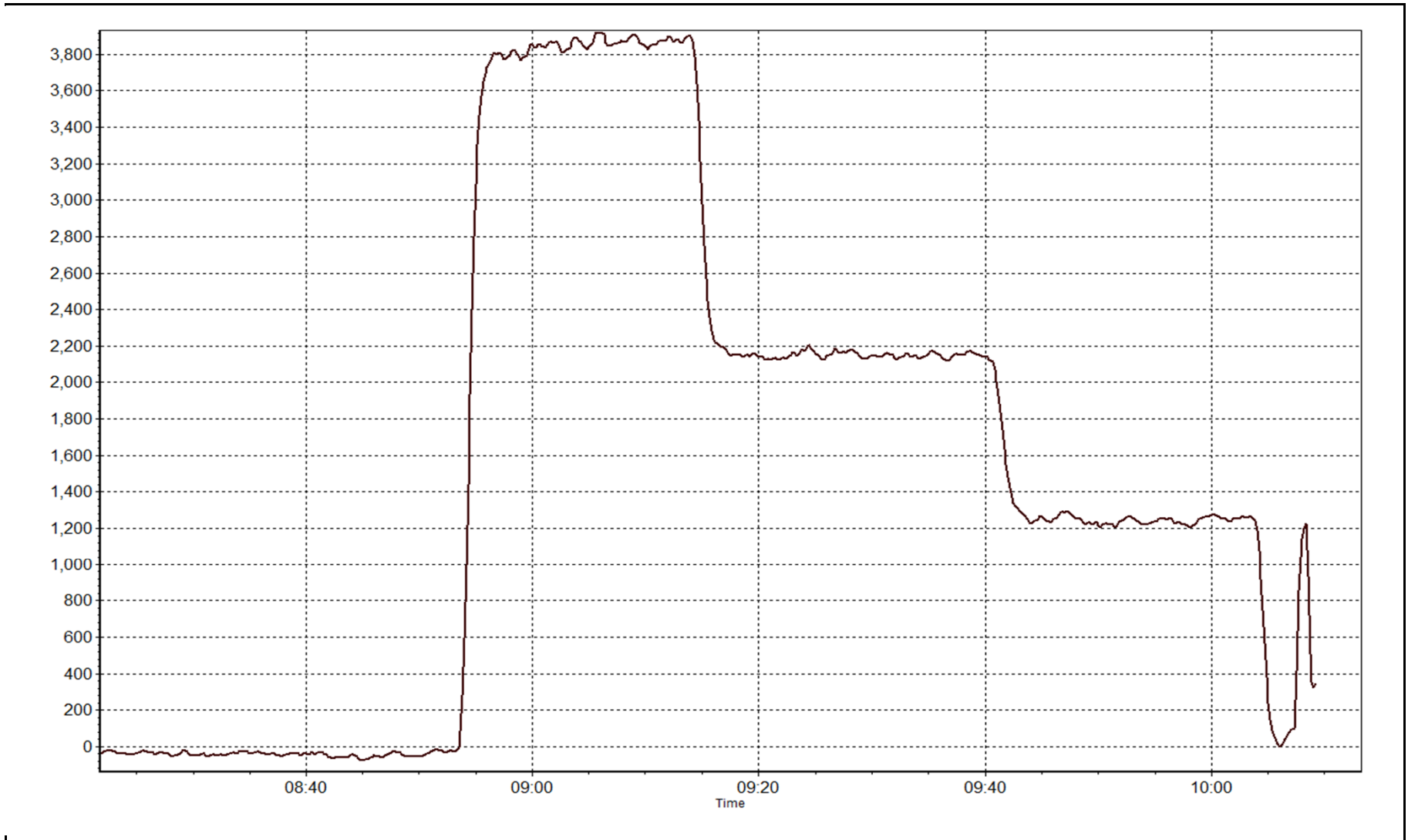
Calibration Date	July 22, 2014	Previous Calibration	June 23, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:20	End Time (MST)	10:00
Analyzer make	TEI 45C	Analyzer serial #	630718530

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.0	N/A	Correlation Coefficient	0.999966
75.0	77.0	0.9742		
42.0	43.0	0.9781	Slope	0.960972
25.0	24.8	1.0082		
			Intercept	0.960123

TRS Calibration Curve







Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	July 22, 2014	Previous Calibration	n/a
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	INSTALL		
Start Time (MST)	10:15	End Time (MST)	12:45
Barometric Pressure	740 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	8400311
Cal Gas Concentration	5.64 ppm H2S	Cal Gas Expiry Date	11/3/2009
Gas Cert Reference	CC 188098	SO2 gas conc.	50.8 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2575
DACS voltage range	0-5V	DACS channel #	2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-619	-619
Analyzer Range (input)	5000	5000	Lamp voltage	811	808
Calculated slope	0.960972	0.995784	Chamber temp.	44	44
Calculated intercept	0.960123	0.529000	Pressure	692.6	680.2
Analyzer Background	17.7	17	Flow	0.478	0.472
Analyzer Coefficient	1.026	0.975	Intensity	43500	43500
			Converter temp.	815	800

Analyzer make/model	TEI 45C	Analyzer serial #	630718530
Converter make/model	Model 26 Thermal Oxidizer	Converter serial #	20101-14

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
SO2 scrubber check	5000	8.9	90.4	0.2	NA
calibrator zero	6000	0.0	0.0	0.0	NA
high point	6000	79.8	75.0	75.1	0.998
second point	6000	44.7	42.0	41.4	1.015
third point	6000	26.6	25.0	24.0	1.042
calibrator zero	5000	0.0	0.0	0.0	NA
as left zero	5000	0.0	0.0	-0.5	NA
as left span	6000	79.8	75.0	75.0	1.000
Average Correction Factor					1.019

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

Re-installed previous TRS converter. Adjusted span

Calibration Performed By:

Mike Martineau



Wood Buffalo Environmental Association

TRS Calibration Summary

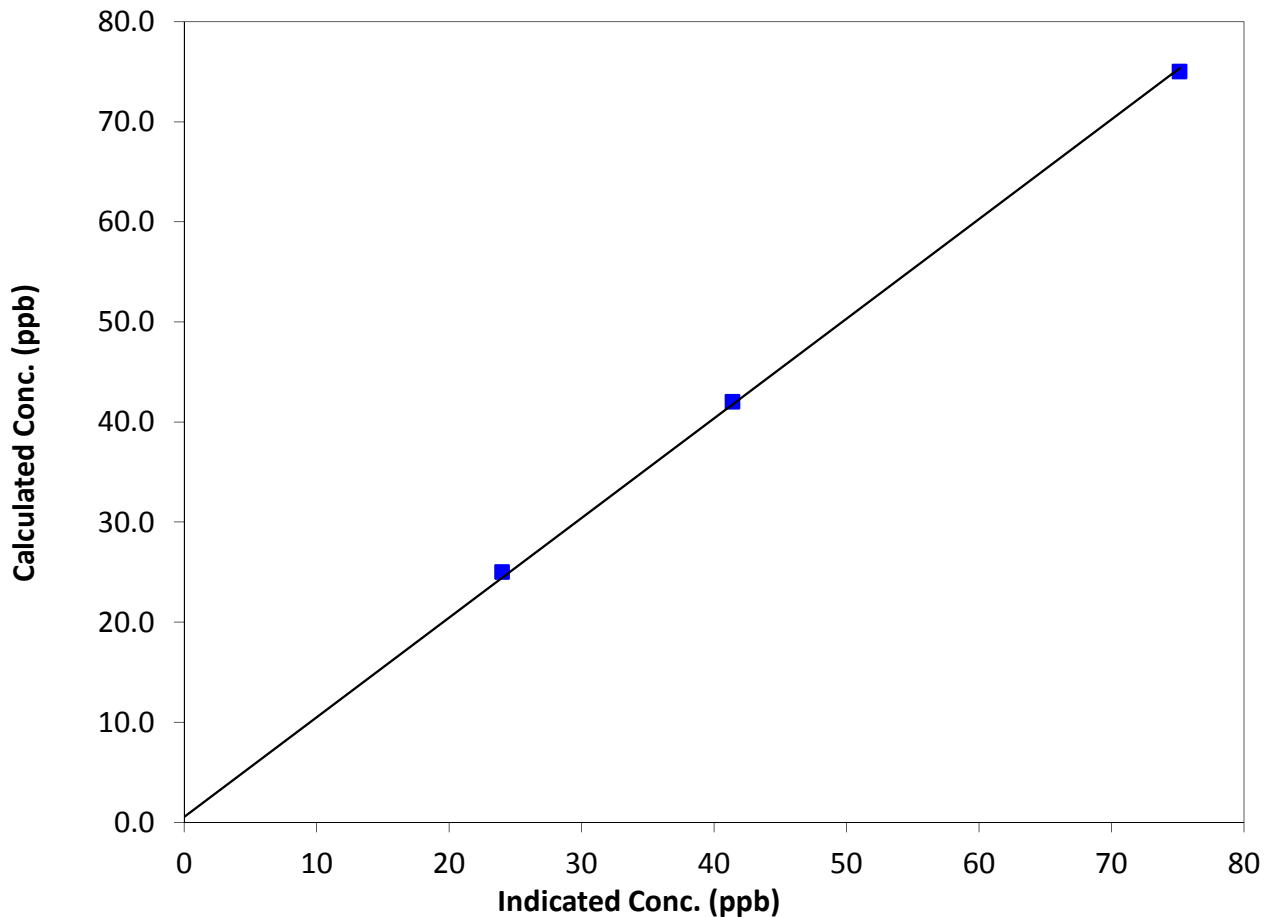
Station Information

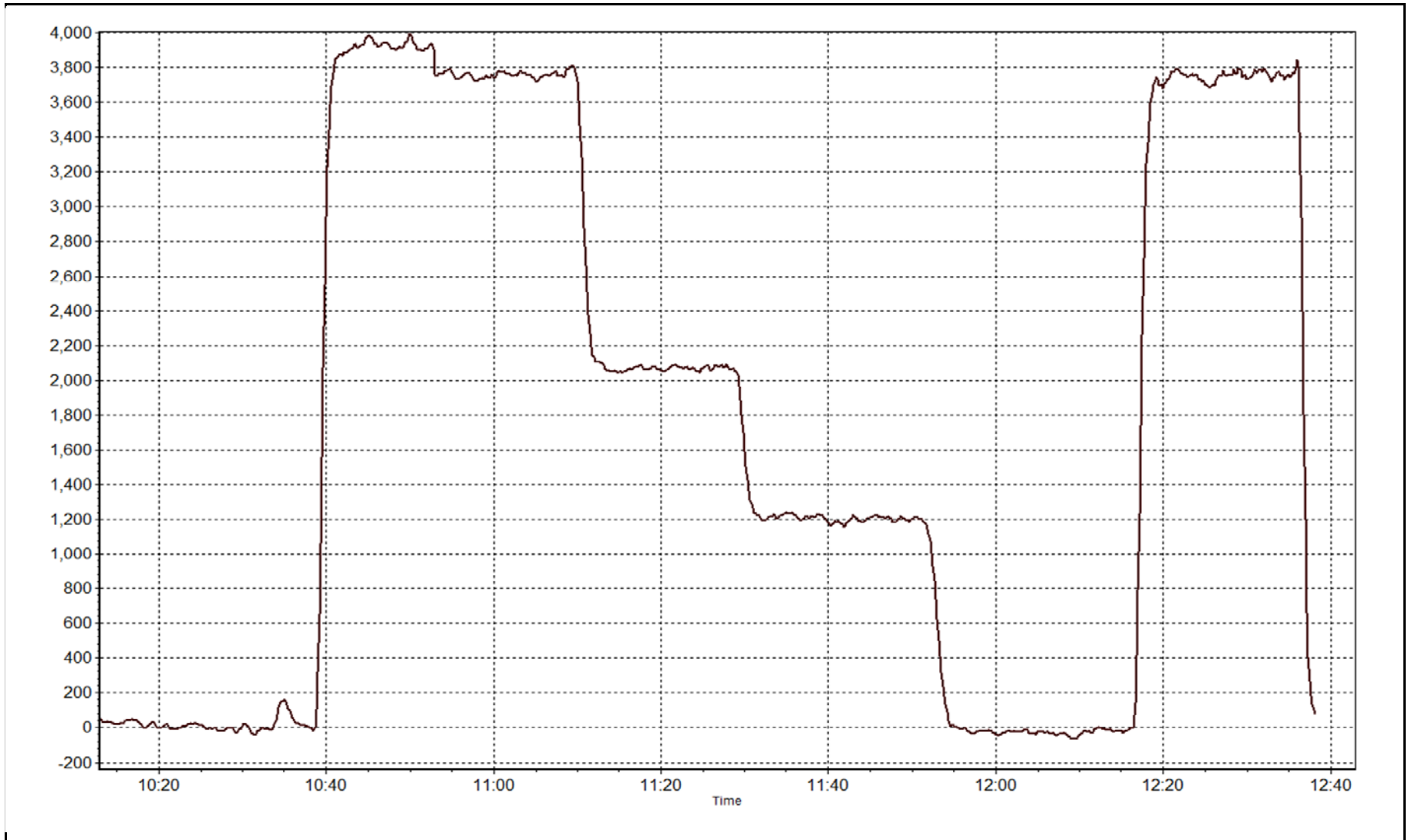
Calibration Date	July 22, 2014	Previous Calibration	
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	10:15	End Time (MST)	12:45
Analyzer make	TEI 45C	Analyzer serial #	630718530

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999732
75.0	75.1	0.9983		
42.0	41.4	1.0154	Slope	0.995784
25.0	24.0	1.0418		
			Intercept	0.529000

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Monday, July 21, 2014	Prev Calibration	Monday, June 16, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	14:20
Barometric Pressure	735 mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
Gas Cert Reference	LL 105142	Cal Gas Expiry Date	Thursday, October 10, 2013
CH4 Cal Gas Conc.	502.0 ppm	CH4 Equiv Conc.	1063.0 ppm
C3H8 Cal Gas Conc.	204.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5563

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	30.6	30.6
THC Range (input)	50	50	Flame Temp	386.9	385.7
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	1.000372	1.005252	Air Pressure	32.5	32.5
THC Calc intercept	0.022108	0.018158			
NMHC Calc slope	1.000091	0.995614			
NMHC Calc intercept	0.016083	0.013998			

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	12.43	1.006
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	58.8	12.50	12.43	1.006
second point	5000	29.4	6.25	6.18	1.011
third point	5000	14.7	3.13	3.08	1.015
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	12.45	1.004
Average Correction Factor					1.011

Corrected As found 12.43 Previous response 12.47 % change 0.4%

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	6.62	0.997
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	58.8	6.60	6.62	0.997
second point	5000	29.4	3.30	3.29	1.003
third point	5000	14.7	1.65	1.63	1.012
calibrator zero	6000	0.0	0.00	0.00	N/A
as left zero	6000	0.0	0.00	0.00	N/A
as left span	5000	58.8	6.60	6.63	0.995
Average Correction Factor					1.004

Corrected As found 6.62 Previous response 6.58 % change -0.6%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	58.8	5.90	5.81	1.016
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	58.8	5.90	5.80	1.018
second point	5000	29.4	2.95	2.89	1.021
third point	5000	14.7	1.48	1.45	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	5.90	5.82	1.014
Average Correction Factor					

Corrected As found 5.81 Previous response 5.89 % change 1.4%



Wood Buffalo Environmental Association

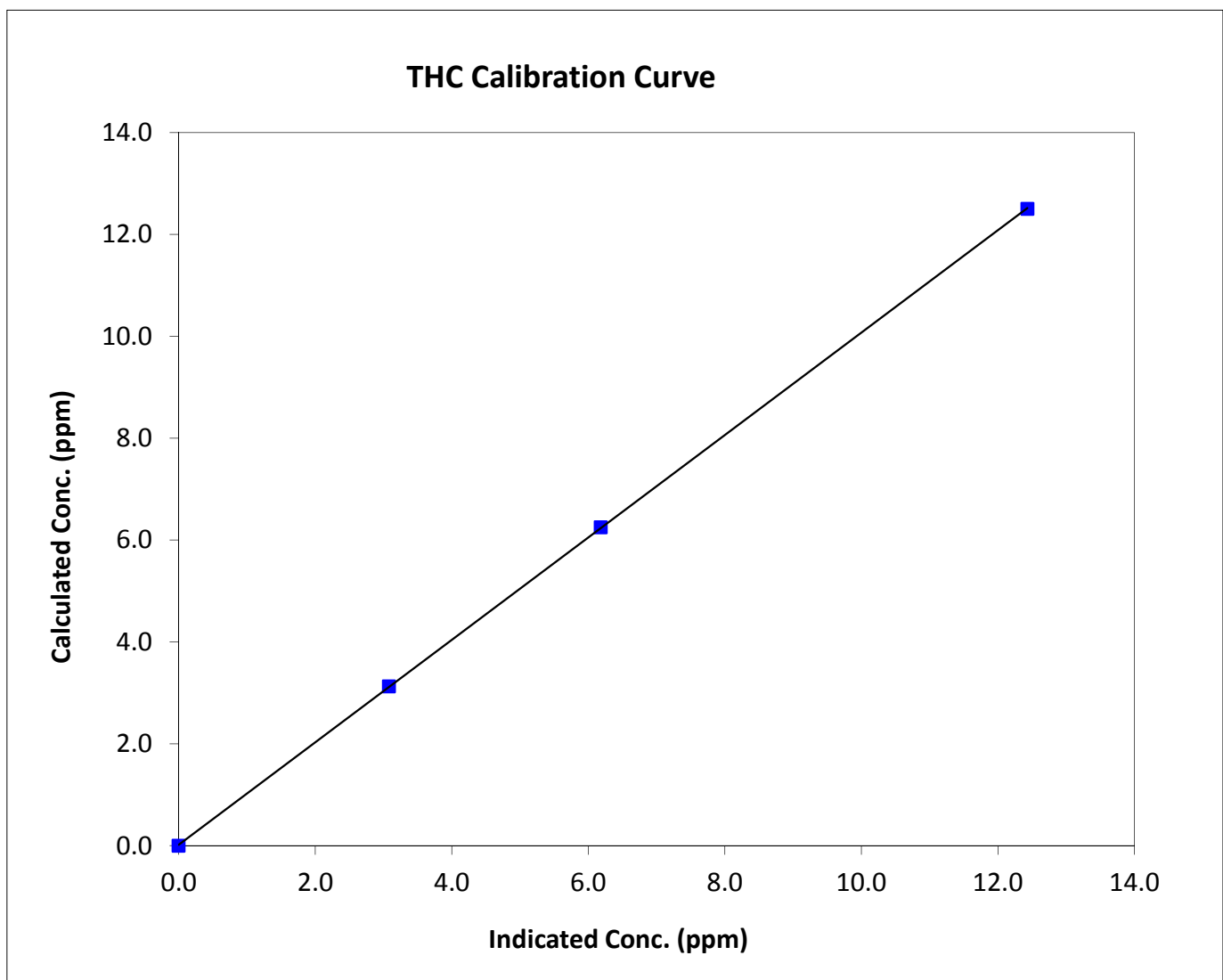
THC Calibration Summary

Station Information

Calibration Date	July 21, 2014	Previous Calibration	June 16, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:15	End Time (MST)	14:20
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	0.999988
12.50	12.43	1.0057		
6.25	6.18	1.0114	Slope	1.005252
3.13	3.08	1.0147		
			Intercept	0.018158





Wood Buffalo Environmental Association

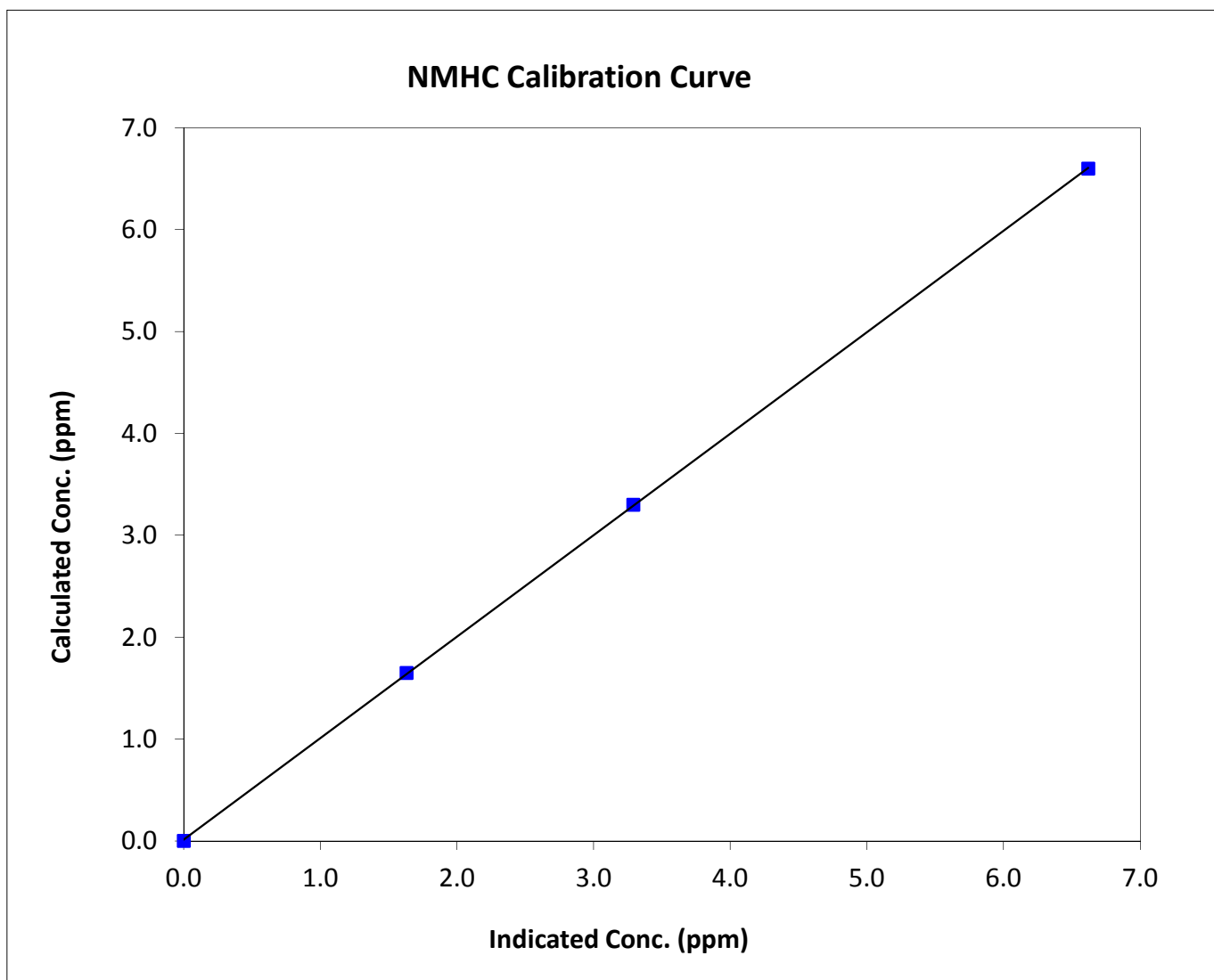
NMHC Calibration Summary

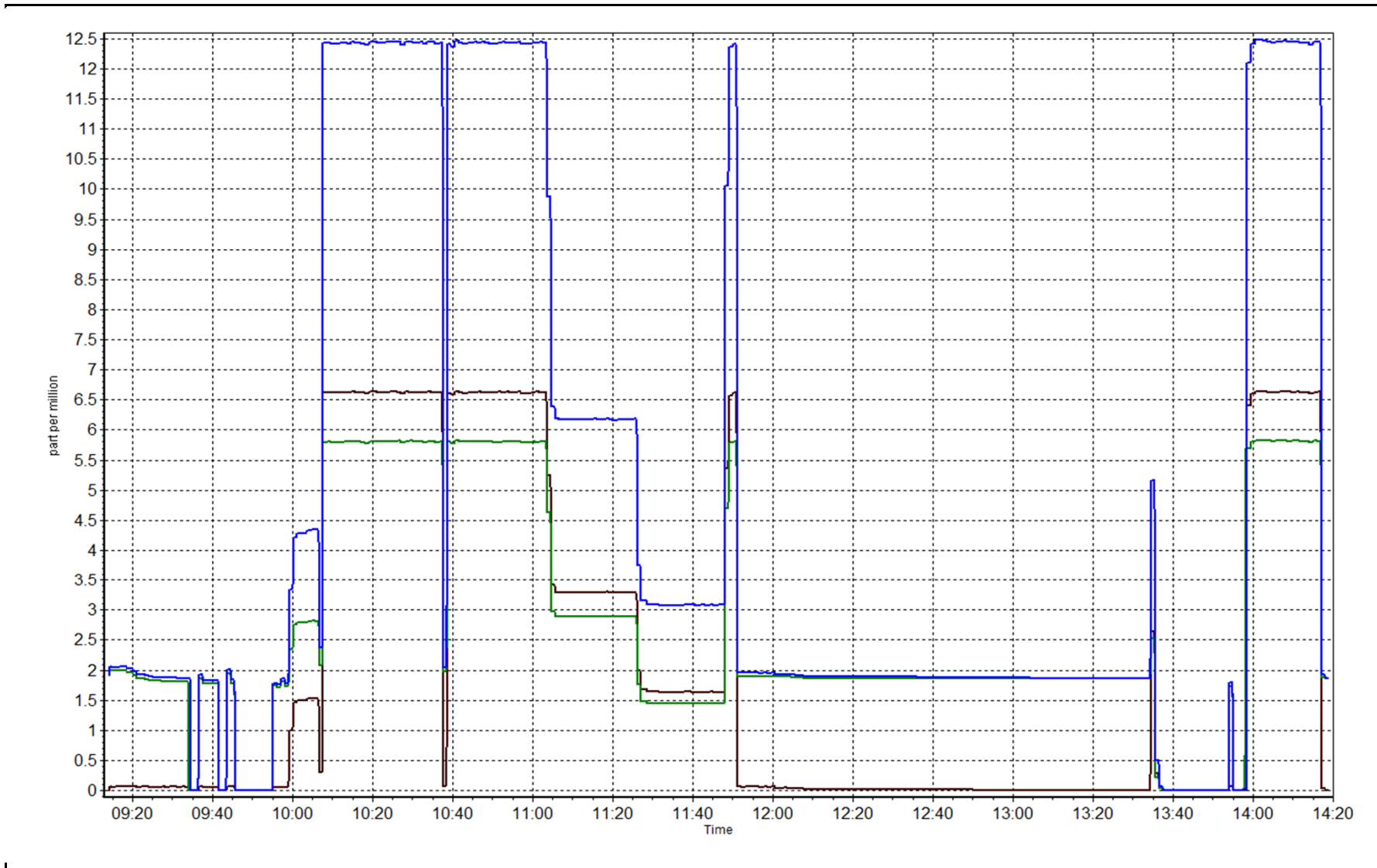
Station Information

Calibration Date	July 21, 2014	Previous Calibration	June 16, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:15	End Time (MST)	14:20
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	0.999979
6.60	6.62	0.9966		
3.30	3.29	1.0026	Slope	0.995614
1.65	1.63	1.0119		
			Intercept	0.013998







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	July 23, 2014	Previous Calibration	June 17, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	12:10
Barometric Pressure	739 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
NO2 calibration used	Tuesday, May 20, 2014	Transfer Standard	N/A
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5563
DACS voltage range	0-5V	DACS channel #	5

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	28.8	29.8
Analyzer Range (input)	5000	5000	Lamp temp.	70.8	70.8
Calculated slope	1.006107	1.003886	Pressure	720.6	719.5
Calculated intercept	0.230348	0.677668	Flow cell A	0.679	0.679
Analyzer Background	-0.2	-0.2	Flow cell B	0.745	0.744
Analyzer Coefficient	1.053	1.053	Cell A Intensity	106700	106500
			Cell B Intensity	89700	89400

Analyzer make TEI 49C Analyzer serial # 607415760

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.1	N/A
as found span	5000	N/A	352.1	350.5	1.005
calibrator zero	5000	0.00	0.0	0.1	N/A
high point	5000	N/A	352.1	350.4	1.005
second point	5000	N/A	180.1	178.5	1.009
third point	5000	N/A	91.3	89.4	1.021
calibrator zero	5000	0.00	0.0	0.1	N/A
as left zero	5000	0.00	0.0	0.0	N/A
as left span	5000	N/A	352.1	346.3	1.017
Average Correction Factor					1.012

Corrected As found 350.4 Previous response 349.7 % change -0.2%

Notes:

Changed inlet filter after as founds. No adjustments required.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

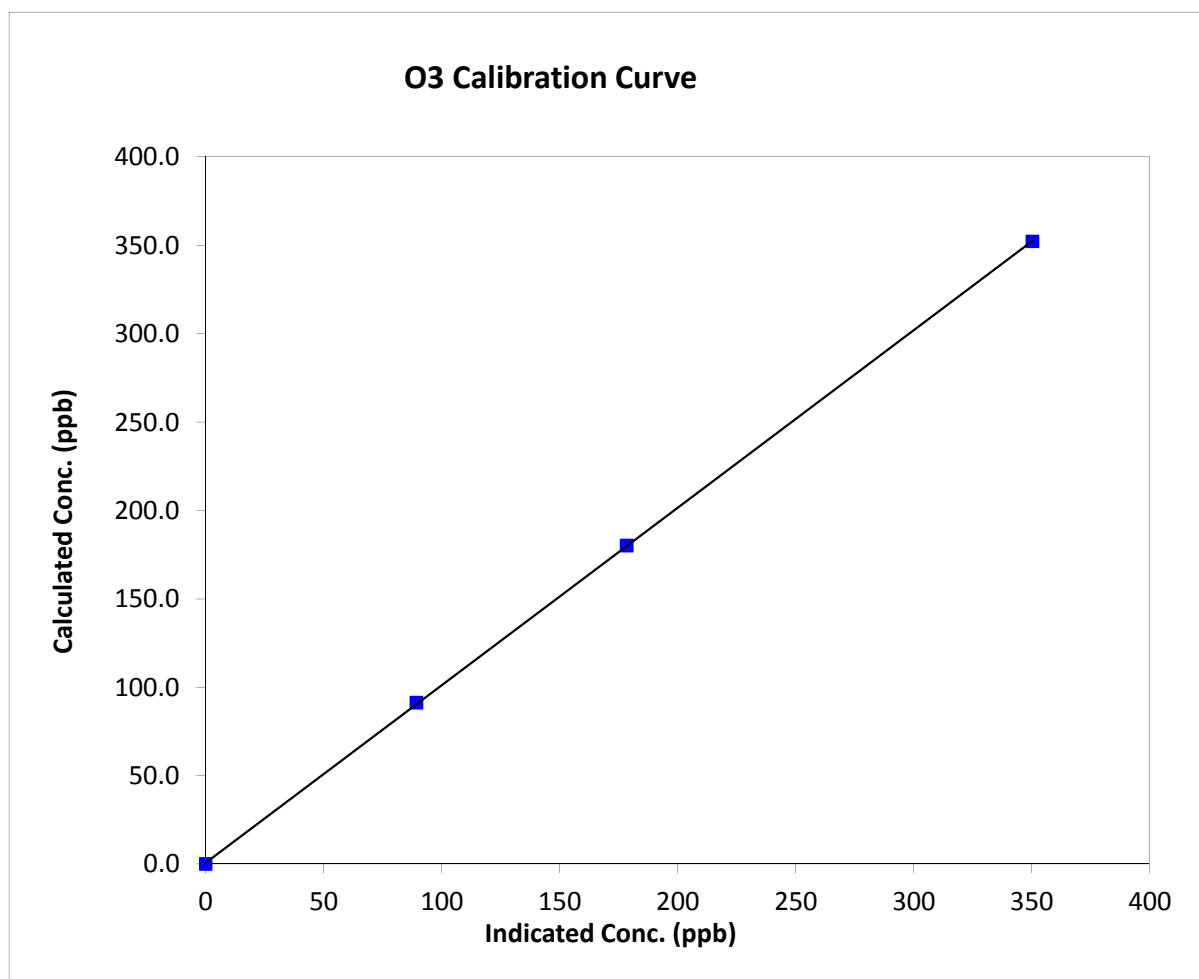
O₃ Calibration Summary

Station Information

Calibration Date	Wednesday, July 23, 2014	Previous Calibration	June 17, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:45	End Time (MST)	12:10
Analyzer make	TEI 49C	Analyzer serial #	607415760

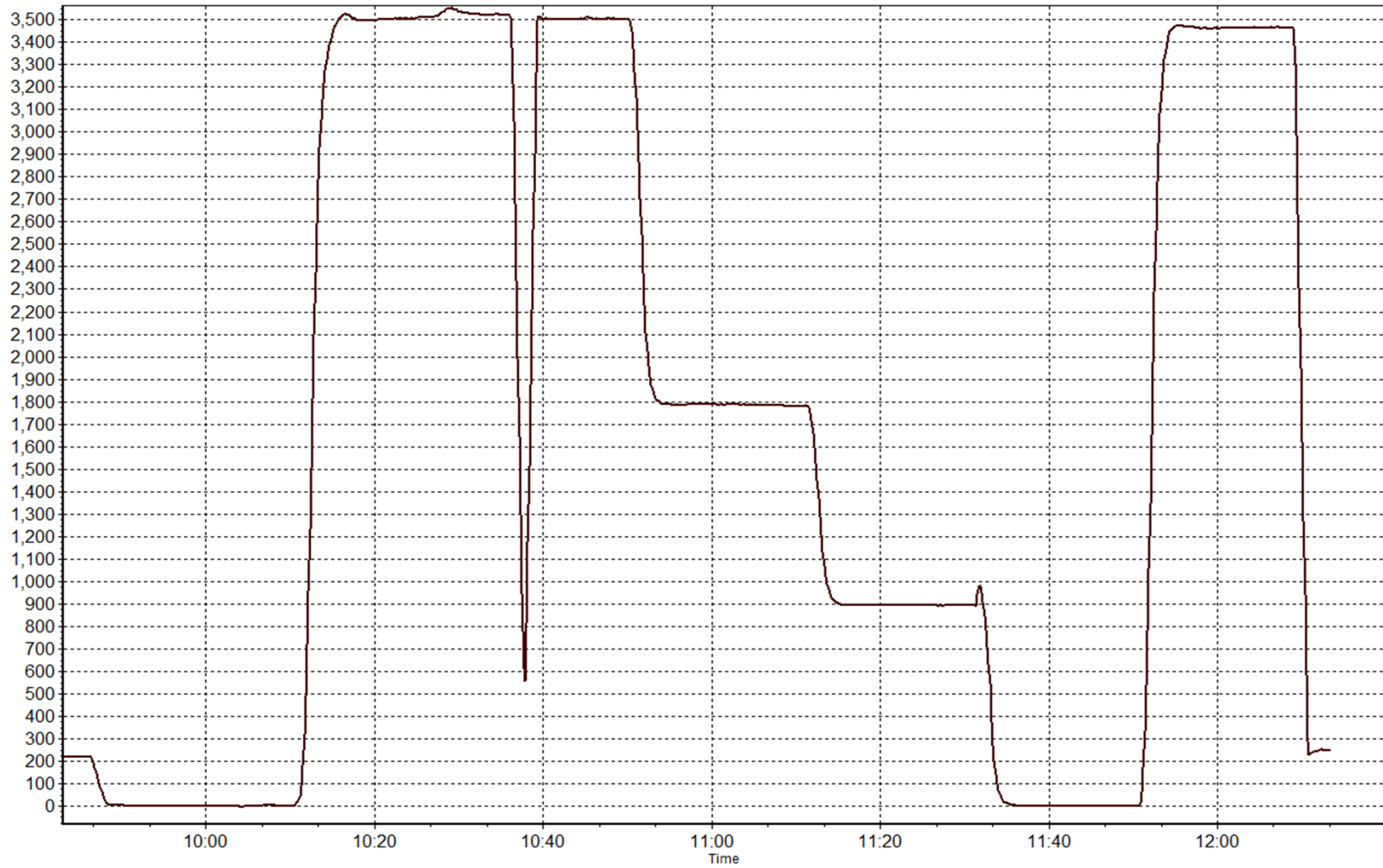
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999978
352.1	350.4	1.0049		
180.1	178.5	1.0090	Slope	1.003886
91.3	89.4	1.0213		
			Intercept	0.677668



O3 Calibration Plot

Date: July 23, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 21, 2014	Previous Calibration	June 16, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	14:20
Barometric Pressure	735 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
NO _x Cal Gas Conc	51.2 ppm	Cal Gas Serial #	LL 105142

DACS Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 2575

Parameter		NO _x	NO	NO ₂
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	1.000049	0.998286	0.998003
	Data Offset	1.505401	1.403243	-0.143664
After	Data Slope	1.002811	0.997727	1.003483
	Data Offset	1.410038	1.449295	0.824401
Channel #		4	5	6
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model Thermo 42c Analyzer serial # 601114773

Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.884	ppb	0.895	ppb
NO _x coefficient	1.001	ppb	0.998	ppb
NO ₂ coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	3.7		3.8	
NO _x bkgrnd	4.0		4.0	
Nt coefficient	n/a		n/a	
Chamber Temp	49.7	Deg C	49.6	Deg C
Moly Temp	322.0	Deg C	323.0	Deg C
PMT Temp	-3.6	Deg C	-3.6	Deg C
O ₃ flow	ok	ccm	ok	ccm
R Cell Press	160.2	mmHg	158.7	mmHg
Sample Flow	0.751	ccm	0.726	ccm

Notes:

adjusted span



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

July 21, 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	0.2	N/A	N/A
as found span	5000	58.8	602.1	599.8	2.4	585.4	584.0	1.7	1.0285	1.0270
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.2	N/A	N/A
high point	5000	58.8	602.1	599.8	2.4	600.3	601.1	-0.4	1.0030	0.9978
second point	5000	29.4	301.1	299.9	1.2	297.4	297.4	0.1	1.0123	1.0083
third point	5000	14.7	150.5	149.9	0.6	146.2	146.4	-0.1	1.0296	1.0242
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.2	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	248.8	353.3	589.5	245.9	343.8	1.0214	1.0120
Average Correction Factor									1.0150	1.0101

Corrected As found

NO_x= 585.5

NO= 584.1

Percent Change

NO_x= 2.6%

NO= 2.6%

Previous Response

NO_x= 600.6

NO= 599.4

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

58.80

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			0.2			N/A	
1st NO ₂ (300)	N/A	248.8	352.1	599.1	248.8	350.5	0.9933	1.0000	1.0046	99.5%
2nd NO ₂ (200)	N/A	420.8	180.1	599.0	420.8	178.4	0.9935	1.0000	1.0095	99.1%
3rd NO ₂ (100)	N/A	509.6	91.3	598.4	509.6	89.0	0.9945	1.0000	1.0258	97.5%
4th NO ₂ (0)	600.9	N/A	-0.9	600.0	600.9	-0.4	0.9919	1.0000	N/A	N/A
Average Correction Factor							0.9933	1.0000	1.0133	98.7%

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

NO_x Calibration Summary

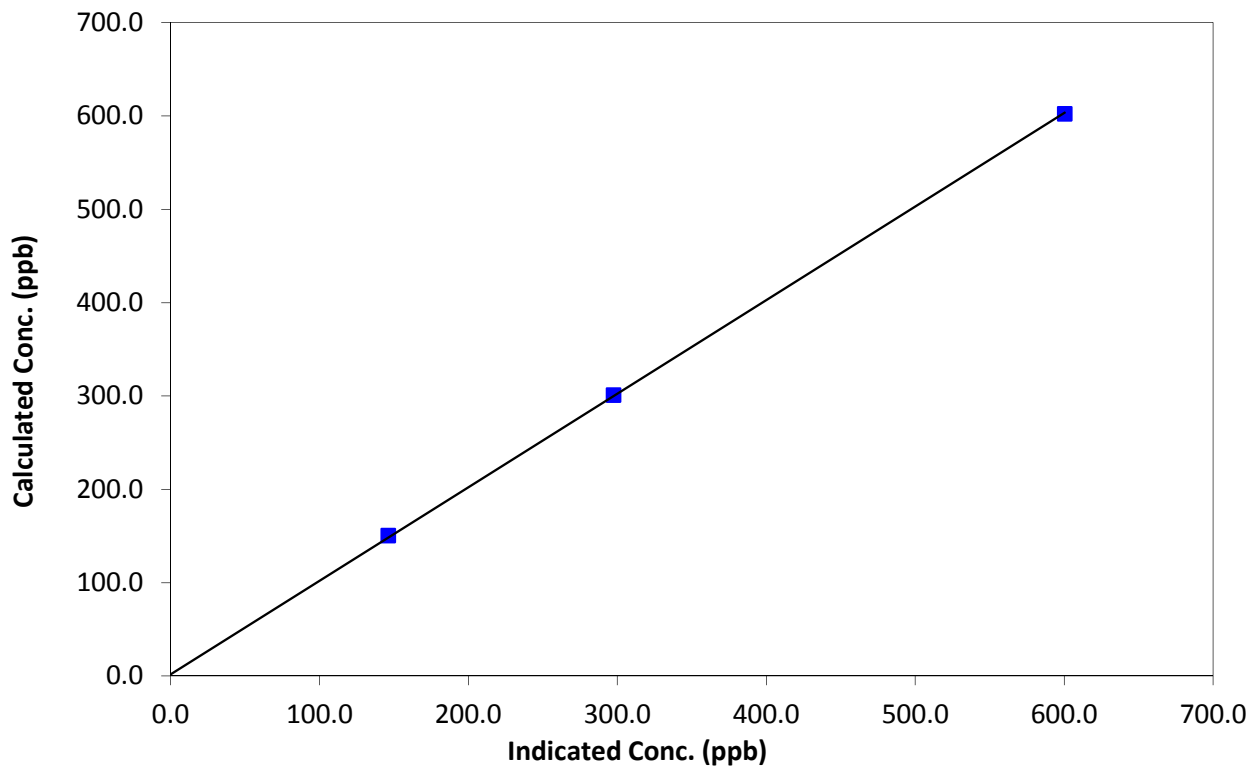
Station Information

Calibration Date	July 21, 2014	Previous Calibration	June 16, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:15	End Time (MST)	14:20
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	0.999947
602.1	600.3	1.0030		
301.1	297.4	1.0123	Slope	1.002811
150.5	146.2	1.0296		
0.0	-0.1	0.0000	Intercept	1.410038

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

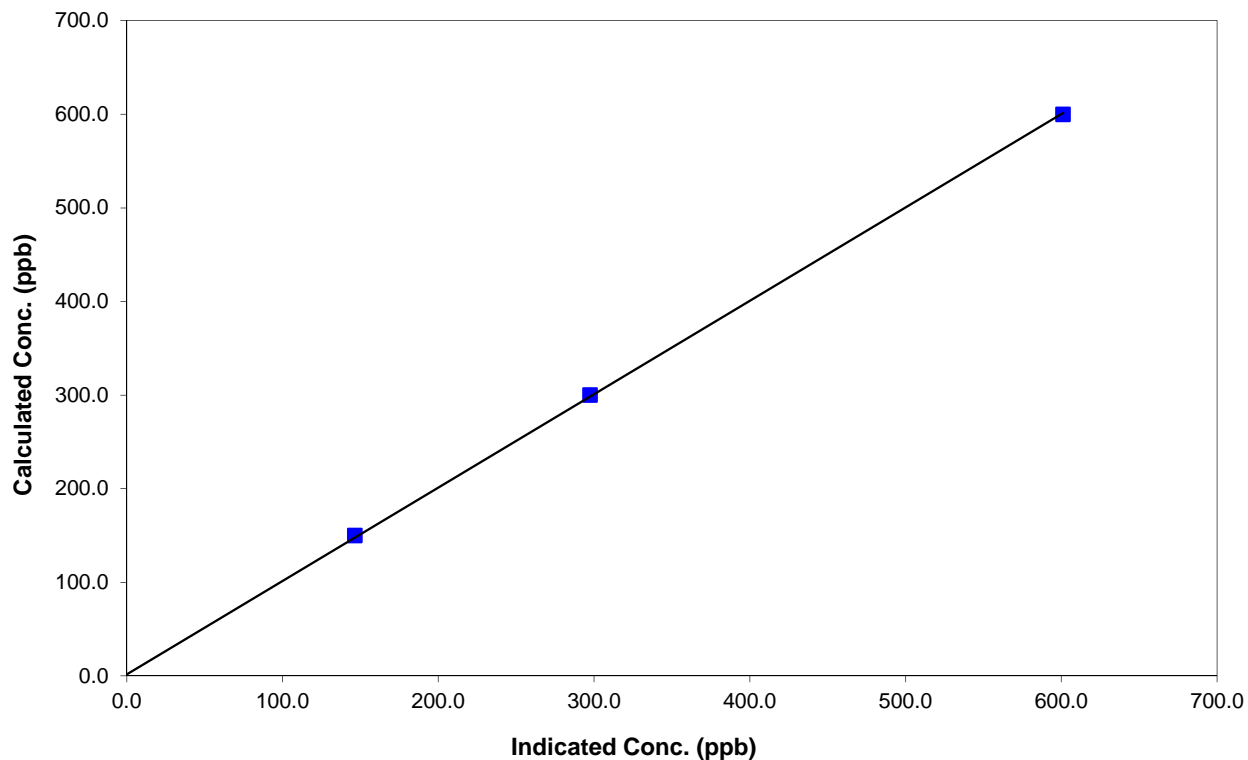
Station Information

Calibration Date	July 21, 2014	Previous Calibration	June 16, 2014
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:15	End Time (MST)	14:20
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	0.999943
599.8	601.1	0.9978		
299.9	297.4	1.0083	Slope	0.997727
149.9	146.4	1.0242		
0.0	-0.1	0.0000	Intercept	1.449295

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

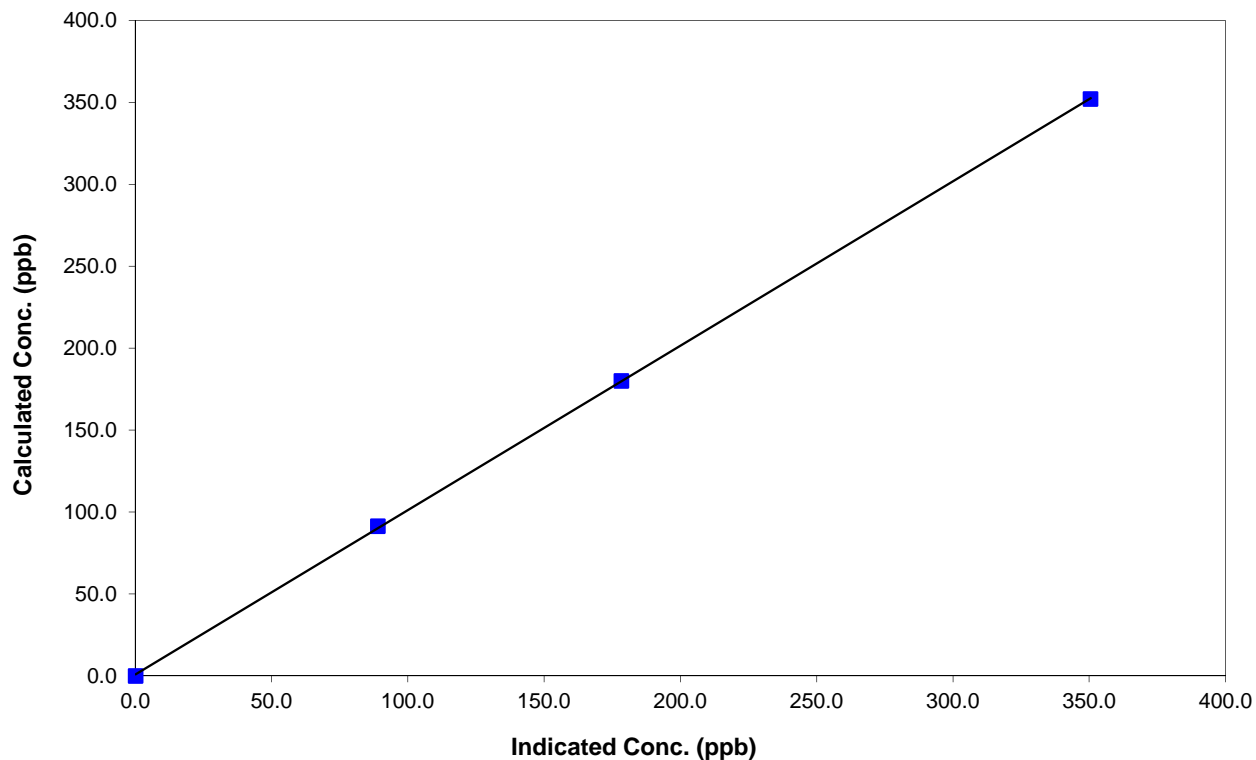
Station Information

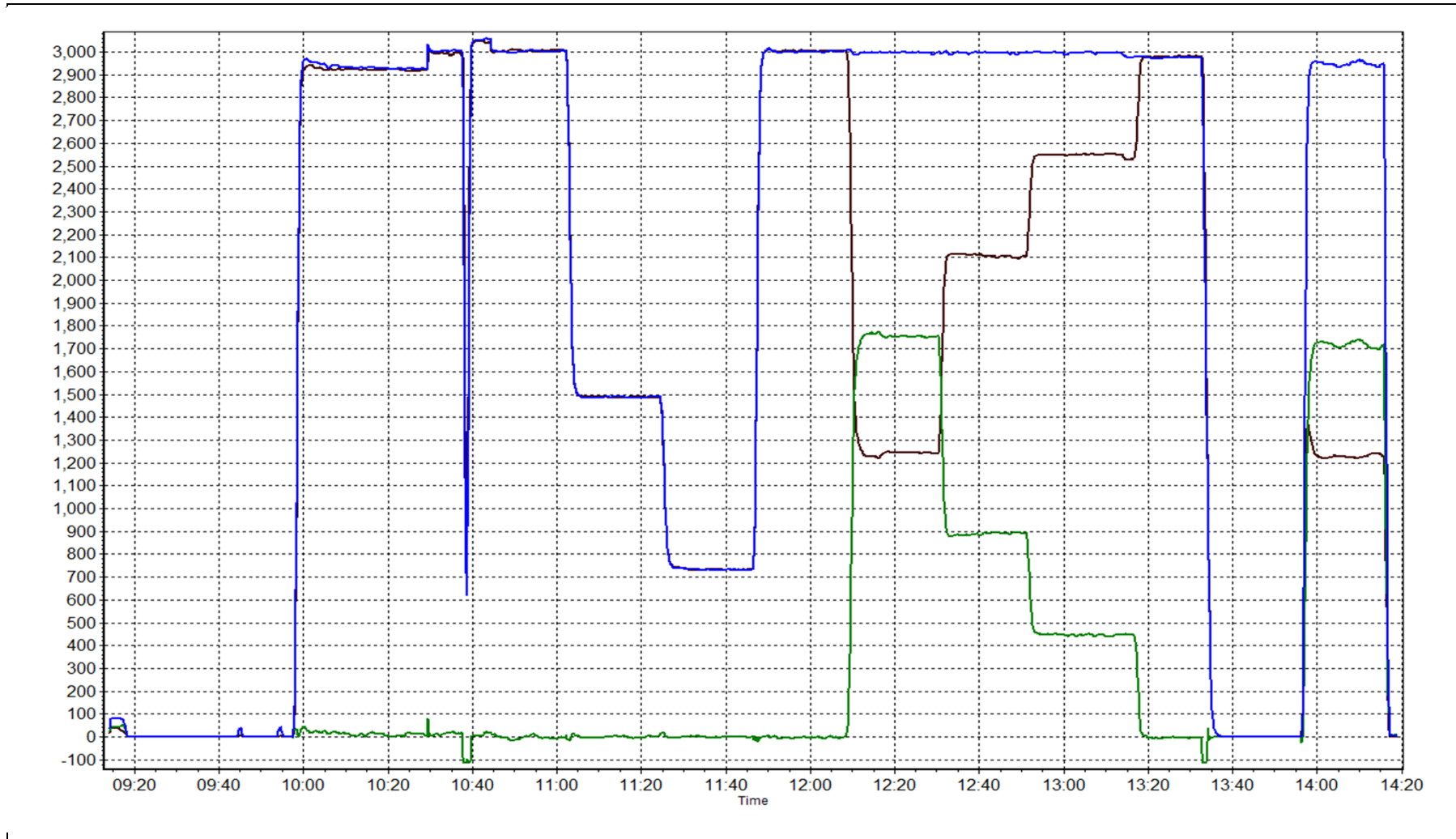
Calibration Date	July 21, 2014	Previous Calibration	June 16, 2014
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:15	End Time (MST)	14:20
Analyzer make	Thermo 42c	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999962
352.1	350.5	1.0046		
180.1	178.4	1.0095	Slope	1.003483
91.3	89.0	1.0258		
			Intercept	0.824401

NO₂ Calibration Curve







Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Calibration Date	July 16, 2014	Previous Calibration	June 18, 2014
Station Name	Athabasca Valley	Station Number	7
Reason:	Routine	Install	Removal
Start Time (MST)	8:40	End Time (MST)	11:00
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	4/27/2015
Gas Cert Reference	LL 85940		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5563
DACS voltage range	0-5V	DACS channel #	11

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	50	50	Chamber temp.	48.0	47.8
Analyzer Range (mv)	5000	5000	Pressure	711.9	723.0
Calculated slope	0.999357	0.998545	Flow	1.262	1.282
Calculated intercept	0.039886	0.024186	Intensity	200300	200000
Analyzer Background	1.614	1.608	S/R ratio	1.165000	1.166000
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	0.997
calibrator zero	5000	0.00	0.0	0.1	N/A
high point	5000	67.60	41.4	41.5	0.997
second point	5000	34.20	20.9	20.8	1.009
third point	5000	14.70	9.0	8.9	1.006
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					1.004

Corrected As found 41.4 Previous response 41.3 % change -0.2%

Notes:

no adjustments required.
changed inlet filter

Calibration Performed By: Michael Martineau



Wood Buffalo Environmental Association

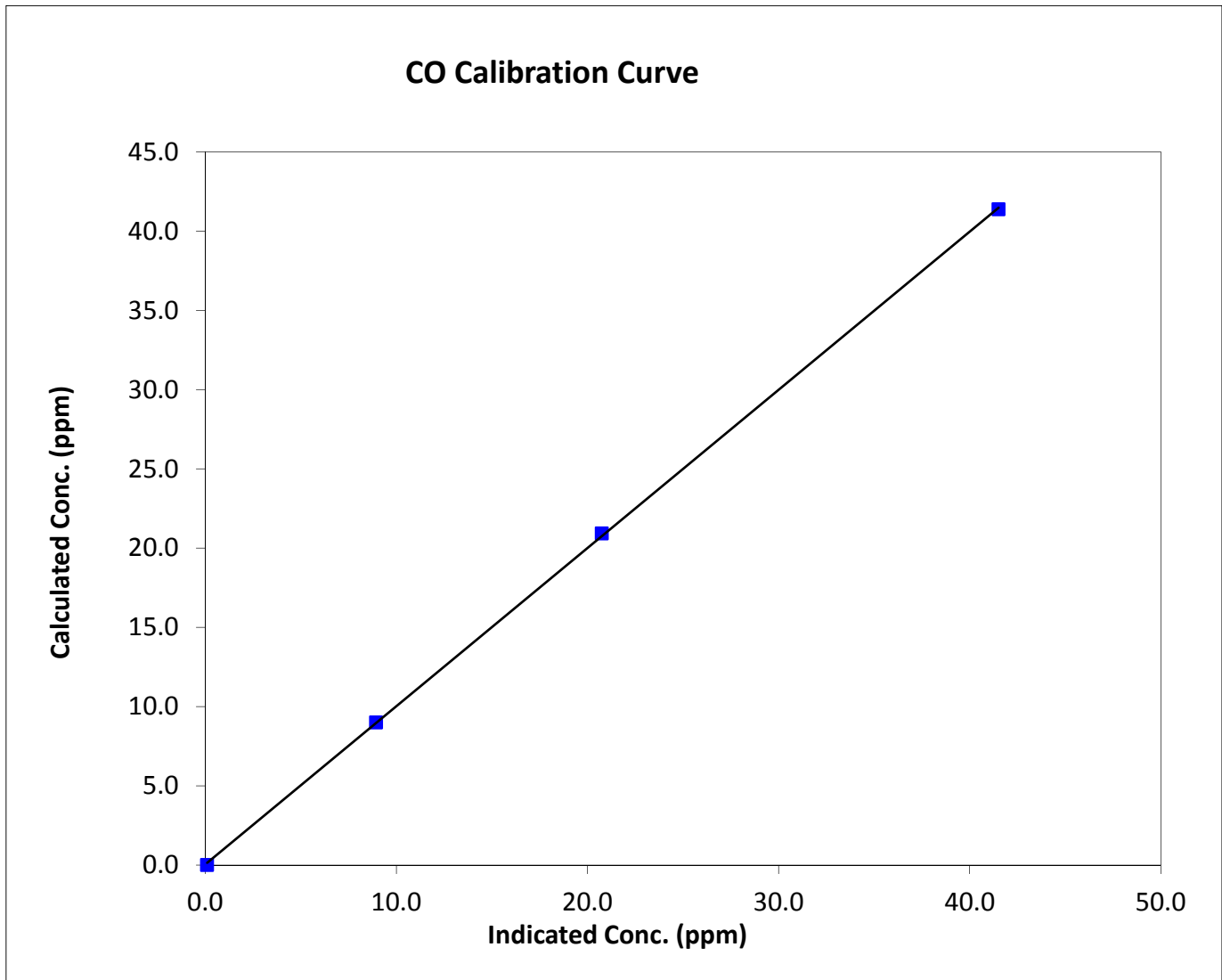
CO Calibration Summary

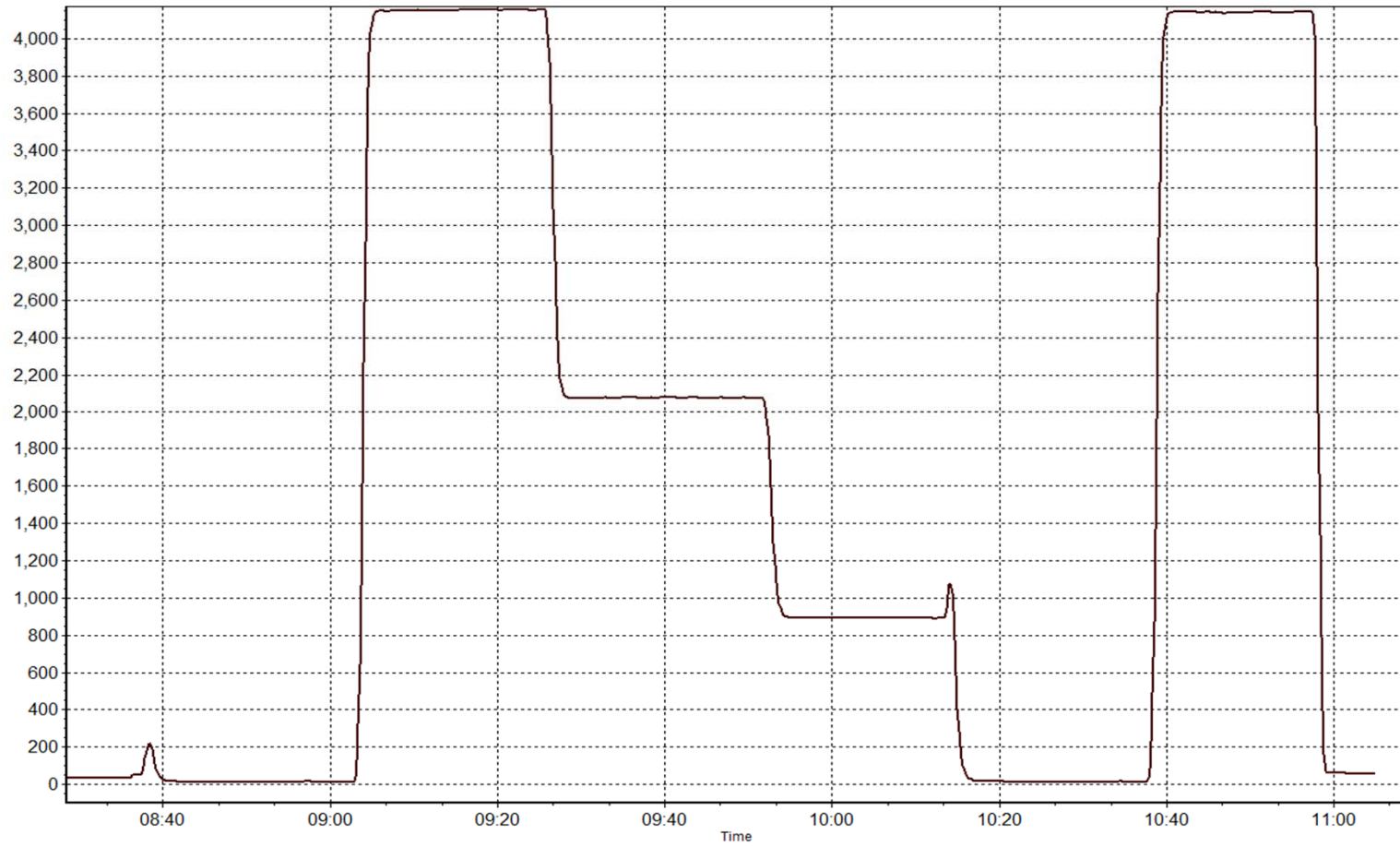
Station Information

Calibration Date	July 16, 2014	Previous Calibration	June 18, 2014
Station Name	Athabasca Valley	Station Number	7
Start Time (MST)	8:40	End Time (MST)	11:00
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	0.999933
41.4	41.5	0.9967		
20.9	20.8	1.0087	Slope	0.998545
9.0	8.9	1.0063		
			Intercept	0.024186





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 8
FORT CHIPEWYAN
JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
 JULY 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	701	39	43	99.46	3	0	1	0
O3(ppb) Average	706	34	38	99.46	52	0	39	-
NO2(ppb) Average	701	39	43	99.46	6	0	2	-
NO(ppb) Average	701	39	43	99.46	3	-	1	-
NOX(ppb) Average	701	39	43	99.46	7	-	3	-
PM2.5(ug/m3) Average	742	0	2	99.73	241	-	51.9	3
Wind Speed 10 m (km/h) Average	743	0	1	99.87	31	-	21	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	30.8	-	25.4	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	-	-
Precipitation (mm) Total	744	0	0	100.00	19.8	-	-	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	907	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
 JULY 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	701	0.2	0	-	0	0	0	0	0	0	0	3
O3(ppb) Average	706	28.9	8	-	12	20	24	29	34	38	38	52
NO2(ppb) Average	701	0.4	1	-	0	0	0	0	0	0	1	6
NO(ppb) Average	701	0.1	0	-	0	0	0	0	0	0	0	3
NOX(ppb) Average	701	0.5	1	-	0	0	0	0	1	1	1	7
PM2.5(ug/m3) Average	742	14.86	18.6	-	0.2	2.5	5.7	9.2	17.1	31.9	31.9	241
Wind Speed 10 m (km/h) Average	743	12.1	6	-	1	6	8	11	16	20	31	31
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	19.94	4	-	8.9	14.9	17.2	19.8	22.6	25.4	30.8	30.8
Relative Humidity (%) Average	744	65.5	16	-	27	44	55	66	77	85	97	97
Precipitation (mm) Total	744	-	-	128.53	0	0	0	0	0	0	0	19.8
Global Solar Radiation (W/m2) Average	744	277.5	297	-	0	0	2	143	550	753	907	907

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
JULY 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	09 Jul 2014 22:00	10 Jul 2014 01:00	4	Power spike followed by stabilization period
O3	09 Jul 2014 22:00	10 Jul 2014 01:00	4	Power spike followed by stabilization period
NO2, NO, NOX	09 Jul 2014 22:00	10 Jul 2014 01:00	4	Power spike followed by stabilization period
PM2.5	08 Jul 2014 17:00	08 Jul 2014 18:00	2	Flow and zero reference checks, sample head cleaning
Wind Speed, Wind Direction	27 Jul 2014 06:00	27 Jul 2014 06:00	1	Flatline in sensor output signal

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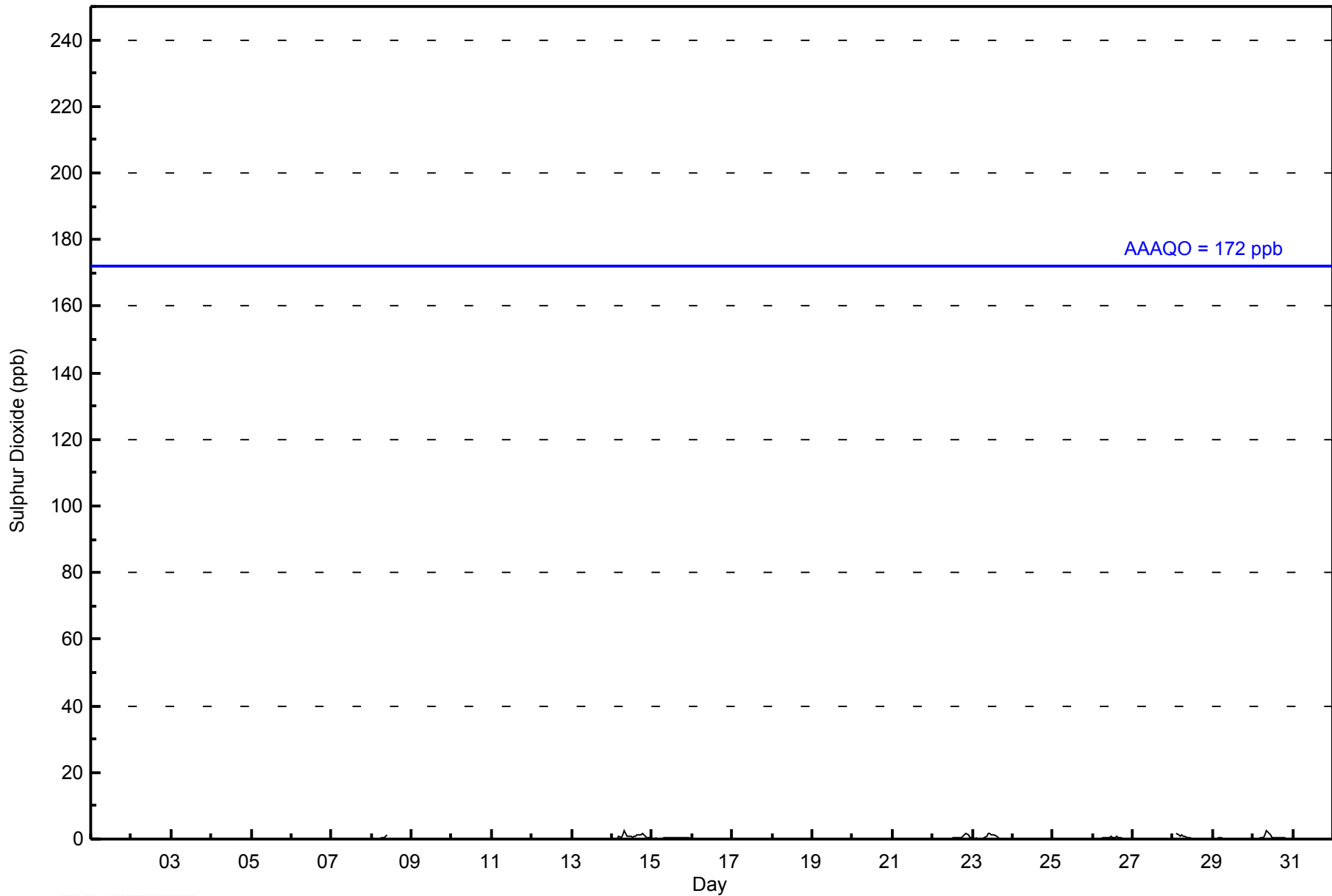


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 3 ppb on Jul 14 08:00										Maximum Daily Average: 0.9 ppb on Jul 14										Hours of Data: 701						
Minimum Value: 0 ppb on Jul 2 01:00										Minimum Daily Average: 0.0 ppb on Jul 2										Hours of Missing Data: 43						
Maximum Diurnal Average: 0.3 ppb at hour 10										Minimum Diurnal Average: 0.1 ppb at hour 24										Hours of Calibration: 39						
Monthly Average: 0.2 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 2										Percent Operational Time: 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-Jul	0	Z	0	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-Jul	0	Z	0	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-Jul	0	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-Jul	0	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-Jul	0	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-Jul	0	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-Jul	0	Z	0	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-Jul	0	Z	0	0	0	0	0	1	1	1	C	C	C	C	C	C	C	C	0	0	0	0	0	0	--	1
9-Jul	0	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-Jul	PF	Z	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Jul	0	Z	0	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-Jul	0	Z	0	0	1	0	1	3	2	1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0.9	3
15-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0.3	1
16-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	1	1	2	1	0	0	0.4	2
23-Jul	0	Z	0	0	0	0	0	0	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	2
24-Jul	0	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-Jul	0	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-Jul	0	Z	0	0	0	0	0	1	1	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0.3	1
27-Jul	0	Z	0	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-Jul	1	Z	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
29-Jul	0	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-Jul	0	Z	0	0	0	1	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	2
31-Jul	0	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
																								Diurnal Average		
																								Diurnal Maximum		
0.1 -- 0.1 0.1 0.1 0.1 0.1 0.2 0.2 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.1 0.1																										
1 -- 2 1 1 1 1 1 3 2 2 2 1 1 1 1 1 1 1 1 2 1 2 1 0 0																										
Z - zerospan C - Calibration PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



WBEA NETWORK
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort Chipeywan - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipecwan - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	701	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: 701

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - July 2014

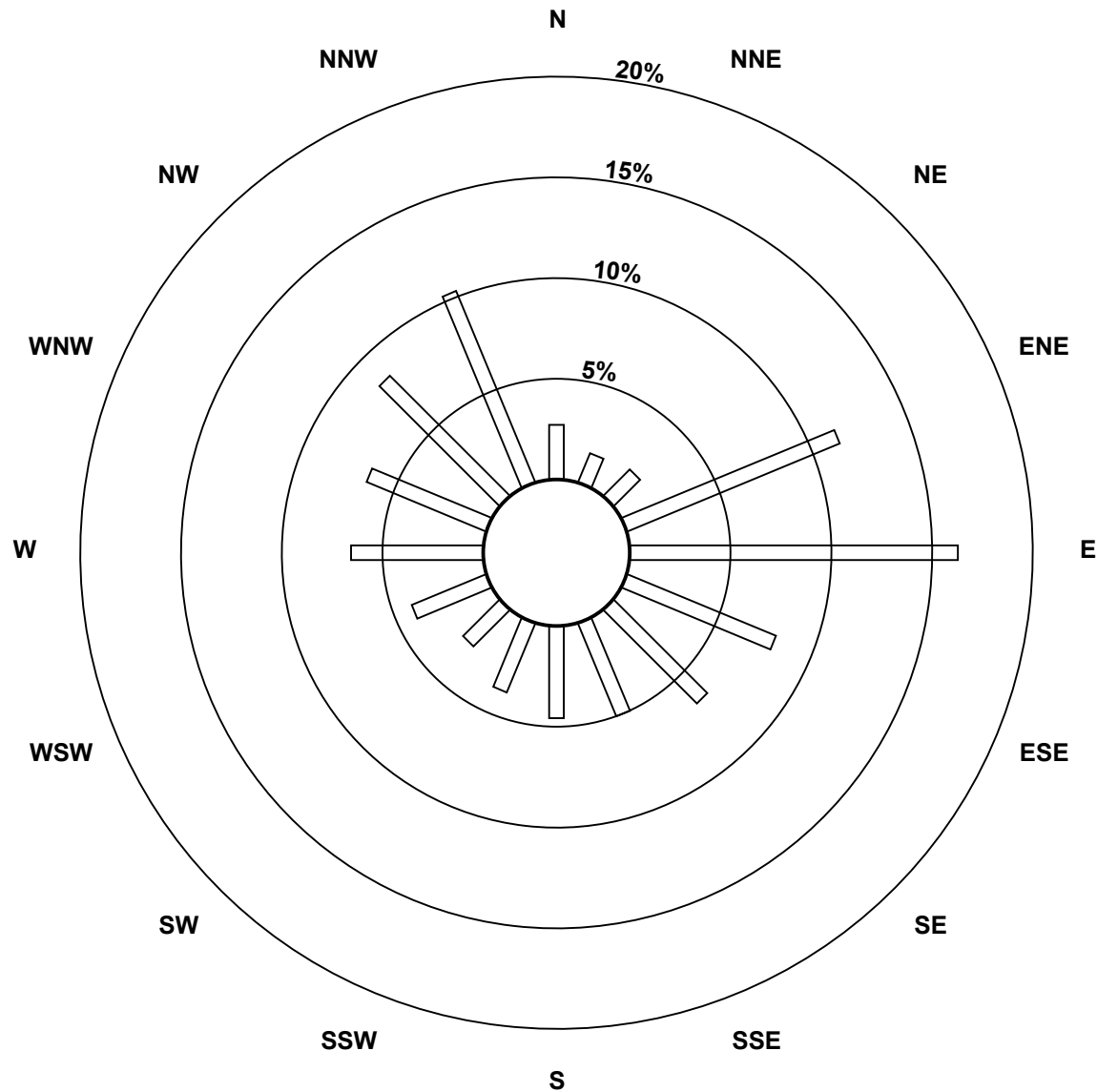
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	19	11	13	80	114	56	46	35	32	26	18	28	46	45	59	72	700
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	19	11	13	80	114	56	46	35	32	26	18	28	46	45	59	72	700

Total Number of Valid Hours: 700

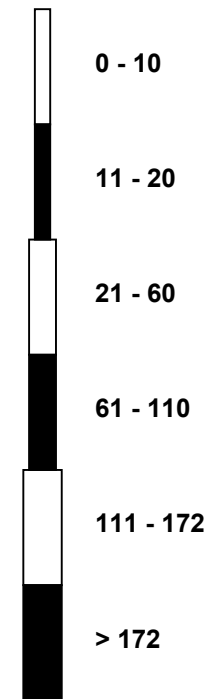
Total Number of Hours: 744

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

**Sulphur Dioxide (SO₂) - ppb
Fort Chipeywan (AMS 8)**



Classes (ppb)



Total Number of Valid Hours: 700

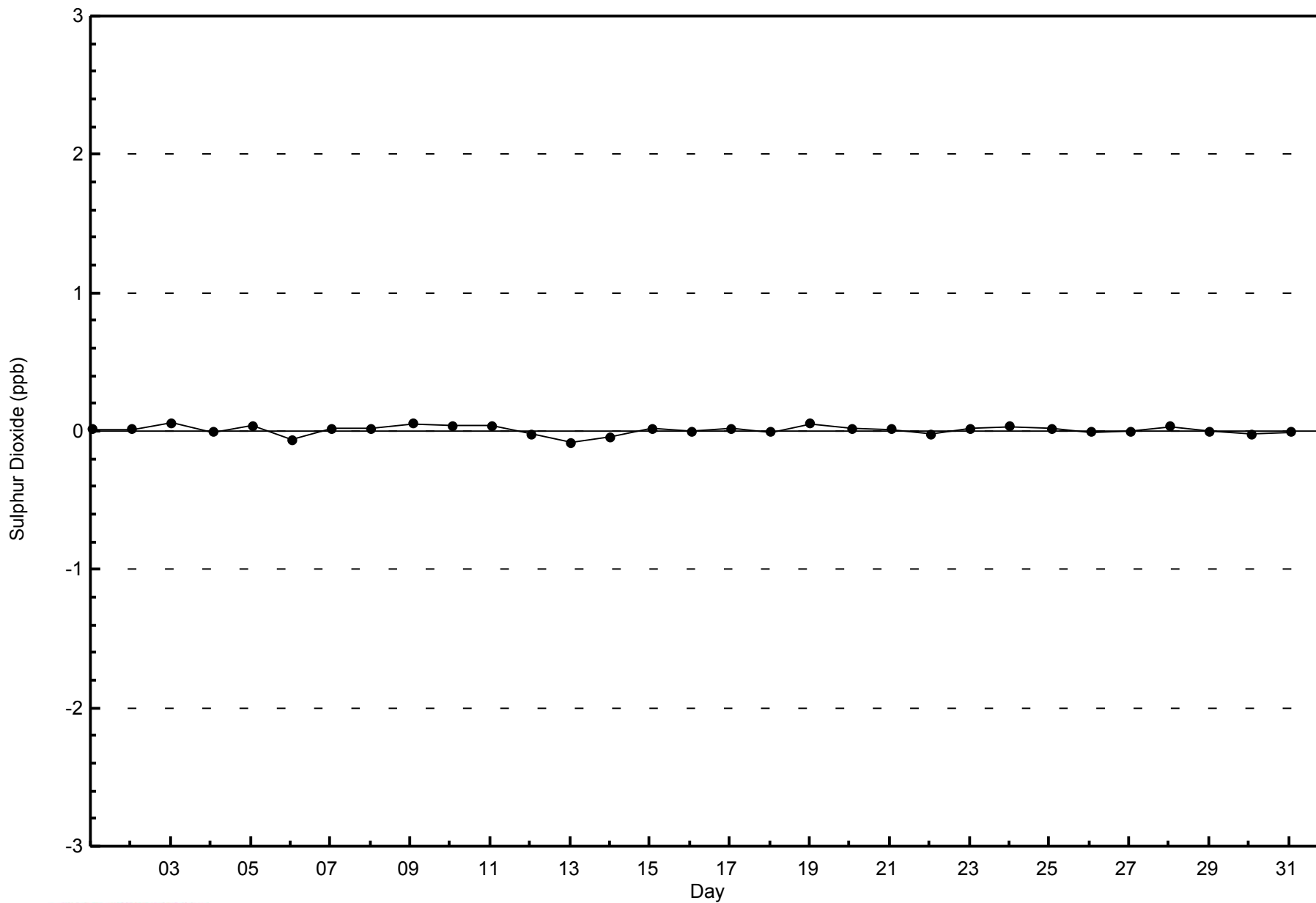


WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

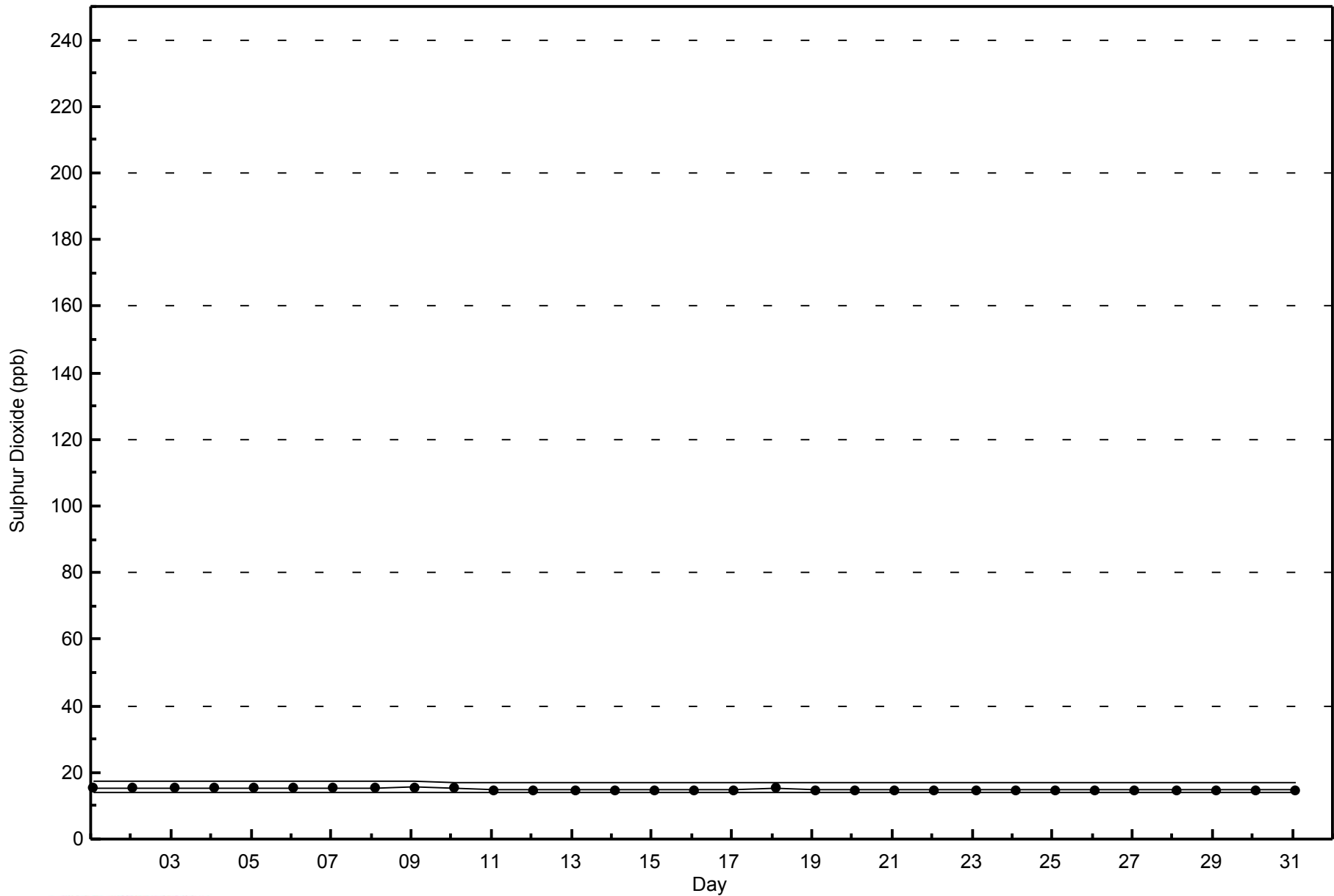
Fort Chipeywan - July 2014





WBEA NETWORK
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort Chipeywan - July 2014



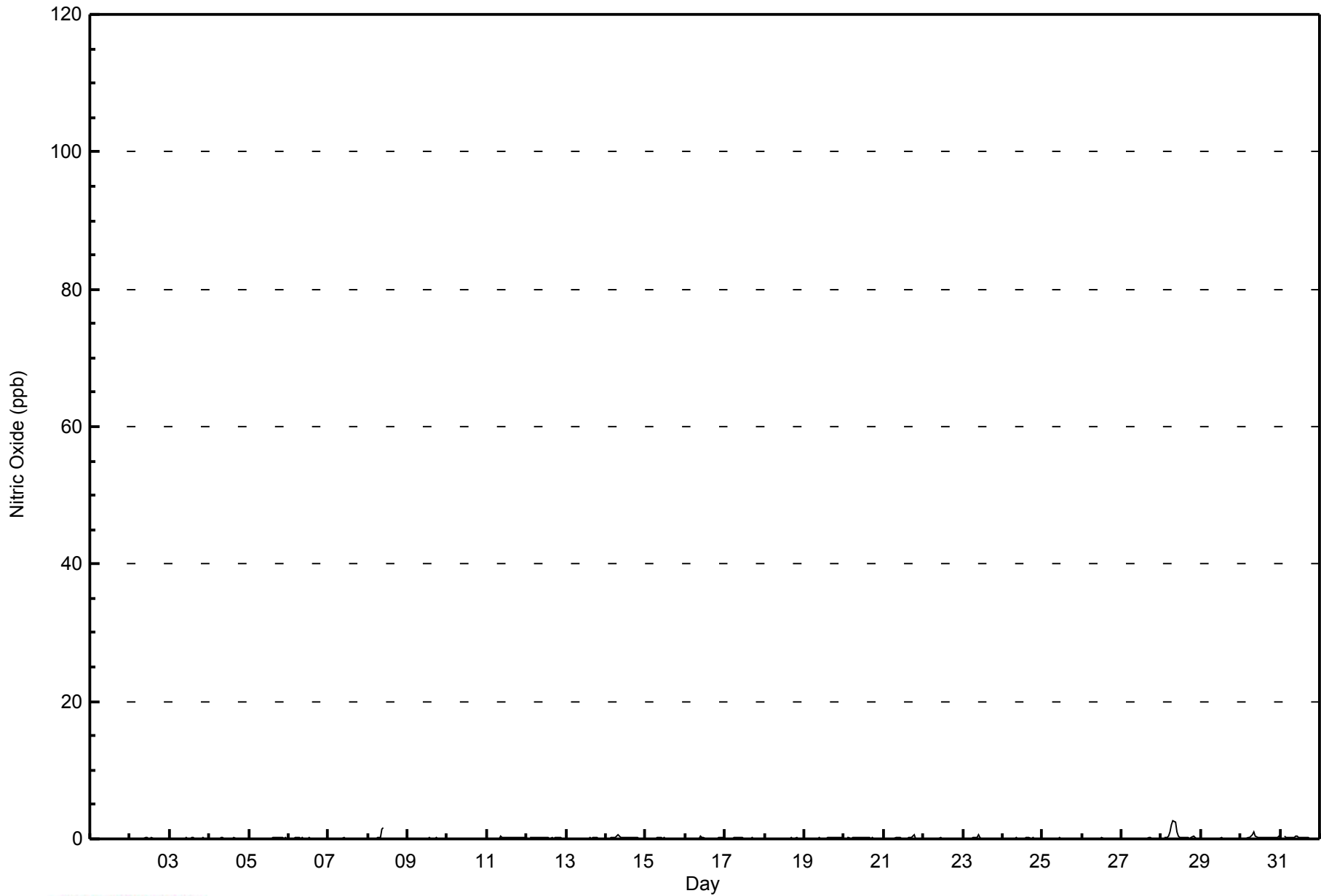


Maximum Value: 3 ppb on Jul 28 08:00														Maximum Daily Average: 0.5 ppb on Jul 28														Hours in Service: 744																				
Minimum Value: 0 ppb on Jul 1 22:00														Minimum Daily Average: 0.0 ppb on Jul 10														Hours of Data: 701																				
Maximum Diurnal Average: 0.3 ppb at hour 9														Minimum Diurnal Average: 0.1 ppb at hour 24														Hours of Missing Data: 43																				
Monthly Average: 0.1 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1														Hours of Calibration: 39																				
																												Percent Operational Time: 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-Jul	0	Z	0	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-Jul	0	Z	0	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-Jul	0	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-Jul	0	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-Jul	0	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-Jul	0	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-Jul	0	Z	0	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-Jul	0	Z	0	0	0	0	0	0	1	2	C	C	C	C	C	C	C	C	0	0	0	0	0	0	--	2																						
9-Jul	0	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-Jul	PF	Z	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
12-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
13-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
14-Jul	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
15-Jul	0	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-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
18-Jul	0	Z	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
20-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
21-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.1	1																						
22-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
23-Jul	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																						
24-Jul	0	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-Jul	0	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-Jul	0	Z	0	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-Jul	0	Z	0	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-Jul	0	Z	0	0	0	1	2	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3																						
29-Jul	0	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-Jul	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
31-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
																								0.1	--	0.1	0.1	0.1	0.1	0.2	0.2	0.3	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	Diurnal Average
																								0	--	0	0	0	1	2	3	2	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	Diurnal Maximum
Z - zerospan C - Calibration PF - Power Failure																																																



WBEA NETWORK
Hourly Averages

Nitric Oxide (NO) - ppb
Fort Chipecywan - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipecwan - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	701	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: 701

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipewyan - July 2014

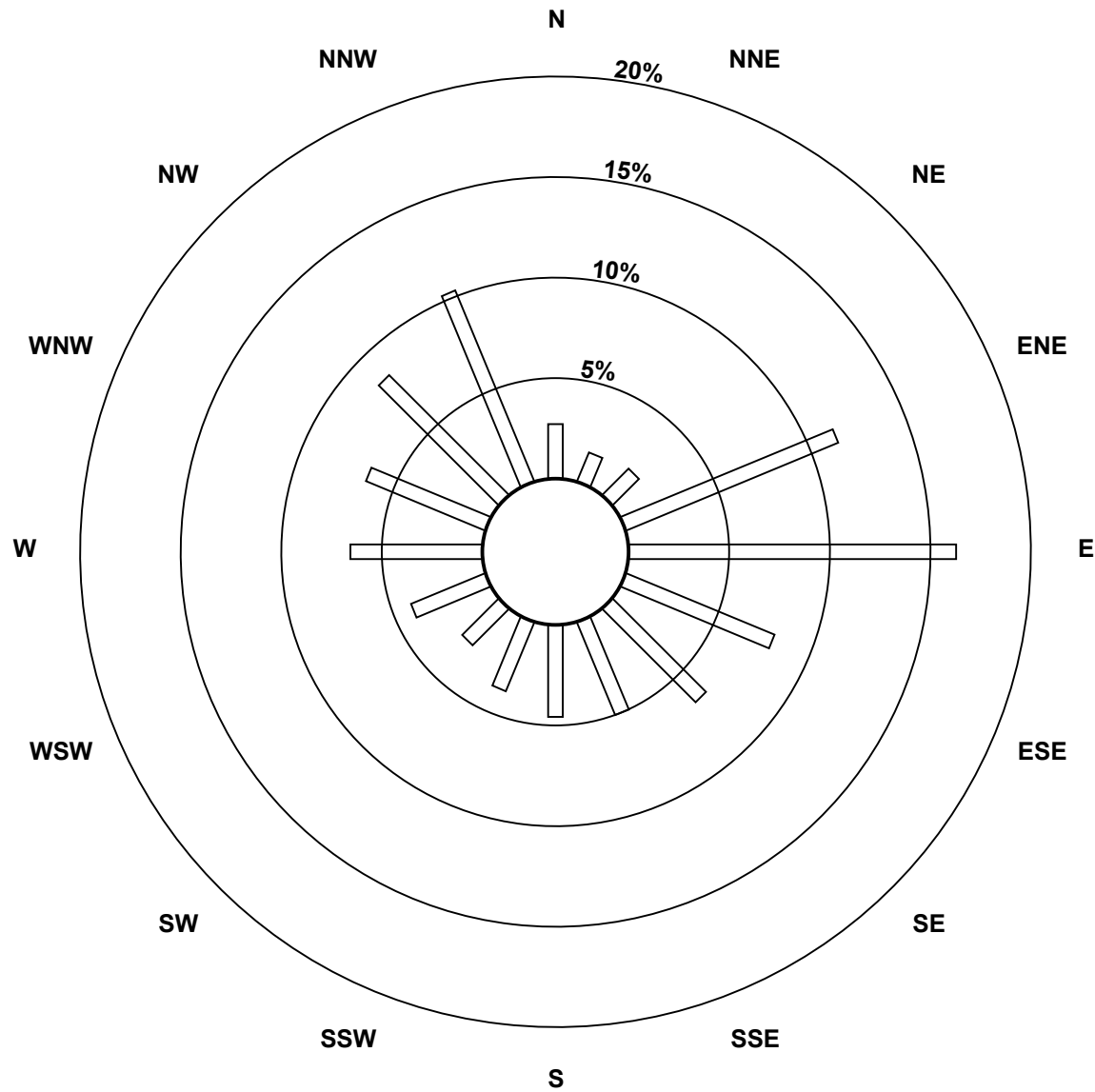
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	19	11	13	80	114	56	46	35	32	26	18	28	46	45	59	72	700
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	11	13	80	114	56	46	35	32	26	18	28	46	45	59	72	700

Total Number of Valid Hours: 700

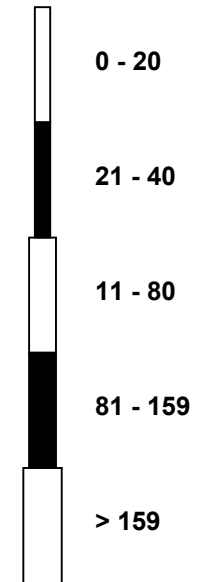
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Nitric Oxide (NO) - ppb
Fort Chipeywan (AMS 8)



Classes (ppb)



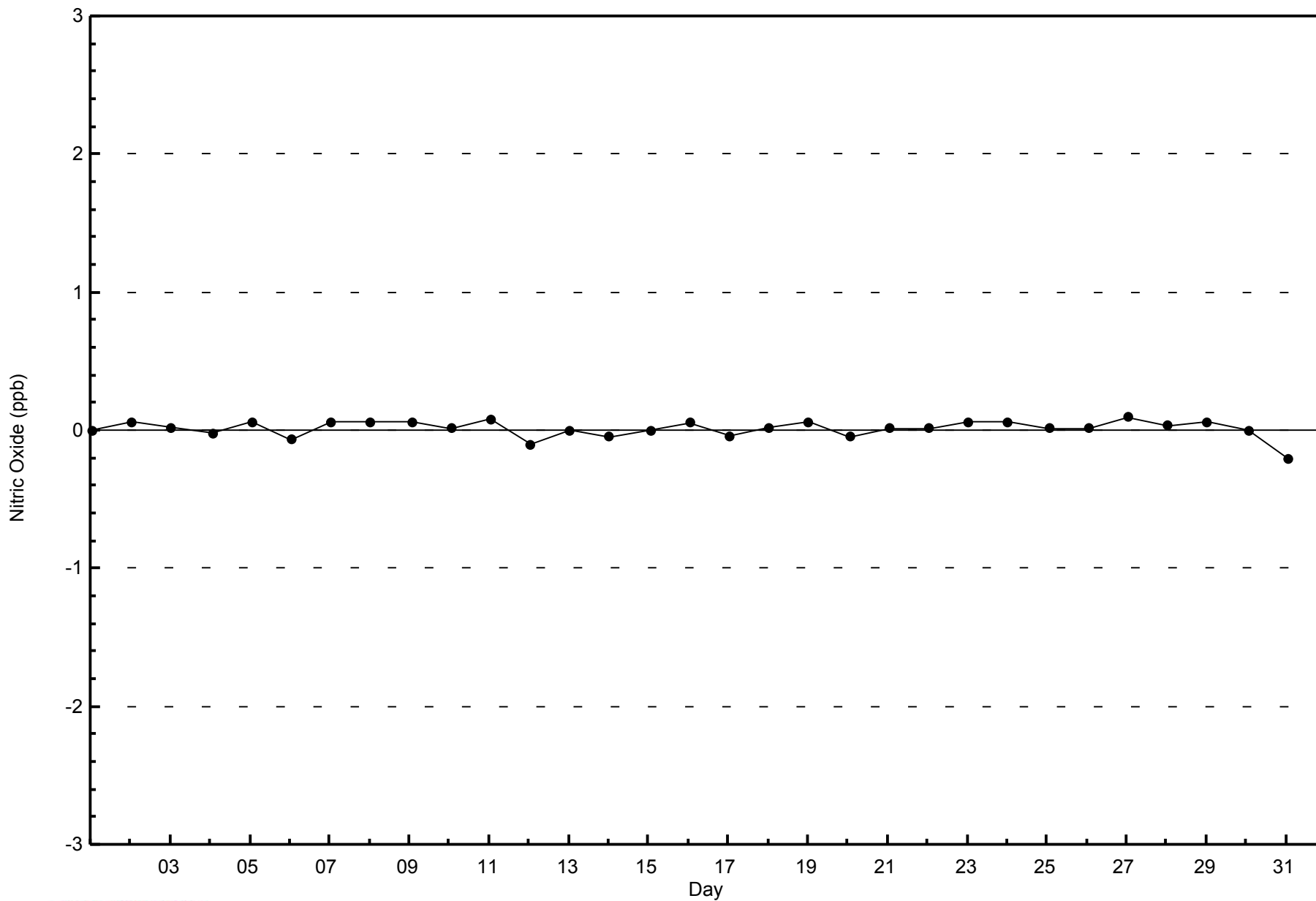
Total Number of Valid Hours: 700



WBEA NETWORK

Zero Responses

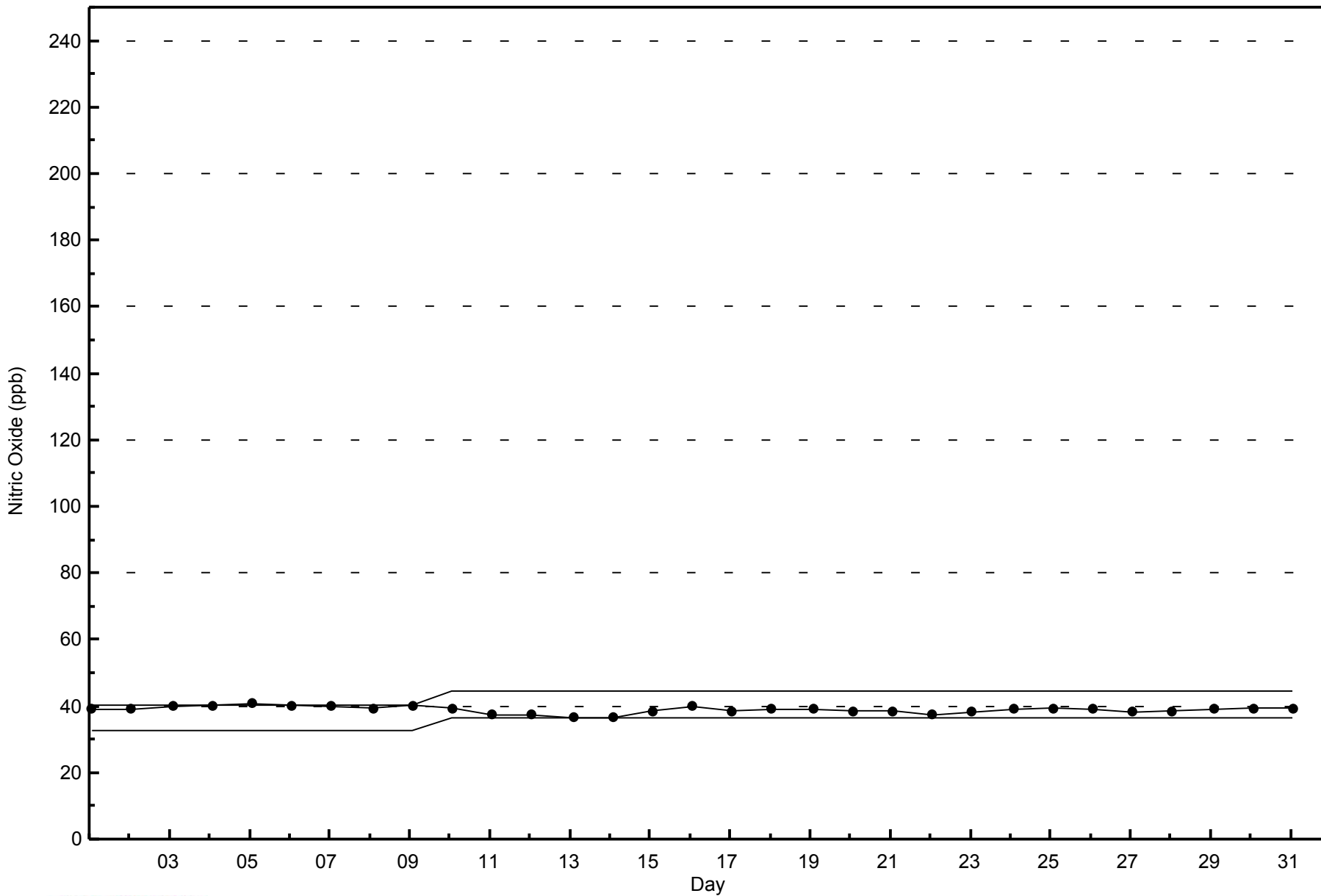
Nitric Oxide (NO) - ppb
Fort Chipecywan - July 2014





WBEA NETWORK
Span Responses

Nitric Oxide (NO) - ppb
Fort Chipeywan - July 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 6 ppb on Jul 28 05:00	Maximum Daily Average: 2.1 ppb on Jul 28		Hours of Data:	701
Minimum Value: 0 ppb on Jul 1 07:00	Minimum Daily Average: 0.0 ppb on Jul 13		Hours of Missing Data:	43
Maximum Diurnal Average: 0.7 ppb at hour 10	Minimum Diurnal Average: 0.3 ppb at hour 12		Hours of Calibration:	39
Monthly Average: 0.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 4		Percent Operational Time:	99.5

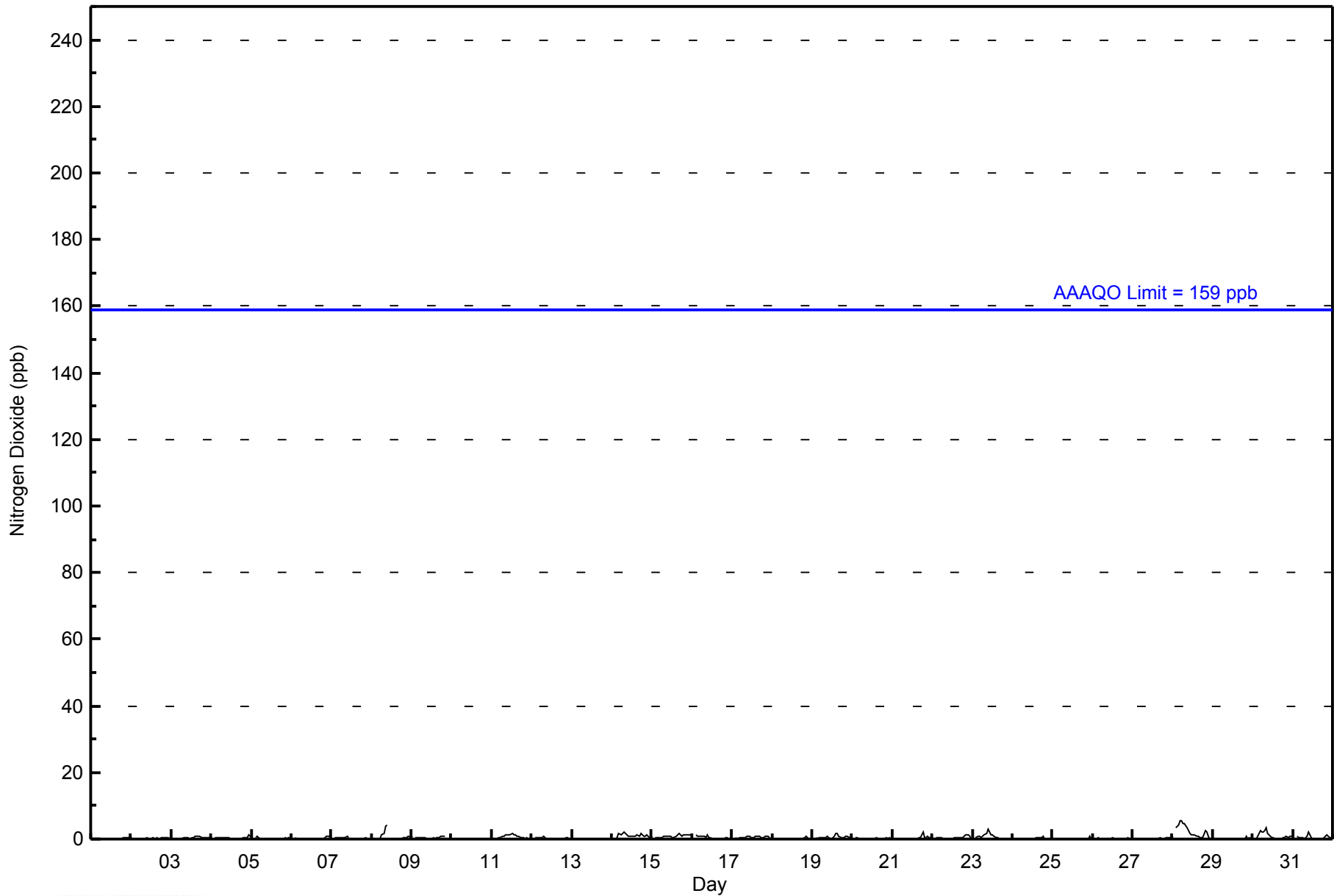
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1																								
2-Jul	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.2	1																								
3-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0.4	1																								
4-Jul	0	Z	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1																								
5-Jul	1	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1																								
6-Jul	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.2	1																								
7-Jul	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
8-Jul	0	Z	0	0	0	0	1	2	4	4	C	C	C	C	C	C	C	C	1	0	0	1	1	1	--	4																								
9-Jul	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	PF	PF	PF	0.4	1																								
10-Jul	PF	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-Jul	0	Z	0	0	0	1	1	1	1	1	1	2	1	1	1	1	1	1	0	0	0	0	0	0	0.7	2																								
12-Jul	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																								
13-Jul	0	Z	0	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-Jul	0	Z	0	0	2	1	2	2	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1.0	2																								
15-Jul	1	Z	1	0	0	0	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	0.9	2																								
16-Jul	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.5	1																								
17-Jul	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0.5	1																								
18-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.1	1																								
19-Jul	0	Z	0	0	0	0	0	1	1	1	0	0	1	1	2	2	1	0	1	1	1	1	0	0	0.6	2																								
20-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	1	1	0	0.3	2																								
22-Jul	1	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.4	1																								
23-Jul	0	Z	1	1	1	1	1	1	2	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	3																								
24-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.2	1																								
25-Jul	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																								
26-Jul	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																								
27-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.1	1																								
28-Jul	1	Z	3	4	6	6	5	5	3	2	2	1	1	1	1	0	0	1	3	2	1	0	0	0	2.1	6																								
29-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.1	1																								
30-Jul	0	Z	0	1	3	2	2	3	3	2	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0.9	3																								
31-Jul	1	Z	1	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0.5	2																								
																								0.3	--	0.4	0.4	0.5	0.5	0.5	0.6	0.7	0.7	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.3	Diurnal Average		
																								1	--	3	4	6	6	5	5	4	4	2	1	2	1	2	2	2	2	2	2	3	2	1	1	1	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort Chipeywan - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort Chipecwan - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	701	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: 701

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort Chipecywan - July 2014

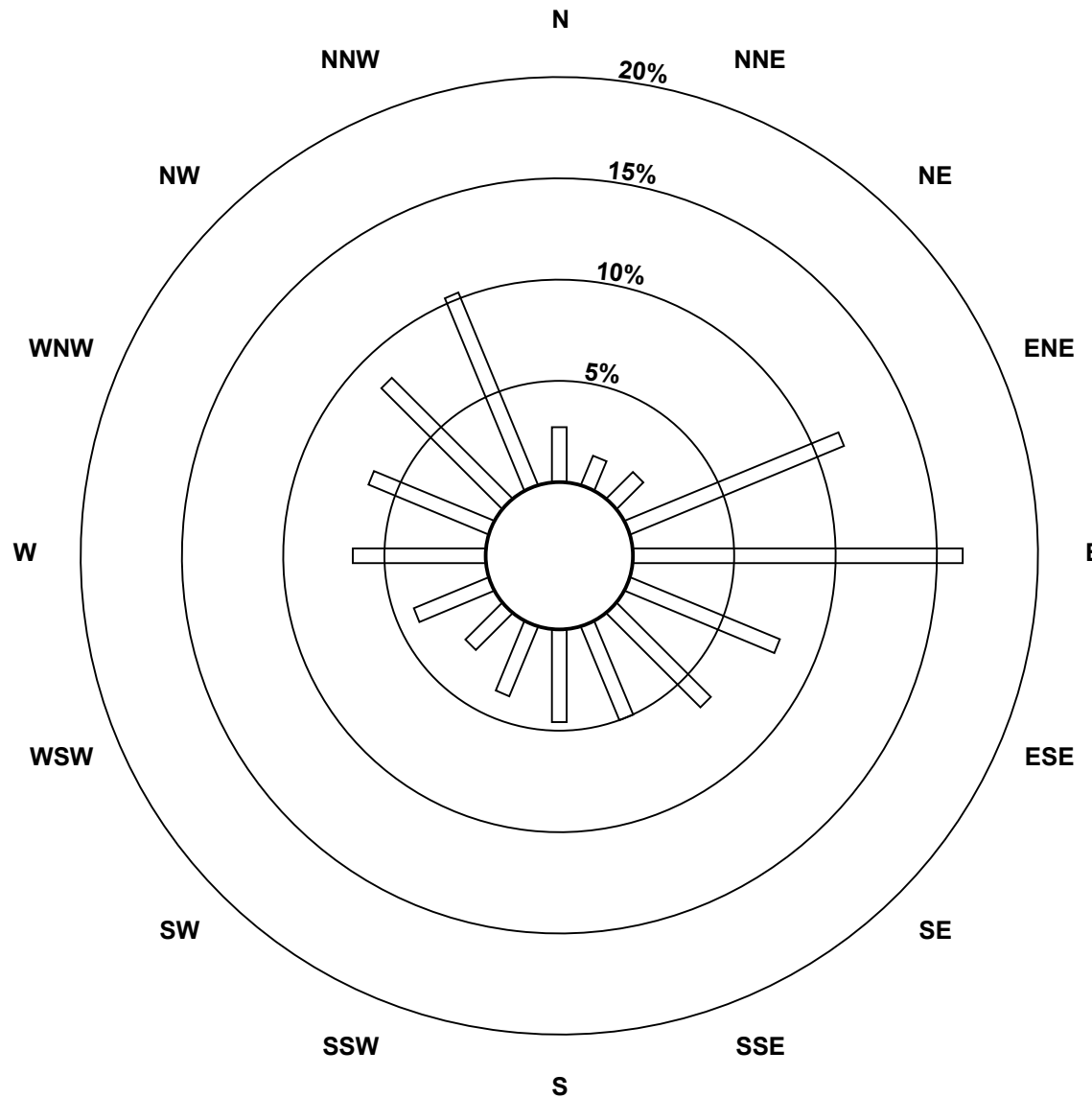
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	19	11	13	80	114	56	46	35	32	26	18	28	46	45	59	72	700
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	11	13	80	114	56	46	35	32	26	18	28	46	45	59	72	700

Total Number of Valid Hours: 700

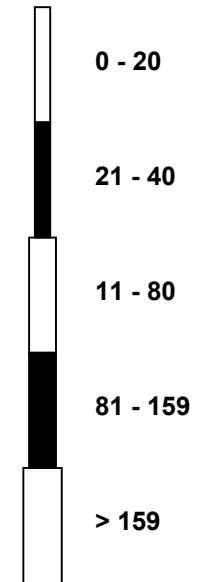
Total Number of Hours: 744

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

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipeywan (AMS 8)**



Classes (ppb)



Total Number of Valid Hours: 700

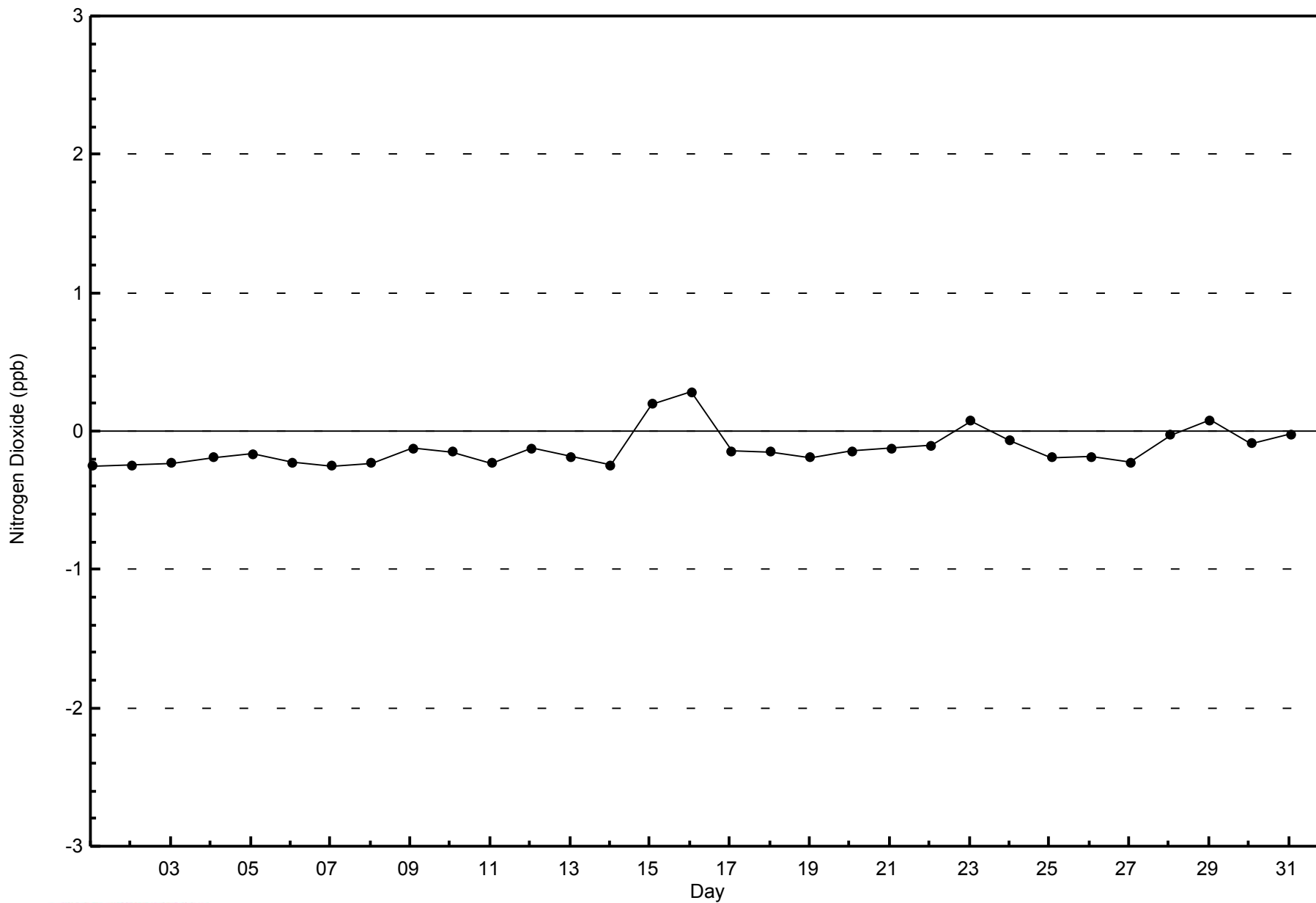


WBEA NETWORK

Zero Responses

Nitrogen Dioxide (NO₂) - ppb

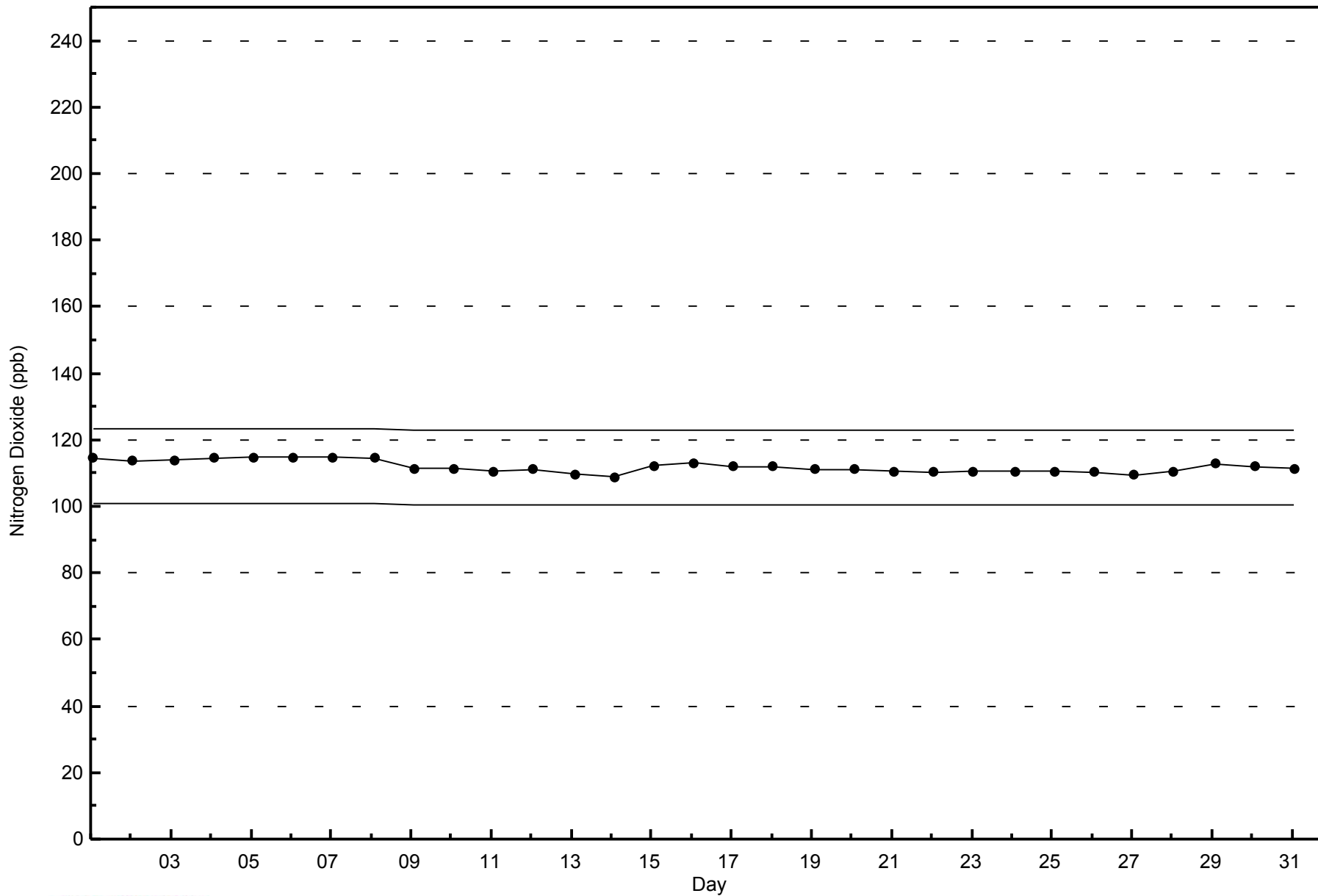
Fort Chipeywan - July 2014





WBEA NETWORK
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Fort Chipecywan - July 2014



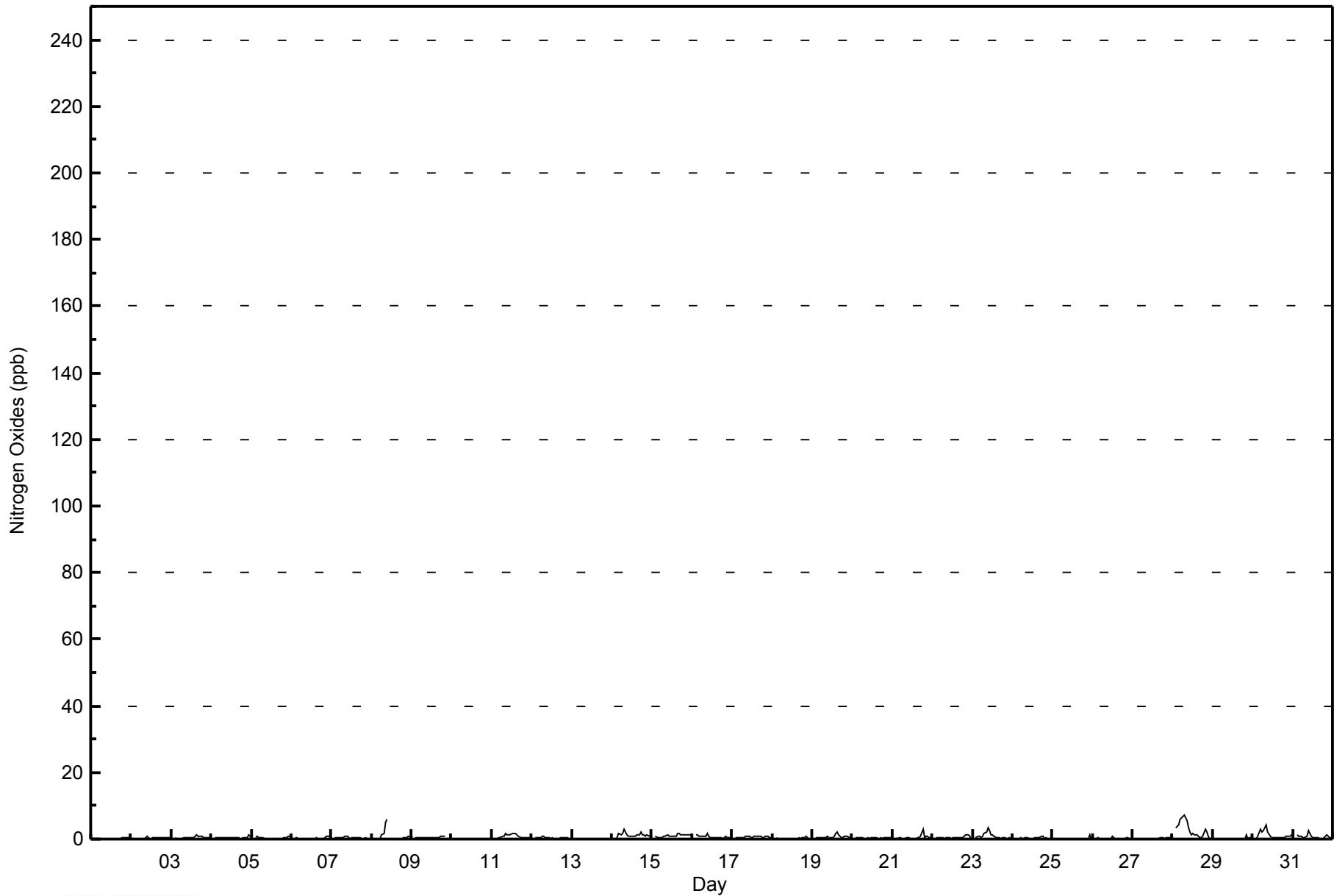


Maximum Value: 7 ppb on Jul 28 08:00														Maximum Daily Average: 2.6 ppb on Jul 28														Hours in Service: 744																				
Minimum Value: 0 ppb on Jul 2 03:00														Minimum Daily Average: 0.1 ppb on Jul 13														Hours of Data: 701																				
Maximum Diurnal Average: 1.0 ppb at hour 10														Minimum Diurnal Average: 0.3 ppb at hour 1														Hours of Missing Data: 43																				
Monthly Average: 0.5 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 5														Hours of Calibration: 39																				
																												Percent Operational Time: 99.5																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1																							
2-Jul	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1																							
3-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0.5	1																							
4-Jul	0	Z	1	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1																							
5-Jul	1	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1																							
6-Jul	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	1																							
7-Jul	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
8-Jul	0	Z	0	0	0	0	1	2	5	6	C	C	C	C	C	C	C	C	1	0	0	0	1	1	--	6																						
9-Jul	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	PF	PF	PF	0.5	1																						
10-Jul	PF	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
11-Jul	0	Z	0	0	0	1	1	1	1	1	1	2	2	2	1	1	1	1	0	0	0	0	0	0.8	2																							
12-Jul	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
14-Jul	0	Z	0	0	2	1	2	3	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1.2	3																							
15-Jul	1	Z	1	0	0	0	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1.0	2																							
16-Jul	1	Z	1	1	1	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	1	0	0	0.6	2																							
17-Jul	0	Z	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.6	1																							
18-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.2	1																							
19-Jul	0	Z	0	0	0	0	0	1	1	1	0	0	1	1	2	2	1	1	1	1	1	1	1	0.7	2																							
20-Jul	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																							
21-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	0	1	1	1	0	0.4	3																							
22-Jul	1	Z	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	1	0	0.5	1																							
23-Jul	0	Z	1	1	1	1	1	2	2	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0.8	3																							
24-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0.3	1																							
25-Jul	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																							
26-Jul	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
27-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.1	1																							
28-Jul	1	Z	3	4	6	6	7	7	6	3	2	1	2	1	1	1	0	1	3	2	1	0	0	2.6	7																							
29-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1																							
30-Jul	1	Z	0	1	3	2	2	3	4	2	1	1	0	0	0	0	0	0	0	1	1	1	1	1.2	4																							
31-Jul	1	Z	1	1	1	1	1	1	1	2	2	1	0	0	0	0	0	0	0	1	1	1	0	0.7	2																							
																								0.3	--	0.4	0.5	0.6	0.6	0.7	0.8	0.9	1.0	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.6	0.6	0.5	0.4	Diurnal Average
																								1	--	3	4	6	6	7	7	6	6	2	1	2	2	2	2	2	2	3	3	2	1	1	1	Diurnal Maximum
Z - zerospan			C - Calibration				PF - Power Failure																																									



WBEA NETWORK
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort Chipeywan - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	701	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: 701

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - July 2014

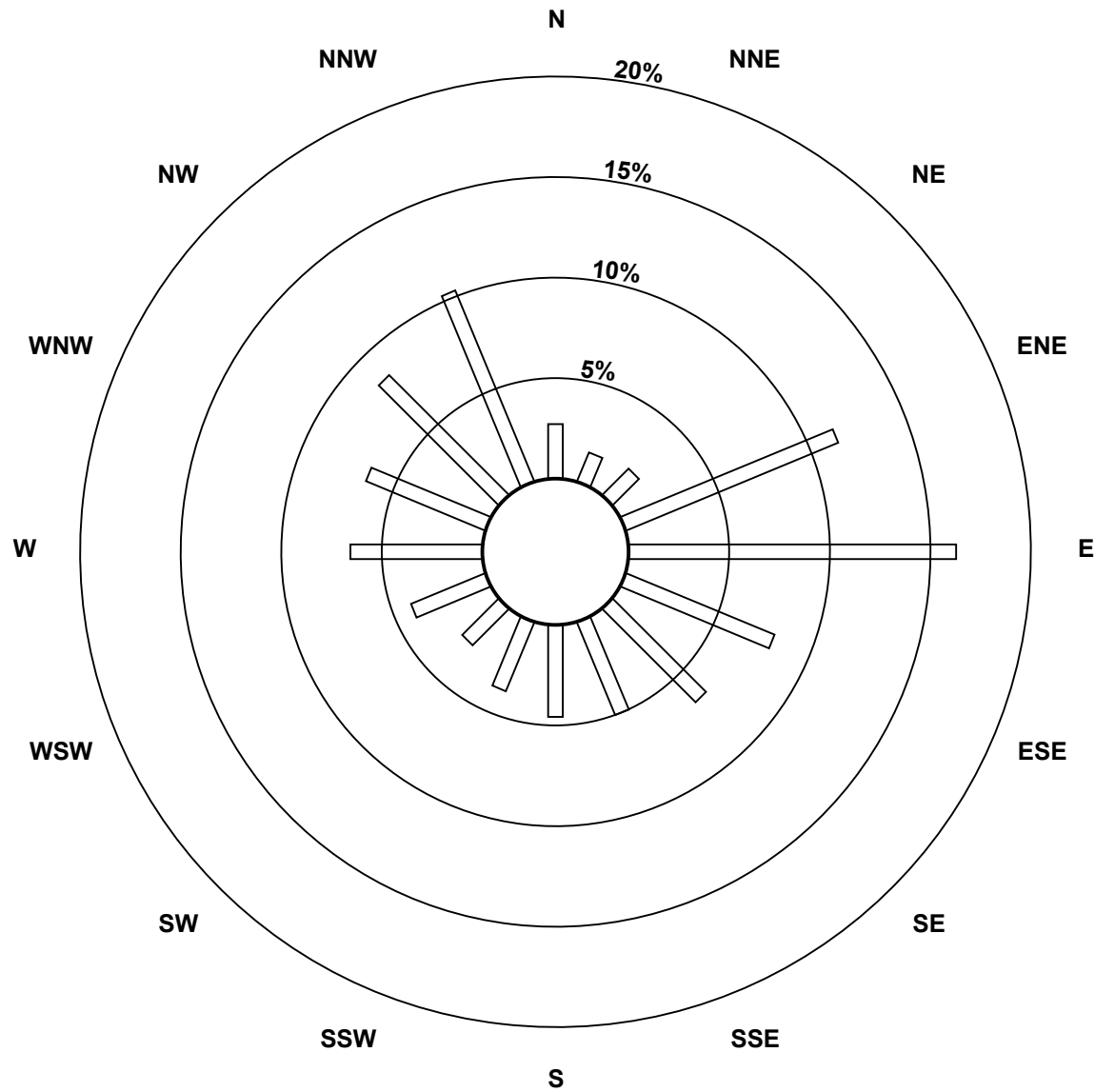
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	19	11	13	80	114	56	46	35	32	26	18	28	46	45	59	72	700
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	11	13	80	114	56	46	35	32	26	18	28	46	45	59	72	700

Total Number of Valid Hours: 700

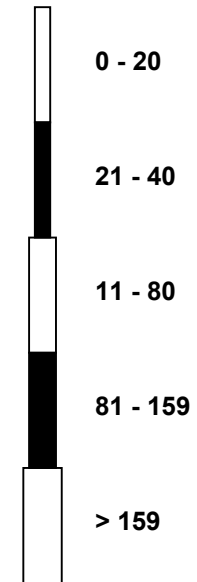
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

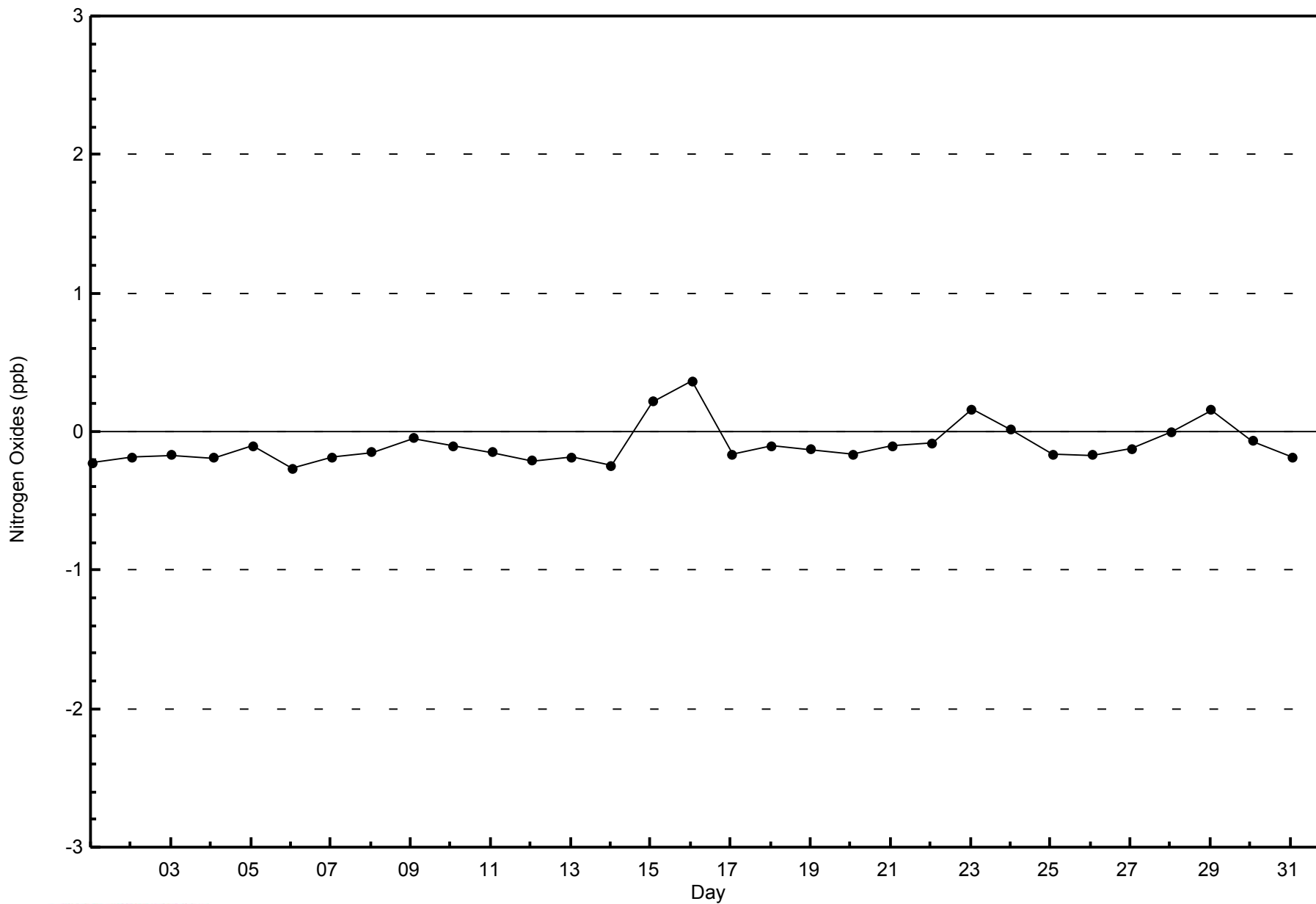
Nitrogen Oxides (NO_x) - ppb
Fort Chipeywan (AMS 8)



Classes (ppb)



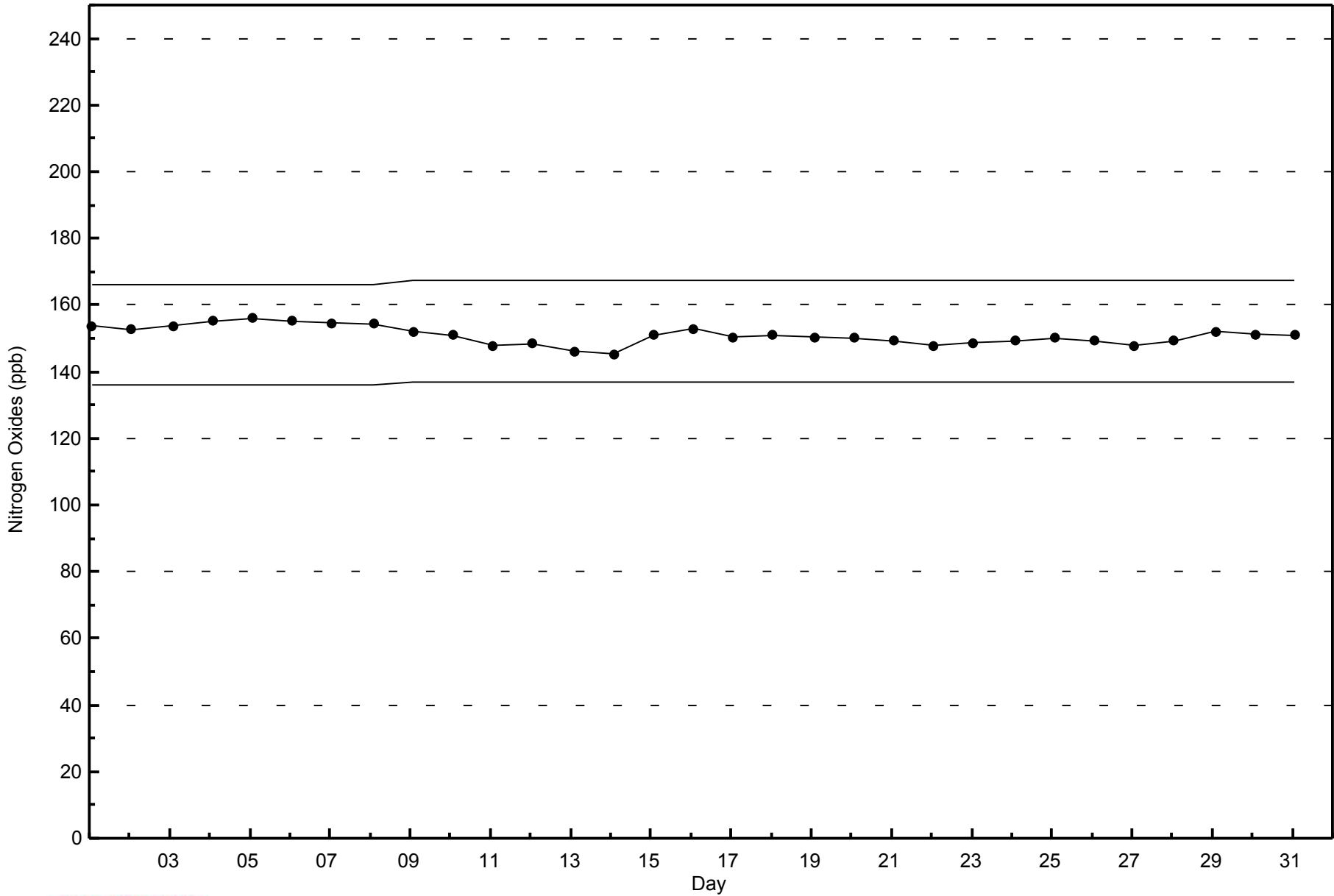
Total Number of Valid Hours: 700





WBEA NETWORK
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort Chipeywan - July 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 52 ppb on Jul 14 16:00	Maximum Daily Average: 39.3 ppb on Jul 22		Hours of Data:	706
Minimum Value: 12 ppb on Jul 31 11:00	Minimum Daily Average: 20.3 ppb on Jul 31		Hours of Missing Data:	38
Maximum Diurnal Average: 34.1 ppb at hour 16	Minimum Diurnal Average: 23.0 ppb at hour 7		Hours of Calibration:	34
Monthly Average: 28.9 ppb	Percentiles: P ₁ = 13 P ₁₀ = 20 Q ₁ = 24 Median = 29 Q ₃ = 34 P ₉₀ = 38 P ₉₉ = 49		Percent Operational Time:	99.5

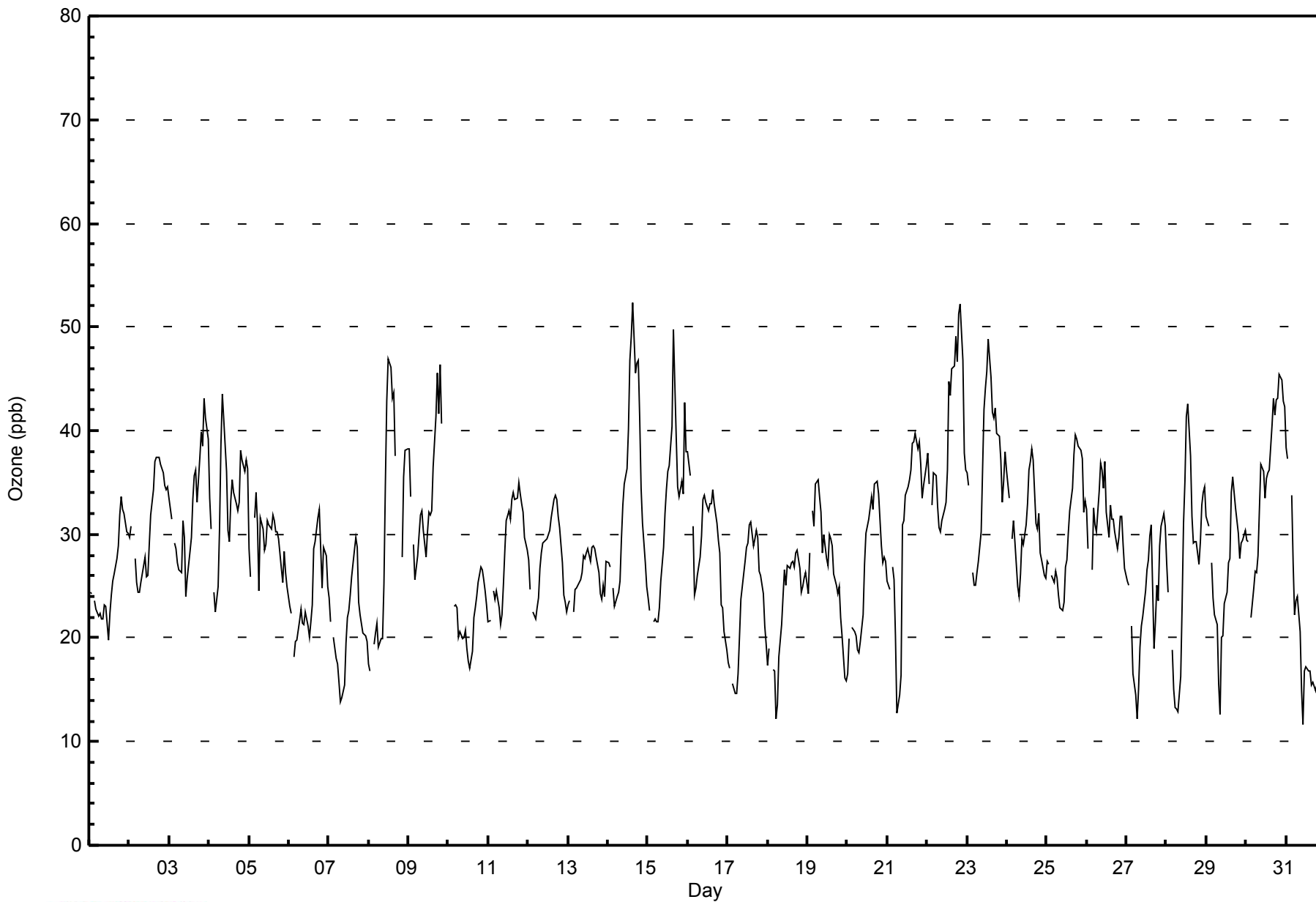
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	24	24	Z	24	23	22	22	22	22	23	23	20	22	24	26	26	28	29	32	34	32	32	30	30	25.8	34																						
2-Jul	30	31	Z	28	25	24	24	25	26	28	26	26	29	32	34	37	37	37	37	37	36	35	34	35	31.1	37																						
3-Jul	34	31	Z	29	29	27	27	26	31	30	24	26	28	30	33	36	36	33	37	40	39	43	41	39	32.6	43																						
4-Jul	34	30	Z	24	22	25	31	39	43	41	36	30	29	33	35	34	33	32	33	38	37	36	37	36	33.5	43																						
5-Jul	29	26	Z	32	34	31	25	32	31	28	29	31	31	30	32	31	30	30	30	27	25	28	26	25	29.3	34																						
6-Jul	23	22	Z	18	20	20	22	23	21	21	23	21	20	22	23	29	29	32	32	29	25	29	28	25	24.2	32																						
7-Jul	24	22	Z	20	18	17	16	14	14	15	20	22	23	24	26	28	30	29	23	22	20	20	20	20	21.2	30																						
8-Jul	17	17	Z	19	20	21	19	20	20	25	35	43	47	46	43	44	37	C	C	C	28	36	38	38	30.7	47																						
9-Jul	38	34	Z	29	26	28	30	32	32	30	28	30	32	32	32	37	41	46	42	46	41	PF	PF	PF	34.3	46																						
10-Jul	PF	23	Z	23	23	23	20	21	20	20	21	19	18	17	19	22	23	24	25	27	27	26	25	23	22.1	27																						
11-Jul	22	22	Z	24	24	25	23	21	22	25	28	31	32	31	33	34	33	34	35	34	33	32	30	28	28.6	35																						
12-Jul	27	25	Z	23	22	23	24	27	28	29	29	30	30	30	32	33	34	33	32	31	27	24	23	23	27.8	34																						
13-Jul	23	24	Z	22	25	25	25	26	26	28	28	28	29	27	29	29	29	28	26	24	24	25	24	27	26.1	29																						
14-Jul	27	27	Z	25	23	24	24	25	30	33	35	36	40	47	49	52	46	47	47	41	34	31	27	25	34.6	52																						
15-Jul	24	23	Z	22	22	22	22	23	26	29	32	34	36	37	40	50	44	39	35	34	35	34	43	38	32.2	50																						
16-Jul	38	36	Z	31	24	25	26	28	30	33	34	33	32	33	33	34	33	31	29	28	23	23	21	19	29.4	38																						
17-Jul	18	17	Z	16	15	15	16	20	24	25	27	29	29	31	31	29	30	30	30	26	26	24	21	19	23.8	31																						
18-Jul	17	19	Z	17	17	12	14	18	21	24	27	25	27	27	27	27	27	28	28	27	24	25	26	26	23.1	28																						
19-Jul	24	28	Z	32	31	35	35	34	32	28	30	28	27	30	30	29	26	25	24	25	22	20	16	16	27.3	35																						
20-Jul	17	20	Z	21	21	20	19	19	20	22	27	30	31	31	34	32	35	35	35	34	29	27	28	27	26.7	35																						
21-Jul	26	25	Z	27	26	20	13	15	16	31	31	34	35	35	36	39	39	40	38	39	37	34	35	37	30.6	40																						
22-Jul	38	35	Z	33	36	36	33	31	30	31	32	33	36	45	43	46	46	49	47	51	52	47	38	36	39.3	52																						
23-Jul	36	35	Z	26	25	25	26	27	30	36	42	44	46	49	45	42	41	42	40	39	37	33	35	38	36.5	49																						
24-Jul	36	34	Z	30	31	29	25	24	26	30	29	31	33	36	37	38	37	31	31	32	28	27	26	26	30.7	38																						
25-Jul	27	27	Z	26	25	26	26	24	23	23	23	27	28	30	32	34	38	40	39	38	38	37	32	33	30.3	40																						
26-Jul	32	29	Z	27	33	31	30	34	37	36	34	37	32	30	33	31	31	30	29	30	32	32	29	27	31.5	37																						
27-Jul	25	25	Z	21	17	14	12	15	19	21	22	25	27	28	30	31	19	22	25	24	29	31	32	31	23.6	32																						
28-Jul	27	24	Z	19	15	13	13	13	16	23	31	35	41	43	38	32	29	29	29	27	29	33	34	35	27.4	43																						
29-Jul	32	31	Z	27	24	22	21	16	13	20	20	23	24	27	28	34	36	32	31	30	28	29	29	30	26.5	36																						
30-Jul	29	29	Z	22	25	26	26	28	32	37	36	33	35	36	36	41	43	41	43	43	45	45	43	42	35.6	45																						
31-Jul	38	37	Z	34	27	22	24	24	21	15	12	17	17	17	15	16	15	15	16	16	16	16	18	17	20.3	38																						
																								27.9	26.8	--	24.8	24.1	23.5	23.0	24.0	25.3	27.2	28.2	29.4	30.5	31.9	32.8	34.1	33.4	33.1	32.7	32.4	30.9	30.5	29.7	29.1	Diurnal Average
																								38	37	--	34	36	36	35	39	43	41	42	44	47	49	49	52	46	49	47	51	52	47	43	42	Diurnal Maximum

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



WBEA NETWORK
Hourly Averages

Ozone (O₃) - ppb
Fort Chipeywan - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort Chipeywan - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	91	12.89	12.89
21 - 50	612	86.69	99.58
51 - 82	3	0.42	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Ozone (O₃) - ppb
Fort Chipecywan - July 2014

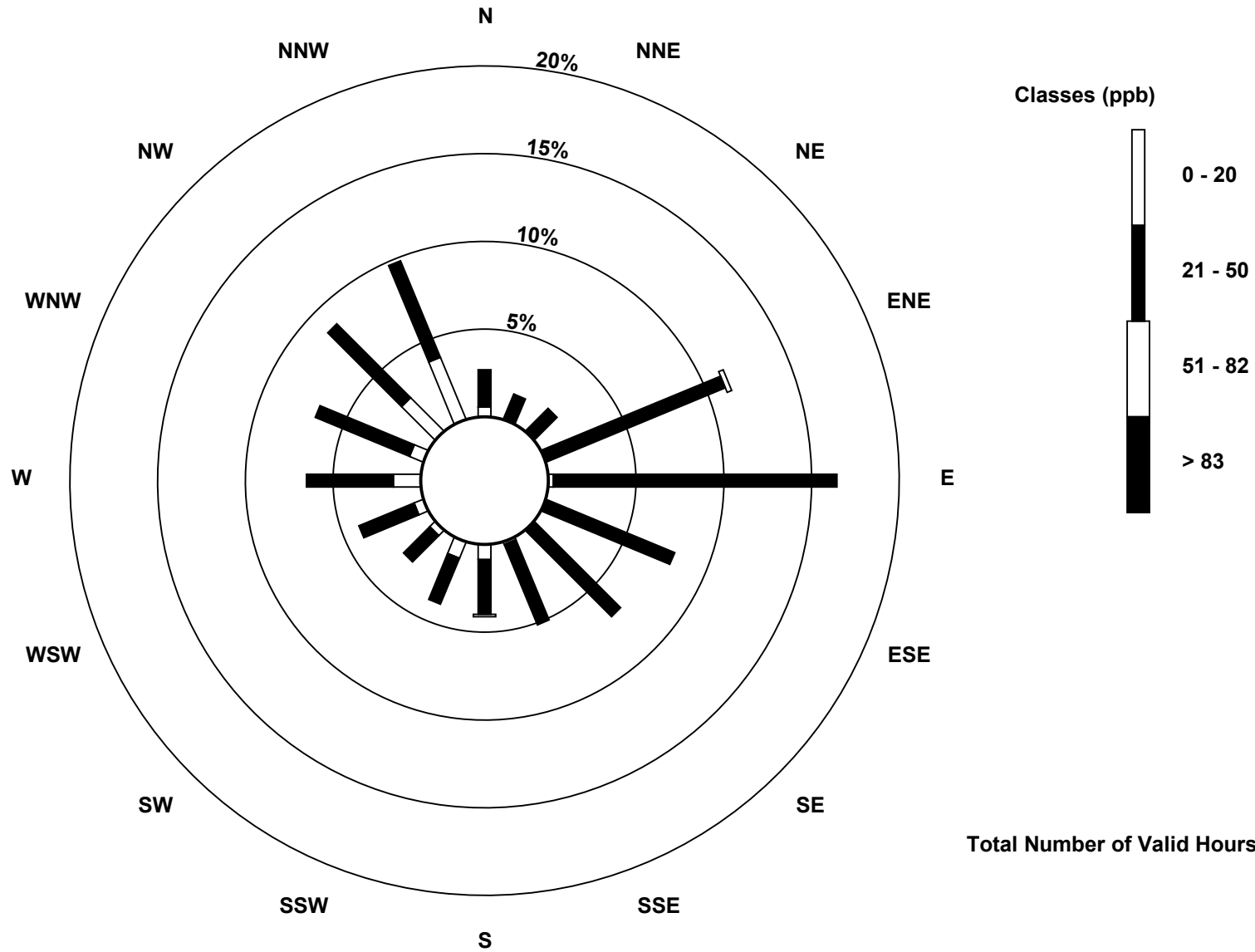
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	4	0	0	0	2	0	0	1	6	7	3	4	11	6	19	27	90
21 - 50	15	11	13	78	114	56	49	35	22	20	15	24	35	41	42	42	612
51 - 82	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	3
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	11	13	80	116	56	49	36	29	27	18	28	46	47	61	69	705

Total Number of Valid Hours: 705

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Ozone (O₃) - ppb
Fort Chipeywan (AMS 8)



Total Number of Valid Hours: 705

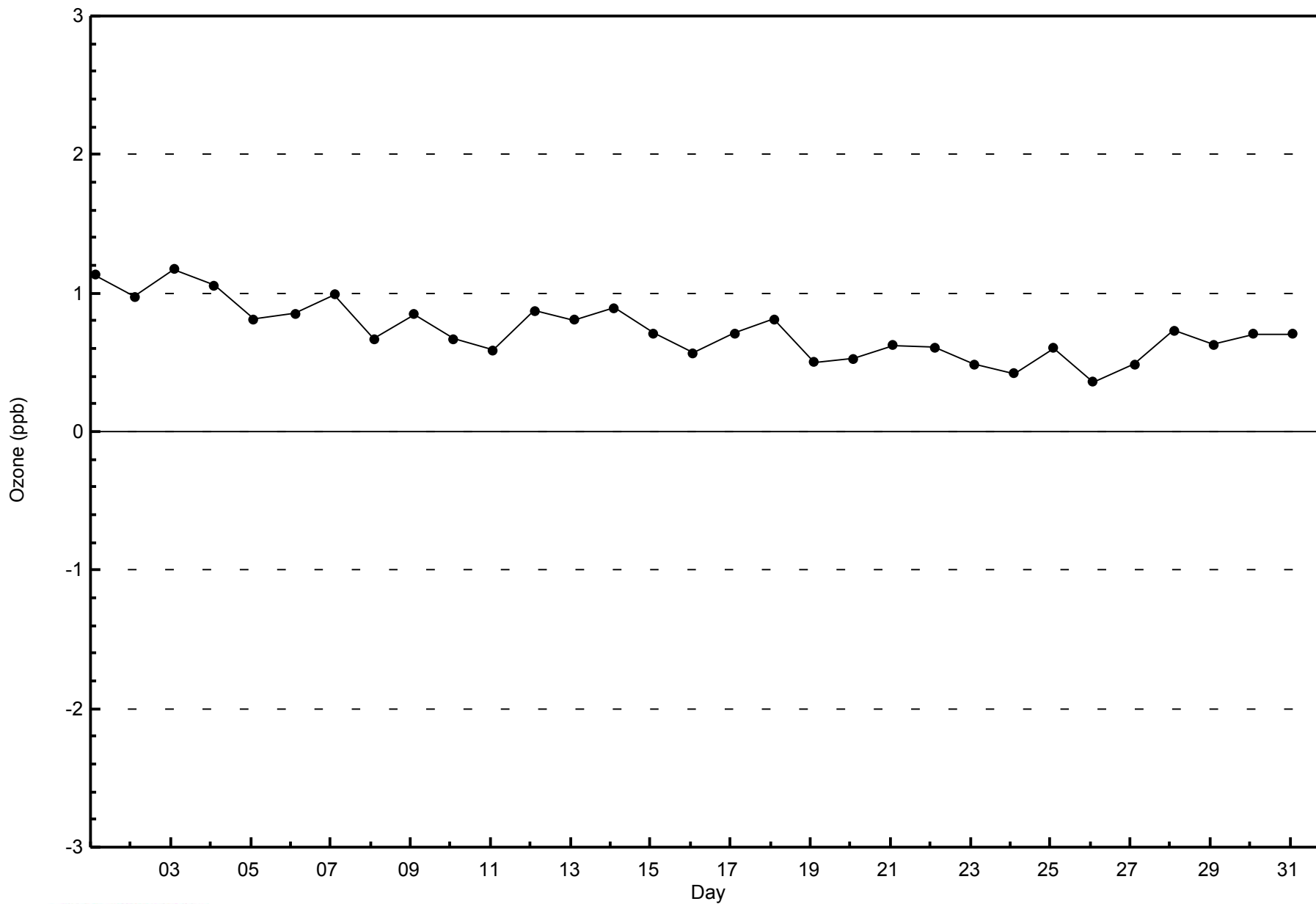


WBEA NETWORK

Zero Responses

Ozone (O₃) - ppb

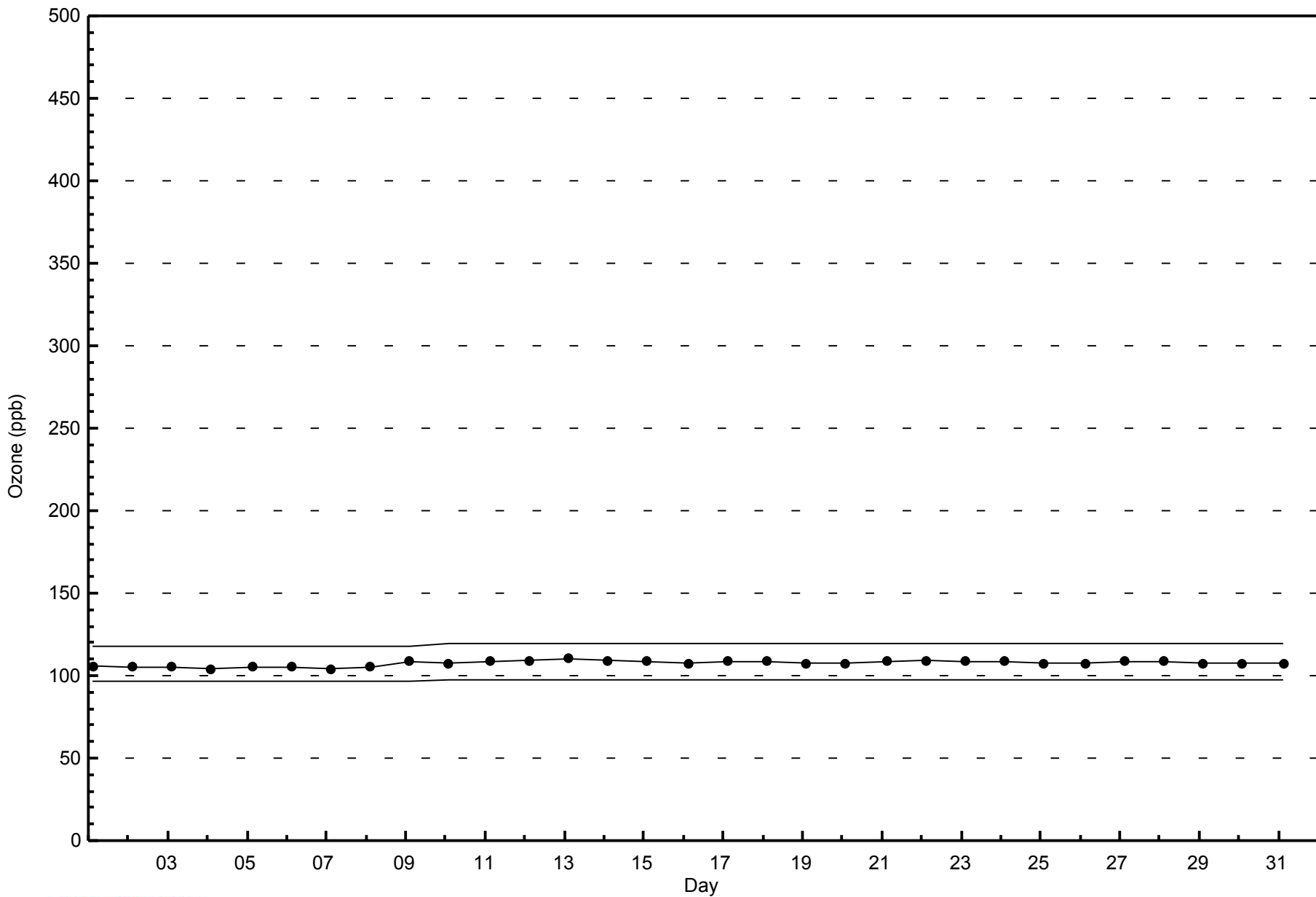
Fort Chipeywan - July 2014





WBEA NETWORK
Span Responses

Ozone (O₃) - ppb
Fort Chipeywan - July 2014





Summary of Hour Averages

Fort Chipewyan - July 2014

Number of Exceedences (AAAQO):	24-hr: 3	Hours in Service:	744
Maximum Value: 241.0 µg/m ³ on Jul 31 10:00	Maximum Daily Average: 51.9 µg/m ³ on Jul 31	Hours of Data:	742
Minimum Value: 0.2 µg/m ³ on Jul 13 23:00	Minimum Daily Average: 0.6 µg/m ³ on Jul 13	Hours of Missing Data:	2
Maximum Diurnal Average: 20.5 µg/m ³ at hour 10	Minimum Diurnal Average: 10.2 µg/m ³ at hour 18	Hours of Calibration:	0
Monthly Average: 14.86 µg/m ³	Percentiles: P ₁ = 0.4 P ₁₀ = 2.5 Q ₁ = 5.7 Median = 9.2 Q ₃ = 17.1 P ₉₀ = 31.9 P ₉₉ = 90.1	Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	5.0	5.6	6.4	6.6	6.6	7.4	8.4	7.4	6.8	8.3	8.7	6.2	5.5	5.1	5.2	4.8	5.3	7.9	9.8	13.2	8.2	5.4	4.6	4.7	6.8	13.2																						
2-Jul	4.7	3.4	3.5	3.5	3.8	4.0	6.3	8.2	9.6	19.7	7.1	8.1	8.6	9.1	10.9	12.9	13.1	12.9	12.8	13.0	13.9	14.4	16.9	20.8	10.1	20.8																						
3-Jul	28.6	43.2	35.6	28.9	25.7	23.0	21.4	19.1	14.2	13.9	15.1	14.7	13.6	12.0	13.4	12.7	10.5	9.5	9.8	10.6	9.4	7.9	11.2	13.2	17.4	43.2																						
4-Jul	13.9	14.9	16.2	18.4	18.5	12.9	6.1	4.9	3.1	2.8	2.7	2.5	2.5	2.7	2.5	2.4	2.4	2.3	1.9	3.3	3.3	5.5	8.9	9.1	6.8	18.5																						
5-Jul	8.9	8.8	10.0	8.9	7.7	5.6	5.4	4.9	4.7	2.5	2.1	1.5	1.3	1.1	1.5	2.1	1.5	1.8	2.2	2.0	3.1	1.4	1.4	1.0	3.8	10.0																						
6-Jul	0.8	0.8	0.9	1.2	1.6	1.3	1.2	1.2	1.0	1.7	2.1	2.1	2.2	1.9	2.1	2.2	3.2	4.4	6.5	8.3	9.2	11.2	12.9	14.6	3.9	14.6																						
7-Jul	13.0	13.7	45.7	64.3	70.5	80.3	75.3	75.3	70.6	37.7	18.2	13.1	12.3	12.2	4.5	7.0	9.3	8.1	9.1	8.7	9.4	10.2	10.6	11.9	28.8	80.3																						
8-Jul	13.7	14.8	15.3	15.3	16.3	17.8	17.8	16.5	18.0	22.0	30.6	40.3	39.8	36.0	25.9	27.7	M	M	14.9	10.5	7.2	4.2	2.1	3.7	18.7	40.3																						
9-Jul	2.9	7.9	13.3	13.9	13.7	12.9	9.0	8.8	8.9	8.4	9.2	10.1	10.3	10.5	12.2	15.4	20.1	7.6	8.5	7.1	7.4	14.0	11.1	3.2	10.3	20.1																						
10-Jul	1.5	1.1	1.3	6.0	11.2	3.9	1.3	0.6	0.6	0.9	3.2	5.2	6.0	7.4	11.5	15.6	21.4	14.6	16.2	19.8	22.9	22.4	21.1	20.4	9.8	22.9																						
11-Jul	17.3	9.5	11.6	16.0	29.8	54.0	75.4	60.6	70.1	67.2	72.2	71.3	84.5	69.8	68.4	46.7	33.0	22.7	18.4	12.1	7.3	7.5	7.0	7.2	39.1	84.5																						
12-Jul	11.0	7.0	10.5	18.2	25.1	32.9	43.1	50.0	24.7	11.6	9.9	9.3	8.3	8.6	6.7	5.0	4.3	5.0	11.3	8.2	5.5	4.3	1.8	1.3	13.5	50.0																						
13-Jul	1.2	1.0	0.9	0.8	0.7	0.7	0.6	0.5	0.4	0.5	0.5	0.6	0.6	0.6	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.2	0.5	0.6	1.2																						
14-Jul	0.5	0.4	0.5	0.9	2.5	4.4	7.5	7.7	6.1	6.4	7.4	11.8	17.1	20.5	20.6	20.7	17.4	17.7	20.0	20.3	17.6	15.5	14.2	12.7	11.3	20.7																						
15-Jul	12.5	12.4	12.0	10.8	10.3	9.5	8.9	8.2	8.0	7.8	8.2	9.2	9.6	10.0	10.0	10.8	9.7	8.1	8.0	8.4	10.1	15.6	32.3	30.8	11.7	32.3																						
16-Jul	35.0	34.2	35.6	34.8	33.9	39.4	50.0	42.3	34.1	22.9	13.2	11.5	13.0	11.8	8.3	9.1	10.8	8.8	7.6	7.1	6.7	7.2	8.3	12.1	20.7	50.0																						
17-Jul	15.2	17.4	20.0	20.7	30.3	37.6	34.1	31.5	32.0	31.5	38.1	26.4	25.0	30.2	39.2	47.3	43.1	39.9	25.4	26.6	22.8	19.1	17.5	15.1	28.6	47.3																						
18-Jul	16.1	18.3	17.7	14.7	11.4	8.6	8.0	10.1	12.7	12.9	10.4	8.2	5.4	4.5	3.3	3.0	3.3	3.4	2.9	3.5	4.7	4.4	4.1	3.9	8.1	18.3																						
19-Jul	5.1	4.9	5.1	6.5	7.7	6.1	8.1	6.4	7.5	4.6	4.4	11.1	24.4	40.1	99.2	94.0	46.5	21.7	26.0	32.6	36.8	35.9	26.7	16.2	24.1	99.2																						
20-Jul	18.2	31.5	45.7	42.6	34.8	30.6	26.7	21.2	15.6	9.8	6.3	8.2	10.2	13.9	14.4	5.2	2.1	2.2	3.5	3.4	13.3	17.6	18.8	19.6	17.3	45.7																						
21-Jul	22.5	25.2	19.4	18.2	15.7	13.0	11.3	10.5	8.9	4.5	5.3	3.8	3.9	4.2	4.1	5.7	5.1	6.2	7.3	8.8	10.7	9.1	26.8	45.1	12.3	45.1																						
22-Jul	55.5	52.3	46.9	46.0	47.8	41.1	34.5	26.9	23.4	21.9	24.3	23.6	25.5	29.5	26.2	24.2	22.7	23.7	21.8	27.5	30.3	28.3	21.0	19.8	31.0	55.5																						
23-Jul	20.9	27.9	28.6	28.4	29.3	29.1	29.8	29.1	28.7	30.0	27.5	22.2	20.2	17.5	16.2	13.1	11.9	12.3	5.4	4.6	7.3	8.1	7.3	6.4	19.2	30.0																						
24-Jul	7.8	10.7	12.3	12.2	8.6	7.2	7.1	6.5	5.3	4.9	5.9	6.7	7.2	6.5	6.1	5.8	7.5	8.3	7.3	6.9	7.9	8.7	10.1	10.8	7.9	12.3																						
25-Jul	10.2	9.6	9.5	9.0	8.5	6.2	6.2	5.5	5.8	6.2	6.2	6.0	6.4	6.1	6.1	6.1	5.9	6.2	7.1	8.8	9.6	10.6	8.0	5.0	7.3	10.6																						
26-Jul	4.3	4.1	4.1	4.2	4.3	5.0	5.4	5.7	5.0	4.7	5.2	6.7	7.6	8.4	8.6	9.2	9.8	11.3	14.2	18.7	17.8	12.6	6.2	3.5	7.8	18.7																						
27-Jul	3.0	4.2	5.2	6.5	6.7	6.3	6.2	5.7	6.6	7.6	6.9	6.9	7.6	7.7	7.5	7.9	5.0	5.9	7.1	6.9	7.0	7.6	8.7	10.4	6.7	10.4																						
28-Jul	11.5	13.9	15.1	15.3	15.2	13.4	11.5	11.1	10.7	9.4	9.5	9.7	11.3	10.9	8.5	6.0	5.0	5.6	5.3	5.0	5.7	7.0	6.8	6.9	9.6	15.3																						
29-Jul	7.1	7.9	9.0	9.9	10.0	8.7	7.4	5.6	3.7	3.1	3.1	3.3	3.3	3.7	4.2	5.4	6.0	6.4	7.2	7.6	7.8	7.6	8.8	12.7	6.6	12.7																						
30-Jul	17.0	10.1	7.6	10.0	12.0	10.9	10.3	10.5	10.8	9.9	8.0	7.5	6.5	5.9	6.6	7.8	7.9	7.8	8.9	9.5	6.7	3.5	8.8	16.5	9.2	17.0																						
31-Jul	22.7	21.7	28.9	9.1	14.9	16.7	13.2	14.5	91.8	241.0	163.1	73.3	35.1	14.5	13.5	14.3	12.5	12.1	15.5	92.0	131.8	98.6	54.7	40.6	51.9	241.0																						
																								13.1	14.1	15.9	16.2	17.3	17.8	18.0	16.7	17.7	20.5	17.2	14.2	14.0	13.6	15.1	14.5	11.9	10.2	10.4	13.4	14.9	13.7	12.9	12.9	Diurnal Average
																								55.5	52.3	46.9	64.3	70.5	80.3	75.4	75.3	91.8	241.0	163.1	73.3	84.5	69.8	99.2	94.0	46.5	39.9	26.0	92.0	131.8	98.6	54.7	45.1	Diurnal Maximum

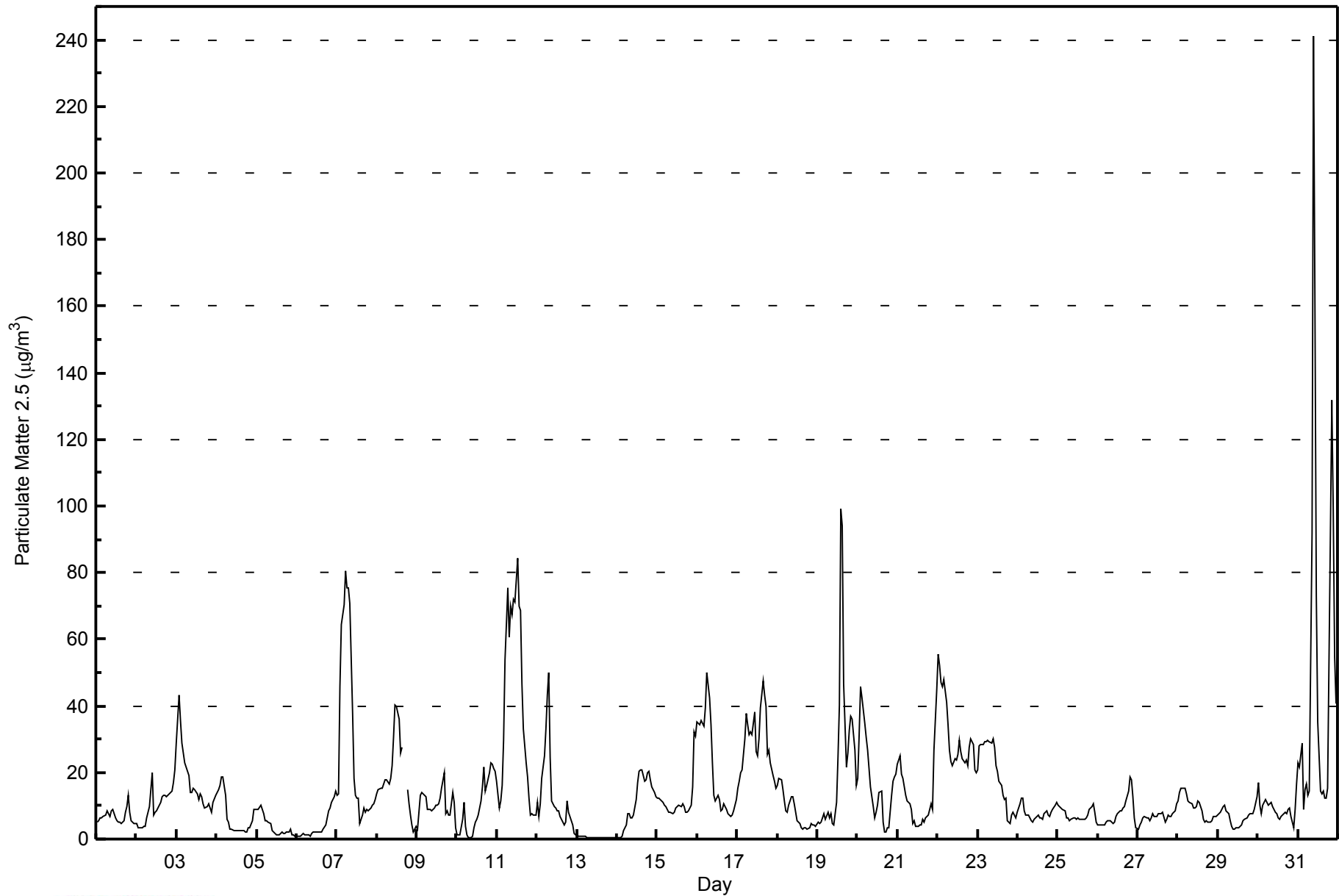
M - Maintenance

Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA NETWORK
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipeywan - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipecwan - July 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	145	19.54	19.54
6 - 15	360	48.52	68.06
16 - 25	92	12.40	80.46
26 - 80	102	13.75	94.20
> 81.0	9	1.21	95.42

Total Number of Valid Hours: 742

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort Chipecywan - July 2014

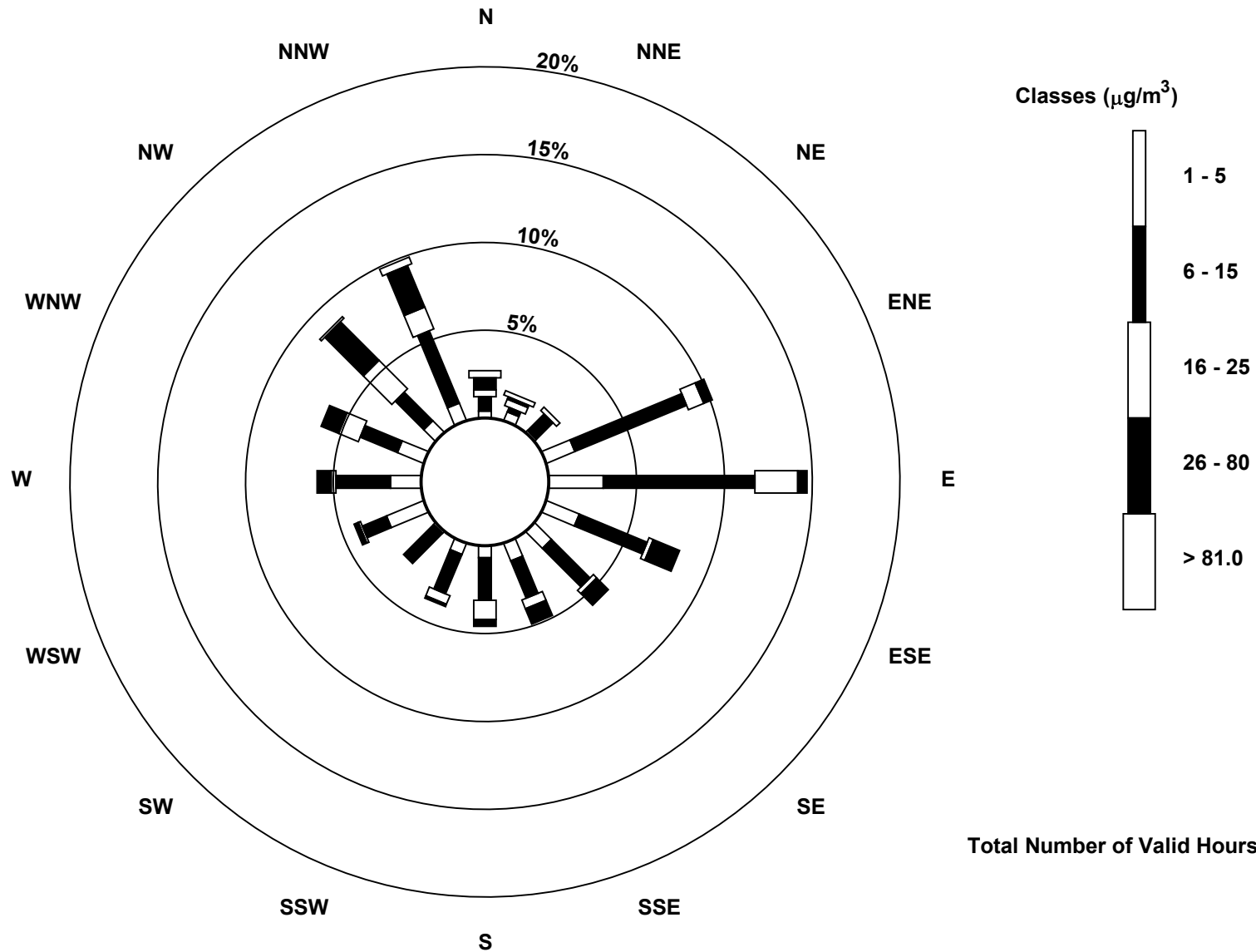
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	3	4	1	13	23	15	10	8	5	5	1	17	13	12	7	8	145
6 - 15	6	2	10	51	64	31	23	17	18	18	18	11	23	17	17	33	359
16 - 25	3	3	2	7	18	2	2	4	8	4	0	1	2	9	17	10	92
26 - 80	5	1	0	4	4	12	7	7	3	1	0	2	6	8	23	19	102
> 81.0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	1	3	9
Totals	20	12	13	75	109	60	42	36	34	28	19	31	44	46	65	73	707

Total Number of Valid Hours: 741

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
 Fort Chipeywan (AMS 8)





Maximum Value: 30.8 C on Jul 14 16:00																				Maximum Daily Average: 25.4 C on Jul 29					Hours in Service: 744																							
Minimum Value: 8.9 C on Jul 12 05:00																				Minimum Daily Average: 15.0 C on Jul 19					Hours of Data: 744																							
Maximum Diurnal Average: 23.2 C at hour 16																				Minimum Diurnal Average: 16.3 C at hour 5					Hours of Missing Data: 0																							
Monthly Average: 19.94 C																				Percentiles: P ₁ = 11.2 P ₁₀ = 14.9 Q ₁ = 17.2 Median = 19.8 Q ₃ = 22.6 P ₉₀ = 25.4 P ₉₉ = 29.6					Hours of Calibration: 0																							
																									Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	19.0	18.4	17.7	17.5	17.4	17.8	19.1	19.1	19.3	19.9	20.0	19.7	20.1	20.2	21.0	20.5	20.3	21.1	20.9	20.5	19.9	19.2	18.5	18.6	19.4	21.1																						
2-Jul	18.8	19.8	19.3	17.5	16.6	17.2	18.0	18.5	19.0	19.2	20.0	21.3	22.2	22.8	23.5	23.6	23.5	23.5	23.4	22.9	22.4	21.6	21.1	21.2	20.7	23.6																						
3-Jul	21.4	21.1	20.6	20.4	20.4	20.4	20.4	19.9	19.7	20.7	21.2	22.3	23.6	24.5	21.1	18.8	18.6	18.3	18.9	19.8	19.1	18.6	18.3	18.0	20.3	24.5																						
4-Jul	16.7	15.8	15.4	15.3	15.7	16.6	17.2	18.9	20.2	20.9	22.2	23.4	24.2	24.3	25.1	25.6	25.4	24.9	24.6	21.7	19.9	18.5	18.3	18.1	20.4	25.6																						
5-Jul	16.4	16.2	14.7	14.9	16.6	17.6	17.6	19.6	21.3	21.9	22.7	23.2	23.8	23.7	24.0	23.8	23.0	22.3	21.7	20.5	19.7	17.9	16.9	16.4	19.8	24.0																						
6-Jul	16.3	16.8	16.7	16.2	15.6	15.6	15.9	15.2	15.6	16.2	16.8	16.8	18.8	20.0	18.9	17.9	19.6	21.8	22.0	19.3	18.3	16.0	15.3	14.9	17.4	22.0																						
7-Jul	15.2	15.1	15.3	15.1	14.6	14.9	15.3	15.5	16.6	17.3	18.4	19.2	19.8	19.9	20.4	21.3	22.0	22.2	20.8	19.9	18.3	17.4	16.8	16.3	17.8	22.2																						
8-Jul	15.5	14.7	14.7	15.5	15.4	15.9	16.0	16.4	17.5	20.1	21.8	23.6	25.3	26.0	26.0	27.2	26.7	26.4	25.8	24.7	23.2	20.3	19.4	19.0	20.7	27.2																						
9-Jul	18.5	17.9	17.7	17.3	17.4	18.9	18.5	18.5	19.0	19.9	21.3	23.1	24.6	25.5	26.3	26.5	21.9	22.1	21.8	22.3	21.2	18.7	18.5	17.9	20.6	26.5																						
10-Jul	17.9	17.0	16.9	16.3	16.1	15.2	15.3	15.5	15.9	16.7	16.7	16.1	15.4	16.2	15.6	14.9	15.2	15.5	16.6	16.7	16.3	15.4	14.8	14.3	15.9	17.9																						
11-Jul	13.5	12.6	11.9	11.4	11.5	11.9	12.3	13.8	15.8	17.6	18.6	19.3	19.2	19.5	19.6	20.1	20.0	19.8	19.3	18.3	16.6	14.9	13.4	12.6	16.0	20.1																						
12-Jul	11.4	10.5	9.8	9.0	8.9	9.8	11.6	13.2	14.9	16.0	16.8	17.7	18.5	19.4	20.1	20.6	20.7	19.9	19.7	19.1	18.5	16.9	16.9	17.3	15.7	20.7																						
13-Jul	16.7	16.3	15.3	15.2	15.1	14.5	15.0	16.0	16.9	17.7	18.0	18.2	18.5	18.6	19.2	19.7	20.3	20.8	20.3	19.7	19.0	19.1	19.0	19.5	17.9	20.8																						
14-Jul	19.0	17.9	17.0	16.8	16.7	16.8	17.6	18.9	20.4	22.0	23.6	25.4	27.1	28.5	29.9	30.8	30.4	30.0	28.4	27.6	26.5	25.7	23.9	22.9	23.5	30.8																						
15-Jul	22.8	22.1	21.5	20.7	20.0	19.8	20.7	22.3	23.7	25.3	27.0	28.1	29.2	29.3	28.9	29.2	28.2	27.4	26.4	26.1	25.9	24.1	21.9	20.9	24.6	29.3																						
16-Jul	19.5	18.6	18.2	17.2	16.7	18.2	18.8	19.3	20.0	20.5	21.4	22.2	22.8	23.7	24.6	24.9	23.6	23.4	22.4	17.3	16.5	16.8	16.3	15.7	19.9	24.9																						
17-Jul	14.8	14.1	13.3	12.3	12.1	13.0	14.5	16.1	17.5	18.5	19.4	20.2	20.8	20.7	20.1	19.1	19.5	19.5	19.3	18.7	18.4	17.1	15.9	15.7	17.1	20.8																						
18-Jul	15.0	14.9	13.9	13.6	13.3	14.0	15.1	16.8	18.6	19.7	20.8	20.7	22.0	22.4	23.0	23.5	23.5	22.4	22.0	21.4	20.4	20.2	20.7	20.9	19.1	23.5																						
19-Jul	18.9	17.0	16.4	15.5	15.2	14.8	14.6	14.5	14.9	15.0	14.1	14.3	13.9	13.8	13.7	14.0	14.7	15.4	15.3	15.6	15.2	14.9	14.6	14.1	15.0	18.9																						
20-Jul	13.3	12.5	11.9	11.2	10.6	10.5	11.5	13.5	15.2	16.9	18.0	18.3	18.9	19.3	19.9	20.4	20.6	20.7	20.6	19.9	17.6	16.0	15.1	14.1	16.1	20.7																						
21-Jul	13.4	12.8	12.8	12.6	12.9	12.7	13.6	16.4	18.6	19.5	19.7	20.5	21.5	21.5	21.7	22.2	22.1	22.0	21.6	21.1	20.6	19.6	19.8	19.6	18.3	22.2																						
22-Jul	18.8	17.6	17.6	17.2	17.5	18.1	17.9	18.2	18.9	19.4	20.3	21.2	21.8	22.9	22.7	23.0	23.1	23.4	22.8	23.0	22.4	21.5	21.5	21.5	20.5	23.4																						
23-Jul	20.8	20.4	19.6	19.3	18.5	18.4	19.1	20.0	20.4	20.9	21.5	22.2	22.9	23.9	24.1	25.0	25.1	25.1	25.5	24.6	23.3	22.2	21.7	21.3	21.9	25.5																						
24-Jul	20.8	20.5	20.3	20.0	19.2	19.0	19.4	20.0	21.2	22.2	22.8	24.7	25.3	25.8	24.6	24.3	24.4	22.6	23.3	23.2	23.1	22.8	22.0	21.3	22.2	25.8																						
25-Jul	21.3	21.2	20.9	20.6	20.2	19.9	19.1	20.1	20.7	22.0	23.1	23.5	24.3	25.6	26.1	26.6	26.8	27.0	26.6	25.2	24.1	23.1	22.2	22.3	23.0	27.0																						
26-Jul	21.0	19.7	18.8	19.1	19.6	19.4	19.6	21.1	22.3	22.2	23.0	23.4	23.9	23.5	24.3	24.3	24.5	24.5	24.2	23.6	23.0	22.7	22.5	22.3	22.2	24.5																						
27-Jul	21.8	21.2	20.3	19.2	17.5	17.6	18.3	20.1	21.7	23.3	25.0	25.4	26.4	26.9	27.0	26.9	23.3	22.9	23.0	22.8	22.6	22.1	21.4	20.7	22.4	27.0																						
28-Jul	20.0	18.9	18.1	17.7	17.5	18.2	19.2	18.9	21.0	23.1	23.4	24.3	24.6	25.4	26.1	26.5	26.9	26.7	26.1	25.5	24.8	24.4	23.6	22.6	22.6	26.9																						
29-Jul	21.5	21.3	20.5	19.7	19.5	20.4	22.0	22.6	25.0	26.3	27.7	28.0	28.7	29.0	28.8	30.1	30.1	29.7	29.3	28.9	26.2	25.7	23.8	23.7	25.4	30.1																						
30-Jul	23.3	23.0	21.1	20.2	20.6	21.1	21.7	22.4	23.3	24.3	26.2	25.6	27.0	27.5	27.1	27.3	28.1	27.9	27.3	26.4	21.7	20.1	19.9	20.8	23.9	28.1																						
31-Jul	19.8	19.1	19.4	18.0	17.2	17.1	17.7	18.7	18.7	17.9	17.4	18.8	19.4	19.7	19.5	19.5	19.3	18.7	17.4	15.5	14.6	14.1	13.4	12.9	17.7	19.8																						
																								18.2	17.6	17.0	16.5	16.3	16.6	17.2	18.1	19.2	20.1	20.9	21.6	22.4	22.9	23.0	23.2	23.0	22.8	22.5	21.7	20.6	19.6	19.0	18.6	Diurnal Average
																								23.3	23.0	21.5	20.7	20.6	21.1	22.0	22.6	25.0	26.3	27.7	28.1	29.2	29.3	29.9	30.8	30.4	30.0	29.3	28.9	26.5	25.7	23.9	23.7	Diurnal Maximum

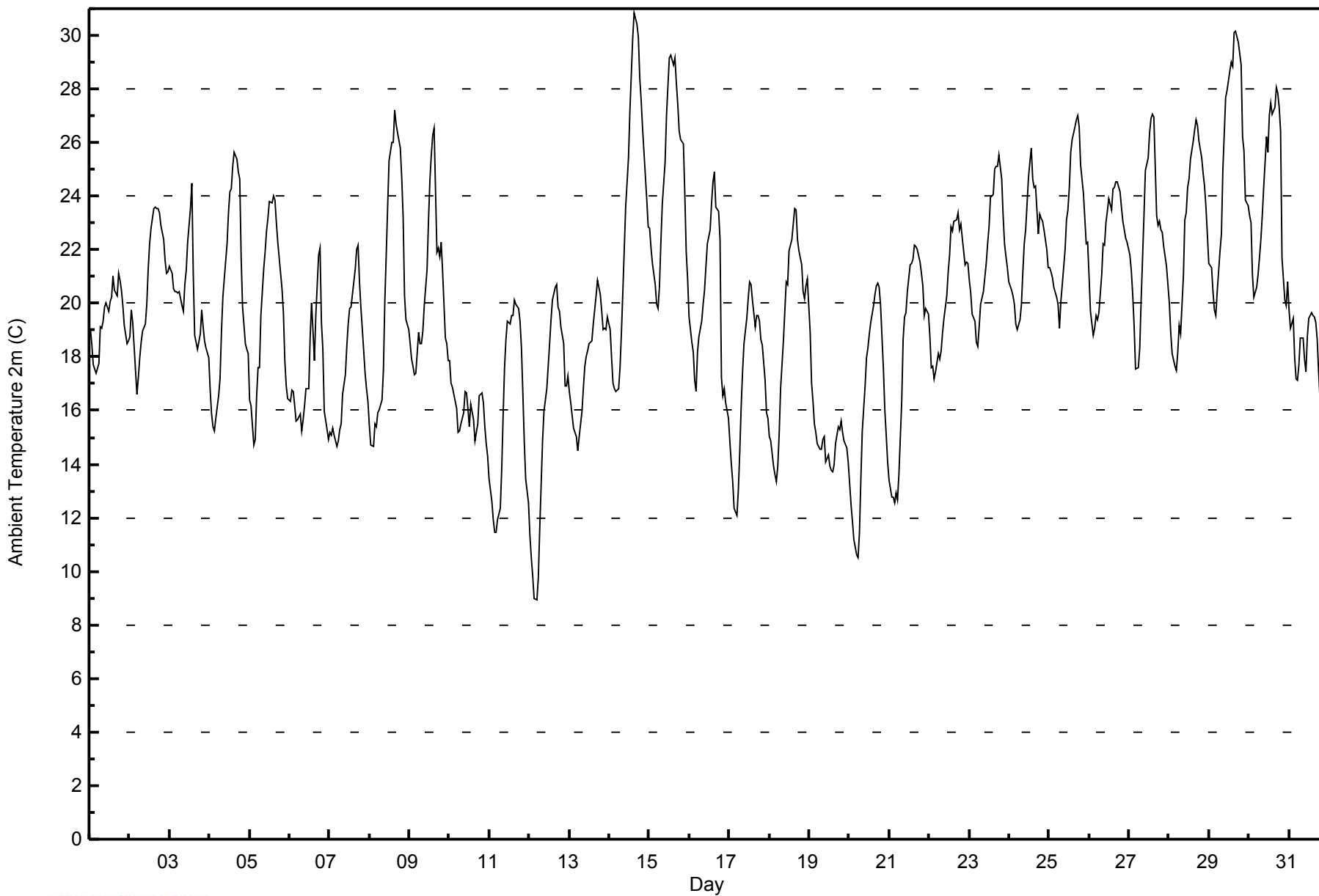


WBEA NETWORK

Hourly Averages

Ambient Temperature 2m (AT 2m) - C

Fort Chipeywan - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - July 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	4	0.54	0.54
10 - 20	389	52.28	52.82
> 20	351	47.18	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

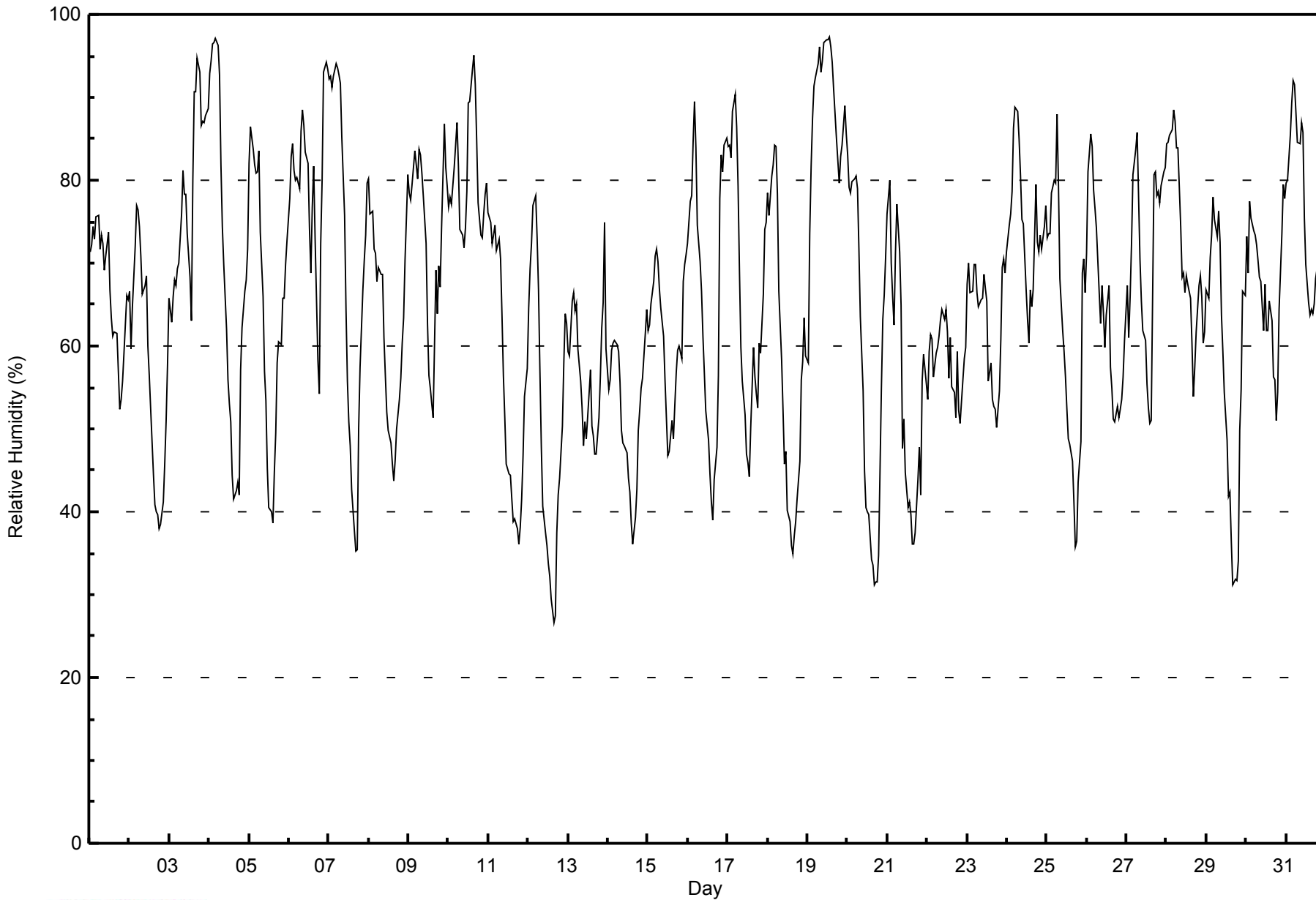


Maximum Value: 97 % on Jul 19 14:00														Maximum Daily Average: 88.3 % on Jul 19														Hours in Service: 744																					
Minimum Value: 27 % on Jul 12 16:00														Minimum Daily Average: 51.2 % on Jul 12														Hours of Data: 744																					
Maximum Diurnal Average: 78.8 % at hour 5														Minimum Diurnal Average: 52.8 % at hour 16														Hours of Missing Data: 0																					
Monthly Average: 65.5 %														Percentiles: P ₁ = 32 P ₁₀ = 44 Q ₁ = 55 Median = 66 Q ₃ = 77 P ₉₀ = 85 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-Jul	71	72	74	73	76	76	72	73	72	69	71	74	67	63	61	62	61	57	52	54	56	59	66	66	66.6	76																							
2-Jul	67	60	65	72	77	76	74	71	66	67	68	60	56	52	44	41	40	40	38	39	41	46	51	58	57.1	77																							
3-Jul	66	63	66	68	67	69	70	76	81	78	78	74	68	63	80	91	91	95	93	87	87	87	88	89	78.1	95																							
4-Jul	93	94	96	97	97	96	93	82	74	70	62	56	53	51	44	42	43	44	42	57	62	67	68	72	68.9	97																							
5-Jul	82	87	84	82	81	81	84	74	66	57	53	45	41	40	39	45	49	58	60	60	66	66	70	73	64.2	87																							
6-Jul	78	83	84	81	80	80	79	86	88	87	83	82	74	69	77	82	73	58	54	72	80	93	94	93	79.7	94																							
7-Jul	92	93	91	93	94	94	93	92	85	76	64	56	51	48	43	38	35	36	50	57	67	70	73	80	69.6	94																							
8-Jul	80	76	76	72	71	68	69	69	69	61	56	52	50	48	46	44	46	50	54	56	60	63	70	81	62.0	81																							
9-Jul	79	78	80	82	84	80	84	83	81	78	72	63	56	55	53	51	69	64	70	67	74	87	82	79	72.9	87																							
10-Jul	77	78	77	82	84	87	82	74	73	72	74	79	89	89	93	95	92	85	77	73	73	76	78	80	80.8	95																							
11-Jul	76	75	72	73	75	71	73	71	64	57	51	46	45	44	42	39	39	38	36	38	41	47	54	57	55.1	76																							
12-Jul	65	69	72	77	78	73	67	57	48	41	37	36	34	32	29	27	27	38	42	44	50	58	64	63	51.2	78																							
13-Jul	59	59	65	66	64	65	60	56	52	48	51	49	52	57	50	49	47	47	51	56	62	65	75	60	56.9	75																							
14-Jul	55	56	59	60	61	60	59	56	50	48	48	47	44	42	39	36	39	43	50	52	55	56	61	64	51.7	64																							
15-Jul	62	63	65	68	71	72	70	67	65	61	56	51	47	47	51	49	53	57	60	60	58	68	70	71	60.8	72																							
16-Jul	72	77	78	85	89	84	75	70	67	61	57	52	49	45	41	39	44	48	56	78	83	81	84	85	66.7	89																							
17-Jul	84	84	83	88	90	86	79	69	60	56	52	47	46	44	50	60	56	54	53	60	59	66	74	75	65.7	90																							
18-Jul	78	76	81	82	84	84	78	67	58	52	46	47	40	39	36	35	37	39	42	46	56	58	63	59	57.6	84																							
19-Jul	58	74	82	87	91	92	94	96	93	94	97	97	97	97	96	94	91	85	82	80	83	84	89	86	88.3	97																							
20-Jul	83	79	78	80	80	81	79	72	64	55	45	40	40	40	34	34	31	31	31	35	55	63	66	71	56.9	83																							
21-Jul	76	80	70	66	63	71	77	71	65	48	51	45	41	41	40	36	36	37	44	48	42	56	59	55	54.9	80																							
22-Jul	54	59	61	61	56	59	60	61	63	64	63	64	62	56	61	55	54	51	59	52	51	56	59	60	58.4	64																							
23-Jul	68	70	66	67	70	70	66	65	66	66	69	67	65	56	58	54	53	52	50	55	61	70	71	69	63.4	71																							
24-Jul	71	74	76	79	86	89	88	85	80	75	75	67	63	60	67	65	67	79	73	71	73	72	74	77	74.5	89																							
25-Jul	73	74	74	79	80	80	88	79	68	62	59	56	52	49	48	46	41	36	36	44	48	69	70	66	61.6	88																							
26-Jul	71	81	86	84	79	77	74	67	63	67	64	60	64	67	58	55	51	51	53	51	52	54	56	61	64.3	86																							
27-Jul	67	61	66	72	81	84	86	78	71	65	62	61	55	53	51	51	81	81	78	79	77	79	81	81	70.9	86																							
28-Jul	84	85	85	86	88	87	84	84	74	68	69	66	68	67	66	60	54	58	62	67	68	66	60	62	71.7	88																							
29-Jul	67	66	71	73	78	75	73	76	73	64	59	54	49	42	42	36	31	32	32	34	50	55	67	66	56.9	78																							
30-Jul	73	69	78	76	74	73	72	70	68	68	62	68	62	62	65	63	56	56	51	54	64	74	80	78	67.3	80																							
31-Jul	80	80	85	89	92	92	88	85	84	87	86	75	70	65	64	64	64	65	68	71	72	71	69	72	76.5	92																							
																								72.9	74.0	75.7	77.4	78.8	78.5	77.1	73.5	69.4	65.2	62.6	59.2	56.4	54.4	53.8	52.8	53.3	53.7	54.8	58.0	62.2	67.1	70.5	71.2	Diurnal Average	
																								93	94	96	97	97	96	94	96	93	94	97	97	97	97	96	95	92	95	93	87	87	93	94	93	Diurnal Maximum	



WBEA NETWORK
Hourly Averages

Relative Humidity (RH) - %
Fort Chipeywan - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Fort Chipecwan - July 2014

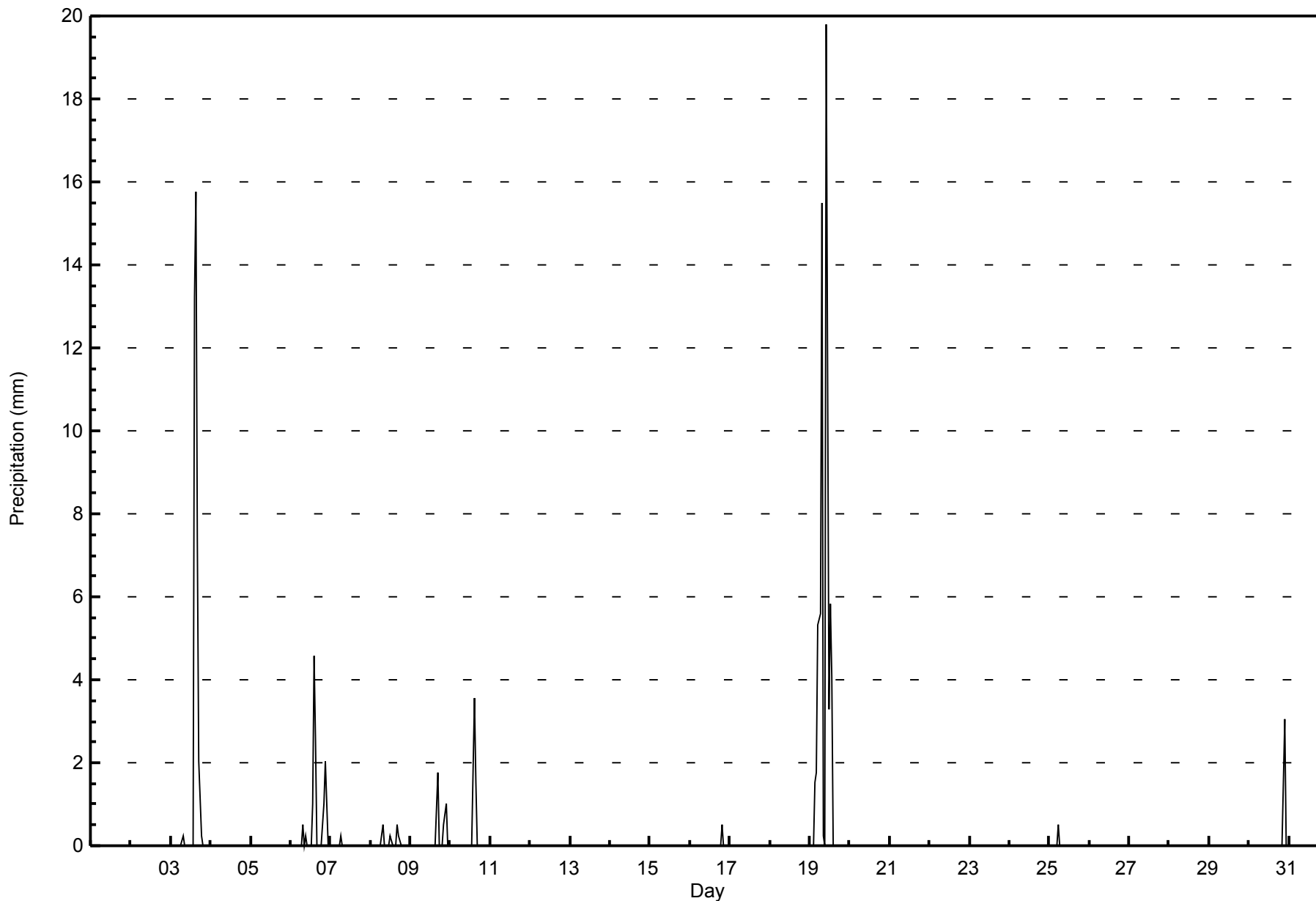
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	50	6.72	6.72
40 - 60	217	29.17	35.89
60 - 80	335	45.03	80.91
80 - 100	142	19.09	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 19.8 mm on Jul 19 11:00		Maximum Daily Total: 63.0 mm on Jul 19		Hours in Service: 744																									
Minimum Value: 0.0 mm on Jul 1 01:00		Minimum Daily Total: 0.0 mm on Jul 1		Hours of Data: 744																									
Maximum Diurnal Total: 21.3 mm at hour 15		Minimum Diurnal Total: 0.0 mm at hour 1		Hours of Missing Data: 0																									
Monthly Total: 128.53 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 = 5.3		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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	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	13.2	15.7	7.4	2.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.9	15.7
4-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.3	0.0	0.0	0.0	1.0	4.6	2.5	0.0	0.0	0.0	0.5	1.0	2.0	0.0	0.0	0.0	0.0	12.4	4.6	
7-Jul	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	0.0	0.0	0.0	0.3	0.3	
8-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.5	
9-Jul	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.5	1.0	0.0	0.0	0.0	0.0	3.3	1.8	
10-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	3.6	
11-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	
17-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	1.5	1.8	5.3	5.6	15.5	0.3	0.0	19.8	3.3	5.8	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.0	19.8	
20-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	
26-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0	3.0	3.0
31-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 NETWORK
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort Chipecwan - July 2014

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	714	95.97	95.97
0.4 - 0.5	7	0.94	96.91
0.6 - 0.7	0	0.00	96.91
0.8 - 1.4	3	0.40	97.31
1.5 - 10	16	2.15	99.46
> 10	4	0.54	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

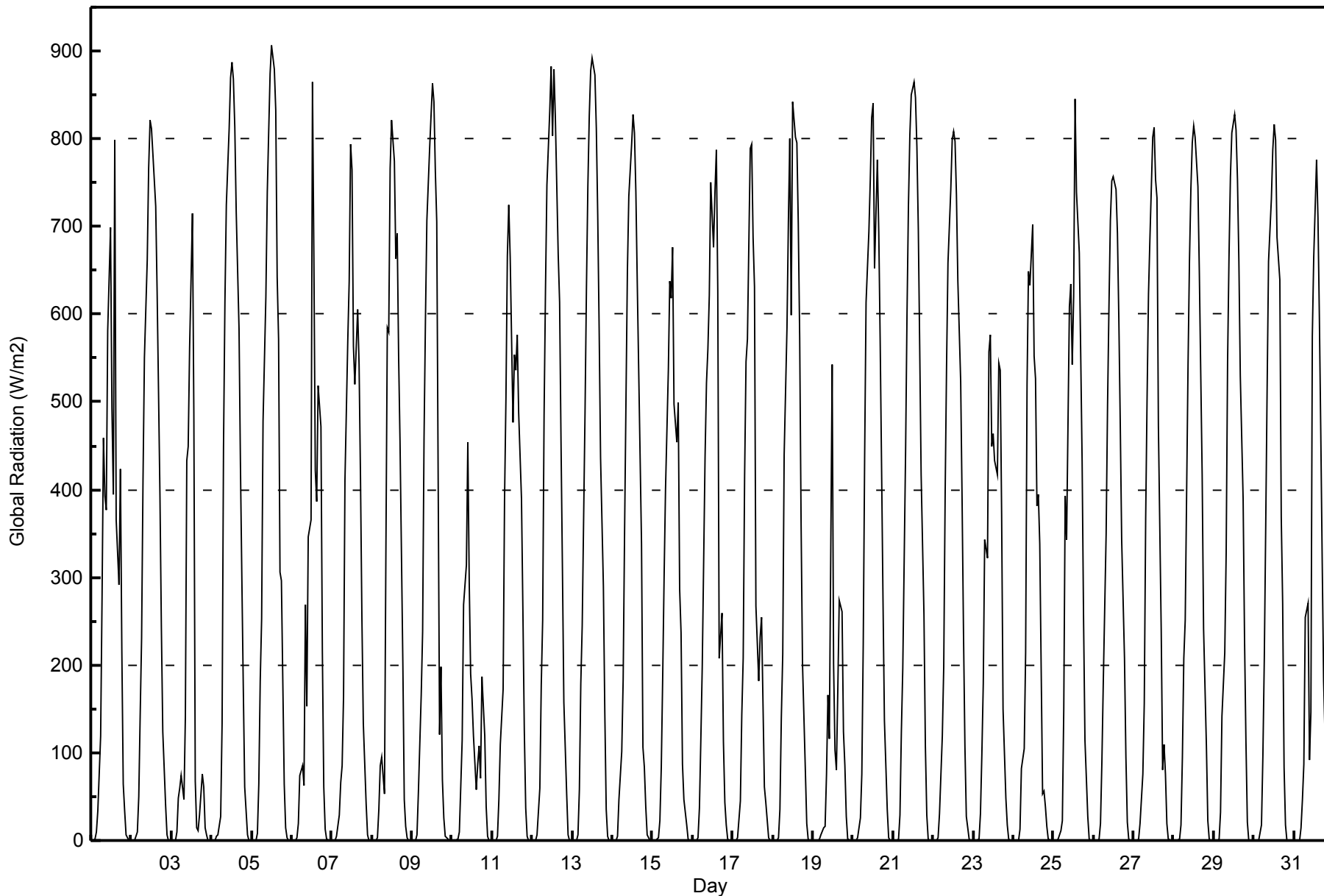


Maximum Value: 907 W/m2 on Jul 5 13:00																			Maximum Daily Average: 368.2 W/m2 on Jul 13						Hours in Service: 744																																											
Minimum Value: 0 W/m2 on Jul 2 01:00																			Minimum Daily Average: 94.4 W/m2 on Jul 19						Hours of Data: 744																																											
Maximum Diurnal Average: 716.7 W/m2 at hour 13																			Minimum Diurnal Average: 0.1 W/m2 at hour 24						Hours of Missing Data: 0																																											
Monthly Average: 277.5 W/m2																			Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 2 Median = 143 Q ₃ = 550 P ₉₀ = 753 P ₉₉ = 876						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-Jul	0	0	1	9	34	119	276	459	394	377	582	699	492	395	798	365	292	424	218	64	34	7	0	0	251.7	798																																										
2-Jul	0	0	1	9	50	144	230	411	550	662	767	822	812	782	723	624	510	394	243	123	40	6	0	0	329.3	822																																										
3-Jul	0	0	0	10	49	59	74	46	141	433	450	562	714	486	67	14	11	29	76	62	15	7	0	0	137.7	714																																										
4-Jul	0	0	0	5	6	27	134	448	613	724	812	869	888	868	814	717	582	427	298	175	60	6	0	0	353.1	888																																										
5-Jul	0	0	0	7	65	182	253	478	621	739	808	874	907	878	832	643	571	306	296	64	14	3	0	0	355.9	907																																										
6-Jul	0	0	0	3	20	74	85	62	269	153	346	365	865	663	422	386	518	472	216	62	12	1	0	0	208.0	865																																										
7-Jul	0	0	0	5	28	66	85	164	411	570	638	793	766	564	520	606	543	414	254	133	41	6	0	0	275.3	793																																										
8-Jul	0	0	0	4	35	86	94	53	332	584	579	767	821	774	664	693	551	454	202	46	15	4	0	0	281.7	821																																										
9-Jul	0	0	0	7	54	165	239	459	594	707	791	828	862	842	763	705	121	198	69	26	5	1	0	0	309.9	862																																										
10-Jul	0	0	0	2	9	61	115	269	315	454	295	190	162	118	58	88	108	70	186	120	38	4	0	0	110.9	454																																										
11-Jul	0	0	0	5	47	109	173	388	504	667	725	664	476	554	536	576	487	390	262	126	36	6	0	0	280.5	725																																										
12-Jul	0	0	0	6	59	177	252	484	628	747	831	882	804	879	822	669	614	455	309	157	53	7	0	0	368.1	882																																										
13-Jul	0	0	0	6	59	178	245	487	630	745	827	877	892	872	812	712	582	437	290	146	35	4	0	0	368.2	892																																										
14-Jul	0	0	0	5	47	102	184	351	502	650	734	793	828	807	739	635	439	338	106	84	38	6	0	0	307.9	828																																										
15-Jul	0	0	0	3	23	84	186	301	401	536	638	619	676	498	454	499	287	237	86	46	17	2	0	0	233.0	676																																										
16-Jul	0	0	0	3	38	115	197	439	522	560	622	751	677	739	787	626	208	259	113	44	18	2	0	0	279.9	787																																										
17-Jul	0	0	0	3	45	143	208	416	546	571	789	794	687	631	268	182	232	255	158	61	43	3	0	0	251.4	794																																										
18-Jul	0	0	0	3	35	140	212	439	584	706	800	599	843	801	796	703	574	361	201	81	20	2	0	0	329.1	843																																										
19-Jul	0	0	0	0	2	6	15	16	76	166	116	542	201	102	81	171	273	261	123	85	27	1	0	0	94.4	542																																										
20-Jul	0	0	0	3	26	75	224	438	614	694	754	824	840	652	776	693	568	424	274	137	35	2	0	0	335.6	840																																										
21-Jul	0	0	0	2	30	123	196	445	601	723	804	850	864	846	790	698	560	418	258	107	29	2	0	0	347.8	864																																										
22-Jul	0	0	0	2	30	119	199	395	541	659	743	798	809	798	735	638	524	388	237	107	27	1	0	0	322.9	809																																										
23-Jul	0	0	0	2	31	98	179	343	322	557	576	449	464	434	417	544	535	372	149	49	18	1	0	0	230.8	576																																										
24-Jul	0	0	0	1	12	82	105	214	520	649	633	702	553	527	382	394	337	54	57	38	17	1	0	0	219.9	702																																										
25-Jul	0	0	0	1	11	22	149	393	343	609	634	543	620	845	739	670	554	431	254	114	27	1	0	0	290.1	845																																										
26-Jul	0	0	0	1	19	90	182	350	496	609	707	751	757	743	693	594	474	343	207	94	21	1	0	0	297.2	757																																										
27-Jul	0	0	0	1	20	75	156	367	505	623	686	801	814	753	733	474	240	80	109	76	19	1	0	0	272.3	814																																										
28-Jul	0	0	0	1	18	95	207	252	543	661	743	796	814	801	746	648	531	418	241	108	22	1	0	0	318.6	814																																										
29-Jul	0	0	0	1	32	141	215	329	545	665	756	807	828	810	753	660	529	390	231	113	21	1	0	0	326.1	828																																										
30-Jul	0	0	0	1	18	97	208	357	515	660	730	788	816	799	688	639	369	270	84	18	1	0	0	0	294.1	816																																										
31-Jul	0	0	0	0	15	47	87	255	270	92	146	575	665	777	710	596	463	319	183	56	10	1	0	0	219.5	777																																										
																			0.1		0.1		0.2		3.6		31.1		100.1		172.9		332.5		466.1		579.1		647.1		708.8		716.7		678.7		616.7		543.8		425.6		325.3		193.2		87.9		26.2		3.0		0.1		0.1		Diurnal Average	
																			0		1		10		65		182		276		487		630		747		831		882		907		879		832		717		614		472		309		175		60		7		0		0		Diurnal Maximum			



WBEA NETWORK
Hourly Averages

Global Radiation (GR) - W/m²
Fort Chipeywan - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Fort Chipecwan - July 2014

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	247	33.20	33.20
21 - 100	94	12.63	45.83
101 - 300	112	15.05	60.89
301 - 600	133	17.88	78.76
601 - 900	157	21.10	99.87
> 900	1	0.13	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 31 km/h on Jul 9 00:00	Maximum Daily Speed Average: 18.9 km/h on Jul 13	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jul 29 20:00	Minimum Daily Speed Average: 0.3 km/h on Jul 18	Hours of Data: 743
Maximum Diurnal Speed Average: 5.4 km/h at hour 24	Minimum Diurnal Speed Average: 1.7 km/h at hour 5	Hours of Missing Data: 1
Monthly Average Velocity: 3.3 km/h 86.1 deg	Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 8 Median = 11 Q ₃ = 16 P ₉₀ = 20 P ₉₉ = 28	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																
1-Jul	SE11	SE13	SE11	SE10	SSE7	SSE5	SE7	ESE13	E12	E12	E16	E21	E21	ENE19	E24	E23	ENE20	ENE23	ENE21	ENE19	ENE17	ENE16	ENE12	ENE13	E14.0	E24														
2-Jul	E14	E22	E20	ENE13	NE8	ENE7	ENE11	ENE15	E18	E22	E19	E18	E16	E20	E23	ENE23	ENE22	ENE22	ENE23	ENE21	ENE18	ENE14	ENE14	E17	E17.1	ENE23														
3-Jul	E18	SE15	SE16	ESE16	ESE19	SE18	ESE16	SE14	ESE15	ESE19	E23	E29	E27	ENE27	NE14	NE5	NE5	ENE12	E21	ESE28	ESE25	E22	ENE18	ENE13	E16.6	E29														
4-Jul	NE9	NNE6	NNE8	NE3	W5	W9	W11	W13WSW16WSW17	SW16WSW14WSW15	W15WSW13WSW14WSW16	W14WNNW12NNW14	N8	NE3	E3	ENE6	WSW1	NW3	N12	NE7	E8	E3	WSW5	SSW8	S7	SSW5	S6	W9WSW13	W15	W15	NW10	N8	ESE6	NE6	NNW7	WSW5	WSW7	WNN7	NW7	W3.1	W15
5-Jul	W7	W7	W4	NNW6	NNW5	W3	WNN4	WNN5	WSW6	W10WNNW11WNNW12WNNW12	WNNW12	NW8	NNE7	N7	NNW10	N10	N7	NNW7	WNNW10	WNNW10	WNNW10	WNNW10	WNNW10	WNNW8	NW6.6	WNNW12														
6-Jul	NW8	NW9	NW11	NNW10	NW11	NW10	NW12	NW11	NW14	NW14	NNW12	NNW12	NNW12	NNW12	NW14	NW13	NNW11	NNW10	W11	W9	W7	W9	W9	W7	NW9.8	NW14														
7-Jul	SW8	WSW5	SW7	SSW9	SSW11	SSW17	SSW15	S11	SSE15	S18	S16	SSW16	S12	SSE16	SSE17	SSE16	SSW21	S25	S15	S7	SW11	NNE14	E17	E31	S10.8	E31														
8-Jul	ESE19	SE15	SE9	SE5	ENE7	E18	E28	E29	E27	E27	ENE28	ENE31	ENE30	ENE28	ENE27	E22	ESE9	E7	E5	SE15	SSE17	WSW9	W12WSW11	E14.0	ENE31															
9-Jul	WSW9	W12	W16	W16WNNW17	W17	W17WNNW18	W14	W16	W18WNNW19	W14WNNW12	NW16	NW16	NW19	NNW18	NNW16	NNW16	NW15	NW12	NW10	NW9	WNNW13.8	WNNW19																		
10-Jul	NW7	NW9	NW11	NW10	NW10	NNW12	NW9WNNW10WNNW13	NW16	NW16	NW14	NW15	NW16	NW18	NW16	NW17	NW15	NNW14	NNW12	NNW9	NNW7	NNW8	NNW7	NNW7	NW11.9	NW18															
11-Jul	NW7	NW9	NNW7	NW9	NW9	NNW8	NNW6	NNW9	NNW8	NNW9	NNW10	NNW8	NNW5	N6	NNW6	NNW6	NW5	ESE12	SE12	ESE13	E14	ENE10	E12	SE19	NNE3.8	SE19														
12-Jul	SE17	SE16	SSE12	SE15	SE27	SE29	SE25	SE23	SE21	SE19	E20	E24	E26	E26	E25	E23	ENE21	ENE19	ENE20	ENE19	ENE19	E21	E18	ESE20	ESE18.9	SE29														
13-Jul	SE21	SE19	SSE14	SSE13	SE10	ESE8	SE8	SSE10	SSE13	SE13	SE14	SSE16	SSE20	SSE21	S23	S18	S17	S13	S13	S15	SSW12	SW13	SW15	SSE13.8	S23															
14-Jul	SW9	SW7	SSW6	SW10	SW11	SW12	SW9	SSW7	S8	SSW10	SSW12	SSW15	SSW17	SSW17	S15	S19	S18	S18	S11	S4	WNNW2	E10	ENE11	N7	SSW8.6	S19														
15-Jul	N6	NW7	NNW9	WNNW7WNNW12WNNW13	NNW15	NNW13	NW13	NW14WNNW15WNNW16WNNW15WNNW16WNNW15WNNW15WNNW11	W10	W12	NW13	WNNW7	WNNW9WNNW10	NW7	WNNW11.1	WNNW16																								
16-Jul	NW8	NW9	NW8	WNNW6	WNN7	NW7	NW7	NW5	W6	WSW7	W8	WSW9	WSW7	W8	WNNW8	W5	W4	W8	WNNW7	WNNW5	WNNW5	WNNW7	WNNW8	NNW8	WNNW6.5	WSW9														
17-Jul	NNW8	N8	NNW4	NW6	NW7	NNW7	NNW7	NNW5	WSW5	WSW8	W9	W10WSW11WSW10	WSW8	SSW7	SSE4	ESE7	ESE9	E7	ENE9	ENE11	E17	ESE26	N0.3	ESE26																
18-Jul	S9WNNW10	WSW5	SW11	SSE11	SSE10	SSE10	ESE13	E9	NNE10	NNE13	NNE15	NNE16	NNE13	NNE14	NNE14	N14	NNE13	N8	NNW7	NW5	NW7	NW7	NW11	NNE4.5	NNE16															
19-Jul	NNW11	NNW12	NNW11	NNW11	NNW14	NNW15	NNW14	NNW11	NNW9	NNW8	NNW10	NNW11	NNW10	NNW8	NNW8	NNW7	N8	NW10	NW8	WNNW7	W8	W10WNNW10	WNNW7	NNW9.2	NNW15															
20-Jul	WNNW7	WNNW9	NW11	NW7	N3	NW4	WNNW4	WSW3	SSW5	ESE7	E9	E10	ESE9	E11	E12	ESE11	ESE8	ESE8	E11	E9	ENE7	ENE11	ESE14	ESE16	E4.5	ESE16														
21-Jul	SE16	ESE11	ESE11	ESE7	ESE14	ESE15	SE11	E10	E12	E15	E15	E15	E15	E18	E19	E18	E17	E16	E15	ENE10	ENE8	ENE8	ENE8	ENE10	E12.6	E19														
22-Jul	E10	ESE7	S9	SSE7	SE5	SE6	SSE6	SSE7	SE7	ESE9	E12	E13	E13	E15	E16	E15	E18	E18	SSE14	SSE17	SSE17	SE18	ESE18	ESE17	ESE10.6	E18														
23-Jul	ESE17	ESE18	ESE21	ESE18	ESE17	ESE16	SE16	SE14	ESE13	E15	E9	E11	E8	ESE13	E16	E18	ENE7	ESE11	ESE15	E18	E18	ENE15	ENE12	ESE14.0	ESE21															
24-Jul	ENE18	E16	ESE16	E15	ENE13	E20	ENE15	ENE16	ENE16	ENE18	ENE21	ENE23	ENE20	ENE20	ENE20	ENE22	ENE23	ENE23	NE17	NE14	NE13	ESE11	ESE8	SE11	ENE16.3	ENE23														
25-Jul	SSE14	SSE5	ESE3	E8	SE9	SSE9	SE11	SSE9	SE5	E9	E9	E13	E13	E20	E22	ENE22	ENE22	ENE20	ENE19	ENE18	ENE17	ENE18	ENE18	E17	E12.0	ENE22														
26-Jul	E16	ESE11	ESE11	SE8	WSW5	AF	W4	WSW6	W6	W6	SW6	SSW10	SW8	SW6	W7	WSW6	E15	ESE11	SSE4	SE2	SE9	ESE6	SE5	S10	SSE3.5	E16														
27-Jul	S6	SSW7	SSW8	SSW8	S6	S6	S7	SW8	SSW5	SSE4	ESE7	ESE9	E10	E10	ESE9	E10	E10	E9	E9	E7	E6	SSE10	SSE7	SE5.6	E10															
28-Jul	ENE8	ESE7	S4	SSE3	SE3	SW4	SSW2	SW4	SSW5	S7	S6	SSE7	SSE5	SE5	SE6	SSW7	WSW7	W6	W4	W1	E2	NE3	ENE8	ENE8	SSE2.2	ENE8														
29-Jul	ENE9	SE7	S5	SSW6	S7	S8	S9	SSE10	SE9	ESE11	SE12	E13	E12	E17	E21	E19	E14	E14	E13	ESE4WSW22WNNW19	E26	ENE23	ESE7.7	E26																
30-Jul	NE10	E12	SSE21	SSW5	NNW4	N5	N6	N8	N11	N10	N10	N10	NNW10	NNW13	NW13	NNW14	NNW13	NNW11	NNW14	NNW12	NNW9	NNW11	NNW12	NNW9	N7.7	SSE21														
31-Jul	ENE4.1	ESE2.8	SE2.4	SE1.7	ESE1.7	SE2.1	SE1.8	SE2.2	ESE2.5	ESE2.6	E3.2	ENE3.9	E3.8	ENE4.4	ENE4.8	ENE4.9	ENE4.9	ENE4.9	ENE4.3	ENE4.5	E3.3	NE4.0	ENE5.0	E5.4	Diurnal Average															
	SE21	E22	ESE21	ESE18	SE27	SE29	E28	E29	E27	E27	ENE28	ENE31	ENE30	ENE28	ENE27	ENE23	ENE23	S25	ENE23	ESE28	ESE25	E22	E26	E31	Diurnal Maximum															

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Fort Chipewyan - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on Jul 30 21:00	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9
Minimum Value: 1 km/h on Jul 28 11:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8	

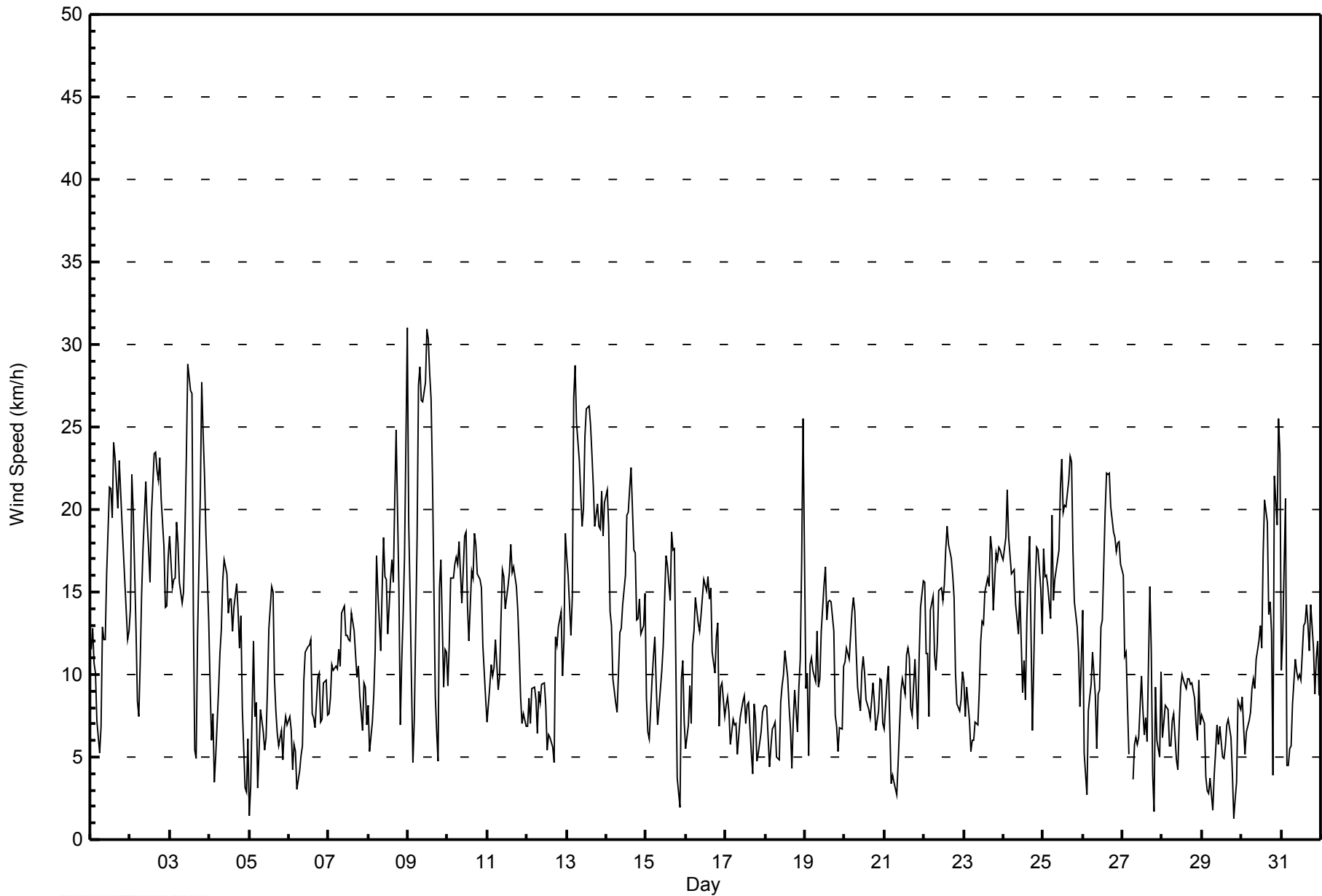
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	2	3	1	1	2	2	2	2	2	1	4	2	2	2	3	3	4	3	5	3	2	2	2	1	5
2-Jul	4	1	2	3	1	1	2	3	2	2	2	1	1	3	3	3	3	4	3	4	3	2	2	2	4
3-Jul	2	2	2	2	3	2	2	2	5	4	3	3	3	4	9	7	3	3	4	4	2	4	4	5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

AF - Analyzer Failure



WBEA NETWORK
Hourly Averages

Wind Speed (WS) - km/h
Fort Chipeywan - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort Chipecwan - July 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	70	9.42	9.42
6 - 11	320	43.07	52.49
12 - 19	274	36.88	89.37
20 - 28	73	9.83	99.19
29 - 38	6	0.81	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Wind Speed (WS) - km/h
Fort Chipeywan - July 2014

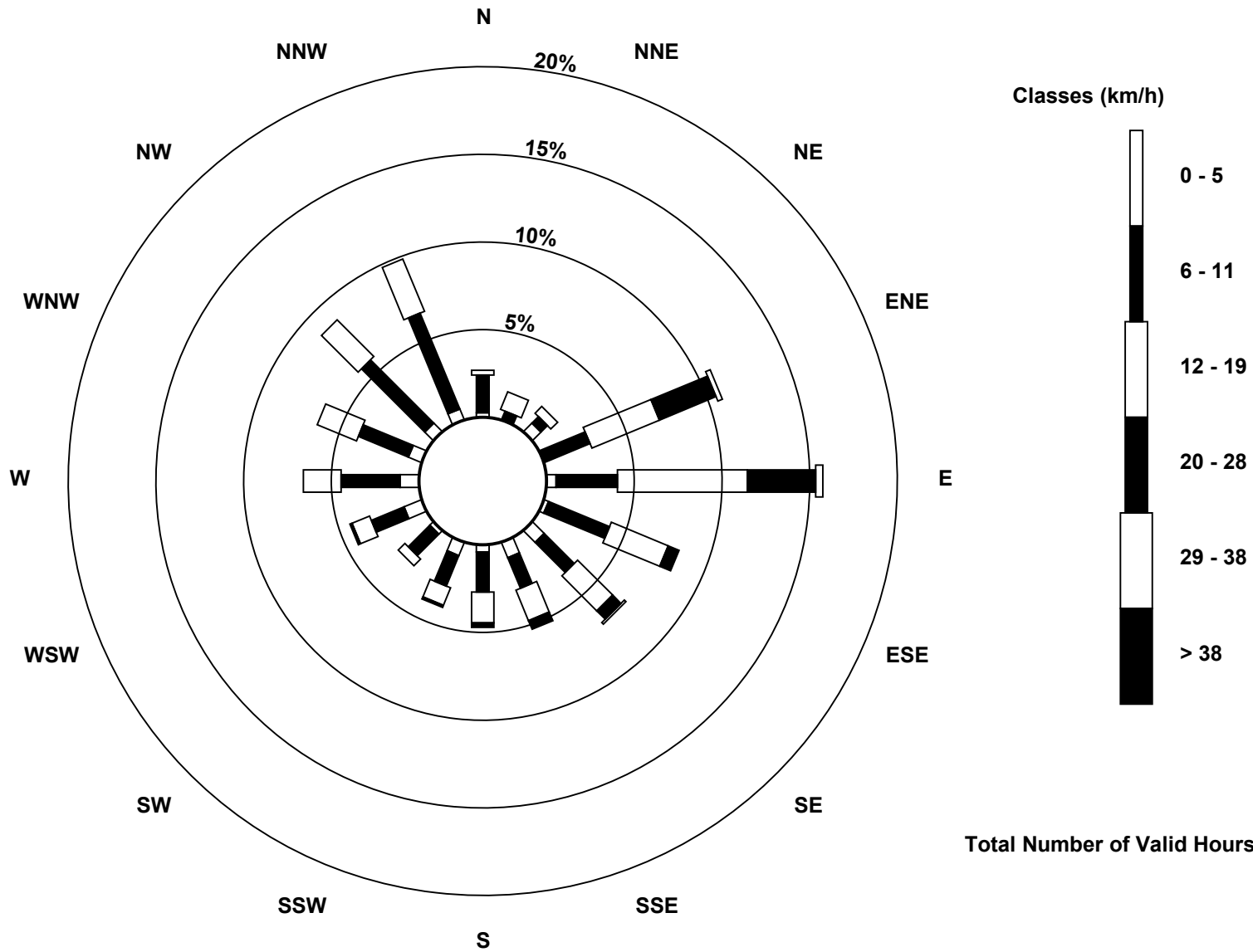
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	0	5	0	4	2	7	7	3	6	2	8	8	6	5	5	70
6 - 11	16	4	4	21	26	28	18	14	17	14	13	15	25	23	38	44	320
12 - 19	2	8	4	31	55	26	21	14	13	8	4	8	16	18	22	24	274
20 - 28	0	0	0	26	29	5	5	4	2	1	0	1	0	0	0	0	73
29 - 38	0	0	0	2	3	0	1	0	0	0	0	0	0	0	0	0	6
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	12	13	80	117	61	52	39	35	29	19	32	49	47	65	73	743

Total Number of Valid Hours: 743

Total Number of Hours: 744

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

**Wind Speed (WS) - km/h
Fort Chipeywan (AMS 8)**



Total Number of Valid Hours: 743



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort Chipewyan - July 2014

Direction of Maximum Speed: 99 deg on Jul 9 00:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 102.5 deg on Jul 13	Hours of Data: 743
Direction of Minimum Speed: 277 deg on Jul 29 20:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 0.3 deg on Jul 18	Percent Operational Time: 99.9
Monthly Average Direction: 301.2 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	137	134	132	132	149	158	132	103	99	98	91	86	83	76	90	83	69	78	67	66	69	69	68	73	88.9
2-Jul	86	99	99	72	56	61	70	78	83	90	89	91	94	93	86	73	66	68	66	62	63	65	72	83	79.0
3-Jul	95	128	129	119	122	129	120	136	114	109	89	83	82	78	34	52	47	71	84	120	120	89	77	71	98.6
4-Jul	51	29	27	36	262	271	270	259	242	240	234	243	253	262	251	237	241	269	287	341	355	50	82	65	266.3
5-Jul	256	305	358	51	79	98	238	213	186	203	184	260	257	276	265	316	5	115	49	339	242	250	286	312	279.6
6-Jul	268	274	266	334	331	264	288	289	249	277	284	290	290	291	320	15	5	340	351	6	331	302	296	297	305.7
7-Jul	315	322	322	331	318	323	324	309	326	323	340	347	339	329	320	319	330	313	268	267	267	275	275	267	315.2
8-Jul	232	241	221	203	196	195	198	181	166	180	189	194	184	163	151	162	197	190	188	185	226	16	84	99	177.1
9-Jul	118	140	131	140	66	88	82	85	82	79	78	75	72	66	62	84	104	85	96	131	149	253	277	250	89.0
10-Jul	254	259	266	274	297	274	277	283	281	270	274	286	277	285	321	322	320	330	330	328	322	317	311	305	294.7
11-Jul	314	320	317	321	325	329	319	293	300	313	307	323	315	308	309	313	321	325	329	335	340	333	333	348	318.8
12-Jul	324	325	338	320	322	347	347	341	336	334	328	334	336	356	328	335	322	103	145	109	99	60	99	124	15.3
13-Jul	134	136	148	131	126	134	138	137	129	127	97	87	84	84	79	79	75	77	67	66	70	79	85	121	102.5
14-Jul	139	145	154	150	142	121	133	147	151	146	144	155	156	156	163	172	172	174	171	175	178	192	223	226	162.0
15-Jul	234	226	211	218	219	223	218	204	191	195	204	206	202	204	182	186	188	184	186	185	288	79	78	360	197.7
16-Jul	349	309	338	296	289	302	330	331	321	306	294	293	294	298	295	293	296	277	261	308	287	293	300	307	301.6
17-Jul	315	313	312	285	298	308	315	311	278	252	263	252	257	280	283	262	264	278	287	284	301	282	303	329	288.6
18-Jul	343	355	340	324	314	335	346	336	237	253	259	279	256	249	237	211	163	119	114	86	77	68	99	112	6.7
19-Jul	175	288	252	215	155	153	148	117	82	25	16	17	28	19	17	12	7	20	2	342	320	315	308	313	15.8
20-Jul	336	337	342	346	347	343	342	343	339	336	339	333	341	342	327	329	349	309	321	302	273	280	290	286	329.5
21-Jul	287	284	308	320	351	308	289	248	194	106	97	97	103	99	99	111	103	103	100	92	78	76	105	120	95.1
22-Jul	130	111	107	113	105	116	128	101	92	91	92	94	93	91	92	92	92	88	89	73	63	67	65	78	95.4
23-Jul	85	107	187	154	126	133	151	157	127	102	93	92	91	87	85	85	86	90	158	164	158	132	115	105	115.1
24-Jul	108	109	113	113	110	105	133	142	109	111	84	91	101	93	108	88	100	73	106	106	94	80	75	68	102.1
25-Jul	77	81	104	86	70	87	70	74	62	66	68	73	64	69	63	66	63	58	52	50	52	117	109	134	72.5
26-Jul	158	166	104	87	125	147	144	154	133	99	93	94	98	92	90	78	71	66	66	60	63	67	72	79	89.3
27-Jul	93	114	113	137	244	AF	259	257	273	280	227	209	217	228	280	249	96	111	151	134	131	108	143	174	157.9
28-Jul	183	204	209	195	175	172	188	214	197	148	107	103	98	100	104	99	97	101	99	98	90	97	163	156	134.0
29-Jul	69	121	184	157	125	235	197	219	203	188	178	162	154	141	141	197	251	274	277	277	86	50	63	63	160.9
30-Jul	70	133	176	209	177	178	171	154	138	115	133	98	96	93	91	90	88	90	82	102	257	297	83	73	107.2
31-Jul	40	84	148	208	334	358	355	351	357	0	351	349	343	334	325	336	336	342	338	342	345	343	345	348	350.5

104.7	116.8	131.4	134.9	114.9	129.7	132.6	133.2	115.6	105.5	87.5	77.5	79.9	72.9	68.7	73.9	66.9	73.1	71.1	69.0	81.5	52.7	71.7	89.2
Diurnal Average																							

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Fort Chipeywan - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 89 deg on Jul 5 01:00	Hours of Data: 743
Minimum Value: 3 deg on Jul 2 13:00	Hours of Missing Data: 1
Percentiles: P ₁ = 4 P ₁₀ = 6 Q ₁ = 9 Median = 15 Q ₃ = 24 P ₉₀ = 34 P ₉₉ = 73	Hours of Calibration: 0
	Percent Operational Time: 99.9

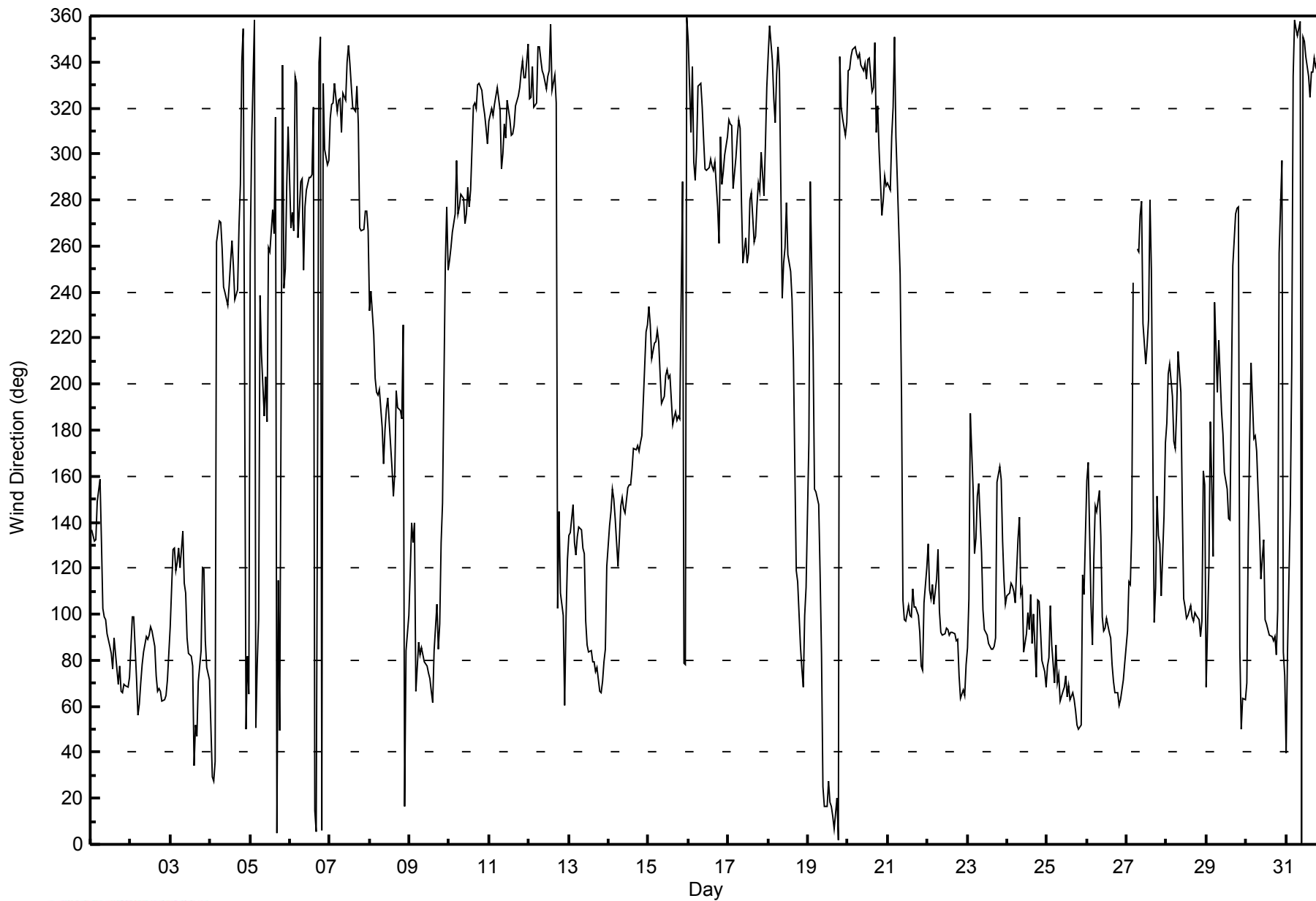
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	7	11	10	7	16	24	26	14	9	8	9	6	7	7	5	7	9	8	10	8	9	8	8	8	26
2-Jul	12	4	8	9	10	9	11	10	9	4	5	5	3	3	7	10	9	10	9	9	8	7	8	6	12
3-Jul	12	10	7	8	12	10	8	12	15	6	8	7	6	7	58	89	29	10	13	5	9	12	10	14	89
4-Jul	16	41	16	48	24	15	16	17	16	15	16	20	21	20	21	18	16	18	24	25	25	42	41	32	48
5-Jul	89	75	22	44	14	88	27	13	15	26	37	33	24	21	22	44	36	79	50	25	36	24	10	17	89
6-Jul	16	12	29	20	20	17	30	19	27	19	17	16	26	24	45	45	23	29	24	24	20	20	15	14	45
7-Jul	17	15	15	17	13	16	18	18	23	22	28	32	35	27	22	23	27	31	15	15	11	8	10	15	35
8-Jul	11	15	14	10	8	7	9	31	21	8	12	13	14	15	10	14	13	8	9	18	49	28	17	11	49
9-Jul	13	12	16	29	18	8	6	7	8	9	7	8	8	9	9	27	73	38	46	18	31	46	21	14	73
10-Jul	17	14	15	16	17	15	15	16	16	17	17	15	18	21	23	21	22	23	26	24	21	18	16	17	26
11-Jul	18	16	14	15	18	19	18	18	20	20	22	28	22	25	18	24	24	26	25	25	23	20	20	22	28
12-Jul	11	14	14	11	16	18	26	28	35	33	42	47	68	53	57	65	67	8	33	33	10	8	32	7	68
13-Jul	5	5	6	7	6	6	7	7	8	7	18	5	5	7	7	7	8	9	9	8	7	7	8	18	
14-Jul	8	6	7	7	18	14	18	13	12	15	14	13	8	8	10	8	11	6	7	5	12	9	6	18	
15-Jul	15	17	13	9	8	9	11	14	10	8	12	9	9	8	12	7	15	9	7	33	75	46	18	55	75
16-Jul	60	45	23	23	15	20	24	26	26	21	20	20	23	21	25	24	18	16	16	23	18	15	18	16	60
17-Jul	13	13	14	19	7	10	14	22	27	31	34	34	42	25	18	22	31	16	17	13	12	13	11	12	42
18-Jul	11	17	56	14	12	17	20	30	39	27	32	25	26	35	42	38	44	18	11	25	10	8	17	20	56
19-Jul	54	14	32	29	15	15	18	16	33	16	21	22	17	19	20	22	23	22	24	22	14	14	11	17	54
20-Jul	18	18	18	20	17	16	18	21	25	30	30	33	31	43	43	47	42	26	25	18	12	11	9	14	47
21-Jul	14	7	9	15	25	50	26	55	22	18	8	5	6	6	5	13	10	9	4	11	6	6	19	5	55
22-Jul	6	20	15	20	12	8	12	7	6	4	4	4	4	4	4	4	6	4	5	12	9	10	10	9	20
23-Jul	9	32	8	26	26	26	19	22	24	9	5	4	5	5	5	6	5	7	24	8	13	7	10	6	32
24-Jul	6	7	6	6	9	7	15	11	16	11	8	16	13	9	12	12	17	41	29	11	8	7	8	10	41
25-Jul	8	11	8	9	14	14	10	12	10	12	11	10	10	11	11	10	10	10	10	9	14	13	21	32	32
26-Jul	6	42	56	8	25	7	7	9	22	8	5	4	6	4	4	10	9	9	8	8	8	8	8	6	56
27-Jul	12	7	6	23	31	AF	24	15	17	41	34	15	30	42	34	42	9	22	49	74	17	19	24	12	74
28-Jul	17	13	14	11	21	19	22	12	16	27	8	6	5	5	7	5	3	5	4	6	19	29	18	25	29
29-Jul	14	17	34	34	36	51	54	25	32	12	14	21	18	22	20	29	32	21	18	61	26	31	6	5	61
30-Jul	10	26	32	24	17	16	14	10	9	9	24	4	4	3	4	4	8	6	8	64	24	27	36	16	64
31-Jul	38	33	19	74	40	26	22	23	25	27	27	34	33	27	28	25	26	28	24	25	26	27	24	25	74
	89	75	56	74	40	88	54	55	39	41	42	47	68	53	58	89	73	79	50	74	75	46	41	55	
	Diurnal Maximum																								

AF - Analyzer Failure



WBEA NETWORK
Hourly Averages

Wind Direction (WD) - deg
Fort Chipecwan - July 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 8, 2014	Previous Calibration	June 4, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	10:45	End Time (MST)	17:17
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	0.977624	0.996148	Chamber temp.	50.0	50.0
Calculated intercept	-0.079155	-0.041594	Pressure (in Hg)	26.4	26.3
Analyzer Background	6.9	6.9	Flow (lpm)	0.628	0.624
Analyzer Coefficient	1.008	0.990	UV Lamp (mV)	4407	4410

Analyzer make	T100u	Analyzer serial #	138
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.01	NA
as found span	5000	36.7	17.98	18.09	0.994
calibrator zero	5000	0.0	0.0	0.01	NA
high point	5000	36.7	17.98	18.07	0.995
second point	5000	19.8	9.70	9.82	0.988
third point	5000	9.9	4.85	4.94	0.983
calibrator zero	5000	0.0	0.0	0.0	NA
as left zero	5000	0.0	0.0	0.0	NA
as left span	5000	36.6	17.9	16.0	NA
Average Correction Factor					0.989

Corrected As found	18.1	Previous response	18.5	% change	2.1%
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Notes:

As found zero used as calibrator zero
 Span adjusted
 Filter changed after As Finds

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

SO₂ Calibration Summary

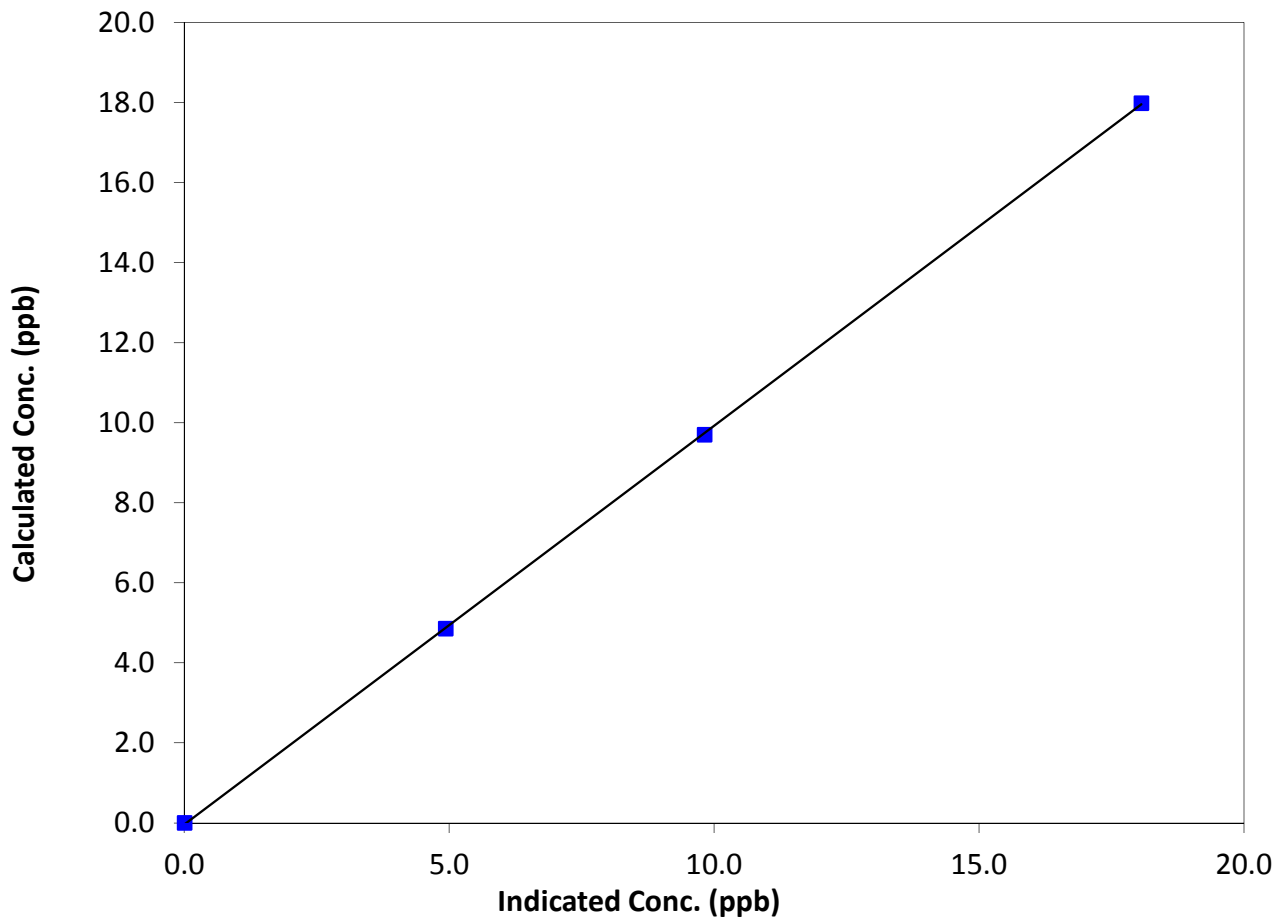
Station Information

Calibration Date	July 8, 2014	Previous Calibration	June 4, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:45	End Time (MST)	17:17
Analyzer make	T100u	Analyzer serial #	138

Calibration Data

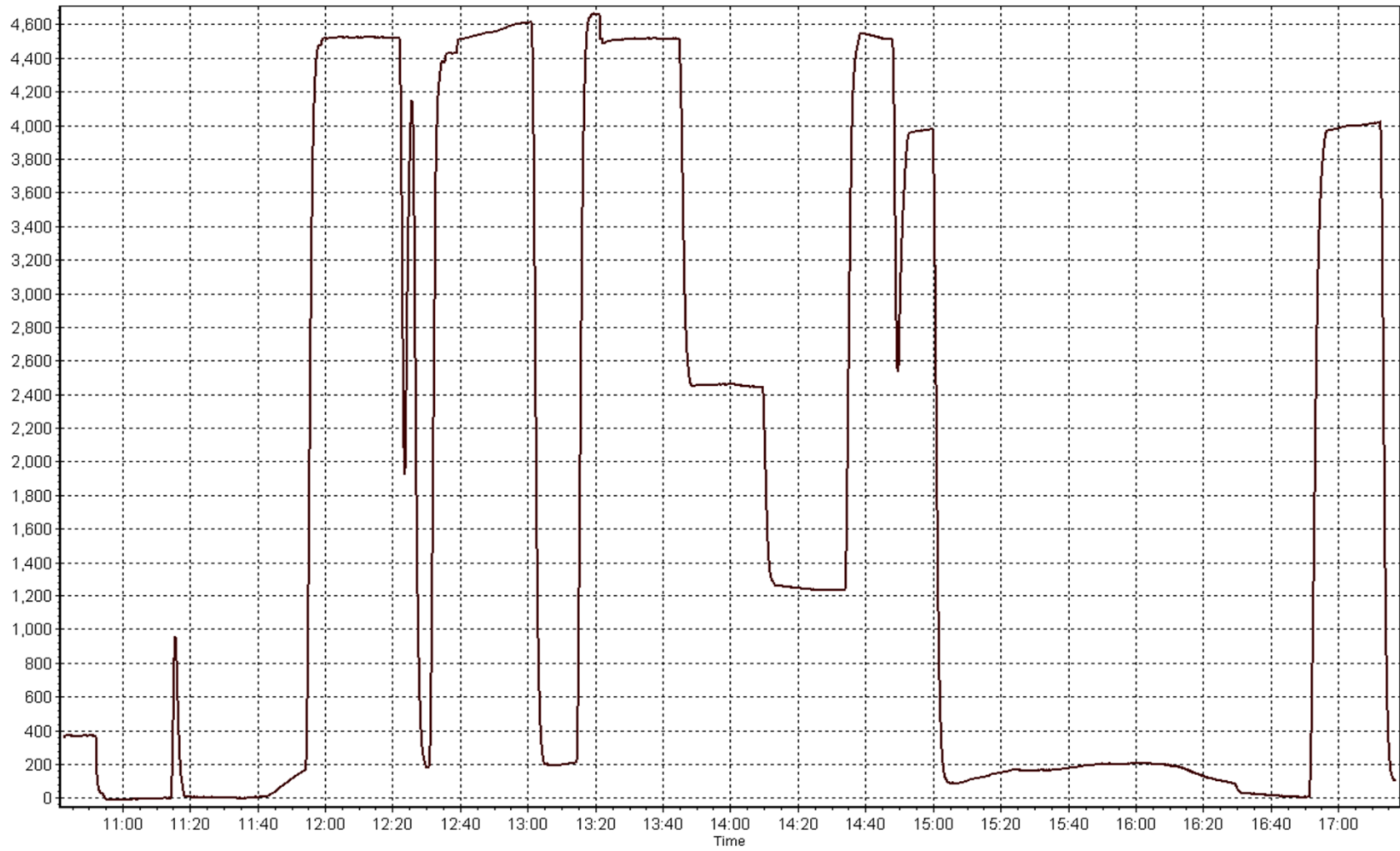
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999976
18.0	18.1	0.9954		
9.7	9.8	0.9878	Slope	0.996148
4.9	4.9	0.9828		
			Intercept	-0.041594

SO₂ Calibration Curve



SO2 Calibration Plot

Date: July 8, 2014





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	July 8, 2014	Previous Calibration	June 4, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	17:15	End Time (MST)	19:00
Barometric Pressure	760 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	API T700	Serial Number	747
NO2 calibration used	Tuesday, July 08, 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)	25.9	26.3
Analyzer Range (input)	5000	5000	Lamp temp. (Deg C)	58.0	58.0
Calculated slope	1.025464	1.005481	Pressure (in Hg)	26.8	26.7
Calculated intercept	-1.393676	-0.768152	Flow cell (LPM)	0.742	0.738
Analyzer Background	-0.50	-0.5	Cell A Intensity	NA	NA
Analyzer Coefficient	0.979	1.008	Cell B Intensity	NA	NA

Analyzer make API T400 Analyzer serial # 1020

Calibration Data

Set Point	Dilution air flow rate (cc/min)	O3 Ref -- O3 Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.6	N/A
as found span	5000	197.5 -- 810.1	107.7	104.3	1.032
calibrator zero	5000	0.00	0.0	0.6	N/A
high point	5000	197.5 -- 810.1	107.7	107.7	1.000
second point	5000	148 -- 772	81.7	82.2	0.994
third point	5000	93 -- 715	53.9	54.6	0.988
calibrator zero					
as left zero					
as left span					
Average Correction Factor					0.994

Corrected As found 103.7 Previous response 106.4 % change 2.6%

Notes:

As Found Zero used for Calibrator zero, Span adjusted.

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

O₃ Calibration Summary

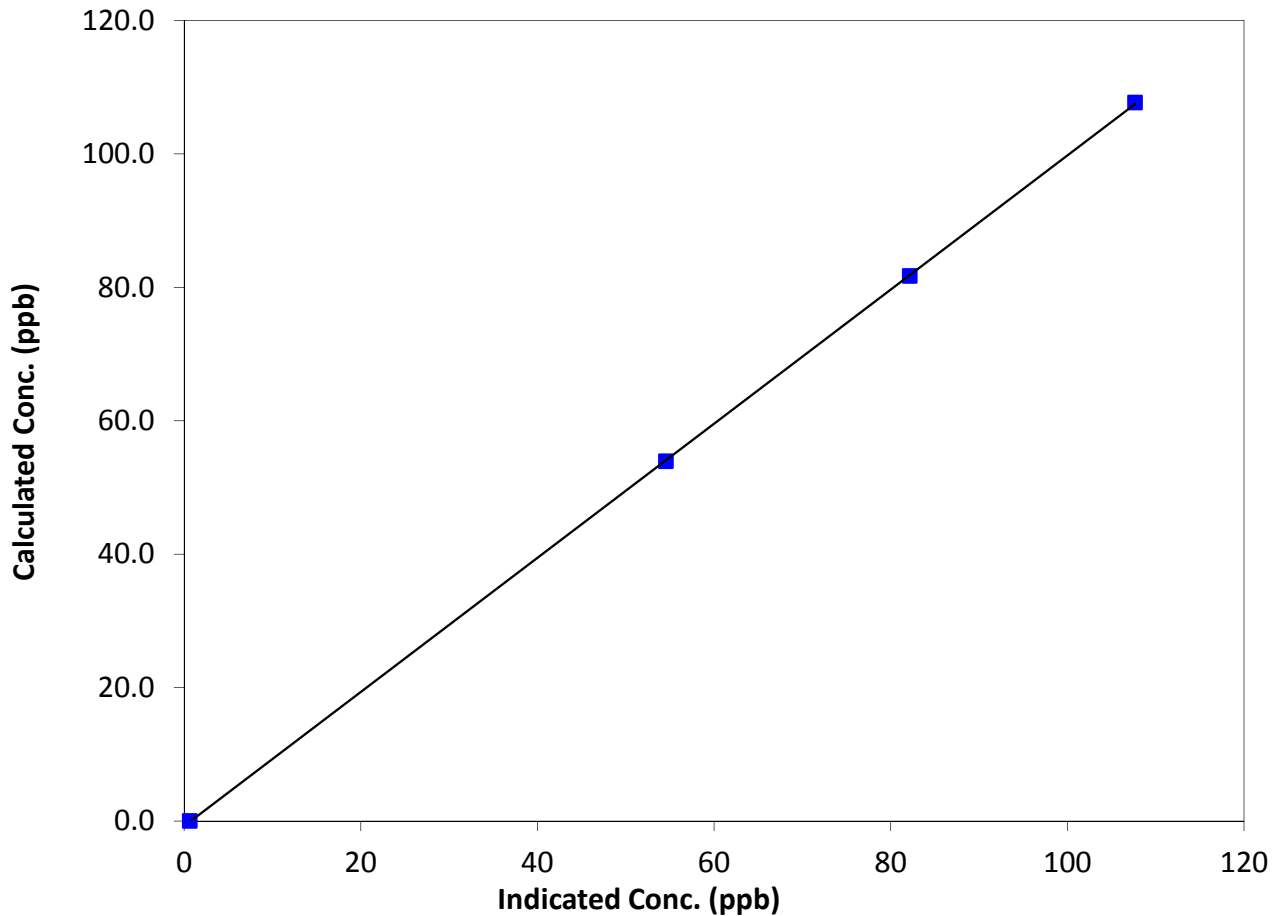
Station Information

Calibration Date	Tuesday, July 08, 2014	Previous Calibration	June 4, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	17:15	End Time (MST)	19:00
Analyzer make	API T400	Analyzer serial #	1020

Calibration Data

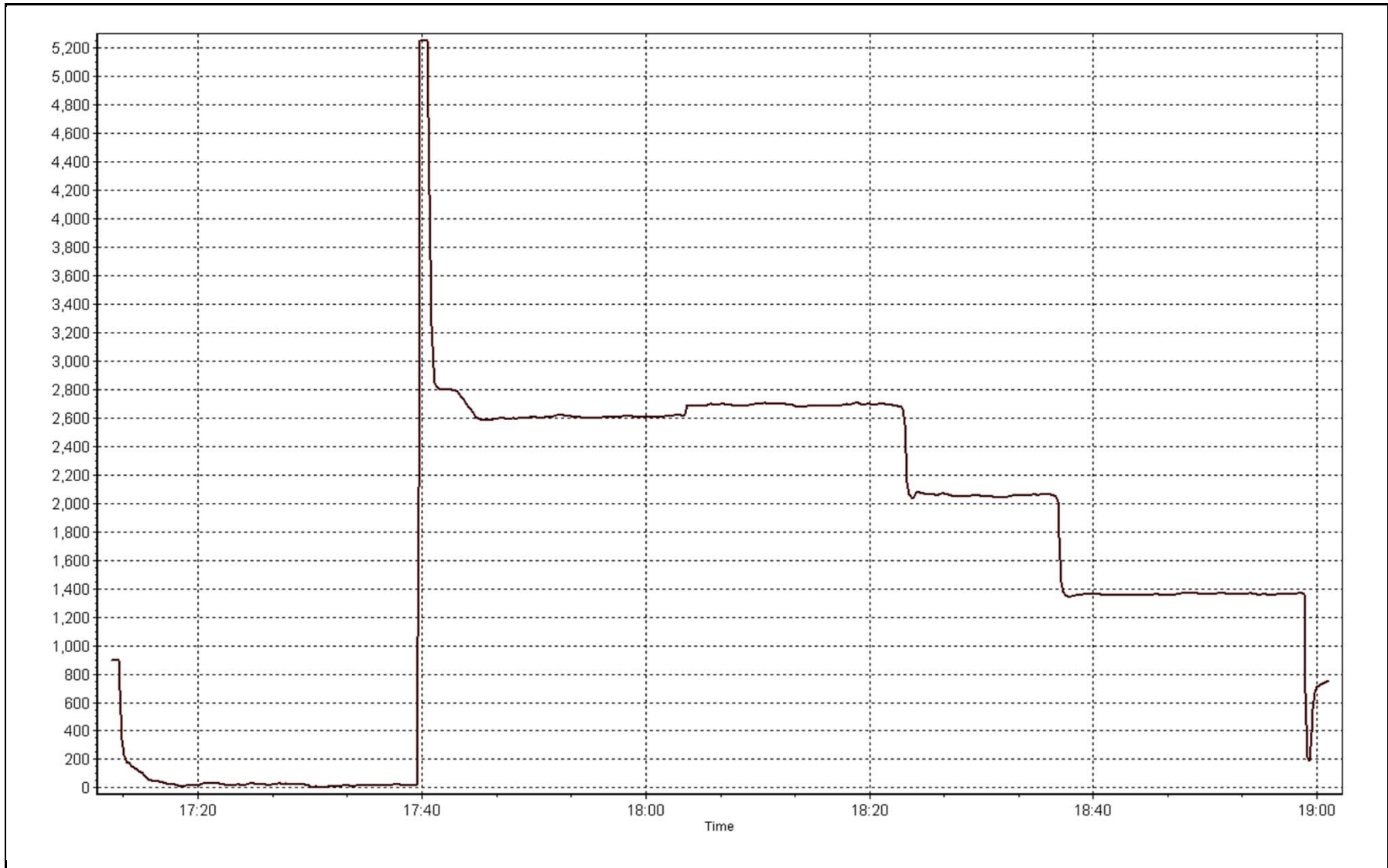
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	N/A	Correlation Coefficient	0.999983
107.7	107.7	1.0002		
81.7	82.2	0.9944	Slope	1.005481
53.9	54.6	0.9880		
			Intercept	-0.768152

O₃ Calibration Curve



O3 Calibration Plot

Date: July 8, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 8, 2014	Previous Calibration	June 4, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	11:30	End Time (MST)	14:10
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	September 16, 2016
NOx Cal Gas Conc	20.3 ppm	Cal Gas Serial #	LL103809

DACS Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 8205

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	200	200	200
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.994159	0.991732	0.981245
	Data Offset	0.334688	0.502583	-0.003137
After	Data Slope	0.990436	0.992696	0.980768
	Data Offset	-0.111899	0.079961	0.168999
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

Test Point	before		after	
Concentration range	200	ppb	200	ppb
NO coefficient	1.249	ppb	1.196	ppb
NOX coefficient	1.264	ppb	1.207	ppb
NO2 coefficient	na	ppb	na	ppb
NO bkgrnd	-0.1	mv	-0.1	mv
NOX bkgrnd	0.4	mv	0.4	mv
Nt coefficient	N/A		N/A	
Chamber Temp	40.0	Deg C	40.0	Deg C
Moly Temp	314.2	Deg C	316.5	Deg C
PMT Temp	5.1	Deg C	5.1	Deg C
O3 flow	88.0	ccm	88.0	ccm
R Cell Press	2.6	mmHg	2.6	mmHg
Sample Flow	1122	ccm	1115	ccm

Notes:

As Found zero used as calibrator zero; Small adjustment to span; Filter changed after As Found



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

July 8, 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	-0.1	0.1	-0.2	N/A	N/A
as found span	5000	36.7	149.0	148.3	0.7	157.0	156.3	0.6	0.9491	0.9485
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.2	N/A	N/A
high point	5000	36.7	149.0	148.3	0.7	150.1	149.8	0.1	0.9930	0.9897
second point	5000	19.8	80.4	80.0	0.4	80.7	80.8	-0.1	0.9958	0.9895
third point	5000	9.9	40.2	40.0	0.2	40.6	40.6	0.0	0.9900	0.9861
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.2	N/A	N/A
as left span	5000	36.6	148.6	42.5	106.1	152.0	42.0	109.9	0.9775	1.0123
Average Correction Factor									0.9929	0.9884

Corrected As found

NO_x= 157.1

NO= 156.2

Percent Change

NO_x= -4.8%

NO= -4.6%

Previous Response

NO_x= 149.5

NO= 149.0

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			-0.2			N/A	
1st NO ₂ (300)	N/A	42.5	107.7	152.2	42.5	109.6	0.9771	1.0000	0.9832	101.7%
2nd NO ₂ (200)	N/A	68.6	81.7	151.7	68.6	83.2	0.9801	1.0000	0.9823	101.8%
3rd NO ₂ (100)	N/A	96.4	53.9	151.3	96.4	54.9	0.9830	1.0000	0.9815	101.9%
4th NO ₂ (0)	150.2	N/A	0.1	150.3	150.2	0.1	0.9893	1.0000	N/A	N/A
Average Correction Factor							0.9824	1.0000	0.9823	101.8%

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

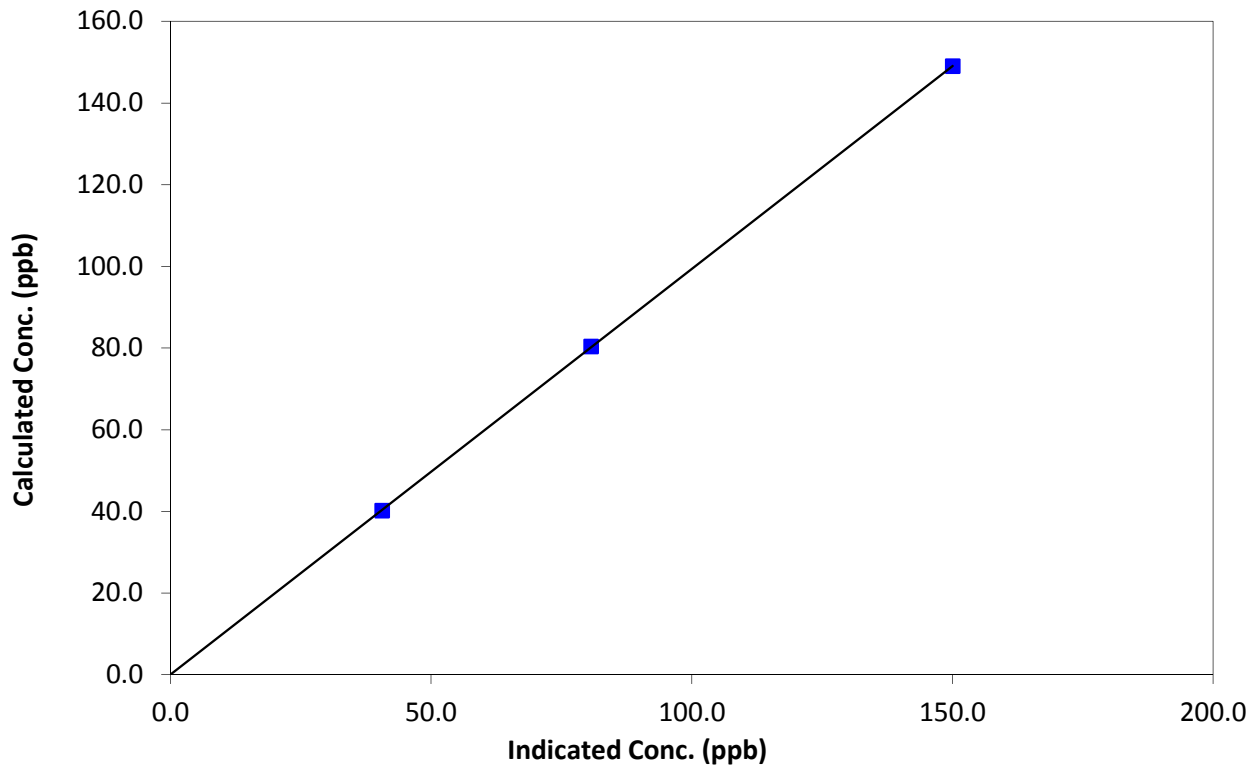
Station Information

Calibration Date	July 8, 2014	Previous Calibration	June 4, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	11:30	End Time (MST)	14:10
Analyzer make	API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999994
149.0	150.1	0.9930		
80.4	80.7	0.9958	Slope	0.992696
40.2	40.6	0.9900		
			Intercept	0.079961

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

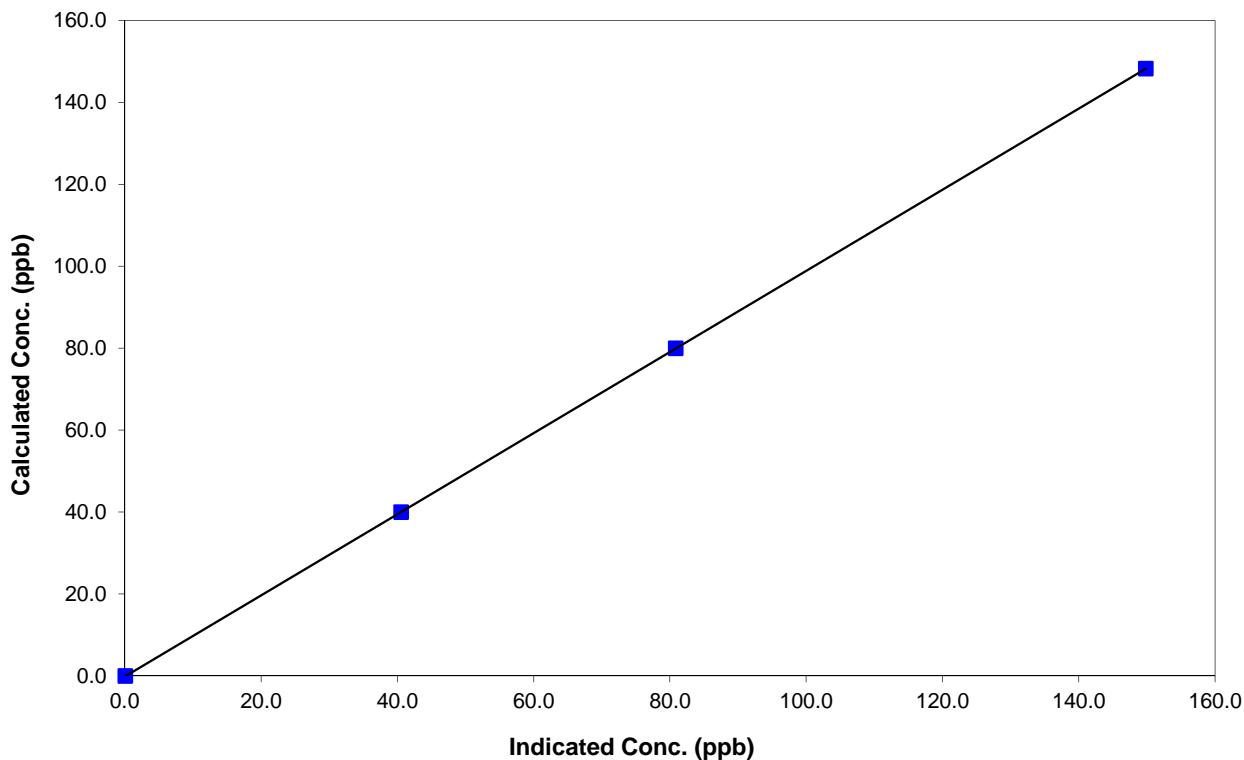
Station Information

Calibration Date	July 8, 2014	Previous Calibration	June 4, 2014
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	11:30	End Time (MST)	14:10
Analyzer make	API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999999
148.3	149.8	0.9897		
80.0	80.8	0.9895	Slope	0.990436
40.0	40.6	0.9861		
			Intercept	-0.111899

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

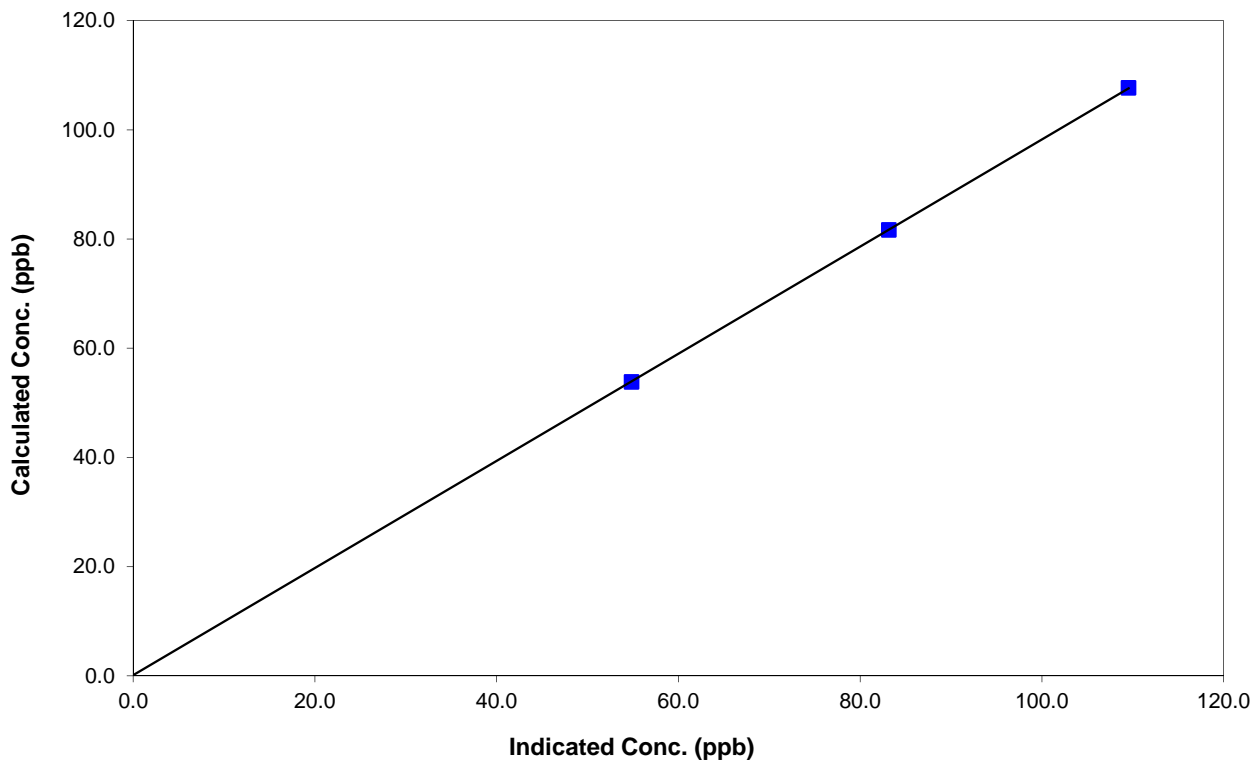
Station Information

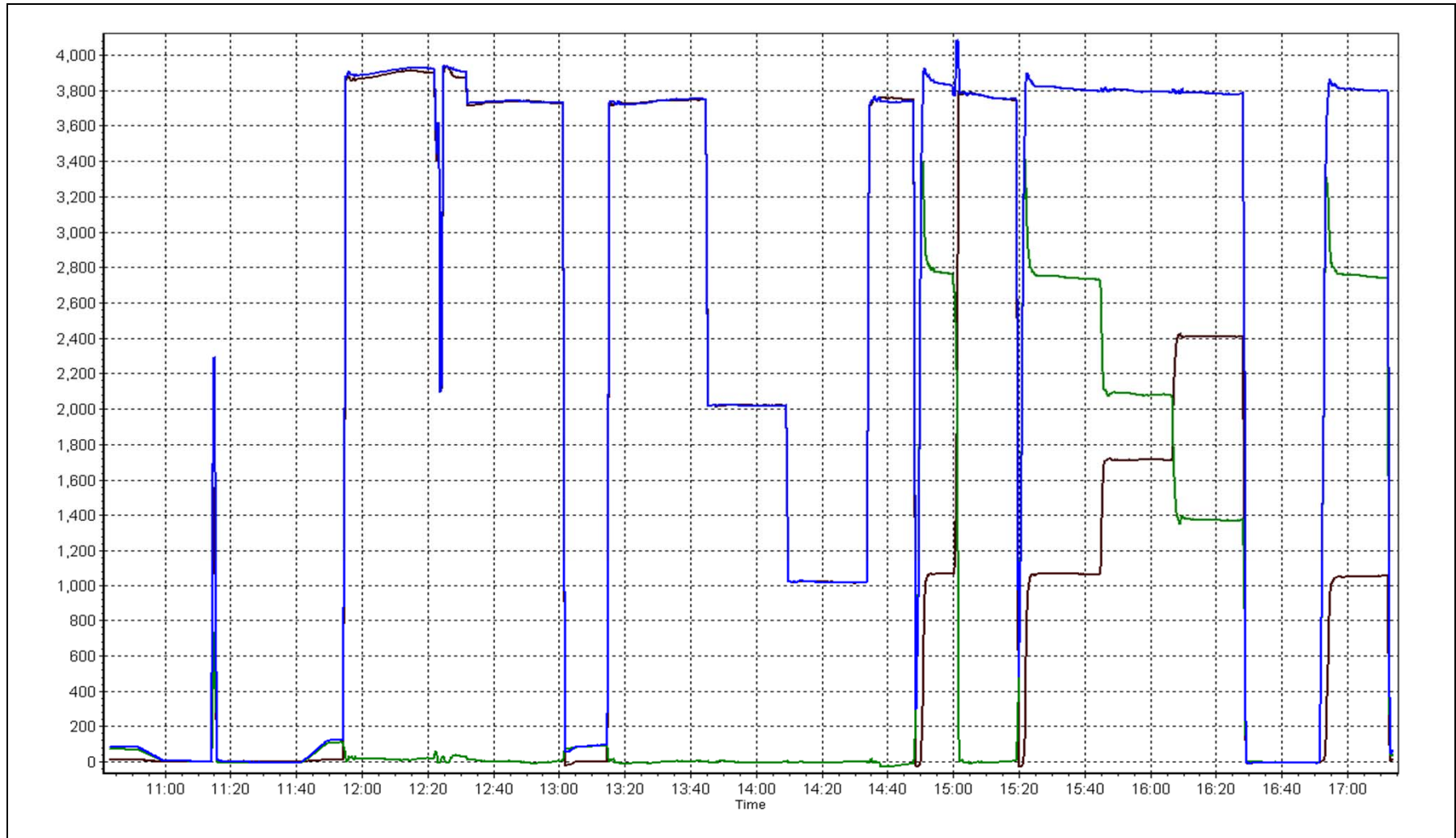
Calibration Date	July 8, 2014	Previous Calibration	June 4, 2014
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	11:30	End Time (MST)	14:10
Analyzer make	API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999995
107.7	109.6	0.9832		
81.7	83.2	0.9823	Slope	0.980768
53.9	54.9	0.9815		
			Intercept	0.168999

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 9 BARGE LANDING JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
 JULY 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	704	37	40	99.60	3	0	1	0
THC(ppm) Average	705	35	39	99.46	3.1	-	2.3	-
Temperature (C) Average	744	0	0	100.00	35.5	-	26.8	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	19	-	10	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
 JULY 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	704	0.4	0	-	0	0	0	0	0	1	3
THC(ppm) Average	705	2.08	0.2	-	1.8	1.9	1.9	2	2.2	2.4	3.1
Temperature (C) Average	744	21.75	5.5	-	7.5	14.8	17.3	21.6	25.9	29	35.5
Wind Speed 10 m (km/h) Average	743	5.4	3	-	0	2	3	5	7	9	19
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
 JULY 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	03 Jul 2014 13:00	03 Jul 2014 14:00	2	Power spikes
TRS	08 Jul 2014 10:00	08 Jul 2014 10:00	1	Maintenance - sample manifold cleaned
THC	30 Jul 2014 21:00	30 Jul 2014 21:00	1	Intermittent unstable operation - excessive baseline drift
THC	30 Jul 2014 23:00	31 Jul 2014 01:00	3	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	29 Jul 2014 20:00	29 Jul 2014 20:00	1	Flatline in sensor output signal

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Summary of Hour Averages

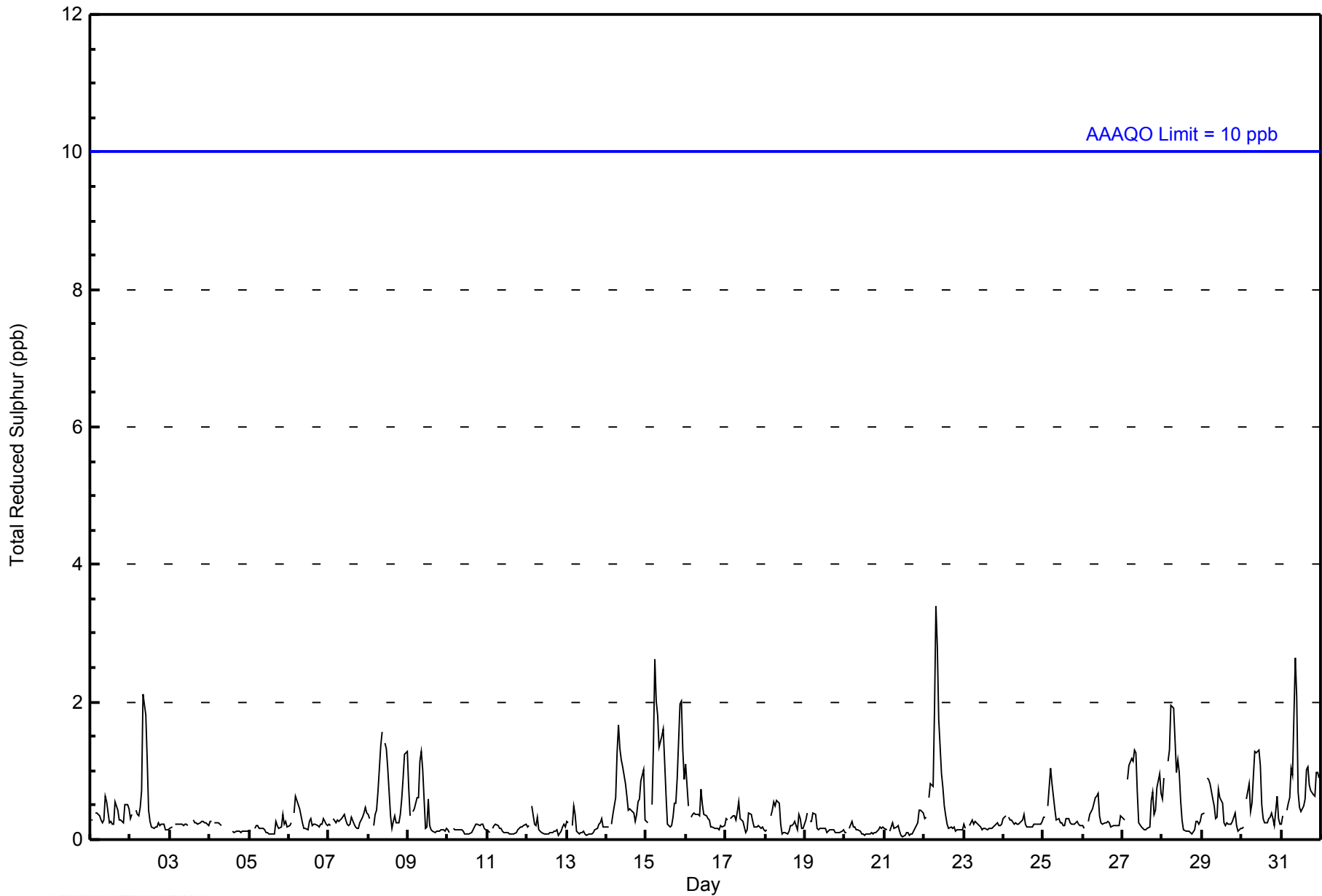
Barge Landing - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 3 ppb on Jul 22 08:00										Maximum Daily Average: 1.1 ppb on Jul 15										Hours of Data: 704						
Minimum Value: 0 ppb on Jul 21 12:00										Minimum Daily Average: 0.1 ppb on Jul 20										Hours of Missing Data: 40						
Maximum Diurnal Average: 0.7 ppb at hour 9										Minimum Diurnal Average: 0.2 ppb at hour 15										Hours of Calibration: 37						
Monthly Average: 0.4 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 2										Percent Operational Time: 99.6						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0.4	1
2-Jul	0	0	Z	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
3-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	PF	PF	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Jul	0	0	Z	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	--	0
5-Jul	0	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-Jul	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Jul	0	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-Jul	0	0	Z	0	0	0	1	1	2	M	1	1	1	0	0	0	0	0	0	0	1	1	1	1	0.7	2
9-Jul	1	0	Z	0	0	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
10-Jul	0	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-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Jul	0	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-Jul	0	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-Jul	0	0	Z	0	0	1	1	2	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0.7	2
15-Jul	0	0	Z	1	1	3	2	2	1	2	2	1	1	0	0	0	0	1	1	1	2	2	1	1	1.1	3
16-Jul	1	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
17-Jul	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
18-Jul	0	0	Z	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
19-Jul	0	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-Jul	0	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-Jul	0	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-Jul	0	0	Z	1	1	1	2	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	3
23-Jul	0	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-Jul	0	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-Jul	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
26-Jul	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
27-Jul	0	0	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	1	1	1	0.6	1
28-Jul	1	1	Z	1	1	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2
29-Jul	0	0	Z	1	1	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
30-Jul	0	0	Z	1	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0.5	1
31-Jul	0	0	Z	0	1	1	1	1	3	2	1	0	0	0	1	1	1	1	1	1	1	1	1	1	0.8	3
0.3 0.3 -- 0.4 0.5 0.6 0.6 0.7 0.7 0.6 0.5 0.4 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.4 0.4 0.3																								Diurnal Average		
1 1 -- 1 1 3 2 3 3 2 2 1 1 0 1 1 1 1 1 1 1 2 2 1 1																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



WBEA NETWORK
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Barge Landing - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	700	99.43	99.43
3 - 4	4	0.57	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - July 2014

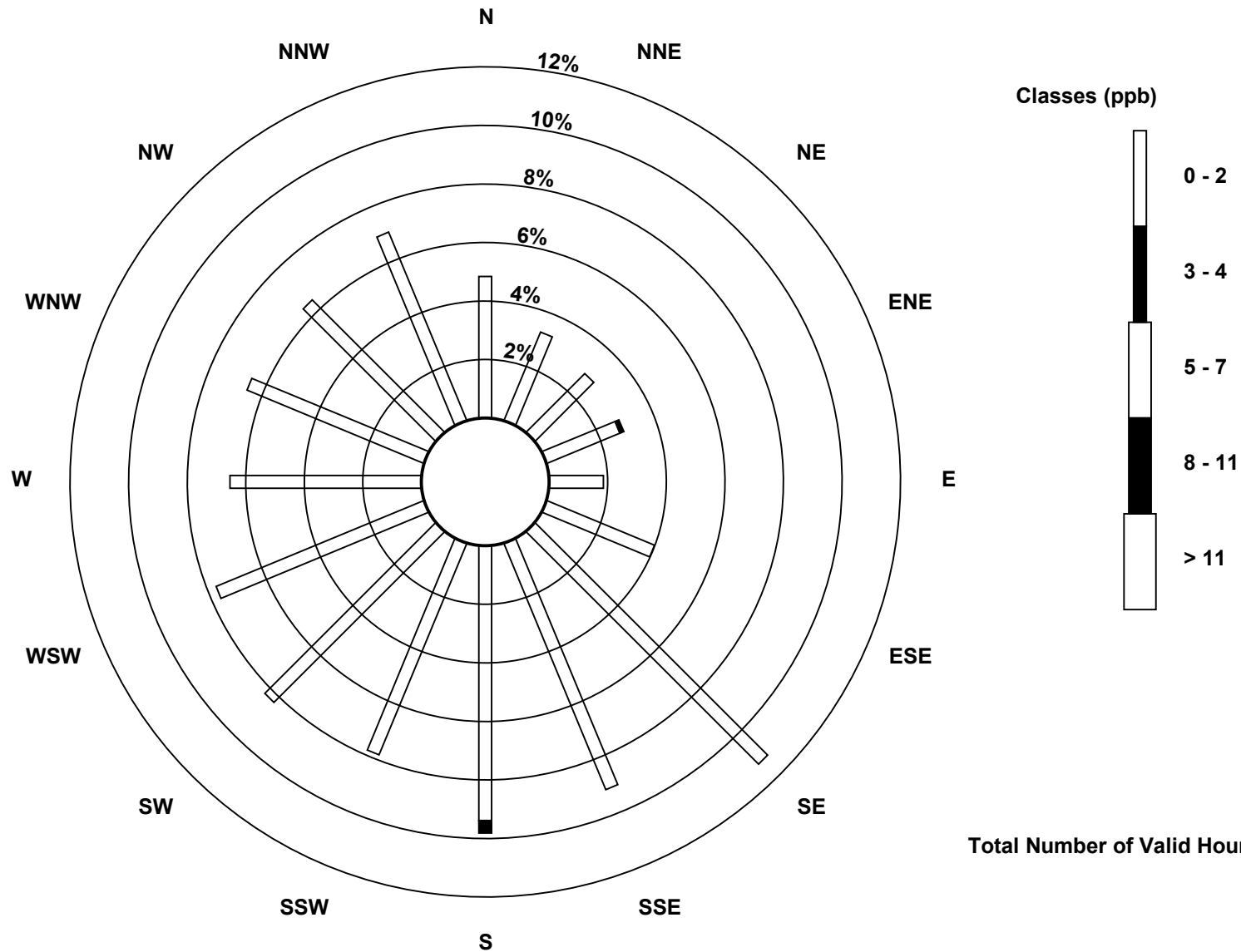
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	34	23	20	19	13	28	79	64	66	55	58	54	46	46	45	49	699
3 - 4	0	0	0	1	0	0	0	0	3	0	0	0	0	0	0	0	4
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	34	23	20	20	13	28	79	64	69	55	58	54	46	46	45	49	703

Total Number of Valid Hours: 703

Total Number of Hours: 744

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

**Total Reduced Sulphur (TRS) - ppb
Barge Landing (AMS 9)**



Total Number of Valid Hours: 703

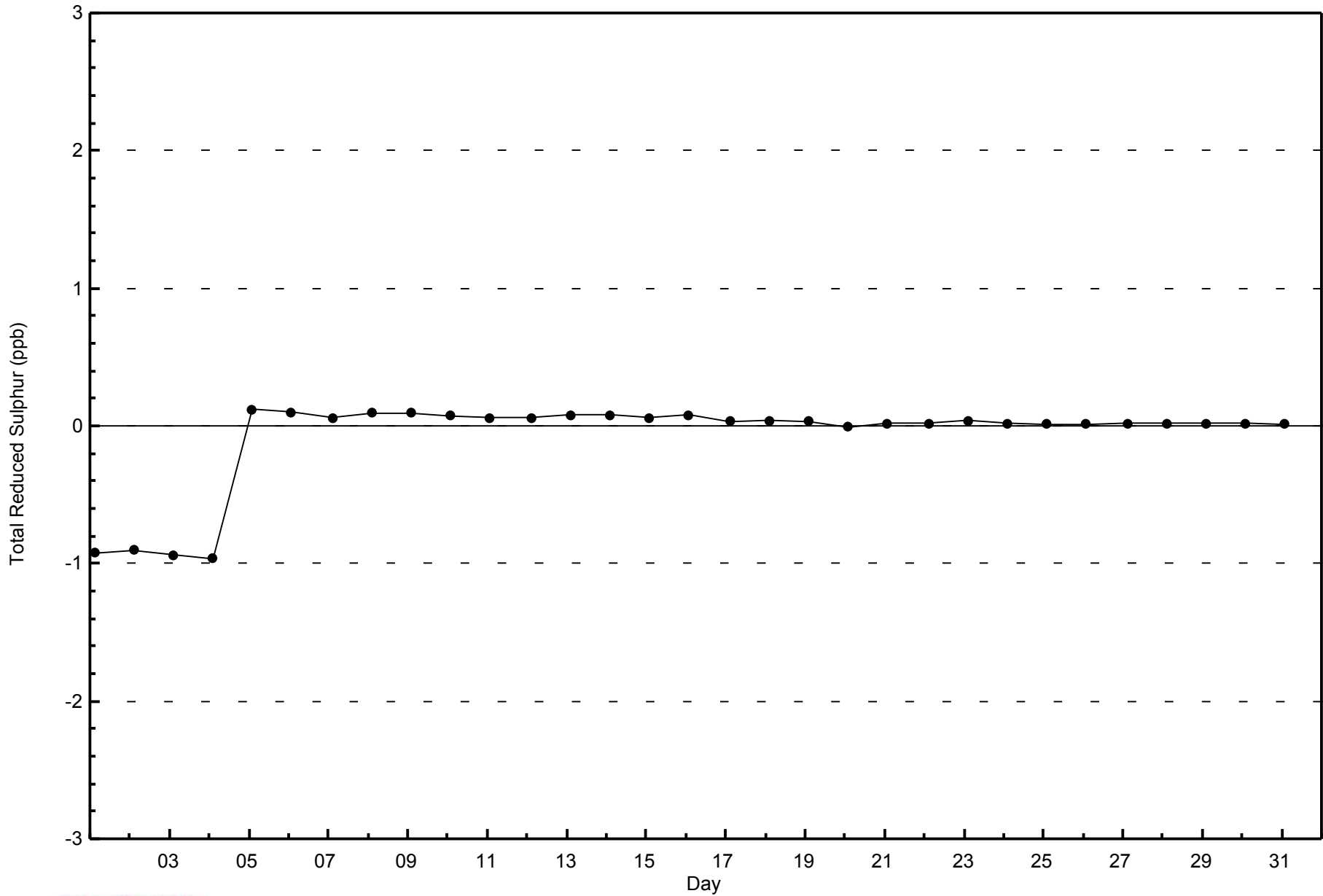


WBEA NETWORK

Zero Responses

Total Reduced Sulphur (TRS) - ppb

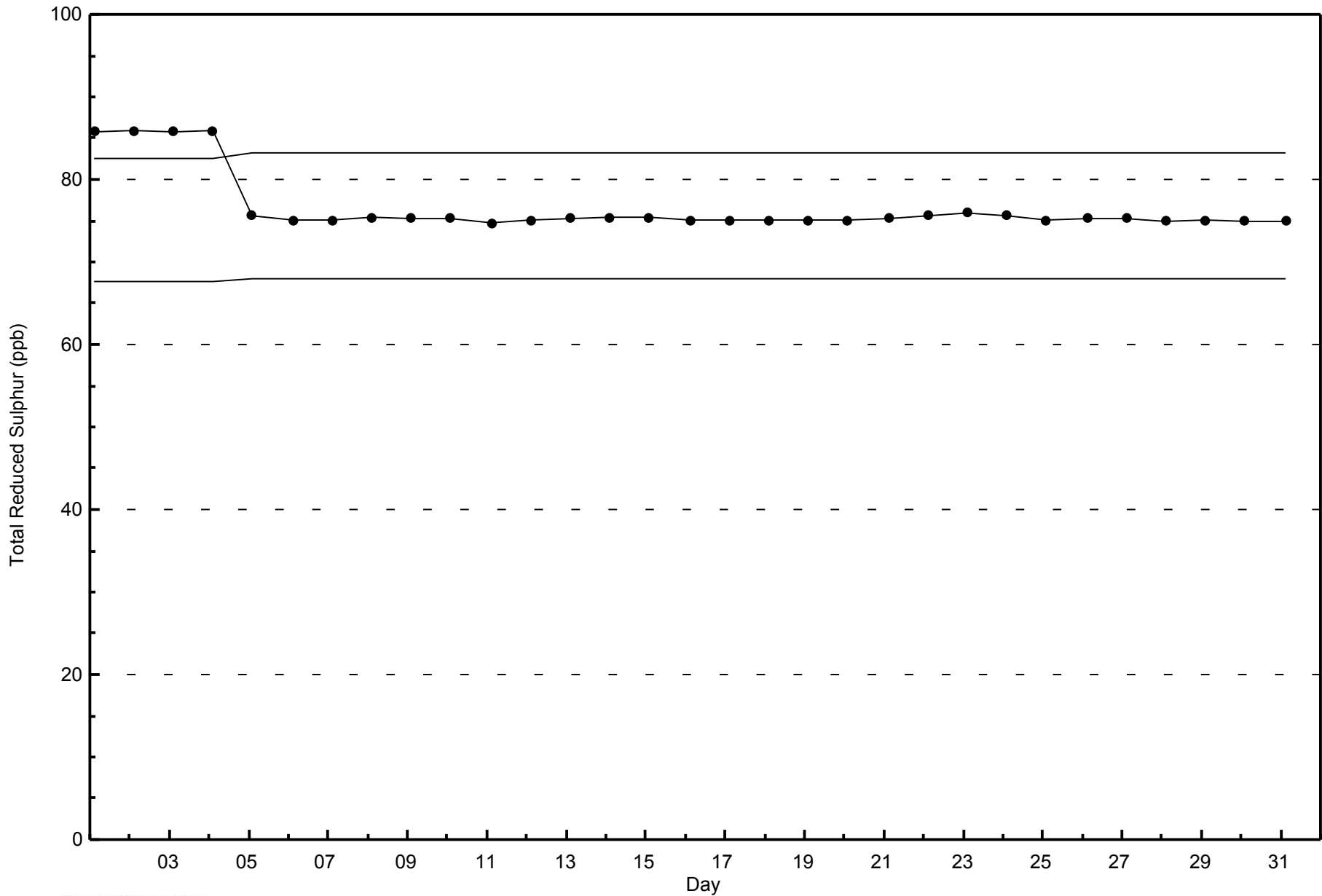
Barge Landing - July 2014





WBEA NETWORK
Span Responses

Total Reduced Sulphur (TRS) - ppb
Barge Landing - July 2014





Maximum Value: 3.1 ppm on Jul 15 21:00		Maximum Daily Average: 2.3 ppm on Jul 1		Hours in Service: 744																							
Minimum Value: 1.8 ppm on Jul 28 19:00		Minimum Daily Average: 1.9 ppm on Jul 10		Hours of Data: 705																							
Maximum Diurnal Average: 2.2 ppm at hour 5		Minimum Diurnal Average: 2.0 ppm at hour 14		Hours of Missing Data: 39																							
Monthly Average: 2.08 ppm		Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.2 P ₉₀ = 2.4 P ₉₉ = 2.7		Hours of Calibration: 35																							
				Percent Operational Time: 99.5																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	2.2	Z	2.4	2.3	2.4	2.4	2.3	2.2	2.3	2.5	2.5	2.2	2.2	2.2	2.1	2.6	2.3	2.2	2.3	2.2	2.3	2.7	2.5	2.6	2.3	2.7	
2-Jul	2.5	Z	2.5	2.5	2.4	2.3	2.4	2.5	2.6	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.3	2.6	
3-Jul	2.1	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	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-Jul	2.2	Z	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.2	
5-Jul	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.0	2.1	2.3	2.2	2.2	2.2	2.1	2.3	
6-Jul	2.1	Z	2.4	2.4	2.5	2.5	2.3	2.2	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.1	2.1	2.5	
7-Jul	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.4	2.6	2.5	2.6	2.4	2.2	2.6	
8-Jul	2.5	Z	2.3	2.3	2.3	2.4	2.4	2.4	2.4	C	C	C	C	2.2	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.4	2.4	2.3	2.5	
9-Jul	2.4	Z	2.2	2.3	2.2	2.2	2.3	2.5	2.3	2.1	2.0	2.0	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.5	
10-Jul	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	1.9	2.0	2.1	1.9	1.9	1.9	2.1	
11-Jul	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	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
12-Jul	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.0	2.2	
13-Jul	2.3	Z	2.3	2.2	2.2	2.2	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.0	2.3	
14-Jul	2.2	Z	2.2	2.1	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.3	2.3	2.4	2.5	2.1	2.2	2.5	
15-Jul	2.1	Z	2.1	2.2	2.4	2.5	2.5	2.6	2.5	2.4	2.4	2.4	2.2	2.0	2.0	2.0	2.1	2.1	2.1	2.3	3.1	2.9	2.5	2.3	2.3	3.1	
16-Jul	2.5	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5	2.2	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.0	2.1	2.1	2.5	
17-Jul	2.4	Z	2.2	2.1	2.3	2.2	2.0	2.1	2.3	2.2	2.3	2.1	2.0	2.0	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.1	2.4	
18-Jul	1.9	Z	2.1	2.1	2.2	2.1	2.3	2.3	2.5	2.2	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	1.9	2.0	2.0	1.9	2.0	2.1	2.1	2.5	
19-Jul	2.1	Z	2.2	2.1	2.1	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	2.1	2.2	2.0	2.2	
20-Jul	1.9	Z	1.9	1.9	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.1	2.0	2.1	2.0	2.0	2.2	
21-Jul	2.1	Z	2.2	2.2	2.1	2.1	2.0	2.1	2.1	2.0	1.9	1.9	1.9	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	
22-Jul	2.2	Z	2.3	2.4	2.5	2.7	2.8	2.6	2.9	2.7	2.4	2.2	2.1	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.9	
23-Jul	2.1	Z	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.0	2.2	
24-Jul	2.0	Z	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.1	
25-Jul	2.1	Z	2.2	2.2	2.6	2.4	2.3	2.1	2.0	2.1	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.0	2.6	
26-Jul	2.1	Z	2.1	2.2	2.3	2.4	2.2	2.4	2.3	2.2	2.0	2.0	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.4	
27-Jul	2.0	Z	2.5	2.6	2.6	2.6	2.4	2.5	2.5	2.2	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	2.1	2.6	
28-Jul	2.0	Z	2.3	2.3	2.3	2.2	2.1	2.3	2.2	2.3	2.2	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.3	
29-Jul	2.1	Z	2.3	2.4	2.4	2.2	2.1	2.0	2.0	2.0	2.3	2.1	2.0	1.9	1.9	1.8	1.8	1.9	2.0	2.1	2.1	1.8	1.9	1.9	2.0	2.4	
30-Jul	1.9	Z	1.9	2.0	2.0	2.0	2.1	2.2	2.1	2.1	2.1	2.1	2.0	1.9	1.9	1.8	1.9	1.9	1.9	1.9	UO	2.0	UO	UO	2.0	2.2	
31-Jul	UO	Z	1.9	1.9	2.0	2.0	2.0	2.0	2.6	2.7	2.0	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.8	1.8	2.0	2.0	2.0	2.0	2.7	
		2.1	--	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	Diurnal Average		
		2.5	--	2.5	2.6	2.6	2.7	2.8	2.6	2.9	2.7	2.5	2.4	2.2	2.2	2.2	2.6	2.3	2.2	2.3	2.4	3.1	2.9	2.6	2.6	Diurnal Maximum	
Z - zerospan		C - Calibration						UO - Unstable Operation																			

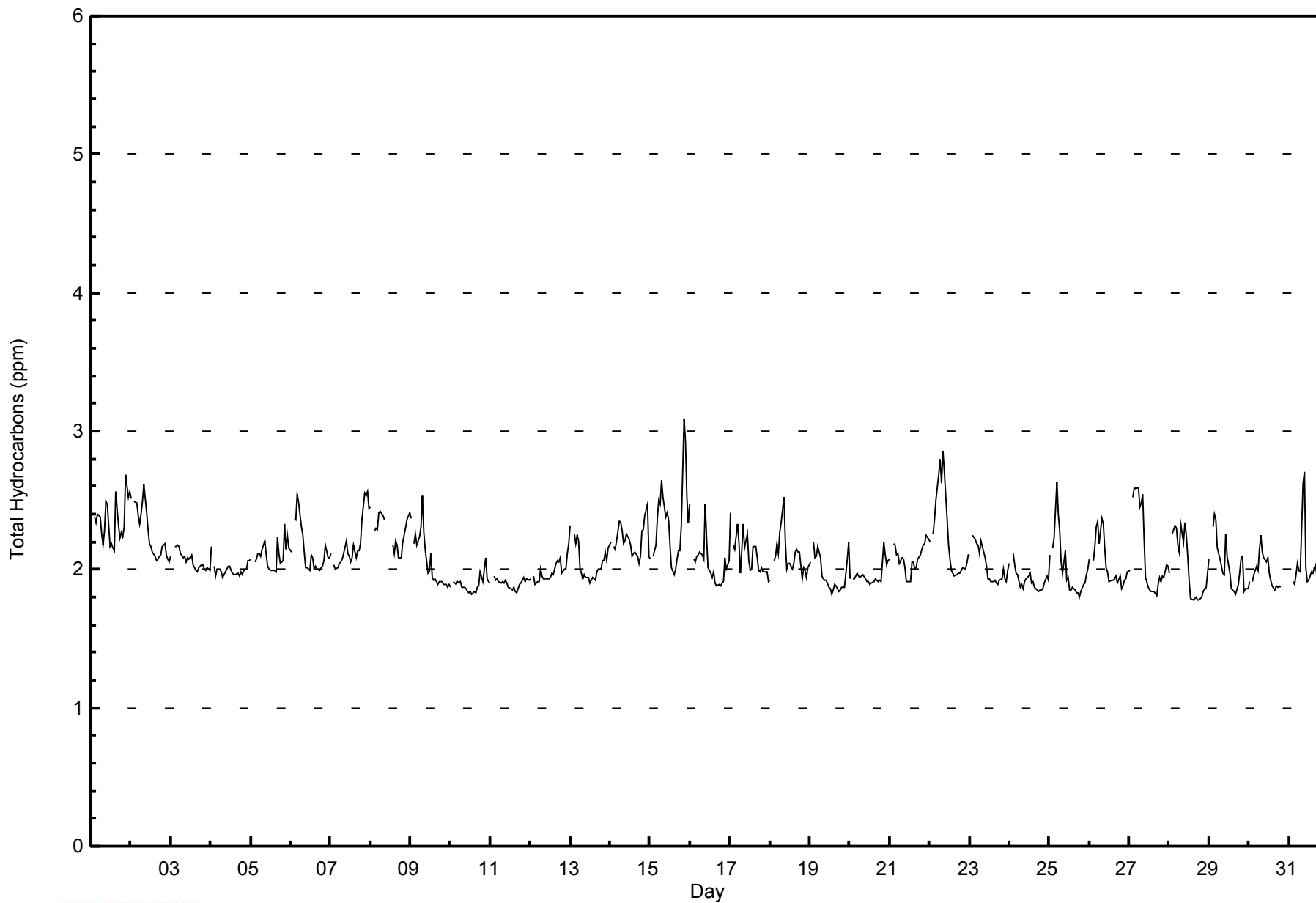


WBEA NETWORK

Hourly Averages

Total Hydrocarbons (THC) - ppm

Barge Landing - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	370	52.48	52.48
2.1 - 3.0	334	47.38	99.86
3.1 - 10.0	1	0.14	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - July 2014

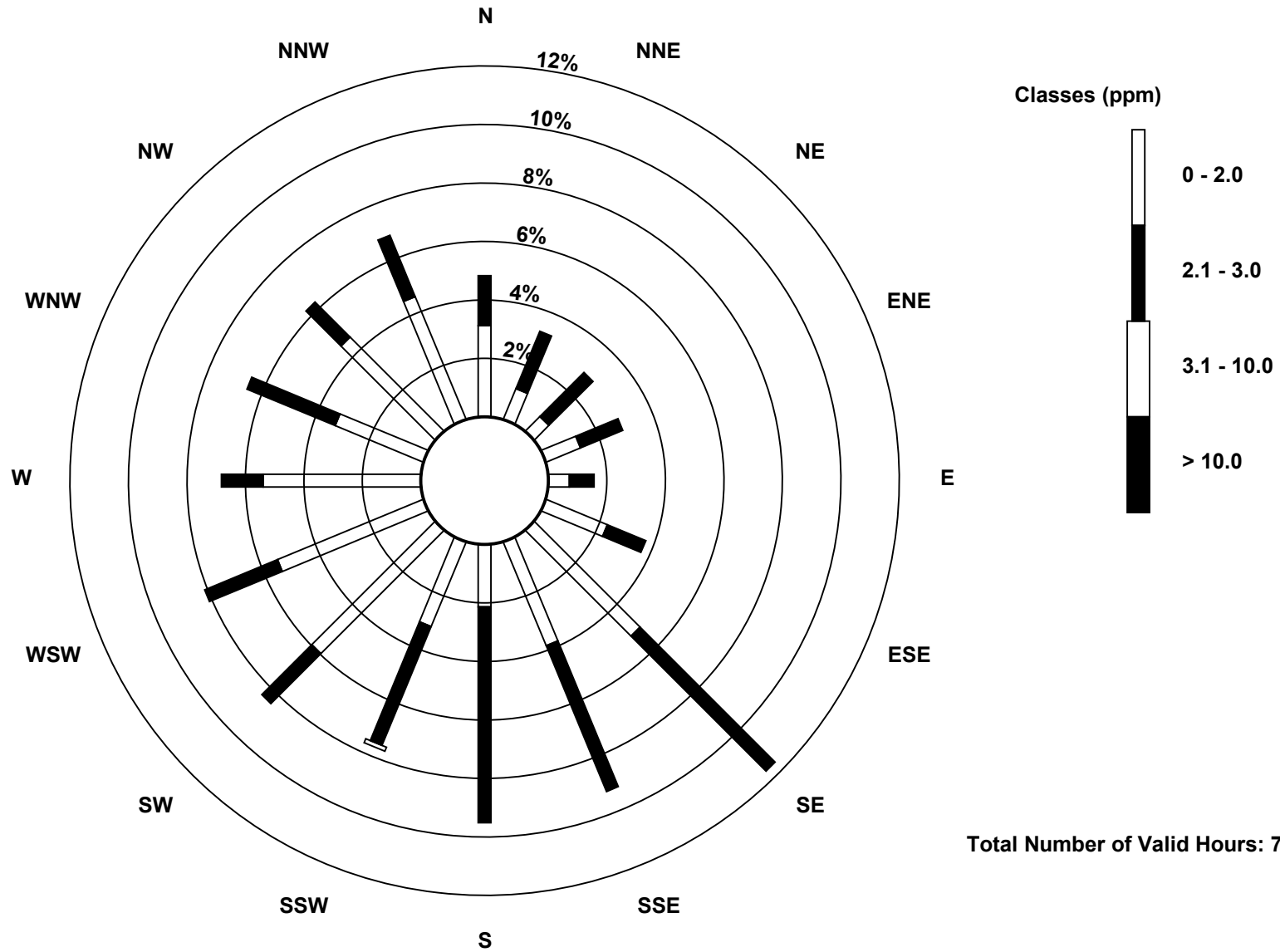
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	22	8	5	9	5	16	36	27	15	22	42	38	38	23	32	32	370
2.1 - 3.0	12	15	15	11	6	10	46	38	52	31	17	19	10	23	12	16	333
3.1 - 10.0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	34	23	20	20	11	26	82	65	67	54	59	57	48	46	44	48	704

Total Number of Valid Hours: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Total Hydrocarbons (THC) - ppm
Barge Landing (AMS 9)



Total Number of Valid Hours: 704

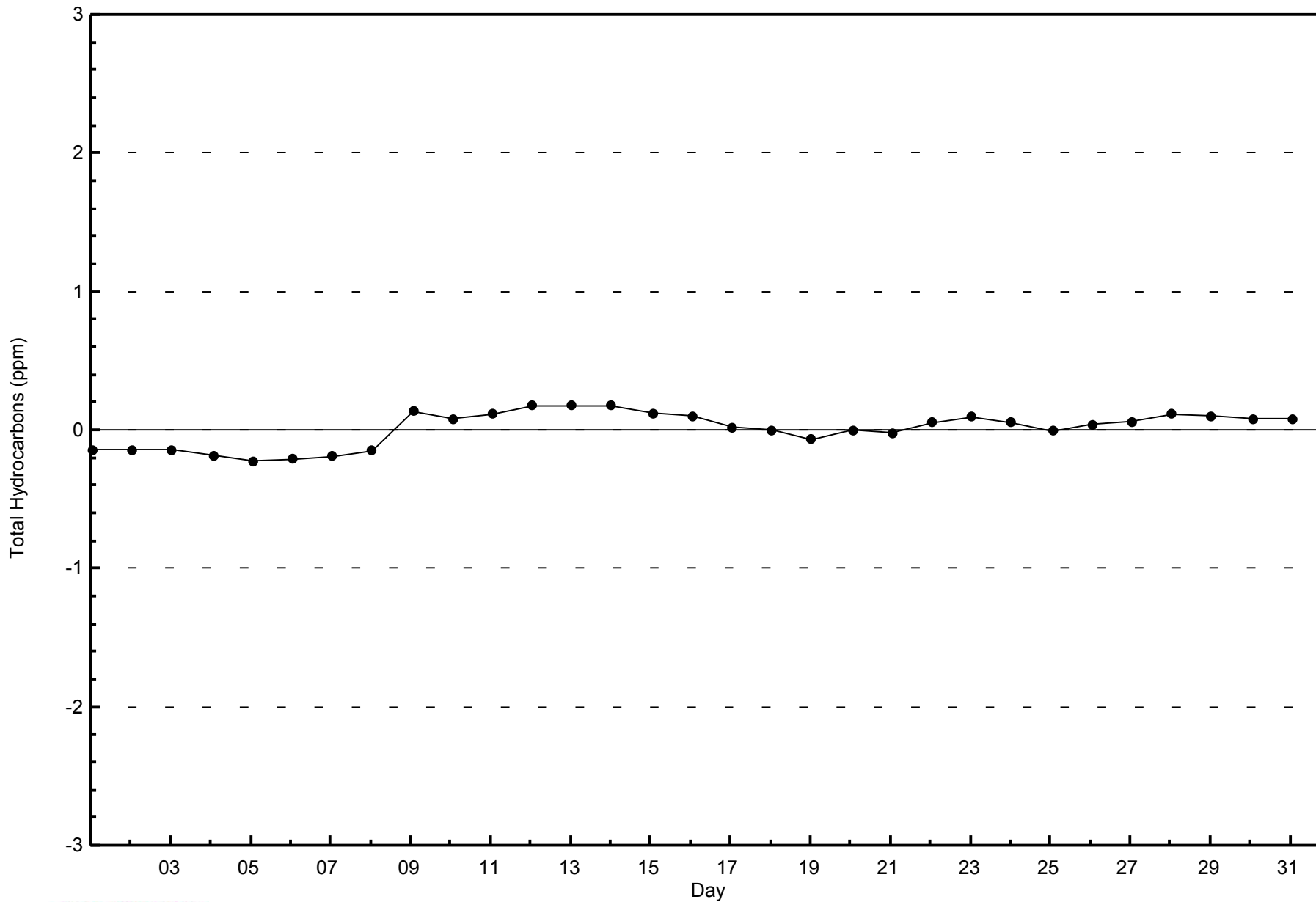


WBEA NETWORK

Zero Responses

Total Hydrocarbons (THC) - ppm

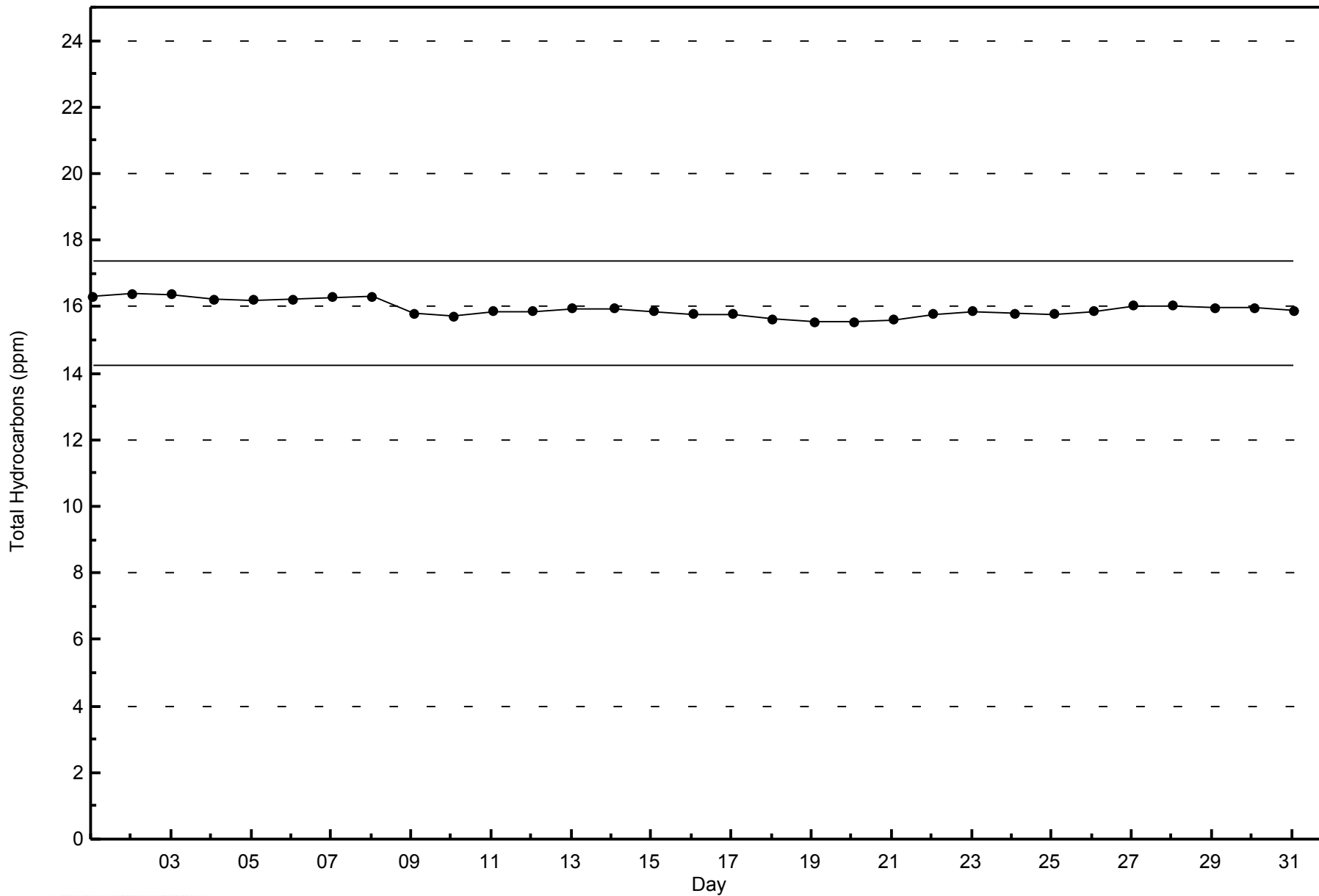
Barge Landing - July 2014





WBEA NETWORK
Span Responses

Total Hydrocarbons (THC) - ppm
Barge Landing - July 2014



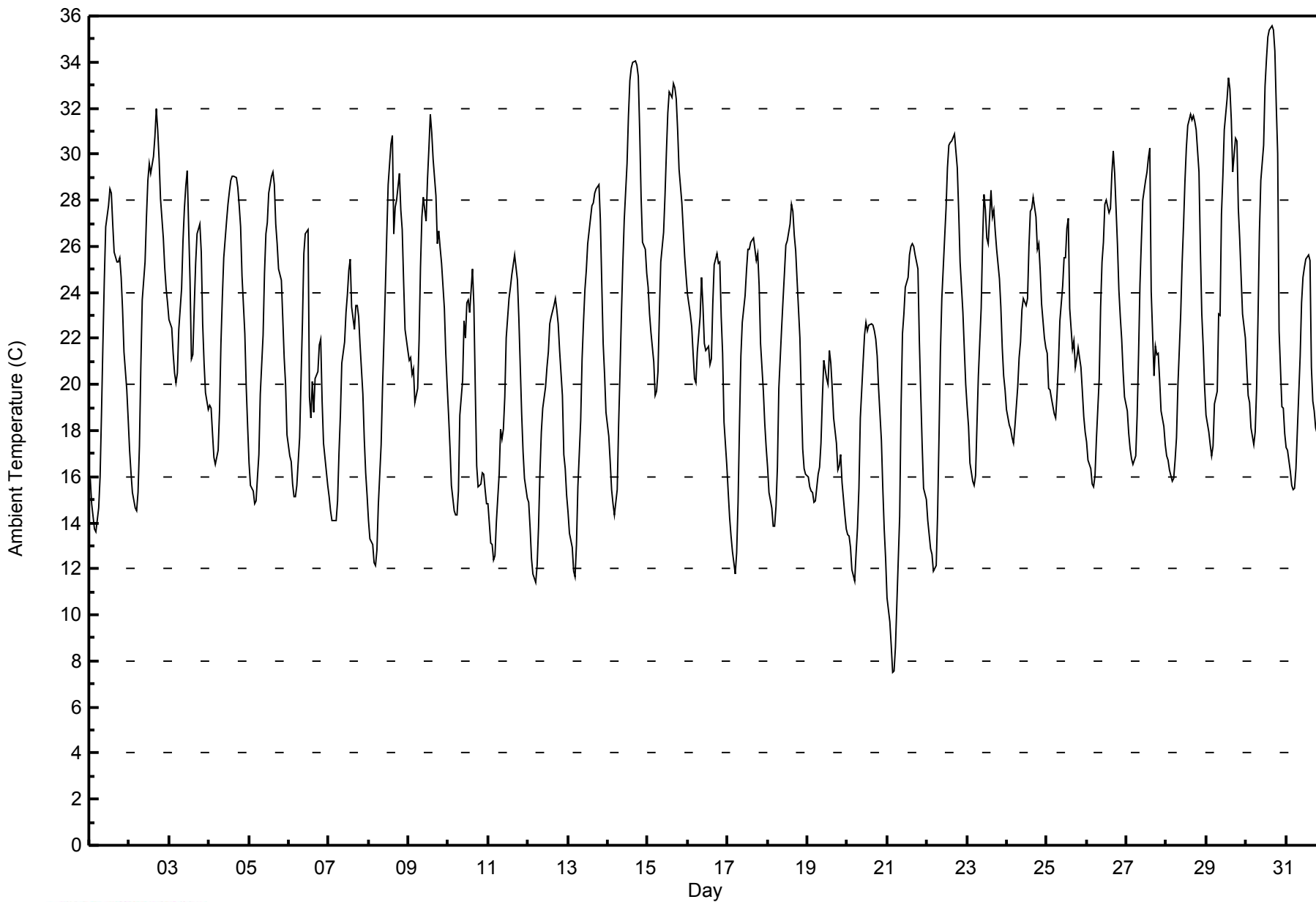


Maximum Value: 35.5 C on Jul 30 16:00																				Maximum Daily Average: 26.8 C on Jul 15					Hours in Service: 744																							
Minimum Value: 7.5 C on Jul 21 04:00																				Minimum Daily Average: 17.3 C on Jul 19					Hours of Data: 744																							
Maximum Diurnal Average: 27.3 C at hour 15																				Minimum Diurnal Average: 15.0 C at hour 5					Hours of Missing Data: 0																							
Monthly Average: 21.75 C																				Percentiles: P ₁ = 11.4 P ₁₀ = 14.8 Q ₁ = 17.3 Median = 21.6 Q ₃ = 25.9 P ₉₀ = 29.0 P ₉₉ = 34.0					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-Jul	15.9	14.8	14.3	13.7	13.6	14.6	16.0	18.7	21.7	24.6	26.9	27.8	28.5	28.3	27.0	25.7	25.3	25.3	25.5	24.6	23.3	21.4	19.7	18.5	21.5	28.5																						
2-Jul	17.2	16.2	15.3	14.6	14.5	15.3	17.3	20.8	23.7	25.3	27.3	28.9	29.6	29.2	29.9	30.8	31.9	31.1	29.8	28.1	26.4	25.1	24.2	23.5	24.0	31.9																						
3-Jul	22.8	22.4	21.3	20.5	20.0	20.5	22.4	24.2	26.3	27.6	28.6	29.3	24.5	21.1	21.3	23.3	25.3	26.5	27.0	25.7	22.7	21.0	19.7	18.9	23.5	29.3																						
4-Jul	19.1	19.0	17.9	16.9	16.5	17.2	18.9	21.8	23.8	25.5	27.1	27.8	28.4	28.9	29.0	29.1	29.0	28.5	27.8	26.8	24.7	22.2	19.9	18.2	23.5	29.1																						
5-Jul	16.6	15.6	15.4	14.8	15.0	16.0	16.9	19.6	22.2	24.9	26.6	27.0	28.3	29.0	29.2	28.7	26.9	26.1	25.0	24.5	22.9	21.2	20.0	17.8	22.1	29.2																						
6-Jul	16.9	16.7	15.7	15.2	15.2	15.6	17.7	20.3	22.7	25.7	26.5	26.7	19.5	18.5	20.1	18.8	20.3	20.5	21.7	22.0	19.3	17.4	16.2	15.6	19.4	26.7																						
7-Jul	15.1	14.5	14.1	14.1	14.1	14.9	17.0	18.7	21.0	21.8	23.1	23.9	25.0	25.4	23.4	22.4	23.4	23.4	23.0	21.7	19.6	17.6	16.2	15.2	19.5	25.4																						
8-Jul	14.1	13.3	13.1	12.3	12.1	12.8	14.8	17.4	19.9	22.0	24.2	26.5	28.7	30.5	30.8	26.5	27.7	28.0	29.2	27.6	26.7	24.5	22.4	21.5	21.9	30.8																						
9-Jul	21.1	21.2	20.4	20.7	19.2	19.8	21.9	25.1	27.3	28.1	27.1	28.9	30.3	31.7	30.9	29.8	28.2	26.1	26.7	26.0	25.3	23.3	21.3	20.0	25.0	31.7																						
10-Jul	18.7	17.3	15.6	14.5	14.3	14.3	15.4	18.7	20.2	22.7	22.0	23.6	23.7	23.1	25.0	23.4	19.8	16.5	15.6	15.7	16.2	16.1	15.4	14.8	18.4	25.0																						
11-Jul	14.8	13.1	13.0	12.4	12.6	14.1	16.1	18.0	17.6	18.0	19.5	22.0	23.7	24.2	24.8	25.2	25.7	24.5	22.9	20.8	18.7	17.1	15.9	15.1	18.7	25.7																						
12-Jul	14.9	13.8	12.5	11.8	11.4	12.2	13.8	16.2	17.9	19.0	19.9	20.7	21.4	22.6	22.9	23.4	23.7	23.2	22.6	21.5	19.5	16.9	16.3	15.2	18.1	23.7																						
13-Jul	14.4	13.5	12.9	11.9	11.6	13.1	15.5	18.4	21.1	22.7	24.1	24.9	26.1	27.2	27.8	27.9	28.3	28.5	28.7	27.1	24.4	21.8	20.5	18.8	21.3	28.7																						
14-Jul	17.8	16.7	15.5	14.8	14.3	15.4	18.2	20.6	23.1	25.3	27.2	29.6	31.6	33.2	33.8	34.0	34.1	33.9	33.4	31.0	28.1	26.2	25.8	24.8	25.3	34.1																						
15-Jul	24.2	23.1	22.3	21.0	19.5	19.7	20.6	23.1	25.3	26.6	28.2	30.1	31.8	32.7	32.4	33.0	32.9	32.4	31.0	29.4	27.9	26.7	25.6	24.7	26.8	33.0																						
16-Jul	23.9	23.1	22.5	21.3	20.2	20.1	21.4	22.9	24.7	23.4	21.8	21.5	21.7	20.9	21.1	23.5	25.2	25.7	25.3	25.3	23.0	21.4	18.4	16.5	22.3	25.7																						
17-Jul	15.3	14.2	13.4	12.8	11.8	12.7	14.9	18.2	21.3	22.7	23.9	25.0	25.9	25.8	26.2	26.4	25.9	25.4	25.7	24.3	21.8	19.7	18.3	17.3	20.4	26.4																						
18-Jul	16.4	15.3	14.6	13.9	13.8	14.7	16.4	19.9	22.5	23.7	24.8	26.0	26.3	27.0	27.8	27.5	26.5	25.8	24.5	22.0	19.5	17.2	16.3	16.1	20.8	27.8																						
19-Jul	16.0	15.6	15.4	15.3	14.9	14.9	16.1	16.4	17.5	19.4	21.0	20.3	20.0	21.5	20.9	19.8	18.6	17.4	16.3	16.5	17.0	15.7	14.4	13.7	17.3	21.5																						
20-Jul	13.5	13.4	12.9	12.0	11.5	12.7	13.8	15.5	18.5	21.0	22.1	22.7	22.3	22.5	22.6	22.6	22.3	22.0	21.2	19.8	17.6	15.5	13.7	12.5	17.7	22.7																						
21-Jul	10.7	9.7	8.7	7.5	7.6	8.6	10.5	14.2	19.0	22.2	23.1	24.2	24.7	25.7	26.0	26.1	26.0	25.6	25.0	21.9	19.6	17.4	15.5	15.0	18.1	26.1																						
22-Jul	14.1	13.5	12.9	12.6	11.9	12.1	14.4	17.8	21.4	23.8	26.4	27.6	29.4	30.4	30.5	30.6	30.9	30.1	29.4	27.5	25.3	23.2	21.5	20.0	22.4	30.9																						
23-Jul	19.0	18.2	16.6	15.8	15.6	16.1	18.3	20.4	23.3	26.2	28.3	27.6	26.4	26.1	28.5	27.3	27.6	26.7	25.9	24.6	23.4	21.6	20.4	19.8	22.6	28.5																						
24-Jul	18.9	18.3	18.1	17.7	17.5	18.2	19.9	21.2	21.8	23.3	23.7	23.4	23.8	26.0	27.5	27.6	28.1	27.3	25.9	26.1	24.9	23.5	22.0	21.6	22.8	28.1																						
25-Jul	21.3	19.8	19.8	19.4	18.8	18.6	19.6	20.9	22.8	24.3	25.5	25.5	26.8	27.2	23.3	21.6	21.9	20.7	21.1	21.6	20.8	19.7	18.6	17.9	21.6	27.2																						
26-Jul	17.5	16.7	16.4	15.7	15.5	16.1	17.7	20.2	23.4	25.3	26.2	27.8	28.0	27.4	27.7	29.2	30.2	29.2	26.1	24.1	23.0	22.0	20.5	19.4	22.7	30.2																						
27-Jul	18.8	17.9	17.2	16.8	16.6	16.9	18.7	21.3	24.4	26.2	28.0	28.9	29.2	29.9	30.3	24.0	20.4	21.7	21.3	21.4	20.2	18.9	18.2	17.4	21.9	30.3																						
28-Jul	16.9	16.7	16.3	15.8	15.9	16.7	17.7	20.0	23.1	25.3	26.9	28.8	30.3	31.3	31.7	31.5	31.7	31.4	31.1	29.3	25.8	23.1	21.7	19.9	24.1	31.7																						
29-Jul	18.7	17.9	17.4	16.9	17.3	19.1	19.7	23.0	23.0	27.4	29.1	31.1	32.4	33.3	32.8	31.5	29.2	30.7	30.6	27.6	26.3	24.6	23.1	22.0	25.2	33.3																						
30-Jul	20.7	19.5	19.2	18.1	17.4	18.0	19.8	22.9	26.6	28.8	30.4	33.0	34.1	35.1	35.4	35.5	35.4	34.5	32.1	30.0	22.3	19.0	19.0	17.9	26.0	35.5																						
31-Jul	17.3	17.1	16.2	15.6	15.4	15.5	16.4	18.0	21.2	23.5	24.7	25.1	25.5	25.7	25.4	20.8	19.3	18.9	18.1	17.6	17.3	17.0	16.6	16.4	19.4	25.7																						
																								17.5	16.7	16.0	15.4	15.0	15.7	17.3	19.8	22.2	24.1	25.3	26.3	26.7	27.1	27.3	26.7	26.5	26.0	25.5	24.3	22.4	20.6	19.3	18.3	Diurnal Average
																								24.2	23.1	22.5	21.3	20.2	20.5	22.4	25.1	27.3	28.8	30.4	33.0	34.1	35.1	35.4	35.5	35.4	34.5	33.4	31.0	28.1	26.7	25.8	24.8	Diurnal Maximum



WBEA NETWORK
Hourly Averages

Ambient Temperature (AT) - C
Barge Landing - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Barge Landing - July 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	5	0.67	0.67
10 - 20	297	39.92	40.59
> 20	442	59.41	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 19 km/h on Jul 30 21:00	Maximum Daily Speed Average: 9.2 km/h on Jul 4	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 30 20:00	Minimum Daily Speed Average: 0.6 km/h on Jul 18	Hours of Data: 743
Maximum Diurnal Speed Average: 4.0 km/h at hour 12	Minimum Diurnal Speed Average: 0.2 km/h at hour 22	Hours of Missing Data: 1
Monthly Average Velocity: 1.7 km/h 212.3 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 7 P ₉₀ = 9 P ₉₉ = 15	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	WSW1	WSW4	WSW2	SSW3	SSE3	SSW2	SSW3	SW4	SW4	SSW4	SW5	SW6	SSW6	WSW6	NNW5	NNE8	ENE5	NE4	ENE4	ENE4	NNE2	NNW3	NNW1	E1	SW0.7	NNE8
2-Jul	ESE1	E1	SSE1	E2	ESE2	SE1	SE3	WSW4	W4	NW4	WNW5	WNW4	NW3	SSE0	E3	E5	SW1	SSW7	S5	SE3	ESE5	ESE8	SE9	SE10	SSE1.7	SE10
3-Jul	SE9	SE8	SSE6	SE6	SE5	SSE4	SE6	SE8	SE9	SE11	SE13	SE13	SSE14	SE8	ESE5	ESE4	ESE5	SSE4	NNW4	NNW6	N7	NNW5	NNW3	NW4	SE4.5	SSE14
4-Jul	WNW4	WSW6	SW4	SSW5	S3	S5	SSW7	SW8	SSW9	SW11	WSW14	WSW15	WSW17	WSW16	WSW17	SW16	WSW16	WSW12	WSW12	WSW12	WSW6	WSW6	SW5	SW4	SW9.2	WSW17
5-Jul	SSW3	SSE2	WNW2	S4	S4	SSW4	SSW5	SSW7	SSW9	SSW9	SW13	SW12	WSW12	SW13	WSW11	WSW9	N3	ENE6	ENE4	NNE1	N4	NNE4	ENE4	W3	SW3.7	SW13
6-Jul	WSW3	NNW3	W1	W3	NW3	SW4	WSW3	WSW4	SW5	W4	SW5	WSW8	NE3	E5	SE5	SE1	SSE3	N1	WSW4	W4	N3	WNW4	WNW5	WNW2	WSW1.8	WSW8
7-Jul	WNW4	WNW4	WNW4	WNW5	NW5	WNW4	W4	WNW3	NNW3	NNW3	WNW4	WNW5	WNW7	NNW6	NNE6	NNE7	NNE7	NNE7	NNE6	NNE5	N3	NW0	S1	SE1	NNW3.1	NNE7
8-Jul	SE2	SSE2	SE4	SW2	SE1	SSE3	SSE4	S7	S9	S9	S9	S9	SSE10	S11	SW11	N7	E8	SE8	SSE7	SSE5	SSE2	S4	SE6	SE3	SSE4.7	S11
9-Jul	SSE5	E1	NNE3	SE6	SSW3	SW3	SE2	SSE4	SSE7	S10	SW12	SW11	SSW13	SW13	SW10	W13	W10	WSW4	SSW7	SSW7	W7	NW10	WNW6	WSW5	SW4.9	W13
10-Jul	W5	WNW5	W2	SW4	WSW9	WSW6	SW5	SW7	SW8	WSW8	W9	WSW12	W10	W8	WSW13	NW15	NW16	NW12	WNW7	WNW5	NW7	NW7	W5	WNW7	W7.1	NW16
11-Jul	W6	NW4	NW5	NNW4	W3	W5	W7	W6	WNW5	WNW5	W9	W10	W10	W10	WNW11	W13	WNW11	NNW9	N11	N9	NNW5	NNW5	NNW5	NNW6	WNW6.0	W13
12-Jul	NNW7	NNW6	NW6	NNW6	NNW5	NNW5	NW5	NNW6	NNW6	NW5	NW5	NNW5	N5	NNW5	NNE3	ENE2	NNE2	NE3	NE4	ENE3	N2	NNW2	NNW2	NE2	NNW3.7	NNW7
13-Jul	N1	NNE1	WNW2	E1	ESE3	ESE4	SE6	SE5	SSW4	S5	SW4	WSW4	WNW6	WNW6	W4	W3	NW4	W5	W4	W2	SE3	ESE3	SE6	SE6	SSW1.4	SE6
14-Jul	SE8	SE5	SE4	SE4	SE3	S2	S5	S8	S8	S7	S8	S8	SSE10	S12	S10	S10	SSW9	SW9	SSW6	S6	SSE5	SSE6	SSW6	SSW8	S6.6	S12
15-Jul	SSW8	SSW7	S8	S6	SSE7	S6	S6	S7	S8	SSE9	S7	S8	S10	SW10	SW9	SSW9	SSW9	S10	SSW7	S6	SSW8	S7	S6	S7	S7.3	SW10
16-Jul	SSW5	SW6	W5	WSW4	WSW3	WSW4	WSW2	WSW3	NNW4	NE7	NNW3	NW4	NNW5	NNW3	SW6	SW10	SW8	SSW7	SW5	SSW5	SW6	N5	ENE6	N1	WSW2.4	SW10
17-Jul	W3	NW2	WNW2	WNW3	W2	W1	WNW2	NW2	NE2	NNE3	NE3	NW4	W4	SW3	WSW3	WSW5	SSW2	SSW1	W1	SSW1	NNW4	N1	NW4	NW4	WNW1.7	WSW5
18-Jul	NW1	WNW3	NNW3	NNW3	NNW3	NNW4	NW3	NW3	NNE4	NE5	NE5	N3	E4	WNW4	WSW7	SSW5	SE5	SE5	SE5	SW10	S6	SW8	SSE0	SE3	WSW0.6	SW10
19-Jul	SSE4	SE5	SE4	ESE2	SE4	SSE2	SW3	WSW7	SW8	WSW9	WSW11	WSW13	WSW11	W12	NW12	NNW7	NW5	NW6	NNW11	N9	N8	NNW6	NW6	WNW5	WNW3.8	WSW13
20-Jul	W4	WSW5	WSW4	WSW3	WSW4	WNW3	WSW3	WSW5	W4	WNW4	NW3	NNW5	N6	N5	NNE4	NNE5	N7	N6	N7	N4	N1	NNW3	NNW0	WNW1	NW2.8	N7
21-Jul	SW3	WSW4	WSW3	SW3	SSW3	WSW3	SW3	WSW4	WSW5	W3	N2	WSW4	NW4	W5	WNW5	NW2	NW1	ESE2	SW3	WSW1	SW1	SE0	W1	S2	WSW2.1	W5
22-Jul	SSE2	SSE2	SSE4	SSE2	SE4	SE4	SSE4	S5	S6	S7	S6	S8	SSW6	S7	SSW6	SSW6	SSW6	S7	S6	SE6	SE6	SE7	SE7	SE5	SSE4.9	S8
23-Jul	SE6	SE6	SE3	SE4	SE3	ESE2	WNW1	WNW2	NW2	WNW4	SSE4	SE11	SE13	E6	SE11	ESE14	SE13	ESE8	ESE6	E3	ESE3	SSE5	S1	SSE1	SE4.6	ESE14
24-Jul	SE2	SE6	SE6	SSE5	SE4	SSE6	SSE6	SE6	SE6	SSW2	SSE5	SE7	SE9	SSE8	SE6	SE8	ESE10	SE9	ESE7	ESE5	ESE4	E3	NE2	SE5.4	ESE10	
25-Jul	ENE4	NE1	NNW1	NNE3	N5	N5	N5	NE7	NE6	NE6	NE6	ENE4	ENE6	E6	ENE6	NW5	W4	NNW4	WNW3	W3	WNW3	NW2	WNW1	SE1	NNE2.6	NE7
26-Jul	NE1	NNW1	NE2	ENE2	NE2	ENE1	SSE0	NNW1	WNW3	NW4	NW5	W5	WNW5	NW2	NNE3	WNW2	WSW8	SW5	ENE3	NW3	SW2	SW3	SSE2	SE2	WNW1.2	WSW8
27-Jul	SE4	SSE4	S3	SSE3	SSE4	SSE5	SSE4	S7	S6	SSW7	SSW7	SSW8	SSW9	SW8	SW6	ESE13	SSE7	SSE7	SSE8	S7	SE5	SSE4	SE5	SE5	S5.2	ESE13
28-Jul	SSE4	S5	SSE5	SSE5	SSE7	SSE7	S8	S7	S6	S7	S8	SSW8	S7	SSW8	SW9	SW7	SW7	SW6	SSW5	S3	SSE4	SE3	SE3	WSW1	S5.3	SW9
29-Jul	SE3	S4	SSE4	SSW2	SSE3	NNW2	ENE2	W1	W3	SW3	S5	S6	S6	SSW5	SW5	NW3	NW6	NW5	NW1	AF	SE6	SE6	SE8	SSE6	S2.1	SE8
30-Jul	ESE3	ESE2	SE4	ESE3	ESE4	SE4	S4	S6	S6	S6	S6	SSW6	SSW8	S8	S6	SSW5	S6	SSE9	SSE7	SE0	NW19	ENE7	ESE4	SSW5	S3.4	NW19
31-Jul	W4	WNW5	SE2	SSE4	S2	ESE2	SSE3	SSE4	ENE2	NE5	NE7	NNE9	N10	NNE9	NNE10	N11	N7	NNW7	N4	N8	NNW9	N8	N9	N9	N4.3	N11

SSW1.4SSW1.3SSW1.2	S1.4	S1.5SSW1.6SSW2.1SSW3.0SSW2.9SSW2.6	SW3.3	SW4.0	SW3.5	SW3.3	SW3.2	WSW2.0	SW1.6SSW1.0SSW0.7WSW0.8	NW0.7	NW0.2	SSE0.7SSW0.9	Diurnal Average												
SE9	SE8	S8	S6	WSW9	SSE7	S8	SE8	SSW9	SE11	WSW14	WSW15	WSW17	WSW16	WSW17	SW16	NW16	WSW12	WSW12	WSW12	NW19	NW10	SE9	SE10	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 - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 9 km/h on Jul 30 21:00	Hours of Data: 743
Minimum Value: 0 km/h on Jul 20 22:00	Hours of Missing Data: 1
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 5	Hours of Calibration: 0
	Percent Operational Time: 99.9

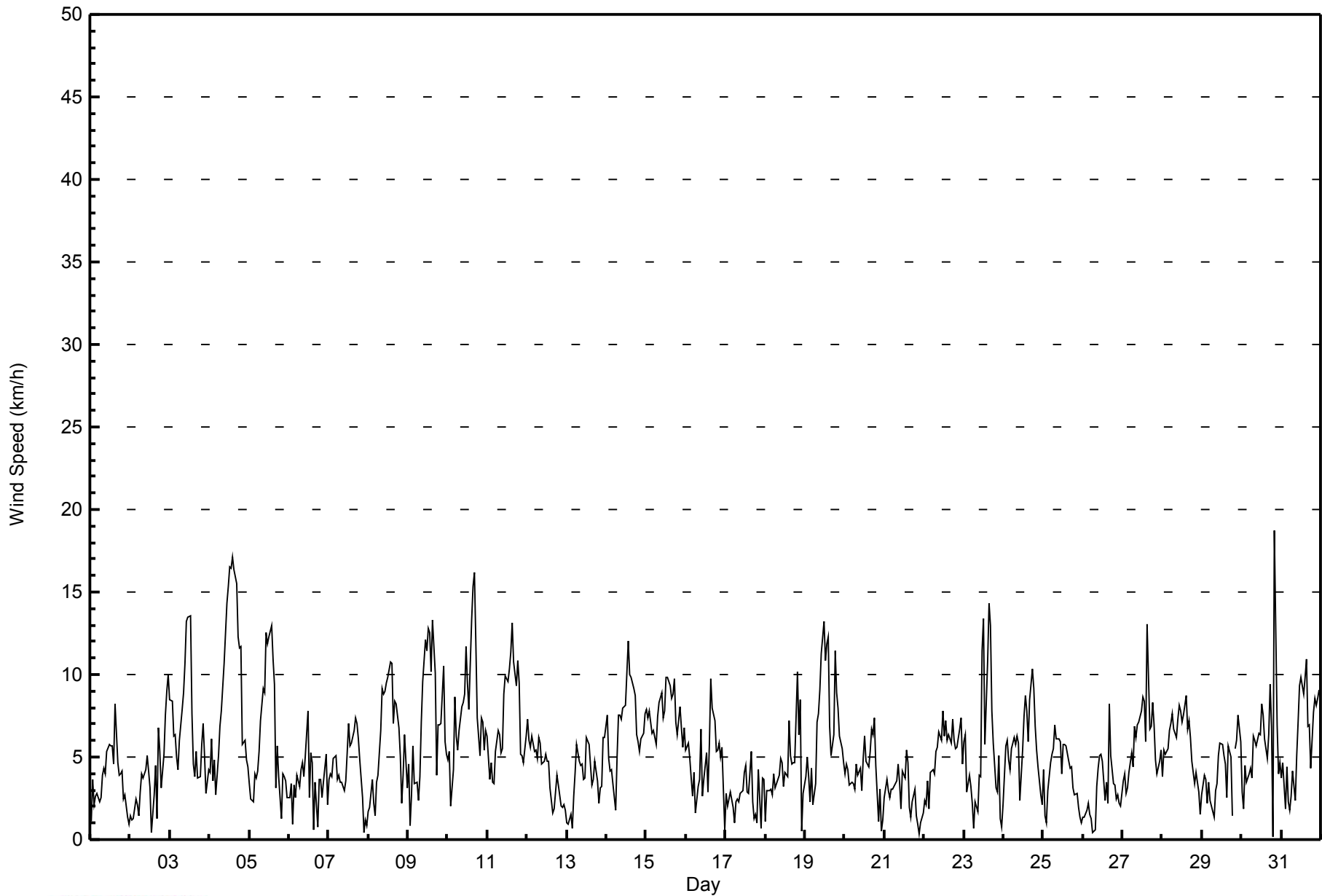
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	2	1	1	1	1	1	1	1	2	2	2	2	3	3	5	4	2	1	1	1	1	1	1	1	5
2-Jul	1	1	2	1	1	1	1	1	2	1	2	2	2	2	2	2	2	2	2	1	1	2	2	3	3
3-Jul	2	2	2	1	1	1	2	3	3	4	4	5	6	3	2	2	3	2	1	2	2	2	1	1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

AF - Analyzer Failure



WBEA NETWORK
Hourly Averages

Wind Speed (WS) - km/h
Barge Landing - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Barge Landing - July 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	436	58.68	58.68
6 - 11	271	36.47	95.15
12 - 19	36	4.85	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: 743

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Wind Speed (WS) - km/h
Barge Landing - July 2014

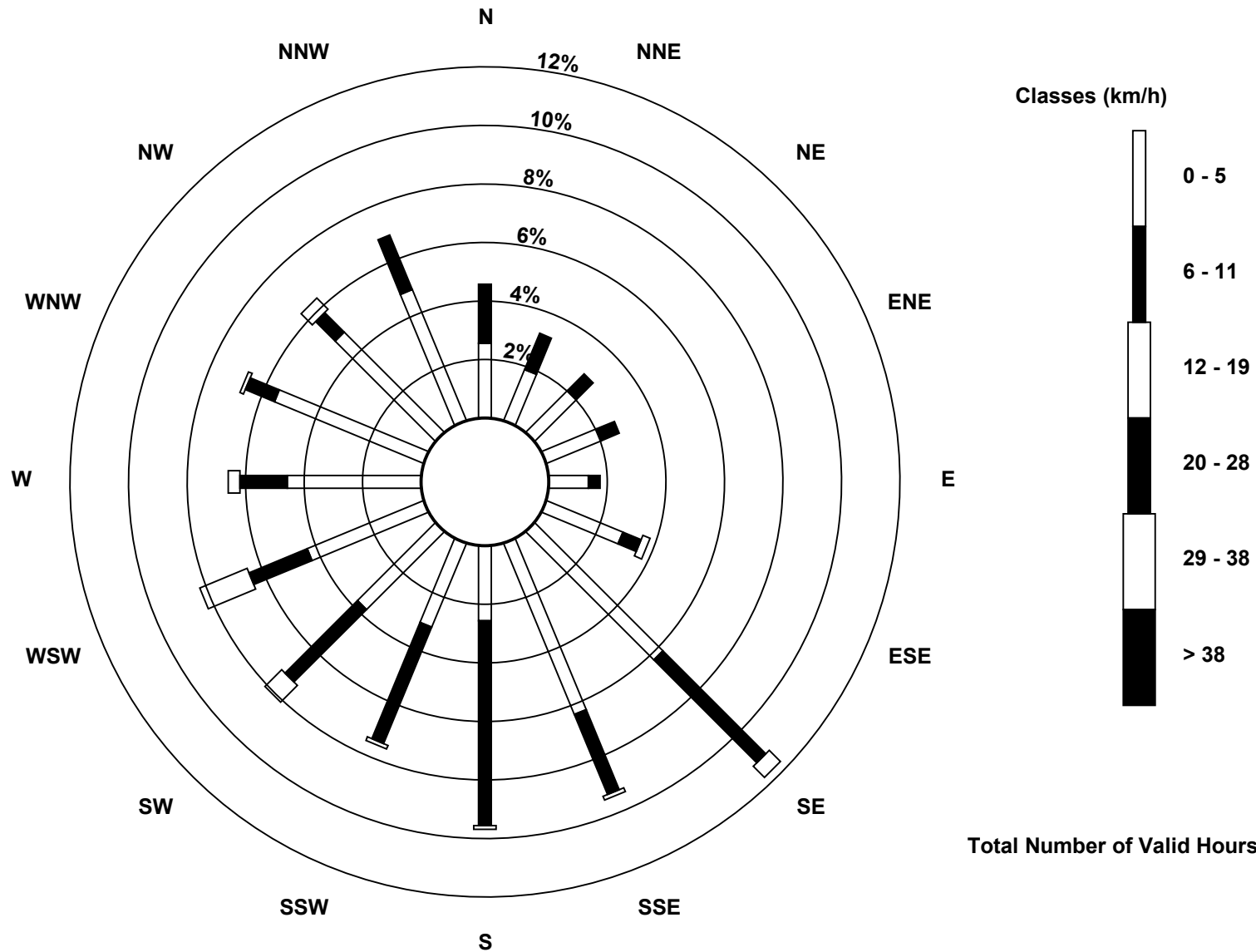
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	19	14	15	15	10	21	46	47	19	23	28	32	34	41	36	36	436
6 - 11	15	10	6	5	3	5	37	22	52	32	26	16	12	8	7	15	271
12 - 19	0	0	0	0	0	2	4	1	1	1	6	13	3	1	4	0	36
20 - 28	0	0	0	0	0	0	0	0	0	0	0	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	34	24	21	20	13	28	87	70	72	56	60	61	49	50	47	51	743

Total Number of Valid Hours: 743

Total Number of Hours: 744

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

**Wind Speed (WS) - km/h
Barge Landing (AMS 9)**



Total Number of Valid Hours: 743



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Barge Landing - July 2014

Direction of Maximum Speed: 316 deg on Jul 30 21:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 234.4 deg on Jul 4	Hours of Data: 743
Direction of Minimum Speed: 131 deg on Jul 30 20:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 0.6 deg on Jul 18	Percent Operational Time: 99.9
Monthly Average Direction: 250.7 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	244	237	254	213	168	208	197	223	214	201	218	228	203	254	341	26	62	51	67	57	26	348	346	81	229.6
2-Jul	121	99	160	97	118	134	127	244	270	314	291	299	311	156	91	101	219	192	185	130	116	121	134	138	149.6
3-Jul	141	145	147	146	145	149	145	142	144	142	140	142	157	139	103	104	108	158	328	341	353	344	328	316	136.9
4-Jul	284	254	215	208	179	184	206	218	213	222	238	241	242	241	239	233	238	240	248	248	245	238	226	222	234.4
5-Jul	199	162	288	169	170	206	194	196	198	201	223	234	248	235	242	248	0	61	71	14	355	20	65	279	223.2
6-Jul	255	337	259	265	307	221	239	242	231	263	236	239	37	79	124	137	149	2	244	265	350	291	300	303	256.4
7-Jul	299	289	293	302	308	291	268	282	298	336	303	302	293	336	16	16	19	17	23	27	3	314	177	139	330.7
8-Jul	135	147	132	219	141	157	152	183	174	172	170	173	162	184	221	2	98	125	148	148	166	174	140	144	161.8
9-Jul	154	100	27	127	198	217	124	168	161	191	223	217	192	222	226	269	274	250	193	200	262	309	296	258	223.3
10-Jul	276	301	280	232	249	249	236	235	236	244	263	258	270	276	257	304	313	315	302	282	310	317	274	287	276.8
11-Jul	270	313	311	347	269	260	273	276	289	290	260	273	276	278	287	279	298	347	10	4	345	342	345	342	301.2
12-Jul	338	340	324	338	336	340	308	331	329	316	315	339	351	343	24	58	17	51	44	64	1	338	329	48	344.1
13-Jul	10	21	295	83	104	117	136	141	200	170	227	243	284	284	268	266	306	259	267	270	144	114	141	145	204.9
14-Jul	144	142	129	132	142	187	171	178	172	180	173	183	167	172	179	189	195	214	205	181	167	168	195	193	176.4
15-Jul	207	192	190	179	165	173	178	169	178	168	172	170	180	229	229	216	195	187	202	191	192	186	189	187	189.4
16-Jul	194	228	260	246	238	246	254	242	343	47	346	321	336	346	228	232	228	205	215	206	223	0	78	1	244.9
17-Jul	274	313	302	283	262	274	296	324	46	27	41	318	270	219	239	243	212	207	275	213	333	360	321	318	292.7
18-Jul	312	287	332	334	327	335	313	317	24	49	49	6	97	301	249	195	137	127	134	227	171	233	165	143	247.6
19-Jul	165	134	127	113	142	158	229	238	234	248	245	248	248	268	312	341	306	325	345	349	349	339	322	303	282.4
20-Jul	281	253	258	254	257	286	248	249	277	292	318	343	350	1	28	21	10	8	359	349	350	335	328	294	323.5
21-Jul	233	245	251	226	211	248	228	239	251	260	9	245	309	271	285	316	307	115	214	242	232	140	263	169	251.3
22-Jul	156	162	163	149	127	144	149	175	184	180	183	173	192	191	193	192	205	175	169	143	129	137	142	142	167.5
23-Jul	141	143	143	125	129	115	282	289	323	285	161	139	141	92	134	123	125	115	103	97	106	147	175	165	130.3
24-Jul	142	126	142	155	144	155	152	144	137	144	208	166	160	128	163	137	129	120	125	110	107	103	89	49	135.9
25-Jul	64	54	328	29	357	354	351	47	54	36	38	63	72	88	67	324	277	342	296	273	302	311	283	140	21.9
26-Jul	34	333	41	69	42	74	151	342	283	309	315	276	285	309	30	283	239	231	61	326	222	215	161	133	288.9
27-Jul	145	162	189	167	160	150	149	174	176	192	202	212	203	226	218	115	152	163	158	189	134	159	146	139	171.1
28-Jul	157	174	161	156	154	168	174	180	191	177	174	194	189	199	227	229	216	223	213	181	149	140	132	253	185.3
29-Jul	125	185	154	211	160	337	63	265	268	218	171	177	173	196	223	308	323	318	317	AF	136	144	143	148	179.6
30-Jul	119	105	144	113	122	135	169	185	187	182	179	211	199	188	173	200	175	148	150	131	316	67	114	213	171.8
31-Jul	270	294	139	165	183	115	152	165	67	56	39	12	11	28	20	350	355	344	351	350	342	350	357	352	4.8

192.6 204.1 195.5 178.0 177.1 194.0 193.8 204.6 204.5 203.1 216.1 223.8 215.8 228.3 234.7 253.9 234.7 194.7 192.5 241.1 304.2 314.3 153.7 196.5
 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
Barge Landing - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 104 deg on Jul 2 17:00	Hours of Data: 743
Minimum Value: 8 deg on Jul 21 02:00	Hours of Missing Data: 1
	Hours of Calibration: 0
	Percent Operational Time: 99.9
Percentiles: P ₁ = 10 P ₁₀ = 18 Q ₁ = 24 Median = 32 Q ₃ = 46 P ₉₀ = 62 P ₉₉ = 90	

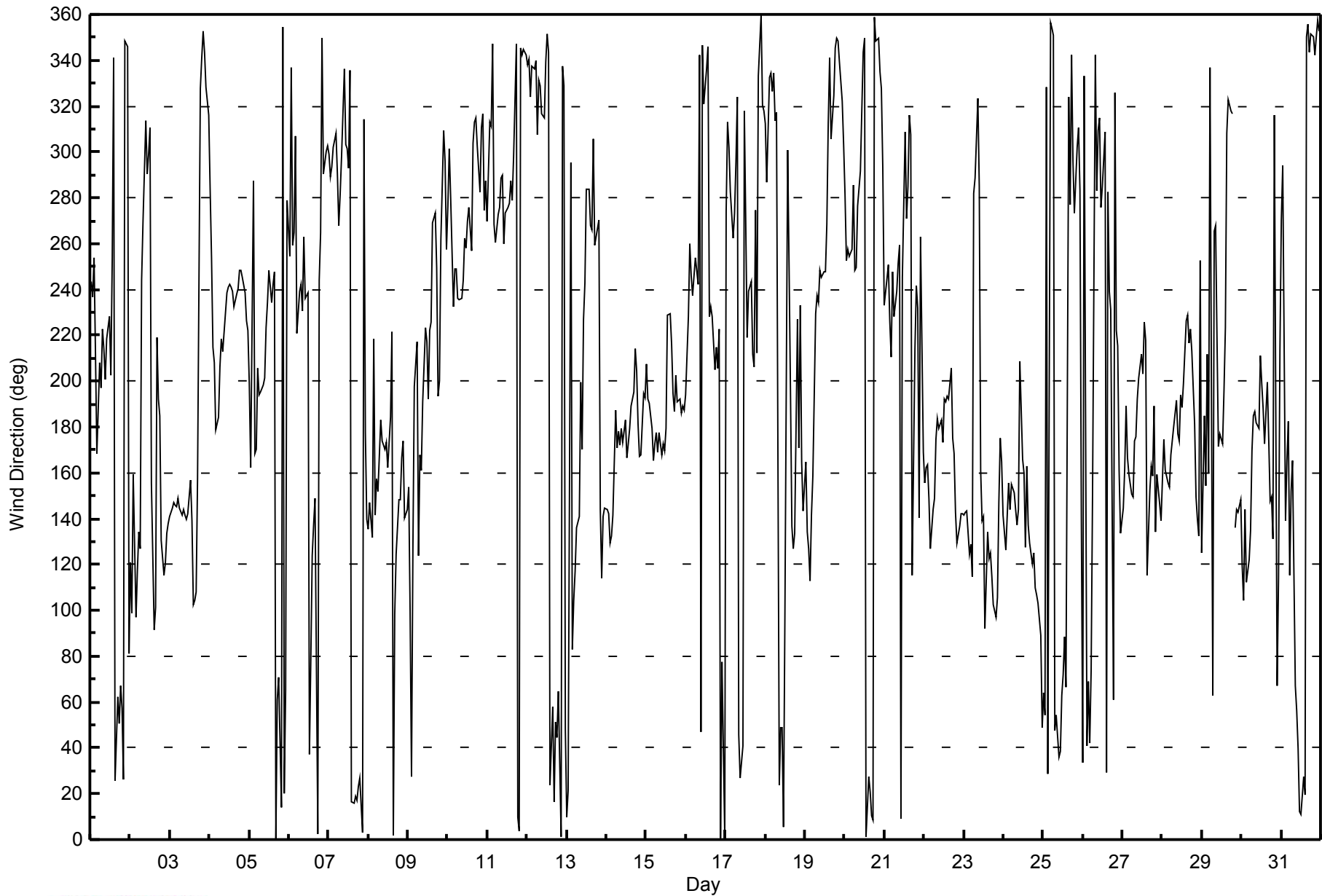
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	81	24	28	55	31	29	33	26	38	56	46	55	52	41	73	35	34	28	29	24	27	24	59	40	81
2-Jul	24	47	57	12	28	29	27	35	46	34	44	55	78	101	78	61	104	35	23	18	12	12	15	13	104
3-Jul	14	14	17	14	15	21	24	21	25	24	23	22	28	20	26	56	36	65	35	24	25	21	29	19	65
4-Jul	62	57	52	32	51	28	31	25	25	29	24	24	26	26	27	24	24	26	26	27	22	14	18	20	62
5-Jul	42	53	60	37	22	25	23	28	31	31	24	31	32	29	36	33	74	32	25	65	28	55	59	45	74
6-Jul	52	31	91	43	80	34	40	33	28	65	44	46	82	40	73	93	53	95	44	27	59	23	41	77	95
7-Jul	24	22	23	15	16	25	26	43	39	39	45	36	35	57	39	27	28	25	27	24	25	64	65	88	88
8-Jul	60	46	20	32	59	41	37	26	27	31	31	33	32	34	37	43	26	22	22	17	71	29	12	60	71
9-Jul	51	83	64	51	28	28	57	50	32	35	23	27	29	24	28	36	33	58	29	25	51	26	32	28	83
10-Jul	40	32	56	54	25	45	25	35	26	32	36	34	39	39	32	36	24	25	30	39	36	31	36	31	56
11-Jul	38	57	47	48	52	34	31	32	32	45	34	37	37	39	35	34	36	38	23	25	22	17	15	18	57
12-Jul	19	18	14	17	15	22	20	24	27	39	46	47	60	54	66	89	78	58	27	24	40	34	51	25	89
13-Jul	68	77	47	77	15	16	23	53	55	62	75	73	41	42	62	76	53	41	32	33	50	14	11	10	77
14-Jul	10	10	12	12	15	58	29	28	34	35	35	36	33	30	34	32	37	31	28	20	15	14	23	21	58
15-Jul	25	24	25	25	20	24	22	30	31	30	35	37	30	25	24	30	29	28	27	22	21	20	22	21	37
16-Jul	28	25	26	25	24	14	46	45	47	26	23	23	25	58	36	23	26	30	28	31	26	72	30	37	72
17-Jul	20	28	27	43	28	51	40	48	78	76	68	59	61	85	85	30	66	60	45	76	54	55	39	25	85
18-Jul	55	22	30	12	23	18	26	43	52	44	50	73	58	79	49	56	33	18	25	25	35	36	95	35	95
19-Jul	27	18	13	20	18	73	49	24	25	26	23	22	25	36	30	28	42	53	24	24	24	24	14	18	73
20-Jul	23	24	40	48	32	22	35	31	44	39	73	44	37	49	51	47	31	28	25	21	51	9	45	34	73
21-Jul	12	8	11	18	18	18	19	18	27	54	79	66	74	50	48	86	85	65	52	16	59	88	64	88	88
22-Jul	61	33	23	49	16	17	34	31	34	29	39	34	50	43	55	59	46	30	32	14	13	12	11	30	61
23-Jul	15	10	17	14	14	37	76	35	71	33	88	20	20	25	29	16	23	24	23	27	24	24	74	84	88
24-Jul	61	14	15	17	30	17	24	22	21	32	56	38	26	25	34	27	26	20	19	20	18	24	33	37	61
25-Jul	35	62	77	42	23	29	28	27	28	29	34	43	33	29	38	35	38	52	37	32	32	30	63	90	90
26-Jul	54	62	25	27	41	75	83	90	46	35	37	41	49	43	27	80	24	65	53	24	47	25	41	42	90
27-Jul	37	27	59	26	12	18	32	31	40	38	43	44	36	33	50	27	39	26	25	24	18	25	27	20	59
28-Jul	30	18	18	15	16	23	26	30	32	31	32	35	45	47	36	52	37	33	26	17	10	19	14	43	52
29-Jul	46	33	34	62	43	95	69	87	58	53	48	50	55	55	46	29	19	23	47	AF	24	12	13	11	95
30-Jul	30	51	14	11	10	17	42	28	37	36	45	46	41	40	50	54	41	25	17	78	24	58	56	37	78
31-Jul	37	27	82	20	49	40	59	49	55	36	30	28	29	27	30	27	35	31	49	24	22	23	24	25	82
	81	83	91	77	80	95	83	90	78	76	88	73	82	101	85	93	104	95	53	78	71	88	95	90	
	Diurnal Maximum																								

AF - Analyzer Failure



WBEA NETWORK
Hourly Averages

Wind Direction (WD) - deg
Barge Landing - July 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	July 4, 2014	Previous Calibration	June 13, 2014
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	12:50
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	-690	-689
Analyzer Range (input)	5000	5000	Lamp voltage	1110	993
Calculated slope	0.992529	0.989481	Chamber temp.	45	45
Calculated intercept	-0.073249	-0.045125	Pressure	566	574.1
Analyzer Background	3.69	2.27	Flow	0	0.373
Analyzer Coefficient	1.127	0.978	Intensity	90	31
			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	-0.9	NA
as found span	5000	83.8	79.9	91.1	0.878
SO2 scrubber check	5000	10.1	119.2	-0.9	NA
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	83.8	79.9	80.8	0.989
second point	5000	41.9	40.0	40.5	0.986
third point	5000	21.0	20.0	20.2	0.993
calibrator zero	6000	0.0	0.0	0.1	NA
as left zero	6000	0.0	0.0	0.3	NA
as left span	5000	83.7	79.8	81.0	0.986
Average Correction Factor					0.989

Corrected As found	92.0	Previous response	80.6	% change	-12.4%
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Notes:

Adjusted Zero and span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

TRS Calibration Summary

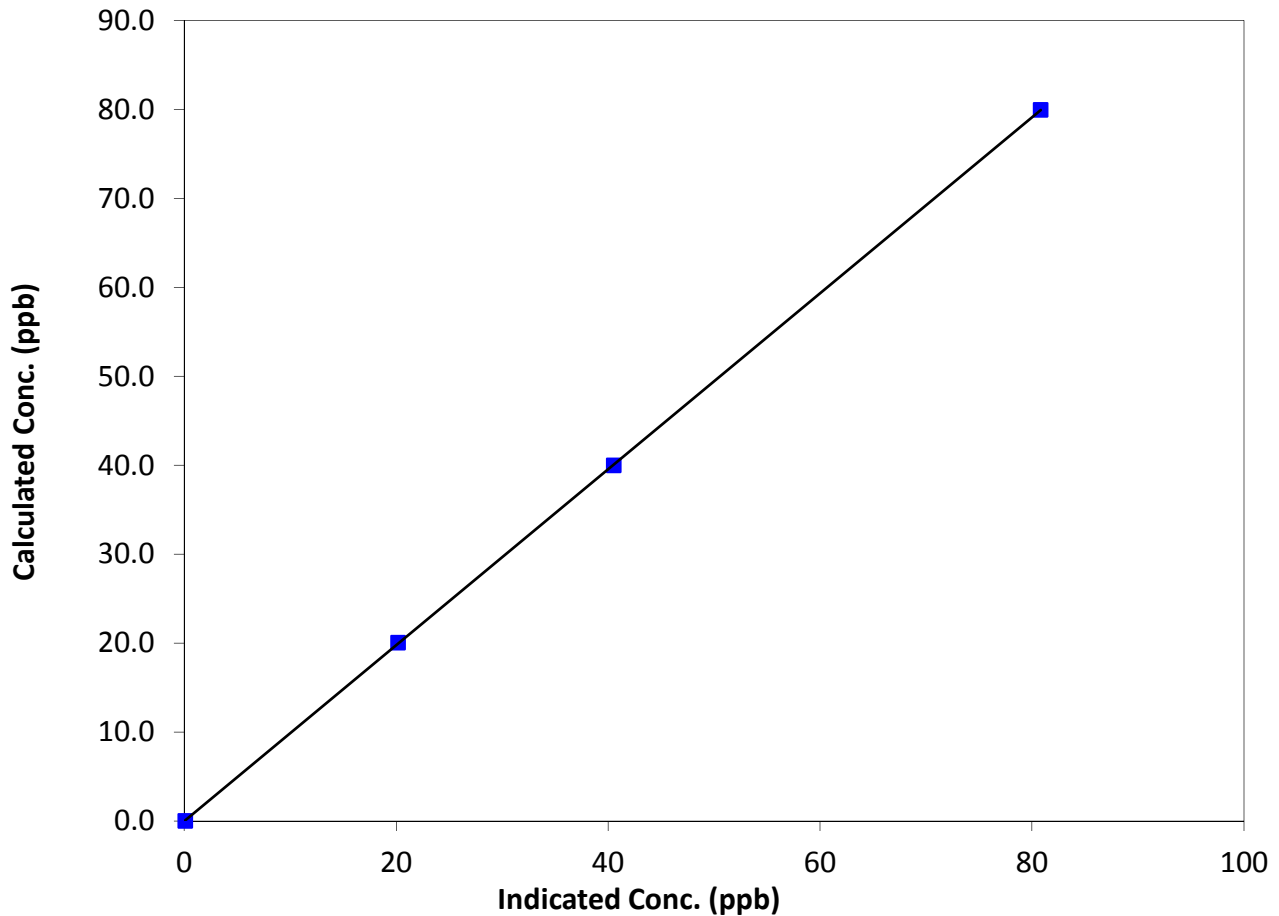
Station Information

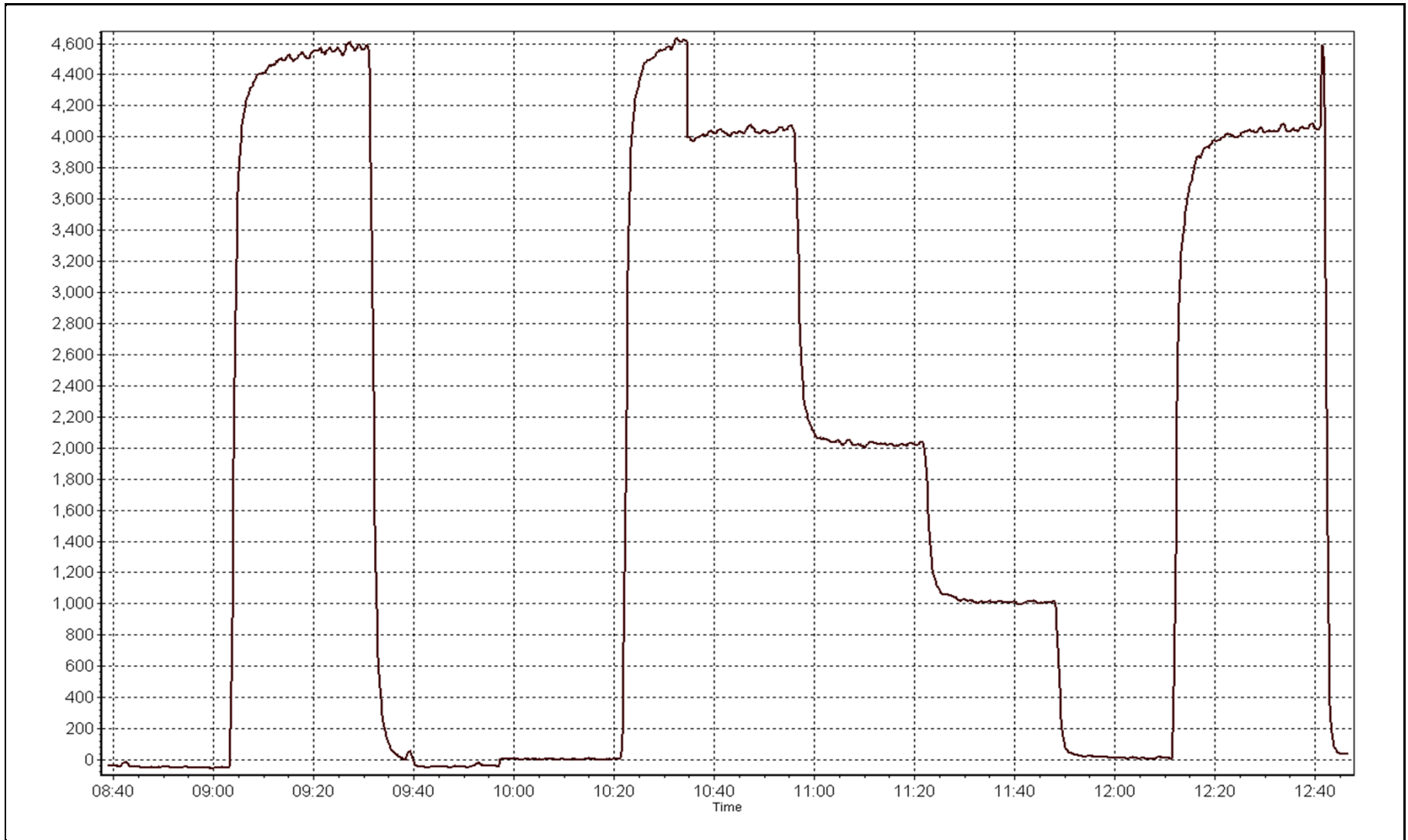
Calibration Date	July 4, 2014	Previous Calibration	June 13, 2014
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	8:40	End Time (MST)	12:50
Analyzer make	Thermo 45C	Analyzer serial #	328702540

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999993
79.9	80.8	0.9891		
40.0	40.5	0.9861	Slope	0.989481
20.0	20.2	0.9931		
			Intercept	-0.045125

TRS Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Tuesday, July 08, 2014	Previous Calibration	Monday, June 16, 2014
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:30
Barometric Pressure	730 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
Gas Cert Reference	139843	Cal Gas Expiry Date	11/24/2012
CH4 Cal Gas Conc.	494 ppm	CH4 Equiv Conc.	1049.5 ppm
C3H8 Cal Gas Conc.	202 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	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	0.988827	1.000559	Fuel Pressure	24.1	24.1
Calculated intercept	0.192821	-0.107497	BKG	6.11	5.68
			COEF	4.370	4.179

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	-0.15	N/A
as found span	6000	89.7	15.69	16.08	0.976
calibrator zero	6000	0.0	0.00	0.03	N/A
high point	6000	89.7	15.69	15.75	0.996
second point	6000	48.0	8.40	8.54	0.983
third point	6000	18.0	3.15	3.33	0.945
calibrator zero	6000	0.0	0.00	0.03	N/A
as left zero	6000	0.5	0.09	0.23	N/A
as left span	6000	89.7	15.69	16.03	0.979
Average Correction Factor					0.975

Corrected As found	16.23	Previous response	15.67	% change	-3.4%
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Notes:

Hydrogen cylinder replaced after as founds. Zero and span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

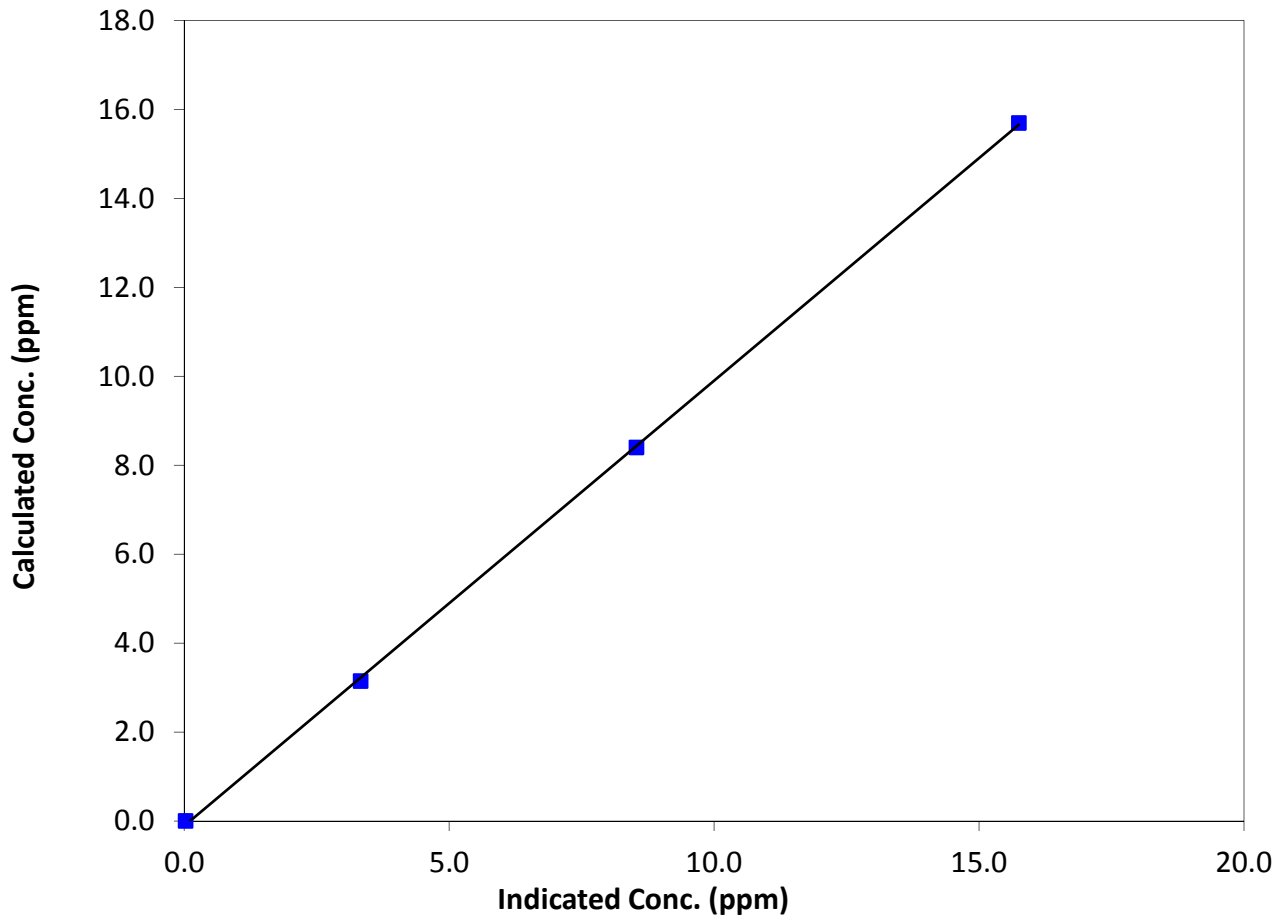
Station Information

Calibration Date	July 8, 2014	Previous Calibration	June 16, 2014
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	9:00	End Time (MST)	12:30
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

Calibration Data

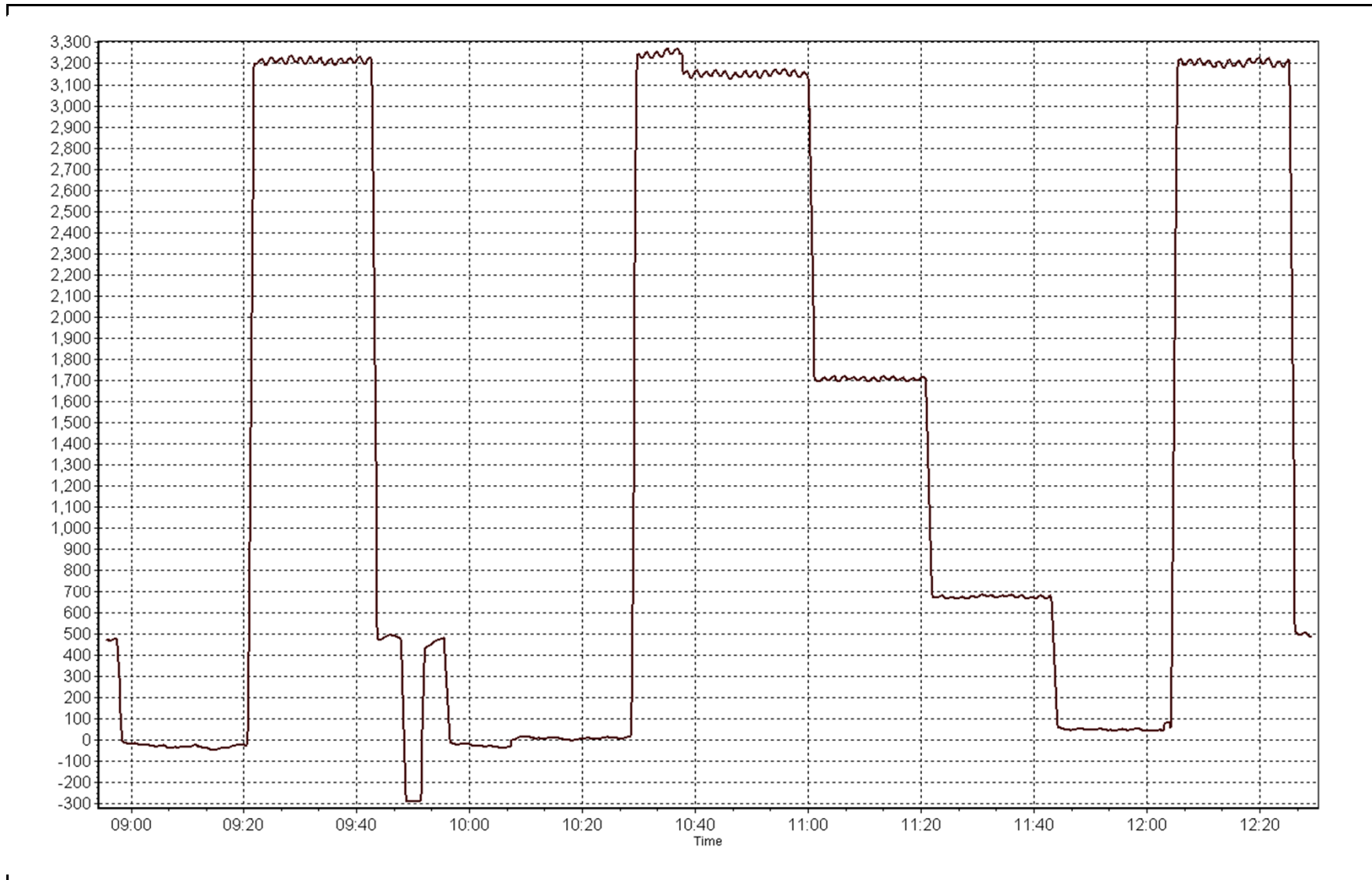
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	N/A	Correlation Coefficient	0.999891
15.69	15.75	0.9961		
8.40	8.54	0.9833	Slope	1.000559
3.15	3.33	0.9449		
			Intercept	-0.107497

THC Calibration Curve



THC Calibration Plot

Date: July 8, 2014



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 11 LOWER CAMP JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
 JULY 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	35	36	99.87	45	0	11	0
H2S (ppb) Average	707	36	37	99.87	7	0	2	0
THC (ppm) Average	707	36	37	99.87	4.3	-	3.1	-
Temperature (C) Average	744	0	0	100.00	34.3	-	25.3	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	27	-	-	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
 JULY 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1	3	-	0	0	0	0	1	1	45
H2S (ppb) Average	707	0.6	1	-	0	0	0	0	1	1	7
THC (ppm) Average	707	2.35	0.4	-	1.8	2	2.1	2.3	2.5	2.8	4.3
Temperature 2 m (C) Average	744	20.76	5	-	8	14.3	16.9	20.4	24.3	27.6	34.3
Wind Speed 10 m (km/h) Average	744	7.7	5	-	0	2	4	7	10	15	27
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
JULY 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	16 Jul 2014 11:00	16 Jul 2014 11:00	1	Maintenance - Station operator on site

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Summary of Hour Averages

Lower Camp - July 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 45 ppb on Jul 21 10:00	Maximum Daily Average: 10.9 ppb on Jul 21		Hours of Data:	708
Minimum Value: 0 ppb on Jul 1 04:00	Minimum Daily Average: 0.0 ppb on Jul 3		Hours of Missing Data:	36
Maximum Diurnal Average: 2.2 ppb at hour 17	Minimum Diurnal Average: 0.4 ppb at hour 1		Hours of Calibration:	35
Monthly Average: 1.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 15		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0	Z	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	1
3-Jul	0	Z	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	2	2	2	2	0.5	2
5-Jul	2	Z	1	1	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.4	2
6-Jul	0	Z	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
7-Jul	0	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-Jul	0	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-Jul	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
10-Jul	1	Z	1	1	1	0	1	1	1	2	1	1	1	1	3	1	0	0	0	1	2	1	1	0	1.0	3
11-Jul	0	Z	0	0	0	1	1	1	1	C	C	C	C	1	1	1	2	1	1	1	1	0	0	0	0.6	2
12-Jul	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0.4	1
13-Jul	0	Z	0	0	0	0	0	0	0	1	0	1	1	1	2	3	3	2	1	1	1	0	0	0	0.9	3
14-Jul	0	Z	0	0	0	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.7	1
15-Jul	0	Z	0	0	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.9	2
16-Jul	1	Z	1	1	1	1	1	1	1	1	M	1	0	0	1	1	1	1	1	1	2	2	1	1	0.7	2
17-Jul	0	Z	0	0	0	0	0	0	1	1	1	4	11	4	11	18	7	3	2	2	1	1	1	1	3.1	18
18-Jul	1	Z	1	0	0	0	0	0	1	1	1	1	1	2	3	3	4	1	1	2	1	1	1	1	1.1	4
19-Jul	1	Z	1	0	0	0	1	1	1	1	1	2	1	1	2	3	4	1	1	1	1	1	1	1	1.0	4
20-Jul	1	Z	1	2	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.7	2
21-Jul	0	Z	0	0	0	0	0	0	2	45	41	14	24	6	8	24	37	27	10	6	3	2	1	1	10.9	45
22-Jul	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	2	0	0	0	0	0	0	0.6	2
23-Jul	0	Z	0	0	0	0	0	0	0	0	1	6	2	1	1	0	0	0	0	0	0	0	0	0	0.8	6
24-Jul	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
25-Jul	1	Z	1	1	1	1	1	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0.5	1
26-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	1	1	1	0.4	1
27-Jul	1	Z	1	1	1	0	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
28-Jul	0	Z	1	3	3	2	2	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0.9	3
29-Jul	0	Z	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.5	1
30-Jul	1	Z	1	1	1	1	1	1	1	1	0	1	1	1	0	1	0	0	1	1	0	0	0	0	0.5	1
31-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0

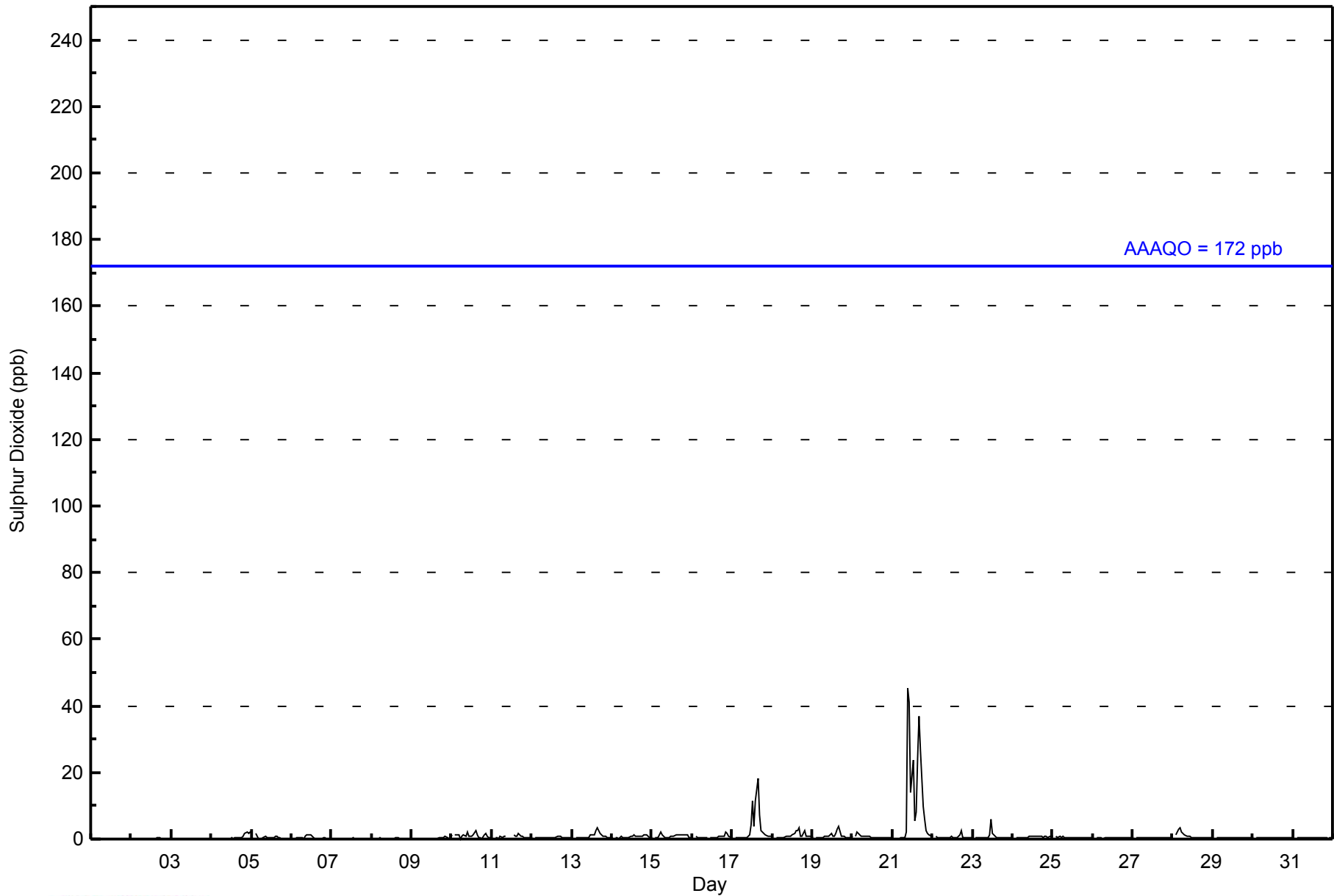
0.4	--	0.5	0.5	0.5	0.5	0.4	0.4	0.5	2.0	1.9	1.3	1.7	0.8	1.3	2.1	2.2	1.5	0.8	0.8	0.7	0.6	0.4	0.4	Diurnal Average	
2	--	1	3	3	2	2	1	2	45	41	14	24	6	11	24	37	27	10	6	3	2	2	2	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Lower Camp - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Lower Camp - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	698	98.59	98.59
11 - 20	4	0.56	99.15
21 - 60	6	0.85	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Lower Camp - July 2014

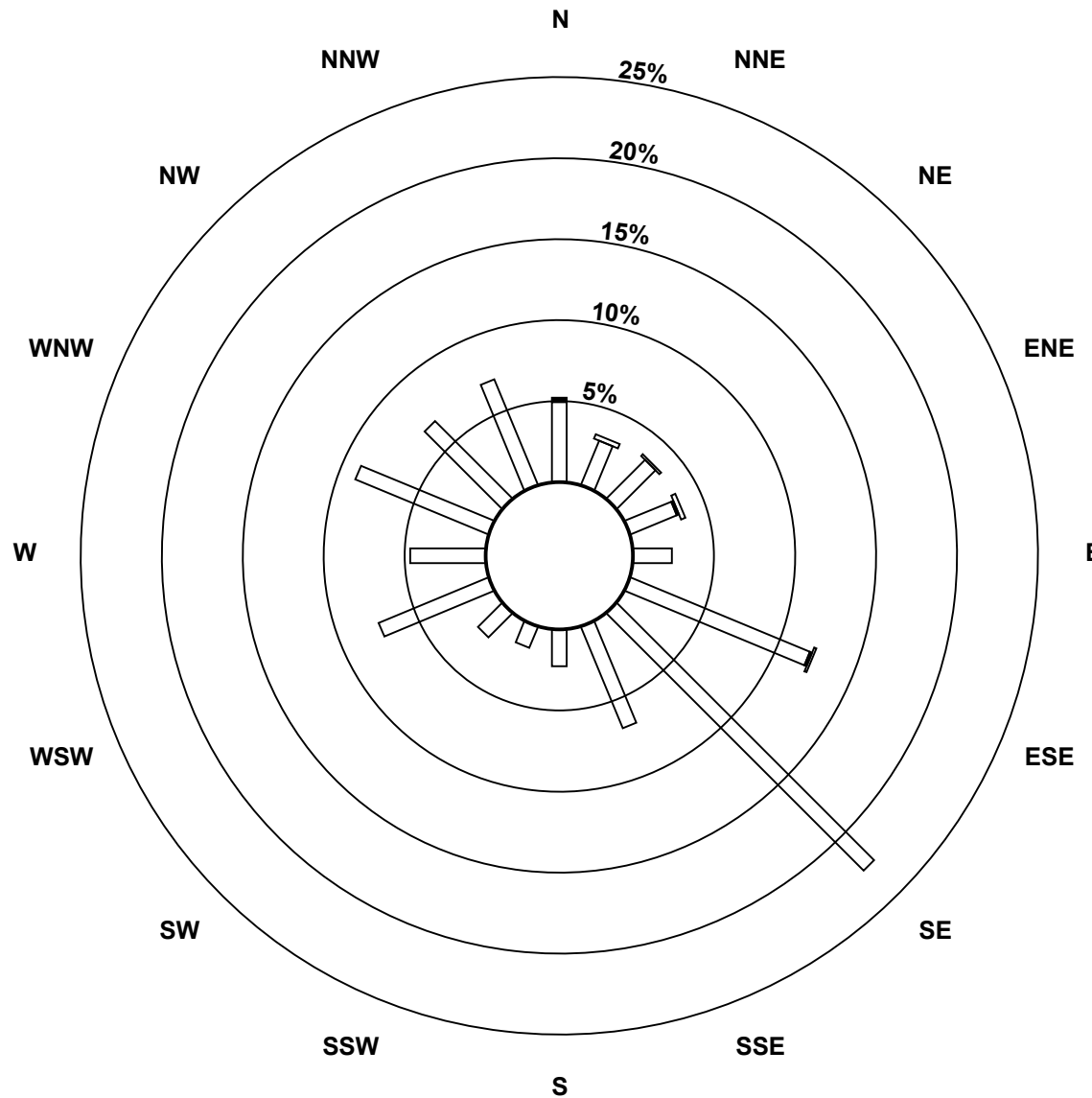
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	35	21	24	22	17	85	159	48	16	10	15	52	33	63	48	50	698
11 - 20	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	4
21 - 60	0	2	1	2	0	1	0	0	0	0	0	0	0	0	0	0	6
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	37	23	25	25	17	87	159	48	16	10	15	52	33	63	48	50	708

Total Number of Valid Hours: 708

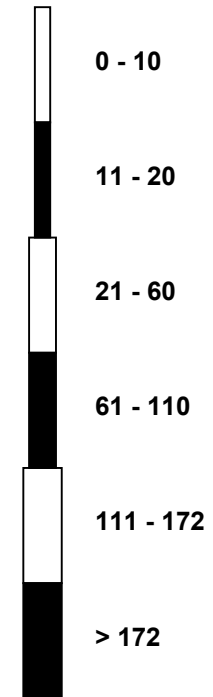
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Sulphur Dioxide (SO₂) - ppb
Lower Camp (AMS 11)



Classes (ppb)



Total Number of Valid Hours: 708

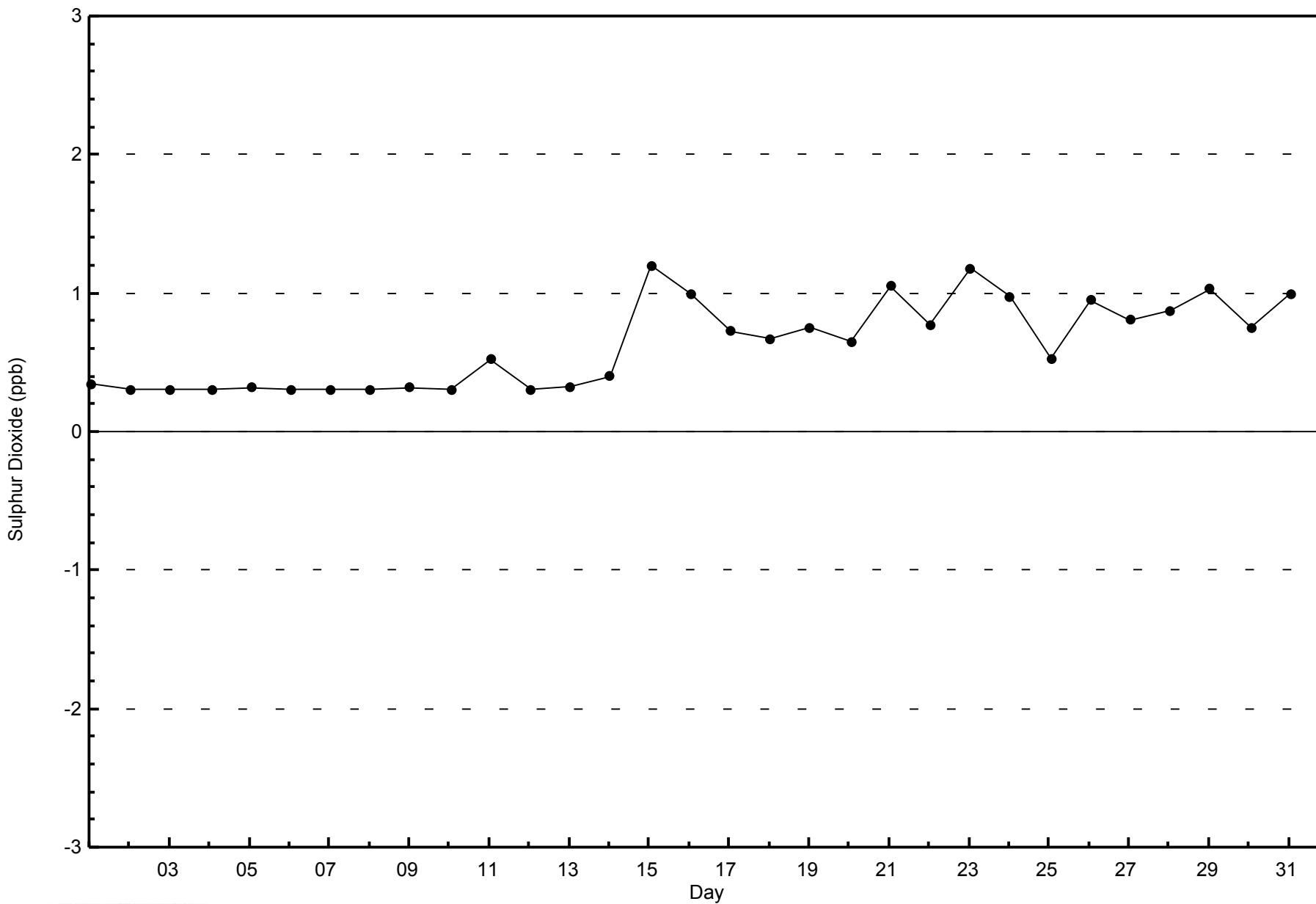


WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

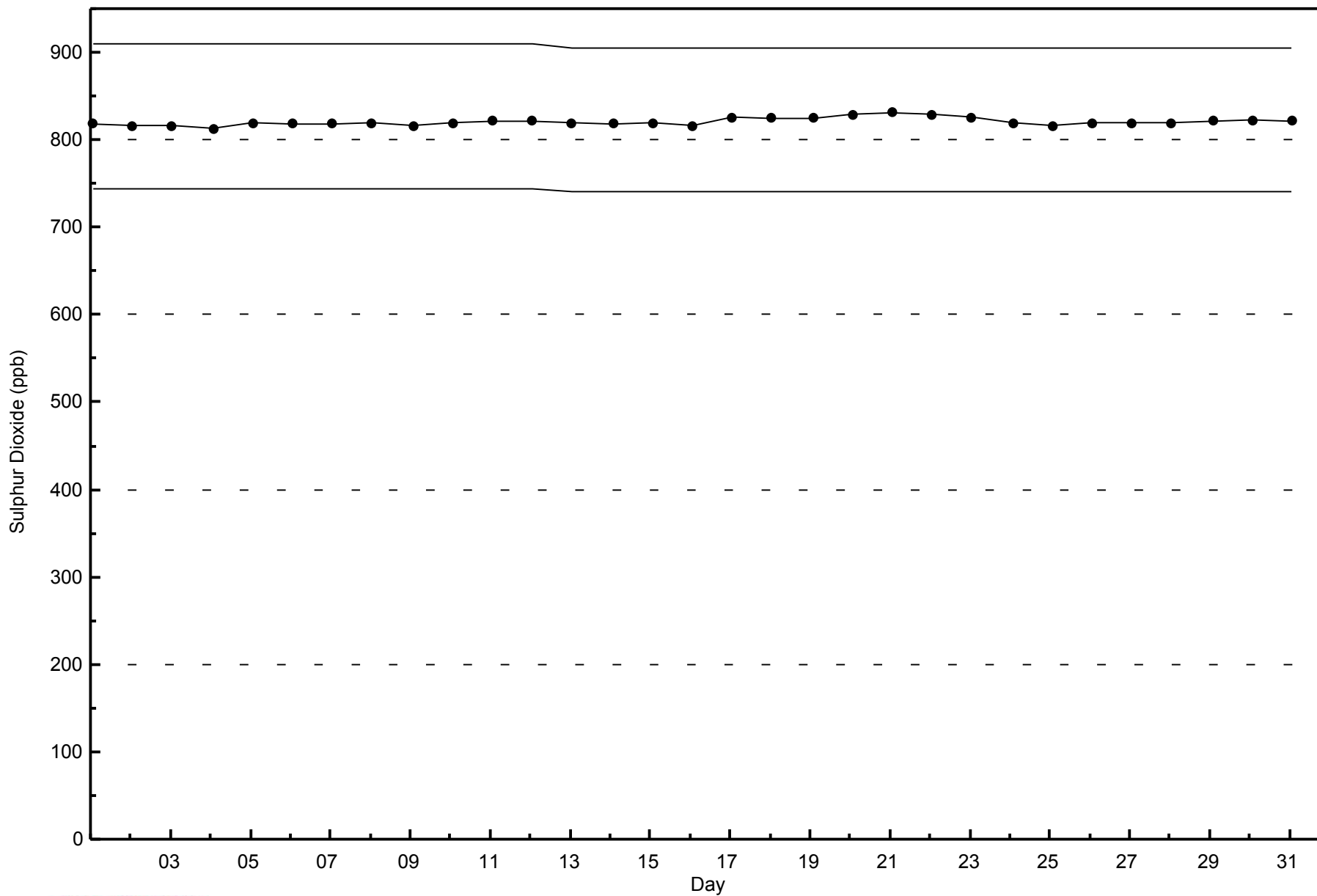
Lower Camp - July 2014





WBEA NETWORK
Span Responses

Sulphur Dioxide (SO₂) - ppb
Lower Camp - July 2014



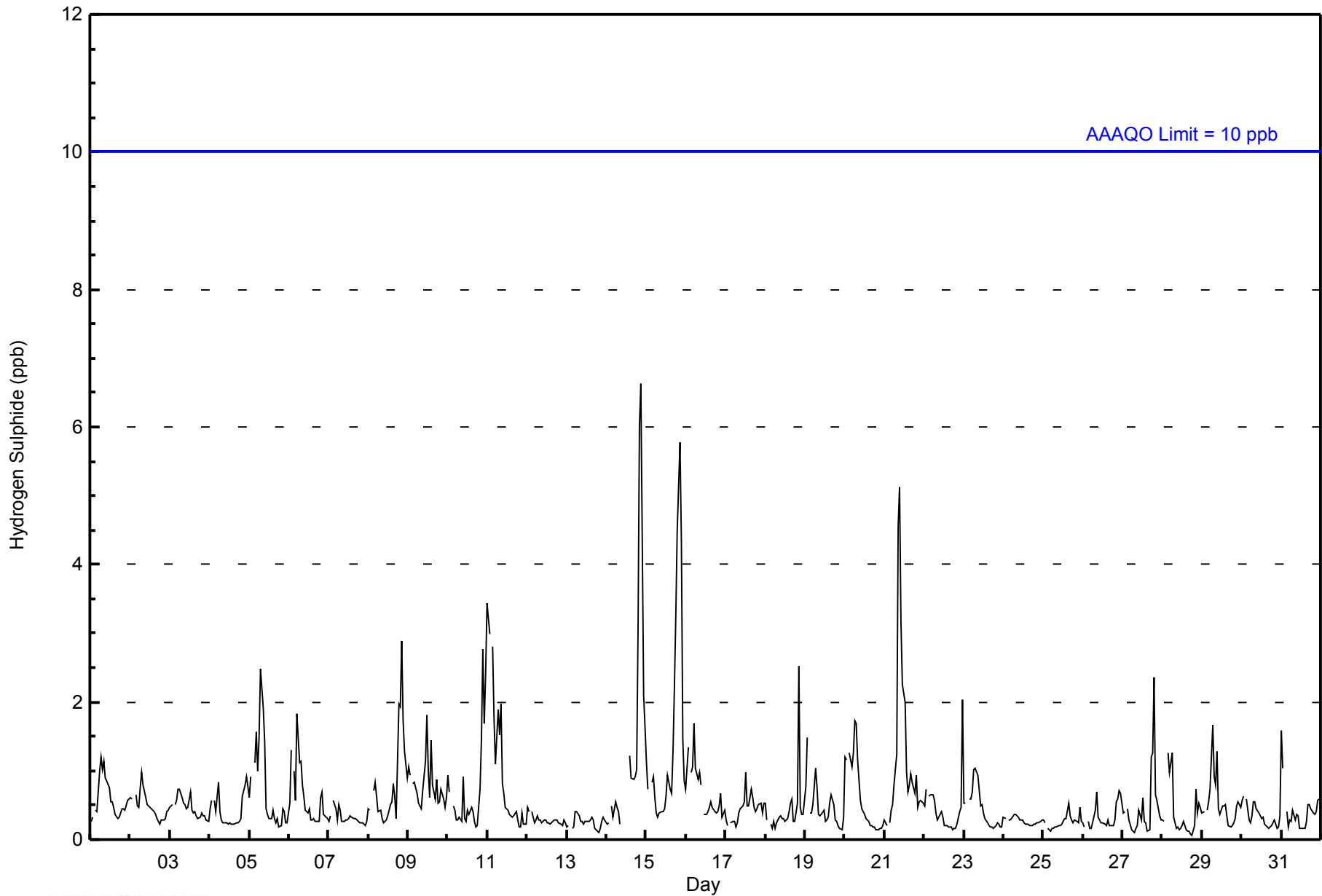


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744												
Maximum Value: 7 ppb on Jul 14 22:00														Maximum Daily Average: 1.5 ppb on Jul 14												
Minimum Value: 0 ppb on Jul 28 19:00														Minimum Daily Average: 0.3 ppb on Jul 13												
Maximum Diurnal Average: 0.9 ppb at hour 21														Minimum Diurnal Average: 0.4 ppb at hour 14												
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												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0	0	Z	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	0.6	1	
2-Jul	1	1	Z	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
3-Jul	0	1	Z	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
4-Jul	0	1	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1	
5-Jul	1	1	Z	1	2	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2	
6-Jul	1	1	Z	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0.6	2	
7-Jul	0	0	Z	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
8-Jul	0	0	Z	1	1	1	0	0	0	0	0	0	1	1	1	1	0	2	2	3	2	1	1	0.8	3	
9-Jul	1	1	Z	1	1	1	1	0	0	1	1	2	1	1	1	1	1	1	1	1	1	1	0	0.8	2	
10-Jul	1	1	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	3	2	0.7	3	
11-Jul	3	3	Z	3	2	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.0	3	
12-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
13-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
14-Jul	0	0	Z	0	0	1	0	0	0	C	C	C	C	C	1	1	1	1	1	3	6	7	2	1.5	7	
15-Jul	1	1	Z	1	1	1	0	0	0	0	0	0	1	1	1	1	1	2	3	5	6	4	1	1.4	6	
16-Jul	1	1	Z	1	1	2	1	1	1	1	M	0	0	0	0	1	0	0	0	0	0	1	0	0.7	2	
17-Jul	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0.4	1	
18-Jul	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	3	0	0	0.4	3	
19-Jul	1	1	Z	0	0	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0.5	1	
20-Jul	1	1	Z	1	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2	
21-Jul	0	0	Z	0	0	1	1	1	5	5	3	2	2	1	1	1	1	1	1	1	0	1	1	1.3	5	
22-Jul	0	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.4	2	
23-Jul	1	1	Z	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
24-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
25-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1	
26-Jul	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1	
27-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	2	1	1	0	0.5	2	
28-Jul	0	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.4	1	
29-Jul	0	0	Z	0	1	1	2	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0.5	2	
30-Jul	1	1	Z	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
31-Jul	2	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0.4	2	
0.6 0.7 -- 0.6 0.6 0.6 0.7 0.7 0.7 0.7 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.5 0.7 0.9 0.8 0.5 0.6																								Diurnal Average		
3 3 -- 3 2 2 2 2 5 5 3 2 2 1 1 1 1 1 1 2 3 5 6 7 2 2																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



WBEA NETWORK
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	691	97.74	97.74
3 - 4	10	1.41	99.15
5 - 7	6	0.85	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - July 2014

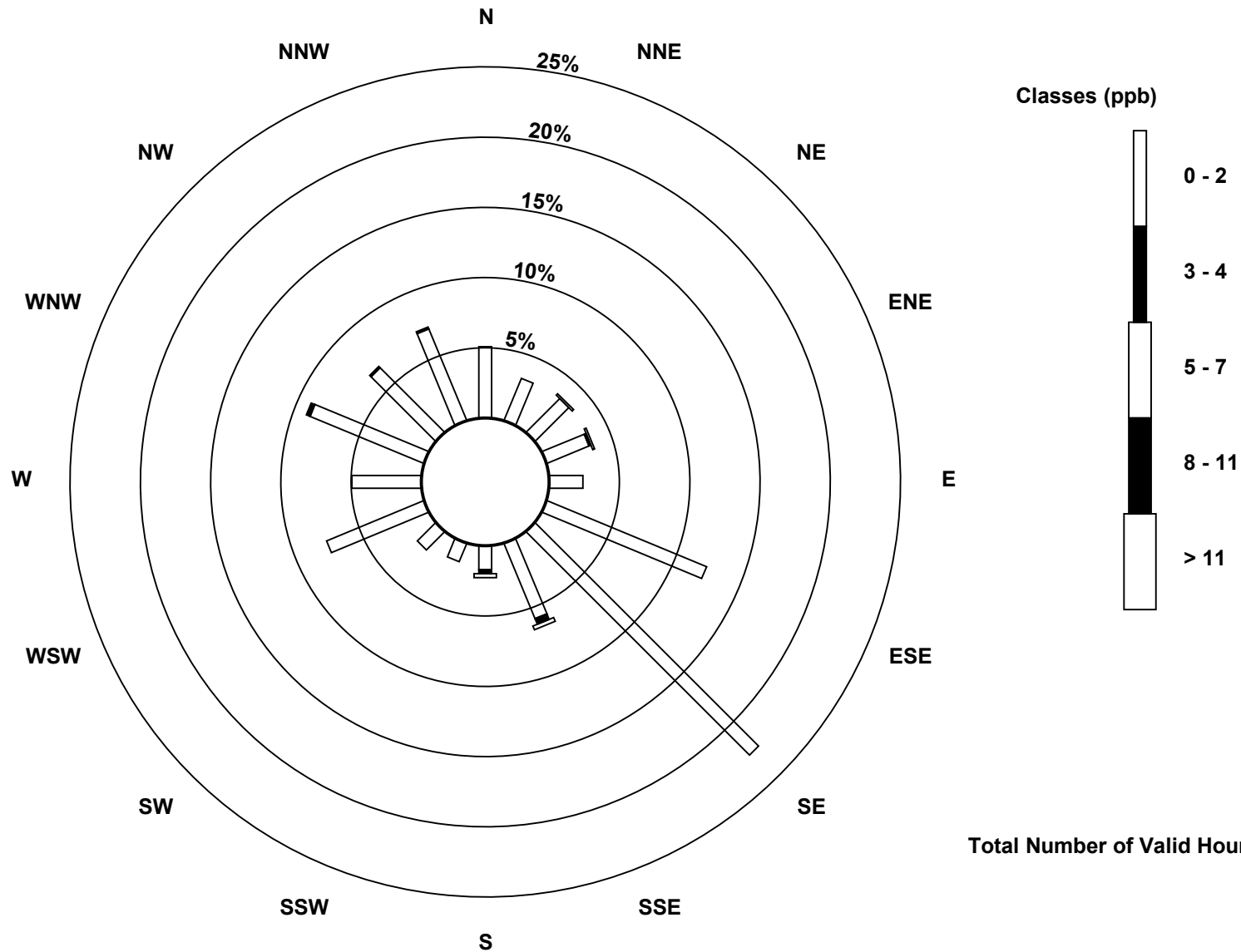
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	36	23	24	23	17	87	159	41	12	10	13	53	35	62	46	50	691
3 - 4	0	0	0	1	0	0	0	3	2	0	0	0	0	2	1	1	10
5 - 7	0	0	1	1	0	0	0	2	2	0	0	0	0	0	0	0	6
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	23	25	25	17	87	159	46	16	10	13	53	35	64	47	51	707

Total Number of Valid Hours: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Hydrogen Sulphide (H₂S) - ppb
Lower Camp (AMS 11)



Total Number of Valid Hours: 707

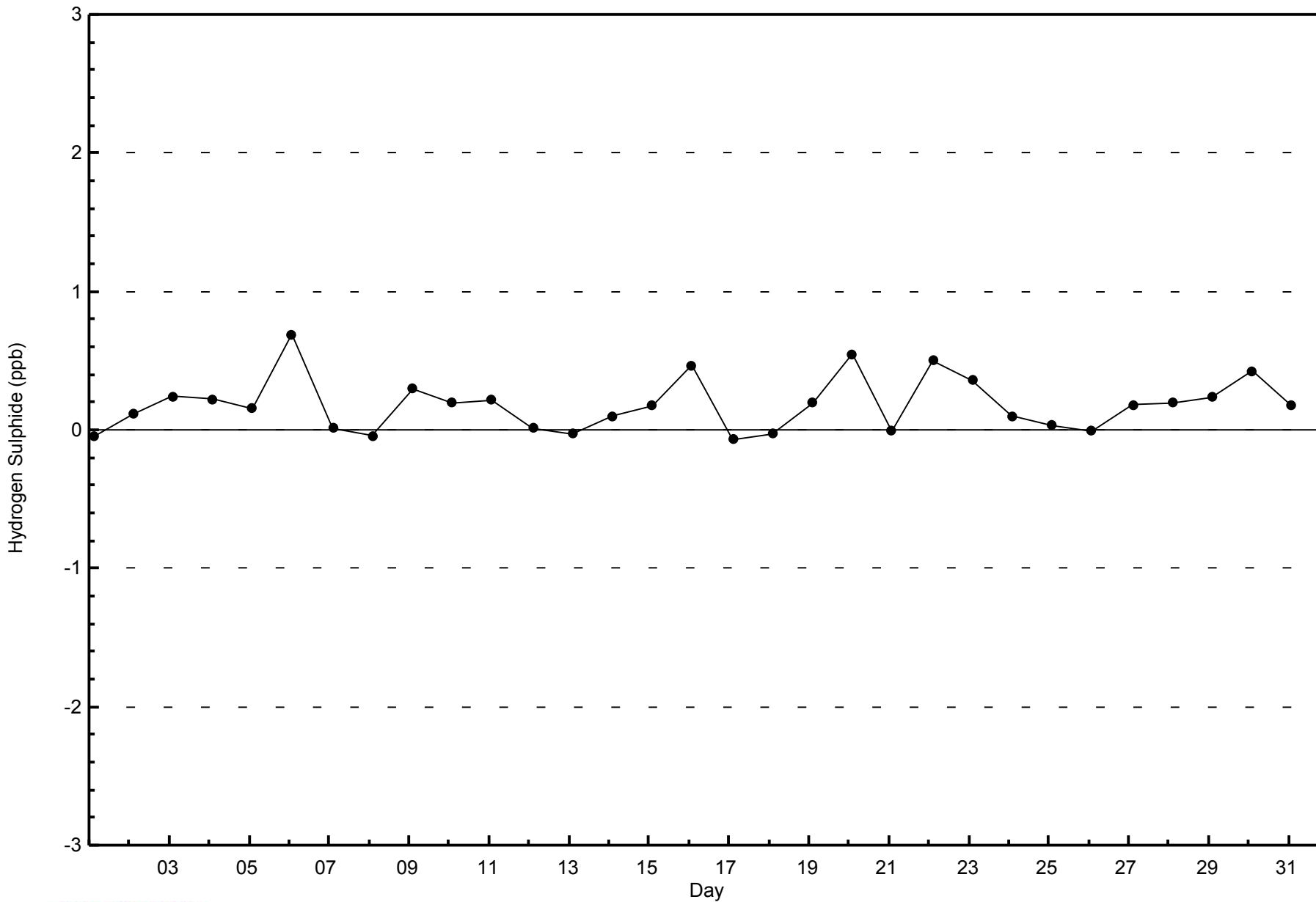


WBEA NETWORK

Zero Responses

Hydrogen Sulphide (H₂S) - ppb

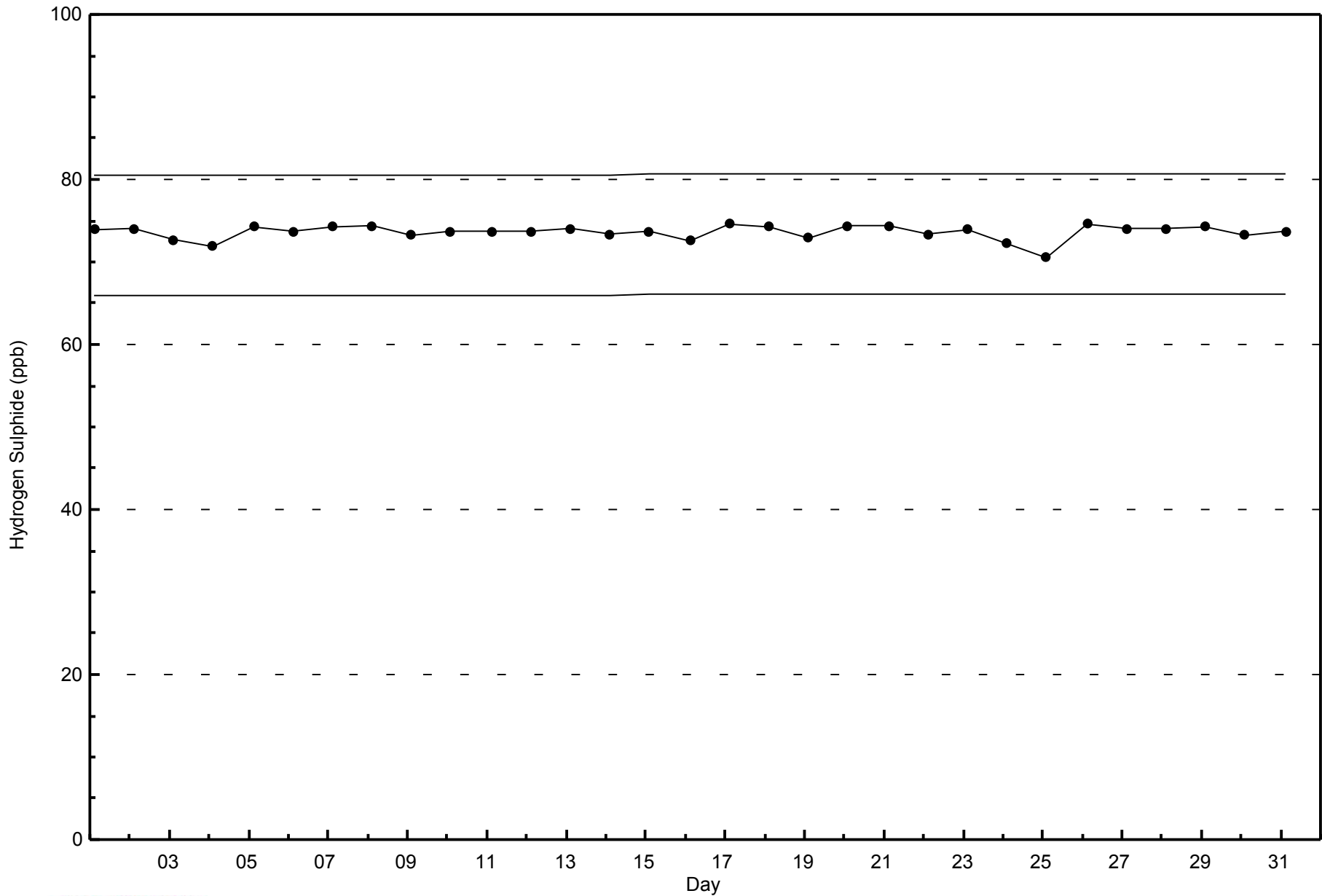
Lower Camp - July 2014





WBEA NETWORK
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - July 2014



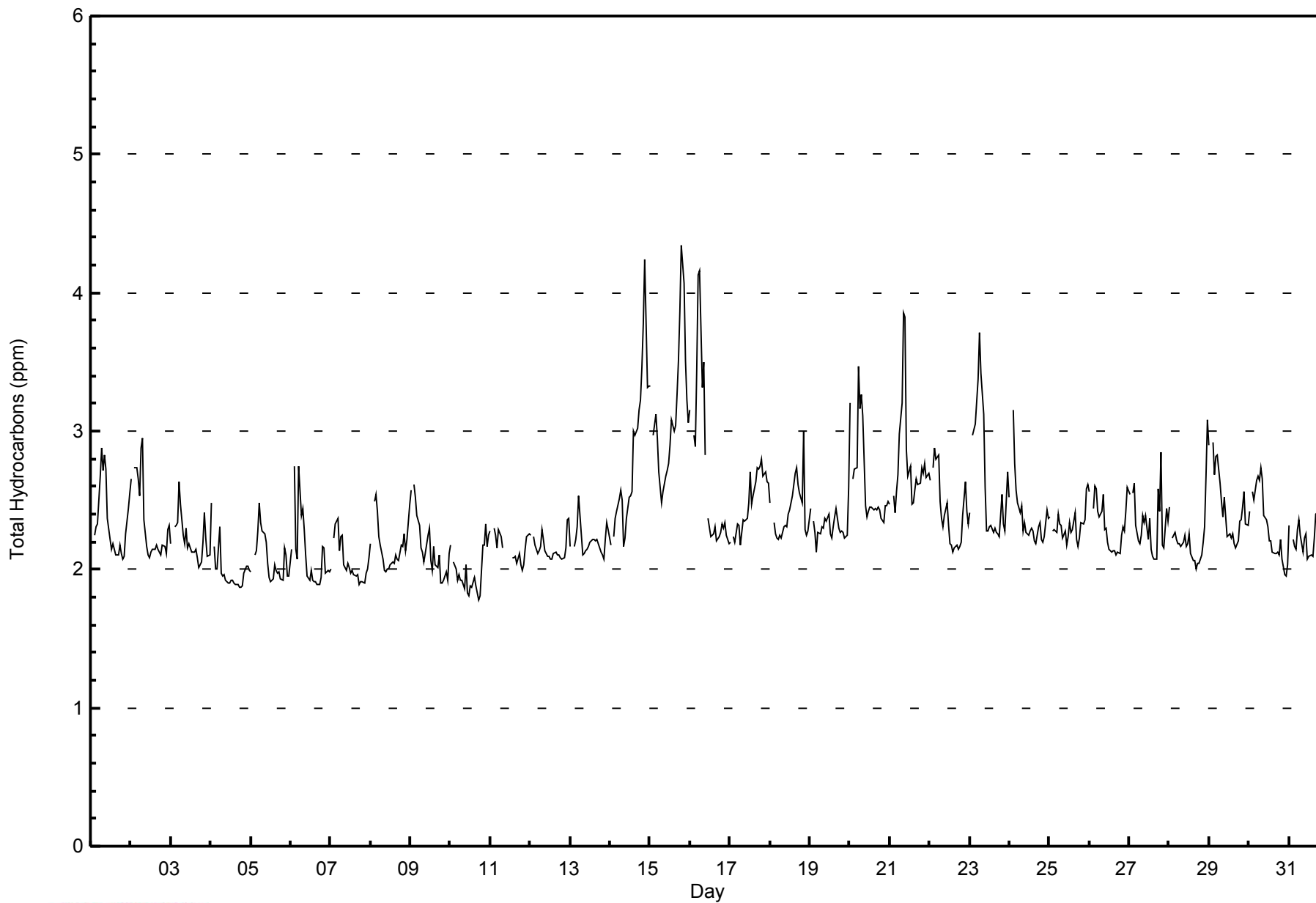


Maximum Value: 4.3 ppm on Jul 15 20:00																	Maximum Daily Average: 3.1 ppm on Jul 15																	Hours in Service: 744	
Minimum Value: 1.8 ppm on Jul 10 18:00																	Minimum Daily Average: 2.0 ppm on Jul 10																	Hours of Data: 707	
Maximum Diurnal Average: 2.5 ppm at hour 6																	Minimum Diurnal Average: 2.2 ppm at hour 14																	Hours of Missing Data: 37	
Monthly Average: 2.35 ppm																	Percentiles: P ₁ = 1.9 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.3 Q ₃ = 2.5 P ₉₀ = 2.8 P ₉₉ = 3.8																	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-Jul	2.2	Z	2.2	2.3	2.3	2.7	2.9	2.7	2.8	2.7	2.4	2.2	2.1	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.3	2.4	2.6	2.3	2.9									
2-Jul	2.7	Z	2.7	2.7	2.7	2.5	2.9	3.0	2.4	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.3	2.3	2.3	2.3	3.0									
3-Jul	2.2	Z	2.3	2.3	2.3	2.6	2.5	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.4	2.2	2.1	2.1	2.2	2.6									
4-Jul	2.5	Z	2.2	2.0	2.0	2.3	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	2.0	2.0	2.0	2.0	2.0	2.5									
5-Jul	2.0	Z	2.1	2.1	2.3	2.5	2.3	2.3	2.3	2.2	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	2.2	2.1	2.0	2.0	2.1	2.5									
6-Jul	2.1	Z	2.7	2.1	2.1	2.7	2.4	2.4	2.3	2.1	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.2	2.0	2.0	2.0	2.1	2.7									
7-Jul	2.0	Z	2.2	2.3	2.4	2.1	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.0	2.4									
8-Jul	2.2	Z	2.5	2.5	2.4	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.2	2.2	2.3	2.1	2.2	2.5	2.2	2.5									
9-Jul	2.6	Z	2.6	2.5	2.4	2.3	2.2	2.1	2.1	2.1	2.2	2.3	2.1	2.0	2.2	2.0	2.0	2.1	1.9	1.9	1.9	2.0	1.9	2.1	2.2	2.6									
10-Jul	2.2	Z	2.1	2.0	1.9	2.0	1.9	1.9	1.9	2.0	1.8	1.8	1.9	1.9	1.9	1.9	1.8	1.8	1.8	2.2	2.2	2.3	2.2	2.2	2.0	2.3									
11-Jul	2.3	Z	2.3	2.3	2.2	2.3	2.2	2.2	C	C	C	C	C	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.2	2.3	2.2	2.3									
12-Jul	2.3	Z	2.2	2.2	2.1	2.1	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.4	2.2	2.4									
13-Jul	2.2	Z	2.2	2.2	2.3	2.5	2.4	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	2.2	2.3	2.3	2.2	2.5									
14-Jul	2.2	Z	2.2	2.4	2.4	2.5	2.6	2.5	2.2	2.2	2.4	2.5	2.5	2.6	3.0	3.0	3.0	3.2	3.2	3.5	3.8	4.2	3.3	3.3	2.8	4.2									
15-Jul	3.3	Z	3.0	3.1	3.0	2.7	2.6	2.5	2.6	2.7	2.7	2.8	2.9	3.1	3.0	3.0	3.3	3.5	3.9	4.3	4.1	3.5	3.2	3.1	3.1	4.3									
16-Jul	3.2	Z	3.0	2.9	3.4	4.1	4.2	3.3	3.5	2.8	M	2.4	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.7	4.2										
17-Jul	2.2	Z	2.2	2.2	2.3	2.3	2.2	2.3	2.4	2.4	2.4	2.5	2.7	2.5	2.5	2.6	2.7	2.7	2.7	2.8	2.7	2.7	2.6	2.6	2.5	2.8									
18-Jul	2.5	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.5	2.6	2.7	2.7	2.6	2.6	2.5	3.0	2.3	2.2	2.3	2.4	3.0									
19-Jul	2.4	Z	2.3	2.3	2.1	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.2	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.6	2.3	2.6									
20-Jul	3.2	Z	2.7	2.7	2.7	3.5	3.2	3.3	3.1	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.5	2.5	2.5	2.6	3.5									
21-Jul	2.5	Z	2.5	2.4	2.6	2.7	3.0	3.2	3.9	3.8	2.9	2.7	2.7	2.5	2.5	2.6	2.7	2.6	2.6	2.7	2.7	2.8	2.7	2.7	2.8	3.9									
22-Jul	2.6	Z	2.7	2.9	2.8	2.8	2.5	2.4	2.3	2.4	2.5	2.3	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.4	2.6	2.4	2.3	2.4	2.9									
23-Jul	2.4	Z	3.0	3.1	3.2	3.4	3.7	3.4	3.1	2.6	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.5	2.3	2.3	2.5	2.7	2.6	3.7									
24-Jul	2.5	Z	3.2	2.8	2.6	2.5	2.4	2.5	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.4	2.4	2.4	3.2									
25-Jul	2.4	Z	2.3	2.3	2.3	2.4	2.3	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.4	2.2	2.2	2.2	2.3	2.3	2.4	2.6	2.6	2.3	2.6									
26-Jul	2.6	Z	2.4	2.6	2.6	2.4	2.4	2.4	2.5	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.3	2.3	2.4	2.6	2.3	2.6									
27-Jul	2.5	Z	2.6	2.6	2.3	2.2	2.2	2.2	2.4	2.3	2.4	2.2	2.4	2.1	2.1	2.1	2.1	2.6	2.4	2.9	2.2	2.2	2.4	2.4	2.3	2.9									
28-Jul	2.4	Z	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.3	2.7	3.1	2.2	3.1									
29-Jul	2.9	Z	2.9	2.7	2.8	2.8	2.6	2.5	2.4	2.5	2.4	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.4	2.4	2.5	2.6	2.3	2.3	2.5	2.9									
30-Jul	2.4	Z	2.6	2.5	2.6	2.7	2.6	2.7	2.7	2.4	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.3	2.7									
31-Jul	2.3	Z	2.2	2.2	2.1	2.3	2.4	2.3	2.1	2.2	2.3	2.1	2.1	2.1	2.1	2.2	2.4	2.4	2.3	2.3	2.3	2.3	2.5	2.5	2.3	2.5									
	2.4	--	2.5	2.4	2.4	2.5	2.5	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.4	Diurnal Average										
	3.3	--	3.2	3.1	3.4	4.1	4.2	3.4	3.9	3.8	2.9	2.8	2.9	3.1	3.0	3.0	3.3	3.5	3.9	4.3	4.1	4.2	3.3	3.3	Diurnal Maximum										
Z - zerospan		C - Calibration					M - Maintenance																												



WBEA NETWORK
Hourly Averages

Total Hydrocarbons (THC) - ppm
Lower Camp - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	102	14.43	14.43
2.1 - 3.0	565	79.92	94.34
3.1 - 10.0	40	5.66	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - July 2014

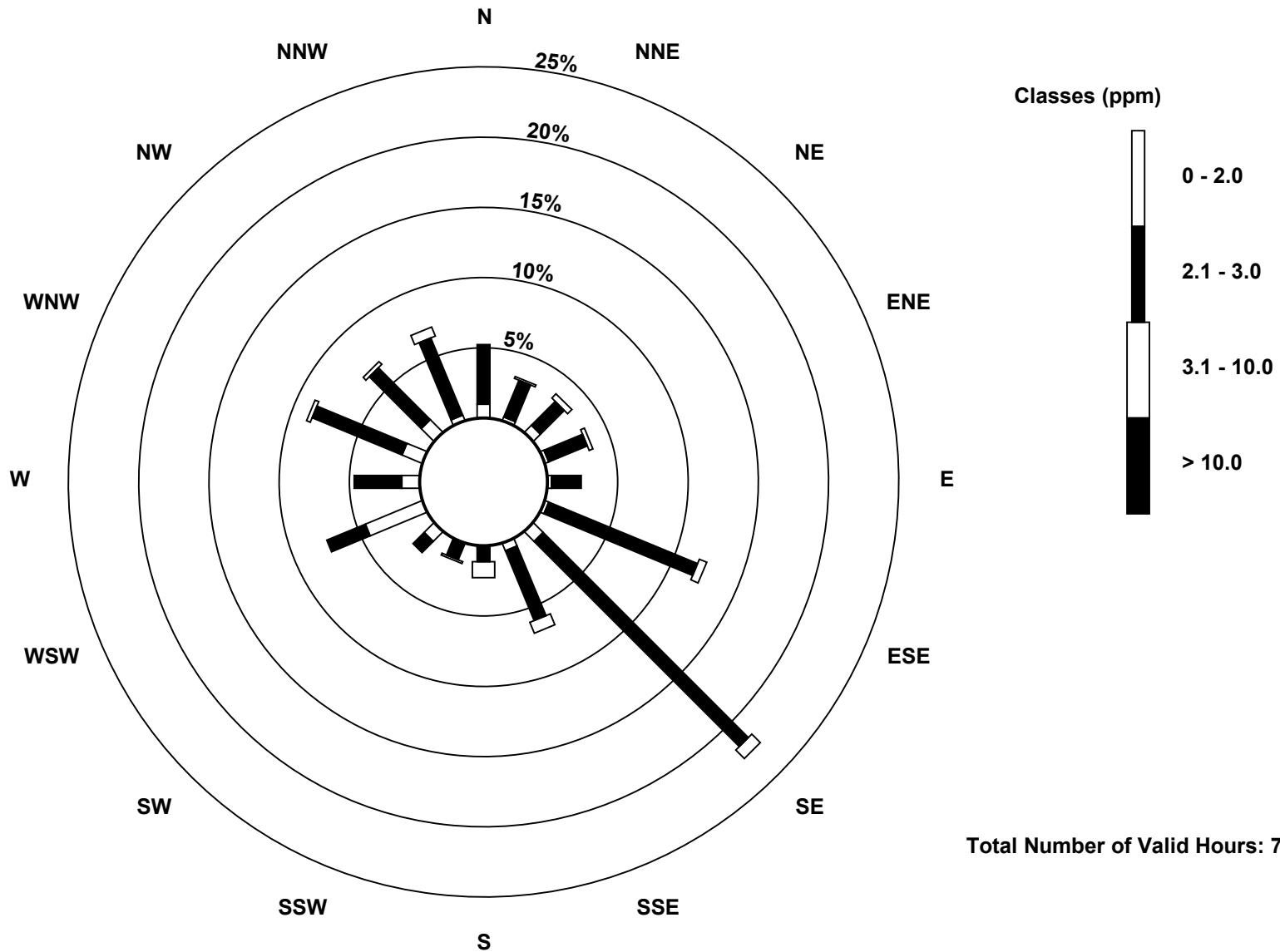
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	7	2	5	2	2	2	7	4	1	0	7	31	9	11	9	3	102
2.1 - 3.0	30	20	17	21	15	81	146	38	7	9	8	21	24	49	37	42	565
3.1 - 10.0	0	1	3	2	0	4	6	6	8	1	0	0	0	2	2	5	40
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	37	23	25	25	17	87	159	48	16	10	15	52	33	62	48	50	707

Total Number of Valid Hours: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Total Hydrocarbons (THC) - ppm
Lower Camp (AMS 11)



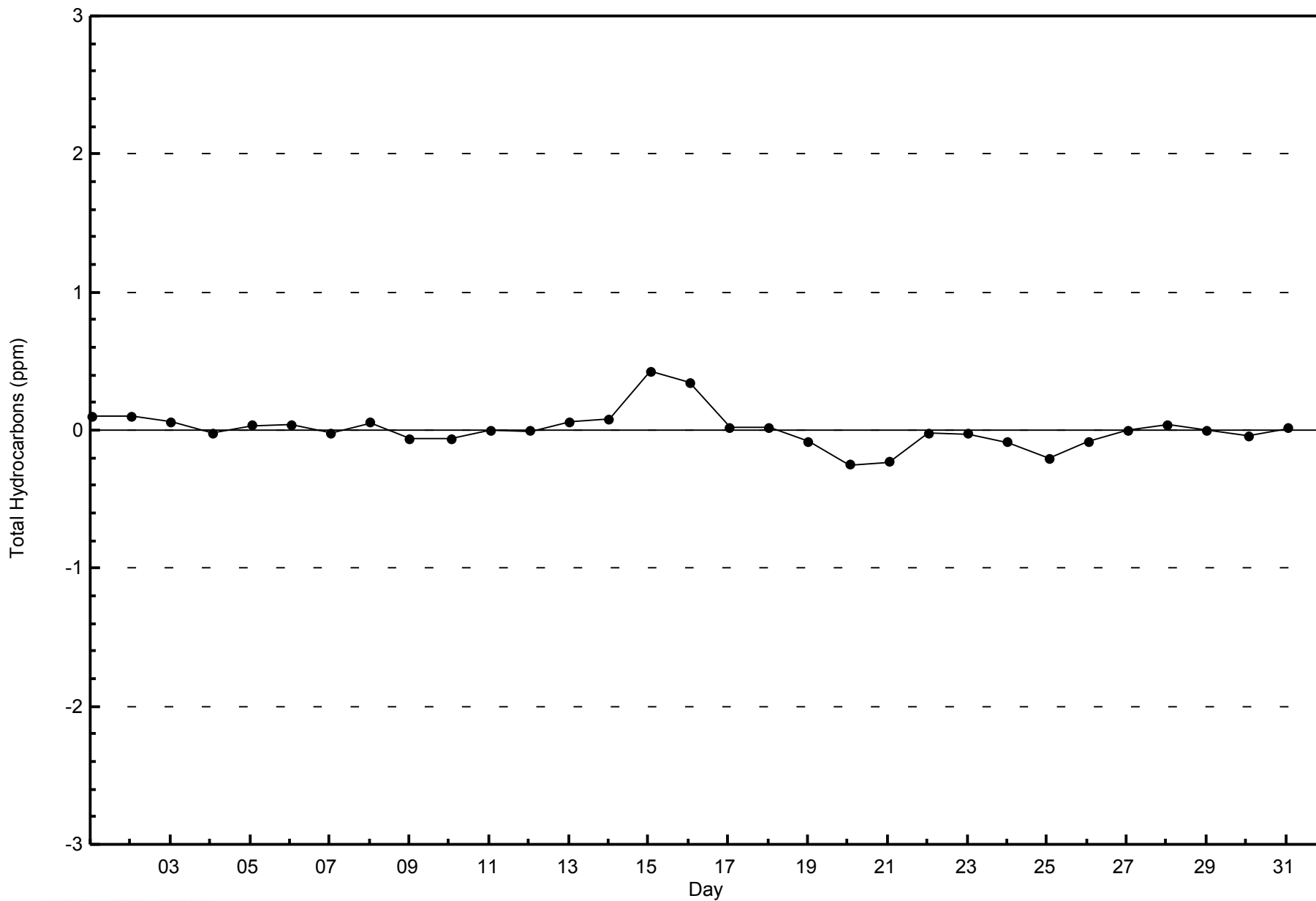


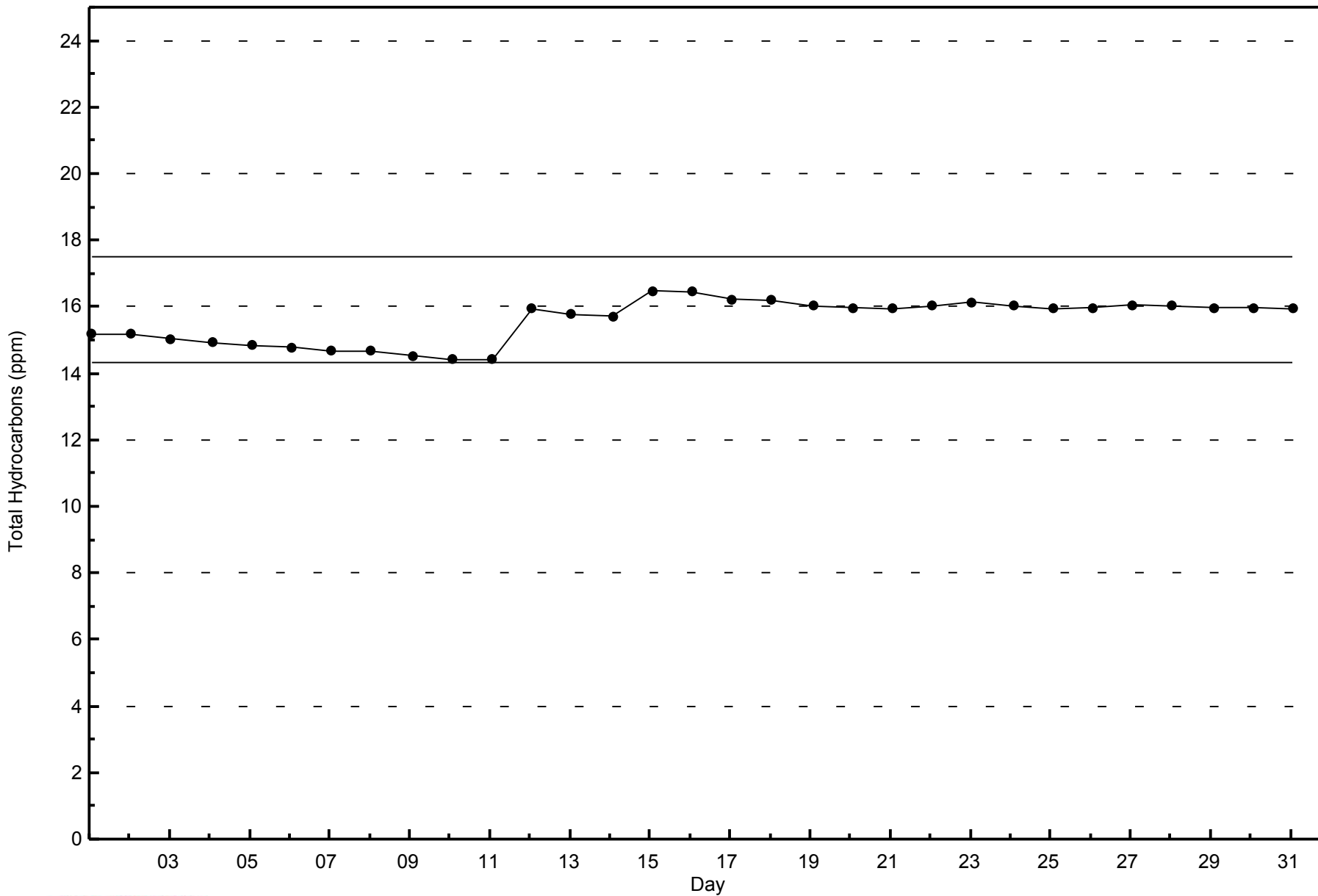
WBEA NETWORK

Zero Responses

Total Hydrocarbons (THC) - ppm

Lower Camp - July 2014





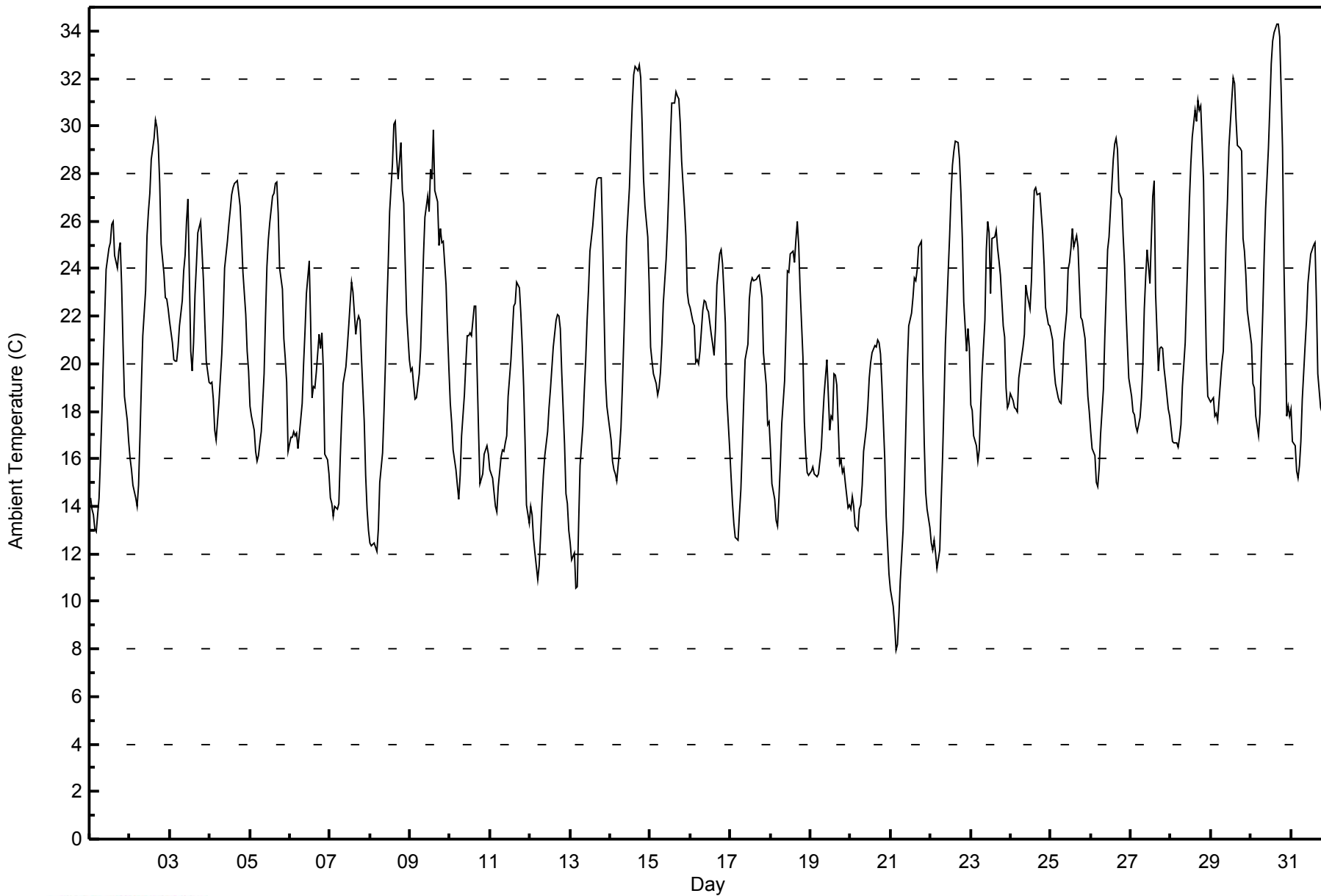


Maximum Value: 34.3 C on Jul 30 16:00																				Maximum Daily Average: 25.3 C on Jul 30					Hours in Service: 744																							
Minimum Value: 8.0 C on Jul 21 04:00																				Minimum Daily Average: 16.4 C on Jul 12					Hours of Data: 744																							
Maximum Diurnal Average: 26.0 C at hour 15																				Minimum Diurnal Average: 15.2 C at hour 5					Hours of Missing Data: 0																							
Monthly Average: 20.76 C																				Percentiles: P ₁ = 10.6 P ₁₀ = 14.3 Q ₁ = 16.9 Median = 20.4 Q ₃ = 24.3 P ₉₀ = 27.6 P ₉₉ = 32.4					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-Jul	14.4	13.9	13.6	13.0	12.9	14.4	16.0	17.9	20.1	22.0	23.9	24.9	25.1	25.9	26.0	24.6	24.0	24.8	25.1	23.3	20.8	18.6	17.6	16.7	20.0	26.0																						
2-Jul	16.0	15.5	14.9	14.3	14.0	14.9	16.9	19.1	21.2	23.1	25.4	26.4	27.2	28.6	29.5	30.2	30.0	29.2	27.6	25.1	23.8	22.8	22.7	22.3	22.5	30.2																						
3-Jul	21.8	20.9	20.1	20.1	20.1	20.7	21.6	22.6	23.9	24.6	26.0	26.9	20.5	19.7	20.9	22.9	24.2	25.5	26.0	24.7	23.5	21.7	20.1	19.2	22.4	26.9																						
4-Jul	19.2	19.2	18.5	17.2	16.8	18.4	19.4	20.4	22.0	24.0	25.2	25.9	26.5	27.1	27.4	27.6	27.7	27.2	26.6	25.3	23.8	22.1	20.5	19.7	22.8	27.7																						
5-Jul	18.2	17.8	17.2	16.3	15.9	16.1	16.6	17.2	19.6	21.9	24.1	25.2	25.9	27.1	27.2	27.6	27.6	26.3	24.0	23.1	21.0	20.2	19.2	16.3	21.3	27.6																						
6-Jul	16.9	16.9	17.2	17.0	17.1	16.4	17.7	18.3	20.0	21.4	22.9	24.3	21.7	18.6	19.1	19.0	19.6	21.3	20.6	21.3	19.8	16.2	16.0	15.3	18.9	24.3																						
7-Jul	14.3	14.1	13.6	14.0	13.9	14.1	16.1	17.8	19.2	19.9	20.7	21.6	22.5	23.4	23.0	21.2	21.8	22.0	21.8	20.3	17.6	15.3	13.9	13.0	18.1	23.4																						
8-Jul	12.4	12.3	12.5	12.3	12.1	13.0	15.0	16.2	17.9	20.0	22.3	24.2	26.4	28.4	30.1	30.2	28.7	27.8	29.3	27.3	26.7	24.3	22.1	20.2	21.3	30.2																						
9-Jul	19.7	19.8	19.1	18.5	18.6	19.6	20.7	22.6	24.6	26.2	27.0	26.4	28.2	27.8	29.8	27.3	26.8	24.9	25.7	25.1	25.2	23.3	21.4	19.8	23.7	29.8																						
10-Jul	18.3	17.5	16.4	15.5	14.9	14.3	15.3	16.9	18.7	20.0	21.2	21.2	21.3	21.2	22.4	22.4	19.7	17.3	14.9	15.4	16.2	16.3	16.5	16.2	17.9	22.4																						
11-Jul	15.5	15.2	14.6	14.0	13.8	14.8	16.1	16.4	16.3	16.7	16.9	18.6	20.2	21.3	22.4	22.5	23.5	23.2	22.1	20.8	19.1	16.7	14.0	13.3	17.8	23.5																						
12-Jul	14.0	13.6	12.7	12.0	10.9	11.5	12.8	14.2	15.3	16.1	17.1	18.1	18.9	19.8	20.7	21.8	22.1	22.0	21.5	19.6	16.6	14.5	14.1	13.0	16.4	22.1																						
13-Jul	12.5	11.7	12.1	10.6	10.6	13.3	15.7	17.4	18.9	20.2	21.8	23.1	24.8	25.8	26.6	27.3	27.8	27.8	27.9	25.3	22.2	19.3	18.2	17.7	19.9	27.9																						
14-Jul	16.8	15.9	15.6	15.3	15.1	16.4	17.3	19.0	21.0	23.0	25.3	27.4	29.3	30.9	32.2	32.5	32.3	32.5	32.0	30.1	27.8	26.6	25.3	23.3	24.3	32.5																						
15-Jul	20.7	20.1	19.6	19.1	18.7	19.0	19.6	20.8	22.6	24.4	25.7	27.5	29.3	31.0	31.0	31.4	31.3	31.1	30.2	28.5	26.6	25.4	23.0	22.6	25.0	31.4																						
16-Jul	22.4	21.8	21.6	20.1	20.2	20.0	20.5	22.2	22.7	22.6	22.3	22.2	21.3	20.8	20.3	21.5	23.3	24.6	24.8	24.2	23.0	21.7	18.6	16.5	21.6	24.8																						
17-Jul	15.3	14.2	13.3	12.7	12.6	13.7	14.7	16.5	18.4	20.2	20.8	22.7	23.4	23.6	23.5	23.5	23.7	23.7	23.3	22.8	20.5	19.1	17.5	17.6	19.0	23.7																						
18-Jul	16.4	14.9	14.3	13.4	13.2	14.4	15.8	17.5	19.3	21.4	23.9	23.8	24.6	24.7	24.3	25.2	26.0	25.0	23.2	20.3	17.6	16.3	15.4	15.3	19.4	26.0																						
19-Jul	15.5	15.7	15.4	15.3	15.2	15.3	16.5	17.6	18.7	19.4	20.2	17.2	17.8	17.7	19.6	19.5	19.1	15.8	15.9	15.5	15.6	15.0	13.9	14.1	16.7	20.2																						
20-Jul	13.9	14.4	14.0	13.2	13.0	13.9	14.1	14.9	16.3	17.3	18.2	19.4	20.0	20.5	20.8	20.7	21.0	20.9	20.4	19.1	16.0	13.6	12.4	11.1	16.6	21.0																						
21-Jul	10.5	9.8	9.0	8.0	8.2	9.4	10.8	13.0	15.0	17.4	19.9	21.6	22.1	22.8	23.6	23.5	24.0	24.9	25.1	19.7	16.7	14.6	13.9	13.1	16.5	25.1																						
22-Jul	12.5	12.1	12.6	12.0	11.4	12.2	14.3	16.1	18.4	20.8	23.9	25.4	27.1	28.4	29.0	29.3	29.3	28.6	27.2	25.3	22.6	20.5	21.5	20.7	20.9	29.3																						
23-Jul	18.3	18.0	17.0	16.6	15.9	16.4	18.2	19.6	21.8	24.8	26.0	25.5	23.0	25.3	25.3	25.6	24.9	24.3	23.7	21.6	21.1	19.0	18.2	18.3	21.2	26.0																						
24-Jul	18.7	18.4	18.2	18.1	18.0	19.4	20.3	20.7	21.3	23.3	22.9	22.3	23.5	25.6	27.3	27.4	27.1	27.2	26.3	25.4	24.2	22.4	21.7	21.6	22.5	27.4																						
25-Jul	21.3	21.0	19.8	19.2	18.6	18.4	18.4	19.5	20.9	22.2	24.0	24.3	24.8	25.7	24.9	25.4	24.9	23.3	21.9	21.8	21.1	19.9	18.6	18.0	21.6	25.7																						
26-Jul	17.2	16.4	16.1	15.0	14.8	15.6	17.0	18.9	21.1	23.0	24.8	25.3	26.5	28.6	29.3	29.5	29.0	27.2	26.9	25.4	24.1	22.3	20.8	19.4	22.3	29.5																						
27-Jul	18.6	18.0	17.8	17.4	17.2	17.7	18.6	20.0	22.3	23.7	24.8	23.4	25.3	27.0	27.7	23.0	19.7	20.6	20.7	20.6	19.8	19.3	18.1	17.8	20.8	27.7																						
28-Jul	17.3	16.8	16.7	16.7	16.5	16.9	17.4	19.1	20.9	22.8	24.8	26.9	28.4	29.6	30.7	30.2	31.1	30.7	30.8	27.7	23.4	20.3	18.6	18.5	23.0	31.1																						
29-Jul	18.4	18.6	17.8	17.9	17.6	18.4	20.0	20.5	22.8	25.2	26.9	29.1	31.1	32.0	31.8	30.3	29.2	29.1	28.9	25.3	24.8	23.8	22.3	21.3	24.3	32.0																						
30-Jul	20.8	19.1	19.0	17.8	17.0	17.9	20.2	22.2	24.6	26.5	29.1	30.8	32.6	33.6	33.9	34.3	34.3	33.8	31.6	29.1	24.2	17.8	18.2	17.8	25.3	34.3																						
31-Jul	18.1	16.7	16.5	15.5	15.2	15.7	16.7	18.5	20.8	21.8	23.4	24.0	24.6	25.0	25.1	22.7	19.6	18.9	18.1	17.7	17.1	16.8	16.5	15.8	19.2	25.1																						
																								17.0	16.5	16.0	15.4	15.2	15.9	17.1	18.5	20.2	21.8	23.3	24.1	24.6	25.4	26.0	25.8	25.6	25.2	24.7	23.1	21.4	19.5	18.4	17.6	Diurnal Average
																								22.4	21.8	21.6	20.1	20.2	20.7	21.6	22.6	24.6	26.5	29.1	30.8	32.6	33.6	33.9	34.3	34.3	33.8	32.0	30.1	27.8	26.6	25.3	23.3	Diurnal Maximum



WBEA NETWORK
Hourly Averages

Ambient Temperature (AT) - C
Lower Camp - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Lower Camp - July 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	5	0.67	0.67
10 - 20	341	45.83	46.51
> 20	398	53.49	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 27 km/h on Jul 30 21:00	Maximum Daily Speed Average: 16.0 km/h on Jul 10	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 21 06:00	Minimum Daily Speed Average: 1.4 km/h on Jul 1	Hours of Data: 744
Maximum Diurnal Speed Average: 3.6 km/h at hour 10	Minimum Diurnal Speed Average: 0.5 km/h at hour 23	Hours of Missing Data: 0
Monthly Average Velocity: 1.1 km/h 176.8 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 10 P ₉₀ = 15 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-Jul	ENE2	NNE1	WNW0	E1	E1	NE2	N1	ENE3	SE5	SE6	SE7	ESE5	NE4	NNE5	N1	N9	NE3	NW4	WSW5	ENE0	ESE3	W1	ESE1	ESE1	ENE1.4	N9	
2-Jul	ESE2	W1	NW1	SSE1	NE0	ENE2	E3	ESE5	ESE7	SE7	ESE8	ESE10	ESE7	ESE9	ESE10	ESE8	SE8	SE6	SE6	ESE10	ESE7	ESE11	ESE13	ESE12	ESE6.2	ESE13	
3-Jul	ESE14	ESE13	ESE11	ESE17	ESE17	ESE16	ESE20	SE18	SE18	ESE22	SE21	SE20	SSE13	E1	ENE5	ESE10	ESE12	SE12	SE1	NNW5	NNW8	N9	NW4	WNW5	ESE9.7	ESE22	
4-Jul	WNW8	WNW15	SW9	SW6	SSE4	S5	SW8	WSW11	WSW10	WSW15	WSW20	W21	WSW22	WSW21	WSW24	WSW24	WSW21	WSW22	WSW18	WSW17	WSW12	WSW11	WSW12	WSW14	WSW14.0	WSW24	
5-Jul	WSW10	WSW11	W6	SSE2	SSE4	SE6	S5	SSE5	SSE6	ESE9	SSE5	WSW18	WSW18	W17	W16	WSW16	WSW14	WNW8	NE6	NW1	WNW3	N7	NW3	SSE4	WSW4.9	WSW18	
6-Jul	NE2	ESE1	SW3	W11	W11	NW5	NW6	NNW6	WNW5	WSW8	WSW13	WSW13	WNW12	NE13	SSE4	NNE3	E3	NW4	NW4	W7	N3	NW2	NW8	WNW4	WNW3.8	NE13	
7-Jul	ESE2	NNE1	ESE1	NW4	NNW1	NNE0	E3	N4	N6	N8	NW6	NNW10	NNW9	NNW10	NE11	N8	N9	NE10	NNE8	NE4	W1	ESE2	E1	ESE1	N4.0	NE11	
8-Jul	E2	ESE1	ESE4	ESE3	SE2	SE5	SE8	SE8	SE9	SE13	SE11	SE15	SE13	SSE8	SW11	SSW10	ENE3	ESE10	SSE7	SSE7	SSE7	SE9	SE6	ENE4	SE6.4	SE15	
9-Jul	ESE3	ESE4	ESE1	SE6	SE6	SE6	SE9	SE9	SE11	SSW12	S9	SSE8	SSE10	SE12	SSW13	W17	W22	WNW7	SW10	SW10	SW12	WNW15	NW10	WNW8	SSW4.5	W22	
10-Jul	WSW10	WSW17	WSW18	WSW19	WSW21	W21	W10	WSW12	WSW11	WSW10	WSW13	W15	WNW16	WNW19	WNW18	WNW21	NW25	NW22	WNW18	WNW19	WNW18	WNW18	WNW20	WNW19	W16.0	NW25	
11-Jul	WNW14	NW12	NNW10	NNW8	NNW5	NW5	NW11	WNW10	WNW11	W12	W12	W20	W18	W16	W15	WNW14	WNW14	WNW19	N17	N18	N10	NW5	W5	WNW4	WNW9.7	W20	
12-Jul	NW7	NNW8	NW6	NNW7	NNW3	NNW3	NNW4	NW6	NW8	NW10	WNW10	NW9	NW8	NNW9	NW7	W6	WNW5	NNW4	N5	NE3	WSW0	NNE1	WNW4	NW2	NW5.2	WNW10	
13-Jul	N3	NNW2	NW3	W4	WNW2	ENE3	ESE13	ESE16	ESE14	ESE12	SE8	SE7	SE7	SE7	ESE6	SE7	SE7	SE7	SE6	SE5	SE5	SE5	SE6	SE7	SE5.5	ESE16	
14-Jul	SE8	SE8	SE9	SE8	SE6	SE7	SE9	SE10	SE12	SE13	SE12	SE14	SE11	SSE10	S9	SSE9	SSE8	S7	S6	SSE5	SSE6	S7	SSW8	SE5	SSE8.1	SE14	
15-Jul	SE6	SE8	SE9	SE10	SE10	SE11	SE11	SE9	SE10	SE12	SE9	ESE14	SE12	SE9	S8	SW9	SSW9	S8	S9	S7	S5	SSE7	SSE8	ESE4	SE8	SSE7.9	ESE14
16-Jul	SE8	SE6	SSE3	SSW2	NW3	NNW3	WNW4	WNW6	NNE5	NW5	NNE8	NNW7	NNW8	NNW8	WNW4	WSW10	WSW14	SW11	SW8	SSW5	SW11	W15	NNE10	NNW3	W3.1	WSW15	
17-Jul	WNW5	NW4	W6	WNW3	WNW1	NE4	NE5	NW3	NW3	N2	NE4	E4	ENE2	NW8	N6	N7	N3	ENE1	NNW2	ENE1	WSW3	NW4	WNW1	NW6	NNW2.3	NW8	
18-Jul	NW2	WNW5	WNW4	WNW3	WNW3	NW4	WNW5	WNW4	WNW5	W3	SSE2	ENE2	WSW4	ENE3	N2	NE4	ESE7	SE4	SW6	WSW15	S7	SW9	ESE2	E1	WSW1.8	WSW15	
19-Jul	SE6	SE8	ESE6	SE6	SE6	SSE7	SSE6	SSW1	W4	W11	W14	W18	W18	WSW20	WNW21	WNW19	WNW19	NNW11	NNW16	NW14	NW10	NW9	WNW7	NW9	WNW6.7	WNW21	
20-Jul	NNW6	NNW5	W6	W7	WNW4	NNW4	NNW5	NNW6	NW6	N8	N9	N10	N10	N9	N7	N10	NNE7	NNE9	NE10	NNE7	N2	WNW4	NW2	W1	NNW5.3	N10	
21-Jul	NNW2	WNW4	NNW2	E2	NNE0	WNW0	ENE3	NE2	NE3	NE3	ENE3	ESE5	NE2	N4	NE6	NNE6	NNE5	ESE2	ESE3	NNW2	E2	ENE1	NE1	WSW1	NE1.8	NE6	
22-Jul	N1	SE5	SE5	SE4	SE3	ESE6	ESE9	ESE10	SE9	SE10	SE8	ESE12	ESE10	SE8	SE7	SE8	SE7	SE8	SE7	SSE5	SSE3	SE4	SSE6	SSE7	SE6.5	ESE12	
23-Jul	SE7	SE8	SE6	SSE6	SE2	NE2	ESE4	ESE8	ESE8	ESE12	SE14	SE11	E6	SE15	ESE20	SE19	ESE14	ESE13	ESE7	ESE1	SE9	ESE0	NW2	WNW4	ESE7.6	ESE20	
24-Jul	ESE2	SE6	SE4	SSE5	SE6	ESE15	ESE15	ESE16	SE14	SE13	SE11	SE10	SE16	SE16	SE14	SE15	SE16	SE16	ESE16	ESE14	ESE11	ESE11	ESE12	ESE12	ESE11.9	SE16	
25-Jul	NE8	ENE10	N4	NW5	NNW6	NNW8	NNW7	NNW7	NNW5	NNE3	ESE5	SE3	WNW1	S2	NNE3	N4	SE4	NNW4	NNW6	NW5	NW4	NW3	WNW3	NW3	N2.8	ENE10	
26-Jul	E2	SE4	ENE1	WNW4	WNW5	WNW5	NNW4	N5	ESE4	SE7	SE8	ESE9	ESE8	SE7	SSE8	SSE6	WSW14	WSW17	W13	W8	WSW10	WSW3	SE3	SE5	SSW2.1	WSW17	
27-Jul	SE4	SE5	SE5	SSE6	SE7	SE9	ESE14	ESE12	SE9	SE9	NE5	WSW2	NNE4	W7	W6	E13	SE5	SSE8	SSE6	SSE6	SSE6	SE8	SE10	SE8	SE9	SE5.6	ESE14
28-Jul	SE6	SSE7	SSE7	SSE6	SE6	SE7	SE8	SE10	SE8	SE8	SE11	SE8	SE8	SW4	SSW6	WNW6	SW5	W4	WSW7	S4	ENE2	ENE1	E2	ENE2	SSE4.1	SE11	
29-Jul	SE6	SE5	SE5	SE7	ESE2	S5	SSE8	SE4	SW5	ESE7	SE7	SE8	ESE4	SSW3	WSW1	N7	NNW7	NNW7	NNW3	E2	SE9	SE6	SE10	SE8	SE3.3	SE10	
30-Jul	SE6	ESE4	NNE1	ENE1	ENE1	ESE5	ESE7	SE9	SE9	SE11	SE7	SE9	SSE8	SE8	SE8	SE7	SSE7	SSE8	SSE8	SSE6	NW27	ENE11	ENE1	S3	SE4.4	NW27	
31-Jul	SE3	SE2	NNE3	NE3	ESE0	WNW2	SE2	SE8	ESE5	N3	NNE11	NNE13	NNE14	N14	NNE17	NNW19	N12	NNW13	NNW4	NNW12	NNW10	NNW9	NNW11	NNW10	N6.4	NNW19	

SE1.0 SSE1.2 S1.2 S1.5 S1.3 SE1.8 ESE3.2 SE3.2 SE3.2 SE3.6 SE3.1 SSE2.6 SSW1.2 SW1.1 SW1.7 W1.7 WSW1.9 W1.3 WSW1.1 WSW1.1 WSW1.4 W1.0 W0.5 SW0.7	Diurnal Average
ESE14 WSW17 WSW18 WSW19 WSW21 W21 ESE20 SE18 SE18 ESE22 SE21 WSW21 WSW22 WSW21 WSW24 WSW24 NW25 NW22 WNW18 WNW19 NW27 WNW18 WNW20 WNW19	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

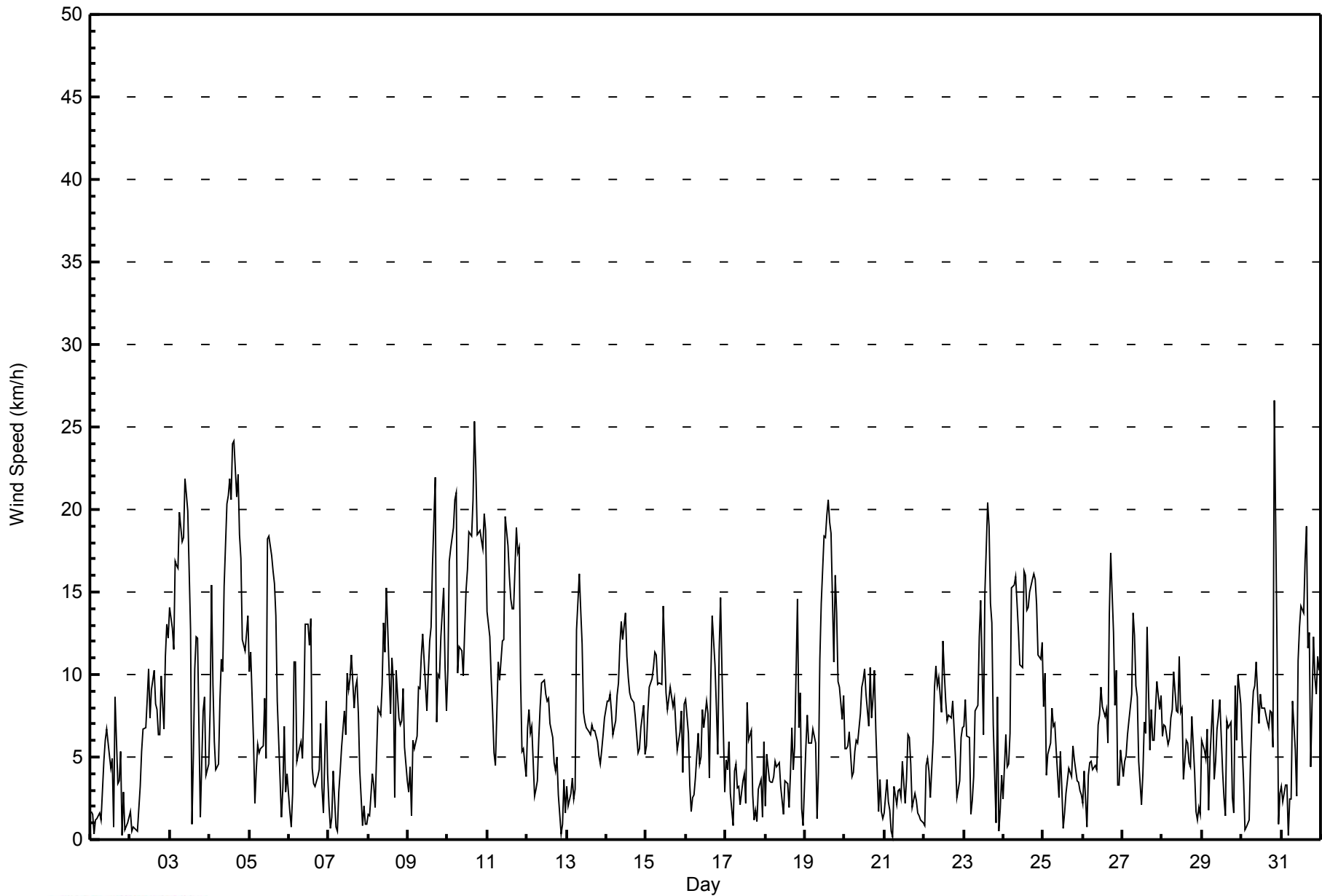
Wind Speed (WS) - km/h
Lower Camp - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 15 km/h on Jul 30 21:00														Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0											
Minimum Value: 1 km/h on Jul 21 03:00																									
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-Jul	1	1	1	1	1	1	1	1	1	1	2	2	1	3	2	5	3	1	3	2	1	2	2	1	5
2-Jul	1	1	1	2	1	1	1	2	2	2	2	2	3	4	4	3	2	3	3	4	3	3	3	3	4
3-Jul	4	3	4	3	2	2	3	4	4	5	5	6	7	3	2	4	3	5	1	1	2	3	2	2	7
4-Jul	3	6	3	3	1	2	4	3	3	5	4	5	4	5	6	5	7	5	4	4	2	2	3	3	7
5-Jul	2	2	3	2	1	1	2	2	3	3	4	5	4	5	5	4	4	5	4	2	2	6	2	2	6
6-Jul	2	2	2	5	5	4	2	2	3	5	3	3	6	7	2	3	1	2	2	2	7	2	6	1	7
7-Jul	2	2	1	2	1	1	1	1	2	2	2	3	2	4	4	6	3	2	2	3	1	1	1	1	6
8-Jul	1	1	2	2	2	2	2	2	3	4	3	4	4	3	5	4	6	3	3	2	2	2	2	1	6
9-Jul	2	3	2	2	3	2	3	3	4	5	4	3	4	4	5	8	5	6	4	3	3	5	3	2	8
10-Jul	3	3	4	4	5	5	3	3	3	3	3	4	4	4	5	5	5	6	4	4	4	4	4	4	6
11-Jul	4	4	2	3	3	4	3	3	3	3	5	4	4	4	4	3	5	5	4	4	3	1	1	1	5
12-Jul	2	1	1	2	2	1	2	2	2	2	2	3	3	2	2	3	2	2	1	1	1	1	1	1	3
13-Jul	1	2	2	1	1	2	4	4	4	3	3	2	2	2	2	2	2	2	1	1	1	1	1	2	4
14-Jul	3	3	3	2	2	2	3	3	4	3	3	4	4	4	3	4	3	3	2	2	1	2	3	2	4
15-Jul	2	2	2	2	2	4	3	3	3	3	4	4	3	3	4	3	3	3	3	2	2	2	2	2	4
16-Jul	2	2	1	1	3	2	1	4	1	2	2	3	3	3	3	5	3	3	2	3	4	3	8	3	8
17-Jul	1	1	1	2	1	1	1	1	1	1	1	2	2	2	1	1	2	1	1	1	2	3	2	2	3
18-Jul	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	1	3	2	9	6	6	4	2	2	9
19-Jul	2	3	2	2	2	2	2	2	2	3	4	5	5	4	4	5	5	5	5	3	4	2	1	2	5
20-Jul	2	1	3	3	2	1	1	2	2	3	2	3	3	4	4	4	4	2	3	1	1	1	1	1	4
21-Jul	1	1	1	1	1	1	2	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	2	2
22-Jul	2	2	2	2	2	2	3	3	3	3	3	3	4	3	3	4	3	3	2	2	1	2	2	2	4
23-Jul	2	2	2	2	2	2	2	2	3	5	5	4	4	8	5	5	4	4	3	2	3	2	2	2	8
24-Jul	2	2	1	2	4	3	4	4	4	4	4	4	5	5	4	5	5	5	4	3	3	3	3	4	5
25-Jul	3	4	2	2	2	3	2	2	2	2	2	1	3	2	3	2	3	4	2	1	1	2	1	2	4
26-Jul	3	4	1	1	1	1	1	1	1	2	3	3	3	3	4	3	5	4	3	3	2	3	1	2	5
27-Jul	1	2	1	2	2	3	3	3	3	2	2	3	2	4	2	9	2	3	2	2	3	3	3	3	9
28-Jul	2	2	2	2	2	3	3	3	2	2	3	3	3	3	4	3	4	3	2	2	1	1	1	1	4
29-Jul	3	3	2	3	2	4	4	3	3	2	2	3	2	3	2	2	2	2	1	4	4	2	4	3	4
30-Jul	2	2	1	1	1	2	2	3	3	3	2	3	3	3	3	3	2	3	3	2	15	5	4	2	15
31-Jul	2	2	3	2	2	2	2	3	2	2	3	4	4	4	4	6	5	4	5	4	2	3	3	2	6
														Diurnal Maximum											
														4 6 4 5 5 5 4 4 4 5 5 6 7 8 6 9 7 6 9 6 15 6 8 4											



WBEA NETWORK
Hourly Averages

Wind Speed (WS) - km/h
Lower Camp - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Lower Camp - July 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	282	37.90	37.90
6 - 11	318	42.74	80.65
12 - 19	120	16.13	96.77
20 - 28	24	3.23	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Wind Speed (WS) - km/h
Lower Camp - July 2014

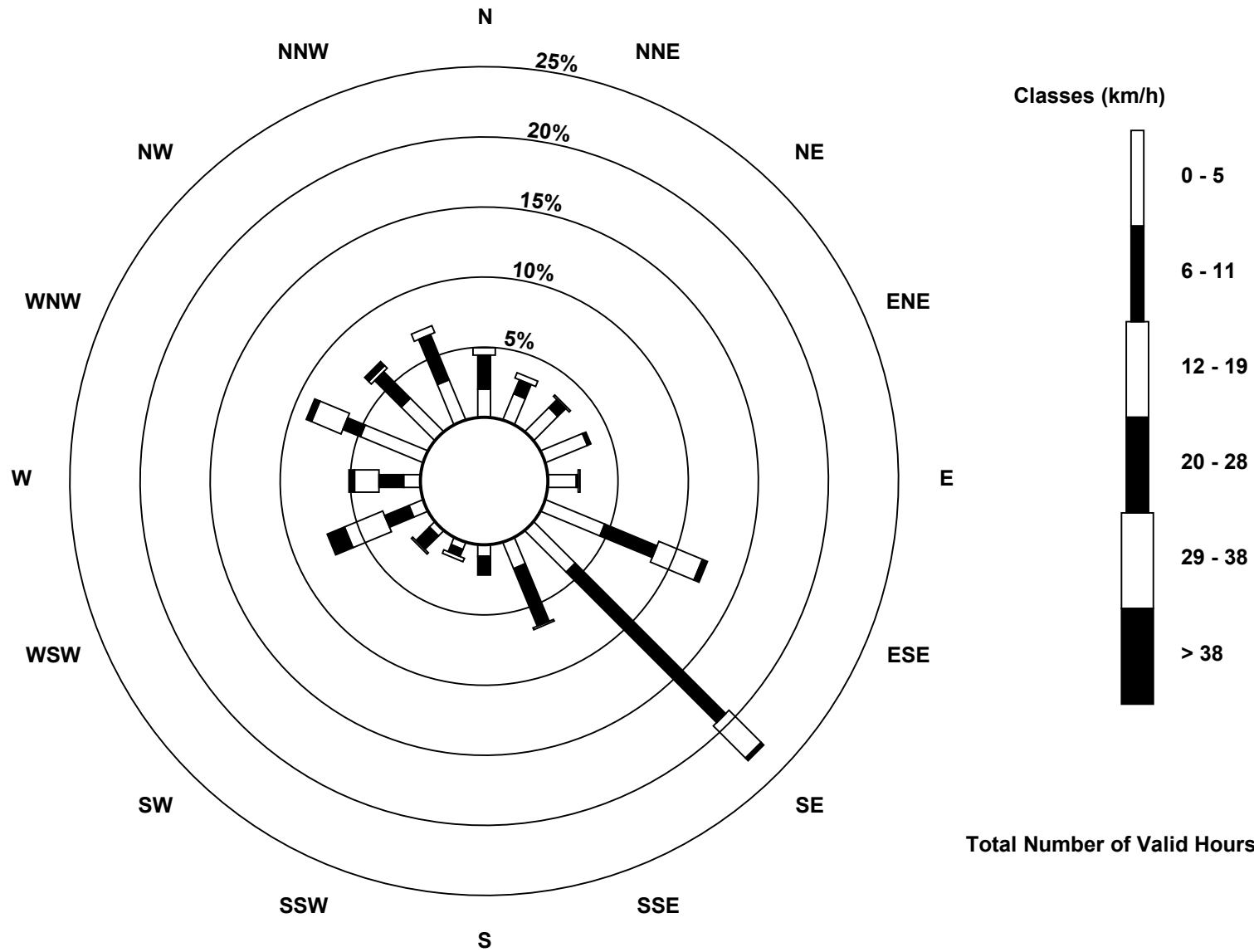
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	15	18	24	15	34	31	15	6	4	4	8	9	36	25	23	282
6 - 11	18	8	6	2	1	30	113	33	10	4	10	14	13	10	20	26	318
12 - 19	4	3	1	0	1	25	24	1	0	2	1	22	13	17	2	4	120
20 - 28	0	0	0	0	0	3	2	0	0	0	0	10	3	3	3	0	24
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	37	26	25	26	17	92	170	49	16	10	15	54	38	66	50	53	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

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

**Wind Speed (WS) - km/h
Lower Camp (AMS 11)**



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Lower Camp - July 2014

Direction of Maximum Speed: 320 deg on Jul 30 21:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 279.1 deg on Jul 10	Hours of Data: 744
Direction of Minimum Speed: 285 deg on Jul 21 06:00	Direction of Minimum Daily Speed Average: 1.4 deg on Jul 1
Direction of Minimum Daily Speed Average: 1.4 deg on Jul 1	Hours of Missing Data: 0
Monthly Average Direction: 280.5 deg	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	78	23	292	97	90	49	359	57	134	139	125	104	49	21	351	6	49	316	246	74	122	268	106	113	72.4
2-Jul	104	276	304	148	37	77	90	114	123	130	117	120	121	105	113	121	137	143	133	107	120	117	117	123	119.0
3-Jul	123	123	123	116	112	108	115	127	128	123	125	131	148	81	60	119	115	127	125	330	334	354	315	294	118.0
4-Jul	291	286	235	215	157	182	234	238	245	243	253	259	252	254	243	258	249	250	250	244	239	248	248	253	249.2
5-Jul	255	252	263	161	155	145	143	155	161	122	163	255	255	260	272	252	257	302	42	313	298	352	320	154	247.9
6-Jul	42	108	225	259	261	306	323	333	285	246	255	248	292	42	163	25	84	306	319	265	357	304	313	288	287.0
7-Jul	112	26	120	312	345	19	81	0	353	6	321	344	345	329	37	359	7	36	25	49	266	109	88	108	6.7
8-Jul	96	102	119	115	127	137	138	137	131	129	131	127	130	153	215	200	60	109	158	155	158	144	134	61	139.3
9-Jul	122	120	121	132	142	126	127	131	131	201	182	161	150	142	193	262	272	286	220	214	236	303	318	296	204.1
10-Jul	256	253	256	257	258	265	272	253	253	257	253	263	296	300	285	289	311	309	302	285	290	297	287	284	279.1
11-Jul	302	316	339	335	333	308	308	290	283	261	264	259	263	261	269	298	283	292	357	9	352	308	270	284	297.0
12-Jul	324	328	321	332	340	344	340	313	310	312	298	313	323	329	316	278	298	341	350	54	254	25	297	326	319.9
13-Jul	4	344	307	275	285	76	111	121	120	120	133	140	138	130	123	124	130	136	141	139	135	136	136	134	126.5
14-Jul	132	129	129	142	144	139	125	137	131	128	127	126	140	147	179	167	166	181	178	165	161	173	194	146	146.3
15-Jul	137	141	141	139	142	125	132	133	133	133	123	129	145	180	215	200	179	187	185	172	151	151	123	132	148.4
16-Jul	142	144	150	207	312	346	298	284	26	310	17	341	331	328	303	257	246	236	227	210	226	259	26	341	274.6
17-Jul	288	305	271	297	286	36	47	316	306	1	38	98	74	314	2	358	7	57	343	76	239	317	291	315	335.8
18-Jul	304	295	286	284	293	319	296	296	300	268	164	76	241	73	5	45	104	135	229	240	180	236	119	90	256.0
19-Jul	128	133	119	126	143	154	150	206	272	268	272	273	263	242	294	293	285	332	331	324	322	304	299	312	282.9
20-Jul	333	330	276	273	293	340	331	327	317	358	353	352	351	357	357	9	16	24	39	31	353	288	307	278	348.0
21-Jul	327	284	340	81	25	285	67	43	40	56	60	103	36	351	49	17	21	105	109	336	90	78	56	246	39.8
22-Jul	360	131	132	131	132	111	120	123	130	127	127	122	121	129	140	131	137	129	138	153	159	144	161	154	131.4
23-Jul	134	138	135	148	136	34	123	114	114	118	126	142	100	124	123	131	120	107	103	121	130	106	305	298	123.2
24-Jul	120	141	135	155	124	120	122	121	127	127	135	138	124	124	130	129	127	128	124	106	110	112	115	109	123.6
25-Jul	41	70	352	324	340	317	339	342	348	15	104	140	284	171	25	4	146	346	331	307	304	326	282	311	352.9
26-Jul	89	126	66	285	286	297	330	11	105	129	124	115	120	142	149	155	254	257	260	274	249	257	137	145	207.1
27-Jul	135	139	146	147	145	130	120	122	132	128	48	249	27	267	268	87	130	147	161	151	137	138	143	140	133.7
28-Jul	131	148	147	147	144	144	144	131	136	134	126	129	126	231	204	293	227	270	251	180	63	75	95	58	150.4
29-Jul	136	141	132	127	115	172	165	146	227	116	128	124	119	202	253	357	340	338	334	87	124	146	128	133	131.2
30-Jul	135	112	27	73	72	104	120	126	127	125	133	139	160	137	133	139	148	152	156	148	320	76	73	185	128.8
31-Jul	137	135	12	53	112	293	129	128	111	355	33	13	19	8	16	348	3	331	341	340	332	332	339	332	2.2

135.9 165.3 182.7 179.1 171.9 128.0 122.8 130.7 137.8 143.8 143.8 168.0 196.9 233.2 230.2 281.2 252.7 261.4 258.0 255.1 251.2 264.2 259.8 214.3
Diurnal Average

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

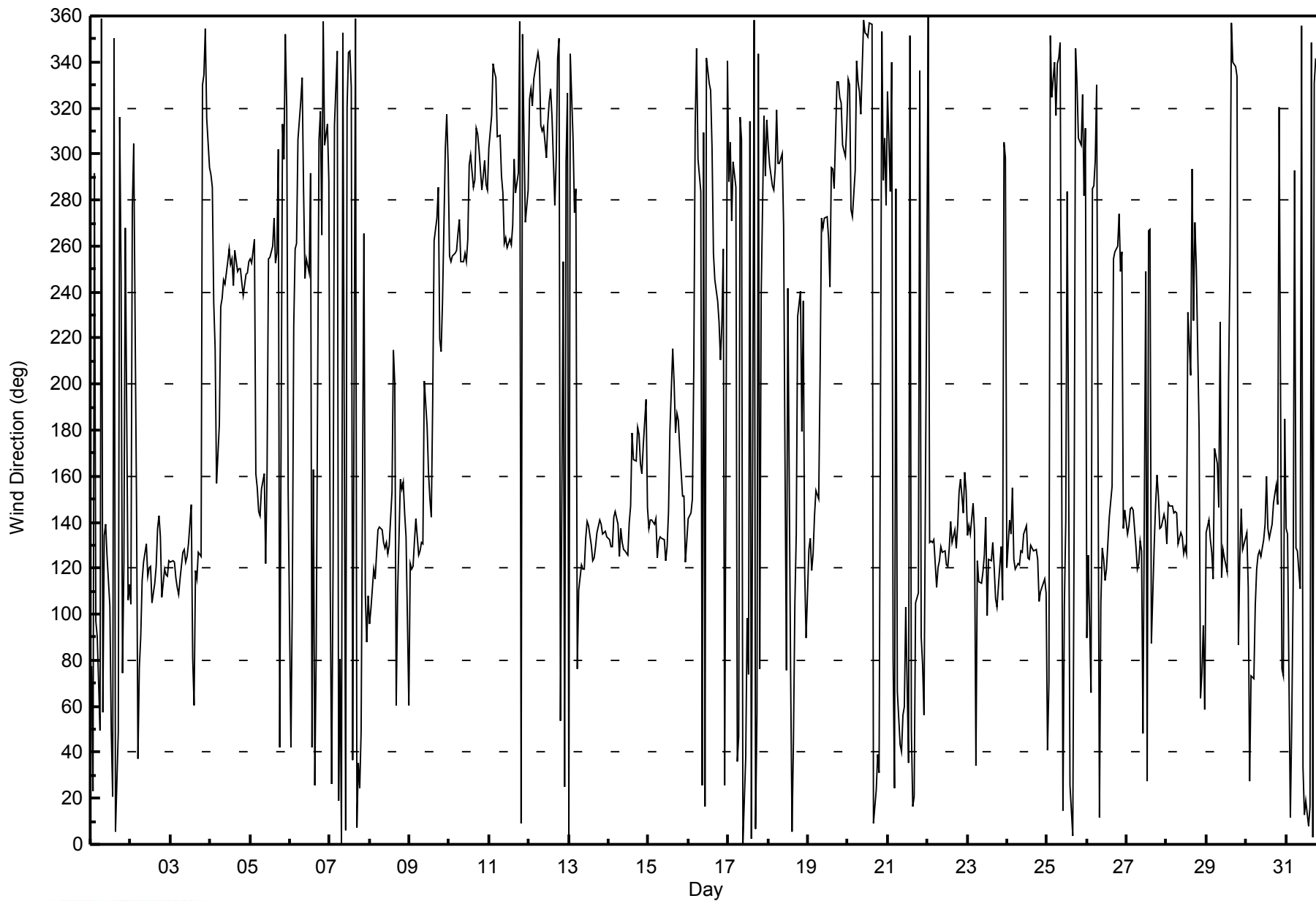
Lower Camp - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																			Hours in Service: 744						
Maximum Value: 103 deg on Jul 30 23:00																			Hours of Data: 744						
Minimum Value: 9 deg on Jul 3 06:00																			Hours of Missing Data: 0						
Percentiles: P ₁ = 11 P ₁₀ = 16 Q ₁ = 21 Median = 30 Q ₃ = 47 P ₉₀ = 73 P ₉₉ = 98																			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-Jul	48	64	98	52	74	73	68	42	21	26	29	44	49	49	89	32	50	32	40	100	37	95	96	80	100
2-Jul	69	94	57	83	91	69	49	22	19	19	16	12	19	27	18	26	26	28	26	14	25	16	15	23	94
3-Jul	21	21	24	11	9	9	11	17	18	14	16	23	41	99	28	22	15	21	87	18	21	21	44	35	99
4-Jul	27	17	26	25	28	37	30	22	23	19	15	17	16	18	16	14	17	16	16	12	12	14	13	12	37
5-Jul	14	13	29	82	27	19	26	32	46	23	62	20	16	18	17	18	16	54	48	93	44	41	81	48	93
6-Jul	93	73	66	32	40	55	40	39	57	54	18	21	53	53	40	68	43	55	46	24	70	91	29	37	93
7-Jul	68	89	78	28	84	92	40	29	27	17	28	25	25	30	27	45	19	14	14	28	79	38	96	80	96
8-Jul	61	55	32	47	57	45	35	36	32	25	25	17	22	57	39	39	89	20	30	22	23	19	42	51	89
9-Jul	70	66	88	23	44	26	27	27	25	45	39	35	41	30	35	41	14	58	24	23	20	17	12	26	88
10-Jul	15	12	12	13	13	11	20	17	18	25	20	16	22	18	19	19	14	14	13	12	12	12	11	11	25
11-Jul	23	23	17	28	42	72	18	21	16	14	26	13	16	17	26	16	31	13	25	15	21	27	9	33	72
12-Jul	16	10	15	18	81	40	46	29	19	19	20	31	30	28	35	58	53	44	22	35	89	48	19	67	89
13-Jul	37	62	57	24	59	55	16	16	16	20	27	29	29	25	21	27	19	21	23	20	17	18	25	62	
14-Jul	31	33	35	35	45	31	25	35	30	21	18	18	27	37	40	42	37	39	35	25	22	29	31	36	45
15-Jul	18	24	20	22	21	22	30	34	34	33	18	24	35	40	34	35	35	34	36	26	19	22	53	16	53
16-Jul	20	20	54	62	53	34	11	51	42	34	17	26	21	18	73	41	16	20	26	49	21	34	67	92	92
17-Jul	32	24	13	55	66	42	24	51	56	68	22	38	73	19	26	12	32	58	35	62	57	75	88	43	88
18-Jul	84	41	46	40	41	35	18	33	36	72	80	93	73	76	83	31	19	35	74	25	39	55	89	93	93
19-Jul	37	34	38	38	27	25	33	98	54	21	17	13	16	15	17	17	18	19	17	16	32	15	16	16	98
20-Jul	24	21	41	32	46	37	15	25	35	46	24	27	26	32	45	29	38	22	14	12	63	19	41	58	63
21-Jul	48	21	47	49	70	89	40	58	24	25	28	33	67	63	22	33	33	58	29	39	65	40	78	87	89
22-Jul	84	19	36	51	53	29	20	18	23	21	28	13	21	23	34	34	35	28	31	34	30	39	31	37	84
23-Jul	23	23	24	29	98	65	62	22	24	17	28	34	51	45	19	23	23	20	28	94	33	99	75	56	99
24-Jul	89	25	28	31	41	14	17	16	21	24	35	32	22	21	25	23	23	23	20	14	14	17	17	17	89
25-Jul	32	35	57	32	37	18	29	26	27	71	42	30	87	87	70	44	73	91	24	17	28	62	33	65	91
26-Jul	94	63	96	25	17	21	29	27	38	19	27	19	24	41	38	50	28	13	15	25	12	84	38	34	96
27-Jul	23	26	28	22	24	35	16	20	27	19	54	91	49	57	47	65	35	40	33	34	34	31	26	31	91
28-Jul	35	23	25	32	33	40	41	28	35	27	17	32	27	84	66	58	80	84	24	44	57	66	57	44	84
29-Jul	29	27	34	41	75	77	55	69	72	35	20	23	57	94	103	25	17	21	58	70	31	27	35	32	103
30-Jul	45	60	96	59	50	31	20	22	24	17	27	34	42	39	44	37	40	33	27	26	53	59	103	71	103
31-Jul	64	88	68	53	99	48	62	32	28	66	24	24	24	23	20	22	30	27	78	26	17	24	22	19	99
																			94 94 98 83 99 92 68 98 72 72 80 93 87 99 103 68 89 91 87 100 89 99 103 93						
Diurnal Maximum																									



WBEA NETWORK
Hourly Averages

Wind Direction (WD) - deg
Lower Camp - July 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 11, 2014	Previous Calibration	June 9, 2014
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	8:55	End Time (MST)	12:35
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	-557
Analyzer Range (mv)	5000	5000	Lamp voltage	876	880
Calculated slope	0.994161	0.996959	Chamber temp.	45.1	45.2
Calculated intercept	0.157525	-0.032060	Pressure (mmHg)	718.0	708.8
Analyzer Background	20.7	20.8	Flow (lpm)	0.506	0.496
Analyzer Coefficient	0.988	0.982	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	833.5	0.996
calibrator zero	5000	0.0	0.0	0.4	NA
high point	5001	80.9	829.9	832.6	0.997
second point	5000	40.9	419.6	420.7	0.997
third point	5002	20.4	209.2	209.6	0.998
calibrator zero	5000	0.0	0.0	0.4	NA
as left zero	5000	0.0	0.0	0.7	NA
as left span	5000	80.9	830.0	836.7	0.992
Average Correction Factor					0.997

Corrected As found 833.2 Previous response 834.6 % change 0.2%

Notes:

Adjusted span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

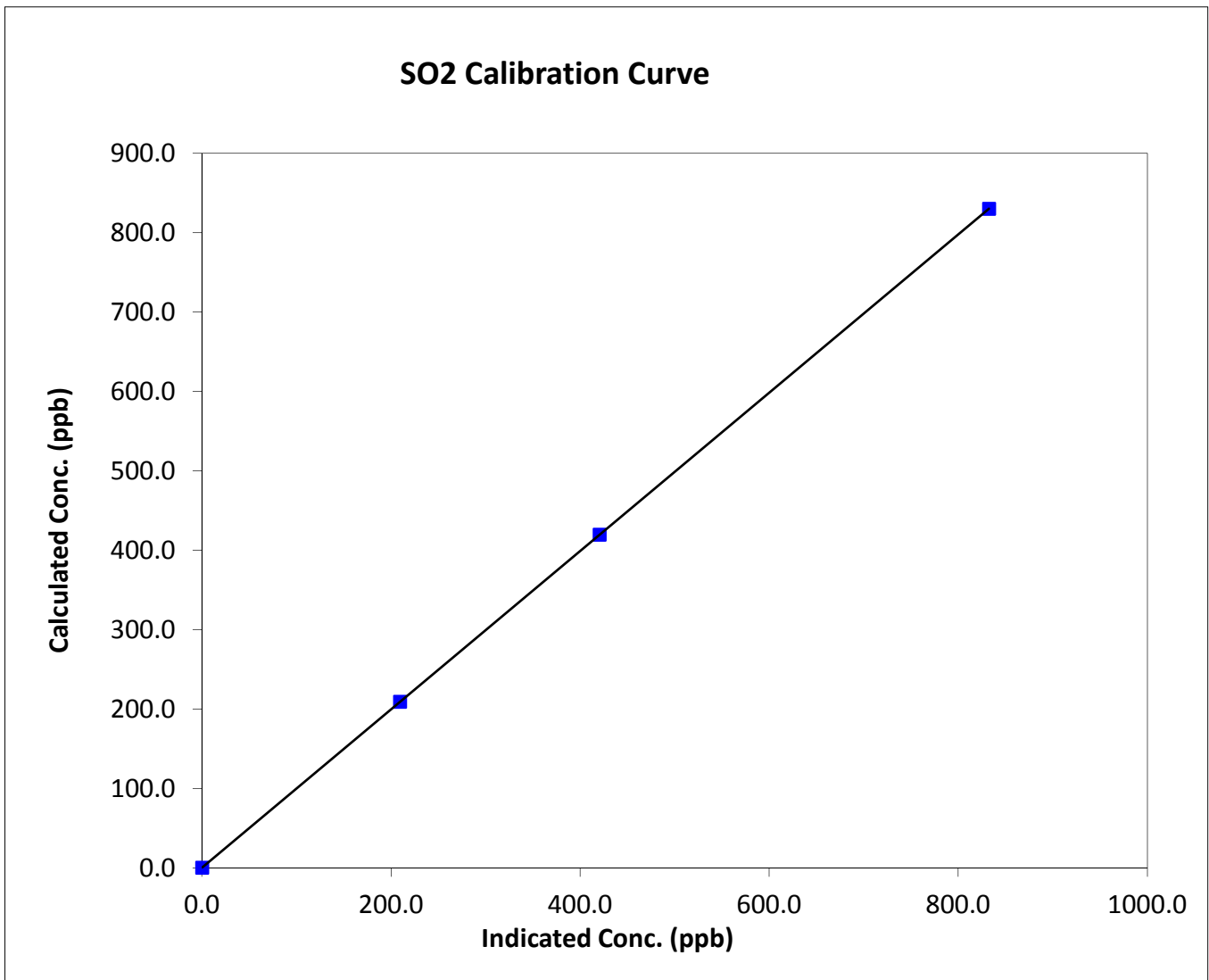
SO₂ Calibration Summary

Station Information

Calibration Date	July 11, 2014	Previous Calibration	June 9, 2014
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	8:55	End Time (MST)	12:35
Analyzer make	TEI 43C	Analyzer serial #	518112184

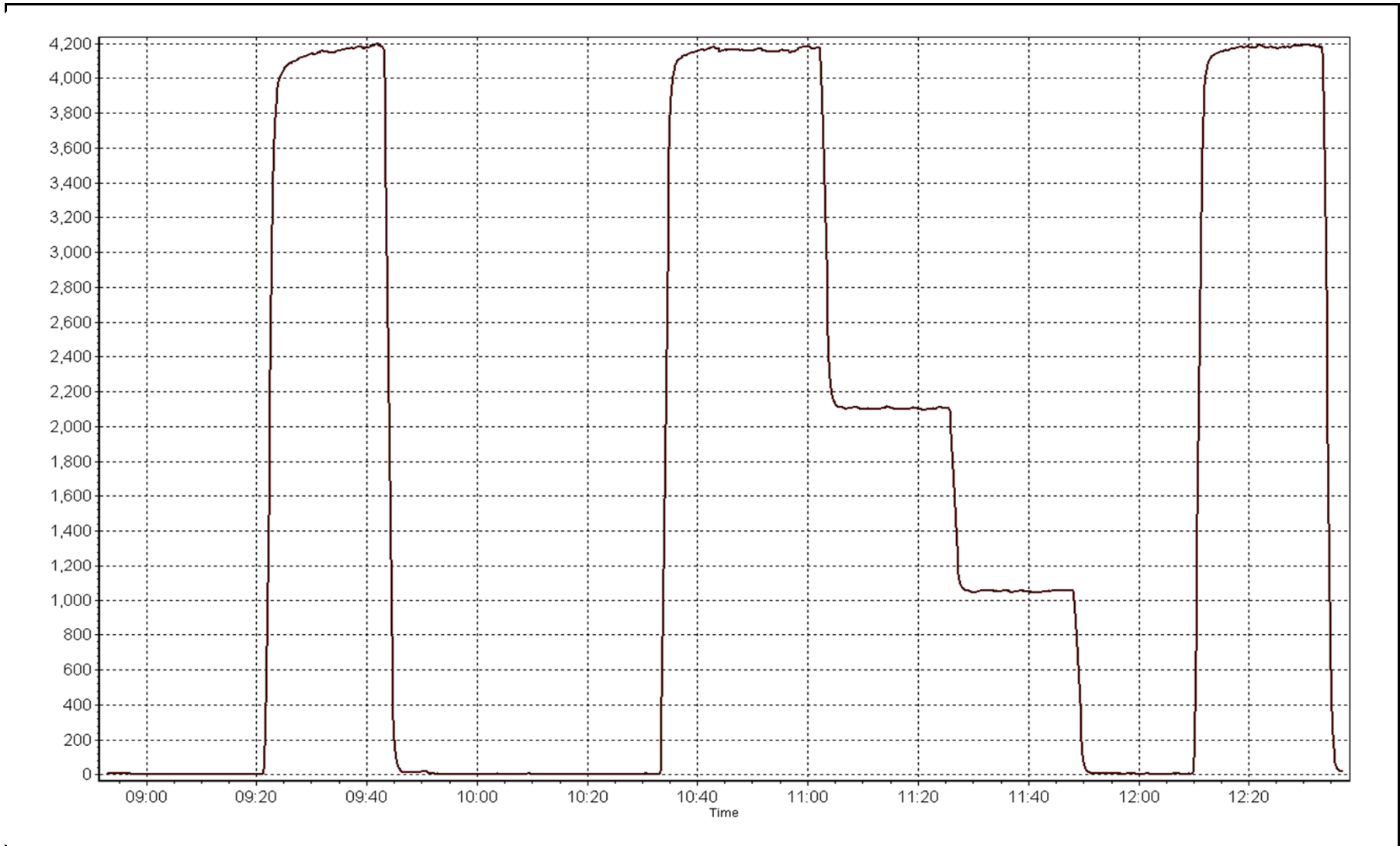
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999999
829.9	832.6	0.9967		
419.6	420.7	0.9974	Slope	0.996959
209.2	209.6	0.9983		
			Intercept	-0.032060



SO2 Calibration Plot

Date: July 11, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	July 14, 2014	Previous Calibration	June 18, 2014
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	1:05
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	971
Calculated slope	1.002757	1.002962	Chamber temp. (deg C)	45	45
Calculated intercept	-0.098674	0.051685	Pressure (mmHg)	599.5	580.5
Analyzer Background	1.52	1.59	Flow(LPM)	0.414	0.405
Analyzer Coefficient	0.858	0.874	Intensity(%)	90	91
			Converter temp.(deg C)	370	370

Analyzer make/model	Thermo 43i	Analyzer serial #	1008841400
Converter make/model	TEI 340	Converter serial #	328702539

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	NA
as found span	5000	36.4	75.0	73.1	1.026
SO2 scrubber check	5000	20.5	210.3	1.3	NA
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5001	36.4	75.0	74.8	1.002
second point	5002	19.4	39.9	39.7	1.007
third point	5002	9.7	20.0	19.7	1.012
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	74.2	1.010
Average Correction Factor					1.007

Corrected As found	73.0	Previous response	74.9	% change	2.6%
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Notes:

Adjusted span.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

H2S Calibration Summary

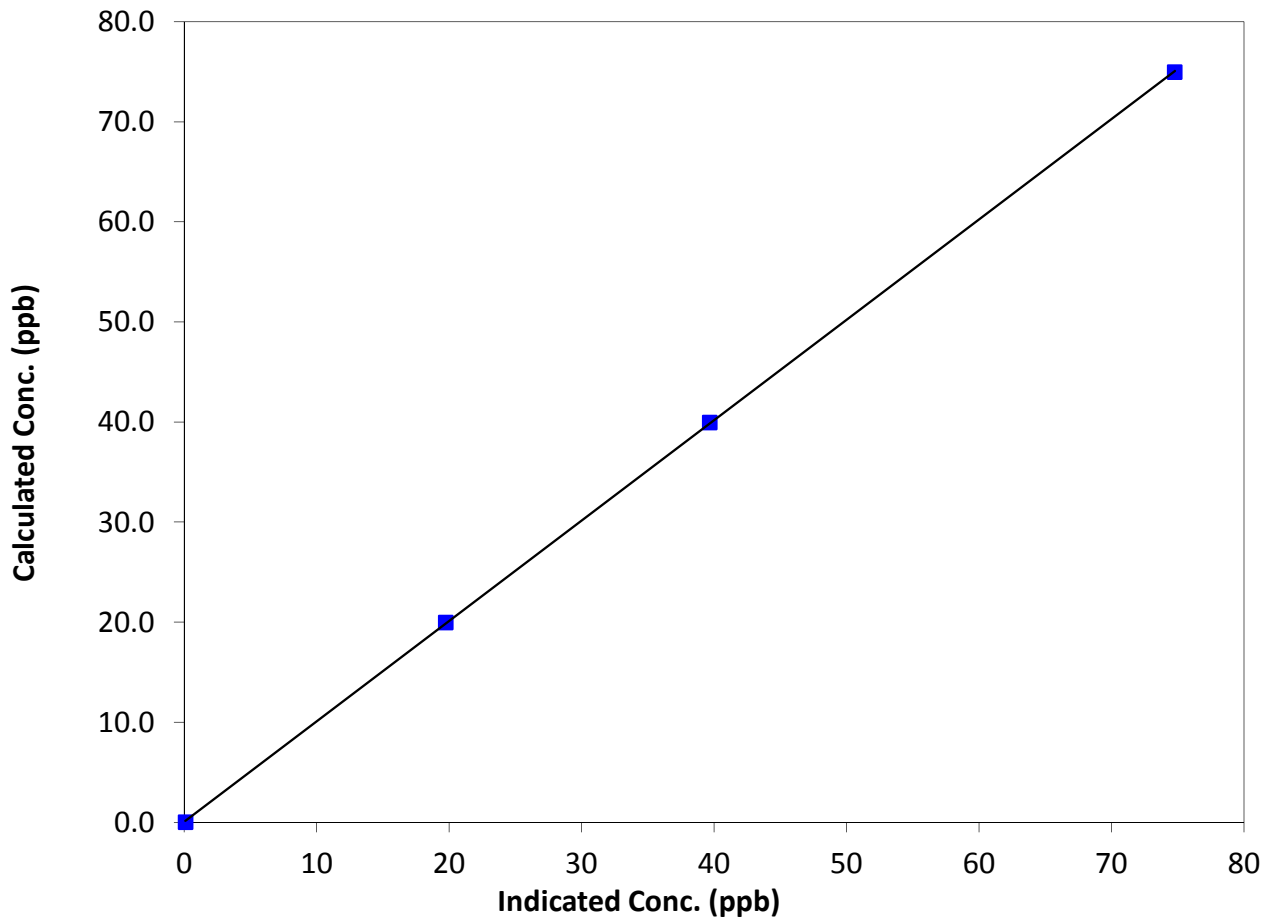
Station Information

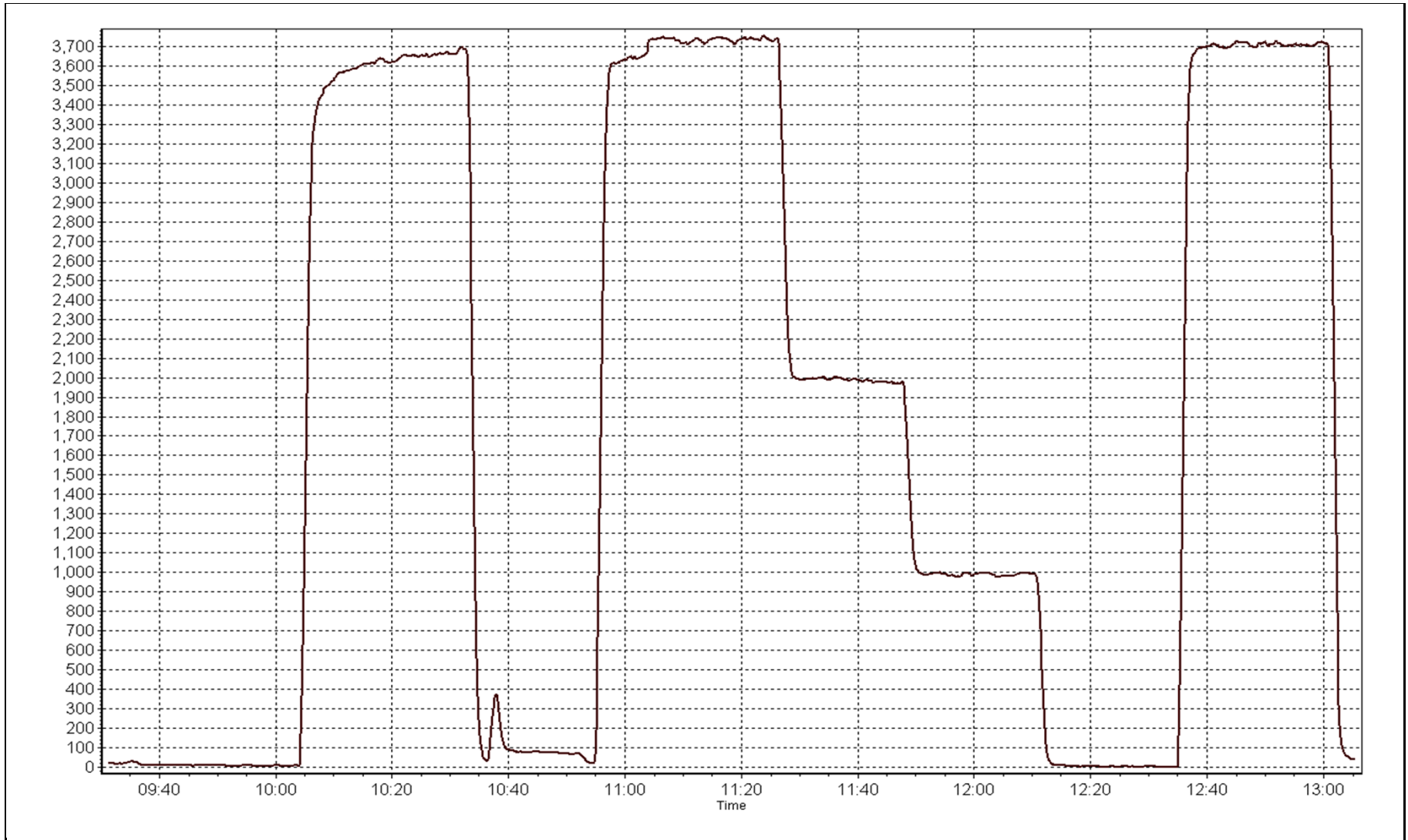
Calibration Date	July 14, 2014	Previous Calibration	June 18, 2014
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:35	End Time (MST)	1:05
Analyzer make	Thermo 43i	Analyzer serial #	1008841400

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999981
75.0	74.8	1.0024		
39.9	39.7	1.0071	Slope	1.002962
20.0	19.7	1.0121		
			Intercept	0.051685

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Friday, July 11, 2014	Previous Calibration	June-09-14
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	8:55	End Time (MST)	12:35
Barometric Pressure	760 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
Gas Cert Reference	CC 302056	Cal Gas Expiry Date	
CH4 Cal Gas Conc.	510 ppm	CH4 Equiv Conc.	1073.8 ppm
C3H8 Cal Gas Conc.	205 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2634
DACS voltage range	0-5v	DACS channel #	SE3

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.2	8.2
Analyzer Range (mv)	5000	5000	Air or Bypass press	37.8	37.8
Calculated slope	1.003754	1.002608	Fuel Pressure	24.2	24.2
Calculated intercept	0.014635	-0.023396			

Analyzer make	51i-LT	Analyzer serial #	1218153580
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.02	N/A
as found span	5001	80.9	17.37	15.72	1.105
calibrator zero	5000	0.0	0.00	0.04	N/A
high point	5001	80.9	17.37	17.37	1.000
second point	5000	40.9	8.78	8.74	1.005
third point	5002	20.4	4.38	4.39	0.997
calibrator zero	5000	0.0	0.00	0.05	N/A
as left zero	5000	0.0	0.00	0.05	N/A
as left span	5000	80.9	17.37	17.73	0.980
Average Correction Factor					1.001

Corrected As found 15.70 Previous response 17.29 % change 10.1%

Notes:

Adjusted span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

THC Calibration Summary

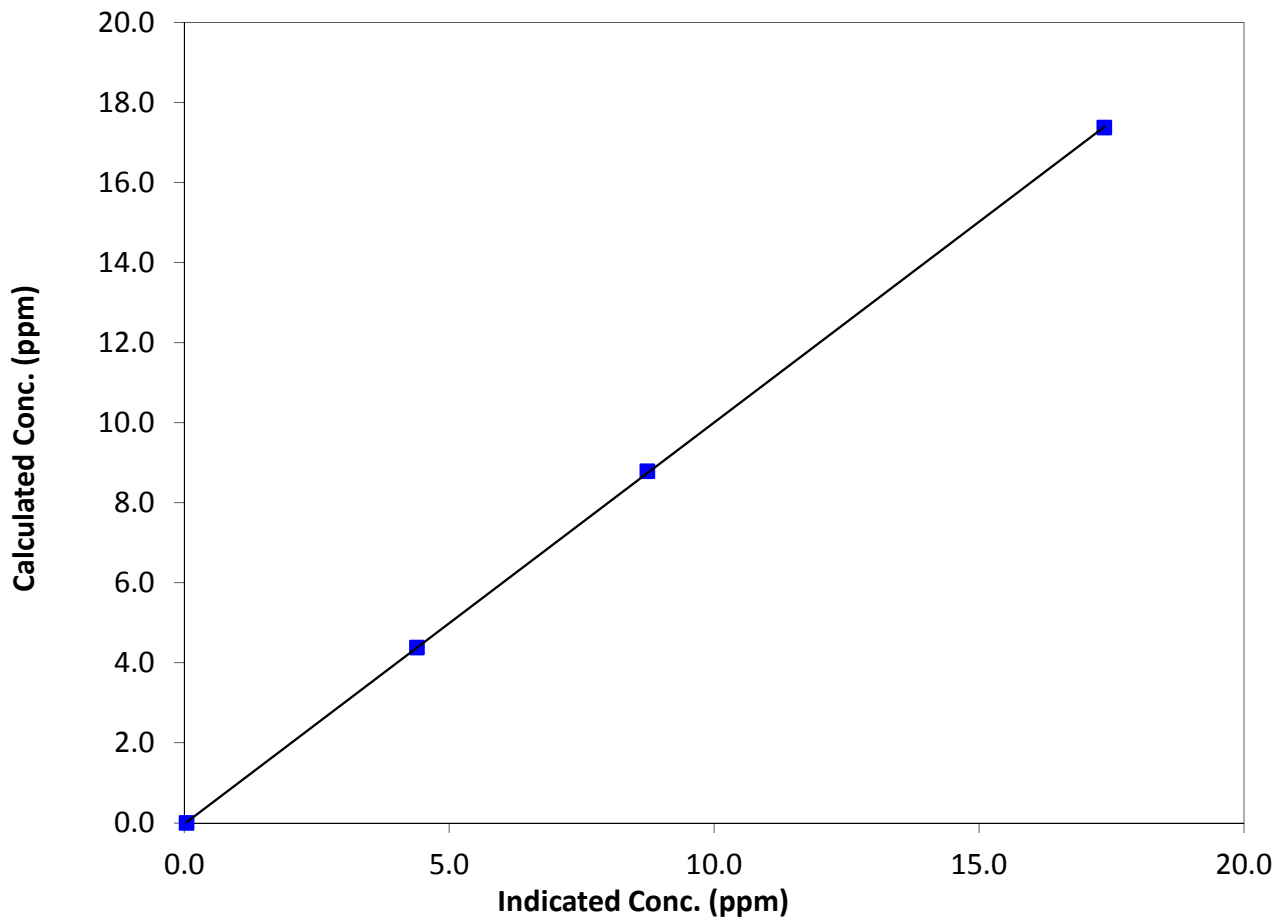
Station Information

Calibration Date	July 11, 2014	Previous Calibration	June-09-14
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	8:55	End Time (MST)	12:35
Analyzer make	51i-LT	Analyzer serial #	1218153580

Calibration Data

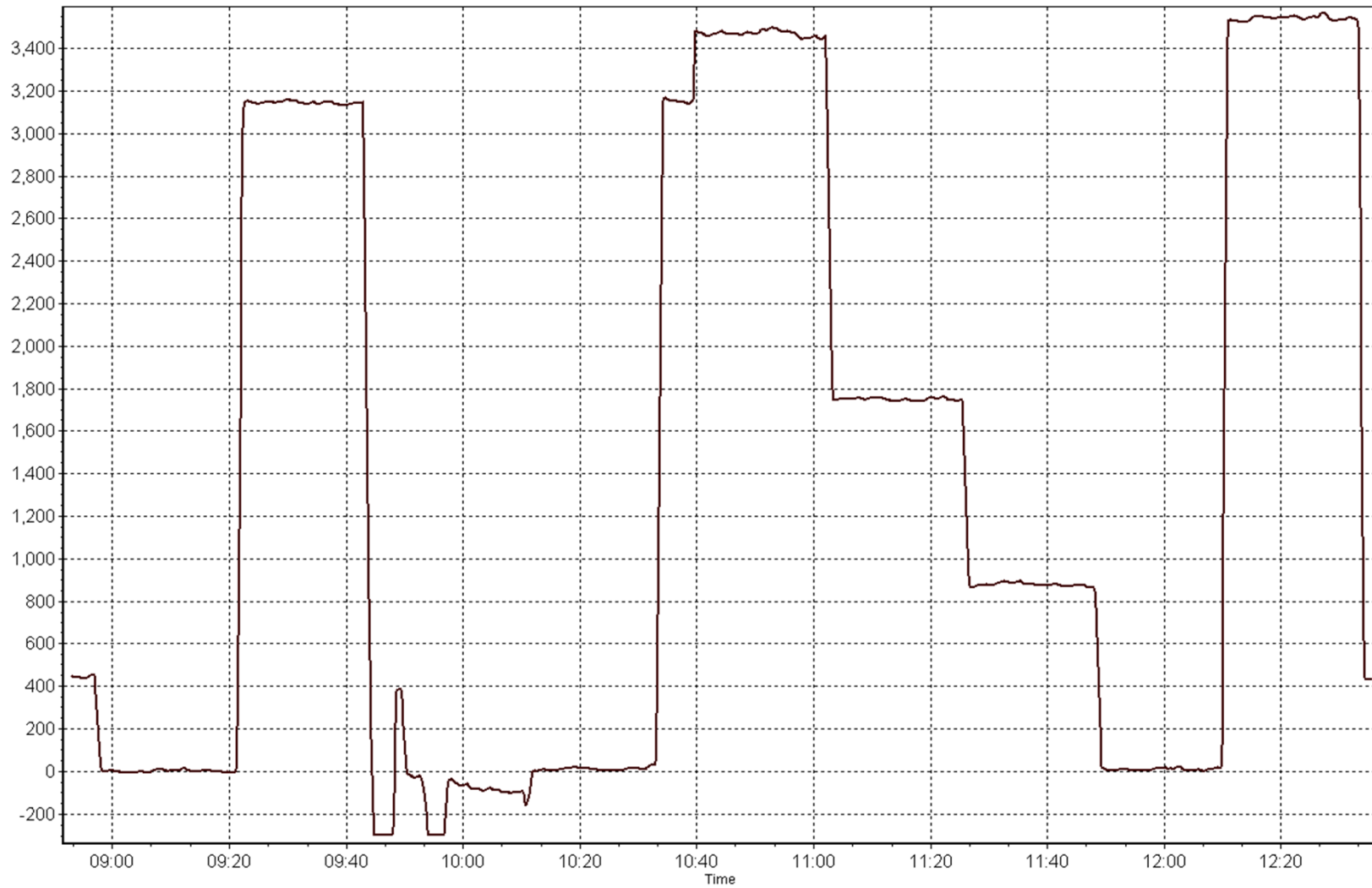
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.04	N/A	Correlation Coefficient	0.999985
17.37	17.37	1.0001		
8.78	8.74	1.0046	Slope	1.002608
4.38	4.39	0.9974		
			Intercept	-0.023396

THC Calibration Curve



THC Calibration Plot

Date: July 11, 2014



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 12
MILLENNIUM MINE
JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)

JULY 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	704	37	40	99.60	34	0	7	0
TRS(ppb) Average	703	38	41	99.60	5	0	1	0
THC(ppm) Average	703	37	41	99.46	5.1	-	3.1	-
NO2(ppb) Average	701	36	43	99.06	43	0	13	-
NO(ppb) Average	701	36	43	99.06	77	-	15	-
NOX(ppb) Average	701	36	43	99.06	92	-	28	-
PM2.5(ug/m3) Average	740	0	4	99.46	269.2	-	42.3	7
Temperature 2 m (C) Average	744	0	0	100.00	33.7	-	25	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	24	-	-	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)
 JULY 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	704	1	3	-	0	0	0	0	1	2	34
TRS(ppb) Average	703	0.4	1	-	0	0	0	0	0	1	5
THC(ppm) Average	703	2.48	0.4	-	2	2.2	2.3	2.4	2.6	2.9	5.1
NO2(ppb) Average	701	7.3	6	-	0	1	2	5	11	17	43
NO(ppb) Average	701	4.3	9	-	0	0	1	1	3	13	77
NOX(ppb) Average	701	11.6	13	-	0	1	3	7	15	28	92
PM2.5(ug/m3) Average	740	18.01	19.7	-	0.4	3.3	6.2	11.9	23.7	37.7	269.2
Temperature 2 m (C) Average	744	20.07	4.9	-	8.2	14.1	16.1	19.7	23.5	26.7	33.7
Wind Speed 10 m (km/h) Average	743	7.1	4	-	0	3	5	6	9	12	24
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -MILLENNIUM MINE (AMS 12)
JULY 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	16 Jul 2014 10:00	16 Jul 2014 11:00	2	Station power interruption and stabilization period
SO2	23 Jul 2014 09:00	23 Jul 2014 09:00	1	Station power interruption and stabilization period
TRS	16 Jul 2014 10:00	16 Jul 2014 11:00	2	Station power interruption and stabilization period
TRS	23 Jul 2014 09:00	23 Jul 2014 09:00	1	Station power interruption and stabilization period
THC	16 Jul 2014 10:00	16 Jul 2014 11:00	2	Station power interruption and stabilization period
THC	23 Jul 2014 09:00	23 Jul 2014 10:00	2	Station power interruption and stabilization period
NO2, NO, NOX	16 Jul 2014 09:00	16 Jul 2014 12:00	4	Station power interruption and stabilization period
NO2, NO, NOX	23 Jul 2014 09:00	23 Jul 2014 11:00	3	Station power interruption and stabilization period
PM2.5	16 Jul 2014 10:00	16 Jul 2014 11:00	2	Station power interruption and stabilization period
PM2.5	23 Jul 2014 09:00	23 Jul 2014 09:00	1	Station power interruption and stabilization period
PM2.5	29 Jul 2014 09:00	29 Jul 2014 09:00	1	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	21 Jul 2014 22:00	21 Jul 2014 22:00	1	Flatline in sensor output signal

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Summary of Hour Averages

Millennium - July 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 34 ppb on Jul 17 17:00	Maximum Daily Average: 6.6 ppb on Jul 17		Hours of Data:	704
Minimum Value: 0 ppb on Jul 2 21:00	Minimum Daily Average: 0.2 ppb on Jul 27		Hours of Missing Data:	40
Maximum Diurnal Average: 2.0 ppb at hour 17	Minimum Diurnal Average: 0.4 ppb at hour 6		Hours of Calibration:	37
Monthly Average: 1.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 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-Jul	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
2-Jul	0	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
3-Jul	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Jul	0	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-Jul	0	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-Jul	0	Z	0	0	0	0	1	1	15	4	1	0	0	0	0	1	0	4	2	6	2	0	0	0	1.7	15
7-Jul	0	Z	1	1	2	1	1	1	1	1	3	1	1	3	1	0	0	0	0	0	0	0	0	0	0.9	3
8-Jul	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
9-Jul	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	3	0.7	5
10-Jul	1	Z	0	0	0	0	0	1	0	0	0	0	0	1	0	0	2	5	2	3	3	9	12	9	2.2	12
11-Jul	10	Z	5	7	3	2	2	3	3	2	1	1	1	1	0	0	0	4	2	0	0	0	0	0	2.1	10
12-Jul	0	Z	0	0	0	0	0	0	0	1	2	7	4	1	3	4	2	1	1	1	0	1	0	0	1.3	7
13-Jul	0	Z	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0	1	1	0	0	1	0	0	0.5	1
14-Jul	1	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1
15-Jul	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	1
16-Jul	0	Z	0	0	0	0	0	0	1	PF	PF	0	0	0	0	1	0	0	0	0	0	0	1	0	0.4	1
17-Jul	0	Z	0	0	0	0	0	0	0	0	6	13	15	4	12	27	34	16	7	5	7	2	1	1	6.6	34
18-Jul	1	Z	0	0	0	0	0	0	0	0	0	0	2	5	7	2	1	1	1	0	0	0	0	0	1.0	7
19-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0.3	2
20-Jul	1	Z	2	1	0	0	1	1	5	4	2	1	1	0	0	0	1	0	0	0	0	0	0	0	0.9	5
21-Jul	0	Z	0	0	0	0	0	0	0	0	0	3	3	2	3	16	11	11	13	10	7	7	3	1	4.0	16
22-Jul	1	Z	0	1	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
23-Jul	0	Z	0	0	0	0	1	1	PF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
24-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
25-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1
26-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Jul	0	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
29-Jul	0	Z	0	0	0	0	C	C	C	C	C	C	0	0	0	0	1	10	5	1	0	0	0	0	--	10
30-Jul	0	Z	0	0	0	0	0	0	0	1	1	2	2	3	2	1	1	2	2	1	6	0	0	0	1.1	6
31-Jul	0	Z	0	0	0	0	0	0	0	3	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0.8	9

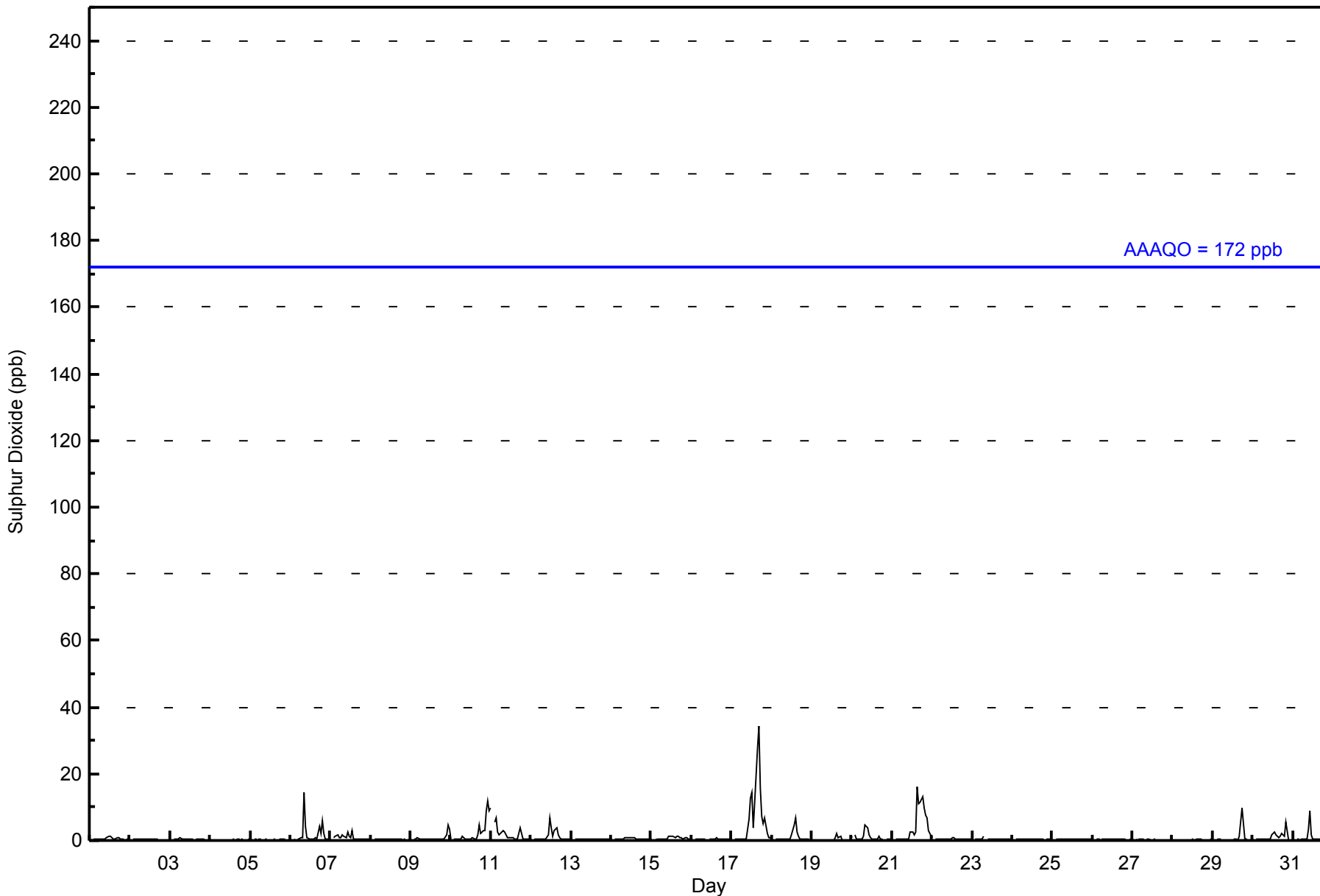
0.7	--	0.5	0.5	0.4	0.4	0.5	0.5	1.1	0.8	1.1	1.3	1.2	0.9	1.2	2.0	2.0	2.0	1.3	1.0	1.0	0.9	0.9	0.7	Diurnal Average	
10	--	5	7	3	2	2	3	15	4	9	13	15	5	12	27	34	16	13	10	7	9	12	9	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Millennium - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Millennium - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	692	98.30	98.30
11 - 20	10	1.42	99.72
21 - 60	2	0.28	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Millennium - July 2014

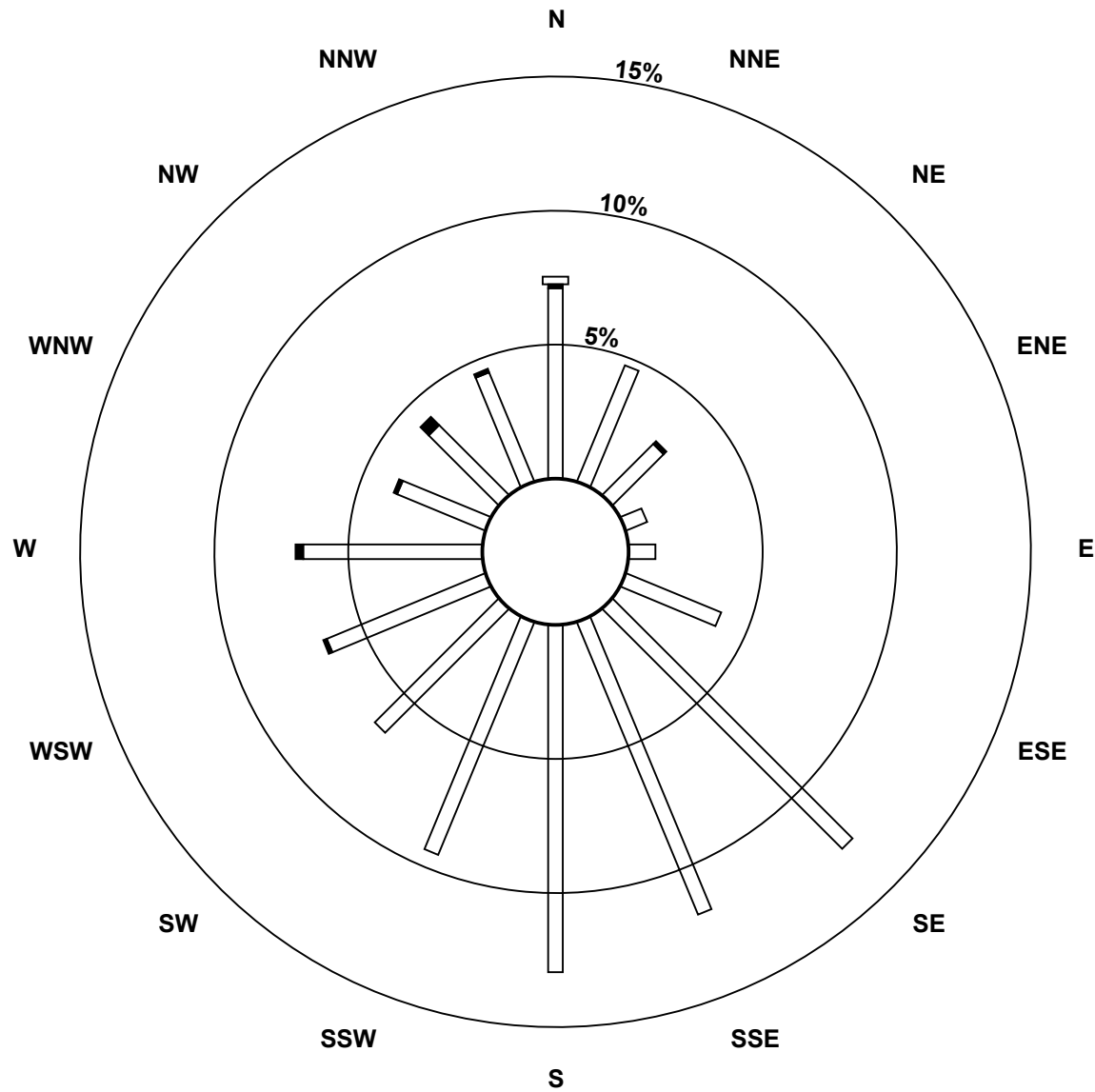
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	50	33	19	6	7	27	89	83	91	66	46	45	47	25	26	31	691
11 - 20	1	0	1	0	0	0	0	0	0	0	0	1	2	1	3	1	10
21 - 60	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	53	33	20	6	7	27	89	83	91	66	46	46	49	26	29	32	703

Total Number of Valid Hours: 703

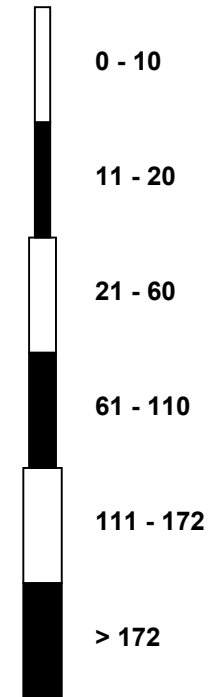
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Sulphur Dioxide (SO₂) - ppb
Millennium (AMS 12)



Classes (ppb)



Total Number of Valid Hours: 703

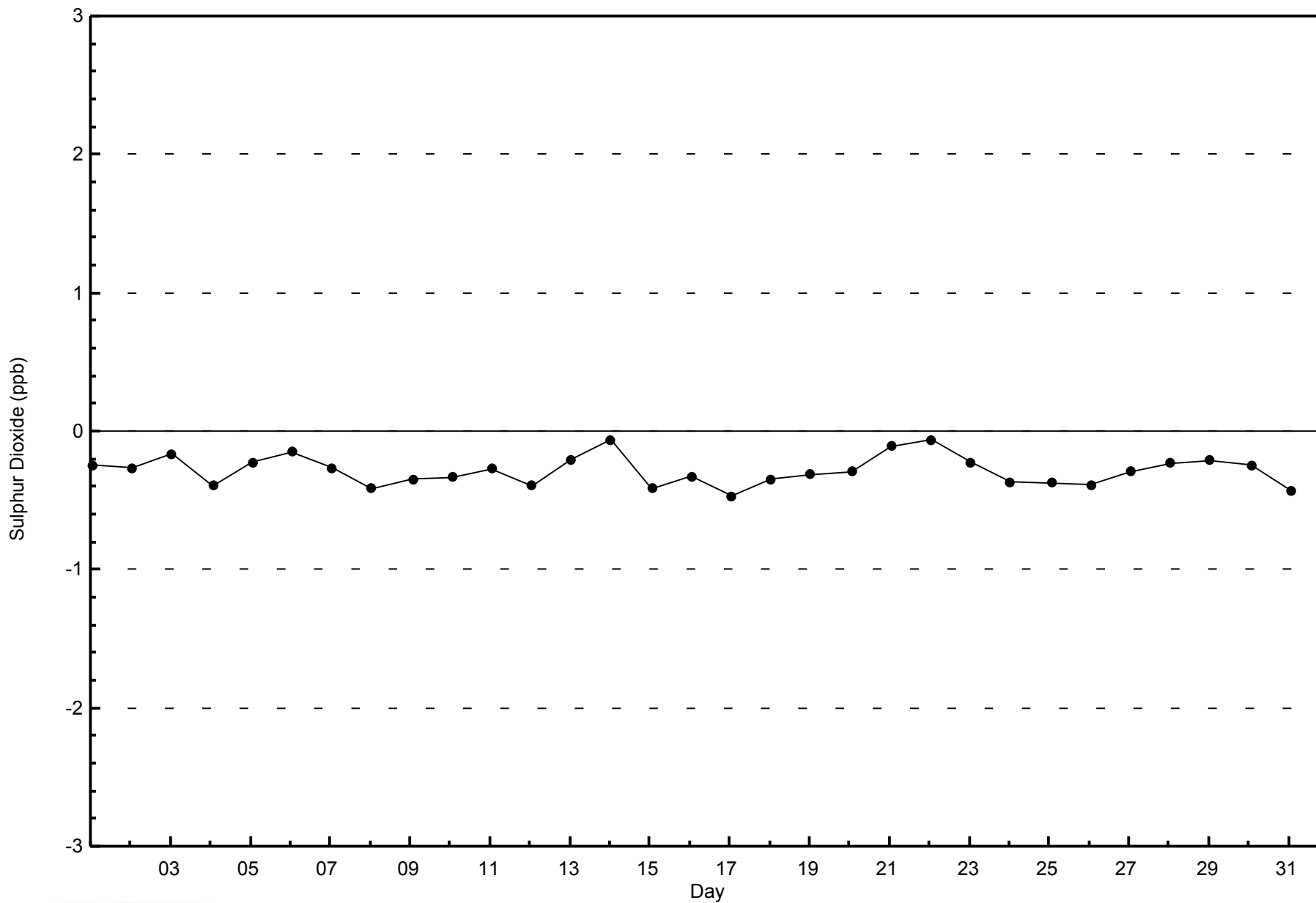


WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

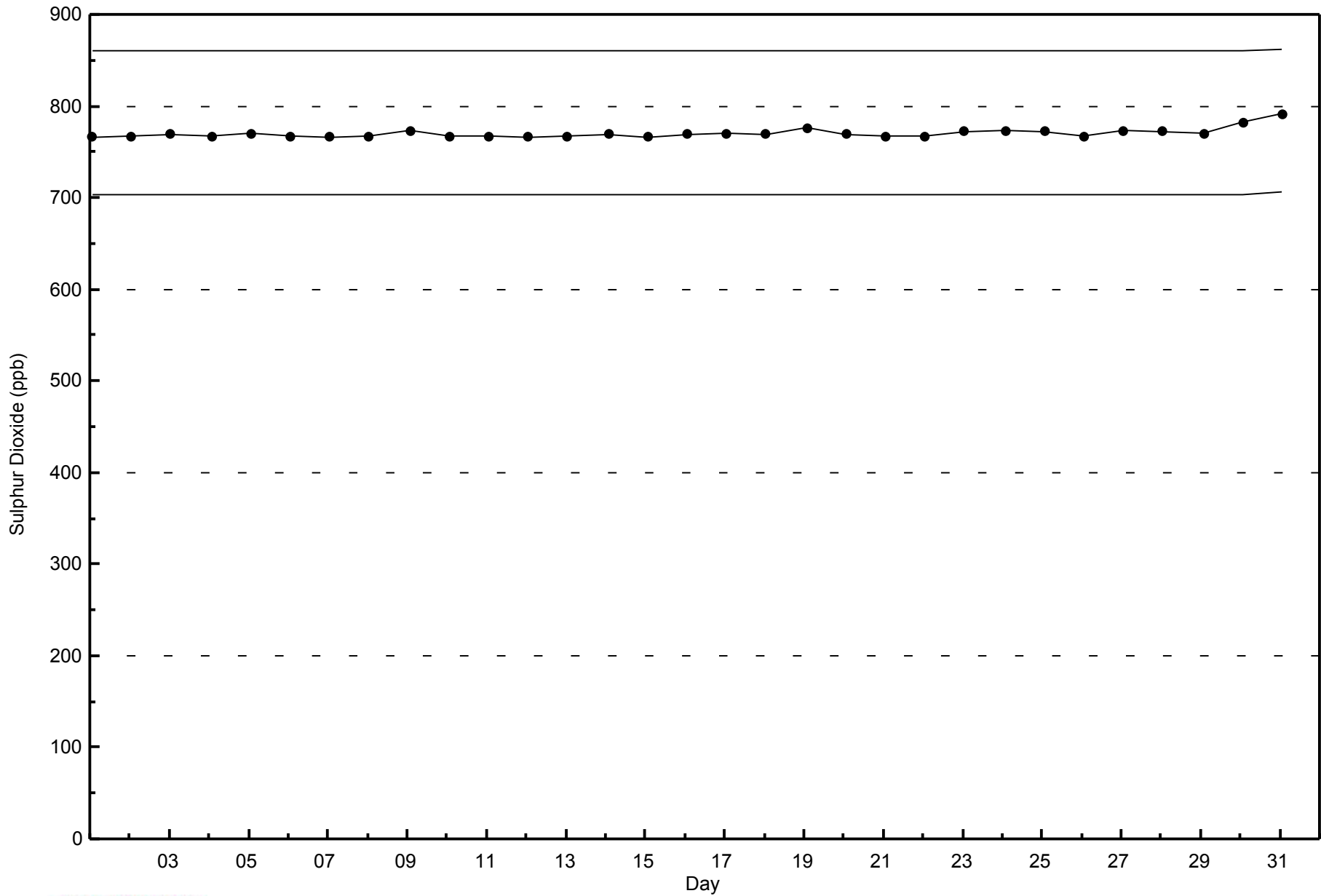
Millennium - July 2014





WBEA NETWORK
Span Responses

Sulphur Dioxide (SO₂) - ppb
Millennium - July 2014





Summary of Hour Averages

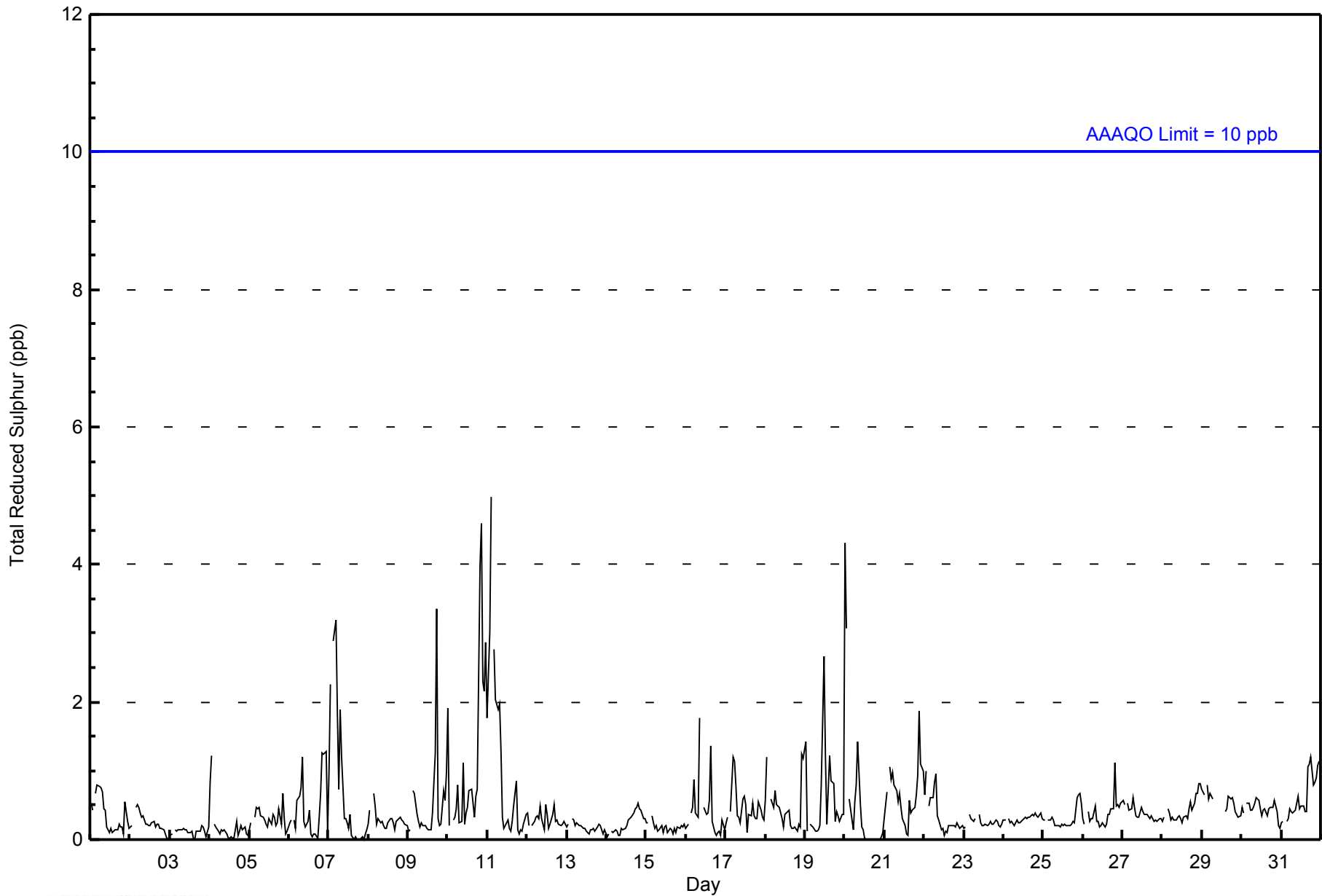
Millennium - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 5 ppb on Jul 11 03:00										Maximum Daily Average: 1.1 ppb on Jul 10										Hours of Data: 703																													
Minimum Value: 0 ppb on Jul 3 00:00										Minimum Daily Average: 0.1 ppb on Jul 3										Hours of Missing Data: 41																													
Maximum Diurnal Average: 5.0 ppb at hour 3										Minimum Diurnal Average: 0.2 ppb at hour 14										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 = 3										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-Jul	1	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1																							
2-Jul	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																							
3-Jul	0	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-Jul	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
5-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1																							
6-Jul	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.5	1																							
7-Jul	1	2	Z	3	3	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	3																							
8-Jul	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																							
9-Jul	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	1	1	1	1	0.5	3																							
10-Jul	2	0	Z	0	0	0	1	0	0	1	0	0	1	1	1	0	1	1	4	5	2	2	3	1.1	5																								
11-Jul	2	3	5	Z	3	2	2	2	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1.0	5																								
12-Jul	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1																								
13-Jul	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-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1																								
15-Jul	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																								
16-Jul	0	0	Z	0	0	1	0	0	2	PF	PF	0	0	0	1	1	0	0	0	0	0	0	0	0.4	2																								
17-Jul	0	0	Z	0	1	1	1	0	0	0	1	1	1	0	0	0	1	0	0	0	1	0	0	0.5	1																								
18-Jul	1	1	Z	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.5	1																								
19-Jul	1	0	Z	0	0	0	0	0	0	0	1	3	1	0	1	1	1	1	0	0	0	0	0	0.6	3																								
20-Jul	4	3	Z	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4																								
21-Jul	0	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	1	1	2	1	1	0.7	2																							
22-Jul	1	1	Z	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																								
23-Jul	0	0	Z	0	0	0	0	0	0	PF	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																								
24-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																								
25-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.3	1																								
26-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0.4	1																								
27-Jul	1	1	Z	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																								
28-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0.4	1																								
29-Jul	1	1	Z	1	1	1	1	C	C	C	C	C	C	C	0	0	1	1	1	1	0	0	0	--	1																								
30-Jul	0	0	Z	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1																								
31-Jul	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0.6	1																								
																								0.6	0.6	5.0	0.5	0.6	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.4	0.3	0.4	0.5	0.5	0.4	0.4	Diurnal Average	
																								4	3	5	3	3	2	2	2	2	1	1	3	1	1	1	1	1	1	3	1	4	5	2	2	3	Diurnal Maximum
Z - zerospan C - Calibration PF - Power Failure																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																	



WBEA NETWORK
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Millennium - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Millennium - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	691	98.29	98.29
3 - 4	10	1.42	99.72
5 - 7	2	0.28	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Millennium - July 2014

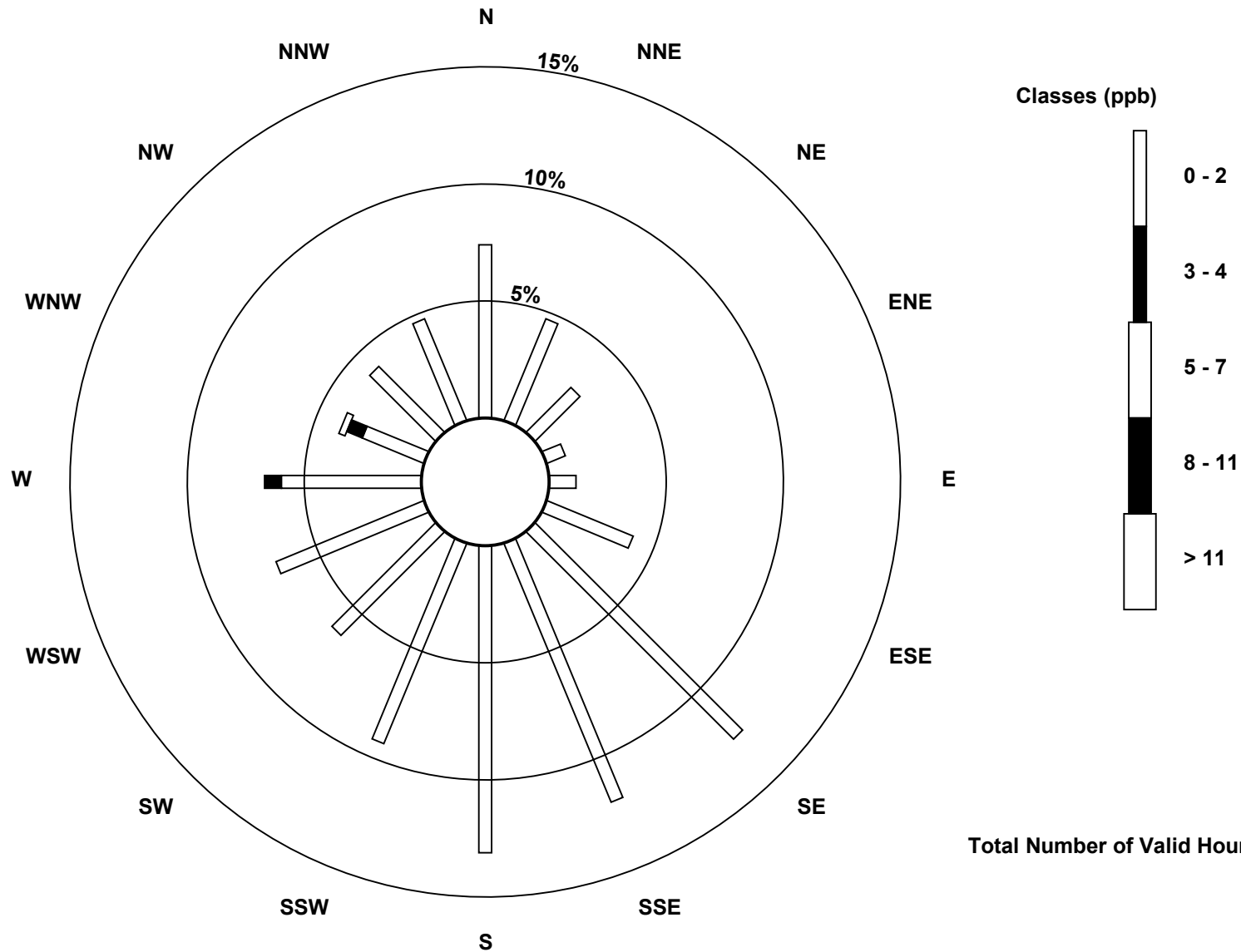
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	52	33	19	6	8	28	88	84	92	65	44	48	42	20	28	33	690
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	10
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	52	33	19	6	8	28	88	84	92	65	44	48	47	27	28	33	702

Total Number of Valid Hours: 702

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Total Reduced Sulphur (TRS) - ppb
Millennium (AMS 12)



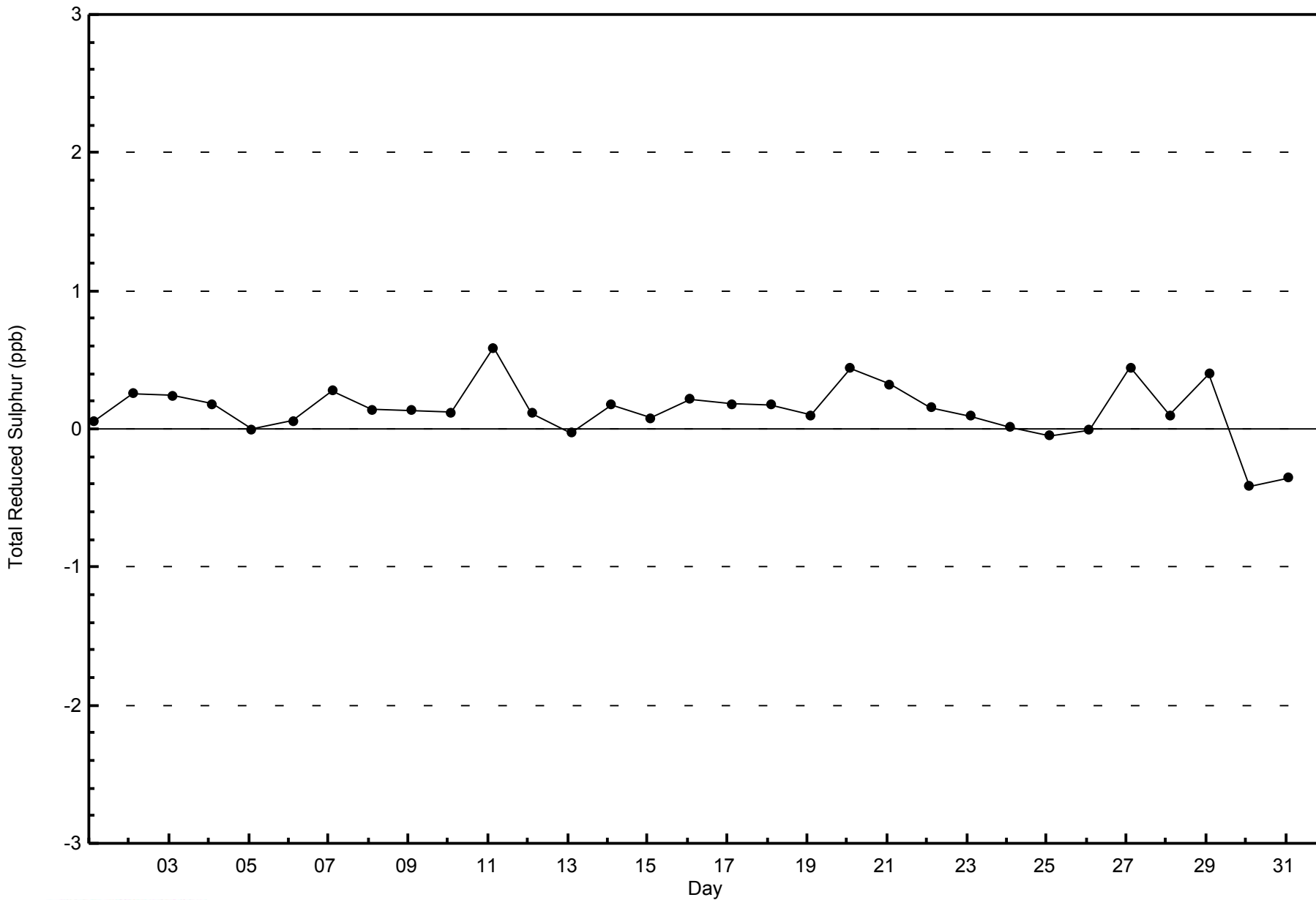


WBEA NETWORK

Zero Responses

Total Reduced Sulphur (TRS) - ppb

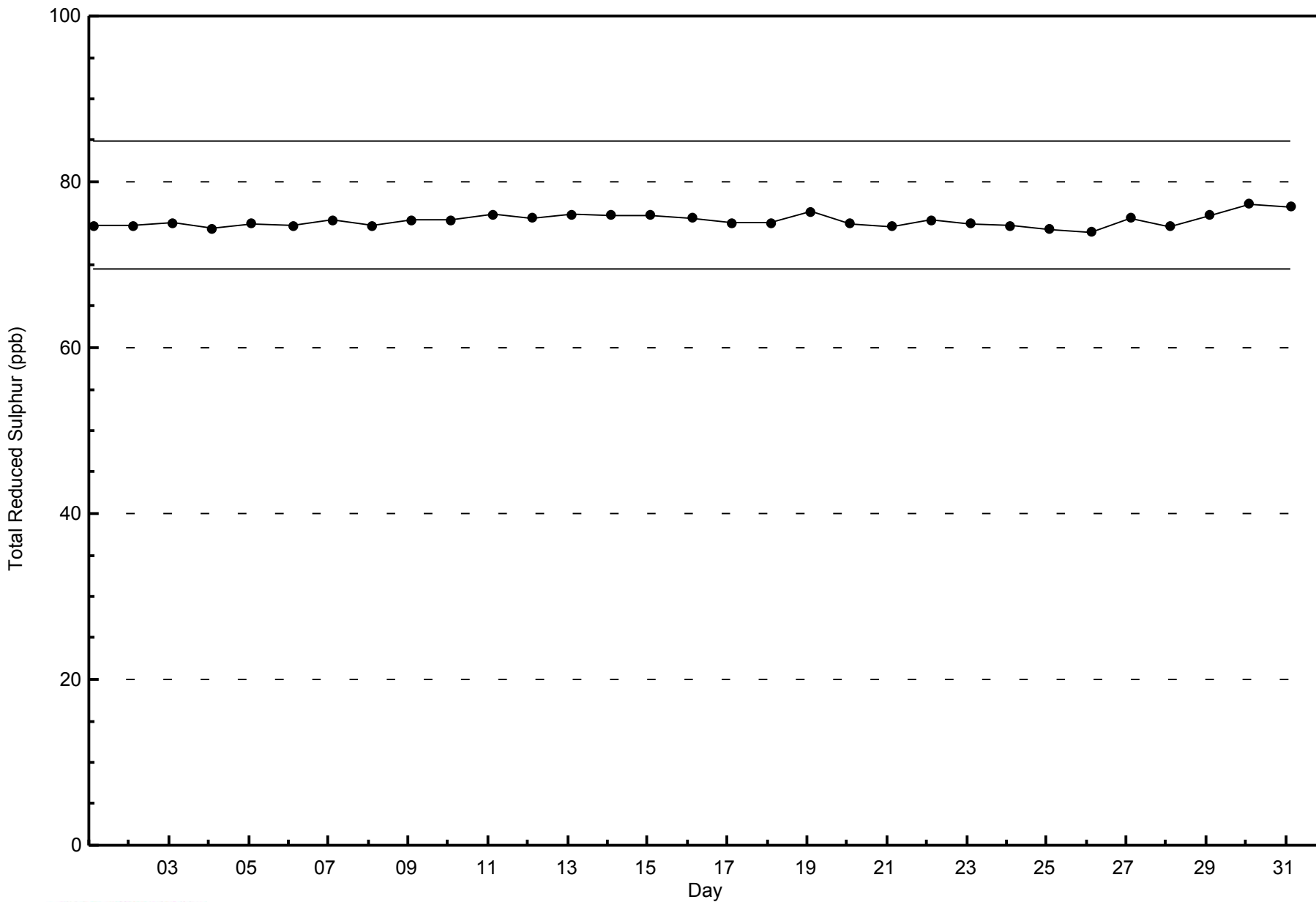
Millennium - July 2014





WBEA NETWORK
Span Responses

Total Reduced Sulphur (TRS) - ppb
Millennium - July 2014



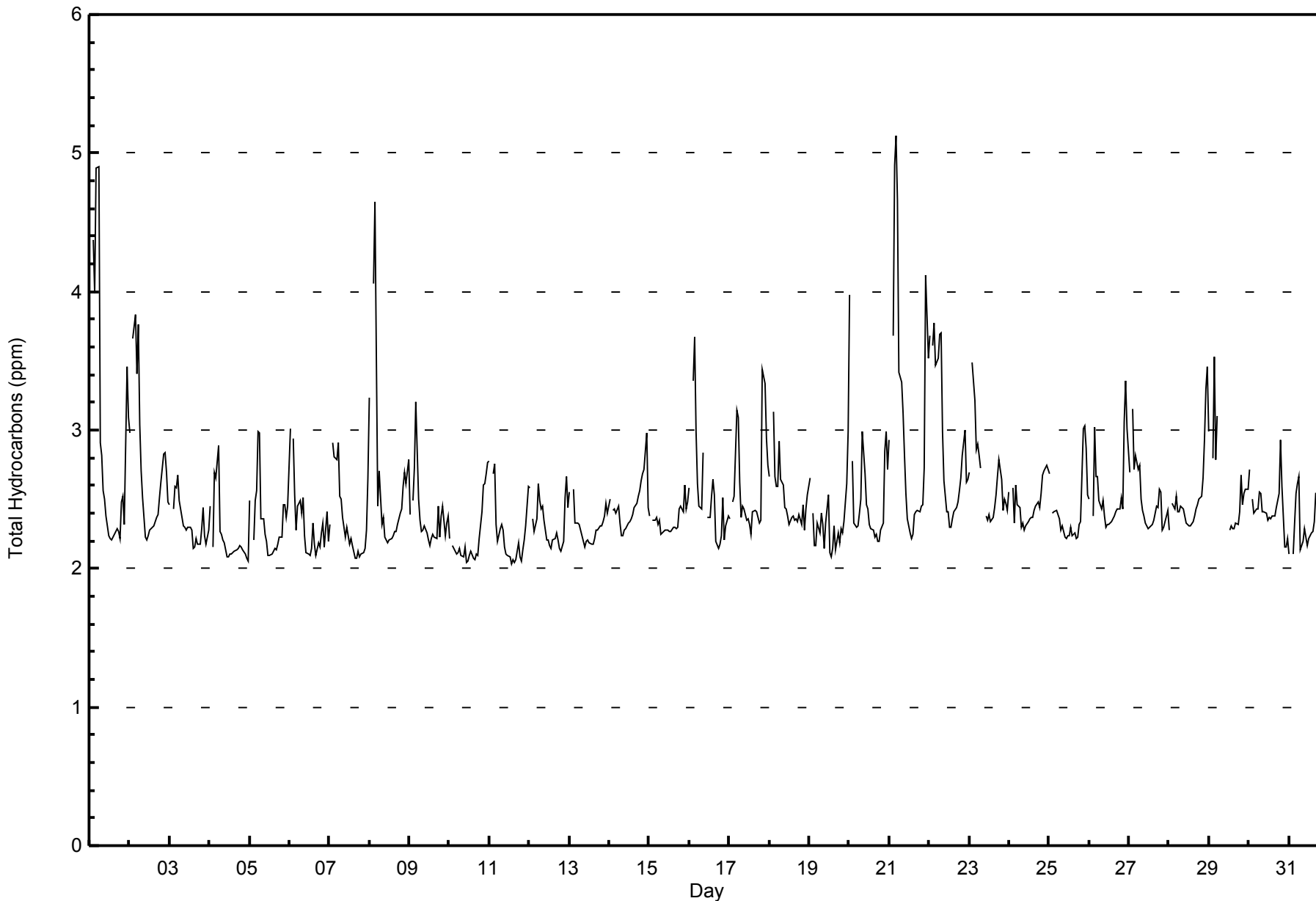


Maximum Value: 5.1 ppm on Jul 21 05:00		Maximum Daily Average: 3.1 ppm on Jul 21		Hours in Service: 744																							
Minimum Value: 2.0 ppm on Jul 11 14:00		Minimum Daily Average: 2.2 ppm on Jul 10		Hours of Data: 703																							
Maximum Diurnal Average: 2.9 ppm at hour 4		Minimum Diurnal Average: 2.2 ppm at hour 13		Hours of Missing Data: 41																							
Monthly Average: 2.48 ppm		Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.3 Median = 2.4 Q ₃ = 2.6 P ₉₀ = 2.9 P ₉₉ = 4.2		Hours of Calibration: 37																							
				Percent Operational Time: 99.5																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	2.7	Z	4.4	4.0	4.9	4.9	2.9	2.8	2.6	2.5	2.4	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.5	2.5	2.3	3.5	3.1	2.9	4.9	
2-Jul	3.0	Z	3.7	3.8	3.4	3.8	3.0	2.7	2.5	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.6	2.8	2.8	2.7	2.5	2.7	3.8	
3-Jul	2.5	Z	2.4	2.6	2.6	2.7	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.1	2.2	2.2	2.2	2.2	2.3	2.4	2.2	2.2	2.3	2.3	2.3	2.7	
4-Jul	2.5	Z	2.2	2.7	2.7	2.9	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.9	
5-Jul	2.5	Z	2.2	2.5	2.6	3.0	3.0	2.4	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.5	2.5	2.4	2.4	2.3	3.0	
6-Jul	3.0	Z	2.9	2.5	2.3	2.5	2.5	2.4	2.5	2.2	2.1	2.1	2.1	2.1	2.3	2.2	2.1	2.2	2.2	2.3	2.3	2.2	2.4	2.2	2.3	3.0	
7-Jul	2.3	Z	2.9	2.8	2.8	2.9	2.5	2.5	2.4	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.7	2.4	2.9	
8-Jul	3.2	Z	4.1	4.6	3.5	2.5	2.7	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.6	2.7	2.6	2.8	2.7	4.6	
9-Jul	2.4	Z	2.5	2.7	3.2	2.5	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.2	2.4	2.5	2.2	2.3	2.4	2.4	3.2	
10-Jul	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.6	2.6	2.7	2.8	2.2	2.8	
11-Jul	2.8	Z	2.7	2.8	2.3	2.2	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.2	2.1	2.1	2.1	2.2	2.3	2.6	2.3	2.8	
12-Jul	2.6	Z	2.4	2.3	2.4	2.6	2.5	2.4	2.4	2.4	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.2	2.1	2.1	2.2	2.5	2.7	2.4	2.3	2.7	
13-Jul	2.6	Z	2.6	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.4	2.3	2.6	
14-Jul	2.5	Z	2.4	2.4	2.4	2.4	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.6	2.6	2.7	2.7	3.0	2.4	2.5	3.0	
15-Jul	2.4	Z	2.3	2.3	2.4	2.3	2.4	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.4	2.6	2.4	2.5	2.3	2.6	
16-Jul	2.6	Z	3.4	3.7	3.0	2.6	2.4	2.4	2.8	PF	PF	2.4	2.4	2.5	2.6	2.5	2.2	2.2	2.2	2.2	2.5	2.2	2.3	2.4	2.5	3.7	
17-Jul	2.4	Z	2.5	2.5	3.1	3.1	2.6	2.4	2.5	2.4	2.4	2.4	2.3	2.2	2.4	2.4	2.4	2.4	2.3	2.3	3.4	3.3	2.9	2.7	2.6	3.4	
18-Jul	2.7	Z	3.1	2.7	2.6	2.6	2.9	2.6	2.6	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.3	2.4	2.3	2.5	2.3	2.4	2.5	2.5	3.1	
19-Jul	2.6	Z	2.4	2.2	2.2	2.3	2.3	2.4	2.3	2.1	2.3	2.5	2.1	2.1	2.1	2.3	2.1	2.3	2.2	2.3	2.3	2.3	2.6	3.0	2.3	3.0	
20-Jul	4.0	Z	2.8	2.3	2.3	2.3	2.4	2.5	3.0	2.7	2.5	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.8	3.0	2.7	2.5	4.0	
21-Jul	2.9	Z	3.7	4.9	5.1	4.7	3.4	3.4	3.1	2.8	2.5	2.4	2.3	2.2	2.2	2.4	2.4	2.4	2.4	2.5	2.5	2.7	4.1	3.5	3.1	5.1	
22-Jul	3.7	Z	3.6	3.8	3.5	3.5	3.7	3.7	3.0	2.6	2.4	2.4	2.3	2.3	2.4	2.4	2.4	2.5	2.6	2.7	2.8	3.0	2.6	2.6	2.9	3.8	
23-Jul	2.7	Z	3.5	3.2	2.9	2.9	2.8	2.7	PF	PF	2.4	2.4	2.4	2.3	2.4	2.4	2.5	2.7	2.8	2.6	2.4	2.5	2.5	2.4	2.6	3.5	
24-Jul	2.5	Z	2.6	2.3	2.6	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.5	2.7	2.7	2.7	2.7	2.5	2.7	
25-Jul	2.7	Z	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	3.0	3.0	2.9	2.5	2.4	3.0	
26-Jul	2.5	Z	2.4	3.0	2.7	2.7	2.5	2.4	2.5	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.5	2.4	3.1	3.4	3.0	2.6	3.4	
27-Jul	2.7	Z	3.2	2.7	2.8	2.7	2.7	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.4	2.6	2.6	2.3	2.3	2.4	2.4	2.5	3.2	
28-Jul	2.3	Z	2.5	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.5	2.5	2.7	2.9	3.3	3.5	2.5	3.5	
29-Jul	3.0	Z	2.8	3.5	2.8	3.1	C	C	C	C	C	C	C	C	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.7	2.5	2.6	2.6	--	3.5
30-Jul	2.7	Z	2.5	2.4	2.4	2.4	2.6	2.5	2.4	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.9	2.6	2.2	2.2	2.4	2.9	
31-Jul	2.1	Z	2.1	2.3	2.5	2.6	2.7	2.1	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.5	2.5	2.6	2.4	2.3	2.3	2.5	2.5	2.4	2.7	
		2.7	--	2.8	2.9	2.8	2.8	2.6	2.5	2.4	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.5	2.7	2.6	Diurnal Average		
		4.0	--	4.4	4.9	5.1	4.9	3.7	3.7	3.1	2.8	2.5	2.5	2.4	2.5	2.6	2.5	2.5	2.7	2.8	2.9	3.4	3.3	4.1	3.5	Diurnal Maximum	
Z - zerospan			C - Calibration			PF - Power Failure																					



WBEA NETWORK
Hourly Averages

Total Hydrocarbons (THC) - ppm
Millennium - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Millennium - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	3	0.43	0.43
2.1 - 3.0	652	92.75	93.17
3.1 - 10.0	48	6.83	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Millennium - July 2014

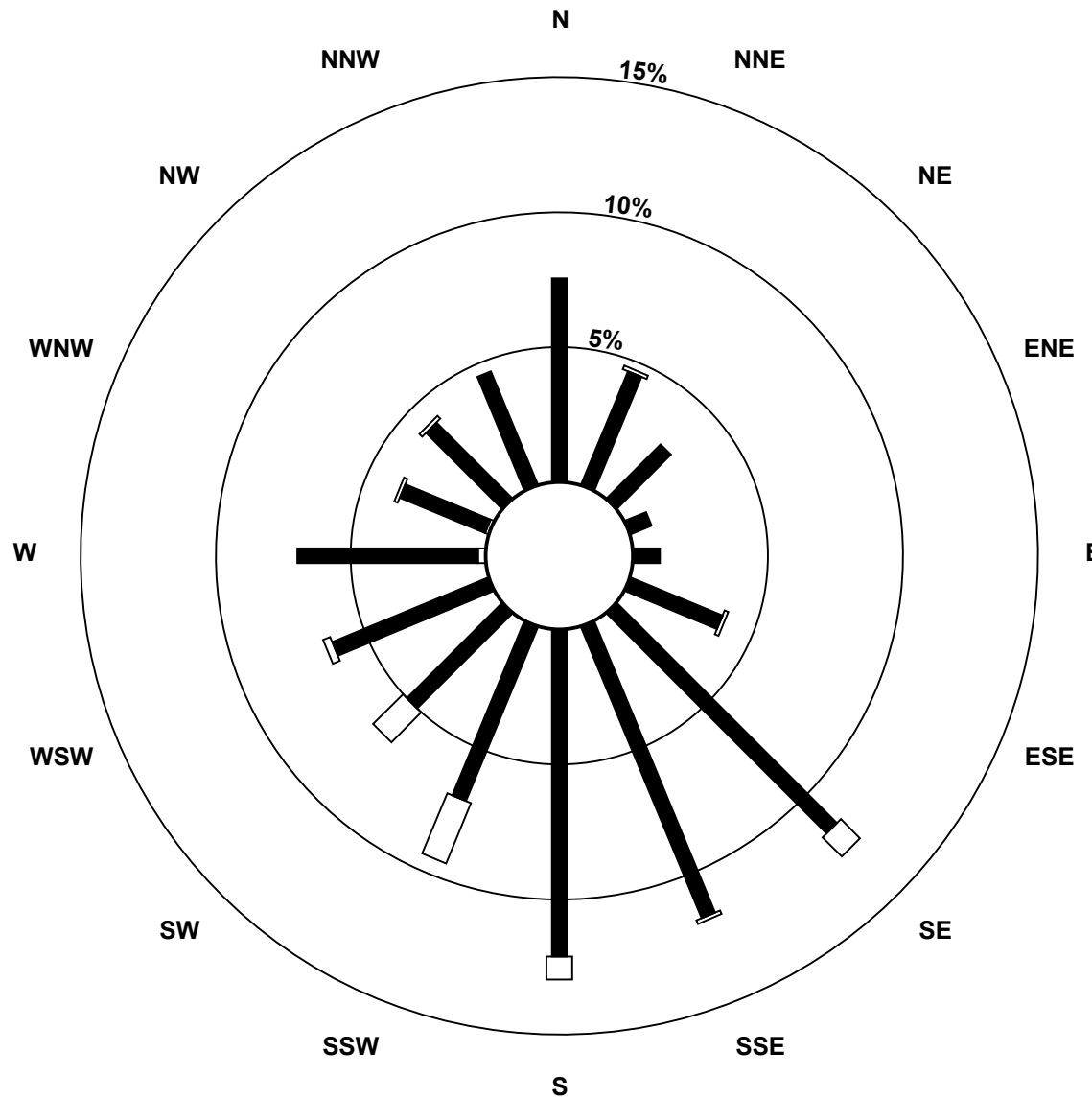
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3
2.1 - 3.0	53	32	20	6	7	26	81	82	85	49	35	44	47	24	28	32	651
3.1 - 10.0	0	1	0	0	0	1	7	1	6	17	11	2	0	1	1	0	48
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	53	33	20	6	7	27	88	83	91	66	46	46	49	26	29	32	702

Total Number of Valid Hours: 702

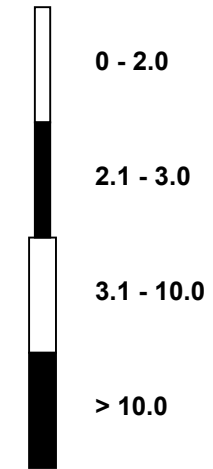
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Total Hydrocarbons (THC) - ppm
Millennium (AMS 12)



Classes (ppm)



Total Number of Valid Hours: 702

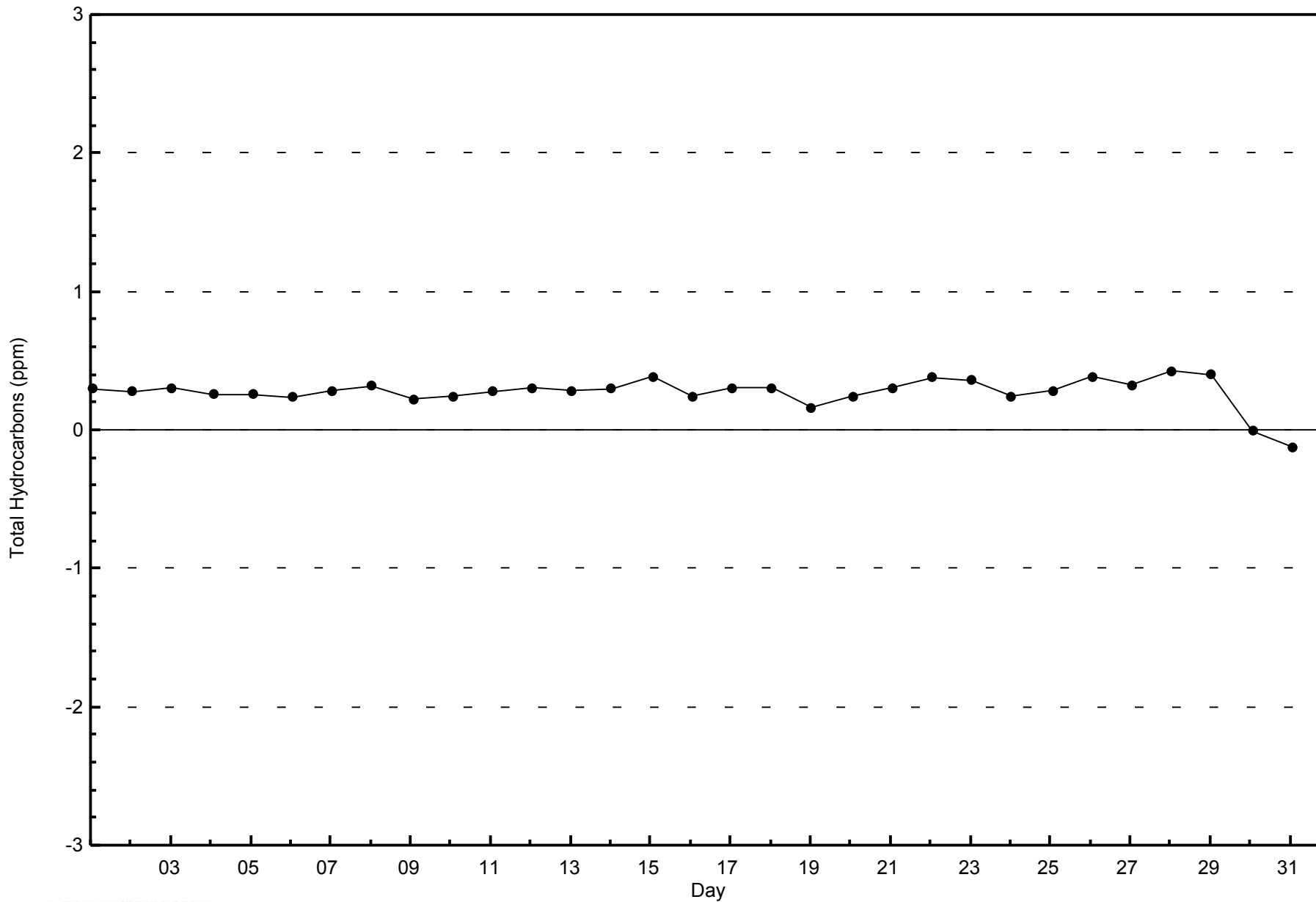


WBEA NETWORK

Zero Responses

Total Hydrocarbons (THC) - ppm

Millennium - July 2014



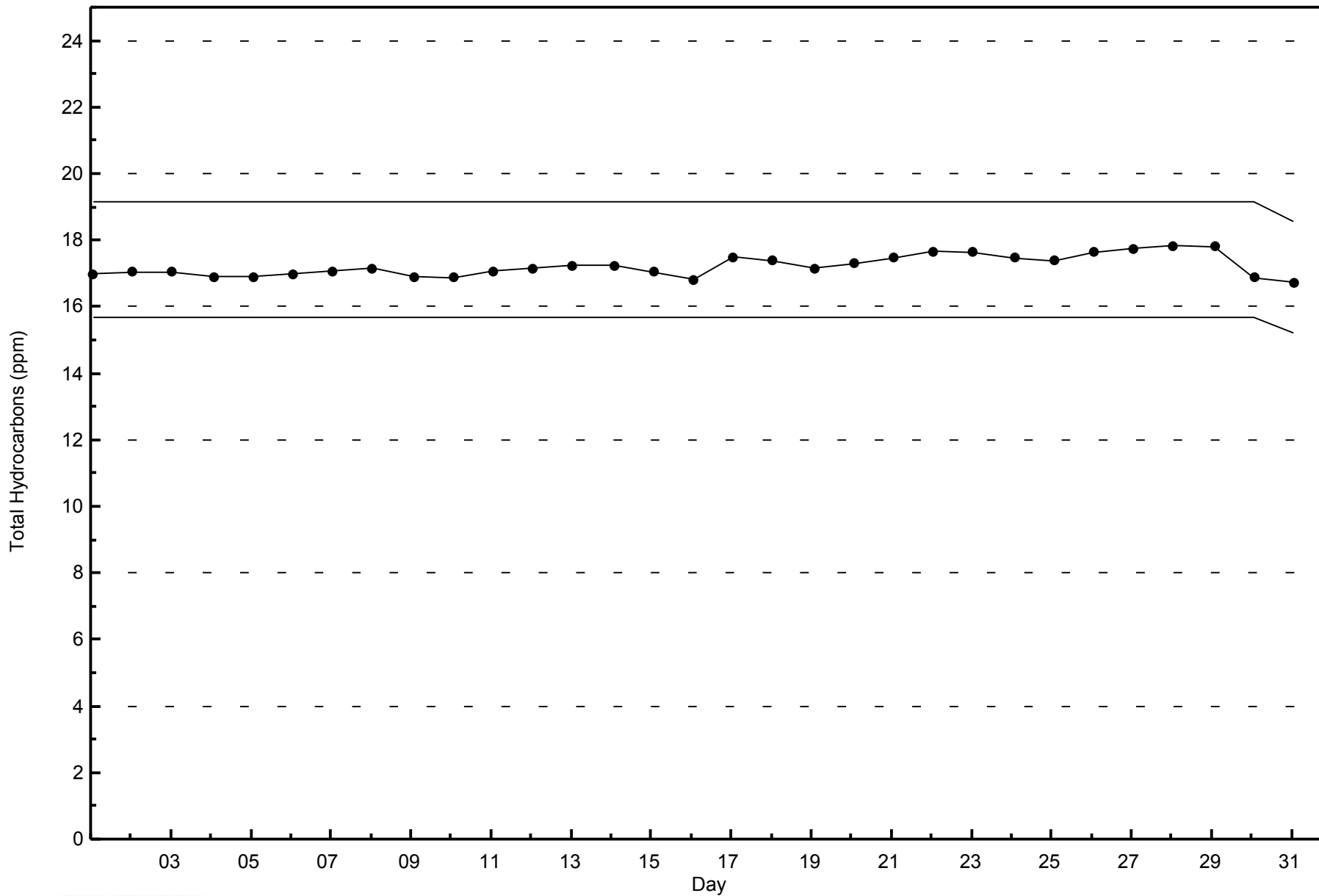


WBEA NETWORK

Span Responses

Total Hydrocarbons (THC) - ppm

Millennium - July 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

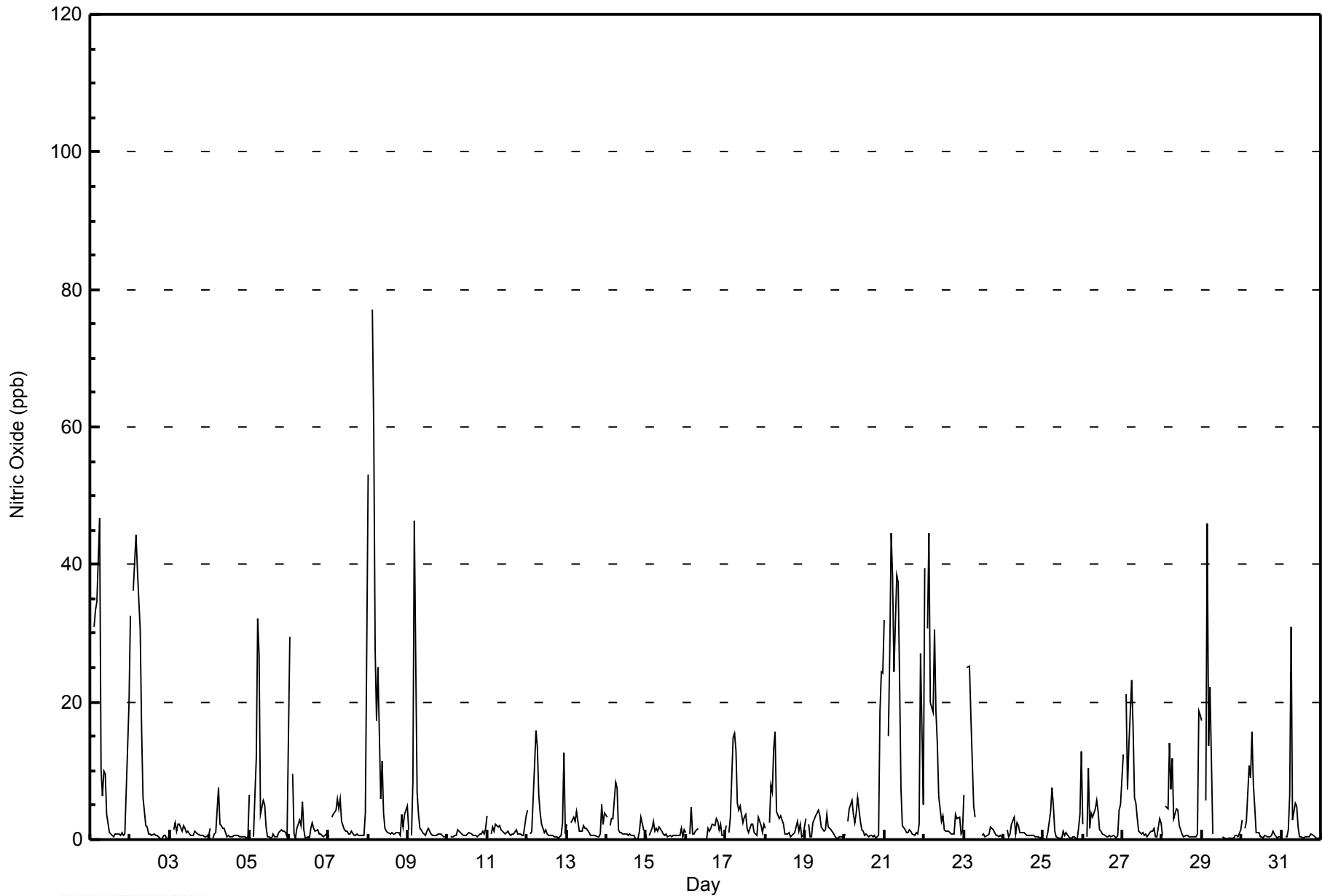
Millennium - July 2014

Maximum Value: 77 ppb on Jul 8 03:00														Maximum Daily Average: 14.5 ppb on Jul 21										Hours in Service: 744			
Minimum Value: 0 ppb on Jul 2 20:00														Minimum Daily Average: 0.8 ppb on Jul 10										Hours of Data: 701			
Maximum Diurnal Average: 12.0 ppb at hour 6														Minimum Diurnal Average: 0.7 ppb at hour 19										Hours of Missing Data: 43			
Monthly Average: 4.3 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 13 P ₉₉ = 44										Hours of Calibration: 36			
																								Percent Operational Time: 99.1			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	1	Z	31	33	35	47	10	6	10	9	4	1	1	1	0	1	1	1	1	1	1	1	14	20	9.9	47	
2-Jul	32	Z	36	44	39	35	30	16	6	2	2	1	1	1	1	1	1	0	0	0	1	1	0	0	10.9	44	
3-Jul	1	Z	1	2	1	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1.1	2	
4-Jul	2	Z	0	1	1	7	2	2	2	2	0	1	0	0	0	1	1	1	0	0	0	0	0	0	1.1	7	
5-Jul	6	Z	1	6	12	32	27	4	6	5	2	0	0	0	1	0	0	0	1	1	1	1	1	0	4.8	32	
6-Jul	29	Z	10	1	0	2	3	2	6	1	0	0	0	2	2	2	1	1	1	1	1	0	1	0	2.9	29	
7-Jul	1	Z	3	4	4	6	4	6	3	1	1	1	1	1	1	1	1	1	1	1	1	1	4	28	3.2	28	
8-Jul	53	Z	77	59	28	17	25	6	11	4	2	1	1	1	1	1	1	1	1	1	4	2	4	5	13.2	77	
9-Jul	1	Z	1	9	46	7	4	2	2	1	1	1	2	1	1	1	1	1	1	1	1	0	0	0	3.6	46	
10-Jul	1	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	0.8	2	
11-Jul	3	Z	1	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1.3	3	
12-Jul	4	Z	1	1	11	16	13	6	4	2	1	1	1	1	1	1	0	0	0	0	1	2	13	1	3.6	16	
13-Jul	2	Z	2	3	3	3	4	1	1	1	2	2	1	1	1	1	1	1	0	0	1	5	2	4	1.9	5	
14-Jul	3	Z	2	3	3	8	8	1	1	1	1	1	1	1	1	1	1	0	0	1	3	2	1	1	1.9	8	
15-Jul	0	Z	1	2	3	1	2	1	2	1	1	1	1	0	1	0	1	1	1	1	1	2	0	1	1.0	3	
16-Jul	1	Z	1	5	1	1	1	2	PF	PF	PF	PF	0	2	1	2	2	2	3	3	1	2	1	1	1.6	5	
17-Jul	2	Z	1	3	15	16	13	5	4	5	2	3	4	2	1	2	2	1	1	1	3	2	1	2	4.0	16	
18-Jul	2	Z	2	8	7	13	16	4	3	3	3	2	1	1	1	0	1	1	1	3	1	2	0	1	3.3	16	
19-Jul	3	Z	2	1	0	3	3	4	4	3	2	1	1	4	2	2	1	1	0	0	0	0	0	0	1.7	4	
20-Jul	1	Z	3	4	6	4	3	4	6	3	1	1	1	1	0	1	1	0	1	0	1	19	24	24	4.7	24	
21-Jul	32	Z	15	27	44	38	24	38	37	24	7	2	1	1	1	1	1	1	1	1	1	2	27	5	14.5	44	
22-Jul	39	Z	31	44	20	18	30	19	14	6	3	3	1	1	1	1	1	1	1	4	3	3	1	1	10.8	44	
23-Jul	7	Z	25	25	18	11	5	3	PF	PF	PF	1	1	0	1	1	2	2	1	1	1	0	1	0	5.3	25	
24-Jul	1	Z	2	0	1	2	3	1	2	2	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1.0	3	
25-Jul	1	Z	0	1	4	8	5	1	0	0	0	0	1	1	1	0	0	0	0	0	0	2	4	13	1.9	13	
26-Jul	2	Z	0	10	2	4	3	4	6	4	1	1	1	1	0	0	1	0	1	0	0	1	4	5	2.3	10	
27-Jul	12	Z	21	7	14	23	16	6	5	3	1	1	1	1	0	1	1	1	1	2	0	0	3	2	5.5	23	
28-Jul	1	Z	5	4	14	7	12	3	4	4	2	1	1	0	1	1	0	1	0	0	0	1	19	18	4.4	19	
29-Jul	17	Z	6	46	14	22	1	C	C	C	C	C	0	0	0	0	0	0	0	0	1	1	0	2	6.1	46	
30-Jul	3	Z	2	3	11	9	16	8	5	1	1	0	0	0	1	0	0	0	1	1	1	0	0	0	2.8	16	
31-Jul	0	Z	0	1	2	6	31	3	5	5	2	0	0	0	0	0	0	0	1	1	0	0	0	0	2.6	31	
		8.5	--	9.1	11.7	11.6	12.0	10.3	5.5	5.5	3.5	1.6	1.2	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.9	0.9	1.9	4.1	4.6	Diurnal Average	
		53	--	77	59	46	47	31	38	37	24	7	3	4	4	2	2	2	2	3	4	4	19	27	28	Diurnal Maximum	
Z - zerospan			C - Calibration				PF - Power Failure																				



WBEA NETWORK
Hourly Averages

Nitric Oxide (NO) - ppb
Millennium - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Millennium - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	659	94.01	94.01
21 - 40	33	4.71	98.72
41 - 80	9	1.28	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitric Oxide (NO) - ppb
Millennium - July 2014

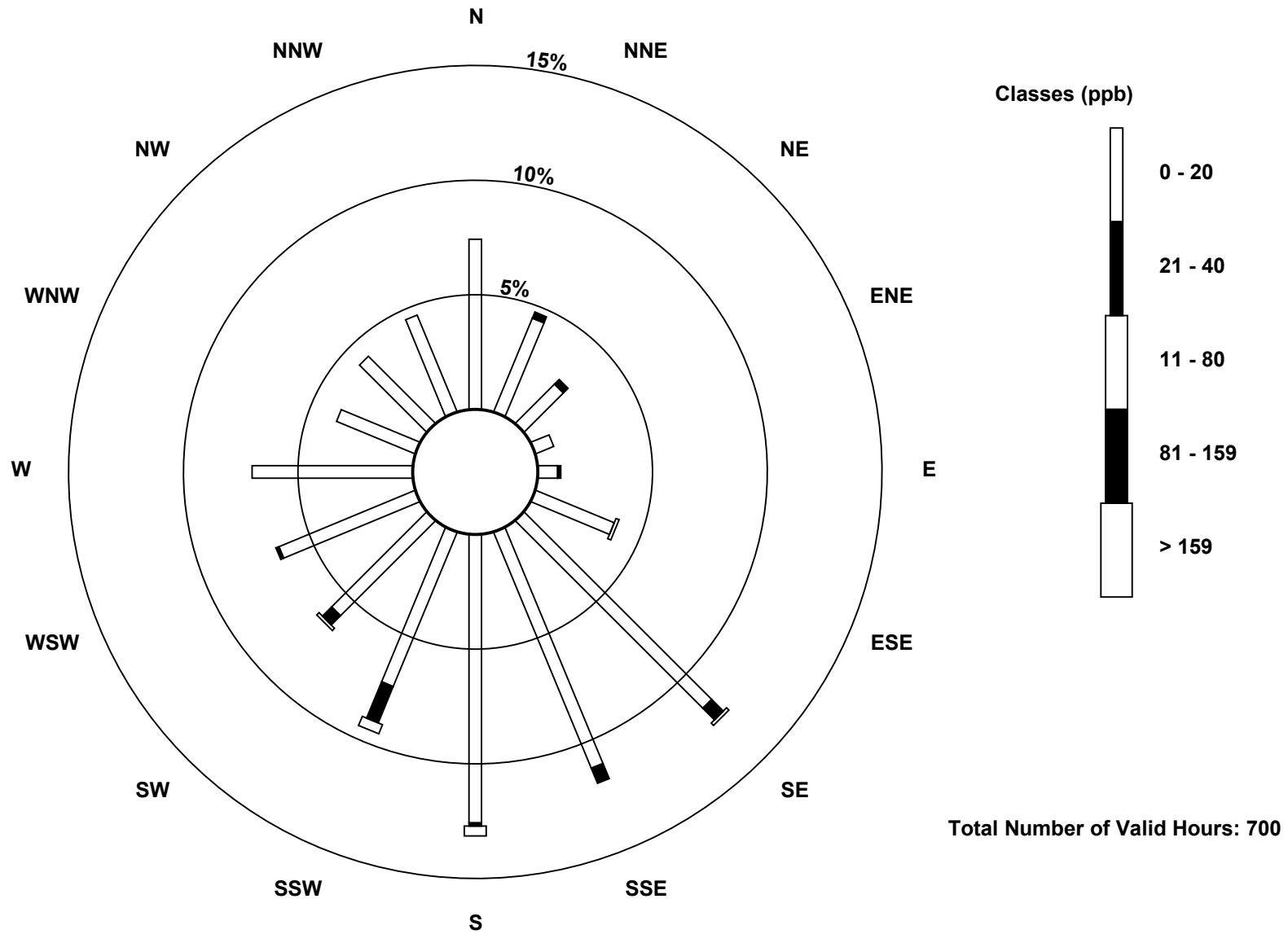
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	52	31	17	6	6	26	81	78	88	51	41	45	49	26	29	32	658
21 - 40	0	2	2	0	1	0	5	5	1	12	4	1	0	0	0	0	33
11 - 80	0	0	0	0	0	1	1	0	3	3	1	0	0	0	0	0	9
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	52	33	19	6	7	27	87	83	92	66	46	46	49	26	29	32	700

Total Number of Valid Hours: 700

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Nitric Oxide (NO) - ppb
Millennium (AMS 12)



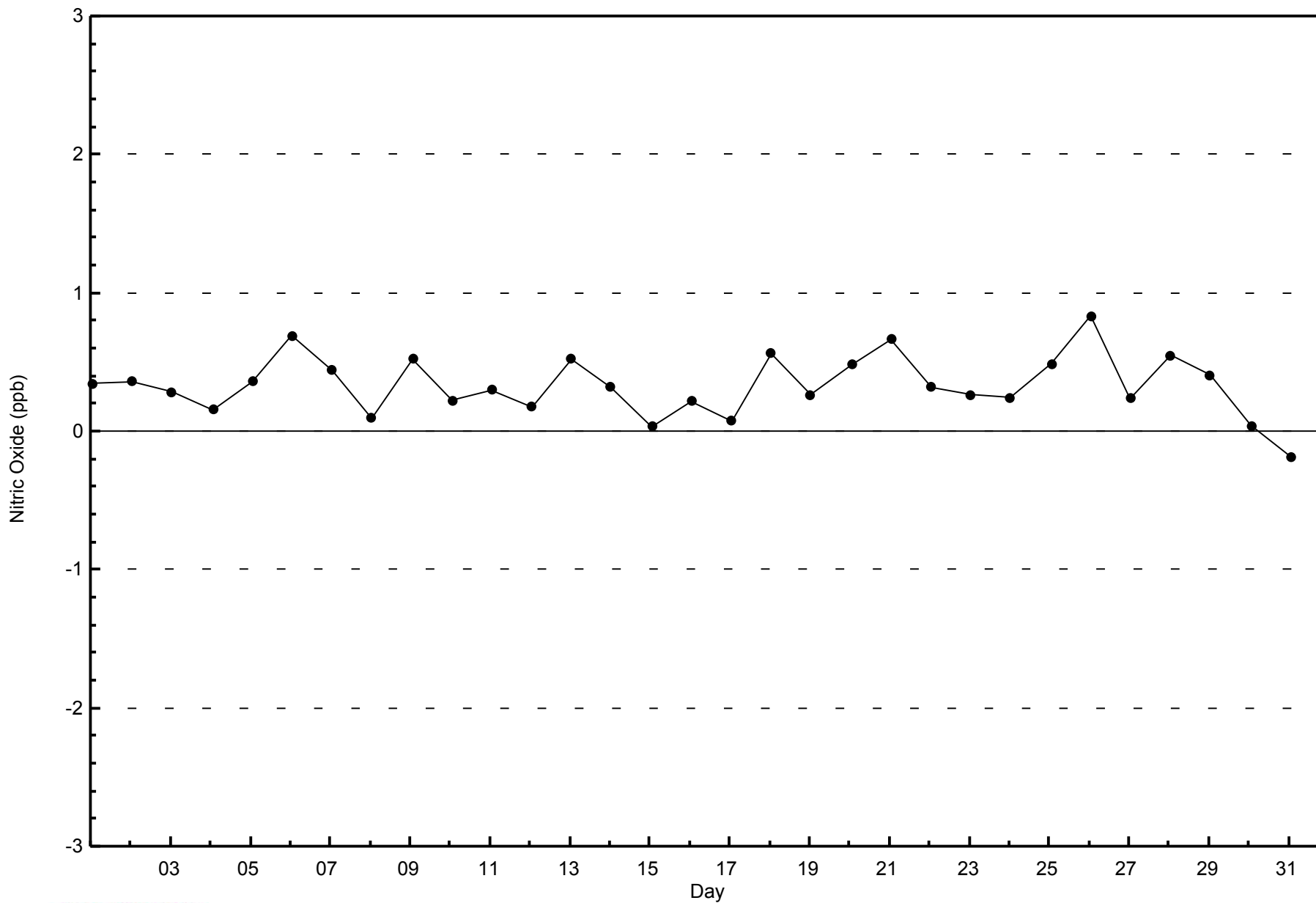


WBEA NETWORK

Zero Responses

Nitric Oxide (NO) - ppb

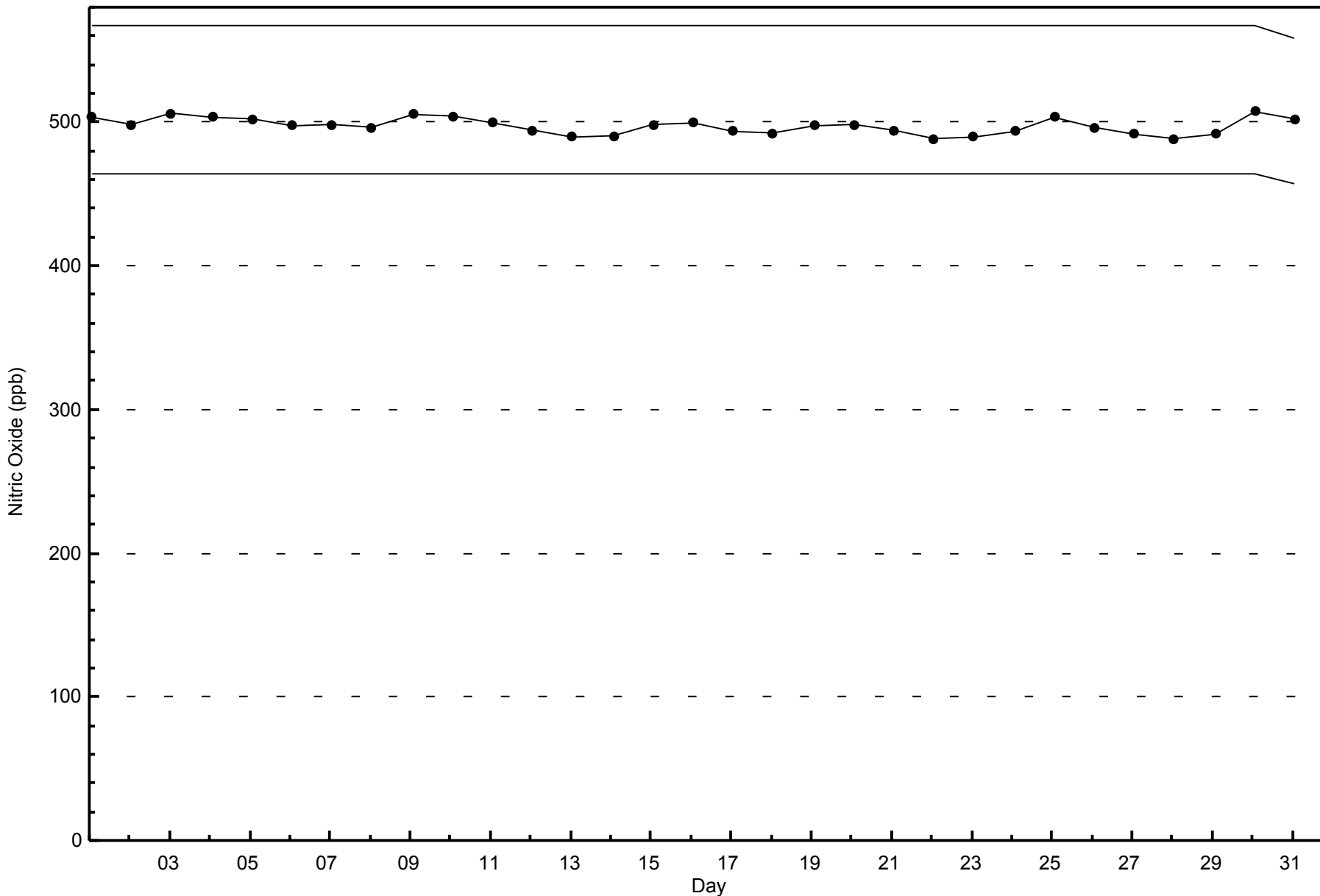
Millennium - July 2014





WBEA NETWORK
Span Responses

Nitric Oxide (NO) - ppb
Millennium - July 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

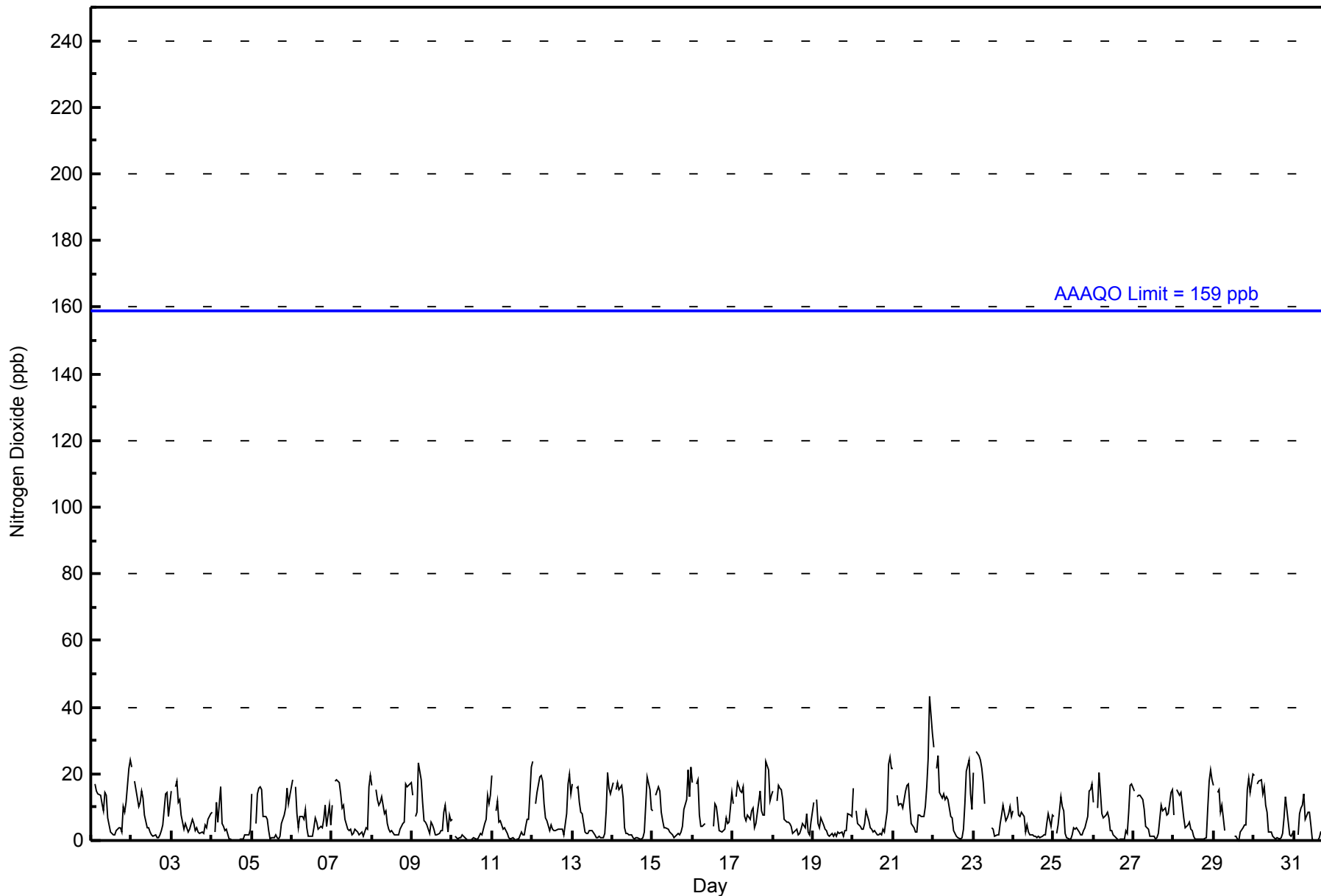
Millennium - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																	
Maximum Value: 43 ppb on Jul 21 23:00										Maximum Daily Average: 13.3 ppb on Jul 21										Hours of Data: 701							
Minimum Value: 0 ppb on Jul 10 10:00										Minimum Daily Average: 3.1 ppb on Jul 10										Hours of Missing Data: 43							
Maximum Diurnal Average: 14.8 ppb at hour 1										Minimum Diurnal Average: 2.0 ppb at hour 15										Hours of Calibration: 36							
Monthly Average: 7.3 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 5 Q ₃ = 11 P ₉₀ = 17 P ₉₉ = 25										Percent Operational Time: 99.1							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	17	Z	17	15	14	14	11	9	14	14	7	3	2	2	2	3	4	4	3	10	9	11	22	24	9.9	24	
2-Jul	22	Z	18	13	10	11	15	13	8	4	4	2	2	1	2	1	1	2	3	5	14	15	7	11	7.9	22	
3-Jul	15	Z	16	18	11	12	8	3	5	4	2	4	6	5	3	4	2	2	2	5	4	6	8	6.4	18		
4-Jul	9	Z	3	12	6	16	5	4	3	3	0	0	0	0	0	0	0	1	1	2	2	2	4	3.1	16		
5-Jul	14	Z	5	14	16	16	15	7	7	6	3	0	1	1	2	1	0	1	5	8	10	16	11	13	7.4	16	
6-Jul	18	Z	16	8	4	7	7	6	9	4	1	1	1	4	7	6	3	4	4	6	11	4	10	5	6.4	18	
7-Jul	11	Z	18	18	18	14	10	11	6	3	3	3	2	2	4	3	2	2	2	1	4	3	16	20	7.6	20	
8-Jul	17	Z	15	12	11	11	13	8	9	5	3	3	3	2	2	2	2	4	5	6	17	16	17	17	8.6	17	
9-Jul	14	Z	7	9	24	18	12	6	6	5	2	5	5	3	2	2	2	3	3	9	11	3	8	6	7.0	24	
10-Jul	6	Z	1	1	1	1	2	1	1	0	0	0	0	1	1	1	1	2	2	5	7	14	11	14	3.1	14	
11-Jul	19	Z	9	12	5	6	3	4	3	2	1	0	1	0	0	1	1	2	2	4	6	6	22	4.8	22		
12-Jul	24	Z	11	14	19	19	18	11	7	6	3	5	4	3	3	3	4	4	3	2	8	17	20	14	9.6	24	
13-Jul	17	Z	16	16	11	8	8	3	2	2	3	3	3	2	1	1	1	1	1	2	9	20	16	14	6.9	20	
14-Jul	17	Z	15	17	15	16	13	4	2	2	2	2	2	1	1	1	1	1	1	3	11	19	15	10	7.3	19	
15-Jul	9	Z	13	16	15	9	6	4	4	4	3	2	2	1	2	2	2	3	4	10	12	21	13	22	7.7	22	
16-Jul	18	Z	17	18	8	4	4	5	PF	PF	PF	PF	4	11	10	7	3	3	3	3	7	5	5	15	7.9	18	
17-Jul	11	Z	13	18	15	14	16	7	6	8	7	9	10	4	5	11	15	9	8	8	24	21	12	14	11.4	24	
18-Jul	15	Z	12	17	16	15	12	7	6	6	5	4	2	3	3	2	2	3	5	4	8	3	2	6	6.7	17	
19-Jul	12	Z	12	5	4	7	5	3	3	2	1	2	1	2	1	3	2	2	1	3	3	8	8	7	4.2	12	
20-Jul	16	Z	9	5	4	3	4	5	9	6	4	3	3	3	2	2	2	2	4	3	9	23	25	22	7.2	25	
21-Jul	22	Z	14	11	11	11	10	15	17	17	10	5	4	3	3	8	8	7	7	10	16	25	43	32	13.3	43	
22-Jul	28	Z	21	26	15	13	14	12	13	12	7	7	3	2	1	1	1	1	4	11	21	24	14	9	11.3	28	
23-Jul	20	Z	27	26	24	22	18	11	PF	PF	PF	4	3	1	2	2	5	8	10	6	7	8	10	7	11.0	27	
24-Jul	9	Z	13	8	7	9	7	2	5	3	2	2	1	1	1	1	1	1	2	2	5	8	4	8	4.4	13	
25-Jul	7	Z	2	5	13	10	9	2	1	1	0	2	4	4	4	2	2	2	3	4	7	15	15	17	5.7	17	
26-Jul	12	Z	10	20	14	8	7	8	9	7	3	3	2	1	0	0	0	1	1	3	2	9	17	17	6.6	20	
27-Jul	15	Z	13	13	13	12	9	4	4	3	1	1	1	1	1	2	11	9	9	10	8	8	14	15	7.8	15	
28-Jul	8	Z	15	14	14	11	7	4	5	6	4	3	1	1	0	0	0	0	1	1	10	18	21	18	6.9	21	
29-Jul	17	Z	14	15	8	11	3	C	C	C	C	C	1	1	1	0	2	4	5	5	15	19	14	20	8.6	20	
30-Jul	20	Z	17	18	18	14	16	11	9	3	2	1	1	1	1	0	1	2	7	13	9	2	1	2	7.3	20	
31-Jul	3	Z	2	8	10	11	14	7	9	9	5	0	0	0	0	1	2	3	4	3	2	2	2	3	4.3	14	
		14.8	--	12.6	13.5	12.0	11.4	9.6	6.6	6.4	5.1	3.1	2.7	2.4	2.1	2.0	2.3	2.6	2.9	3.7	5.1	9.1	11.8	12.5	13.4	Diurnal Average	
		28	--	27	26	24	22	18	15	17	17	10	9	10	11	10	11	15	9	10	13	24	25	43	32	Diurnal Maximum	
Z - zerospan		C - Calibration		PF - Power Failure																							
		Alberta Ambient Air Quality Objectives (AAAQO):		1-hr		159 ppb																					



WBEA NETWORK
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Millennium - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Millennium - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	674	96.15	96.15
21 - 40	26	3.71	99.86
41 - 80	1	0.14	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Millennium - July 2014

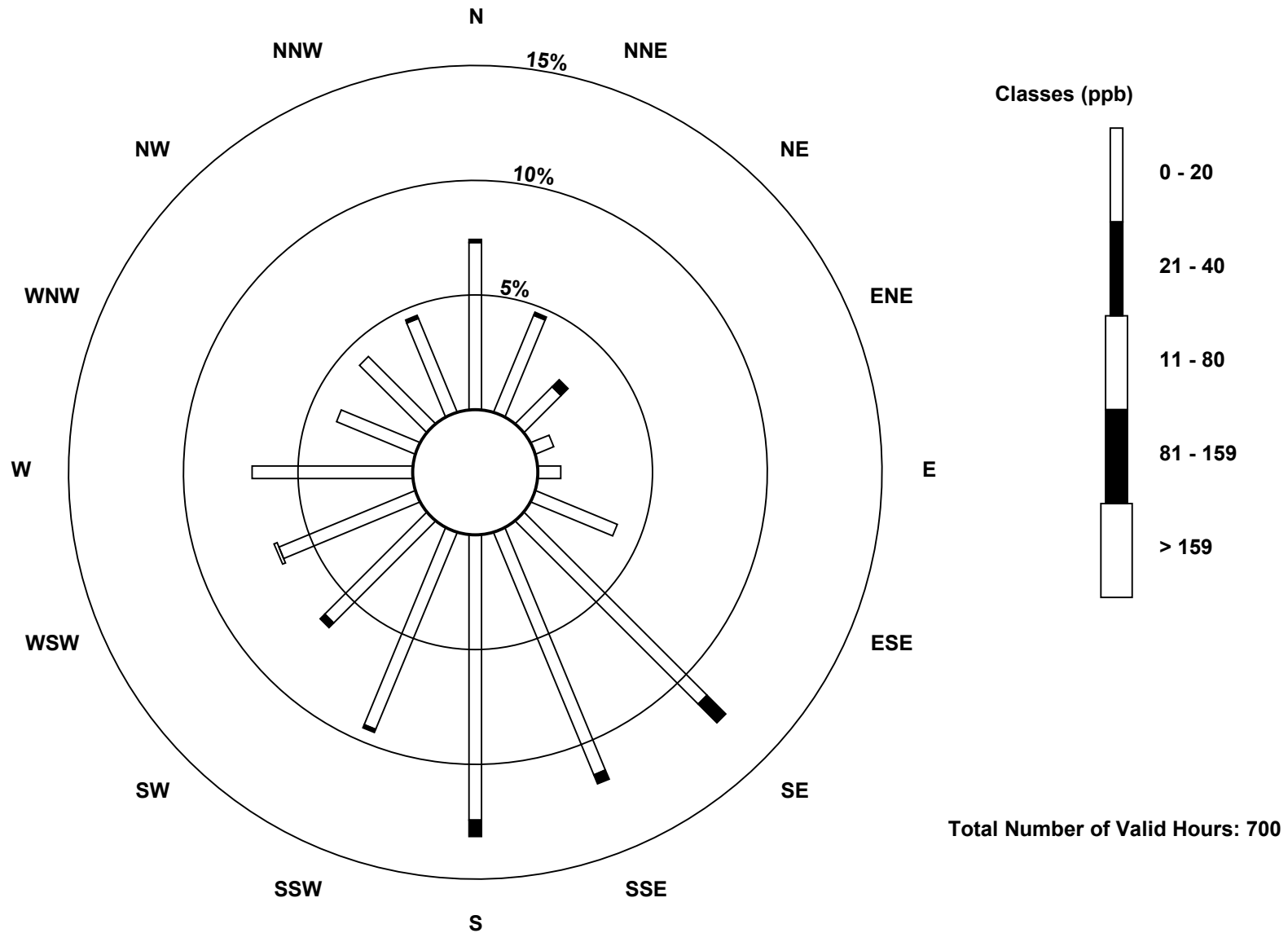
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	51	32	16	6	7	27	79	80	87	65	44	45	49	26	29	31	674
21 - 40	1	1	3	0	0	0	8	3	5	1	2	0	0	0	0	1	25
11 - 80	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	52	33	19	6	7	27	87	83	92	66	46	46	49	26	29	32	700

Total Number of Valid Hours: 700

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Nitrogen Dioxide (NO₂) - ppb
Millennium (AMS 12)



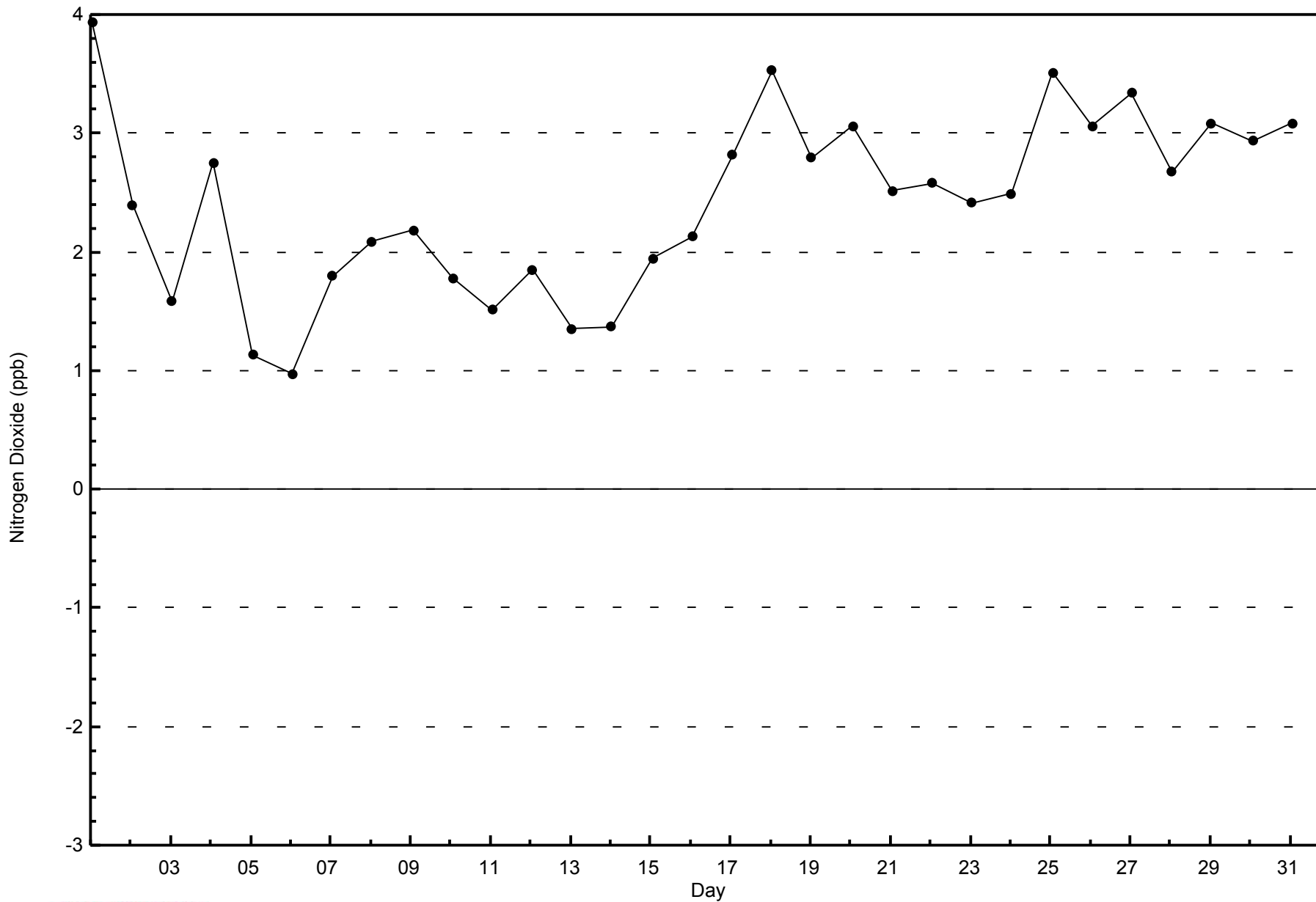


WBEA NETWORK

Zero Responses

Nitrogen Dioxide (NO₂) - ppb

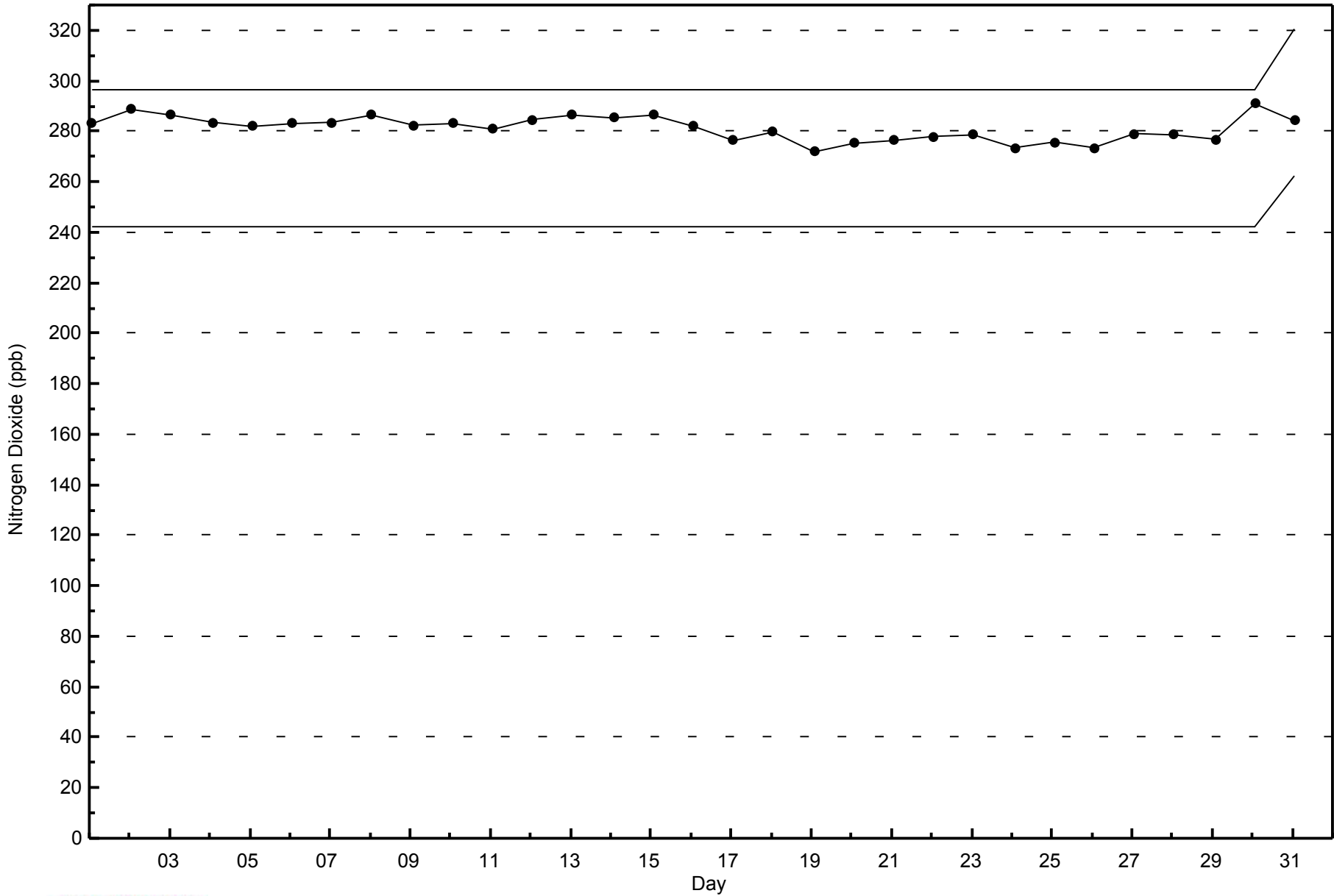
Millennium - July 2014





WBEA NETWORK
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Millennium - July 2014



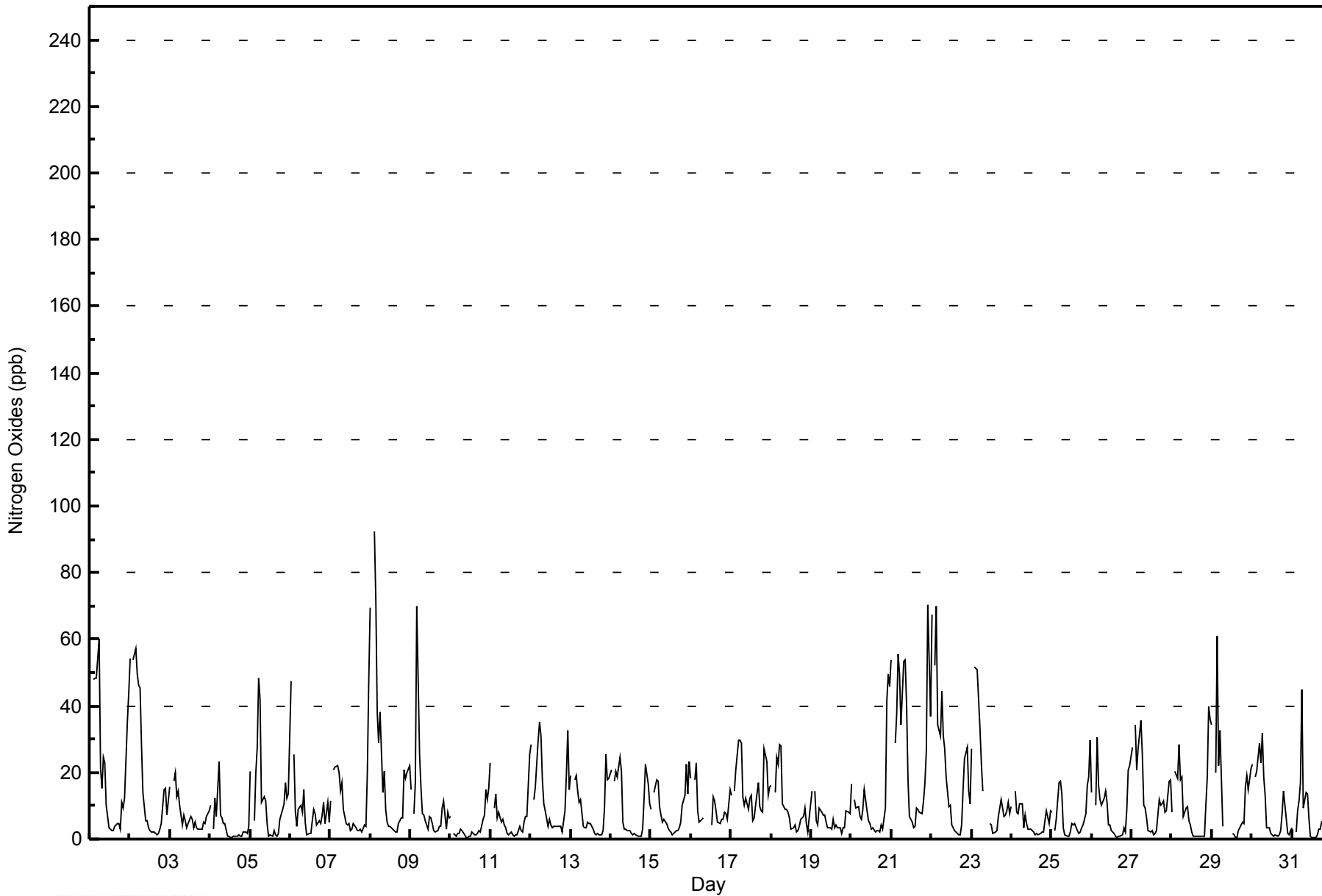


Maximum Value: 92 ppb on Jul 8 03:00														Maximum Daily Average: 27.8 ppb on Jul 21														Hours in Service: 744																					
Minimum Value: 0 ppb on Jul 29 16:00														Minimum Daily Average: 3.8 ppb on Jul 10														Hours of Data: 701																					
Maximum Diurnal Average: 25.2 ppb at hour 4														Minimum Diurnal Average: 2.9 ppb at hour 15														Hours of Missing Data: 43																					
Monthly Average: 11.6 ppb														Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 3 Median = 7 Q ₃ = 15 P ₉₀ = 28 P ₉₉ = 66														Hours of Calibration: 36																					
																												Percent Operational Time: 99.1																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	18	Z	48	48	48	60	21	15	24	23	10	4	3	2	2	4	5	4	3	11	9	12	35	44	19.8	60																							
2-Jul	54	Z	54	57	50	46	45	29	14	6	6	3	3	2	2	2	1	2	3	5	15	15	7	12	18.8	57																							
3-Jul	16	Z	17	20	13	15	10	4	7	6	3	5	7	6	4	5	4	3	3	3	5	5	7	8	7.6	20																							
4-Jul	10	Z	3	12	7	23	7	6	5	5	1	1	1	0	1	1	1	1	1	1	2	2	2	4	4.2	23																							
5-Jul	20	Z	5	20	28	48	42	11	13	11	5	1	1	1	2	1	1	2	6	9	11	17	12	14	12.2	48																							
6-Jul	48	Z	26	9	4	9	10	8	15	5	1	1	2	5	9	7	4	6	5	7	11	4	11	5	9.3	48																							
7-Jul	11	Z	21	22	22	20	14	17	9	5	4	4	3	3	5	3	2	3	3	2	4	4	20	48	10.8	48																							
8-Jul	70	Z	92	72	38	29	38	14	20	9	5	4	4	3	3	2	2	4	6	6	21	18	20	22	21.9	92																							
9-Jul	15	Z	8	17	70	25	15	8	7	6	3	7	6	5	2	2	3	4	4	9	11	3	8	6	10.6	70																							
10-Jul	7	Z	2	1	2	2	3	3	1	1	1	1	1	2	1	1	2	3	2	6	7	15	12	15	3.8	15																							
11-Jul	23	Z	10	13	6	8	5	6	4	3	2	1	2	1	1	1	1	4	3	2	5	7	7	26	6.1	26																							
12-Jul	28	Z	12	16	30	35	31	18	11	8	4	6	4	3	4	4	4	4	4	2	9	19	33	15	13.2	35																							
13-Jul	19	Z	18	19	15	11	12	4	4	3	5	5	5	3	2	1	2	1	1	2	9	26	18	18	8.8	26																							
14-Jul	21	Z	17	20	18	25	20	5	3	3	2	3	2	1	2	1	1	1	1	3	12	22	17	11	9.2	25																							
15-Jul	9	Z	14	18	17	10	7	5	6	5	3	3	2	1	2	2	2	3	5	10	13	22	13	23	8.6	23																							
16-Jul	18	Z	18	23	9	5	6	7	PF	PF	PF	PF	4	13	11	8	5	5	6	6	8	8	6	15	9.4	23																							
17-Jul	13	Z	14	21	30	30	29	13	10	12	9	12	13	6	6	13	17	10	9	8	27	23	13	16	15.4	30																							
18-Jul	16	Z	14	25	23	28	28	11	9	9	8	6	3	4	4	2	3	4	6	7	9	5	2	6	10.0	28																							
19-Jul	15	Z	14	5	4	9	8	7	7	5	3	3	3	6	3	4	4	3	2	3	3	8	8	8	6.0	15																							
20-Jul	17	Z	12	9	10	7	6	9	15	9	5	5	3	4	2	2	3	2	4	3	9	42	49	46	11.8	49																							
21-Jul	54	Z	29	38	55	49	34	53	54	40	18	7	5	4	4	9	9	8	8	11	17	27	70	37	27.8	70																							
22-Jul	68	Z	52	70	34	31	44	31	27	19	10	10	4	4	3	2	1	1	4	15	24	28	15	11	22.0	70																							
23-Jul	27	Z	52	51	42	33	23	14	PF	PF	PF	5	4	2	2	2	7	9	12	7	7	8	11	7	16.3	52																							
24-Jul	10	Z	15	8	8	11	11	3	7	5	3	3	2	2	1	2	1	2	2	2	6	9	5	8	5.4	15																							
25-Jul	8	Z	3	6	17	18	14	4	1	1	1	2	5	4	5	3	2	2	4	4	7	16	19	30	7.5	30																							
26-Jul	14	Z	10	31	16	12	10	12	14	11	4	4	3	2	1	1	1	1	1	3	2	9	21	22	8.9	31																							
27-Jul	27	Z	34	21	27	36	25	10	9	6	2	2	2	1	1	3	12	10	11	11	8	8	17	18	13.2	36																							
28-Jul	8	Z	20	18	28	18	19	7	9	10	5	4	2	1	1	1	1	1	1	1	10	19	40	36	11.3	40																							
29-Jul	34	Z	20	61	22	33	4	C	C	C	C	C	2	1	1	0	3	4	5	5	16	19	15	21	14.7	61																							
30-Jul	22	Z	18	21	29	23	32	19	13	4	3	2	1	1	1	1	1	2	8	14	10	2	1	3	10.1	32																							
31-Jul	4	Z	2	8	11	17	45	9	14	13	6	1	1	0	0	1	3	3	5	4	2	2	2	4	6.9	45																							
																								23.3	--	21.7	25.2	23.6	23.4	20.0	12.0	11.9	8.6	4.8	3.9	3.3	3.0	2.9	3.0	3.4	3.6	4.4	5.9	10.1	13.7	16.6	18.0	Diurnal Average	
																								70	--	92	72	70	60	45	53	54	40	18	12	13	13	11	13	17	10	12	15	27	42	70	48	Diurnal Maximum	
Z - zerspan																								C - Calibration				PF - Power Failure																					



WBEA NETWORK
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Millennium - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Millennium - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	586	83.59	83.59
21 - 40	78	11.13	94.72
41 - 80	36	5.14	99.86
81 - 159	1	0.14	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Millennium - July 2014

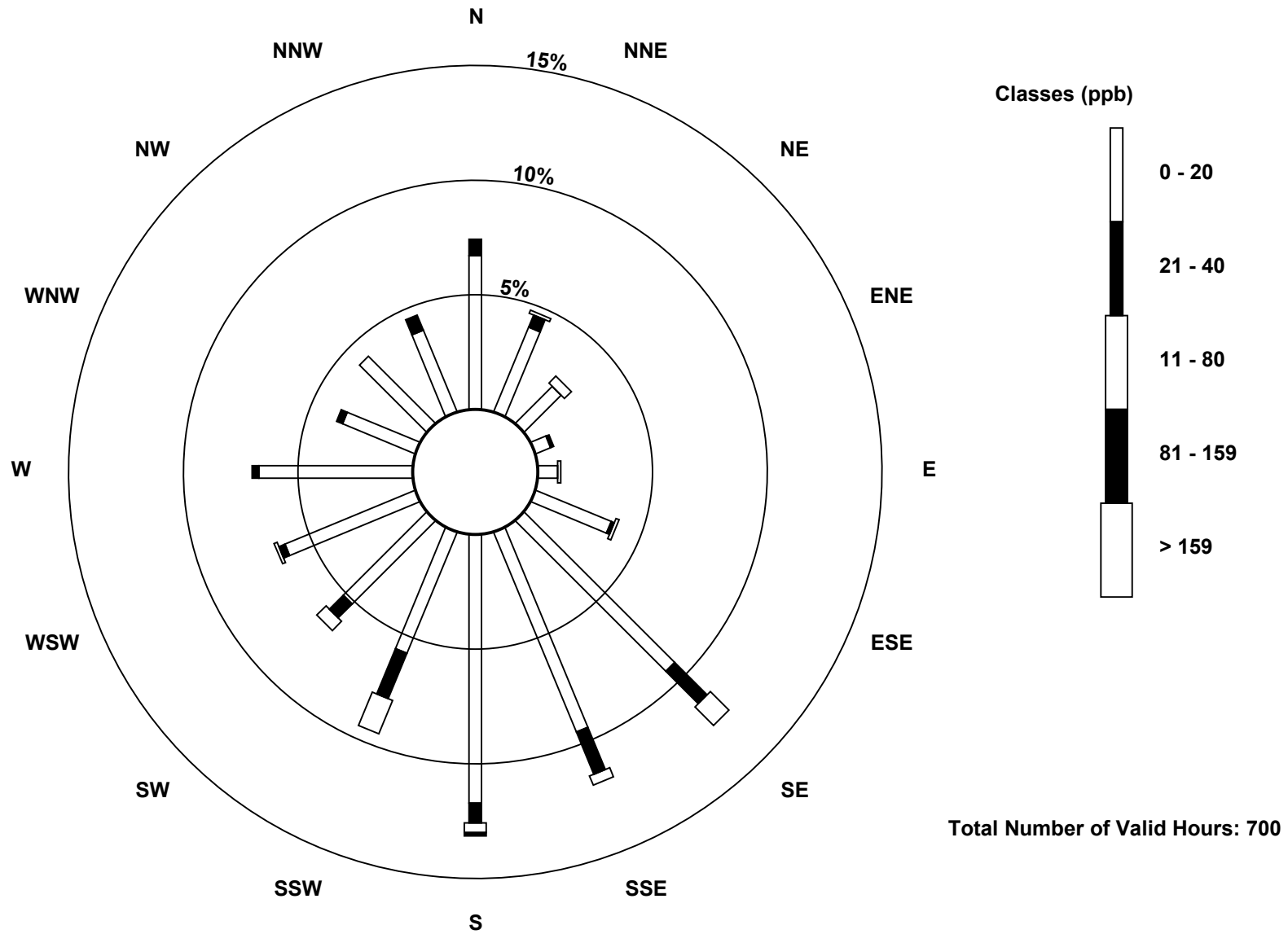
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	47	28	16	5	6	25	65	66	82	40	36	43	47	24	29	27	586
21 - 40	5	4	0	1	0	1	14	14	6	15	6	2	2	2	0	5	77
11 - 80	0	1	3	0	1	1	8	3	3	11	4	1	0	0	0	0	36
81 - 159	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	52	33	19	6	7	27	87	83	92	66	46	46	49	26	29	32	700

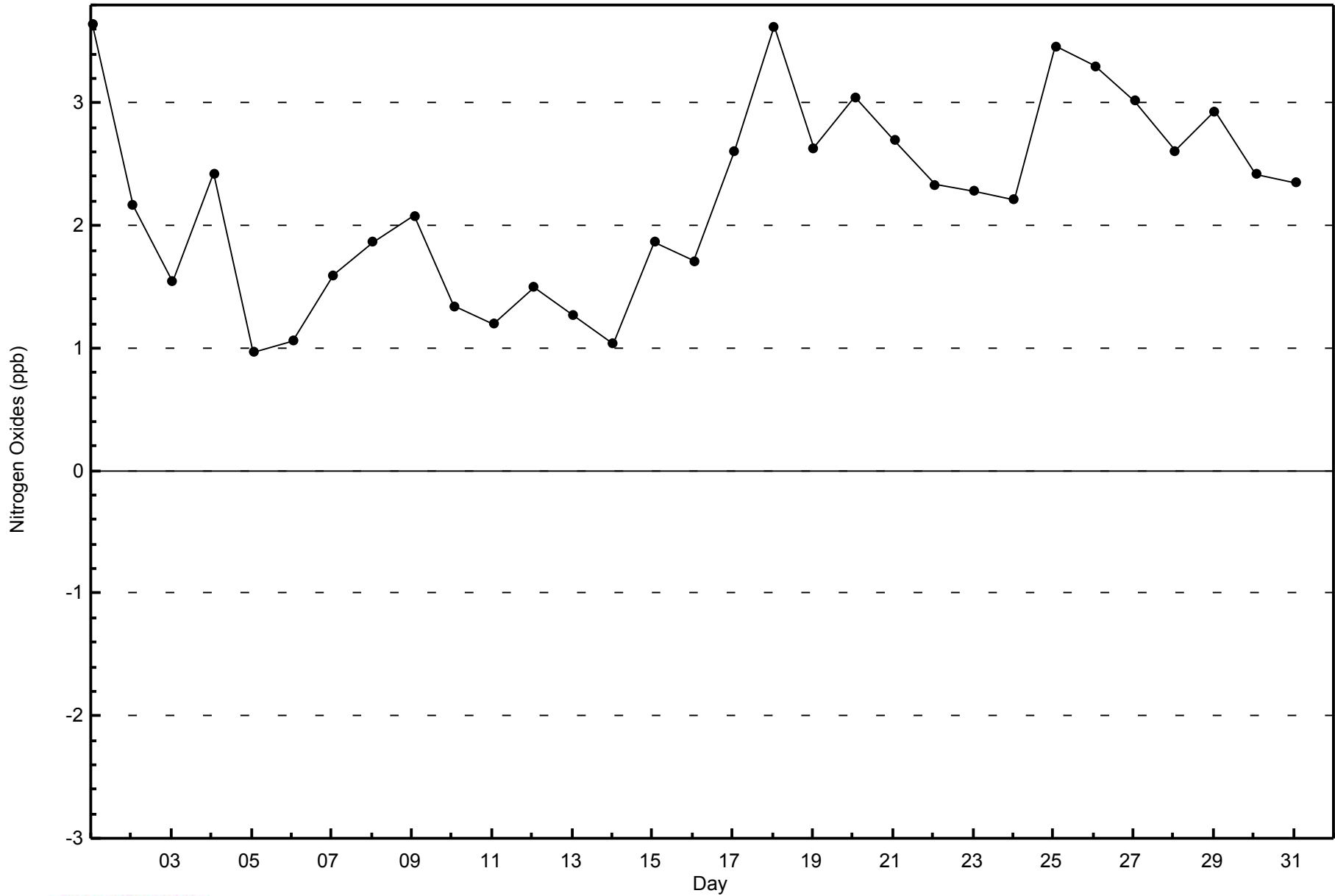
Total Number of Valid Hours: 700

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

Nitrogen Oxides (NO_x) - ppb
 Millennium (AMS 12)

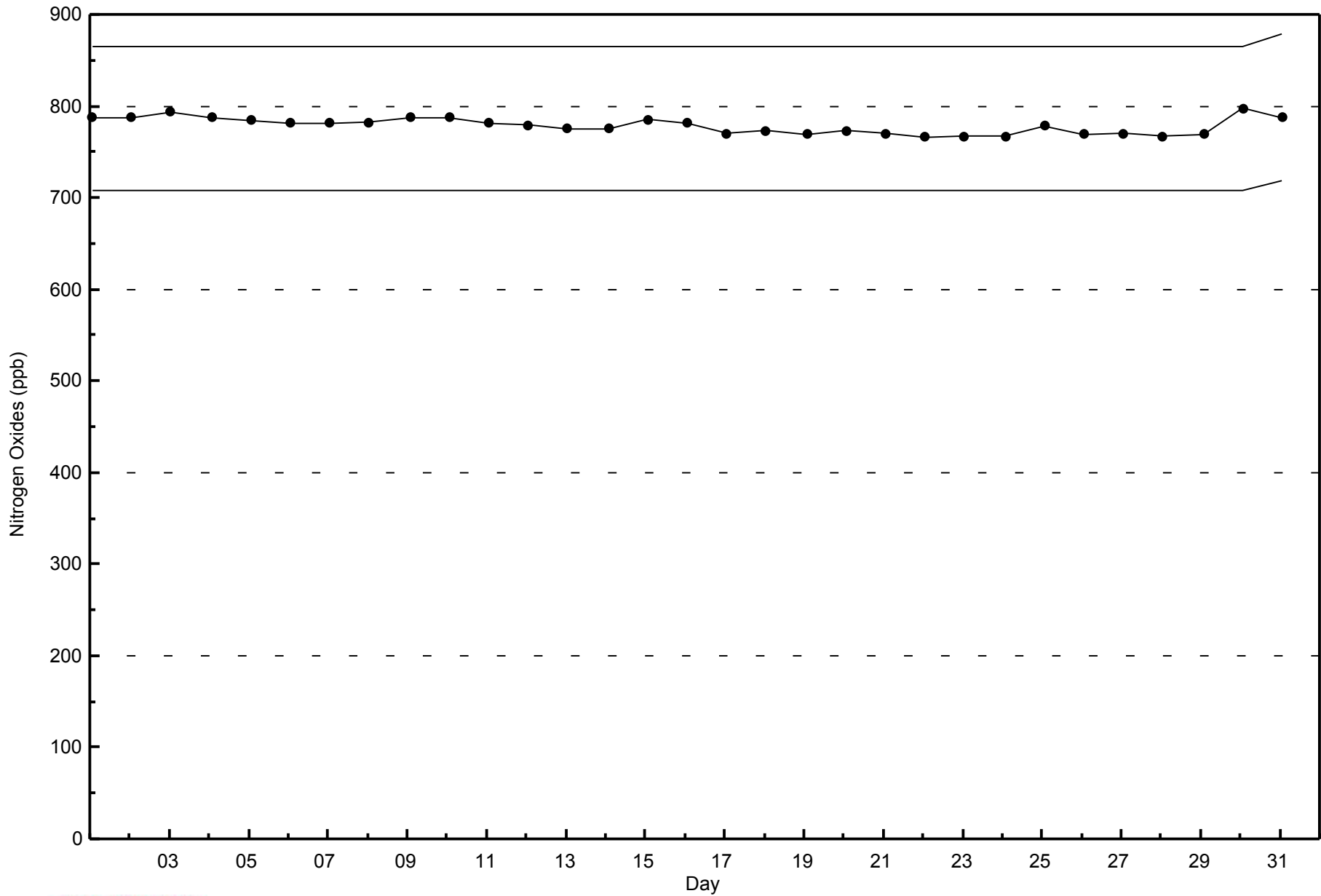






WBEA NETWORK
Span Responses

Nitrogen Oxides (NO_x) - ppb
Millennium - July 2014





Summary of Hour Averages

Millennium - July 2014

Number of Exceedences (AAAQO):	24-hr: 7	Hours in Service:	744
Maximum Value: 269.2 µg/m ³ on Jul 31 17:00	Maximum Daily Average: 42.3 µg/m ³ on Jul 12	Hours of Data:	740
Minimum Value: 0.4 µg/m ³ on Jul 4 20:00	Minimum Daily Average: 3.1 µg/m ³ on Jul 4	Hours of Missing Data:	4
Maximum Diurnal Average: 24.0 µg/m ³ at hour 17	Minimum Diurnal Average: 14.7 µg/m ³ at hour 7	Hours of Calibration:	0
Monthly Average: 18.01 µg/m ³	Percentiles: P ₁ = 1.0 P ₁₀ = 3.3 Q ₁ = 6.2 Median = 11.9 Q ₃ = 23.7 P ₉₀ = 37.7 P ₉₉ = 91.5	Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	11.7	16.8	24.1	20.7	23.2	25.3	18.4	22.0	30.0	27.1	18.3	16.1	16.8	19.5	22.1	22.4	31.5	28.9	27.7	32.6	32.6	27.9	34.8	27.3	24.1	34.8
2-Jul	30.4	27.8	29.9	35.5	31.0	34.2	24.4	26.0	29.9	21.0	19.5	21.3	24.5	25.5	26.3	24.1	20.5	21.3	24.4	24.4	28.4	26.6	23.4	24.0	26.0	35.5
3-Jul	24.9	18.8	17.2	20.5	19.8	16.5	17.9	18.2	15.4	16.1	16.9	22.0	21.7	17.4	10.9	8.1	8.7	10.5	11.3	15.4	18.1	14.4	15.6	15.2	16.3	24.9
4-Jul	11.7	14.4	7.1	4.1	4.1	5.0	3.6	3.3	2.4	2.4	1.1	1.1	1.3	1.3	1.2	1.0	0.7	0.8	0.6	0.4	1.1	1.5	1.5	1.9	3.1	14.4
5-Jul	7.9	3.6	3.1	5.3	6.2	18.7	14.4	6.7	5.7	5.8	3.1	1.4	1.3	1.2	1.4	1.3	0.8	1.0	2.7	2.8	5.5	6.3	6.7	5.0	4.9	18.7
6-Jul	16.6	9.9	11.8	6.9	5.4	7.7	13.2	11.7	21.0	6.5	3.4	1.6	2.8	3.8	1.5	1.5	1.2	2.1	3.2	10.3	17.7	6.6	5.2	8.0	7.5	21.0
7-Jul	11.8	19.5	27.5	34.3	38.6	30.5	30.2	49.1	56.7	61.4	64.1	59.6	42.5	40.0	33.4	36.9	38.5	30.2	28.7	23.1	16.4	14.8	14.9	16.4	34.1	64.1
8-Jul	20.0	21.6	23.8	24.6	25.2	21.8	22.6	26.0	24.0	23.4	33.4	29.1	22.9	24.8	19.5	13.3	11.1	8.5	6.9	6.8	14.2	30.2	24.2	9.5	20.3	33.4
9-Jul	5.3	4.0	3.4	4.6	10.6	8.2	8.4	6.5	5.5	8.4	8.8	10.1	11.0	9.3	9.0	9.6	10.7	9.6	8.9	11.6	10.4	10.6	15.9	14.0	8.9	15.9
10-Jul	31.8	17.7	3.9	2.5	4.0	4.8	6.1	6.2	2.8	1.6	0.9	1.6	2.3	3.8	3.3	3.0	6.9	8.9	17.1	30.6	50.2	58.5	48.2	39.9	14.9	58.5
11-Jul	34.0	27.6	25.4	26.6	23.5	20.7	18.4	16.3	15.1	13.4	12.3	4.6	2.6	2.6	2.2	2.5	3.6	4.9	12.0	12.7	38.8	71.7	92.4	92.6	24.0	92.6
12-Jul	84.3	60.3	34.5	22.6	22.6	20.0	17.7	22.6	31.2	26.9	32.5	51.6	73.9	90.6	89.1	70.6	64.5	63.5	44.2	28.5	18.2	16.7	16.6	10.9	42.3	90.6
13-Jul	7.0	4.4	3.8	4.4	3.9	2.7	2.3	1.6	1.4	1.6	1.9	2.5	3.4	2.5	1.7	2.1	2.7	2.2	1.9	3.7	8.3	14.0	8.6	11.7	4.2	14.0
14-Jul	7.3	8.3	7.0	7.4	6.4	7.1	8.0	13.4	18.4	19.8	12.3	9.6	13.5	14.4	13.7	13.1	11.0	10.3	11.1	13.3	19.8	24.6	19.9	17.0	12.8	24.6
15-Jul	9.6	8.3	8.6	8.5	9.8	5.5	4.7	5.2	6.5	6.5	4.4	6.1	8.4	10.3	13.8	16.9	16.3	18.8	15.0	14.6	11.8	18.7	20.7	20.3	11.2	20.7
16-Jul	15.3	18.6	18.6	18.3	16.0	20.5	22.7	22.9	26.9	PF	PF	82.0	88.7	91.9	99.7	88.4	34.2	25.2	10.8	4.5	5.7	5.1	2.6	2.3	32.8	99.7
17-Jul	3.4	4.3	5.3	6.6	8.2	10.3	6.1	7.0	10.0	16.1	27.6	27.3	22.2	20.2	21.8	21.5	27.2	26.0	25.4	29.3	31.7	25.9	21.5	19.4	17.7	31.7
18-Jul	26.9	17.1	14.6	14.1	13.9	12.9	14.9	16.0	17.4	17.7	17.6	18.2	14.0	15.1	22.9	14.6	13.7	13.3	13.2	8.2	7.6	3.9	3.6	6.4	14.1	26.9
19-Jul	4.9	2.6	4.0	7.1	8.1	10.0	16.5	13.4	15.3	21.7	22.2	15.0	14.8	12.4	10.0	16.6	14.0	12.4	14.7	33.4	39.5	54.4	59.9	62.6	20.2	62.6
20-Jul	67.6	59.8	49.5	35.6	27.2	26.2	30.7	38.7	51.1	45.0	41.2	41.7	42.1	39.3	35.3	31.5	30.8	26.1	27.0	27.4	26.2	22.9	21.1	21.9	36.1	67.6
21-Jul	20.4	26.8	29.5	28.9	30.5	30.1	29.4	30.0	27.8	24.9	18.7	32.1	39.4	39.1	37.8	38.0	30.7	28.4	31.2	35.8	39.9	46.5	59.6	40.0	33.2	59.6
22-Jul	47.9	42.5	43.0	49.8	41.1	40.9	43.9	46.7	54.0	70.5	65.1	55.4	37.8	28.7	23.1	20.4	16.8	17.2	19.6	22.5	26.4	29.4	29.9	30.7	37.6	70.5
23-Jul	28.3	26.1	24.8	23.3	22.6	21.1	19.1	15.0	AF	19.8	14.2	16.1	14.2	15.1	17.0	17.5	17.6	14.1	13.8	11.0	8.4	5.8	8.9	6.4	16.5	28.3
24-Jul	4.6	3.3	2.9	3.4	3.0	2.6	3.9	4.8	5.1	6.4	9.1	11.6	10.1	9.8	10.6	12.0	10.0	9.1	9.2	10.1	9.2	10.0	9.6	7.3	7.4	12.0
25-Jul	7.6	8.9	6.8	7.0	9.3	10.9	11.5	9.1	4.7	3.9	4.3	5.6	3.8	5.1	5.9	5.4	4.0	2.5	2.7	3.2	4.2	6.1	6.0	6.7	6.0	11.5
26-Jul	5.6	5.8	6.2	8.8	6.9	7.7	9.2	9.5	7.7	6.1	4.9	6.4	7.6	8.9	10.0	10.3	7.2	5.7	5.6	6.6	7.1	8.7	5.4	6.3	7.3	10.3
27-Jul	7.4	4.5	5.5	7.9	11.6	12.2	10.6	11.1	17.0	12.4	9.0	9.2	14.9	17.1	15.9	12.8	13.5	10.2	6.1	5.5	4.2	5.6	7.6	9.0	10.0	17.1
28-Jul	10.1	10.4	7.9	8.6	10.2	11.0	10.9	7.1	6.5	5.4	3.7	3.6	4.3	3.6	3.8	3.7	4.0	3.8	4.5	5.8	10.0	15.6	23.3	14.9	8.0	23.3
29-Jul	10.3	9.0	10.1	8.4	5.9	9.3	7.1	6.8	M	5.5	4.2	6.1	6.4	7.6	7.8	8.2	10.5	20.5	29.6	23.7	11.3	7.9	7.1	8.4	10.1	29.6
30-Jul	7.5	6.1	7.7	7.2	6.9	7.4	5.8	5.3	4.7	5.6	9.9	10.3	7.1	8.6	9.5	10.4	11.5	9.5	10.0	12.4	53.8	7.7	3.4	2.6	9.6	53.8
31-Jul	3.1	3.0	2.8	3.0	3.2	3.5	4.3	4.0	4.4	6.8	10.1	4.7	5.7	7.0	6.6	50.4	269.2	161.1	99.1	61.5	33.4	29.2	65.8	67.8	37.9	269.2

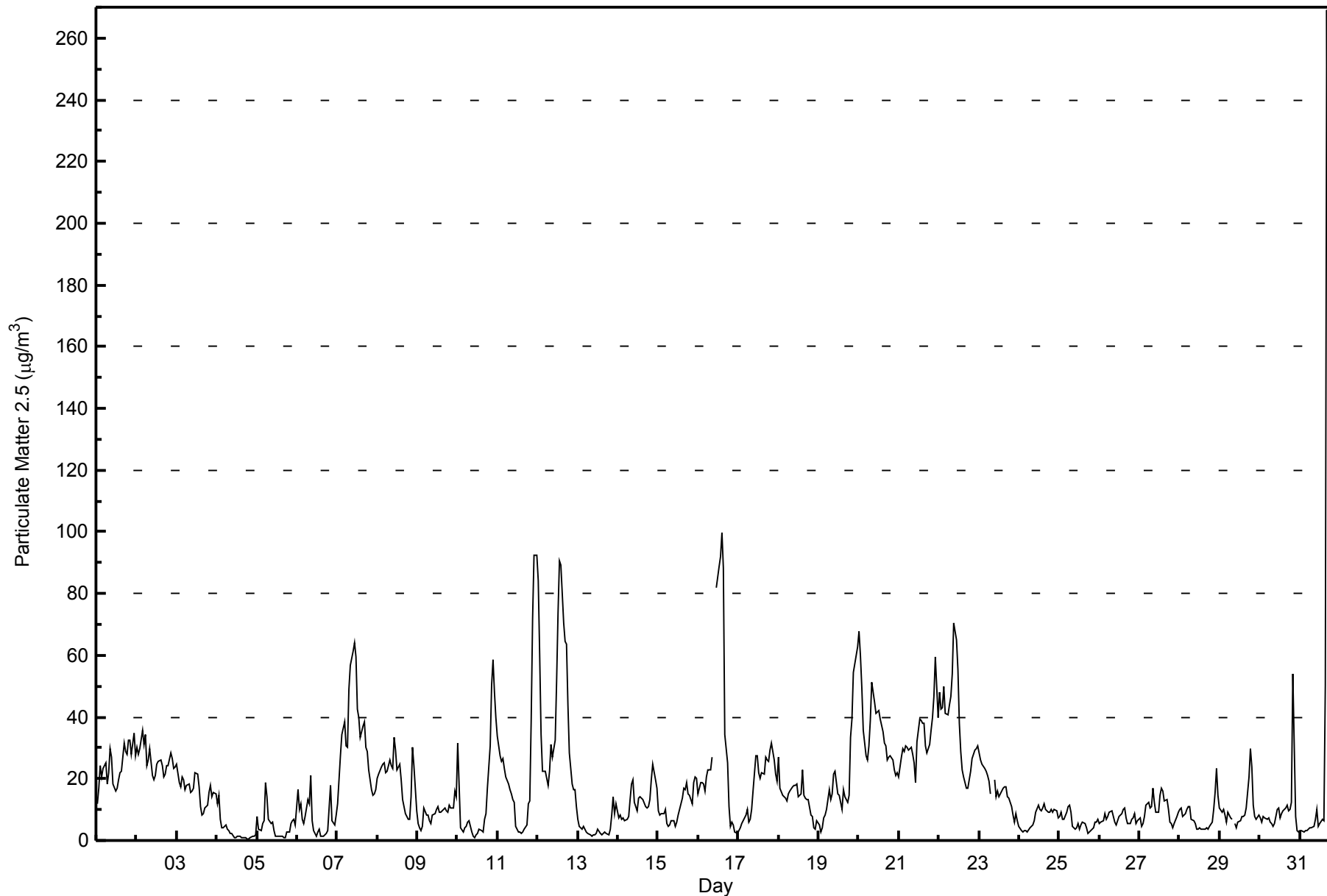
18.9	16.5	15.2	15.1	14.8	15.0	14.7	15.6	17.9	17.0	16.5	18.8	18.8	19.2	18.9	19.0	24.0	19.6	17.4	17.2	19.7	20.2	22.1	20.2	Diurnal Average	
84.3	60.3	49.5	49.8	41.1	40.9	43.9	49.1	56.7	70.5	65.1	82.0	88.7	91.9	99.7	88.4	269.2	161.1	99.1	61.5	53.8	71.7	92.4	92.6	Diurnal Maximum	

M - Maintenance AF - Analyzer Failure PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA NETWORK
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Millennium - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Millennium - July 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	150	20.27	20.27
6 - 15	275	37.16	57.43
16 - 25	146	19.73	77.16
26 - 80	150	20.27	97.43
> 81.0	13	1.76	99.19

Total Number of Valid Hours: 740

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Millennium - July 2014

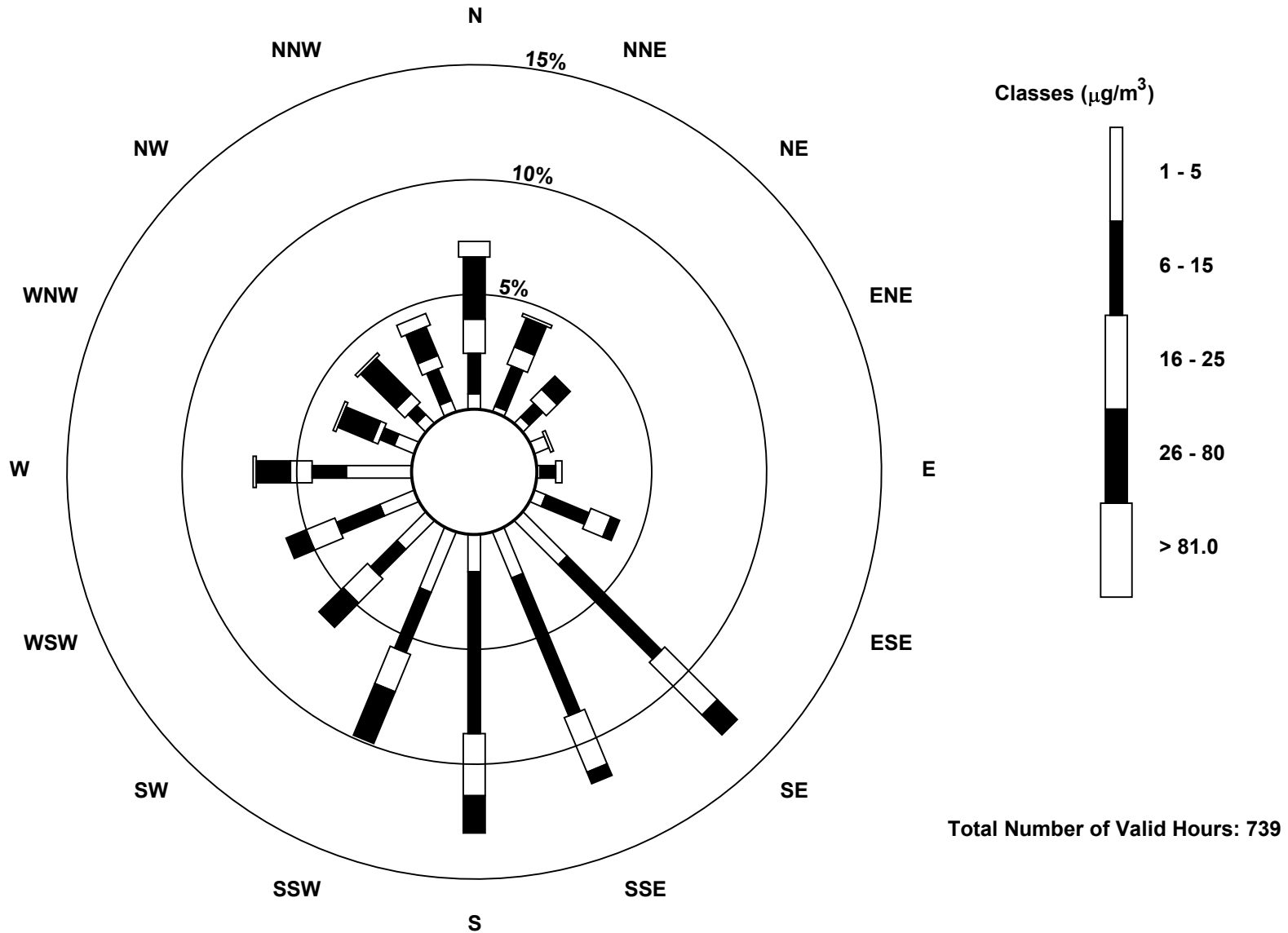
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	5	2	3	5	1	4	20	16	12	21	13	12	21	7	4	4	150
6 - 15	13	14	6	0	5	15	43	48	52	21	12	15	11	5	4	11	275
16 - 25	11	6	5	1	2	7	24	19	20	13	11	10	7	2	4	4	146
26 - 80	20	10	6	0	0	3	9	4	12	18	11	7	11	12	16	10	149
> 81.0	5	1	0	0	0	0	0	0	0	0	0	0	1	1	1	4	13
Totals	54	33	20	6	8	29	96	87	96	73	47	44	51	27	29	33	733

Total Number of Valid Hours: 739

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Millennium (AMS 12)



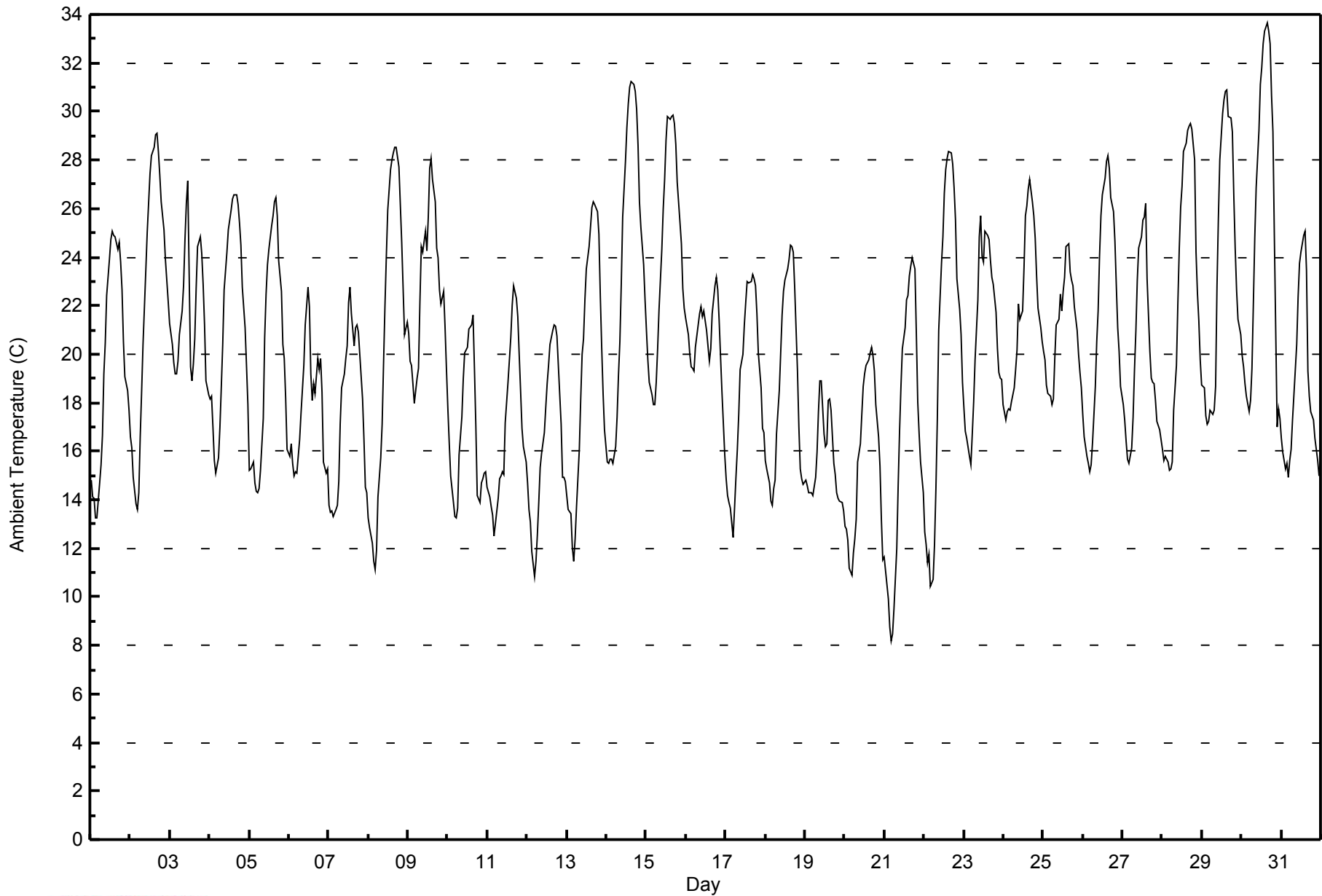


Maximum Value: 33.7 C on Jul 30 16:00																				Maximum Daily Average: 25.0 C on Jul 30					Hours in Service: 744																							
Minimum Value: 8.2 C on Jul 21 05:00																				Minimum Daily Average: 15.7 C on Jul 19					Hours of Data: 744																							
Maximum Diurnal Average: 25.0 C at hour 16																				Minimum Diurnal Average: 14.6 C at hour 5					Hours of Missing Data: 0																							
Monthly Average: 20.07 C																				Percentiles: P ₁ = 10.7 P ₁₀ = 14.1 Q ₁ = 16.1 Median = 19.7 Q ₃ = 23.5 P ₉₀ = 26.7 P ₉₉ = 30.7					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-Jul	14.8	14.1	14.0	13.3	13.3	14.7	15.4	16.7	19.2	20.5	22.4	23.9	24.7	25.1	24.9	24.9	24.3	24.6	23.8	22.7	20.5	19.1	18.5	17.7	19.7	25.1																						
2-Jul	16.6	16.1	14.9	13.8	13.6	14.3	16.6	18.4	20.4	23.5	25.0	26.2	27.4	28.2	28.5	29.0	29.1	28.3	27.4	26.3	25.1	23.9	23.0	22.2	22.4	29.1																						
3-Jul	21.2	20.4	19.7	19.2	19.2	19.7	20.8	21.8	22.8	24.7	26.2	27.2	19.5	18.9	19.6	20.6	22.7	24.4	24.8	24.1	22.9	21.2	18.9	18.3	21.6	27.2																						
4-Jul	18.2	18.3	17.0	15.6	15.1	15.8	17.0	18.7	20.4	22.7	24.2	25.1	25.6	25.9	26.4	26.6	26.6	26.2	25.4	24.5	22.8	21.1	19.5	17.9	21.5	26.6																						
5-Jul	15.2	15.2	15.5	14.7	14.3	14.3	14.4	15.2	17.3	20.7	22.5	23.7	24.3	25.3	25.7	26.3	26.4	25.7	23.9	22.6	20.4	19.8	18.2	16.1	19.9	26.4																						
6-Jul	15.8	16.3	15.5	15.0	15.2	15.1	16.5	17.6	18.6	19.6	21.2	22.8	21.9	19.2	18.1	18.8	18.4	19.8	19.4	19.8	18.4	15.6	15.1	15.3	17.9	22.8																						
7-Jul	13.8	13.5	13.5	13.3	13.6	13.8	14.8	17.1	18.6	19.2	19.8	20.3	22.1	22.8	21.6	20.3	21.1	21.2	20.9	20.0	18.1	16.5	14.5	14.3	17.7	22.8																						
8-Jul	13.2	12.9	12.2	11.5	11.1	11.9	14.1	15.7	17.1	19.6	22.0	24.0	26.0	27.6	28.0	28.3	28.5	28.5	27.7	26.2	24.6	22.7	20.8	21.3	20.7	28.5																						
9-Jul	20.9	19.7	19.5	18.8	18.0	19.0	19.4	22.1	24.4	24.2	25.1	24.3	25.7	27.7	28.1	27.2	26.3	24.3	23.9	22.7	22.1	22.6	21.1	19.4	22.8	28.1																						
10-Jul	17.8	16.3	15.0	13.9	13.3	13.3	13.6	15.9	17.4	18.9	20.1	20.2	20.3	21.1	21.2	21.6	19.4	17.1	14.2	13.9	14.7	14.9	15.1	15.2	16.8	21.6																						
11-Jul	14.5	14.1	13.7	13.4	12.5	13.0	14.0	14.9	15.0	15.1	15.0	17.2	18.9	19.8	20.7	22.0	22.8	22.3	21.6	20.0	18.5	16.9	16.2	15.5	17.0	22.8																						
12-Jul	14.7	13.6	13.1	11.9	10.8	11.5	12.5	13.9	15.3	15.9	16.8	17.8	18.8	19.5	20.4	21.0	21.2	21.1	20.8	19.6	17.1	14.9	14.9	14.8	16.3	21.2																						
13-Jul	14.2	13.6	13.4	12.0	11.5	12.4	13.7	16.1	18.1	20.0	20.6	22.2	23.5	24.4	25.2	26.0	26.3	26.2	25.9	24.9	22.4	20.3	18.4	16.9	19.5	26.3																						
14-Jul	15.5	15.5	15.7	15.7	15.5	16.2	17.4	19.1	20.5	22.9	25.7	28.0	29.3	30.3	31.0	31.2	31.1	30.8	30.1	28.6	26.3	25.3	23.7	22.3	23.7	31.2																						
15-Jul	21.0	19.8	18.8	18.3	17.9	17.9	18.8	20.2	21.9	24.3	26.0	27.2	28.8	29.8	29.7	29.8	29.9	29.5	28.6	27.1	25.4	24.6	22.7	21.9	24.2	29.9																						
16-Jul	21.5	20.8	20.0	19.5	19.4	19.3	20.3	21.2	21.7	21.9	21.5	21.8	21.0	20.4	19.7	20.2	21.7	22.8	23.2	22.6	21.4	19.9	18.4	15.8	20.7	23.2																						
17-Jul	14.9	14.2	13.9	13.7	12.5	13.7	14.9	16.1	17.5	19.3	20.0	21.2	22.1	23.0	22.9	23.0	23.3	23.1	22.8	21.7	20.0	18.6	16.9	16.8	18.6	23.3																						
18-Jul	15.6	15.3	14.7	13.9	13.8	14.4	14.8	16.7	18.5	20.1	21.6	22.6	23.0	23.5	23.9	24.5	24.4	24.2	22.8	19.3	17.0	15.3	14.8	14.7	18.7	24.5																						
19-Jul	14.8	14.6	14.3	14.3	14.3	14.2	14.9	16.0	17.6	18.9	18.9	16.7	16.2	16.3	18.1	18.1	17.7	15.5	15.1	14.3	14.1	13.9	13.9	13.6	15.7	18.9																						
20-Jul	12.9	12.8	12.3	11.2	10.9	11.8	12.4	13.2	15.6	16.3	17.5	18.6	19.2	19.5	19.7	20.1	20.3	19.9	19.3	18.0	16.6	15.4	13.2	11.5	15.8	20.3																						
21-Jul	11.7	10.5	9.9	8.8	8.2	8.5	9.5	12.0	14.6	16.8	18.6	20.2	21.1	22.2	22.4	23.2	23.7	24.0	23.5	20.9	18.1	16.7	15.5	14.3	16.4	24.0																						
22-Jul	12.7	12.1	11.4	11.8	10.4	10.7	12.2	14.5	17.3	21.0	23.7	24.8	26.6	27.6	28.1	28.4	28.3	27.8	26.9	25.5	23.1	21.8	20.8	18.8	20.3	28.4																						
23-Jul	17.8	16.8	16.5	15.8	15.4	16.7	18.0	19.8	22.2	24.8	25.7	24.0	23.8	25.0	24.9	24.7	23.8	23.2	22.9	21.7	20.2	19.2	19.0	19.0	20.9	25.7																						
24-Jul	17.9	17.3	17.6	17.8	17.7	18.1	18.6	19.4	20.1	22.1	21.4	21.8	23.5	25.7	26.1	26.8	27.2	26.3	25.7	24.8	23.2	21.9	21.1	20.5	21.8	27.2																						
25-Jul	20.1	19.8	18.7	18.4	18.3	17.9	18.1	19.8	21.2	21.5	22.5	21.8	22.6	23.2	24.5	24.6	23.4	23.1	22.8	22.0	21.0	20.0	19.2	18.6	21.0	24.6																						
26-Jul	17.5	16.6	15.8	15.5	15.1	15.4	16.4	18.7	20.5	21.8	24.0	25.7	26.6	27.3	27.9	28.2	27.6	26.4	25.9	24.7	22.8	21.1	20.1	18.7	21.7	28.2																						
27-Jul	17.9	17.3	16.4	15.7	15.5	16.1	17.4	19.4	21.0	23.0	24.4	24.8	25.5	25.7	26.2	23.1	20.1	19.0	18.8	18.8	18.1	17.2	16.9	16.5	19.8	26.2																						
28-Jul	16.1	15.6	15.8	15.6	15.2	15.3	15.5	17.7	19.5	22.1	24.3	26.0	26.9	28.3	28.7	29.2	29.4	29.5	29.3	28.0	24.2	22.5	21.4	19.8	22.3	29.5																						
29-Jul	18.8	18.6	17.5	17.1	17.2	17.7	17.5	17.7	18.7	22.8	25.7	28.0	29.9	30.5	30.8	30.9	29.8	29.7	29.2	26.6	24.4	22.6	21.5	20.8	23.5	30.9																						
30-Jul	19.9	19.5	18.8	18.2	17.7	18.1	19.4	22.1	24.8	26.9	29.2	31.1	31.8	32.8	33.3	33.7	33.3	32.8	30.6	29.2	24.9	17.0	17.7	17.4	25.0	33.7																						
31-Jul	16.5	15.9	15.3	15.5	14.9	15.6	16.1	17.3	19.4	20.4	22.4	23.7	24.2	24.9	25.0	23.4	19.3	18.3	17.6	17.3	16.5	16.1	15.6	15.0	18.6	25.0																						
																								16.6	16.0	15.5	14.9	14.6	15.0	16.0	17.6	19.3	21.0	22.4	23.3	23.9	24.6	24.9	25.0	24.8	24.4	23.7	22.5	20.8	19.3	18.3	17.4	Diurnal Average
																								21.5	20.8	20.0	19.5	19.4	19.7	20.8	22.1	24.8	26.9	29.2	31.1	31.8	32.8	33.3	33.7	33.3	32.8	30.6	29.2	26.3	25.3	23.7	22.3	Diurnal Maximum



WBEA NETWORK
Hourly Averages

Ambient Temperature (AT) - C
Millennium - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Millennium - July 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	5	0.67	0.67
10 - 20	385	51.75	52.42
> 20	354	47.58	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 24 km/h on Jul 30 22:00	Maximum Daily Speed Average: 10.2 km/h on Jul 24	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 21 19:00	Minimum Daily Speed Average: 1.5 km/h on Jul 18	Hours of Data: 743
Maximum Diurnal Speed Average: 3.4 km/h at hour 9	Minimum Diurnal Speed Average: 0.1 km/h at hour 21	Hours of Missing Data: 1
Monthly Average Velocity: 1.7 km/h 187.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 6 Q ₃ = 9 P ₉₀ = 12 P ₉₉ = 17	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NE2	WSW2	SW5	SSW5	SSW4	SW2	WSW4	SSW4	S3	SSW4	SSW5	SW4	SSW1	N3	NNW2	SW5	NNE8	WNV3	SW5	SSW6	S2	SW3	SE3	SE3	SW2.1	NNE8
2-Jul	SE3	ESE5	SE4	SSW2	SE1	SW3	SE4	SSW4	SSW5	SSE5	SSE4	SSE4	S5	SSE6	S6	SSE7	S8	SSE7	SE9	SE10	ESE11	ESE13	SE14	SE14	SE5.8	SE14
3-Jul	SE11	SE9	SE9	ESE9	ESE8	ESE8	ESE11	SE14	SE15	SE16	SE16	SE15	SSE11	E7	SE4	SE7	SE11	SSE8	S2	NNW3	N6	N12	N4	NNW4	SE7.0	SE16
4-Jul	WSW5	W8	SW7	SSW7	S3	SSW7	SSW8	SSW8	SSW8	SSW8	W12WSW13WSW14WSW15WSW15	SW14WSW14WSW13WSW13WSW10	WSW9	WSW7	SW7	SW5									SW9.0	WSW15
5-Jul	S3	SW3	WSW5	SSW5	S3	SSW5	SSW6	S7	S5	SSE6	S4WSW12	WSW9	W11	W10	W11WSW10	W8	NNW7	NW2	NW3	N6	NE5	NE2		WSW3.7	WSW12	
6-Jul	SSE6	SSW7	SSW7	SW7	WSW7	WSW3	WSW4	W3	WSW4	SW6	W8	W7	WNV9	NNE16	ENE4	N3	N3	NNW3	W4	WSW6	NNW5	WNV3	WNV6	NNW7	W2.7	NNE16
7-Jul	WNV3	WNV4	W4	W4	WNV4	SW4	WSW3	W3	NW5	NNW7	NW6	N8	NNW7	NNW7	NNE14	NNE11	NNE12	NNE14	NNE8	NNE8	N5	N5	NNE4	E3	N4.7	NNE14
8-Jul	ESE3	S3	S3	SSW4	SSW6	SSE5	SSE4	S6	S7	S9	S7	S9	S9	SSE9	SSW12	S11	S10	S10	S9	S7	SSE6	SSE5	SSE4	S8	S6.7	SSW12
9-Jul	SSW8	SSE5	W4	S3	S6	SSE4	SSE7	SSE7	SSE8	S13	S11	S10	S9	S12	S15	SW12WNV14	W6	SSW7	SSW6	SW6WNV10	NW10	WNV6		SSW5.6	S15	
10-Jul	W6	WSW8	W8	W5	W5	W5	W6	WSW6	WNV4	WNV7	WNV8	W9WNV11WNV13	W14	W14	NW16	NW18	NW17WNV13WNV14WNV13WNV12WNV15							WNV9.9	NW18	
11-Jul	WNV14WNV13WNV12WNV12	W9	W9	W7	W7	WSW7	WSW7	WSW8	W9	W12	W11WSW10	W11	W12WNV11	N14	NNE18	N12	N8	N8	NNW7					WNV7.8	NNE18	
12-Jul	N11	N10	N11	N10	NNE9	N5	N5	N7	NW7	NW8	NW8	NW8	NW8	NW7	NW7	NW6	WNV2	N5	NNE6	NE7	NE6	NE6	ENE5	E5	N5.7	N11
13-Jul	E6	ESE8	SE5	SSE5	SE6	SE9	SE10	SE11	SE10	SE7	ESE5	SE6	SE5	SSE3	S6	S3	SSW5	SSW6	SSW6	SSE5	SE5	SE7	SE6	SE6	SE5.5	SE11
14-Jul	SE6	SE8	SE9	SE11	SE10	SE8	SSE7	S8	S10	S9	S8	SSE9	SSE10	S10	S11	S11	S10	S9	S8	S7	S9	SSW9	S8	SSE8.4	SE11	
15-Jul	S7	SSE5	SE7	SSE6	SSE5	SSE5	SSE6	S7	SSE7	SSE7	S8	S10	S10	SSW10	S9	S10	S11	SSW10	S7	S8	S8	SE5	SSE5	S7.4	S11	
16-Jul	S5	S5	S3	SW3	WSW4	SW2	SW3	WSW5	NE3	N4	NNE9	N8	N9	NNW6	NNW4	W4	WSW8	SW7	SW7	SW5	SSW7	SW6	NNE14	NE6	WNV1.7	NNE14
17-Jul	NNW5	NNW5	N4	N5	WSW3	NNE1	N6	NNE6	N5	NNW2	N5	NW2	W4	SW2	N5	N6	N3	NE2	NW2	NW1	SW6	SW4	SSW2	WSW3	NNW2.1	NNE6
18-Jul	W3	WSW5	NW4	NNW4	N6	NNW5	NNW4	NW4	NW4	SW6	S7	SSW4	NNW4	NNE6	N8	N7	NNE1	SE4	S3	SW7	SSE5	SW5	N2	SW1	WNV1.5	N8
19-Jul	SE6	SE7	SSE4	SSE5	SSE5	S3	S7	SSW6	SW5	SW8	W8	W11	W9WSW10	W13	W13	W13	NNW12	NNW13	NNW12	N14	NNW8	NW8	NW8	W4.4	N14	
20-Jul	WNV7	W6	W5	SW4	WSW4	WSW4	W4	W3	NW6	N7	NNW7	NW5	NNW9	N10	N12	NNE9	N9	NNE8	NNE10	NE7	NE8	NE8	NE4	NNE2	N4.5	N12
21-Jul	NE3	SSW5	SW5	SSW5	SSW4	SW5	SW5	SSW3	SSW3	NNE4	N5	N2	WSW5	SSW3	NNW6	NW5	NNW5	NW3	W0	WSW4	W4	AF	WSW2	S3	WSW1.8	NNW6
22-Jul	S1	SSW6	SSW5	S3	SSW4	SW6	SSW4	SSW6	SSW6	S5	SSE6	SSW6	S7	S7	SSE7	SSE7	SSE7	SSE7	SE8	SE9	SE9	SE10	SE8	SE3	SSE5.4	SE10
23-Jul	SE7	SE7	SE7	SE5	SE6	SE6	SE7	ESE7	SE11	SE13	SE14	SE14	ESE12	SE17	SE16	SE17	ESE12	E10	ESE8	SE11	SE9	SE6	SE6	SE6	SE9.6	SE17
24-Jul	SW3	SE5	SE9	SE10	SE10	SE11	SE10	SE9	SSE8	SE12	SE13	ESE13	SE13	ESE12	ESE13	SE15	ESE14	ESE10	ESE11	ESE9	ESE10	ESE10	ESE11	SE10.2	SE15	
25-Jul	ESE10	E7	NE7	NE7	NNW5	N9	NE5	NE7	ENE9	ENE7	E6	ESE2	NW4	SW2	SSW8	SSW7	S6	SE11	SSE6	SW7	NW4	WSW2	N4	NNE5	E2.0	SE11
26-Jul	E7	SE4	SSE5	ESE6	SSE1	WSW2	SW4	NE2	S4	SSE3	SE4	SSE5	SSE6	SSE6	S6	S6	SW9	W10	WSW7	W4	WSW4	SW5	SSW4	SSE3	S3.1	W10
27-Jul	S4	S5	SSW6	SSE3	SSE4	SSE5	SE6	SE7	SSE7	S5	SSW5	WSW7	W8	W7	WSW5	NNE5	SE4	S8	SSW9	SSW6	SSE6	SSE6	SSE5	SSE6	S4.0	SSW9
28-Jul	SSE6	SSE5	SSE5	S5	SSE6	SSE6	S6	S6	S6	S5	S5	S6	SSW3	WSW4	SW6	SSW5	SW4	SSW4	SSW3	SSW4	S5	S4	SSE4	SSW4	S4.3	S6
29-Jul	SSE5	SSE4	SSW4	SE6	SSW3	SSW6	S6	S7	SSW10	SSW8	SSW7	SSW6	S7	SSW5	NW1	NNE6	NNE7	NNE10	NE6	ESE8	SE8	SE8	SE8	SE9	SSE3.4	NNE10
30-Jul	SE10	SE10	SE7	SSE6	SSE5	SE6	SE6	SSE5	SSE6	SSE7	SSE7	SSE9	S8	SSE6	SSE7	S4	SSE8	SSE8	SSE8	SE7	NNW17	NNE24	NE14	SSE5	SE4.6	NNE24
31-Jul	SSW7	SSW5	ESE1	ENE3	SW1	ENE2	SSE5	S4	SSE3	N5	NNE8	N13	N14	N14	NNE14	N20	NNE20	N11	NNW9	N12	N15	N14	N16	N15	N7.3	NNE20

SSE2.0	S2.4	S2.3	S2.3	S2.3	S2.3	S3.0	S3.2	S3.4	S3.3	S2.6	SSW2.8	SW2.8	SSW1.7	SW2.1	SW1.8	WSW1.4	SW1.1	SSW0.9	S0.9	ENE0.1	NE0.7	ENE1.3	SE1.0		Diurnal Average
WNV14	WNV13	WNV12	WNV12	SE10	ESE10	ESE11	SE14	SE15	SE16	SE16	SE15	N14	SE17	SE16	N20	NNE20	NW18	NW17	NNE18	NNW17	NNE24	N16	N15		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 - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 14 km/h on Jul 30 21:00	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9
Minimum Value: 1 km/h on Jul 21 21:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	

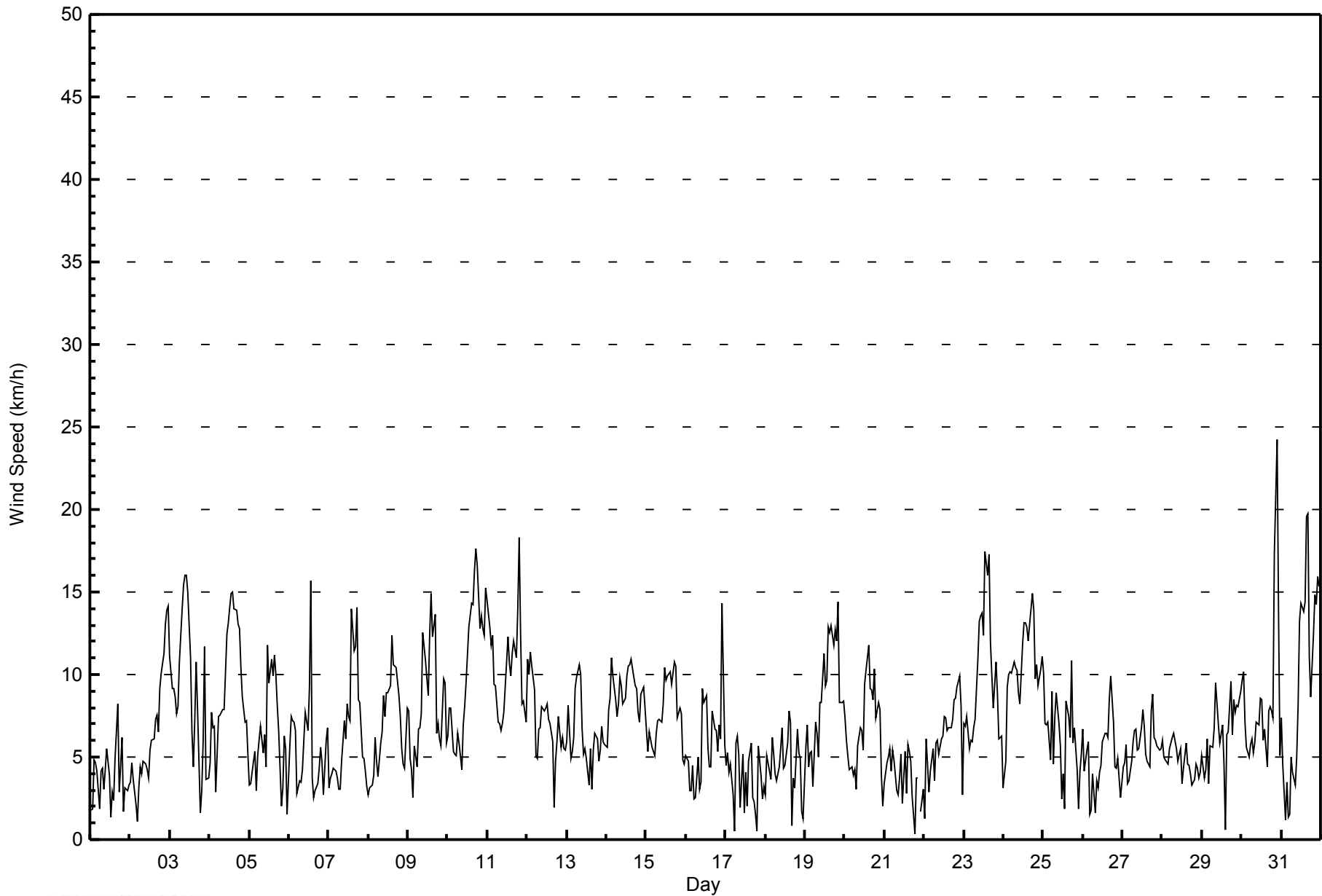
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	2	2	1	1	1	1	2	2	1	1	2	2	2	2	3	3	4	2	1	2	2	2	1	1	4
2-Jul	2	1	1	2	1	1	2	2	2	2	2	2	3	3	3	3	2	2	3	3	3	4	4	4	4
3-Jul	3	3	2	2	2	3	3	4	4	5	5	5	7	2	2	3	5	4	2	1	2	3	3	1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

AF - Analyzer Failure



WBEA NETWORK
Hourly Averages

Wind Speed (WS) - km/h
Millennium - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Millennium - July 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	281	37.82	37.82
6 - 11	374	50.34	88.16
12 - 19	85	11.44	99.60
20 - 28	3	0.40	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Wind Speed (WS) - km/h
Millennium - July 2014

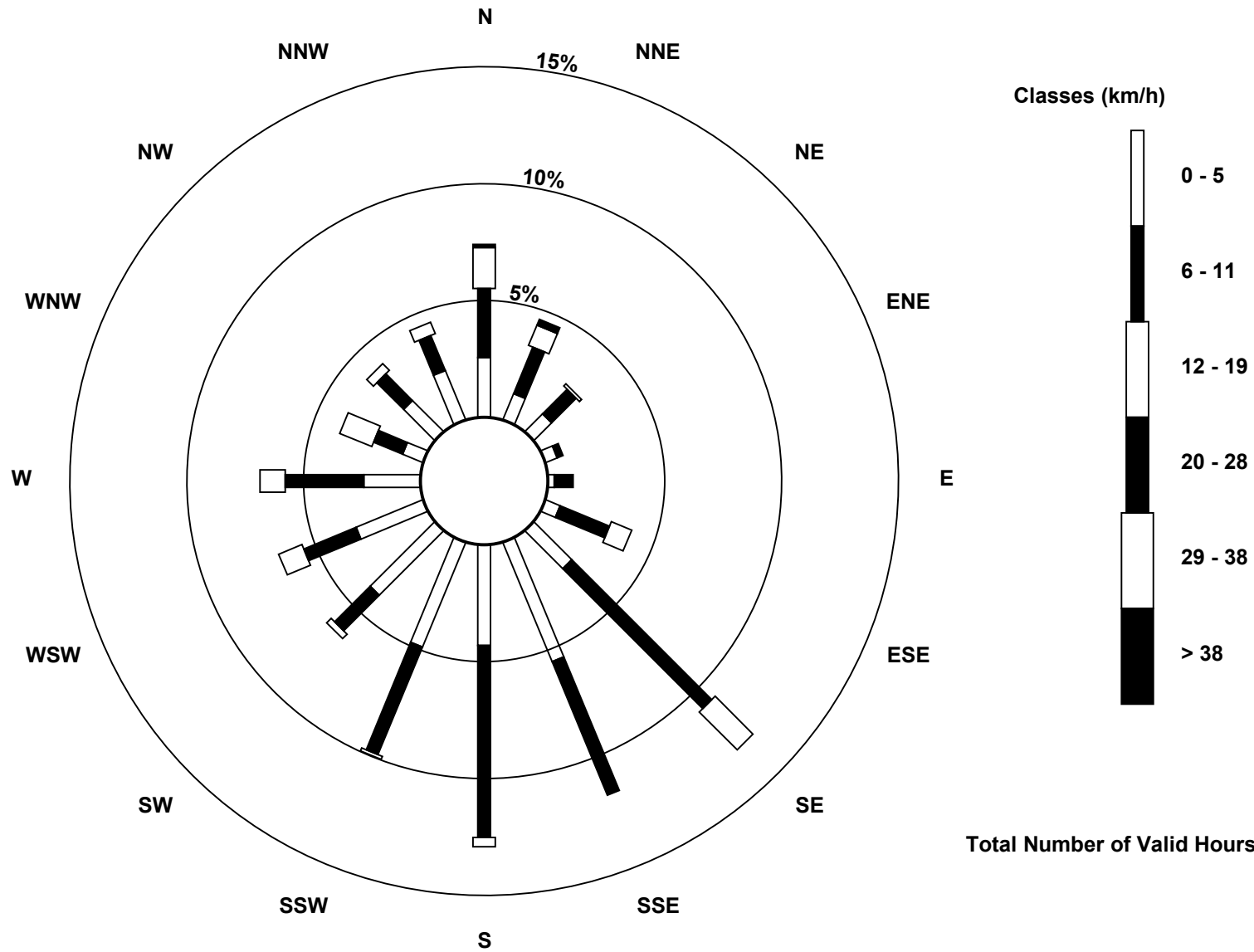
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	19	9	8	4	2	5	17	41	32	36	29	23	18	7	14	17	281
6 - 11	22	16	11	2	6	17	63	46	61	37	16	18	25	10	12	12	374
12 - 19	13	7	1	0	0	7	17	0	3	1	2	8	8	11	3	4	85
20 - 28	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	34	20	6	8	29	97	87	96	74	47	49	51	28	29	33	743

Total Number of Valid Hours: 743

Total Number of Hours: 744

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

**Wind Speed (WS) - km/h
Millennium (AMS 12)**





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Millennium - July 2014

Direction of Maximum Speed: 33 deg on Jul 30 22:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 125.6 deg on Jul 24	Hours of Data: 743
Direction of Minimum Speed: 262 deg on Jul 21 19:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 1.5 deg on Jul 18	Percent Operational Time: 99.9
Monthly Average Direction: 226.4 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-Jul	50	242	218	207	199	225	242	199	186	201	205	231	192	7	337	229	20	285	235	213	175	222	128	130	215.8
2-Jul	146	120	138	200	125	215	141	193	192	154	166	156	180	152	175	168	175	157	129	125	120	123	124	127	145.4
3-Jul	128	127	127	122	119	113	122	126	128	131	132	142	149	101	133	134	141	151	172	347	353	9	351	328	124.1
4-Jul	257	273	223	210	183	200	209	200	206	213	262	258	245	243	242	230	237	239	251	249	237	238	229	222	235.9
5-Jul	175	228	241	198	175	194	204	191	181	161	189	251	253	267	273	273	242	264	347	320	312	2	43	50	244.0
6-Jul	153	199	207	217	237	254	243	269	251	216	265	278	284	26	59	1	359	336	267	251	335	287	302	346	273.0
7-Jul	291	288	265	278	288	227	253	263	317	338	323	356	336	327	32	25	17	20	25	27	11	8	29	90	355.0
8-Jul	111	173	176	194	201	150	157	182	178	174	171	177	177	165	194	187	175	177	176	174	159	160	163	187	175.8
9-Jul	196	156	259	171	179	163	148	159	163	188	186	176	174	174	184	224	284	269	202	197	214	293	309	288	203.2
10-Jul	266	258	277	268	275	272	261	250	299	302	283	277	285	282	280	277	319	315	313	288	293	298	300	302	289.8
11-Jul	298	292	282	283	271	268	259	264	257	237	242	263	271	260	238	271	276	291	350	14	8	357	354	346	292.2
12-Jul	354	354	357	5	18	356	351	352	305	313	308	310	305	325	304	310	290	2	13	38	43	35	62	88	349.7
13-Jul	84	114	144	150	145	126	129	136	133	132	106	130	128	166	190	191	197	205	201	168	145	141	133	132	142.8
14-Jul	136	135	136	130	138	141	149	172	172	175	172	160	167	172	174	175	182	173	176	176	186	191	197	186	165.9
15-Jul	174	163	145	153	161	158	161	171	168	158	169	187	180	190	197	187	186	186	195	190	181	182	145	148	176.0
16-Jul	176	190	187	215	253	234	217	254	49	354	15	7	352	333	332	277	247	227	220	221	206	236	18	48	284.8
17-Jul	340	339	7	349	244	24	5	15	2	340	359	308	259	227	5	7	359	37	326	315	218	229	200	258	336.4
18-Jul	276	256	308	330	356	346	328	310	304	233	191	194	344	24	11	358	32	124	178	226	158	235	8	214	300.2
19-Jul	145	140	165	166	163	172	186	209	216	228	264	271	269	239	279	273	278	336	340	341	3	336	323	313	279.4
20-Jul	285	272	264	236	241	243	267	275	307	350	338	326	348	358	1	24	6	23	21	43	34	36	42	25	349.1
21-Jul	45	209	226	209	208	214	217	207	200	16	354	0	248	211	343	316	330	326	262	254	261	AF	246	179	255.6
22-Jul	187	210	201	171	209	215	207	208	201	180	168	200	176	169	163	161	155	158	138	140	128	133	146	138	168.3
23-Jul	138	137	127	133	133	131	140	121	128	134	138	136	116	125	128	124	104	93	110	124	133	134	143	141	126.9
24-Jul	228	128	127	129	125	124	124	128	134	143	159	138	131	123	125	120	112	126	123	112	116	108	114	115	125.6
25-Jul	112	97	55	35	345	3	34	42	78	73	90	111	312	225	206	200	186	130	162	220	315	248	350	31	84.1
26-Jul	100	146	147	114	167	250	236	34	181	159	143	151	167	153	177	170	220	262	255	268	246	221	212	153	187.6
27-Jul	191	191	197	163	160	149	140	141	154	170	199	242	269	279	242	14	127	184	204	194	156	160	150	147	182.9
28-Jul	165	156	157	175	148	151	173	177	187	179	170	178	197	256	222	212	225	212	209	207	188	185	154	204	184.3
29-Jul	149	157	194	129	212	194	169	190	209	194	203	200	187	193	321	13	19	12	48	108	126	134	133	137	155.7
30-Jul	126	127	140	148	159	142	135	158	154	168	159	164	191	161	150	169	165	153	149	137	328	33	45	161	134.8
31-Jul	193	193	115	78	229	75	168	169	161	1	17	7	7	9	17	5	14	350	342	10	356	358	0	357	6.2

161.1 177.9 185.0 169.8 182.9 174.6 173.1 175.9 173.9 176.6 190.6 207.7 227.6 210.1 217.0 231.2 238.2 221.7 212.9 173.8 59.5 47.5 58.1 125.9
 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

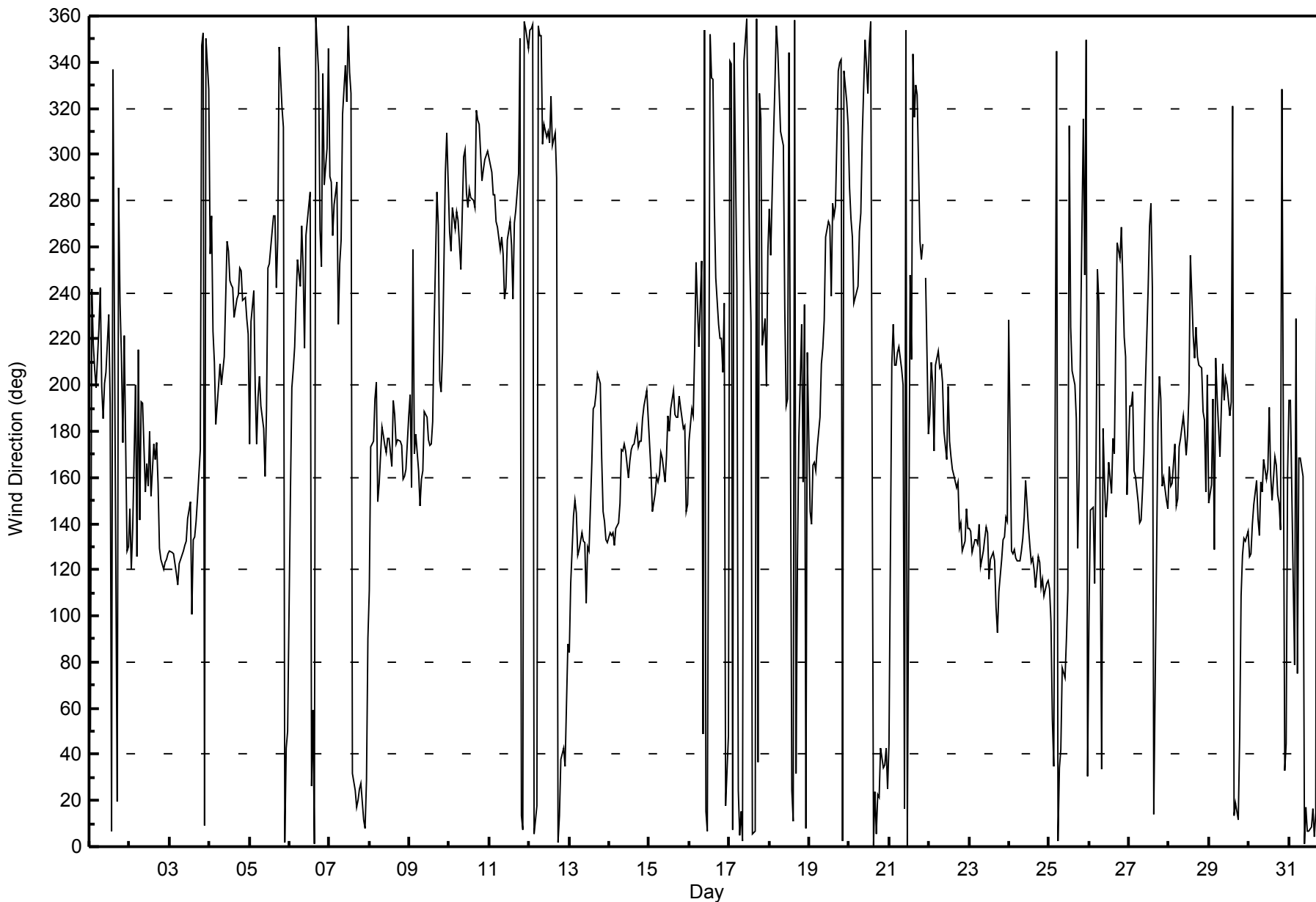
Wind Direction (WD) - deg
Millennium - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 108 deg on Jul 29 15:00 Minimum Value: 7 deg on Jul 12 22:00 Percentiles: P ₁ = 11 P ₁₀ = 17 Q ₁ = 20 Median = 27 Q ₃ = 37 P ₉₀ = 57 P ₉₉ = 91																		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	55	52	21	11	12	50	22	33	48	33	30	68	104	84	56	39	23	69	22	16	63	49	32	28	104
2-Jul	36	18	28	69	46	19	29	34	41	45	47	72	54	47	49	40	27	27	22	18	18	18	18	17	72
3-Jul	17	18	16	16	22	24	20	19	18	19	20	23	31	31	46	28	25	26	72	34	18	14	32	36	72
4-Jul	54	34	24	18	52	18	20	23	29	40	35	35	34	33	33	29	29	32	31	30	27	25	23	24	54
5-Jul	20	41	39	27	18	14	19	20	23	29	68	36	39	39	38	38	38	32	37	43	37	22	43	86	86
6-Jul	34	18	14	22	23	76	34	66	46	43	42	45	55	17	61	88	74	47	28	27	51	41	36	29	88
7-Jul	41	19	23	19	22	36	31	35	40	29	34	22	34	35	18	15	17	16	17	13	25	10	13	38	41
8-Jul	29	25	24	15	18	20	23	20	21	23	27	27	25	27	25	27	23	21	23	17	19	17	17	19	29
9-Jul	32	29	44	53	15	22	18	20	22	24	23	22	26	24	22	43	28	35	19	15	24	37	31	32	53
10-Jul	24	26	28	33	37	46	29	38	72	41	43	39	36	34	32	33	35	35	31	26	27	23	26	26	72
11-Jul	24	27	26	26	23	25	28	27	26	28	27	38	33	31	30	32	34	35	36	15	15	19	20	24	38
12-Jul	24	19	19	17	13	42	37	39	36	30	32	36	37	41	41	41	89	38	19	11	9	7	29	28	89
13-Jul	29	24	44	11	18	17	18	21	21	38	50	52	62	93	58	79	52	33	27	25	16	16	17	18	93
14-Jul	19	16	15	15	16	16	22	21	21	23	30	26	28	25	25	25	24	23	21	20	15	17	16	18	30
15-Jul	20	17	13	15	15	15	19	22	25	28	25	26	25	27	23	23	23	21	19	18	19	19	17	14	28
16-Jul	25	18	42	40	23	63	23	33	65	29	16	18	25	36	31	32	34	32	21	17	15	36	33	32	65
17-Jul	22	29	29	27	31	76	22	22	29	86	32	93	59	97	41	19	61	32	40	67	12	52	62	52	97
18-Jul	46	30	35	26	18	35	42	44	48	53	35	71	61	40	29	39	99	33	57	31	49	63	75	73	99
19-Jul	29	20	24	19	20	21	25	26	36	31	35	30	37	30	34	37	30	35	33	32	19	29	33	30	37
20-Jul	21	22	21	15	22	24	29	45	38	29	38	53	39	24	22	25	29	20	17	12	9	7	52	30	53
21-Jul	59	40	15	12	18	15	19	19	50	65	33	99	60	84	61	44	48	54	96	14	13	AF	71	23	99
22-Jul	66	18	34	51	16	14	24	16	22	32	39	36	32	36	40	37	34	26	21	17	16	16	25	64	66
23-Jul	15	13	16	18	16	18	21	21	21	21	21	20	26	19	19	23	31	32	30	25	26	31	20	21	32
24-Jul	31	46	15	15	16	19	18	21	21	27	27	23	22	26	24	24	29	20	23	25	24	28	23	24	46
25-Jul	23	34	28	34	20	24	55	23	31	31	39	78	58	68	28	27	29	18	50	20	42	63	24	26	78
26-Jul	27	30	15	13	63	63	28	92	61	74	64	64	53	47	47	40	36	31	34	25	20	17	34	34	92
27-Jul	30	32	27	18	22	18	24	25	29	37	50	51	35	35	56	71	59	22	20	20	22	20	14	18	71
28-Jul	17	14	18	16	18	22	20	27	31	37	46	41	87	83	55	68	72	48	37	17	13	23	21	24	87
29-Jul	22	28	28	25	53	42	59	56	31	24	25	38	34	73	108	26	25	14	20	31	17	16	16	14	108
30-Jul	15	15	18	16	17	19	20	30	30	29	34	34	37	53	40	59	35	26	19	17	81	31	27	65	81
31-Jul	22	44	91	37	72	70	31	25	50	31	24	17	20	19	17	19	17	34	52	36	20	20	19	20	91
Diurnal Maximum																									
AF - Analyzer Failure																									



WBEA NETWORK
Hourly Averages

Wind Direction (WD) - deg
Millennium - July 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 29, 2014	Previous Calibration	June 12, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	6:40	End Time (MST)	11:03
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	779	779
Calculated slope	1.010221	1.001162	Chamber temp.	45.0	45.0
Calculated intercept	-0.331672	-0.831184	Pressure (mmHg)	712.2	712.2
Analyzer Background	8.6	8.4	Flow (lpm)	0.446	0.446
	1.190	1.199	Intensity	92	92

Analyzer make	43i Thermo	Analyzer serial #	1118148499
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	-0.4	NA
as found span	6000	94.1	801.4	788.0	1.017
calibrator zero	6000	0.0	0.0	0.0	NA
high point	6000	94.1	801.4	801.2	1.000
second point	6000	47.1	401.1	401.0	1.000
third point	6000	23.5	200.1	202.2	0.990
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	795.4	1.008
Average Correction Factor					0.997

Corrected As found	788.4	Previous response	793.6	% change	0.7%
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Notes:

Filter changed; no maintenance performed. Span adjusted response.

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

SO₂ Calibration Summary

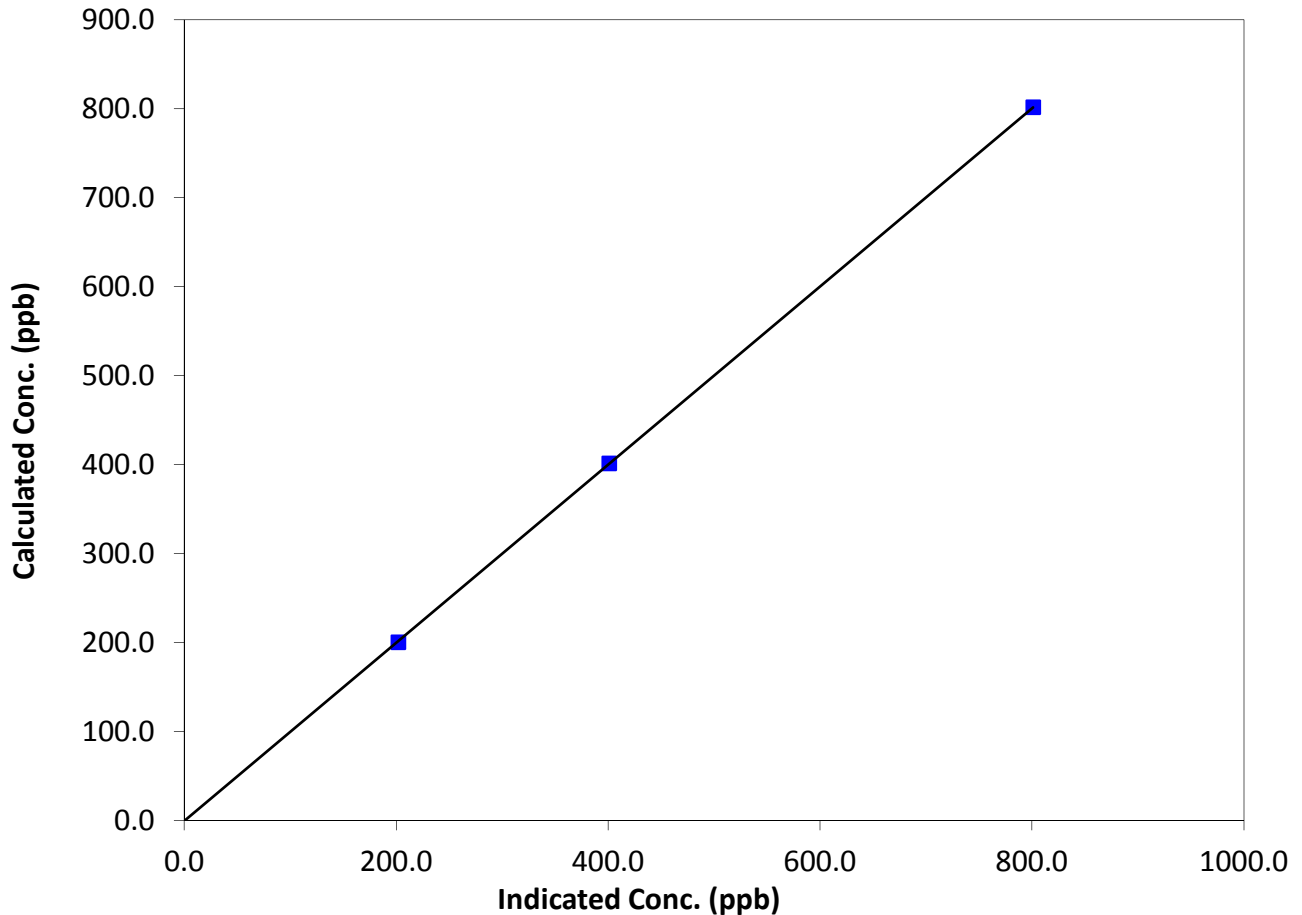
Station Information

Calibration Date	July 29, 2014	Previous Calibration	June 12, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	6:40	End Time (MST)	11:03
Analyzer make	43i Thermo	Analyzer serial #	1118148499

Calibration Data

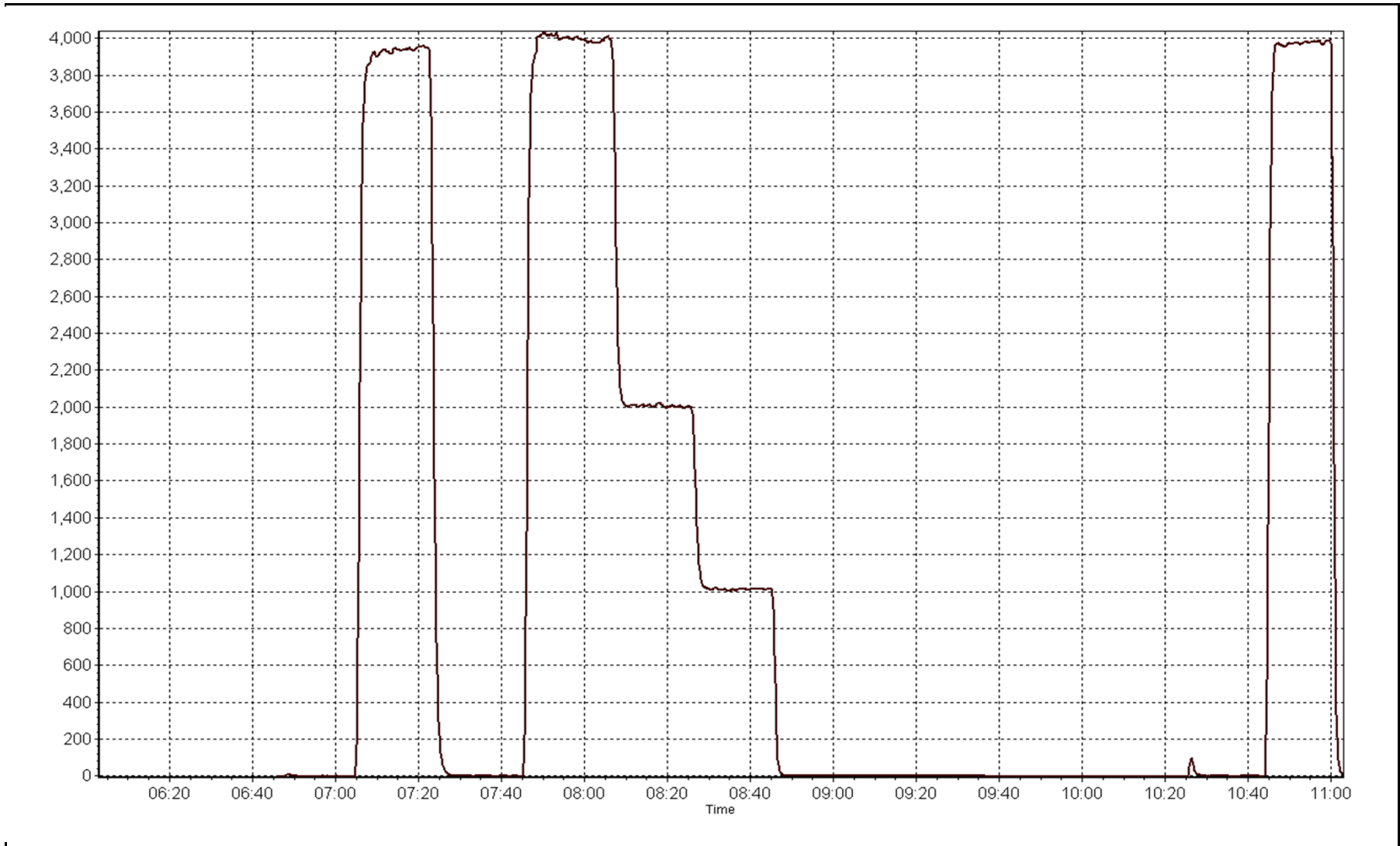
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999991
801.4	801.2	1.0003		
401.1	401.0	1.0003	Slope	1.001162
200.1	202.2	0.9898		
			Intercept	-0.831184

SO₂ Calibration Curve



SO2 Calibration Plot

Date: July 29, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	July 29, 2014	Previous Calibration	June 13, 2014
Station Name	Millenium Mine	Station Number	Ams 12
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	13:30
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	874	874
Calculated slope	0.998147	0.992581	Chamber temp.	44.1	44.1
Calculated intercept	0.276454	-0.462951	Pressure	687	687
Analyzer Background	18.5	19.4	Flow	0.605	0.605
Analyzer Coefficient	0.654	0.667	Intensity	46700	46700
			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	0.5	NA
as found span	5000	38.5	80.1	78.4	1.021
SO2 scrubber check	6000	47.1	401.1	2.8	NA
calibrator zero	5000	0.0	0.0	0.5	NA
high point	5000	38.5	80.1	81.2	0.986
second point	5000	19.2	39.9	40.5	0.987
third point	5000	9.6	20.0	20.8	0.962
calibrator zero	6000	0.0	0.0	0.0	NA
as left zero	6000	0.0	0.0	0.0	NA
as left span	5000	38.5	80.1	81.5	0.982
Average Correction Factor					0.978

Corrected As found	78.0	Previous response	80.0	% change	2.6%
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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

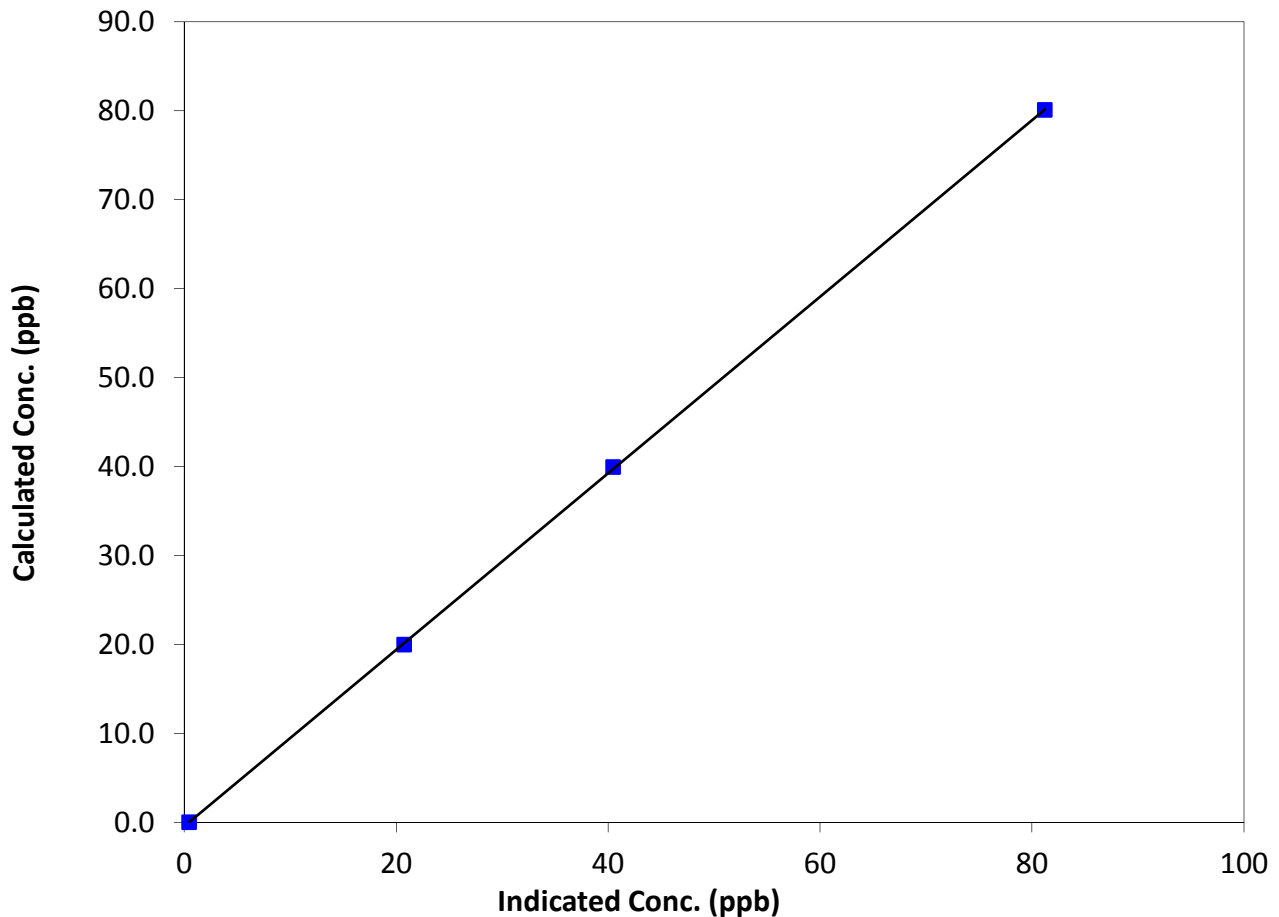
Station Information

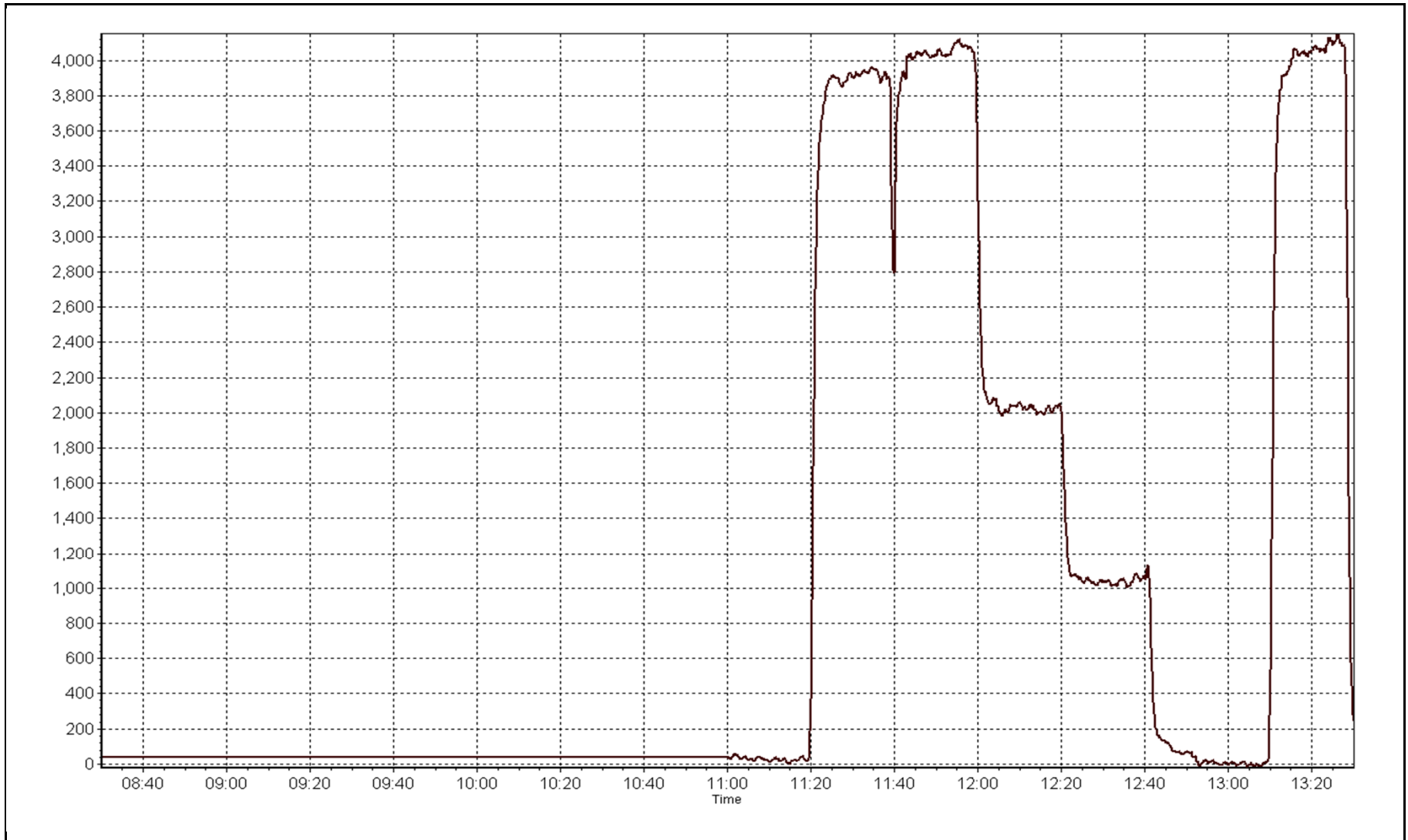
Calibration Date	July 29, 2014	Previous Calibration	June 13, 2014
Station Name	Millenium Mine	Station Number	Ams 12
Start Time (MST)	11:00	End Time (MST)	13:30
Analyzer make	TEI 43C	Analyzer serial #	0509110887

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	N/A	Correlation Coefficient	0.999973
80.1	81.2	0.9860		
39.9	40.5	0.9870	Slope	0.992581
20.0	20.8	0.9618		
			Intercept	-0.462951

TRS Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Tuesday, July 29, 2014	Previous Calibration	Thursday, June 12, 2014
Station Name	Millennium	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	6:40	End Time (MST)	11:03
Barometric Pressure	na mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11091107
Gas Cert Reference	LL107924	Cal Gas Expiry Date	5/29/2014
CH4 Cal Gas Conc.	510.0 ppm	CH4 Equiv Conc.	1079.3 ppm
C3H8 Cal Gas Conc.	207.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2374
DACS voltage range	0 - 5 volts	DACS channel #	3

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	11.8	11.8
Analyzer Range (mv)	5000	5000	Air or Bypass press	42.9	42.9
Calculated slope	1.003123	1.000507	Fuel Pressure	19.3	19.3
Calculated intercept	-0.095754	-0.009127		3.83	4.05
				2.23	2.17

Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958296
---------------	---------------	-------------------	------------

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	0.41	N/A
as found span	6000	94.1	16.93	17.72	0.955
calibrator zero	6000	0.0	0.00	0.00	N/A
high point	6000	94.1	16.93	16.92	1.000
second point	6000	47.1	8.47	8.49	0.998
third point	6000	23.5	4.23	4.24	0.998
calibrator zero	6000	0.0	0.00	0.04	N/A
as left zero	6000	0.0	0.00	0.04	N/A
as left span	6000	94.1	16.93	17.20	0.984
Average Correction Factor					0.999

Corrected As found 17.30 Previous response 16.97 % change -1.9%

Notes:

Filter changed out, zero and span adjusted, NO maintenance done, Last month a new zero air was put in

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

THC Calibration Summary

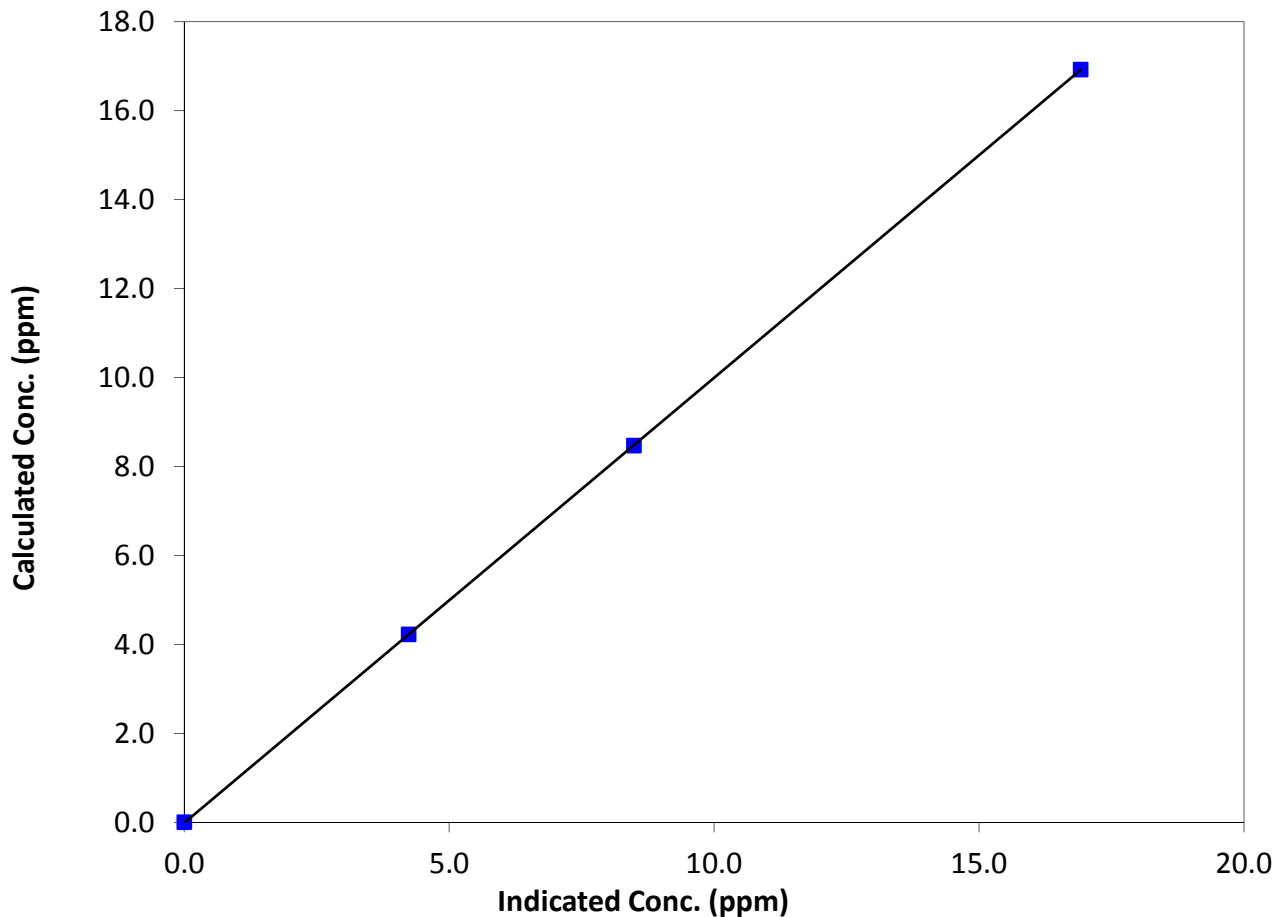
Station Information

Calibration Date	July 29, 2014	Previous Calibration	June 12, 2014
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	6:40	End Time (MST)	11:03
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958296

Calibration Data

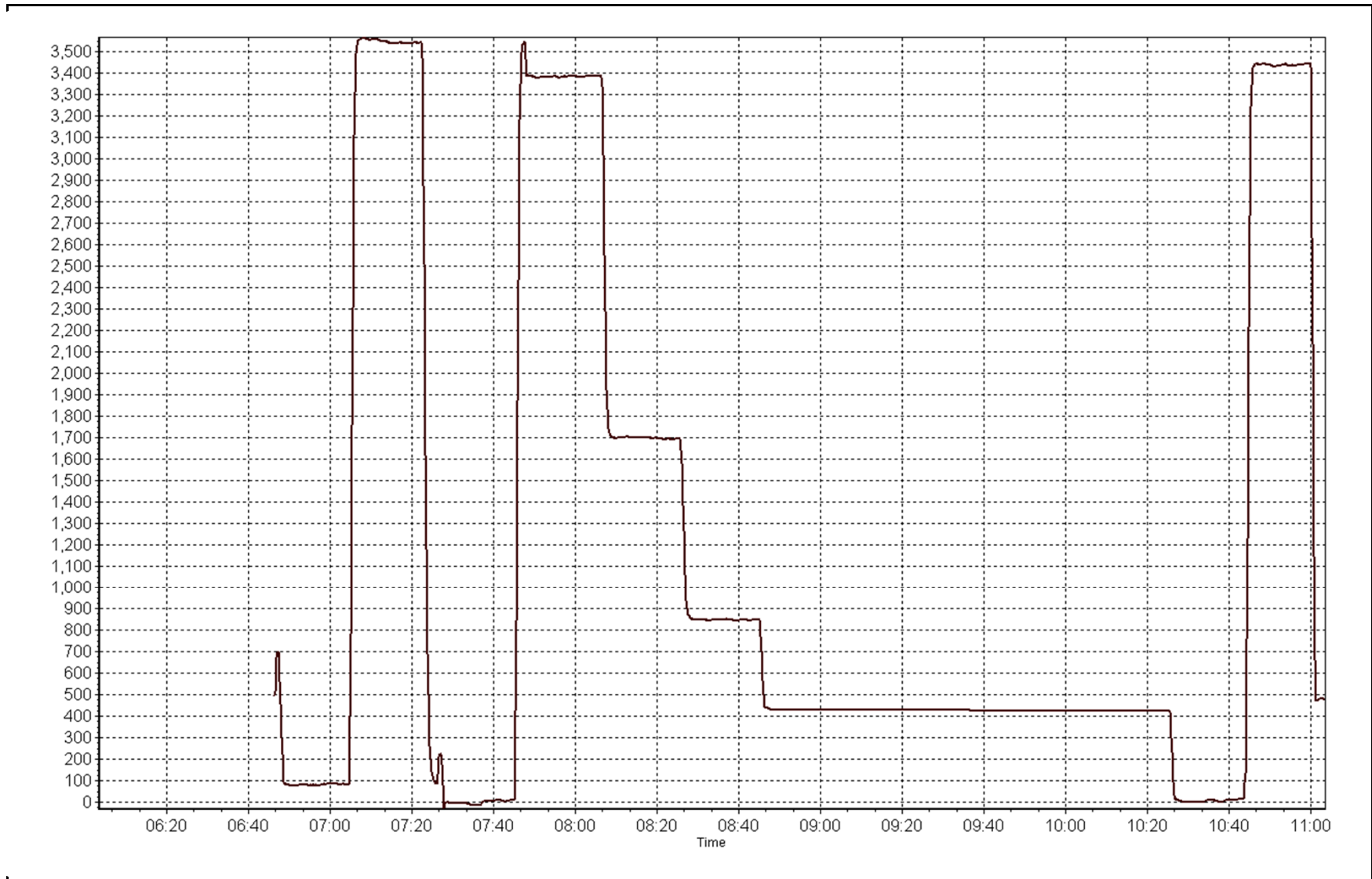
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999998
16.93	16.92	1.0004		
8.47	8.49	0.9979	Slope	1.000507
4.23	4.24	0.9981		
			Intercept	-0.009127

THC Calibration Curve



THC Calibration Plot

Date: July 29, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 29, 2014	Previous Calibration	June 12, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	6:40	End Time (MST)	11:03
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	1.015165	1.015715	1.024096
	Data Offset	0.561271	0.067830	-0.278787
After	Data Slope	0.998869	0.998898	1.005666
	Data Offset	1.113760	-0.244705	-0.077911
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	1.130	ppb
NOX coefficient	1.080	ppb	1.122	ppb
NO2 coefficient		ppb		ppb
NO bkgrnd	0.0		0.6	
NOX bkgrnd	2.7		1.6	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.4	Deg C	314.4	Deg C
PMT Temp	6.8	Deg C	6.8	Deg C
O3 flow	88.0	ccm	88.0	ccm
R Cell Press	2.9	mmHg	2.9	mmHg
Sample Flow	496-503	ccm	496-503	ccm

Notes:

Filter changed, No mainenance zero and span adjusted, Checked diagnostics similar to last month, pump is good as well



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

July 29, 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	-0.5	0.3	-0.2	N/A	N/A
as found span	6000	94.1	799.9	799.9	0.0	768.0	768.4	-0.1	1.0415	1.0409
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.9	0.2	-0.5	N/A	N/A
high point	6000	94.1	799.9	799.9	0.0	799.8	801.0	-0.5	1.0001	0.9986
second point	6000	47.1	400.4	400.4	0.0	399.4	400.8	-0.3	1.0024	0.9989
third point	6000	23.5	199.8	199.8	0.0	198.8	200.6	-0.5	1.0048	0.9958
calibrator zero	6000	0.0	0.0	0.0	0.0	-1.1	0.1	-0.6	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	-1.1	0.1	-0.6	N/A	N/A
as left span	6000	94.1	799.9	489.4	310.5	791.8	493.8	298.0	1.0102	0.9911
Average Correction Factor									1.0024	0.9977

Corrected As found

NO_x= 768.5

NO= 768.1

Percent Change

NO_x= 2.5%

NO= 2.5%

Previous Response

NO_x= 787.3

NO= 787.4

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			-0.5			N/A	
1st NO ₂ (300)	N/A	489.4	310.0	797.2	489.4	307.8	0.9878	1.0000	1.0071	99.3%
2nd NO ₂ (200)	N/A	596.6	202.8	797.8	596.6	202.2	0.9871	1.0000	1.0030	99.7%
3rd NO ₂ (100)	N/A	699.2	100.2	799.2	699.2	100.4	0.9854	1.0000	0.9980	100.2%
4th NO ₂ (0)	799.4	N/A	-0.8	798.6	799.4	-0.2	0.9861	1.0000	N/A	N/A
Average Correction Factor							0.9866	1.0000	1.0027	99.7%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

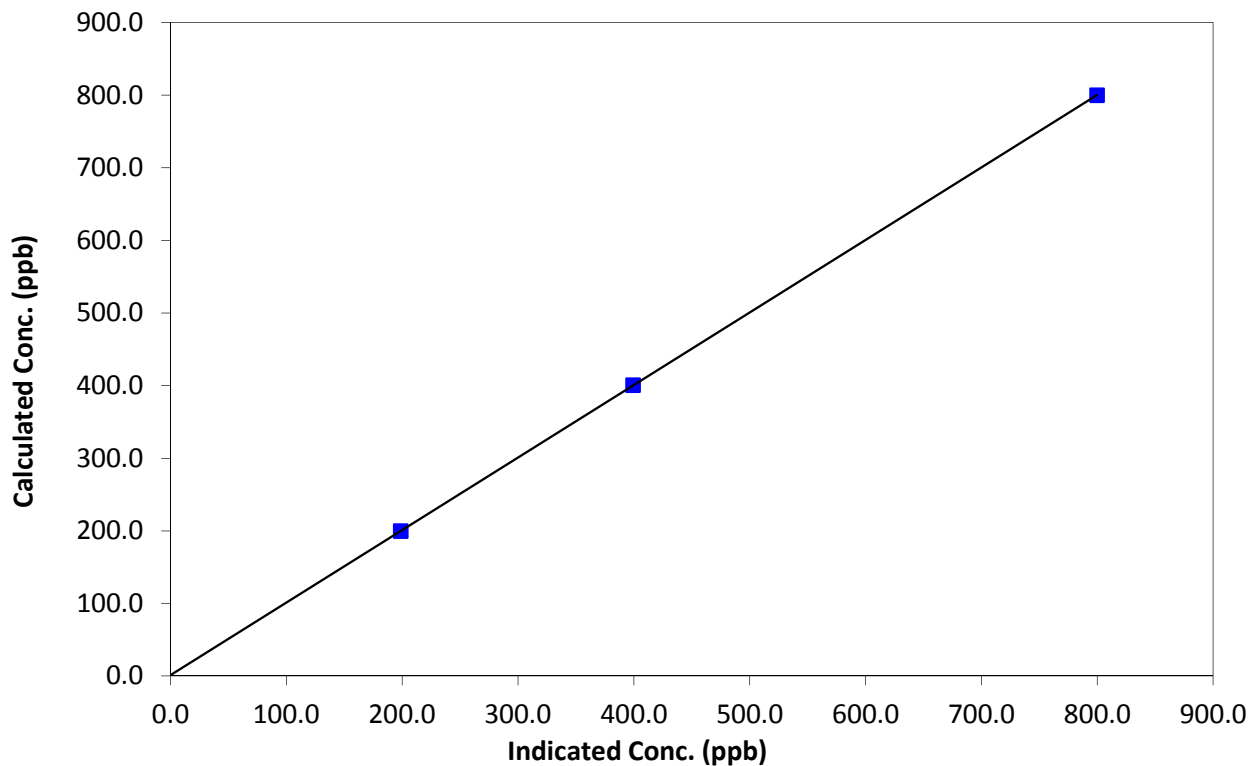
Station Information

Calibration Date	July 29, 2014	Previous Calibration	June 12, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	6:40	End Time (MST)	11:03
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	-0.9	N/A	Correlation Coefficient	1.000000
799.9	799.8	1.0001		
400.4	399.4	1.0024	Slope	0.998869
199.8	198.8	1.0048		
0.0	-1.1	0.0000	Intercept	1.113760

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

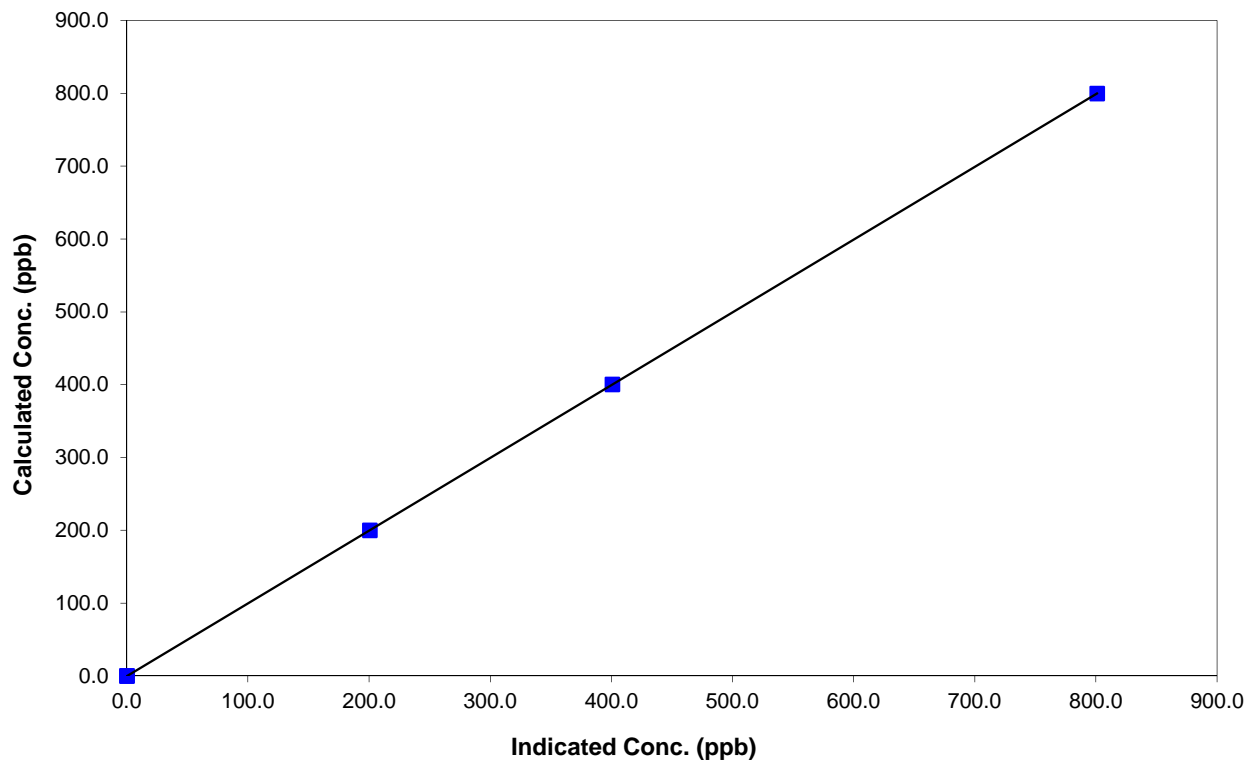
Station Information

Calibration Date	July 29, 2014	Previous Calibration	June 12, 2014
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	6:40	End Time (MST)	11:03
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	1.000000
799.9	801.0	0.9986		
400.4	400.8	0.9989	Slope	0.998898
199.8	200.6	0.9958		
0.0	0.1	0.0000	Intercept	-0.244705

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

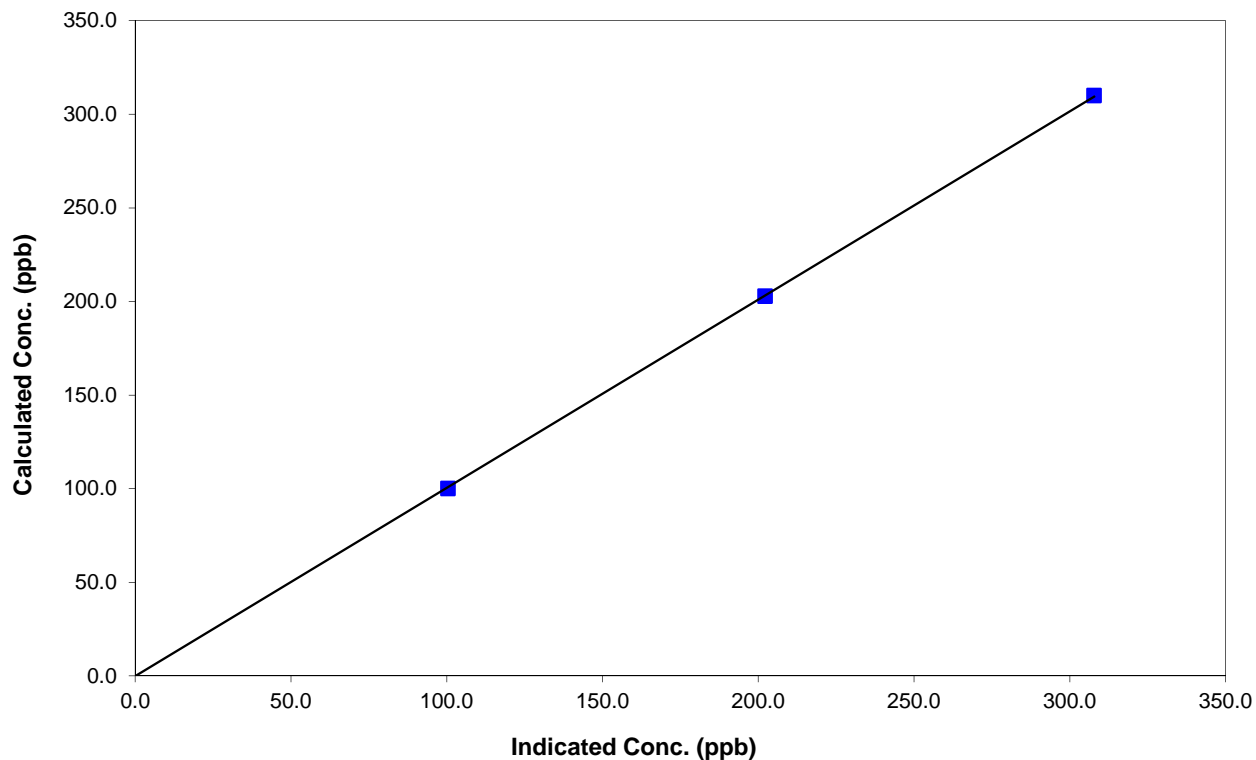
Station Information

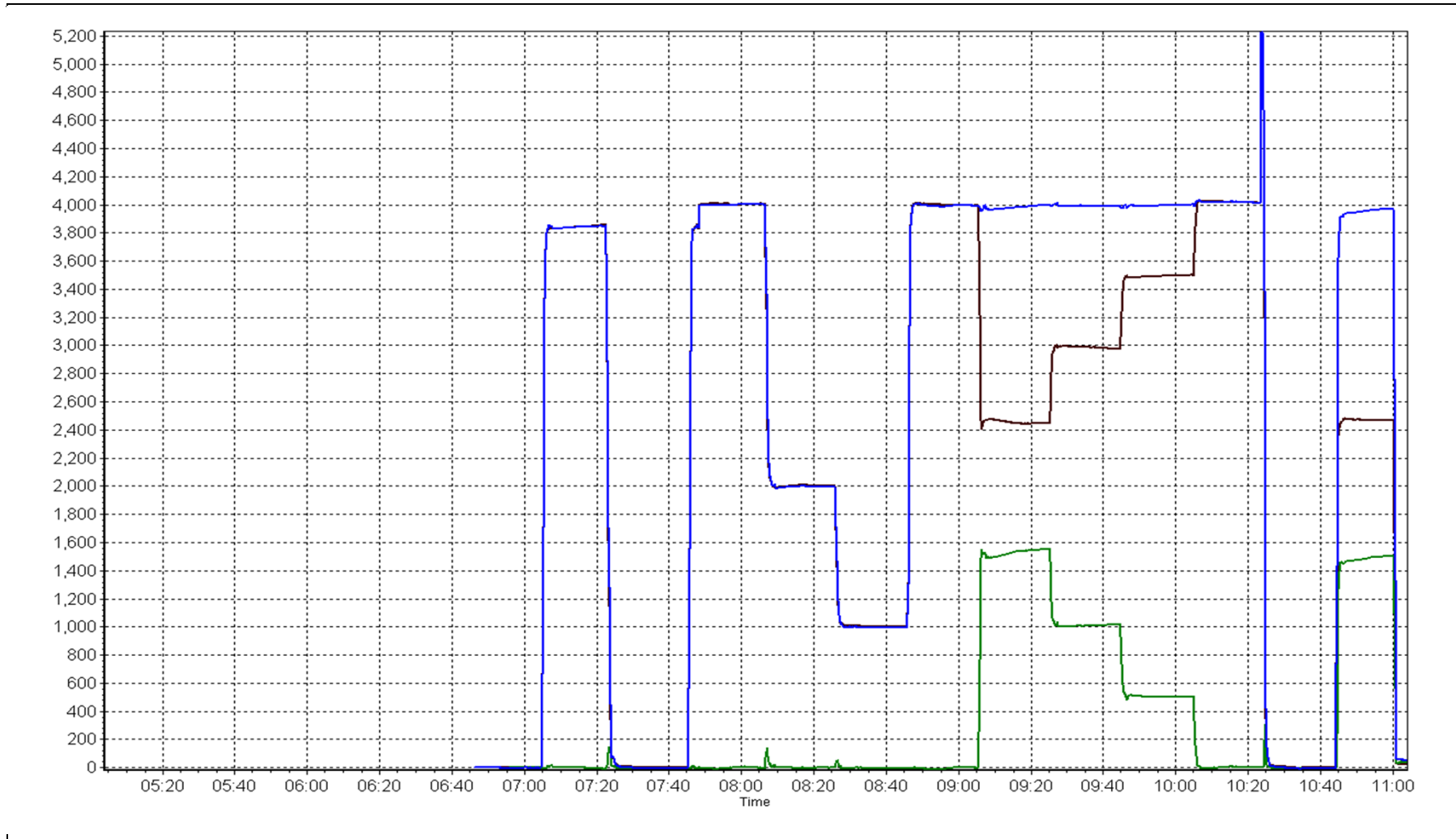
Calibration Date	July 29, 2014	Previous Calibration	June 12, 2014
Station Number	Millenium Mine	Station Number	AMS 12
Start Time (MST)	6:40	End Time (MST)	11:03
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	N/A	Correlation Coefficient	0.999974
310.0	307.8	1.0071		
202.8	202.2	1.0030	Slope	1.005666
100.2	100.4	0.9980		
			Intercept	-0.077911

NO₂ Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 13
FORT MCKAY SOUTH
JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
 JULY 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	703	37	41	99.46	46	0	7	0
TRS(ppb) Average	709	35	35	100.00	3	0	1	0
THC(ppm) Average	707	37	37	100.00	3.3	-	2.4	-
O3(ppb) Average	709	35	35	100.00	69	0	30	-
NO2(ppb) Average	707	37	37	100.00	22	0	6	-
NO(ppb) Average	707	37	37	100.00	32	-	5	-
NOX(ppb) Average	707	37	37	100.00	46	-	9	-
PM2.5(ug/m3) Average	743	0	1	99.87	173.3	-	45.1	5
Temperature 2 m (C) Average	744	0	0	100.00	34.4	-	24.1	-
Relative Humidity (%) Average	744	0	0	100.00	100	-	-	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	13	-	-	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
 JULY 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	703	1.8	4	-	0	0	0	0	1	4	46
TRS(ppb) Average	709	0.3	0	-	0	0	0	0	0	1	3
THC(ppm) Average	707	2.18	0.2	-	1.8	2	2	2.1	2.3	2.5	3.3
O3(ppb) Average	709	19.8	15	-	0	1	7	17	31	43	69
NO2(ppb) Average	707	3	3	-	0	0	1	2	4	8	22
NO(ppb) Average	707	0.9	3	-	0	0	0	0	0	3	32
NOX(ppb) Average	707	3.9	5	-	0	0	1	2	4	10	46
PM2.5(ug/m3) Average	743	16.89	16.1	-	1.5	3.7	6.9	11.7	22	36.2	173.3
Temperature 2 m (C) Average	744	19.05	6.2	-	2.5	11.1	14.1	19.2	23.7	27.2	34.4
Relative Humidity (%) Average	744	69.7	22	-	23	37	51	74	90	97	100
Wind Speed 10 m (km/h) Average	744	4.5	3	-	0	1	2	4	6	8	13
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)
JULY 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	17 Jul 2014 10:00	17 Jul 2014 10:00	1	Intermittent unstable operation - excessive baseline drift
SO2	22 Jul 2014 00:00	22 Jul 2014 00:00	1	Intermittent unstable operation - excessive baseline drift
SO2	24 Jul 2014 00:00	24 Jul 2014 00:00	1	Intermittent unstable operation - excessive baseline drift
SO2	24 Jul 2014 04:00	24 Jul 2014 04:00	1	Intermittent unstable operation - excessive baseline drift
PM2.5	22 Jul 2014 11:00	22 Jul 2014 11:00	1	Maintenance - Flow and zero check, sample head cleaning

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 46 ppb on Jul 2 10:00	Maximum Daily Average: 7.1 ppb on Jul 26		Hours of Data:	703
Minimum Value: 0 ppb on Jul 4 23:00	Minimum Daily Average: 0.1 ppb on Jul 5		Hours of Missing Data:	41
Maximum Diurnal Average: 6.8 ppb at hour 10	Minimum Diurnal Average: 0.3 ppb at hour 24		Hours of Calibration:	37
Monthly Average: 1.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 4 P ₉₉ = 18		Percent Operational Time:	99.5

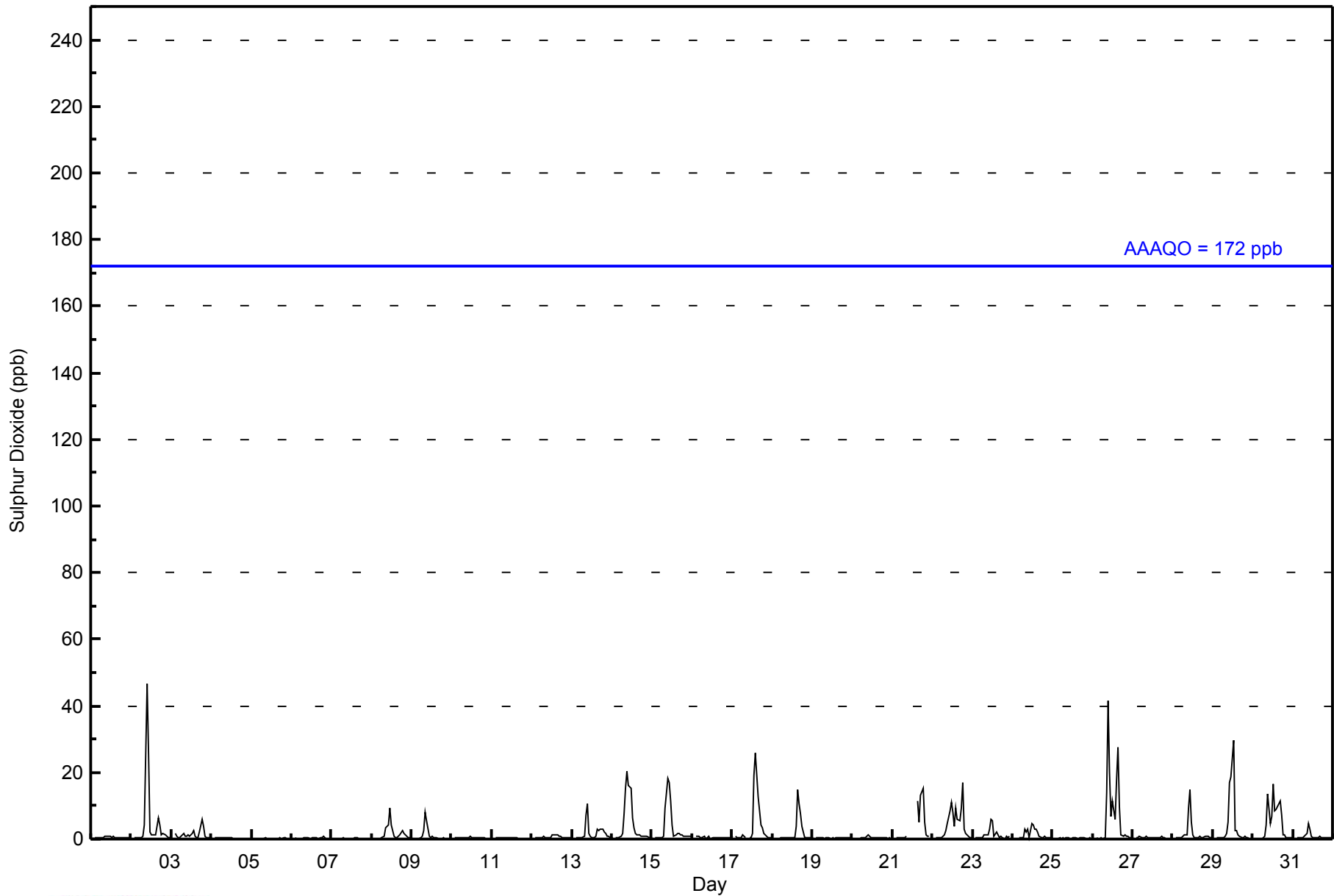
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0	Z	1	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
2-Jul	0	Z	0	0	0	0	0	1	4	46	26	2	1	1	1	4	6	4	1	2	1	1	1	0	4.6	46
3-Jul	1	Z	2	1	0	0	1	2	1	1	1	2	2	1	1	0	2	6	4	1	0	0	0	1.3	6	
4-Jul	0	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-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	1
7-Jul	0	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-Jul	0	Z	0	0	0	0	0	1	3	4	4	9	4	1	0	0	1	1	3	2	1	1	1	0	1.6	9
9-Jul	0	Z	0	0	0	0	1	2	8	6	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1.0	8
10-Jul	0	Z	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1
11-Jul	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Jul	0	Z	0	0	0	0	0	1	1	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0.6	1
13-Jul	0	Z	0	0	0	0	1	1	7	11	1	1	0	1	1	3	3	3	3	2	2	1	1	1	1.8	11
14-Jul	0	Z	0	0	1	1	2	8	15	20	16	15	6	3	2	1	1	1	1	1	1	1	1	0	4.2	20
15-Jul	0	Z	1	0	1	1	1	1	9	18	17	12	4	1	1	2	2	1	1	1	1	1	1	1	3.3	18
16-Jul	1	Z	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0.5	1
17-Jul	1	Z	1	0	0	0	1	1	1	UO	1	1	2	19	26	13	8	4	3	2	1	1	0	0	3.9	26
18-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	4	15	11	8	4	0	0	0	0	0	2.0	15
19-Jul	0	Z	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
20-Jul	0	Z	0	0	0	1	0	0	1	1	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0.4	1
21-Jul	0	Z	1	1	0	1	1	0	1	C	C	C	C	C	C	12	5	13	15	5	1	1	1	UO	--	15
22-Jul	0	Z	0	0	1	1	1	1	2	4	8	11	8	4	9	6	5	9	17	3	2	1	1	1	4.2	17
23-Jul	0	Z	0	0	0	0	0	1	1	1	3	6	5	1	2	1	0	1	1	0	1	0	1	UO	1.3	6
24-Jul	1	Z	1	UO	0	1	1	3	2	3	0	5	4	3	3	2	1	0	1	1	1	0	0	0	1.5	5
25-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Jul	0	Z	0	0	0	0	0	14	41	20	7	12	6	18	28	10	1	1	1	1	1	1	1	0	7.1	41
27-Jul	0	Z	0	0	1	1	1	0	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0.4	1
28-Jul	0	Z	0	0	0	0	1	1	1	9	15	5	1	0	0	1	1	1	1	1	1	1	0	1	1.8	15
29-Jul	1	Z	0	0	1	0	0	1	2	5	17	18	30	3	3	1	1	0	1	1	1	0	0	0	3.7	30
30-Jul	0	Z	0	0	0	0	1	4	14	5	7	17	9	9	11	12	7	1	1	0	0	0	0	0	4.3	17
31-Jul	0	Z	0	0	0	0	1	2	5	3	1	1	1	1	1	1	1	0	1	1	0	0	1	0	0.8	5
	0.3	--	0.4	0.3	0.3	0.4	0.5	1.0	2.7	6.8	4.8	3.5	3.5	2.0	2.9	3.4	2.3	2.0	2.1	1.0	0.6	0.4	0.3	0.3		Diurnal Average
	1	--	2	1	1	1	2	8	15	46	26	18	30	19	26	28	12	13	17	5	2	1	1	1		Diurnal Maximum

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



WBEA NETWORK
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	669	95.16	95.16
11 - 20	28	3.98	99.15
21 - 60	6	0.85	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: 703

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - July 2014

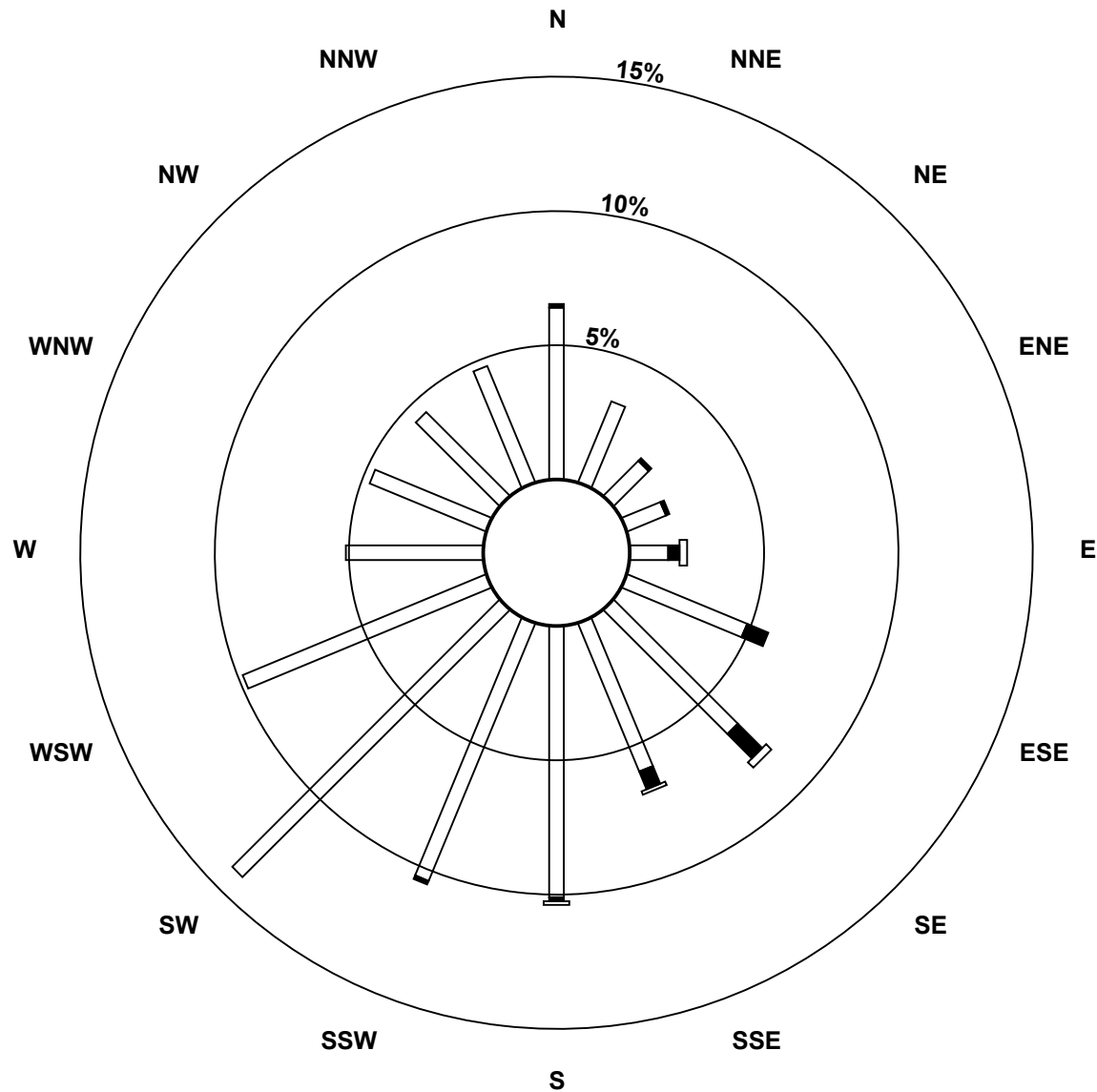
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	45	23	13	11	10	34	46	42	71	73	99	69	36	33	31	33	669
11 - 20	1	0	1	1	3	6	9	5	1	1	0	0	0	0	0	0	28
21 - 60	0	0	0	0	2	0	2	1	1	0	0	0	0	0	0	0	6
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	46	23	14	12	15	40	57	48	73	74	99	69	36	33	31	33	703

Total Number of Valid Hours: 703

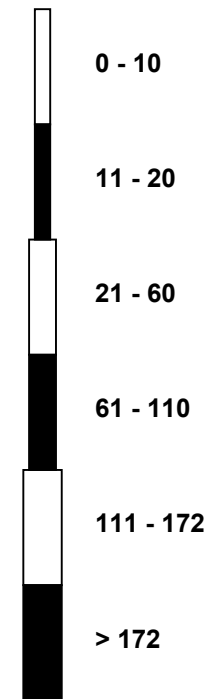
Total Number of Hours: 744

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

**Sulphur Dioxide (SO₂) - ppb
Fort McKay South (AMS 13)**



Classes (ppb)



Total Number of Valid Hours: 703

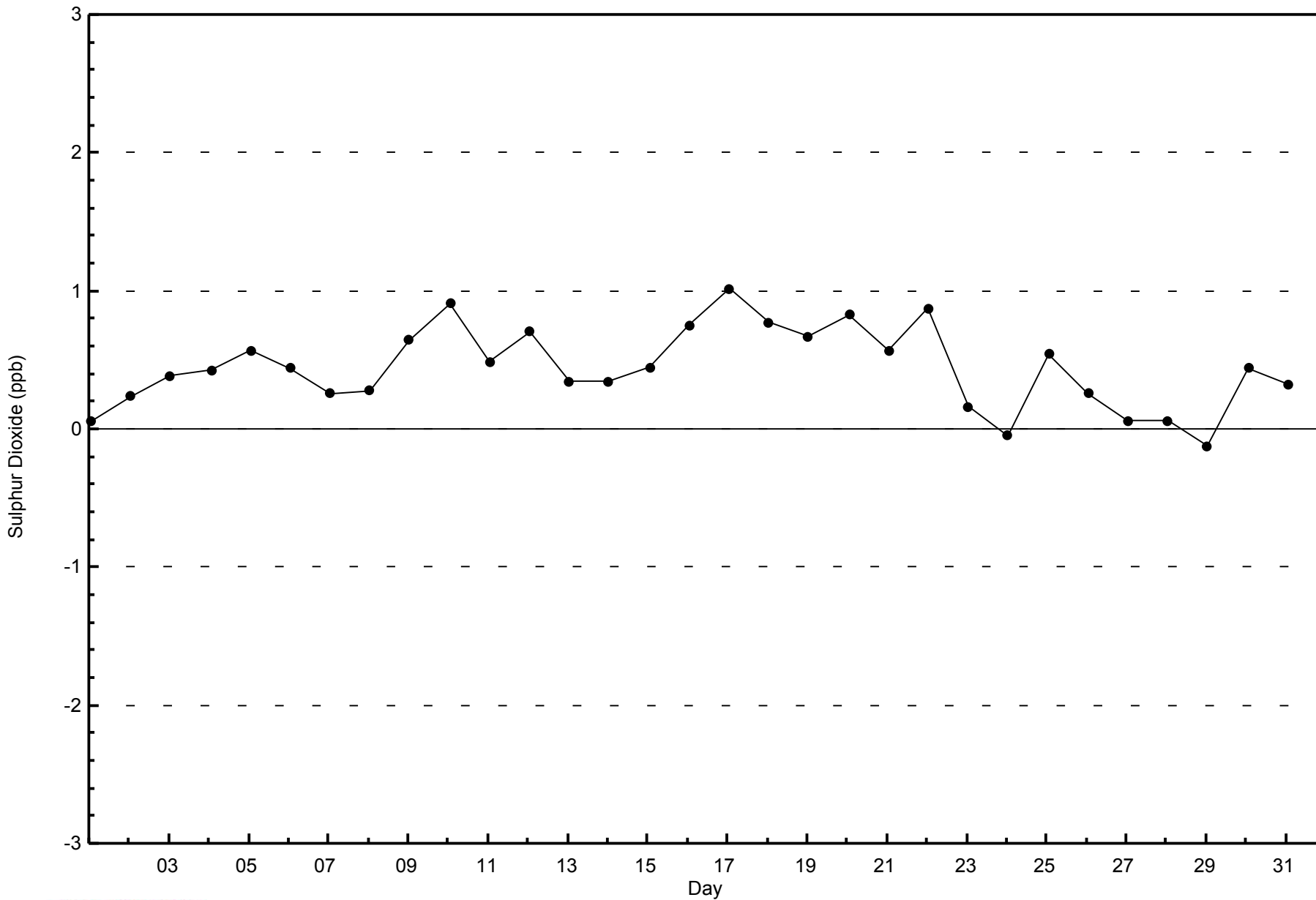


WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

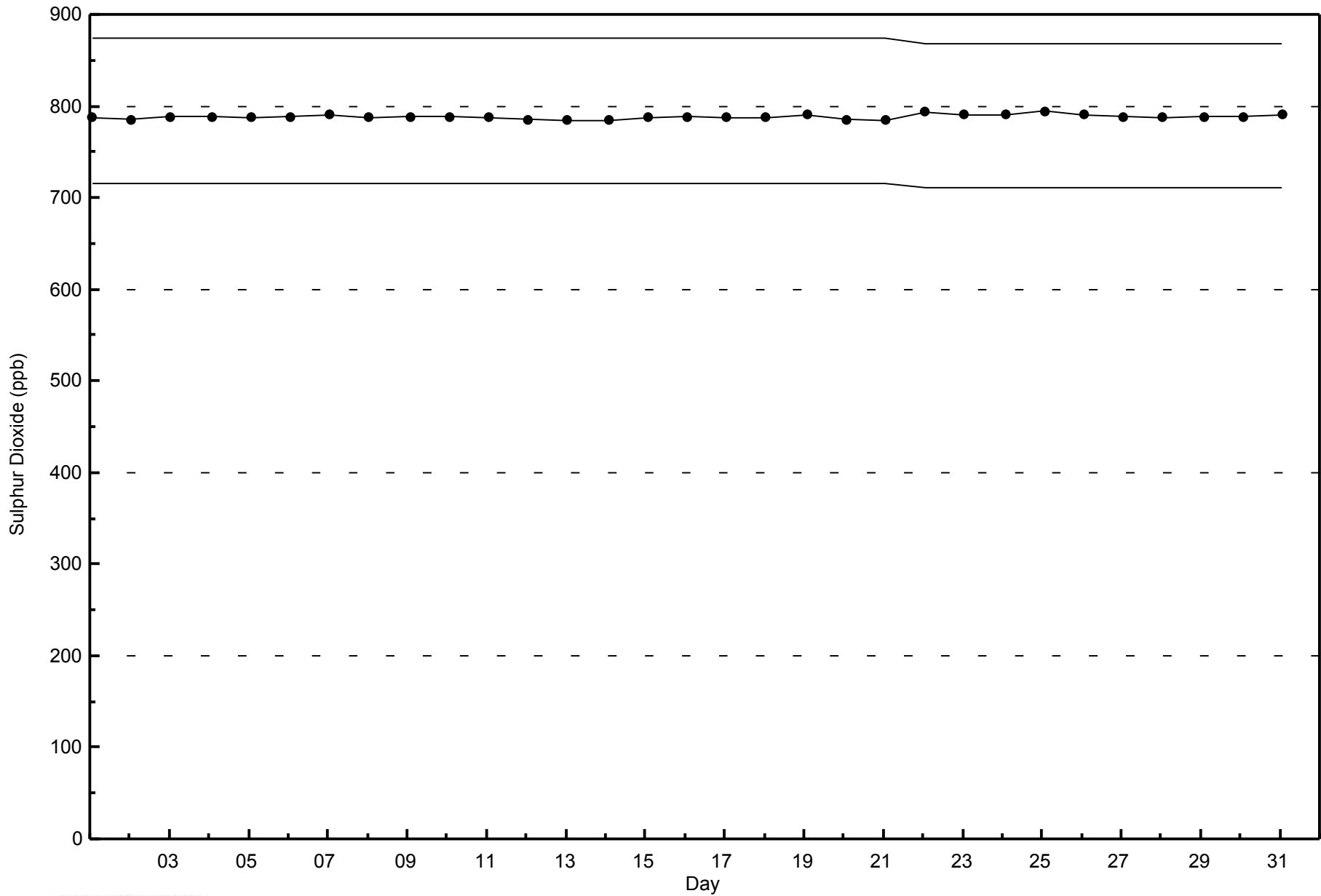
Fort McKay South - July 2014





WBEA NETWORK
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - July 2014



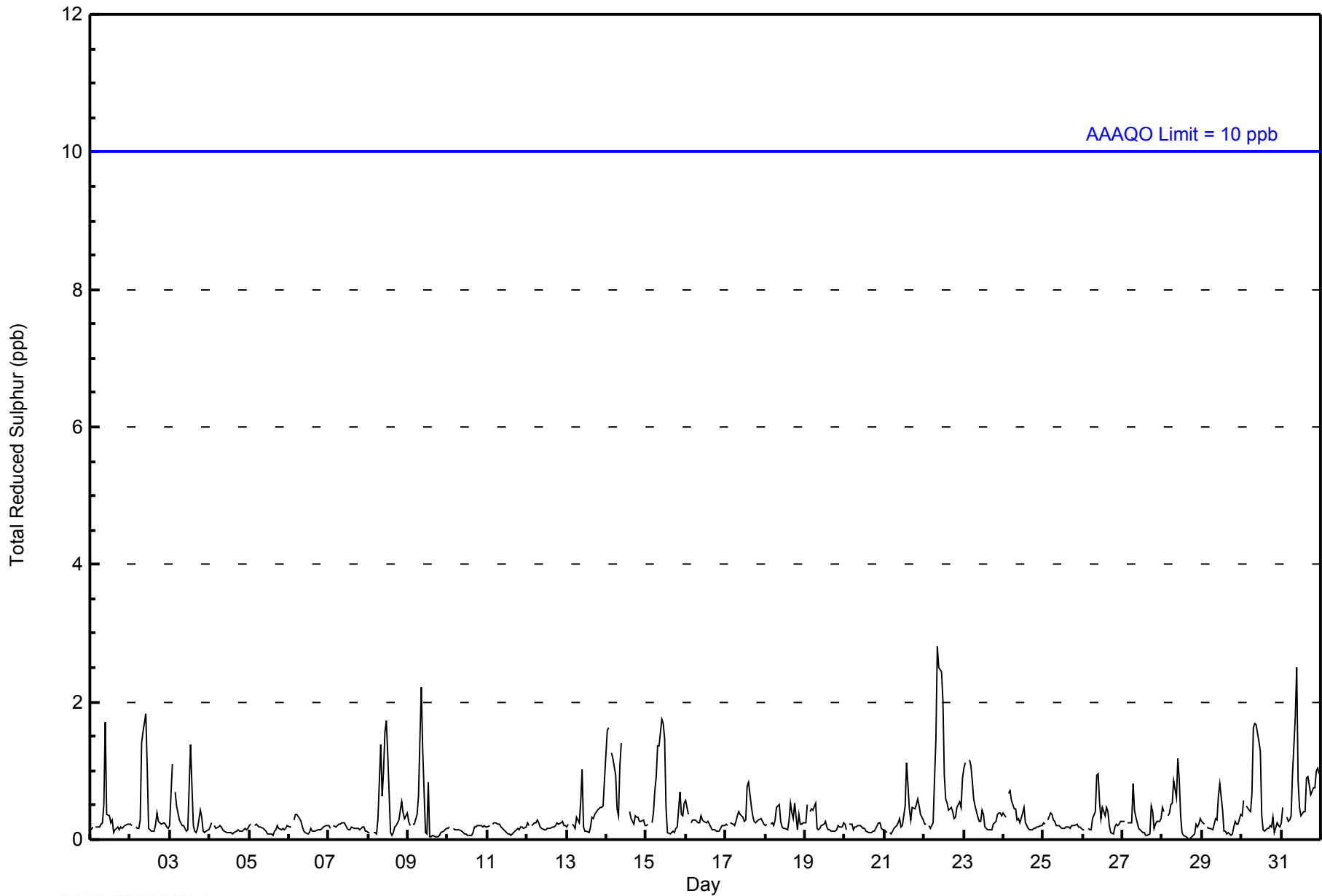


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																								
Maximum Value: 3 ppb on Jul 22 09:00										Maximum Daily Average: 0.8 ppb on Jul 22										Hours of Data: 709																														
Minimum Value: 0 ppb on Jul 28 17:00										Minimum Daily Average: 0.1 ppb on Jul 4										Hours of Missing Data: 35																														
Maximum Diurnal Average: 0.7 ppb at hour 10										Minimum Diurnal Average: 0.2 ppb at hour 17										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 = 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-Jul	0	0	Z	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																								
2-Jul	0	0	Z	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																								
3-Jul	0	1	Z	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1																								
4-Jul	0	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-Jul	0	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-Jul	0	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-Jul	0	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-Jul	0	0	Z	0	0	0	0	1	1	1	2	2	1	0	0	0	0	0	0	0	1	0	0	0	0.5	2																								
9-Jul	0	0	Z	0	0	0	1	1	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2																								
10-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																								
11-Jul	0	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-Jul	0	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-Jul	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1																								
14-Jul	2	2	Z	1	1	1	0	1	1	1	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.7	2																								
15-Jul	0	0	Z	0	0	1	1	1	1	2	2	1	0	0	0	0	0	0	0	0	1	0	0	1	0.6	2																								
16-Jul	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																								
17-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1																								
18-Jul	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0.3	1																								
19-Jul	0	1	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																								
20-Jul	0	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-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0.4	1																								
22-Jul	0	0	Z	0	0	0	1	1	3	2	2	2	1	1	1	0	0	0	0	0	0	1	0	1	0.8	3																								
23-Jul	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																								
24-Jul	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
25-Jul	0	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-Jul	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
27-Jul	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																								
28-Jul	0	0	Z	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
29-Jul	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																								
30-Jul	0	1	Z	0	0	0	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2																								
31-Jul	0	0	Z	0	0	0	0	1	2	2	1	0	0	0	0	1	1	1	1	1	1	1	1	1	0.8	2																								
																								0.3	0.3	--	0.3	0.3	0.3	0.4	0.5	0.7	0.7	0.5	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	Diurnal Average	
																								2	2	--	1	1	1	1	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum
Z - zerospan C - Calibration																																																		
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																		



WBEA NETWORK
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	708	99.86	99.86
3 - 4	1	0.14	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - July 2014

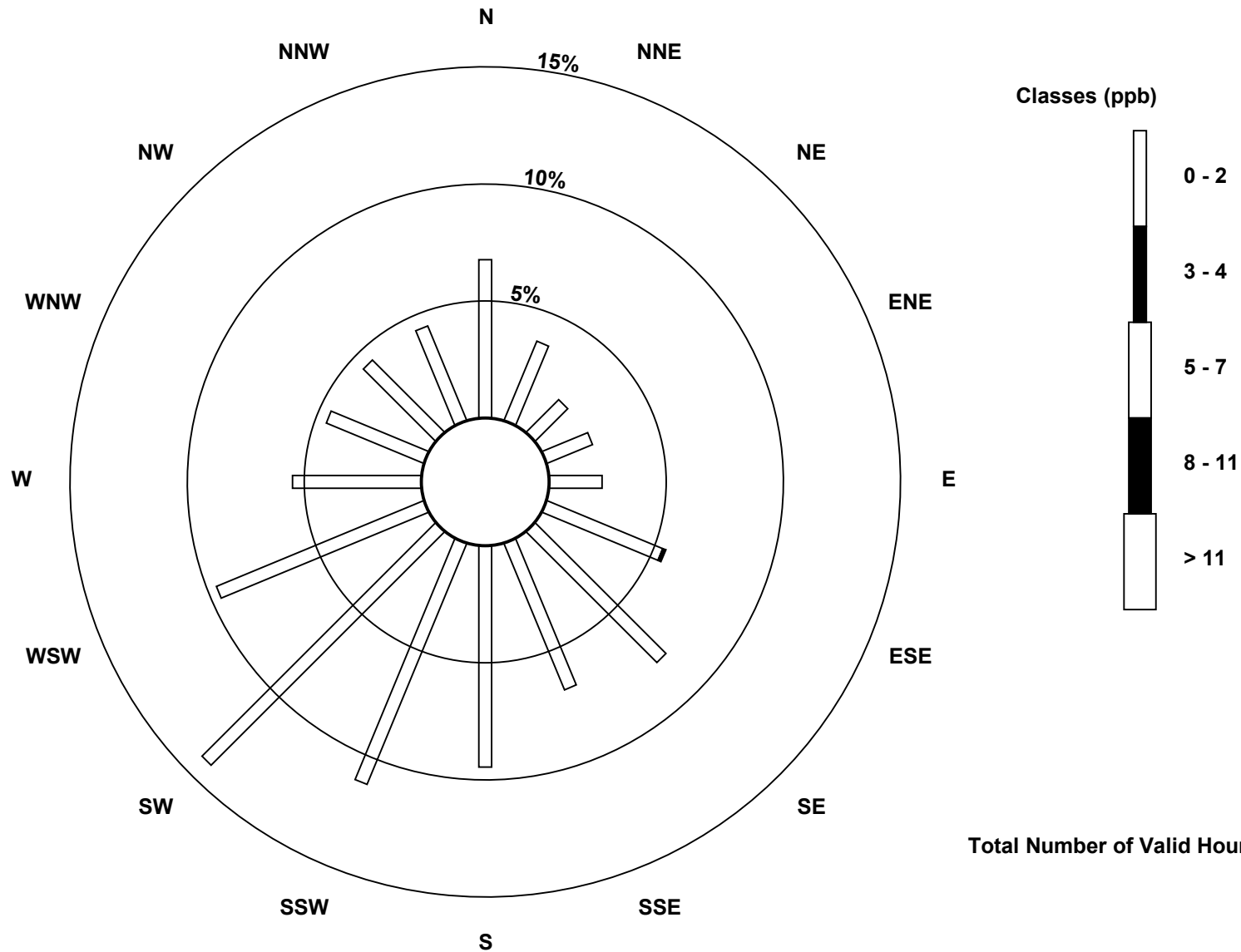
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	48	26	14	15	16	38	56	48	67	79	100	68	39	32	31	31	708
3 - 4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	48	26	14	15	16	39	56	48	67	79	100	68	39	32	31	31	709

Total Number of Valid Hours: 709

Total Number of Hours: 744

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

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South (AMS 13)**



Total Number of Valid Hours: 709

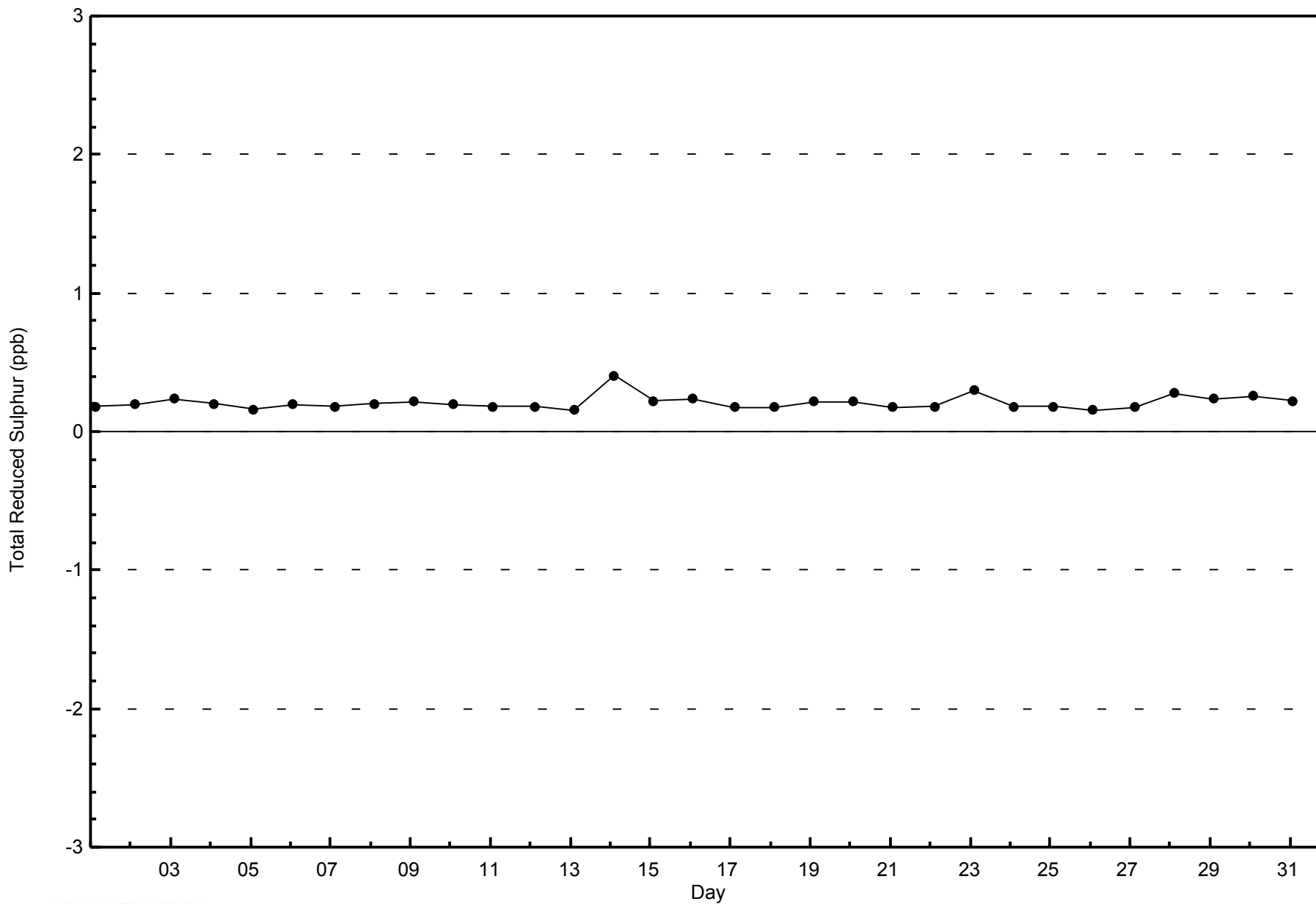


WBEA NETWORK

Zero Responses

Total Reduced Sulphur (TRS) - ppb

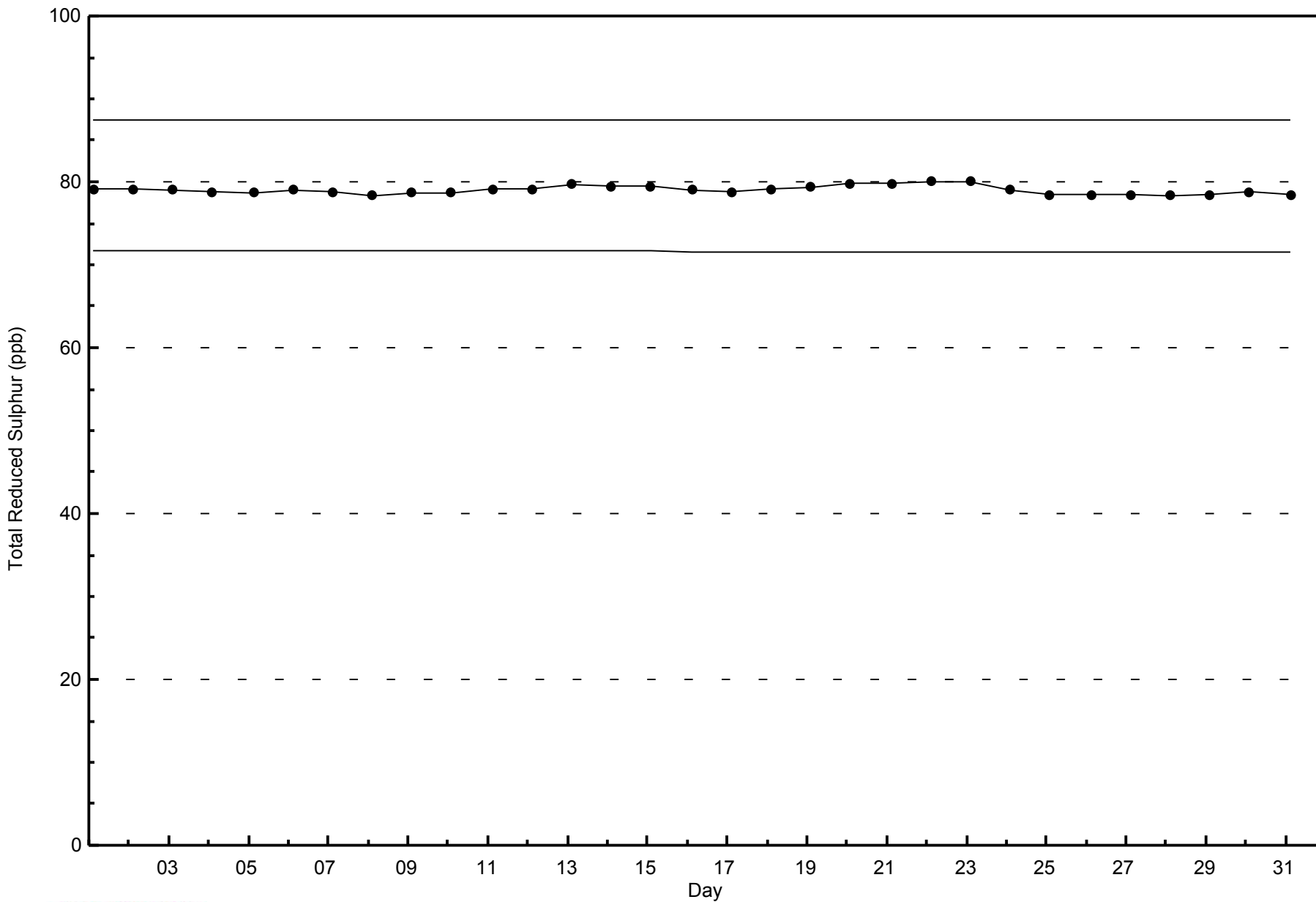
Fort McKay South - July 2014





WBEA NETWORK
Span Responses

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - July 2014





Maximum Value: 3.3 ppm on Jul 31 10:00																		Maximum Daily Average: 2.4 ppm on Jul 15																		Hours in Service: 744			
Minimum Value: 1.8 ppm on Jul 10 16:00																		Minimum Daily Average: 1.9 ppm on Jul 10																		Hours of Data: 707			
Maximum Diurnal Average: 2.3 ppm at hour 8																		Minimum Diurnal Average: 2.0 ppm at hour 17																		Hours of Missing Data: 37			
Monthly Average: 2.18 ppm																		Percentiles: P ₁ = 1.8 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.3 P ₉₀ = 2.5 P ₉₉ = 2.7																		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-Jul	2.1	Z	2.3	2.2	2.2	2.3	2.3	2.2	2.5	3.1	2.3	2.2	2.1	2.1	2.0	2.1	2.2	2.0	2.2	2.2	2.3	2.3	2.3	2.4	2.3	3.1													
2-Jul	2.5	Z	2.5	2.5	2.5	2.5	2.5	2.7	2.6	2.4	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.3	2.7													
3-Jul	2.2	Z	2.5	2.5	2.5	2.5	2.4	2.3	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.5													
4-Jul	2.2	Z	2.1	2.0	2.1	2.1	2.1	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	2.1	2.1	2.0	2.2													
5-Jul	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.2													
6-Jul	2.2	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.3													
7-Jul	2.0	Z	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	1.9	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.1	2.2													
8-Jul	2.2	Z	2.2	2.2	2.2	2.3	2.4	2.5	2.3	2.3	2.2	2.3	2.2	1.9	1.9	1.9	2.0	1.9	1.9	2.1	2.2	2.2	2.2	2.3	2.2	2.5													
9-Jul	2.3	Z	2.1	2.1	2.1	2.2	2.5	2.6	2.4	2.1	1.9	2.0	2.1	1.8	1.9	1.8	1.9	1.8	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.6													
10-Jul	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.8	1.8	1.9	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	2.1													
11-Jul	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.0	2.1	1.9	2.1													
12-Jul	2.1	Z	2.1	2.1	2.1	2.4	2.4	2.4	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	2.1	2.1	2.4													
13-Jul	2.1	Z	2.2	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.4	2.1	2.4													
14-Jul	2.5	Z	2.4	2.4	2.4	2.4	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.1	2.0	2.1	2.0	2.1	2.0	2.1	2.2	2.5	2.5	2.2	2.3	2.5													
15-Jul	2.2	Z	2.3	2.3	2.4	2.5	2.6	2.7	2.6	2.7	2.4	2.4	2.2	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.3	2.4	2.6	2.7	2.6	2.7													
16-Jul	2.6	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.4	2.4	2.3	2.1	2.1	2.1	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.2	2.2	2.2	2.6													
17-Jul	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.1	2.1	2.1	2.4	2.3	2.2	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.2	2.4													
18-Jul	2.3	Z	2.3	2.3	2.4	2.4	2.4	2.7	2.7	2.3	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.3	2.1	2.2	2.2	2.1	2.2	2.3	2.7													
19-Jul	2.2	Z	2.4	2.4	2.4	2.4	2.4	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	2.2	2.1	2.1	2.4														
20-Jul	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.2													
21-Jul	2.1	Z	2.2	2.3	2.2	2.3	2.3	2.3	2.3	C	C	C	C	C	C	2.1	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2	--	2.3													
22-Jul	2.3	Z	2.4	2.4	2.5	2.5	2.8	2.9	3.1	2.8	2.6	2.5	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.3	2.3	3.1													
23-Jul	2.4	Z	2.5	2.4	2.5	2.6	2.6	2.6	2.5	2.3	2.2	2.1	2.0	2.0	1.9	2.0	1.9	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.2	2.6													
24-Jul	2.3	Z	2.4	2.5	2.6	2.6	2.5	2.3	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	1.9	2.0	2.0	2.1	2.1	2.2	2.6													
25-Jul	2.2	Z	2.2	2.4	2.5	2.6	2.4	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.6													
26-Jul	2.3	Z	2.5	2.4	2.4	2.4	2.4	2.4	2.5	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.5													
27-Jul	2.2	Z	2.3	2.6	2.9	2.6	2.7	2.5	2.4	2.3	2.1	2.0	2.0	2.0	1.9	1.9	1.9	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.9													
28-Jul	2.4	Z	2.4	2.5	2.4	2.4	2.4	2.5	2.6	2.8	2.6	2.3	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.1	2.1	2.1	2.2	2.4	2.3	2.8													
29-Jul	2.6	Z	2.4	2.4	2.3	2.1	2.1	2.2	2.3	2.3	2.4	2.3	2.1	2.0	2.0	2.1	2.1	2.0	2.1	2.2	2.2	2.2	2.3	2.4	2.2	2.6													
30-Jul	2.4	Z	2.5	2.5	2.5	2.6	2.6	2.6	2.6	2.5	2.4	2.3	2.2	2.0	2.0	2.0	2.0	2.0	2.1	2.2	1.9	2.1	2.0	2.0	2.3	2.6													
31-Jul	2.1	Z	2.3	2.3	2.3	2.2	2.3	2.4	2.7	3.3	2.4	2.2	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.4	2.4	2.5	2.3	3.3													
	2.2	--	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.2	Diurnal Average													
	2.6	--	2.5	2.6	2.9	2.6	2.8	2.9	3.1	3.3	2.6	2.5	2.2	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.6	2.7	2.6	2.6	Diurnal Maximum													
Z - zerospan		C - Calibration																																					

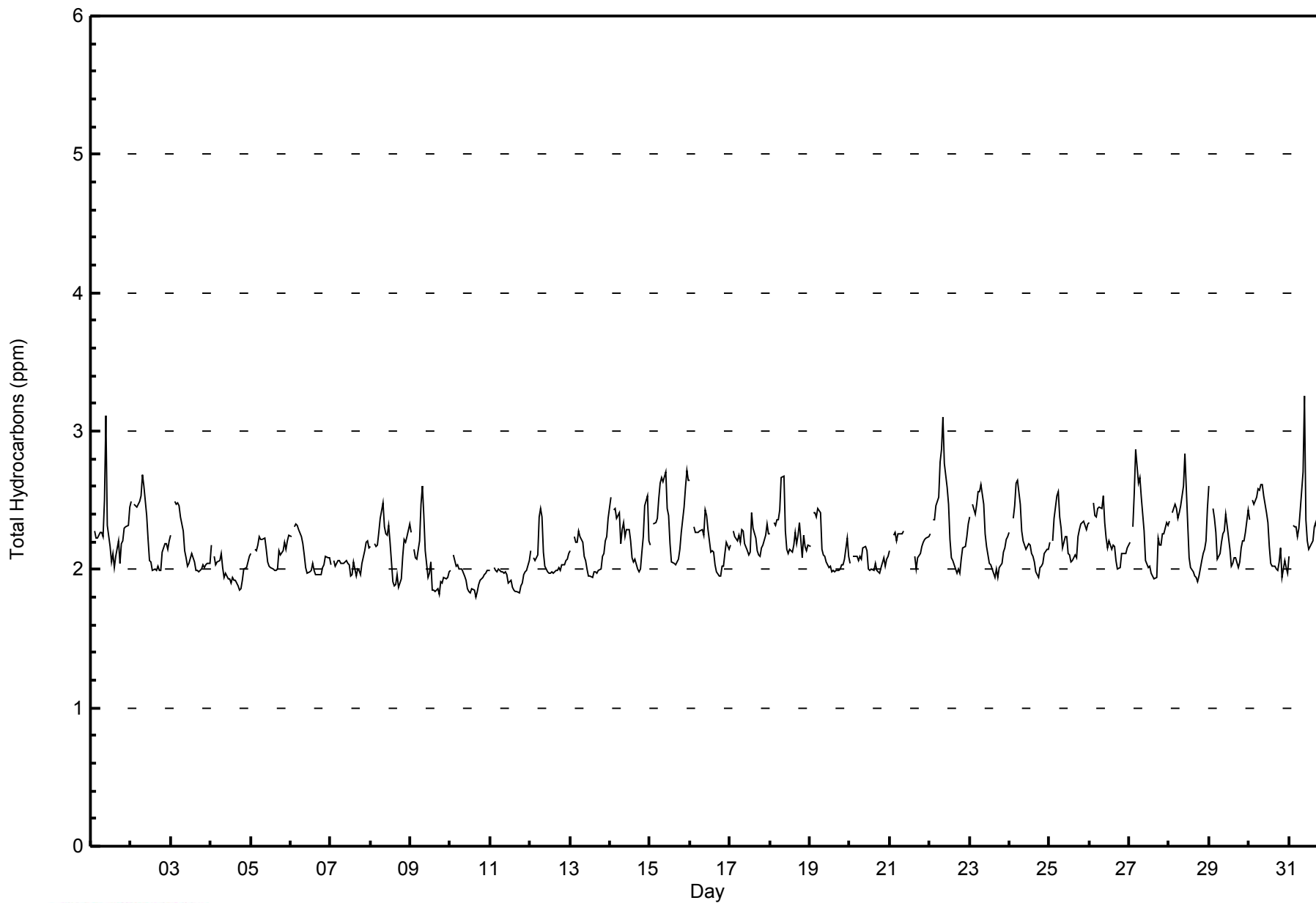


WBEA NETWORK

Hourly Averages

Total Hydrocarbons (THC) - ppm

Fort McKay South - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	227	32.11	32.11
2.1 - 3.0	477	67.47	99.58
3.1 - 10.0	3	0.42	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - July 2014

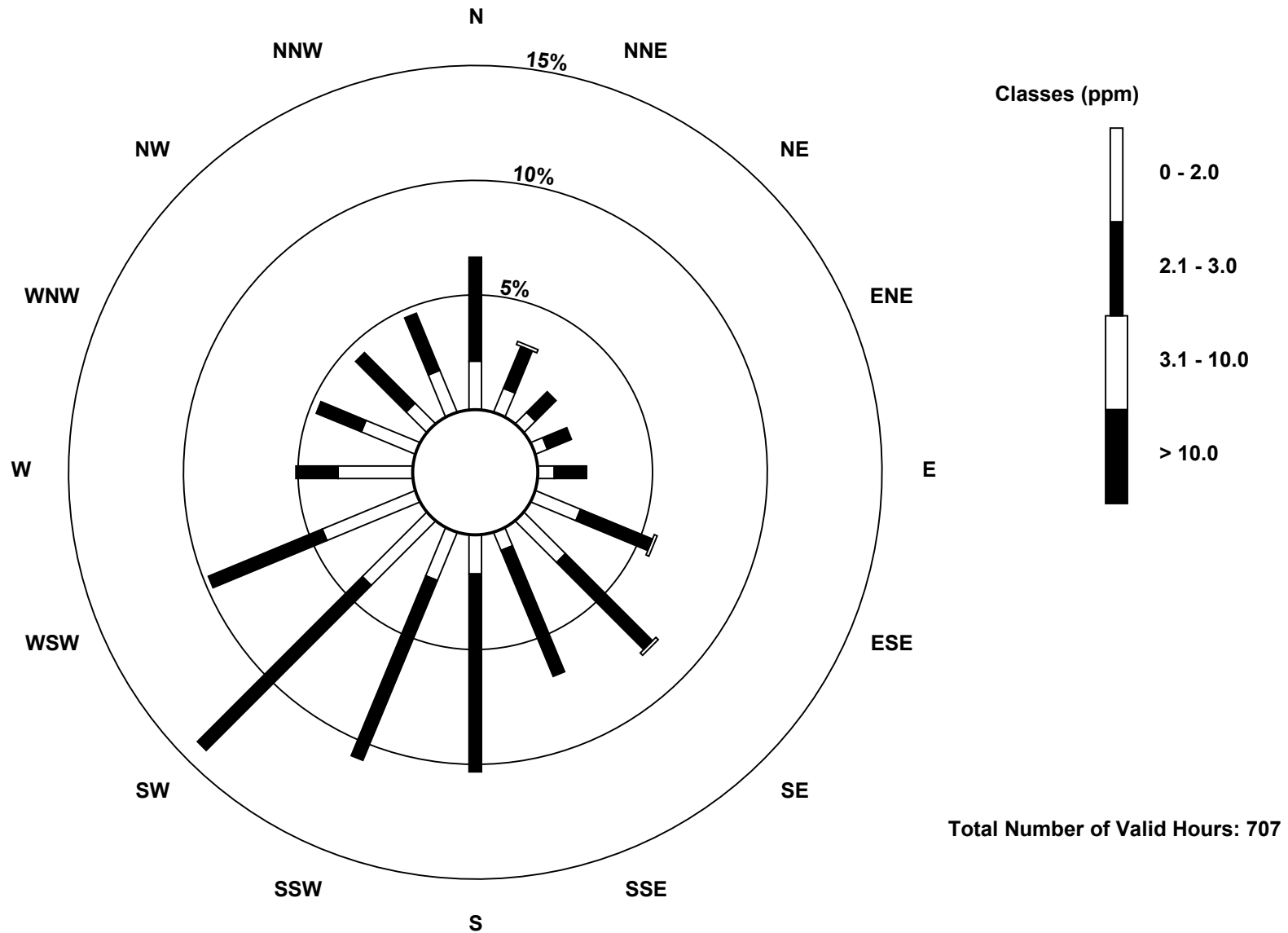
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	15	8	5	4	5	15	18	6	12	16	28	31	23	18	9	14	227
2.1 - 3.0	32	14	9	8	10	24	38	42	61	60	72	38	13	15	22	19	477
3.1 - 10.0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	3
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	47	23	14	12	15	40	57	48	73	76	100	69	36	33	31	33	707

Total Number of Valid Hours: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Total Hydrocarbons (THC) - ppm
Fort McKay South (AMS 13)



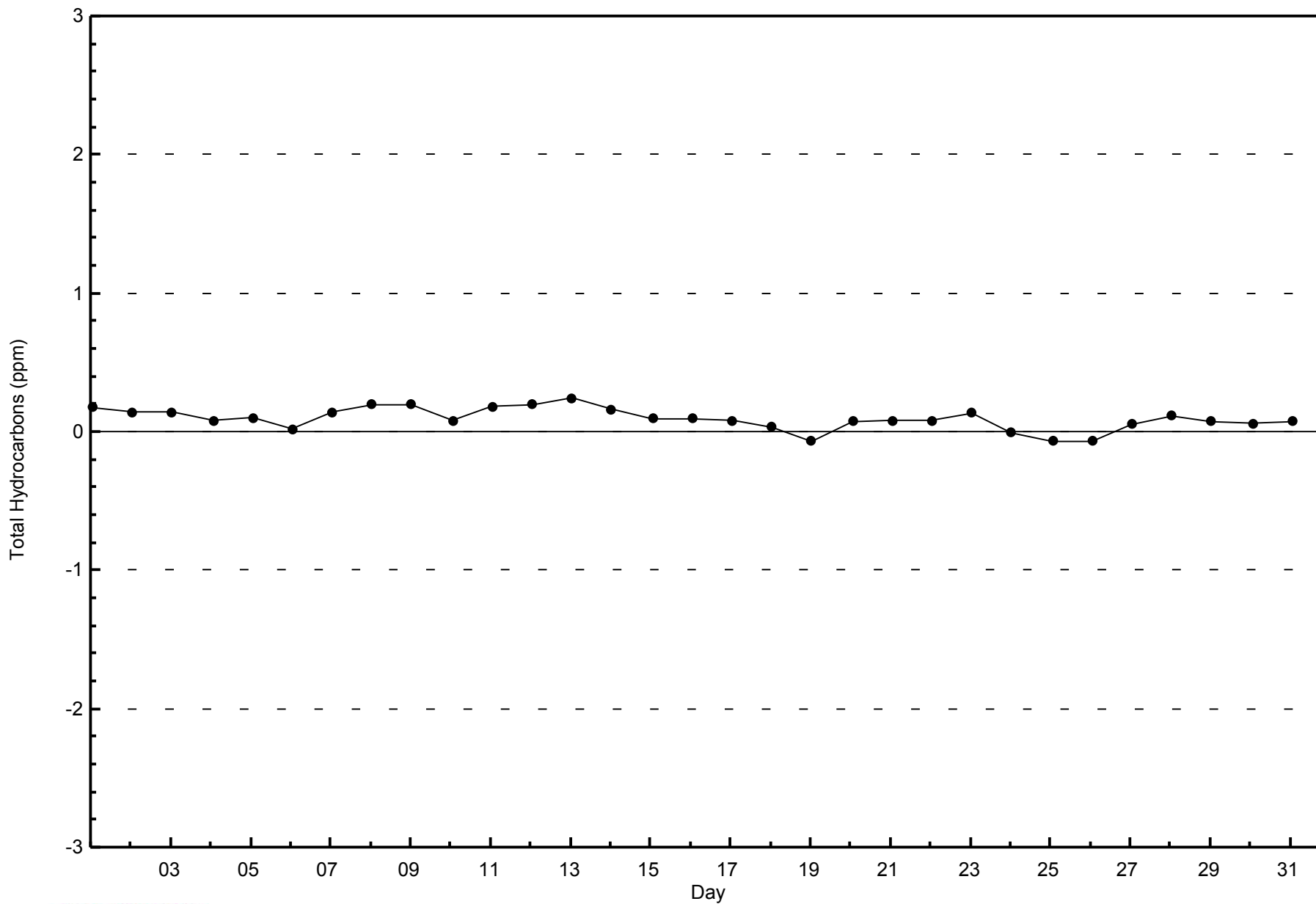


WBEA NETWORK

Zero Responses

Total Hydrocarbons (THC) - ppm

Fort McKay South - July 2014



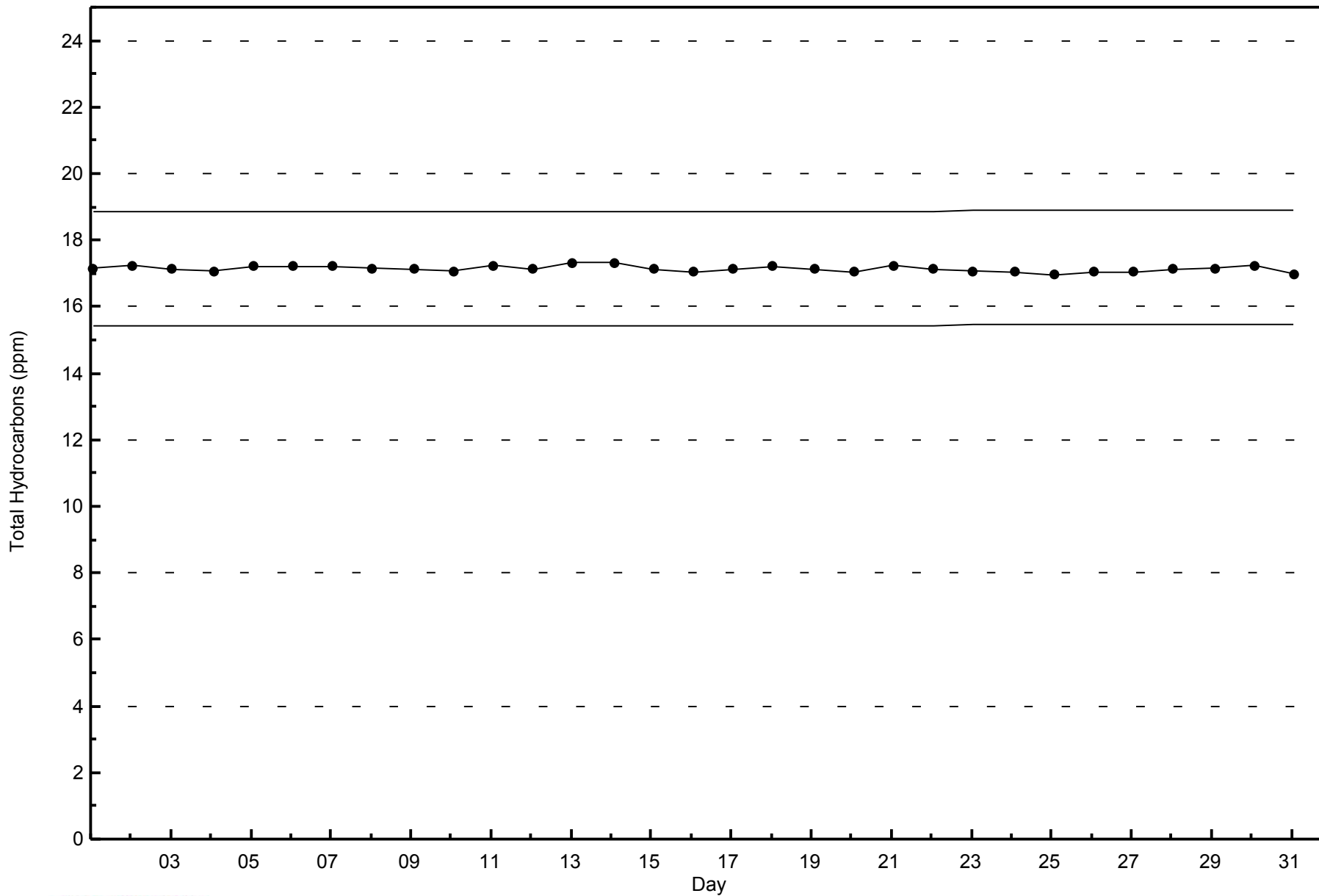


WBEA NETWORK

Span Responses

Total Hydrocarbons (THC) - ppm

Fort McKay South - July 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 69 ppb on Jul 21 18:00	Maximum Daily Average: 29.5 ppb on Jul 9		Hours of Data:	709
Minimum Value: 0 ppb on Jul 19 04:00	Minimum Daily Average: 12.3 ppb on Jul 19		Hours of Missing Data:	35
Maximum Diurnal Average: 36.2 ppb at hour 15	Minimum Diurnal Average: 3.7 ppb at hour 5		Hours of Calibration:	35
Monthly Average: 19.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 7 Median = 17 Q ₃ = 31 P ₉₀ = 43 P ₉₉ = 55		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	2	3	Z	1	1	1	6	11	7	9	21	36	38	39	35	37	36	41	37	29	14	7	4	1	18.1	41																							
2-Jul	1	0	Z	0	0	0	4	11	21	18	30	50	54	53	52	50	50	45	38	23	13	10	10	11	23.6	54																							
3-Jul	17	11	Z	3	2	3	12	19	28	30	32	35	34	27	26	33	35	34	30	26	27	23	14	17	22.5	35																							
4-Jul	16	21	Z	10	3	10	16	25	27	31	32	32	32	33	32	32	32	30	28	27	20	13	15	20	23.5	33																							
5-Jul	14	13	Z	9	6	4	6	16	20	23	26	26	26	26	27	27	25	25	21	15	10	19	14	8	17.6	27																							
6-Jul	7	3	Z	4	6	7	11	17	23	25	23	23	24	22	22	17	22	23	20	19	13	9	13	7	15.7	25																							
7-Jul	12	8	Z	8	8	10	13	11	10	13	15	20	22	25	26	22	24	24	22	9	4	2	1	1	13.4	26																							
8-Jul	0	0	Z	0	0	0	1	5	12	16	26	34	39	31	29	29	31	32	31	16	8	2	1	0	14.9	39																							
9-Jul	2	7	Z	5	6	9	12	24	39	38	36	37	42	49	48	43	48	46	43	39	33	31	26	16	29.5	49																							
10-Jul	23	23	Z	21	19	19	19	20	21	22	23	25	27	26	24	24	30	26	20	16	15	16	14	16	21.2	30																							
11-Jul	17	15	Z	15	13	12	12	11	10	13	17	18	21	21	22	21	23	26	27	28	25	13	10	9	17.3	28																							
12-Jul	16	16	Z	16	10	5	9	15	24	32	34	37	42	48	53	54	55	50	37	23	15	10	5	4	26.5	55																							
13-Jul	2	2	Z	2	1	1	8	16	21	23	27	31	34	37	41	47	50	50	46	29	17	10	6	4	22.0	50																							
14-Jul	5	5	Z	6	4	2	13	17	21	27	36	48	44	36	35	34	33	32	31	20	8	2	8	24	21.4	48																							
15-Jul	23	15	Z	7	5	5	8	20	25	30	32	43	44	41	44	49	46	40	33	23	27	18	6	5	25.7	49																							
16-Jul	3	12	Z	7	9	6	7	7	9	9	14	11	17	15	18	26	28	27	27	24	22	22	23	11	15.4	28																							
17-Jul	5	4	Z	2	2	1	9	15	17	25	36	43	46	53	50	53	54	48	44	28	22	11	10	12	25.6	54																							
18-Jul	6	3	Z	1	1	2	7	10	13	25	31	35	37	38	43	54	49	45	35	32	15	18	7	2	22.1	54																							
19-Jul	3	6	Z	0	0	0	4	11	11	10	13	12	13	16	19	18	21	20	25	24	21	14	10	13	12.3	25																							
20-Jul	13	11	Z	7	5	4	7	10	18	23	28	34	35	35	35	36	31	31	29	18	8	5	3	2	18.6	36																							
21-Jul	1	1	Z	1	0	1	5	8	13	20	34	41	49	51	56	62	61	69	59	35	14	12	8	7	26.4	69																							
22-Jul	4	3	Z	1	1	1	3	8	C	C	C	C	55	52	52	51	48	44	39	28	16	12	5	5	22.5	55																							
23-Jul	7	5	Z	1	1	1	2	7	16	26	33	34	32	32	34	33	35	33	27	17	10	3	2	1	17.0	35																							
24-Jul	1	0	Z	0	0	1	6	9	11	13	16	15	16	27	33	35	34	30	28	29	22	13	9	5	15.3	35																							
25-Jul	4	10	Z	7	3	3	8	11	16	21	25	26	27	30	26	23	22	16	14	11	2	1	0	0	13.3	30																							
26-Jul	0	0	Z	0	0	0	5	12	21	27	33	40	44	45	43	43	43	37	38	33	20	12	9	3	22.1	45																							
27-Jul	1	0	Z	0	0	0	2	5	8	14	26	30	35	36	35	38	29	20	20	16	4	3	0	0	14.0	38																							
28-Jul	0	0	Z	0	1	3	6	10	7	18	28	29	31	32	32	33	36	39	34	21	8	4	1	0	16.2	39																							
29-Jul	0	0	Z	0	7	17	17	13	12	24	41	50	48	47	46	32	27	35	26	12	8	5	3	3	20.6	50																							
30-Jul	1	1	Z	0	0	0	3	12	21	32	46	53	48	45	47	47	47	44	32	19	44	33	16	11	26.2	53																							
31-Jul	5	7	Z	0	0	0	1	4	15	37	34	32	35	35	35	20	11	10	7	10	11	10	9	8	14.7	37																							
																								6.8	6.7	--	4.4	3.7	4.2	7.8	12.5	17.2	22.5	28.3	32.6	35.2	35.6	36.2	36.2	36.0	34.6	30.6	22.6	16.0	11.6	8.4	7.3	Diurnal Average	
																								23	23	--	21	19	19	19	25	39	38	46	53	55	53	56	62	61	69	59	39	44	33	26	24	Diurnal Maximum	

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

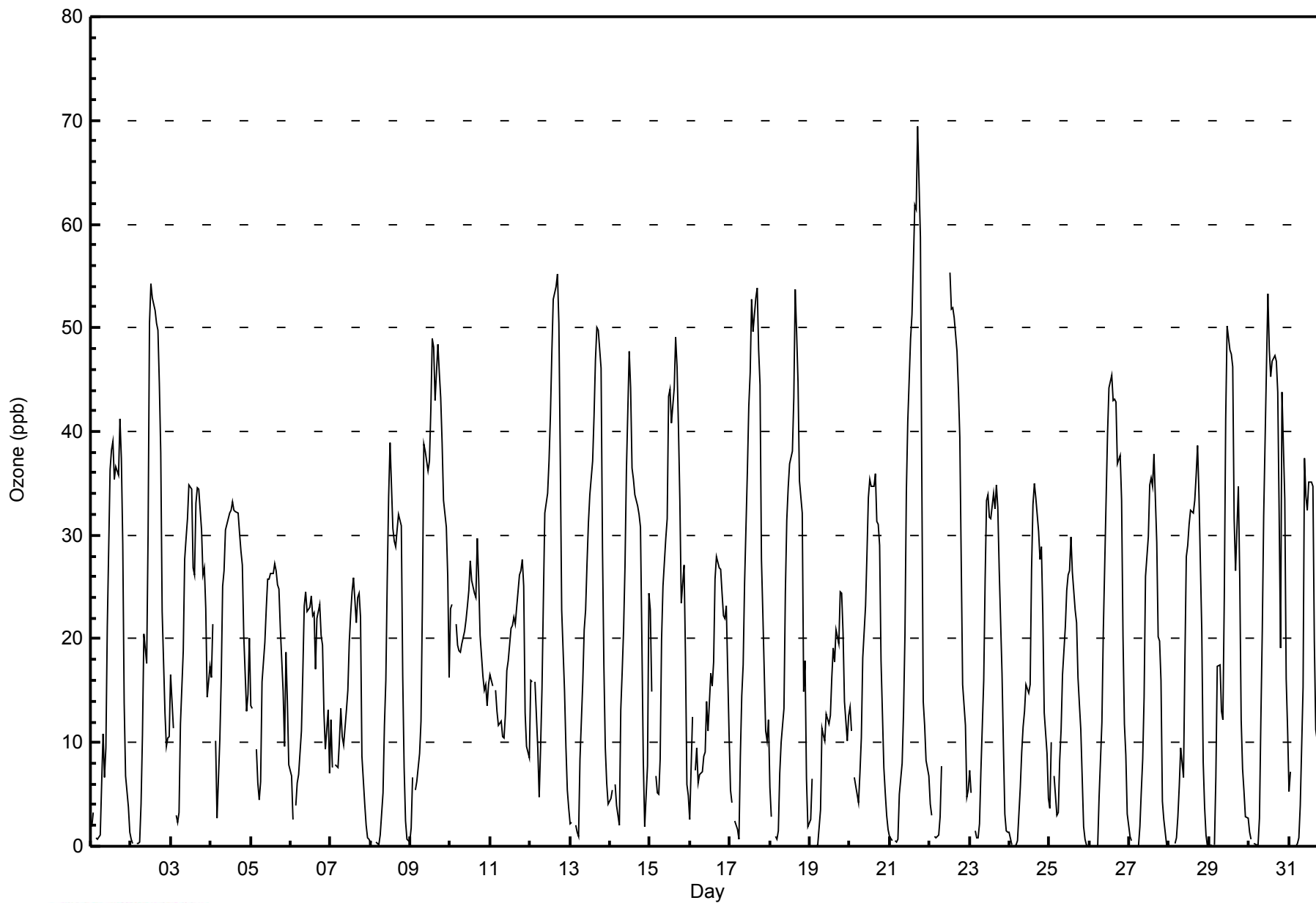


WBEA NETWORK

Hourly Averages

Ozone (O₃) - ppb

Fort McKay South - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	390	55.01	55.01
21 - 50	298	42.03	97.04
51 - 82	21	2.96	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - July 2014

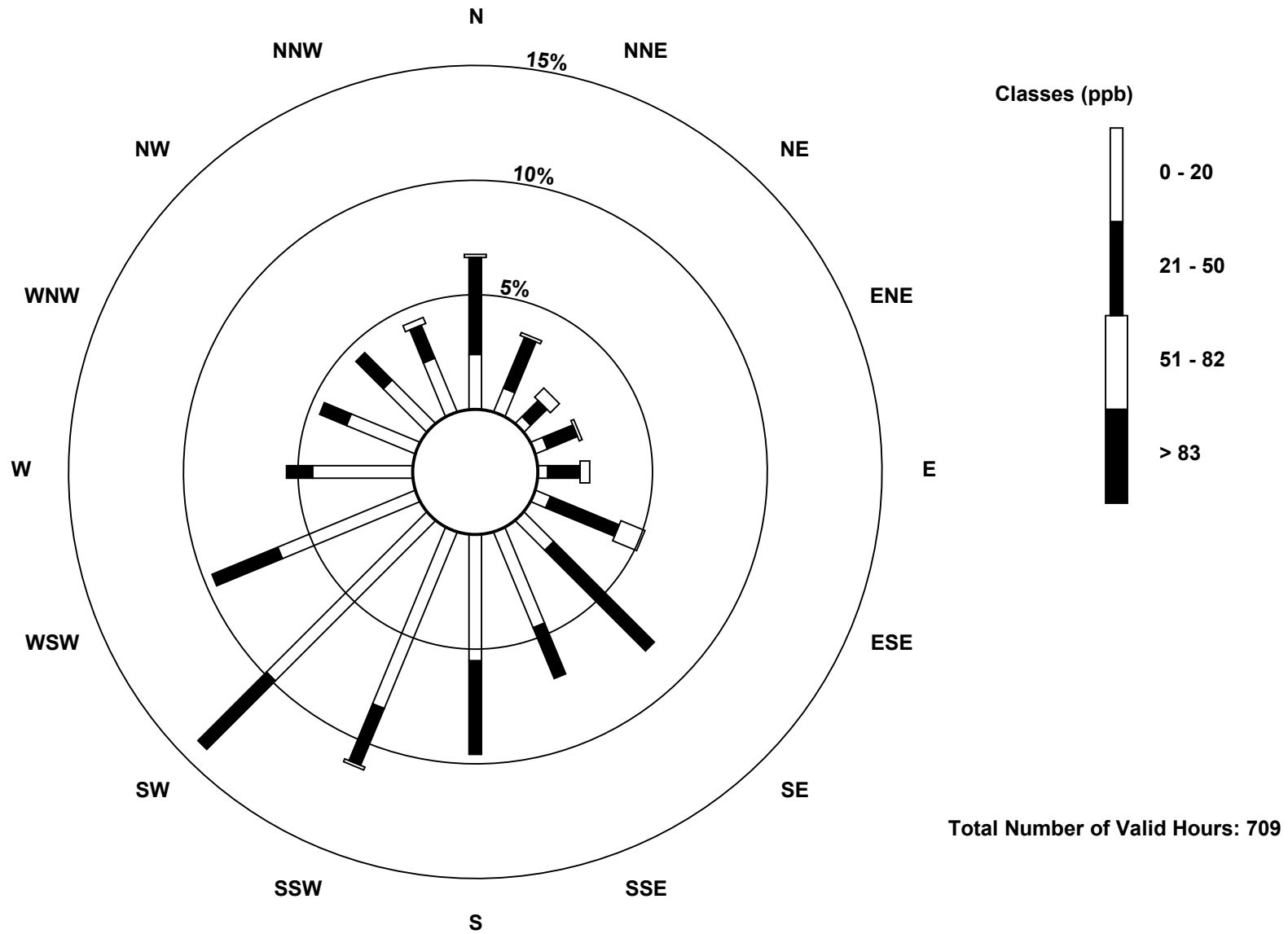
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	17	8	3	4	3	5	13	32	39	59	70	46	31	23	19	18	390
21 - 50	30	17	7	10	10	23	44	17	29	19	30	22	8	9	12	11	298
51 - 82	1	1	4	1	3	8	0	0	0	1	0	0	0	0	0	2	21
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	48	26	14	15	16	36	57	49	68	79	100	68	39	32	31	31	709

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Ozone (O₃) - ppb
Fort McKay South (AMS 13)



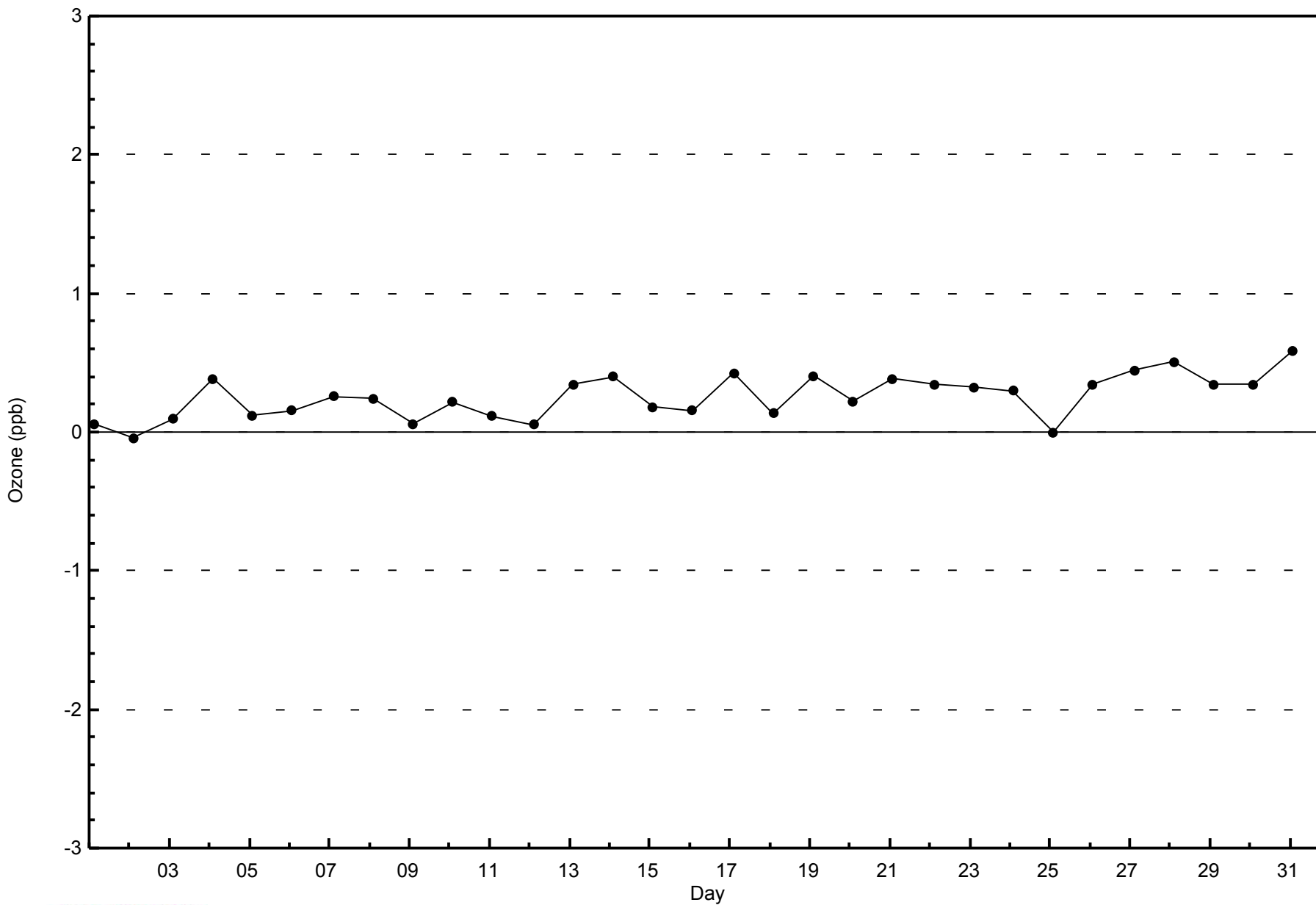


WBEA NETWORK

Zero Responses

Ozone (O₃) - ppb

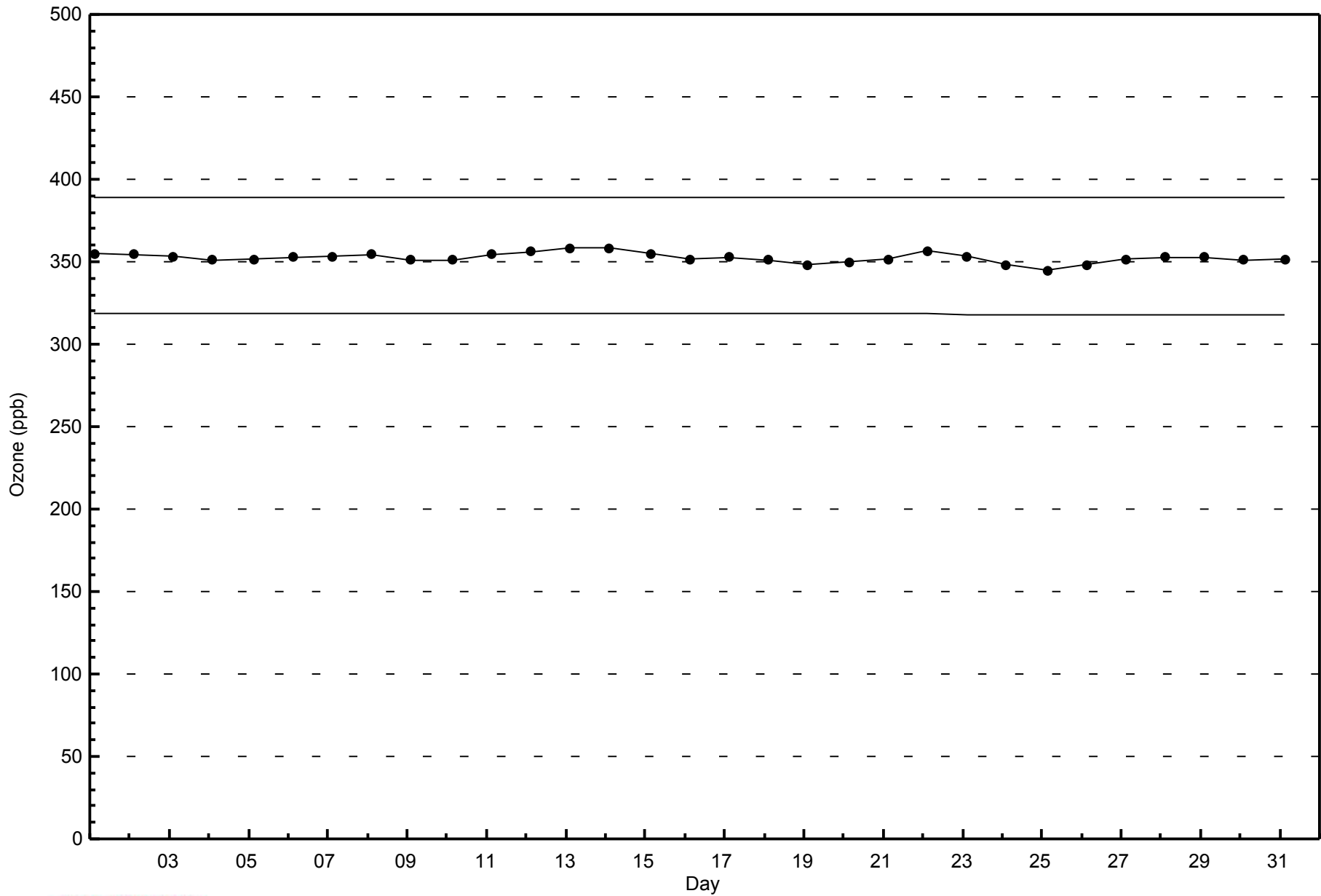
Fort McKay South - July 2014





WBEA NETWORK
Span Responses

Ozone (O₃) - ppb
Fort McKay South - July 2014



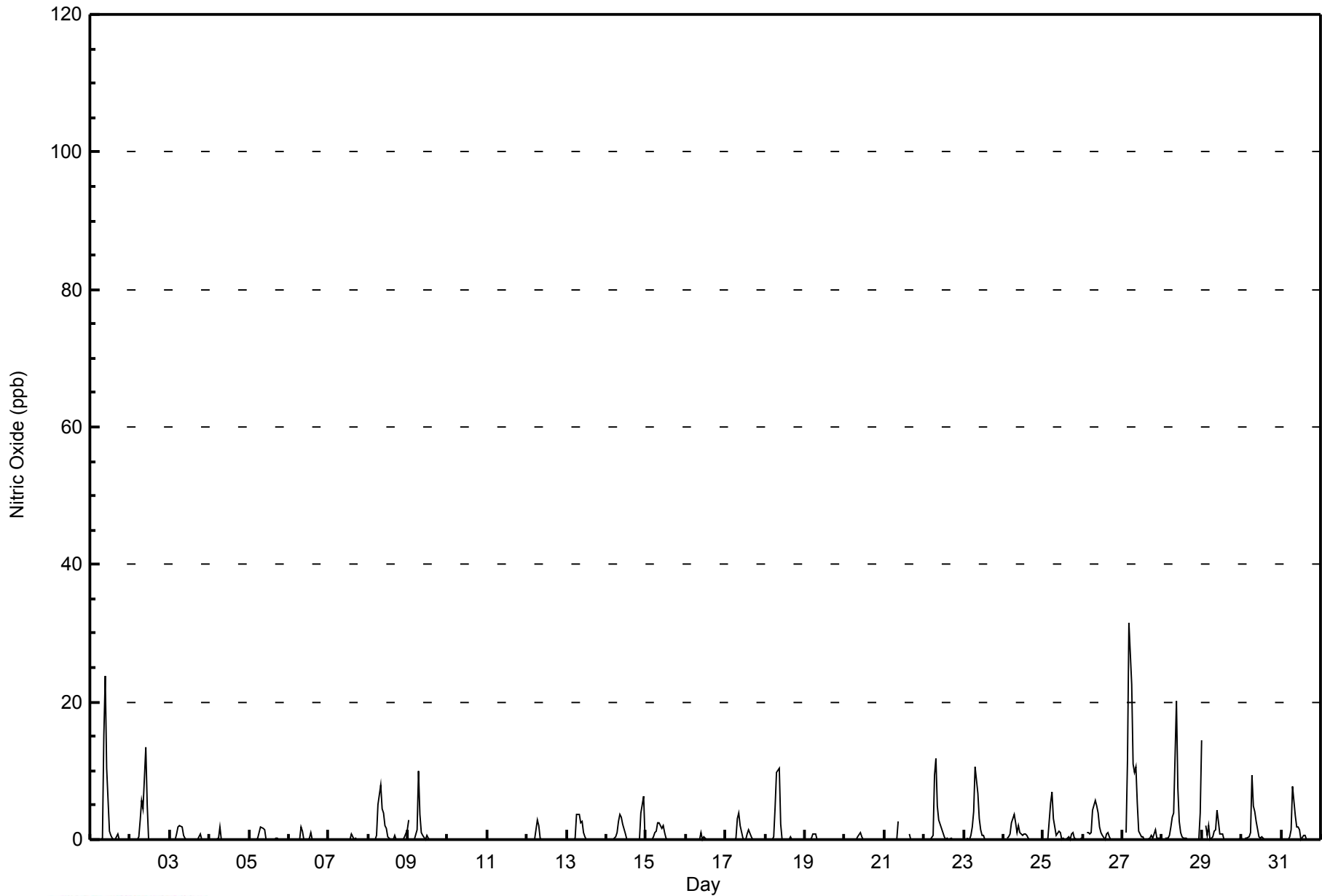


Maximum Value: 32 ppb on Jul 27 05:00																	Maximum Daily Average: 4.7 ppb on Jul 27																	Hours in Service: 744																
Minimum Value: 0 ppb on Jul 1 19:00																	Minimum Daily Average: 0.0 ppb on Jul 11																	Hours of Data: 707																
Maximum Diurnal Average: 3.6 ppb at hour 9																	Minimum Diurnal Average: 0.0 ppb at hour 20																	Hours of Missing Data: 37																
Monthly Average: 0.9 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 3 P ₉₉ = 13																	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-Jul	0	Z	0	0	0	0	0	0	15	24	10	1	1	0	0	0	1	0	0	0	0	0	0	0	2.3	24																								
2-Jul	0	Z	0	0	0	1	3	6	4	14	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	14																								
3-Jul	0	Z	0	0	1	2	2	2	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	2																								
4-Jul	0	Z	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2																								
5-Jul	0	Z	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																								
6-Jul	0	Z	0	0	0	0	0	2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	2																								
7-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	1																								
8-Jul	0	Z	0	0	0	1	5	8	5	4	2	2	0	0	0	0	1	0	0	0	0	0	0	1	1.2	8																								
9-Jul	3	Z	0	0	0	2	10	4	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.9	10																								
10-Jul	0	Z	0	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-Jul	0	Z	0	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-Jul	0	Z	0	0	0	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3																								
13-Jul	0	Z	0	0	0	0	4	4	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4																								
14-Jul	0	Z	0	0	0	0	1	3	4	3	2	1	0	0	0	0	0	0	0	0	0	4	6	0	1.0	6																								
15-Jul	0	Z	0	0	0	1	1	2	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3																								
16-Jul	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																								
17-Jul	0	Z	0	0	0	0	0	3	4	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.5	4																								
18-Jul	0	Z	0	0	0	0	5	10	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	10																								
19-Jul	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																								
20-Jul	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																								
21-Jul	0	Z	0	0	0	0	0	0	3	C	C	C	C	C	C	1	0	0	0	0	0	0	0	0	--	3																								
22-Jul	0	Z	0	0	0	1	9	12	5	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1.4	12																								
23-Jul	0	Z	0	0	1	2	4	11	7	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1.3	11																								
24-Jul	0	Z	0	0	1	3	4	2	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.8	4																								
25-Jul	0	Z	0	0	5	7	3	2	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1.0	7																								
26-Jul	0	Z	1	1	1	1	4	6	5	4	2	1	1	0	1	1	0	0	0	0	0	0	0	0	1.2	6																								
27-Jul	0	Z	1	12	32	22	11	10	11	5	1	0	0	0	0	0	0	1	0	1	1	0	0	0	4.7	32																								
28-Jul	0	Z	0	0	1	2	3	4	20	7	3	1	0	0	0	0	0	0	0	0	0	0	0	4	2.0	20																								
29-Jul	14	Z	2	1	2	0	0	1	1	4	3	1	1	0	0	0	0	0	0	0	0	0	0	0	1.3	14																								
30-Jul	0	Z	0	0	0	1	9	5	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	9																								
31-Jul	0	Z	0	0	0	0	1	8	3	2	2	1	0	1	1	0	0	0	0	0	0	0	0	0	0.8	8																								
																								0.6	--	0.2	0.5	1.4	1.5	2.8	3.4	3.6	3.1	1.3	0.4	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	Diurnal Average
																								14	--	2	12	32	22	11	12	20	24	10	2	1	1	1	1	1	1	1	1	1	1	1	4	6	4	Diurnal Maximum
Z - zerospan C - Calibration																																																		



WBEA NETWORK
Hourly Averages

Nitric Oxide (NO) - ppb
Fort McKay South - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	704	99.58	99.58
21 - 40	3	0.42	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - July 2014

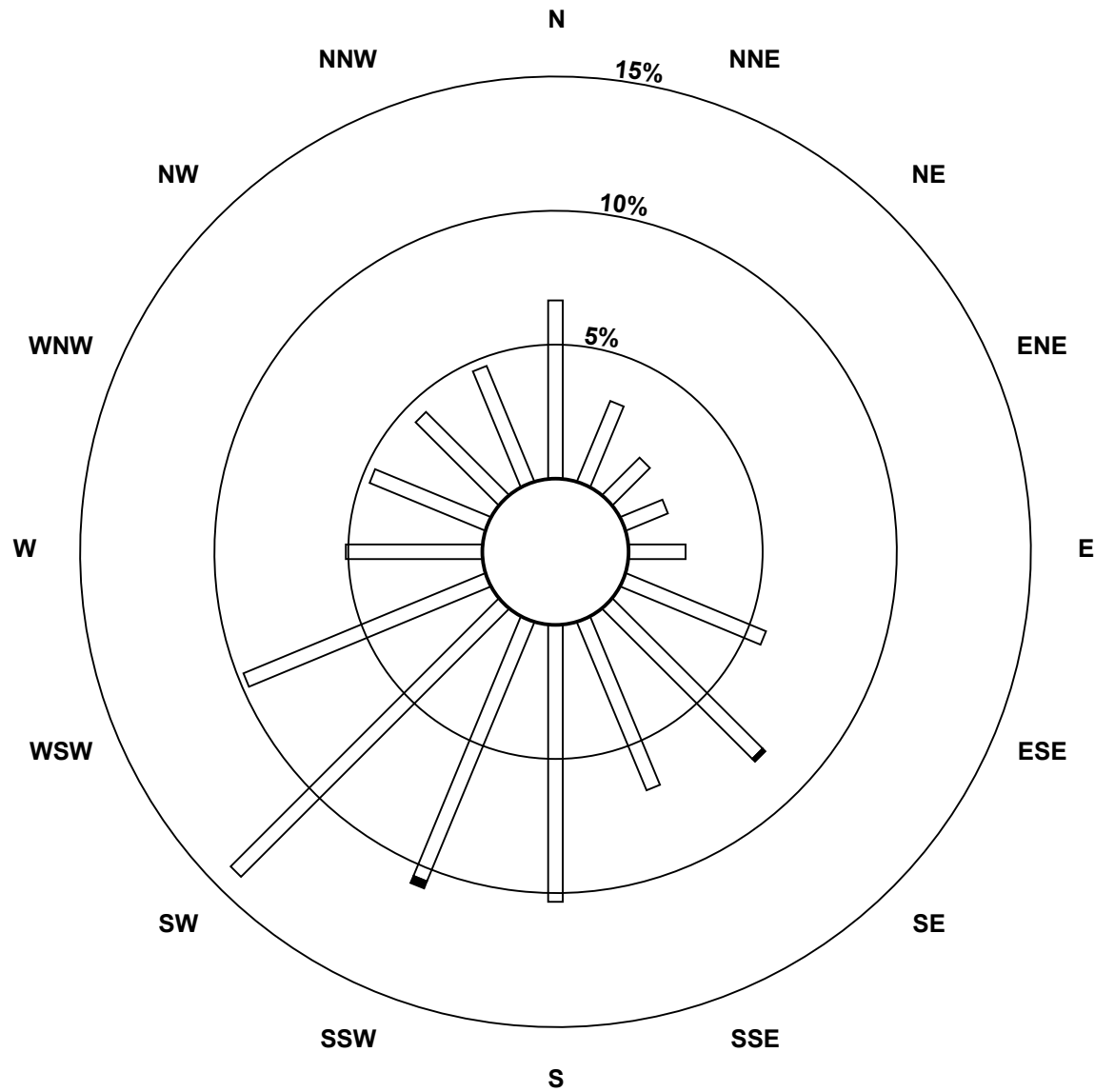
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	47	23	14	12	15	40	56	48	73	74	100	69	36	33	31	33	704
21 - 40	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	3
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	47	23	14	12	15	40	57	48	73	76	100	69	36	33	31	33	707

Total Number of Valid Hours: 707

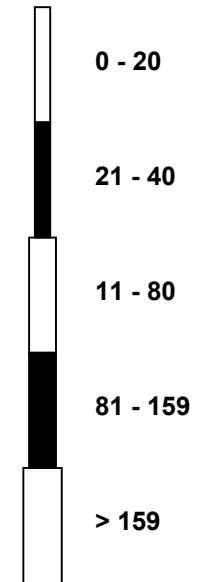
Total Number of Hours: 744

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

**Nitric Oxide (NO) - ppb
Fort McKay South (AMS 13)**



Classes (ppb)



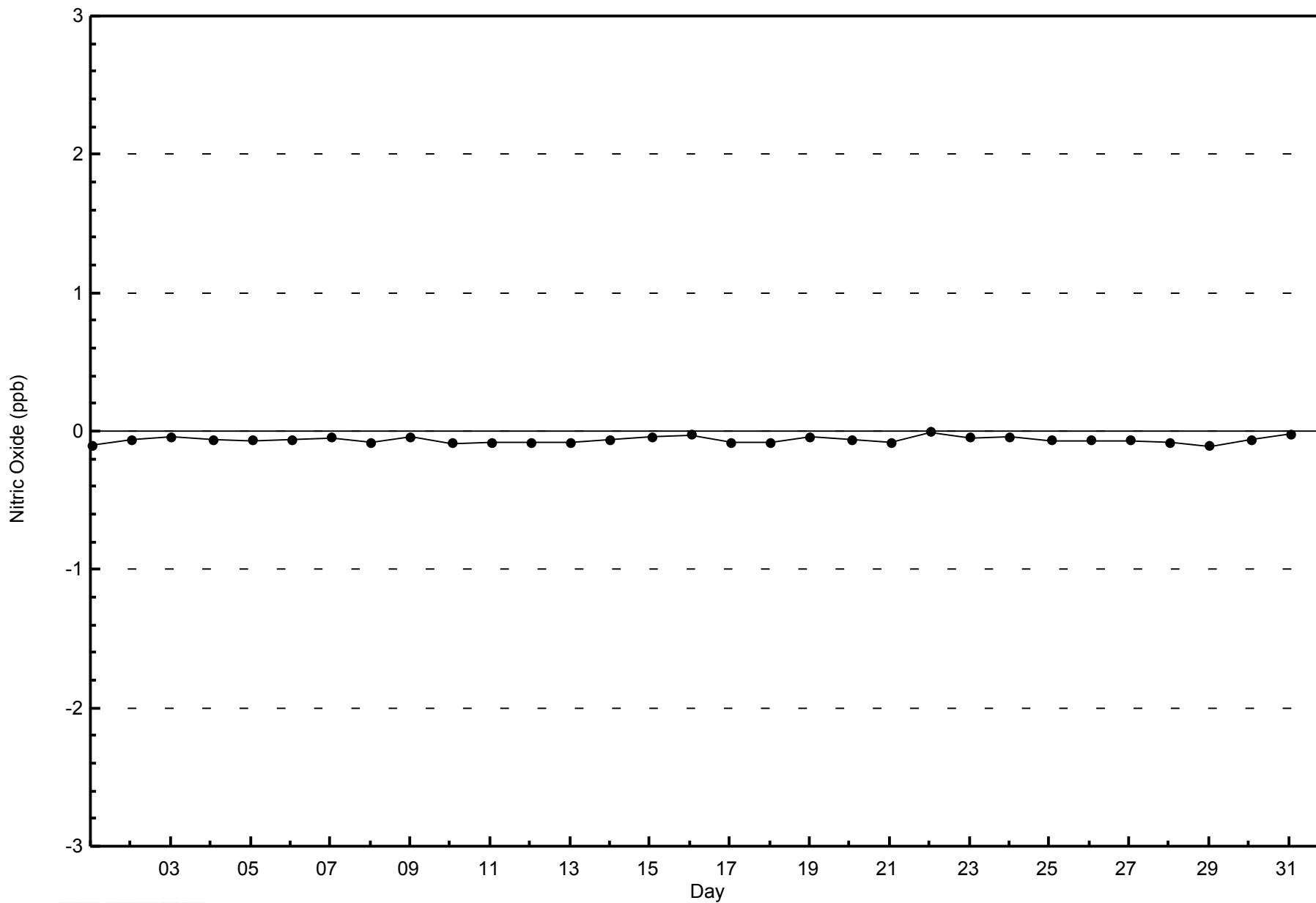
Total Number of Valid Hours: 707



WBEA NETWORK

Zero Responses

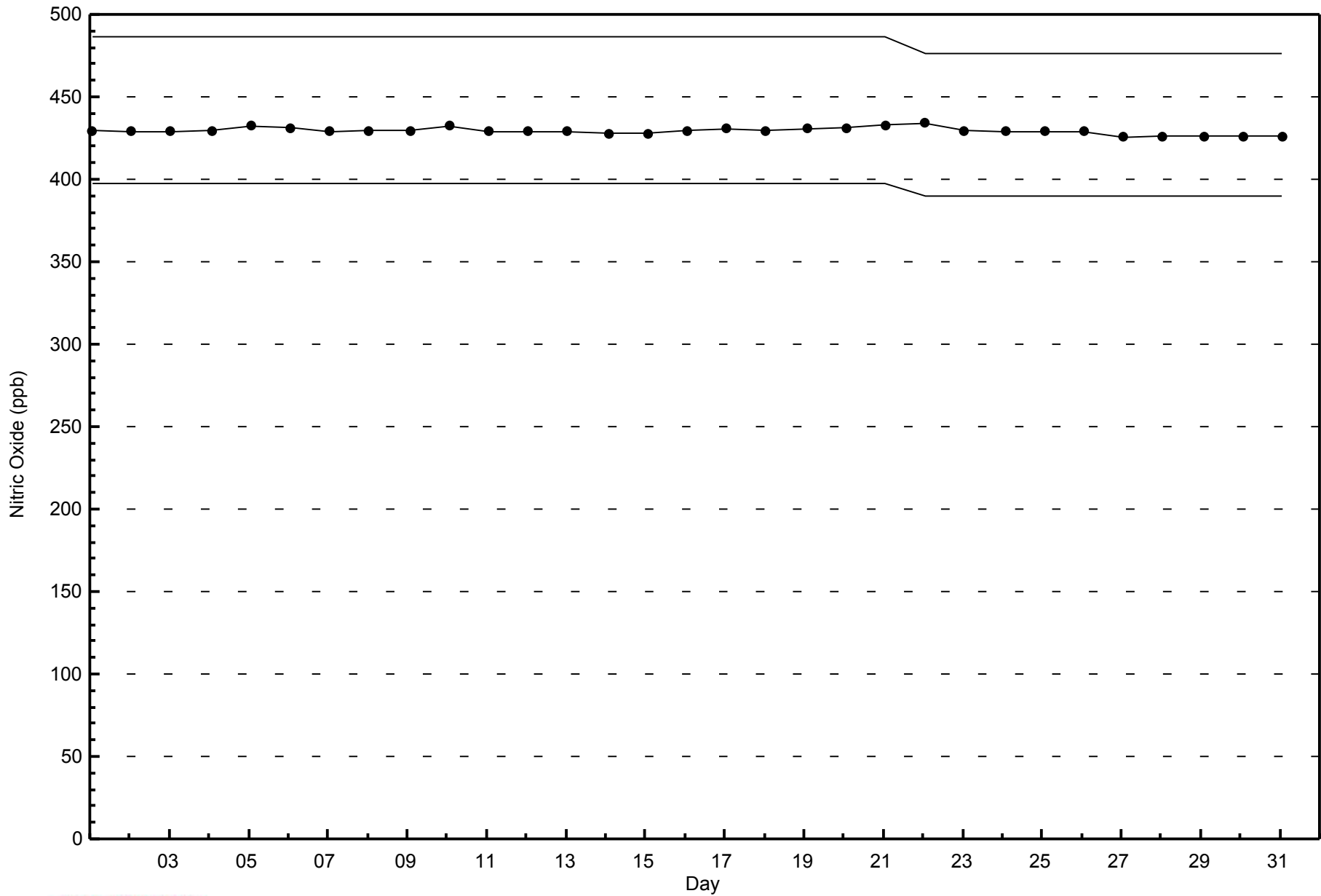
Nitric Oxide (NO) - ppb
Fort McKay South - July 2014





WBEA NETWORK
Span Responses

Nitric Oxide (NO) - ppb
Fort McKay South - July 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Fort McKay South - July 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 22 ppb on Jul 1 10:00	Maximum Daily Average: 6.3 ppb on Jul 15		Hours of Data:	707
Minimum Value: 0 ppb on Jul 1 01:00	Minimum Daily Average: 0.0 ppb on Jul 10		Hours of Missing Data:	37
Maximum Diurnal Average: 6.9 ppb at hour 10	Minimum Diurnal Average: 1.6 ppb at hour 4		Hours of Calibration:	37
Monthly Average: 3.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 8 P ₉₉ = 15		Percent Operational Time:	100.0

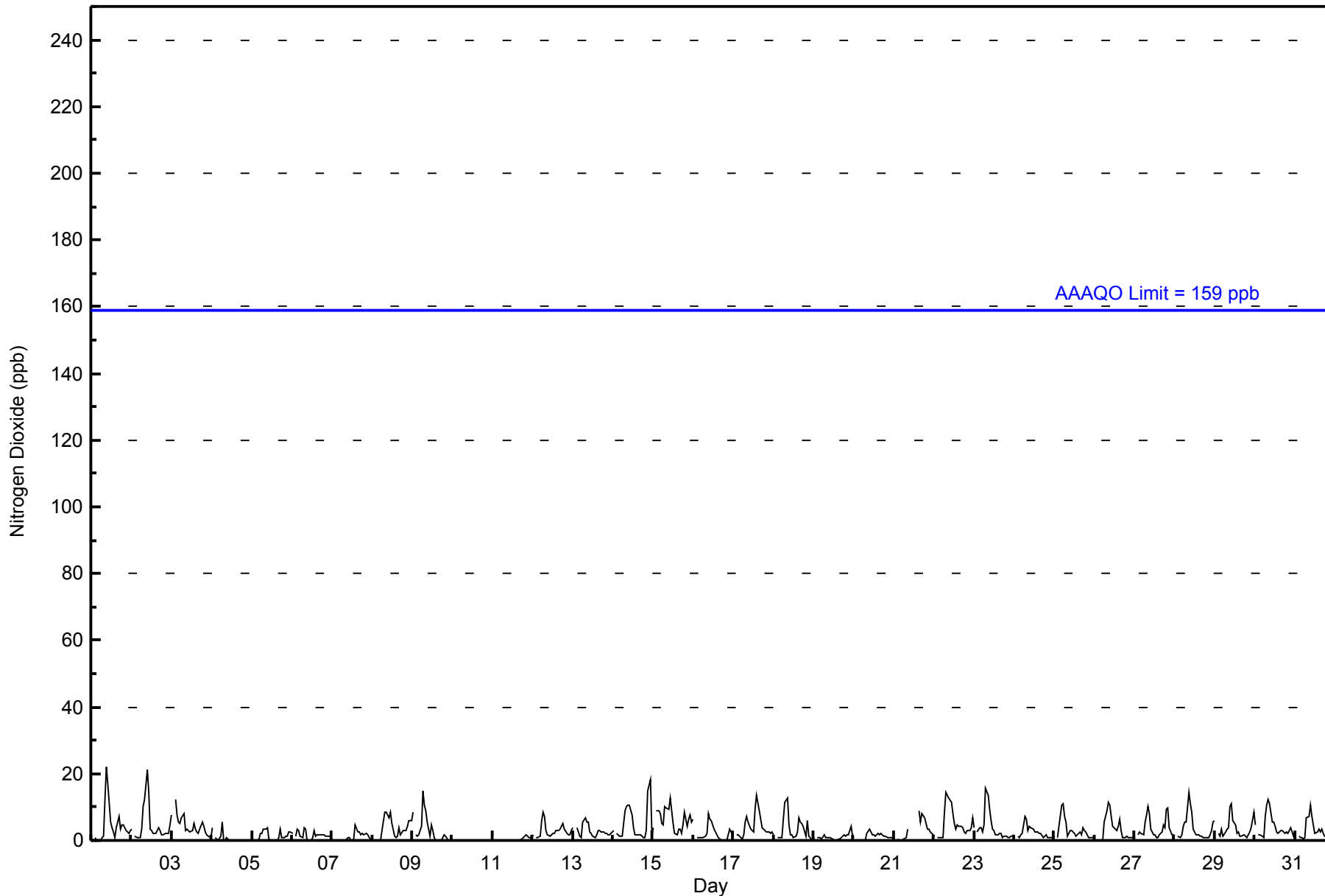
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	0	Z	1	0	0	0	1	1	12	22	17	6	4	3	1	4	7	3	5	5	4	3	2	3	4.5	22																						
2-Jul	4	Z	1	1	1	1	4	10	12	21	15	3	3	2	2	3	4	3	2	2	2	2	2	5	4.5	21																						
3-Jul	8	Z	12	8	6	5	7	8	3	3	3	3	5	3	3	2	3	5	4	3	2	1	1	4.4	12																							
4-Jul	4	Z	1	0	0	1	6	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	6																						
5-Jul	0	Z	0	0	0	2	2	4	3	4	1	0	0	0	0	0	1	4	1	1	1	1	3	2	1.3	4																						
6-Jul	2	Z	1	3	3	1	1	4	3	0	0	0	1	3	1	2	2	2	2	2	1	1	1	1	1.6	4																						
7-Jul	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	5	2	3	2	2	2	2	2	1	0	1.0	5																						
8-Jul	0	Z	0	0	0	0	3	8	8	8	7	8	5	1	1	1	4	2	3	3	3	4	6	6	3.6	8																						
9-Jul	8	Z	2	1	2	4	15	11	9	6	1	5	3	1	0	0	0	0	1	2	1	0	0	0	3.1	15																						
10-Jul	0	Z	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	1	0.3	2																						
12-Jul	2	Z	1	1	1	6	9	7	3	2	1	2	2	2	3	3	3	4	5	3	2	2	2	3	3.0	9																						
13-Jul	4	Z	4	3	1	1	5	7	6	6	3	2	1	1	2	3	3	3	3	2	2	2	2	2	2.8	7																						
14-Jul	3	Z	2	2	1	1	5	9	10	11	11	8	4	2	2	2	2	1	1	1	3	15	18	2	4.9	18																						
15-Jul	4	Z	9	9	8	5	5	10	10	9	13	9	5	2	2	4	3	2	5	9	4	6	8	6	6.3	13																						
16-Jul	6	Z	1	1	1	1	1	1	2	8	7	6	3	3	2	1	1	0	0	0	0	2	4	2	2.2	8																						
17-Jul	2	Z	2	2	1	0	2	6	7	5	3	3	3	9	14	9	6	4	3	3	3	2	2	3	4.0	14																						
18-Jul	2	Z	1	1	1	1	6	12	13	5	2	2	1	1	3	7	6	5	4	1	6	1	1	0	3.5	13																						
19-Jul	1	Z	1	1	1	0	2	1	1	1	1	0	0	0	0	0	0	1	2	1	2	2	4	1	1.0	4																						
20-Jul	1	Z	0	0	0	0	0	0	2	4	3	2	2	1	2	2	2	2	1	1	1	1	1	1	1.2	4																						
21-Jul	0	Z	1	0	0	0	0	1	4	C	C	C	C	C	C	9	5	8	7	5	4	3	3	2	--	9																						
22-Jul	1	Z	1	1	1	1	9	14	13	13	11	8	5	4	5	4	4	4	3	2	3	3	4	7	5.2	14																						
23-Jul	4	Z	3	4	4	3	5	16	14	9	6	3	3	2	2	2	2	1	1	1	1	1	1	1	3.9	16																						
24-Jul	2	Z	1	1	2	2	7	7	3	4	4	3	3	3	3	2	2	1	1	2	1	1	1	1	2.4	7																						
25-Jul	1	Z	1	4	11	11	7	5	1	3	3	2	2	1	2	3	2	4	3	2	1	1	1	1	3.1	11																						
26-Jul	1	Z	0	0	0	0	5	9	12	11	7	4	4	3	4	6	3	1	1	1	1	1	1	1	3.3	12																						
27-Jul	1	Z	2	2	2	2	6	8	10	8	3	2	2	1	1	2	2	5	4	9	10	4	2	2	3.8	10																						
28-Jul	1	Z	1	1	2	4	5	6	14	11	9	4	2	2	2	1	1	1	1	1	1	2	3	5	3.5	14																						
29-Jul	6	Z	2	1	4	1	3	3	4	10	11	6	5	2	3	1	1	2	1	1	2	2	4	8	3.6	11																						
30-Jul	5	Z	2	2	1	1	7	11	12	11	6	6	4	3	2	3	3	3	2	2	2	4	3	1	4.1	12																						
31-Jul	3	Z	1	1	1	1	1	7	7	11	7	5	2	3	3	3	3	2	1	1	1	1	2	2	2.9	11																						
																								2.4	--	1.7	1.6	1.7	1.8	4.1	5.9	6.4	6.9	5.1	3.3	2.4	2.0	2.2	2.6	2.5	2.3	2.3	2.3	2.2	2.3	2.6	2.2	Diurnal Average
																								8	--	12	9	11	11	15	16	14	22	17	9	5	9	14	9	7	8	7	9	10	15	18	8	Diurnal Maximum

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



WBEA NETWORK
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	99.72	99.72
21 - 40	2	0.28	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: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - July 2014

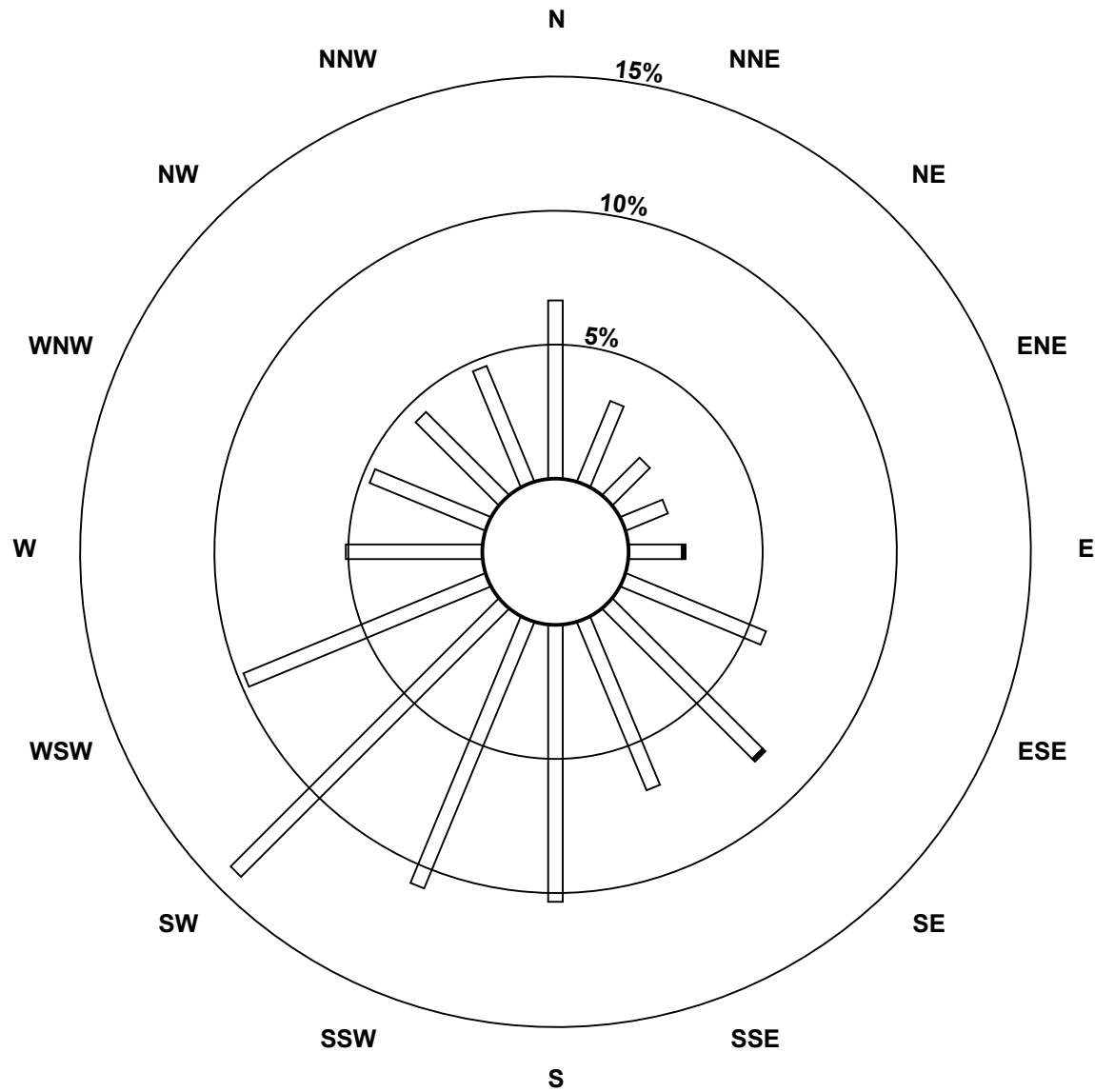
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	47	23	14	12	14	40	56	48	73	76	100	69	36	33	31	33	705
21 - 40	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	47	23	14	12	15	40	57	48	73	76	100	69	36	33	31	33	707

Total Number of Valid Hours: 707

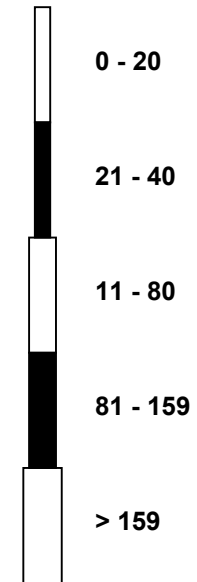
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South (AMS 13)



Classes (ppb)



Total Number of Valid Hours: 707

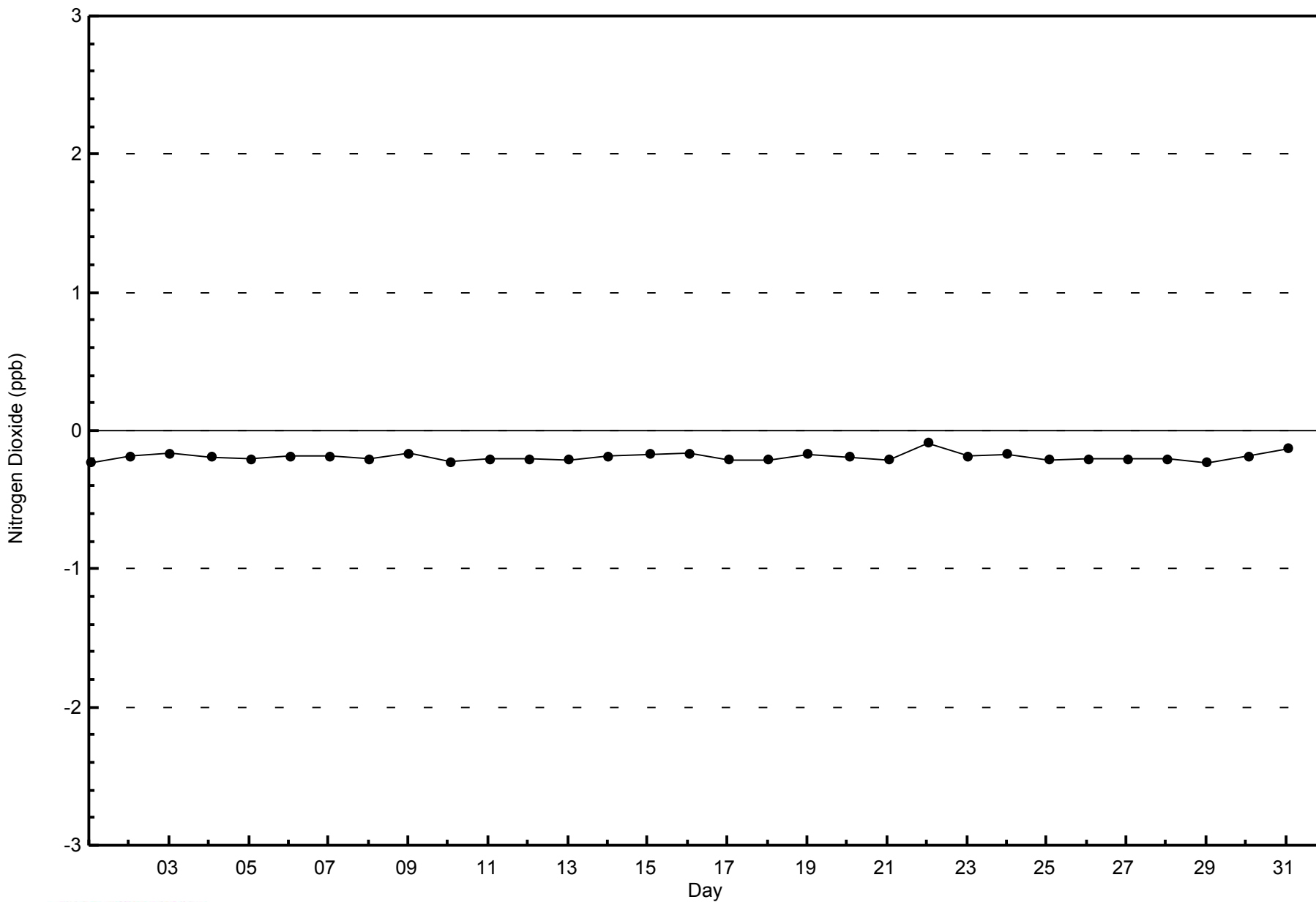


WBEA NETWORK

Zero Responses

Nitrogen Dioxide (NO₂) - ppb

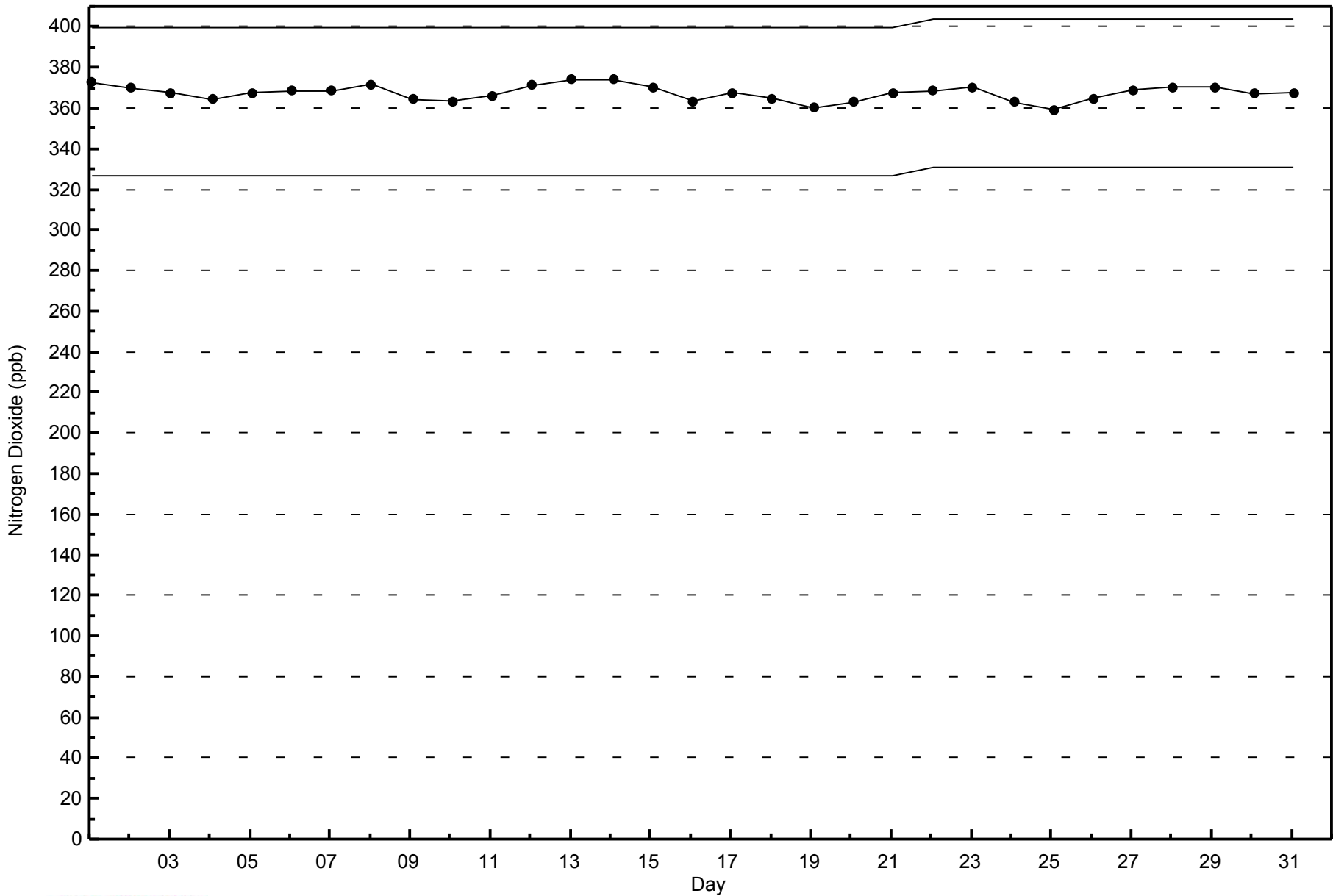
Fort McKay South - July 2014





WBEA NETWORK
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - July 2014



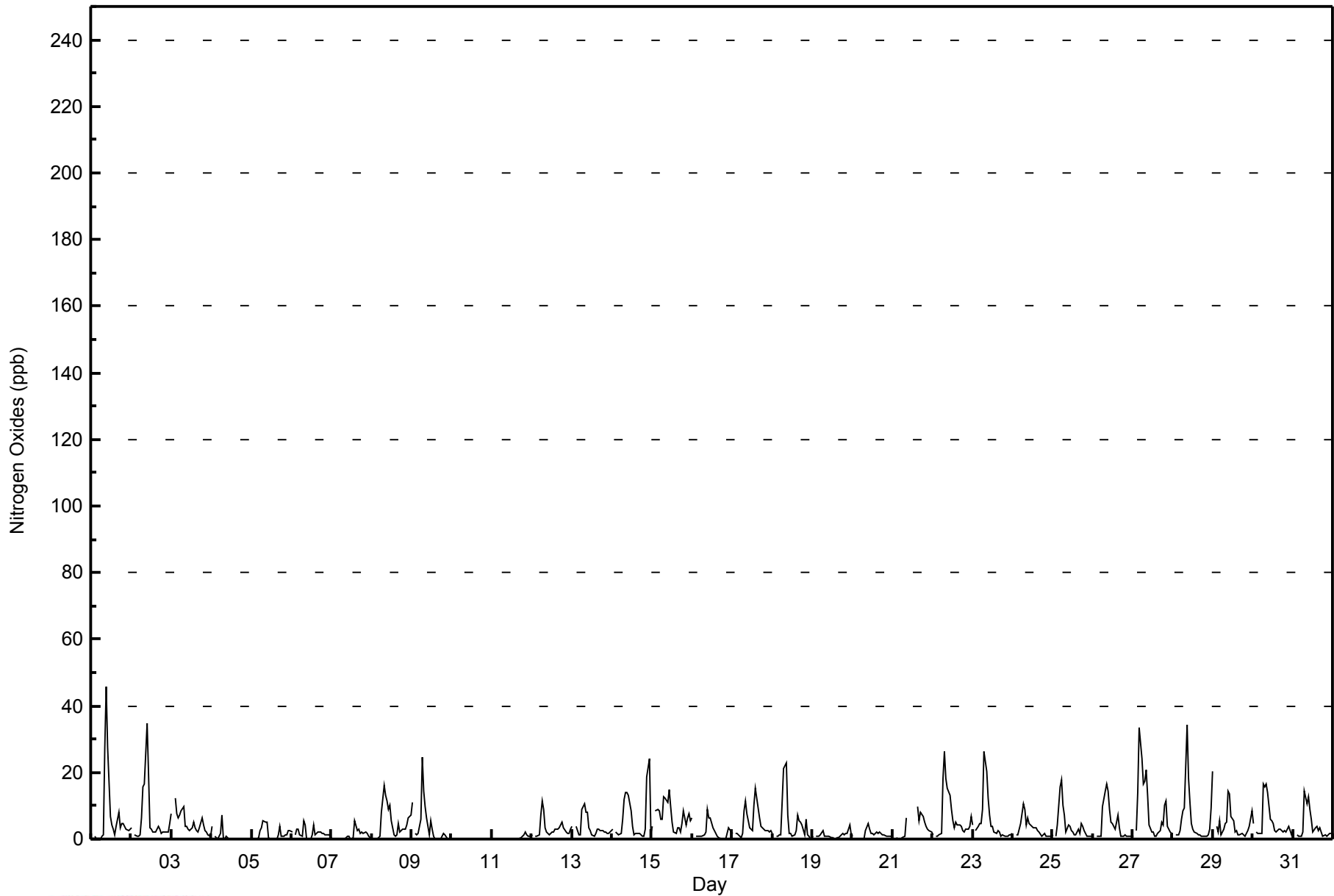


Maximum Value: 46 ppb on Jul 1 10:00																		Maximum Daily Average: 8.5 ppb on Jul 27						Hours in Service: 744																									
Minimum Value: 0 ppb on Jul 4 09:00																		Minimum Daily Average: 0.0 ppb on Jul 10						Hours of Data: 707																									
Maximum Diurnal Average: 10.1 ppb at hour 9																		Minimum Diurnal Average: 1.8 ppb at hour 3						Hours of Missing Data: 37																									
Monthly Average: 3.9 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 10 P ₉₉ = 26						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-Jul	0	Z	1	0	0	0	1	1	28	46	27	7	4	3	1	4	8	3	5	5	4	3	2	3	6.8	46																							
2-Jul	4	Z	1	1	1	1	6	16	17	35	20	3	3	2	2	3	4	3	2	2	2	2	2	4	5.9	35																							
3-Jul	8	Z	12	8	7	7	9	10	4	4	3	3	5	3	2	2	3	6	4	3	2	1	1	4.7	12																								
4-Jul	4	Z	1	0	0	2	7	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	7																							
5-Jul	0	Z	0	0	0	2	3	6	5	5	1	0	0	0	0	0	1	4	1	1	1	1	3	2	1.6	6																							
6-Jul	2	Z	1	3	3	1	1	5	4	0	0	0	1	4	1	2	2	2	2	2	1	1	1	1	1.8	5																							
7-Jul	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	5	3	3	2	2	2	2	2	1	0	1.0	5																							
8-Jul	0	Z	0	0	0	1	8	16	13	12	9	10	5	1	1	1	5	2	3	3	3	4	7	7	4.8	16																							
9-Jul	11	Z	2	1	2	6	25	14	10	6	1	5	3	1	0	0	0	0	1	2	1	0	0	0	4.0	25																							
10-Jul	0	Z	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	1	0.3	2																							
12-Jul	1	Z	1	1	1	7	11	9	3	2	1	2	2	2	3	3	3	4	5	3	2	2	2	3	3.3	11																							
13-Jul	4	Z	4	3	1	1	9	10	8	8	3	3	1	1	2	3	3	3	3	2	2	1	2	2	3.4	10																							
14-Jul	3	Z	2	2	1	2	6	12	14	14	13	8	4	1	1	2	2	1	1	1	3	19	24	2	6.0	24																							
15-Jul	4	Z	9	9	9	6	6	13	12	11	15	10	5	2	2	4	3	2	4	9	4	6	8	6	6.9	15																							
16-Jul	6	Z	1	1	1	1	1	1	2	9	6	6	3	2	2	1	0	0	0	0	0	2	4	2	2.3	9																							
17-Jul	2	Z	2	2	1	0	2	8	11	7	4	3	3	10	15	9	6	4	3	3	3	2	2	3	4.6	15																							
18-Jul	2	Z	1	1	1	1	11	21	23	7	2	2	1	1	3	7	6	5	4	1	6	1	1	0	4.7	23																							
19-Jul	1	Z	1	1	1	1	3	1	1	1	1	0	0	0	0	0	0	1	2	1	2	2	4	1	1.1	4																							
20-Jul	1	Z	0	0	0	0	0	0	2	4	3	2	2	1	2	2	2	2	1	1	1	1	1	1	1.3	4																							
21-Jul	0	Z	0	0	0	0	0	1	6	C	C	C	C	C	C	10	5	8	7	5	4	3	3	2	--	10																							
22-Jul	1	Z	1	1	1	2	18	26	18	15	13	9	5	4	5	4	4	4	3	2	3	3	4	7	6.7	26																							
23-Jul	4	Z	3	4	5	5	9	26	20	12	7	4	4	2	2	2	2	1	1	1	1	1	1	1	5.2	26																							
24-Jul	2	Z	1	1	3	4	11	9	4	7	5	4	4	3	3	2	2	1	1	2	1	1	1	1	3.2	11																							
25-Jul	1	Z	1	4	16	18	10	7	2	4	4	2	2	1	1	3	2	5	4	3	1	1	1	1	4.1	18																							
26-Jul	1	Z	1	1	1	1	10	15	17	14	9	5	4	3	5	7	3	1	1	1	1	1	1	1	4.5	17																							
27-Jul	1	Z	3	14	34	24	17	17	21	13	4	2	2	1	1	2	3	5	4	10	11	4	2	2	8.5	34																							
28-Jul	2	Z	1	1	2	6	9	9	35	18	11	5	3	2	2	1	1	1	1	1	1	1	3	9	5.5	35																							
29-Jul	20	Z	4	2	5	1	3	4	5	15	14	7	6	2	3	1	1	2	1	1	2	2	4	8	4.9	20																							
30-Jul	5	Z	2	2	2	2	16	16	16	14	6	6	5	3	2	3	3	3	2	2	2	4	3	1	5.1	16																							
31-Jul	3	Z	1	1	1	1	2	14	11	13	9	6	2	3	4	3	3	2	1	1	1	1	2	2	3.8	14																							
																								3.0	--	1.8	2.1	3.2	3.3	6.9	9.3	10.1	9.9	6.4	3.8	2.6	2.1	2.4	2.7	2.6	2.4	2.3	2.3	2.2	2.4	2.9	2.4	Diurnal Average	
																								20	--	12	14	34	24	25	26	35	46	27	10	6	10	15	10	8	8	7	10	11	19	24	9	Diurnal Maximum	
Z - zerospan C - Calibration																																																	



WBEA NETWORK
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	693	98.02	98.02
21 - 40	13	1.84	99.86
41 - 80	1	0.14	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - July 2014

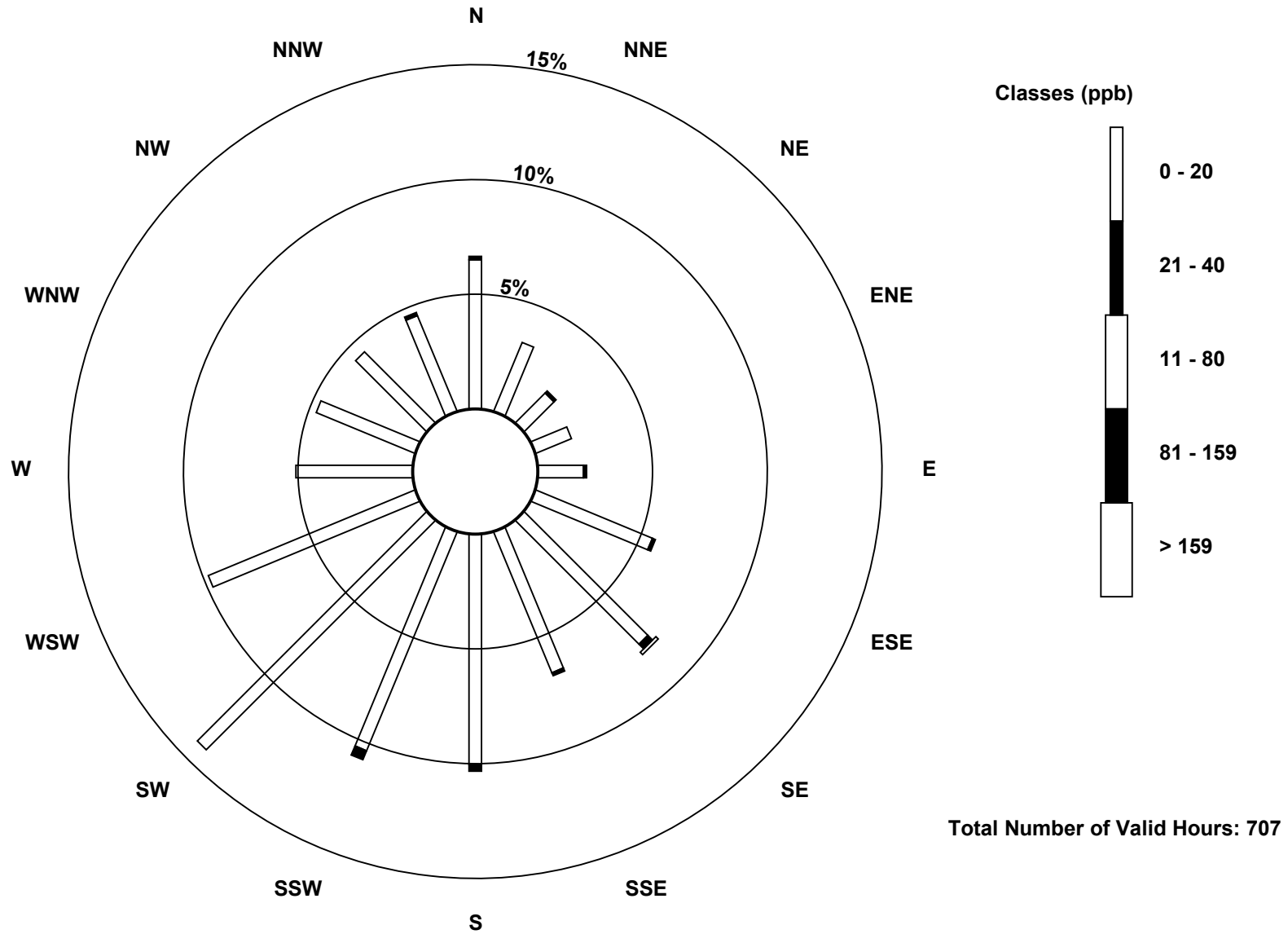
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	46	23	13	12	14	39	54	47	71	73	100	69	36	33	31	32	693
21 - 40	1	0	1	0	1	1	2	1	2	3	0	0	0	0	0	1	13
11 - 80	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	47	23	14	12	15	40	57	48	73	76	100	69	36	33	31	33	707

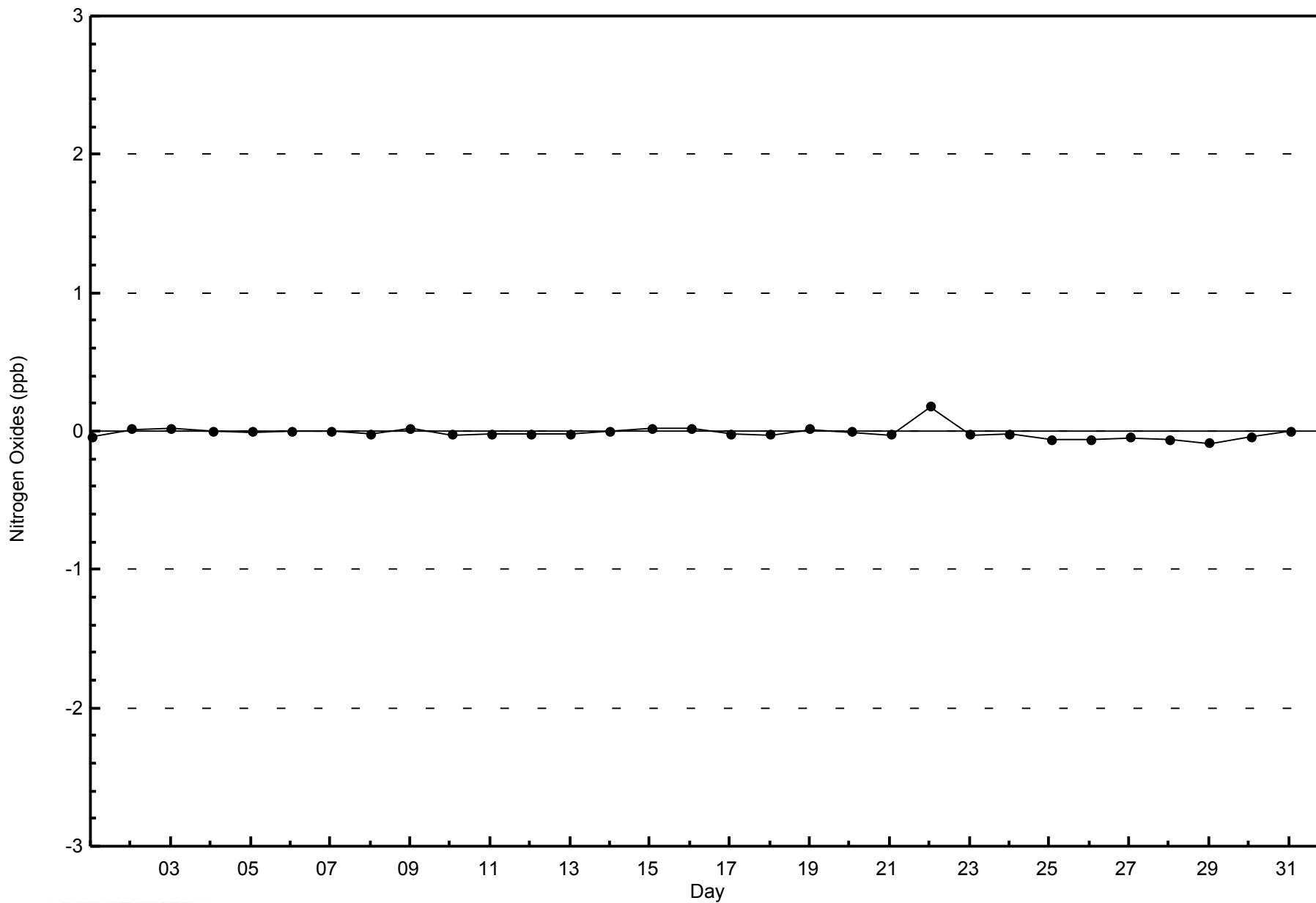
Total Number of Valid Hours: 707

Total Number of Hours: 744

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

**Nitrogen Oxides (NO_x) - ppb
Fort McKay South (AMS 13)**

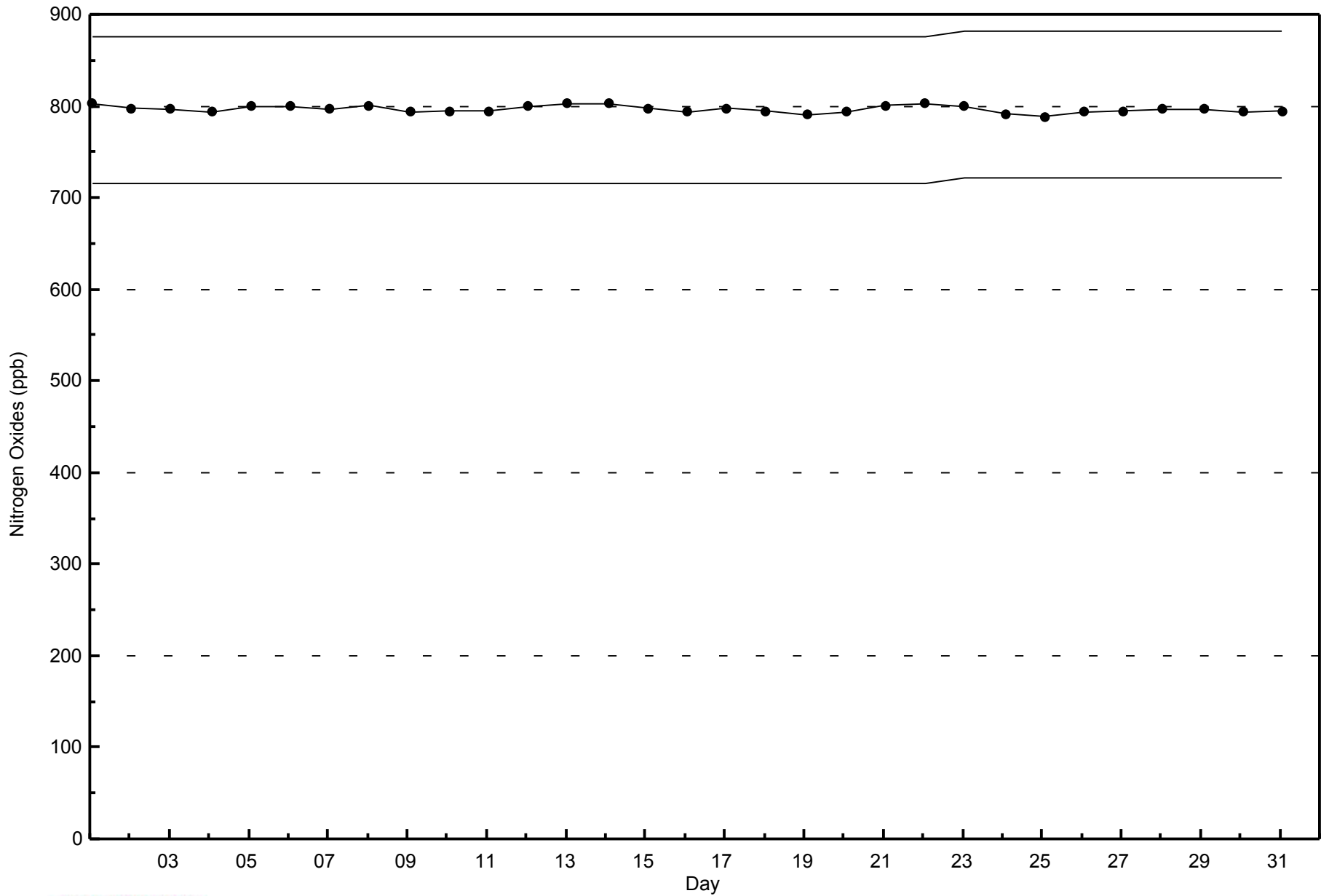






WBEA NETWORK
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - July 2014





Summary of Hour Averages

Fort McKay South - July 2014

Number of Exceedences (AAAQO):	24-hr: 5	Hours in Service:	744
Maximum Value: 173.3 µg/m ³ on Jul 31 16:00	Maximum Daily Average: 45.1 µg/m ³ on Jul 12	Hours of Data:	743
Minimum Value: 1.5 µg/m ³ on Jul 10 16:00	Minimum Daily Average: 2.4 µg/m ³ on Jul 5	Hours of Missing Data:	1
Maximum Diurnal Average: 21.6 µg/m ³ at hour 16	Minimum Diurnal Average: 13.7 µg/m ³ at hour 4	Hours of Calibration:	0
Monthly Average: 16.89 µg/m ³	Percentiles: P ₁ = 1.5 P ₁₀ = 3.7 Q ₁ = 6.9 Median = 11.7 Q ₃ = 22.0 P ₉₀ = 36.2 P ₉₉ = 67.6	Percent Operational Time:	99.9

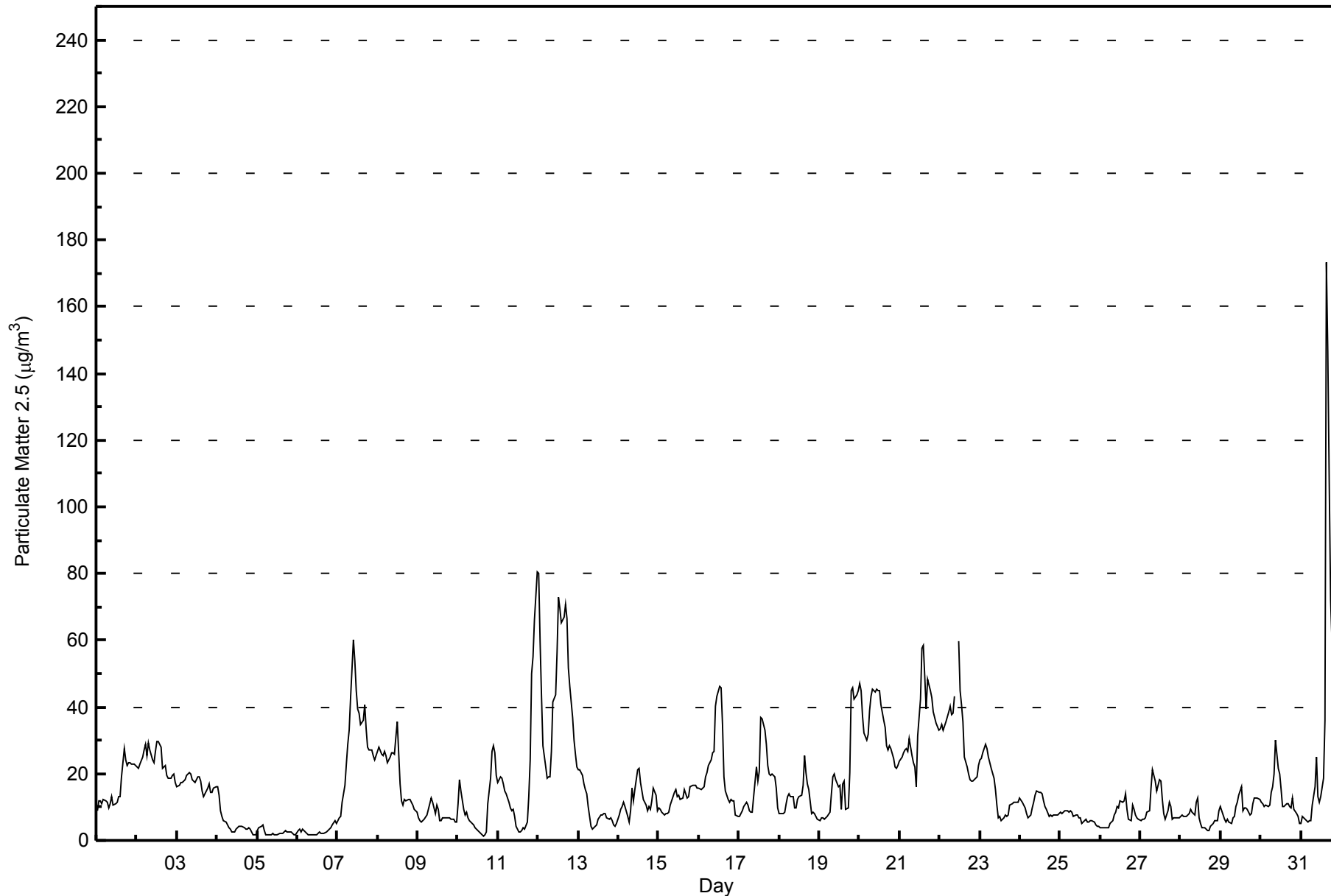
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	9.1	12.1	11.7	10.9	12.1	12.0	11.3	9.9	11.0	13.2	10.8	11.1	11.3	13.0	13.2	19.1	27.4	24.0	22.5	23.2	23.2	22.7	22.8	22.5	15.8	27.4
2-Jul	22.0	21.7	22.8	24.9	27.0	28.9	25.3	29.4	26.9	24.0	23.1	26.9	29.6	29.7	28.1	21.7	22.2	22.6	19.7	18.8	18.8	19.4	19.8	17.4	23.8	29.7
3-Jul	16.1	16.6	17.3	17.2	17.9	18.1	19.6	20.1	19.9	18.4	17.7	17.4	19.2	19.2	17.9	14.8	13.2	14.0	15.6	16.8	14.4	14.5	15.7	15.9	17.0	20.1
4-Jul	16.3	13.7	8.9	7.1	6.0	5.4	4.7	3.7	3.2	2.6	2.7	3.4	4.0	4.2	4.3	4.1	3.9	3.4	3.4	3.7	3.5	1.9	1.5	1.5	4.9	16.3
5-Jul	2.8	4.0	4.4	4.5	3.0	1.9	1.9	1.7	1.9	2.1	1.5	1.5	1.5	1.9	2.2	2.3	2.5	3.0	2.4	2.5	2.5	2.1	1.9	1.8	2.4	4.5
6-Jul	3.0	3.3	2.6	3.4	3.0	2.3	1.7	1.6	1.5	1.7	1.5	1.5	1.9	2.6	2.2	2.3	2.3	2.4	2.8	3.3	4.0	4.5	5.9	5.2	2.8	5.9
7-Jul	6.1	6.7	7.2	11.5	16.7	23.1	28.9	33.0	43.0	60.1	53.9	44.9	39.3	38.3	34.5	36.1	40.7	33.5	28.1	27.1	27.1	25.6	24.2	25.3	29.8	60.1
8-Jul	26.5	28.0	26.0	25.5	26.6	25.5	23.4	24.9	26.2	26.3	25.8	31.1	35.6	17.1	11.9	10.5	12.5	11.7	12.2	12.4	11.4	10.4	9.3	8.4	20.0	35.6
9-Jul	6.9	5.9	5.5	5.8	6.4	7.5	9.2	11.1	12.8	11.6	8.0	10.5	9.4	5.9	6.1	6.7	6.6	6.6	6.9	6.8	6.5	6.5	5.5	5.6	7.5	12.8
10-Jul	10.8	18.1	15.0	9.5	7.7	8.4	6.8	5.8	5.2	4.6	3.7	3.4	3.2	2.7	1.7	1.5	1.7	2.5	11.1	18.6	26.7	28.5	26.2	19.6	10.1	28.5
11-Jul	17.2	19.1	18.6	16.7	14.8	14.1	11.6	9.9	8.7	9.2	7.2	4.1	2.7	2.4	2.8	3.9	3.2	5.6	13.2	24.1	49.8	55.1	66.0	80.4	19.2	80.4
12-Jul	80.0	59.7	43.1	28.5	22.2	18.8	19.3	19.3	26.9	41.6	43.7	56.2	72.9	69.3	65.1	67.0	70.6	66.6	51.5	46.2	37.0	30.1	25.8	22.0	45.1	80.0
13-Jul	21.0	21.2	19.6	16.9	15.2	14.0	10.0	4.0	3.3	4.0	4.2	4.9	6.4	7.5	7.6	8.0	7.9	6.7	6.5	6.7	5.9	4.8	4.2	5.2	9.0	21.2
14-Jul	7.7	9.4	10.0	11.3	10.4	7.3	5.6	8.9	15.6	12.0	15.3	21.1	21.5	17.3	14.6	12.4	10.5	9.1	10.0	9.3	11.7	15.7	13.7	8.7	12.0	21.5
15-Jul	10.0	9.5	8.5	7.8	8.1	8.1	8.7	10.5	11.9	14.6	15.4	13.2	13.5	12.4	12.8	15.1	13.9	12.8	13.3	15.9	16.4	16.7	16.5	15.7	12.6	16.7
16-Jul	15.7	15.1	15.8	16.1	19.1	20.1	22.3	24.1	26.2	26.7	40.2	43.1	46.3	45.7	34.6	18.9	14.8	12.1	11.6	12.3	12.0	11.9	7.8	7.0	21.7	46.3
17-Jul	7.1	7.9	8.8	10.3	11.3	10.8	8.9	8.4	8.4	13.3	21.9	17.8	20.9	36.7	36.4	32.8	29.0	22.5	19.8	19.5	20.0	18.9	15.5	9.5	17.4	36.7
18-Jul	7.9	8.1	7.9	8.7	10.9	13.0	13.9	13.3	13.1	9.6	9.7	12.2	13.3	13.4	16.7	25.3	20.3	16.8	15.2	7.9	8.5	7.9	7.3	6.5	12.0	25.3
19-Jul	5.9	6.7	6.6	6.4	6.8	7.1	8.3	14.1	19.0	20.0	18.3	16.2	16.4	9.5	17.0	17.8	9.3	9.7	20.4	44.7	45.9	42.5	43.5	45.1	19.1	45.9
20-Jul	47.2	45.1	37.3	32.3	30.2	31.7	38.9	43.4	45.2	44.6	45.5	45.0	45.0	40.8	35.9	33.8	28.3	26.9	28.5	27.5	24.4	22.2	21.7	22.3	35.2	47.2
21-Jul	23.7	25.0	26.1	27.3	27.3	26.7	30.3	25.3	23.3	21.9	16.3	31.4	42.5	57.8	58.6	49.1	39.5	48.1	45.1	42.7	38.4	36.7	35.0	33.1	34.6	58.6
22-Jul	33.3	34.9	32.9	34.3	35.6	38.4	40.4	37.7	38.3	43.3	M	59.9	45.1	40.6	35.7	25.1	22.0	19.8	18.4	17.6	17.7	18.7	19.1	22.3	31.8	59.9
23-Jul	24.0	24.5	26.1	28.8	27.7	25.1	23.4	21.4	18.5	15.4	10.5	6.7	7.2	5.8	6.6	7.6	7.0	7.5	10.6	11.1	11.3	11.5	11.3	11.3	15.0	28.8
24-Jul	12.5	11.4	10.8	9.6	8.1	6.8	7.7	9.7	11.2	13.5	14.9	14.3	14.6	13.8	11.8	10.1	9.1	7.1	7.6	7.1	7.8	7.8	7.6	7.9	10.1	14.9
25-Jul	8.5	8.1	8.4	8.7	9.0	8.3	8.8	8.3	7.4	7.7	7.8	6.9	6.7	5.2	5.7	6.5	5.6	5.6	5.8	5.9	5.5	4.9	4.4	4.2	6.8	9.0
26-Jul	3.9	3.7	3.6	3.6	3.7	3.8	5.3	5.9	7.8	8.6	10.2	9.9	11.9	11.3	12.0	14.0	9.3	6.2	6.1	10.6	9.2	7.6	7.0	6.5	7.6	14.0
27-Jul	6.1	6.4	6.2	6.9	8.6	8.8	15.7	21.1	19.5	18.0	15.0	18.1	17.7	12.1	7.9	6.5	8.8	11.3	10.0	6.4	6.9	6.8	6.8	6.9	10.8	21.1
28-Jul	7.1	7.5	7.2	7.4	7.7	8.0	9.2	8.7	7.4	11.6	12.8	6.8	5.0	3.9	3.7	3.3	3.0	3.0	4.1	5.1	6.0	5.8	6.0	8.8	6.6	12.8
29-Jul	10.3	7.6	6.3	5.7	6.3	5.5	5.1	6.7	7.1	10.2	11.3	13.7	16.1	8.9	9.8	9.6	9.3	7.7	8.2	11.1	12.7	12.9	12.5	12.3	9.4	16.1
30-Jul	11.3	11.0	10.4	10.5	10.3	10.4	14.6	16.2	19.9	30.0	21.6	19.8	15.2	10.3	10.1	10.9	11.0	10.0	9.8	12.6	9.4	8.0	7.0	5.2	12.7	30.0
31-Jul	5.1	7.1	6.4	5.9	5.7	5.7	6.1	10.6	16.1	24.9	13.3	11.3	13.0	18.7	35.9	173.3	146.6	107.9	72.2	46.4	35.5	73.6	81.0	71.7	41.4	173.3
	15.6	15.5	14.3	13.7	13.7	13.7	14.4	15.1	16.3	18.2	16.8	18.9	19.6	18.6	18.2	21.6	19.7	17.6	16.5	16.9	17.1	17.9	17.8	17.3		Diurnal Average
	80.0	59.7	43.1	34.3	35.6	38.4	40.4	43.4	45.2	60.1	53.9	59.9	72.9	69.3	65.1	173.3	146.6	107.9	72.2	46.4	49.8	73.6	81.0	80.4		Diurnal Maximum

M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA NETWORK
Hourly Averages

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





WBEA NETWORK
Cumulative Frequency Distribution

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	114	15.34	15.34
6 - 15	339	45.63	60.97
16 - 25	146	19.65	80.62
26 - 80	140	18.84	99.46
> 81.0	4	0.54	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

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

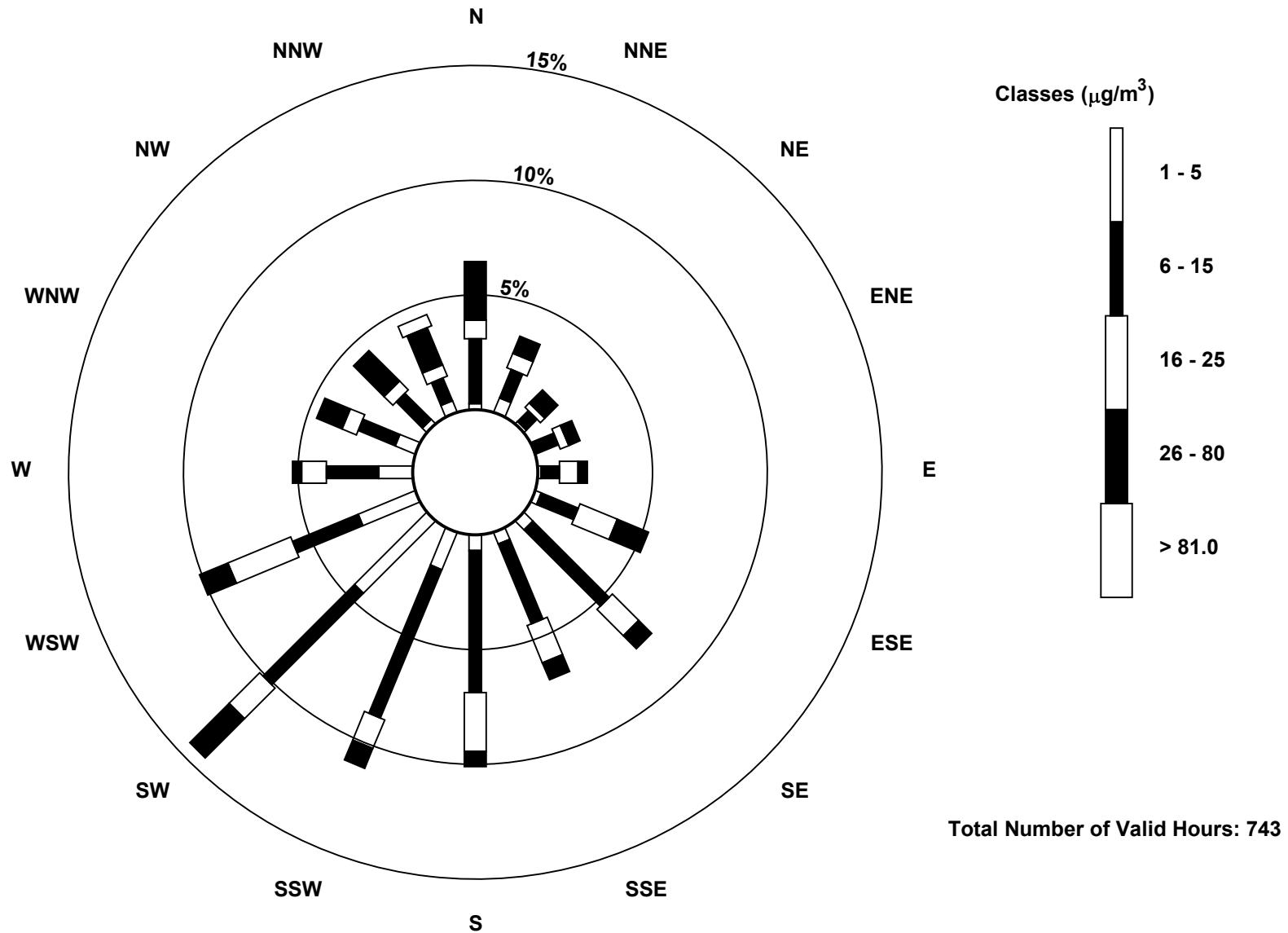
Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	2	5	1	0	1	2	4	4	5	13	33	20	11	7	2	4	114
6 - 15	21	10	5	8	6	13	35	28	46	52	42	23	17	13	12	8	339
16 - 25	6	5	2	3	6	13	12	13	19	10	14	22	8	5	4	4	146
26 - 80	19	6	6	4	3	11	6	6	5	7	18	10	3	9	14	13	140
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
Totals	48	26	14	15	16	39	57	51	75	82	107	75	39	34	32	33	743

Total Number of Valid Hours: 743

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South (AMS 13)



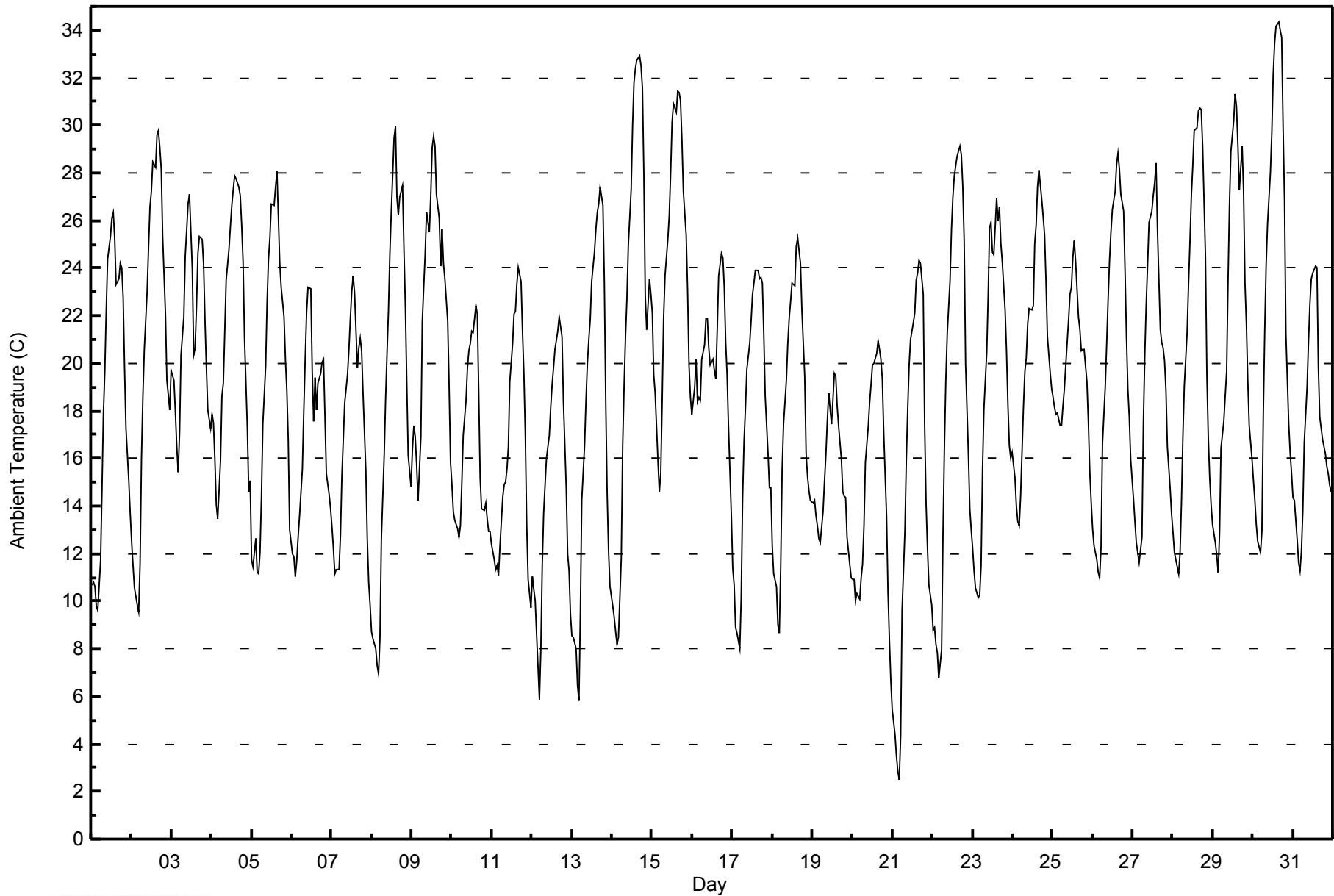


Maximum Value: 34.4 C on Jul 30 16:00		Maximum Daily Average: 24.1 C on Jul 15		Hours in Service: 744																																												
Minimum Value: 2.5 C on Jul 21 05:00		Minimum Daily Average: 14.5 C on Jul 21		Hours of Data: 744																																												
Maximum Diurnal Average: 25.7 C at hour 15		Minimum Diurnal Average: 11.0 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 19.05 C		Percentiles: P ₁ = 5.9 P ₁₀ = 11.1 Q ₁ = 14.1 Median = 19.2 Q ₃ = 23.7 P ₉₀ = 27.2 P ₉₉ = 32.6		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-Jul	10.7	10.8	10.6	9.8	9.6	11.7	14.7	17.8	19.6	22.2	24.4	25.4	26.1	26.3	25.2	23.3	23.5	24.2	24.0	22.8	19.8	17.2	15.1	13.7	18.7	26.3																						
2-Jul	12.5	11.5	10.6	9.8	9.5	11.6	16.0	18.6	20.6	23.0	24.9	26.6	27.2	28.5	28.2	29.6	29.8	29.1	28.2	25.3	22.1	19.3	18.7	18.0	20.8	29.8																						
3-Jul	19.7	19.3	18.0	16.5	15.5	17.1	20.4	22.0	24.5	25.5	26.7	27.1	24.0	20.7	22.4	24.6	25.4	25.2	24.2	21.8	19.8	18.0	17.3	21.5	27.1																							
4-Jul	17.8	17.5	15.9	14.1	13.4	15.9	18.6	19.2	21.3	23.5	24.8	25.7	26.6	27.3	27.9	27.8	27.4	27.1	25.8	24.3	21.1	17.3	14.6	15.1	21.2	27.9																						
5-Jul	11.7	11.4	12.7	11.2	11.2	12.0	14.4	17.5	19.9	22.6	24.4	25.3	26.7	26.6	27.4	28.1	26.2	24.2	23.2	22.0	20.2	18.9	16.8	13.0	19.5	28.1																						
6-Jul	12.0	11.9	11.0	11.7	12.7	13.6	15.6	18.0	20.2	22.1	23.2	23.1	19.6	17.6	19.4	18.0	19.2	19.6	20.1	20.2	17.8	15.4	14.5	13.9	17.1	23.2																						
7-Jul	13.1	12.2	11.2	11.3	11.4	12.8	15.2	16.8	18.3	19.5	20.6	21.9	23.0	23.7	23.0	19.8	20.6	21.1	20.5	18.8	15.5	12.6	10.8	9.8	16.8	23.7																						
8-Jul	8.7	8.4	8.0	7.3	7.0	8.5	12.7	16.2	18.5	20.4	22.2	24.6	26.3	29.5	30.0	27.0	26.2	27.0	27.5	24.8	22.4	19.2	16.2	14.8	18.9	30.0																						
9-Jul	16.4	17.4	16.9	15.7	14.2	16.9	21.8	23.2	24.6	26.3	25.5	27.0	29.1	29.6	29.1	27.1	26.1	24.1	25.6	24.2	23.5	21.8	19.0	15.8	22.5	29.6																						
10-Jul	14.9	13.8	13.4	13.0	12.7	13.2	14.9	16.9	18.5	19.8	20.5	20.8	21.3	21.3	22.4	22.1	18.7	15.2	13.9	13.8	14.1	13.5	13.0	12.9	16.4	22.4																						
11-Jul	12.4	11.7	11.3	11.5	11.1	12.3	14.3	14.9	15.0	15.5	16.5	19.2	20.8	22.1	22.2	23.3	24.0	23.5	21.4	19.6	17.0	13.2	10.9	9.7	16.4	24.0																						
12-Jul	11.1	10.5	10.1	8.6	5.9	8.0	11.5	13.7	14.9	16.0	17.0	18.1	19.1	19.8	20.6	21.4	22.0	21.5	21.1	18.4	14.8	12.0	11.2	9.4	14.9	22.0																						
13-Jul	8.6	8.5	8.0	6.5	5.8	9.4	14.2	16.5	18.4	20.0	21.0	21.8	23.5	24.7	25.6	26.3	26.7	27.4	26.6	23.5	18.4	14.5	12.1	10.6	17.4	27.4																						
14-Jul	9.8	9.3	8.7	8.2	8.5	11.8	16.5	19.1	21.1	22.7	24.9	27.3	29.9	31.8	32.4	32.7	32.9	32.5	31.6	27.9	22.8	21.4	23.5	22.9	22.1	32.9																						
15-Jul	22.1	19.5	18.7	15.9	14.6	15.4	18.5	21.9	23.6	25.2	26.2	28.0	30.1	30.9	30.5	31.4	31.4	31.0	29.4	27.2	25.4	23.1	20.0	18.6	24.1	31.4																						
16-Jul	17.8	19.0	20.2	18.4	18.6	18.4	20.2	20.8	21.9	21.9	20.6	19.9	20.1	19.7	19.3	21.4	23.7	24.6	24.5	23.2	20.9	19.5	17.3	13.6	20.2	24.6																						
17-Jul	11.4	10.7	8.9	8.7	8.0	10.2	14.4	16.7	18.1	19.8	20.8	21.8	22.9	23.4	23.9	23.9	23.6	23.6	23.4	21.3	18.6	16.2	14.8	14.8	17.5	23.9																						
18-Jul	12.4	11.2	10.6	9.0	8.7	11.4	15.5	17.4	19.3	20.8	21.9	22.6	23.4	23.3	24.9	25.3	24.8	24.2	22.2	19.4	16.2	15.3	14.7	14.3	17.9	25.3																						
19-Jul	14.1	14.2	13.6	13.2	12.6	12.5	13.8	15.0	16.1	17.6	18.7	17.4	18.5	19.6	19.5	18.2	17.4	16.0	14.6	14.4	14.3	12.7	11.5	11.0	15.3	19.6																						
20-Jul	10.9	10.9	10.0	10.3	10.1	11.0	11.6	13.2	15.8	17.3	18.4	19.1	20.0	20.0	20.4	21.0	20.6	20.1	19.4	17.1	13.6	10.4	8.4	6.7	14.8	21.0																						
21-Jul	5.5	4.4	3.5	2.9	2.5	4.3	9.6	12.9	15.9	18.1	19.9	21.0	21.7	22.1	23.5	23.8	24.3	24.2	22.9	17.4	14.1	12.2	10.6	9.9	14.5	24.3																						
22-Jul	8.8	8.9	8.2	7.8	6.7	8.0	12.8	16.5	19.3	21.2	23.5	25.6	27.0	27.9	28.3	28.7	29.1	28.8	27.5	25.2	20.0	16.1	13.9	13.0	18.9	29.1																						
23-Jul	12.2	11.3	10.5	10.2	10.3	11.5	15.5	18.1	20.5	22.9	25.7	25.9	24.7	24.6	26.9	26.0	26.6	25.1	24.3	22.2	20.5	18.3	16.6	16.0	19.4	26.9																						
24-Jul	16.3	15.2	14.0	13.3	13.2	14.4	18.1	19.7	20.2	21.7	22.3	22.2	22.4	25.0	25.8	27.4	28.1	26.9	26.2	25.4	23.5	21.1	19.6	19.0	20.9	28.1																						
25-Jul	18.5	18.1	17.8	17.9	17.4	17.4	18.2	18.9	19.9	21.8	22.9	23.2	24.5	25.1	24.3	21.9	21.4	20.5	20.6	20.6	19.2	17.6	15.5	14.2	19.9	25.1																						
26-Jul	13.0	12.3	11.7	11.2	11.0	12.3	16.6	19.1	20.8	22.7	24.3	25.5	26.4	27.2	28.4	28.8	28.2	27.1	26.4	23.9	21.1	18.9	17.7	15.9	20.5	28.8																						
27-Jul	14.3	13.4	12.4	12.1	11.7	12.7	17.5	20.3	22.5	24.2	26.0	26.4	27.1	27.6	28.4	25.6	21.4	20.9	20.7	20.1	18.9	16.5	14.7	13.6	19.5	28.4																						
28-Jul	12.9	12.1	11.7	11.2	12.0	14.2	16.9	19.0	21.3	23.3	25.1	27.1	28.3	29.8	29.9	30.6	30.7	30.7	29.1	24.5	19.5	16.9	15.2	14.1	21.1	30.7																						
29-Jul	13.2	12.5	11.9	11.2	12.9	16.4	17.6	18.6	19.6	23.4	26.7	28.9	30.2	31.3	30.8	29.1	27.3	29.1	27.3	23.4	21.7	19.3	17.4	16.0	21.5	31.3																						
30-Jul	15.1	14.2	13.2	12.5	12.1	12.9	17.9	21.4	24.2	25.8	28.0	29.7	32.2	33.5	34.2	34.4	34.0	33.7	30.0	26.9	21.2	17.4	16.2	15.3	23.2	34.4																						
31-Jul	14.4	14.3	12.6	11.6	11.3	12.1	13.9	16.7	19.0	20.9	22.5	23.6	23.8	24.1	24.0	19.8	17.7	17.3	16.8	16.2	15.7	15.4	14.9	14.6	17.2	24.1																						
																								13.3	12.8	12.1	11.4	11.0	12.6	15.8	18.0	19.8	21.5	22.9	23.9	24.7	25.3	25.7	25.4	25.1	24.7	23.9	21.9	19.2	16.9	15.3	14.1	Diurnal Average
																								22.1	19.5	20.2	18.4	18.6	18.4	21.8	23.2	24.6	26.3	28.0	29.7	32.2	33.5	34.2	34.4	34.0	33.7	31.6	27.9	25.4	23.1	23.5	22.9	Diurnal Maximum



WBEA NETWORK
Hourly Averages

Ambient Temperature (AT) - C
Fort McKay South - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Fort McKay South - July 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	48	6.45	6.45
10 - 20	365	49.06	55.51
> 20	331	44.49	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

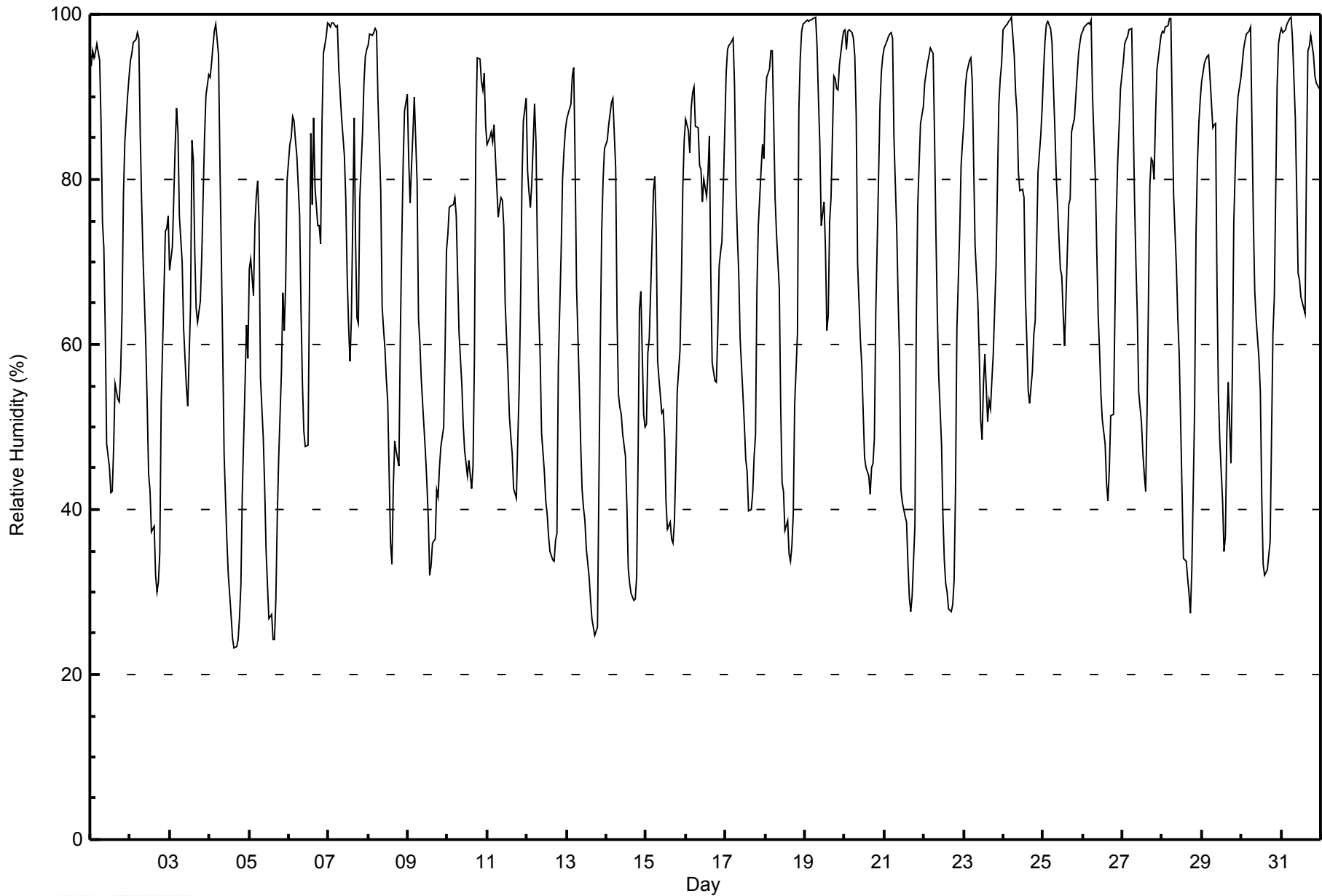


Maximum Value: 100 % on Jul 31 07:00																		Maximum Daily Average: 88.4 % on Jul 19																		Hours in Service: 744							
Minimum Value: 23 % on Jul 4 16:00																		Minimum Daily Average: 53.1 % on Jul 5																		Hours of Data: 744							
Maximum Diurnal Average: 93.6 % at hour 5																		Minimum Diurnal Average: 45.4 % at hour 15																		Hours of Missing Data: 0							
Monthly Average: 69.7 %																		Percentiles: P ₁ = 26 P ₁₀ = 37 Q ₁ = 51 Median = 74 Q ₃ = 90 P ₉₀ = 97 P ₉₉ = 99																		Hours of Calibration: 0							
																																				Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																			
1-Jul	94	96	95	95	96	94	87	75	72	62	48	45	42	42	47	55	53	53	57	64	78	85	90	92	71.5	96																	
2-Jul	94	95	97	97	98	97	86	78	71	60	53	44	42	37	38	32	30	31	35	53	67	74	74	76	64.9	98																	
3-Jul	69	72	78	84	89	86	76	70	62	58	55	53	65	85	82	71	64	63	65	71	78	85	90	93	73.4	93																	
4-Jul	92	94	96	98	99	95	82	71	59	47	36	32	30	27	24	23	23	24	27	31	42	55	62	58	55.4	99																	
5-Jul	69	70	66	74	78	80	75	56	49	43	35	31	27	27	24	24	29	39	46	57	66	62	67	80	53.1	80																	
6-Jul	84	85	88	87	85	83	76	64	55	50	48	48	66	86	77	88	79	74	74	72	87	95	97	99	76.9	99																	
7-Jul	99	98	99	99	98	99	93	90	87	83	78	68	62	58	63	87	72	63	63	78	86	92	95	96	83.6	99																	
8-Jul	96	98	97	98	98	98	90	79	65	62	60	56	53	36	33	43	48	47	45	61	72	82	88	90	70.6	98																	
9-Jul	82	77	82	86	90	80	63	60	56	53	47	43	39	32	33	36	36	42	41	45	48	50	59	71	56.3	90																	
10-Jul	73	77	77	77	78	76	68	61	55	50	47	46	44	46	43	45	59	85	95	95	92	91	93	87	69.1	95																	
11-Jul	84	85	86	85	87	83	75	77	78	77	74	65	56	51	49	47	43	41	49	55	65	80	87	90	69.5	90																	
12-Jul	81	79	77	80	89	84	72	64	59	49	45	41	40	37	35	34	34	36	37	57	71	80	83	86	60.4	89																	
13-Jul	87	88	89	93	94	82	67	55	48	42	40	39	35	32	29	27	26	25	26	43	60	74	80	84	56.8	94																	
14-Jul	85	87	88	89	90	81	63	54	52	52	49	47	41	33	31	30	29	29	32	46	64	66	52	50	55.8	90																	
15-Jul	50	59	61	72	79	80	73	58	56	52	52	49	41	38	38	37	36	38	45	54	59	68	79	85	56.6	85																	
16-Jul	87	86	83	89	90	91	87	86	82	81	77	80	78	81	85	69	58	56	55	61	69	71	73	86	77.6	91																	
17-Jul	93	96	96	96	97	91	79	73	69	61	54	50	46	45	40	40	42	46	49	67	74	81	84	83	68.9	97																	
18-Jul	89	92	93	96	96	87	78	73	67	52	43	42	38	39	35	34	36	39	53	61	88	95	98	99	67.6	99																	
19-Jul	99	99	99	99	99	99	100	96	90	84	74	77	72	62	64	75	78	93	92	91	91	94	97	98	88.4	100																	
20-Jul	98	96	98	98	98	97	95	88	70	61	57	52	46	45	44	42	45	46	49	64	80	89	93	95	72.7	98																	
21-Jul	96	97	97	98	98	97	85	74	65	59	42	41	39	38	33	29	28	29	38	63	77	82	87	89	65.9	98																	
22-Jul	92	93	94	95	96	95	85	74	64	56	48	39	34	31	30	28	28	28	31	42	62	74	82	84	61.9	96																	
23-Jul	87	91	93	94	95	92	82	72	65	59	51	49	55	59	51	53	52	56	59	70	79	89	92	94	72.4	95																	
24-Jul	98	99	99	99	99	100	95	91	88	81	79	79	78	66	61	54	53	57	61	63	72	81	85	89	80.2	100																	
25-Jul	93	97	99	99	98	97	91	86	81	73	69	68	64	60	66	77	78	86	87	87	93	95	97	98	84.9	99																	
26-Jul	98	99	99	99	99	99	90	80	71	64	59	54	51	48	43	41	45	51	52	64	76	82	86	91	72.5	99																	
27-Jul	94	97	97	97	98	98	88	78	70	64	54	51	47	44	42	52	79	82	82	80	87	93	96	98	77.9	98																	
28-Jul	98	98	98	99	99	100	88	78	69	63	59	51	42	34	34	32	30	27	33	52	73	82	87	90	67.3	100																	
29-Jul	92	94	95	95	95	92	86	87	87	67	54	48	41	35	37	49	55	46	57	75	81	87	90	92	72.4	95																	
30-Jul	94	96	97	98	98	98	87	75	67	63	58	54	41	33	32	33	34	36	49	61	66	91	96	98	69.0	98																	
31-Jul	98	98	98	99	99	100	100	97	87	78	69	68	66	64	64	82	96	96	97	95	93	92	91	91	88.2	100																	
																		88.7	89.8	90.6	92.4	93.6	91.3	82.7	74.8	68.2	61.4	55.3	51.9	49.0	46.8	45.4	47.4	48.3	50.5	54.2	63.8	74.1	81.1	84.9	87.4	Diurnal Average	
																		99	99	99	99	99	100	100	97	90	84	79	80	78	86	85	88	96	96	97	95	93	95	98	99	Diurnal Maximum	



WBEA NETWORK
Hourly Averages

Relative Humidity (RH) - %
Fort McKay South - July 2014





Maximum Speed: 13 km/h on Jul 4 16:00	Maximum Daily Speed Average: 7.7 km/h on Jul 4	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 17 06:00	Minimum Daily Speed Average: 0.4 km/h on Jul 1	Hours of Data: 744
Maximum Diurnal Speed Average: 2.4 km/h at hour 12	Minimum Diurnal Speed Average: 0.5 km/h at hour 18	Hours of Missing Data: 0
Monthly Average Velocity: 1.4 km/h 212.3 deg	Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 6 P ₉₀ = 8 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-Jul	SW2	SSW1	S1	SSW1	SSW2	SSW1	SSE2	SSE4	SE2	SE3	SSE5	SSE5	S4	SSW5	NNW4	N9	N4	N5	N3	NNW3	WVW1	WSW2	WSW2	WSW1	SSW0.4	N9
2-Jul	S2	SSW1	SW2	SW2	SW2	SW1	ESE1	SE3	ENE3	E5	SE5	SE6	ESE4	ESE4	NE6	ESE5	ESE7	ESE5	SE4	WSW0	WSW1	SSW2	SSE3	SSE3	SE2.3	ESE7
3-Jul	SSE4	SSE4	S3	S2	WSW1	S2	SE3	SE7	SE9	SSE9	SE9	SE10	SSE10	SSE5	E3	ENE3	SE5	SE5	E3	N4	N9	NNW5	NW2	NNW3	SE2.8	SSE10
4-Jul	W5	WSW7	SSW4	SSW3	S1	SSE3	S5	SW8	SSW9	SW10	SW12	SW13	WSW12	SW13	SW12	SW13	SW13	SW11	SW11	SW7	SW5	SSW4	SW6	SSW5	SW7.7	SW13
5-Jul	SW4	SW5	SW3	ESE2	SSE2	S2	SSE2	S6	SSW8	S9	SW10	SW10	WSW9	WSW8	SW12	SW10	WVW4	NNE7	NE1	W2	NW2	NNW6	N2	WSW2	SW3.6	SW12
6-Jul	SSW2	NNW1	WSW2	WSW4	SW1	SW2	WSW3	W3	SW3	WSW4	SW6	WSW5	NNW3	NNE6	ESE4	NNE1	E2	N3	SW3	WSW3	NNW3	W3	NNW2	SW1	W1.5	SW6
7-Jul	W4	WSW3	SW1	NNW4	W3	W3	WSW4	W3	NNW3	NW5	NNW5	NNW6	NNW6	NW8	N10	NNW5	N6	N6	N5	NNW2	SW1	SW2	S2	SW2	NW2.8	N10
8-Jul	SSW2	SSW2	SW2	S2	S2	SW2	SSW1	SSE4	SSE7	SE6	ESE7	SE8	SE8	S10	SSW11	NW4	ENE5	ESE5	SE4	SSW1	SW1	SW1	SW2	S2	SSE3.0	SSW11
9-Jul	S3	ENE0	NNW1	SSW3	SSW2	SSW3	ESE2	ESE3	SE6	S9	SW10	SSW11	S9	SSW11	SW9	W10	WSW9	SW4	SSW8	S7	WSW6	NNW8	W3	SW4	SSW4.4	SSW11
10-Jul	WSW5	WSW5	WSW7	WSW8	WSW7	WSW7	W3	SW7	WSW6	WSW6	WSW7	WSW11	WSW10	W8	WSW10	NNW13	NW12	NNW10	W7	WSW7	NNW6	W7	W7	W8	W7.2	NNW13
11-Jul	WSW8	W7	WSW7	W8	W8	W8	W6	W6	W6	W6	WSW8	W9	W8	W8	W8	WVW9	NNW9	N11	N12	NNW4	NNW2	NNW2	NW3	W5.9	N12	
12-Jul	NNW5	NW5	NW6	NW4	WSW2	NNW3	NNW3	NNW5	NW5	NNW5	NW5	NNW4	NNE3	NNE5	NE2	NE3	NNW2	N5	NE3	NNW1	WSW1	WSW1	SW1	SW2	NNW2.5	NW6
13-Jul	SW2	SW2	WSW2	SW1	SW2	W1	NE1	SE6	SE7	SE7	SE5	SSE4	SE3	ESE3	ESE5	SE4	NE1	ESE1	ESE2	SW1	SW1	SW2	SSW2	SW2	SSE2.0	SE7
14-Jul	SSW2	SW2	WSW2	SSW2	W1	W1	SSE6	SSE6	SE6	ESE6	SE7	ESE8	SSE9	S11	S11	S10	S9	SSW8	S6	SSW4	SSW3	SSW5	SSW7	SSW8	S5.0	S11
15-Jul	S7	S5	S6	SSW3	S2	S3	S3	SSE6	SE6	SSE6	SE7	SE7	S8	SSW8	SW9	SSW8	S9	S10	S7	S5	S7	S3	SSW2	S3	S5.4	S10
16-Jul	S2	SW5	WSW6	SW3	SW3	SSW2	NW1	WSW4	N5	N5	N3	NW3	NW4	NNW3	SW5	SW8	SW7	SSW7	SW4	SSW6	SW8	NW6	NNE4	NNW1	WSW2.4	SW8
17-Jul	WSW2	W1	S1	SW1	SW1	NNE0	NNE1	NNE2	N2	N3	NE1	E5	ENE4	E4	E1	N2	ENE3	ENE1	NNE1	WSW2	W2	SW2	NW3	NW3	NNE0.6	E5
18-Jul	SSW1	WSW2	NNW1	SW1	N1	NNW1	NNW3	NNW6	N4	NNE6	N5	N5	NNE6	NE4	ESE3	E2	ESE5	ESE4	S3	SW11	S4	SW6	SSE1	SSW1	N0.5	SW11
19-Jul	S2	SSE3	WSW0	NW1	SW1	SSW2	WSW1	SW5	WSW5	WSW5	WSW9	WSW8	WSW10	W10	NNW10	NNW7	NNW6	NNW5	NNW10	NNW7	NW5	NW4	NNW5	WSW5	W4.2	W10
20-Jul	WSW5	SW4	SW4	WSW5	WSW5	WSW2	SW4	WSW5	NNW3	N2	NE5	NNE5	N6	N6	NNE6	NNE6	N8	N7	N6	NW2	W2	WSW2	SSW2	SSW2	NW1.9	N8
21-Jul	SSW1	S2	SSE1	SSE1	SSE2	SW0	SSE2	E2	ENE2	NNE4	NNE4	ENE4	NE5	NNE5	E3	NE2	NW2	ESE3	SSW1	WSW2	SSW2	SW1	SW2	SSW2	E0.8	ENE5
22-Jul	S2	SW2	SSW2	SW2	SSW2	S2	S3	SE4	ESE5	ESE6	ESE6	ESE6	ESE6	ESE7	ESE7	ESE7	ESE5	SE5	SE5	SE3	SW2	SW2	SW2	SSW3	SE3.1	ESE7
23-Jul	S2	SSE2	SSE1	SW2	SW1	WSW1	NNW1	NE1	ESE2	ESE3	SE7	SE7	SE9	ENE4	SE9	SE10	SE9	ESE6	E3	ENE2	E1	NNW1	NW0	SSW2	SE2.7	SE10
24-Jul	WSW1	W1	S2	SW1	SSW1	SSW1	SSE4	SE4	SE5	SE5	SE4	SE6	SSE6	SE7	SE7	SE8	SE7	ESE7	SE7	E5	ESE4	ESE2	ENE2	N3	SE3.5	SE8
25-Jul	NNE2	N2	NNW2	NNW4	N4	N5	N7	N7	N7	N7	NNE5	NNE5	SE3	NNE4	E4	NW3	NNW4	NW3	NNW1	NW1	NNW0	W1	SW1	SSW1	N2.6	N7
26-Jul	SW2	WSW1	NNW1	NNW1	SW1	SW2	N1	NE3	ENE2	SE4	SSE4	SSE6	SE6	SE6	S7	S6	SW7	SW9	WSW5	N3	SW4	WSW5	SW2	SW1	SSW2.1	SW9
27-Jul	SW2	S3	SW2	WSW1	S2	SSW2	SSE4	S7	S7	S7	S7	S9	S8	SSW8	WSW5	E7	SE4	SSE5	SSE5	S4	SSE2	SSW2	SSW1	SSW2	S3.7	S9
28-Jul	SSW2	SSW3	S2	S3	S4	S4	SSE5	SSE5	S5	SSE6	SE7	S7	SSW7	S8	SSW7	SSW7	S7	SSW6	SSW3	SW3	SW2	SSW2	SSW2	SW2	S4.2	S8
29-Jul	SSW2	SSW3	S3	SW2	SSW4	SW6	NNW2	N2	WSW1	NE4	E5	SE6	SSE5	S4	SSE1	NW3	NW5	N4	NW1	SW2	SSW2	SW2	S2	SSW2	SSW1.1	SW6
30-Jul	W1	WSW1	SW2	SW1	SSW2	SSW2	SSE3	SSE5	SE5	ESE5	ESE5	ESE6	SSE8	S7	S7	SSE6	SSE7	SSE7	SSE4	NNW3	NNW3	ENE5	SSE3	SW3	SSE2.6	NNW13
31-Jul	WSW4	SW1	SSW1	S2	S1	WSW1	S2	S3	NNE4	NNE5	N8	N10	N13	N11	N12	NNW12	NNW9	NNW7	N2	NNW8	N7	N8	NNW9	NNW10	N5.1	N13

SW2.1	SW2.0	SW2.0	SW1.8	SW1.8	SW1.8	SSW1.1	S1.9	SSE1.6	SSE1.6	S2.1	S2.4	S2.3	SSW1.7	SSW2.1	SW1.2	SW1.0	SSW0.5	SSW0.7	W1.4	W1.7	W1.7	WSW1.4	WSW1.9	Diurnal Average
WSW8	W7	WSW7	W8	W8	W8	N7	SW8	SE9	SW10	SW12	SW13	N13	SW13	SW12	SW13	SW13	SW11	N11	N12	NW13	N8	NNW9	NNW10	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

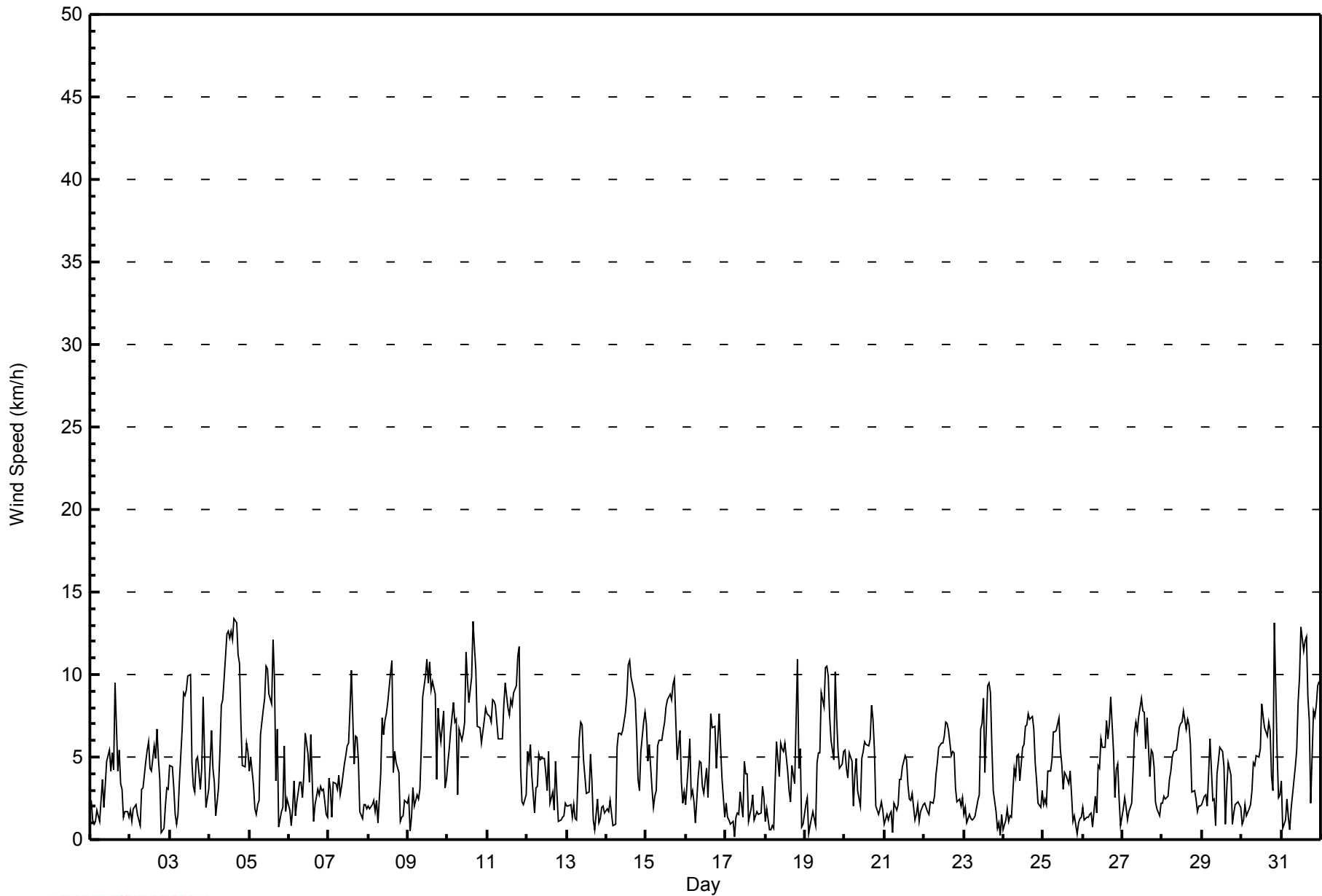
Wind Speed (WS) - km/h
Fort McKay South - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Jul 30 21:00 Minimum Value: 0 km/h on Jul 22 22:00 Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 5																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	1	1	1	1	1	1	1	1	1	2	2	2	3	3	3	5	2	2	1	2	1	1	1	1	5
2-Jul	1	1	1	1	1	1	1	1	1	2	2	2	2	3	2	2	2	2	2	1	1	1	1	1	3
3-Jul	1	1	1	1	1	1	2	3	4	3	4	4	5	2	1	2	2	2	2	3	2	1	2	5	
4-Jul	2	3	1	1	1	1	2	3	3	5	5	5	5	5	5	6	5	4	5	3	1	1	1	1	6
5-Jul	1	1	3	1	1	1	2	2	3	3	4	4	4	4	4	4	4	3	2	1	1	4	2	1	4
6-Jul	1	1	1	2	2	2	1	2	2	2	3	3	3	3	2	1	1	1	1	1	4	2	2	1	4
7-Jul	2	1	1	1	1	2	2	1	2	2	2	2	2	3	4	2	2	2	2	1	1	1	1	1	4
8-Jul	1	1	1	1	1	1	1	1	2	2	2	3	3	4	4	4	2	2	2	1	1	1	0	1	4
9-Jul	2	2	1	1	2	2	1	1	2	6	4	4	4	4	3	4	4	2	3	2	3	4	2	1	6
10-Jul	1	2	2	3	2	3	2	3	3	3	3	5	4	3	4	6	5	5	3	2	2	3	2	3	6
11-Jul	3	3	2	3	3	3	3	2	2	2	3	4	3	4	4	3	4	5	4	4	2	1	1	1	5
12-Jul	1	1	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2
13-Jul	1	1	1	1	1	1	1	3	3	2	2	2	2	2	3	2	2	1	1	1	1	1	0	1	3
14-Jul	1	1	1	1	1	1	2	2	2	2	2	3	3	4	3	4	3	3	2	1	1	1	2	2	4
15-Jul	3	1	2	2	1	1	1	2	2	2	2	2	3	3	3	3	3	3	3	1	2	2	2	1	3
16-Jul	1	2	2	3	2	1	1	3	2	2	2	2	2	1	3	3	2	2	2	2	2	4	2	1	4
17-Jul	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	2	1	1	1	2
18-Jul	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	6	4	5	4	1	1	6
19-Jul	1	1	1	1	1	1	1	2	2	3	4	3	5	5	5	4	3	4	4	2	2	2	2	2	5
20-Jul	2	1	1	2	2	1	2	2	1	1	2	2	3	2	2	2	2	2	2	1	1	0	0	1	3
21-Jul	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2
22-Jul	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	2	2	2	2	1	1	0	1	1	3
23-Jul	1	1	1	1	1	1	1	1	1	1	3	3	4	2	4	4	3	3	2	1	1	1	1	1	4
24-Jul	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	3	2	1	2	1	1	3
25-Jul	1	2	1	1	1	1	2	2	2	3	2	2	1	2	3	2	2	1	1	1	1	1	1	1	3
26-Jul	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	2	4	3	2	2	1	1	2	1	4
27-Jul	1	1	1	1	1	1	1	2	3	2	3	3	3	3	3	4	2	3	3	2	1	1	1	1	4
28-Jul	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	3	3	2	1	0	0	1	1	1	3
29-Jul	1	1	1	1	4	5	3	2	2	1	2	3	3	2	2	1	2	1	1	1	1	1	1	1	5
30-Jul	1	1	1	1	1	0	1	2	2	2	2	2	3	3	3	3	3	2	2	8	9	4	1	2	9
31-Jul	1	1	1	1	1	1	1	1	1	2	2	3	4	3	4	4	3	3	2	2	2	3	3	3	4
Diurnal Maximum																									



WBEA NETWORK
Hourly Averages

Wind Speed (WS) - km/h
Fort McKay South - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - July 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	503	67.61	67.61
6 - 11	226	30.38	97.98
12 - 19	15	2.02	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: 744

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - July 2014

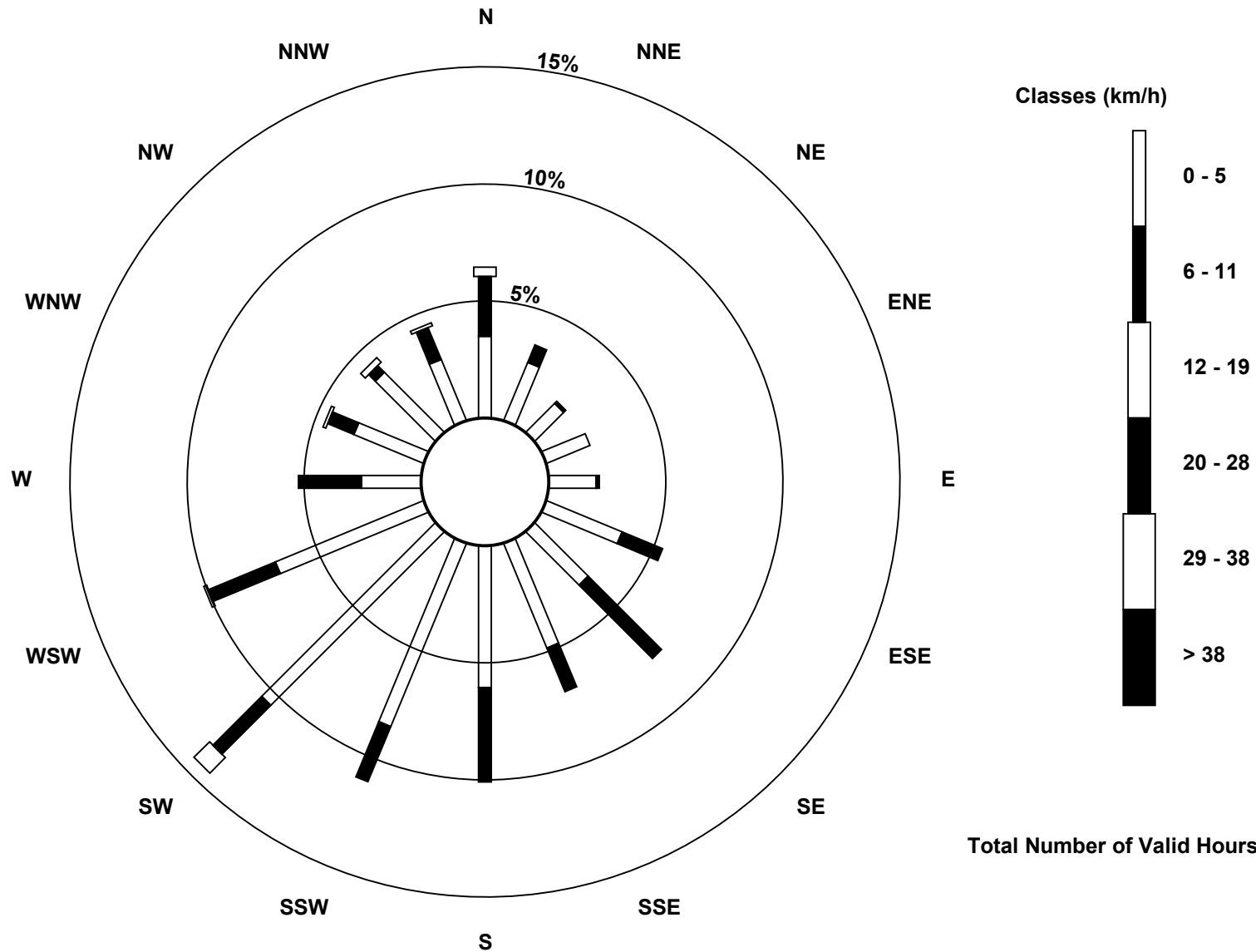
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	26	20	13	15	15	26	24	36	45	63	78	51	19	24	27	21	503
6 - 11	19	6	1	0	1	14	33	15	30	19	22	23	20	9	3	11	226
12 - 19	3	0	0	0	0	0	0	0	0	0	7	1	0	1	2	1	15
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	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	48	26	14	15	16	40	57	51	75	82	107	75	39	34	32	33	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

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

**Wind Speed (WS) - km/h
Fort McKay South (AMS 13)**



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

**Wind Direction (WD) - deg
Fort McKay South - July 2014**

Direction of Maximum Speed: 231 deg on Jul 4 16:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 224.2 deg on Jul 4	Hours of Data: 744
Direction of Minimum Speed: 28 deg on Jul 17 06:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.4 deg on Jul 1	Percent Operational Time: 100.0
Monthly Average Direction: 236.6 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	225	200	191	195	192	195	160	163	141	142	159	155	186	199	332	357	10	3	350	345	297	246	242	240	208.3
2-Jul	187	201	219	228	221	223	119	128	58	98	140	136	102	116	52	108	113	123	134	241	247	213	149	157	127.6
3-Jul	154	159	177	177	243	186	137	138	140	149	143	145	157	151	82	66	128	134	88	355	351	340	307	283	137.8
4-Jul	268	245	207	192	183	158	186	221	206	217	223	234	237	227	235	231	235	226	225	232	219	206	216	206	224.2
5-Jul	224	233	231	123	151	174	168	188	194	191	219	220	253	251	222	228	287	25	48	271	315	348	354	249	226.8
6-Jul	199	285	240	253	221	235	251	266	236	254	234	246	332	18	110	23	82	11	236	255	338	262	285	223	263.8
7-Jul	261	246	221	294	262	269	241	262	310	317	282	303	296	324	11	343	1	1	358	335	218	216	172	232	308.9
8-Jul	206	195	220	186	178	225	206	159	154	128	121	132	132	181	204	317	70	115	136	206	234	230	218	185	161.1
9-Jul	182	72	348	197	198	201	116	123	129	187	216	202	174	207	226	260	253	225	194	189	242	299	271	235	212.2
10-Jul	241	249	245	246	243	245	266	233	249	258	246	245	256	263	248	292	309	292	281	257	285	275	259	274	262.6
11-Jul	252	261	258	266	260	263	268	264	263	261	250	261	260	281	268	276	285	330	4	3	340	302	291	325	281.1
12-Jul	328	319	324	315	250	293	314	332	326	342	312	347	29	33	53	41	346	7	49	285	244	250	228	224	334.8
13-Jul	228	230	239	229	232	259	52	139	129	145	138	167	138	115	118	129	52	111	117	232	234	214	198	224	154.0
14-Jul	192	220	237	207	280	274	158	156	142	120	124	119	147	180	182	184	184	195	189	195	194	193	210	208	175.0
15-Jul	183	179	186	193	190	180	176	161	137	168	124	127	180	201	216	193	182	180	183	182	183	183	202	175	177.9
16-Jul	174	231	247	232	227	213	318	242	6	7	9	304	324	329	222	231	222	205	215	205	227	323	21	289	250.2
17-Jul	247	269	182	236	233	28	16	28	11	9	45	92	69	84	87	352	76	61	16	238	271	220	309	307	28.1
18-Jul	213	246	301	221	6	295	337	346	351	29	2	356	23	35	109	80	111	115	187	226	186	220	158	213	2.4
19-Jul	171	149	238	309	217	213	258	228	246	252	239	245	242	265	287	283	300	303	331	329	317	305	285	253	272.4
20-Jul	251	214	230	250	246	256	235	245	287	7	43	26	352	9	26	20	359	357	349	323	271	247	209	202	320.4
21-Jul	212	173	158	156	166	228	160	82	75	29	22	65	56	21	100	49	326	112	197	240	199	228	227	197	84.7
22-Jul	187	218	211	221	204	186	178	142	121	118	121	120	115	115	109	111	122	131	127	135	236	226	221	201	137.7
23-Jul	190	163	166	230	235	248	335	50	104	112	133	138	134	64	136	145	138	107	83	70	81	302	326	213	131.1
24-Jul	238	277	191	214	208	196	148	144	142	142	136	134	149	127	134	140	139	113	126	87	115	103	67	358	133.0
25-Jul	28	357	289	345	352	350	349	9	8	4	15	12	141	30	81	314	295	324	333	314	296	264	221	201	356.2
26-Jul	224	254	333	289	236	236	2	44	71	129	150	153	139	140	180	171	225	234	257	357	226	238	227	232	195.6
27-Jul	221	191	217	238	191	195	164	190	177	170	179	190	188	205	250	86	130	168	153	170	148	205	208	202	180.4
28-Jul	202	200	178	170	181	176	164	162	172	148	135	178	196	189	204	195	186	212	212	236	215	204	207	214	185.0
29-Jul	194	200	184	219	194	222	297	351	256	42	90	143	159	174	165	316	320	356	319	222	197	225	177	209	198.2
30-Jul	274	251	214	222	205	194	168	162	134	111	113	106	166	169	181	156	164	153	158	293	311	60	161	217	163.4
31-Jul	247	224	199	185	191	241	187	173	22	24	8	7	3	9	6	348	343	334	349	343	349	350	346	341	353.3

224.2 227.2 228.6 235.4 225.6 228.6 200.7 185.3 159.1 147.0 169.1 174.4 180.4 197.8 200.5 234.1 223.1 198.7 198.7 262.0 266.5 267.3 243.0 239.2
Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

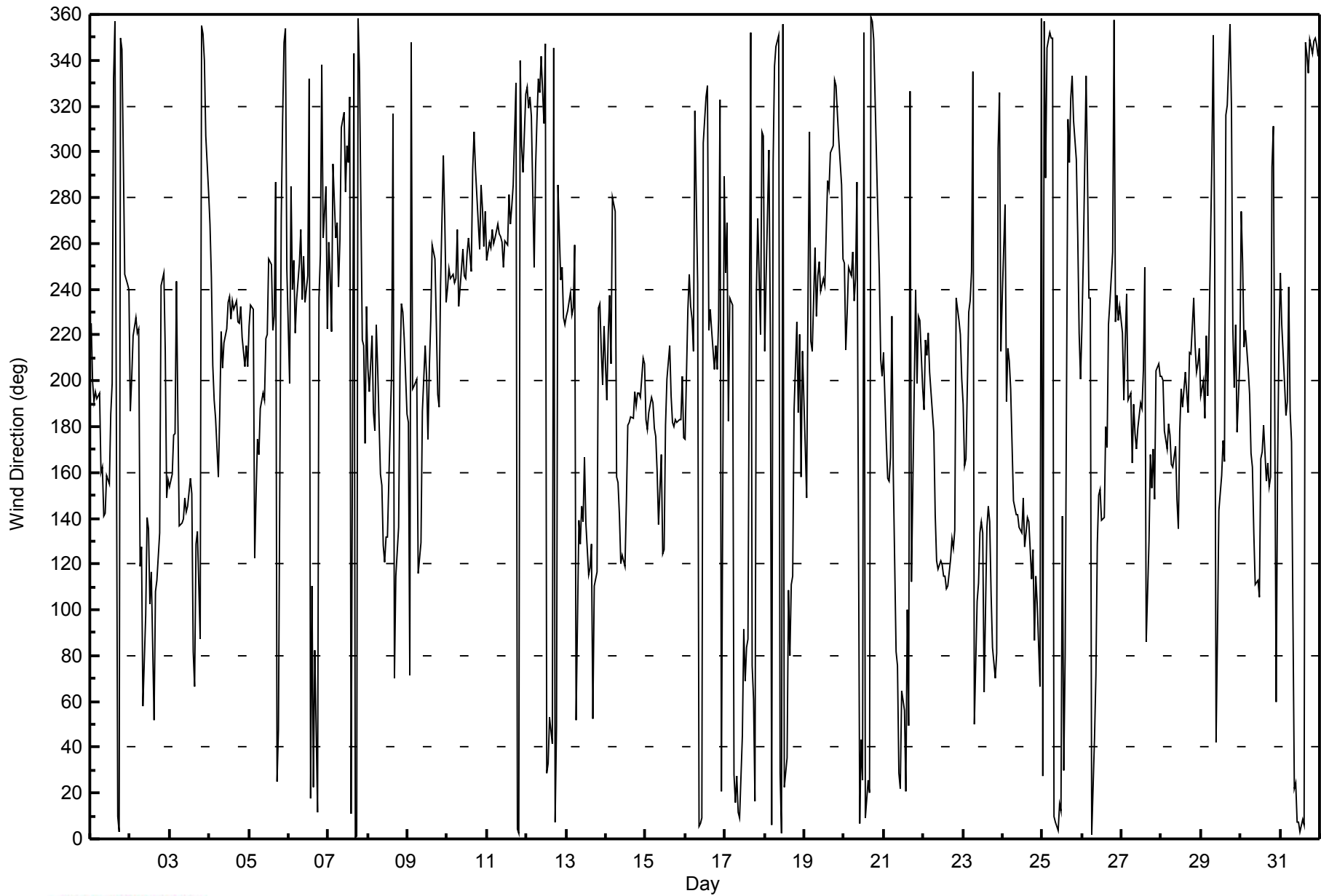
Wind Direction (WD) - deg
Fort McKay South - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 111 deg on Jul 13 18:00																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 9 deg on Jul 22 22:00																									
Percentiles: P ₁ = 13 P ₁₀ = 24 Q ₁ = 31 Median = 41 Q ₃ = 57 P ₉₀ = 74 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-Jul	20	71	79	81	21	61	28	30	64	59	60	62	72	49	52	30	48	27	41	25	28	39	42	62	81
2-Jul	38	54	36	16	45	48	59	40	50	45	47	51	64	83	46	58	38	38	40	75	39	40	28	27	83
3-Jul	25	21	33	41	64	53	39	34	34	32	36	35	34	39	51	68	58	47	57	29	24	28	47	56	68
4-Jul	45	30	32	29	77	25	30	32	31	33	30	35	36	35	33	37	32	35	28	24	18	15	16	14	77
5-Jul	18	16	78	53	60	34	32	28	32	35	35	43	52	44	34	43	62	39	99	40	47	53	83	41	99
6-Jul	52	87	55	48	80	70	43	61	74	79	48	56	76	40	58	96	77	56	44	25	68	52	74	84	96
7-Jul	49	33	68	44	37	70	41	49	58	42	42	43	47	37	32	46	22	22	21	52	41	26	19	42	70
8-Jul	27	30	41	26	24	12	57	27	26	36	33	33	42	31	35	75	45	44	39	45	56	60	23	48	75
9-Jul	62	89	86	33	75	64	46	52	38	47	26	28	37	29	32	36	40	57	26	20	47	34	40	29	89
10-Jul	18	21	21	24	24	29	76	46	46	53	49	38	44	44	42	41	37	36	42	32	34	33	26	33	76
11-Jul	27	28	27	32	27	31	46	40	31	34	35	41	45	54	42	44	46	47	25	27	29	22	32	38	54
12-Jul	23	20	22	26	50	28	44	42	44	48	49	69	82	62	90	83	90	37	55	12	26	34	50	15	90
13-Jul	17	56	22	49	36	49	73	36	38	41	62	85	93	87	53	69	93	111	64	83	37	23	22	19	111
14-Jul	27	27	13	48	67	75	25	28	38	36	35	37	37	32	31	34	28	28	24	25	21	13	21	23	75
15-Jul	23	19	16	56	27	24	24	28	36	40	32	39	39	31	27	29	25	23	23	16	17	28	57	16	57
16-Jul	59	35	24	56	50	60	87	68	30	31	38	52	40	34	35	29	40	31	56	26	18	62	51	65	87
17-Jul	30	85	58	77	57	79	73	94	89	81	95	66	72	64	97	80	45	55	63	41	68	66	40	67	97
18-Jul	67	30	91	66	49	76	39	36	61	53	56	50	51	54	81	95	36	33	70	25	66	80	82	94	95
19-Jul	26	35	70	38	59	39	90	40	41	48	34	35	34	42	42	41	54	51	31	29	33	31	33	22	90
20-Jul	22	25	31	27	28	60	33	30	63	78	47	52	53	41	47	43	27	25	27	39	40	25	17	63	78
21-Jul	48	25	34	47	35	77	27	61	71	52	59	63	58	56	72	86	76	58	65	31	25	80	51	62	86
22-Jul	31	25	47	37	27	23	25	32	32	32	37	43	43	42	47	38	46	41	31	29	9	9	16	33	47
23-Jul	29	18	73	29	11	45	65	58	58	70	41	38	35	57	39	35	38	45	45	61	92	85	97	62	97
24-Jul	87	64	31	62	68	58	29	49	38	42	37	33	39	45	43	38	41	40	38	45	35	67	49	20	87
25-Jul	56	80	57	26	32	27	24	35	27	31	37	38	69	64	57	65	48	75	84	68	91	60	62	61	91
26-Jul	36	65	22	38	14	37	87	45	86	48	57	49	56	60	44	46	56	31	39	74	17	14	61	81	87
27-Jul	68	32	50	66	38	24	24	28	33	36	40	33	38	40	63	54	60	34	43	33	38	52	46	41	68
28-Jul	39	18	21	14	14	16	22	30	36	39	40	45	52	44	53	43	39	38	53	10	17	51	28	42	53
29-Jul	48	43	33	50	52	49	84	92	87	43	52	56	66	71	102	33	36	46	70	41	40	16	26	42	102
30-Jul	74	52	25	43	24	16	26	26	46	42	49	47	37	46	50	48	38	32	30	68	43	66	76	60	76
31-Jul	40	93	75	40	71	89	56	60	34	48	33	33	29	30	30	31	30	42	86	26	26	25	26	26	93
Diurnal Maximum																									



WBEA NETWORK
Hourly Averages

Wind Direction (WD) - deg
Fort McKay South - July 2014





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 21, 2014	Previous Calibration	June 13, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	14:25
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	26	40
Analyzer Range (mv)	5000	5000	Lamp voltage	2292	2295
Calculated slope	0.996148	0.996266	Chamber temp.	50.0	50.0
Calculated intercept	1.672407	1.618113	Pressure ("Hg)	25.8	26.1
Analyzer Background	26.0	26.3	Flow (lpm)	662.000	674.000
Analyzer Coefficient	1.608	1.616	Intensity	75	78

Analyzer make	API T100	Analyzer serial #	599
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	1.6	NA
as found span	5000	78.9	806.4	804.8	1.002
calibrator zero	5000	0.0	0.0	-0.4	0.000
high point	5000	78.9	806.4	808.6	0.997
second point	5000	39.4	402.7	401.1	1.004
third point	5000	19.7	201.3	199.8	1.008
calibrator zero					
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	78.9	806.4	803.5	NA
Average Correction Factor					1.003

Corrected As found	803.2	Previous response	807.8	% change	0.6%
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Notes:

Slight adjustments to zero and span. Filter changed after As Founds.

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

SO₂ Calibration Summary

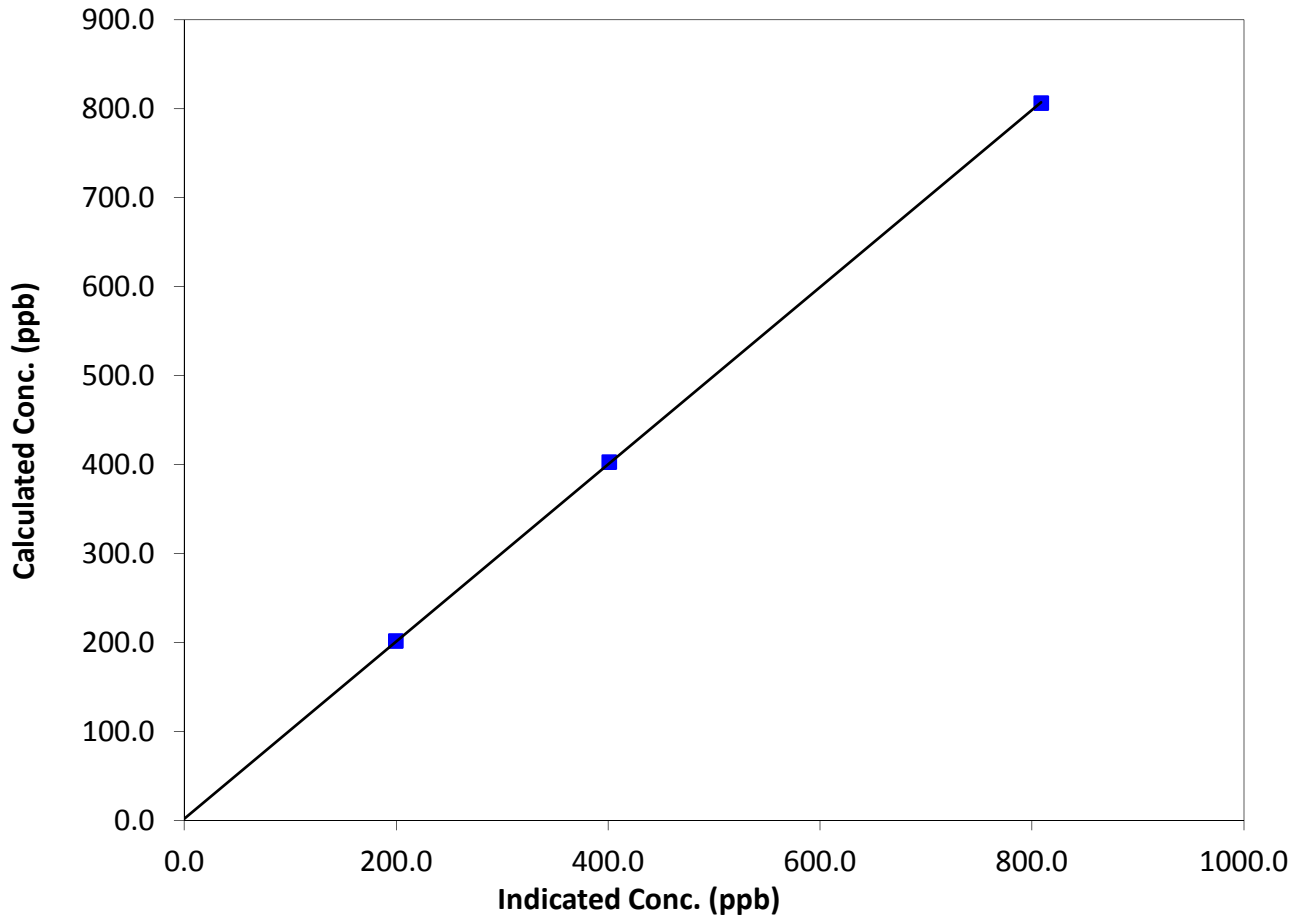
Station Information

Calibration Date	July 21, 2014	Previous Calibration	June 13, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:30	End Time (MST)	14:25
Analyzer make	API T100	Analyzer serial #	599

Calibration Data

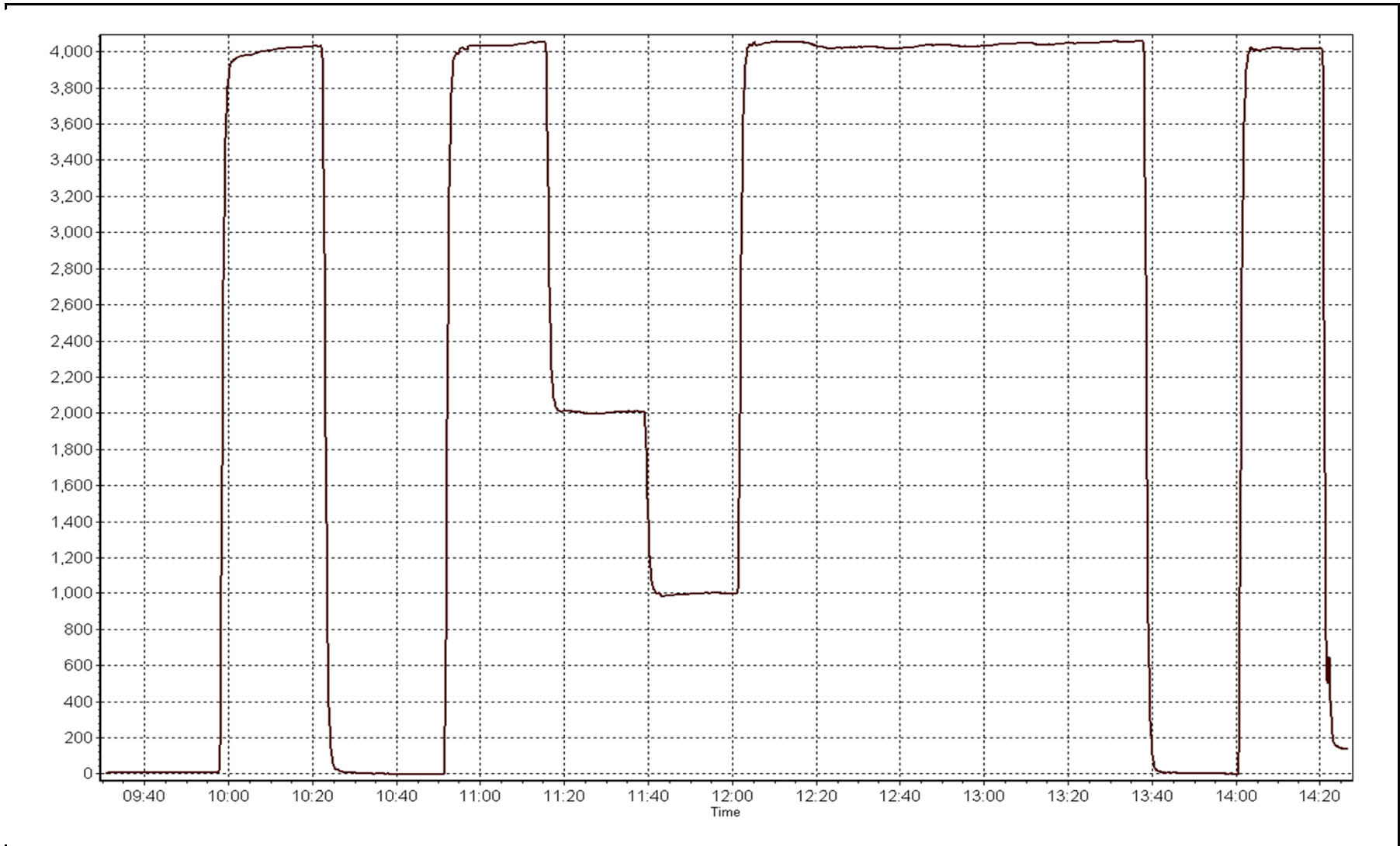
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999986
806.4	808.6	0.9972		
402.7	401.1	1.0039	Slope	0.996266
201.3	199.8	1.0077		
			Intercept	1.618113

SO₂ Calibration Curve



SO2 Calibration Plot

Date: July 21, 2014





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	July 14, 2014	Previous Calibration	June 10, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	13:09
Barometric Pressure	741 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11041107
Cal Gas Concentration	10.4 ppm H2S	Cal Gas Expiry Date	5/30/2013
Gas Cert Reference	LL82750	SO2 gas conc.	51.1 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2581
DACS voltage range	0-5v	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-727	-727
Analyzer Range (input)	5000	5000	Lamp voltage	990	990
Calculated slope	1.006821	1.007002	Chamber temp.	45	45
Calculated intercept	-0.236227	-0.244684	Pressure	692.9	691.4
Analyzer Background	1.79	1.8	Flow	0.436	0.436
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	79.6	1.006
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	40.1	0.995
third point	5000	9.6	20.0	20.0	0.999
calibrator zero					
as left zero	5000	0.0	0.0	0.2	NA
as left span	4000	30.8	80.1	79.6	1.006
Average Correction Factor					1.000

Corrected As found	79.4	Previous response	79.8	% change	0.4%
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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

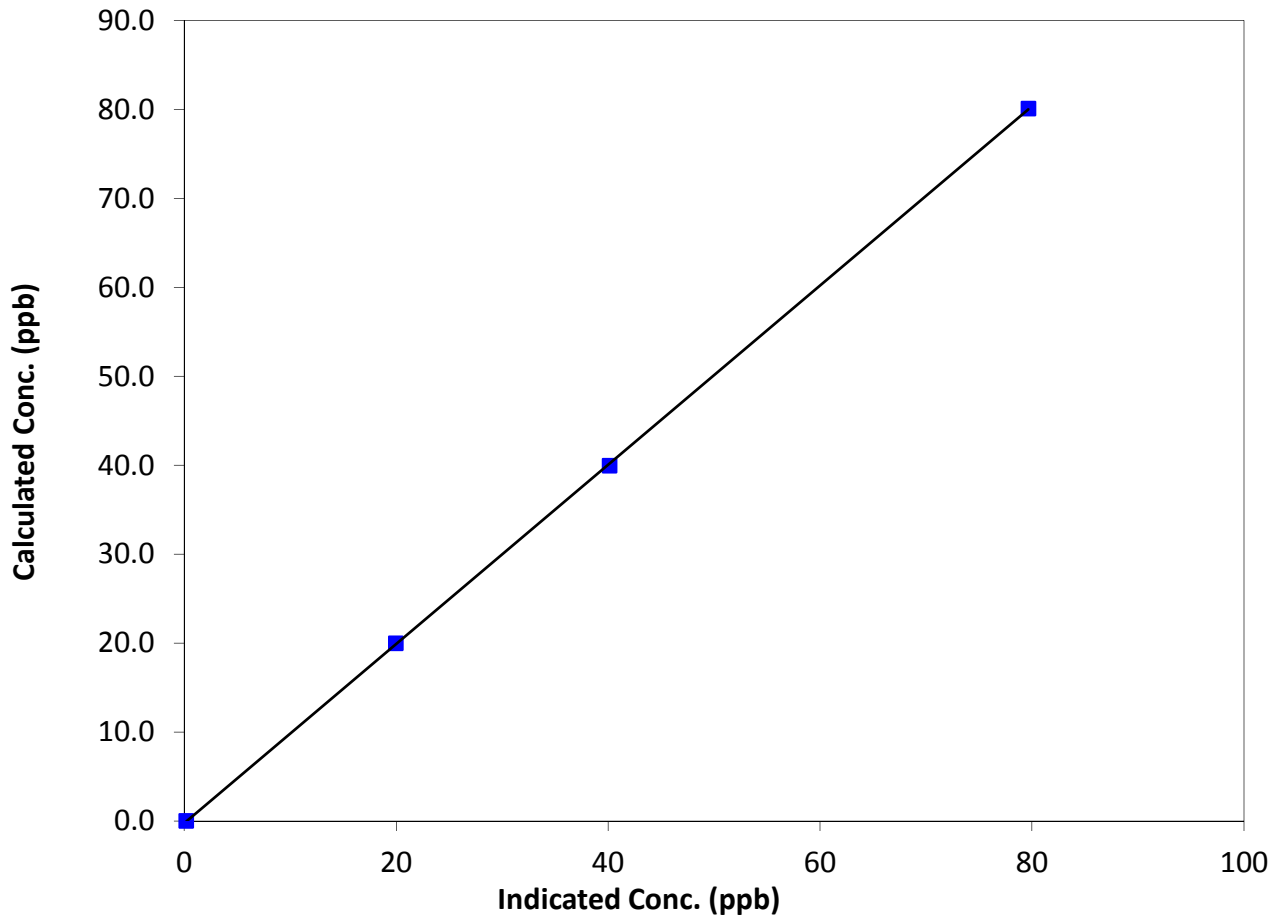
Station Information

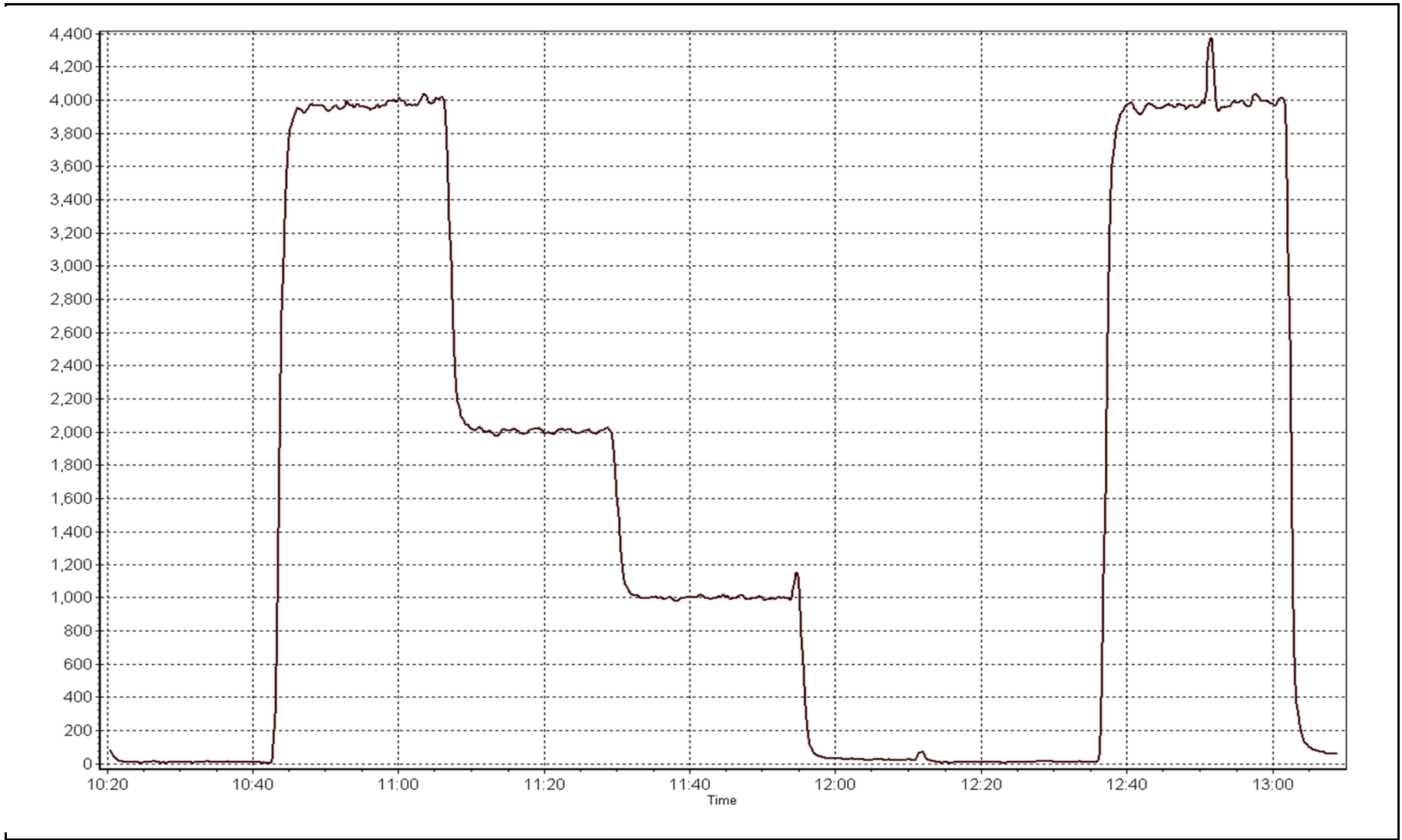
Calibration Date	July 14, 2014	Previous Calibration	June 10, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:15	End Time (MST)	13:09
Analyzer make	TEI 43i-TLE	Analyzer serial #	1218153359

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999978
80.1	79.7	1.0052		
39.9	40.1	0.9950	Slope	1.007002
20.0	20.0	0.9993		
			Intercept	-0.244684

TRS Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Monday, July 21, 2014	Previous Calibration	Friday, June 13, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	14:24
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	1.002942	1.005147	Fuel Pressure	22.6	22.6
Calculated intercept	-0.043983	0.040653			
BKG	2.5	2.6			
COEF	4.773	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	0.04	N/A
as found span	5000	78.9	16.98	16.90	1.005
calibrator zero	5000	0.0	0.00	-0.03	N/A
high point	5000	78.9	16.98	16.86	1.007
second point	5000	39.4	8.48	8.36	1.014
third point	5000	19.7	4.24	4.19	1.011
calibrator zero					
as left zero	5000	0.0	0.00	-0.06	N/A
as left span	5000	78.9	16.98	16.96	1.001
Average Correction Factor					1.011

Corrected As found 16.86 Previous response 16.97 % change 0.6%

Notes:

Zero slightly adjusted. Filter changed after As Finds.

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

THC Calibration Summary

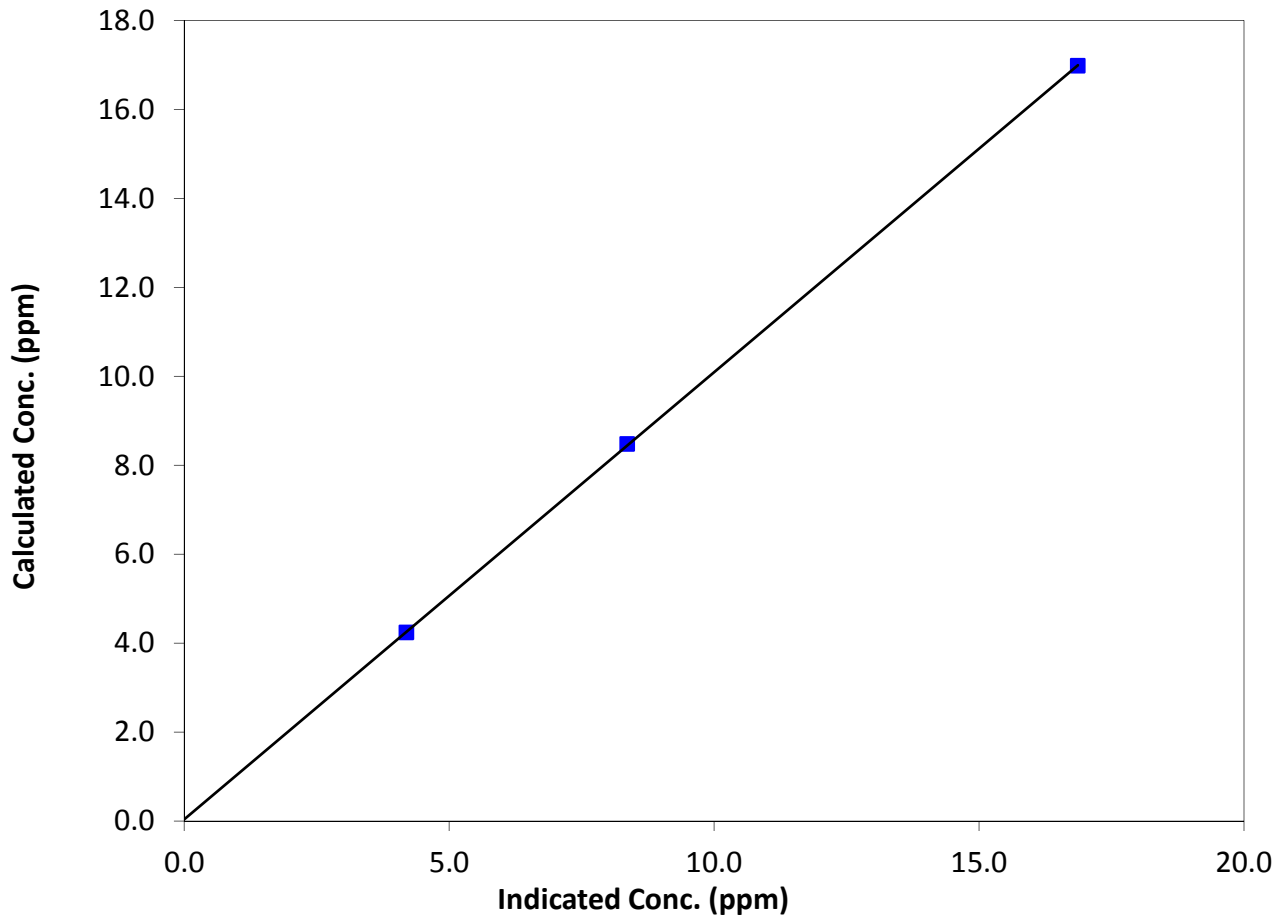
Station Information

Calibration Date	July 21, 2014	Previous Calibration	June 13, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:30	End Time (MST)	14:24
Analyzer make	Thermo Model 51iLT	Analyzer serial #	1236656114

Calibration Data

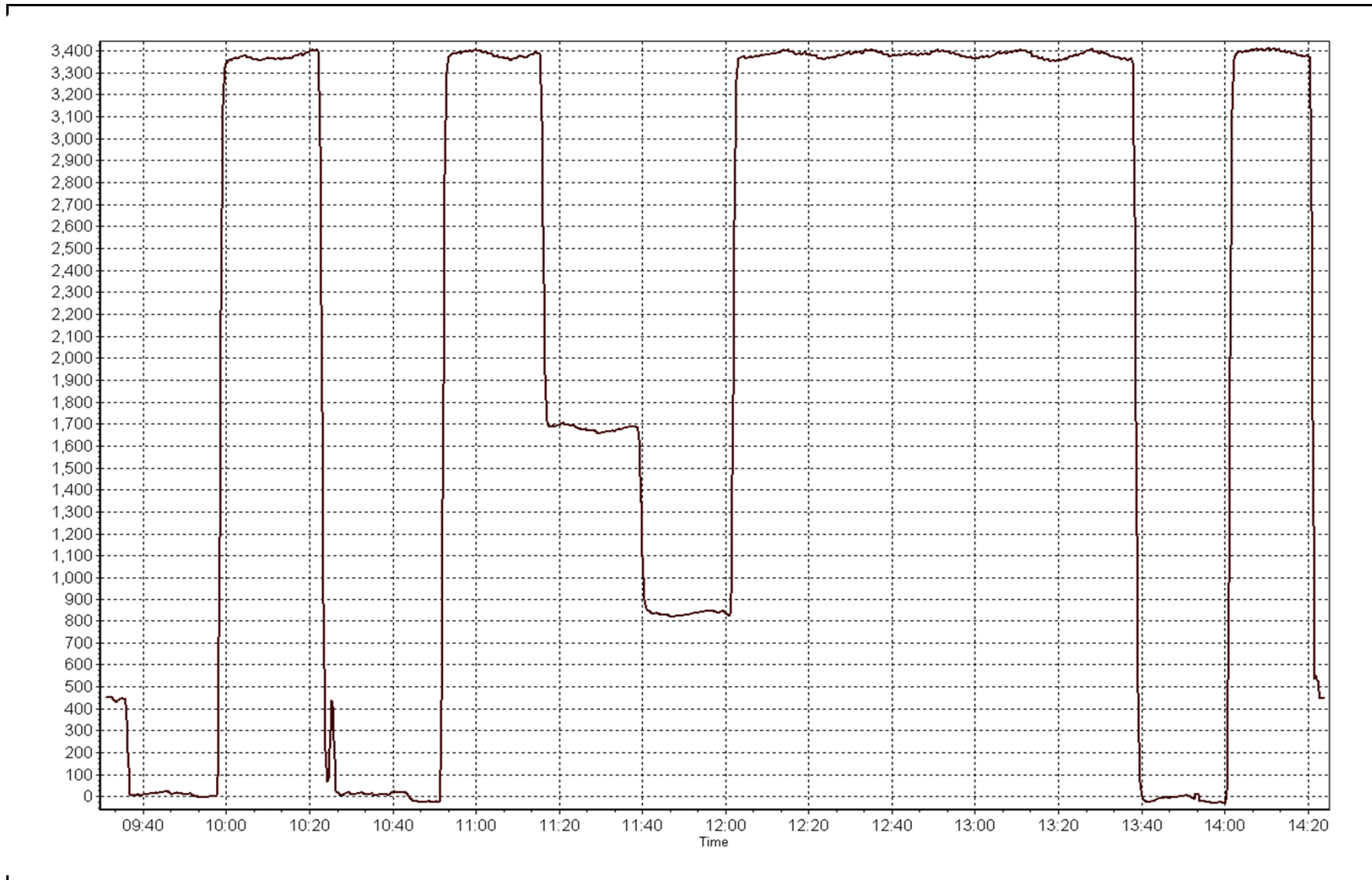
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	N/A	Correlation Coefficient	0.999990
16.98	16.86	1.0068		
8.48	8.36	1.0140	Slope	1.005147
4.24	4.19	1.0114		
			Intercept	0.040653

THC Calibration Curve



THC Calibration Plot

Date: July 21, 2014





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	July 22, 2014	Previous Calibration	June 13, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	11:24
Barometric Pressure	734 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
NO2 calibration used	Monday, July 21, 2014	Transfer Standard	??
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2681
DACS voltage range	0-5v	DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	30.3	30.1
Analyzer Range (input)	5000	5000	Lamp temp.	58.0	58.0
Calculated slope	0.995642	1.001342	Pressure ("Hg)	26.0	26.5
Calculated intercept	0.022034	-1.018398	Flow cell A	690	715
Analyzer Background	-1.1	-1.1	Flow cell B	N/A	
Analyzer Coefficient	1.025	1.014	Cell A Intensity	N/A	
			Cell B Intensity	N/A	

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	0.8	N/A
as found span	5000	0.903	356.4	360.3	0.989
calibrator zero	5000	0.00	0.0	0.8	N/A
high point	5000	0.903	356.4	356.8	0.999
second point	5000	0.585	211.6	212.4	0.996
third point	5000	0.358	111.0	112.2	0.990
calibrator zero					
as left zero	5000	0.00	0.0	0.4	N/A
as left span	5000	0.903	356.4	352.9	N/A
Average Correction Factor					0.995

Corrected As found 359.5 Previous response 357.9 % change -0.4%

Notes:

Small adjustment to span. Filter changed during As Lefts

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

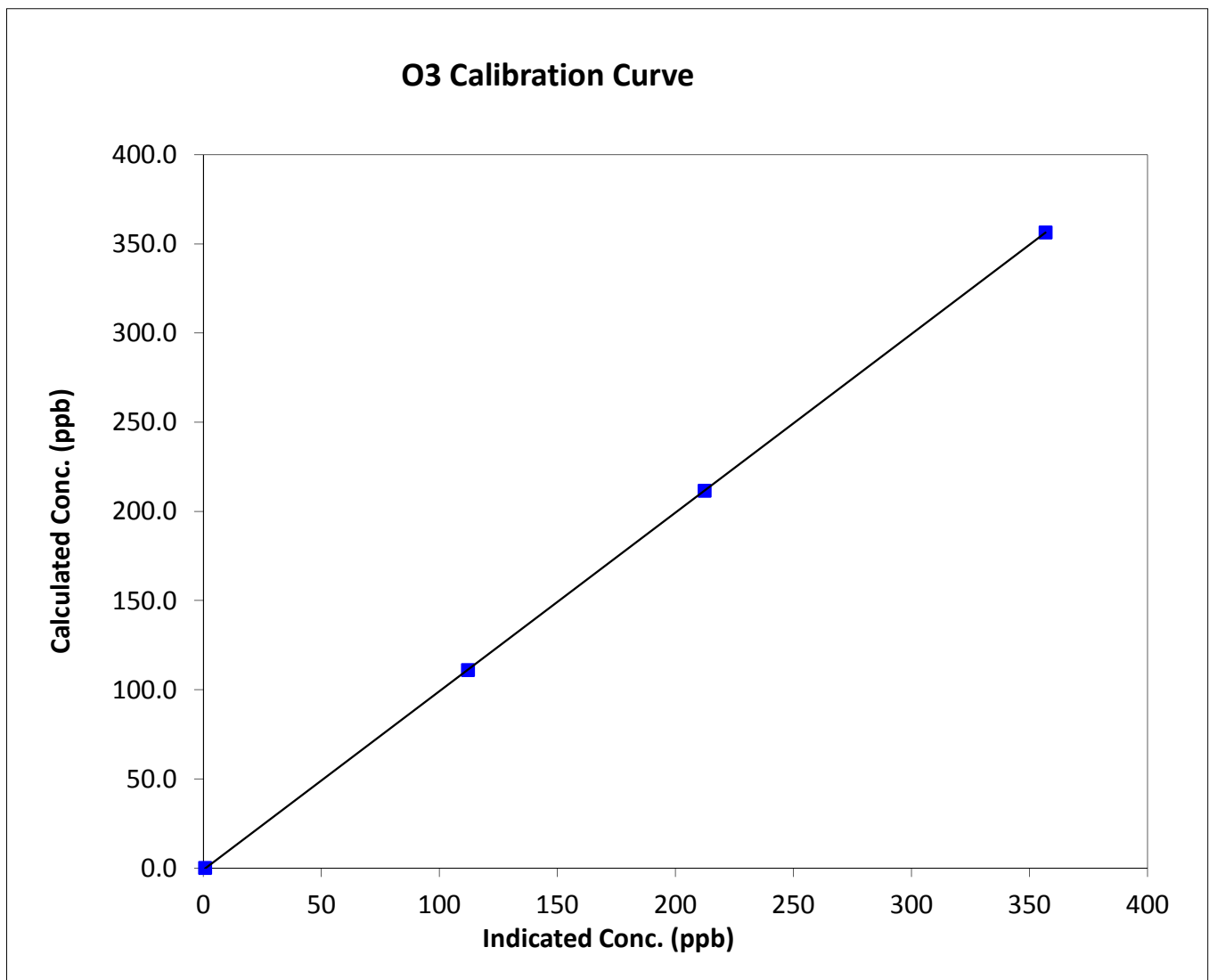
O₃ Calibration Summary

Station Information

Calibration Date	Tuesday, July 22, 2014	Previous Calibration	June 13, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:45	End Time (MST)	11:24
Analyzer make	API T400	Analyzer serial #	825

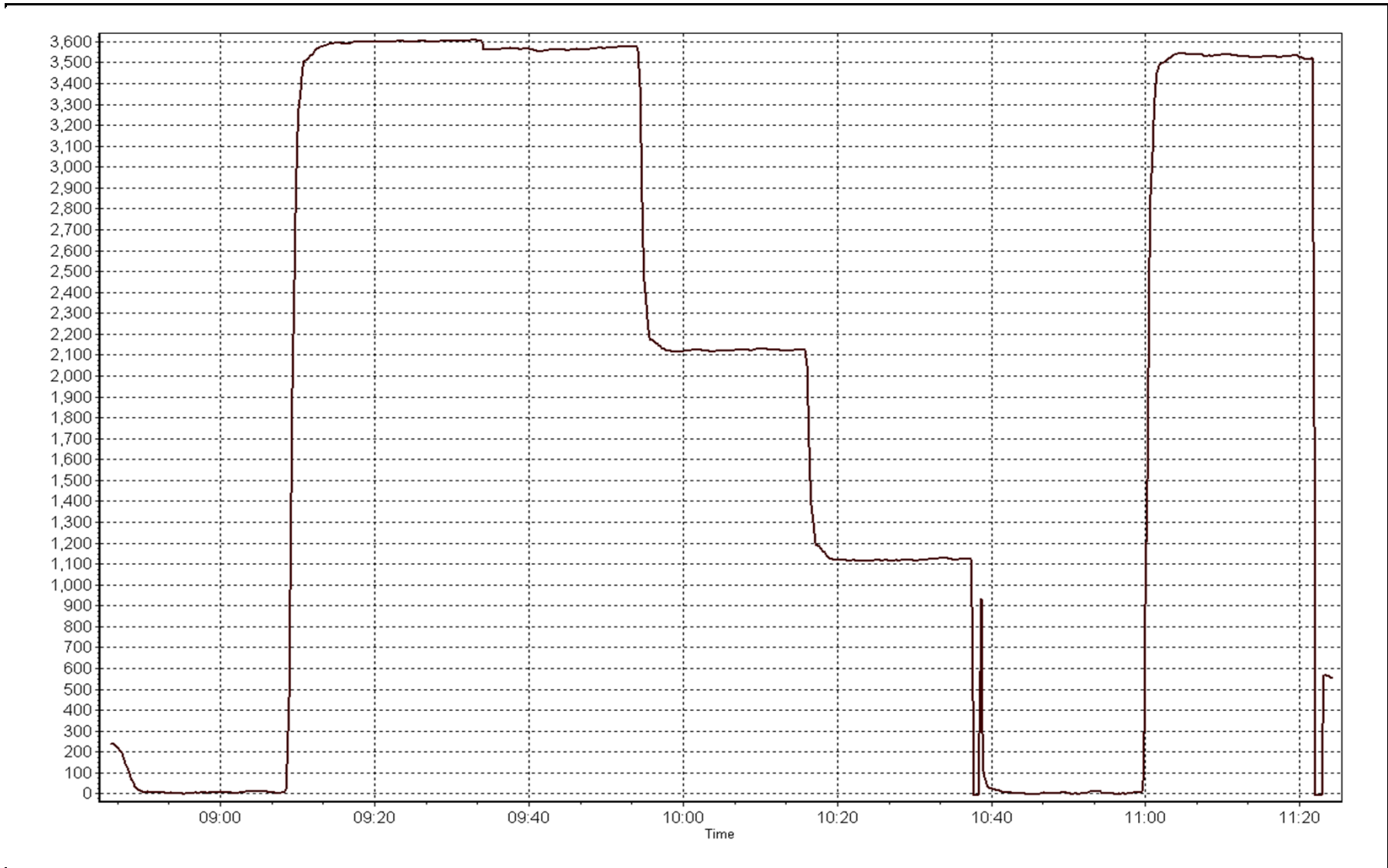
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.8	N/A	Correlation Coefficient	0.999998
356.4	356.8	0.9989		
211.6	212.4	0.9962	Slope	1.001342
111.0	112.2	0.9896		
			Intercept	-1.018398



O3 Calibration Plot

Date: July 22, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 21, 2014	Previous Calibration	June 13, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	9:30	End Time (MST)	14:25
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
NOx Cal Gas Conc	50.8 ppm	Cal Gas Serial #	LL107918

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	3492
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	0.996616	0.995599	0.996418
	Data Offset	1.767564	1.890060	-0.251535
After	Data Slope	0.998656	0.998353	0.997074
	Data Offset	2.040642	2.013774	-0.495390
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
NOX coefficient	1.001	ppb	1.001	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	4.2		4.0	
NOX bkgrnd	4.3		4.1	
Nt coefficient	N/A		N/A	
Chamber Temp	49.5	Deg C	49.8	Deg C
Moly Temp	325.0	Deg C	325.0	Deg C
PMT Temp	-3.6	Deg C	-3.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	197.9	mmHg	199.0	mmHg
Sample Flow	0.804	ccm	0.814	ccm

Notes:

Zero with small adjustment. Filter changed after As Found



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

July 21, 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	-0.1	-0.2	N/A	N/A
as found span	5000	78.9	801.6	800.0	1.6	791.4	790.1	1.6	1.0129	1.0125
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.2	N/A	N/A
high point	5000	78.9	801.6	800.0	1.6	801.8	800.5	1.7	0.9998	0.9994
second point	5000	39.4	400.3	399.5	0.8	397.3	396.5	0.8	1.0076	1.0075
third point	5000	19.7	200.2	199.8	0.4	196.8	196.6	0.1	1.0172	1.0160
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	N/A	N/A
as left span	5000	78.9	801.6	443.7	357.9	802.4	451.3	351.4	0.9991	0.9833
Average Correction Factor									1.0082	1.0077

Corrected As found
Previous Response

NO_x= 791.5
NO_x= 802.6

NO= 790.3
NO= 801.7

Percent Change

NO_x= 1.4%

NO= 1.4%

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

78.90

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			-0.2			N/A	
1st NO ₂ (350)	N/A	443.7	356.4	801.1	443.7	357.4	0.9851	1.0000	0.9973	100.3%
2nd NO ₂ (200)	N/A	588.6	211.6	801.7	588.6	213.4	0.9844	1.0000	0.9918	100.8%
3rd NO ₂ (100)	N/A	689.2	111.0	801.4	689.2	112.5	0.9847	1.0000	0.9866	101.4%
4th NO ₂ (0)	800.2	N/A	0.6	800.8	800.2	0.9	0.9855	1.0000	N/A	N/A
Average Correction Factor							0.9849	1.0000	0.9919	100.8%

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

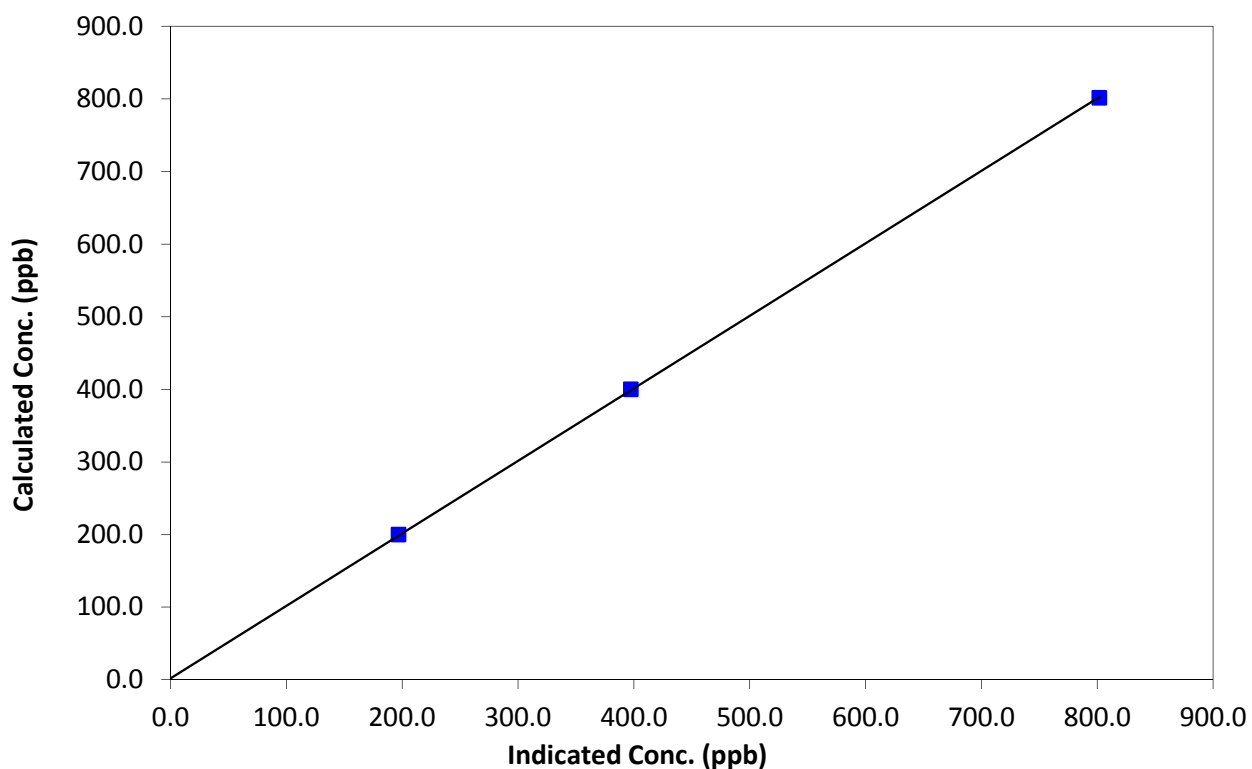
Station Information

Calibration Date	July 21, 2014	Previous Calibration	June 13, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:30	End Time (MST)	14:25
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	0.999971
801.6	801.8	0.9998		
400.3	397.3	1.0076	Slope	0.998656
200.2	196.8	1.0172		
			Intercept	2.040642

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

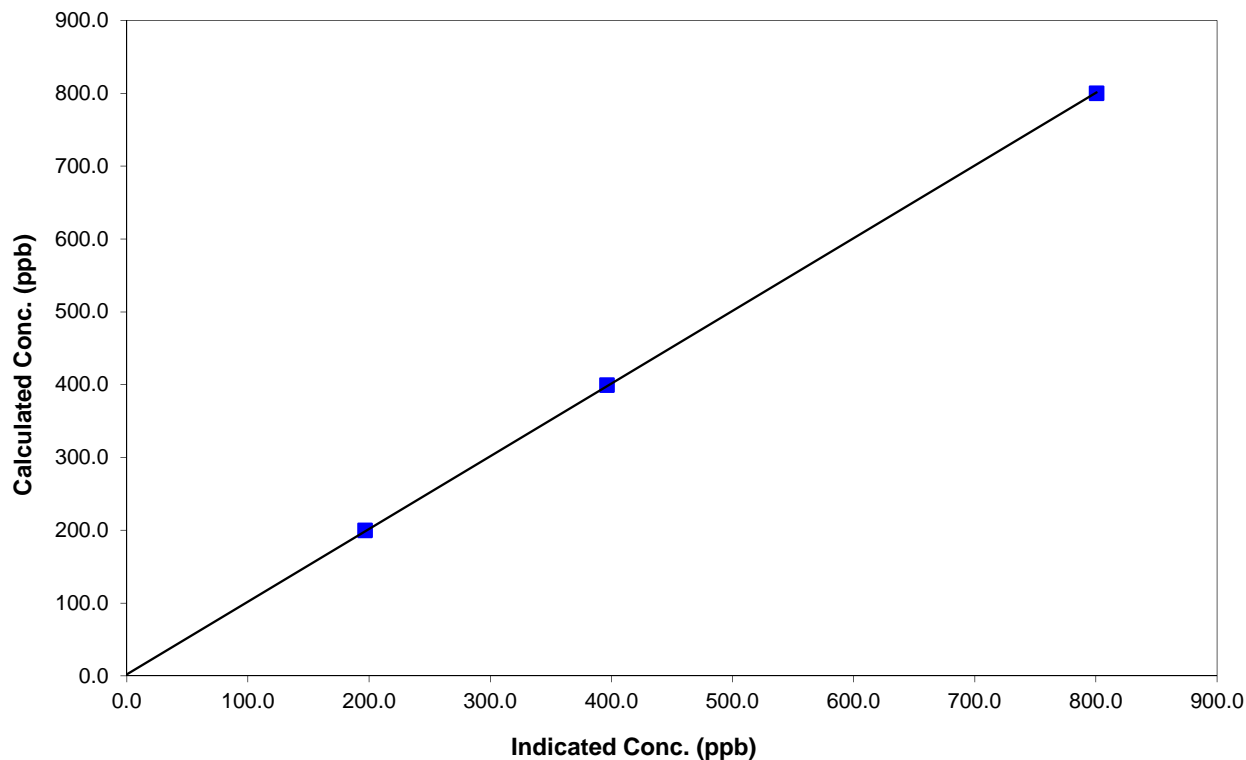
Station Information

Calibration Date	July 21, 2014	Previous Calibration	June 13, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:30	End Time (MST)	14:25
Analyzer make	Thermo 42C	Analyzer serial #	2185

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999972
800.0	800.5	0.9994		
399.5	396.5	1.0075	Slope	0.998353
199.8	196.6	1.0160		
			Intercept	2.013774

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

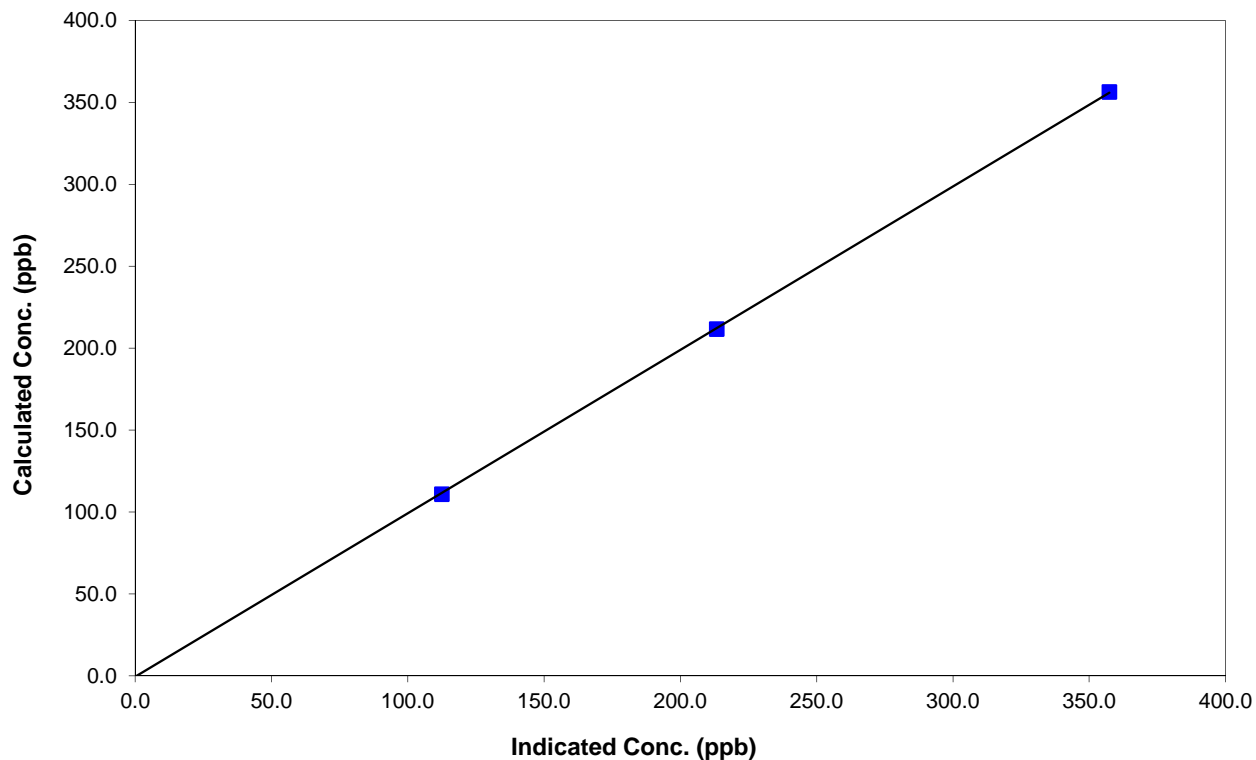
Station Information

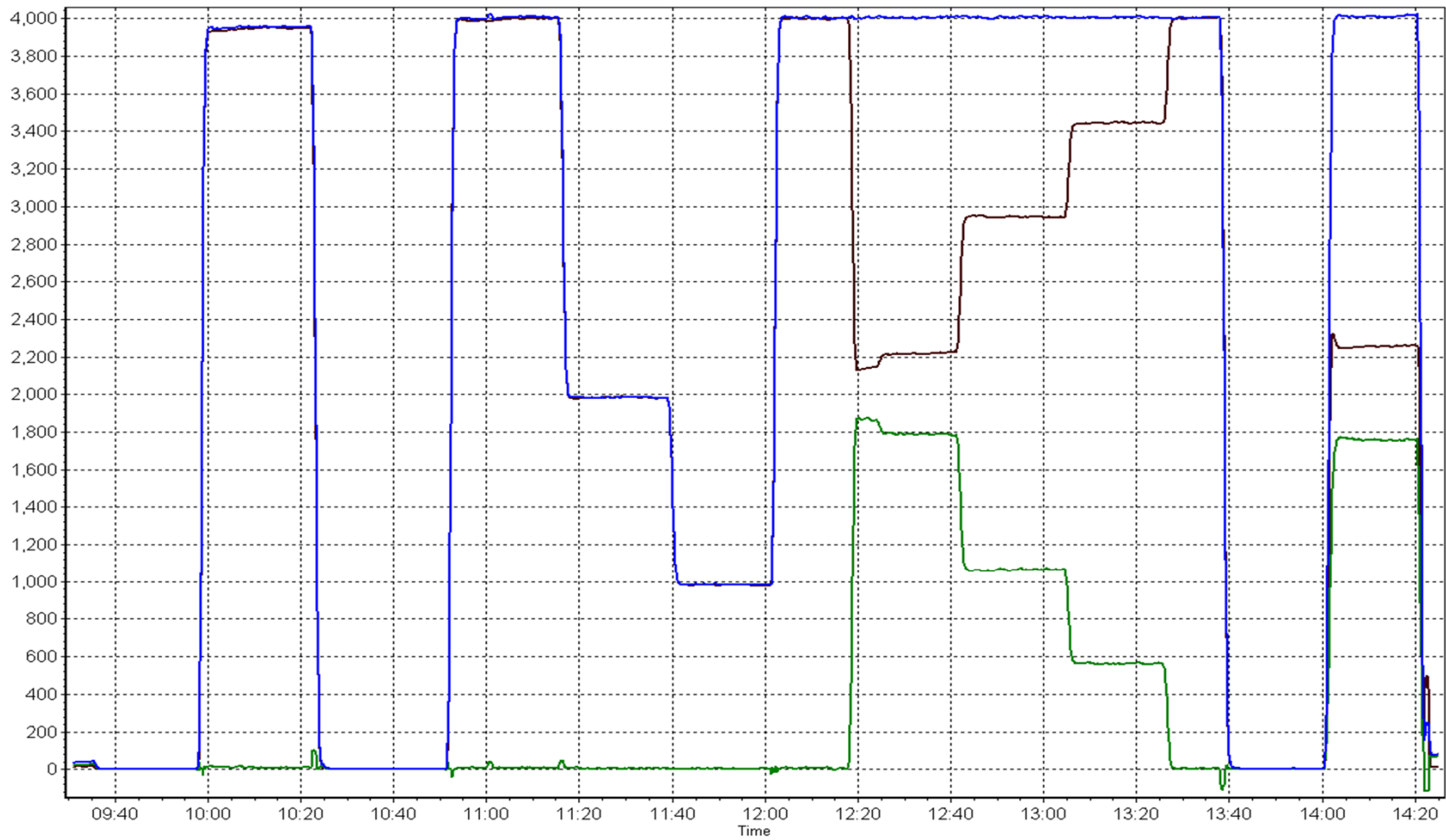
Calibration Date	July 21, 2014	Previous Calibration	June 13, 2014
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:30	End Time (MST)	14:25
Analyzer make	Thermo 42C	Analyzer serial #	2185

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999975
356.4	357.4	0.9973		
211.6	213.4	0.9918	Slope	0.997074
111.0	112.5	0.9866		
			Intercept	-0.495390

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 14
ANZAC
JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)

JULY 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	701	36	43	99.06	64	0	5	0
TRS(ppb) Average	702	35	42	99.06	7	0	1	0
THC(ppm) Average	693	36	51	97.98	3.8	-	2.3	-
NMHC(ppm) Average	693	36	51	97.98	0.24	-	0.132	-
CH4(ppm) Average	693	36	51	97.98	3.7	-	2.2	-
NO2(ppb) Average	701	36	43	99.06	14	0	3	-
NO(ppb) Average	701	36	43	99.06	16	-	2	-
NOX(ppb) Average	701	36	43	99.06	23	-	5	-
O3(ppb) Average	700	37	44	99.06	66	0	37	-
PM2.5(ug/m3) Average	730	0	14	98.12	86.2	-	54.7	5
Temperature 2 m (C) Average	739	0	5	99.33	31.6	-	23.6	-
Relative Humidity (%) Average	739	0	5	99.33	97	-	-	-
Surface Wetness (% of range) Average	739	0	5	99.33	76	-	-	-
Wind Speed 10 m (km/h) Average	722	0	22	97.04	18	-	-	-
Wind Direction 10 m (deg) Average	722	0	22	97.04	-	-	-	-
Precipitation (mm) Total	741	0	3	99.60	3.6	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
 JULY 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	701	0.7	3	-	0	0	0	0	0	1	64
TRS(ppb) Average	702	0.3	0	-	0	0	0	0	0	0	7
THC(ppm) Average	693	1.96	0.2	-	1.8	1.8	1.9	1.9	2	2.1	3.8
NMHC (ppm) Average	693	0.071	0.042	-	0.001	0	0	0.1	0.1	0.1	0.24
CH4(ppm) Average	693	1.89	0.2	-	1.7	1.8	1.8	1.8	1.9	2	3.7
NO2(ppb) Average	701	1.7	2	-	0	0	1	1	2	4	14
NO(ppb) Average	701	0.9	2	-	0	0	0	0	1	2	16
NOX(ppb) Average	701	2.6	3	-	0	0	1	1	3	6	23
O3(ppb) Average	700	25.3	12	-	0	9	17	25	34	40	66
PM2.5(ug/m3) Average	730	15.99	15.8	-	0.7	2.9	4.7	9	22.7	40.8	86.2
Temperature 2 m (C) Average	739	18.71	5	-	5.2	12.4	15.2	18.4	22.3	25.5	31.6
Relative Humidity (%) Average	739	66.8	20	-	22	37	51	68	84	93	97
Surface Wetness (% of range) Average	739	4.4	11	-	0	0	0	0	4	13	76
Wind Speed 20 m (km/h) Average	722	6.8	3	-	0	3	5	7	9	11	18
Wind Direction 20 m (deg) Average	722	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	741	-	-	35.56	0	0	0	0	0	0	3.6

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)

JULY 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	19 Jul 2014 11:00	19 Jul 2014 12:00	2	New DAS collection program upload
ALL PARAMETERS	27 Jul 2014 18:00	27 Jul 2014 20:00	3	DAS collection error - data not recorded
AIR QUALITY ANALYZERS	06 Jul 2014 15:00	06 Jul 2014 16:00	2	Station power failure
CH4, NMHC, THC	06 Jul 2014 16:00	06 Jul 2014 17:00	1	Additional stabilization period following power spike
CH4, NMHC, THC	09 Jul 2014 09:00	09 Jul 2014 09:00	1	Maintenance on daily auto zero and span system
CH4, NMHC, THC	19 Jul 2014 05:00	19 Jul 2014 12:00	8	Maintenance and replace carrir gas cylinder, new program
PM2.5	04 Jul 2014 01:00	04 Jul 2014 09:00	9	Maintenance - broken filter tape and analyzer replacement
PM2.5	18 Jul 2014 19:00	18 Jul 2014 20:00	2	Unstable operation - power interruption
Wind Speed, Wind Direction	01 Jul 2014 01:00	01 Jul 2014 09:00	9	Flatline in sensor output signal
Wind Speed, Wind Direction	01 Jul 2014 21:00	01 Jul 2014 22:00	2	Flatline in sensor output signal
Wind Speed, Wind Direction	02 Jul 2014 02:00	02 Jul 2014 05:00	4	Flatline in sensor output signal
Wind Speed, Wind Direction	06 Jul 2014 13:00	06 Jul 2014 14:00	2	Flatline in sensor output signal
Wind Speed, Wind Direction	07 Jul 2014 14:00	07 Jul 2014 14:00	1	Maintenance - replaced wind sensors and alignment check
Wind Speed, Wind Direction	20 Jul 2014 23:00	20 Jul 2014 23:00	1	Flatline in sensor output signal

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Summary of Hour Averages

Anzac - July 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 64 ppb on Jul 30 10:00	Maximum Daily Average: 5.0 ppb on Jul 30		Hours of Data:	701
Minimum Value: 0 ppb on Jul 1 14:00	Minimum Daily Average: 0.0 ppb on Jul 4		Hours of Missing Data:	43
Maximum Diurnal Average: 3.5 ppb at hour 10	Minimum Diurnal Average: 0.0 ppb at hour 4		Hours of Calibration:	36
Monthly Average: 0.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 9		Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
2-Jul	0	0	0	Z	0	0	0	4	12	7	3	2	1	2	2	0	0	1	0	0	0	2	1	0	1.6	12
3-Jul	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
4-Jul	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
5-Jul	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
6-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	PF	PF	0	0	1	2	2	1	0	0	0.3	2
7-Jul	1	Z	0	0	0	0	0	1	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2
8-Jul	0	0	Z	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-Jul	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
10-Jul	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0
11-Jul	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
12-Jul	0	Z	0	0	0	0	0	0	0	0	0	3	2	6	7	5	4	1	1	1	1	1	0	0	1.3	7
13-Jul	0	0	Z	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
14-Jul	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
15-Jul	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0	0.2	1
16-Jul	0	0	0	0	0	Z	0	0	0	1	1	1	6	2	0	0	0	0	0	0	0	0	0	0	0.5	6
17-Jul	0	0	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1
18-Jul	Z	0	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Jul	0	Z	0	0	0	0	0	0	0	2	1	1	1	2	3	4	2	1	2	2	1	0	0	0	1.0	4
21-Jul	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	1	0	0	0	0	0	0.2	1
22-Jul	0	0	0	Z	0	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	0	3	1	0	0.4	3
23-Jul	0	0	0	0	Z	0	0	2	8	14	4	0	9	8	0	0	0	0	0	0	0	1	0	0	2.1	14
24-Jul	0	0	0	0	0	Z	1	1	1	1	0	2	1	1	0	2	2	3	0	0	0	0	0	0	0.8	3
25-Jul	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
26-Jul	Z	0	0	0	0	0	0	5	9	8	4	9	10	6	2	0	0	0	0	0	0	0	0	0	2.3	10
27-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	MS	MS	MS	0	0	0	0	0.3	4
28-Jul	0	0	Z	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3
29-Jul	0	0	0	Z	0	0	0	0	0	0	39	9	1	0	0	0	6	0	0	1	0	0	0	0	2.4	39
30-Jul	0	0	0	0	Z	0	0	9	26	64	8	0	0	0	0	0	0	0	0	0	0	6	2	0	5.0	64
31-Jul	9	2	0	0	0	Z	0	0	0	0	0	0	1	2	3	2	0	0	0	0	0	0	0	0	0.9	9

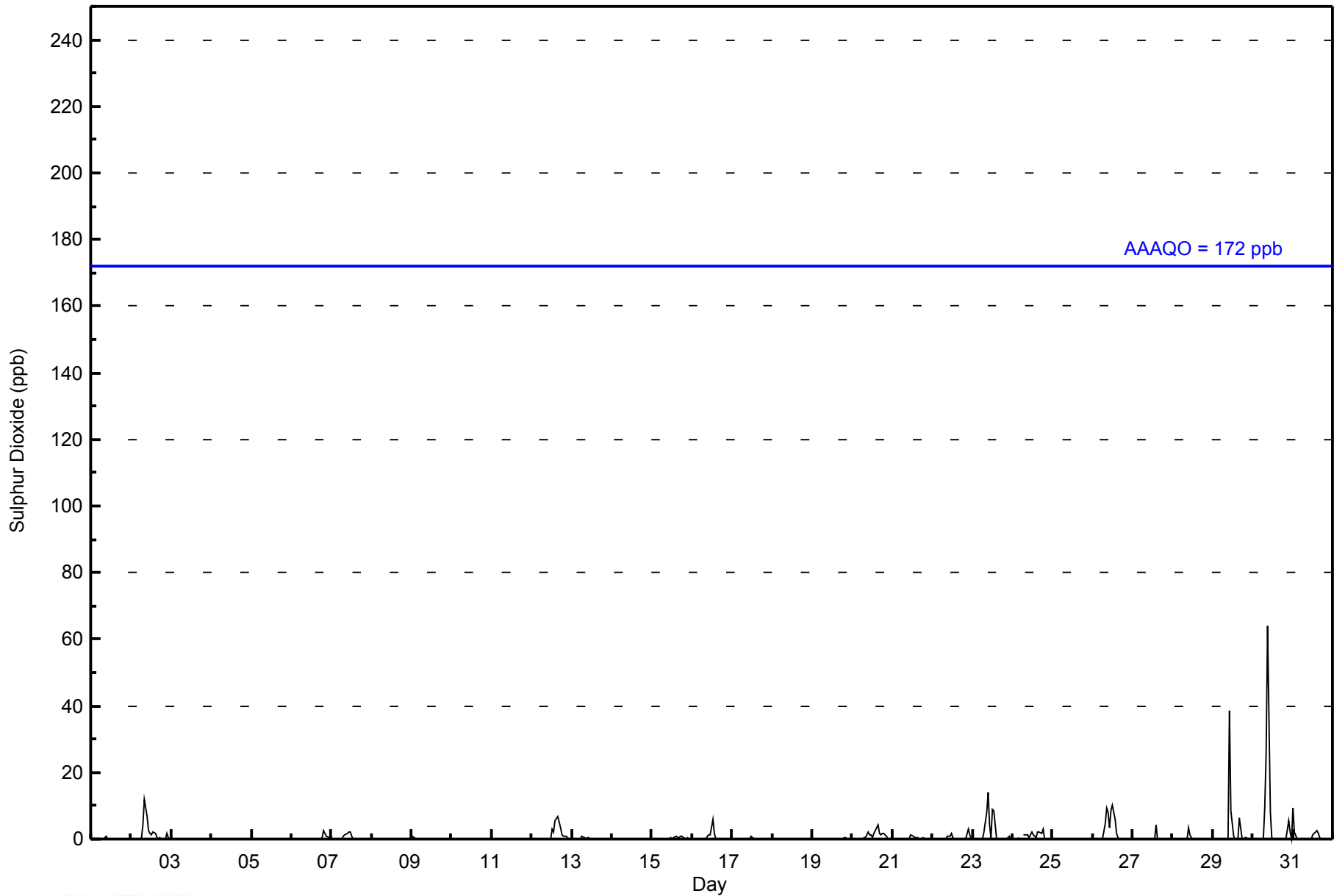
0.4	0.1	0.0	0.0	0.0	0.0	0.1	0.8	1.9	3.5	2.3	1.1	1.2	0.9	0.7	0.6	0.5	0.3	0.3	0.2	0.1	0.4	0.2	0.1	Diurnal Average	
9	2	0	0	0	0	1	9	26	64	39	9	10	8	6	7	6	4	3	2	2	6	2	0	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Anzac - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	696	99.29	99.29
11 - 20	2	0.29	99.57
21 - 60	2	0.29	99.86
61 - 110	1	0.14	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - July 2014

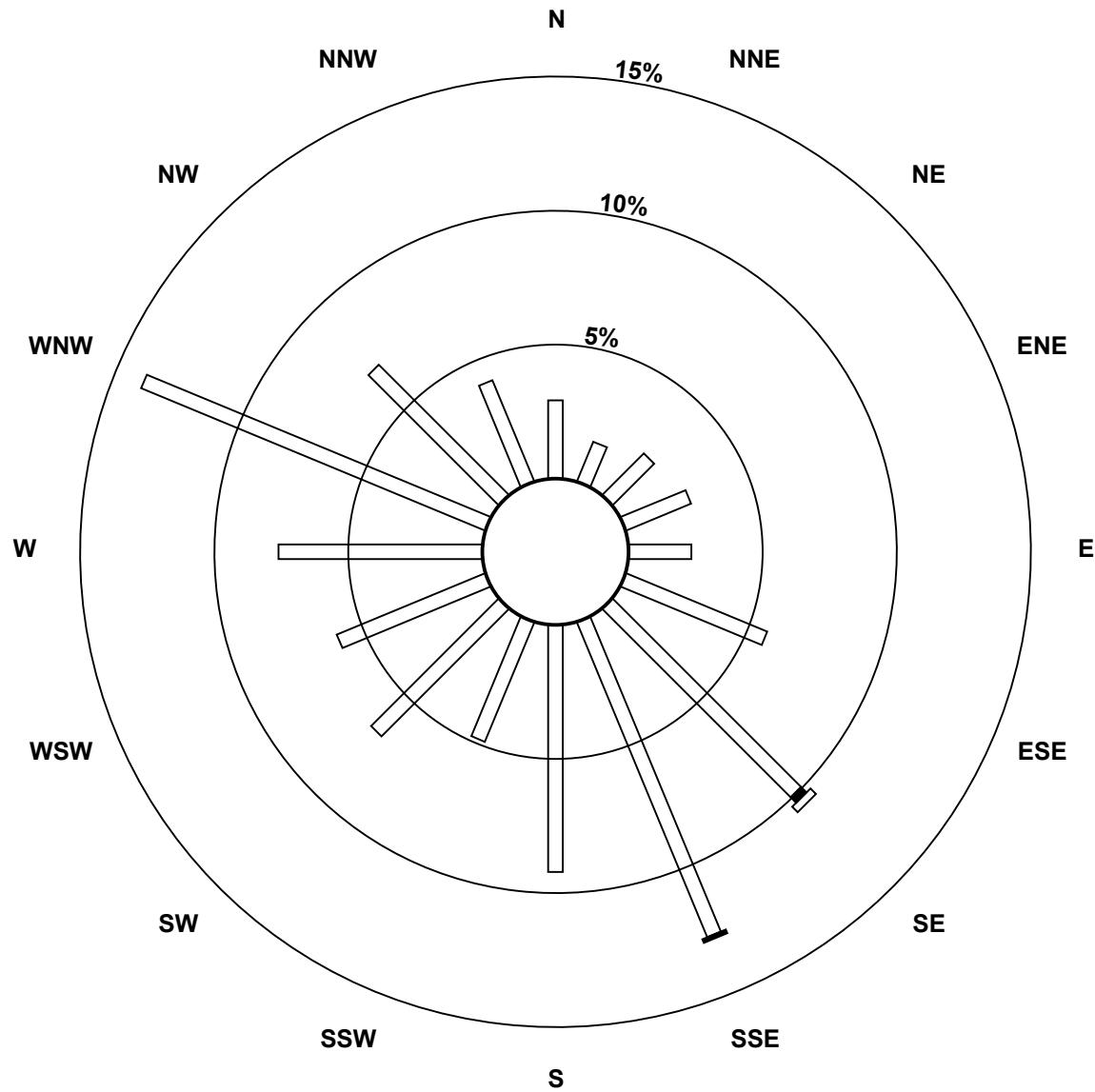
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	20	11	15	18	16	39	68	87	63	33	46	41	52	95	47	28	679
11 - 20	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
21 - 60	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
61 - 110	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	11	15	18	16	39	72	88	63	33	46	41	52	95	47	28	684

Total Number of Valid Hours: 684

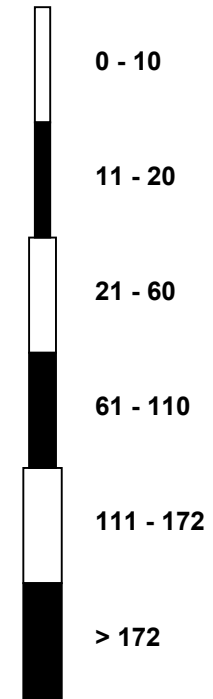
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Sulphur Dioxide (SO₂) - ppb
Anzac (AMS 14)



Classes (ppb)



Total Number of Valid Hours: 684

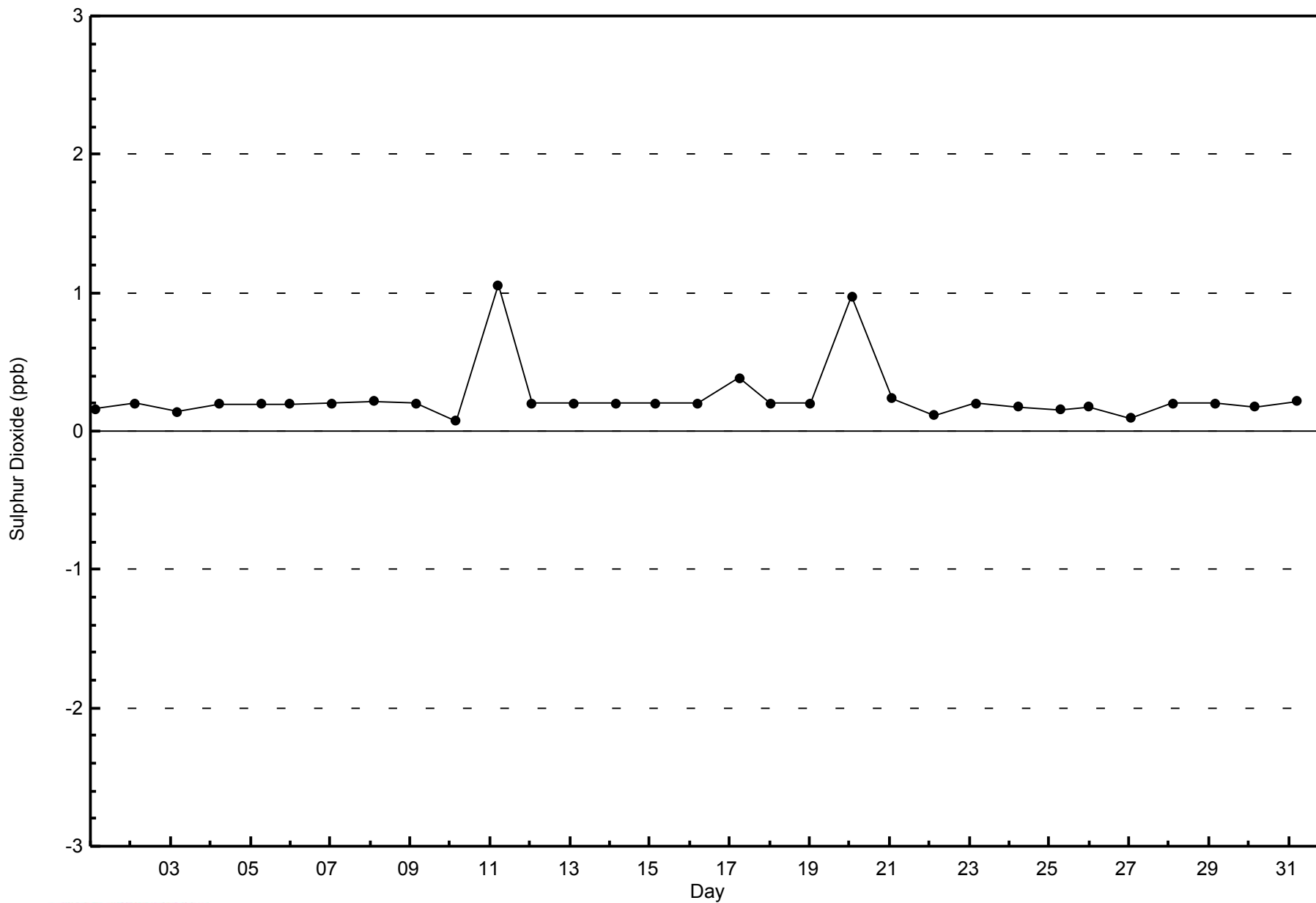


WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

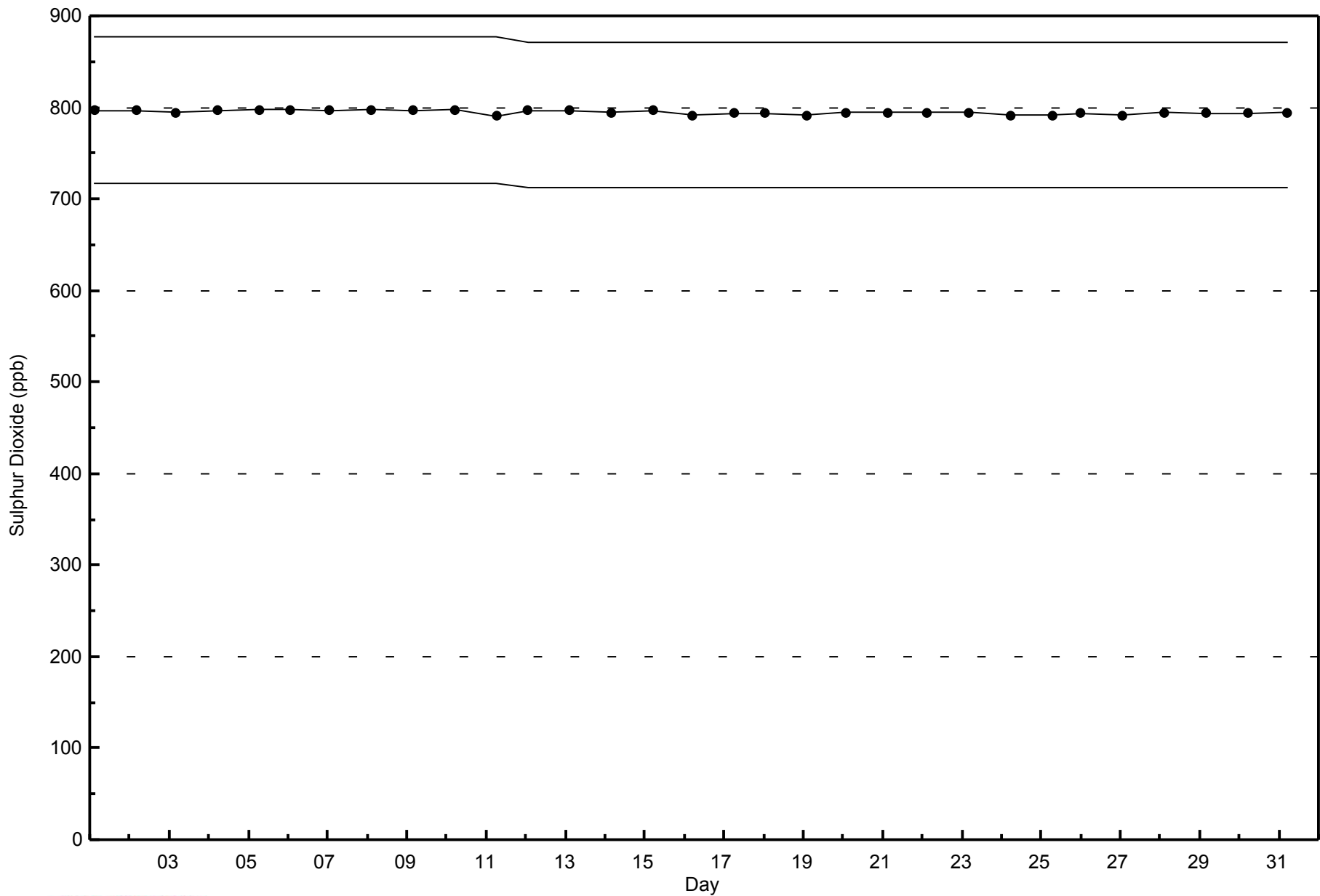
Anzac - July 2014





WBEA NETWORK
Span Responses

Sulphur Dioxide (SO₂) - ppb
Anzac - July 2014





Summary of Hour Averages

Anzac - July 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 7 ppb on Jul 2 07:00	Maximum Daily Average: 1.0 ppb on Jul 2		Hours of Data:	702
Minimum Value: 0 ppb on Jul 28 02:00	Minimum Daily Average: 0.2 ppb on Jul 13		Hours of Missing Data:	42
Maximum Diurnal Average: 0.7 ppb at hour 7	Minimum Diurnal Average: 0.2 ppb at hour 3		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:	99.1

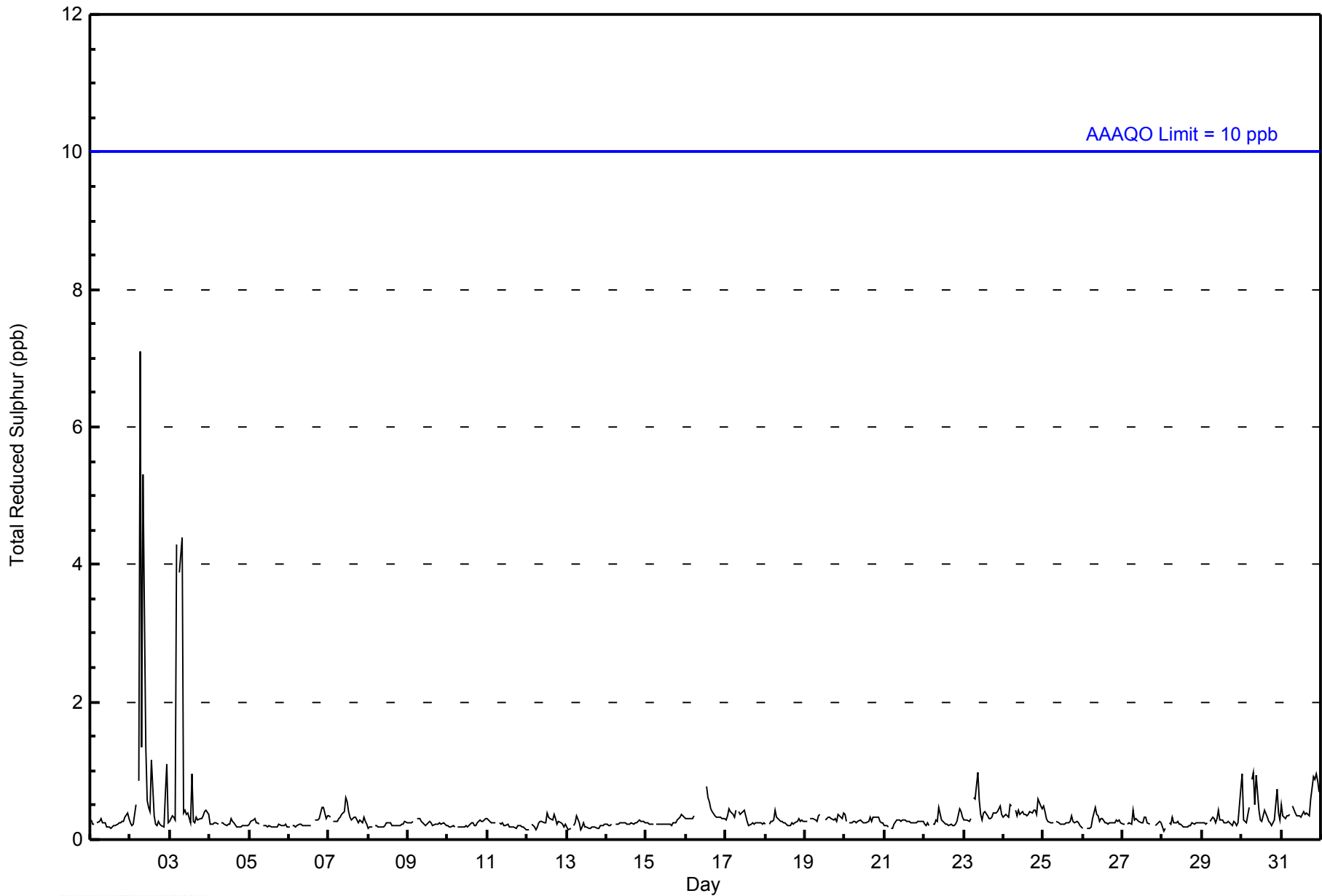
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
2-Jul	0	0	0	1	Z	1	7	1	5	1	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	1.0	7
3-Jul	0	0	0	0	4	Z	4	4	0	0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

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



WBEA NETWORK
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Anzac - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	697	99.29	99.29
3 - 4	3	0.43	99.72
5 - 7	2	0.28	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - July 2014

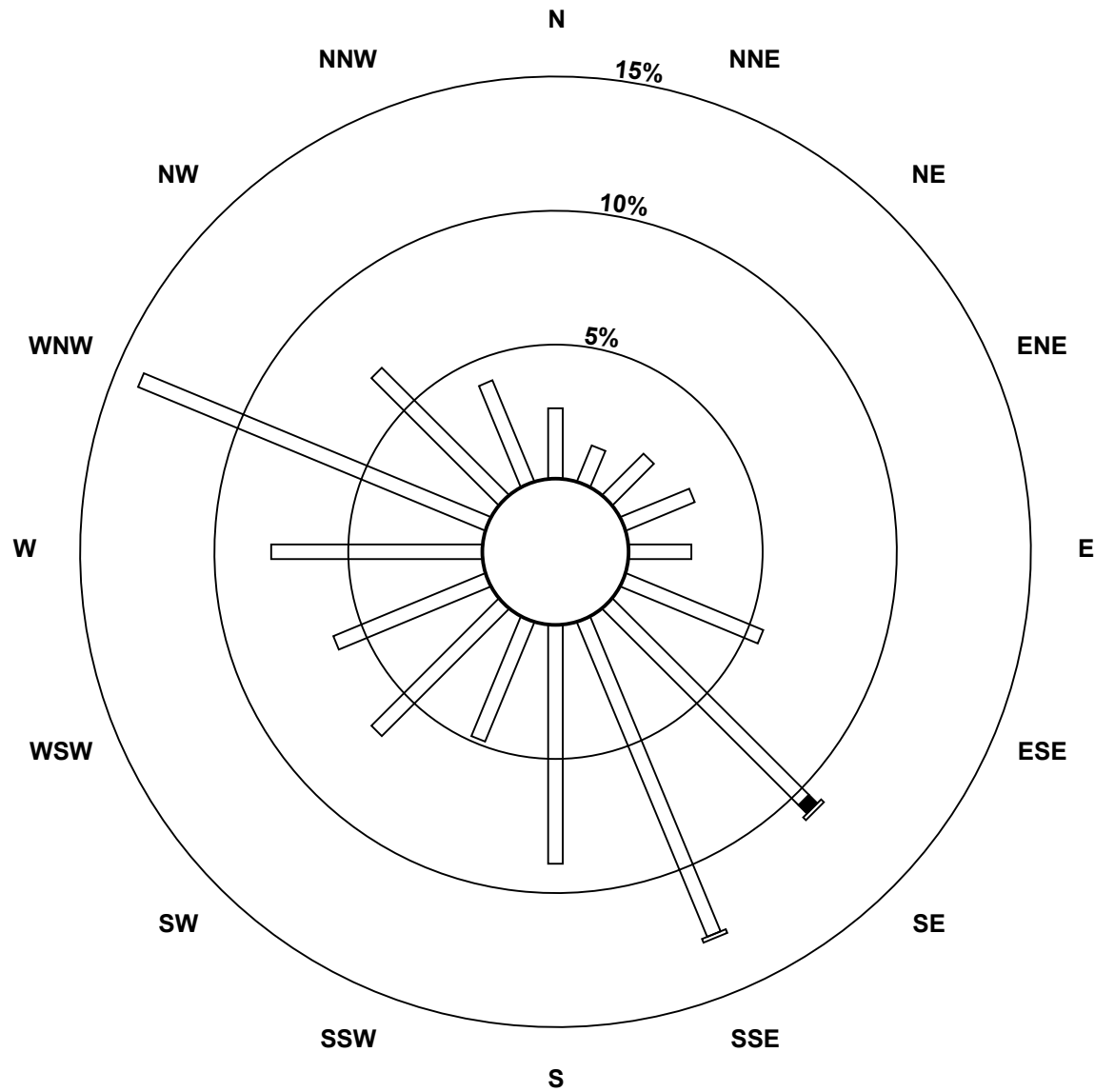
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	18	10	15	19	16	38	71	87	61	33	46	42	54	96	46	28	680
3 - 4	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3
5 - 7	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	18	10	15	19	16	38	75	88	61	33	46	42	54	96	46	28	685

Total Number of Valid Hours: 685

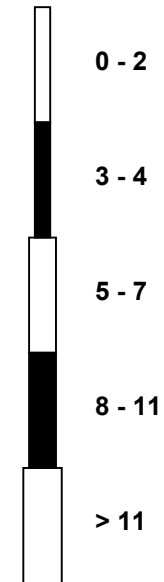
Total Number of Hours: 744

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

**Total Reduced Sulphur (TRS) - ppb
Anzac (AMS 14)**



Classes (ppb)



Total Number of Valid Hours: 685

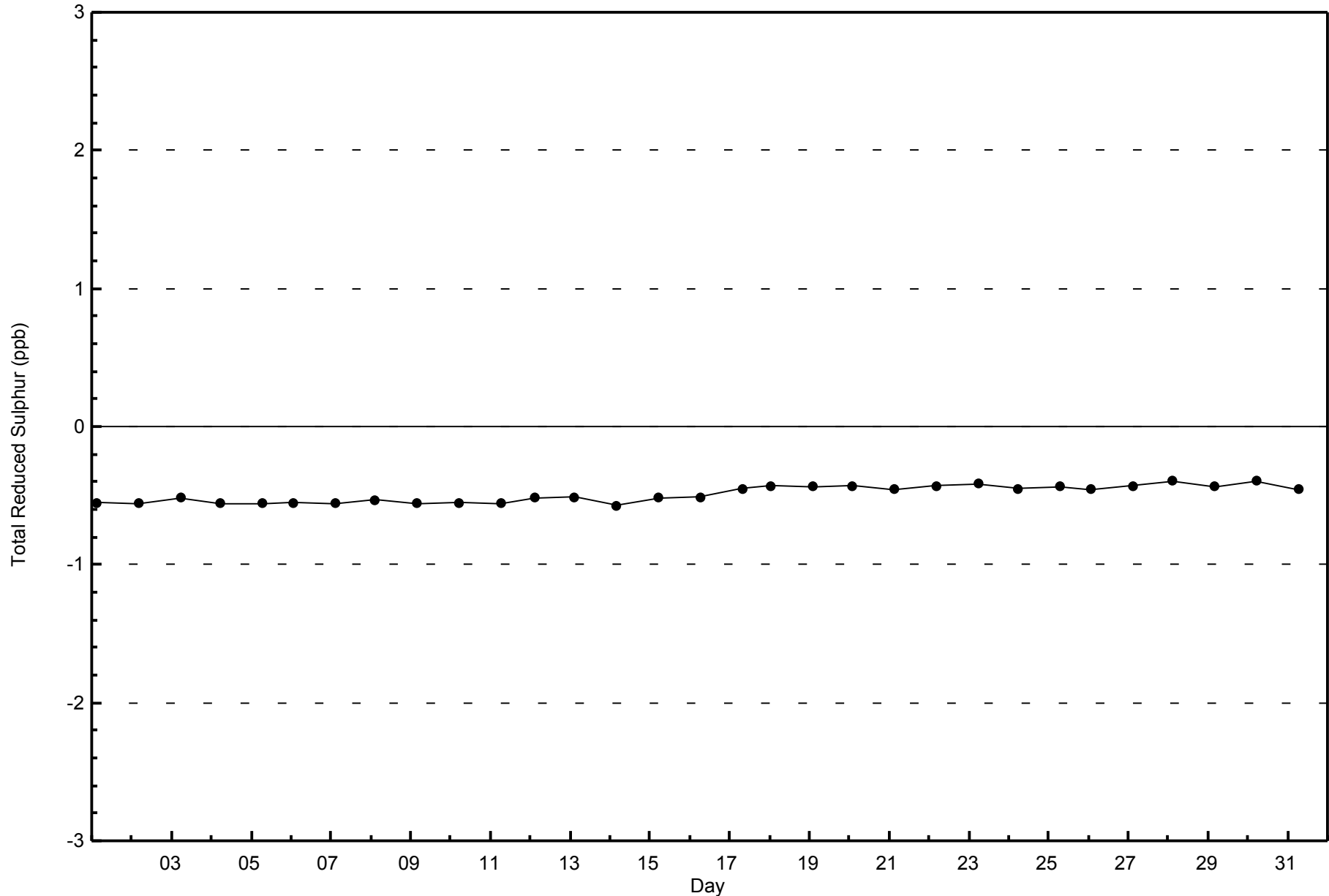


WBEA NETWORK

Zero Responses

Total Reduced Sulphur (TRS) - ppb

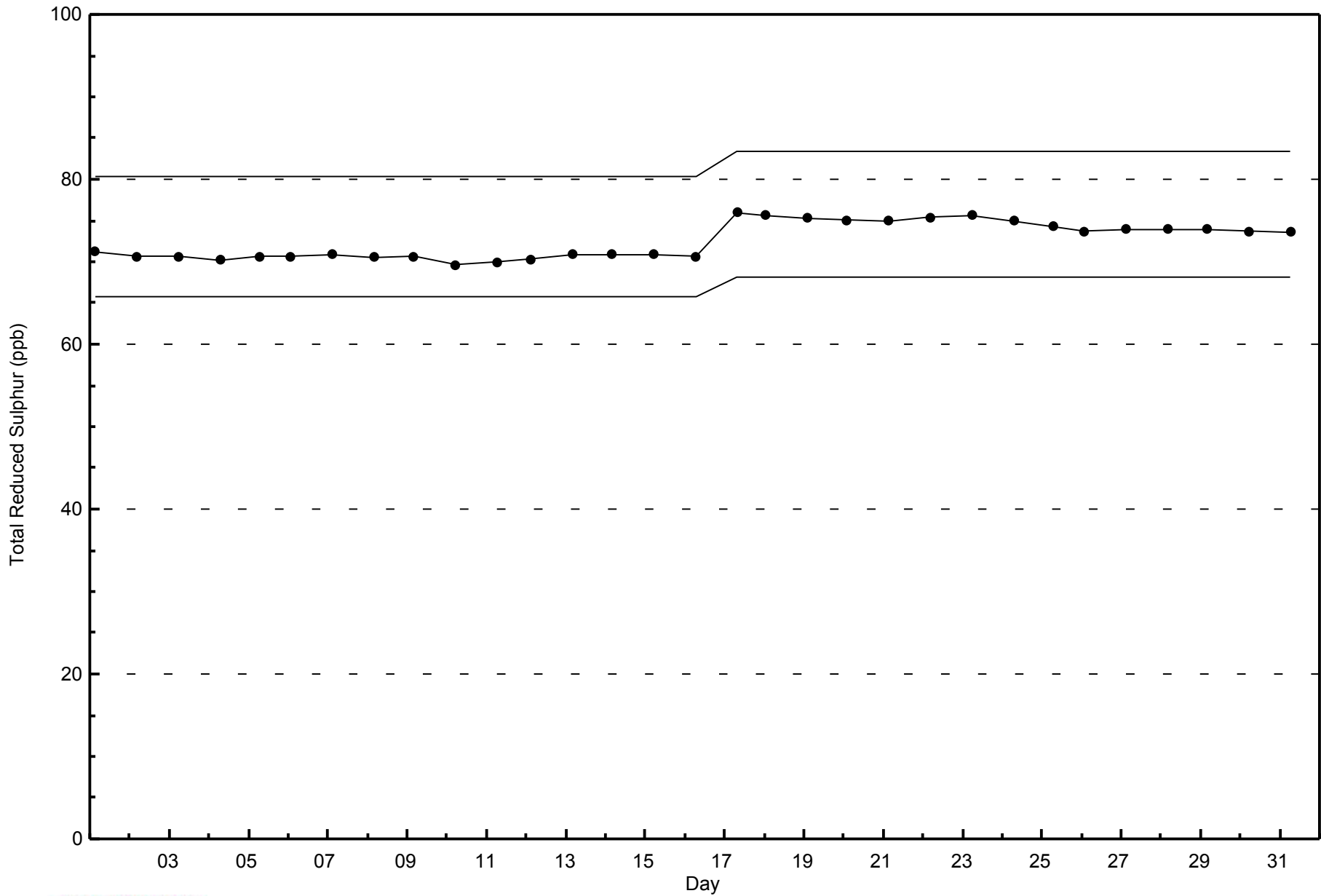
Anzac - July 2014





WBEA NETWORK
Span Responses

Total Reduced Sulphur (TRS) - ppb
Anzac - July 2014



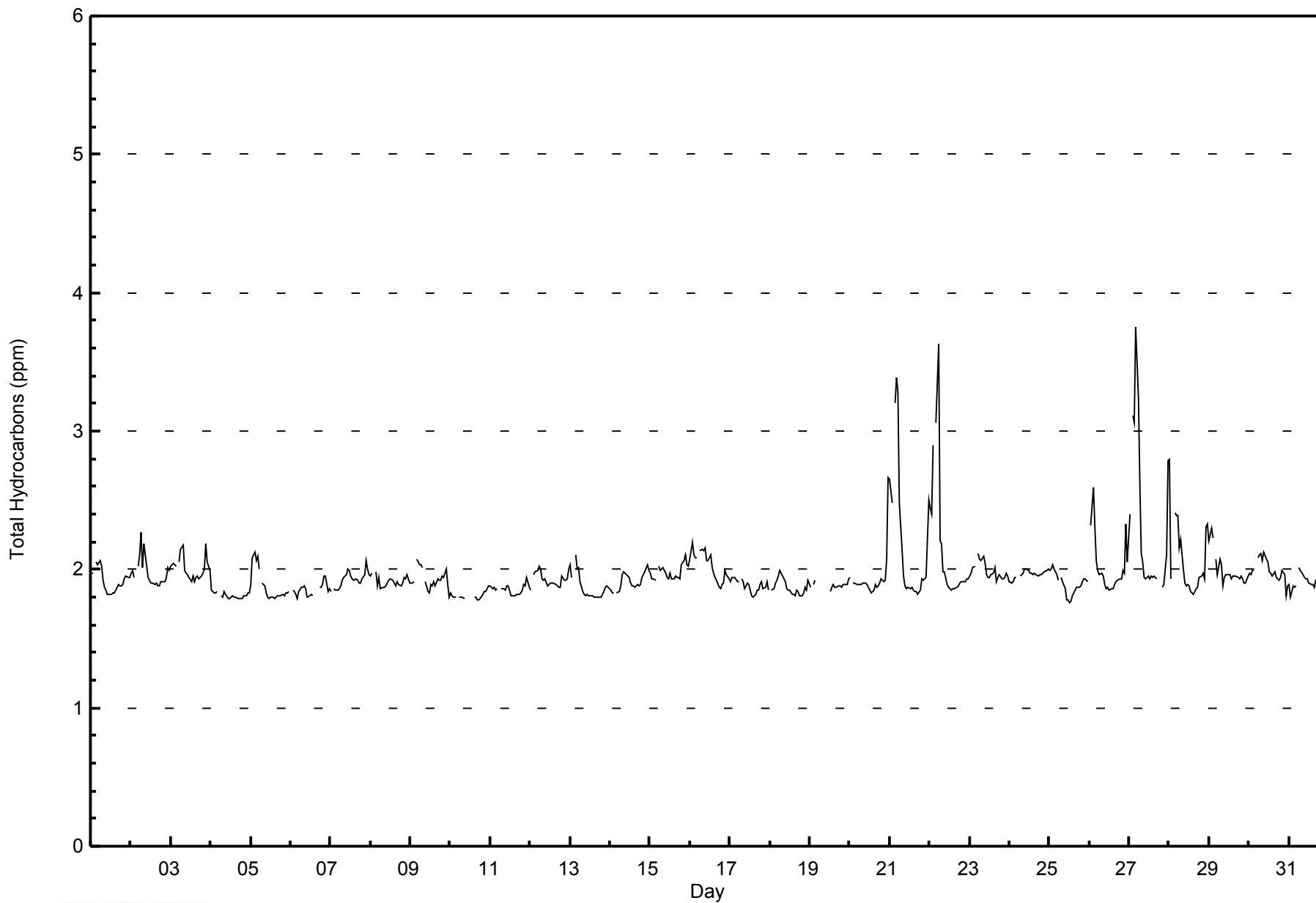


WBEA NETWORK

Hourly Averages

Total Hydrocarbons (THC) - ppm

Anzac - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	599	86.44	86.44
2.1 - 3.0	85	12.27	98.70
3.1 - 10.0	9	1.30	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 693

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - July 2014

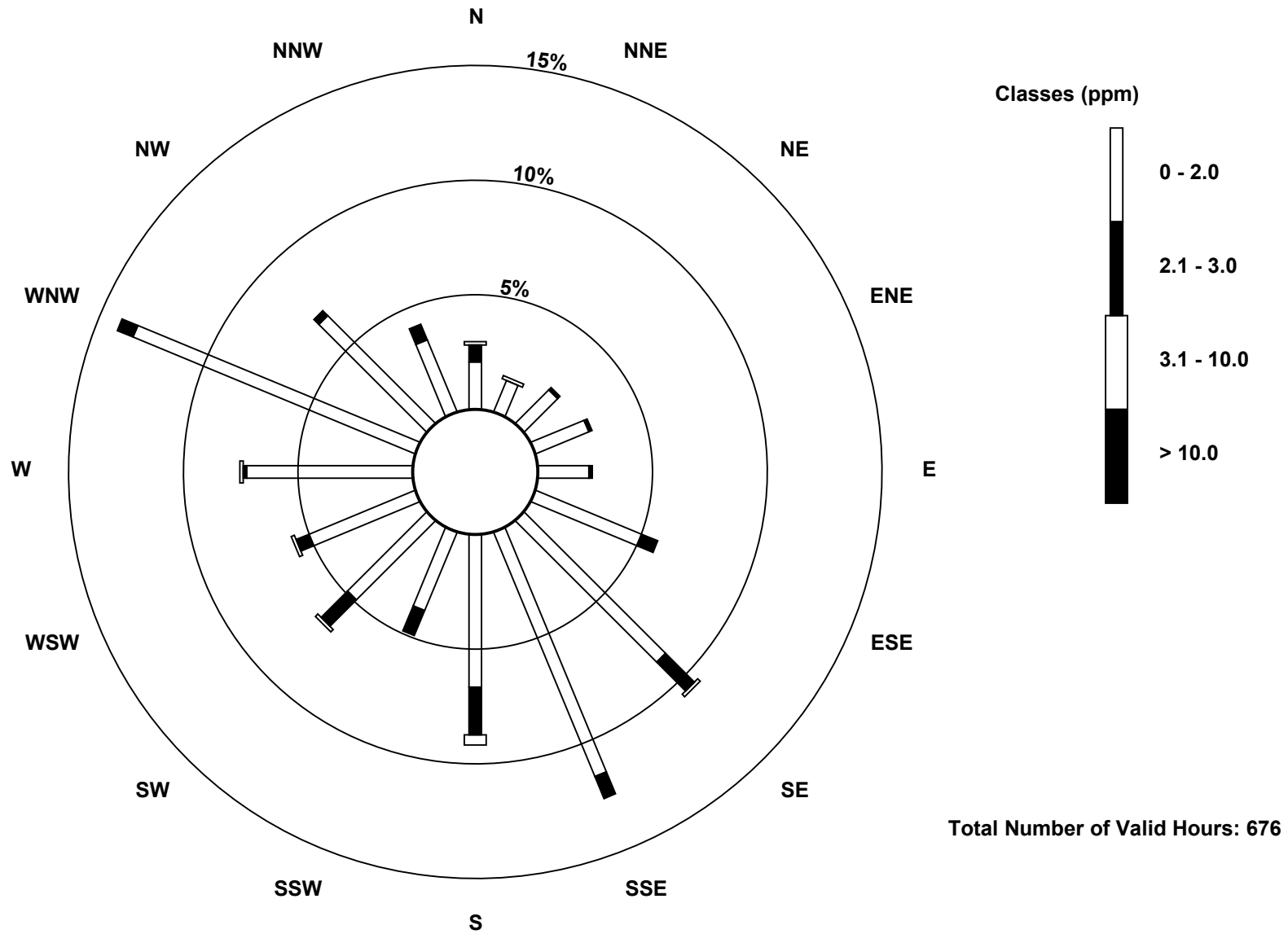
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	14	10	14	17	15	34	59	78	45	25	33	34	49	90	45	23	585
2.1 - 3.0	5	0	1	1	1	5	12	7	14	8	11	4	1	5	2	5	82
3.1 - 10.0	1	1	0	0	0	0	1	0	3	0	1	1	1	0	0	0	9
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	11	15	18	16	39	72	85	62	33	45	39	51	95	47	28	676

Total Number of Valid Hours: 676

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Total Hydrocarbons (THC) - ppm
Anzac (AMS 14)



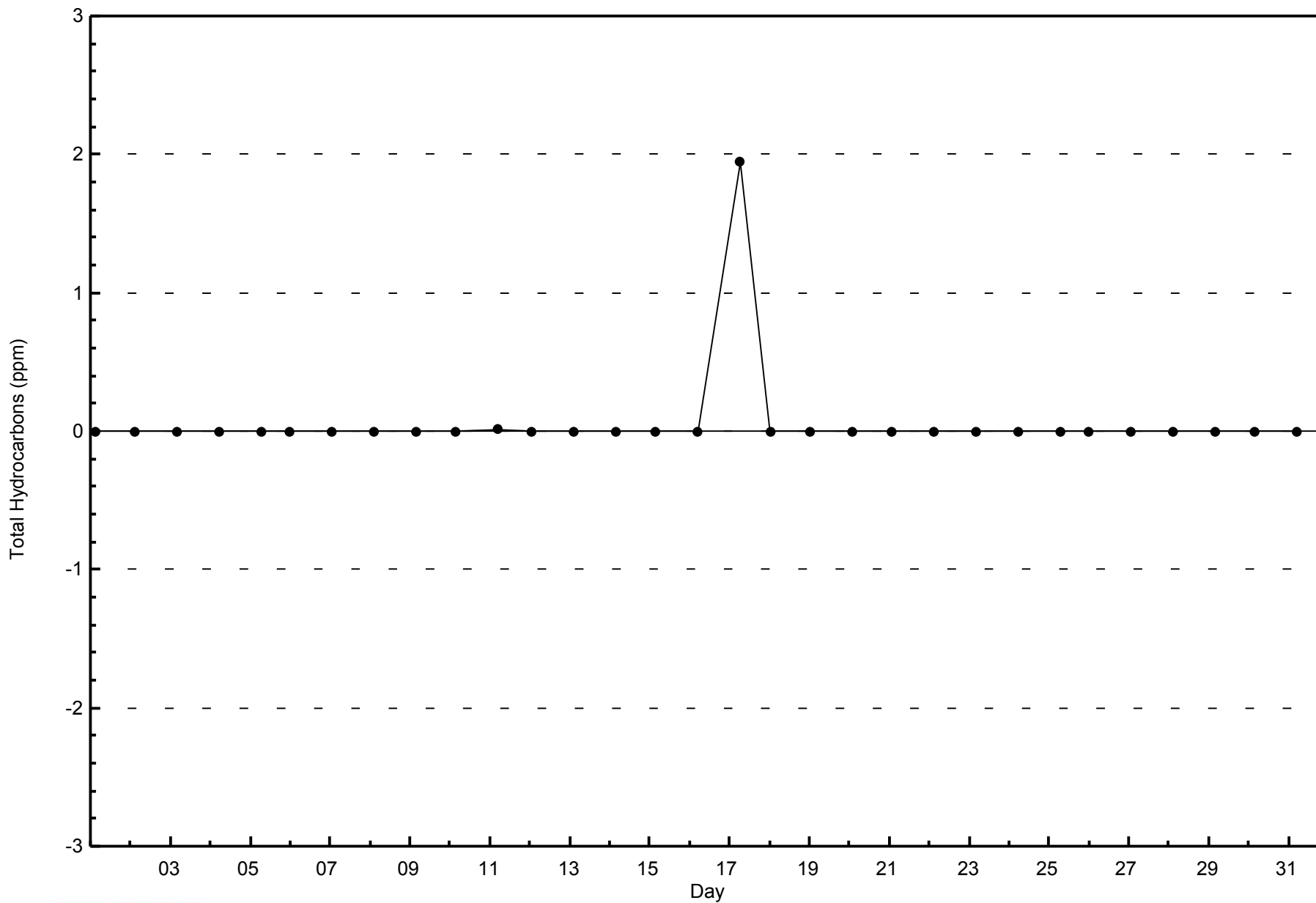


WBEA NETWORK

Zero Responses

Total Hydrocarbons (THC) - ppm

Anzac - July 2014



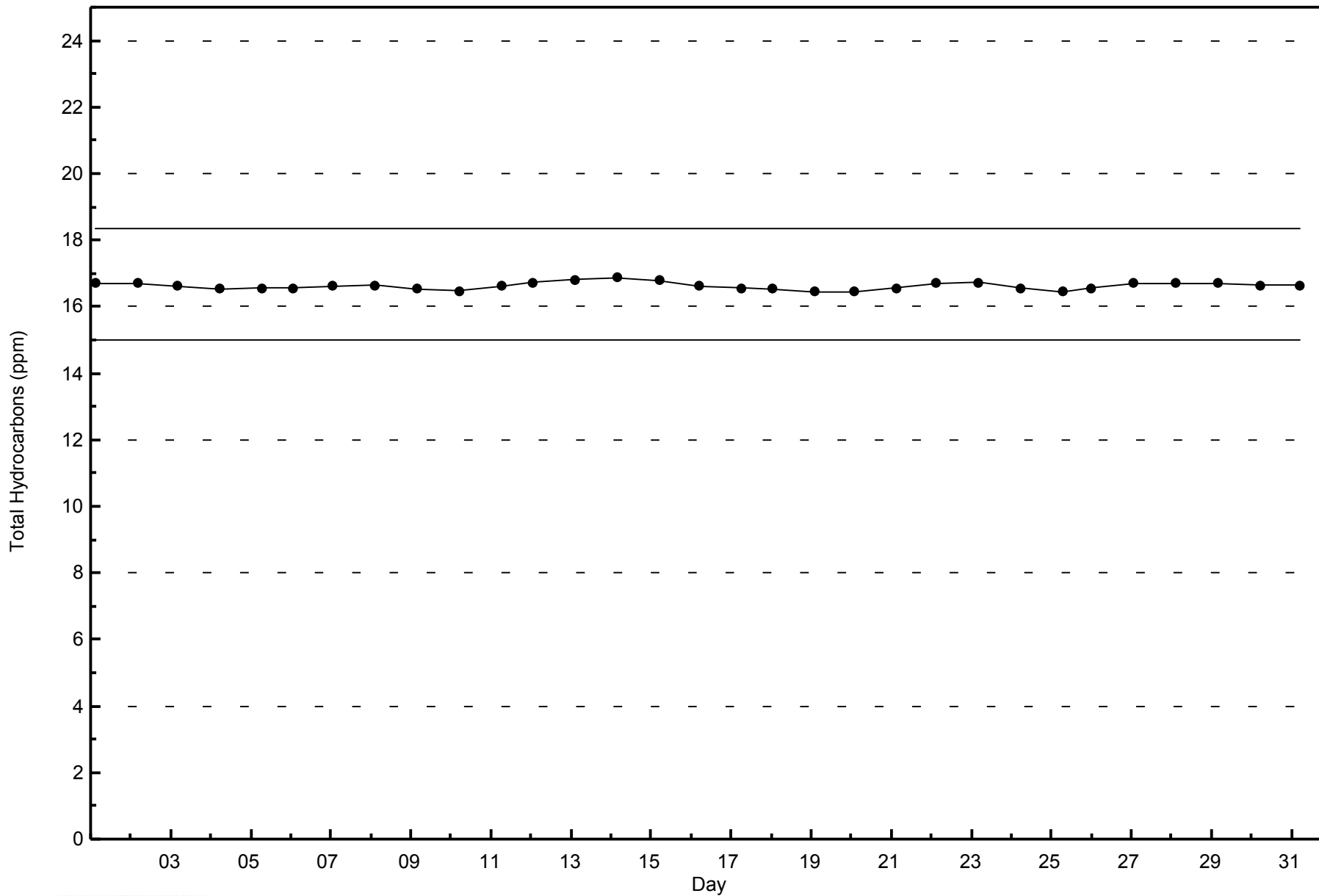


WBEA NETWORK

Span Responses

Total Hydrocarbons (THC) - ppm

Anzac - July 2014



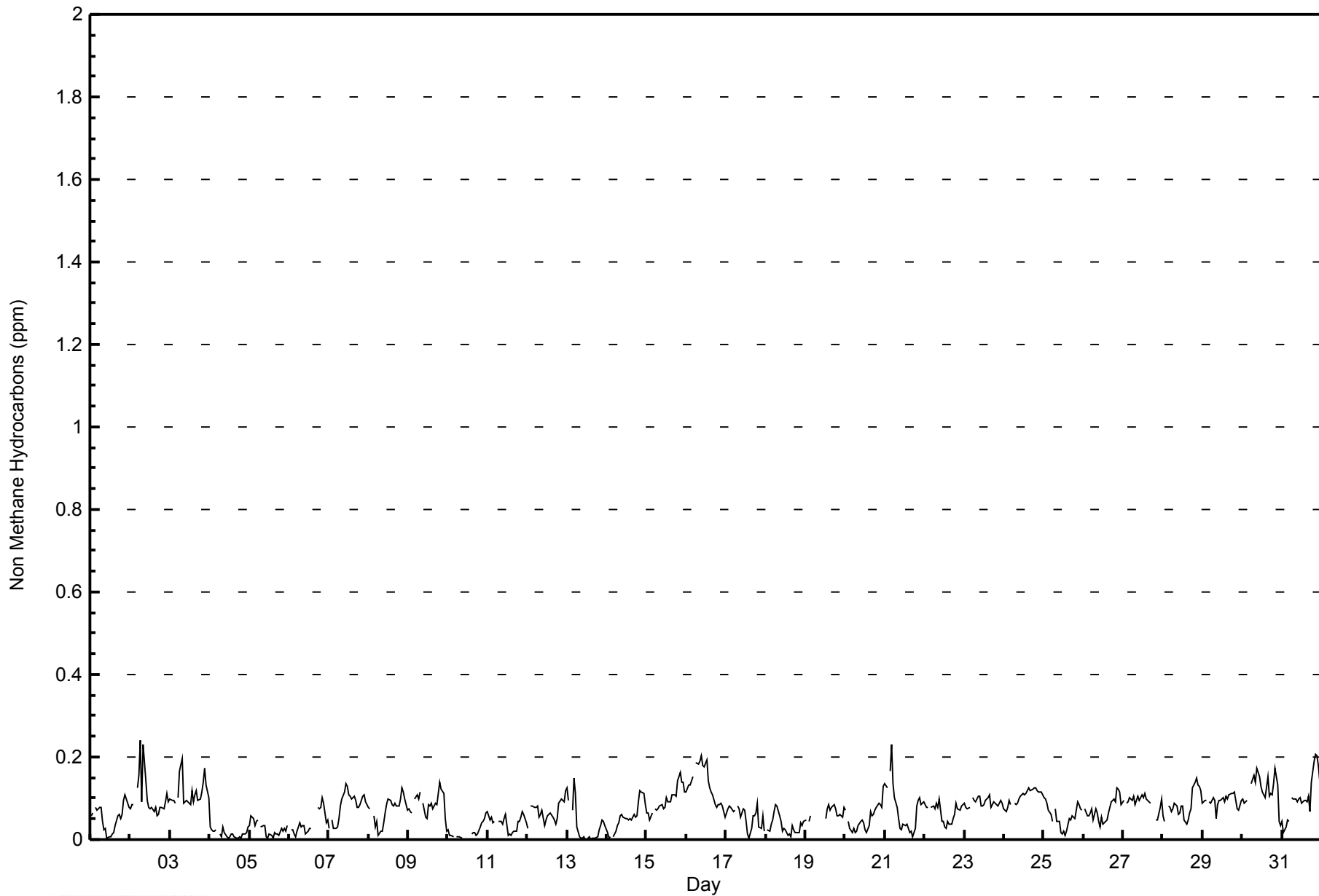


Maximum Value: 0.240 ppm on Jul 2 07:00																								Maximum Daily Average: 0.132 ppm on Jul 16																								Hours in Service: 744	
Minimum Value: 0.001 ppm on Jul 13 15:00																								Minimum Daily Average: 0.014 ppm on Jul 4																								Hours of Data: 693	
Maximum Diurnal Average: 0.092 ppm at hour 21																								Minimum Diurnal Average: 0.059 ppm at hour 15																								Hours of Missing Data: 51	
Monthly Average: 0.071 ppm																								Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.1 P ₉₀ = 0.1 P ₉₉ = 0.2																								Hours of Calibration: 36	
																																																Percent Operational Time: 98.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.058	0.063	Z	0.077	0.070	0.079	0.079	0.045	0.024	0.028	0.004	0.006	0.008	0.013	0.019	0.033	0.059	0.059	0.050	0.063	0.096	0.109	0.088	0.077	0.052	0.109																							
2-Jul	0.076	0.083	0.084	Z	0.125	0.156	0.240	0.093	0.231	0.143	0.096	0.077	0.074	0.078	0.069	0.076	0.059	0.061	0.077	0.076	0.076	0.092	0.112	0.090	0.102	0.240																							
3-Jul	0.099	0.094	0.095	0.088	Z	0.101	0.165	0.195	0.088	0.090	0.096	0.091	0.084	0.117	0.092	0.108	0.120	0.093	0.100	0.114	0.138	0.174	0.132	0.102	0.112	0.195																							
4-Jul	0.031	0.023	0.021	0.021	0.022	Z	0.014	0.006	0.030	0.018	0.007	0.002	0.005	0.015	0.014	0.008	0.004	0.004	0.006	0.003	0.015	0.014	0.017	0.030	0.014	0.031																							
5-Jul	0.033	0.056	0.051	0.035	0.044	0.046	Z	0.031	0.034	0.032	0.008	0.005	0.014	0.011	0.004	0.016	0.015	0.014	0.009	0.026	0.020	0.028	0.020	0.033	0.025	0.056																							
6-Jul	Z	0.022	0.025	0.013	0.005	0.019	0.041	0.031	0.035	0.035	0.013	0.019	0.027	0.027	PF	PF	PF	0.079	0.076	0.078	0.102	0.088	0.040	0.046	0.041	0.102																							
7-Jul	0.025	Z	0.046	0.026	0.026	0.030	0.051	0.082	0.099	0.115	0.137	0.130	0.107	0.106	0.099	0.107	0.094	0.077	0.079	0.086	0.106	0.109	0.091	0.084	0.083	0.137																							
8-Jul	0.079	0.074	Z	0.056	0.029	0.046	0.009	0.020	0.021	0.039	0.065	0.085	0.099	0.094	0.085	0.080	0.089	0.080	0.081	0.098	0.125	0.114	0.100	0.073	0.071	0.125																							
9-Jul	0.073	0.066	0.065	Z	0.099	0.108	0.098	0.116	M	0.088	0.054	0.051	0.084	0.082	0.089	0.074	0.090	0.084	0.113	0.139	0.124	0.111	0.051	0.021	0.085	0.139																							
10-Jul	0.022	0.010	0.009	0.005	Z	0.007	0.005	0.008	0.003	C	C	C	C	C	0.014	0.016	0.018	0.012	0.012	0.030	0.042	0.045	0.050	0.066	0.021	0.066																							
11-Jul	0.069	0.046	0.053	0.042	0.044	Z	0.043	0.043	0.044	0.039	0.050	0.062	0.012	0.015	0.010	0.017	0.021	0.022	0.042	0.045	0.054	0.069	0.061	0.040	0.041	0.069																							
12-Jul	0.026	Z	0.083	0.082	0.079	0.079	0.083	0.053	0.060	0.071	0.033	0.047	0.057	0.060	0.065	0.056	0.047	0.038	0.051	0.088	0.098	0.093	0.091	0.118	0.068	0.118																							
13-Jul	0.126	0.096	Z	0.071	0.148	0.111	0.030	0.005	0.003	0.002	0.007	0.001	0.001	0.007	0.001	0.002	0.002	0.003	0.006	0.024	0.035	0.047	0.044	0.034	0.035	0.148																							
14-Jul	0.016	0.004	0.007	Z	0.007	0.020	0.033	0.039	0.056	0.059	0.055	0.049	0.052	0.046	0.051	0.047	0.062	0.055	0.058	0.091	0.118	0.115	0.113	0.085	0.054	0.118																							
15-Jul	0.066	0.064	0.048	0.065	Z	0.076	0.072	0.074	0.082	0.086	0.075	0.079	0.103	0.093	0.090	0.109	0.108	0.108	0.105	0.144	0.163	0.139	0.139	0.116	0.096	0.163																							
16-Jul	0.116	0.132	0.133	0.143	0.151	Z	0.188	0.184	0.190	0.204	0.179	0.177	0.194	0.143	0.124	0.115	0.108	0.085	0.076	0.085	0.086	0.089	0.081	0.053	0.132	0.204																							
17-Jul	0.065	0.075	0.083	0.079	0.067	0.071	Z	0.081	0.073	0.054	0.075	0.070	0.043	0.014	0.004	0.028	0.059	0.058	0.066	0.087	0.030	0.027	0.056	0.021	0.056	0.087																							
18-Jul	Z	0.024	0.019	0.037	0.048	0.068	0.084	0.083	0.059	0.045	0.020	0.026	0.024	0.010	0.015	0.007	0.035	0.025	0.016	0.017	0.016	0.040	0.034	0.043	0.035	0.084																							
19-Jul	0.047	Z	0.045	0.056	PF	PF	PF	PF	PF	PF	PF	PF	M	0.051	0.076	0.086	0.071	0.077	0.083	0.075	0.057	0.058	0.062	0.055	0.078	--	0.086																						
20-Jul	0.072	Z	0.045	0.027	0.018	0.028	0.016	0.019	0.032	0.043	0.048	0.042	0.024	0.018	0.033	0.068	0.057	0.062	0.070	0.077	0.089	0.086	0.078	0.129	0.051	0.129																							
21-Jul	0.135	0.127	Z	0.166	0.229	0.134	0.103	0.077	0.050	0.027	0.023	0.037	0.034	0.037	0.027	0.019	0.019	0.006	0.026	0.083	0.096	0.101	0.084	0.090	0.075	0.229																							
22-Jul	0.086	0.078	0.079	Z	0.077	0.081	0.075	0.089	0.079	0.098	0.045	0.045	0.030	0.027	0.043	0.039	0.036	0.050	0.062	0.088	0.074	0.071	0.082	0.086	0.066	0.098																							
23-Jul	0.090	0.078	0.074	0.079	Z	0.101	0.096	0.090	0.105	0.106	0.083	0.080	0.086	0.093	0.101	0.109	0.077	0.084	0.092	0.085	0.083	0.089	0.095	0.088	0.090	0.109																							
24-Jul	0.074	0.068	0.078	0.094	0.085	Z	0.089	0.085	0.087	0.097	0.107	0.113	0.109	0.113	0.119	0.125	0.120	0.120	0.126	0.126	0.119	0.117	0.114	0.108	0.104	0.126																							
25-Jul	0.101	0.099	0.090	0.071	0.062	0.043	Z	0.074	0.043	0.045	0.016	0.013	0.019	0.011	0.022	0.050	0.049	0.058	0.054	0.051	0.091	0.085	0.074	0.071	0.056	0.101																							
26-Jul	Z	0.075	0.059	0.058	0.065	0.073	0.048	0.074	0.063	0.045	0.029	0.053	0.036	0.043	0.048	0.066	0.078	0.091	0.097	0.091	0.126	0.120	0.114	0.085	0.071	0.126																							
27-Jul	0.095	Z	0.087	0.093	0.101	0.094	0.107	0.085	0.094	0.104	0.096	0.109	0.100	0.112	0.100	0.095	0.088	MS	MS	MS	0.048	0.047	0.077	0.097	0.091	0.112																							
28-Jul	0.059	0.044	Z	0.081	0.079	0.067	0.075	0.088	0.082	0.061	0.063	0.080	0.081	0.049	0.037	0.049	0.064	0.073	0.125	0.138	0.149	0.131	0.130	0.118	0.084	0.149																							
29-Jul	0.089	0.095	0.094	Z	0.090	0.088	0.103	0.096	0.051	0.086	0.096	0.094	0.101	0.091	0.105	0.100	0.107	0.112	0.110	0.116	0.095	0.073	0.072	0.094	0.094	0.116																							
30-Jul	0.098	0.090	0.092	0.095	Z	0.137	0.147	0.157	0.140	0.175	0.151	0.129	0.114	0.110	0.102	0.153	0.107	0.113	0.109	0.136	0.173	0.131	0.043	0.034	0.119	0.175																							
31-Jul	0.044	0.017	0.031	0.049	0.044	Z	0.103	0.099	0.098	0.091	0.097	0.102	0.089	0.094	0.095	0.092	0.104	0.068	0.140	0.191	0.205	0.202	0.181	0.143	0.103	0.205																							
																								Diurnal Average																									
																								Diurnal Maximum																									
Z - zerospan																																																	
C - Calibration																																																	
M - Maintenance																																																	
PF - Power Failure																																																	
MS - Missing																																																	



WBEA NETWORK
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	23	3.32	3.32
0.006 - 0.05	236	34.05	37.37
0.06 - 0.1	408	58.87	96.25
> 0.1	26	3.75	100.00

Total Number of Valid Hours: 693

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - July 2014

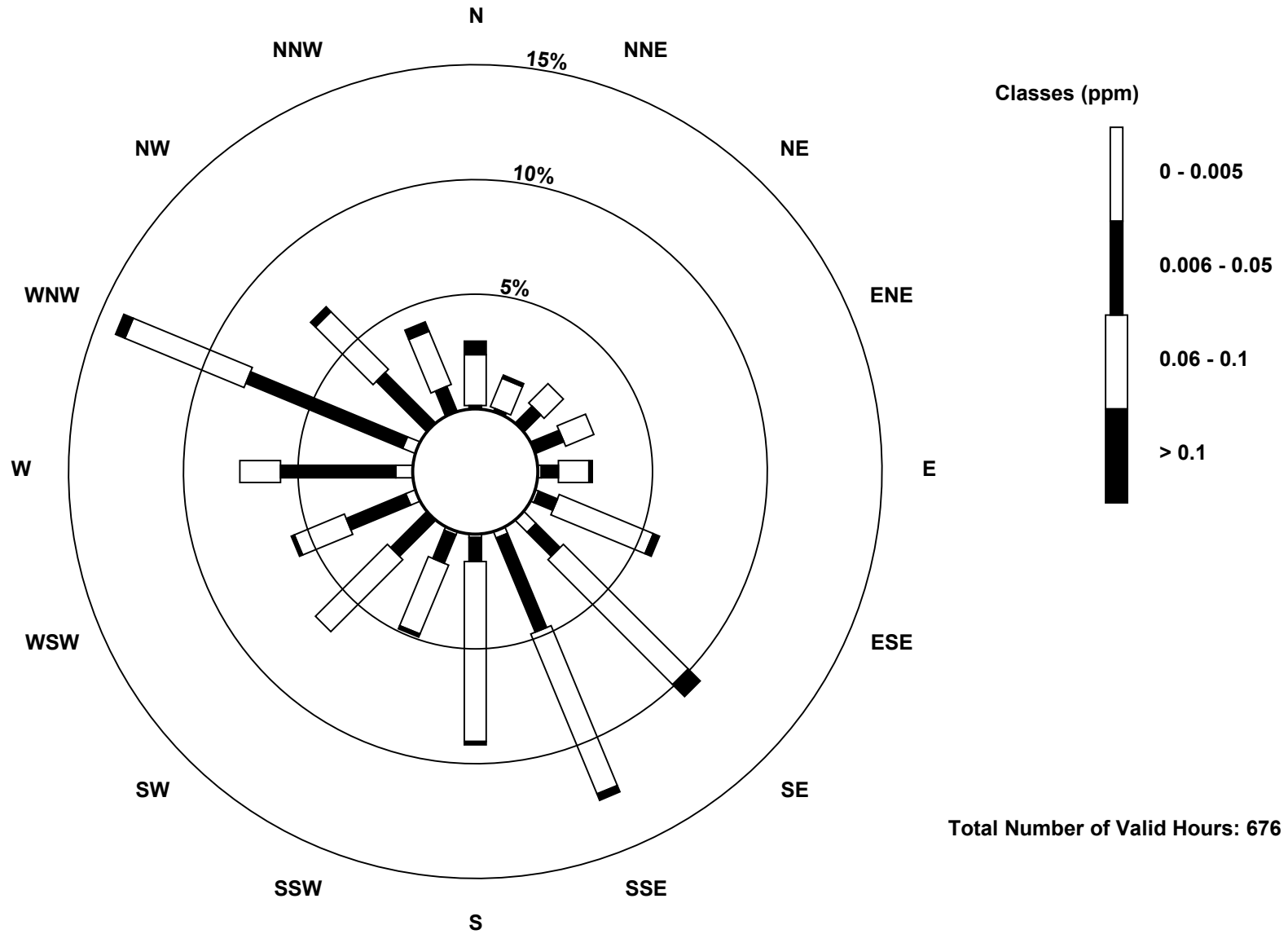
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	0	0	0	0	1	1	5	2	1	1	0	3	5	4	0	0	23
0.006 - 0.05	1	1	7	9	5	6	10	30	7	9	15	19	34	50	21	8	232
0.06 - 0.1	15	9	8	9	9	30	52	51	53	22	30	16	12	38	24	17	395
> 0.1	4	1	0	0	1	2	5	2	1	1	0	1	0	3	2	3	26
Totals	20	11	15	18	16	39	72	85	62	33	45	39	51	95	47	28	676

Total Number of Valid Hours: 676

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Non Methane Hydrocarbons (NMHC) - ppm
Anzac (AMS 14)



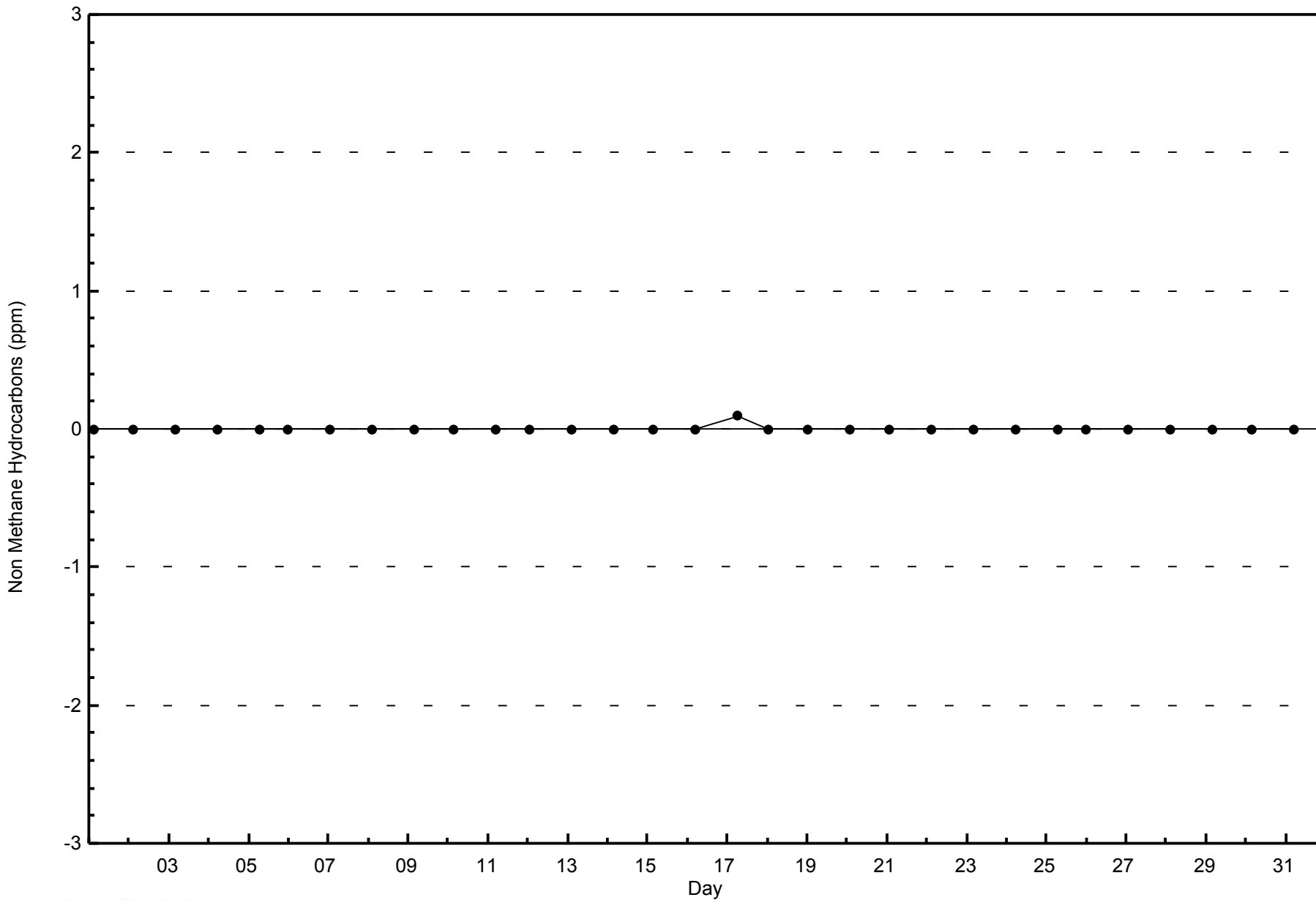


WBEA NETWORK

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

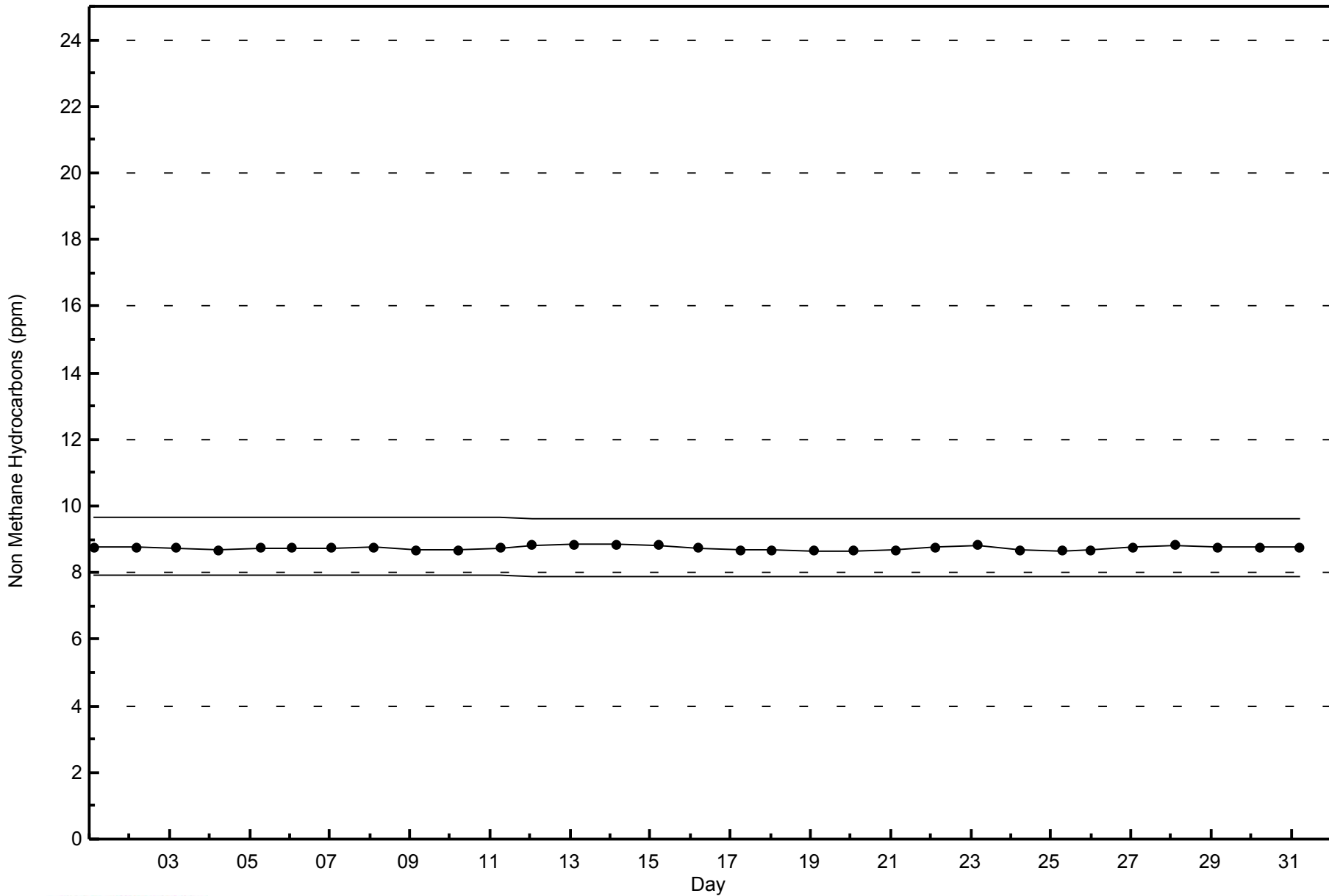
Anzac - July 2014





WBEA NETWORK
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - July 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

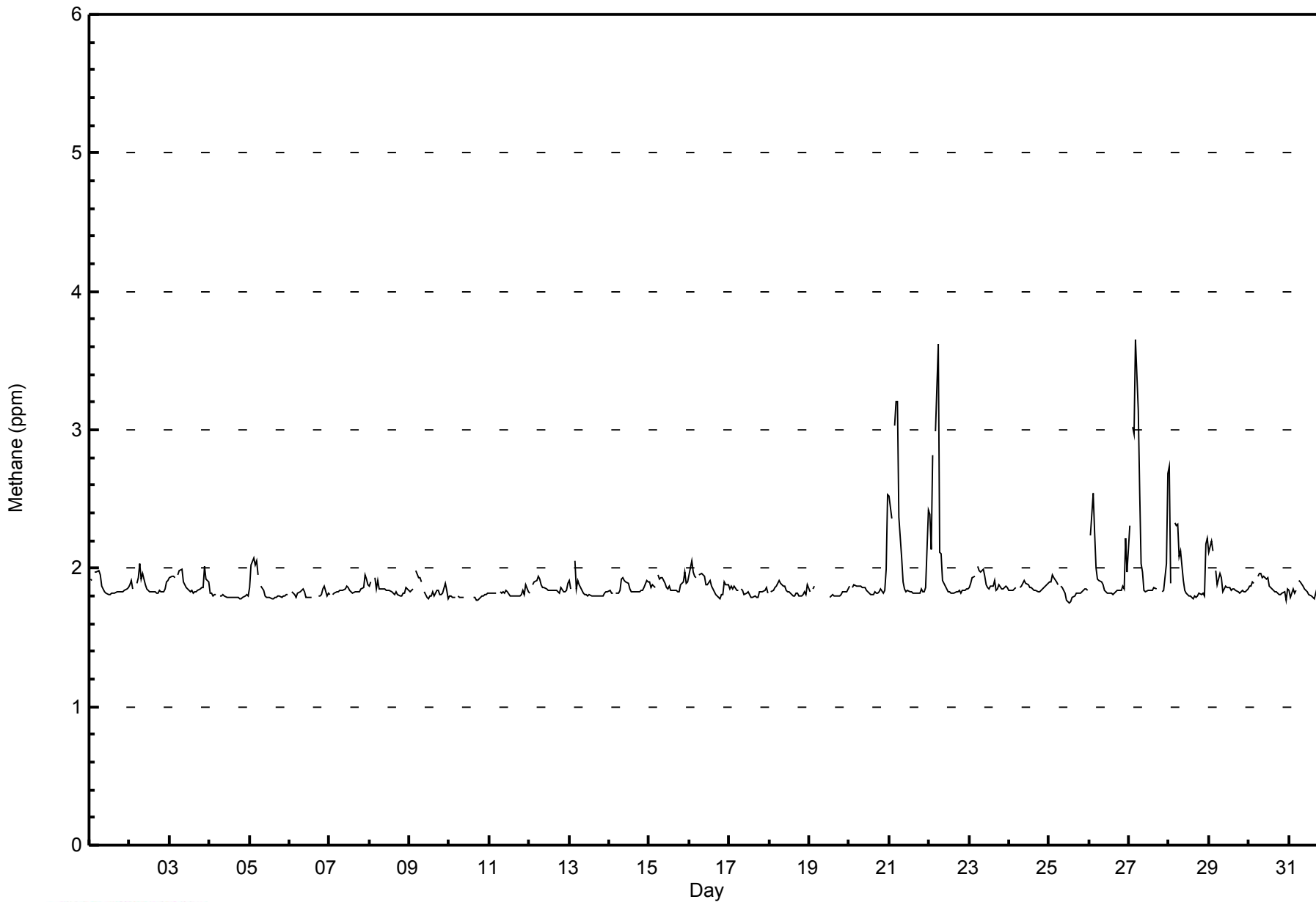
Anzac - July 2014

Number of Exceedences (AAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.7 ppm on Jul 27 05:00 Maximum Daily Average: 2.2 ppm on Jul 27										Hours in Service: 744 Hours of Data: 693 Hours of Missing Data: 51 Hours of Calibration: 36 Percent Operational Time: 98.0																	
Minimum Value: 1.7 ppm on Jul 25 13:00 Minimum Daily Average: 1.8 ppm on Jul 10 Maximum Diurnal Average: 2.1 ppm at hour 6 Minimum Diurnal Average: 1.8 ppm at hour 18 Monthly Average: 1.89 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 = 3.0																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	1.9	1.9	Z	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	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0
2-Jul	1.9	1.9	1.9	Z	1.9	1.9	2.0	1.9	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9
3-Jul	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0
4-Jul	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	1.8
5-Jul	1.9	2.0	2.1	2.0	2.1	2.0	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
6-Jul	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	PF	PF	PF	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8
7-Jul	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	1.9	1.9	1.9
8-Jul	1.9	1.9	Z	1.9	1.8	1.9	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8
9-Jul	1.8	1.8	1.9	Z	2.0	1.9	1.9	1.9	1.9	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	1.9	1.8	1.8	1.8	1.8
10-Jul	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	C	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
11-Jul	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	1.9	1.8	1.8	1.8	1.9
12-Jul	1.8	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9
13-Jul	1.9	1.8	Z	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	1.8	1.8	1.8	1.8	2.1
14-Jul	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.8	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
15-Jul	1.9	1.9	1.9	1.9	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	1.9	1.9	2.0
16-Jul	2.0	2.1	2.0	1.9	1.9	Z	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	1.8	1.9	1.9	1.9	1.9	2.1
17-Jul	1.9	1.9	1.9	1.9	1.8	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	1.9	1.8	1.9
18-Jul	Z	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9
19-Jul	1.8	Z	1.8	1.9	PF	PF	PF	PF	PF	PF	PF	PF	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	1.9	-
20-Jul	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	2.5
21-Jul	2.5	2.4	Z	3.0	3.2	3.2	2.4	2.1	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.9	2.4	2.1	3.2
22-Jul	2.4	2.1	2.8	Z	3.0	3.6	2.1	2.1	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	3.6
23-Jul	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	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
24-Jul	1.8	1.8	1.8	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9
25-Jul	1.9	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.8	1.8	1.8	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9
26-Jul	Z	2.2	2.5	2.3	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.2	2.0	1.9	2.5
27-Jul	2.3	Z	3.0	3.0	3.7	3.1	2.5	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	1.9	3.7
28-Jul	2.7	1.9	Z	2.3	2.3	2.3	2.1	2.1	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.7
29-Jul	2.1	2.2	2.1	Z	2.0	1.9	2.0	1.9	1.8	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.2
30-Jul	1.9	1.9	1.9	1.9	Z	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0
31-Jul	1.8	1.8	1.8	1.8	1.8	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.0	1.9	2.0
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan			C - Calibration			M - Maintenance			PF - Power Failure			MS - Missing															



WBEA NETWORK
Hourly Averages

Methane (CH₄) - ppm
Anzac - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Anzac - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	651	93.94	93.94
2.1 - 3.0	37	5.34	99.28
3.1 - 10.0	5	0.72	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 693

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Methane (CH₄) - ppm
Anzac - July 2014

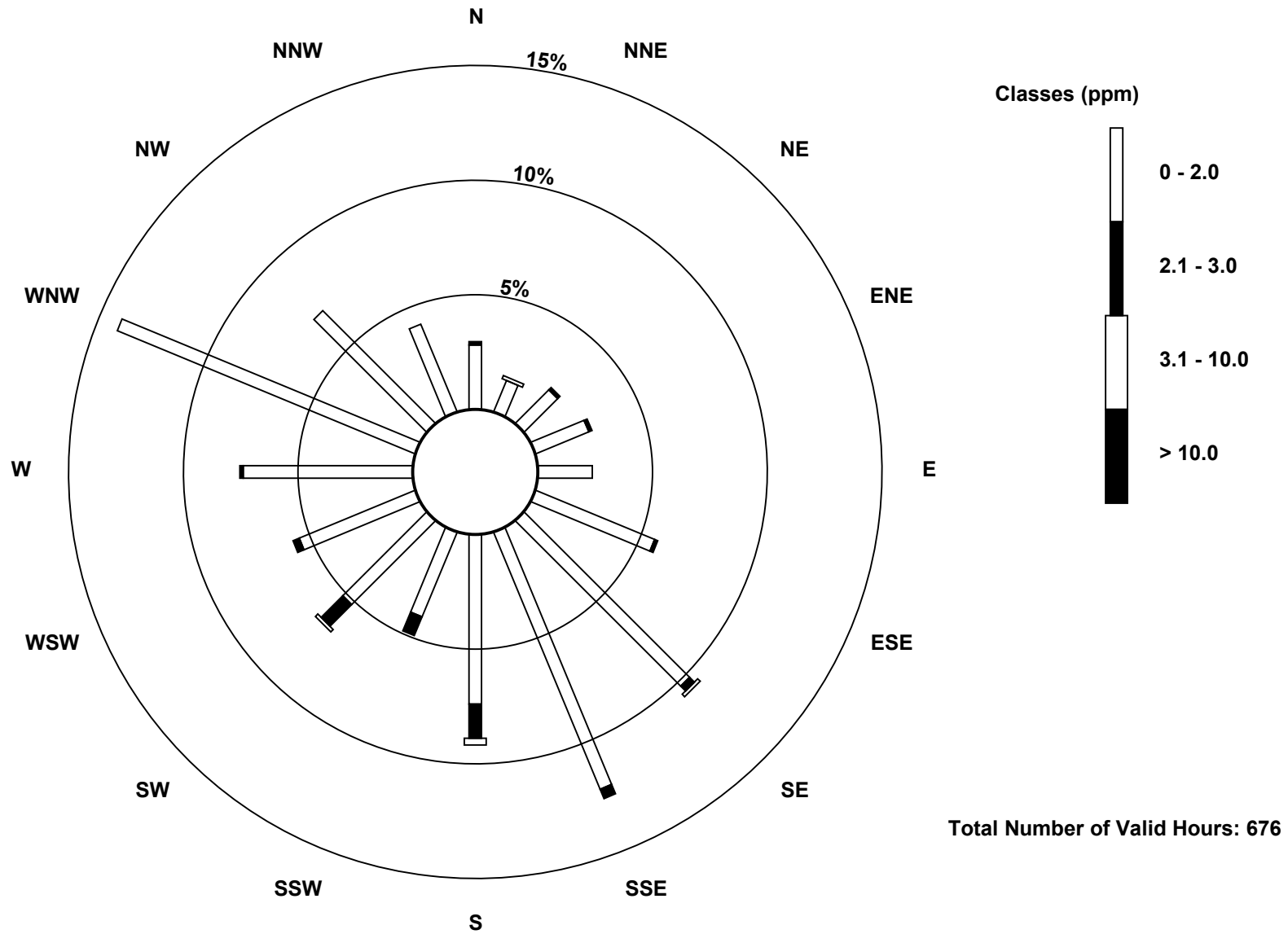
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	19	10	14	17	16	38	69	82	50	27	35	37	50	95	47	28	634
2.1 - 3.0	1	0	1	1	0	1	2	3	10	6	9	2	1	0	0	0	37
3.1 - 10.0	0	1	0	0	0	0	1	0	2	0	1	0	0	0	0	0	5
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	11	15	18	16	39	72	85	62	33	45	39	51	95	47	28	676

Total Number of Valid Hours: 676

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Methane (CH₄) - ppm
Anzac (AMS 14)



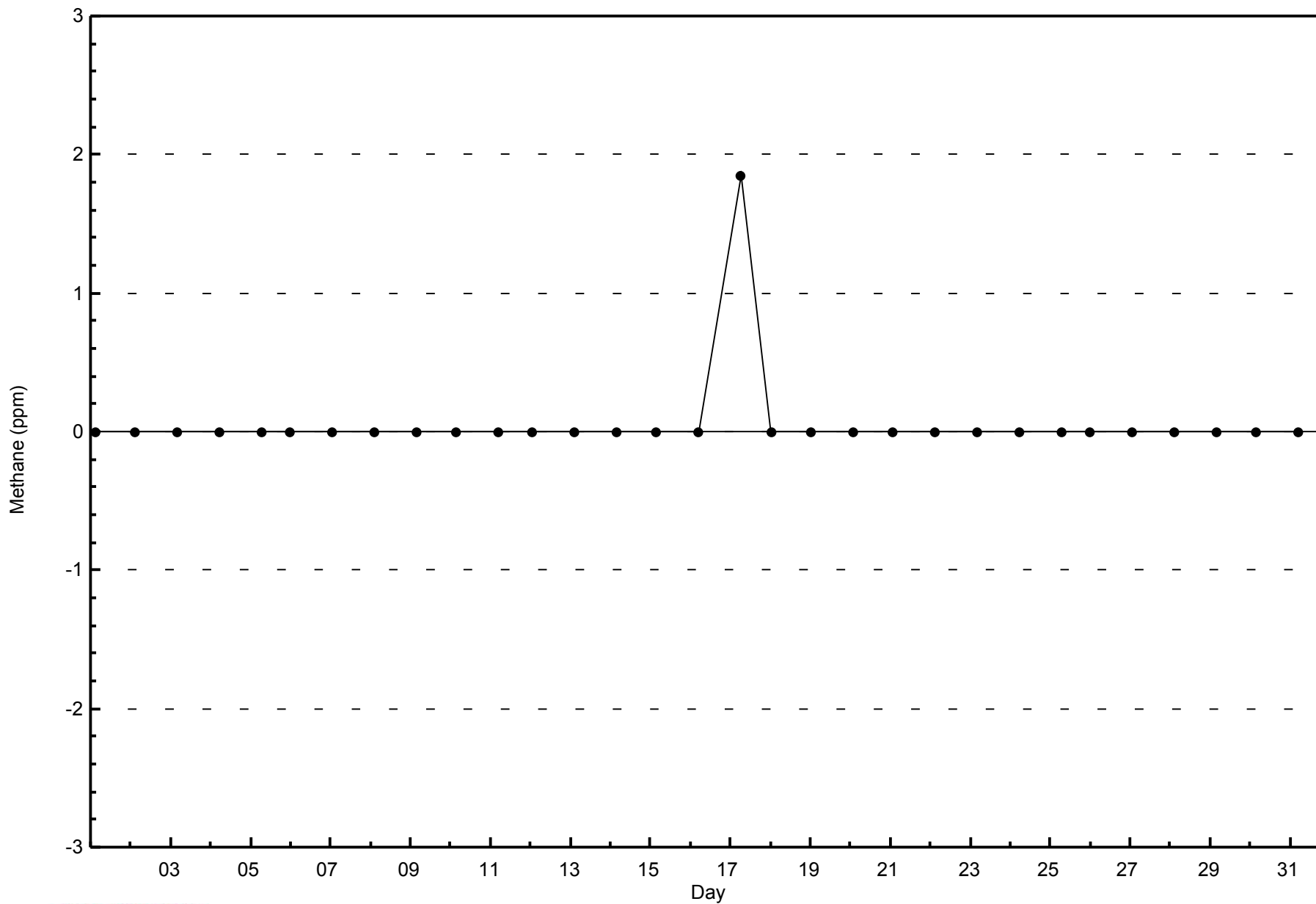


WBEA NETWORK

Zero Responses

Methane (CH₄) - ppm

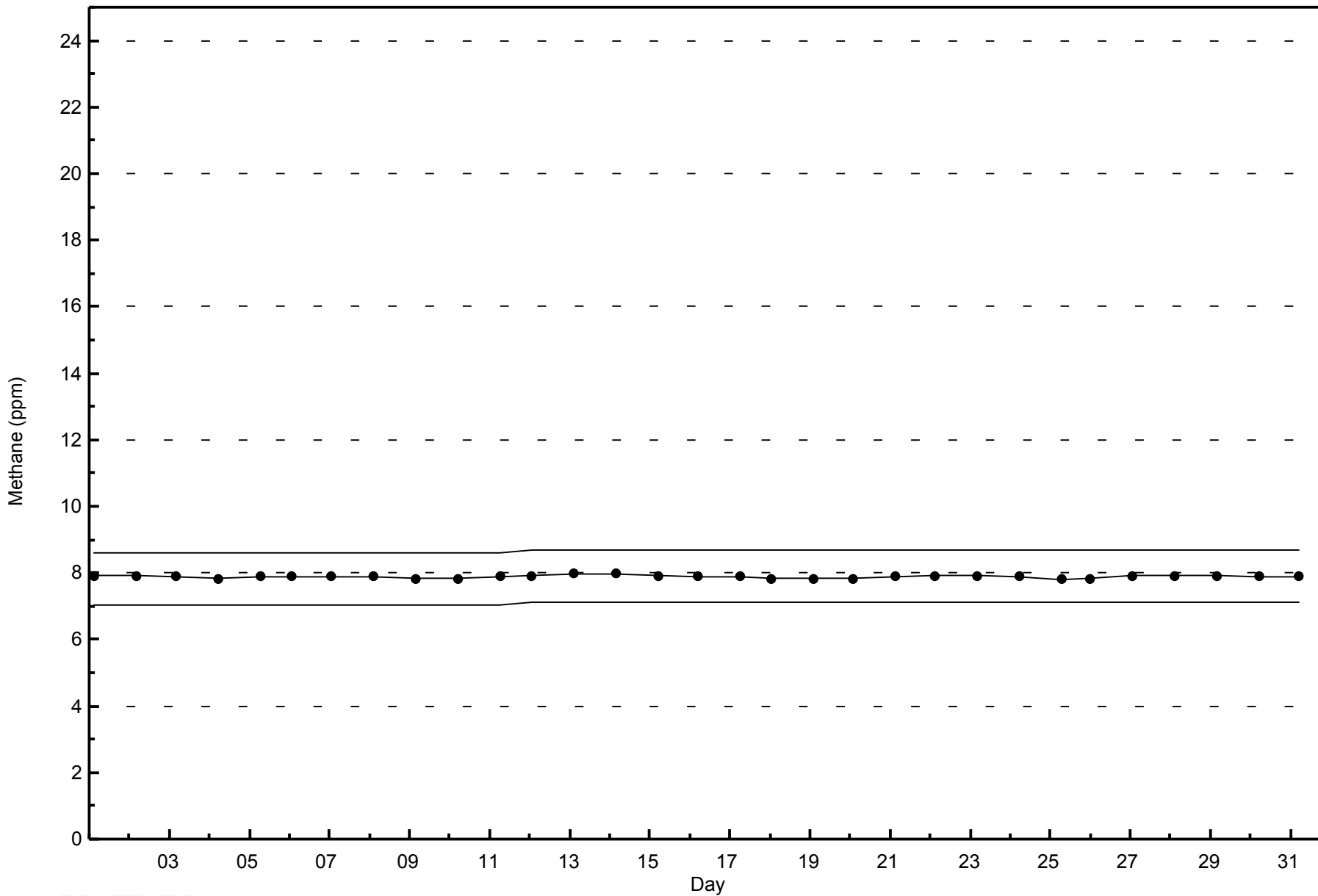
Anzac - July 2014





WBEA NETWORK
Span Responses

Methane (CH₄) - ppm
Anzac - July 2014





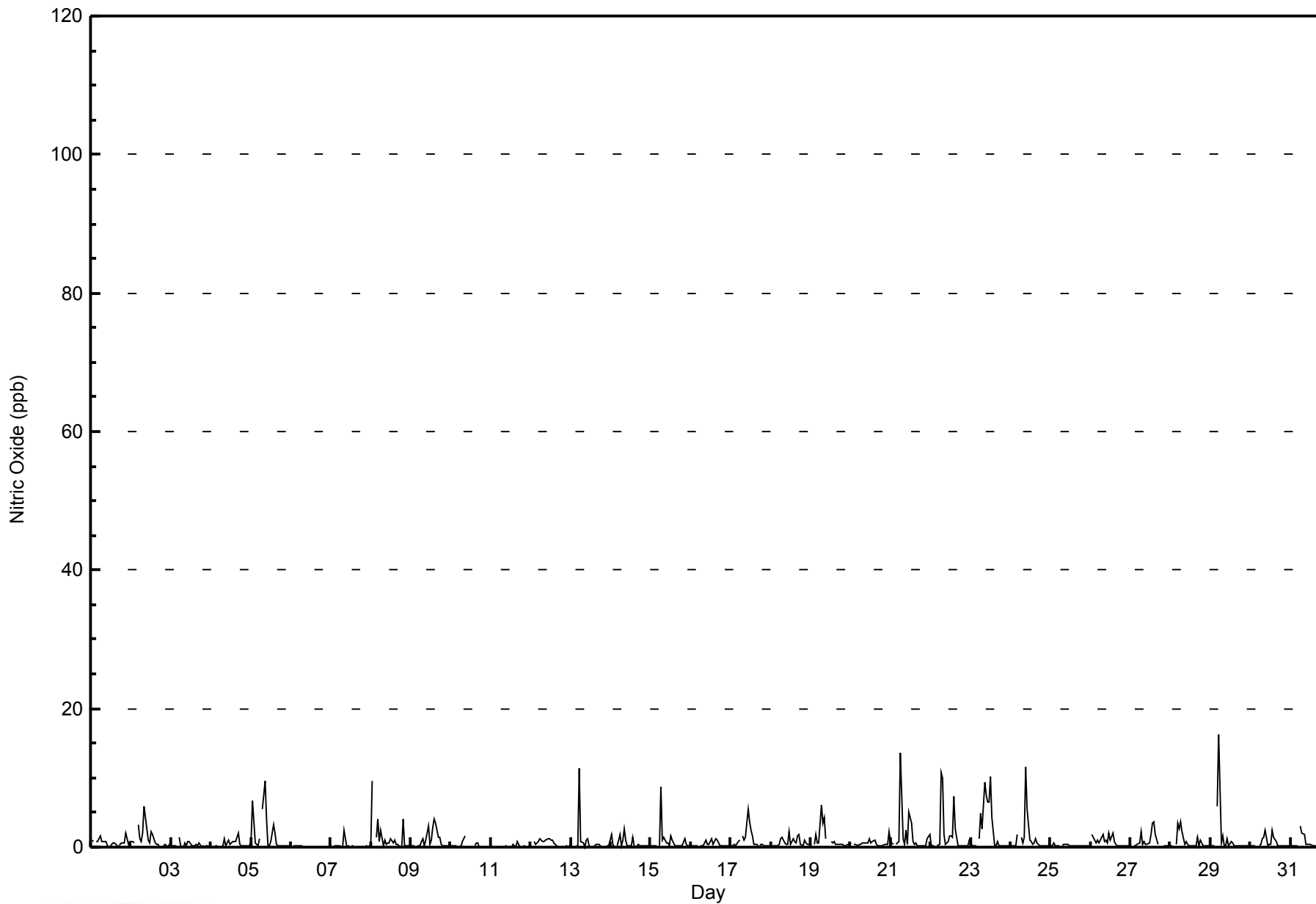
Maximum Value: 16 ppb on Jul 29 06:00																	Maximum Daily Average: 2.5 ppb on Jul 23										Hours in Service: 744	
Minimum Value: 0 ppb on Jul 1 12:00																	Minimum Daily Average: 0.1 ppb on Jul 6										Hours of Data: 701	
Maximum Diurnal Average: 2.3 ppb at hour 7																	Minimum Diurnal Average: 0.2 ppb at hour 19										Hours of Missing Data: 43	
Monthly Average: 0.9 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 10										Hours of Calibration: 36	
																											Percent Operational Time: 99.1	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Jul	1	1	Z	1	1	2	1	1	1	1	0	0	0	1	1	0	0	0	1	1	1	2	0	1	0.7	2		
2-Jul	1	1	1	Z	3	1	1	2	6	3	1	1	2	2	1	0	0	0	0	0	0	0	0	0	1.1	6		
3-Jul	0	0	0	0	Z	1	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0.3	1			
4-Jul	0	0	0	0	0	Z	0	0	1	0	1	0	1	1	1	1	2	0	0	0	0	0	0	0.4	2			
5-Jul	1	7	1	0	0	1	Z	5	10	4	0	0	1	3	2	0	0	0	0	0	0	0	0	1.6	10			
6-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	PF	PF	0	0	0	0	0	0	0	0.1	0			
7-Jul	0	Z	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3			
8-Jul	0	10	Z	1	4	1	2	0	1	0	1	1	1	1	1	0	0	0	0	4	0	0	0	1.3	10			
9-Jul	0	0	0	Z	0	0	1	1	0	1	3	0	1	3	4	4	1	1	0	0	0	0	0	1.0	4			
10-Jul	0	0	0	0	Z	0	0	1	2	C	C	C	C	C	0	1	1	0	0	0	0	0	0	0.3	2			
11-Jul	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1	1			
12-Jul	0	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.6	1			
13-Jul	0	0	Z	0	0	11	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.8	11			
14-Jul	2	0	0	Z	0	2	0	1	3	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0.6	3			
15-Jul	0	0	0	0	Z	0	9	1	1	1	1	0	2	1	0	0	0	0	0	0	1	0	0	0.8	9			
16-Jul	0	0	0	0	0	Z	0	0	1	1	0	0	1	0	1	1	1	0	0	0	0	0	0	0.4	1			
17-Jul	0	0	0	0	1	1	Z	2	1	1	5	4	3	2	0	0	0	0	0	0	0	0	0	1.0	5			
18-Jul	Z	0	0	0	0	1	1	1	1	0	0	2	0	1	1	1	2	2	0	0	1	1	0	0.8	2			
19-Jul	0	Z	0	2	1	1	6	3	4	1	M	M	1	1	1	0	0	0	0	0	0	0	0	1.2	6			
20-Jul	1	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	2	0.6	2			
21-Jul	1	0	Z	0	1	1	14	1	0	2	0	5	3	1	0	1	0	0	0	0	0	0	1	1.6	14			
22-Jul	0	0	0	Z	0	0	11	10	2	0	1	2	2	1	7	3	0	0	0	0	0	0	1	1.8	11			
23-Jul	1	0	0	0	Z	1	5	3	9	8	7	6	10	4	0	0	1	0	0	0	0	0	0	2.5	10			
24-Jul	0	0	0	0	2	Z	1	1	2	12	6	1	1	0	1	1	1	0	0	0	0	0	0	1.3	12			
25-Jul	0	0	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1			
26-Jul	Z	2	1	1	1	1	1	2	1	1	1	2	1	2	1	0	0	0	0	0	0	0	0	0.8	2			
27-Jul	0	Z	0	0	0	1	2	0	1	0	0	1	2	3	4	2	0	MS	MS	MS	0	0	0	0.9	4			
28-Jul	0	0	Z	0	3	3	4	2	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0.8	4			
29-Jul	0	0	0	Z	6	16	1	2	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1.3	16			
30-Jul	0	0	0	0	Z	0	0	1	1	2	0	0	2	1	1	0	0	0	0	0	0	0	0	0.6	2			
31-Jul	0	0	0	0	0	Z	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3			
																	Diurnal Average		Diurnal Maximum									
																	0.4		2									
																	0.9		10									
																	0.3		1									
																	0.4		2									
																	1.0		6									
																	1.8		16									
																	2.3		14									
																	1.5		10									
																	1.8		10									
																	1.5		12									
																	1.2		7									
																	1.1		6									
																	1.2		10									
																	1.2		4									
																	1.0		7									
																	0.7		4									
																	0.5		2									
																	0.3		2									
																	0.2		1									
																	0.3		4									
																	0.2		1									
																	0.3		2									
																	0.2		1									
																	0.3		2									

Z - zerospan C - Calibration M - Maintenance PF - Power Failure MS - Missing



WBEA NETWORK
Hourly Averages

Nitric Oxide (NO) - ppb
Anzac - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Anzac - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	701	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: 701

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitric Oxide (NO) - ppb
Anzac - July 2014

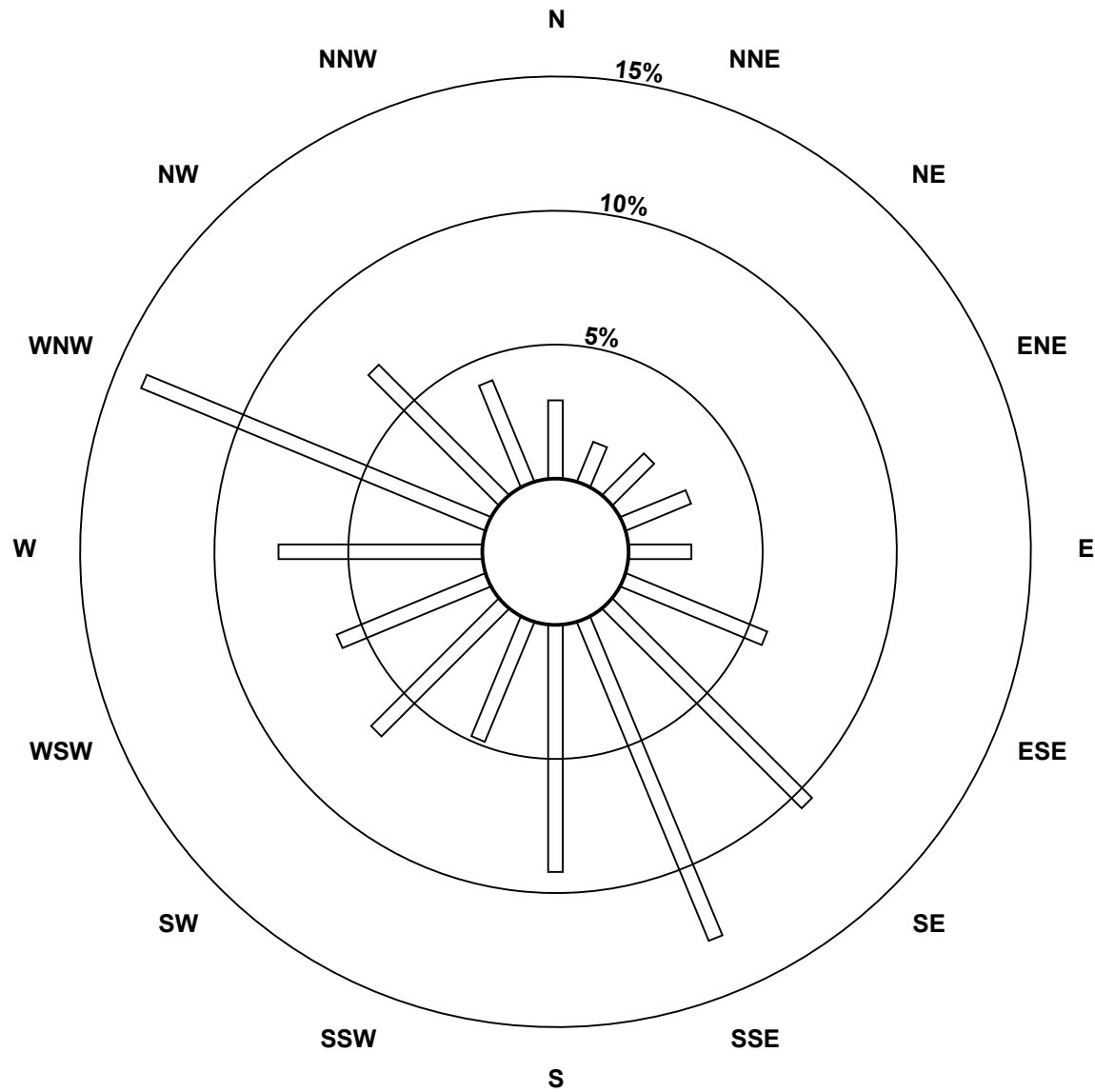
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	20	11	15	18	16	39	72	88	63	33	46	41	52	95	47	28	684
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	11	15	18	16	39	72	88	63	33	46	41	52	95	47	28	684

Total Number of Valid Hours: 684

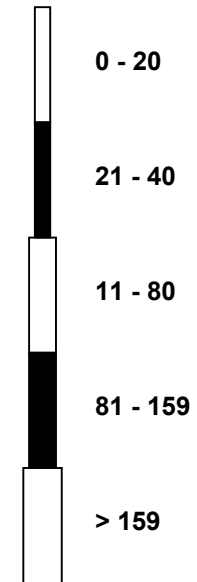
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Nitric Oxide (NO) - ppb
Anzac (AMS 14)



Classes (ppb)



Total Number of Valid Hours: 684

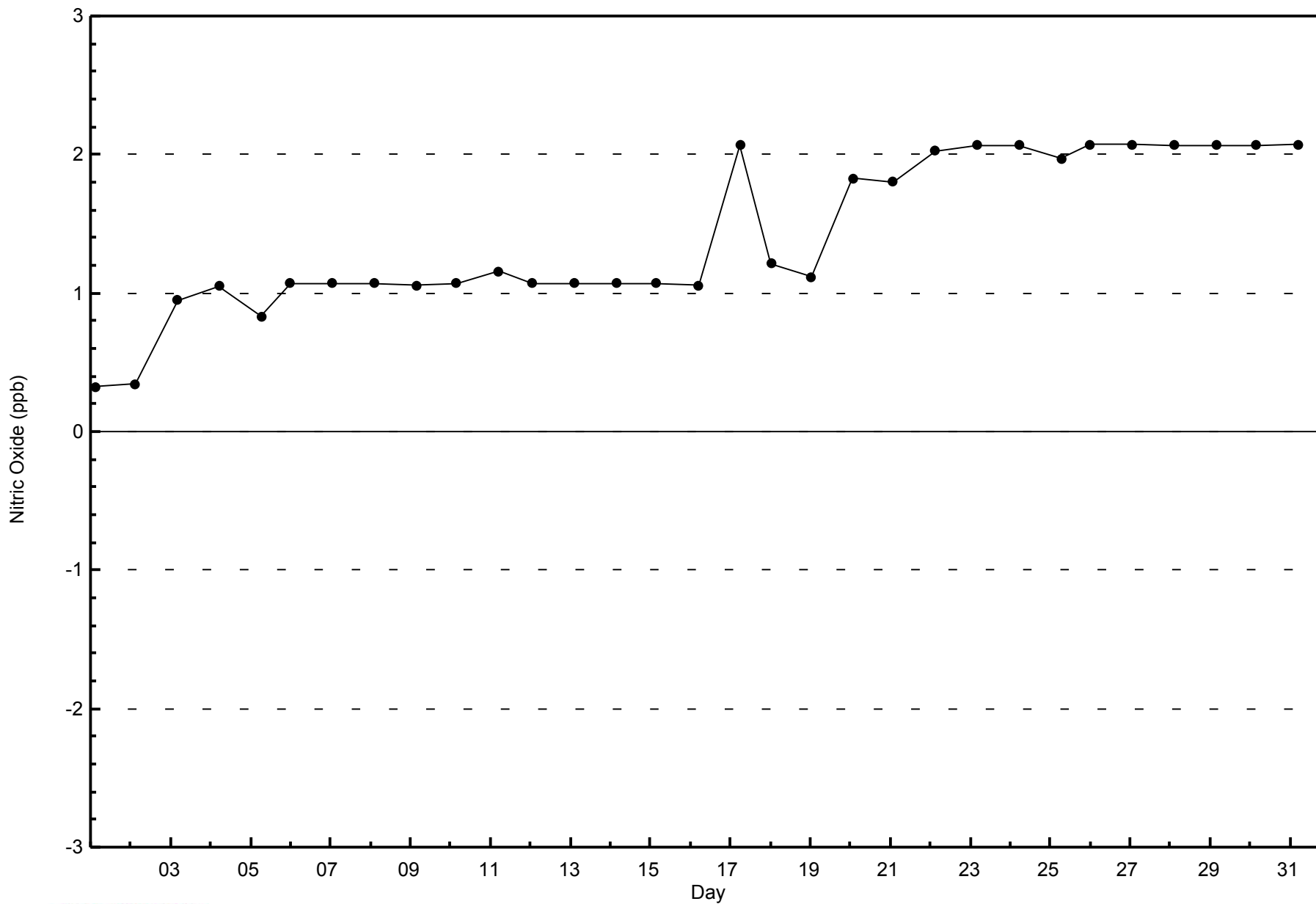


WBEA NETWORK

Zero Responses

Nitric Oxide (NO) - ppb

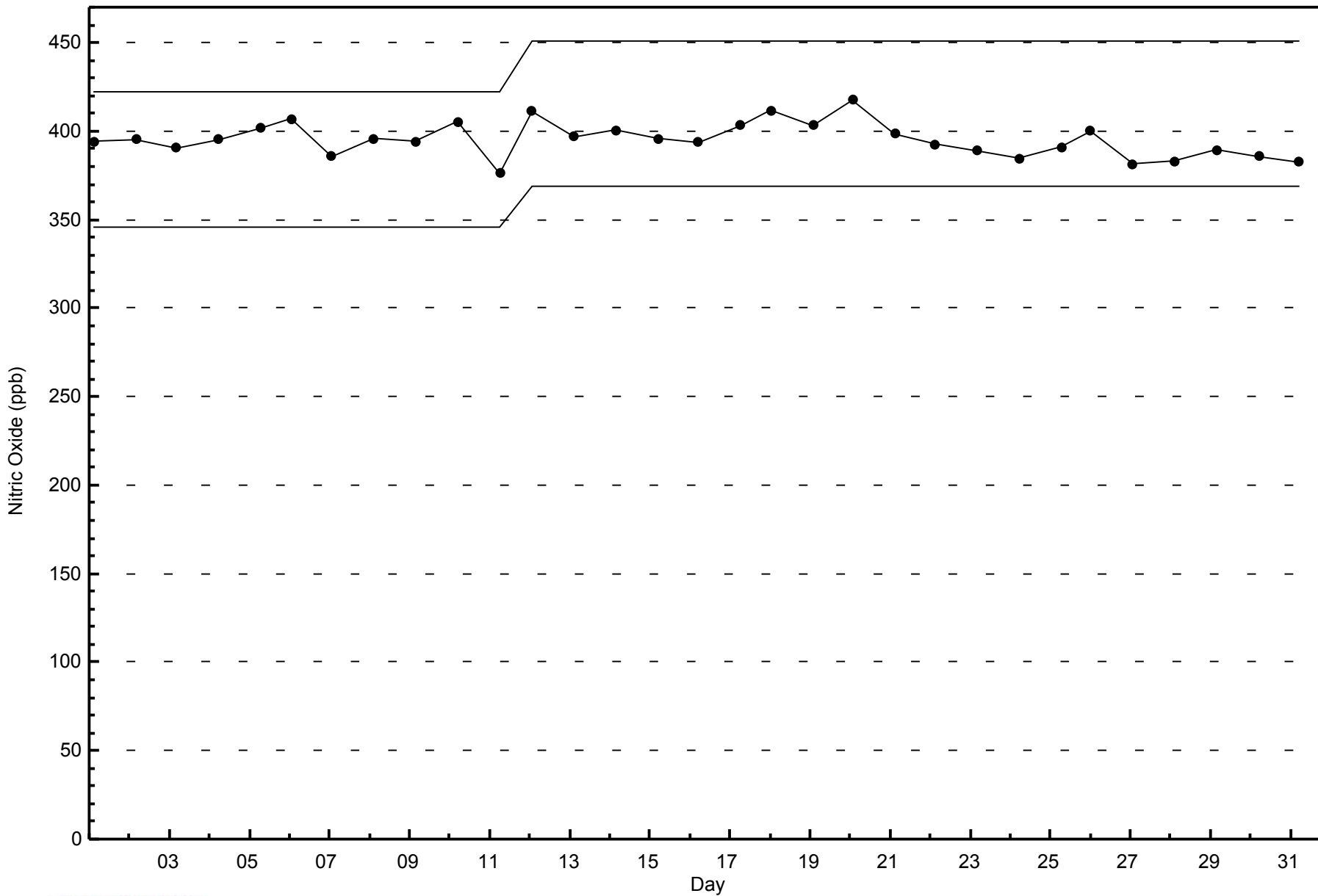
Anzac - July 2014





WBEA NETWORK
Span Responses

Nitric Oxide (NO) - ppb
Anzac - July 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 14 ppb on Jul 5 02:00	Maximum Daily Average: 3.2 ppb on Jul 12		Hours of Data:	701
Minimum Value: 0 ppb on Jul 3 00:00	Minimum Daily Average: 0.0 ppb on Jul 25		Hours of Missing Data:	43
Maximum Diurnal Average: 2.9 ppb at hour 8	Minimum Diurnal Average: 1.1 ppb at hour 20		Hours of Calibration:	36
Monthly Average: 1.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 4 P ₉₉ = 8		Percent Operational Time:	99.1

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-Jul	8	6	Z	1	0	1	3	1	2	2	1	1	1	1	1	1	1	2	1	1	1	5	1	1	1.8	8	
2-Jul	1	1	0	Z	2	1	2	4	9	5	2	2	3	3	2	1	0	1	1	0	0	2	1	0	1.8	9	
3-Jul	0	0	0	1	Z	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	2	1	1	0.9	2	
4-Jul	1	1	1	1	1	Z	0	1	2	1	2	1	1	1	1	1	3	1	1	0	1	1	1	0	1.0	3	
5-Jul	2	14	5	2	1	3	Z	6	8	4	0	0	1	3	2	1	0	0	0	1	1	0	2	1	2.4	14	
6-Jul	Z	0	1	0	0	1	1	1	1	0	0	0	0	0	PF	PF	1	1	1	2	2	1	1	1	0.7	2	
7-Jul	1	Z	1	0	1	0	1	1	3	2	3	4	2	1	1	2	1	1	1	1	1	2	1	1	1.3	4	
8-Jul	1	4	Z	5	8	5	3	1	2	1	2	2	2	2	3	2	2	1	1	4	1	1	1	1	2.3	8	
9-Jul	1	1	1	Z	2	2	5	5	1	4	8	3	5	6	7	7	6	5	2	1	1	2	1	0	3.2	8	
10-Jul	0	0	0	0	Z	0	1	1	2	C	C	C	C	C	1	1	1	0	0	1	1	1	1	1	0.7	2	
11-Jul	1	0	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	0.9	2	
12-Jul	1	Z	6	3	2	1	2	3	3	3	4	4	4	5	5	5	5	4	3	3	3	3	2	3	3.2	6	
13-Jul	2	1	Z	1	2	4	2	2	0	2	2	0	1	0	0	1	1	1	0	0	1	1	1	2	1.2	4	
14-Jul	6	1	1	Z	1	4	1	3	4	2	1	1	1	3	1	1	1	1	1	1	1	1	2	1	1.7	6	
15-Jul	1	1	1	1	Z	1	8	4	3	2	1	1	2	2	2	2	3	2	2	2	6	2	1	1	2.3	8	
16-Jul	1	2	2	2	2	Z	2	2	2	2	2	3	5	4	4	3	2	1	1	1	2	2	1	1	2.0	5	
17-Jul	1	1	3	2	2	2	Z	5	3	2	5	6	4	2	2	2	1	1	1	2	1	1	1	1	2.0	6	
18-Jul	Z	1	1	1	1	1	3	3	1	1	1	2	1	1	1	1	4	4	1	1	2	1	1	1	1.4	4	
19-Jul	1	Z	1	3	1	1	5	3	3	1	M	M	1	0	0	0	0	0	1	1	3	2	2	3	1.5	5	
20-Jul	2	Z	1	0	1	0	0	0	0	1	1	2	1	3	4	2	2	2	2	2	2	1	1	3	1.5	4	
21-Jul	6	2	Z	1	0	1	7	3	0	2	1	6	5	2	2	3	1	1	1	1	1	0	6	10	2.6	10	
22-Jul	6	2	1	Z	1	1	6	13	5	2	3	4	4	3	7	3	1	1	0	0	1	1	1	2	2.8	13	
23-Jul	4	1	1	1	Z	4	6	6	9	8	5	4	6	5	0	0	1	0	0	0	0	1	1	1	2.8	9	
24-Jul	1	1	1	1	2	Z	3	2	1	6	4	1	1	0	1	2	1	1	1	0	0	0	0	0	1.2	6	
25-Jul	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	
26-Jul	Z	1	1	0	0	0	1	2	2	2	2	5	3	3	1	1	1	1	1	1	1	1	1	0	1.3	5	
27-Jul	1	Z	1	1	1	0	3	2	2	1	1	2	2	3	4	3	1	MS	MS	MS	0	1	1	1	1.5	4	
28-Jul	1	0	Z	1	6	3	4	3	1	3	1	1	1	0	0	1	2	0	6	1	3	2	1	1	1.8	6	
29-Jul	1	1	1	Z	2	7	2	4	1	1	4	1	4	3	1	1	2	1	1	1	1	1	1	1	1.8	7	
30-Jul	2	1	1	1	Z	1	1	3	4	7	2	2	1	2	2	2	1	1	1	1	1	2	2	2	1.7	7	
31-Jul	3	2	2	1	1	Z	5	6	4	2	2	1	1	1	1	1	1	1	1	1	3	2	3	2	1	1.9	6

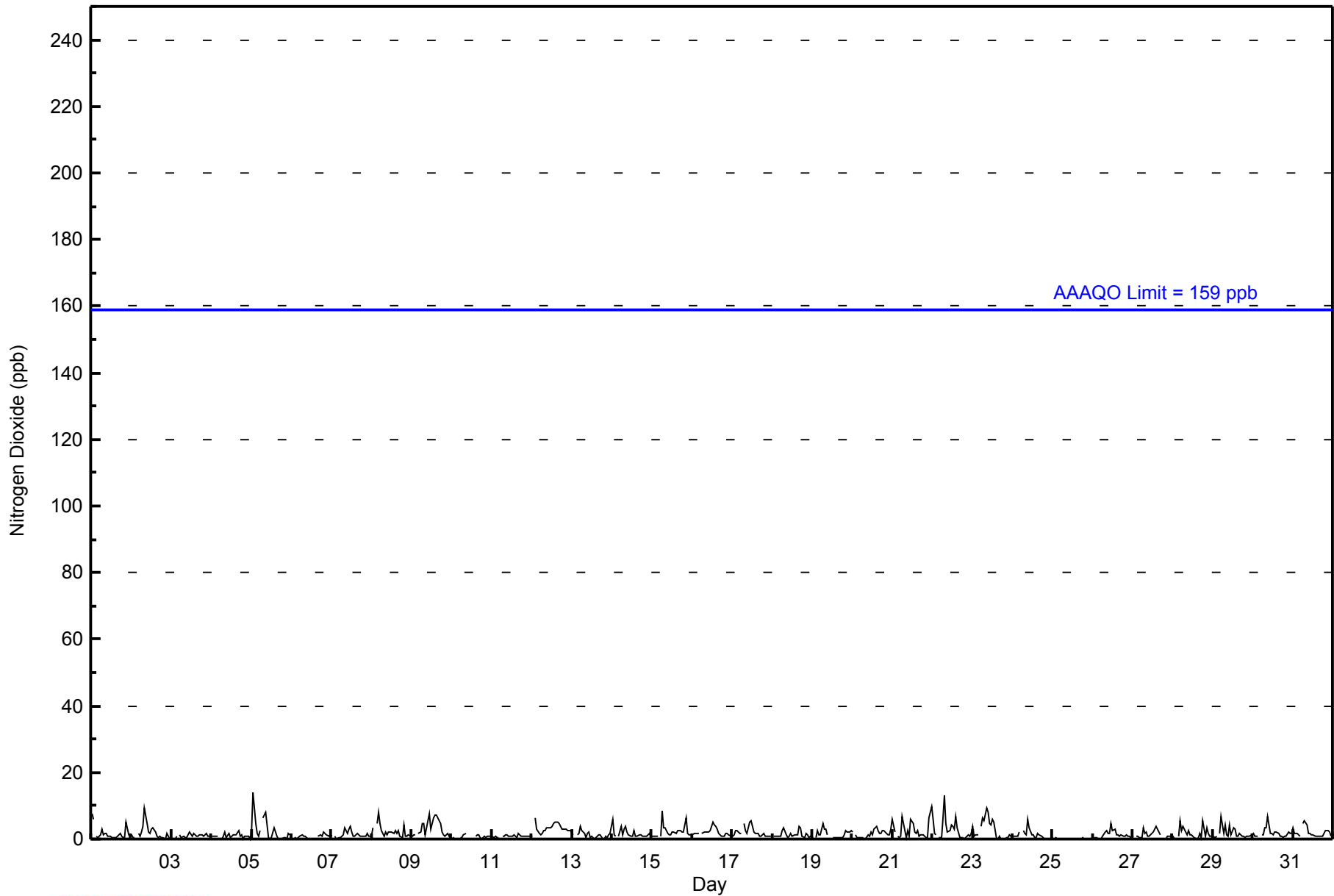
1.9	1.7	1.3	1.1	1.4	1.7	2.7	2.9	2.6	2.3	2.1	2.1	2.1	2.1	1.9	1.7	1.5	1.2	1.1	1.1	1.2	1.3	1.3	1.3	1.3	Diurnal Average
8	14	6	5	8	7	8	13	9	8	8	6	6	6	7	7	6	5	6	4	6	5	6	10	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Anzac - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	701	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: 701

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - July 2014

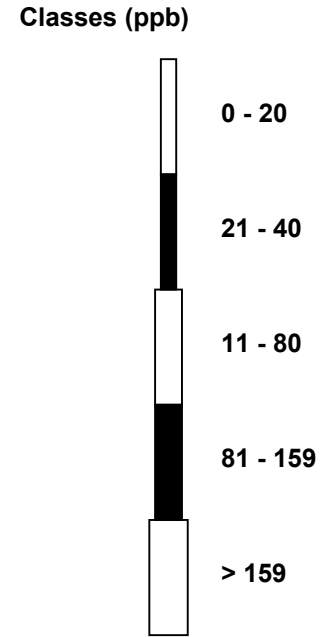
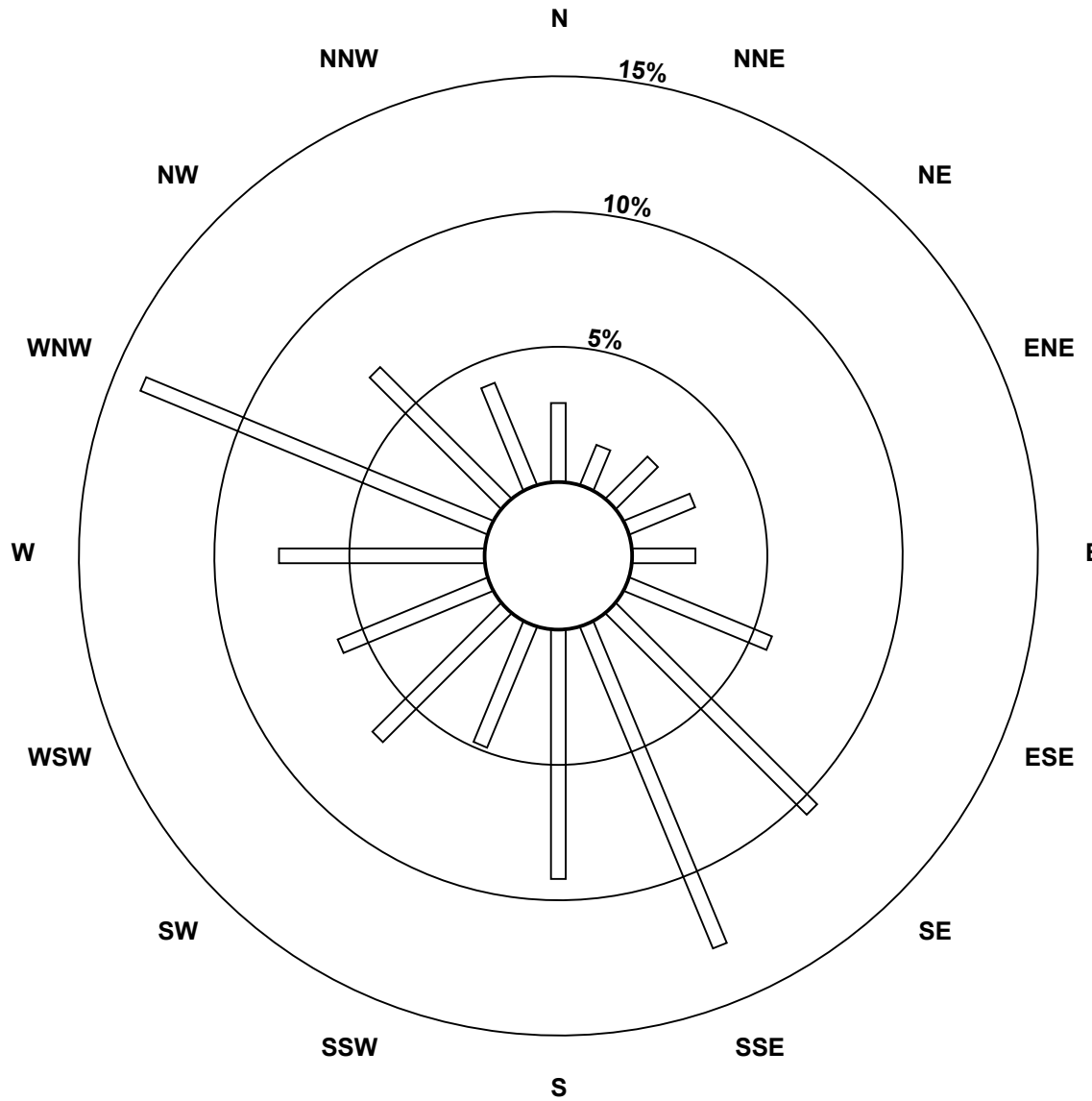
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	20	11	15	18	16	39	72	88	63	33	46	41	52	95	47	28	684
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	11	15	18	16	39	72	88	63	33	46	41	52	95	47	28	684

Total Number of Valid Hours: 684

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Nitrogen Dioxide (NO₂) - ppb
Anzac (AMS 14)



Total Number of Valid Hours: 684

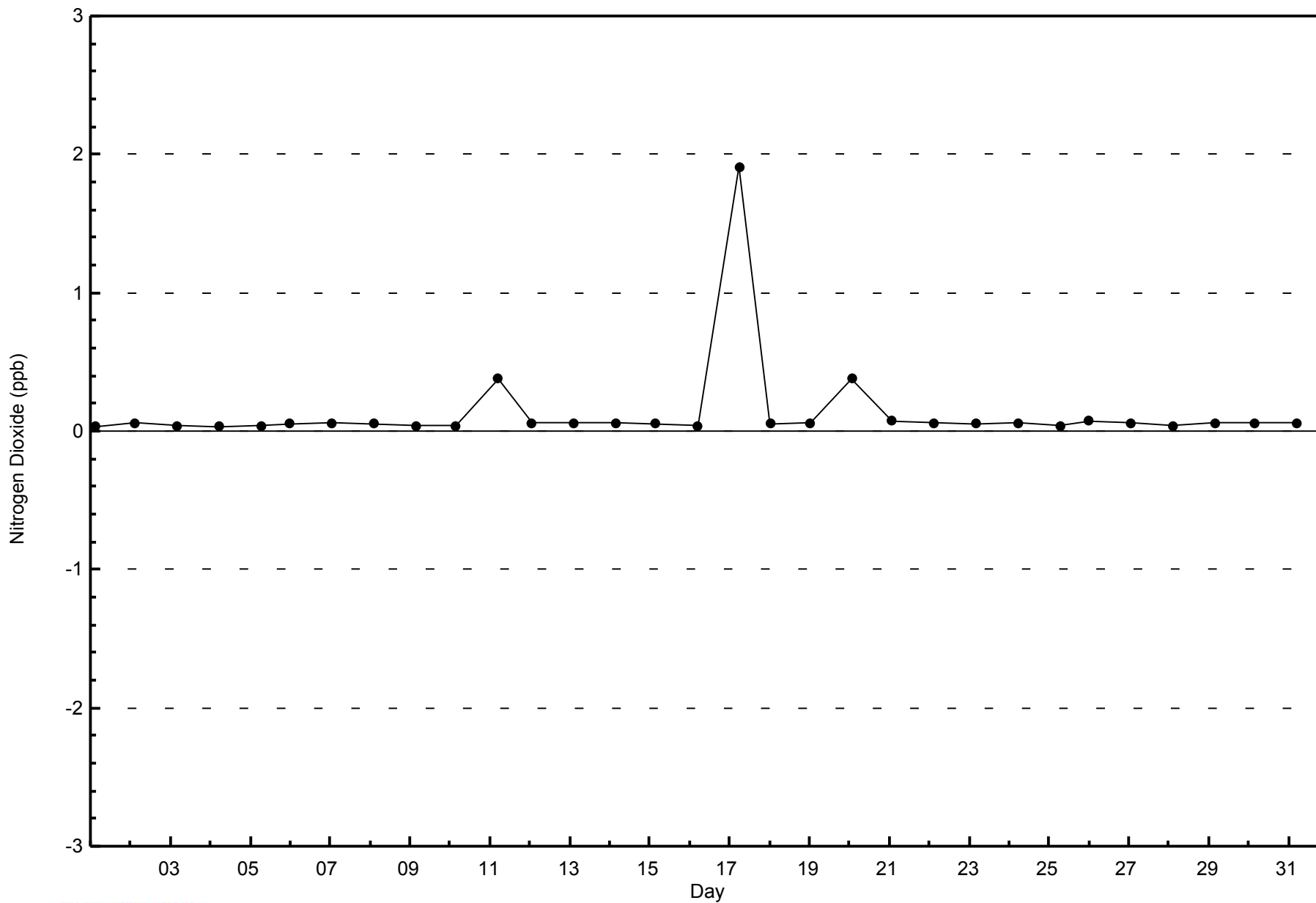


WBEA NETWORK

Zero Responses

Nitrogen Dioxide (NO₂) - ppb

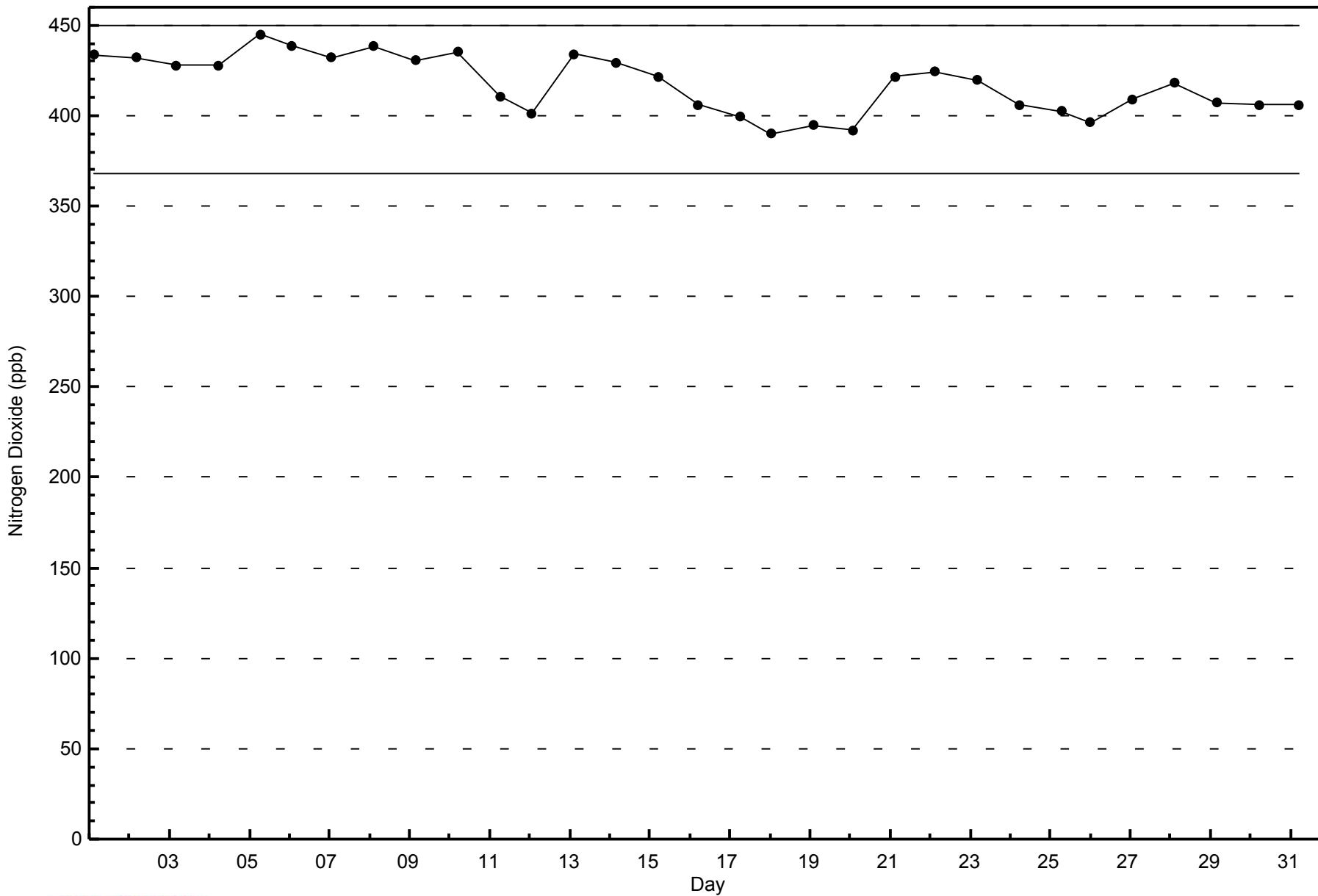
Anzac - July 2014





WBEA NETWORK
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Anzac - July 2014



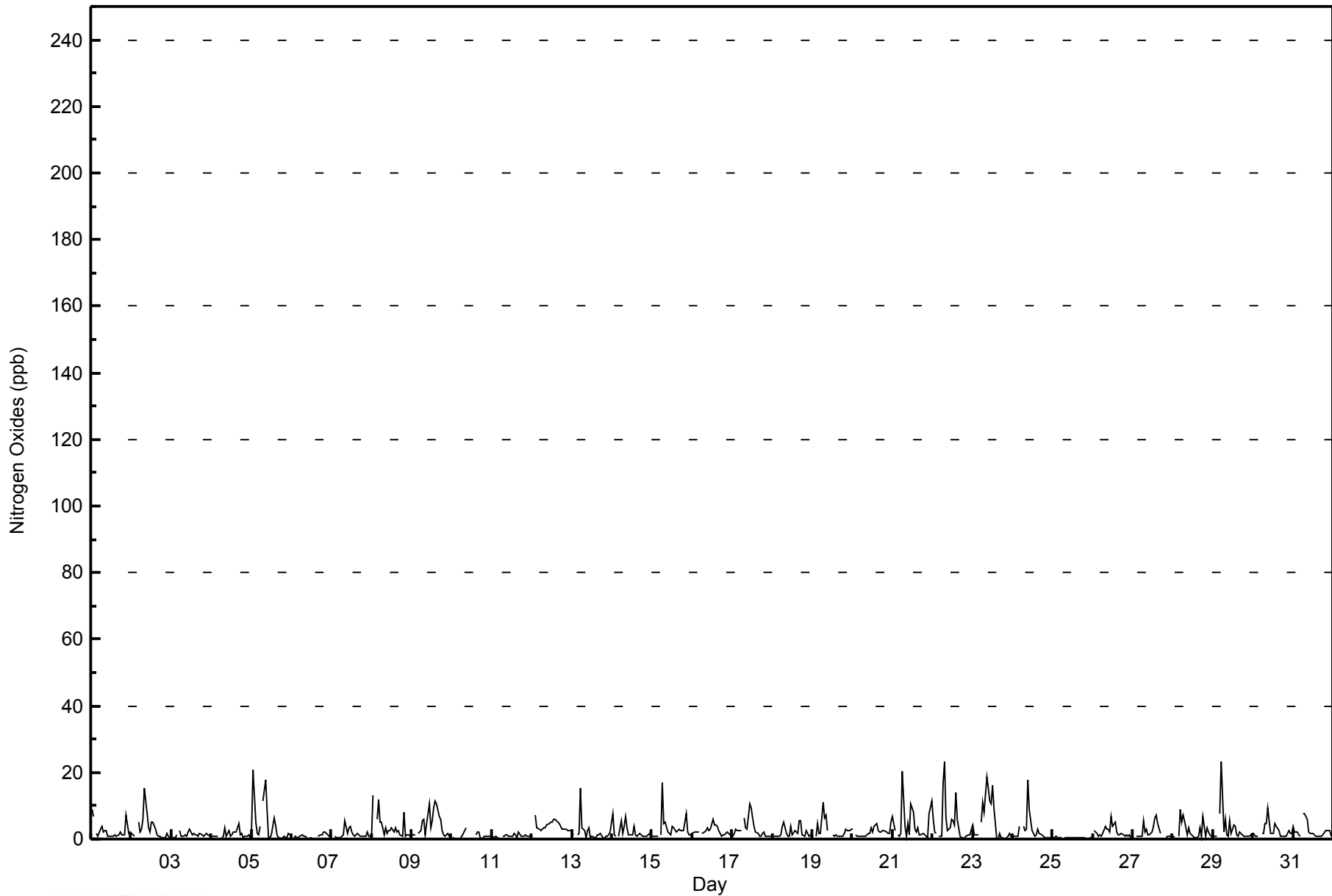


Maximum Value: 23 ppb on Jul 22 08:00																		Maximum Daily Average: 5.3 ppb on Jul 23						Hours in Service: 744																																													
Minimum Value: 0 ppb on Jul 6 13:00																		Minimum Daily Average: 0.3 ppb on Jul 25						Hours of Data: 701																																													
Maximum Diurnal Average: 5.1 ppb at hour 7																		Minimum Diurnal Average: 1.3 ppb at hour 19						Hours of Missing Data: 43																																													
Monthly Average: 2.6 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 6 P ₉₉ = 18						Hours of Calibration: 36																																													
																								Percent Operational Time: 99.1																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																													
1-Jul	9	7	Z	2	1	3	4	2	3	3	1	1	1	1	1	1	1	2	1	1	1	7	2	2	2.5	9																																											
2-Jul	2	1	1	Z	5	2	3	6	15	7	3	2	5	5	3	1	1	1	1	0	0	2	1	0	3.0	15																																											
3-Jul	0	0	0	1	Z	3	1	1	1	1	2	3	1	2	1	1	1	2	1	1	1	2	1	1	1.2	3																																											
4-Jul	1	1	1	1	1	Z	0	1	4	1	2	1	1	2	2	2	5	1	2	0	1	1	1	0	1.4	5																																											
5-Jul	4	21	5	2	1	4	Z	12	18	9	1	0	1	7	4	1	0	0	0	1	1	0	2	1	4.1	21																																											
6-Jul	Z	0	1	0	0	1	1	1	1	0	0	0	0	0	PF	PF	1	1	1	2	2	2	1	1	0.8	2																																											
7-Jul	1	Z	1	0	1	0	1	1	6	2	3	4	2	1	1	2	1	1	1	1	1	2	1	1	1.5	6																																											
8-Jul	1	13	Z	6	12	5	5	1	3	2	3	3	3	2	3	2	3	1	1	8	1	1	1	1	3.6	13																																											
9-Jul	1	1	1	Z	2	2	5	6	1	5	11	3	6	9	11	11	7	6	2	1	1	2	1	0	4.2	11																																											
10-Jul	0	0	0	0	Z	1	1	2	4	C	C	C	C	C	1	2	2	0	0	1	1	1	1	1	0.9	4																																											
11-Jul	1	0	1	0	1	Z	1	1	1	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1.0	2																																											
12-Jul	1	Z	7	3	3	3	3	4	3	4	5	5	5	6	6	5	5	4	3	3	3	3	3	3	3.8	7																																											
13-Jul	2	1	Z	1	2	15	3	2	0	3	4	1	1	0	1	1	1	2	0	0	1	1	1	2	2.0	15																																											
14-Jul	8	1	1	Z	1	5	1	4	7	3	1	1	1	4	1	1	2	1	1	1	1	2	1	1	2.3	8																																											
15-Jul	1	1	1	1	Z	1	17	5	5	2	2	1	4	3	2	3	3	3	2	3	8	2	1	1	3.1	17																																											
16-Jul	2	2	2	2	2	Z	2	2	3	3	3	3	6	4	4	4	3	1	1	1	2	2	2	1	2.4	6																																											
17-Jul	1	2	3	3	3	2	Z	6	4	3	11	9	6	4	2	2	1	1	2	2	1	1	1	1	3.0	11																																											
18-Jul	Z	1	1	1	1	1	4	5	2	1	1	4	1	3	2	2	5	6	1	1	3	2	1	1	2.1	6																																											
19-Jul	1	Z	1	5	2	2	11	7	7	2	M	M	1	1	1	1	1	1	1	2	3	2	3	3	2.7	11																																											
20-Jul	3	Z	1	1	1	1	1	1	1	2	2	3	2	4	5	3	2	2	3	3	2	2	5	5	2.1	5																																											
21-Jul	7	3	Z	1	1	2	20	4	1	5	1	11	8	3	2	3	1	1	2	1	1	1	7	12	4.2	20																																											
22-Jul	6	2	2	Z	1	1	17	23	6	2	3	6	5	4	14	6	1	1	0	0	1	1	1	3	4.7	23																																											
23-Jul	4	1	1	1	Z	5	11	8	19	15	11	11	16	10	0	0	2	0	0	0	0	1	1	1	5.3	19																																											
24-Jul	1	1	1	1	4	Z	4	2	3	18	9	2	2	1	1	3	2	1	1	0	0	0	0	0	2.5	18																																											
25-Jul	0	0	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1																																											
26-Jul	Z	2	2	1	1	1	2	4	3	3	2	7	4	5	2	1	1	2	1	1	1	1	1	1	2.1	7																																											
27-Jul	1	Z	1	1	1	1	5	2	3	1	1	2	4	6	7	5	2	MS	MS	MS	0	1	1	1	2.4	7																																											
28-Jul	1	0	Z	1	9	5	7	5	1	4	2	1	1	1	0	1	3	1	7	1	4	2	1	1	2.6	9																																											
29-Jul	1	1	1	Z	8	23	2	6	1	1	5	2	4	4	1	1	2	1	1	1	1	1	1	2	3.1	23																																											
30-Jul	2	1	1	1	Z	2	2	4	5	9	2	2	2	5	4	3	1	1	1	1	1	2	2	2	2.3	9																																											
31-Jul	4	2	2	1	1	Z	8	8	6	2	2	2	2	1	1	1	1	1	1	3	3	3	2	1	2.4	8																																											
2.3																		2.6						1.5		1.5		2.4		3.5		5.1		4.4		4.4		3.8		3.2		3.1		3.3		3.3		2.9		2.3		2.0		1.5		1.3		1.4		1.5		1.6		1.5		1.7		Diurnal Average	
9																		21						7		6		12		23		20		23		19		18		11		11		16		10		14		11		7		6		7		8		8		7		7		12		Diurnal Maximum	
Z - zerospan			C - Calibration			M - Maintenance			PF - Power Failure			MS - Missing																																																									



WBEA NETWORK
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Anzac - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	698	99.57	99.57
21 - 40	3	0.43	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - July 2014

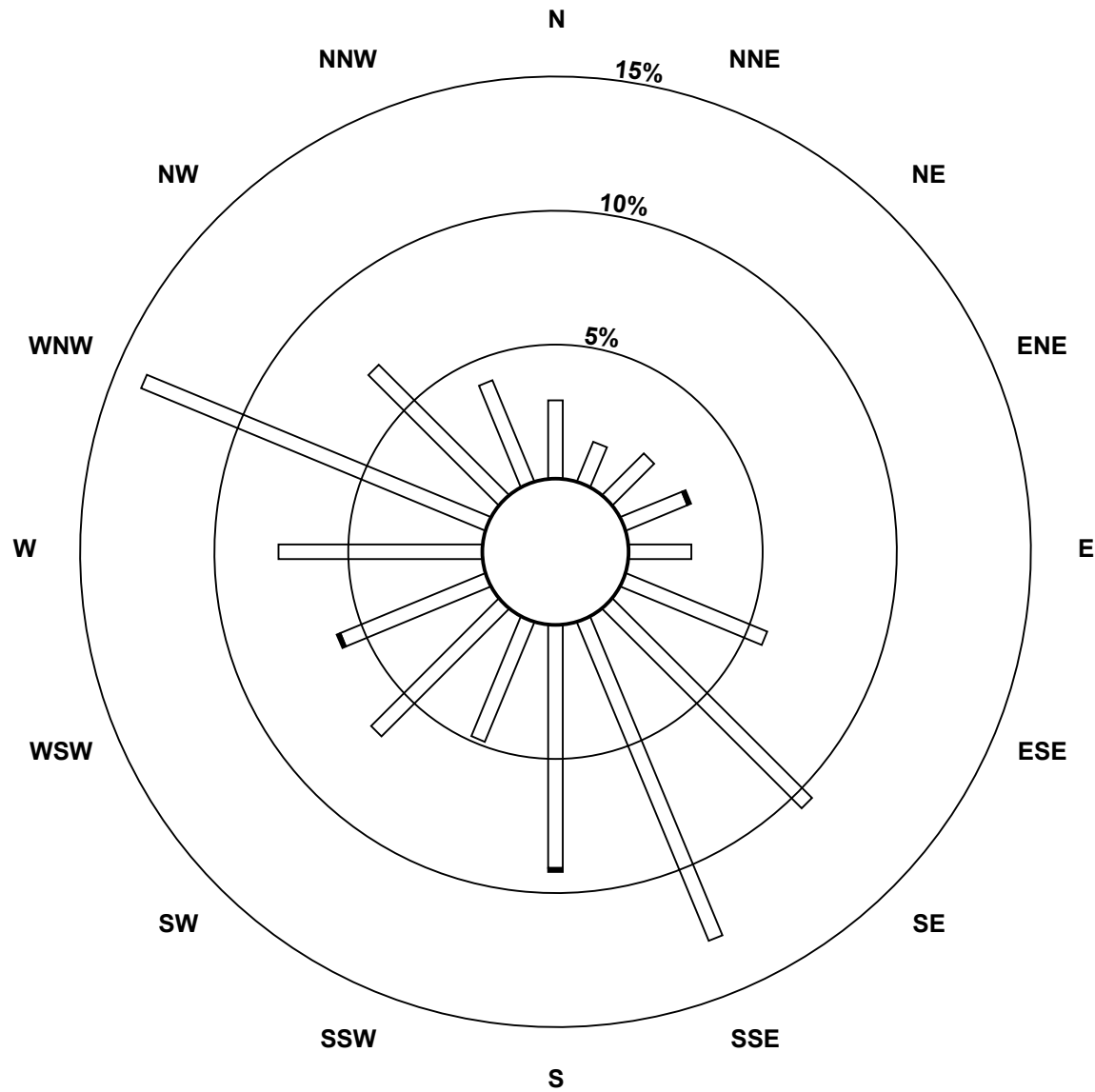
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	20	11	15	17	16	39	72	88	62	33	46	40	52	95	47	28	681
21 - 40	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	3
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	11	15	18	16	39	72	88	63	33	46	41	52	95	47	28	684

Total Number of Valid Hours: 684

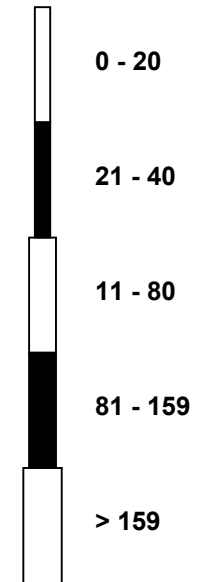
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

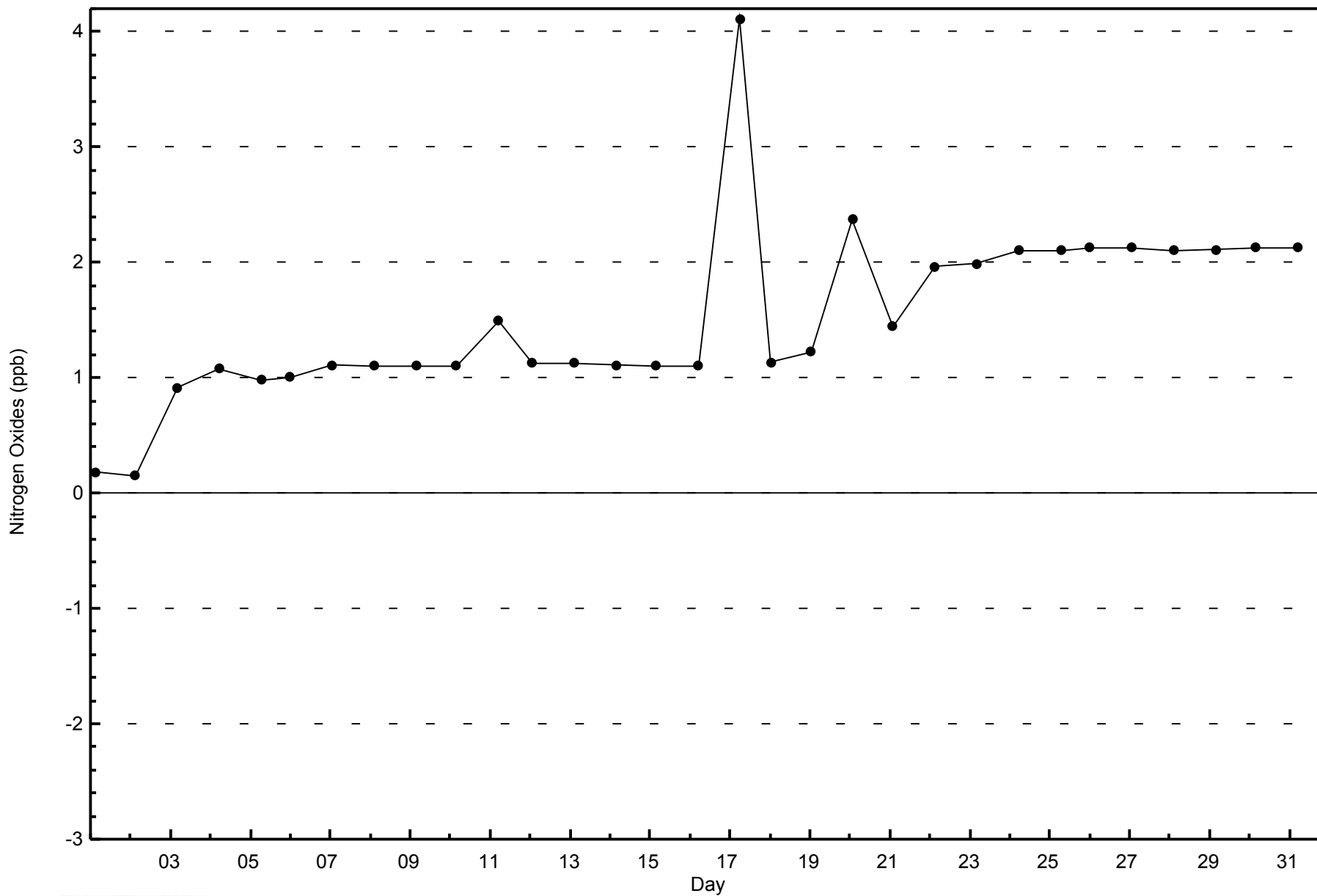
Nitrogen Oxides (NO_x) - ppb
Anzac (AMS 14)



Classes (ppb)



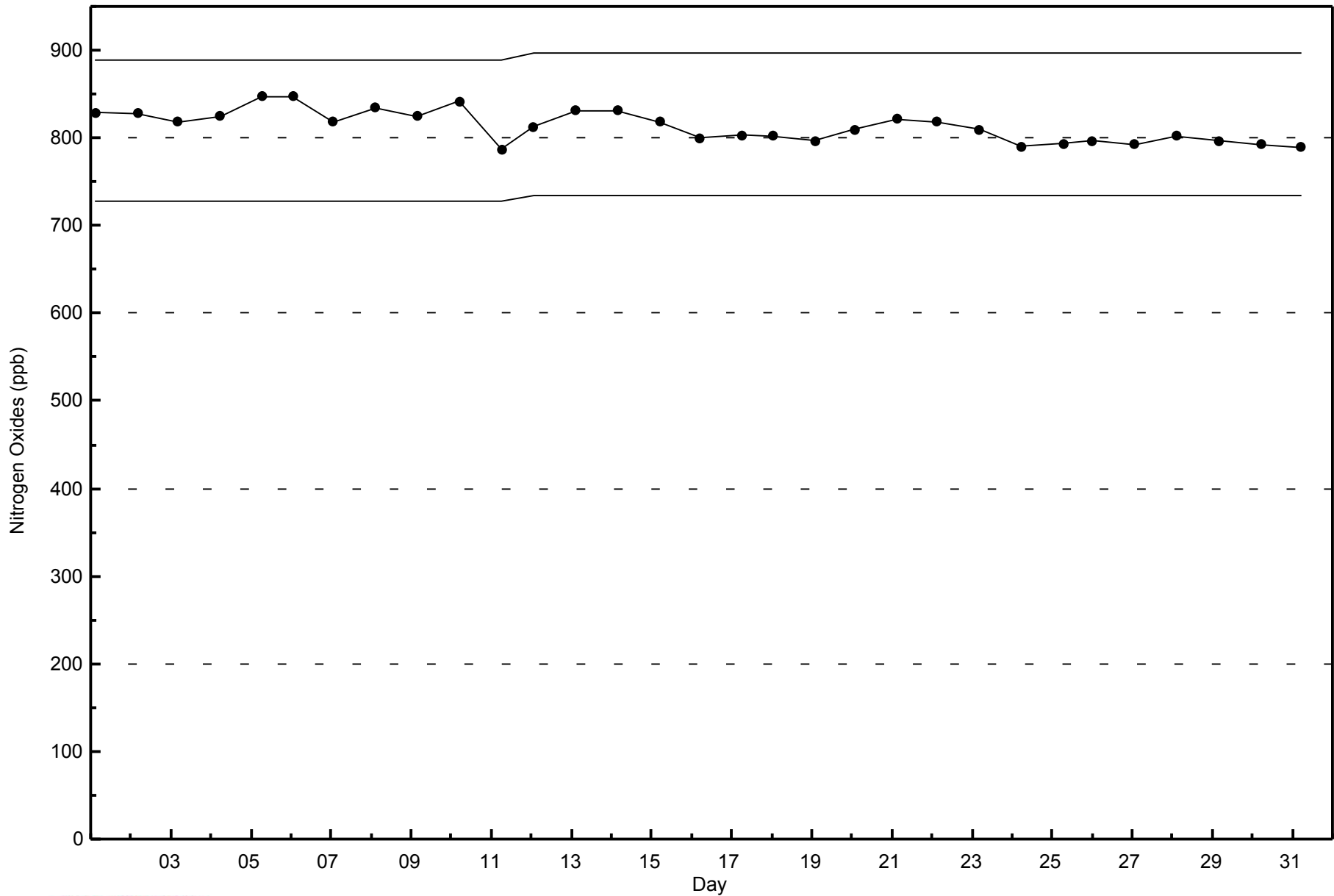
Total Number of Valid Hours: 684





WBEA NETWORK
Span Responses

Nitrogen Oxides (NO_x) - ppb
Anzac - July 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

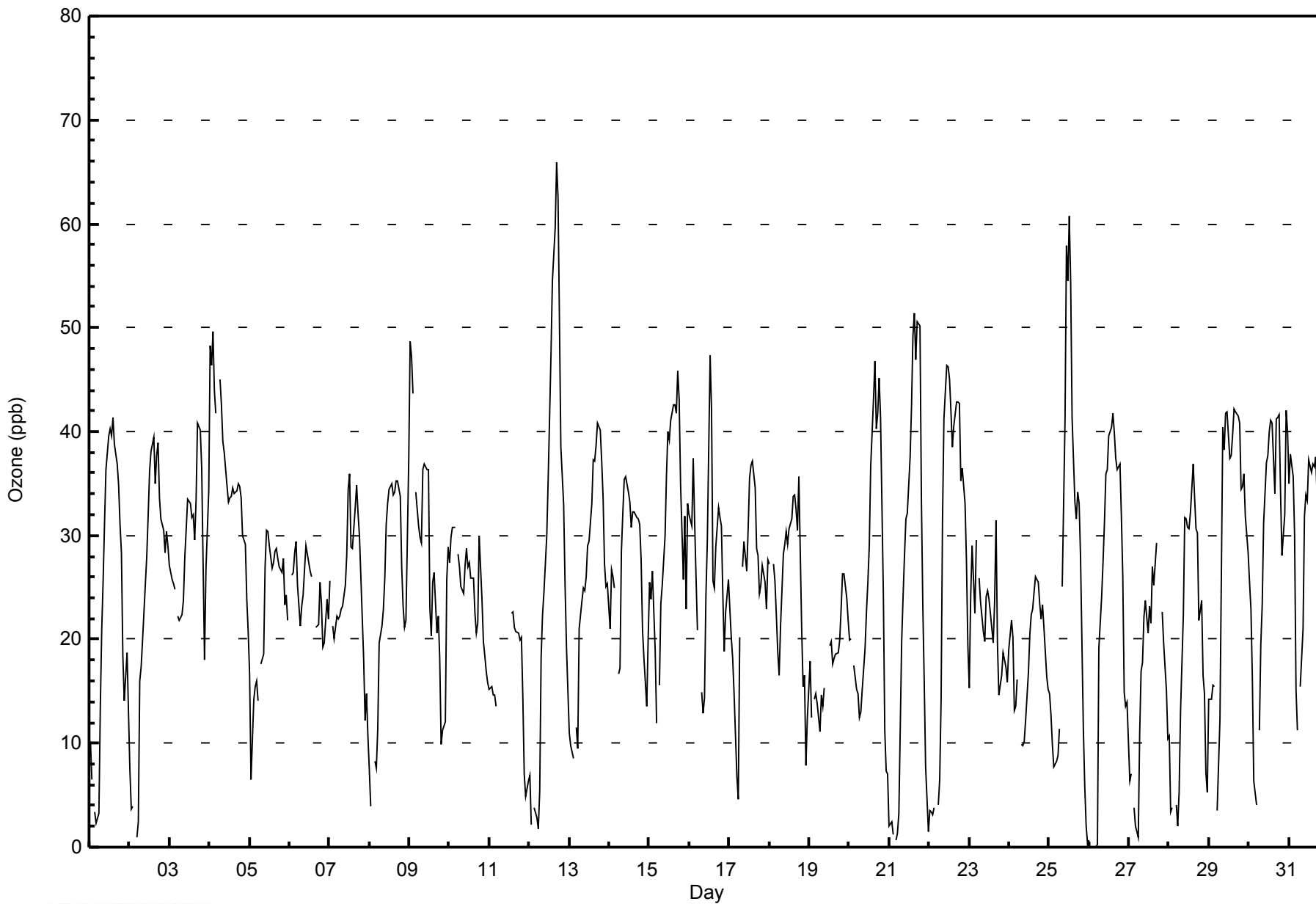
Anzac - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 66 ppb on Jul 12 17:00										Maximum Daily Average: 36.5 ppb on Jul 4										Hours of Data: 700																													
Minimum Value: 0 ppb on Jul 26 03:00										Minimum Daily Average: 16.3 ppb on Jul 27										Hours of Missing Data: 44																													
Maximum Diurnal Average: 34.3 ppb at hour 15										Minimum Diurnal Average: 11.9 ppb at hour 6										Hours of Calibration: 37																													
Monthly Average: 25.3 ppb										Percentiles: P ₁ = 1 P ₁₀ = 9 Q ₁ = 17 Median = 25 Q ₃ = 34 P ₉₀ = 40 P ₉₉ = 55										Percent Operational Time: 99.1																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	10	6	Z	3	2	3	13	21	26	31	36	40	40	40	41	39	37	35	31	28	18	14	19	13	23.8	41																							
2-Jul	8	4	4	Z	1	2	16	17	20	25	28	32	36	38	39	35	38	39	34	32	31	28	30	29	24.6	39																							
3-Jul	27	26	25	25	Z	22	22	22	24	28	31	33	33	32	32	30	33	41	40	36	27	18	27	34	29.1	41																							
4-Jul	48	46	50	44	42	Z	45	43	39	38	35	33	34	34	35	34	34	35	35	34	30	29	24	21	36.5	50																							
5-Jul	17	6	14	15	16	14	Z	18	19	27	31	30	29	27	27	28	29	28	27	26	28	23	24	22	22.9	31																							
6-Jul	Z	26	26	28	29	25	21	23	24	27	29	27	27	26	PF	PF	21	21	25	23	19	20	24	22	24.6	29																							
7-Jul	26	Z	21	20	22	22	22	23	23	25	28	34	36	29	29	33	35	32	30	26	18	12	15	11	24.9	36																							
8-Jul	7	4	Z	8	8	11	20	21	23	26	31	33	34	35	34	34	35	35	34	27	23	21	22	37	24.6	37																							
9-Jul	49	47	44	Z	34	31	30	29	36	37	36	36	23	20	25	26	21	22	18	10	11	12	26	29	28.4	49																							
10-Jul	27	30	31	31	Z	28	27	25	24	27	29	27	27	26	26	22	21	21	30	24	20	18	17	16	25.0	31																							
11-Jul	15	15	15	15	14	Z	15	C	C	C	C	C	C	22	23	21	21	21	20	20	15	7	5	6	--	23																							
12-Jul	7	2	Z	4	3	2	5	18	22	25	30	35	41	48	55	60	66	63	51	38	33	25	19	15	29.0	66																							
13-Jul	11	10	9	Z	12	9	21	24	25	25	26	29	29	33	37	37	39	41	40	37	34	27	25	25	26.3	41																							
14-Jul	21	27	26	25	Z	17	17	28	32	35	36	34	33	31	32	32	32	32	31	28	21	18	14	20	27.0	36																							
15-Jul	25	24	27	19	12	Z	16	23	25	30	36	40	39	41	43	43	42	46	43	35	26	32	23	33	31.4	46																							
16-Jul	32	31	37	31	26	21	Z	15	13	14	24	29	47	42	26	25	29	33	32	31	24	19	23	26	27.4	47																							
17-Jul	23	20	18	15	7	5	20	Z	27	29	27	31	35	37	37	35	29	28	24	25	27	26	23	28	25.0	37																							
18-Jul	27	Z	27	26	22	19	17	21	28	29	30	29	31	32	34	34	33	31	36	21	15	17	8	12	25.1	36																							
19-Jul	18	12	Z	14	15	14	11	15	14	15	M	M	19	20	18	18	19	19	20	23	26	26	24	22	18.2	26																							
20-Jul	20	20	Z	18	15	15	13	13	15	19	23	25	29	37	43	47	40	42	45	41	24	11	7	7	24.8	47																							
21-Jul	2	2	1	Z	1	1	3	20	24	28	32	32	38	42	49	51	47	51	50	34	23	16	8	2	24.2	51																							
22-Jul	4	3	3	4	Z	4	7	14	32	41	46	46	45	42	39	40	43	43	43	35	37	33	28	19	28.3	46																							
23-Jul	15	24	29	23	30	Z	26	24	21	20	24	25	24	23	20	24	32	20	15	17	19	18	17	16	21.8	32																							
24-Jul	19	22	20	13	14	16	Z	10	10	10	12	17	21	22	23	25	26	25	23	22	23	21	16	15	18.5	26																							
25-Jul	15	13	10	8	8	9	11	Z	25	41	58	55	61	54	41	33	32	34	33	28	11	6	2	0	25.6	61																							
26-Jul	1	Z	0	0	0	0	19	24	28	31	36	36	40	40	42	40	37	36	37	32	26	15	14	14	23.8	42																							
27-Jul	6	7	Z	4	2	1	11	17	18	22	24	21	23	22	27	25	29	MS	MS	MS	23	20	15	10	16.3	29																							
28-Jul	11	3	4	Z	4	2	5	13	22	32	32	31	31	32	37	34	31	30	22	24	17	15	7	5	19.2	37																							
29-Jul	14	14	16	15	Z	4	12	26	40	38	42	42	37	38	40	42	42	41	41	34	35	36	32	28	30.9	42																							
30-Jul	25	23	16	6	4	Z	11	20	23	31	37	38	40	41	41	34	41	41	42	34	28	32	42	40	30.1	42																							
31-Jul	35	38	36	30	15	11	Z	15	21	32	34	33	37	36	37	37	38	33	23	14	13	10	7	6	25.8	38																							
																								18.8	18.1	20.3	17.1	13.7	11.9	16.9	20.8	24.1	28.0	31.7	32.9	34.0	33.6	34.3	33.9	33.8	34.0	32.5	28.0	23.4	20.2	18.9	18.9	Diurnal Average	
																								49	47	50	44	42	31	45	43	40	41	58	55	61	54	55	60	66	63	51	41	37	36	42	40	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance PF - Power Failure MS - Missing																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																																																	



WBEA NETWORK
Hourly Averages

Ozone (O₃) - ppb
Anzac - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Anzac - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	228	32.57	32.57
21 - 50	461	65.86	98.43
51 - 82	11	1.57	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 700

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Ozone (O₃) - ppb
Anzac - July 2014

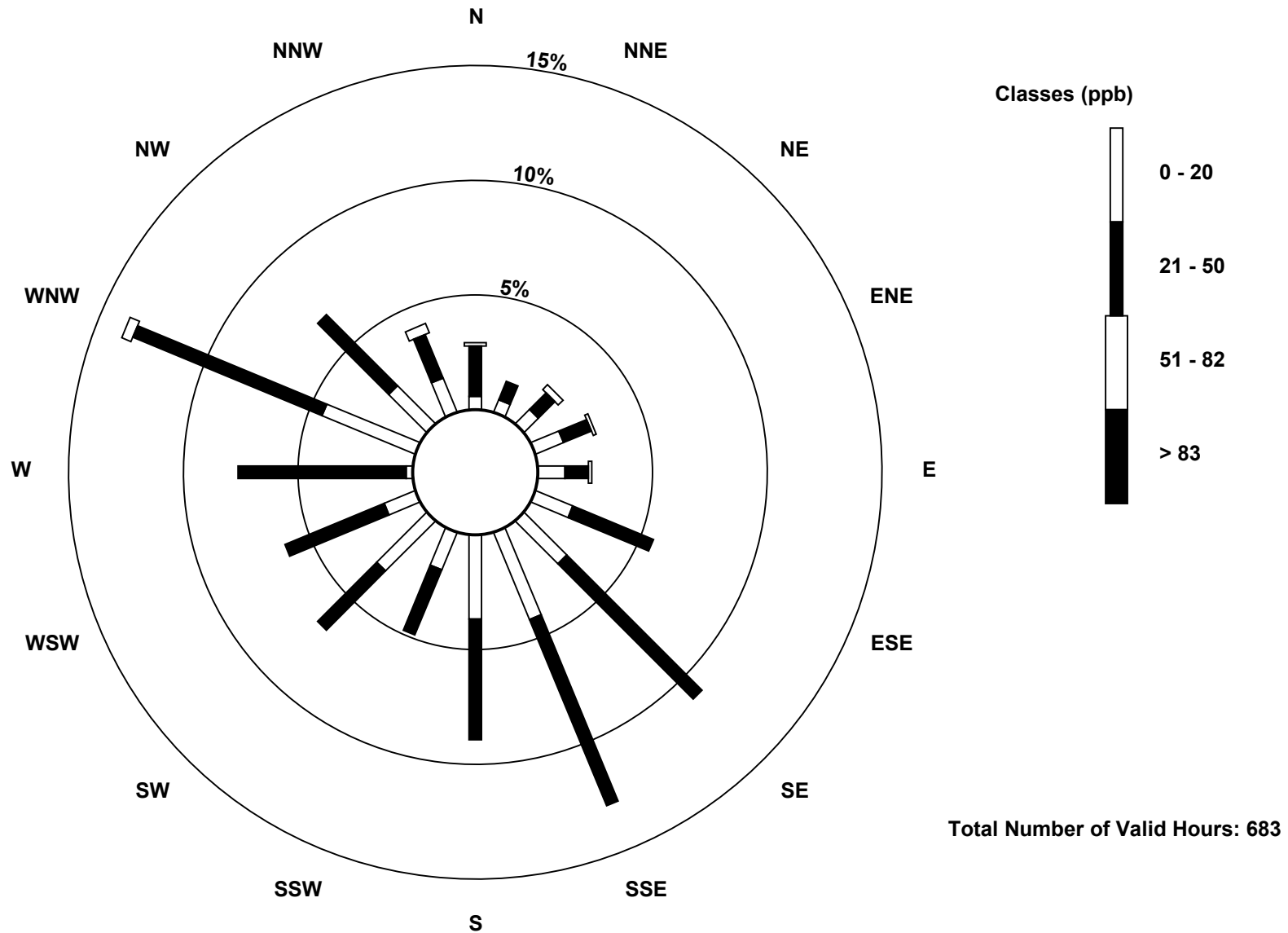
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	4	4	6	9	8	12	18	28	25	12	21	10	2	30	16	11	216
21 - 50	15	6	7	9	7	26	57	60	36	21	25	32	50	61	30	14	456
51 - 82	1	0	2	1	1	0	0	0	0	0	0	0	0	3	0	3	11
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	10	15	19	16	38	75	88	61	33	46	42	52	94	46	28	683

Total Number of Valid Hours: 683

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Ozone (O₃) - ppb
Anzac (AMS 14)



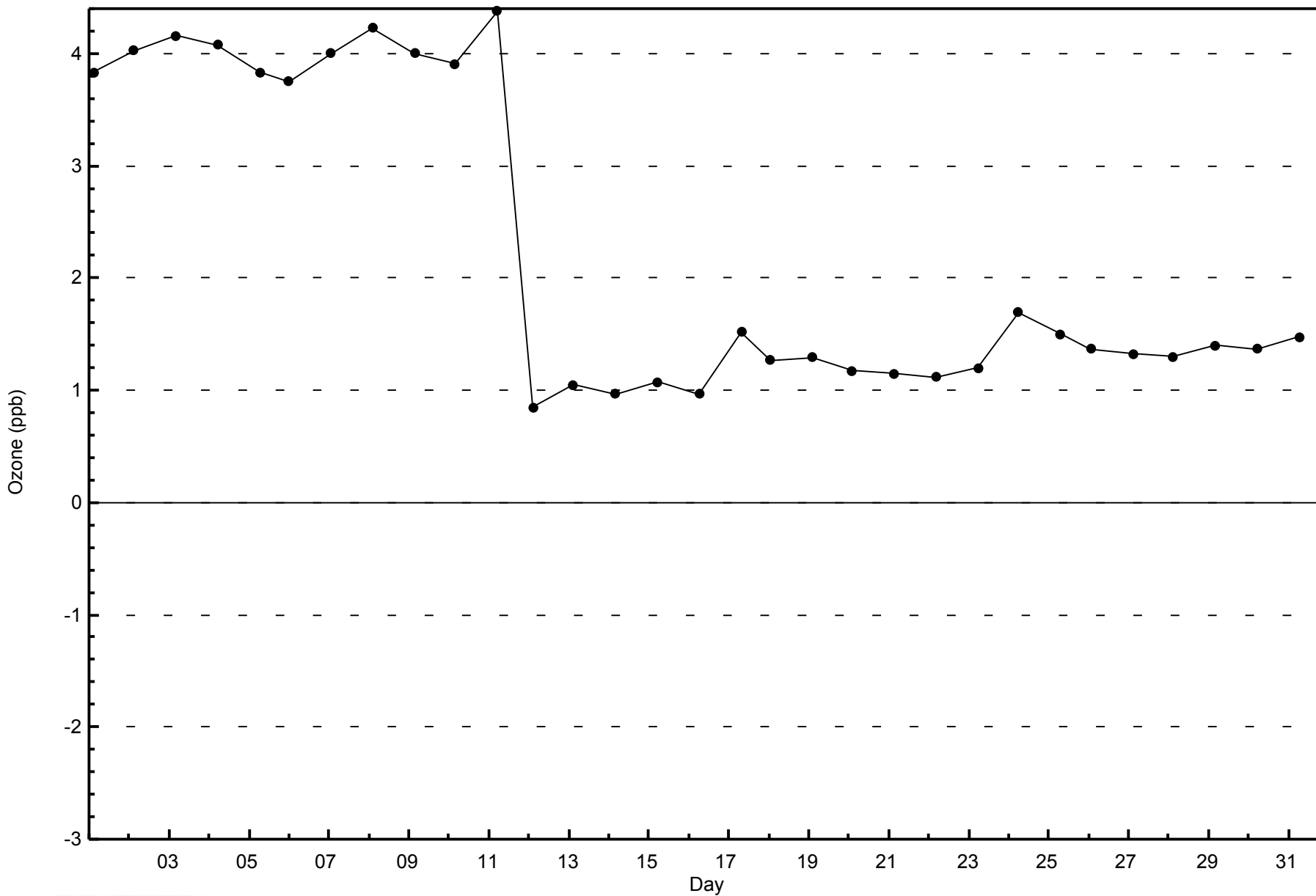


WBEA NETWORK

Zero Responses

Ozone (O₃) - ppb

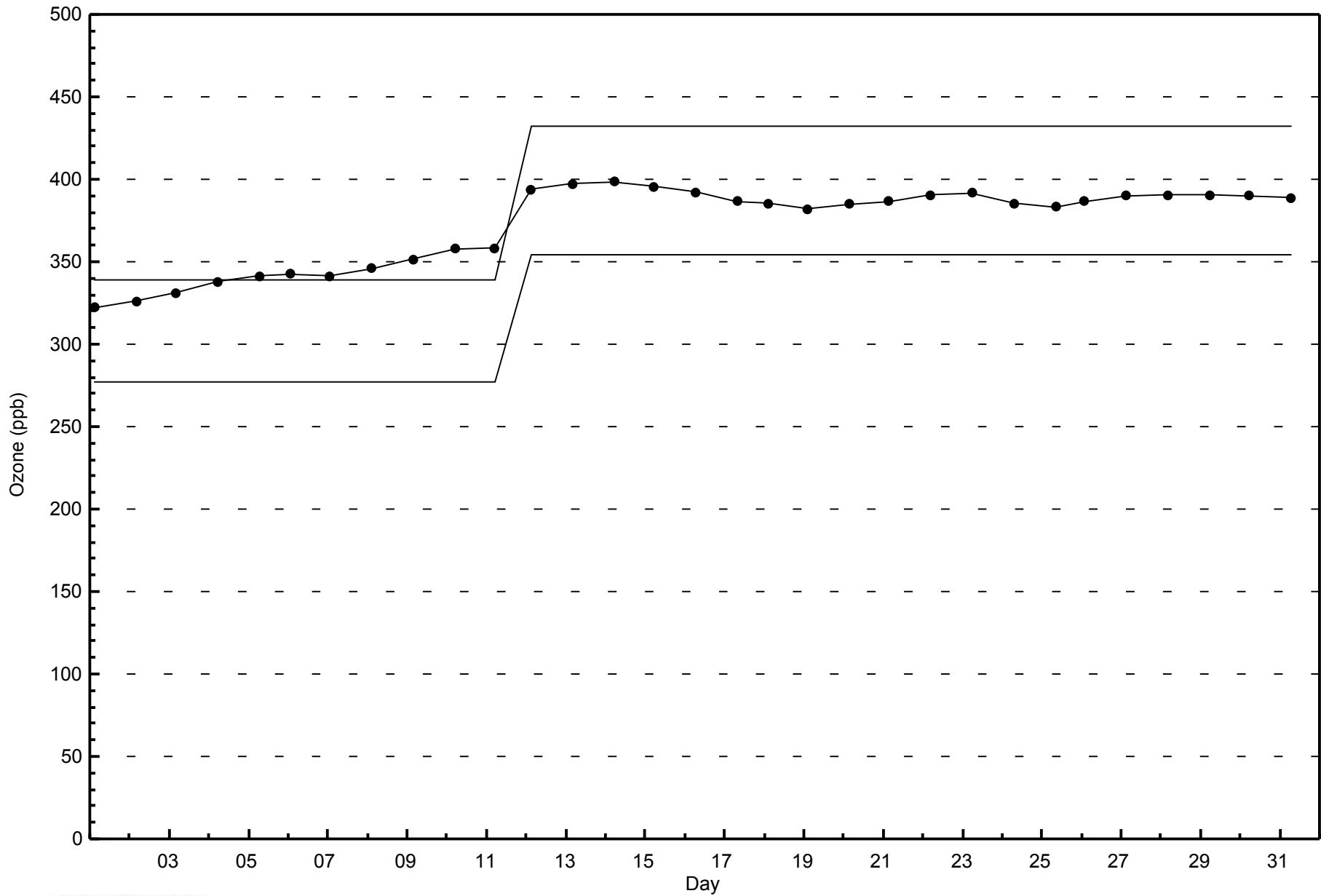
Anzac - July 2014





WBEA NETWORK
Span Responses

Ozone (O₃) - ppb
Anzac - July 2014





Summary of Hour Averages

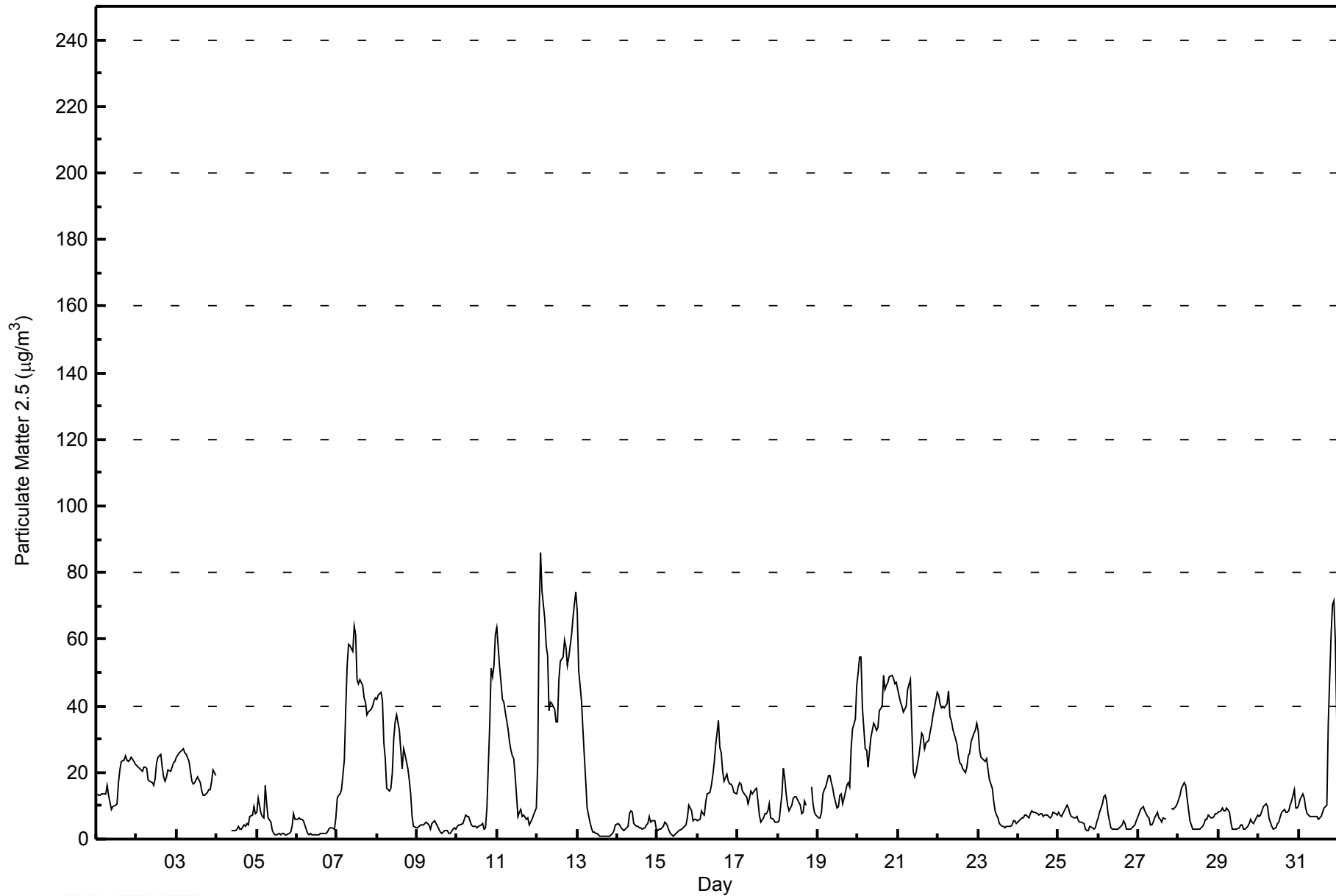
Anzac - July 2014

Number of Exceedences (AAAQO): 24-hr: 5 Maximum Value: 86.2 µg/m ³ on Jul 12 03:00 Minimum Value: 0.7 µg/m ³ on Jul 13 19:00 Maximum Diurnal Average: 20.2 µg/m ³ at hour 3 Monthly Average: 15.99 µg/m ³		Maximum Daily Average: 54.7 µg/m ³ on Jul 12 Minimum Daily Average: 3.0 µg/m ³ on Jul 6 Minimum Diurnal Average: 12.8 µg/m ³ at hour 13 Percentiles: P ₁ = 1.0 P ₁₀ = 2.9 Q ₁ = 4.7 Median = 9.0 Q ₃ = 22.7 P ₉₀ = 40.8 P ₉₉ = 66.7		Hours in Service: 744 Hours of Data: 730 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-Jul	13.3	13.3	13.0	13.6	13.7	13.8	15.9	13.2	11.1	9.0	10.0	10.2	10.5	16.9	20.9	23.3	23.6	24.9	23.9	23.5	23.8	24.4	23.1	22.4	17.1	24.9	
2-Jul	21.9	21.8	21.1	20.3	21.7	21.6	21.3	17.9	17.2	17.0	16.1	18.3	22.7	24.7	25.3	21.5	18.4	17.3	18.7	20.9	20.4	21.5	22.7	23.3	20.6	25.3	
3-Jul	24.7	25.7	26.3	26.6	26.9	26.0	25.4	23.3	20.3	17.2	16.4	17.1	18.6	17.9	16.9	14.4	13.0	13.2	13.9	14.6	14.8	17.2	20.6	19.1	19.6	26.9	
4-Jul	PF	PF	PF	PF	PF	PF	PF	PF	PF	M	2.5	2.5	2.6	3.0	3.7	2.9	3.0	4.1	3.9	4.5	4.4	6.7	7.0	9.9	7.7	--	9.9
5-Jul	8.1	12.4	7.5	7.0	6.4	16.0	10.4	6.2	5.2	2.7	1.5	1.2	1.2	1.9	1.3	1.8	1.8	1.4	1.4	1.8	2.0	3.6	7.5	5.8	4.8	16.0	
6-Jul	5.9	6.3	6.0	5.9	5.6	4.3	1.8	1.4	1.6	1.4	1.2	1.2	1.2	1.3	1.6	1.6	1.6	1.7	2.2	3.0	3.3	3.5	3.1	6.4	3.0	6.4	
7-Jul	12.2	13.1	13.8	14.9	23.8	38.8	52.3	58.3	58.2	56.2	63.9	61.5	48.0	46.4	47.9	46.3	42.3	40.9	37.3	38.0	39.0	39.8	41.5	42.2	40.7	63.9	
8-Jul	42.0	43.2	44.1	41.7	28.6	24.0	15.2	14.2	15.1	19.8	29.9	35.0	37.2	32.4	26.9	21.1	27.3	25.4	21.1	17.9	13.4	6.6	3.7	3.2	24.5	44.1	
9-Jul	3.4	4.0	4.4	4.1	4.1	5.0	4.7	4.1	2.9	4.5	5.3	4.5	3.7	3.0	2.1	1.9	2.3	2.7	2.6	1.6	1.9	2.8	3.3	3.0	3.4	5.3	
10-Jul	3.8	4.4	4.1	4.6	6.1	7.4	7.0	6.7	4.4	3.9	3.8	3.7	3.6	3.7	4.2	4.6	3.1	3.4	9.3	34.2	51.1	48.7	52.0	61.6	14.1	61.6	
11-Jul	63.5	51.8	46.9	41.9	41.0	38.1	33.2	29.3	26.9	24.9	24.3	18.9	6.9	8.2	8.9	6.9	7.1	6.1	6.5	4.4	5.2	6.1	7.2	9.5	21.8	63.5	
12-Jul	22.8	67.3	86.2	74.8	66.3	58.1	55.3	38.6	40.9	40.6	38.8	35.1	35.2	47.9	53.4	54.6	59.8	57.7	52.1	54.8	61.3	66.6	70.7	74.0	54.7	86.2	
13-Jul	68.3	51.0	41.4	32.9	25.1	17.5	9.4	5.0	3.2	2.2	1.8	1.8	1.1	0.8	0.8	0.7	0.7	0.7	0.9	1.3	1.8	2.7	4.1	11.6	68.3		
14-Jul	4.7	4.1	3.2	2.8	2.6	3.5	3.8	7.6	8.4	8.0	4.7	3.9	4.0	3.5	3.5	3.2	3.6	4.1	4.9	6.6	5.2	5.4	5.5	2.9	4.6	8.4	
15-Jul	2.5	3.0	3.1	3.7	5.1	4.6	3.6	2.4	1.5	1.0	1.3	1.8	2.1	2.5	2.8	3.5	3.6	4.2	6.2	10.1	8.3	5.6	5.8	6.1	3.9	10.1	
16-Jul	5.6	5.9	8.4	7.6	7.3	11.1	13.6	13.8	16.3	19.1	22.7	28.0	35.6	27.6	25.8	20.5	17.5	19.4	17.2	16.5	16.5	15.9	14.0	13.7	16.6	35.6	
17-Jul	15.9	16.8	16.3	14.5	13.1	12.7	10.7	12.2	14.4	13.5	14.9	15.3	11.4	7.1	5.1	6.6	7.6	7.7	8.3	10.5	6.2	5.8	5.2	5.1	10.7	16.8	
18-Jul	5.2	5.6	13.5	21.3	18.1	13.7	10.0	8.5	10.2	12.5	12.8	12.9	11.9	10.0	7.6	8.2	11.3	10.3	UO	UO	15.5	10.5	8.1	7.4	11.1	21.3	
19-Jul	6.3	6.3	8.2	13.4	14.9	15.9	19.2	19.0	17.0	15.1	12.6	9.3	9.6	13.0	13.4	10.7	12.4	16.0	16.9	15.9	27.3	32.9	35.8	46.2	17.0	46.2	
20-Jul	50.1	54.5	54.5	39.2	27.2	26.7	21.7	26.4	30.7	34.7	34.0	32.8	33.5	38.6	40.0	49.1	45.0	46.1	47.0	48.7	49.1	48.1	46.8	46.8	40.5	54.5	
21-Jul	44.9	41.2	39.7	38.1	39.0	39.9	45.1	47.8	33.3	20.5	18.7	19.9	25.1	28.3	31.7	31.0	27.3	28.8	29.5	32.1	34.5	37.1	39.2	44.2	34.1	47.8	
22-Jul	43.3	40.8	39.5	39.7	39.5	40.5	44.7	36.7	35.6	33.2	30.3	28.2	25.2	22.9	22.3	21.0	20.0	21.7	25.2	25.7	29.1	31.9	32.8	34.8	31.9	44.7	
23-Jul	32.7	26.6	24.8	23.7	23.1	24.2	20.6	17.7	15.3	11.3	8.3	7.3	6.2	4.6	3.8	3.9	3.4	3.8	4.0	3.6	4.1	5.4	5.6	4.7	12.0	32.7	
24-Jul	5.0	5.7	6.3	6.3	7.2	7.4	6.5	7.7	8.6	8.0	7.9	7.6	7.1	7.8	7.5	6.9	7.1	7.4	6.9	6.2	6.9	8.1	7.6	7.2	7.1	8.6	
25-Jul	7.8	7.2	6.9	7.8	9.2	10.3	9.4	7.7	7.0	6.4	6.3	6.7	5.3	5.1	4.9	4.5	2.8	2.5	2.6	3.8	3.4	2.8	3.4	5.0	5.8	10.3	
26-Jul	6.3	8.2	10.8	12.9	13.2	11.3	7.6	3.4	2.9	2.9	2.9	2.8	2.9	3.7	4.3	5.7	4.6	2.9	3.0	2.9	3.5	3.9	4.3	5.7	5.5	13.2	
27-Jul	7.4	8.9	9.1	9.8	8.6	6.7	6.4	4.4	4.3	5.2	6.5	7.9	6.3	5.8	5.2	6.2	5.9	MS	MS	MS	9.3	8.9	9.6	10.8	7.3	10.8	
28-Jul	11.9	13.2	15.4	17.0	16.2	12.1	9.0	5.5	3.0	3.0	2.9	2.8	2.8	3.1	3.9	4.8	6.0	6.1	7.4	6.5	6.3	6.9	7.8	7.4	7.5	17.0	
29-Jul	7.9	8.7	9.2	8.4	8.7	9.5	8.2	5.1	2.8	2.9	3.1	3.0	3.5	4.3	4.3	3.0	3.0	3.6	4.8	6.0	4.9	4.9	5.5	7.1	5.5	9.5	
30-Jul	6.9	7.3	8.4	9.9	10.8	9.6	6.3	4.9	3.7	3.1	3.3	4.5	5.2	6.6	7.9	8.8	7.9	7.9	8.3	10.2	11.5	15.0	9.1	9.4	7.8	15.0	
31-Jul	10.4	11.9	13.5	12.4	9.4	7.6	7.2	6.7	6.8	6.8	6.8	6.6	6.1	6.8	8.0	9.3	9.6	10.1	34.9	61.4	70.5	71.7	59.3	35.7	20.4	71.7	
18.8 19.7 20.2 19.2 18.1 17.9 16.8 15.2 14.3 13.2 13.4 13.3 12.8 13.2 13.4 13.2 13.0 13.4 14.5 16.8 17.9 18.4 18.5 18.8																								Diurnal Average			
68.3 67.3 86.2 74.8 66.3 58.1 55.3 58.3 58.2 56.2 63.9 61.5 48.0 47.9 53.4 54.6 59.8 57.7 52.1 61.4 70.5 71.7 70.7 74.0																								Diurnal Maximum			
M - Maintenance UO - Unstable Operation PF - Power Failure MS - Missing Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																											



WBEA NETWORK
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - July 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	208	28.49	28.49
6 - 15	258	35.34	63.84
16 - 25	106	14.52	78.36
26 - 80	151	20.68	99.04
> 81.0	1	0.14	99.18

Total Number of Valid Hours: 730

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Anzac - July 2014

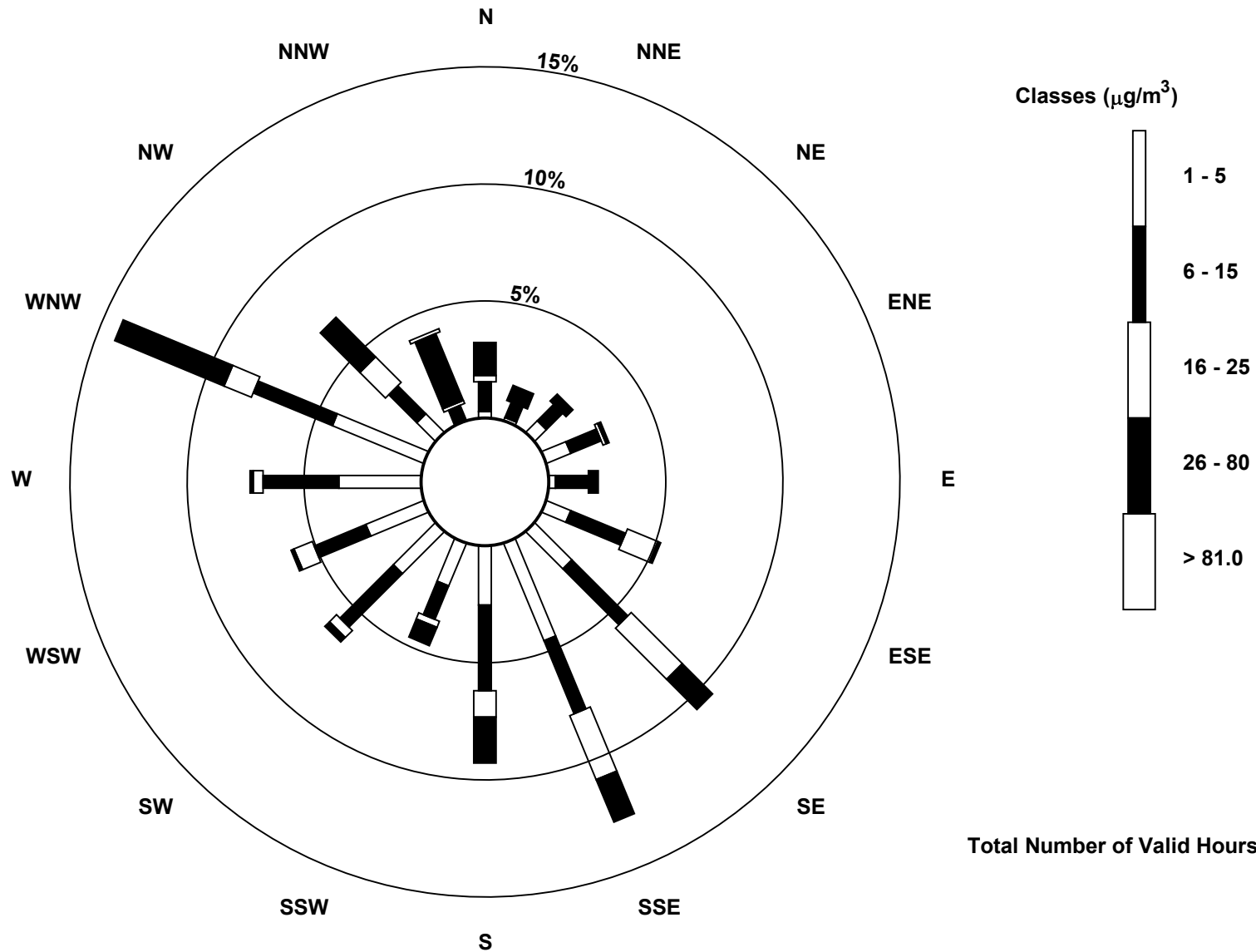
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	2	1	5	8	2	8	16	32	18	14	18	19	25	30	8	0	206
6 - 15	9	5	7	10	10	18	24	24	26	11	23	17	23	26	12	5	250
16 - 25	2	0	0	1	0	10	22	21	8	2	3	6	3	9	11	1	99
26 - 80	10	5	3	1	3	1	13	14	14	6	2	1	1	36	17	22	149
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Totals	23	11	15	20	15	37	75	91	66	33	46	43	52	101	48	29	705

Total Number of Valid Hours: 711

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac (AMS 14)



Total Number of Valid Hours: 711



Maximum Value: 31.6 C on Jul 30 17:00																				Maximum Daily Average: 23.6 C on Jul 30					Hours in Service: 744	
Minimum Value: 5.2 C on Jul 21 05:00																				Minimum Daily Average: 13.4 C on Jul 12					Hours of Data: 739	
Maximum Diurnal Average: 23.6 C at hour 17																				Minimum Diurnal Average: 13.2 C at hour 5					Hours of Missing Data: 5	
Monthly Average: 18.71 C																				Percentiles: P ₁ = 7.1 P ₁₀ = 12.4 Q ₁ = 15.2 Median = 18.4 Q ₃ = 22.3 P ₉₀ = 25.5 P ₉₉ = 29.5					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-Jul	13.3	11.8	10.9	10.6	10.5	12.6	15.5	16.9	18.6	20.9	22.3	23.3	24.3	24.5	25.3	24.6	23.7	19.4	18.9	19.0	17.4	15.6	15.6	14.9	17.9	25.3
2-Jul	13.3	11.9	11.2	10.5	10.4	12.2	15.6	17.7	20.2	22.1	23.4	24.7	25.9	26.5	26.9	26.8	27.4	27.6	26.0	24.7	23.5	22.3	21.4	19.8	20.5	27.6
3-Jul	18.8	18.1	17.7	17.4	17.4	17.4	18.0	19.6	20.8	23.4	24.5	24.7	19.6	20.7	21.8	24.3	26.8	27.4	26.4	25.3	23.7	22.2	22.1	22.3	21.7	27.4
4-Jul	22.0	19.8	18.4	17.4	16.8	17.4	18.8	19.4	20.7	22.2	23.3	24.0	24.6	25.3	25.8	25.8	25.5	25.1	24.3	23.0	21.4	19.9	17.4	14.8	21.4	25.8
5-Jul	13.8	13.7	14.0	13.4	13.2	13.9	15.1	16.8	18.5	20.3	20.7	21.9	22.9	23.2	23.4	24.0	24.0	23.4	23.5	22.3	21.0	18.2	17.7	16.4	19.0	24.0
6-Jul	16.6	16.7	17.0	18.1	17.8	16.5	16.7	18.7	19.8	20.9	22.2	22.6	23.4	24.2	17.2	16.8	17.4	17.5	18.3	17.5	16.4	16.2	15.5	14.4	18.3	24.2
7-Jul	14.1	14.0	14.0	13.8	13.5	13.9	15.0	16.3	17.5	18.9	19.6	20.5	21.7	22.3	22.6	21.8	21.6	20.2	20.3	19.1	16.6	14.5	13.0	11.5	17.4	22.6
8-Jul	10.4	9.7	9.4	10.3	11.3	12.0	14.5	16.0	18.0	20.0	22.2	23.8	24.9	25.6	26.5	26.8	26.3	26.6	26.1	25.3	22.8	20.9	20.0	21.1	19.6	26.8
9-Jul	21.9	22.2	21.3	19.3	18.0	18.0	20.1	22.5	24.5	23.1	20.6	18.8	18.5	18.0	19.9	19.9	18.6	20.0	20.9	19.9	18.6	18.1	18.3	17.8	19.9	24.5
10-Jul	16.6	16.1	14.6	13.6	12.9	12.6	13.4	14.9	16.4	17.8	18.7	18.1	19.1	17.8	19.0	15.8	17.1	17.4	15.9	13.6	12.6	13.0	12.7	12.5	15.5	19.1
11-Jul	12.5	12.3	11.9	11.7	11.5	12.4	13.7	14.7	15.7	16.2	14.8	14.3	15.0	16.5	18.3	20.1	20.3	19.8	16.7	17.1	16.2	14.2	12.7	10.8	15.0	20.3
12-Jul	9.7	8.6	8.9	8.3	7.1	6.8	8.9	11.8	13.1	13.6	14.8	16.2	17.4	18.5	19.4	19.7	19.9	19.7	19.0	17.0	13.7	11.2	9.4	8.6	13.4	19.9
13-Jul	7.7	7.3	7.0	7.0	8.0	9.6	13.2	14.2	16.0	17.6	18.9	20.0	21.4	22.9	23.7	24.3	24.7	24.3	23.6	22.1	19.9	17.6	16.2	15.6	16.8	24.7
14-Jul	15.0	14.7	14.5	14.4	14.6	14.6	17.2	20.2	23.3	24.7	25.6	26.8	27.6	28.4	29.2	29.4	29.5	29.3	28.5	26.9	23.0	20.8	19.1	17.5	22.3	29.5
15-Jul	18.1	16.5	16.5	14.4	13.1	15.9	17.3	19.4	22.1	24.2	26.2	27.6	28.5	29.5	29.6	28.6	28.8	28.6	27.2	25.5	22.8	20.0	20.3	22.1	22.7	29.6
16-Jul	21.1	20.5	21.8	21.4	20.6	20.3	20.1	20.2	20.5	21.8	23.2	23.6	24.6	22.5	18.2	20.5	22.3	22.2	21.8	20.8	19.4	17.2	16.8	17.7	20.8	24.6
17-Jul	16.6	15.7	14.8	13.3	11.3	12.3	15.2	16.2	18.0	18.9	18.9	20.0	21.4	23.1	23.7	23.7	22.0	20.8	20.4	19.5	18.1	17.7	17.3	16.5	18.1	23.7
18-Jul	15.8	15.2	15.0	14.6	14.2	14.3	15.6	17.0	18.5	19.7	20.7	21.3	22.4	23.3	23.8	24.1	23.4	21.9	16.8	14.1	14.5	14.7	13.8	14.4	17.9	24.1
19-Jul	14.0	13.6	13.7	13.9	13.9	14.0	14.4	16.0	16.9	17.6	M	M	15.2	15.6	16.0	17.2	16.4	16.6	16.0	14.8	13.7	12.8	12.2	12.4	14.9	17.6
20-Jul	11.5	11.2	11.4	11.5	11.7	12.3	12.2	12.8	13.7	15.3	16.9	18.1	17.7	18.4	19.4	19.0	20.2	19.1	18.7	16.9	13.9	11.6	10.0	9.8	14.7	20.2
21-Jul	8.0	7.6	6.4	5.5	5.2	6.9	10.4	13.5	16.0	18.0	19.1	20.0	20.9	21.8	22.4	22.9	23.1	22.8	22.1	19.8	16.4	13.5	11.7	10.6	15.2	23.1
22-Jul	9.6	9.1	8.8	8.2	8.3	9.4	13.2	16.6	20.6	22.6	23.4	24.4	25.1	25.8	26.2	26.5	26.6	26.3	25.6	23.3	22.2	20.4	17.8	15.6	19.0	26.6
23-Jul	14.6	14.4	14.6	13.8	15.2	15.7	16.5	17.3	18.6	20.1	20.6	21.4	22.2	20.5	20.4	24.2	23.0	18.6	18.4	18.2	18.4	17.8	18.0	17.7	18.3	24.2
24-Jul	17.3	17.0	16.5	15.8	15.9	16.8	16.9	17.2	17.7	18.0	19.0	21.1	22.5	23.3	23.8	23.9	24.3	24.0	23.0	22.4	21.3	20.0	19.0	18.5	19.8	24.3
25-Jul	18.1	17.7	17.1	16.0	15.2	15.3	15.8	17.2	17.9	19.6	20.0	17.5	18.7	20.5	19.5	18.7	19.2	19.8	19.6	19.3	17.8	15.8	14.4	13.4	17.7	20.5
26-Jul	13.0	12.6	11.5	11.2	11.5	12.5	16.0	17.8	20.0	21.3	22.3	23.1	24.3	25.2	25.2	24.5	24.4	23.0	23.8	22.6	21.0	18.2	17.1	15.7	19.1	25.2
27-Jul	14.6	14.0	13.3	13.4	13.7	13.9	16.3	18.3	19.7	22.0	22.0	21.0	21.1	21.5	22.3	20.8	21.5	MS	MS	MS	16.8	15.6	14.7	13.4	17.6	22.3
28-Jul	12.9	11.6	11.3	11.2	11.9	11.8	15.0	18.0	21.4	23.4	24.5	25.9	26.7	26.3	27.5	26.4	27.2	26.6	24.6	23.5	20.0	17.5	16.0	14.9	19.8	27.5
29-Jul	15.6	15.9	16.0	15.2	14.3	14.3	18.1	21.9	24.4	25.6	26.6	27.5	25.5	21.9	26.8	28.8	28.6	27.7	26.9	24.5	22.4	20.8	19.7	19.0	22.0	28.8
30-Jul	18.0	17.4	16.6	14.8	14.3	15.9	19.3	21.7	24.6	26.5	28.0	28.6	29.6	30.3	30.4	28.6	31.6	31.3	30.4	27.5	24.8	21.8	18.2	17.5	23.6	31.6
31-Jul	17.3	17.7	17.6	16.4	15.6	15.6	16.7	17.9	19.4	21.6	23.6	24.8	25.8	26.0	26.7	26.0	24.8	22.4	18.0	17.3	17.0	16.4	15.7	14.5	19.8	26.7
																								Diurnal Average		
																								Diurnal Maximum		
M - Maintenance MS - Missing																										

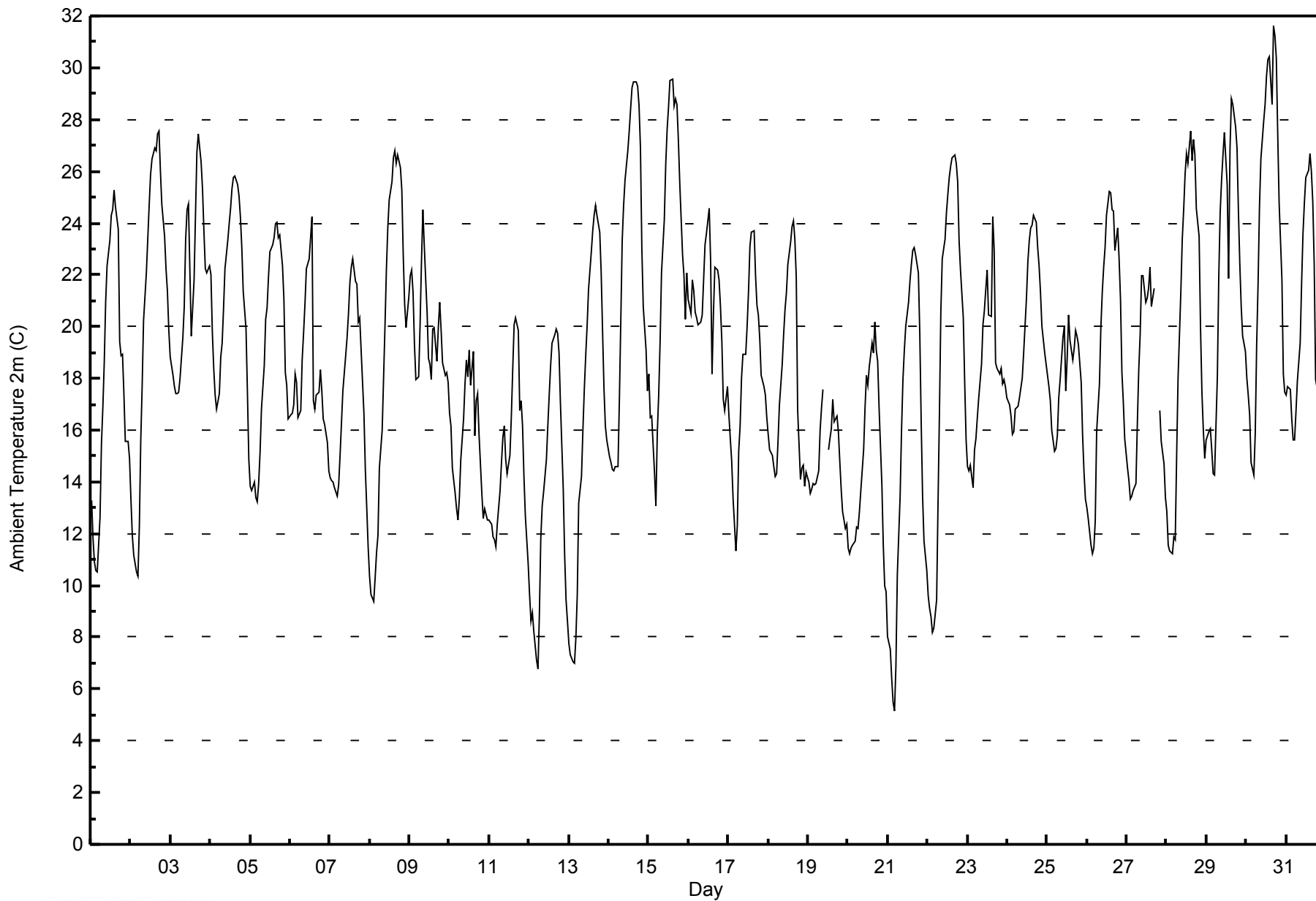


WBEA NETWORK

Hourly Averages

Ambient Temperature 2m (AT 2m) - C

Anzac - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ambient Temperature 2m (AT 2m) - C
Anzac - July 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	4.19	4.19
10 - 20	416	56.29	60.49
> 20	292	39.51	100.00

Total Number of Valid Hours: 739

Total Number of Hours: 744

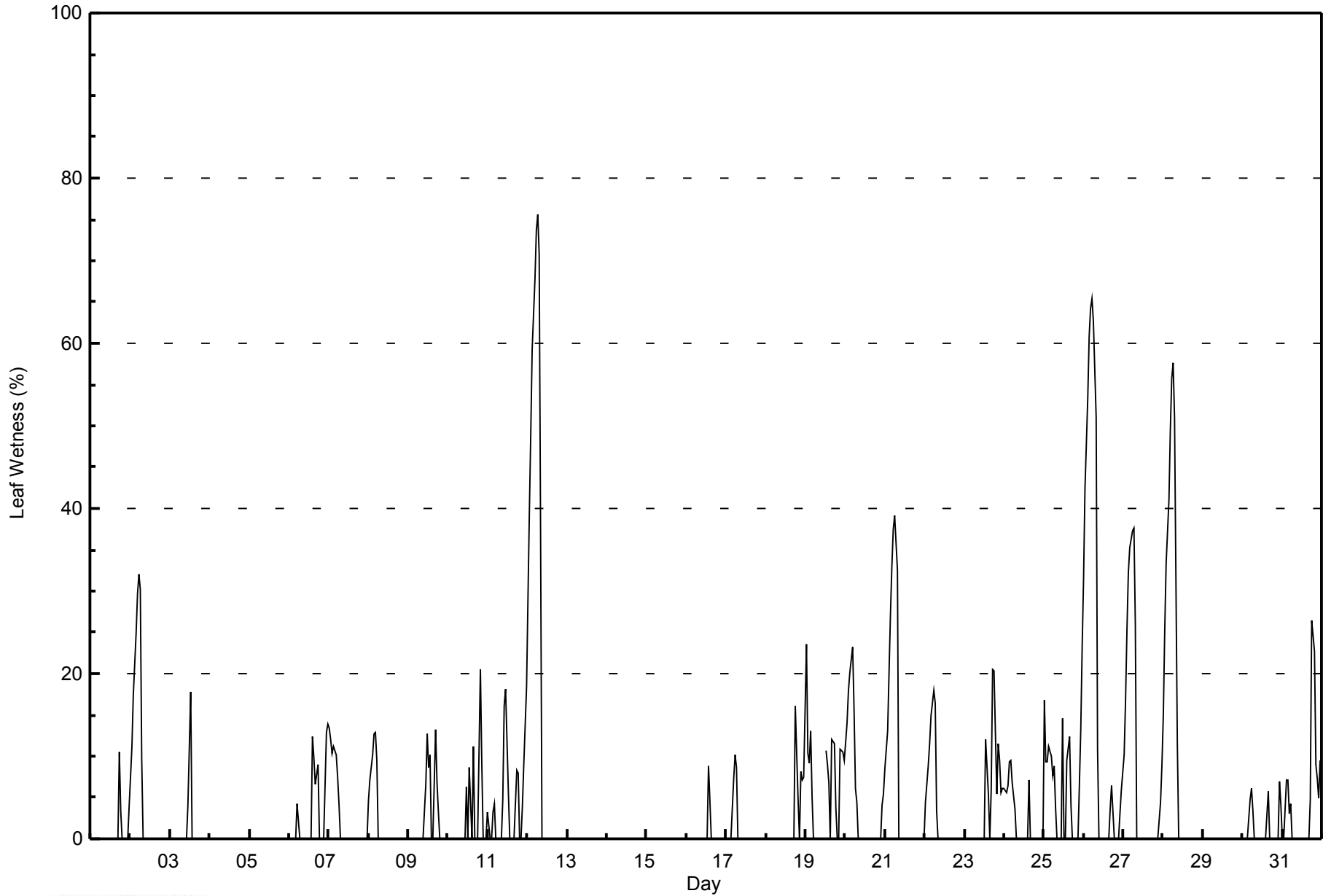


Maximum Value: 76 % on Jul 12 07:00																	Maximum Daily Average: 20.9 % on Jul 12																	Hours in Service: 744	
Minimum Value: 0 % on Jul 1 01:00																	Minimum Daily Average: 0.0 % on Jul 4																	Hours of Data: 739	
Maximum Diurnal Average: 12.6 % at hour 6																	Minimum Diurnal Average: 0.2 % at hour 10																	Hours of Missing Data: 5	
Monthly Average: 4.4 %																	Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =4 P ₉₀ =13 P ₉₉ =61																	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-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	3	0	0	0	0	4	0.7	10									
2-Jul	7	11	17	25	30	32	30	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.8	32									
3-Jul	0	0	0	0	0	0	0	0	0	0	0	4	18	0	0	0	0	0	0	0	0	0	0	0	0.9	18									
4-Jul	0	0	0	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-Jul	0	0	0	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-Jul	0	0	0	0	0	4	0	0	0	0	0	0	0	0	12	10	7	9	0	0	0	0	13	14	2.9	14									
7-Jul	13	12	10	11	10	7	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.9	13									
8-Jul	5	7	10	13	13	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.4	13									
9-Jul	0	0	0	0	0	0	0	0	0	0	7	13	9	10	0	0	13	7	3	0	0	0	0	0	2.6	13									
10-Jul	0	0	0	0	0	0	0	0	0	0	0	6	0	9	0	11	0	0	0	20	9	0	0	0	2.3	20									
11-Jul	3	0	0	3	4	0	0	0	0	5	16	18	6	0	0	0	8	8	0	0	4	9	18	4.3	18										
12-Jul	29	40	49	59	68	74	76	71	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20.9	76									
13-Jul	0	0	0	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-Jul	0	0	0	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-Jul	0	0	0	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-Jul	0	0	0	0	0	0	0	0	0	0	0	0	9	5	0	0	0	0	0	0	0	0	0	0	0.6	9									
17-Jul	0	0	0	0	7	10	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	10									
18-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	5	0	8	7	7	1.8	16										
19-Jul	23	10	9	13	5	0	0	0	0	M	M	11	9	7	0	12	12	4	0	0	11	11	9	6.6	23										
20-Jul	12	14	18	20	23	16	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	5.1	23										
21-Jul	9	13	20	27	33	37	39	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.8	39									
22-Jul	4	7	9	12	15	18	16	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.5	18									
23-Jul	0	0	0	0	0	0	0	0	0	0	0	0	12	5	0	6	21	20	5	11	9	6	6	4.3	21										
24-Jul	6	6	6	9	9	7	3	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	2.3	9									
25-Jul	17	9	9	11	10	8	9	4	0	0	0	15	0	0	10	12	4	0	0	0	6	13	23	6.7	23										
26-Jul	31	42	53	61	64	65	63	51	11	0	0	0	0	0	0	3	7	0	0	0	0	3	6	19.2	65										
27-Jul	10	17	25	32	35	37	38	26	0	0	0	0	0	0	0	0	MS	MS	MS	0	0	4	9	11.1	38										
28-Jul	15	25	33	41	49	56	58	51	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14.2	58									
29-Jul	0	0	0	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-Jul	0	0	0	0	5	6	3	0	0	0	0	0	0	0	0	6	0	0	0	0	0	7	4	1.3	7										
31-Jul	0	0	7	7	3	4	0	0	0	0	0	0	0	0	0	0	5	26	23	9	7	5	10	4.4	26										
6.0 6.9 9.0 11.1 12.4 12.6 11.4 8.1 1.9 0.2 0.8 1.9 1.4 1.6 1.2 1.5 1.5 2.6 2.7 1.8 1.0 1.5 2.6 3.7																								Diurnal Average											
31 42 53 61 68 74 76 71 37 5 16 18 18 12 12 12 13 21 26 23 11 11 13 23																								Diurnal Maximum											
M - Maintenance MS - Missing																																			



WBEA NETWORK
Hourly Averages

Leaf Wetness (SW) - %
Anzac - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Anzac - July 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	541	73.21	73.21
0.4 - 0.5	0	0.00	73.21
0.6 - 0.7	0	0.00	73.21
0.8 - 1.4	0	0.00	73.21
1.5 - 10	96	12.99	86.20
> 10	102	13.80	100.00

Total Number of Valid Hours: 739

Total Number of Hours: 744

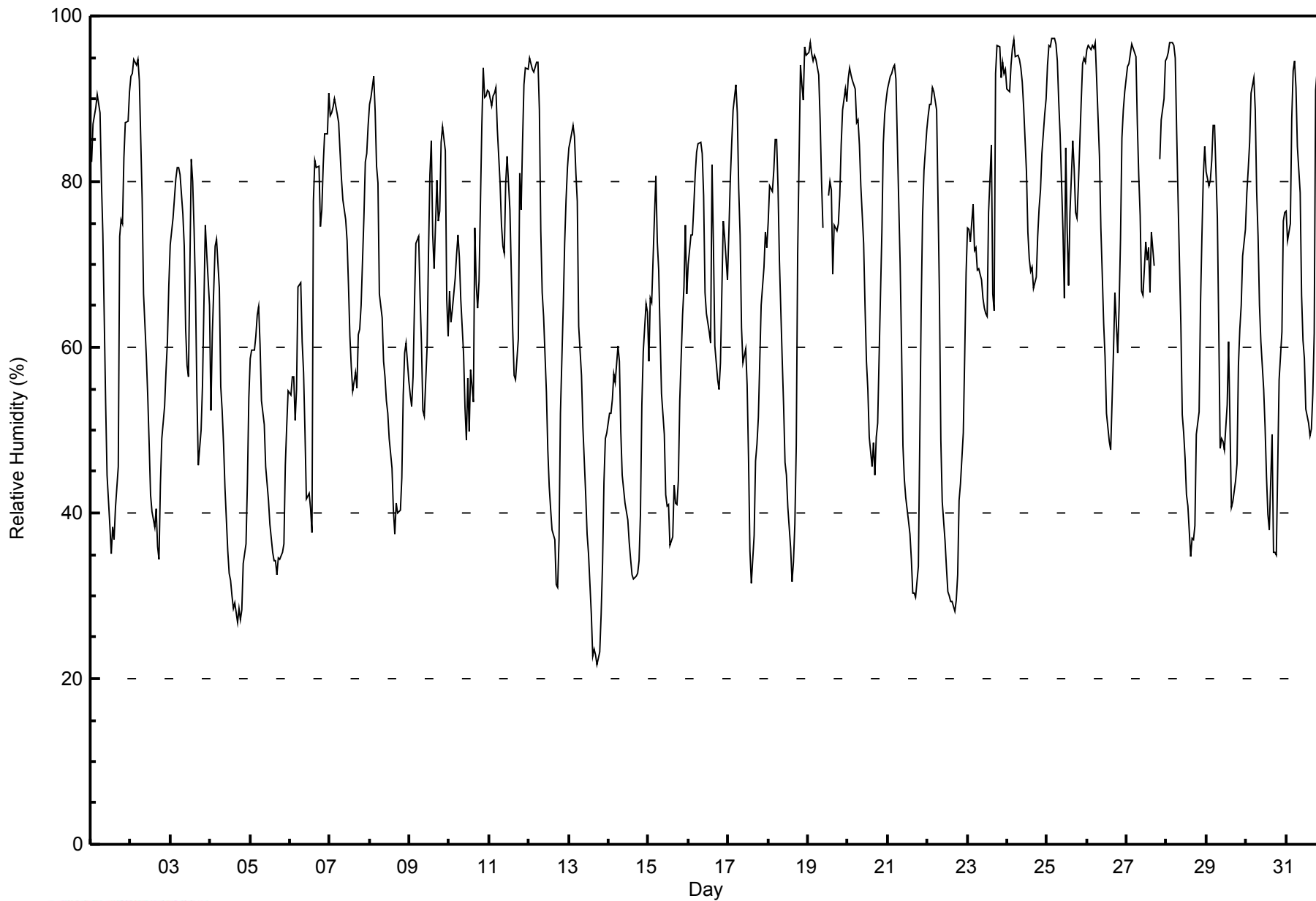


Maximum Value: 97 % on Jul 25 05:00																		Maximum Daily Average: 85.9 % on Jul 25																		Hours in Service: 744													
Minimum Value: 22 % on Jul 13 18:00																		Minimum Daily Average: 44.1 % on Jul 4																		Hours of Data: 739													
Maximum Diurnal Average: 84.9 % at hour 5																		Minimum Diurnal Average: 49.6 % at hour 17																		Hours of Missing Data: 5													
Monthly Average: 66.8 %																		Percentiles: P ₁ = 28 P ₁₀ = 37 Q ₁ = 51 Median = 68 Q ₃ = 84 P ₉₀ = 93 P ₉₉ = 97																		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-Jul	82	87	88	89	91	88	80	74	64	53	45	38	35	38	37	41	46	73	75	75	83	87	87	91	68.6	91																							
2-Jul	93	93	95	94	95	92	85	78	66	59	54	48	42	40	38	40	36	34	43	49	53	57	61	68	63.1	95																							
3-Jul	72	76	78	80	82	82	81	76	72	62	58	56	83	80	74	67	55	46	50	55	65	75	71	65	69.2	83																							
4-Jul	52	62	67	72	73	67	55	52	48	43	35	33	32	30	28	29	27	28	27	28	34	36	44	54	44.1	73																							
5-Jul	59	60	60	61	64	65	60	53	51	46	44	42	39	35	34	34	33	35	34	35	36	46	50	55	47.1	65																							
6-Jul	54	56	56	51	55	67	68	61	57	50	42	42	41	38	78	83	82	82	75	77	82	86	86	91	64.9	91																							
7-Jul	88	88	89	90	88	87	83	80	78	75	73	67	61	58	55	57	55	62	62	65	76	82	83	87	74.6	90																							
8-Jul	89	90	93	89	82	80	66	63	58	56	54	52	49	45	40	37	41	40	40	44	54	59	61	56	60.0	93																							
9-Jul	54	53	56	65	73	73	66	60	52	52	60	71	81	85	73	69	80	75	76	85	87	84	66	61	69.1	87																							
10-Jul	67	63	65	68	71	74	71	66	59	53	49	56	50	57	53	74	68	65	68	87	94	90	90	91	68.7	94																							
11-Jul	91	89	90	91	91	86	80	75	72	71	80	83	77	69	62	57	56	61	81	77	85	92	94	94	79.3	94																							
12-Jul	95	94	94	93	94	94	89	74	67	64	55	48	43	41	38	37	31	31	37	52	65	73	78	82	65.3	95																							
13-Jul	84	85	87	85	81	78	62	57	50	46	42	37	35	28	23	24	23	22	23	28	34	44	49	50	49.0	87																							
14-Jul	52	52	54	57	56	60	58	50	45	43	41	39	37	34	32	32	32	33	34	40	53	60	65	64	46.8	65																							
15-Jul	58	66	65	76	81	73	69	62	54	49	42	41	41	36	37	43	41	41	44	53	64	67	75	66	56.1	81																							
16-Jul	70	74	74	77	81	84	85	85	83	78	67	64	62	60	82	72	60	56	55	58	67	75	73	68	71.2	85																							
17-Jul	74	80	85	89	92	88	79	74	62	58	60	55	47	35	31	37	46	48	52	58	65	70	74	72	63.8	92																							
18-Jul	75	79	79	81	85	85	79	71	58	53	46	45	41	36	32	34	39	48	71	94	92	90	96	95	66.8	96																							
19-Jul	96	97	95	95	95	95	93	87	80	74	M	M	78	80	79	69	75	74	75	78	84	89	91	90	85.0	97																							
20-Jul	92	94	93	92	91	87	87	84	80	73	65	58	55	49	46	48	45	49	51	59	74	85	88	90	72.3	94																							
21-Jul	91	93	93	94	94	92	85	70	60	48	44	42	39	37	34	30	30	30	33	49	65	76	81	86	62.4	94																							
22-Jul	88	89	89	91	91	89	78	66	49	41	37	33	31	30	29	29	28	29	33	41	44	50	59	69	54.7	91																							
23-Jul	74	74	73	77	72	72	69	69	68	66	65	64	64	76	84	66	64	93	96	96	92	94	93	94	77.4	96																							
24-Jul	91	91	94	96	97	95	95	94	92	89	81	74	71	69	70	67	69	73	77	79	83	88	90	84.2	97																								
25-Jul	94	96	96	97	97	97	95	90	86	74	66	84	74	68	76	85	82	76	76	80	94	95	94	85.9	97																								
26-Jul	96	96	96	96	96	97	92	83	74	69	63	59	52	49	48	54	60	67	59	65	73	85	89	91	75.3	97																							
27-Jul	94	94	96	97	96	95	87	81	76	67	66	73	70	72	67	74	70	MS	MS	MS	83	88	90	95	82.3	97																							
28-Jul	95	96	97	97	96	95	86	78	63	52	50	47	42	41	35	37	37	38	49	52	65	73	81	84	66.1	97																							
29-Jul	81	79	80	83	87	87	76	62	48	49	49	48	53	61	51	41	41	44	46	58	62	65	71	74	62.3	87																							
30-Jul	79	82	85	91	93	89	79	73	65	61	55	50	44	40	38	50	35	35	35	46	56	62	75	76	62.2	93																							
31-Jul	76	73	75	88	93	95	91	84	79	66	61	59	53	51	49	50	54	62	91	96	95	97	97	97	76.3	97																							
																								79.3	80.7	81.8	83.9	84.9	84.1	78.4	72.1	65.1	59.5	55.1	53.9	52.3	50.6	50.1	50.7	49.6	51.6	55.6	61.9	69.4	74.6	77.5	78.7	Diurnal Average	
																								96	97	97	97	97	97	95	95	94	92	89	84	83	85	84	85	82	93	96	96	95	97	97	97	Diurnal Maximum	
M - Maintenance MS - Missing																																																	



WBEA NETWORK
Hourly Averages

Relative Humidity (RH) - %
Anzac - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Anzac - July 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	88	11.91	11.91
40 - 60	188	25.44	37.35
60 - 80	230	31.12	68.47
80 - 100	233	31.53	100.00

Total Number of Valid Hours: 739

Total Number of Hours: 744



Maximum Speed: 18 km/h on Jul 9 02:00	Maximum Daily Speed Average: 10.8 km/h on Jul 4	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 21 04:00	Minimum Daily Speed Average: 0.4 km/h on Jul 21	Hours of Data: 722
Maximum Diurnal Speed Average: 3.1 km/h at hour 2	Minimum Diurnal Speed Average: 1.0 km/h at hour 20	Hours of Missing Data: 22
Monthly Average Velocity: 1.9 km/h 219.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 9 P ₉₀ = 11 P ₉₉ = 15	Percent Operational Time: 97.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	WSW1	SSW1	W4	W5	WSW6	W5	NW1	N5	SW9	S7	SSE4	AF	AF	SSE8	S4	----	SW9
2-Jul	S3	AF	AF	AF	AF	SE5	SSE6	SSE7	SE8	SE9	SE9	SE8	SE8	SE8	SE7	ESE9	ESE8	SE9	ESE12	ESE11	ESE10	SE8	SE8	SE7	SE7.7	ESE12
3-Jul	SE8	SE9	SE9	SE9	SE10	SE11	SE12	SE14	SE14	S12	S9	ESE10	ESE13	ESE14	SE12	SSE17	S11	S7	S3	WSW3	WSW8	W10	SSE8.7	SSE17		
4-Jul	SW13	W14	WNW12	WNW9	WNW8	W10	W12	W12	W10	W11	W13	WNW13	W14	W13	W13	W13	WSW16	WSW15	WSW16	WSW14	WSW7	WSW7	WSW5	W2	W10.8	WSW16
5-Jul	WSW3	WSW5	WS5	SW4	SW5	WSW3	WS5	WS5	SW10	WSW11	WNW11	WNW10	W12	W11	W9	WSW9	WSW11	W8	W8	WSW7	WSW8	WSW3	WSW4	WSW2	WSW6.6	W12
6-Jul	W4	WNW4	W5	WSW6	W11	W6	WSW3	WNW7	W7	WSW9	W5	WNW8	AF	AF	N8	N6	WSW1	NW4	WNW6	NW5	NW3	WNW6	NW8	NW6	WNW4.9	W11
7-Jul	NW7	WNW7	NW8	NW9	NW9	NW8	WNW8	WNW9	WNW9	WNW8	NNW8	NW8	WNW9	M	NW10	N8	N8	N7	N7	NNW4	NNW3	NNW2	WSW1	SE1	NW6.1	NW10
8-Jul	SSW2	SSE3	S5	S6	SSE7	SSE7	SSE9	SSE11	SSE10	SSE9	SSE8	SSE8	S8	S8	S7	SSW6	S8	SSE8	SSE9	SSE8	S7	S6	SW9	SW12	S7.1	SW12
9-Jul	SW17	SW18	SW11	W6	WNW6	SW6	S6	S6	SSE8	WSW15	SW14	SW6	S4	SSW3	SSW7	SSW6	S6	SSW6	WSW4	SSE3	S4	SW4	WNW9	NW9	SW6.2	SW18
10-Jul	WNW7	WNW12	WNW14	WNW12	WNW12	WNW11	WNW10	WNW8	W7	WNW7	W7	WNW5	WNW5	WNW9	W12	W9	W10	NW13	NW15	NW13	NW11	WNW12	WNW12	WNW12	WNW9.9	NW15
11-Jul	WNW12	WNW12	NW11	WNW11	WNW10	WNW11	WNW10	WNW8	WNW8	WNW8	NW7	NW7	WNW6	W7	W7	W8	W7	WNW6	WNW7	W6	NW5	N4	NNW3	NNW2	WNW7.3	WNW12
12-Jul	NNW3	NNW5	NNW5	NNW4	NW3	WNW3	NW3	NW4	NW5	WNW7	WNW7	W9	WNW9	WNW9	WNW9	WNW8	NNW7	NNW6	NNW4	NNW2	NNW1	NNE1	NNE1	SSW1	NW4.2	WNW9
13-Jul	E3	ESE4	SSE4	SSE6	SE6	SSE6	SE7	SE11	SE10	SE8	ESE7	SE7	SSE7	SE7	SSE7	SE6	ESE7	E8	ESE7	ESE7	SE7	SSE7	SSE8	SSE9	SE6.5	SE11
14-Jul	SSE11	S10	SSE10	SSE12	SSE11	SSE6	SSE3	SSE5	S4	SW5	SSW7	SSE10	S11	SW9	SSW8	SW9	S10	SSW9	SSW8	SSW7	SSW5	SSW5	SW6	SW7	S7.3	SSE12
15-Jul	WSW7	WSW5	SW6	SSE3	SSW5	SSW5	S5	S6	S7	SSE8	S8	SSE9	SSE8	SW6	W7	WNW6	WSW6	SW8	SW9	SW6	SSW5	S6	SSW4	SW9	SSW5.2	SSE9
16-Jul	SW7	WSW6	W8	WNW7	NW7	WNW7	WNW7	WNW7	WNW6	NW4	N7	N6	NNW7	NNW11	NNW6	W6	WNW8	NW8	NW7	WNW6	WSW6	WSW6	W6	WNW7	WNW5.8	NNW11
17-Jul	WNW7	WNW8	WNW7	NW5	NW3	NNW3	N6	NNE5	NE5	ENE3	S5	SW6	SW4	W4	W5	NNW4	NNE6	N6	NW1	W7	WNW8	W9	WNW8	WNW12	NW3.7	WNW12
18-Jul	WNW11	WNW11	WNW8	NW8	NW8	NW7	NW5	NNE3	NE6	NE6	ENE5	NE1	NNW1	SSW5	W7	W5	SSW6	SSW13	SSW7	SSE3	SSE6	SW5	E1	SW5	W2.6	SSW13
19-Jul	WNW3	SSE4	S7	S6	SSE8	SSE8	S7	SW8	WSW9	W10	W8	WSW12	WSW13	WNW11	WNW13	WNW11	NW14	WNW12	NW12	NW8	NNW10	NW9	NW8	NW8	W5.9	WNW14
20-Jul	NW6	NW7	WNW8	WNW8	WNW9	WNW11	WNW9	WNW9	WNW9	WNW9	WNW9	WNW8	NW6	NW6	W7	NNW6	WNW6	NNW5	N5	NNE3	NE2	S1	AF	SSW2	WNW5.9	WNW11
21-Jul	ENE3	SW2	SSE1	N0	NNE1	S1	SW2	NE3	NE2	ESE5	ENE6	SSE5	SSW2	NNW3	NNE4	N2	WNW6	WNW4	SSW1	NNW3	E1	SSE1	S3	SSW2	ENE0.4	WNW6
22-Jul	SE2	SSE5	SSW4	S2	S3	S2	S2	S3	SE3	SE7	SE7	SE8	S9	SSE8	SE7	SSE8	SSE9	SSE8	SSE7	SE5	SE8	SSE7	SSE6	SSE5	SSE5.3	SSE9
23-Jul	SSE5	SSE6	SSE7	SSE6	SE8	ESE8	SE9	ESE7	SE9	SE8	SE10	ESE12	SE11	SE9	NE7	ENE10	ESE13	ENE3	NE5	ENE8	ESE7	SE9	SSE10	SSE8	ESE6.9	ESE13
24-Jul	SSE8	SSE12	SE9	ESE6	ESE6	SE8	ESE6	ESE7	ESE7	SE8	SE7	ESE10	ESE10	E11	ESE9	SE12	SE12	SE9	ESE5	E8	ESE9	ESE7	E6	E6	ESE7.7	SE12
25-Jul	E7	ENE7	ENE7	NE5	NNE6	NE6	ENE8	ENE8	ENE8	E6	E11	ENE7	NE8	NE8	ENE8	E4	ESE5	E3	ENE3	ENE3	NW1	NNE2	NE2	ENE2	ENE5.3	E11
26-Jul	ENE5	S1	ESE1	SE3	ESE1	E4	E5	SE5	SE5	ESE6	SE8	SE7	SSE9	SSE7	SSE8	WSW4	WNW7	W6	W5	WNW4	SW5	WNW3	SW4	S3	SSE2.3	SSE9
27-Jul	SW4	WSW4	W4	WSW2	SW3	SE3	S4	S3	SSW3	WNW5	W7	SW7	SW5	SE7	S10	SSW8	S11	MS	MS	MS	SSE6	SSE6	S5	SSW5	SSW3.9	S11
28-Jul	SSW4	SE3	SSE5	SSE5	S6	S4	S3	S4	SSE5	SSE5	ESE2	W1	WNW5	WNW2	NW6	WNW6	WNW3	WNW4	W2	WSW2	SE1	S3	S4	SW4	SSW1.9	WNW6
29-Jul	SW4	SW4	SSW5	S3	SSE2	ENE2	N2	WNW1	ENE4	ESE6	SE7	SE9	S6	SSW9	S9	S8	S9	SSE9	SSE9	SE8	SSE9	SSE10	SSE8	SE9	SSE5.3	SSE10
30-Jul	SE9	SSE8	SSE5	ESE3	SE3	SSE3	SE5	ESE6	SE7	SSE7	SE10	S11	SSE10	SSE10	SSE9	ESE5	SSE8	SSE10	SSE10	SSE6	S6	N12	NE8	S6	SSE5.8	N12
31-Jul	SSE8	SSE13	S7	S5	SE1	ESE4	S2	SW3	WSW5	W4	WNW3	WNW6	NW6	N8	N7	NNE5	N9	N13	N8	N3	E4	NNW8	NNW7	NNW6	NNW1.8	N13

SW2.6 SW3.1 SW2.7	WSW1.8	WSW1.8	SW1.4	SSW1.3	SSW1.5	S1.9	SSW2.1	S1.9	SSW2.5	SW2.7	SW2.0	WSW2.1	WSW1.5	SSW2.2	SW2.2	SW1.8	SW1.0	S1.7	SW1.4	SW1.8	WSW2.5	Diurnal Average		
SW17	SW18	WNW14	WNW12	WNW12	WNW11	W12	W12	SE14	WSW15	SE14	WNW13	W14	W13	W13	ESE14	WSW16	SSE17	WSW16	WSW14	NW11	WNW12	WNW12	SW12	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Anzac - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Jul 30 22:00	Hours in Service: 744 Hours of Data: 722 Hours of Missing Data: 22 Hours of Calibration: 0 Percent Operational Time: 97.0
Minimum Value: 1 km/h on Jul 22 04:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7	

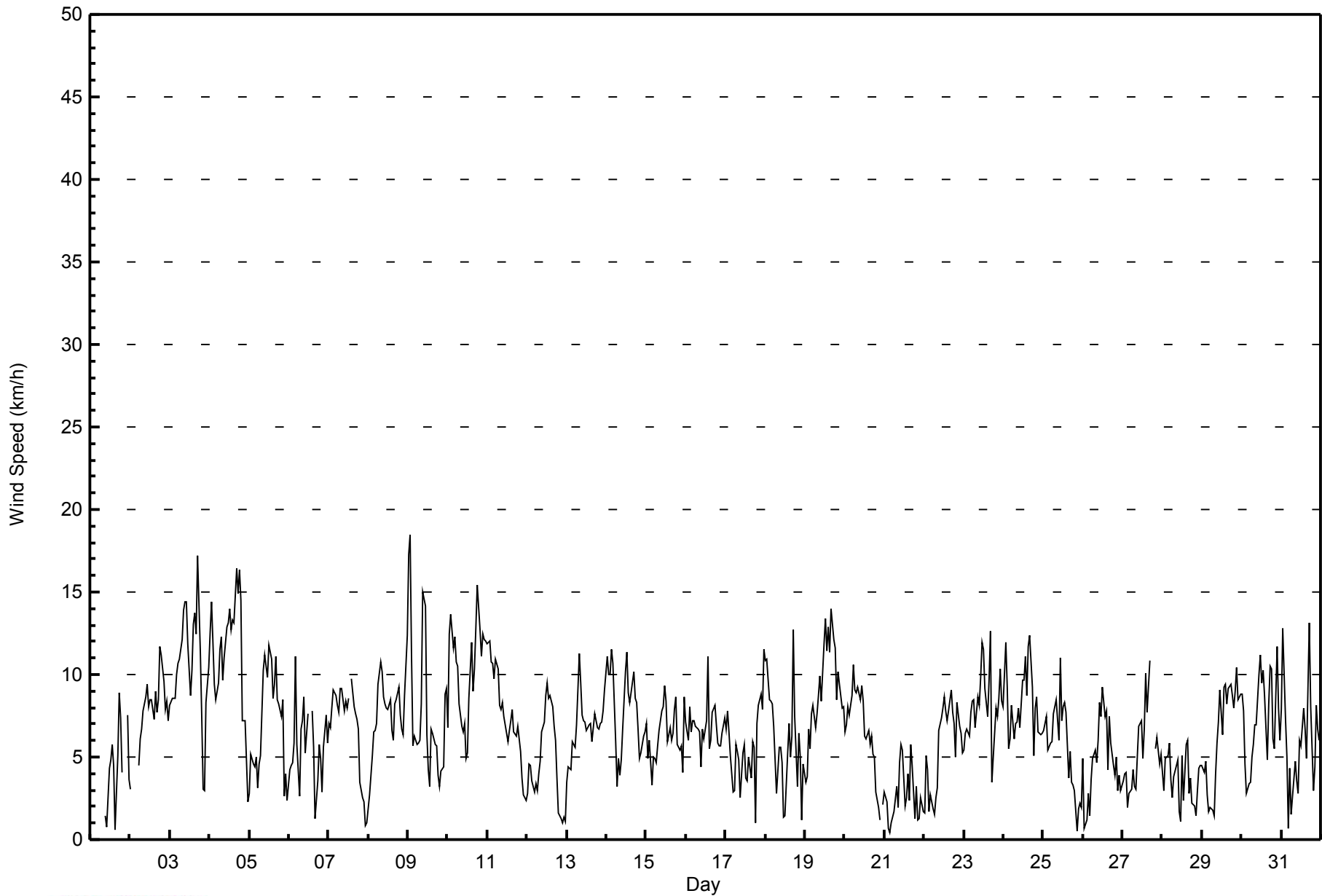
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	3	3	4	3	3	2	4	5	3	3	AF	AF	2	3	5
2-Jul	3	AF	AF	AF	AF	3	2	3	3	3	3	4	4	4	4	4	3	4	4	4	4	2	2	2	4
3-Jul	2	2	2	2	3	3	3	4	4	5	5	5	3	4	5	5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

M - Maintenance AF - Analyzer Failure MS - Missing



WBEA NETWORK
Hourly Averages

Wind Speed (WS) - km/h
Anzac - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Anzac - July 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	241	33.38	33.38
6 - 11	420	58.17	91.55
12 - 19	61	8.45	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: 722

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Wind Speed (WS) - km/h
Anzac - July 2014

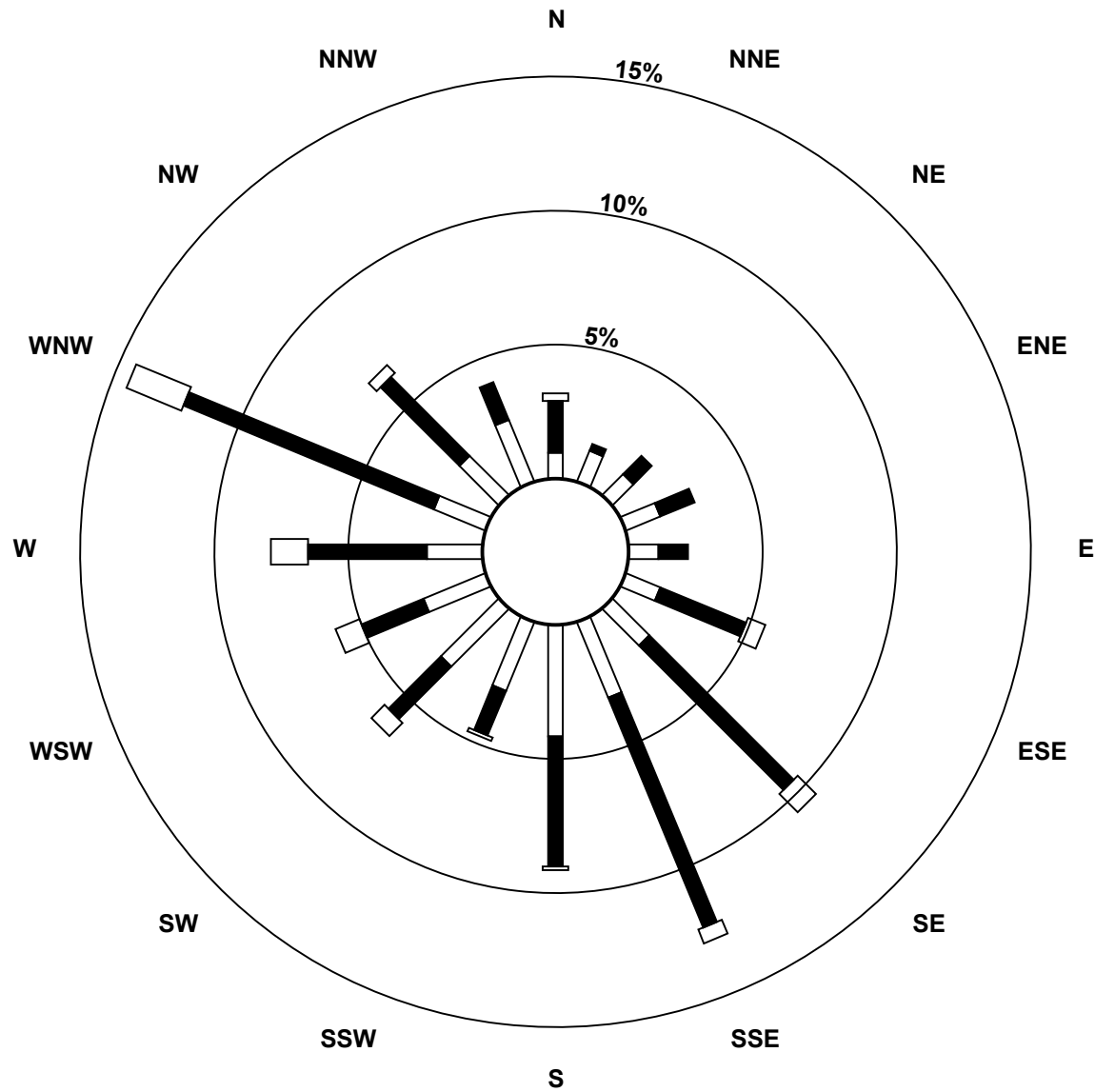
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	7	9	8	10	8	10	14	22	30	20	22	18	15	15	15	18	241
6 - 11	14	2	7	10	8	25	55	67	35	13	20	18	32	73	30	11	420
12 - 19	2	0	0	0	0	5	7	4	1	1	5	7	10	16	3	0	61
20 - 28	0	0	0	0	0	0	0	0	0	0	0	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	23	11	15	20	16	40	76	93	66	34	47	43	57	104	48	29	722

Total Number of Valid Hours: 722

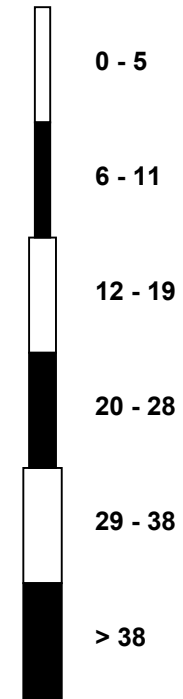
Total Number of Hours: 744

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

**Wind Speed (WS) - km/h
Anzac (AMS 14)**



Classes (km/h)



Total Number of Valid Hours: 722



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Anzac - July 2014

Direction of Maximum Speed: 226 deg on Jul 9 02:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 267.2 deg on Jul 4	Hours of Data: 722
Direction of Minimum Speed: 351 deg on Jul 21 04:00	Direction of Minimum Daily Speed Average: 0.4 deg on Jul 21
Direction of Minimum Daily Speed Average: 0.4 deg on Jul 21	Hours of Missing Data: 22
Monthly Average Direction: 256.0 deg	Percent Operational Time: 97.0

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-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	245	194	279	273	255	273	321	354	232	178	154	AF	AF	161	177	--
2-Jul	186	AF	AF	AF	AF	131	152	155	138	129	133	135	124	135	134	115	118	130	108	117	112	126	138	138	129.3
3-Jul	135	134	143	142	134	139	137	134	138	142	145	171	171	114	120	114	142	168	172	178	185	257	240	279	148.9
4-Jul	225	263	296	297	293	273	280	277	267	279	277	285	279	274	277	268	257	247	246	242	247	254	256	271	267.2
5-Jul	247	243	232	217	215	216	218	230	233	248	282	289	281	264	260	258	255	279	273	254	252	239	256	253	255.7
6-Jul	270	287	261	257	260	274	246	289	276	258	272	290	AF	AF	351	9	241	306	300	313	312	296	311	310	288.6
7-Jul	311	303	309	304	304	307	303	296	292	296	331	322	317	M	317	357	5	2	358	339	348	344	253	146	319.0
8-Jul	196	156	169	169	162	164	160	160	162	159	153	150	185	175	175	201	179	163	161	158	173	185	218	225	172.9
9-Jul	227	226	234	273	286	216	187	169	168	256	231	224	178	193	201	207	182	207	243	165	182	221	298	307	225.9
10-Jul	296	282	284	291	293	297	290	298	281	295	281	296	299	296	274	277	266	304	322	324	308	303	300	300	294.9
11-Jul	302	300	304	301	303	302	298	298	294	292	307	306	287	272	273	278	260	297	287	280	305	350	339	331	296.3
12-Jul	334	343	342	333	323	292	320	313	314	292	293	281	286	283	282	298	327	347	347	334	338	29	25	196	308.3
13-Jul	100	115	150	147	143	149	141	141	144	142	114	126	153	140	160	135	115	98	105	121	128	154	167	166	137.0
14-Jul	168	170	165	165	162	163	159	167	181	220	198	167	179	217	198	218	181	196	205	212	206	198	219	223	186.9
15-Jul	239	248	224	166	201	201	177	173	176	164	172	158	156	223	259	289	237	233	223	217	210	188	200	234	206.0
16-Jul	230	239	278	283	305	295	301	296	301	312	352	3	339	337	329	276	288	313	308	293	248	250	276	300	297.8
17-Jul	301	295	301	317	326	337	355	12	51	70	175	216	220	270	279	343	14	9	308	277	287	279	291	292	304.1
18-Jul	296	294	301	304	305	309	312	16	53	45	64	41	331	205	265	266	194	208	192	165	168	219	79	228	268.6
19-Jul	290	154	173	176	160	167	184	228	251	265	272	240	253	294	282	302	304	299	304	323	335	326	323	320	276.0
20-Jul	315	310	300	295	287	289	299	298	296	295	298	284	320	313	262	330	300	348	354	20	55	189	AF	208	302.1
21-Jul	69	216	149	351	17	191	227	55	38	105	67	149	197	347	27	2	302	290	211	347	81	150	177	206	56.7
22-Jul	126	168	193	183	181	181	182	181	140	136	145	142	181	151	138	147	167	160	162	140	127	147	158	161	154.9
23-Jul	162	152	155	150	142	123	128	120	127	127	126	120	137	134	56	62	110	60	42	57	105	126	164	157	122.3
24-Jul	156	154	146	104	115	129	108	118	118	143	133	117	110	97	106	138	131	124	112	99	110	103	79	86	120.2
25-Jul	83	71	61	45	33	39	57	69	77	80	100	59	52	46	63	99	111	100	64	76	305	16	40	61	66.5
26-Jul	77	177	116	130	104	97	97	126	127	112	146	145	153	157	159	256	291	265	279	284	230	282	233	182	163.7
27-Jul	221	237	260	247	225	142	174	176	207	284	281	230	215	133	177	192	174	MS	MS	MS	155	150	170	192	195.4
28-Jul	197	137	152	157	176	188	189	183	153	158	122	267	295	300	304	289	297	292	261	246	138	169	179	228	205.9
29-Jul	224	222	202	178	165	68	350	303	65	123	136	143	186	207	172	178	170	165	162	124	163	163	158	143	163.4
30-Jul	142	152	151	115	134	153	127	121	128	147	138	172	163	162	154	119	157	163	162	166	175	355	52	181	147.4
31-Jul	168	160	184	184	136	104	178	233	258	277	290	289	318	5	6	23	1	3	349	3	100	333	346	336	342.1

223.7 225.8 235.0 238.3 238.0 216.6 206.8 195.6 186.0 207.4 189.6 200.3 215.0 216.3 236.6 245.8 213.7 234.3 232.8 216.3 186.7 227.8 227.2 237.9
 Diurnal Average

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



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 101 deg on Jul 28 11:00	Hours of Data: 722
Minimum Value: 10 deg on Jul 2 01:00	Hours of Missing Data: 22
Percentiles: P ₁ = 13 P ₁₀ = 18 Q ₁ = 23 Median = 30 Q ₃ = 38 P ₉₀ = 54 P ₉₉ = 85	Hours of Calibration: 0
	Percent Operational Time: 97.0

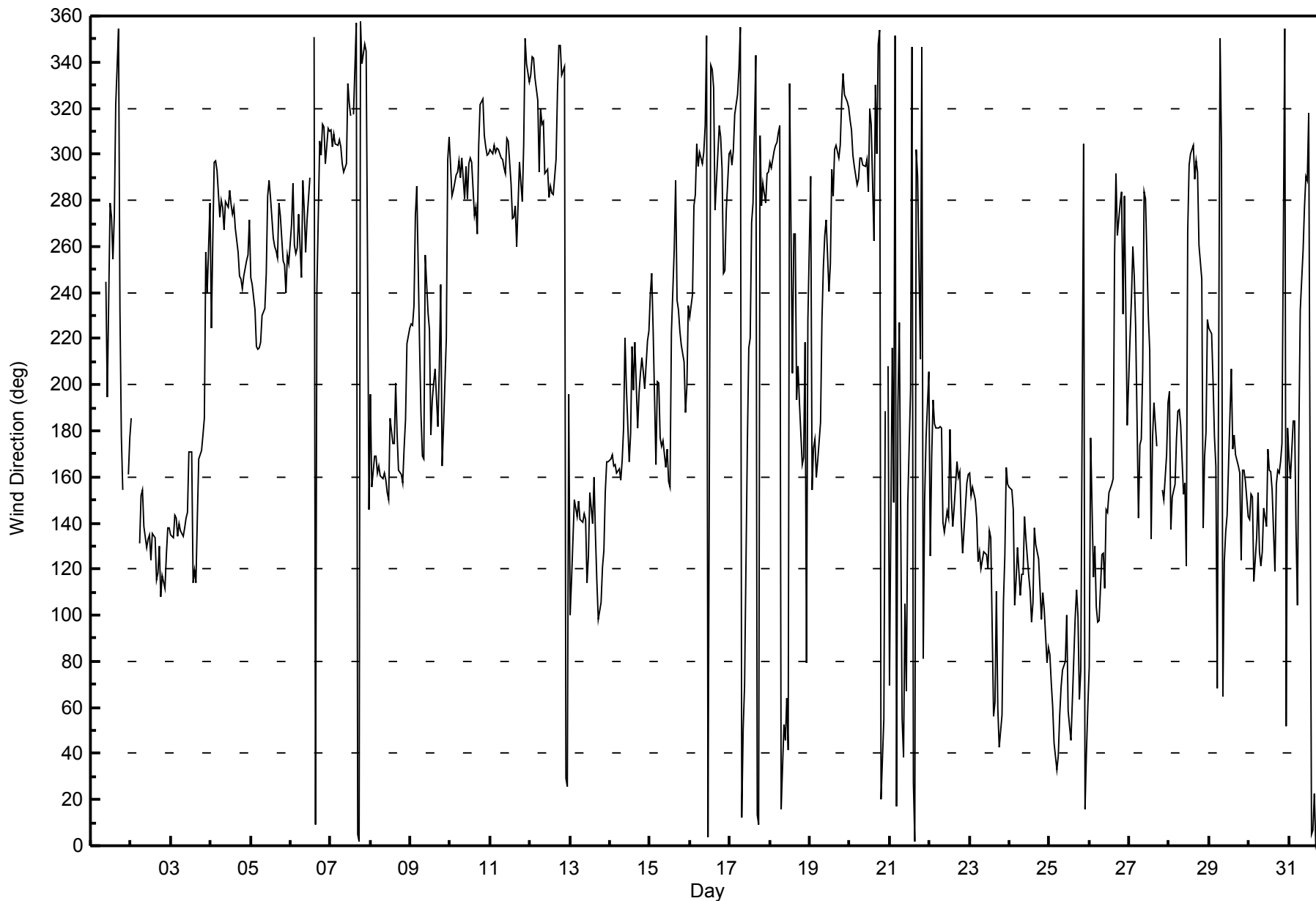
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	34	94	37	44	34	41	45	25	38	26	47	AF	AF	15	16	94
2-Jul	10	AF	AF	AF	AF	16	19	24	29	28	33	40	37	39	41	30	40	31	28	24	25	20	18	16	41
3-Jul	17	17	17	18	18	19	21	22	20	25	23	35	39	26	25	25	33	24	22	23	20	22	21	32	39
4-Jul	39	32	29	31	33	25	30	30	33	33	33	34	36	34	34	34	32	29	27	24	23	23	18	33	39
5-Jul	14	11	25	12	13	11	17	15	21	34	31	34	30	36	40	31	31	32	26	23	23	19	19	13	40
6-Jul	31	20	20	21	26	25	30	25	28	29	33	30	AF	AF	25	37	72	21	28	21	17	26	23	23	72
7-Jul	24	25	24	27	26	26	26	27	28	31	29	27	31	M	29	42	27	24	24	27	22	66	68	83	83
8-Jul	51	28	15	15	14	15	16	16	20	21	28	43	48	38	56	60	30	25	21	20	16	20	15	14	60
9-Jul	16	16	30	57	31	23	23	28	31	33	29	49	58	72	30	32	24	26	25	20	23	34	29	28	72
10-Jul	30	34	32	35	31	35	35	35	44	44	37	41	48	32	36	40	36	33	25	25	30	28	30	28	48
11-Jul	29	27	29	28	29	28	32	34	32	35	30	31	42	47	41	35	45	42	44	25	30	18	20	20	47
12-Jul	18	15	18	22	25	25	26	27	33	31	37	38	37	42	41	38	36	32	26	30	24	58	43	79	79
13-Jul	23	27	21	18	15	16	24	25	31	46	46	60	54	53	43	71	48	31	28	17	14	16	14	17	71
14-Jul	16	16	16	16	18	20	34	33	64	54	39	34	34	42	44	37	36	33	28	24	18	21	19	22	64
15-Jul	21	21	35	31	22	37	30	25	27	28	33	35	35	56	45	35	45	22	14	19	21	26	46	21	56
16-Jul	17	18	29	33	30	28	28	27	32	39	30	37	37	24	47	40	37	30	28	32	21	15	25	27	47
17-Jul	27	25	27	21	26	27	27	39	50	67	44	43	74	74	52	66	25	22	64	31	27	26	28	28	74
18-Jul	30	30	30	26	27	26	34	74	41	47	69	97	89	55	40	48	37	29	66	50	21	62	83	22	97
19-Jul	68	20	23	24	18	19	30	25	29	35	51	29	33	32	38	33	30	33	29	26	24	23	23	24	68
20-Jul	23	24	27	29	30	33	31	27	30	33	35	41	39	43	52	38	48	35	28	28	24	55	AF	48	55
21-Jul	22	31	82	73	54	63	48	42	77	53	52	62	95	82	59	85	35	37	81	35	79	60	17	64	95
22-Jul	54	12	20	41	31	36	59	45	37	33	36	42	38	51	52	49	41	36	26	21	20	17	14	14	59
23-Jul	16	15	14	14	19	16	20	25	20	24	26	24	25	26	25	36	29	72	55	18	34	30	20	20	72
24-Jul	19	19	17	35	27	19	26	23	27	23	30	27	32	27	33	24	27	25	27	30	28	26	21	22	35
25-Jul	33	20	21	24	25	27	24	26	25	44	31	33	30	32	32	44	27	37	24	24	74	40	28	15	74
26-Jul	15	69	48	38	70	20	32	35	41	50	37	44	38	51	46	81	41	33	53	31	28	24	28	23	81
27-Jul	25	17	13	66	35	32	21	26	41	45	30	28	32	31	33	33	27	MS	MS	MS	18	22	36	17	66
28-Jul	41	32	17	21	18	17	34	28	43	50	101	93	50	73	37	27	75	32	42	35	39	16	15	15	101
29-Jul	27	33	23	53	67	61	65	84	41	39	37	47	46	33	25	32	30	23	20	31	19	18	18	17	84
30-Jul	17	15	25	26	25	20	17	22	28	33	35	28	37	33	31	52	35	23	19	23	19	83	43	32	83
31-Jul	32	17	43	77	94	35	74	38	37	65	85	44	53	35	40	38	25	25	29	58	54	27	23	21	94
68 69 82 77 94 63 74 84 77 67 101 97 95 82 59 85 75 72 81 58 79 83 83 83																									
Diurnal Maximum																									

M - Maintenance AF - Analyzer Failure MS - Missing



WBEA NETWORK
Hourly Averages

Wind Direction (WD) - deg
Anzac - July 2014





Summary of Hour Averages

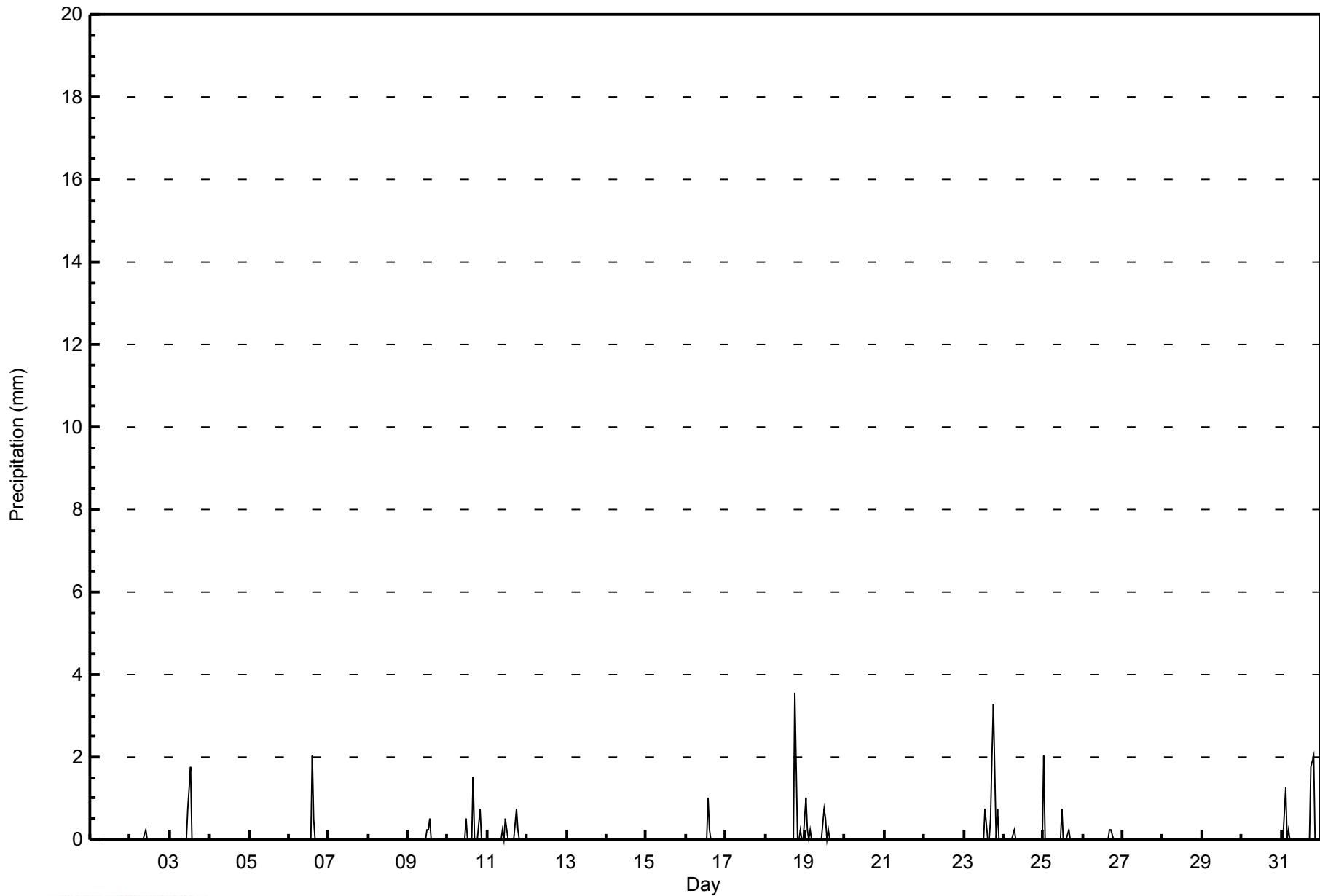
Anzac - July 2014

Maximum Value: 3.6 mm on Jul 18 19:00		Maximum Daily Total: 7.4 mm on Jul 23		Hours in Service: 744																																		
Minimum Value: 0.0 mm on Jul 1 01:00		Minimum Daily Total: 0.0 mm on Jul 1		Hours of Data: 741																																		
Maximum Diurnal Total: 8.9 mm at hour 19		Minimum Diurnal Total: 0.0 mm at hour 6		Hours of Missing Data: 3																																		
Monthly Total: 35.56 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 = 1.5		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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
3-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1.8
4-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	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	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.0	
7-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	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	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	
10-Jul	0.0	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	1.5	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	1.5		
11-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.8		
12-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.0		
17-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	3.6		
19-Jul	1.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.0			
20-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.5	2.0	3.3	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4	3.3			
24-Jul	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	0.0	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
25-Jul	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.3	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	3.0	2.0	0.0	0.0	0.0	0.0
26-Jul	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.0	0.0	0.0	0.0
27-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MS	MS	MS	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31-Jul	0.0	0.0	1.3	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	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	2.0	0.0	0.0	0.0	0.0	
		3.0	0.3	1.3	0.3	0.3	0.0	0.3	0.0	0.0	0.5	0.0	3.6	2.5	2.3	2.5	2.3	0.8	3.0	8.9	2.8	0.8	0.3	0.0	0.0							Diurnal Average						
		2.0	0.3	1.3	0.3	0.3	0.0	0.3	0.0	0.0	0.3	0.0	0.8	1.8	1.0	2.0	1.5	0.5	2.0	3.6	2.0	0.8	0.3	0.0	0.0							Diurnal Maximum						
MS - Missing																																						



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Anzac - July 2014





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 10, 2014	Previous Calibration	June 17, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	13:50
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Cal Gas Concentration	51 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL107928		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2372
DACS voltage range	NA	DACS channel #	NA

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-596	-596
Analyzer Range (mv)	5000	5000	Lamp voltage	802	800
Calculated slope	0.985611	0.996418	Chamber temp.	44.1	44.1
Calculated intercept	0.555671	0.603664	Pressure (mmHg)	686.2	685.7
Analyzer Background	12.9	12.7	Flow (lpm)	0.390	0.391
Analyzer Coefficient	0.945	0.931	Intensity	30000	30000

Analyzer make TEI 43C Analyzer serial # 613516095

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	NA
as found span	5000	78.3	798.7	811.9	0.984
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	78.3	798.7	801.8	0.996
second point	5000	39.1	398.8	397.8	1.003
third point	5000	19.6	199.9	200.2	0.999
calibrator zero	5000	0.0	0.0	0.2	NA
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	78.3	798.7	801.2	0.997
Average Correction Factor					0.999

Corrected As found 811.7 Previous response 809.8 % change -0.2%

Notes:

Adjusted span

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

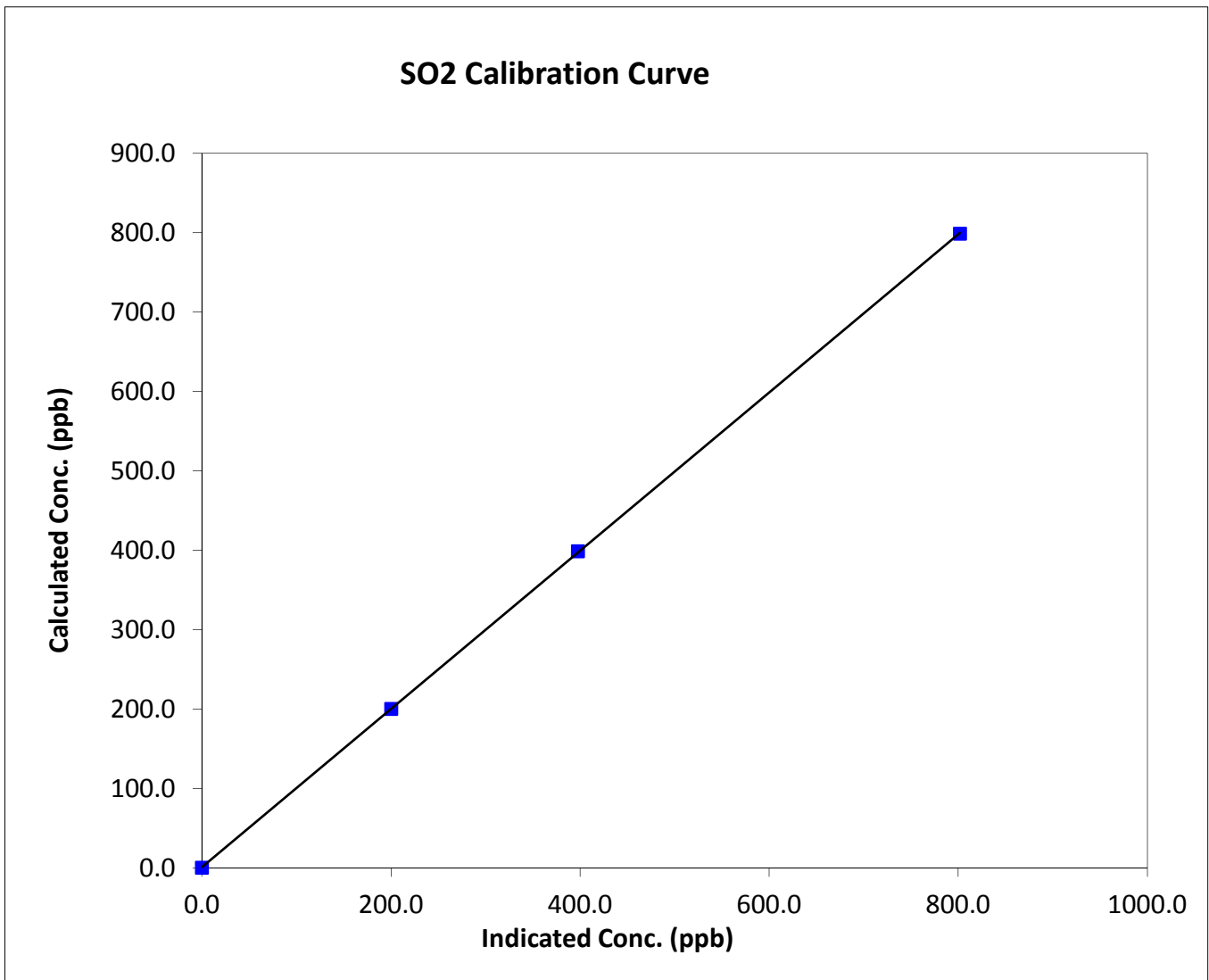
SO₂ Calibration Summary

Station Information

Calibration Date	July 10, 2014	Previous Calibration	June 17, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:50
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	0.2	N/A	Correlation Coefficient	0.999986
798.7	801.8	0.9961		
398.8	397.8	1.0026	Slope	0.996418
199.9	200.2	0.9986		
			Intercept	0.603664







Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	July 16, 2014	Previous Calibration	June 17, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:12	End Time (MST)	11:42
Barometric Pressure	732 mmHg	Station temp.	22
Calibrator Make/Model	Sabio 4010	Serial number	8400311
Cal Gas Concentration	9.6 ppm H2S	Cal Gas Expiry Date	2/22/2016
Gas Cert Reference	LL82745	SO2 gas conc.	51.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2372
DACS voltage range	0-5 volts	DACS channel #	2

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-730	-730
Analyzer Range (input)	5000	5000	Lamp voltage	947	979
Calculated slope	1.011508	0.995985	Chamber temp.	45	45
Calculated intercept	0.238089	0.095130	Pressure	655.6	655.6
Analyzer Background	2.1	2.05	Flow	0.396	0.396
Analyzer Coefficient	1.157	1.134	Intensity	91	99
			Converter temp.	800	800

Analyzer make/model	43i-TL	Analyzer serial #	1300156232
Converter make/model	CDN-101	Converter serial #	510

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	NA
as found span	5000	39.1	75.1	71.0	1.057
SO2 scrubber check	5000	39.1	398.8	0.5	NA
calibrator zero	5000	0.0	0.0	-0.4	NA
high point	5000	39.1	75.1	75.0	1.000
second point	5000	20.8	39.9	40.4	0.989
third point	5000	10.4	20.0	20.1	0.992
calibrator zero	5000	0.0	0.0	-0.3	NA
as left zero	5000	0.0	0.0	-0.3	NA
as left span	5000	39.1	75.1	75.4	0.996
Average Correction Factor					0.994

Corrected As found	71.4	Previous response	74.0	% change	3.6%
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Notes:

Flash lamp Voltage Adjustment was done, Span adjusted, Filter changed out, Scrubber checked before calibrator zero

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

TRS Calibration Summary

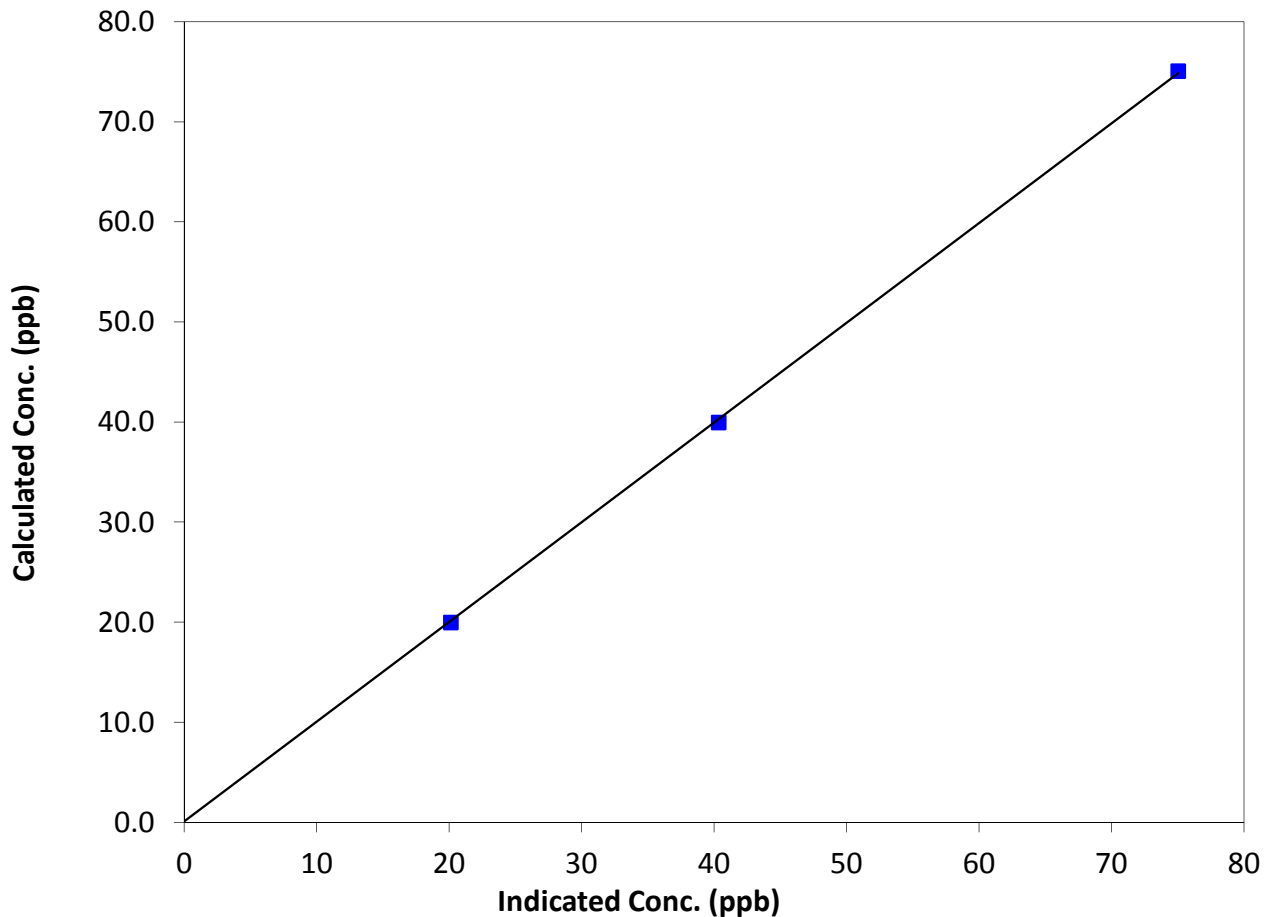
Station Information

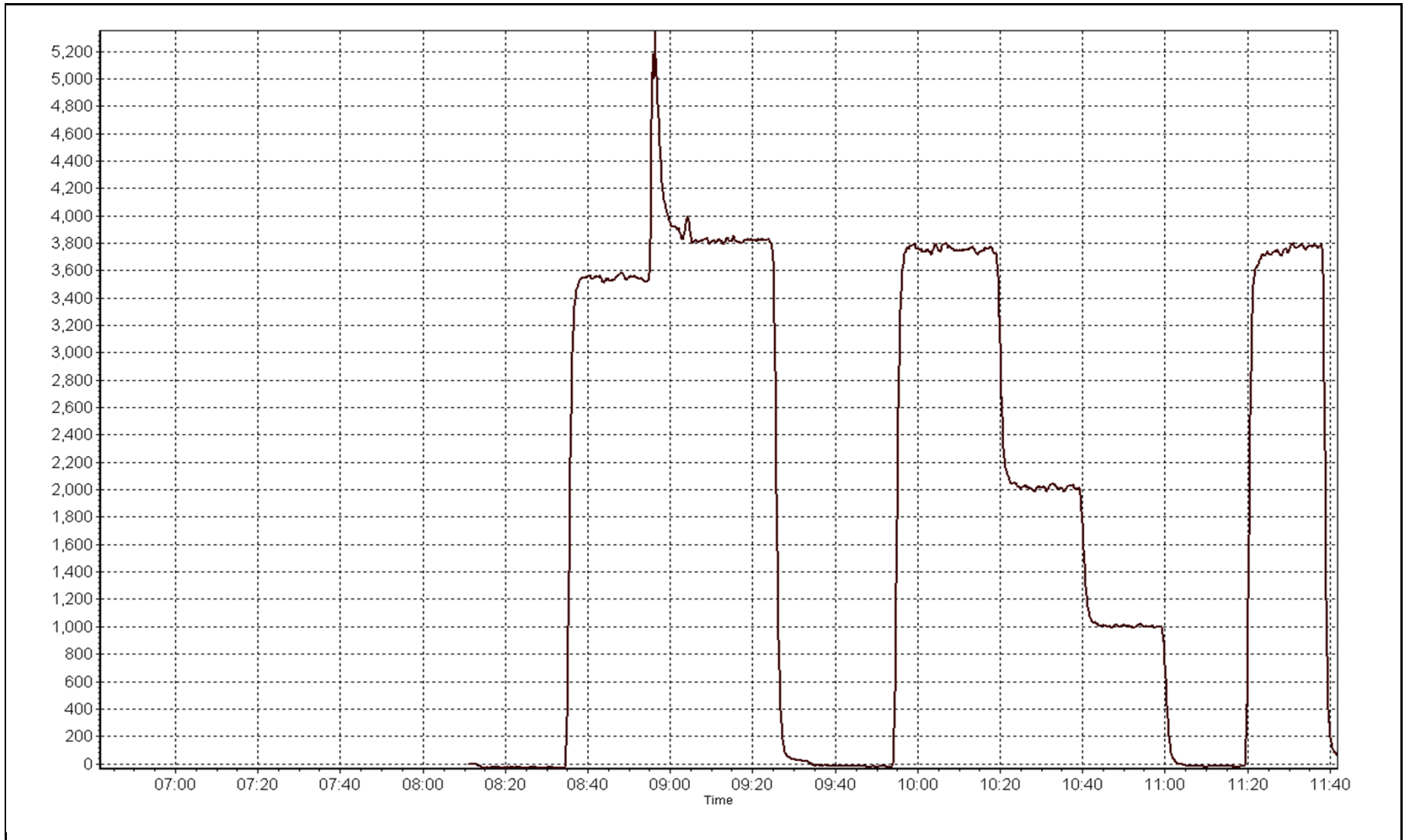
Calibration Date	July 16, 2014	Previous Calibration	June 17, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:12	End Time (MST)	11:42
Analyzer make	43i-TL	Analyzer serial #	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999905
75.1	75.0	1.0004		
39.9	40.4	0.9895	Slope	0.995985
20.0	20.1	0.9924		
			Intercept	0.095130

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

Station Information

Calibration Date	Thursday, July 10, 2014	Prev Calibration	Thursday, June 05, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	13:50
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
Gas Cert Reference	LL107928	Cal Gas Expiry Date	Thursday, May 29, 2014
CH4 Cal Gas Conc.	505.0 ppm	CH4 Equiv Conc.	1066.0 ppm
C3H8 Cal Gas Conc.	204.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2372

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	31.1	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	0.999436	1.009796	Air Pressure	32.5	32.5
THC Calc intercept	0.016215	0.016420			
NMHC Calc slope	1.001757	1.013385			
NMHC Calc intercept	-0.003896	-0.008014			

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	16.54	1.009
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.3	16.69	16.54	1.009
second point	5000	39.1	8.34	8.18	1.019
third point	5000	19.6	4.18	4.14	1.009
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	78.3	16.69	16.54	1.009
Average Correction Factor					1.013

Corrected As found 16.54 Previous response 16.69 % change 0.9%

Notes:

no adjustments

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	78.3	8.79	8.68	1.012
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.3	8.79	8.68	1.012
second point	5000	39.1	4.39	4.32	1.016
third point	5000	19.6	2.20	2.20	1.000
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	78.3	8.79	8.68	1.012
Average Correction Factor					1.009

Corrected As found 8.68 Previous response 8.77 % change 1.1%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	78.3	7.91	7.86	1.006
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.3	7.91	7.86	1.006
second point	5000	39.1	3.95	3.86	1.023
third point	5000	19.6	1.98	1.94	1.020
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	7.86	1.006
Average Correction Factor					

Corrected As found 7.86 Previous response 7.91 % change 0.7%



Wood Buffalo Environmental Association

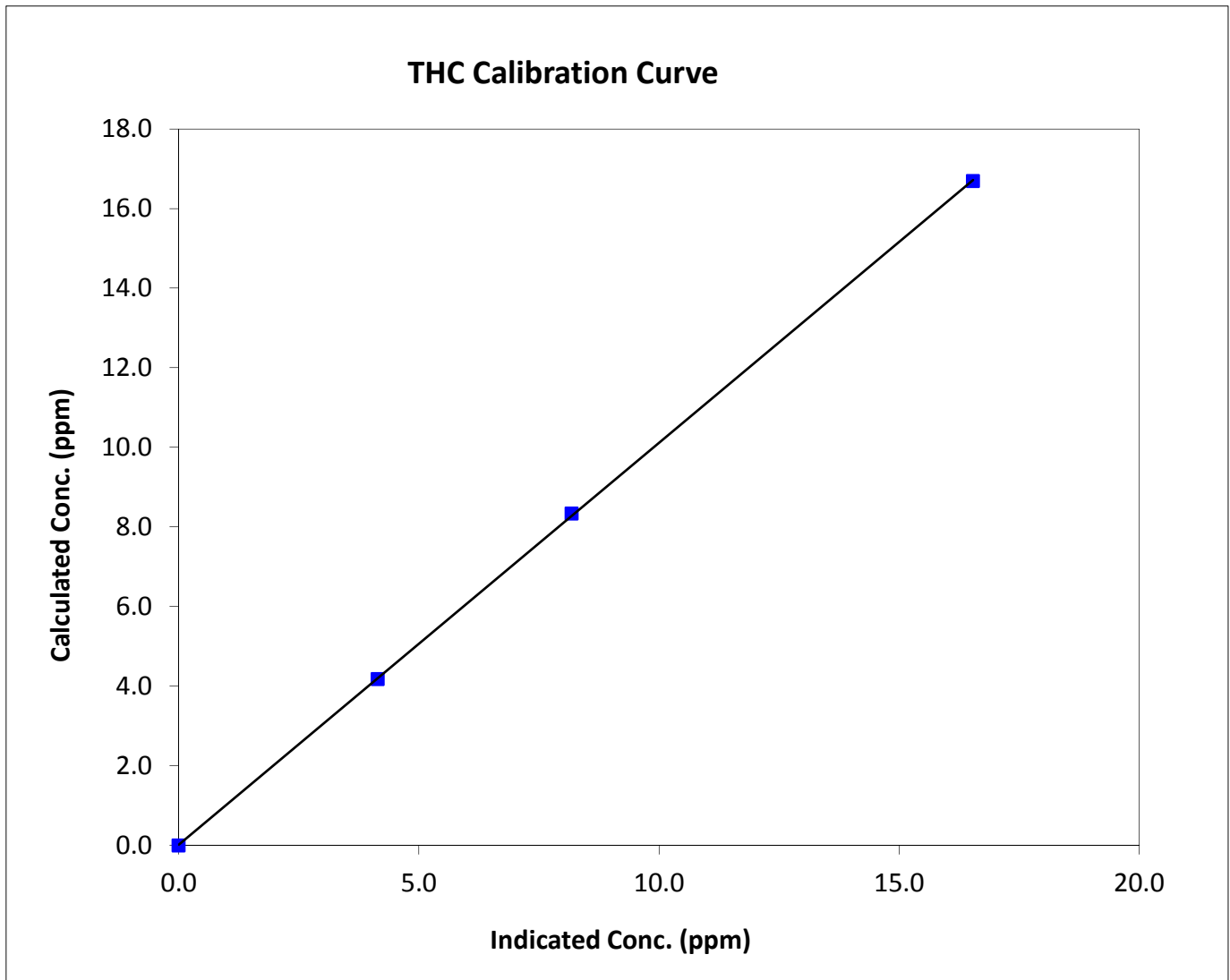
THC Calibration Summary

Station Information

Calibration Date	July 10, 2014	Previous Calibration	June 5, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:50
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	0.999969
16.69	16.54	1.0093		
8.34	8.18	1.0191	Slope	1.009796
4.18	4.14	1.0094		
			Intercept	0.016420





Wood Buffalo Environmental Association

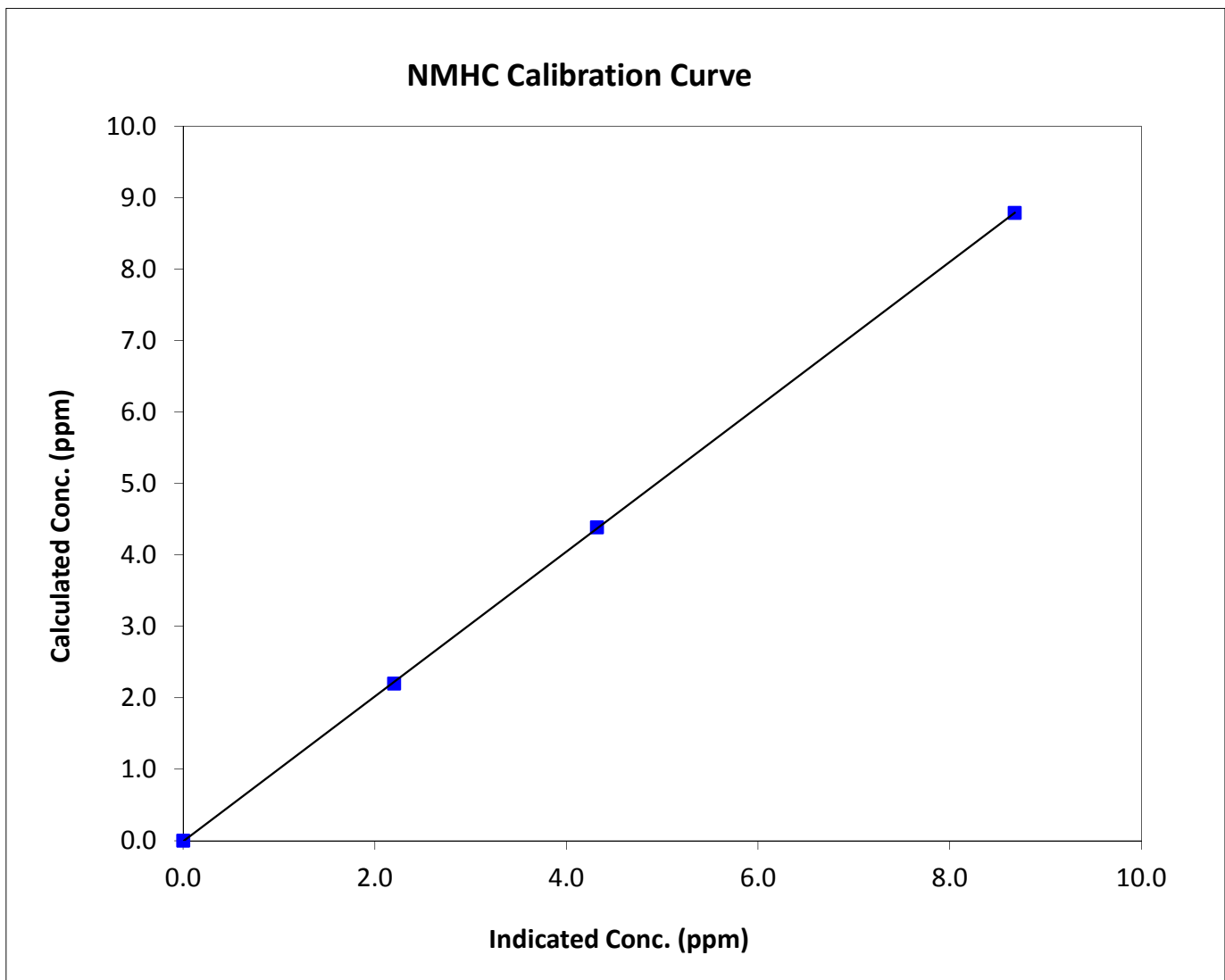
NMHC Calibration Summary

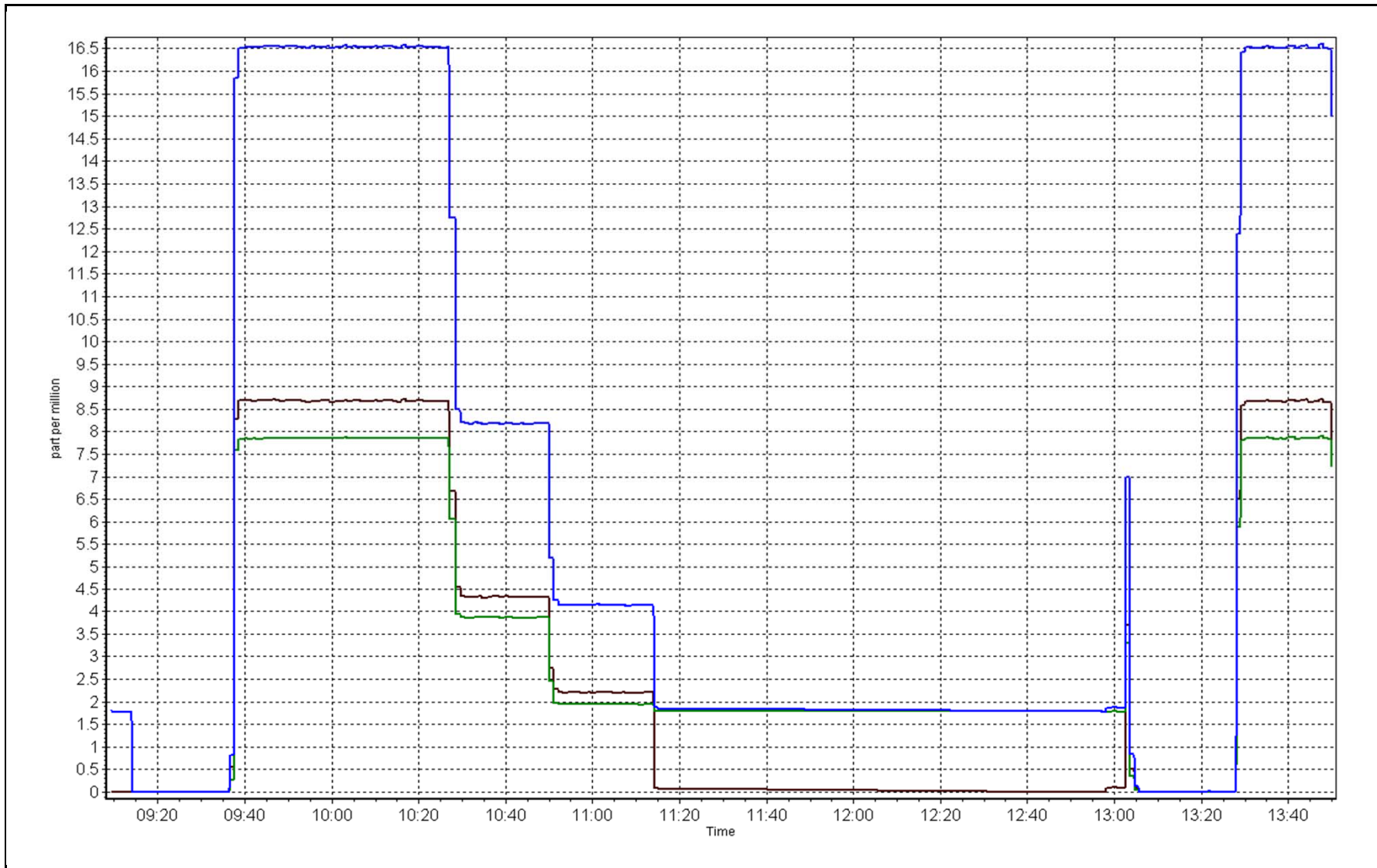
Station Information

Calibration Date	July 10, 2014	Previous Calibration	June 5, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:50
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	0.999979
8.79	8.68	1.0121		
4.39	4.32	1.0155	Slope	1.013385
2.20	2.20	0.9996		
			Intercept	-0.008014







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	July 11, 2014	Previous Calibration	June 20, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	7:25	End Time (MST)	12:10
Barometric Pressure	732 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
NO2 calibration used	Thursday, July 10, 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.	28.9	29.2
Analyzer Range (input)	5000	5000	Lamp temp.	55.7	55.8
Calculated slope	0.992960	0.986820	Pressure	714.1	712.5
Calculated intercept	-0.622283	-0.962958	Flow cell A	0.725	0.883
Analyzer Background	-3.5	0.3	Flow cell B	0.635	0.805
Analyzer Coefficient	1.039	1.039	Cell A Intensity	65092	91866
			Cell B Intensity	59655	65753

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	-1.4	N/A
as found span	5000	N/A	390.0	400.1	0.975
calibrator zero	5000	0.00	0.0	0.0	N/A
high point	5000	N/A	390.0	395.5	0.986
second point	5000	N/A	269.8	274.6	0.983
third point	5000	N/A	139.2	143.5	0.970
calibrator zero	5000	0.00	0.0	-0.1	N/A
as left zero	5000	0.00	N/A	-0.1	
as left span	5000	N/A	390.0	391.9	0.995
Average Correction Factor					0.980

Corrected As found 401.5 Previous response 393.4 % change -2.0%

Notes:

Both Cells cleaned out, Pump changed out, Zero adjusted, Filter changed out

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

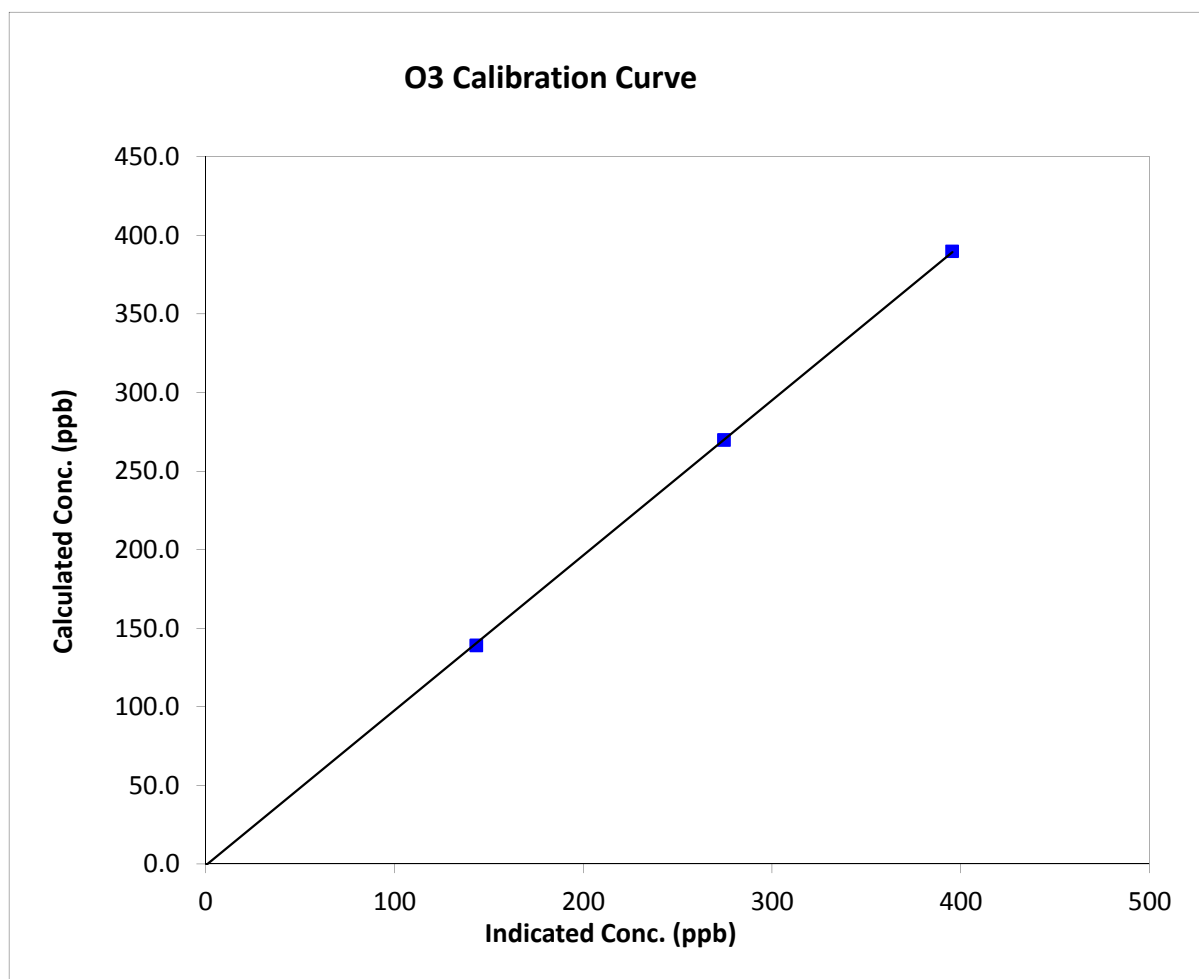
O₃ Calibration Summary

Station Information

Calibration Date	Friday, July 11, 2014	Previous Calibration	June 20, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:25	End Time (MST)	12:10
Analyzer make	49C	Analyzer serial #	509110892

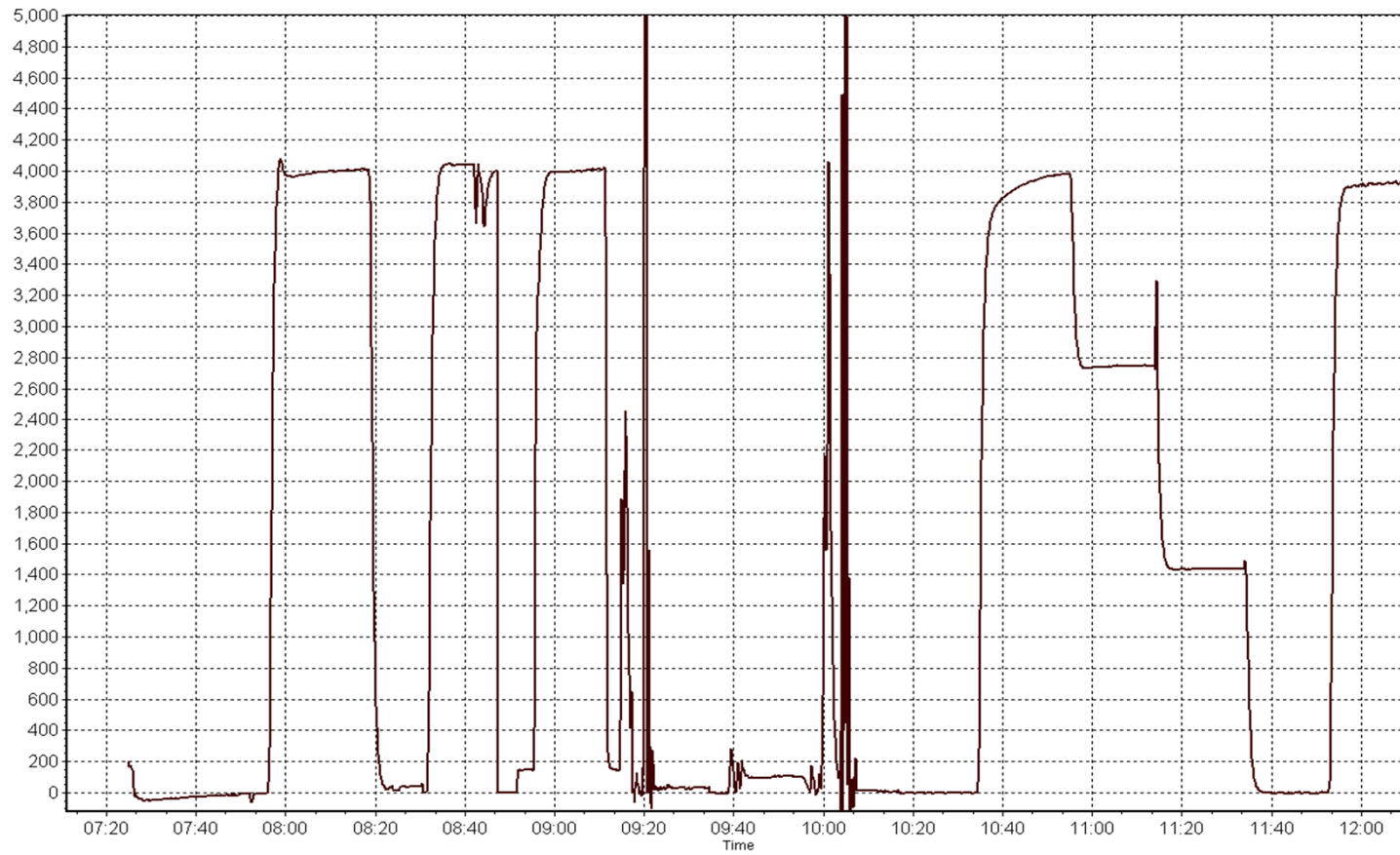
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999958
390.0	395.5	0.9861		
269.8	274.6	0.9825	Slope	0.986820
139.2	143.5	0.9700		
			Intercept	-0.962958



O3 Calibration Plot

Date: July 11, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 10, 2014	Previous Calibration	June 18, 2014
Station Name	Anzac	Station Number	AMS 14
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	9:10	End Time (MST)	13:50
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	Sabio 4010	Serial Number	8400311
NO Cal Gas Conc	51.1 ppm	Cal Gas Expiry Date	May 29, 2014
NOx Cal Gas Conc	51.2 ppm	Cal Gas Serial #	LL107928

DACS Information

DACS make & model Campbell Scientific CR3000 DACS serial No. _____

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	1.002685	1.001707	1.005988
	Data Offset	1.862837	2.186887	0.487607
After	Data Slope	0.997449	0.997684	1.007691
	Data Offset	0.300003	0.380471	-0.183870
Channel #		6	5	4
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model 42C Analyzer serial # 509110890

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	1.114	ppb	1.052	ppb
NOx coefficient	0.999	ppb	0.999	ppb
NO2 coefficient	1.002	ppb	1.002	ppb
NO bkgrnd	13.8		13.0	
NOx bkgrnd	13.9		13.1	
Nt coefficient	n/a		n/a	
Chamber Temp	49.3	Deg C	49.5	Deg C
Moly Temp	318.0	Deg C	317.0	Deg C
PMT Temp	-2.6	Deg C	-2.7	Deg C
O3 flow	Ok	ccm	Ok	ccm
R Cell Press	212.2	mmHg	212.6	mmHg
Sample Flow	0.524	ccm	0.531	ccm

Notes:

Adjusted span.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

July 10, 2014

Station Number:

AMS 14

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	1.1	1.0	0.0	N/A	N/A
as found span	5000	78.3	801.8	800.2	1.6	848.5	846.5	0.9	0.9449	0.9453
calibrator zero	5000	0.0	0.0	0.0	0.0	1.1	1.0	0.0	N/A	N/A
high point	5000	78.3	801.8	800.2	1.6	805.4	803.6	0.9	0.9955	0.9958
second point	5000	39.1	400.4	399.6	0.8	398.2	397.2	0.5	1.0055	1.0060
third point	5000	19.6	200.7	200.3	0.4	199.2	198.6	0.4	1.0076	1.0086
calibrator zero	5000	0.0	0.0	0.0	0.0	1.1	1.0	0.0	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	1.1	1.0	0.0	N/A	N/A
as left span	5000	78.3	801.8	409.8	392.0	806.0	415.4	390.0	0.9948	0.9865
Average Correction Factor									1.0029	1.0035

Corrected As found

NO_x= 847.5

NO= 845.5

Percent Change

NO_x= -5.9%

NO= -5.8%

Previous Response

NO_x= 797.8

NO= 796.7

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	409.8	390.0	798.6	409.8	387.8	0.9885	1.0000	1.0057	99.4%
2nd NO ₂ (200)	N/A	530.0	269.8	797.4	530.0	266.6	0.9900	1.0000	1.0120	98.8%
3rd NO ₂ (100)	N/A	660.6	139.2	800.6	660.6	139.2	0.9860	1.0000	1.0000	100.0%
4th NO ₂ (0)	799.8	N/A	0.4	800.2	799.8	-0.6	0.9865	1.0000	N/A	N/A
Average Correction Factor							0.9878	1.0000	1.0059	99.4%

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

NO_x Calibration Summary

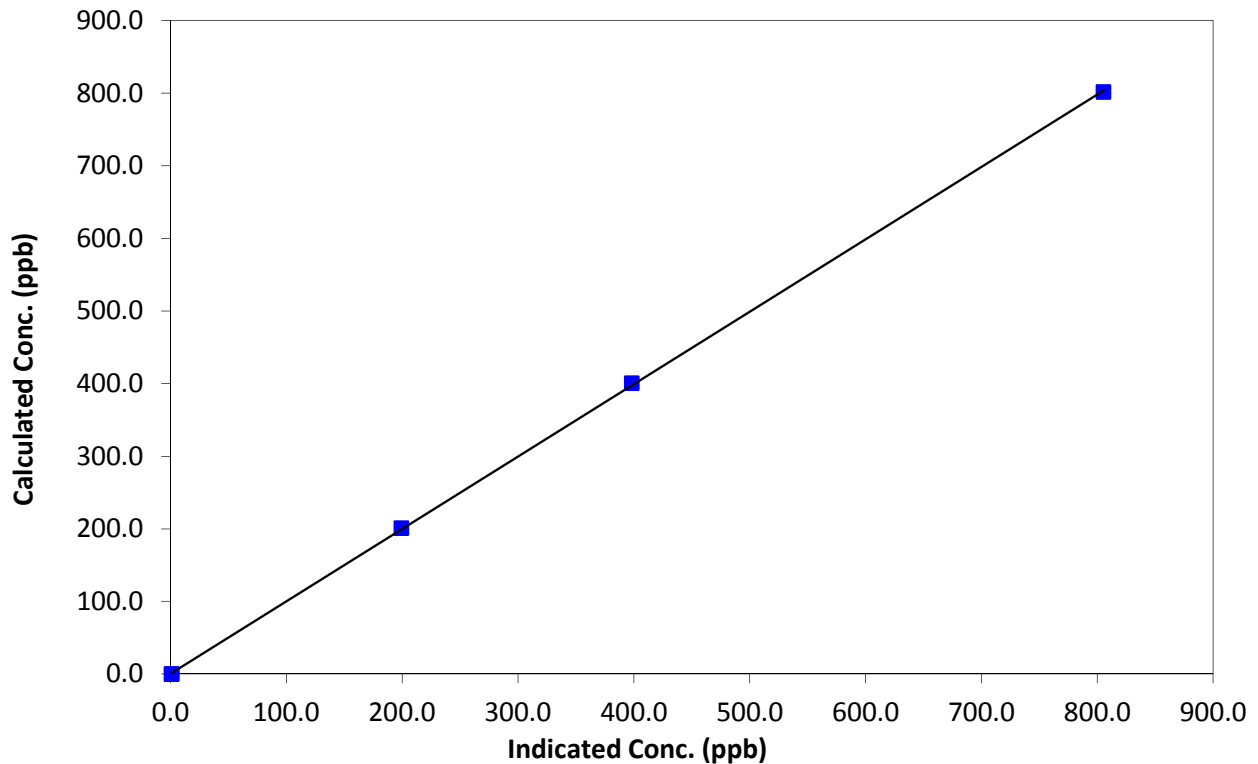
Station Information

Calibration Date	July 10, 2014	Previous Calibration	June 18, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:50
Analyzer make	42C	Analyzer serial #	509110890

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.1	N/A	Correlation Coefficient	0.999959
801.8	805.4	0.9955		
400.4	398.2	1.0055	Slope	0.997449
200.7	199.2	1.0076		
0.0	1.1	0.0000	Intercept	0.300003

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

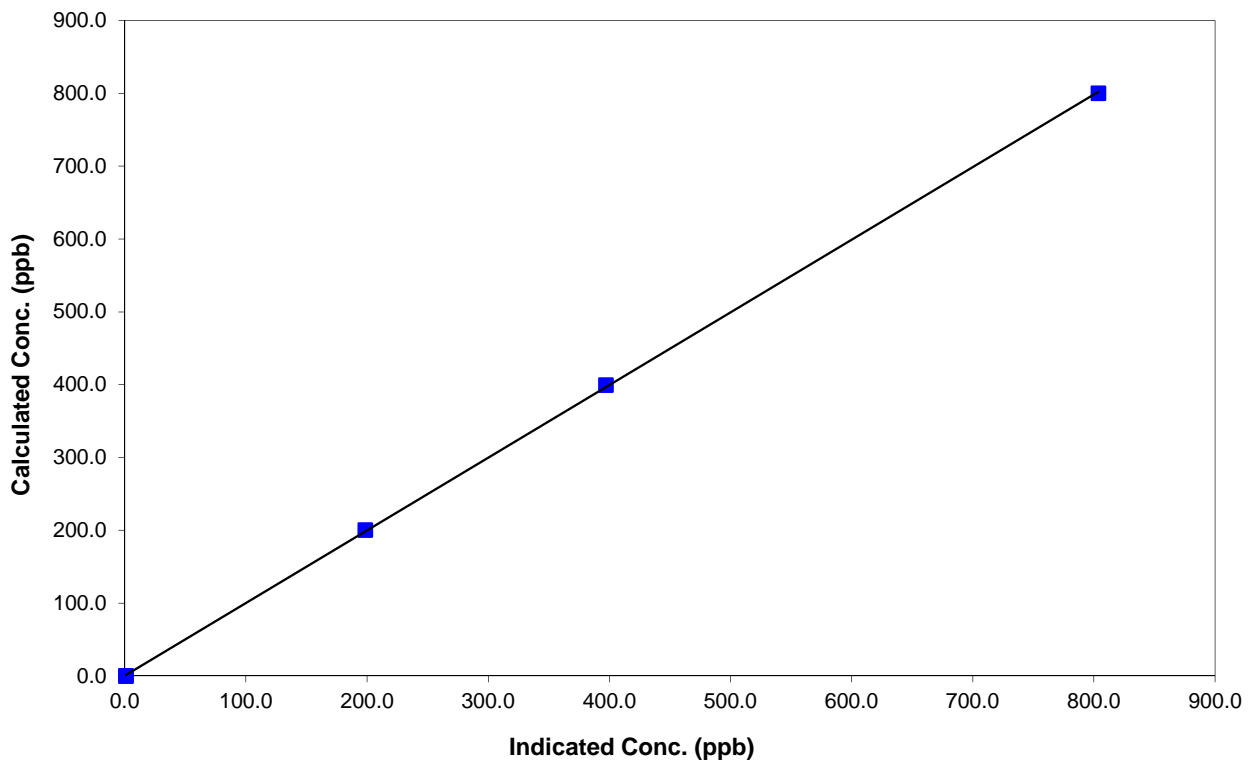
Station Information

Calibration Date	June 18, 2014	Previous Calibration	June 18, 2014
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:50
Analyzer make	42C	Analyzer serial #	509110890

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.0	N/A	Correlation Coefficient	0.999957
800.2	803.6	0.9958		
399.6	397.2	1.0060	Slope	0.997684
200.3	198.6	1.0086		
0.0	1.0	0.0000	Intercept	0.380471

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

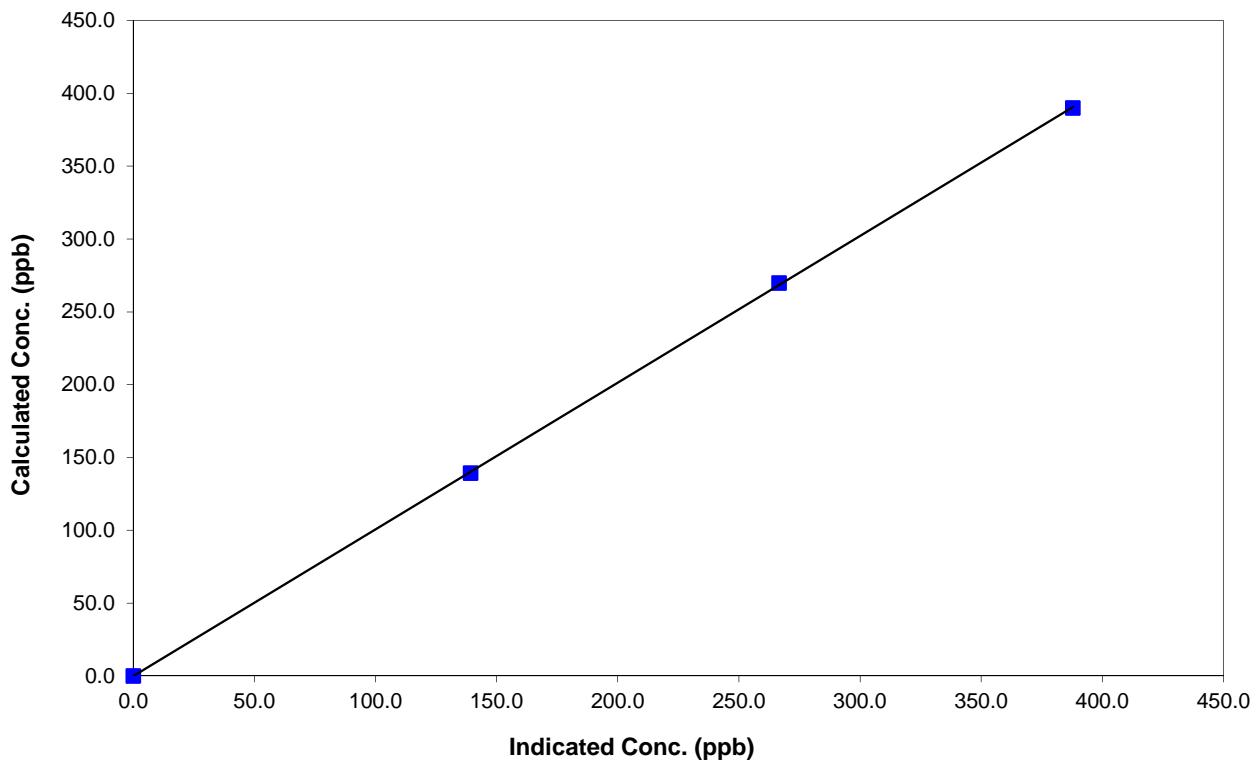
Station Information

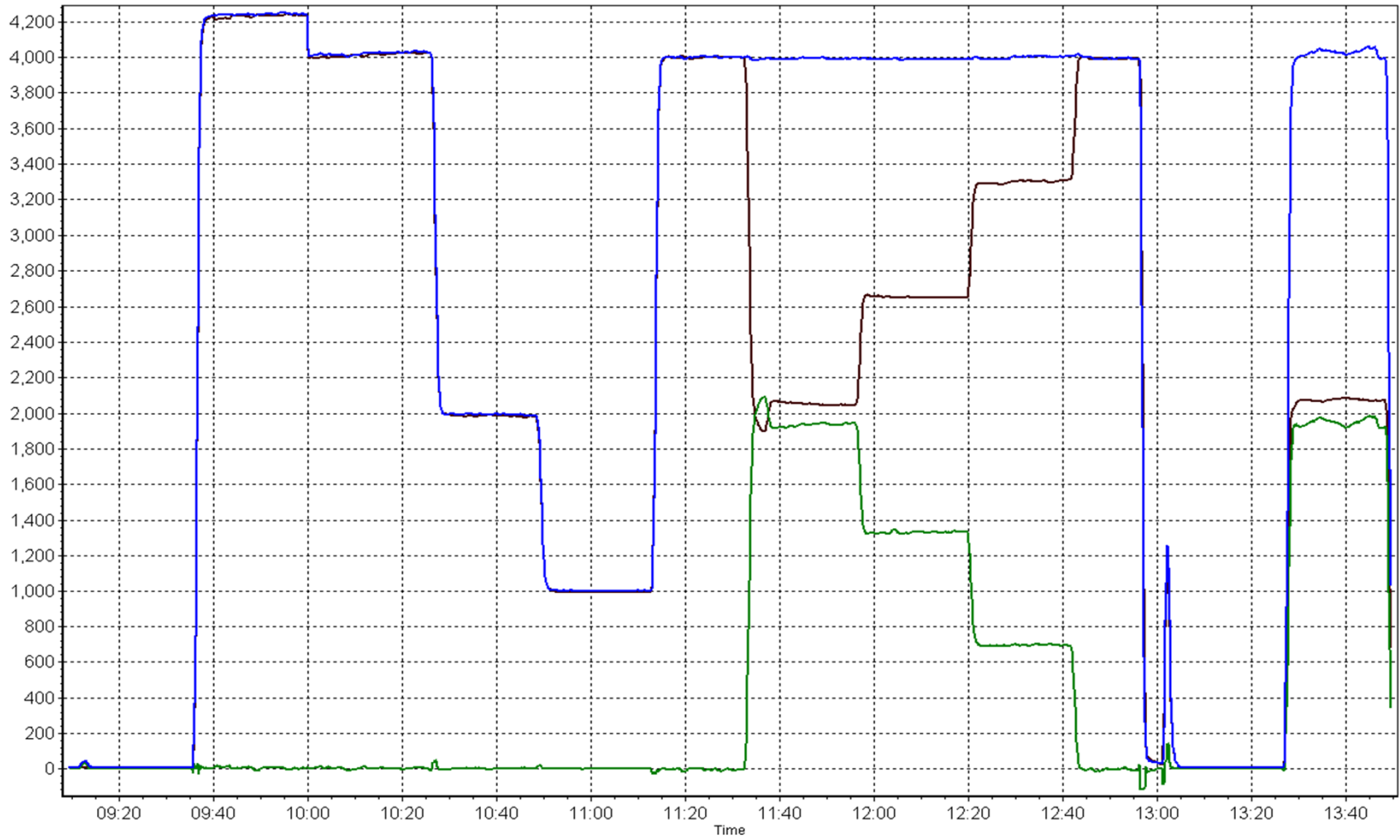
Calibration Date	July 10, 2014	Previous Calibration	June 18, 2014
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:50
Analyzer make	42C	Analyzer serial #	509110890

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999965
390.0	387.8	1.0057		
269.8	266.6	1.0120	Slope	1.007691
139.2	139.2	1.0000		
			Intercept	-0.183870

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 15 CNRL HORIZON JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)

JULY 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	37	37	100.00	40	0	6	0
TRS (ppb) Average	709	34	35	99.87	2	0	1	0
THC (ppm) Average	707	37	37	100.00	4	-	2.6	-
NO2 (ppb) Average	707	37	37	100.00	24	0	7	-
NO (ppb) Average	707	37	37	100.00	37	-	4	-
NOX (ppb) Average	707	37	37	100.00	53	-	10	-
PM2.5 (ug/m3) Average	743	0	1	99.87	210.9	-	55.1	6
Temperature 2 m (C) Average	744	0	0	100.00	34.4	-	24.2	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	26	-	-	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-
Precipitation (mm) Total	743	0	1	99.87	7.9	-	-	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	-	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	669	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
 JULY 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	1.1	3	-	0	0	0	0	1	2	40
TRS (ppb) Average	709	0.2	0	-	0	0	0	0	0	0	2
THC (ppm) Average	707	2.38	0.2	-	2.1	2.2	2.2	2.3	2.4	2.6	4
NO2 (ppb) Average	707	3.7	4	-	0	0	1	2	5	9	24
NO (ppb) Average	707	1	3	-	0	0	0	0	1	2	37
NOX (ppb) Average	707	4.7	6	-	0	0	1	3	6	12	53
PM2.5 (ug/m3) Average	743	19.96	19.8	-	1.6	3.3	7.8	13.8	26.6	41.9	210.9
Temperature 2 m (C) Average	744	19.82	5.6	-	4.5	12.7	15.5	19.8	23.8	27.4	34.4
Wind Speed 10 m (km/h) Average	744	7.5	4	-	0	3	5	7	10	13	26
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	743	-	-	52.58	0	0	0	0	0	0	7.9
Relative Humidity (%) Average	744	65.6	21	-	23	37	48	66	84	93	99
Global Solar Radiation (W/m2) Average	744	190	205	-	0	0	1	100	355	524	669

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
JULY 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	15 Jul 2014 14:00	15 Jul 2014 14:00	1	Maintenance - glass manifold cleaned
PM2.5	17 Jul 2014 13:00	17 Jul 2014 13:00	1	Maintenance - Flow and zero check, sample head cleaning
Precipitation Collector	15 Jul 2014 13:00	15 Jul 2014 13:00	1	Maintenance - tipping bucket cleaned

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 40 ppb on Jul 26 10:00	Maximum Daily Average: 5.6 ppb on Jul 22		Hours of Data:	707
Minimum Value: 0 ppb on Jul 9 18:00	Minimum Daily Average: 0.1 ppb on Jul 28		Hours of Missing Data:	37
Maximum Diurnal Average: 2.7 ppb at hour 10	Minimum Diurnal Average: 0.2 ppb at hour 5		Hours of Calibration:	37
Monthly Average: 1.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 18		Percent Operational Time:	100.0

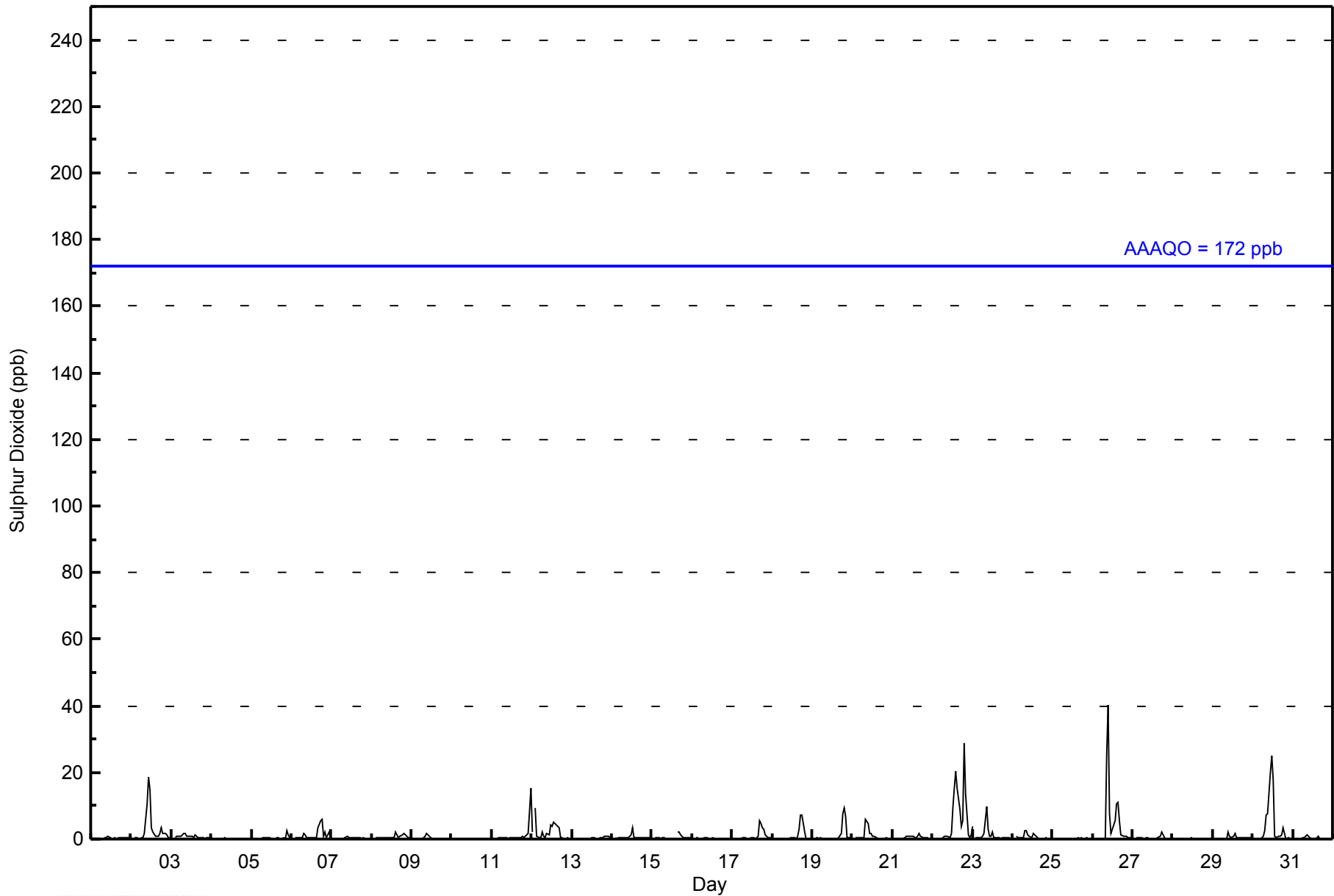
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1																						
2-Jul	0	Z	0	0	0	0	0	0	2	11	19	15	3	2	1	1	1	2	3	2	2	1	0	0	2.9	19																						
3-Jul	0	Z	0	1	1	1	1	2	2	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0.7	2																						
4-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0.4	3																						
6-Jul	0	Z	0	0	0	0	1	2	1	0	0	0	1	0	0	0	3	5	6	1	2	0	2	0	1.2	6																						
7-Jul	0	Z	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1																						
8-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	2	1	1	1	1	1	2	1	1	0	0	0.6	2																						
9-Jul	0	Z	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2																						
10-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2	15	1.1	15																						
12-Jul	2	Z	9	1	1	0	2	1	1	2	1	4	4	5	5	4	3	0	0	0	0	0	0	0	2.1	9																						
13-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.3	1																						
14-Jul	0	Z	0	0	0	0	0	0	0	0	1	1	3	1	0	0	0	0	0	0	0	0	0	0	0.5	3																						
15-Jul	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	2	2	1	1	1	0	0	0	0	--	2																						
16-Jul	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																						
17-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	5	5	3	3	1	0	0	0	0	1.0	5																						
18-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	3	7	7	2	0	0	0	0	0	1.0	7																						
19-Jul	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	8	9	7	1	0	0	0	1.3	9																						
20-Jul	0	Z	0	0	0	0	0	0	6	5	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0.9	6																						
21-Jul	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	0	1	2	1	1	0	1	0	0	0	0.5	2																						
22-Jul	0	Z	0	0	0	0	0	1	1	1	1	2	9	15	20	15	9	4	6	29	13	1	0	1	5.6	29																						
23-Jul	4	Z	0	0	0	0	1	2	10	3	1	1	2	0	0	0	0	0	0	0	0	0	0	0	1.2	10																						
24-Jul	0	Z	1	0	0	0	0	3	3	1	1	0	2	1	1	0	0	0	0	0	0	0	0	0	0.7	3																						
25-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
26-Jul	0	Z	0	0	0	0	0	0	25	40	7	2	3	5	11	11	5	1	1	1	1	1	0	0	5.1	40																						
27-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	0	0	0	0	0	0.4	2																						
28-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	2	1	0	1	2	0	0	0	0	0	0	0	1	0	0	0.4	2																						
30-Jul	0	Z	0	0	0	0	1	3	7	8	20	25	18	1	0	1	1	1	3	2	0	0	0	0	4.0	25																						
31-Jul	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1																						
																								0.4	--	0.5	0.2	0.2	0.2	0.3	0.6	2.0	2.7	2.0	1.9	1.7	1.3	1.5	1.4	1.3	1.2	1.5	1.8	1.1	0.5	0.4	0.8	Diurnal Average
																								4	--	9	1	1	1	2	3	25	40	20	25	18	15	20	15	9	7	8	29	13	3	2	15	Diurnal Maximum

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



WBEA NETWORK
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	691	97.74	97.74
11 - 20	12	1.70	99.43
21 - 60	4	0.57	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - July 2014

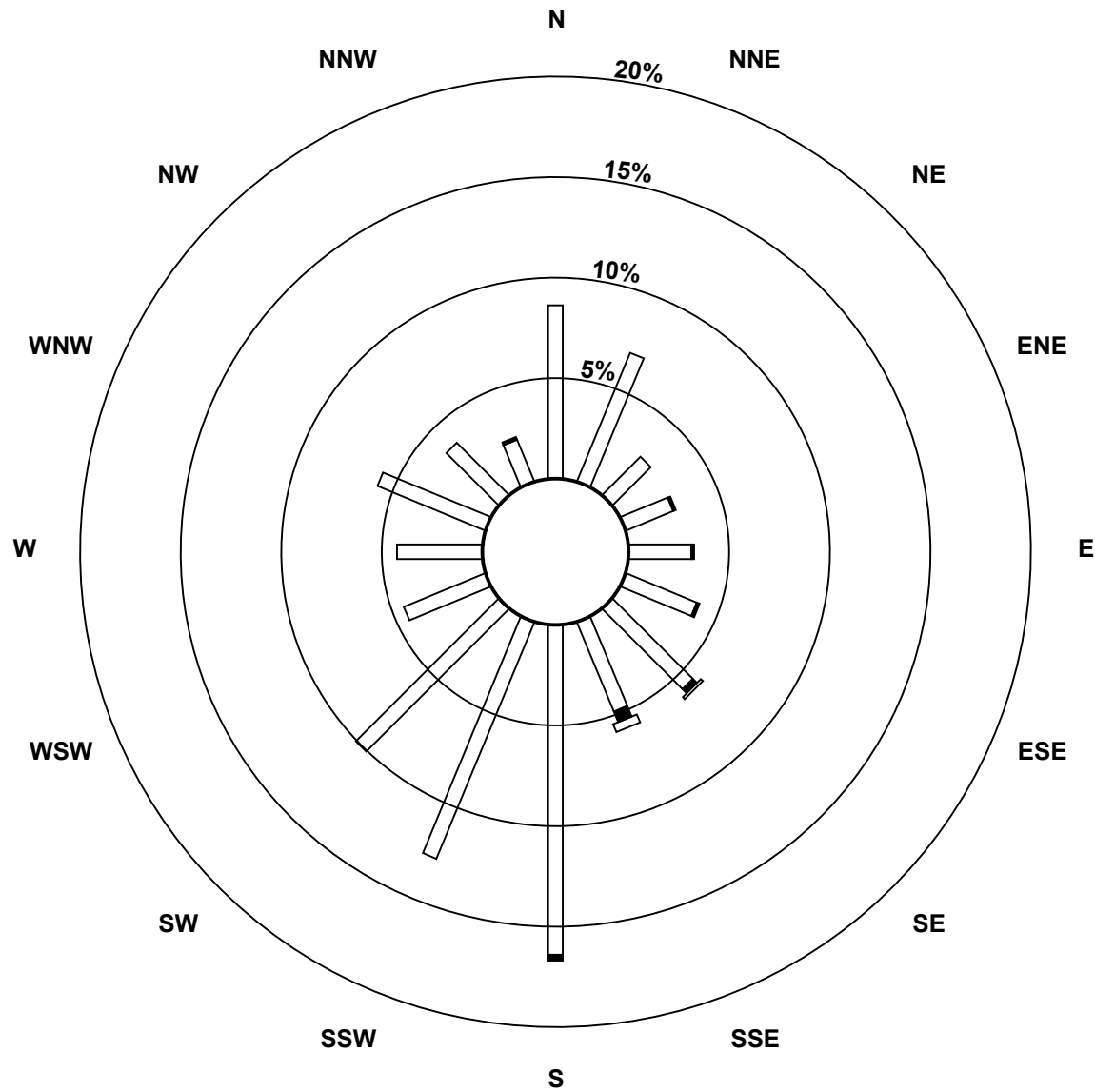
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	61	49	19	18	22	27	40	34	116	90	71	31	30	41	26	16	691
11 - 20	0	0	0	1	1	1	2	4	2	0	0	0	0	0	0	1	12
21 - 60	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	4
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	49	19	19	23	28	43	41	118	90	71	31	30	41	26	17	707

Total Number of Valid Hours: 707

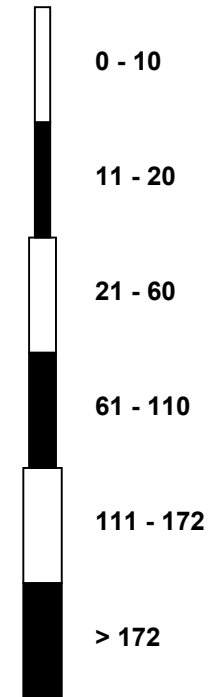
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon (AMS 15)



Classes (ppb)



Total Number of Valid Hours: 707

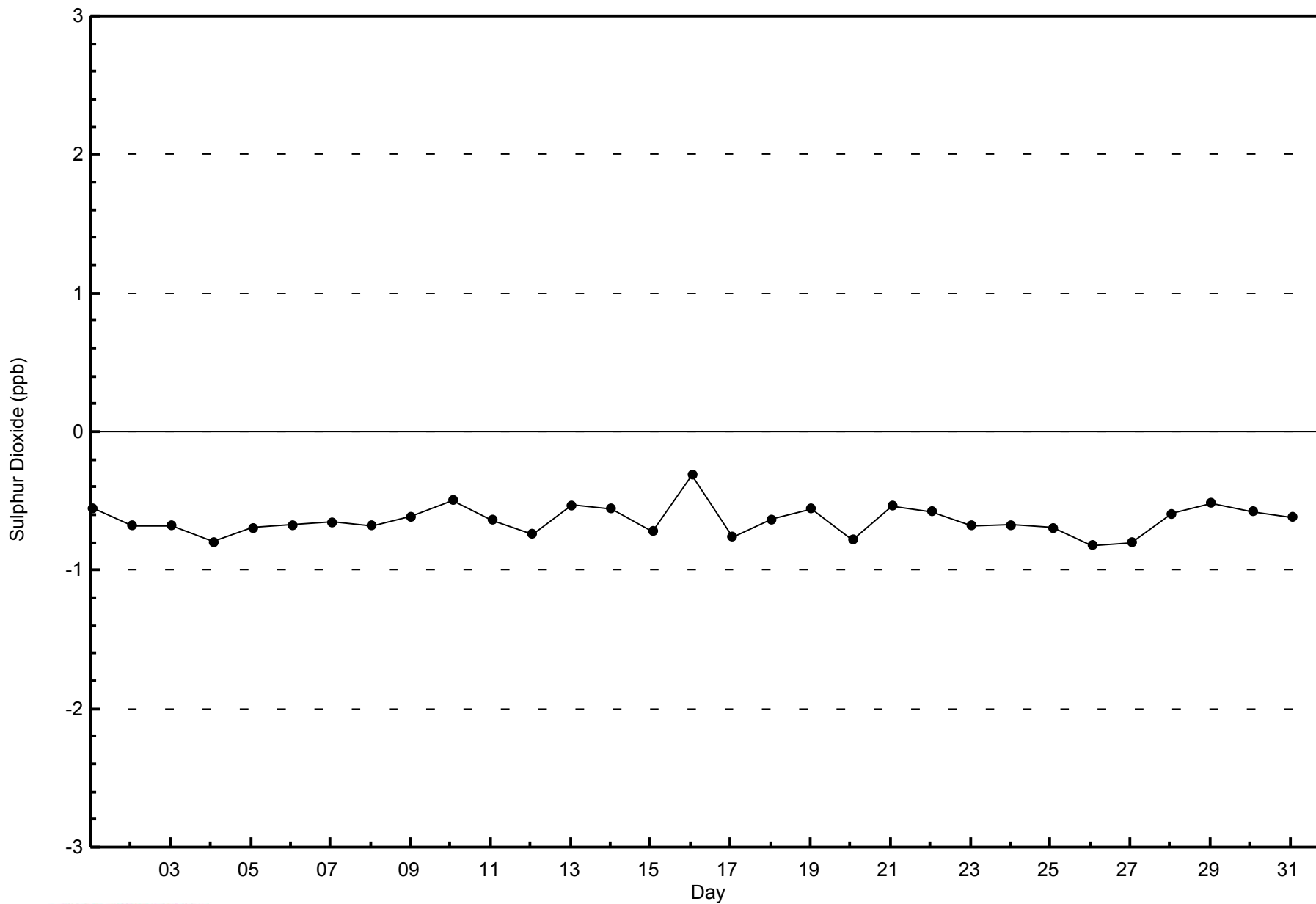


WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

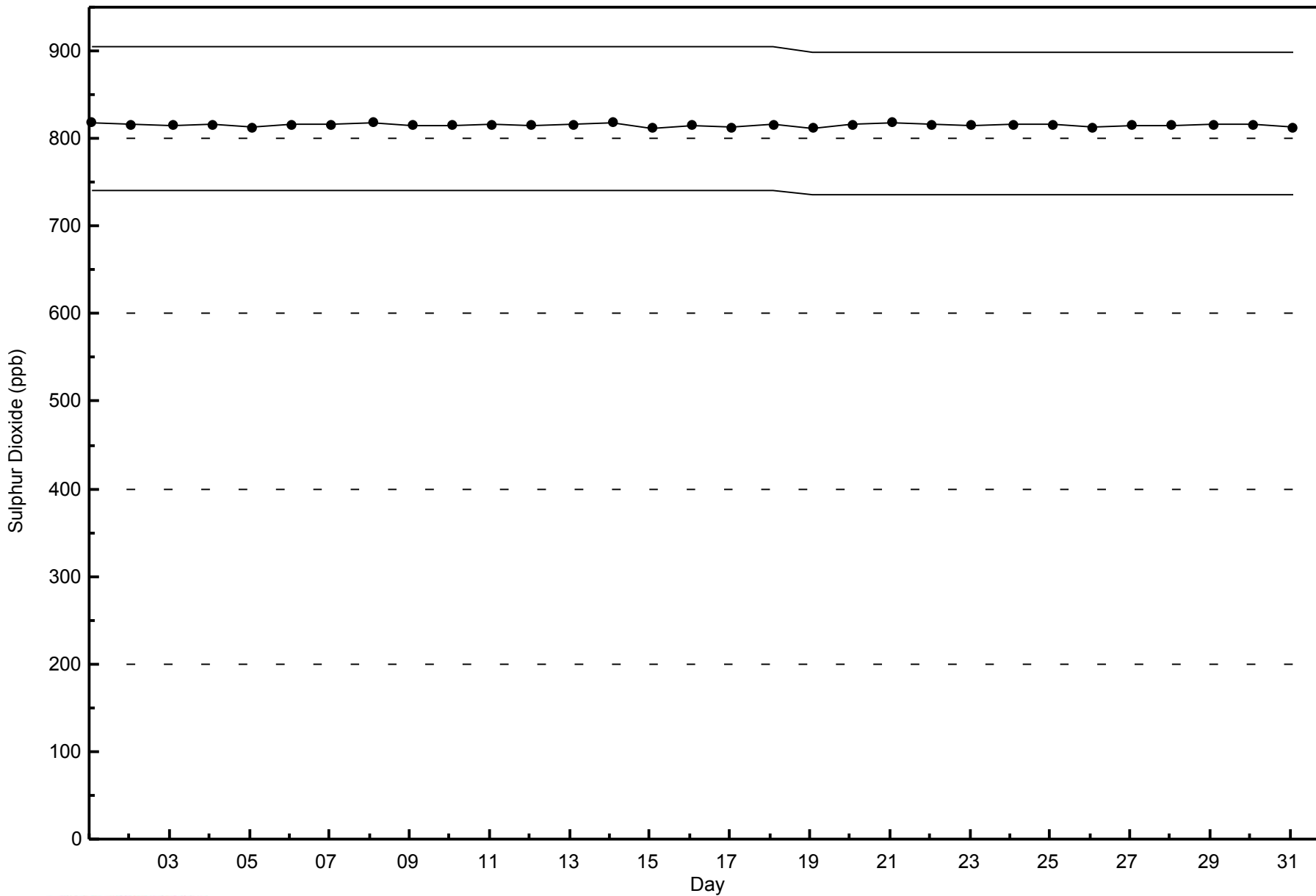
CNRL Horizon - July 2014





WBEA NETWORK
Span Responses

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - July 2014



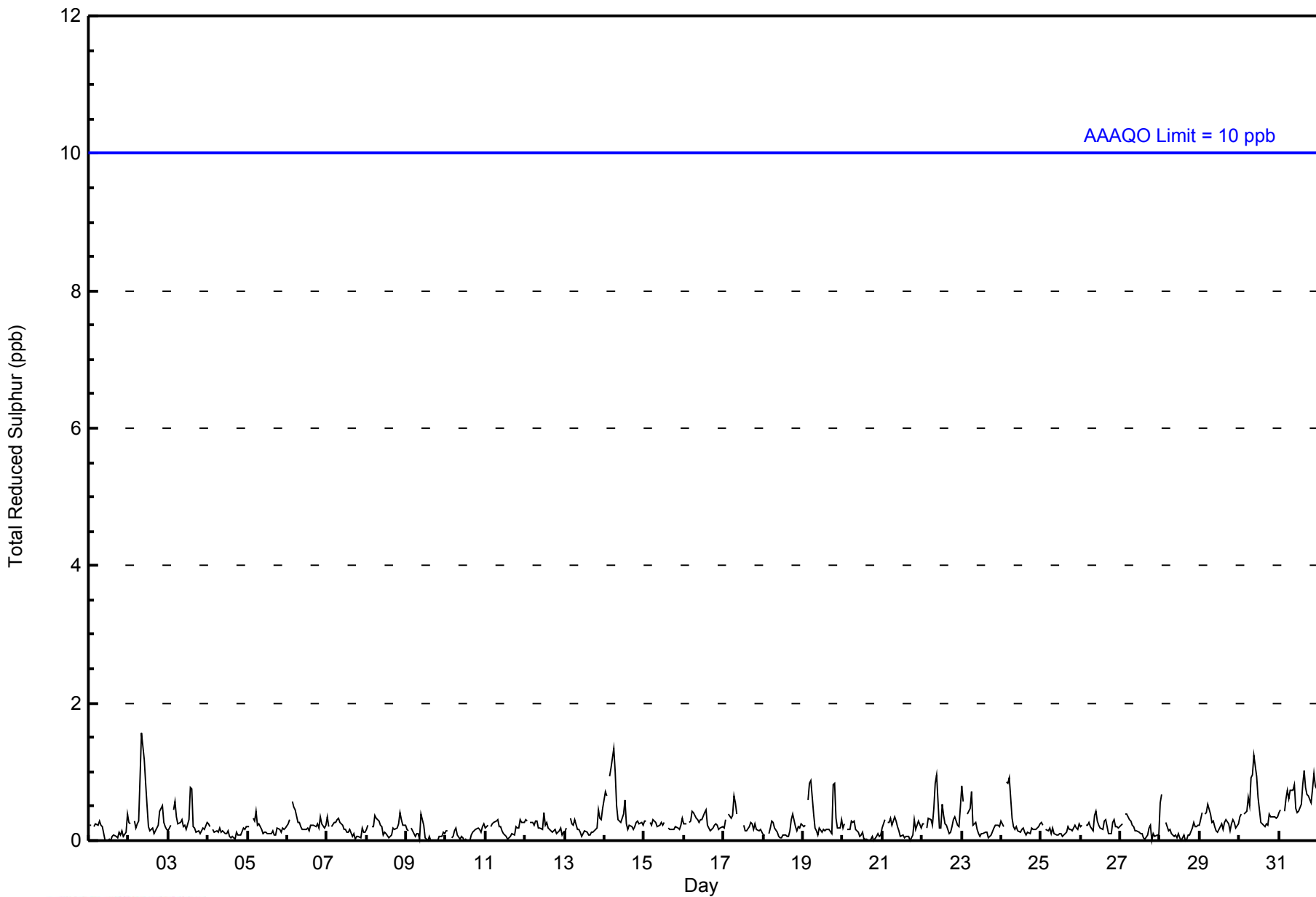


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 2 ppb on Jul 2 09:00										Maximum Daily Average: 0.7 ppb on Jul 31										Hours of Data: 709																													
Minimum Value: 0 ppb on Jul 1 11:00										Minimum Daily Average: 0.1 ppb on Jul 9										Hours of Missing Data: 35																													
Maximum Diurnal Average: 0.4 ppb at hour 6										Minimum Diurnal Average: 0.1 ppb at hour 18										Hours of Calibration: 34																													
Monthly Average: 0.2 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 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-Jul	0	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-Jul	0	0	Z	0	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																							
3-Jul	0	0	Z	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1																							
4-Jul	0	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-Jul	0	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-Jul	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																							
7-Jul	0	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-Jul	0	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-Jul	0	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-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
11-Jul	0	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-Jul	0	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-Jul	0	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-Jul	1	1	Z	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																							
15-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
16-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
17-Jul	0	0	Z	0	0	0	1	1	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
18-Jul	0	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-Jul	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	1																							
20-Jul	0	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-Jul	0	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-Jul	0	0	Z	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
23-Jul	1	1	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
24-Jul	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
25-Jul	0	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-Jul	0	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-Jul	0	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-Jul	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
29-Jul	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
30-Jul	0	0	Z	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																							
31-Jul	0	0	Z	0	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.7	1																							
																								0.3	0.3	--	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average
																								1	1	--	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																	



WBEA NETWORK
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	709	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: 709

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - July 2014

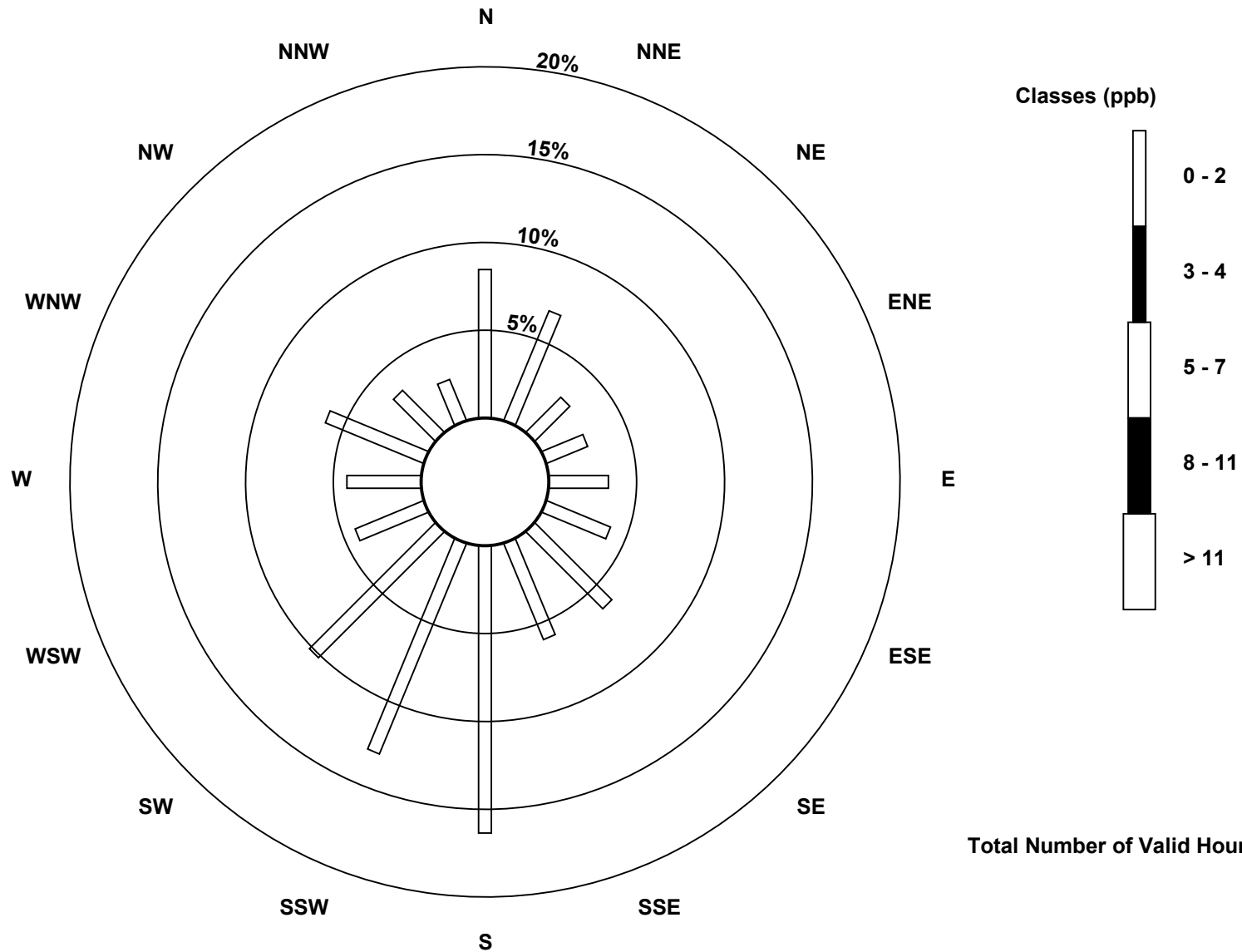
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	60	48	20	18	24	28	44	42	116	92	72	30	30	43	24	18	709
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	60	48	20	18	24	28	44	42	116	92	72	30	30	43	24	18	709

Total Number of Valid Hours: 709

Total Number of Hours: 744

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

**Total Reduced Sulphur (TRS) - ppb
CNRL Horizon (AMS 15)**



Total Number of Valid Hours: 709

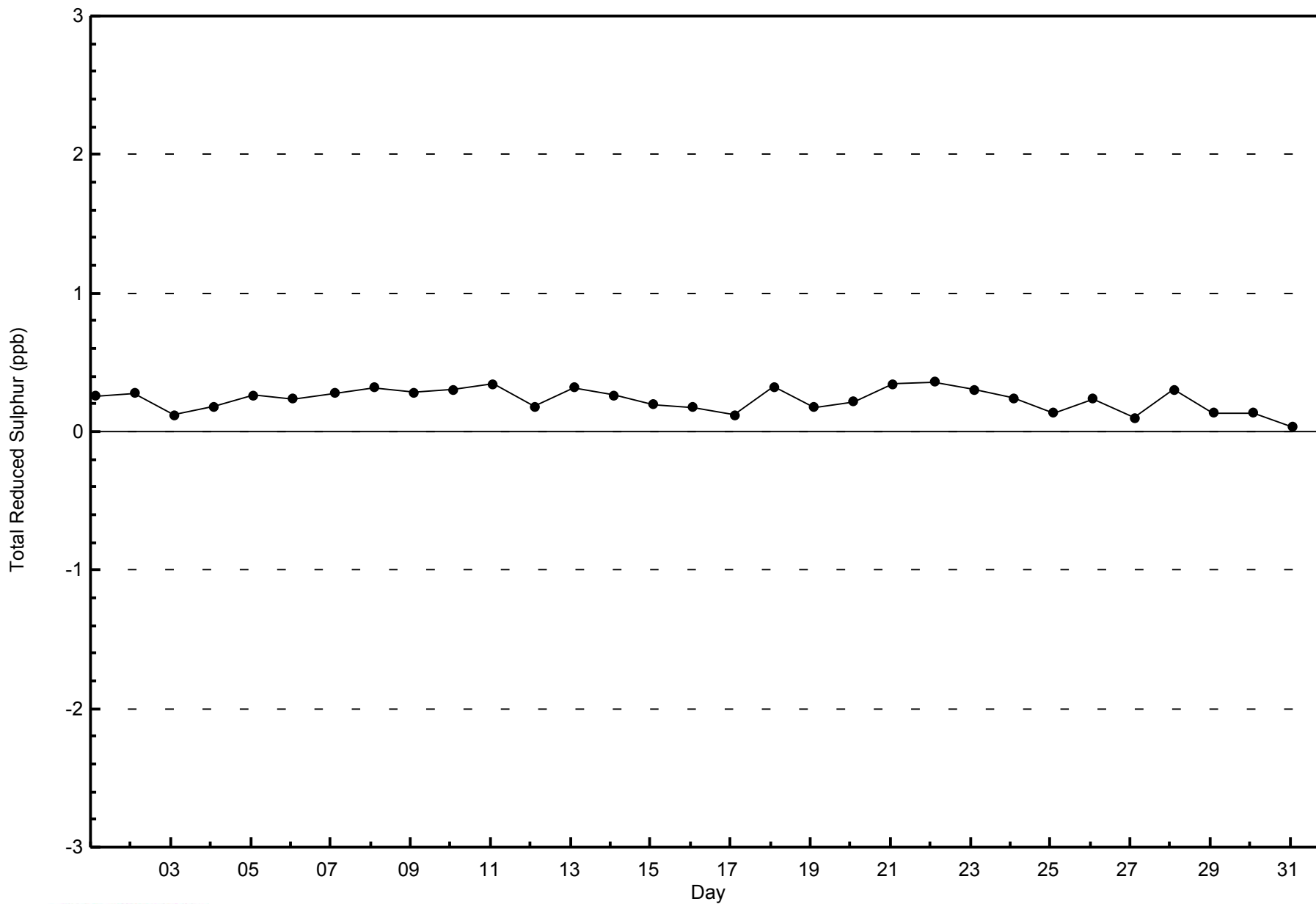


WBEA NETWORK

Zero Responses

Total Reduced Sulphur (TRS) - ppb

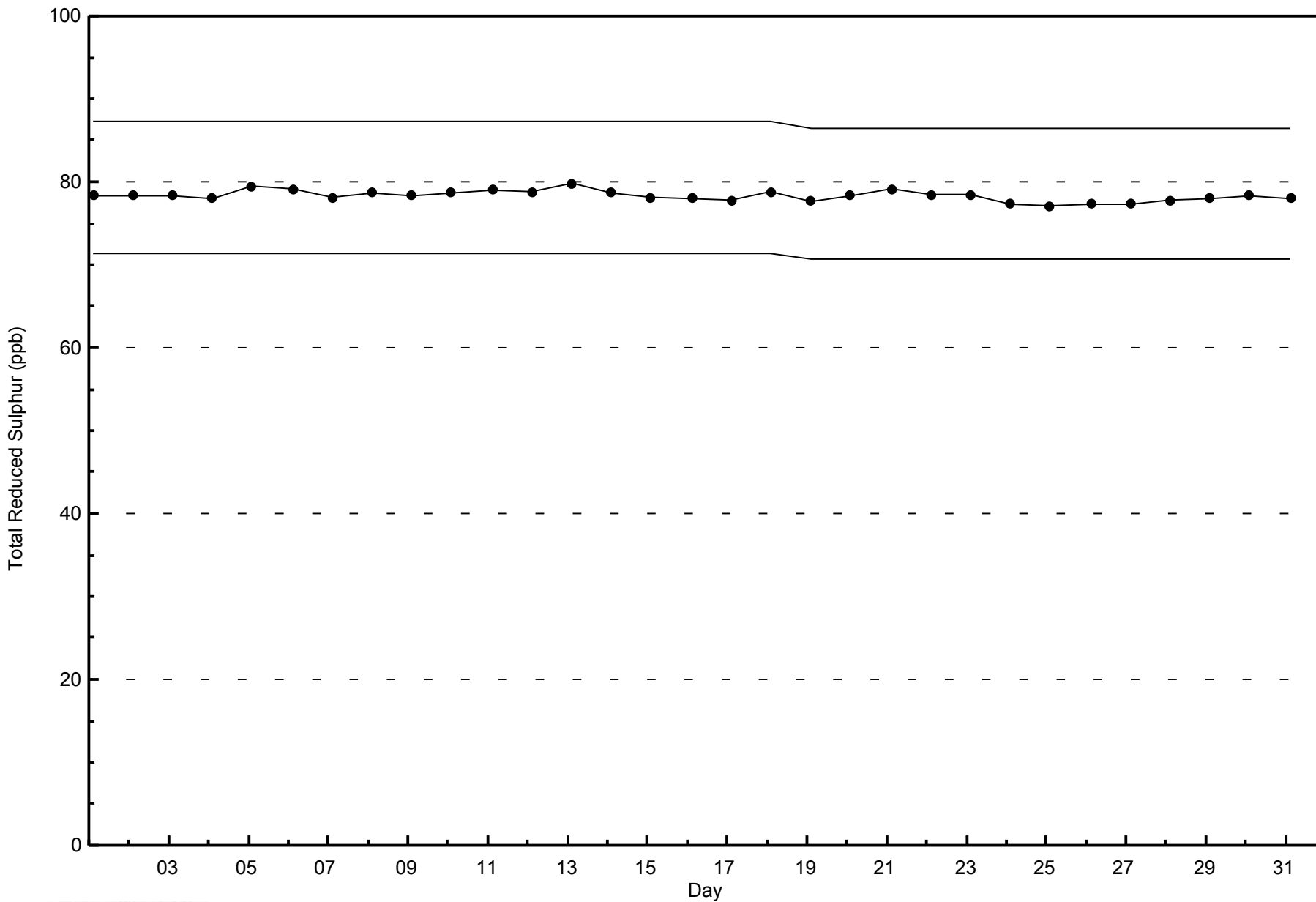
CNRL Horizon - July 2014





WBEA NETWORK
Span Responses

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - July 2014





Maximum Value: 4.0 ppm on Jul 17 07:00																Maximum Daily Average: 2.6 ppm on Jul 30																Hours in Service: 744																
Minimum Value: 2.1 ppm on Jul 30 23:00																Minimum Daily Average: 2.2 ppm on Jul 4																Hours of Data: 707																
Maximum Diurnal Average: 2.5 ppm at hour 4																Minimum Diurnal Average: 2.3 ppm at hour 18																Hours of Missing Data: 37																
Monthly Average: 2.38 ppm																Percentiles: P ₁ = 2.2 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.4 P ₉₀ = 2.6 P ₉₉ = 3.3																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-Jul	2.6	Z	2.6	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.4	2.3	2.3	2.3	2.7	2.4	2.7																						
2-Jul	2.4	Z	2.4	2.5	2.4	2.4	2.7	2.9	3.0	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.2	2.4	3.0																						
3-Jul	2.2	Z	2.3	2.4	2.5	2.5	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.5																							
4-Jul	2.6	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6																							
5-Jul	2.3	Z	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3																							
6-Jul	2.4	Z	3.1	3.3	2.9	2.6	2.5	2.5	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.3	2.3	2.5	2.3	2.4	2.4	3.2	2.5	3.3																							
7-Jul	3.5	Z	2.3	2.4	2.6	2.5	2.4	2.8	2.4	2.3	2.4	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.6	2.4	3.5																							
8-Jul	2.8	Z	2.8	2.7	2.6	2.4	2.4	2.4	2.7	2.7	2.4	2.3	2.3	2.2	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.4	2.5	2.4	2.8																							
9-Jul	2.5	Z	2.6	2.6	2.3	2.2	2.3	2.3	2.3	2.5	2.4	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.4	2.6	2.7	2.2	2.7																							
10-Jul	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.7	2.2	2.5	3.2	3.1	3.2																							
11-Jul	3.5	Z	2.9	2.9	3.0	2.6	3.0	2.9	2.7	2.4	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.5	2.6	2.3	3.5																							
12-Jul	2.4	Z	2.4	2.4	2.3	2.4	2.7	2.4	2.3	2.3	2.3	2.3	2.5	2.5	2.6	2.4	2.3	2.3	2.2	2.3	2.2	2.3	2.3	2.3	2.7																							
13-Jul	2.3	Z	2.3	2.5	2.6	2.4	2.5	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.3	2.6																							
14-Jul	2.6	Z	2.6	2.6	2.6	2.6	2.4	2.4	2.4	2.5	2.5	2.4	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.6																							
15-Jul	2.3	Z	2.4	2.3	2.3	2.4	2.3	2.4	2.3	C	C	C	C	C	C	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4																							
16-Jul	2.3	Z	2.3	2.4	2.5	2.6	2.7	2.8	2.5	2.3	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	2.8																							
17-Jul	2.4	Z	2.7	2.8	2.6	2.3	4.0	2.9	2.4	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.6	2.2	2.5	4.0																							
18-Jul	2.4	Z	2.5	2.5	3.0	3.1	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.2	2.2	2.2	2.4	3.1																							
19-Jul	2.2	Z	2.4	2.4	2.5	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.6	3.3	3.3	3.3																							
20-Jul	2.3	Z	2.3	2.6	2.7	3.0	2.9	2.8	2.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.6	2.4	3.0																							
21-Jul	3.2	Z	2.8	2.5	2.4	2.4	2.6	3.0	2.4	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.6	3.1	3.0	2.9	3.2																							
22-Jul	2.7	Z	2.4	2.4	2.4	2.4	2.4	2.5	2.8	3.0	2.6	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5	3.0																							
23-Jul	2.5	Z	2.7	3.0	2.8	2.7	2.7	2.6	2.6	2.4	2.4	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.4	2.4	3.0																							
24-Jul	2.4	Z	2.5	2.6	2.6	2.7	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.7																							
25-Jul	2.4	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.5	2.6	2.5	2.6	2.9																							
26-Jul	2.5	Z	2.5	2.4	2.4	2.3	2.4	2.3	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.5																							
27-Jul	2.3	Z	2.3	2.3	2.4	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.4	2.2	2.2	2.2	2.2	2.3	2.4																							
28-Jul	2.5	Z	2.7	2.7	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.7																							
29-Jul	2.4	Z	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.3	2.2	2.2	2.3	2.3	2.2	3.3	3.3	2.5	2.3	2.4	2.4	2.4	2.4	2.5	3.3																							
30-Jul	2.5	Z	2.6	2.8	3.0	3.0	2.7	2.8	2.8	3.0	2.8	2.7	2.6	2.4	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.3	2.1	2.1	3.0																							
31-Jul	2.3	Z	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.6	2.3	2.3	2.3	2.4	2.5	2.6	2.5	2.4	2.4	2.3	2.4	2.5	2.5	2.6	2.6																							
																								2.5	--	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.5	Diurnal Average	
																								3.5	--	3.1	3.3	3.0	3.1	4.0	3.0	3.0	3.0	2.8	2.7	2.6	2.5	2.6	3.3	3.3	2.5	2.5	2.7	2.6	3.1	3.3	3.3	Diurnal Maximum
Z - zerospan C - Calibration																																																

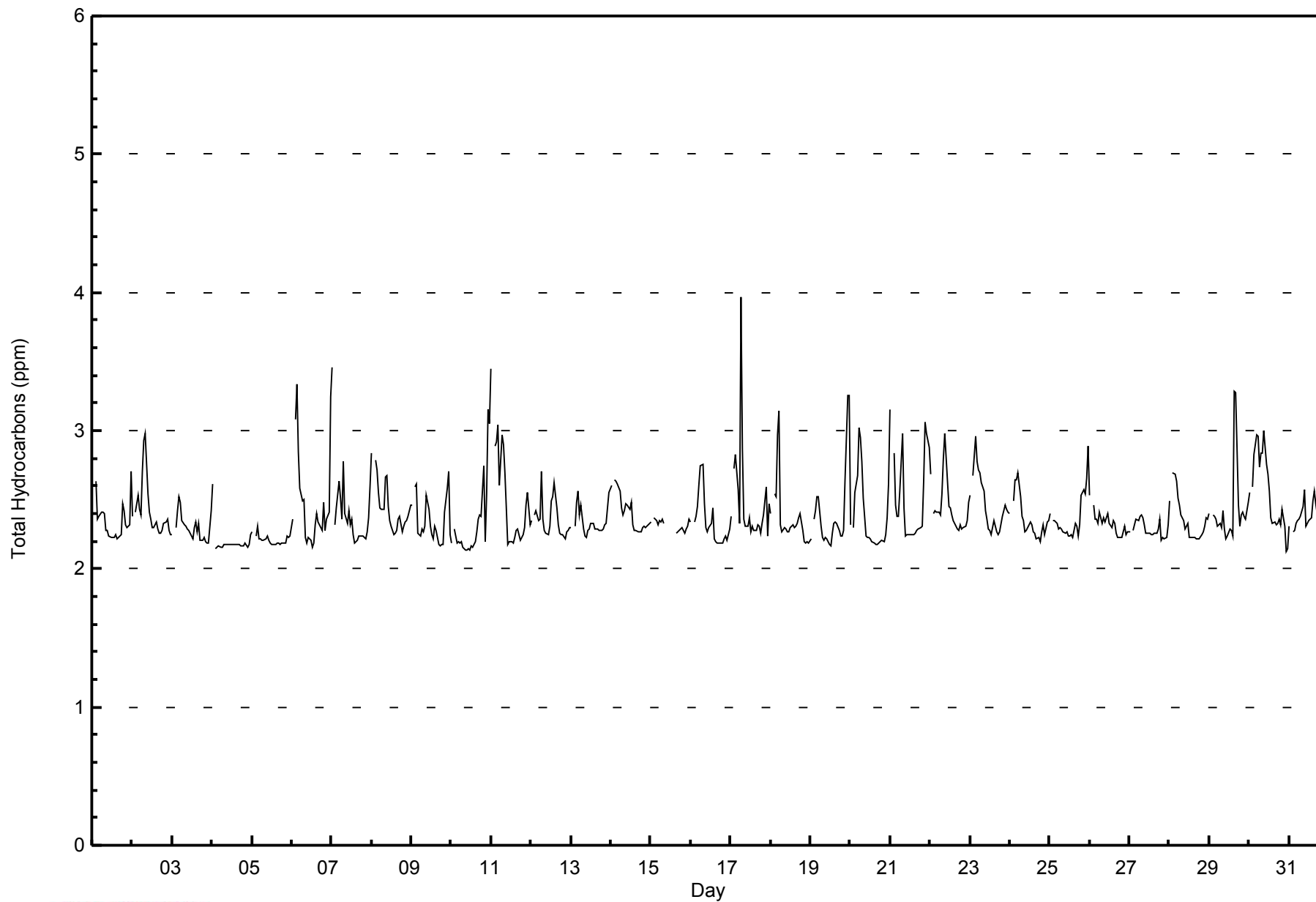


WBEA NETWORK

Hourly Averages

Total Hydrocarbons (THC) - ppm

CNRL Horizon - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	692	97.88	97.88
3.1 - 10.0	15	2.12	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - July 2014

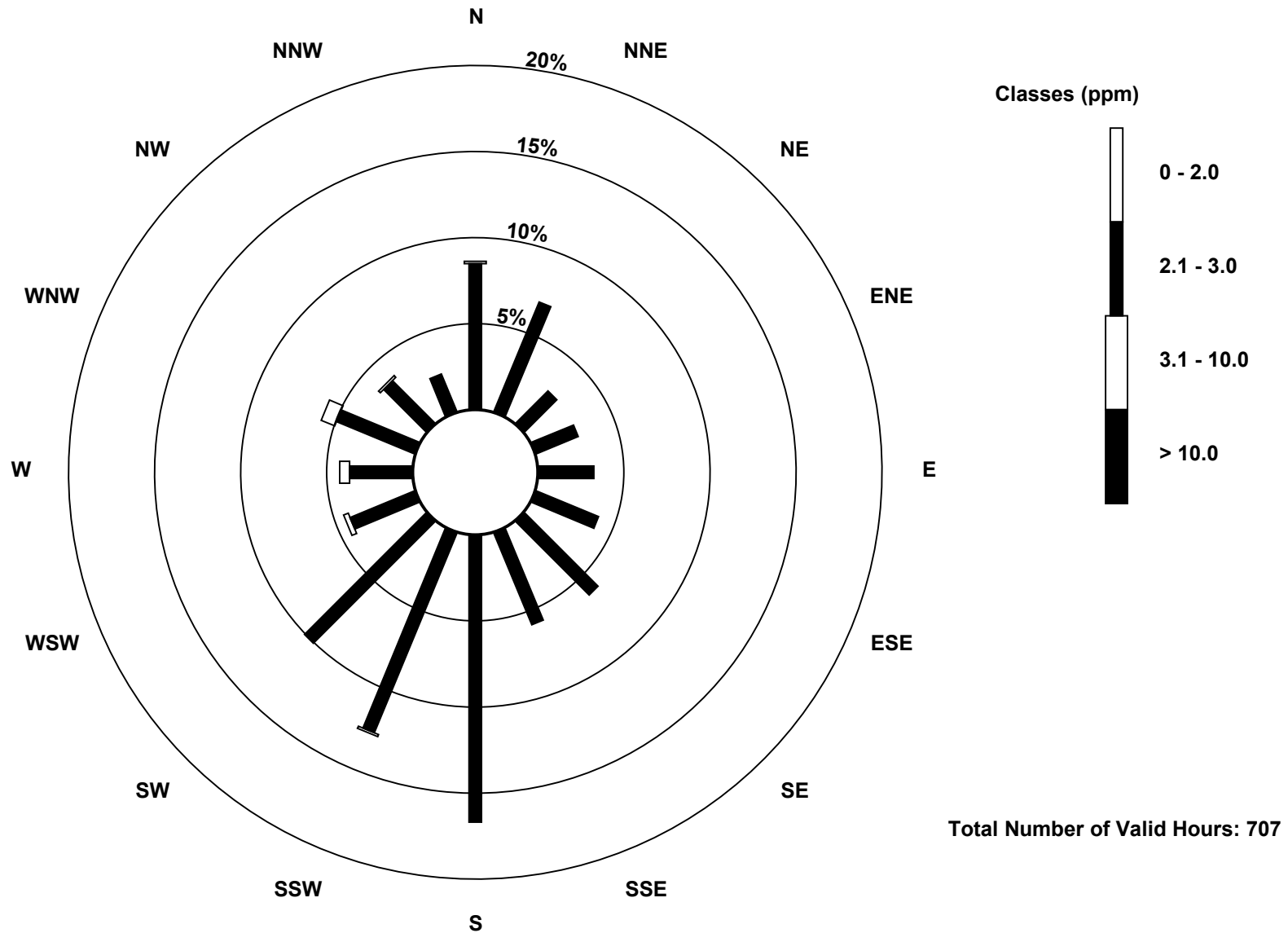
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	60	49	19	19	23	28	43	41	118	89	71	29	26	35	25	17	692
3.1 - 10.0	1	0	0	0	0	0	0	0	0	1	0	2	4	6	1	0	15
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	49	19	19	23	28	43	41	118	90	71	31	30	41	26	17	707

Total Number of Valid Hours: 707

Total Number of Hours: 744

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

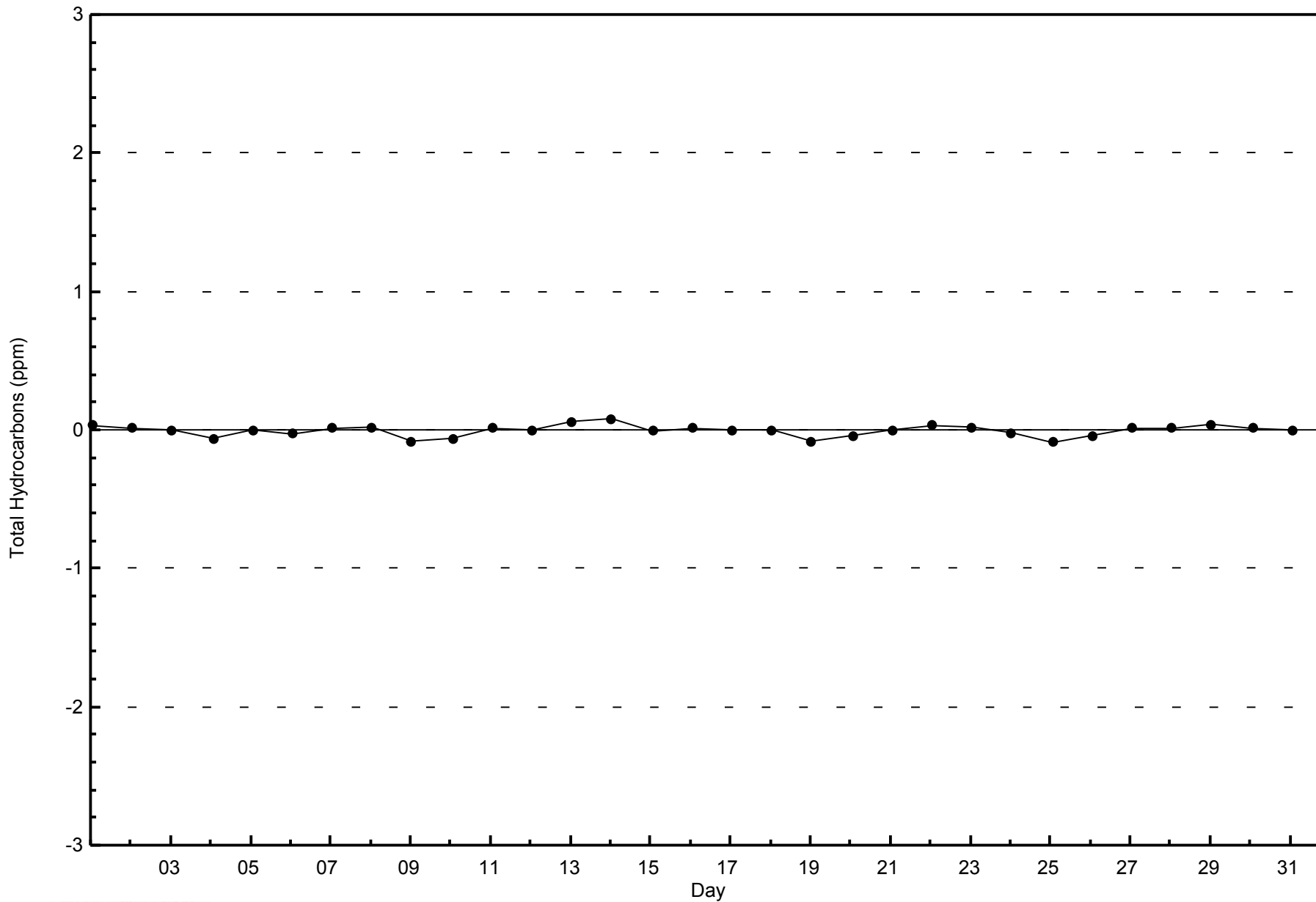
**Total Hydrocarbons (THC) - ppm
CNRL Horizon (AMS 15)**





WBEA NETWORK
Zero Responses

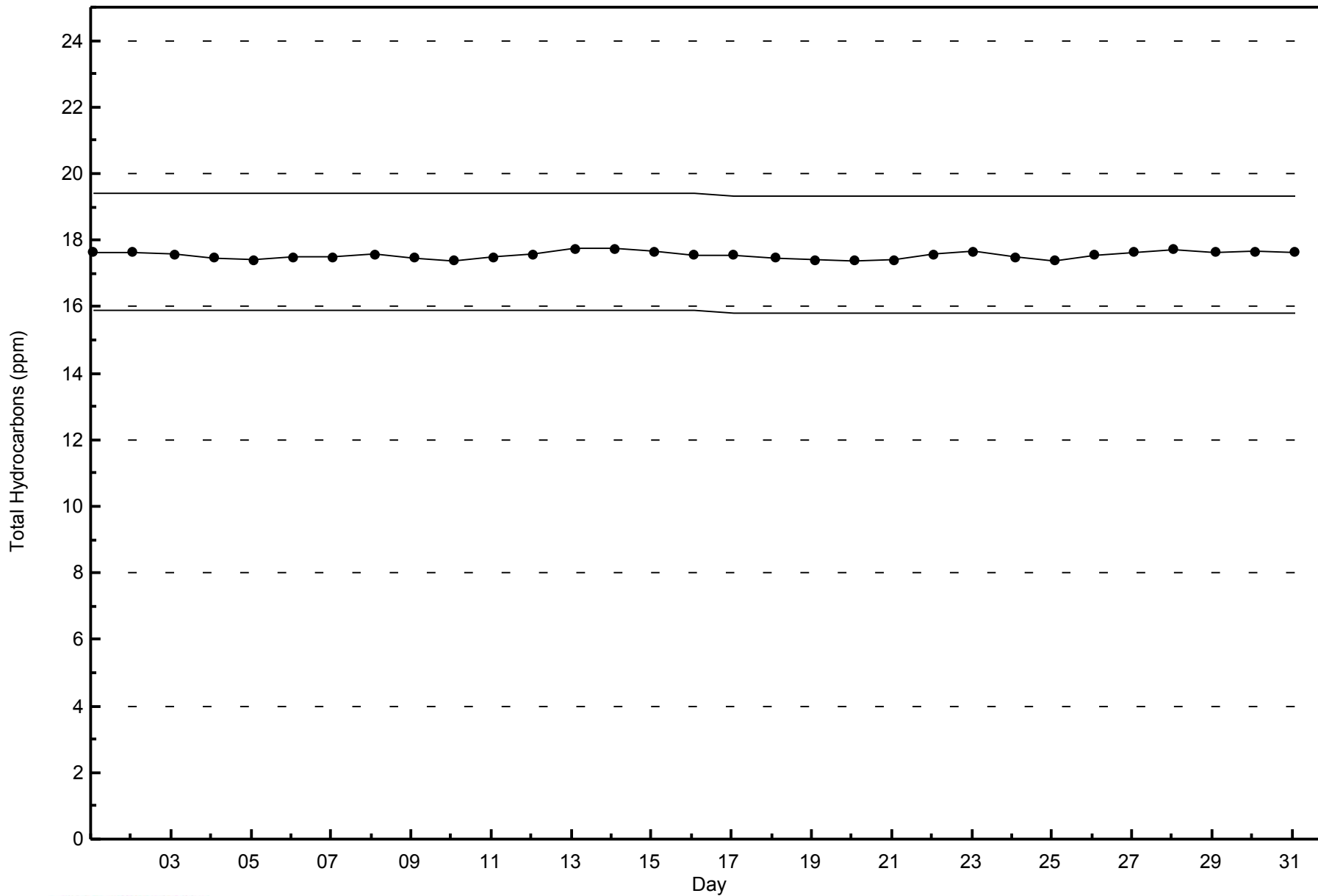
Total Hydrocarbons (THC) - ppm
CNRL Horizon - July 2014





WBEA NETWORK
Span Responses

Total Hydrocarbons (THC) - ppm
CNRL Horizon - July 2014



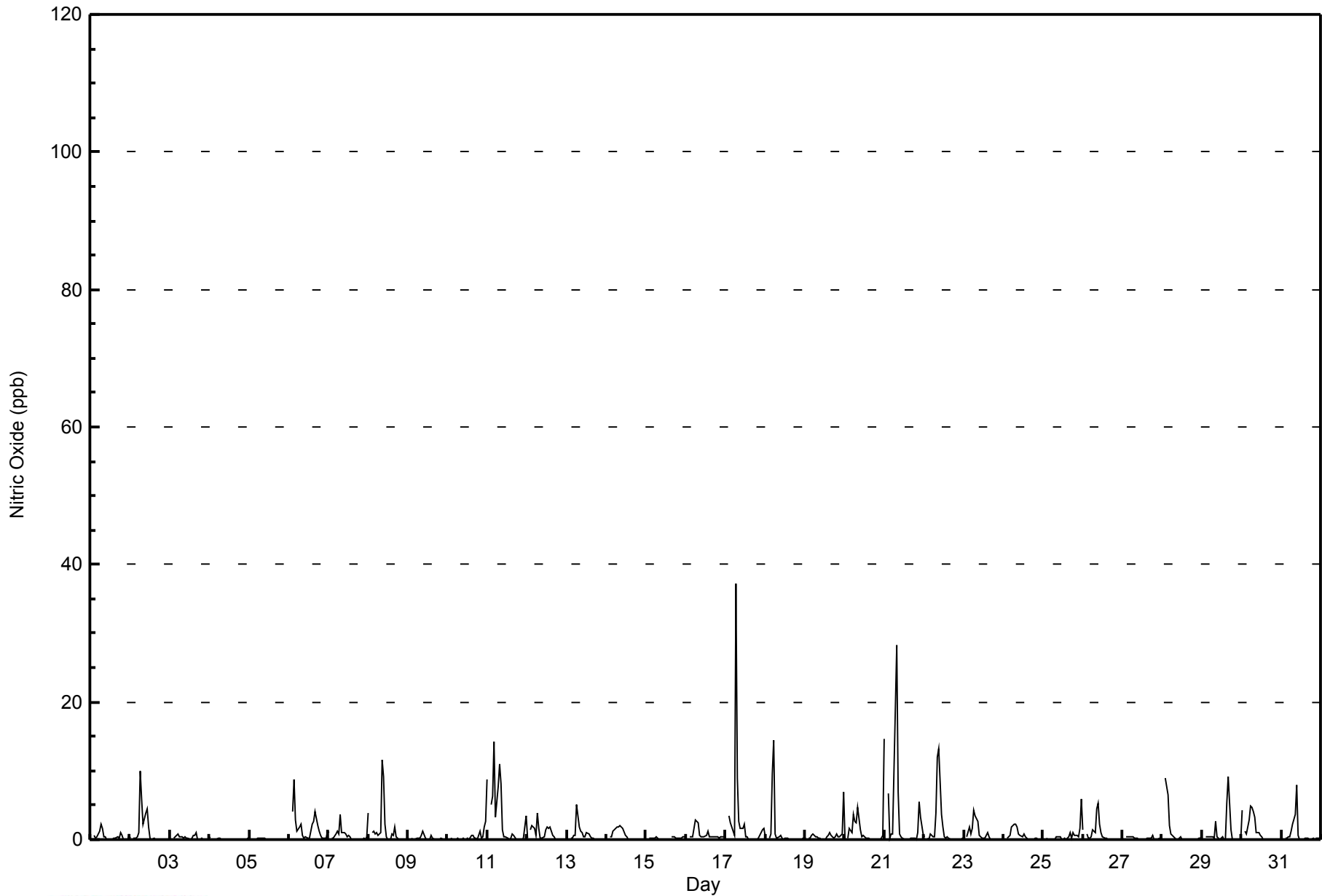


Maximum Value: 37 ppb on Jul 17 07:00																	Maximum Daily Average: 3.5 ppb on Jul 21																	Hours in Service: 744														
Minimum Value: 0 ppb on Jul 4 13:00																	Minimum Daily Average: 0.1 ppb on Jul 4																	Hours of Data: 707														
Maximum Diurnal Average: 3.4 ppb at hour 7																	Minimum Diurnal Average: 0.1 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 = 2 P ₉₉ = 11																	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-Jul	0	Z	1	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0.5	2																						
2-Jul	0	Z	0	0	0	1	10	6	2	4	4	2	0	0	0	0	0	0	0	0	0	0	0	0	1.3	10																						
3-Jul	0	Z	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.3	1																						
4-Jul	0	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-Jul	0	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-Jul	0	Z	4	9	3	1	2	2	1	0	0	0	1	2	3	4	2	1	1	0	0	0	1	1.6	9																							
7-Jul	1	Z	0	0	1	1	1	4	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.6	4																						
8-Jul	4	Z	1	1	1	1	1	1	1	12	9	2	0	0	1	1	2	0	0	0	0	0	0	0	1.6	12																						
9-Jul	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																						
10-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	2	3	0.4	3																						
11-Jul	9	Z	5	6	14	3	8	11	8	1	0	0	0	0	1	1	0	0	0	0	0	0	0	3	3.1	14																						
12-Jul	0	Z	2	2	2	1	4	2	0	0	0	1	2	2	2	1	0	0	0	0	0	0	0	0	0.9	4																						
13-Jul	0	Z	0	0	1	1	5	2	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.6	5																						
14-Jul	0	Z	0	0	1	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2																						
15-Jul	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0																						
16-Jul	0	Z	0	0	0	2	3	2	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.7	3																						
17-Jul	0	Z	3	2	1	1	37	9	3	2	2	2	0	0	0	0	0	0	0	0	0	1	1	2	2.9	37																						
18-Jul	0	Z	0	1	10	14	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	14																						
19-Jul	0	Z	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	1	7	0.7	7																							
20-Jul	0	Z	0	2	1	4	3	3	5	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0.9	5																							
21-Jul	15	Z	7	0	1	1	10	28	7	1	0	0	0	0	0	0	0	0	0	0	1	6	3	1	3.5	28																						
22-Jul	0	Z	0	0	1	0	0	4	12	13	4	2	0	0	0	0	0	0	0	0	0	0	0	0	1.7	13																						
23-Jul	0	Z	0	2	1	2	4	4	3	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.8	4																						
24-Jul	0	Z	0	0	1	2	2	2	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.6	2																						
25-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	2	6	0.6	6																						
26-Jul	1	Z	1	0	0	0	1	1	4	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.8	5																						
27-Jul	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																						
28-Jul	0	Z	9	6	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	9																						
29-Jul	0	Z	0	0	0	0	0	0	3	0	0	0	0	0	0	5	9	1	0	0	0	0	0	0	1.0	9																						
30-Jul	4	Z	1	1	3	5	5	4	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.3	5																						
31-Jul	0	Z	0	0	0	0	1	2	4	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	8																						
																								1.2	--	1.2	1.2	1.5	1.5	3.4	3.0	2.4	1.9	0.8	0.5	0.3	0.3	0.4	0.5	0.7	0.2	0.2	0.2	0.1	0.3	0.4	0.8	Diurnal Average
																								15	--	9	9	14	14	37	28	12	13	4	2	2	2	2	5	9	2	1	1	1	6	3	7	Diurnal Maximum
Z - zerospan C - Calibration																																																



WBEA NETWORK
Hourly Averages

Nitric Oxide (NO) - ppb
CNRL Horizon - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
CNRL Horizon - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	99.72	99.72
21 - 40	2	0.28	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: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitric Oxide (NO) - ppb
CNRL Horizon - July 2014

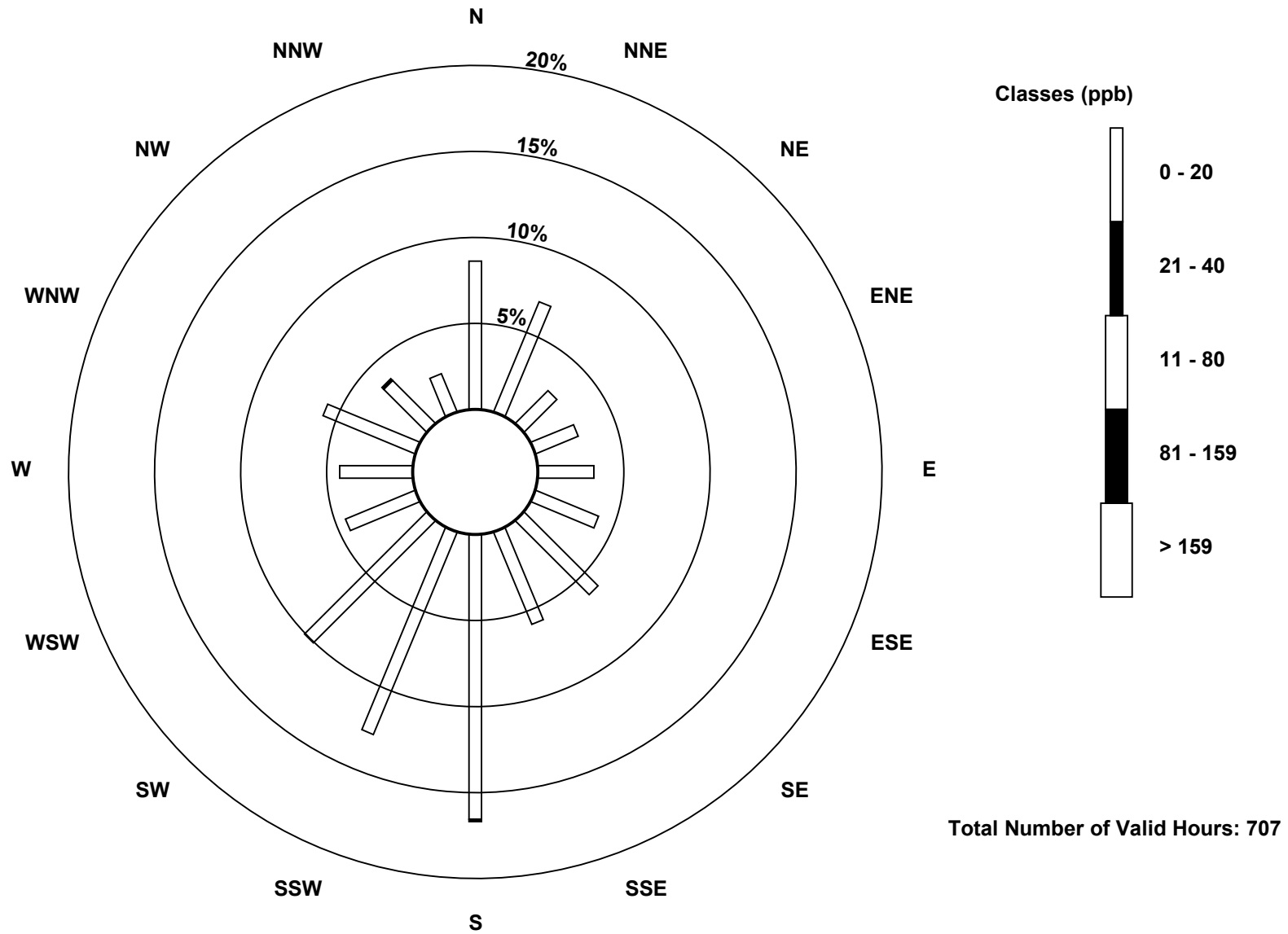
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	61	49	19	19	23	28	43	41	117	90	71	31	30	41	25	17	705
21 - 40	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	49	19	19	23	28	43	41	118	90	71	31	30	41	26	17	707

Total Number of Valid Hours: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

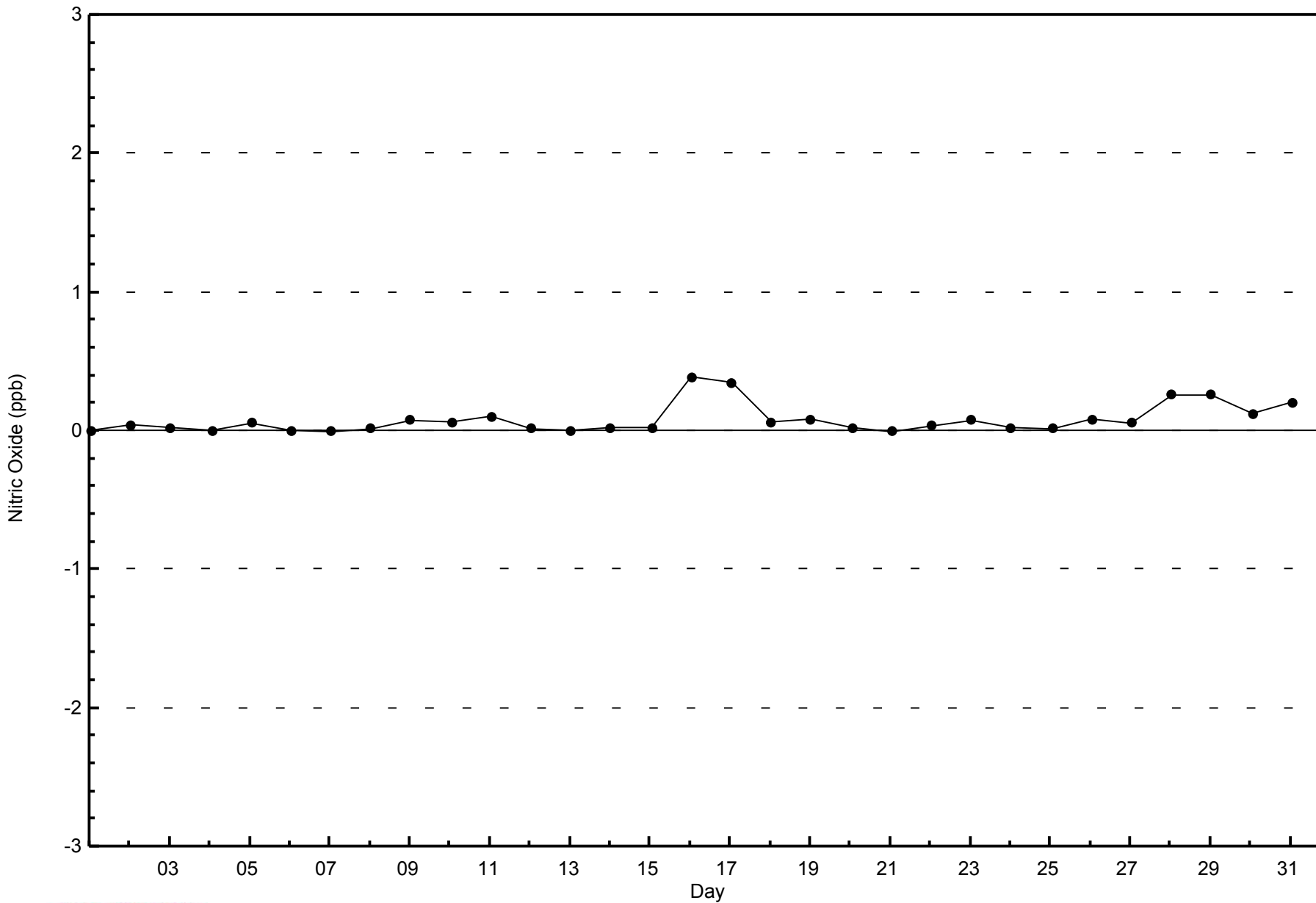
Nitric Oxide (NO) - ppb
CNRL Horizon (AMS 15)





WBEA NETWORK
Zero Responses

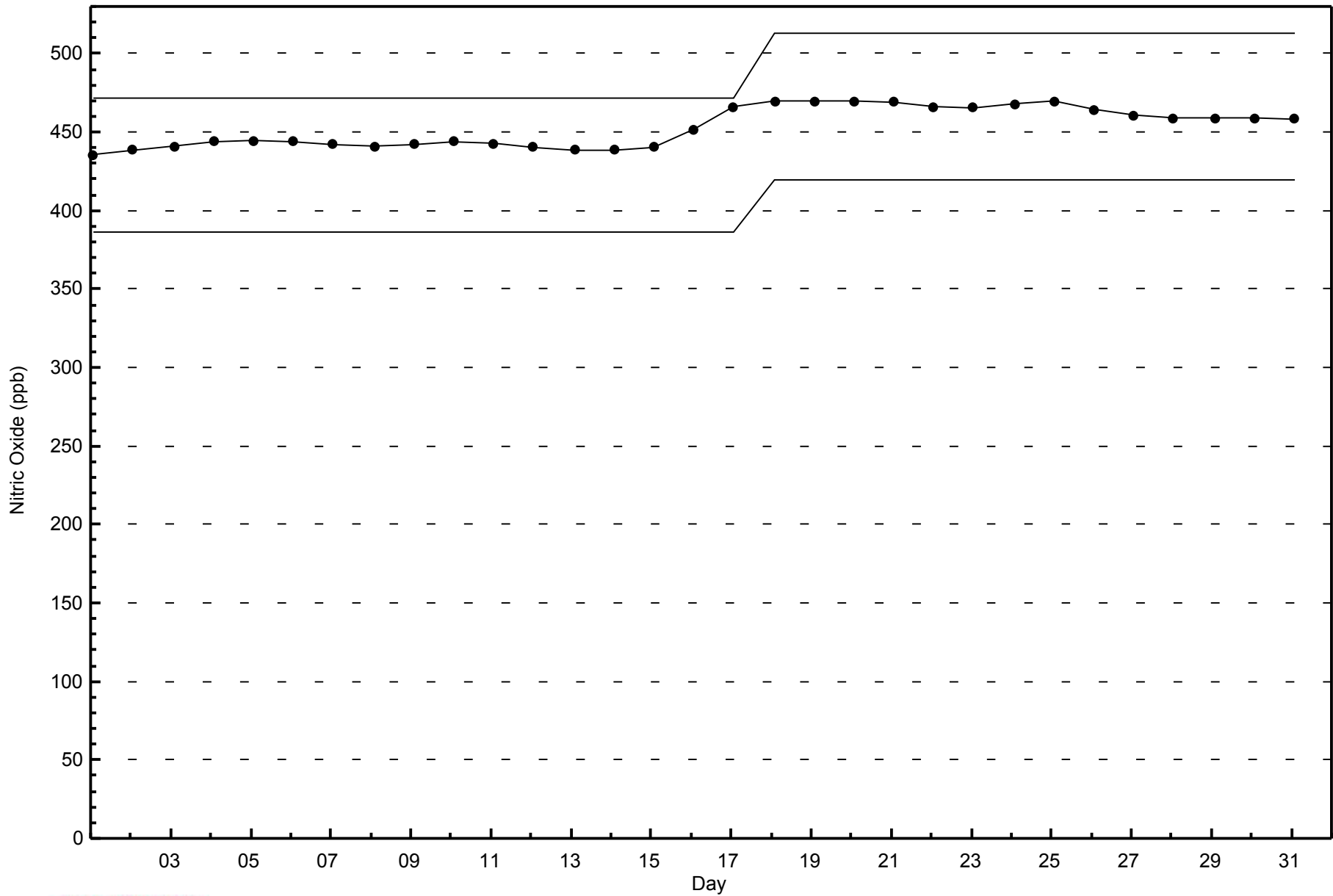
Nitric Oxide (NO) - ppb
CNRL Horizon - July 2014





WBEA NETWORK
Span Responses

Nitric Oxide (NO) - ppb
CNRL Horizon - July 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 24 ppb on Jul 21 22:00	Maximum Daily Average: 7.3 ppb on Jul 11		Hours of Data:	707
Minimum Value: 0 ppb on Jul 4 18:00	Minimum Daily Average: 0.8 ppb on Jul 5		Hours of Missing Data:	37
Maximum Diurnal Average: 6.3 ppb at hour 24	Minimum Diurnal Average: 1.9 ppb at hour 14		Hours of Calibration:	37
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 = 19		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	5	Z	5	2	2	3	4	3	1	1	1	0	0	0	2	1	3	2	10	8	3	2	2	9	3.0	10																						
2-Jul	5	Z	4	6	3	3	10	10	8	11	13	9	3	3	3	2	2	2	2	2	2	2	1	1	4.6	13																						
3-Jul	1	Z	4	12	9	6	2	2	2	2	2	2	2	4	4	5	1	1	3	1	1	1	5	3.1	12																							
4-Jul	12	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	12																						
5-Jul	1	Z	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0	4	3	1	0.8	4																						
6-Jul	3	Z	12	11	10	5	5	7	1	0	1	1	1	3	7	8	9	8	5	6	4	4	7	21	6.0	21																						
7-Jul	19	Z	2	6	9	5	3	9	3	4	3	2	3	1	1	1	1	1	1	1	1	2	2	4	3.5	19																						
8-Jul	8	Z	3	3	2	2	1	3	13	12	6	2	1	1	4	4	6	3	2	2	3	2	3	4	3.9	13																						
9-Jul	3	Z	9	7	1	3	1	1	3	8	3	1	1	1	3	2	0	0	0	1	6	7	11	2	3.3	11																						
10-Jul	1	Z	2	0	0	0	0	0	0	0	0	0	1	0	1	2	3	4	2	8	2	7	15	19	3.0	19																						
11-Jul	23	Z	18	17	20	8	12	15	10	3	1	0	0	0	1	2	1	0	1	1	2	5	6	22	7.3	23																						
12-Jul	5	Z	15	11	11	5	11	4	1	1	2	5	7	8	10	6	4	2	1	1	1	1	1	3	5.0	15																						
13-Jul	3	Z	4	5	7	2	8	4	2	2	1	1	3	3	2	2	2	2	1	2	2	2	4	5	2.9	8																						
14-Jul	4	Z	11	9	7	7	6	5	5	6	6	4	4	1	1	1	1	1	1	1	1	1	2	2	3.7	11																						
15-Jul	1	Z	1	1	1	1	1	0	1	C	C	C	C	C	C	2	2	1	1	1	1	2	1	2	--	2																						
16-Jul	1	Z	1	2	2	5	6	7	3	2	1	2	6	6	1	0	0	0	0	1	1	1	3	5	2.4	7																						
17-Jul	6	Z	10	10	5	1	16	11	5	4	5	8	4	5	3	3	5	5	3	5	8	14	8	10	6.6	16																						
18-Jul	6	Z	4	5	7	9	2	0	1	2	1	1	2	2	2	2	3	5	5	2	1	1	1	1	2.6	9																						
19-Jul	1	Z	3	3	7	6	2	1	1	1	1	1	1	1	2	2	3	3	6	10	8	8	17	19	4.5	19																						
20-Jul	2	Z	4	6	6	14	10	6	9	3	2	2	2	1	1	0	1	1	1	1	1	2	9	8	3.9	14																						
21-Jul	10	Z	5	3	3	2	6	13	9	3	2	2	1	1	1	2	3	4	4	3	11	24	18	13	6.1	24																						
22-Jul	8	Z	2	3	4	2	1	7	19	23	12	10	4	5	5	4	3	2	3	3	2	3	6	8	6.0	23																						
23-Jul	4	Z	10	13	9	4	12	11	9	3	2	2	2	1	5	2	1	1	1	7	9	10	5	4	5.5	13																						
24-Jul	7	Z	5	4	3	3	8	8	6	3	2	1	2	2	1	1	1	1	1	2	6	3	5	5	3.4	8																						
25-Jul	7	Z	4	2	2	0	0	0	1	1	1	1	1	1	1	3	5	2	3	4	6	4	5	9	2.8	9																						
26-Jul	4	Z	6	2	2	2	4	3	9	11	7	5	3	3	3	3	2	1	1	1	2	2	1	1	3.2	11																						
27-Jul	2	Z	2	1	1	1	1	0	0	0	0	0	0	0	0	1	1	2	5	1	1	1	2	3	1.1	5																						
28-Jul	5	Z	14	13	10	3	1	0	0	0	1	2	0	0	0	0	0	0	0	1	1	3	4	3	2.7	14																						
29-Jul	1	Z	1	1	1	1	1	1	7	2	1	1	3	2	1	19	22	7	2	3	3	4	4	8	4.1	22																						
30-Jul	13	Z	11	6	5	5	9	9	9	7	9	8	6	2	1	1	1	2	2	3	6	6	2	2	5.3	13																						
31-Jul	3	Z	3	1	2	2	3	3	5	11	2	1	1	1	2	2	1	1	1	1	1	1	1	1	2.1	11																						
																								5.5	--	5.6	5.4	4.9	3.6	4.7	4.7	4.6	4.2	2.8	2.4	2.1	1.9	2.2	2.7	2.9	2.0	2.1	2.6	3.1	4.1	4.8	6.3	Diurnal Average
																								23	--	18	17	20	14	16	15	19	23	13	10	7	8	10	19	22	8	10	10	11	24	18	22	Diurnal Maximum

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



WBEA NETWORK
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	701	99.15	99.15
21 - 40	6	0.85	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - July 2014

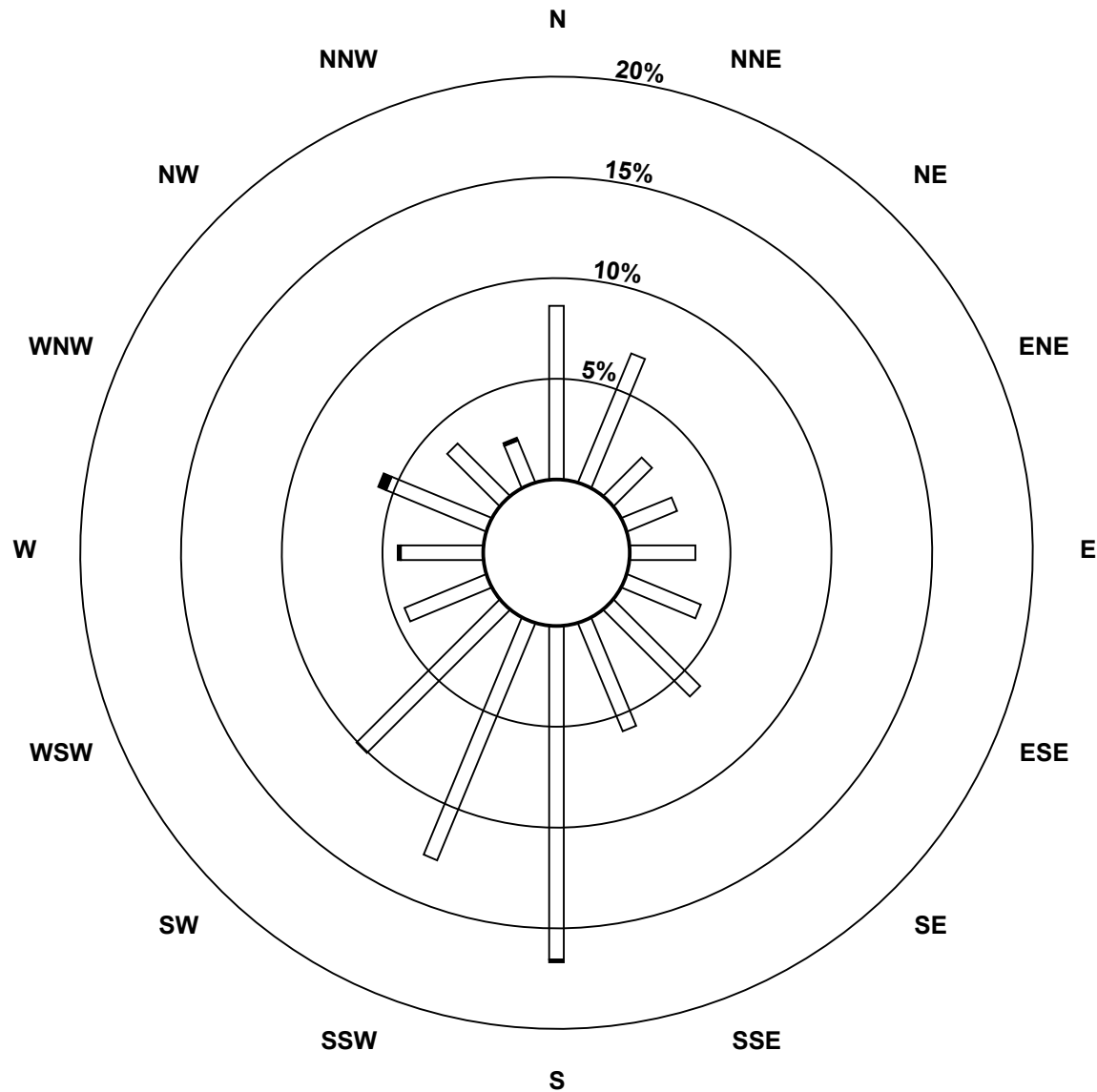
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	61	49	19	19	23	28	43	41	117	90	71	31	29	38	26	16	701
21 - 40	0	0	0	0	0	0	0	0	1	0	0	0	1	3	0	1	6
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	49	19	19	23	28	43	41	118	90	71	31	30	41	26	17	707

Total Number of Valid Hours: 707

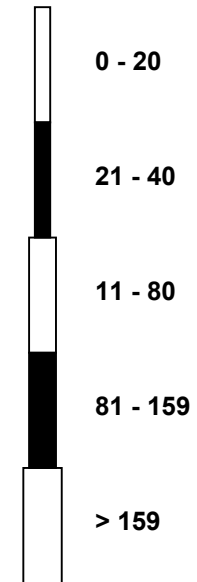
Total Number of Hours: 744

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

**Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon (AMS 15)**



Classes (ppb)



Total Number of Valid Hours: 707

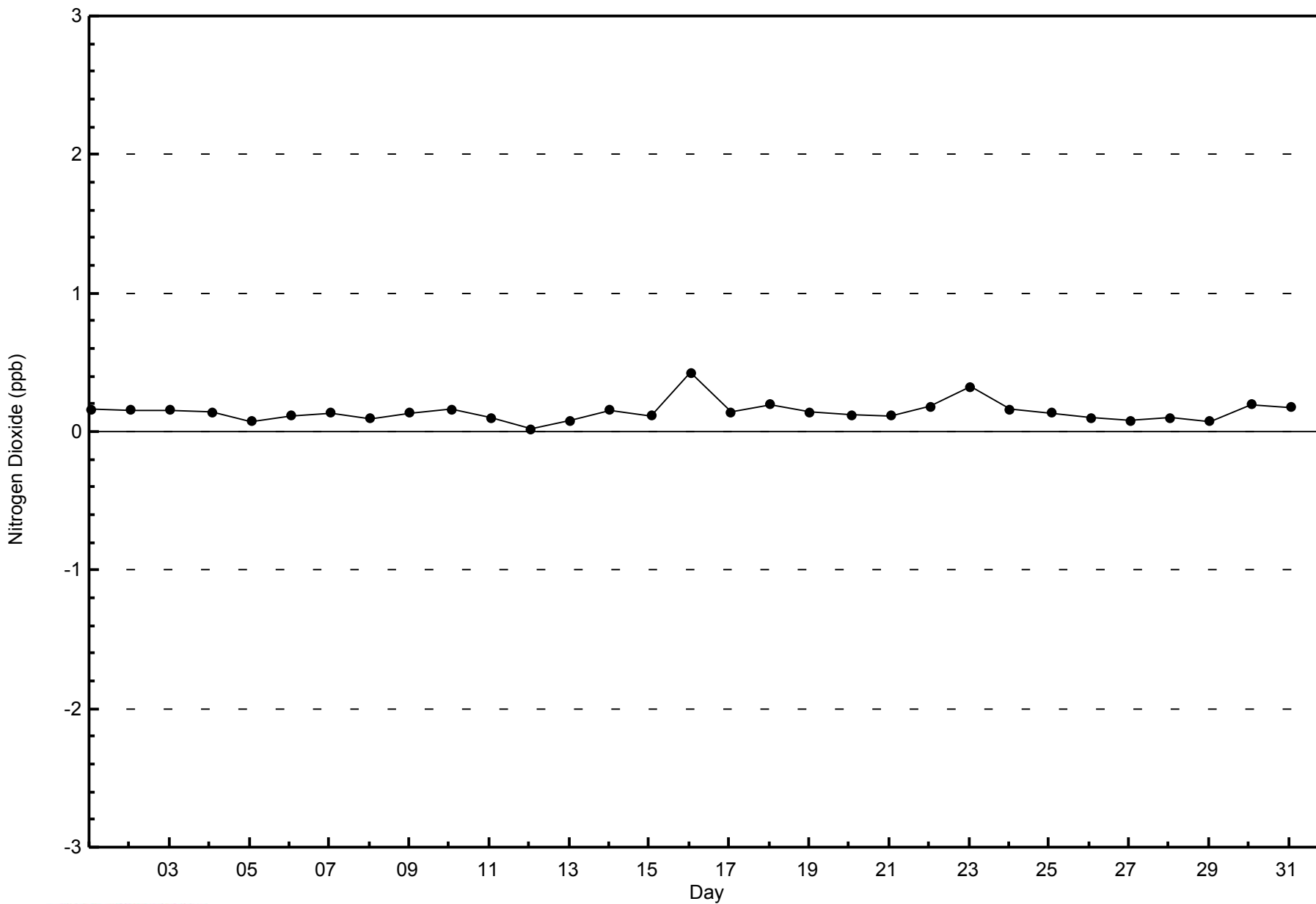


WBEA NETWORK

Zero Responses

Nitrogen Dioxide (NO₂) - ppb

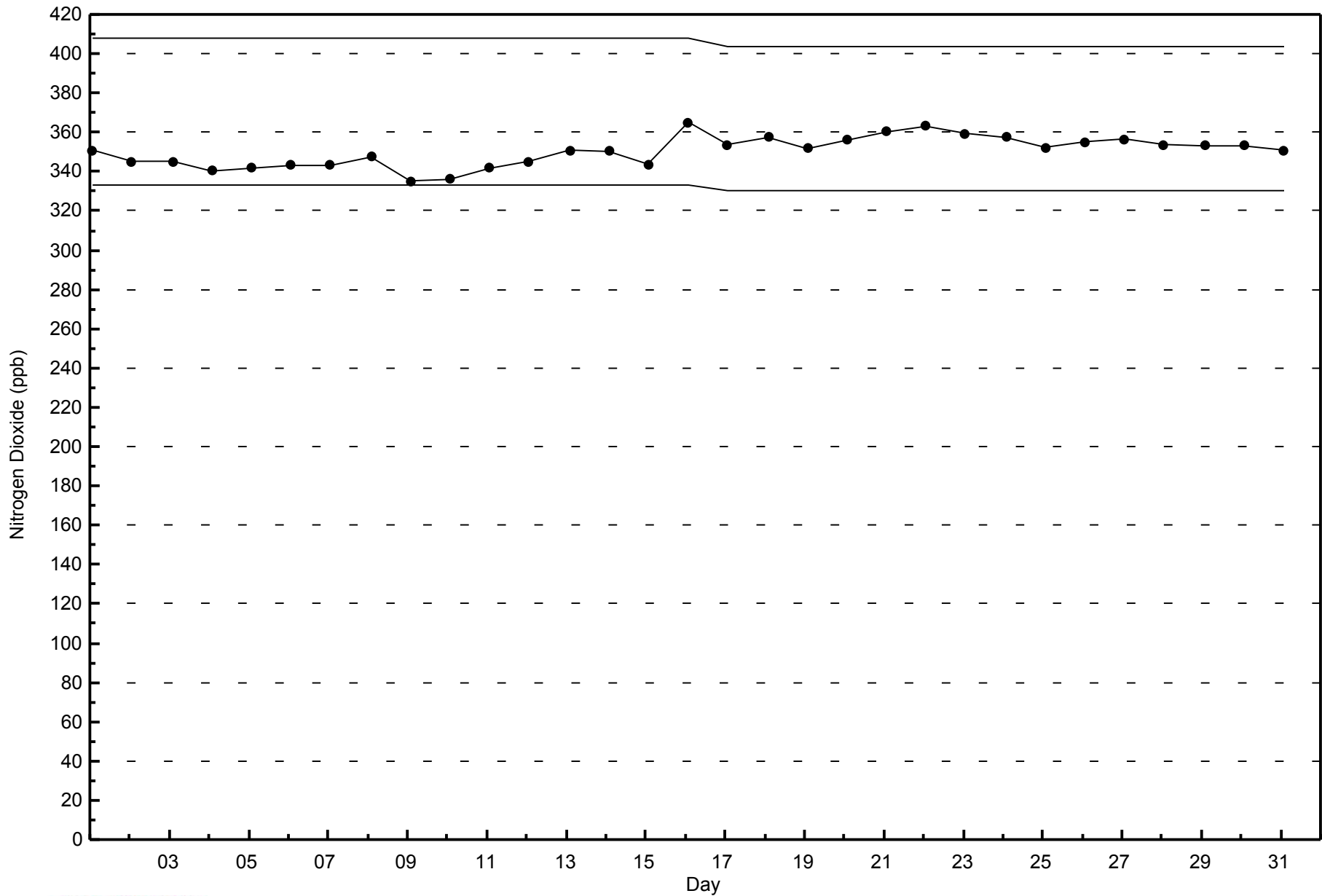
CNRL Horizon - July 2014





WBEA NETWORK
Span Responses

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - July 2014



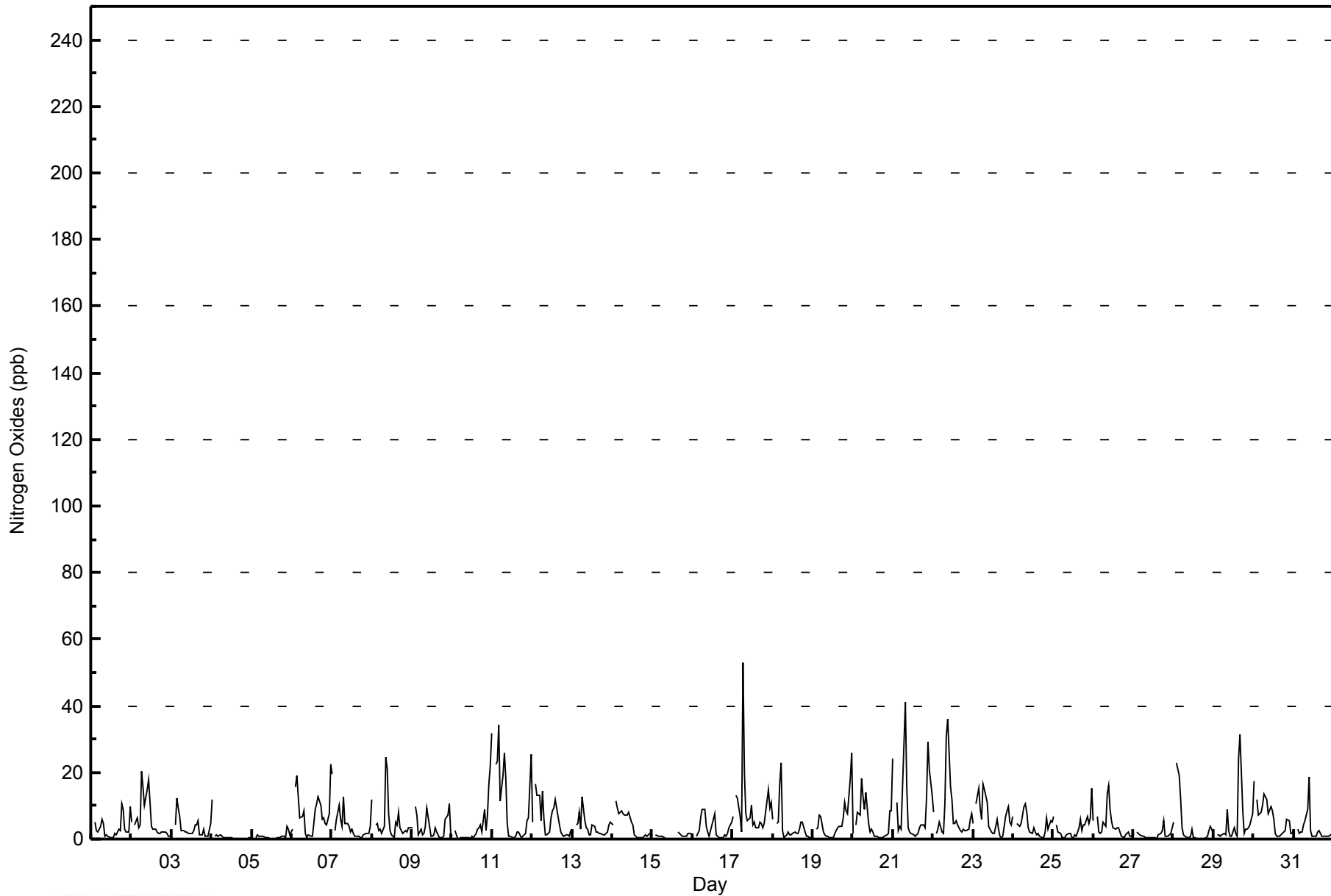


Maximum Value: 53 ppb on Jul 17 07:00																	Maximum Daily Average: 10.4 ppb on Jul 11																	Hours in Service: 744			
Minimum Value: 0 ppb on Jul 4 18:00																	Minimum Daily Average: 0.8 ppb on Jul 5																	Hours of Data: 707			
Maximum Diurnal Average: 8.1 ppb at hour 7																	Minimum Diurnal Average: 2.2 ppb at hour 14																	Hours of Missing Data: 37			
Monthly Average: 4.7 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 6 P ₉₀ = 12 P ₉₉ = 31																	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-Jul	6	Z	5	3	2	4	6	4	1	1	1	0	0	0	2	1	3	2	11	9	3	2	2	10	3.4	11											
2-Jul	5	Z	4	6	3	4	20	16	10	15	18	11	4	3	3	2	2	2	2	2	2	2	1	1	6.0	20											
3-Jul	1	Z	4	12	9	7	2	3	2	2	2	2	3	4	4	6	1	1	3	1	1	1	5	3.4	12												
4-Jul	12	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.9	12												
5-Jul	1	Z	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0	4	3	0.8	4												
6-Jul	3	Z	16	19	13	7	7	9	2	0	1	1	1	5	9	10	13	10	6	6	5	4	8	7.6	23												
7-Jul	20	Z	3	6	10	6	4	13	5	5	4	2	3	2	1	1	1	1	1	1	1	2	2	4.1	20												
8-Jul	12	Z	4	5	3	3	2	4	24	21	8	3	1	1	5	4	8	3	2	2	3	2	3	5.5	24												
9-Jul	3	Z	10	7	1	3	1	2	4	9	4	1	1	1	3	2	0	0	0	1	6	7	11	3.5	11												
10-Jul	1	Z	2	0	0	0	1	0	0	0	0	0	1	0	2	3	3	4	2	9	3	7	17	3.4	22												
11-Jul	32	Z	23	23	34	11	19	26	18	5	1	1	0	0	1	2	2	0	1	1	2	5	7	10.4	34												
12-Jul	5	Z	16	13	13	6	15	6	1	1	2	6	8	10	12	7	4	2	1	1	1	1	3	5.9	16												
13-Jul	3	Z	4	5	8	3	13	5	3	3	1	1	4	4	2	2	2	2	1	1	1	2	4	3.5	13												
14-Jul	4	Z	12	9	8	9	8	7	7	7	8	5	4	1	1	1	0	1	1	1	1	1	1	4.3	12												
15-Jul	1	Z	1	1	1	1	1	1	0	C	C	C	C	C	C	2	2	1	1	1	1	2	2	--	2												
16-Jul	1	Z	1	2	2	6	9	9	4	2	1	3	6	7	1	1	1	0	0	1	1	2	3	3.0	9												
17-Jul	7	Z	13	12	7	2	53	20	8	5	6	10	4	5	3	3	5	5	3	5	8	15	9	9.6	53												
18-Jul	6	Z	5	5	17	23	3	0	1	2	1	1	2	2	2	2	3	5	5	2	1	1	1	3.9	23												
19-Jul	1	Z	3	3	7	7	2	1	1	1	1	1	0	2	3	3	4	4	6	11	8	8	18	5.2	26												
20-Jul	2	Z	4	8	7	18	13	9	14	4	2	3	2	1	1	0	0	1	1	1	1	2	9	4.8	18												
21-Jul	24	Z	11	3	4	3	16	41	16	3	2	2	1	1	1	2	4	4	4	3	12	29	9.6	41													
22-Jul	8	Z	2	3	5	2	2	10	31	36	16	12	5	5	6	4	3	2	3	3	2	3	6	7.6	36												
23-Jul	5	Z	11	15	9	6	16	15	11	4	3	2	2	2	6	3	1	1	1	7	9	10	5	6.3	16												
24-Jul	7	Z	5	4	4	4	10	10	8	3	2	2	3	2	1	2	1	1	1	2	7	3	5	4.0	10												
25-Jul	7	Z	4	2	2	1	1	0	1	2	2	1	0	1	1	4	6	2	4	4	7	5	7	3.4	15												
26-Jul	6	Z	7	2	2	2	5	4	14	16	9	6	3	3	3	3	2	1	0	1	2	2	1	4.1	16												
27-Jul	2	Z	2	2	1	1	1	0	0	0	0	0	0	0	0	1	2	2	6	1	1	1	2	1.3	6												
28-Jul	5	Z	23	19	12	3	1	1	0	0	1	3	0	0	0	0	0	0	0	1	1	3	4	3.5	23												
29-Jul	2	Z	1	1	1	1	2	1	9	3	1	1	3	2	1	24	31	9	2	3	3	4	4	5.0	31												
30-Jul	17	Z	12	7	8	10	14	13	12	8	10	8	6	2	1	1	1	2	2	3	6	6	2	6.5	17												
31-Jul	3	Z	3	2	2	2	4	5	9	19	3	1	1	1	2	3	2	1	1	1	1	1	1	2.9	19												
6.8																	--																	Diurnal Average			
32																	23																	Diurnal Maximum			
Z - zerospan C - Calibration																																					



WBEA NETWORK
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	685	96.89	96.89
21 - 40	20	2.83	99.72
41 - 80	2	0.28	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - July 2014

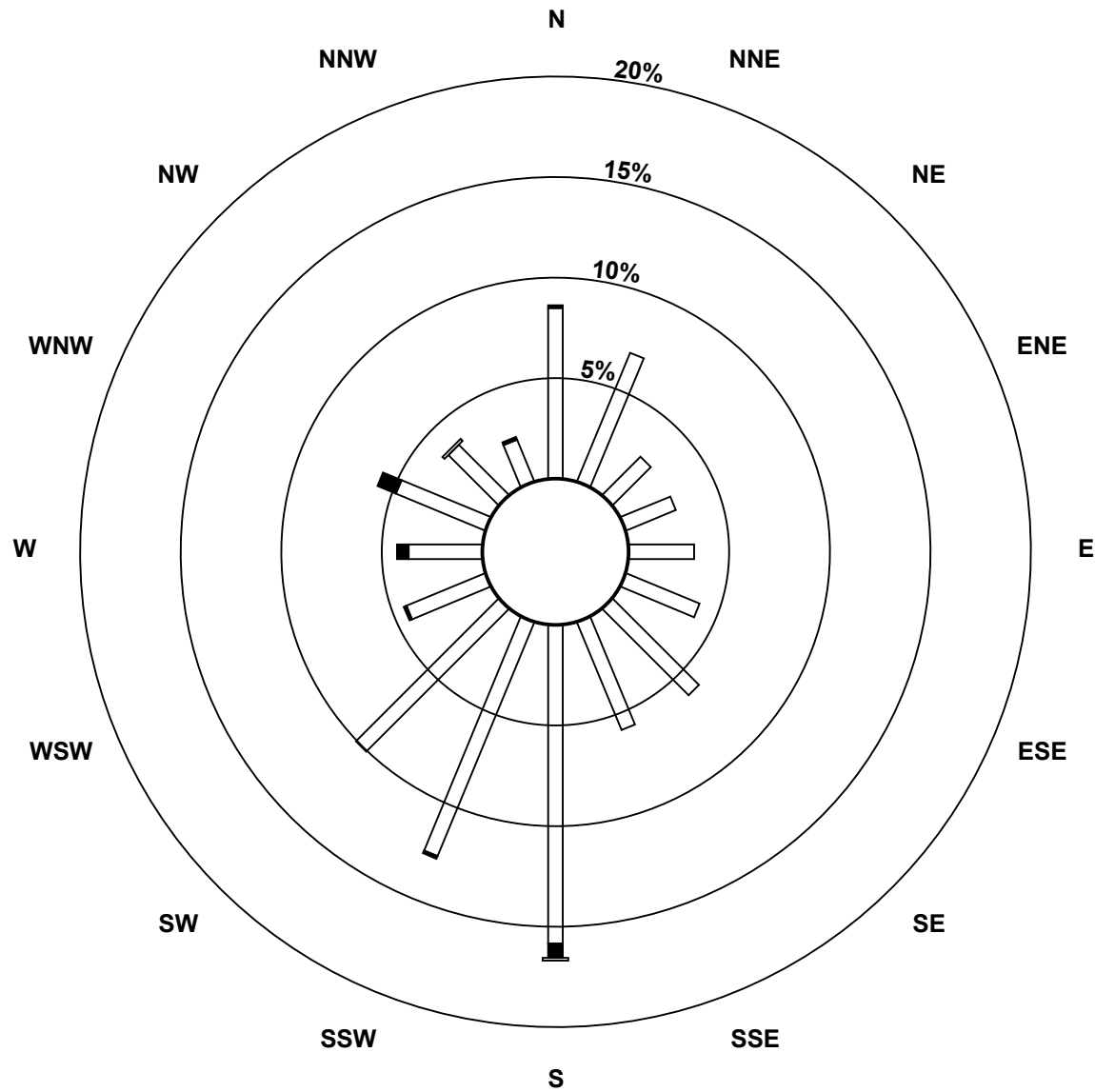
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	60	49	19	19	23	28	43	41	112	89	71	30	26	34	25	16	685
21 - 40	1	0	0	0	0	0	0	0	5	1	0	1	4	7	0	1	20
11 - 80	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	49	19	19	23	28	43	41	118	90	71	31	30	41	26	17	707

Total Number of Valid Hours: 707

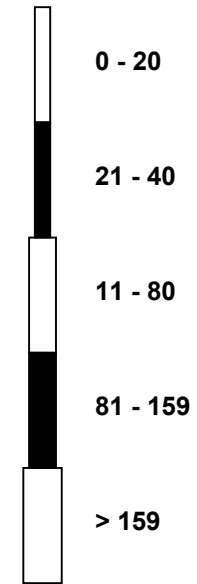
Total Number of Hours: 744

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

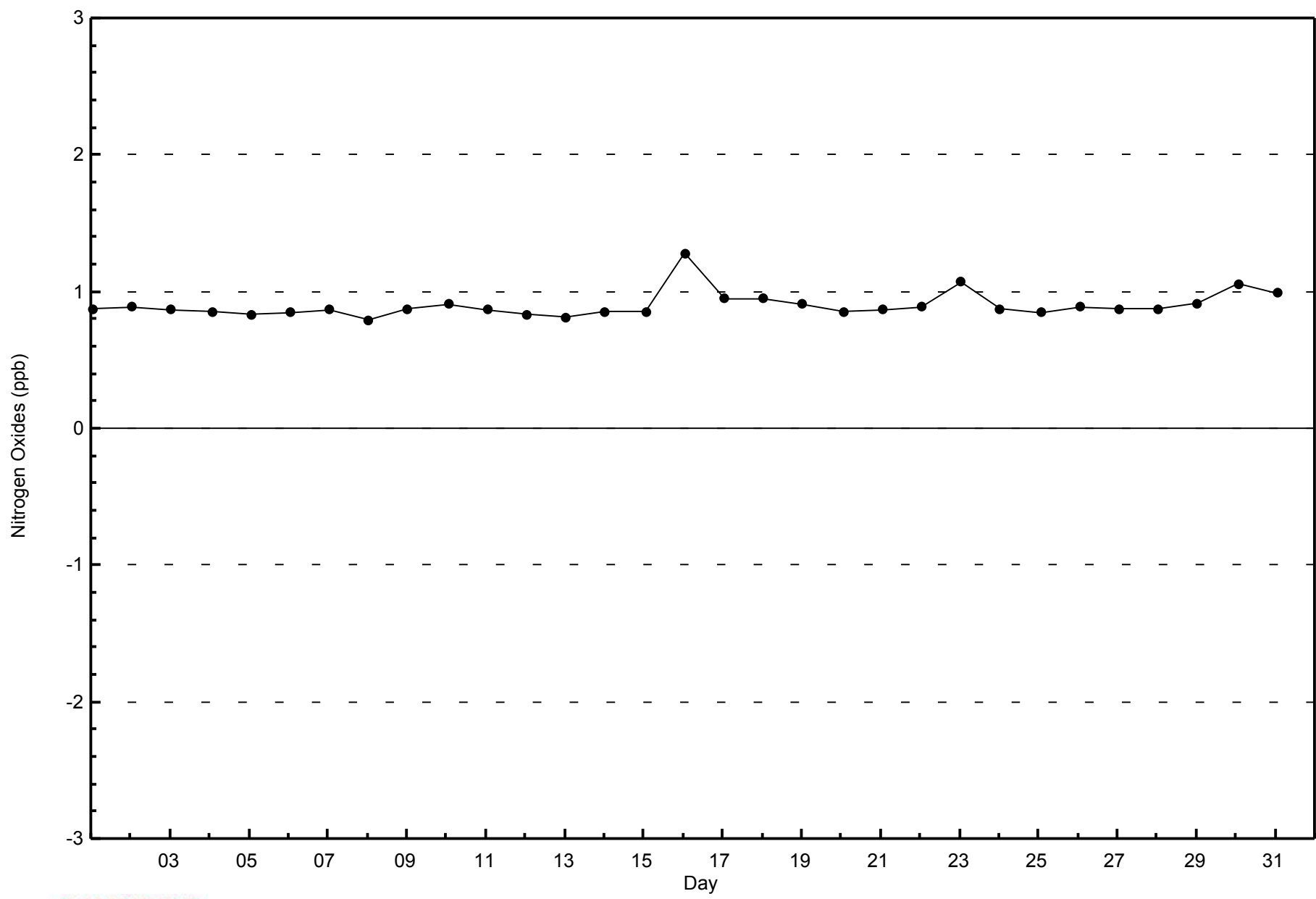
**Nitrogen Oxides (NO_x) - ppb
CNRL Horizon (AMS 15)**



Classes (ppb)



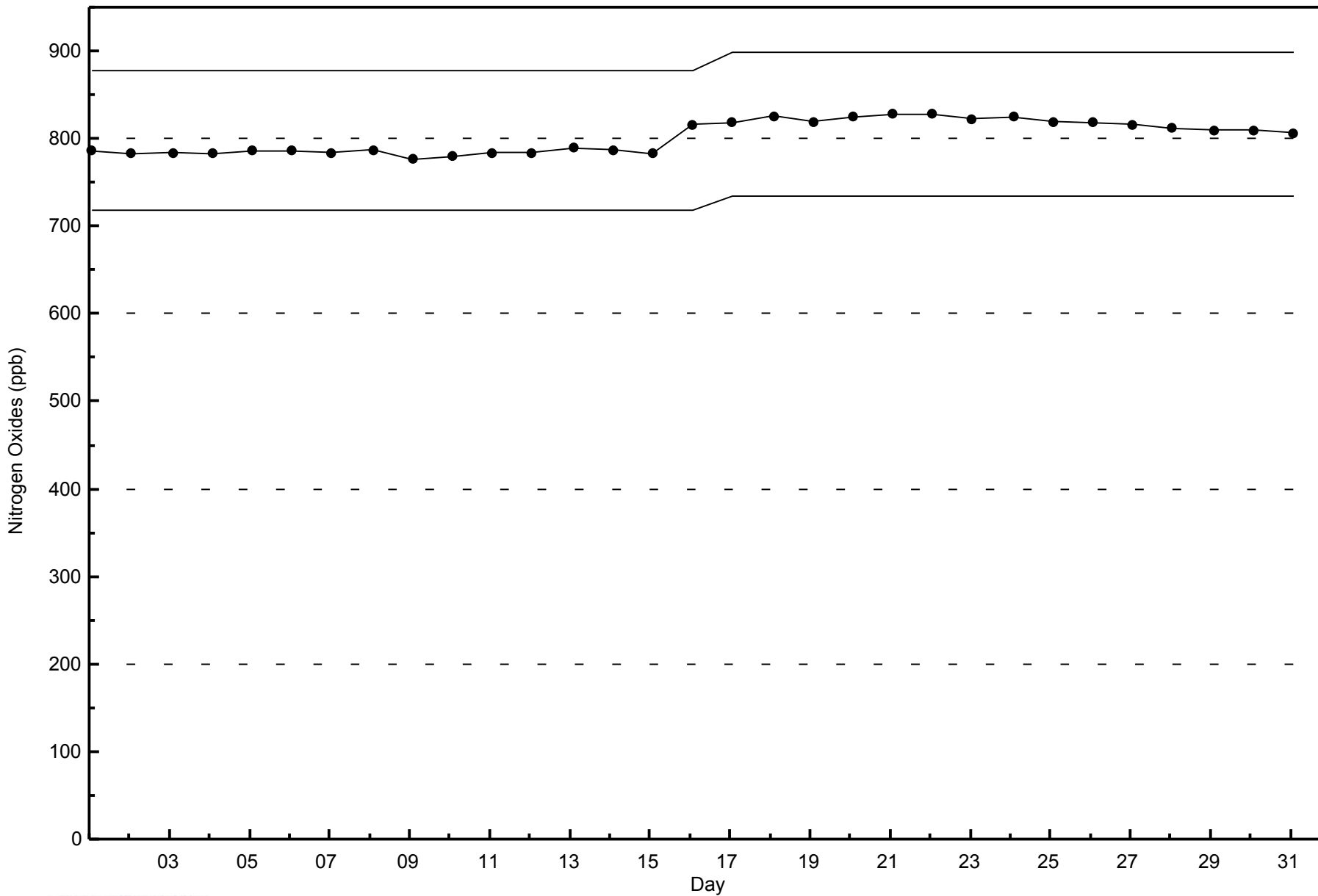
Total Number of Valid Hours: 707





WBEA NETWORK
Span Responses

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - July 2014





Summary of Hour Averages

CNRL Horizon - July 2014

Number of Exceedences (AAAQO): 24-hr: 6	Hours in Service: 744
Maximum Value: 210.9 µg/m ³ on Jul 31 16:00	Maximum Daily Average: 55.1 µg/m ³ on Jul 31
Minimum Value: 1.6 µg/m ³ on Jul 5 04:00	Hours of Data: 743
Maximum Diurnal Average: 24.2 µg/m ³ at hour 20	Hours of Missing Data: 1
Monthly Average: 19.96 µg/m ³	Hours of Calibration: 0
Minimum Daily Average: 1.9 µg/m ³ on Jul 5	Percent Operational Time: 99.9
Minimum Diurnal Average: 16.7 µg/m ³ at hour 3	
Percentiles: P ₁ = 1.8 P ₁₀ = 3.3 Q ₁ = 7.8 Median = 13.8 Q ₃ = 26.6 P ₉₀ = 41.9 P ₉₉ = 89.0	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	17.3	16.3	15.8	15.0	18.0	21.3	17.0	14.1	13.1	12.7	10.1	9.9	11.3	12.6	15.7	20.3	20.4	22.8	24.6	23.9	24.2	32.0	38.5	36.5	19.3	38.5																							
2-Jul	34.1	33.5	32.3	31.2	29.0	27.9	26.1	27.2	31.2	25.6	22.1	27.4	32.7	34.5	33.6	29.1	26.4	24.6	21.6	21.5	23.0	25.0	24.5	22.1	27.8	34.5																							
3-Jul	21.2	22.0	23.8	24.9	25.3	25.0	24.1	23.1	22.6	21.7	18.6	17.6	15.3	16.0	17.2	14.0	13.8	12.3	13.2	14.1	12.7	15.7	16.2	17.1	18.6	25.3																							
4-Jul	18.5	12.8	6.9	5.2	4.6	4.6	4.9	4.4	3.5	2.8	2.4	2.3	2.2	2.1	1.9	1.9	1.9	2.0	1.8	1.8	2.0	1.9	1.9	1.9	4.0	18.5																							
5-Jul	1.9	1.9	1.8	1.6	2.4	2.5	1.9	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.9	1.9	2.1	2.0	2.0	1.8	1.9	1.9	1.9	1.9	2.5																							
6-Jul	2.0	2.7	2.9	3.4	2.8	2.3	2.6	2.7	2.4	2.0	2.2	2.2	3.3	3.7	4.3	6.2	6.4	6.6	7.7	9.4	11.0	14.4	14.3	18.3	5.7	18.3																							
7-Jul	19.4	16.6	19.6	40.5	72.9	60.3	52.8	77.4	75.3	59.7	53.6	48.0	47.3	36.9	39.5	50.8	45.3	36.7	32.1	30.8	24.1	23.4	23.8	24.1	42.1	77.4																							
8-Jul	26.8	26.0	25.6	24.6	24.6	26.9	26.6	26.9	30.8	37.4	45.0	45.7	41.2	19.1	9.8	7.6	12.1	14.5	14.3	15.0	13.9	12.9	14.3	11.7	23.1	45.7																							
9-Jul	9.5	7.5	10.3	9.9	11.7	10.5	9.7	8.5	9.0	12.1	9.1	7.0	7.1	6.7	7.3	5.3	5.1	4.8	4.3	4.9	7.3	6.1	5.9	5.6	7.7	12.1																							
10-Jul	4.9	3.3	2.5	2.2	3.0	4.2	5.3	5.6	5.7	5.2	3.3	3.1	2.4	2.0	2.9	4.8	5.3	16.5	64.4	59.9	52.5	38.9	22.8	16.6	14.1	64.4																							
11-Jul	17.4	18.4	17.2	16.4	16.8	15.3	16.1	13.7	10.8	8.8	7.2	3.2	2.3	2.2	2.6	2.7	3.4	17.4	19.3	83.2	93.5	98.8	98.4	71.7	27.4	98.8																							
12-Jul	42.9	26.2	16.5	12.0	12.4	14.5	19.0	32.2	48.2	51.8	50.8	59.5	65.4	63.4	65.0	67.8	69.0	62.7	50.2	39.3	27.7	26.1	27.5	33.4	41.0	69.0																							
13-Jul	29.1	23.1	21.5	21.0	17.7	16.1	12.4	4.4	2.6	2.8	3.5	4.3	6.6	11.8	10.4	10.1	9.7	9.6	9.7	10.8	11.8	13.9	15.4	13.7	12.2	29.1																							
14-Jul	12.6	16.1	15.2	13.4	13.9	20.6	13.3	10.1	15.4	22.7	28.0	33.8	35.3	23.0	16.6	13.6	11.8	11.2	9.7	10.9	11.5	11.8	10.8	9.6	16.3	35.3																							
15-Jul	9.4	8.9	7.8	8.1	8.3	6.3	5.2	4.7	4.4	4.6	4.8	7.5	9.2	9.3	11.0	11.8	11.5	11.5	12.0	13.0	14.6	15.5	16.7	17.4	9.7	17.4																							
16-Jul	17.4	18.7	20.5	23.7	26.5	26.6	28.0	28.7	32.2	44.5	62.4	62.6	58.6	51.0	22.9	17.9	14.3	12.3	12.8	13.1	10.8	7.7	7.0	7.5	26.2	62.6																							
17-Jul	7.9	7.9	8.0	7.6	7.8	8.0	11.5	14.1	12.8	16.1	20.7	20.7	M	27.0	28.7	28.8	36.9	32.6	26.3	30.6	14.1	8.4	7.4	6.4	17.0	36.9																							
18-Jul	6.4	7.1	6.8	7.3	11.3	16.4	16.2	11.9	12.7	10.9	9.3	9.8	11.3	12.4	11.1	13.6	18.9	27.4	30.5	16.2	6.8	8.1	8.6	8.8	12.5	30.5																							
19-Jul	8.8	10.7	17.6	19.1	21.8	16.3	17.3	23.7	30.0	28.5	26.3	22.5	18.4	12.9	22.9	18.7	14.7	16.5	49.4	63.1	58.3	60.0	56.9	54.0	28.7	63.1																							
20-Jul	53.8	48.9	43.3	43.7	49.5	53.3	54.2	50.8	44.4	38.2	39.0	39.9	36.9	27.9	24.7	24.0	28.1	30.3	28.9	26.9	27.5	29.5	31.2	31.1	37.8	54.2																							
21-Jul	34.1	36.7	34.3	33.3	33.2	33.8	36.0	36.8	32.6	31.3	34.6	36.6	30.5	27.0	25.5	27.2	33.5	31.9	27.6	31.2	39.4	41.1	41.9	41.9	33.8	41.9																							
22-Jul	35.4	34.2	31.4	29.9	31.3	34.4	35.7	36.4	37.0	43.6	43.2	44.2	53.1	50.0	46.4	36.1	20.2	20.3	22.6	23.2	24.0	26.8	29.0	33.4	34.2	53.1																							
23-Jul	36.0	36.5	37.7	34.4	34.2	33.0	32.0	25.6	22.2	18.0	14.1	9.8	8.6	6.0	8.5	9.0	8.8	7.8	11.9	14.8	16.0	17.2	16.2	17.1	19.8	37.7																							
24-Jul	18.4	18.3	20.3	21.8	15.7	16.8	11.0	9.0	9.5	10.7	11.7	11.7	13.7	13.7	12.8	11.2	8.9	7.8	7.3	7.8	8.6	8.6	9.2	9.8	12.3	21.8																							
25-Jul	10.8	10.0	10.3	10.2	10.0	11.2	11.0	10.2	9.3	8.9	8.3	7.5	7.8	7.8	7.0	6.6	5.3	5.7	5.3	4.9	5.8	6.2	7.5	9.7	8.2	11.2																							
26-Jul	6.7	8.2	9.6	10.2	11.0	10.6	8.6	6.9	14.9	19.3	10.7	13.4	15.1	16.3	20.7	21.0	14.5	9.9	8.4	12.3	13.0	10.9	9.5	9.9	12.2	21.0																							
27-Jul	10.5	11.8	12.8	13.1	12.4	14.9	15.1	13.4	12.5	11.9	12.4	16.4	19.1	16.3	11.1	9.0	8.2	10.4	10.7	6.8	6.8	7.6	7.4	9.3	11.7	19.1																							
28-Jul	11.0	11.4	9.6	9.3	9.3	9.5	8.4	7.3	6.3	4.7	4.3	4.6	3.1	3.0	2.9	3.0	2.9	3.1	3.3	6.8	5.6	6.3	8.3	6.6	6.3	11.4																							
29-Jul	7.2	8.3	8.2	8.7	9.1	8.8	6.8	7.0	7.9	6.7	4.9	5.4	8.4	8.9	7.5	15.0	17.3	12.4	10.0	14.7	15.6	16.9	16.5	22.0	10.6	22.0																							
30-Jul	24.8	23.0	20.8	21.6	20.8	20.6	18.4	23.1	27.5	32.0	38.7	38.0	34.4	11.9	8.5	9.2	10.8	12.8	14.1	82.8	9.8	6.3	4.9	5.4	21.7	82.8																							
31-Jul	6.7	6.5	6.1	6.1	6.6	8.0	7.8	8.7	9.7	10.8	8.2	12.6	44.7	84.0	178.2	210.9	145.1	91.8	71.2	55.4	69.0	102.0	86.7	84.7	55.1	210.9																							
																								18.2	17.2	16.7	17.1	18.5	18.7	17.9	18.4	19.3	19.6	19.7	20.3	21.6	20.0	21.9	22.9	20.4	19.0	20.2	24.2	21.4	22.6	22.0	21.3	Diurnal Average	
																								53.8	48.9	43.3	43.7	72.9	60.3	54.2	77.4	75.3	59.7	62.4	62.6	65.4	84.0	178.2	210.9	145.1	91.8	71.2	83.2	93.5	102.0	98.4	84.7	Diurnal Maximum	

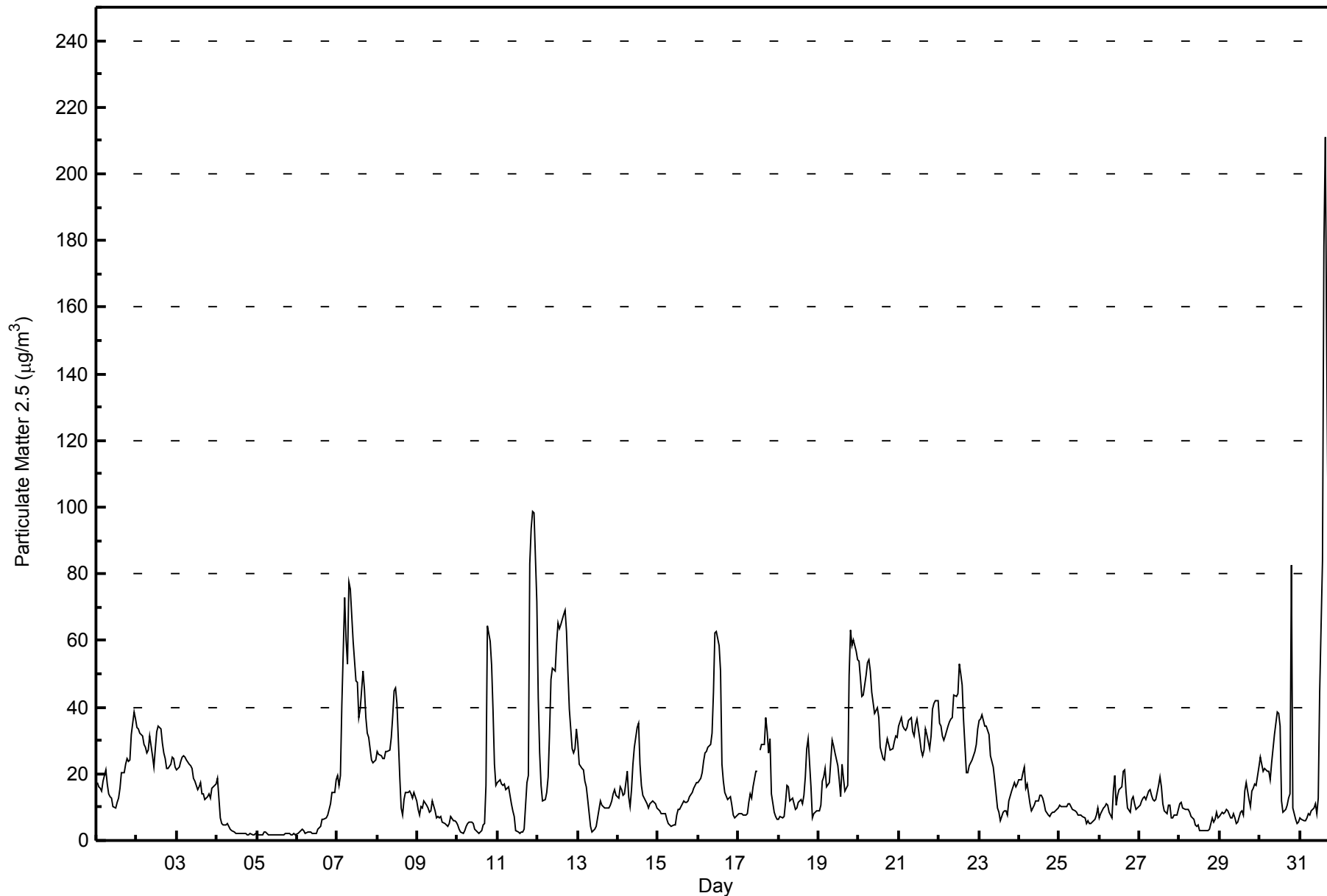
M - Maintenance

Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA NETWORK
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - July 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	113	15.21	15.21
6 - 15	294	39.57	54.78
16 - 25	138	18.57	73.35
26 - 80	185	24.90	98.25
> 81.0	13	1.75	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
CNRL Horizon - July 2014

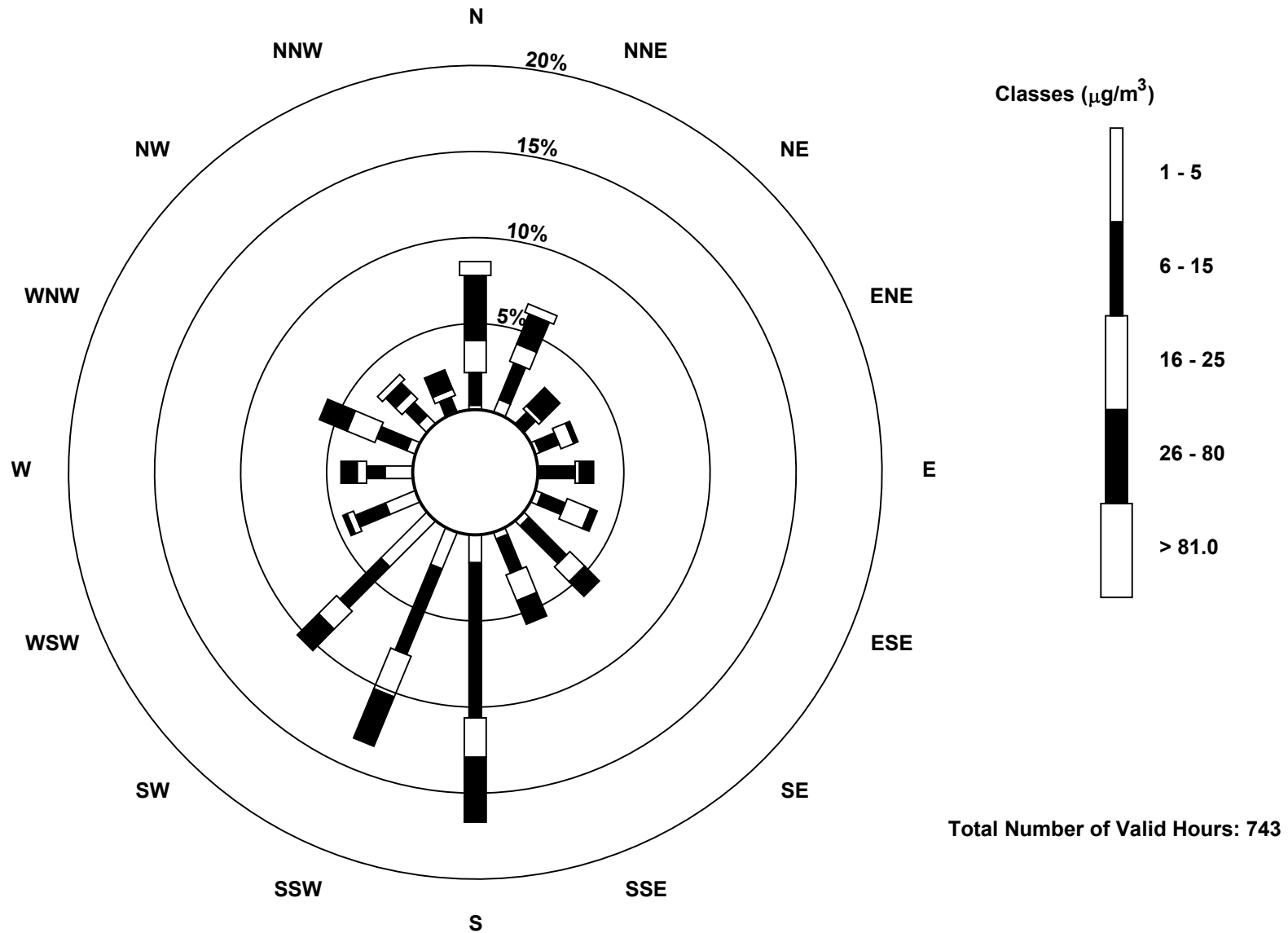
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	2	6	0	2	1	3	3	3	12	17	28	14	12	4	5	1	113
6 - 15	14	17	7	9	15	11	23	16	67	40	25	14	8	14	8	6	294
16 - 25	14	8	2	6	2	11	9	12	17	19	11	3	4	13	4	3	138
26 - 80	28	14	11	2	6	3	9	11	28	23	13	2	7	13	6	9	185
> 81.0	6	4	0	0	0	0	0	0	0	0	0	0	0	0	3	0	13
Totals	64	49	20	19	24	28	44	42	124	99	77	33	31	44	26	19	743

Total Number of Valid Hours: 743

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon (AMS 15)



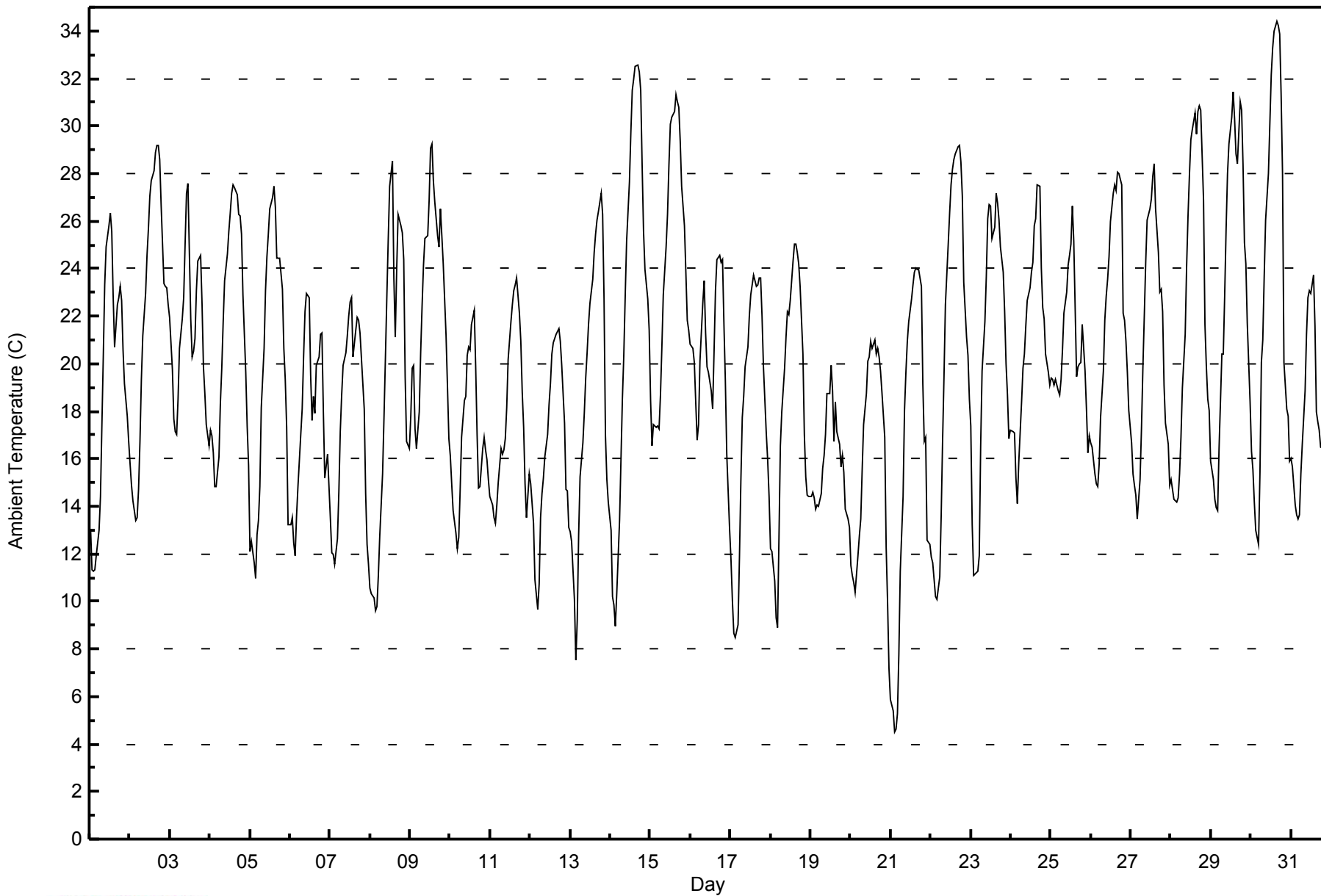


Maximum Value: 34.4 C on Jul 30 16:00 Maximum Daily Average: 24.2 C on Jul 15																						Hours in Service: 744 Hours of Data: 744				
Minimum Value: 4.5 C on Jul 21 03:00 Minimum Daily Average: 15.9 C on Jul 19 Maximum Diurnal Average: 25.2 C at hour 14 Minimum Diurnal Average: 12.7 C at hour 4 Monthly Average: 19.82 C Percentiles: P ₁ = 7.7 P ₁₀ = 12.7 Q ₁ = 15.5 Median = 19.8 Q ₃ = 23.8 P ₉₀ = 27.4 P ₉₉ = 32.5																						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-Jul	13.1	11.3	11.2	11.3	11.9	13.0	14.4	17.4	20.3	23.3	24.9	25.8	26.3	25.6	22.8	20.7	22.5	22.8	23.3	22.7	20.6	19.2	17.8	16.7	19.1	26.3
2-Jul	15.8	14.9	14.2	13.4	13.6	14.7	16.7	19.3	21.2	23.0	24.5	25.7	27.0	27.7	28.1	28.9	29.2	29.2	28.6	26.7	23.4	23.3	23.2	22.5	22.3	29.2
3-Jul	22.0	19.8	17.7	17.1	17.0	18.5	20.6	21.9	22.8	25.0	27.2	27.6	21.9	20.3	20.5	21.1	23.1	24.3	24.6	22.5	19.9	18.7	17.5	16.6	21.2	27.6
4-Jul	17.2	17.0	16.3	14.8	14.8	16.1	18.4	19.8	21.7	23.5	24.6	25.6	26.4	27.1	27.5	27.4	27.1	26.3	26.2	25.4	22.9	19.6	17.4	15.7	21.6	27.5
5-Jul	12.1	12.5	11.6	11.0	12.8	13.4	14.8	18.2	20.6	23.1	24.5	25.5	26.5	27.0	27.5	26.6	24.4	24.5	24.5	23.1	20.7	19.3	17.3	13.2	19.8	27.5
6-Jul	13.2	13.6	12.4	11.9	13.6	14.8	17.1	18.1	20.3	22.2	22.9	22.8	19.5	17.6	18.6	17.9	20.0	20.3	21.3	21.3	18.1	15.2	16.2	14.8	17.7	22.9
7-Jul	13.5	12.0	12.0	11.6	12.6	14.6	17.1	18.7	19.9	20.5	21.2	22.0	22.6	22.8	20.3	21.4	21.9	21.8	21.3	20.2	18.1	14.5	12.4	11.6	17.7	22.8
8-Jul	10.5	10.3	10.1	9.6	9.8	11.1	12.8	15.4	17.7	20.3	22.8	25.2	27.5	28.5	23.6	21.1	23.9	26.3	25.8	25.5	24.4	19.5	16.7	16.4	19.0	28.5
9-Jul	17.8	19.8	20.0	17.2	16.4	18.0	20.5	22.4	24.1	25.3	25.4	26.9	29.1	29.2	27.7	26.8	25.4	24.9	26.5	25.4	24.2	21.2	19.0	16.9	22.9	29.2
10-Jul	16.1	15.0	13.8	12.9	12.2	12.7	14.7	16.9	18.5	18.6	20.4	20.7	20.6	21.6	22.3	19.9	17.0	14.8	14.8	16.4	16.9	16.4	16.0	15.1	16.8	22.3
11-Jul	14.4	14.1	13.5	13.3	14.0	15.0	16.4	16.2	16.3	16.8	18.2	20.2	21.8	22.5	23.1	23.3	23.6	22.1	20.9	18.8	17.3	14.9	13.5	15.4	17.7	23.6
12-Jul	15.0	14.1	13.3	10.9	9.7	10.8	13.5	14.6	15.2	16.1	17.0	18.3	19.2	20.4	20.9	21.3	21.4	21.5	20.9	20.0	17.5	14.7	14.7	13.1	16.4	21.5
13-Jul	13.0	12.5	10.1	7.5	9.2	12.8	15.2	16.6	17.9	19.4	20.5	21.7	22.6	23.6	24.7	25.5	26.0	26.4	27.2	26.3	22.7	17.0	15.1	14.2	18.6	27.2
14-Jul	13.0	10.2	9.8	8.9	10.3	13.4	16.0	18.5	20.3	22.8	25.1	27.6	29.7	31.5	32.0	32.5	32.6	32.3	31.5	28.3	25.6	24.0	22.7	21.4	22.5	32.6
15-Jul	18.4	16.5	17.4	17.3	17.4	17.3	18.7	20.7	22.9	24.9	26.3	28.4	30.1	30.4	30.6	31.3	31.0	30.8	29.4	27.4	25.8	23.9	21.8	21.4	24.2	31.3
16-Jul	20.8	20.6	20.1	18.4	16.8	17.5	20.1	22.5	23.5	21.3	19.8	19.7	18.9	18.1	20.5	23.1	24.4	24.5	24.2	24.4	21.6	19.3	16.2	13.1	20.4	24.5
17-Jul	11.7	10.0	8.7	8.5	9.0	11.8	15.1	17.8	18.7	19.9	20.7	22.0	22.9	23.3	23.7	23.3	23.3	23.6	23.6	22.0	19.9	17.1	15.9	14.4	17.8	23.7
18-Jul	12.2	12.1	10.9	9.3	8.9	12.6	16.6	18.0	19.8	21.1	22.2	22.1	22.7	24.3	25.0	25.1	24.7	24.2	23.2	20.4	17.0	15.2	14.5	14.4	18.2	25.1
19-Jul	14.4	14.6	14.4	13.9	14.1	14.0	14.6	15.6	16.2	17.0	18.8	18.8	20.0	18.9	16.7	18.4	17.1	16.6	15.7	16.1	15.5	13.9	13.5	13.1	15.9	20.0
20-Jul	11.5	11.1	10.8	10.4	11.9	12.8	13.5	15.6	17.4	18.8	20.1	20.3	21.0	20.6	21.0	20.4	20.7	20.3	19.7	18.8	16.9	12.3	10.0	7.2	16.0	21.0
21-Jul	5.9	5.4	4.5	4.6	5.3	7.8	11.3	14.4	18.0	19.7	21.0	21.8	22.7	23.3	23.8	24.0	24.0	24.0	23.3	19.1	16.7	16.9	12.6	12.4	15.9	24.0
22-Jul	11.9	11.7	10.9	10.2	10.1	11.0	13.6	16.7	19.4	22.5	25.0	26.3	27.5	28.2	28.6	28.8	29.1	29.2	28.5	27.0	23.4	21.1	20.4	18.5	20.8	29.2
23-Jul	17.4	13.2	11.1	11.2	11.3	11.9	16.6	19.7	21.8	23.7	26.1	26.7	26.6	25.3	25.8	27.2	26.8	26.1	24.9	23.8	22.2	20.0	18.7	16.8	20.6	27.2
24-Jul	17.2	17.1	17.1	15.2	14.1	15.8	18.4	19.8	20.4	21.6	22.7	23.2	23.8	24.2	25.8	26.1	27.5	27.5	24.0	22.4	21.9	20.4	19.6	19.1	21.0	27.5
25-Jul	19.4	19.3	19.1	19.3	18.9	18.7	19.4	20.6	22.1	23.0	24.2	24.6	25.1	26.6	25.2	19.5	19.9	20.0	20.1	21.7	19.7	18.1	16.2	17.0	20.7	26.6
26-Jul	16.7	16.5	15.4	15.0	14.8	15.8	17.7	19.7	21.8	22.8	23.5	24.5	26.0	27.2	27.5	27.3	28.1	28.0	27.5	22.1	21.8	20.9	19.6	18.1	21.6	28.1
27-Jul	16.7	15.3	14.9	14.5	13.5	15.1	17.2	19.8	22.0	24.3	26.0	26.5	26.9	27.9	28.4	26.5	24.7	23.0	23.1	22.2	19.1	17.5	16.6	14.9	20.7	28.4
28-Jul	15.1	14.7	14.3	14.2	14.4	15.4	16.9	19.0	21.2	24.1	26.2	27.9	29.4	29.8	30.6	29.6	30.6	30.8	30.7	26.9	21.6	19.9	18.5	18.1	22.5	30.8
29-Jul	15.9	15.1	14.3	13.9	13.8	16.4	20.4	20.4	22.9	25.7	28.0	29.3	30.4	31.5	30.3	28.8	28.4	31.0	30.7	28.3	25.1	24.2	21.7	18.4	23.5	31.5
30-Jul	16.3	15.5	14.2	13.0	12.4	15.4	20.1	21.0	23.7	26.1	28.0	30.1	32.2	33.3	34.0	34.4	34.2	33.8	31.3	28.0	20.0	18.1	17.8	15.9	23.7	34.4
31-Jul	16.0	15.7	14.0	13.6	13.4	13.7	15.3	16.6	18.9	21.2	22.8	23.1	22.9	23.7	21.6	18.0	17.6	17.2	16.5	16.4	16.3	15.6	15.0	14.6	17.5	23.7
15.0 14.2 13.5 12.7 12.8 14.3 16.6 18.4 20.2 21.9 23.2 24.2 24.8 25.2 25.1 24.7 24.8 24.8 24.3 22.9 20.5 18.4 17.0 15.8																								Diurnal Average		
22.0 20.6 20.1 19.3 18.9 18.7 20.6 22.5 24.1 26.1 28.0 30.1 32.2 33.3 34.0 34.4 34.2 33.8 31.5 28.3 25.8 24.2 23.2 22.5																								Diurnal Maximum		



WBEA NETWORK
Hourly Averages

Ambient Temperature (AT) - C
CNRL Horizon - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
CNRL Horizon - July 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	20	2.69	2.69
10 - 20	365	49.06	51.75
> 20	359	48.25	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



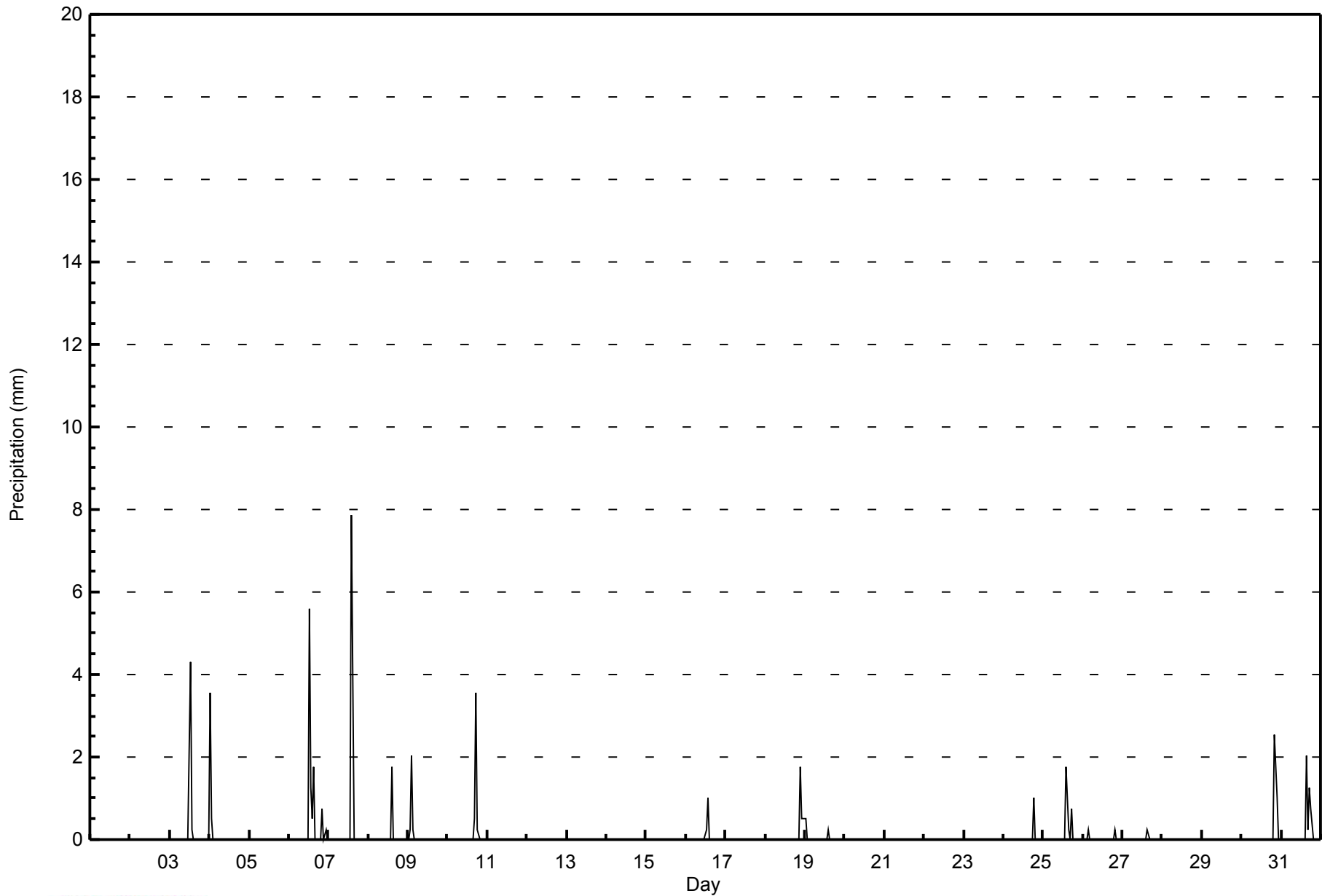
Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

CNRL Horizon - July 2014

Maximum Value: 7.9 mm on Jul 7 15:00		Maximum Daily Total: 10.2 mm on Jul 6		Hours in Service: 744																								
Minimum Value: 0.0 mm on Jul 1 01:00		Minimum Daily Total: 0.0 mm on Jul 1		Hours of Data: 743																								
Maximum Diurnal Total: 12.2 mm at hour 15		Minimum Diurnal Total: 0.0 mm at hour 5		Hours of Missing Data: 1																								
Monthly Total: 52.58 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 = 1.6		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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	3.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	1.3	0.5	1.8	0.0	0.0	0.0	0.0	0.8	0.0	0.3	0.0	0.0	10.2	5.6	
7-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	7.9	
8-Jul	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	1.8	
9-Jul	0.0	0.3	2.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.0	
10-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	3.6	0.3	0.0	0.0	0.0	0.0	0.0	4.3	3.6		
11-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.0	
17-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.5	0.5	2.8	1.8		
19-Jul	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	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.5	
20-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	1.0	1.0	
25-Jul	0.0	0.0	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	0.3	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	2.8	1.8		
26-Jul	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	0.0	0.0	0.0	0.0	0.5	0.3	0.3	
27-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	2.5	
31-Jul	0.0	0.0	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	0.3	1.3	0.8	0.0	0.0	0.0	0.0	0.0	4.3	2.0			
		4.1	0.8	2.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.2	2.5	12.2	4.3	0.8	5.6	2.0	0.3	3.3	2.8	0.8	0.5	Diurnal Average			
		3.6	0.5	2.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	1.3	7.9	2.0	0.5	3.6	1.0	0.3	2.5	1.8	0.5	0.5	Diurnal Maximum			
M - Maintenance																												



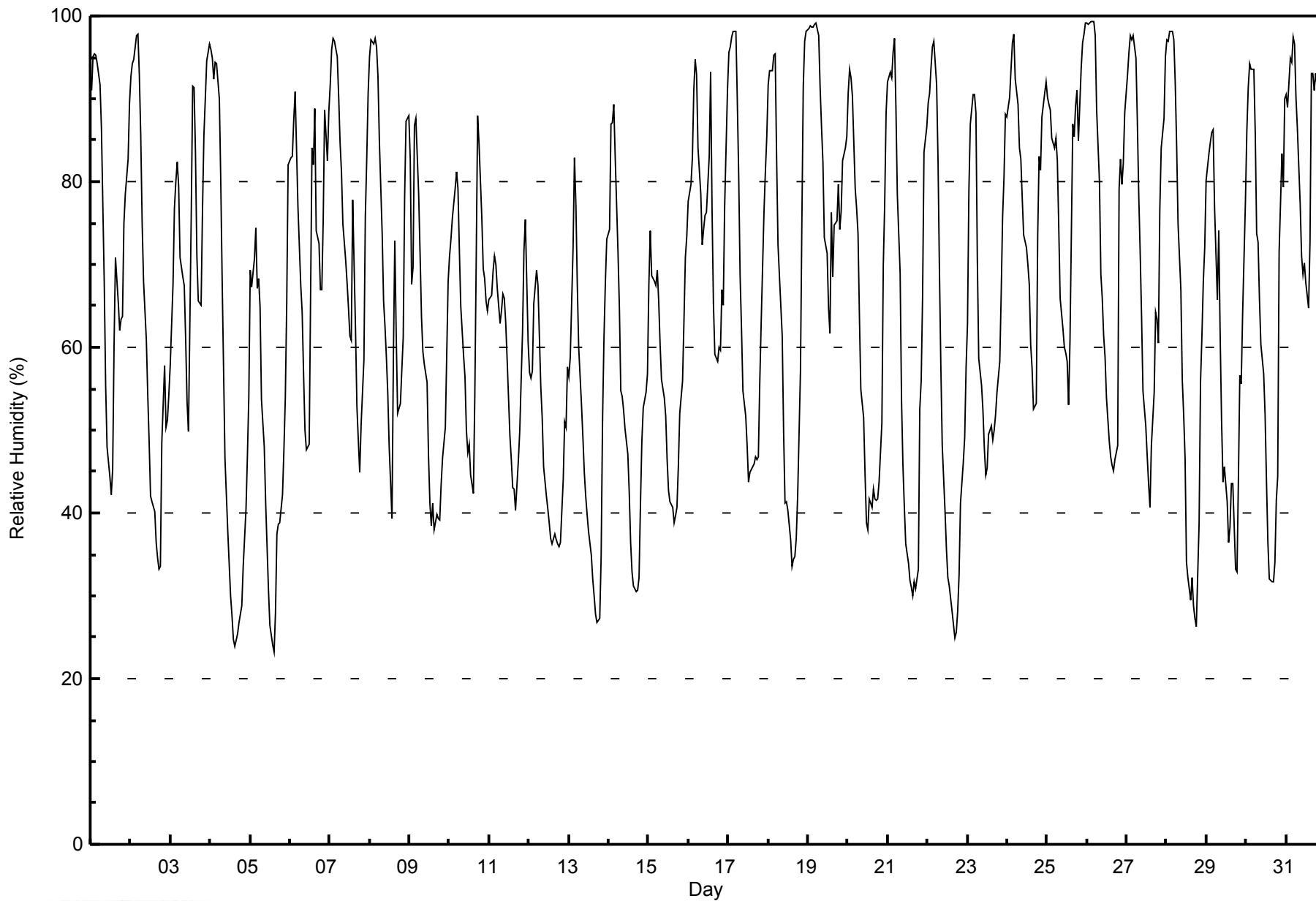


Maximum Value: 99 % on Jul 26 04:00																			Maximum Daily Average: 84.8 % on Jul 31						Hours in Service: 744																			
Minimum Value: 23 % on Jul 5 15:00																			Minimum Daily Average: 48.6 % on Jul 12						Hours of Data: 744																			
Maximum Diurnal Average: 89.5 % at hour 4																			Minimum Diurnal Average: 47.3 % at hour 14						Hours of Missing Data: 0																			
Monthly Average: 65.6 %																			Percentiles: P ₁ = 26 P ₁₀ = 37 Q ₁ = 48 Median = 66 Q ₃ = 84 P ₉₀ = 93 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-Jul	91	95	95	95	94	92	86	77	68	55	48	44	42	45	60	71	65	62	63	64	75	79	83	90	72.5	95																		
2-Jul	93	94	95	98	98	93	86	75	68	61	54	49	42	41	40	36	35	33	34	48	58	50	51	54	61.9	98																		
3-Jul	58	68	77	80	82	79	71	68	67	61	53	50	76	91	91	83	71	66	65	77	86	90	95	97	75.1	97																		
4-Jul	96	95	92	94	94	90	80	68	58	47	38	34	30	28	25	24	25	27	28	29	34	40	47	54	53.2	96																		
5-Jul	69	67	71	74	67	68	65	54	48	41	36	31	27	24	23	28	37	39	39	42	48	54	65	82	50.0	82																		
6-Jul	83	83	87	91	84	77	67	64	57	50	48	48	66	84	82	89	74	73	67	67	75	89	82	89	74.0	91																		
7-Jul	92	96	97	97	95	90	85	81	75	71	68	65	61	61	78	62	53	49	45	51	59	76	83	91	74.1	97																		
8-Jul	95	97	97	97	96	93	85	74	66	63	59	54	48	39	59	73	61	52	53	57	61	78	87	88	72.2	97																		
9-Jul	83	68	70	87	88	79	71	64	59	58	56	47	41	38	41	38	40	39	39	43	47	50	59	68	57.2	88																		
10-Jul	71	73	76	79	81	79	72	65	59	56	50	47	48	45	42	54	71	88	85	76	70	68	66	64	66.0	88																		
11-Jul	66	66	69	71	70	67	63	64	66	66	63	59	49	46	43	43	40	46	50	56	62	72	75	61	59.8	75																		
12-Jul	57	56	57	65	69	67	61	55	51	46	42	41	39	37	36	37	37	36	36	36	44	51	50	58	48.6	69																		
13-Jul	57	59	72	83	77	68	60	53	49	45	42	40	38	35	32	30	28	27	27	35	51	61	68	73	50.4	83																		
14-Jul	74	87	87	89	83	72	65	55	54	52	50	47	42	36	33	31	30	31	32	41	49	53	55	57	54.4	89																		
15-Jul	68	74	69	68	68	69	66	60	56	54	52	46	43	41	41	39	40	41	46	52	56	63	71	73	56.4	74																		
16-Jul	78	80	83	91	95	93	84	79	72	74	76	76	83	93	77	65	59	58	60	60	67	65	77	91	76.5	95																		
17-Jul	96	96	97	98	98	90	81	69	62	55	52	48	44	45	45	46	47	47	47	56	63	76	81	85	67.6	98																		
18-Jul	92	93	93	95	95	83	72	69	61	50	41	41	40	37	34	34	35	37	42	57	75	92	97	98	65.2	98																		
19-Jul	99	99	99	99	99	99	98	91	87	82	73	71	65	62	76	68	75	75	80	74	76	83	84	86	83.3	99																		
20-Jul	91	93	93	90	79	77	74	64	55	52	45	39	38	42	41	43	42	42	42	44	51	70	77	88	61.2	93																		
21-Jul	92	93	93	96	97	89	78	69	54	46	41	36	34	32	31	30	32	31	33	53	56	66	84	87	60.5	97																		
22-Jul	90	91	94	96	97	92	83	69	58	48	40	36	32	31	30	28	25	26	28	33	41	46	49	58	54.9	97																		
23-Jul	63	79	87	91	90	88	71	59	56	52	48	45	45	50	51	49	50	52	55	58	67	76	81	88	64.5	91																		
24-Jul	88	90	94	97	98	92	89	84	83	78	74	72	70	68	60	57	53	53	73	83	81	88	91	92	79.5	98																		
25-Jul	90	89	89	85	84	85	83	75	66	62	60	59	58	53	61	87	85	89	91	85	94	97	98	99	80.2	99																		
26-Jul	99	99	99	99	99	98	89	80	69	66	61	59	54	49	47	46	45	46	48	79	83	80	82	88	73.5	99																		
27-Jul	93	96	98	97	98	95	87	78	72	64	55	50	47	44	41	48	55	64	63	61	77	84	88	95	72.8	98																		
28-Jul	97	97	98	98	97	92	84	75	67	56	52	47	34	32	29	32	29	27	26	39	56	61	68	72	61.1	98																		
29-Jul	80	83	85	86	86	77	66	74	61	51	44	46	41	36	38	44	44	33	33	44	57	56	64	78	58.6	86																		
30-Jul	86	91	94	94	94	86	74	73	66	60	57	52	44	36	32	32	32	34	42	44	72	83	79	90	64.4	94																		
31-Jul	91	89	95	94	98	97	90	86	77	71	69	70	68	65	73	93	93	91	93	90	85	85	86	86	84.8	98																		
																			83.0	85.1	87.1	89.5	88.7	84.4	76.9	70.0	63.4	57.8	53.1	50.0	48.1	47.3	48.1	49.7	48.6	48.8	50.5	55.9	63.6	70.3	74.9	80.0	Diurnal Average	
																			99	99	99	99	99	99	98	91	87	82	76	76	83	93	91	93	93	91	93	90	94	97	98	99	Diurnal Maximum	



WBEA NETWORK
Hourly Averages

Relative Humidity (RH) - %
CNRL Horizon - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Relative Humidity (RH) - %
CNRL Horizon - July 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	96	12.90	12.90
40 - 60	208	27.96	40.86
60 - 80	215	28.90	69.76
80 - 100	225	30.24	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

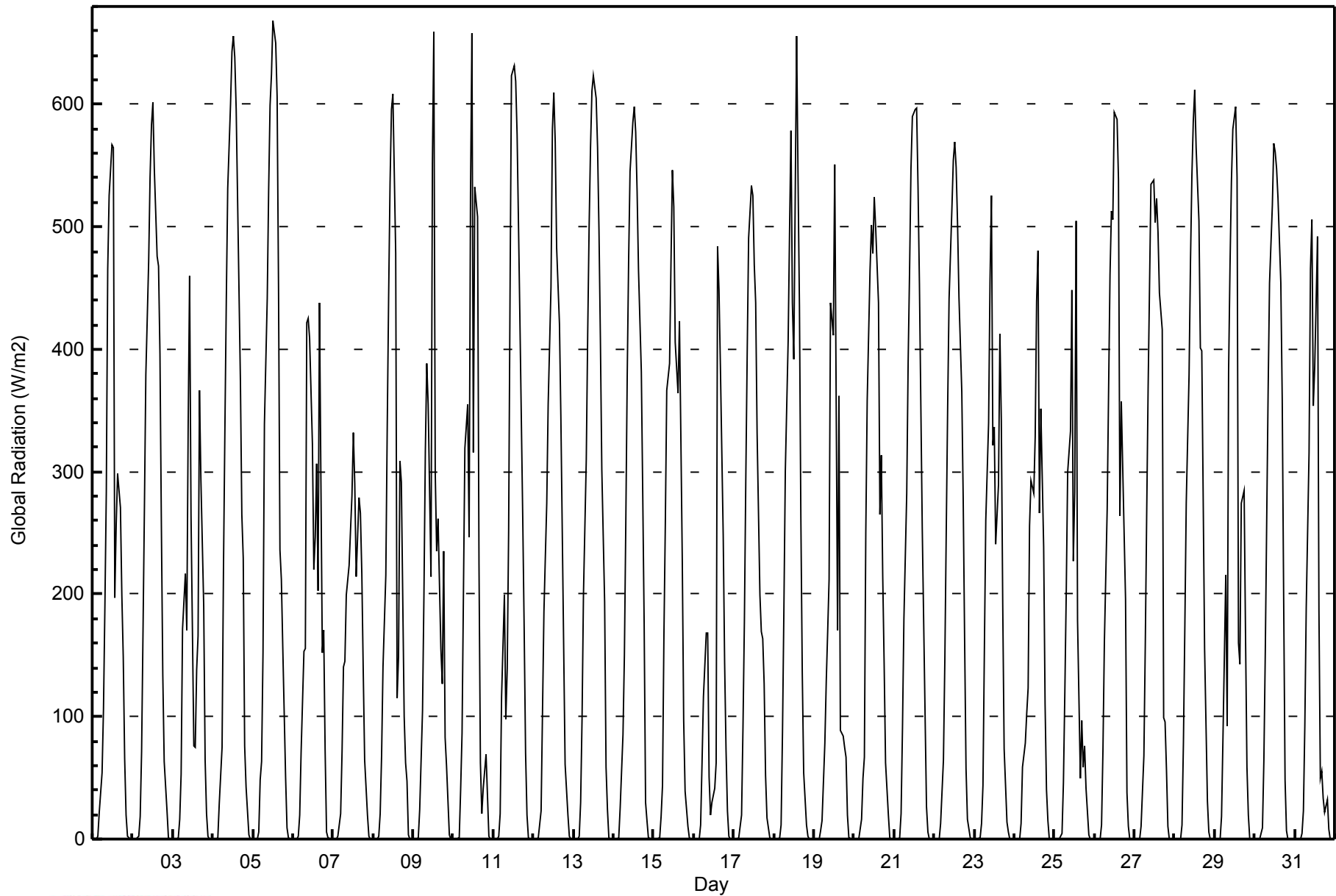


Maximum Value: 669 W/m2 on Jul 5 13:00																				Maximum Daily Average: 261.6 W/m2 on Jul 4					Hours in Service: 744				
Minimum Value: 0 W/m2 on Jul 6 01:00																				Minimum Daily Average: 105.8 W/m2 on Jul 16					Hours of Data: 744				
Maximum Diurnal Average: 484.7 W/m2 at hour 12																				Minimum Diurnal Average: 0.0 W/m2 at hour 1					Hours of Missing Data: 0				
Monthly Average: 190.0 W/m2																				Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 100 Q ₃ = 355 P ₉₀ = 524 P ₉₉ = 636					Hours of Calibration: 0				
																				Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Jul	0	0	0	3	22	54	107	190	283	466	526	567	564	197	257	299	270	199	149	66	19	3	0	0	176.8	567			
2-Jul	0	0	0	2	18	71	170	271	380	471	541	583	601	547	476	468	396	256	135	64	23	2	0	0	228.1	601			
3-Jul	0	0	0	1	16	53	172	216	171	339	460	265	76	75	138	166	366	293	190	65	21	2	0	0	128.6	460			
4-Jul	0	0	0	1	29	75	222	334	440	531	600	643	656	639	596	522	373	266	230	76	42	3	0	0	261.6	656			
5-Jul	0	0	0	5	48	64	152	338	441	530	599	625	669	650	606	449	236	212	156	51	9	1	0	0	243.5	669			
6-Jul	0	0	0	2	19	72	153	156	422	425	409	322	220	247	307	203	438	152	170	73	6	1	0	0	158.2	438			
7-Jul	0	0	0	2	21	72	141	145	199	223	252	280	332	291	214	279	267	217	137	65	20	2	0	0	131.6	332			
8-Jul	0	0	0	2	21	68	140	216	336	444	535	596	609	478	116	149	309	292	100	63	47	3	0	0	188.5	609			
9-Jul	0	0	0	1	24	105	199	316	388	355	214	552	659	299	235	262	156	126	235	83	60	3	0	0	178.1	659			
10-Jul	0	0	0	2	41	87	203	319	355	247	528	658	316	532	509	224	62	21	41	70	35	3	0	0	177.2	658			
11-Jul	0	0	0	2	21	117	200	98	139	252	447	623	632	618	575	500	423	262	171	71	20	2	0	0	215.5	632			
12-Jul	0	0	0	2	23	105	185	230	275	355	451	579	609	569	483	421	345	250	156	61	20	2	0	0	213.4	609			
13-Jul	0	0	0	2	30	99	200	310	412	500	565	611	624	606	565	497	408	302	193	58	24	1	0	0	250.2	624			
14-Jul	0	0	0	2	26	85	150	258	378	473	545	586	598	578	529	464	381	282	176	30	16	1	0	0	231.5	598			
15-Jul	0	0	0	1	19	44	166	258	367	388	471	546	516	406	365	423	329	228	97	39	11	1	0	0	194.8	546			
16-Jul	0	0	0	0	12	63	117	168	168	51	20	30	42	62	484	448	386	247	144	73	22	2	0	0	105.8	484			
17-Jul	0	0	0	1	19	91	178	294	398	491	534	526	469	438	332	199	169	164	127	52	18	1	0	0	187.6	534			
18-Jul	0	0	0	1	11	88	189	301	406	497	579	438	391	655	541	436	263	136	54	12	2	0	0	0	208.4	655			
19-Jul	0	0	0	0	6	15	78	129	170	212	437	411	551	362	171	362	89	84	75	67	19	1	0	0	135.0	551			
20-Jul	0	0	0	1	16	49	67	250	359	465	501	478	524	499	437	266	313	215	143	62	19	1	0	0	194.3	524			
21-Jul	0	0	0	1	20	91	180	282	389	463	547	590	596	597	533	453	354	254	101	27	6	1	0	0	228.5	597			
22-Jul	0	0	0	0	12	65	146	252	354	442	516	554	570	549	502	443	366	277	164	58	16	1	0	0	220.3	570			
23-Jul	0	0	0	1	12	44	155	260	340	457	525	321	337	241	289	412	342	193	73	14	6	0	0	0	167.7	525			
24-Jul	0	0	0	0	13	59	78	103	123	255	292	282	329	439	480	267	351	238	111	40	15	0	0	0	144.9	480			
25-Jul	0	0	0	0	5	46	119	202	300	333	449	227	284	505	178	49	97	59	76	41	4	0	0	0	123.9	505			
26-Jul	0	0	0	0	12	73	160	269	367	461	513	506	593	588	538	264	357	303	196	38	10	0	0	0	218.7	593			
27-Jul	0	0	0	0	10	68	160	268	369	452	535	538	503	523	496	446	416	99	96	57	10	0	0	0	210.3	538			
28-Jul	0	0	0	0	12	79	173	275	379	471	541	586	612	565	505	401	399	279	156	31	6	0	0	0	228.0	612			
29-Jul	0	0	0	0	18	82	216	92	382	468	538	579	598	541	160	143	274	285	166	59	19	0	0	0	192.5	598			
30-Jul	0	0	0	0	9	65	153	261	365	454	518	568	561	547	523	454	359	199	48	7	0	0	0	0	212.2	568			
31-Jul	0	0	0	0	4	23	92	189	316	466	506	354	384	492	187	49	56	34	22	32	8	0	0	0	133.9	506			
																								Diurnal Average					
																								Diurnal Maximum					



WBEA NETWORK
Hourly Averages

Global Radiation (GR) - W/m²
CNRL Horizon - July 2014





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
CNRL Horizon - July 2014

Maximum Speed: 26 km/h on Jul 10 16:00	Maximum Daily Speed Average: 11.1 km/h on Jul 10	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 30 01:00	Minimum Daily Speed Average: 0.7 km/h on Jul 1	Hours of Data: 744
Maximum Diurnal Speed Average: 4.2 km/h at hour 13	Minimum Diurnal Speed Average: 0.5 km/h at hour 19	Hours of Missing Data: 0
Monthly Average Velocity: 2.0 km/h 215.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 13 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-Jul	N3	SW6	SW5	SSW5	SSW5	SSW4	SSW5	SSW5	SSW5	S6	SSW7	SSW5	SW8	WSW6	N14	NNE10	N5	NE6	E4	ENE6	NNE3	N5	N5	NNW6	W0.7	N14
2-Jul	N5	N5	N4	N5	N5	N3	NE3	S3	S3	ENE2	ESE4	E5	E6	SE5	ESE7	SE8	SE8	SE6	SE5	ESE3	E4	ESE6	SE8	SE9	ESE3.2	SE9
3-Jul	SE6	SSW1	NW2	NNW3	ENE2	NNE2	ESE4	ESE7	ESE6	ESE6	SE10	SSE14	SSW9	SSE6	ESE6	E6	E6	SE4	NNE5	NNE11	NNE11	N8	N4	WNW5	E2.5	SSE14
4-Jul	SSW4	SW9	SW8	SSW7	S6	SSW4	SSW9	SW11	SW11	SW15	WSW16	SW16	SW18	SW16	SW17	SW17	SW14	SW14	WSW12	WSW9	SW7	SW8	SW8	WSW7	SW10.8	SW18
5-Jul	WSW5	WSW9	SW9	SSW8	SW7	SSW7	SSW8	S9	S12	SSW11	SSW14	SW14	SW13	WSW12	SW10	WNW5	NNE14	ENE6	NNE7	NNE9	N10	NNE6	NNE4	SW5	SW4.0	NNE14
6-Jul	WSW5	N4	WSW2	SSW4	NW3	NW4	W2	SSW5	SSW7	SW6	WNW7	NNW9	NNE7	E8	SE5	E2	SSE4	ESE2	WNW2	WNW6	NNW11	WNW6	NW6	WNW6	WNW1.9	NNW11
7-Jul	W4	SW6	S4	SW5	WNW5	SW4	S4	WNW7	NW10	NNW9	NNW10	W8	W11	N9	NE7	NE13	NNE11	NE12	NE10	NNE7	N6	N3	WSW4	SSW4	NNW3.2	NE13
8-Jul	SSW5	SSW4	SSW5	SSW5	SSW5	S5	S6	S8	S11	S10	S10	S12	S13	S12	N9	ENE7	ESE10	SE11	S7	SW5	S5	S3	SSW3	SW5	S5.5	S13
9-Jul	SSW5	WNW9	NW15	WSW7	SW9	WSW5	SW1	SSW4	SE3	SSE7	SSW11	SSW13	S14	S11	WSW8	W14	WSW13	W11	SW9	SSW7	W14	WNW11	W6	SW7	WSW6.8	NW15
10-Jul	WSW9	W7	WSW7	SW11	SW12	SW9	SSW8	SW9	SW9	SW8	WSW12	WSW14	W10	W13	W16	WNW26	NW23	WNW16	NW16	WNW18	NW22	NW17	WNW14	WNW11	W11.1	WNW26
11-Jul	WNW13	WNW15	WNW14	W12	WNW10	W11	WNW12	WNW12	W12	W13	WSW12	W14	W13	W15	W16	WNW16	NW16	NNE16	N14	NNE12	N6	NW5	NW7	NNW13	WNW10.3	W16
12-Jul	N15	N13	NNW13	NW9	WNW8	WNW6	W4	N8	N8	N8	N4	NW6	NNE4	NW4	E2	ENE5	NE5	NE5	NE7	NNE6	NNE6	N6	N6	N5	N5.4	N15
13-Jul	N5	N6	N3	NW4	NNE4	N3	ESE3	SE7	ESE6	ESE7	SE7	ESE5	E6	E5	E6	ESE5	E5	ENE3	S3	ESE3	ESE3	SSE4	S6	S7	E2.7	ESE7
14-Jul	SSW6	SSW5	SSW5	SSW5	SSW7	SSW7	S7	S10	S10	S9	S10	S11	SSE11	S14	S16	S14	S14	S14	S12	S8	S9	S8	SSW7	SSW7	S9.3	S16
15-Jul	S4	S4	S9	S9	S9	S10	S11	S12	S12	S9	S9	S12	SSW13	S12	S13	S15	S15	S17	S12	S11	S11	SSW6	S8	SSW8	S10.4	S17
16-Jul	S9	SW10	SSW6	SW6	SW3	SSW4	SSW4	SSW4	NNE5	NNE9	NNE5	NNW6	N5	SSW5	SW10	SSW10	SSW10	S10	S8	SSW8	SW8	NNE11	ENE5	SW2	SSW2.9	NNE11
17-Jul	WSW5	WSW4	WSW4	WSW6	WSW6	SW5	NW3	SE1	ENE4	NNE3	ENE6	SSW3	WSW4	SW3	SSE5	SE5	SE6	SSE4	SE3	N2	NW3	NW6	NNW7	WNW5	SW1.2	NNW7
18-Jul	E1	SW3	WSW4	WNW4	NW4	N4	N4	NNE7	NNE6	ENE8	E7	NE4	E4	ESE6	S5	SE7	ESE6	SE7	ESE4	SSW12	S6	SSW10	S1	S4	SE1.6	SSW12
19-Jul	S5	SSE5	S3	SSE1	SSE3	S4	S6	SSW7	SW9	SW9	SW12	WSW13	WSW14	WNW17	NW15	NW11	NNW13	NNW17	N17	NNW14	NNW9	WNW8	WNW8	W7	W5.4	NNW17
20-Jul	SW7	SSW5	W5	WNW6	NW9	WNW5	WNW5	WNW5	NNW4	NE3	N6	N12	N8	NE8	NNE10	NNE11	NNE9	NNE11	NNE11	N8	N6	N4	WNW6	W4	NNW4.6	N12
21-Jul	WSW3	SW3	S3	SSW5	SSW6	SSW5	SSW3	S4	S4	SSE3	SSW3	SW4	SW3	SW3	E4	E5	ESE7	E5	NE2	SW4	WSW6	W6	SSW2	SSW4	SSW2.4	ESE7
22-Jul	SSW5	SSW6	SSW4	S6	SSW6	S7	S7	S7	S9	S7	S8	S10	S9	S9	SSE10	SE10	S8	S8	SSE8	SSE5	SSE5	SE5	SSE7	SSE8	S7.0	S10
23-Jul	SSW3	WNW2	S3	SSW5	SW3	W1	NNE1	SSE3	ESE4	ESE8	SE11	SE12	SE15	ESE10	E11	SE12	SE14	ESE11	E8	E7	NE5	ENE4	SE3	SW1	SE5.3	SE15
24-Jul	ENE3	SE4	SSW4	WNW2	S2	S1	SSE5	SSE6	SE4	SE8	SE6	SE8	SSE13	SE11	SE10	SE7	SE8	SE10	ESE8	ENE6	NNE5	N5	N4	NNE4	SE4.4	SSE13
25-Jul	N6	NE6	N4	NNE8	NNE9	N9	N11	NNE12	NE11	NE11	NNE12	NNE11	NE10	NE11	ENE9	NNW6	NW9	ENE2	W3	SW4	W2	SSW2	WNW3	NW5	NNE5.8	NNE12
26-Jul	N4	NNW5	N5	NNE5	N5	N5	N4	N3	SSE3	SE5	ESE8	SE5	SSW4	S4	SSE7	SE5	SSW6	W8	SW9	E4	SW4	SSW7	SW7	SW6	SSW1.1	SW9
27-Jul	SW5	SSW5	SSW7	SSW7	SSW5	S6	S8	S7	S7	S6	SSW10	SW12	SW10	SW9	SW8	SE9	SE14	S12	S11	S8	SSE2	SSE7	S6	S7	S7.1	SE14
28-Jul	SSW8	SSW8	S8	S9	S10	S11	S12	S11	S11	S9	SSE10	SSE10	SSW9	SSW8	S9	SSE4	SSW7	SSW6	SW5	S4	S6	SSW7	SW6	SW7	S7.9	S12
29-Jul	SW6	SSW7	SW6	SSW8	S7	S2	SSE1	E1	NNW4	SW4	S8	S8	SSE8	S8	WSW6	W8	WNW9	WNW4	N1	SSE4	S5	SSE8	SSE7	WNW1	SSW3.6	WNW9
30-Jul	N0	E3	S4	SW4	W2	SSE2	S2	SSW6	S5	SSE5	SSE6	SSE8	S10	S10	S9	S9	SSE11	S9	SSE6	NW14	WNW24	NNE16	ENE3	SW7	SSW3.3	WNW24
31-Jul	WSW10	WSW7	SW7	S3	SSW8	SSW5	S2	SE4	E5	NE11	NNE11	NNE16	NNE16	NNE16	N18	N15	NNE14	N10	N7	N9	N14	N13	N12	N15	N6.6	N18

WSW2.6	WSW3.0	WSW3.3	SW3.7	SW3.2	SW2.7	SSW2.8	SSW3.2	S2.7	S2.5	S3.5	SSW3.7	SSW4.2	SSW3.3	SSW1.7	S0.8	SSE1.2	SSE1.5	SSE0.5	NW1.0	NW2.6	NW1.5	W1.7	WSW2.7	Diurnal Average
N15	WNW15	NW15	W12	SW12	S11	WNW12	NNE12	W12	SW15	WSW16	SW16	SW18	WNW17	N18	WNW26	NW23	NNW17	N17	WNW18	WNW24	NW17	WNW14	N15	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

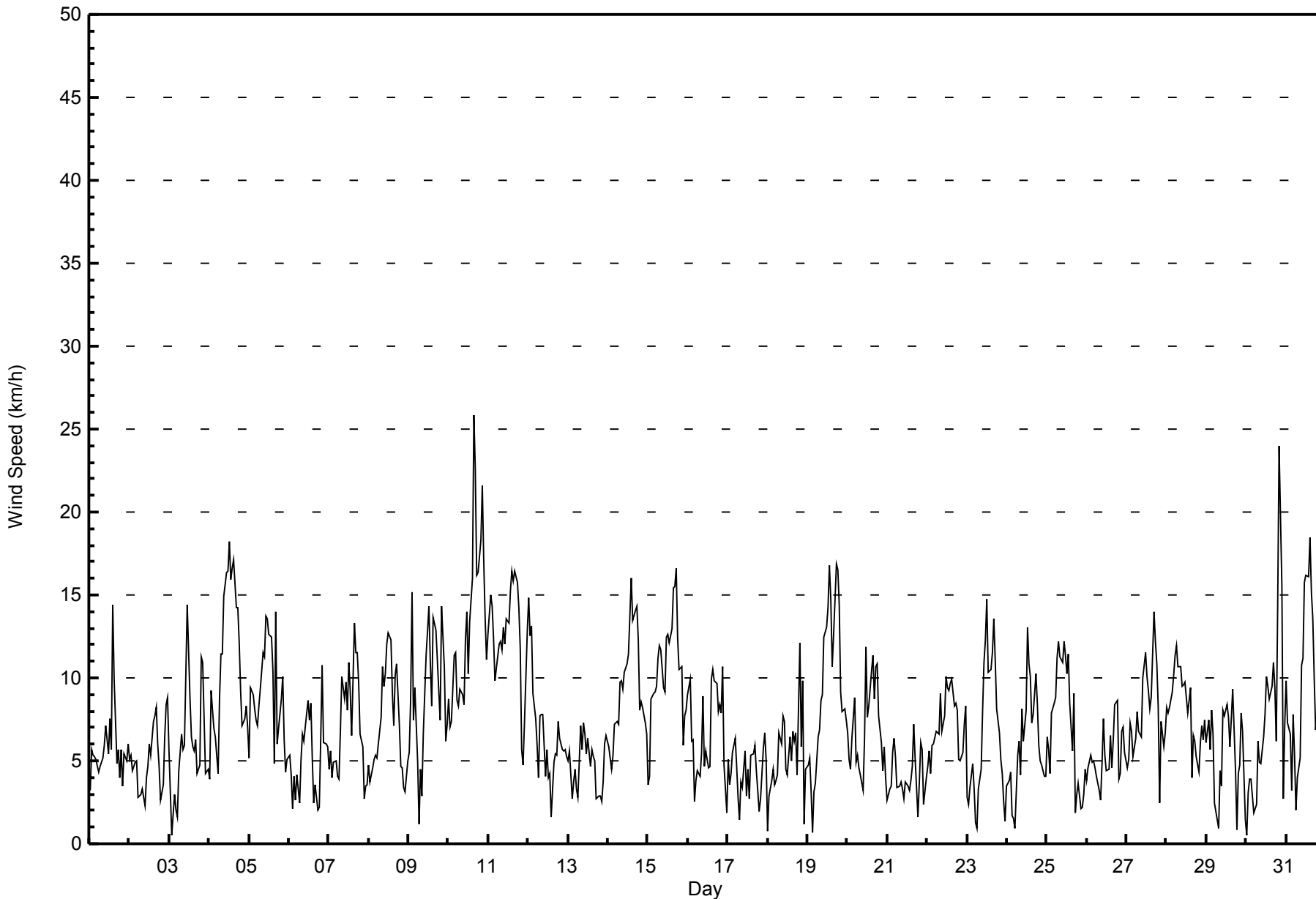
Wind Speed (WS) - km/h
CNRL Horizon - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 18 km/h on Jul 30 20:00														Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0											
Minimum Value: 0 km/h on Jul 13 04:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 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-Jul	2	1	1	1	1	1	1	2	1	2	2	3	3	2	6	4	2	2	1	1	1	1	1	1	6
2-Jul	1	1	1	1	1	2	1	1	1	2	3	3	3	3	3	3	3	3	2	1	1	1	2	2	3
3-Jul	3	1	2	1	2	1	2	2	2	3	5	5	7	3	3	2	2	3	2	3	3	3	1	2	7
4-Jul	3	2	2	2	1	2	4	4	3	5	6	5	6	6	6	6	5	5	4	4	1	1	1	2	6
5-Jul	1	2	2	1	2	2	2	2	3	4	5	4	5	4	4	4	3	3	4	3	2	3	1	5	
6-Jul	1	1	2	3	3	1	1	2	2	3	4	4	3	3	2	2	2	2	2	2	10	4	4	2	10
7-Jul	1	1	1	1	1	1	1	2	3	3	3	3	3	4	4	4	3	3	3	2	1	2	1	1	4
8-Jul	1	3	1	1	1	1	1	2	2	2	3	4	4	4	7	3	3	3	2	3	2	2	1	1	7
9-Jul	2	4	6	2	1	3	1	1	2	3	4	4	4	3	5	5	4	4	3	2	6	4	2	2	6
10-Jul	2	2	2	3	3	4	2	3	3	3	4	4	4	5	7	7	6	5	4	5	5	5	3	3	7
11-Jul	3	3	4	3	3	3	3	3	3	4	4	5	5	5	5	5	4	4	5	4	2	2	1	4	5
12-Jul	4	3	4	2	1	1	1	3	2	2	2	3	2	2	2	2	2	2	2	1	1	1	1	1	4
13-Jul	1	1	2	0	1	1	2	2	2	3	3	3	3	2	3	3	3	2	2	1	1	1	1	1	3
14-Jul	1	1	1	1	1	1	1	3	2	3	3	3	4	4	5	4	4	3	3	1	1	1	1	2	5
15-Jul	1	2	1	1	2	2	2	3	3	2	3	3	4	3	3	4	4	4	3	2	2	2	1	1	4
16-Jul	2	2	3	1	2	1	2	2	4	2	2	2	2	2	3	3	3	3	2	2	1	6	2	1	6
17-Jul	1	1	1	1	1	1	1	2	2	2	3	3	3	2	2	2	2	1	2	4	3	2	2	2	4
18-Jul	1	2	1	1	1	1	1	2	2	3	3	3	2	3	3	3	3	2	1	7	3	4	1	1	7
19-Jul	1	1	1	1	1	2	2	2	3	3	4	4	5	6	4	4	4	4	5	5	3	2	2	2	6
20-Jul	1	1	1	2	2	1	1	1	2	2	4	4	4	4	3	3	3	3	3	2	1	0	1	1	4
21-Jul	1	1	0	1	1	1	1	1	1	2	2	3	3	3	3	2	2	2	2	1	2	2	2	1	3
22-Jul	3	1	1	1	1	1	2	2	2	2	3	3	3	3	3	3	3	2	2	1	1	1	1	2	3
23-Jul	2	1	1	1	1	1	1	2	2	3	3	4	5	3	3	6	4	4	2	2	1	2	2	1	6
24-Jul	2	2	2	1	1	1	3	2	2	3	2	3	4	4	3	3	3	3	5	1	1	1	1	1	5
25-Jul	2	2	1	2	2	2	3	3	3	3	3	3	3	4	5	4	2	5	2	1	2	1	1	1	5
26-Jul	1	1	1	1	1	1	1	1	2	2	3	3	2	3	2	2	3	3	3	3	2	1	1	2	3
27-Jul	1	2	2	2	1	1	2	2	2	3	3	4	4	3	3	6	5	4	3	4	2	1	2	1	6
28-Jul	1	2	2	1	2	2	2	3	3	3	3	3	4	3	4	3	4	3	2	1	1	1	1	2	4
29-Jul	1	1	1	2	2	1	2	2	2	2	3	3	3	4	2	2	2	2	2	1	2	2	1	2	4
30-Jul	2	1	2	1	2	2	2	2	2	2	3	3	3	3	4	4	4	3	1	18	10	5	3	2	18
31-Jul	2	2	1	2	2	2	1	1	2	3	3	4	4	4	4	4	4	3	2	3	4	3	4	4	4
Diurnal Maximum																									
4 4 6 3 3 4 4 4 4 4 5 6 5 7 6 7 7 6 5 5 18 10 6 4 4																									



WBEA NETWORK
Hourly Averages

Wind Speed (WS) - km/h
CNRL Horizon - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
CNRL Horizon - July 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	276	37.10	37.10
6 - 11	353	47.45	84.54
12 - 19	111	14.92	99.46
20 - 28	4	0.54	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Wind Speed (WS) - km/h
CNRL Horizon - July 2014

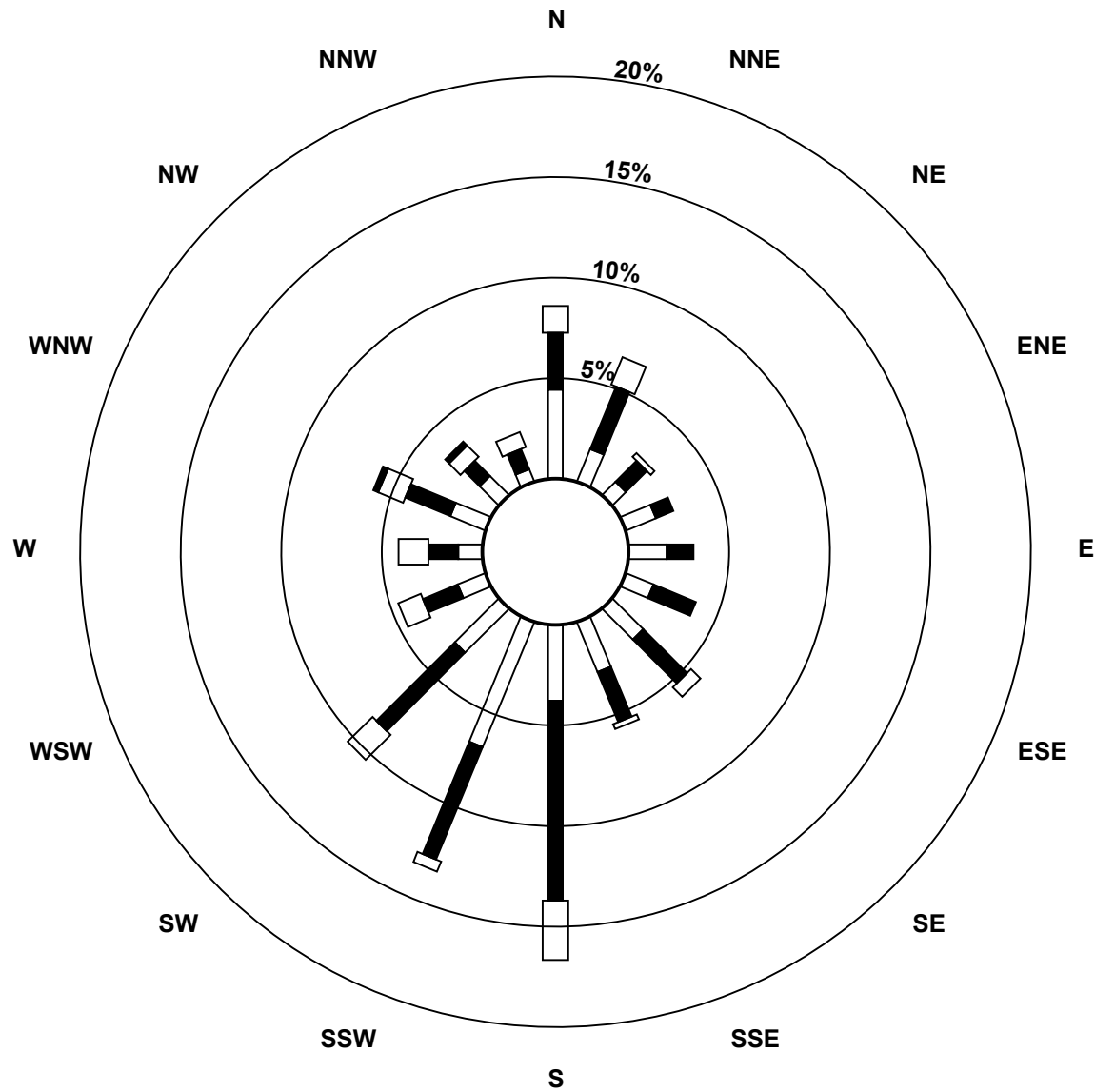
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	33	13	7	12	14	11	16	20	28	50	23	11	9	14	10	5	276
6 - 11	21	25	11	7	10	17	23	20	74	45	41	14	11	18	8	8	353
12 - 19	10	11	2	0	0	0	5	2	22	4	13	9	11	10	6	6	111
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	4
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	64	49	20	19	24	28	44	42	124	99	77	34	31	44	26	19	744

Total Number of Valid Hours: 744

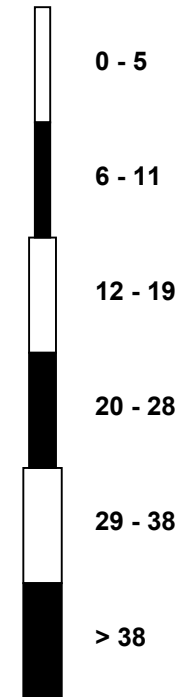
Total Number of Hours: 744

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

**Wind Speed (WS) - km/h
CNRL Horizon (AMS 15)**



Classes (km/h)



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
CNRL Horizon - July 2014

Direction of Maximum Speed: 303 deg on Jul 10 16:00 Direction of Maximum Daily Speed Average: 275.0 deg on Jul 10	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0
Direction of Minimum Speed: 356 deg on Jul 30 01:00 Direction of Minimum Daily Speed Average: 0.7 deg on Jul 1	Percent Operational Time: 100.0
Monthly Average Direction: 229.4 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-Jul	360	226	222	208	213	201	201	198	196	190	199	209	219	237	10	30	352	43	79	58	16	9	350	337	259.3
2-Jul	354	5	357	354	355	349	54	170	169	74	107	99	93	124	110	141	132	130	141	122	88	113	129	124	103.1
3-Jul	145	193	316	340	66	31	109	112	107	104	146	150	205	159	109	85	97	125	21	14	13	8	349	293	95.4
4-Jul	204	218	232	206	186	197	200	229	218	219	237	234	228	229	227	230	230	235	251	246	233	223	219	256	227.3
5-Jul	247	245	214	201	217	193	211	190	179	203	211	231	224	240	227	301	26	59	27	13	9	12	29	233	226.7
6-Jul	251	351	246	197	316	319	263	193	209	234	288	339	25	80	124	99	153	121	300	302	340	303	304	285	298.2
7-Jul	267	214	184	234	291	229	191	289	306	328	302	271	281	7	44	44	22	40	35	15	356	352	248	209	330.4
8-Jul	208	210	210	202	202	190	176	186	183	176	173	177	175	184	3	66	121	131	170	214	177	183	209	229	176.5
9-Jul	205	286	307	243	214	240	226	210	124	161	204	207	171	188	243	271	251	263	234	199	281	282	267	229	237.3
10-Jul	252	267	245	235	231	225	204	215	229	220	241	248	263	265	280	303	305	299	307	302	314	305	296	283	275.0
11-Jul	283	287	286	279	282	266	288	289	277	275	258	268	264	275	278	297	304	18	4	14	9	315	304	339	295.6
12-Jul	352	349	339	309	294	301	260	355	4	355	351	318	18	308	86	75	49	53	45	24	19	5	2	352	353.4
13-Jul	4	352	353	320	19	9	105	127	114	111	126	112	91	79	84	104	89	65	183	120	104	168	185	179	100.6
14-Jul	206	206	204	209	205	202	183	179	183	188	182	181	168	186	183	181	185	181	181	182	185	187	206	199	186.8
15-Jul	191	190	182	181	182	180	180	184	182	185	181	189	192	186	184	179	183	185	184	182	187	197	190	195	184.7
16-Jul	191	218	202	215	230	208	207	206	29	30	26	344	357	212	222	213	197	177	176	193	229	20	57	223	207.1
17-Jul	249	253	246	242	238	231	316	139	66	16	66	198	243	217	166	129	143	154	132	359	312	311	342	294	235.5
18-Jul	92	226	244	286	308	354	10	29	31	57	91	38	97	121	191	138	110	128	117	211	175	210	181	169	131.1
19-Jul	182	162	169	167	156	179	191	200	221	233	227	246	239	285	309	307	341	332	351	343	330	294	295	263	280.9
20-Jul	227	192	277	284	304	293	288	288	342	43	3	350	350	38	29	30	20	18	15	11	4	356	288	262	347.9
21-Jul	256	235	187	193	204	211	194	177	172	155	205	214	221	214	85	97	103	84	37	227	251	279	211	212	194.3
22-Jul	196	210	206	189	196	176	179	184	178	169	179	171	176	170	158	145	172	181	166	153	147	145	156	162	172.1
23-Jul	192	289	176	192	219	272	16	154	113	119	127	136	142	122	92	140	133	122	101	81	52	78	141	229	127.0
24-Jul	78	129	200	298	187	189	162	150	128	124	132	126	159	130	134	137	142	125	123	77	24	2	5	12	127.0
25-Jul	9	49	5	19	17	9	9	28	42	39	29	22	37	42	73	342	313	61	274	234	271	201	298	324	19.1
26-Jul	360	337	353	21	358	353	353	9	155	141	104	138	194	179	162	131	208	261	233	86	218	202	225	230	202.8
27-Jul	223	207	198	210	196	172	178	184	175	185	199	216	217	222	236	142	145	178	178	187	153	166	190	176	188.4
28-Jul	193	200	188	185	182	184	183	188	182	177	164	168	212	210	188	153	192	205	222	188	186	212	214	217	190.1
29-Jul	217	202	214	207	179	190	159	88	334	232	173	176	154	176	237	281	289	292	350	163	174	158	164	288	201.0
30-Jul	356	99	184	219	262	149	184	202	187	168	158	164	179	183	180	185	163	172	159	305	292	28	66	228	196.1
31-Jul	246	254	227	180	200	213	171	128	80	51	33	31	26	27	3	6	14	2	8	2	359	11	3	3	10.8

241.5 244.1 239.5 230.1 228.1 220.0 199.9 192.7 182.4 171.1 185.4 202.5 198.5 197.9 200.3 175.9 168.7 151.0 161.2 312.7 310.5 310.6 263.8 250.7
 Diurnal Average

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

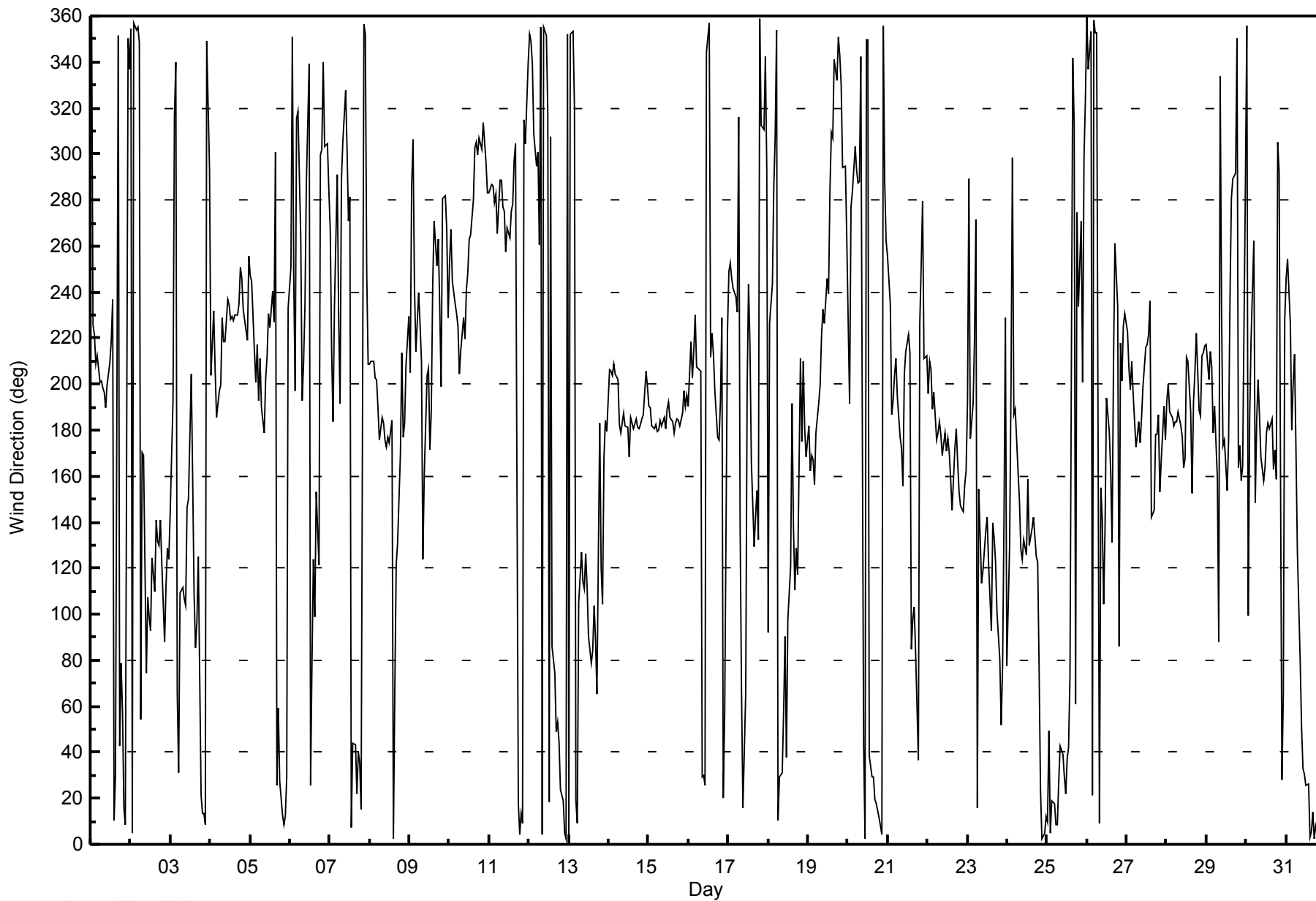
CNRL Horizon - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 98 deg on Jul 29 08:00																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 7 deg on Jul 13 23:00																									
Percentiles: P ₁ = 9 P ₁₀ = 14 Q ₁ = 18 Median = 26 Q ₃ = 40 P ₉₀ = 62 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-Jul	52	8	21	8	11	12	17	20	23	41	45	57	49	48	34	30	35	29	31	25	14	11	21	14	57
2-Jul	9	11	16	13	12	32	29	50	66	83	90	76	56	62	48	43	37	44	34	13	15	23	17	18	90
3-Jul	23	66	39	24	52	57	28	29	32	45	43	25	31	29	31	29	32	81	43	19	18	21	26	42	81
4-Jul	74	21	23	20	20	37	27	24	24	24	25	27	26	29	26	27	26	25	25	21	16	13	11	33	74
5-Jul	15	15	13	12	21	24	19	21	21	30	26	29	31	36	36	75	17	39	23	23	25	50	63	16	75
6-Jul	24	46	68	67	83	43	49	29	33	44	62	52	45	28	44	71	68	76	85	20	73	47	54	25	85
7-Jul	36	16	45	25	18	40	21	34	18	27	27	29	30	38	49	17	21	18	18	23	15	32	19	29	49
8-Jul	13	15	14	15	22	18	15	17	17	22	24	24	24	29	62	53	21	20	16	39	39	31	44	23	62
9-Jul	18	42	35	39	11	67	91	29	62	30	29	26	21	21	57	26	24	27	26	19	35	20	27	16	91
10-Jul	15	18	22	17	16	27	22	25	27	30	35	30	34	29	25	17	16	23	18	17	15	16	17	18	35
11-Jul	16	17	18	19	20	19	19	17	20	21	26	27	25	30	25	24	31	21	22	19	29	26	18	17	31
12-Jul	19	17	19	11	10	12	32	28	22	28	71	63	67	74	95	65	44	38	17	17	12	13	14	15	95
13-Jul	10	10	29	24	18	14	52	27	40	42	48	55	61	61	57	61	55	85	61	36	20	14	7	10	85
14-Jul	14	19	12	13	10	16	16	18	21	25	24	26	29	21	20	21	19	17	16	10	10	11	15	16	29
15-Jul	18	25	11	11	11	11	14	17	20	23	26	21	25	21	20	18	17	16	16	13	15	14	12	11	26
16-Jul	19	16	34	20	42	32	26	34	66	20	30	30	37	31	23	24	28	20	20	18	18	39	27	85	85
17-Jul	29	27	25	8	15	18	43	87	69	75	58	88	76	78	65	28	28	27	34	74	75	21	25	40	88
18-Jul	81	66	26	17	24	14	24	25	37	34	45	63	60	60	70	53	48	22	13	41	51	23	82	23	82
19-Jul	19	21	16	70	26	35	19	25	23	27	28	25	28	29	17	23	32	19	20	20	25	16	12	21	70
20-Jul	11	16	41	20	15	22	14	33	43	72	79	32	64	52	26	23	33	22	20	17	12	11	9	11	79
21-Jul	28	38	16	11	8	13	24	40	47	74	81	80	90	89	81	68	35	42	79	15	14	52	55	23	90
22-Jul	10	13	35	12	17	10	18	21	19	33	32	30	33	35	36	36	31	27	22	17	14	15	16	16	36
23-Jul	70	25	9	9	43	51	55	54	52	31	28	26	24	26	23	36	25	26	23	19	14	30	50	60	70
24-Jul	40	40	44	43	62	68	27	27	43	28	44	28	25	32	33	33	37	25	49	25	23	23	18	37	68
25-Jul	17	30	35	18	20	18	19	22	22	24	24	23	30	25	51	63	17	96	47	31	61	53	13	36	96
26-Jul	47	22	16	17	12	14	19	38	78	46	39	60	78	72	45	47	64	33	34	67	27	12	12	63	78
27-Jul	46	24	12	14	21	16	17	32	32	43	33	30	32	40	45	62	26	17	19	20	64	20	16	12	64
28-Jul	11	12	13	13	12	13	15	20	20	25	30	39	45	50	36	69	53	47	34	18	7	15	23	14	69
29-Jul	20	18	28	18	22	44	88	98	51	74	38	44	44	53	32	19	21	48	86	18	24	17	10	67	98
30-Jul	72	33	32	13	37	50	34	28	40	56	48	45	38	40	37	39	27	24	19	73	20	36	79	21	79
31-Jul	17	28	22	77	14	22	45	48	39	26	28	21	21	22	25	21	24	24	22	18	20	18	19	18	77
																		81 66 68 77 83 68 91 98 78 83 90 88 90 89 95 75 68 96 86 74 75 53 82 85							
Diurnal Maximum																									



WBEA NETWORK
Hourly Averages

Wind Direction (WD) - deg
CNRL Horizon - July 2014





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 15, 2014	Previous Calibration	June 11, 2014
Station Name	CNRL	Station Number	15
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	14:00
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	772	760
Calculated slope	0.997910	1.010867	Chamber temp.	45.3	45.3
Calculated intercept	-0.039504	-0.061794	Pressure (mmHg)	703.3	707.0
Analyzer Background	12.5	12.5	Flow (lpm)	0.424	0.428
Analyzer Coefficient	1.006	1.006	Intensity	87	88

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	-0.7	NA
as found span	5000	82.3	827.9	818.4	1.012
calibrator zero	5000	0.0	0.0	-0.7	NA
high point	5000	82.3	827.9	818.4	1.012
second point	5000	41.2	414.5	411.4	1.007
third point	5000	20.6	207.2	205.2	1.010
calibrator zero	5000	0.0	0.0	-0.7	NA
as left zero	5000	0.0	0.0	-0.3	NA
as left span	5000	82.3	827.9	819.0	1.011
Average Correction Factor					1.010

Corrected As found 819.1 Previous response 829.7 % change 1.3%

Notes:

No adjustments or maintenance performed.

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

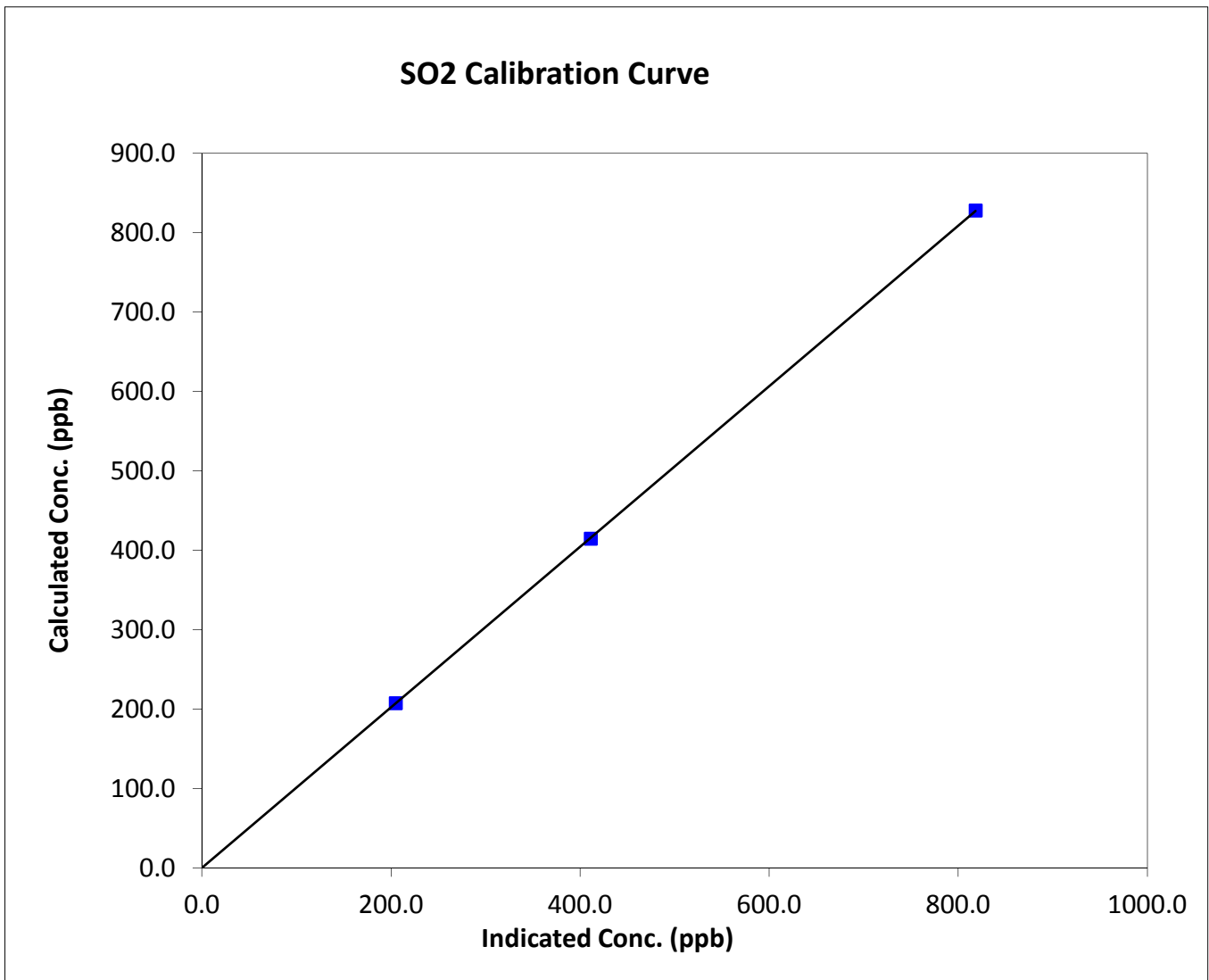
SO₂ Calibration Summary

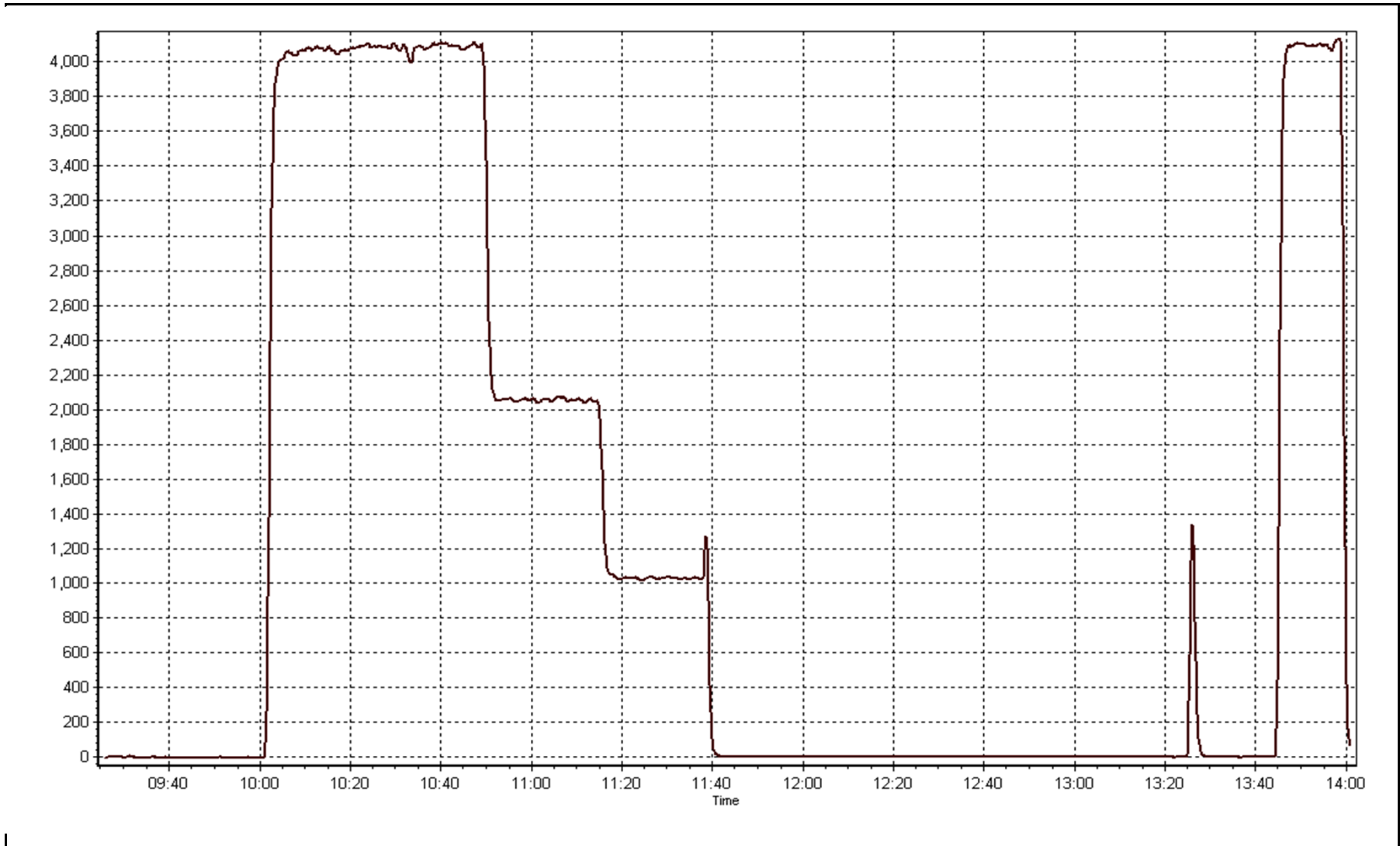
Station Information

Calibration Date	July 15, 2014	Previous Calibration	June 11, 2014
Station Name	CNRL	Station Number	15
Start Time (MST)	9:30	End Time (MST)	14:00
Analyzer make	43i	Analyzer serial #	10710321322

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.7	N/A	Correlation Coefficient	0.999992
827.9	818.4	1.0117		
414.5	411.4	1.0075	Slope	1.010867
207.2	205.2	1.0099		
			Intercept	-0.061794







Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	July 17, 2014	Previous Calibration	June 9, 2014
Station Name	CNRL Horizon	Station Number	15
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	11:45
Barometric Pressure	728.5 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	763	759
Calculated slope	0.994082	1.007406	Chamber temp.	45	45
Calculated intercept	-0.384958	-0.474707	Pressure	686.7	684.0
Analyzer Background	9	9	Flow	0.419	0.417
Analyzer Coefficient	0.934	0.934	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	0.3	NA
as found span	5000	38.5	80.1	79.8	1.004
SO2 scrubber check	5000	20.6	207.2	0.5	NA
calibrator zero	5000	0.0	0.0	0.3	NA
high point	5000	38.5	80.1	79.8	1.004
second point	5000	19.2	39.9	40.5	0.986
third point	5000	9.6	20.0	20.3	0.983
calibrator zero	5000	0.0	0.0	0.3	NA
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	38.5	80.1	79.9	1.002
Average Correction Factor					0.991

Corrected As found	79.5	Previous response	80.9	% change	1.8%
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Notes:

No adjustments or maintenance performed.

Calibration Performed By:

Mike Martineau



Wood Buffalo Environmental Association

TRS Calibration Summary

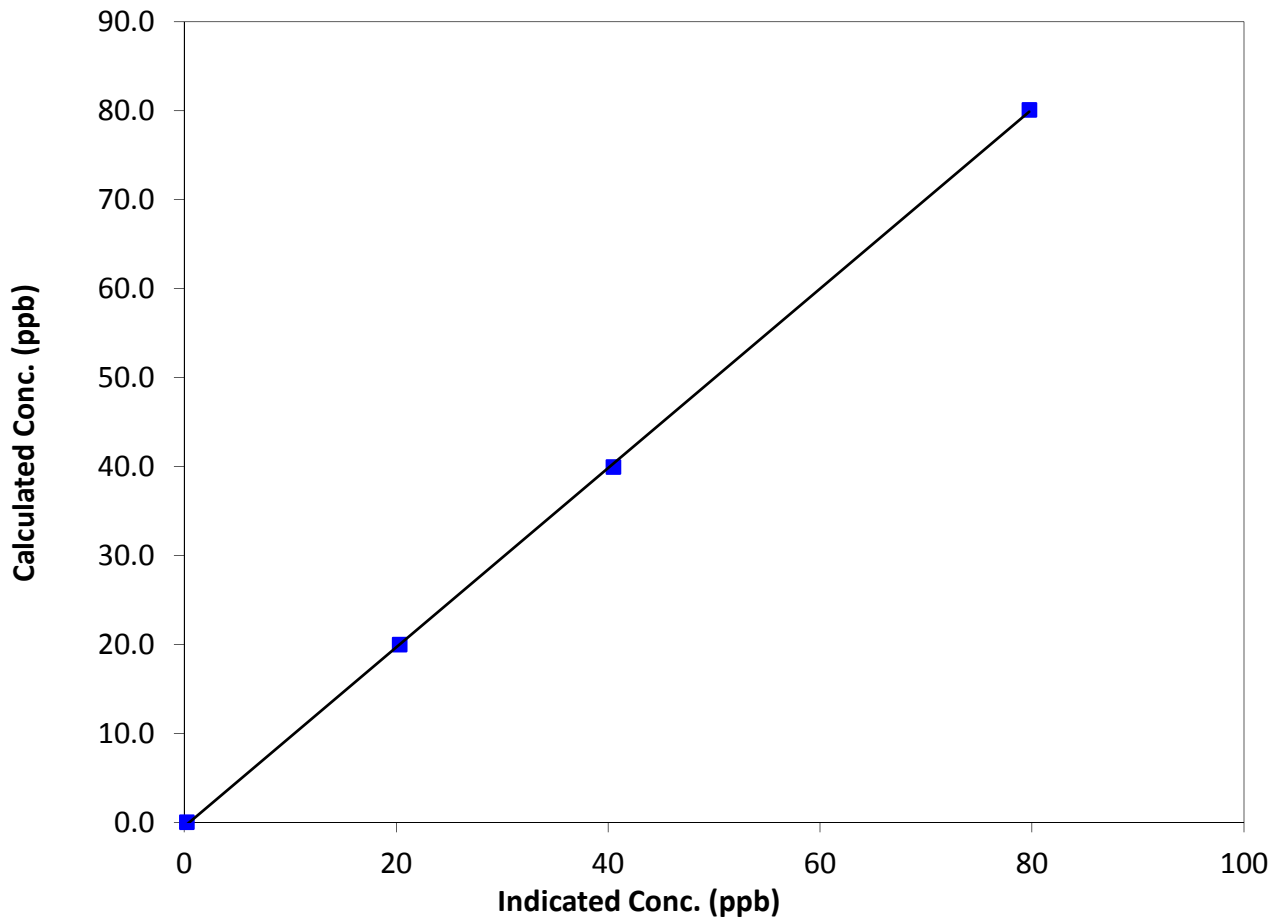
Station Information

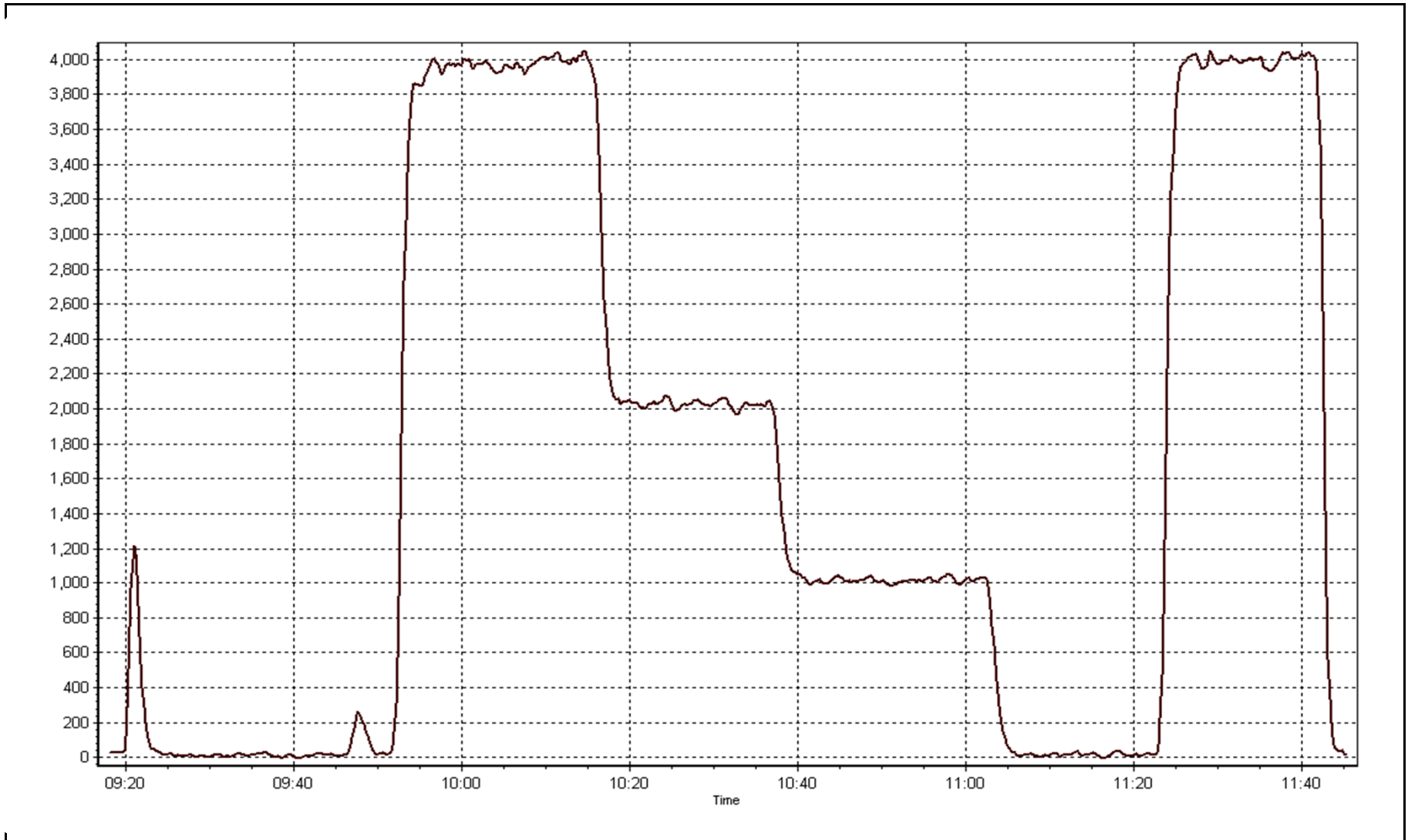
Calibration Date	July 17, 2014	Previous Calibration	June 9, 2014
Station Name	CNRL Horizon	Station Number	15
Start Time (MST)	9:15	End Time (MST)	11:45
Analyzer make	TEI 43I	Analyzer serial #	0710321323

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999932
80.1	79.8	1.0040		
39.9	40.5	0.9861	Slope	1.007406
20.0	20.3	0.9827		
			Intercept	-0.474707

TRS Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	July 15, 2014	Previous Calibration	June 11, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	14:00
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	10880507
Gas Cert Reference	LL107945	Cal Gas Expiry Date	11/6/2014
CH4 Cal Gas Conc.	490.0 ppm	CH4 Equiv Conc.	1062.0 ppm
C3H8 Cal Gas Conc.	208 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	0-5000mV	DACS channel #	SE 3

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	6.0	6.0
Analyzer Range (mv)	5000	5000	Air or Bypass press	20.0	20.0
Calculated slope	0.998371	0.998000	Fuel Pressure	18.0	18.0
Calculated intercept	0.039955	0.041926			

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	8.72	1.004
third point	5000	20.6	4.38	4.34	1.009
calibrator zero	5000	0.0	0.00	-0.03	N/A
as left zero	5000	0.0	0.00	0.01	N/A
as left span	5000	82.3	17.48	17.53	0.997
Average Correction Factor					1.004

Corrected As found 17.51 Previous response 17.47 % change -0.3%

Notes:

No adjustments required

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

THC Calibration Summary

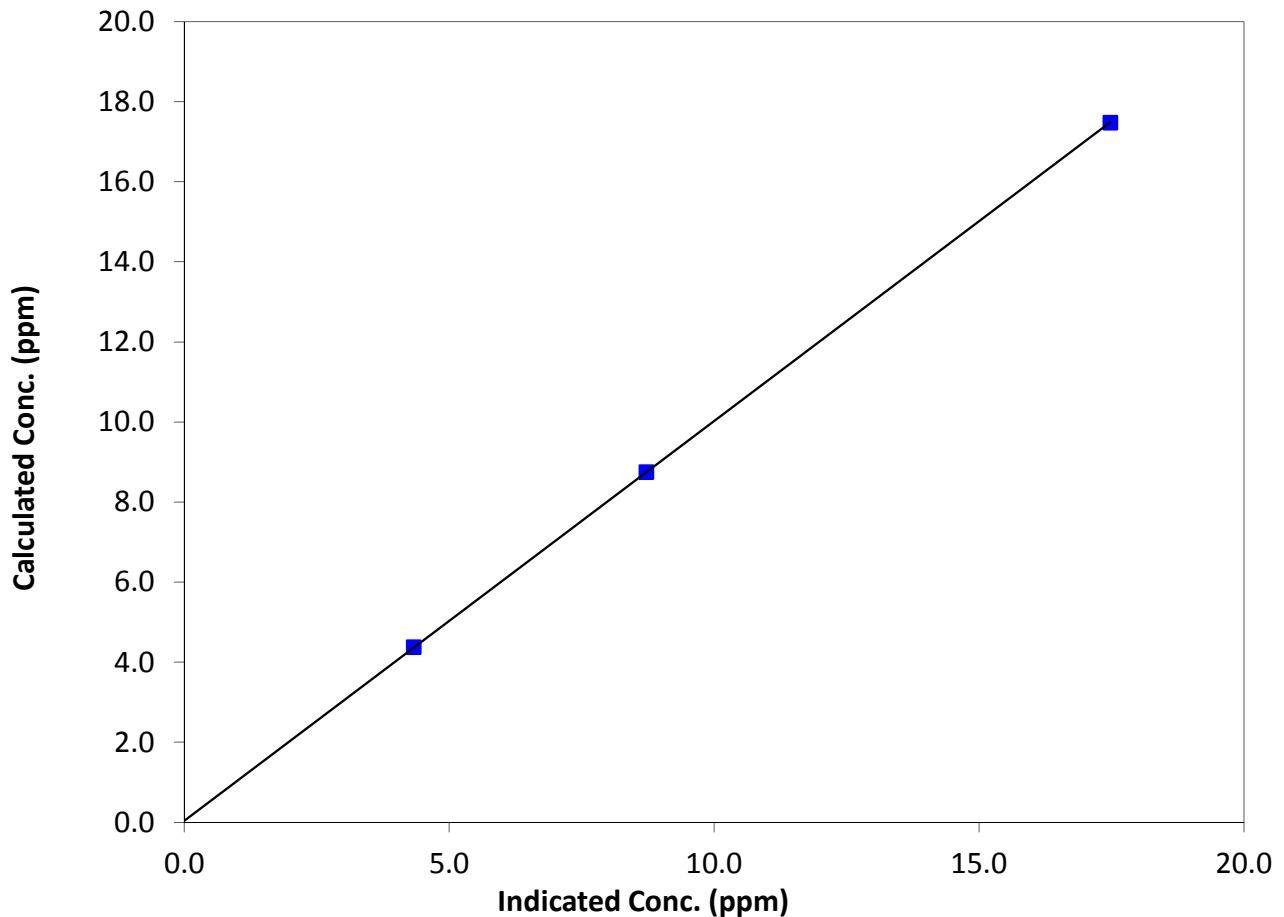
Station Information

Calibration Date	July 15, 2014	Previous Calibration	June 11, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:30	End Time (MST)	14:00
Analyzer make	TEI 51C-LT	Analyzer serial #	76232382

Calibration Data

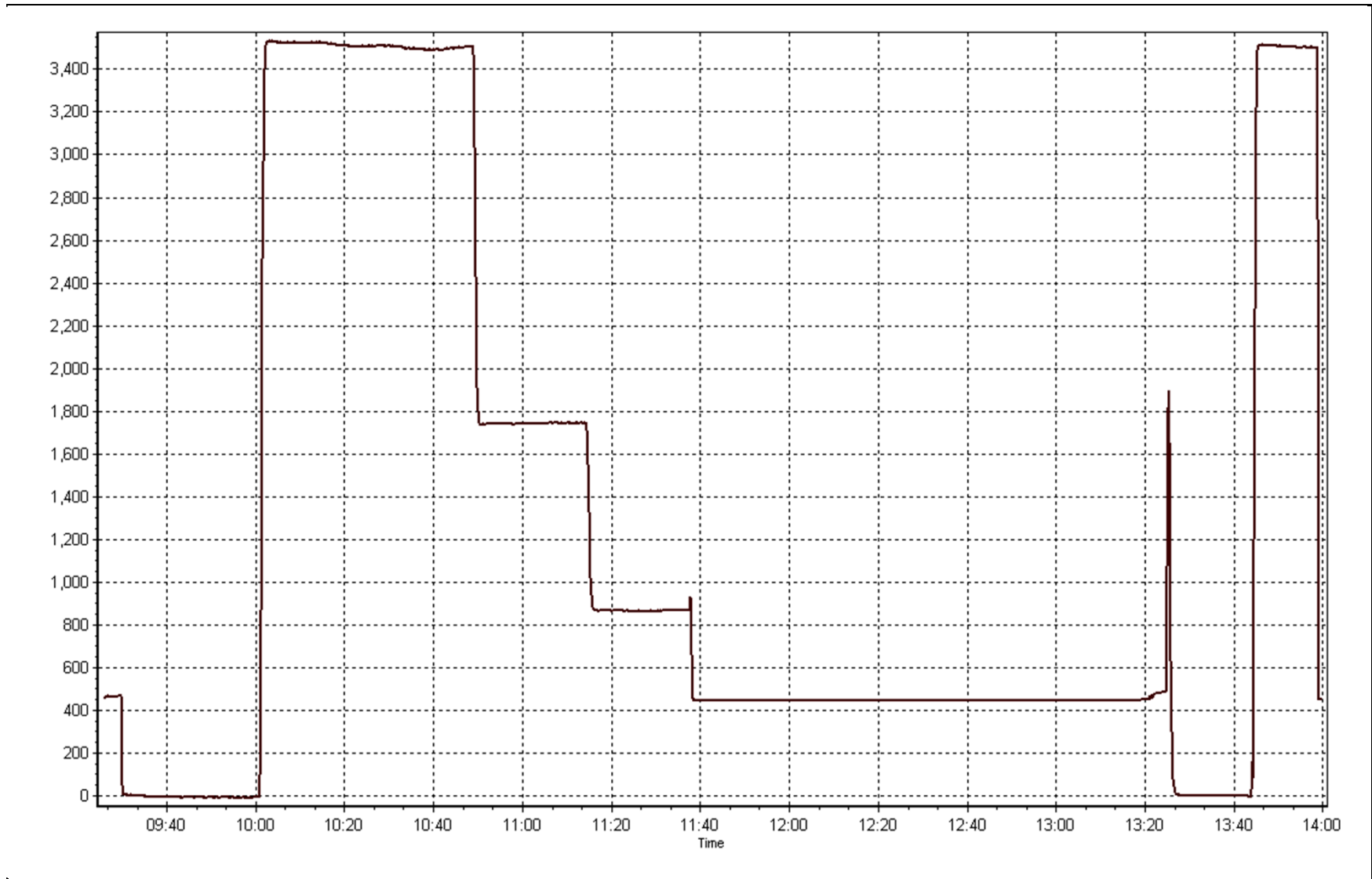
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	N/A	Correlation Coefficient	0.999999
17.48	17.48	1.0001		
8.75	8.72	1.0035	Slope	0.998000
4.38	4.34	1.0093		
			Intercept	0.041926

THC Calibration Curve



THC Calibration Plot

Date: July 15, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 15, 2014	Previous Calibration	June 11, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	9:30	End Time (MST)	14:00
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	Sabio 4010	Serial Number	10880507
NO Cal Gas Conc	48.6 ppm	Cal Gas Expiry Date	November 6, 2014
NOx Cal Gas Conc	48.6 ppm	Cal Gas Serial #	LL107945

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2632
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	1.008210	1.005482	0.997710
	Data Offset	-1.705808	-0.894861	1.418044
After	Data Slope	1.001270	0.999265	0.999486
	Data Offset	-1.506776	-0.679006	-1.060022
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	0.923	ppb
NOX coefficient	0.998	ppb	1.000	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	10.3		11.5	
NOX bkgrnd	10.6		11.7	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	325.0	Deg C	325.0	Deg C
PMT Temp	-3.0	Deg C	-3.0	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	173.7	mmHg	168.0	mmHg
Sample Flow	0.697	ccm	0.613	ccm

Notes:

powered off unit after as founds to restore screen. Adjusted span.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

July 15, 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	775.5	776.2	0.5	1.0315	1.0306
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	799.4	800.2	0.4	1.0006	0.9997
second point	5000	41.2	400.5	400.5	0.0	403.2	403.2	0.4	0.9932	0.9932
third point	5000	20.6	200.2	200.2	0.0	202.0	201.6	0.4	0.9912	0.9932
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	451.4	348.6	803.4	458.2	346.7	0.9958	0.9852
Average Correction Factor									0.9950	0.9954

Corrected As found

NO_x= 774.6

NO= 776.2

Percent Change

NO_x= 2.7%

NO= 2.6%

Previous Response

NO_x= 795.1

NO= 796.5

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	451.4	348.2	798.9	451.4	349.0	0.9851	1.0000	0.9977	100.2%
2nd NO ₂ (200)	N/A	584.6	215.0	799.8	584.6	216.4	0.9840	1.0000	0.9932	100.7%
3rd NO ₂ (100)	N/A	717.3	82.3	801.2	717.3	84.4	0.9823	1.0000	0.9746	102.6%
4th NO ₂ (0)	799.6	N/A	-1.2	798.4	799.6	0.2	0.9857	1.0000	N/A	N/A
Average Correction Factor							0.9843	1.0000	0.9885	101.2%

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

NO_x Calibration Summary

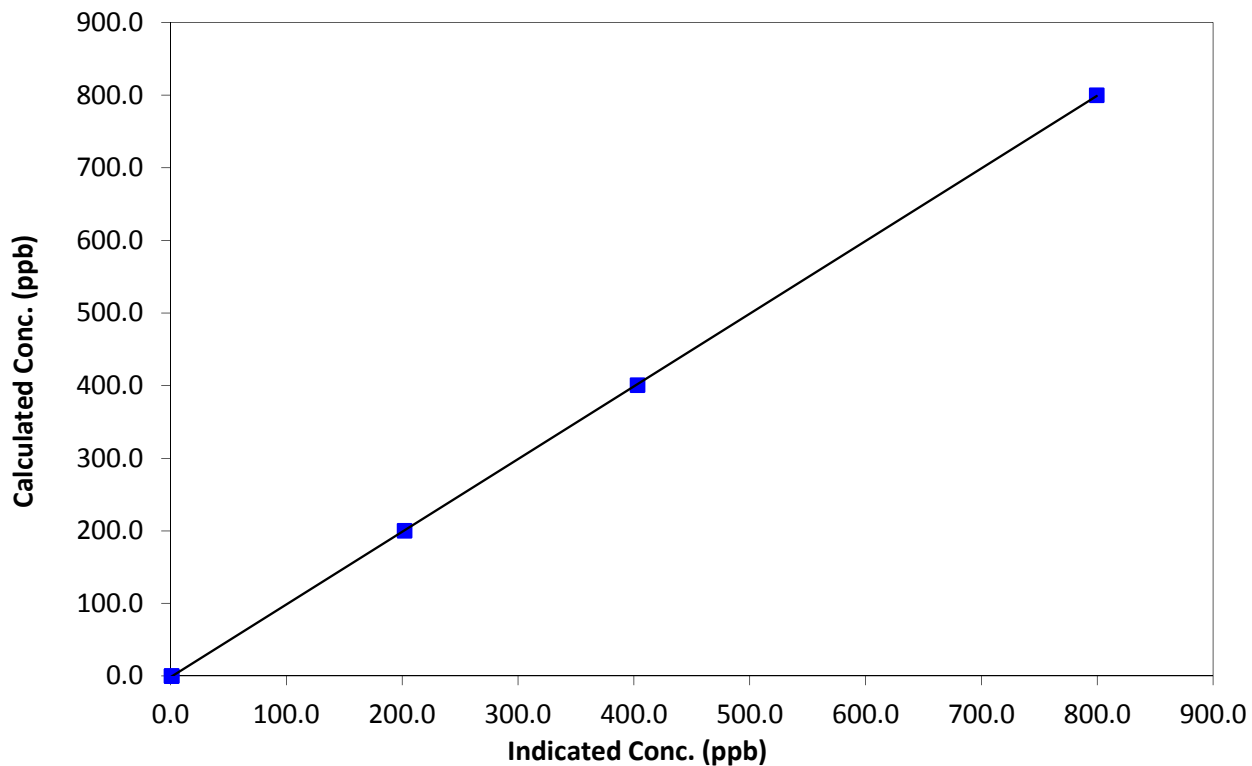
Station Information

Calibration Date	July 15, 2014	Previous Calibration	June 11, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:30	End Time (MST)	14:00
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	0.999989
800.0	799.4	1.0006		
400.5	403.2	0.9932	Slope	1.001270
200.2	202.0	0.9912		
0.0	0.9	0.0000	Intercept	-1.506776

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

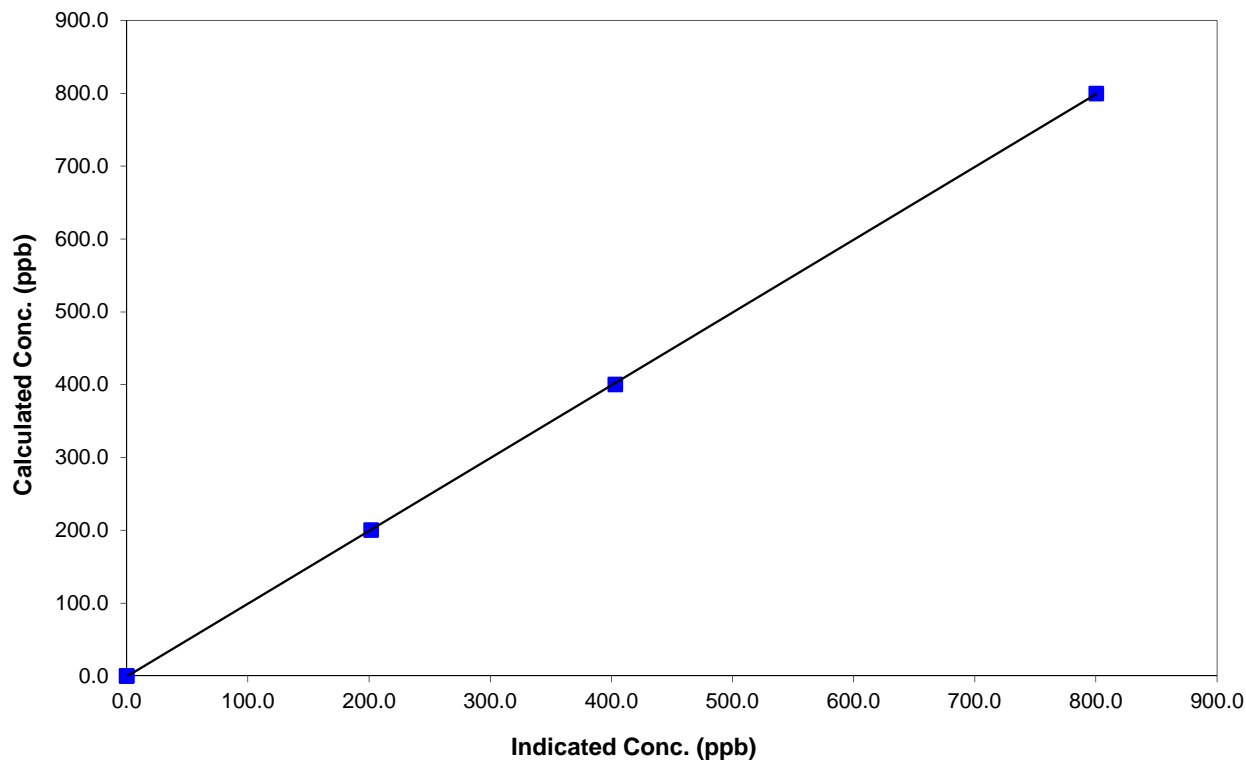
Station Information

Calibration Date	July 15, 2014	Previous Calibration	June 11, 2014
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:30	End Time (MST)	14:00
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	0.999988
800.0	800.2	0.9997		
400.5	403.2	0.9932	Slope	0.999265
200.2	201.6	0.9932		
0.0	0.0	0.0000	Intercept	-0.679006

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

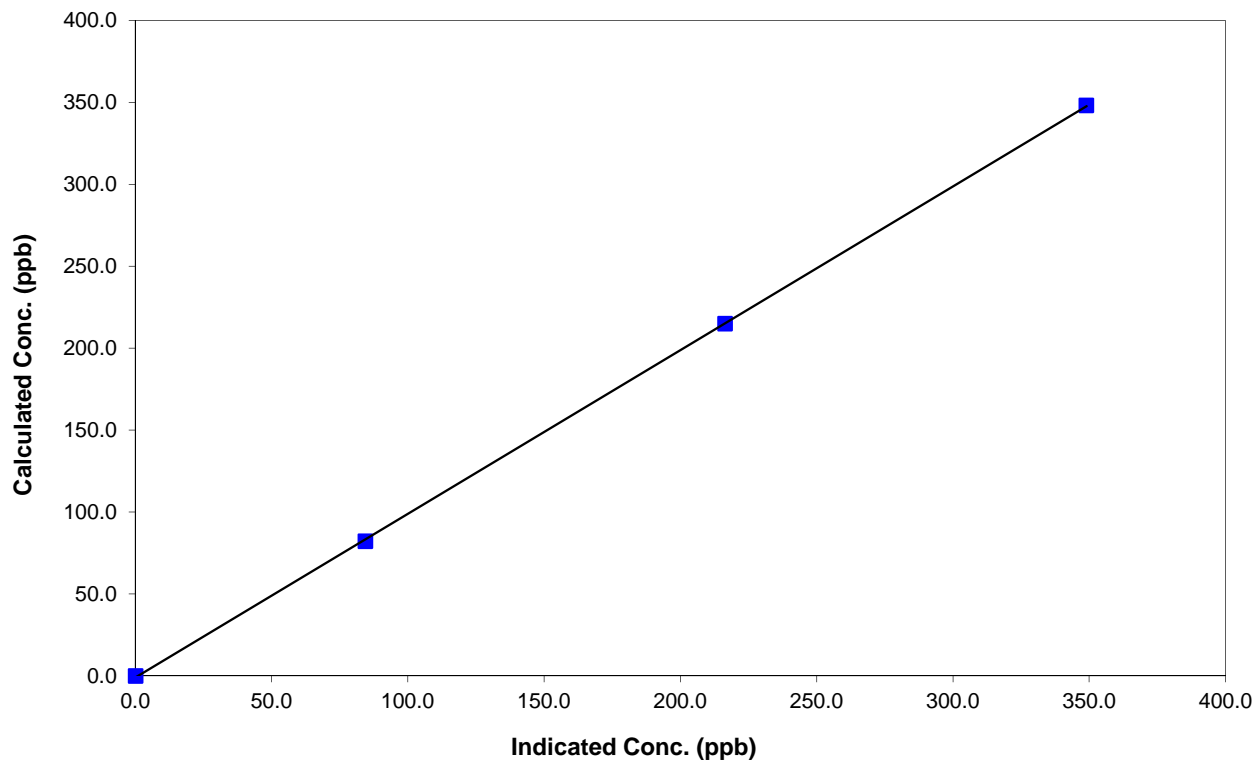
Station Information

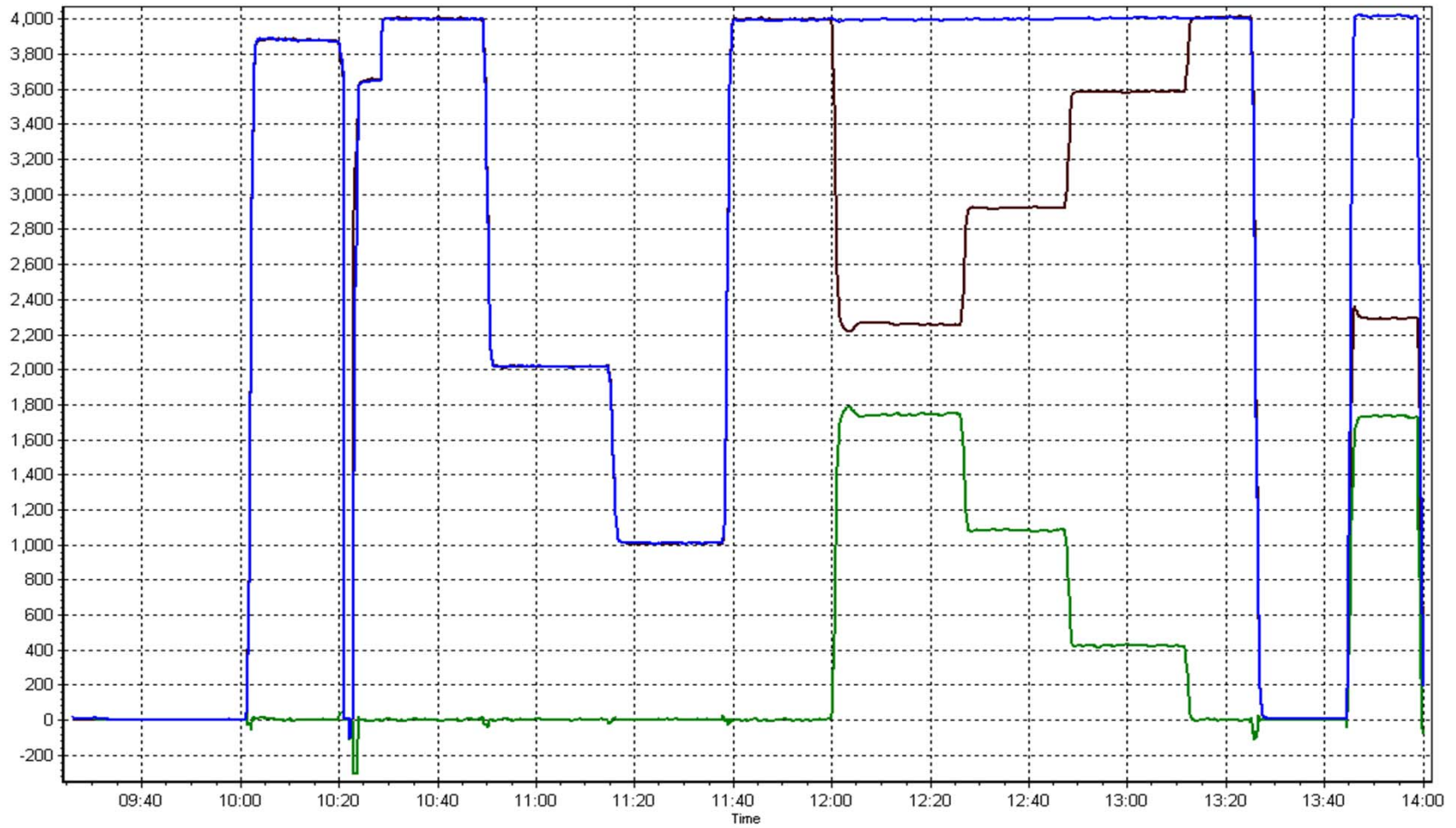
Calibration Date	July 15, 2014	Previous Calibration	June 11, 2014
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:30	End Time (MST)	14:00
Analyzer make	42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999969
348.2	349.0	0.9977		
215.0	216.4	0.9932	Slope	0.999486
82.3	84.4	0.9746		
			Intercept	-1.060022

NO₂ Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 16
SHELL MUSKEG RIVER
JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
 JULY 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	702	37	42	99.33	49	0	10	0
THC (ppm) Average	702	37	42	99.33	4.1	-	2.9	-
NO2 (ppb) Average	702	37	42	99.33	36	0	17	0
NO (ppb) Average	702	37	42	99.33	58	-	14	-
NOX (ppb) Average	702	37	42	99.33	88	-	31	-
PM2.5 (ug/m3) Average	738	0	6	99.19	212.3	-	42.4	3
Temperature 2 m (C) Average	744	0	0	100.00	33.4	-	24	-
Relative Humidity (%) Average	734	0	10	98.66	99	-	-	-
Barometric Pressure (inHg) Average	734	0	10	98.66	29.2	-	-	-
Wind Speed 10 m (km/h) Average	742	0	2	99.73	30	-	-	-
Wind Direction 10 m (deg) Average	742	0	2	99.73	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
 JULY 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	702	1.4	4	-	0	0	0	0	1	4	49
THC (ppm) Average	702	2.57	0.3	-	2.1	2.2	2.3	2.5	2.7	3	4.1
NO2 (ppb) Average	702	7.1	7	-	0	1	2	5	10	17	36
NO (ppb) Average	702	3.6	7	-	0	0	0	0	4	11	58
NOX (ppb) Average	702	10.8	13	-	0	1	2	5	14	29	88
PM2.5 (ug/m3) Average	738	16.23	16.4	-	0.9	4.1	6.6	11.7	19.4	36	212.3
Temperature 2 m (C) Average	744	19.74	5.1	-	5.8	13.4	15.7	19.6	23.3	26.6	33.4
Relative Humidity (%) Average	734	66.5	20	-	26	39	51	67	83	94	99
Barometric Pressure (inHg) Average	734	28.83	0.2	-	28.3	28.6	28.7	28.8	29	29.1	29.2
Wind Speed 10 m (km/h) Average	742	8.8	5	-	1	4	5	8	11	16	30
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
JULY 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	06 Jul 2014 06:00	06 Jul 2014 07:00	2	Station power failure
AIR QUALITY ANALYZERS	25 Jul 2014 15:00	25 Jul 2014 16:00	2	Station power failure
AIR QUALITY ANALYZERS	31 Jul 2014 14:00	31 Jul 2014 14:00	1	New DAS collection program upload
PM2.5	29 Jul 2014 14:00	29 Jul 2014 14:00	1	Maintenance - Flow and zero check, sample head cleaning
Relative Humidity	31 Jul 2014 15:00	01 Aug 2014 00:00	10	DAS collection error - data not recorded
Barometric Pressure	31 Jul 2014 15:00	01 Aug 2014 00:00	10	DAS collection error - data not recorded
Wind Speed, Wind Direction	13 Jul 2014 20:00	13 Jul 2014 20:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	23 Jul 2014 07:00	23 Jul 2014 07:00	1	Flatline in sensor output signal

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 49 ppb on Jul 15 11:00	Maximum Daily Average: 9.6 ppb on Jul 15		Hours of Data:	702
Minimum Value: 0 ppb on Jul 1 04:00	Minimum Daily Average: 0.0 ppb on Jul 4		Hours of Missing Data:	42
Maximum Diurnal Average: 4.6 ppb at hour 11	Minimum Diurnal Average: 0.2 ppb at hour 4		Hours of Calibration:	37
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 = 20		Percent Operational Time:	99.3

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
2-Jul	Z	0	0	0	0	0	0	0	6	5	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0.8	6
3-Jul	Z	0	0	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Jul	Z	0	0	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-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	1
6-Jul	Z	0	0	0	0	PF	PF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
7-Jul	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
8-Jul	Z	0	0	0	0	0	0	1	23	10	15	11	6	3	1	0	1	1	0	0	1	0	0	0	3.2	23
9-Jul	Z	0	0	0	0	0	0	4	20	13	1	2	6	3	2	1	0	0	0	0	0	0	0	0	2.3	20
10-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.2	1
11-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.2	1
12-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0.2	1
14-Jul	Z	0	0	0	0	0	0	8	18	21	20	22	14	9	6	5	3	4	2	1	1	1	1	1	6.1	22
15-Jul	Z	1	2	3	4	7	12	12	10	22	49	36	12	3	2	6	8	7	6	5	7	7	2	2	9.6	49
16-Jul	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
17-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	6	6	4	1	0	0	0	0	1.0	6
18-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	4	3	1	1	0	0	0	0	0.8	4
19-Jul	Z	0	0	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-Jul	Z	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-Jul	Z	0	0	0	0	0	0	0	1	1	0	0	0	1	4	2	3	1	1	1	4	2	2	1	1.0	4
22-Jul	Z	1	1	0	0	1	1	4	10	13	19	17	16	8	3	2	1	1	1	0	0	0	0	0	4.3	19
23-Jul	Z	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
24-Jul	Z	0	0	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-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	PF	PF	0	0	0	0	0	0	0	0	0.1	0
26-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	4	7	5	1	0	0	0	0	0	0	1.0	7
27-Jul	Z	0	0	0	0	0	0	1	4	5	2	1	0	0	0	0	0	1	2	1	1	1	0	0	1.0	5
28-Jul	Z	0	1	0	0	0	6	10	7	13	12	11	5	1	1	0	0	0	0	0	1	0	0	0	3.1	13
29-Jul	Z	0	1	1	1	1	1	4	3	4	C	C	C	C	C	C	1	1	1	1	1	1	0	0	--	4
30-Jul	Z	1	1	0	0	0	0	1	4	15	13	7	9	9	6	7	8	7	3	1	0	1	0	0	4.1	15
31-Jul	Z	0	0	0	0	0	0	1	6	2	1	0	0	PF	1	0	0	0	0	0	0	0	0	0	0.5	6

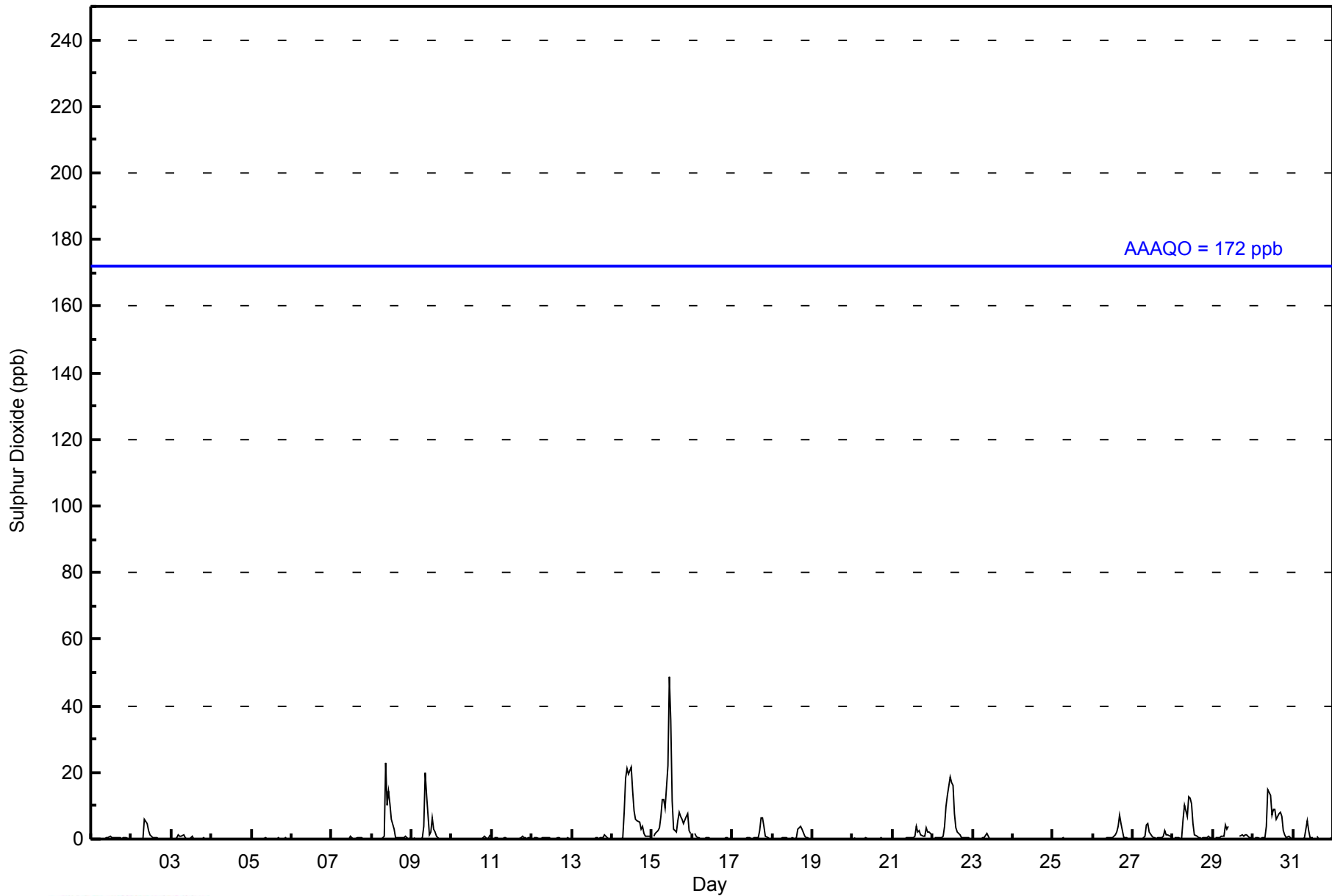
--	0.2	0.2	0.2	0.2	0.4	0.8	1.6	3.7	4.1	4.6	3.7	2.4	1.4	1.0	1.2	1.4	1.2	0.9	0.7	0.6	0.6	0.3	0.2	Diurnal Average
--	2	2	3	4	7	12	12	23	22	49	36	16	9	6	7	8	7	6	5	7	7	2	2	Diurnal Maximum

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



WBEA NETWORK
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	677	96.44	96.44
11 - 20	19	2.71	99.15
21 - 60	6	0.85	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: 702

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - July 2014

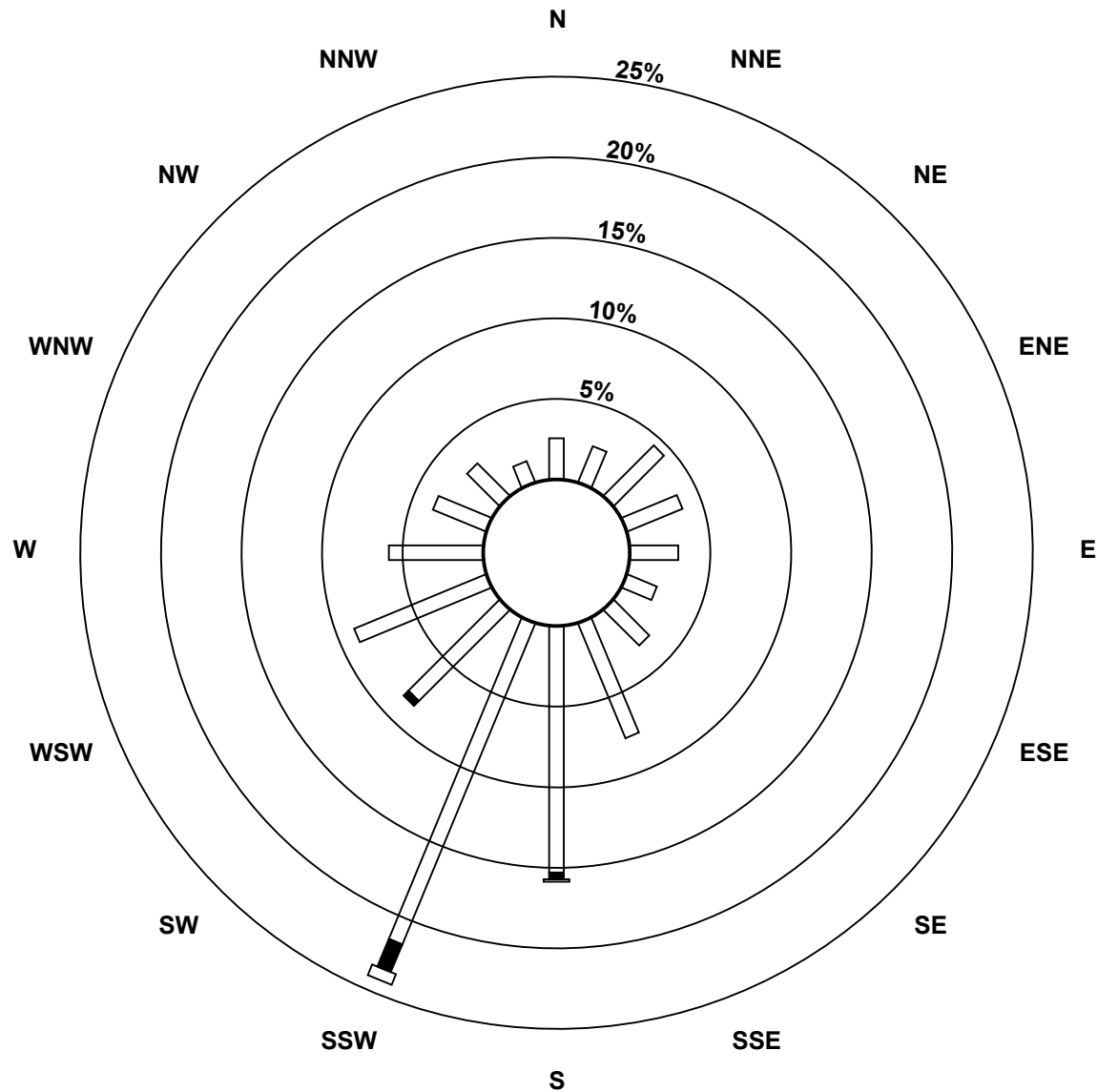
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	18	17	31	26	21	14	22	54	107	151	56	62	41	25	20	10	675
11 - 20	0	0	0	0	0	0	0	0	3	13	3	0	0	0	0	0	19
21 - 60	0	0	0	0	0	0	0	0	1	5	0	0	0	0	0	0	6
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	18	17	31	26	21	14	22	54	111	169	59	62	41	25	20	10	700

Total Number of Valid Hours: 700

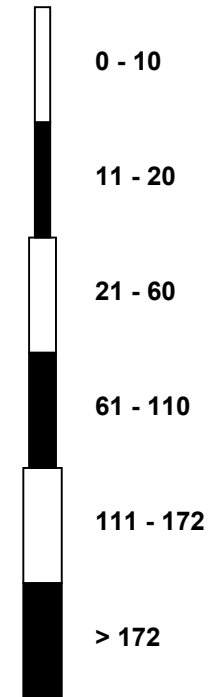
Total Number of Hours: 744

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

**Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River (AMS 16)**



Classes (ppb)



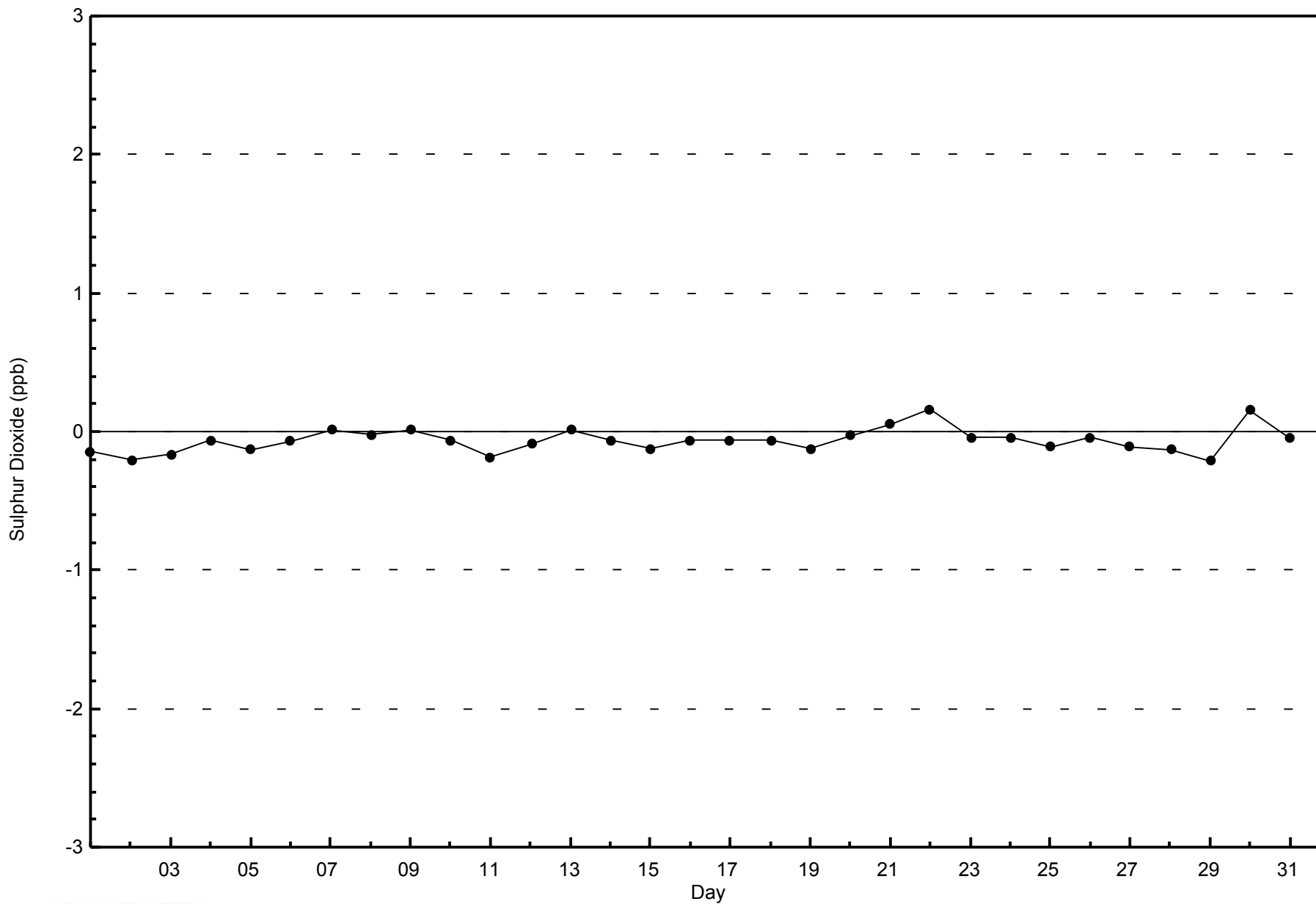
Total Number of Valid Hours: 700



WBEA NETWORK

Zero Responses

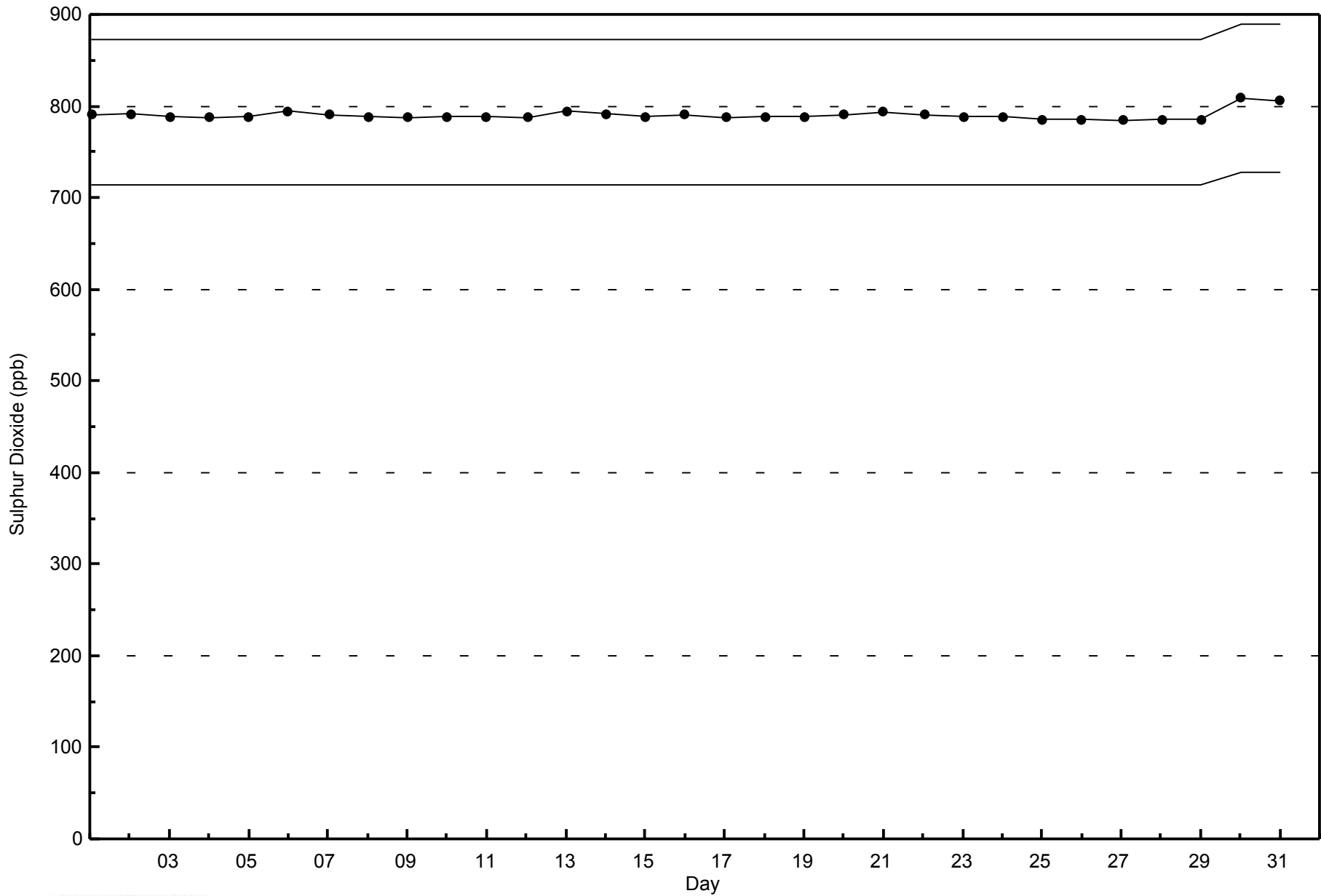
Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - July 2014





WBEA NETWORK
Span Responses

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - July 2014





Maximum Value: 4.1 ppm on Jul 3 20:00																			Maximum Daily Average: 2.9 ppm on Jul 31						Hours in Service: 744	
Minimum Value: 2.1 ppm on Jul 4 05:00																			Minimum Daily Average: 2.2 ppm on Jul 10						Hours of Data: 702	
Maximum Diurnal Average: 2.8 ppm at hour 22																			Minimum Diurnal Average: 2.4 ppm at hour 11						Hours of Missing Data: 42	
Monthly Average: 2.57 ppm																			Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.3 Median = 2.5 Q ₃ = 2.7 P ₉₀ = 3.0 P ₉₉ = 3.6						Hours of Calibration: 37	
																									Percent Operational Time: 99.3	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	Z	3.2	2.9	2.7	2.6	2.5	2.4	2.4	2.5	2.5	2.6	2.4	2.5	2.5	2.9	3.6	2.5	2.4	2.4	2.4	2.5	2.6	2.6	2.4	2.6	3.6
2-Jul	Z	2.8	2.9	3.2	2.9	2.7	2.2	2.3	2.4	2.4	2.5	2.7	2.7	2.5	2.5	2.5	2.6	2.7	2.7	2.6	2.7	2.4	2.2	2.1	2.6	3.2
3-Jul	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.4	2.5	2.5	2.3	2.2	2.3	2.2	2.3	3.1	4.1	3.7	2.7	2.6	2.8	2.5	4.1
4-Jul	Z	2.6	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.3	2.4	2.3	2.4	2.5	2.4	3.4	3.4	2.4	2.4	3.4
5-Jul	Z	2.5	2.4	2.4	2.3	2.5	2.5	2.5	2.6	2.4	2.3	2.3	2.3	2.4	2.4	2.4	2.9	2.4	2.4	2.8	3.1	3.0	2.7	2.5	2.5	3.1
6-Jul	Z	3.3	3.7	3.0	3.1	PF	PF	3.0	2.7	2.5	2.2	2.4	2.3	2.4	2.3	2.5	2.8	2.4	2.3	2.3	2.3	2.3	2.2	2.6	3.7	
7-Jul	Z	2.3	2.2	2.2	2.2	2.2	2.4	2.4	2.4	2.7	2.4	2.4	2.3	2.5	2.8	3.0	2.7	2.7	2.6	3.2	2.7	3.3	2.7	2.9	2.6	3.3
8-Jul	Z	2.8	2.6	2.3	2.3	2.4	2.5	2.5	2.4	2.4	2.5	2.4	2.5	2.5	2.6	3.1	2.4	2.3	2.4	2.6	2.5	2.4	2.6	2.7	2.5	3.1
9-Jul	Z	2.8	3.1	3.0	2.6	2.5	2.8	2.8	2.4	2.4	2.4	2.3	2.5	2.5	2.6	2.5	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.5	3.1
10-Jul	Z	2.2	2.1	2.1	2.1	2.1	2.3	2.4	2.3	2.3	2.2	2.2	2.1	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.4
11-Jul	Z	2.3	2.4	2.3	2.3	2.2	2.1	2.5	2.7	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.6	2.7	2.9	3.1	3.4	3.6	3.7	2.6	3.7
12-Jul	Z	3.2	3.4	3.6	2.9	2.7	3.3	2.9	2.4	2.4	2.4	2.3	2.5	2.4	2.5	2.5	2.5	2.4	2.3	2.4	2.8	2.7	2.8	2.4	2.7	3.6
13-Jul	Z	2.5	2.5	2.2	2.9	2.8	2.3	2.2	2.2	2.3	2.3	2.2	2.4	2.5	2.6	2.6	2.7	2.7	2.8	2.9	3.1	3.2	2.6	2.5	3.2	
14-Jul	Z	2.3	2.2	2.1	2.1	2.2	2.3	2.3	2.4	2.3	2.4	2.5	2.6	2.8	2.8	2.8	2.9	2.9	2.9	3.0	2.8	2.8	2.8	2.6	3.0	3.0
15-Jul	Z	2.6	2.6	2.5	2.4	2.4	2.4	2.5	2.4	2.4	2.6	2.6	2.7	2.7	2.8	2.8	2.8	2.8	2.8	3.0	2.7	2.7	2.9	2.8	2.6	3.0
16-Jul	Z	2.8	2.5	2.7	3.0	3.1	2.8	3.0	3.4	2.7	2.6	3.0	2.8	2.8	2.4	2.3	2.1	2.1	2.2	2.4	2.3	2.5	2.1	2.2	2.6	3.4
17-Jul	Z	2.8	2.7	2.6	2.9	2.7	2.7	2.8	2.4	2.5	2.4	2.3	2.5	2.6	2.5	2.5	2.5	2.5	2.6	3.2	3.2	2.7	2.7	2.6	3.2	
18-Jul	Z	3.0	2.5	3.3	3.5	3.1	2.6	2.8	2.6	2.4	2.3	2.3	2.4	2.5	2.5	2.4	2.5	2.5	2.6	2.5	2.3	2.5	2.4	2.3	2.6	3.5
19-Jul	Z	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.4	2.4	2.2	2.3	2.3	2.4	2.2	2.5	2.5	2.6	2.9	3.0	3.2	2.3	2.5	2.4	3.2
20-Jul	Z	2.4	2.5	2.4	2.5	2.3	2.2	2.5	2.8	3.1	2.6	2.7	2.6	2.6	2.5	2.6	2.6	2.6	3.0	2.5	2.5	2.9	3.2	3.2	2.6	3.2
21-Jul	Z	3.1	2.8	2.7	2.3	2.1	2.3	2.5	2.7	2.5	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.6	2.6	2.7	2.8	3.1	3.1	3.0	2.6	3.1
22-Jul	Z	2.9	2.9	3.0	3.0	2.9	2.9	2.8	2.9	2.8	2.5	2.5	2.4	2.5	2.6	2.6	2.7	2.6	2.6	2.7	2.6	2.4	2.3	2.4	2.7	3.0
23-Jul	Z	2.4	2.3	2.4	2.3	2.3	2.3	2.4	2.5	2.3	2.3	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.6	2.5	2.5	2.3	2.9	2.4	2.9	
24-Jul	Z	2.4	2.4	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.3	2.3	2.3	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.3	2.5	2.5
25-Jul	Z	2.3	2.4	2.4	2.5	2.6	2.5	2.4	2.3	2.3	2.3	2.4	2.4	2.4	PF	PF	3.1	2.7	3.5	2.8	2.6	2.7	3.1	3.0	2.6	3.5
26-Jul	Z	2.5	2.4	2.3	2.7	2.7	2.6	2.5	2.8	2.5	2.6	2.9	2.6	2.6	2.7	2.7	2.7	2.6	2.4	2.3	2.4	2.6	2.6	2.6	2.6	2.9
27-Jul	Z	2.7	2.6	2.8	2.9	2.7	2.8	2.8	2.7	2.7	2.6	2.5	2.5	2.6	2.6	2.6	2.4	2.4	2.4	2.5	2.4	2.4	2.4	2.5	2.6	2.9
28-Jul	Z	2.5	2.5	2.6	2.7	2.7	2.6	2.5	2.6	2.6	2.5	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	3.0	2.4	2.6	2.6	3.0
29-Jul	Z	3.0	2.9	2.9	3.1	2.8	2.7	2.8	2.6	2.9	C	C	C	C	C	C	2.9	3.0	3.0	3.1	3.0	2.6	2.5	2.3	--	3.1
30-Jul	Z	2.2	2.5	2.5	2.7	2.6	2.2	2.2	2.3	2.5	2.6	2.7	2.9	2.9	3.0	3.1	3.2	3.3	3.2	3.1	2.8	2.8	2.3	2.2	2.7	3.3
31-Jul	Z	2.1	2.4	2.4	2.3	2.4	2.2	2.4	4.0	2.9	2.8	3.0	3.0	PF	3.4	3.6	3.4	3.2	3.1	3.0	3.1	3.2	3.1	3.0	2.9	4.0
--	--	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.4	2.5	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.7	2.7	2.8	2.7	2.6	--	Diurnal Average
--	--	3.3	3.7	3.6	3.5	3.1	3.3	3.0	4.0	3.1	2.8	3.0	3.0	2.9	3.4	3.6	3.4	3.3	3.5	4.1	3.7	3.4	3.6	3.7	--	Diurnal Maximum
Z - zerospan		C - Calibration				PF - Power Failure																				

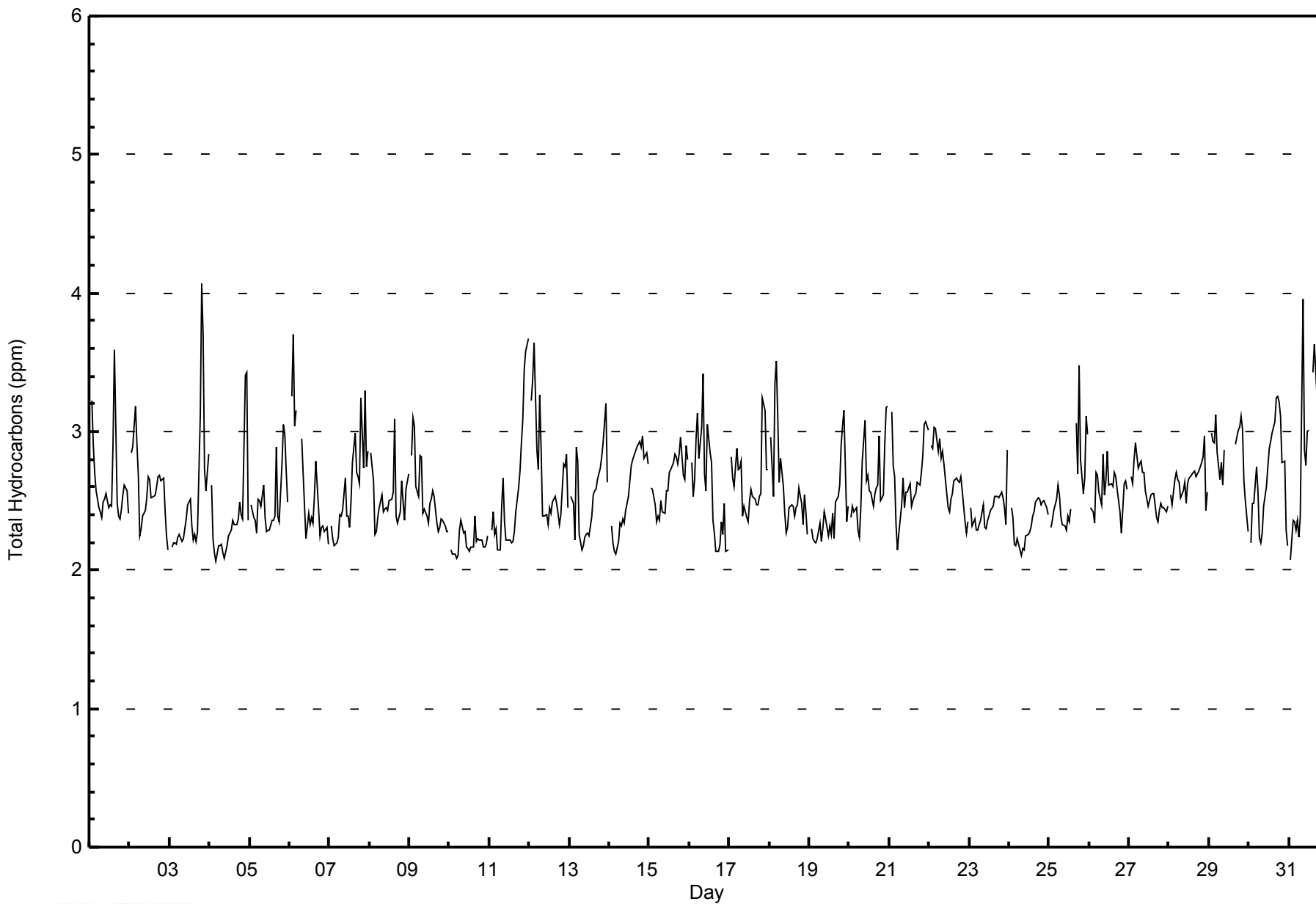


WBEA NETWORK

Hourly Averages

Total Hydrocarbons (THC) - ppm

Shell Muskeg River - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	643	91.60	91.60
3.1 - 10.0	59	8.40	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - July 2014

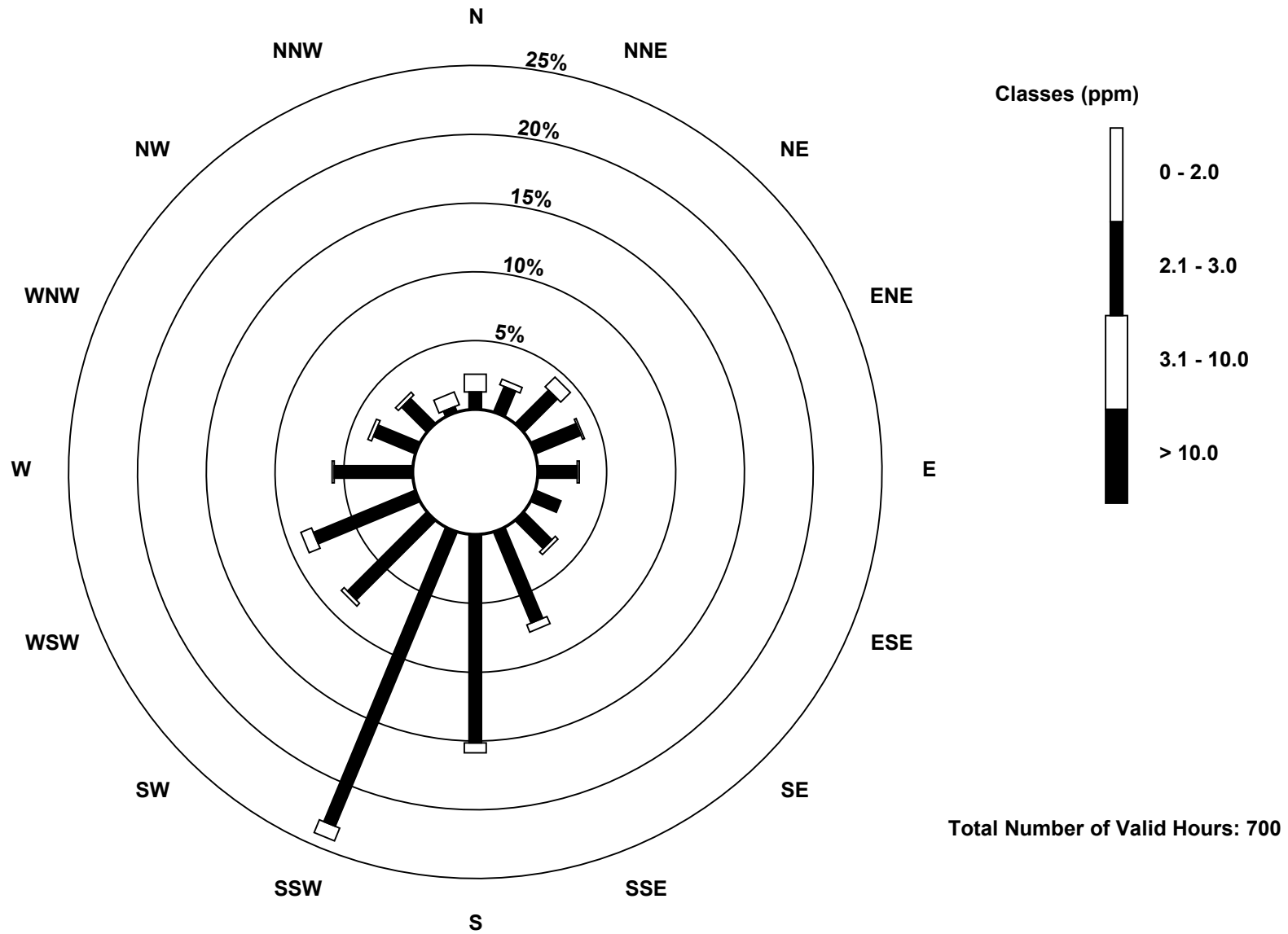
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	9	14	24	25	20	14	20	50	106	162	57	56	40	23	18	3	641
3.1 - 10.0	9	3	7	1	1	0	2	4	5	7	2	6	1	2	2	7	59
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	18	17	31	26	21	14	22	54	111	169	59	62	41	25	20	10	700

Total Number of Valid Hours: 700

Total Number of Hours: 744

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

**Total Hydrocarbons (THC) - ppm
Shell Muskeg River (AMS 16)**



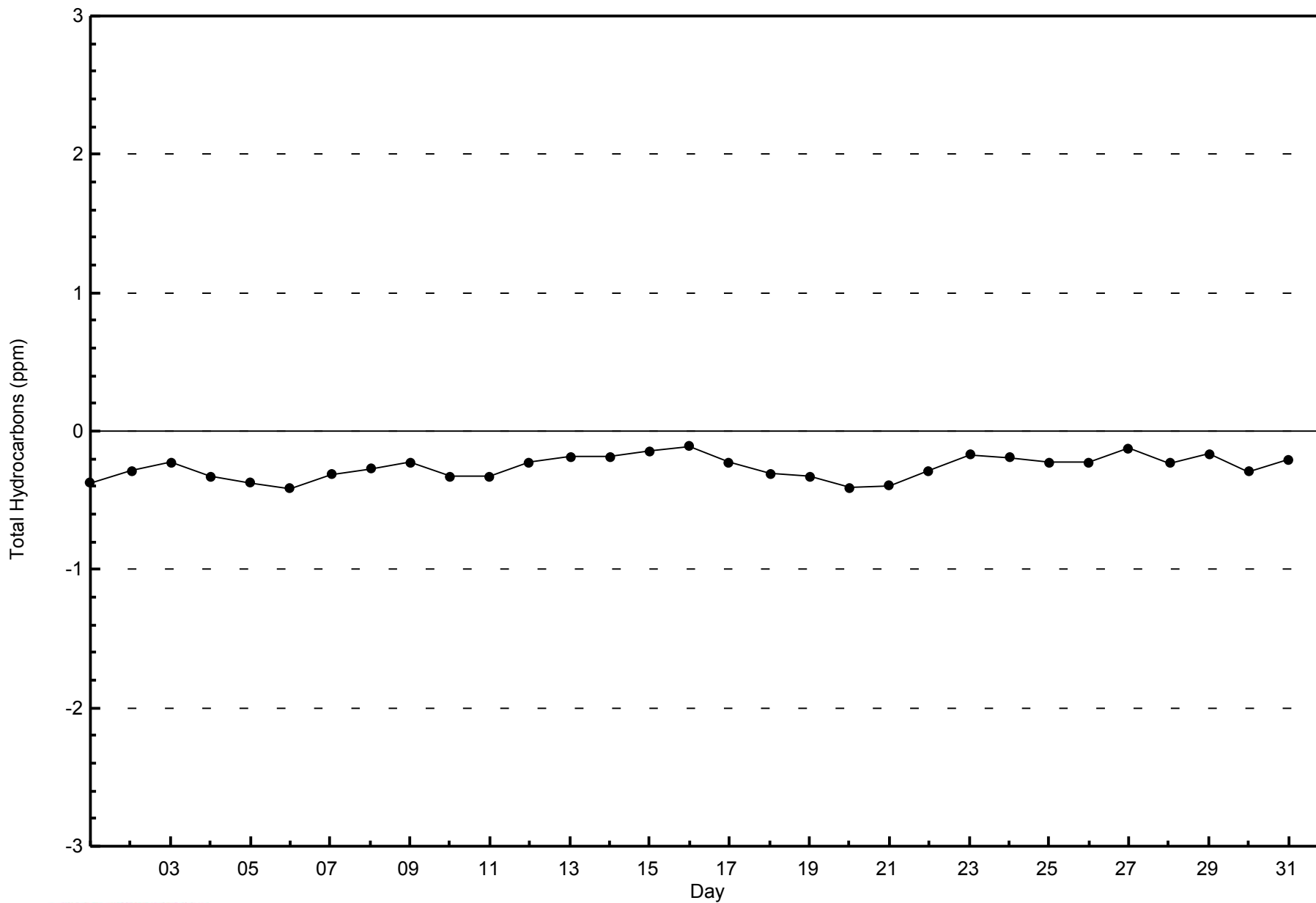


WBEA NETWORK

Zero Responses

Total Hydrocarbons (THC) - ppm

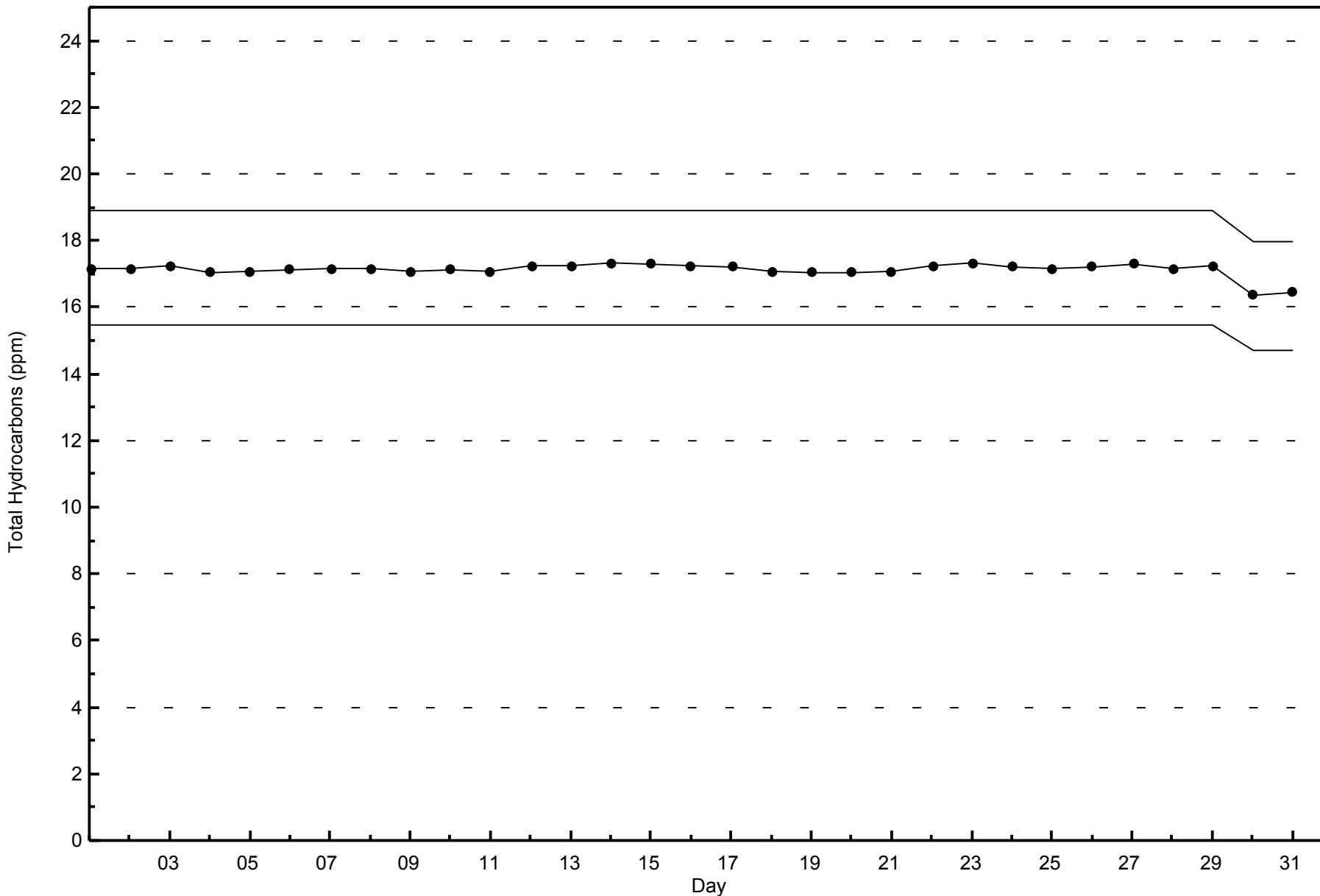
Shell Muskeg River - July 2014





WBEA NETWORK
Span Responses

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - July 2014



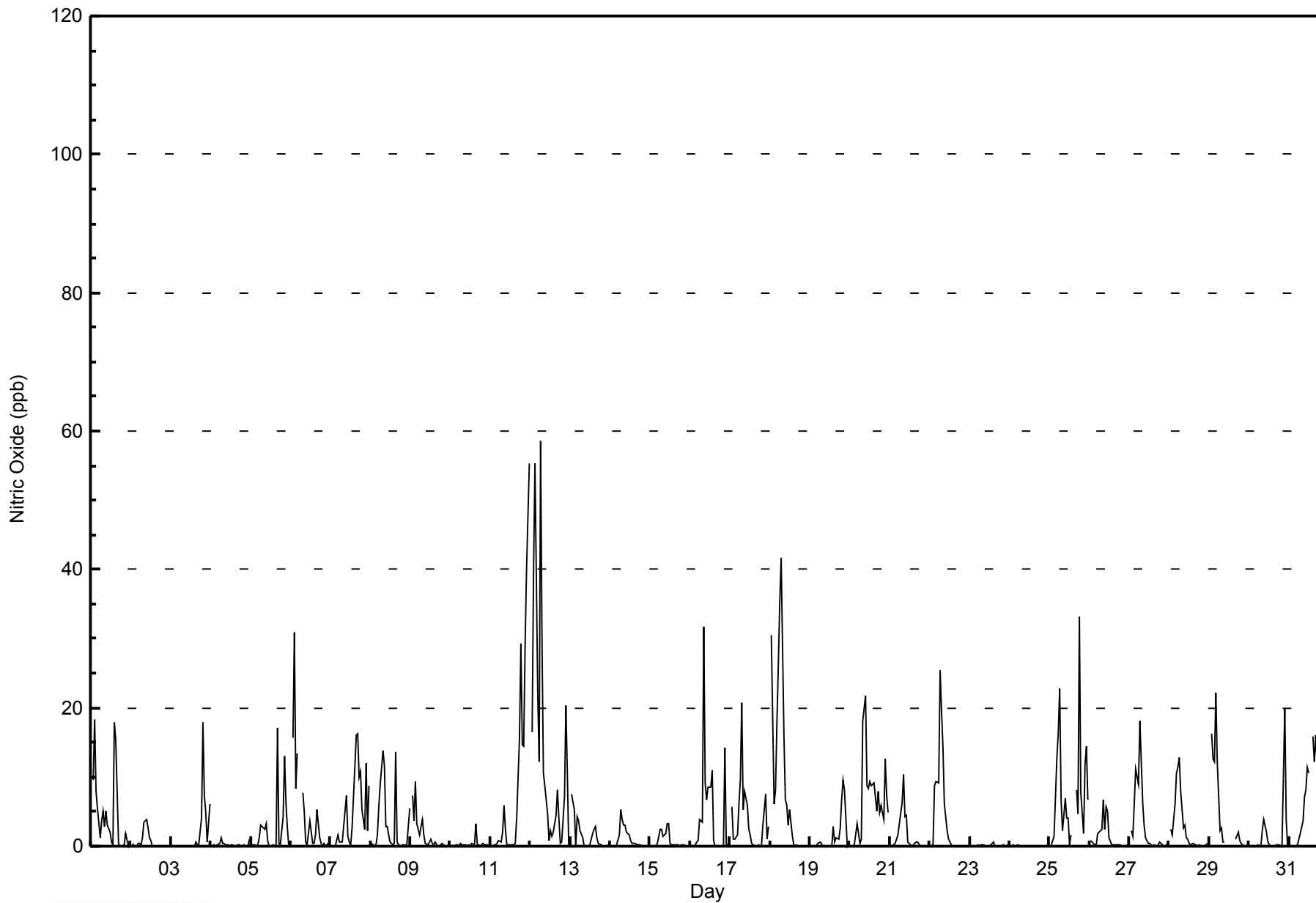


Maximum Value: 58 ppb on Jul 12 07:00														Maximum Daily Average: 13.9 ppb on Jul 12														Hours in Service: 744					
Minimum Value: 0 ppb on Jul 1 19:00														Minimum Daily Average: 0.0 ppb on Jul 24														Hours of Data: 702					
Maximum Diurnal Average: 7.6 ppb at hour 7														Minimum Diurnal Average: 1.1 ppb at hour 14														Hours of Missing Data: 42					
Monthly Average: 3.6 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 4 P ₉₀ = 11 P ₉₉ = 33														Hours of Calibration: 37					
																												Percent Operational Time: 99.3					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24									
1-Jul	Z	10	18	8	6	1	4	5	3	5	3	2	1	0	18	16	0	0	0	0	0	2	0	1	4.4	18							
2-Jul	Z	0	0	0	0	0	0	1	3	4	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0.6	4							
3-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4	18	7	5	1	6	1.8	18							
4-Jul	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1							
5-Jul	Z	0	0	0	0	1	3	3	2	3	1	0	0	0	0	0	17	0	0	4	13	6	3	0	2.5	17							
6-Jul	Z	16	31	8	13	PF	PF	8	5	1	0	4	2	0	0	2	5	1	0	0	0	0	0	0	4.7	31							
7-Jul	Z	0	0	0	2	1	1	1	3	7	1	1	0	3	7	16	16	10	11	5	2	12	2	9	4.8	16							
8-Jul	Z	0	0	0	2	6	9	14	12	3	3	2	1	0	0	14	1	0	0	0	0	0	0	6	3.1	14							
9-Jul	Z	7	4	9	3	2	3	4	2	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	1.7	9							
10-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0.3	3							
11-Jul	Z	0	0	0	0	1	1	2	6	2	0	0	0	0	0	4	16	29	15	14	29	40	55	9.4	55								
12-Jul	Z	16	40	55	22	12	58	30	11	9	5	1	2	1	2	4	8	4	0	1	7	20	11	0	13.9	58							
13-Jul	Z	8	5	0	4	4	2	1	0	0	0	0	2	2	3	1	0	0	0	0	0	0	0	0	1.5	8							
14-Jul	Z	0	0	0	0	2	5	4	3	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	1.0	5							
15-Jul	Z	0	0	0	0	1	3	3	1	2	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0.8	3							
16-Jul	Z	0	0	0	1	1	4	4	32	9	7	8	9	11	1	0	0	0	0	0	14	0	0	0	4.3	32							
17-Jul	Z	6	1	1	2	6	10	21	5	8	6	2	2	0	0	0	0	0	0	0	3	7	1	3	3.7	21							
18-Jul	Z	31	6	8	18	26	35	42	16	7	6	3	5	2	0	0	0	0	0	0	0	0	0	0	8.9	42							
19-Jul	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	3	1	1	1	3	7	10	8	0	0	1.5	10							
20-Jul	Z	0	0	0	3	2	0	1	18	22	9	8	9	9	9	7	5	8	5	6	4	13	7	5	6.5	22							
21-Jul	Z	0	0	0	1	2	3	6	10	4	4	1	0	0	0	0	1	1	0	0	0	0	0	0	1.5	10							
22-Jul	Z	0	0	9	9	9	26	19	14	6	2	1	1	0	0	0	0	0	0	0	0	0	0	0	4.2	26							
23-Jul	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							
24-Jul	Z	0	0	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-Jul	Z	0	1	2	13	16	23	7	2	7	4	4	0	2	PF	PF	8	5	33	8	2	12	14	7	8.0	33							
26-Jul	Z	1	0	0	0	2	2	3	7	2	6	5	1	0	0	0	0	0	0	0	0	0	0	0	1.3	7							
27-Jul	Z	2	1	6	11	9	18	12	6	3	1	0	0	0	0	0	0	0	1	0	0	0	0	0	3.2	18							
28-Jul	Z	2	2	6	11	11	13	8	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2.7	13							
29-Jul	Z	16	13	12	22	12	2	3	1	1	C	C	C	C	C	C	1	2	1	0	0	0	0	0	--	22							
30-Jul	Z	0	0	0	0	0	0	0	2	4	2	1	0	0	0	0	0	0	0	0	0	20	4	0	1.5	20							
31-Jul	Z	0	0	0	0	0	1	2	4	7	8	11	11	PF	16	12	16	11	10	13	21	20	24	26	9.7	26							
--	--	3.8	4.0	4.1	4.6	4.3	7.6	6.5	5.6	4.0	2.6	2.1	1.6	1.1	2.1	2.8	2.8	2.0	3.2	2.5	2.8	5.5	3.5	3.9	Diurnal Average								
--	--	31	40	55	22	26	58	42	32	22	9	11	11	11	18	16	17	16	33	18	21	29	40	55	Diurnal Maximum								
Z - zerospan		C - Calibration				PF - Power Failure																											



WBEA NETWORK
Hourly Averages

Nitric Oxide (NO) - ppb
Shell Muskeg River - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Shell Muskeg River - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	678	96.58	96.58
21 - 40	20	2.85	99.43
41 - 80	4	0.57	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitric Oxide (NO) - ppb
Shell Muskeg River - July 2014

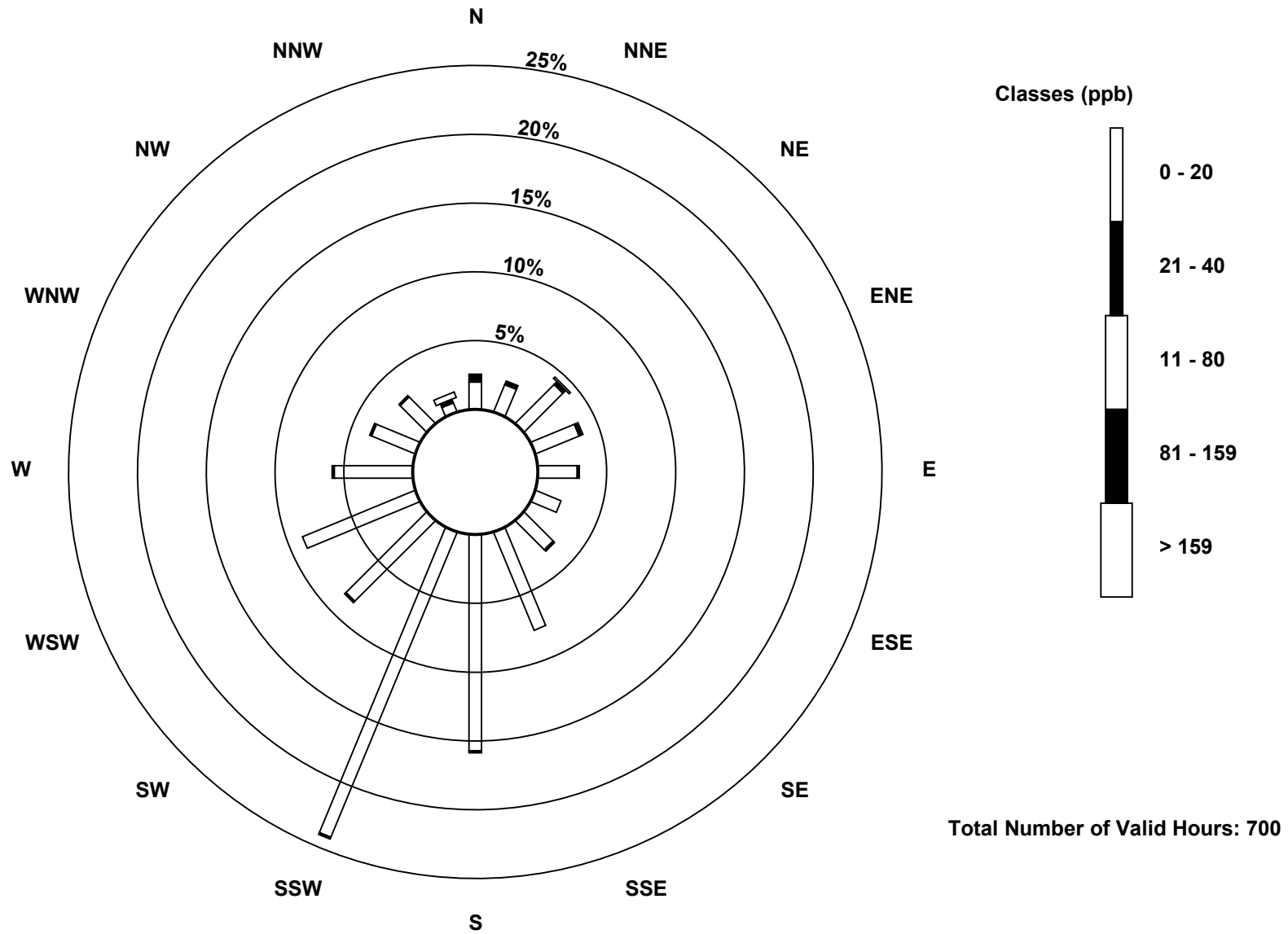
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	14	15	28	24	20	14	21	54	110	168	58	62	40	24	19	5	676
21 - 40	4	2	2	2	1	0	1	0	1	1	1	0	1	1	1	2	20
41 - 80	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3	4
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	18	17	31	26	21	14	22	54	111	169	59	62	41	25	20	10	700

Total Number of Valid Hours: 700

Total Number of Hours: 744

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

**Nitric Oxide (NO) - ppb
Shell Muskeg River (AMS 16)**

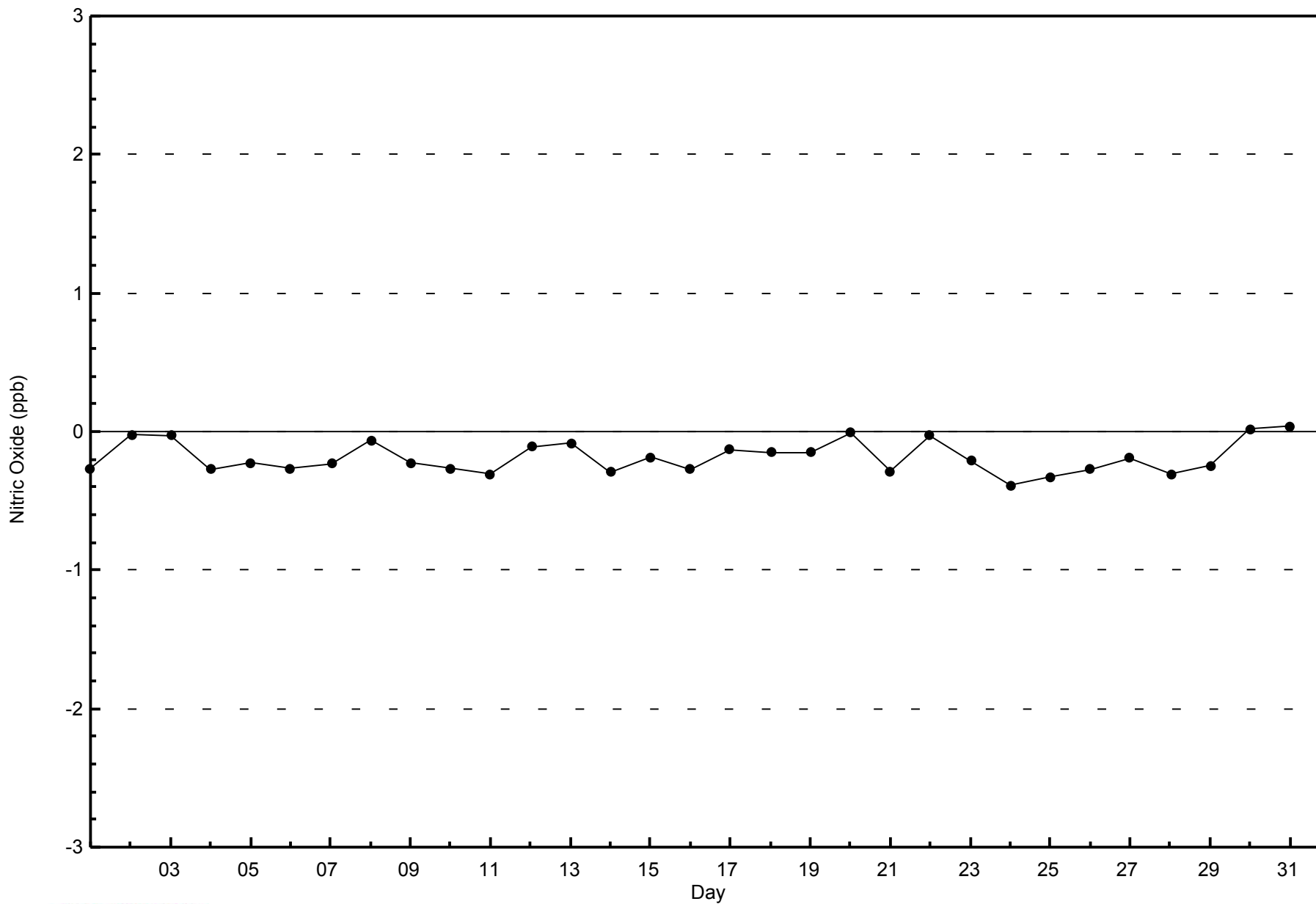




WBEA NETWORK

Zero Responses

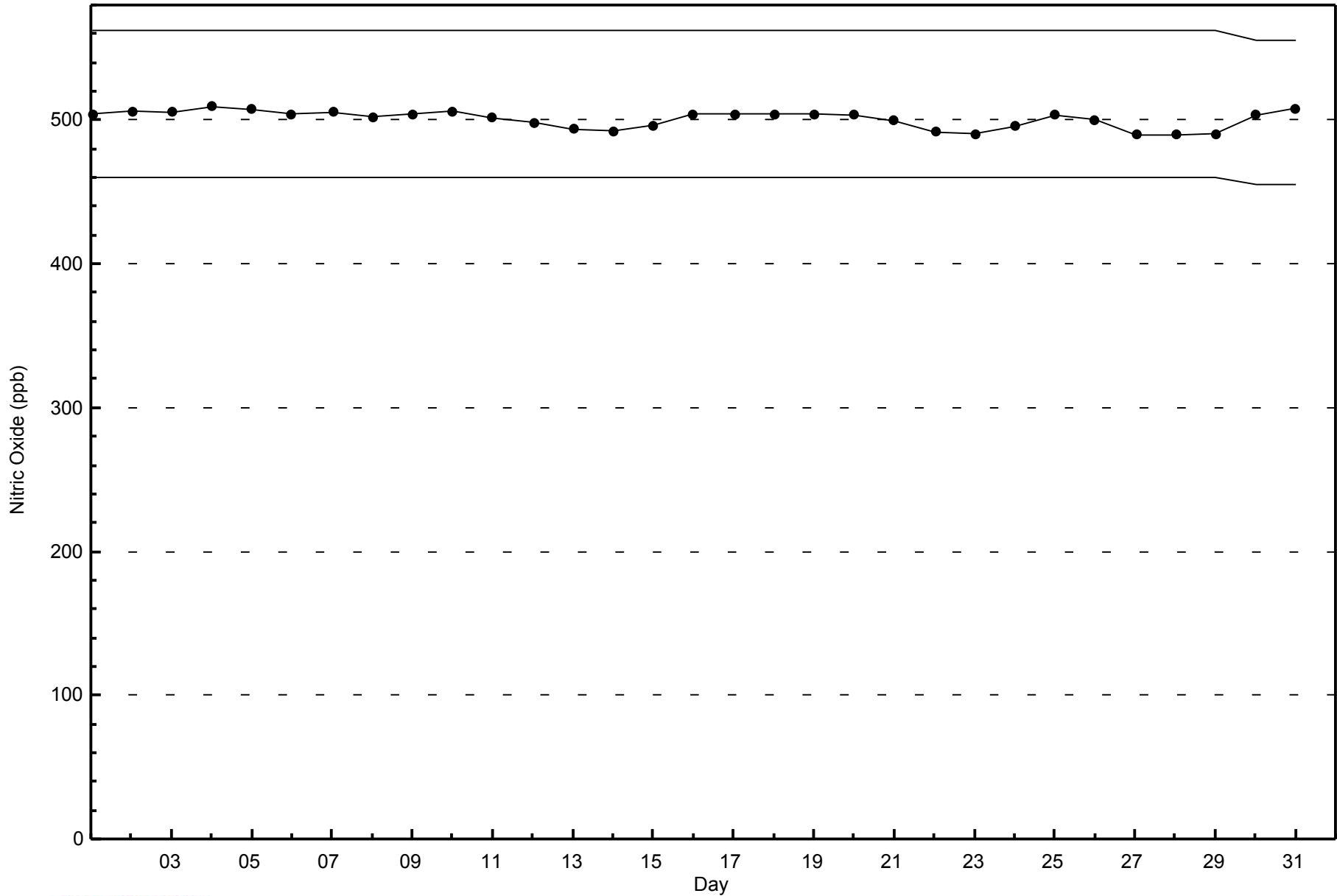
Nitric Oxide (NO) - ppb
Shell Muskeg River - July 2014





WBEA NETWORK
Span Responses

Nitric Oxide (NO) - ppb
Shell Muskeg River - July 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Shell Muskeg River - July 2014

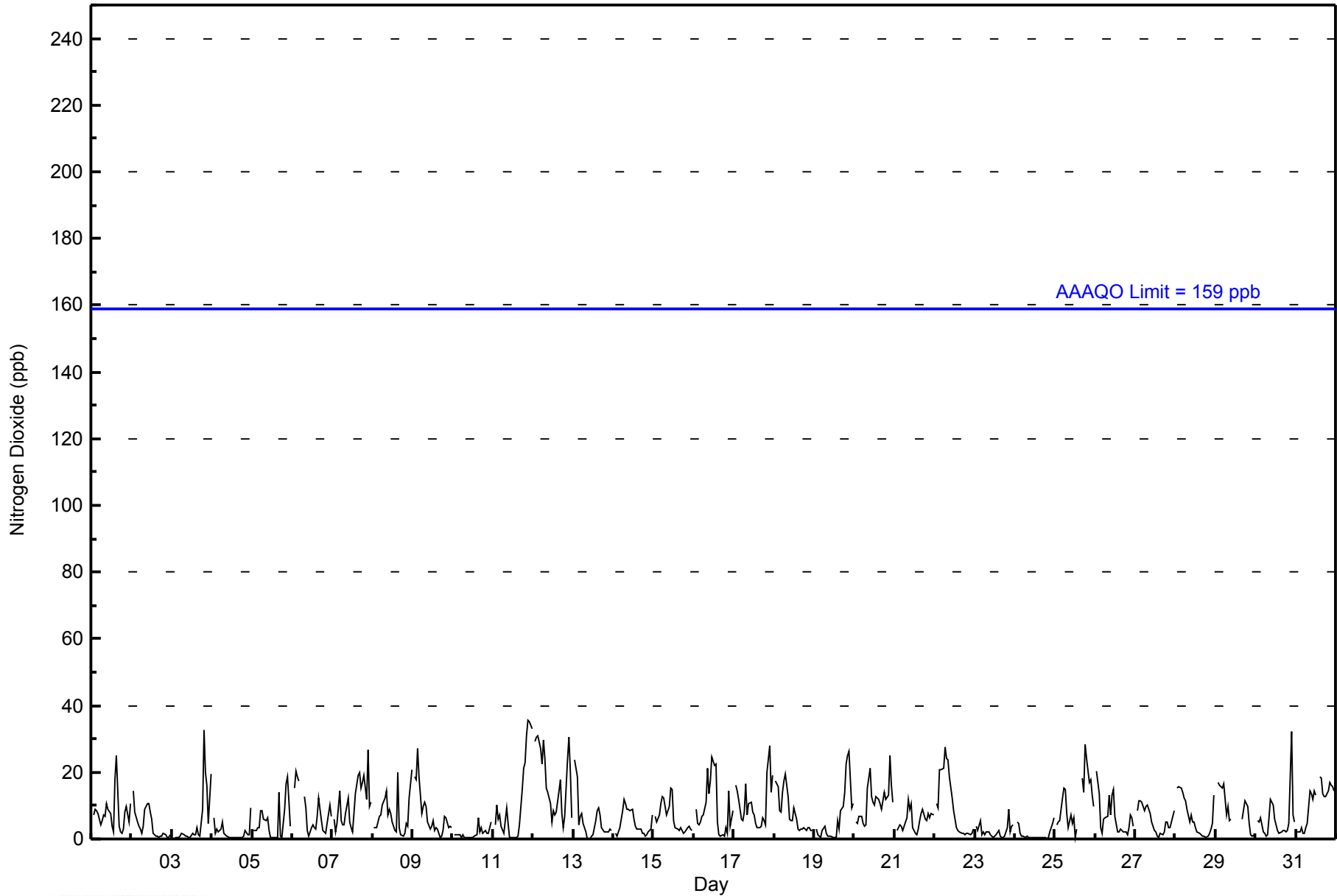
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 36 ppb on Jul 11 22:00										Maximum Daily Average: 17.1 ppb on Jul 12										Hours of Data: 702						
Minimum Value: 0 ppb on Jul 13 10:00										Minimum Daily Average: 1.4 ppb on Jul 24										Hours of Missing Data: 42						
Maximum Diurnal Average: 11.3 ppb at hour 22										Minimum Diurnal Average: 3.7 ppb at hour 14										Hours of Calibration: 37						
Monthly Average: 7.1 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 5 Q ₃ = 10 P ₉₀ = 17 P ₉₉ = 31										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-Jul	Z	7	9	8	8	4	5	7	7	11	9	8	4	2	18	25	4	2	2	3	8	10	5	11	7.6	25
2-Jul	Z	14	8	5	4	3	2	4	9	11	11	8	6	2	1	1	1	1	1	2	1	0	1	1	4.1	14
3-Jul	Z	0	0	0	1	1	2	1	1	1	1	1	2	1	1	3	1	1	9	33	20	16	5	20	5.2	33
4-Jul	Z	6	2	3	2	3	5	2	1	1	1	1	0	1	1	1	1	0	0	1	2	1	1	10	2.0	10
5-Jul	Z	3	3	3	3	8	9	6	6	7	3	0	0	1	0	1	14	1	0	9	17	19	11	4	5.5	19
6-Jul	Z	15	21	19	18	PF	PF	13	9	3	1	3	4	3	3	7	12	6	3	2	2	5	10	7	7.8	21
7-Jul	Z	6	2	5	15	5	4	4	8	12	5	3	2	8	13	19	20	15	17	19	12	27	10	11	10.5	27
8-Jul	Z	4	3	5	7	7	10	12	14	7	9	8	5	3	2	20	4	1	1	2	5	4	12	21	7.1	21
9-Jul	Z	19	18	27	19	8	10	11	10	5	3	4	6	3	4	3	1	1	3	7	7	3	4	3	7.6	27
10-Jul	Z	1	1	1	1	0	1	1	0	1	0	0	0	1	1	6	2	3	2	3	2	2	3	5	1.7	6
11-Jul	Z	4	10	6	7	4	2	5	10	5	1	1	1	1	1	4	15	21	23	31	36	35	33	11.1	36	
12-Jul	Z	29	30	31	27	22	30	24	15	14	11	5	9	7	8	15	18	8	3	7	24	31	21	6	17.1	31
13-Jul	Z	24	19	4	7	8	5	2	0	0	0	1	1	6	9	9	7	3	2	2	2	3	3	3	5.1	24
14-Jul	Z	2	1	2	4	8	12	10	9	9	9	6	4	3	3	3	3	2	2	1	1	2	3	7	4.8	12
15-Jul	Z	7	5	7	11	13	12	10	7	10	15	15	6	3	3	3	4	2	2	2	3	4	3	3	6.5	15
16-Jul	Z	9	5	4	5	7	7	11	21	14	17	25	22	22	5	1	1	1	1	3	2	14	4	8	9.1	25
17-Jul	Z	16	15	12	6	6	8	16	7	11	11	8	7	5	4	3	4	6	6	4	20	28	14	19	10.2	28
18-Jul	Z	18	16	9	8	14	17	19	13	6	6	5	10	6	3	2	3	3	4	2	4	3	3	3	7.6	19
19-Jul	Z	3	1	1	1	3	4	2	1	1	1	1	1	1	5	3	8	10	14	22	25	26	9	11	6.6	26
20-Jul	Z	5	5	7	7	5	4	4	15	21	13	11	10	13	12	11	9	12	14	12	13	25	16	11	11.0	25
21-Jul	Z	3	3	4	4	3	4	6	12	9	11	4	2	1	3	6	8	9	6	6	8	7	8	7	5.7	12
22-Jul	Z	11	9	21	21	21	27	24	24	19	12	9	6	4	3	2	2	2	1	2	2	1	2	3	9.8	27
23-Jul	Z	4	2	5	1	2	1	2	2	1	1	1	1	1	3	1	0	0	1	3	9	2	4	4	2.3	9
24-Jul	Z	5	5	2	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	1	2	5	7	1.4	7
25-Jul	Z	4	5	5	12	15	15	8	4	7	5	6	1	3	PF	PF	18	14	29	24	17	18	13	10	11.0	29
26-Jul	Z	20	14	3	2	6	6	7	13	7	13	15	7	2	2	3	2	2	2	1	3	7	6	4	6.5	20
27-Jul	Z	8	12	11	11	8	10	10	9	8	5	3	2	1	0	2	1	2	5	5	4	3	7	8	5.9	12
28-Jul	Z	15	16	15	14	12	11	9	5	7	5	5	3	2	2	1	1	1	1	1	2	3	5	13	6.5	16
29-Jul	Z	17	16	16	15	17	7	10	5	6	C	C	C	C	C	C	6	11	11	10	5	1	1	1	--	17
30-Jul	Z	5	5	6	2	2	1	1	7	12	10	6	4	3	2	2	2	3	2	2	5	32	7	5	5.5	32
31-Jul	Z	2	2	3	2	2	4	5	15	13	12	15	13	PF	19	18	14	13	13	14	17	16	16	15	10.9	19
--	--	9.2	8.4	8.1	7.8	7.2	7.8	8.0	8.3	7.6	6.6	5.9	4.7	3.7	4.4	5.9	5.6	4.8	5.6	7.3	8.7	11.3	7.9	8.8	Diurnal Average	
--	--	29	30	31	27	22	30	24	24	21	17	25	22	22	19	25	20	15	29	33	31	36	35	33	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	660	94.02	94.02
21 - 40	42	5.98	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: 702

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - July 2014

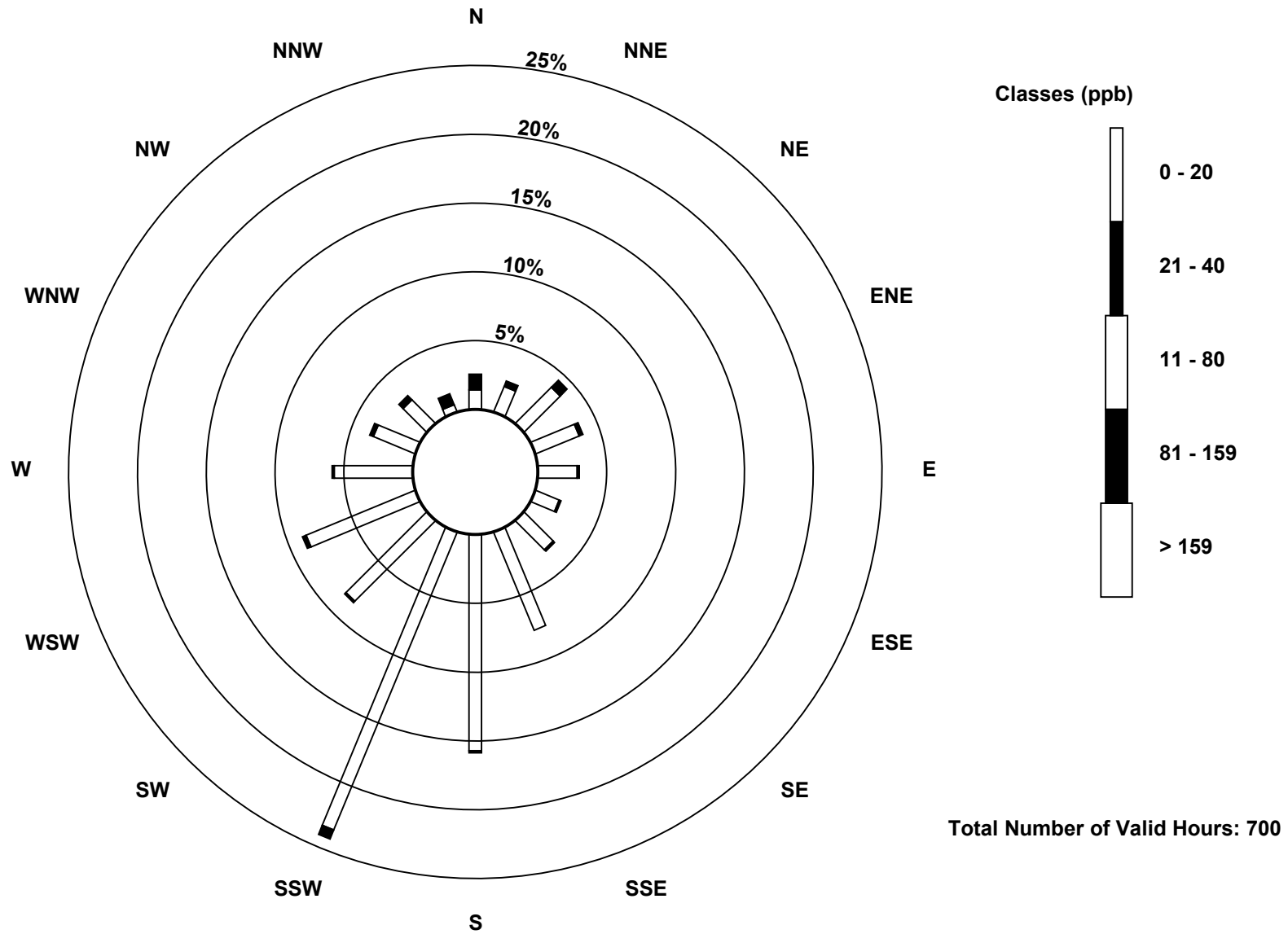
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	10	14	26	24	20	13	21	54	110	164	58	60	40	23	17	4	658
21 - 40	8	3	5	2	1	1	1	0	1	5	1	2	1	2	3	6	42
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	18	17	31	26	21	14	22	54	111	169	59	62	41	25	20	10	700

Total Number of Valid Hours: 700

Total Number of Hours: 744

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

**Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River (AMS 16)**



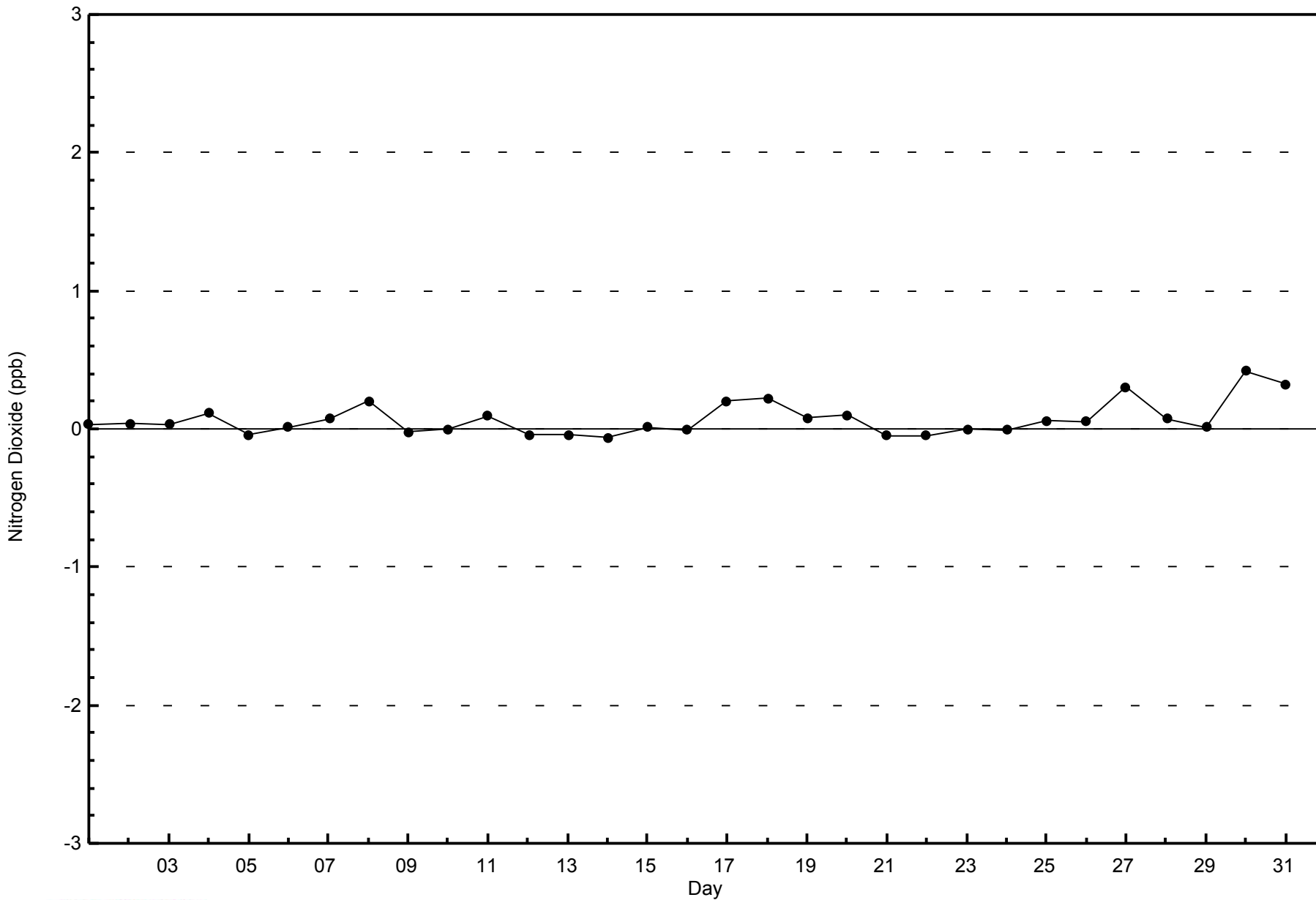


WBEA NETWORK

Zero Responses

Nitrogen Dioxide (NO₂) - ppb

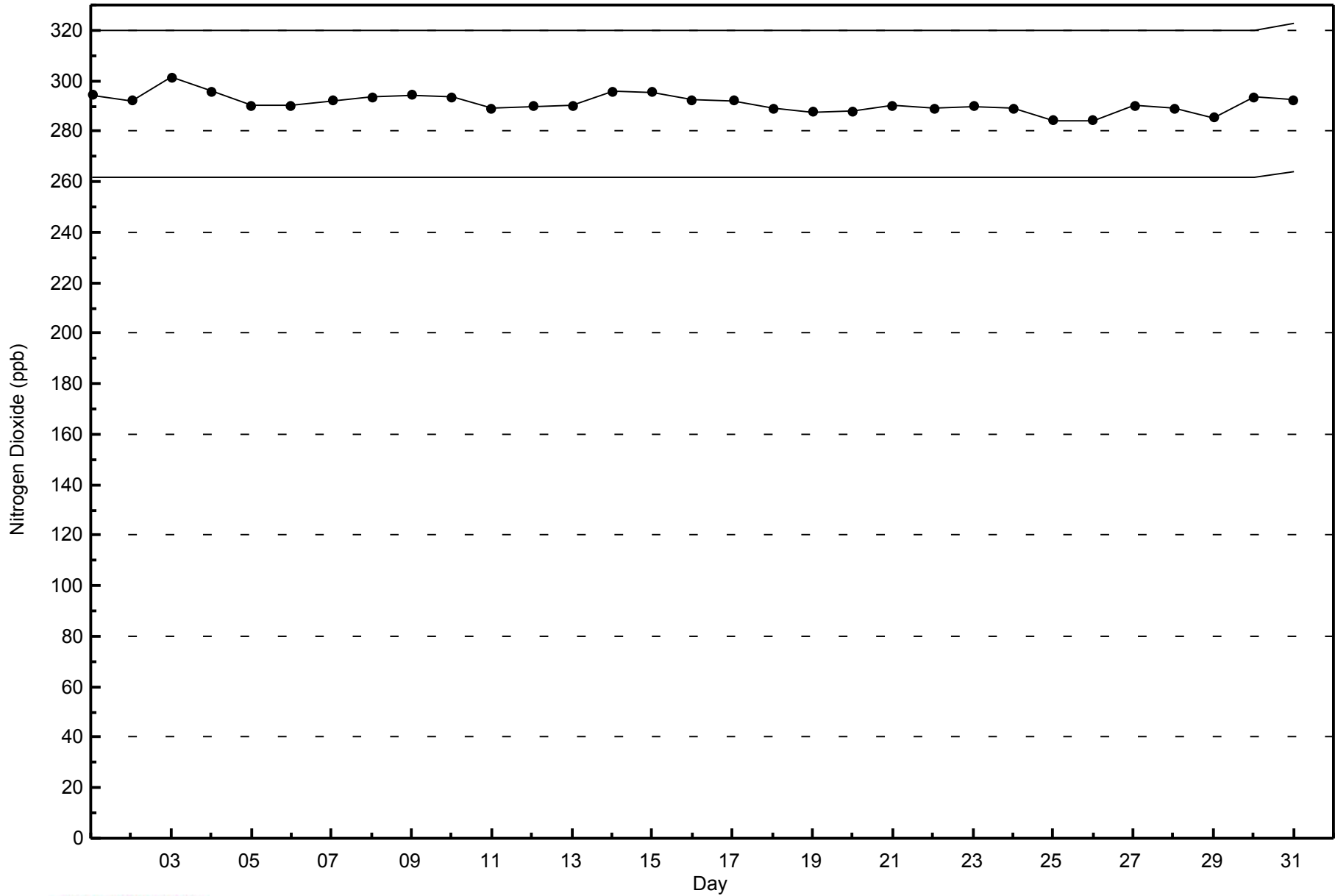
Shell Muskeg River - July 2014





WBEA NETWORK
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - July 2014



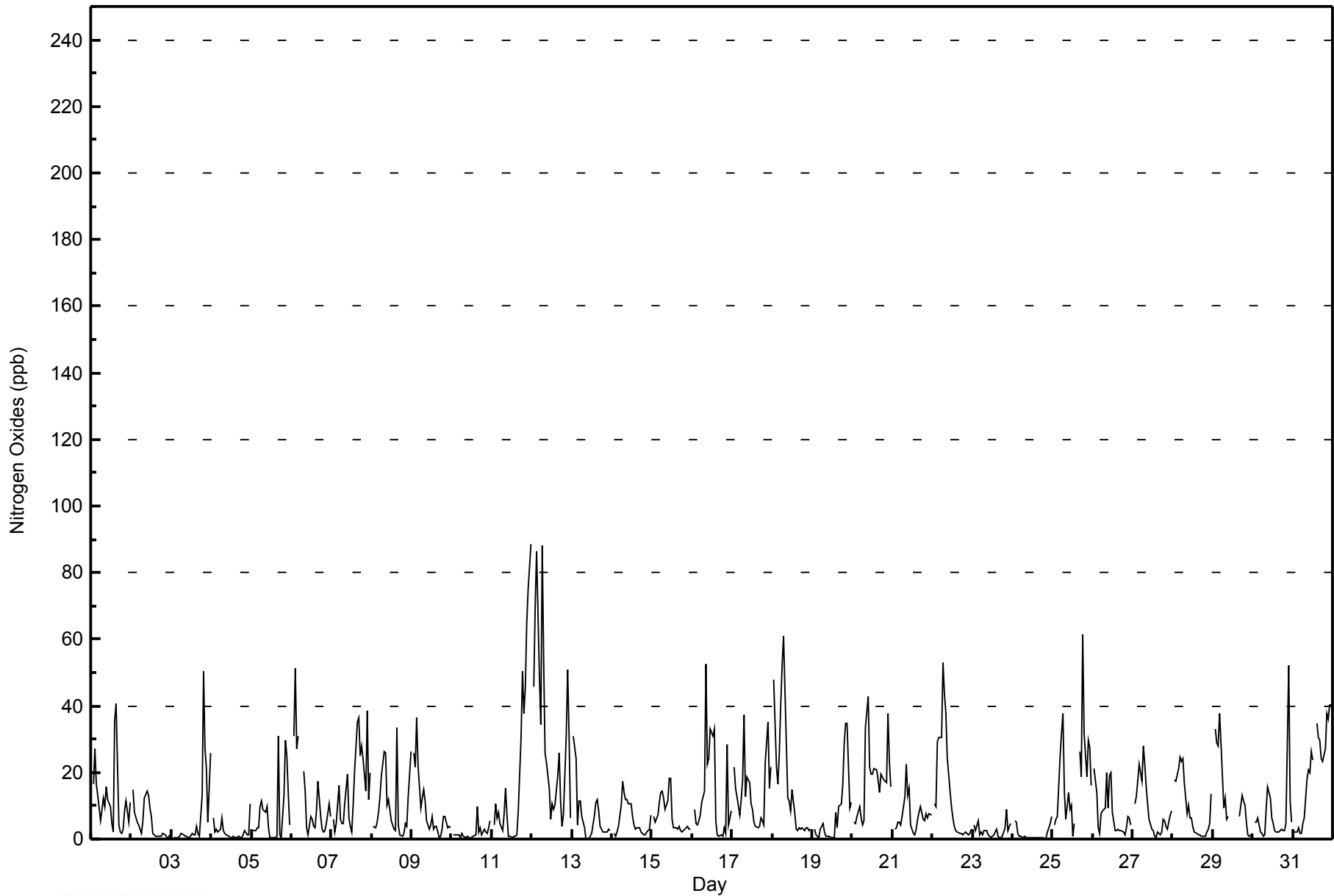


Maximum Value: 88 ppb on Jul 12 00:00														Maximum Daily Average: 31.0 ppb on Jul 12														Hours in Service: 744	
Minimum Value: 0 ppb on Jul 13 10:00														Minimum Daily Average: 1.4 ppb on Jul 24														Hours of Data: 702	
Maximum Diurnal Average: 16.8 ppb at hour 22														Minimum Diurnal Average: 4.8 ppb at hour 14														Hours of Missing Data: 42	
Monthly Average: 10.8 ppb														Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 5 Q ₃ = 14 P ₉₀ = 29 P ₉₉ = 60														Hours of Calibration: 37	
																												Percent Operational Time: 99.3	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Jul	Z	17	27	16	13	6	9	12	10	16	12	10	5	2	36	41	4	2	2	3	8	11	5	11	12.1	41			
2-Jul	Z	15	8	5	4	3	2	5	12	15	13	9	7	2	1	1	1	1	1	2	1	0	1	1	4.7	15			
3-Jul	Z	0	0	0	0	1	2	1	1	1	1	0	2	1	1	4	2	1	13	50	27	21	5	26	7.0	50			
4-Jul	Z	7	2	3	2	3	6	2	2	1	1	1	1	1	1	1	1	0	0	1	2	1	1	10	2.2	10			
5-Jul	Z	3	3	3	3	10	12	9	8	10	3	1	0	0	1	31	1	0	13	30	25	14	4	8.0	31				
6-Jul	Z	31	51	27	31	PF	PF	20	14	3	1	7	6	4	4	8	17	7	3	2	2	5	11	7	12.5	51			
7-Jul	Z	6	2	5	16	6	5	5	10	19	6	4	2	10	21	35	37	25	28	24	14	39	12	20	15.3	39			
8-Jul	Z	4	3	5	8	13	19	26	26	10	12	9	5	3	3	34	4	1	1	2	5	4	13	26	10.2	34			
9-Jul	Z	26	22	37	22	9	12	15	11	5	3	4	7	3	4	4	1	1	3	7	7	3	4	3	9.2	37			
10-Jul	Z	1	1	1	1	1	2	1	0	1	0	1	0	1	1	10	2	3	1	3	2	2	3	5	2.0	10			
11-Jul	Z	4	10	6	8	5	2	8	15	7	1	1	1	1	1	1	9	31	51	38	46	65	75	88	20.5	88			
12-Jul	Z	46	70	86	49	35	88	54	26	23	15	6	11	9	10	19	26	12	4	7	31	51	31	6	31.0	88			
13-Jul	Z	31	24	4	11	11	7	3	0	0	0	1	1	7	11	12	9	4	2	2	2	3	3	3	6.6	31			
14-Jul	Z	2	1	2	4	10	17	14	12	12	11	11	7	4	3	3	3	2	2	1	1	2	3	7	5.8	17			
15-Jul	Z	7	5	7	11	14	15	12	9	11	18	18	6	4	3	3	4	3	2	2	3	4	3	3	7.3	18			
16-Jul	Z	9	5	4	5	7	11	14	53	23	24	33	31	33	6	1	1	1	1	3	2	29	4	9	13.4	53			
17-Jul	Z	22	15	13	7	12	18	37	13	19	17	11	9	5	4	3	4	6	6	4	23	35	15	22	13.9	37			
18-Jul	Z	48	22	17	26	40	52	61	28	12	11	8	15	8	3	2	3	3	3	2	4	3	3	3	16.5	61			
19-Jul	Z	3	1	1	1	3	5	2	1	1	1	1	1	1	8	4	10	11	17	29	35	35	9	11	8.1	35			
20-Jul	Z	5	5	7	10	7	4	5	33	43	21	20	20	21	21	18	14	20	19	18	17	38	23	16	17.5	43			
21-Jul	Z	3	3	5	5	4	7	13	22	13	15	4	2	1	3	6	8	10	6	6	8	6	7	7	7.2	22			
22-Jul	Z	11	10	29	30	30	53	44	38	25	14	10	7	4	3	2	2	2	1	2	2	1	2	3	14.1	53			
23-Jul	Z	4	3	5	1	2	1	2	3	1	1	1	1	1	3	1	0	0	1	3	9	2	4	5	2.4	9			
24-Jul	Z	5	5	2	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	2	5	7	1.4	7			
25-Jul	Z	4	6	7	25	32	38	14	6	14	9	10	1	5	PF	PF	26	19	62	32	19	30	28	16	19.1	62			
26-Jul	Z	21	14	4	2	8	8	9	20	9	19	20	8	2	2	3	3	2	2	1	3	7	6	4	7.8	21			
27-Jul	Z	11	13	17	22	17	28	22	15	11	6	3	3	1	1	2	1	2	6	5	4	3	7	9	9.1	28			
28-Jul	Z	18	17	21	25	23	24	17	8	10	6	6	4	2	2	1	1	1	1	1	2	3	5	14	9.2	25			
29-Jul	Z	33	29	28	38	29	9	12	6	7	C	C	C	C	C	C	7	13	12	10	5	1	1	1	--	38			
30-Jul	Z	5	5	6	2	2	1	1	9	16	12	6	5	3	2	2	3	3	2	2	5	52	11	5	7.0	52			
31-Jul	Z	2	2	3	2	2	4	6	18	21	20	26	24	PF	35	30	30	24	23	27	38	36	40	40	20.6	40			
--	--	13.0	12.4	12.2	12.5	11.5	15.4	14.5	13.9	11.5	9.2	8.0	6.3	4.8	6.6	8.7	8.4	6.8	8.8	9.8	11.5	16.8	11.4	12.7	Diurnal Average				
--	--	48	70	86	49	40	88	61	53	43	24	33	31	33	36	41	37	31	62	50	46	65	75	88	Diurnal Maximum				
Z - zerospan		C - Calibration				PF - Power Failure																							



WBEA NETWORK
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	579	82.48	82.48
21 - 40	99	14.10	96.58
41 - 80	21	2.99	99.57
81 - 159	3	0.43	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - July 2014

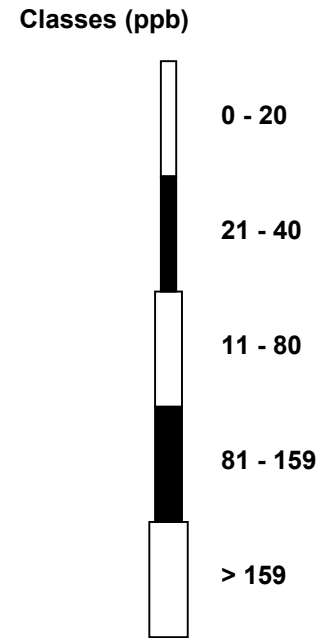
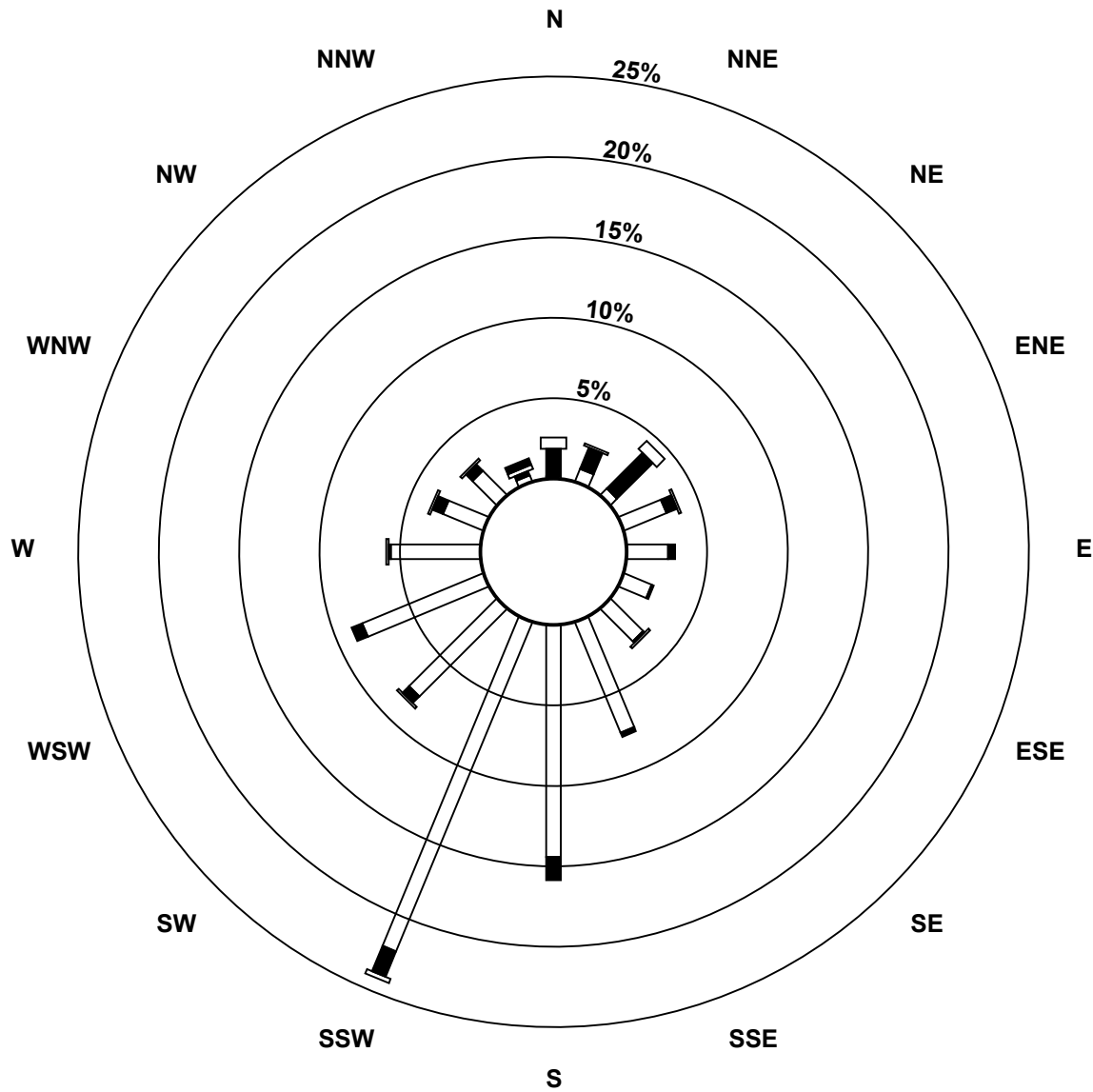
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	1	6	4	20	18	13	20	52	101	155	54	57	39	19	15	3	577
21 - 40	12	10	22	5	3	1	1	2	10	12	4	5	1	5	4	2	99
11 - 80	5	1	5	1	0	0	1	0	0	2	1	0	1	1	1	2	21
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	18	17	31	26	21	14	22	54	111	169	59	62	41	25	20	10	700

Total Number of Valid Hours: 700

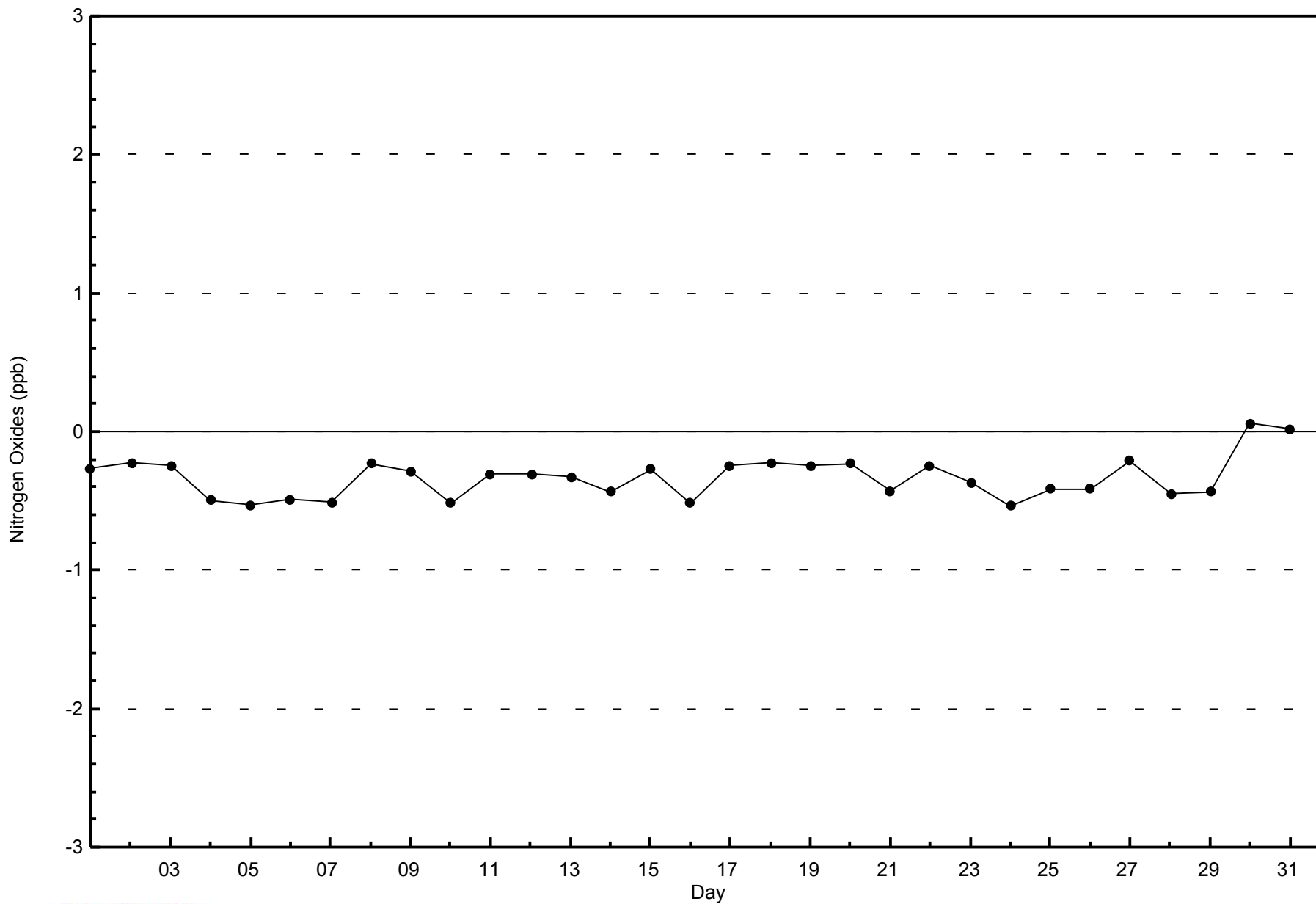
Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

Nitrogen Oxides (NO_x) - ppb
 Shell Muskeg River (AMS 16)



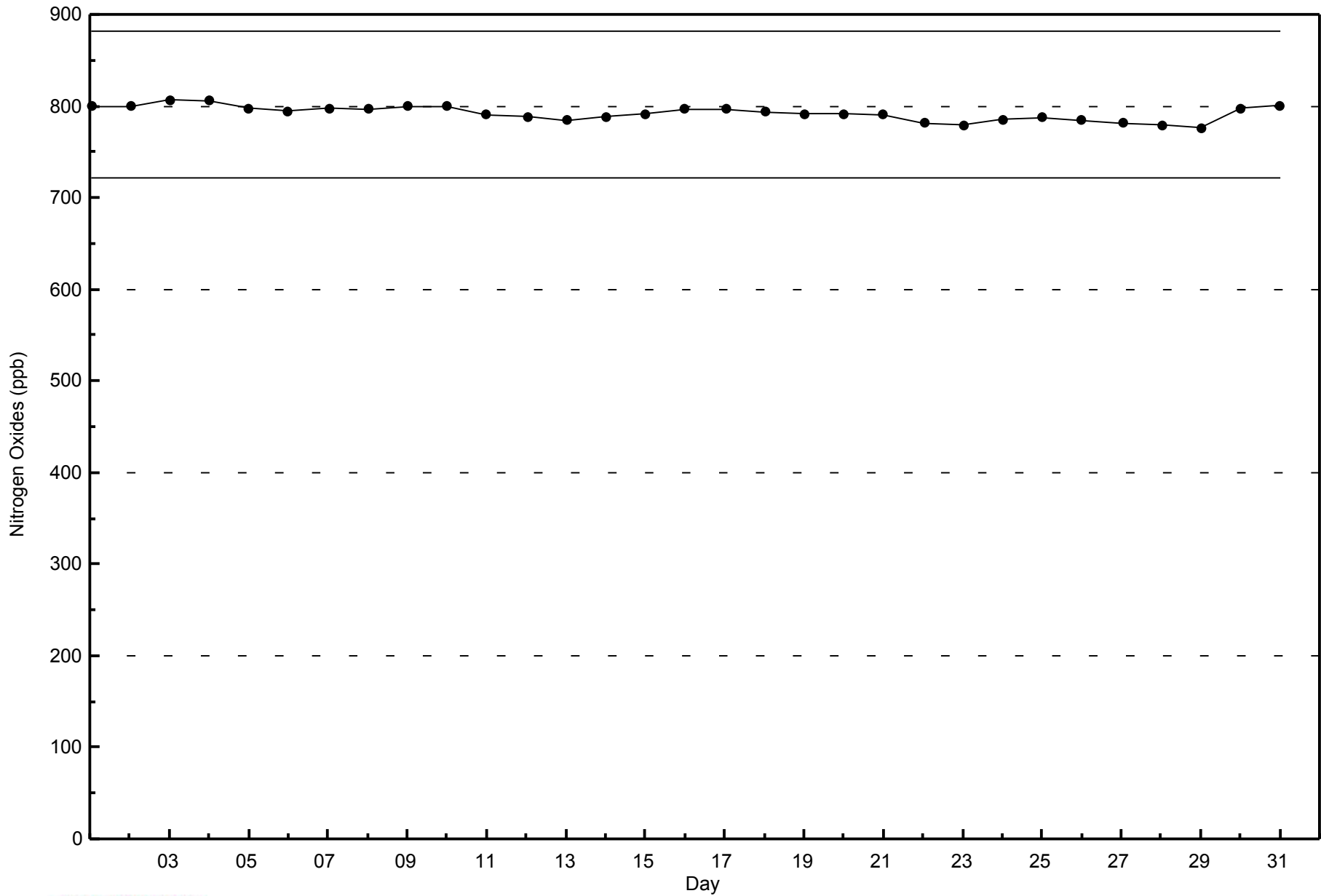
Total Number of Valid Hours: 700





WBEA NETWORK
Span Responses

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - July 2014





Number of Exceedences (AAAQO): 24-hr: 3	Hours in Service: 744
Maximum Value: 212.3 µg/m ³ on Jul 31 16:00	Maximum Daily Average: 42.4 µg/m ³ on Jul 31
Minimum Value: 0.9 µg/m ³ on Jul 5 19:00	Hours of Data: 738
Maximum Diurnal Average: 21.5 µg/m ³ at hour 16	Hours of Missing Data: 6
Monthly Average: 16.23 µg/m ³	Hours of Calibration: 0
Minimum Daily Average: 3.0 µg/m ³ on Jul 6	Percent Operational Time: 99.2
Minimum Diurnal Average: 11.1 µg/m ³ at hour 4	
Percentiles: P ₁ = 1.8 P ₁₀ = 4.1 Q ₁ = 6.6 Median = 11.7 Q ₃ = 19.4 P ₉₀ = 36.0 P ₉₉ = 81.4	

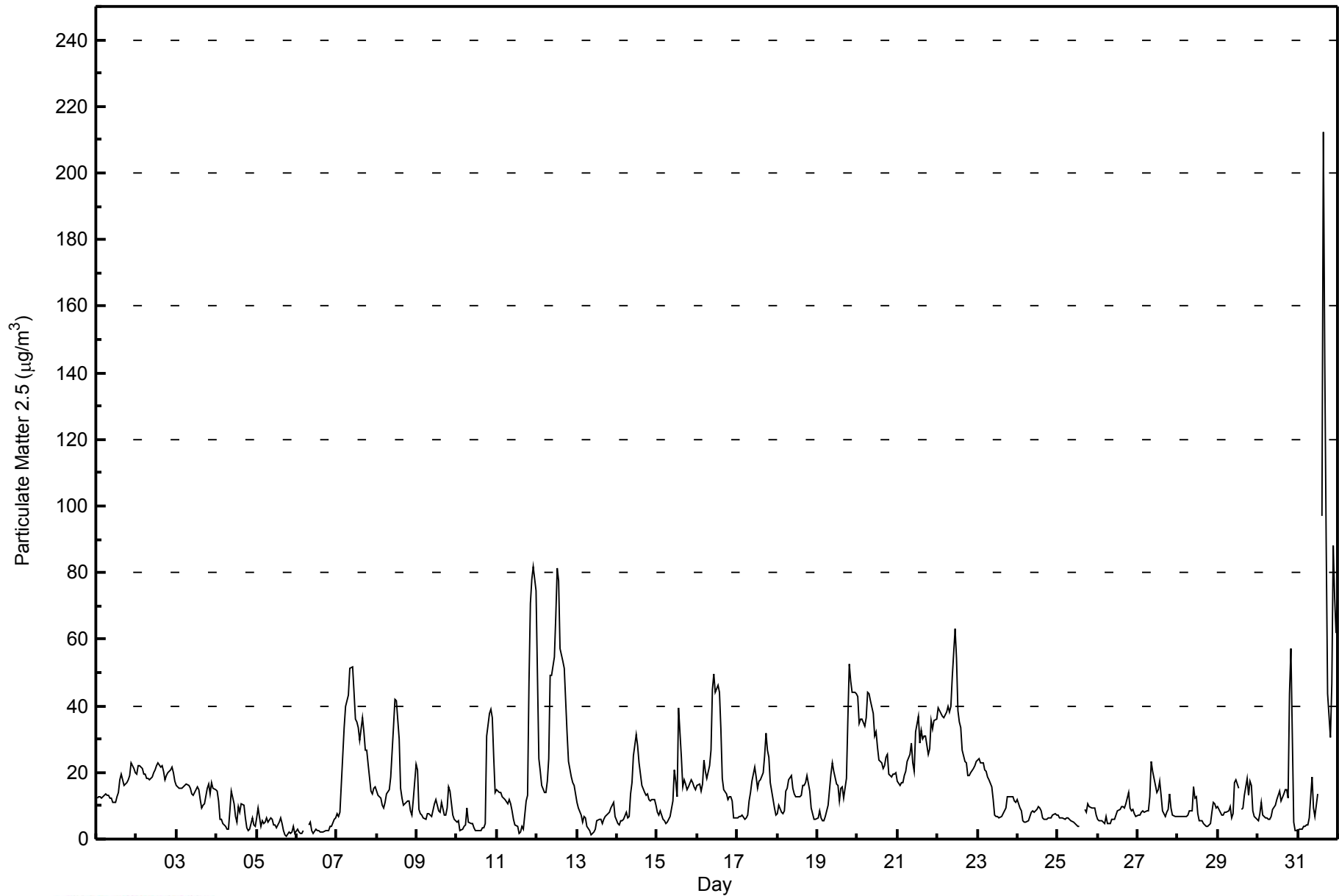
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	12.4	12.9	12.9	12.2	12.8	13.5	13.1	13.0	12.2	12.4	10.9	11.2	12.9	13.9	17.9	19.5	16.2	16.7	17.1	18.0	19.2	23.0	21.3	19.9	15.2	23.0
2-Jul	19.4	22.1	22.1	21.2	19.6	19.5	18.4	18.4	17.9	18.6	20.0	20.9	22.2	22.8	21.8	22.1	20.3	17.7	19.2	20.0	20.7	21.8	19.9	17.3	20.2	22.8
3-Jul	16.3	15.4	15.1	15.2	15.9	15.9	16.4	16.0	15.2	13.5	13.1	13.9	15.6	14.9	11.7	9.5	10.3	10.6	15.2	16.4	13.6	16.8	15.3	14.6	14.4	16.8
4-Jul	14.3	11.6	5.9	6.0	4.5	3.9	3.0	3.1	8.6	14.2	10.5	6.8	4.9	9.8	7.9	10.5	10.1	6.2	3.3	2.6	3.1	6.4	4.1	4.0	6.9	14.3
5-Jul	6.1	9.2	3.9	5.6	4.7	4.9	6.2	4.9	6.3	6.0	4.1	4.1	3.4	5.1	6.3	4.6	2.7	1.1	0.9	2.2	1.9	2.3	3.9	1.6	4.2	9.2
6-Jul	3.0	2.0	1.7	1.8	2.5	PF	PF	4.4	5.0	2.5	1.8	2.9	2.6	2.5	1.9	2.3	2.3	2.4	2.5	2.7	3.9	3.8	6.1	6.3	3.0	6.3
7-Jul	7.7	6.9	8.0	16.7	33.5	40.0	41.5	43.3	51.2	51.8	44.3	36.0	35.2	33.6	29.9	36.5	32.4	26.7	26.9	22.7	14.5	13.4	15.4	15.5	28.5	51.8
8-Jul	14.6	13.3	12.1	10.3	9.4	10.9	13.4	15.0	18.7	26.3	34.1	42.1	41.4	30.1	15.3	12.3	10.2	10.8	11.6	11.3	8.3	7.0	11.8	22.6	17.2	42.1
9-Jul	20.9	9.0	7.7	7.2	6.5	6.1	7.4	7.5	7.4	6.8	10.6	11.7	10.3	8.3	8.2	10.9	7.2	7.1	9.4	15.5	14.2	7.4	6.0	5.6	9.1	20.9
10-Jul	5.2	5.5	2.7	3.1	3.7	4.4	9.3	5.1	4.7	4.9	3.4	2.4	2.4	2.6	2.6	3.4	3.3	4.5	30.8	37.7	39.0	36.5	24.5	13.9	10.7	39.0
11-Jul	14.7	14.1	14.1	12.7	12.2	11.7	10.5	11.9	10.6	8.5	5.9	4.1	4.0	1.8	2.3	3.7	3.1	11.5	13.0	47.2	70.9	78.0	81.6	74.7	21.8	81.6
12-Jul	49.1	24.1	20.3	16.1	13.8	13.9	17.5	24.0	49.1	49.1	54.5	66.8	81.5	77.6	57.3	53.6	51.3	41.7	31.9	23.5	18.8	16.8	16.0	13.7	36.7	81.5
13-Jul	11.1	9.2	7.2	5.1	7.0	6.4	4.0	2.4	1.4	1.5	2.1	2.9	5.5	5.7	5.8	4.7	6.0	6.6	7.4	7.9	9.3	10.2	11.1	6.6	6.1	11.1
14-Jul	4.8	4.4	5.6	5.6	6.1	8.1	6.5	6.9	13.7	16.9	25.0	31.5	27.9	22.8	19.3	16.1	13.8	13.3	13.6	11.9	11.6	11.8	12.0	10.1	13.3	31.5
15-Jul	7.9	7.3	8.4	5.9	5.5	4.9	5.1	5.9	6.7	11.4	20.9	17.3	12.8	39.2	24.5	15.9	17.8	16.3	14.7	15.7	17.7	16.8	15.7	14.9	13.7	39.2
16-Jul	16.0	16.3	14.6	16.7	23.6	20.5	18.3	22.2	26.8	44.8	49.4	44.1	46.3	44.3	32.9	18.1	14.7	13.4	11.7	12.9	12.6	11.5	6.4	6.2	22.7	49.4
17-Jul	6.3	6.9	6.9	7.0	5.9	6.5	7.4	11.4	13.8	17.3	21.6	18.7	15.1	17.5	17.6	19.7	25.1	31.6	26.6	24.7	16.9	11.7	9.2	7.4	14.7	31.6
18-Jul	7.7	10.4	8.2	7.4	8.6	14.2	15.3	17.7	18.9	15.1	13.5	12.7	12.5	12.7	13.3	15.9	16.3	17.0	19.2	14.5	9.3	7.7	6.1	6.0	12.5	19.2
19-Jul	6.5	8.6	6.2	5.5	5.4	6.9	10.3	14.7	19.3	23.0	20.3	16.5	16.3	11.5	15.5	15.5	12.4	18.0	36.0	52.5	47.4	43.9	44.1	43.6	20.8	52.5
20-Jul	42.6	34.9	36.2	36.0	33.7	36.4	44.0	43.8	41.6	37.9	30.9	32.3	27.3	23.5	22.9	21.1	22.2	24.7	25.3	19.4	18.6	19.6	19.4	19.7	29.8	44.0
21-Jul	17.3	16.0	16.9	17.1	19.3	20.5	23.4	25.4	28.9	23.0	20.5	32.2	36.9	29.0	32.8	30.3	30.8	30.8	25.4	26.9	35.7	32.9	35.7	36.2	26.8	36.9
22-Jul	39.5	38.6	37.8	36.9	36.4	38.0	40.0	38.3	39.7	48.7	63.3	54.0	38.5	35.0	33.5	26.7	23.3	22.9	19.0	19.0	19.8	21.3	22.2	23.4	34.0	63.3
23-Jul	23.8	24.0	22.8	23.0	20.7	20.4	18.4	17.9	15.5	11.7	7.4	6.6	6.7	6.2	6.6	7.7	8.7	9.4	12.5	12.6	12.7	12.6	11.3	11.1	13.8	24.0
24-Jul	11.7	9.2	8.4	5.4	5.2	5.3	5.6	6.9	8.0	8.5	8.2	8.8	9.6	9.3	8.5	6.3	6.0	6.1	6.5	6.3	6.5	7.0	7.5	7.1	7.4	11.7
25-Jul	7.2	6.5	6.4	6.5	5.9	6.3	6.2	5.9	5.5	5.3	4.8	4.1	3.9	3.9	PF	PF	9.1	8.3	10.6	9.9	9.5	9.3	9.3	7.1	6.9	10.6
26-Jul	5.9	5.6	5.5	5.0	4.7	6.9	4.6	4.7	5.9	6.1	6.1	7.2	8.5	9.1	9.6	9.8	9.5	10.5	14.1	9.1	8.5	8.7	7.5	6.9	7.5	14.1
27-Jul	7.0	7.1	8.1	8.3	8.2	8.4	8.3	12.6	23.3	20.3	18.1	14.1	14.9	17.5	13.2	8.6	6.9	7.9	8.7	13.5	9.4	7.1	6.6	6.6	11.0	23.3
28-Jul	6.8	6.7	6.9	6.9	6.9	6.9	7.3	8.4	8.6	15.7	12.1	12.8	7.6	5.4	5.3	4.6	4.2	4.0	3.9	4.8	8.1	11.1	10.6	9.3	7.7	15.7
29-Jul	9.6	7.9	7.2	7.3	8.0	8.2	8.6	9.9	6.5	7.4	17.0	17.9	15.1	M	8.8	9.3	13.1	18.1	13.1	17.4	15.9	8.4	6.8	5.7	10.7	18.1
30-Jul	5.7	7.4	11.1	7.4	6.1	6.2	5.9	5.8	6.9	8.7	10.0	11.9	12.9	14.3	11.5	13.7	14.8	14.9	12.2	43.5	57.0	5.0	2.6	2.4	12.4	57.0
31-Jul	2.6	3.1	2.9	3.7	3.8	4.1	4.2	6.4	18.8	9.3	6.7	10.1	13.5	PF	97.0	212.3	143.0	89.0	43.5	30.5	46.8	88.3	72.4	61.9	42.4	212.3
13.7 12.1 11.4 11.1 11.6 12.7 13.3 14.0 16.7 17.7 18.4 18.7 18.3 18.3 18.7 21.5 18.3 16.8 16.3 18.5 19.4 18.6 17.5 16.2																								Diurnal Average		
49.1 38.6 37.8 36.9 36.4 40.0 44.0 43.8 51.2 51.8 63.3 66.8 81.5 77.6 97.0 212.3 143.0 89.0 43.5 52.5 70.9 88.3 81.6 74.7																								Diurnal Maximum		

M - Maintenance PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA NETWORK
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - July 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	114	15.45	15.45
6 - 15	356	48.24	63.69
16 - 25	154	20.87	84.55
26 - 80	106	14.36	98.92
> 81.0	7	0.95	99.86

Total Number of Valid Hours: 738

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - July 2014

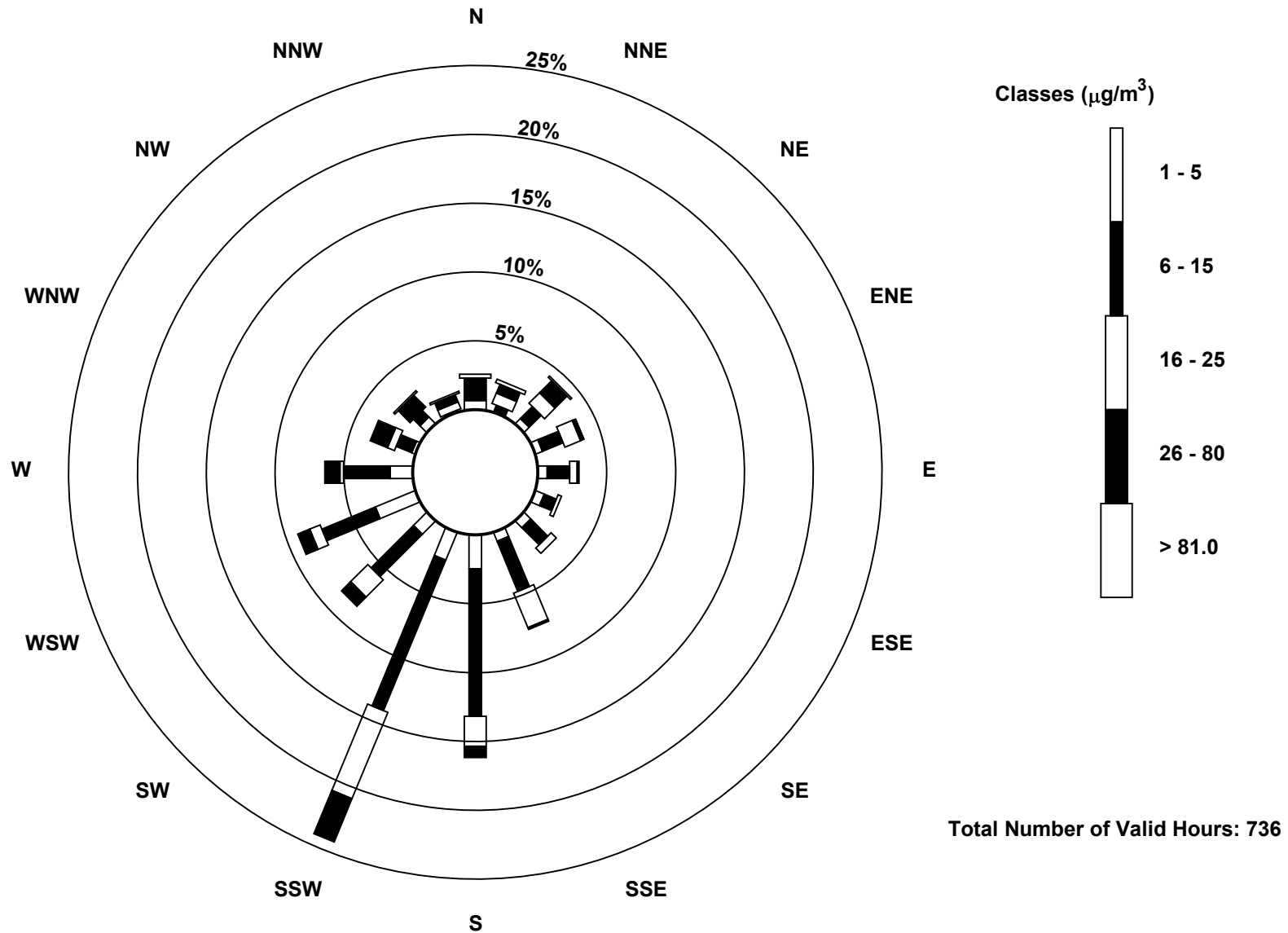
Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	0	0	4	4	5	5	5	5	18	16	10	23	12	2	5	0	114
6 - 15	0	4	9	12	12	7	13	29	79	87	32	31	25	9	5	1	355
16 - 25	5	6	8	9	4	2	4	20	16	50	13	6	2	4	0	4	153
26 - 80	12	5	9	2	1	0	0	1	6	25	7	7	8	10	9	4	106
> 81.0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	1	1	7
Totals	19	17	31	27	22	14	22	55	119	178	62	67	47	25	20	10	735

Total Number of Valid Hours: 736

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Shell Muskeg River (AMS 16)





Wood Buffalo Environmental Association

Summary of Hour Averages

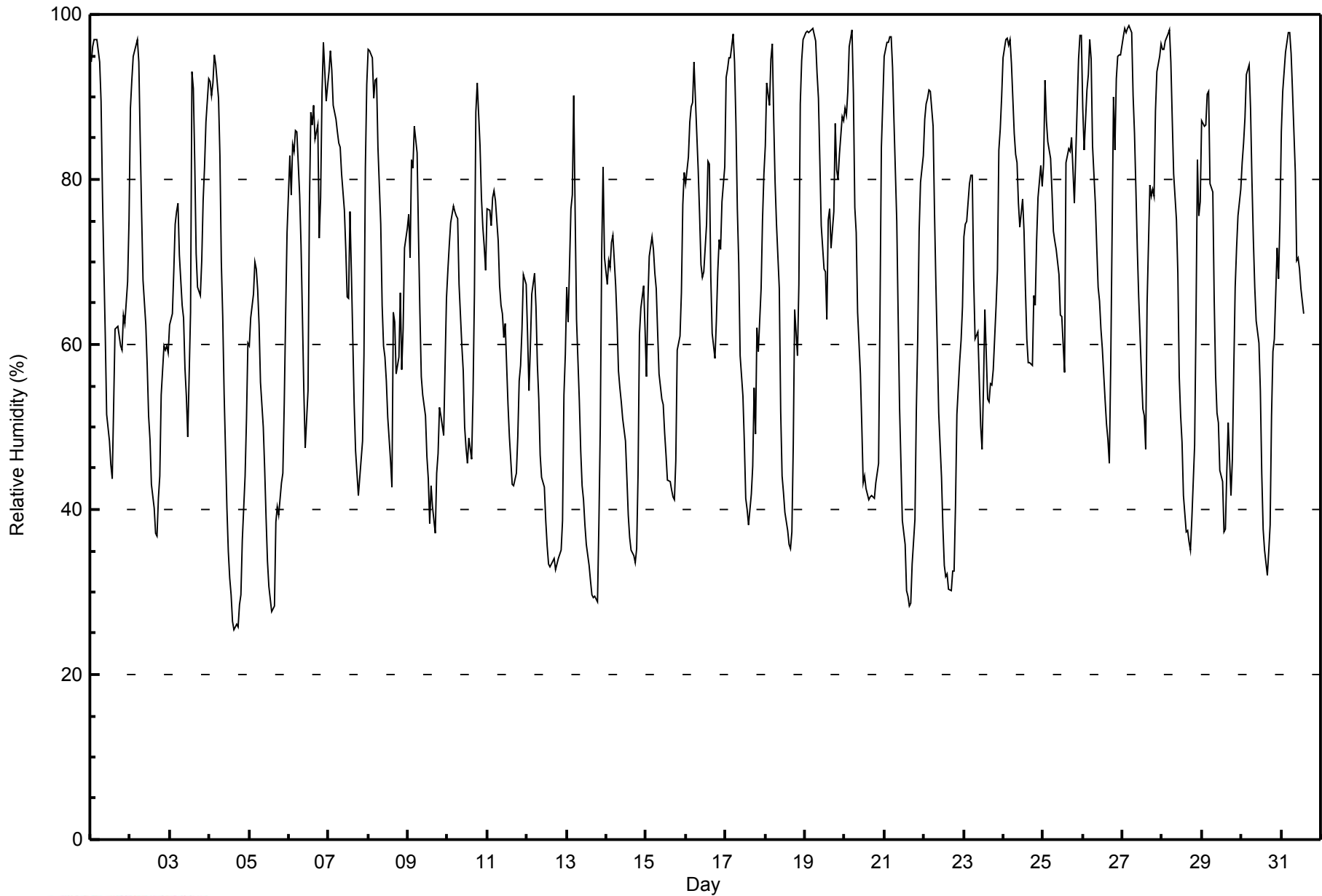
Relative Humidity (RH) - %
Shell Muskeg River - July 2014

Maximum Value: 99 % on Jul 27 05:00																			Maximum Daily Average: 84.6 % on Jul 19						Hours in Service: 744																			
Minimum Value: 26 % on Jul 4 16:00																			Minimum Daily Average: 46.4 % on Jul 12						Hours of Data: 734																			
Maximum Diurnal Average: 88.6 % at hour 5																			Minimum Diurnal Average: 48.4 % at hour 15						Hours of Missing Data: 10																			
Monthly Average: 66.5 %																			Percentiles: P ₁ = 28 P ₁₀ = 39 Q ₁ = 51 Median = 67 Q ₃ = 83 P ₉₀ = 94 P ₉₉ = 98						Hours of Calibration: 0																			
																									Percent Operational Time: 98.7																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Jul	94	96	97	97	97	94	90	78	70	61	52	48	45	44	53	62	62	61	60	59	64	63	68	75	70.4	97																		
2-Jul	89	92	95	96	97	94	85	76	68	62	57	51	48	43	40	37	37	41	44	54	60	59	60	59	64.4	97																		
3-Jul	62	64	69	75	76	77	71	65	63	57	54	49	64	93	91	82	71	67	66	70	77	81	87	92	71.8	93																		
4-Jul	92	90	92	95	94	90	83	70	63	54	40	35	32	30	26	26	26	26	28	30	36	44	51	60	54.7	95																		
5-Jul	60	63	66	70	69	67	62	55	50	45	39	34	31	28	28	28	39	40	39	43	44	53	64	74	49.6	74																		
6-Jul	83	78	84	83	86	86	78	72	63	54	47	54	77	88	87	89	85	87	73	78	90	97	89	91	79.2	97																		
7-Jul	93	96	93	89	87	86	84	84	81	76	72	66	66	76	69	53	47	44	42	44	48	59	81	92	71.9	96																		
8-Jul	96	96	95	90	92	92	84	75	65	60	58	56	51	46	43	64	63	56	58	66	57	62	72	74	69.6	96																		
9-Jul	76	71	82	81	87	83	73	64	56	54	51	47	44	38	43	40	37	44	47	52	51	49	57	66	58.1	87																		
10-Jul	69	72	75	77	76	76	75	67	60	57	50	47	46	49	46	54	66	88	92	84	78	74	72	69	67.4	92																		
11-Jul	76	76	74	78	79	78	73	67	65	64	61	63	53	49	46	43	43	44	49	56	57	62	68	67	62.1	79																		
12-Jul	61	54	60	66	69	65	58	53	47	44	43	39	36	33	33	34	34	33	33	34	35	39	54	59	46.4	69																		
13-Jul	67	63	76	78	90	76	63	53	47	43	41	38	36	33	31	30	29	30	29	38	50	71	82	70	52.7	90																		
14-Jul	67	70	69	72	73	67	63	57	55	53	51	48	44	39	37	35	34	34	35	44	61	64	67	62	54.3	73																		
15-Jul	56	65	71	73	71	69	67	62	56	53	53	49	47	44	43	42	42	41	46	59	61	66	77	81	58.1	81																		
16-Jul	79	83	87	89	89	94	90	81	76	70	68	69	75	82	82	68	61	58	63	69	73	71	77	81	76.5	94																		
17-Jul	92	93	95	95	98	94	87	76	70	59	54	48	41	40	38	42	45	55	49	62	59	67	75	81	67.3	98																		
18-Jul	84	92	89	95	96	87	80	75	67	52	44	42	40	37	36	35	37	48	64	59	67	89	94	97	66.9	97																		
19-Jul	98	98	98	98	98	98	97	93	90	82	74	69	69	63	75	76	72	76	87	81	80	83	88	87	84.6	98																		
20-Jul	89	88	91	96	98	90	77	74	64	56	50	43	44	43	41	42	42	42	41	43	46	64	84	89	64.0	98																		
21-Jul	95	97	97	97	97	94	87	75	63	52	46	39	36	30	30	28	29	33	39	52	61	74	80	83	63.0	97																		
22-Jul	87	89	90	91	91	86	76	67	59	52	44	38	33	32	32	30	30	33	33	40	52	58	61	65	57.0	91																		
23-Jul	73	75	75	79	81	80	68	61	62	56	50	47	55	64	53	53	55	55	57	65	69	84	86	90	66.3	90																		
24-Jul	95	97	97	96	97	94	86	83	82	77	74	78	74	67	61	58	58	58	66	65	72	78	82	79	78.0	97																		
25-Jul	82	92	87	85	83	78	74	72	72	68	64	63	60	57	82	84	83	85	81	77	89	95	97	98	79.5	98																		
26-Jul	89	84	91	93	97	95	84	77	72	67	65	62	60	53	50	49	46	57	90	84	92	95	95	95	76.7	97																		
27-Jul	97	98	98	98	99	98	90	86	79	72	66	56	52	51	47	65	79	78	79	78	88	93	95	96	80.8	99																		
28-Jul	96	96	97	98	98	94	87	81	75	69	56	51	48	42	37	37	36	35	39	48	63	82	76	77	67.4	98																		
29-Jul	87	86	87	90	91	79	79	65	56	52	51	45	43	37	38	45	51	42	46	57	67	72	76	79	63.3	91																		
30-Jul	82	84	87	93	94	88	80	73	67	63	60	54	44	38	35	32	35	38	51	59	61	72	68	75	63.9	94																		
31-Jul	86	91	95	97	98	98	95	91	81	70	70	69	67	64	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	98																		
																			82.3	83.5	85.8	87.4	88.6	85.4	78.8	71.8	65.9	59.8	55.0	51.5	50.2	49.4	48.4	48.8	49.1	51.0	54.2	58.3	63.7	70.6	76.1	78.8	Diurnal Average	
																			98	98	98	98	99	98	97	93	90	82	74	78	77	93	91	89	85	88	92	84	92	97	97	98	Diurnal Maximum	
AF - Analyzer Failure																																												



WBEA NETWORK
Hourly Averages

Relative Humidity (RH) - %
Shell Muskeg River - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Shell Muskeg River - July 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	82	11.17	11.17
40 - 60	197	26.84	38.01
60 - 80	238	32.43	70.44
80 - 100	217	29.56	100.00

Total Number of Valid Hours: 734

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

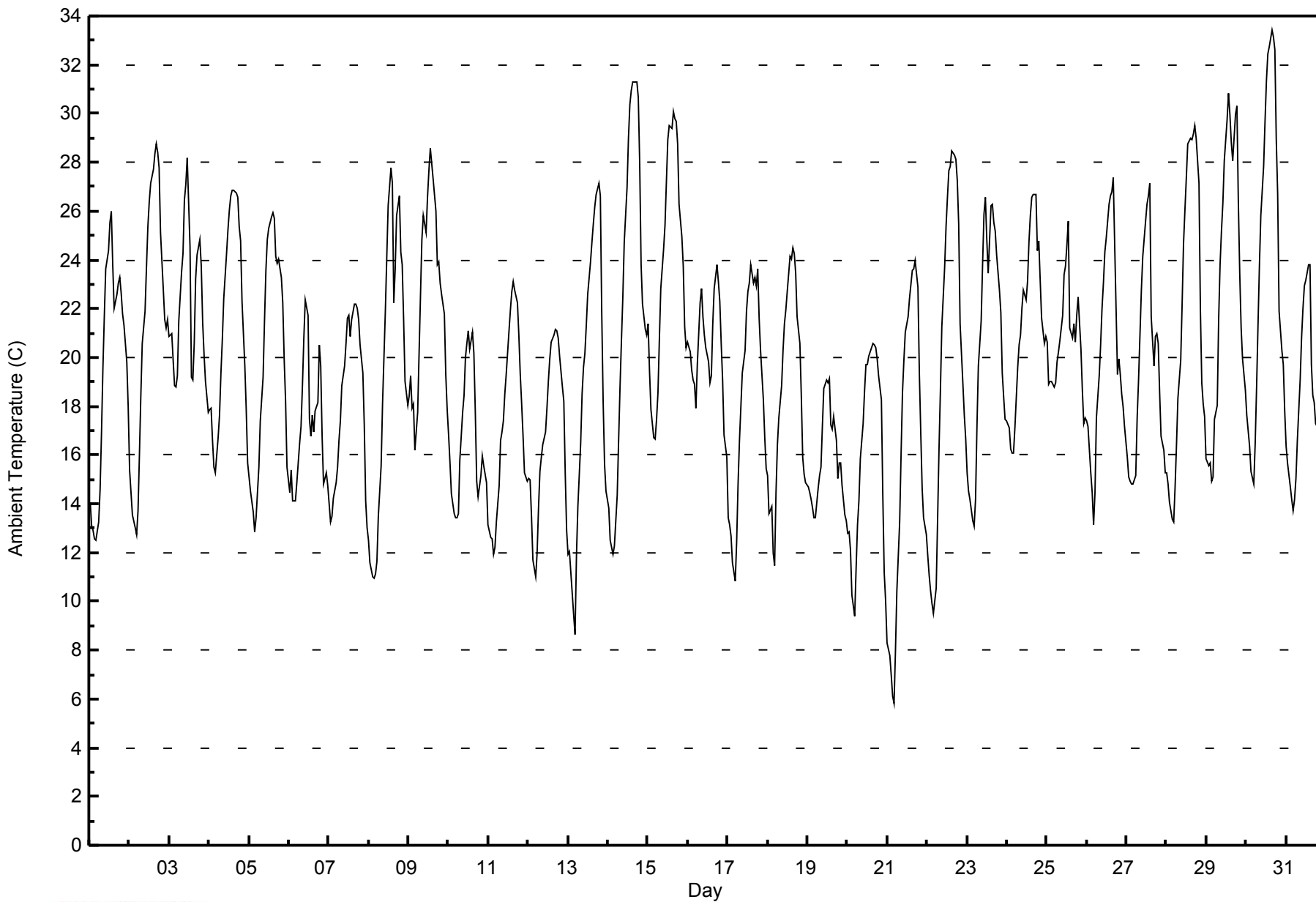
Ambient Temperature (AT) - C
Shell Muskeg River - July 2014

Maximum Value: 33.4 C on Jul 30 16:00		Maximum Daily Average: 24.0 C on Jul 30		Hours in Service: 744																																												
Minimum Value: 5.8 C on Jul 21 05:00		Minimum Daily Average: 15.8 C on Jul 19		Hours of Data: 744																																												
Maximum Diurnal Average: 24.7 C at hour 15		Minimum Diurnal Average: 13.4 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 19.74 C		Percentiles: P ₁ = 9.4 P ₁₀ = 13.4 Q ₁ = 15.7 Median = 19.6 Q ₃ = 23.3 P ₉₀ = 26.6 P ₉₉ = 31.3		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-Jul	14.0	13.1	12.9	12.5	12.5	13.2	14.6	16.9	19.5	21.7	23.6	24.4	25.5	26.0	23.8	22.0	22.6	23.1	23.3	22.6	21.8	21.3	19.8	18.0	19.5	26.0																						
2-Jul	15.4	14.4	13.5	13.0	12.7	13.7	16.0	18.5	20.6	21.9	23.7	25.3	26.4	27.1	27.7	28.4	28.7	28.4	27.8	25.1	22.8	21.6	21.2	21.5	21.5	28.7																						
3-Jul	20.9	21.0	19.9	18.9	18.8	19.3	21.5	23.5	24.3	26.4	27.1	28.2	24.6	19.2	19.1	20.6	23.2	24.2	24.8	23.7	21.4	20.1	19.0	17.8	22.0	28.2																						
4-Jul	17.9	17.9	16.6	15.5	15.3	16.7	17.6	19.3	20.7	22.4	24.2	25.2	26.0	26.6	26.9	26.9	26.8	26.6	25.3	24.8	22.3	19.7	17.9	15.7	21.5	26.9																						
5-Jul	15.1	14.5	13.7	12.9	13.5	14.5	15.5	17.4	19.2	21.5	23.6	24.8	25.3	25.7	25.9	25.7	24.2	23.8	24.0	23.3	22.3	20.0	18.2	15.5	20.0	25.9																						
6-Jul	14.5	15.4	14.1	14.1	14.1	14.9	16.5	17.2	18.8	20.8	22.4	21.7	17.4	16.8	17.6	16.9	17.8	18.1	20.5	19.7	16.8	14.8	15.3	14.7	17.1	22.4																						
7-Jul	14.0	13.2	13.5	14.3	14.9	15.5	16.6	17.4	18.8	19.6	20.6	21.6	21.7	20.8	21.5	22.2	22.2	22.0	21.5	20.5	19.3	17.2	14.1	13.1	18.2	22.2																						
8-Jul	12.5	11.6	11.0	11.0	11.1	11.7	13.5	15.6	18.1	20.0	21.9	24.1	26.2	27.8	27.1	22.3	23.6	25.8	26.6	24.3	23.8	21.6	19.0	18.1	19.5	27.8																						
9-Jul	18.4	19.2	17.9	18.1	16.2	17.8	20.2	22.6	24.9	25.8	25.1	26.6	27.7	28.6	27.9	27.3	26.0	23.8	23.9	23.0	22.6	21.8	19.3	17.8	22.6	28.6																						
10-Jul	16.8	15.7	14.4	13.6	13.5	13.4	13.6	15.8	17.7	18.5	20.0	20.6	21.1	20.3	21.0	20.2	17.8	14.9	14.3	15.2	16.0	15.6	15.2	14.9	16.7	21.1																						
11-Jul	13.1	12.6	12.5	11.9	12.2	13.3	14.7	16.6	17.0	17.4	18.5	19.3	21.1	21.9	22.7	23.1	22.7	22.2	20.9	19.3	18.1	16.8	15.3	14.9	17.4	23.1																						
12-Jul	15.0	15.0	13.5	11.7	11.0	12.0	13.9	15.3	15.9	16.4	17.0	17.9	19.0	20.0	20.6	20.9	21.2	21.1	20.8	20.1	18.8	18.2	15.3	12.9	16.8	21.2																						
13-Jul	11.9	12.1	10.3	9.4	8.7	11.9	13.9	16.5	18.5	19.6	20.2	21.3	22.6	23.9	24.7	25.5	26.2	26.7	27.2	26.6	21.8	18.2	15.6	14.5	18.7	27.2																						
14-Jul	13.8	12.5	12.2	11.9	12.3	14.3	16.6	18.8	20.7	22.5	24.7	27.0	29.0	30.4	30.9	31.3	31.3	31.3	30.6	27.9	23.8	22.2	21.1	20.9	22.4	31.3																						
15-Jul	21.4	19.4	17.9	16.7	16.6	17.5	18.5	20.8	22.8	24.5	25.4	27.2	28.9	29.5	29.4	30.1	29.8	29.7	28.8	26.2	24.9	23.7	21.2	20.4	23.8	30.1																						
16-Jul	20.6	20.2	19.5	19.1	18.9	17.9	19.7	22.2	22.8	21.7	20.9	20.4	19.8	18.9	19.3	21.4	22.8	23.8	23.1	22.3	20.6	19.1	16.9	15.9	20.3	23.8																						
17-Jul	13.4	13.1	12.7	11.6	10.8	12.4	14.8	16.6	18.0	19.4	20.3	21.9	22.7	23.0	23.8	23.0	23.3	23.0	23.6	21.6	20.3	18.3	16.7	15.5	18.3	23.8																						
18-Jul	15.1	13.6	13.9	12.0	11.4	14.5	16.4	17.5	18.9	20.3	21.4	21.9	22.7	24.1	24.0	24.5	24.3	23.4	21.7	20.6	18.5	15.9	15.2	14.9	18.6	24.5																						
19-Jul	14.7	14.4	14.2	13.8	13.4	13.4	14.7	15.2	15.5	17.2	18.8	19.1	19.0	19.2	17.2	17.1	17.6	16.6	15.1	15.7	15.7	14.7	13.6	13.3	15.8	19.2																						
20-Jul	12.8	12.9	12.1	10.2	9.4	11.4	13.1	14.1	15.8	17.3	18.6	19.7	19.7	20.1	20.4	20.6	20.5	20.4	19.9	19.2	18.3	14.4	11.2	10.0	15.9	20.6																						
21-Jul	8.3	7.8	7.0	6.1	5.8	8.0	10.4	13.2	16.0	18.6	19.9	21.0	21.7	22.4	23.0	23.5	23.6	24.0	22.9	19.4	16.9	14.7	13.4	12.7	15.8	24.0																						
22-Jul	11.9	11.1	10.4	9.9	9.5	10.5	13.4	16.3	18.6	21.3	23.7	25.4	26.5	27.7	27.8	28.4	28.3	28.1	27.3	25.5	21.4	18.9	17.6	16.7	19.8	28.4																						
23-Jul	15.3	14.5	14.2	13.3	13.1	14.2	17.2	19.6	21.5	23.8	25.9	26.5	24.8	23.4	26.2	26.3	25.5	25.2	24.2	22.7	21.9	19.3	18.4	17.5	20.6	26.5																						
24-Jul	17.4	17.1	16.2	16.1	16.1	17.1	19.6	20.5	20.9	22.0	22.8	22.4	23.1	24.7	25.8	26.5	26.7	26.7	24.4	24.8	23.2	21.6	20.5	20.9	21.5	26.7																						
25-Jul	20.6	18.9	19.0	19.0	18.8	19.0	19.8	20.2	20.7	21.7	23.4	23.7	24.6	25.6	21.2	20.8	21.4	20.6	21.7	22.5	20.3	18.7	17.3	17.5	20.7	25.6																						
26-Jul	17.4	17.2	15.3	14.4	13.2	14.5	17.5	19.3	20.5	22.0	23.1	24.3	24.9	26.3	26.6	26.8	27.4	24.6	19.3	19.9	19.3	18.5	18.0	17.2	20.3	27.4																						
27-Jul	15.9	15.1	14.9	14.8	14.8	15.1	17.5	19.1	20.9	22.8	24.2	25.6	26.3	26.6	27.1	21.7	19.7	20.9	21.0	20.6	18.6	16.7	16.2	15.2	19.6	27.1																						
28-Jul	15.3	14.8	14.1	13.4	13.2	14.7	16.4	18.3	19.9	22.2	24.7	26.0	27.4	28.7	29.0	28.9	29.1	29.5	29.0	27.1	22.0	19.0	18.1	17.5	21.6	29.5																						
29-Jul	15.9	15.5	15.7	14.9	15.1	17.4	18.1	21.5	23.8	25.2	26.3	28.1	29.8	30.8	30.0	28.8	28.1	30.0	30.3	26.4	23.5	21.2	19.9	18.7	23.1	30.8																						
30-Jul	17.6	17.0	16.4	15.3	14.8	16.5	18.8	21.3	23.7	25.8	27.8	29.7	31.3	32.5	32.8	33.4	33.2	32.6	28.9	26.7	21.9	20.3	19.7	17.8	24.0	33.4																						
31-Jul	16.4	15.7	14.7	14.2	13.7	14.2	15.1	16.6	19.1	20.8	22.0	22.9	23.2	23.8	23.8	19.7	18.4	18.1	17.3	17.1	17.0	16.4	15.9	15.6	18.0	23.8																						
																								15.6	15.1	14.3	13.7	13.4	14.5	16.3	18.2	19.8	21.3	22.6	23.7	24.2	24.6	24.7	24.3	24.3	24.2	23.6	22.4	20.5	18.7	17.3	16.4	Diurnal Average
																								21.4	21.0	19.9	19.1	18.9	19.3	21.5	23.5	24.9	26.4	27.8	29.7	31.3	32.5	32.8	33.4	33.2	32.6	30.6	27.9	24.9	23.7	21.2	21.5	Diurnal Maximum



WBEA NETWORK
Hourly Averages

Ambient Temperature (AT) - C
Shell Muskeg River - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Shell Muskeg River - July 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	11	1.48	1.48
10 - 20	383	51.48	52.96
> 20	350	47.04	100.00

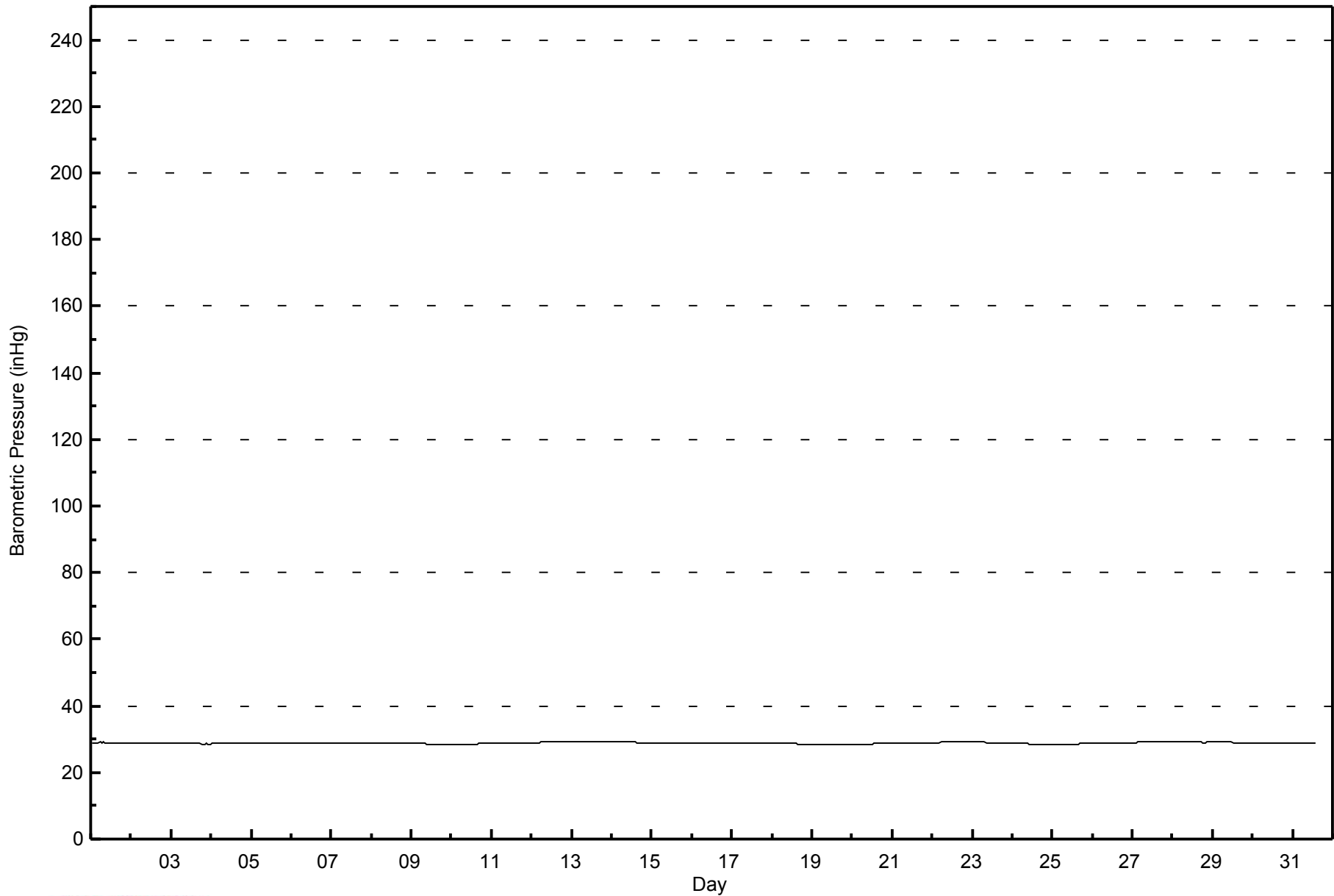
Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA NETWORK
Hourly Averages

Barometric Pressure (BP) - inHg
Shell Muskeg River - July 2014





Maximum Speed: 30 km/h on Jul 30 22:00	Maximum Daily Speed Average: 16.7 km/h on Jul 4	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jul 2 12:00	Minimum Daily Speed Average: 1.4 km/h on Jul 16	Hours of Data: 742
Maximum Diurnal Speed Average: 6.4 km/h at hour 13	Minimum Diurnal Speed Average: 0.7 km/h at hour 20	Hours of Missing Data: 2
Monthly Average Velocity: 3.2 km/h 214.9 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 5 Median = 8 Q ₃ = 11 P ₉₀ = 16 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-Jul	SSW3	SSW5	SSW5	S5	S5	S5	S5	SSW6	SSW5	S5	SSW8	SW8	SW7	SW8	N11	NE15	SE6	E7	ESE6	E11	ENE10	NE12	ENE12	E9	SE2.6	NE15
2-Jul	SSE4	SSE4	SSE4	SSE5	S4	S4	SSW3	SSW4	SW3	SSE2	W5	WSW1	ENE3	SE4	SSE4	SSE3	SSE2	SSE6	SSE7	S5	SSE7	SSE9	SSE9	SSE10	SSE4.1	SSE10
3-Jul	S10	S8	S9	S8	S9	SSE9	SSE8	SSE9	SSE8	SSE11	SSE14	SSE19	S19	S8	SE6	SE3	SSE6	SSE3	E3	N11	NNE14	NNE14	E6	WNW6	SSE5.7	SSE19
4-Jul	W11WSW13	WSW11	WSW9	SSW8	SSW7	SSW9	SW17	SW11	SW17WSW25	WSW26	WSW27	WSW26	WSW27	WSW26	WSW28	WSW27	SW25	WSW23	WSW22	WSW19	WSW12	WSW13	WSW13	SW13	WSW16.7	WSW28
5-Jul	WSW12	SW6	SW5	SSW8	SSW8	SSW7	SSW7	SSW10	SSW13	SSW11	SW15	WSW19	WSW17	WSW19	WSW15	WSW14	NE18	E11	ESE8	ENE10	NE17	NE7	ENE7	S3	SW4.5	WSW19
6-Jul	WSW7	NW3	SE5	SSE2	W4	SSW4	SSW6	SW6	SW7	WSW8	W4	NW2	E8	SE6	SE6	SSW3	SSE4	SSW5	W8	W9	E5	W5	NW11	WNW9	SW2.6	NW11
7-Jul	W6	WSW6	WSW8	WNW9	NW10	W9	WSW7	W8	WNW8	WNW7	NW10	WNW9	W11	E3	NE12	NE18	NE18	NE16	NE17	NE11	ENE10	NE6	SSW5	SSW5	NNW3.8	NE18
8-Jul	S5	S5	S5	SSW7	S5	S5	S6	SSW7	SSW11	SSW10	S9	SSW10	SSW13	S14	SW7	NE18	SE10	SSE11	SSE7	S6	SSW8	S5	S7	SSW7	S6.5	NE18
9-Jul	S7	SW3	WNW3	ESE5	SSW8	SW7	S3	S4	S8	SSW12	SW21	SW20	SSW16	SSW15	SSW14	W20	W21	WSW12	SSW10	SSW9	WSW13	WNW21	W12	WSW12	SW9.3	W21
10-Jul	WSW13	W15	W13	WSW14	WSW17	WSW12	SW12	SW13	SW11	WSW12	WSW19	W20	WSW20	WSW19	W15	NW16	NW21	WNW22	WNW17	WNW17	NW18	NW18	WNW16	WNW17	W14.5	WNW22
11-Jul	W15	W16	W15	WNW13	W8	WSW11	W10	W9	W12	W15	W18	WSW19	W16	W19	W22	W21	NW14	NNE20	NNE19	NNE16	N10	NNW10	NNW7	NNW10	WNW10.4	W22
12-Jul	N12	N17	N14	NNW11	NW8	NW7	NNW8	N7	N9	NNE8	NW6	WNW9	NW8	NW8	NW7	N6	ENE9	NE13	ENE9	ENE10	NNE11	NE13	ENE7	E6	N6.9	N17
13-Jul	E8	E7	SSW3	S2	S4	SSE4	SSW4	SSE6	S6	SSE6	ESE4	SSE4	SE4	WSW1	W7	WNW3	SSW5	SSW4	SSW2	AF	SSE5	SSE5	S6	S8	SSE3.2	E8
14-Jul	S8	S8	S8	S8	S8	SSW5	SSW5	SSW8	SSW9	SSW9	SSW9	SSW10	SSW13	S14	SSW13	SSW12	SSW12	SSW11	SSW10	SSW9	SSW7	SSW9	SSW9	SSW10	SSW9.2	S14
15-Jul	SSW10	S8	S9	S9	SSW8	SSW9	SSW7	SSW8	SSW9	S10	SSW10	SSW10	S11	SSW12	SSW11	SSW12	SSW11	SSW13	SSW10	SSW8	SSW10	SSW7	S7	S6	SSW9.3	SSW13
16-Jul	SSW8	SSW7	SSW6	WSW9	SSW2	S4	SSW3	SW5	NE10	NE18	NE12	N7	NW9	WNW6	SW12	SW14	SW11	S8	S7	SSE6	SSW7	NE13	E12	ENE9	S1.4	NE18
17-Jul	W4	WNW5	W4	W6	SSW5	SSW3	S3	E5	SE4	ENE5	E4	SSW4	SSW4	SW6	SSW5	SW5	SSW4	S3	SW3	SSW5	NNW7	WSW4	ESE3	WSW3	SW2.0	NNW7
18-Jul	WSW4	SW4	WNW5	SSW2	SE3	ENE10	ENE13	NE10	NE9	ENE10	ENE8	E6	NE2	S6	SW4	SW5	ESE5	SSE4	SE4	SW14	SSW10	SW16	S2	SSW4	SE2.0	SW16
19-Jul	S6	S6	S4	S3	S5	SSW5	SSW7	SW9	SW11	WSW16	WSW19	W20	WSW18	W18	NW15	WNW10	NNW13	NNW16	NNW17	N16	N14	NNW10	WNW10	WNW9	WNW6.8	W20
20-Jul	W9	WSW6	WSW6	SW4	WSW5	W6	W7	WSW6	W3	WNW5	N6	NNE12	NNE12	NNE9	NE8	NNE12	NNE9	NE12	N11	ENE15	ENE13	ENE3	SW2	SW2	N3.4	ENE15
21-Jul	SW3	SSW5	SSW6	SSW6	SSW6	SSW4	SSW4	SSW4	SW4	SW4	SSW5	SSW4	W8	SW5	SSW3	SSW5	S4	SSE4	SSW3	SSW4	SSW5	SSW3	WSW3	SSW6	SSW4.3	W8
22-Jul	SSW6	S6	SSW7	SSW6	S7	SSW6	SSW6	SSW6	SW8	SSW7	SSW7	SSW9	SSW9	SSW9	SW9	SSW8	SSW7	SSW8	SSW9	S7	S6	SSE6	S6	SSW9	SSW7.0	SSW9
23-Jul	S5	SSW6	SSW5	SW4	SSW4	SSW2	AF	SSW1	S3	SSW3	S12	SSE14	SSE15	ESE7	SE12	SSE16	SSE15	SE11	SE9	ESE7	ESE6	SSW4	SW4	WSW4	SSE6.4	SSE16
24-Jul	S5	S7	S7	S9	S6	S8	S8	S9	S8	SSE7	SSE8	S8	S10	SSE10	S9	SSE9	SSE10	SSE13	SSE11	SSE9	SE7	SE7	SE5	E9	SSE7.8	SSE13
25-Jul	ENE10	E9	E10	ENE14	NE15	NE17	NE18	ENE17	ENE15	ENE14	ENE11	E12	ESE11	ESE9	ESE3	NNW6	NW7	SW3	W3	WSW4	W4	WSW3	S3	ESE8	ENE6.6	NE18
26-Jul	ESE8	E9	ESE4	ESE6	SE4	SE2	S2	SW3	WSW4	SSW3	NNE2	W7	WSW8	WSW6	WSW7	WSW6	W7	SSE8	WSW11	W11	SSW3	SW7	S5	S5	SSW3.0	WSW11
27-Jul	SSW6	S6	SSW7	SSW6	S6	S6	S6	SSW7	SSW8	SSW9	SSW8	SSW11	SW11	WSW11	SW7	SE16	S10	SSW10	SSW12	SSW9	S5	S7	S7	S6	SSW7.5	SE16
28-Jul	SSW8	S7	S6	S7	S8	S7	SSW9	SSW8	SW9	SSW8	SSW9	SW12	SW10	S7	SSW8	SW9	SSW8	SSW8	SSW6	S5	S5	SSW5	SSW6	SSW5	SSW7.2	SW12
29-Jul	S7	S7	S8	SSW7	S6	SE4	S5	WSW5	SSE5	SSW6	SSW6	SW8	SSW7	SSW7	SW6	W7	WNW8	WNW7	SSE4	SSE5	S6	S7	S9	S8	SSW5.1	S9
30-Jul	SSW3	SW4	SSW6	S6	S6	SSW5	SSW4	SSW6	SSW6	SW6	SW8	SW11	SW12	SSW10	SSW9	SSW6	SSW7	SSW8	S8	WSW3	NW24	NE30	E9	S5	SSW4.0	NE30
31-Jul	WSW11	WSW6	S5	S6	SSW5	S4	S4	SSW5	SE3	ENE14	ENE16	NE17	NE18	NE18	NNE17	N19	NE16	NNE14	N10	N15	N15	N15	N14	NNE15	NNE7.5	N19

SW4.2SSW3.6SSW4.0SSW3.9SSW4.2SSW3.5SSW3.6SSW4.3SSW4.1SSW3.6	SW4.9	SW6.1	SW6.4	SW5.9	SW4.7	WSW3.0	SW2.0	S2.0	SSW1.9	SW0.7	N0.8	NNW0.9	SSW1.5	SSW2.6	Diurnal Average										
W15	N17	W15	WSW14	WSW17	NE17	NE18	ENE17	ENE15	NE18	WSW25	WSW26	WSW27	WSW26	WSW28	WSW27	SW25	WSW23	WSW22	WSW19	NW24	NE30	WNW16	WNW17	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

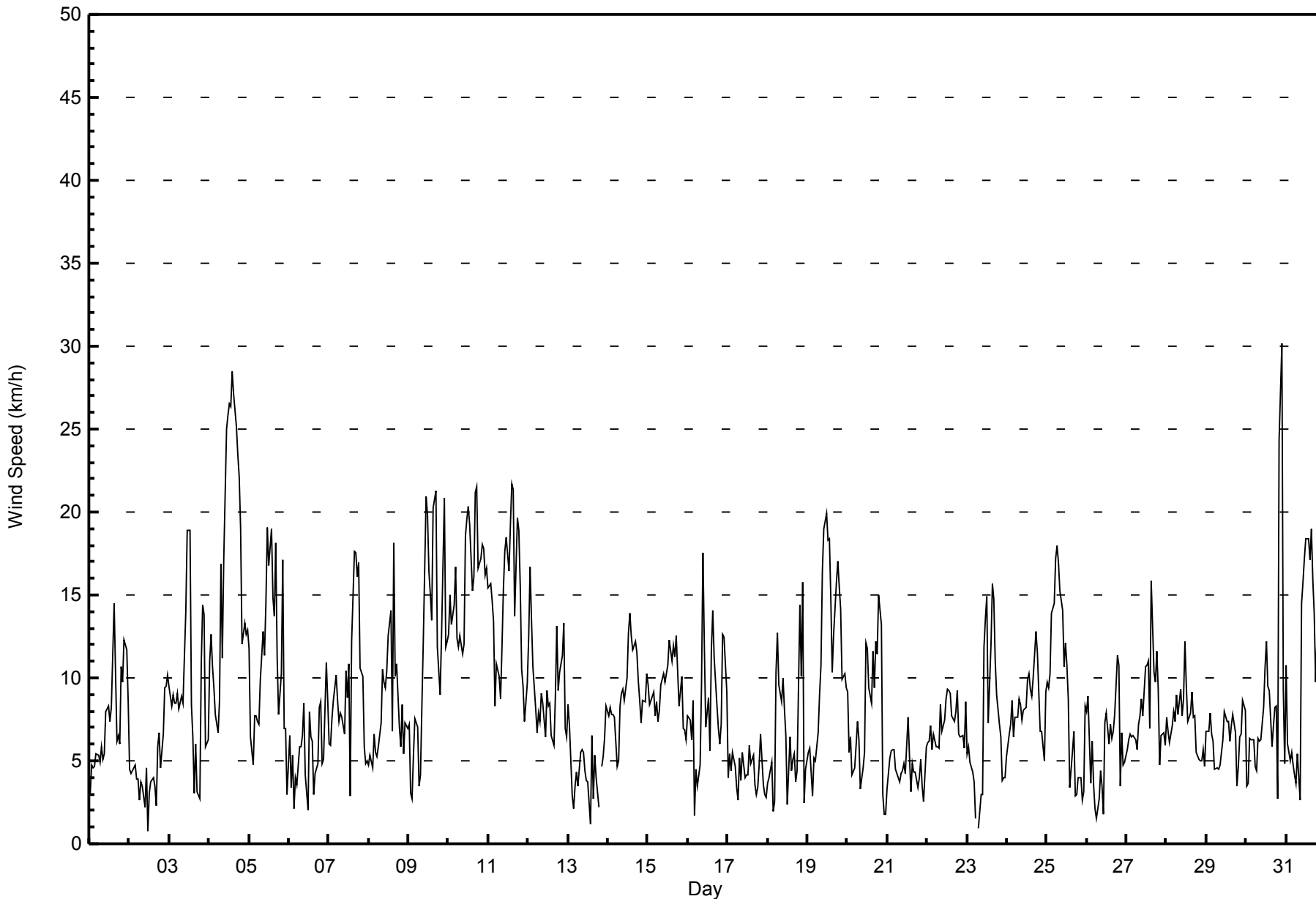
Wind Speed (WS) - km/h
Shell Muskeg River - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 14 km/h on Jul 30 22:00 Minimum Value: 0 km/h on Jul 2 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: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7									
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	1	1	1	1	1	1	1	2	1	2	3	3	3	4	9	4	2	2	2	2	2	3	2	2	9	
2-Jul	1	1	1	0	1	1	1	1	2	1	2	3	3	3	2	2	2	2	2	1	2	2	3	3	3	
3-Jul	3	2	2	2	2	3	2	3	4	4	6	7	8	4	3	2	3	2	2	4	4	4	3	2	8	
4-Jul	6	3	2	2	2	2	3	5	4	5	5	5	6	6	6	6	6	6	5	4	2	2	2	1	6	
5-Jul	2	3	2	3	3	2	2	3	4	4	5	5	4	5	5	4	4	4	2	4	3	4	3	3	5	
6-Jul	1	2	2	2	2	2	2	3	3	3	3	10	5	2	2	4	2	2	2	2	9	4	6	3	10	
7-Jul	2	2	1	2	3	3	2	2	3	3	3	3	3	3	4	4	4	3	4	2	3	3	2	1	4	
8-Jul	1	1	1	1	1	1	2	2	3	3	3	4	4	5	5	6	3	3	3	2	3	1	1	2	6	
9-Jul	1	3	3	5	2	2	1	2	3	4	6	6	6	5	5	7	5	8	3	2	6	5	4	3	8	
10-Jul	3	3	2	3	4	3	3	3	3	4	4	4	4	4	4	7	8	6	5	4	5	5	3	3	8	
11-Jul	2	3	3	2	3	2	2	3	3	4	3	4	3	5	5	5	5	6	6	5	4	3	2	4	6	
12-Jul	4	5	4	3	2	2	3	3	4	4	3	3	3	3	3	3	4	3	3	3	3	4	3	3	5	
13-Jul	2	2	2	2	1	1	1	2	2	2	3	3	2	3	2	2	2	2	2	AF	1	1	2	2	3	
14-Jul	2	2	1	2	2	1	2	3	3	3	3	3	4	5	4	4	4	3	3	2	1	2	2	2	5	
15-Jul	3	2	2	2	2	2	2	3	3	3	3	3	4	4	4	4	3	4	3	2	2	4	2	1	4	
16-Jul	1	2	2	2	2	1	2	4	7	4	3	3	3	3	7	4	4	2	2	2	2	7	4	5	7	
17-Jul	3	2	2	2	2	1	2	3	2	3	3	2	3	3	2	2	1	1	1	1	3	2	3	2	3	
18-Jul	2	1	2	1	2	3	2	2	2	4	3	4	3	2	3	3	2	2	2	6	4	7	2	1	7	
19-Jul	1	2	1	1	1	1	2	2	3	4	4	4	4	6	5	3	5	7	6	6	5	4	2	2	7	
20-Jul	2	1	2	1	2	3	2	1	2	2	4	4	5	4	3	4	4	5	4	3	2	3	1	2	5	
21-Jul	1	1	1	1	1	1	1	1	2	2	2	2	3	3	2	2	1	1	1	1	1	2	2	2	3	
22-Jul	1	1	1	1	1	1	2	1	2	2	2	3	3	3	4	3	3	3	3	2	1	2	2	3	4	
23-Jul	1	1	1	1	1	1	AF	1	1	1	5	5	5	3	5	5	6	4	3	2	2	2	2	2	6	
24-Jul	2	1	2	2	2	2	2	3	3	2	3	3	4	4	4	4	5	4	3	2	2	2	2	2	5	
25-Jul	4	4	3	3	3	3	4	3	3	3	4	4	3	3	4	3	4	4	2	1	2	2	2	2	4	
26-Jul	2	2	3	1	2	2	1	2	2	2	2	2	2	2	3	2	2	7	4	4	2	1	2	1	7	
27-Jul	1	1	1	1	1	2	2	2	3	3	3	3	4	4	5	6	3	3	3	4	1	2	2	1	6	
28-Jul	2	2	1	1	2	2	3	3	2	3	3	3	3	3	3	3	3	2	2	1	1	1	1	2	3	
29-Jul	1	1	2	1	1	2	2	3	2	2	2	3	3	3	4	2	3	3	1	1	3	2	2	2	4	
30-Jul	2	1	1	2	1	1	2	2	2	2	2	3	4	4	3	3	3	3	2	9	12	14	6	2	14	
31-Jul	3	3	2	2	1	1	2	2	2	5	4	5	5	5	5	6	5	5	4	5	5	5	4	5	6	
																	Diurnal Maximum									
																	6 5 4 5 4 3 4 5 7 5 6 10 8 6 9 7 8 8 8 6 9 12 14 6 5									
AF - Analyzer Failure																										



WBEA NETWORK
Hourly Averages

Wind Speed (WS) - km/h
Shell Muskeg River - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - July 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	197	26.55	26.55
6 - 11	376	50.67	77.22
12 - 19	145	19.54	96.77
20 - 28	23	3.10	99.87
29 - 38	1	0.13	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - July 2014

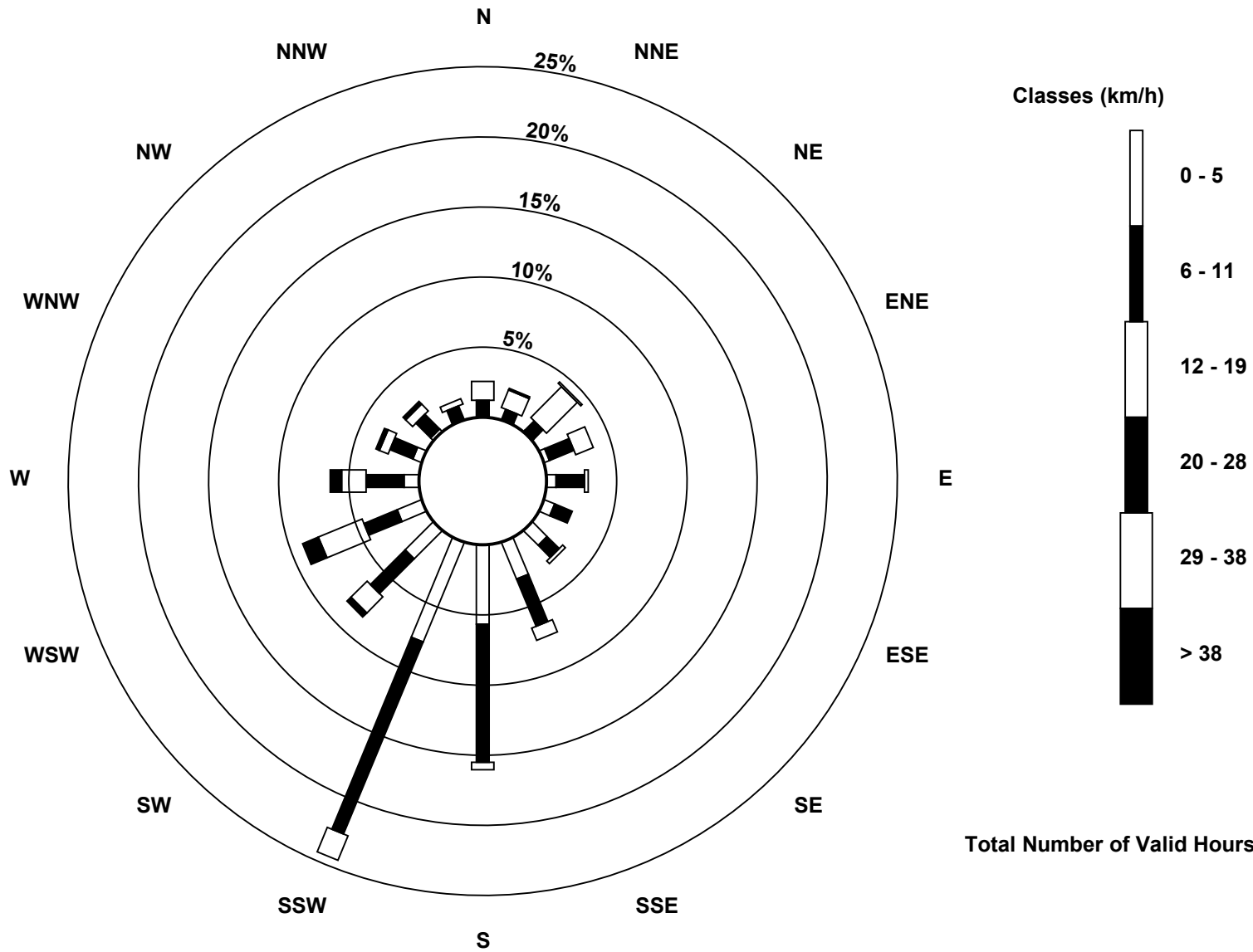
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	0	1	1	3	5	6	11	21	42	57	21	14	8	5	2	0	197
6 - 11	9	5	7	14	15	10	9	27	73	110	26	19	20	13	11	8	376
12 - 19	10	10	23	10	2	0	2	7	4	14	12	25	13	5	5	3	145
20 - 28	0	1	0	0	0	0	0	0	0	0	3	9	6	2	2	0	23
29 - 38	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	17	32	27	22	16	22	55	119	181	62	67	47	25	20	11	742

Total Number of Valid Hours: 742

Total Number of Hours: 744

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

**Wind Speed (WS) - km/h
Shell Muskeg River (AMS 16)**



Total Number of Valid Hours: 742



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Shell Muskeg River - July 2014

Direction of Maximum Speed: 35 deg on Jul 30 22:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 238.4 deg on Jul 4	Hours of Data: 742
Direction of Minimum Speed: 243 deg on Jul 2 12:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 1.4 deg on Jul 16	Percent Operational Time: 99.7
Monthly Average Direction: 218.3 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-Jul	196	199	196	182	190	185	188	203	199	189	213	221	216	230	7	41	131	96	109	93	65	54	76	93	133.2
2-Jul	148	147	160	149	171	188	195	208	215	159	269	243	76	135	159	158	159	148	165	175	151	148	152	158	161.8
3-Jul	170	182	181	179	177	160	157	165	166	163	164	161	178	170	143	145	164	168	92	9	29	33	85	288	156.5
4-Jul	277	253	242	214	213	194	210	232	214	223	242	246	241	238	239	238	236	238	244	257	256	241	240	233	238.4
5-Jul	248	230	219	213	202	206	208	202	203	204	220	241	255	243	239	246	45	92	111	62	47	42	75	182	217.1
6-Jul	237	314	126	168	259	208	195	224	227	247	272	320	91	140	128	194	166	204	264	264	98	281	310	296	233.6
7-Jul	281	256	253	296	304	281	257	263	295	303	308	288	268	97	37	37	38	46	45	46	59	56	200	209	343.5
8-Jul	182	171	176	212	187	187	187	196	192	193	190	198	194	190	216	36	130	159	166	187	195	176	186	203	182.7
9-Jul	190	228	302	104	205	214	182	184	184	193	223	220	195	205	203	281	259	254	196	193	247	284	268	254	228.4
10-Jul	254	262	261	254	255	252	236	225	235	247	253	266	252	256	266	313	310	297	302	287	308	306	298	291	273.0
11-Jul	264	276	280	282	266	257	263	264	280	279	264	252	261	266	269	279	313	31	29	18	359	343	328	341	290.9
12-Jul	352	7	356	337	320	312	328	0	5	28	322	298	314	306	317	352	67	55	75	61	30	42	62	96	6.6
13-Jul	93	92	192	182	171	148	211	158	181	158	106	147	133	237	278	291	211	210	211	AF	153	164	180	178	166.7
14-Jul	180	181	188	189	186	207	193	197	197	208	199	201	199	191	202	200	203	202	201	197	194	199	202	208	197.3
15-Jul	201	191	187	186	200	199	201	198	194	189	213	208	190	196	205	194	198	195	205	194	201	195	182	174	196.2
16-Jul	200	194	210	248	212	190	210	234	54	49	54	349	318	282	234	229	220	190	191	161	206	41	80	74	191.2
17-Jul	259	283	276	278	203	198	184	83	125	66	89	193	211	232	193	231	200	184	217	208	333	258	112	257	219.2
18-Jul	257	226	283	193	146	63	63	56	53	71	76	90	51	182	224	225	120	157	130	224	206	224	189	197	145.6
19-Jul	173	170	180	182	179	206	213	220	229	243	251	267	242	279	316	303	343	339	347	357	5	330	303	299	284.1
20-Jul	275	244	246	217	246	279	272	257	279	282	358	19	32	33	48	33	16	39	11	60	68	77	215	215	8.6
21-Jul	214	202	201	199	199	197	192	204	227	232	212	205	269	222	210	203	180	168	205	208	199	195	246	204	208.2
22-Jul	193	189	202	194	172	200	195	196	218	202	209	210	213	206	225	194	210	200	199	181	169	166	186	208	199.0
23-Jul	190	198	207	215	212	204	AF	205	174	192	175	166	168	119	144	155	148	144	140	112	123	195	229	237	163.6
24-Jul	169	172	175	178	185	185	186	175	177	166	160	177	173	163	169	162	151	154	149	147	141	139	133	96	161.9
25-Jul	76	95	79	61	52	45	51	59	62	59	75	89	116	103	121	341	311	224	263	244	266	247	182	108	68.4
26-Jul	115	91	115	111	146	132	179	228	246	207	29	275	256	251	237	252	266	158	237	262	210	215	181	175	213.3
27-Jul	199	190	201	199	187	190	180	196	209	201	202	208	219	246	226	135	191	192	199	204	172	190	186	179	196.0
28-Jul	194	186	187	182	185	186	195	203	215	206	201	220	218	188	199	222	207	203	200	188	176	193	200	203	199.8
29-Jul	186	172	190	193	187	124	175	238	165	211	208	229	201	203	227	263	284	284	164	150	169	189	186	184	200.3
30-Jul	197	231	213	184	179	192	197	206	205	217	218	225	216	205	208	198	196	192	182	246	314	35	95	176	208.7
31-Jul	244	251	183	180	195	185	172	193	146	64	58	40	40	38	28	3	35	12	359	6	9	5	10	14	24.9

216.0 211.2 213.1 206.8 204.8 201.0 200.9 205.9 204.7 202.8 219.4 228.4 220.6 220.9 231.3 255.5 225.4 181.7 196.1 216.2 3.2 337.6 192.5 210.1
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

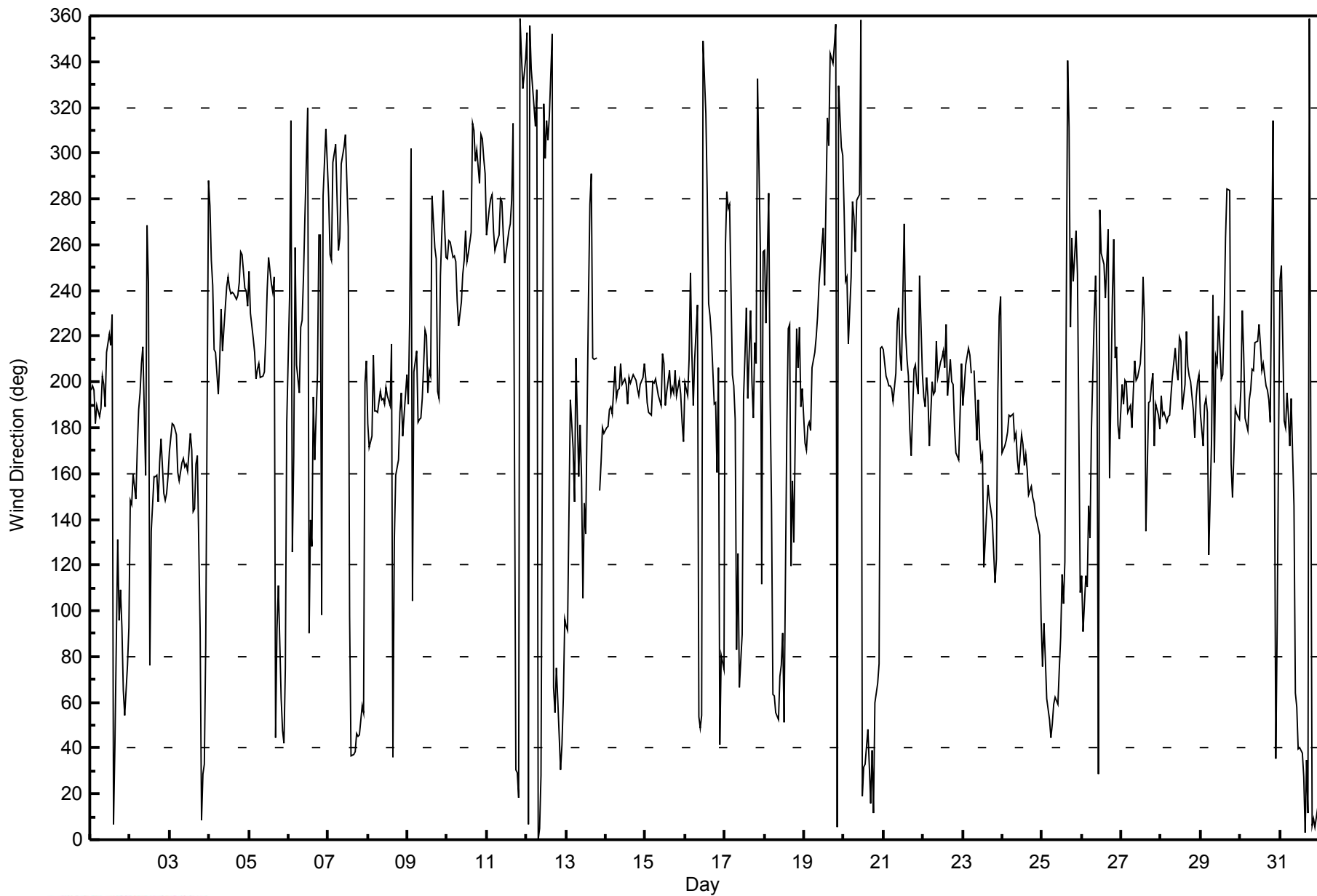
Wind Direction (WD) - deg
Shell Muskeg River - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on Jul 13 14:00																	Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7								
Minimum Value: 5 deg on Jul 5 00:00																									
Percentiles: P ₁ = 7 P ₁₀ = 12 Q ₁ = 15 Median = 20 Q ₃ = 32 P ₉₀ = 51 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-Jul	7	19	10	9	12	13	16	16	18	22	24	29	32	30	63	27	28	36	28	13	17	15	13	17	63
2-Jul	18	30	20	13	17	12	17	17	24	75	48	92	94	61	39	58	63	21	22	19	13	15	16	16	94
3-Jul	16	17	14	13	14	14	15	18	21	20	20	19	22	22	24	41	44	46	71	36	27	20	50	33	71
4-Jul	24	13	20	13	12	16	18	13	20	16	10	11	12	12	12	12	14	15	9	11	8	6	5	5	24
5-Jul	8	41	44	13	17	13	15	20	20	20	22	16	22	15	20	19	23	24	23	35	14	63	56	50	63
6-Jul	14	81	35	80	56	57	24	21	19	21	93	77	62	42	42	79	28	27	17	11	63	43	40	25	93
7-Jul	30	17	14	17	24	16	13	12	36	47	29	32	21	91	29	22	22	19	17	29	26	63	29	8	91
8-Jul	12	12	14	15	9	12	14	17	18	19	21	21	21	23	62	31	26	18	15	12	24	18	12	18	62
9-Jul	28	57	79	62	18	15	24	16	22	19	16	17	20	21	26	24	12	33	19	17	36	14	13	9	79
10-Jul	11	10	10	10	11	11	13	16	22	17	15	16	16	18	24	41	26	19	21	12	21	17	12	14	41
11-Jul	7	11	9	9	17	10	15	20	15	14	15	13	20	16	14	16	46	23	23	29	36	31	42	42	46
12-Jul	28	25	28	31	38	40	41	56	49	57	68	40	53	51	62	66	43	21	34	30	20	19	48	39	68
13-Jul	12	28	54	50	11	14	16	22	30	38	69	65	71	104	47	82	24	29	51	AF	15	9	14	13	104
14-Jul	13	14	11	13	13	16	14	16	19	20	22	22	21	19	23	21	20	17	15	14	14	14	14	14	23
15-Jul	16	16	12	14	15	15	15	17	19	19	19	20	22	20	19	18	18	18	18	14	15	20	15	13	22
16-Jul	13	19	19	17	68	12	11	26	75	19	25	55	40	48	18	14	20	17	14	22	20	78	23	40	78
17-Jul	36	37	41	37	13	15	13	55	45	57	78	45	49	41	27	25	28	7	23	14	65	54	69	66	78
18-Jul	42	26	39	15	54	42	15	21	28	34	50	63	100	40	68	47	38	28	31	45	27	20	63	16	100
19-Jul	16	17	13	16	13	22	16	17	16	12	11	12	15	31	34	28	40	38	35	33	34	38	11	17	40
20-Jul	10	22	30	16	35	37	16	18	74	50	79	45	49	56	56	48	54	40	36	19	13	89	43	12	89
21-Jul	11	9	5	8	12	12	10	18	16	28	38	49	32	52	84	25	32	20	22	16	12	13	47	28	84
22-Jul	10	10	12	10	13	14	13	15	15	19	21	25	23	27	24	25	26	20	15	14	12	12	25	17	27
23-Jul	11	12	11	13	10	44	AF	9	17	31	20	20	18	34	35	18	21	21	20	25	27	26	38	28	44
24-Jul	29	13	13	14	12	14	18	18	16	25	19	16	20	24	24	23	21	20	18	18	17	18	31	20	31
25-Jul	42	32	17	20	17	16	18	15	17	23	35	34	25	38	88	70	62	65	58	16	35	40	22	24	88
26-Jul	18	13	51	19	33	43	13	48	32	38	103	37	21	35	27	26	25	69	29	18	65	13	37	34	103
27-Jul	11	13	11	12	11	14	16	18	20	20	23	22	23	24	46	22	19	18	18	18	20	24	17	16	46
28-Jul	15	17	11	13	13	15	16	19	17	23	20	17	23	29	26	25	27	22	18	11	9	11	11	13	29
29-Jul	15	17	13	15	17	48	25	30	46	23	26	25	26	32	27	20	27	31	21	13	15	14	13	13	48
30-Jul	15	16	17	11	11	10	13	18	20	21	20	19	23	27	25	28	24	17	15	60	48	18	49	42	60
31-Jul	18	21	31	17	13	15	52	23	54	23	19	31	27	29	35	31	33	37	47	27	28	29	29	29	54
																	Diurnal Maximum 42 81 79 80 68 57 52 56 75 75 103 92 100 104 88 82 63 69 71 60 65 89 69 66								
AF - Analyzer Failure																									



WBEA NETWORK
Hourly Averages

Wind Direction (WD) - deg
Shell Muskeg River - July 2014



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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 29, 2014	Previous Calibration	June 23, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:40	End Time (MST)	15:05
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	786	786
Calculated slope	0.999091	0.998287	Chamber temp.	45.0	45.2
Calculated intercept	2.038684	2.007311	Pressure (mmHg)	705.4	704.2
Analyzer Background	6.4	6.3	Flow (lpm)	0.452	0.451
Analyzer Coefficient	1.297	1.297	Intensity	90	90

Analyzer make Thermo 43i Analyzer serial # 1118148498

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	NA
as found span	5000	78.7	799.6	800.4	0.999
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	78.7	799.6	800.4	0.999
second point	5000	39.4	400.3	396.5	1.010
third point	5000	19.7	200.2	197.6	1.013
calibrator zero	5000	0.0	0.0		
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	78.1	793.5	796.4	0.996
Average Correction Factor					1.007

Corrected As found 800.5 Previous response 798.3 % change -0.3%

Notes:

No adjustments. As founds used as calibrator zero and high point

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

SO₂ Calibration Summary

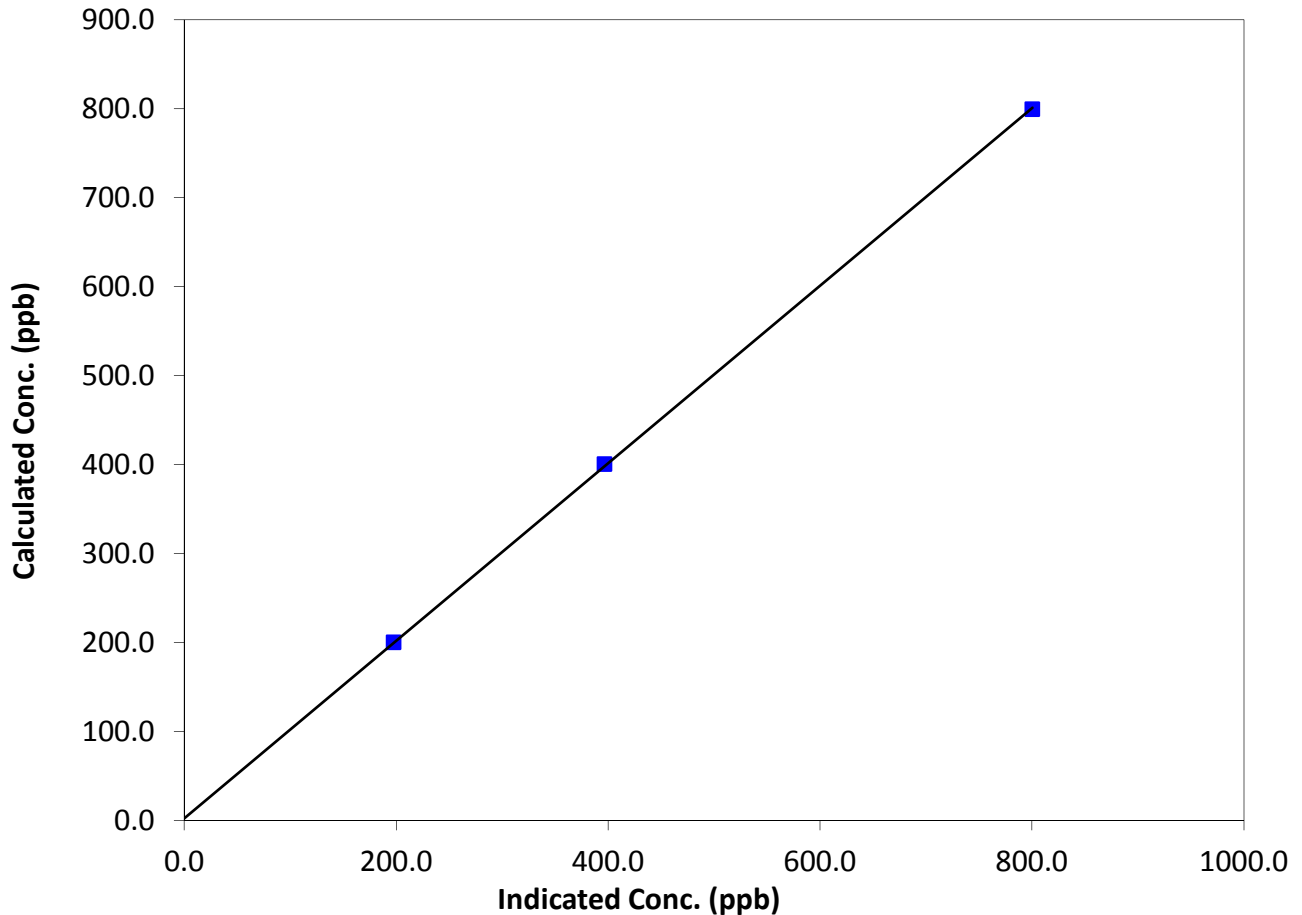
Station Information

Calibration Date	July 29, 2014	Previous Calibration	June 23, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:40	End Time (MST)	15:05
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

Calibration Data

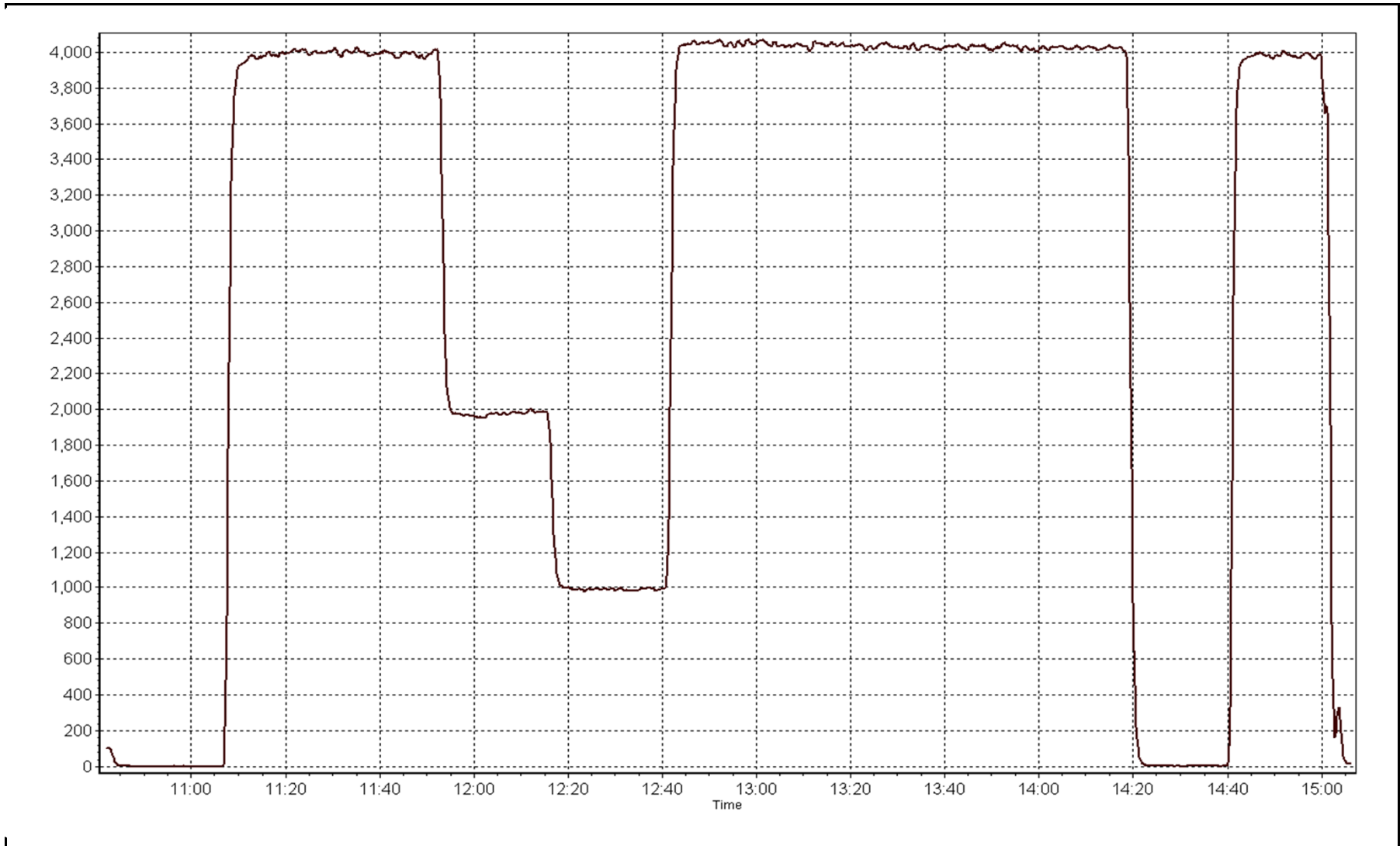
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999964
799.6	800.4	0.9990		
400.3	396.5	1.0096	Slope	0.998287
200.2	197.6	1.0129		
			Intercept	2.007311

SO₂ Calibration Curve



SO2 Calibration Plot

Date: July 29, 2014





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Tuesday, July 29, 2014	Previous Calibration	Monday, June 23, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:40	End Time (MST)	15:04
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	1.002942	1.005976	Fuel Pressure	24.2	24.2
Calculated intercept	0.064652	-0.124907			

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	0.11	N/A
as found span	5000	78.7	16.98	17.81	0.954
calibrator zero	5000	0.0	0.00	0.11	N/A
high point	5000	78.7	16.98	17.01	0.998
second point	5000	39.4	8.50	8.55	0.994
third point	5000	19.7	4.25	4.38	0.970
calibrator zero					
as left zero	5000	0.0	0.00	0.57	N/A
as left span	5000	78.7	16.98	17.06	0.996
Average Correction Factor					0.987

Corrected As found 17.70 Previous response 16.87 % change -4.7%

Notes:

Span adjusted, as found zero used as calibrator zero

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

THC Calibration Summary

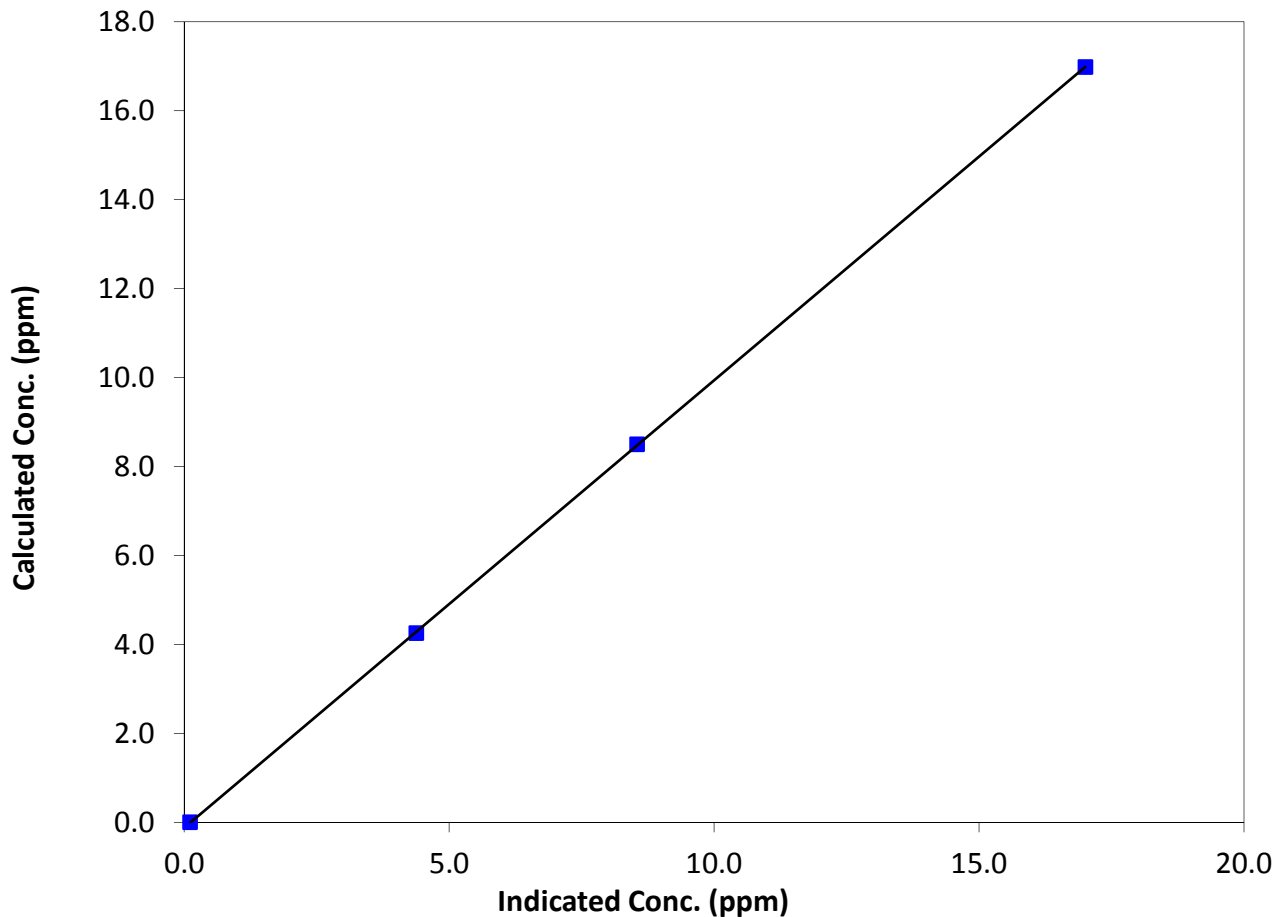
Station Information

Calibration Date	July 29, 2014	Previous Calibration	June 23, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:40	End Time (MST)	15:04
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153485

Calibration Data

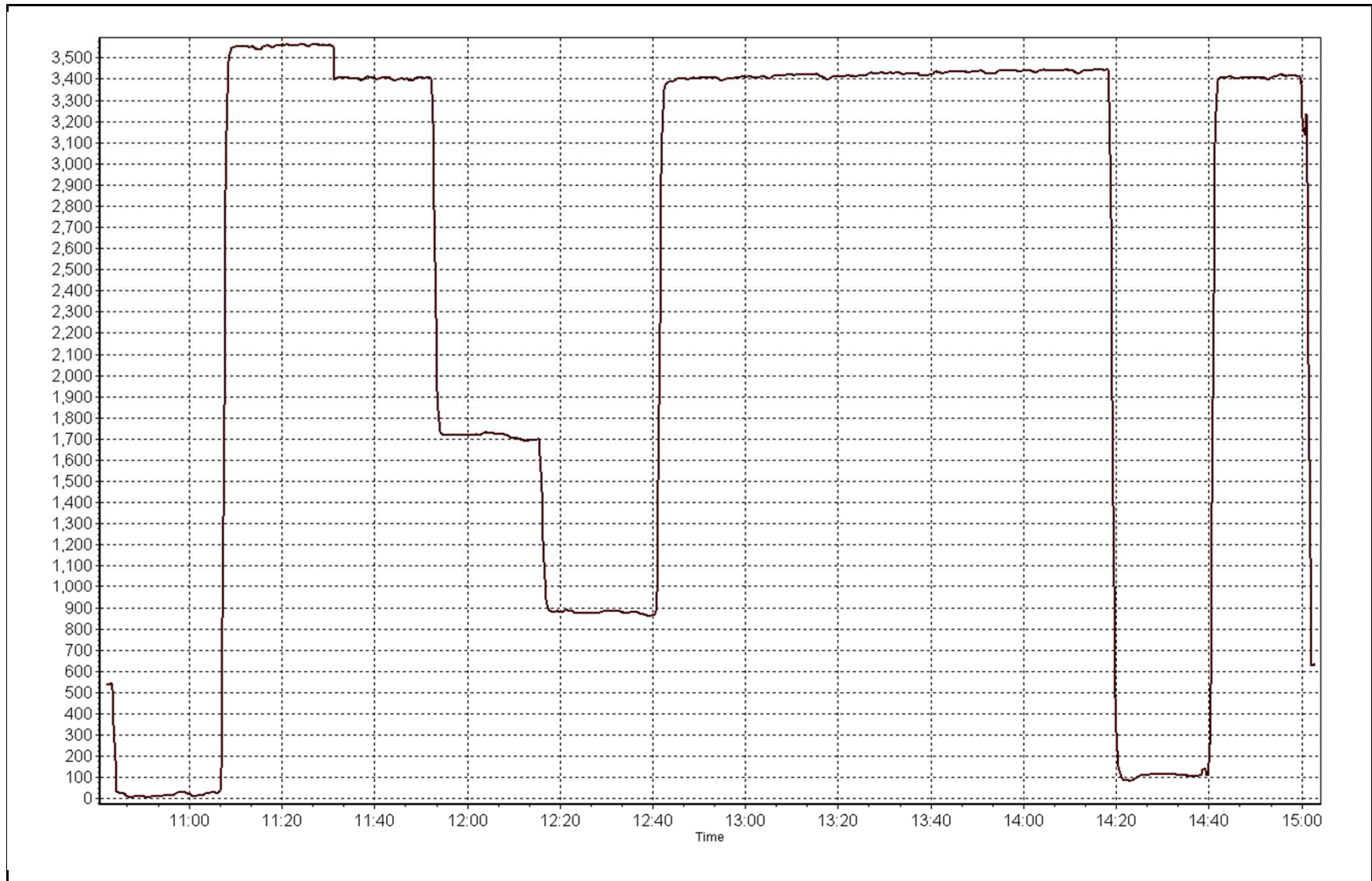
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.11	N/A	Correlation Coefficient	0.999988
16.98	17.01	0.9984		
8.50	8.55	0.9943	Slope	1.005976
4.25	4.38	0.9698		
			Intercept	-0.124907

THC Calibration Curve



THC Calibration Plot

Date: July 29, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 29, 2014	Previous Calibration	June 23, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:40	End Time (MST)	15:05
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

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	1.000439	1.000524	1.004235
	Data Offset	1.528209	1.711930	-0.653980
After	Data Slope	0.999212	0.993312	1.010856
	Data Offset	3.405107	4.936362	-0.218384
Channel #		3	2	1
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model API T200 Analyzer serial # 724

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	1.291	ppb	1.339	ppb
NOx coefficient	1.288	ppb	1.332	ppb
NO2 coefficient	n/a	ppb	n/a	ppb
NO bkgrnd	0.5		0.5	
NOx bkgrnd	1.2		1.2	
Nt coefficient	n/a		n/a	
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.1	Deg C	317.0	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	87.0	ccm	86.0	ccm
R Cell Press	3.1	mmHg	3.0	mmHg
Sample Flow	488	ccm	492	ccm

Notes:

Span adjusted. As found zero used as calibrator zero



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

July 29, 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	-0.3	-0.4	0.3	N/A	N/A
as found span	5000	78.7	807.5	805.9	1.6	781.6	779.0	3.0	1.0330	1.0345
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.4	0.3	N/A	N/A
high point	5000	78.7	807.5	805.9	1.6	806.8	809.5	-2.1	1.0008	0.9955
second point	5000	39.4	404.2	403.5	0.8	397.8	395.9	1.2	1.0162	1.0191
third point	5000	19.7	202.1	201.7	0.4	197.0	195.7	0.9	1.0259	1.0309
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	0.4	0.6	0.3	N/A	N/A
as left span	5000	78.1	801.3	511.3	290.1	784.5	712.8	271.9	1.0214	0.7173
Average Correction Factor									1.0143	1.0152

Corrected As found

NO_x= 781.9

NO= 779.4

Percent Change

NO_x= 3.0%

NO= 3.1%

Previous Response

NO_x= 805.6

NO= 803.8

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			0.3			N/A	
1st NO ₂ (300)	N/A	511.3	293.3	802.4	511.3	290.9	0.9907	1.0000	1.0081	99.2%
2nd NO ₂ (200)	N/A	606.3	198.2	801.4	606.3	195.2	0.9919	1.0000	1.0156	98.5%
3rd NO ₂ (100)	N/A	700.8	103.7	803.7	700.8	103.3	0.9891	1.0000	1.0039	99.6%
4th NO ₂ (0)	804.5	N/A	0.5	805.0	804.5	1.2	0.9875	1.0000	N/A	N/A
Average Correction Factor							0.9898	1.0000	1.0092	99.1%

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

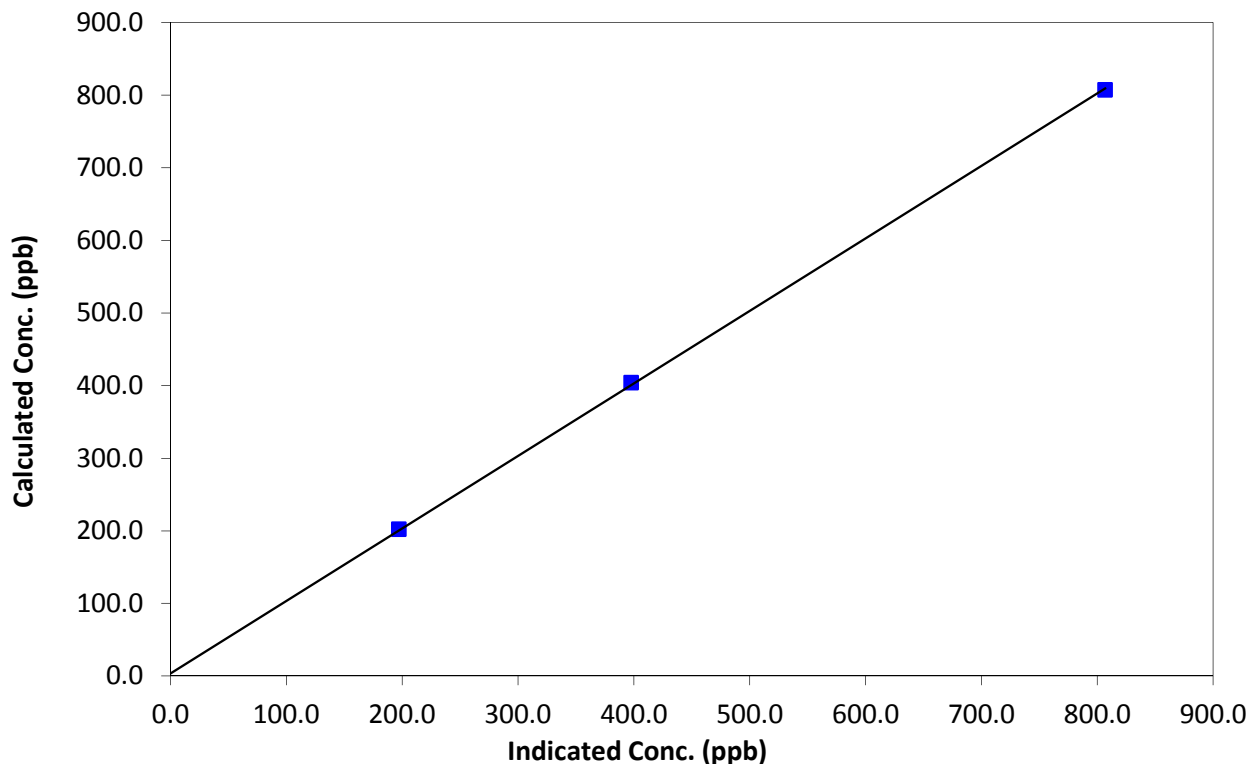
Station Information

Calibration Date	July 29, 2014	Previous Calibration	June 23, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:40	End Time (MST)	15:05
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	-0.3	N/A	Correlation Coefficient	0.999919
807.5	806.8	1.0008		
404.2	397.8	1.0162	Slope	0.999212
202.1	197.0	1.0259		
			Intercept	3.405107

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

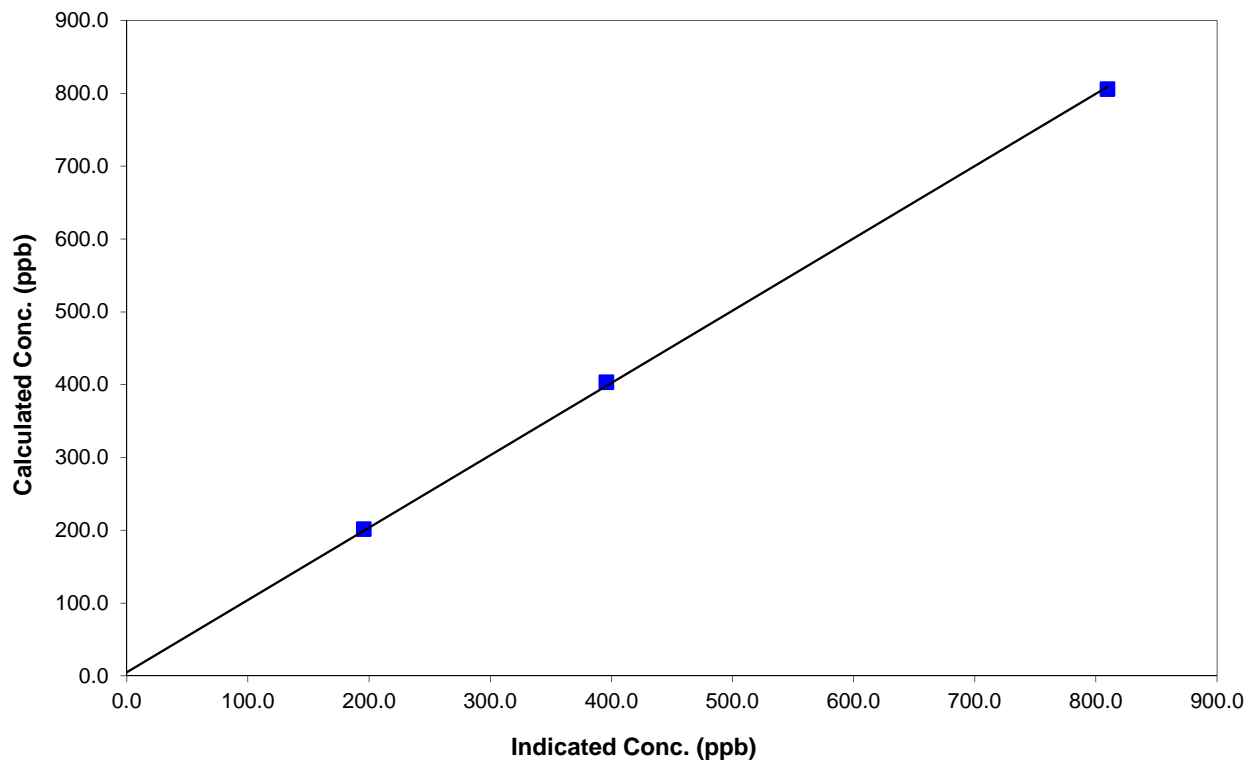
Station Information

Calibration Date	July 29, 2014	Previous Calibration	June 23, 2014
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:40	End Time (MST)	15:05
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	-0.4	N/A	Correlation Coefficient	0.999820
805.9	809.5	0.9955		
403.5	395.9	1.0191	Slope	0.993312
201.7	195.7	1.0309		
			Intercept	4.936362

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

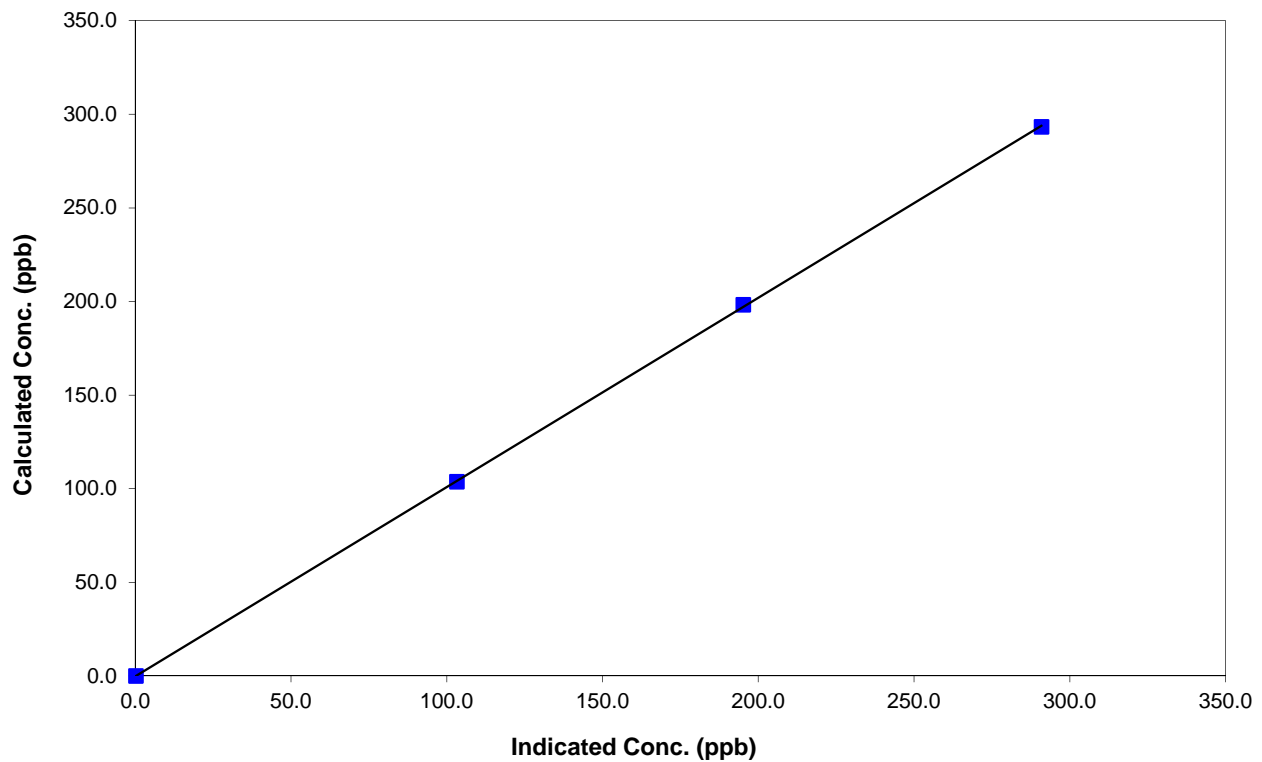
Station Information

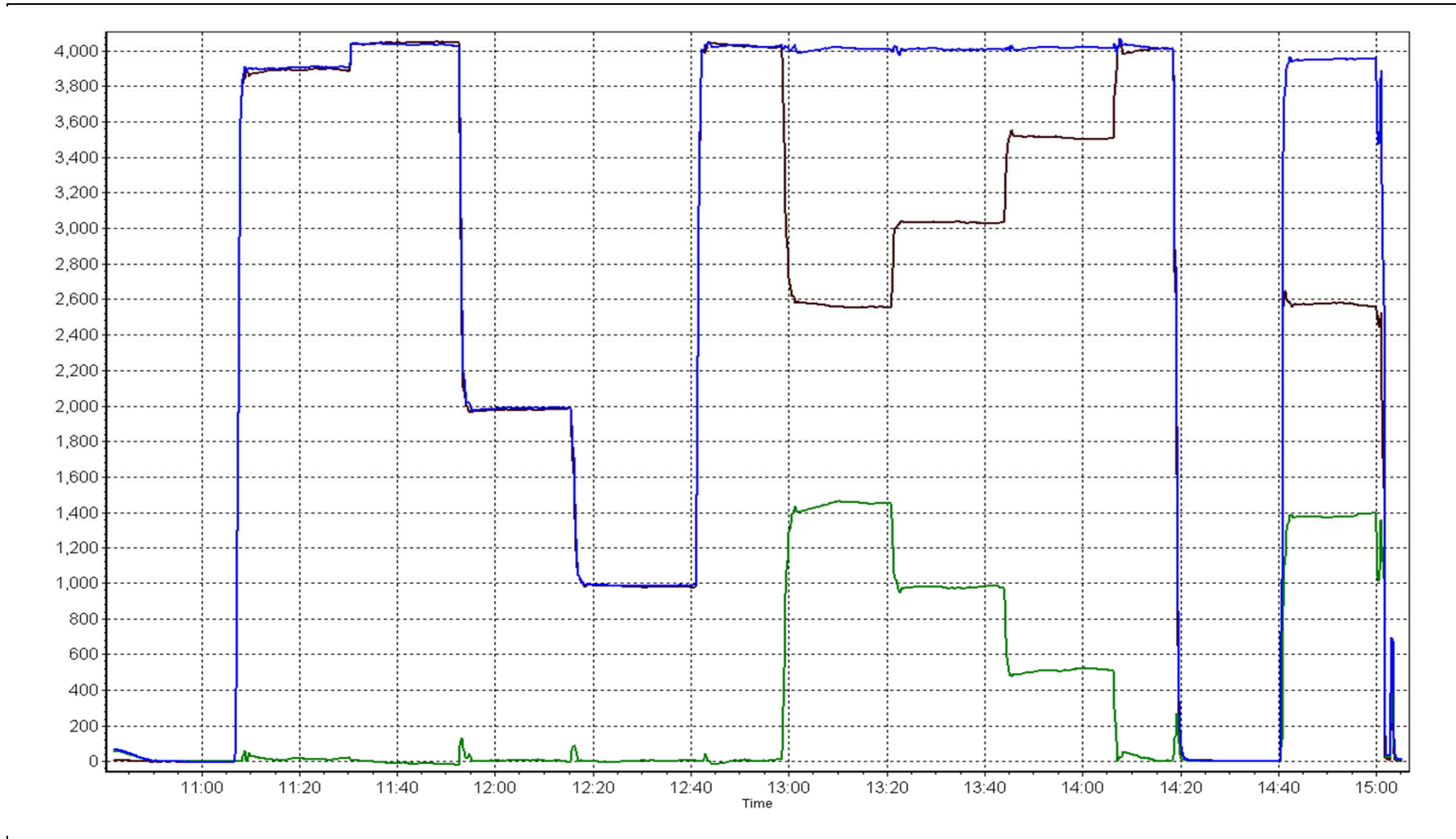
Calibration Date	July 29, 2014	Previous Calibration	June 23, 2014
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:40	End Time (MST)	15:05
Analyzer make	API T200	Analyzer serial #	724

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999959
293.3	290.9	1.0081		
198.2	195.2	1.0156	Slope	1.010856
103.7	103.3	1.0039		
			Intercept	-0.218384

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 17 WAPASU JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)

JULY 2014

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	705	36	39	99.60	27	0	4	0
H2S (ppb) Average	707	34	37	99.60	5	0	1	0
THC (ppm) Average	704	36	40	99.46	2.7	-	2.3	-
O3 (ppb) Average	708	36	36	100.00	76	0	43	-
NO2 (ppb) Average	703	36	41	99.33	13	0	4	-
NO (ppb) Average	703	36	41	99.33	8	-	2	-
NOX (ppb) Average	703	36	41	99.33	19	-	5	-
PM2.5 (ug/m3) Average	743	0	1	99.87	180.4	-	33.2	3
Temperature 2 m (C) Average	744	0	0	100.00	31.9	-	24	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	-	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	20	-	-	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
 JULY 2014

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	705	1	2	-	0	0	0	0	1	2	27
H2S (ppb) Average	707	0.3	0	-	0	0	0	0	0	0	5
THC (ppm) Average	704	2.13	0.1	-	1.9	2	2.1	2.1	2.2	2.3	2.7
O3 (ppb) Average	708	28.5	12	-	1	12	20	29	37	43	76
NO2 (ppb) Average	703	1.6	2	-	0	0	0	1	2	4	13
NO (ppb) Average	703	0.7	1	-	0	0	0	1	1	1	8
NOX (ppb) Average	703	2.3	3	-	0	1	1	1	3	5	19
PM2.5 (ug/m3) Average	743	15	15.7	-	1.3	3.7	6.1	9.5	18.1	35.4	180.4
Temperature 2 m (C) Average	744	18.47	5.5	-	1.9	11.3	14.9	18.6	22.3	25.3	31.9
Relative Humidity (%) Average	744	64.2	21	-	19	36	47	63	84	93	99
Wind Speed 10 m (km/h) Average	744	7.5	4	-	0	3	5	7	10	13	20
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)

JULY 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	06 Jul 2014 09:00	06 Jul 2014 09:00	1	Maintenance on daily auto zero and span system
SO2	08 Jul 2014 13:00	08 Jul 2014 13:00	1	Maintenance on daily auto zero and span system
SO2	15 Jul 2014 08:00	15 Jul 2014 08:00	1	Maintenance - sample manifold cleaned
H2S	04 Jul 2014 02:00	04 Jul 2014 02:00	1	Power spike
H2S	06 Jul 2014 09:00	06 Jul 2014 09:00	1	Maintenance on daily auto zero and span system
H2S	08 Jul 2014 13:00	08 Jul 2014 13:00	1	Maintenance on daily auto zero and span system
THC	06 Jul 2014 09:00	06 Jul 2014 09:00	1	Maintenance on daily auto zero and span system
THC	08 Jul 2014 13:00	08 Jul 2014 13:00	1	Maintenance on daily auto zero and span system
THC	15 Jul 2014 08:00	15 Jul 2014 08:00	1	Maintenance - sample manifold cleaned
THC	27 Jul 2014 15:00	27 Jul 2014 15:00	1	Power spike
NO2, NO, NOX	04 Jul 2014 11:00	04 Jul 2014 11:00	1	Maintenance on daily auto zero and span system
NO2, NO, NOX	06 Jul 2014 09:00	06 Jul 2014 09:00	1	Maintenance on daily auto zero and span system
NO2, NO, NOX	08 Jul 2014 13:00	08 Jul 2014 13:00	1	Maintenance on daily auto zero and span system
NO2, NO, NOX	15 Jul 2014 08:00	15 Jul 2014 08:00	1	Maintenance - sample manifold cleaned
NO2, NO, NOX	21 Jul 2014 10:00	21 Jul 2014 10:00	1	Power spike
PM2.5	15 Jul 2014 09:00	15 Jul 2014 09:00	1	Maintenance - Flow and zero check, sample head cleaning

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Summary of Hour Averages

Wapasu - July 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 27 ppb on Jul 5 09:00	Maximum Daily Average: 4.2 ppb on Jul 5		Hours of Data:	705
Minimum Value: 0 ppb on Jul 4 00:00	Minimum Daily Average: 0.2 ppb on Jul 24		Hours of Missing Data:	39
Maximum Diurnal Average: 2.5 ppb at hour 9	Minimum Diurnal Average: 0.4 ppb at hour 24		Hours of Calibration:	36
Monthly Average: 1.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 11		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-Jul	0	Z	0	0	0	0	0	0	4	11	10	7	6	5	2	1	1	1	1	0	0	1	1	0	2.3	11
2-Jul	0	Z	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
3-Jul	0	Z	1	1	1	2	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.3	2
4-Jul	0	Z	0	0	1	2	4	4	6	6	4	0	0	0	2	1	2	2	1	0	0	0	1	3	1.7	6
5-Jul	3	Z	2	2	2	2	15	18	27	11	8	4	0	0	0	0	0	0	0	0	0	0	0	0	4.2	27
6-Jul	1	Z	0	0	0	1	0	0	M	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Jul	0	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
8-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	M	0	1	1	0	0	0	0	0	0	0	0	0.3	1
9-Jul	0	Z	1	0	0	0	0	1	1	1	1	2	0	0	0	1	0	0	0	3	2	1	0	0	0.8	3
10-Jul	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
11-Jul	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Jul	0	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
13-Jul	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.4	1
14-Jul	0	Z	0	0	1	1	1	1	0	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0.5	1
15-Jul	0	Z	0	0	0	0	1	M	5	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1.1	5
16-Jul	1	Z	3	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	7	2	0	0	1.1	7
17-Jul	0	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
18-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	1	0	0.5	4
19-Jul	0	Z	0	0	0	0	0	2	5	9	4	1	0	0	0	0	0	0	0	0	0	0	0	0	1.0	9
20-Jul	0	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-Jul	0	Z	0	0	0	0	0	0	0	0	0	1	4	6	4	6	7	8	7	3	1	1	1	0	2.2	8
22-Jul	1	Z	0	3	4	2	1	1	3	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1.1	4
23-Jul	0	Z	1	1	1	3	10	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.9	10
24-Jul	0	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-Jul	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
26-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.4	1
27-Jul	0	Z	1	1	2	1	2	14	11	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1.7	14
28-Jul	1	Z	1	0	0	0	0	0	0	0	0	0	1	6	9	4	2	2	6	4	2	1	1	0	1.8	9
29-Jul	0	Z	1	2	2	6	10	6	1	0	1	2	1	0	1	2	5	5	6	4	0	0	0	0	2.5	10
30-Jul	1	Z	1	1	3	4	2	1	1	1	0	0	1	1	0	1	1	1	1	1	0	0	0	0	0.9	4
31-Jul	0	Z	0	0	0	0	1	4	6	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.9	6

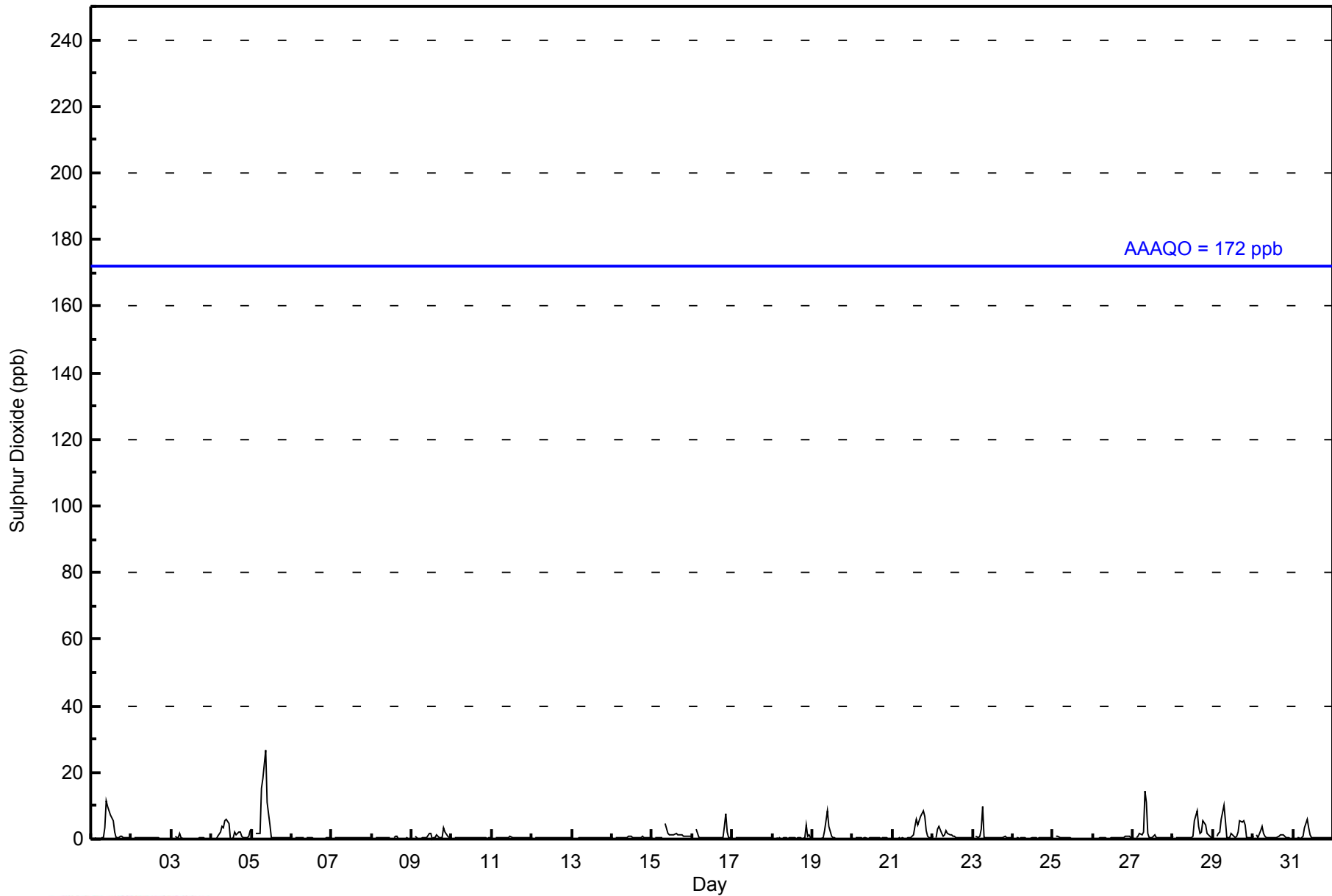
0.5	--	0.6	0.6	0.7	0.9	1.7	1.9	2.5	1.8	1.3	0.9	0.7	0.8	1.0	0.7	0.8	0.9	1.0	1.0	0.9	0.5	0.4	0.4	Diurnal Average	
3	--	3	3	4	6	15	18	27	11	10	7	6	6	9	4	6	7	8	7	7	2	1	3	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Wapasu - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	698	99.01	99.01
11 - 20	6	0.85	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - July 2014

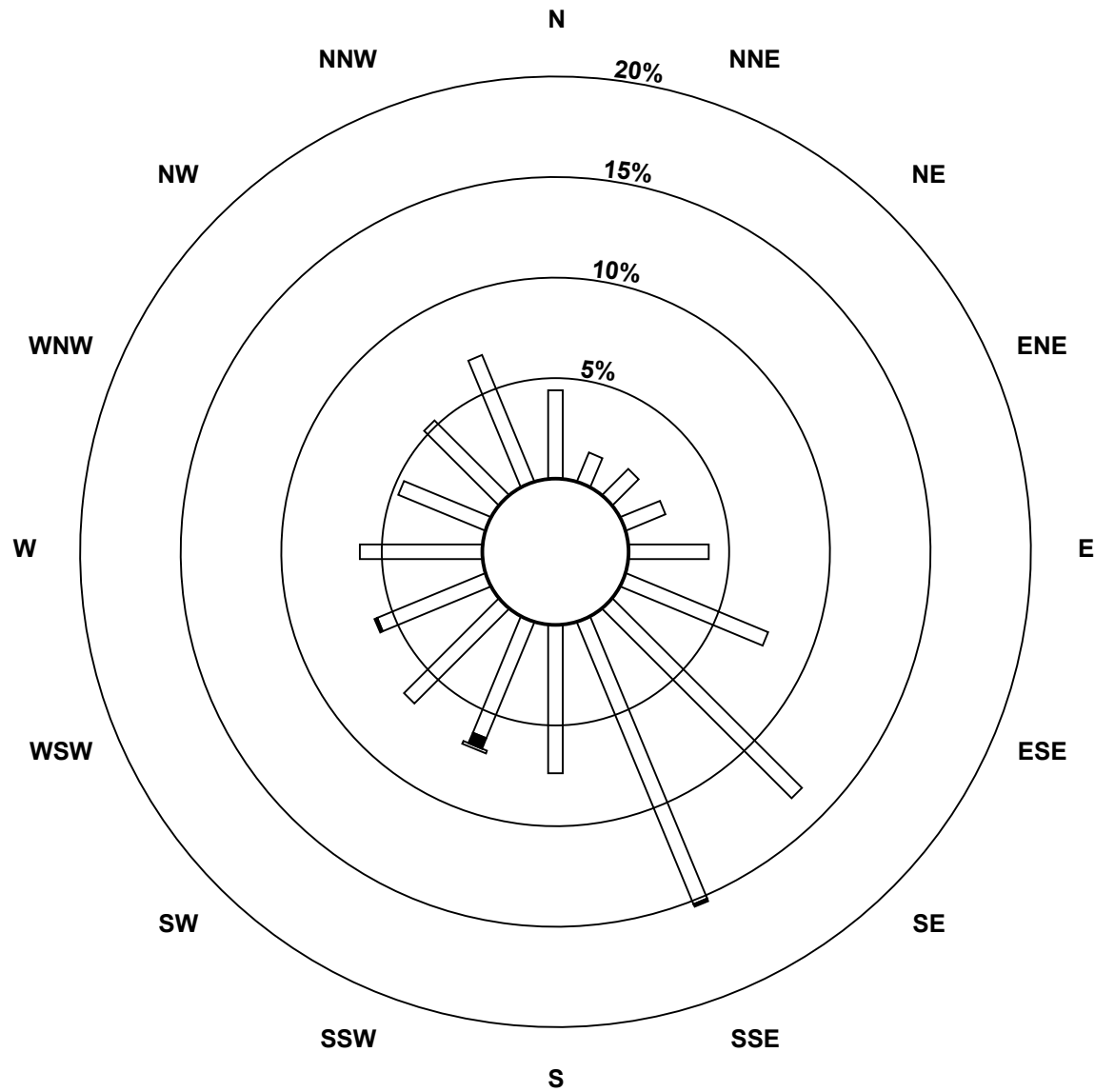
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	31	11	13	15	28	54	94	107	52	44	47	41	43	33	37	48	698
11 - 20	0	0	0	0	0	0	0	1	0	4	0	1	0	0	0	0	6
21 - 60	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	31	11	13	15	28	54	94	108	52	49	47	42	43	33	37	48	705

Total Number of Valid Hours: 705

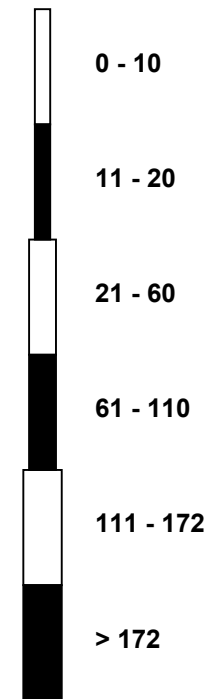
Total Number of Hours: 744

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

**Sulphur Dioxide (SO₂) - ppb
Wapasu (AMS 17)**



Classes (ppb)



Total Number of Valid Hours: 705

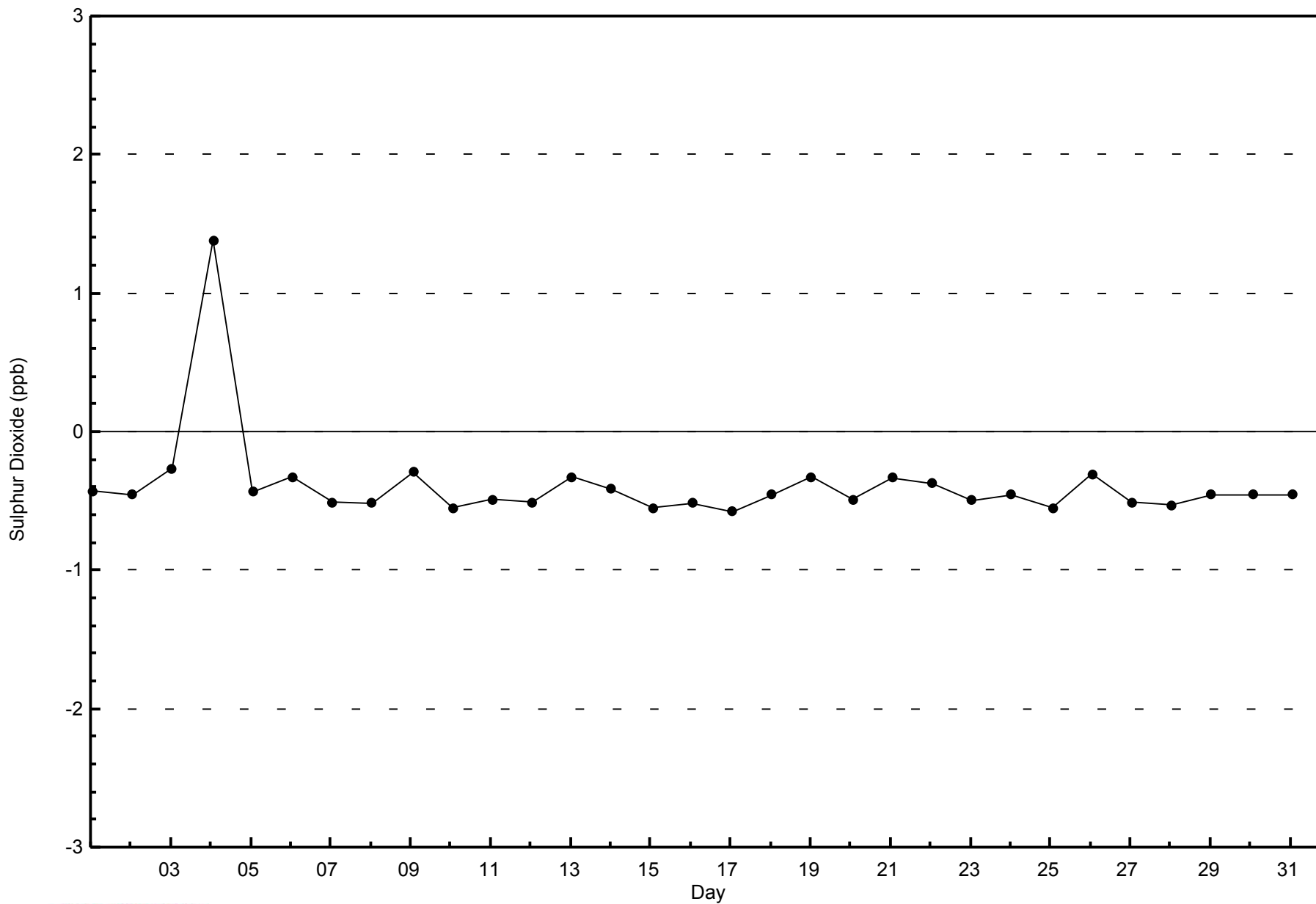


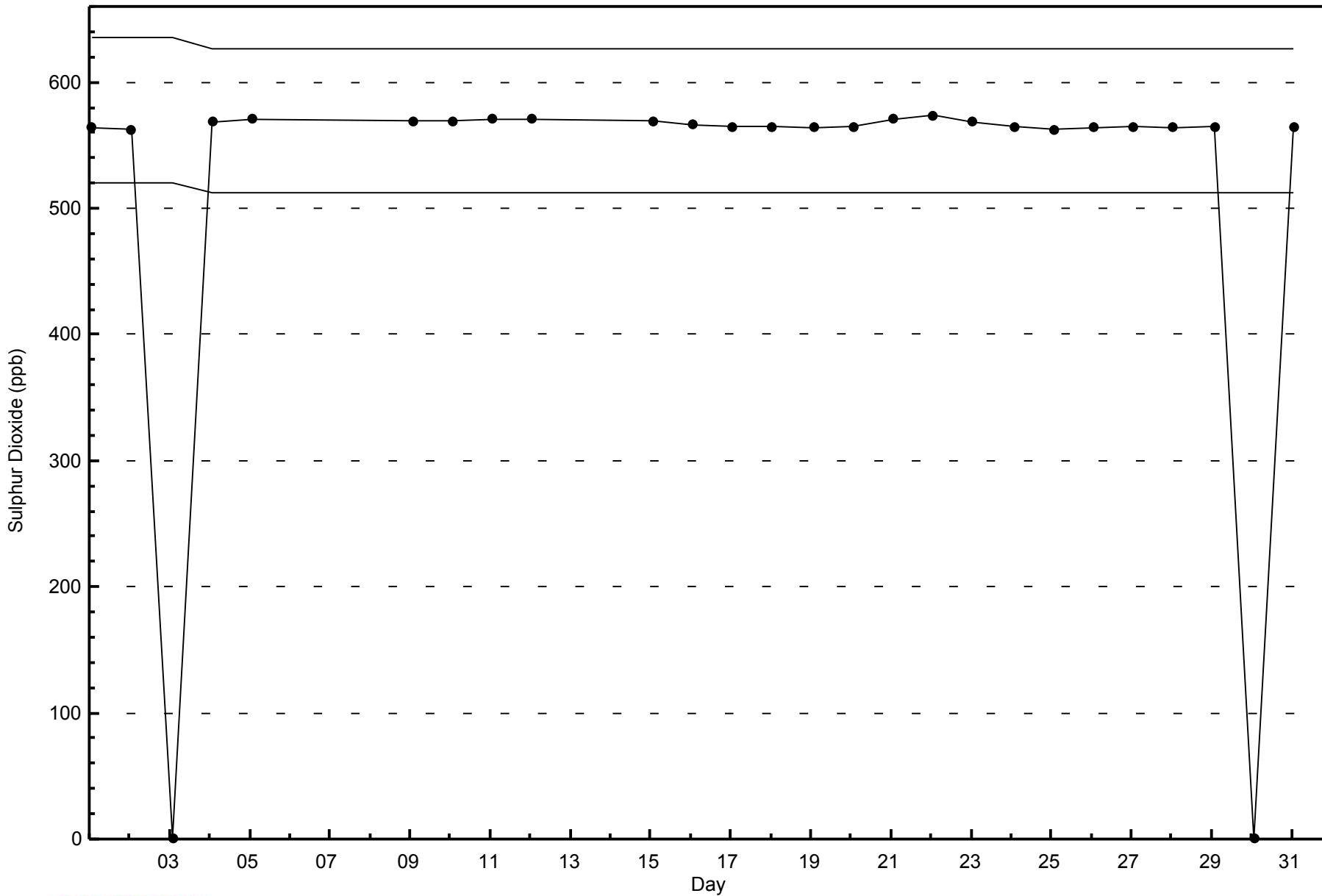
WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

Wapasu - July 2014







Summary of Hour Averages

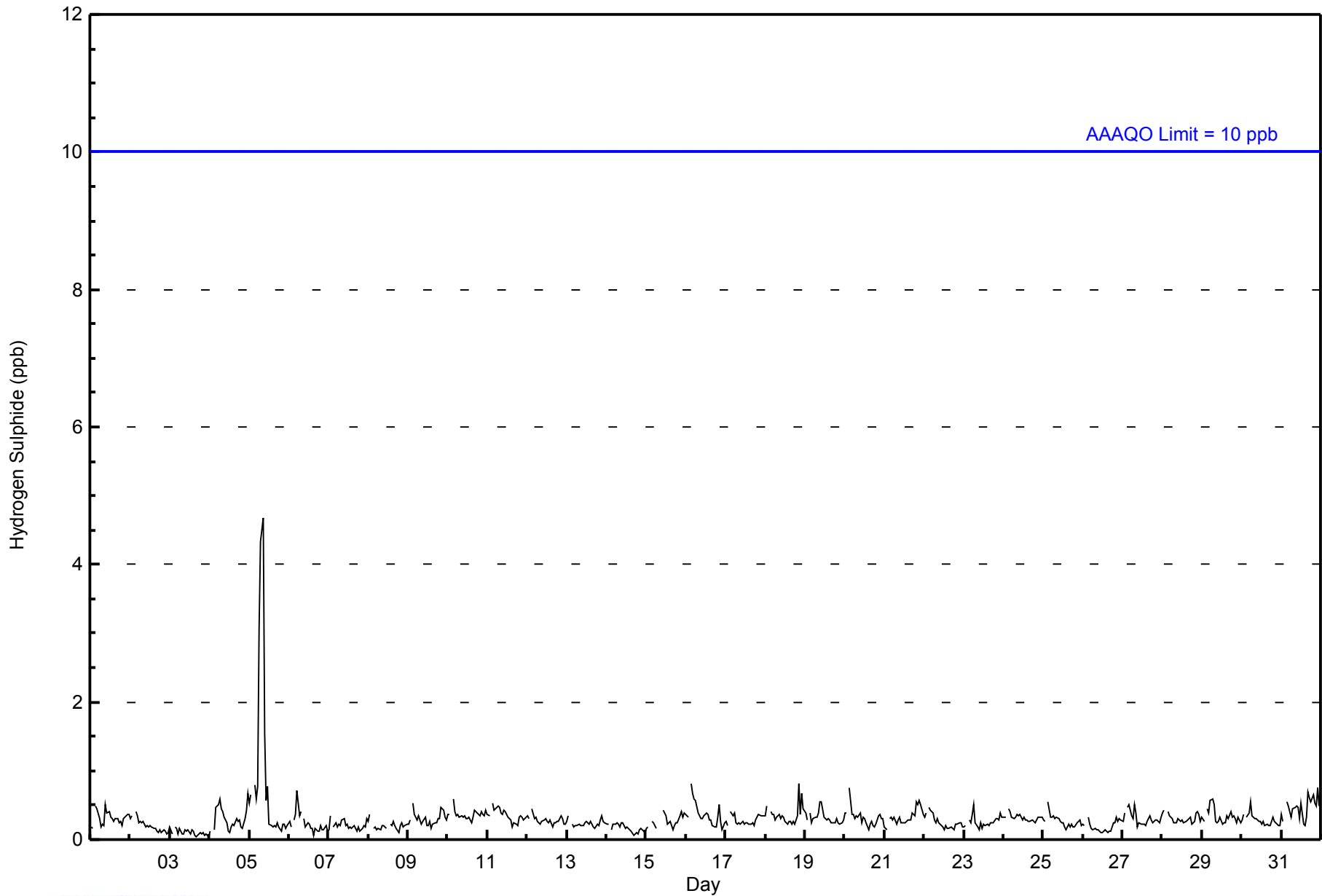
Wapasu - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 5 ppb on Jul 5 09:00										Maximum Daily Average: 0.9 ppb on Jul 5										Hours of Data: 707						
Minimum Value: 0 ppb on Jul 3 17:00										Minimum Daily Average: 0.1 ppb on Jul 3										Hours of Missing Data: 37						
Maximum Diurnal Average: 0.4 ppb at hour 9										Minimum Diurnal Average: 0.2 ppb at hour 15										Hours of Calibration: 34						
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-Jul	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
2-Jul	0	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-Jul	0	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-Jul	0	PF	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
5-Jul	1	1	Z	1	1	1	3	4	5	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.9	5
6-Jul	0	0	Z	0	0	1	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
7-Jul	0	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-Jul	0	0	Z	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Jul	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
10-Jul	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
11-Jul	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
12-Jul	0	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-Jul	0	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-Jul	0	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-Jul	0	0	Z	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
16-Jul	0	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1
17-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
18-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0.4	1
19-Jul	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
20-Jul	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
21-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.3	1
22-Jul	0	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-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Jul	0	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-Jul	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
26-Jul	0	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-Jul	0	0	Z	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
28-Jul	0	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-Jul	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
30-Jul	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
31-Jul	0	0	Z	1	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	1	0	1	0.5	1
0.3 0.3 -- 0.4 0.4 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 0.3 0.3 0.3 0.3 0.3																								Diurnal Average		
1 1 -- 1 1 1 3 4 5 2 1 1 1 1 0 0 0 0 1 1 1 1 1 1 1																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



WBEA NETWORK
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Wapasu - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	704	99.58	99.58
3 - 4	2	0.28	99.86
5 - 7	1	0.14	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - July 2014

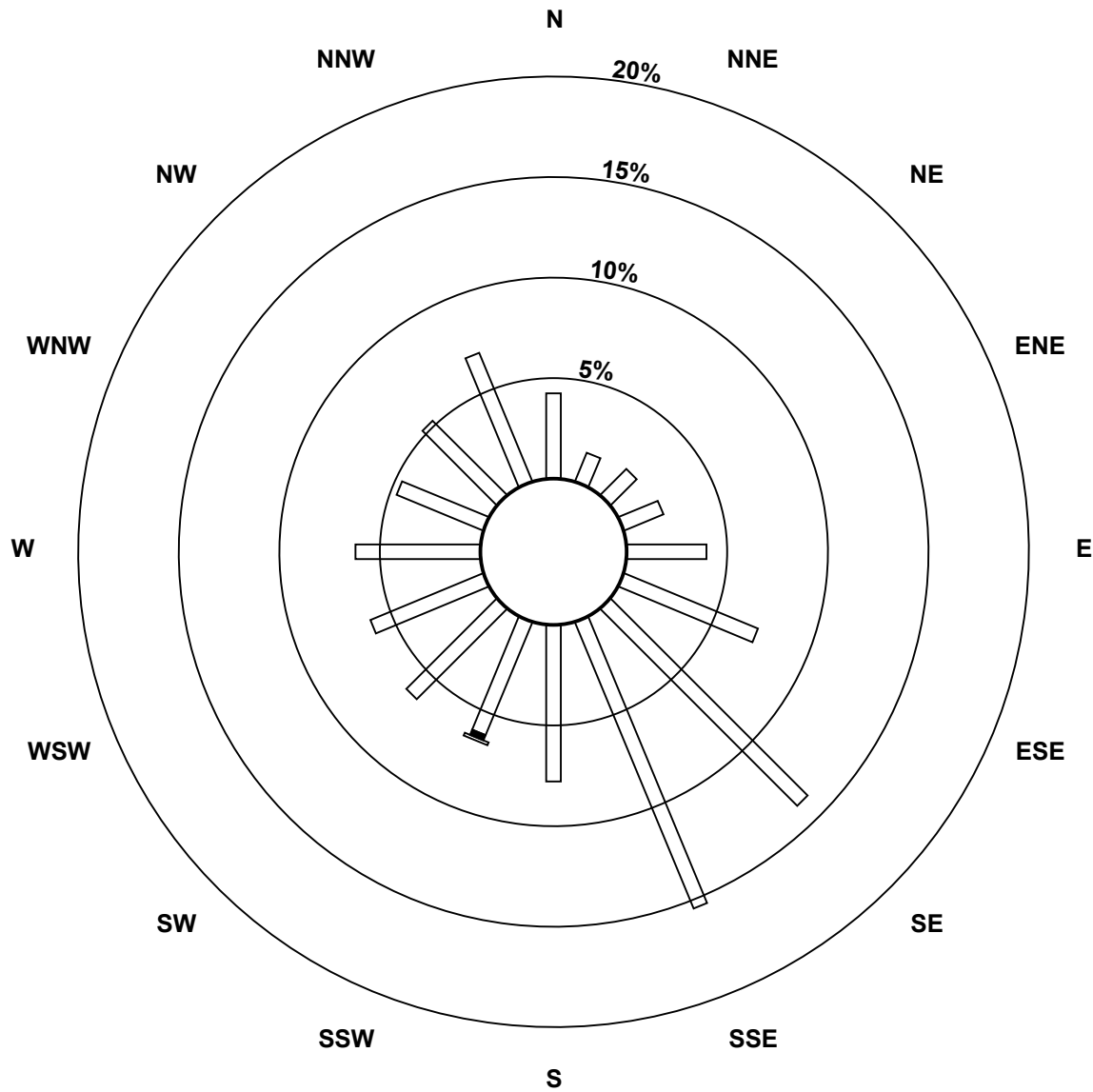
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	30	11	13	15	28	51	98	109	55	43	45	43	44	33	37	49	704
3 - 4	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
5 - 7	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	30	11	13	15	28	51	98	109	55	46	45	43	44	33	37	49	707

Total Number of Valid Hours: 707

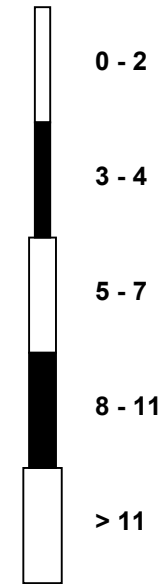
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Hydrogen Sulphide (H₂S) - ppb
Wapasu (AMS 17)



Classes (ppb)



Total Number of Valid Hours: 707

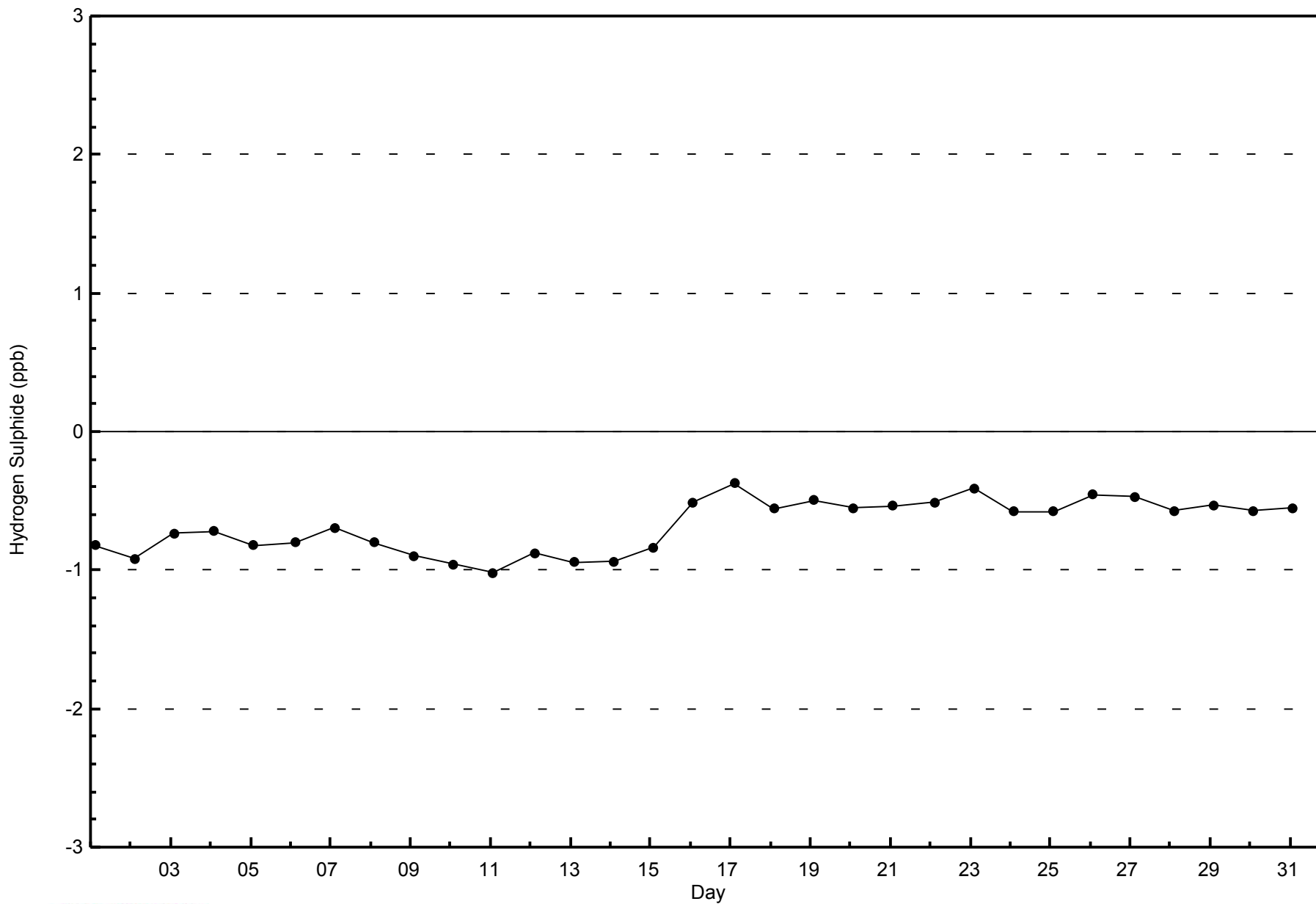


WBEA NETWORK

Zero Responses

Hydrogen Sulphide (H₂S) - ppb

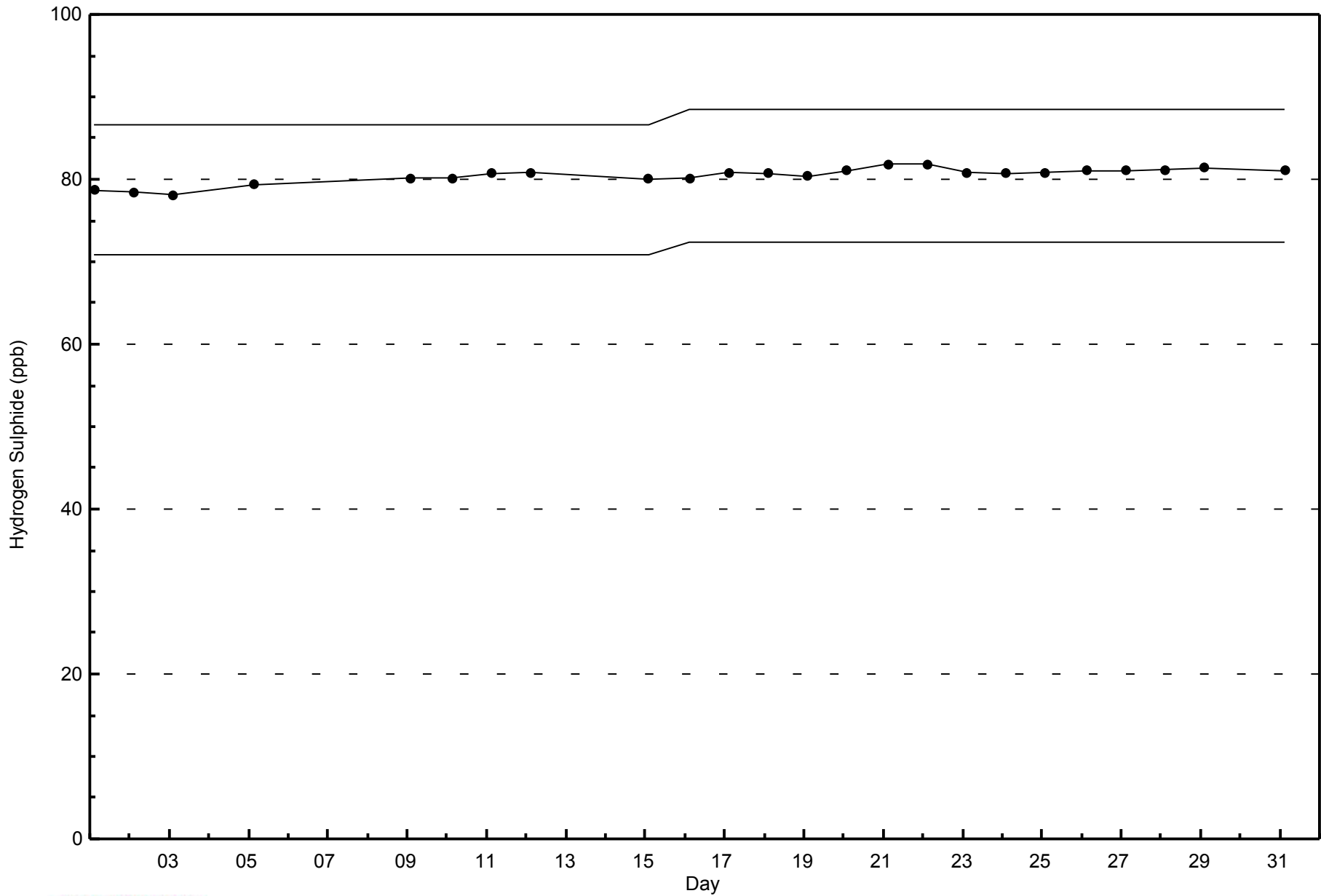
Wapasu - July 2014





WBEA NETWORK
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Wapasu - July 2014





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

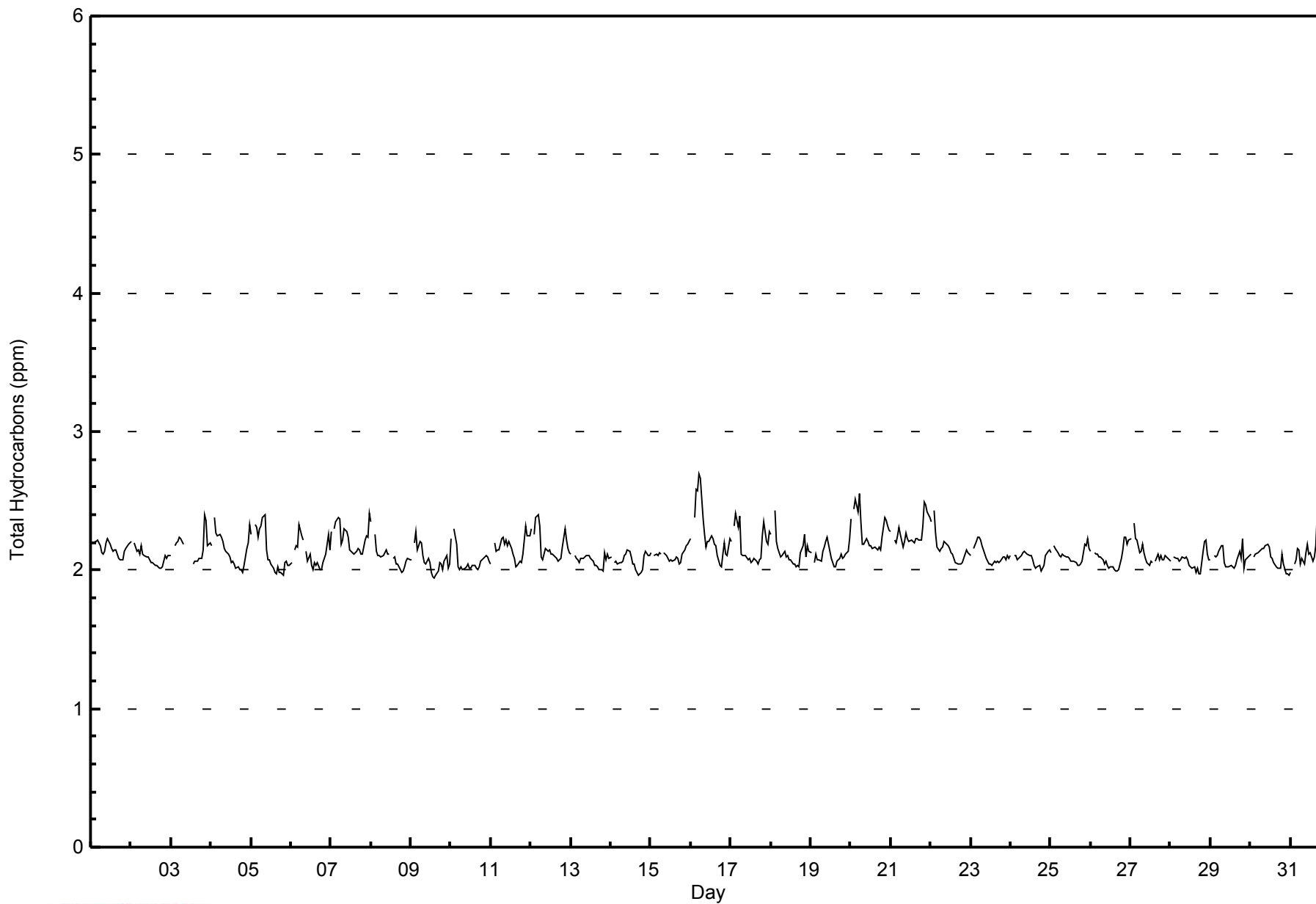
Wapasu - July 2014

Maximum Value: 2.7 ppm on Jul 16 06:00																	Maximum Daily Average: 2.3 ppm on Jul 20																	Hours in Service: 744	
Minimum Value: 1.9 ppm on Jul 9 15:00																	Minimum Daily Average: 2.1 ppm on Jul 14																	Hours of Data: 704	
Maximum Diurnal Average: 2.2 ppm at hour 3																	Minimum Diurnal Average: 2.1 ppm at hour 16																	Hours of Missing Data: 40	
Monthly Average: 2.13 ppm																	Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.5																	Hours of Calibration: 36	
																																		Percent Operational Time: 99.5	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Jul	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2									
2-Jul	2.2	Z	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1									
3-Jul	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	C	C	C	C	C	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.4	2.2	2.2	2.2	2.2									
4-Jul	2.2	Z	2.4	2.3	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.3	2.1									
5-Jul	2.3	Z	2.3	2.3	2.2	2.3	2.3	2.4	2.4	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.4									
6-Jul	2.0	Z	2.1	2.2	2.2	2.3	2.2	2.2	M	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.3	2.1	2.1	2.3									
7-Jul	2.3	Z	2.3	2.4	2.4	2.4	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.3	2.2	2.4	2.2	2.4									
8-Jul	2.3	Z	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	M	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1									
9-Jul	2.1	Z	2.2	2.3	2.1	2.2	2.2	2.1	2.1	2.0	2.1	2.1	2.0	2.0	1.9	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.3									
10-Jul	2.2	Z	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	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3									
11-Jul	2.0	Z	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.2	2.3									
12-Jul	2.3	Z	2.3	2.4	2.4	2.3	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.1	2.2	2.4									
13-Jul	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1									
14-Jul	2.1	Z	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1									
15-Jul	2.1	Z	2.1	2.1	2.1	2.1	2.1	M	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2									
16-Jul	2.2	Z	2.4	2.6	2.6	2.7	2.7	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.1	2.2	2.1	2.1	2.2	2.3	2.7									
17-Jul	2.2	Z	2.3	2.4	2.3	2.4	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	2.2	2.3	2.2	2.2	2.3	2.2	2.4									
18-Jul	2.3	Z	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.1	2.2	2.1	2.1	2.4									
19-Jul	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2									
20-Jul	2.4	Z	2.4	2.5	2.4	2.6	2.4	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	2.4	2.4	2.3	2.3	2.3	2.6									
21-Jul	2.3	Z	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.5	2.4	2.4	2.3	2.5									
22-Jul	2.4	Z	2.4	2.3	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.4									
23-Jul	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2									
24-Jul	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1									
25-Jul	2.1	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.2									
26-Jul	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2									
27-Jul	2.2	Z	2.3	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.0	2.1	2.0	PF	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3									
28-Jul	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.1	2.1	2.1	2.2									
29-Jul	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.0	2.1	2.1	2.1	2.1	2.2									
30-Jul	2.1	Z	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	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.2									
31-Jul	2.0	Z	2.0	2.1	2.2	2.1	2.0	2.1	2.0	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.4	2.4	2.3	2.2	2.2	2.3	2.4	2.2	2.2	2.4									
	2.2	--	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	Diurnal Average									
	2.4	--	2.4	2.6	2.6	2.7	2.7	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.3	2.3	2.5	2.5	2.4	2.4	2.4	Diurnal Maximum									
Z - zerospan			C - Calibration				M - Maintenance				PF - Power Failure																								



WBEA NETWORK
Hourly Averages

Total Hydrocarbons (THC) - ppm
Wapasu - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	144	20.45	20.45
2.1 - 3.0	560	79.55	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - July 2014

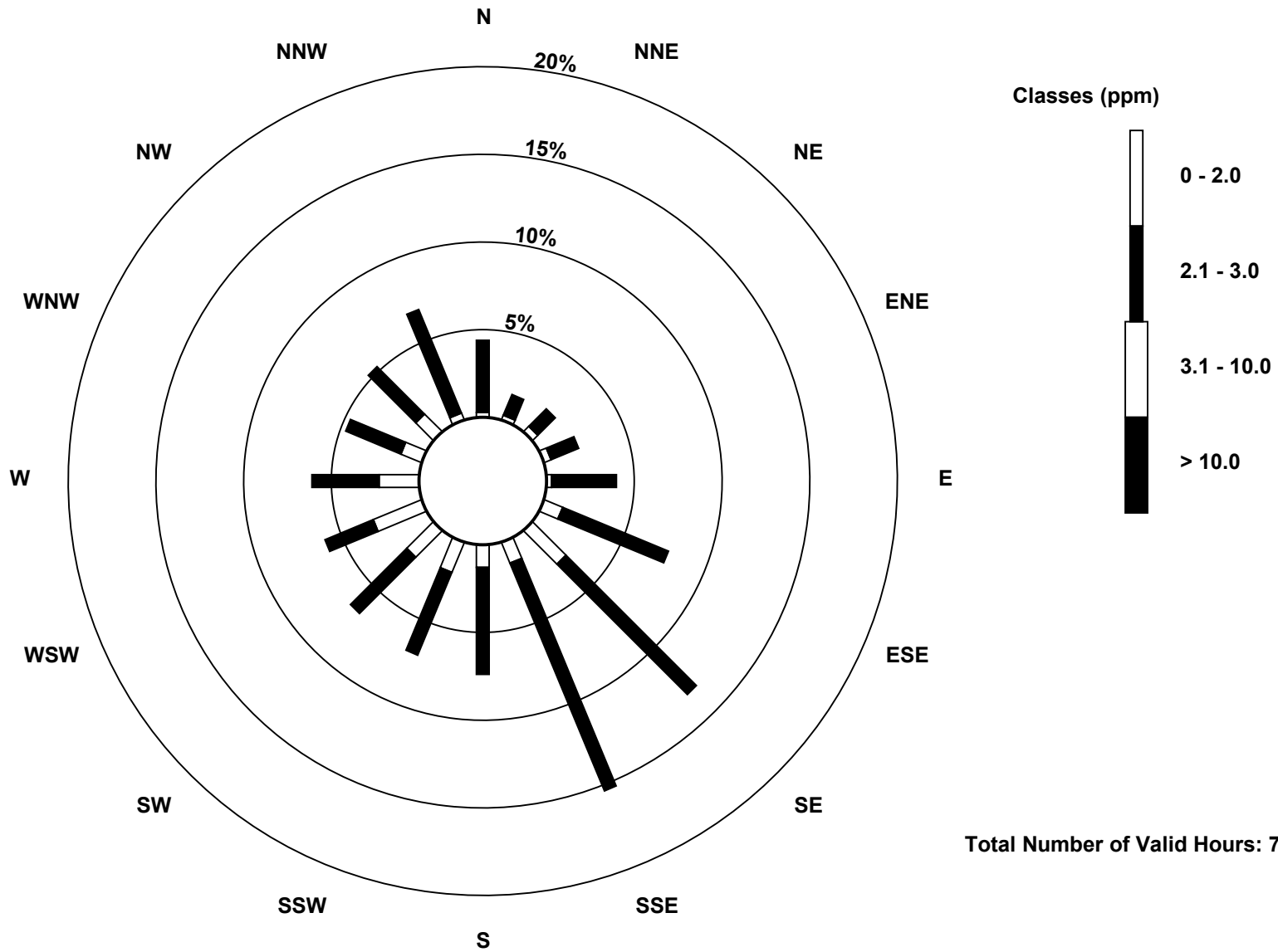
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	2	2	3	3	2	8	19	9	9	13	15	21	16	9	10	3	144
2.1 - 3.0	29	9	10	12	26	46	74	99	43	36	32	21	27	24	27	45	560
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	31	11	13	15	28	54	93	108	52	49	47	42	43	33	37	48	704

Total Number of Valid Hours: 704

Total Number of Hours: 744

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

**Total Hydrocarbons (THC) - ppm
Wapasu (AMS 17)**



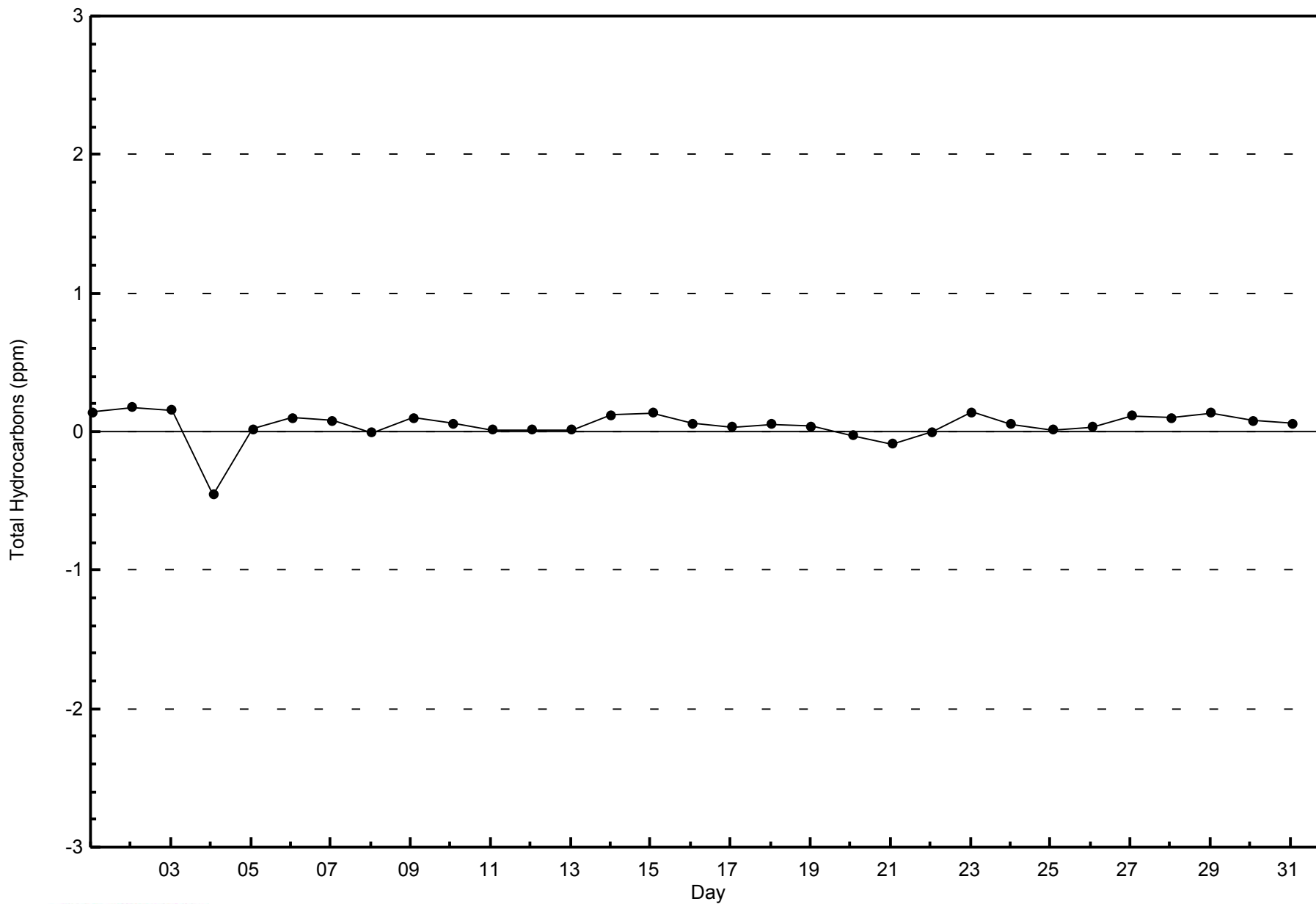


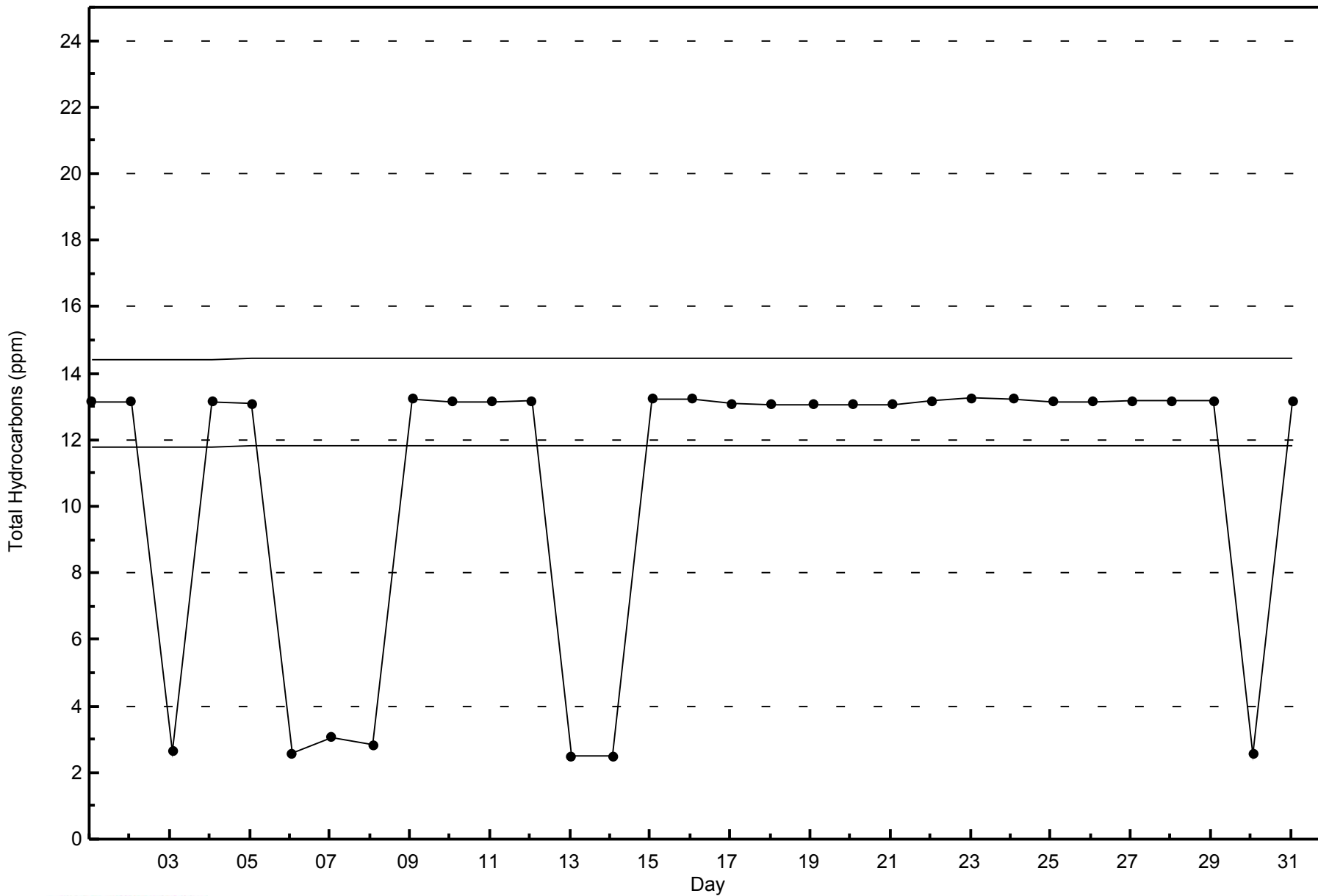
WBEA NETWORK

Zero Responses

Total Hydrocarbons (THC) - ppm

Wapasu - July 2014







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Wapasu - July 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 76 ppb on Jul 21 19:00	Maximum Daily Average: 42.8 ppb on Jul 29		Hours of Data:	708
Minimum Value: 1 ppb on Jul 7 06:00	Minimum Daily Average: 18.1 ppb on Jul 6		Hours of Missing Data:	36
Maximum Diurnal Average: 38.0 ppb at hour 18	Minimum Diurnal Average: 17.2 ppb at hour 3		Hours of Calibration:	36
Monthly Average: 28.5 ppb	Percentiles: P ₁ = 2 P ₁₀ = 12 Q ₁ = 20 Median = 29 Q ₃ = 37 P ₉₀ = 43 P ₉₉ = 63		Percent Operational Time:	100.0

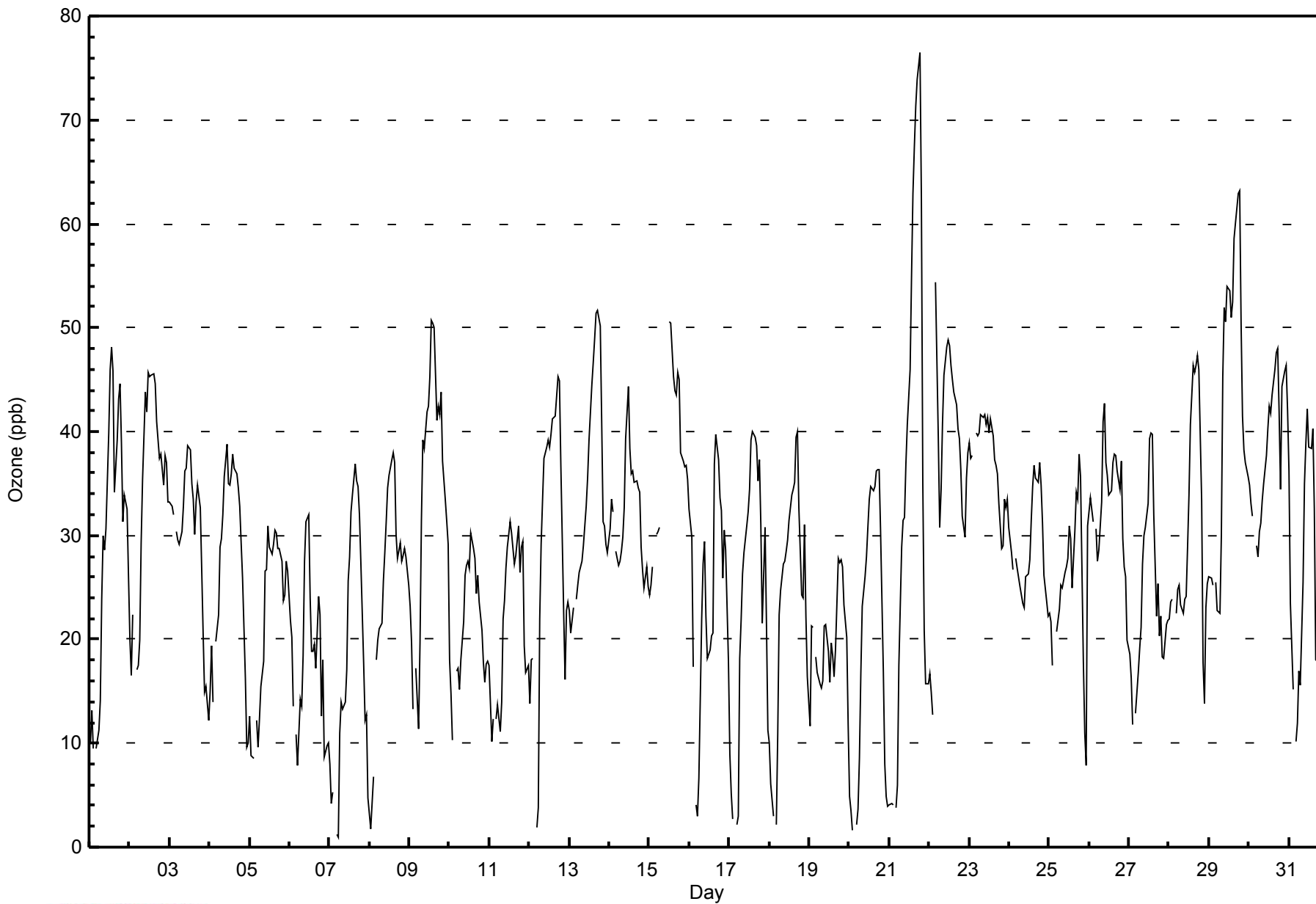
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	10	13	10	Z	10	11	14	24	30	29	31	40	46	48	46	34	39	43	45	39	31	34	33	26	29.8	48																						
2-Jul	20	17	22	Z	17	18	20	29	35	44	42	46	45	45	46	45	41	39	37	38	35	38	37	33	34.3	46																						
3-Jul	33	33	32	Z	30	30	29	30	33	36	37	39	38	35	33	30	33	35	33	27	21	15	16	12	30.0	39																						
4-Jul	15	19	14	Z	20	22	29	30	32	36	39	35	35	36	38	36	36	35	33	29	26	16	10	10	27.4	39																						
5-Jul	13	9	8	Z	12	10	12	15	18	27	27	31	29	28	29	30	30	29	29	28	24	24	27	27	22.4	31																						
6-Jul	22	20	14	Z	11	8	14	14	18	28	31	32	24	19	19	20	17	24	22	13	18	9	10	10	18.1	32																						
7-Jul	8	4	5	Z	1	1	11	14	13	14	17	26	28	32	34	37	35	35	32	27	18	12	13	5	18.4	37																						
8-Jul	3	2	7	Z	18	20	21	22	26	28	31	35	36	37	38	37	30	28	29	28	28	29	28	25	25.4	38																						
9-Jul	23	20	13	Z	17	11	20	31	39	38	42	42	45	51	50	50	41	42	42	44	37	33	31	29	34.5	51																						
10-Jul	18	15	10	Z	17	17	15	18	22	26	27	28	27	30	29	28	24	26	24	21	18	16	18	18	21.3	30																						
11-Jul	18	10	12	Z	12	14	11	14	22	24	27	29	31	30	29	27	28	31	26	29	29	19	17	18	22.1	31																						
12-Jul	14	18	18	Z	2	4	22	29	33	37	39	39	38	40	41	41	43	45	45	37	23	16	23	24	29.2	45																						
13-Jul	23	21	23	Z	24	25	26	27	29	31	33	36	39	45	47	49	51	52	50	41	31	31	29	28	34.4	52																						
14-Jul	31	33	32	Z	28	27	27	28	30	33	39	44	38	36	35	35	35	34	29	27	25	27	25	25	32.0	44																						
15-Jul	24	25	27	Z	30	30	31	C	C	C	C	C	51	50	45	44	43	46	45	38	37	37	35	35	37.6	51																						
16-Jul	33	30	17	Z	4	3	7	22	27	29	22	18	19	20	21	37	40	37	34	32	26	31	29	18	24.2	40																						
17-Jul	9	5	3	Z	2	3	18	22	26	28	31	32	34	39	40	39	39	35	37	31	21	31	21	11	24.4	40																						
18-Jul	10	6	3	Z	2	11	22	25	27	28	28	29	31	34	34	35	39	40	33	24	24	31	22	16	24.2	40																						
19-Jul	12	21	21	Z	18	17	16	15	16	21	21	19	16	20	18	16	19	28	27	28	27	23	20	12	19.7	28																						
20-Jul	5	3	2	Z	2	4	9	17	23	26	28	31	34	35	34	35	36	36	36	31	17	8	5	4	20.0	36																						
21-Jul	4	4	4	Z	4	6	18	29	31	32	37	41	46	55	63	67	71	74	76	62	35	21	16	16	35.3	76																						
22-Jul	17	15	13	Z	54	39	31	34	41	45	48	49	48	46	45	44	43	40	39	36	32	30	36	38	37.6	54																						
23-Jul	39	37	38	Z	40	40	40	42	41	42	41	41	40	41	40	37	37	36	33	29	29	34	33	34	37.4	42																						
24-Jul	31	28	27	Z	28	27	25	24	24	23	26	26	28	31	35	37	36	35	37	35	31	26	24	22	28.9	37																						
25-Jul	22	22	18	Z	21	22	23	25	25	26	27	28	31	30	25	31	34	33	38	36	18	11	8	31	25.4	38																						
26-Jul	32	34	31	Z	31	27	29	33	41	43	37	36	34	34	37	38	38	36	34	37	30	27	26	20	33.3	43																						
27-Jul	19	16	12	Z	13	17	19	21	27	30	31	33	39	40	40	32	22	25	20	22	18	18	21	22	24.3	40																						
28-Jul	22	24	24	Z	23	25	25	23	22	24	24	29	34	41	46	46	46	47	46	33	18	14	23	25	29.8	47																						
29-Jul	26	26	25	Z	25	23	22	30	45	52	51	54	54	51	53	59	60	63	63	50	42	38	37	36	42.8	63																						
30-Jul	35	33	32	Z	29	28	30	31	33	35	38	40	42	42	43	46	48	48	42	34	44	46	46	42	38.6	48																						
31-Jul	36	23	15	Z	10	12	17	16	25	35	39	42	39	38	40	33	18	18	16	13	12	12	13	14	23.3	42																						
																								20.2	18.9	17.2	--	17.9	17.8	21.1	24.5	28.6	31.7	33.0	35.0	36.1	37.4	37.9	37.9	37.2	38.0	36.7	32.3	26.6	24.3	23.7	22.1	Diurnal Average
																								39	37	38	--	54	40	40	42	45	52	51	54	54	55	63	67	71	74	76	62	44	46	46	42	Diurnal Maximum

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



WBEA NETWORK
Hourly Averages

Ozone (O₃) - ppb
Wapasu - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Wapasu - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	182	25.71	25.71
21 - 50	504	71.19	96.89
51 - 82	22	3.11	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Ozone (O₃) - ppb
Wapasu - July 2014

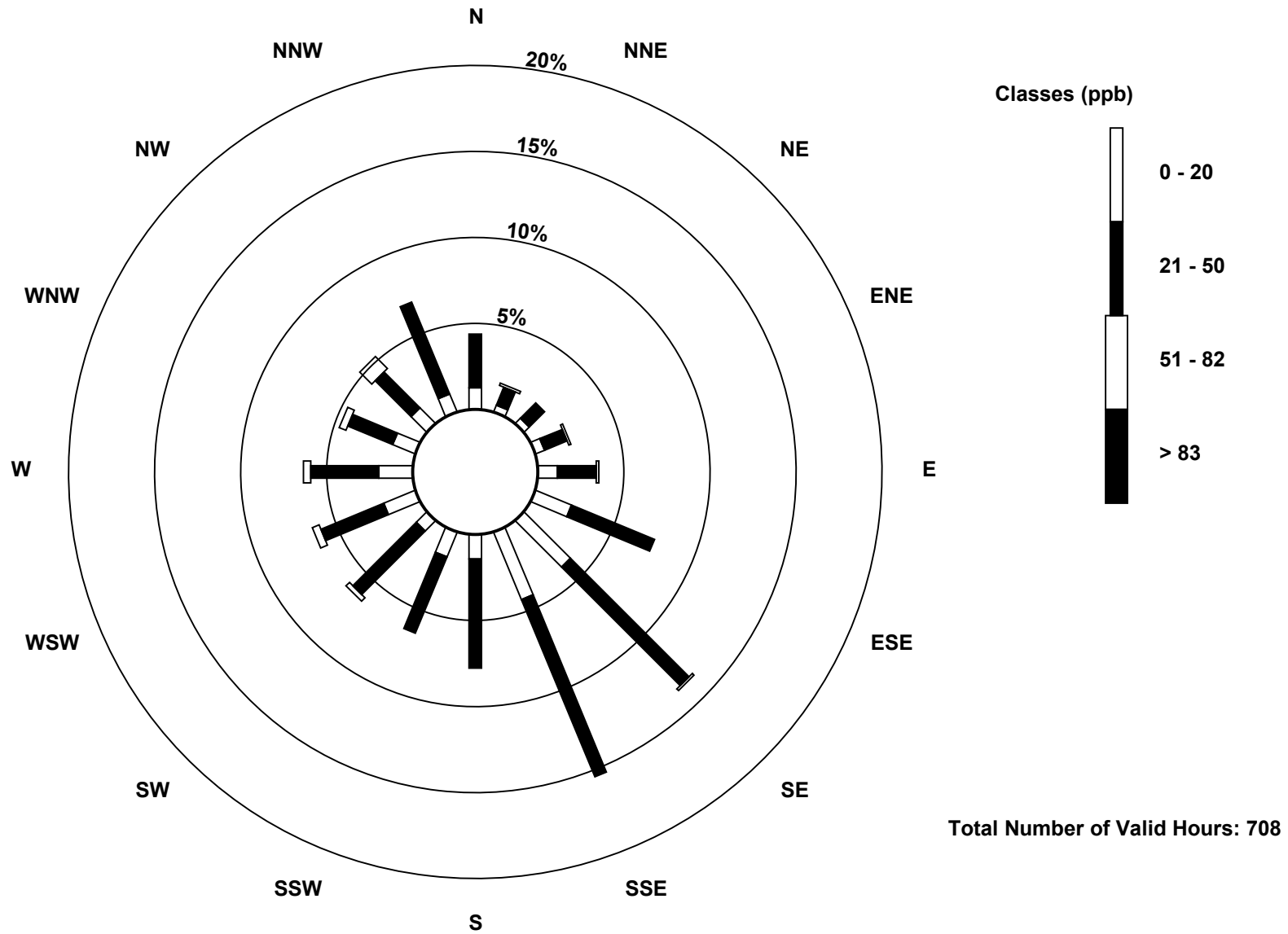
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	9	3	3	4	8	16	27	30	10	11	6	14	14	10	9	8	182
21 - 50	22	8	9	10	16	37	69	79	45	34	37	28	28	20	21	41	504
51 - 82	0	1	0	1	1	0	1	0	0	0	2	3	3	3	7	0	22
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	31	12	12	15	25	53	97	109	55	45	45	45	45	33	37	49	708

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Ozone (O₃) - ppb
Wapasu (AMS 17)



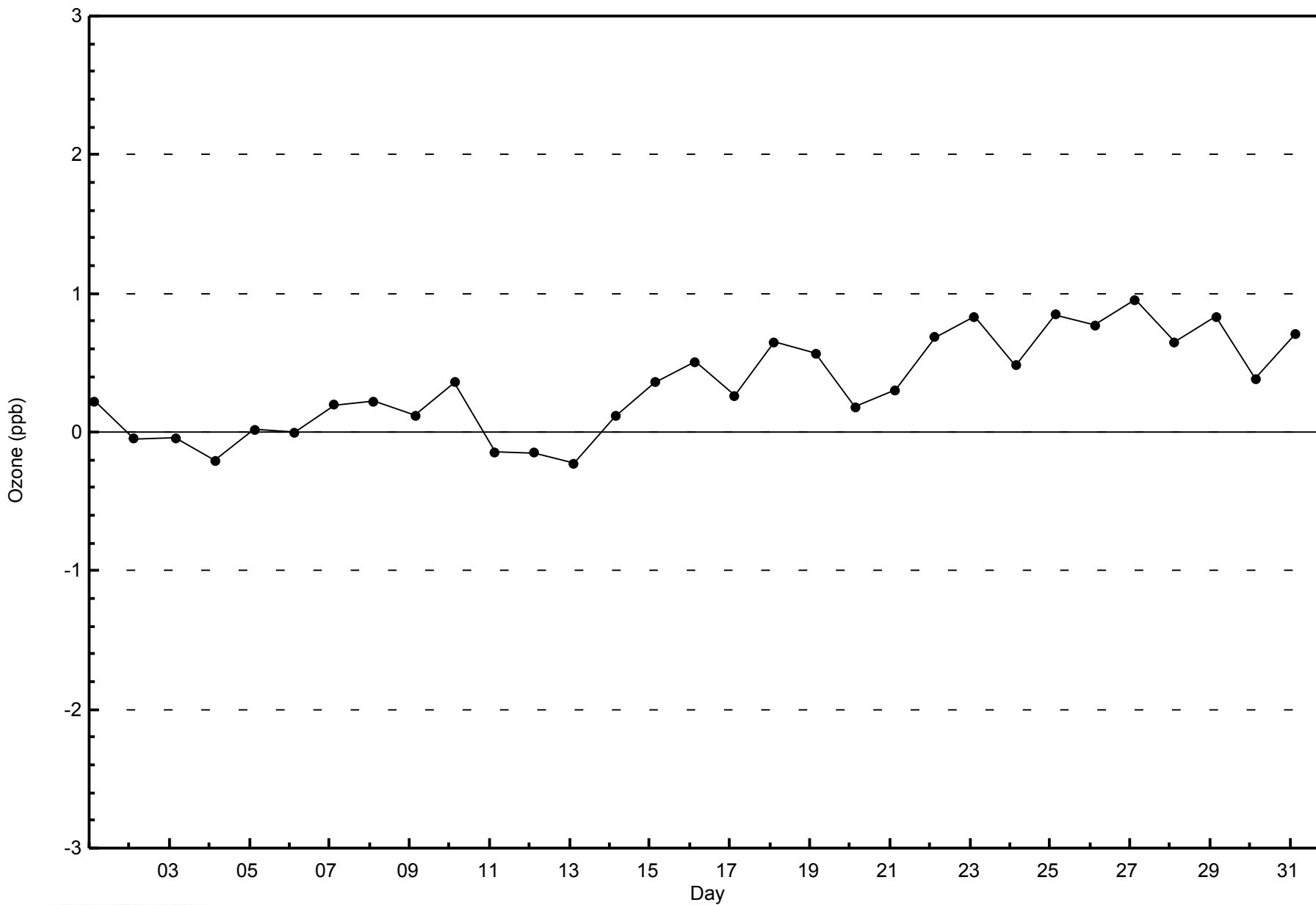


WBEA NETWORK

Zero Responses

Ozone (O₃) - ppb

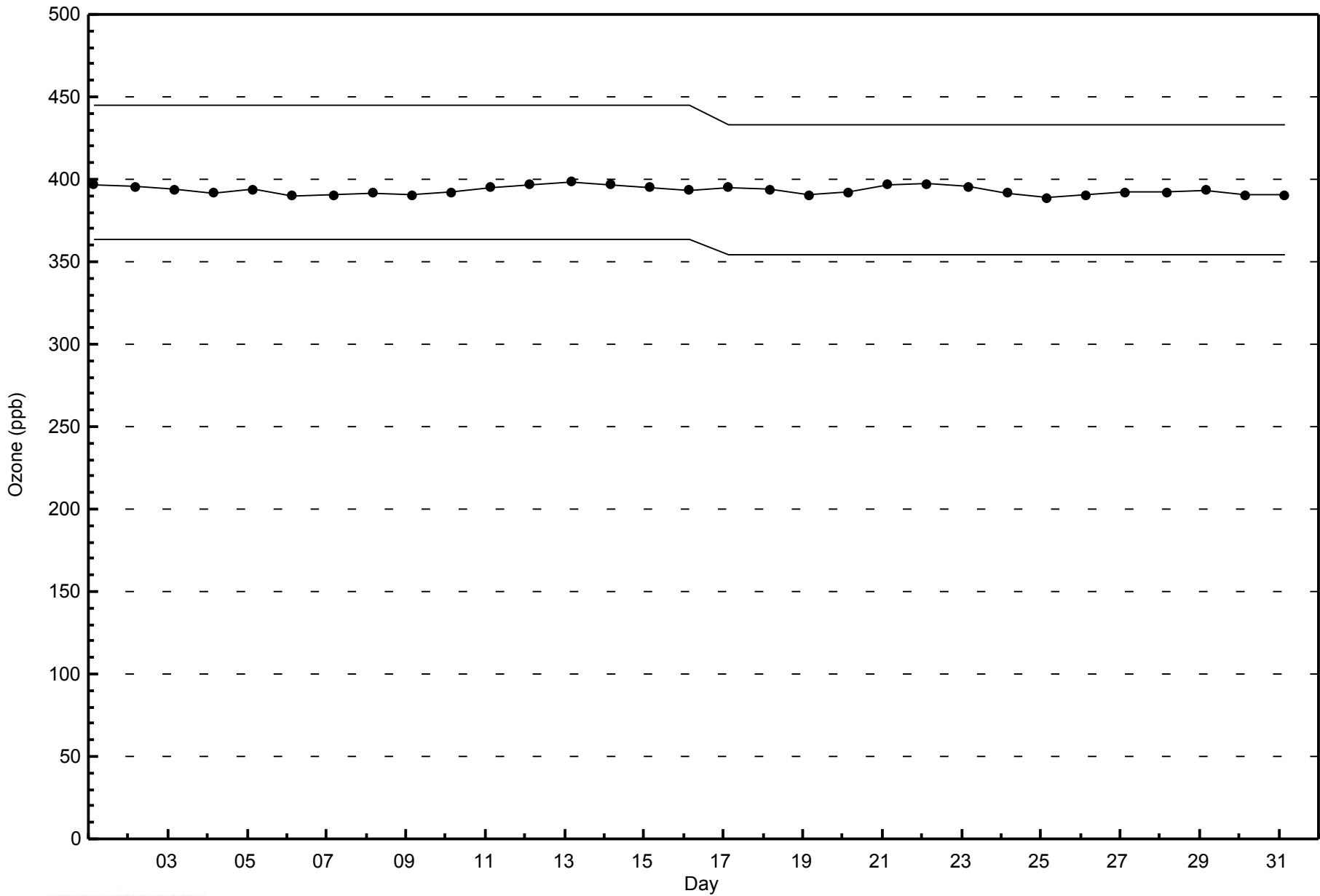
Wapasu - July 2014





WBEA NETWORK
Span Responses

Ozone (O₃) - ppb
Wapasu - July 2014



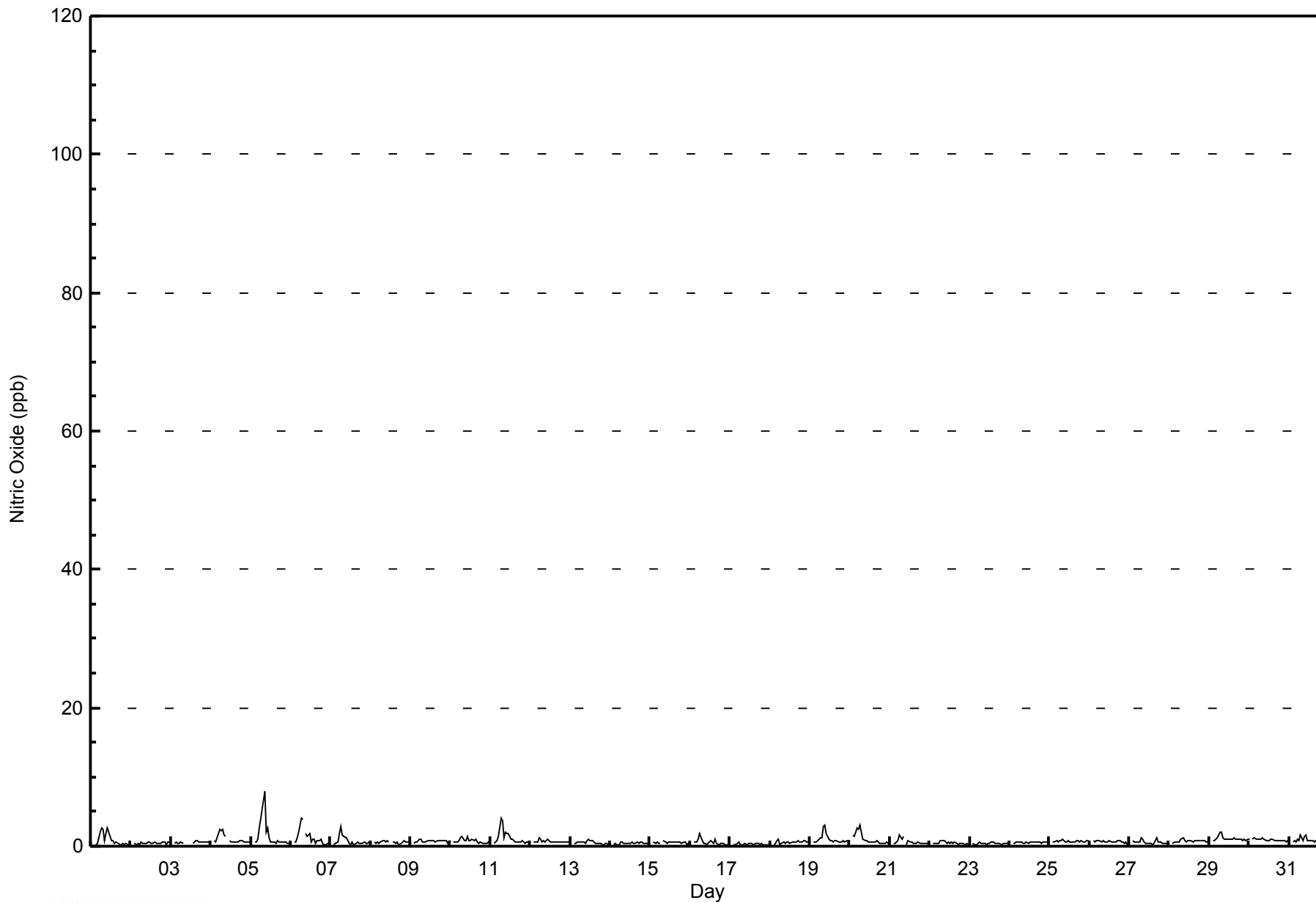


Maximum Value: 8 ppb on Jul 5 09:00																	Maximum Daily Average: 1.5 ppb on Jul 5										Hours in Service: 744	
Minimum Value: 0 ppb on Jul 1 03:00																	Minimum Daily Average: 0.3 ppb on Jul 17										Hours of Data: 703	
Maximum Diurnal Average: 1.4 ppb at hour 7																	Minimum Diurnal Average: 0.5 ppb at hour 1										Hours of Missing Data: 41	
Monthly Average: 0.7 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 4										Hours of Calibration: 36	
																	Percent Operational Time: 99.3											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Jul	0	Z	0	0	0	2	3	2	1	2	3	1	1	1	0	1	0	0	0	0	0	0	0	0	0.9	3		
2-Jul	0	Z	0	0	0	0	1	0	0	1	1	1	0	0	1	1	0	0	0	1	1	0	1	1	0.4	1		
3-Jul	0	Z	0	1	0	1	1	0	C	C	C	C	C	0	1	1	1	1	1	1	1	1	1	1	0.6	1		
4-Jul	1	Z	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2		
5-Jul	1	Z	1	1	1	3	4	5	8	2	3	1	1	1	1	0	1	1	1	1	1	1	1	0	1.5	8		
6-Jul	0	Z	1	1	1	2	4	4	M	2	1	2	1	1	1	0	1	1	1	0	0	0	0	0	1.1	4		
7-Jul	0	Z	0	0	1	2	3	2	1	1	1	0	0	1	0	0	1	0	0	0	1	0	0	1	0.7	3		
8-Jul	0	Z	1	0	1	0	1	1	1	1	1	1	M	1	1	0	1	0	0	1	1	1	1	1	0.6	1		
9-Jul	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	1		
10-Jul	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0.8	1		
11-Jul	0	Z	0	1	1	1	4	4	1	2	2	2	1	1	1	1	1	1	1	1	1	1	0	1	1.2	4		
12-Jul	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		
13-Jul	0	Z	0	0	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1		
14-Jul	0	Z	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1	0	1	1	0	1	0	0	0.4	1		
15-Jul	0	Z	1	0	1	0	0	M	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0.5	1		
16-Jul	0	Z	1	1	1	1	2	1	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0.6	2		
17-Jul	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		
18-Jul	0	Z	0	0	1	1	0	0	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0.6	1		
19-Jul	1	Z	1	1	1	1	1	1	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	3		
20-Jul	1	Z	2	2	3	3	3	2	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	0	1.0	3		
21-Jul	0	Z	0	0	1	1	2	1	1	PF	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0.6	2		
22-Jul	0	Z	0	0	0	0	1	1	1	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0.5	1		
23-Jul	0	Z	1	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1		
24-Jul	1	Z	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.5	1		
25-Jul	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		
26-Jul	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.7	1		
27-Jul	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0.6	1		
28-Jul	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1		
29-Jul	1	Z	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2		
30-Jul	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		
31-Jul	1	Z	1	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0	1	0.9	2		
																	Diurnal Average		Diurnal Maximum									
0.5																	--		0.5									
1																	--		2									
Z - zerospan			C - Calibration			M - Maintenance			PF - Power Failure																			



WBEA NETWORK
Hourly Averages

Nitric Oxide (NO) - ppb
Wapasu - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Wapasu - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	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: 703

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitric Oxide (NO) - ppb
Wapasu - July 2014

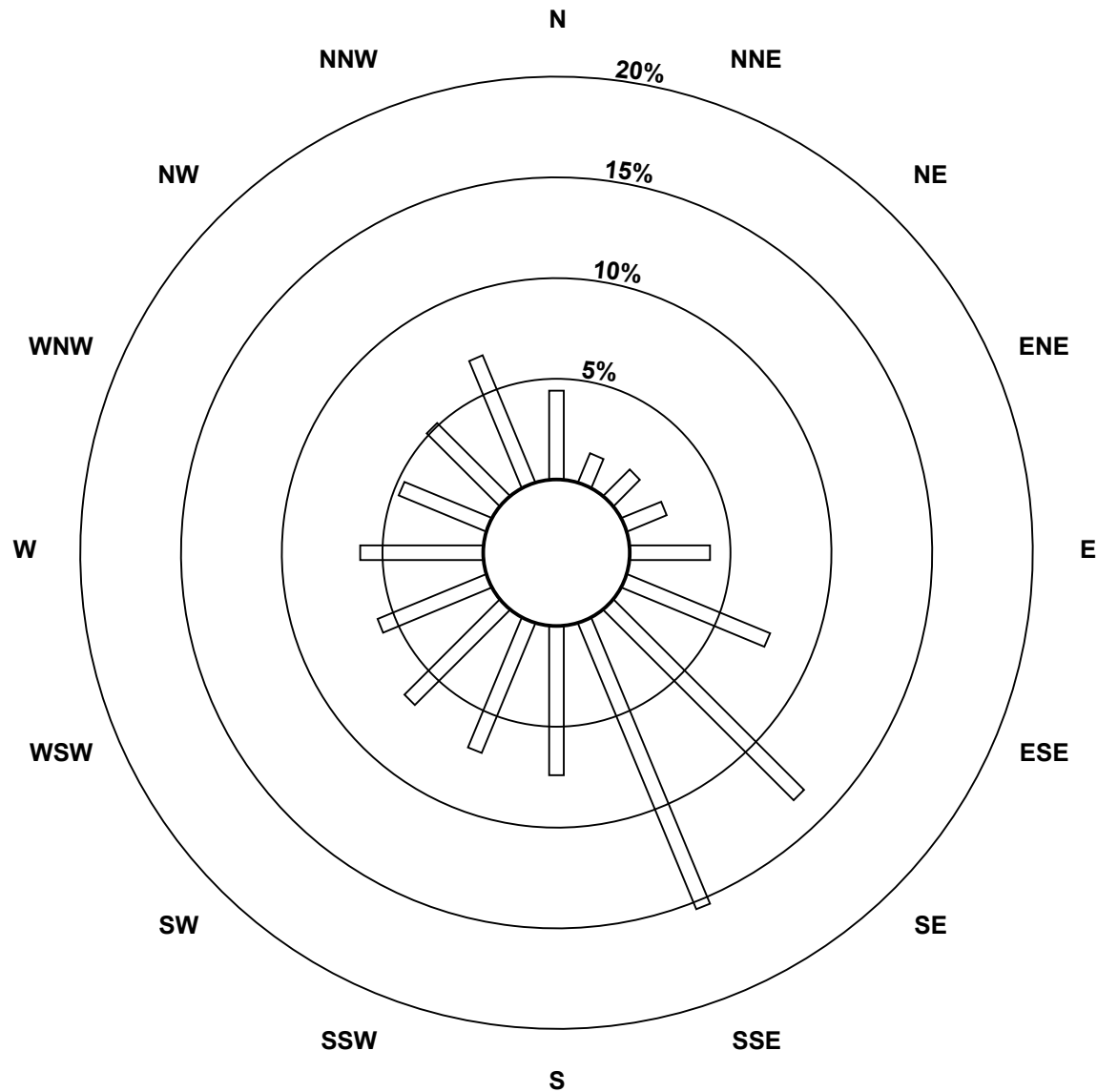
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	31	11	13	15	28	54	94	108	52	49	47	41	43	33	36	48	703
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	31	11	13	15	28	54	94	108	52	49	47	41	43	33	36	48	703

Total Number of Valid Hours: 703

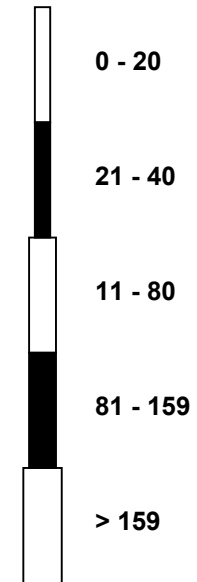
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Nitric Oxide (NO) - ppb
Wapasu (AMS 17)



Classes (ppb)



Total Number of Valid Hours: 703

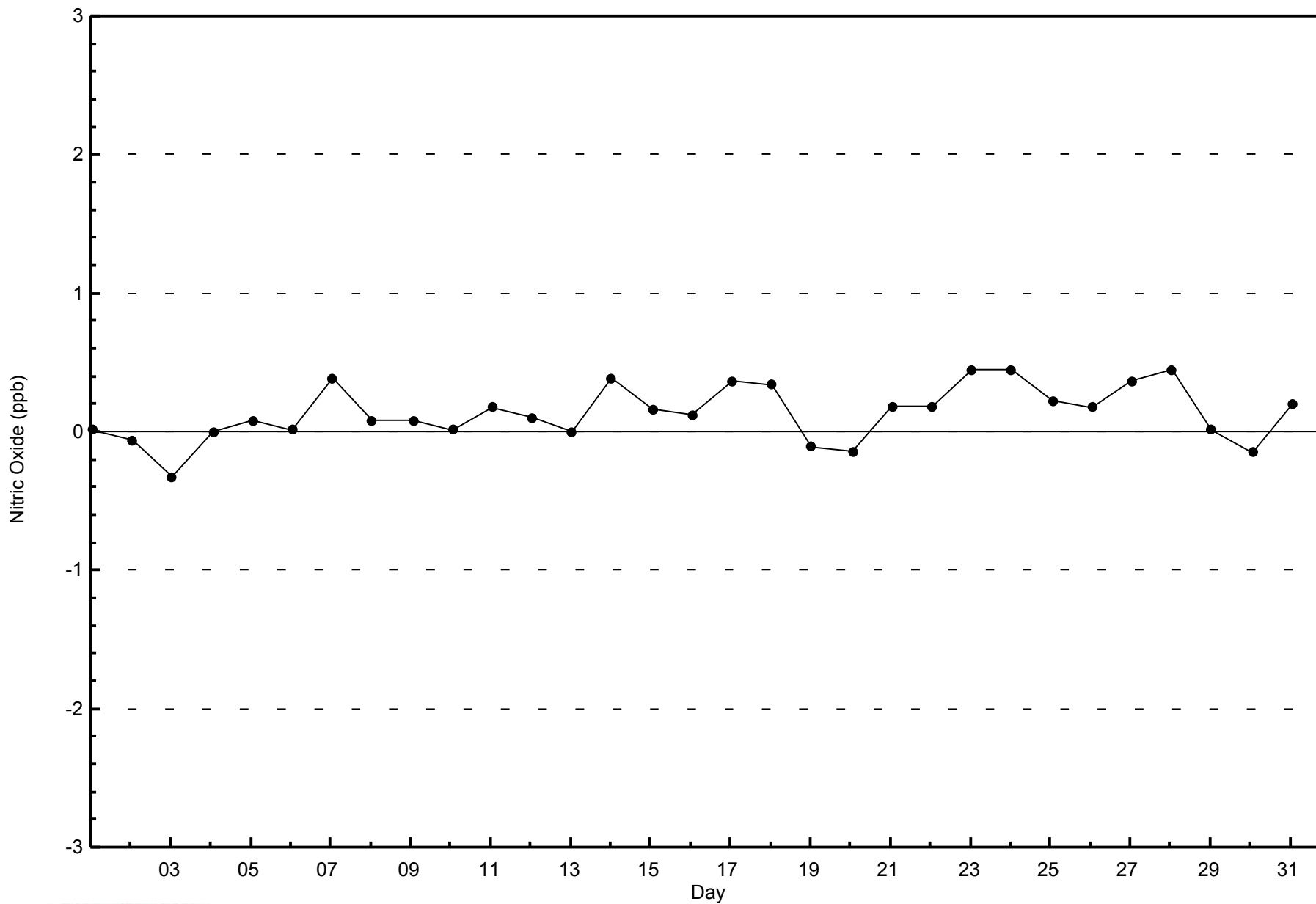


WBEA NETWORK

Zero Responses

Nitric Oxide (NO) - ppb

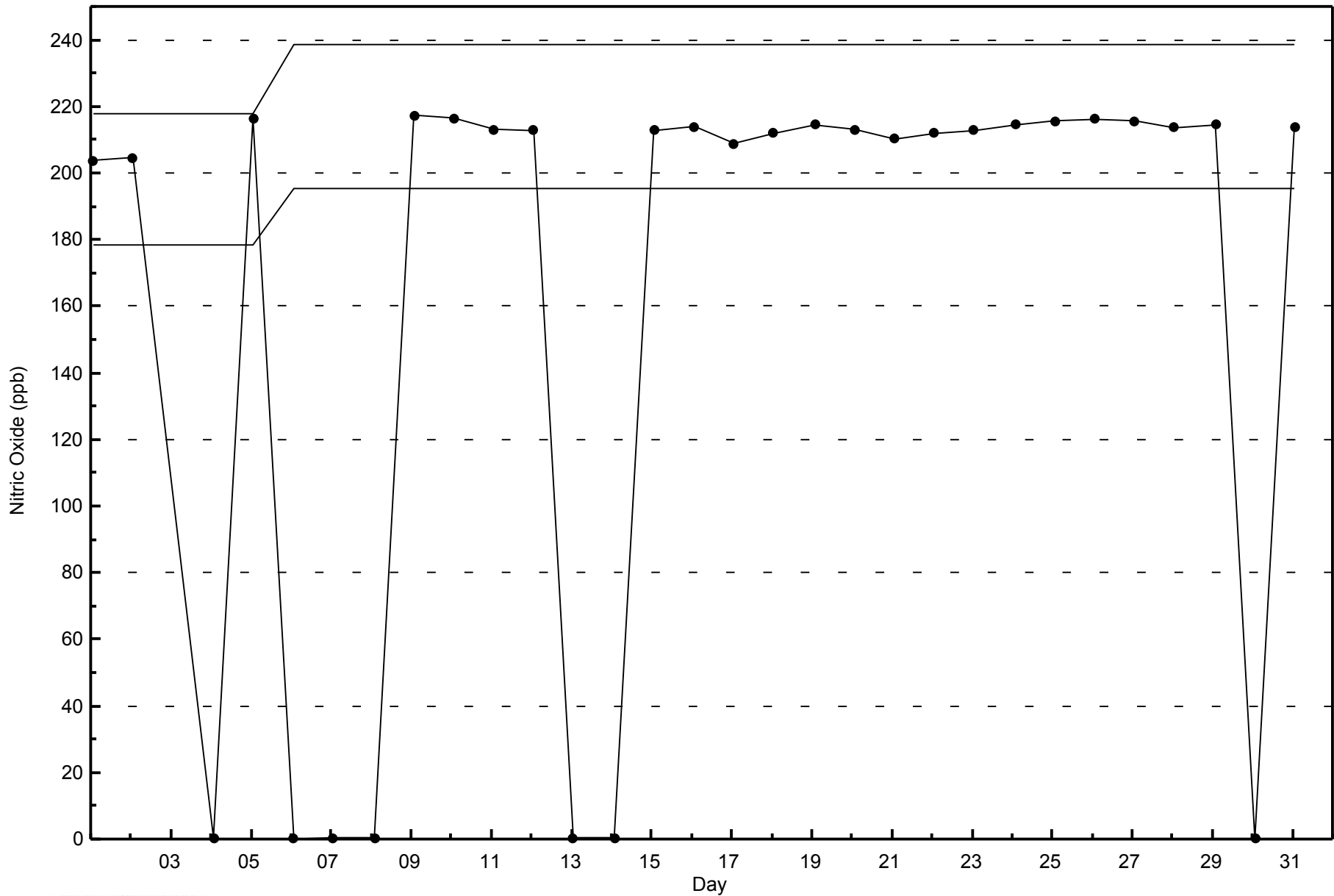
Wapasu - July 2014





WBEA NETWORK
Span Responses

Nitric Oxide (NO) - ppb
Wapasu - July 2014





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 13 ppb on Jul 16 04:00	Maximum Daily Average: 3.9 ppb on Jul 4
Minimum Value: 0 ppb on Jul 1 01:00	Hours of Data: 703
Maximum Diurnal Average: 3.0 ppb at hour 3	Hours of Missing Data: 41
Monthly Average: 1.6 ppb	Hours of Calibration: 36
Minimum Daily Average: 0.1 ppb on Jul 24	Percent Operational Time: 99.3
Minimum Diurnal Average: 0.8 ppb at hour 15	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 4 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-Jul	0	Z	1	1	1	8	8	8	2	6	8	5	4	4	3	3	1	1	1	2	1	1	2	4	3.3	8
2-Jul	6	Z	3	3	2	1	1	1	1	1	2	2	1	1	1	1	1	0	0	0	1	1	1	1	1.3	6
3-Jul	1	Z	0	0	0	1	1	1	C	C	C	C	C	2	1	0	0	0	0	1	3	3	0	1	0.9	3
4-Jul	0	Z	10	10	9	10	7	6	3	3	M	0	0	0	0	0	0	0	0	0	0	3	12	11	3.9	12
5-Jul	8	Z	5	5	7	9	10	11	11	3	4	2	0	0	0	0	0	0	0	0	0	1	0	0	3.3	11
6-Jul	3	Z	2	2	6	10	8	9	M	4	3	5	3	3	3	1	3	1	2	2	2	0	1	0	3.2	10
7-Jul	0	Z	1	0	0	1	4	5	6	4	2	0	0	0	1	1	1	1	0	0	0	0	0	0	1.2	6
8-Jul	0	Z	1	1	0	0	0	1	0	1	1	1	M	1	1	1	1	0	0	0	0	0	0	1	0.5	1
9-Jul	1	Z	6	4	3	2	2	1	1	1	2	3	1	1	1	2	2	4	4	5	8	4	1	0	2.5	8
10-Jul	3	Z	12	7	1	1	2	1	0	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0	1.5	12
11-Jul	0	Z	7	5	5	5	8	7	3	4	4	3	2	2	1	0	0	1	0	1	1	4	8	8	3.4	8
12-Jul	10	Z	4	3	1	1	2	1	1	2	1	1	0	1	0	0	0	0	1	1	0	0	0	0	1.3	10
13-Jul	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2	0	0	1	0	0	0.5	2
14-Jul	0	Z	0	0	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	4	1	3	1	1	1.1	4
15-Jul	1	Z	1	1	1	1	1	M	2	1	1	1	1	2	2	3	3	3	3	4	1	1	1	1	1.5	4
16-Jul	1	Z	12	13	7	3	5	3	2	1	2	2	4	3	1	3	1	1	1	4	8	4	1	1	3.5	13
17-Jul	0	Z	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2	2	1	1	0.8	2
18-Jul	1	Z	1	2	2	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5	3	3	2	0.9	5
19-Jul	4	Z	1	1	0	2	2	3	5	5	3	1	0	0	0	0	0	0	1	1	1	2	2	0	1.5	5
20-Jul	0	Z	4	6	5	1	4	3	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1.3	6
21-Jul	1	Z	1	0	0	0	2	2	2	PF	1	1	1	1	2	3	3	4	4	5	3	2	2	1	1.7	5
22-Jul	2	Z	3	5	3	1	3	4	3	2	2	1	1	1	1	0	0	0	0	0	1	3	0	0	1.5	5
23-Jul	0	Z	0	1	1	2	3	1	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0.5	3
24-Jul	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
25-Jul	0	Z	3	6	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	6
26-Jul	1	Z	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4	4	1	2	0.8	4
27-Jul	3	Z	7	5	5	2	1	2	2	1	1	0	1	1	1	3	8	2	0	0	0	0	1	1	2.0	8
28-Jul	1	Z	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	0.8	1
29-Jul	0	Z	0	1	1	3	8	7	3	0	0	0	1	0	0	1	1	2	2	1	0	0	0	0	1.4	8
30-Jul	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	2	1	1	0	0	0.4	2
31-Jul	2	Z	6	2	1	3	1	3	1	3	4	2	1	0	0	1	3	1	1	1	1	1	1	0	1.6	6

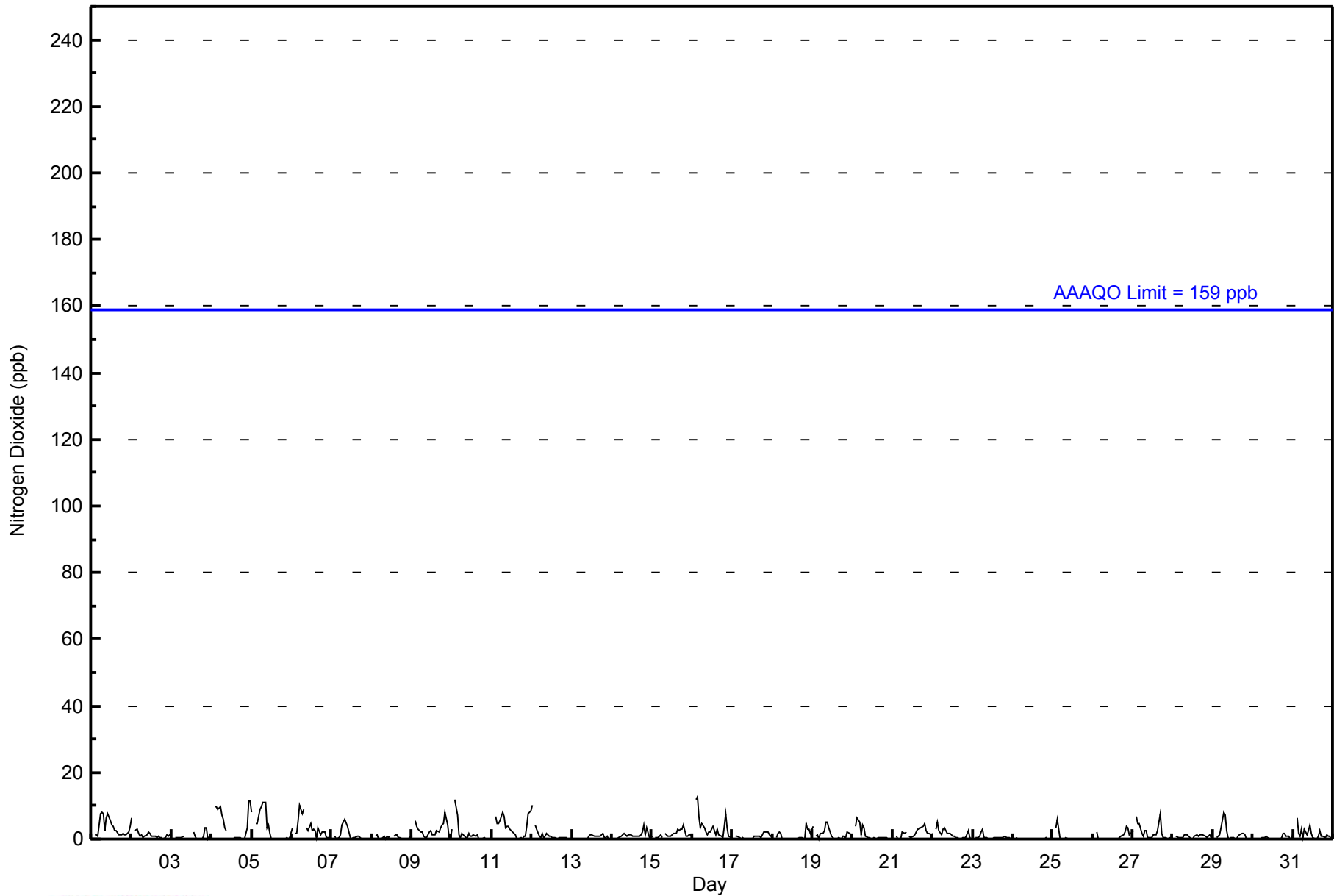
1.6	--	3.0	2.7	2.0	2.3	2.7	2.7	1.9	1.5	1.5	1.1	0.9	0.9	0.8	0.9	1.1	0.9	1.0	1.3	1.5	1.5	1.2	1.2	Diurnal Average	
10	--	12	13	9	10	10	11	11	6	8	5	4	4	3	3	8	4	4	5	8	4	12	11	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wapasu - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	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: 703

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - July 2014

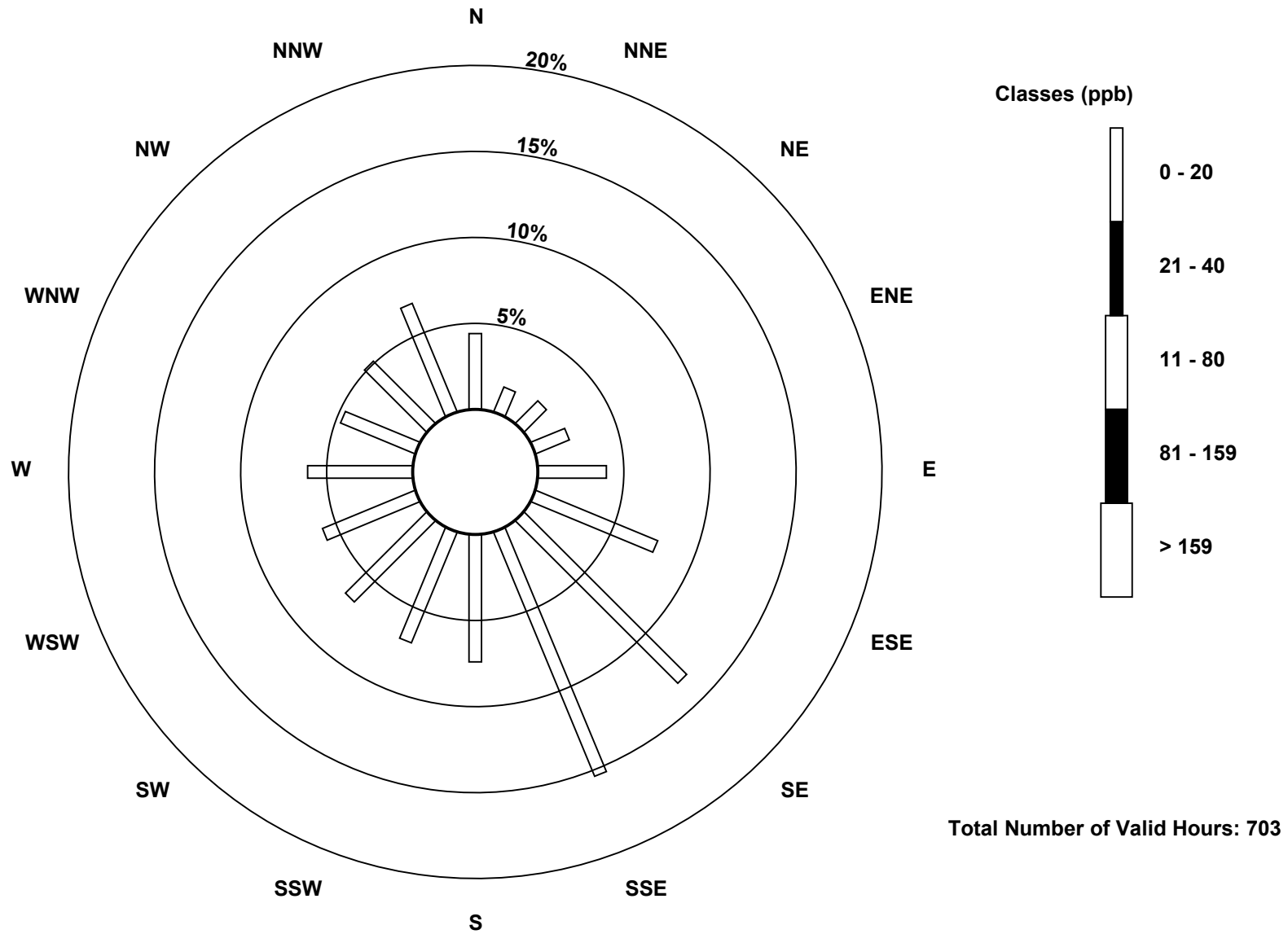
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	31	11	13	15	28	54	94	108	52	49	47	41	43	33	36	48	703
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	31	11	13	15	28	54	94	108	52	49	47	41	43	33	36	48	703

Total Number of Valid Hours: 703

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Nitrogen Dioxide (NO₂) - ppb
Wapasu (AMS 17)



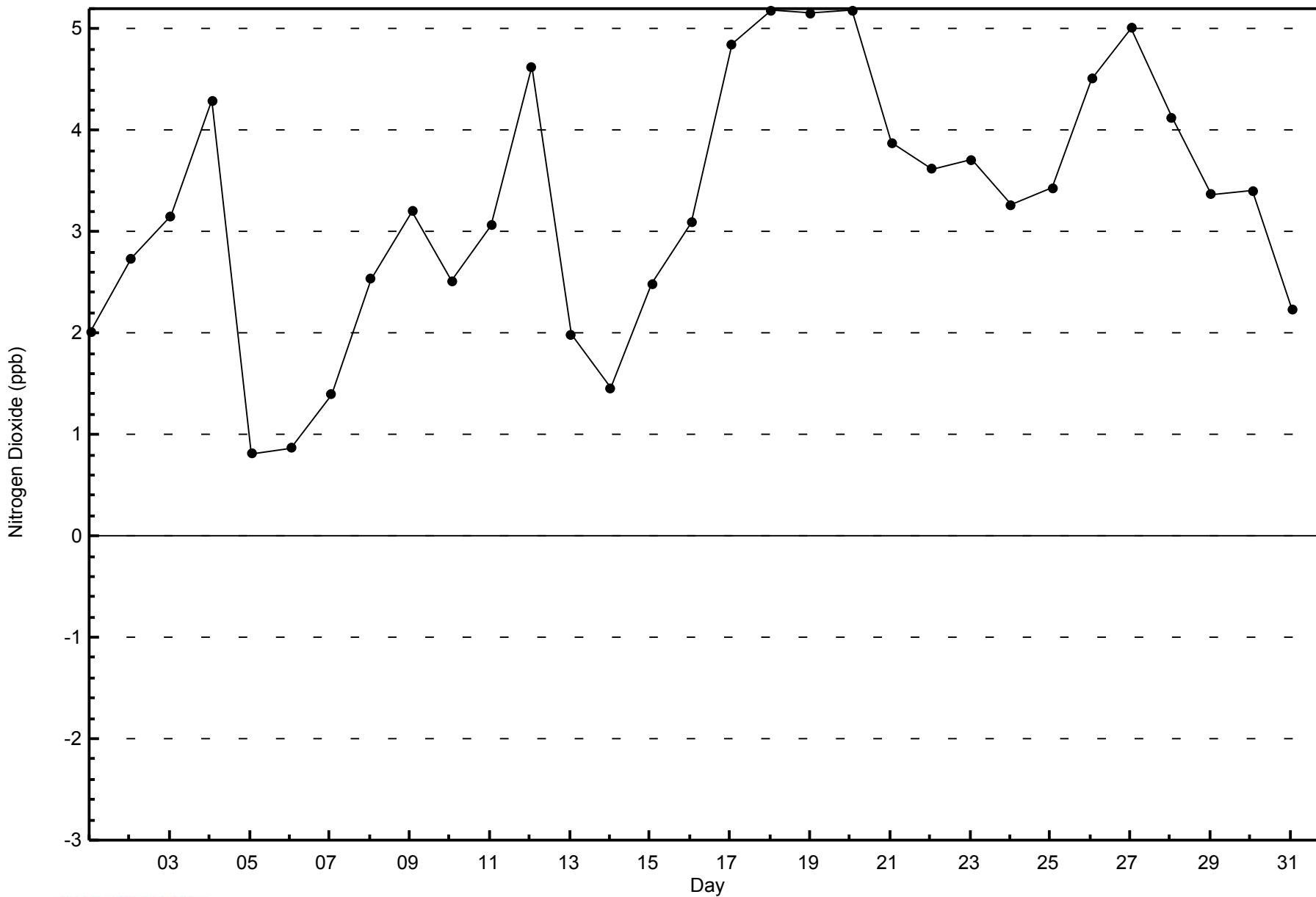


WBEA NETWORK

Zero Responses

Nitrogen Dioxide (NO₂) - ppb

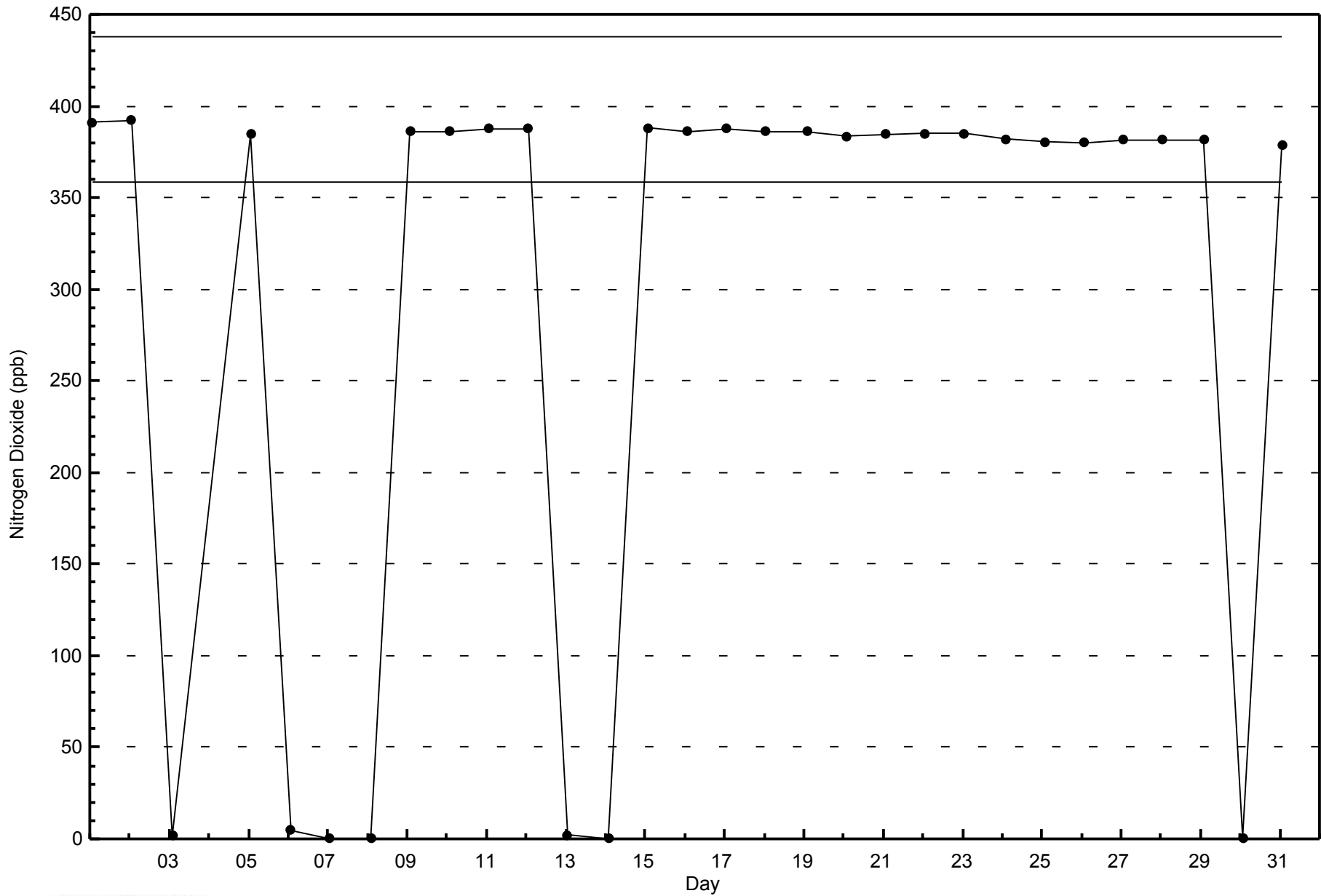
Wapasu - July 2014





WBEA NETWORK
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Wapasu - July 2014



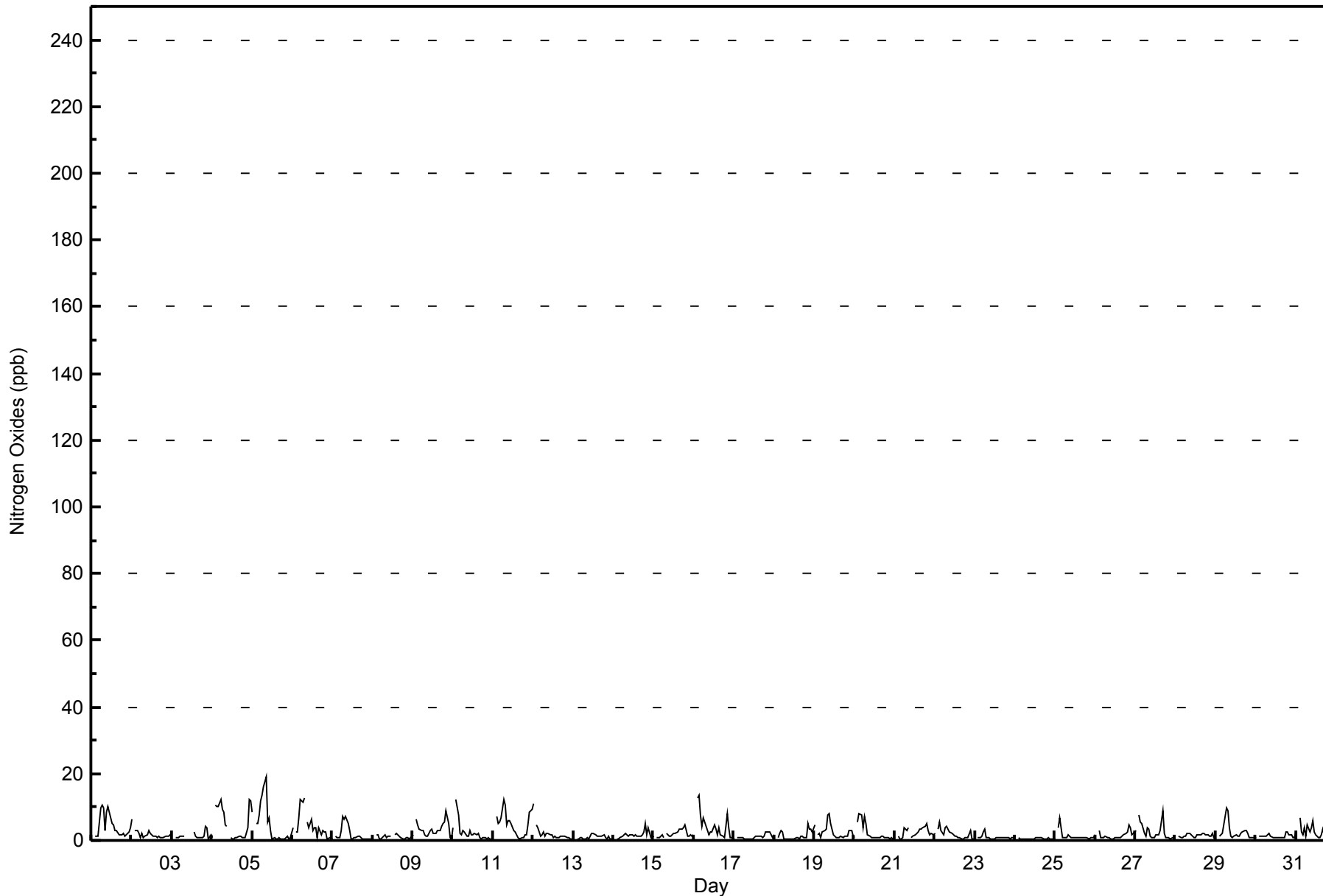


Maximum Value: 19 ppb on Jul 5 09:00																	Maximum Daily Average: 4.9 ppb on Jul 4																	Hours in Service: 744														
Minimum Value: 0 ppb on Jul 14 00:00																	Minimum Daily Average: 0.6 ppb on Jul 24																	Hours of Data: 703														
Maximum Diurnal Average: 4.1 ppb at hour 7																	Minimum Diurnal Average: 1.4 ppb at hour 15																	Hours of Missing Data: 41														
Monthly Average: 2.3 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 12																	Hours of Calibration: 36														
																																		Percent Operational Time: 99.3														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	0	Z	1	1	1	10	11	10	3	8	10	7	5	5	3	3	2	2	2	2	1	2	2	4	4.1	11																						
2-Jul	6	Z	3	3	2	1	2	1	1	2	3	2	2	1	1	1	1	1	1	1	1	1	1	2	1.7	6																						
3-Jul	1	Z	1	1	1	1	1	1	C	C	C	C	C	3	1	1	1	1	1	1	4	4	1	2	1.5	4																						
4-Jul	1	Z	10	10	10	12	9	8	5	4	M	1	1	1	1	1	1	1	1	1	1	4	12	12	4.9	12																						
5-Jul	9	Z	5	5	8	12	14	16	19	5	7	3	1	1	1	0	1	1	1	1	1	1	1	1	4.8	19																						
6-Jul	4	Z	2	2	7	12	12	13	M	6	4	6	3	4	4	1	4	2	3	3	2	0	1	1	4.4	13																						
7-Jul	0	Z	1	1	1	3	7	6	7	5	3	1	1	1	1	1	1	1	1	0	1	0	0	1	1.9	7																						
8-Jul	0	Z	2	2	1	0	1	2	1	1	1	1	M	2	2	2	1	1	0	1	1	1	1	1	1.1	2																						
9-Jul	2	Z	6	5	3	3	3	2	1	1	3	4	2	2	2	3	3	4	5	5	9	5	1	0	3.2	9																						
10-Jul	4	Z	12	8	2	2	3	3	1	1	3	2	2	2	2	2	1	1	1	1	1	0	1	1	2.3	12																						
11-Jul	0	Z	7	5	6	7	12	10	5	6	6	5	3	2	2	1	1	1	1	1	2	5	8	9	4.5	12																						
12-Jul	11	Z	5	4	1	2	3	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2.0	11																						
13-Jul	0	Z	0	0	1	1	1	1	1	0	1	2	2	2	1	1	1	1	2	1	1	1	0	0	1.0	2																						
14-Jul	0	Z	0	0	1	1	2	2	2	1	2	2	1	2	1	1	1	2	3	5	2	4	1	1	1.6	5																						
15-Jul	1	Z	1	1	1	2	1	M	2	1	1	2	2	2	2	4	3	3	4	5	1	1	2	1	2.0	5																						
16-Jul	2	Z	13	13	8	4	7	4	3	2	2	2	5	3	2	4	2	1	1	4	8	4	1	1	4.1	13																						
17-Jul	1	Z	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	2	3	3	2	1	1.1	3																						
18-Jul	1	Z	1	2	3	3	1	0	1	0	1	1	0	1	1	1	1	1	1	1	5	4	4	2	1.5	5																						
19-Jul	5	Z	2	2	1	3	3	4	8	8	5	2	1	1	1	1	1	1	1	1	1	3	3	1	2.5	8																						
20-Jul	1	Z	5	8	8	4	7	5	2	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	2.3	8																						
21-Jul	1	Z	1	1	1	1	4	3	4	PF	1	1	2	2	3	3	3	4	4	5	3	2	2	2	2.3	5																						
22-Jul	2	Z	3	5	3	2	4	4	3	3	2	2	1	1	1	0	0	1	1	1	1	3	1	0	2.0	5																						
23-Jul	0	Z	1	1	1	2	3	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0.9	3																						
24-Jul	1	Z	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1																						
25-Jul	1	Z	4	7	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	7																						
26-Jul	2	Z	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	5	4	2	2	1.5	5																						
27-Jul	3	Z	8	5	5	2	1	4	4	1	1	1	2	2	2	3	9	2	1	1	1	1	1	1	2.5	9																						
28-Jul	1	Z	1	1	1	1	1	2	2	2	1	1	1	2	2	2	2	2	2	2	1	1	2	1	1.5	2																						
29-Jul	1	Z	1	2	2	5	10	9	4	1	1	1	2	1	1	2	2	3	3	2	1	1	1	1	2.5	10																						
30-Jul	1	Z	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	2	3	2	2	1	1	1.3	3																						
31-Jul	3	Z	7	2	2	4	1	4	2	4	6	2	2	1	1	2	4	2	2	1	2	1	1	1	2.5	7																						
																								2.1	--	3.6	3.3	2.7	3.3	4.1	4.0	3.0	2.5	2.5	1.9	1.5	1.6	1.4	1.5	1.8	1.4	1.6	1.8	2.0	1.9	1.8	1.7	Diurnal Average
																								11	--	13	13	10	12	14	16	19	8	10	7	5	5	4	4	9	4	5	5	9	5	12	12	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																																																



WBEA NETWORK
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Wapasu - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	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: 703

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - July 2014

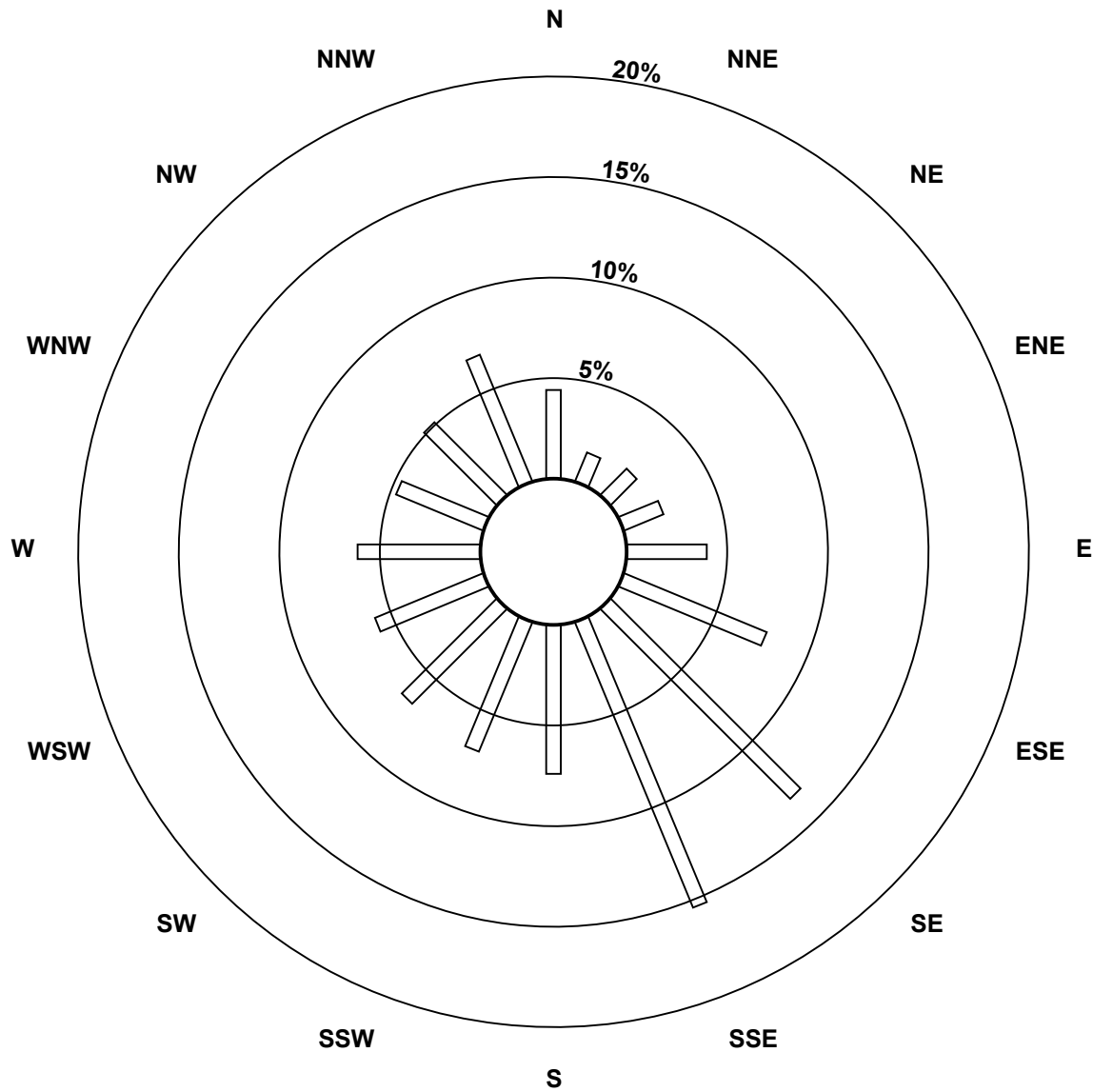
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	31	11	13	15	28	54	94	108	52	49	47	41	43	33	36	48	703
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	31	11	13	15	28	54	94	108	52	49	47	41	43	33	36	48	703

Total Number of Valid Hours: 703

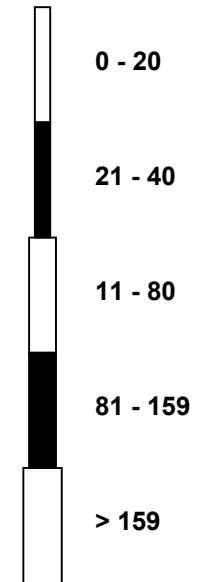
Total Number of Hours: 744

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

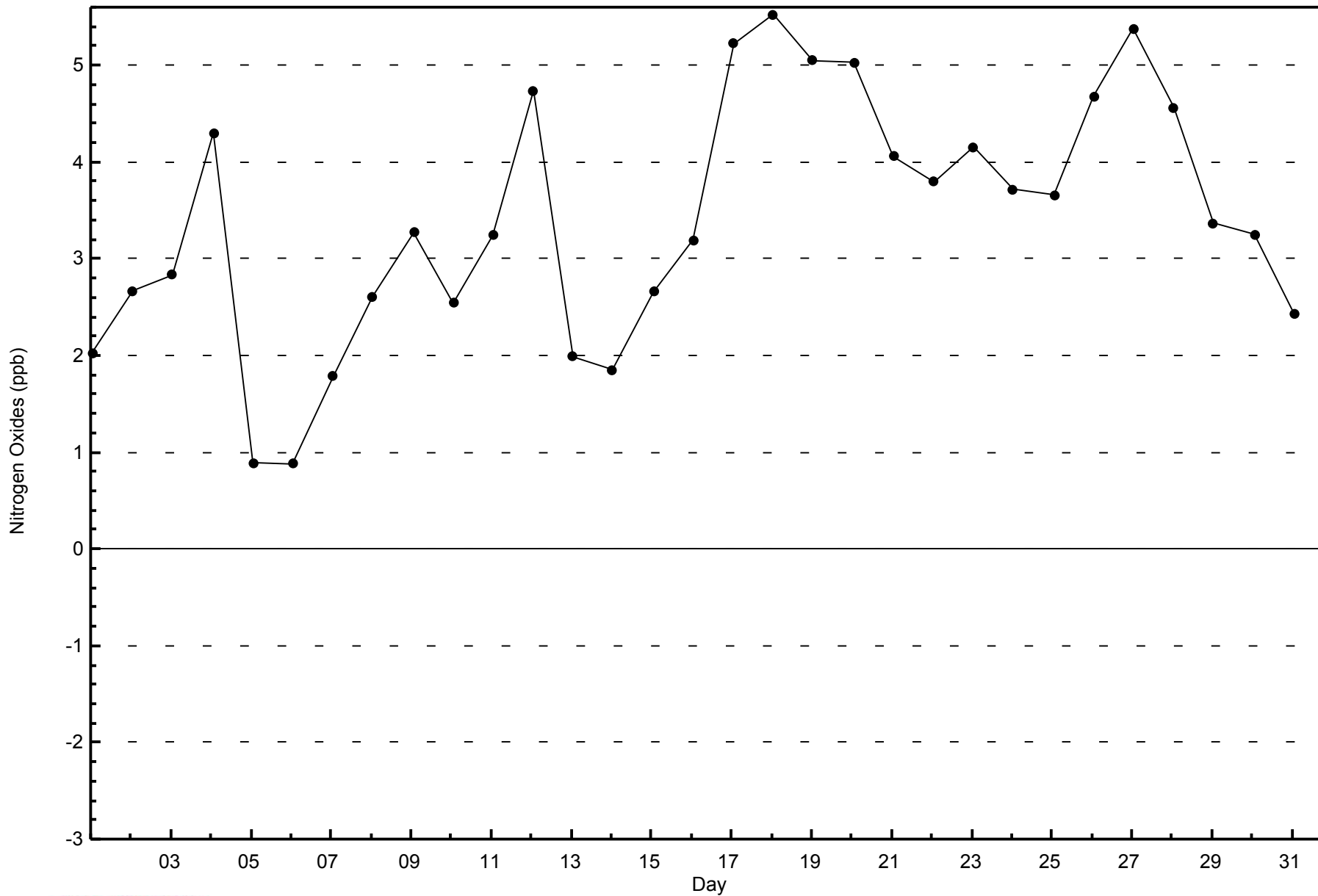
**Nitrogen Oxides (NO_x) - ppb
Wapasu (AMS 17)**



Classes (ppb)



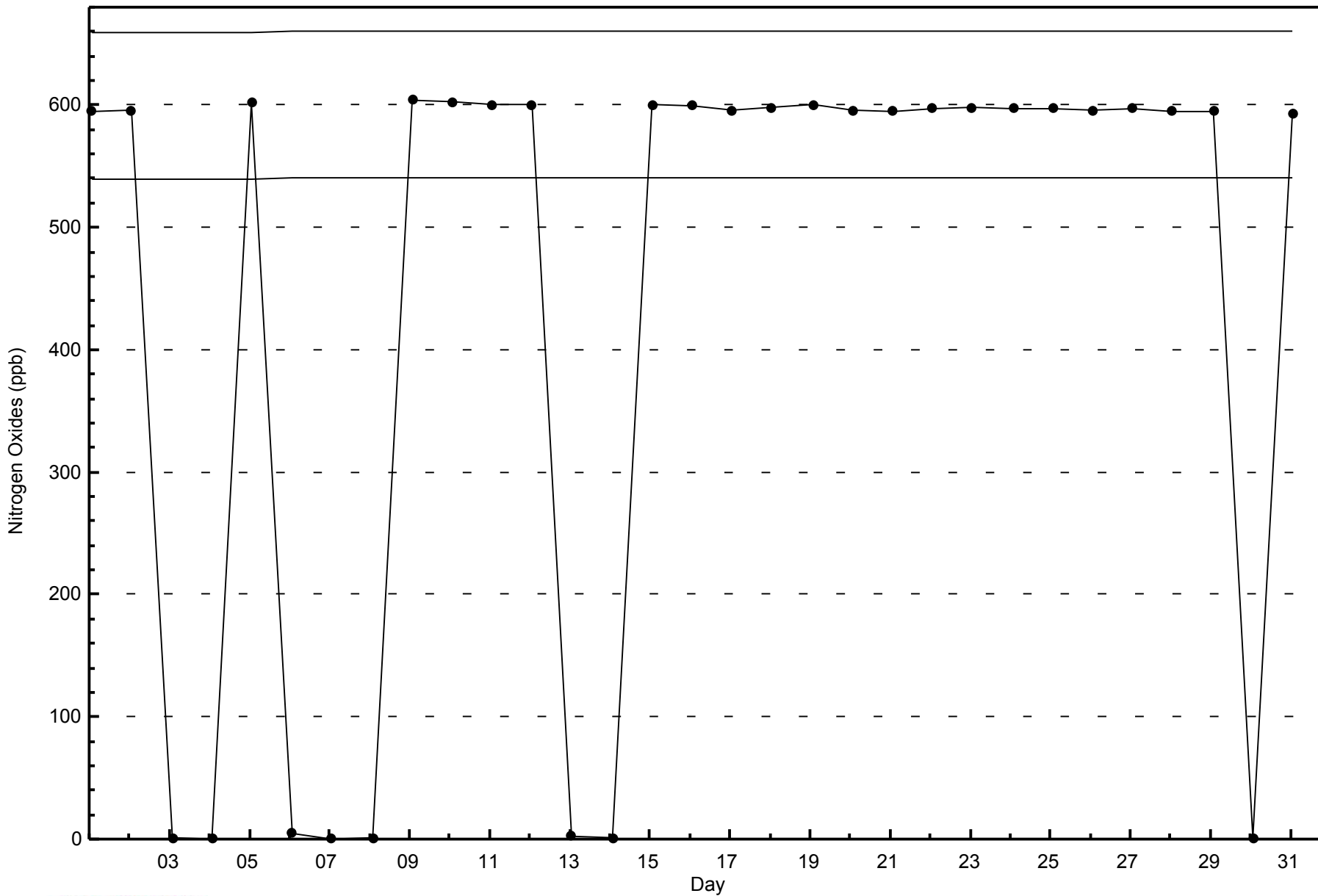
Total Number of Valid Hours: 703





WBEA NETWORK
Span Responses

Nitrogen Oxides (NO_x) - ppb
Wapasu - July 2014





Summary of Hour Averages

Wapasu - July 2014

Number of Exceedences (AAAQO): 24-hr: 3	Hours in Service: 744
Maximum Value: 180.4 µg/m ³ on Jul 31 17:00	Maximum Daily Average: 33.2 µg/m ³ on Jul 22
Minimum Value: 1.3 µg/m ³ on Jul 13 08:00	Hours of Data: 743
Maximum Diurnal Average: 18.2 µg/m ³ at hour 17	Hours of Missing Data: 1
Monthly Average: 15.00 µg/m ³	Hours of Calibration: 0
Minimum Daily Average: 2.3 µg/m ³ on Jul 13	Percent Operational Time: 99.9
Minimum Diurnal Average: 10.9 µg/m ³ at hour 7	
Percentiles: P ₁ = 1.5 P ₁₀ = 3.7 Q ₁ = 6.1 Median = 9.5 Q ₃ = 18.1 P ₉₀ = 35.4 P ₉₉ = 65.5	

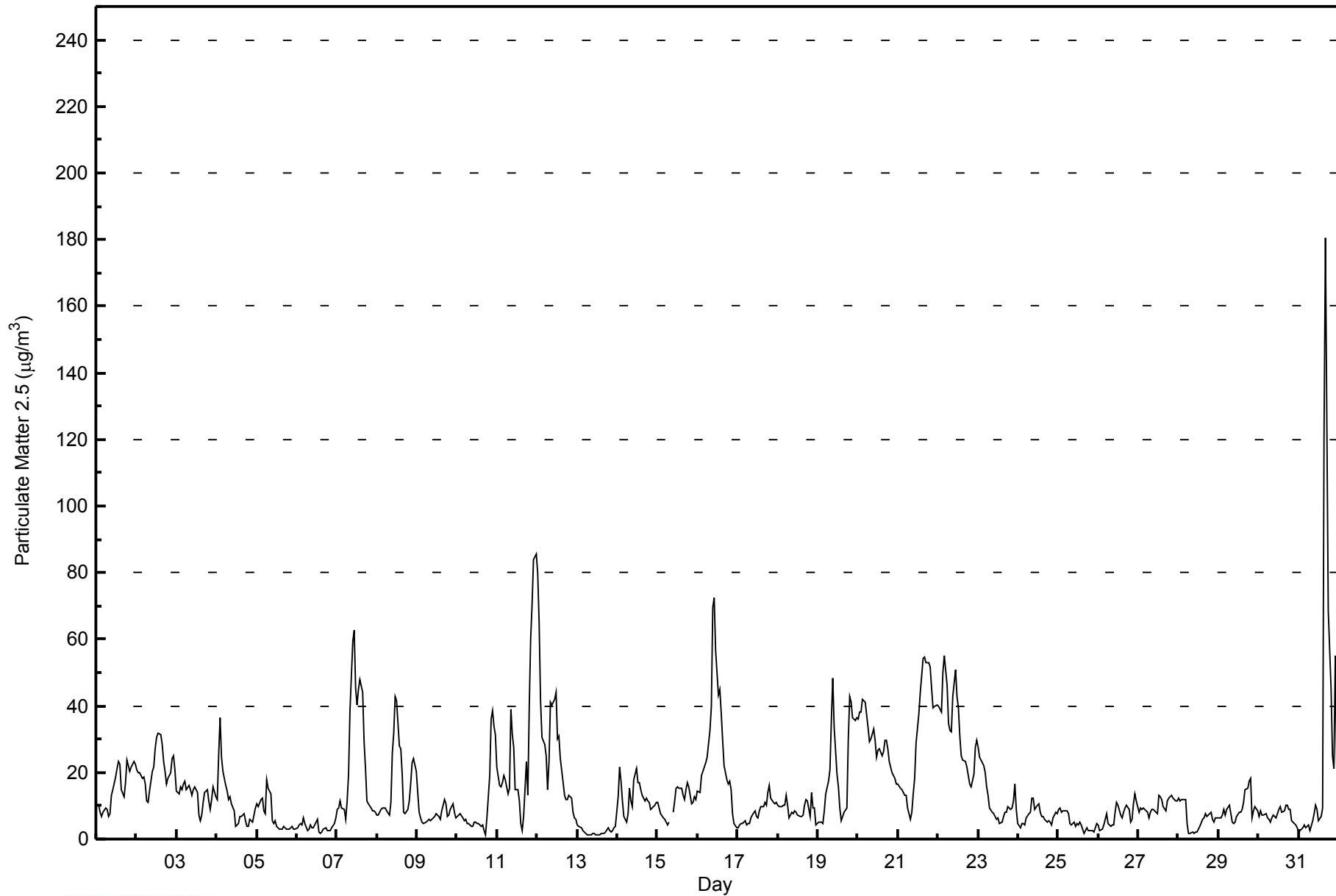
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	10.2	10.4	7.9	6.9	7.9	9.3	8.7	6.7	7.7	13.3	15.0	18.8	21.1	23.3	22.5	14.7	12.5	16.9	23.9	22.1	20.4	21.7	23.4	22.6	15.3	23.9																						
2-Jul	20.9	20.0	20.0	18.3	18.8	16.5	11.4	11.1	14.3	20.5	21.4	27.1	30.5	31.6	31.6	28.5	23.3	20.5	16.7	18.1	20.1	24.2	25.1	20.6	21.3	31.6																						
3-Jul	14.2	13.5	15.8	15.0	16.5	17.4	14.6	16.1	15.0	13.3	14.9	15.8	13.8	7.0	5.4	7.4	10.9	13.8	14.8	11.3	8.9	11.7	15.7	12.8	13.1	17.4																						
4-Jul	11.9	25.6	36.4	24.7	20.2	16.1	14.5	12.0	12.8	10.7	8.7	4.0	4.1	4.7	6.7	6.7	7.6	5.4	4.0	3.7	5.9	4.9	7.1	9.3	11.2	36.4																						
5-Jul	10.7	9.6	11.8	12.4	8.3	7.6	17.8	15.1	13.6	5.5	4.5	5.5	3.8	3.1	2.9	3.1	3.7	3.2	3.0	2.8	3.4	3.9	3.1	2.8	6.7	17.8																						
6-Jul	3.6	4.4	4.6	4.3	6.2	4.7	2.4	3.2	4.1	3.5	3.6	5.1	5.7	2.1	1.7	2.0	3.1	3.4	2.4	2.5	2.4	3.2	4.8	6.2	3.7	6.2																						
7-Jul	8.8	9.4	11.3	9.4	8.8	6.1	11.6	19.4	38.6	59.2	62.9	45.1	40.2	45.0	47.9	44.0	29.2	21.3	11.6	10.7	9.5	8.6	8.5	7.9	24.0	62.9																						
8-Jul	7.3	7.3	8.8	9.1	9.1	9.5	8.6	7.1	11.0	25.7	31.7	42.8	41.6	28.0	27.2	19.4	8.2	7.8	8.8	11.3	16.5	22.9	24.1	20.1	17.3	42.8																						
9-Jul	13.9	8.2	6.5	5.3	4.5	4.9	5.7	5.9	5.5	5.8	6.7	7.7	7.4	6.6	6.1	8.3	12.0	10.5	6.8	7.3	8.8	10.7	8.1	6.5	7.5	13.9																						
10-Jul	6.8	7.4	7.4	6.3	5.5	6.0	4.7	4.5	3.7	4.0	5.0	4.9	4.8	4.5	3.8	4.2	2.5	1.3	6.3	19.3	35.8	38.5	33.7	31.5	10.5	38.5																						
11-Jul	21.6	16.0	15.7	16.9	19.3	17.9	13.5	15.3	39.1	31.3	27.5	14.6	14.8	11.6	4.5	2.7	6.6	23.4	13.1	40.0	60.1	70.3	83.9	85.6	27.7	85.6																						
12-Jul	79.6	64.6	41.7	30.5	28.2	24.9	14.9	23.2	41.1	40.4	42.0	44.2	30.2	31.0	24.0	16.9	13.0	12.0	11.8	13.0	12.3	8.1	6.3	5.8	27.5	79.6																						
13-Jul	4.1	4.0	3.3	2.4	2.0	1.6	1.5	1.3	1.4	1.9	1.6	1.4	1.4	1.5	1.5	1.5	1.8	2.2	3.5	2.5	2.1	2.5	3.6	3.8	2.3	4.1																						
14-Jul	12.5	21.6	17.4	11.5	7.0	4.9	7.6	15.3	11.4	9.9	17.6	21.2	17.2	16.9	14.7	13.1	11.4	12.2	11.3	11.1	9.1	9.1	10.2	10.9	12.7	21.6																						
15-Jul	10.9	9.4	7.5	6.3	5.8	5.0	4.0	4.9	M	8.1	11.6	15.2	15.5	15.4	15.1	13.2	11.8	15.0	17.1	15.7	10.4	11.0	12.5	11.8	11.0	17.1																						
16-Jul	14.4	14.1	19.1	20.5	21.7	22.7	24.5	32.5	39.7	69.3	72.3	56.7	43.2	44.8	37.8	29.6	22.2	17.6	16.6	17.5	14.7	7.6	4.5	3.4	27.8	72.3																						
17-Jul	3.5	4.1	4.7	4.5	5.5	4.2	4.5	4.6	6.4	7.2	8.5	7.0	6.5	8.6	9.8	9.7	10.8	10.2	13.9	16.3	12.4	11.0	10.7	10.9	8.1	16.3																						
18-Jul	10.0	9.9	9.8	10.0	10.1	13.2	10.3	6.5	8.1	7.6	8.5	7.9	7.0	6.6	6.9	7.2	10.2	11.7	11.3	6.8	13.9	9.2	9.4	4.4	9.0	13.9																						
19-Jul	5.0	5.2	5.1	4.9	8.4	13.7	17.3	20.6	35.4	48.3	33.6	19.6	15.5	9.4	5.7	6.9	8.1	9.3	30.2	42.8	41.3	36.3	35.4	36.2	20.6	48.3																						
20-Jul	36.2	38.3	38.1	41.8	41.1	37.1	33.5	29.1	29.9	33.2	29.5	24.6	26.6	27.0	24.9	26.3	29.8	29.8	26.9	23.2	19.9	19.0	18.4	16.4	29.2	41.8																						
21-Jul	16.4	15.3	14.9	14.1	13.2	13.2	9.5	6.1	8.2	13.6	18.1	28.6	37.7	43.9	49.0	54.2	54.6	52.8	53.1	51.7	45.5	39.3	39.7	40.5	30.6	54.6																						
22-Jul	39.9	39.0	38.0	49.8	54.9	46.1	34.9	32.7	32.3	42.7	50.7	42.7	39.6	31.1	25.2	23.6	23.4	21.7	19.1	16.5	15.8	19.7	27.3	29.7	33.2	54.9																						
23-Jul	27.5	24.7	23.8	22.0	19.9	15.5	13.3	9.4	8.0	7.5	7.0	6.1	6.2	4.7	5.3	6.9	8.0	8.2	9.7	9.0	9.5	11.3	16.6	8.9	12.0	27.5																						
24-Jul	4.9	3.2	4.5	4.6	4.0	6.4	7.5	8.1	12.1	12.4	8.8	10.3	10.5	8.0	6.9	6.6	6.0	5.2	5.7	5.2	4.3	6.5	8.3	7.7	7.0	12.4																						
25-Jul	8.9	9.5	8.2	8.6	8.4	8.3	7.6	4.6	4.1	5.1	3.9	4.6	4.3	4.9	4.2	1.7	2.4	3.5	2.5	2.7	2.7	2.1	3.4	4.7	5.0	9.5																						
26-Jul	4.1	2.7	2.9	4.1	5.7	7.7	4.7	3.7	4.2	4.3	8.1	10.9	10.3	7.3	6.3	7.9	9.4	10.1	9.0	5.3	6.0	10.5	13.5	11.3	7.1	13.5																						
27-Jul	8.2	9.2	9.0	9.5	9.1	8.0	6.4	7.9	9.0	8.8	8.3	7.4	13.1	12.6	11.7	9.5	8.6	11.5	12.3	12.7	13.0	12.1	11.3	11.2	10.0	13.1																						
28-Jul	12.4	11.5	11.7	11.8	11.8	4.8	1.9	1.9	2.0	1.6	1.9	2.2	2.9	4.0	5.8	6.2	7.6	6.8	7.4	8.0	6.1	5.0	6.1	6.5	6.2	12.4																						
29-Jul	6.3	6.3	7.2	8.7	7.2	9.0	10.2	7.5	5.2	4.5	5.3	6.7	8.0	8.0	9.1	11.1	14.7	15.3	17.4	18.3	6.2	8.6	9.9	8.5	9.1	18.3																						
30-Jul	6.8	8.5	7.3	7.4	7.7	6.3	6.0	5.1	6.2	7.4	6.5	7.8	9.0	9.9	8.2	8.4	10.2	10.2	8.8	9.1	5.7	4.8	4.2	3.3	7.3	10.2																						
31-Jul	2.3	2.7	3.2	4.0	3.5	3.8	4.0	2.5	5.5	7.6	10.4	8.8	5.5	7.0	9.4	121.3	180.4	124.9	68.6	44.8	25.0	21.2	55.0	19.6	30.9	180.4																						
																								14.3	14.1	13.7	13.1	12.9	12.0	10.9	11.1	14.5	17.2	17.9	16.9	16.1	15.2	14.2	16.9	18.2	16.7	15.1	15.5	15.1	15.3	17.5	15.5	Diurnal Average
																								79.6	64.6	41.7	49.8	54.9	46.1	34.9	32.7	41.1	69.3	72.3	56.7	43.2	45.0	49.0	121.3	180.4	124.9	68.6	51.7	60.1	70.3	83.9	85.6	Diurnal Maximum

M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA NETWORK
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - July 2014

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	167	22.48	22.48
6 - 15	355	47.78	70.26
16 - 25	105	14.13	84.39
26 - 80	111	14.94	99.33
> 81.0	5	0.67	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Wapasu - July 2014

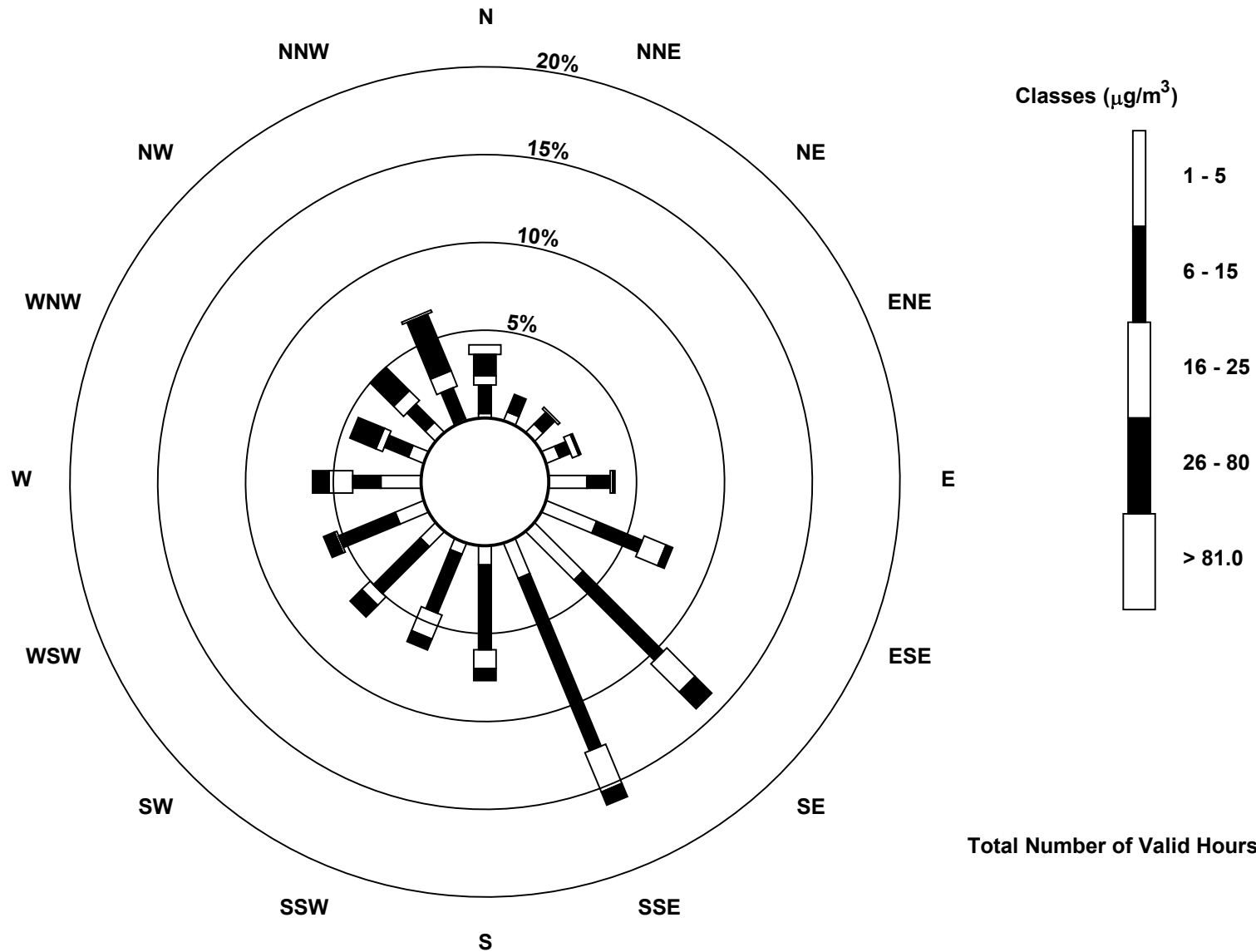
Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	2	4	5	6	16	23	29	16	8	5	9	13	17	7	6	1	167
6 - 15	12	8	7	5	10	21	48	79	36	27	28	26	12	11	11	14	355
16 - 25	4	0	1	3	1	10	17	18	8	11	5	1	10	3	6	7	105
26 - 80	9	0	0	1	1	3	10	6	5	5	7	5	7	12	14	26	111
> 81.0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5
Totals	31	12	13	15	28	57	104	119	57	48	49	45	46	33	37	49	743

Total Number of Valid Hours: 743

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Wapasu (AMS 17)



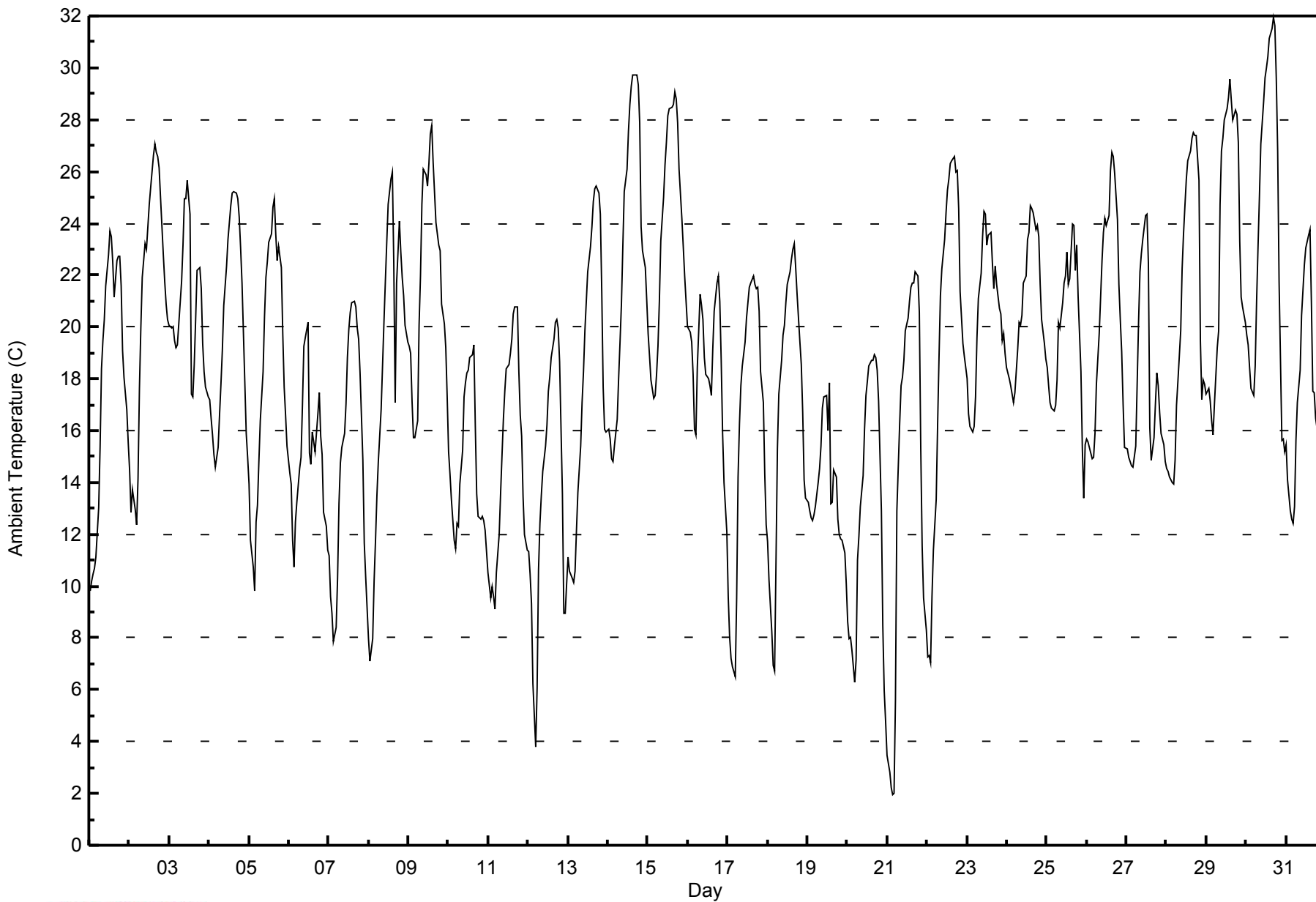


Maximum Value: 31.9 C on Jul 30 17:00		Maximum Daily Average: 24.0 C on Jul 30		Hours in Service: 744																																												
Minimum Value: 1.9 C on Jul 21 04:00		Minimum Daily Average: 12.9 C on Jul 20		Hours of Data: 744																																												
Maximum Diurnal Average: 22.9 C at hour 15		Minimum Diurnal Average: 12.5 C at hour 4		Hours of Missing Data: 0																																												
Monthly Average: 18.47 C		Percentiles: P ₁ = 5.6 P ₁₀ = 11.3 Q ₁ = 14.9 Median = 18.6 Q ₃ = 22.3 P ₉₀ = 25.3 P ₉₉ = 29.5		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-Jul	9.8	10.2	10.5	10.7	11.1	13.0	15.4	18.4	19.5	20.3	21.6	22.8	23.7	23.5	22.5	21.1	22.5	22.8	22.7	21.6	19.1	18.1	16.8	15.6	18.0	23.7																						
2-Jul	14.5	12.9	13.7	13.0	12.3	14.2	17.6	19.9	21.9	23.2	23.0	23.8	24.7	25.4	26.6	27.1	26.7	26.6	26.1	25.0	22.8	21.8	20.9	20.3	21.0	27.1																						
3-Jul	20.1	20.0	20.0	19.5	19.2	19.3	20.1	21.8	23.2	24.9	25.0	25.7	24.4	17.4	17.3	18.6	20.3	22.2	22.3	21.5	19.4	18.3	17.7	17.3	20.6	25.7																						
4-Jul	17.2	16.5	15.8	15.1	14.6	15.4	16.6	17.8	19.1	20.8	22.4	23.4	24.0	24.7	25.2	25.2	24.9	24.2	23.0	21.7	17.9	15.9	15.0	20.1	25.2																							
5-Jul	13.9	11.8	10.7	9.8	12.5	13.1	14.8	16.4	18.3	20.4	21.9	22.5	23.3	23.6	24.6	25.0	23.6	22.6	23.1	22.3	19.8	17.7	16.6	15.4	18.5	25.0																						
6-Jul	14.4	13.9	11.7	10.8	12.5	13.2	14.5	15.0	17.0	19.3	19.6	20.2	15.1	14.7	15.9	15.6	15.2	16.6	17.5	15.8	15.1	12.9	12.3	11.4	15.0	20.2																						
7-Jul	11.2	9.6	9.0	7.9	8.4	10.3	13.2	14.7	15.3	15.9	17.0	18.8	19.9	20.6	20.9	21.0	20.8	20.0	19.5	18.2	14.9	11.7	10.4	9.2	14.9	21.0																						
8-Jul	8.0	7.1	8.0	10.2	11.8	13.5	14.8	16.8	18.5	20.2	21.7	23.3	24.7	25.7	26.0	22.4	17.1	21.7	24.1	22.9	21.9	21.2	20.1	19.4	18.4	26.0																						
9-Jul	19.2	19.0	17.1	15.7	15.7	16.4	20.1	21.9	24.7	26.1	25.9	25.4	26.3	27.4	27.8	26.4	24.0	23.6	23.2	23.0	20.9	20.1	19.2	17.3	21.9	27.8																						
10-Jul	15.2	14.3	13.3	11.8	11.4	12.4	12.3	13.9	15.2	17.3	17.9	18.2	18.3	18.8	18.9	19.3	16.2	13.6	12.7	12.6	12.7	12.6	12.1	11.3	14.7	19.3																						
11-Jul	10.5	9.5	10.0	9.6	9.1	10.5	12.0	13.6	15.0	16.4	17.5	18.4	18.6	19.0	19.5	20.5	20.8	20.8	18.3	16.6	15.8	13.4	12.0	11.4	14.9	20.8																						
12-Jul	11.3	10.5	9.3	6.2	3.8	6.1	10.6	12.4	13.5	14.4	15.4	16.2	17.5	18.1	18.8	19.5	20.2	20.3	19.9	18.7	13.6	8.9	9.0	10.1	13.5	20.3																						
13-Jul	11.1	10.6	10.3	10.1	10.6	12.1	13.6	15.4	17.1	18.3	19.8	21.0	22.2	23.1	23.9	24.8	25.3	25.4	25.2	24.4	21.4	17.7	16.0	16.0	18.1	25.4																						
14-Jul	16.0	15.7	14.9	14.8	15.4	16.4	18.0	19.4	20.9	23.1	25.2	26.1	27.6	28.6	29.3	29.7	29.7	29.7	29.4	27.9	23.8	22.9	22.3	21.1	22.8	29.7																						
15-Jul	19.7	18.9	17.9	17.2	17.3	18.2	19.2	21.0	23.3	25.0	26.2	27.1	28.1	28.4	28.5	28.6	29.1	28.8	27.9	26.1	24.2	23.1	22.0	21.0	23.6	29.1																						
16-Jul	20.0	19.8	19.4	18.2	16.0	15.9	18.5	21.3	20.8	20.3	18.8	18.2	18.0	17.7	17.4	19.1	20.6	21.7	21.9	21.0	18.7	15.9	14.0	12.1	18.6	21.9																						
17-Jul	9.6	8.0	7.2	6.9	6.5	9.6	14.2	16.3	17.7	18.5	19.4	20.3	20.9	21.5	21.7	22.0	21.7	21.5	21.5	20.6	18.3	17.1	14.3	12.4	16.2	22.0																						
18-Jul	11.7	10.3	8.2	7.0	6.7	11.0	15.3	17.4	18.7	19.7	20.1	20.9	21.6	22.1	22.6	23.0	23.2	22.3	21.3	19.4	18.6	16.7	14.1	13.4	16.9	23.2																						
19-Jul	13.2	12.9	12.6	12.6	12.7	13.1	14.0	14.6	15.4	16.9	17.3	17.3	16.0	17.9	13.2	13.3	14.5	14.2	12.6	12.0	11.8	11.8	11.3	10.1	13.8	17.9																						
20-Jul	8.6	8.0	8.0	7.5	6.3	7.2	11.0	11.9	13.1	14.3	16.0	17.3	17.9	18.5	18.7	18.7	18.9	18.8	18.3	17.2	12.9	8.5	6.0	4.8	12.9	18.9																						
21-Jul	3.5	2.8	2.2	1.9	2.0	5.6	12.9	16.3	17.8	18.1	18.7	19.9	20.4	21.0	21.5	21.7	21.7	22.1	22.0	20.6	15.3	11.6	9.6	8.3	14.1	22.1																						
22-Jul	7.3	7.3	7.0	9.6	11.4	13.4	16.2	18.8	21.2	22.3	23.4	24.4	25.3	25.7	26.3	26.4	26.6	26.0	26.0	24.6	21.4	19.4	18.9	18.4	19.5	26.6																						
23-Jul	18.0	16.6	16.1	16.0	16.2	17.3	19.6	21.1	22.1	23.5	24.5	24.4	23.2	23.5	23.6	22.4	21.5	22.4	21.6	20.7	20.5	19.5	19.7	19.0	20.5	24.5																						
24-Jul	18.4	18.0	17.7	17.4	17.1	17.5	19.1	20.2	20.1	20.5	21.7	22.0	23.4	23.7	24.7	24.6	24.4	23.8	23.9	23.5	21.6	20.3	19.4	18.8	20.9	24.7																						
25-Jul	18.5	17.8	17.1	16.9	16.7	17.0	18.0	20.2	19.9	20.9	21.7	21.9	22.9	21.7	21.9	24.0	23.9	22.2	23.1	21.1	18.3	15.3	13.4	15.5	19.6	24.0																						
26-Jul	15.7	15.6	15.1	14.9	14.9	15.9	17.8	19.8	21.2	22.6	23.6	24.2	23.9	24.3	26.0	26.8	26.6	25.9	24.1	21.6	20.3	19.0	17.0	15.4	20.5	26.8																						
27-Jul	15.3	15.0	14.8	14.7	14.6	15.4	17.8	20.2	22.1	22.8	23.3	24.3	24.4	22.5	16.1	14.9	15.7	17.0	18.2	17.8	16.7	15.9	15.5	14.8	17.9	24.4																						
28-Jul	14.6	14.4	14.2	14.0	14.0	14.9	17.0	17.9	19.9	22.2	23.6	24.7	25.7	26.4	26.8	27.3	27.5	27.4	27.4	25.6	19.5	17.2	18.0	17.8	20.7	27.5																						
29-Jul	17.4	17.6	17.1	16.4	15.9	17.0	19.2	19.9	24.8	26.8	27.3	28.0	28.4	28.8	29.6	28.8	28.0	28.4	28.2	27.1	23.3	21.2	20.8	20.2	23.3	29.6																						
30-Jul	19.7	19.3	18.5	17.6	17.4	18.5	21.0	23.0	25.0	27.1	28.7	29.6	30.0	30.4	31.1	31.5	31.9	31.6	29.6	26.8	21.7	15.6	15.7	15.2	24.0	31.9																						
31-Jul	15.4	14.1	12.9	12.6	12.4	13.1	15.6	17.1	18.3	20.5	21.4	22.4	23.0	23.6	23.8	20.9	17.5	17.5	16.5	15.7	15.1	14.5	14.4	14.1	17.2	23.8																						
																								14.2	13.5	12.9	12.5	12.5	13.8	16.1	17.9	19.4	20.7	21.6	22.4	22.7	22.8	22.9	22.9	22.6	22.7	22.3	21.1	18.7	16.7	15.7	14.9	Diurnal Average
																								20.1	20.0	20.0	19.5	19.2	19.3	21.0	23.0	25.0	27.1	28.7	29.6	30.0	30.4	31.1	31.5	31.9	31.6	29.6	27.9	24.2	23.1	22.3	21.1	Diurnal Maximum



WBEA NETWORK
Hourly Averages

Ambient Temperature (AT) - C
Wapasu - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Wapasu - July 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	50	6.72	6.72
10 - 20	392	52.69	59.41
> 20	302	40.59	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

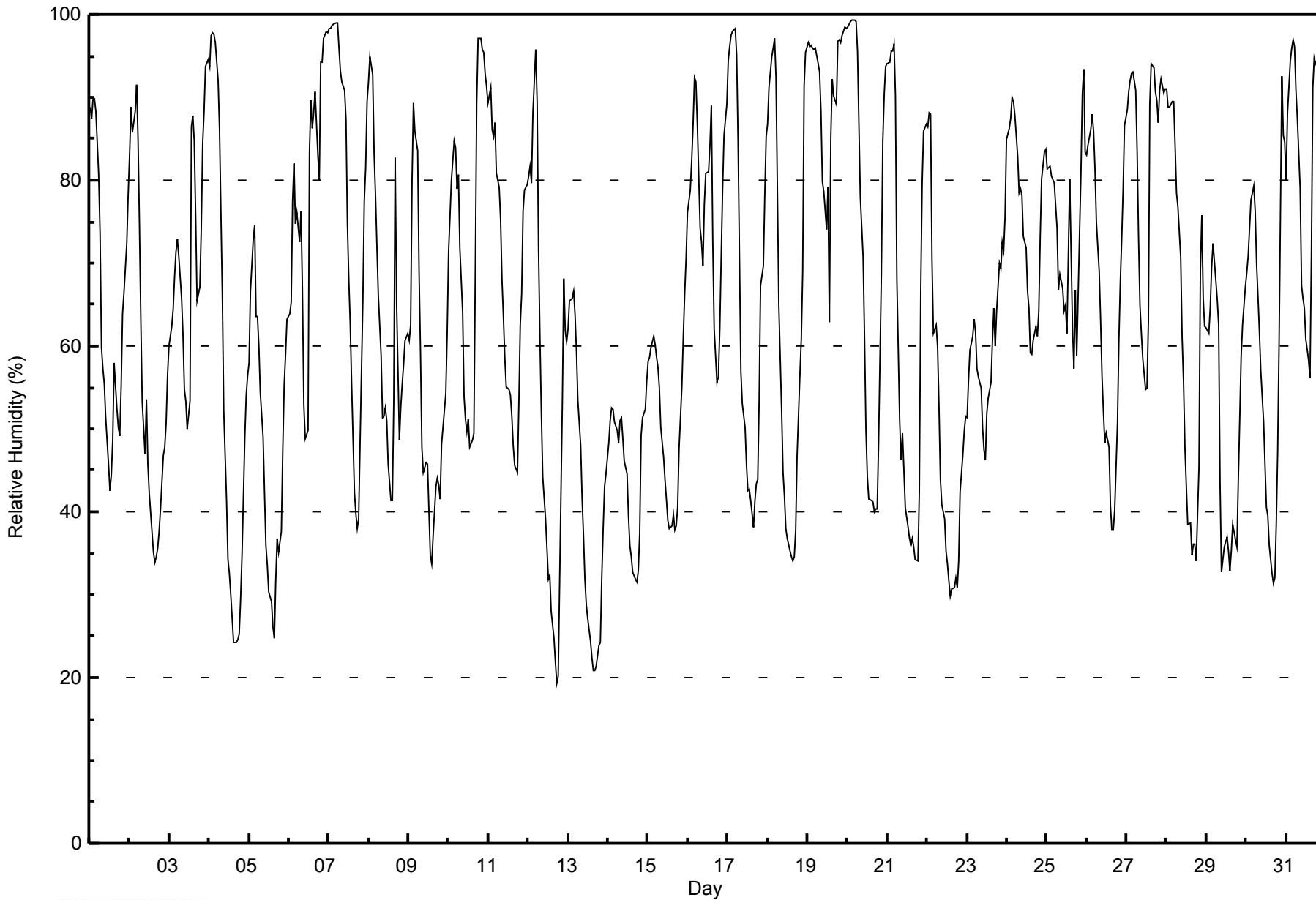


Maximum Value: 99 % on Jul 20 05:00														Maximum Daily Average: 90.3 % on Jul 19														Hours in Service: 744											
Minimum Value: 19 % on Jul 12 18:00														Minimum Daily Average: 40.3 % on Jul 13														Hours of Data: 744											
Maximum Diurnal Average: 83.8 % at hour 4														Minimum Diurnal Average: 48.2 % at hour 16														Hours of Missing Data: 0											
Monthly Average: 64.2 %														Percentiles: P ₁ = 24 P ₁₀ = 36 Q ₁ = 47 Median = 63 Q ₃ = 84 P ₉₀ = 93 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-Jul	89	88	90	90	88	81	73	60	57	55	51	46	43	44	49	58	52	50	49	55	64	66	72	78	64.6	90													
2-Jul	83	89	86	88	92	85	75	63	53	47	54	46	42	40	35	34	35	36	38	40	47	48	51	56	56.7	92													
3-Jul	60	62	64	68	71	73	71	66	61	55	53	50	53	86	88	85	76	65	67	74	84	88	94	95	71.3	95													
4-Jul	94	97	98	98	97	92	86	76	66	52	41	34	32	30	27	24	24	25	25	29	35	49	54	56	55.9	98													
5-Jul	58	67	73	75	64	63	60	54	49	42	36	34	30	29	26	25	32	37	35	38	48	55	59	63	47.9	75													
6-Jul	64	65	77	82	75	76	72	76	67	53	49	50	83	90	86	88	91	83	80	94	94	97	98	98	78.7	98													
7-Jul	98	98	99	99	99	99	96	93	92	91	87	75	68	63	55	42	40	38	39	48	65	77	82	89	76.4	99													
8-Jul	92	95	93	83	78	72	66	59	51	52	53	51	46	41	41	53	83	65	49	53	55	58	61	62	62.9	95													
9-Jul	61	63	80	89	86	84	69	59	48	45	46	46	40	35	34	37	43	44	43	42	48	52	54	61	54.5	89													
10-Jul	71	76	80	85	84	79	81	72	64	54	51	50	51	48	49	49	69	89	97	97	96	95	93	91	73.8	97													
11-Jul	89	91	86	85	87	81	79	75	68	64	59	55	55	54	52	48	46	45	53	62	66	76	79	80	68.1	91													
12-Jul	80	82	80	88	96	90	72	61	52	44	39	36	32	32	28	25	22	19	20	31	54	68	62	60	53.0	96													
13-Jul	62	65	66	67	64	59	53	48	42	37	32	29	27	24	22	21	21	21	24	24	32	38	43	45	40.3	67													
14-Jul	48	51	53	52	51	50	48	51	51	49	46	45	39	36	35	33	32	31	33	37	49	51	52	56	45.0	56													
15-Jul	58	59	60	61	60	59	57	55	50	47	44	41	39	38	38	40	38	38	41	48	55	61	66	70	50.9	70													
16-Jul	76	79	82	87	92	92	87	74	72	70	77	81	81	84	89	73	62	56	56	62	71	79	85	89	77.4	92													
17-Jul	94	96	97	98	98	95	85	71	57	53	50	46	43	43	41	38	41	43	44	54	67	70	78	85	66.2	98													
18-Jul	87	91	95	96	97	92	79	65	52	45	42	38	37	35	35	34	35	38	47	56	61	69	91	95	63.0	97													
19-Jul	97	96	96	96	96	96	94	93	88	80	79	74	79	63	85	92	90	89	97	97	97	98	98	98	90.3	98													
20-Jul	98	99	99	99	99	99	96	87	78	71	61	50	44	42	41	41	40	40	40	48	69	85	90	94	71.3	99													
21-Jul	94	94	96	96	96	90	68	51	46	49	45	41	38	37	36	37	36	34	34	43	67	80	86	87	61.7	96													
22-Jul	86	88	88	70	61	63	60	52	44	41	39	35	34	32	30	31	31	32	31	34	42	47	50	52	48.9	88													
23-Jul	51	56	59	61	63	62	57	56	55	50	48	46	52	54	56	60	65	60	64	70	69	72	71	76	59.8	76													
24-Jul	85	86	88	90	90	88	83	79	79	78	73	72	67	65	59	59	61	62	61	64	73	80	83	84	75.3	90													
25-Jul	81	82	82	81	80	77	74	67	69	67	64	65	62	71	80	62	57	67	59	66	81	90	93	83	73.3	93													
26-Jul	83	84	86	88	86	81	75	69	63	56	52	48	50	48	41	38	38	40	51	61	68	73	79	87	64.3	88													
27-Jul	89	91	92	93	93	91	83	73	65	61	59	55	55	63	89	94	93	91	90	87	91	92	91	91	82.1	94													
28-Jul	91	89	89	90	90	84	78	77	71	61	56	48	43	39	39	35	36	36	34	45	69	76	66	62	62.6	91													
29-Jul	62	61	65	70	72	70	66	63	43	33	34	36	37	35	33	35	38	37	36	44	51	59	63	67	50.4	72													
30-Jul	69	71	74	78	79	76	70	66	62	57	51	46	40	39	36	33	31	32	38	47	60	93	85	85	59.1	93													
31-Jul	80	88	94	96	97	96	91	88	79	67	66	65	61	58	56	71	91	95	94	95	93	92	93	89	83.1	97													
														78.4	80.6	82.8	83.8	83.2	80.5	74.3	67.7	61.1	55.6	52.8	49.3	48.5	48.3	48.7	48.2	49.9	49.7	50.6	56.3	65.2	72.1	74.9	76.9	Diurnal Average	
														98	99	99	99	99	99	96	93	92	91	87	81	83	90	89	94	93	95	97	97	97	98	98	98	Diurnal Maximum	



WBEA NETWORK
Hourly Averages

Relative Humidity (RH) - %
Wapasu - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Wapasu - July 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	1	0.13	0.13
20 - 40	117	15.73	15.86
40 - 60	208	27.96	43.82
60 - 80	201	27.02	70.83
80 - 100	217	29.17	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 20 km/h on Jul 3 12:00	Maximum Daily Speed Average: 13.0 km/h on Jul 23	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 2 10:00	Minimum Daily Speed Average: 0.4 km/h on Jul 1	Hours of Data: 744
Maximum Diurnal Speed Average: 5.1 km/h at hour 4	Minimum Diurnal Speed Average: 0.8 km/h at hour 18	Hours of Missing Data: 0
Monthly Average Velocity: 2.5 km/h 179.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 13 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-Jul	ESE5	SE5	SE5	SE5	SE4	S4	SSE4	WSW5	WSW8	WSW7	W6	NNW7	SW5	NW8	NNW7	N9	NNE6	NE6	ENE5	ENE6	E4	ESE6	ESE5	ESE5	SE0.4	N9
2-Jul	ESE5	SE4	SE5	SE5	SE4	ESE3	SSE4	SE5	SE4	SSE0	NW5	W1	E5	ENE5	S4	ESE6	SSW7	S7	SSE7	SE7	SE7	SE11	SE13	SE12	SE4.6	SE13
3-Jul	SE13	SE13	SSE13	SSE13	SSE12	SE12	SE13	SE14	SE14	SSE18	SSE19	SE20	SSE15	SSE9	SE13	SE15	SE19	SE18	SSE8	NNW6	NNE4	ENE5	ESE4	SE6	SE11.2	SE20
4-Jul	S3	W6	SW3	SW6	SSW5	SSW5	SW7	SW9	SW11	WSW13	WSW16	W16	WSW16	WSW16	WSW15	WSW18	WSW18	WSW15	WSW15	WSW10	WSW6	SSW3	S4	S5	WSW9.6	WSW18
5-Jul	SSW4	SSE5	SSE5	SSE6	SSE6	SSE5	SSW6	SSW6	SSW9	SSW9	SSW11	WSW13	W12	W12	W12	W12	NW10	NE7	ENE6	NE5	N6	NNE6	ENE5	SE6	SW2.9	WSW13
6-Jul	SE7	W2	SE3	SE4	SSW4	NW2	SSE3	SW4	SW6	W8	NNW9	NNW6	NNE1	S5	SE2	SSW2	WSW7	W8	WSW3	W3	NW5	NNW2	W1	NNE2	WSW2.1	NNW9
7-Jul	NNW2	WSW1	SW2	SW1	SSE2	SSE2	WSW3	W4	NNW5	NNW6	NNW8	NW11	NW11	NW12	NNW13	N12	N10	N8	NNE8	NNE5	ENE2	ESE4	E4	SE3	NNW3.7	NNW13
8-Jul	SE4	SE5	SE6	SE7	SE7	SSE8	SSE10	SSE11	S12	S11	S12	SSW12	SW12	SSW11	SW10	NW8	ESE7	SE9	SSE10	SSE10	SSE11	SSE10	SSE11	S8	S7.7	SSW12
9-Jul	S8	S7	WSW2	E3	SE4	ESE3	SSE4	SSE9	SSE10	S10	SSW15	SSW12	SSW15	SW14	SW15	SW11	NNW9	W7	SSW4	SW8	SSW7	W7	NNW9	NNW5	SSW6.1	SSW15
10-Jul	WSW4	WSW5	WSW5	SW6	WSW8	WSW9	WSW7	SW7	WSW8	W12	W13	W13	NNW12	W12	NNW13	NNW15	NW14	NW15	NW13	NNW9	NW8	NNW6	NNW7	NNW6	W8.5	NNW15
11-Jul	NW6	W4	W7	W5	NNW5	W5	W6	W7	NNW7	W9	W11	W11	NNW10	W11	NNW11	NW11	NNW10	N11	NNW10	N6	NNW4	NNW4	N5	N5	NNW6.4	W11
12-Jul	NNW5	NNW6	N5	ESE2	SSE3	SSE1	NNW6	NNW9	NNW9	NNW10	NNW10	NW11	NNW10	NW9	NW11	NW9	NNW10	NNW9	NNW7	NNW4	NE2	E4	E6	ESE7	NNW5.1	NW11
13-Jul	ESE8	ESE9	ESE9	SE9	ESE9	ESE11	SE12	SE11	SE6	WSW1	ENE5	ESE3	ESE3	ESE3	W2	SSW1	NNE1	E2	NNW7	ESE3	SSE4	SE6	SE8	SE9	SE4.8	SE12
14-Jul	SSE12	SSE13	SSE13	SSE13	SSE13	SSE13	S11	S11	S11	S10	SSW9	SW10	SSW11	SSW12	SW11	SW11	SW12	SW10	SW7	SSW5	S5	S7	S7	S7	SE8.9	SSE13
15-Jul	S7	S8	S8	S9	S9	S10	S9	S8	SSW9	SSW10	SSW11	SSW12	SSW12	SW13	SW11	SW10	SSW11	SSW10	SSW9	S7	S7	S8	S7	S7	SSW8.8	SW13
16-Jul	S6	S6	SSW4	SW2	W1	SE2	SSE2	N6	NNW11	NNW9	NNW4	N4	NW6	NW5	WSW4	WSW11	W8	W6	WSW7	SW5	S5	NE7	E5	E2	NNW1.7	WSW11
17-Jul	ENE1	NNE3	NNE3	NE2	E3	SE2	NE3	NE4	NNE4	NNW4	N5	NW3	NNW6	NNW7	NNW6	W5	NNW3	NNW4	NNW3	S1	N3	N1	ENE3	E3	NNW2.1	NNW7
18-Jul	NE3	SE1	ESE2	E3	E3	NE5	NE7	NE7	NE8	ENE7	N5	N4	NNW7	NNW3	NNW4	NW3	NNW6	N2	E2	ESE3	WSW6	SSW7	SW7	SSE2	NNE1.5	NE8
19-Jul	SW3	SE7	ESE6	SE8	SSE8	S6	S7	SSW7	SSW7	SW9	WSW9	W13	WSW10	WSW12	NW8	WSW5	NNW7	NW12	NNW15	NNW12	NNW11	NNW11	NNW7	NNW3	W3.7	NNW15
20-Jul	W2	S2	SSE3	SSE4	NNW1	WSW1	W2	NW4	NNW7	NNW9	NNW9	NNW12	NNW11	NNW12	NNW11	N8	NNW9	NNW7	N7	NNW4	ESE1	ESE3	ESE3	SE4	NNW3.9	NNW12
21-Jul	ESE4	SE4	ESE4	ESE4	SE4	ESE4	SE4	SSE3	NNW2	NW6	NNW5	NW5	W5	NNW6	NW6	NNW8	NNW7	NW4	NW2	NW3	SE3	SE4	SE4	SE4	NNW0.6	NNW8
22-Jul	ESE4	SE4	SSE5	SE7	SE6	SSE6	SSE5	S5	SSW6	SW8	SW6	SW6	WSW5	SSW3	W4	SSW5	S5	S6	S7	SSE6	SE6	SE8	SE10	SE11	S4.7	SE11
23-Jul	SE11	SSE9	SSE7	SSE8	SSE8	SE9	SSE11	SSE10	SSE12	SSE13	SSE15	SSE17	SSE15	SE16	SE17	SE17	SE19	ESE17	ESE14	ESE12	SE16	SE17	SE16	SSE14	SE13.0	SE19
24-Jul	SSE13	SSE12	SSE13	SSE13	SE11	SE13	SE14	SSE12	SSE12	SSE10	SE13	SSE14	SE13	SSE11	SE12	SE14	SE15	SE16	SE15	SE13	ESE11	ESE12	SE15	ESE14	SE12.6	SE16
25-Jul	ESE13	ESE10	E8	E7	E8	E8	E10	E11	E9	E9	E11	E8	E9	ESE8	E7	E11	ESE11	ESE8	SE10	ESE5	E3	E3	E4	ESE8	E8.1	ESE13
26-Jul	ESE8	ESE10	ESE9	ESE9	SE8	SE7	SE7	SSE7	SE7	SE8	SE9	SE8	ESE8	SE5	S5	SSW7	SSW7	SW4	W4	SW5	SSE2	SSE5	SE4	SE5	SE5.4	ESE10
27-Jul	SSE5	SSE6	SSE6	SSE6	SSE6	SSE7	SSE7	SSE7	SSW7	SW8	SW9	SW7	SW5	ENE3	SE12	SSE6	SSE5	SSE7	SSE7	S7	SSE6	SSE7	S7	S7	SSE5.8	SE12
28-Jul	SSE7	SSE7	SSE7	SSE7	SSE7	SSE8	S8	S9	S8	SSW8	SW9	SW10	SW8	W9	WSW6	WSW7	SW6	WSW4	W5	SSW1	ESE3	SE5	SE6	SE6	SSW5.2	SW10
29-Jul	SSE6	SSE7	SSE7	SSE7	SSE6	SSE5	S5	SSE7	S6	W6	WSW5	WSW5	WSW7	W8	W6	NNW9	NNW6	NW2	ENE2	SSE4	SSE10	SE9	SSE12	SSE12	S3.6	SSE12
30-Jul	SSE11	SSE8	SE8	SE8	SSE6	SSE6	SSE8	SSE7	S6	S7	SSW8	SSW10	SW8	SSW7	SW7	SW6	SSW7	SSW7	S6	SSE5	NNW18	N9	NE12	E10	S4.3	NNW18
31-Jul	ESE10	WSW4	SE3	SSE4	SSE2	SSE5	SE4	S5	SE1	N7	N9	N10	N10	N11	NNE11	NNW13	N8	N7	NW8	NNW7	N8	NNW6	N7	N7	N4.1	NNW13

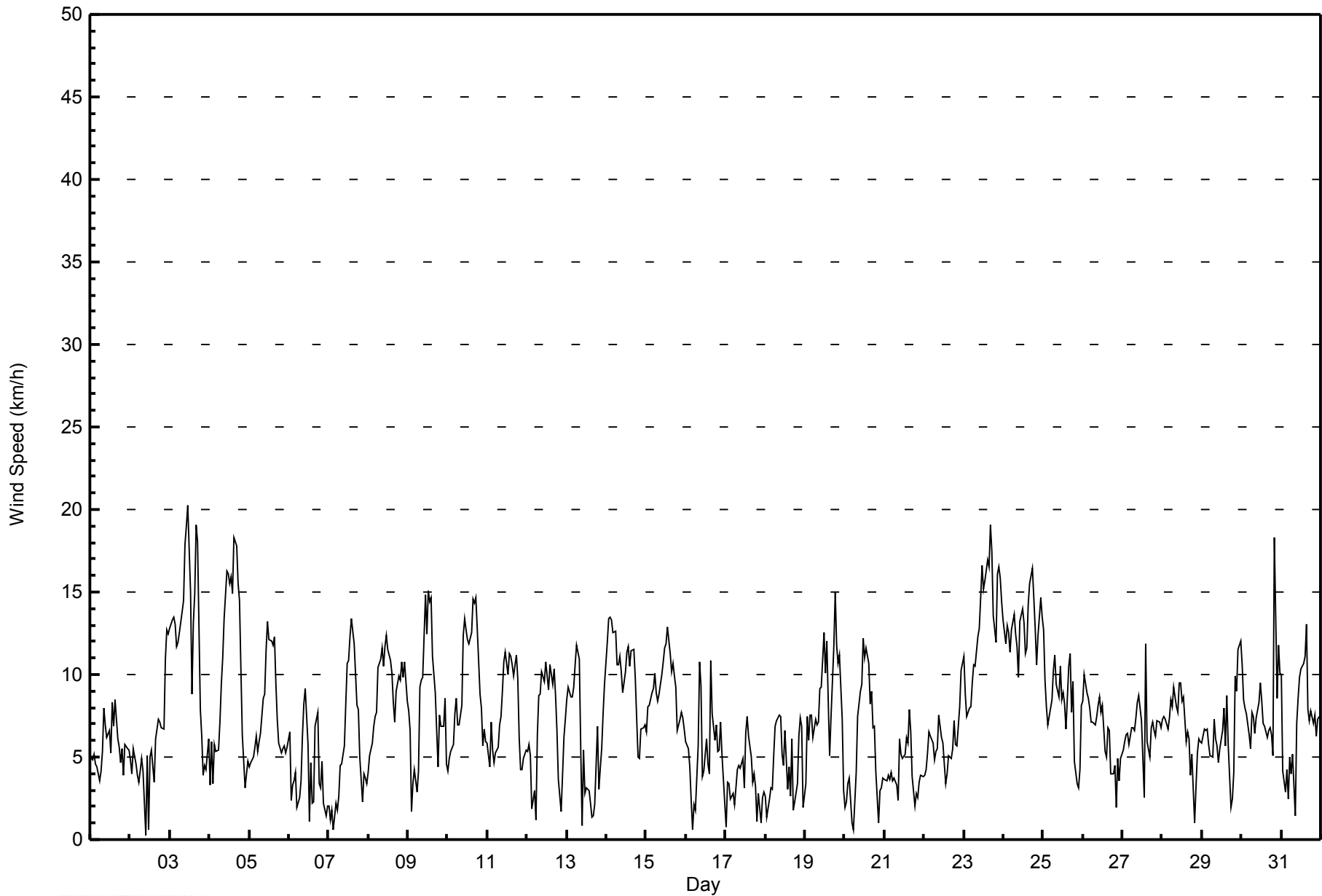
SE4.7 SSE4.4 SSE4.6 SSE5.1 SSE4.8 SSE4.6 SSE4.6 SSE4.4 S3.6 SW3.5 SW3.7WSW3.9WSW3.8WSW3.9WSW3.0WSW2.9 W1.8WSW0.8 SW1.0 S1.0 SSE1.3 SE2.6 SE3.7 SE4.5	Diurnal Average
SSE13 SSE13 SSE13 SSE13 SSE13 SE13 SE14 SE14 SE14 SSE18 SSE19 SE20WSW16WSW16 SE17WSW18 SE19 SE18NNW15 SE13 NW18 SE17 SE16 SSE14	Diurnal Maximum

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



WBEA NETWORK
Hourly Averages

Wind Speed (WS) - km/h
Wapasu - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Wapasu - July 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	248	33.33	33.33
6 - 11	378	50.81	84.14
12 - 19	117	15.73	99.87
20 - 28	1	0.13	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Wind Speed (WS) - km/h
Wapasu - July 2014

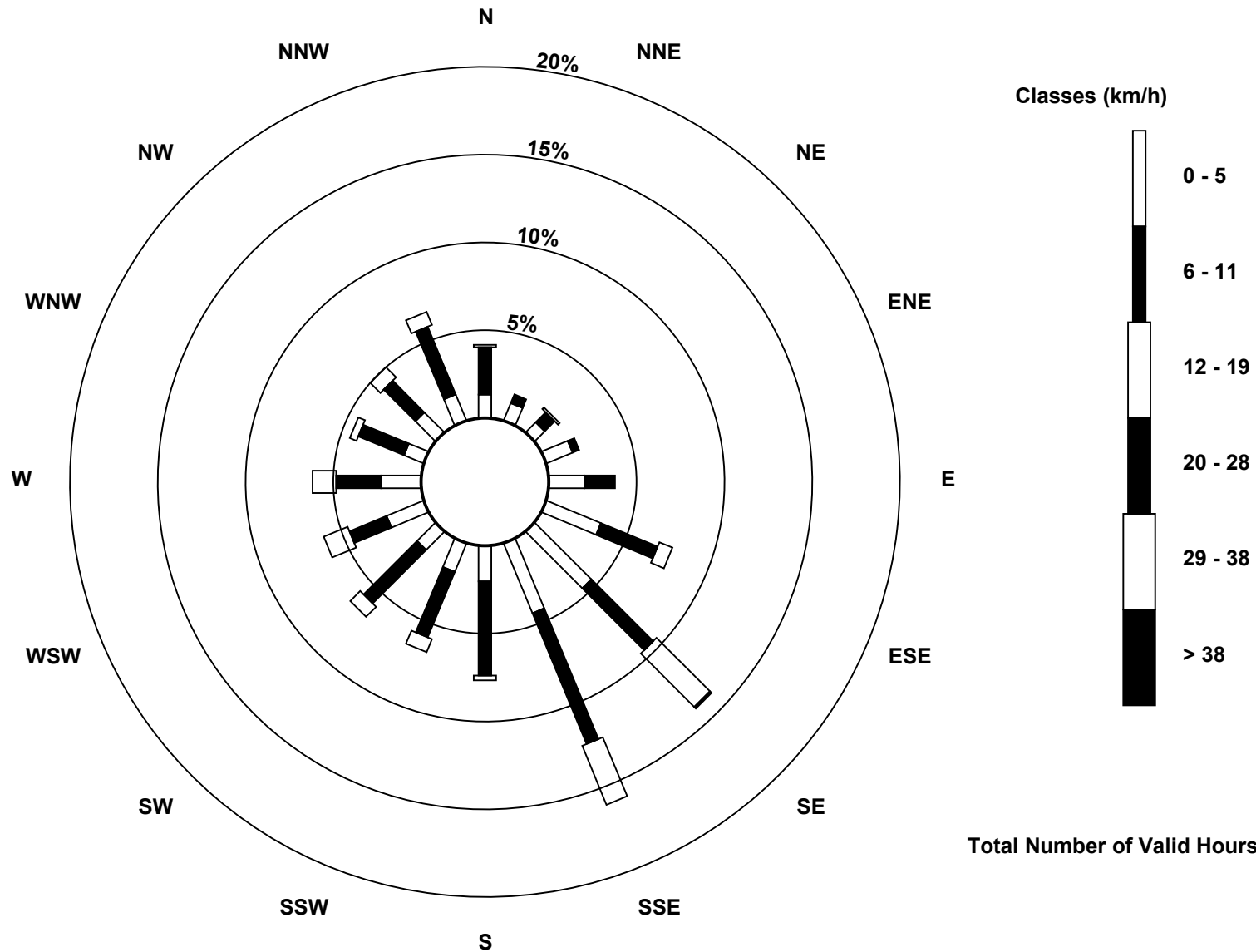
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	10	8	6	12	15	25	34	32	15	13	11	17	17	9	12	12	248
6 - 11	20	4	6	3	13	26	37	60	40	30	32	17	19	21	19	31	378
12 - 19	1	0	1	0	0	6	32	27	2	6	6	11	10	3	6	6	117
20 - 28	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	31	12	13	15	28	57	104	119	57	49	49	45	46	33	37	49	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

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

**Wind Speed (WS) - km/h
Wapasu (AMS 17)**



Total Number of Valid Hours: 744



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744											
Maximum Value: 12 km/h on Jul 30 21:00														Hours of Data: 744											
Minimum Value: 0 km/h on Jul 22 03:00														Hours of Missing Data: 0											
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6														Hours of Calibration: 0											
														Percent Operational Time: 100.0											
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	1	1	1	1	1	1	1	2	2	2	3	3	3	3	2	4	2	2	2	2	1	1	1	1	4
2-Jul	1	1	1	1	1	1	1	1	2	2	3	2	3	3	2	4	3	3	2	2	2	3	3	3	4
3-Jul	3	3	4	3	3	3	3	4	4	5	6	6	6	4	3	5	5	5	6	3	2	1	2	1	6
4-Jul	4	3	2	2	2	2	2	4	5	5	6	5	5	5	6	5	5	5	4	3	3	1	1	1	6
5-Jul	1	1	1	1	1	1	2	3	3	3	4	5	4	4	5	4	5	3	2	2	3	2	2	2	5
6-Jul	1	3	1	1	2	2	2	2	2	3	3	3	4	2	2	1	3	2	3	1	2	1	1	1	4
7-Jul	1	1	1	1	1	1	1	1	2	2	3	4	4	4	4	4	4	3	3	2	1	1	1	1	4
8-Jul	1	1	1	1	1	2	3	4	4	4	4	4	4	4	5	6	3	2	3	2	3	3	3	2	6
9-Jul	2	2	2	3	2	1	3	2	3	4	6	5	6	5	6	5	3	2	3	3	2	3	3	2	6
10-Jul	1	1	1	2	2	3	2	2	3	4	5	5	4	4	5	5	4	5	5	3	2	2	2	2	5
11-Jul	2	1	3	2	2	2	2	2	2	3	3	4	4	3	4	4	3	4	4	2	1	1	1	2	4
12-Jul	1	2	2	1	0	1	2	2	4	3	3	4	4	4	4	4	3	3	2	1	1	1	1	1	4
13-Jul	2	2	2	2	2	3	4	3	3	2	3	3	3	3	2	2	2	2	2	3	1	2	2	2	4
14-Jul	3	3	3	3	3	4	4	3	3	3	3	4	4	4	4	4	4	3	3	2	1	1	2	2	4
15-Jul	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	2	2	3	2	2	4
16-Jul	2	1	1	1	1	1	2	2	4	3	2	1	2	2	2	3	2	2	2	2	1	5	2	1	5
17-Jul	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	2	2	1	1	1	4	3	1	1	4
18-Jul	1	1	1	1	1	2	2	3	3	3	3	3	3	3	3	3	3	2	1	1	3	3	3	2	3
19-Jul	2	2	1	1	2	2	2	2	3	3	3	4	4	4	4	2	3	4	6	4	4	3	2	1	6
20-Jul	1	1	1	1	1	1	1	2	2	3	3	4	4	4	4	3	4	3	2	2	1	0	0	1	4
21-Jul	0	0	1	0	1	1	1	1	2	2	3	3	3	4	3	3	3	2	1	1	1	1	1	1	4
22-Jul	1	0	0	1	1	1	1	2	2	3	3	3	2	3	3	3	3	3	2	2	1	1	2	2	3
23-Jul	2	2	2	2	2	2	3	3	3	4	5	5	5	5	5	5	6	5	4	3	5	5	4	4	6
24-Jul	4	3	3	3	3	3	4	4	4	3	4	4	4	4	4	4	5	5	4	4	3	3	4	4	5
25-Jul	4	3	2	2	3	3	3	3	3	3	3	3	3	4	3	3	4	3	3	1	1	1	1	1	4
26-Jul	2	2	2	2	2	2	2	2	2	4	4	3	3	3	3	3	2	2	3	2	1	1	1	1	4
27-Jul	1	1	1	1	1	1	2	2	3	3	3	3	3	4	5	3	2	2	2	2	1	2	2	2	5
28-Jul	2	2	2	1	2	2	3	3	3	3	3	3	3	3	3	3	3	2	2	1	1	1	1	1	3
29-Jul	1	1	1	1	1	1	2	2	2	3	3	3	3	4	3	3	2	1	1	4	3	2	3	3	4
30-Jul	2	2	2	2	1	1	2	2	2	3	3	4	4	3	3	4	3	3	2	1	12	4	4	3	12
31-Jul	2	3	2	2	1	1	2	2	2	2	3	3	4	4	4	5	4	3	4	3	3	2	3	3	5
														Diurnal Maximum											



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Wapasu - July 2014

Direction of Maximum Speed: 146 deg on Jul 3 12:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 139.4 deg on Jul 23	Hours of Data: 744
Direction of Minimum Speed: 158 deg on Jul 2 10:00	Direction of Minimum Daily Speed Average: 0.4 deg on Jul 1
Direction of Minimum Speed: 158 deg on Jul 2 10:00	Hours of Missing Data: 0
Monthly Average Direction: 229.2 deg	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	113	124	144	143	144	181	155	238	248	243	268	290	236	309	331	0	15	40	67	63	91	113	117	115	129.5
2-Jul	118	124	136	132	127	110	157	146	131	158	314	278	81	68	181	119	196	172	162	146	127	131	132	133	136.1
3-Jul	139	144	148	150	148	145	141	143	145	148	150	146	162	154	124	125	130	136	158	329	18	58	117	138	141.1
4-Jul	183	270	234	218	213	206	214	225	234	239	246	260	254	249	241	244	252	248	256	252	237	201	186	191	240.8
5-Jul	193	168	156	161	164	166	193	197	200	208	224	257	268	272	261	262	318	34	70	41	3	30	68	131	230.1
6-Jul	144	270	125	139	199	322	164	227	234	275	295	328	25	186	128	212	253	277	256	275	307	302	277	19	254.5
7-Jul	327	241	228	220	167	151	258	280	300	302	298	311	319	326	331	353	0	5	12	32	75	104	100	144	334.3
8-Jul	142	146	139	140	145	160	162	166	170	189	190	205	217	205	214	325	120	145	154	151	150	154	158	170	169.7
9-Jul	183	188	247	100	133	122	157	151	168	184	213	210	204	215	217	224	297	276	208	222	203	266	293	284	210.7
10-Jul	253	258	245	228	239	247	239	229	257	275	268	279	287	280	291	286	311	313	311	293	314	294	294	283	279.7
11-Jul	312	259	280	279	283	272	270	279	289	268	273	269	282	261	282	316	337	350	344	352	339	334	353	350	298.6
12-Jul	348	335	2	105	153	165	335	334	340	336	337	326	348	310	321	325	336	339	347	330	47	95	101	103	342.6
13-Jul	110	118	123	124	119	122	128	132	133	238	78	104	103	112	261	201	22	88	300	102	148	143	145	145	125.0
14-Jul	148	153	154	157	162	161	170	176	170	179	209	218	203	211	218	232	236	232	214	195	170	169	180	178	185.5
15-Jul	180	178	176	174	177	184	189	184	195	192	199	199	215	229	228	215	209	207	209	190	186	191	183	181	196.7
16-Jul	173	176	203	215	267	130	160	8	341	344	331	357	324	317	250	257	260	269	251	227	176	41	79	79	284.4
17-Jul	59	17	28	41	98	127	42	56	22	338	350	322	288	296	300	280	293	341	322	185	5	355	59	88	345.7
18-Jul	40	143	113	100	80	47	47	51	51	58	0	354	331	285	327	307	335	10	93	106	237	201	217	148	30.4
19-Jul	221	138	121	139	154	174	183	199	204	223	250	271	246	258	314	248	295	315	329	340	337	331	332	341	270.8
20-Jul	261	177	151	163	293	239	266	314	337	333	336	337	331	330	345	357	341	332	350	331	105	114	117	130	337.6
21-Jul	121	127	115	119	125	117	129	152	282	311	343	304	273	296	310	291	297	307	322	313	130	124	141	131	288.8
22-Jul	120	146	153	145	146	153	166	181	196	231	234	217	245	210	271	202	183	170	186	167	136	135	140	141	171.9
23-Jul	141	150	159	153	149	146	148	152	150	154	155	153	152	126	135	136	131	122	118	118	128	127	134	149	139.4
24-Jul	154	165	157	151	145	142	146	147	152	159	139	150	145	168	131	132	126	127	143	133	122	123	124	123	141.1
25-Jul	115	112	101	91	90	82	81	90	94	100	85	89	94	106	94	101	118	110	124	120	97	91	88	107	99.7
26-Jul	113	115	121	123	124	127	141	153	136	141	132	138	120	138	179	194	197	232	271	232	160	156	143	146	143.5
27-Jul	151	149	149	150	150	148	153	156	193	214	226	233	224	64	134	153	164	163	168	170	156	165	169	172	167.9
28-Jul	161	161	159	160	165	162	169	175	181	205	224	218	231	262	240	246	221	248	280	204	123	146	145	146	192.1
29-Jul	155	157	157	158	157	154	179	157	180	269	249	244	248	267	276	305	320	323	67	150	148	144	150	147	181.2
30-Jul	147	148	143	142	148	153	155	163	183	191	203	207	224	205	214	220	211	201	179	168	307	353	53	98	177.8
31-Jul	116	252	138	155	162	154	133	169	124	9	3	359	357	10	20	341	357	353	325	339	351	348	3	6	5.4

143.9 154.6 149.2 148.8 151.7 152.4 158.4 166.3 184.1 217.4 230.3 238.7 239.6 249.0 250.5 255.8 259.5 240.6 230.7 175.5 146.9 129.3 130.9 136.7
Diurnal Average

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

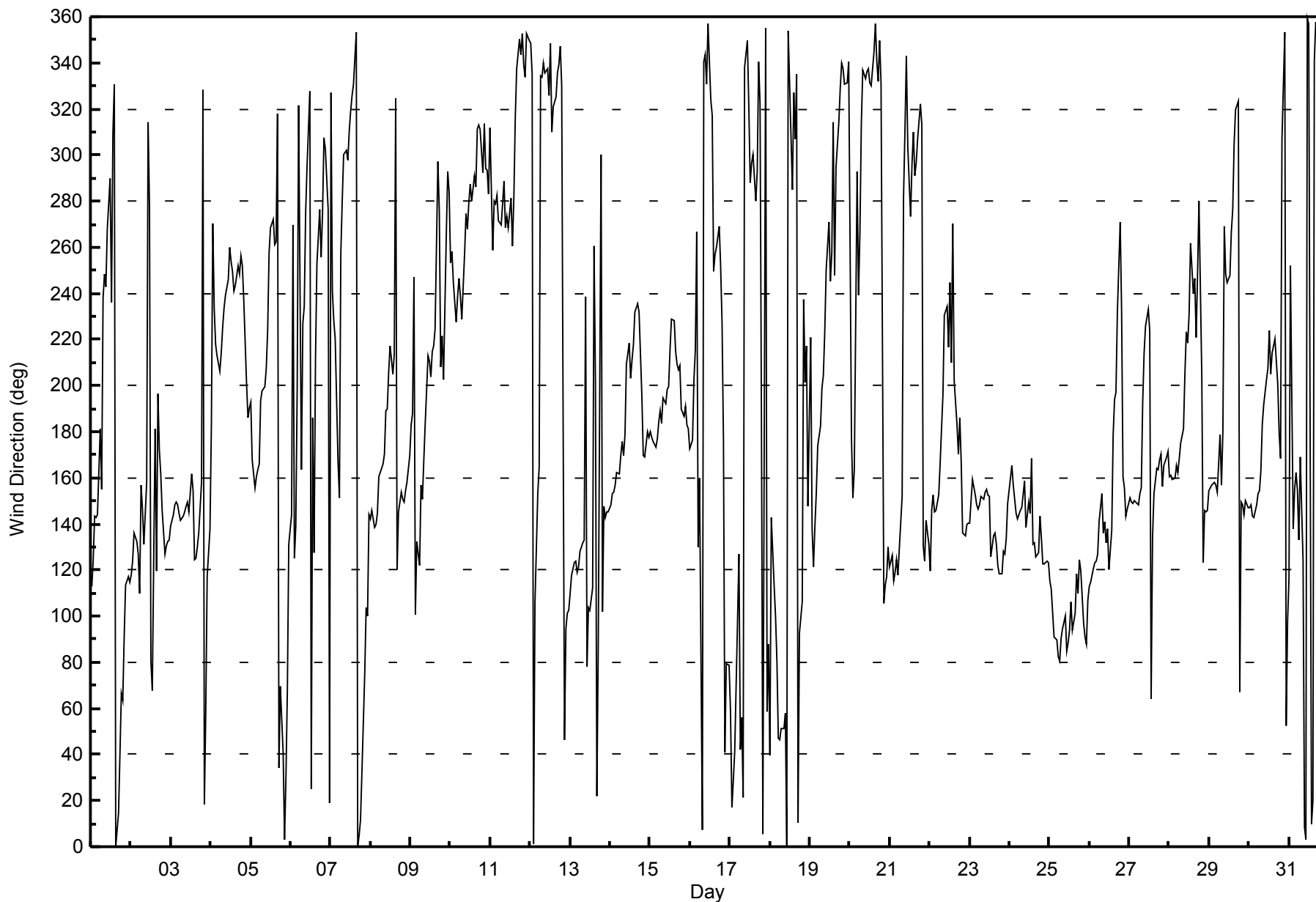


WBEA NETWORK

Hourly Averages

Wind Direction (WD) - deg

Wapasu - July 2014





Summary of Hour Standard Deviations

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Jul 2 10:00 Minimum Value: 4 deg on Jul 22 03:00 Percentiles: P ₁ = 8 P ₁₀ = 15 Q ₁ = 21 Median = 30 Q ₃ = 41 P ₉₀ = 61 P ₉₉ = 94																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	9	10	10	15	9	35	21	28	27	31	48	57	72	35	32	42	45	43	33	20	11	19	20	13	72
2-Jul	10	16	16	14	13	20	22	28	43	103	53	98	48	59	76	63	43	32	25	18	13	17	17	17	103
3-Jul	18	19	18	20	20	18	19	20	21	22	23	22	36	43	20	19	19	21	73	40	36	21	41	14	73
4-Jul	66	44	49	32	26	35	37	32	34	29	26	29	30	31	27	27	25	24	24	26	26	20	25	66	
5-Jul	22	10	13	14	19	20	29	40	39	41	37	37	34	32	35	34	50	37	35	29	31	35	42	55	55
6-Jul	12	74	25	37	39	72	81	49	39	38	34	59	95	40	69	71	33	28	91	31	32	35	79	65	95
7-Jul	44	80	57	85	34	21	50	28	32	31	27	29	32	30	27	37	37	37	39	32	23	12	25	19	85
8-Jul	21	7	9	11	15	21	23	25	29	35	38	36	38	43	39	62	53	20	21	18	20	23	21	22	62
9-Jul	28	36	88	78	43	25	54	20	30	33	37	38	39	37	38	47	26	32	45	35	33	50	26	30	88
10-Jul	23	23	22	26	24	24	26	32	32	31	31	28	28	31	37	30	24	24	24	25	23	30	27	35	37
11-Jul	30	31	33	34	36	28	25	30	27	30	34	33	33	27	33	32	32	34	31	35	30	19	28	26	36
12-Jul	27	23	28	57	9	73	29	27	35	36	40	32	47	47	38	40	36	36	32	28	56	8	12	12	73
13-Jul	15	15	15	15	16	19	21	25	71	98	61	91	85	96	92	95	97	92	28	65	34	16	13	15	98
14-Jul	18	20	20	21	23	24	28	30	27	37	42	38	43	37	41	35	30	31	41	31	14	18	24	27	43
15-Jul	28	25	27	24	28	30	33	33	38	38	38	37	38	31	32	36	38	41	37	30	29	33	30	27	41
16-Jul	28	24	26	46	78	29	18	44	31	28	35	35	24	32	50	24	32	34	28	38	20	71	24	56	78
17-Jul	65	22	26	41	29	26	38	51	60	72	75	92	57	47	49	47	47	36	55	77	71	94	25	20	94
18-Jul	48	66	39	15	10	23	30	34	47	48	68	73	56	93	75	94	53	79	44	39	34	37	48	84	94
19-Jul	53	21	18	16	24	34	34	36	37	35	42	27	33	33	27	30	34	21	30	30	28	21	21	29	53
20-Jul	46	38	21	11	95	87	44	42	34	31	34	31	36	37	39	44	43	42	38	23	60	25	9	6	95
21-Jul	9	10	11	9	11	11	16	45	94	52	62	72	82	72	65	40	42	64	70	33	34	16	10	18	94
22-Jul	13	10	4	8	7	11	21	34	41	36	53	59	71	84	79	55	56	38	36	21	12	11	14	16	84
23-Jul	16	19	18	19	16	19	20	23	23	26	26	24	24	22	22	20	21	21	21	21	20	20	20	20	26
24-Jul	20	25	20	19	18	20	20	23	24	27	25	30	29	33	31	25	25	22	22	21	19	20	19	21	33
25-Jul	24	22	21	27	28	25	25	28	30	27	27	31	30	38	34	29	23	22	21	14	16	20	15	14	38
26-Jul	15	17	17	16	16	17	16	25	28	36	39	39	24	49	62	55	41	45	41	30	62	10	16	10	62
27-Jul	9	9	11	10	13	17	20	26	33	41	38	53	61	91	50	38	29	23	22	24	18	19	24	25	91
28-Jul	19	19	20	19	21	25	28	30	36	43	34	38	43	44	61	63	47	70	32	66	19	5	6	7	70
29-Jul	11	13	13	13	11	11	42	23	39	50	66	67	54	51	72	25	28	78	49	22	19	15	19	17	78
30-Jul	19	19	17	18	13	16	22	28	40	43	45	44	43	48	53	53	46	47	30	18	58	42	33	25	58
31-Jul	20	51	61	50	54	18	29	26	79	39	40	42	43	41	43	32	42	37	47	30	33	35	34	38	79
																		66 80 88 85 95 87 81 51 94 103 75 98 95 96 92 95 97 92 91 77 71 94 79 84							
Diurnal Maximum																									

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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 3, 2014	Previous Calibration	June 10, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	12:05
Barometric Pressure	716 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	API T700	Serial Number	493
Cal Gas Concentration	47.8 ppm	Cal Gas Expiry Date	12-Dec-16
Gas Cert Reference	SA130010A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894
DACS voltage range	NA	DACS channel #	TCP/IP

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-702	-702
Analyzer Range (mv)	1000	1000	Lamp voltage	856	878
Calculated slope	0.996863	1.003540	Chamber temp.	44.9	44.9
Calculated intercept	0.429148	0.067046	Pressure (mmHg)	686.8	688.0
Analyzer Background	8.3	8.3	Flow (lpm)	0.450	0.450
Analyzer Coefficient	0.808	0.808	Intensity	83	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	-0.5	NA
as found span	5000	60.4	577.4	574.5	1.005
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	60.4	577.4	574.9	1.004
second point	5000	30.2	288.7	288.8	1.000
third point	5000	15.1	144.4	143.1	1.009
calibrator zero	6000	0.0	0.0	-0.3	NA
as left zero	6000	0.0	0.0	-0.3	NA
as left span	5000	60.4	577.4	575.0	1.004
Average Correction Factor					1.004

Corrected As found	575.0	Previous response	578.8	% change	0.7%
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Notes:

No Maintenance Done, Filter changed out, No adjustments made

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

SO₂ Calibration Summary

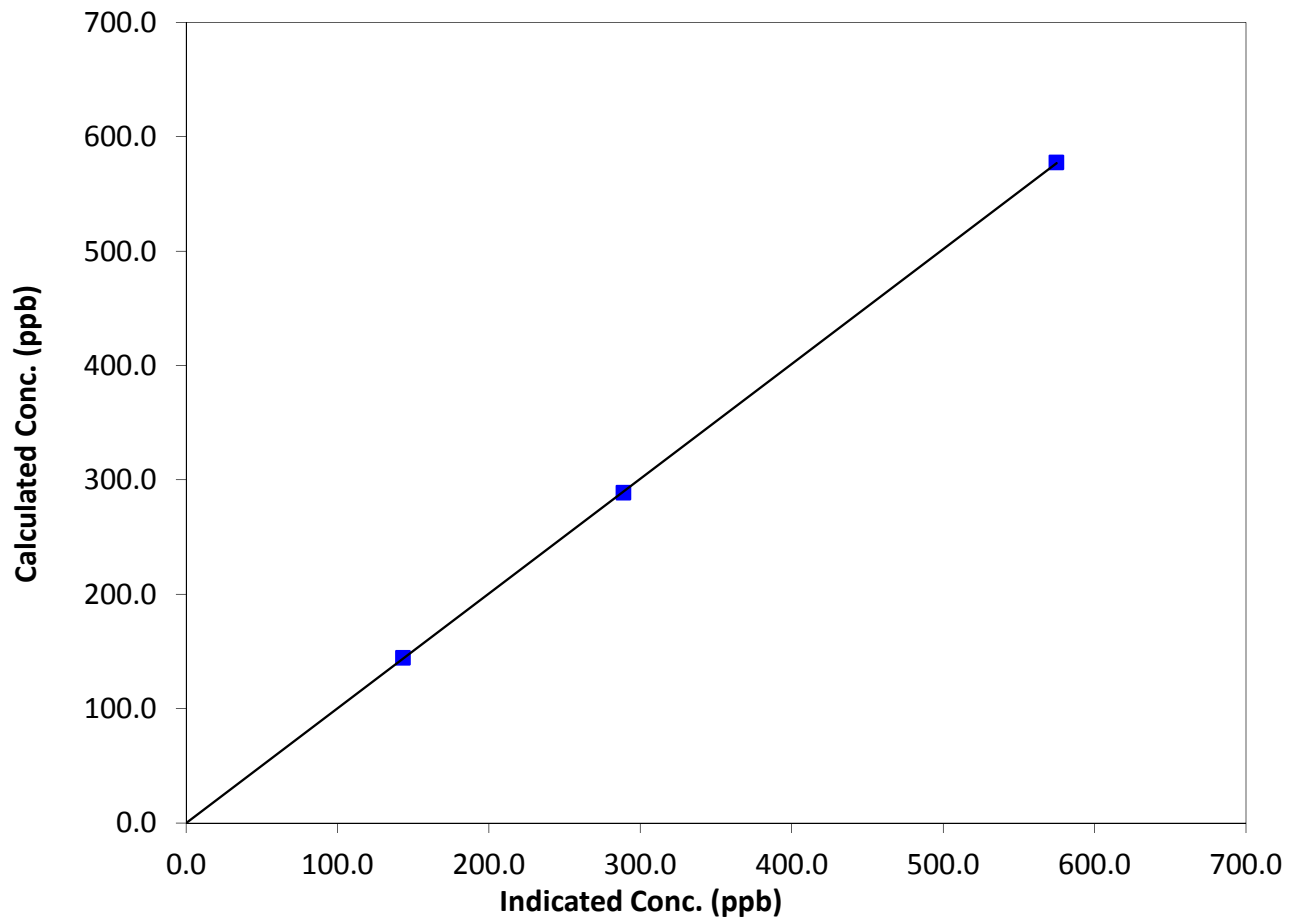
Station Information

Calibration Date	July 3, 2014	Previous Calibration	June 10, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:55	End Time (MST)	12:05
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

Calibration Data

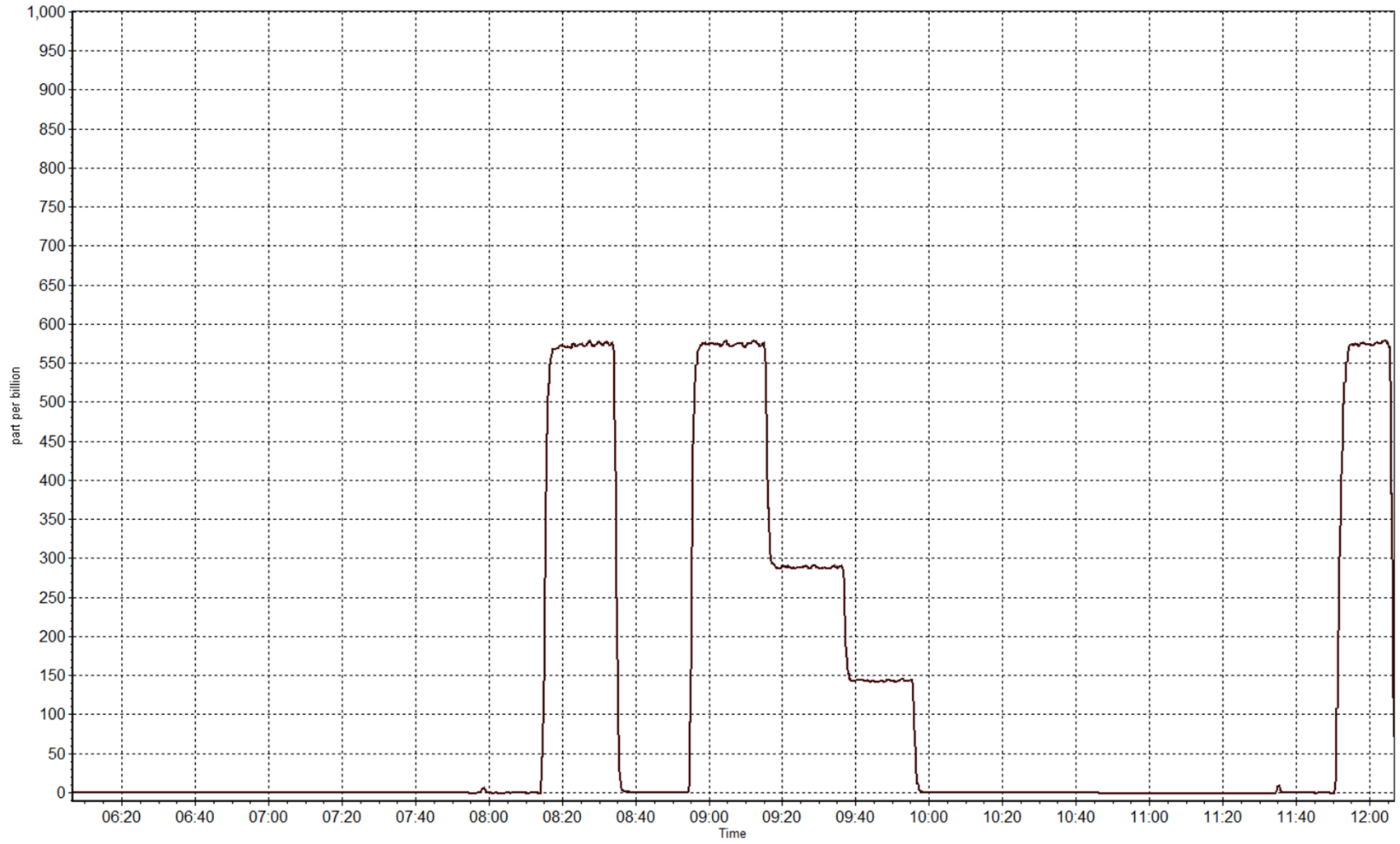
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999989
577.4	574.9	1.0044		
288.7	288.8	0.9997	Slope	1.003540
144.4	143.1	1.0088		
			Intercept	0.067046

SO₂ Calibration Curve



SO2 Calibration Plot

Date: July 3, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	July 15, 2014	Previous Calibration	June 11, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:15	End Time (MST)	9:55
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	807	807
Calculated slope	0.997379	0.977210	Chamber temp.	45	45
Calculated intercept	0.388962	0.141042	Pressure	574.7	574.7
Analyzer Background	12.2	11.8	Flow	0.933	0.933
Analyzer Coefficient	0.837	0.837	Intensity	91	91
			Converter temp.	341	341

Analyzer make/model	450i	Analyzer serial #	1218153583
Converter make/model		Converter serial #	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-1.0	NA
as found span	5000	39.3	80.2	80.4	0.997
SO2 scrubber check	5000	80.5	769.6	5.7	NA
calibrator zero	5000	0.0	0.0	-0.2	NA
high point	5000	39.3	80.2	81.8	0.980
second point	5000	19.5	39.8	40.8	0.975
third point	6000	11.8	20.1	20.3	0.988
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	39.2	80.0	82.1	0.974
Average Correction Factor					0.981

Corrected As found	81.4	Previous response	80.0	% change	-1.7%
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Notes:

Scrubber checked after calibrated zero, zero adjusted, No Maintenance Done, filter changed

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

H2S Calibration Summary

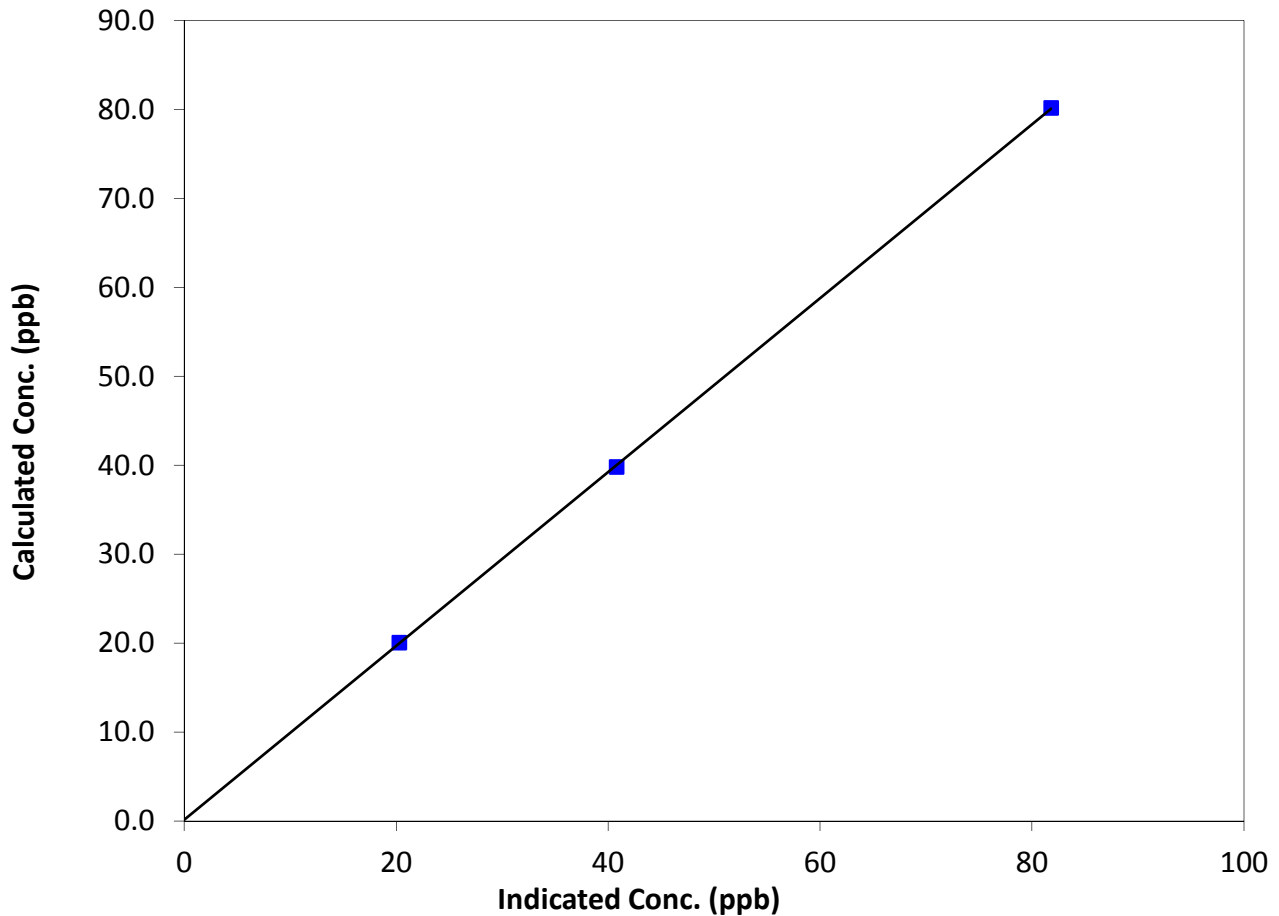
Station Information

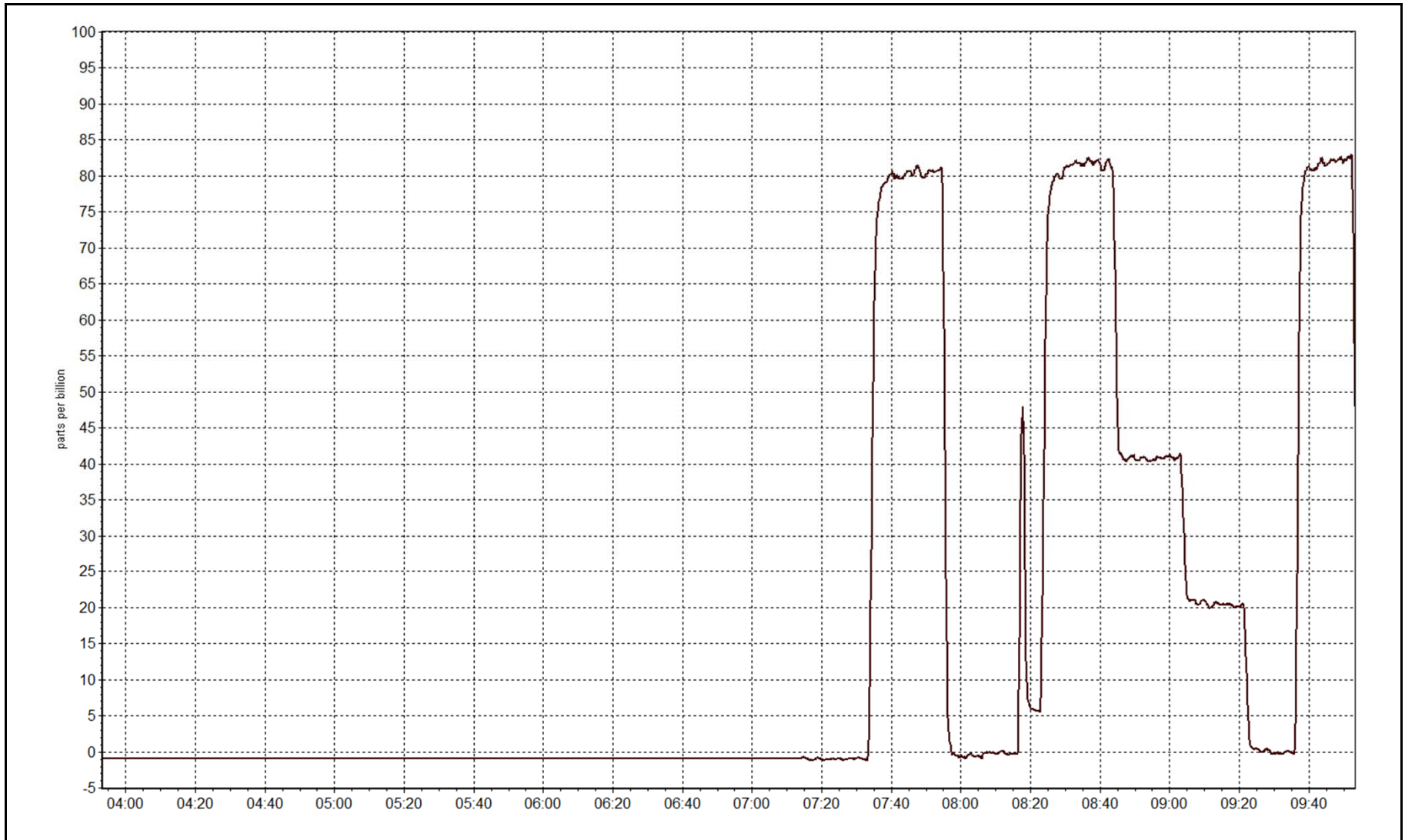
Calibration Date	July 15, 2014	Previous Calibration	June 11, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:15	End Time (MST)	9:55
Analyzer make	450i	Analyzer serial #	1218153583

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999979
80.2	81.8	0.9801		
39.8	40.8	0.9750	Slope	0.977210
20.1	20.3	0.9882		
			Intercept	0.141042

H2S Calibration Curve







Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Thursday, July 03, 2014	Previous Calibration	Tuesday, June 24, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	12:05
Barometric Pressure	716 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	API T700	Serial Number	493
Gas Cert Reference	SA130010A	Cal Gas Expiry Date	12-Dec-16
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894
DACS voltage range	NA	DACS channel #	NA

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	100	100	Sample Pressure	8.5	8.5
Analyzer Range (mv)	100	100	Air or Bypass press	40.6	40.6
Calculated slope	1.020131	1.005476	Fuel Pressure	24.8	24.8
Calculated intercept	-0.097933	-0.034082		2.4	2.6
				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	0.16	N/A
as found span	5000	60.4	13.19	13.26	0.995
calibrator zero	5000	0.0	0.00	0.02	N/A
high point	5000	60.4	13.19	13.14	1.004
second point	5000	30.2	6.60	6.63	0.995
third point	5000	15.1	3.30	3.31	0.997
calibrator zero	5000	0.0	0.00	-0.02	N/A
as left zero	5000	0.0	0.00	-0.02	N/A
as left span	5000	60.4	13.19	13.04	1.012
Average Correction Factor					0.999

Corrected As found 13.10 Previous response 13.03 % change -0.5%

Notes:

Filter changed, zero adjusted, no maintenance done

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

THC Calibration Summary

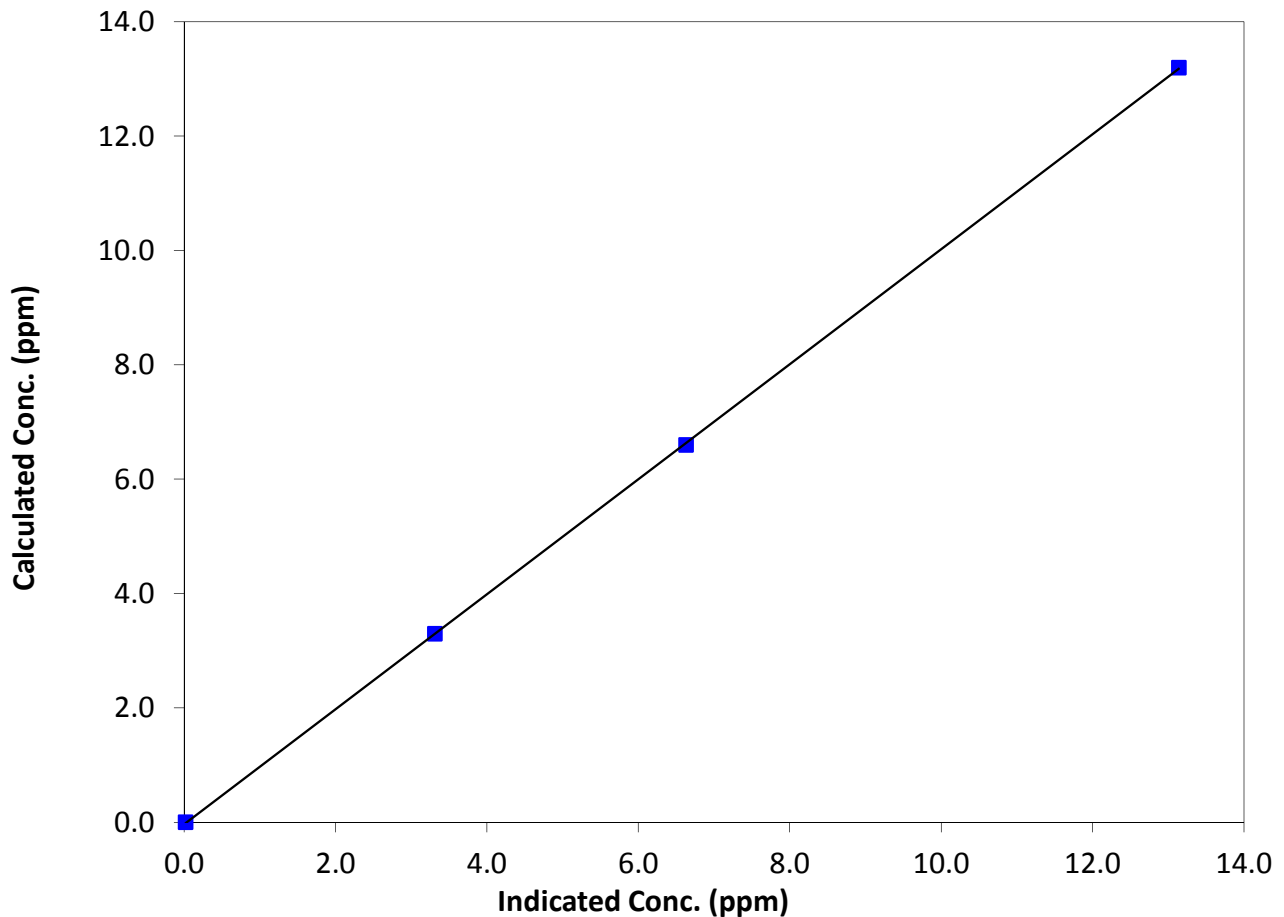
Station Information

Calibration Date	July 3, 2014	Previous Calibration	June 24, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:55	End Time (MST)	12:05
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

Calibration Data

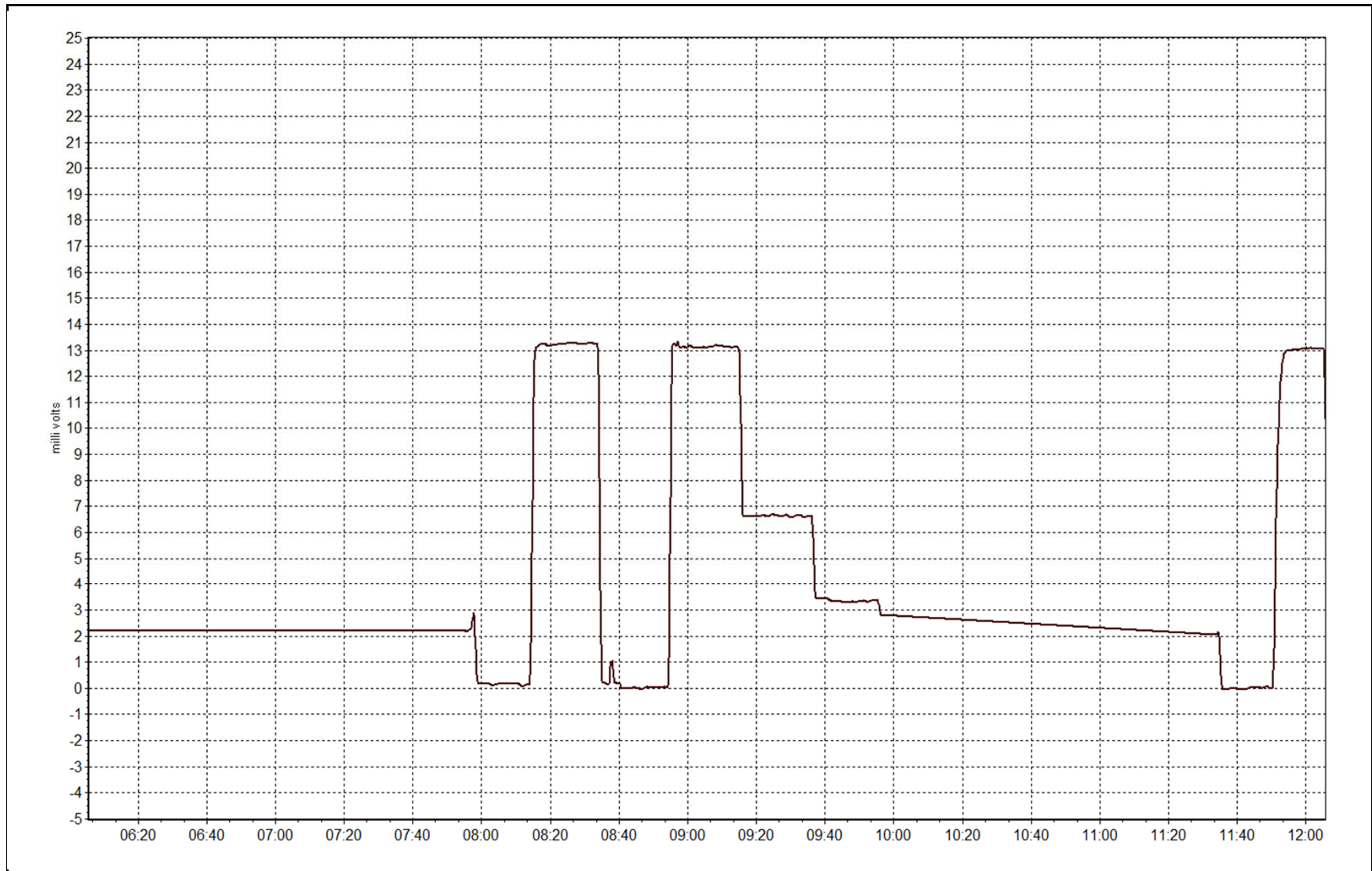
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	N/A	Correlation Coefficient	0.999982
13.19	13.14	1.0041		
6.60	6.63	0.9951	Slope	1.005476
3.30	3.31	0.9966		
			Intercept	-0.034082

THC Calibration Curve



THC Calibration Plot

Date: July 3, 2014





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	July 15, 2014	Previous Calibration	June 11, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:52	End Time (MST)	11:40
Barometric Pressure	23 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	T700	Serial Number	997
NO2 calibration used	Thursday, July 03, 2014	Transfer Standard	23
DACS make/model	N/A	DACS serial No.	N/A
DACS voltage range	N/A	DACS channel #	N/A

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Box temp.	27.8	27.8
Analyzer Range (input)	500	500	Photo Lamp Temp.	58.0	58.0
Calculated slope	0.992534	0.986666	Pressure	26.1	26.1
Calculated intercept	1.052178	1.018369	Flow	677	677
Analyzer Background	1.436	1.436			
Analyzer Coefficient	1.016	1.016			

Analyzer make	T400	Analyzer serial #	824
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.3	N/A
as found span	5000	933.10	389.7	394.5	0.988
calibrator zero	5000	0.00	0.0	0.3	N/A
high point	5000	713.5	389.7	394.5	0.988
second point	5000	495.5	264.4	267.2	0.990
third point	5000	260.7	138.3	137.0	1.009
calibrator zero	5000	0.00	0.0	0.3	N/A
as left zero	5000	0.00	0.0	0.3	N/A
as left span	5000	714.70	389.7	397.3	0.981
Average Correction Factor					0.996

Corrected As found	394.2	Previous response	391.6	% change	-0.7%
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Notes:

No Maintenance Done, No adjustments made, Filter changed out

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

O₃ Calibration Summary

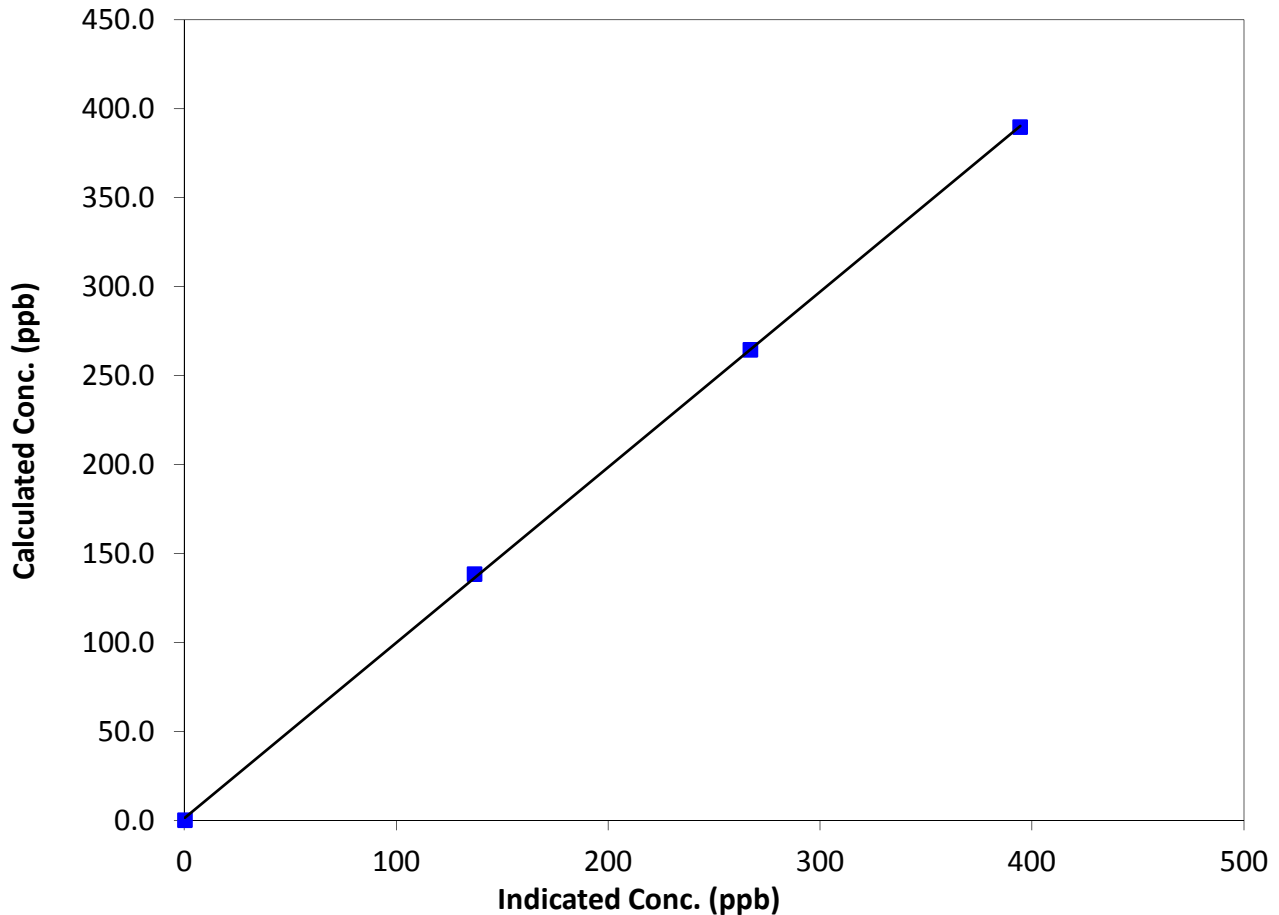
Station Information

Calibration Date	Tuesday, July 15, 2014	Previous Calibration	June 11, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:52	End Time (MST)	11:40
Analyzer make	T400	Analyzer serial #	824

Calibration Data

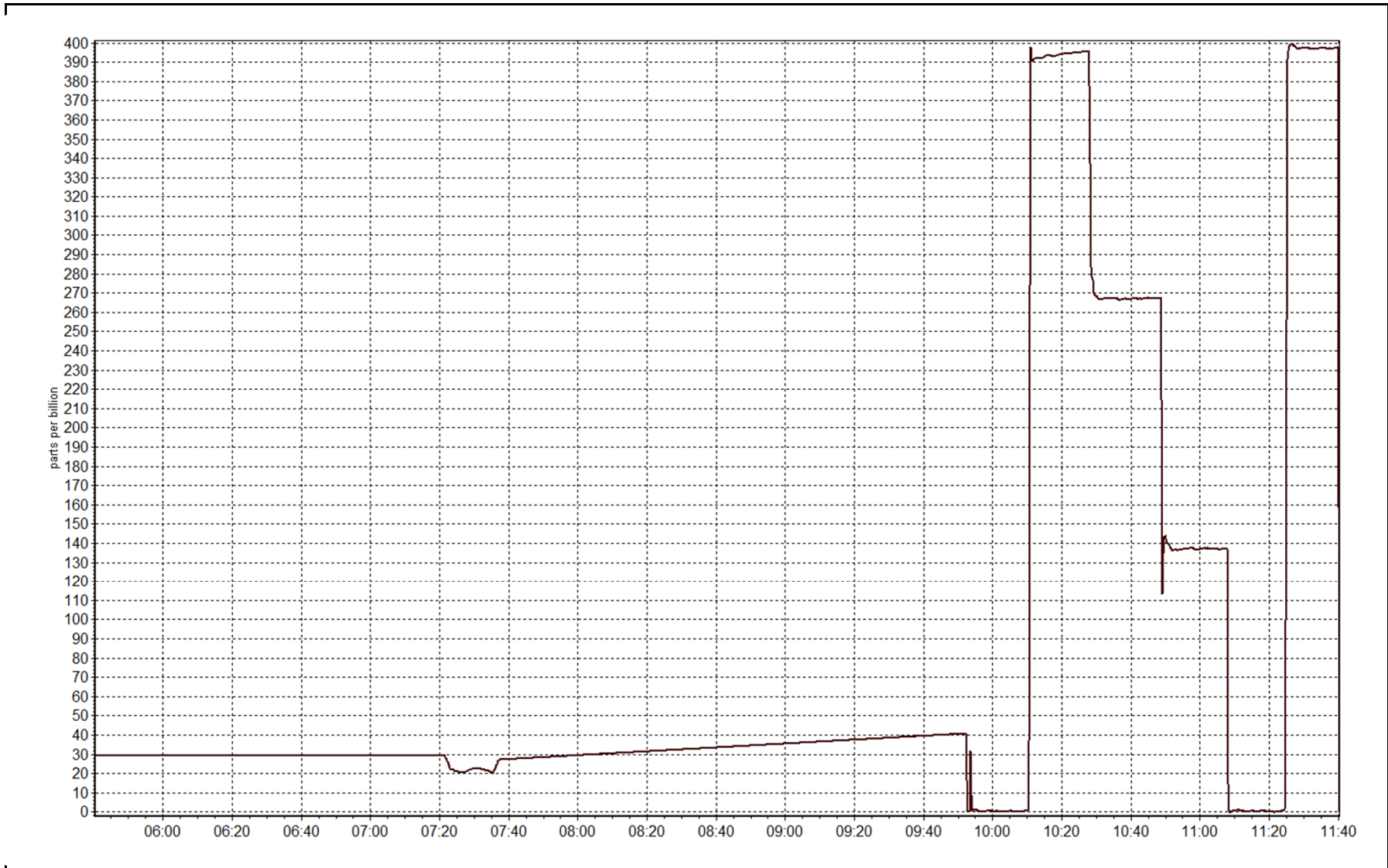
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999923
389.7	394.5	0.9878		
264.4	267.2	0.9895	Slope	0.986666
138.3	137.0	1.0095		
			Intercept	1.018369

O₃ Calibration Curve



O3 Calibration Plot

Date: July 15, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 3, 2014	Previous Calibration	June 10, 2014
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	12:05
Barometric Pressure	mmHg	Station Temperature	21.0 Deg C
Calibrator	API T700	Serial Number	997
NO Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	49.7 ppm	Cal Gas Serial #	SA130010A

DACs Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.995768	0.997432	0.998456
	Data Offset	-0.258283	0.377693	0.129707
After	Data Slope	0.988955	0.992499	1.006418
	Data Offset	0.022135	0.011633	-0.584437
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	0.960	ppb	0.960	ppb
NOx coefficient	0.960	ppb	0.961	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	0.2		-0.6	
NOx bkgrnd	0.9		1.7	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.2	Deg C	314.2	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	71.0	ccm	71.0	ccm
R Cell Press	5.1	mmHg	5.1	mmHg
Sample Flow	440-446	ccm	440-446	ccm

Notes:

Filter changed, no maintenance done, zero adjusted



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

July 3, 2014

Station Number:

AMS 17

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	2.6	2.6	N/A	N/A
as found span	5000	60.4	600.4	600.4	0.0	605.0	604.3	0.7	0.9924	0.9935
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	N/A	N/A
high point	5000	60.4	600.4	600.4	0.0	606.4	604.5	2.0	0.9901	0.9932
second point	5000	30.2	300.2	300.2	0.0	305.0	303.6	1.2	0.9842	0.9888
third point	5000	15.1	150.1	150.1	0.0	151.4	150.5	1.0	0.9914	0.9973
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.4	0.2	-0.5	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	-0.4	0.2	-0.5	N/A	N/A
as left span	5000	60.4	600.4	215.8	384.6	602.0	215.0	387.0	0.9973	1.0037
Average Correction Factor									0.9886	0.9931

Corrected As found

NO_x= 605.0

NO= 601.7

Percent Change

NO_x= -0.3%

NO= 0.0%

Previous Response

NO_x= 603.2

NO= 601.5

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	215.8	389.7	602.6	215.8	386.9	0.9844	1.0000	1.0072	99.3%
2nd NO ₂ (200)	N/A	341.1	264.4	605.5	341.1	264.5	0.9797	1.0000	0.9996	100.0%
3rd NO ₂ (100)	N/A	467.2	138.3	605.4	467.2	138.2	0.9799	1.0000	1.0007	99.9%
4th NO ₂ (0)	605.5	N/A	0.1	605.6	605.5	0.2	0.9795	1.0000	N/A	N/A
Average Correction Factor							0.9809	1.0000	1.0025	99.7%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

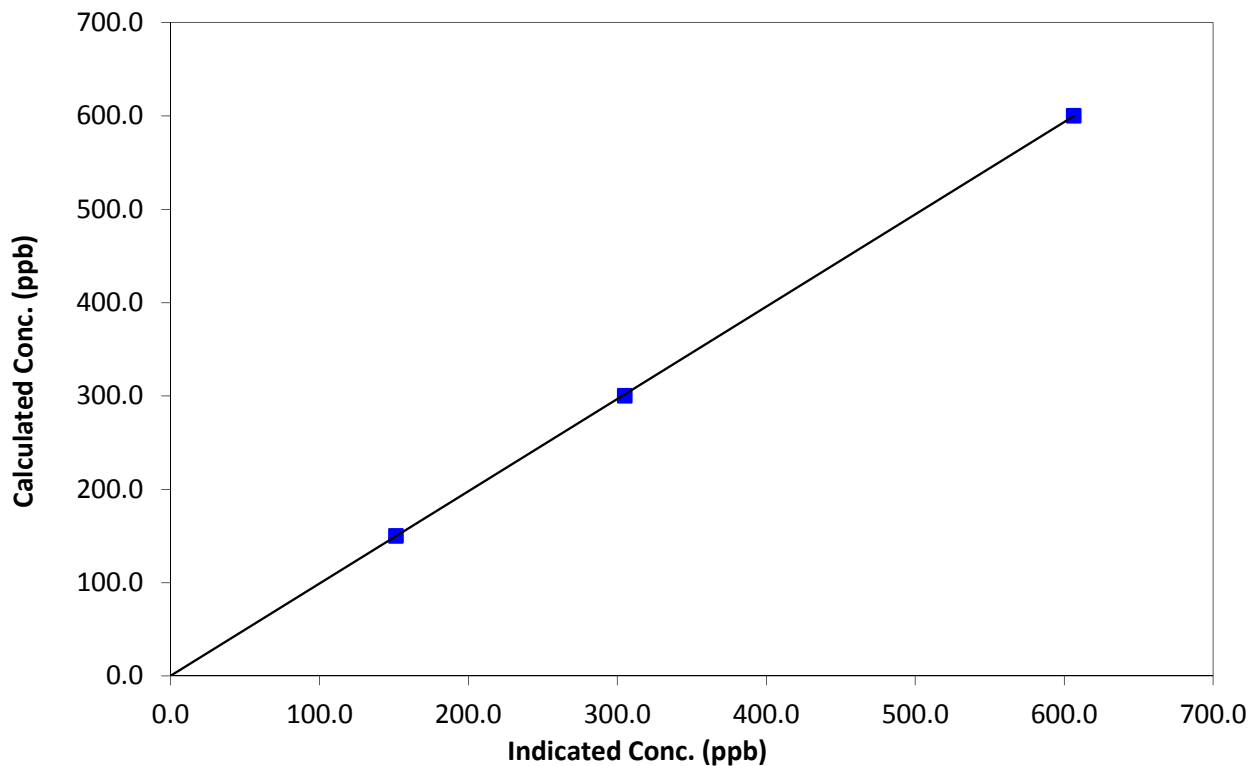
Station Information

Calibration Date	July 3, 2014	Previous Calibration	June 10, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:55	End Time (MST)	12:05
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999989
600.4	606.4	0.9901		
300.2	305.0	0.9842	Slope	0.988955
150.1	151.4	0.9914		
0.0	-0.4	0.0000	Intercept	0.022135

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

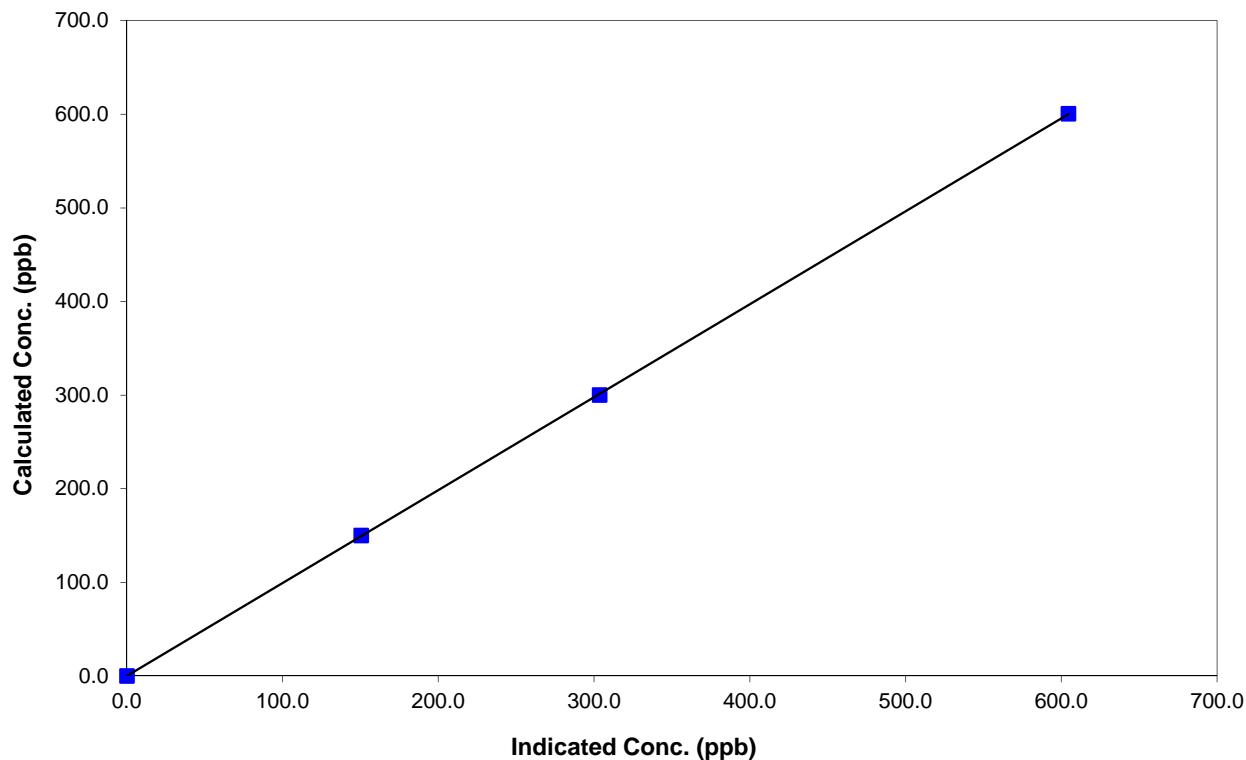
Station Information

Calibration Date	July 3, 2014	Previous Calibration	June 10, 2014
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:55	End Time (MST)	12:05
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999992
600.4	604.5	0.9932		
300.2	303.6	0.9888	Slope	0.992499
150.1	150.5	0.9973		
0.0	0.2	0.0000	Intercept	0.011633

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

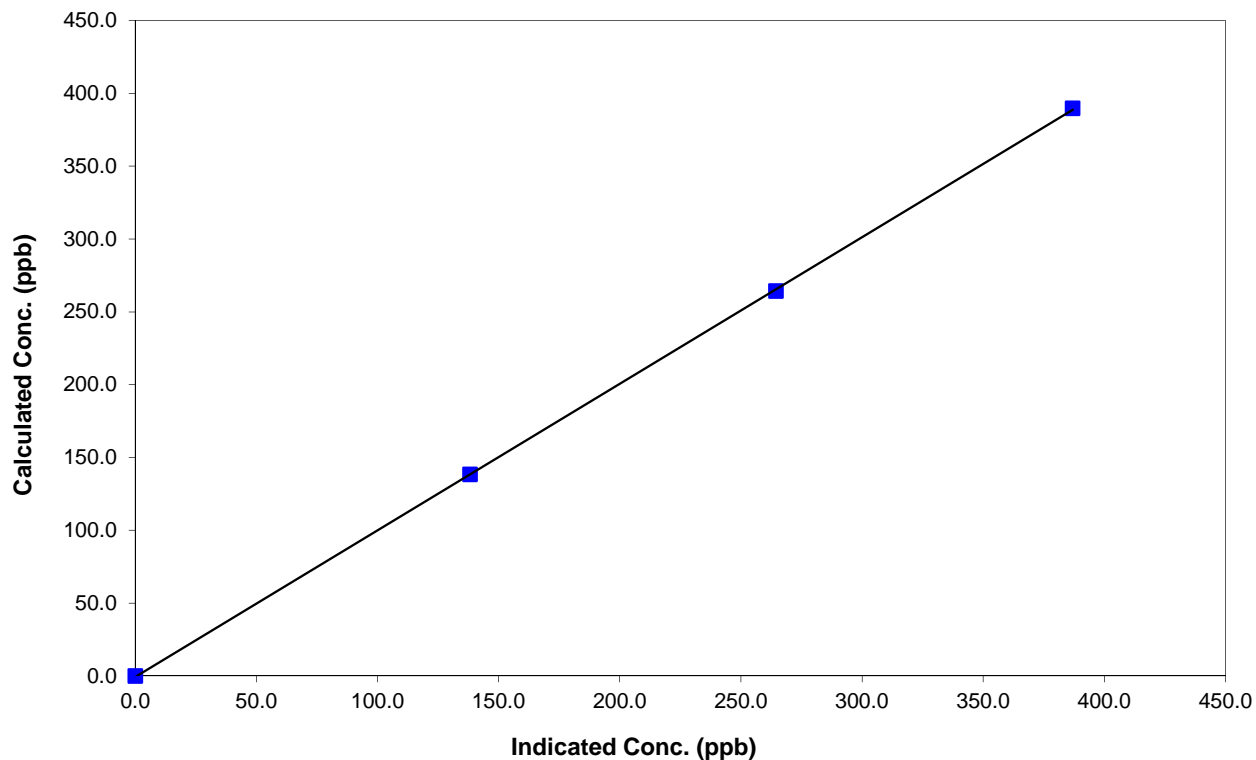
Station Information

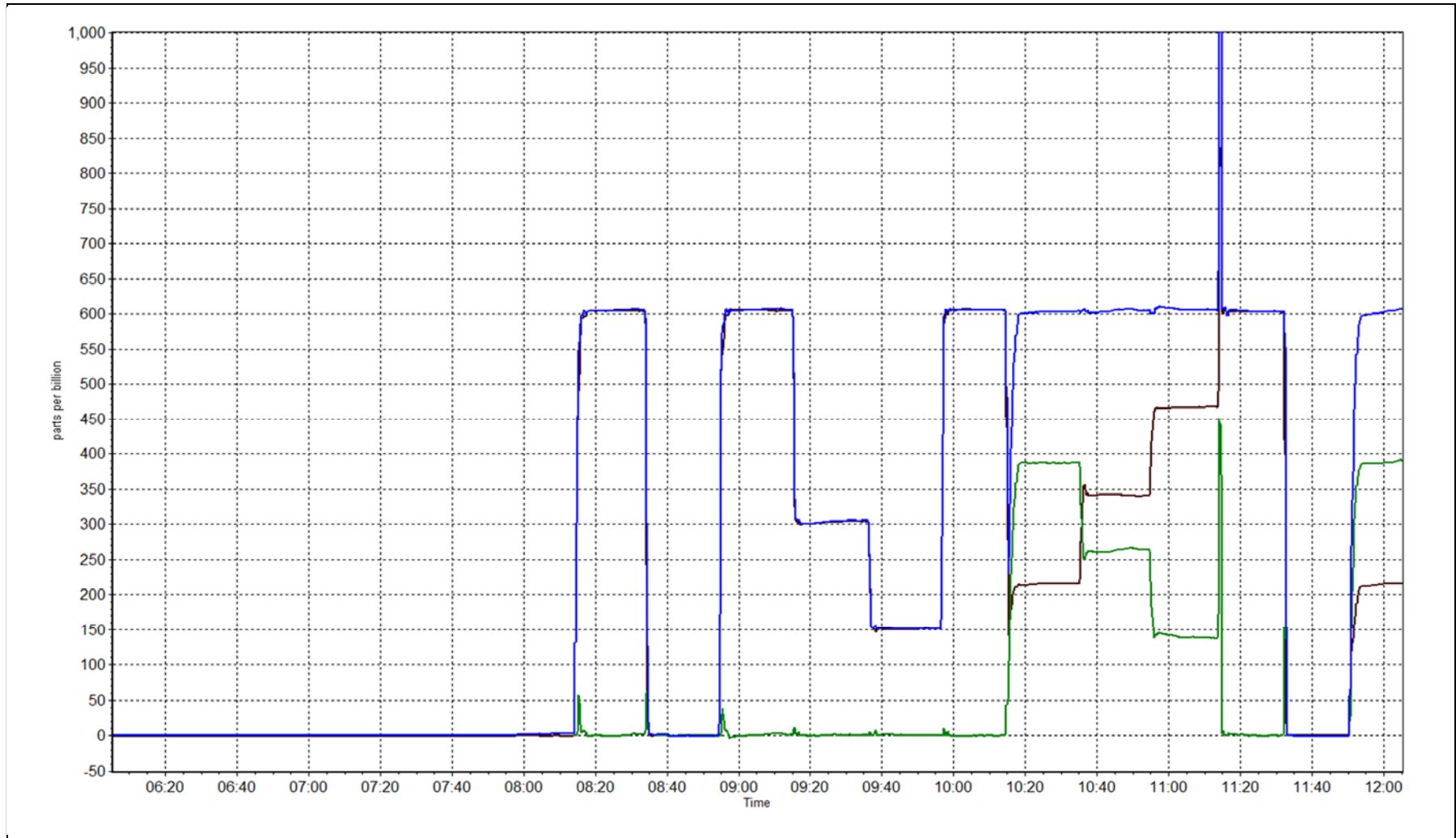
Calibration Date	July 3, 2014	Previous Calibration	June 10, 2014
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	7:55	End Time (MST)	12:05
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999969
389.7	386.9	1.0072		
264.4	264.5	0.9996	Slope	1.006418
138.3	138.2	1.0007		
			Intercept	-0.584437

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 19 FIREBAG JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)

JULY 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
SO ₂ (ppb) Average	495	26	26	100.00	13	0	2	0
H ₂ S (ppb) Average	514	29	29	100.00	1	0	1	0
THC (ppm) Average	495	26	26	100.00	3.2	-	2.4	-
NO ₂ (ppb) Average	495	26	26	100.00	38	0	9	0
NO (ppb) Average	495	26	26	100.00	15	-	2	-
NO _X (ppb) Average	495	26	26	100.00	44	-	11	-
Temperature 2 m (C) Average	538	0	0	100.00	30.5	-	23.4	-
Relative Humidity (%) Average	538	0	0	100.00	99	-	-	-
Wind Speed 10 m (km/h) Average	537	0	1	99.81	29	-	-	-
Wind Direction 10 m (deg) Average	537	0	1	99.81	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
 JULY 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	495	0.7	1	-	0	0	0	0	1	2	13
H2S (ppb) Average	514	0.4	0	-	0	0	0	0	0	1	1
THC (ppm) Average	495	2.17	0.1	-	2	2	2.1	2.1	2.2	2.3	3.2
NO2 (ppb) Average	495	3	4	-	0	1	1	2	3	7	38
NO (ppb) Average	495	0.9	2	-	0	0	0	0	1	3	15
NOX (ppb) Average	495	3.9	6	-	0	1	1	2	4	9	44
Temperature 2 m (C) Average	538	18.34	4.9	-	7.2	12	14.8	18.2	21.6	25.1	30.5
Relative Humidity (%) Average	538	62.5	20	-	19	36	45	62	81	90	99
Wind Speed 10 m (km/h) Average	537	12.3	5	-	1	5	8	12	16	19	29
Wind Direction 10 m (deg) Average	537	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
JULY 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	01 Jul 2014 01:00	10 Jul 2014 07:00	223	Not in Service
H2S	01 Jul 2014 01:00	09 Jul 2014 09:00	201	Not in Service
THC	01 Jul 2014 01:00	10 Jul 2014 07:00	223	Not in Service
NO2, NO, NOX	01 Jul 2014 01:00	10 Jul 2014 07:00	223	Not in Service
Temperature	01 Jul 2014 01:00	09 Jul 2014 14:00	206	Not in Service
Relative Humidity	01 Jul 2014 01:00	09 Jul 2014 14:00	206	Not in Service
Wind Speed, Wind Direction	01 Jul 2014 01:00	09 Jul 2014 14:00	206	Not in Service
Wind Speed, Wind Direction	21 Jul 2014 22:00	21 Jul 2014 22:00	1	Flatline in sensor output signal

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Summary of Hour Averages

Firebag - July 2014

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	521
Maximum Value: 13 ppb on Jul 29 07:00	Maximum Daily Average: 2.1 ppb on Jul 29		Hours of Data:	495
Minimum Value: 0 ppb on Jul 12 23:00	Minimum Daily Average: 0.0 ppb on Jul 12		Hours of Missing Data:	26
Maximum Diurnal Average: 1.4 ppb at hour 9	Minimum Diurnal Average: 0.3 ppb at hour 23		Hours of Calibration:	26
Monthly Average: 0.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 8		Percent Operational Time:	100.0

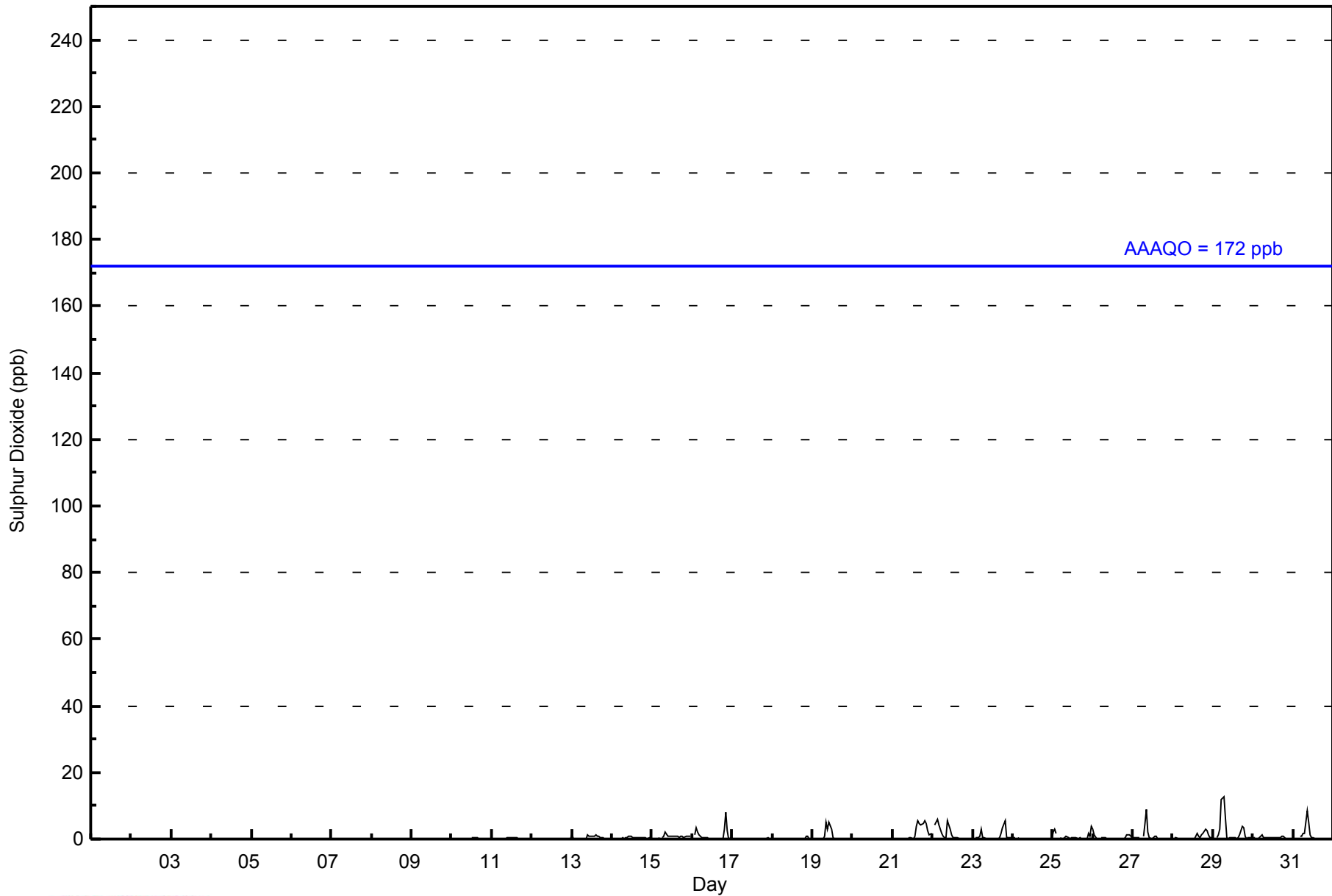
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																						
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																						
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																						
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																						
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																						
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																						
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																						
8-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																						
9-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																						
10-Jul	NS	NS	NS	NS	NS	NS	NS	NS	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	--	0																						
11-Jul	0	Z	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																						
12-Jul	0	0	Z	0	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-Jul	2	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	2																						
14-Jul	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
15-Jul	0	0	0	0	0	Z	0	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	2																						
16-Jul	Z	1	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	8	2	0	0	0	1.1	8																						
17-Jul	0	Z	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																						
18-Jul	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	0.2	1																						
19-Jul	0	0	0	Z	0	0	0	1	5	3	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	5																						
20-Jul	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
21-Jul	0	0	0	0	0	Z	0	0	0	0	0	0	1	4	5	5	4	5	5	5	5	2	1	2	0	1.8	5																						
22-Jul	Z	4	5	6	4	2	1	0	0	5	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.5	6																						
23-Jul	0	Z	0	1	1	3	1	0	0	0	0	0	0	0	0	0	0	2	3	5	0	0	0	0	0	0.8	5																						
24-Jul	0	0	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-Jul	2	3	2	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	1	4	0	0.7	4																						
26-Jul	3	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0.5	3																						
27-Jul	1	1	1	1	0	Z	1	5	9	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.9	9																						
28-Jul	Z	1	0	0	0	0	0	0	0	0	0	0	0	2	1	0	1	2	3	3	3	1	1	0	0	0.7	3																						
29-Jul	0	Z	0	1	3	12	13	6	0	0	0	0	0	0	0	1	4	3	1	0	0	0	0	0	0	2.1	13																						
30-Jul	0	0	Z	0	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.4	1																						
31-Jul	0	0	0	Z	1	1	2	2	8	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	8																						
																								0.5	0.7	0.7	0.7	0.7	1.2	1.0	0.8	1.4	1.0	0.7	0.5	0.3	0.3	0.5	0.5	0.5	0.7	0.8	0.9	0.9	0.6	0.3	0.4	Diurnal Average	
																								3	4	5	6	4	12	13	6	9	5	5	3	1	1	4	5	5	4	5	5	8	2	1	4	Diurnal Maximum	

Z - zerospan C - Calibration 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
Firebag - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	493	99.60	99.60
11 - 20	2	0.40	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: 495

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - July 2014

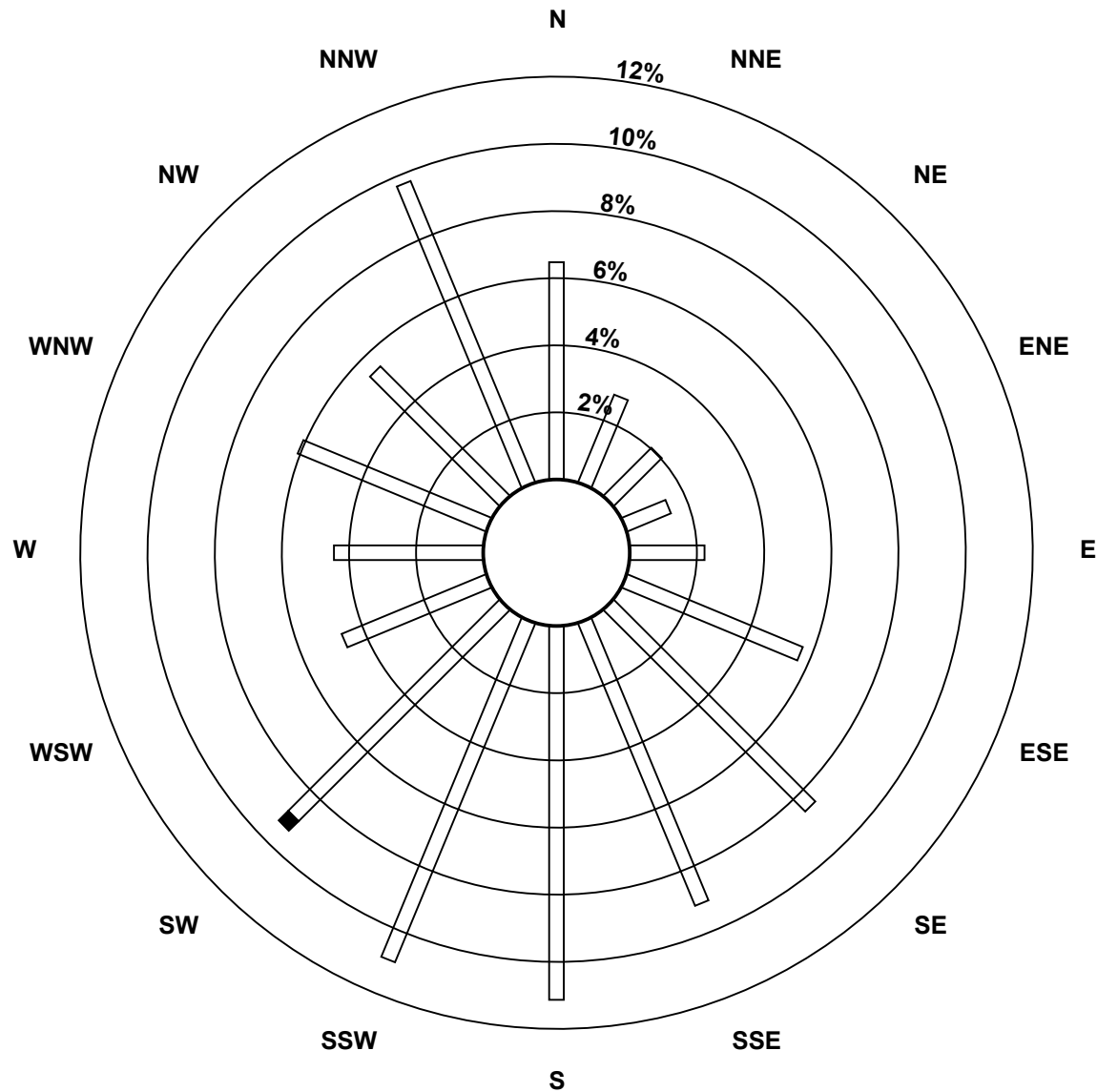
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	32	14	10	7	11	28	42	45	55	54	44	23	22	30	27	48	492
11 - 20	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	32	14	10	7	11	28	42	45	55	54	46	23	22	30	27	48	494

Total Number of Valid Hours: 494

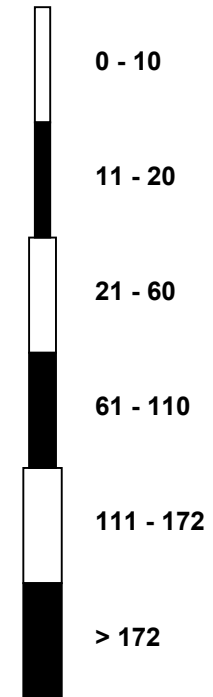
Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

Sulphur Dioxide (SO₂) - ppb
 Firebag (AMS 19)



Classes (ppb)



Total Number of Valid Hours: 494

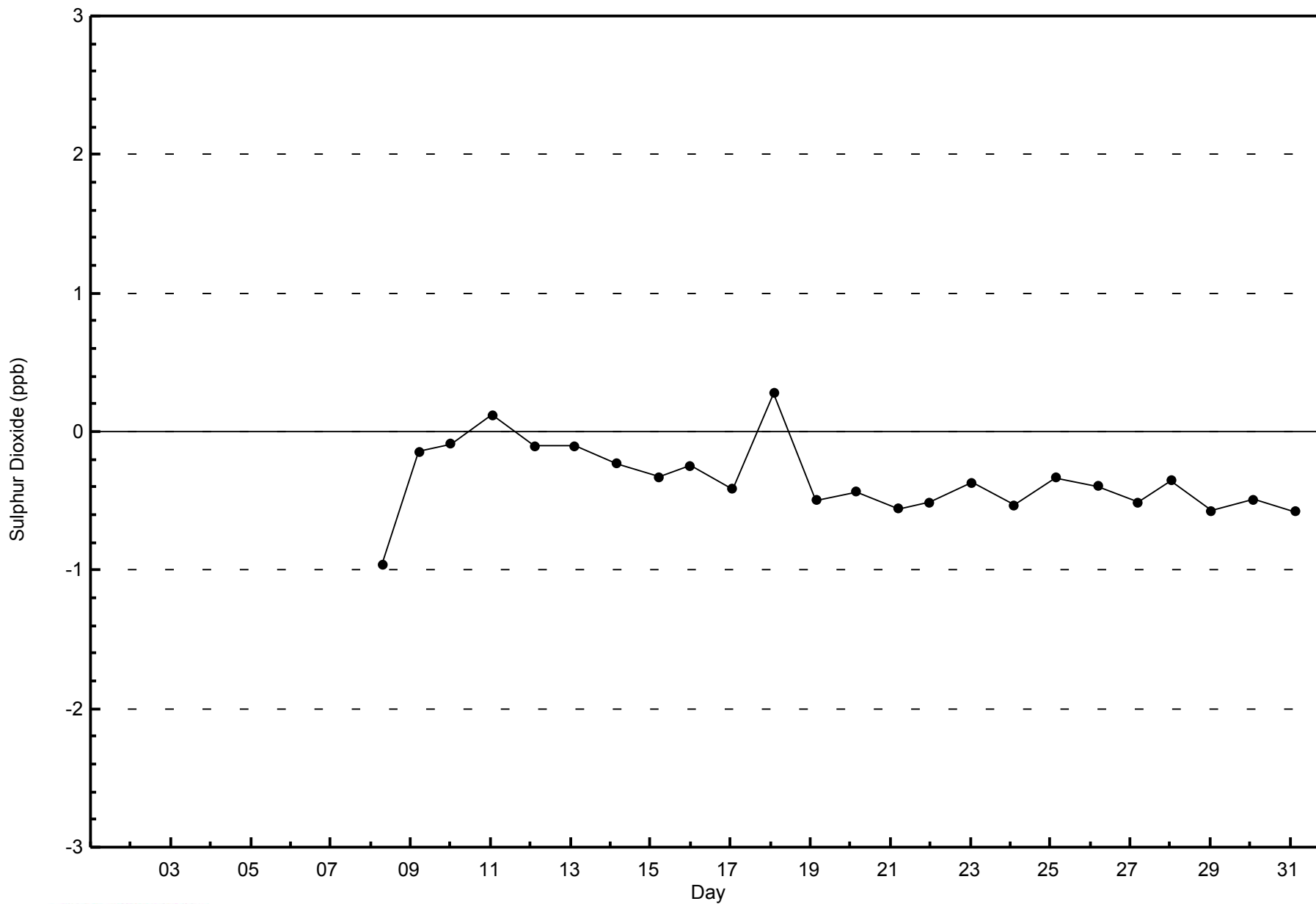


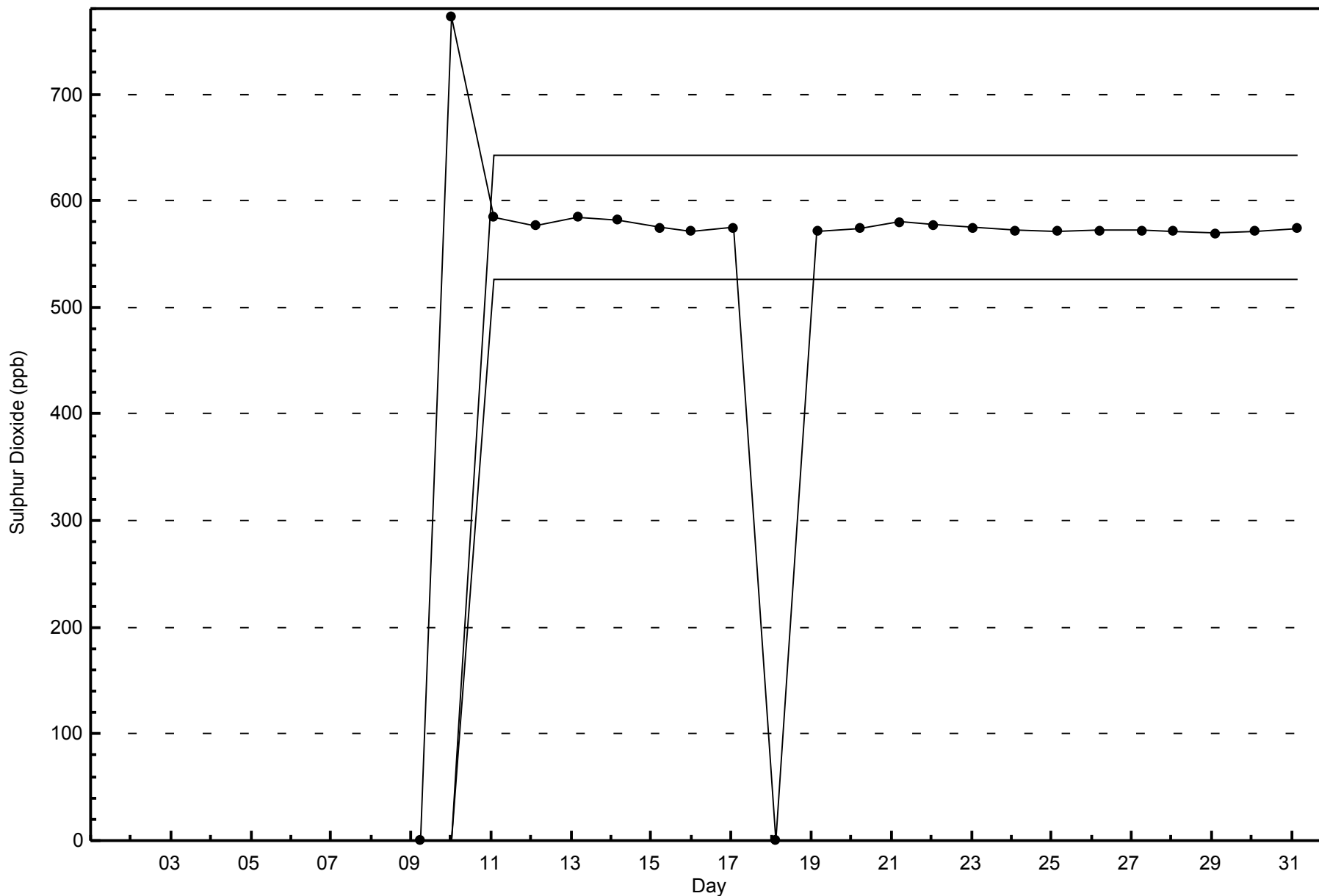
WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

Firebag - July 2014







Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	543
Maximum Value: 1 ppb on Jul 25 23:00	Maximum Daily Average: 0.7 ppb on Jul 25		Hours of Data:	514
Minimum Value: 0 ppb on Jul 17 01:00	Minimum Daily Average: 0.2 ppb on Jul 17		Hours of Missing Data:	29
Maximum Diurnal Average: 0.5 ppb at hour 23	Minimum Diurnal Average: 0.3 ppb at hour 15		Hours of Calibration:	29
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 = 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-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
8-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
9-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0
10-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	0	0.4	1	
11-Jul	0	0	Z	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
12-Jul	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1	
13-Jul	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1	
14-Jul	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	
15-Jul	0	0	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.4	1	
16-Jul	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1	
17-Jul	0	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-Jul	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1	
19-Jul	1	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1	
20-Jul	0	0	1	1	1	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
21-Jul	1	0	0	0	1	1	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1	
22-Jul	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.5	1	
23-Jul	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.4	1	
24-Jul	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0.4	1	
25-Jul	0	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	0.7	1	
26-Jul	1	1	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.4	1	
27-Jul	1	1	1	1	1	1	Z	0	1	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0.6	1	
28-Jul	1	Z	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1	
29-Jul	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
30-Jul	0	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1	
31-Jul	1	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.5	1	

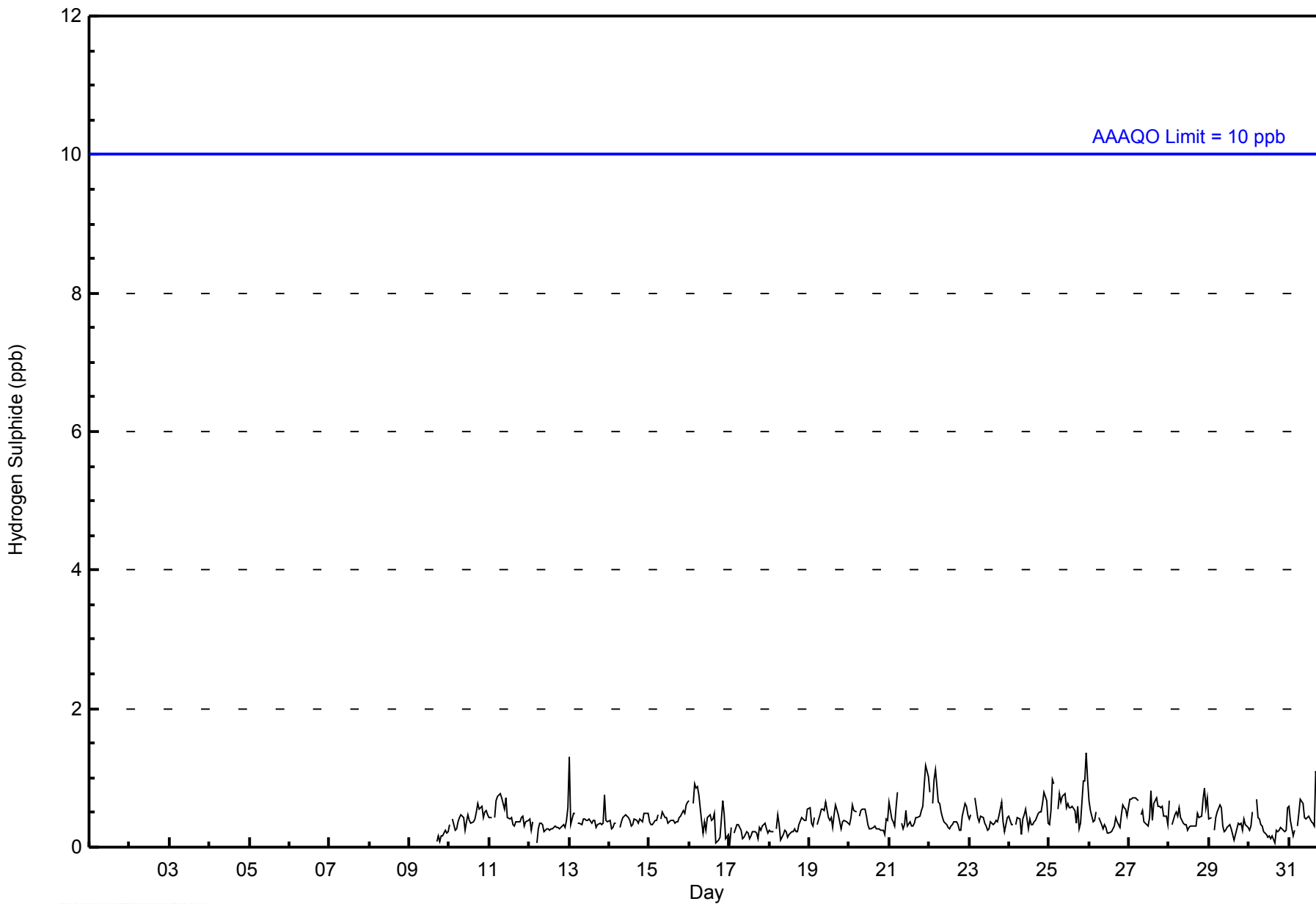
0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	Diurnal Average		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum	

Z - zerospan C - Calibration 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
Firebag - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Firebag - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	514	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: 514

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Firebag - July 2014

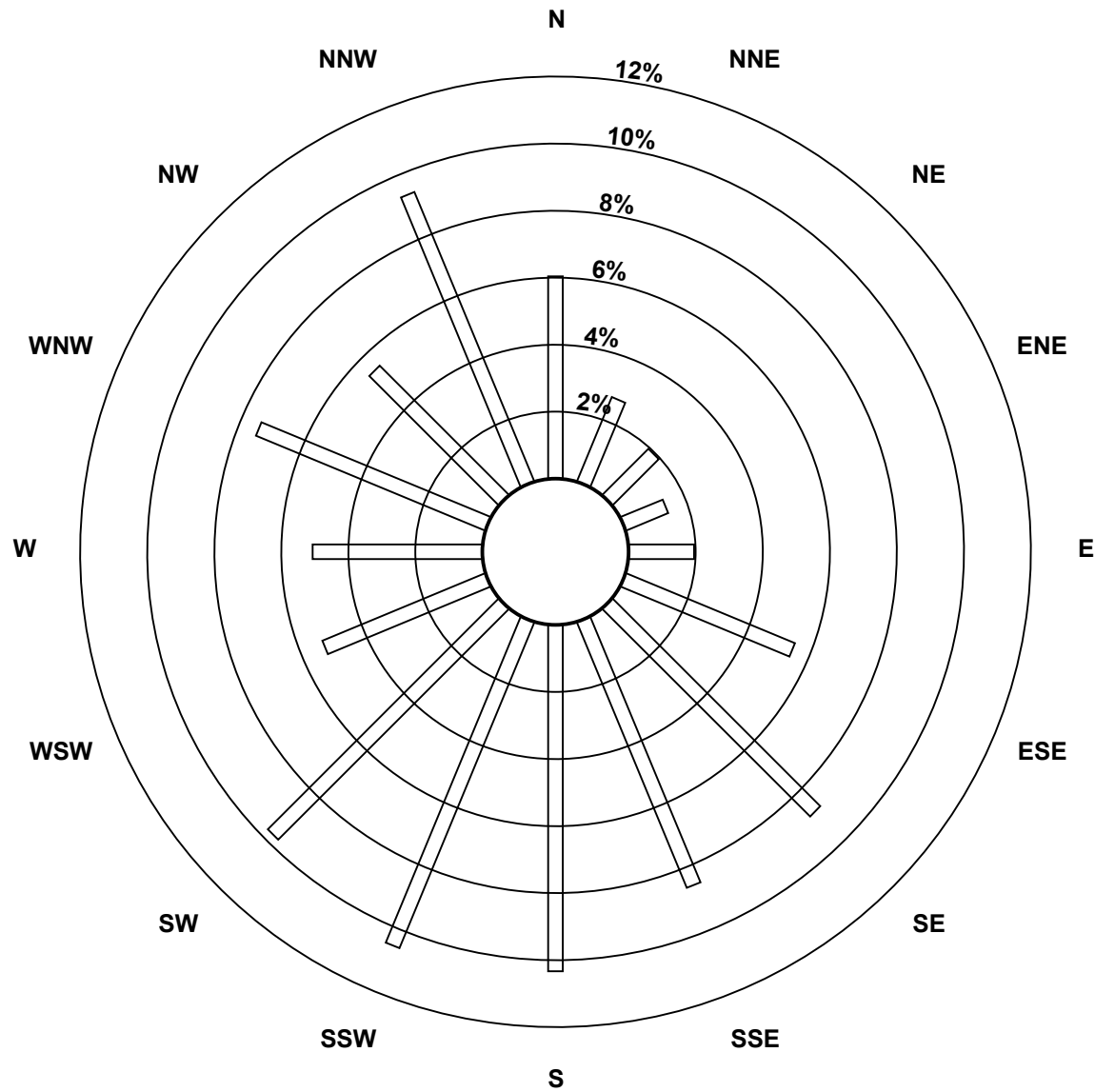
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	31	14	10	7	10	28	45	44	53	54	50	27	26	38	28	48	513
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	31	14	10	7	10	28	45	44	53	54	50	27	26	38	28	48	513

Total Number of Valid Hours: 513

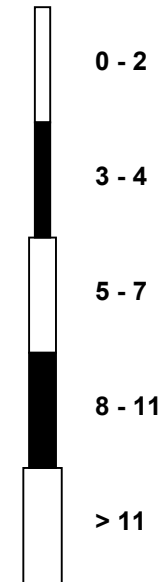
Total Number of Hours: 744

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

**Hydrogen Sulphide (H₂S) - ppb
Firebag (AMS 19)**



Classes (ppb)



Total Number of Valid Hours: 513

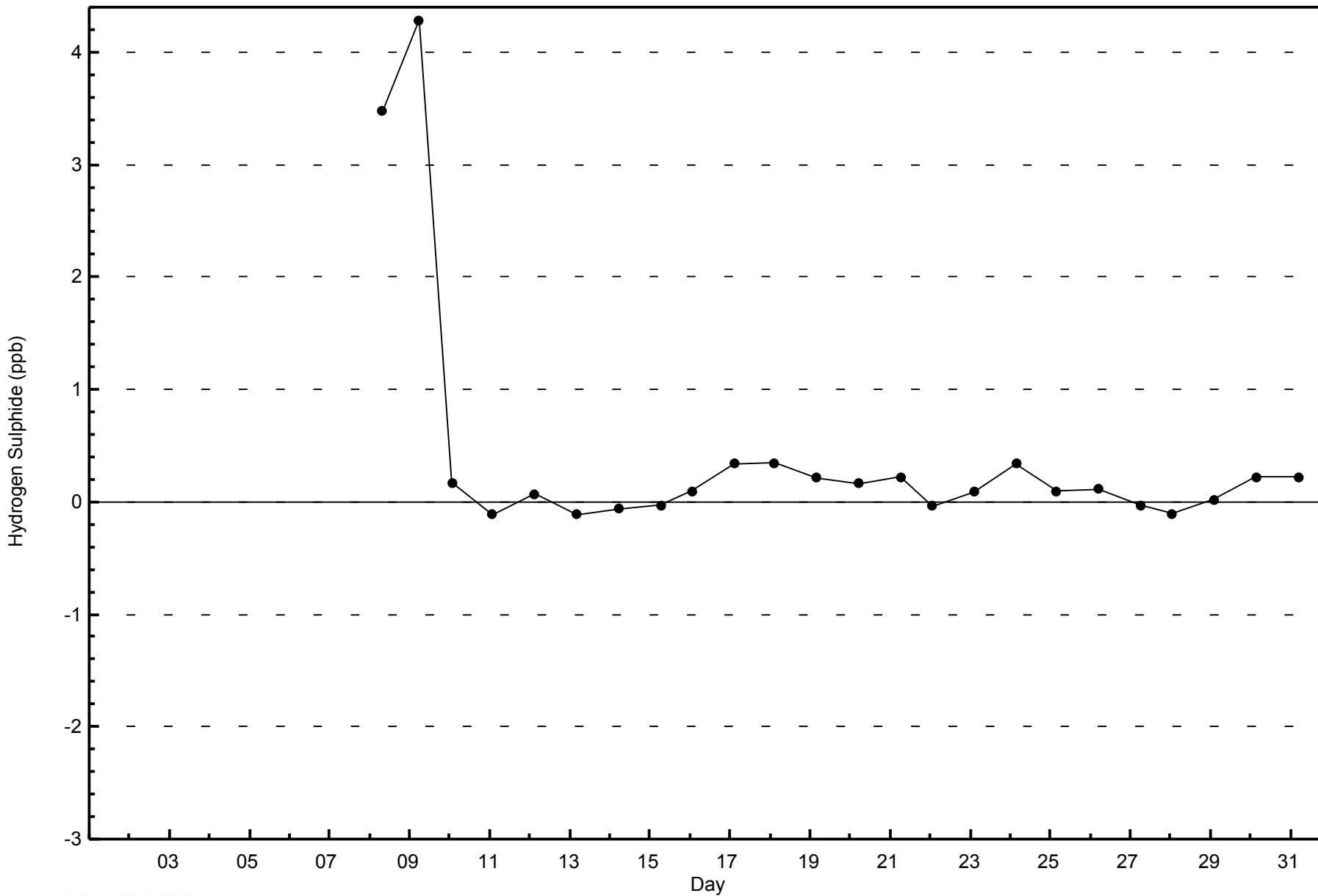


WBEA NETWORK

Zero Responses

Hydrogen Sulphide (H₂S) - ppb

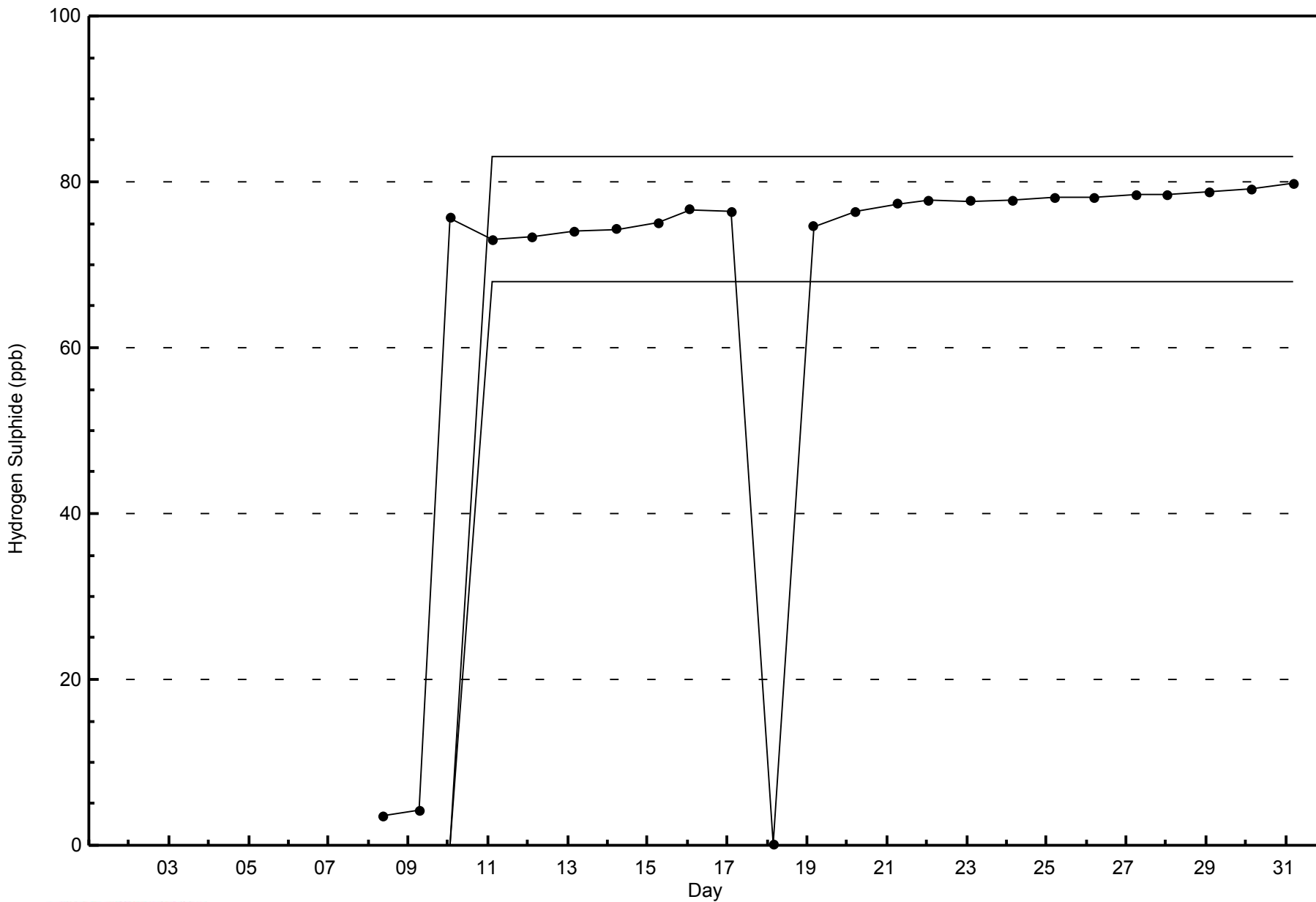
Firebag - July 2014





WBEA NETWORK
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Firebag - July 2014





Maximum Value: 3.2 ppm on Jul 21 00:00		Maximum Daily Average: 2.4 ppm on Jul 21		Hours in Service: 521																						
Minimum Value: 2.0 ppm on Jul 28 13:00		Minimum Daily Average: 2.1 ppm on Jul 15		Hours of Data: 495																						
Maximum Diurnal Average: 2.3 ppm at hour 2		Minimum Diurnal Average: 2.1 ppm at hour 15		Hours of Missing Data: 26																						
Monthly Average: 2.17 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.7		Hours of Calibration: 26																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
8-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
9-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
10-Jul	NS	NS	NS	NS	NS	NS	NS	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	--	2.1
11-Jul	2.1	Z	2.3	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.1	2.3
12-Jul	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.2
13-Jul	2.3	2.2	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.1	2.3
14-Jul	2.2	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.1	2.2
15-Jul	2.2	2.2	2.1	2.1	2.1	Z	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	2.2	2.2	2.2	2.1	2.2
16-Jul	Z	2.2	2.3	2.4	2.5	2.5	2.7	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.7
17-Jul	2.2	Z	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5	2.3	2.3	2.3	2.5
18-Jul	2.3	2.8	Z	2.3	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.8
19-Jul	2.2	2.1	2.2	Z	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.4	2.2	2.4
20-Jul	2.3	2.2	2.5	2.5	Z	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.5	2.8	3.2	2.3	3.2
21-Jul	2.8	2.6	2.7	2.4	2.4	Z	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.6	2.7	2.6	2.4	2.8
22-Jul	Z	2.7	2.7	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.2	2.2	2.7
23-Jul	2.2	Z	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.3
24-Jul	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2
25-Jul	2.2	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.2	2.4	2.3	2.2	2.1	2.4
26-Jul	2.1	2.1	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.4	2.1	2.4
27-Jul	2.5	2.5	2.5	2.4	2.5	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.5
28-Jul	Z	2.2	2.1	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	2.0	2.0	2.0	2.1	2.2	2.4	2.5	2.4	2.1	2.5
29-Jul	2.3	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.3
30-Jul	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.1	2.2	2.2
31-Jul	2.1	2.1	2.2	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.3	2.4	2.4	2.2	2.2	2.3	2.2	2.2	2.4
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration NS - Not in Service																										

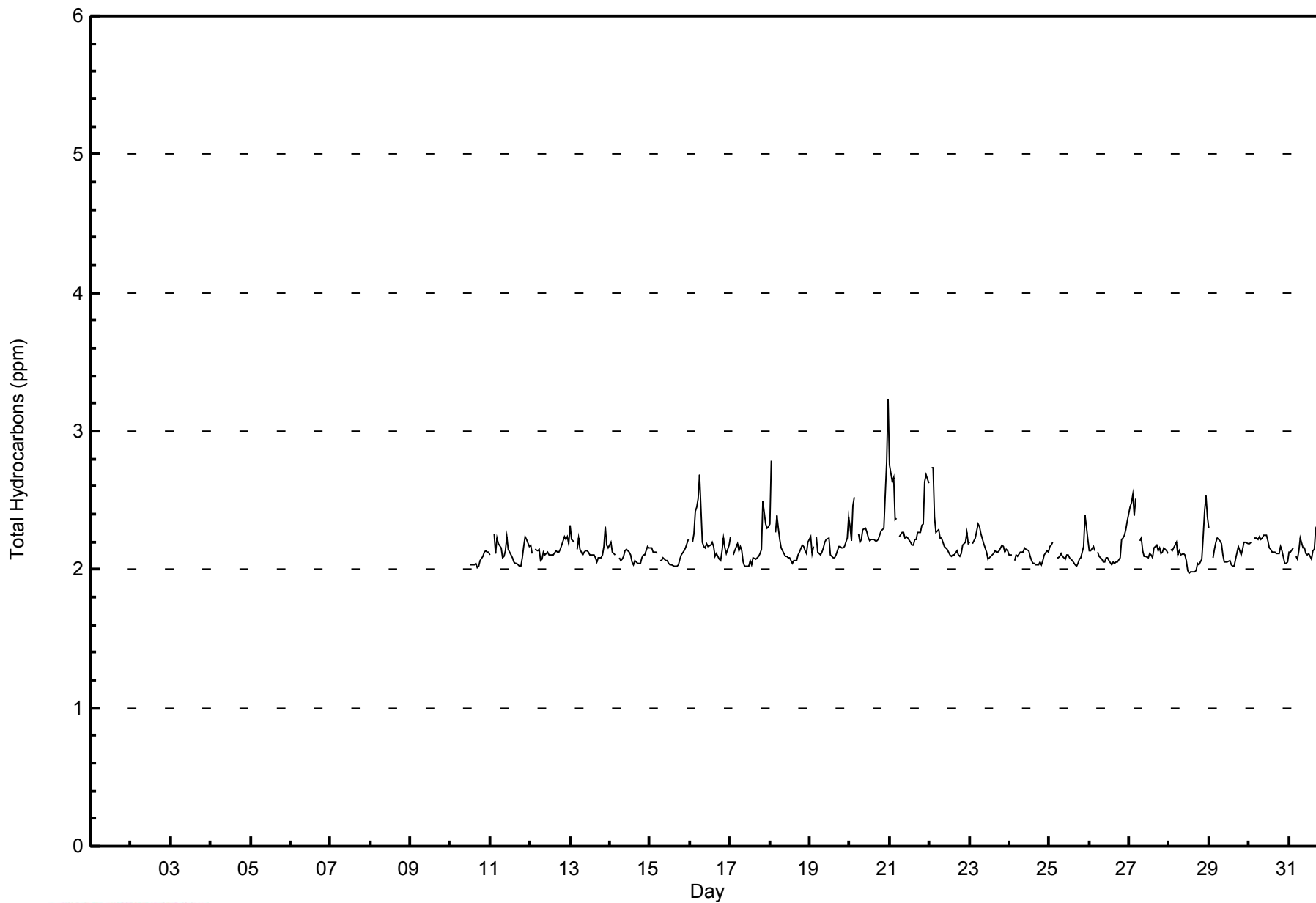


WBEA NETWORK

Hourly Averages

Total Hydrocarbons (THC) - ppm

Firebag - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - July 2014

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	50	10.10	10.10
2.1 - 3.0	444	89.70	99.80
3.1 - 10.0	1	0.20	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 495

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - July 2014

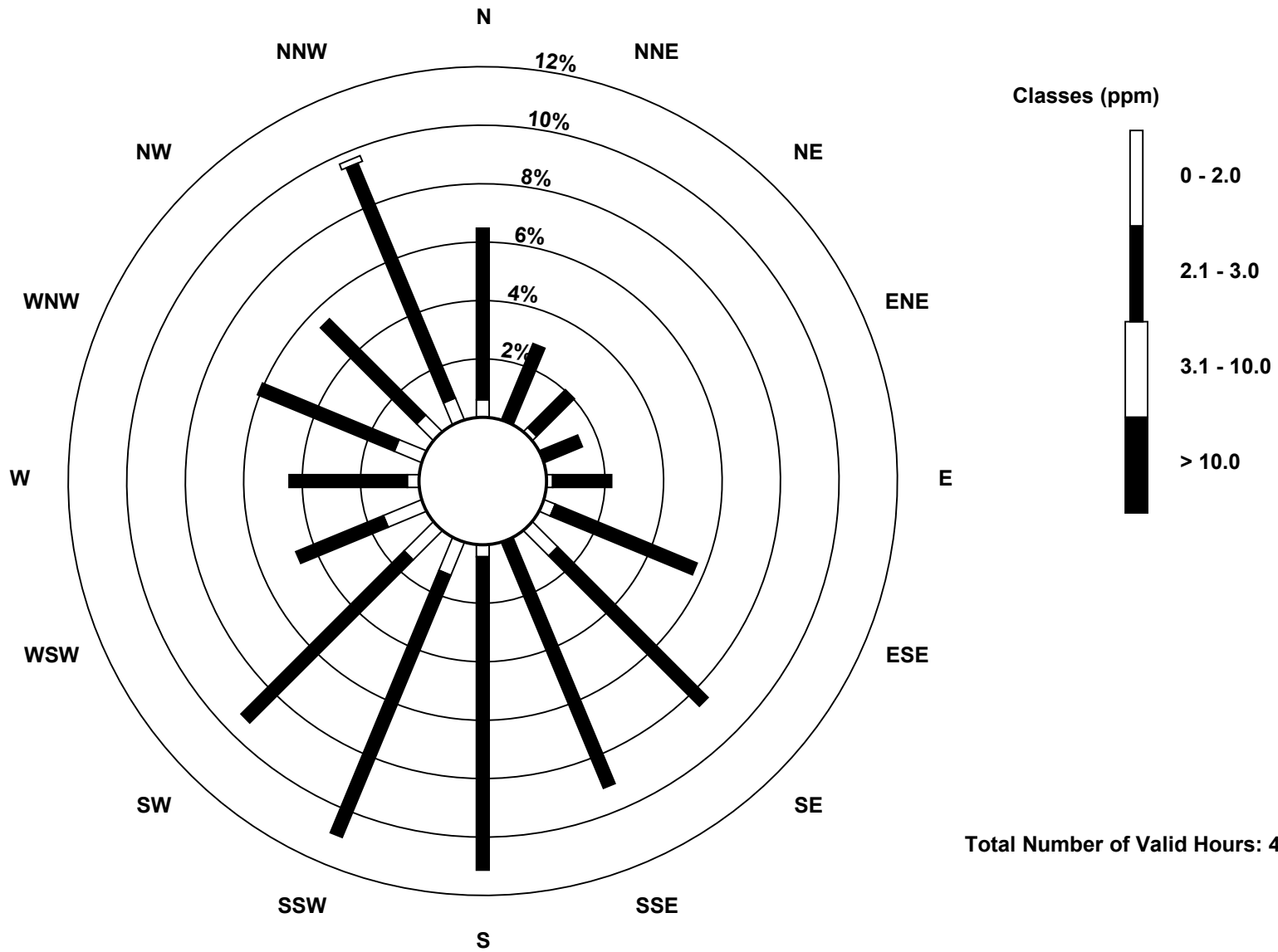
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	3	0	1	0	1	2	6	0	2	6	7	7	2	5	4	4	50
2.1 - 3.0	29	14	9	7	10	26	36	45	53	48	39	16	20	25	23	43	443
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	32	14	10	7	11	28	42	45	55	54	46	23	22	30	27	48	494

Total Number of Valid Hours: 494

Total Number of Hours: 744

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

**Total Hydrocarbons (THC) - ppm
Firebag (AMS 19)**



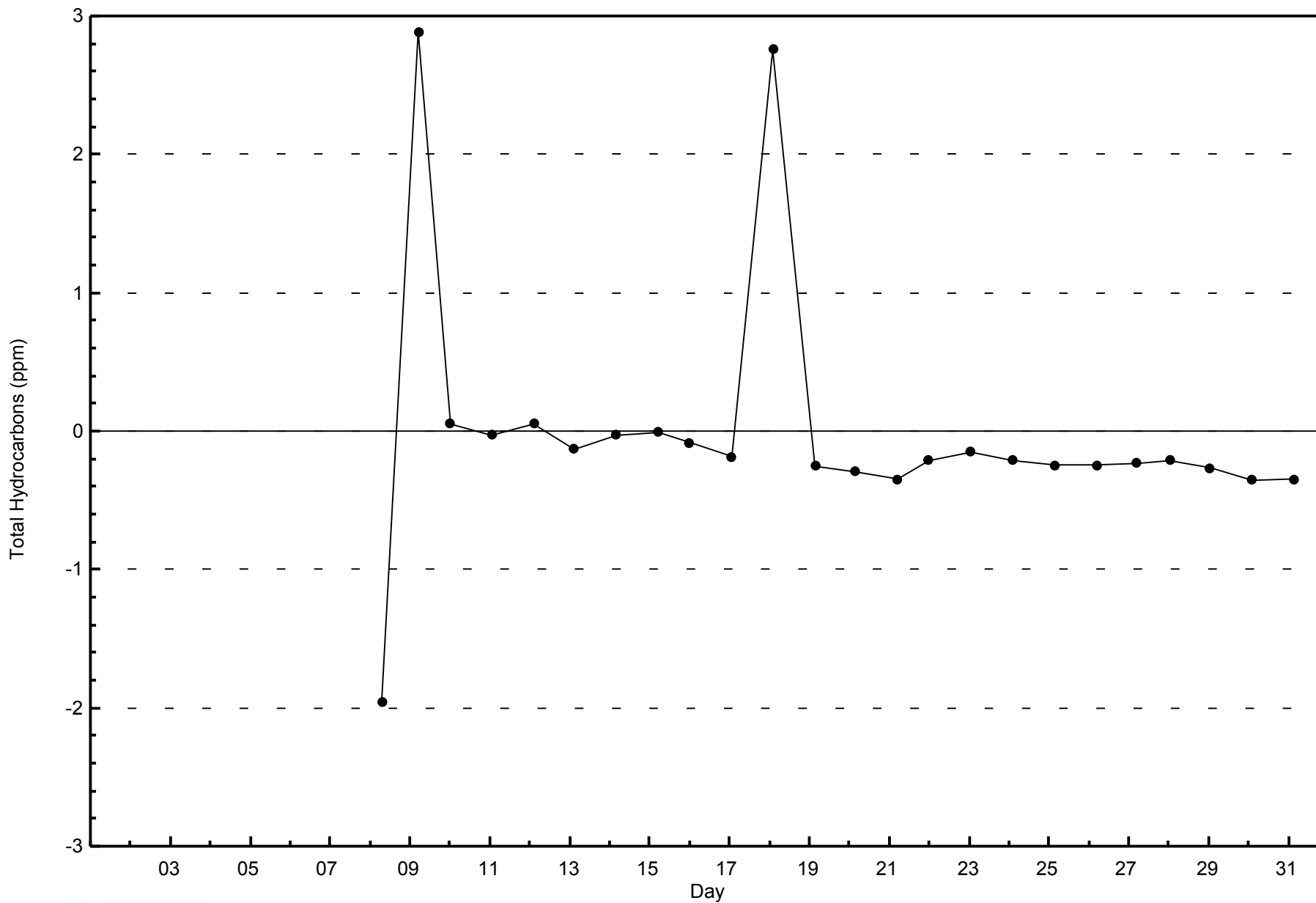


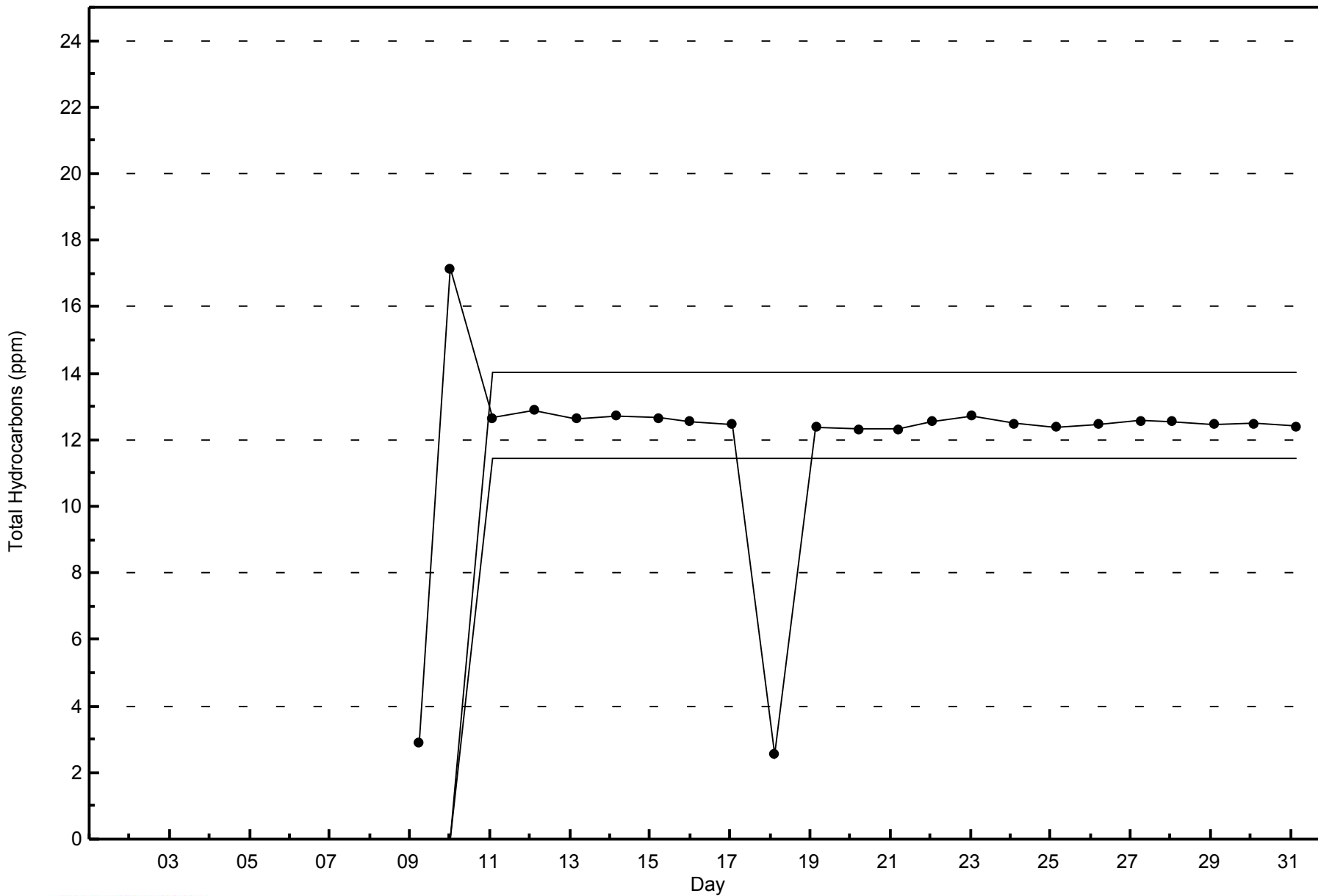
WBEA NETWORK

Zero Responses

Total Hydrocarbons (THC) - ppm

Firebag - July 2014





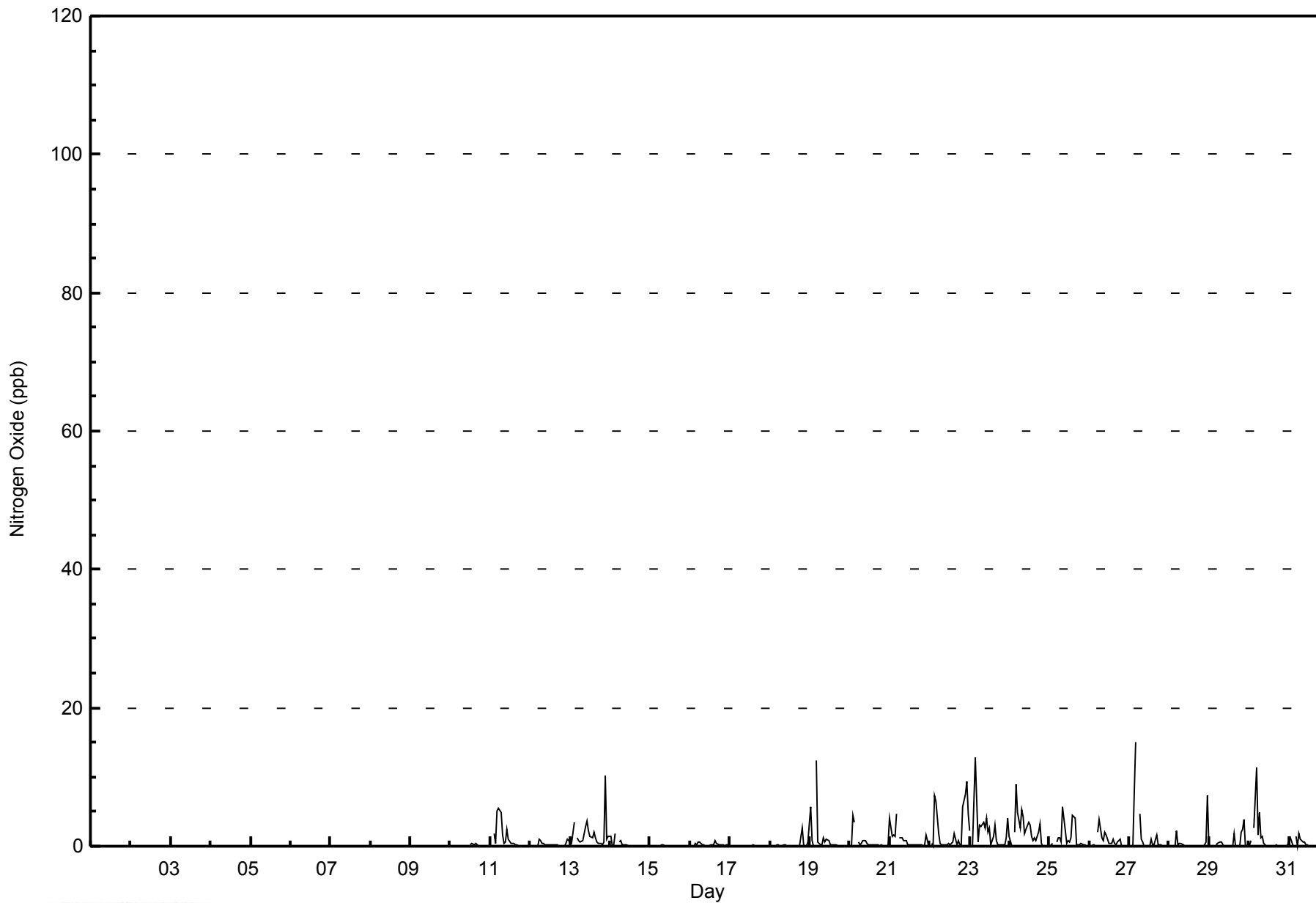


Maximum Value: 15 ppb on Jul 27 05:00																	Maximum Daily Average: 2.4 ppb on Jul 23										Hours in Service: 521	
Minimum Value: 0 ppb on Jul 12 01:00																	Minimum Daily Average: 0.1 ppb on Jul 15										Hours of Data: 495	
Maximum Diurnal Average: 4.3 ppb at hour 5																	Minimum Diurnal Average: 0.3 ppb at hour 18										Hours of Missing Data: 26	
Monthly Average: 0.9 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 9										Hours of Calibration: 26	
																											Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--		
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--		
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--		
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--		
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--		
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--		
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--		
8-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--		
9-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--		
10-Jul	NS	NS	NS	NS	NS	NS	NS	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	--	0		
11-Jul	0	Z	2	0	5	6	5	2	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1.1	6		
12-Jul	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		
13-Jul	0	0	3	Z	1	1	1	1	2	3	4	2	2	1	2	1	1	0	0	0	1	10	1	1	1.7	10		
14-Jul	1	0	0	2	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2		
15-Jul	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0		
16-Jul	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1		
17-Jul	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0		
18-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0.2	3		
19-Jul	6	1	0	Z	12	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.1	12		
20-Jul	0	0	5	3	Z	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	5		
21-Jul	4	1	2	2	5	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0.9	5		
22-Jul	Z	0	0	7	7	2	0	0	0	0	0	0	0	1	2	0	1	0	0	6	8	9	5	2.1	9			
23-Jul	2	Z	0	13	7	1	3	3	3	3	4	2	3	0	1	3	1	0	0	0	0	1	4	2.4	13			
24-Jul	1	0	Z	2	9	5	3	5	4	2	2	3	3	1	1	1	1	2	3	0	0	0	0	2.2	9			
25-Jul	0	0	0	Z	1	1	1	1	6	2	1	1	1	1	5	4	0	0	0	0	0	0	0	1.1	6			
26-Jul	0	0	0	0	Z	2	4	1	1	2	2	1	0	0	1	0	0	1	1	0	0	0	0	0.7	4			
27-Jul	0	0	0	8	15	Z	5	1	1	0	0	0	0	1	0	0	2	0	0	0	0	0	0	1.4	15			
28-Jul	Z	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	0.5	7			
29-Jul	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	2	0	0	0	2	2	4	0	0	0.6	4			
30-Jul	0	1	Z	3	11	2	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	11			
31-Jul	1	1	0	Z	2	0	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2			
																								Diurnal Average				
																								Diurnal Maximum				
Z - zerospan C - Calibration NS - Not in Service																												



WBEA NETWORK
Hourly Averages

Nitrogen Oxide (NO) - ppb
Firebag - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
Firebag - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	495	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: 495

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Oxide (NO) - ppb
Firebag - July 2014

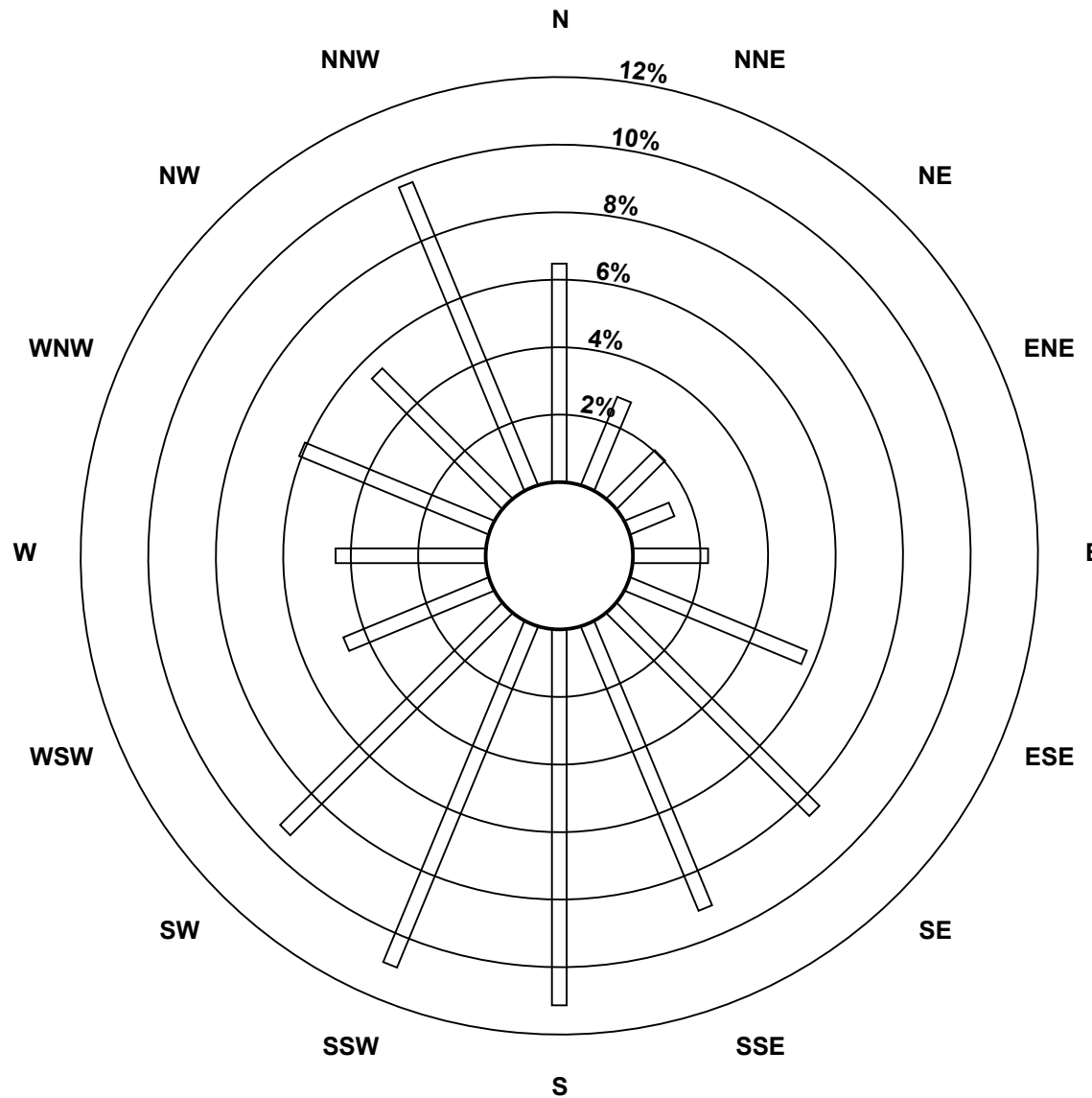
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	32	14	10	7	11	28	42	45	55	54	46	23	22	30	27	48	494
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	32	14	10	7	11	28	42	45	55	54	46	23	22	30	27	48	494

Total Number of Valid Hours: 494

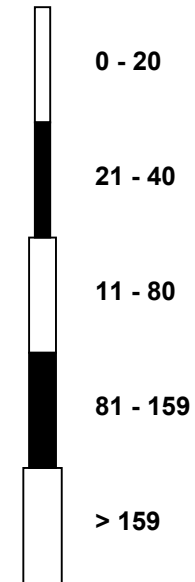
Total Number of Hours: 744

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

**Nitrogen Oxide (NO) - ppb
Firebag (AMS 19)**



Classes (ppb)



Total Number of Valid Hours: 494

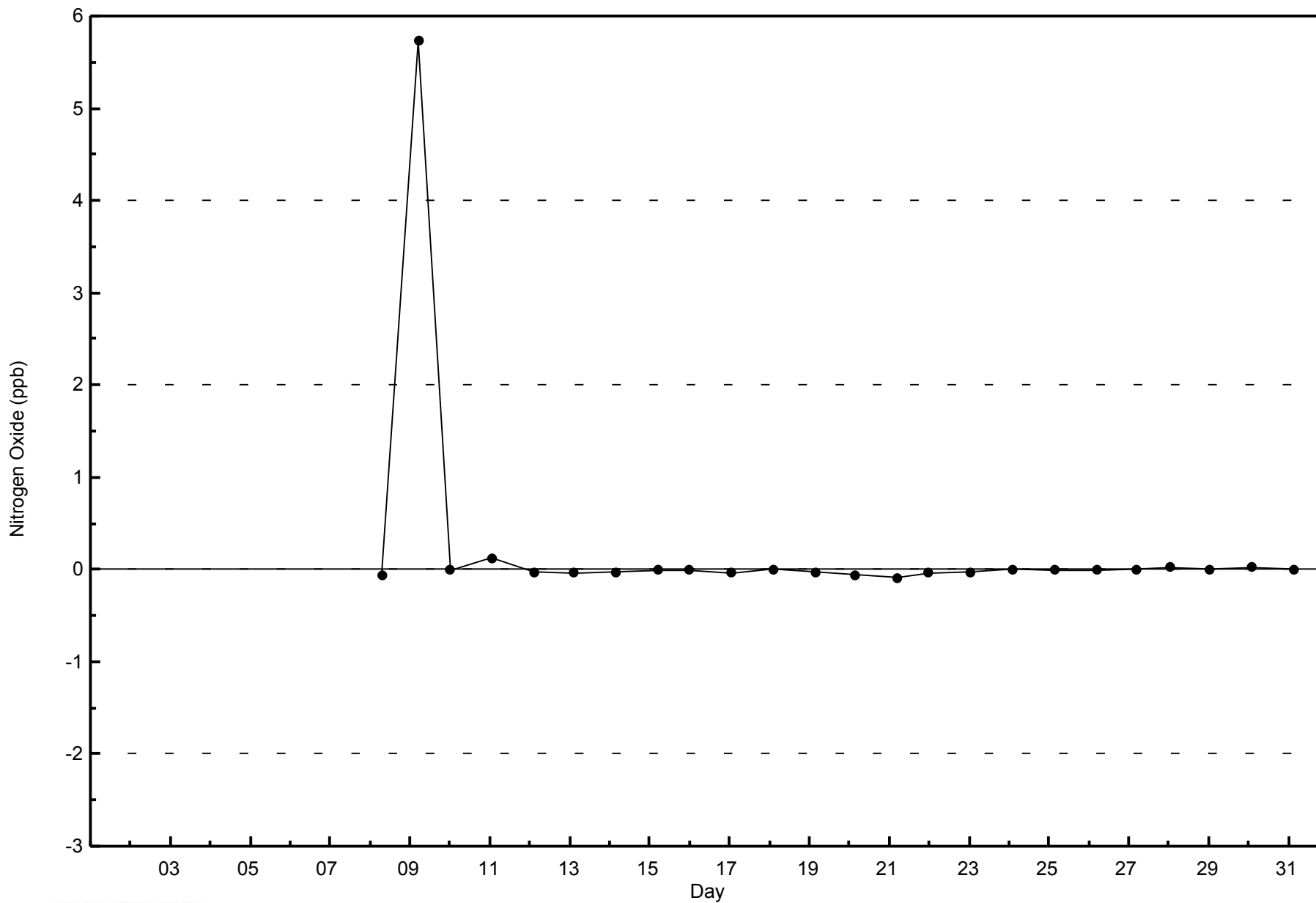


WBEA NETWORK

Zero Responses

Nitrogen Oxide (NO) - ppb

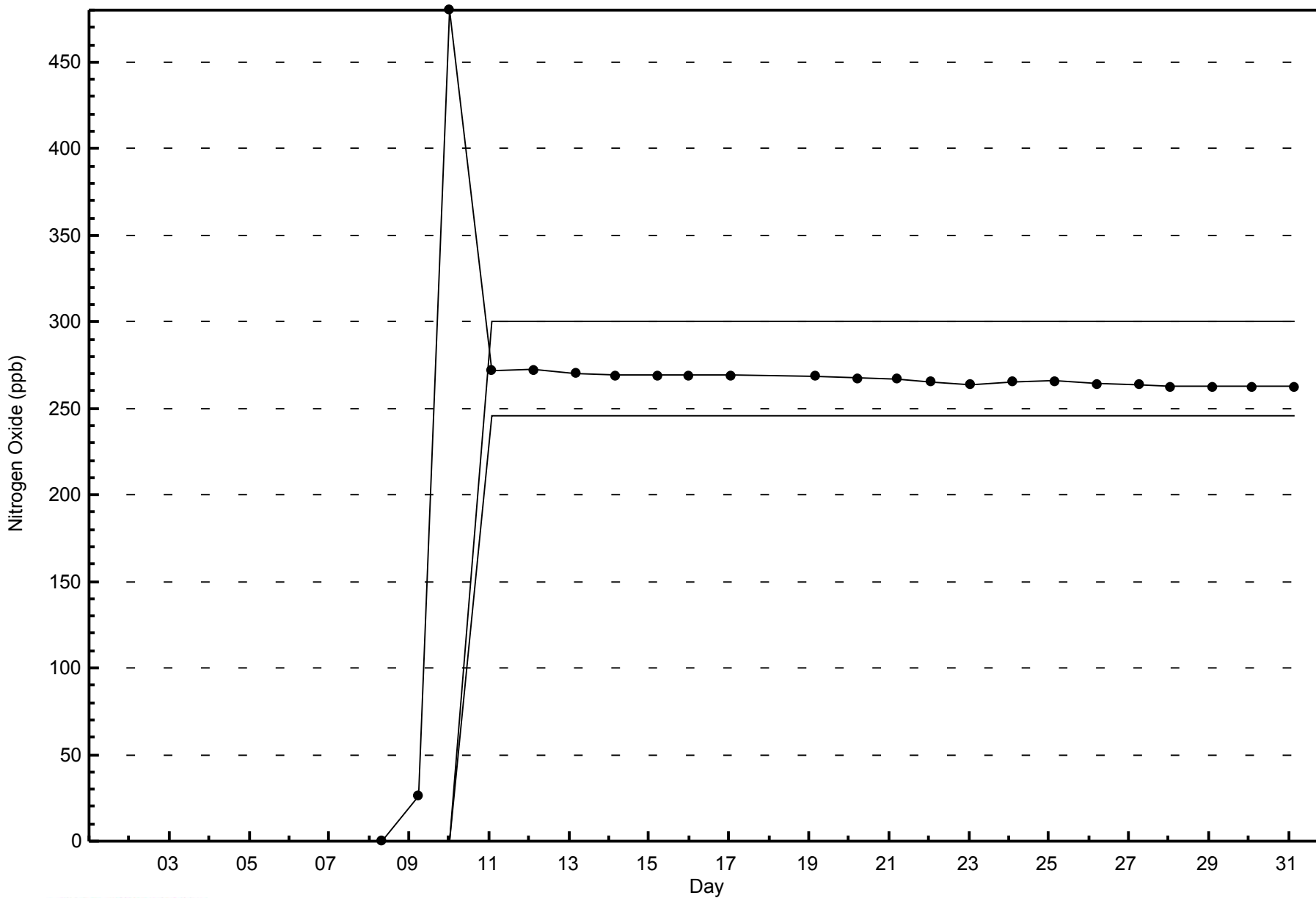
Firebag - July 2014





WBEA NETWORK
Span Responses

Nitrogen Oxide (NO) - ppb
Firebag - July 2014





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 521
Maximum Value: 38 ppb on Jul 22 05:00	Maximum Daily Average: 9.2 ppb on Jul 22
Minimum Value: 0 ppb on Jul 18 12:00	Hours of Data: 495
Maximum Diurnal Average: 9.4 ppb at hour 5	Hours of Missing Data: 26
Monthly Average: 3.0 ppb	Hours of Calibration: 26
Minimum Daily Average: 0.8 ppb on Jul 17	Percent Operational Time: 100.0
Minimum Diurnal Average: 1.3 ppb at hour 13	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 7 P ₉₉ = 20	

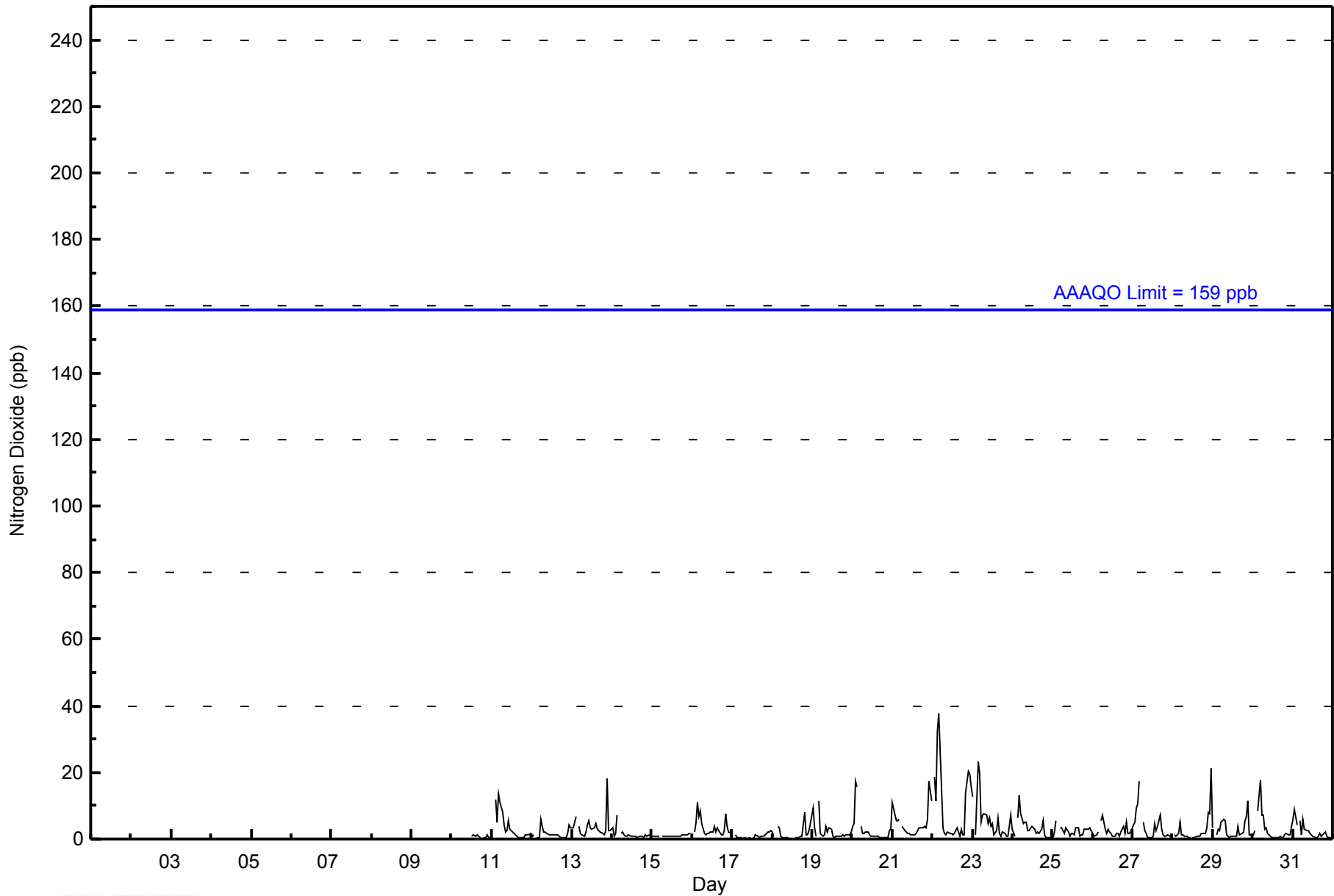
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	
8-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	
9-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	
10-Jul	NS	NS	NS	NS	NS	NS	NS	C	C	C	C	C	1	1	1	1	1	1	0	0	0	1	0	0	--	1	
11-Jul	0	Z	12	5	14	11	8	4	2	3	5	3	2	2	1	1	1	1	0	1	1	1	1	1	2	3.5	14
12-Jul	1	1	Z	0	1	6	4	2	2	2	1	1	1	1	1	1	1	0	0	0	0	2	4	4	1.7	6	
13-Jul	3	4	7	Z	4	2	1	1	2	4	5	4	3	3	5	3	2	2	1	3	18	3	3	3	3.7	18	
14-Jul	4	1	2	7	Z	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	7	
15-Jul	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1.0	2	
16-Jul	Z	2	5	11	7	9	5	2	1	2	2	2	2	4	2	3	2	1	1	3	8	4	2	2	3.5	11	
17-Jul	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	2	2	3	0.8	3	
18-Jul	2	1	Z	4	3	1	0	0	0	0	0	0	0	0	1	1	1	1	1	8	1	1	2	5	1.5	8	
19-Jul	9	4	1	Z	11	2	1	1	4	2	3	3	1	1	1	1	1	1	1	1	1	1	1	2	2.3	11	
20-Jul	4	5	18	16	Z	4	2	2	2	2	1	1	1	1	1	1	1	1	1	0	0	3	3	3	2.9	18	
21-Jul	11	7	5	5	6	Z	4	3	2	2	2	1	1	1	2	3	3	4	4	4	4	6	17	12	4.7	17	
22-Jul	Z	19	11	32	38	15	3	2	1	2	2	2	1	2	3	3	1	3	1	1	14	20	19	16	9.2	38	
23-Jul	13	Z	1	23	20	5	7	8	7	5	6	4	5	1	3	6	2	1	2	2	1	1	4	7	5.8	23	
24-Jul	3	1	Z	6	13	8	5	5	5	3	3	4	3	3	2	2	2	3	6	1	1	1	0	0	3.4	13	
25-Jul	1	2	5	Z	3	3	3	2	3	2	1	2	2	1	3	3	1	1	1	3	3	3	3	3	2.4	5	
26-Jul	2	1	1	2	Z	5	7	3	2	3	2	2	1	1	2	2	1	2	4	2	5	2	2	2	2.4	7	
27-Jul	4	5	9	11	17	Z	5	2	2	1	0	0	1	5	3	4	7	3	1	1	1	1	1	1	3.7	17	
28-Jul	Z	1	1	2	5	1	1	1	1	0	0	0	0	0	1	1	1	2	2	2	3	8	8	21	2.7	21	
29-Jul	4	Z	1	3	2	5	6	6	1	1	1	1	1	1	4	1	2	2	6	7	12	1	1	1	2.9	12	
30-Jul	1	2	Z	8	18	7	7	3	3	2	1	1	1	1	1	1	1	1	1	1	2	1	1	4	2.9	18	
31-Jul	6	9	4	Z	5	1	6	3	3	3	2	1	1	1	1	1	2	1	1	2	1	0	0	0	2.3	9	
																								Diurnal Average			
																								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
Firebag - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Firebag - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	491	99.19	99.19
21 - 40	4	0.81	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: 495

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Firebag - July 2014

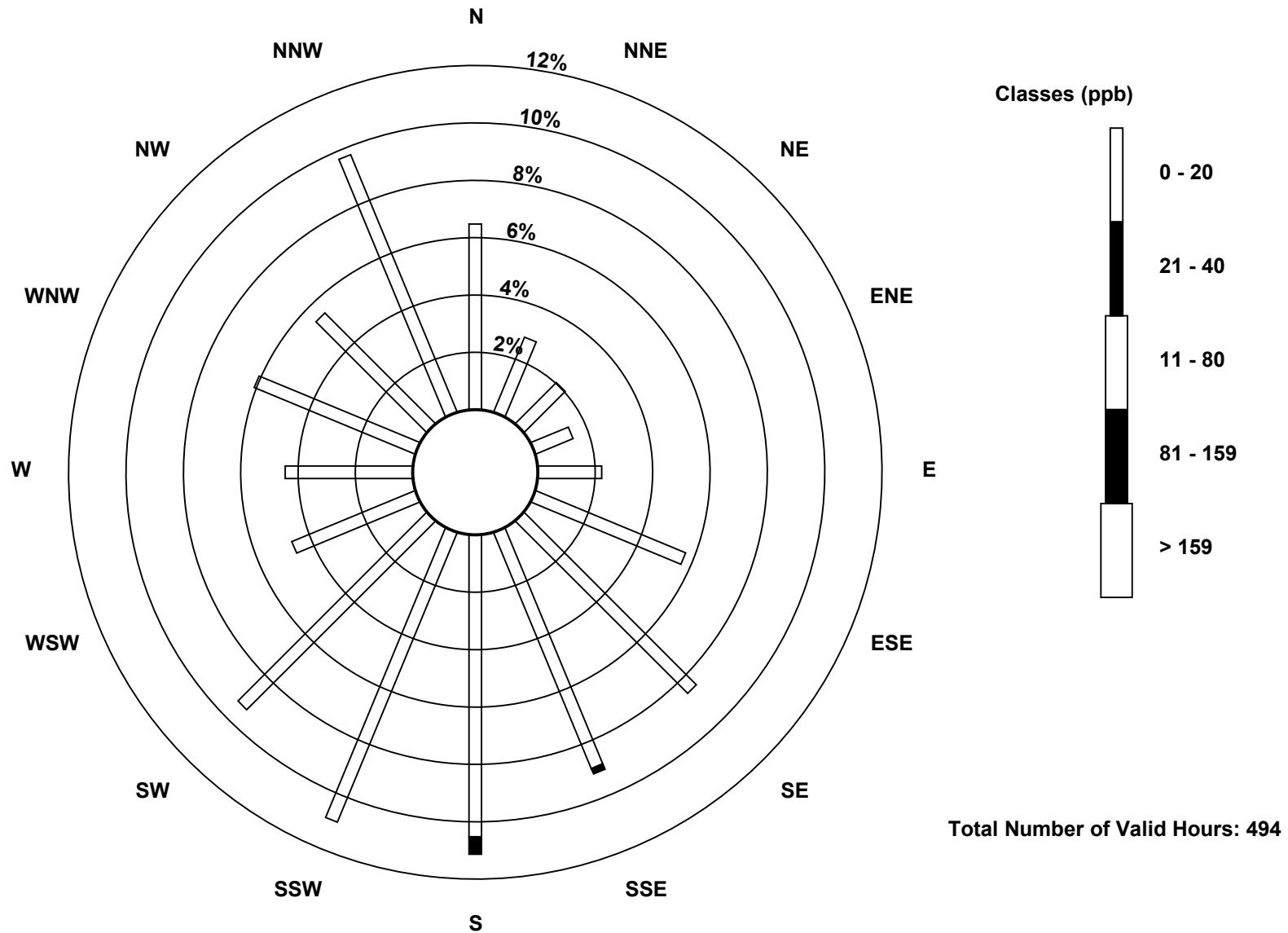
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	32	14	10	7	11	28	42	44	52	54	46	23	22	30	27	48	490
21 - 40	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	4
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	32	14	10	7	11	28	42	45	55	54	46	23	22	30	27	48	494

Total Number of Valid Hours: 494

Total Number of Hours: 744

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

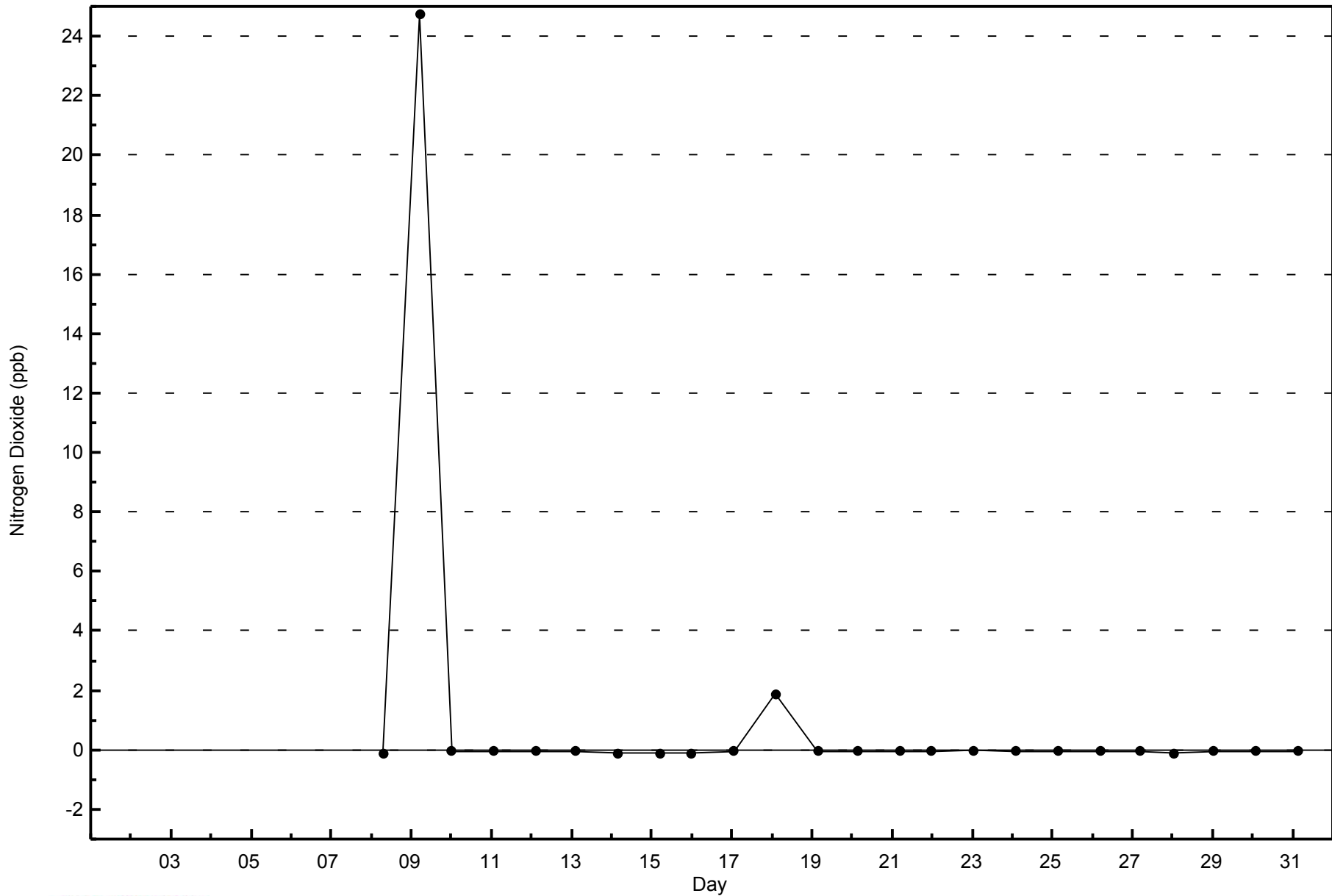
**Nitrogen Dioxide (NO₂) - ppb
Firebag (AMS 19)**





WBEA NETWORK
Zero Responses

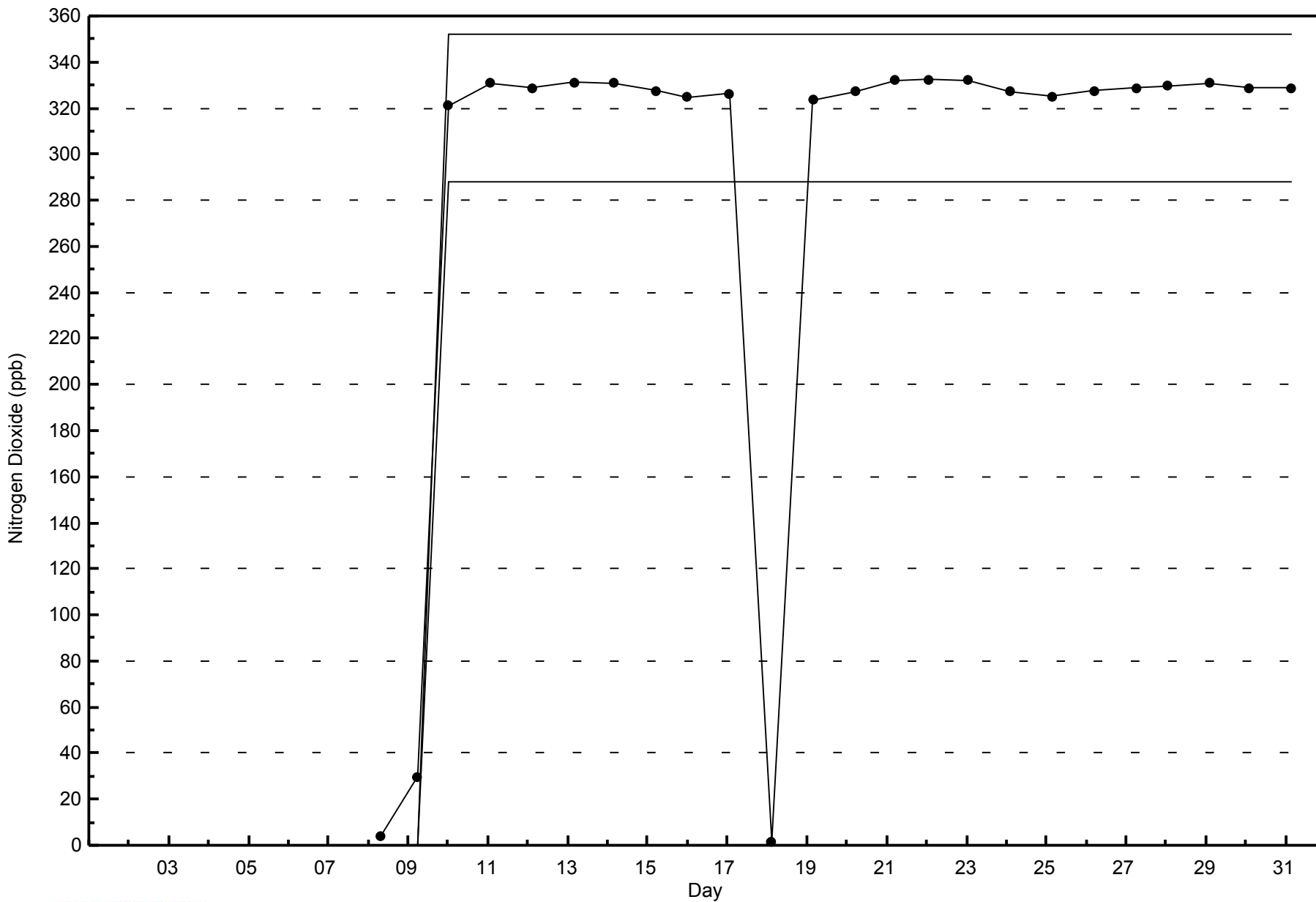
Nitrogen Dioxide (NO₂) - ppb
Firebag - July 2014





WBEA NETWORK
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Firebag - July 2014



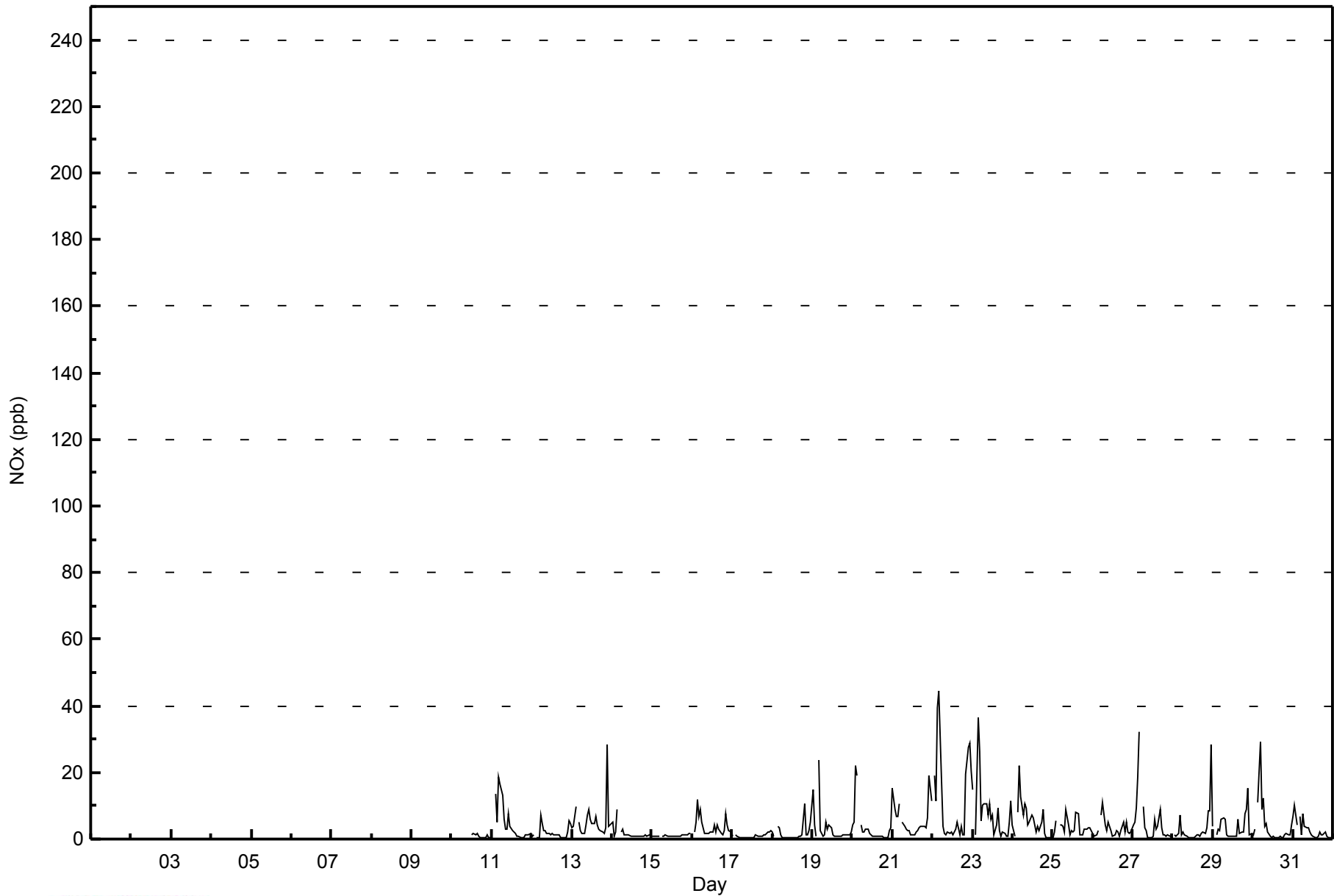


Maximum Value: 44 ppb on Jul 22 05:00																		Maximum Daily Average: 11.3 ppb on Jul 22						Hours in Service: 521		
Minimum Value: 0 ppb on Jul 11 01:00																		Minimum Daily Average: 0.9 ppb on Jul 17						Hours of Data: 495		
Maximum Diurnal Average: 13.6 ppb at hour 5																		Minimum Diurnal Average: 1.7 ppb at hour 18						Hours of Missing Data: 26		
Monthly Average: 3.9 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 9 P ₉₉ = 28						Hours of Calibration: 26		
																								Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
8-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
9-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
10-Jul	NS	NS	NS	NS	NS	NS	NS	C	C	C	C	C	1	2	1	2	1	0	0	0	0	1	0	0	--	2
11-Jul	0	Z	14	5	19	16	13	6	3	3	8	4	3	2	2	1	1	1	0	1	1	1	1	1	4.6	19
12-Jul	1	1	Z	0	1	7	5	3	2	2	2	1	2	1	1	1	1	0	0	0	0	2	5	5	1.9	7
13-Jul	4	4	10	Z	5	3	2	2	4	7	9	6	5	5	7	4	3	3	2	2	3	28	4	4	5.4	28
14-Jul	5	1	2	9	Z	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.7	9
15-Jul	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1.0	2
16-Jul	Z	2	5	12	7	9	5	2	2	2	2	2	4	2	4	3	2	1	3	8	4	2	2	2	3.7	12
17-Jul	1	Z	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	0.9	2
18-Jul	2	1	Z	4	3	1	1	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	2	5	1.7	11
19-Jul	15	4	1	Z	24	2	1	1	5	3	4	3	1	1	1	1	1	1	1	1	1	1	1	2	3.4	24
20-Jul	4	5	22	19	Z	4	2	2	3	3	2	1	1	1	1	1	1	1	1	1	0	1	3	3	3.5	22
21-Jul	15	9	7	7	11	Z	5	4	3	3	3	1	1	1	2	3	3	4	4	4	4	6	19	12	5.6	19
22-Jul	Z	19	12	40	44	17	4	2	1	2	2	2	1	2	3	5	1	4	1	1	19	28	29	20	11.3	44
23-Jul	15	Z	1	36	26	6	10	10	11	7	11	6	7	1	4	9	2	1	2	2	1	1	5	11	8.1	36
24-Jul	4	1	Z	8	22	13	7	11	9	4	5	7	6	4	2	4	3	5	9	2	1	1	0	0	5.6	22
25-Jul	1	2	6	Z	4	4	4	2	9	4	1	3	2	3	8	8	1	1	1	3	3	3	3	3	3.5	9
26-Jul	2	1	1	2	Z	7	11	4	3	5	4	3	1	1	2	2	1	3	5	2	5	2	2	2	3.1	11
27-Jul	4	5	9	19	32	Z	10	3	2	1	0	0	1	6	3	4	9	3	1	1	1	1	1	1	5.1	32
28-Jul	Z	1	1	2	7	1	2	1	1	0	0	0	0	1	1	1	1	2	2	2	3	8	8	28	3.3	28
29-Jul	4	Z	1	3	2	6	6	6	1	1	1	1	1	1	1	6	2	2	2	8	9	15	1	2	3.5	15
30-Jul	1	3	Z	11	29	9	12	4	5	2	1	1	1	1	0	1	1	1	1	1	2	1	1	4	4.0	29
31-Jul	7	10	4	Z	7	1	8	4	3	3	2	1	1	1	1	1	2	1	1	2	1	0	0	0	2.7	10
4.8 4.1 5.8 10.5 13.6 6.1 5.3 3.3 3.4 2.6 2.8 2.2 1.8 1.8 2.1 2.7 1.8 1.7 1.8 2.2 3.1 5.1 4.3 5.1																								Diurnal Average		
15 19 22 40 44 17 13 11 11 7 11 7 7 6 8 9 9 5 9 11 19 28 29 28																								Diurnal Maximum		
Z - zerospan			C - Calibration			NS - Not in Service																				



WBEA NETWORK
Hourly Averages

NO_x (NO_x) - ppb
Firebag - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

NO_x (NO_x) - ppb
Firebag - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	482	97.37	97.37
21 - 40	12	2.42	99.80
41 - 80	1	0.20	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 495

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

NO_x (NO_x) - ppb
Firebag - July 2014

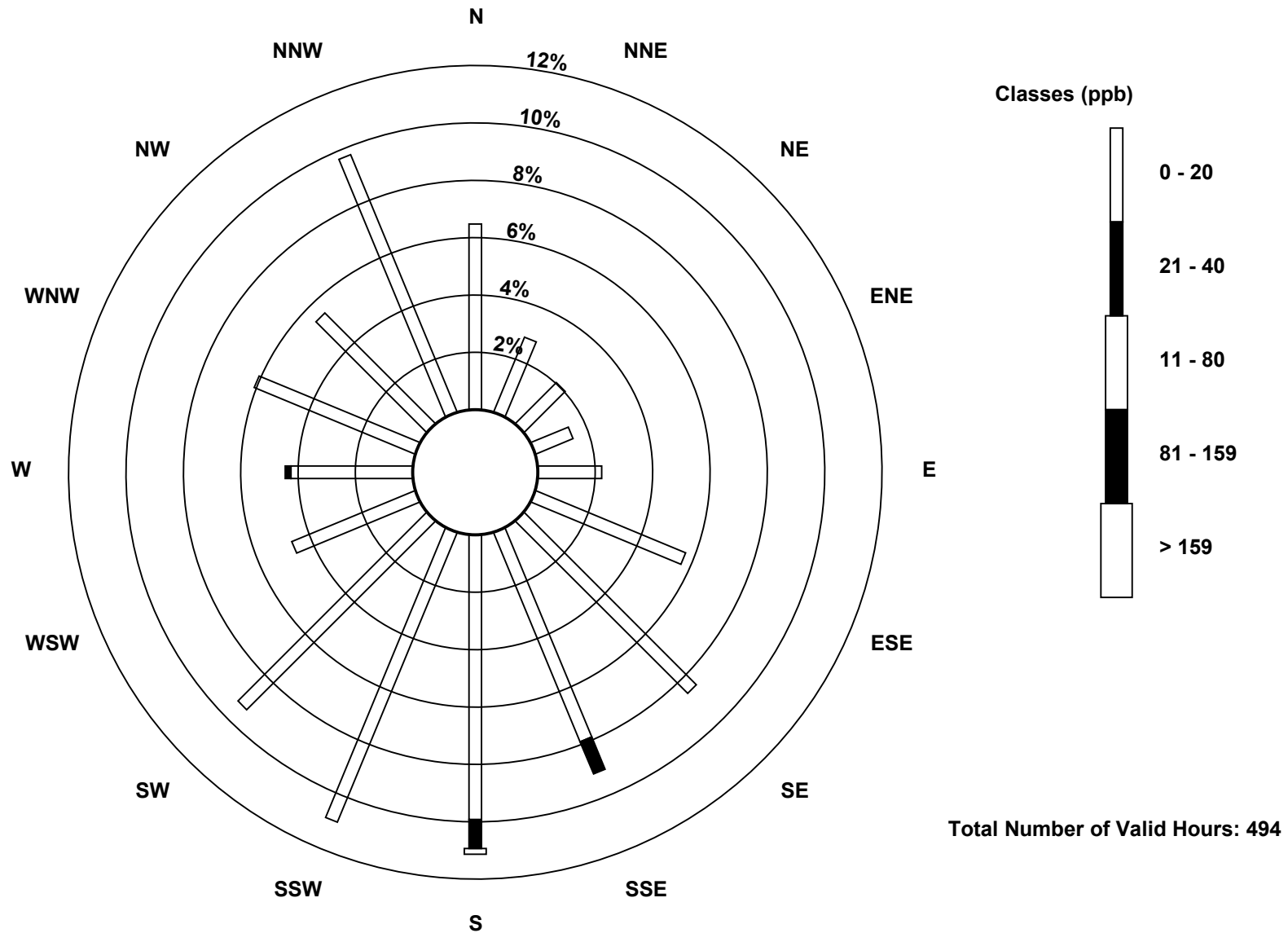
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	32	14	10	7	11	28	42	39	49	54	46	23	21	30	27	48	481
21 - 40	0	0	0	0	0	0	0	6	5	0	0	0	1	0	0	0	12
11 - 80	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	32	14	10	7	11	28	42	45	55	54	46	23	22	30	27	48	494

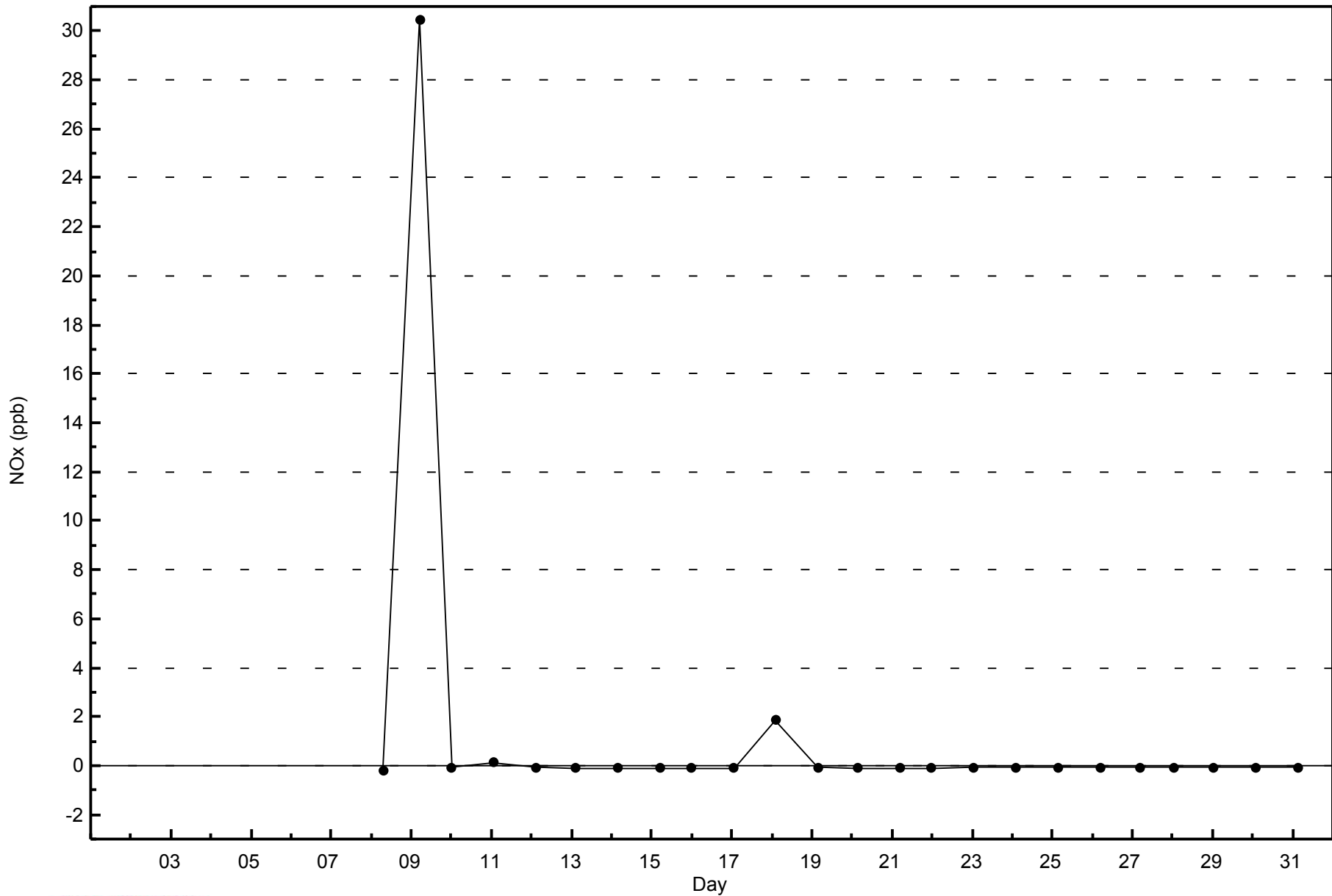
Total Number of Valid Hours: 494

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

NOx (NO_x) - ppb
 Firebag (AMS 19)

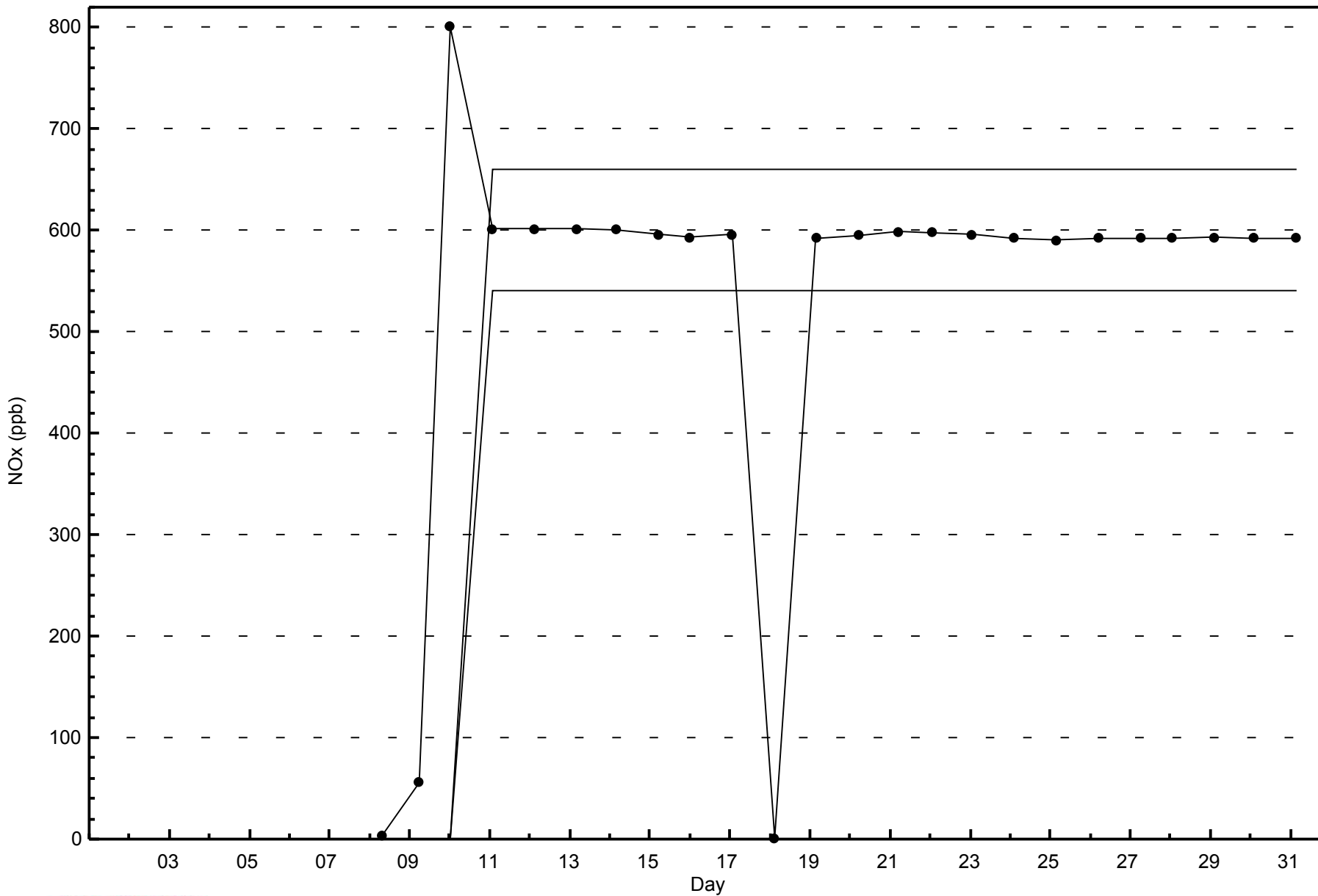






WBEA NETWORK
Span Responses

NO_x (NO_x) - ppb
Firebag - July 2014



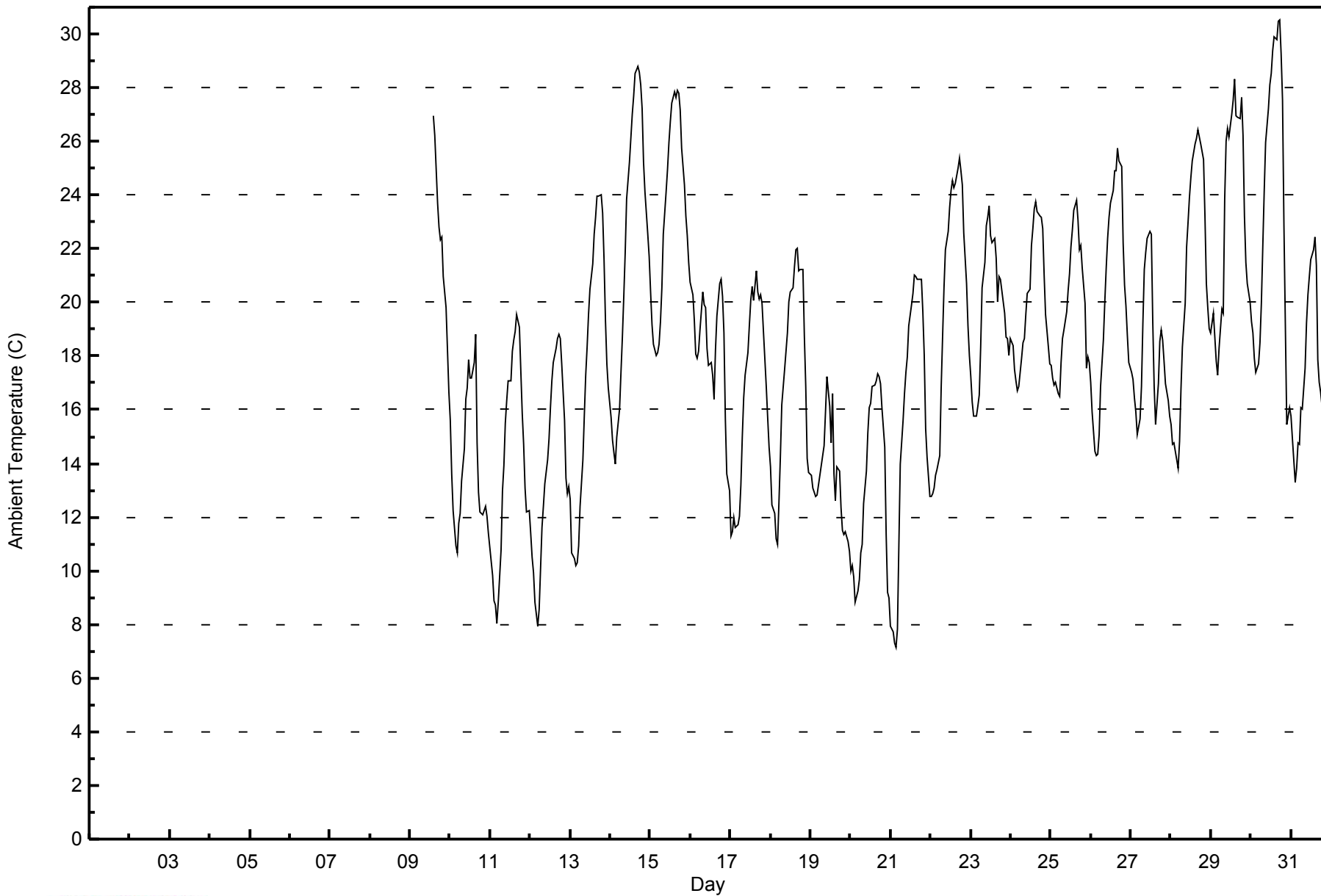


Maximum Value: 30.5 C on Jul 30 18:00 Maximum Daily Average: 23.4 C on Jul 30																								Hours in Service:	538	
Minimum Value: 7.2 C on Jul 21 04:00 Minimum Daily Average: 13.1 C on Jul 20																								Hours of Data:	538	
Maximum Diurnal Average: 22.3 C at hour 16 Minimum Diurnal Average: 13.5 C at hour 5																								Hours of Missing Data:	0	
Monthly Average: 18.34 C Percentiles: P ₁ = 7.9 P ₁₀ = 12.0 Q ₁ = 14.8 Median = 18.2 Q ₃ = 21.6 P ₉₀ = 25.1 P ₉₉ = 29.0																								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-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
8-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
9-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	26.9	26.2	23.7	22.8	22.3	22.5	21.0	19.8	18.2	16.7	--	26.9
10-Jul	15.6	13.6	12.2	10.9	10.7	11.7	12.1	13.4	14.6	16.4	16.8	17.9	17.2	17.2	17.8	18.8	14.8	12.9	12.2	12.1	12.2	12.4	12.0	11.4	14.0	18.8
11-Jul	10.9	9.8	8.9	8.7	8.0	8.8	10.8	13.0	13.9	15.5	16.4	17.1	17.1	18.2	18.6	18.9	19.6	19.1	17.5	15.9	14.7	13.1	12.2	12.2	14.1	19.6
12-Jul	11.4	10.5	9.9	8.8	8.0	8.5	10.1	11.6	12.4	13.3	14.1	14.9	16.1	17.1	17.8	18.3	18.6	18.8	18.6	17.7	15.6	13.5	12.9	13.1	13.8	18.8
13-Jul	12.7	10.7	10.5	10.2	10.3	10.9	12.4	14.1	15.8	17.3	18.4	19.6	20.5	21.5	22.5	23.2	24.0	24.0	24.0	23.3	21.6	19.3	17.7	16.8	17.6	24.0
14-Jul	15.7	14.9	14.4	14.0	15.0	16.0	17.4	18.7	20.2	21.9	23.9	25.2	26.1	27.0	27.7	28.5	28.8	28.6	28.1	27.2	25.2	24.1	22.5	21.7	22.2	28.8
15-Jul	20.4	19.2	18.5	18.0	18.1	18.5	19.3	20.5	22.6	24.1	25.0	26.0	26.8	27.4	27.8	27.6	27.9	27.8	27.2	25.7	24.4	23.2	22.5	21.5	23.3	27.9
16-Jul	20.7	20.3	19.4	18.1	17.9	18.2	19.0	20.4	19.9	19.8	18.3	17.7	17.8	17.3	16.4	18.2	19.5	20.7	20.9	20.2	18.8	15.7	13.6	13.0	18.4	20.9
17-Jul	11.3	11.5	12.0	11.6	11.7	12.0	13.2	15.0	16.4	17.3	18.1	19.1	20.1	20.6	20.1	21.2	20.4	20.1	20.3	20.0	18.9	16.9	15.7	14.6	16.6	21.2
18-Jul	13.8	12.5	12.1	11.2	11.0	12.5	14.3	16.2	17.5	18.2	18.9	20.0	20.4	20.6	21.3	22.0	22.0	21.2	21.2	21.2	18.8	16.9	14.2	13.6	17.1	22.0
19-Jul	13.6	13.1	12.9	12.8	12.8	13.2	13.9	14.3	14.7	15.9	17.3	16.1	14.8	16.6	13.6	12.6	13.9	13.7	12.3	11.5	11.4	11.5	11.1	10.7	13.5	17.3
20-Jul	10.0	10.2	9.8	8.8	9.2	9.7	10.7	11.0	12.5	13.7	15.1	16.1	16.2	16.9	16.9	17.1	17.3	17.2	17.0	16.1	14.6	11.3	9.2	9.0	13.1	17.3
21-Jul	7.9	7.7	7.3	7.2	7.9	10.9	14.0	15.6	16.6	17.4	18.0	19.1	19.9	20.3	21.0	21.0	20.9	20.8	20.9	19.6	18.0	15.3	14.3	12.7	15.6	21.0
22-Jul	12.7	12.9	13.1	13.6	13.8	14.3	16.8	18.7	20.6	22.0	22.7	23.5	24.2	24.5	24.3	24.4	25.0	25.4	24.9	24.4	22.6	20.7	19.1	18.0	20.1	25.4
23-Jul	17.2	16.3	15.8	15.8	16.1	16.6	18.3	20.5	21.5	22.8	23.1	23.6	22.5	22.2	22.4	21.7	20.0	21.0	20.9	20.0	19.6	18.7	18.7	18.0	19.7	23.6
24-Jul	18.6	18.4	17.5	17.1	16.7	16.8	17.9	18.5	18.7	19.6	20.3	20.5	22.1	22.8	23.5	23.7	23.4	23.2	23.2	22.8	21.0	19.6	18.3	17.7	20.1	23.7
25-Jul	17.7	17.2	16.9	17.0	16.6	16.5	17.7	18.7	19.0	19.6	20.5	21.0	22.0	22.7	23.5	23.8	23.1	22.0	22.1	21.3	19.9	17.6	18.0	17.8	19.7	23.8
26-Jul	17.0	15.9	14.4	14.3	14.4	15.1	16.9	18.6	20.0	21.3	22.4	23.1	23.7	24.2	24.9	24.9	25.8	25.3	25.1	22.2	20.7	19.9	18.8	17.7	20.3	25.8
27-Jul	17.4	17.1	16.5	15.9	15.1	15.7	16.8	19.2	21.2	21.9	22.4	22.7	22.5	19.3	16.8	15.4	17.0	18.6	19.0	18.6	17.8	17.0	16.3	15.7	18.2	22.7
28-Jul	15.5	14.7	14.8	14.2	13.8	14.8	16.7	18.3	20.0	22.1	23.0	23.9	24.6	25.3	25.9	26.1	26.4	26.1	25.9	25.3	23.2	20.7	19.8	19.0	20.8	26.4
29-Jul	18.9	19.6	18.7	17.8	17.3	18.3	19.7	19.6	23.8	26.0	26.5	26.2	27.0	27.5	28.3	27.0	26.9	26.8	27.6	26.2	23.2	21.5	20.7	20.0	23.1	28.3
30-Jul	19.3	18.8	17.9	17.4	17.7	18.5	20.0	22.1	24.1	25.9	27.2	28.1	28.5	29.4	29.9	29.8	30.5	30.5	29.3	27.5	22.9	15.5	15.8	16.1	23.4	30.5
31-Jul	15.7	14.9	13.3	13.8	14.8	14.7	16.1	16.0	17.5	19.2	20.3	20.9	21.6	22.0	22.4	21.4	17.8	17.0	16.6	15.6	15.0	14.4	14.2	13.7	17.0	22.4
																								Diurnal Average		
																								Diurnal Maximum		
NS - Not in Service																										



WBEA NETWORK
Hourly Averages

Ambient Temperature (AT) - C
Firebag - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Firebag - July 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	21	3.90	3.90
10 - 20	325	60.41	64.31
> 20	192	35.69	100.00

Total Number of Valid Hours: 538

Total Number of Hours: 744

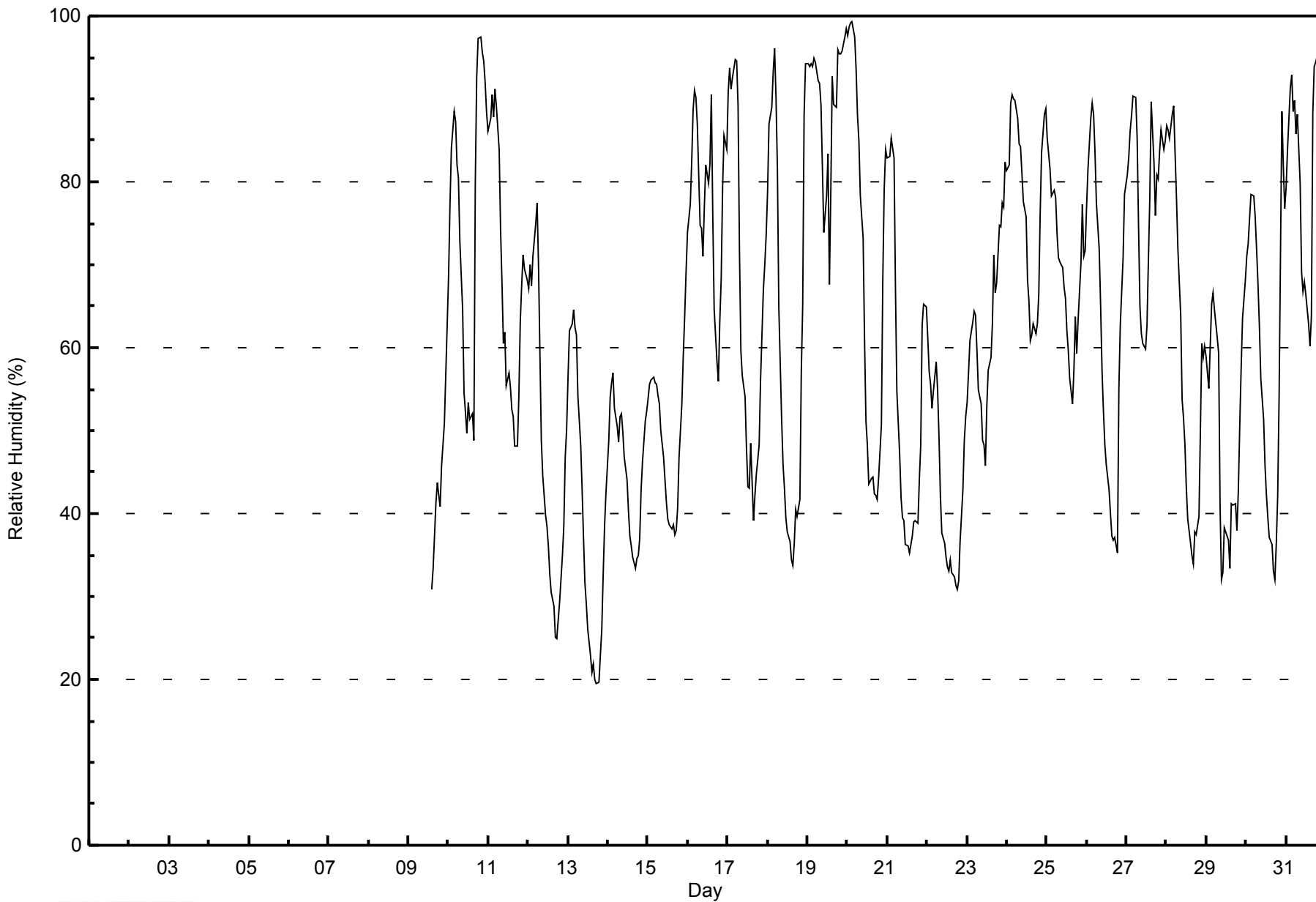


Maximum Value: 99 % on Jul 20 04:00																			Maximum Daily Average: 89.7 % on Jul 19						Hours in Service: 538																			
Minimum Value: 19 % on Jul 13 18:00																			Minimum Daily Average: 38.6 % on Jul 13						Hours of Data: 538																			
Maximum Diurnal Average: 80.5 % at hour 5																			Minimum Diurnal Average: 47.3 % at hour 15						Hours of Missing Data: 0																			
Monthly Average: 62.5 %																			Percentiles: P ₁ = 23 P ₁₀ = 36 Q ₁ = 45 Median = 62 Q ₃ = 81 P ₉₀ = 90 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-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																		
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																		
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																		
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																		
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																		
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																		
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																		
8-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--																		
9-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	31	33	41	44	42	41	46	51	57	63	--	63																		
10-Jul	69	77	84	88	87	82	80	73	65	55	52	50	53	51	52	49	80	92	97	98	96	95	92	88	75.2	98																		
11-Jul	86	88	91	88	91	89	84	74	68	61	62	55	57	55	53	52	48	48	54	63	67	71	69	68	68.4	91																		
12-Jul	67	70	67	71	75	78	70	59	49	45	40	39	36	33	30	29	25	25	27	29	35	38	47	50	47.2	78																		
13-Jul	56	62	63	65	62	62	54	48	43	37	32	29	26	23	21	22	20	19	20	23	26	33	38	43	38.6	65																		
14-Jul	49	54	56	57	53	50	49	52	52	50	47	44	40	37	36	35	33	35	35	37	43	46	51	52	45.5	57																		
15-Jul	54	56	56	56	56	56	54	53	50	47	44	41	39	39	38	39	37	38	41	47	53	59	64	69	49.4	69																		
16-Jul	74	77	82	89	91	90	87	75	74	71	77	82	80	82	91	76	65	58	56	63	68	79	86	84	77.4	91																		
17-Jul	91	94	91	93	95	95	89	72	60	57	54	48	43	43	49	39	42	45	47	48	56	67	70	73	64.9	95																		
18-Jul	79	87	89	93	96	90	82	65	51	46	43	40	38	37	34	34	36	41	40	42	57	65	88	94	61.1	96																		
19-Jul	94	94	94	94	95	94	92	92	89	82	74	78	83	68	79	93	89	89	96	95	95	96	97	98	89.7	98																		
20-Jul	98	99	99	99	97	94	88	85	78	73	61	51	48	43	44	44	42	42	42	44	51	68	79	84	69.0	99																		
21-Jul	83	83	85	84	83	67	55	47	42	39	39	36	36	35	36	37	39	39	39	44	48	63	65	65	53.8	85																		
22-Jul	61	57	56	53	55	58	55	49	42	38	37	35	34	33	34	33	32	31	31	32	37	43	49	52	43.1	61																		
23-Jul	53	57	61	63	64	64	60	55	53	49	48	46	53	57	59	63	71	67	68	75	75	77	77	82	62.4	82																		
24-Jul	81	82	90	90	90	90	88	85	84	81	78	76	68	66	61	61	63	62	63	66	76	84	88	89	77.5	90																		
25-Jul	85	83	81	78	79	78	74	71	70	70	67	66	62	60	56	53	57	64	59	63	70	77	71	72	69.5	85																		
26-Jul	77	82	88	90	88	84	78	72	65	57	52	48	46	43	40	37	37	37	35	55	63	67	71	79	62.0	90																		
27-Jul	81	83	86	88	90	90	85	75	65	62	61	60	63	70	78	90	82	76	81	80	84	86	84	85	78.5	90																		
28-Jul	87	86	85	88	89	83	78	72	64	54	52	48	43	39	36	35	34	38	38	40	50	61	59	60	59.1	89																		
29-Jul	59	55	60	65	67	64	61	59	41	32	33	38	37	37	33	41	41	41	38	43	51	57	64	68	49.5	68																		
30-Jul	71	73	76	78	78	76	72	68	63	56	51	46	42	39	37	36	33	32	36	42	54	89	82	77	58.6	89																		
31-Jul	79	84	91	93	89	90	86	88	80	69	67	68	66	63	60	64	88	94	94	96	93	92	92	90	82.4	96																		
																			74.3	76.5	78.7	80.2	80.5	78.4	73.6	67.6	61.3	55.9	53.2	51.1	49.8	47.9	47.3	47.6	49.5	50.3	51.2	55.1	60.6	68.0	71.3	73.3	Diurnal Average	
																			98	99	99	99	97	95	92	92	89	82	78	82	83	82	91	93	89	94	97	98	96	96	97	98	Diurnal Maximum	
NS - Not in Service																																												



WBEA NETWORK
Hourly Averages

Relative Humidity (RH) - %
Firebag - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Firebag - July 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	2	0.37	0.37
20 - 40	94	17.47	17.84
40 - 60	156	29.00	46.84
60 - 80	148	27.51	74.35
80 - 100	138	25.65	100.00

Total Number of Valid Hours: 538

Total Number of Hours: 744



Maximum Speed: 29 km/h on Jul 9 15:00	Maximum Daily Speed Average: 17.8 km/h on Jul 15	Hours in Service: 538
Minimum Speed Value: 1 km/h on Jul 28 21:00	Minimum Daily Speed Average: 1.1 km/h on Jul 21	Hours of Data: 537
Maximum Diurnal Speed Average: 5.7 km/h at hour 4	Minimum Diurnal Speed Average: 1.3 km/h at hour 22	Hours of Missing Data: 1
Monthly Average Velocity: 3.2 km/h 209.8 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 8 Median = 12 Q ₃ = 16 P ₉₀ = 19 P ₉₉ = 25	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-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
8-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
9-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
10-Jul	WNW8	W9	W9	WSW11	WSW13	W15	W15	WSW11	W12	WNW19	W22	WNW21	WNW20	W19	NW19	WNW23	NW21	NW26	NW24	NW19	NW20	NW17	NW16	WNW15	WNW15.6	WNW15.6	NW26
11-Jul	WNW13	WNW12	W11	W11	W10	W10	W10	WNW13	WNW15	WNW15	W18	WNW15	WNW13	W17	W20	WNW18	NNW16	N18	N18	N13	NNW9	NNW9	NNW13	N15	WNW11.7	WNW11.7	W20
12-Jul	NNW13	NNW14	N14	N9	NW7	NW8	NW12	NNW15	N18	NNW16	NNW17	NNW15	NNW16	NNW12	NNW14	NNW13	N14	NNW14	N13	NNE10	NE9	ENE9	ENE10	E11	N10.9	N10.9	NNW18
13-Jul	ESE13	SE10	SE10	SE11	SE12	SE12	SE16	SE15	SE10	S3	ESE4	SSE8	S7	S3	S4	SSW5	SW4	ESE5	SE9	SE11	SE10	SSE11	SSE13	SSE16	SE8.6	SE8.6	SSE16
14-Jul	SSE17	S18	S18	S17	S19	S19	S18	SSW20	SSW18	SSW17	SSW16	SW16	SSW19	SSW18	SSW18	SW16	SW15	WSW15	WSW16	SW11	SSW9	SSW13	S13	SSW16	SSW15.2	SSW15.2	SSW20
15-Jul	SW15	SW16	SW17	SSW17	SSW18	SW20	SW19	SSW15	SSW15	SSW17	SSW22	SSW21	SSW21	SSW19	SW17	SW18	SW21	SSW21	SW19	SSW13	SSW16	SW18	SW18	SW17	SSW17.8	SSW17.8	SSW22
16-Jul	SW15	SW16	WSW13	W9	WNW7	NNW3	NW5	N13	NNW18	N16	NNW9	N10	NNW13	NW11	WNW7	W16	W13	WNW10	W10	WSW12	SW11	NNE12	ENE8	NE3	WNW6.4	WNW6.4	NNW18
17-Jul	NNW7	NNW11	N10	N10	N9	N9	NNE8	NE8	NE7	N5	WNW8	NW4	WNW6	NNW7	NNW12	WNW4	NNW7	NNE7	NW5	NW2	WSW2	NW7	N6	NNE6	N5.9	N5.9	NNW12
18-Jul	NNE4	NNW4	NW5	NNW6	NNE8	NNE10	NNE13	NE13	NE13	NE11	NE8	NW5	N6	NNW5	WNW2	NW4	W6	NNW5	WSW1	S7	SW14	SW16	SW14	SE3	N2.5	N2.5	SW16
19-Jul	S8	SSE7	ESE9	SE9	SSE12	S13	SSW16	SSW16	SW13	SW14	WSW18	W18	WSW16	WSW19	NW17	W9	WNW14	NW19	NNW24	NNW25	NNW24	N20	NNW16	NNW12	W7.1	W7.1	NNW25
20-Jul	NW9	WNW8	W9	W9	NW9	NW11	NW12	NNW12	NNW15	NW14	NNW17	NNW17	NNW19	N20	N17	N15	N14	N13	N12	NNW8	NNW5	NNW2	NNW2	NNW2	NNW10.4	NNW10.4	N20
21-Jul	NNW2	ENE1	SE2	E2	ESE2	SE4	ESE6	SE7	SSE4	ENE3	NE2	W3	WNW5	WSW6	WNW6	WNW9	WNW9	WNW7	NW4	NW7	NW5	AF	SSE3	SSE3	WNW1.1	WNW1.1	WNW9
22-Jul	SE5	SSE5	SSE5	S10	S9	S7	SSW8	SSW8	SW8	SW8	WSW5	SSW6	SW5	SSW6	SE3	ESE7	ESE11	SE10	S12	S12	SSE10	SSE12	SSE14	SSE12	S7.1	S7.1	SSE14
23-Jul	SE13	SSE14	S11	S14	S14	SSE14	SSE16	SSE16	SSE19	SSE22	SSE24	SSE25	SSE26	SE21	SE21	SE20	SE22	ESE21	ESE18	ESE15	SE18	SE20	SE18	SSE18	SSE17.4	SSE17.4	SSE26
24-Jul	S22	S19	S20	S17	SSE15	SE16	SE17	SSE19	SSE17	SSE17	SE20	SSE19	SSE19	SSE18	SE20	SE24	SE23	SE24	SSE22	SE17	ESE15	ESE15	SE16	ESE15	SSE17.7	SSE17.7	SE24
25-Jul	ESE17	ESE15	ESE15	ESE16	E15	ENE14	E18	E19	ESE16	E13	ENE15	E16	ESE15	ESE19	ESE19	E17	ESE16	ESE11	SE13	SE8	ESE5	ESE4	E8	ESE12	ESE13.5	ESE13.5	E19
26-Jul	ESE14	ESE12	SE12	SE12	SE10	SE10	SSE12	SSE11	S12	S14	SE12	SE14	SE14	S12	S10	S5	S5	S4	S7	WSW7	WSW5	SW6	SW8	SW7	SSE8.1	SSE8.1	S14
27-Jul	SSW9	SSW7	SW9	S8	S7	S11	SSE12	S9	S10	SSW11	SW12	SW11	WNW6	E17	SSW15	WSW10	S6	SSW8	SSW8	S15	SSW12	S12	SSW13	SSW12	SSW8.6	SSW8.6	E17
28-Jul	SSW12	S10	SSW12	S12	S13	SSW14	SSW15	SSW16	S15	SW15	SSW16	SW14	SW12	WSW11	WSW10	WSW10	WSW12	W9	WSW7	WSW5	SW1	SSE4	S6	SSE6	SSW9.6	SSW9.6	SSW16
29-Jul	S9	SSW11	SSW10	SSW10	SW11	SW8	SW11	SW13	SSW11	WSW7	WNW8	W9	WSW10	NW8	SW5	SE12	WSW3	NW5	WNW1	SSE12	SSE14	SSE12	S18	S16	SSW7.4	SSW7.4	S18
30-Jul	S14	S12	SSE12	S12	S12	S10	SSE11	S12	SSE12	S14	SSW16	SSW16	SW12	SW11	SW12	SW8	SSW9	SW13	SSW13	S11	WNW23	NNW26	NE21	E16	SSW7.1	SSW7.1	NNW26
31-Jul	SE12	SSW4	W7	SW7	SSW10	SW10	SSE5	S7	S2	N10	NNE15	N15	N17	NNE19	NNE19	N18	N18	NNE14	NNW13	NNW12	N15	N11	N14	NNE19	N7.3	N7.3	NNE19

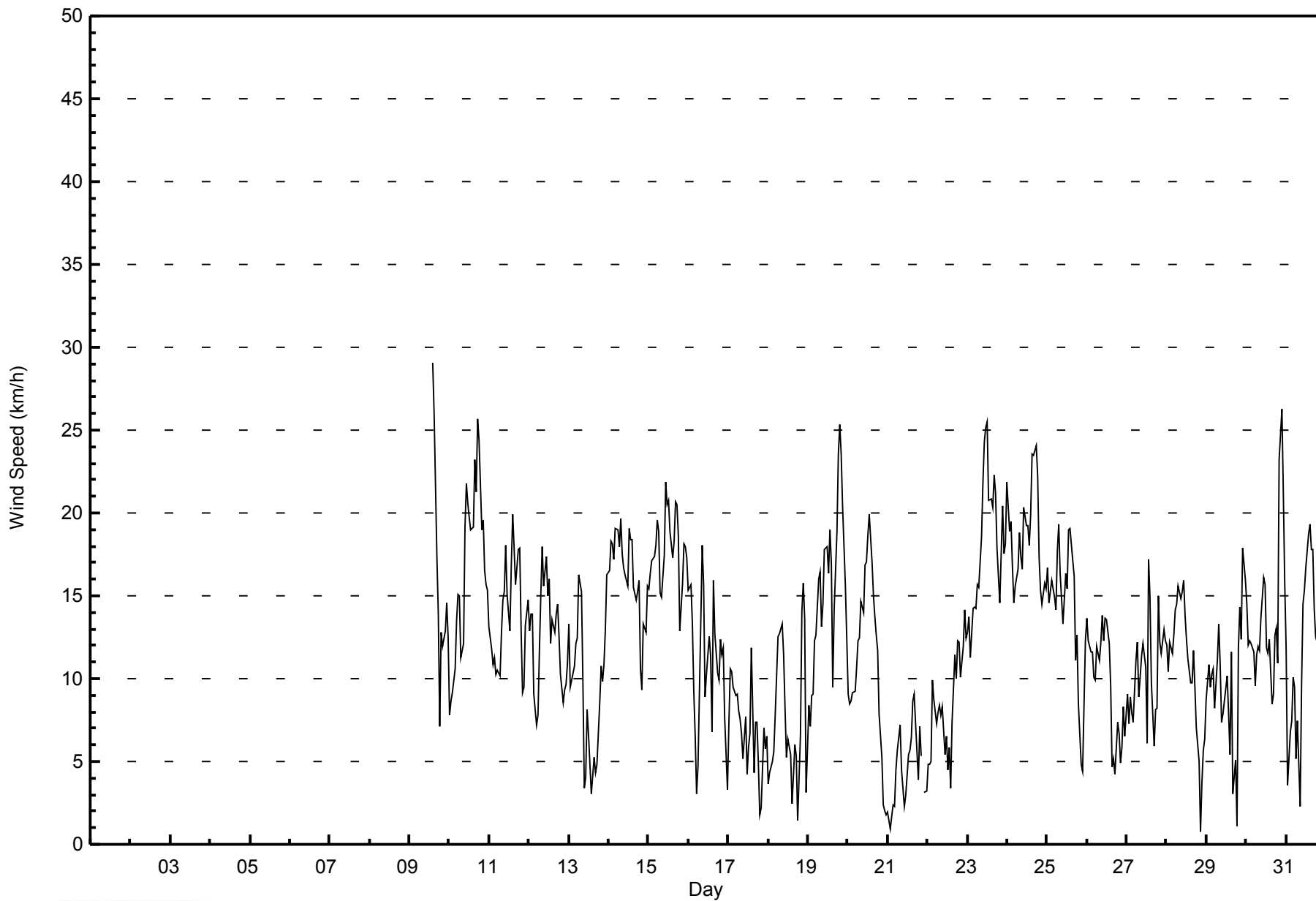
S5.1	S5.2	S5.2	S5.7	S5.4	S5.0	S5.3	S5.2	S3.9	SW3.7	SW4.0	WSW4.5	WSW4.5	WSW3.4	WSW4.2	WSW4.2	W2.8	NNW2.6	W2.4	SW2.3	WSW2.4	SW1.3	S1.9	SSE2.5	Diurnal Average	
S22	S19	S20	SSW17	S19	SW20	SW19	SSW20	SSE19	SSE22	SSE24	SSE25	SSE26	SE21	SW29	SW26	SE23	NW26	NW24	NNW25	NNW24	NNW26	NE21	NNE19	Diurnal Maximum	

AF - Analyzer Failure 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
Firebag - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Firebag - July 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	67	12.48	12.48
6 - 11	163	30.35	42.83
12 - 19	263	48.98	91.81
20 - 28	43	8.01	99.81
29 - 38	1	0.19	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 537

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Wind Speed (WS) - km/h
Firebag - July 2014

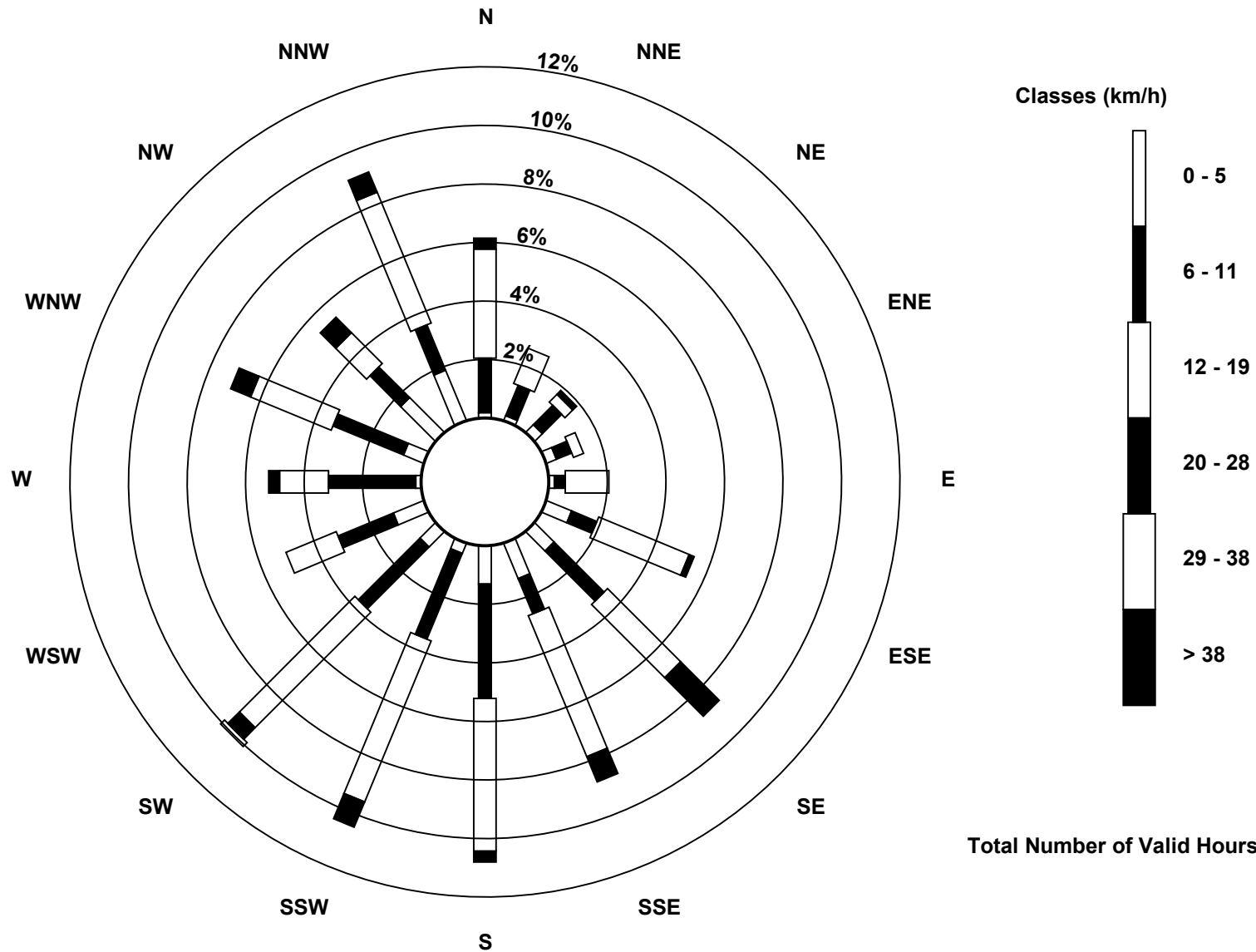
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	1	2	2	1	5	5	7	7	2	4	6	1	4	9	10	67
6 - 11	10	6	5	3	2	5	13	7	21	17	16	11	16	14	8	9	163
12 - 19	20	7	2	2	8	18	19	28	28	32	30	10	9	16	8	26	263
20 - 28	2	0	1	0	0	1	10	5	2	5	3	0	2	4	4	4	43
29 - 38	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	33	14	10	7	11	29	47	47	58	56	54	27	28	38	29	49	537

Total Number of Valid Hours: 537

Total Number of Hours: 744

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

**Wind Speed (WS) - km/h
Firebag (AMS 19)**





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Firebag - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 17 km/h on Jul 30 21:00	Hours in Service: 538 Hours of Data: 537 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.8
Minimum Value: 1 km/h on Jul 22 03:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 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-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
8-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
9-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	5	4	5	3	3	2	2	4	3	3	3	3	5
10-Jul	1	1	1	2	2	3	3	3	3	5	4	5	6	4	4	6	6	6	7	4	4	4	3	2	2	7	
11-Jul	3	2	2	2	1	1	2	2	3	3	4	4	4	5	5	5	4	5	5	3	1	1	3	2	2	5	
12-Jul	2	3	3	1	1	1	3	3	3	4	4	4	5	4	4	4	5	4	3	2	1	1	1	2	2	5	
13-Jul	3	2	2	2	2	2	4	3	3	2	3	4	3	3	3	3	2	3	3	2	2	1	2	2	2	4	
14-Jul	3	3	3	2	3	2	3	3	2	3	3	4	4	4	4	4	4	3	3	2	1	2	2	2	2	4	
15-Jul	2	2	2	2	2	3	3	2	3	3	4	4	4	4	4	3	3	3	4	2	3	3	2	2	2	4	
16-Jul	2	2	2	2	2	1	2	4	4	3	2	2	3	3	2	4	3	3	2	2	2	10	2	2	2	10	
17-Jul	1	1	1	1	1	1	2	2	2	3	3	3	3	3	4	3	2	1	1	2	1	5	2	1	5	5	
18-Jul	1	3	1	1	1	2	3	2	3	4	4	3	5	4	3	3	2	1	2	2	5	5	5	2	5	5	
19-Jul	3	1	1	2	2	2	3	3	2	3	4	4	4	4	6	2	3	4	6	5	4	4	3	3	6	6	
20-Jul	2	1	1	1	1	2	2	3	2	3	3	5	4	5	5	4	4	3	2	2	1	2	1	1	5	5	
21-Jul	1	1	1	1	1	1	1	2	3	3	2	3	4	3	3	4	3	3	2	1	1	AF	1	1	1	4	
22-Jul	1	1	1	2	1	1	1	2	2	2	3	3	3	3	3	2	2	3	2	2	2	2	2	2	2	3	
23-Jul	2	2	2	2	2	2	2	3	4	4	4	5	5	4	5	4	5	4	4	3	4	4	3	3	3	5	
24-Jul	4	4	3	2	3	3	4	4	3	3	4	4	4	3	4	5	5	5	4	5	3	2	3	2	2	5	
25-Jul	3	4	4	3	3	2	4	4	4	3	3	3	4	5	4	4	4	4	2	2	1	1	5	3	5	5	
26-Jul	3	2	2	2	2	2	2	2	3	3	4	4	4	4	5	3	4	3	2	3	1	1	1	2	5	5	
27-Jul	1	2	1	2	1	1	2	1	2	3	3	3	3	6	7	4	3	1	2	2	2	2	2	2	2	7	
28-Jul	1	1	1	1	2	1	1	2	2	3	3	4	3	4	4	4	3	3	3	2	1	1	1	1	1	4	
29-Jul	1	1	1	1	1	2	4	2	3	3	4	3	4	4	5	3	2	2	1	7	3	2	2	2	2	7	
30-Jul	2	2	2	1	2	1	2	1	2	3	4	5	4	5	4	4	4	4	3	1	17	5	5	3	17	17	
31-Jul	3	2	2	2	2	3	3	2	1	4	3	4	4	5	4	5	5	3	5	3	2	3	3	4	4	5	
Diurnal Maximum																											
4 4 4 3 3 3 4 4 4 5 4 5 6 6 7 6 6 6 6 7 7 17 10 5 4																											

AF - Analyzer Failure NS - Not in Service



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Firebag - July 2014

Direction of Maximum Speed: 226 deg on Jul 9 15:00	Hours in Service: 538
Direction of Maximum Daily Speed Average: 213.3 deg on Jul 15	Hours of Data: 537
Direction of Minimum Speed: 225 deg on Jul 28 21:00	Direction of Minimum Daily Speed Average: 1.1 deg on Jul 21
Direction of Minimum Speed: 225 deg on Jul 28 21:00	Hours of Missing Data: 1
Monthly Average Direction: 254.0 deg	Percent Operational Time: 99.8

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-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
8-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
9-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	226	223	292	291	219	233	220	250	298	292	--
10-Jul	285	263	262	250	256	265	266	258	279	293	280	285	291	280	308	294	325	321	316	309	314	318	308	298	293.2
11-Jul	302	285	268	275	262	265	271	289	296	293	279	283	291	274	273	302	335	354	357	359	344	333	345	352	303.7
12-Jul	347	347	2	2	317	310	325	335	349	341	339	348	336	329	336	339	352	340	6	22	38	60	77	88	351.6
13-Jul	109	135	139	136	135	126	131	134	136	171	121	152	170	180	173	210	226	110	125	128	136	155	167	166	142.8
14-Jul	165	174	175	174	180	176	179	194	195	195	206	220	208	211	202	218	230	242	239	225	201	198	190	211	198.9
15-Jul	215	214	214	210	211	215	216	203	206	208	205	213	210	206	220	231	214	212	218	213	210	215	219	219	213.3
16-Jul	218	229	238	263	303	337	312	1	348	351	335	350	336	322	289	266	275	285	277	246	218	19	62	43	298.3
17-Jul	343	345	355	357	9	10	32	42	44	355	299	318	298	334	336	294	347	27	319	309	246	313	1	13	350.0
18-Jul	25	344	314	341	17	27	33	45	48	44	45	311	355	337	295	320	273	338	238	170	228	221	224	138	353.8
19-Jul	169	165	120	139	158	191	198	209	223	229	244	271	255	256	304	279	297	315	330	348	346	350	343	336	280.0
20-Jul	326	295	270	273	308	312	325	332	340	321	338	338	336	351	351	3	354	351	351	348	339	334	342	335	334.2
21-Jul	344	57	135	97	118	126	118	136	150	61	38	275	286	258	287	298	292	299	312	311	326	AF	163	149	288.7
22-Jul	144	163	163	174	178	179	201	211	215	225	237	203	228	211	138	119	114	139	184	180	157	150	157	148	172.2
23-Jul	145	162	178	172	171	166	164	160	162	160	157	155	161	127	136	145	134	117	113	116	136	128	142	159	147.6
24-Jul	174	180	173	170	154	144	144	159	154	148	143	155	154	167	132	134	126	138	147	133	121	122	125	121	146.8
25-Jul	118	109	107	104	81	72	84	95	108	87	67	95	110	117	105	97	117	120	128	136	119	102	100	106	102.4
26-Jul	113	120	125	132	140	140	160	161	169	171	136	140	145	176	180	177	172	170	176	251	239	221	224	217	158.8
27-Jul	209	208	214	174	172	174	167	171	188	209	233	235	292	90	201	255	187	194	203	191	196	191	195	211	196.3
28-Jul	193	186	196	191	190	192	193	196	189	220	211	229	234	237	240	237	248	262	254	239	225	165	172	155	210.3
29-Jul	184	198	197	201	218	232	221	215	197	238	287	261	246	304	231	145	253	323	294	161	165	160	174	170	202.6
30-Jul	169	172	156	170	173	173	164	170	161	178	198	211	222	217	235	219	195	218	209	190	303	329	41	80	194.1
31-Jul	129	203	278	216	208	234	150	175	186	0	20	8	4	12	26	4	350	17	335	337	353	0	2	12	1.0

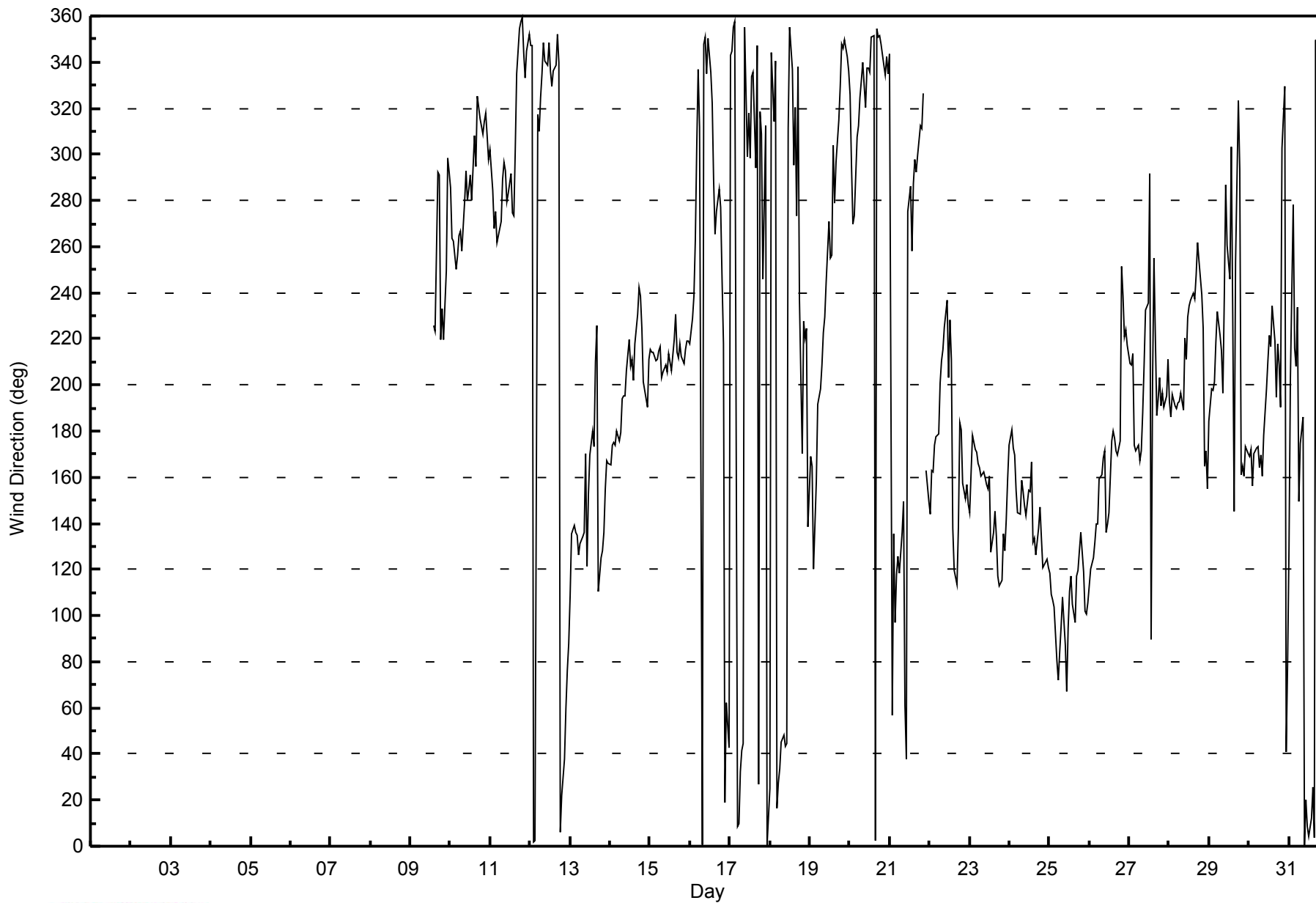
171.7 191.2 190.5 184.6 185.9 187.9 179.5 180.4 187.1 224.1 233.9 237.7 245.0 241.5 242.1 244.4 274.7 297.6 260.3 222.6 236.9 228.3 168.9 156.9
 Diurnal Average

AF - Analyzer Failure NS - Not in Service
 All monthly, daily, and diurnal averages have been calculated using vector methods



WBEA NETWORK
Hourly Averages

Wind Direction (WD) - deg
Firebag - July 2014





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 538
Maximum Value: 94 deg on Jul 13 14:00	Hours of Data: 537
Minimum Value: 5 deg on Jul 29 03:00	Hours of Missing Data: 1
Percentiles: P ₁ = 6 P ₁₀ = 8 Q ₁ = 11 Median = 14 Q ₃ = 23 P ₉₀ = 46 P ₉₉ = 83	Hours of Calibration: 0
	Percent Operational Time: 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-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
8-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
9-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	13	13	21	13	55	11	11	37	12	9	55
10-Jul	14	7	9	8	9	10	14	16	18	17	17	19	17	15	20	14	15	13	15	15	12	13	11	10	20
11-Jul	11	14	9	13	6	12	12	15	12	16	18	19	22	22	16	23	24	21	15	15	11	6	10	12	24
12-Jul	10	13	12	12	14	10	14	13	18	21	18	19	25	34	27	29	23	18	19	11	7	13	8	10	34
13-Jul	13	11	9	9	9	11	12	14	26	59	74	47	44	94	73	65	62	56	25	13	13	9	7	7	94
14-Jul	7	8	8	8	8	8	11	9	11	11	16	17	17	16	22	24	22	16	14	8	7	6	9	8	24
15-Jul	8	8	8	8	9	9	9	11	12	14	14	13	14	16	19	13	15	12	10	10	9	9	9	8	19
16-Jul	8	8	8	13	13	19	35	14	14	12	10	10	15	13	28	14	16	18	15	12	12	85	18	52	85
17-Jul	16	10	11	10	13	11	14	24	35	60	46	77	58	55	23	60	23	24	30	52	52	52	44	9	77
18-Jul	23	42	21	21	5	10	10	12	18	32	39	71	70	76	85	64	40	17	78	19	19	11	25	70	85
19-Jul	32	36	11	10	11	12	8	12	15	15	21	13	15	16	23	19	14	12	20	11	12	13	11	9	36
20-Jul	10	14	13	13	17	11	11	12	15	22	15	21	19	15	23	26	20	26	22	12	15	39	16	22	39
21-Jul	21	52	43	24	31	13	13	19	79	78	87	84	76	69	63	48	33	29	37	11	8	AF	11	12	87
22-Jul	9	9	6	7	7	8	13	11	17	28	69	52	81	59	82	22	13	38	14	9	11	9	8	10	82
23-Jul	10	13	7	7	7	7	8	12	11	14	13	15	13	14	17	13	15	12	11	14	11	12	11	11	17
24-Jul	13	9	8	9	12	10	12	11	13	19	15	14	18	17	17	15	14	13	13	11	11	11	11	11	19
25-Jul	11	14	12	12	14	11	16	12	16	25	16	17	20	19	18	19	15	31	15	14	21	18	15	13	31
26-Jul	11	10	10	12	11	14	13	17	19	16	27	23	23	30	42	65	64	81	28	20	20	12	9	9	81
27-Jul	7	11	9	28	13	7	7	10	18	26	26	23	54	16	46	22	49	19	17	10	8	6	9	10	54
28-Jul	9	8	6	6	6	5	6	9	7	15	13	23	27	37	34	41	25	22	19	14	65	12	12	10	65
29-Jul	10	5	5	8	9	9	16	10	21	35	38	34	27	51	71	27	66	25	71	53	9	10	8	8	71
30-Jul	8	10	11	8	7	7	10	14	17	14	17	19	27	35	24	33	36	19	11	7	57	15	23	18	57
31-Jul	24	68	38	46	24	20	40	30	72	27	18	20	18	19	18	21	17	16	15	15	10	15	13	12	72
	32	68	43	46	31	20	40	30	79	78	87	84	81	94	85	65	66	81	78	53	65	85	44	70	

Diurnal Maximum

AF - Analyzer Failure NS - Not in Service

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Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	July 10, 2014	Previous Calibration	NA
Station Name	Firebag	Station Number	AMS 19
Reason:	Install		
Start Time (MST)	7:08	End Time (MST)	11:25
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	996
Cal Gas Concentration	50 ppm	Cal Gas Expiry Date	12/12/2016
Gas Cert Reference	SA130123A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037
DACS voltage range		DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	NA	-606
Analyzer Range (mv)	1000	1000	Lamp voltage	NA	785
Calculated slope	NA	1.000748	Chamber temp.	NA	45.0
Calculated intercept	NA	-0.661238	Pressure (mmHg)	NA	679.2
Analyzer Background	NA	10.3	Flow (lpm)	NA	0.455
Analyzer Coefficient	NA	0.982	Intensity	NA	90

Analyzer make Thermo 43i Analyzer serial # 1410661308

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	58.3	583.0	582.2	1.001
second point	5000	29.1	291.0	293.8	0.990
third point	5000	14.7	147.0	146.9	1.001
calibrator zero	5000	0.0	0.0	0.0	NA
as left zero	5000	0.0	0.0	0.0	NA
as left span	5000	58.3	583.0	585.4	NA
Average Correction Factor					0.998

Corrected As found NA Previous response NA % change NA

Notes:

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

SO₂ Calibration Summary

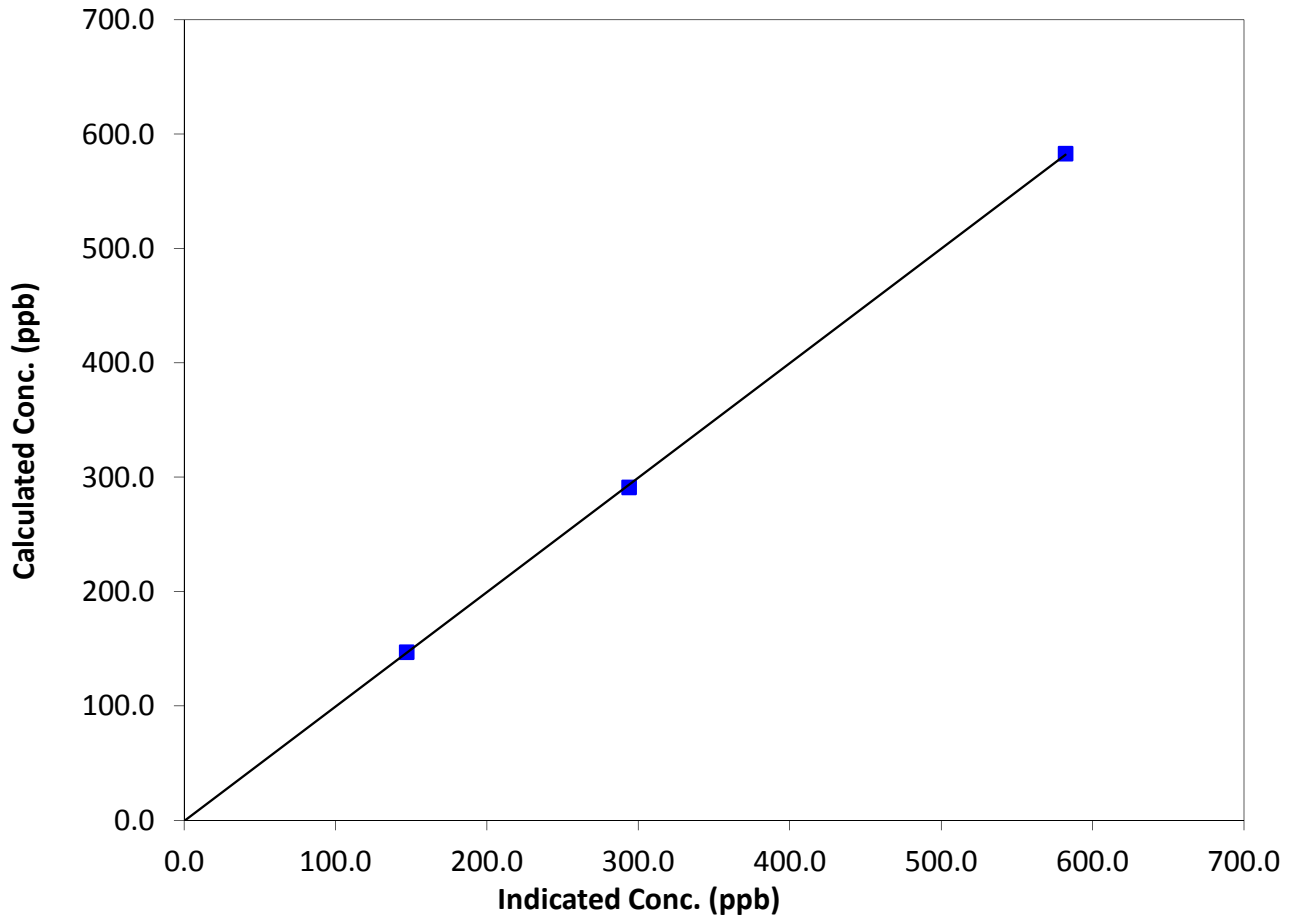
Station Information

Calibration Date	July 10, 2014	Previous Calibration	NA
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:08	End Time (MST)	11:25
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

Calibration Data

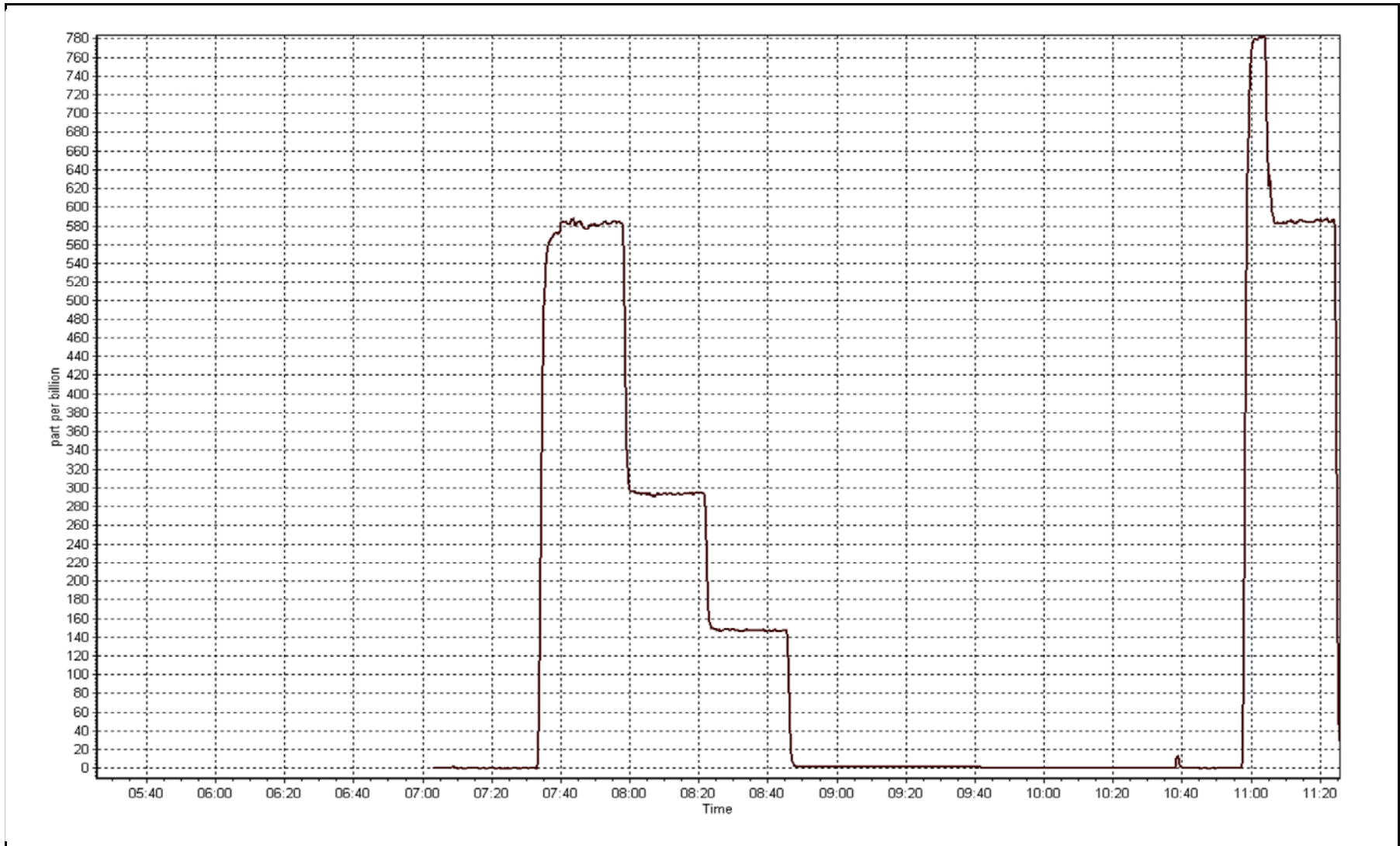
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999960
583.0	582.2	1.0014		
291.0	293.8	0.9905	Slope	1.000748
147.0	146.9	1.0007		
			Intercept	-0.661238

SO₂ Calibration Curve



SO2 Calibration Plot

Date: July 10, 2014





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	July 9, 2014	Previous Calibration	NA
Station Name	Firebag	Station Number	19
Reason:	Install		
Start Time (MST)	9:20	End Time (MST)	11:23
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	996
Cal Gas Concentration	4.85 ppm H2S	Cal Gas Expiry Date	6/10/2014
Gas Cert Reference	ALM066720	SO2 gas conc.	49.3 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	
DACS voltage range		DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	NA	18
Analyzer Range (mv)	100	100	Lamp voltage	NA	2755
Calculated slope	NA	1.004173	Chamber temp.	NA	34
Calculated intercept	NA	0.555179	Pressure	NA	22.2
Analyzer Background	NA	26.8	Flow	NA	549
Analyzer Coefficient	NA	0.768	Intensity	NA	68
			Converter temp.	NA	315

Analyzer make/model	API H2S T101	Analyzer serial #	158
Converter make/model		Converter serial #	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
SO2 scrubber check	5000	29.2	287.9	4.4	N/A
calibrator zero	5000	0.0	0.0	-0.2	N/A
high point	5000	83.3	80.8	80.2	1.008
second point	5000	41.7	40.4	39.4	1.028
third point	5000	21.0	20.4	19.5	1.047
calibrator zero	5000	0.0	0.0	0.6	N/A
as left zero					
as left span					
Average Correction Factor					1.027

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

Scrubber checked First before claibrator zero

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

H2S Calibration Summary

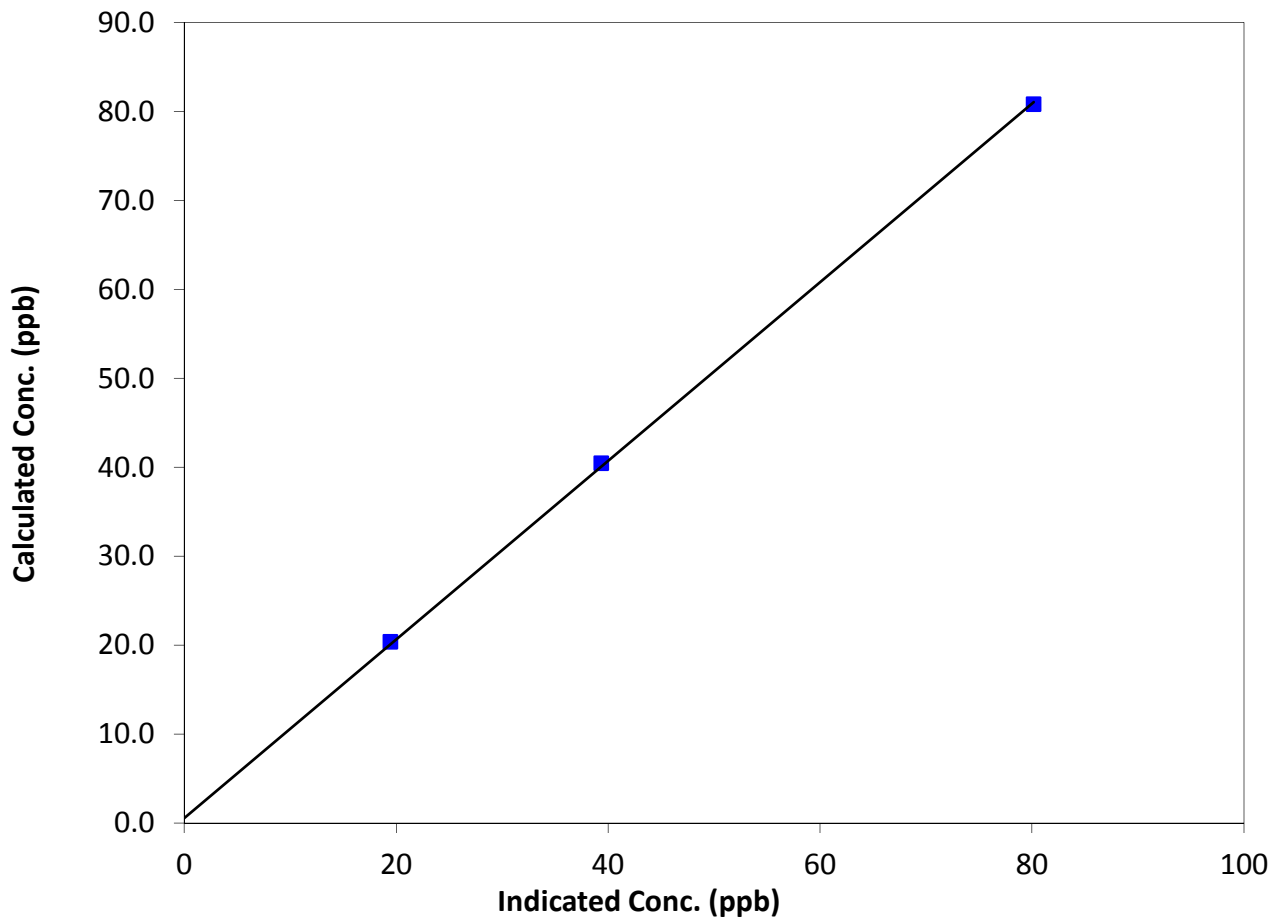
Station Information

Calibration Date	July 9, 2014	Previous Calibration	
Station Name	Firebag	Station Number	19
Start Time (MST)	9:20	End Time (MST)	11:23
Analyzer make	API H2S T101	Analyzer serial #	158

Calibration Data

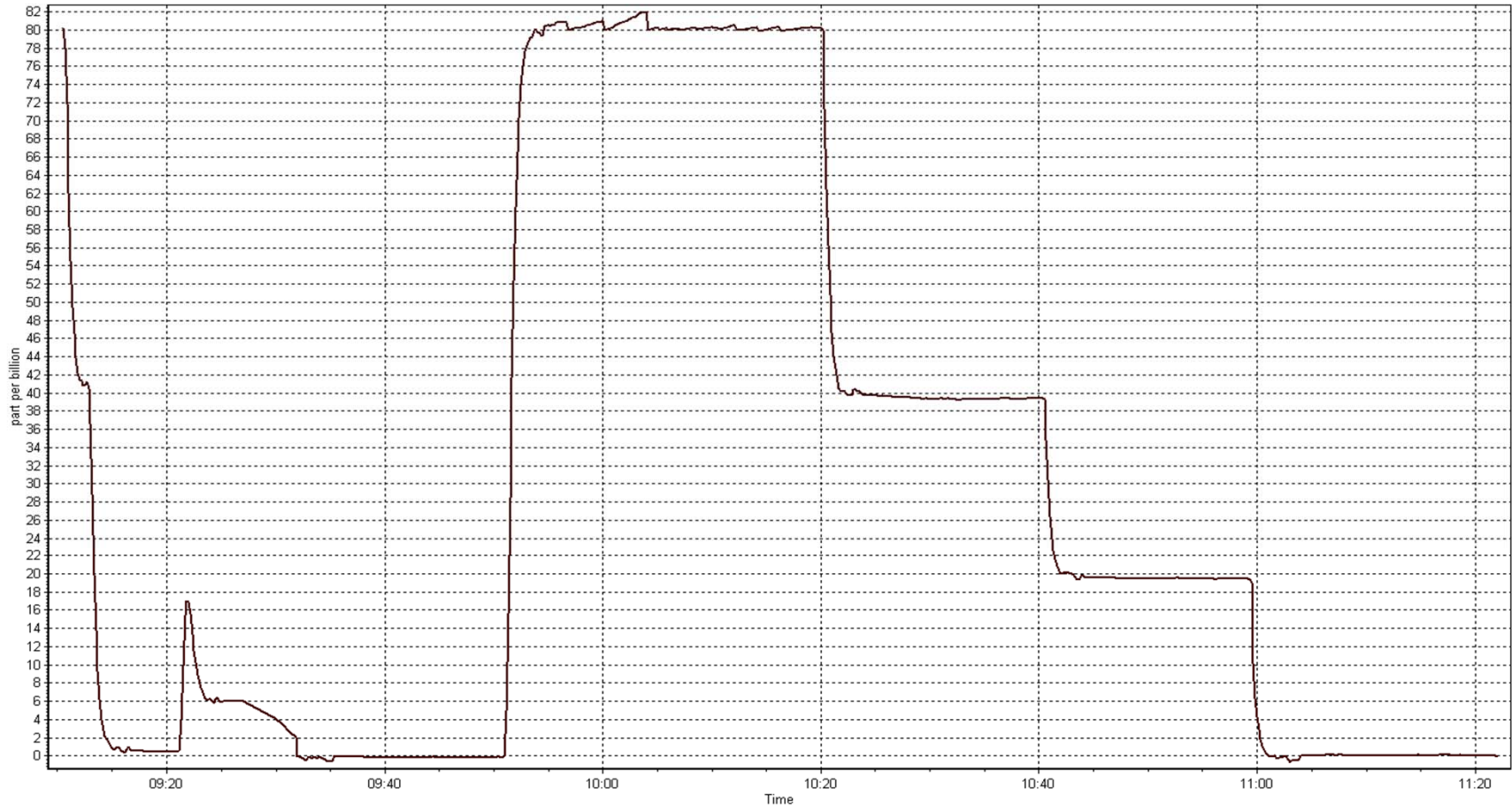
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999880
80.8	80.2	1.0080		
40.4	39.4	1.0277	Slope	1.004173
20.4	19.5	1.0468		
			Intercept	0.555179

H2S Calibration Curve



H2S Calibration Plot

Date: Wednesday, July 09, 2014





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Calibration Date	Thursday, July 10, 2014	Previous Calibration	NA
Station Name	Firebag	Station Number	AMS 19
Reason:	Install		
Start Time (MST)	7:08	End Time (MST)	11:25
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	996
Gas Cert Reference	SA130123A	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037
DACS voltage range		DACS channel #	

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.6	8.6
Analyzer Range (mv)	25	25	Air or Bypass press	35.0	35.0
Calculated slope		1.008328	Fuel Pressure	23.0	23.0
Calculated intercept		-0.015245	Coef		4.2
			BKG		3.415

Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.00	0.05	N/A
high point	5000	58.3	12.74	12.65	1.007
second point	5000	29.1	6.36	6.34	1.003
third point	5000	14.7	3.21	3.14	1.023
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	58.3	12.74	12.60	1.011
Average Correction Factor					1.011

Corrected As found NA Previous response NA % change NA

Notes:

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

THC Calibration Summary

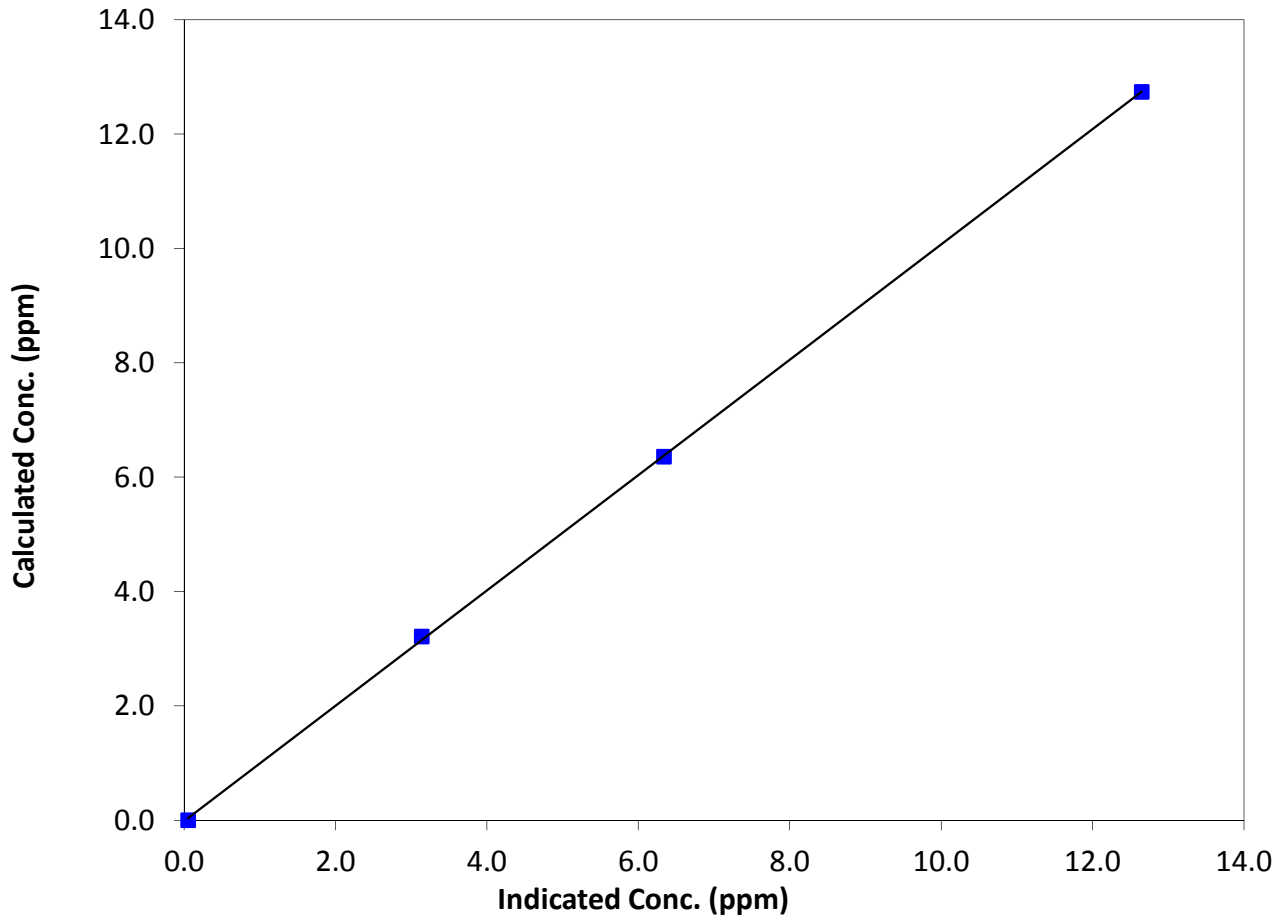
Station Information

Calibration Date	July 10, 2014	Previous Calibration	
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:08	End Time (MST)	11:25
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.05	N/A	Correlation Coefficient	0.999940
12.74	12.65	1.0068		
6.36	6.34	1.0027	Slope	1.008328
3.21	3.14	1.0227		
			Intercept	-0.015245

THC Calibration Curve



THC Calibration Plot

Date: July 10, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 10, 2014	Previous Calibration	NA
Station Name	Firebag	Station Number	AMS 19
Reason:	Install		
Start Time (MST)	7:08	End Time (MST)	11:25
Barometric Pressure	mmHg	Station Temperature	Deg C
Calibrator	API T700	Serial Number	996
NO Cal Gas Conc	51.5 ppm	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	51.5 ppm	Cal Gas Serial #	SA130123A

DACS Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 9037

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	NA	NA	NA
	Data Offset	NA	NA	NA
After	Data Slope	0.992249	0.992536	1.002901
	Data Offset	-0.536914	-0.524301	0.314143
Channel #				
Voltage Range				

Analyzer Information

Analyzer make/model Thermo 42i Analyzer serial # 1410661309

Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	NA	ppb	0.824	ppb
NOX coefficient	NA	ppb	0.998	ppb
NO2 coefficient	NA	ppb	1.000	ppb
NO bkgrnd	NA		3.5	
NOX bkgrnd	NA		3.6	
Nt coefficient	NA		N/A	
Chamber Temp	NA	Deg C	50.6	Deg C
Moly Temp	NA	Deg C	322.4	Deg C
PMT Temp	NA	Deg C	-3.1	Deg C
O3 flow	NA	ccm	ok	ccm
R Cell Press	NA	mmHg	158.9	mmHg
Sample Flow	NA	ccm	0.639	ccm

Notes:



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

July 10, 2014

Station Number:

AMS 19

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero										
as found span										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	N/A	N/A
high point	5000	58.3	600.5	600.5	0.0	604.5	604.4	0.1	0.9934	0.9935
second point	5000	29.1	299.7	299.7	0.0	305.0	304.8	0.2	0.9827	0.9834
third point	5000	14.7	151.4	151.4	0.0	153.2	153.0	0.3	0.9883	0.9896
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	N/A	N/A
as left span	5000	58.3	600.5	278.5	322.0	601.0	276.5	324.5	0.9992	1.0072
Average Correction Factor									0.9881	0.9888

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

58.30

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO ₂ (300)	N/A	278.5	326.6	604.1	278.5	325.6	0.9826	1.0000	1.0031	99.7%
2nd NO ₂ (200)	N/A	385.4	219.7	603.9	385.4	218.5	0.9829	1.0000	1.0055	99.5%
3rd NO ₂ (100)	N/A	492.2	112.9	604.2	492.2	112.0	0.9824	1.0000	1.0080	99.2%
4th NO ₂ (0)	605.1	N/A	-0.8	604.3	605.1	-0.7	0.9822	1.0000	N/A	N/A
Average Correction Factor							0.9825	1.0000	1.0055	99.5%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

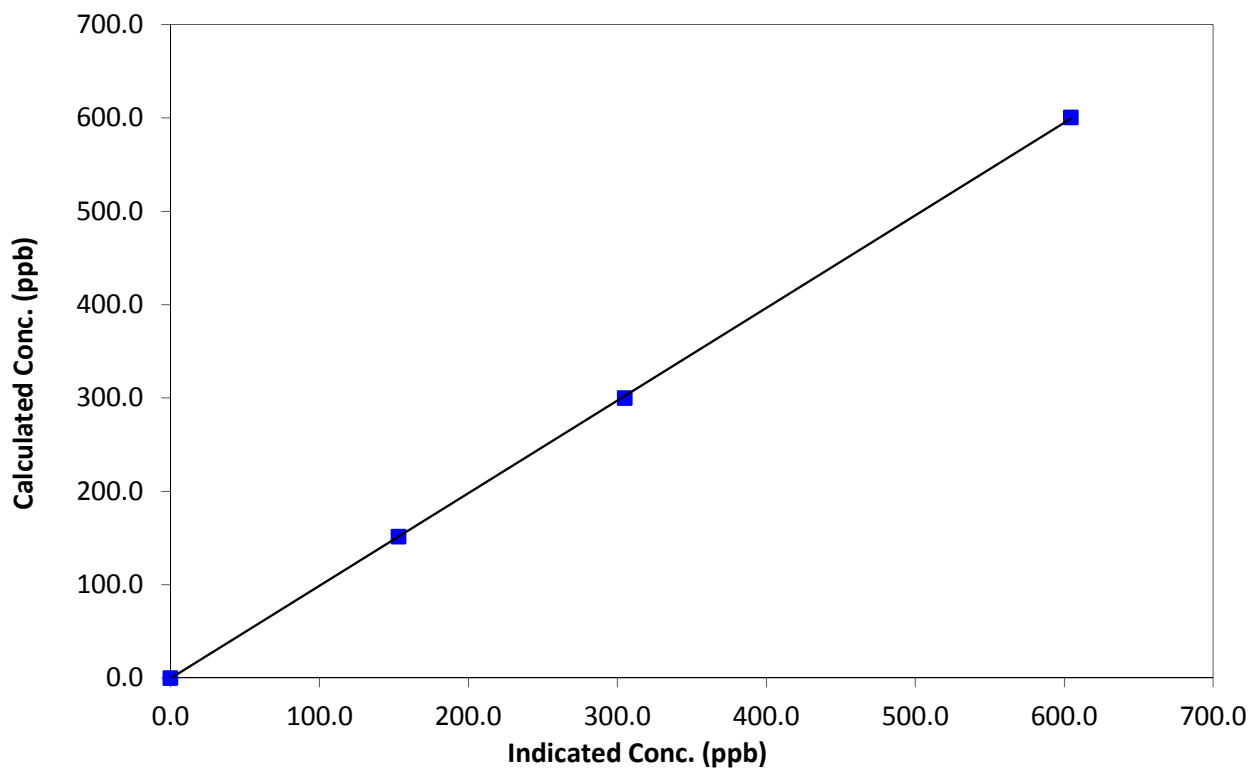
Station Information

Calibration Date	July 10, 2014	Previous Calibration	NA
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:08	End Time (MST)	11:25
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999969
600.5	604.5	0.9934		
299.7	305.0	0.9827	Slope	0.992249
151.4	153.2	0.9883		
0.0	0.0	#DIV/0!	Intercept	-0.536914

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

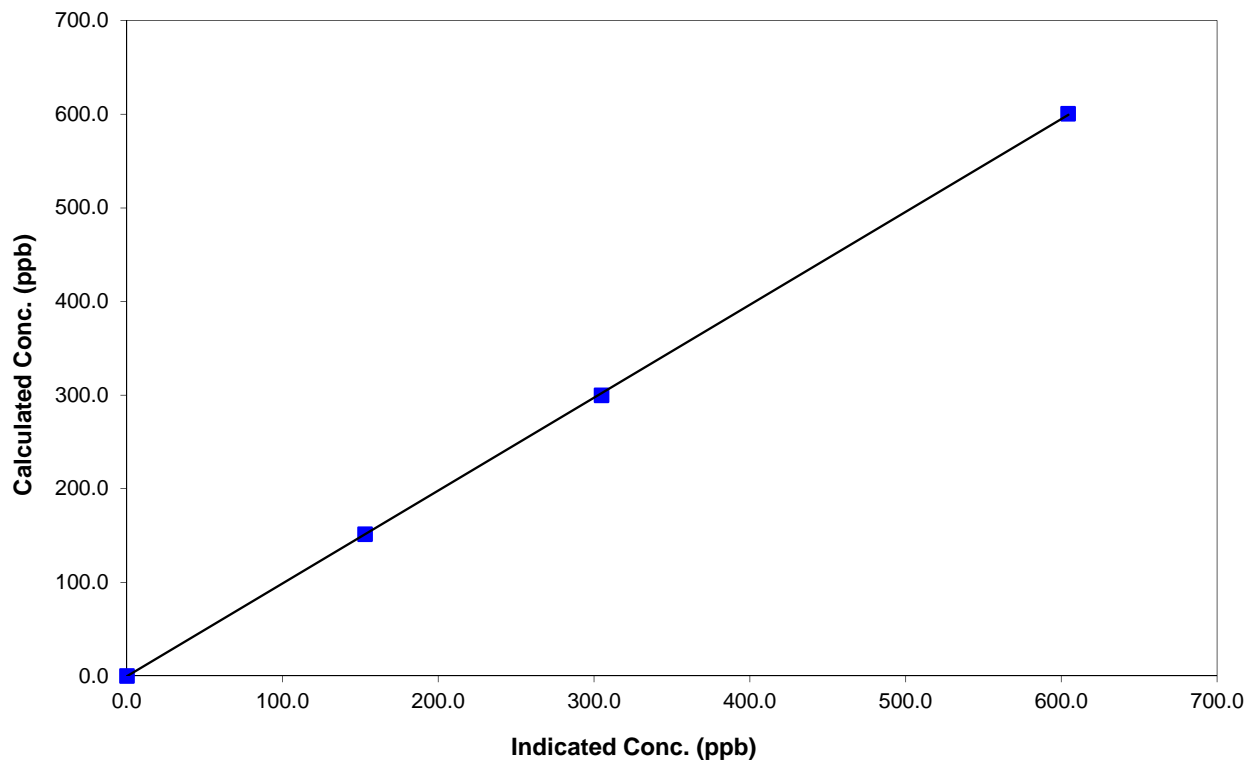
Station Information

Calibration Date	July 10, 2014	Previous Calibration	
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:08	End Time (MST)	11:25
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999972
600.5	604.4	0.9935		
299.7	304.8	0.9834	Slope	0.992536
151.4	153.0	0.9896		
0.0	0.1	0.0000	Intercept	-0.524301

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

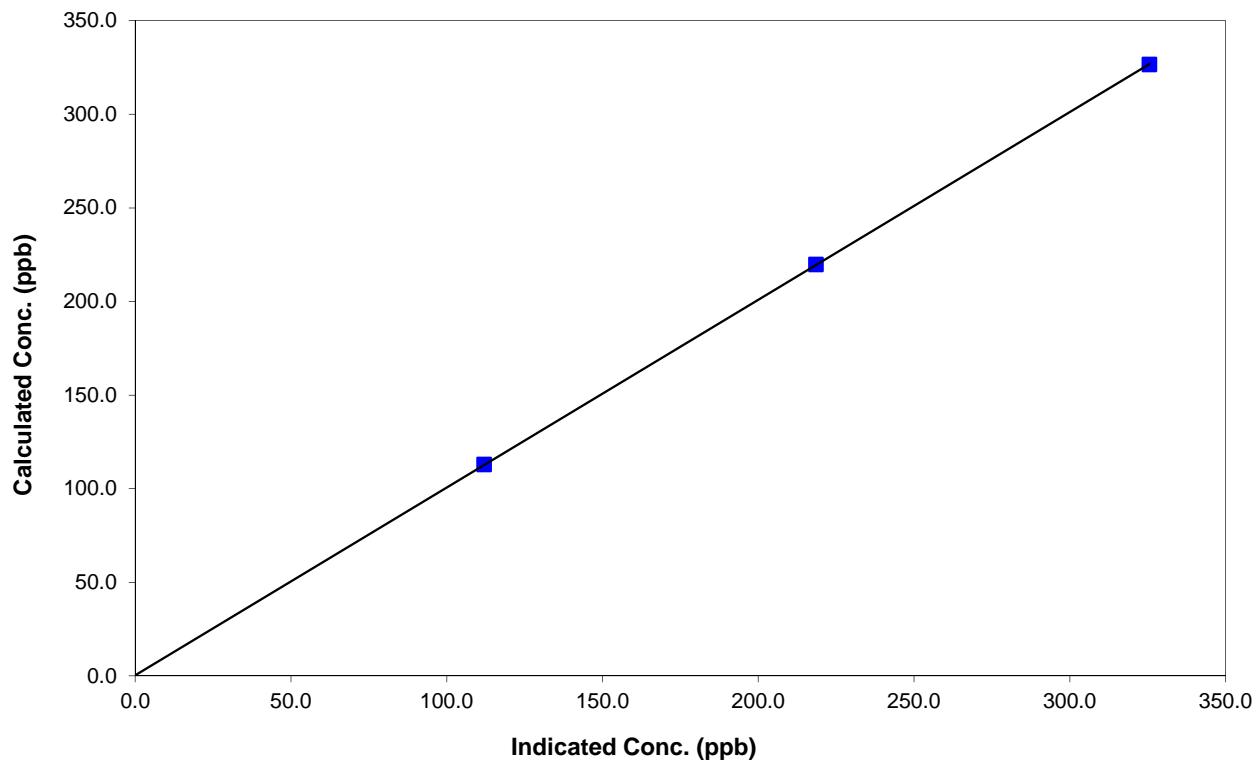
Station Information

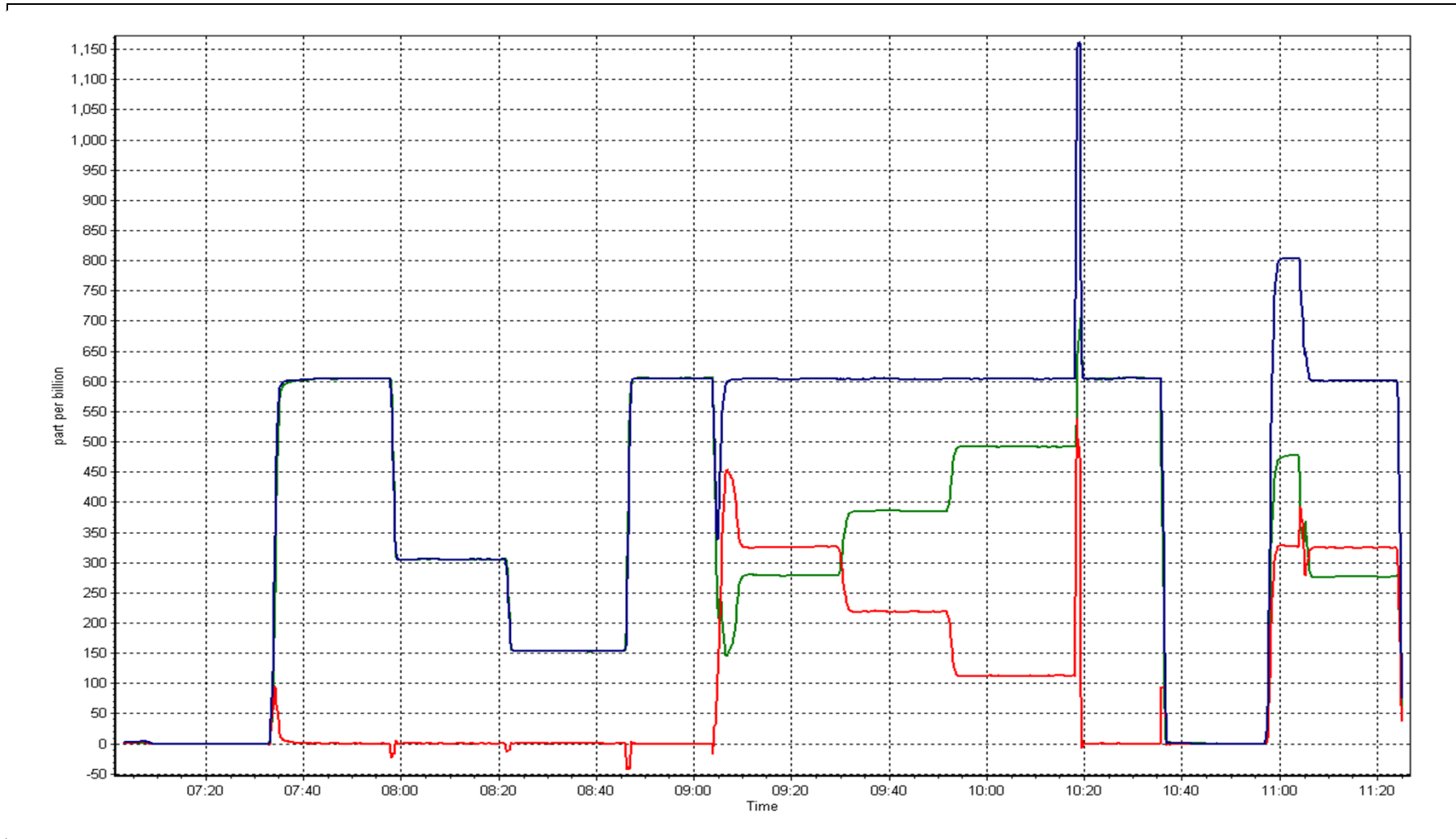
Calibration Date	July 10, 2014	Previous Calibration	NA
Station Number	Firebag	Station Number	AMS 19
Start Time (MST)	7:08	End Time (MST)	11:25
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999996
326.6	325.6	1.0031		
219.7	218.5	1.0055	Slope	1.002901
112.9	112.0	1.0080		
			Intercept	0.314143

NO₂ Calibration Curve





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

**AMS 501
STATOIL
LEISMER
JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
 JULY 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	31	70	94.76	7	0	2	0
H2S (ppb) Average	702	31	42	98.52	1	0	0	0
NO2 (ppb) Average	705	31	39	98.92	14	0	4	-
NO (ppb) Average	705	31	39	98.92	13	-	4	-
NOX (ppb) Average	705	31	39	98.92	25	-	7	-
Temperature 2 m (C) Average	744	0	0	100.00	29.9	-	23.2	-
Relative Humidity (%) Average	744	0	0	100.00	100	-	87.0	-
Wind Speed 10 m (km/h) Average	741	0	3	99.60	30	-	17.0	-
Wind Direction 10 m (deg) Average	741	0	3	99.60	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
 JULY 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	0.7	1	-	0	0	0	0	1	2	7
H2S (ppb) Average	702	0.2	0	-	0	0	0	0	0	0	1
NO2 (ppb) Average	705	1.6	2	-	0	0	1	1	2	4	14
NO (ppb) Average	705	1.3	2	-	0	0	0	1	1	3	13
NOX (ppb) Average	705	2.9	3	-	0	1	1	2	3	8	25
Temperature 2 m (C) Average	744	18	4.5	-	5.9	12.3	14.8	17.6	21.4	24	29.9
Relative Humidity (%) Average	744	67.3	18	-	29	41	52	69	82	93	100
Wind Speed 10 m (km/h) Average	741	8.5	5	-	0	3	5	7	11	16	30
Wind Direction 10 m (deg) Average	741	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
JULY 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, H2S, NO2	11 Jul 2014 10:00	11 Jul 2014 17:00	8	Station power failure
SO2	01 Jul 2014 03:00	31 Jul 2014 03:00	31	Stabilization after daily span
H2S	14 Jul 2014 23:00	15 Jul 2014 00:00	2	Unstable Operation
H2S	22 Jul 2014 13:00	22 Jul 2014 13:00	1	Unstable Operation
Wind Speed, Wind Direction	22 Jul 2014 04:00	22 Jul 2014 04:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	28 Jul 2014 02:00	28 Jul 2014 02:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	29 Jul 2014 04:00	29 Jul 2014 04:00	1	Flatline in sensor output signal

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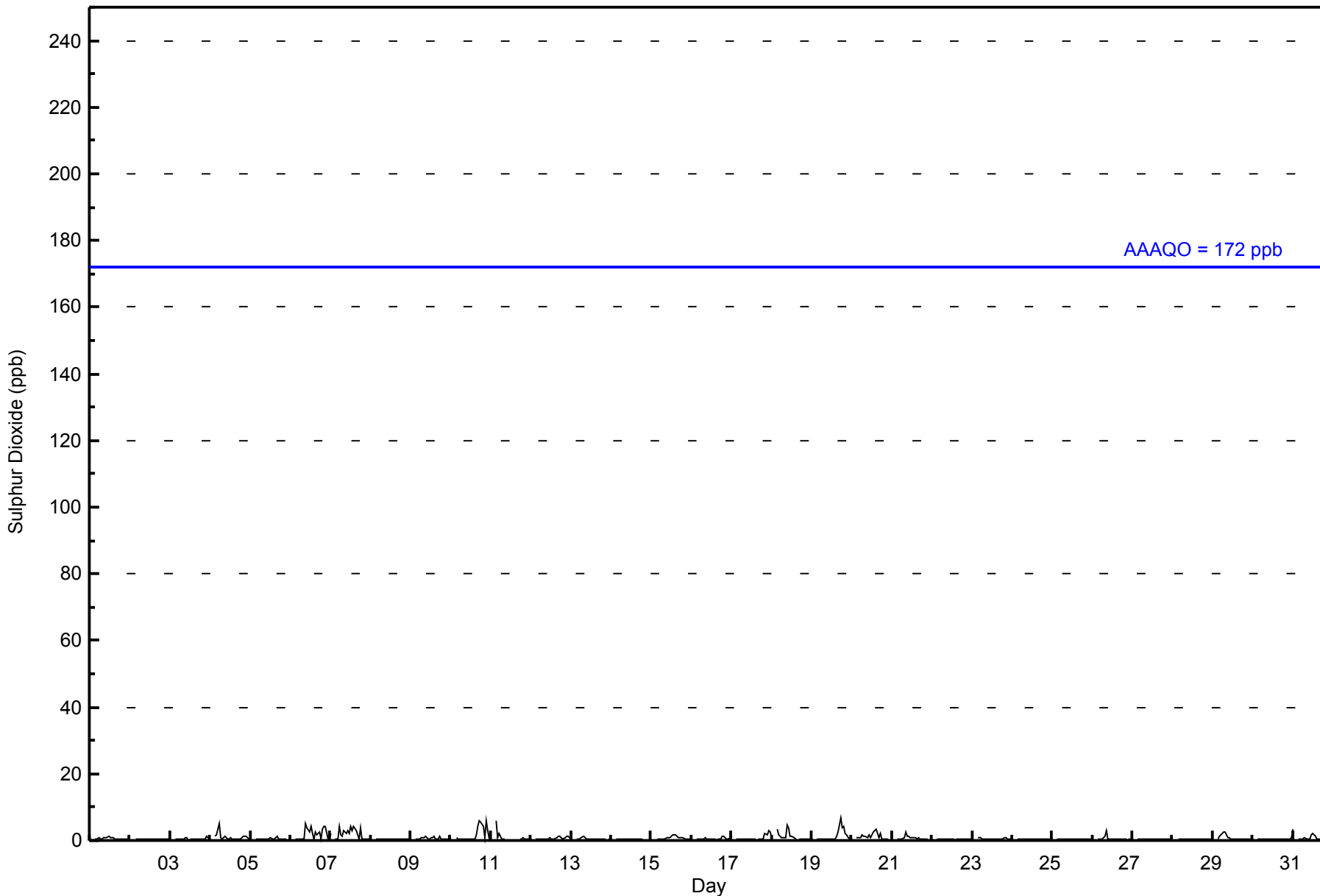


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																					
Maximum Value: 7 ppb on Jul 19 18:00										Maximum Daily Average: 2.0 ppb on Jul 7										Hours of Data: 674																											
Minimum Value: 0 ppb on Jul 17 16:00										Minimum Daily Average: 0.3 ppb on Jul 25										Hours of Missing Data: 70																											
Maximum Diurnal Average: 1.0 ppb at hour 18										Minimum Diurnal Average: 0.5 ppb at hour 24										Hours of Calibration: 31																											
Monthly Average: 0.7 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 5										Percent Operational Time: 94.8																											
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-Jul	1	Z	RE	0	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0.6	1																					
2-Jul	0	Z	RE	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																					
3-Jul	0	Z	RE	0	0	0	1	1	1	1	1	0	0	0	1	1	1	0	0	0	0	1	0	0.5	1																						
4-Jul	1	Z	RE	1	2	5	1	0	1	1	1	0	1	0	0	0	0	0	1	1	1	1	1	0	0.9	5																					
5-Jul	0	Z	RE	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0.4	1																					
6-Jul	0	Z	RE	0	0	0	0	0	0	5	4	2	4	2	1	2	2	3	0	3	4	4	0	0	1.8	5																					
7-Jul	2	Z	RE	0	0	4	2	1	3	2	3	2	4	3	4	3	2	0	4	1	0	0	0	0	2.0	4																					
8-Jul	0	Z	RE	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0.4	1																					
9-Jul	0	Z	RE	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	1	0.7	1																					
10-Jul	0	Z	RE	1	1	0	0	0	0	0	0	0	0	0	0	2	4	6	5	4	1	6	3	1	1.7	6																					
11-Jul	3	Z	RE	6	1	2	1	0	0	PF	PF	PF	PF	PF	PF	PF	PF	0	0	1	0	0	0	0	--	6																					
12-Jul	0	Z	RE	0	0	1	1	1	0	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	0.7	1																					
13-Jul	1	Z	RE	0	1	1	1	1	1	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0.5	1																					
14-Jul	0	Z	RE	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1																					
15-Jul	0	Z	RE	0	0	0	0	1	1	1	1	1	1	2	2	1	1	1	1	1	1	0	0	1	0.8	2																					
16-Jul	0	Z	RE	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	0	0	1	0.6	1																					
17-Jul	1	Z	RE	1	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	2	2	3	3	0.8	3																					
18-Jul	1	Z	RE	3	2	1	1	1	1	5	4	1	1	1	0	0	0	0	0	0	0	0	0	1	1.1	5																					
19-Jul	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	1	2	7	4	4	2	2	1	1	1.3	7																					
20-Jul	0	Z	RE	1	1	1	2	1	1	1	2	1	2	2	4	2	1	2	0	0	0	0	0	0	1.1	4																					
21-Jul	0	Z	RE	0	0	0	0	1	3	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.7	3																					
22-Jul	0	Z	RE	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																					
23-Jul	0	Z	RE	1	1	1	1	0	1	0	1	0	0	0	1	0	0	0	0	1	1	1	0	0	0.5	1																					
24-Jul	0	Z	RE	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																					
25-Jul	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																					
26-Jul	0	Z	RE	0	0	0	0	1	3	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.5	3																					
27-Jul	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0																					
28-Jul	0	Z	RE	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1																					
29-Jul	0	Z	RE	0	1	2	3	2	2	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0.8	3																					
30-Jul	0	Z	RE	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0.4	1																					
31-Jul	3	Z	RE	0	0	0	0	1	1	0	1	2	2	1	1	0	0	1	0	0	0	0	0	0	0.7	3																					
0.7																								--	--	0.7	0.6	0.9	0.6	0.7	0.8	0.9	0.9	0.7	0.9	0.7	0.7	0.7	0.8	1.0	0.8	0.8	0.7	0.8	0.6	0.5	Diurnal Average
3																								--	--	6	2	5	3	2	3	5	4	2	4	3	4	3	4	7	5	4	4	6	3	3	Diurnal Maximum
Z - zerospan PF - Power Failure RE - Recovery																																															
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																															



WBEA NETWORK
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	674	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: 674

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer - July 2014

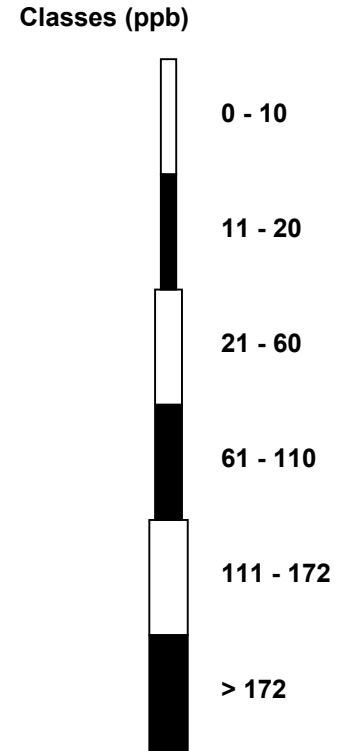
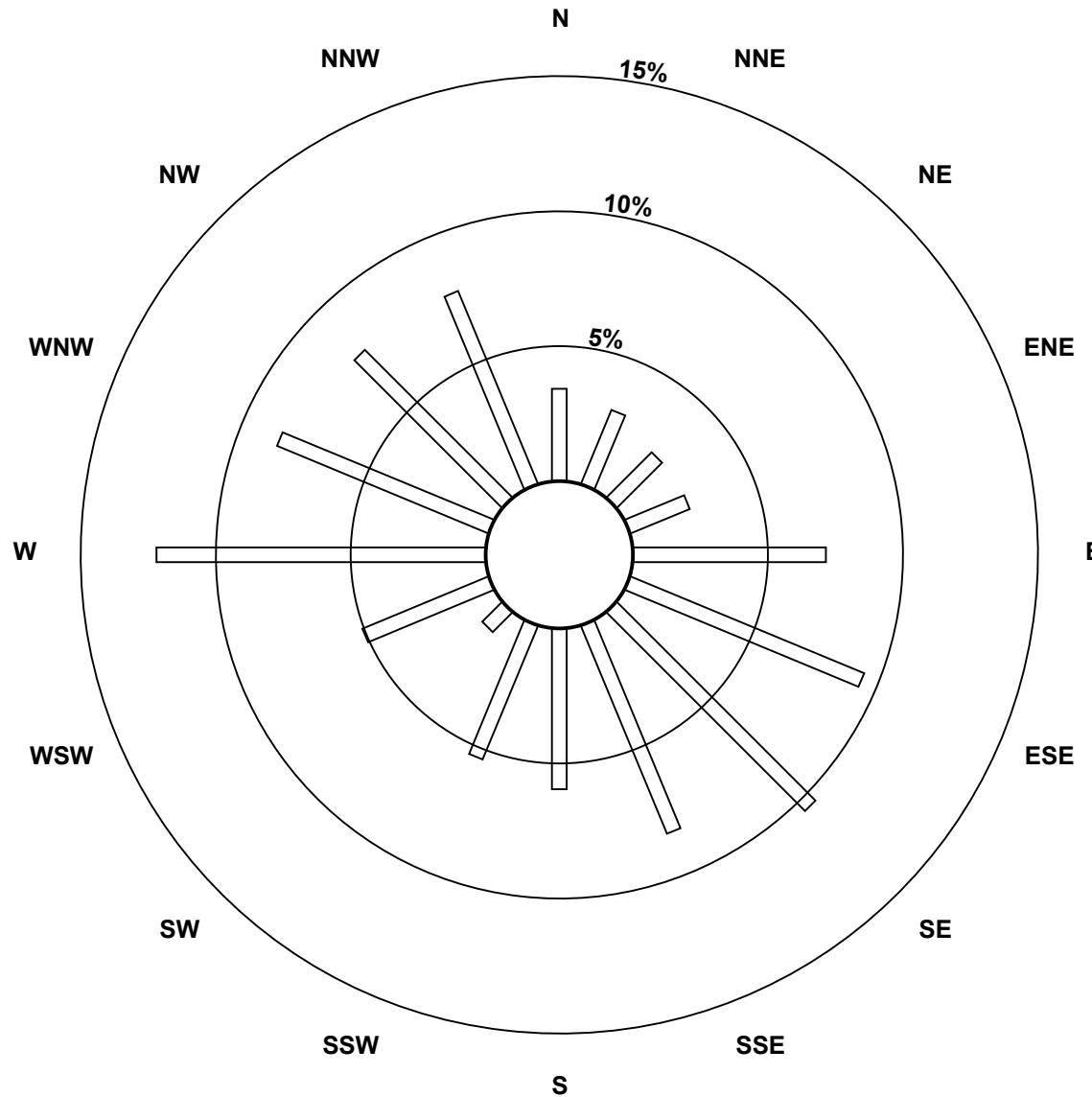
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	23	20	16	16	48	63	70	56	40	36	7	34	82	57	52	52	672
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	23	20	16	16	48	63	70	56	40	36	7	34	82	57	52	52	672

Total Number of Valid Hours: 672

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer (AMS501)



Total Number of Valid Hours: 672

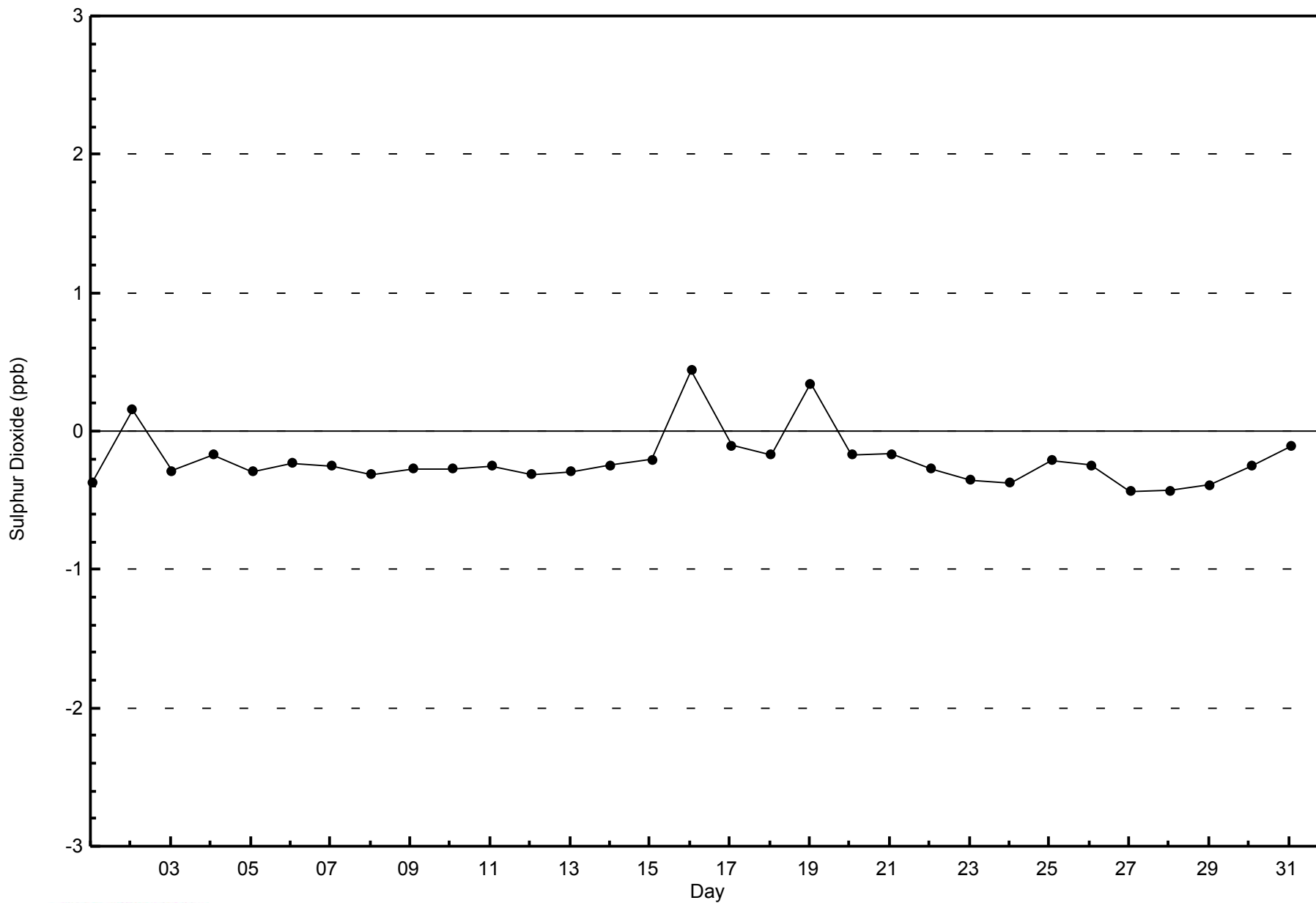


WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

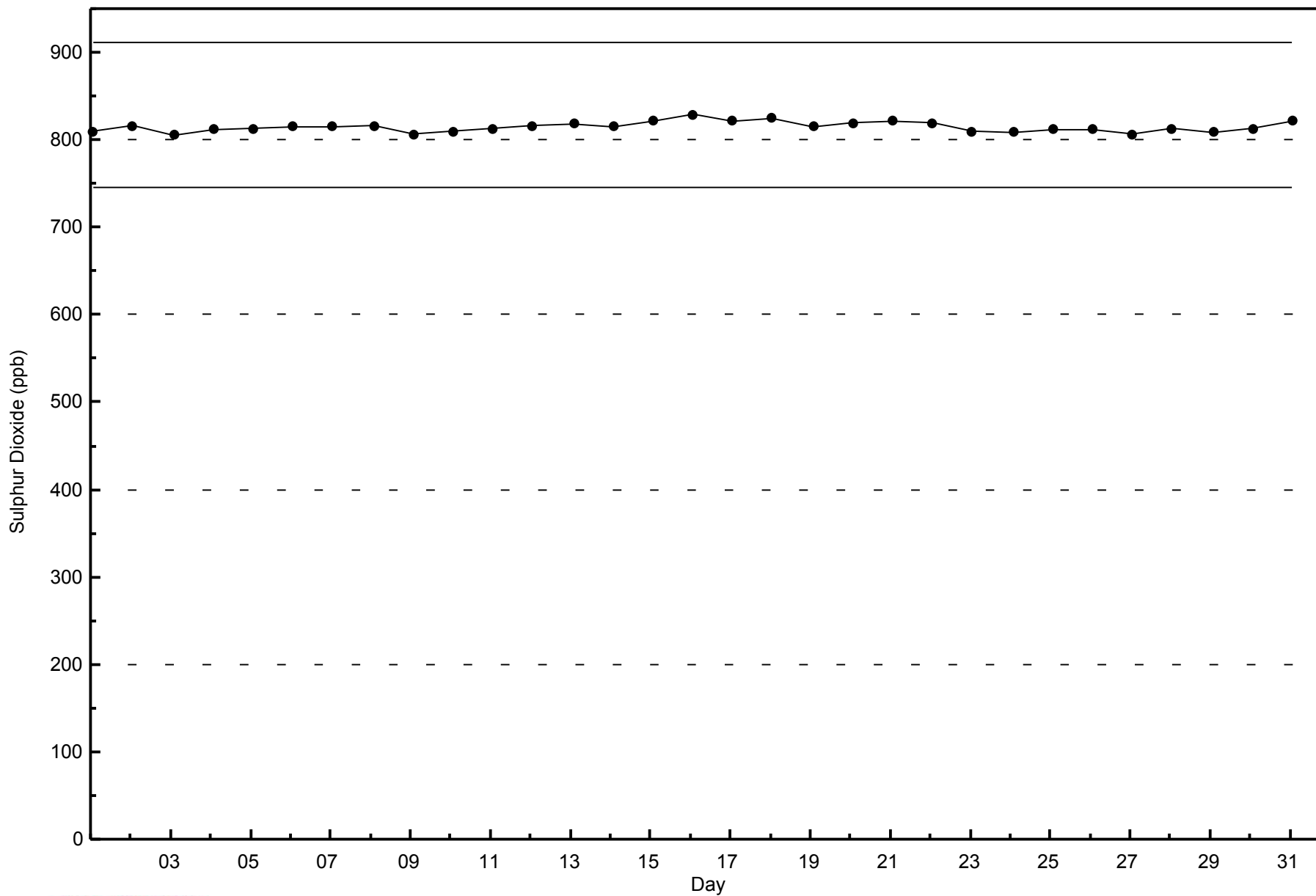
Statoil - Leismer - July 2014





WBEA NETWORK
Span Responses

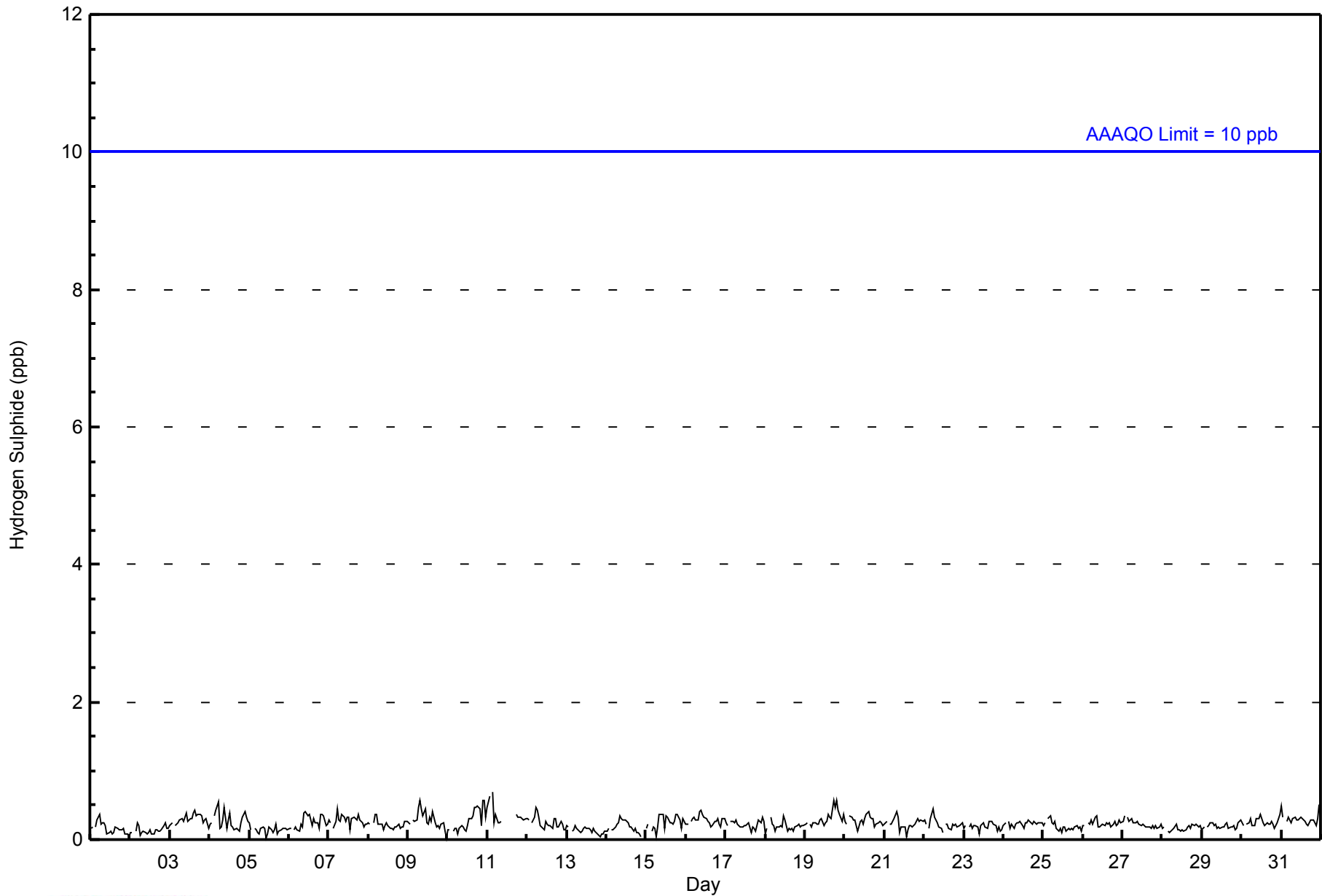
Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer - July 2014





WBEA NETWORK
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	702	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: 702

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer - July 2014

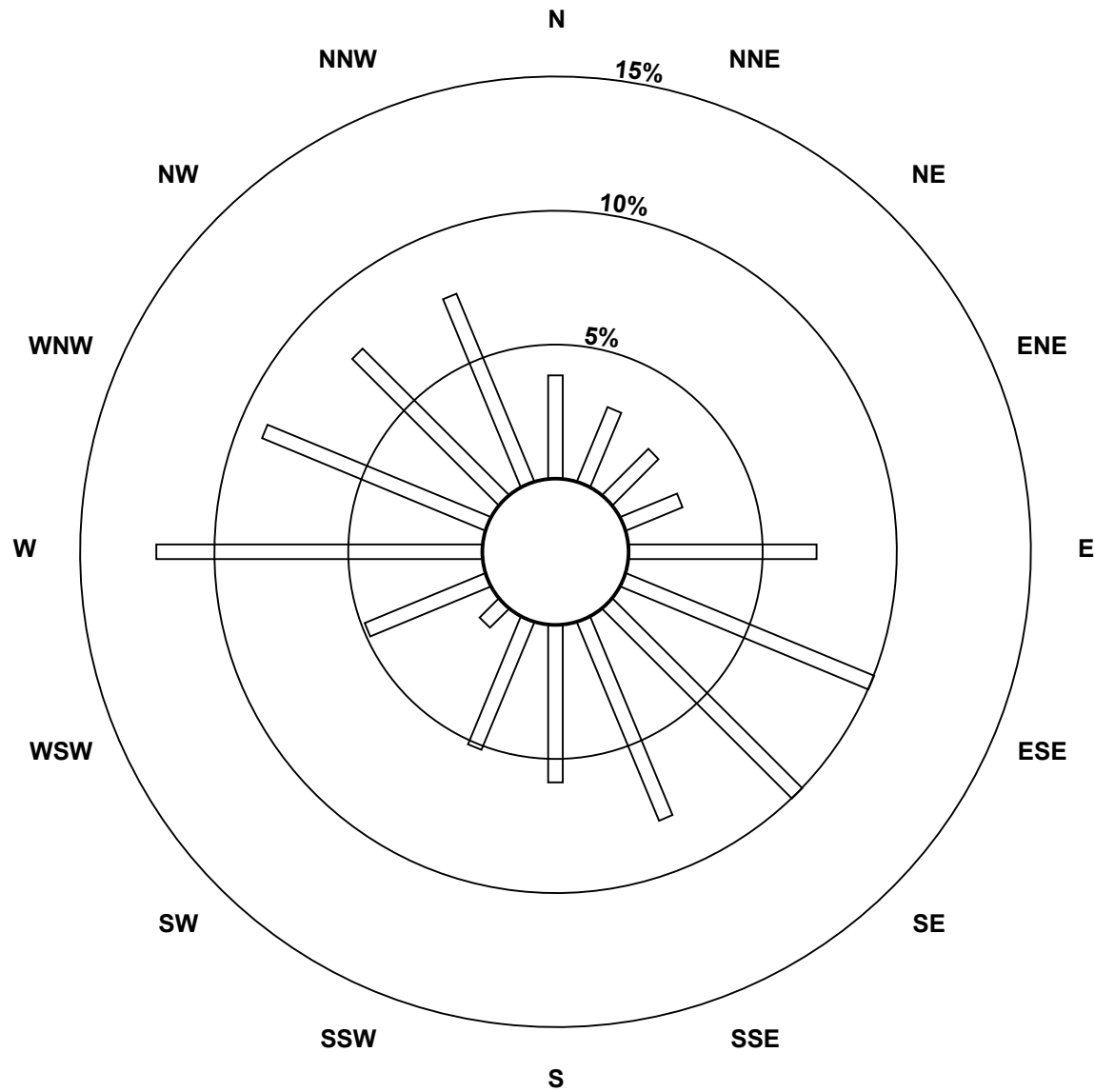
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	27	21	17	16	49	70	70	56	41	36	7	34	85	63	54	53	699
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	27	21	17	16	49	70	70	56	41	36	7	34	85	63	54	53	699

Total Number of Valid Hours: 699

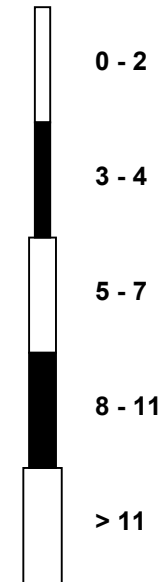
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer (AMS501)



Classes (ppb)



Total Number of Valid Hours: 699

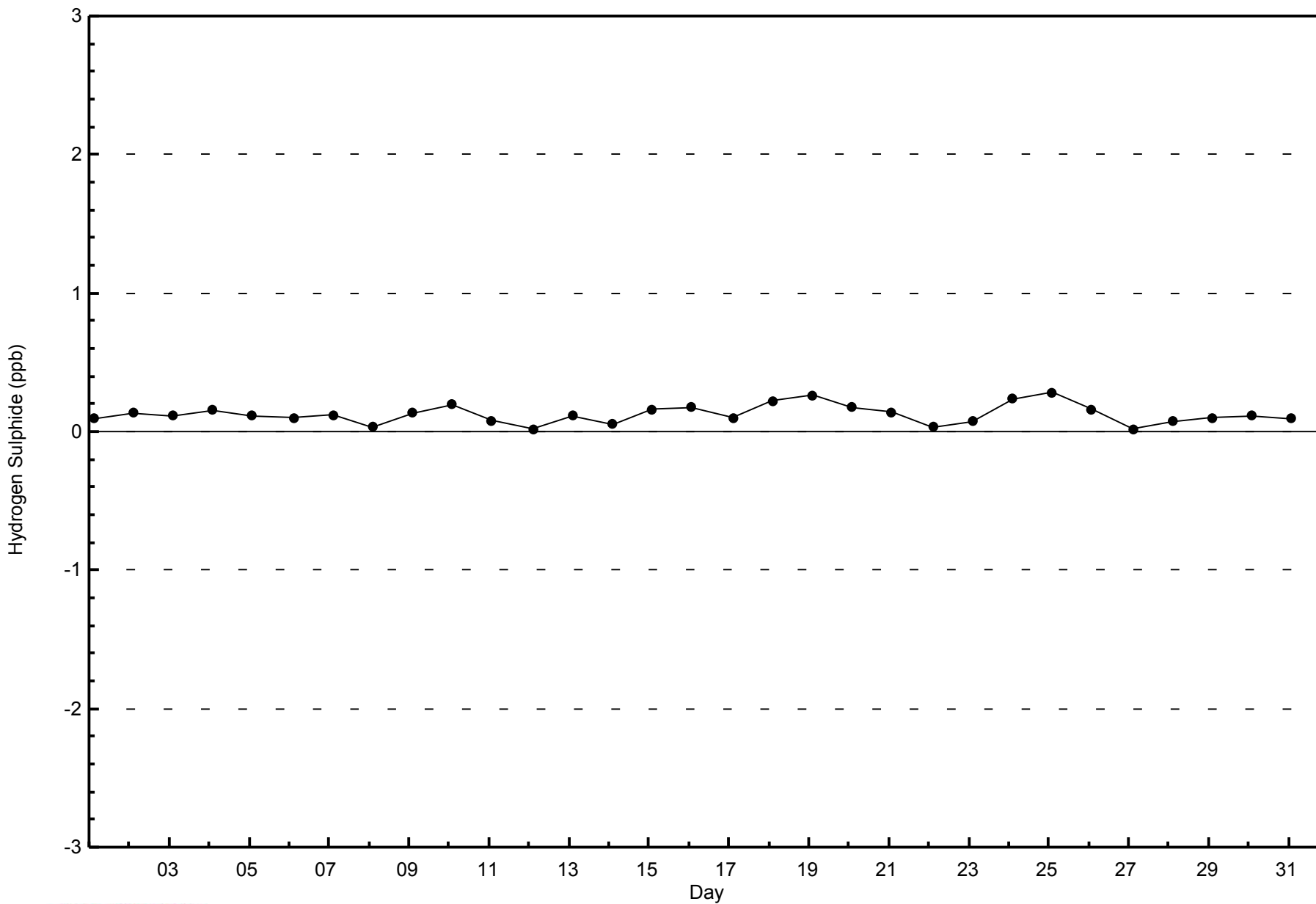


WBEA NETWORK

Zero Responses

Hydrogen Sulphide (H₂S) - ppb

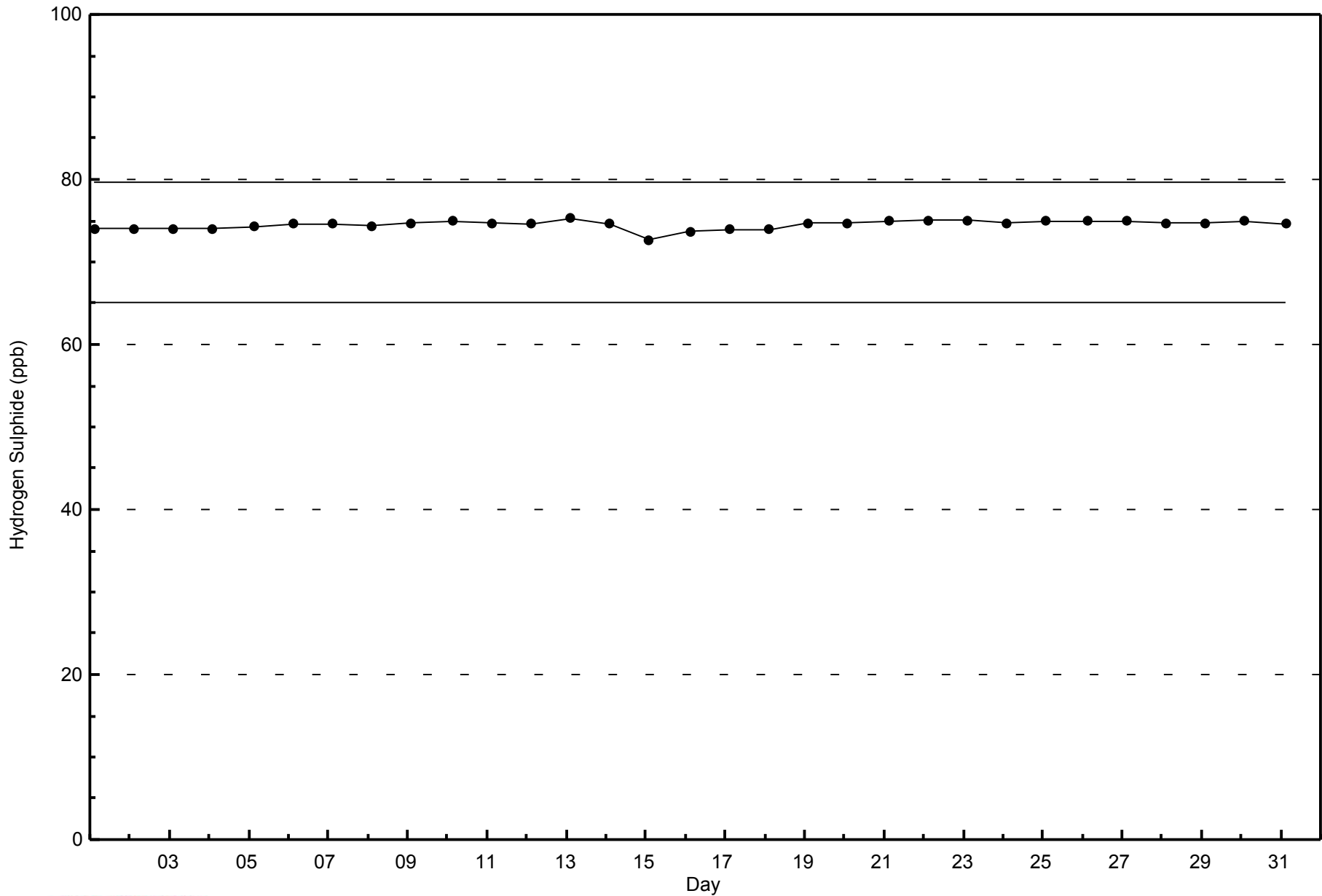
Statoil - Leismer - July 2014





WBEA NETWORK
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer - July 2014



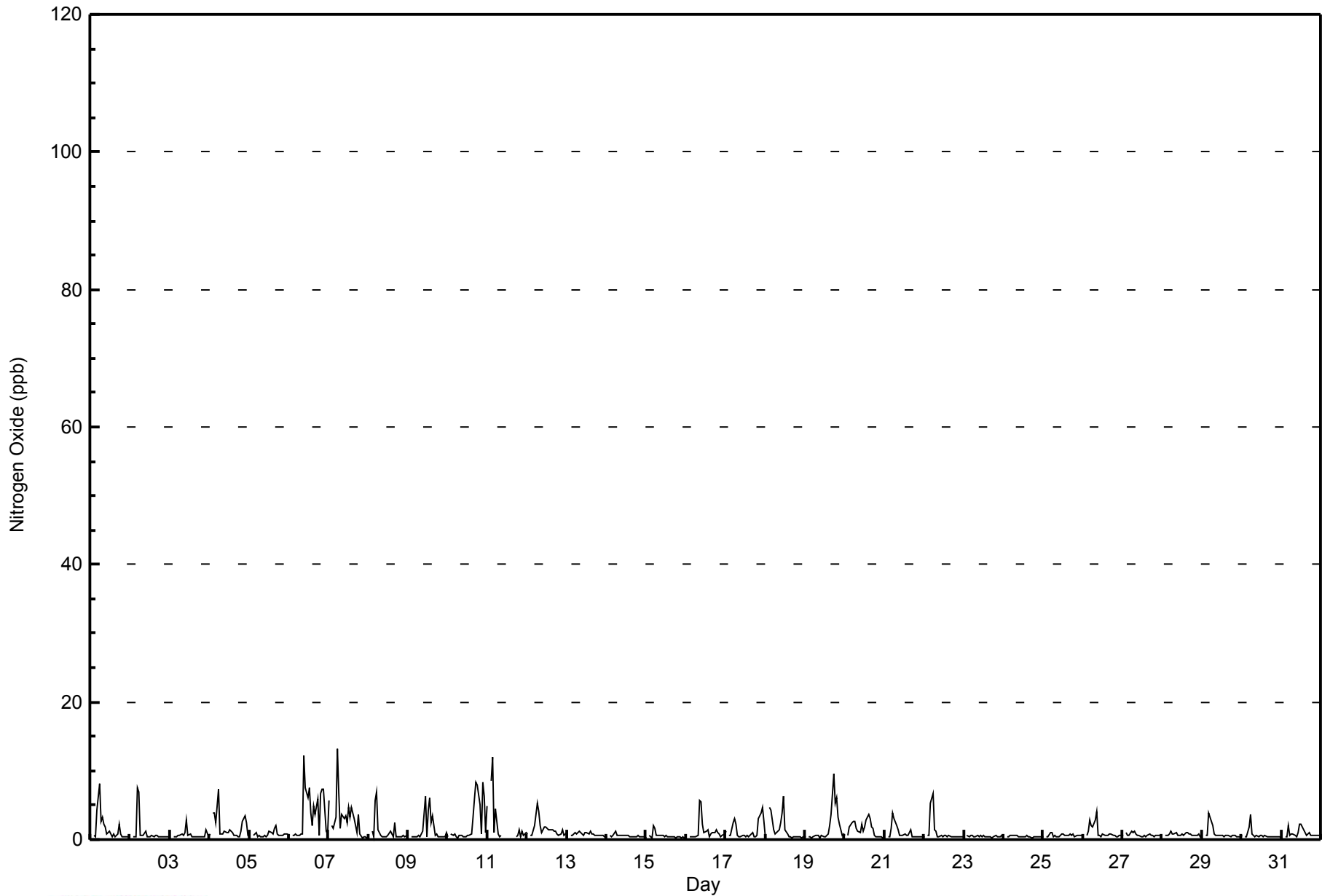


Maximum Value: 13 ppb on Jul 7 06:00														Maximum Daily Average: 3.6 ppb on Jul 6														Hours in Service: 744	
Minimum Value: 0 ppb on Jul 15 04:00														Minimum Daily Average: 0.5 ppb on Jul 23														Hours of Data: 705	
Maximum Diurnal Average: 2.9 ppb at hour 6														Minimum Diurnal Average: 0.6 ppb at hour 24														Hours of Missing Data: 39	
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 = 8														Hours of Calibration: 31	
																												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-Jul	0	Z	1	0	4	8	3	3	2	2	1	1	1	0	1	0	1	2	1	0	0	0	0	0	1.5	8			
2-Jul	0	Z	0	0	8	7	1	1	1	1	0	0	0	1	0	1	1	0	0	0	0	0	0	0	1.1	8			
3-Jul	0	Z	0	0	0	1	1	1	1	1	3	1	1	0	0	0	0	0	0	0	0	0	1	0	0.7	3			
4-Jul	1	Z	4	4	2	7	1	1	1	1	1	1	1	1	1	1	1	0	0	1	3	3	2	1	1.7	7			
5-Jul	0	Z	1	1	1	0	1	0	0	1	0	1	1	1	1	1	2	2	1	1	1	1	1	1	0.8	2			
6-Jul	1	Z	1	1	1	1	1	1	1	12	7	6	8	4	2	5	4	6	1	7	7	7	1	1	3.6	12			
7-Jul	6	Z	2	2	3	13	7	2	4	3	4	3	5	3	5	3	2	1	4	1	0	0	0	0	3.1	13			
8-Jul	0	Z	1	0	6	7	1	1	0	0	0	0	1	1	1	0	2	0	0	1	1	1	0	1	1.2	7			
9-Jul	1	Z	1	0	0	0	1	0	1	1	6	0	4	6	3	4	1	1	0	0	0	0	0	1	1.4	6			
10-Jul	0	Z	1	1	1	0	0	1	1	0	0	0	1	1	1	3	6	8	8	5	1	8	6	1	2.4	8			
11-Jul	5	Z	9	12	1	4	1	0	1	PF	PF	PF	PF	PF	PF	PF	PF	0	1	1	0	1	1	1	--	12			
12-Jul	1	Z	1	1	2	4	5	4	2	1	2	2	2	1	1	1	1	1	1	1	1	2	1	1	1.6	5			
13-Jul	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.8	1			
14-Jul	0	Z	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0.6	1			
15-Jul	0	Z	1	0	2	2	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0.5	2			
16-Jul	0	Z	0	0	0	0	0	1	6	6	2	1	1	1	0	1	1	1	1	1	1	0	1	1	1.2	6			
17-Jul	1	Z	1	1	3	3	2	1	0	0	1	1	1	1	0	1	1	0	0	1	3	4	5	3	1.4	5			
18-Jul	0	Z	5	4	3	1	1	1	1	2	4	6	1	1	0	1	0	0	0	0	0	0	0	0	1.6	6			
19-Jul	0	Z	0	0	0	0	1	1	1	0	1	0	0	1	1	2	4	9	5	6	3	2	1	1	1.7	9			
20-Jul	1	Z	1	2	3	3	3	2	1	1	2	1	2	3	4	3	2	2	1	0	0	0	0	0	1.5	4			
21-Jul	0	Z	0	0	2	4	3	2	2	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	1.0	4			
22-Jul	0	Z	1	1	5	7	1	1	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	1.0	7			
23-Jul	0	Z	1	0	1	1	0	0	1	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1	0.5	1			
24-Jul	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0.5	1			
25-Jul	0	Z	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0.6	1			
26-Jul	1	Z	1	1	3	2	2	3	4	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1.1	4			
27-Jul	1	Z	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	0	1	1	1	1	0.7	1			
28-Jul	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1			
29-Jul	1	Z	1	1	4	3	2	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	0	0.9	4			
30-Jul	1	Z	0	0	2	4	1	1	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0.7	4			
31-Jul	0	Z	0	0	2	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	0.9	2			
0.8																								Diurnal Average					
6																								Diurnal Maximum					
Z - zerospan																								PF - Power Failure					



WBEA NETWORK
Hourly Averages

Nitrogen Oxide (NO) - ppb
Statoil - Leismer - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
Statoil - Leismer - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	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: 705

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Oxide (NO) - ppb
Statoil - Leismer - July 2014

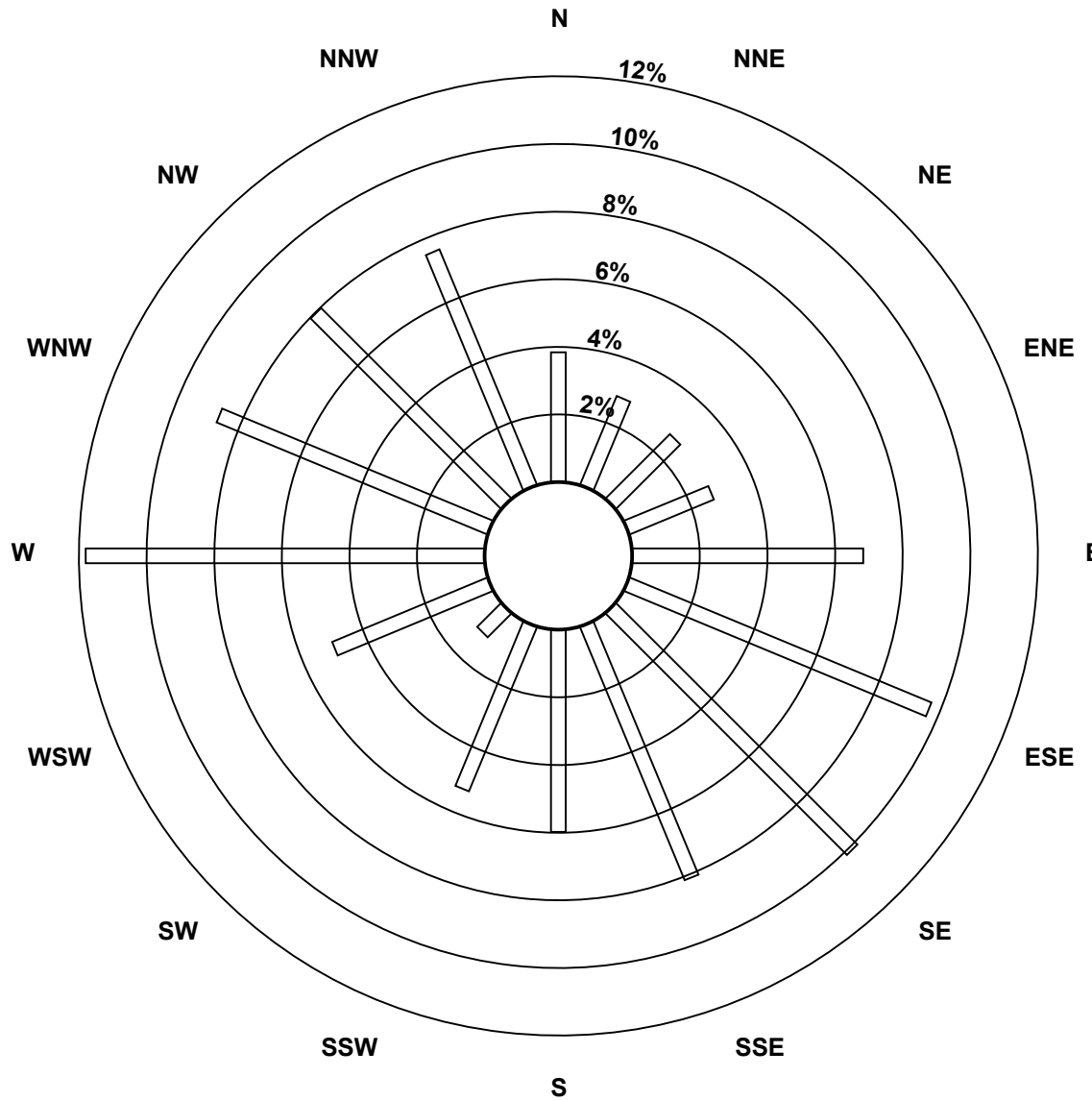
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	20	19	19	48	68	71	57	42	37	7	35	83	61	56	53	703
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	27	20	19	19	48	68	71	57	42	37	7	35	83	61	56	53	703

Total Number of Valid Hours: 703

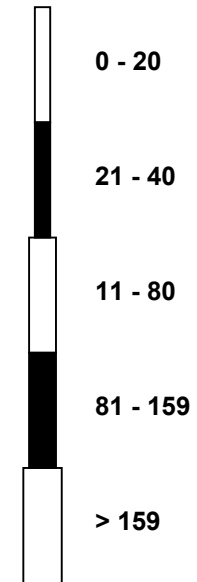
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Nitrogen Oxide (NO) - ppb
Statoil - Leismer (AMS501)



Classes (ppb)



Total Number of Valid Hours: 703

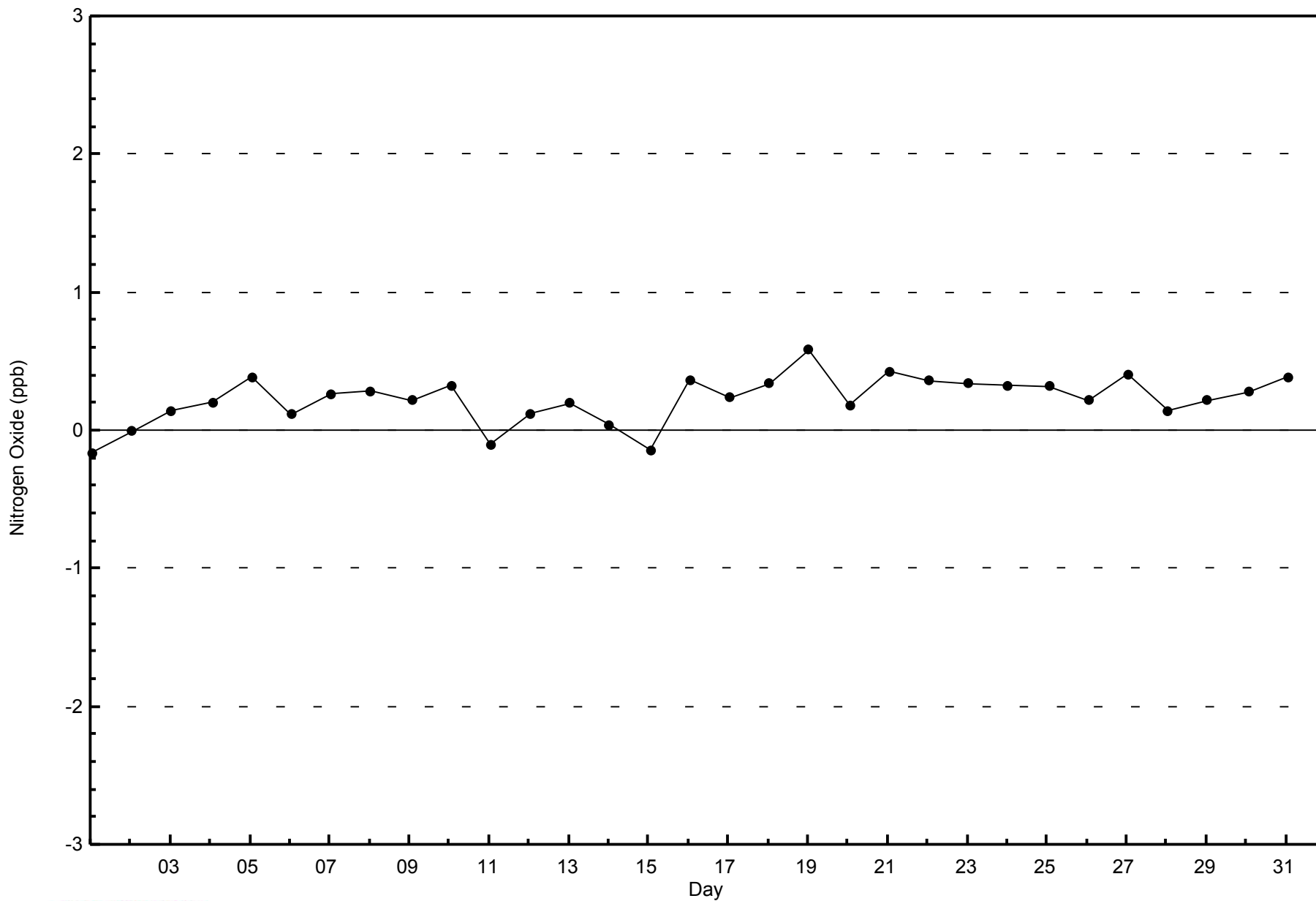


WBEA NETWORK

Zero Responses

Nitrogen Oxide (NO) - ppb

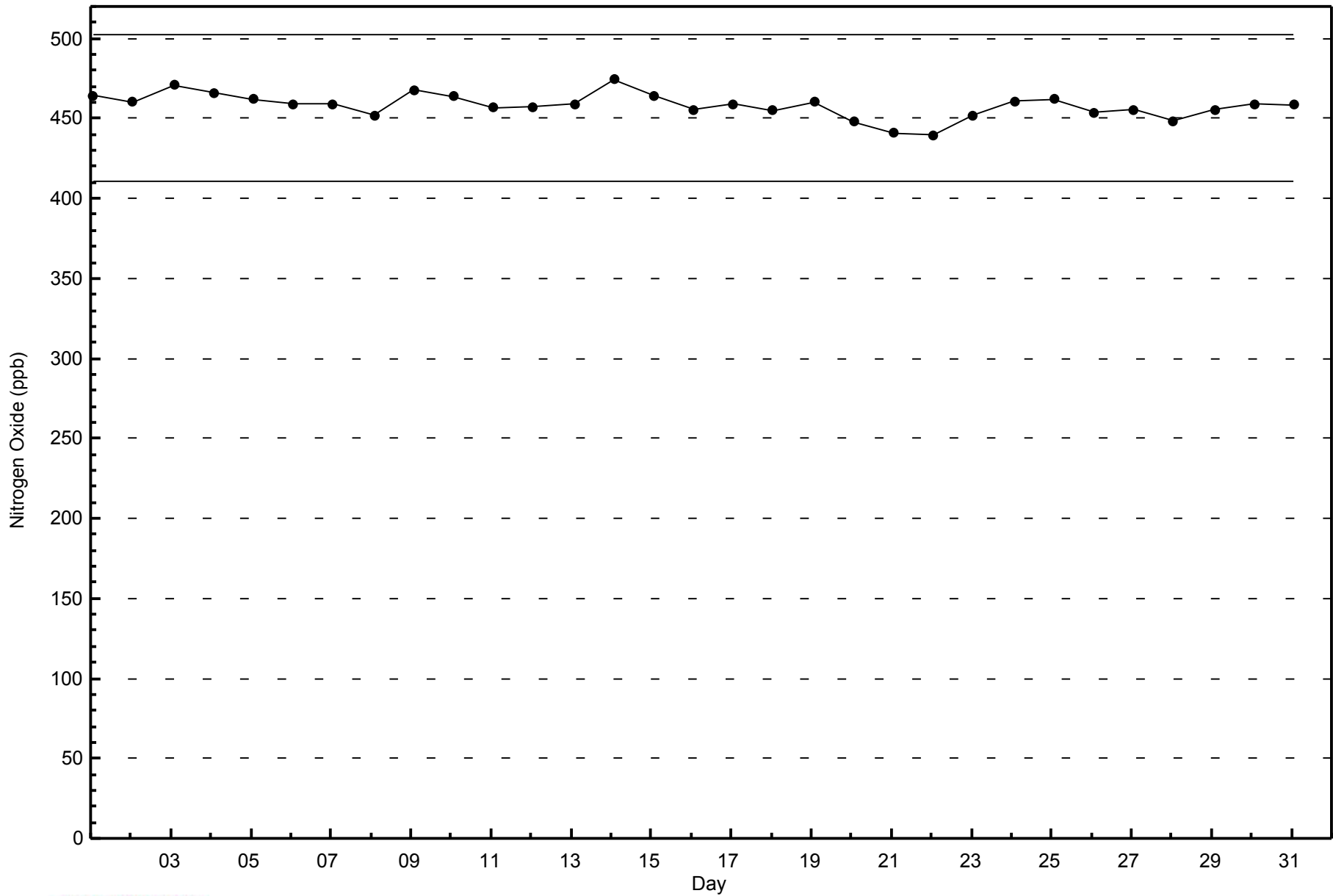
Statoil - Leismer - July 2014





WBEA NETWORK
Span Responses

Nitrogen Oxide (NO) - ppb
Statoil - Leismer - July 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 14 ppb on Jul 4 06:00	Maximum Daily Average: 3.9 ppb on Jul 7		Hours of Data:	705
Minimum Value: 0 ppb on Jul 4 18:00	Minimum Daily Average: 0.5 ppb on Jul 30		Hours of Missing Data:	39
Maximum Diurnal Average: 3.2 ppb at hour 6	Minimum Diurnal Average: 1.1 ppb at hour 19		Hours of Calibration:	31
Monthly Average: 1.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 4 P ₉₉ = 8		Percent Operational Time:	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-Jul	2	Z	3	4	7	8	4	4	4	3	1	2	2	1	2	1	1	2	2	1	0	0	0	1	2.4	8
2-Jul	0	Z	0	0	2	4	1	1	1	1	0	0	0	0	1	1	1	1	0	0	1	1	1	1	0.8	4
3-Jul	1	Z	1	1	2	2	2	1	1	2	3	2	1	0	0	1	1	1	1	0	1	1	4	1	1.2	4
4-Jul	2	Z	8	8	6	14	2	1	1	1	1	1	1	1	1	0	0	0	0	1	4	6	5	3	3.0	14
5-Jul	4	Z	4	5	2	0	0	0	0	0	0	0	1	1	1	1	1	2	0	0	0	1	2	2	1.1	5
6-Jul	2	Z	2	2	3	1	1	1	1	9	6	5	7	3	2	4	3	4	1	8	7	8	2	1	3.5	9
7-Jul	7	Z	2	2	4	11	5	2	4	4	5	4	6	4	7	5	4	2	7	2	1	1	1	1	3.9	11
8-Jul	1	Z	6	2	2	3	1	1	1	0	1	0	0	1	1	0	1	0	0	0	0	0	1	0	0.9	6
9-Jul	1	Z	1	1	1	1	1	1	2	2	3	1	5	9	5	6	1	2	1	1	1	0	0	2	1.9	9
10-Jul	0	Z	2	1	1	0	0	0	0	0	0	0	0	0	1	2	5	6	6	5	1	9	7	1	2.0	9
11-Jul	4	Z	7	8	1	3	0	0	0	PF	PF	PF	PF	PF	PF	PF	PF	0	1	1	1	2	1	1	--	8
12-Jul	1	Z	2	3	5	6	4	4	1	1	2	2	2	3	3	2	1	2	1	1	7	6	3	2	2.8	7
13-Jul	3	Z	2	1	1	1	1	2	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0.8	3
14-Jul	1	Z	2	1	1	3	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	1	1	0.8	3
15-Jul	1	Z	1	1	5	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	5
16-Jul	1	Z	1	2	2	2	2	3	5	5	3	1	1	1	1	1	2	2	2	3	2	1	5	4	2.2	5
17-Jul	4	Z	4	3	3	3	4	2	1	1	1	1	1	1	0	1	2	1	1	1	4	4	6	5	2.3	6
18-Jul	1	Z	7	6	4	3	1	1	2	4	3	3	2	1	0	0	0	0	0	0	0	0	0	1	1.7	7
19-Jul	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	1	2	2	6	4	6	3	2	1	2	1.5	6
20-Jul	2	Z	1	2	2	2	2	2	1	1	3	2	4	5	8	7	4	5	1	2	3	2	2	2	2.8	8
21-Jul	3	Z	6	4	4	4	5	5	4	2	2	2	2	2	2	3	2	2	1	1	1	1	1	2	2.7	6
22-Jul	2	Z	2	3	5	5	2	3	2	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1.4	5
23-Jul	1	Z	2	2	3	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.8	3
24-Jul	1	Z	1	1	1	1	1	1	1	1	0	1	0	1	0	0	0	0	0	1	1	1	2	1	0.7	2
25-Jul	2	Z	3	0	1	1	1	1	0	0	1	1	0	0	0	0	1	1	1	1	0	0	0	0	0.7	3
26-Jul	1	Z	1	5	4	3	2	4	7	1	0	0	1	1	0	0	1	0	0	1	1	1	2	1	1.5	7
27-Jul	0	Z	1	1	2	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	0.6	2
28-Jul	1	Z	1	1	1	1	1	1	1	0	0	0	1	0	1	1	2	1	0	1	0	1	1	0	0.7	2
29-Jul	0	Z	1	1	8	6	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1.1	8
30-Jul	0	Z	0	0	1	2	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0.5	2
31-Jul	1	Z	1	1	2	3	2	2	1	1	1	2	3	1	1	0	1	1	1	1	1	0	0	1	1.2	3

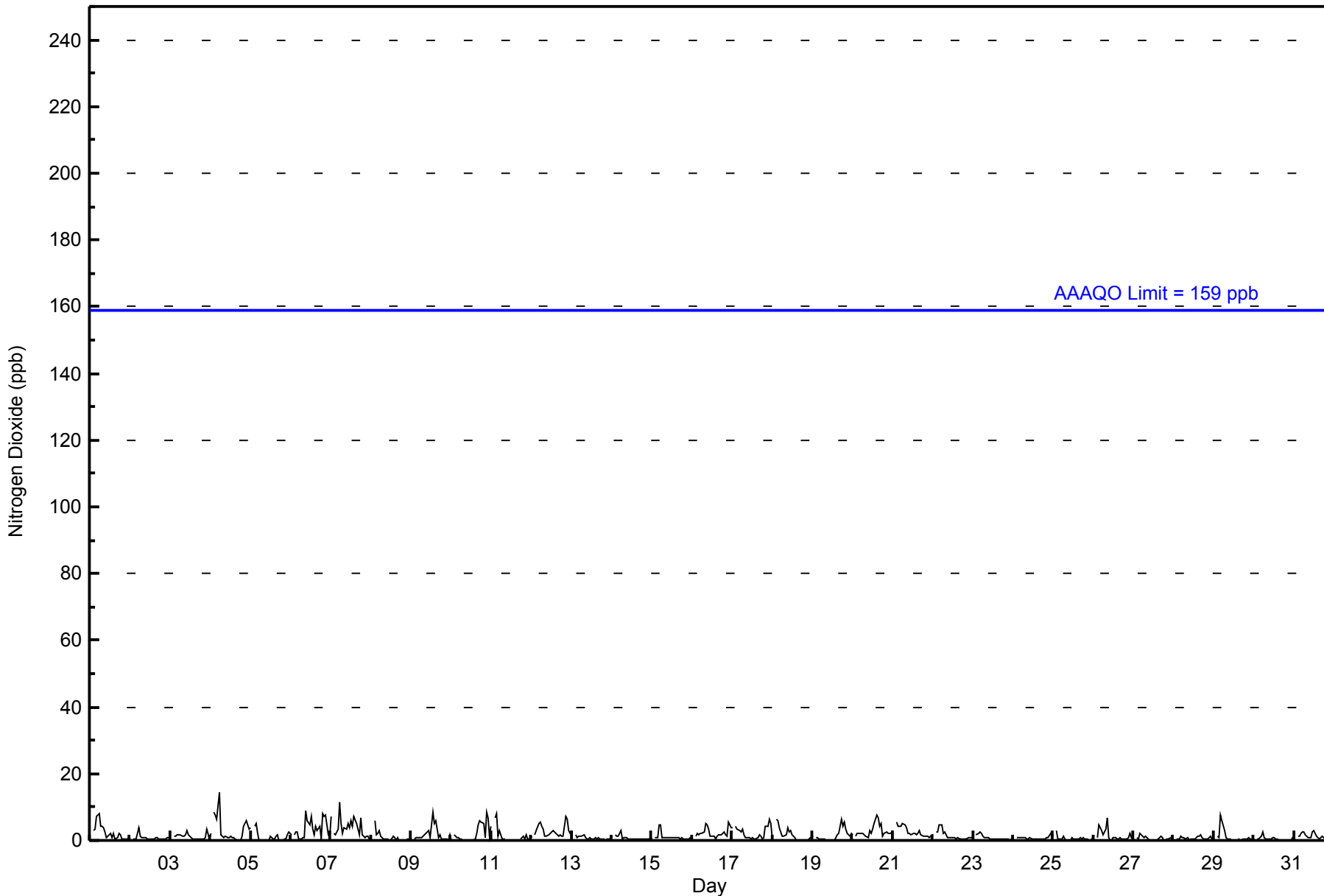
1.6	--	2.4	2.3	2.8	3.2	1.7	1.4	1.4	1.4	1.3	1.2	1.5	1.4	1.4	1.4	1.3	1.4	1.1	1.3	1.4	1.6	1.7	1.3	Diurnal Average	
7	--	8	8	8	14	5	5	7	9	6	5	7	9	8	7	5	6	7	8	7	9	7	5	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	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: 705

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - July 2014

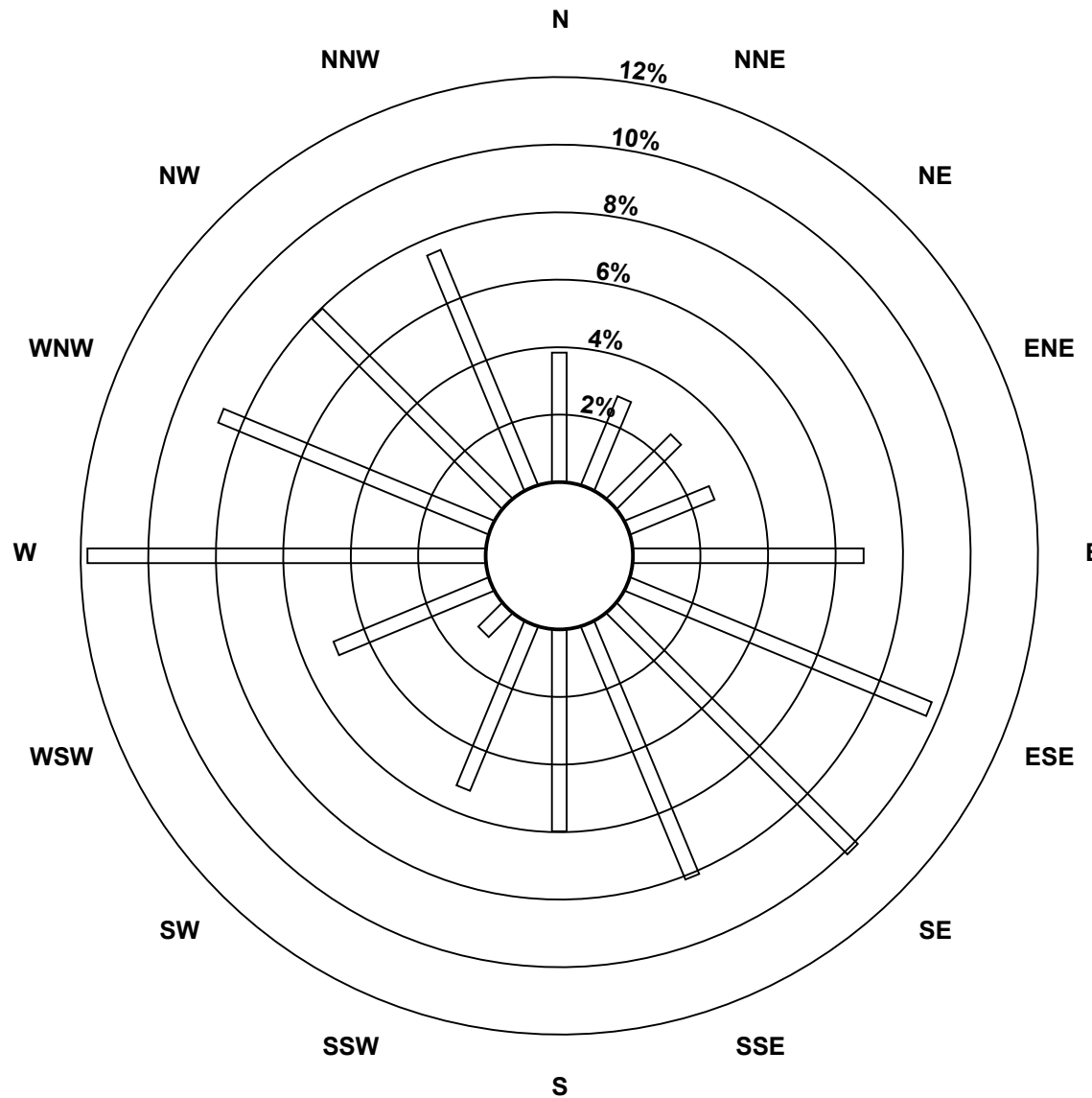
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	20	19	19	48	68	71	57	42	37	7	35	83	61	56	53	703
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	27	20	19	19	48	68	71	57	42	37	7	35	83	61	56	53	703

Total Number of Valid Hours: 703

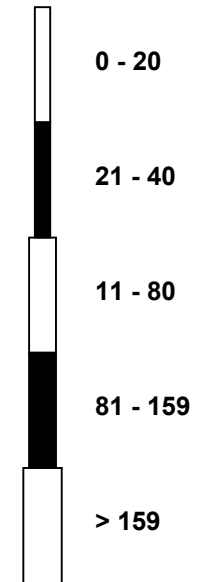
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer (AMS501)



Classes (ppb)



Total Number of Valid Hours: 703

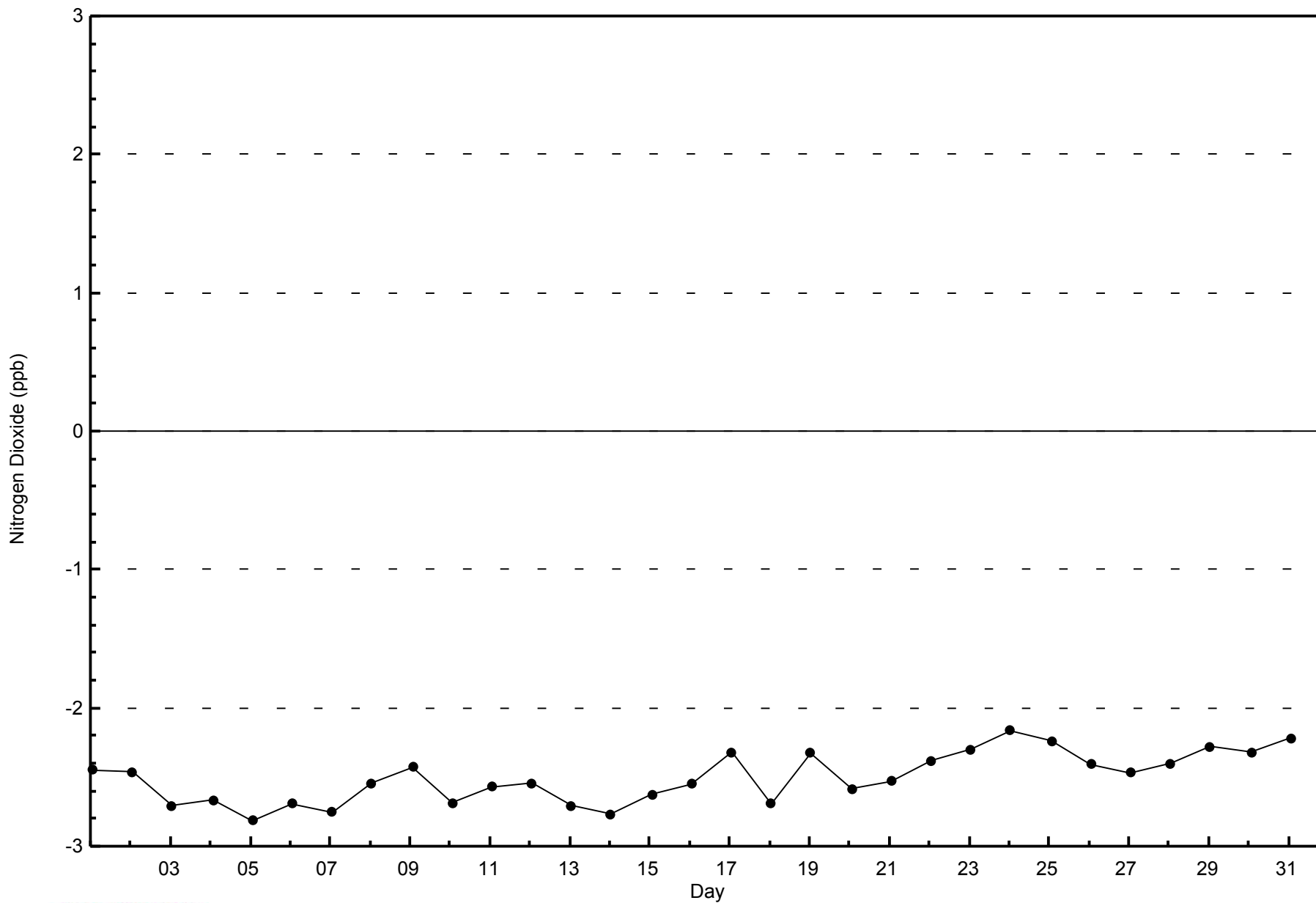


WBEA NETWORK

Zero Responses

Nitrogen Dioxide (NO₂) - ppb

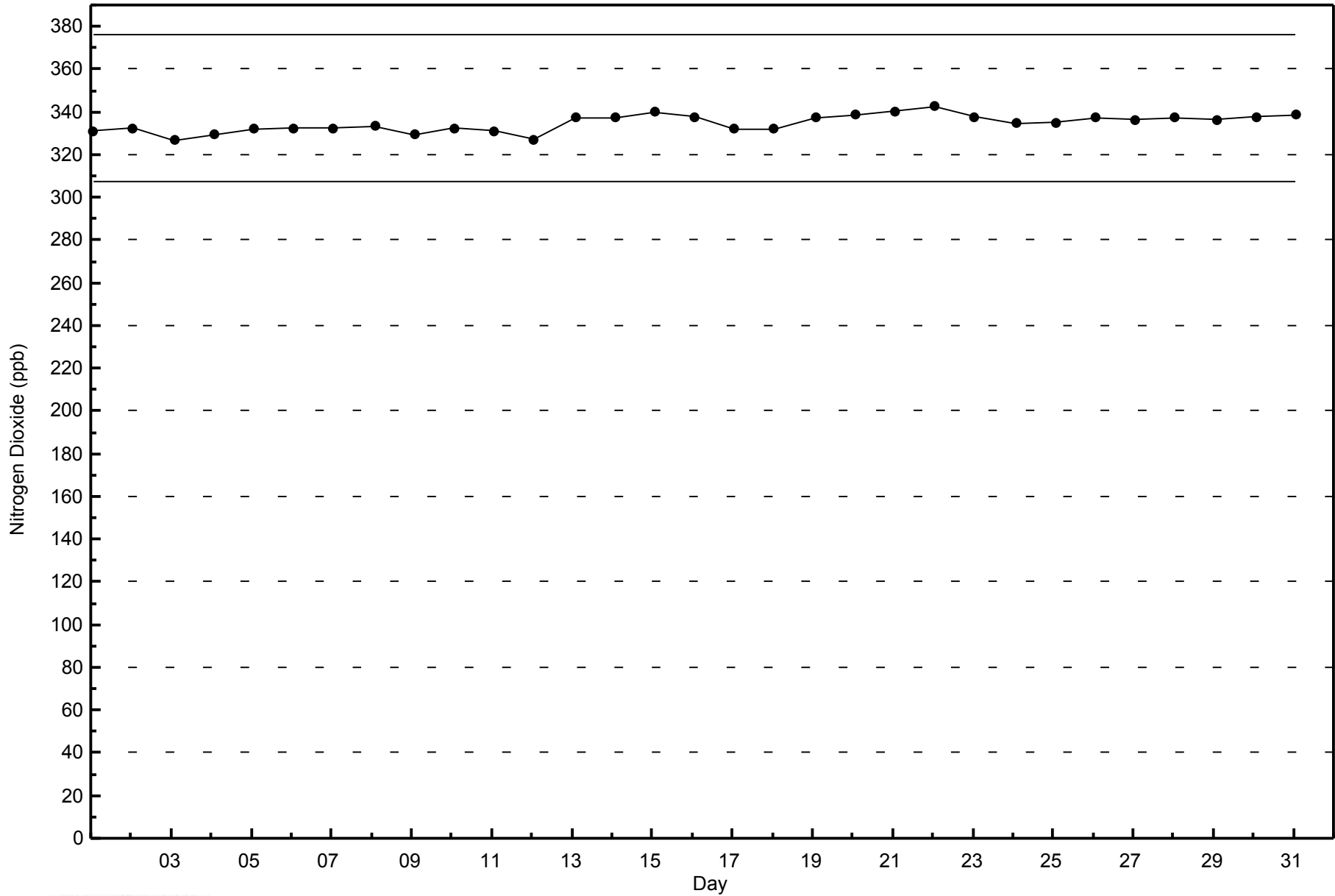
Statoil - Leismer - July 2014





WBEA NETWORK
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - July 2014



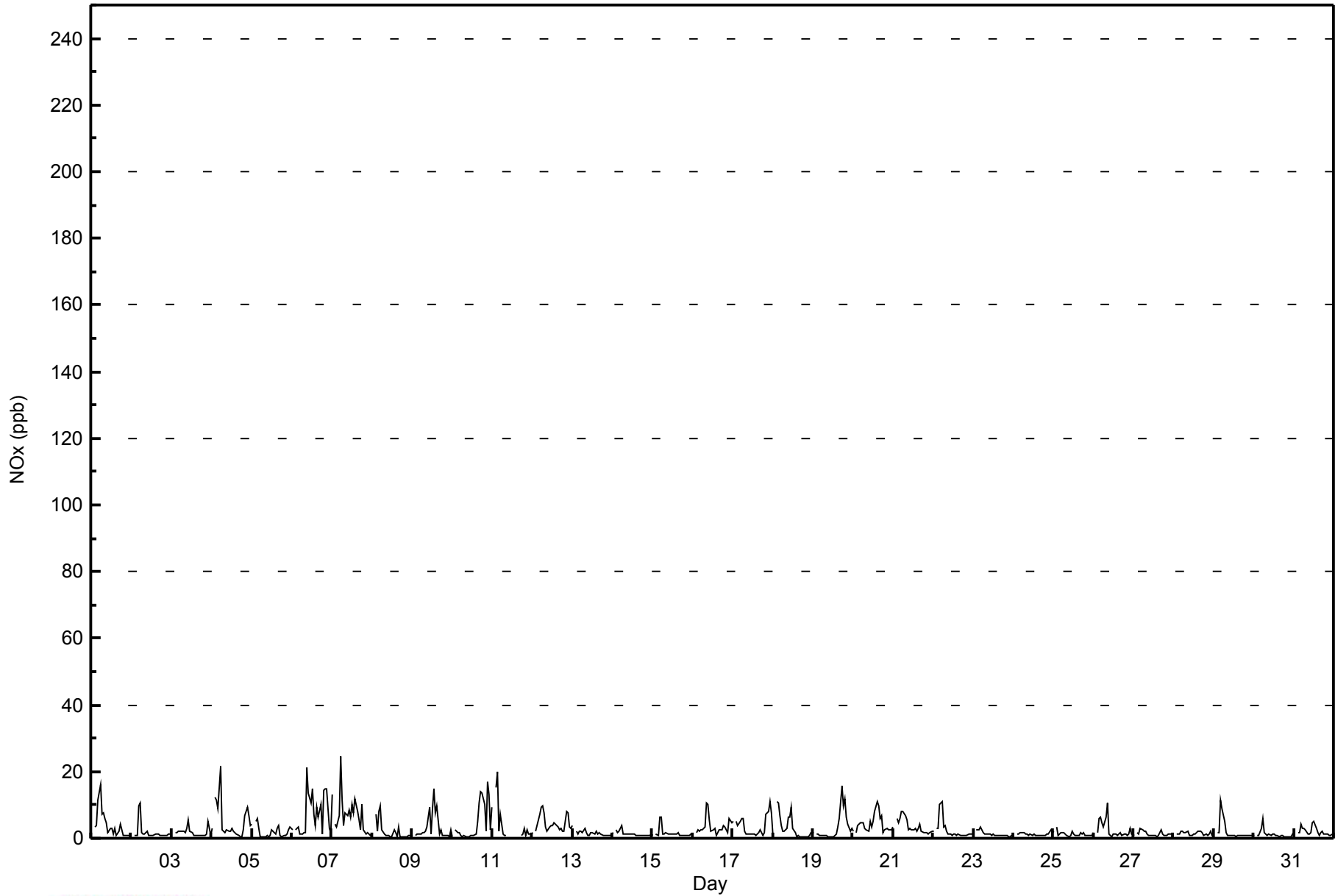


Maximum Value: 25 ppb on Jul 7 06:00														Maximum Daily Average: 7.1 ppb on Jul 6														Hours in Service: 744																				
Minimum Value: 0 ppb on Jul 10 01:00														Minimum Daily Average: 1.2 ppb on Jul 30														Hours of Data: 705																				
Maximum Diurnal Average: 6.1 ppb at hour 6														Minimum Diurnal Average: 1.9 ppb at hour 24														Hours of Missing Data: 39																				
Monthly Average: 2.9 ppb														Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 8 P ₉₉ = 16														Hours of Calibration: 31																				
																												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-Jul	2	Z	4	4	11	16	7	8	6	4	2	3	3	1	3	1	2	4	2	1	1	1	1	1	3.9	16																						
2-Jul	1	Z	1	1	10	11	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.9	11																						
3-Jul	1	Z	2	2	2	2	2	2	2	3	6	2	2	1	1	1	1	1	1	1	1	1	5	1	1.8	6																						
4-Jul	3	Z	12	11	9	22	2	2	2	3	2	2	3	2	2	1	1	0	0	3	7	10	7	4	4.7	22																						
5-Jul	4	Z	5	6	3	0	1	0	0	1	1	1	2	2	1	3	4	1	1	1	1	1	3	3	1.9	6																						
6-Jul	2	Z	2	3	3	1	1	2	2	21	14	11	15	7	4	9	7	10	1	15	15	15	3	2	7.1	21																						
7-Jul	13	Z	4	3	7	25	12	4	8	7	8	6	10	8	12	8	6	3	10	3	1	2	1	1	7.0	25																						
8-Jul	1	Z	7	2	8	10	3	1	1	1	1	1	1	2	2	0	3	0	0	1	1	1	1	1	2.1	10																						
9-Jul	1	Z	1	1	1	1	2	2	2	3	9	1	9	15	8	10	1	3	1	1	1	1	1	2	3.3	15																						
10-Jul	0	Z	3	2	2	1	1	1	1	1	1	1	1	1	1	5	11	14	13	10	2	17	13	2	4.4	17																						
11-Jul	9	Z	15	20	2	7	1	1	1	PF	PF	PF	PF	PF	PF	PF	PF	1	1	3	1	3	1	1	--	20																						
12-Jul	2	Z	2	4	7	9	10	8	3	2	3	4	4	4	4	3	3	3	2	2	8	8	4	3	4.4	10																						
13-Jul	4	Z	2	1	2	2	2	3	2	1	1	2	2	1	2	1	2	1	1	1	1	1	1	1	1.6	4																						
14-Jul	2	Z	2	2	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	4																						
15-Jul	1	Z	1	1	7	6	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1.6	7																						
16-Jul	1	Z	2	3	2	3	3	3	11	10	5	2	3	3	1	2	3	3	4	4	3	2	6	5	3.5	11																						
17-Jul	5	Z	5	4	5	6	6	2	1	1	1	1	1	1	1	2	3	2	1	2	7	8	11	8	3.6	11																						
18-Jul	1	Z	11	10	7	4	2	2	3	6	7	9	3	2	1	1	0	0	0	0	1	1	1	2	3.2	11																						
19-Jul	2	Z	1	1	1	1	1	1	1	0	1	1	0	1	1	4	6	16	10	12	7	4	2	3	3.3	16																						
20-Jul	2	Z	2	4	5	5	5	3	3	2	5	3	5	8	11	10	6	7	2	3	3	2	2	2	4.3	11																						
21-Jul	3	Z	6	5	6	8	8	7	5	3	3	3	3	3	2	3	4	2	2	2	2	1	2	2	3.7	8																						
22-Jul	2	Z	3	3	10	11	4	4	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2.4	11																						
23-Jul	1	Z	2	2	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	3																						
24-Jul	1	Z	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	1.2	3																						
25-Jul	2	Z	3	1	2	2	2	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1.3	3																						
26-Jul	2	Z	2	6	7	5	3	6	11	1	1	1	1	1	1	1	2	1	1	1	1	1	3	1	2.6	11																						
27-Jul	1	Z	2	1	3	2	2	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1.3	3																						
28-Jul	1	Z	1	1	2	2	1	1	2	1	1	1	1	1	2	2	2	2	1	1	1	1	2	1	1.5	2																						
29-Jul	1	Z	2	2	12	9	5	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2.0	12																						
30-Jul	1	Z	1	1	3	6	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1.2	6																						
31-Jul	2	Z	2	1	4	3	3	3	1	1	2	5	5	3	2	1	2	2	1	1	1	1	1	1	2.1	5																						
																								2.4	--	3.5	3.5	4.8	6.1	3.1	2.5	2.6	2.8	2.7	2.3	2.8	2.6	2.4	2.6	2.6	2.7	2.1	2.4	2.3	2.9	2.6	1.9	Diurnal Average
																								13	--	15	20	12	25	12	8	11	21	14	11	15	15	12	10	11	16	13	15	15	17	13	8	Diurnal Maximum
Z - zerospan																								PF - Power Failure																								



WBEA NETWORK
Hourly Averages

NO_x (NO_x) - ppb
Statoil - Leismer - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

NO_x (NO_x) - ppb
Statoil - Leismer - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	702	99.57	99.57
21 - 40	3	0.43	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

NOx (NO_x) - ppb
Statoil - Leismer - July 2014

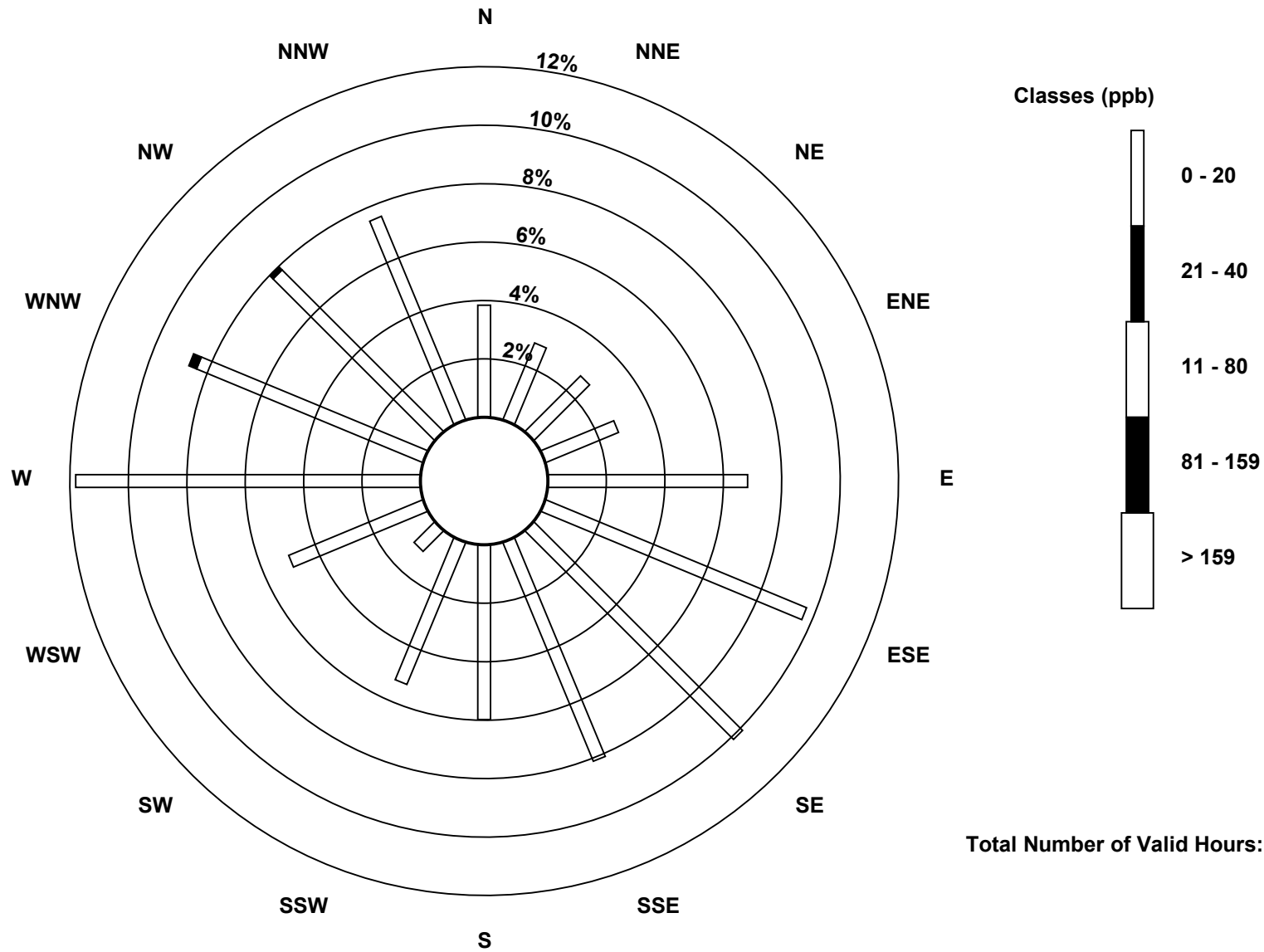
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	20	19	19	48	68	71	57	42	37	7	35	83	59	55	53	700
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	27	20	19	19	48	68	71	57	42	37	7	35	83	61	56	53	703

Total Number of Valid Hours: 703

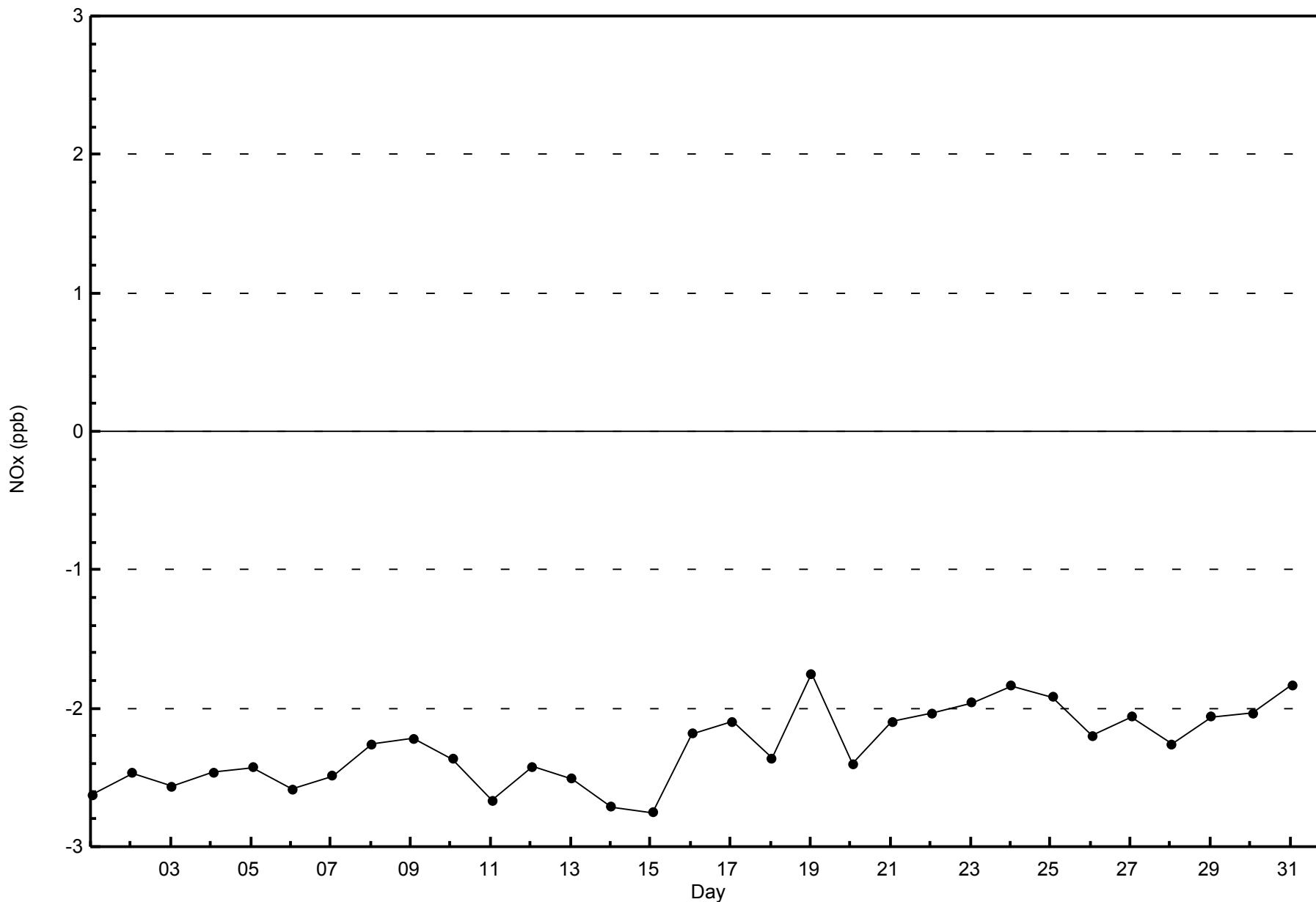
Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

NO_x (NO_x) - ppb
 Statoil - Leismer (AMS501)



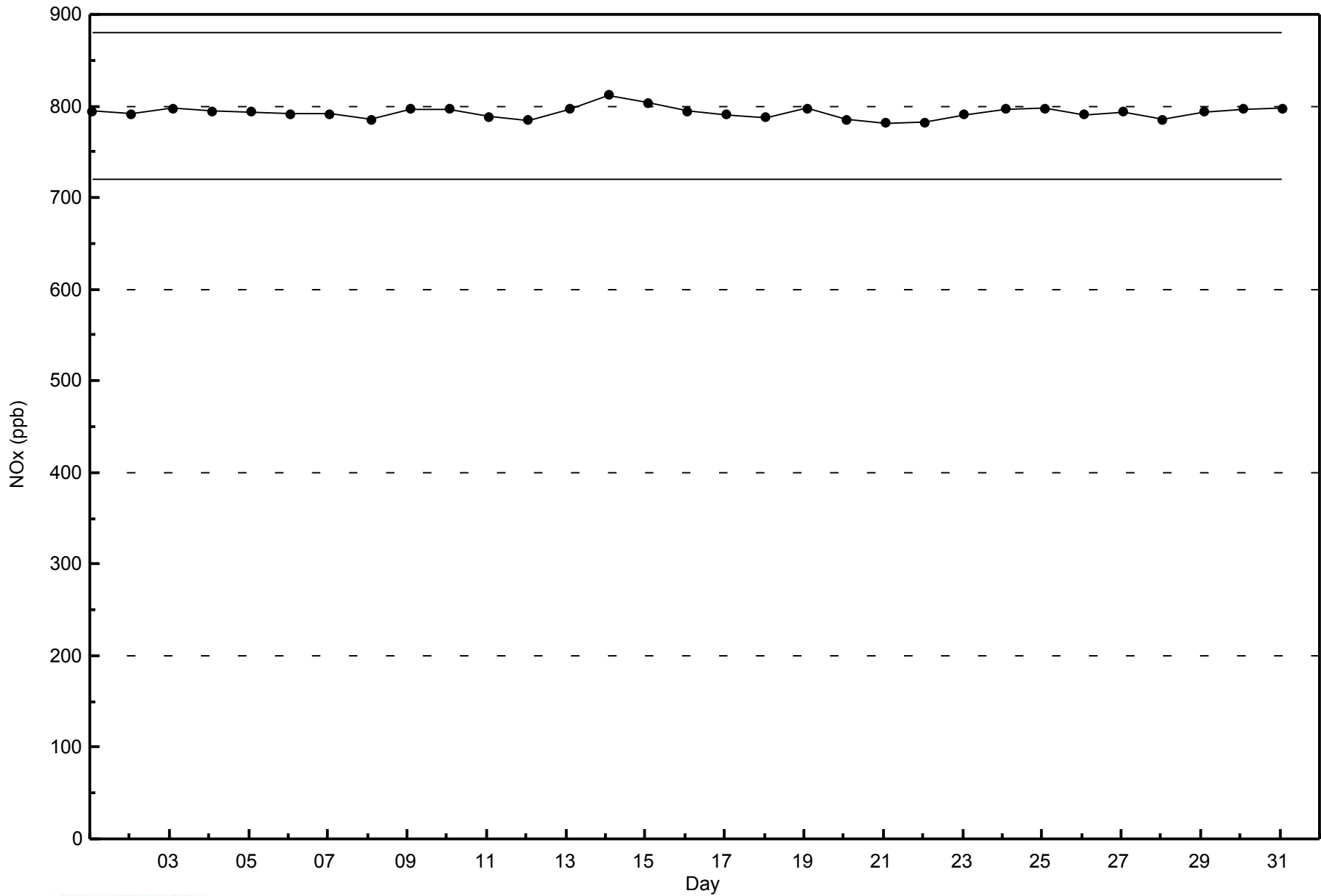
Total Number of Valid Hours: 703





WBEA NETWORK
Span Responses

NOx (NO_x) - ppb
Statoil - Leismer - July 2014



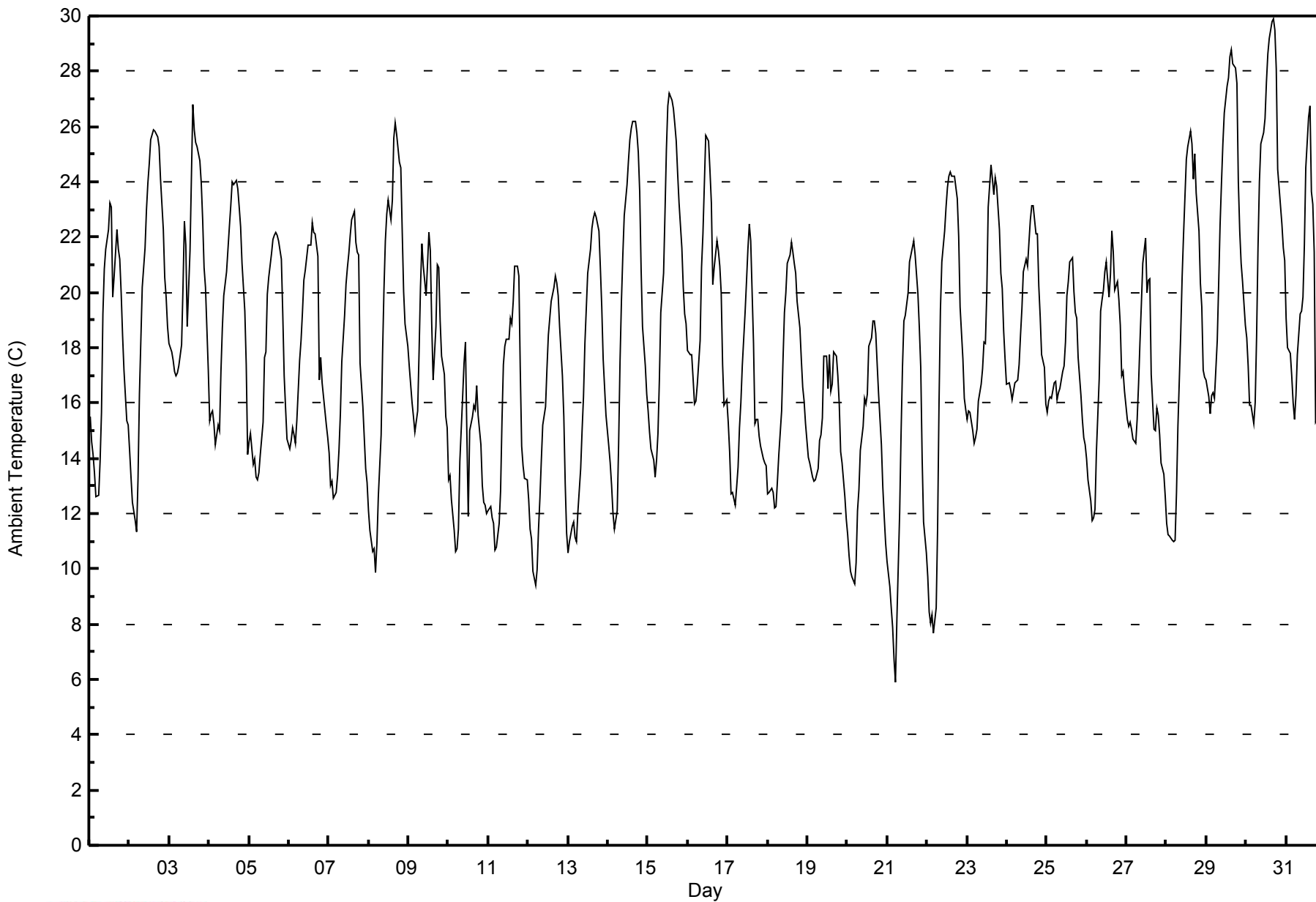


Maximum Value: 29.9 C on Jul 30 17:00																				Maximum Daily Average: 23.2 C on Jul 30					Hours in Service: 744																								
Minimum Value: 5.9 C on Jul 21 06:00																				Minimum Daily Average: 13.9 C on Jul 10					Hours of Data: 744																								
Maximum Diurnal Average: 22.7 C at hour 15																				Minimum Diurnal Average: 12.8 C at hour 5					Hours of Missing Data: 0																								
Monthly Average: 18.00 C																				Percentiles: P ₁ = 8.4 P ₁₀ = 12.3 Q ₁ = 14.8 Median = 17.6 Q ₃ = 21.4 P ₉₀ = 24.0 P ₉₉ = 28.4					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-Jul	15.5	14.6	14.1	13.5	12.6	12.7	13.9	15.7	19.2	20.8	21.6	22.3	23.2	23.1	19.8	20.6	22.3	21.6	21.2	20.0	18.5	17.2	15.4	15.2	18.1	23.2																							
2-Jul	14.3	13.3	12.4	11.7	11.4	13.2	16.3	18.2	20.2	21.6	23.0	23.9	24.7	25.5	25.9	25.8	25.7	25.6	25.3	24.1	22.3	20.6	19.8	18.8	20.1	25.9																							
3-Jul	18.1	17.9	17.6	17.1	17.0	17.1	17.3	18.1	20.2	22.6	21.7	18.7	21.5	24.2	26.8	25.9	25.4	25.3	24.8	23.9	22.6	20.9	20.2	17.2	20.9	26.8																							
4-Jul	15.4	15.6	15.7	15.3	14.5	15.2	15.0	17.1	18.7	19.9	20.7	21.6	22.4	23.1	24.0	23.9	24.0	23.7	23.1	22.4	21.1	19.3	17.4	14.1	19.3	24.0																							
5-Jul	14.6	14.9	13.8	14.0	13.3	13.2	13.5	14.1	15.3	17.6	17.8	19.9	20.5	21.4	21.9	22.1	22.2	22.1	21.9	21.2	19.2	17.0	15.8	14.7	17.6	22.2																							
6-Jul	14.3	14.6	15.1	14.8	14.5	15.4	17.6	18.3	19.2	20.5	20.8	21.7	21.7	21.7	22.5	22.2	22.1	21.3	16.8	17.6	16.7	16.2	15.2	14.7	18.2	22.5																							
7-Jul	14.2	13.0	13.2	12.6	12.8	13.4	14.3	15.6	17.5	19.2	20.3	20.9	21.4	22.0	22.6	22.9	21.8	21.4	21.4	17.4	15.8	14.8	13.6	13.1	17.3	22.9																							
8-Jul	12.1	11.4	10.6	10.7	9.9	10.9	12.6	14.8	17.8	20.1	21.9	22.8	23.4	22.6	23.3	25.6	26.1	25.7	24.7	24.5	22.2	20.1	18.9	18.1	18.8	26.1																							
9-Jul	17.3	16.7	16.0	15.5	14.9	15.7	17.8	20.2	21.7	21.0	19.9	21.0	22.1	21.5	18.9	16.8	18.8	21.0	20.9	19.0	17.7	17.0	15.5	15.1	18.4	22.1																							
10-Jul	13.2	13.4	12.5	11.4	10.6	10.7	11.4	13.9	16.2	17.4	18.2	14.9	11.9	15.0	15.5	15.9	15.8	16.6	15.6	14.5	13.0	12.4	12.3	12.0	13.9	18.2																							
11-Jul	12.1	12.3	11.8	11.6	10.7	10.8	11.6	12.8	15.3	17.4	18.1	18.3	18.3	19.1	18.9	19.7	21.0	21.0	20.6	17.2	14.4	13.7	13.3	13.2	15.6	21.0																							
12-Jul	12.5	11.4	11.1	9.9	9.4	10.0	11.4	12.6	13.9	15.2	15.9	17.3	18.4	19.1	19.7	20.2	20.6	20.3	19.9	18.7	17.0	15.5	13.1	11.3	15.2	20.6																							
13-Jul	10.6	11.0	11.5	11.7	11.1	11.0	12.0	13.6	15.0	16.2	18.1	19.4	20.7	21.6	22.3	22.7	22.9	22.8	22.2	20.9	19.5	17.6	16.6	15.6	16.9	22.9																							
14-Jul	14.4	13.8	13.0	12.0	11.4	12.1	14.5	17.5	19.7	21.4	22.8	23.9	24.8	25.5	25.9	26.2	26.2	25.8	25.1	23.7	20.8	18.8	17.4	16.3	19.7	26.2																							
15-Jul	15.7	14.9	14.3	14.0	13.3	13.9	14.9	16.8	19.3	20.7	22.9	25.2	26.7	27.2	27.0	26.6	26.1	25.4	24.3	23.3	21.6	20.2	19.2	18.9	20.5	27.2																							
16-Jul	17.9	17.8	17.8	16.9	16.0	16.1	16.7	18.3	20.9	22.1	23.9	25.7	25.5	24.4	23.2	20.3	20.9	21.9	21.5	20.9	20.0	17.4	15.9	16.1	19.9	25.7																							
17-Jul	15.3	14.2	12.7	12.8	12.3	12.9	13.7	15.1	16.0	17.3	19.3	20.4	21.5	22.5	21.9	18.1	15.2	15.4	15.4	14.8	14.4	14.0	13.9	13.7	16.0	22.5																							
18-Jul	12.7	12.8	12.9	12.8	12.2	12.3	13.2	14.1	15.7	17.6	19.3	20.0	21.0	21.3	21.8	21.5	21.0	20.7	19.7	18.7	17.6	16.6	16.0	15.3	16.9	21.8																							
19-Jul	14.0	13.8	13.6	13.3	13.2	13.2	13.6	14.7	14.9	15.5	17.7	17.7	16.5	17.8	16.4	16.7	17.9	17.7	17.0	15.9	14.2	13.8	12.6	11.8	15.1	17.9																							
20-Jul	11.2	10.5	9.9	9.7	9.5	10.2	12.1	12.9	14.3	15.1	16.2	16.0	16.3	18.1	18.4	18.9	18.9	18.5	17.4	16.3	14.5	13.0	11.9	11.0	14.2	18.9																							
21-Jul	10.3	9.4	8.6	7.9	6.7	5.9	8.2	12.0	14.9	17.3	18.9	19.2	20.0	21.1	21.4	21.6	21.8	21.4	19.9	18.7	17.3	14.0	11.7	10.6	14.9	21.8																							
22-Jul	9.7	8.5	8.0	8.3	7.7	8.6	11.5	16.0	19.4	21.1	22.2	23.1	23.8	24.2	24.4	24.2	24.2	23.8	23.4	22.0	19.5	17.6	16.1	15.7	17.6	24.4																							
23-Jul	15.4	15.7	15.7	15.0	14.5	14.8	15.1	16.1	16.7	17.2	18.2	18.1	20.0	23.1	24.6	24.1	23.5	24.2	23.9	22.3	20.7	20.1	18.6	17.6	19.0	24.6																							
24-Jul	16.7	16.7	16.5	16.1	16.4	16.7	16.8	17.4	18.4	19.4	20.8	21.2	21.0	21.8	22.6	23.2	23.1	22.1	22.1	20.2	19.1	17.7	17.3	15.9	19.1	23.2																							
25-Jul	15.7	16.1	16.2	16.2	16.7	16.8	16.1	16.4	16.5	17.1	17.3	18.2	19.9	20.4	21.1	21.2	20.0	19.3	19.1	17.7	16.3	15.4	14.8	14.5	17.5	21.2																							
26-Jul	14.0	13.2	12.5	11.7	11.8	12.2	14.2	16.9	19.3	19.7	20.1	20.8	21.1	19.8	20.7	22.2	21.4	20.1	20.4	19.7	18.8	17.0	17.1	16.4	17.6	22.2																							
27-Jul	15.4	15.1	15.3	15.1	14.7	14.6	15.4	16.7	18.2	19.6	21.1	21.9	20.0	20.4	20.5	17.0	15.1	15.0	15.8	15.5	14.9	13.9	13.4	12.6	16.5	21.9																							
28-Jul	11.6	11.2	11.2	11.1	11.0	11.0	12.8	15.2	18.5	20.6	22.1	23.5	24.8	25.3	25.8	25.4	24.1	25.0	23.6	22.2	20.3	19.5	17.2	16.9	18.7	25.8																							
29-Jul	16.8	16.2	15.6	16.2	16.4	16.2	18.3	20.3	22.4	24.0	25.4	26.5	27.5	27.8	28.5	28.8	28.3	28.1	27.5	24.0	22.2	21.0	20.4	18.8	22.4	28.8																							
30-Jul	18.4	17.3	15.9	15.9	15.3	16.0	18.4	21.6	24.0	25.4	25.8	26.3	27.6	28.6	29.2	29.8	29.9	29.5	28.0	24.5	23.8	22.5	21.6	21.2	23.2	29.9																							
31-Jul	19.1	18.0	17.8	17.0	16.0	15.4	16.3	17.8	19.2	19.3	19.8	21.7	24.5	26.4	26.7	23.6	23.2	21.4	15.3	15.5	14.9	14.1	13.0	13.8	18.7	26.7																							
																								14.5	14.0	13.6	13.3	12.8	13.2	14.4	16.2	18.0	19.4	20.4	21.0	21.7	22.4	22.7	22.4	22.2	22.1	21.2	19.9	18.4	17.1	16.0	15.2	Diurnal Average	
																								19.1	18.0	17.8	17.1	17.0	17.1	18.4	21.6	24.0	25.4	25.8	26.5	27.6	28.6	29.2	29.8	29.9	29.5	28.0	24.5	23.8	22.5	21.6	21.2	Diurnal Maximum	



WBEA NETWORK
Hourly Averages

Ambient Temperature (AT) - C
Statoil - Leismer - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Statoil - Leismer - July 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	19	2.55	2.55
10 - 20	463	62.23	64.79
> 20	262	35.22	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

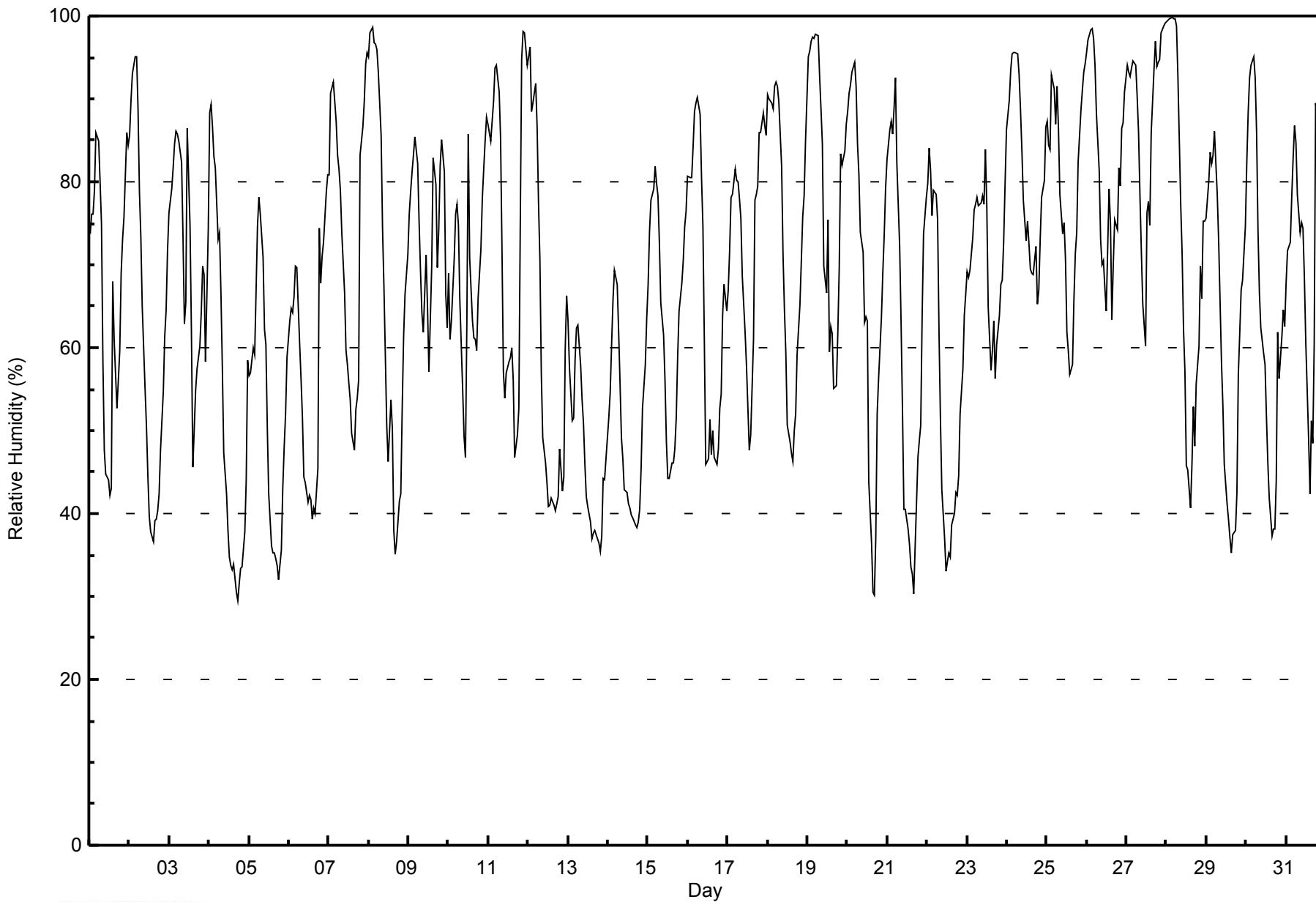
Statoil - Leismer - July 2014

Maximum Value: 100 % on Jul 28 04:00																			Maximum Daily Average: 87.4 % on Jul 27						Hours in Service: 744																			
Minimum Value: 29 % on Jul 4 18:00																			Minimum Daily Average: 47.1 % on Jul 13						Hours of Data: 744																			
Maximum Diurnal Average: 85.9 % at hour 5																			Minimum Diurnal Average: 49.1 % at hour 15						Hours of Missing Data: 0																			
Monthly Average: 67.3 %																			Percentiles: P ₁ = 33 P ₁₀ = 41 Q ₁ = 52 Median = 69 Q ₃ = 82 P ₉₀ = 93 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-Jul	74	76	76	79	86	85	80	75	58	48	45	44	42	43	68	61	53	56	60	69	73	76	86	84	66.5	86																		
2-Jul	86	90	93	95	95	89	79	73	65	55	50	45	40	38	37	39	39	40	42	48	55	61	65	72	62.1	95																		
3-Jul	76	79	82	85	86	86	85	82	73	63	65	86	75	62	46	50	55	58	60	64	70	69	58	74	70.4	86																		
4-Jul	88	89	87	83	82	73	74	67	58	47	42	38	35	34	33	34	31	29	32	33	34	38	44	58	52.6	89																		
5-Jul	57	57	60	59	67	75	78	76	71	62	60	50	42	36	35	35	35	34	32	36	43	48	52	59	52.5	78																		
6-Jul	63	65	64	66	70	70	61	56	52	44	44	41	42	42	39	41	40	45	74	68	71	73	79	81	57.9	81																		
7-Jul	81	91	91	92	87	83	81	79	74	67	60	58	56	54	50	48	53	54	56	83	87	90	94	96	73.4	96																		
8-Jul	95	98	99	97	97	96	93	86	74	67	59	50	46	54	50	38	35	37	42	42	53	61	66	71	67.0	99																		
9-Jul	76	79	81	83	85	82	75	69	64	62	71	65	57	63	70	83	80	70	74	82	85	81	67	62	73.7	85																		
10-Jul	69	61	63	71	76	77	75	66	55	49	47	63	86	71	63	61	61	60	66	72	78	82	85	88	68.5	88																		
11-Jul	87	85	87	90	94	94	91	85	72	57	54	57	58	59	60	56	47	50	53	75	95	98	98	94	74.8	98																		
12-Jul	95	96	88	89	92	87	78	70	57	49	46	44	41	41	42	41	40	41	42	48	43	44	60	66	60.0	96																		
13-Jul	63	58	51	51	59	62	63	58	54	51	46	42	41	39	37	38	38	37	36	35	37	44	44	47	47.1	63																		
14-Jul	52	55	60	66	69	68	62	56	49	47	43	43	41	41	40	39	39	38	39	40	45	53	58	63	50.2	69																		
15-Jul	68	74	78	79	82	80	78	73	66	62	56	49	44	44	46	46	48	52	59	64	68	70	75	76	64.0	82																		
16-Jul	81	81	80	84	88	90	90	88	81	75	61	46	47	51	47	50	47	46	48	53	54	64	68	64	65.9	90																		
17-Jul	67	72	78	78	82	80	80	78	76	69	62	58	53	48	49	61	78	78	80	86	86	88	87	86	73.3	88																		
18-Jul	91	90	90	89	92	92	92	90	82	71	65	59	51	49	47	46	50	52	59	65	70	76	78	85	72.0	92																		
19-Jul	95	96	97	98	97	98	98	93	89	85	70	67	75	59	63	62	55	55	62	70	83	82	84	87	79.9	98																		
20-Jul	88	91	92	93	94	92	85	81	74	71	63	64	63	44	37	31	30	37	52	56	64	69	74	79	67.6	94																		
21-Jul	83	86	87	86	89	93	82	72	63	53	40	41	38	36	34	33	30	36	47	49	51	64	74	78	60.1	93																		
22-Jul	80	84	81	76	79	78	75	62	51	43	37	33	34	35	35	39	40	43	42	45	52	57	64	67	55.5	84																		
23-Jul	69	69	69	73	77	77	78	77	77	78	77	84	77	65	57	60	63	56	60	64	68	68	73	80	70.7	84																		
24-Jul	86	90	93	95	96	96	95	93	89	84	78	73	75	72	70	69	69	72	65	67	73	78	80	87	81.0	96																		
25-Jul	87	84	84	93	91	87	92	86	78	74	75	71	62	60	57	58	66	71	74	82	89	91	93	94	79.1	94																		
26-Jul	96	97	98	98	97	94	88	81	73	70	70	67	64	79	75	63	70	75	74	82	80	86	87	91	81.6	98																		
27-Jul	94	93	93	94	95	94	90	86	78	72	65	60	76	78	75	86	94	97	94	94	95	98	99	99	87.4	99																		
28-Jul	99	100	100	100	100	100	99	93	77	71	62	57	46	45	41	46	53	48	56	60	70	66	75	75	72.4	100																		
29-Jul	76	80	84	82	83	86	78	73	66	58	53	46	41	39	37	35	37	38	43	57	62	67	68	75	61.0	86																		
30-Jul	82	88	93	94	95	93	86	74	67	62	59	58	52	46	42	37	38	38	44	62	56	61	65	62	64.8	95																		
31-Jul	68	72	73	78	83	87	85	78	74	75	74	68	61	49	42	51	48	61	89	86	91	94	97	96	74.2	97																		
																			79.7	81.4	82.3	83.8	85.9	85.2	82.1	76.7	68.9	62.6	58.1	55.7	53.6	50.8	49.1	49.6	50.3	51.8	56.6	62.5	67.0	70.9	74.0	77.3	Diurnal Average	
																			99	100	100	100	100	100	99	93	89	85	78	86	86	79	75	86	94	97	94	94	95	98	99	99	Diurnal Maximum	



WBEA NETWORK
Hourly Averages

Relative Humidity (RH) - %
Statoil - Leismer - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Statoil - Leismer - July 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	66	8.87	8.87
40 - 60	198	26.61	35.48
60 - 80	264	35.48	70.97
80 - 100	216	29.03	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 30 km/h on Jul 16 15:00	Maximum Daily Speed Average: 16.3 km/h on Jul 10	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 9 16:00	Minimum Daily Speed Average: 1.3 km/h on Jul 27	Hours of Data: 741
Maximum Diurnal Speed Average: 3.8 km/h at hour 17	Minimum Diurnal Speed Average: 1.1 km/h at hour 21	Hours of Missing Data: 3
Monthly Average Velocity: 1.9 km/h 273.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 11 P ₉₀ = 16 P ₉₉ = 24	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-Jul	N7	N6	N7	N4	NW4	NNW5	NNW4	NNW4	NW2	N4	N2	N5	WSW1	ESE3	NNW3	E4	ENE3	NW7	W3	E3	ENE5	ENE3	ESE2	E3	N2.5	N7
2-Jul	ENE3	NNE3	NE3	NE2	NNE3	NNE3	E2	ESE6	E7	E8	ESE8	SE8	ESE7	SE6	SE9	ESE9	ESE11	SE13	SE11	SE9	SE8	SE8	SE9	SE9	ESE6.2	SE13
3-Jul	ESE8	ESE8	ESE7	ESE8	ESE9	E10	E12	E10	ESE12	ESE14	SE5	NE8	E13	ESE17	SSE20	SSW12	S9	SSW9	SSW7	S6	S6	WSW9	W20	SSW12	SE6.1	W20
4-Jul	W8	W13	NW10	NW12	WNW11	WNW13	W15	W19	W17	W20	W19	W18	W17	W15	WSW11	WSW16	WSW14	WSW14	W15	WNW11	WNW10	WNW6	ESE2	W13.1	W20	
5-Jul	NNW3	NW2	SSW2	WSW3	SSE2	S6	SSE10	SSE9	S8	SSW10	SSW8	WSW12	W15	W13	W13	W12	W14	W14	W16	W13	W12	W8	W6	W8	WSW7.2	W16
6-Jul	W7	W7	W7	WSW5	WSW4	W8	W16	W17	W18	WNW23	WNW22	WNW22	WNW20	W22	WNW23	WNW20	W27	NW23	NNW17	WNW13	WNW13	NW14	NW13	NW15	WNW14.8	W27
7-Jul	WNW12	WNW10	NW13	NW15	NW15	NW18	NW16	NW14	NW14	NW16	NW20	WNW19	WNW20	NW19	WNW19	WNW20	NW15	NNW10	NW13	N6	N6	N5	N4	NNE4	NW12.9	WNW20
8-Jul	NE2	E0	ENE1	E2	E2	ESE2	SE5	SE7	SSE6	SE7	SSE8	SSW6	S2	E5	E6	SE5	SSW9	SSW9	S7	SSW8	SSE4	SSE5	S4	SSE5	SSE3.9	SSW9
9-Jul	SSE4	SSE3	S3	S3	SSE4	SSE5	SSW6	S6	WSW5	W10	NNW1	ESE3	NNW4	NNW8	NW12	NNW0	SSE7	WNW4	SSE4	SSE6	SE6	SW4	W13	W14	SW2.3	W14
10-Jul	W12	WNW17	WNW18	W13	W14	W13	W9	WSW6	WSW7	WSW10	WSW11	W21	W12	W16	W22	W22	WNW23	WNW22	NW29	NW28	NW30	WNW21	WNW20	W21	WNW16.3	NW30
11-Jul	WNW20	WNW20	WNW18	WNW17	W14	W11	W12	W11	W13	WNW17	WNW17	W17	W18	WNW14	NNW13	NW9	W15	W13	W12	WNW11	SW2	WSW1	WSW3	NNW7	WNW12.2	WNW20
12-Jul	NNW5	NNW5	NNW7	NNW7	NNW7	NNW8	NNW6	NNW6	N6	NNW6	NNW11	NNW9	NNW10	NNW13	NNW15	NNW17	NW16	N10	N8	NE4	NE6	ENE5	NNE2	NE2	NNW7.4	NNW17
13-Jul	NE4	NE5	ENE7	ENE8	E9	E8	E8	ESE11	ESE11	ESE10	SE5	ESE7	E7	SE9	E4	E7	ESE8	ESE10	ESE9	E7	E8	E7	E8	ESE9	E7.4	ESE11
14-Jul	ESE8	ESE8	ESE7	SE7	SE6	SE5	SSE5	S7	SSW9	SSW8	S9	S10	S10	S10	SSW9	SSW9	S8	S8	S8	SSW8	S4	SSE4	SSE5	SSE4	S6.5	S10
15-Jul	SSE3	SSE4	SSE4	SE4	SE5	SSE5	S5	SE7	SSE9	SSE9	S8	SSW8	SSW8	SSW8	SSW9	SSW8	S9	SSW7	S6	SSE5	S4	S5	SSW5	S5.9	S9	
16-Jul	S4	S5	S3	SSW3	SSW2	WSW4	W6	W5	NW8	NW4	N7	NNE7	NW14	NW20	NNW30	NNW26	NNW11	NNW12	NW16	NW9	NW11	W6	W8	WNW10	NW7.5	NNW30
17-Jul	WNW8	WNW7	WSW4	WNW5	NW4	NNW10	NNW8	ENE4	ESE6	ESE7	E6	E6	ESE4	ESE6	SE6	NNW17	WNW12	SSE5	SSW1	WNW9	WNW14	WNW17	WNW15	WNW12	NW3.6	NNW17
18-Jul	WSW8	WNW11	WNW13	WNW13	WNW11	WNW9	W9	NNW7	NW7	NNW4	WSW5	W7	WNW7	W5	SSW12	SSW10	SSW7	SSW8	S7	S7	S6	SSE6	SSE5	WSW5	WSW5.0	WNW13
19-Jul	SSE3	ESE4	SE2	SE7	SE7	SSE4	S4	SSW5	WSW7	WSW9	WSW10	WSW9	SW12	W27	W26	W25	W25	WNW21	WNW21	WNW17	WNW14	NW17	NW18	NW13	W9.6	W27
20-Jul	NW13	NW13	NW13	NW13	NW11	NW13	WNW12	W12	W14	W13	W15	NW14	WNW14	WNW19	WNW19	WNW16	NW17	WNW15	W10	WSW5	W6	W5	W6	WSW4	WNW11.4	WNW19
21-Jul	W3	W5	WNW3	NW3	NNW3	NNW4	NNW6	WNW5	NNW5	W2	WNW4	NNW6	NNE4	WNW2	N6	NNW7	NNW6	NE5	E7	ENE6	ENE4	NNE2	NNE3	NNE3	N2.8	E7
22-Jul	NNE3	N5	N3	AF	N3	NNW3	N3	NW1	ESE2	SE5	SSE8	SSE7	SE9	SE10	SE10	SSE9	SE8	SSE9	SSE8	SE8	SE8	SE8	SE8	SE8	SE4.7	SE10
23-Jul	SE8	ESE7	ESE8	E8	E10	E12	E11	E10	E11	E11	ESE12	E10	E13	E13	ESE10	SSE9	SSE11	SSE11	SE5	SSE8	SE5	SSE14	SE12	SE10	ESE9.0	SSE14
24-Jul	SE9	ESE8	ESE7	E7	E9	SE7	ESE5	E7	ESE8	ESE11	ESE13	SE14	ESE11	ESE11	E11	ESE13	ESE12	SE9	SSE8	SE8	ESE5	SSW4	W2	NNE4	ESE7.8	SE14
25-Jul	ENE2	N5	N8	N10	N10	NNE13	NE11	ENE13	ESE14	ESE11	E13	ENE9	ENE10	E10	NE8	NE9	NNE11	NNE7	NE5	NE3	NNE4	NNE5	NNE6	N7	NE6.7	ESE14
26-Jul	N6	N6	N6	NW4	NNW4	WNW4	NW5	NW3	WNW1	ESE6	S7	SSE6	NNW6	NW13	NNW7	NNW7	S3	WSW7	W4	E3	ENE5	N4	NW5	NNW2	NNW2.4	NW13
27-Jul	NW2	WNW5	NW6	NW4	W5	WSW5	W4	WSW3	W5	WSW4	SSE3	SSW5	SSE3	ESE5	ESE8	ESE16	WSW4	SSE4	SE3	SE6	SE6	ESE3	ESE3	NW2	S1.3	ESE16
28-Jul	NE1	AF	ESE1	SE2	SE2	S1	SSE2	S3	SW2	SSE5	SE7	SSE7	SW3	SSW6	WSW5	E3	ESE4	SE7	S6	S4	SSE1	W3	ESE4	ESE3	SSE2.6	SSE7
29-Jul	SE1	SE1	NE1	AF	S1	ENE2	ESE4	SE5	SE8	SE10	SE11	SE11	SSE13	SSE12	SSE11	S8	S6	S6	S5	ENE10	E12	ESE11	SE10	SE5	SE6.1	SSE13
30-Jul	ESE5	ESE4	ENE3	E4	NE2	NE2	E1	SE5	SE5	SE9	ESE13	SE12	SSE9	SE9	SE9	SE8	SSE7	SE9	SE6	ESE4	SSE2	ESE3	SW1	NE10	SE5.0	ESE13
31-Jul	ESE10	ESE10	NE2	ESE3	NNE2	SSE2	WSW1	SW2	SSW3	W6	W6	WNW7	WNW5	NNW8	NW12	E11	E7	WNW7	NNW23	N15	N9	N4	NE1	NNW7	N2.8	NNW23

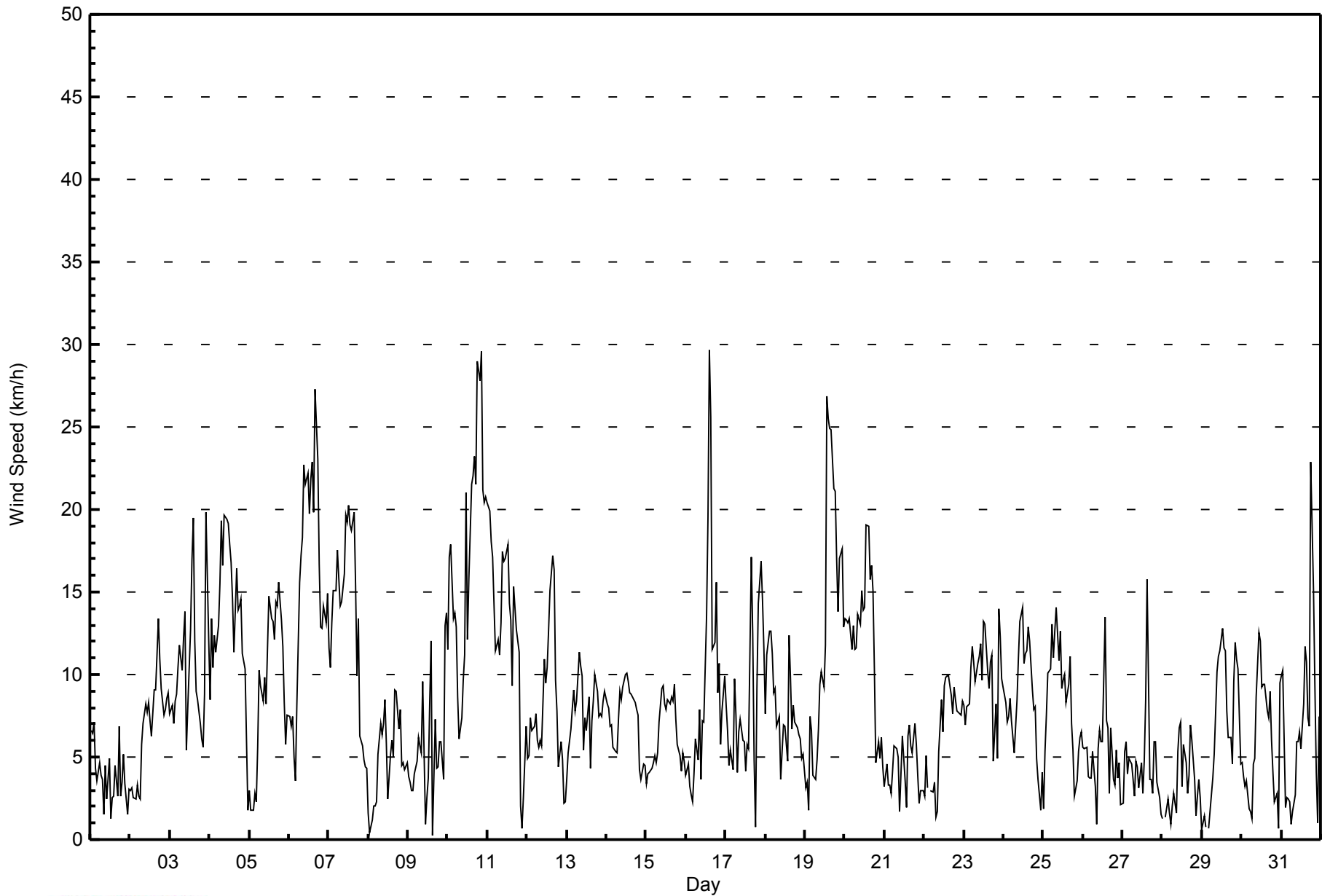
WNW1.2	NW2.0	NW2.5	NW2.2	NNW1.6	NW1.8	W1.6	SW1.2	SW1.7	SW1.9	SW1.9	WSW2.3	W2.3	W2.9	W3.7	WNW2.8	W3.8	WSW3.2	W3.1	W1.5	WNW1.1	W1.4	W2.2	WNW1.7	Diurnal Average	
WNW2.0	WNW2.0	WNW18	WNW17	NW15	NW18	NW16	W19	W18	WNW23	WNW22	WNW22	WNW20	W27	NNW30	NNW26	W27	NW23	NW29	NW28	NW30	WNW21	WNW20	W21	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

Wind Speed (WS) - km/h
Statoil - Leismer - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Statoil - Leismer - July 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	248	33.47	33.47
6 - 11	312	42.11	75.57
12 - 19	143	19.30	94.87
20 - 28	35	4.72	99.60
29 - 38	3	0.40	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 741

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Wind Speed (WS) - km/h
Statoil - Leismer - July 2014

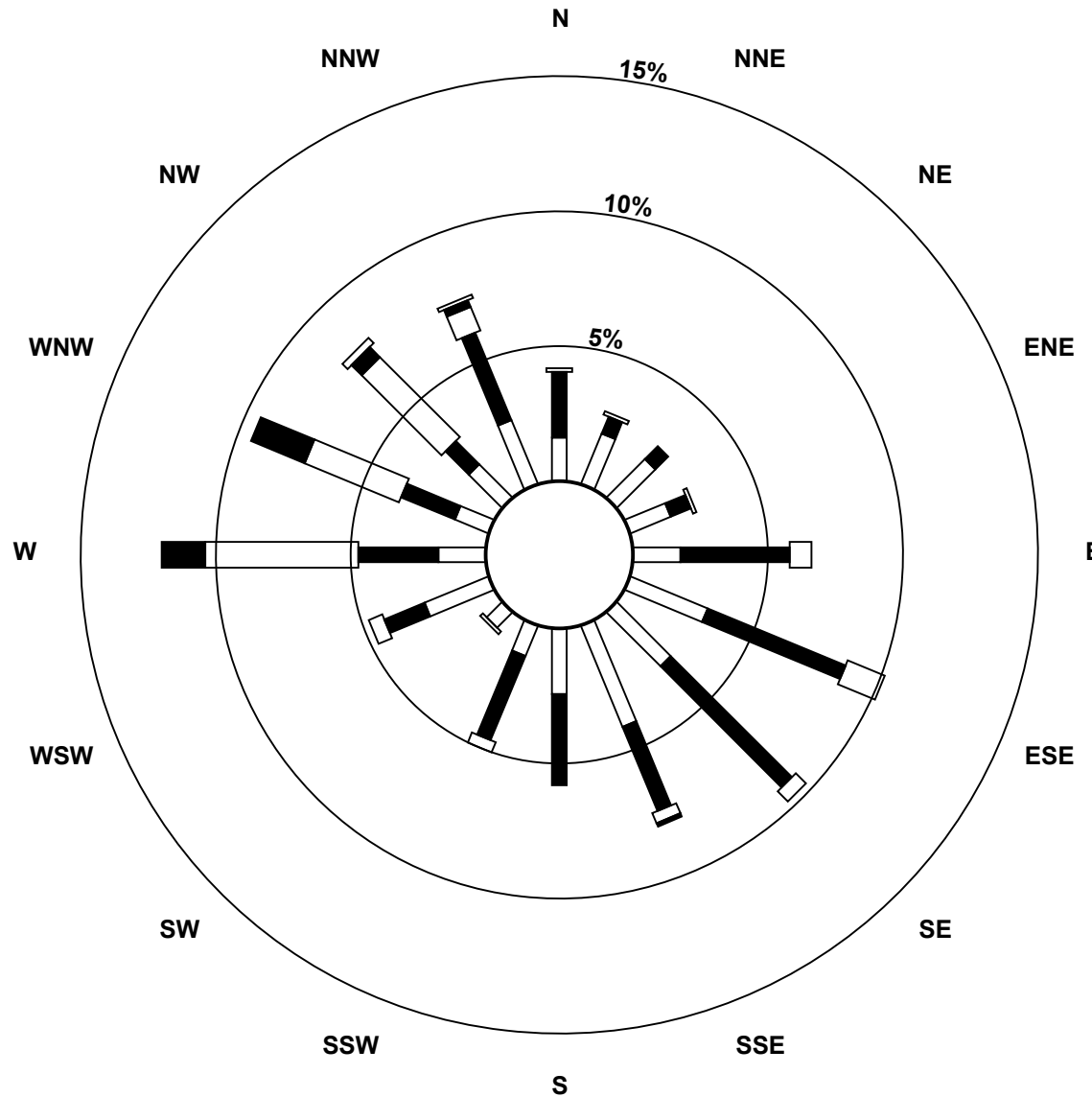
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	12	15	15	12	13	23	21	30	18	9	6	19	13	10	13	19	248
6 - 11	18	5	5	6	30	41	47	25	25	25	0	12	22	16	9	26	312
12 - 19	1	1	0	1	6	11	4	3	0	3	1	4	42	28	31	7	143
20 - 28	0	0	0	0	0	0	0	1	0	0	0	0	12	16	4	2	35
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	31	21	20	19	49	75	72	59	43	37	7	35	89	70	59	55	741

Total Number of Valid Hours: 741

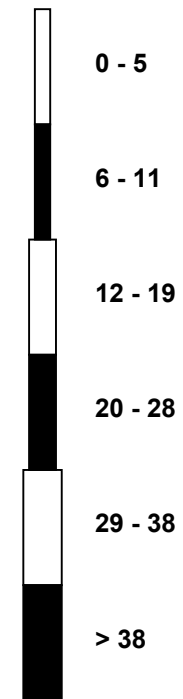
Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

Wind Speed (WS) - km/h
 Statoil - Leismer (AMS501)



Classes (km/h)



Total Number of Valid Hours: 741



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Statoil - Leismer - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 13 km/h on Jul 3 23:00	Hours of Data: 741
Minimum Value: 1 km/h on Jul 29 07:00	Hours of Missing Data: 3
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 8	Hours of Calibration: 0
	Percent Operational Time: 99.6

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

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Statoil - Leismer - July 2014

Direction of Maximum Speed: 330 deg on Jul 16 15:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 283.0 deg on Jul 10	Hours of Data: 741
Direction of Minimum Speed: 348 deg on Jul 9 16:00	Hours of Missing Data: 3
Direction of Minimum Daily Speed Average: 1.3 deg on Jul 27	Percent Operational Time: 99.6
Monthly Average Direction: 278.3 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-Jul	360	354	351	6	320	332	329	336	326	349	7	354	254	121	343	83	59	310	268	90	70	76	116	91	3.5
2-Jul	68	33	34	36	32	26	96	104	101	99	113	128	107	127	125	103	123	132	135	136	139	130	125	125	115.0
3-Jul	120	118	108	109	103	92	97	96	111	118	144	47	87	118	155	194	190	194	196	187	185	242	277	208	139.7
4-Jul	280	279	307	306	287	294	278	276	267	274	268	272	269	268	263	249	255	252	255	270	286	288	290	108	273.5
5-Jul	341	317	195	240	166	175	164	168	179	200	211	256	274	265	259	266	270	261	262	262	268	268	268	268	248.2
6-Jul	268	265	264	257	253	262	265	266	273	286	293	286	288	278	290	293	277	307	332	302	287	317	321	324	288.7
7-Jul	303	287	320	319	317	311	312	312	309	312	308	301	303	308	297	291	325	340	309	354	351	5	5	16	312.5
8-Jul	43	83	57	81	83	121	145	142	160	144	158	193	188	80	89	144	198	193	190	200	168	163	170	168	159.5
9-Jul	165	154	175	184	158	165	197	191	257	278	347	119	333	345	307	348	150	298	157	152	146	216	276	280	234.7
10-Jul	273	282	284	277	278	269	261	257	244	244	243	263	262	262	268	281	303	295	304	306	317	295	287	279	283.0
11-Jul	286	292	291	291	277	281	263	260	269	282	299	268	274	286	328	316	275	260	273	288	236	254	257	338	283.4
12-Jul	345	341	344	341	339	343	345	332	360	345	345	334	343	336	337	337	325	3	3	43	51	70	12	48	347.1
13-Jul	53	53	57	70	81	88	99	103	114	117	124	103	87	133	91	97	109	116	111	91	84	92	99	106	97.8
14-Jul	118	115	114	128	139	139	167	191	192	193	181	177	177	181	202	207	191	175	188	193	174	165	155	157	171.3
15-Jul	166	159	157	142	137	132	150	173	146	151	155	182	192	203	201	201	193	190	192	176	165	173	183	193	174.5
16-Jul	180	188	185	205	193	254	265	267	325	322	10	13	324	325	330	340	344	328	313	311	317	281	273	282	316.9
17-Jul	284	286	247	291	316	342	346	71	112	111	94	94	113	110	124	329	291	162	208	290	290	290	300	299	307.5
18-Jul	258	285	300	290	294	282	278	333	313	332	257	267	282	272	211	202	195	194	173	170	173	155	164	238	253.9
19-Jul	163	117	133	135	143	152	183	213	240	250	245	238	232	265	270	280	274	299	287	287	287	316	324	313	273.5
20-Jul	314	320	325	320	319	315	291	273	272	269	277	308	284	291	301	298	315	288	261	251	270	273	280	256	294.7
21-Jul	272	274	294	312	339	345	331	294	330	272	301	346	22	290	350	347	340	56	83	74	69	30	30	24	348.9
22-Jul	22	11	10	AF	358	333	354	326	105	132	149	164	135	142	131	131	148	139	152	155	145	143	133	130	134.3
23-Jul	128	118	107	98	100	93	95	97	98	101	104	94	98	101	111	165	163	161	139	159	146	152	141	137	119.4
24-Jul	132	113	106	83	100	124	112	92	113	115	123	126	110	119	98	106	118	128	150	134	117	208	275	33	115.7
25-Jul	74	11	354	351	8	26	38	77	116	104	92	78	76	91	55	39	26	21	34	37	23	19	15	9	48.5
26-Jul	356	0	5	310	342	287	312	305	285	107	171	149	330	325	342	344	188	257	260	90	69	359	314	337	332.4
27-Jul	324	292	308	305	274	256	270	244	259	254	160	198	159	105	122	117	250	154	137	125	124	121	120	312	176.3
28-Jul	45	AF	119	133	134	178	150	179	234	155	144	158	232	204	243	94	112	142	186	169	158	267	123	103	161.5
29-Jul	127	135	48	AF	190	63	117	124	141	146	146	146	150	158	165	185	188	173	174	77	93	102	139	141	140.6
30-Jul	112	109	76	86	55	56	100	128	132	129	118	133	157	140	135	136	152	144	140	115	160	123	214	34	125.5
31-Jul	112	121	56	119	28	158	240	215	203	259	266	288	298	332	324	90	95	282	348	6	356	356	34	347	354.5

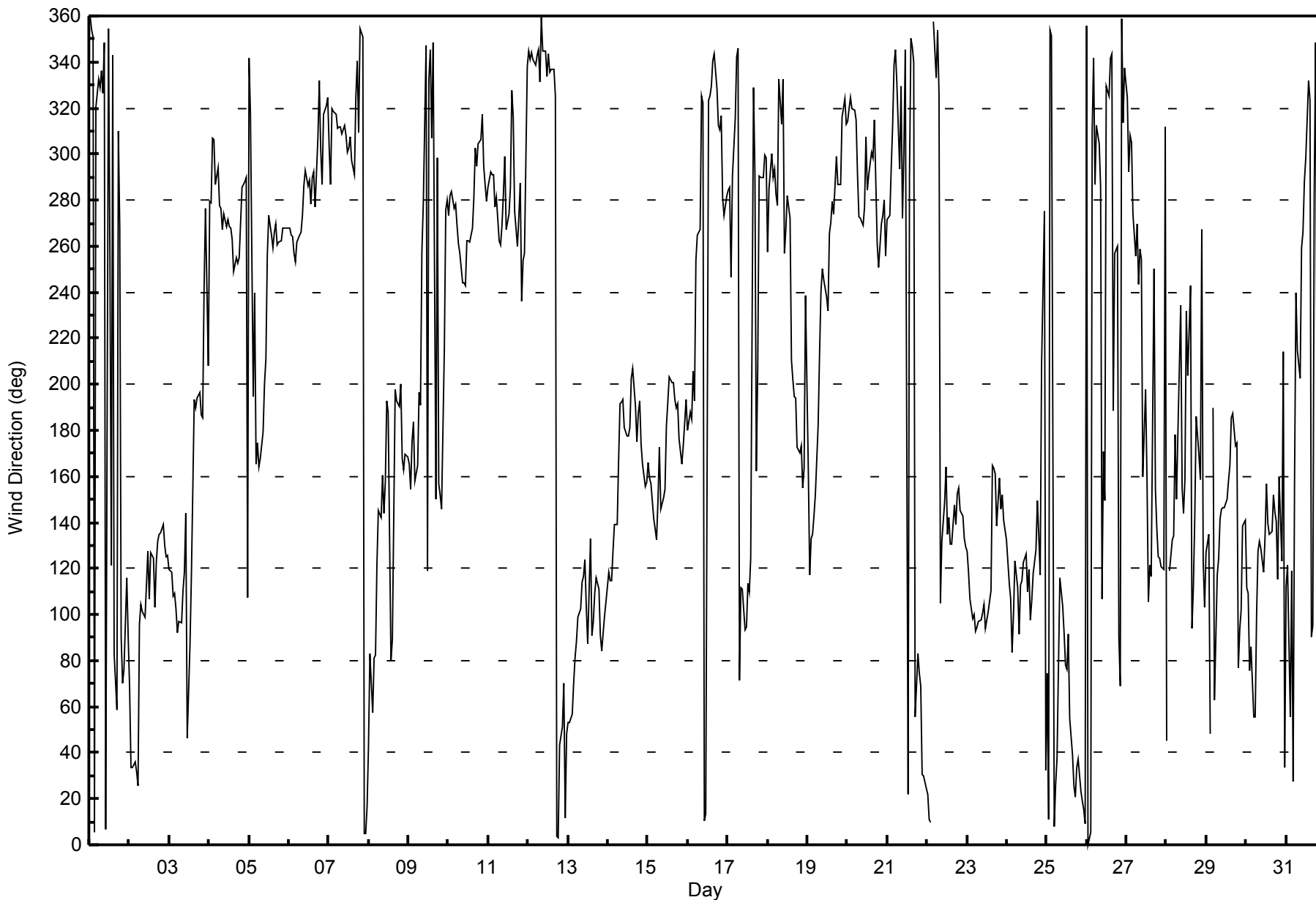
293.1 303.8 323.1 320.7 326.8 317.6 278.8 233.1 218.0 214.7 213.9 243.5 264.1 267.4 280.4 286.7 263.4 252.3 268.5 261.2 296.6 277.5 280.1 297.7
 Diurnal Average

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



WBEA NETWORK
Hourly Averages

Wind Direction (WD) - deg
Statoil - Leismer - July 2014





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Statoil - Leismer - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Jul 26 09:00 Minimum Value: 6 deg on Jul 22 23:00 Percentiles: P ₁ = 9 P ₁₀ = 12 Q ₁ = 17 Median = 23 Q ₃ = 37 P ₉₀ = 59 P ₉₉ = 94		Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6																							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	17	12	13	48	17	22	15	28	83	68	94	57	96	71	94	40	76	53	56	62	24	41	54	27	96
2-Jul	45	38	27	54	29	32	61	20	25	30	35	37	43	63	44	34	25	18	13	10	8	9	12	13	63
3-Jul	14	16	17	16	15	15	15	18	20	22	69	23	25	24	20	22	23	23	20	20	18	50	38	28	69
4-Jul	37	13	18	14	15	16	10	12	18	15	15	17	22	22	25	32	26	30	28	18	16	16	68	61	68
5-Jul	18	69	59	45	59	15	15	22	28	26	32	31	22	25	23	27	21	24	21	22	11	10	14	14	69
6-Jul	15	20	17	57	42	16	14	14	15	17	18	20	20	16	27	21	18	34	12	16	22	19	21	10	57
7-Jul	19	23	11	10	10	10	11	14	17	17	16	20	19	19	21	20	24	16	29	52	17	20	16	35	52
8-Jul	85	79	77	65	35	55	11	11	25	33	35	48	86	28	25	59	34	26	22	20	12	13	12	15	86
9-Jul	18	23	24	31	10	18	20	25	69	32	91	71	67	36	52	95	33	52	46	12	12	39	10	11	95
10-Jul	8	11	13	13	12	10	18	28	44	35	36	17	18	24	16	17	17	17	12	12	12	15	14	12	44
11-Jul	13	14	15	14	11	24	15	17	17	19	19	20	18	25	17	28	20	19	12	24	66	82	32	26	82
12-Jul	20	20	10	9	11	12	21	18	36	51	20	41	27	26	18	20	18	23	19	28	21	14	54	43	54
13-Jul	15	23	23	22	17	20	17	18	24	27	59	41	54	51	70	40	26	23	22	17	17	15	13	16	70
14-Jul	14	14	14	11	13	11	20	24	25	31	34	31	31	34	36	31	30	30	26	18	13	8	11	18	36
15-Jul	18	10	11	14	11	12	22	22	23	17	22	35	40	35	32	28	21	19	22	16	10	11	17	20	40
16-Jul	13	14	33	37	40	34	17	23	20	39	32	40	16	13	14	15	19	18	12	18	11	38	20	13	40
17-Jul	21	19	30	21	21	12	22	42	25	28	46	42	63	64	50	32	37	65	92	20	19	19	24	20	92
18-Jul	22	20	16	18	18	19	17	20	31	66	67	55	61	73	30	30	38	28	18	17	20	13	17	37	73
19-Jul	31	53	78	9	10	24	26	38	39	29	35	39	36	17	15	14	17	16	16	15	18	10	11	10	78
20-Jul	10	8	9	9	10	11	27	20	17	23	17	24	20	23	19	19	17	26	17	31	13	13	12	38	38
21-Jul	27	16	30	35	33	18	11	24	22	80	70	67	75	98	54	44	43	52	17	14	79	37	34	26	98
22-Jul	36	17	23	AF	22	12	19	63	62	52	29	44	34	38	30	27	18	30	24	10	7	7	6	9	63
23-Jul	10	13	17	17	16	17	21	20	18	19	18	22	20	26	26	35	30	15	44	27	37	13	10	12	44
24-Jul	13	18	15	18	17	18	21	17	24	22	22	20	21	25	26	23	23	16	20	18	27	45	96	30	96
25-Jul	65	33	20	16	25	26	29	28	21	26	28	38	36	32	41	37	28	33	30	26	16	9	9	9	65
26-Jul	17	16	43	39	16	37	25	40	101	46	28	38	73	20	24	38	65	15	64	37	36	71	33	70	101
27-Jul	48	22	26	31	13	32	25	42	26	52	82	56	64	31	23	22	78	34	58	16	25	31	48	38	82
28-Jul	51	AF	78	35	43	71	48	62	93	37	35	42	84	49	68	76	58	39	37	39	44	25	41	27	93
29-Jul	92	30	67	AF	79	49	15	20	18	18	20	25	30	31	42	38	30	25	28	20	16	16	14	21	92
30-Jul	16	23	24	20	48	24	44	26	37	22	21	23	31	39	31	39	37	21	30	23	57	44	62	37	62
31-Jul	21	16	79	65	32	52	94	78	57	15	38	32	48	37	40	20	20	71	19	20	18	29	86	19	94
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 27, 2014	Previous Calibration	NA
Station Name	Statoil	Station Number	AMS 103
Reason:	Install		
Start Time (MST)	9:25	End Time (MST)	14:50
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	NA	14
Analyzer Range (mv)	1000	1000	Lamp voltage	NA	3058
Calculated slope	NA	1.000614	Chamber temp.	NA	50.0
Calculated intercept	NA	-3.466221	Pressure ("Hg)	NA	24.8
Analyzer Background	NA	14.4	Flow (ccpm)	NA	621
Analyzer Coefficient	NA	1.115	Intensity	NA	75

Analyzer make	API T100	Analyzer serial #	720
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
calibrator zero	6000	0.0	0.0	0.1	NA
high point	6000	95.4	785.5	785.9	0.999
second point	6000	47.7	392.7	400.0	0.982
third point	6000	23.9	196.8	202.0	0.974
calibrator zero	6000	0.0	0.0	0.1	NA
as left zero	5000	0.0	0.0	-0.4	NA
as left span	5000	79.5	785.5	800.0	0.982
Average Correction Factor					0.985

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

Call passed. Some instability caused by high station temperature due to failed HVAC unit.

Calibration Performed By: Zack Eastman



Wood Buffalo Environmental Association

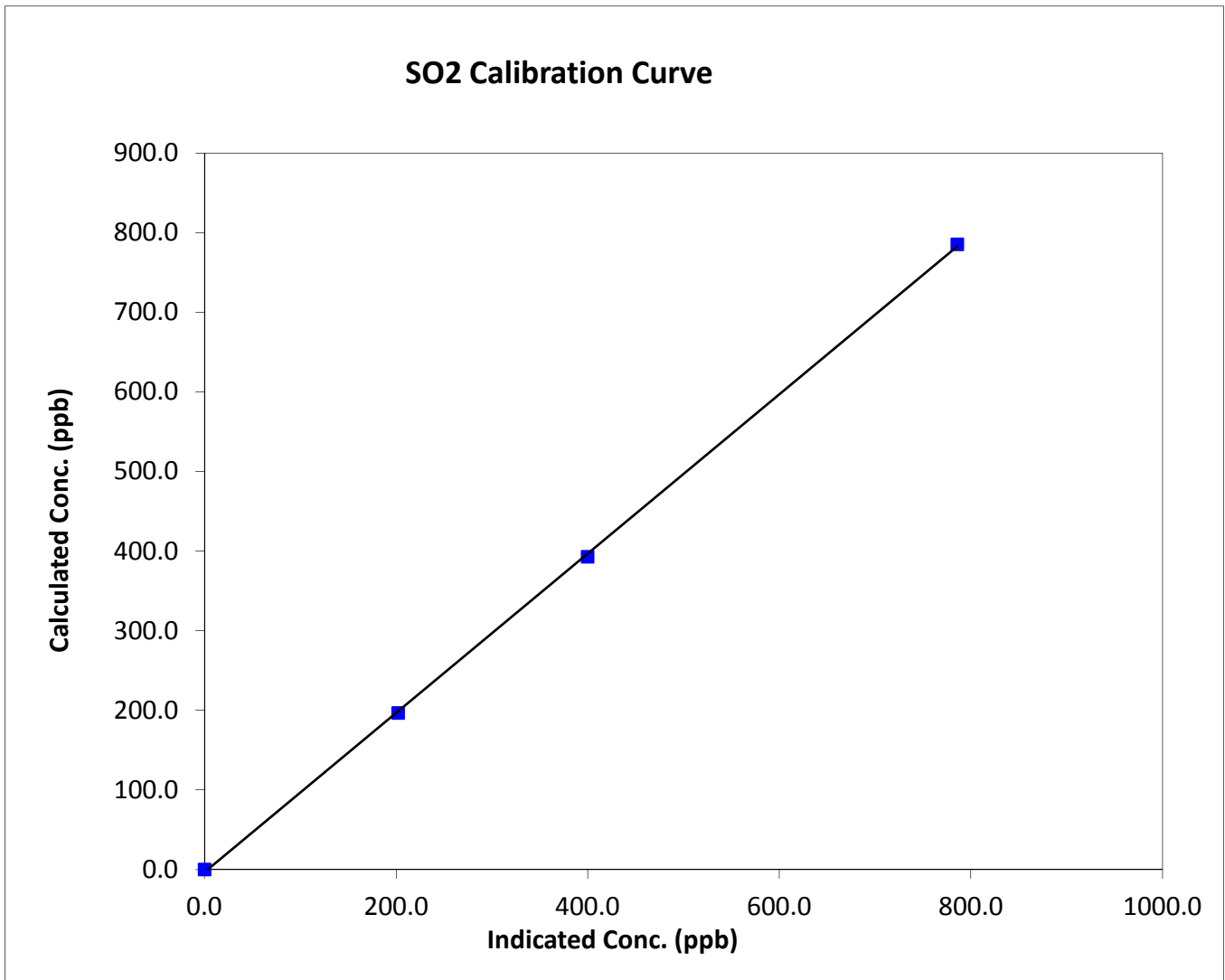
SO₂ Calibration Summary

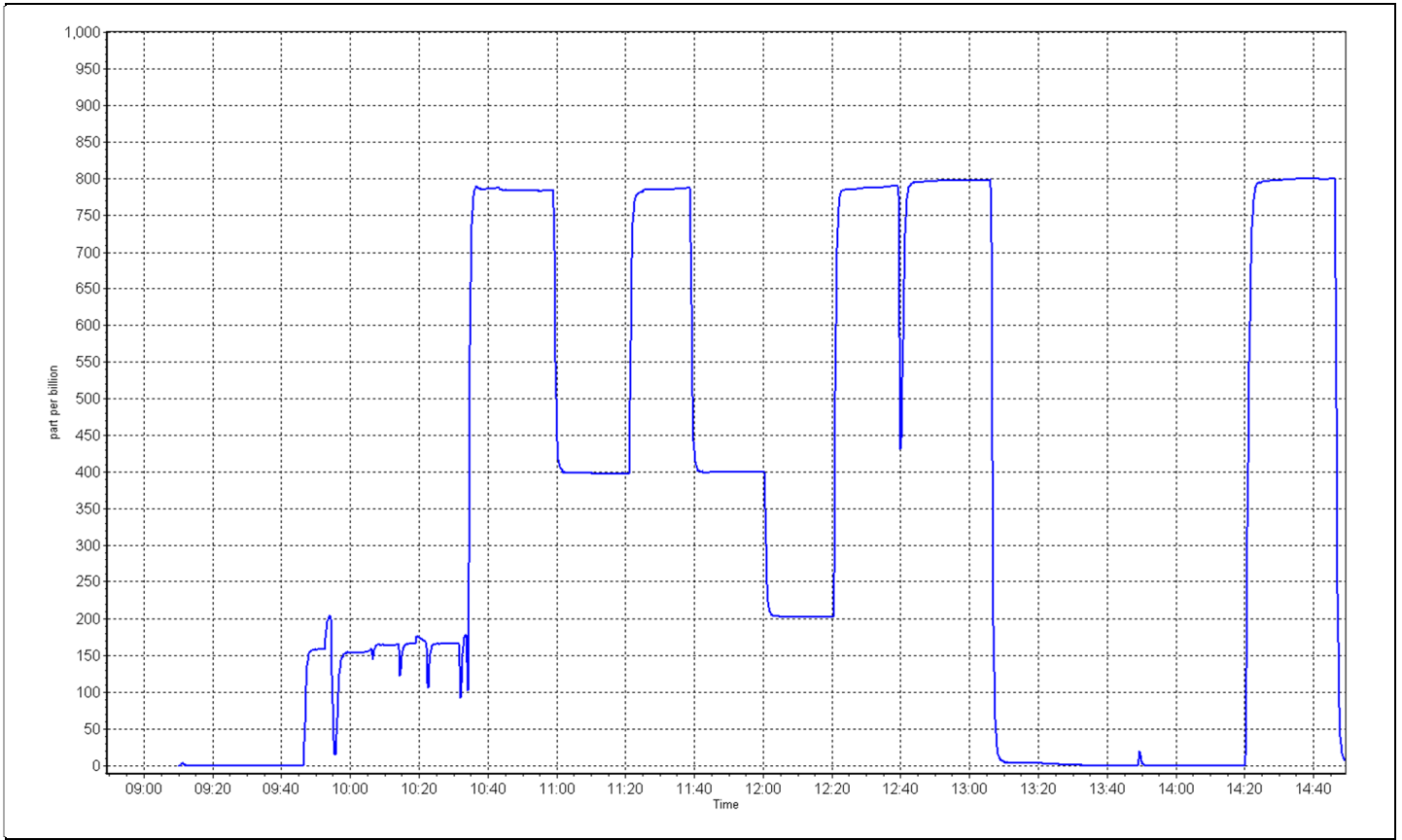
Station Information

Calibration Date	June 27, 2014	Previous Calibration	NA
Station Name	Statoil	Station Number	AMS 103
Start Time (MST)	9:25	End Time (MST)	14:50
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	0.1	N/A	Correlation Coefficient	0.999888
785.5	785.9	0.9994		
392.7	400.0	0.9818	Slope	1.000614
196.8	202.0	0.9741		
			Intercept	-3.466221







Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	June 18, 2014	Previous Calibration	NA
Station Name	Statoil	Station Number	AMS 103
Reason:	Install		
Start Time (MST)	7:10	End Time (MST)	10:10
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	NA	19.6
Analyzer Range (mv)	100	100	Lamp voltage	NA	2308
Calculated slope	NA	0.991499	Chamber temp.	NA	50
Calculated intercept	NA	-0.270855	Pressure	NA	23.2
Analyzer Background	NA	17.9	Flow	NA	552
Analyzer Coefficient	NA	0.986	Intensity	NA	59
			Converter temp.	NA	314

Analyzer make/model	API T101	Analyzer serial #	157
Converter make/model	Internal	Converter serial #	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
SO2 scrubber check	6000	24.3	200.1	4.6	NA
calibrator zero	6000	0.0	0.0	0.0	NA
high point	6000	44.1	75.0	75.7	0.990
second point	6000	23.5	40.0	40.8	0.979
third point	6000	11.8	20.1	20.7	0.968
calibrator zero	5000	0.0	0.0		NA
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	36.8	75.1	76.2	0.985
Average Correction Factor					0.979

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

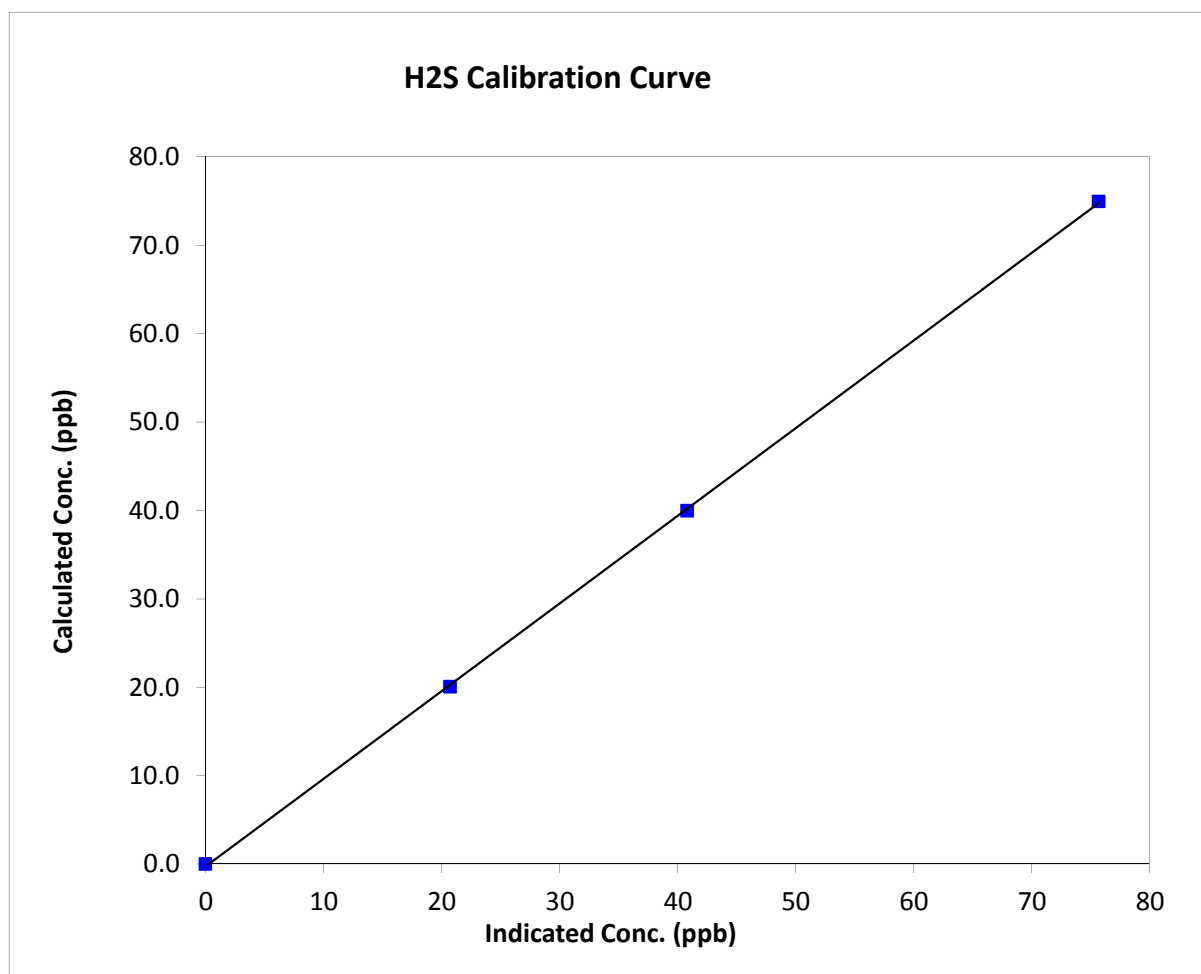
H2S Calibration Summary

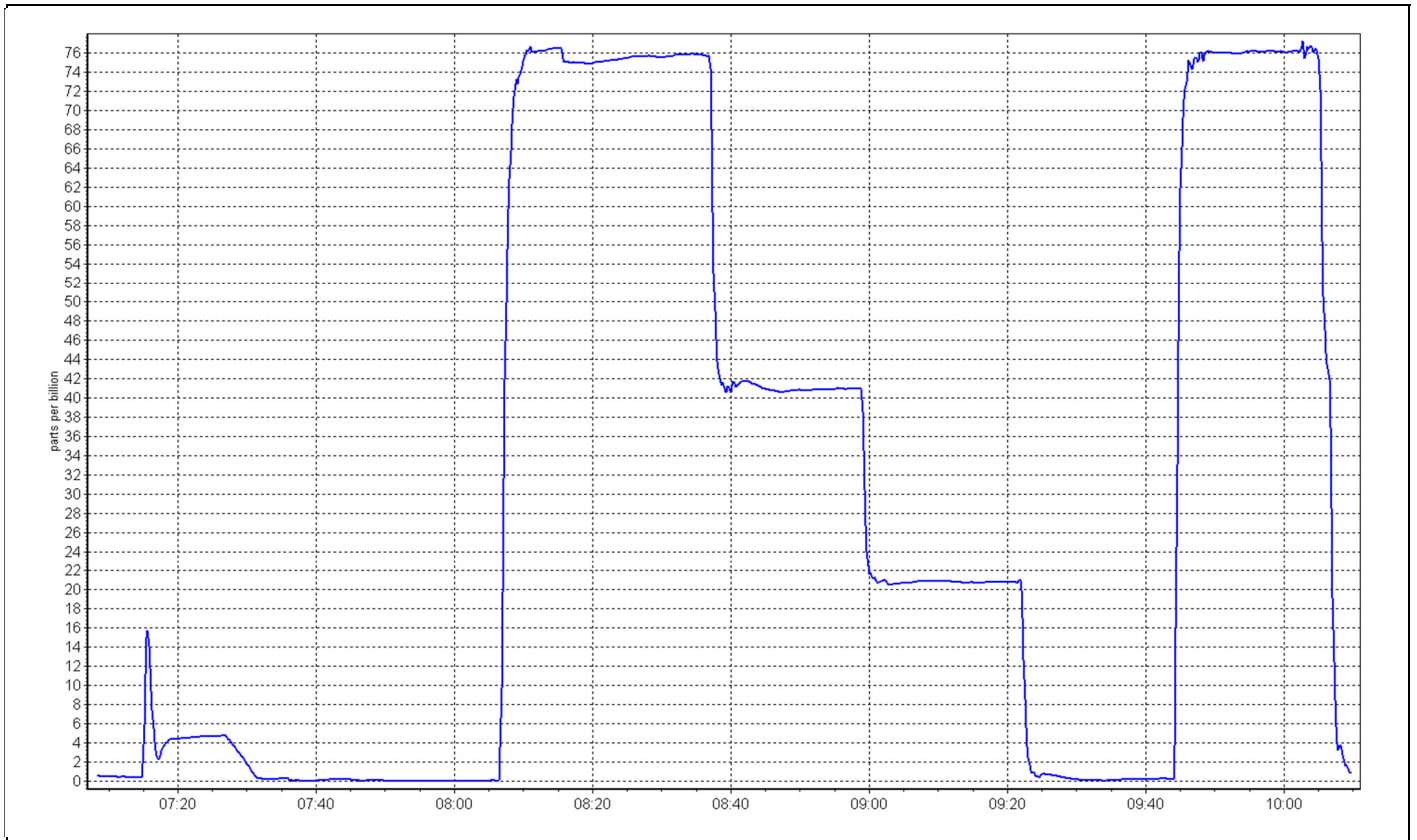
Station Information

Calibration Date	June 18, 2014	Previous Calibration	
Station Name	Statoil	Station Number	AMS 103
Start Time (MST)	7:10	End Time (MST)	10:10
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	0.0	N/A	Correlation Coefficient	0.999928
75.0	75.7	0.9905		
40.0	40.8	0.9787	Slope	0.991499
20.1	20.7	0.9681		
			Intercept	-0.270855







Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	June 27, 2014	Previous Calibration	NA
Station Name	Statoil	Station Number	AMS 103
Reason:	Install		
Start Time (MST)	11:30	End Time (MST)	14:50
Barometric Pressure	mmHg	Station Temperature	24.0 Deg C
Calibrator	API T700	Serial Number	451
NO Cal Gas Conc	50.3 ppm	Cal Gas Expiry Date	October 6, 2016
NOx Cal Gas Conc	50.3 ppm	Cal Gas Serial #	EY0000359

DACs Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8203
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	NA	NA	NA
	Data Offset	NA	NA	NA
After	Data Slope	0.991718	0.995710	0.994228
	Data Offset	-1.498582	-0.960900	-1.746006
Channel #				
Voltage Range		0 - 5V	0 - 5V	0 - 5V

Analyzer Information

Analyzer make/model	Teledyne T200	Analyzer serial #	722
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.986	ppb	0.981	ppb
NOX coefficient	0.981	ppb	0.975	ppb
		ppb		ppb
NO bkgrnd	-0.5	mv	0.8	mv
NOX bkgrnd	1.3	mv	5.7	mv
Nt coefficient	N/A		NA	
Chamber Temp	31.1	Deg C	31.1	Deg C
Moly Temp	316.0	Deg C	316.0	Deg C
PMT Temp	6.8	Deg C	6.8	Deg C
O3 flow	83.0	ccm	83.0	ccm
R Cell Press	4.7	"Hg	4.7	"Hg
Sample Flow	451	ccm	451	ccm

Notes:

Molly converter changed. Call passed. Some instability in the GPT related to new converter and high station temps due to failed HVAC unit.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

June 27, 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
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.7	-0.6	0.1	N/A	N/A
high point	6000	95.5	800.6	800.6	0.0	806.4	802.7	-3.7	0.993	0.997
second point	6000	47.8	400.7	400.7	0.0	409.0	407.0	-2.0	0.980	0.985
third point	6000	24.0	201.2	201.2	0.0	207.0	205.0	-2.0	0.972	0.981
calibrator zero	6000	0.0	0.0	0.0	0.0	0.1	-0.7	-0.6	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	0.9	1.0	-0.1	N/A	N/A
as left span	5000	79.5	799.8	424.0	375.8	817.0	491.0	326.0	0.9789	0.8635
Average Correction Factor									0.9815	0.9878

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

6000

ccm

Source Gas Flow

95.50

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 (400)	N/A	424.0	386.0	813.0	424.0	389.0	0.969	1.000	0.992	100.8%
2nd NO ₂ (200)	N/A	592.0	218.0	814.0	592.0	222.0	0.968	1.000	0.982	101.8%
3rd NO ₂ (100)	N/A	712.0	98.0	814.0	712.0	102.0	0.968	1.000	0.961	104.1%
4th NO ₂ (0)	810.0	N/A	-7.0	803.0	810.0	-0.1	0.981	1.000	N/A	N/A
Average Correction Factor							0.972	1.000	0.978	102.2%

Calibration Performed By:

Zack Eastman



Wood Buffalo Environmental Association

NO_x Calibration Summary

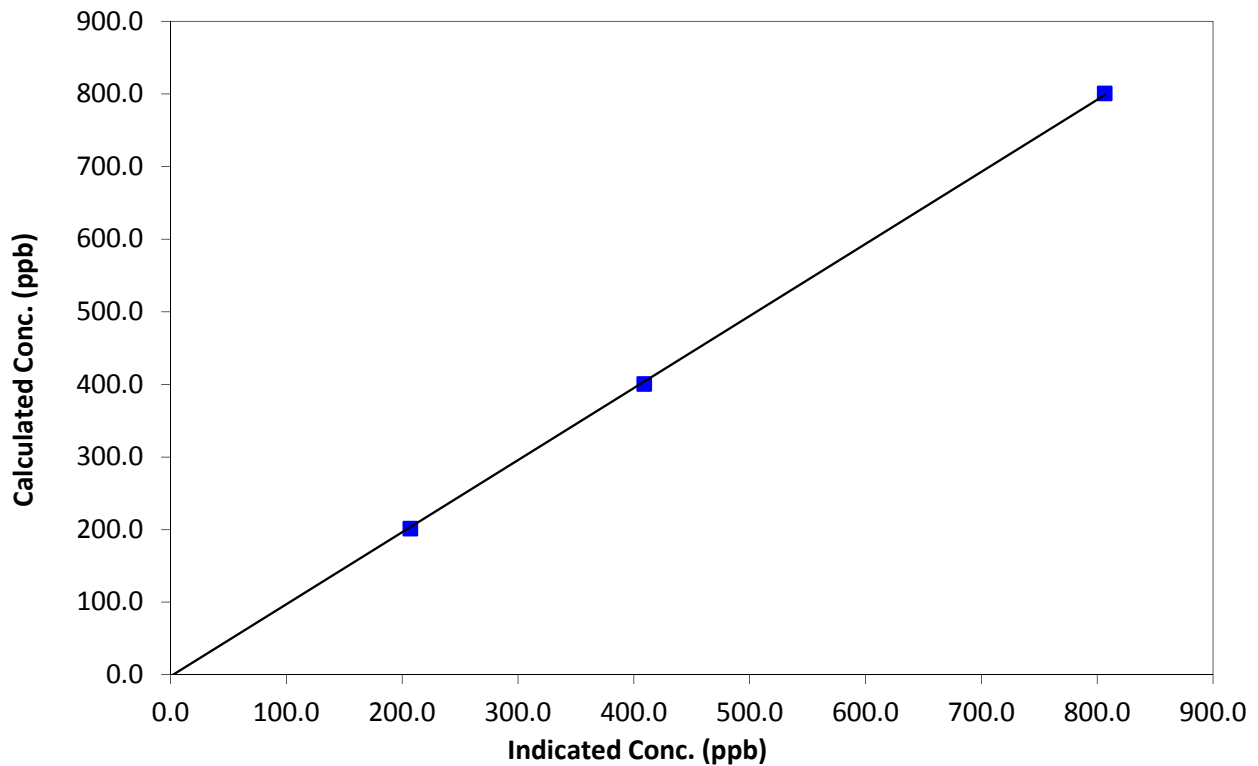
Station Information

Calibration Date	June 27, 2014	Previous Calibration	NA
Station Name	Statoil	Station Number	AMS 103
Start Time (MST)	11:30	End Time (MST)	14:50
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	-0.7	N/A	Correlation Coefficient	0.999932
800.6	806.4	0.9928		
400.7	409.0	0.9798	Slope	0.991718
201.2	207.0	0.9720		
0.0	0.1	0.0000	Intercept	-1.498582

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

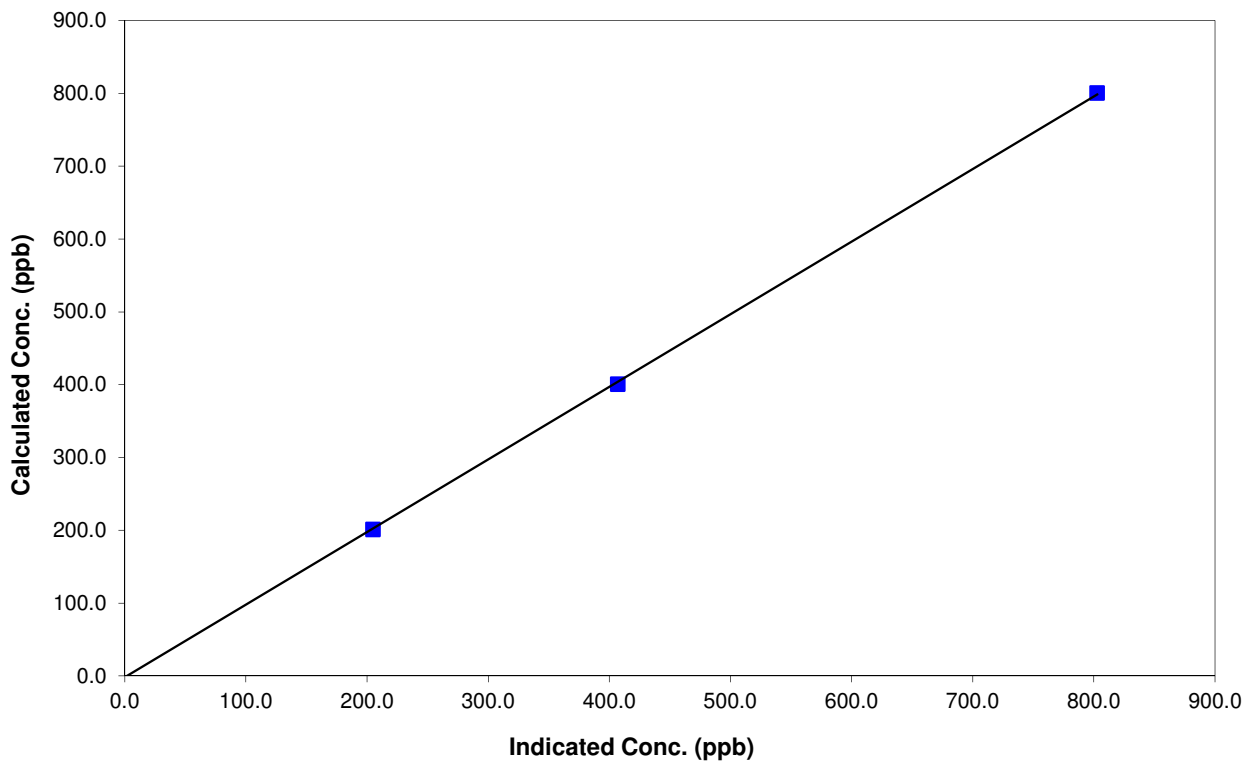
Station Information

Calibration Date	June 27, 2014	Previous Calibration	
Station Name	Statoil	Station Number	AMS 103
Start Time (MST)	11:30	End Time (MST)	14:50
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	-0.6	N/A	Correlation Coefficient	0.999940
800.6	802.7	0.9974		
400.7	407.0	0.9846	Slope	0.995710
201.2	205.0	0.9815		
0.0	-0.7	0.0000	Intercept	-0.960900

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

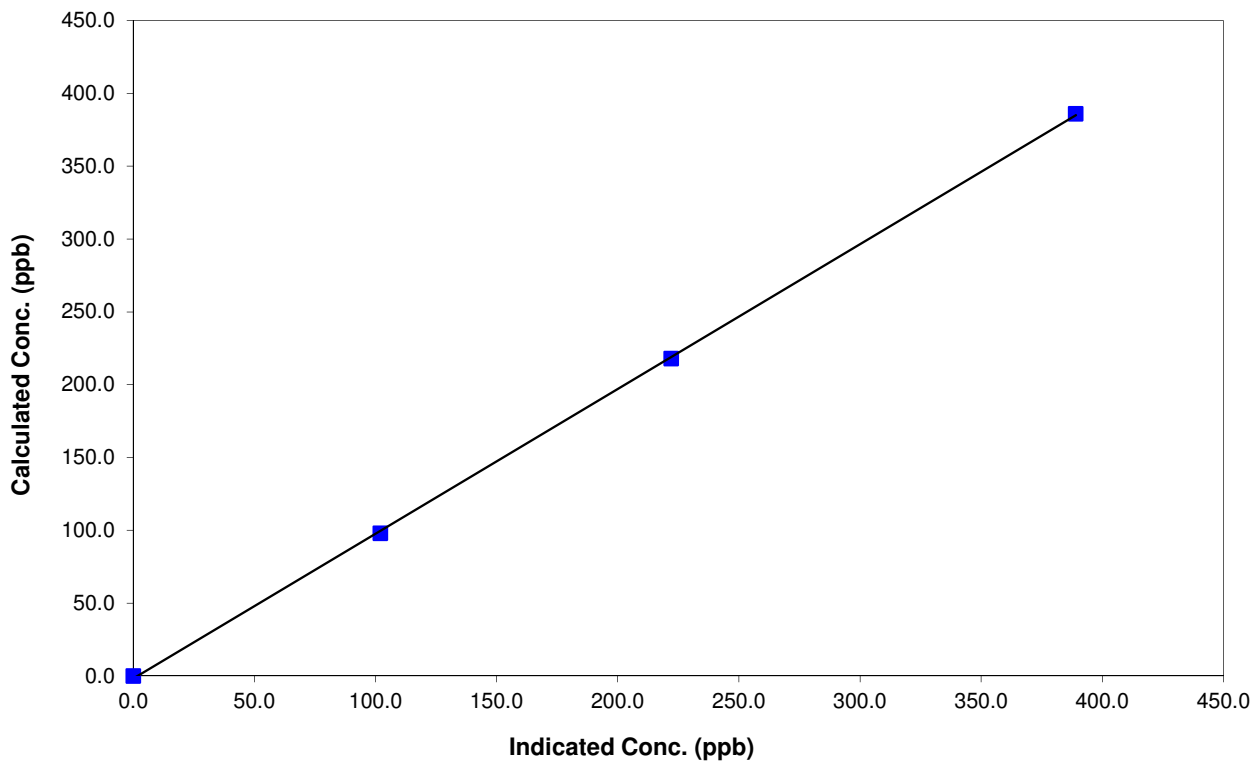
Station Information

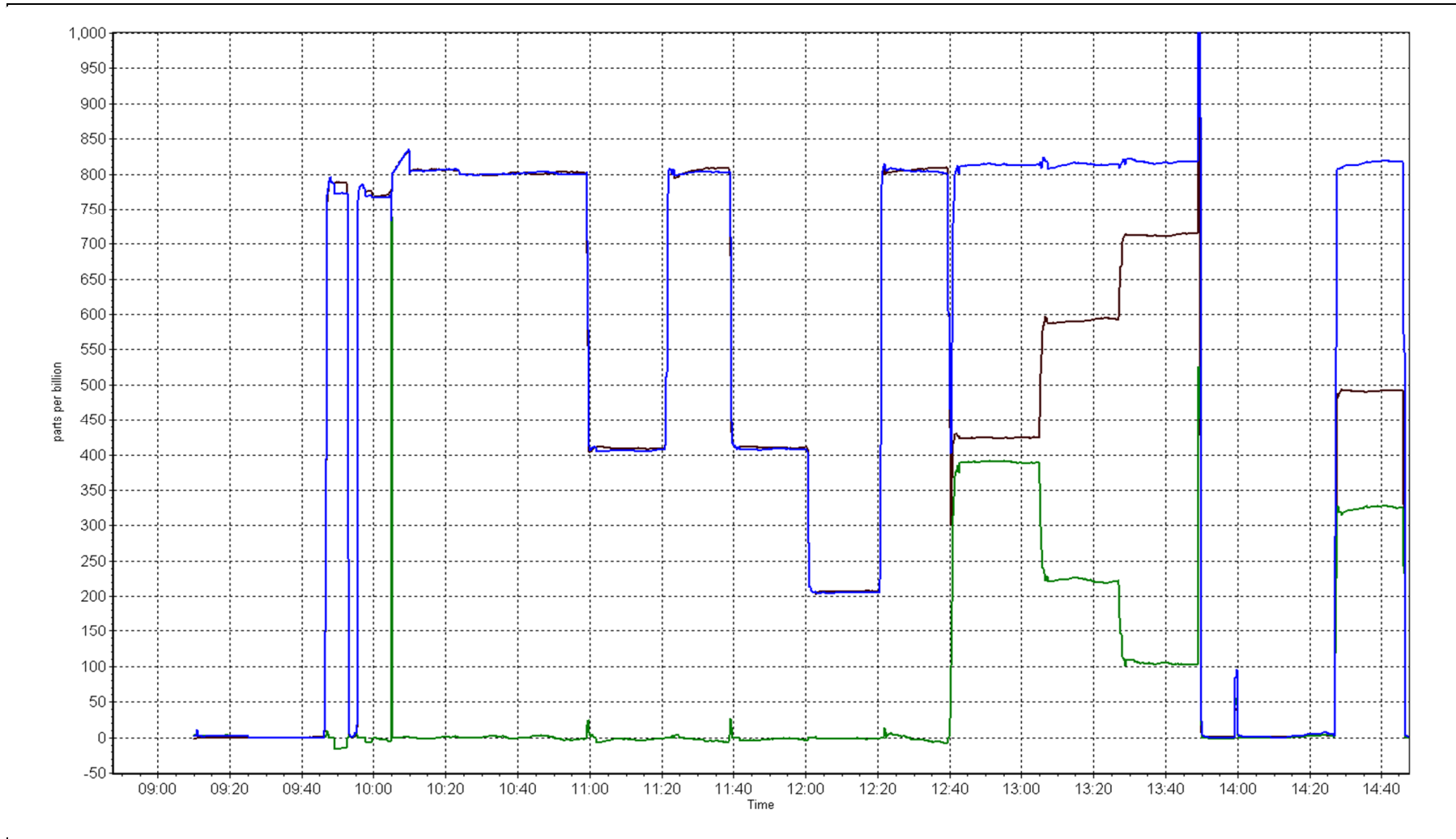
Calibration Date	June 27, 2014	Previous Calibration	NA
Station Number	Statoil	Station Number	AMS 103
Start Time (MST)	11:30	End Time (MST)	14:50
Analyzer make	Teledyne T200	Analyzer serial #	722

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999911
386.0	389.0	0.9923		
218.0	222.0	0.9820	Slope	0.994228
98.0	102.0	0.9608		
			Intercept	-1.746006

NO₂ Calibration Curve





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 502
CONOCOPHILLIPS
SURMONT
JULY 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

August 29, 2014

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
 JULY 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	713	31	31	100.00	17	0	4	0
H2S (ppb) Average	713	31	31	100.00	6	0	1	0
NO2 (ppb) Average	648	45	96	93.15	21	0	7	-
NO (ppb) Average	648	45	96	93.15	28	-	5	-
NOX (ppb) Average	648	45	96	93.15	48	-	11	-
Temperature 2 m (C) Average	744	0	0	100.00	29.5	-	23.9	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	87.0	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	31	-	22.0	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
 JULY 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	713	1.1	2	-	0	0	0	0	1	3	17
H2S (ppb) Average	713	0.4	0	-	0	0	0	0	1	1	6
NO2 (ppb) Average	648	3.5	3	-	0	1	2	3	4	7	21
NO (ppb) Average	648	3.3	2	-	0	1	2	3	4	5	28
NOX (ppb) Average	648	6.7	5	-	1	3	4	6	8	12	48
Temperature 2 m (C) Average	744	18.63	3.8	-	9	14	15.9	18.4	21.1	24	29.5
Relative Humidity (%) Average	744	64.5	17	-	26	39	52	65	79	87	98
Wind Speed 10 m (km/h) Average	744	11.6	5	-	0	5	8	11	15	19	31
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)

JULY 2014

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NO, NOX	02 Jul 2014 11:00	02 Jul 2014 11:00	1	Intermittent unstable operation - Moly converter flow restricted
NO2, NO, NOX	03 Jul 2014 22:00	03 Jul 2014 23:00	2	Intermittent unstable operation - Moly converter flow restricted
NO2, NO, NOX	07 Jul 2014 14:00	07 Jul 2014 14:00	1	Intermittent unstable operation - Moly converter flow restricted
NO2, NO, NOX	08 Jul 2014 01:00	08 Jul 2014 01:00	1	Intermittent unstable operation - Moly converter flow restricted
NO2, NO, NOX	10 Jul 2014 12:00	10 Jul 2014 18:00	7	Maintenance - replaced moly converter and recalibration
NO2, NO, NOX	12 Jul 2014 06:00	12 Jul 2014 06:00	1	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	12 Jul 2014 19:00	12 Jul 2014 21:00	3	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	12 Jul 2014 23:00	13 Jul 2014 01:00	3	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	16 Jul 2014 07:00	16 Jul 2014 11:00	5	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	16 Jul 2014 13:00	16 Jul 2014 17:00	5	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	17 Jul 2014 06:00	17 Jul 2014 07:00	2	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	18 Jul 2014 08:00	18 Jul 2014 08:00	1	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	20 Jul 2014 19:00	20 Jul 2014 19:00	1	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	20 Jul 2014 21:00	20 Jul 2014 21:00	1	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	21 Jul 2014 07:00	21 Jul 2014 08:00	2	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	21 Jul 2014 22:00	21 Jul 2014 22:00	1	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	23 Jul 2014 17:00	23 Jul 2014 21:00	5	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	25 Jul 2014 22:00	26 Jul 2014 03:00	6	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	27 Jul 2014 12:00	27 Jul 2014 12:00	1	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	28 Jul 2014 21:00	28 Jul 2014 21:00	1	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	31 Jul 2014 18:00	31 Jul 2014 18:00	1	Intermittent unstable operation - excessive baseline drift

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 17 ppb on Jul 20 00:00	Maximum Daily Average: 4.4 ppb on Jul 7		Hours of Data:	713
Minimum Value: 0 ppb on Jul 5 11:00	Minimum Daily Average: 0.2 ppb on Jul 13		Hours of Missing Data:	31
Maximum Diurnal Average: 1.7 ppb at hour 14	Minimum Diurnal Average: 0.4 ppb at hour 4		Hours of Calibration:	31
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 = 12		Percent Operational Time:	100.0

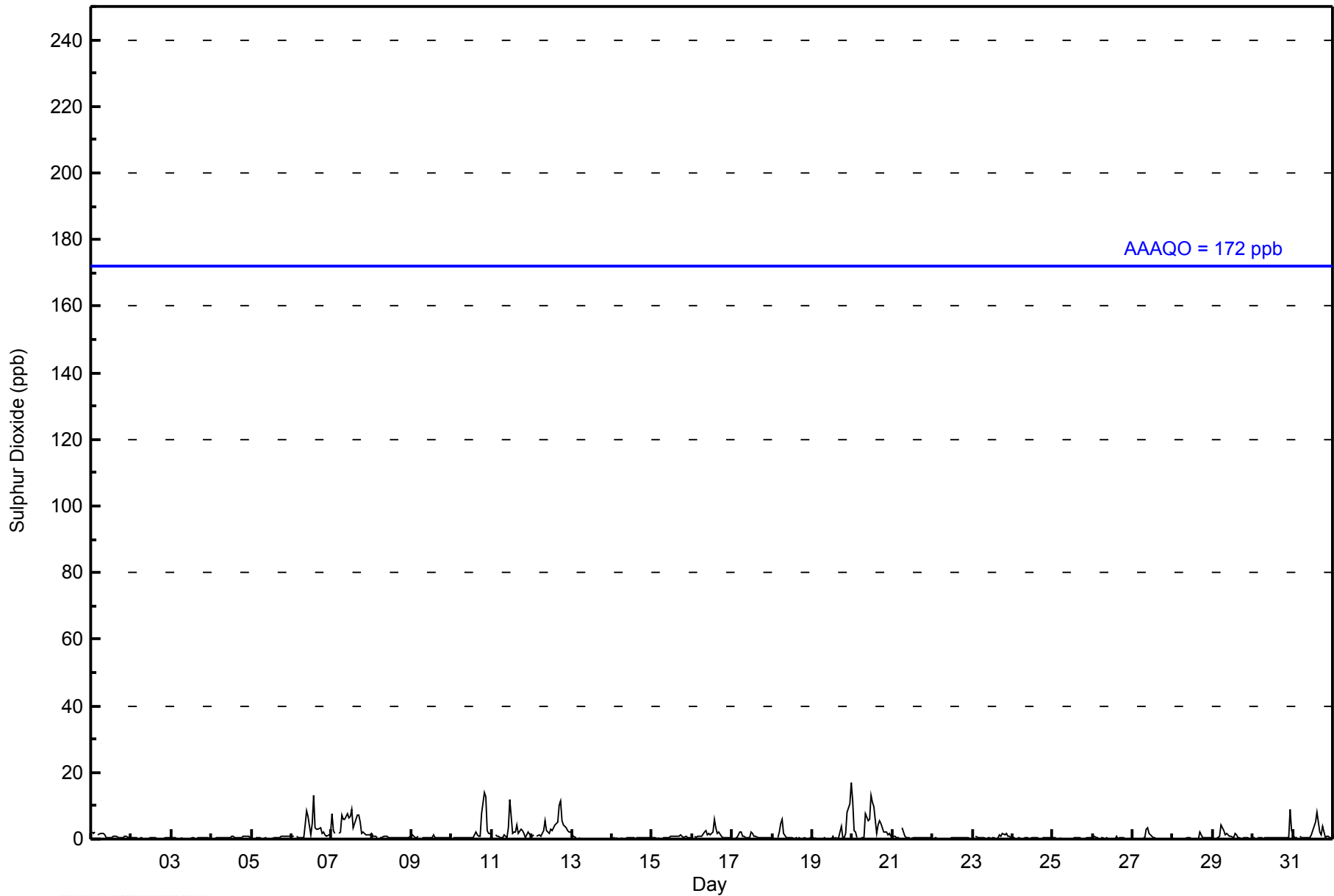
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	2	2	2	Z	1	2	2	2	1	1	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1.0	2
2-Jul	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
3-Jul	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Jul	Z	0	0	0	1	1	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0.5	1
5-Jul	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.4	1
6-Jul	1	1	Z	1	0	1	0	1	4	8	7	1	5	13	3	3	3	3	2	2	1	1	1	2	2.8	13
7-Jul	7	3	2	Z	2	2	7	6	6	8	6	7	9	4	4	7	7	5	2	2	1	1	1	1	4.4	9
8-Jul	2	1	1	1	Z	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0.5	2
9-Jul	1	1	1	1	1	Z	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
10-Jul	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	2	1	1	1	7	14	13	3	2	2	2.2	14
11-Jul	1	Z	1	1	1	0	0	1	1	1	4	12	2	2	2	4	2	3	3	2	1	1	2	1	2.0	12
12-Jul	1	1	Z	1	1	1	2	2	6	3	2	3	2	4	4	5	10	12	6	4	3	3	2	2	3.5	12
13-Jul	2	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
14-Jul	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
15-Jul	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0.6	1
16-Jul	Z	1	1	1	1	1	1	2	2	1	2	1	2	6	3	2	2	1	0	0	0	0	0	0	1.4	6
17-Jul	0	Z	0	0	2	2	1	1	1	0	0	2	2	1	1	0	0	0	0	0	0	0	0	0	0.7	2
18-Jul	0	0	Z	0	2	5	6	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	6
19-Jul	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	1	4	0	0	2	8	11	17	2.0	17
20-Jul	11	2	2	1	Z	1	0	1	7	6	6	13	11	10	2	4	5	5	3	2	2	1	2	1	4.3	13
21-Jul	1	1	1	0	0	Z	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
22-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
23-Jul	0	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	2	1	2	1	1	1	1	0.6	2
24-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
25-Jul	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1
26-Jul	0	1	1	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
27-Jul	0	0	0	0	0	Z	0	0	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
28-Jul	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0.3	2
29-Jul	0	Z	0	0	1	4	3	1	2	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0.9	4
30-Jul	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	2	0.8	9
31-Jul	2	1	0	Z	1	0	0	0	0	0	1	1	3	5	8	5	2	1	4	0	1	1	0	0	1.6	8
	1.3	0.7	0.6	0.4	0.7	0.9	1.0	0.8	1.3	1.2	1.1	1.5	1.4	1.7	1.3	1.3	1.4	1.4	1.2	1.2	1.1	0.9	1.2	1.2	Diurnal Average	
	11	3	2	1	2	5	7	6	7	8	7	13	11	13	8	7	10	12	7	14	13	8	11	17	Diurnal Maximum	

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



WBEA NETWORK
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	703	98.60	98.60
11 - 20	10	1.40	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: 713

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - July 2014

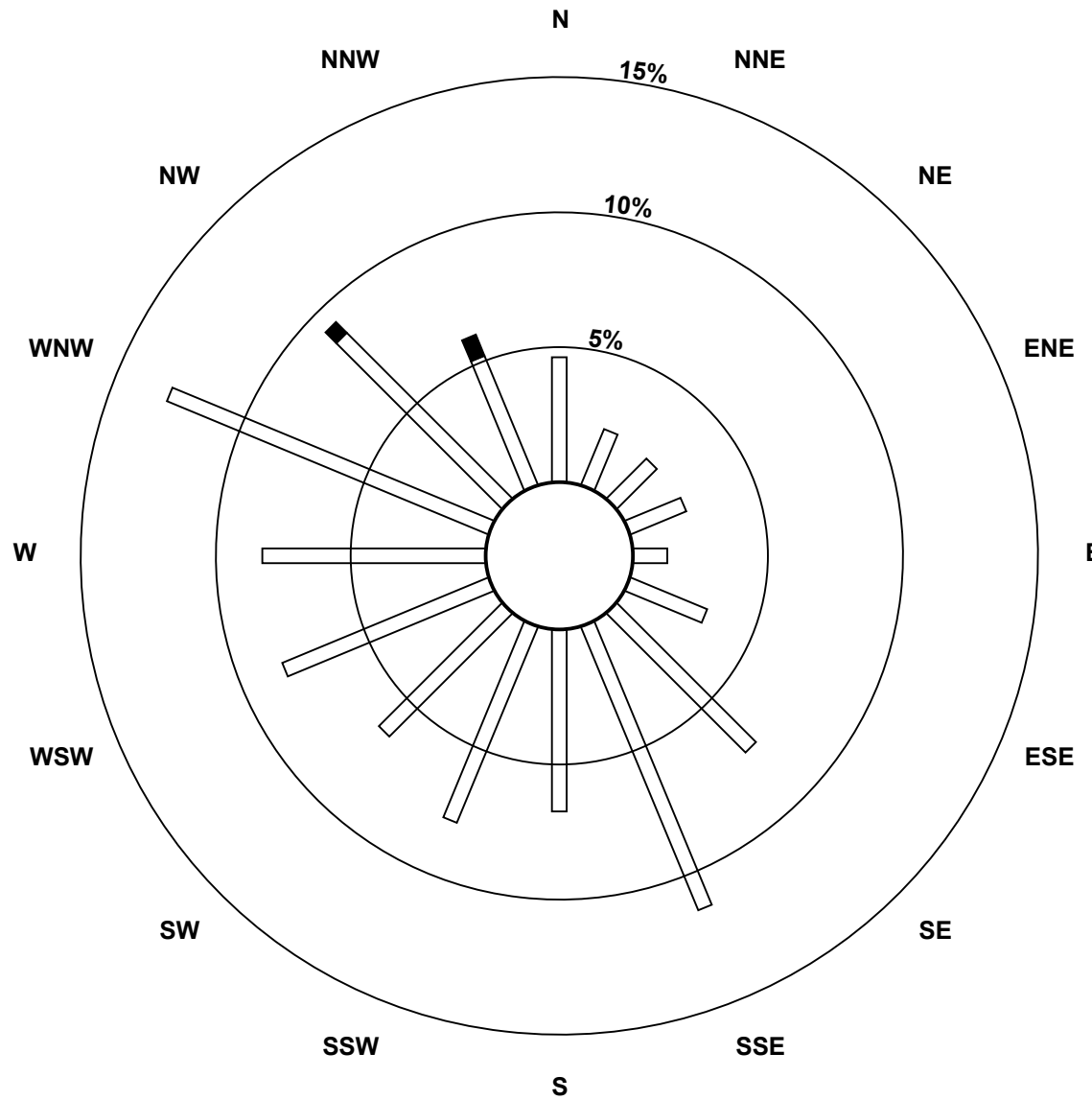
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	33	16	15	16	9	22	52	81	48	56	46	59	59	92	62	37	703
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	10
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	33	16	15	16	9	22	52	81	48	56	46	59	59	92	66	43	713

Total Number of Valid Hours: 713

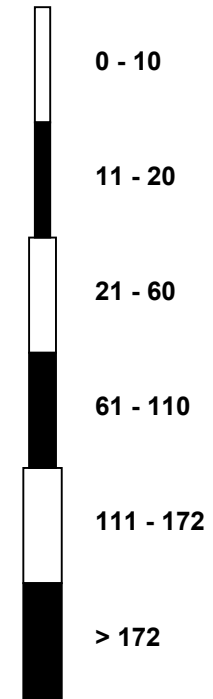
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont (AMS502)



Classes (ppb)



Total Number of Valid Hours: 713

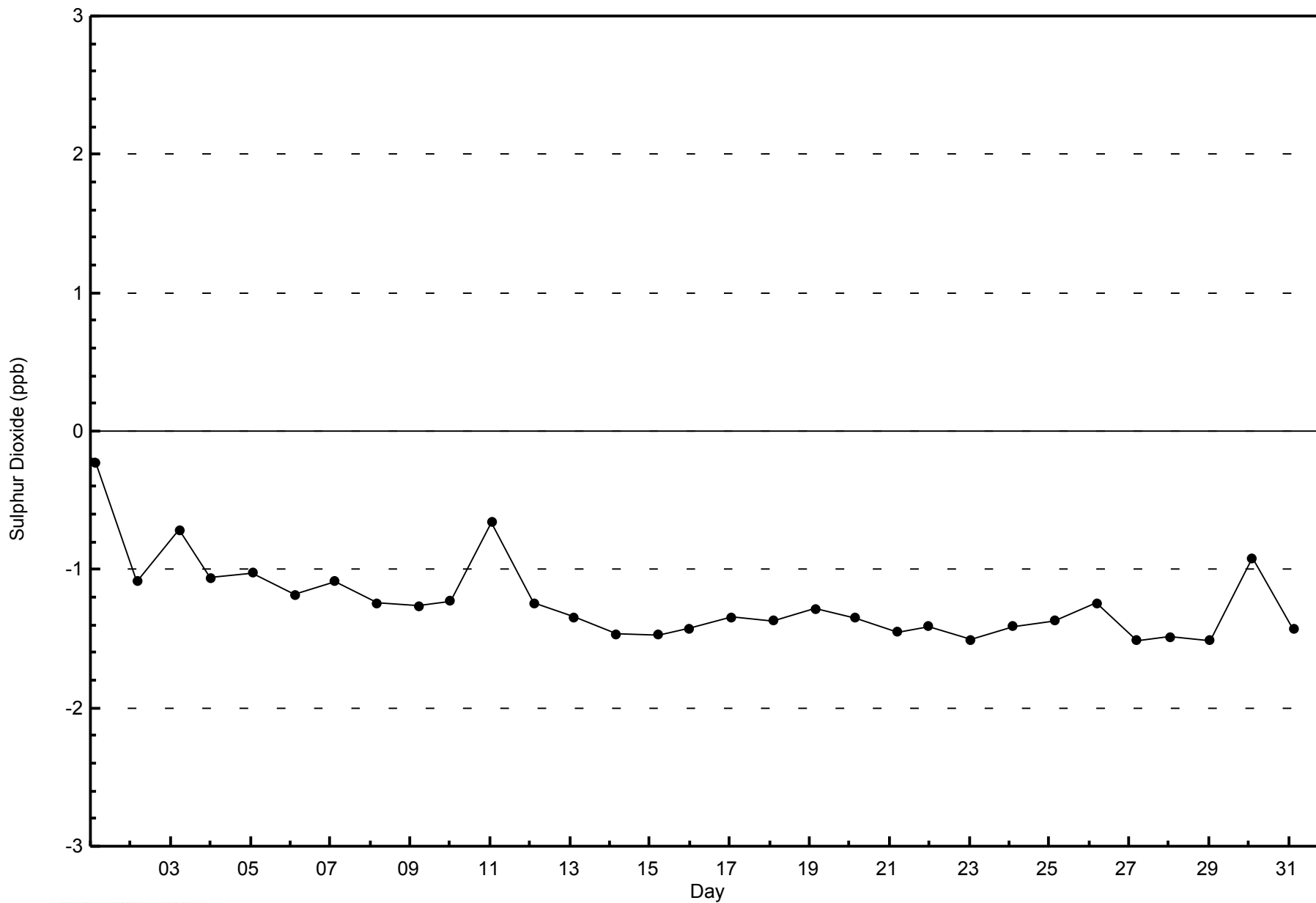


WBEA NETWORK

Zero Responses

Sulphur Dioxide (SO₂) - ppb

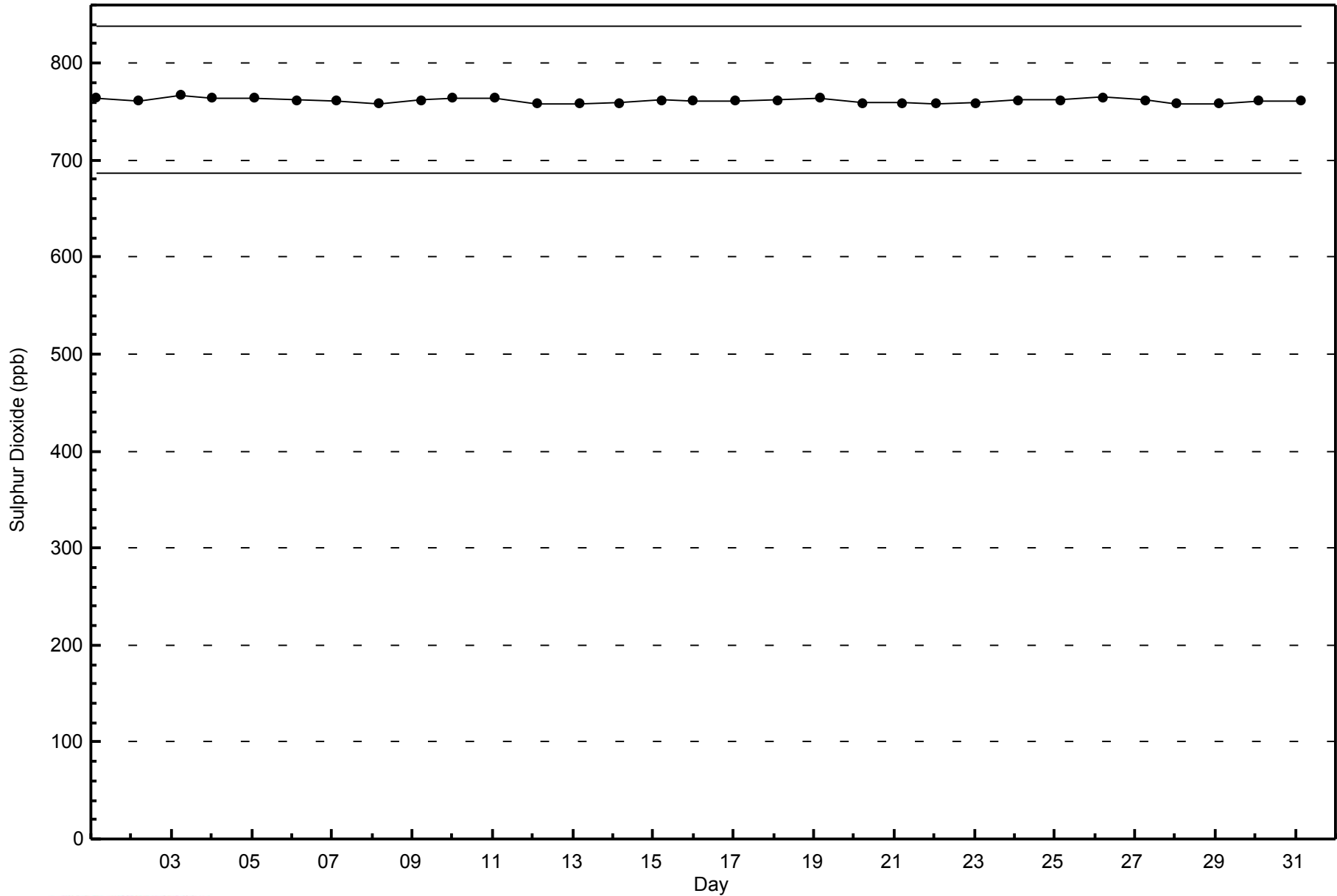
ConocoPhillips - Surmont - July 2014





WBEA NETWORK
Span Responses

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surrmont - July 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 6 ppb on Jul 31 20:00	Maximum Daily Average: 1.0 ppb on Jul 10		Hours of Data:	713
Minimum Value: 0 ppb on Jul 13 13:00	Minimum Daily Average: 0.1 ppb on Jul 13		Hours of Missing Data:	31
Maximum Diurnal Average: 0.6 ppb at hour 20	Minimum Diurnal Average: 0.3 ppb at hour 2		Hours of Calibration:	31
Monthly Average: 0.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 2		Percent Operational Time:	100.0

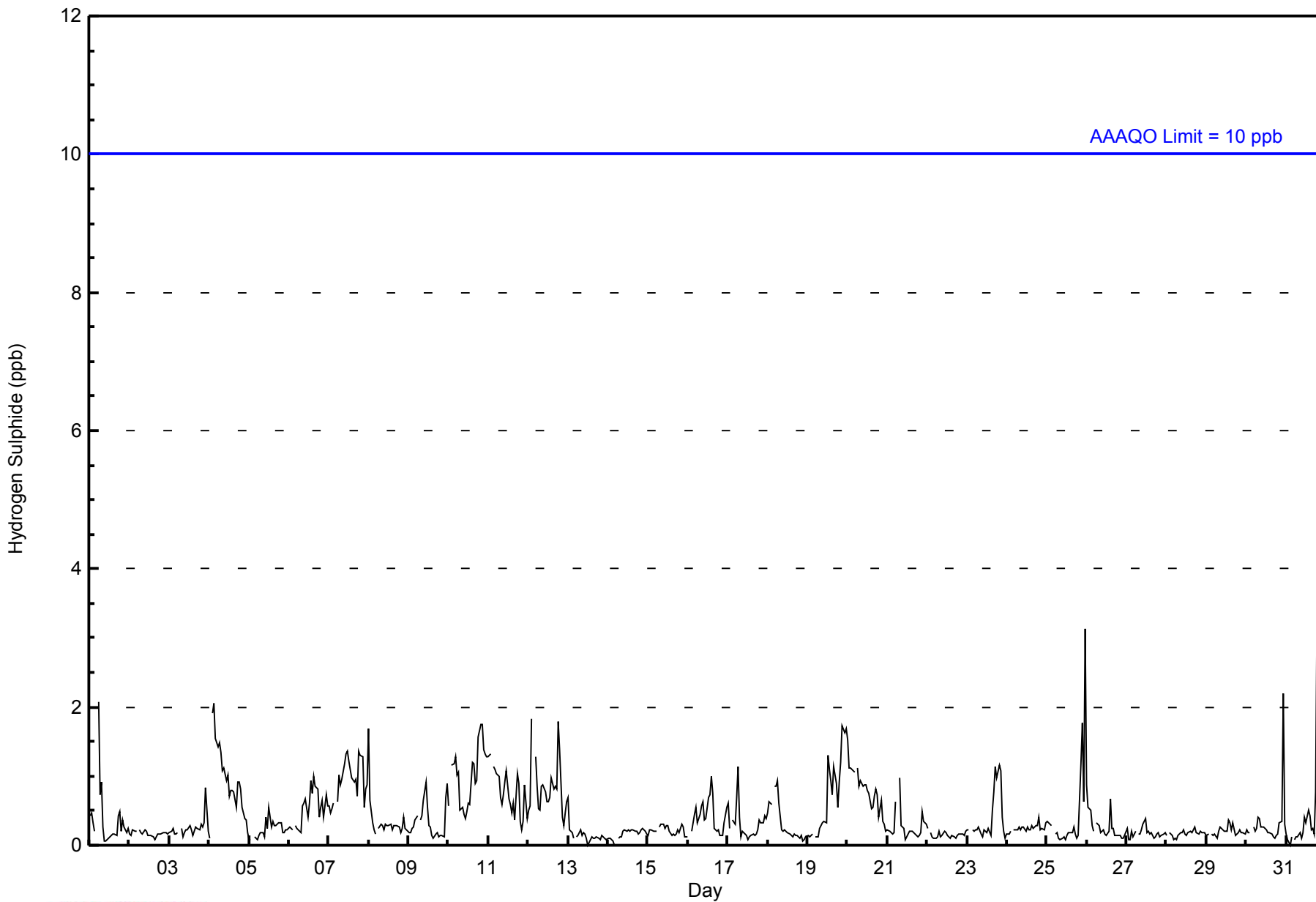
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0	0	0	0	Z	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
2-Jul	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Jul	0	0	0	0	0	0	Z	0	0	0	0	0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

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



WBEA NETWORK
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	711	99.72	99.72
3 - 4	1	0.14	99.86
5 - 7	1	0.14	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 713

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - July 2014

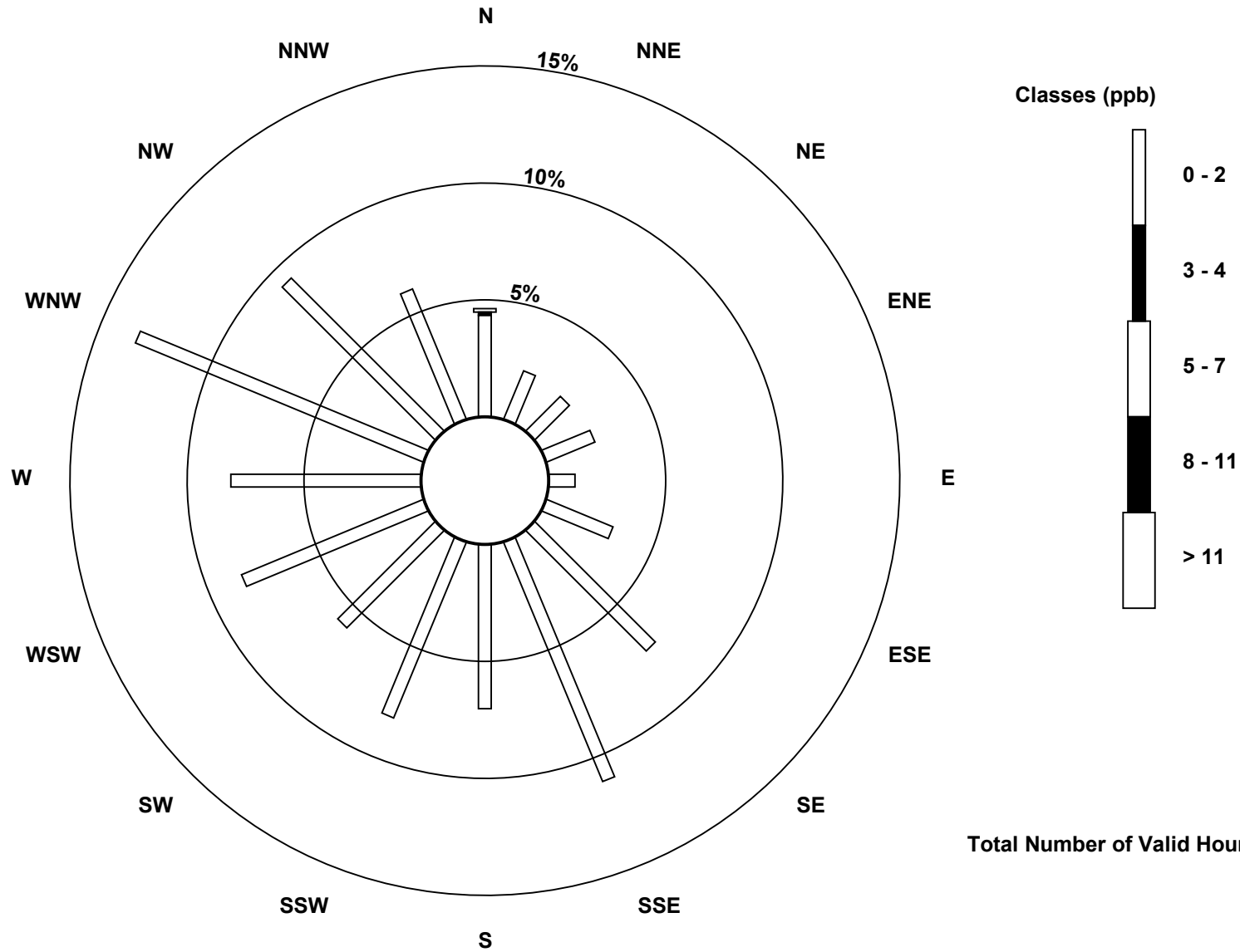
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	31	16	15	16	8	22	52	79	50	58	42	60	58	95	66	43	711
3 - 4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5 - 7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	33	16	15	16	8	22	52	79	50	58	42	60	58	95	66	43	713

Total Number of Valid Hours: 713

Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont (AMS502)



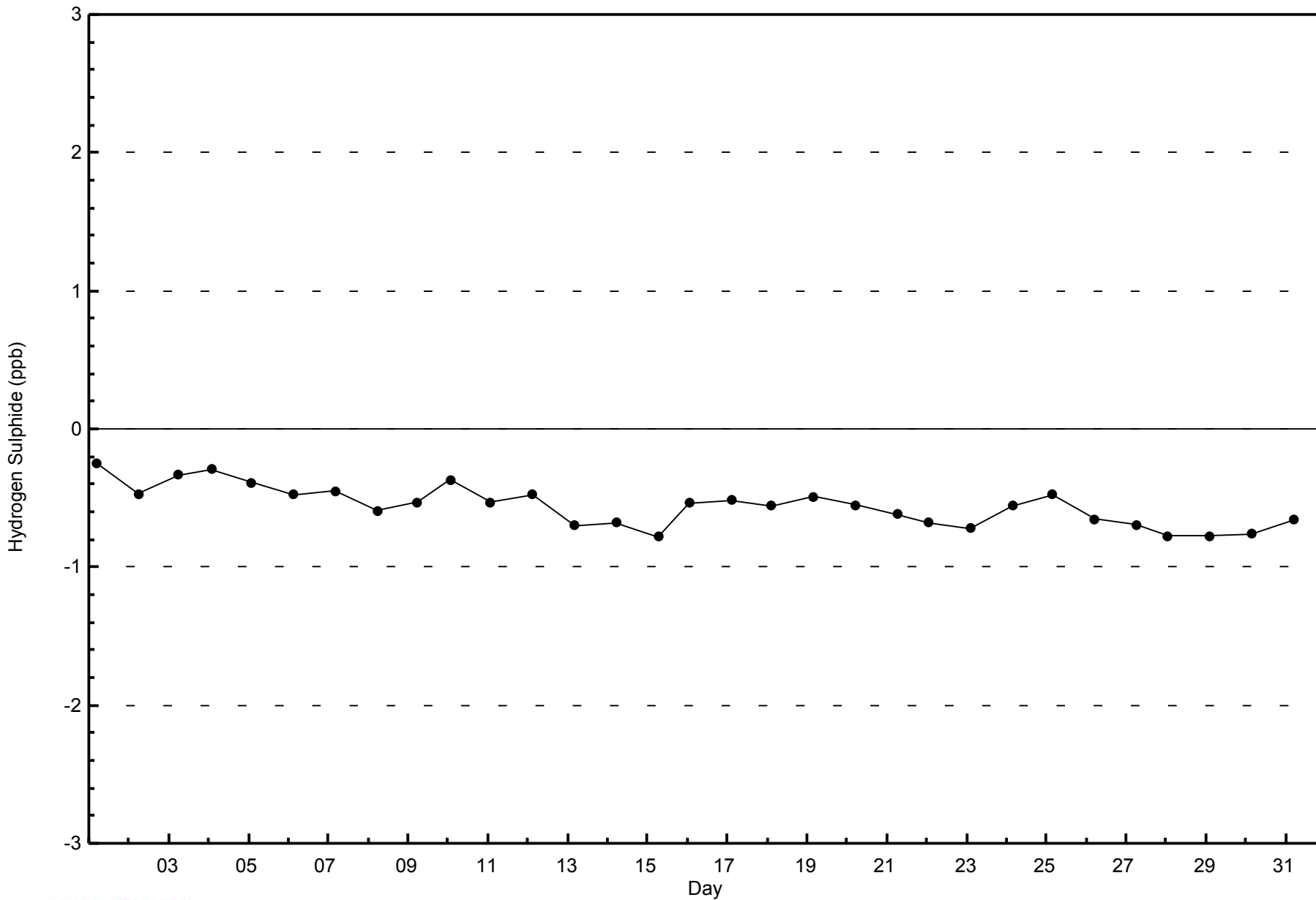
Total Number of Valid Hours: 713



WBEA NETWORK

Zero Responses

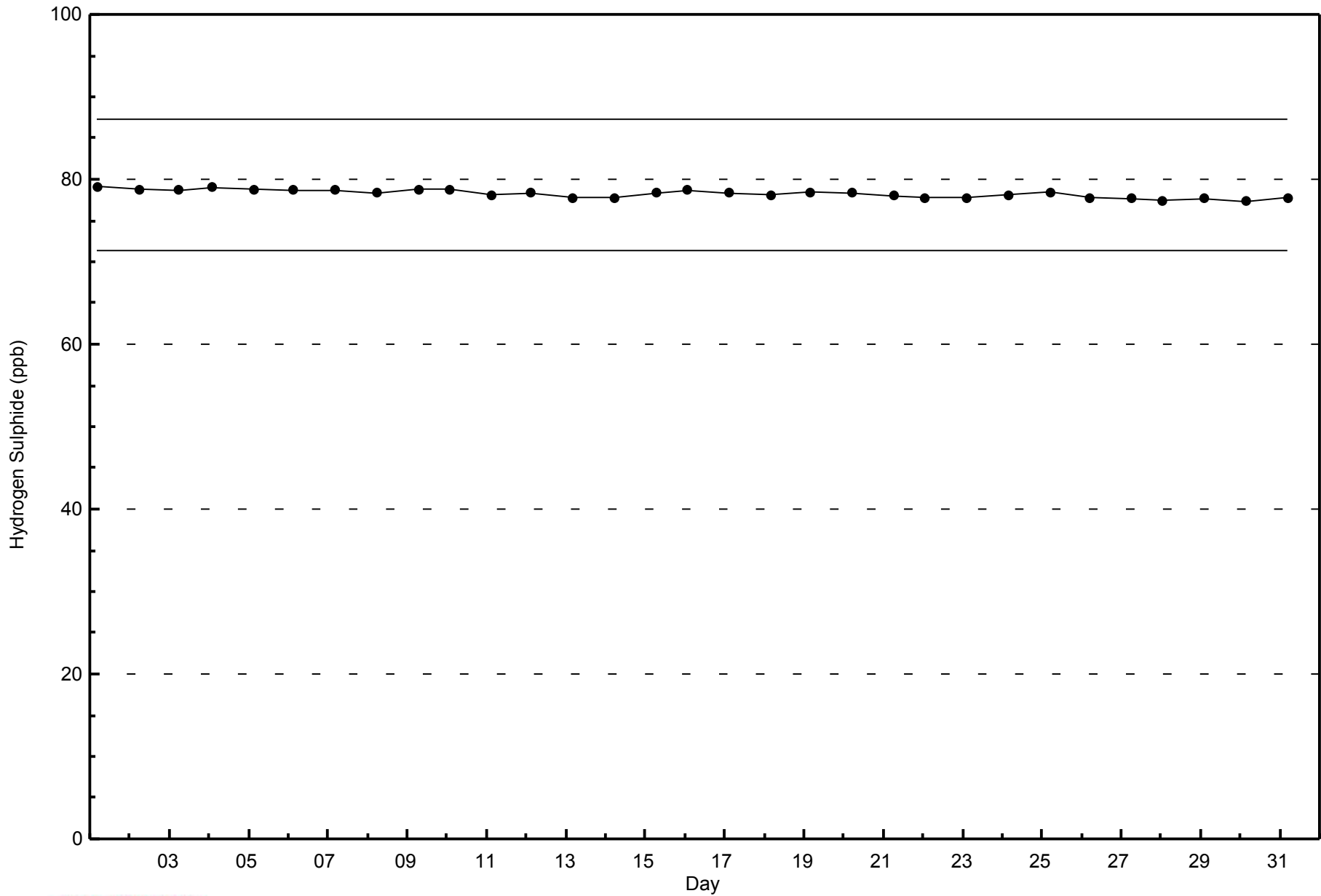
Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surrmont - July 2014





WBEA NETWORK
Span Responses

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - July 2014



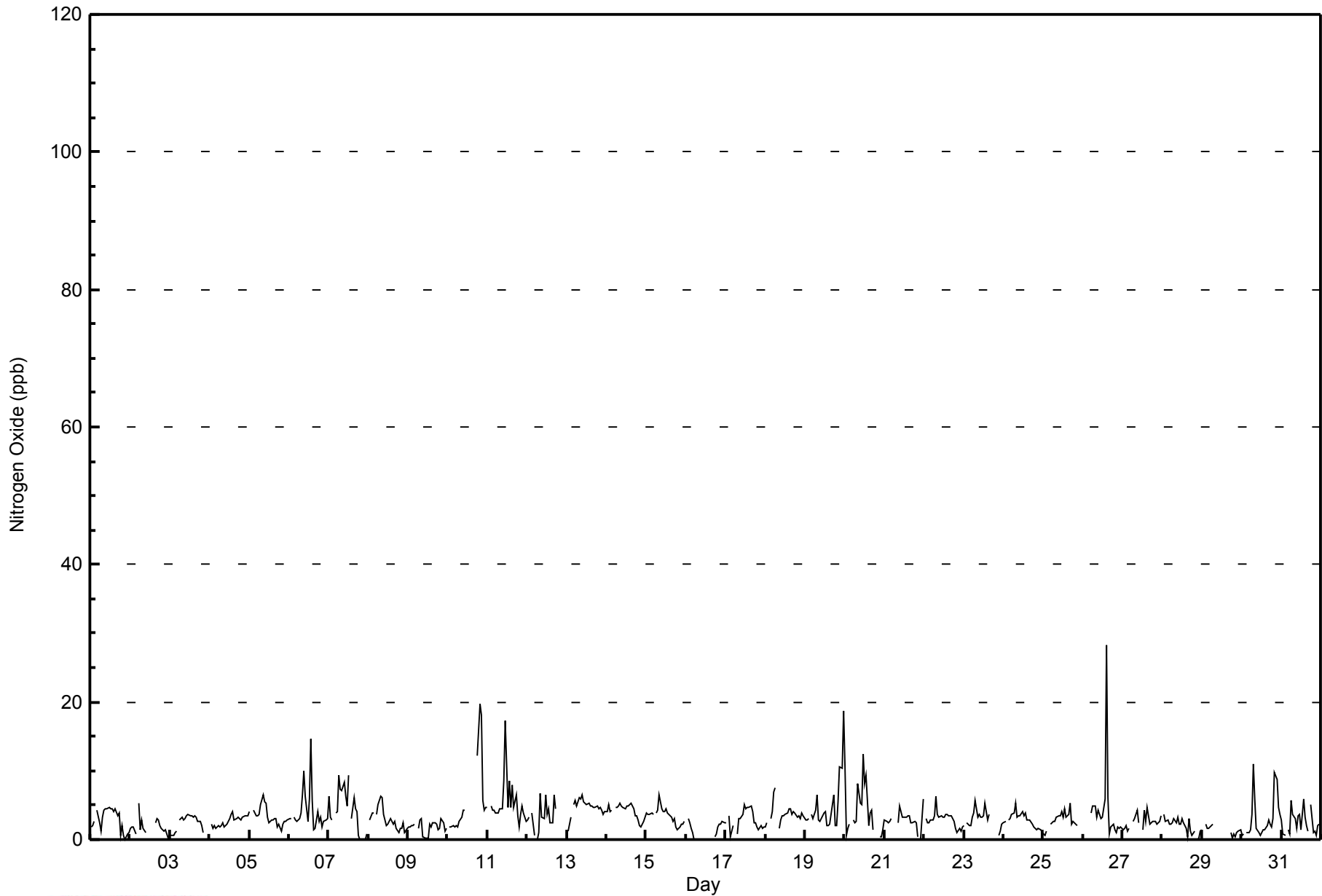


Maximum Value: 28 ppb on Jul 26 15:00																		Maximum Daily Average: 5.3 ppb on Jul 11						Hours in Service: 744																																									
Minimum Value: 0 ppb on Jul 1 22:00																		Minimum Daily Average: 1.8 ppb on Jul 9						Hours of Data: 648																																									
Maximum Diurnal Average: 4.7 ppb at hour 14																		Minimum Diurnal Average: 2.3 ppb at hour 2						Hours of Missing Data: 96																																									
Monthly Average: 3.3 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 12						Hours of Calibration: 45																																									
																								Percent Operational Time: 93.2																																									
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-Jul	2	2	3	Z	4	2	1	3	4	5	5	5	4	4	4	4	4	4	1	2	1	0	1	1	2.8	5																																							
2-Jul	2	2	2	1	Z	5	1	3	2	1	UO	C	C	C	C	2	3	3	2	2	1	1	1	0	1.9	5																																							
3-Jul	1	1	1	1	1	Z	3	3	3	3	3	4	3	3	3	4	3	3	3	2	1	UO	UO	2	2.4	4																																							
4-Jul	Z	2	2	2	2	2	2	2	2	2	2	3	3	4	4	3	3	3	3	3	3	4	4	3	2.7	4																																							
5-Jul	4	Z	4	4	4	3	4	5	7	5	5	3	2	3	3	3	3	2	2	1	2	3	3	3	3.4	7																																							
6-Jul	3	3	Z	3	3	3	3	4	7	10	6	3	6	15	6	1	2	4	3	3	2	3	3	3	4.2	15																																							
7-Jul	6	3	3	Z	4	4	9	7	7	8	6	5	9	UO	3	6	4	4	1	0	0	0	0	1	4.2	9																																							
8-Jul	UO	3	4	4	Z	4	5	6	6	4	3	2	2	3	3	2	3	2	1	2	2	2	1	2	2.9	6																																							
9-Jul	2	2	2	2	2	Z	2	3	3	0	0	0	0	2	2	2	3	2	1	2	3	2	1	2	1.8	3																																							
10-Jul	Z	2	2	2	2	2	2	3	3	4	4	M	M	M	M	M	M	M	12	20	18	6	4	5	--	20																																							
11-Jul	5	Z	5	4	4	4	4	4	5	4	9	17	5	9	5	8	5	6	3	2	4	5	4	3	5.3	17																																							
12-Jul	3	3	Z	4	1	UO	0	1	7	3	3	6	4	4	2	2	7	4	UO	UO	UO	0	UO	UO	--	7																																							
13-Jul	UO	1	3	Z	5	6	5	6	6	7	6	5	5	5	5	5	5	5	5	5	5	4	4	4	4.8	7																																							
14-Jul	4	5	4	4	Z	5	5	5	5	5	5	4	5	5	5	4	3	3	3	3	2	2	3	3	4.1	5																																							
15-Jul	4	4	4	4	4	Z	4	4	7	4	4	4	4	4	3	3	3	3	2	2	2	2	2	3	3.4	7																																							
16-Jul	Z	3	2	2	1	0	UO	UO	UO	UO	UO	0	UO	UO	UO	UO	UO	0	1	2	2	2	3	2	--	3																																							
17-Jul	2	Z	3	0	2	UO	UO	1	3	3	4	5	4	5	5	5	4	2	3	2	1	2	2	2	2.9	5																																							
18-Jul	2	2	Z	3	4	7	8	UO	2	3	3	3	4	4	4	5	4	4	4	3	3	3	4	4	3.7	8																																							
19-Jul	3	3	3	Z	4	3	4	6	3	3	3	4	4	2	2	2	4	7	2	2	6	11	10	19	4.7	19																																							
20-Jul	10	1	2	2	Z	3	2	3	8	5	5	12	8	9	2	4	4	1	UO	1	UO	0	0	1	4.1	12																																							
21-Jul	3	3	2	3	3	Z	UO	UO	2	5	4	3	3	3	3	3	2	2	3	2	0	UO	0	6	2.9	6																																							
22-Jul	Z	3	2	2	3	3	4	6	4	3	3	3	3	4	4	3	3	3	3	2	1	2	1	2	2.9	6																																							
23-Jul	2	Z	2	2	2	3	4	6	3	4	3	3	3	5	3	4	UO	UO	UO	UO	UO	1	1	2	3.0	6																																							
24-Jul	3	3	Z	3	3	4	4	5	3	3	4	4	3	4	3	3	3	2	2	2	1	2	2	1	2.9	5																																							
25-Jul	1	1	1	Z	2	2	3	3	3	3	3	4	3	4	3	4	5	2	3	2	2	UO	UO	UO	2.8	5																																							
26-Jul	UO	UO	UO	2	Z	4	5	5	3	4	4	3	3	6	28	6	1	2	2	1	1	2	2	2	4.3	28																																							
27-Jul	1	2	2	1	2	Z	3	3	4	4	3	UO	1	4	3	5	2	2	3	3	3	2	3	3	2.6	5																																							
28-Jul	Z	4	3	3	2	2	3	3	2	3	2	2	3	2	2	0	3	1	1	1	UO	0	0	1	2.0	4																																							
29-Jul	1	Z	2	2	2	2	2	C	C	C	C	C	C	C	C	C	C	C	1	0	1	0	1	1	1	--	2																																						
30-Jul	1	1	Z	1	1	1	4	11	6	2	1	1	1	1	1	1	2	3	2	2	3	10	9	5	4	3.1	11																																						
31-Jul	3	1	1	Z	1	1	6	4	3	2	3	4	1	6	3	2	1	UO	5	1	1	1	2	2	2.4	6																																							
2.9																		2.3		2.5		2.4		2.6		3.1		3.5		4.3		4.2		3.9		3.8		4.2		3.7		4.7		4.3		3.6		3.3		2.9		2.6		2.6		2.9		2.5		2.3		3.0		Diurnal Average	
10																		5		5		4		5		7		9		11		8		10		9		17		9		15		28		8		7		7		12		20		18		11		10		19		Diurnal Maximum	
Z - zerospan																								C - Calibration						M - Maintenance						UO - Unstable Operation																													



WBEA NETWORK
Hourly Averages

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	647	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: 648

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - July 2014

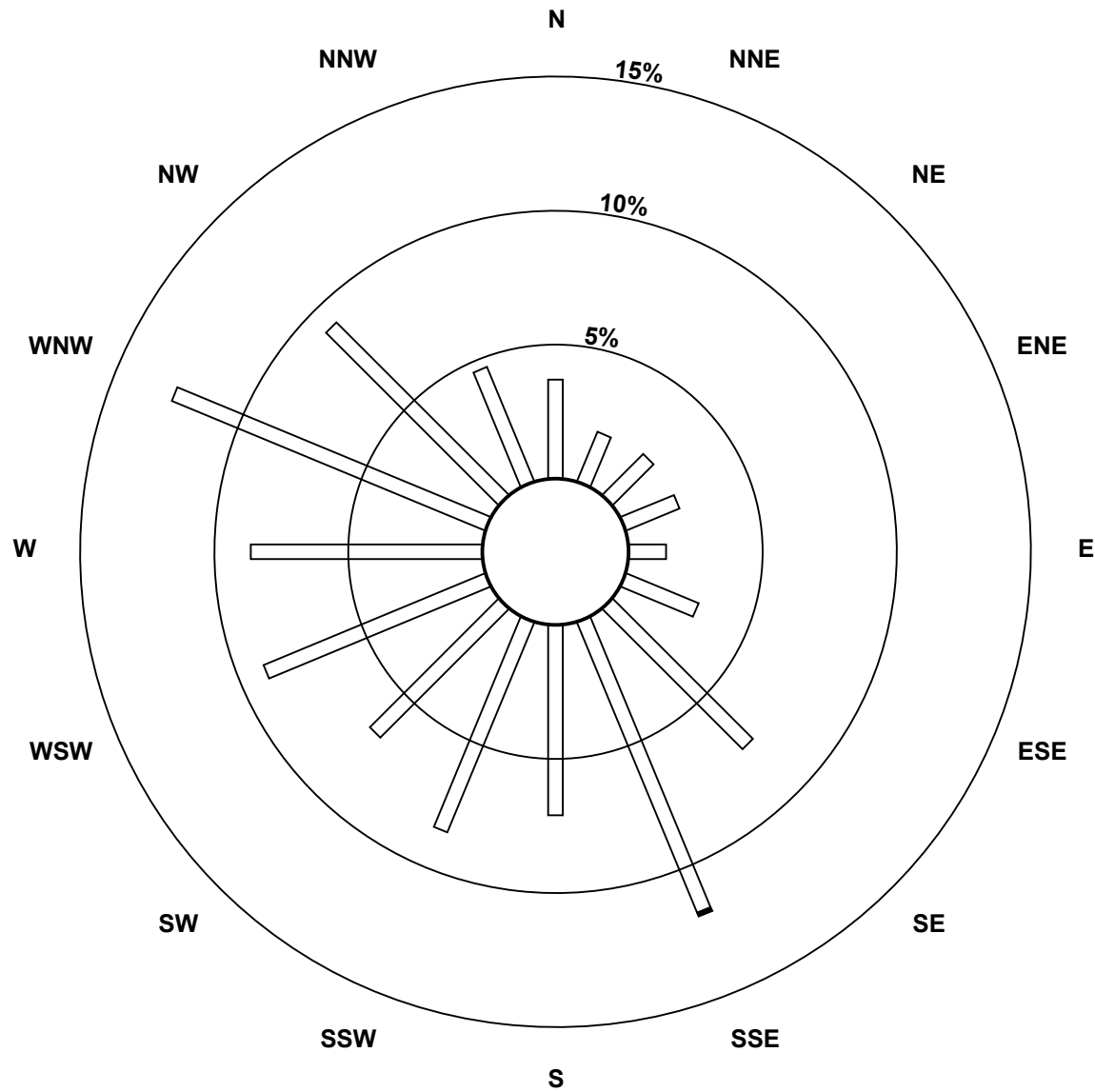
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	24	13	14	14	9	19	48	76	46	55	44	58	56	82	59	30	647
21 - 40	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	24	13	14	14	9	19	48	77	46	55	44	58	56	82	59	30	648

Total Number of Valid Hours: 648

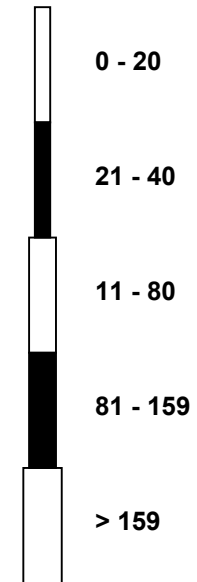
Total Number of Hours: 744

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

**Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont (AMS502)**



Classes (ppb)



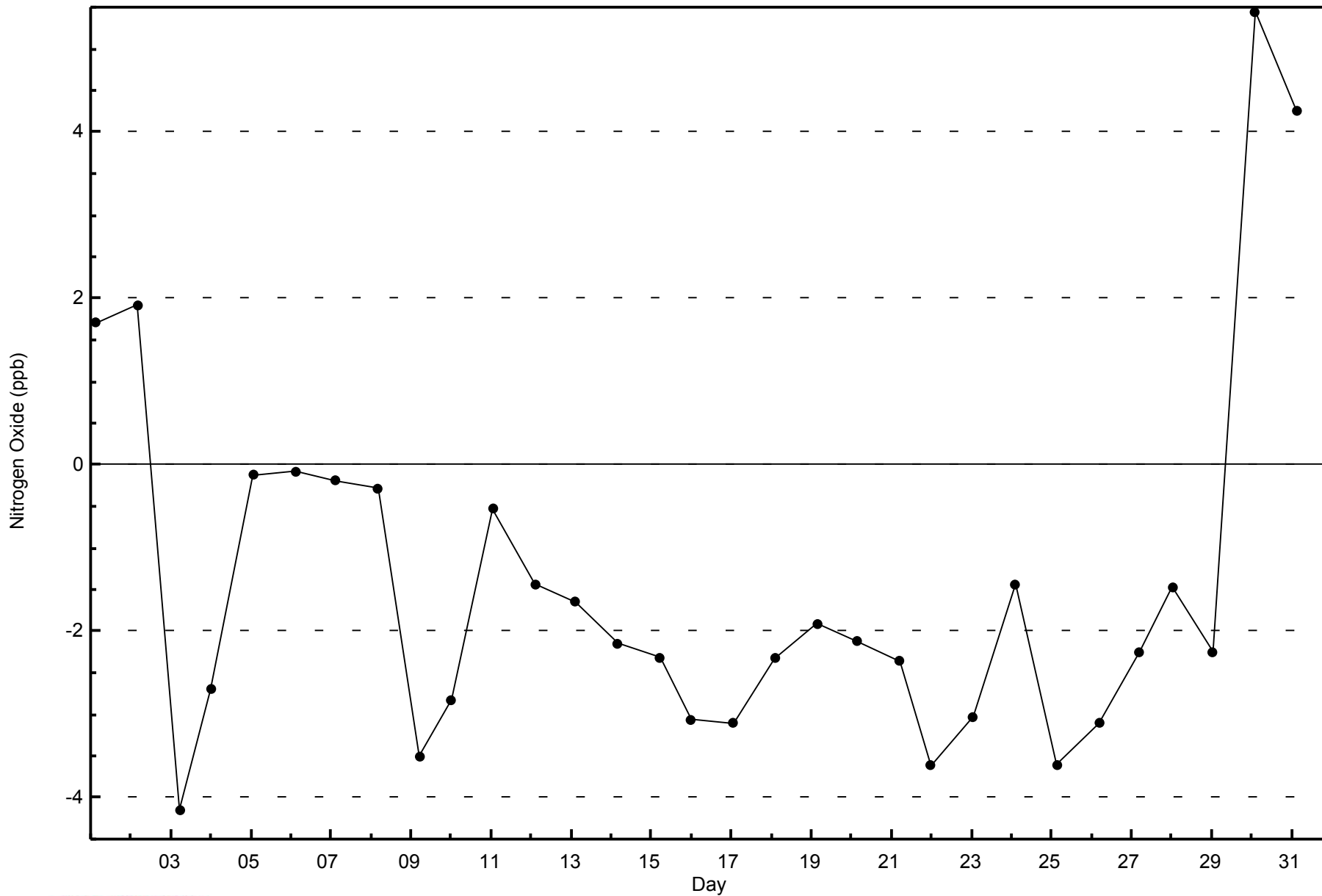
Total Number of Valid Hours: 648



WBEA NETWORK

Zero Responses

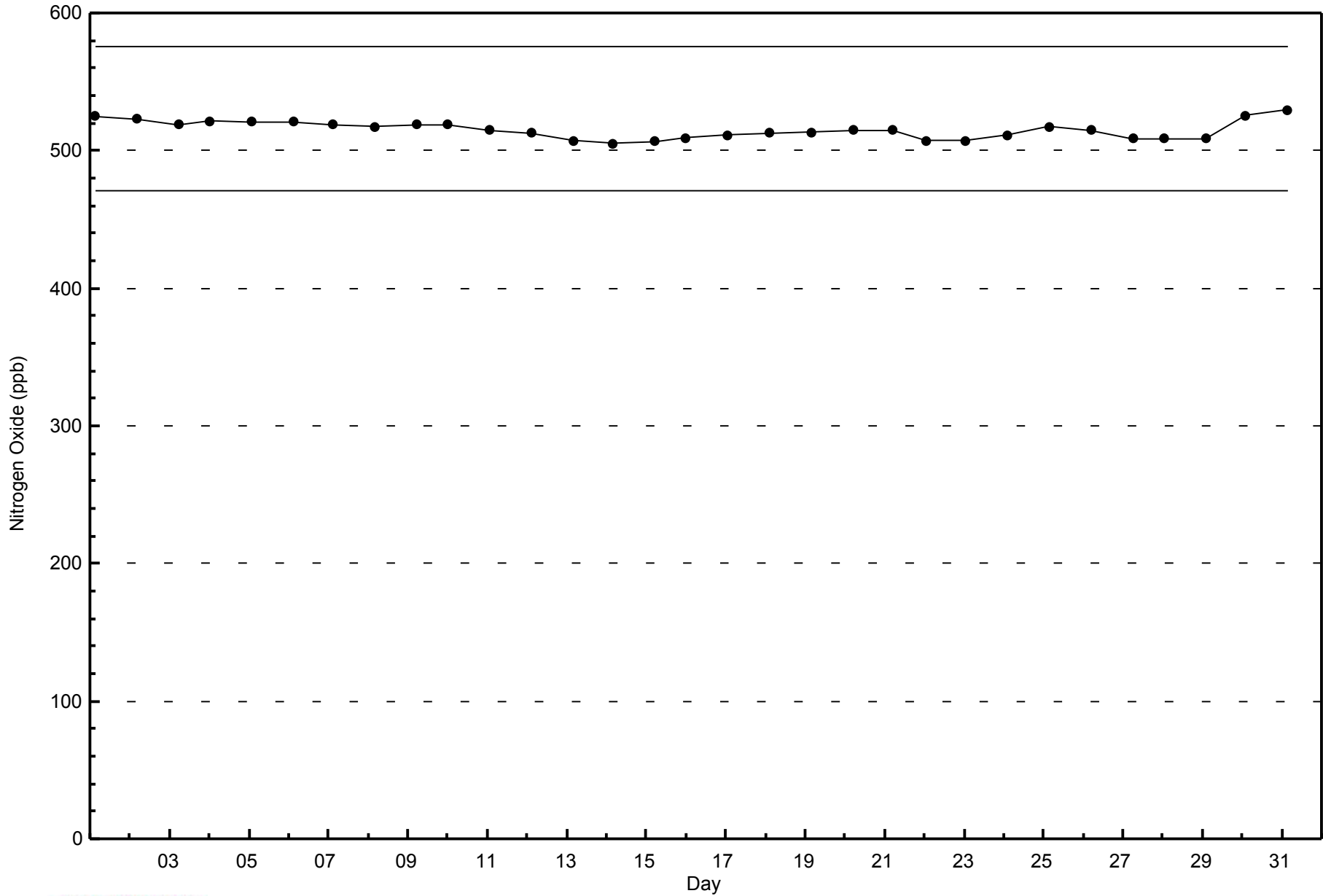
Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - July 2014





WBEA NETWORK
Span Responses

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - July 2014





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 21 ppb on Jul 22 00:00	Maximum Daily Average: 7.2 ppb on Jul 20		Hours of Data:	648
Minimum Value: 0 ppb on Jul 1 05:00	Minimum Daily Average: 0.5 ppb on Jul 1		Hours of Missing Data:	96
Maximum Diurnal Average: 4.5 ppb at hour 8	Minimum Diurnal Average: 2.0 ppb at hour 19		Hours of Calibration:	45
Monthly Average: 3.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 7 P ₉₉ = 13		Percent Operational Time:	93.2

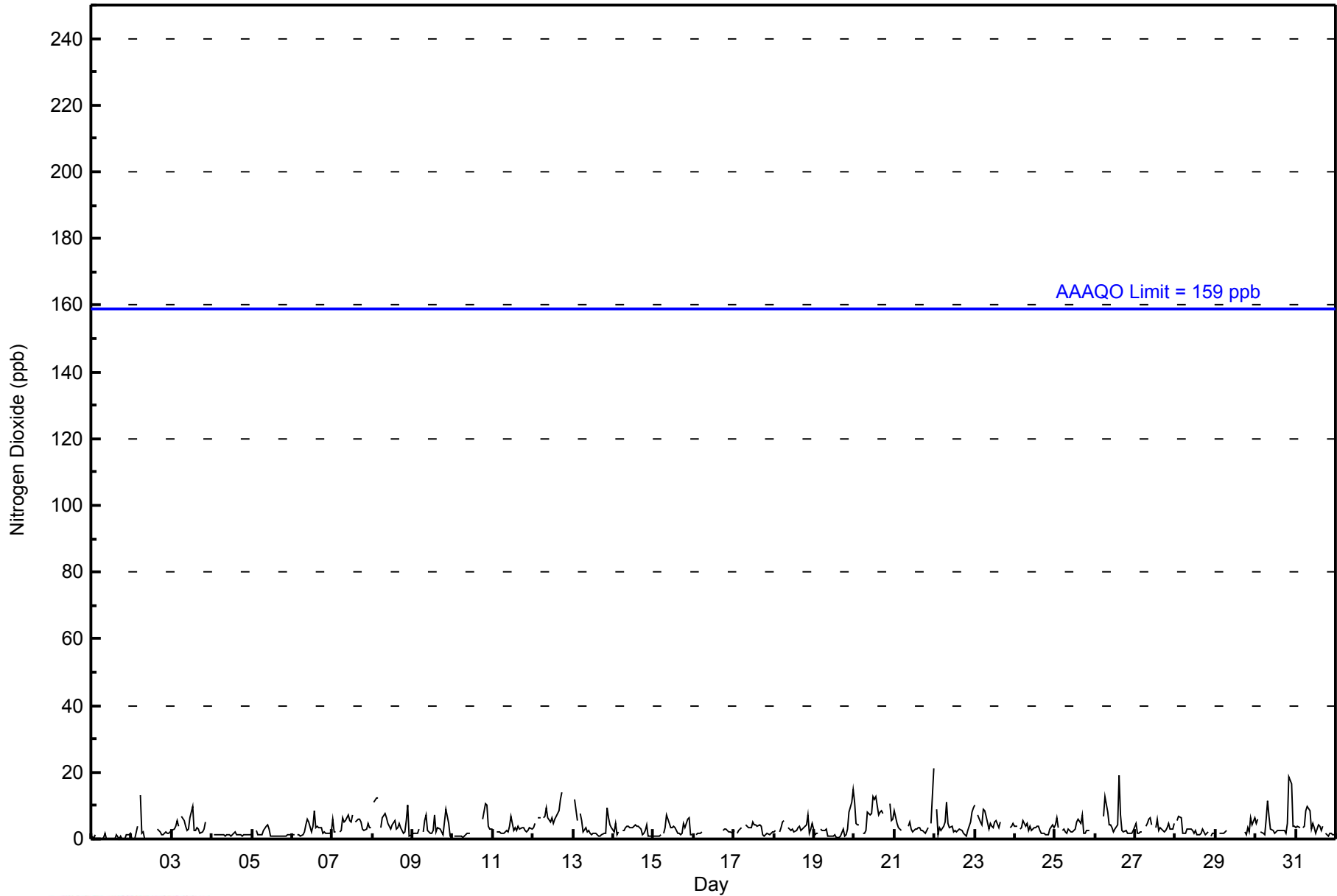
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	1	0	1	Z	0	0	0	1	2	0	0	0	0	0	0	1	0	1	0	0	0	1	1	2	0.5	2																							
2-Jul	0	0	0	4	Z	13	2	2	0	0	UO	C	C	C	C	3	3	2	1	1	2	2	2	2	2.1	13																							
3-Jul	3	3	4	6	4	Z	7	6	4	3	3	6	10	3	2	3	3	2	2	3	5	UO	UO	3	3.9	10																							
4-Jul	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1.2	2																							
5-Jul	2	Z	3	1	1	1	1	3	4	4	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	4																							
6-Jul	1	1	Z	1	1	1	1	2	4	6	5	2	4	9	4	4	3	3	2	2	2	2	2	2	2.8	9																							
7-Jul	6	2	2	Z	2	3	6	5	6	7	6	5	7	UO	5	6	6	5	3	3	3	5	4	3	4.5	7																							
8-Jul	UO	11	12	12	Z	3	6	8	6	5	4	3	4	6	3	3	5	3	2	2	5	10	1	1	5.3	12																							
9-Jul	2	2	2	2	3	Z	2	6	7	2	2	2	3	7	2	3	3	2	1	5	9	5	1	1	3.1	9																							
10-Jul	Z	1	1	1	1	1	1	1	2	2	2	M	M	M	M	M	M	M	6	10	10	4	3	3	--	10																							
11-Jul	3	Z	2	2	2	2	2	2	3	2	4	7	3	4	3	4	3	4	4	3	2	3	3	3	2.9	7																							
12-Jul	4	5	Z	6	6	UO	6	7	9	6	5	6	5	6	7	8	12	14	UO	UO	UO	6	UO	UO	--	14																							
13-Jul	UO	12	6	Z	8	5	2	3	2	3	2	1	2	2	1	1	1	1	2	2	9	6	4	4	3.5	12																							
14-Jul	2	5	1	2	Z	3	3	4	4	4	4	3	4	4	4	4	3	1	2	3	4	1	1	1	2.8	5																							
15-Jul	1	1	1	1	1	Z	2	3	7	5	3	4	4	4	2	2	1	2	5	3	6	6	1	1	2.8	7																							
16-Jul	Z	1	2	2	2	2	UO	UO	UO	UO	UO	2	UO	UO	UO	UO	UO	3	3	3	3	2	2	2	--	3																							
17-Jul	2	Z	2	3	4	UO	UO	4	4	4	3	5	4	4	4	4	4	1	1	1	2	1	2	2	2.9	5																							
18-Jul	2	3	Z	2	3	5	5	UO	3	3	3	3	2	3	3	4	2	3	4	4	7	2	3	5	3.4	7																							
19-Jul	1	2	2	Z	3	2	3	3	1	1	1	1	1	1	1	1	1	3	1	1	3	8	11	15	2.8	15																							
20-Jul	11	5	4	4	Z	2	2	3	8	7	8	13	12	13	7	8	8	8	UO	7	UO	11	5	6	7.2	13																							
21-Jul	9	5	3	3	3	Z	UO	UO	4	5	3	2	3	3	4	3	2	3	2	2	3	UO	5	21	4.3	21																							
22-Jul	Z	9	1	3	2	4	5	11	5	3	4	2	3	2	2	3	3	2	1	1	2	5	8	10	4.0	11																							
23-Jul	10	Z	7	5	4	9	9	7	3	5	4	4	5	6	3	5	UO	UO	UO	UO	UO	3	4	5	5.4	10																							
24-Jul	4	4	Z	3	4	6	4	5	3	4	3	4	3	4	4	2	2	2	1	1	1	3	4	4	3.1	6																							
25-Jul	4	6	4	Z	3	3	2	2	3	2	2	3	3	5	6	5	7	2	2	2	3	UO	UO	UO	3.4	7																							
26-Jul	UO	UO	UO	5	Z	7	13	8	4	4	3	2	3	4	19	7	3	2	2	2	2	2	2	3	4.8	19																							
27-Jul	5	2	2	2	2	Z	4	5	6	6	4	UO	3	6	3	3	2	2	3	3	5	3	3	5	3.5	6																							
28-Jul	Z	5	7	6	2	2	2	3	3	3	3	2	3	1	1	2	3	2	1	2	UO	1	2	2	2.6	7																							
29-Jul	2	Z	2	2	2	2	2	C	C	C	C	C	C	C	C	C	C	2	1	3	2	7	4	6	--	7																							
30-Jul	5	6	Z	2	2	1	6	11	7	3	2	2	2	3	3	3	3	2	2	5	19	17	4	4	4.8	19																							
31-Jul	4	4	4	Z	4	4	9	10	8	3	5	3	2	4	4	3	4	UO	2	1	2	2	1	1	3.7	10																							
																								3.6	3.8	2.9	3.3	2.6	3.4	3.8	4.5	4.2	3.5	3.2	3.3	3.5	4.0	3.7	3.4	3.2	2.8	2.0	2.7	4.2	4.2	3.1	4.0	Diurnal Average	
																								11	12	12	12	8	13	13	11	9	7	8	13	12	13	19	8	12	14	6	10	19	17	11	21	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



WBEA NETWORK
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	647	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: 648

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - July 2014

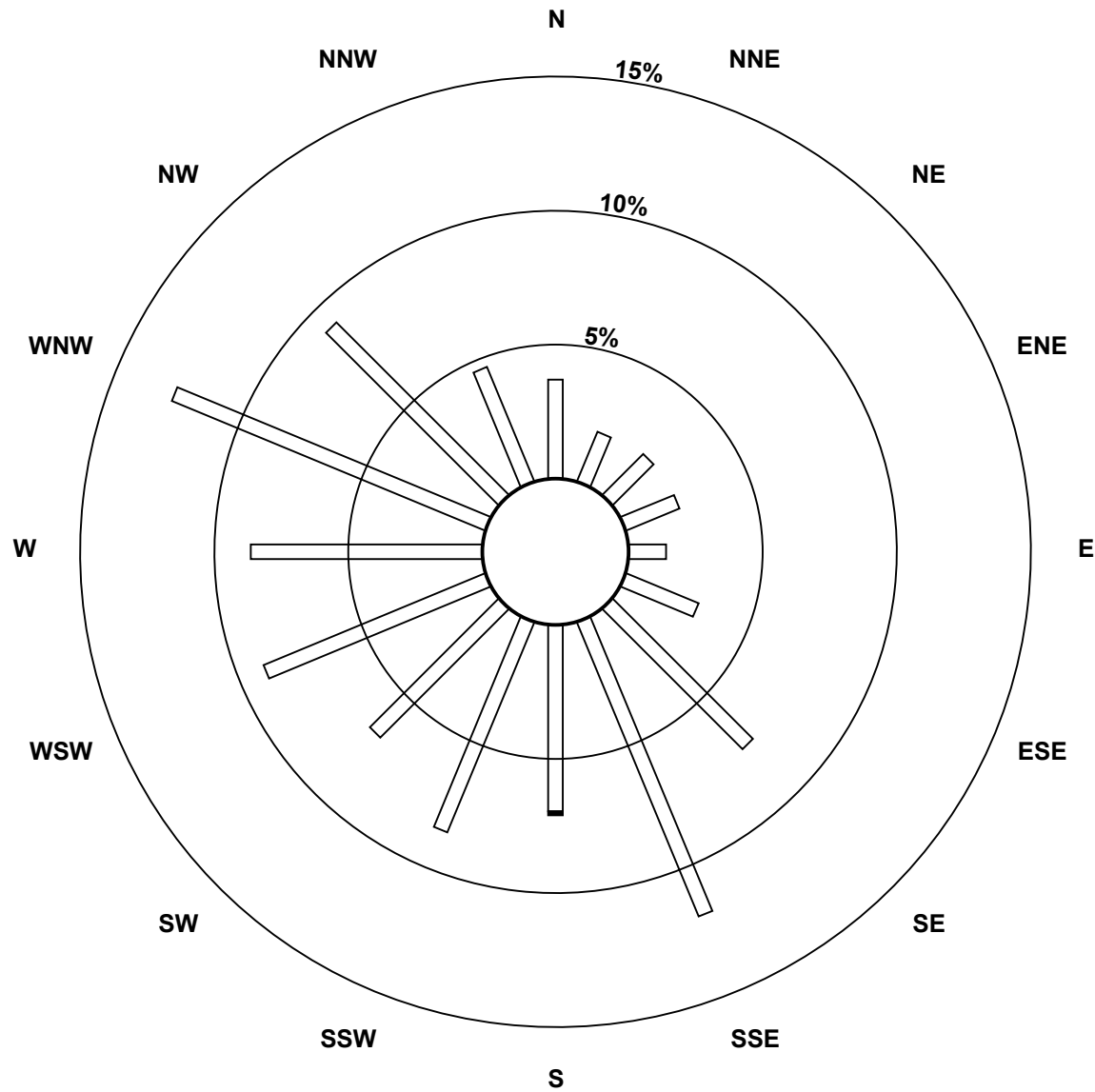
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	24	13	14	14	9	19	48	77	45	55	44	58	56	82	59	30	647
21 - 40	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	24	13	14	14	9	19	48	77	46	55	44	58	56	82	59	30	648

Total Number of Valid Hours: 648

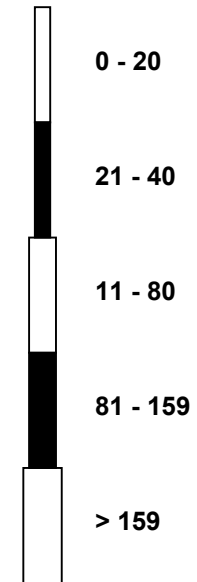
Total Number of Hours: 744

Wood Buffalo Environmental Association
Wind Rose Jul 2014

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont (AMS502)



Classes (ppb)



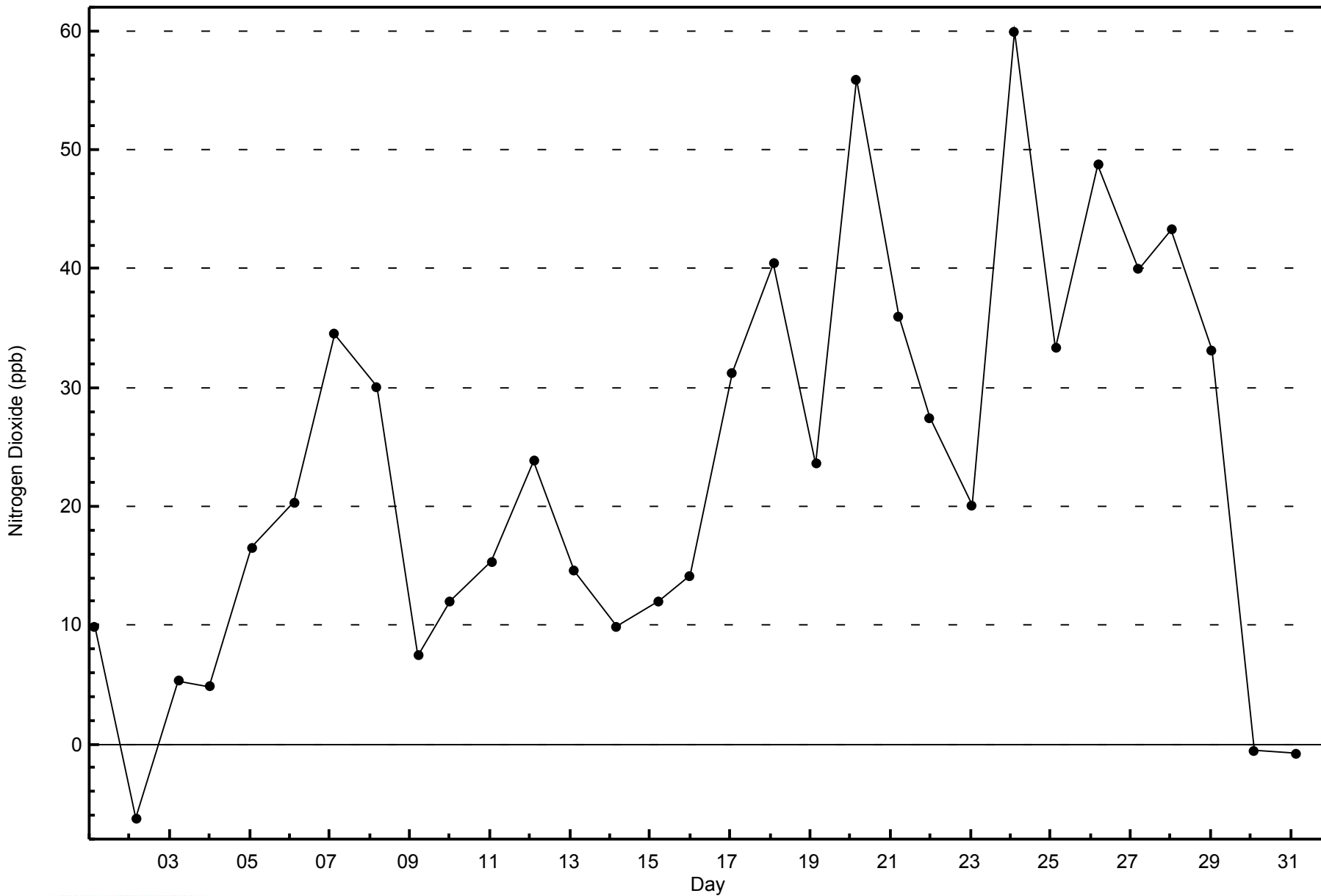
Total Number of Valid Hours: 648



WBEA NETWORK

Zero Responses

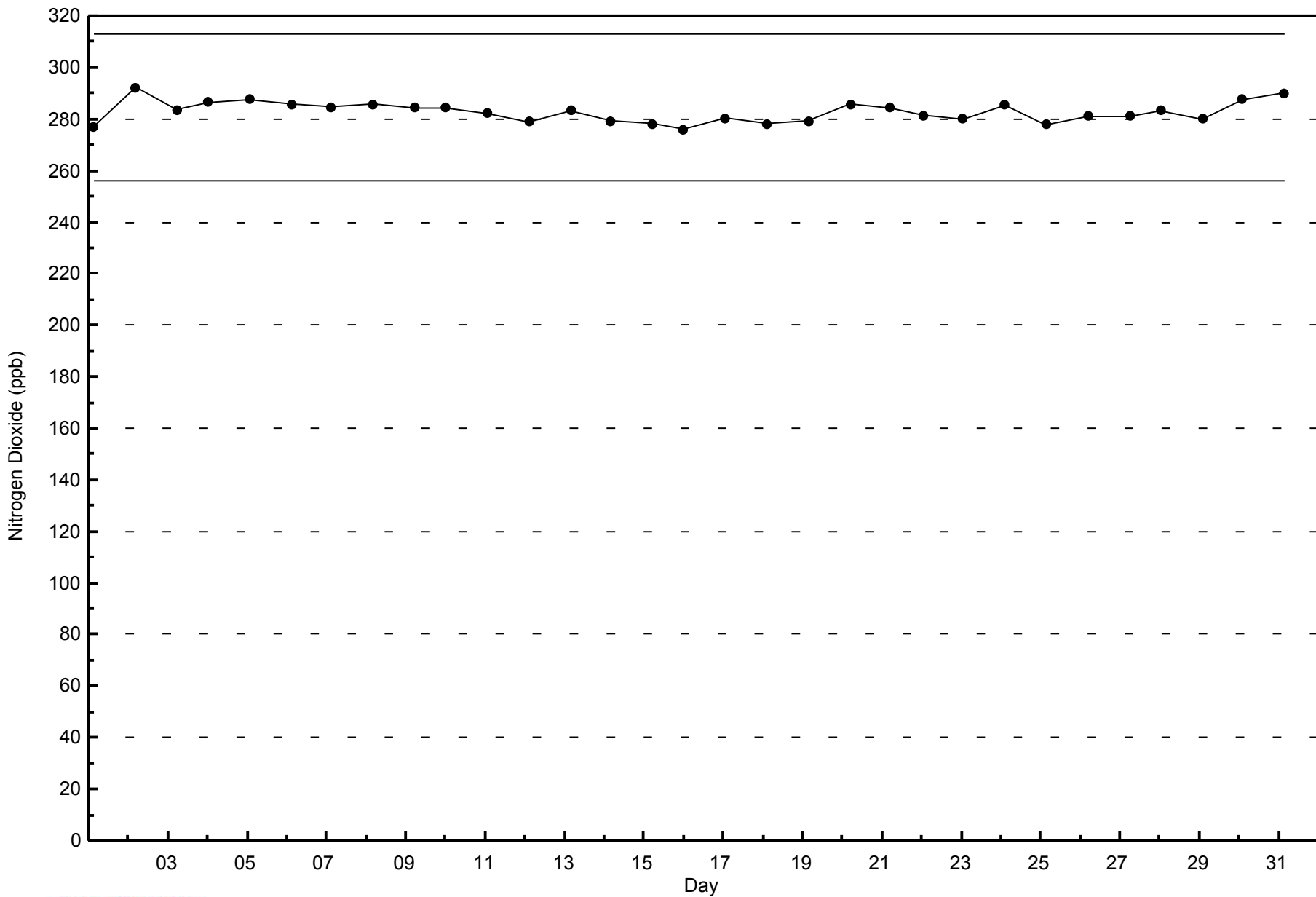
Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surrmont - July 2014





WBEA NETWORK
Span Responses

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surrmont - July 2014



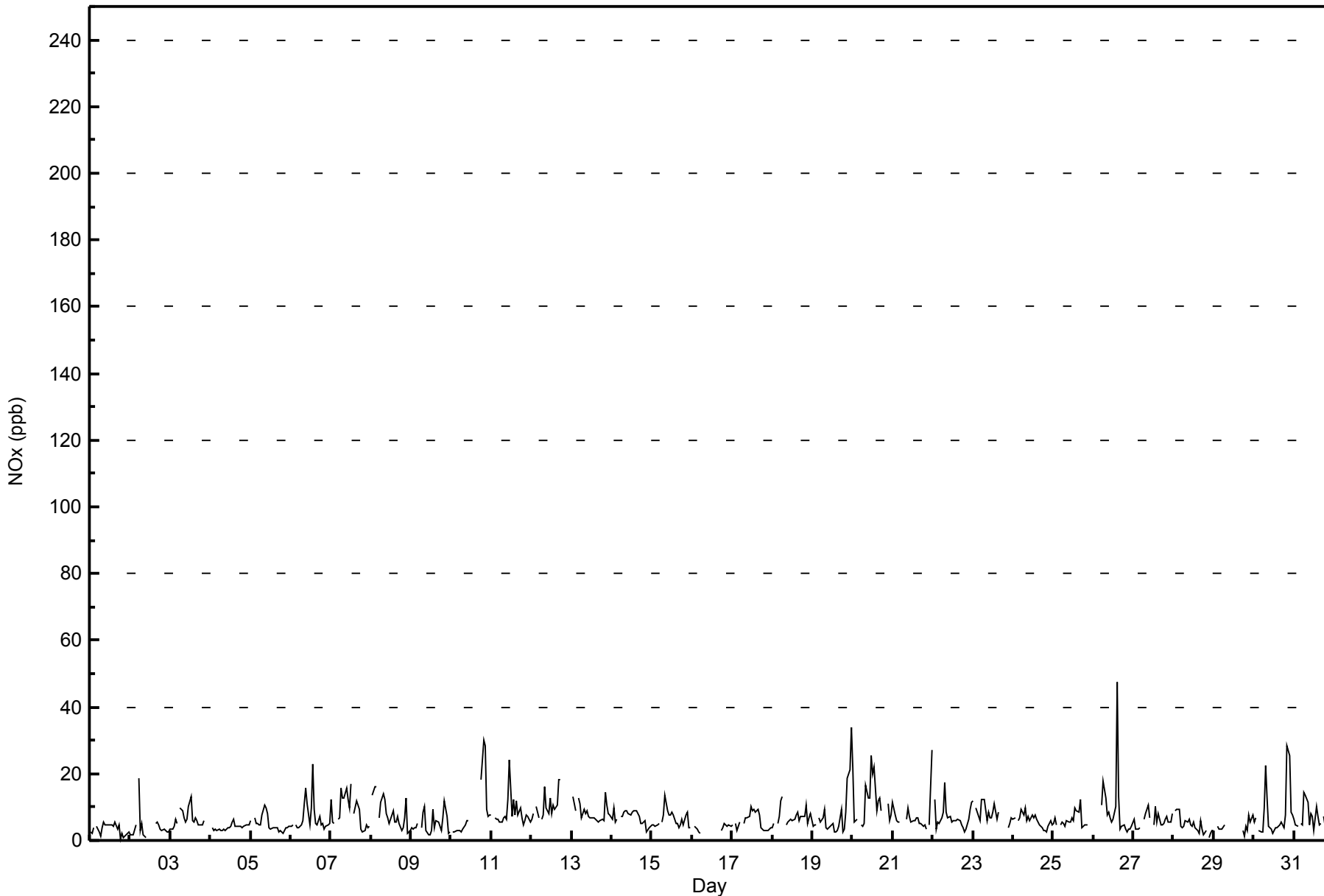


Maximum Value: 48 ppb on Jul 26 15:00																		Maximum Daily Average: 11.3 ppb on Jul 20						Hours in Service: 744		
Minimum Value: 1 ppb on Jul 1 19:00																		Minimum Daily Average: 3.3 ppb on Jul 1						Hours of Data: 648		
Maximum Diurnal Average: 8.8 ppb at hour 8																		Minimum Diurnal Average: 4.6 ppb at hour 19						Hours of Missing Data: 96		
Monthly Average: 6.7 ppb																		Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 6 Q ₃ = 8 P ₉₀ = 12 P ₉₉ = 26						Hours of Calibration: 45		
																								Percent Operational Time: 93.2		
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-Jul	3	2	4	Z	4	2	1	4	6	5	5	5	4	4	6	4	5	1	2	1	1	2	3	3.3	6	
2-Jul	2	2	2	5	Z	18	3	5	2	1	UO	C	C	C	C	5	6	5	3	3	3	3	2	4.0	18	
3-Jul	3	4	4	6	5	Z	10	9	7	6	7	10	13	6	6	7	6	5	5	6	UO	UO	5	6.3	13	
4-Jul	Z	4	3	3	3	3	3	3	3	3	4	4	4	6	6	4	4	4	4	4	4	5	5	4.0	6	
5-Jul	6	Z	7	5	5	5	5	8	10	10	8	4	3	4	4	4	4	3	3	2	3	4	4	4.9	10	
6-Jul	4	4	Z	5	4	4	5	6	11	16	11	5	10	23	9	5	5	7	5	5	3	4	5	7.0	23	
7-Jul	12	6	5	Z	6	7	16	13	13	16	12	10	17	UO	8	12	11	9	4	3	3	5	4	8.7	17	
8-Jul	UO	14	16	16	Z	7	11	14	12	8	7	5	6	9	6	6	7	5	3	4	7	13	2	8.2	16	
9-Jul	4	3	4	4	5	Z	4	8	10	3	2	2	3	9	4	6	6	4	3	7	12	7	2	4.9	12	
10-Jul	Z	3	2	3	3	3	2	3	5	6	6	M	M	M	M	M	M	M	18	30	28	9	7	--	30	
11-Jul	7	Z	7	6	6	6	6	7	7	6	12	24	7	12	8	12	8	10	7	5	6	8	7	8.2	24	
12-Jul	6	8	Z	10	7	UO	6	8	16	10	8	13	8	11	9	11	18	18	UO	UO	UO	6	UO	UO	--	18
13-Jul	UO	13	9	Z	13	11	7	9	8	9	7	7	7	7	6	6	6	6	6	6	14	10	8	8.3	14	
14-Jul	6	10	5	6	Z	7	7	9	9	9	8	8	8	9	9	7	5	5	5	6	3	4	4	7.0	10	
15-Jul	4	5	4	5	5	Z	5	8	14	9	7	8	9	8	5	5	4	5	6	5	8	9	4	6.2	14	
16-Jul	Z	4	4	3	3	2	UO	UO	UO	UO	UO	2	UO	UO	UO	UO	UO	3	4	5	5	4	5	--	5	
17-Jul	5	Z	5	3	6	UO	UO	5	7	7	7	10	9	9	9	9	8	4	3	3	3	3	4	5.8	10	
18-Jul	4	5	Z	5	7	12	13	UO	5	6	6	6	6	6	8	8	6	7	7	7	11	5	7	7.1	13	
19-Jul	4	4	5	Z	7	6	7	9	4	3	4	5	5	3	3	3	4	9	3	3	8	19	21	7.5	34	
20-Jul	21	5	6	6	Z	5	4	5	16	13	13	25	20	22	9	12	13	9	UO	8	UO	11	6	11.3	25	
21-Jul	11	8	6	5	6	Z	UO	UO	6	10	7	5	6	6	7	7	5	5	4	5	4	UO	5	27	7.2	27
22-Jul	Z	12	4	6	5	7	9	17	8	7	7	5	6	6	6	6	6	5	4	3	3	7	9	6.9	17	
23-Jul	12	Z	10	7	6	12	12	12	6	8	7	7	8	11	6	9	UO	UO	UO	UO	UO	4	5	8.4	12	
24-Jul	6	7	Z	6	7	9	8	10	6	7	6	8	7	8	7	5	4	4	3	3	3	4	6	6.0	10	
25-Jul	5	7	5	Z	5	5	5	4	6	6	6	7	6	10	9	9	12	4	4	5	5	UO	UO	UO	6.2	12
26-Jul	UO	UO	UO	7	Z	10	18	13	8	9	7	5	6	10	48	13	3	4	5	3	2	3	3	9.1	48	
27-Jul	6	3	4	3	4	Z	6	8	9	11	7	UO	5	10	5	8	5	4	5	6	7	5	6	6.2	11	
28-Jul	Z	9	9	9	4	4	4	6	5	6	5	4	6	4	3	2	6	4	2	3	UO	1	2	4.6	9	
29-Jul	3	Z	4	3	3	3	5	C	C	C	C	C	C	C	C	C	C	C	3	1	4	3	8	6	--	8
30-Jul	5	7	Z	3	3	3	10	22	13	4	3	2	3	4	4	5	5	5	4	7	29	25	8	7.9	29	
31-Jul	7	5	4	Z	5	5	14	14	11	5	8	7	3	10	7	4	5	UO	7	2	3	2	3	4	6.1	14
6.5 6.1 5.5 5.7 5.2 6.5 7.3 8.8 8.4 7.5 7.0 7.5 7.2 8.7 7.9 7.0 6.6 5.7 4.6 5.3 7.0 6.7 5.4 7.0																		Diurnal Average								
21 14 16 16 13 18 18 22 16 16 13 25 20 23 48 13 18 18 18 30 29 25 21 34																		Diurnal Maximum								
Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation																										



WBEA NETWORK
Hourly Averages

NO_x (NO_x) - ppb
ConocoPhillips - Surmont - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

NO_x (NO_x) - ppb
ConocoPhillips - Surmont - July 2014

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	634	97.84	97.84
21 - 40	13	2.01	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: 648

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

NO_x (NO_x) - ppb
ConocoPhillips - Surmont - July 2014

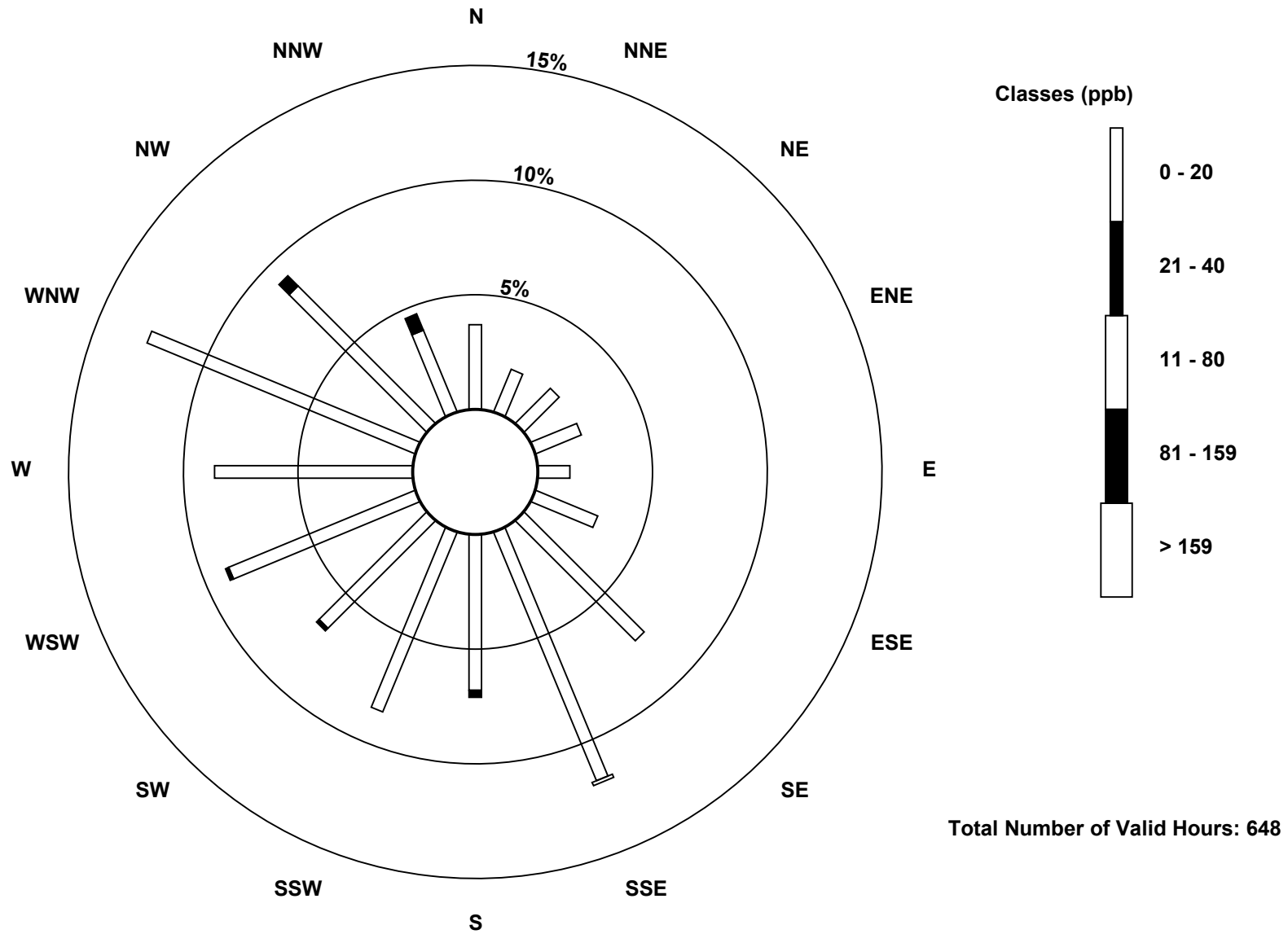
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	24	13	14	14	9	19	48	76	44	55	43	57	56	82	55	25	634
21 - 40	0	0	0	0	0	0	0	0	2	0	1	1	0	0	4	5	13
11 - 80	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	24	13	14	14	9	19	48	77	46	55	44	58	56	82	59	30	648

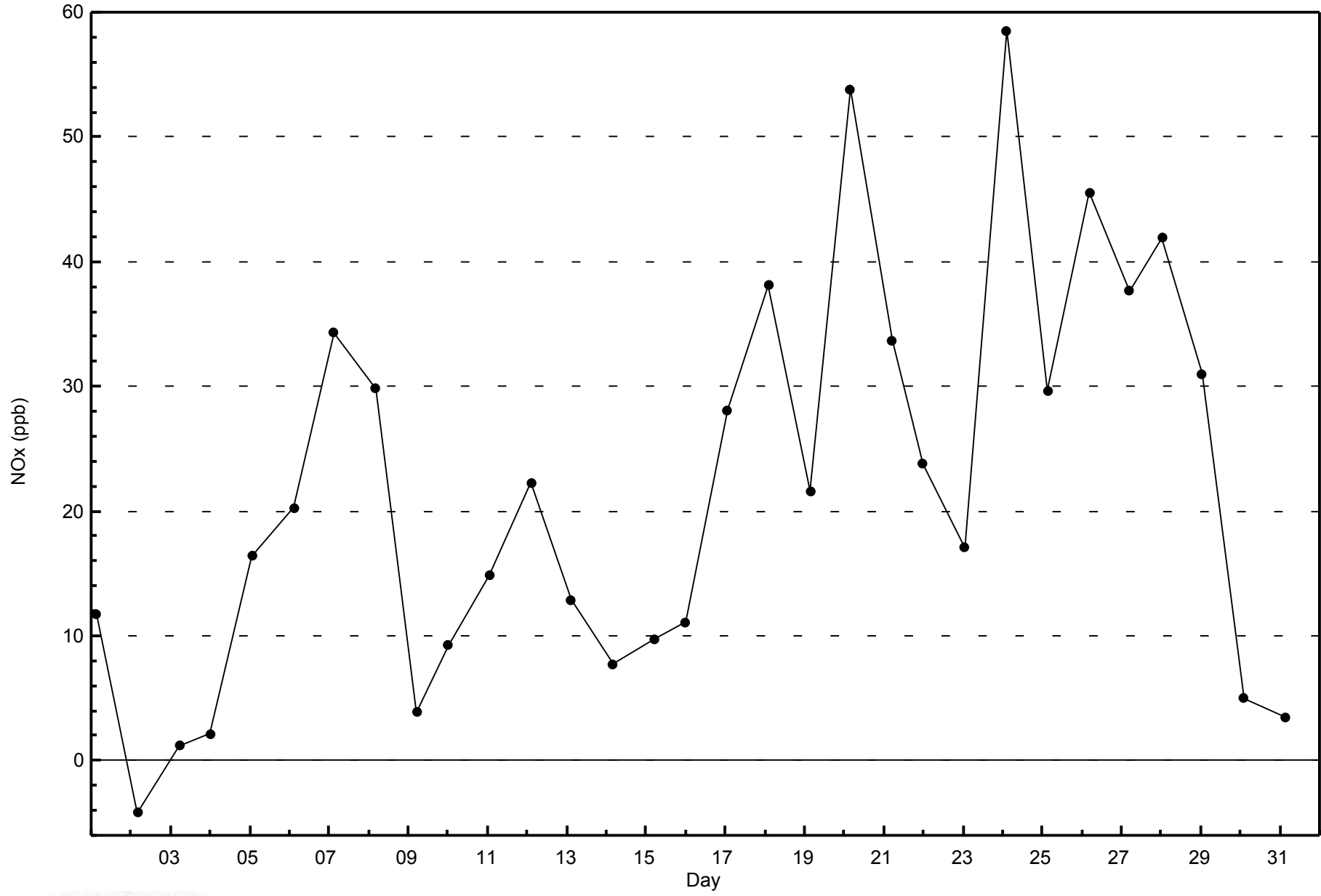
Total Number of Valid Hours: 648

Total Number of Hours: 744

Wood Buffalo Environmental Association
 Wind Rose Jul 2014

NOx (NO_x) - ppb
 ConocoPhillips - Surmont (AMS502)

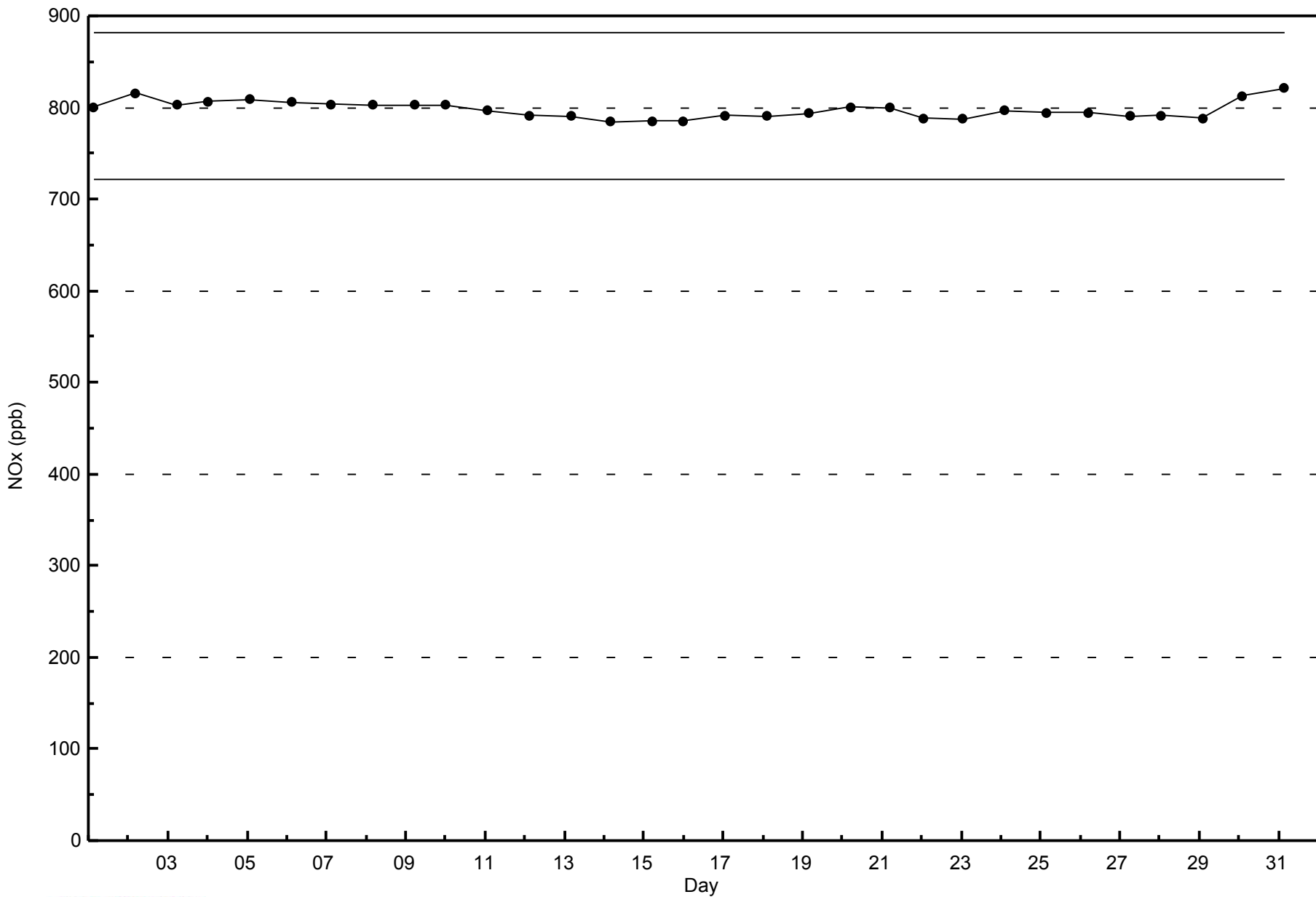






WBEA NETWORK
Span Responses

NOx (NO_x) - ppb
ConocoPhillips - Surmont - July 2014



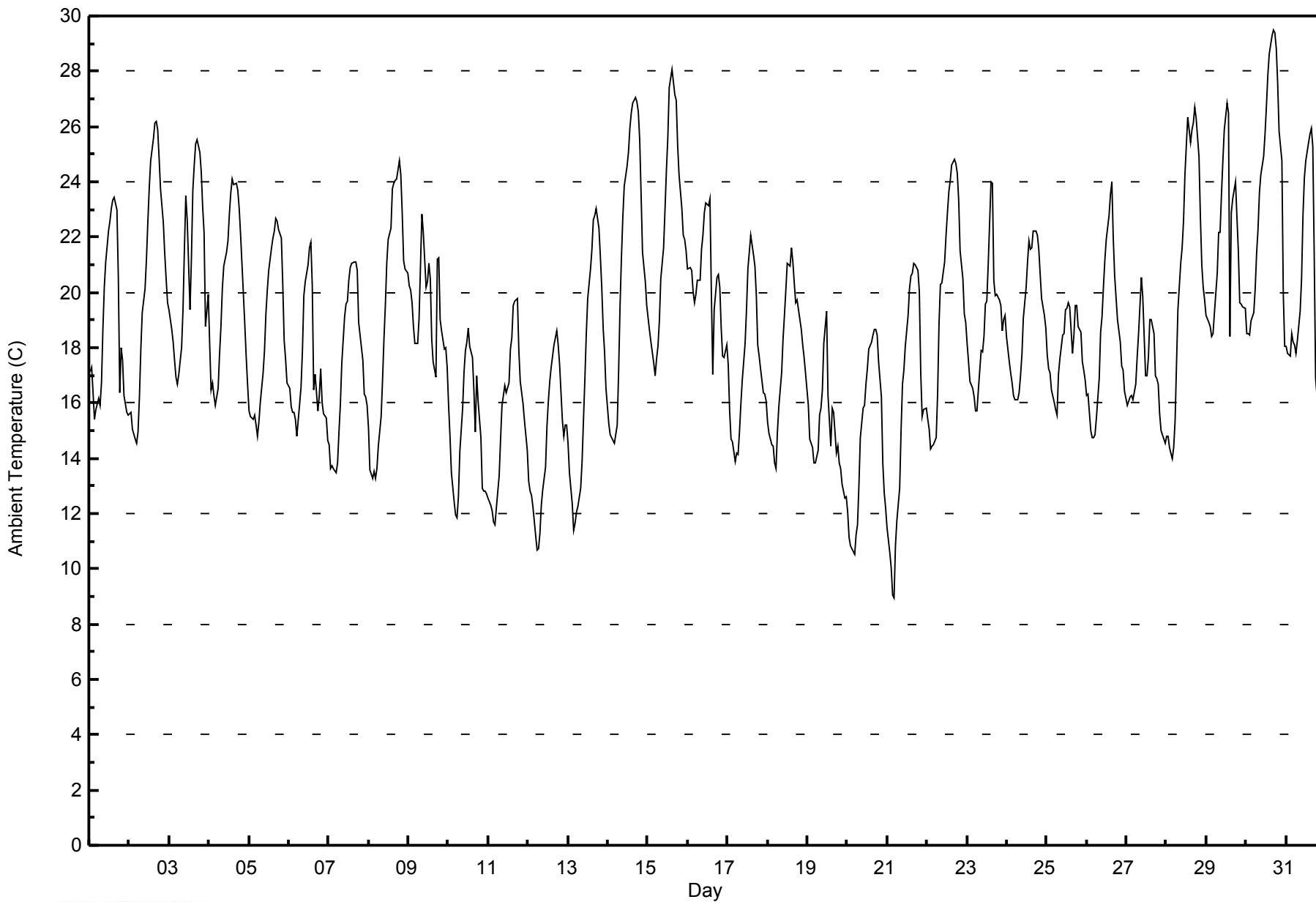


Maximum Value: 29.5 C on Jul 30 17:00																						Maximum Daily Average: 23.9 C on Jul 30																						Hours in Service: 744		
Minimum Value: 9.0 C on Jul 21 05:00																						Minimum Daily Average: 14.6 C on Jul 12																						Hours of Data: 744		
Maximum Diurnal Average: 21.9 C at hour 16																						Minimum Diurnal Average: 14.9 C at hour 5																						Hours of Missing Data: 0		
Monthly Average: 18.63 C																						Percentiles: P ₁ = 10.7 P ₁₀ = 14.0 Q ₁ = 15.9 Median = 18.4 Q ₃ = 21.1 P ₉₀ = 24.0 P ₉₉ = 27.7																						Hours of Calibration: 0		
																																												Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																						
1-Jul	17.2	17.3	16.4	15.4	15.7	16.2	15.9	16.7	18.7	20.2	21.1	22.2	22.6	23.1	23.4	23.4	23.0	20.5	16.4	18.0	17.5	16.3	15.7	15.5	18.7	23.4																				
2-Jul	15.6	15.7	15.1	14.7	14.5	14.9	16.2	18.0	19.3	20.1	21.2	22.6	23.8	24.8	25.6	26.1	26.2	25.9	24.9	23.8	22.5	21.4	20.5	19.6	20.5	26.2																				
3-Jul	19.4	18.7	18.2	17.5	16.9	16.7	17.0	18.0	19.3	21.5	23.5	22.6	19.4	21.3	23.7	24.6	25.4	25.5	25.0	24.4	23.1	22.2	18.8	19.9	20.9	25.5																				
4-Jul	18.1	16.5	16.7	16.3	15.9	16.5	17.7	18.8	20.1	20.9	21.5	21.9	22.8	23.6	24.1	23.9	23.9	23.7	23.0	22.1	21.0	18.8	17.6	16.6	20.1	24.1																				
5-Jul	15.7	15.5	15.4	15.6	15.2	14.8	15.3	16.0	17.1	17.9	19.2	20.1	20.8	21.6	21.9	22.2	22.7	22.6	22.3	22.0	20.3	18.3	17.6	16.8	18.6	22.7																				
6-Jul	16.5	15.9	15.7	15.7	15.4	14.8	16.0	16.6	17.9	19.9	20.4	21.0	21.6	21.8	20.2	16.5	17.0	15.7	16.3	17.2	16.0	15.6	15.5	14.7	17.2	21.8																				
7-Jul	14.5	13.6	13.8	13.6	13.5	13.8	14.9	16.0	17.4	19.1	19.6	19.7	20.4	20.9	21.0	21.1	21.1	20.8	18.9	18.5	17.5	16.3	16.2	15.9	17.4	21.1																				
8-Jul	15.1	13.6	13.3	13.5	13.3	13.6	14.5	15.5	16.8	18.3	19.5	21.0	21.9	22.3	23.7	24.0	24.0	24.1	24.8	24.3	22.9	21.1	20.9	20.7	19.3	24.8																				
9-Jul	20.2	20.1	19.6	18.8	18.2	18.1	19.1	21.0	22.8	22.2	20.2	20.4	21.1	20.5	18.3	17.5	16.9	21.2	21.2	19.0	18.6	17.9	18.0	17.3	19.5	22.8																				
10-Jul	15.9	14.8	13.4	12.4	11.9	11.8	12.6	14.3	15.8	17.2	17.9	18.2	18.7	18.1	17.6	16.5	14.9	17.0	16.1	14.8	12.9	12.8	12.8	12.7	15.1	18.7																				
11-Jul	12.5	12.3	12.1	11.7	11.6	12.2	13.4	14.7	15.9	16.3	16.6	16.4	16.7	17.9	18.4	19.5	19.7	19.8	17.9	16.8	16.4	16.0	15.3	14.3	15.6	19.8																				
12-Jul	13.2	12.8	12.6	12.2	11.2	10.7	10.7	11.3	12.3	12.9	13.7	15.1	16.1	16.8	17.3	18.1	18.4	18.6	18.1	17.4	15.4	14.8	15.2	15.2	14.6	18.6																				
13-Jul	14.5	13.5	12.3	11.4	11.6	12.0	12.3	12.9	13.9	15.4	16.9	18.5	19.8	20.8	21.6	22.6	22.8	23.1	22.3	21.3	20.2	18.7	17.8	16.5	17.2	23.1																				
14-Jul	15.3	14.9	14.8	14.7	14.6	15.2	17.2	19.5	21.3	22.7	23.8	24.6	25.1	25.9	26.5	26.8	27.0	26.9	26.5	25.5	23.5	21.4	20.4	19.5	21.4	27.0																				
15-Jul	19.1	18.6	18.2	17.4	17.0	17.6	18.1	19.0	20.5	21.6	23.0	24.4	25.6	27.4	28.0	27.6	27.1	27.0	25.3	24.3	23.1	22.1	21.9	21.5	22.3	28.0																				
16-Jul	20.9	20.9	20.8	20.0	19.7	19.9	20.5	20.4	21.6	22.1	22.9	23.3	23.1	23.4	20.0	17.1	19.4	20.6	20.7	20.2	18.7	17.7	17.6	18.1	20.4	23.4																				
17-Jul	17.4	15.7	14.7	14.6	13.9	14.2	14.1	14.9	16.0	16.8	18.1	19.4	20.9	21.5	22.0	21.4	21.0	19.9	18.1	17.7	17.2	16.4	16.3	16.1	17.4	22.0																				
18-Jul	15.3	14.9	14.5	14.4	13.8	13.6	14.9	15.9	17.1	18.3	19.2	20.1	21.0	21.0	21.6	21.1	20.3	19.6	19.7	19.0	18.7	18.1	17.7	17.1	17.8	21.6																				
19-Jul	15.9	14.7	14.5	14.4	13.8	13.9	14.3	15.6	15.8	16.5	18.2	19.3	16.3	15.4	14.5	15.8	15.7	14.2	14.4	13.8	13.6	13.1	12.6	12.6	14.9	19.3																				
20-Jul	12.1	11.1	10.8	10.7	10.5	11.2	11.6	13.0	14.7	15.8	15.9	16.7	17.2	17.9	18.2	18.5	18.7	18.6	18.5	17.5	16.2	13.8	12.7	12.2	14.8	18.7																				
21-Jul	11.5	10.6	10.0	9.0	9.0	10.8	11.7	12.9	15.0	16.7	17.2	18.1	19.2	20.1	20.6	20.7	21.0	21.0	20.8	20.1	17.1	15.5	15.8	15.8	15.8	21.0																				
22-Jul	15.4	15.0	14.3	14.5	14.5	14.8	16.3	18.8	20.3	20.3	21.1	22.1	22.9	23.7	24.1	24.6	24.8	24.7	24.3	23.4	21.5	20.5	19.2	18.9	20.0	24.8																				
23-Jul	18.1	17.5	16.8	16.5	16.2	15.7	15.7	16.5	17.9	17.8	18.4	19.6	19.7	21.0	24.0	23.9	20.4	19.9	19.9	19.7	19.5	18.6	19.0	19.1	18.8	24.0																				
24-Jul	18.4	17.5	17.1	16.7	16.3	16.1	16.1	16.4	17.0	17.8	19.1	20.2	21.1	21.8	21.5	21.6	22.2	22.2	22.1	21.6	20.6	19.8	19.2	18.7	19.2	22.2																				
25-Jul	17.8	17.2	17.1	16.5	16.0	15.7	15.6	17.0	17.6	18.5	18.5	19.4	19.4	19.6	19.5	17.8	18.5	19.5	19.5	18.8	18.6	17.5	17.2	16.8	17.9	19.6																				
26-Jul	16.3	16.3	15.0	14.7	14.8	14.8	15.5	16.9	18.6	19.1	20.2	21.1	21.9	22.8	23.5	24.0	22.0	20.6	19.0	18.6	18.2	17.3	17.2	16.4	18.5	24.0																				
27-Jul	15.9	16.1	16.2	16.3	16.1	16.7	17.6	18.5	19.5	20.6	19.9	17.0	17.0	17.7	19.0	19.0	18.5	17.0	16.9	16.7	15.6	15.0	14.7	14.5	17.2	20.6																				
28-Jul	14.8	14.8	14.4	14.0	14.4	15.3	17.4	19.4	21.1	21.6	22.6	24.3	25.3	26.3	25.4	25.9	26.1	26.7	26.3	24.9	22.7	21.0	20.2	19.7	21.0	26.7																				
29-Jul	19.2	18.9	18.8	18.4	18.5	19.3	20.7	22.1	22.2	23.5	24.7	25.9	26.9	26.5	18.4	22.9	23.4	24.0	22.7	21.5	19.6	19.6	19.5	19.4	21.5	26.9																				
30-Jul	18.5	18.5	18.5	19.0	19.3	20.1	21.4	22.3	23.6	24.2	24.9	25.7	26.7	27.9	28.6	29.3	29.5	29.4	28.8	27.6	25.8	24.7	19.9	18.1	23.9	29.5																				
31-Jul	18.1	17.8	17.7	18.5	18.2	18.1	17.8	18.3	19.3	20.5	22.8	24.1	24.8	25.4	25.7	25.9	25.3	21.4	16.9	15.6	15.5	16.1	15.7	15.4	19.8	25.9																				
																						16.4	15.8	15.4	15.1	14.9	15.1	15.9	17.0	18.3	19.2	20.1	20.8	21.3	21.9	21.9	21.9	21.8	21.7	20.9	20.2	19.0	18.0	17.4	17.0	Diurnal Average
																						20.9	20.9	20.8	20.0	19.7	20.1	21.4	22.3	23.6	24.2	24.9	25.9	26.9	27.9	28.6	29.3	29.5	29.4	28.8	27.6	25.8	24.7	21.9	21.5	Diurnal Maximum



WBEA NETWORK
Hourly Averages

Ambient Temperature (AT) - C
ConocoPhillips - Surrmont - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
ConocoPhillips - Surmont - July 2014

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	2	0.27	0.27
10 - 20	486	65.32	65.59
> 20	256	34.41	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

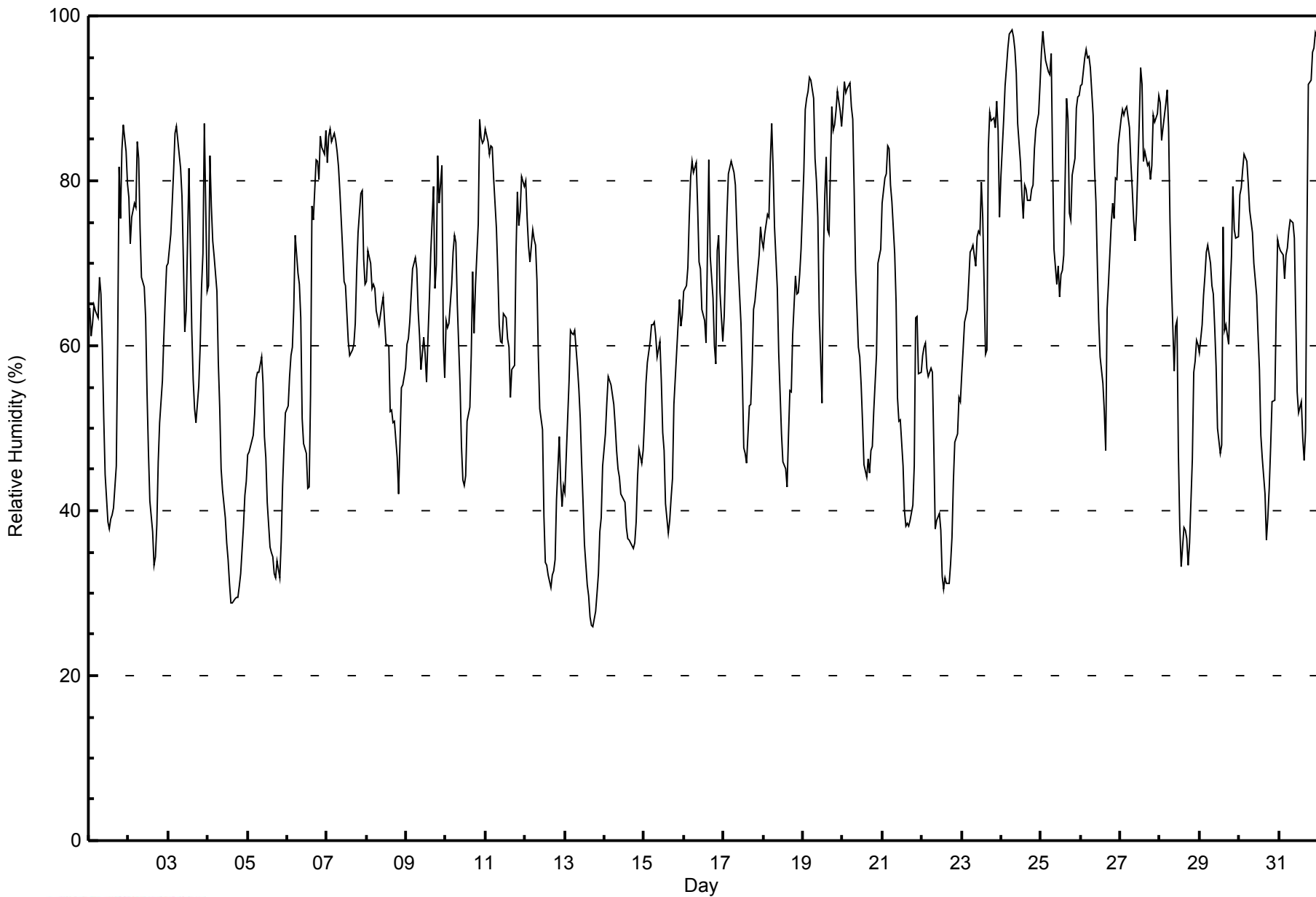
ConocoPhillips - Surmont - July 2014

Maximum Value: 98 % on Jul 24 07:00																		Maximum Daily Average: 86.6 % on Jul 24																		Hours in Service: 744													
Minimum Value: 26 % on Jul 13 18:00																		Minimum Daily Average: 42.9 % on Jul 13																		Hours of Data: 744													
Maximum Diurnal Average: 76.8 % at hour 6																		Minimum Diurnal Average: 51.3 % at hour 15																		Hours of Missing Data: 0													
Monthly Average: 64.5 %																		Percentiles: P ₁ = 29 P ₁₀ = 39 Q ₁ = 52 Median = 65 Q ₃ = 79 P ₉₀ = 87 P ₉₉ = 95																		Hours of Calibration: 0													
																																				Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	65	61	63	65	64	63	68	66	60	51	44	39	38	39	39	40	45	61	82	75	84	87	84	80	61.0	87																							
2-Jul	78	72	76	77	77	85	83	74	68	67	63	54	47	41	38	33	34	38	46	51	56	61	66	70	60.6	85																							
3-Jul	70	74	77	81	86	87	85	82	78	70	62	64	82	72	62	56	52	51	55	60	67	71	87	67	70.7	87																							
4-Jul	67	83	77	73	71	67	58	53	45	42	39	36	34	31	29	29	29	30	29	31	32	38	42	44	46.2	83																							
5-Jul	47	47	49	49	52	56	57	57	59	55	49	46	41	36	35	34	32	32	34	32	36	43	48	52	44.9	59																							
6-Jul	53	56	59	60	65	73	69	67	63	51	48	47	43	43	54	77	75	82	82	80	85	84	83	86	66.1	86																							
7-Jul	82	85	86	85	86	85	84	82	79	71	68	67	64	61	59	59	60	63	69	74	78	79	71	67	73.5	86																							
8-Jul	68	72	70	67	67	67	64	63	64	65	66	63	60	60	52	52	51	51	46	42	48	55	55	57	59.4	72																							
9-Jul	60	61	63	66	69	71	69	64	61	57	61	59	56	61	66	71	79	67	70	83	77	82	61	56	66.2	83																							
10-Jul	63	62	63	68	71	73	73	65	55	48	44	43	44	51	53	59	69	61	67	75	87	85	85	85	64.5	87																							
11-Jul	86	85	83	84	84	80	74	69	63	61	60	64	63	61	60	54	57	58	71	79	75	76	80	79	71.1	86																							
12-Jul	80	75	72	70	74	73	72	68	59	52	50	39	34	33	32	31	32	33	34	41	49	43	40	43	51.3	80																							
13-Jul	42	47	56	62	62	61	62	57	55	51	46	41	36	31	30	27	26	26	28	30	32	37	39	45	42.9	62																							
14-Jul	49	53	56	56	55	53	50	47	45	44	42	41	41	38	37	36	36	35	36	39	44	48	46	47	44.8	56																							
15-Jul	51	55	58	61	63	62	63	61	59	61	56	50	47	41	37	39	41	44	53	56	63	66	62	64	54.7	66																							
16-Jul	67	67	69	76	80	82	81	82	77	70	69	64	63	60	71	83	71	66	60	58	72	73	67	60	70.4	83																							
17-Jul	64	70	76	81	82	82	81	80	74	70	63	56	48	47	46	53	53	58	64	65	67	71	74	73	66.5	82																							
18-Jul	72	74	76	76	82	87	82	74	67	59	54	49	46	45	43	49	55	54	61	68	66	67	69	72	64.4	87																							
19-Jul	81	89	90	91	93	92	90	83	80	76	64	53	71	78	83	74	74	89	86	87	88	91	88	87	82.4	93																							
20-Jul	89	92	91	91	92	89	87	79	69	60	59	55	51	46	44	46	45	47	48	52	59	70	71	72	66.8	92																							
21-Jul	77	80	81	84	84	79	78	71	65	54	51	51	45	40	38	39	38	39	41	46	63	64	57	57	59.2	84																							
22-Jul	59	60	60	57	56	57	57	48	38	39	40	38	32	31	32	31	31	34	37	44	48	49	54	53	45.1	60																							
23-Jul	57	60	63	64	68	71	72	72	70	73	74	74	80	76	59	59	84	88	87	88	86	90	86	76	74.0	90																							
24-Jul	81	88	92	94	96	98	98	97	96	93	87	82	78	75	80	79	78	78	79	80	84	86	88	92	86.6	98																							
25-Jul	96	98	96	94	93	93	95	82	72	67	70	66	69	69	71	90	87	76	75	81	83	89	90	90	83.0	98																							
26-Jul	92	92	95	96	95	95	94	88	81	78	70	63	59	55	52	47	64	68	75	77	75	80	80	84	77.3	96																							
27-Jul	87	89	88	89	89	87	82	79	75	73	76	87	94	92	82	84	82	82	80	82	88	87	88	90	84.7	94																							
28-Jul	89	85	86	89	91	87	75	68	57	62	63	47	38	33	38	38	37	33	36	46	57	58	61	60	59.8	91																							
29-Jul	59	63	66	69	71	72	70	67	66	62	58	50	47	48	74	62	63	60	66	71	79	74	73	73	65.2	79																							
30-Jul	78	79	81	83	82	80	76	75	74	70	66	61	57	49	46	42	36	39	43	48	53	53	64	73	63.0	83																							
31-Jul	72	71	71	68	71	72	74	75	75	73	63	54	52	53	49	46	50	73	92	92	96	96	98	97	72.3	98																							
																								70.3	72.4	73.8	75.0	76.5	76.8	74.9	70.8	66.1	62.1	58.8	55.0	53.5	51.5	51.3	52.2	53.8	55.3	59.2	62.3	67.1	69.5	69.5	69.4	Diurnal Average	
																								96	98	96	96	96	98	98	97	96	93	87	87	94	92	83	90	87	89	92	92	96	96	98	97	Diurnal Maximum	



WBEA NETWORK
Hourly Averages

Relative Humidity (RH) - %
ConocoPhillips - Surrmont - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Relative Humidity (RH) - %
ConocoPhillips - Surmont - July 2014

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	81	10.89	10.89
40 - 60	205	27.55	38.44
60 - 80	290	38.98	77.42
80 - 100	168	22.58	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 31 km/h on Jul 10 19:00	Maximum Daily Speed Average: 21.1 km/h on Jul 10	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 27 07:00	Minimum Daily Speed Average: 1.3 km/h on Jul 1	Hours of Data: 744
Maximum Diurnal Speed Average: 9.0 km/h at hour 3	Minimum Diurnal Speed Average: 1.3 km/h at hour 13	Hours of Missing Data: 0
Monthly Average Velocity: 4.6 km/h 267.6 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 8 Median = 11 Q ₃ = 15 P ₉₀ = 19 P ₉₉ = 26	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NNW9	NNW9	NW7	NW5	NW5	N8	NW6	NW5	NNE3	NE7	ENE7	ENE4	SE7	E6	ENE6	SSE8	SSW12	NNW8	NE7	WSW5	WNW1	S7	SW8	SW8	NNW1.3	SSW12
2-Jul	WSW9	SW8	WSW7	SSW4	SSW3	SE4	SE4	ESE5	SE6	ESE7	ESE8	SE9	ESE9	SE9	SSE10	SSE9	SE10	SE12	SE12	SE11	SE11	SSE10	SSE10	SSE10	SSE6.7	SE12
3-Jul	S10	S10	S9	S8	SSE11	SSE12	SSE12	SSE14	SSE14	SSE16	SSE19	S12	SSE6	SSE17	SE19	SSE18	SSE16	S19	S13	S9	SSW5	WSW6	W8	SW11	S11.0	SE19
4-Jul	WSW26	WNW26	WNW25	WNW24	WNW19	WNW17	WNW23	WNW22	WNW19	WNW21	WNW23	WNW22	W22	WNW22	WNW24	W24	WNW26	WNW21	WNW19	W14	W14	W13	W13	W13	WNW20.6	WSW26
5-Jul	W12	W12	W12	W14	W14	WSW14	W13	W13	WSW12	SW13	W17	W15	WNW20	W19	W18	W15	W16	WNW17	WNW17	WNW19	W15	W13	W18	W18	W14.9	WNW20
6-Jul	W20	W22	W21	W20	W18	W17	W14	W14	NW14	NW17	NW13	WNW17	NW22	NW22	NW18	NW12	NNW8	NW13	WNW12	NW11	WNW8	WNW13	NW17	NW14	WNW14.7	NW22
7-Jul	NW14	NW14	WNW15	NW17	NW17	NW17	NW16	NW17	NW17	NW19	NNW19	NNW18	NNW18	NNW18	NNW17	NW18	NW13	WNW13	N12	NW9	NNW7	NW7	NNW8	NNW6	NNW14.0	NNW19
8-Jul	NW3	SSW2	SSW6	SSW8	SSW8	SSW8	SSW10	SSW13	S13	S11	SSE13	SSE15	SSE14	SSE9	SSE15	SSE13	SE10	SSE9	S8	SSW10	SSW8	WSW9	WSW11	WSW13	S8.3	SSE15
9-Jul	WSW13	WSW16	WSW17	W22	W14	W4	SW10	SW8	S8	WNW25	WNW22	WNW18	NW8	W8	SW13	SW10	SSW8	WSW11	SSW7	S9	SSW11	WSW11	WNW23	WNW20	WSW10.9	WNW25
10-Jul	WNW14	WNW22	WNW23	WNW24	WNW20	WNW18	WNW18	WNW14	WNW15	WNW15	W16	WNW15	W20	W25	WNW26	WNW24	WNW22	WNW23	NW31	NW29	NW26	NW28	NW27	NW25	WNW21.1	NW31
11-Jul	NW22	NW22	NW23	WNW21	WNW23	WNW21	WNW19	WNW15	NW14	WNW20	NW23	NNW18	N14	N11	NW16	NW21	N10	N11	NW13	WNW10	WNW14	NW14	NNW12	NW10	NW15.5	NW23
12-Jul	NNW11	NNW12	N15	N15	NNW12	NNW10	NNW9	NW9	NNW10	NNW13	N11	N14	N13	N15	N15	N14	NNW15	NNW14	N12	NNW7	WNW6	WNW7	NW7	NNW7	NNW10.9	N15
13-Jul	NNE4	ESE4	SSE6	SE6	SSE6	SE9	SE11	SSE12	SSE12	SSE7	SSE6	SE5	ESE6	SE4	SSE6	SSE2	SSE4	ESE5	SSE10	SSE10	SSE8	SSE9	S10	S13	SSE6.6	S13
14-Jul	SSW14	SSW15	SSW14	SSW15	SSW13	SSW10	SW12	SW15	SW13	SW10	SW10	S14	S15	S16	S15	S15	S15	S14	SSW11	SSW8	SSW7	WSW11	WSW13	WSW12	SSW11.6	S16
15-Jul	WSW14	SW15	SW15	SW12	SW10	SW10	SW9	SW9	SSW9	SSE10	SSE15	SSE17	SSE16	SSW9	WSW12	WSW12	WSW10	WSW9	SSW8	SSW10	SSW9	SW12	SW15	WSW16	SW9.9	SSE17
16-Jul	WSW14	WSW15	W19	W18	WNW17	NW15	WNW11	NW14	NNW12	N8	NE9	NNE14	N14	N17	N21	NW10	WNW8	WNW12	WNW14	WNW10	W12	W14	W18	WNW19	NW10.7	N21
17-Jul	WNW17	WNW10	W10	NW12	NW13	NNW13	N15	NNE10	ENE7	E4	ESE4	S3	ENE3	SE6	ESE4	S11	S4	W14	W15	WNW16	WNW16	WNW18	WNW17	WNW17	WNW6.5	WNW18
18-Jul	WNW19	WNW21	WNW22	WNW23	NW20	NW16	NNW13	NNE12	NE8	ENE7	NE4	ENE6	NE6	ENE6	SSW8	S11	SSW14	SSW8	SSW8	SSW8	SSW9	SW11	SW10	SSW8	WNW4.7	WNW23
19-Jul	W9	WSW7	WSW10	SSW11	SSW12	SSW12	SW10	W16	W16	W19	W20	W22	WNW23	WNW23	WNW21	WNW23	WNW20	NW14	WNW17	WNW18	NW16	NNW17	NNW18	NNW18	WNW13.2	WNW23
20-Jul	NW17	NW16	NW17	NW15	WNW16	WNW16	WNW18	WNW18	NW15	NW20	NW19	NNW18	NNW17	NNW16	N13	N12	N12	N12	N10	NNE8	N2	SW5	WSW9	WSW8	NW12.0	NW20
21-Jul	SW7	WSW6	WSW7	WSW10	W6	NNW6	NNW7	NNE6	ENE5	ESE9	SE11	SE9	SE7	S6	SE3	SE4	N3	SE6	SE5	S3	W5	WNW3	S0	S5	S1.7	SE11
22-Jul	SSW9	SW9	WSW10	WSW9	WSW10	WSW8	WSW7	SW5	SSE7	SE10	SSE10	SSE10	SSE10	SE9	SE10	S8	S9	SSE8	SE6	SE5	SSE9	S7	SW7	SSW8	S6.4	SSE10
23-Jul	SSW8	SSW9	SSW8	SSW7	S7	SSE8	SSE8	SSE8	SE10	SE9	SE10	SSE11	SE9	E8	SE11	E9	WN9	NW10	NNW11	NNW9	NNW9	SE3	SSE13	S16	SSE4.1	S16
24-Jul	S14	S14	S12	SSE11	SSE9	SSE7	SSE10	SE8	SSE10	SE12	SE12	ESE11	SSE9	SE8	SE10	SE15	SE13	SE10	SE6	SE10	SE10	SSE3	ESE4	ESE3	SSE9.2	SE15
25-Jul	NE3	NE8	NNE9	NNE12	NNE13	NE13	ENE13	E14	ESE13	ESE14	E14	E12	NE12	NNE13	NE12	ENE8	NE10	ENE8	NE8	NE7	N7	NNW7	NNW8	N6	NE8.2	E14
26-Jul	NNW4	NW6	WNW3	N2	WNW3	WSW1	ENE4	ENE4	SE5	ESE6	ESE8	SE9	SSE10	SSE8	SSE7	SSW4	WNW11	S6	WSW8	W7	W9	W11	W7	W6	SW2.0	WNW11
27-Jul	W5	W10	W9	WNW9	WSW3	WNW1	E0	E4	ESE3	ESE6	WNW4	SW3	SSW3	ESE5	SSE6	S11	SSW12	SW12	SW10	SW8	SSW9	SW11	SW11	WSW10	SW4.8	WSW12
28-Jul	WSW10	SW7	SSW6	SSW7	WSW10	WSW9	WSW7	WSW5	SSW5	SSE8	SSE11	SSW7	SSW9	WSW9	WNW8	WNW8	W6	WNW9	SSW2	SSE5	SW6	WSW9	WSW11	WSW13	SW6.2	WSW13
29-Jul	WSW11	W13	W14	WSW14	WSW15	WSW13	WSW10	ENE3	ENE8	SE7	SSE11	SSE14	S16	S7	ESE9	SSE9	SE5	SSE11	SSE9	SSW5	SSE9	S10	SSW13	SSW13	SSW6.4	S16
30-Jul	SSW12	SW11	SW10	SW10	SW9	WSW9	SW5	S5	SE7	SE10	SSE12	SSE14	S11	SSE11	SE11	SSE10	SSE12	SSE11	SSE10	S8	SW7	WSW5	NNE19	WSW3	S6.4	NNE19
31-Jul	S14	S10	SW12	S11	SW7	S9	S10	SSW5	SW5	SSW3	NE3	N10	NNE12	NNE14	NNE16	NNE12	NNE10	SSW5	WNW17	N12	N11	NNW11	N17	N18	NNW3.0	N18

W8.2	W8.5	W9.0	W8.3	W7.7	W5.9	W5.0	W4.0	WSW1.9	WSW1.9	SW1.5	WSW1.5	W1.3	WNW1.8	W2.0	WSW3.0	W3.4	W4.1	W4.0	W4.2	W4.6	W6.5	W7.4	W7.5	Diurnal Average	
WSW26	WNW26	WNW25	WNW24	WNW23	WNW21	WNW23	WNW22	WNW19	WNW25	NW23	WNW23	WNW23	W25	WNW26	WNW24	W24	WNW26	NW31	NW29	NW26	NW28	NW27	NW25	Diurnal Maximum	

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

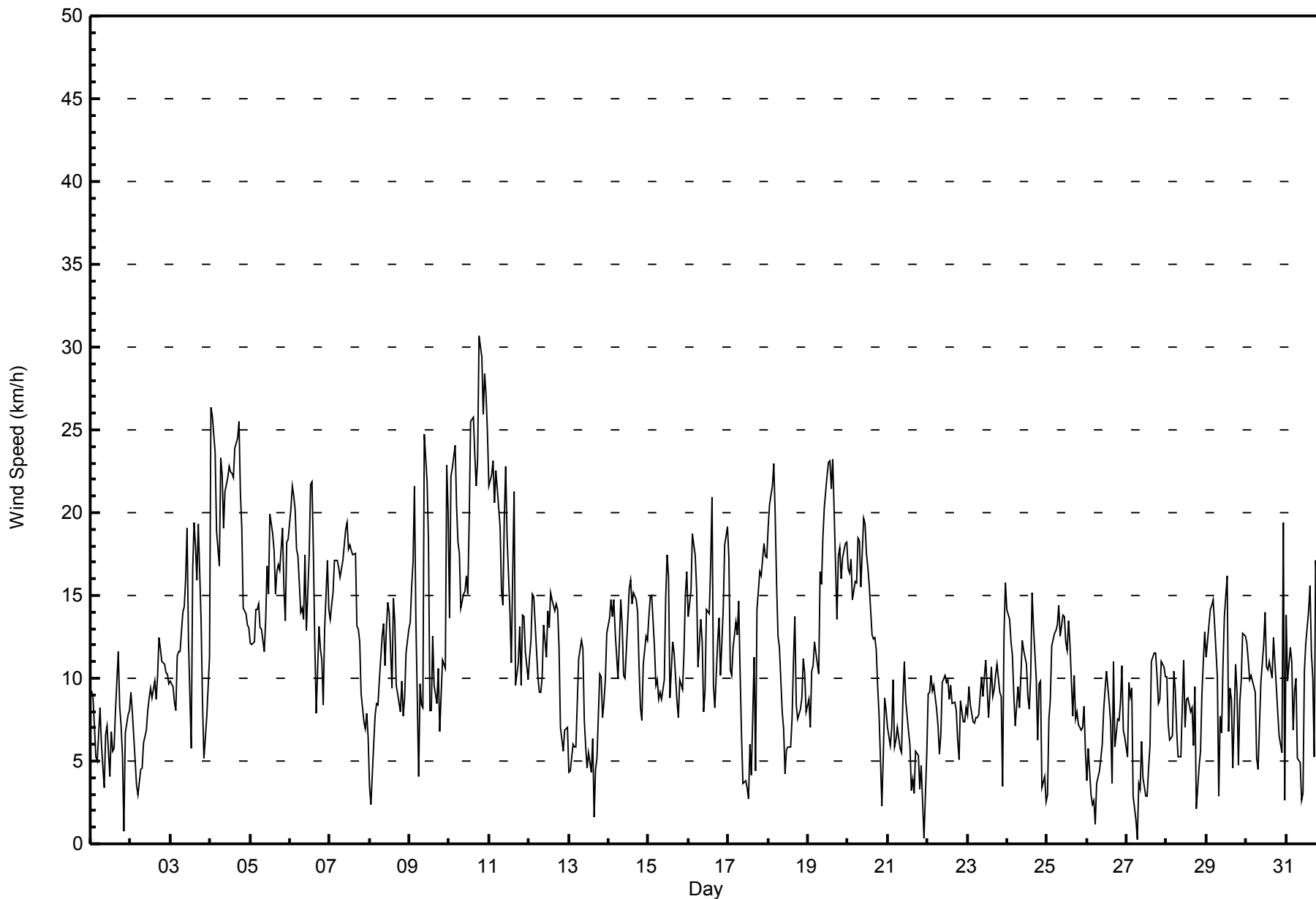


WBEA NETWORK

Hourly Averages

Wind Speed (WS) - km/h

ConocoPhillips - Surmont - July 2014





WBEA NETWORK
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - July 2014

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	84	11.29	11.29
6 - 11	325	43.68	54.97
12 - 19	269	36.16	91.13
20 - 28	64	8.60	99.73
29 - 38	2	0.27	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA NETWORK
Frequency Distribution

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - July 2014

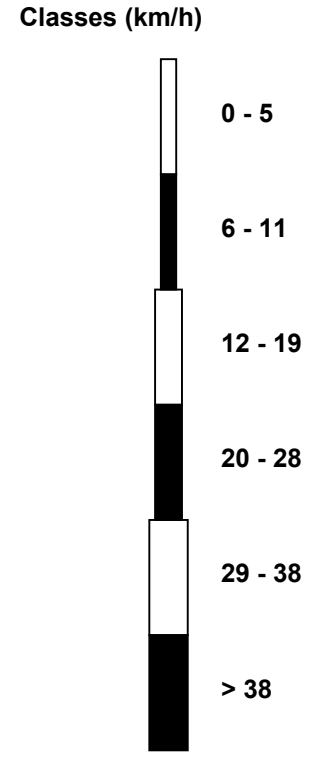
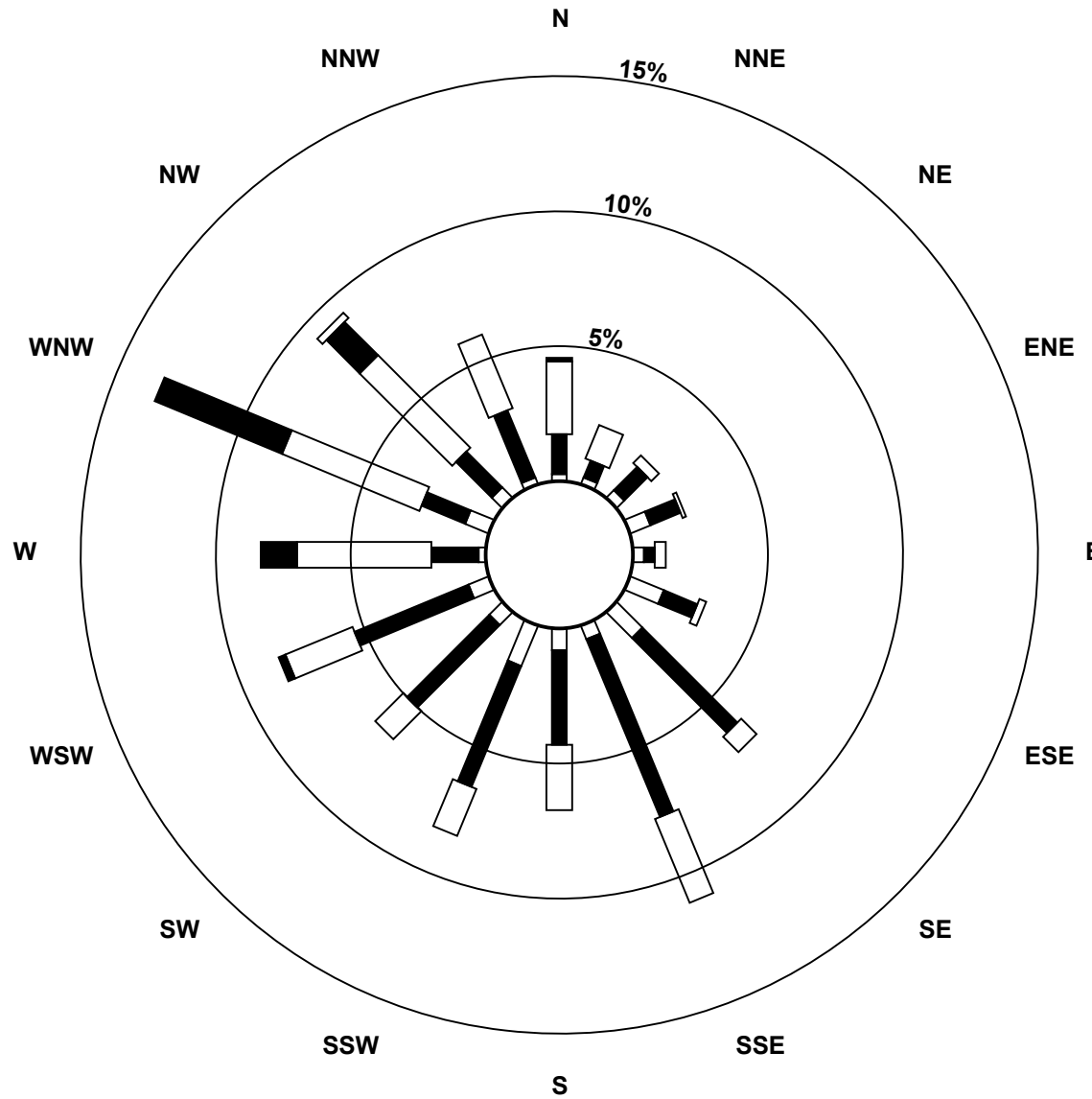
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	2	3	6	3	10	10	4	6	12	5	6	2	7	4	2	84
6 - 11	11	5	9	9	3	10	37	53	26	36	32	34	13	13	14	20	325
12 - 19	20	10	3	1	3	2	6	25	18	14	11	20	37	41	36	22	269
20 - 28	1	0	0	0	0	0	0	0	0	0	0	2	10	38	13	0	64
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	34	17	15	16	9	22	53	82	50	62	48	62	62	99	69	44	744

Total Number of Valid Hours: 744

Total Number of Hours: 744

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

**Wind Speed (WS) - km/h
ConocoPhillips - Surmont (AMS502)**



Total Number of Valid Hours: 744



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 15 km/h on Jul 29 15:00																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 1 km/h on Jul 8 03:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 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-Jul	3	2	1	1	1	2	1	1	1	2	2	3	3	3	2	3	3	7	5	3	2	3	1	1	7
2-Jul	1	1	4	2	1	1	1	1	2	2	2	2	2	3	4	3	3	3	3	2	2	2	1	1	4
3-Jul	2	2	1	1	2	2	2	3	3	3	4	5	3	4	4	5	3	4	4	2	1	1	11	5	11
4-Jul	7	4	4	4	3	3	4	4	4	4	5	5	5	5	5	6	5	6	5	4	4	2	2	1	7
5-Jul	1	1	1	2	2	3	2	4	3	4	5	4	4	4	4	4	4	4	4	5	3	3	2	3	5
6-Jul	3	3	3	3	4	3	2	3	3	4	3	4	4	5	8	3	3	3	2	2	1	2	4	3	8
7-Jul	2	3	2	3	3	3	2	3	3	4	4	4	4	4	4	3	3	3	3	2	4	1	3	1	4
8-Jul	1	2	1	1	1	1	2	2	3	2	2	3	4	2	3	3	2	1	3	2	1	2	2	3	4
9-Jul	4	3	3	3	7	4	3	2	2	7	4	3	4	4	4	2	3	3	3	4	3	3	5	5	7
10-Jul	3	4	4	4	4	4	4	3	4	3	4	5	6	6	5	5	4	6	6	6	5	6	5	5	6
11-Jul	4	4	4	5	4	4	4	4	4	5	4	5	4	3	4	5	5	3	4	1	3	3	3	2	5
12-Jul	2	2	3	3	2	3	2	2	2	3	3	3	4	4	3	3	3	3	3	2	2	1	1	1	4
13-Jul	1	2	1	1	1	2	2	2	3	3	3	3	3	3	3	3	2	2	2	1	1	2	2	3	4
14-Jul	2	3	3	3	3	2	3	4	3	3	3	3	3	4	4	3	3	3	3	2	1	2	3	3	4
15-Jul	3	3	3	3	2	2	2	2	2	2	3	3	3	4	3	3	3	2	2	2	2	3	3	4	4
16-Jul	3	4	3	3	3	4	2	2	2	2	3	3	3	5	5	8	2	2	3	2	2	2	3	3	8
17-Jul	3	1	1	2	2	2	3	2	2	2	2	2	3	2	3	3	2	5	2	3	3	3	3	3	5
18-Jul	3	3	4	4	3	2	3	3	3	2	3	3	3	3	4	3	4	3	2	2	2	3	3	3	4
19-Jul	2	2	3	3	3	3	3	4	4	5	5	6	6	6	6	5	4	3	4	3	3	4	4	3	6
20-Jul	3	2	2	3	3	3	4	3	3	4	3	3	4	4	4	3	3	4	2	1	2	3	1	1	4
21-Jul	2	1	2	1	2	2	2	1	2	3	3	3	3	3	3	3	2	3	1	1	1	2	1	2	3
22-Jul	1	1	1	1	1	2	1	1	1	2	2	3	3	3	4	3	2	2	1	1	1	1	1	1	4
23-Jul	1	2	1	1	1	1	1	2	2	2	2	2	2	2	4	4	3	2	2	4	4	2	2	4	4
24-Jul	3	2	2	2	3	2	2	2	2	2	2	2	2	2	4	4	3	3	2	2	2	2	1	2	4
25-Jul	2	1	2	2	2	3	3	4	3	3	3	3	4	3	3	2	2	2	1	1	2	2	2	2	4
26-Jul	2	2	1	2	1	2	1	2	2	2	3	3	3	3	3	3	4	2	1	2	1	2	2	2	4
27-Jul	3	1	1	1	2	3	1	1	2	2	6	3	2	2	2	4	3	3	2	2	3	2	2	2	6
28-Jul	2	3	2	3	2	1	2	2	2	2	2	3	4	3	2	2	2	3	3	2	2	2	2	2	4
29-Jul	2	3	3	3	2	3	2	3	2	2	2	3	4	4	15	3	2	3	2	2	2	2	3	2	15
30-Jul	2	2	2	2	2	2	2	1	1	2	3	3	3	3	3	3	2	2	2	2	1	7	9	3	9
31-Jul	3	3	3	6	5	2	3	3	2	2	3	3	3	3	4	4	3	4	7	3	2	4	3	3	7
Diurnal Maximum																									



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

ConocoPhillips - Surmont - July 2014

Direction of Maximum Speed: 315 deg on Jul 10 19:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 298.5 deg on Jul 10	Hours of Data: 744
Direction of Minimum Speed: 83 deg on Jul 27 07:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.3 deg on Jul 1	Percent Operational Time: 100.0
Monthly Average Direction: 267.7 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	338	344	316	304	312	353	311	307	25	48	73	72	140	100	67	148	213	341	38	247	300	170	221	232	336.4
2-Jul	238	236	248	211	195	142	135	122	128	111	115	129	111	130	150	157	141	142	144	141	146	151	165	166	150.4
3-Jul	179	179	182	172	164	168	167	162	154	150	149	187	158	149	143	154	164	177	175	184	207	252	279	218	169.3
4-Jul	251	285	296	299	302	295	294	290	296	295	287	286	282	278	283	283	272	285	285	285	276	278	277	277	284.9
5-Jul	259	259	263	267	261	257	263	259	243	234	263	270	292	279	278	277	277	283	282	287	278	274	277	274	270.6
6-Jul	272	271	271	270	277	277	270	270	312	315	320	294	305	317	304	326	348	322	303	308	301	300	307	309	295.7
7-Jul	311	307	303	309	308	310	317	312	315	322	342	346	339	344	329	318	323	321	3	325	338	308	335	330	323.6
8-Jul	322	195	201	205	209	205	195	195	189	170	157	157	160	148	159	151	144	150	173	193	208	237	249	246	184.1
9-Jul	246	251	256	259	269	281	236	222	191	282	299	301	309	275	222	223	202	248	208	188	200	238	285	297	258.7
10-Jul	298	290	299	298	300	294	291	288	289	285	278	284	279	270	296	302	294	299	315	322	320	310	308	309	298.5
11-Jul	309	312	306	303	300	297	302	298	304	300	309	335	6	5	305	310	356	353	321	292	282	305	340	321	312.6
12-Jul	324	327	354	357	335	348	335	320	345	347	4	358	353	360	357	358	346	334	4	329	294	293	309	336	343.8
13-Jul	18	109	147	142	164	144	142	154	160	157	147	133	118	134	165	156	154	110	150	161	162	162	169	187	151.7
14-Jul	205	207	205	204	211	213	223	234	232	224	220	170	172	175	178	174	175	176	200	197	218	238	242	239	203.5
15-Jul	242	236	230	229	235	231	234	228	199	156	156	162	159	203	249	257	251	246	201	213	204	218	235	253	218.1
16-Jul	243	251	266	272	283	312	301	311	327	6	34	20	8	6	359	323	297	301	301	287	273	275	281	289	304.8
17-Jul	298	284	278	309	317	345	4	22	65	93	102	181	74	130	120	171	185	270	281	293	295	288	303	297	302.0
18-Jul	296	302	301	303	315	319	336	15	48	65	49	64	48	75	192	186	208	213	198	196	209	236	219	207	284.9
19-Jul	264	239	247	196	195	197	233	260	269	267	262	259	301	293	295	287	295	312	296	298	319	343	335	332	283.3
20-Jul	325	309	307	304	298	297	296	301	319	311	314	333	335	334	354	352	353	357	358	23	353	231	244	250	318.1
21-Jul	236	250	254	250	263	333	339	22	68	114	137	141	143	169	137	127	3	136	140	171	269	299	175	190	179.3
22-Jul	213	221	243	245	242	248	249	226	161	144	149	153	167	137	142	175	180	155	143	129	151	181	216	202	185.5
23-Jul	205	203	212	197	179	158	156	154	140	143	145	151	140	81	128	94	312	323	332	336	327	145	167	186	164.7
24-Jul	181	174	174	161	158	149	150	146	149	152	136	123	147	126	145	143	126	146	131	133	143	158	110	103	147.4
25-Jul	56	55	33	27	33	39	72	99	115	105	100	80	43	31	42	74	36	60	47	39	11	335	338	355	53.4
26-Jul	329	317	303	349	287	252	58	57	124	121	118	143	152	167	152	211	295	188	249	265	270	259	261	262	221.9
27-Jul	275	264	271	286	251	284	83	91	102	117	300	236	192	121	166	188	200	236	236	217	205	224	229	246	225.8
28-Jul	241	235	206	210	252	246	253	254	195	168	161	194	194	242	283	283	277	302	202	165	229	252	258	257	236.2
29-Jul	254	259	262	255	257	255	252	68	62	130	161	161	169	181	104	157	145	159	155	199	157	190	207	197	198.9
30-Jul	204	220	221	223	232	249	222	186	134	144	151	154	169	161	145	162	155	155	157	184	217	255	13	252	180.6
31-Jul	188	185	220	191	219	185	177	213	231	208	45	10	14	14	16	20	26	211	301	356	7	348	360	2	343.7

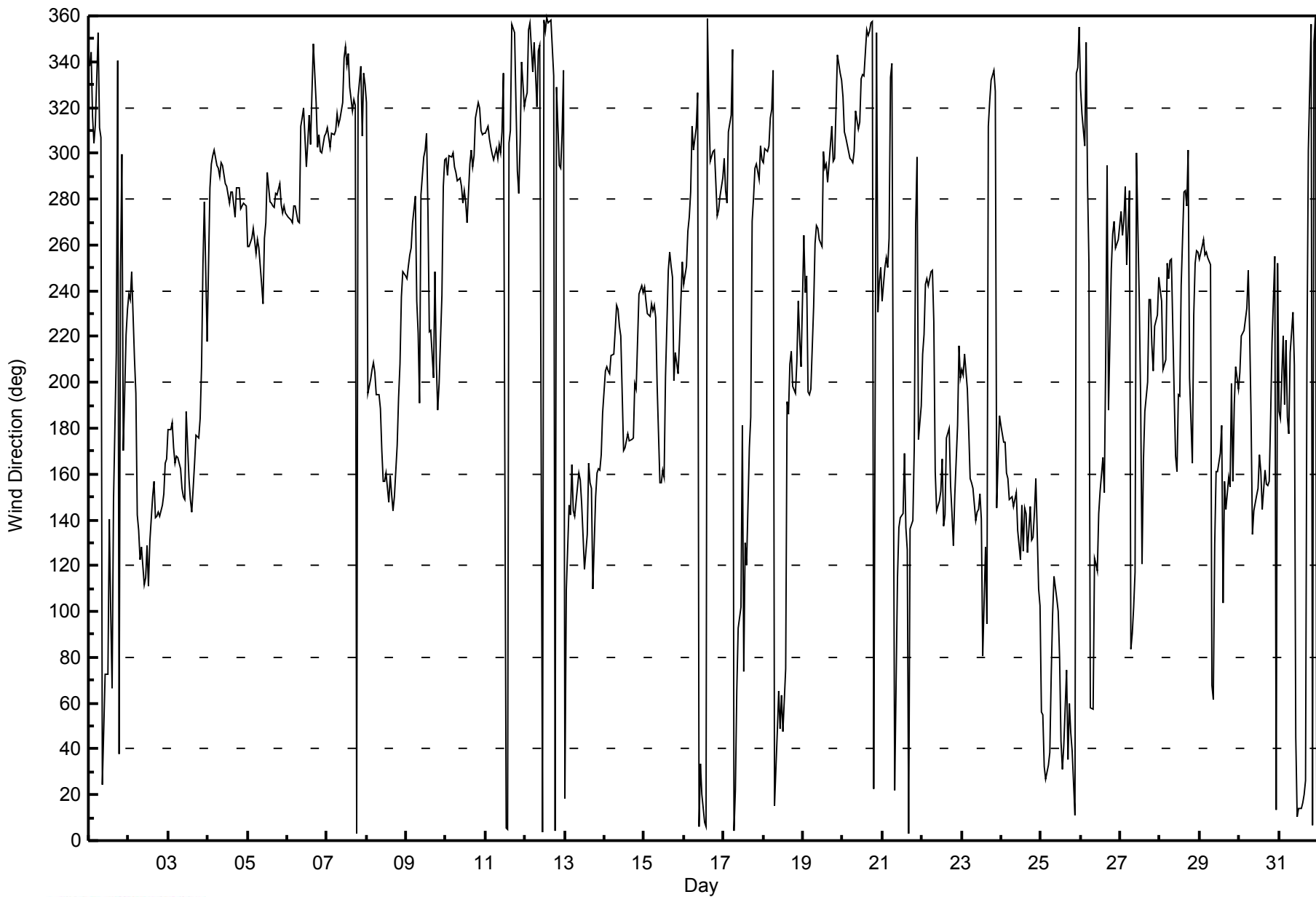
262.5 265.1 268.2 268.9 272.0 276.0 272.0 266.6 245.8 245.7 229.0 238.0 277.4 296.9 277.6 248.8 259.4 267.2 278.2 270.1 264.7 266.1 279.1 269.4
 Diurnal Average

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



WBEA NETWORK
Hourly Averages

Wind Direction (WD) - deg
ConocoPhillips - Surrmont - July 2014





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

ConocoPhillips - Surmont - July 2014

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Jul 17 13:00																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 3 deg on Jul 22 04:00																									
Percentiles: P ₁ = 6 P ₁₀ = 9 Q ₁ = 12 Median = 17 Q ₃ = 26 P ₉₀ = 47 P ₉₉ = 90																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Jul	22	15	17	20	24	18	19	27	45	29	32	76	37	57	39	27	23	71	61	18	91	31	13	12	91
2-Jul	7	6	42	22	34	23	20	27	26	27	25	32	31	35	27	32	20	19	13	12	12	11	9	9	42
3-Jul	12	11	11	11	8	10	11	11	13	13	14	37	46	12	14	18	16	13	14	14	29	18	60	38	60
4-Jul	18	12	9	9	9	11	10	10	13	13	17	15	17	16	18	13	17	13	12	11	9	6	7	6	18
5-Jul	9	9	7	6	8	11	9	14	19	21	21	17	16	18	17	20	15	13	13	11	8	8	7	8	21
6-Jul	8	8	8	9	16	10	9	16	16	16	27	17	18	16	33	26	41	27	10	14	22	10	9	9	41
7-Jul	10	9	9	9	10	9	12	10	12	18	23	21	23	25	26	21	20	21	22	28	28	10	29	30	30
8-Jul	46	50	15	10	11	16	15	14	13	18	16	13	17	11	16	15	12	10	30	16	13	15	14	15	50
9-Jul	15	14	11	9	65	76	17	22	22	18	10	11	60	62	27	20	52	26	48	29	14	23	12	10	76
10-Jul	10	9	11	9	9	10	11	14	16	21	20	28	18	14	16	16	12	14	11	14	14	11	10	9	28
11-Jul	10	10	10	11	11	11	11	13	13	12	13	27	23	28	14	13	39	25	29	17	8	16	22	13	39
12-Jul	13	13	17	16	21	22	20	19	26	26	24	23	32	22	23	24	24	20	15	35	19	16	24	21	35
13-Jul	32	22	12	11	12	11	13	15	18	48	50	57	59	72	60	92	59	49	18	10	9	11	10	16	92
14-Jul	13	13	13	14	15	15	18	16	20	28	33	21	18	19	23	22	18	17	21	17	12	13	15	16	33
15-Jul	15	15	14	16	13	13	14	16	23	21	11	13	13	48	20	15	16	17	16	17	16	16	16	14	48
16-Jul	16	15	9	8	11	9	14	8	22	27	27	15	21	21	17	49	14	10	10	17	8	8	8	9	49
17-Jul	9	8	12	9	10	19	15	22	28	61	63	65	99	52	58	17	46	14	9	10	9	10	9	9	99
18-Jul	9	9	9	8	8	9	25	22	26	37	73	56	70	53	51	22	28	22	24	16	18	17	21	28	73
19-Jul	20	19	18	20	14	16	23	12	12	12	19	20	19	12	14	13	14	15	12	10	22	19	17	14	23
20-Jul	14	8	8	8	10	10	10	15	13	12	13	18	23	25	35	29	26	23	27	12	63	55	6	10	63
21-Jul	13	17	14	6	30	19	22	19	30	33	24	33	51	57	93	67	80	53	21	35	31	28	92	16	93
22-Jul	10	11	6	3	6	5	10	20	23	12	20	29	28	31	25	38	32	24	13	13	16	18	12	12	38
23-Jul	14	14	13	12	10	10	11	17	15	13	12	14	15	27	32	44	29	20	21	33	41	64	12	14	64
24-Jul	13	11	11	12	13	15	12	15	15	14	15	17	20	28	15	15	18	13	15	14	13	64	40	68	68
25-Jul	45	14	21	12	16	13	17	18	19	20	18	21	36	16	26	21	17	27	23	13	13	31	28	36	45
26-Jul	34	26	53	49	58	85	23	32	31	36	32	28	24	40	48	85	48	51	10	13	14	13	11	16	85
27-Jul	31	8	8	9	68	88	94	32	47	35	89	67	52	20	36	21	26	16	18	18	29	14	15	14	94
28-Jul	16	30	26	37	12	10	14	20	40	25	20	49	47	34	16	22	45	20	69	33	20	10	9	9	69
29-Jul	11	13	8	11	11	11	14	93	26	33	23	21	18	81	85	30	65	25	14	40	24	15	14	12	93
30-Jul	13	14	13	14	13	15	40	27	15	13	18	15	25	24	20	24	15	14	11	21	11	37	20	72	72
31-Jul	14	20	21	41	49	22	22	41	48	68	80	23	19	23	22	23	21	80	49	36	30	22	15	16	80
																	46 50 53 49 68 88 94 93 48 68 89 76 99 81 93 92 80 80 69 40 91 64 92 72								
Diurnal Maximum																									



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Calibration Date	June 30, 2013	Previous Calibration	N/A
Station Name	ConocoPhillips	Station Number	AMS 102
Reason:	Install		
Start Time (MST)	13:48	End Time (MST)	5:05
Barometric Pressure	n/a mmHg	Station temp.	25 Deg C
Calibrator Make/Model	API T700	Serial Number	622
Cal Gas Concentration	51.1 ppm	Cal Gas Expiry Date	29-May-14
Gas Cert Reference	LL110503		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882
DACS voltage range	NA	DACS channel #	TCP/IP

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	NA	938
Analyzer Range (mv)	1000	1000	Lamp voltage	NA	3045
Calculated slope	NA	0.993496	Chamber temp.	NA	50.0
Calculated intercept	NA	0.814280	Pressure (inHg)	NA	22.9
Analyzer Background	NA	18.7	Flow (lpm)	NA	0.587
Analyzer Coefficient	NA	1.013	Intensity	NA	75

Analyzer make	API T100	Analyzer serial #	598
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.0	-0.1	N/A
high point	5006	76.6	781.9	786.6	0.994
second point	5006	38.4	392.0	393.4	0.996
third point	5006	19.2	196.0	195.7	1.002
calibrator zero	5000	0.0	0.0	-0.1	N/A
as left zero	5000	0.0	0.0	0.3	N/A
as left span	6000	92.0	783.5	768.0	1.020
Average Correction Factor					0.997

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

Adjusted zero and span.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

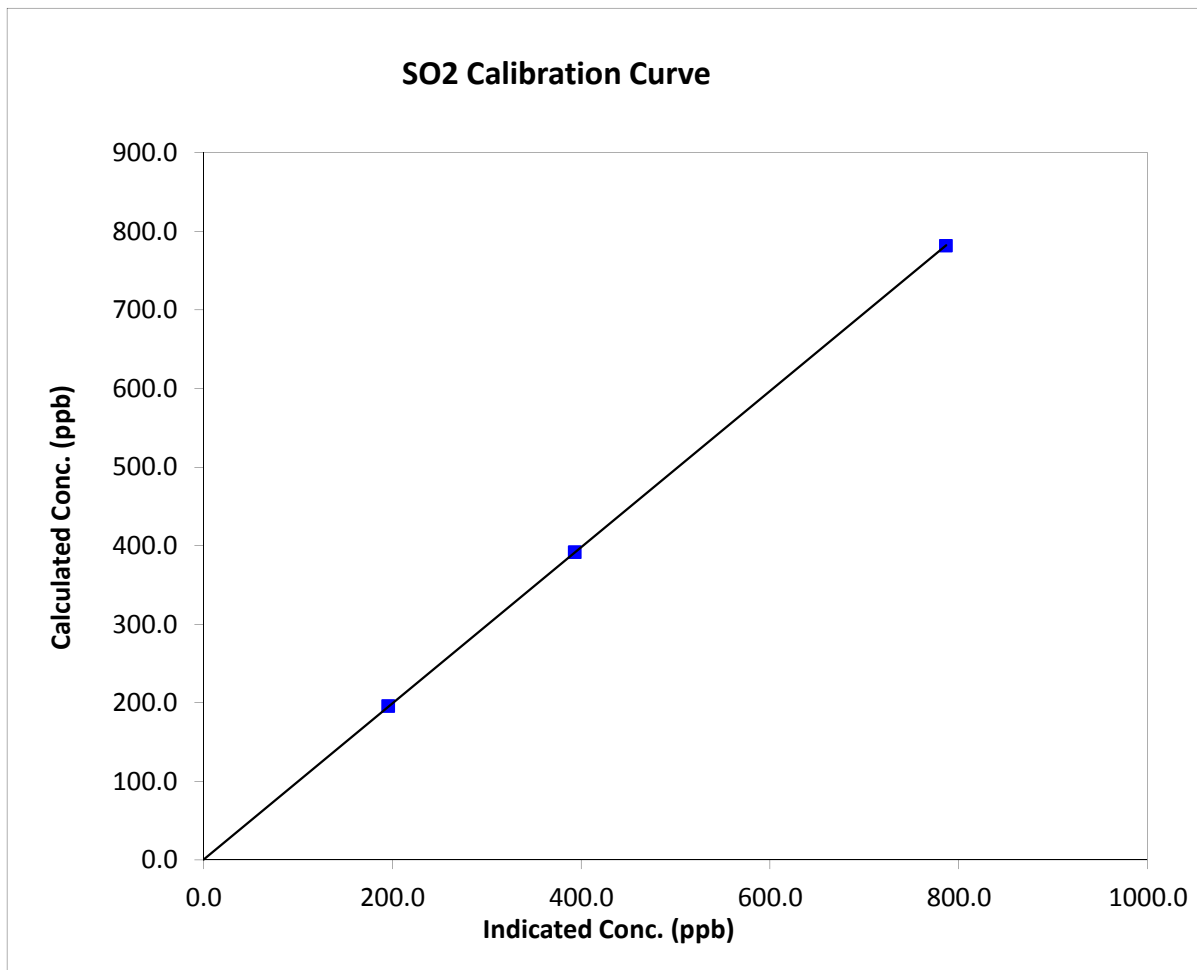
SO₂ Calibration Summary

Station Information

Calibration Date	June 30, 2013	Previous Calibration	
Station Name	ConocoPhillips	Station Number	AMS 102
Start Time (MST)	13:48	End Time (MST)	5:05
Analyzer make	API T100	Analyzer serial #	598

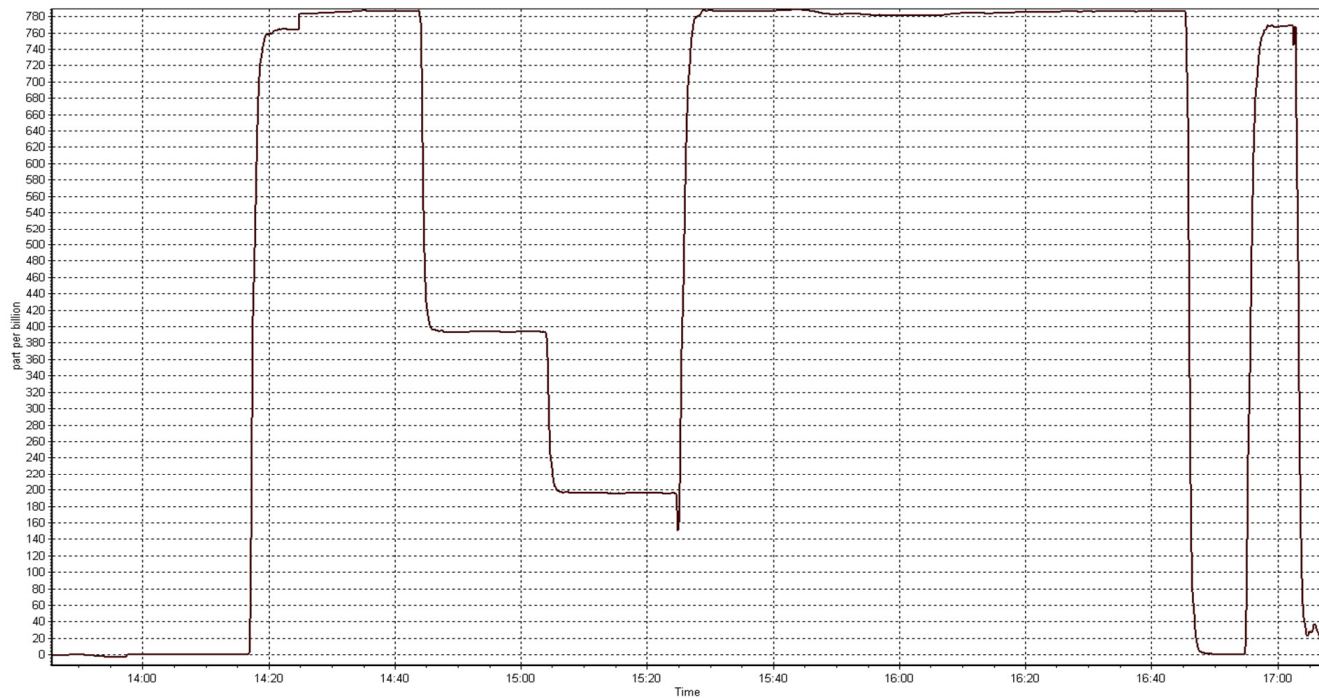
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999996
781.9	786.6	0.9941		
392.0	393.4	0.9964	Slope	0.993496
196.0	195.7	1.0015		
			Intercept	0.814280



SO₂ Calibration Plot

Date: June 30, 2013





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	June 30, 2014	Previous Calibration	N/A
Station Name	ConocoPhillips	Station Number	AMS 102
Reason:	Install		
Start Time (MST)	11:00	End Time (MST)	13:50
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	622
Cal Gas Concentration	10.4 ppm H2S	Cal Gas Expiry Date	30-May-16
Gas Cert Reference	LL34303	SO2 gas conc.	51.1 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882
DACS voltage range	NA	DACS channel #	TCP/IP

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	NA	57
Analyzer Range (mv)	100	100	Lamp voltage	NA	4685
Calculated slope	NA	0.993013	Chamber temp.	NA	50
Calculated intercept	NA	0.266873	Pressure	NA	22.9
Analyzer Background	NA	19.7	Flow	NA	569
Analyzer Coefficient	NA	0.928	Intensity	NA	104
			Converter temp.	NA	315

Analyzer make/model	API T101	Analyzer serial #	197
Converter make/model	n/a	Converter serial #	n/a

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
SO2 scrubber check	5000	19.6	200.3	3.6	N/A
calibrator zero	5000	0.0	0.0	-0.1	N/A
high point	5000	38.5	80.1	80.5	0.995
second point	5000	19.3	40.1	40.1	1.002
third point	5000	12.1	25.2	24.9	1.010
calibrator zero	5000	0.0	0.0	-0.3	N/A
as left zero	5000	0.0	0.0	-0.1	N/A
as left span	5000	38.5	80.1	79.8	1.004
Average Correction Factor					1.003

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

Adjusted zero and span.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

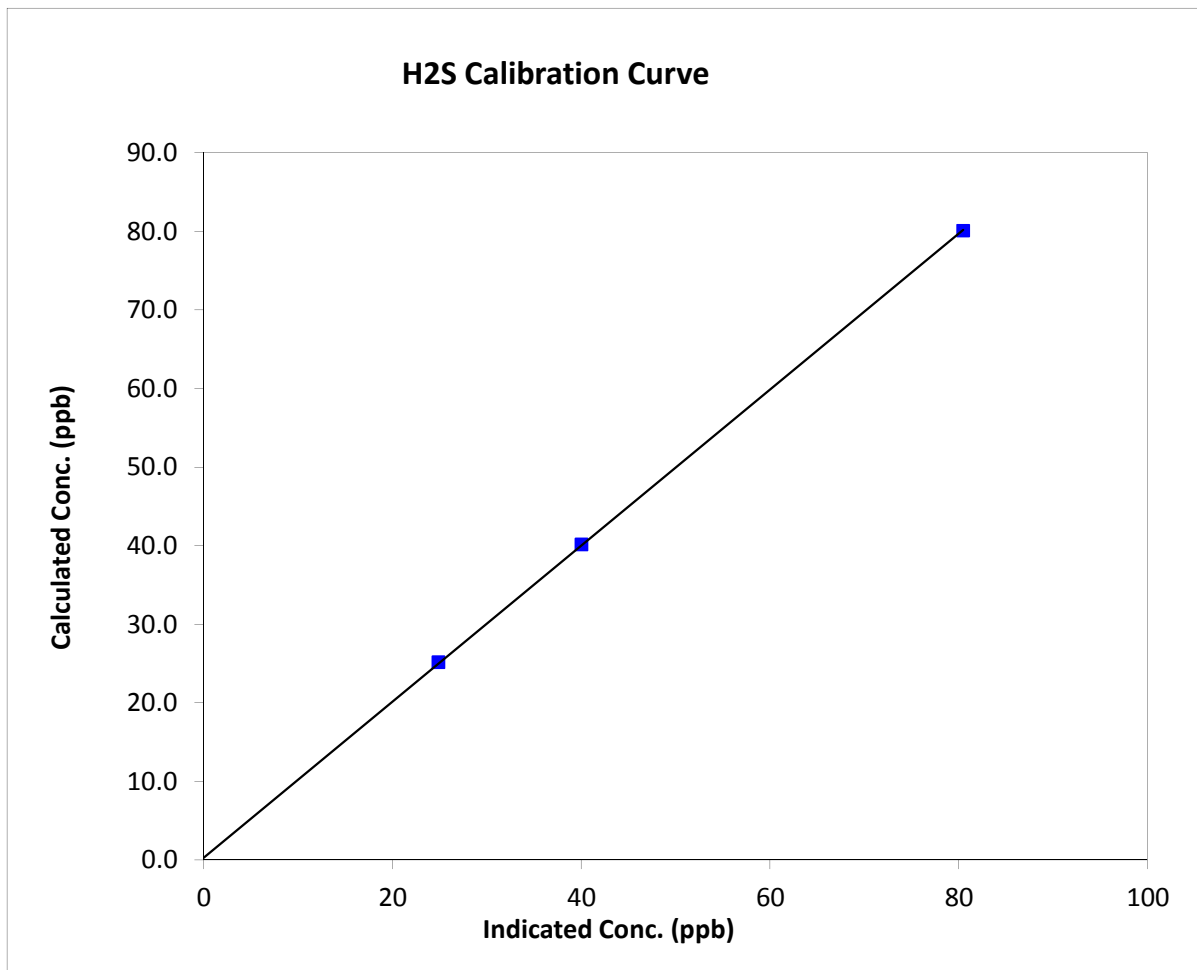
H2S Calibration Summary

Station Information

Calibration Date	June 30, 2014	Previous Calibration	
Station Name	ConocoPhillips	Station Number	AMS 102
Start Time (MST)	11:00	End Time (MST)	13:50
Analyzer make	API T101	Analyzer serial #	197

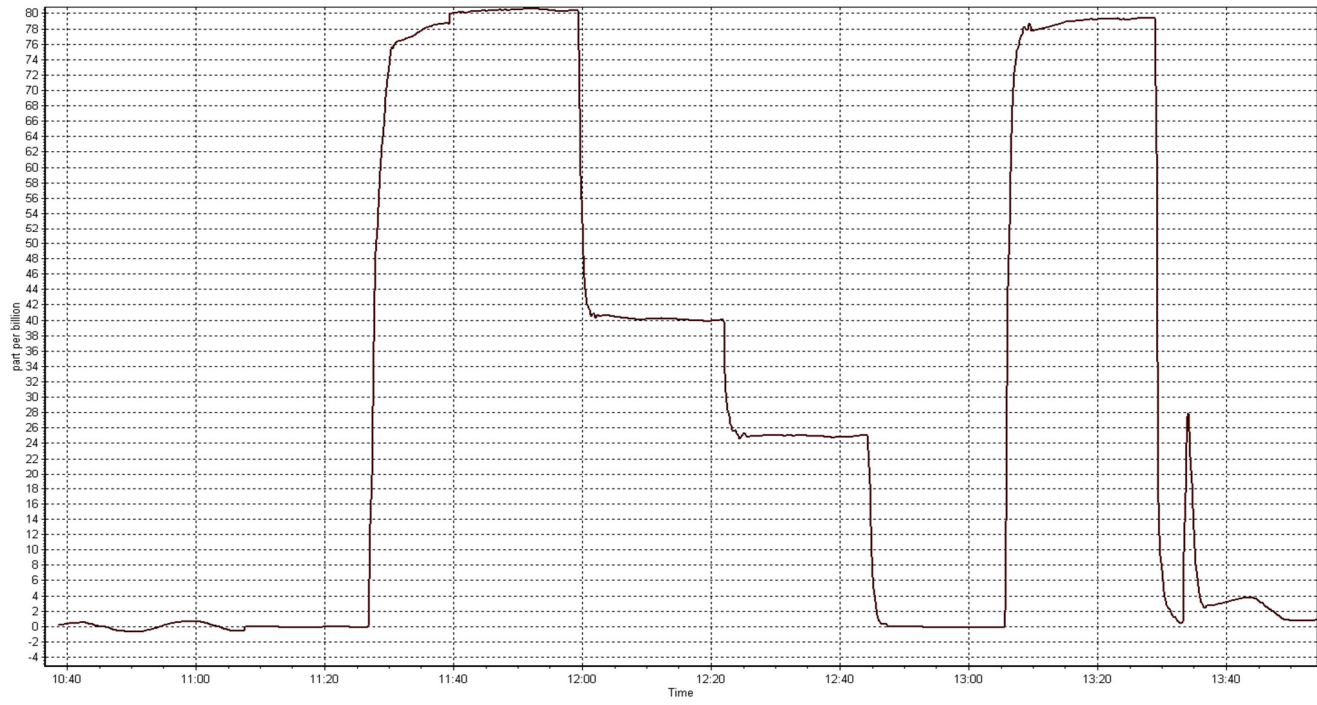
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999977
80.1	80.5	0.9950		
40.1	40.1	1.0023	Slope	0.993013
25.2	24.9	1.0104		
			Intercept	0.266873



H2S Calibration Plot

Date: June-30-14





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	June 30, 2014	Previous Calibration	N/A
Station Name	ConocoPhillips	Station Number	AMS 102
Reason:	Routine		
Start Time (MST)	13:48	End Time (MST)	5:05
Barometric Pressure	n/a mmHg	Station Temperature	23.5 Deg C
Calibrator	API T700	Serial Number	622
NO Cal Gas Conc	52.2 ppm	Cal Gas Expiry Date	May 29, 2014
NOx Cal Gas Conc	52.2 ppm	Cal Gas Serial #	LL110503

DACs Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 7882

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	1.003399	1.002874	1.004537
	Data Offset	1.332510	1.564872	-1.013505
After	Data Slope	0.992617	0.980197	0.952808
	Data Offset	0.362363	6.189642	-0.695839
Channel #		TCP/IP	TCP/IP	TCP/IP
Voltage Range				

Analyzer Information

Analyzer make/model API T200 Analyzer serial # 721

Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	1.119	ppb	1.261	ppb
NOx coefficient	1.113	ppb	1.301	ppb
NO2 coefficient		ppb		ppb
NO bkgrnd	-0.5		-2.0	
NOx bkgrnd	0.4		22.5	
HVPS	800.000		800.000	
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	317.5	Deg C	313.7	Deg C
PMT Temp	6.7	Deg C	6.7	Deg C
O3 flow	83.0	ccm	83.0	ccm
R Cell Press	4.6	inHg	5.4	inHg
Sample Flow	462.000	ccm	468.000	ccm

Notes:

Zero and Span adjusted



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

June 30, 2014

Station Number:

AMS 102

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					
as found span	5000	76.7	800.7	800.7	0.0					
calibrator zero	5000	0.0	0.0	0.0	0.0	-2.7	1.1	-3.8	N/A	N/A
high point	5000	76.7	800.7	800.7	0.0	812.3	807.2	5.2	0.9858	0.9920
second point	5000	38.4	400.9	400.9	0.0	401.0	402.3	-1.3	0.9997	0.9965
third point	5000	19.2	200.4	200.4	0.0	194.5	200.4	-6.0	1.0305	1.0001
calibrator zero	5000	0.0	0.0	0.0	0.0	-2.7	1.1	-3.8	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	-12.2	2.4	-14.6	N/A	N/A
as left span	6000	92.0	800.4	800.4	0.0	815.0	522.6	292.6	0.9821	1.5316
Average Correction Factor									1.0053	0.9962

Corrected As found
Previous Response

NO_x= NA
NO_x= 802.1

NO= NA
NO= 801.5

Percent Change

NO_x= N/A

NO= N/A

GPT Calibration Data

Dilution Flow

4923

Source Gas Flow

76.60

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			-3.8			N/A	
1st NO ₂ (300)	N/A	524.5	283.7	819.4	524.5	295.0	0.9761	1.0000	0.9616	104.0%
2nd NO ₂ (200)	N/A	610.7	197.4	820.8	610.7	208.9	0.9744	1.0000	0.9452	105.8%
3rd NO ₂ (100)	N/A	706.6	101.6	820.9	706.6	114.4	0.9742	1.0000	0.8880	112.6%
4th NO ₂ (0)	808.2	N/A	11.2	819.3	808.2	11.2	0.9761	1.0000	N/A	N/A
Average Correction Factor							0.9752	1.0000	0.9316	107.5%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

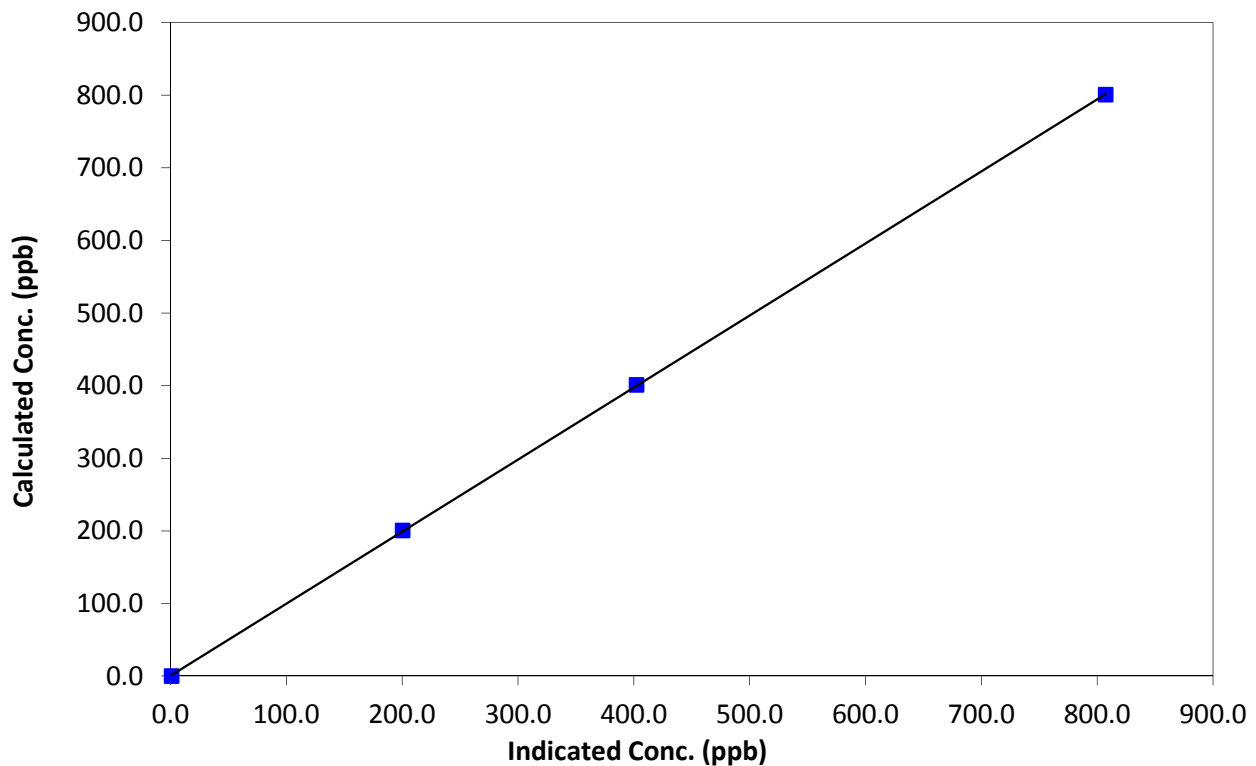
Station Information

Calibration Date	June 30, 2014	Previous Calibration	
Station Number	ConocoPhillips	Station Number	AMS 102
Start Time (MST)	13:48	End Time (MST)	5:05
Analyzer make	API T200	Analyzer serial #	721

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.1	N/A	Correlation Coefficient	0.999984
800.7	807.2	0.9920		
400.9	402.3	0.9965	Slope	0.992617
200.4	200.4	1.0001		
			Intercept	0.362363

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

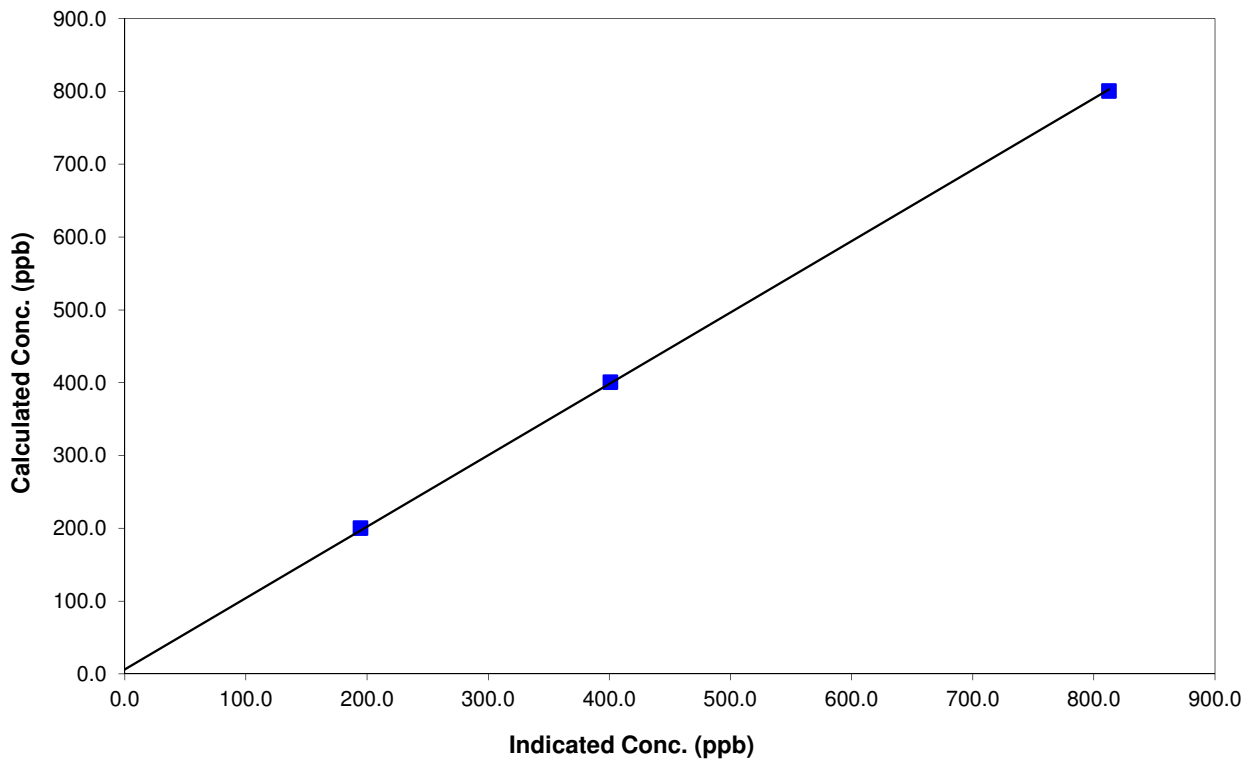
Station Information

Calibration Date	June 30, 2014	Previous Calibration	
Station Number	ConocoPhillips	Station Number	AMS 102
Start Time (MST)	13:48	End Time (MST)	5:05
Analyzer make	API T200	Analyzer serial #	721

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-2.7	N/A	Correlation Coefficient	0.999912
800.7	812.3	0.9858		
400.9	401.0	0.9997	Slope	0.980197
200.4	194.5	1.0305		
			Intercept	6.189642

NO Calibration Curve





Wood Buffalo Environmental Association

NO2 Calibration Summary

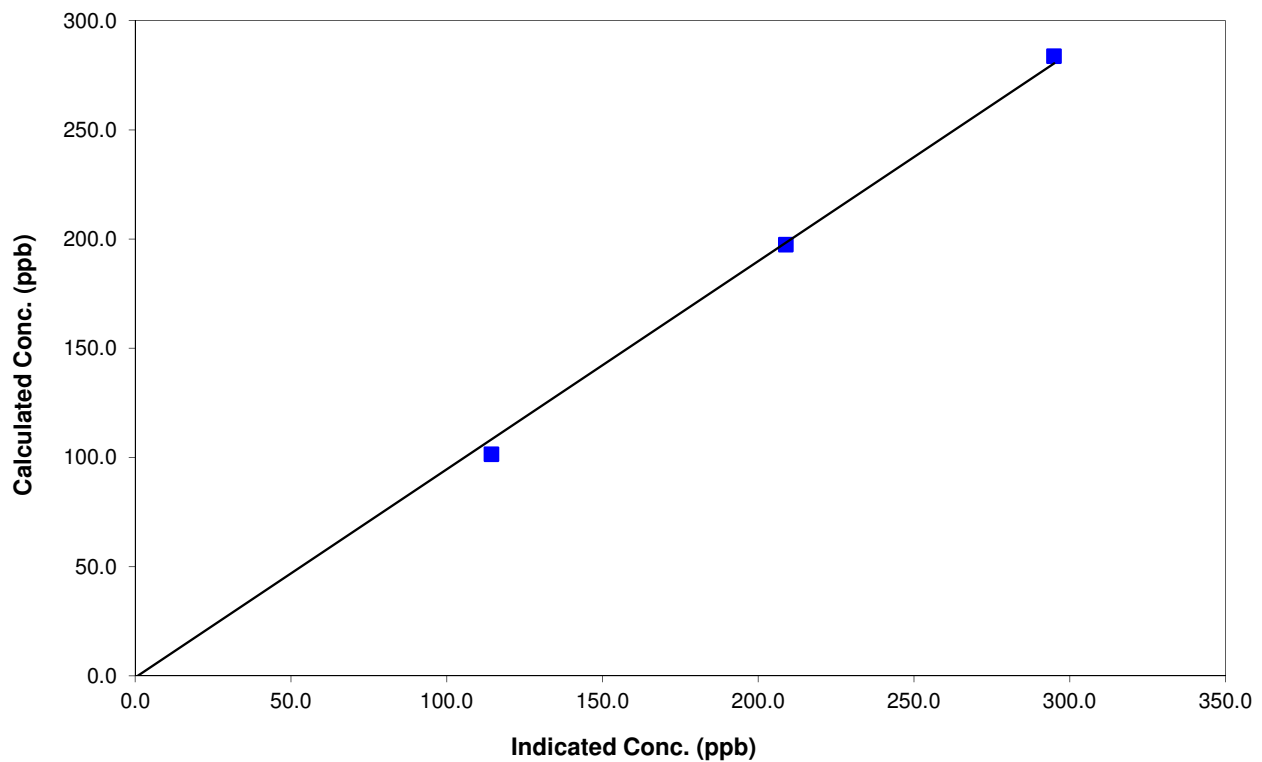
Station Information

Calibration Date	June 30, 2014	Previous Calibration	
Station Number	ConocoPhillips	Station Number	AMS 102
Start Time (MST)	13:48	End Time (MST)	5:05
Analyzer make	API T200	Analyzer serial #	721

Calibration Information

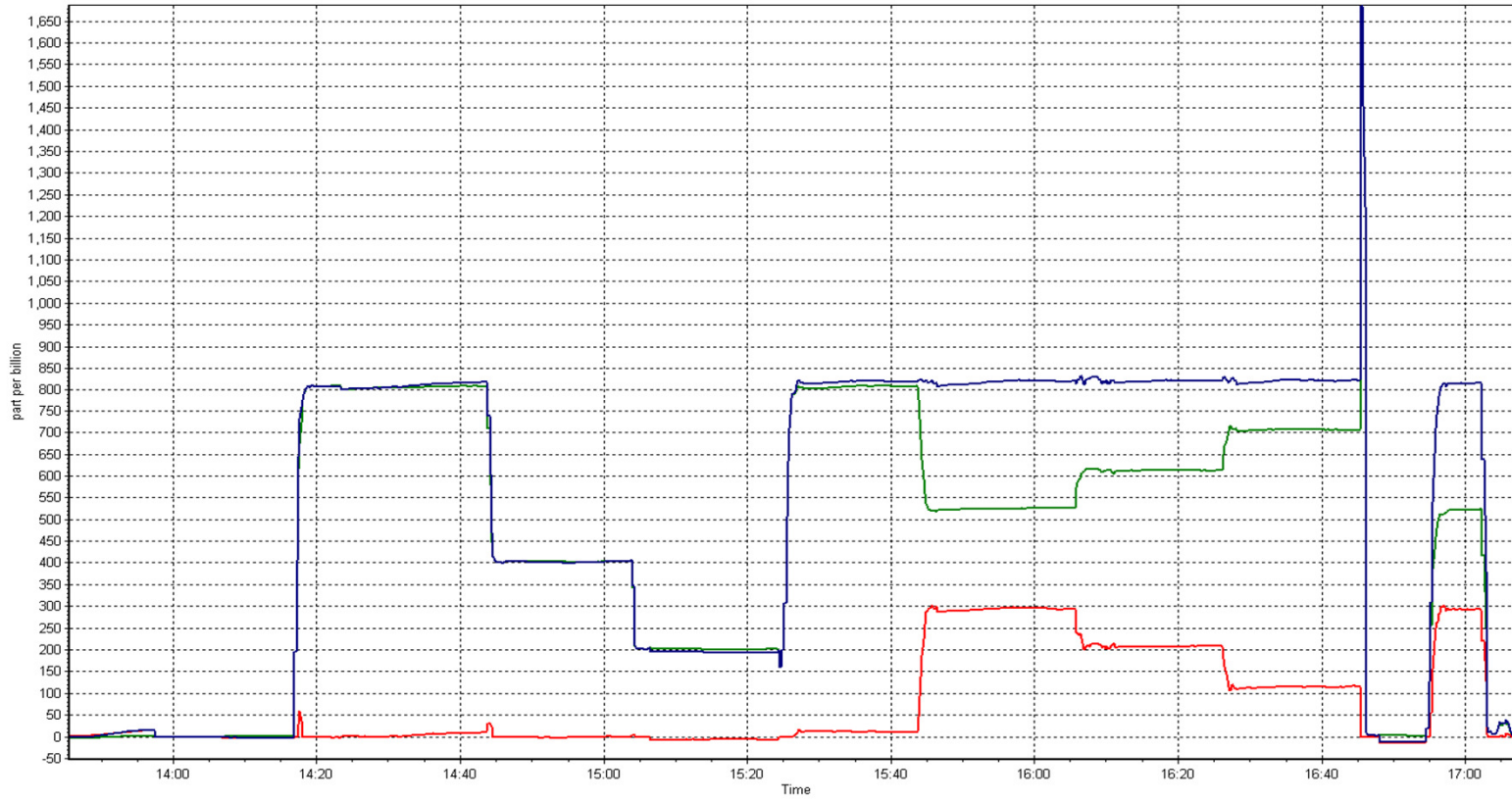
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-3.8	N/A	Correlation Coefficient	0.998322
283.7	295.0	0.9616		
197.4	208.9	0.9452	Slope	0.952808
101.6	114.4	0.8880		
			Intercept	-0.695839

NO2 Calibration Curve



NOx, NO & NO₂ Calibration Plot

Date: June 30, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 2, 2014	Previous Calibration	June 30, 2014
Station Name	ConocoPhillips	Station Number	AMS 102
Reason:	Routine		
Start Time (MST)	10:50	End Time (MST)	14:40
Barometric Pressure	n/a mmHg	Station Temperature	23.5 Deg C
Calibrator	API T700	Serial Number	622
NO Cal Gas Conc	52.2 ppm	Cal Gas Expiry Date	May 29, 2014
NO _x Cal Gas Conc	52.2 ppm	Cal Gas Serial #	LL110503

DACs Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882
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Parameter		NO _x	NO	NO ₂
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.992617	0.980197	0.952808
	Data Offset	0.362363	6.189642	-0.695839
After	Data Slope	0.998543	0.993342	0.988786
	Data Offset	2.213712	1.822762	-1.581285
Channel #		TCP/IP	TCP/IP	TCP/IP
Voltage Range				

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	721
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	1.261	ppb	1.258	ppb
NO _x coefficient	1.301	ppb	1.264	ppb
NO ₂ coefficient		ppb		ppb
NO bkgrnd	-2.0		2.6	
NO _x bkgrnd	22.5		6.0	
HVPS	800.000		800.000	
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	313.7	Deg C	316.8	Deg C
PMT Temp	6.7	Deg C	6.7	Deg C
O ₃ flow	83.0	ccm	83.0	ccm
R Cell Press	5.4	inHg	5.4	inHg
Sample Flow	468.000	ccm	463.000	ccm

Notes:

Zero and Span adjusted



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

July 2, 2014

Station Number:

AMS 102

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	-7.1	1.3	-8.3	N/A	N/A
as found span	5000	76.7	800.7	800.7	0.0	811.4	796.6	12.7	0.9869	1.0052
calibrator zero	5000	0.0	0.0	0.0	0.0	-1.4	-1.3	-0.1	N/A	N/A
high point	5000	76.7	800.7	800.7	0.0	804.7	800.3	4.3	0.9951	1.0005
second point	5000	38.4	400.9	400.9	0.0	400.8	398.4	2.4	1.0002	1.0064
third point	5000	19.2	200.4	200.4	0.0	200.0	197.9	2.0	1.0021	1.0130
calibrator zero	5000	0.0	0.0	0.0	0.0	-1.4	-1.3	-0.1	N/A	N/A
as left zero										
as left span										
Average Correction Factor									0.9991	1.0066

Corrected As found

NO_x= 818.5

NO= 795.3

Percent Change

NO_x= -2.9%

NO= -2.1%

Previous Response

NO_x= 794.5

NO= 778.7

GPT Calibration Data

Dilution Flow

4923

Source Gas Flow

76.60

ccm

O ₃ Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO ₂ (300)	N/A	516.1	287.0	806.7	516.1	290.8	0.9914	1.0000	0.9870	101.3%
2nd NO ₂ (200)	N/A	604.5	198.6	807.0	604.5	202.5	0.9910	1.0000	0.9808	102.0%
3rd NO ₂ (100)	N/A	699.3	103.8	808.5	699.3	109.3	0.9892	1.0000	0.9492	105.3%
4th NO ₂ (0)	803.1	N/A	6.9	810.0	803.1	6.9	0.9874	1.0000	N/A	N/A
Average Correction Factor							0.9898	1.0000	0.9723	102.9%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

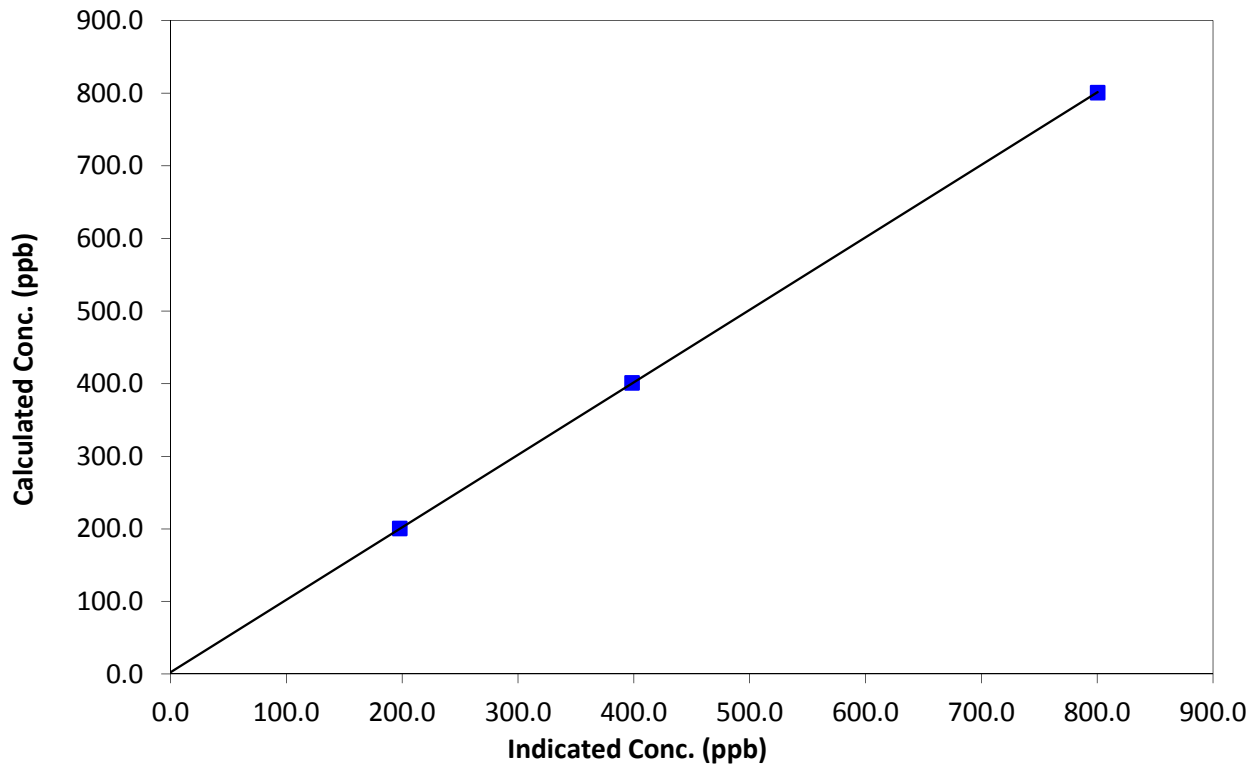
Station Information

Calibration Date	July 2, 2014	Previous Calibration	June 30, 2014
Station Number	ConocoPhillips	Station Number	AMS 102
Start Time (MST)	10:50	End Time (MST)	14:40
Analyzer make	API T200	Analyzer serial #	721

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.3	N/A	Correlation Coefficient	0.999993
800.7	800.3	1.0005		
400.9	398.4	1.0064	Slope	0.998543
200.4	197.9	1.0130		
			Intercept	2.213712

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

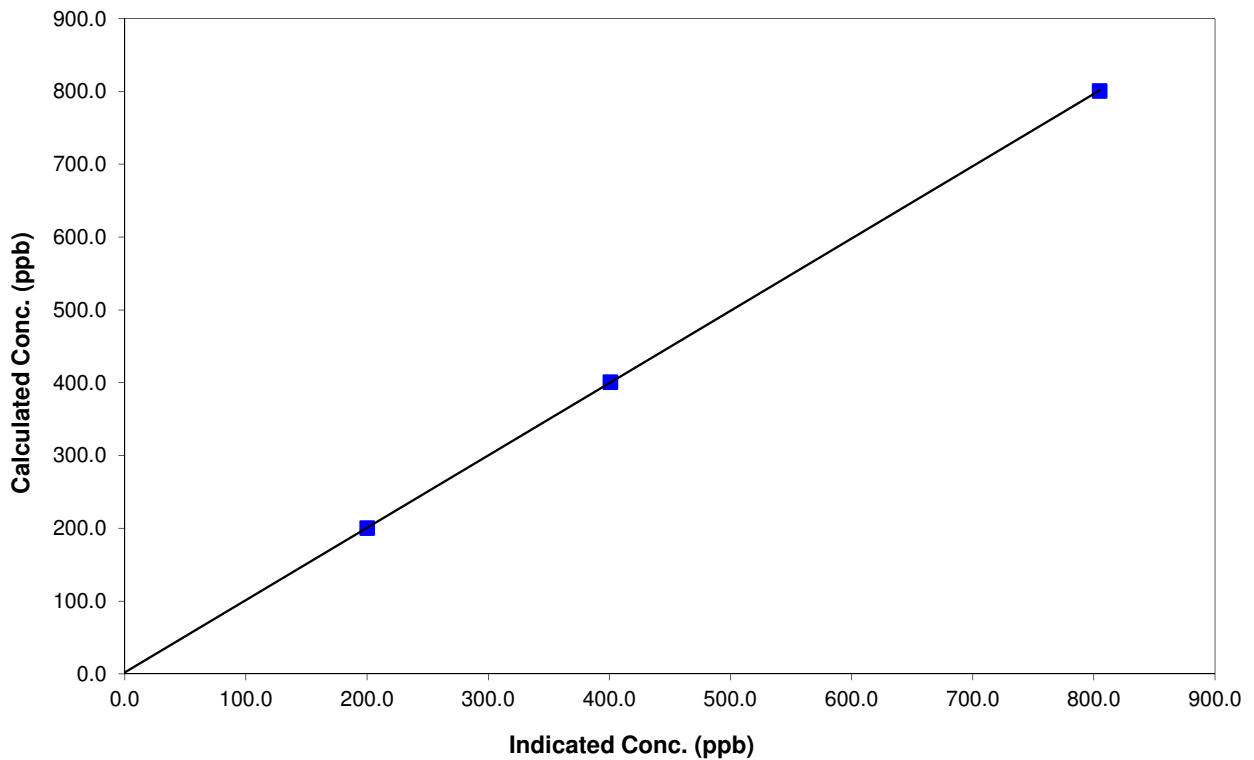
Station Information

Calibration Date	July 2, 2014	Previous Calibration	June 30, 2014
Station Number	ConocoPhillips	Station Number	AMS 102
Start Time (MST)	10:50	End Time (MST)	14:40
Analyzer make	API T200	Analyzer serial #	721

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.4	N/A	Correlation Coefficient	0.999996
800.7	804.7	0.9951		
400.9	400.8	1.0002	Slope	0.993342
200.4	200.0	1.0021		
			Intercept	1.822762

NO Calibration Curve





Wood Buffalo Environmental Association

NO2 Calibration Summary

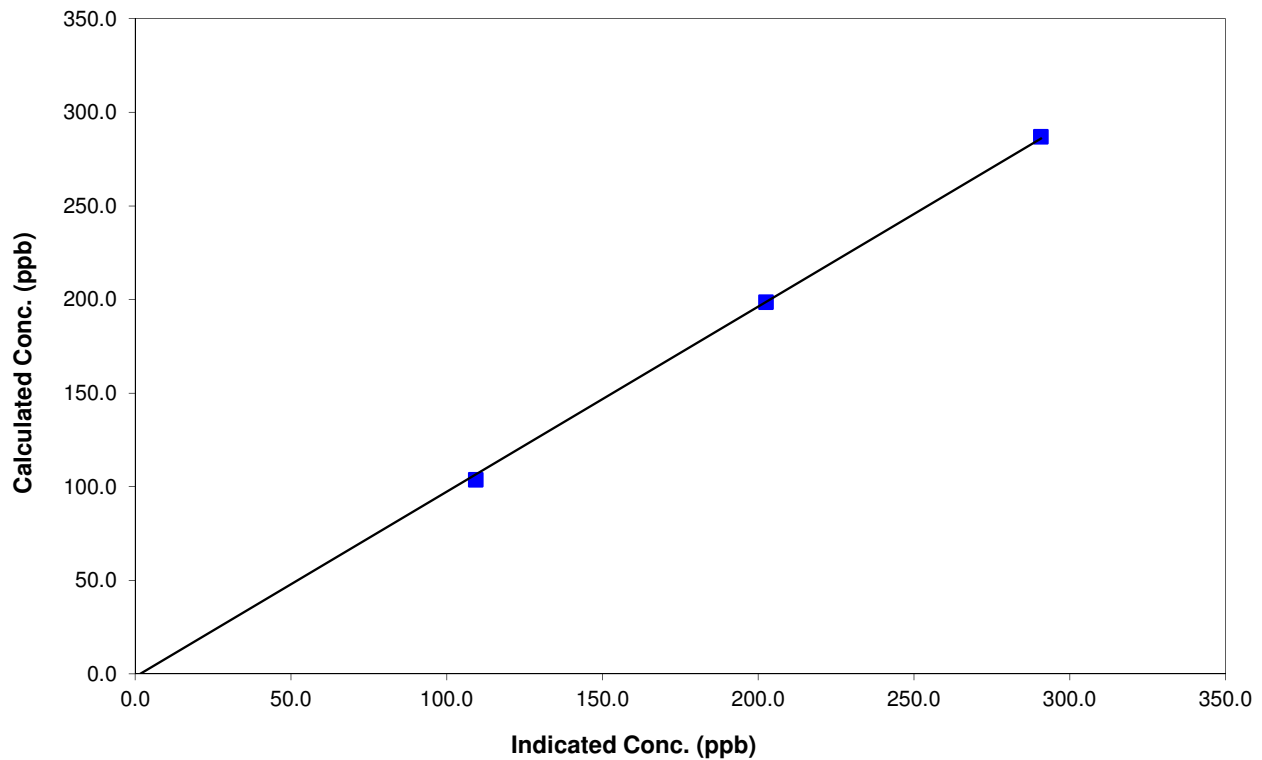
Station Information

Calibration Date	July 2, 2014	Previous Calibration	June 30, 2014
Station Number	ConocoPhillips	Station Number	AMS 102
Start Time (MST)	10:50	End Time (MST)	14:40
Analyzer make	API T200	Analyzer serial #	721

Calibration Information

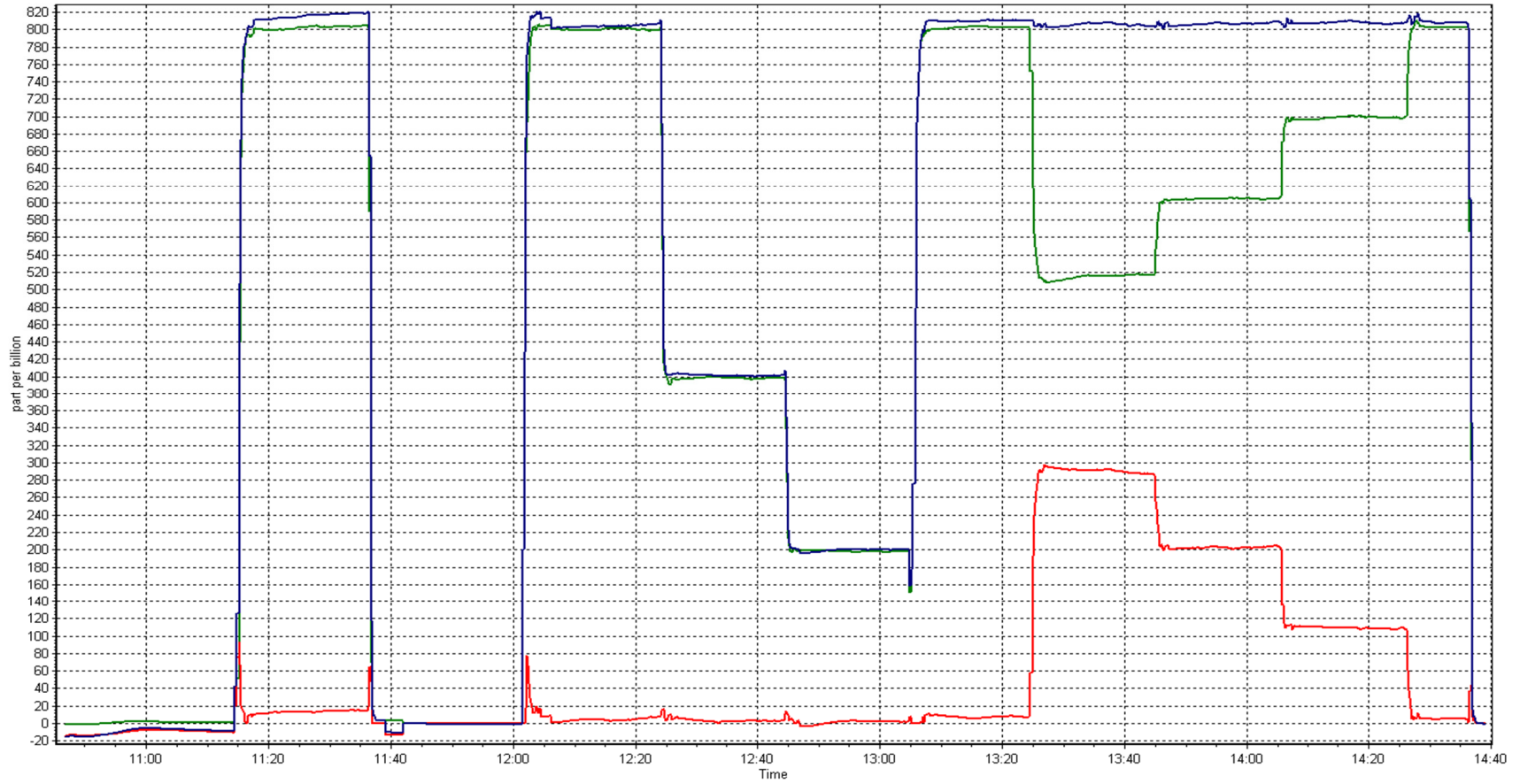
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999747
287.0	290.8	0.9870		
198.6	202.5	0.9808	Slope	0.988786
103.8	109.3	0.9492		
			Intercept	-1.581285

NO2 Calibration Curve



NOx, NO & NO₂ Calibration Plot

Date: July 2, 2014





Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 10, 2014	Previous Calibration	July 2, 2014
Station Name	ConocoPhillips	Station Number	AMS 102
Reason:	Routine		
Start Time (MST)	11:25	End Time (MST)	4:58
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	API T700	Serial Number	622
NO Cal Gas Conc	52.2 ppm	Cal Gas Expiry Date	May 29, 2014
NOx Cal Gas Conc	52.2 ppm	Cal Gas Serial #	LL110503

DACs Information

DACs make & model	Campbell Scientific CR3000	DACs serial No.	7882
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.998543	0.993342	0.988786
	Data Offset	2.213712	1.822762	-1.581285
After	Data Slope	1.002207	0.997253	1.012240
	Data Offset	-1.853095	3.363573	-4.196817
Channel #		TCP/IP	TCP/IP	TCP/IP
Voltage Range				

Analyzer Information

Analyzer make/model	Analyzer serial #
---------------------	-------------------

Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	1.258	ppb	1.255	ppb
NOx coefficient	1.264	ppb	1.250	ppb
NO2 coefficient		ppb		ppb
NO bkgrnd	2.6		2.6	
NOx bkgrnd	6.0		6.0	
HVPS	800.000		800.000	
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	316.8	Deg C	316.7	Deg C
PMT Temp	6.7	Deg C	6.7	Deg C
O3 flow	83.0	ccm	82.0	ccm
R Cell Press	5.4	mmHg	5.6	mmHg
Sample Flow	463.000	ccm	468.000	ccm

Notes:

Replaced Moly Converter after as founds. Adjusted span.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

July 10, 2014

Station Number:

AMS 102

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	7.4	-0.8	8.1	N/A	N/A
as found span	5000	76.7	800.7	800.7	0.0	807.1	800.9	6.2	0.9921	0.9998
calibrator zero	5000	0.0	0.0	0.0	0.0	3.1	-3.0	6.2	N/A	N/A
high point	5000	76.7	800.7	800.7	0.0	802.0	800.2	1.9	0.9984	1.0007
second point	5000	38.4	400.9	400.9	0.0	400.7	397.6	2.9	1.0005	1.0084
third point	5000	19.2	200.4	200.4	0.0	199.3	197.4	1.9	1.0058	1.0154
calibrator zero	5000	0.0	0.0	0.0	0.0	3.1	-3.0	6.2	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.8	0.2	N/A	N/A
as left span	6000	92.0	800.4	517.0	283.5	794.6	514.7	280.0	1.0073	1.0044
Average Correction Factor									1.0015	1.0082

Corrected As found

NO_x= 799.8

NO= 801.8

Percent Change

NO_x= 0.0%

NO= 0.3%

Previous Response

NO_x= 799.7

NO= 804.3

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

76.70

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			6.2			N/A	
1st NO ₂ (300)	N/A	517.0	281.2	800.6	517.0	283.7	0.9850	1.0000	0.9912	100.9%
2nd NO ₂ (200)	N/A	603.8	194.4	798.7	603.8	194.9	0.9875	1.0000	0.9973	100.3%
3rd NO ₂ (100)	N/A	693.6	104.5	798.6	693.6	104.9	0.9876	1.0000	0.9962	100.4%
4th NO ₂ (0)	798.1	N/A	3.4	801.6	798.1	3.4	0.9839	1.0000	N/A	N/A
Average Correction Factor							0.9860	1.0000	0.9949	100.5%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

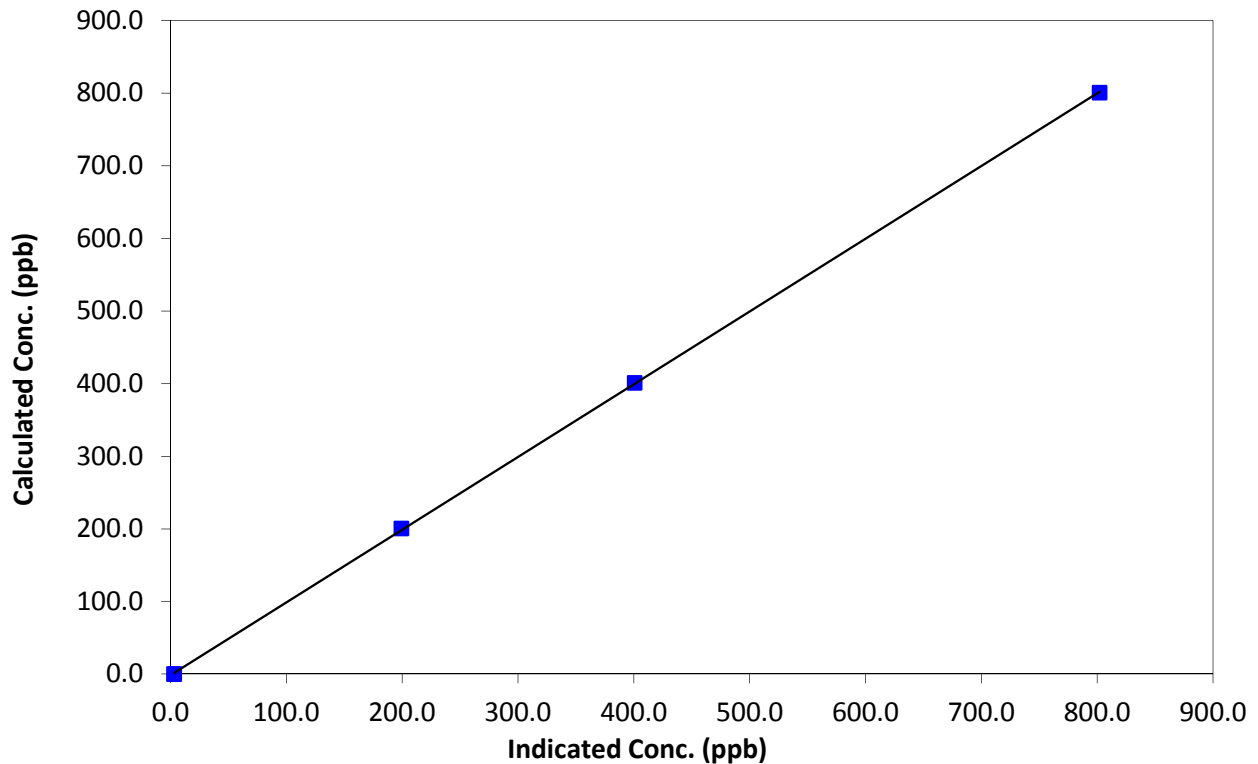
Station Information

Calibration Date	July 10, 2014	Previous Calibration	July 2, 2014
Station Name	ConocoPhillips	Station Number	AMS 102
Start Time (MST)	11:25	End Time (MST)	4:58
Analyzer make		Analyzer serial #	

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	3.1	N/A	Correlation Coefficient	0.999972
800.7	802.0	0.9984		
400.9	400.7	1.0005	Slope	1.002207
200.4	199.3	1.0058		
0.0	3.1	0.0000	Intercept	-1.853095

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

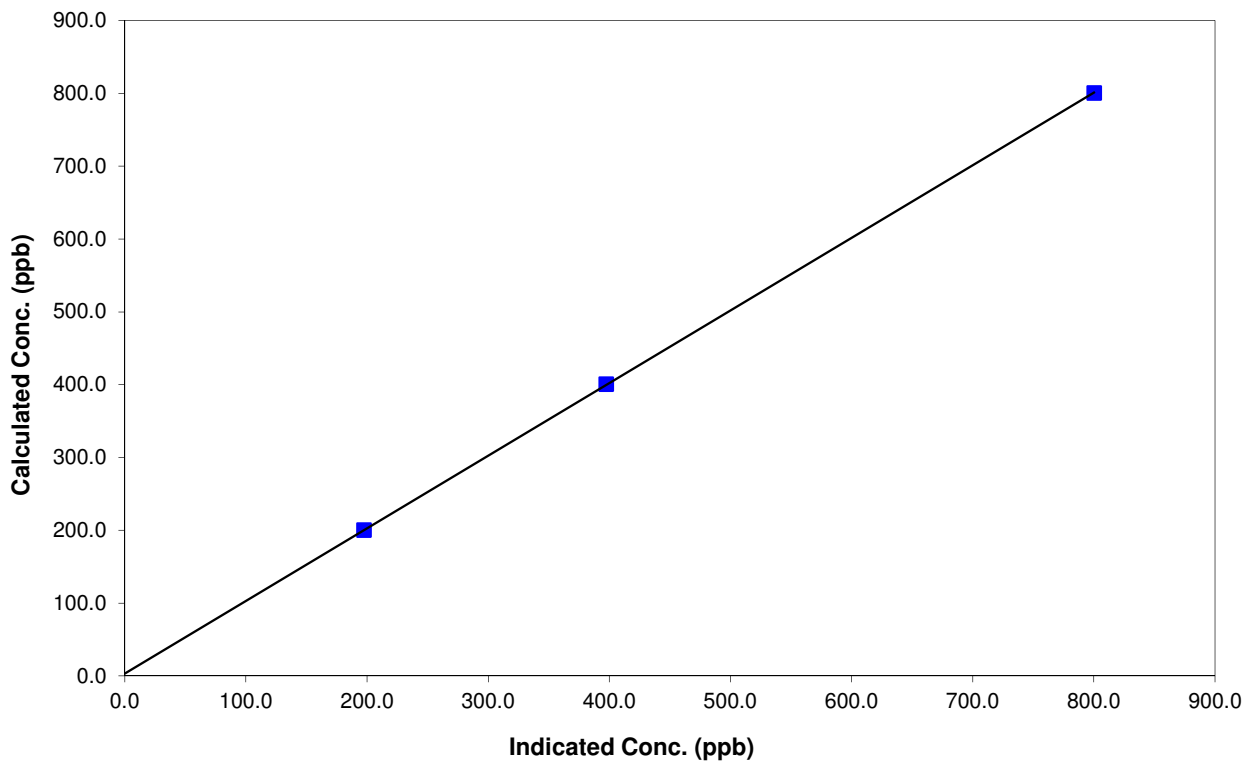
Station Information

Calibration Date	July 10, 2014	Previous Calibration	July 2, 2014
Station Name	ConocoPhillips	Station Number	AMS 102
Start Time (MST)	11:25	End Time (MST)	4:58
Analyzer make		Analyzer serial #	

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-3.0	N/A	Correlation Coefficient	0.999996
800.7	800.2	1.0007		
400.9	397.6	1.0084	Slope	0.997253
200.4	197.4	1.0154		
0.0	-3.0	0.0000	Intercept	3.363573

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

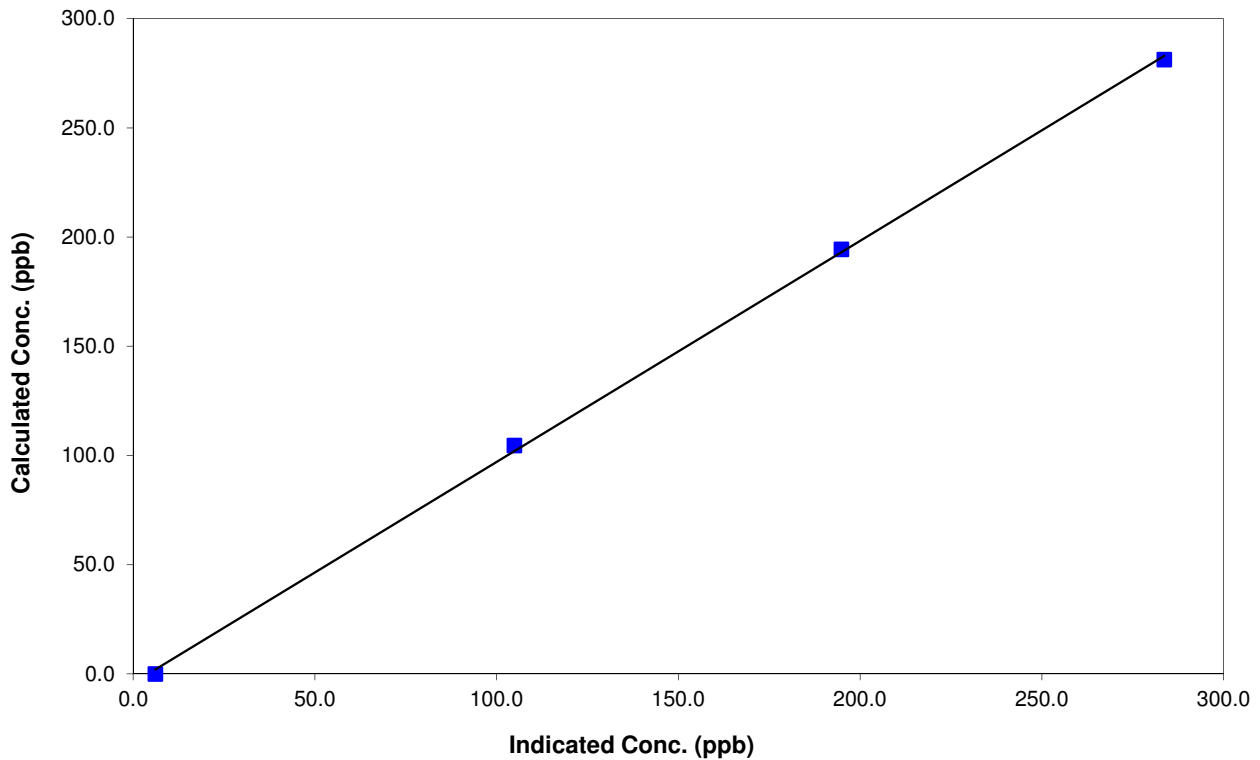
Station Information

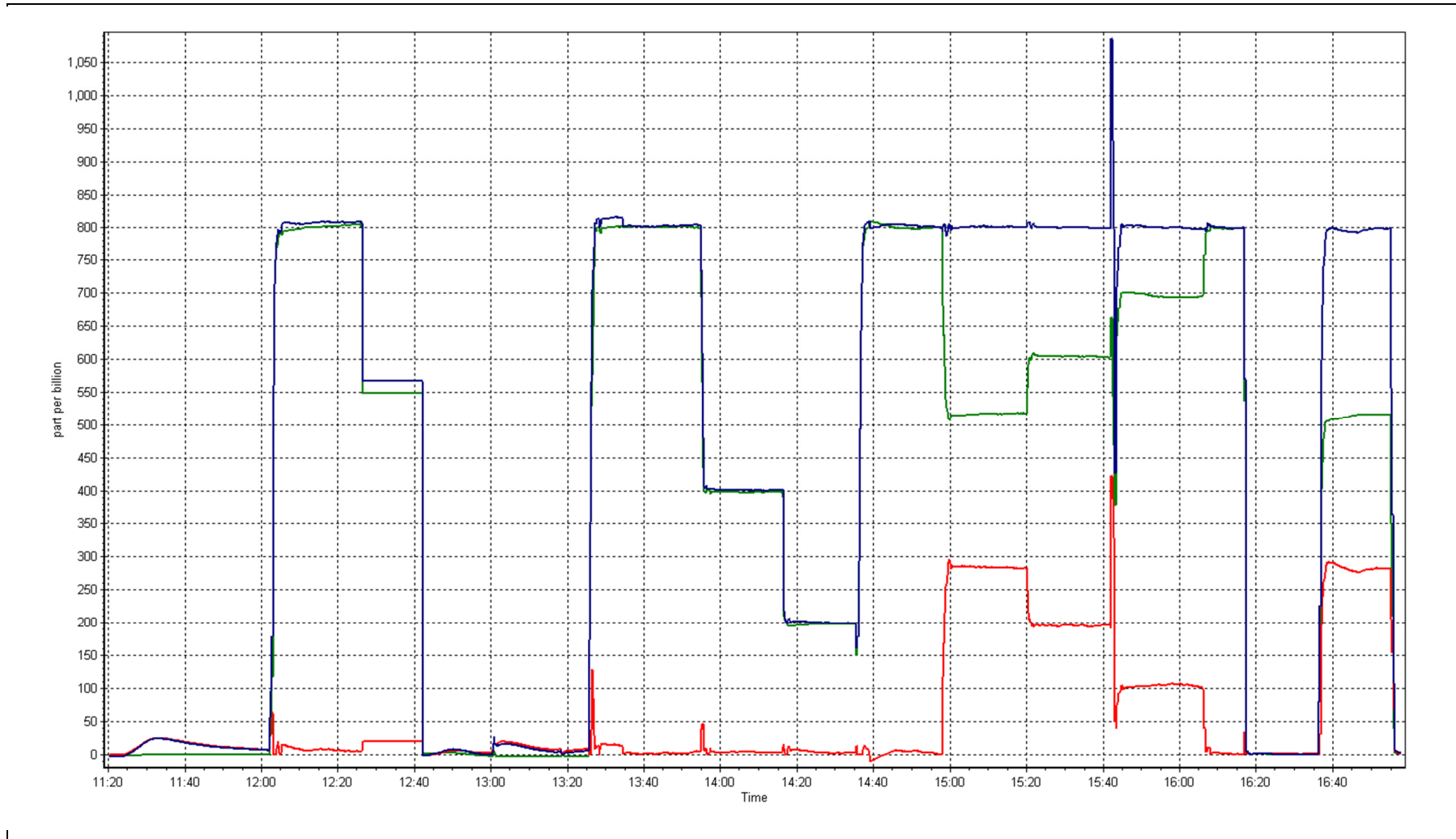
Calibration Date	July 10, 2014	Previous Calibration	July 2, 2014
Station Number	ConocoPhillips	Station Number	AMS 102
Start Time (MST)	11:25	End Time (MST)	4:58
Analyzer make		Analyzer serial #	

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	6.2	N/A	Correlation Coefficient	0.999652
281.2	283.7	0.9912		
194.4	194.9	0.9973	Slope	1.012240
104.5	104.9	0.9962		
			Intercept	-4.196817

NO₂ Calibration Curve







Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 29, 2014	Previous Calibration	July 10, 2014
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Removal		
Start Time (MST)	7:40	End Time (MST)	10:30
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	API T700	Serial Number	622
NO Cal Gas Conc	52.2 ppm	Cal Gas Expiry Date	May 29, 2014
NO _x Cal Gas Conc	52.2 ppm	Cal Gas Serial #	LL110503

DACs Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882
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Parameter		NO _x	NO	NO ₂
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	1.002207	0.997253	1.012240
	Data Offset	-1.853095	3.363573	-4.196817
After	Data Slope	1.028439	1.024764	1.023756
	Data Offset	-1.610330	1.824142	-4.709280
Channel #		TCP/IP	TCP/IP	TCP/IP
Voltage Range				

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	721
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Test Point	before		after	
Concentration range	1000	ppb		ppb
NO coefficient	1.255	ppb		ppb
NO _x coefficient	1.250	ppb		ppb
NO ₂ coefficient		ppb		ppb
NO bkgrnd	2.6			
NO _x bkgrnd	6.0			
HVPS	800			
Chamber Temp	50.0	Deg C		Deg C
Moly Temp	316.7	Deg C		Deg C
PMT Temp	6.7	Deg C		Deg C
O ₃ flow	82.0	ccm		ccm
R Cell Press	5.6	mmHg		mmHg
Sample Flow	468	ccm		ccm

Notes:

Removal Cal.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

July 29, 2014

Station Number:

AMS 502

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	2.9	-1.8	4.6	N/A	N/A
as found span	5000	76.7	800.7	800.7	0.0	781.7	779.5	2.2	1.0243	1.0273
calibrator zero	5000	0.0	0.0	0.0	0.0	2.9	-1.8	4.6	N/A	N/A
high point	5000	76.7	800.7	800.7	0.0	781.7	779.5	2.2	1.0243	1.0273
second point	5000	38.4	400.9	400.9	0.0	389.3	389.8	-0.5	1.0298	1.0285
third point	5000	19.2	200.4	200.4	0.0	194.3	193.6	0.7	1.0315	1.0352
calibrator zero	5000	0.0	0.0	0.0	0.0	2.9	-1.8	4.6	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	2.9	-1.8	4.6	N/A	N/A
as left span	6000	92.0	800.4	508.0	292.4	781.7	779.5	4.6	1.0239	0.6517
Average Correction Factor									1.0286	1.0303

Corrected As found NO_x= 778.9 NO= 781.2 Percent Change NO_x= 2.8% NO= 2.3%
 Previous Response NO_x= 800.8 NO= 799.6

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 76.70 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO 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			4.6			N/A	
1st NO ₂ (300)	N/A	508.0	275.8	784.0	508.0	274.0	1.0059	1.0000	1.0066	99.3%
2nd NO ₂ (200)										
3rd NO ₂ (100)										
4th NO ₂ (0)	783.8	N/A	0.1	783.9	783.8	0.1	1.0061	1.0000	N/A	N/A
Average Correction Factor							1.0060	1.0000	1.0066	99.3%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

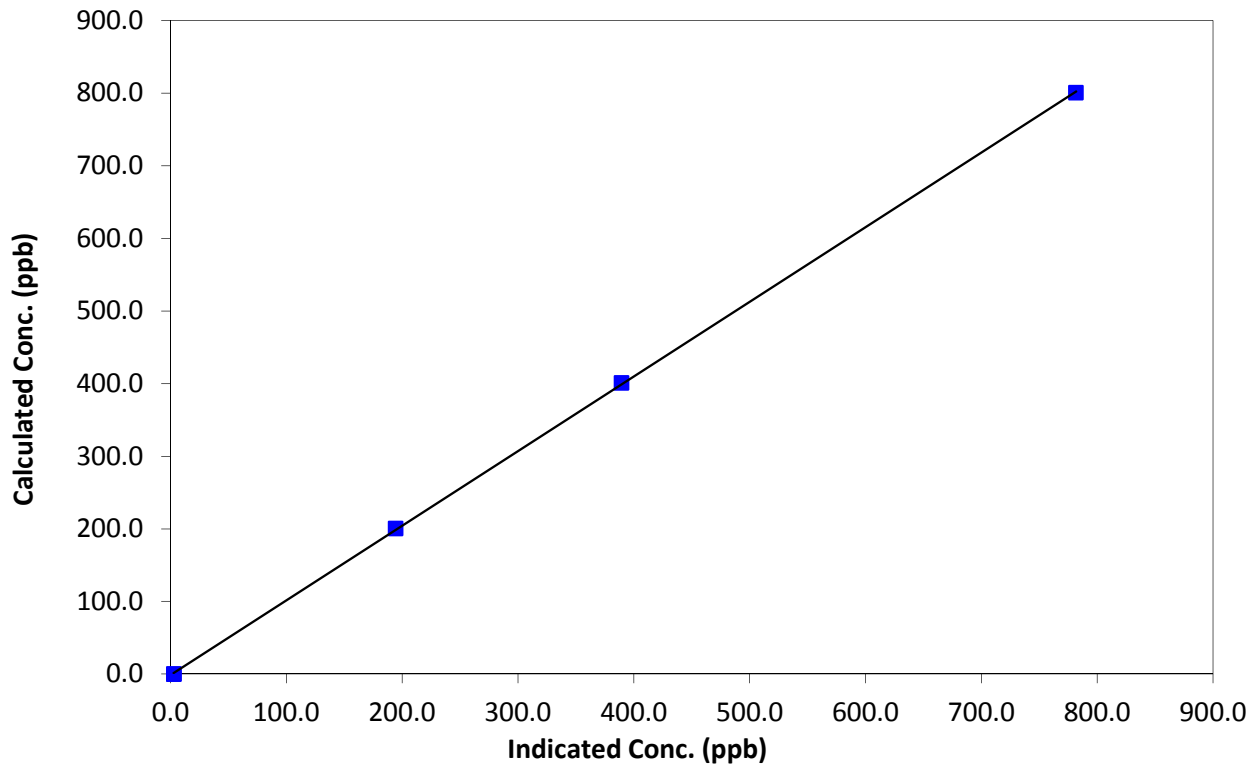
Station Information

Calibration Date	July 29, 2014	Previous Calibration	July 10, 2014
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	7:40	End Time (MST)	10:30
Analyzer make	API T200	Analyzer serial #	721

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	2.9	N/A	Correlation Coefficient	0.999965
800.7	781.7	1.0243		
400.9	389.3	1.0298	Slope	1.028439
200.4	194.3	1.0315		
0.0	2.9	0.0000	Intercept	-1.610330

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

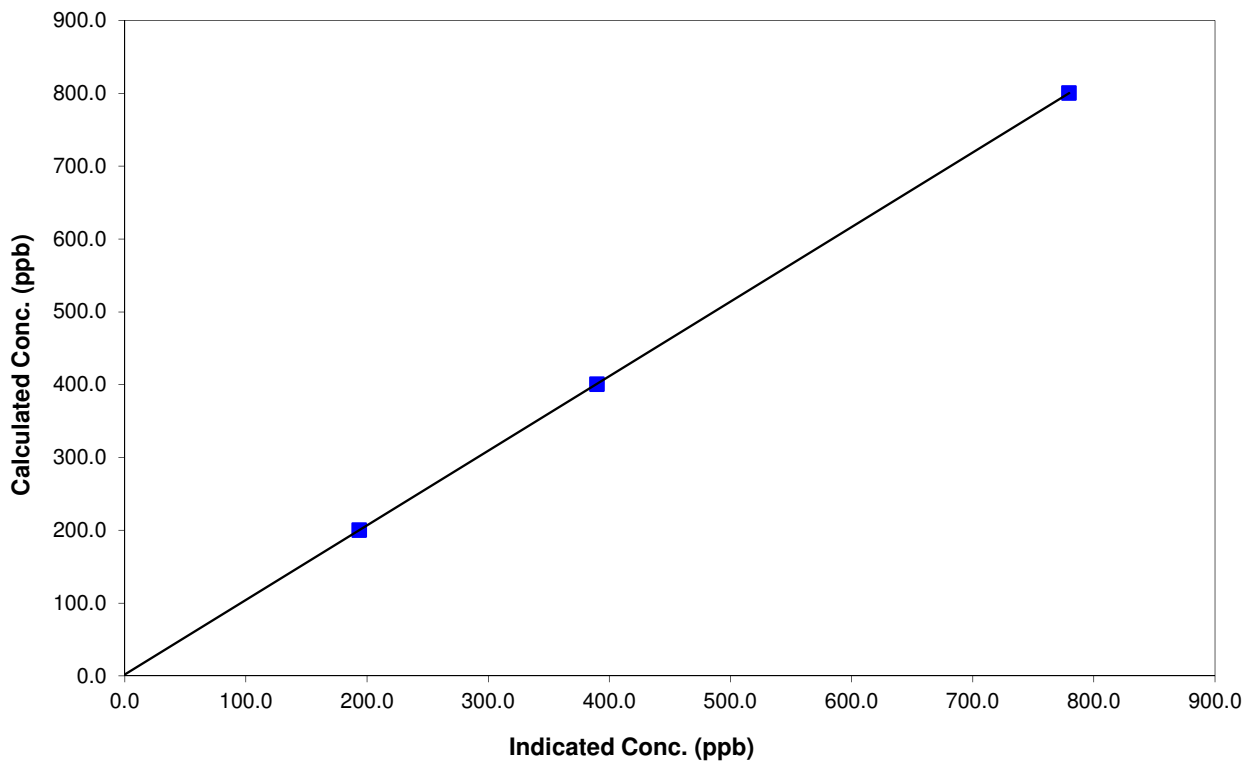
Station Information

Calibration Date	July 29, 2014	Previous Calibration	July 10, 2014
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	7:40	End Time (MST)	10:30
Analyzer make	API T200	Analyzer serial #	721

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.8	N/A	Correlation Coefficient	1.000000
800.7	779.5	1.0273		
400.9	389.8	1.0285	Slope	1.024764
200.4	193.6	1.0352		
0.0	-1.8	0.0000	Intercept	1.824142

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

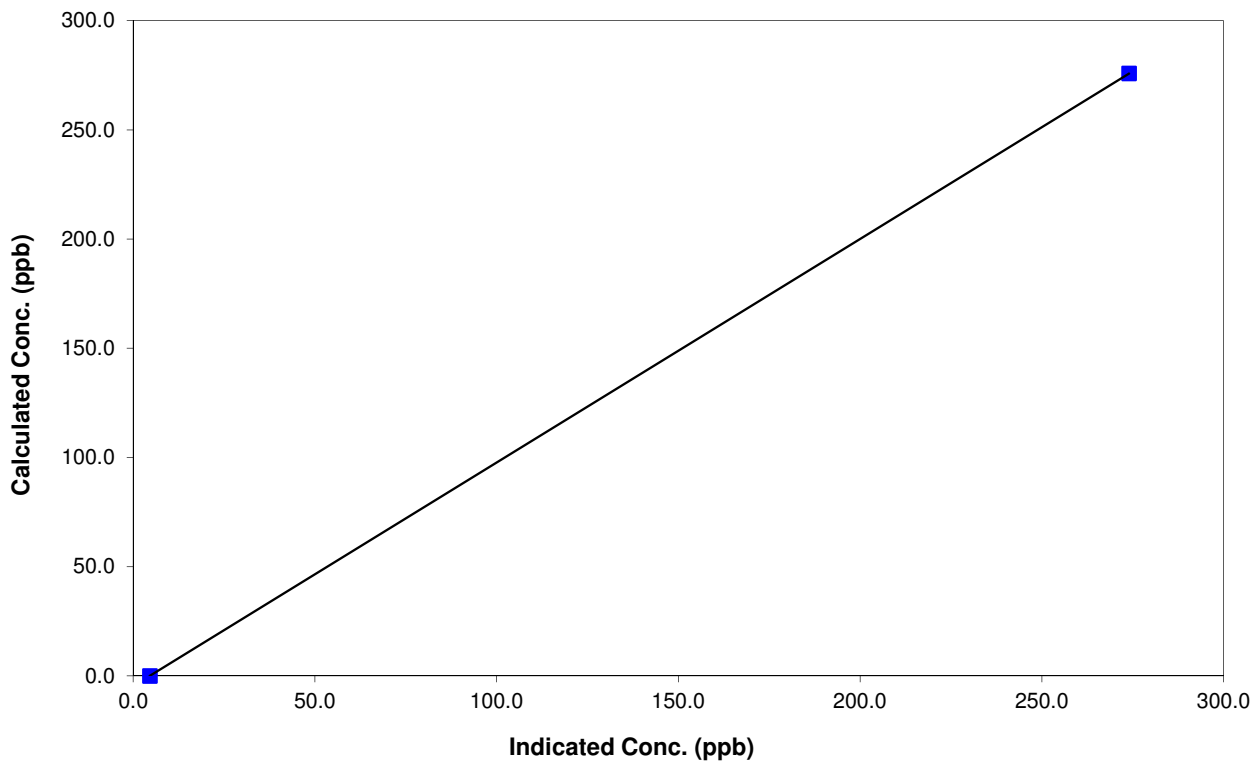
Station Information

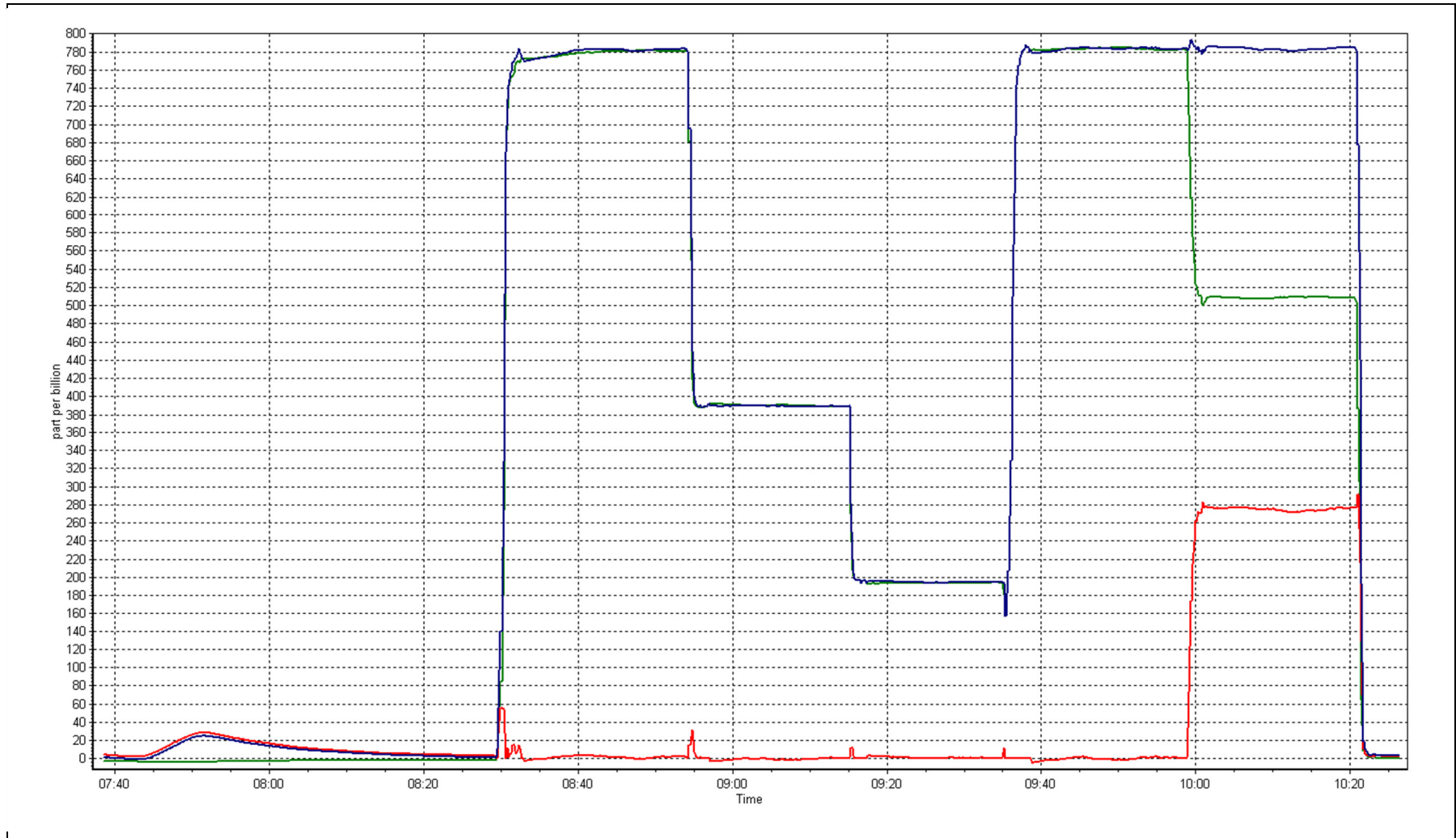
Calibration Date	July 29, 2014	Previous Calibration	July 10, 2014
Station Number	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	7:40	End Time (MST)	10:30
Analyzer make	API T200	Analyzer serial #	721

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	4.6	N/A	Correlation Coefficient	1.000000
275.8	274.0	1.0066		
			Slope	1.023756
			Intercept	-4.709280

NO₂ Calibration Curve







Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date	July 29, 2014	Previous Calibration	
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Install		
Start Time (MST)	13:20	End Time (MST)	16:56
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	API T700	Serial Number	622
NO Cal Gas Conc	52.2 ppm	Cal Gas Expiry Date	May 29, 2014
NO _x Cal Gas Conc	52.2 ppm	Cal Gas Serial #	LL110503

DACs Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882
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Parameter		NO _x	NO	NO ₂
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope			
	Data Offset			
After	Data Slope	0.996448	0.995315	0.990519
	Data Offset	-1.149937	-1.241764	3.409672
Channel #		TCP/IP	TCP/IP	TCP/IP
Voltage Range				

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356
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Test Point	before		after	
Concentration range		ppb	1000	ppb
NO coefficient		ppb	0.793	ppb
NO _x coefficient		ppb	0.997	ppb
NO ₂ coefficient		ppb	1.000	ppb
NO bkgnd			29.4	
NO _x bkgnd			30.2	
HVPS			-940.900	
Chamber Temp		Deg C	50.6	Deg C
Moly Temp		Deg C	322.1	Deg C
PMT Temp		Deg C	6.7	Deg C
O ₃ flow		ccm		ccm
Chamber Press		mmHg	197.5	mmHg
Sample Flow		ccm	0.535	ccm

Notes:

Installation Cal. Adjusted HVPS, zero and span.



Wood Buffalo Environmental Association

NO_x-NO-NO₂ Calibration Report

Station Information

Calibration Date:

July 29, 2014

Station Number:

AMS 502

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0					
as found span	5000	76.7	800.7	800.7	0.0					
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	0.2	-0.6	N/A	N/A
high point	5000	76.7	800.7	800.7	0.0	801.8	803.7	-2.0	0.9986	0.9963
second point	5000	38.4	400.9	400.9	0.0	408.9	408.0	1.0	0.9804	0.9826
third point	5000	19.2	200.4	200.4	0.0	202.9	202.8	0.0	0.9882	0.9882
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	0.2	-0.6	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	2.1	3.0	-0.9	N/A	N/A
as left span	6000	92.0	800.4	516.2	284.2	814.0	522.7	291.3	0.9833	0.9876
Average Correction Factor									0.9891	0.9891

Corrected As found

NO_x=

NA

NO=

NA

Percent Change

NO_x=

N/A

NO=

N/A

Previous Response

NO_x=

NA

NO=

NA

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

76.70

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			-0.6			N/A	
1st NO ₂ (300)	N/A	516.2	285.9	804.5	516.2	288.3	0.9803	1.0000	0.9916	100.8%
2nd NO ₂ (200)	N/A	601.7	200.5	797.6	601.7	196.0	0.9887	1.0000	1.0230	97.8%
3rd NO ₂ (100)	N/A	692.0	110.1	796.5	692.0	104.7	0.9901	1.0000	1.0517	95.1%
4th NO ₂ (0)	802.1	N/A	-0.3	801.8	802.1	-0.3	0.9836	1.0000	N/A	N/A
Average Correction Factor							0.9857	1.0000	1.0221	97.9%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

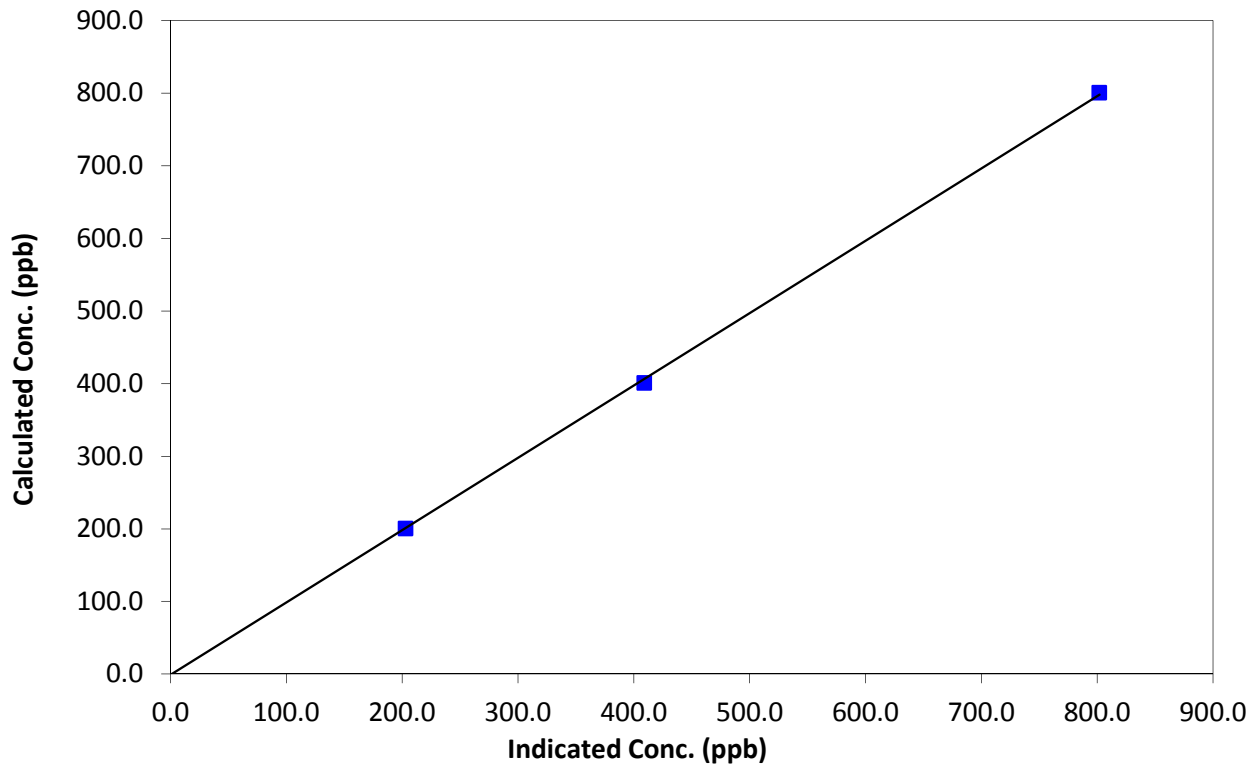
Station Information

Calibration Date	July 29, 2014	Previous Calibration	
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	13:20	End Time (MST)	16:56
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999904
800.7	801.8	0.9986		
400.9	408.9	0.9804	Slope	0.996448
200.4	202.9	0.9882		
0.0	-0.4	0.0000	Intercept	-1.149937

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

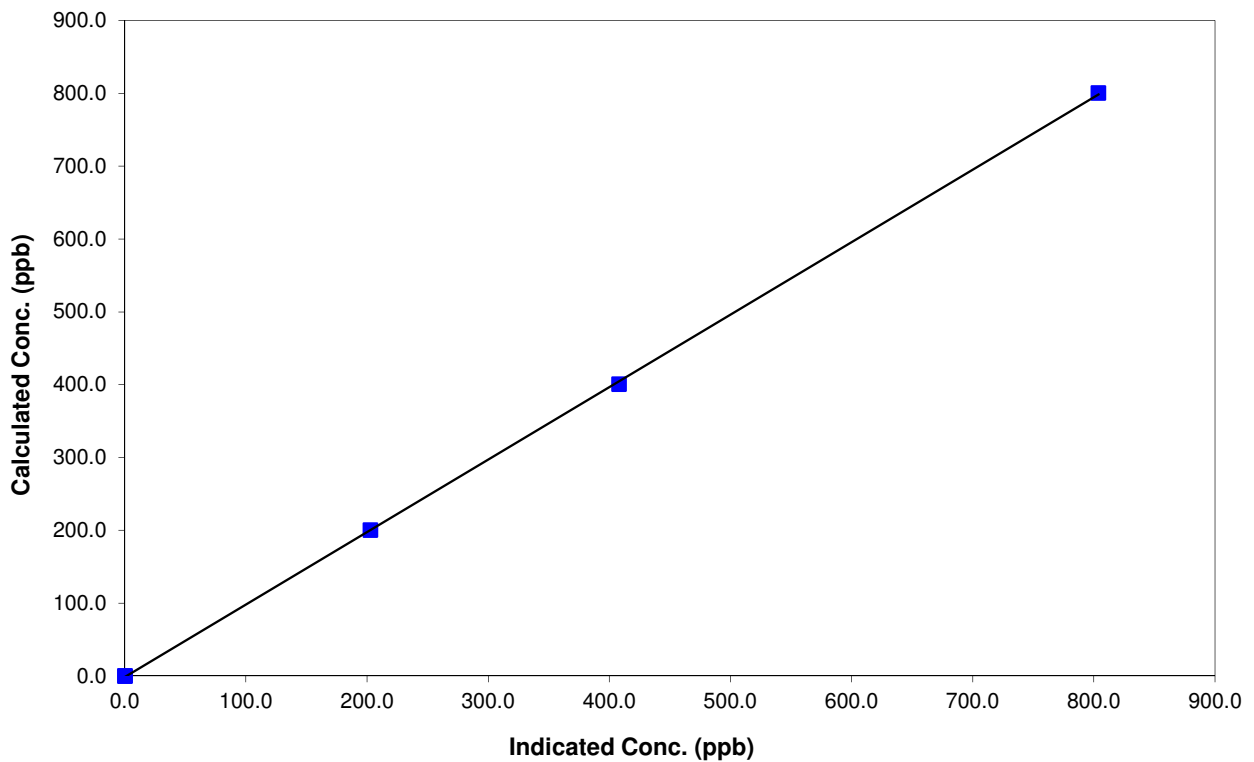
Station Information

Calibration Date	July 29, 2014	Previous Calibration	
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	13:20	End Time (MST)	16:56
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999951
800.7	803.7	0.9963		
400.9	408.0	0.9826	Slope	0.995315
200.4	202.8	0.9882		
0.0	0.2	0.0000	Intercept	-1.241764

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

Station Information

Calibration Date	July 29, 2014	Previous Calibration	
Station Number	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	13:20	End Time (MST)	16:56
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.6	N/A	Correlation Coefficient	0.999217
285.9	288.3	0.9916		
200.5	196.0	1.0230	Slope	0.990519
110.1	104.7	1.0517		
			Intercept	3.409672

NO₂ Calibration Curve

